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摘要

數位電視條件接取系統（CA, Conditional Access）為數位電視節目加值、收費的管制中樞。各國制訂 CA 政策目標及精神不外：一、建立在公平、合理、非歧視的基礎上；二、維持產業競爭機制；三、鼓勵創新及投資；四、保障消費者權益。比較參考各國 CA 政策（包括英國、美國、日本、新加坡、加拿大、德國、法國、澳洲、中國大陸等國），分析各類數位電視的 CA 標準技術，CA 標準政策架構為：一、CA 營運頭端採用符合 CA Simulcrypt 標準，CA 頭端可以同時使用多個 CA 系統技術，以保障 CA 頭端營運業者權益，及維持 CA 系統技術業者競爭機制。二、CA 頭端營運業者、消費者端器材製造業者採用 Multicrypt CA 機制：CA 頭端業者在公平、合理、非歧視的基礎下將技術（CA 的 industrial IPR）授權給消費者端器材製造商，使設備製造商能得到多個 CA 技術授權以製造接收多個 CA 的接收機；消費者可以省去購買多個不同 CA 接收機上的資源浪費。三、在數位電視機、機上盒消費者端器材製造上採用 CA 模組之分離式設計（CA 模組與機上盒之間的分離式共通介面），以保障消費者所在公開市場購買數位電視機、機上盒，能以此共通介面 CA 模組接取選擇付費數位電視應用服務。本研究提出三項不同管理度 CA 標準政策候選方案：（1）市場完全開放政策；（2）制訂開放模組介面政策；（3）制訂 SimulCrypt 政策。透過訪談、公開座談會等與國內產政學研各界（包括廣播業者、接收設備製造商、政府與學術研究單位）意見溝通交流，分析評估研提適合我國國情可行方案。本研究建議制訂開放模組介面政策，並由政府主導成立產政學研各界所組成的工作小組，共同探討開放模組政策的範疇、時程、規範相關議題，以達到確保消費者權益，廣播業者與接收設備製造商能有公平競爭之環境發展，進而達到產業發展整體效益最大化目標。

ABSTRACT

Digital TV conditional access system is the core of the development for paid, and value-added digital programs. The goals of DTV conditional access standard policy are: 1. to establish fair, reasonable, and non-discriminatory regulation foundation; 2. to support and maintain industry competition mechanism, 3. to reward early investment, and innovation; 4. to protect the consumer interest. In comparison of the CA policy and CA standards worldwide, including United Kingdom, United States, Japan, Singapore, Canada, German, etc, the structures of CA standard policy are: 1. By adopting Simulcrypt CA standard at the head-end, a CA operator is open to utilize multiple Simulcrypt CA systems. It protects in the interest of the CA operators, and hence provide a competitive mechanism for CA technology providers..2. CA operators and consumer electronics manufacturers are to adopt Multicrypt CA mechanism: the regulation should require that CA industrial IPRs are licensed to the DTV receiver/STB manufacturer on a fair, reasonable, non-discriminatory basis. It enables the consumer electronics manufacturers to produce DTV receivers/STB capable of decoding multiple CA used, and hence provides a cost effective product solution for consumers to receive multiple CA controlled DTV services. 3. DTV receiver, STB manufacturers to adopt a DTV CA common interface standard on the respective products to accept a separate CA module: It protects the consumers for the DTV receiver/STB acquired from retail market to allow independent selection of DTV services and further enhancement possibility. With the CA standard and policy considerations, 3 policy candidates are proposed: 1. Total open policy; 2. Separate access module via common interface policy; 3. Simulcrypt policy. Public discussion meetings, individual interviews were held with the representatives of the TV broadcasters, TV manufacturers, set-top-box manufacturers, cable operators, regulators, academia, research institutions. This study concludes to recommend adoption of the Separate access module via common interface policy. It is further recommended that under guidance of government, a committee is to be formed of representatives from industry, government, academia, research institutions and to work on the details of the implementation scope, schedule, and specification. On the verge to launch digital terrestrial TV broadcast by the end of 2001 in Taiwan, a CA standard policy in the consumer interest is to provide an environment for development of the industry and safeguard well being of the society.

第 1 章、緒論

1.1 研究背景

依我國政府推動數位地面廣播電視之時程規劃，我國數位地面廣播電視已於民國八十九年中開始試播，並預計將於今年（民國九十年）底在全台廣播。順應全球蓬勃發展的網際網路資訊傳播風潮，未來數位電視除了影像和語音之外，更包括了同時傳輸數據資訊的功能。數位電視開啟了各種數位資訊、互動服務、或商務的機會。電視廣播節目業者及系統業者在節目播送前利用頭端數位設備加密處理，可有效管理用戶節目收視及服務；用戶端透過廣播業者之授權密碼，始能透過視訊接收轉換器之條件接取機制解密，接收廣播業者提供之節目服務，因此當中的條件接取（Condition Access），將是極為重要的管制中樞。

我國政府目前尚未針對 CA 制定相關之政策規範，但基於上述技術發展趨勢，為配合未來數位電視多元內容服務，以確保條件接取控制能完善運作，進而保障消費者權益，電信總局有必要對 CA 相關技術標準及政策規範之制訂加以研究探討，以俾使業者可茲遵循，消費者亦能獲得最大之權益保障，產業整體發展效益最大。

1.2 研究目標

本研究擬參考國內外 CA 相關技術標準與法規政策，比較應用於數位電視地面廣播、有線電視系統及衛星直播電視的各類條件式接取技術性能與相關產業效益分析之優劣；透過與產政學研公開公平公正協商，擬定建議，以確保消費者權益，並提昇國內數位機上盒、數位電視機等相關視訊產品及 CA 產業技術水準。

因此本研究針對世界主要 CA 技術標準規範、世界各國之 CA 法規政策概況，做進一步的深入研究探討，並對適合我國之 CA 法規及政策提出建議方案，供我國政府在制訂相關政策時之參考，以期達到下列目的：

- (1) 確保消費者權益
- (2) 廣播業者與接收設備製造商能有公平競爭之環境與營運空間
- (3) 達到產業發展整體效益最大化

1.3 研究項目

- (1) 完成「世界各國政府對數位電視條件式接取(CA)機制之法規及政策研究報告」。(以美規、歐規、日規為軸含至少日本、新加坡、美國、加拿大、英國、德國、法國、澳洲、中國大陸等國家)
- (2) 完成「世界各國數位電視條件式接取(CA)標準評估研究報告」。
- (3) 完成「適合我國環境之數位電視條件式接取(CA)機制之法規及政策研究建議報告」。
- (4) 完成能使我國衛星、有線電視及地面各廣播系統用戶終端數位電視相關產品相容之 CA 標準評估報告及我國 CA 標準政策具體可行建議方案報告。
- (5) 以公平公正公開座談方式凝聚相關各界共識，研定適合我國環境並為有線、地面、衛星各廣播平台及系統通用之「數位電視條件式接取標準建議草案」。

1.4 研究小組成員

類別	姓名	職位	最高學歷	在本計畫中擔任之工作
主持人	朱博湧	教授	博士	數位電視 CA 法規及政策機制
協同研究人員	杭學鳴	教授	博士	數位電視 CA 標準技術
協同研究人員	趙子宏	EMBA 碩士生	博士	數位電視 CA 產業策略
研究助理	張正忠	博士生	碩士	數位電視 CA 標準政策分析、資料整理
研究助理	李梅菁	碩士生	碩士	數位電視 CA 計畫整合管理
研究助理	何浩銘	碩士生	學士	數位電視 CA 標準政策分析、資料整理
研究助理	黃政清	碩士生	學士	數位電視 CA 標準政策分析、資料整理
研究助理	曾馨誼	碩士生	學士	數位電視 CA 標準政策分析、資料整理
專任行政助理	林碧梧	行政助理	學士	行政支援

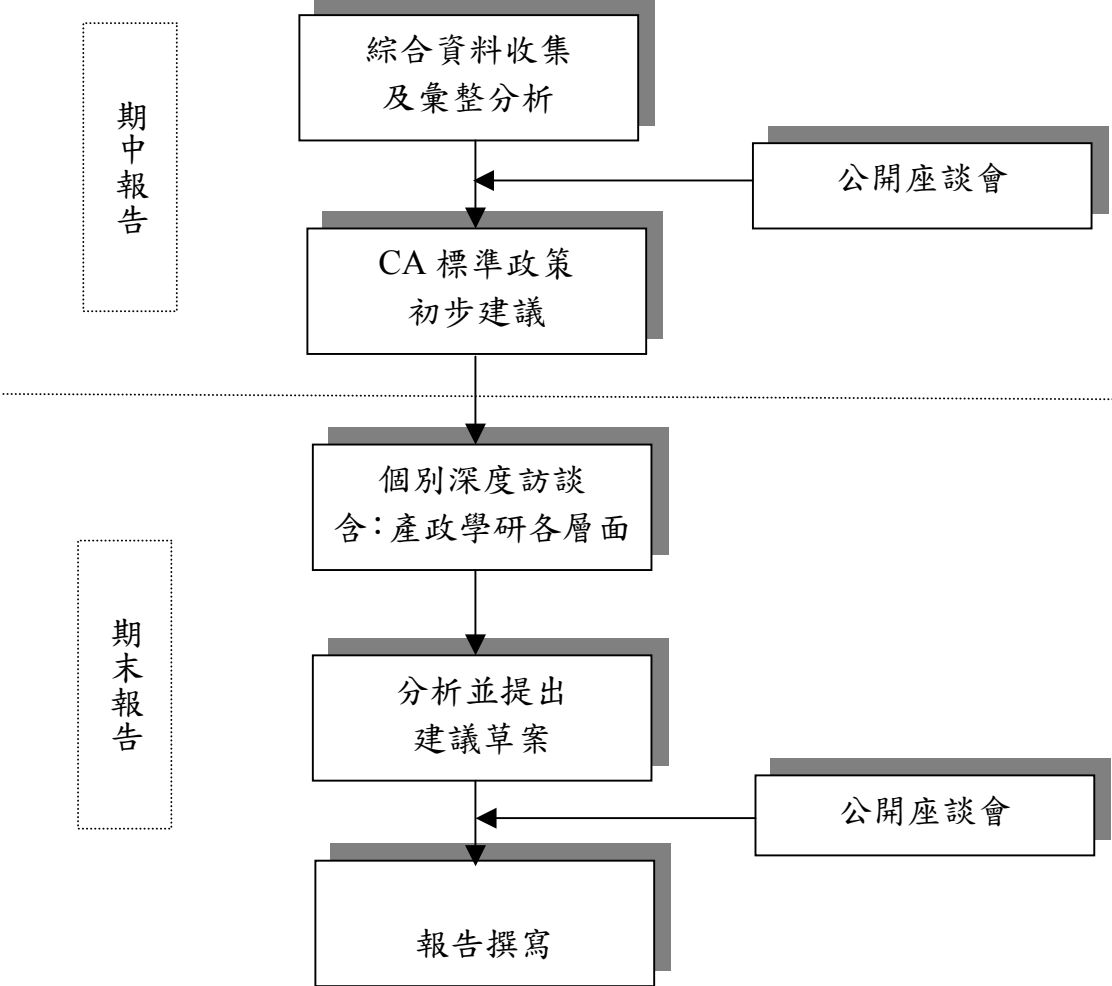
1.5 研究流程

本研究廣泛收集國內外 CA 相關技術標準與法規政策資料，並藉由座談會之方法，邀集我國無線、有線、衛星電視、設備製造商等相關業者，以及相關政府主管單位，作意見交流討論。另外並透過個別訪談法，深度訪問產政學研等各層面主要的執行人員，以了解各相關單位對我國未來 CA 政策制定之建議，並期獲得在我國推行 CA 標準之共識。

最後本研究對適合我國環境的 CA 機制及標準政策提出可行方案之研

究建議，供相關廠商依循，並做為電信總局監理及輔導 CA 機制之參考依據。

圖 1-1 計畫執行流程圖



第 2 章、CA 系統基本原理

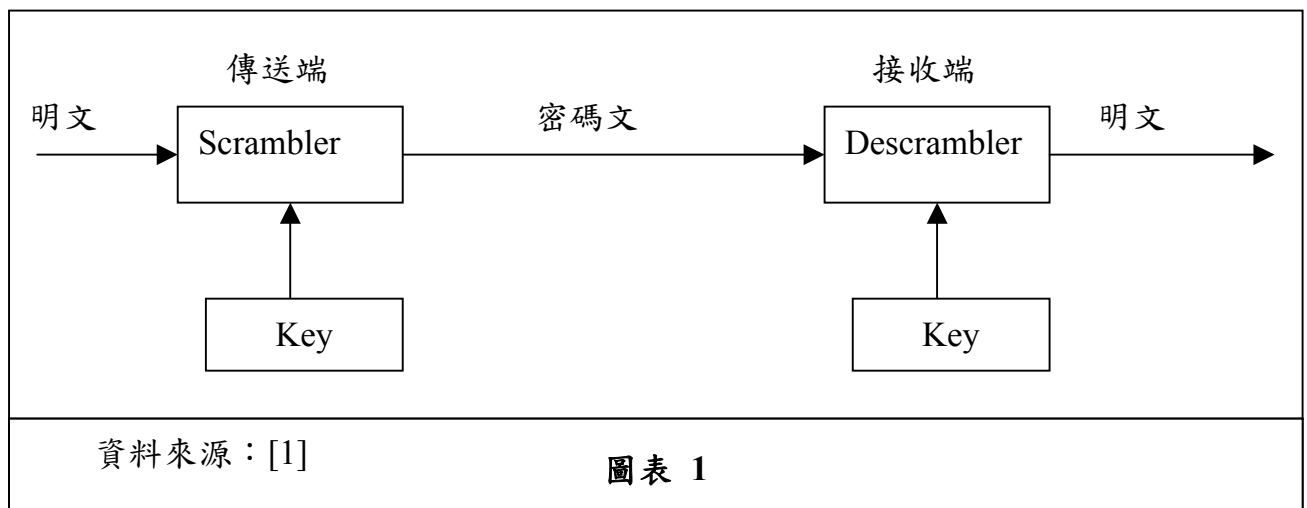
2.1 基本密碼系統理論

2.1.1 一般密碼系統簡介¹

密碼方法是「避免未授權的或非法的行為侵害使用者的資訊、網路資源以及服務」的藝術及科學。透過密碼方法，資訊可以受到保護使其不被未授權或是非法的使用者存取或是竄改。它也可以使用在防止使用者否認其已接受的服務（數位簽章）。密碼方法是提供網路安全及認證的方法。

密碼系統的目的在於建立一個夠堅固的系統可以免於被攻擊，使其能提供安全的通訊。一般常用密碼系統如圖 2-1 所示。

圖 2-1 一般密碼系統



¹ 參考資料：[1]

密碼系統在傳送端必須要具有 Scrambler，或是稱作擾碼器，另外還需要一個秘密鑰匙 (Key)，或稱作密鑰。擾碼器就像是我們日常生活會用到的喇叭鎖一樣，各個喇叭鎖內部的原理及結構都類似，真正保護的關鍵是在每個喇叭鎖所專屬的鑰匙。密碼系統也一樣，擾碼器通常是公開的，而機密的是密鑰。因此，鑰匙的傳遞就是個重要的問題。由此演變出兩種密碼系統，分別是私密鑰匙系統以及公開鑰匙系統，我們將在下兩節做更詳細的說明。

數位擾碼器依據擾碼演算法將輸入 (明文) 轉變成輸出 (密碼文)。接收端執行傳送端的反運算 (不一定是傳送端擾碼器的反函數)。不管是接收端還是傳送端都需要密鑰作為參數才可以完成的鎖碼或是解碼動作。

2.1.2 擾碼演算法²

將資訊透過一種規律的規則重新排列或組合，或是還加入多餘的不必要的資訊，以使未被授權的或是非法的使用者無法輕易的得到其正確的內容，而被授權者又可以經由某種一定的程序將其還原回來。這種將保護資訊秘密的方法可以稱作擾碼法，其相反的步驟則是解擾碼法。

在數位的系統中，所有的資訊都可以用 0 與 1 的組合表示，所以擾碼法可以用一個 (或一組) 數學函式 (輸入包括明文以及密鑰) 來表示，此種擾碼法亦可稱作擾碼演算法。

擾碼演算法 (Scrambling algorithm) 亦做加密演算法 (Encryption algorithm)；解擾碼演算法 (Descrambling algorithm) 亦做解密演算法 (Decryption algorithm)。

² 註：演算法 (Algorithm)，數學方面的術語，指一種 (或一組) 明確的規則指出如何解決問題。

2.1.3 私密鑰匙系統³

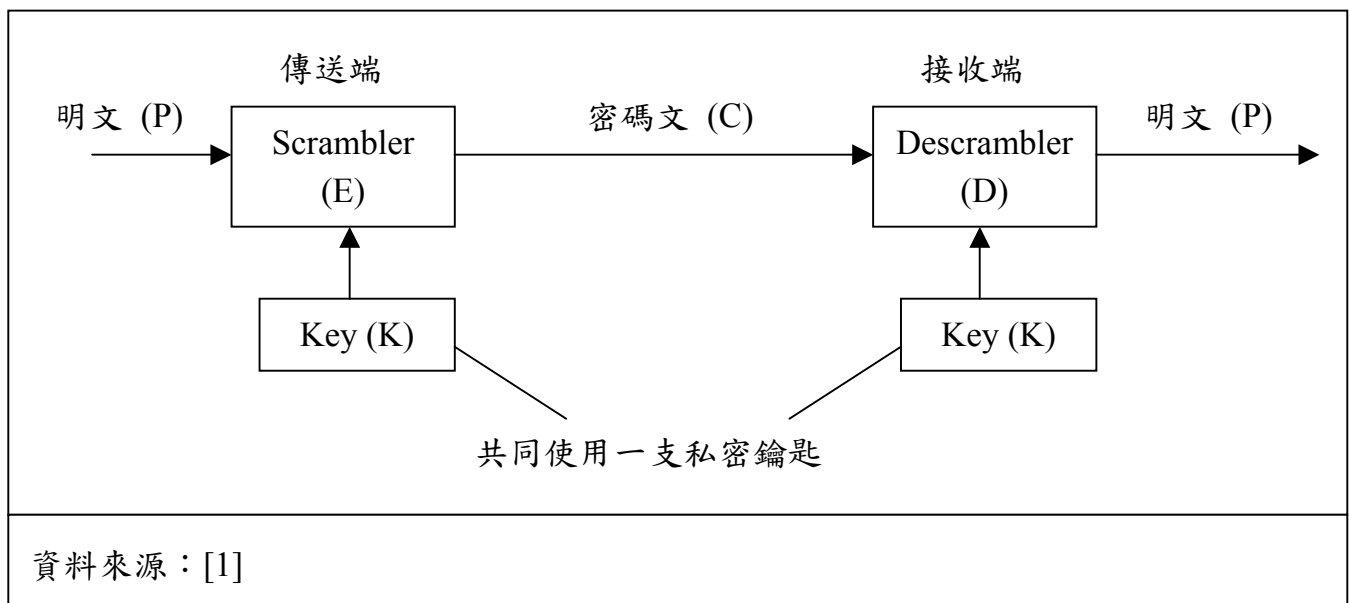
私密鑰匙系統又稱作對稱鑰匙系統，如圖 2-2 所示。私密鑰匙系統在傳送端與接收端共用一支私密鑰匙。其加密 (Encryption) 與解密 (Decryption) 可以用以下的函數表示：

加密： $E(K,P) = C$

解密： $D(K,C) = P$

$E(K,P)$ 是加密函數， $D(K,C)$ 是解密函數， K 是私密鑰匙， C 是密碼文， P 是明文。

圖 2-2 私密鑰匙系統



私密鑰匙系統中的擾碼器與解擾碼器互為反函數，所以在知道擾碼器

³ 參考資料：[1]

的情況下，就可以推論出什麼是解擾碼器。所以未授權者只要竊取到私密鑰匙，就可以完整的解出資料。在電腦運算速度越來越快的今天，如果密碼可能的組合太少（或是說密碼太短）只要用電腦輔助就可以一個一個「試」出密碼（此為窮舉法），所以密碼長度相對來說相當重要。

目前國際上最常用的私密鑰匙系統的標準是 DES (Data Encryption Standard)。它使用的密鑰的長度是 56 位元，有鑒於目前電腦速度越來越快，所以又有許多的變形，像是 Triple DES，就是對同一組資料作三次 DES 加密，其中需要三支密鑰。每支密鑰的長度為 56 位元，加起來就有 168 位元，自然安全性高於 DES。

2.1.4 公開鑰匙系統⁴

公開鑰匙系統的觀念是由 Diffie 及 Hellman 在 1976 年所提出的，又稱不對稱密碼系統，它的特色是在於利用單向函數（一種數學上的函數，本身運算不大複雜，但是其反函數卻很難逆推回來）的特性，使其不需要同一支鑰匙進行編碼與解碼，如圖 2-3 所示。此系統可用以下的函數表示：

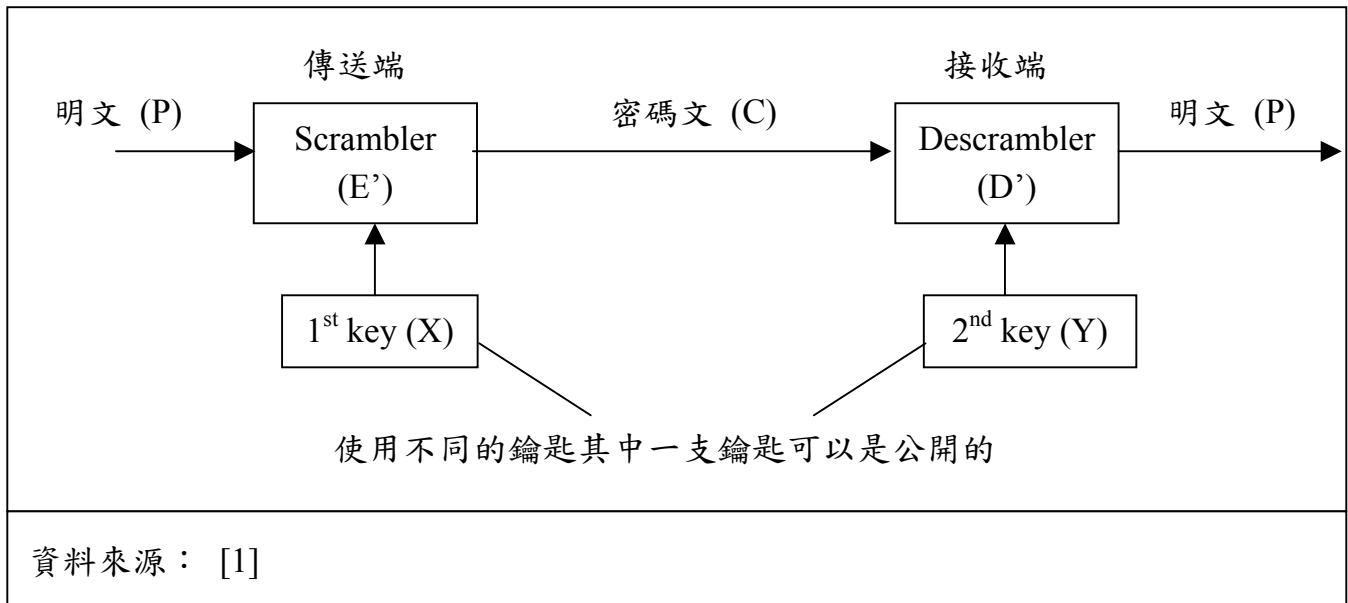
$$\text{加密： } E'(X, P) = C$$

$$\text{解密： } D'(Y, C) = P$$

$E'(X, P)$ 是公開鑰匙加密函數， X 是公開鑰匙， P 是明文， C 是密碼文， $D'(Y, C)$ 是相對的解密函數， Y 是私密鑰匙， X 與 Y 是不同的。

⁴ 參考資料：[1][2]

圖 2-3 公開鑰匙系統



由於公開鑰匙系統在加密及解密的部分使用不同的鑰匙，所以鑰匙傳遞的問題就不會發生，因為傳送端無須告知接收端其加密時所用的鑰匙，只要接收端知道傳送端用哪一支公開鑰匙加密，即使未授權的使用者竊取到了該公開鑰匙，他仍然很難猜出私密鑰匙。同樣的，為增加猜出密碼的困難度，仍然需要一組夠長的數字做為鑰匙。

目前國際上最出名的公開鑰匙系統是 RSA (Rivest-Shamir-Adleman) 公開鑰匙演算法[2]。

另外，與公開鑰匙系統作用類似的演算法，是由 Diffie 及 Hellman 所提出的，稱做 Diffie-Hellman 鑰匙交換技術，此法容許完全透過公開的通道達到交換傳送與接收端的兩把鑰匙，在交換鑰匙後，可由這兩把鑰匙得出一把共同的密鑰，再用私密鑰匙技術來加密[2]。

2.2 MPEG-2 系統介紹⁵

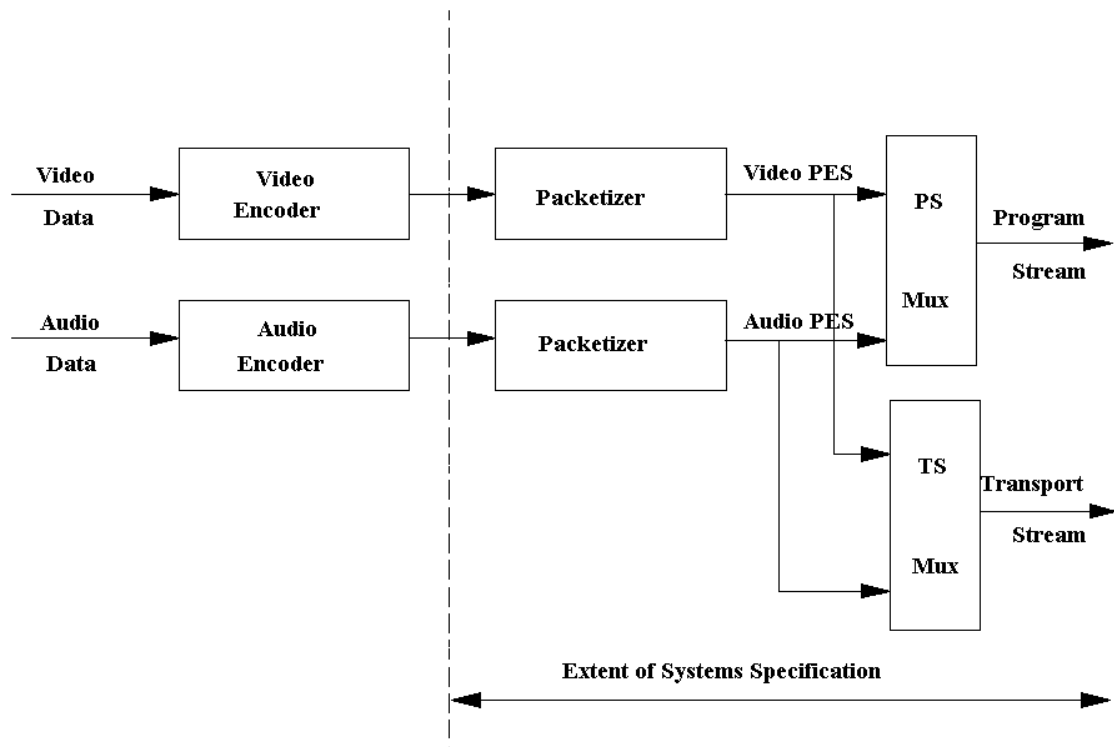
2.2.1 MPEG-2 系統

MPEG (Moving Picture Expert Group，動態影像壓縮專家群) 成立於 1988 年，是 ISO/IEC 下的一個工作小組，負責發展數位影音資訊的壓縮標準。目前該小組已經完成 MPEG-1 (Video CD 以及 MP3 的壓縮標準)、MPEG-2 (數位電視及 DVD 的標準)、MPEG-4 (適用於行動接收以及網路的多媒體壓縮標準)；正在進行之中的有 MPEG-7 (多媒體內容描述介面)、MPEG-21 (多媒體架構)。

MPEG-2 System 界定如何結合多個 elementary stream 使其成為一個單一的串流以適用於儲存以及傳輸。它明確的定義出了兩種格式，一種是 Program Stream，用於低傳輸錯誤的環境，如 DVD；另一種是 Transport Stream，用於較高傳輸錯誤的環境，如數位電視。其基本模型如下圖 2-4 所示。

⁵ 參考資料：[3]

圖 2-4 MPEG-2 System 模型

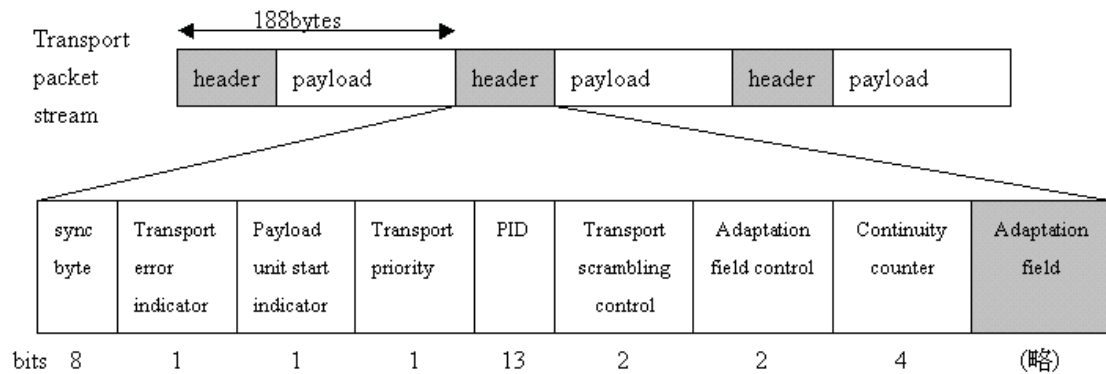


資料來源：[3]

2.2.2 Transport Stream 與 Elementary Stream

Transport Stream (TS) 在數位電視的傳輸上扮演了相當重要的角色。每個 TS 都是固定的長度 188 bytes，這樣可以避免當傳輸發生錯誤時的錯誤傳遞使得全部的節目都無法解壓縮。TS 的語法如下圖 2-5 所示：

圖 2-5 Transport Stream 語法



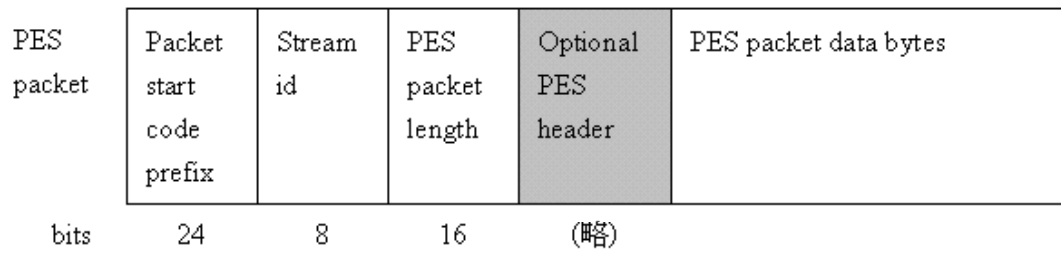
資料來源：[3]

Elementary Stream 為 video/audio 經過 video/audio encoder 後所產生的資料串。將 Elementary Stream 經過 packetizer 後，就是 Packetized Elementary Stream (PES)。TS 與 PES 的關係請參考圖 2-4。PES 再經過 MUX (Multiplexer，多工器) 就是 TS。PES 可以傳送一般數位影音資料外，還可以傳送與 CA 有關的 ECM 及 EMM (將在下一小節介紹)。

2.2.3 ECM 與 EMM

ECM (Entitlement Control Message)與 EMM (Entitlement Management Message)都是位於 PES 內的資料串流 (stream)。PES 封包的語法如圖 2-6 所示，當 stream id 等於 “1111 0000” 時，此 stream 為 ECM stream；當 stream id 等於 “1111 0001” 時，此 stream 為 EMM stream。由於 ECM 及 EMM 都是屬於密碼系統的資訊，基於密碼系統高機密的特性，所以 MPEG 在這方面只設計了其架構中所需的格式，卻不對於其內容做更詳盡的界定，細節留給各 CA 技術業者依其需求自行設計。

圖 2-6 PES 封包語法



資料來源：[3]

MPEG 提供了一套參考的 CA 操作方法，詳細的內容會在 2.3.2 中說明。這套方法雖然不是標準中所規定，但卻廣泛的被各 CA 技術業者採用。

2.3 CA 系統

2.3.1 何謂 CA 系統

數位視訊除了提供免費的電視廣播服務之外，還可以提供付費收視的服務。為了保護消費者及業者的權益，使其提供之付費電視節目不會被盜看，就必須要有條件接收 (CA, Conditional Access) 系統，負責解擾碼、授權與認證功能。CA 除了可以作為付費電視收費的工具外，還可以提供電子商務及其他個人化的加值服務。

CA 系統基本上就是一個密碼系統，其基本架構為 MPEG-2 System，目前世界上多由專業的 CA 公司提供這方面的技術。

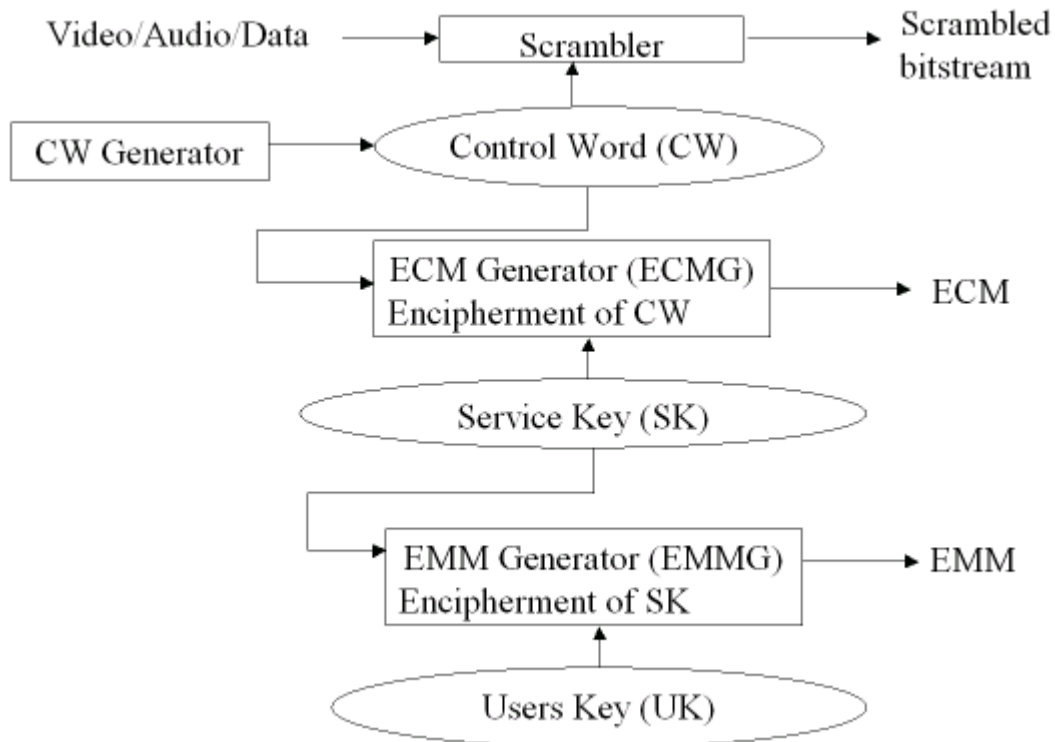
2.3.2 一般 CA 系統的操作方法⁶

MPEG-2 系統在 CA 方面設計了其架構上的元件，將其細節留給 CA 技術業者去發揮，但是仍然提供了一套非標準化的操作方法給 CA 技術業者參考，目前被廣泛的採用著。

這個操作方法是利用階層式鑰匙的設計，頻繁地更換鑰匙來達到密碼系統的穩固。其系統架構如下圖 2-7，系統中有三把密鑰，各在不同的層次，分別為 Control Word (CW)、Service Key (SK) 與 Users Key (UK) (Service Key、Users Key 的名稱並非一定，亦有人稱為 Authorization Key 及 Distribution Key。其功能相近，名稱不同而已)。

⁶ 參考資料：[4][5]

圖 2-7 MPEG-2 System 下之加密系統架構



資料來源：[4][5]

首先，由 MUX (Multiplexer，多工器) 出來的 MPEG-2 bitstream，裡面攜帶著壓縮過的視訊、音訊、以及其他的數據資料，經過擾碼器，用控制字元 (Control Word, CW) 密鑰加密傳送出去，負責產生 CW 的是 CWG (CW Generator)。由於 MPEG-2 bitstream 資料量相當龐大，若使用複雜的擾碼演算法或是過長的密鑰，其硬體的要求非常高。因此目前使用較簡單的擾碼器，但是頻繁更動 CW 來避免竊取者取得 CW 來破解此系統。CW 的更動週期大約是在數秒鐘之內，竊取者即使用超級電腦試出 CW，卻也因為它迅速的變換而失去用處。

頻繁變動的 CW 本身需要一個夠安全的方式將其傳送給使用者，通常都是將 CW 放在 ECM 中廣播出去，所以 ECM 的內容也必須要經過加密，

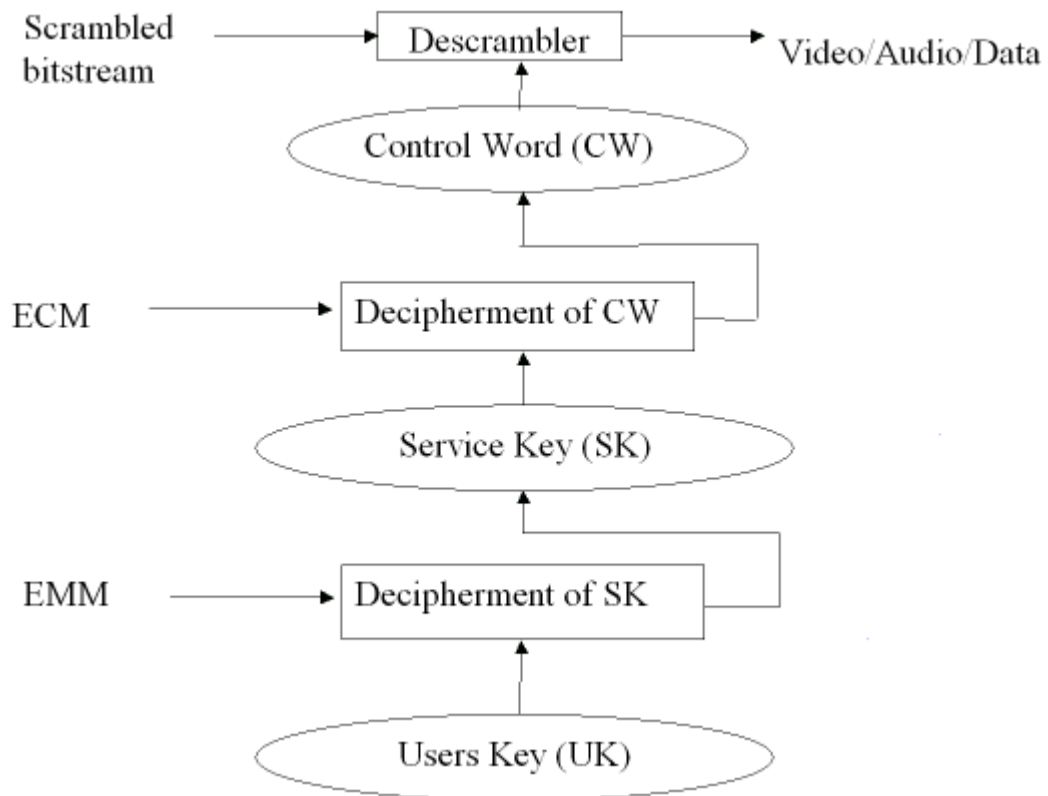
否則竊取者只要靠著分析出 ECM 就可以破解這個系統。負責產生 ECM 的叫做 ECM Generator (ECMG)，它本身也是一個擾碼器。加密 ECM 所使用的密鑰是服務鑰匙 (Service Key, SK)。

同樣的，加密 ECM 所用的密鑰 SK 放在 EMM 中傳送出去，EMM 用使用者鑰匙 (Users Key, UK) 加密，UK 可以放置在 Smart Card 中，也可以放在 STB 或是 PCMCIA 模組上，使用者在得到授權後通常長期持有而不改變，除非是更換 Smart Card 或 STB 或是 PCMCIA 模組。

ECMG 以及 EMMG 由於數據量不很高，所以可以用比較複雜的加密方法以及較長的密鑰來保護其安全。

接收端的架構如圖 2-8 所示，大致上就是將加密步驟的相反。系統已經持有 UK，藉由 UK 解出 SK，再解出 CW，接收端就可依此解碼得到明文的訊號。

圖 2-8 MPEG-2 System 下之解密系統架構



資料來源：[4][5]

在這個階層架構中，由下而上是 UK->SK->CW。越下層的密鑰越為重要，竊取者竊取了 CW，只能使用幾秒鐘，所以不會有人這麼做。竊取到了 SK，可以使用比較久，但是只要頭端業者常常更換 SK (約莫一個月一次)，竊取者就必須再重需破解一次。最危險的部分是在 UK，因為它是不大會更動的。不過 UK 多半放在 Smart Card 中，而 Smart Card 對於如何讀取內部的資料有經過特別的保護，因此這部分的安全是較可信賴的。

ECM 及 EMM 除有 CA 功能之外還可以傳送有關節目的資料，例如標題或是片長等，透過 ECM、EMM 也可以做到諸如 Pay per view 的功能。

2.3.3 頭端業者與 CA 系統

頭端業者，或是說廣播業者，多與國外專業的 CA 技術業者購買整套的 CA 系統，包含頭端與用戶端授權用的 Smart Card。CA 是種軟體工業。CA 的頭端設備，如 ECMG、EMMG 等，都是使用一般的 Server 就可以建構起來的。ECMG、EMMG 與 MUX 間的介面是採用網路協定。

圖 2-9 頭端設備關係示意圖

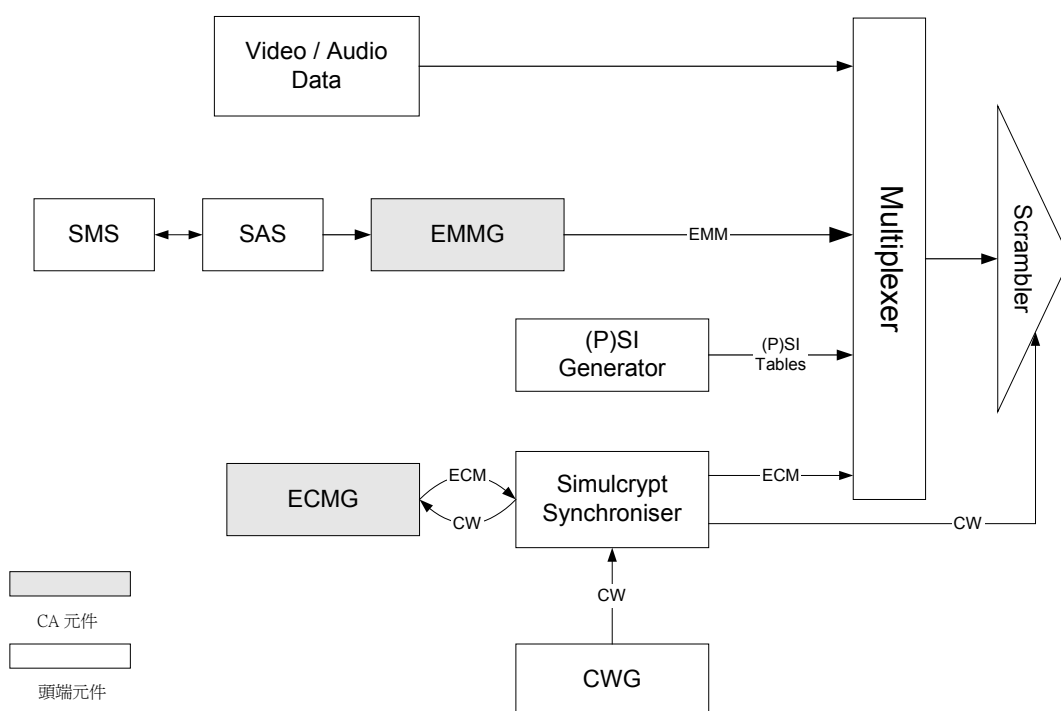


圖 2-9 是數位電視頭端系統的示意圖。為簡化起見，某些亦屬於頭端系統的元件在圖 2-9 中被省略掉，如 PDG (Personal Data Generator，個人資料產生器)。圖中同步加密同步器 (Simulcrypt Synchroniser, SCS) 是為了同步加密 (Simulcrypt) 所設置的，若在不需要同步加密的系統上，SCS 並非必要的，關於同步加密的細節部分會在 2.3.5 中介紹。

(P)SI Generator (SI, Service Information) 負責產生服務資料或是個人服務資料[13]。SMS (Subscriber Management System, 訂閱戶管理系統) 負責管理用戶的資料, 如姓名、地址、授權編號 (通常亦存在 Smart Card 中)、訂閱的頻道以及繳費狀況等資料。SMS 依照用戶的訂閱情形, 要求 SAS (Subscriber Authorization System, 訂閱戶授權系統) 送出授權碼給 EMMG, EMMG 再產生 EMM 給特定的用戶。SAS 接收到的是用戶的授權編號, 並不會得到用戶私人的資料, 以確保個人資料不被外洩。

頭端業者通常需要付給 CA 技術業者系統建置費以及依客戶數量所需要發出的 Smart Card 的費用。

2.3.4 用戶端設備與 CA 關係

用戶端與 CA 系統有關的部分為機上盒 (Set top box, STB) 及其授權所用的 Smart Card。雖然在國際上各大標準都沒有把 Smart Card 列作為必須, 但是各大 CA 公司多使用 Smart Card 作為其授權認證的重要依據, 這是因為 Smart Card 的安全性比較可靠以及成本較為低廉所致。

一般而言, STB 製作廠商必須要向 CA 技術公司取得其技術授權, 需支付權利金, 才可以製作相容於該 CA 的 STB, 除此之外, 每一個 STB 還必須支付該 STB 的授權金。

假如使用 DVB-CI 模組或是 POD 模組的 STB, 則不需支付上述費用 (對製造商而言), 上述費用將會轉到模組上去。

由於目前的 CA 系統已經不只提供付費收視的服務, 還可以提供其他如電子節目表 (Electronic Program Guides, EPG), 家庭銀行 (Home banking)、家庭購物 (Home shopping) 等服務。這些服務需要牽涉到較複雜

的 middle ware 以及 API (Application Interface)，採用 DVB-CI 或是 POD interface 的 STB 恐怕無法提供這方面的加值服務，但是無損其收視的權益。

2.3.5 多家 CA 系統共同操作方法⁷

CA 系統多半是封閉的，高度機密性的，所以不同 CA 系統難以共同操作。有鑑於此，世界上各大標準都有共同操作的規範。共同操作有兩個方案：一為同步加密 (Simulcrypt)，使用在頭端的設備；另一為多重解密 (Multicrypt)，使用在用戶端。以下將個別介紹。

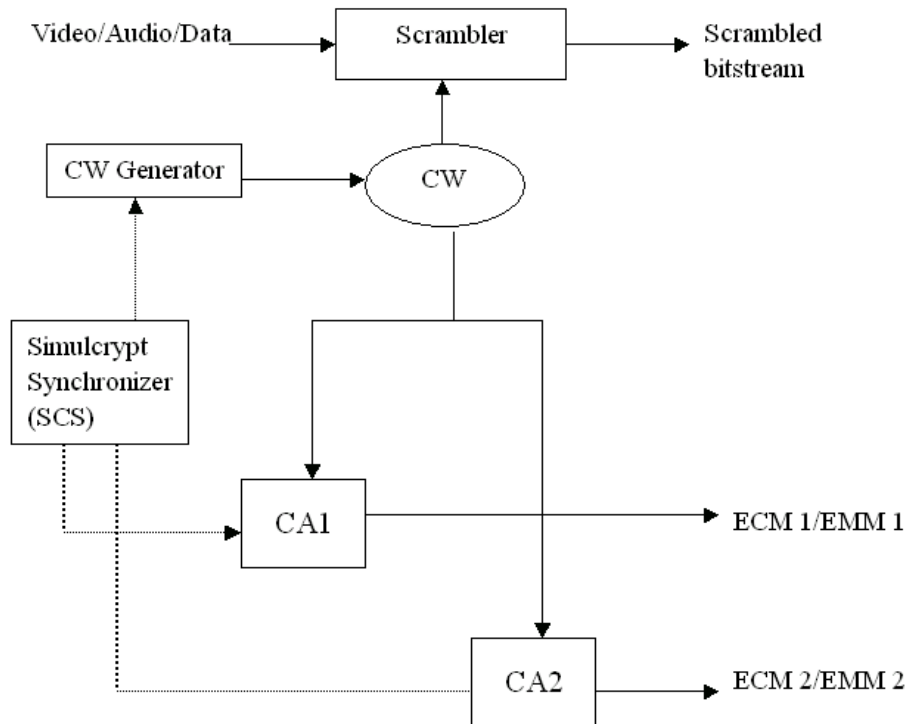
1. 同步加密 (Simulcrypt)

同步加密，是指在頭端的設備可以同時放入多家的 CA 系統。其架構圖如圖 2-10 所示，CA1 與 CA2 必須共用一組的 CW，CW 的產生由 CW Generator (CWG) 負責。CA1、CA2 與 CWG 透過 Simulcrypt Synchronizer (SCS) 的協調來達到同步。每家 CA 業者專屬的部分為 ECM 及 EMM，Scrambler 由頭端業者控制。

如此的好處是當頭端業者在需要更換 CA 技術或是其他原因（例如兩家不同的廣播業者合併，且合併前是採用不同的 CA 技術）時，需要同時採用兩套 CA 技術以俾降低迅速更換系統對用戶端所造成的不便。

⁷ 參考資料：[4][5]

圖 2-10 同步加密系統架構



資料來源：本研究報告

2. 多重解密 (Multicrypt)

多重解密是指接收端可以包含多家 CA 技術。實際上的操作方法可以分做嵌入式以及分離式。嵌入式多重解密是指接收設備內建了多家的 CA 系統，分離式的多重解密則是將安全系統完全與接收設備分離。嵌入式的問題在於 CA 技術業者甚多，要內建多少家才能夠讓此接收設備能夠解所有的 CA 技術。又此做法牽涉到各家 CA 間的相容性以及設備製造業者的成本，所以如此製造的廠商並不多。嵌入式多重解密示意圖請見圖 2-11。

大多數的解決方法傾向於採用安全模組分離的方式，也就是制定開放模組介面，又以採用 PCMCIA 模組的為主，其示意圖請見圖 2-12。因為

PCMCIA 模組為公開的標準，且其在容量以及速度上都足以應付處理像 MPEG-2 stream 這樣龐大資料的解密系統。而 Smart Card 受限於運算能力，只能處理 ECM 及 EMM 這些比較少量的資料，不過大部分的 CA 技術業者都還是會為其 CA 模組 (CA module, CAM) 設計 Smart Card 的插槽來放置授權用的 Smart Card。

它的工作原理，以 PCMCIA 模組為例，是將由 STB 解調變後 MPEG-2 TS 直接送入 PCMCIA 模組。PCMCIA 模組內部具有一 deMUX (demultiplexer, 解多工器)，可以將 ECM 及 EMM 給分離出來，分離出來的 ECM 及 EMM 可以解出 CW。通常 ECM 及 EMM 的解密都是在 Smart Card 內執行。DeMUX 另外的輸出是原本的 MPEG-2 TS，它會被輸入解擾碼器，擾碼器用 Smart Card 輸出的 CW 解密，得到明文的 TS 再送入 STB 內的 MPEG-2 Decoder (解碼器)。

圖 2-11 嵌入式多重解密示意圖

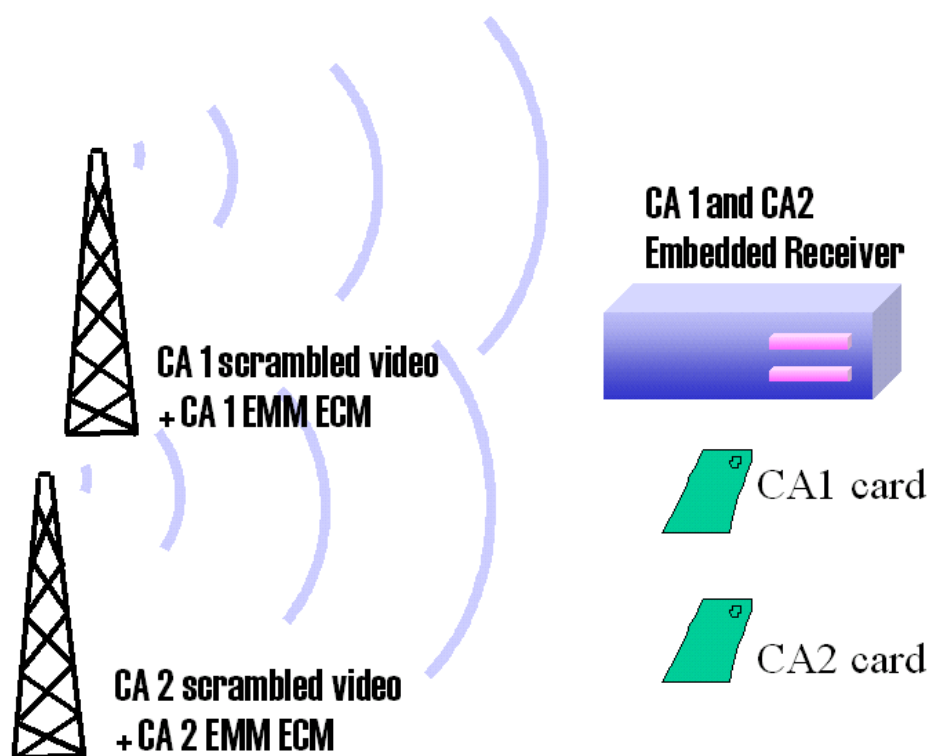
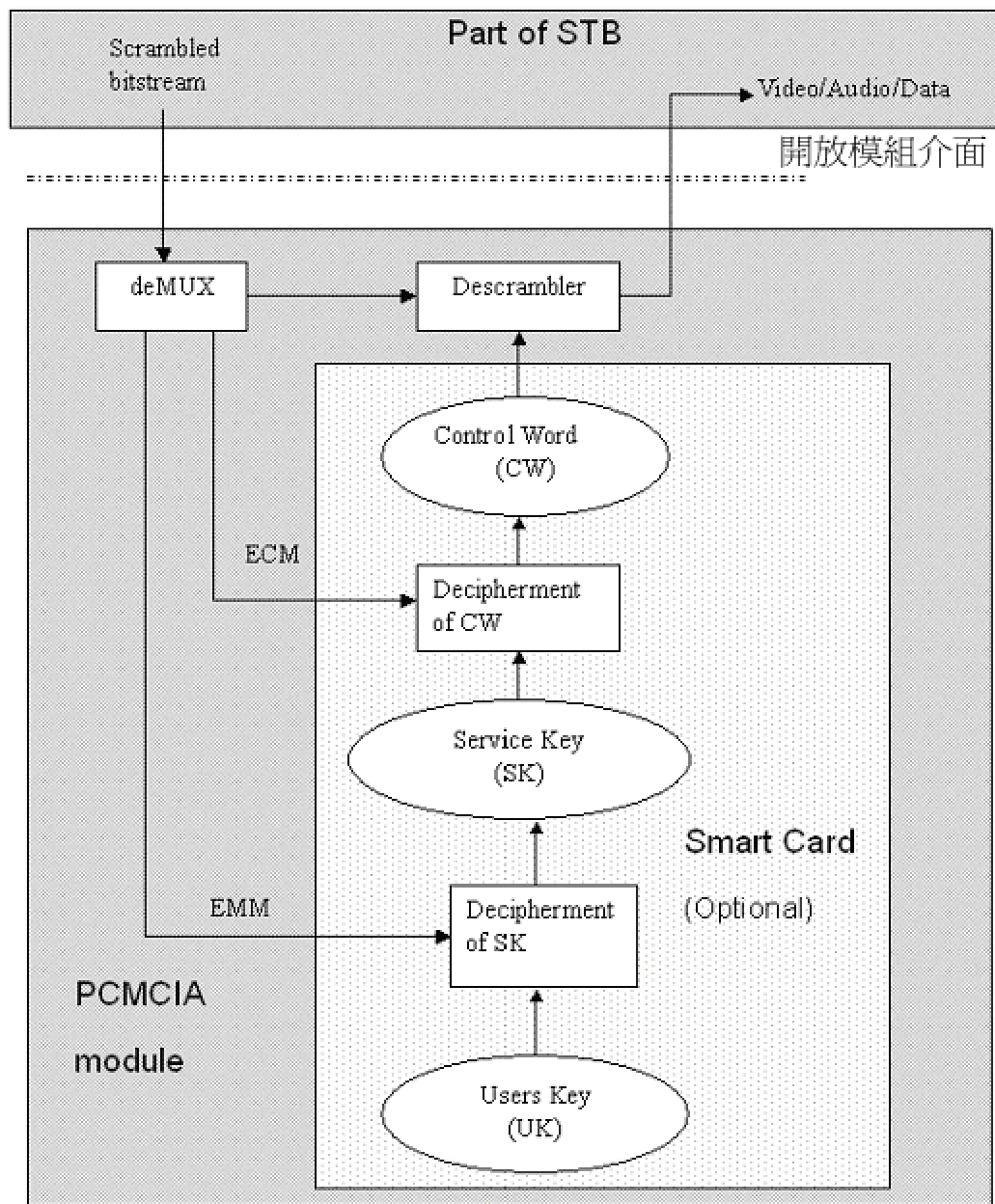


圖 2-12 開放模組介面 (example)



資料來源：本研究報告

第 3 章、世界各先進國家之 CA 標準

目前與數位電視相關標準之發展，主要有由歐洲廣播聯盟 (European Broadcast Union; EBU) 所制定之 DVB (Digital Video Broadcasting)，美國的 ATSC (Advanced Television Systems Committee) 和 OpenCable，以及日本的 ISDB (Integrated Services Digital Broadcasting)。三大標準在視訊訊號方面都是以 MPEG-2 來壓縮，傳送的方式也都是遵循 MPEG-2 System 中所規範。三大標準中以 DVB 技術最為成熟，採用的國家也最多。

3.1 DVB (歐規)

3.1.1 DVB-CSA⁸

DVB-CSA 為 DVB 中的加擾標準，對一般 DVB 應用所設定的擾碼演算法，是設計來盡量減少剽竊攻擊的可能性，因此包含了高度敏感的安全資訊。唯有簽署保密條款(Non Disclosure Agreement - NDA)，可信賴的使用者才能得到擾碼演算法的技術細節。以下的部分僅包含了擾碼方法的摘要以及一些實現的問題。

就傳輸流層 (TS-level) 擾碼而言，擾碼演算法操作於 TS 封包的載體上。PES 封包之 structuring 曾使用相同的擾碼法實現於 PES-level 之上。PES-level 擾碼方法必須做到 PES 封包檔頭不能夠被擾亂 (就像 ISO/IEC 13818-1 [1] 中的要求)，包含部分已擾碼 PES 封包的 TS 封包是不能包含 Adaptation Field (例外：具有 PES 封包結尾的 TS 封包)。已擾碼 PES 封包之檔頭不能包含多個 TS 封包。雖然標準規定可以對 PES 擾亂，但大多數的狀況是對 TS 擾亂。

⁸ 參考資料：[6]

3.1.2 DVB-SIM ⁹

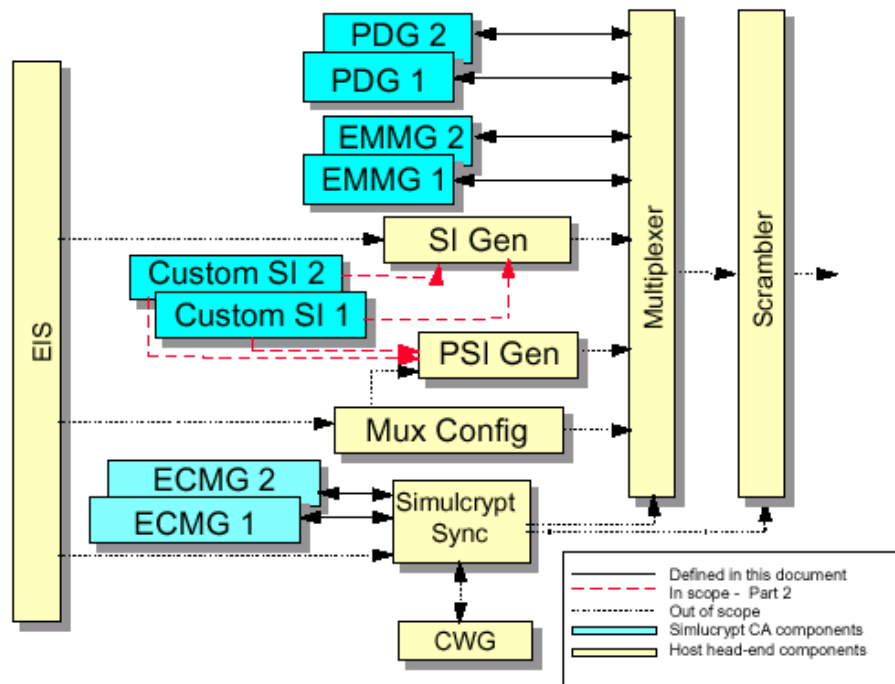
同步加密是指一家廣播業者可以平行地使用數個 CA 系統。由於同步加密需要多家 CA 系統彼此的合作，所以 DVB-SIM 規範了當數個系統一起協同工作的方法以及協定。

數個 CA 系統必須能要共同的操作，所以它們必須共享相同的擾碼運算法，DVB-SIM 訂定了共通的擾碼標準為 DVB-CSA，以及 SCS (Simulcrypt Synchronizer) 來協調數個 CA 系統的 ECMG (ECM Generator) 能夠在相同的時間送出相同的 CW。

圖 3-1 為同步加密架構。DVB-SIM 的規範內容是 CA 組件與頭端組件間的通訊協定，彼此交換資料的格式。藉由共通的資料格式，可以做到同步加密的目的。

⁹參考資料：[7]

圖 3-1 DVB Simulcrypt 架構



資料來源：[7]

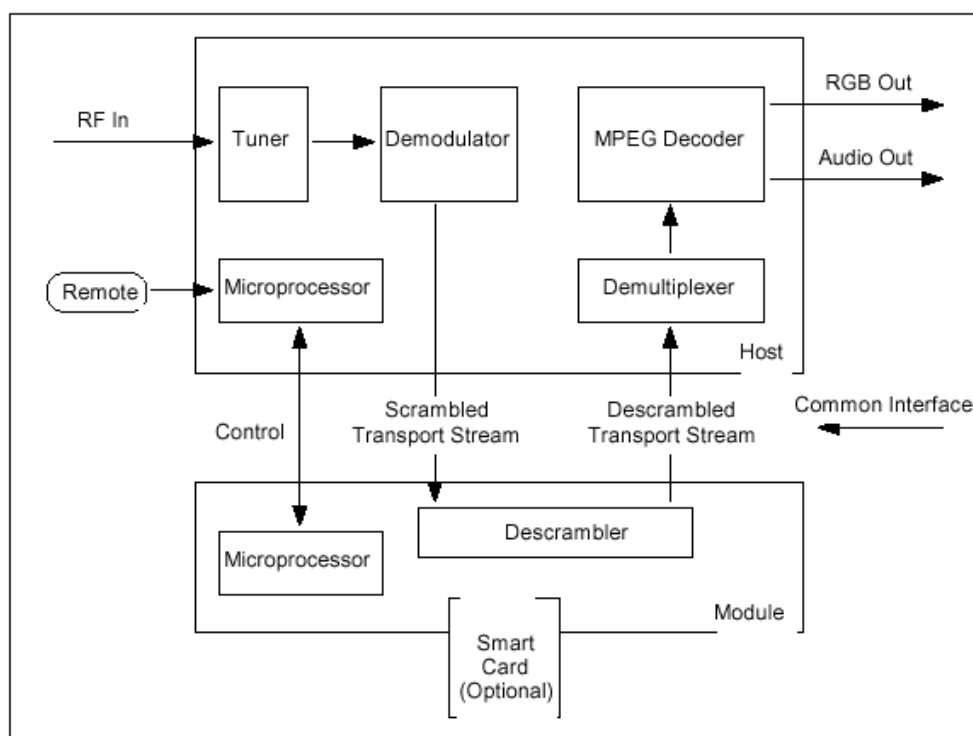
3.1.3 DVB-CI¹⁰

由於 CA 系統是被設計在廣播服務上提供條件接收，所以 CA 系統並不是全然標準化，即使 DVB 已經提出了 DVB-CSA。DVB-CI 訂定了將 CA 模組與機上盒 (STB) 分離的接面標準。它定義了網路多層架構中所需的通訊協定，包括實體層中 CA 模組 (內建於 PCMCIA 卡中) 與 Host (STB) 間的詳細的接腳分配。如此一來，用戶端可以自由的選擇他想要的廣播業者，即使不同的廣播業者採用不同的 CA 系統，不用擔心必須要更換數位電視機或是 STB。

¹⁰ 參考資料：[8]

圖 3-2 為 DVB-CI 的例子，我們可以看出分離的模組與 STB 在數位電視接收設備上的關係。

圖 3-2 DVB-CI 及 NRSS-B 之 CA 模組與 STB 關係示意圖



資料來源：[8][10]

3.2 ATSC (美規)¹¹

ATSC 在 CA 方面大都與 DVB 都相同，它也包含了同步加密的部分，完全與 DVB 相同。ATSC 的開放模組介面為 NRSS-A 或是 NRSS-B。其內容與 DVB-CI 大致相同。其關係圖請見圖 3-2。

¹¹ 參考資料：[9][10]

ATSC 的擾碼演算法使用“ABC EDE Triple DES”模式中所指定的 FIPS 46-2 DES 方式，其密碼長度為 168 個位元，並以 ABC EDE TDES 的方式來使用 Cipher Block Chaining (CBC) 模式。

ATSC 擾碼規定只能操作在 MPEG-2 TS 上，且檔頭不能被擾碼。

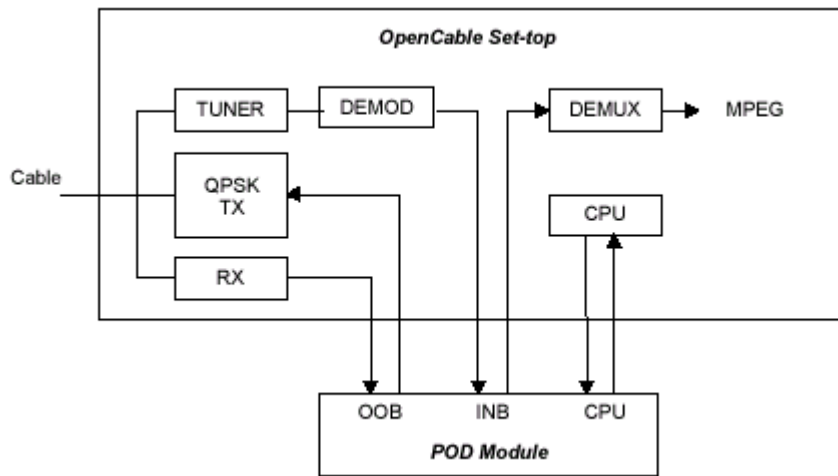
3.3 SCTE OpenCable¹²

POD 是由 CableLabs 所提出的 OpenCable 標準中的一部份。他與 DVB-CI 一樣，也對於 POD-Host (STB) 接面有詳細的定義。POD 模組介面包含

1. PCMCIA Interface (common interface)
2. Inband MPEG-2 TS in/out
3. Bi-directional access to OOB RF front-end
(communication with headend)
4. CPU Interface (Data channel v.s. extended data channel)

¹² 參考資料：[11][12]

圖 3-3 具有雙向網路的 OpenCable 系統



資料來源：[11]

圖 3-3 是具有雙向網路的 OpenCable 系統的例子。基本上它與 NRSS-B 相當類似，但是由於 OpenCable 是有線電視的傳輸標準，所以其回送通道 (Return Channel) 可以直接透過纜線，而不用透過數據機。

POD 特別的地方在於安全防護。由於 DVB-CI 在流出 PCMCIA 模組的部分已經是未擾碼的 TS，所以會有安全上的顧慮，恐怕會被盜拷。POD 對於這方面另外提出解決方法。它對於解碼後的 TS 又再進行一次擾碼，由於 OpenCable 的 STB 是標準化的，所以該次擾碼必須是標準化的。該標準化的擾碼運算法是 DES-ECB [9]。

公開的標準使得此系統的安全性必須靠可靠且夠機密的鑰匙來維持，OpenCable 規定 POD 與 Host 間鑰匙的傳遞採用著名的 Diffie-Hellman 鑰匙交換演算法，來保護鑰匙的機密性。

3.4 ISDB (日規)

日本 ISDB 由於資料難以取得，所以未加入比較表，僅知其修改自 DVB，所以與 DVB 大同小異，但卻不相容。ISDB 其基本架構亦為 MPEG-2，擾碼演算法為 MultiII (ISDB 細節需經授權)。

第 4 章、世界各國之 CA 標準比較與分析

目前與數位電視相關標準之發展，主要是歐洲的 DVB (Digital Video Broadcasting)，美國的 ATSC (Advanced Television Systems Committee) 和 OpenCable，以及日本的 ISDB (Integrated Services Digital Broadcasting)。以下將會針對其標準內容進行比較分析。日本資料由於難以取得，所以未加入比較。標準比較表列於表 4-1。

4.1 數據傳輸協定

MPEG-2 system 是目前所有數位電視 CA 基本架構所採用的標準。

4.2 同步加密與擾碼演算法

同步加密目前只有 DVB 對其細節有詳細的描述，ATSC 標準也建議其同步加密系統中的多工器與擾碼器介面遵從 DVB 的同步加密標準。

擾碼演算法的部分可分兩種情形討論，在有同步加密的情況下，一個共同的擾碼演算法 (Common Scrambling/descrambling Algorithm) 是必要的。但是假如沒有同步加密時，擾碼法通常屬於各業者自己所專有。

現有國際上數位電視 CA 常用的演算法：

1. DVB-CSA
2. 168 bit Triple DES (ATSC 所採用)

由於擾碼法的控制字元 (control word) 或鑰匙 (key) 更動頻繁，這兩者的安全性大致接近。DVB-CSA 須向 ETSI 取得使用權。

4.3 多重解密

多重解密的具體解決方案通常是制定一開放模組介面。這方面的考慮多從 CA 模組分離的角度出發。

現有國際上數位電視 CA 常用的開放模組介面，其優缺點分析比較如下，表列於表 4-2：

1. DVB-CI

DVB-CI 的優點在於歐洲 DTV 系統廣泛採用，大量生產的話其生產成本可能較低。與其它的分離模組介面相比較其技術比較成熟。DVB-CI 為一相容有線、地面、衛星等各廣播系統的標準。

缺點為 DVB-CI 在 PCMCIA 模組至 STB 的訊號為未擾碼的訊號，所以易被盜錄。(註：有業者認為盜錄並不能算是破解 CA 系統，盜錄者在得到節目後要自己將節目廣播出去對業者才會造成巨大的損害。因此有業者建議根本解決為加強智財權相關法規的罰則。)

2. NRSS-A

NRSS-A 是 ATSC 系統中 Smart Card 與 STB 的介面。Smart card 成本比 PCMCIA 便宜。

其缺點為目前使用者較少，技術較不成熟。且我國 DTV 多用 DVB 系統，搭配使用成本可能較高。

3. NRSS-B

NRSS-B 是 ATSC 系統中 PCMCIA module 與 STB 的介面。大致上與 DVB-CI 相同，故優缺點也一樣。但由於我國多用 DVB 系統，搭配使用成本可能較高。

4. Host-POD Interface

POD 的優點在於其輸出 PCMCIA 模組時有再經過一次擾碼，該次擾碼的演算法為公開的演算法，保護不被破解的方法是高度機密的鑰匙傳遞方法 — Diffie-Hellman Key Agreement。經過這一層的保護，可以保護其 MPEG-2 串流(stream)不被盜錄。所以 POD 比 DVB-CI 安全。

POD 目前尚未最終定案，尚無使用業者（指廣播業者）。OpenCable 為有線電視的傳輸標準，Host-POD Interface 的安全設計也特別利用到回送頻道，這樣的設計使得它只能使用在有線電視系統。又 POD 屬於 OpenCable 系統，與 DVB 搭配的成本比較高。

表 4-1 CA 標準表列

項目	DVB	ATSC	OpenCable
A. 基本架構	<p>MPEG-2 system</p> <p>傳輸數據格式:</p> <p>ECM, EMM, CAT, Table_ID, etc.</p> <p>(ETR 289, p.7)</p>	<p>MPEG-2 system</p> <p>傳輸數據格式:</p> <p>ECM, EMM, CAT, Table_ID, etc.</p> <p>(A/70, P.25)</p>	<p>MPEG-2 system</p> <p>傳輸數據格式:</p> <p>ECM, EMM, CAT, Table_ID, etc.</p> <p>(SCTE DVS/313 r.5, p.11)</p>
B. 同步加密	<p>DVB Simulcrypt</p> <p>內容:</p> <p>SimulCrypt Synchronizer (SCS)</p> <p>介面:</p> <p>1. ECM Generator 與 SCS 之間</p> <p>2. EMM Generator 與 Multiplexer 之間</p> <p>3. Private Data Generator 與 Multiplexer 之間</p>	<p>與 DVB Simulcrypt 類似</p> <p>4.1.2</p> <p>This standard does not specify or define multiplexer or scrambler interfaces. However, to maximize interoperability and to support multiple CA vendors, it is recommended that these interfaces comply with the principles outlined in part 1 and part 2 of the DVB Simulcrypt Technical Specification referenced in Section 2.</p> <p>(A/70, p.7)</p>	N/A

項目	DVB	ATSC	OpenCable
	4. etc. (TS 101 197-1 v1.1.1, TS 103 197 v1.1.1)		
C. 擾碼演算法	DVB-CSA 技術細節必須透過 ETSI 並簽署 NDA，才可以取得 (ETR 289, p.9)	168 bit Triple DES, The scrambling function <i>Shall</i> be performed by the replaceable CA module (A/70, p.9)	N/A
D. 多重解密 (開放模組介面)	DVB-CI, 使用 PCMCIA 模組 (EN 50221 TS 101 699 v1.1.1)	Renewable Security Interface, 使用 NRSS-A (smart card)及 NRSS-B (PCMCIA) (A/70, p.11)	Host – POD interface 以 NRSS-B 為藍本，發展出的介面。 在 PCMCIA 模組與 STB 間加入 copy protection (IS-POD-131-INT06-010515 IS-POD-CP-INT05-010515)

資料來源：本研究整理

表 4-2 用戶端接收設備 CA 卡/CA 模組比較

	有限標準外	歐規	美規		
標準	CA 業者自訂	DVB-CI	NRSS-A	NRSS-B	Host-POD interface
卡片別	SMART CARD	PCMCIA CARD	SMART CARD	PCMCIA CARD	PCMCIA CARD
模組成本	約 10 美元	約 50 美元	約 10 美元	約 50 美元	約 50 美元
與傳輸系統相容性	業者自訂,可相容於各種傳輸標準	相容於 DVB-C (有線)、DVB-T (地面廣播)、DVB-S (衛星)	相容於 ATSC (地面廣播)	相容於 ATSC (地面廣播)	相容於 OpenCable (有線)
資料安全性	正常	正常,除介面 clear video 外	正常	正常	正常
目前普及性	接收器都已具備, CA 業者使用廣泛	國外接收器已具備, 已有 CA 模組小量販售, 廣播業者尚未採用	美國數位電視地面廣播尚未使用 CA		已有業者提出產品, 尚未有廣播業者採用
國外支援廠商	接收器都已具備, CA 業者使用廣泛	國外已具備, 已有 CA 模組小量販售, 廣播業者尚未採用			目前沒有公開市場銷售
我國支援廠商	我國目前生產之 DVB 接收器都已具備	我國生產接收器已具備			我國目前沒有廠商生產

4.4 用戶端系統選用架構比較分析

4.4.1 嵌入式 / 分離式、專屬式 / 開放式

嵌入式是將 CA 的模組直接做在 STB 內，而僅僅將解 ECM 以及 EMM 的部分給獨立出來在 SMART CARD 上，這是由於 SMART CARD 是顧客專屬的。要製作嵌入式的 STB 必須要得到 CA 系統業者的授權，通常這些授權是必須算在每生產一個 STB 就必須付給 CA 系統業者一定的權利金。通常每個 CA 系統商對於 SMART CARD 的接腳定義不同，或是每家所使用的擾碼演算法可能不一樣，所以必須由 CA 技術業者授權給設備製造商。

分離式就是採用 DVB-CI 或是 POD 的方式，將 CA 模組給分離，這樣的好處是設備供應商（包括機上盒及數位電視）可以不需要付給 CA 系統業者權利金，僅僅只要在其設備上加上符合 DVB-CI 或是 POD 的接面，使 CA 模組可以外加上來收取被保護的節目。

由於嵌入式具有獨佔性，機上盒就一定會專屬於某家 CA 系統業者，所以他也可以稱做專屬式。而分離式也就可以稱做開放式。

相對於嵌入式設計，DVB-CI 的缺點在於輸出 PCMCIA 模組的 TS 可能會被盜錄，但是 POD 已經把這問題解決，不過 POD 是設計給纜線廣播使用的，其設計尚需要回送頻道，而這點會是地面或是衛星廣播業者所缺乏的。所以 POD 較欠缺公平的原則。

分離式另外的缺點，在於 PCMCIA 模組的價格比較昂貴，反而造成客戶端這邊要多負擔購買安全模組 (PCMCIA 模組) 所需的費用。

嵌入式的缺點在於當使用者已經使用了該家 CA 的 STB 後，就會比較難換成另一家，如此恐怕會造成壟斷。不過實際上在操作時，STB 通常由廣播業者以送或是租借的方式提供給使用者。如此一來，消費者就不需要負擔 STB 的錢，消費者要更換廣播業者時，也就比較不會有所顧忌（擔心之前買 STB 的錢浪費）。

目前世界各國（包括台灣）的數位電視 CA 系統仍以嵌入式為主。這是因為在數位電視服務剛開始時，廣播業者為了要能夠迅速推銷數位電視的節目給一般的使用者，會使用贈送或租用機上盒給收視戶來刺激市場。在此情況下，以嵌入式較能夠保障業者之利益。

目前 DVB-CI 或是 POD 都不是很普及，但也都已經有 CA 技術業者提出解決方案，只是使用的人不多，這有可能是因為市場還在剛起步的階段。即使如此，歐洲許多的接收設備已經都具備了 DVB-CI，其中也不乏我國所生產的產品。

考慮我國國情，由於我國目前數位電視傳輸標準已決定選用 DVB，若與歐洲同步採用 DVB-CI，到時國內的設備製造商只要稍微修改一下其產品就可以內銷，廠商可以不需要為了國內特殊的標準而投入額外的人力與財力，也可以縮短由研發到上市的時間。

當數位電視普及後，民眾可以自由地在零售市場購買多樣化的 STB 或是數位電視機。假如將 CA 系統嵌入至 STB 或是數位電視機，則可能會造成不公平的競爭。如此一來開放模組介面的必要性將會提昇。

目前許多國家（美國、英國、義大利等）都規定必須要將 CA 模組分離，長程來看可能還是必須要做分離式的。

4.4.2 SMART CARD / PCMCIA 模組

PCMCIA 模組為一複雜之模組，其可以置入功能強大的運算單元以及大容量的記憶體。所以可以放入整個 CA 的模組進去，已達到“CA 模組與 STB 分離的目的”。SMART CARD 的容量以及處理速度都遠不及 PCMCIA 模組，這是由於當初設計的用途不一樣所致。但 SMART CARD 便宜安全的優點，使得它現在在市場上廣為使用，目前即使是使用開放模組介面的解決方案，SMART CARD 仍然需要拿來作為每個客戶端身分識別的工具，所以目前開放模組介面標準的 PCMCIA 模組上幾乎都會有一個 SMART CARD 的插槽，來放置客戶識別用的 SMART CARD。

由於 PCMCIA CARD 成本較高，約略為 50 美元，所以目前比較不普

遍，而且生產的公司也較少。但是目前英國已有許多 STB 具有 DVB-CI，所以假如未來投入製造 PCMCIA 模組的公司增加，說不定分離式的設計會變成市場的主流。

世界上各大 CA 標準均未規定需要採用 SMART CARD 作為 CA 操作中操作中所需要的元件，只是目前對於各系統商來說，採用 SMART CARD 是最經濟有效的方法。所以目前世界各大 CA 系統商都有使用到 SMART CARD。

SMART CARD 與 PCMCIA 模組的比較請見表 4-3。

表 4-3 SMART CARD 與 PCMCIA 模組的比較

項目	智慧卡 (SMART CARD)	PCMCIA 模組
成本	低 (約\$10 美元)	高 (約\$50 美元)
效能	低	高
使用範圍	嵌入式 及 分離式 都有	分離式

資料來源：本研究整理

第 5 章、世界各國 CA 之法規及政策

由於數位電視為世界各國最近幾年積極推動與發展，因此在附加服務扮演重要角色的 CA 機制，多由業界廠商擬訂使用標準與規範。先進國家如英國、美國等國有相關之法規與政策，以下將針對英、美、日、新加坡、加拿大、德國、法國、澳洲、中國大陸等國做進一步說明。¹³

5.1 英國

英國是由 Oftel 來負責規範 CA 相關之法規及政策，主要的立法規範建構在先進電視服務標準規範（advanced television services regulations 1996）及條件式接取服務基本營運規範（conditional access services class licence）的條文中，其主要內容分為以下幾個部分：

一、有關 CA 技術之產業財產權（industrial property right）授權到顧客端接收器材製造商之相關法規規範。

二、CA 業者在提供服務時必須遵守公平、合理、非歧視的條件，包括在價格上或是提供的服務內容上。

三、有線業者在 CA 運作上之相關規範。

四、針對電子節目導覽（EPG – electronic programme guides）之服務訂立之相關規範。

以上四個方面之法規設立，主要是希望能維持市場競爭機制，使消費

¹³ 各國法規政策原文請參照檢送之原文附件影本。

者利益達到最大，且讓此產業的各個方面都能穩定發展。接下來我們針對這四個部分法規的主要內容及目的說明。

1. 第一部份

在第一部份是由 1996 年的『先進電視服務規範』(advanced television services regulations)所規範的，其在商品生產實行上的主要法規條文有三：

一、當電視機螢幕對角線超過 42 英吋時，則其必須至少包含一個開放的介面來接取解碼或是數位接收器材。

二、所有客戶端解碼接收器必須也能接收沒經過加密 (scrambling) 的訊號。

三、當製造商出產的電視機內建有數位解碼器時，則必須還要有一個開放的介面來接取其他 CA 系統或是數位解碼系統器材，目前這個共同介面主要指的是由 CENELEC 所界定的 CI (common interface)。

這裡法規訂立主要的目的有二：

第一是希望擁有 CA 技術之產業財產權 (industrial property right) 的公司必須在授權給消費者端器材製造商時能符合公平、合理、非歧視的條件，避免壟斷或是影響市場競爭機制的行為發生。

第二是主要是希望避免消費者設備製造商沒有意願去建立共同介面 (common interface) 或是同時接收不同 CA 系統的接收器，如此才能讓消費者權益受到保障而不會被單一業者所壟斷。

2. 第二及第三部份

在第二部分及第三部分，主要經由 class licence 來規範 CA 業者在提供服務時必須遵守的一些規定。其主要包含十四個基本營運條件（condition）及撤銷 CA 業者執照的相關條款。這十四個基本營運條件分別為：

一、當廣播業者（Broadcaster）需要解密等相關服務時，取得執照的 CA 業者（Licensee）必須要能在公平、合理、且非歧視的情況下提供服務。此外 Licensee 也必須跟 Broadcaster 協調來確保不同系統間的互通運作（interoperability）或是共連性（interconnection）。

二、當 Licensee 提供服務給有線傳輸業者時，必須給予適當的幫助及資訊，使其能轉換控制權（transcontrol）且再播放（re-broadcast）電視服務，並且不用承受不需要及不合理的額外費用。

三、Licensee 不能有避免（preventing）、限制（Restricting）、或是扭曲（distorting）競爭機制的行為，必要時主管機關（Director）可以採取行動來制止相關行為發生。

四、除非在主管機關（Director）同意的範圍之內，Licensee 不能將其服務包裹販賣，以避免傷及其他接受服務業者的權益。

五、CA 業者必須提供實體介面，這邊的實體介面指的是為了讓應用系統（Applicable systems）、其他業者的 CA 系統（Third party's conditional access system）或是傳輸系統得以有共同運作（interoperability）的介面。當主管機關（Director）選定一個實體介面後，licensee 以後必需使其能提

供 Broadcaster 的系統所使用。此外，當廣播業者（Broadcaster）覺得有需要 relevant standard 時，Licensee 也要能提供。

六、當主管機關（Director）認定 licensee 是獨大的業者時，其不能提供服務給業者時有偏好或差別待遇的行為。

七、當主管機關（Director）認定 Licensee 是獨大的業者時，其必須將其服務的內涵（package of such services）或相關訊息公布出來，且在第一次運作一個 applicable system 後的二十八天內必須送交一份報告給主管機關（Director），且其他需要此資訊的人也可以獲得。

八、當有業者要去運作一個 CA 系統時，必須告知主管機關（Director）其 licensee 的名字及聯絡處，然後 licensee 必須付給 Secretary of state 必須的費用及每年的更新費用（renewal fee）。

九、當主管機關（Director）認定 licensee 為獨大的業者時，其要確保使用其服務的業者能在其可以接受的 charges、terms、及 conditions 下使用其相關的 intellectual property right，以達到 connecting、提供或是獲得服務。

十、licensee 必須將其跟 CA 服務相關事業的財務會計損益與其他事業分開計算。

十一、Licensee 必須提供主管機關 Director 所需要的所有相關資訊，其包括文件，帳目，估計，營收或是其他技術上及商業上的資訊等等。

十二、Licensee 必須採取必要措施保護其所提供服務的廣播業者的私人資訊。且必須將此保密的措施或是條文讓主管機關（Director）知道，以確保 licensee 有確實執行這個要求。

十三及十四條則是針對 CA 業者其他相關定義及例外條款的說明。

總合以上的條款來看，可以發現其主要是希望能規範 CA 業者在對廣播業者（broadcaster）提供服務時及收取費用時，都能在公平、合理、非歧視的情況下來運作。在撤銷條款方面，當 CA 業者不遵守前述的營運條件或是本身有破產、停止業務或自發性結束營業時，主管當局便可以依法撤銷其營運執照。

3. 第四部份

在第四部分方面，由於 EPG（electronic programme guides）未來將是消費者在選看、購買節目時所憑藉的媒介，若其所提供的資訊有所偏頗，將對導致消費者權益的損失，也會違反競爭的原則。因此主管機關 Oftel 主要針對兩點去考量 EPG 服務的運作。

第一、業者在提供 EPG 服務時，必須先考量到顧客的喜好及需求，而非廠商的喜好。

第二、業者提供 EPG 服務時必須不能有限制或是妨礙競爭機制的行為發生。

不過目前這個服務的技術仍在發展階段，主管當局 Oftel 主要是希望在提供 EPG 服務時，能同時提供彼此競爭的節目來供消費者選擇，而不會有壟斷的情形產生。這邊主要有兩個規範：

一、 Free to air service：

在『先進電視服務規範』（advanced television services regulations）中，

其中有規範說所有客戶端的解碼接收器必須也能接收沒經過加密（scrambling）的訊號，其乃指所有機上盒（set-top box）皆必須能接收那些免費的節目，來供消費者選擇。因此，在 EPG 服務上，Oftel 也要求必須將這些免費的節目列到其選擇清單上，讓消費者也能經由 EPG 來選擇。

二、 Display of services available on a different platform：

當一個 EPG 是設計在某一傳輸平台上提供服務時（如 cable），則其不需要去提供資訊或連結到其他的傳輸平台上。雖然如此，假如要將某一平台的 EPG 服務提供到其他平台上，則必須能提供相同的服務品質及內容。這邊主要是希望能維持單一平台上其 EPG 服務的競爭機制，而非跨平台方面。

5.2 美國

目前美國主要針對有線傳輸（cable）相關的 CA 設備訂立規範。在 Telecommunication Acts 92-96 中，其規範當業者在提供給收視戶有關收視設備（如 set top box）時必須給其有擁有或是租用其收視設備的選擇權。在 FCC's Report and Order (63 Fed. Reg.39095, June 24,1998)中，其規範零售市場之有線電視接收設備必須在 2000 年 7 月 1 日後使其收視端設備中的 security modules（安全模組）能夠分離出來，此外在 2005 年 1 月 1 日後，其必須只能採用分離的 security 來做收視的儀器設備。總而言之，美國在 CA 法規上主要針對有線業者在設備上進行規範，其目的是希望未來客戶端的收視器材能分為兩部分，一部份是 general 的機上盒，一部份是個別業者所提供的 security device，如此一來消費者將會可以有較多的選擇，也能維持市場的競爭機制，而不會有壟斷的情形。

5.3 日本

其在 CA 政策上，除了一方面發展自有的 CA 技術標準(ISDB,MultiII)外，另外在衛星傳輸的數位電視服務上，也由政府及產業協調成立一個獨立的 CA 服務業者(B-CAS)來提供技術上的服務給廣播業者。因此產業結構變成節目業者、廣播業者、及 CA 服務業者三者獨立運作來形成整個衛星數位電視產業，此外，消費者端器材的製造也透過 CA 業者的技術授權來進行生產。因此，其在 CA 的政策上傾向成立單一 CA 業者來運作，進而達到一定的經濟規模及效益，也經由發展自有的 CA 技術標準，扶植本國產業與避免國外業者的壟斷及競爭。

5.4 新加坡

新加坡目前是由 SBA (Singapore broadcast association) 來規範及制訂數位電視相關法規及政策。目前新加坡的數位地面廣播是屬於 free on air 的形式，目前規範了 open-standard television set 其必須符合三點要求：

- (1) 包含一個整合的數位解碼器；
- (2) 不能內建一個隱含的 CA 系統；
- (3) 要能有標準數位介面及連接器或數位電視共同介面來連結 CA 系統，以獲得 Mobil DTV 服務或其它授權的廣播服務。

新加坡廣電局於 2000 年 12 月 6 日接受國家數位電視委員會的三項建議，以訂定新加坡數位電視相關標準。其中數位電視委員會於 1999 年成立，為一業界成立的工作小組，主要目地為提供新加坡廣電局發展數位電視的相關建議。數位電視委員會下分三個小組:數位電視接收設備小組、傳輸與接收小組、產業發展小組。

數位電視委員會於 2000 年的建議案中提出數位電視地面廣播接收器

的詳細規範。數位電視接收設備指可接收地面廣播的 STB(set-top-box)及 iDTV(Integrated Digital Television)，必須有開放標準，且設備製造商可將這些接收設備賣至一般消費性電子商店。而這些數位電視接收器至少必須包含：

- (1) MPEG2 decoding
- (2) MPEG1 layer2
- (3) 解析度規格(Receiver resolution specification)
- (4) 電源功率限度和安全需求(Power regulatory and safety requirements)
- (5) 回傳路徑通道(Return Path Chennal)
- (6) 共通介面(Common Interface)

另外，數位電視接收小組建議新加坡採用 DVB-MHP。

5.5 加拿大

目前並無明確的 CA 法規及政策。

5.6 德國

目前並無明確的 CA 法規及政策，其未來可能遵循 2001 年 3 月歐洲國會達成之共識，於 2002 年 1 月 1 日後出售之數位接收設備需包含一共通介面 (Common Interface.)，擬採 DVB 體制。

5.7 法國

其在 CA 的政策上，是由政府及民間相關業者協調產生單一 CA 服務業者，然後來提供各個廣播業者相關的服務。如同日本衛星數位電視一樣，由一家業者來提供技術上的營運及服務，一方面可以達到一定經濟規模，另一方面也可以免除不同 CA 系統下消費者端器材不相容的問題。此外在技術標準方面，主要是採用歐洲 DVB 的標準來發展其 CA 系統。

5.8 澳洲

目前澳洲數位電視的服務仍屬於免費的階段，因此對於 CA 的政策及法規並沒有明確的方向及條文。未來將視其數位電視服務的發展來看是否對於 CA 有所需求再來訂立需要的法規及政策。

5.9 中國大陸

中國目前傾向發展自己特有的 CA 技術，其主要考量大陸市場具有一定的規模，發展自有的 CA 將可以保護自己的業者及其產業環境。CA 標準政策以促進一種零售市場販售之接收機上盒為目標，考量 common interface，common scrambling, simulcrypt,及 multicrypt。

5.10 各國政策比較分析

由於英國於 CA 技術上發展較早，且為了維持競爭機制及讓產業健全發展，故其對於 CA 營運業者訂立許多相關法令來加以約束，避免其壟斷。此外為了維護消費者權益及消費者端設備產業的健全發展，也訂立了『先進電視服務規範』來規範消費者端器材所需具有的標準規格及違反其規範之罰責。英國在 CA 之相關法令的訂立上可說是鉅細靡遺，但就我國目前 CA 發展的狀況，還不夠成熟且 CA 技術服務產業也尚具雛形而已，EPG

等未來數位電視可能出現的服務現在也都仍在起步階段。因此，為了能因應未來真實情況且配合我國國情，可以進行後續探討，根據現實情況再訂立適當之法規加以管理。

美國方面採用的技術與英國及歐洲體系不同，但其只針對消費者端設備進行規範，藉由標準的消費者產品來避免廣播業者的壟斷，且讓設備製造商能生產更具價值的商品。

在日本與法國方面，則是由業者與政府合作，成立單一 CA 技術服務公司，一方面保護國內業者，另一方面也能達到一定經濟規模進而打入國際市場。但這需要國內有一定的技術水準，且廠商跟政府能有一定的共識，我國是否適合此一模式端視國內數位電視產業是否能有合作的空間及機會。

新加坡方面，其在 CA 技術上本身並無成熟的產業，但在 CA 法規的制訂上其乃是由業界成立一數位電視委員會作為與政府溝通的橋樑，將業界的共識及建議傳達給主管機關並進一步形成法規。目前新加坡數位電視仍為免費服務，但目前已就消費者端設備相關規範進行制訂。相較於先前各國，新加坡跟我國在發展數位電視的歷程上有較多相似之處，因此其 CA 法規的制訂規程及與廠商合作的模式是值得我國去參考的。最後本研究將各國 CA 法規及是否適合我國國情之比較分析表列於下：

表 5-1 各國政策比較分析表列

國家	相關法規	主管機關	CA 技術標準	有關 CA 服務業者營運規範	消費者器材端之規範	與我國國情之比較分析
英國	主要的立法規範建構在先進電視服務標準條例(advanced television services regulations 1996)及條件式接取服務執照 (conditional access services class licence) 的條文中。(見附錄六：英國法規)	Oftel	採用歐規 DVB	依條件接取服務執照 (conditional access services class licence)的條文規範，規範 CA 業者在對廣播業者 (broadcaster) 提供服務時及收取費用時，都必須在公平、合理、非歧視的情況下運作，其主要包含十四個基本營運條件及撤銷 CA 業者執照的相關條款，並由主管機關 Oftel 來加以監督。此外針對 EPG 的	由 1996 年的『先進電視服務規範』，規範消費者端器材客戶端解碼接收器必須能接收沒經過加密 (scrambling) 的訊號，且當製造商出產的電視機內建有數位解碼器時，則必須還要有一個開放的介面來接取其他 CA 系統或是數位解碼系統器材。	由於我國 CA 技術服務剛萌芽，為系統自營，尚未對外提供服務。但 EPG 的相關規範在未來數位電視成熟後，或許需要再加以評估。為了保障消費者權益，消費者端器材的開放介面需求是需要的。

				營運也加以管制，避免壟斷及違反競爭的情形。		
美國	美國主要針對有線傳輸（cable）相關的 CA 設備訂立規範。在 Telecommunication Acts '92-'96 中。(見附錄六：美國法規)	FCC	1.地面廣播採用美規 ATSC 2.有線採用 Open Cable 3.衛星採用 DVB	無明確規範	規範 2000 年 7 月 1 日後零售市場販售之有線電視接收設備必須在使其收視端設備中的 security modules（安全模組）能夠分離出來，在 2005 年 1 月 1 日後，必須只採用分離的 security 來做收視的儀器設備。	基於保障消費者權益及維持市場競爭機制，讓消費者端設備標準化且能接收不同系統，將避免消費者遭系統業者壟斷，消費者端設備製造商也能生產較具價值的產品。
日本	NHK 領導，但由 ARIB 協調電視軟硬體產業進行合	--	ISDB，MultiII	無明確規範，但由政府及業者協調成立一 CA 技術營運公司。	目前只有單一 CA 系統，故在消費者端設備上無明確規範。	日本自行發展 CA 系統，藉以保護國內業者。不過台灣市場有

	作。				BS-Digital 數位電視機, 機上盒均有內建 CA 及相對 Smart Card 插槽。	限, 發展自有標準是否符合效益值得商榷。但政府及業者共同合作模式值得參考。
新加坡	目前無明確 CA 政策條文, 但產政學研組成之數位電視委員會已有初步共識, 登錄於新加坡廣電局網站。(見附錄六: 新加坡網站資料)	新加坡 廣電局 SBA	DVB	--	由產政學研組成的數位電視委員會提供新加坡廣電局發展數位電視的相關建議, 建議消費者端設備必須有開放模組介面, 且設備製造商可將這些接收設備賣至一般消費性電子商店。數位電視接收設備指可接收地面廣播的 STB 及 iDTV, 必須有開放標準。	台灣業界可參考成立一委員會, 做為產業與政府之間溝通的橋樑。

加拿大	目前無明確 CA 政策條文	--	--	--	--	
德國	目前無明確 CA 政策條文	--	擬採歐規 DVB 體制	--	未來可能遵循 2001 年 3 月歐洲國會達成之共識，於 2002 年 1 月 1 日後出售之數位接收設備需包含一共通介面 (Common Interface.)	
法國	目前無明確 CA 政策條文	--	採用歐規 DVB	並無明確規範，但由政府及業者協調成立一 CA 技術服務公司。	未來可能遵循 2001 年 3 月歐洲國會達成之共識，於 2002 年 1 月 1 日後出售之數位接收設備需包含一共通介面 (Common Interface.)	與日本相似，業者及政府合作模式可參考。
澳洲	目前無明確 CA 政策條文	--	Free on air	--	--	澳洲目前數位電視是免

	策條文					費服務，未來台灣在規範 CA 相關法規時，可先思考數位電視服務是否計價的問題。
中國大陸	目前無明確 CA 政策條文	廣電總局主導，召集產政學研共同研究。	傾向自己制訂	--	CA 標準政策以促進一種零售市場販售之接收機上盒為目標。	中國大陸與台灣的市場特性不同，但若能相容於其系統，或是制訂與其相同標準之消費者端器材規格，將有助於台灣設備廠商發展。

第 6 章、個別訪談意見

本研究之個別訪談包含了政府單位 (4)、學術研究單位 (3)、衛星與有線電視 (5)、無線電視 (4)、STB 及 DTV 設備製造商 (5)，產政學研各各層面共 21 個單位。訪談內容主要以訪談大綱的十題內容為主，藉以瞭解個別單位的相關意見，並作為政策方案擬定之重要參考。本章並將對個別訪談意見作進一步分析。

6.1 訪談大綱

訪談大綱主要分為：第一部份主要是政策規範，以瞭解各單位受訪者對於政府在制訂政策規範上的看法為何。第二份則是技術規範，為更深入的細部討論。第三部份是開放題，讓受訪者提供其他相關意見。訪談大綱內容如下：

政策規範

- 一、您認為將來在台灣數位電視產業中，我國是否應有 CA 發展的時程規劃？或任由市場決定？規定時程應為何？(ex: 美國 Open Cable-POD 已於 2000 年 7 月開始執行，歐盟 2002 年開始規定數位電視機使用 CI)
- 二、您認為政府在制定 CA 政策的主要考量層面應為何？(有哪些方面可以考量)，及您對 CA 相關政策的具體建議？

三、您認為我國是否需要制定一個適用於衛星傳輸、地面廣播、有線傳輸的統一 CA 標準（如：軟硬體介面）？

1. 統一或不統一之利弊分析？
2. 如果您認為應該統一，理由為何？

如果您認為不應該統一，理由又為何？

四、就您所知（貴公司）目前 CA 技術授權取得與權利金問題之情況？
以及目前面臨的障礙與困難？

技術規範

五、如果是需使用 CA 機制，則應採用自有的 CA 技術，或是採用他人已制定好的 CA 技術？

1. 鼓勵研發自有技術與採用他人既定技術，兩者您認為各有何優劣點？
2. 如果您認為應發展自有 CA 技術，理由為何？

如果您認為應採用既有技術，理由又為何？

六、您認為是否應在 CA 頭端採用 SimulCrypt？

1. 採用或不採用之利弊分析為何？
2. 如果您認為應該採用，理由為何？實施時程與規範範籌

(ex:不同傳輸者..) ?

如果您認為不應該採用，理由又為何？

七、您認為是否應在 CA 頭端與用戶端間採用 MultiCrypt ?

1. 採用或不採用之利弊分析為何？
2. 如果您認為應該採用，理由為何？實施時程與規範範籌（ex: STB、idTV、服務提供者...）？

如果您認為不應該採用，理由又為何？

八、您認為在接收端是否應將 CA 模組與接收設備的產品分離？

（專屬式&開放式）

1. 此兩種不同模式之利弊分析為何？
2. 如果您認為應分離，理由為何？又，應該採用 DVB-CI、Open Cable-POD 或其它標準？

如果您認為不應分離，理由為何？則，壟斷和轉換的成本應如何考量（對廣播業者及消費者而言）？

九、請問您有關專屬式與開放式的成本比較為何？

1. 開放式：
 - (1) Interface：符合 DVB-CI 與符合 OpenCable Host-POD interface 的 STB 製作成本的差異？
 - (2) Module：符合 DVB-CI 與符合 OpenCable Host-POD interface 的

PCMCIAA module 成本的差異？

2. 專屬式：

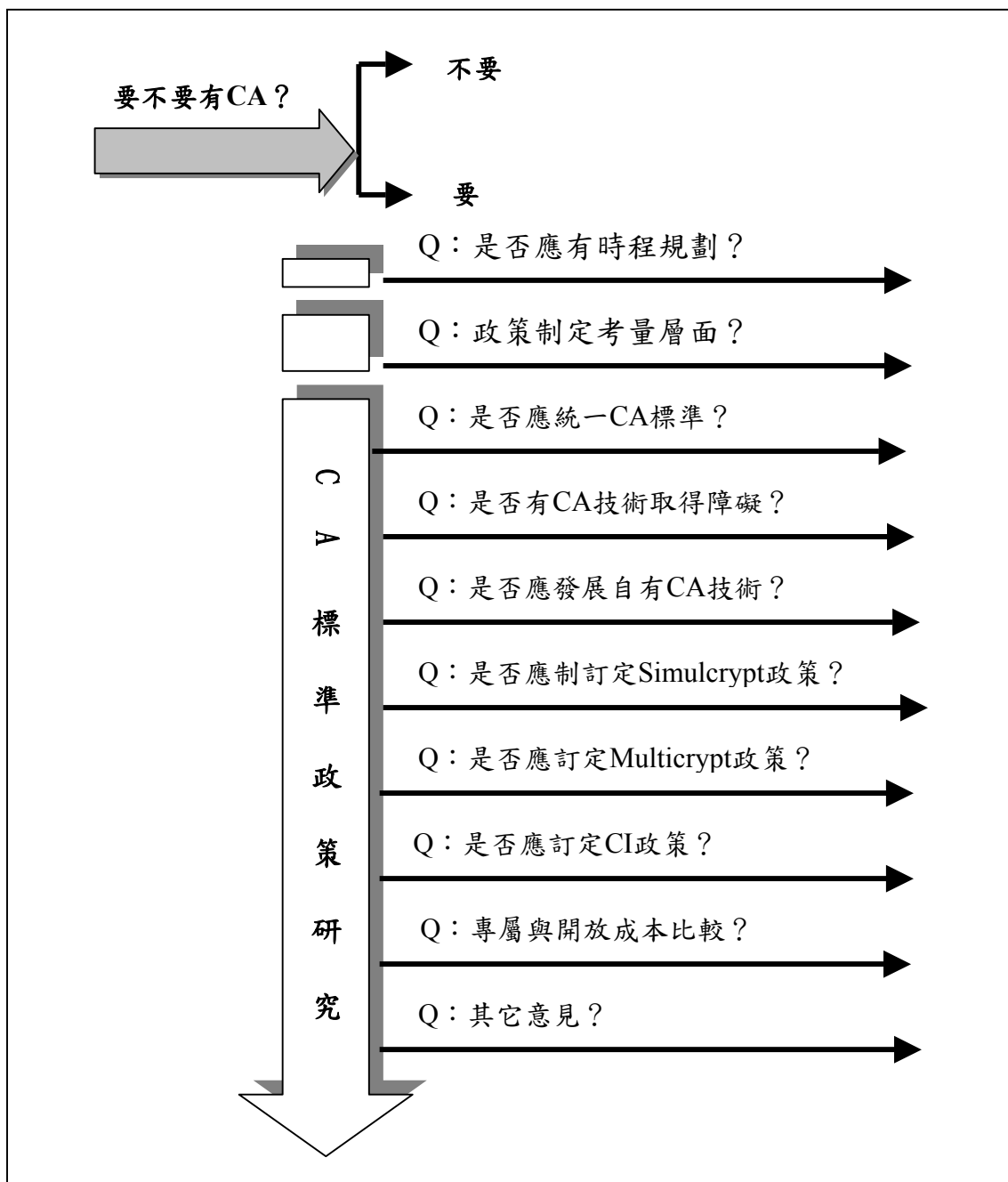
(1) Embeded Smart Card？

其它

十、您對本研究案之其它建議？

進一步的訪談大綱分析如下圖 6-1 所示。

圖 6-1 訪談意見分析流程圖



資料來源：本研究整理

6.2 訪談意見彙整

除訪談大綱第十題與開放意見，與第九題專屬、開放成本比較，因受訪者無法回答，未列在表上，其它各題各受訪者所回答的意見彙整表列如下：

表 6-1 訪談意見彙整

	是否應由政府 規劃 CA 發展 時程	是否應統一 (無線、有 線、衛星) CA 標準	是否有 CA 技 術授權取得障 礙	是否應發展自 有 CA 技術	是否應規定頭 端需採用 SimulCrypt	是否應規定設 備端需採用 MultiCrypt	是否應規定 CA 模組與接 收設備分離	政府政策考量
受訪者 1	否；除非政府 能確定準確的 產業發展時程	否；不應由法 規規定，法規 應公平不應只 規定無線要統 一	否；無障礙	中立；不一定 採用國內 CA 自有技術	否；是否使用 應為業者自己 的商業考量	中立；若要要 求業者，則應 對有線、衛 星、無線三者 均要求	中立；若要制 訂分離，則應 有線、衛星、 無線三者均訂 定	技術與商業細 節不應制訂， 政策只要制訂 保護消費者、 對消費者有利 的政策

受訪者 2	否；民間腳步快於政府	否；不應由法規規定無線統一，應用鼓勵的方式	--	是；但政府仍應先評估可行性，再制定獎勵研發辦法	--	--	是；才不會受牽制於國外大廠，且對業者、消費者都有利	政府政策應只制訂原則
受訪者 3	否；CA 應是整體視訊產業的規劃	否；有線、無線、衛星三者統一的可行性低	否；視商業交易模式而不同	否；發展時機已逝，業者也不願意冒險採用	否；是否使用應為業者自己的商業考量	否；是否使用應為業者自己的商業考量	是；符合零售銷售模式，開放模組的制定可使用戶數增加較快	1.政府應待數位電視用戶普及之後，再考量 CA 政策制定。 2.政府應對整個視訊產業規範，而非對個別業者規範
受訪者 4	中立；除非背	否；有線、無	--	中立；若政府	否；是否使用	否；是否使用	是；政府政策	保障民眾免費

	後應有周全之傳播政策，並配合數位電視發展時程	線、衛星三者統一的可行性低		要發展應先評估可行性	應為業者自己的商業考量	應為業者自己的商業考量	制定的目的應使消費者成本最低	收視權益，不要被鎖死在CA 中
受訪者 5	否；應由產業自然發展，但可對 CI 做柔性的規劃	中立；政府願意擔負制訂政策責任時才贊成，否則應讓業者自行決定	否；視商業交易模式而不同	中立；不一定採用國內 CA 自有技術	否；是否使用應為業者自己的商業考量	否；因採用使消費者成本變高	否；開放有安全疑慮，應由市場趨勢來決定	1.政策應能與世界接軌 2.政策制訂應先考量產業發展與法令配套措施
受訪者 6	否；市場尚未成熟政府不應干預	否；現階段不應統一，待數位化後再考慮	否；視商業交易模式而不同	否；採用他人技術在商業營運上較有法律保障	否，是否使用應為業者自己的商業考量	否；現階段尚未成熟，且有成本考量	否；開放有安全疑慮、成本、商業營運等考量，因此現階段應用專屬式	現階段不應制定 CA 政策，應由業者自行決定採用，等數位化市場發展成熟再說

受訪者 7	--	否；三者統一，成本必定增加，會有成本吸收、掌控權等問題	--	--	否；政策應制訂大原則，不需訂定這些細節	否；政策應制訂大原則，不需訂定這些細節	否；業者成本增加	政府只要定大原則就好了，細節不要去訂定，多輔導、少管制
受訪者 8	中立；如果選定的標準將來不是趨勢，有時程也沒用	中立；會有執行上的困難，對是否能達成存疑	--	否；既定標準較易讓大家遵循	否；政策應制訂大原則，不需訂定這些細節	否；政策應制訂大原則，不需訂定這些細節	否；應制訂大家都需遵守的大標準（歐規或美規）	1.應制訂主要的大標準 2.中立政府單位主持工作小組，促使業界達成共識
受訪者 9	否；應由市場狀況決定	否；由業者自行選擇 CA，但政府應解決之間的共通性	否；視商業交易模式而不同	是；政府應鼓勵	否，是否使用應為業者自己的商業考量	否；機上盒同時有兩套不同的 CA 系統會有一些技術問	否；應鼓勵發展 CI，但不應強制	政府應該不要做細部的規範，僅須定大方向的遊戲規

						題		則即可。
受訪者 10	否；應由市場決定	否；但應規定無線需統一 CA 標準，但由業者自行選擇 CA 廠商	否；視商業交易模式而不同	是；自有技術可發展許多加值服務	否，是否使用應為業者自己的商業考量，政府可鼓勵其好處，但不強迫	否；因採用使成本較高	否；沒有必要分離，模組分離較貴且有安全疑慮	國內廠商如果有能力發展 CA 技術，政府應該給予支持
受訪者 11	否；但應有 CI 時程規劃	否；國家不需制定統一標準之政策	否；視商業交易模式而不同	中立；有必要，但限於市場因素發展應不樂觀	否，是否使用應為業者自己的商業考量	否；因採用使成本較高	是；採用 CI 有利消費者與產業發展	數位電視接收設備應訂定 CI 政策，以保護消費者並加速產業發展

受訪者 12	否；因 cable 業者已開始商業營運計畫了，時程規劃已晚	是，因台灣市場小，主要為有線市場，其他業者應遵循有線所選擇的 CA	否；為視商業交易之問題	中立；自己研發是保護國內業者，以及技術上的宣示	中立；市場規模小，政府規定不一定有用	中立；市場規模小，政府規定不一定有用	是；採用 CI 可保護消費者，並對設備製造商有利	CA 不是目前數位電視發展的重要議題
受訪者 13	否；CA 與業者提供的有價服務連動有關，應由業者自行決定	--	--	--	--	--	是；應針對 CI 訂定國家標準	1.技術中立造成業界標準混亂，有礙數位電視機之生產與消費者權益 2.應成立跨部會政府機關，執掌視訊產業相關規定

受訪者 14	否；目前產業發展仍不明確，應由業者自行決定	是；標準統一有利設備製造商	否；目前主要的障礙是前景不明朗	是；發展自己技術可避免受限於人	--	--	是；開放標準可使業者透過公平機制來競爭	政府政策應降低障礙，使業者有商機
受訪者 15	中立；台灣市場小，應等待市場與技術的成熟再精確規劃	否；市場不同業者有不同商業營運考量，不應強制	--	是；政府可給予引導誘因但不應強制	--	--	中立；政府引導，業界提建議方案	政府政策應給大方向之指導，保持彈性 可由政府主導組成工作小組來制定標準
受訪者 16	中立；應與數位電視開播時程配合，目前可針對 CI 規劃即可	否；應規定無線統一 CA 廠商準，但由業者自行選擇何家	否；視商業交易模式而不同	中立；若政府要發展需先行評估有利之後才發展，且不該強迫業者採	中立；視產業發展狀況，政府再決定是否需要規範	中立；視產業發展狀況，政府再決定是否需要規範	是；至於細節則由政府與業者共同協調決定	政府若要針對 CI 定規範應加快腳步

				用國內自行開發之技術				
受訪者 17	中立；如果要制訂越早越好，否則應由市場自由發展	否，但應有統一的開放式標準	否，市場自由競爭問題	是；政府應可給予引導與鼓勵	否；是商業營運問題，不應由政策制訂	否；是商業營運問題，不應由政策制訂	是，應有開放標準的政策，並由業界決定	政策應該明確，制訂大方或原則，要訂規範應要及早
受訪者 18	否；應由產業協調訂出	是；有必要，但不是自己開發，要觀察不同技術在上場上的狀況，再作選擇	--	否；我們沒有能力自己發展技術，以及內需市場不夠大，不足以支持一個技術的發展	否；廠商自己有不同的決定策略，政府不應該規範。	否；廠商自己有不同的決定策略，政府不應該規範。	是，使市場有競爭存在	國內發展政策腳步不應太倉促，技術大原則應確定，細節由業者決定，應解決技術中立所產生的相關問題

受訪者 19	--	--	--	--	--	--	是；採用開放模組使市場有競爭存在，保障消費者權益	政府應保護消費者，訂法規或政策一定要能讓市場保持競爭，避免獨佔情形發生
受訪者 20	中立；但應有 CI 標準或制定介面技術規範之時程規劃	--	--	--	--	--	是；並預計將列為策略性產業獎勵項目	CI 標準或制定介面技術規範希望能訂定時程，以協助產業爭取商機
受訪者 21	--	--	--	--	--	--	--	有關 CA 已委託相關單位對 CI 做研究

6.3 訪談意見分析

各受訪單位對於各題之正反面意見重點，及統計次數彙整列表如下。
(註：* 表示多數訪談者之意見。)

1. 是否應由政府規劃 CA 發展時程？

本題絕大多數受訪者均反對政府規劃 CA 發展時程，多認為 CA 是市場面的問題。若政府真欲規劃 CA 發展時程，則主要應針對 CI 作規劃，另外應有周全之傳播政策配合，且應配合數位電視發展時程規劃。

表 6-2 是否應由政府規劃 CA 發展時程？

持贊同之意見	持反對之意見*	持中立之意見
--	<ul style="list-style-type: none"> ▪除非政府能確定準確的產業發展時程 ▪民間腳步快於政府 ▪CA 應是整體視訊產業的規劃 ▪應由產業自然發展，但可對 CI 做柔性的規劃 ▪市場尚未成熟政府不應干預 ▪應由市場狀況決定 ▪應由產業協調訂出 	<ul style="list-style-type: none"> ▪除非背後應有周全之傳播政策，並配合數位電視發展時程 ▪如果選定的標準將來不是趨勢，有時程也沒用 ▪台灣市場小，應等待市場與技術的成熟再精確規劃 ▪應與數位電視開播時程配合，目前可針對 CI 規劃即可 ▪時程規劃應有 CI 標準

	<ul style="list-style-type: none"> 因 cable 業者已開始商業營運計畫了，時程規劃已晚 CA 與業者提供的有價服務連動有關，應由業者自行決定 目前產業發展仍不明確，應由業者自行決定 	或制定介面技術規範之時程規劃 如果要制訂越早越好，否則應由市場自由發展
廣播業者單位 (0) 次	廣播業者單位 (6) 次	廣播業者單位 (3) 次
設備製造商單位 (0) 次	設備製造商單位 (5) 次	設備製造商單位 (0) 次
政府與學術單位 (0) 次	政府與學術單位 (1) 次	政府與學術單位 (6) 次

資料來源：本研究整理

2. 是否應統一（無線、有線、衛星）CA 標準？

本題受訪者仍多持反對意見，不認為應由法規規定無線、有線、衛星統一 CA 標準。因有線電視目前已開始積極準備，因此目前法規可能只能針對五家無線電視台規定必須統一 CA 標準，但部分受訪者亦認為法規應公平，不應只規定無線統一，應由業者自行選擇 CA 廠商。

表 6-3 是否應統一 CA 標準？

持贊同之意見	持反對之意見*	持中立之意見
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<ul style="list-style-type: none"> ▪因台灣市場小，主要為有線市場，其他業者應遵循有線所選擇的 CA ▪標準統一有利設備製造商 ▪有必要，但不是自己開發，要觀察不同技術在市場上的狀況，再作選擇 	<ul style="list-style-type: none"> ▪不應由法規規定，法規應公平，不應只規定無線要統一 ▪不應由法規規定無線統一，應用鼓勵的方式 ▪有線、無線、衛星三者統一的可行性低 ▪現階段不應統一，待數位化後再考慮 ▪三者統一，成本必定增加，會有成本吸收、掌控權等問題 ▪由業者自行選擇 CA，但政府應解決之間的共通性 ▪應規定無線需統一 CA 標準，但由業者自行選擇 CA 廠商 ▪國家不需制定統一標準之政策 ▪市場不同業者有不同商業營運考量，不應強制 ▪不需統一，但應有統一的開放式標準 	<ul style="list-style-type: none"> ▪政府願意擔負制訂政策的責任時才贊成，否則應讓業者自行決定 ▪會有執行上的困難，對是否能達成存疑
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廣播業者單位 (0) 次	廣播業者單位 (7) 次	廣播業者單位 (2) 次
設備製造商單位 (2) 次	設備製造商單位 (2) 次	設備製造商單位 (1) 次
政府與學術單位 (1) 次	政府與學術單位 (3) 次	政府與學術單位 (3) 次

資料來源：本研究整理

3. 是否有 CA 技術授權取得障礙？

本題受訪者多認為沒有 CA 技術授權取得的障礙，尤其授權金方面因是商業營運的考量，並非問題。

表 6-4 是否有 CA 技術授權取得障礙？

持贊同之意見	持反對之意見*	持中立之意見
	<ul style="list-style-type: none"> ▪ 無障礙 ▪ 視商業交易模式而不同 ▪ 為視商業交易之問題 ▪ 市場自由競爭問題 ▪ 目前主要的障礙是前景不明朗 	
廣播業者單位 (0) 次	廣播業者單位 (5) 次	廣播業者單位 (4) 次
設備製造商單位 (0) 次	設備製造商單位 (4) 次	設備製造商單位 (1) 次
政府與學術單位 (0) 次	政府與學術單位 (2) 次	政府與學術單位 (5) 次

資料來源：本研究整理

4. 否應發展自有 CA 技術？

受訪者在本題之以中立意見居多，多認同發展自有 CA 技術可帶來之相關利益，不過贊同之餘均附有但書，業者不一定會採用，並認為政府要發展應先評估可行性，且不應以政策強迫業者採用國內自行開發之技術。

表 6-5 是否應發展自有 CA 技術？

持贊同之意見	持反對之意見	持中立之意見*
<ul style="list-style-type: none"> ▪但政府仍應先評估可行性，再制定獎勵研發辦法 ▪政府應可給予引導與鼓勵 ▪自有技術可發展許多加值服務 ▪發展自己技術可避免受限於人 ▪政府可給予引導誘因但不應強制 	<ul style="list-style-type: none"> ▪採用他人技術在商業營運上較有法律保障 ▪既定標準較易讓大家遵循 ▪我們沒有能力自己發展技術，以及內需市場不夠大，不足以支持一個技術的發展 	<ul style="list-style-type: none"> ▪不一定採用國內 CA 自有技術 ▪發展時機已逝，業者也不願意冒險採用 ▪若政府要發展應先評估可行性 ▪若政府要發展需先行評估有利之後才發展，且不該強迫業者採用國內自行開發之技術 ▪有必要，但限於市場因素發展應不樂觀 ▪自己研發是保護國內業者，以及技術上的宣示
廣播業者單位 (2) 次 設備製造商單位 (2) 次	廣播業者單位 (3) 次 設備製造商單位 (0) 次	廣播業者單位 (3) 次 設備製造商單位 (3) 次

政府與學術單位（2）次	政府與學術單位（1）次	政府與學術單位（4）次
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資料來源：本研究整理

5. 是否應規定頭端需採用 SimulCrypt？

多數受訪者持反對意見，認為業者採用 CA 如同軟體的商業買賣，業者各有不同的商業營運考量，不應由政策規定必須採用。

表 6-6 是否應規定頭端需採用 SimulCrypt？

持贊同之意見	持反對之意見*	持中立之意見
	<ul style="list-style-type: none"> ▪ 是否使用應為業者自己的商業考量 ▪ 是商業營運問題，不應由政策制訂 ▪ 政策應制訂大原則，不需訂定這些細節 ▪ 政府可鼓勵其好處，但不強迫 ▪ 廠商自己有不同的決定策略，政府不應該規範 	<ul style="list-style-type: none"> ▪ 市場規模小，政府規定不一定有用 ▪ 視產業發展狀況，政府再決定是否需要規範
廣播業者單位（0）次	廣播業者單位（8）次	廣播業者單位（1）次
設備製造商單位（0）次	設備製造商單位（2）次	設備製造商單位（3）次
政府與學術單位（0）次	政府與學術單位（2）次	政府與學術單位（5）次

資料來源：本研究整理

6. 是否應規定設備端需採用 MultiCrypt？

本題相對應於第五題，因此受訪者意見與第五題之考量相同，認為此為商業考量，因此政府政策不需規定。

表 6-7 是否應規定設備端需採用 MultiCrypt？

持贊同之意見	持反對之意見*	持中立之意見
	<ul style="list-style-type: none">▪ 是否使用應為業者自己的商業考量是商業營運問題，不應由政策制訂▪ 採用使消費者成本變高▪ 採用使成本較高▪ 現階段尚未成熟，且有成本考量▪ 政策應制訂大原則，不需訂定這些細節▪ 機上盒同時有兩套不同的 CA 系統會有一些技術問題▪ 廠商自己有不同的決定策略，政府不應該規範	<ul style="list-style-type: none">▪ 若要要求業者，則應對有線、衛星、無線三者均要求▪ 市場規模小，政府規定不一定有用▪ 視產業發展狀況，政府再決定是否需要規範

廣播業者單位 (0) 次	廣播業者單位 (7) 次	廣播業者單位 (2) 次
設備製造商單位 (0) 次	設備製造商單位 (2) 次	設備製造商單位 (3) 次
政府與學術單位 (0) 次	政府與學術單位 (2) 次	政府與學術單位 (5) 次

資料來源：本研究整理

7. 是否應規定 CA 模組與接收設備分離？

除安全疑慮與成本、責任問題，受訪者均肯定政策制訂開放模組對消費者或產業之利益。惟有受訪者認為若要制訂，應對有線、衛星、無線三者均公平訂定，另外在進一步的規範應由政府或業界決定，是贊同之餘較不同之意見。

表 6-8 是否應規定 CA 模組與接收設備分離？

持贊同之意見*	持反對之意見	持中立之意見
<ul style="list-style-type: none"> 才不會受牽制於國外大廠，且對業者、消費者都有利 符合零售銷售模式，開放模組的制定可使用戶數增加較快 政府政策制定的目的應使消費者成本最低 採用 CI 有利消費者與產業發展 	<ul style="list-style-type: none"> 開放有安全疑慮，應由市場趨勢來決定 開放有安全疑慮、成本、商業營運等考量，因此現階段應用專屬式 業者成本增加 應制訂大家都需遵守的大標準（歐規或美規） 應鼓勵發展 CI，但不應強制 	<ul style="list-style-type: none"> 若要制訂分離，則應有線、衛星、無線三者均訂定 政府引導，業界提建議方案

<ul style="list-style-type: none"> ▪採用 CI 可保護消費者，並對設備製造商有利 ▪應針對 CI 訂定國家標準 ▪開放標準可使業者透過公平機制來競爭 ▪細節則由政府與業者共同協調決定 ▪應有開放標準的政策，並由業界決定 ▪使市場有競爭存在 ▪採用開放模組使市場有競爭存在，保障消費者權益 ▪預計將列為策略性產業獎勵項目 	<ul style="list-style-type: none"> ▪沒有必要分離，模組分離較貴且有安全疑慮 	
廣播業者單位 (3) 次 設備製造商單位 (4) 次 政府與學術單位 (5) 次	廣播業者單位 (5) 次 設備製造商單位 (1) 次 政府與學術單位 (0) 次	廣播業者單位 (1) 次 設備製造商單位 (0) 次 政府與學術單位 (2) 次

資料來源：本研究整理

8. 政府政策考量層面？

有關受訪者的各種考量意見，本研究將之分為政策制訂考量、消費者保護考量、市場發展考量、技術考量等幾個層面，將意見歸納如下表：

表 6-9 政府政策考量層面？

▪政策制訂考量

=>政府政策應只制訂大原則指導方向以保持彈性

=>技術與商業細節不宜制訂

=>應對整個視訊產業規範，而非對個別業者規範

=>應成立跨部會政府機關，執掌視訊產業相關規定

▪消費者保護考量

=>降低消費者負擔與增加消費者方便

=>保障民眾免費收視權益不要被鎖死在 CA 中

▪市場發展考量

=>應待數位電視用戶普及之後，再考量 CA 政策制定

=>應先考量產業發展，不要讓法規限制產業生命力

=>政府政策應降低障礙，使業者有商機

=>應鼓勵發展我國自己的 CA

=>台灣市場規模小，不應太早倉促訂定政策，待國外成功經營模式再明訂

▪技術考量

=>技術中立造成業界標準混亂，有礙數位電視機之生產與消費者權益

=>應解決技術中立所產生的相關問題

=>數位電視接收設備應訂定 CI 政策，以保護消費者並加速產業發展

=>政府若要針對 CI 定規範應加快腳步

=> CA 不是目前數位電視發展的最重要議題

資料來源：本研究整理

9. 專屬與開放成本比較？

受訪者對於本題多無法回答。

10. 其它意見？

多與上述各題回答意見相同。

第 7 章、我國數位電視 CA 標準政策研究分析

本章主要整理歸納訪談意見，整合世界各國數位電視 CA 發展研究，及本研究小組至新加坡參訪之心得，提出三項候選方案，透過公開產政學研座談會、深度訪談，彙整、分析後，提出符合我國國情建議方案。

7.1 政策候選方案形成階段

本研究政策候選建議方案產生方式如下：

1. 第一階段：

- (1) 綜合蒐集國外法規與技術標準資料
- (2) 新加坡“2001 世界電信展”實地考察，訪問多家 CA 相關業者及新加坡主要主管機關
- (3) 舉行第一次座談會，彙總各界看法
- (4) 期中擬出本研究小組的研究報告，

2. 第二階段：

- (1) 針對產業上、中、下游業者深度訪談
- (2) 與電信總局共同討論，草擬可行方案
- (3) 舉行第二次公開座談會以集思廣益

3. 第三階段

- (1) 根據我國國情並提出建議方案
- (2) 研擬數位電視條件接取 (CA) 標準建議草案。

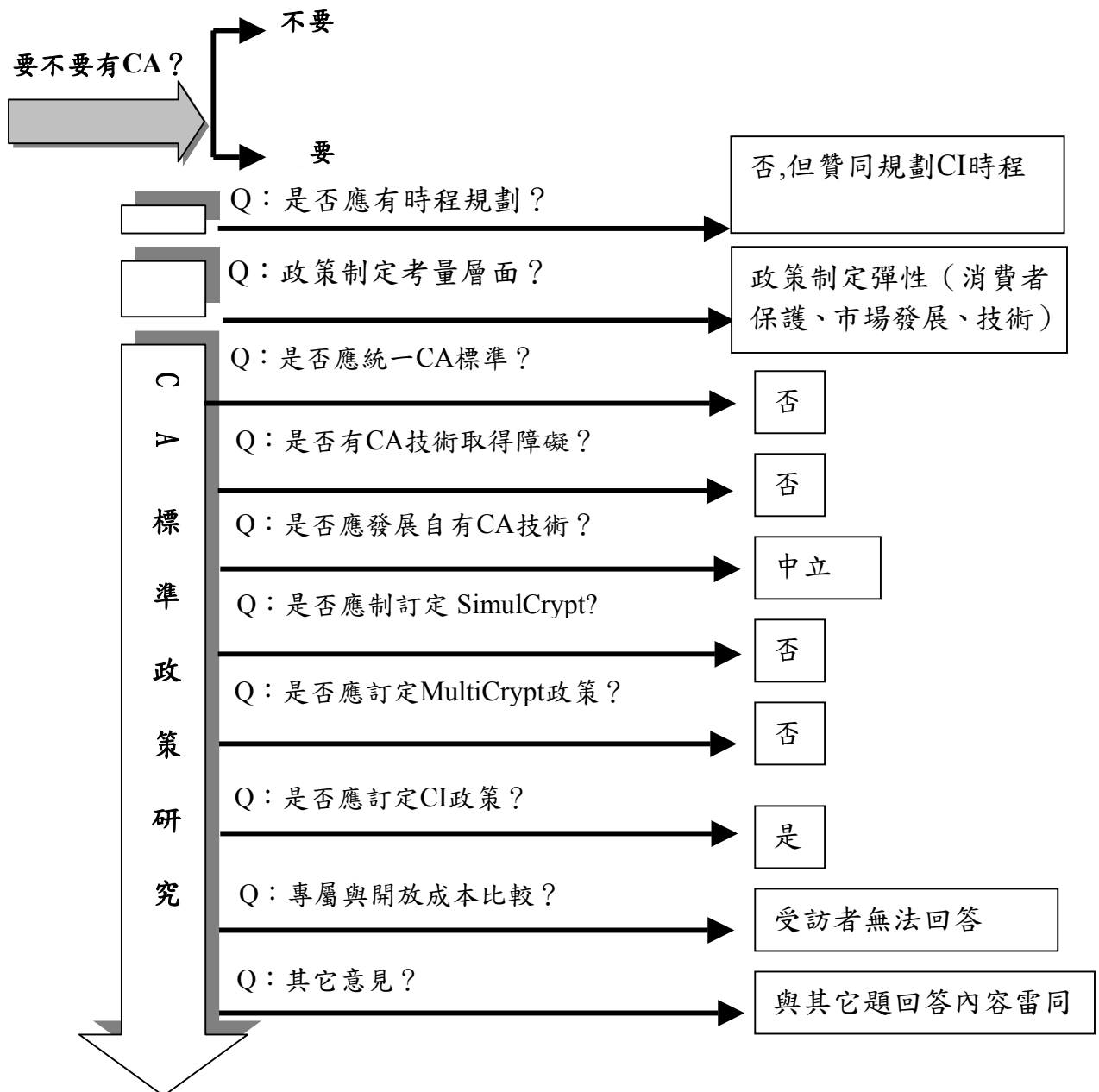
7.2 深度訪談意見分析

深度訪談問卷調查意見分析如圖 7-1：

1. Q：是否應有時程規劃？ 絕大多數受訪者認為 CA 是市場面的問題，反對政府規劃 CA 發展時程；若政府欲規劃 CA 發展時程，則主要應針對 CI 來作規劃，另外應有周全之傳播政策配合，及應配合數位電視發展時程規劃。
2. Q：是否應統一 CA 標準？ 受訪者多持反對意見，不認為應由法規規定無線、有線、衛星應統一 CA 標準。因有線電視目前已開始積極準備，因此目前法規可能只能針對五家無線電視台規定必須統一 CA 標準，但無線電視台受訪者則認為法規應公平，不應只規定無線要統一，並應由業者自行選擇 CA 廠商。
3. Q：是否有 CA 技術取得障礙？ 受訪者一般認為沒有 CA 技術授權取得的障礙，尤其授權金方面因是商業營運的考量，並非問題。
4. Q：是否應發展自有 CA 技術？ 受訪者在本題之意見以中立與贊同居多，多認同發展自有 CA 技術可帶來之相關利益，不過贊同之餘均附有但書，廣播業者不一定會採用國內自行研發之 CA 技術，並認為政府要發展應先評估可行性，並且不應用政策強迫業者採用自有技術。
5. Q：是否應制訂定 SimulCrypt？ 除有一位受訪者持保留意見，認為應視產業發展狀況，政府再決定是否需要規範，其餘受訪者均一致認為業者採用 CA 如同軟體的商業買賣，業者各有不同的商業營運考量，不應由政策規定必須採用 SimulCrypt。
6. Q：是否應訂定 MultiCrypt 政策？ 受訪者均一致認為業者各有不同的商業營運考量，不應由政策規定必須採用 MultiCrypt。
7. Q：是否應訂定 CI 政策？ 除安全疑慮與責任問題，受訪者均肯定政策制

訂開放模組對消費者或產業之利益。惟有受訪者認為若要制訂，應對有線、衛星、無線三者均公平訂定，另外在細節規範應由政府或業界決定，是贊同之餘較不同之意見。

圖 7-1 個別訪談意見分析說明



7.3 方案 1：市場完全自由政策

方案 1：完全開放的政策	
<p>說明：</p> <p>此方案為政府不制訂具體的數位電視 CA 政策、法規與標準，由產業發展趨勢形成決定。如需共同標準、規範，可由現有的民間公學會共同制訂標準、規範，報請政府主管單位核可，政府再決定是否成為國家標準。</p> <p>例子：澳洲、加拿大、德國，至目前為止沒有具體政策。</p>	
採取方案 1 之優點	採取方案 1 之缺點
CA 本質是隱密性的，由市場競爭產出廉價且安全的 CA 系統	消費者可能需支付較高的市場試驗成本代價，標準不一致也可能因此不易更換設備，因此可能損及消費者權益
市場尚未成熟，政府可待數位電視用戶普及後再考慮 CA 政策之制訂	技術中立對於接收設備製造廠商之發展，沒有共通的統一的標準，將導致使製造商不知如何遵循，可能導致市場發展凌亂，有礙消費者權益
業者可自由發展其商業模式，較易順應市場發展趨勢，選用之標準也較易與世界接軌	
台灣市場規模略小，不宜太早訂定政策，可待國外有成功模式後再制訂明確政策	

7.4 方案 2：制定開放模組介面政策

方案 2：制訂開放模組介面政策	
<p>2-1：政府制訂開放模組介面之政策原則。例子：美國</p> <p>2-2：政府制訂開放模組介面之政策原則，相關規範由政府與業界組成之工作小組共同決定。例子：新加坡</p> <p>2-3：政府制訂開放模組介面之政策原則，及規定相關規範。例子：英國</p>	
<p>說明：</p> <p>方案 2-1 主要為政府制訂幾個開放模組介面的主要大原則，包括：(1)引用產品範圍、(2)實施時程、(3)開放模組介面之標準規範。例如：要求在公開市場或零售店販售的接收設備（所有權屬於消費者），包含至少一個符合此標準的可更換模組介面。而這些原則以及其他相關規範，可由政府出面主導組成的業界共同工作小組來共同訂定（方案 2-2），或由政府自行制訂（方案 2-3）。方案 2-1 至方案 2-3，政府所規定之政策，從原則性漸增至詳細規定，至方案 2-3 政府具有最強之管理力。</p>	
採取方案 2 之共同優點	採取方案 2 之共同缺點
可符合零售銷售模式，開放模組介面可使用戶數增加較快，有利產業發展	若接收設備廠商目前已內建專屬式 CA 系統，可能需增加開放模組介面之製造成本
若使用開放模組介面，使設備製造商有標準可尋	業者對開放模組介面有安全疑慮

開放模組介面使市場有競爭存在，讓業者可透過公平機制來競爭	
若使用開放模組介面，廣播服務業者欲更換 CA 系統，亦可降低租送給顧客之專屬式設備回收轉換成本	
對消費者而言，開放模組介面可保障消費者收視權益，不被單一業者鎖死	
除共同優點外，方案 2-1 之個別優點	除共同優點外，方案 2-1 之個別缺點
政策只訂到降低消費者負擔，與增加消費者之方便，技術與商業細節政府不干涉，讓其回歸市場	相關規範仍須由業者自行決定，使設備製造商無明確共通標準可尋
除共同優點外，方案 2-2 之個別優點	除共同優點外，方案 2-2 之個別缺點
政府角色具管理彈性，並可符合業界對細部標準制定期望	政府主導之業界工作小組，若欠缺專業素養召集人，可能無法凝聚共識，喪失小組成立之目的，而工作小組之意見亦可能為業界強勢業者為主導左右規範訂定
	若業界無法協調統一之開放模組介面標準，則市場上可能仍存在多套開放模組介面之標準，未達到保障消費者權益目標
除共同優點外，方案 2-3 之個別優點	除共同優點外，方案 2-3 之個別缺點
政府明訂開放模組介面之標準，使業界有一明確國家標準可遵循	技術無法中立

7.5 方案 3：制定 SimulCrypt（同步加密）政策

方案 3：制訂同步加密（SimulCrypt）政策	
<p>3-1：政府制訂 SimulCrypt 之政策原則。</p> <p>3-2：政府制訂 SimulCrypt 之政策原則，介面規範由政府與業界組成之工作小組共同決定。</p> <p>3-3：政府制訂 SimulCrypt 之政策原則，並規定介面規範。</p>	
<p>說明：</p> <p>此方案為對頭端廣播業者制訂規範，規定必需採用 SimulCrypt。</p> <p>例子：目前尚未有國家制訂此政策。</p>	
採取方案 3 之優點	採取方案 3 之缺點
廣播業者不易被 CA 業者限制住，較易更換想要的 CA 技術，對頭端廣播業者更有保障	採用 SimulCrypt 會浪費少許額外的頻寬來傳 ECM 及 EMM
不同的 CA 技術相互競爭，有利廣播業者及消費者	頭端廣播業者會增加一些建置成本

7.6 第二次座談會意見彙整

數位電視在我國屬於剛起步階段，產業環境尚未明朗。而預期未來的數位電視產業發展將逐步朝自由化與國際化邁進，(1)可以逐步走向全面開

放；(2)因處於自由競爭的大環境中，價格會隨著效率的提高及競爭的激烈而降低；(3)服務的品質會因業者之間的競爭而大幅提高；(4)產品會更為多樣化；(5)因廠商數增加、價格降低、服務品質提升，以及產品的多樣化等有利因素，使市場規模擴大。

產業上不同的參與者，對於 CA 標準政策訂定，各有不同的利益考量出發點。第二次座談會主要的參與者可分為下列三者，其意見彙整如下：

7.6.1 廣播業者

主要包含有線、無線、衛星等業者，廣播業者單位為主要的服務提供者。目前三者 in CA 機制的運作上，衛星業者已開始有使用 CA 機制；有線業者則配合分級付費之政策，開始積極投入有關 CA 機制的運作；而無線業者現階段主要是準備數位電視的開播，初期仍以免費節目為主，在經營模式尚未確定之前，對於使用在付費節目的 CA 機制，並非其目前重要的考量。

我國民眾目前主要的收視方式主要仍是以有線為主，為最具影響力的廣播業者，前幾大有線 MSO 業者，對於 CA 的考量主要為：(1)「建置成本低、並可達到有效運作」；(2)「既有收視顧客不會輕易轉換到競爭對手」。因此所持觀點多是市場開放為主要原則，並不希望政府政策影響已準備即將開始運作的 CA 機制。對於用戶的接收設備，有線業者也計畫以贈送的方式提供低價位的基本型接收設備予顧客使用，以避免顧客輕易流動到競爭對手，對於開放模組政策也就較不贊同。

7.6.2 設備製造商

設備製造商主要包括 STB、DTV 製造商。對生產接收設備的製造商來說，「標準」是其最重要的考量。包含大標準是歐規或美規、以及進一步的 CI 標準，都希望能有國家標準可以遵循，並希望相關服務提供者亦能遵守使用。

7.6.3 政府與學術研究機構

主要多以「消費者權益」為考量點，因此多贊同制訂開放模組政策之優點，可以有效達到保護消費者選購接收設備時之權益。但對於要求有關 SimulCrypt 與 MultiCrypt 的政策，則多認為應業者自己商業營運的考量。

綜合本研究對各國政策標準之分析比較（第五章），及歸納訪談意見，最後分析我國國情，本研究擬定三項可行方案，由低度管理至高度管理，分別為：

方案 1：完全開放的政策

方案 2：制訂開放模組標準政策

方案 3：制訂 SimulCrypt 政策

（註：方案 2 與方案 3 可單選或複選）

以下三節，將詳細描述此三項方案，並加以比較優缺點，最後提出本研究建議之方案。

第 8 章、我國數位電視條件式接取標準建議草案

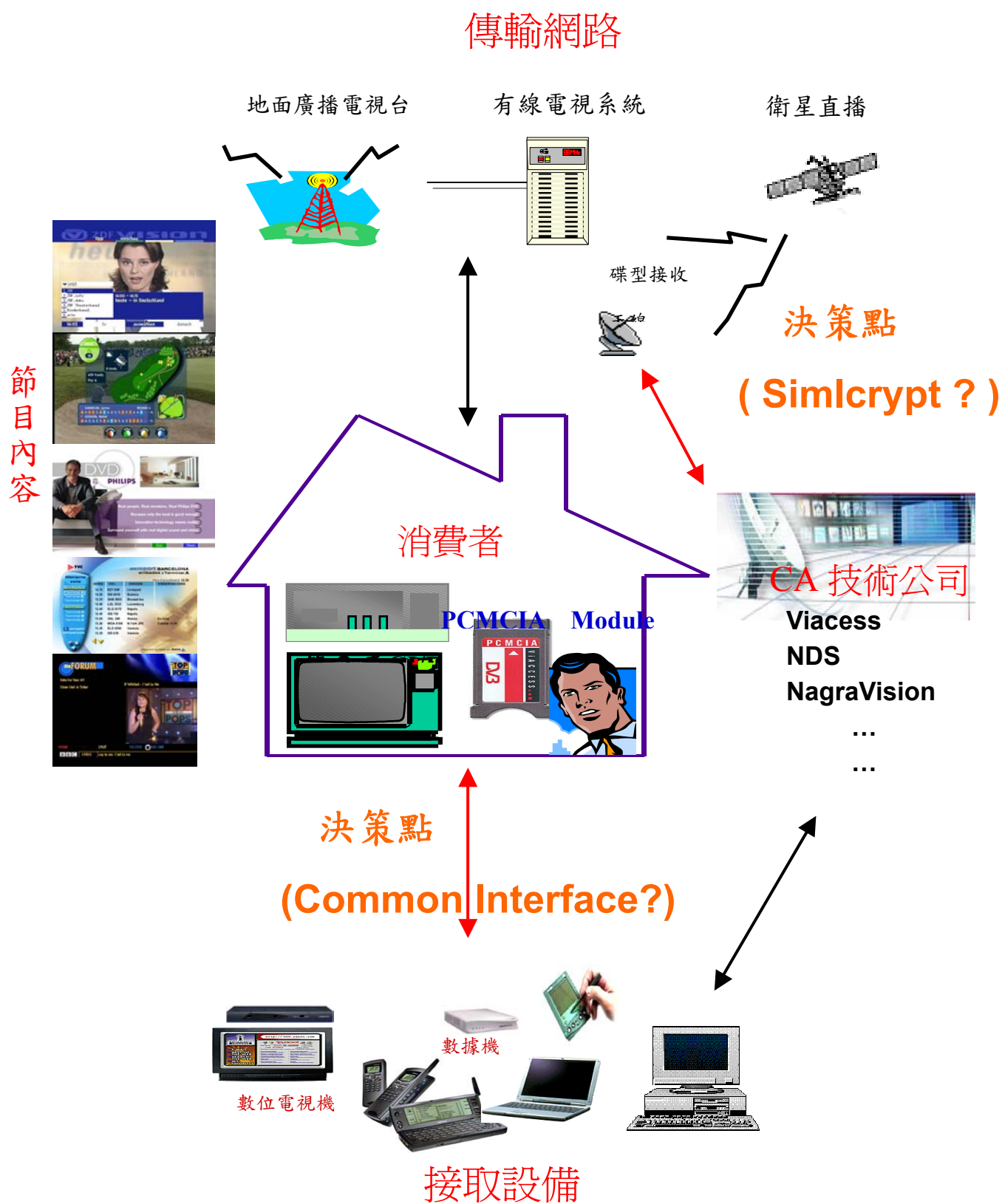
8.1 數位電視條件式接取標準建議草案制訂說明

數位電視產業法規修訂的立法主要精神不外乎在保護消費者權益前提下，將競爭的概念導引到市場之中。藉由公平而開放環境的建立，使多家業者能夠經由競爭合作等不同方式，有效地使用社會資源，藉由競爭來促使服務品質的提昇及費率制定的合理化。基本上需要考慮以下的因素：一、建立在公平、合理、非歧視的基礎上；二、維持產業競爭機制，確保社會資源有效運用；三、鼓勵創新及投資；四、保障消費者權益。基於上述政策制訂考量，以及數位電視條件接取產業上中下游其它考量因素（如圖 8-1），以提出適用於我國環境之數位電視條件接取政策建議方案。目前各國 CA 政策以美國、新加坡、英國較具雛形，基本上，各國因其數位電視發展的程度不同，科技技術能力及國家產業優勢迥異，故各國在訂定數位電視國家政策時，在程度上及做法上亦不盡相同。

（1）美國

美國講求自由市場經濟為原則，在 CA 法規上主要針對有線業者在設備上進行規範，其規範主要為：當業者在提供給收視戶有關收視設備（如 set top box）時必須給其有擁有或是租用其收視設備的選擇權。規範零售市場之有線電視接收設備必須在 2000 年 7 月 1 日後使其收視端設備中的安全模組能夠分離出來，此外在 2005 年 1 月 1 日後，其必須只能採用分離的模組來做收視的儀器設備。如此一來消費者將會可以有較多的選擇，也能維持市場的競爭機制，而不會有壟斷的情形。

圖 8-1 數位電視 CA 產業上中下游法規決策架構示意圖



（2）新加坡

由新加坡廣電局與產政學研代表組成新加坡數位電視委員會，以擬訂新加坡數位電視相關政策與標準。在數位電視接收設備主要規範有三點要求：一、必須包含一個整合的數位解碼器；二、不能內建一個隱含的 CA 系統；三、要能有標準數位介面及連接器或數位電視共同介面來連結 CA 系統。具體條文已納入 Mobile DTV 服務執照實施。

（3）英國

英國政府對數位電視發展有前瞻性的政策規範，由主管機關 Oftel 來加以監督，旨在引導數位電視產業發展。主要內容分為幾個部分：一、有關 CA 技術之產業財產權（industrial property right）授權到顧客端接收器材製造商之相關法規規範。二、CA 業者在提供服務時必須遵守公平、合理、非歧視的條件，包括在價格上或是提供的服務內容上。三、有線業者在 CA 運作上之相關規範。亦由 1996 年的『先進電視服務規範』，規範消費者端器材客戶端解碼接收器必須能接收沒經過加密（scrambling）的訊號，且電視機內建有數位解碼器時，必須有一個開放的介面來接取其他 CA 系統或數位解碼系統。

我國數位電視產業尚處萌芽階段，因此本研究建議在數位電視產業以漸進的方式逐步發展，政策上在保護消費者前提下，要求開放模組介面原則，促進標準化與掌握服務發展彈性；開放介面標準規範則建議由產、政、學、研代表共同研擬，使政府決策能掌握重點，促進我國數位電視產業快速穩健發展。

透過文獻探討、公開公平公正之訪談、座談會等方法，與國內產政學研各界（包括廣播業者、接收設備製造商、政府與學術研究單位）做意見溝通交流，瞭解產、政、學、研各界意見，本研究建議針對零售市場販售之接收設備加以管理，制訂開放模組介面政策，並由政府主導成立產政學

研各界所組成的工作小組，共同探討開放模組介面的範疇、時程、規格等相關議題，以達到確保消費者權益，廣播業者與接收設備製造商能有公平競爭之環境與營運空間，進而達到產業發展整體效益最大化之目標。主要建議如下：

1. 政策制定出發點考量

政策制定應建立在以下原則：

- (1) 建立在公平、合理、非歧視的基礎上。
- (2) 保障消費者權益。
- (3) 維持產業競爭機制環境。
- (4) 鼓勵創新及投資。

2. 制訂開放模組介面之目的

- (1) 保護消費者選擇接收設備與營運服務者之權益。
- (2) 促進接收設備標準化與營運服務彈性。
- (3) 使數位電視服務與節目產業得以漸進逐步發展。

3. 制訂開放模組介面標準原則

應要求包括：

- (1) 實施產品範疇。
- (2) 實施時程。
- (3) 開放模組介面標準規範。

例如：要求在公開市場或零售店販售的接收設備（所有權屬於消費者），包含至少一個符合此標準的可更換模組介面。

4. 成立共同工作小組

進一步的共同介面標準規範，則由政府主導組成工作小組來共同訂定。工作小組成員包括產、政、學、研代表，針對如何制訂開放模組標準，參考國內外市場與科技發展進度，進一步深度討論以形成共識。

5. 建議實施實時程

CA 標準實施時程需配合我國數位地面廣播電視開播時程，但數位地面廣播電視即將開播，因此建議儘速成立數位電視 CA 標準工作小組，討論相關細項問題，使業界以茲遵循。

6. 標準技術中立與廣播平台相容性

國際上主要數位電視標準體系有 DVB、ATSC、OpenCable 以及 ISDB。由於數位電視 CA 與傳輸及壓縮標準系統架構設計，CA 的標準必須選擇與數位電視傳輸及壓縮相同體系的標準（例如：假使我國有線電視採用 DVB-C 的系統，則有線數位接收機的開放模組介面就需要選用 DVB-CI 介面）。亦即要有相容有線、地面、衛星各廣播平台 CA 標準開放模組介面前題是各傳輸媒介採有一致數位電視傳輸標準體系。目前我國有線、地面、衛星各廣播平台環境皆採用 DVB 傳輸標準，則在 CA 標準技術中立政策原則下，在公開市場或零售店販售的有線、地面、衛星接收設備皆可採用 DVB-CI 開放模組介面 CA 標準以和各廣播平台環境相容通用。

8.2 數位電視條件式接取標準建議草案

數位電視條件式接取標準建議（草案）

DTV Conditional Access Standard Implementaton Guideline (Draft)

10.18.2001

條文	Articles
第一條：立法精神¹⁴	Article 1: Legislation Philosophy
數位電視條件接取標準制定方針之精神為： 1、建立在公平、合理、非歧視的基礎上， 2、保障消費者權益， 3、維持產業競爭機制環境， 4、鼓勵創新及投資。	The philosophy of DTV Conditional Access Standard Implementation Guideline are: 1. to establish fair, reasonable, and non-discriminatory regulation foundation; 1. to protect the consumer interest; 2. to support and maintain industry competition mechanism; 3. to reward early investment, and innovation.
第二條 定義	Article 2 Definition
1、數位電視條件接取：數位電視服務與節目之接取控制機制。 2、服務營運者：從事數位電視條件接取營運者可為無線電視、有線電視、衛星電視業者或獨立第三業者。 3、接收設備：接收數位電視服務與節目之設備包括數位電視機、數位機上盒、多媒體電腦等。 4、用戶：指取得、購置接收設備以接受服務營運者服務之消費者。 5、開放模組介面：數位電視接收設備與條件接收開放模組間之實體與協定介面。	1. DTV Conditional Access: a mechanism for control of access to DTV service and programs 2. Service Operator: a terrestrial TV, cable TV, satellite TV, or a third party who operates DTV conditional access service to control access to paid DTV service and programs. 3. Receiving Equipment: equipment capable of receiving DTV service and programs, including DTV set, DTV STB(Set-Top-Box), and DTV capable multimedia PC, etc. 4. User: consumer who obtains, purchases DTV receiving equipment to access the DTV service and programs. 5. Open Module Interface: a physical and protocol interface between the DTV receiving equipment and the conditional access open module.

¹⁴消費者應有自由在市場上選購接收設備與服務經營者之權益。在數位電視開播後，缺乏條件接收政策將形成用戶轉換服務提供者之障礙，並造成產業不公平競爭環境。准此，乃參照先進國家之相關規定，並配合我國環境修正，訂定本建議草案。

第三條 主管機關¹⁵	Article 3 Governing Organization
數位電視條件接取標準制定方針之監理事項由交通部主辦、會同經濟部、新聞局相關單位共同協調之。	The MOTC is the principal governing organization of DTV Conditional Access Standard Implementation Guideline. MOTC should coordinate the respective issues with necessary entities of MOEA, and GIO.
第四條 開放模組介面標準制訂之目的¹⁶	Article 4 Goal of Open Module Interface Standard
1、保護消費者選擇接收設備與營運服務者之權益。 2、促進接收設備標準化與營運服務彈性。 3、使數位電視服務與節目產業得以漸進逐步發展。	1. To protect the consumer interest in the independent selection of the DTV receiving equipment and service. 2. To facilitate the standardization of DTV products and service flexibility. 3. To allow progressive development of CA enabled DTV service and program industry.
第五條 成立共同工作小組¹⁷	Article 5 To Establish Common Working Committee
由主管單位召集產政學研代表、專家，成立共同工作小組，擬訂實施細則，包含開放模組介面標準： 1、實施產品範疇， 2、實施時程，及 3、規範。	The principle governing organization should organize The Common Working Committee of DTV CA Open Module Interface Standard to define the implementation details, including: 1. applicable scope of products, 2. implementation schedule, and 3. specification.
第六條 適用對象與用戶權益保障¹⁸	Article 6 Applicable Segment and User Protection
用戶至公開或零售市場購買販售的接收設備，所有權屬於消費者時，接收設備需包含至少一個符合開放模組介面規範介面，以保障用戶權益。但服務經營者直接提供給用戶(免費與否)之接收設備則不在此限。	To protect consumer interest, DTV Receiving Equipment sold at the open, retail market, should contain at least one interface conformed to the DTV Conditional Access Open Module Interface Spec. (This does not abide the DTV Receiving Equipment provided directly (free or not) by the a service operator to a user.)

¹⁵參考美國、英國之 CA 政策制訂主管機關。與我國主管機制環境之考量。

¹⁶參考美國之 CA 政策制訂方向。

¹⁷參考新加坡之 CA 政策制訂方式。

¹⁸參考美國之 CA 政策制訂方向。

8.3 結語

隨著未來我國數位電視的開播，多元服務內容，為確保 CA 條件接取能完善運作，本研究建議針對有線、衛星、地面數位電視零售市場販售之接收設備加以管理，制訂開放模組介面政策；由政府主導成立產政學研各界所組成的工作小組，共同探討開放模組介面的範疇、時程、規範等相關議題；以保護消費者選擇接收設備與營運服務者之權益，促進接收設備標準化與營運服務彈性，使數位電視服務與節目產業得以漸進逐步發展，進而達到產業發展、整體社會發展效益目標。

此外，在數位電視應用發展上亦須考量 API(Application Interface)標準之訂定，目前數位電視 API 多半以 HTML 及 Java 為核心擬訂。歐規 DVB API 標準為 MHP(Multimedia Home Platform)，美規 ATSC 亦提出 DASE (DTV Application Software Environment)標準；另外還有微軟、Intel、Discovery、Time Warner、NBC 等所支持的 ATVEF(Advanced Television Enhancement Forum)，以及 OpenTV 業界私有 API 等。對我國數位電視節目加值應用發展，這亦是未來必須加以考量者。

產業的發展由自由化與國際化走向開放、自由競爭環境中，產品、服務多樣化，價格會隨著競爭、效率提高而降低。因廠商數增加、價格降低、服務品質提升，以及產品的多樣化等因素，而使市場規模擴大。我國與其它如新加坡、韓國、香港等地區因地狹人稠，民眾活動空間不大，休閒娛樂的內容有限，所以數位電視互動視訊與多媒體服務的推廣，相對成功機率很大。接取設備製造商應保持競爭力強點，掌握時機，推出具國際競爭力產品，搶得市場先機；廣播業者應及早思考新興服務商機所在，對 CA 技術的掌握，可提供消費者更多加值服務，也為廣播業者帶來更大的發展空間。

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- 【6】 ETR 289, Support for Use of Scrambling and Conditional Access (CA) within Digital Broadcasting Systems, Oct. 1996.
- 【7】 ETSI TS 101 197-1 v 1.1.1, DVB SimulCrypt; Part1: Head-end Architecture and Synchronization, June 1997.
- 【8】 EN50221, Common Interface Specification for Conditional Access and other Digital Video Broadcasting Decoder Applications, European Standard.

- 【9】 ATSC Standard A/70, Conditional Access System for Terrestrial Broadcast and Amendment No.1, 1997. (Available from the ATSC at www.atsc.org.)
- 【10】 EIA Standard, EIA-679-B, National Renewable Security Standard, March 2000.
- 【11】 IS-POD-131-INT06-010515, OpenCable Host-POD Interface Specification.
- 【12】 IS-POD-CP-INT05-010515, OpenCable POD Copy Protection System.
- 【13】 ETSI EN 300 468 v1.4.1, Specification for Service Information (SI) in DVB systems, Nov. 2000.
- 【14】 各國政策原文文件
- 【15】 CA 技術相關文件

DVB STANDARDS :

DVB-CSA

1. Digital Video Broadcasting (DVB); Support for use of scrambling and Conditional Access (CA) within digital broadcasting systems, ETR 289, 1996.

DVB-SIM

1. Digital Video Broadcasting (DVB); DVB SimulCrypt; Part 1: Head-end architecture and synchronization, ETSI TS 101 197-1 V1.1.1, 1997
2. Digital Video Broadcasting (DVB); Head-end implementation of DVB SimulCrypt, ETSI TS 103 197 V1.1.1, 2000.

DVB-CI

1. EUROPEAN STANDARD, Common Interface Specification for Conditional Access and other Digital Video Broadcasting Decoder Applications, EN50221, 1997
2. Digital Video Broadcasting (DVB); Extensions to the Common Interface Specification, ETSI TS 101 699 V1.1.1, 1999
3. Guidelines for Implementation and Use of the Common Interface for DVB Decoder Applications, 1998.

ATSC STANDARDS :

1. ATSC STANDARD, Conditional Access System for Terrestrial Broadcast and Amendment No.1, Doc. A/70, 1999, Amendment No.1 – 31, 2000.
2. EIA STANDARD, National Renewable Security Standard, EIA-679-B, 2000

OpenCable STANDARDS :

1. OpenCable HOST-POD Interface Specification,
IS-POD-131-INT06-010515
2. OpenCable POD Copy Protection System, IS-POD-CP-INT05-010515

(註：參考文獻 14 與 15 為另外檢送之文件影本)

附錄一：中英文名詞對照表

Algorithm: 演算法

ATSC: Advanced Television Systems Committee, 美規, 先進電視系統委員會

Bitstream: 位元串流

CA: Conditional Access, 條件接取

CI: Common Interface, 共通介面

CW: Control Word, 控制字元

CWG: Control Word Generator, 控制字元產生器

Decryption: 解密

DES: Data Encryption Standard, 美國國家資料加密標準

Descrambling Algorithm: 解擾碼演算法

DVB: Digital Video Broadcasting, 歐規, 數位電視廣播

ECM: Entitlement Control Message, 授權控制系統

ECMG: ECM 產生器

EMM: Entitlement Management Message, 授權管理系統

EMMG: EMM 產生器

Encryption: 加密

ISDB: Integrated Services Digital Broadcasting, 日規

ISO: International Standard Organization, 國際標準組織

Key: 秘密鑰匙

MPEG: Moving Picture Expert Group, 動態影像壓縮專家群

Multicrypt: 多重解密

MUX: Multiplexer, 多工器

NDA: Non Disclosure Agreement, 保密條款

NRSS: National Renewable Security Standard, 美國國家可抽換安全模組標準

PCMCIA: Personal Computer Memory Card International Association, 個人電腦記憶體卡國際協會

PES: Packetized Elementary Stream, 已包裝的單位串流

POD: Point of deployment

PS: Program Stream, 節目串流

RSA: Rivest-Shamir-Adleman Algorithm, 一種公開鑰匙加密系統

SAS: Subscribe Authorization System, 訂購授權系統

Scrambler: 擾碼器

Scrambling Algorithm: 擾碼演算法

SCS: Simulcrypt Synchroniser, 同步加密同步器

Simulcrypt: 同步加密

SK: Service Key, 服務鑰匙

Smart Card: 智慧卡

SMS: Subscribe Management System, 訂購管理系統

STB: Set-top-box, 機上盒

Stream: 串流

Synchronizer: 同步器

TS: Transport Stream, 傳輸串流

UK: Users Key, 使用者鑰匙

附錄二：受訪者各題意見重點紀要

受訪者 (1)

1. 是否應由政府規劃 CA 發展時程？

答：除非政府能很清楚的預估台灣數位電視產業的發展，才能定時程規劃，否則定了又會常修改。若能訂得很實際，那業界當然沒有問題；但若無法訂得很實際，就乾脆不要訂時程。

2. 政府政策考量？

答：政府訂定政策須考量消費者負擔和方便性，商業有關的細節政府不要干涉，否則訂的太細，對消費者不一定有利，反而還增加了業者相互間協商的困擾。

3. 是否應統一（無線、有線、衛星）CA 標準？

答：無線電視台只有五家，目前應會整合在一起，但訂法規時，不能只有訂定無線電視台須整合，法規須公平，若要訂立規則，必須對無線、有線、衛星都公平，否則就都不要訂。目前五家電視台正在談整合問題，但政府不需要訂法規來強制無線電視台整合，因為這是屬於商業問題，政府應該給予自由。

4. 是否有 CA 技術授權取得障礙？

答：無障礙。

5. 是否應發展自有 CA 技術？

答：業者會考量系統的優缺點、售後服務等，再考量其要使用國內或國外 CA 系統，在商言商，不會因為國內有人發展技術就使用國內的系統，完全是商業考量。若由政府來領導業界發展國內自有 CA 技術，可能一塌糊塗，因為政府的效率往往不如民間。

6. 是否應規定頭端需採用 SimulCrypt？

答：回歸市場，不該由法規來強制業者採用，若採用 SimulCrypt 有好處，業者自然會採用，不需要由法規來強制業者。

7. 是否應規定設備端需採用 MultiCrypt？

答：對消費者最有利的方​​式，是無線、衛星、有線用同一個系統，消費者用一張卡即三者皆可收看，但政府若要要求業者，必須對無線、有線、衛星都要求，這樣才公平，若無法做到這樣，就對三者都不要干涉。

8. 是否應規定 CA 模組與接收設備分離？

答：這樣對消費者有利，若能對無線、有線、衛星都要求 Common Interface，非常贊同，但不要只管到無線電視台。

9. 有關專屬式與開放式的成本比較？

答：本題未回答相關意見。

10. 對本研究案之其它建議？

答：很明顯可以保護消費者的才訂定政策，其它的政府不要干涉，讓市場回歸市場。

受訪者（2）

1. 是否應由政府規劃 CA 發展時程？

答：台灣沒有一個單位是可以代表這個產業的，美國有一個 FCC，事實上很多東西是民間的腳步在前面，政府在後面，有線電視法就是這樣出來的。

2. 政府政策考量？

答：CA 就如同好像使用軟體，如 Microsoft office，所以應由業者自己決定。政府政策應只制訂原則即可。

3. 是否應統一（無線、有線、衛星）CA 標準？

答：本來我們的想法就是 STB 最好 cable、衛星、地面能夠整合在一起是最好的，如果沒有就是 cable 走 cable、衛星走衛星、地面走地面，接下去就是地面最好只有一個盒子就好了，如果每一家用一個變成要插很多個卡，現在我們就是朝這個方向在做，我們要成立的平台營運公司就可以做這件事。政策訂得越多越不容易執行，政策不需規範要使用同一家 CA 公司，應該用獎勵的方式誘因。

4. 是否有 CA 技術授權取得障礙？

答：本題未回答相關意見。

5. 是否應發展自有 CA 技術？

答：事實上台灣就這麼大一個，要做 CA 不容易，NDS 就有兩千多個博士在做這個，台灣沒有那麼多的電腦博士來做這個，因為一破解的話就很麻煩了，要做到別人破不了才行。台灣做加工很快，研發的話，台灣的企業主也多不願意在這方面投資。我們還是希望自己可以發展，包括工研院一票的專家在那裡，像數位電視政府應該大力的提倡，需要政府支援，政府獎勵是一種方法。我們也希望工研院推出一套出來，我們來配合試用，可以的話大家就可以參考採用，所以我認為我們應該要朝這個方向努力，應該自己發展一套，包括有可能的話，與大陸合作，用我們自己中文系統，外國要破就很難了，英文的話是他們自己原來的系統，就很容易被破了，大陸的軟體人才是比台灣多很多。這個東西就像新竹科學園區一樣，政府不丟錢下去沒辦法起來，政府仍應先評估，認為對國家有利的，要發展這個產業、要培養人才的話，就應該投入。

6. 是否應規定頭端需採用 SimulCrypt？

答：本題未回答相關意見。

7. 是否應規定設備端需採用 MultiCrypt？

答：本題未回答相關意見。

8. 是否應規定 CA 模組與接收設備分離？

答：CA 最好還是大家的看法，因為像 CA 事實上也不能太多的系統，不能說民視一個、華視一個、台視一個，到時候 smart card 就要準備五張。但是我們在工研院裡也有共識，希望這個東西是能 open，用 CI 比較好，CI 的方式才不會被國外的大廠給綁住了，大廠殺傷力強，我們自己才不會

受牽制於別人。雖然五家要使用同一個 CA 廠商，但仍應採用 CI，對業者來說有問題的話才不用花費成本、人力回收盒子，對顧客來說也可節省設備成本。

9. 有關專屬式與開放式的成本比較？

答：本題未回答相關意見。

10. 對本研究案之其它建議或意見？

答：將在無線電視台工研會提出此議題，共同討論共識。贊同由政府主導的工作小組之成立，但必須有這方面的權威學者帶領才可行。

受訪者 (3)

1. 是否應由政府規劃 CA 發展時程？

答：在這個產業來講，政府其實只要扮演協助的角色就好了，不需要去設任何的時程，不然的話，在不同的傳輸產業他可能已經發展到了各自不同的階段，你還硬要把他拉到一樣的發展程度，這個方式就很有可能產生很多的問題。

2. 政府政策考量？

答：因為有線電視和無線電視業者在發展的現況上，並沒有到了一個各自都已經就位的情形，因此在這個部份怎麼樣去訂這些政策還是不要太早訂下什麼太死的標準，先由各家業者去找出他們自己適合的系統或是發展模式，到了比較成熟的情形下，才有可能去談是不是有什麼具體的政策可以來規範業者。

3. 是否應統一（無線、有線、衛星）CA 標準？

答：現在的問題是在於這種可能性有多高，如果是在目前的情況來講根本就沒有可能去做，那麼政府要硬性的規定這種東西實在是沒有什麼意義的事情。

4. 是否有 CA 技術授權取得障礙？

答：我們目前來講大概只是要先做出一個開放性的架構和標準，在 CA 的部份倒是不必先這麼早去考慮。

5. 是否應發展自有 CA 技術？

答：這個部份在時間上是已經很緊了，從整個發展面來看的話，台灣目前也等於完全是沒有 CA 的產業，以國家本身來說，當然應該是要有自己的技術會比較好，但是在目前的狀況來看，如果國家認為有這個需要的話，還是應該要去開發這個部份，並結合相關業者的力量，以目前台灣的市場來看，是可以支持到一家 CA 廠商的生存的，不過在這個部份來講，人才可能是一個問題，但在同時，市場是不是可以接受這樣的模式，可能還有一定程度的問題。

6. 是否應規定頭端需採用 SimulCrypt？

答：在這個部份其實在成本上來講並沒有想像中的那麼大，只要把 CA 的系統電腦換掉就可以了，這個部份是沒有什麼很大的成本的，不過在政府的部份倒是根本就不必去管到這個部份就是了。

7. 是否應規定設備端需採用 MultiCrypt？

答：在無線電視業者來講，你要做 CI 的話，在用戶端間強制採用 MultiCrypt 其實是沒有什麼道理的事情，到時候可能就是直接告訴消費者你去店裡面買一個 MODULE 回來插進去就好了，並不用花什麼多大的力氣或是時間。

8. 是否應規定 CA 模組與接收設備分離？

答：在目前來講好像只有美國有做這樣的規範，另外新加坡也有，不過那是他們和業者之間商議的結果，在其他世界各國來講的話，其實如果是採用 CA 的國家他們自己都已經有了成功的商業模式，你現在要用這種觀念要他們去改變原來已經成功的商業模式，我認為那是不太可能的事，所以以 CA 模組與接收設備的產品是不是要分離的問題來講的話，可能要先看看現有業者是不是已經採用了什麼樣的一種模式來使用，不然的話，你再怎麼規範也沒有什麼實質上的作用。

9. 有關專屬式與開放式的成本比較？

答：在 CI 的模組的部份，這些東西其實最後這些成本都還是轉嫁到消費者的身上去，以二個成本來分析，其實應該是會 CI 那邊的成本比較高。

10. 對本研究案之其它建議或意見？

答：本題未回答相關意見。

受訪者（4）

受訪者綜合回答意見如下：

就我們的立場其實很清楚，我們跟本就不需要 CA。因為就我們的立場我們的節目不可能會向觀眾收費，我們並不向一般的商業頻道一樣什麼廣告都可以接；我們去做 data service 根本就沒有可能回收，在我們的商業利基裡最少就要有二個 free channel，所以我們無法在這一個部分來生存。

原住民、兒童這些部份還是我們的基本主題，在這些分眾上我們根本就沒有什麼商業上的利益可以回收，以太平洋衛視來講，他們的 free channel 還是要買他們的卡，才能夠收到他們的節目，這樣實在不能夠算是真正的 free channel，真正的 free channel 應該是我就算不是你的訂戶，你應該也要讓我能夠看的到你的節目才是，不然的話到時候國內真正的在推 CA 的時候，我們認為還是會有很大的問題。

在產業上而言，到時候對做 IRD 的人而言，要生產什麼樣的 IRD？在規格上就會面臨很大的問題，因為在這種情形下，他根本不知道今天要收視各家的節目到底需要什麼樣的規格？這和問卷裡所謂的模組分離又有些不同，在模組分開來講，他又會需要有模組的成本，像以 CI 的模組來講，這些 IRD 的製造廠商他又還是需要另外一個部分的成本。

以我們的立場來講，應該是要有一個最陽春的機種，根本就不要再有加上任何 CA 的組件的一種機種，在這樣的情形下，才有所謂 free channel 的可能，以我們的了解，在 IRD 的製造廠商來說，其實他們也並不是那麼希望用 CI 或是 CA 的模式，他們希望是產業最好一次就先把到底是用 CA 還是 CI 在一開始就先去談定，看到底是怎麼樣，那麼他們就知道接下來到底該怎麼做，真正在推要 CI 這個東西的人只有工研院在推而已，他們推的原因也只是因為在電視機的製造商來講，他們一直在努力的要求趕快

把 CI 的規格訂定出來。

以國內的相關產業來講其實真的很可憐，政府又表明要開放，完全不訂標準出來，在這樣的情形下，以有線電視來講，他一定會去找國外的廠商，而國外的廠商在量的部分絕對是大很多，而在價格或是品質上當然會有一定的競爭能力，在這種情形下，我們國內的廠商怎麼可能會有足夠的競爭力來發展自己的產業？這等於是國內自己把手上的整個產業免費奉送給別人去賺嘛！

對國內來講，如果很早就可以確定是要採用哪一家 CA 的話，那根本後面就不需要 CI 了嘛，所以你一定要先確定到底是要怎麼來走數位電視這一塊，對台灣本身的產業來講，如果是數位電視機的廠商，台灣本身這樣的市場是可以養得活目前的這些廠商，但是如果想要走外銷的路線，我們認為那是一件不可能的事情！對各國本身而言，在這種製造廠商的環境來說，一定是用當地的廠商來做，不可能會用別人的東西，所以台灣廠商這一塊根本就不可能去考慮外銷這件事！

以 API 這個部份而言，OPEN TV 大概是沒什麼機會了，因為他是完全封閉的系統，現在就只能看 MHP 的報價，看到時候怎麼樣的一個系統來做會比較好。

政府如果在政策上一定要來做一些輔導的話，其實可以直接告訴這些相關的廠商，先規定上游，要他們在節目上 free channel 不可以銷碼，這樣再叫做電視機的廠商就專心來做數位電視的部份，不要去管鎖碼這件事情，關於 CA 或是 CI 的部份就直接到丟給那些做 IRD 的廠商去做就好了，那麼對這些生產電視機的業者來講，他們也有錢可以賺，對 IRD 的廠商而

言他們也可以賺到錢嘛，那麼後面到底是要 CI 還是 CA，是要用哪一種其實都很清楚嘛！這樣子做就比較不會有那麼多的問題了，不然像現在最大的問題就是大家都不知道到底現在是要走什麼樣的方向，結果就都停在那裡，造成整個產業的停滯不前！

現在其實有 50% 的家庭他們根本就要需要像分級付費那些後半段的節目部份嘛！所以反而如果直接把 free channel 的部份直接就拉到消費者的家裡去，根本就不要用 BOX，那麼對有線電視的業者來講，他們也就不需要另外再去付擔這些 BOX 的成本了嘛！

其實數位電視委員會裡的 Work group 應該是要負責這一個部份的事情，但現在變成沒有一個人可以保證說如果採用那一個方式，大家一定都可以賺到錢，結果後來就變成說大家各講各的話，到後來仍然變成不了了之的結果，以五家無線電視業者而言，我們自己到現在都還是沒有辦法達成一定的共識，為什麼五家不能達成共識？因為大家都鴨子划水，自己在下面自己各有各的動作，到現在還是沒有辦法去找到一個一定的共識！

例如說共同塔台的營運模式來講，例如台視，要和我們合作，但是到發射塔台這一段，他自己卻要用自己的兩套設備，那這樣根本就不需要合作了嘛！這樣的情形你還要說電視產業還是要用什麼 CA 還是 CI 的東西，如果政府不能先解決前端的部份，根本就沒有辦法去談什麼共識不共識的結果嘛！

CA 的重點是因為他有可能會被破解，所以才要 CA 嘛！但是這樣的結果就變成如果你完全什麼都不規定，那就變成我們只好去找最複雜的嘛！那找最複雜的結果當然就是要錢啊，要錢的後果當然最後仍然是轉嫁

到消費者的身上，對國內而言根本一點好處都沒有！

受訪者 (5)

1. 是否應由政府規劃 CA 發展時程？

答：我的看法認為最好不要，因為 CA 牽涉到世界市場的問題，如果台灣訂一個所謂的 CA 時程規劃，是否能有能力與世界接軌，市場規模是否夠大，定義此東西讓數位產業順利發展或是蔓延發展都有可能，所以 CA 發展時程不要有政府的規劃，但是可以有政府的輔助國內廠商，所以重點應是讓市場來決定。但是共通規格與 CA 又不太一樣，共通規格是可以做比較柔性的規劃，但是不要太硬性的規劃，產業剛開始的時候，太硬性的規劃很容易讓市場機制受到傷害。

2. 政府政策考量？

答：“如果”政府一定要制訂 CA 政策，考量層面一定要與世界接軌，因為台灣市場沒有主導力量，沒有辦法像大陸或美國制定一套自己的，那是不可能的事情，所以 CA 應找一個主要市場去跟隨，如歐洲市場，數位的東西與規格歐洲似乎走得比較前面，較成熟。如果真的要制訂台灣的 rule，則建議一定要與人家 compatible，骨幹與人家一樣，枝節才加上自己的色彩。現在談到消費者考量是早了些，因為 CA 最重要是保護智慧財產權，這保護了產業本身也間接保護需付費收視的消費者權益，CA 並不是必要，而是有付費收視時才需要。所以政府制訂政策時應該考量產業的發展與政策可行性，與法令配套，對破壞的人刑法夠不夠，是不是屬於經濟犯罪，罰則夠不夠重等，不只是為了 CA，也是為了整體產業經濟的發展。

3. 是否應統一（無線、有線、衛星）CA 標準？

答：與其他業者談過這個問題，認為應該是各自發展，而這個問題從不同的層面來看會有很多不同的歧見，地面廣播部分似乎會採用共同一套 CA 廠商，但這不代表共同的 CA 標準。統一標準安全性可能比較差，因為這個標準是所有 CA 都可以上去的，只要找到最弱的 CA 破解，其他的就都跟著破掉了。如果不採用統一標準，採用一個信任的廠商，召集所有的有線、無線、衛星去跟這家廠商買，價格會比較便宜，但這是理想上，實務上的操作應該很困難，大家是否齊心、是否會圖利廠商，造成技術壟斷，所以考慮的是相當複雜的。統一對消費者是有好處的，換系統不用換機器，但是統一的缺點就是一旦系統破了就變成台灣都不設防了，所有業者投資風險變大。政府如果要訂統一標準，我們非常支持，但是要能負擔這個訂定規則的責任，否則的話則贊成業者各自發展。我們也希望有線能夠共同去採用共同 CA 的這個產品，因為這樣成本比較低，但是按照目前有線的緊密程度，並沒有像無線那麼緊密，比較獨立行使這個部分，所以目前是沒有這個可能。電視產業不管是有線、衛星、無線都比較封閉，業者間共同交流少，不像行動通訊產業，重視共通規格，否則無法互通。所以政府政策如果認為廣播屬於通信業，就應該有共同規格，如果認為他還是傳統廣播業，就不需改變本質，讓各自為政就好了。

4. 是否有 CA 技術授權取得障礙？

答：這是一個市場問題，國外 CA 廠商跟你收取權利金，你就必須衡量這個權利金是否付得起，是否有辦法在市場上得到回饋回來，所花的錢是否能回收，這應該是市場的問題，由公司自己去評估，類似買軟體一樣。權利金也因為談判的方式而不太一樣，有的可能是一次買斷，有的可能是分批買，視不同公司政策或商業模式而決定，所以應該沒有固定答案。

5. 是否應發展自有 CA 技術？

答：據我所知目前國內有兩家有做 CA 技術的公司，但是問題是台灣的規模可能很小，技術是否已經能夠接受市場的考驗，不見得比較便宜，因為自己做 RD 的費用 customer share 較少，風險也比較大，世界 CA 廠規模是很大的，也是經過市場考驗過的。這是政府產業政策輔導的問題，台灣的硬體做得不錯，是屬於大量重複生產的，但是對於沒辦法重複生產的產業，像軟體工業的發展，就必須觀察了，CA 的技術是數學，台灣人才的量是否夠去發展一套成熟的系統。對業者來說採購 CA 時考量的是這個 CA 本身是否具備競爭性，包括安全度、費用夠不夠便宜、報酬好不好、能力夠不夠大，至於是國產或是國外的並不在意，我採購時的重點是能否提供具競爭性的產品。這個產業是否值得政府投入，政府應該是會去評估的，而就旁觀者來看，現在要發展這個產業可能是有些困難的。

6. 是否應規定頭端需採用 SimulCrypt？

答：SimulCrypt 的好處是採用後，公司不會被單一的 CA 公司綁死，讓 CA 公司間產生競爭性，或許會讓價格降下來。但是壞處是盒子種類變多，只要有一個 CA 被破解，就必須回收或是消費者必須重買。政府如果規定 SimulCrypt 必須使用放兩個 CA，就必須像剛說的必須負起這個責任，業者若是只放一個則風險就是由業者自行承擔回收成本。SimulCrypt 會發生是因為不同的 operator merge 時，比如這家 operator 用 CA1，這家用 CA2，這兩家 operator merge 時，要共通一個 source，就必須用 SimulCrypt 把 CA1 與 CA2 放進去，Box 不用換。如過要讓 CA 競爭也可以想成這樣，但是讓 CA 惡性競爭未必對產業有好處，CA 賺不到錢，服務也就不好或安全比較差。這應該是商業行為，而不是法規要來規定的，當時機成熟時業者自然會做，政府不用告訴業者該天天吃三餐，這是不必要的。

7. 是否應規定設備端需採用 MultiCrypt？

答：MultiCrypt 我比較不看好，因為對消費者來說成本一定是比較高的，這費用誰要出呢？如果市面上有十幾種 CA，那要 MultiCrypt 幾種呢？一般來說一個 Box 就是解一個 CA，解第二個費用就變高，到底要解幾種才夠呢？這誰能告訴一個答案呢？萬一業者又用一個新的 CA，Box 不能解又該怎麼辦呢？所以還是有風險的，而且 MultiCrypt 一定比較貴，變成客戶必須自己去承擔，羊毛出在羊身上。

8. 是否應規定 CA 模組與接收設備分離？

答：Common Interface 是一個比較好的 solution，較沒有剛 MultiCrypt embedded 的問題，但是有一些需思考到問題，如果萬一 CI 被破解，仍有安全的問題，content provider 是否願意接受 CI，冒 source 可能被 copy 的危險。CI 是否已經夠安全，且是世界接受，當然可以要求賣者一定要用，但是萬一生產出來沒人要用或敢用，是制訂政策的需承擔風險嗎？台灣無線電產業平台規格強調技術中立，則應該放手，規定的話是針對有線電視或是一視同仁，又市場是否能接受，消費者能接受更貴的 Box 嗎？如果這是一個趨勢，達到經濟規模，成本 down 下來，自然會往這個方向走，是由市場決定一切，而不是由規定來決定一切，因為台灣的規定沒有辦法扭轉市場與世界市場抗衡，因為台灣的市場真的是太小了。而照理說如果想要達到在零售市場的販賣模式，應該是用分開模組會比較好的，用戶成長速度也會比較快，像大哥大，消費者到店面就可隨時買到，而不用等業者設定好後才送到家。而法規應該強調精神而不是細節，不要讓市場太束縛。

9. 有關專屬式與開放式的成本比較？

答：這部分我並不是很清楚，目前台灣並沒有人去購買所謂符合 DVB-CI 的 Box，沒有真正去買是不會知道他的成本。而 DVB-CI 或是 POD，應該是看你選擇的規格是什麼，如果選 DVB 就是考慮 DVB-CI，不會考慮 open

cable POD 的 Module。

10. 對本研究案之其它建議或意見？

答：成立工作小組討論細節有相當的困難度，因為經濟部也有類似業界科專在做，經濟部看的是產業發展，交通部看的是產業規範，我的看法是規範不能違背發展，發展是主動的要優先考慮，有因果關係存在，所以交通部訂規範應考慮產業的發展而不是想辦法去規範產業。你可能會想如果不訂的話是不是消費者權益會受損，可是如果產業沒發展的話，哪來受損的消費者。政策強調的應是精神。會比較建議工作小組是跨部會的，可能需會同經濟部、新聞局，交通部與新聞局是比較屬於管理的單位，經濟部是發展單位，所以應該不為逆。台灣未來是服務業越來越重要，而服務業最怕的就是規矩太多，這樣很容易讓產業失去生命力。

受訪者（6）

1. 是否應由政府規劃 CA 發展時程？

答：我覺得現在政府不應該干預 CA 發展的時程與規劃，因為整個市場尚未成熟，我認為應該由市場決定 CA 問題，因用 CA 是在數位化裡面，現在投資蠻大，投資要保護 STB 的問題，必須用好的 CA 保護我們的產品，如果 CA 不是由市場決定，CA 的安全我們沒有信心，所以應由市場決定 CA 發展，政府不應干預。

2. 政府政策考量？

答：我覺得政府不應該訂 CA 政策，應該由業者自己來選用 CA。CA 最大的目的是可以保護智財權，因為可以鎖碼，有授權後節目才可以看得到，不像類比很容易被人家偷看。另外未來數位廣播有很多的 Interactive、

e-banking、VOD 等，不同的小部分也可以用不同的 CA 部分授權。所以 CA 應由市場與業者自己去用，以及怎麼樣提供 CA 給客戶，因考慮的最重要因素是安全性，會影響我們的利益。如果要保護消費者可以從費用上去保護，比如付費方式不同、選購 STB 時有一些規定，比如 STB 是不能賣多少錢的，如果把 STB 的投資全部轉給用戶也不好，民眾可能也付不起買一個新的 STB，所以可能一部份的錢是從公司吸收，所以從消費者的立場我想也是有好處的。

3. 是否應統一（無線、有線、衛星）CA 標準？

答：因 CA 的發展較敏感一點，還有很多 CA 的廠商，自己有自己的專利 CA，與其它廠商的 CA 完全不同也不公開，所以定一個 CA 的同時，我覺得在市場立場與時間性來說，還是不應該定一個 CA。現階段應該是不一樣的，應該自己有自己的，因為現階段很多業者很快要經推出自己的 CA 了，如果要等政府定下來時間來不及，如果要等訂 CA 的標準，必須多等半年或一年，推出數位化時時間是不太配合的。所以現階段不應該有統一 CA，可能在未來等全國電視數位化後，然後第二階段是等在電視上有 Interactive 的時候，再考慮這個應該是比較好一點。

4. 是否有 CA 技術授權取得障礙？

答：每一個 CA 的公司有不一樣的收費方法，有一些是每一張卡，有一些是整個系統，這個是沒有什麼太大的問題的。

5. 是否應發展自有 CA 技術？

答：我覺得不應該，如果國家訂 CA，然後我們用國家的 CA，有人入侵這個技術，把這個 CA 破壞，使很多人不用付錢就可以看到 CA 的東西，這

樣的責任誰來負責呢？是政府還是業者呢？這不是技術上的問題而是責任的問題了。如果採用他人的，應為有 loyalty fee 這就是一個保障，如果大家有問題，可能在法律上去解決這個問題，這是從商業角度來看。

6. 是否應規定頭端需採用 SimulCrypt？

答：現在很多數位化的頭端如果是新的機器已經有 SimulCrypt 的可能性，但是如果是自己一家公司，除非有自己的 STB，以及受夠另外一公司，或合併另外一家公司，用不一樣的 CA，我們不希望把所有的解碼器都換掉時，才利用 SimulCrypt 這個方法。如果是在不同的公司，大家是競爭對手，我覺得 SimulCrypt 是不可能在不同的公司大家共用的。所以如果是單一的公司，比如剛推出 CA，可能不需要用 SimulCrypt，SimulCrypt 只適用當我們受夠另外一家公司，或是覺得 CA 的安全性不夠好，要另外加一個 CA 兩個一起用的時候可以考慮，但是用 SimulCrypt 時，傳送 CA 的 bandwidth 會增大，bandwidth 就是錢，用多的 bandwidth 在 CA，使 efficiency 會降低一些。

7. 是否應規定設備端需採用 MultiCrypt？

答：我覺得與 CI 一樣，現階段仍尚未成熟，有安全性的問題，還有投資成本的問題。MultiCrypt 是用不同的電視機也可以用這個卡放進去就可以了，CI 就是放一個卡在 PCMCIA 卡裡，然後把他們放到不同的 STB 裡。現在 SimulCrypt 在外國也不是太流行，因為變化太大，所以我覺得 SimulCrypt 應該等到 MHP 比較成熟時，可以再用 MultiCrypt。

8. 是否應規定 CA 模組與接收設備分離？

答：我想現階段不要訂這個，因為要訂模組的話，還沒有一個方案，如果

現在已經訂像美國那樣的方案，就比較容易點，但是現在沒有，我們推出時可能是把成本降到最低。還有兩個問題還沒解決，一個是 Interface 這個模組，因為是用 PCMCIA 卡，然後 descramble 信號去電視機，因為卡較小容易轉來轉去，商業角度對我們可能不太好，因為我們推出時不同區收費可能不同，這樣會有問題。還有就是安全性問題，放這個卡後面就有一個 decode signal 去電視機，如果駭客在後面鎖住這個信號時，就沒有辦法鎖定他。還有成本會很高，大概高 50%。在每一個 STB 裡，有一個 middle ware 可能兼容性不太一樣。所以我覺得現階段有成本、安全性、middle ware 的問題，另外每一家廣播業者服務上有些不同。現階段比較贊成是專屬式，未來等 MHP 較成熟時再考慮，應該先讓民眾從類比訊號轉到數位化，很快一兩年技術上應該成熟了，現在訂也要一兩年，定下來後是不是整個遊戲規則不一樣，我們又要訂另外一個呢？這樣是不太方便的。

9. 有關專屬式與開放式的成本比較？

答：第九題首先是看第八題要不要分離，我的答案是不要分離。如果不要分離，第九題我應該可以不用回答。

10. 對本研究案之其它建議或意見？

答：我覺得現在數位化在台灣還沒有大量的推出，政府如果太大的干預，對產業的影響很大，因為投資成本可能要提高。還有政府沒有訂標準時，我們已經要推出我們的產品，另外 STB 在未來還有空間在功能上會有變化，比如手機剛開始時沒有什麼功能，現在變化則是很大。我覺得先讓產品推出來，再看怎麼從消費者立場看有沒有什麼好處，現在我覺得應該給一個機會，讓民眾看看什麼是數位化才是比較好的。因為未來是先有數位化解碼器後，才可以利用這個平台的好處用 e-mail 或 banking 等功能，應該先給一個空間讓 STB 數位化推出，現在政府不應該干預 CA。

受訪者 (7)

1. 是否應由政府規劃 CA 發展時程？

答：本題未回答相關意見。

2. 政府政策考量？

答：政府只要定大原則就好了，細節不要去訂定，多輔導、少管制。

3. 是否應統一（無線、有線、衛星）CA 標準？

答：想要讓一個 Box 可以同時看有線、無線、衛星，成本勢必會增加很多，這成本誰吸收，再者天線都無法統一了，盒子怎麼統一，誰要去統一誰？誰要被統一？

4. 是否有 CA 技術授權取得障礙？

答：本題未回答相關意見。

5. 是否應發展自有 CA 技術？

答：本題未回答相關意見。

6. 是否應規定頭端需採用 SimulCrypt？

7. 是否應規定設備端需採用 MultiCrypt？

答：政府只要訂大原則就好，這些細節都不要訂。

8. 是否應規定 CA 模組與接收設備分離？

答：否。CI 多一個 slot 會多一些成本，成本系統業者需吸收。

9. 有關專屬式與開放式的成本比較？

答：本題未回答相關意見。

10. 對本研究案之其它建議？

答：本題未回答相關意見。

受訪者 (8)

4. 是否應由政府規劃 CA 發展時程？

答：Digital 的服務通常都是整套的 total solution，CA 只是他其中的一部份，這在他提供給我們 solution 的時候就會提供給我們了，要我們自己去組合一個頭端設備、加上 CA、STB 找廠商生產，可能需要一段很長的時間。所以說如果要單獨挑出 CA，說要制訂一個標準，可行性不是很高。整個標準幾乎都在歐規與美規這兩個大的主體，最多只能說制訂以 DVB 或是 ATSC 的標準來走。美國有規定零售市場賣的 STB，在什麼時間要做到，但是雖然他們說 2000 年七月就開始，可是現在大家都延長，等到設備用到差不多，折舊到完了，才會考慮轉換成標準的，所以縱使有年限在那裡也不見得有效，現在我們看的幾乎沒有真正按照標準在那裡運作的。原則上有一個時程目標是對的，可是如果我們選定標準將來不是趨勢，有那個時程也沒用。如果選的是對的、方向趨勢也是對的、量也對，可能不用到那個時程，自然就會有這個 solution 出來。而且現在這些標準

的 solution，因為沒有實際的產品出來，所以還需要一段時間的測試，才能讓系統敢大量的使用。

2. 政府政策考量？

答：我們比較關切的是到底要採用歐規還是美規，CA 政府如果真的要做的話，就是要決定採用歐規或美規哪一邊，然後我們從那邊開始，類似這樣大原則的規格出來，然後我們就可以儘可能的遵循。我們現在要做就有一個問題，到底是選 ATSC，還是 DVB。設備廠商兩種 solution 都有，我現在買了這一套，將來是不可能換的，要轉換幾乎是等於重買，所以只能業者之間互相討論過，大家都同意，我們就這樣子。

3. 是否應統一（無線、有線、衛星）CA 標準？

答：標準有理想上是很好的，就像網際網路有一個 Security Authority 認證中心，可是台灣現在也沒有這樣一個認證中心，誰都不服誰，所以有標準也沒有用。所以說要統一，我會贊成，可是會懷疑是否能夠達到，尤其是三種要統一。美國的 ATSC 也只有制訂定無線台，但是並沒有制訂 Cable 或是 Satellite 的，所以很難說大家是不是都要去遵循，這是不太可能的。統一是很好，可是其中困難點相當多，統一是說都可以相容，但是有問題時，到底是 STB 硬體上出了問題，還是那個 channel 上的 CA 出了問題，還是他的主機或我的主機出了問題，會造成困擾。這是從商業營運的角度來看，與技術沒有什麼絕對的關係，只是說技術的問題很難解決。

4. 是否有 CA 技術授權取得障礙？

答：本題未回答相關意見。

5. 是否應發展自有 CA 技術？

答：自己發展是提昇自己國家的技術層次，是好事。可是反過來說，市場沒有大到那樣的地步，要頭端與 STB 去配合的話，量沒有大到某種程度，可能很難。反而是人家有一個標準，類似 IP 起來後，大家都去遵循了。

6. 是否應規定頭端需採用 SimulCrypt？

7. 是否應規定設備端需採用 MultiCrypt？

答：不用規定這些細則。一定要廠商在他的 solution 裡，或是在什麼時程裡，要有 SimulCrypt 與 MultiCrypt，其實也不一定能夠完全遵循，因為量不夠大，原廠可能也不願意做這些東西。要不然就是要支付費用，可是這樣等於提高我們營運的成本。

8. 是否應規定 CA 模組與接收設備分離？

答：我們主要是靠原廠的 total solution，要做分離的模組，如果量很多他會答應，但是台灣的 MSO 都沒有那麼大的量，或是那個東西逐漸成為趨勢，他就自動會去做，可是如果時間上有限制，他也不一定會遵循，因為趨勢還沒到，所以原廠考慮趨勢沒有、量沒有，就不會主動生產這些，也不會授權給某家公司幫你做 STB，這個控制權是在原廠的。雖然說是零售市場制訂 CI 政策，會讓客戶覺得只要去買一個來，不管是哪一個、住那裡、或是住哪裡都可以用得上，可是實際上不是哪麼回事，因為那只是一個硬體的盒子，買回家之後還需要與地區的系統業者要 Smart Card，可是還有其他的應用中界，是不是能夠直接下載到 Box 就不知道了，就只能看一些某一些鎖碼的頻道，有 pay per view、或上網這些就不一定可以，因為需要 STB 有各種各樣的中界。系統原來的 application 也必須改好，而且原廠同意，才能夠置放到 STB，就算 AP 放上去，原本 STB 上也有一些 AP，如果這兩個之間不一致時，是 STB 或我們要負責除錯呢？如果是原

廠 total solution 提供的 STB，有任何問題就可以送回原廠解決。所以要訂標準不應該只是訂定零售市場，應該訂一個大家都要遵循的歐規或美規大標準。

9. 有關專屬式與開放式的成本比較？

答：本題未回答相關意見。

10. 對本研究案之其它建議或意見？

答：目前可能是五個有線電視系統可以大家一起合起來談的時候，但是要有政府出來主導整合，因為底下很多的系統的狀況都不是完全一樣，如果大家都能夠談出一個統一的方式，由政府主導、聚合這些人，是一個好方法，因為不管是由哪一個 MSO 業者主導，會堅持自己的哪一個好。目前第一步大家各做各的已經是無法避免了，但是頭端的部份如果可以統一的話，至少可以說服我們提供 solution 的廠商，將來要有這樣的東西，至於 STB 的話，至少可以想辦法用 Smart Card 或什麼方式，這樣完全拿著 Box 到各地的可能性才會有，否則就是出了某一個系統地區就得換設備，因為頭端設備完全都不一樣。如果中立點政府單位，先把要遵循歐規還是美規的標準定下來，再從這裡面去看 CA 到底在頭端要用什麼，STB 要怎樣訂。一開始要把無線、衛星、有線全部找來是很難達到共識的，至少先在有線的部份先達到共識。應該把電信總局、或新聞局等相關單位一起找來，有一個類似 FCC 中立的單位主持工作小組，這樣才使業界有希望達到共識。

受訪者 (9)

1. 是否應由政府規劃 CA 發展時程？

答：應該要參考市場上的發展情形，CA 這東西應該是產業、市場領先政

策或技術。

2. 政府政策考量？

答：政府應該不要做細部的規範，僅須定大方向的遊戲規則即可。

3. 是否應統一（無線、有線、衛星）CA 標準？

答：應該容許不同系統間的獨立性，政府出面的時候僅須解決系統間的互通性，做整合的動作，整合到終端消費者只須要一張 Smart Card。各個業者應該要合組一家公司，作類似金融體係、金資中心的工作。

4. 是否有 CA 技術授權取得障礙？

答：這通常沒什麼問題，你付錢給他，他就給你。

5. 是否應發展自有 CA 技術？

答：要自己做，我們有自己的一套 Business 的想法，要回過頭來請這些 CA 技術公司來幫我們配合做修改，很困難。這些場廠它沒有時間幫你做，再者他們也不了解我們的文化，台灣商場上的結構、文化和美國、歐洲不一樣，自己發展技術可以提供較多的加值服務。這技術的發展應該由國內公司共同來做，而不是由某一家單獨來做。

6. 是否應規定頭端需採用 SimulCrypt？

答：這完全是商業上的需求，政府沒有理由也不應該要強制，這完全是商業上的考量，業者有這個需求他自行會採用。世界上也沒有一個國家用法規來規定頭端必須使用 SimulCrypt。

7. 是否應規定設備端需採用 MultiCrypt？

答：MultiCrypt 的使定是為了解決用戶端的問題，這其中還有一些技術上的問題，就像要在一個 Box 上同時有兩套不同的 CA 系統，CA 技術公司之間彼此也會有疑慮。

8. 是否應規定 CA 模組與接收設備分離？

答：CI 的成本比較高，且客戶有可能會流到競爭者那邊，所以問任何一個系統廠商，他們都不會贊成 CI。但我認為現階段政府有需要 promote，因為這和下一階段的數位電視發展有關，但只需要 promote，不要用強制的方式。至於盜錄的安全疑慮，就算你盜錄下來了，你要怎麼廣播出去，所以這比較起來應該是較小的問題。

9. 有關專屬式與開放式的成本比較？

答：如果是走 operator model，set top box 由系統廠商買來租送給客戶，錢是他們花的，那他們當然希望是專屬式，因為成本較低，且可以鎖住客戶。如果是走 retailer model，那要越開放越好，綁越少東西越好，消費者自己去買了 set top box 才不會因為搬家等等的問題就不能用了。

10. 對本研究案之其它建議？

答：本題未回答相關意見。

受訪者 (10)

1. 是否應由政府規劃 CA 發展時程？

答：應該要有發展時程，但是由市場機能來決定。CA 在無線廣播方面應統一，採用哪一家由他們自己決定，但應規定他們採用同一家。

2. 政府政策考量？

答：國內廠商如果有能力發展 CA technology，政府應該 support，不強制，但應鼓勵。

3. 是否應統一（無線、有線、衛星）CA 標準？

答：應該要有一個統一的標準會比較好，但蠻難的，因為像 cable 都已開跑，現在要講統一很難，可以由市場的機制慢慢去發展，政府可鼓勵統一的好處，不過在無線廣播方面，政府管得到，應該要要求其統一標準。

4. 是否有 CA 技術授權取得障礙？

答：只要願意花錢都不是問題，權利金跟你談判條件有關。

5. 是否應發展自有 CA 技術？

答：自己發展 CA 技術，可發展一些加值服務，因為台灣市場不大，要求 CA 技術公司幫你修改，通常他們都不太願意，所以要鼓勵採用自己發展自己的 CA 技術，錢幹嘛給老外賺。

6. 是否應規定頭端需採用 SimulCrypt？

答：採用 SimulCrypt 對廣播業者有利，可保護他們不會被單一家 CA 技術公司鎖死，但不要採用廣播業者有主動權。政府可以鼓勵它的好處，但若要強制，多出來的成本誰付？

7. 是否應規定設備端需採用 MultiCrypt？

答：MultiCrypt 的成本較高，所以一般來講，都不太建議。

8. 是否應規定 CA 模組與接收設備分離？

答：沒有必要分離，因為以 CI 來說，一定比 smart card 貴，如果 100 元貴 50 元，消費者怎麼能接受，就政府的角度，只要能讓廣播業者之間競爭，就能保護消費者。且 CI 有安全疑慮。

9. 有關專屬式與開放式的成本比較？

答：一個介面一定會有成本，所以開放式增加一個介面，一定會增加成本。一般來說，成本大概會增加 27~47 元美金。另外 DVB-CI 定義的不是很嚴謹，容易有安全問題。

10. 對本研究案之其它建議？

答：在地面廣播方面，政府應該要規定他們使用同一個 CA。然後以 SimulCrypt 和 MultiCrypt 來說，個人是比較贊成 SimulCrypt。

受訪者 (11)

1. 是否應由政府規劃 CA 發展時程？

答：應有 CI 時程規劃。

2. 政府政策考量？

答：數位電視接收設備應訂定 CI 政策，以保護消費者並加速產業發展。

3. 是否應統一（無線、有線、衛星）CA 標準？

答：國家不需制定統一標準之政策。

4. 是否有 CA 技術授權取得障礙？

答：應視商業交易模式而不同。

5. 是否應發展自有 CA 技術？

答：有必要，但限於市場因素發展應不樂觀。

6. 是否應規定頭端需採用 SimulCrypt？

答：是否使用應為業者自己的商業考量。

7. 是否應規定設備端需採用 MultiCrypt？

答：採用會使成本較高。

8. 是否應規定 CA 模組與接收設備分離？

答：採用 CI 有利消費者與產業發展。

9. 有關專屬式與開放式的成本比較？

答：本題未回答相關意見。

10. 對本研究案之其它建議或意見？

答：本題未回答相關意見。

受訪者（12）

1. 是否應由政府規劃 CA 發展時程？

答：這其實應該看政府的態度，現在來看目前除了只有日本統一，其他都沒有。時程上我倒覺得現在是有點為時已晚，因為台灣的 digital cable 主要業者，都已經決定用這種東西了，現在再來談時程已經沒有意義了，時程應是之前就做好了。實際上大家也不希望統一，也不希望用 CI，這樣 end user 說換就換了。目前 cable 的還是租的 model，向 Box 製造商買然後租給顧客，未來當然還是希望 end user 自己去電器行買，但是我覺得這五年之內應該還是不會發生。美國推 open cable 那麼久，到現在也沒有看到 Box，美國 FCC 也硬性規定 cable 租給客戶的 Box 要有 CI，但是業者只是留一個

插槽在那裡，仍然沒有人用這樣的東西做 service。

2. 政府政策考量？

答：以第二個議題來看，考量層面好像就是如果統一的話就會有壟斷的嫌疑，因為台灣現在還弄不出一個真正大家認為永遠不會被破的 CA，所以大部分都用外國貨。我覺得如果只考慮內銷那就自製就好了，日本考慮自製是因為他們國內的市場夠大。

3. 是否應統一（無線、有線、衛星）CA 標準？

答：台灣來看現在幾乎只有 cable 這一塊了，因為台灣衛星也弄不起來，地面廣播幾乎就在 cable 裡面，所以我覺得應該是 major，就是少數服從多數，如果今天 cable 選了一個標準，我覺得其他應該 follow，因為市場本身已經夠小了，又分三塊。有一種方式是地面選一塊、衛星選另外一種，變成必須換另外一張卡，或是後面談的，有一種軟體機制，support SimulCrypt 多重 CA，但是這講歸講，都還沒有人實施，只有一個的都已經做得沒辦法統一了，還弄到多個？不過市場有限的話還是統一比較好，台灣現在其實已經沒有地面廣播了，都是透過 cable，所謂的 must carry 問題，無線應該 follow 有線。以政府的立場，當然希望是都統一，但是有時候會有利益衝突。

4. 是否有 CA 技術授權取得障礙？

答：權利金的問題，我覺得基本上 CA 的權利金都不會很高，大概都五塊錢美金以內，比起 DVB 的權利差太多，DVB 權利金一台 20-30 美金。但是話也不能這麼講，整個成本來看，他是 200 塊的五塊錢，或是 100 塊的五塊錢，其實比例上還算是蠻高的。取得是絕對沒問題的，因為這些 CA

的 vendor 他也是要做生意，他巴不得你用，用了是不可能再換的，頭端系統一投資下來都是上千萬台幣的。

5. 是否應發展自有 CA 技術？

答：我是覺得這已經有點晚了，因為這已經是一個蠻成熟的技術。不過這與我前面說的可能有點衝突，如果只考慮自己國內的市場，那當然是自製，但是自製也不是完全自製，像日本也是參考歐規，然後改一些自己國家需要的，保護國內廠商，用國外的 CA，國外的 STB 廠商也可以進來搶這個市場。自製的話就是可以保護國內業者，還有就是至少有一些技術上宣示的作用。這個議題其實也吵很久了，兩三年有了，台灣的數位地面電視一直推不起來，因為台灣主要是以外銷為主，但是外銷沒有很大、內銷也沒有很大，所以變成大家覺得這不是一個賺錢的產品線，就沒有很積極的去看一些事情。如果說用國家標準或許授權金就不用那麼貴了。CA 以軟體的架構來講，只是其中一個元素而已，還有很多其他，最底層有不同的硬體、OS、再上去有 CA、有不同中界、然後不同的客戶有不同的 AP，不像所有的 PC 所有的硬體都一樣，這樣交叉組合起來是很嚇人的，對 service provider 為了保護自己一定會用與別人不一樣的一套。所以 CA 只是其中的小東西，不用大費周章考慮到底是要自己做或是國外買。這議題因為以前東西還不是很複雜，很單純的時候，CA 是一個很重要的東西，但是現在 Box 越來越複雜，很多的應用，所以 CA 變成很微小的元素而以。

6. 是否應規定頭端需採用 SimulCrypt？

7. 是否應規定設備端需採用 MultiCrypt？

答：我比較持保留態度，市場都那麼小了，政府去規定這個也沒用。變成頭端業者要兩套、信號端也要兩套，才能讓 end user 看到兩套節目，如果量大成本自然降低，但是量只有一點點，兩套是不符合經濟效益的。

8. 是否應規定 CA 模組與接收設備分離？

答：用 CI 的方式對 service 業者比較不利，因為 user 要換很快。所以常在辯論，以 service provider 來說，不喜歡用 CI 的方式，會比較希望用專屬的方式，就消費者或做 Box 的，會希望分開比較好，因為整個 world wide 來看，作 pay TV 的 service provider 其實也是很多，光要做給不同家，軟體的整合就幾乎要半年一年，而且小量，用 CI 設備製造商就不用那麼累了，把他統一成 CI，作一個 model 出來就可以通吃了，end user 或 service provider 只要換一張 PCMCIA 卡就可以了，對 Box 單體的成本也降低很多，只要做成一個插槽就可以了，卡的成本也不是由 Box 業者支付，不過還得看如果是在零售店買的就附在 Box 那一邊，或是必須訂閱之後 service provider 去裝機時才給你，這有不同的 model。所以 CI 對消費者或 Box 是有利的，但是對 service provider 就有害，end user 要換很快，客戶忠誠度低，不過其實對 service provider 成本也會比較低的，不用事先跟我買 Box，一台 Box 可能 200 塊美元，但是買卡只要 40 元美金，投資成本也會比較低。

9. 有關專屬式與開放式的成本比較？

答：CI 的話對 Box 業者成本不會多到哪裡去，只是多一個連結而已，不到一塊錢美金，而一個 Box 要 200 塊美金。做這個的話又不用預先付 loyalty，因為後面用誰的軟體都還不知道要付給誰，等於是 service provider 買卡給顧客。做專屬的話，之前就要付 loyalty 了，license fee 都是美金 100k 以上的，以後每賣一台又要付他每賣一台的錢，大概五塊錢美金，對整個開發成本而言，當然這個會比較貴。另外 CA 廠商對頭端業者也要收錢，所以總共加起來可能要 10 塊美金以上。開放式的對做 Box 的成本絕對會降低的。

10. 對本研究案之其它建議或意見？

答：我是覺得讓市場自由去競爭，規劃越少比較容易執行，規定太多執行起來比較困難，這種東西不是一個很重要的議題。我倒覺得應去爭取 must carry、分及付費等問題。

受訪者 (13)

1. 是否應由政府規劃 CA 發展時程？

答：CA 之前的更大問題是消費者收不到訊號，電視台收不到錢，CA 就沒用，CA 是與有價的服務有連動關係，這可能是三五年以後才會發生，絕不是現在。CA 的問題以目前來看是不存在的，因為據我所知電視台目前沒有興趣。

2. 政府政策考量？

答：交通部宣布技術中立導致我們很困擾。從兩年前我們就一直在呼籲趕快把規格定下來，給製造商做出來的東西就是符合這個規格，至於三年後才要播這些有價值的信號，沒有關係，消費者今天買了三年後開播後就可以收得到，這才是消費者最重要的需要。否則今天沒有訂規格，今天賣的東西絕對不會有 CA 規格，消費者之後是不是又要重買一台，那消費者豈不是最大的受害者。數為電視要跨很多產業，要把新聞局、交通部、經濟部，全部統合起來變成一個窗口，否則沒有辦法生產那樣的規格與產品。美國有 FCC，日本有 NHK（日本放送協會），英國廣播公司等於是國家的，幾乎主導整個國家的規格，中國大陸最大的電子信息部，統管整個中國大陸的廣播系統，唯獨台灣沒有，廣播絕對是跨部會、跨產業的，絕對不能因為某個產業的要求而去作他的，那就是圖利某個產業，所以絕對是政府

才能作，或是財團法人工研院是有公信力的。

3. 是否應統一（無線、有線、衛星）CA 標準？

答：本題未回答相關意見。

4. 是否有 CA 技術授權取得障礙？

答：本題未回答相關意見。

5. 是否應發展自有 CA 技術？

答：本題未回答相關意見。

6. 是否應規定頭端需採用 SimulCrypt？

答：本題未回答相關意見。

7. 是否應規定設備端需採用 MultiCrypt？

答：本題未回答相關意見。

8. 是否應規定 CA 模組與接收設備分離？

答：在歐洲發展時用 CI 是因為希望消費者買一部 STB 接收就好了，所以把 CA 變成一個標準，消費者只需要換卡就可以了，最理想就是一台 STB 作一個插槽，以及一張卡。現在的 CA 廠商是互不相讓，互不相往來，所以要他們全部同意一個標準是蠻困難的。台灣應該先走 CI，將 CI 的基本

條件定下來後，用政府的力量，產生一個國家標準，在台灣要作 CA 的話就必須符合台灣 CI 的共同標準。將來消費者不管買哪一家製造廠商的 STB，要收哪一家電視台任何的 Service 都可以，這才是消費者之福。數位電視的發展過程，隨時都不要忘記消費者的立場，現在電視台都不管，製造廠商也不知道怎麼作，所以我們許多產品開發都終止掉了，因為沒有標準不知道該怎麼作。產業沒有強制力是不可能有效果的，因為太自由的狀況下各做各的，產生不出來一個標準，消費者仍是無法選擇，廣播事業就應該有強制性。標準是一個依循的基準，包括電視台、製造廠商、節目供應商，大家都要遵守，產生出來的東西大家都可以用，消費者買的東西也都可以用。就像馬路上汽車靠右邊走這個標準，你可以遵守也可以不遵守，結果產生的就是撞車的現象。

9. 有關專屬式與開放式的成本比較？

答：本題未回答相關意見。

10. 對本研究案之其它建議或意見？

答：CI 的標準訂之前，電視台想要給台灣消費者怎樣的服務是需先定義的，否則 CI 是無法定義的。CA 的研究其實是應該在整個系統定局後接下來才是這部分，但是現在是越到前面來了。希望研究報告希望不管 CI 怎麼去發展，最後應該要產生一個國家標準，假如沒有產生國家標準，就會產生我剛說的背景上的任何問題，都沒有決定就都不能動了。台灣市場非常小，即使日本大台灣 6-10 倍，或韓國大台灣約 3 倍大，都不敢說自由發展，都強有力的主導，不這樣作的話，電視台、節目供應者、接收機製造廠商就會各作各的。而台灣今天就產生這個問題了，12 月要開播了，沒有一家廠商可以做這樣的接收器。

受訪者 (14)

1. 是否應由政府規劃 CA 發展時程？

答：基本上這個部份其實很難去規劃什麼，最終還是會由市場本身來決定，不太可能說政府去訂定什麼時程，然後業者去跟著走那個流程。

2. 政府政策考量？

答：在政府的政策上其實只要整個產業得以發展就可以了，如果作什麼硬性的規定，反而阻擋了業者商業上的發展的話，豈不是反而使的整個數位電視產業的發展變的更慢，所以我們的角度是認為在這個部份政府其實是沒有什麼著力點的。

3. 是否應統一（無線、有線、衛星）CA 標準？

答：我認為最好是有一個統一的介面，但是在各個傳輸介面倒是並不見的有什麼要統一的必要，從製造商的角度來講，要做這樣的產品並沒有什麼困難性，但是你還是要看到底市場是不是真的有這樣的需要，如果市場並沒有這樣的需要，那麼去訂這樣的標準在感覺上實在是沒有什麼具體的功效。

4. 是否有 CA 技術授權取得障礙？

答：這個部份如果說 CA 有什麼標準的話，也許可能成本會比較低一點，但是如果說可以找的對象並不多而且受限制的話，那當然成本就會很高了，不過目前來說我們還沒有走到這個問題的階段。

5. 是否應發展自有 CA 技術？

答：這個問題其實還是一樣要看市場的需求到底是怎麼樣，如果說目前市場上已經有這樣的需求的話，當然是就先用別人已經做好，可以用的東西就好了，那裡還會有時間去開發一套新的東西。

6. 是否應規定頭端需採用 SimulCrypt？

答：這個問題可能和電視台業者比較有關係，和我們設備製造商到是沒有什麼需要去考慮的部分。

7. 是否應規定設備端需採用 MultiCrypt？

答：短期而言，在電視設備製造商來講，因為標準也尚未統一，還有很多的變數，所以我們不太可能會先去做這一方面的準備，還是沒有辦法去預測到底會是什麼樣的情形，基本上以概念來講我們當然還是覺的贊成的。

8. 是否應規定 CA 模組與接收設備分離？

答：以我們來說，還是要以消費者使用的方便性來做主要的考量，而不是以產品功能的完整性為主，如果今天消費者買電視回來還要插這個卡插那個卡的話，我看大概也實在是沒有幾個人知道該怎麼用，那最後的結果反而就變成了沒有人想用這種東西了；所以我想最後還是要把它整個做進去，但是目前整個標準也還沒有一個清楚的標準出來，所以在這種情況上就變的很麻煩，當然如果把它做進去的話還是會增加一些成本的。

9. 有關專屬式與開放式的成本比較？

答：基本上就電視本身的成本上來講，兩個成本的差距並不會太大，所以

我們是採用哪一種的方式原則上還是要看市場的需求，如果市場需求是以開放式的為主，那麼我們當然就直接做開放式的介面出來就好了，但是要用專屬式的話，我們也可以做，並沒月太大的困難在裡面。

10. 對本研究案之其它建議或意見？

答：本題未回答相關意見。

受訪者 (15)

1. 是否應由政府規劃 CA 發展時程？

答：台灣對數位電視已有一明確的發展方法及時程時，再考慮 CA 的發展時程才有意義。任由市場決定，不可能發生，除非國外市場已有非常成熟的案例，否則市場不會自然發生；但我們若走在太前面，就成為世界上的白老鼠。所以在所有相關的因素不是很清楚前，不應該有精確的規劃，政策需保持一定的模糊，然後等待市場和技術的成熟，待國際上技術與標準逐漸成熟，國外之數位電視和 CA 有成功的 Business Model 後，台灣才應有明確的時程規劃，否則搶先訂立時程，國家有可能會食言。歐洲國家會提早實施是因為其在通訊方面的技術相當先進，且其有整個歐盟市場為其後盾，因此其在數位電視產業提早開步對他們而言只有好處，但台灣不同的是，台灣市場小，沒有一個似歐盟的組織為其後盾，因此若走得太前面，有可能成為白老鼠。

2. 政府政策考量？

答：參考國外，不能從純技術面來提政策，須考慮整個層面的 Business Model。政策需保持一定的模糊和彈性，在較明確的地方才可清礎的訂定。

3. 是否應統一（無線、有線、衛星）CA 標準？

答：如果從市場面來看，這幾乎切割成兩個到三個市場，所以統一標準絕對危險。一個技術能夠推展是基於市場有共同利益，一個標準對三個市場同時有利的時候，三個市場會同時接受；必須從 Business Model 來作分析，Business Model 合，則它們會採用同一個標準。所以統一的標準應是基於 Business Model 的自然結合，不應該強制，政府要強制處理，必須有很充足的理由。政府政策的制定不能違反人性，而引導市場的則是追求利益的人性，若政策制定違反這原則，政府會背上不必要的責任。

4. 是否有 CA 技術授權取得障礙？

答：本題未回答相關意見。

5. 是否應發展自有 CA 技術？

答：如果政府決定採用國內自有的技術，而又沒有在很短的時間之內，在市場成熟之前把它開發好，那就根本不要做。業者若自發性的開發自有技術，政府可給部份誘因或引導，但決不能有強制性的文字在政策裡出現。

6. 是否應規定頭端需採用 SimulCrypt？

答：本題未回答相關意見。

7. 是否應規定設備端需採用 MultiCrypt？

答：本題未回答相關意見。

8. 是否應規定 CA 模組與接收設備分離？

答：政府與業界建立良好互動，由業界提出技術標準建議給政府，再由政府決定採用，而不是由政府自發性的採用某一技術標準，政府受國外之壓力會較小。

9. 有關專屬式與開放式的成本比較？

答：本題未回答相關意見。

10. 對本研究案之其它建議？

答：政策應保持一定的彈性，給大方向的指導，已經清楚的部分才明確的訂定，還不清礎的地方要保持彈性和模糊，不要訂了又修改，產業界會很痛苦。關於標準的制訂，除了由產業界協會提出標準建議報請政府外，也可由政府主導組成工作小組來制定標準。

受訪者（16）

1. 是否應由政府規劃 CA 發展時程？

答：不能任由市場決定，在無線電視產業中，一開始絕對不會有 CA 的部份放進去，要等到整個產業比較穩定之後，才比較有可能再把其他的 CA 相關部份放進去；至於在有線電視的部份則應該是整個時程都掌握在相關業者的手上，政府在這個部份是不太需要去硬性規定什麼時程的。

2. 政府政策考量？

答：在考量的層面上來講的話，其實只有一個，就是到底要不要 CI？如果是有 CI 這個東西在上面的話，那麼現在相關的業者和廠商就要開始去做相關標準的規範，否則的話，在時間上根本來不及配合。

3. 是否應統一（無線、有線、衛星）CA 標準？

答：這個部份，在同一個產業裡的話，當然應該是要一樣，但是你不太可能去要求說無線電視業者和有線電視業者一定要一樣；但是如果你已經決定了某一個產業都用同樣的 CA 的話，那你根本就不需要有 CI 這種東西了；如果你要用 CI，那麼在 CA 的部份，則自然是由各個廠商自己去決定，對有線電視來講，他們會有自己的經營模式，和無線電視業者的方式絕對不會一樣。

4. 是否有 CA 技術授權取得障礙？

答：這個部份完全是 CASE BY CASE 的情況，並沒有一定的一個標準，看各家廠商業者的情況而定。

5. 是否應發展自有 CA 技術？

答：這個東西應該是要考慮業者本身的需求才對，你不能夠要求業者在你開發一套東西出來，但是在穩定度上或其他的部分都還不一定確定的情況下，你怎麼可能要求業者一定要採用這些東西？

6. 是否應規定頭端需採用 SimulCrypt？

答：現階段來講的話，要看業者已經開始做到什麼樣的地步，如果業者都已經開始在做自己的模式和營運了，你也不可能要求他把之前的投資都收

回，那麼在這種情形下，就不可能去要求業者怎麼來配合的。

7. 是否應規定設備端需採用 MultiCrypt？

答：這個部分的理由和上一題差不多，所以還是一樣，政府的腳步不能比業者慢。

8. 是否應規定 CA 模組與接收設備分離？

答：我認為在觀念上來講的話，應該是要採用分離式，但是在分離式的觀念下的話，要用什麼樣的方式，就可以有很多的作法，到不一定說一定要用哪一種作法，政府應該是要先決定到底要用哪一種的作法，然後業者再各自去找他們適合的規格。

9. 有關專屬式與開放式的成本比較？

答：一般而言，要做 CI 的成本是要比較貴的，如果是 EMBEDDED 的方式那根本就不需要 SMARTCARD 了，在 Interface 上本來就已經要多一個成本了，這個東西就和消費者去買保險一樣，你希望有比較保險的使用，那自然消費者就必需要多出一些錢了，所以這個部份是不可能由政府來補助的，還是以業者本身的情況來考量比較好。

10. 對本研究案之其它建議或意見？

答：本題未回答相關意見。

受訪者 (17)

1. 是否應由政府規劃 CA 發展時程？

答：CA 時程規劃應是與新聞局規劃有線電視或無線電視、衛星，在收費的政策法令來看，所以是否需要規定時程，應是新聞局的政策約束。如果是有線電視業者、衛星或是無線電視業者，不需有什麼時程上的規劃，除非是對消費者特別考慮的因素，如有線電視的發展是否會傷害消費者，沒有這種考慮的話就應該是市場問題，特別是收費問題會傷害到消費者，否則應該是市場問題，CA 已經牽涉到收費上的問題，還有獨佔性。我們是因為執行標準計畫，所以我們認為還是應該要制訂時程，應該越早越好，如果業者已經投資去做某一特定 CA，政府又說要做開放式的 CA，這樣已經投資的怎麼辦，是否要國家賠償呢？所以如果要制訂就越早越好，不然就應由市場自由發展，不要制訂。

2. 政府政策考量？

答：政策要做或不做應該要明確，不要拖時間，業者都已經投資下去做了，才要他更改，政府是不是要賠呢？這樣會引起民怨。

3. 是否應統一（無線、有線、衛星）CA 標準？

答：要就應該全部統一，不要就通通不要做，如果說地面一個、衛星一個、有線一個，那與沒訂是一樣的，台灣就這麼小一個市場六百萬台，訂三個不同的與沒訂一樣，還是各走各的，所以我們是建議三個應該要統一。如果三個不同必須準備三個不同的接收機，消費者必須花費很多，所以應該是要有一個 common 的 platform，統一的開放式標準，只要買一個電視機就可以看到衛星、有線、或無線。至於目前有線已有開始做 CA 的動作，統一是否有困難，就回到第一題的問題，政府應該及早訂定，現在訂賠少，往後訂的就賠多，對於已經開始做的認賠，其他的就可以開始統一規定，這是造福消費者，可以不用花費那麼多錢。

4. 是否有 CA 技術授權取得障礙？

答：只要政策制訂是開放的，市場自由競爭，如大哥大，權利金一開始時都很高，到後來競爭或合併，這是造福消費者，而且是良性競爭。所以市場自由競爭自然就會降價，政府不需管這個事情，政府只需把制度建立起來。目前現狀的障礙應該是政策不明，不知道底是要訂開放式 CA 或是不需要開放式 CA。

5. 是否應發展自有 CA 技術？

答：CA 本身主要是台灣技術夠不夠好的問題，台灣很多廠商發展的話就不用說要用國外的系統，權利金或授權金也可能會比較低，不用受國外控制，在台灣技術生根上也有幫助。要解決 CA 技術問題，人力、技術，台灣本來就應該培養，在投資獎勵都應該有，才有人願意做這件事。因為台灣市場太小，所以很多在台灣市場做不起來，沒什麼利潤，這部分就需要政府去鼓勵。

6. 是否應規定頭端需採用 SimulCrypt？

7. 是否應規定設備端需採用 MultiCrypt？

答：第六題與第七題應都是生意上的問題，都是歐洲為了不同生意的 model 上來做的，所以沒有辦法說 SimulCrypt 一定是好或壞，或是 MultiCrypt 一定是好或壞，生意考慮不一樣。SimulCrypt 是考慮頭端有一個比較共通的介面，所以考慮頭端成本的分享，MultiCrypt 考慮是接收機分離，大家可以按標準去製造與設計，所以考慮的是用戶端的問題，不是說選一個另外一個就不能做，這是 business model，不是 policy 需要去決定的事情。

8. 是否應規定 CA 模組與接收設備分離？

答：CA 模組與接收設備分開事實上就是主張共同介面，主張這樣的介面是因為台灣的電視機或家電業者事實上仍以製造為主，就是看賣的量，如果能提升到以設計或行銷為主，這就不是問題了，所以台灣目前需要這樣的標準。如果認為對市場有利，制訂政策可能仍沒有效力，要法令才有強制力。採用的話最好還是 follow 台灣數位電視的標準政策，國內市場假設是用 DVB，最好就用 DVB-CI，但是業者也不一定只設計 DVB 的歐洲產品，所以這一點就不用幫業者考慮，他會為了自己生存。所以只要仿造美國 FCC 有公開的標準，至於什麼標準那就由業界自己決定，實際上交通部在歐規或美規已做了技術中立，由業界決定，open cable 這些不是交通部要做的事，所以交通部需做的只是一個政策，把要開放的政策推到立法院去。

9. 有關專屬式與開放式的成本比較？

答：技術是都在成長的，目前的話是開放式介面的成本較高，專屬式比較便宜，但是不代表以後也是這樣。開放式使用的量還不夠大，所以成本設計會比較高，開放式介面的模組可能 20-40 美元都有，POD 或 CI 的成本目前應該都差不多。如果對消費者是公平合理的，政府補貼也不是說不行，以打破專屬式的障礙。

10. 對本研究案之其它建議或意見？

答：我們建議不要訂太細節的事情，像是 Multicrypt 或是 Simulcrypt。好的例子是模仿美國 FCC，政府制訂方向，開放式，公平競爭，至於細節則由業界決定業界標準，可委託中立研究單位來協助。CA 或 CI 政策都應該是從消費者來看，管得到就是新聞局的有線電視法，可從分級付費來考慮 CA；CI 可能就是經濟部，制訂公平競爭的產業發展環境，交通部則是這

些政策被參考的單位，不是主導政策的，對於 CA 技術標準應可決定專屬或開放。

受訪者 (18)

1. 是否應由政府規劃 CA 發展時程？

答：政府不應該規劃 CA 的發展時程，應該由產業自己協調定出。由政府訂定時程，到時候若沒有實現，大家對政府會沒有信心。而且當政府想要訂定時程時，中間若有一環節無法掌握，當其發生問題，後面所有的環節都沒辦法執行，於是時程便無法落實。

2. 政府政策考量？

答：技術規格若放任市場自由競爭，那麼消費者和生產廠商都會很困惑，生產廠商不曉得該生產什麼規革產品，而消費者在市面上購買也會發生一些問題。但政府定技術規格時不該去搶先機，因為台灣不是大國，應觀察世界上其它各國的狀況再訂定，以數位電視美規歐規而言，現在美規也還在修正自己的技術細節，所以不該在混亂不明的時候就強先訂定。

3. 是否應統一（無線、有線、衛星）CA 標準？

答：是有必要，但不是自己開發，要去觀察不同技術在上場上的狀況，再作選擇。

4. 是否有 CA 技術授權取得障礙？

答：本題未回答相關意見。

5. 是否應發展自有 CA 技術？

答：採用他人的技術。第一、我們沒有能力自己發展技術。第二、我們的內需市場不夠大，不足以支持一個技術的發展，若發展一個上百億的技術，到時候只有幾百萬戶的需求，那成本非常非常大。

6. 是否應規定頭端需採用 SimulCrypt？

7. 是否應規定設備端需採用 MultiCrypt？

答：視市場，廠商自己有不同的 Strategy，自行決定是否採用，政府不應該規範。

8. 是否應規定 CA 模組與接收設備分離？

答：如果要讓市場上有競爭存在，分開較好。

9. 有關專屬式與開放式的成本比較？

答：本題未回答相關意見。

10. 對本研究案之其它建議？

答：不該單純由技術的優劣去做分析，應該從市場上對技術的接納程度討論，所以要對國內市場也一定瞭解。我們沒有發展自己技術的能力，所以採用他人技術的時候，要多看看別國採行的狀況與發展。

受訪者（19）

1. 是否應由政府規劃 CA 發展時程？

答：本題未回答相關意見。

2. 政府政策考量？

答：應從消費者端考量，進入數位時代後，市場是否會被比較大的業者獨佔或寡佔，而對消費者索求無度，不斷要求消費者更新配備，或變相加價，政府必須在這方面保護消費者。

3. 是否應統一（無線、有線、衛星）CA 標準？

答：本題未回答相關意見。

4. 是否有 CA 技術授權取得障礙？

答：本題未回答相關意見。

5. 是否應發展自有 CA 技術？

答：本題未回答相關意見。

6. 是否應規定頭端需採用 SimulCrypt？

答：本題未回答相關意見。

7. 是否應規定設備端需採用 MultiCrypt？

答：本題未回答相關意見。

8. 是否應規定 CA 模組與接收設備分離？

答：贊成。希望數位電視市場以後能像手機市場一樣開放，消費者只要換一個 SIM 卡，不管哪一隻手機都可收訊，市場上有競爭，價格降低，品質提升，消費者可享受最大利益。

9. 有關專屬式與開放式的成本比較？

答：本題未回答相關意見。

10. 對本研究案之其它建議？

答：政府應保護消費者，訂法規或政策一定要能讓市場保持競爭，避免獨佔情形發生。

受訪者（20）

書面回覆意見為：

本局立場：八十九年實施的新興重要策略性產業獎勵已將 STB、DTV(數位電視機)、DAB 納入獎勵範圍，為鼓勵產業界研發 CA/CI 模組，預計於九十一年實施的新興重要策略性產業獎勵項目，工業局已建議納入 CA/CI 模組及 Gap Filler（電波強化器）。並輔導廠商申請業界科專或主導性新產品開發計畫。

為使數位電視產業能蓬勃發展，本局及視訊推動小組將持續關切，有

關制定 CI 標準或制定介面技術規範希望電信總局能訂定時程，以協助產業能突破觀望瓶頸，加速研發腳步爭取商機。

受訪者 (21)

電話回覆意見為：

本單位目前有關 CA 之議題，已有科專計畫委託相關單位對 CI 標準做研究，其他相關議題屬於較技術之議題，本單位較無法回答，若針對本單位立場可回答之問題提問，則可再做進一步回答。

附錄三：座談會會議記錄

第一次 CA 座談會會議記錄

時間：九十年六月二十六日（星期二）下午兩點半正

地點：電信總局七樓大禮堂

主持人：交通大學電信中心杭學鳴教授

列席單位：交通部郵電司、交通部電信總局

出席單位及人員：

本研究案：杭學鳴教授、趙子宏博士

助理人員：張正忠、曾馨誼、何浩銘、黃政清、李梅菁

各單位代表：無線電視台、衛星與有線電視台業者、衛星與有線電視公協會單位、家電製造廠商、工研院電通所、大同大學，等（詳見簽到名單）

壹、主席致詞：

因交通部電信總局委託交通大學研究案，希望能瞭解有關 CA 的標準與政策制訂，因此希望透過此座談會知道各位先進對 CA 這方面的意見與看法，也歡迎大家能夠提供一些建議給我們做為參考。今天亦感謝交通部電信總局提供場地，與設備。

貳、報告事項：

一、報告題目：數位電視條件式接取（CA）標準研究

報告人：趙子宏博士（內容如附錄六）。

報告內容：

1、DTV 產業結構概況。

2、各國 CA 標準政策制訂、法規架構概況。

3、DTV CA 基本標準與技術概念。

4、討論議題：simulcrypt、multicrypt、common interface 標準之討論、對消費者公平保護之政策、政府需配合制定之政策規範、其他議題。

參、議題討論要記：

1、CA 標準之制訂方面

（一）首要的問題應該是我們是否需要 CA？國家是否要有 CA 應該有一個共識出來。其次是是否需要 CI？第三則是若我們要有 CA、也要 CI，則什麼時候開始要有 CI？比如一剛開始就要有 CI，或幾年之後就要有 CA？這樣的問題對於政策制訂，在各 Broadcast、Manufacture 間會比較容易執行，對於資源的投入也會比較有幫助。例如：如果清楚知道台灣要有 CA，則可以談要哪種 CA，是自己發展 CA 或者是選一個 CA。若 CI 一開始就要有，則許多做電視或設備的廠商就清楚知道要趕緊將 CI 置入，若兩年後訂戶數夠時要選用一個 CA，則大家能準備兩年後應做些什麼產品，如低價便宜的產品，客戶也能很清楚知道，Broadcast 也不會購買兩年後要求退貨。（高昕科技公司）

（二）英國地面電台 ONDigital 的 Box 上有做入 CA，電視機則逐漸要求要做入 CA，並要有 CI。澳洲則是 Free service，先不要 CA，但事實

上以後還是要 CA，只是 CA 的營運模式尚須實踐。新加坡現在也是 Free 的，不要 CA。要不要 CA 可以依服務提供者自己的時程決定，也可參考他人的商業規劃是如何做。CI 做入，對於接收設備應是一個保護且成本亦不高。(本研究計畫趙子宏博士)

(三) 是否要 CA 應視是否要提供付費服務，免費服務則不需 CA，在廣播上如果許多內容需要收費就應要 CA。目前有線電視與衛星電視來說必須靠 CA 收費以維持營運，因此 CA 對我們來說是必要的東西，另內容上有些授權之問題也必須靠 CA 之機制。至於指定要有 CI 並不會影響先前沒有 CI 的 Box，CI 只是將 CA 部分獨立出來，這會有助於家電廠商未來發展數位電視機產業。因此有沒有 CI 或什麼時候作 CI 並沒有關係，是視市場什麼時候需要。(太平洋衛視公司)

(四) 談論台灣是否要 CA 時，國外作法是如何？是否有制訂統一的 CA 標準？是由什麼單位來制訂？如我國標準制訂是經濟部，國外情形可提供做參考。(交通部郵電司)

(五) 目前若採用 DVB 標準，只能買其設備，相對應標準機制則定義在 DVB 標準架構之下，有些部分是 CA 技術廠商可以自己做，有些是標準直接定義，如共同需要的 scramble 就直接定義。但技術來源可能有些背景，如某個 CA 廠商有這樣的技術，提供出來變成標準的部分。政府政策方面目前如歐洲要求 42 公分以上電視機做 CI，美國要求遙控器選台機制與安全機制必須分開，有 2005 年的時程要求。(本研究計畫趙子宏博士)

(六) CA 並不能單獨存在，與內容服務、各種不同型態商業是結合在一起的，目前許多想做的東西都必須仰賴 CA 廠商做出來，因此非常希望能自己掌握到 CA 的技術，在 control、management 這兩層有關 business know how 是可以去發展的技術。每個國家、區域市場有不同的特性與做生

意方法，需要不同的 CA 去搭配操作控制的機制，因此希望國內自己的產業可以逐漸發展這方面的技術。(太平洋衛視公司)

(七) 贊同有自己的 CA，希望國內可以結合各方面的人才發展自己的 CA，因 CA 控制到所有的內容與產業管理與控制，CA 是很重要的部分。如果發展的時程可以與國內業者推動速度配合，可以從中培養很多人才，幫國內製造或內容業者可以解決許多問題。自己發展的 CA 如果可以單獨存在，也可以支援 CI，可以幫助國內業者很大的忙，未來授權的費用也會較低。(高昕科技公司)

(八) 在工研院的立場發展技術應是可行的，但 CA 並不只是技術問題而以，技術隨時會開發則不屬工研院。CA 有責任上的問題，若政府規定用某種 CA，廠商遵循此標準來做 CA，但 CA 若被破了應由誰來背負責任，這是應考慮的。另，政府應從規範 CA 政策的角度來做，屬於裁判的角色而不是變成球員，規定 CA 就變成球員了，訂死對於產業水平分工也失去意義。(工研院電通所)

(九) 即使歐洲 DVB 並無囑咐任何一種 CA，甚至希望不要有 CA。市場上有的 CA 全都是私人公司 (Irdeto、NDS、Mediaguard、NagraVision、Viaccess 等)，許多 CA 系統至目前為止使用的客戶總數，都尚未達台灣的家庭用戶數 (約五百萬)，並非每個 CA 都很成功，值得深思。所以我們現在發展出來的並非國家標準，而日本 Multi-2 的採用造成很大的影響，是可以真正掌握未來所謂內容主導的產業。因此 CA 算是私人公司並非國家標準，台灣是否能發展決定不在我們的市場規模有多大，而決定於是否可靠、具成本效益。仍希望能發展自己的 CA，若我國能發展一個很好的 CA，大陸或華人市場是相當大的，可衍生出非常大的效果。(高昕科技公司)

2、有關 SimulCrypt、MultiCrypt、Common Interface (CI) 之採用方面

(一) 同意儘量採用 simulcrypt。因不採用的話，整個系統架構是被單一個 CA 廠商所控制，採用 simulcrypt 平台上可以有兩個以上 CA 系統在運作，做 CA 的傳輸會比較容易。與其被一個 CA 控制，不如自己的系統可以去管理與控制兩個以上的 CA。因此從系統的角度來看，非常贊同採用 simulcrypt，不管政府政策是否採用 simulcrypt，我們都會朝這方向做。另從 Box 這一端來看，以 DVB 來說，歐洲已有許多國家由國家政策主動推展 multicrypt。目前 STB 大多授權某家 CA 後，使用該家的 smart card 來做解碼，採用 multicrypt 可以有兩種作法，一是在 Box 上可以接收兩種以上的 CA smart card，另一是採用 CI，把 CA 的模組整個變成 CI 的模組，可以把 CA 部分獨立出來，則將來 Box 或是 TV set 擁有者是屬於 end user，系統營運者不需對這些東西做額外的補貼，只需補貼 CI 的模組即可。所以就一個系統營運者，我們非常希望能走 simulcrypt、multicrypt、甚至能夠定義出一個 CI 的 multicrypt。(太平洋衛視公司)

(二) 有關 simulcrypt，如果公司已經賣了一百萬台在市面上，如何更換 CA 系統？如果再另外選擇一個，公司就必須管理兩個系統，且已在市場上的一百萬台無法回收回來。(高昕科技公司)

(三) 採用 CI 會增加成本(約 50 美金；smart card 約 10 美金)，因此系統廠商不會擅自採用，希望由政府政策，在公平的環境之下來推動 CI 的實行。而 simulcrypt 是希望可以讓我們很容易的管理兩套 CA，假定市面上已有一百萬台 CA1(smart card)廠商的 STB，萬一此 smart card 被破壞，要更換是非常困難且價錢昂貴，但採用 simulcrypt，可以一步步作轉換，原有的一百萬台可以各有五十萬台的 CA1、CA2 兩種不同的 Box 在市場上，負擔也減少一半，也可以漸進更換 Box 上的軟體，將 CA1 改為 CA2，沒有 simulcrypt 必須一夜間改換但這非常困難，否則系統就必須整個運作停止。這是我們贊同採用 simulcrypt 的原因。(太平洋衛視公司)

(四) 因賣 Box 的時候已經付了第一筆權利金，即使轉換每個 Box 仍是需付權利金，這是應由系統 operator 處理，或是製造的 manufacture 處理？或者本身已有某個 CA 在市場？除非一開始告訴 Manufacture 將來會換，收費上才能做較好的準備，市面上的 Box 是否須免費換回，否則若要完全清除掉另外一個系統是較困難的，是否將變成內部需管理兩組管理人員、付兩套兩套授權費用？（高昕科技公司）

(五) 採用 simulcrypt 並不是要更換 CA 廠商，而是萬一 CA 被破壞的話應怎麼解決問題，讓市場上 Box 可以容許兩套的 CA，萬一其一被破壞時，不會一夜之間整個系統因此停止。又，simulcrypt 並不會增加太多的運作成本，只會佔用些許頻寬，在系統端仍只是一套成本並不高，在 Box 端則可能增加幾塊錢數量會是蠻大的，但對系統來說可因此增加 CA 系統的可靠度。（太平洋衛視公司）

(六) 在 Broadcast 方面，simulcrypt 也是應該要採用的，但是大部分應先在商業上合併後才採用 simulcrypt，如果與其他的 Broadcast 一起用一個 simulcrypt，可能性要在商業上的層面來說。在 simulcrypt 的投資上並不是很大，可能只是頻寬多了一些，以及運作上多了些不同。（行健電訊公司）

(七) 即使是有兩個 smart card，若五個 Broadcast 每個都用不同的 CA，不管是 simulcrypt、multicrypt，對消費者而言都是很不方便的，這應是比較重要的議題，所以不管是 CA 或 CI，應該都能有一個共通，讓消費者可以不用換來換去，這方面國內應有一個共識出來。至於說為了安全增加一個 smart card 的 connect 只增多一兩元，但如果定義的 CI 介面沒有擾碼的話，資料訊號很容易被入侵，那內容提供者會願意接受嗎？如果願意的話，我們增加一兩元的投資比較有意義，否則日後仍是無法使用。（全陽科技公司）

(八) CA 應比較屬於是商業營運的問題，大同公司另一媒體研發處對於終端製造應會比較有深入的瞭解。(大同大學黃啟芳教授)

(九) 當客戶數達到某一程度的經濟規模時，再採用 simulcrypt 會是可行的，但若未達到時多買 simulcrypt 會多花一些錢。multicrypt 除非能預估未來市場的主流是哪幾個鎖碼機制，否則未來市場出現更經濟更有效的鎖碼方式時，multicrypt 的 Box 市面上則無法使用了。CI 應是較長遠可行的，先不假設到底採用哪個鎖碼機制但保留一個介面，但 CI 最重要的機制應是經濟、成本到底能便宜到多少，在市場上能有多少競爭。總歸這三項，若依總局之前在無線數位電視的觀念來說，應是採用技術中立，或許在此時尚未能訂定出最恰當的政策時，應由市場機制、技術中立的觀點來看會比較恰當。否則現在選用了某一種機制，萬一未來又變更，則不可行。(東森媒體科技公司、台灣有線視訊寬頻網路發展協進會)

(十) CI 似乎一點也不共通，因每個 CA 營運者不願意把覺得是 CA 安全機制的東西裝置至 CI，如 PCMIC 卡，這是最大的問題，若不解決此安全機制的問題，會有 CI 的問題。另未來若採用 CI，PCMIC 卡價錢亦很貴約 50 元美金，成本增加很多。(行健電訊公司)

(十一) CI 的安全機制基本上應以 POD 比較安全，但目前的晶片在 POD 的發展並沒有那麼完整，因為仍須再裝置一次比較安全。(全陽科技公司)

(十二) 站在地面廣播的立場，因有免費收視的頻道存在有些立場需遵循政府的政策，所以現階段 CA 目前並非我們第一考量，或許兩年後市場有需要時會再做更深一層的考量。以澳洲或新加坡地面廣播來說，用戶數規模尚未達到一定的程度，並不需談 CA 這個問題。Box 端若採用 CI，但有安全機制上的考量，則不贊成這種機制存在。(民視電視公司)

(十三) 針對 CI 是否會被盜錄之問題，若真的有能力作解碼要拿訊號根本不需要 CI，因此是否有用 CI 對於 Box 是否會被解掉並不會有什麼影響，因此對於 CI 是不需要擔心的。CI 其實是很重要的，如果沒有採用 CI 公平性會有問題，假設台灣要用 CA，廣播業者找一家製造商就可以綁死了，沒有 CI 要如何 CA 呢？廣播業者不把東西內容公開出來，或是公開的過程有時間上的差距，則做電視機或硬體業者就無法受到公平的對待。而 CI 對於高價的電視機製造相對較低價的 STB 的重要性來得更高，CI 可以保障電視機製造業者，CI 相對電視機的價格是相當小的，因此 CI 有其含意在。(高昕科技公司)

(十四) 因目前 STB 都做成單晶片了，解擾碼出來後 (de-scramble) 的內容已是 high bit rate，要盜侵內容的話則是擾碼後在傳輸串流 (transport stream)。因目前 DVB 的 CI 機制進到 CPU chip 時，transport stream 是 clean 的，因此要被人盜錄是很容易的。以 simulcrypt 來做 STB，因是以 scramble 進去但是信號沒有流出，只是以 smart card (ECM\EME) 的方式來控制，出來時已是解完後的一百多 M bit rate 的資料，不會有人想要再錄了，且有拷貝保護的機制在上面，因此仍有一些差異。如果要用 CI 模組，贊成用 POD，因解出來的訊號還需 scramble 一次，再進到 STB 的晶片裡去做 de-scramble，這樣才能真正保護內容的提供者。(全陽科技公司)

(十五) 贊成東森公司之意見，因大家所提之各種意見，似乎這樣做也不對，那樣做亦有人會反對，因此是否可以將商業的營運不要干預，技術繼續中立。經過市場的考驗會有一個好的解決方案產生，市場尚未成形就定死規範了未來之發展性，或是讓人認為圖利某人之慮則得不償失。(台灣基礎網路公司)

3、對消費者公平保護之規範方面

(一) 未來在訂定法規時，針對消費者端會比較大的議題，國內法規規定（有線電視）同一區域內可以開放四至五家的業者來經營，這種情況下未來業者若用的是不同的 CA，消費者若要遷移地區或換系統收視時，可能面臨到 Box 無法使用之問題。因此政府法規應能制訂共通標準的 CA，業者是否用 simulcrypt，也應包含到政府法規所規定的基本的 CA，才可以確保 Box 不管是接收哪種系統都能使用。（泰山電子公司）

(二) 站在製造商的立場，主要希望把 CA 標準訂出，我們可以根據標準來做，而製造業者也較站在消費者立場來看待這件事，東元仍希望可以有一個 CI 的介面，因 STB 賣出不可能只用兩、三年，如果搬家至南部需要更換一個 CA 則消費者是無法接受的，會希望 Box 透過換 smart card 或其他方式仍可使用收看，因此希望政府能儘量訂出一個 CI 的標準出來。（東元電機公司）

(三) 台灣松下立場與東元相同，是希望以消費者立場來考慮，能有共通的 CI 制訂，CA 方面若能有共識有共通的 CA 是最好不過的。（台灣松下公司）

(四) 剛談的許多 CA 模式到最後似乎犧牲的都是消費者，成本都需由消費者承擔，在場並無消費者代表可為消費者發言。應考慮台灣整個經濟規模，歐洲、美國、日本規模較大，各有不同的政策（如主席所報告），這些政策未來是否能有長遠的發展，變成高度整合的東西。所有的加值卡最後都面臨整合的問題，是否能有一卡行遍天下。日本市場大我國約四倍，但五六個廣播系統可以整合成一張卡，最大的獲利是消費者。政府可以保持技術中立，由各營運者來運作，政府亦可強力介入，建立類似金融卡之金資中心來運作，幫消費者、各產業界分攤許多成本。為了長遠的成熟社會，或許美國或歐洲將來後幾年也會產生這樣高度整合的現象，日本是較成功的例子，我國業者與政府是否可以共同思考推動整合，共同降低

成本，而非政府補助每個模組多少錢，業界裡有許多公協會可算是一個代表，可以跳出來受政府委託來做這件事。(工研院電通所)

4、政府需配合政策之規範方面

(一) 政府規定廠商的層次是到哪裡？政府如果決定是 simulcrypt 或是 multicrypt，廠商就一定得遵循嗎？政府政策的規範是到什麼樣的程度？否則大家談得太細，談完之後是否形成政策是有困難的？是否能夠提對產業整體較有幫助的議題？(高昕科技公司)

(二) 待研究案之後，能夠瞭解各國相關政策並做評估之後再做考慮。
(交通部電信總局)

(三) 國家目前對於 CA 標準仍是蠻開放的，要做到細部或較高層次的地步，或許需要大家的建議，從國家的立場保持公正公平非歧視的基本原則，應是所有國家政府都希望遵循的方式。(本研究計畫杭學鳴教授)

(四) CA 標準研究之背景是前任行政院副院長(劉副院長)認為，有線電視類比時有 STB，將來數位化時，以及地面數位電視、衛星又有 STB，眾多 STB 造成民眾之不方便，因此要求交通部是否做一個統一標準的研究，因此請電信總局做研究，而電信總局則委託交通大學做研究。政策方面交通部對於 CA 或 CI 角色應扮演至什麼程度是一問題。交通部目前並沒有訂定什麼技術標準，大多訂定技術規範，例如廣播電台設置管理辦法，訂定相關技術規範來做查驗，合格後發給執照使用。另外則是以形式認證方式，例如大哥大。CA 標準是否要成為國家標準由經濟部來管，或是由交通部訂定技術規範或認證，這需請大家共同做探討。(交通部郵電司)

(五) 就政府需配合政策方面，simulcrypt 應是屬於商業議題，不需政府政策來規範是否需採用 simulcrypt。先前配合有線電視業者做 CA 查證時，因類比鎖碼系統是一開關機制（可遙控 STB 開或關某個節目），數位系統的 CA 則是授權機制（將節目內容整個授權出去），因此交通部在修正查驗規範時應考量到不同特性的 CA 機制。CI 方面雖有一些安全上的顧忌，但單純從商業上來考量，對於製造電視機的家電廠商會非常需要這樣一個共同介面的定義，政府應在這方面要有些規範。CI 安全上的問題，因歐規 DVB 的 CI 定義有些缺憾，美國 POD 的問題則較少，若國內要做 CI 之定義，應可做更深層的考量，而不一定需完全採用歐規 DVB。（太平洋衛視公司）

(六) 政府規範應從產業促進觀點來看，今天所談論的是技術層面，此議題主要前提是剛先進所提的我國是否應有 CA 存在，而產業政策應由產業經濟觀點來看，而不是馬上進入到底應制訂什麼樣的技術規範，因技術絕對是最最枝微末節的部分。例如政府規範有線電視解碼盒的模式（賣斷、租、借、自備）包含對消費者的保護，同時也對解碼盒政策做了相當的規範。因此相關主管單位（交通部、新聞局、經濟部）應先對國內整個的廣電大政策做規範，包括賣主、營運業者、相關消費者等，較談論要使用哪項鎖碼機制是較重要的，這範圍或許較大些但是為相當重要的事情。（東森媒體科技公司、台灣有線視訊寬頻網路發展協進會）

(七) 由業者自行結合選定共同要的 CA，讓大家可以公平的來運作，以這樣公平合理的機制應就可以解決許多的問題，在產業上來說也較能有秩序。電視台或許尚未馬上想到用到 CA，但兩年後要使用會可能會遇到問題（使用者需換 smart card、或 port 等），因此五家無線電視台應不能有五個 CA，此種商業模式是不可行的。（全陽科技公司）

(八) 生意的事情有許多競爭與創意，許多業者提供特別的服務不希

望機器帶到其他區域仍可收視，許多 Box 的設定是不能移動區域的。贊同生意的事情留給做生意的人去做決定，政府從經濟面或管理面決定一些較好管理的事即可，否則會抹煞許多創意。(高昕科技公司)

(九) 在歐洲數位產業的發展有些部分政府是有適度的補助，不管將來是採用 simulcrypt、multicrypt、CI，哪種鎖碼技術，建議交通部考慮配合經濟能有適當的補助政策，或許是可行的政策規範。例如：若採用 CI 賣主需 50 元美金成本，補助 50 元美金來推動 CI 政策，如此成本不會由經營者或消費者來直接承受。Box 推出的重要議題是內容提供與成本是否合理，當然並非整個 Box 都補助，政府若將數位產業訂為重要產業政策時，配合制訂哪種技術政策應考慮適度補助，而不只是訂規定便全部交由經營者或消費者來承受所有的成本。(東森媒體科技公司、台灣有線視訊寬頻網路發展協進會)

(十) 政府若要有相關規範應即早，因不管政府如何規範業者早已選定自己要採用的 CA，事後規定可能來不及。不管業者採用何種 CA，政府是否能依公平、合理、非歧視之原則來制訂政策，這是比較能著力的，因政府難以規定業者要或不要採用何種 CA。(佑勝公司)

5、其他建議

(一) 今天的討論會並不做任何的結論，從收集資訊的觀點收集大家意見。為此議題特設專屬 e-mail 信箱：ca_policy@commlab18.ee.nctu.edu.tw，歡迎大家有任何意見或資料隨時 e-mail 來，從不同的觀點有不同的意見，未來將收集大家資料與意見再做整理。(本研究計畫杭學鳴教授)

(二) 是否能設立網頁，除了大家將意見傳過去並可傳出來讓其他人

知道，可激發出更多的意見。(大同大學黃啟芳教授)

肆、散會：下午四點半

數位電視條件式接取 (CA) 政策研究 座談會

出席表

委辦單位：交通部電信總局廣電技術處

主辦單位：交通大學經營管理研究所

協辦單位：台灣數位電視委員會

時間：90年6月26日(星期二) 下午2:30-4:30

地點：交通部電信總局七樓大禮堂(台北市濟南路二段14號7樓)

序號	單位	簽名	簽名
1	公視	黃金華	
2	松下	村之根	
3	台視	陳厚銘	林訓
4	民視	林哲男	謝志豪
5	華視	林金城	徐俊方
6	中視	陳建興	
7	中視	胡德華	
8	公視	林文雄	李銓, 葉國良
9	動聯	王妍文	
10	東森	呂金	
11	祐日	林北仁	黃清杞
12			
13			
14			
15			
16			

序號	單位	簽名	簽名
17	聯通 R4	白克同	鄧家山 張鑑麟
18	王東亞 全陽科技	王東亞	
19	工研院電通所	高懷忠	
20	廣電處	王新融	
21	台灣松下	陳唯心	
22	大同大學	黃啟芳	
23	電機電子公會	林以專	
24	台灣數位電視聯盟	許光正	
25	郵電司	姚秉忠	
26	電信總局	謝慧靜	
27	遠傳公司	卓吳凱	許英明
28	"	劉詩次	
29	"	邱子如	
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35	ITRI	蕭博文	
36			
37			

序號	單	位	簽	名	簽	名
38	東豐衛星		姚俊彥			
39	星際伝播		于世暉		鄭宏仁	
40	夕		張國慶			
41	衛安及有線電視		林清介			
42	太平洋衛視		石佳柏			
43			吳道宏			
44	台灣基礎網路		鄭文龍			
45	中華衛星有線電視		高行健			
46	電訊才辰		劉子仁			
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序號	單位	簽名	簽名
59	東元电机	朱瑞鼎	黃俊宇
60	華邦电子	余淑美	余
61	泰山电子	吳秋霞	張顯琦
62	高昕科技	施河東	
63	中鼎網路	蘇環收	
64	Li	談子峰	
65	意法半導體	蔡博群	
66	邁斯特	于務也	
67	中強光電	胡以能	
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第二次 CA 座談會會議記錄

時間：九十年九月五日（星期三）下午兩點

地點：電信總局七樓大禮堂

主持人：交通大學電信中心杭學鳴教授

列席單位：交通部郵電司、交通部電信總局、行政院新聞局、經濟部工業局、經濟部標準檢驗局、行政院公平交易委員會、工研院電通所、台灣科技大學

出席單位：

本研究團隊：杭學鳴教授、趙子宏博士、曾馨誼、黃政清、李梅菁

各單位代表：無線電視台、衛星與有線電視台業者、衛星與有線電視公協會單位、設備製造廠商、等（詳見簽到名單）

一、政府與學術單位意見

（經濟部工業局 ①）根據我們對產業界有關設備製造業這邊的瞭解，業界很希望趕快將 CA 與 CI 的標準趕快制定。目前東森已經向韓國採購 STB 設備、和信是與 GI 有策略聯盟，業界事實上作了很大的投資，因欠缺將 CA 標準制定好，因此業界喪失這樣的機會。工業局因此希望能將標準趕快制定，業界希望能有統一的 CA 標準，並且這個 CA 標準是我們國內採用，與國外有所區分，這對國內的業者是另外一種獎勵。

（經濟部工業局 ②）工業局的立場是希望產業可以快速發展起來，工業局

在 89 年訂定了新興重要策略性產業，是已經把 STB 與 DTV 納入了，在 91 年度新的新興重要策略性產業，已計畫把 CA、CI 這個模組納入，也是希望對國內設備製造業者，對他的投資能有所獎勵。

（經濟部標準檢驗局）因為這個產品目前還沒有商業化，還沒有量產，目前對這個產品大概不會納入檢驗，因為這個產品牽涉到到底是電信總局所管轄，因為這是牽涉到無線接收與發射系統的產品，還是一般商品如我們一般的電視機，目前電信法把標準檢驗局與電信總局扯在一起，審驗是他們，檢驗是我們。如果說將來電信總局或有關單位，要求標準檢驗局納入檢驗的話，將來檢驗的方向是檢電他的電磁干擾，以及他的安全規範，所以對於系統裡採用什麼系統，我們在檢驗時並不會關切到底裡面是採用歐規、美規、或是日本，但是產品安全，以及不能產生干擾商業用頻道的訊號出來，這目前已經列入很多東西，比如電視機或錄放影機等等，如果要檢驗他的安規要檢驗電磁相容性，這是標準檢驗局對於這樣的產品納入檢驗目前既定的政策。

（公平交易委員會）公平會從市場的觀點來講，希望整個市場不管是在製造商層面或是消費者層面，都能維持開放競爭、公平的立場。政府對技術規格政策的擬定可能牽涉到技術研發或產業政策的考量因素，如果政策擬定出來之後，市場上如果有一方已經具有優勢的市場地位，可能是設備商或系統業者，在這種情況之下，如果有濫用市場優勢地位的情況，可能就是競爭政策或主管機關必須介入處理。現階段還在制訂這些規範或推動時，我們基本的立場就是儘量讓市場保持開放、公平競爭的環境。如果要納入檢驗，會由標準檢驗局召開公聽會，公告實施時間，不會明天公布後天馬上實施檢驗，另外標準要採用國際的標準，加入 WTO 不准用特殊的標準來檢驗這個產品。而站在消費者的立場，STB 的發展到底將來要怎樣，可以參考電信總局所列管的大哥大手機，在世界各國暢銷率大，是因為達

到使用者方便，只要一機，不管哪家門號，只要卡片一換就可以，唯一痛恨是買手機，必須有一大堆的周邊設備，電池、充電器、皮套，只要一換別的行號，這些周邊設備就通通要換，這是因為對於大哥大的充電器或電池沒有訂標準，所以對消費者來講非常不公平。所以以手機來講，就可以想到將來數位電視機的方向，根據台灣電力公司兩年一次的家用電器普及率調查，台灣電視機現在已經達到將近一千萬部，市場很大，對做 STB 來說，每人買一部 STB 就很有商機。但是以消費者來講，希望買的接收設備，將來搬到別區時還是可以接收，不用再重買，裡面的 Smart Card 也不用換，這是方便。就像大哥大帳單，就會告訴你網內多少錢、網外多少錢，不同業者間自己去互相拆帳。所以以方便來想的話，將來數位電視的前途是一光芒的。

（工研院電通所 ①）制訂 CA 的考量應該是怎樣保護消費者，讓內容能在不同的系統流通，而不會被某一個 CA 所綁死，消費者也不會被接收機綁死，其他的都是可以討論的。

（工研院電通所 ②）制訂政策時，還沒定義 CI 到底是哪一種，是 Smart Card 或是 PCMCIA 卡，有待進一步的定義。對於整個產業是不是要規定 CI，消費者要到市面上買的話可能有必要制訂 CI，但是對於個別的業者可能有不同的商業模式，用不同的方式加速他的發展，可以選擇發卡或補貼等各種形式，在這種情況之下就不一定需要 CI。但是前面還是有 CI 的原則，要把利用 CI 的 STB，把裡面的規格制訂下來，將來對於個別業者只是說執行上不用 CI，但是裡面的機制都要符合有 CI 的盒子規格才行。這樣讓消費者可以有選擇，可以自己到市面上買一個盒子，只是向系統公司要張卡，或者不想自己花錢，就可以直接向系統公司要盒子，接受服務，這樣他自己可以有不同的選擇。訂 CI 的目的應該是在這裡，而不是限死，應該是幫助業者使業務可以推得動，或是更省錢，能使消費者更有利，從這

個角度出發。

(工研院電通所 ③) CA 不需要訂標準，CA 有商業考量，包括政府在內也沒有資格規定業界要用哪一個 CA。CI 應該要有標準，尤其對消費性產品應該要有標準，標準應該由業者自行來制訂比較好。政府訂定一些要求，比如說時程、要達到什麼目標、必須是國際標準等，類似這樣的指導原則，可以規定哪些業者團體來制訂，或者由業者自行推派代表團體來制訂。

(電機電子同業工會) CI 還是應該要訂，至於界定哪些產品範圍與實施時程，應該要很明確的訂定。

(台科大電子系邱榮輝教授) 是不是能在 Smart Card 上訂一個標準，讓大家有一個共通的標準，其他的大家就可以不用訂。只要在這規範的標準之下，用戶任何 STB 都可以用，換業者對用戶沒什麼關係，或是買任何 STB 都可以共用，假設能這樣訂，對業者、使用者都比較好。國內業者如果能夠自己去開拓這樣的產品，因為有他的方便性，所以未來開拓國外市場，也是有他的利基所在。

二、 廣播業者意見：

(TV-Plus ①) CA 分三個層次，最底層的 Scramble 部分已經是 DVB 標準，沒有什麼爭議。比較有爭議的是上面兩層的 ECM、EMM 控管層次，這部分 DVB 是開放，由各廠商自己去發展自己的系統，到目前為止有許多系統產生，這也是造成市場上疑慮的原因。我們認為這不是太大的問題，基

本上 DVB 也提出兩個方案，SimulCrypt、Common Crypt。Common Crypt 主要是解決用戶端接收器的問題，讓用戶端設備的廠商可以把 CA 的部份分離出去，讓產品變成簡單的家電產品，對系統端影響並不是那麼大，所以就系統業者來說，要不要採用 CI 或是 Common Crypt 主要考量的因素是價錢的問題，因為採用 CI 後，每個 STB 的成本可能會增加 40-50 美金左右。頭端主要提供 SimulCrypt 解決方案，這主要是 Business Issue，是不是採用這東西，成本並不是很高，從非 SimulCrypt 系統轉換到 SimulCrypt 技術上也不是那麼困難，所以就系統業者來說這不是問題，完全是 Business 上有這樣的考量。比如我們最近與東豐合併，雖然雙方都採用法國電信的 Viaccess，可是我們有兩張 license，我們在做整合上就需要用 SimulCrypt 架構，自然就會採用這樣的東西，如果沒有需要，不採用 SimulCrypt，對於用戶接收來說並沒有什麼不同，不會影響未來 STB 產業的發展，所以這兩個東西應該由業者自己決定，由市場機制決定。我們比較關切的是整個市場應該有一個遊戲規則，整個 CA 涉及到 content 產品包裝、管控等，應該有一整套的政策，應該從這個方面考量。

（TV-Plus ②）基本上不贊成政府一定要求系統業者採用什麼 CA 或 SimulCrypt 這些東西，但是基本上台灣產業應該有一個共識就是遵循歐規 DVB，在 CI 模組上，美國有訂 POD 這樣的規範，這個東西與歐規是不相容的，要在 DVB 的廣播系統裡要採用 POD 的模組的話，會有很大的問題，也許政府很單純的規定一下，產業就是走歐規了，就遵循 DVB 的一些指導原則，剩下的東西應該儘量少規範。另外應該注重整個上下游產業的遊戲規則，廣播環境裡，大部分的 CA 是做產品的包裝、授權、管控，像百貨公司的經營方式，每個產品出場時包裝好，貼上條碼，一路到百貨公司收銀台，掃瞄後就可以馬上收費，就類似這樣 CA 的控管機制，這涉及到上中下游怎麼協調，如果採用一套 CA，就等於是從最上游的內容業者，上中下游做垂直整合把他整個綁在一起，這樣系統與系統之間就不能互通，內容要能夠到其他競爭者系統，必須經過很繁複的解碼、重新鎖碼，

再進到系統裡，這都會增加互通的成本，造成市場疑慮。所以希望政府能制定一套遊戲規則，不要因為 CA 系統或其他控管系統造成上中下游綁在一起的現象，朝這個方向制訂政策，促使產業做水平分工，做更開放的產業架構。

（中嘉網路）我們的意見是希望方案一，就是完全開放的政策，主要是現在在 CA 的部份還沒有什麼成熟，其它國家美國或英國在政策上，英國有一個政策的界定範圍，但是他們的 BskyB 覆蓋很大，他們有自己的 CA，政府也沒有要求，美國現在已經有 CA 的 common interface，是利用 POD，但是成本很高，雖然有這個規範，但是還沒有發展出這個東西到外面，因為他們現在的有線業者提供的解碼器也是成本比較低的，如果要加 POD 在上面，大概要提高 30-50% 的成本。如果中嘉網路要加 CI，在成本上會有一定的考慮。另外有關 SimulCrypt，現在的數位加密、壓縮系統裡，已經有包含 SimulCrypt 在裡面了，就是看業者在商業上的考慮是否需要 SimulCrypt，政府不應該訂一個既定在裡面，但是可以鼓勵。業者要用 SimulCrypt 並不是太大的問題，但是應該只是從商業上的考慮。

（太平洋聯網 ①）第一點：CA 的制訂可以從三方面來看，來做考量，第一是系統經營者，不管是有線、無線、衛星，這個角度來看，訂定那一種，每一個系統應該都可以去調適。第二個是從產業界製造商來看，如果每個製造商都選一種的話，沒有辦法達到經濟規模。第三是從觀眾的角度來看，是希望越便宜越好。第二點：大陸有在研究自己的 CA，因為他們的市場經濟規模夠，所以可以制定說中國大陸就只用這個 CA，如果政府要制訂 CA 應該要成立一個團隊的方式，有營業行為就應該繳錢，不一定說由電信總局交通部或新聞局來出這個錢，但是這個時程要快，因為技術的變化太快，可能你開發出來的東西更先進的東西又出來了，沒辦法達到各層面要的目標，往往法令政策跟不上技術上的發展。第三點：同意中嘉網

路剛所提的方式，政府應該要開放，應該要與業者站在同一條線上，照顧觀眾，同時讓產業界能夠立足台灣，往全世界去發展。Cable Modem 與 ADSL 在台灣能有立足之地，下一階段 STB 台灣能否有立足之地，就要看整個產業與政府的魄力了，不然大陸人工便宜，是很大的競爭敵對者。太平洋其實也考慮很久，未來使用何種 CA，考慮到將來是否能與東森、中嘉、卡來爾、臺基網、或其他獨立族群能否互相通容，是否將來換 IC 卡或 Smart Card 就可以了，還有 Embedded，如果搬家盒子可以不用換，達到這樣的目的，不用說到別的地方還要換盒子，對觀眾是傷害，要求業者有這樣的功能，政府只要制訂大原則，不應該訂細則，很多是商業行為，應該儘量開放，與業者走在一起，瞭解業者的生態、環境、痛苦，來制訂怎麼保護觀眾的方式。CI 是一種方式，應與工研院瞭解看看，CI 在全世界到底用了多少，應該考慮產業界，比如製造商製造是否有困難，成本，將來是否有辦法回收，或賣到國外去，應該考量。

（太平洋聯網 ②）第一點：無線或衛星下來的數位信號，事實上轉成有線是很快的，他可以把 CA 解掉或不解掉，這是沒問題的，所以不見得說這三個是很多不一樣的地方。第二點：使用 CI 應該考慮用 CI、SimulCrypt、MultiCrypt 的價錢，最後其實很多都決定於價錢的問題，比如東森已經用了 Open TV 的 Middle Wave，已經用了 Viaccess 的 CA，中嘉已經用了 NDS，公司政策上已經這樣決定，沒有一個誘因要他換真的是非常的難，因為很難對他的投資人交代，雖然後面幾個集團還沒有決定，但是基本上這兩個集團已經決定，所以要考慮到用價格的方式來比較。第三點：CA 與 CI 應該給國內產業一個機會，那個集團或工研院，給他一個時間去開發，雖然我比較不相信我們能開發這樣的機制比國外 CA 好，但是應該給國內這樣一個機會，多少時間內讓國內的人去開發者樣的東西，這個時間以後，就應該有一個委員會，把國外 CA 提供者叫來到國內一起談，而不是各個廠商去談，因為有 license、loyalty 的問題，國家、整個台灣來談，這樣也幫產業界製造一個標準的價錢在哪裡，這個委員會的功能就在這裡。第四

點：可以看 POD 從開始有到產品出來有多久，時間事實上是拉得蠻長的，所以這點也是要考慮到的因素。最後，價格真的是一個很重要的因素，因為不管是從觀眾角度、產業界角度、系統業者角度，其實很關切的都是價格。

（太平洋聯網 ③）所謂要提供很多個盒子，因為事實上盒子將來有很多，有經濟型、標準型、豪華型，一般 70-80%都是經濟型，因為為了要節省成本，但是有 10-20%是標準型與豪華型，也就是要上無線、有線、衛星、上網、打網路電話都可以，所以一機到底不是不可能，只要出得起價錢，比較出得起價錢的人享受，使用者付費這個角度，不會說電視機上擺很多個盒子，不願意出錢當然要擺很多個盒子。另外 CA 的角度來看將來可能會有很多個卡，一般來說後面應該都會有 080 或其他聯絡電話號碼，不會今天用這張卡找不到是誰，這不太可能發生。未來整個發展的互動電視上，只有兩種選擇，一個是 Cable Modem、一個是 ADSL，所以收費其實是要透過這個，要撥電話，假如撥不進去就是不通了。所以未來互動電視的方向上，可能會有兩張卡，一個是走電信固網的方式，一個是走有線電視的方式，衛星的瓶頸是沒辦法雙向，無線電視台也是沒辦法雙向，所以只能單向廣播。整個市場佔有率還是有線較多，無線、衛星又多少，其實已經很明顯了，當然這個局限不是說一定不能打破，但是要打破有一定程度上的困難。

（太平洋聯網 ④）有關拆帳問題是兩方面，假如說東森與東豐事實上是同樣，這只是左手右手的問題，這比較單純。另外假如東豐、太平洋衛視與太平洋要合作，這就是拆帳其實沒辦法解決，連談都不用談，根本就不會動他的 CA，所以 CA 整個下來後也不會轉第二次，因為轉第二次有時後會遺漏掉，所以這個因素事實上是商業機制，拆帳比例是拆得好或不好而以。另外衛星、無線當然可以互動，把記憶體放大當然可以虛擬互動，但

是不是真實的互動，可以放 DVD 或硬碟，但是成本就提高了，兩種至少提高各 100 美金的盒子，這樣等於是原來盒子兩倍到三倍的成本，這算是高級的盒子，當然可以做到這樣的功能。

（民視）CA 分無線、衛星、有線產業別規範有不妥的地方，因為國家制訂的是整個產業的發展方向，不應該個別產業有個別的考量，這樣公平性會受到質疑。目前地面廣播無線電視台已有共識採用共同的標準，會不會用到 CI，就無線電視台來說，一開始會有很多免費收視的內容，發展到某一個階段之後，才會用某一個擾碼的方式來做付費節目，免費收視的期間長或短，目前也沒有預測，所以建議政策採用比較開放的標準，讓市場自己決定。有些消費者需要買到高級一點所謂 CI 的盒子，只要用 Smart Card 的方式就可以收到，不用換盒子。某些沒有 CI 模組的盒子，就地面廣播的特性來說，還是會有免費收視的內容頻道還是存在，所以並不是完全看不到所有的內容。所以初期可能會有高階盒子或低階盒子的區別，最後會共同採用共同的 CA 標準，可以用零售市場的方式，讓消費者很便宜的在市場上買到，收看地面廣播。

（電視學會）只要對消費者、業者有利的政策，電視學會都表示支持。

（經濟部視推小組）一個政策的制訂有兩個方向要考量。第一個最主要的是使用者，也就是剛許多先進所提的要方便。第二個要考慮到公平性，因為考慮到使用者方便，又考慮到公平，所以政府相關單位會進來，當然最重要的是業界要能賺錢，能讓業界賺錢的政策才是好的政策。一個好的政策真的推出來，時程點是很重要的，太晚推出來，再好的政策讓業界商機失去的話，可能美意都會大打折扣。當然技術方面還有電通所、電視學會等相關單位會有進一步討論，希望在時程方面，能有明確的管制作為。

（數位電視委員會）台灣數位電視委員會的成員，頭端系統這部分有衛星、有線、無線，製造業接收端，不管是 STB 或是數位電視機都含蓋在裡頭，甚至於研究學者也都在這個良性舞台上互動。今天所談的問題，在委員會裡也都時時再討論，從最早開始意見很多，不管是經過委員會的努力，或是交通部的委託研究報告，最少今天來看很多問題也都一直濃縮，將焦點凝聚起來，問題應該可以很快的得到答案。政府規定的數位電視推動時程，要在年底有一個結果，所以很希望在年底之前，最少這方面可以有一個初步有效的展現。

三、製造廠商意見

（高昕科技 ①）在考慮 CA 或 CI 時，應從幾個方向考慮。第一：一定要分業種，有線、無線、衛星，這三個業種其實從生意上來看，差別非常大。比如有線電視業者花了很多錢佈線，不同業者有不同的成本結構，不能一概而論，不適宜討論大家都要用什麼樣的 CA 或 CI，應該分開討論。第二：應考慮時間因素，在開始的階段 CI 雖然成本比較高，可是提供很大的彈性給提供服務的業者（如初期提供免費服務，後期提供付費服務），可以有很長的時間可以去與 CA 業者談判，可以拿到比較好的價格，比較清楚到底要用什麼 CA。服務從開始提供到成熟階段，採用 CA 或 CI 是有不同的考量的，比如無線電視業者還沒開始提供，可是當消費者達到一定的程度看法就會改變。第三：CI 的成本來自兩部分，一是接收設備內部，包含連接器、重要的元組件，另外就是 CI 模組，PCMCIA 卡本身，這是要分開來談的。成本雖然成本提高一些，但是提供給服務提供者很好的彈性，可以解決初期免費，將來採用 CA 時，在市場上的接收設備可以不用回收回來，影響是很大的，也可以讓初期使用者快速成長，有助於產業的快速發展。另外，英國的 ON Digital 現在叫 ITV Digital，本來策略是補助整台

STB，但是此策略讓他虧損很多錢，現在開始採用的策略是設備讓消費者自己到市場上買，如果要採用其服務，則只補助 CI 模組，無形中就可以省掉錢。CI 在 STB 佔的成本比例是比較高，是相對的缺點，但相對在一部很貴的電視機，相對成本是非常的低。CI 提供一個無歧視的原則，只要電視機上有 CI，提供服務的業者就應該必須支援這樣的設備能夠收看你的節目，不能選擇性的因這不是補助的電視機廠，就不提供服務。所以政府在設定遊戲規則時，必須要有這種無歧視的原則，提供服務的廠商不能拒絕提供服務，制於用什麼 CA 政府不規定。第四：如果由政府介入三個原則：第一是開放的系統，與機制。第二必須是標準，如果不是標準就不能規定廠商用非標準的東西，因為用非標準的東西就牽涉到利益衝突，比如規定任何一個 CA，都會有違商業的利益原則。第三是設定限制的人或單位，必須有能力負起責任，比如規定某個 CA 假設廠商遵循而虧錢怎麼辦，如果是廠商自己選擇，必須對自己盈虧負責。

（高昕科技 ②）第一：CI 並不是說將來做的設備一定要把 CI 擺進去，未來生產的接收設備不管是 STB 或是電視，可以擺或不擺，廠商可以自己選，並沒有國家說做了就一定要擺，這是不能混為一談的。再來如果設備用了 CI，政府就有必要要求提供服務的電視台或是服務提供者就必須支援，這是一個非歧視的原則，不能說 A 廠商生產的支援，而 B 廠商生產的就不支援。而且用了 CI 就應該有一個標準，大家就要一樣，不能說用的不一樣，大家才能遵循遊戲規則。第二：大家應該也都同意，鼓勵國內業者開發自己的 CA，但是鼓勵並不代表做出來的東西，政府就規定一定要用這個，這是不成立的。即使國內有人發展出 CA，還是應該到公開市場與任何的廠商作競爭，如果沒有競爭，還是不會有人用，如果發展出來的 CA 有很好的競爭力，大家就會用，所以還是要回到市場競爭。第三：有關整合 Smart Card，其實到市場上買 Smart Card，還必須打電話回去，跟某個單位請求授權，假設將來有那麼多的業者，不知道這通電話要打到哪裡去，收錢的問題其實是很困難的，所以整合一個 IC 卡其實是很不容易

的。

(高昕科技 ③)很多人都希望未來只買一個盒子，而且只有一張卡可以行遍天下，這是很多人的期待。還有兩個議題還沒談，第一個是到底國內無線電視業者可不可以收費？比如澳洲不收費，所以做設備的廠商就不需要擺任何的 CI 在裡面，就可以省很多的成本，因為策略很清楚，所以策略與實施數位電視化的步驟要很清楚，包含 CA 如果有訂出政策，時程也必須非常的清楚，不能留給市場去決定，市場絕對沒有辦法去測試，沒有講清楚東西都不敢出去，因為出去後幾年之內可能要完全回收。德國到目前因為法令問題沒有解決，所以在產品的介紹裡特別加了一段話：「將來買的東西可能沒有辦法收到未來新出來的服務，請見諒」，意思即是以後不會回收，也因此這個東西不會很貴，是非常便宜的。澳洲、德國、英國這種需求就出來了，反正看不清楚也無所謂，就是看那些就好了，但是要講清楚就好了，所以未來台灣在數位化的時程裡必須把時程講清楚。第二個議題是，如果大家期待的是一張卡，那是否能研究，有關有線、無線、衛星業者到底是競爭還是合作？如果是競爭者，就不要期待會成為一張卡，因為你多賺一毛錢他就少賺一毛錢，這怎麼合作呢？市場剛開始一定是競爭，沒有必要合作，但是像手機狀況，慢慢競爭出來，沒有合併就活不下去，就必須去合併了，市場自然而然就會讓他去合併了。

(普騰電子)製造業的觀點就是做出來的 STB，都能夠提供所有的消費者收服務的能力，這裡面就應該建立 CI，假如沒有 CI 就會被服務業者壟斷，就沒辦法發展 STB，將來電視台靠的不是廣告，是向使用者收費。現在用衛星收的，日本全部有共通介面，所以卡有好幾種，如果是付費就買那種卡，假如是公開的就是認證卡而已，就可以收看公開不收費的節目。因為目前作電視機的尚沒有節目可以播，所以就只好用日本高級畫面來測試好不好。所以政府只要管有一個共通介面就好了，其他用什麼系統不要去管

他，服務業者只要提供卡，讓其有權限可以收視或付費就好了。

（博得電子）今天所討論的這個問題，因為在座各位都是專家，都是從技術上的觀點來看，但是用逆向思考，每一位都是使用者，在家裡要看電視時，可以想覺得應該如何作才是對我們比較方便。如果用這個角度思考，第一個是有線，是比較特殊的環境，是一個封閉的環境，因為在類比時代私接的風氣很盛，有線的佈線就是本身封閉的一個系統，所以有線可以用 CA 的方式來做，可以保障自己，對消費者來說也比較專一，而以正規產品來講，目前有線的轉換器、傳輸器不是在市面上就能買得到，都是從系統這邊發出去的，對消費者來說用 CA 或 CI 並沒有什麼關係，因為所有的動作都是在系統那邊處理。但是如果以廣播的環境來看，因為接收機幾乎都是在市面上買得到的，消費者會考慮的就是一張卡，任何機器都可以看，這是一個較開放的環境，建議用 CI 的方式。衛星部分因為有直播衛星也有轉成有線系統，所以衛星可以用 CA 的方式，也可以用 CI 的方式，可以看業者本身考量點。所以個人的建議，也應該用業種別來看，這個角度也就是從消費者角度來看，消費者不需花很多的精神。

（安德利電子 ①）數位時代來臨，可以用無線、衛星、有線、寬頻電信不同的媒體傳送數位電視媒體資料，以消費者角度考量，到底要買幾種盒子在家裡，是每一種媒體要買一個放在電視機上，或是電視機可以接收每一種媒體呢？如果可以買一個盒子可以接收各種媒體是最好也不過了，可是因為每個媒體會有不同的經營業者，盒子上就需要有幾個不同的插孔以及不同卡片，地面、有線、衛星、ADSL 可能都需要一張卡，誰掌握卡片誰掌握收費系統，如果這些東西整合起來一個盒子一張卡，對消費者是最有利的，可是這時候該付費給誰，這些業者怎麼去拆帳，這些問題如果不先思考，就不太瞭解我們國家到底是鼓勵一個產業一個盒子，或是這幾個產業放在一個盒子裡。如果這個盒子是同一張 CA 而已，怎麼去做拆帳的問

題，如果是不同一個 CA，就可能變成像 MultiCrypt 或 SimulCrypt 的方式，CI 是否合適？

（安德利電子 ②）針對所謂媒體互動能力，能做互動電視的是有線與寬頻網路，衛星與無線是比較困難，有不太同意的看法。因為假如說一個好的 CA 系統，通常也能具備互動的能力，不是真正的互動，但也具備某種程度的互動能力。今天 STB 的技術已經能夠提供做個人錄放影機，就是把錄影機放在 STB 裡面做錄影的功能。這種情況之下 CA 保護的不僅是空中傳來的即時資訊，也保護同時存在硬碟裡的資料，這一點目前相對應的智財法裡，是不是對於重製與複製這一部分需要再做一個檢討。

四、其它意見

（洪處長）這個案子原先是由行政院提出來的，研究到底要不要 CA 或 CI，或是開放的方式，當初目的是保護消費者，主要的考量有兩個原則，第一個是讓使用者很方便，如果是自己的，而不是業者提供的話，不要說住在這個地方付了一次盒子的錢，到高雄去又要買一個新的。第二個原則是不需要有一大堆的盒子在那裡，希望能集中起來。

（杭學鳴教授 ①）從無線、有線、衛星分開考量是很好的觀點，但也有業者建議要一起考量，才比較公平，對消費者也比較適當。

（杭學鳴教授 ②）國外的例子 CI 強制的使用範圍是公開的零售市場，假設業者提供使用用戶 STB 這樣的產品，目前並沒有看到例子是由國家加以限制，所以如果做建議，也會將範圍限制在公開的市場，由消費者去採購

的 STB，要符合 CI 的要求。

（趙子宏博士 ①）補充提醒一下大家的思考方向。不同行業有不同的商業模式，從消費者的觀點來看比較是政府需要規範的事情。美國對 POD 要分開的要求是只有到零售商店的 STB 有這個要求，也就是零售商店銷售的 STB 或電視機，怎樣做對保護消費者有利，另外的角度怎樣對內容業者或網路系統業者要發展商業營運有利，比如 Box 上用 CI，消費者買回去之後，將來做服務的人只要發卡或模組就可以了，模組或卡當然不同的標準有不同的作法，目前 DVB 的作法是一個 PCMCIA 的模組，這個模組當然有他的成本架構，而台科大邱教授所提的則是不是有一個辦法將 CI 模組變成一個卡即可。

（趙子宏博士 ②）補充說明，在 1997 年底，當時行政院 NII 小組決定數位地面廣播的時程時，當時就容許無線電視可以做收費的節目。第二點至於如果要規範電視機要有 CI，是不是要有基本的要求，在歐洲國會有要求 42 公分以上的數位電視機要有 CI，實施的時間是公元 2002 年的 1 月 1 日，這是有關時程與如果有 CI 的事情，可能在 2-1 這個方案，將來如果要選擇這樣的方案，產品的實施範圍，是不是只包括到零售店商品，哪一類的產品，然後時間點，要規範這樣的事情。各個媒體之間的競爭合作，如果是內容應用是多媒體的節目服務，相對於消費者來說，可能傾向於訂購其中的某一個服務來開始，所以他們之間一開始應該是互相競爭的。製造業這頭，生產的產品會怎麼發展，應該是類似三頻手機，一開始只接收某個媒體，逐漸把另外一個媒體收進去，讓消費者取得更簡單方便的產品。

數位電視條件式接收 (CA) 政策研究 第二次座談會

出席表

委辦單位：交通部電信總局廣電技術處

主辦單位：交通大學經營管理研究所

協辦單位：台灣數位電視委員會


時間：90 年 9 月 5 日（星期三）下午 2：00-4：00

地點：交通部電信總局七樓大禮堂（台北市濟南路二段 14 號 7 樓）

序號	單位	出席人員簽名	出席人員簽名	出席人員簽名
1.	欣家科技	邱秀英		
2.	駿林科技	黃育德		
3.	豐和	唐永剛		
4.	永信樂	張志豪		
5.	新和	林財順		
6.	豐和	趙和明		
7.	大揚有線電視	黃明英		
8.	北海有線	楊永芳		
9.	永和有線	賴金王		
10.	公平會	洪萱		
11.	交通部	楊魯齊		
12.	聯維	陳宏高		
13.	宏福	張光仁		

序號	單位	出席人員簽名	出席人員簽名	出席人員簽名
14.	DTVC	謝光已		
15.	視推小組	劉利安		
16.	吉隆有線	鄭永照		
17.	台灣寬頻	陳曉崗		
18.	(電信所)	高信雲		
19.	民視	侯銘恩		
20.	紅樓林	林志然		
21.	聯豐	陳亞萍		
22.	佳聯有線	邱志宏		
23.	"	高崇文		
24.	世有科技	翁錦昌		
25.	大丰有線	謝方聰		
26.	吉元有線	邱源生		
27.	工華局	杜偉民		
28.	懷華	楊運容		
29.	TV-Plus	吳道亨		
30.	長德有線電視	李文中		
31.				
32.	電信總局	洪仁桂	謝慧靜	

序號	單位	出席人員簽名	出席人員簽名	出席人員簽名
33.	澎湖有線	陳鴻翔		
34.	台視	葉平恩		
35.	台視	林志星		
36.	台視	林訓		
37.	公視	楊永		
38.	世新有線	黃炳松		
39.	祐勝	劉振代		
40.	觀天下	廖宇達		
41.	聯誼	陳遠昇		
42.	懷華電機	周瑞文		
43.	懷華電機	王高芳		
44.	博德	謝錫祿		
45.	大同公司	潘長榮		
46.	TV plus (大衛)	石佳桐		
47.	ithome	廖慧貞		
48.	太華聯信	游海男		
49.	安德利	游仁強		
50.				
51.				

序號	單位	出席人員簽名	出席人員簽名	出席人員簽名
52.	民視	張天序		
53.	華視	林金成		
54.	"	方力彬		
55.	"	徐俊芳		
56.	北健	張育強		
57.		王兆銀		
58.	微星科技	李佩盈		
59.	標檢局	林文忠		
60.	普騰電子	張鑑麟		
61.	交通部	鄭傑元		
62.	高昕科技	施河東	陳淑利	
63.	南國有線	郭耀復		
64.	Adi	許昌宏		
65.	中嘉網路	談子峰		
66.		尹智平		
67.	電機電子公會	林以惠		
68.	廣電處	傅子亮		
69.	"	王新融		
70.	弘道視研中心	駱憶繁		

序號	單位	出席人員簽名	出席人員簽名	出席人員簽名
71.	台科大電	印榮輝		
72.	誠洲電子	施信安		
73.	行政資訊中心	張夢心		
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序號	單位	出席人員簽名	出席人員簽名	出席人員簽名
90.	台灣橋下	林文輝		
91.	中央社	馮昭		
92.	東豐衛理	姚俊豪		
93.	三洋	黃瑞鵬		
94.	台科大	徐敦文		
95.	電子時報	吳子法		
96.	經濟新報	呂印希		
97.	台大EMBA	鍾子豪		
98.	安得利	陳仁德		
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附錄四：「Broadcast Asia 2001」參訪記錄

一、說明

新加坡電信展（CommunicAsia 2001）為一年一度亞洲規模最為盛大之電信展。此次展覽為第 13 屆，參展廠商規模共有來自全球 25 個國家、2400 家廠商參與這次亞洲最大的電信展。目前國際上著名的 CA 系統廠商包括 Viaccess、NDS、NagraVision 等亦均前往參與此次展覽。此次考察行程除至會場實地觀摩、訪問這些主要 CA 系統廠商，亦拜會新加坡主要主管機關，以瞭解新加坡拓展數位電視（包含 CA 營運機制）整體之概況。此次行程對於本研究案將有相當大之助益。

二、考察行程

時間	民國 90 年 6 月 19 日至 6 月 22 日，共四天
地點	新加坡
參訪人員	本研究計畫：朱博湧教授、杭學鳴教授、趙子宏博士 研究助理：張政忠、曾馨誼、何浩銘、李梅菁
參訪行程	
6 月 19 日	下午抵達後，隨即拜會 CA 廠商：NagraVision 及 NDS
6 月 20 日	上午拜會 CA 廠商：NTL 下午拜會 CA 廠商：Viaccess，以及新加坡廣播局（SBA）
6 月 21 日	上午參加新加坡公車之行動電視之導覽

	<p>拜會新傳媒電視公司（MediaCorp）</p> <p>下午實地勘測 MTT 之塔台建設</p>
6 月 22 日	<p>上午參觀亞洲 2001 Broadcast Asia 展覽</p> <p>下午準備搭機返台</p>

二、訪談重點記要

1、NagraVision

在 CA 技術的部份其實已經有許多已定義的規格和標準，我們是一個 CA 的服務提供廠商，在法規的部份其實並不會去涉入太多，因為我們大部份還是跟隨市場的趨勢而和法規的部份關聯較少。而事實上我們當然有和 DVB 委員會有所連繫。

在目前而言，我們的安全性是最高的，而我們和 STB 的製造商間也有很好的關係；在法規上而言會要要求讓消費者或廣播業者可以更換系統，而每一個 CA 的提供者則希望可以鎖住客戶，所以如何提供客製化的服務就是一件很重要的事情。

在法規的角度來看，Simulcrypt 是一件很對的事情，因為對廣播業者而言，要更換 CA 系統是很麻煩而且成本很高的情況，其問題在於如果要換系統的話，在設備部份、器材部份、在系統部份必須要面對多高的成本？但是如果採用 Simulcrypt 的政策，則這種情形就可以得到改善；在 Simulcrypt 的情形來說，我們是非常樂見其成的，為什麼呢？因為 CA 本

身就是一個轉換成本相當高的系統，所以不只是對 Nagravision 來講，對每一個其他的 CA 系統業者來講，要進入別人的市場都是相當困難的，但是如果是採用 Simulcrypt 的方式，則 CW 由廣播業者來指定，但是卻可以同時傳送好幾家 CA 業者的 ECM、EMM，則在收視端不同的 STB 就可以各自收到他們所使用的 CA 系統的節目，這樣一來，對廣播業者而言，才有轉換 CA 系統的可能，而 CA 系統的業者之間也就可以維持一定的市場競爭，而不致於讓大家都很難再有發展空間。

雖然改變所使用的 Smart Card 可以收視不同的節目，但是當你改變 Smart Card 的同時，表示你已經更換了一個 CA 的系統，而且在這種情況下有時候你還要考慮這張卡本身會不會有認機器，也就是和原來你所使用的 STB 本身能不能溝通的問題。

但是 Simulcrypt 可能不一定是解決問題的唯一之道，因為在政策要做這樣的決策之前，可能還要考慮各 CA 的系統業者能不能配合這一部份關於 CW 的共同使用問題。

PCMCIA 的模組大多用於 Multicrypt 的情形，一般的業者都會考量其各家用戶的所有權問題，當客戶使用了這種模組的 STB 以後，有時候就會有些不肖的業者利用他的技術借由模組介面的部份去把所鎖碼收視的節目盜拷出來，轉作其他的商業用途，在這個部份我們不能不承認其實還是有一些潛在性的安全問題的。

2、NDS

NDS 公司的 CA 產品稱之為 Videoguard，並且把系統分為硬體和軟體兩大部份，並沒有限制一定要合在一起出售。在 CA 的最底層部份它的核心在於加密技術，目前世界上的主流都是用 RSA 的加密技術，1975 年第

一台 MPEG-1 的 ENCODER 做出來，在傳統電視上的類比訊號無法做加密的動作，只能在 Baseband 的部份來做處理，而無法從 Source 端來做加密的動作，在目前世界上有四個集團，主要是歐洲的 DVB，為一開放式的平台；以及美規的部份，因為在 DVB 尚未出現之前，市場上已經存在這樣的需求，而美國則為需求最大的國家，當時美國的 Direct TV 就制定了 DSS 這樣的標準，應用於 Satellite 上；當時美國也有 Open Cable，用於有線電視的部份，類似於 DVB 對於 CA 所做的一種規範；包括了 GI、SA 等廠商，在地面廣播的部份則為 ATSC，而 NTSC 卻是用於類比訊號的部份。

DVB 的規範是比較完整的，在美國三個獨立的系統中彼此並不能相通，一般而言如果 CA 的廠商要在這些不同的系統間做互換，最少需要兩年的時間。而 DVB 的平台上可以運作的 CA 大約包括了五個部份：NDS 的 Open Videoguard、Nagravision、Canal+ 的 Medioguard、和法國電信的 Viaccess 以及 Connex，另外則為菲利浦公司的 CryptWork。

市場的變化是有一定次序的，首先是 Satellite 的部份，最先應用的就是 DTH 上，而現在 Cable 的部份也已經開始在發展了，DVB 在衛星的部份為 DVB-S，在有線的部份叫 DVB-C，而地面廣播的部份則是 DVB-T，這三者之間都是相通的，在 ADSL 或 IP 的部份，DVB 也有規範，叫 DVB-IP，

因為 DVB 的規範，所以各家廠商都可以在不同的平台上作加密，運作的方式包括 DVB 所規範的 Control Word 長度，DVB 的規範為 60 個 bit，因為政府的要求不能高過軍方；第二點則是除了 DVB 以外，日本也採用了 DVB，但日本由於要保護國內的市場，把 DVB 做了一些修改，變成了所謂的 ISDB，但是日本的 ISDB 也還在發展之中，雖然整個架構還是一樣，然而和其他包括 DVB 的標準已經不相容了。

目前在技術上而言，如果要同時收視衛星、有線甚至是廣播電視的節目，仍然是要用不同的 STB 才有辦法接收；在台灣來說，如果真的希望只用一個 STB 來收視，則可以考慮採用一個 CA 的系統，成立一個類似中央管理中心的機制，然後把衛星、有線或廣播的節目統一用同一個系統發送出去，在這種情形下才有可能讓消費者只用一個 STB 就同時收視不同來源的節目；由 CA 廠商同時統一發行各家的 Smart Card，而在同時，各家的節目業者則仍然擁有各自不同的 SMS 系統，在會計上各自獨立，這樣就可以各自發展自己的互動機制或是商業節目模式了。

3、Viaccess

目前在台灣的客戶來說總共有四家：包括華衛、TVBS、太平洋衛視還有新媒體(DBS)。DBS 包括了整個的衛星市場，目前是使用 Simucrypt，新媒體的部份開始的時候是用 Nagravision 的系統，現在則是使用 Viaccess，就是在他的平台上同時可以使用 Nagravision 或是 Viaccess 的卡，即在他的節目中同時用了兩種不同的 CA 系統在鎖，只要你在收視端有任何一個系統的卡，就可以把節目解開收視。所以在傳送節目的部分而言就比較省，不然的話不同的 CA 系統你要同時用不同的鎖碼後的節目分開二次來傳送是比較不經濟的作法。

以台灣來說，直接衛星的客戶，在他加入之前，全部都是用 Viaccess 的東西，那他很難用 Nagra 的產品去搶這個市場，必須要以相同的東西他才能夠去找到客戶；而如果你用 Nagra 的系統要去搶客戶的話，則就要把客戶的 STB 換掉，把卡也換掉，然後再換天線這些。其實就成本的考量來說的話，這些成本包括頭端的器材這些，其實 CA 本身並不貴，真正要考量的部份是在於業者他們所用的系統，這些要送給客戶的 STB。

以我們的卡而言，一張大概在十到十五塊美金之間，同樣的一個 STB

則大概在九十到一百塊美金左右，而 NagraVision 的 STB 則比較貴，CA 主要是一個市場的考量，整個成本上來講，頭端要負責的部份大概就是在 STB 的地方，如果整個產業的走向變成 STB 是消費性電子產品的話，對頭端業者而言成本就低很多。現在用在衛星上的 STB，最便宜的也在八十塊美金左右，所以在競爭上來說他們就採用雙鎖碼的方式，這樣才能夠和我們競爭。至少如果客戶已經有 Viaccess 的器材在的話，那他只要把卡換掉就可以了，那 STB 就不用換了，而至於如果是 NagraVision 的市場的話，那麼別人也沒有辦法去搶他的市場，這也是同樣的道理。

所以其實 CA 本身就是一個市場的考量，因為 CA 每一家都有嘛，那如果客戶今天進來你們這一家需要付錢的話，那門鎖就變的很重要，但門鎖其實並不是你出錢的，整個門鎖其實是客戶出的錢，那因為紙卡這些東西都會由一種消費的方式轉到客人身上，所以整個成本來講的話，頭端要負責的東西，整個要負擔的就是 STB。如果 STB 整個走到一個消費性的電子產品的話，那對業者來講就會減輕一個很大的負擔。

4、NTL

NTL 主要是一提供傳輸諮詢與整合服務的公司。目前已與新加坡的 MTT 合作推出 TV Mobile 的傳輸部分。對於台灣的數位電視產業結構是否能朝類似英國製播分離的方向發展，NTL 表示根據先前來台考察的情況，應是沒有問題。台灣未來若要朝此方向發展，NTL 表示有興趣和台灣的幾家無線業者合作提供諮詢與技術服務。

5、SBA

新加坡廣播局（Singapore Broadcasting Authority，SBA）主要負責新加坡新技術的施行。SBA 對於數位地面廣播電視的推行，是建立一個有助

益產業的法規結構，促使廣播電視能朝向正確的方向發展，SBA 並鼓勵廣播業者與服務提供者共同合作提供創新的服務運用，SBA 也歡迎國外產業相關業者共同促使新加坡的蓬勃發展。新加坡數位電視的發展方向目前著重在 Mobile TV 接收的推展，對於 CA 標準 SBA 表示新加坡目前是 Free 的，尚無任何 CA 機制。

6、MediaCorp

新傳媒（Media Corporation of Singapore，MediaCorp）是新加坡主要的廣電傳播媒體，旗下包含有廣播、電視、新聞、線上網路出版等等事業。在 2000 年 7 月，SBA 授與 MediaCorp 在新加坡兩個 DTV 授權，一為商業行動電視服務，另一為商業數位電視服務。2000 年 12 月 MediaCorp 開始提供 Mdigital 的數位服務，如電子節目表單，並同步廣播 Channel5、8 與 CAN。2001 年 2 月，MediaCorp 在 1500 輛巴士裝有數位電視裝置，成為新加坡第一個在公眾傳輸系統上提供數位電視服務的廣播業者。

附錄五：各國政策原文

英國

UCL Laboratoire de télécommunications et télédétection

The Regulation of Conditional Access Services for Digital Television in the United Kingdom

FOREWORD

Ian Taylor MBE MP

Minister for Science & Technology

Conditional Access is a crucial issue for the development of new digital television services. Digital television is not simply more of the same – while it will offer greatly expanded choice & quality it will also bring the possibility of a whole new range of interactive & multimedia services. This is an important step towards the information society. In putting these regulations forward we are opening up the digital future to competition between content providers and delivery mechanisms.

The Government is committed to ensuring the development of digital services across all delivery mechanisms: cable, terrestrial and satellite. On all these platforms, the need for a decoder in order to receive and display digital signals, means that access to the set top box is crucial for service providers in a competitive market.

We have already implemented regulations governing the licensing to manufacturers of Industrial Property Rights in proprietary conditional access technology. Those regulations have been in force since 23 August this year. We are today publishing the near final drafts of the regulations and licence which will regulate the provision of conditional access services. These regulations place clear obligations on those operating conditional access services to allow other broadcasters access to viewers through their set top boxes on fair, reasonable and non-discriminatory terms.

These drafts take account of the comments we received in response to the extensive consultation we have undertaken since publication of our first proposals in June this year. We have sought to strike an appropriate

balance in these regulations between the various positions represented to us.

Our objective is to foster the development of a competitive market in digital services on all means of delivery. This means it is important that innovation and early investment should be rewarded and not overregulated. At the same time we have sought to provide strong safeguards that will allow the regulator to act quickly and firmly in dealing with anticompetitive abuse of any advantage gained by moving first in the market.

This is the balance we have sought to achieve. We believe we have got it right. This is an important milestone in the development of digital services in this country. It will leave the UK well placed to continue taking a leading role in Europe on these new services.

We are undertaking a short, final round of consultation and comments are invited by 11 December. Following assessment of responses we will aim to make the Regulations available to Parliament before the recess for consideration. Then, subject to Parliamentary approval they will come into force within 21 calendar days.

INTRODUCTION

1.— This paper sets out the Government's proposals for the regulation of conditional access services for digital television. It covers the implementation of the EU Advanced Television Standards Directive 95/47/EC (the Directive). This includes, in particular, the framework for meeting the directive's requirements for ensuring that technical conditional access services for digital television are available on a fair, reasonable and non-discriminatory basis.

2.— These proposals have been developed in the course of extensive and detailed consultation with the industry and with the Department for National Heritage, the Independent Television Commission and the Office for Telecommunications. The paper also sets out the Government's response to the main issues raised by respondents.

3.— The annexes to this paper contain:

- a) A copy of the Directive.
- b) A copy of SI No. 1996/2185 implementing provisions from Article 4(d) of the Directive on licensing of industrial property rights.
- c) A draft statutory instrument (the Regulations), including definitions from which to build a licence for conditional access services and measures to implement the other requirements of the Directive.
- d) A draft telecommunications class licence (the Licence), covering conditional access services for digital television.

e) A draft code of conduct (the Code) relating to confidentiality of subscriber information and invoked in the draft licence.

4. Comments are invited on the issues set out in this paper, the draft Regulations, class licence and code of conduct by 11 December 1996. It may not be possible to take into account any responses received after this deadline given the need to implement these proposals quickly.

5. Additional copies of this document can be obtained from Ray Winterburn on 0171 215 1756. Any comments should be sent in writing to Jonathan Wood at the following address:

Communications & Information Industries Directorate
Department of Trade & Industry
Room 204, 151 Buckingham Palace Rd
London SW1W 9SS.

6. OFTEL will also be publishing for consultation draft guidelines on the licence in early December. The guidelines will give more detailed guidance on the principles and approach OFTEL would take in enforcing the licence conditions, including the questions of prices, terms and conditions and transcontrol at cable headends.

GOVERNMENT POLICY FRAMEWORK

7. These proposals, while flowing from the requirements of a European Directive have also to be viewed in the context of the Government's broader economic policy objectives. The Government seeks to encourage enterprise and to stimulate innovation and investment in UK market opportunities. This involves creating a liberalised economic environment, with the minimum necessary regulation, which has made the UK the enterprise centre of Europe.

8. At the same time, the Government seeks to support and promote competition, as the best guarantor of healthy markets and consumer interests. The Government is firmly committed to acting against any abuse of market power, or of a dominant position, which significantly distorts competition.

9. The Government's objective is to put in place the necessary safeguards to ensure the right environment in which competition can flourish to the benefit of the consumer while innovation and investment are rewarded. Our proposals place clear obligations on the operators of conditional access services, given the gatekeeping position they will occupy. The early development of the market in digital television services (whether satellite, terrestrial or cable) will be to the benefit of UK services and business. The early availability of set top boxes and related conditional access services is a key enabler for that. It is important, therefore, that early investment and innovation are rewarded. At the same

time significant distortion of competition would be to the detriment of the long term development of the market and the interest of the consumer. The Government is therefore concerned to ensure that there is in place a framework under which firm and prompt action can be taken against any behaviour which may have the effect of significantly restricting, distorting or preventing competition.

10. These proposals set out requirements which have five main objectives:

- a) ensuring that consumer equipment placed on the UK market conforms with certain minimum requirements;

- b) ensuring that the licensing of Industrial Property Rights of conditional access technology for the manufacture of consumer equipment is done on fair, reasonable and non-discriminatory terms;

- c) ensuring that conditional access operators offer broadcasters technical conditional access services on a fair reasonable and non-discriminatory basis;

- d) ensuring that cable operators have the ability to use their own conditional access systems and associated services such as Electronic Programme Guides, when rebroadcasting services on their systems.

- e) providing, through a conditional access class licence, an effective enforcement regime to act against behaviour significantly distorting, restricting or preventing competition in digital television services, while protecting third party rights and establishing an alternative disputes resolution procedure.

Other Digital Services

11. The scope of these provisions is determined by the scope of the enabling Directive: 95/47/EC on the use of standards for the transmission of television signals. The scope of the proposals is therefore limited to digital television services provided by broadcasters.

12. However, market developments in Europe and the USA suggest that conditional access technology is likely to be used to control access to other digital services. For example, non-television services transmitted using broadcast networks, such as satellite software download services. Or, services distributed by switched networks – involving point to point transmission.

13. The same issues about gateway control arise in relation to these services. The Government's view is that conditional access to such services should be brought within a single unified framework. However, at present these services are authorised under an existing licence – Value Added Data Services (VADS) class licence – issued under the Telecommunications Act 1984. While the Directive gives scope to remove broadcast digital television services from the VADS licence into the new licence framework, other digital services cannot be so treated until the VADS licence is revoked. At the time this licence was issued, the

Government wished to ensure a period of regulatory stability for such services to encourage investment in their development and so provision was made that the VADS class licence could not be revoked until 1999.

14.The Government therefore wishes to make clear its intention, at the first suitable opportunity, to bring forward separate proposals to extend these regulatory provisions to conditional access services supplied to any digital service. The European Commission will undertake a review of the Directive during 1997 which may allow this issue to be addressed. If a suitable vehicle does not arise beforehand, however, it is the Government's intention to revoke the VADS licence in respect of these services with effect from 1 April 1999.

Self Provision

15.The obligations in the Directive apply only to conditional access operators who produce and market access services. Technically this means that those who do not sell their services to others are outside the scope of these provisions. For the same reasons as with non-television and non-broadcast services, self-providers could not be brought within the scope of the new Conditional Access class licence until the VADS licence is revoked in respect of these services.

16.In principle, it would be possible for a dominant operator to so arrange its dealings that it would provide conditional access services only for its own channels and so evade the obligations of the Directive. However, this would clearly be contrary to the objectives, even if not the letter, of the Directive.

17.Again, the Government wishes to make clear its intention, at the first opportunity, to rectify this situation, so that, in the case of a dominant self-provider, the obligations of the Directive could be brought to bear. This may be possible as a result of the European Commission's review of the Directive during 1997. But if no other opportunity arises beforehand, it is the Government's intention that this should take effect following revocation of the VADS licence in 1999.

18.In the meantime, were a refusal to supply conditional access services to a third party to distort, restrict or prevent competition significantly, the matter can be dealt with outside the licensing framework. The Director General of Telecommunications would be able to move quickly to exercise his powers relating to competition in telecommunications services under the Fair Trading and Competition Acts.

STRUCTURE OF THE PROPOSALS

19.The Government's proposals for implementing the directive have two main elements: the Statutory Instrument and the draft Class Licence. These are discussed below.

The Statutory Instrument

20. The provisions of the Statutory Instrument have five main elements:
a) requirements in relation to consumer equipment (Article 4(a) of the Directive);

b) requirements relating to the licensing of Industrial Property Rights (IPR) in conditional access technology to manufacturers of consumer equipment (Article 4(d) of the Directive);

c) provisions to safeguard third party rights and to establish a disputes resolution procedure (Article 4(e) of the Directive).

d) provisions to enable the Class Licence to be brought forward by the Secretary of State under Section 7 of the Telecommunications Act;

e) provisions transposing into UK law the requirements of the Directive on transcontrol and the offer of conditional access services (Articles 4(b) and 4(c) of the Directive);

21. These are discussed in more detail below. It should be noted also that the requirements of Article 2 on transmission standards were implemented through Section 142 of the Broadcasting Act 1996.

Requirements on Consumer Equipment

22. Article 4(a) of the Directive, and the Regulations require that all consumer equipment first sold or rented on the Community market after the Regulations come into force must:

a) be capable of displaying signals transmitted 'in clear' (i.e.: without scrambling) provided that, if the box is rented, the consumer has not defaulted on the rental agreement. This means that every set top box, or any other form of digital decoder such as a computer card, or integrated digital TV set, must display signals received 'in clear'. Further, a conditional access operator is prohibited from interfering with this display of 'clear' signals provided the consumer has paid for the decoder, or is continuing to pay in accordance with a rental or equivalent tariff package (which may, or may not include supply of programming).

b) Must be capable of unscrambling signals using the standardised European 'common scrambling algorithm'.

23. The Regulations further require that all television sets containing integrated decoders must have the option of fitting at least one standardised socket permitting the connection of alternative conditional access systems and other decoder components. This requirement would be satisfied by the inclusion of a DVB Common Interface (once it is adopted by a recognised European Standards body). However, it cannot be taken as requiring the mandatory inclusion of that Common Interface, as other

standardised connectors may be able to meet the requirement. One or more of any such connector will be required, however, for all television sets containing integrated decoders.

24. These provisions will be enforced by LACOTS (Local Authorities Convention of Trading Standards Officers). LACOTS will operate this enforcement primarily through contact with manufacturers and importers and their trade associations. They will also have powers to inspect and seize equipment being offered for sale which does not conform to the requirements set out in the Regulations.

Licensing of IPR to Consumer Equipment Manufacturers

25. Article 4(d) of the Directive contains requirements relating to the licensing of industrial property rights to manufacturers of conditional access products and systems. Such licensing is to be on fair reasonable and non-discriminatory terms. (Note: this is a distinct issue from any questions of licensing IPR to broadcasters and others in support of service interoperability, which is discussed later).

26. The Government has already brought these provisions into force through SI No. 1996/2185 which took effect from 23 August 1996. It was brought forward in order to ensure that the protection provided would be available in advance of any licensing agreements being concluded.

27. The provisions appear also at Regulation 13 in the attached draft for completeness. They provide protection against anti-competitive behaviour in licensing IPR. They prohibit behaviour which would discourage the inclusion of a common interface or another conditional access system within equipment manufactured under licence from an IPR owner. They also require that licensing is conducted on fair, reasonable and non-discriminatory terms. Taken together with the general provisions of competition law, particularly if the IPR owner has significant market power, this means in practice that there must be an objective, transparent and non-discriminatory reason, if a further licence is to be refused once one manufacturer has been licensed. In the event of a dispute the parties may resolve the matter directly in court, or seek arbitration under the disputes resolution procedure described below.

28. These provisions would apply, for example, where a manufacturer of set top boxes wished to build consumer equipment capable of receiving transmissions using more than one delivery mechanism, having provision for connection of additional tuner modules, or including a Common Interface or additional conditional access systems. If such a manufacturer were improperly refused a licence for the relevant technology, or the licence were offered on unfair or discriminatory terms, it could apply to the courts for damages and other enforcement action.

29. As well as action under the regulations, if licensing were being carried out in a way which was restricting, distorting or preventing competition then action could be taken under UK and EC competition law. In particular, the Director General of Telecommunications could exercise his powers under the Fair Trading and Competition Acts in relation to telecommunications products and services.

Dispute Resolution Provisions

30. Article 4(e) of the Directive requires Member States to ensure that "any party having an unresolved dispute concerning the application of the provisions established in this Article shall have easy, and in principle inexpensive, access to appropriate dispute resolution procedures with the objective of resolving such disputes in a fair, timely and transparent manner". The Directive also requires that such procedures "shall not preclude action for damages".

31. The Government has taken the view that, on a proper construction, Article 4(e) therefore requires the establishment of a conciliation procedure while providing that parties affected can take action directly in court if they so wish.

32. The Regulations therefore provide that, for each of the duties established by Article 4, disputes may be subject to a conciliation or arbitration process involving an independent arbiter. Each of the obligations in Articles 4(a)–4(d) of the Directive is also established as a statutory duty, breach of which is actionable in tort. Naturally, the court would only entertain such a case if there were clear locus. Manufacturers and broadcasters are most likely to be able to establish locus on issues such as licensing of IPR, for example. Similarly cable operators are most likely to have locus for complaints concerning transcontrol.

33. Of course, where an obligation is given effect through provision in the Telecommunications Class licence (see below), the Director General can also take action under his Telecommunications Act powers, issuing determinations and orders.

Provisions to enable the class licence to be brought forward

34. Conditional access systems for digital television must be brought within the definition of a Telecommunications System in the 1984 Act in order to be licensed under it. Most of these systems already fall within the broad definition contained within the Act. However some, such as the preparation and issue of smart cards, or other essential components, may not. So provision is made to deem these systems as Telecommunications systems, in so far as they are used to deliver conditional access services.

35.The definitions used in the last consultation paper were structured to reference those in the Broadcasting Acts. However, this gave rise to considerable difficulty in following them through and interpreting their effect. The definitions in this draft of the Regulations and licence have therefore been simplified to make them more self-contained and simpler to follow.

36.A particular change of note from the previous version is that the Regulations now use the terms as they are presented in the Directive, without expanding on the definition of various service components. The elaboration of the definitions most relevant to conditional access services and systems is then left to the licence. This also ensures that all relevant definitions are clearly accessible in the licence, alongside the provisions which make use of them.

Provisions for the Supply of Conditional Access Services

37.Article 4(b) of the Directive requires that "conditional access systems operated on the market have the necessary capability for cost-effective transcontrol at cable head-ends". This provision is important in ensuring that the cable industry is able, if it so chooses, to operate its own conditional access systems and associated services on its own networks.

38.Article 4(c) of the Directive requires that "operators of conditional access services, irrespective of the means of transmission, who produce and market access services to digital televisions services should offer all broadcasters, on a fair, reasonable and non-discriminatory basis technical services enabling the broadcasters digitally-transmitted services to be received by viewers authorised by means of decoders administered by the service operators". This is the basic obligation to supply conditional access service to other broadcasters.

39.Both Articles 4(b) and 4(c) are given effect through the provisions of the Class Licence governing the supply of conditional access services (See Below). As noted above, they are also transposed directly into UK law as statutory duties by the Regulations.

40.The significance of this is that it creates free-standing rights of action in court for anyone affected by contravention of these duties. Where a broadcaster or cable operator believed that the conditional access operator had not complied with its obligations in relation to transcontrol or the offer of technical conditional access services it would be able to take action in the courts as well as making a complaint to OFTEL or making use of the conciliation provisions. Ordinarily, under the Telecommunications Act 1984, duties are only owed to third parties for the breach of an order made by the Director of Telecommunications. These

provisions would enable third parties to seek damages immediately, starting from the date of any breach of duty.

The Class Licence

41.As noted above, Articles 4(b & c) of the Directive are given effect directly in the Regulations to provide for third party rights which can be exercised in court and an alternative dispute resolution mechanism. They are implemented principally, however, by the provisions of a class licence issues under the Telecommunications Act 1984.,

42.The underlying structure of the licence remains unchanged from the previous version. It has, however, been remodelled in a number of respects, both to make clearer which conditions apply to which services and to simplify the form of the conditions. A number of respondents raised concerns about the drafting of licence obligations, in particular the exceptions and limitations which attached to these. There was a general concern that these appeared to be entirely at the discretion of the licensee. While this was not the case, we have provided more explicitly in a number of conditions that DG OFTEL has the final say on whether an exception or limitation is being invoked legitimately.

Basic Service Definitions

43.While the categories of conditional access service have been refined to a degree, they remain essentially unchanged, and have the same effect as in the previous consultation round. Encryption services have been adjusted to make it clear explicitly that this includes those services needed to access the verifier. Further, in recognition that there may be other elements of service which, from time to time, in certain circumstances, may fall within the meaning of technical conditional access services a fifth category has been added to ensure that all forms of conditional access are properly covered.

a) Technical Services

(i) Subscriber Management Services (SMS) ; concerned with the management of smart cards or other essential components;

(ii) Subscriber Authorisation Services (SAS) ; concerned with the construction and authorisation instructions to enable or disable viewers' entitlements;

(iii) Encryption Services (ES) ; concerned with the encryption of conditional access control instructions and the scrambling of the broadcast signal;

(iv) Other Technical services which are necessary for a broadcaster to access consumers through the relevant decoders (OTS).

These services attract both limbs of Article 4(c) of the Directive and are therefore subject to all the provisions of the licence.

b) Non-Technical Services

(i) Customer Management Services (CMS).

These services are subject only to the second limb of Article 4(c) of the Directive – requiring the keeping of separate financial accounts – as they do not provide a point of bottleneck control.

Main Licence Provisions

44. The key provision of the licence, providing for broadcasters to gain access to viewers through any base of decoders which can receive their signal, is a requirement in line with the directive to offer technical conditional access services to digital television services on a fair, reasonable and non-discriminatory basis.

45. Linked to this are requirements:

a) prohibiting the making sales of one service conditional on purchasing another;

b) prohibiting undue preference and undue discrimination this amplifies the non-discrimination provision in the directive;

c) a requirement for the publication of terms and conditions for technical services. A number of respondents have pointed out that this is an essential safeguard against discrimination because if terms and conditions are not published it is difficult, if not impossible, to know if discrimination is taking place. Charges would be allowed to vary to reflect objective differences such as economies of scale or scope, however;

46. Other important conditions include:

a) a fair trading condition which is modelled on Articles 85 and 86 of the Treaty of Rome and which will prohibit anticompetitive behaviour which may significantly prevent, restrict or distort competition;

b) conditions requiring the conditional access operator to make available sufficient information on proprietary conditional access systems to allow others to develop systems which interoperate with or across them (essential interfaces); or, if there is no other alternative, to require the licensing of proprietary IPR to other operators or broadcasters to allow them to operate a competing service. These conditions are discussed in more detail below;

c) a condition on accounting separation. Ensuring that there is proper accounting separation both between the Licensee's conditional access

business and its other business activities, and its customer management business and its technical services business, will be essential in ensuring that technical services are indeed offered on terms that are 'fair, reasonable and non-discriminatory'

d) conditions on the confidentiality of subscriber data, including the observance of a code of conduct – it is critically important that where an organisation is providing conditional access services to its competitors in downstream markets that there is a positive obligation to ensure that that information which it has gained for the purposes of providing conditional access services does not leak over into other parts of the business;

e) a condition to implement the directive requirements on transcontrol which requires the conditional access operator to co-operate with the cable operator, including providing it with any necessary assistance and information, so that the cable operator is able to transcontrol and rebroadcast television services using its own conditional access system without incurring unnecessary or unreasonable expense. The OFTEL guidelines will set out in more detail what information and assistance should be provided.

Fair Trading Condition

47. As suggested in the last consultation document we have now introduced a general fair trading condition (FTC) into the conditional access licence. This provides for a general prohibition on anti-competitive behaviour or abuse of a dominant position in conditional access and related services. It is in line with the condition which has been introduced into BT's licence, and is now being proposed for inclusion in other Telecommunications Act licences.

48. The FTC makes it unnecessary to provide for the issue of an individual licence to a dominant operator, so this has now been dropped from the proposed scheme.

MAIN ISSUES RAISED IN CONSULTATION

49. This section sets out our response to a number of key issues raised by respondents at various stages during our consultation.

Consumer Equipment Interoperability

50. A number of proposals were made in connection with the capability of consumer equipment (set top boxes, or decoders, in the first instance) to receive signals from more than one means of delivery: cable, terrestrial and satellite. This also extended to the ability to operate different conditional access systems through the same set top box, via

the Common Interface, and the possibility of mandatory licensing of conditional access in IPR to equipment manufacturers.

51.The Government is firmly committed to ensuring the development of digital services across all delivery mechanisms: satellite, cable and terrestrial. However, as was made clear during the passage of the Broadcasting Act, the Government does not consider it appropriate to mandate a common interface, a common set top box, or provision for consumers to add additional tuner modules (for cable, terrestrial or satellite) to a digital set top box.

52.Indeed, the terms of the Directive do not allow the Government unilaterally to mandate any technical features that manufacturers must include in consumer equipment beyond those already discussed above. If any such requirement were imposed it would require clearance under Directive 83/189 as, if not agreed by other Member States, it would act as a technical barrier to trade within the EU. It is worth noting that the Italian Government has notified draft regulations under the 83/189 procedure which mandate various aspects of the set top box, including, it appears, a common interface for conditional access. Both the Commission and the German Government have lodged detailed opinions against this and the proposal is now at a standstill, creating delay and uncertainty for prospective manufacturers.

53.However, the Regulations and the Licence do ensure that the provision of such facilities cannot be excluded and that Licensees cannot favour boxes which exclude these facilities. Under these conditions the market should ensure that customers get equipment which contains those capabilities which they require, at a price which they are prepared to pay.

54.Beyond these general observations, some specific points arise on the Common interface and mandatory licensing of IPR.

Mandating the Common Interface

55.The Common Interface allows the addition to the set top box, through a small, relatively inexpensive module, of another conditional access system. Many respondents called for the imposition of the Common Interface, as a mandatory requirement for consumer equipment, on the face of the Regulations. The Government considers that the imposition of a fully open common interface would be likely to frustrate early investment and innovation in the development of the new digital markets. This is a particularly serious concern given the relatively advanced stage of preparations for the launch of services in all delivery media.

56.Some respondents pointed out that it may be possible to make the operation of a common interface dependent on another conditional access

system embedded in the set top box. This 'controlled common interface' would have the advantage that it could get round the so called 'free-rider' problem. Before being able to access the Common Interface, an alternative conditional access provider, having invested to develop only the small additional conditional access module needed, would have to reach a commercial agreement with the owner of the embedded system. In this way the developer of the plug-in module, could not 'free-ride' on the larger investment of the first mover.

57. Nevertheless, the Directive itself provides no direct mandate to require any particular technical standard or interface in the set top box. So this approach would still raise problems under 83/189. As with all these issues, however, there is nothing to prevent different broadcasters co-operating with manufacturers in order to develop equipment containing such a feature collectively.

Mandatory Licensing of IPR to Manufacturers

58. Some respondents called for mandatory licensing of proprietary IPR to equipment manufacturers as a means to ensure that equipment which can receive more than one mode of delivery could be produced. An important principle of international rights treaties is that mandatory licensing is to be avoided in all but the most exceptional circumstances, where no alternative approach is available. The Government recognises the importance of this principle to UK rights holders and does not accept that mandatory licensing of IPR to manufacturers is the appropriate way forward unless there is evidence of abuse significantly restricting, preventing or distorting competition.

59. Nevertheless there are provisions in the Directive relating to the licensing of IPR. These are the provisions at Article 4(d) of the Directive, which were described in detail above, and which were brought into force on 23 August 1996.

60. Although these provisions stop short of mandatory licensing, they are relevant to the question of whether manufacturers can make set top boxes which are capable of receiving signals on more than one means of delivery (satellite, cable or terrestrial). In particular they prohibit discouragement of a manufacturer from including a Common Interface for conditional access in consumer equipment. The DVB Common Interface specification allows connection to the set top box alternative conditional access modules, and other elements of the digital decoder. In particular this could include the addition of alternative tuner modules, which would again allow extension of the box to receive signals from other delivery media (e.g.: cable or terrestrial).

Obtaining Conditional Access on More than One Platform

61. It seems likely that set top boxes capable of being extended from one delivery means to another might emerge on the market, given the advantages to both consumers and broadcasters. In these circumstances, the question arises of whether a conditional access operator providing service on say, satellite, would then be obliged to provide conditional access service to broadcasters operating on, say, terrestrial who wanted to access consumers through the same boxes fitted with an additional tuner for receiving terrestrial signals.

62. The Directive's obligations in relation to the supply of technical conditional access services apply irrespective of the means of transmission. They apply equally to operators on any delivery mechanism – cable, satellite or terrestrial. The Government's firm view is therefore that broadcasters should be able to obtain the necessary technical conditional access services on a fair reasonable and non-discriminatory basis to enable them to access any set top box which is capable of receiving their signal. This means that viewers with set top boxes equipped to receive two or more types of signal (cable, satellite or terrestrial) but which have only one conditional access module, will always be able to receive the full range of services, if broadcasters choose to supply them.

63. The conditional access operator would, however, clearly not be required to provide the means to broadcast the conditional access control data stream for any means of delivery.

Independent Subscriber Management & Authorisation

64. A number of respondents have stressed the importance of broadcasters being able to maintain a relationship with the consumer which is independent of any other broadcaster (ie: their competitors). The Government's proposals already provide for this by ensuring that the Customer Management Service (CMS) component of subscriber management, can always be obtained independently of technical conditional access services. The draft licence also places clear responsibilities on the conditional access operator to ensure that subscriber data provided by broadcasters to the operator should not be passed on to any associated business.

65. However, some respondents argued that, in buying technical conditional access services, they would have to disclose to the operator information on forthcoming events (eg: a pay-per view exercise) which would be commercially sensitive. If the operator were associated with a competing broadcaster, leakage of the information to that other broadcaster could place them at a competitive disadvantage. They have therefore argued that the provisions should go further in requiring the operator to provide them with the means to operate independent authorisation services themselves, and if necessary to provide for independent smart-card issue.

66.The Government supports the objective that broadcasters should, if they wish, be able to have a direct commercial relationship with their subscribers that is independent of the conditional access operator and that, where practicable, broadcasters should not be required to disclose to the conditional access operator the identity of subscribers or other information which would place them at a commercial disadvantage.

67.In line with this objective, the licence requires the conditional access operator to provide any technical service or combination of technical services where it is reasonable and practicable for them to do so. It also contains provisions enabling the Director General of telecommunications to specify an essential interface and to require the conditional access operator to make that interface available to a third party.

68.An important issue here is the licensing of industrial property rights to broadcasters and others for the provision of subscriber authorisation services (as distinct from the licensing to consumer equipment manufacturers discussed above). To implement the request above in terms would require the conditional access operator to licence the industrial property rights (IPR) in the underlying technology and provide the necessary equipment and know-how to broadcasters, rather than simply providing the services.

69.There is a need here to strike an appropriate balance between the rights of the holders of IPR to exploit that IPR and to protect their investment in it, and the need to prevent significant distortion of competition. The general approach to striking this balance, in telecommunications and other contexts, has been to provide powers to act where there is an abuse of a dominant position leading to significant distortion of competition, rather than providing for automatic licensing of IPR ahead of the market developing. This is the approach the Government proposes to take in this instance, particularly as no-one has yet entered the market to start building a digital platform.

70.In the first instance, OFTEL would seek to secure arrangements for subscriber authorisation and for issue and dispatch of smartcards which protected the interests of the broadcaster whilst not requiring the licensing of IPR. However, the Government is fully aware that the market may develop rapidly and OFTEL will therefore be empowered to be able to take swift action at the first signs of any abuse significantly preventing, restricting or distorting competition. Should it not prove possible to put in place arrangements of the sort described, and were an issue of abuse to arise then OFTEL would be able, to take action under Condition 9 of the Licence (Intellectual Property) as well as under the Fair Trading Condition. The Director General's powers in relation to telecommunications services under the Fair Trading and Competition Acts

would also be relevant. and the balance of all the arguments (including issues of security and integrity of operation) pointed to it,

71. In any such case, the Director would need to reach a decision on the facts of that particular case and on the balance of the arguments for and against proceeding in this way. Relevant considerations are likely to include: on the one hand questions of anti-competitive intent or effect; and on the other hand, questions about the impact on the security and integrity of the conditional access system of allowing separate smart cards to operate in the same box. While this does not provide automatically for independent SAS provision, it clearly can, and as such is intended to forestall anticompetitive behaviour.

Application Programming Interface

72. Concerns were raised about access to the Application Programming Interface (API) which is used to control the presentation to the viewer of information transmitted to the set top box. In particular the "verifier" which enables interactive functions linked to broadcasters' television services to interoperate with the API is clearly a technical conditional access service within the meaning of the Directive and the relevant licence provisions would apply. We have now made this explicit in the definition of encryption. Thus conditional access operators would be obliged to provide a verification service to allow interactive applications broadcast to the viewer to load and run in the set top box. There would also clearly be an obligation to supply information on the API command set so that such applications could be developed to interoperate with the API.

Electronic Programme Guide

73. A number of respondents expressed concern over the potential power of the Electronic Programme Guide (EPG) as a gateway controlling access to television services. The concern is that in an environment where the EPG is used by viewers to request services (pay-per-view or impulse pay-per-view) using the remote control linked to a modem in the set top box, control of the EPG could be used to frustrate the objectives of the Directive and these provisions. It will therefore be important for the regulatory framework to promote, where possible, the provision by broadcasters of competing EPG services, as well as ensuring that control of an EPG is not used anticompetitively.

74. To the extent that an EPG may be provided by combinations of applications and information broadcast to the viewers, the approach set out above should ensure that a broadcaster should always be able to operate his own EPG service, if he so chooses. Such EPG applications should also

be able to include instructions to dial out to any appropriate service provider the broadcaster chose to handle transactions. The objective of this approach is to ensure that competition in the provision of EPG services should always be possible.

75. Where any embedded EPG application is used to select services, it will need to interface to one or more of the components of the conditional access system. The provision of this interface, including, for example, the ability to provide transparent interconnection to another broadcaster's independent CMS provider, would also clearly fall within the scope of the relevant provisions of the Regulations and the licence.

76. Further, were the EPG to become the only way in which services could be selected by viewers, then it would itself clearly fall within the meaning of conditional access services as expressed in the Directive and the full force of the provisions would apply.

77. The provisions of the licence on linked sales would also be relevant should a conditional access provider seek to make the provision of EPG services subject to taking a full package of conditional access services.

78. In addition, the Broadcasting Act 1996 requires that EPG services be licensed for digital terrestrial television. The ITC's duty to ensure fair and effective competition in the provision of licensed services and connected services is also relevant. The ITC will shortly be issuing a consultation document concerning the use of EPGs in relation to the delivery of licensed services.

Interoperability of Conditional Access Systems

79. A discussion was included in the last consultation paper of the different models which support, in particular, means of operating, and interoperating, different conditional access systems. The Euro-crypt (single system, third party operator), Multi-crypt (Common Interface) and Simul-crypt (multiple systems) approaches were examined.

80. Some respondents suggested that the Government favoured the Simulcrypt approach. However, the provisions of the SI and Licence are intended to accommodate any one, or more, of these models if they are taken forward in the market. The Directive does not permit us scope to mandate any particular approach, nor would the Government consider that appropriate at this stage.

81. We have attempted to ensure, however, that the provisions of the regulations and the licence provide the necessary features to help support interoperability between different conditional access systems to the maximum extent practicable, whatever model(s) broadcasters decided to follow.

82.A feature of all schemes for interoperability is that problems can best be avoided by co-operation between broadcasters in developing a co-ordinated approach. Nothing in these Regulations or Licence seeks to prevent or hinder such co-operation, and it may be that many of the issues raised in response to our consultation could better be addressed by such co-operation.

Simul-Crypt

83.A number of respondents expressed concern at the practicability of the Simul-Crypt approach. As subsequent discussions in the Digital Video Board project (DVB) have shown, many of these concerns arise from an extended concept of Simul-crypt, which goes beyond the basic question of interoperability between conditional access systems and concerns wider aspects of service interoperability. Many of the questions revolve around access to, and interoperability with, other features implemented in set top boxes, beyond the basic functionality required to enable unscrambling of a particular programme.

84.The basic Simul-crypt approach involves the inclusion within a single broadcast signal of conditional access information for more than one conditional access system. This allows the broadcast signal to be unscrambled by any decoder which operates with any one of those conditional access systems. This provides basic viewing interoperability between different conditional access services and allows a broadcaster to reach viewers through any box for which he can purchase conditional access service.

85.The Regulations and the Licence have provisions which offer support this basic Simul-crypt interoperability. As noted above, broadcasters are guaranteed access on a fair, reasonable and non-discriminatory basis to conditional access service. They can purchase individual components of conditional access separately if they so wish. Each conditional access operator can be required to make just sufficient technical details of their system available to enable another operator or broadcaster to interoperate with it. Taken together, the provisions effectively provide broadcasters as far as possible with access, at a reasonable cost, to decoders operating with different conditional access systems using a single broadcast signal.

OFTEL Guidelines

86.A number of respondents sought further guidance on how the terms 'fair, reasonable and non-discriminatory' would be interpreted in the context of the Regulations and licence conditions. An indication of some of the factors which would be taken into account was given in the previous consultation document. OFTEL is now actively developing further

guidelines with the intention of publishing a draft for consultation in early December.

The Regulation of Conditional Access Services for Digital Television ;
inal Consultation Paper on Detailed Implementation Proposals

SI NO. 1996/2185

STATUTORY INSTRUMENTS

1996 No. 2185

TELECOMMUNICATIONS

The Advanced Television Services (Industrial Property Rights)
Regulations 1996

Made 21st August 1996

Laid before Parliament 22nd August 1996

Coming into force 23rd August 1996

The Secretary of State, being a Minister designated(a) for the purposes of section 2(2) of the European Communities Act 1972(b) in relation to measures relating to advanced television service sincluding digital conditional access and subscription management services, in exercise of the powers conferred on him by that section and of all other powers enabling him in that behalf, hereby makes the following Regulations:-

(a) S.I. 1996/266

(b) 1972 c.68.

Citation and commencement

1. These Regulations may be cited as the Advanced Television Services (Industrial Property Rights) Regulations 1996 and shall come into force on 23rd August 1996.

Interpretation

2. - (1) In these Regulations, "the Directive" means Directive 95/47/EC of the European Parliament and of the Council on the use of standards for the transmission of television signals(a).

(2) Words and expressions used in these Regulations shall, unless the context otherwise requires, have the same meaning as in the Directive.

(a) OJ No. L281, 23.11.95, p.51.

Application

3. These Regulations apply in relation to conditional access to digital television services broadcast to viewers in the European Community, irrespective of the means of transmission.

Industrial property rights to conditional access products and systems

4. (1) When granting licences to manufacturers of consumer equipment, holders of industrial property rights to conditional access products and systems shall have the duty (provided for in Article 4(d) of the Directive) to ensure that this is done on fair, reasonable and non-discriminatory terms.

(2) Without prejudice to the generality of paragraph (1) above, taking into account technical and commercial factors, holders of such rights shall have the duty not to subject the granting of licences to conditions prohibiting, deterring or discouraging the inclusion in the same product of –

(a) a common interface allowing connection with several other conditional access systems; or

(b) means specific to another conditional access system, provided that the licensee complies with the relevant and reasonable conditions ensuring, as far as he is concerned, the security of transactions of conditional access system operators.

(3) The duties referred to in paragraphs (1) and (2) above are duties owed to any person who may be affected by a contravention of them, and without prejudice to any other cause of action which may arise therefrom –

(a) any breach of those duties which causes that person to sustain loss or damage shall be actionable in tort at the suit or instance of that person; and

(b) any condition included in a licence in contravention of the duty referred to in paragraph (2) above shall be void.

(4) In any proceedings in respect of the infringement of any industrial property rights to which the duties referred to in paragraphs (1) and (2) above relate, it shall be a defence for the defendant –

(a) to show that the infringement consisted only in acts or omissions which would not have constituted an infringement if the holder of such rights had complied with those duties; and

(b) to undertake to make such payments to the holder of such rights (in respect of both past, present and future use) and to abide by such other fair, reasonable and non-discriminatory terms as the court may order.

(5) Without prejudice to the court's jurisdiction to make a declaration or declarator apart from this paragraph, a declaration or declarator that an act or omission would not, or a proposed act or omission would not,

constitute an infringement of any industrial property rights if the holder of such rights had complied or were to comply with the duties referred to in paragraphs (1) and (2) above, may be made by the court in proceedings between the person doing or proposing to do the act or making or proposing to make the omission and the holder of such rights, notwithstanding that no assertion to the contrary has been made by the holder, if it is shown (a) that the person has applied in writing to the holder for a written acknowledgement to the effect of the declaration or declarator claimed, and has furnished him with full particulars in writing of the act in question;

and

(b) that the holder has refused or failed to give any such acknowledgement.

21st August 1996 John M Taylor,
Parliamentary Under Secretary of State for Corporate and Consumer Affairs,
Department of Trade and Industry

EXPLANATORY NOTE

(This note is not part of the Regulations)

These Regulations make provision in respect of licensing industrial property rights to conditional access products and systems for digital television services. They implement in the United Kingdom Article 4(d) of Directive 95/47/EC of the European Parliament and of the Council on the use of standards for the transmission of television signals ("the Advanced Television Services Directive"), as it applies to the holders of such rights.

By Regulation 3, the Regulations apply in relation to conditional access to digital television services broadcast to viewers in the Community, irrespective of the means of transmission. The Regulations thus apply whether the digital television services are transmitted by cable, satellite or terrestrial means.

Regulation 4(1) provides that the holders of such rights, when granting licences to manufacturers of consumer equipment, shall have the duty to license on fair, reasonable and non-discriminatory terms. Regulation 4(2) provides that, taking into account technical and commercial factors, such holders shall not subject the granting of licences to certain conditions. The conditions which are prohibited are those which prohibit, discourage or deter the inclusion of a common interface or of means specific to another conditional access system.

Paragraph (3) of Regulation 4 provides that contravention of the duties provided for in paragraphs (1) and (2) shall be actionable in tort. Any person affected by a contravention of the duties may enforce them. A condition included in a licence in contravention of paragraph (2) shall be void.

Paragraphs (4) and (5) of Regulation 4 provide that the court shall have

certain powers, where an act or omission constitutes or might constitute an infringement of the relevant industrial property rights, but would not so constitute an infringement, if the holder had complied or were to comply with the duties imposed by paragraphs (1) and (2). Paragraph (4) provides that the infringer in such a situation shall have a defence, provided that he makes such payments to the holder in respect of past, present and future use of such rights, and abides by such other fair, reasonable and non-discriminatory terms, as the court may order. Paragraph (5) enables a person using such rights to apply to the court for a declaration or declarator of non-infringement.

The Regulation of Conditional Access Services for Digital Television
Final Consultation Paper on Detailed Implementation Proposals

DRAFT REGULATIONS

26.11.96

The Secretary of State, being a Minister designated(a) for the purposes of section 2(2) of the European Communities Act 1972(b) in relation to measures relating to advanced television services including digital conditional access and subscription management services, in exercise of the powers conferred on him by that section and of all other powers enabling him in that behalf, hereby makes the following Regulations: –

PART 1 INTRODUCTORY

Citation and commencement

1. These Regulations may be cited as the Advanced Television Services Regulations 1996 and shall come into force on [] December 1996.

Revocation

2. The Advanced Television Services (Industrial Property Rights) Regulations 1996(c) are hereby revoked.

Interpretation

3. – (1) In these Regulations, "the Directive" means Directive 95/47/EC of the European Parliament and of the Council on the use of standards for the transmission of television signals(d), and words and expressions used in these Regulations shall, unless the context otherwise requires, have the same meaning as in the Directive.

(2) In these Regulations –

"the 1984 Act" means the Telecommunications Act 1984(e);

"the 1990 Act" means the Broadcasting Act 1990(f);

"the 1996 Act" means the Broadcasting Act 1996(g);

"advanced television services" includes wide-screen television services, high definition television services and television services using fully digital transmission systems;

"the Article 4(e) procedures" has the meaning given by regulation 15(1);

"the BBC" means the British Broadcasting Corporation;

"broadcaster" includes a multiplex operator;

"the Commission" means the Commission of the European Communities;

"the Community" means the European Community;

"domestic satellite licence" means a licence granted under section 44 of the 1990 Act;

"essential component" means the smart card or other technological component in electronic or tangible form, which is necessary for the reception of authorisation signals and thus to enable subscribers to view digital television services, in or upon which is mapped the subscriber's viewing entitlements, for insertion or incorporation into [or other interoperation with] the decoder;

"the ITC" means the Independent Television Commission;

"local delivery service licence" means a licence under Part II of the 1990 Act, and includes a licence to provide a prescribed diffusion service granted under Part I of the Cable and Broadcasting Act 1984(h);

"non-domestic satellite licence" means a licence granted under section 45 of the 1990 Act;

"recognized European standardization body" means the European Committee for Standardization (CEN), the European Committee for Electrotechnical Standardization (CENELEC) and the European Telecommunication Standards Institute (ETSI)

"sell" includes transfer by means of conditional sale or hire purchase, and "offer for sale" and "expose for sale" shall be construed accordingly; and

"wide-screen television service" means a television service consisting of programmes produced and edited to be displayed on a wide screen format; and for the purposes of this definition, the 16:9 format is the reference format for wide-format television services, and "wide-screen format", "wide-screen 16:9 format" and "wide-format services" shall be construed accordingly.

(3) Any provision of these Regulations which is expressed as applying irrespective of the means of transmission of the television services concerned applies whether the services are transmitted by cable, satellite or terrestrial means.

(4) In these Regulations, unless the context otherwise requires, words and expressions shall have the same meaning as in the 1984 Act.

(5) A reference in these Regulations to a licence of any description is, save in paragraph 3 of Schedule 1, a reference to a licence of that description whether granted before or after these Regulations come into force, provided however that nothing in these Regulations which has effect as a provision of such a licence shall be taken to have effect in respect

of any period before these Regulations come into force.

PART II ADVANCED TELEVISION SERVICES

Transmission of wide-screen services on digital networks

4. – (1) The ITC shall see to it that the transfer of wide-screen television services which were in operation on 22nd August 1996 to digital transmission networks open to the public is made easier, in particular pursuant to Directive 92/38/EEC(i) and Decision 93/424/EEC(j), in order to protect the interests of operators and television viewers who have invested to produce or receive such services.

(2) Any person operating a fully digital transmission network open to the public for the distribution of television services shall have the duty to ensure that that network is capable of distributing wide-format services.

Standards for transmission systems used by the BBC

5. – (1) This regulation applies to all television services provided by the BBC which –

(a) are transmitted to viewers in the Community whether by cable, satellite or terrestrial means; and

(b) which are –

(i) in wide-screen format;

(ii) in high definition and not fully digital;

(2) Without prejudice to section 142 of the 1996 Act (which implements the provisions of Article 2 of the Directive concerning transmission systems in relation to every licensed service as defined in subsection (7) of that section), the BBC shall do all that it can to secure that all television services to which this regulation applies use a transmission system complying with the said Article 2.

Television sets to have open interface

6. – (1) Any television set with an integral viewing screen of visible diagonal greater than 42 cm which is put on the market for sale or rent shall be fitted with at least one open interface socket (as standardized by a recognized European standardization body, where a standard has been adopted by such a body and is in force) () [ref. to current standard: SCART socket] permitting simple connection of peripherals, which includes, without prejudice to the generality thereof, additional decoders and digital receivers.

(2) Paragraph (1) above shall not apply to television sets first put on the market in the Community before 23rd August 1996.

(3) No person shall sell or rent out, or offer or expose for sale or rent, a television set which is required to comply with paragraph (1) above which does not so comply.

Redistribution by cable of wide-screen services

7. - (1) Wide-screen television services which are received by, and re-distributed on, cable television systems shall be redistributed on such systems at least in the wide-screen 16:9 format.

(2) The requirement set out in paragraph (1) above shall have effect as if it was set out in every local delivery service licence.

PART III CONDITIONAL ACCESS

Application and interpretation

8. - (1) This Part applies in relation to conditional access to digital television services broadcast to viewers in the Community, irrespective of the means of transmission.

(2) Schedule 1 to these Regulations shall have effect for the purposes of modifying the application of the 1984 Act in relation to conditional access systems.

Requirements for descramblers

9. - (1) All consumer equipment, capable of descrambling digital television signals, for sale or rent or otherwise made available, shall possess the capability -

(a) to allow the descrambling of digital television signals according to the common European scrambling algorithm as administered by a recognized European standardization body; and

(b) to display signals that have been transmitted in clear provided that, in the event that such equipment is rented, the rentee is in compliance with the relevant rental agreement.

(2) Paragraph (1) above shall not apply to any equipment first put on the market in the Community before 23rd August 1996.

(3) No person shall sell or rent out, or otherwise make available, or offer or expose for sale or rent or otherwise making available, any consumer equipment which is required to comply with paragraph (1) above which does not so comply.

Transcontrol

10. (1) It shall be the duty of any person operating a conditional access system on the market to ensure that such system has the necessary technical capability for cost-effective transcontrol at cable head-ends allowing the possibility for full control by cable television operators at local or regional level of the services using such conditional access system.

(2) The duty referred to in paragraph (1) above is a duty owed to any person who may be affected by a contravention of it and without prejudice to any other cause of action which may arise therefrom any breach of such duty which causes that person to sustain loss or damage shall be actionable in tort at the suit or instance of that person.

Obligations of operators of conditional access services

11 (1) It shall be the duty of operators of conditional access services,

irrespective of the means of transmission, who produce and market access services to digital television services

(a) to offer to all broadcasters, on a fair, reasonable and non-discriminatory basis, technical services enabling the broadcasters' digitally-transmitted services to be received by viewers authorised by means of decoders administered by the service operators;

(b) to keep separate financial accounts regarding their activity as conditional access providers.

(2) A digital television service may take advantage of the provisions in paragraph (1) above only if the services offered comply with the relevant [Community obligations] in force.

(3) Each of the duties referred to in paragraph (1) above is a duty owed to any person who may be affected by a contravention of it and without prejudice to any other cause of action which may arise therefrom any breach of such duty which causes that person to sustain loss or damage shall be actionable in tort at the suit or instance of that person.

Form of broadcasters' tariffs

12 (1) Broadcasters shall publish a list of tariffs for the viewer which takes into account whether associated equipment is supplied or not.

(2) The requirement set out in paragraph (1) above shall have effect as if it was set out in

(a) every local delivery service licence, being a licence which authorises the delivery of digital television services, in relation to cable television operators;

(b) every television programme service licence granted under Part I of the 1996 Act, in relation to terrestrial broadcasters other than the BBC;

(c) every domestic satellite service licence and non-domestic satellite service licence, in each case being a licence which authorises the provision of digital television services, in relation to satellite broadcasters.

(d) [the Agreement between the Secretary of State and the BBC dated 1995]

Industrial property rights to conditional access products and systems

13 (1) When granting licences to manufacturers of consumer equipment, holders of industrial property rights to conditional access products and systems shall have the duty to ensure that this is done on fair, reasonable and non-discriminatory terms.

(2) Without prejudice to the generality of paragraph (1) above, taking into account technical and commercial factors, holders of such rights shall have the duty not to subject the granting of licences to conditions prohibiting, deterring or discouraging the inclusion in the same product of

(a) a common interface allowing connection with several other conditional access systems; or

(b) means specific to another conditional access system, provided that the licensee complies with the relevant and reasonable conditions

ensuring, as far as he is concerned, the security of transactions of conditional access system operators.

(3) Each duty referred to in paragraph (1) and (2) above is a duty owed to any person who may be affected by a contravention of it, and without prejudice to any other cause of action which may arise therefrom

(a) any breach of such duty which causes that person to sustain loss or damage shall be actionable in tort at the suit or instance of that person; and

(b) any condition included in a licence in contravention of the duty referred to in paragraph (2) above shall be void.

(4) In any proceedings in respect of the infringement of any industrial property rights to which the duties referred to in paragraphs (1) and (2) above relate, it shall be a defence for the defendant –

(a) to show that the infringement consisted only in acts or omissions which would not have constituted an infringement if the holder of such rights had complied with those duties; and

(b) to undertake to make such payments to the holder of such rights (in respect of both past, present and future use) and to abide by such other fair, reasonable and non-discriminatory terms as the court may order.

(5) Without prejudice to the court's jurisdiction to make a declaration or declarator apart from this paragraph, a declaration or declarator that an act or omission would not, or a proposed act or omission would not, constitute an infringement of any industrial property rights if the holder of such rights had complied or were to comply with the duties referred to in paragraphs (1) and (2) above, may be made by the court in proceedings between the person doing or proposing to do the act or making or proposing to make the omission and the holder of such rights, notwithstanding that no assertion to the contrary has been made by the holder, if it is shown

(a) that the person has applied in writing to the holder for a written acknowledgement to the effect of the declaration or declarator claimed, and has furnished him with full particulars in writing of the act or omission in question; and

(b) that the holder has refused or failed to give any such acknowledgement.

Integrated decoders

14 (1) Where television sets contain integrated digital decoders, such sets must allow for the option of fitting at least one standardized socket permitting connection of conditional access and other elements of a digital television system to the digital decoder.

(2) Paragraph (1) above shall not apply to any television set which was first put on the market in the Community before 23rd August 1996.

(3) No person shall sell or rent out, or otherwise make available, or offer or expose for sale or rent or otherwise making available, any television set which is required to comply with paragraph (1) above which does not so comply.

Dispute resolution procedures

15 (1) The [Secretary of the State] [Director] shall from time to time establish and maintain in force appropriate dispute resolution procedures ("the Article 4(e) dispute resolution procedures") to which any party having an unresolved dispute concerning the application of any provision of this Part shall have easy, and in principle inexpensive, access, with the objective of resolving such disputes in a fair, timely and transparent manner.

(2) The Article 4(e) dispute resolution procedures

- (a) shall not preclude an action at law from either side; and
- (b) are without prejudice to any action that the Commission or any member State may take pursuant

to the Community Treaties.

(3) The Article 4(e) dispute resolution procedures shall provide for the appointment by the [Secretary of State] [Director] of an independent person

- (a) nominated by the parties to the dispute; or
- (b) in default of agreement between the parties, nominated by the [Secretary of State] [Director] according to the procedures established by him, to act as a conciliator to assist the parties to resolve their dispute in accordance with those procedures.

(4) Where the parties so agree

- (a) in their application for the appointment of a conciliator; or
- (b) following notification of the findings of the conciliator,

such findings shall be binding on the parties and shall, subject to paragraph (6), have effect as a contract between the parties.

(5) The reasonable costs and expenses incurred by the conciliator in performing his functions under this regulation shall be set out in his findings and shall be met by the parties in equal shares:

Provided that, where it appears to the conciliator that, having regard to the conduct and means of the parties and any other relevant circumstances, it would be appropriate to share the costs in some other manner, he shall set out in his findings as to the apportionment of the costs and the reasons therefor.

(6) The findings of the conciliator, in so far as they relate to his costs and expenses, shall be enforceable as against any party in respect of his share determined in accordance with paragraph (5) above

- (a) in England and Wales and in Northern Ireland as if it were a judgement of a county court; and

- (b) in Scotland as if it were an extract registered decree arbitral bearing a warrant for execution issued by the sheriff.

(7) On the expiry of [two months] (or such longer period as the parties to the dispute and the conciliator may agree) commencing on the date of

the appointment of the conciliator, the dispute resolution procedure shall be taken to be completed, notwithstanding that the parties have not reached agreement and the conciliator has not made any findings as to the resolution of the dispute.

[(8) In paragraph (3) above, 'independent person' means a person independent of the parties to the dispute, the Secretary of State and the Director.]

PART IV ENFORCEMENT

Enforcement provisions in relation to regulations 6, 9 and 14

16. Schedule 2 to these Regulations shall have effect for the purposes of the enforcement of regulations 6, 9 and 14.

Enforcement by the Director

17. (1) Except as provided for in paragraph (2) below, without prejudice to any right which any person may have by virtue of any provision of these Regulations or otherwise to bring civil proceedings in respect of any contravention or apprehended contravention of any duty referred to in such provision, or to have any dispute concerning that duty resolved pursuant to the Article 4(e) dispute resolution procedures, compliance with that duty shall be enforceable by civil proceedings by the Director for an injunction or interdict or for any other appropriate relief.

(2) Paragraph (1) above shall not apply to –

(a) the duties referred to in regulations 6, 9 and 14; or

(b) the duty referred to in regulation 12, save as it relates to the BBC.

Regulation 8(2)

SCHEDULE 1

MODIFICATION OF THE APPLICATION OF THE TELECOMMUNICATIONS ACT 1984 AND OF CERTAIN LICENCES GRANTED THEREUNDER

Certain systems to be treated as telecommunication systems

1. For the purposes of sections 3 to 7, 12 to 19 and Part III of the 1984 Act

(a) a conditional access system used for the purposes of providing subscriber management or customer management services shall to the extent which it is so used be treated as a telecommunication system even though it would not be so treated apart from this paragraph (in this paragraph referred to as a "deemed system");

(b) subscriber management services or customer management services provided by means of a deemed system shall be treated as telecommunication services;

Disapplication of section 6

2. (1) Subject to sub-paragraph (2) below, Subsection 2(b) of section 6

of the 1984 Act (exemption from the requirement for a telecommunication licence for systems situated on a single set of premises) shall not apply to the running by a person of any conditional access system.

1. Nothing in sub-paragraph (1) above shall affect the exemption in the said subsection (2)(b) as it relates to any conditional access system which is run by a broadcaster and is used to provide conditional access services for himself only, or by a person only to enable him to receive digital television services.

Disapplication of existing licences

3. Every licence granted under section 7 of the 1984 Act before the coming into force of these Regulations (whether granted to all persons, to persons of a class or to a particular person) which authorises (however expressed) the running of a conditional access system by any person who produces and markets conditional access services in relation to digital television services shall, upon the coming into force of these Regulations, cease to authorise the running of such system in so far as it is used for the purposes of the provision by the Licensee of such services to other persons.

Regulation 16

SCHEDULE 2

ENFORCEMENT OF REGULATIONS 6, 9 AND 14

Enforcement of the relevant provisions

1 (1) This Schedule shall have effect for the purposes of providing for the enforcement of regulations 6(3), 9(3) and 14(3), and in this Schedule, each such provision is hereinafter referred to as a "relevant provision".

(2) Nothing in paragraphs 4 or 5 below shall be taken to authorise the taking of any action in relation to any equipment which has been sold or rented out or otherwise made available as the case may be to a viewer, where the viewer has physically taken delivery of the equipment; provided that

(a) nothing in this paragraph shall prevent an enforcement authority or an officer of such authority from taking any other action authorised by this Schedule in relation to such equipment; or

(b) nothing in this Schedule shall prevent the viewer from taking any action or bringing any proceedings which he might otherwise take or bring in respect of such equipment.

Enforcement authorities

2 (1) It shall be the duty of the following authorities to enforce the relevant provisions –

(a) in Great Britain, weights and measures authorities; and

(b) in Northern Ireland, the Department of Economic Development.

(2) The Secretary of State may enforce the relevant provisions.

(3) In this Schedule, "enforcement authority" means any person who is, pursuant to the provisions of this paragraph, authorised to enforce the relevant provisions.

Test purchases

3 (1) An enforcement authority shall have the power, for the purposes of ascertaining whether any equipment which is required to comply with a relevant provision does in fact so comply, to make, or authorise an officer of the authority to make, any purchase of equipment.

(2) Where –

(a) any equipment purchased pursuant to this paragraph by or on behalf of an enforcement authority is submitted to a test;

(b) the test leads to the bringing of forfeiture proceedings in respect of that equipment or equipment of the same description pursuant to paragraph 7 or 8 below; and

(c) the authority is requested to do so and it is practicable for the authority to comply with the request,

the authority shall allow the person from whom the equipment was purchased or any person who is a party to the proceedings [or has an interest in any equipment to which the notice relates] to have the apparatus tested.

(3) In this paragraph, "purchase" includes, where equipment is only available to rent, renting, and where consumer equipment capable of descrambling digital television signals is only made available by a method otherwise than by way of sale or rent, obtaining such equipment by that method, and cognate expressions shall be construed accordingly.

Powers of search etc.

4 (1) Subject to paragraph 5 below, a duly authorised officer of an enforcement authority may at any reasonable hour and on production, if required, of his credentials exercise any of the powers conferred by the following provisions of this paragraph.

(2) The officer may, for the purposes of ascertaining whether there has been a contravention of a relevant provision –

(a) inspect any equipment and enter any premises other than premises occupied only as a person's residence; or

(b) examine any procedure connected with the production of any equipment.

(3) If the officer has reasonable grounds for suspecting that there has been a contravention of a relevant provision, he may for the purpose of ascertaining (by testing or otherwise) whether there has been any such contravention, seize and detain any equipment.

(4) The officer may seize and detain –

(a) any document, record or information or any other thing which he has reasonable grounds for believing may be required –

(i) as evidence in proceedings for forfeiture under paragraph 7 or 8 below; or

(ii) [by the authorities of a member State other than the United Kingdom

for the purposes of the exercise of its functions with regard to the Directive;]

(b) any equipment which he has reasonable grounds for suspecting may be liable to be forfeited.

(5) The officer may, for the purposes of the exercise of his powers under sub-paragraphs (3) or (4) above to seize any equipment, any document, record or information or any other thing –

(a) require any person having authority to do so to open any container; and

(b) himself open or break open any such container where a requirement made under sub-paragraph (a) above in relation to the container has not been complied with.

Provisions supplemental to paragraph 4

5 (1) An officer seizing any equipment, documents, records or information or any other thing under paragraph 4 above shall inform the person from whom they are seized that such equipment, document, record or information or other thing have been so seized.

(2) If a justice of the peace –

(a) is satisfied by any written information on oath that there are reasonable grounds for believing either –

(i) that any equipment, documents, records or information or any other thing which any officer has power to inspect under paragraph 4 above are on any premises (which may be premises occupied only as a person's residence) and that such inspection is likely to disclose evidence that there has been a contravention of a relevant provision; or

(ii) that such a contravention has taken place, is taking place or is about to take place on any premises; and

(b) is also satisfied by any such information either –

(i) that admission to the premises has been or is likely to be refused and that notice of an intention to apply for a warrant under this sub-paragraph has been given to the occupier; or

(ii) that an application for admission, or the giving of such a notice, would defeat the object of the entry or that the premises are unoccupied or that the occupier is temporarily absent and it might defeat the object of the entry to await his return,

the justice may by warrant under his hand, which shall continue in force for one month, authorise any officer of an enforcement authority to enter the premises, if need be by force.

(3) An officer entering any premises by virtue of paragraph 4 above or a warrant under sub-paragraph (2) of this paragraph may take with him such other persons and such equipment as may appear to him to be necessary.

(4) On leaving any premises which a person is authorised to enter by a warrant under sub-paragraph (2) of this paragraph, that person shall, if the premises are unoccupied or the occupier is temporarily absent, leave the premises as effectively secured against trespassers as he found them.

(5) Where any equipment seized by an officer under paragraph 4 above is submitted to a test, the officer shall inform the person mentioned in sub-paragraph (1) of this paragraph of the result of the test and, if –
(a) proceedings are brought in respect of a contravention of a relevant provision for the forfeiture of the equipment concerned; and
(b) the officer is requested to do so and it is practicable to comply with the request,

the officer shall allow any person who is a party to the proceedings or has an interest in the equipment to have the equipment tested.

(6) In the application of this paragraph to Scotland, the reference in sub-paragraph (2) above to a justice of the peace shall include a reference to a sheriff and the references to written information on oath shall be construed as references to evidence on oath.

(7) In the application of this paragraph to Northern Ireland, the references in sub-paragraph (2) above to any information on oath shall be construed as references to any complaint on oath.

Appeals against detention of equipment

6. (1) Any person having an interest in any equipment, document, record, information or other thing which is for the time being detained under any provision of this Schedule by an enforcement authority or by an officer if such an authority may apply for an order requiring such item to be released to him or to another person.

(2) An application under this paragraph may be made –

(a) to any magistrates' court in which proceedings for forfeiture have been brought in England and Wales and Northern Ireland;

(b) where no such proceedings have been brought, by way of complaint to a magistrates' court; or

(c) in Scotland, by summary application to the sheriff.

(3) On an application under this paragraph to a magistrates' court or to the sheriff, an order requiring equipment to be released shall be made only if the court or sheriff is satisfied –

(a) that proceedings for the forfeiture of the equipment under paragraph 7 or 8 below have not been brought, or, having been brought, have been concluded without the equipment being forfeited; and

(b) where no such proceedings have been brought, that more than six months have elapsed since the equipment was seized.

(4) Any person aggrieved by an order made under this paragraph by a magistrates' court in England and Wales or Northern Ireland, or by a decision of such a court not to make such an order, may appeal against that order or decision –

(a) in England and Wales, to the Crown Court;

(b) in Northern Ireland, to the county court;

and an order so made may contain such provision as appears to the court appropriate for delaying the coming into force of the order pending the making and determination of any appeal (including any application under section 111 of the Magistrates' Courts Act 1980(k) (1980 c.43) or article 146 of the Magistrates' Courts (Northern Ireland) Order 1981(1) (S.I. 1981/1675 (N.I. 26) (statement of case)).

Proceedings in England and Wales or Northern Ireland for forfeiture

7 (1) Where in England and Wales or Northern Ireland any equipment has been seized and detained by an officer of an enforcement authority pursuant to paragraph 4 above, an officer of that authority may apply to a justice of the peace acting for the petty sessions area in which the equipment was seized (referred to below in this paragraph as the relevant petty sessions area) to initiate proceedings for forfeiture of the equipment under this paragraph.

(2) An application under this paragraph must be made within the period of six months beginning with the date on which the equipment to which it relates was seized.

(3) A justice of the peace to whom an application under this paragraph is made may issue a summons to any person appearing to him to be the owner of or otherwise interested in any equipment to which the application relates requiring him to appear on a day specified in the summons before a magistrate' court acting for the relevant petty sessions area to show cause why the equipment should not be forfeited.

(4) In addition to the person summoned, any other person claiming to be the owner of or otherwise interested in any equipment to which an application under this paragraph relates shall be entitled to appear before the court on the day specified in the summons to show cause why it should not be forfeited.

(5) Subject to the following provisions of this paragraph, where any equipment is brought before a magistrates' court in proceedings under this paragraph and the court is satisfied that the equipment contravenes the relevant provision, the court shall order the equipment to be forfeited to [the enforcement authority concerned], unless the person summoned or any other person entitled to appear before the court for that purpose shows cause why the equipment should not be forfeited.

(6) If the person summoned does not appear, the court shall not make an order under this paragraph unless service of the summons is proved.

(7) Where in any proceedings under this paragraph an order is made for the forfeiture of any equipment, any person who appeared, or who was entitled to appear, to show cause against the making of the order may appeal to the Crown Court.

(8) No order for the forfeiture of any equipment made under this paragraph shall take effect –

(a) until the end of the period of twenty-one days after the day on which the order is made; or

(b) if appeal proceedings are brought in respect of the order within that period (whether by way of appeal to the Crown Court or by way of case stated for the opinion of the High Court), until the conclusion of those proceedings.

(9) If a magistrates' court does not order forfeiture of any equipment brought before it in proceedings under this paragraph the court may if it thinks fit order the person on whose application the proceedings were initiated to pay such costs as the court thinks reasonable to any person who has appeared before the court to show cause why the equipment should not be forfeited; and costs ordered to be paid under this sub-paragraph shall be enforceable as a civil debt.

(10) Any equipment ordered to be forfeited under this paragraph may be disposed of [by the enforcement authority concerned] in such manner as it thinks fit.

(11) This paragraph has effect notwithstanding anything in section 140 of the Magistrates' Courts Act 1980 or article 58 of the Magistrates' Courts (Northern Ireland) Order 1998 (disposal of non-pecuniary forfeitures).

(12) In the application of this paragraph to Northern Ireland references to a petty sessions area shall be read as references to a petty sessions district.

Proceedings in Scotland for forfeiture

8 (1) Where in Scotland any equipment has been seized and detained by an officer of an enforcement authority pursuant to paragraph 4 above, the procurator fiscal may apply to the sheriff for forfeiture of the equipment under this paragraph.

(2) An application under this paragraph shall be made in the manner specified in section 310 (incidental applications) of the Criminal Procedure (Scotland) Act 1975(m) (in this paragraph referred to as "the 1975 Act") and must be made within [six months] of the seizure of the equipment.

(3) The procurator fiscal making an application under this paragraph shall serve on any person appearing to him to be the owner of, or otherwise interested in, the equipment to which the application relates a notice, to which is attached a copy of the application, giving him the opportunity to appear at the hearing of the application to show cause why the equipment should not be forfeited.

(4) Service under sub-paragraph (3) above shall be carried out, and such service may be proved, in the manner specified for citation of an accused in summary proceedings under the 1975 Act.

(5) In addition to the person on whom notice is served under sub-paragraph (3) above, any other person claiming to be the owner of, or otherwise interested in, any equipment to which an application under this paragraph relates shall be entitled to appear at the hearing of the application to show cause why that equipment should not be forfeited.

(6) Subject to the following provisions of this paragraph, where an application is made under this paragraph and the court is satisfied that the equipment contravenes the relevant provision, the court shall order the equipment to be forfeited to [the enforcement authority concerned], unless cause is shown why the equipment should not be forfeited.

(7) The Court shall not make any order under this paragraph –

(a) if any person on whom notice is served under sub-paragraph (3) above does not appear, unless service of the notice on that person is proved; or

(b) if no notice under sub-paragraph (3) above has been served on any person, unless the court is satisfied that in the circumstances it was reasonable not to serve notice on any person.

(8) Where in any proceedings under this paragraph an order is made for the forfeiture of any equipment, any person who appeared, or was entitled to appear, to show cause why the equipment should not be forfeited may within twenty-one days of the making of the order appeal to the High Court by bill of suspension on the ground of an alleged miscarriage of justice in the proceedings; and section 452(4)(a) to (e) of the 1975 Act shall apply to appeals under this sub-paragraph as it applies to appeals such as are mentioned in section 444(1) of the 1975 Act:

Provided that the foregoing provisions of this sub-paragraph shall be without prejudice to any rule of law relating to bills of suspension in so far as such rule of law is not inconsistent with those provisions.

(9) No order for the forfeiture of any equipment made under this paragraph shall take effect –

(a) until the end of the period of twenty-one days after the day on which the order is made; or

(b) if appeal proceedings are brought in respect of the order within that period, until the conclusion of those proceedings.

(10) Any equipment ordered to be forfeited under this paragraph may be disposed of by [the enforcement authority concerned] in such manner as it thinks fit.

(11) This paragraph applies to Scotland only.

Power of the court to require matter to be remedied

9 (1) Where an application is made for the forfeiture of any equipment in respect of any matters which it appears to the court to be matters which it is in the power of any person who appears or who is entitled to appear to show cause why such equipment should not be forfeited to remedy, the court may, instead of ordering the equipment to be forfeited, order him, within such time as may be fixed by the order, to take such steps as may be specified in the order for remedying the said matters.

(2) The time fixed by an order under sub-paragraph (1) above may be extended or further extended by order of the court on an application made before

the end of that time as originally fixed or as extended under this sub-paragraph, as the case may be.

Recovery of expenses of enforcement

10 (1) This paragraph applies where a court makes an order under paragraph 7, 8 or 9 above.

(2) The court may (in addition to any other order it may make as to costs or expenses) order the person appearing to be the owner of or otherwise interested in the equipment or from whom the equipment was seized, to reimburse the enforcement authority for any expenditure which has been or may be incurred by that authority –

(a) in investigating the contravention, and, without prejudice to the generality of the foregoing, in having the equipment tested; or

(b) in connection with any seizure or detention of the equipment by or on behalf of the authority.

Application in England and Wales of certain provisions of the Police and Criminal Evidence Act 1984

11 (1) Whilst nothing in these Regulations shall be taken as providing that a contravention of a relevant provision constitutes a criminal offence, sections 15, 16, 20 and 21 of the Police and Criminal Evidence Act 1984 (n) (1984 c.60) shall apply to the exercise by an officer of an enforcement authority of the powers conferred by this Schedule as they apply to a constable.

(2) This paragraph applies to England and Wales only.

Application in Northern Ireland of certain provisions of the Police and Criminal Evidence (Northern Ireland) Order 1989

12 (1) Whilst nothing in these Regulations shall be taken as providing that a contravention of a relevant provision constitutes a criminal offence, articles 17, 18, 22 and 23 of the Police and Criminal Evidence (Northern Ireland) Order 1989 (o) (S.I. 1989 No. 1341 (N.I.12)) shall apply to the exercise by an officer of an enforcement authority of the powers conferred by this Schedule as they apply to a constable.

(2) This paragraph applies to Northern Ireland only.

Interpretation

13 (1) In this Schedule –

"equipment" means –

(a) in relation to regulation 6, a television set;

(b) in relation to regulation 9, consumer equipment capable of descrambling digital television signals; and

(c) in relation to regulation 14, a television set containing and integrated digital decoders;

"forfeiture" means forfeiture under paragraphs 7 or 8 above, and

"forfeited" shall be construed accordingly; and "premises" includes any place and, in particular, includes –

- (a) any vehicle, vessel, aircraft or hovercraft;
- (b) [any offshore installation;] and
- (c) any tent or movable structure[,

and in this definition, "offshore installation" has the meaning given to it by section 1 of the Mineral Workings (Offshore Installations) Act 1971()].

(2) In this Schedule, "document, record or information" includes any computer disk or other electronic, magnetic or electromagnetic means upon which the document, record or information is or is reasonably believed to be stored.

EXPLANATORY NOTE

This Note is not part of the Regulations)

Regulation 4 (which places a general duty upon the Independent Television Commission and the BBC) transfer of wide-screen services to digital networks) implements Article 1.2 of the Directive

The Regulation of Conditional Access Services for Digital Television
Final Consultation Paper on Detailed Implementation Proposals

DRAFT CLASS LICENCE FOR CONDITIONAL ACCESS SERVICES

Draft: 26th November 1996

Draft Class Licence for Conditional Access Services

CLASS LICENCE FOR THE RUNNING OF CONDITIONAL ACCESS SYSTEMS
GRANTED BY THE SECRETARY OF STATE UNDER SECTION 7 OF THE
TELECOMMUNICATIONS ACT 1984

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THE LICENCE

1. The Secretary of State, in exercise of the powers conferred on him by section 7 of the Telecommunications Act 1984 ("the Act") as extended by paragraph 1 of Schedule 1 to the Advanced Television Services Regulations 1996 ("the Regulations") hereby grants to all persons of the class defined in paragraph 2 (each such person being hereinafter referred to as "the Licensee") a Licence, subject to the Conditions set out in Schedule 1 and to revocation as provided in Schedule 2, to run within the United Kingdom the telecommunication systems referred to in paragraph 4(c) below ("the Applicable Systems") and authorises the Licensee to do all or any of the acts specified in Schedule 3:

Provided that—

(a) nothing in this Licence shall apply to any Applicable System in so far as it is employed for the purposes of the provision of services other than the services authorised in paragraph (2) of Schedule 3; and

(b) this Licence is without prejudice to any other licence under which —

(i) such Applicable System may be run when employed for the purposes of the provision of such other services; or

(ii) such telecommunication systems may be run (to the extent that it has not been disapplied by paragraph 3 of Schedule 1 to the Regulations).

COVERAGE

2. This Licence is granted to all persons running an Applicable System who produce and market the services authorised by paragraph (2) of Schedule 3 except any person in respect of whom the Secretary of State or the Director has revoked this Licence in accordance with Schedule 2 and whose names and particulars are for the time being included in a list kept for the purpose by the Director and made available by him for public inspection.

DURATION

3. This Licence shall enter into force on [December 1996] and shall be of [] years duration unless previously revoked in accordance with Schedule 2.

INTERPRETATION

4. In this Licence –

(a) "Applicable Systems" mean telecommunication systems or deemed telecommunication systems of any description by means of which there may be provided but only in so far as there are actually so provided Conditional Access Services except that such a system shall not be treated as an Applicable System by means only of the fact that there are conveyed by it Messages comprising Conditional Access Services together with messages comprising other services.

(b) "Conditional Access Services" means telecommunication services (including services which are deemed to be telecommunication services pursuant to paragraph 1() of Schedule 1 to the Regulations) by means of which access to [digital television] programmes, channels or other information may be controlled so that only those subscribers who are authorised to receive such programmes, Channels or other information do so, and includes –

1. Encryption Services, that is to say –

- (i) any encryption or scrambling of signals for digital television services; and
- (ii) the conveyance by the Applicable System of encryption or scrambling information;

2. Subscriber Authorisation Services, that is to say –

- (i) the actuation or control or the remote actuation or control of decoders; or
- (ii) the initial transmission of messages connected with (2)(i) above;

3. Subscriber Management Services, that is to say –

- (i) the preparation, or preparation and supply to subscribers of essential components; or

(ii) the preparation from subscribers' orders of instructions for authorisation signals for transmission to decoders, or both;

4. Customer Management Services, that is to say, the receipt and processing of orders and payments from subscribers to digital television services;

1. Encryption Services;

2. Subscriber Authorisation Services;

3. Subscriber Management Services; and

4. any other [part of a] Conditional Access Service or part thereof which is of a technical nature where failure to provide such a part means that the broadcaster's digitally transmitted services could not be displayed to viewers.

(d) "Conditional Access System" means a system which is used for the provision of Conditional Access Services to the extent that the System is so used, provided however, that a telecommunication system run by a person other than the person providing any such Services shall not be treated as a Conditional Access System on the ground only that it conveys without distinction signals connected with the provision of such Services together with other signals;

(e) "Essential Component" means the smart card or other component in electronic or tangible form for insertion or incorporation into or toher interoperation with the decoder and which is necessary for authorised subscribers to view or receive programmes in intelligible form. Channels or other information provided by means of telecommunication systems.

(f) "Markets" includes entering into, or offering to enter into, any contract which involves the provision of Conditional Access Services or any contract of sale relating to such Services

(g) "Message" means anything falling within paragraphs (a) to (d) of section 4(1) of the Act

5. Any word or expression used in this Licence shall, unless the context otherwise requires, have the same meaning as it has in the Act. The Interpretation Act 1978 shall apply for the purposes of interpreting this Licence as if it were an Act of Parliament. For the purposes of interpreting this Licence, headings and titles shall be disregarded.

6. For the purposes of this Licence references to the "Applicable Systems" are references to all or any of the systems run by the Licensee under this Licence unless the context otherwise requires.

SCHEDULE 1: CONDITIONS INCLUDED UNDER SECTION 7 OF THE 1984 ACT

PART 1: DEFINITIONS, INTERPRETATION AND APPLICATION

1 In this Schedule unless the context otherwise requires –

"Broadcaster" includes the British Broadcasting Corporation and any person licensed to provide television services under one or more of the following: the Wireless Telegraphy Act 1949, the Broadcasting Act 1990, Broadcasting Act 1996, (or any statutory modification, amendment or re-enactment thereof), or any person acting on behalf of such person

"the Community" means the European Community;

"Group" means a parent undertaking and its subsidiary undertaking or undertakings within the meaning of section 258 of the Companies Act 1985 as substituted by section 21 of the Companies Act 1989; and the "Licensee's Group" means a group in respect of which the Licensee is either a parent undertaking or a subsidiary undertaking;

"Major Office" means the Licensee's registered office and such other offices as the Director, having consulted the Licensee, may direct;

"Other Party" means the Broadcaster, the Transmission System Operator or the Other Service Provider, as the context may require;

"Other Service Provider" means a person other than the Licensee providing other Conditional Access Services to the Third Party in question.

"Technical Services Business" means the business of providing Technical Services and includes the running of such parts of the Applicable Systems as are used for the provision of those services, and the installation, maintenance, adjustment, repair, alteration, moving, removal, or replacement of such Systems and any apparatus comprised therein;

"Third Party" means a Broadcaster.

"Transmission System" means the telecommunication system which transmits the programmes, channels or other information to viewers and any point to point system connected thereto (including, without prejudice to the generality of the foregoing, a studio or outside broadcast link) which conveys the programmes, channels or other information to the point of reception of viewers, and includes a multiplex and a cable system but does not include any Conditional Access System.

"the Transmission System Operator" means a person operating a Transmission System on behalf of a Third Party.

2. Notwithstanding section 4(6) of the Act, any requirement imposed by or under the Conditions of this Licence (howsoever expressed) to connect or keep connected to any of the Applicable Systems any other telecommunication system (including a deemed system) or to take any action to ensure the interconnection or interoperability between such systems or to do any other thing which necessarily involves such interconnection or interoperability shall, unless the context otherwise requires, be taken as a requirement which may be satisfied by a connection to the Applicable System of that other system by means of a third telecommunication system to which the Licensee is authorised to connect the Applicable System by paragraph 2 of Schedule 3.

3. Any reference in any Condition in this Schedule, however expressed, to the Director notifying the Licensee about any matter, affording the

Licensee an opportunity to make representations, taking representations by the Licensee into account, or explaining, or giving reasons for, any matter to the Licensee, shall be without prejudice to any obligation of due process or similar obligation which the Director is or may be under by virtue of any rule or principle of law or otherwise.

4. Expressions cognate with those referred to in this Part shall be construed accordingly.

PART 2: CONDITIONS

Condition 1

SERVICE OBLIGATION FOR OPERATORS OF CONDITIONAL ACCESS SERVICES TO PROVIDE TECHNICAL SERVICES

1.1 Where a Third Party requires any Technical Service in respect of decoders administered by the Licensee, the Licensee shall offer that Service to that person on a fair reasonable and non discriminatory basis.

1.2 Where the Licensee provides any Technical Service pursuant to the offer referred to in paragraph 1.1 above, the Licensee shall co-operate with the Third Party and do whatever is reasonably necessary to ensure the interconnection or interoperability of the Applicable System and associated [apparatus] to enable the Technical Services to be provided and maintained.

Condition 2

TRANSCONTROL REQUIREMENTS IMPOSED ON THE OPERATORS OF CONDITIONAL ACCESS SERVICES PURSUANT TO ARTICLE 4(b) OF THE ADVANCED TELEVISION SERVICES DIRECTIVE

2. Where a Licensee provides any Technical Service in relation to the supply of Digital Television Services to a cable operator, the Licensee shall cooperate with the cable operator, including providing it with any necessary assistance and information, so that the cable operator is able to transcontrol and re-broadcast the television services cost-effectively using its own Technical Services, without incurring unnecessary or unreasonable expense.

Condition 3

FAIR TRADING

3.1 The Licensee shall not do any thing, whether by act or omission, which has or is intended to have or is likely to have the effect of preventing, restricting or distorting competition where such act or omission is done in the course of, as a result of or in connection with, providing Conditional Access Services or running an Applicable System.

For the purpose of this Condition such an act or omission will take the form of:—

(a) any abuse by the Licensee, either alone or with other undertakings,

of a dominant position within the United Kingdom or a substantial part of it. Such abuse may, in particular, consist in directly or indirectly imposing unfair purchase or selling prices or other unfair trading conditions;

limiting production, markets or technical development to the prejudice of consumers;

applying dissimilar conditions to equivalent transactions with other parties, thereby placing them at a competitive disadvantage; or

making the conclusion of contracts subject to acceptance by the other parties of supplementary obligations which, by their nature or according to commercial usage, have no connection with the subject of such contracts; or

(b) the making (including the implementation) of any agreement, the compliance with any decision of any association of undertakings or the carrying on of any concerted practice with any other undertaking which has the object or effect of preventing, restricting or distorting competition within the United Kingdom.

3.2(a) An act or omission of a kind described in paragraph 3.1 is not prohibited where:

(i) it has or would have no appreciable effect on competition; or

(ii) it has or would have no effect on competition between persons engaged in commercial activities connected with telecommunications and it would have no effect on users of telecommunication services.

(b) An act or omission of a kind described in paragraph 3.1(b) is not prohibited by this Condition if the agreement decision or concerted practice contributes to improving the provision of any goods or services or to promoting technical or economic progress, while allowing consumers a fair share of the resulting benefit and does not:

(i) impose on the parties concerned restrictions which are not indispensable to attaining those objectives; and

(ii) afford such parties the possibility of eliminating competition in respect of a substantial part of the goods or services in question.

(c) This Condition shall not apply to any provision of an agreement insofar as it is a provision by virtue of which the Restrictive Trade Practices Act 1976 applies to that agreement.

(d) This Condition shall not apply to a merger situation qualifying for investigation under the Fair Trading Act 1973.

3.3 Whether any act or omission is prohibited by this Condition shall be determined :-

(a) with a view to securing that there is no inconsistency with the general principles having application to similar questions of directly applicable competition law, in particular those laid down by the Court of Justice of the European Communities on the scope of the competition rules contained in the EC Treaty and block exemptions adopted by the European Commission under Article 85(3); and

(b) having regard to -

- (i) any decision taken, or notice issued, by the European Commission in applying the competition rules contained in the EC Treaty and any relevant pronouncement of the Director General of Fair Trading or report of the Monopolies and Mergers Commission; and
- (ii) any guidelines on the application of this Condition issued from time to time by the Director.

3.4(a) If it appears to the Director that an act or omission of the Licensee is or was prohibited by this Condition he may make an initial determination to that effect (an "Initial Determination").

(b) Before making an Initial Determination the Director shall give a notice to the Licensee:

- (i) stating that he is investigating a possible contravention of this Condition;
- (ii) setting out the reasons why it appears to him that this Condition may be being, or may have been, breached, including any matters of fact or law which he thinks relevant;
- (iii) requesting within a reasonable period laid down by the Director such further information as he may require from the Licensee in order to complete his Determination; and
- (iv) where appropriate, setting out the steps he believes the Licensee would have to take in order to remedy the alleged breach.

3.5(a) Within 28 days of the Director –

- (i) making an Initial Determination;
- (ii) making a provisional order; or
- (iii) giving notice of his proposal to make a final order under section 17(1) of the Act

in respect of the contravention in question, the Licensee may notify the Director that it–

(iv) requires him to make a final determination (a "Final Determination") of the matter;

(v) requires that in making the Final Determination he take into account a report of a body of experts appointed by him to consider the matter ("the Advisory Body").

(b) Before making a Final Determination the Director shall –

(i) give a notice to the Licensee setting out the matters referred to in paragraph 3.4(b); and

(ii) if the Licensee has given notice under sub-paragraph (a)(v) above, take into account the report of the Advisory Body on the matter.

(c) The Director shall then determine whether he is satisfied that the act or omission in respect of which the Initial Determination was made is or was prohibited by this Condition.

3.6(a) Before making his Initial Determination or Final Determination the Director shall give the Licensee, and any other person whom he considers it appropriate to consult, such period within which to make representations (both orally and in writing) in response to the notice

as he considers reasonable in all the circumstances.

(b) The Director shall notify the Licensee and any other person whom he considers it appropriate to notify of every Initial Determination and Final Determination made by him and of his reasons for making it; and he shall, if so requested by the Licensee, publish any report of the Advisory Body on the matter, subject to such exclusions as he may consider it appropriate to make of matters of a kind mentioned in section 48(2) of the Act.

3.7 The Director shall publish a description of his office's procedures for the enforcement of this Condition including the steps taken to ensure that he has access to appropriate independent advice in enforcing this Condition.

3.8 This Condition shall not limit or affect in any way the Licensee's obligations arising under any other Condition of this Licence nor limit the Director's powers of enforcement under sections 16 to 18 of the Act.

3.9(a) On the coming into force of any Act or subordinate legislation which

—

(i) contains a prohibition enforceable by the Director, or gives to the Director the power to enforce an existing prohibition, of any behaviour prohibited under paragraph 3.1;

(ii) gives to third parties in respect of a breach of that prohibition at least the rights they have under section 18 of the Act in respect of a breach of a provisional or final order; and

(iii) permits the imposition on the Licensee of monetary penalties in respect of the breach of that prohibition

this Condition shall cease to apply to the behaviour prohibited by or the prohibition enforceable by such Act or subordinate legislation.

Condition 4

PROHIBITION OF LINKED SALES

4.1 The Licensee shall not make the provision to any person of any Technical Service conditional upon the acquisition by any person of:

(a) any other service (whether a Conditional Access Service or otherwise) which is not part of the Technical Service requested save where that Service cannot be provided without the provision of that other service; or

(b) any telecommunication apparatus or telecommunication system, save where the Technical Service requested cannot be provided otherwise.

4.2 Except where the Director has agreed otherwise, the Licensee shall not provide a Technical Service together with any of the things described in 4.1(a) or 4.1(b) above in a manner, or for charges, or on terms, or conditions more favourable than would have been available for providing the Technical Service requested without that other thing.

4.3 Notwithstanding paragraphs 4.1 and 4.2 the Licensee may:

(a) where it supplies as part of the same transaction or interconnected series of transactions two or more items for the provision of Technical

Service for connection to any of the Applicable Systems, offer quantity discounts or more favourable terms and conditions in respect of quantity in relation to such apparatus which it so supplies whether those items of apparatus are of the same or different descriptions;

(b) where the Director consents, impose such conditions as are incidental to the provision of the Technical Service or the supply of the apparatus requested;

(c) where it provides by means of or in relation to any of the Applicable Systems and as part of the same transaction or an interconnected series of transactions, two or more Technical Services or other telecommunication services which are of the same description or which are so related as to permit economies of scope when they are provided together, offer such quantity discounts or such more favourable terms and conditions in respect of quantity for those services as have been published in accordance with Condition 7.

Condition 5

ESSENTIAL INTERFACES

5.1 This Condition applies where a Licensee provides to a Third Party any Technical Service.

5.2

a) The Director may, having first notified the Licensee of his proposal, affording the Licensee adequate time in which to make representations, specify an Essential Interface.

b) "Essential Interface" means an interface at which in the opinion of the Director it is essential that interoperability between the Applicable Systems and the Third Party's Conditional Access System or transmission system as the case may be is available.

5.3

a) Where in pursuance of paragraph 5.2 the Director specifies an interface as an Essential Interface, and the Licensee thereafter makes that interface available to the Third Party in relation to its Applicable Systems, it shall do so in such a manner as it considers appropriate, but shall ensure such availability is in compliance with the Relevant Standard if the Third Party so requires.

b) "Relevant Standard" means:

- (i) an appropriate European or other international standard; or
- (ii) in the absence of such a standard, any other standard specified by the Director after notifying the Licensee of his proposal and allowing the Licensee adequate time in which to make representations, provided that the Director shall not specify a standard if an appropriate European or other international standard is expected to be promulgated within a reasonable time, including, by way of example, if the European Telecommunications Standards Institute have published a work programme for the development of such a standard;

to the extent that such a standard is necessary to ensure interoperability.

5.4

a) Where in pursuance of paragraph 5.3(b)(ii) the Director specifies a standard as a Relevant Standard, he shall include in that Standard a technical specification. The Director shall use all reasonable endeavours to obtain the agreement of the Licensee and other relevant licensees to a technical specification applicable to the Standard, being a specification defined by reference to:

(i) (an appropriate European or other international specification; or
(ii) (in the absence of such a specification, a specification defined by reference to any other standard having currency within the European Community at the time.

b) Where after a reasonable time the Director has been unable to secure the agreement of the Licensee and other relevant licensees to a technical specification, the Director shall adopt for inclusion in the Relevant Standard an appropriate technical specification selected by him which has been promulgated by a recognised standards body, including, by way of example, the European Telecommunications Standards Institute, or the British Standards Institution, or other such body as is recognised by the Director as representative of all relevant telecommunications interests.

c) In any event the Director shall specify a Relevant Standard in pursuance of paragraph 5.3(b) only if the owners of the relevant intellectual property rights have agreed to grant any necessary licences in respect thereof to the Licensee on reasonable terms.

5.5 For the avoidance of doubt this Condition shall not:

a) without prejudice to paragraph 5.4, prevent the Licensee using such interfaces as it considers appropriate in relation to the Applicable Systems; or

b) where it makes available to the Third Party an interface which the Director has specified as an Essential Interface, require the Licensee to comply with the Relevant Standard if the Third party does not require it to do so.

5.6 When implementing an Essential Interface, the Licensee shall not be obliged to conform with the Relevant Standard:

a) if to do so would necessitate the Licensee:

(i) (acquiring apparatus, software or other goods or supplies of any kind, or implementing any operation, incompatible with, as the case may be, apparatus, software or such other goods or supplies already at the time in use, in connection with any of the Applicable Systems, or, in the case of an operation, incompatible with any other operation being carried out at the time in connection therewith; or

(ii) (incurring any cost, or having to resolve technical difficulties, disproportionate to the benefits to be gained from the implementation of the Relevant Standard;

provided that the Licensee shall take reasonable steps to incorporate the relevant Standard in its plans for System development, with a view to implementation of that Standard in connection with the Applicable Systems, but without the Licensee incurring any incremental expenditure disproportionate to the benefits to be gained from the implementation of the Relevant Standard which, but for the implementation of the Relevant Standard, would not have been incurred;

b) if the Relevant Standard is inappropriate for the particular application for any reason, including, without limitation:

(i) (that it does not afford the Licensee adequate protection for the security of the Applicable Systems;

(ii) (that its implementation would be liable to cause material impairment in the quality of any telecommunications service provided by means of the Applicable Systems; or

(iii) (that it is technically inadequate in the light of technical developments which have taken place since it was originally created;

(c) if the Essential Interface concerned is of a genuinely innovative nature and accordingly the use in connection with it of the Relevant Standard would not be appropriate;

(d) if compliance with the Relevant Standard would involve the infringement by the Licensee of any intellectual property right vested in any person; or

(e) if the Director so agrees.

5.6 Where paragraph 5.5(b) or (c) applies the Licensee shall notify the Director thereof, with an explanation why.

Condition 6

PROHIBITION ON UNDUE PREFERENCE OR DISCRIMINATION

6.1 Where the Director has determined that the Licensee is dominant in the supply of Technical Services [or in a related market], the licensee shall not (whether in respect of the charges or other terms or conditions applied or otherwise) show undue preference to or exercise undue discrimination against particular persons or persons of any class or description as respects:

(a) the provision of any Conditional Access Services, or

(b) the connection to any of the Applicable Systems of any other Conditional Access System or Transmission System which is not and is not to be comprised in any of the Applicable Systems.

6.2 The Licensee shall be deemed to have shown such undue preference or to have exercised such undue discrimination if it unfairly favours to a material extent a business carried on by it in relation to the doing of any of the things mentioned in paragraph 5.1 so as to place at a significant competitive disadvantage persons competing with that business.

6.3 Nothing done in any manner by the Licensee shall be regarded as undue preference or undue discrimination to the extent that the Licensee is

required to do that thing in that manner by or under any provision of this Licence.

Condition 7

PUBLICATION OF CHARGES, TERMS AND CONDITIONS TO BE APPLIED

7.1 Where the Director has determined that the licensee is dominant in the supply of Technical Services [or in a related market], the Licensee shall, except in so far as the Director may otherwise consent in writing:

(a) publish in the manner and at the times specified in paragraph 7.3 a notice specifying, or specifying the method that is to be adopted for determining, the charges and other terms and conditions on which it offers:

(i) to provide each Technical Service, or package of such services;

(ii) to connect to any of the Applicable Systems any other telecommunication system (which is not and not to be comprised in any of the Applicable Systems) in accordance with an obligation imposed by or under this Licence; or

(iii) to grant permission to connect other telecommunication systems to, or to provide Technical Services by means of, any of the Applicable Systems; and

(b) where it does any of the things mentioned in paragraph 7.1(a)(i) to (iii), do those things at the charges and on the other terms and conditions so published and not depart therefrom.

7.2 Publication of the notice shall be effected by:

(a) sending a copy thereof to the Director not more than 28 days after the date on which the Licensee first runs an Applicable System and, thereafter, not later than the last working day before the date on which any proposal to amend any charge, term or condition or the method of determining the same is to become effective;

(b) placing as soon as practicable thereafter a copy thereof in a publicly accessible part of the Major Office of the Licensee in such manner and in such place that it is readily available for inspection free of charge by members of the general public during such hours as the Secretary of State may prescribe under section 19(4) of the 1984 Act that the register of Licences and orders is to be open to public inspection; and

(c) sending a copy thereof or such part or parts thereof as are appropriate to any person who may request such a copy.

Condition 8

PAYMENT OF FEES

8.1 Any person wishing to run a Conditional Access System shall upon commencement of running such System, notify the Director immediately of the Licensee's name and address of the Licensee's major office.

8.2 The Licensee shall pay the following amounts to the Secretary of State at the times stated:

(a) on the commencement of running an Applicable System the sum of £ ;

(b) on 1st April 1998 and annually thereafter a renewal fee of (at the option of the Director) either £ or such amount which shall represent

a fair proportion, to be determined each year by the Director according to a method has been published, in accordance with 8.3 below, of the estimated costs to be incurred in that fiscal year by the Director in the regulation and enforcement of telecommunications licences and in the exercise of his other functions under the Act. The first renewal fee shall be increased by the proportion which the period from the date of granting of this Licence until the next following 1st April bears to the period of one year; and

(c) where the Director so determines, on a special fee which shall represent a fair proportion, to be determined by the Director according to a method that has been published, of the amount, if any, by which the aggregate of:

(i) the costs estimated to have been already incurred in that fiscal year by the Director in the regulation and enforcement of telecommunications licences and in the exercise of his other functions under the Act;

(ii) the costs estimated to have been already incurred in that fiscal year by the Monopolies and Mergers Commission following licence modification references under section 13 of the Act; and

(iii) the estimated costs to be incurred in the remainder of that fiscal year:

(A) by the Director in the regulation and enforcement of telecommunication licences and in the exercise of his other functions under the Act; and

(B) by the Monopolies and Mergers Commission following licence modification references under section 13 of the Act,

exceeds the renewal fee for that year,

save always that the aggregate of the renewal fee and the special fee for any fiscal year shall not exceed 0.08% of the annual turnover of the Technical Services Business in the financial year before the last complete financial year of the Licensee before the renewal fee is payable, or £ (adjusted in the manner described in paragraph 7.2(b), whichever is the greater (the "normal aggregate fee"), unless the Director determines that the costs incurred in any fiscal year by him and the Monopolies and Mergers Commission in respect of the Licensee's activities exceeds the normal aggregate fee, in which case the aggregate of the renewal fee and the special fee for the following year shall be such amount as the Director determines is sufficient to take account of that excess as well as of the other costs to be incurred as mentioned in this paragraph.

8.3 In this condition "publish" means publish in such manner as the Director considers appropriate for the purpose of bringing the matters to which the publication relates to the attention of persons likely to be affected by them.

Condition 9

INTELLECTUAL PROPERTY

9.1 Where the Director has determined that the Licensee is dominant in the supply of Technical Services audit appears to him that any Relevant

Intellectual Property Right has been, is being or is likely to be exercised (whether by the Licensee or by any other person in pursuance of an agreement, arrangement or concerted practice to which the Licensee is a party) so as to prevent:

(a) any Conditional Access System, Transmission System or Essential Component which may lawfully be connected to any of the Applicable Systems, from being so connected either at all or on reasonable charges, terms and conditions; or

(b) any Technical Service which may lawfully be provided by means of any of the Applicable Systems, from being so provided or obtained either at all or on reasonable charges, terms and conditions;

he may direct the Licensee in writing in accordance with paragraph 9.2 or 9.3.

9.2 Where the exercise of the Relevant Intellectual Property Right prevents a product from being made available either at all or on reasonable charges, terms and conditions to the person wishing to make such a connection or to provide or obtain a Technical Service, the Director may direct the Licensee to take such steps as are within the power of the Licensee and are, in the opinion of the Director, reasonable and necessary in all the circumstances to secure that the product is made available to that person on charges, terms and conditions acceptable to that person or which (in default of agreement) are, in the opinion of the Director, reasonable to enable such connection to be made or such service to be provided or obtained.

9.3 Where paragraph 9.1 applies in circumstances other than those described in paragraph 9.2, the Director may direct the Licensee to take such steps as are within the power of the Licensee and are, in the opinion of the Director, reasonable and necessary in all the circumstances to secure that the person wishing to make such a connection or to provide or obtain such a Technical Service is enabled to make use of the Relevant Intellectual Property Right for the purpose of making the connection or of providing or obtaining the service, upon charges, terms and conditions acceptable to that person or which (in default of agreement) are, in the opinion of the Director, reasonable for such purpose.

9.4 In this Condition:

"product" includes any item which is used for the provision of a Technical Service;

"Relevant Intellectual Property Right" means any right, which is wholly or partly controlled by a member of the Licensee's Group, in Industrial or Intellectual Property or is subject to an agreement, an arrangement or concerted practice to which a member of the Licensee's Group is a party; and

"Industrial or Intellectual Property" includes, without prejudice to its generality, patents, designs, know-how and copyright.

Condition 10

OBLIGATION TO KEEP SEPARATE FINANCIAL ACCOUNTS

10.1 The Licensee shall keep separate financial accounts regarding his operation of Conditional Access Services.

10.2 The Licensee shall maintain such accounting records dealing separately with its Technical Services Business as will enable it to show separately and explain, in response to any request from the Director under paragraph 10.5, all the transactions to which 10.3 refers.

10.3 This paragraph refers to:

all transactions between the Licensee's Technical Services Business and:

(i) any other business carried on by the Licensee whether in the United Kingdom or elsewhere; or

(ii) the business of any Associated Person whether in the United Kingdom or elsewhere;

(iii) the business of any Third Party.

10.4 The Licensee shall update the accounting records referred to in paragraph 10.1 no less frequently than monthly and those records shall include in particular the costs (including capital costs), revenue and a reasonable assessment of assets employed in and liabilities attributable to the Technical Services Business, and separately, the amount of any material item of revenue, cost, asset or liability which has been either:

(a) charged from or to any other business of the Licensee or Associated Person together with a description of the basis of the value on which the charge was made; or

(b) determined by apportionment or attribution from an activity common to the business and any other business of the Licensee or any Associated Person and, if not otherwise disclosed, the basis of the apportionment or attribution.

10.5 The Director may at any time request from the Licensee copies of any of the accounting records and detailed, attribution policies and procedures which the Licensee is obliged to maintain by this Condition, covering any period between:

(a) the date on which the Licensee first carried on any Technical Services Business in the United Kingdom, and

(b) the date on which such records were, or should have been, last updated in accordance with paragraph 10.4.

The Licensee shall provide any such records requested by the Director within [28] days of receiving such a request in writing.

10.6

(a) Accounting records submitted to the Director shall, so far as reasonably practicable, be prepared in the formats and in accordance with the accounting principles and rules which apply to the annual statutory accounts of the Licensee and shall state the attribution policies and procedures used and where the Licensee is a body corporate incorporated outside the United Kingdom the preparation and adoption of those accounts

shall comply with the requirements of sections 226 and 231 to 234A of the Companies Act 1985 as if that body corporate were incorporated in the United Kingdom.

(b) The Licensee shall, where the Director directs, procure in respect of each accounting record an audit report in which the auditor shall state whether in his opinion the record complies with paragraph 10.2.

10.7 Where it appears to the Director that to do so would be beneficial to the promotion or maintenance of competition he may direct the Licensee to publish the accounting records submitted to the Director in such way as he sees fit. In so directing the Licensee the Director shall have regard to the need for excluding, so far as that is practicable, any matter where publication of that matter might, in the opinion of the Director, seriously and prejudicially affect the interests of the Licensee or any Associated Person.

Condition 11

REQUIREMENT TO FURNISH INFORMATION TO THE DIRECTOR

11.1 The Licensee shall furnish or procure and furnish to the Director, in such manner and at such times as the Director may request, such documents, accounts, estimates, returns or other technical or commercial information as he may reasonably require for the purpose of exercising the functions assigned or transferred to him by or under Parts II and III of the Act, and under these Regulations.

11.2 In making any such request the Director shall ensure that no undue burden is imposed on the Licensee in procuring and furnishing such information and that the Licensee is not required to procure or furnish information which would not normally be available to the Licensee, unless the Director considers such information essential to enable him to exercise his functions.

11.3 The Licensee shall permit the Director and any person authorised by him in writing to inspect the Applicable System at any reasonable time for the purpose of verifying whether:

(a) the Licensee is running the Applicable System in accordance with this Licence; or

(b) the connection or the proposed connection of any other telecommunication system to the Applicable Systems causes or would cause any contravention of the Licence under which that other system is run.

11.4 If the Licensee is convicted of an offence under section 5(2) of the Act relating to the Applicable Systems, the Licensee shall, not later than fourteen days after the expiry of the Appeal Period, notify the Director of such conviction, specifying the offence, the date of such conviction, the name and address of the Court concerned and the penalty imposed.

11.5 In this Condition, "documents" includes, without prejudice to the generality thereof, drawings, designs, plans or specifications relating to a Conditional Access System.

Condition 12

CODE OF PRACTICE ON THE CONFIDENTIALITY OF CUSTOMER INFORMATION

12.1 Subject to the other provisions of this Licence, the Licensee shall take all reasonable steps to safeguard the privacy and confidentiality of any information about a Third Party and its business (including subscriber data) to whom it provides Conditional Access Services , acquired by it in relation to the provision of those Services, and shall use its best endeavours to secure that –

- a) no person acting on behalf of the Licensee or any member of the Licensee's Group divulges any such information; and
- b) no such person seeks such information other than is necessary for the purpose of providing Conditional Access Services to the Third Party.

12.2. 12.1 above does not apply where the

- (a) the information relates to a specific party and that party has consented in writing to such information being divulged, and such information is divulged in accordance with the terms of that consent, or
- b) the information is public.

12.3 The Licensee shall take all reasonable precautions against the risk of failure to comply with paragraph 12.1 above, including, without prejudice to the generality of the foregoing:

- a) restrictions on the communication of information to persons acting on behalf of the Licensee or members of its Group other than to those directly engaged in the provision of Conditional Access Services to the Third Party;
- b) restrictions on access by persons directly engaged in the provision of Conditional Access Services to the Third Party to –
 - (i) premises or parts of premises used for the Third Party's business to persons engaged in the Licensee's Technical Services Business ; and
 - (ii) recorded information relating to that business and its customers.

12.4 The Licensee shall take reasonable steps to ensure that the Licensee and any persons acting on its behalf and members of the Licensee's Group and any persons acting on their behalf observe the provisions of a Code of Practice which:

- (a) specifies the persons to whom they may not disclose information about a customer of the Licensee or that customer's business which has been acquired in the course of the Licensee's business providing Conditional Access Services without the prior consent of that customer;
- (b) makes provision for any disclosure of information without the customer's consent.

12.5 The Licensee shall within three months of first running an Applicable System confirm in writing to the Director that the Licensee has taken all reasonable steps to ensure that it and its employees are observing the provisions of a Code of Practice.

12.6 In this Condition, "Code of Practice" means:–

- (a) any Code of Practice from time to time agreed between all Licensees providing Conditional Access Services (including those so doing under other Licences), and approved by the Director;

(b) in the absence of an agreed Code of Practice under sub-paragraph (a) any model Code of Practice issued by the Director; or

(c) in the absence of an agreed Code of Practice under sub-paragraph (a) or a Code of Practice issued by the Director under sub-paragraph (b), any Code of Practice submitted by the Licensee to the Director and agreed by him.

12.7 This Condition is without prejudice to the duties at law of the Licensee towards its customer.

Condition 13

LICENSEE'S GROUP

13.1 Without prejudice to the Licensee's obligations under these Conditions in respect, in particular, of anything done on its behalf, where:

(a) the Director determines either:

(i) that a member of the Licensee's Group has done something which would, if it had been done by the Licensee, be prohibited or not be authorised under these Conditions; or

(ii) that a member of the Licensee's Group had done something which would, if it had been done by the Licensee, require the Licensee to take or refrain from taking a particular action under these Conditions and that neither the Licensee nor the member has met any further requirement; and

(b) the Director is not satisfied that the Licensee has taken all reasonable steps to prevent any member acting in that way,

then the Director may direct the Licensee to take such steps as the Director deems appropriate for the purpose of remedying that matter, including refraining from carrying on with that member such commercial activities connected with telecommunications and conditional access as the Director may determine.

13.2 Where these Conditions apply in respect of the Applicable Systems they do not apply in respect of any other telecommunication system, whether run by the Licensee or another.

13.3 Where any person becomes a member of the Licensee's Group then the Licensee shall not be subject to paragraph 13.1 before that is reasonably practicable but shall be so no later than one year after that person becomes a member or such later date as the Director may determine.

13.4 This Condition shall not apply to any particular member of the Licensee's Group if and to the extent that the Director so determines.

Condition 14

EXCEPTION

14.1 Nothing in this Licence shall require the Licensee to do any thing which the Director has agreed is impracticable on technical or commercial grounds or on the grounds that he could not reasonably be expected to do that thing.

14.2 Nothing in this Licence shall require the Licensee to do anything

which would prejudice the security of the Licensee's Technical Services Business or any apparatus comprised in it so that its ability to combat piracy is materially compromised, and the Director has agreed that it would so prejudice security.

SCHEDULE 2: REVOCATION

1. The Secretary of State may revoke this Licence at any time by giving not less than 30 days' notice published in such manner as the Secretary of State considers appropriate.

2. The Secretary of State or the Director may, subject to paragraph 3 and 4 below, at any time revoke this Licence in respect of any particular Licensee by notice given to the Licensee in any of the following circumstances:

(a) immediately:

(i) if the Licensee agrees in writing with the Secretary of State or the Director that this Licence should be revoked;

(ii) if the Director receives notification whether under Condition 11 of the Schedule 1 that the Licensee has been convicted of an offence under section 5(2) of the Act which involved the use of the Applicable System, or in default of the Licensee giving such notification, within three months of the Director first having had actual notice of the conviction, or the expiry of the Appeal Period, whichever is the later; or

(b) by 30 days notice:

(i) if the Licensee fails to comply with a final order (within the meaning of section 16 of the Act) or a provisional order (within the meaning of that section) which has been confirmed under that section, and that order is not subject to proceedings for review and such failure is not rectified within 3 months after the Secretary of State has given notice in writing of such failure to the Licensee, such notice being given after the conclusion of any such proceedings;

(ii) if the Licensee:

(aa) is unable to pay its debts (within the meaning of section 518 of the Companies Act 1985 as applied for the purposes of this Licence by paragraph 3(b) below), convenes any meeting with its creditors generally with a view to the general readjustment or rescheduling of its indebtedness or makes a general assignment for the benefit of its creditors generally; or

(bb) enters into receivership or liquidation; or

(cc) ceases to carry on its business; or

(dd) if it or any other person takes any action for voluntary winding-up or dissolution of the Licensee or if the Licensee enters into any scheme or arrangement (other than in any such case for the purpose of reconstruction or amalgamation upon terms and within such period as may previously have been approved in writing by the Secretary of State) or if a receiver, trustee or similar officer of the Licensee, or of all or any material part of the revenues and assets of it, is appointed, or if any order is made for the compulsory winding-up or dissolution of it.

3. For the purposes of paragraph 2(b) above in applying section 518 of the Companies Act 1985:

(a) if a written demand is satisfied prior to the expiry of the notice of revocation the Secretary of State, or the Director, as the case may be, shall not revoke the Licence; and

(b) the figure of £750, or such other money sum as may be specified from time to time pursuant to section 644 of that Act, shall be replaced by £250,000, or such higher figure as may be determined from time to time by the Director.

4. Any notice which is required to be given to a particular Licensee under paragraph 2 of this Schedule shall be given to the Licensee concerned by delivering it to the Licensee, by leaving it at the premises where the Licensee runs the Applicable System in respect of which the notice is given or by sending it to the Licensee by registered post or by recorded delivery, provided however that if it is not practicable to ascertain the name and address of the Licensee the notice may be given by addressing it to a person by the description of "the Licensee" of the Applicable System (describing it) and by delivering it to some person on premises where the Applicable System in respect of which the notice is given is situated or, if there is no person on those premises to whom it can be delivered, by affixing it or a copy of it to some conspicuous object on those premises.

5. In this Schedule, "Appeal Period" means:

(1) where the Licensee appeals against neither conviction nor sentence, the period within which such an appeal might have been brought;

(2) where the Licensee appeals against conviction or sentence or both, the period ending all the dates on which such Appeal is finally disposed of;

and in sub-paragraph (b) above "Appeal" includes appeal and application for leave to appeal or further appeal.

SCHEDULE 3: AUTHORISATION TO CONNECT OTHER TELECOMMUNICATION SYSTEMS AND APPARATUS TO THE APPLICABLE SYSTEMS AND TO PROVIDE CONDITIONAL ACCESS SERVICES BY MEANS OF THE APPLICABLE SYSTEMS

1. Nothing in this Licence removes any need to obtain any other licence that may be required under any other enactment but, subject to that limitation, this Licence authorises:

(1) the connection to the Applicable System of:

(i) any other Applicable System run by the Licensee;

(ii) any Conditional Access System or Transmission System run by any Third party;

(iii) any Public Telecommunication System;

(iv) Any other telecommunication system run under a licence granted by the Secretary of State under section 7 of the Act

(v) apparatus of every description which is comprised in the Applicable System;

- (vi) telecommunication apparatus comprised in a telecommunication system mentioned in sub-paragraph (i) to (vii) above; and
- (2) the provision by means of the Applicable Systems of Conditional Access Services.

The Regulation of Conditional Access Services for Digital Television
Final Consultation Paper on Detailed Implementation Proposals

PROTOTYPE CODE OF CONFIDENTIALITY FOR SUBSCRIBER INFORMATION

Introduction

- 1.This code is for use by all employees of [company]. Its purpose is to regulate the disclosure of personal or commercially valuable information, about a customer or their subscribers, acquired during the course of business. This is to prevent such information being used to obtain unfair advantage for [company] or its associate businesses or companies, over their rivals.
- 2.The Code has been agreed with the Director General of Telecommunications (OFTEL) [and with other operators of conditional access services]. Observance of the code is a condition of our licence without which the company cannot operate. [Breach of the code can also give rise to court action against the company by other operators who have agreed this code.]
- 3.The code is additional to any other legal obligation [company] has towards its customers and their subscribers, for example, under the Data Protection Act 1984.

The Code

- 4.Customers and their subscribers provide a variety of information to the company when they first request service and when they modify their requirements. This may include personal details relating to subscribers, and information about the equipment and services supplied by the customer or by another service provider.
- 5.Where any customer or subscriber has supplied such information to the company, it must be assumed that they have done so in confidence. Thus, the information may only be disclosed to employees working in the same business unit within the company and who have a valid operational requirement for that information; unless the customer or their subscriber has given their consent. Where such consent is given orally, it must be recorded by the relevant employee at the time and subsequently notified in writing to the consenting party and to the customer (if different).
- 6.Employees responsible for collecting and storing confidential customer information must ensure that it is kept securely and that its confidentiality is preserved (even) when the data is no longer of operational relevance) until it is destroyed.

Exceptions

- 7.There are five main exceptions to the normal procedure described above:
- a) Information relating to subscribers of a particular customer and

concerning only their business with that customer, shall be disclosed to that customer, on request.

b) Where disclosure is required by the auditors or by any regulatory authority, or where necessary (and within company guidelines) to assist in the prevention or detection of a criminal offence, or in the interests of national security.

c) Disclosure about an individual customer's or subscriber's account may be made in the process of collecting debts, or as required by auditors or by any regulatory authority.

d) Information may be disclosed where it is already in the public domain or has been supplied in order to be published.

e) Statistical information derived from customers' records may be disclosed where the customers concerned and their subscribers cannot be identified from the information.

Compliance

8.The company will take all reasonable steps to ensure that its employees read and understand this Code. It will maintain in place, and from time to time review, procedures governing the handling of business between different business units to ensure maximum compliance with the provisions of this code.

9.If in any doubt about their responsibilities under this code, employees should consult their manager.

10.Observation of the Code is mandatory and the Senior Management attach great importance to compliance with it at all times.

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NEWS

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Report No. CS 98-11

CABLE SERVICES ACTION

June 11, 1998

COMMISSION ADOPTS "NAVIGATION DEVICES" RULES CREATING CONSUMER
MARKET FOR SET TOP BOXES AND OTHER EQUIPMENT USED WITH VIDEO
PROGRAMMING SYSTEMS
(CS DOCKET 97-80)

The Commission has adopted rules providing for the commercial availability of set top boxes and other consumer equipment used to receive video signals and other services. In the Telecommunications Act of 1996, Congress directed the Commission to create rules that would allow consumers to obtain "navigation devices" -- meaning the set top boxes, remote control units and other equipment -- from commercial sources other than the service provider. This order will benefit consumers and further the Commission's goal of providing competition in the telecommunications marketplace by creating a major market for consumers to own equipment used to access video programming and other services in their homes.

Multichannel video programming distributors must separate out security functions from non-security functions by July 1, 2000. An exception is made for navigation devices that operate throughout the continental United States and are commercially available from unaffiliated sources, which includes direct broadcast satellite ("DBS") providers. The selection of this date is premised on the representations of the various interests

involved that they will agree on relevant specifications, interfaces, and standards in a timely fashion, thus permitting the manufacture and sale of navigation devices by unaffiliated sources. For the time being, multichannel video programming distributors may continue to offer devices that have security and non-security functions integrated. The Commission believes that 2005 provides a sufficient period of time for a reasonable transition and therefore it is establishing a prohibition on the sale or lease of new integrated boxes as of January 1, 2005. In the year 2000, once separate security modules are available, the Commission will assess the state of the market to determine whether that timeframe is appropriate.

Section 629 of the Communications Act, as amended by the Telecommunications Act of 1996 instructs the Commission to "adopt regulations to assure the commercial availability, to consumers . . . of . . . equipment used . . . to access multichannel video programming and other services offered over multichannel video programming systems, from manufacturers, retailers, and other vendors not affiliated with any multichannel video programming distributor." Additionally, Section 629 states that Commission rules "shall not prescribe regulations . . . which would jeopardize security of . . . services offered over multichannel video programming systems, or impede the legal rights of a provider of such services to prevent theft of service."

Summary of key elements of the order:

- Section 629 is broad in terms of the multichannel video programming distributors ("MVPDs") involved. The MVPDs covered include cable television, multichannel broadcast television, direct broadcast satellite ("DBS"), multichannel multipoint distribution service ("MMDS"), and satellite master antenna television ("SMATV"). The Commission determined that open video system operators are not covered as a consequence of the specific open video system provisions of the Communications Act which exclude open video system operators from certain regulations applicable to cable operators.
- Section 629 covers not just equipment used to receive video programming, but also equipment used to access "other services offered over multichannel video programming systems." Such equipment includes televisions, VCRs, cable set-top boxes, personal computers, program guide equipment.

and cable modems. The focus of Section 629, however, is on cable television set-top boxes and cable modems, devices that have historically been available only on a lease basis from the service provider.

- Subscribers have the right to attach any compatible navigation device to a multichannel video programming system. We conclude that the core requirement, to make possible the commercial availability of equipment to MVPD subscribers, is similar to the *Carterfone* principle adopted by the Commission in the telephone environment. The *Carterfone* "right to attach" principle is that devices that do not adversely affect the network may be attached to the network. The order also notes that commercial availability is furthered only if consumers are aware of the availability of equipment from alternative sources.
- Service providers are prohibited from taking actions that would prevent navigation devices that do not perform conditional access functions from being made available from retailers, manufacturers, or other unaffiliated vendors.
- Cable operators and other MVPDs can take the necessary steps to guarantee the security of their systems and their programming. The order follows the provisions in the Communications Act that prohibit the manufacture, sale and distribution of equipment designed to allow for the unauthorized reception of service.
- Service providers must provide, upon request, technical information concerning interface parameters that are needed to permit navigation devices to operate with multichannel video programming systems.
- Existing equipment rate rules applicable to cable systems not facing effective competition fulfill the statute's requirement prohibiting subsidies.
- The order adopts rules implementing the statute's waiver and sunset provisions.

The Commission believes that the steps taken in this Report and Order, if implemented promptly and in good faith, will result in a broad expansion of the market for navigation devices so that they become commercially available through retail outlets. This will create incentive for innovation, choice and better prices. The Commission will monitor developments with respect to the availability of information to consumers, retailers, and manufacturers necessary to the functioning of a commercial retail market for navigation

equipment, as well as developments relating to standard means of attaching and using equipment with the networks of service providers. The Commission also will monitor developments with respect to the compatibility of set-top boxes and digital televisions, and the availability of program guides. The Commission also is requiring the filing of reports at six month intervals to ensure that the CableLabs OpenCable process, a private effort by several cable companies, is progressing towards the requirement of separation of security by July 1, 2000.

Action by the Commission June 11, 1998, by Report and Order ([FCC 98-116](#)). Chairman [Kennard](#), Commissioners Ness, Furchtgott-Roth and Tristani with Commissioner Powell dissenting and Commissioners [Ness](#) and [Powell](#) issuing statements.

-FCC -

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**Before the
Federal Communications Commission
Washington, D.C. 20554**

In the Matter of)	
)	
Implementation of Section 304 of the		CS Docket No. 97-80)
Telecommunications Act of 1996)	
)	
Commercial Availability of)	
Navigation Devices)	

REPORT AND ORDER

Adopted: June 11, 1998

Released: June 24, 1998

By the Commission: Chairman Kennard and Commissioner Ness issuing separate statements; Commissioner Powell dissenting in part and issuing a statement.

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Appendix A: Final Rules

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I. INTRODUCTION

1. In this *Report and Order* ("*Order*") we adopt rules to address the mandate expressed in Section 629 of the Communications Act to ensure the commercial availability of "navigation devices,"¹⁹ the equipment used to access video programming and other services from multichannel video programming systems. The purpose of Section 629 and the rules we adopt is to expand opportunities to purchase this equipment from sources other than the service provider.²⁰

1. The Telecommunications Act of 1996 ("1996 Act") established a fundamental premise for the direction of telecommunications markets.²¹ The

¹⁹In this proceeding, we define "navigation devices" as converter boxes, interactive equipment, and other equipment used by consumers within their premises to receive multichannel video programming and other services offered over multichannel video programming systems. Throughout this document, we use the term navigation devices as shorthand for equipment fitting this definition.

²⁰47 U.S.C. § 549. Section 629 was adopted as part of the Telecommunications Act of 1996. Pub. L. No. 104-104, 110 Stat 56 (1996) ("1996 Act").

²¹The Conference Report to the 1996 Telecommunications Act characterized the intent of Congress as being:

to provide for a pro-competitive, de-regulatory national policy framework designed to accelerate rapidly private sector development of advanced telecommunications and information technologies and services to all

amendments reflected in Section 629 are in keeping with the 1996 Act's general goal of "accelerat[ing] rapidly private sector deployment of advanced telecommunications and information technologies and services to all Americans by opening all telecommunications markets to competition."²² As navigation devices are the means to deliver analog and digital communications, competition in the navigation equipment market is central toward encouraging innovation in equipment and services, and toward bringing more choice to a broader range of consumers at better prices.

1. Competition in the markets involved is in an early stage of development and the enormous technological change resulting from the movement from analog to digital communications is underway. This *Order* provides incentives for market forces to operate. We find, however, that certain parameters are necessary to ensure the movement of navigation devices toward a fully competitive market. In particular, (1) a separation of conditional access or security functions from other functions must take place; (2) modular security components must be made available by July 1, 2000; (3) phase out of devices that have security and non-security functions combined must occur by January 1, 2005; (4) information sufficient to permit the manufacture, retail sale, and attachment of devices must be made available and; (5) service providers must be able to protect their operations from technical harm and theft of service. As circumstances are changing rapidly, our commitment to pursue competition means we will carry on an ongoing examination of market developments to determine if we are fulfilling the objectives of the 1996 Act, and Section 629 in particular.

II. BACKGROUND

1. Section 629 instructs the Commission to:

adopt regulations to assure the commercial availability, to consumers . . . of . . . equipment used . . . to access multichannel video programming and other

Americans by opening all telecommunications markets to competition

S. Conf. Rep. 104-230, 104th Cong. 2d Sess. at 113 (1996) (Joint explanatory statement of Committee of Conference).

²²*Id.*

services offered over multichannel video programming systems, from manufacturers, retailers, and other vendors not affiliated with any multichannel video programming distributor.²³

In addition, our rules "shall not prescribe regulations . . . which would jeopardize security of . . . services offered over multichannel video programming systems, or impede the legal rights of a provider of such services to prevent theft of service."²⁴

1. Section 629 does not prohibit service providers from offering equipment to their subscribers. Multichannel video programming distributors may themselves continue to offer equipment "if the system operator's charges to consumers for such devices and equipment are separately stated and not subsidized by charges for" multichannel video programming and other services.²⁵ Section 629 also states that the rules adopted under Section 629 shall cease to apply when the Commission determines that the markets involved are fully competitive and that elimination of the regulations would promote competition and be in the public interest.²⁶ The statute also provides that nothing in Section 629 is to be construed "as expanding or limiting any authority that the Commission may have under law in effect before the date of enactment of the Telecommunications Act of 1996."²⁷

1. The House Report noted that "competition in the manufacturing and distribution of consumer devices has always led to innovation, lower prices and higher quality. Clearly, consumers will benefit from having more choices among telecommunications subscription services arriving by various distribution sources."²⁸

²³47 U.S.C. § 549(a).

²⁴47 U.S.C. § 549(b).

²⁵47 U.S.C. § 549(a).

²⁶47 U.S.C. § 549(e).

²⁷47 U.S.C. § 549(f).

²⁸H.R. Rep. No. 104-204, 104th Cong., 1st Sess. 112 (1995).

1. In the *Notice of Proposed Rule Making ("NPRM")*, we stated our belief that the overarching goal of this proceeding was to assure competition in the availability of set-top boxes and other customer premises equipment ("CPE").²⁹ Additionally, in the *NPRM*, we noted the interest service providers have in protecting system and signal security and in preventing theft of service, and stated our intent to adopt rules that assured adequate protection of service providers' networks from harm from any device used by consumers. Also, we stated our belief that by stimulating equipment innovation, we would maximize consumer choice and flexibility, and stated our preference for minimizing regulation in the equipment design and installation process.

III. SUMMARY

1. This *Order* adopts rules and policies implementing Section 629. The decisions made in this *Order* may be summarized as follows:

- Section 629 is broad in terms of the multichannel video programming distributors ("MVPDs") covered including cable television, direct broadcast satellite ("DBS"), multichannel multipoint distribution service ("MMDS") and satellite master antenna television ("SMATV"). We determine that open video system operators are not covered as a consequence of the specific open video system provisions of the Communications Act which exclude open video system operators from certain regulations applicable to cable operators.
- Section 629 covers not just equipment used to receive video programming, but also equipment used to access "other services offered over multichannel video programming systems." Such equipment includes televisions, VCRs, cable set-top boxes, personal computers, program guide equipment, and cable modems. The focus of Section 629, however, is on cable television set-top boxes, devices that have historically been available only on a lease basis from the service provider.
- Subscribers have the right to attach any compatible navigation device to a multichannel video programming system. We conclude that the core requirement, to make possible

²⁹*Implementation of Section 304 of the Telecommunications Act of 1996, Commercial Availability of Navigation Devices*, CS Docket No. 97-80, *Notice of Proposed Rule Making*, 12 FCC Rcd 5639, 5641 (1997) ("*NPRM*").

the commercial availability of equipment to MVPD subscribers, is similar to the *Carterfone* principle adopted by the Commission in the telephone environment. The *Carterfone* "right to attach" principle is that devices that do not adversely affect the network may be attached to the network. The *Order* also notes that commercial availability is furthered only if consumers are aware of the availability of equipment from alternative sources.

- Service providers are prohibited from taking actions which would prevent navigation devices that do not perform conditional access functions from being made available by retailers, manufacturers, or other unaffiliated vendors.
- Cable operators and other MVPDs can take the necessary steps to guarantee the security of their systems and their programming. The *Order* reaffirms the provisions in the Communications Act that prohibit the manufacture, sale and distribution of equipment designed to allow for the unauthorized reception of service.
- MVPDs must separate out security functions from non-security functions by July 1, 2000. An exception is made for navigation devices that operate throughout the continental United States and are commercially available from unaffiliated sources, which includes DBS. Our rules rely heavily on the representations of the various interests involved that they will agree on relevant specifications, interfaces, and standards in a timely fashion, thus permitting the manufacture and sale of navigation devices.
- MVPDs may offer devices that have security and non-security functions integrated until January 1, 2005. As of that date, no MVPD shall provide new navigation devices for sale, lease, or use that perform both conditional access functions and other functions in a single integrated device. In the year 2000, once separate security modules are available, we will assess the state of the market to determine whether that time frame is appropriate and we will review the mechanics of the phase out of boxes that have combined security and non-security functions.
- MVPDs must provide, upon request, technical information concerning interface parameters that are needed to permit navigation devices to operate with their systems.
- Existing equipment rate rules applicable to cable systems not facing effective competition fulfill the statute's requirement prohibiting subsidies.

- The *Order* adopts rules implementing the statute's waiver and sunset provisions.
- The Commission will monitor developments with respect to the availability of information to consumers, retailers, and manufacturers necessary to the functioning of a commercial retail market for navigation equipment, as well as developments relating to standard means of attaching and using equipment with the networks of service providers.
- The Commission will also monitor developments with respect to the compatibility of set-top boxes and digital televisions, and the availability of program guides.

1. As we stated in the *NPRM*, the multichannel video programming systems subject to Section 629, including cable television, direct broadcast satellite ("DBS"), and multichannel multipoint distribution service ("MMDS") typically consist of a central signal processing or switching center, a transmission network from that facility to user locations, and customer premises equipment that controls access to the network and specific communications on it, and displays or stores picture, sound, and data information.³⁰ Cable television operators and other providers have not discouraged customer ownership of television receivers, radio receivers, and video cassette recorders that receive and display the communications transmitted.

1. Equipment, however, that controls the security aspects of access to programming from cable operators and some other MVPDs has generally only been available for lease so that only those who subscribe may receive service. Signal security control or descrambler units tend to be combined with other control equipment such as signal tuners and remote controls.³¹ In contrast, customer ownership of satellite earth stations receivers and signal decoding equipment has been the norm in the DBS field.³² Even in DBS, however, where customer ownership of equipment is common, the service provider may control the technical design of the equipment involved by licensing the technology used.³³

³⁰*NPRM*, 12 FCC Rcd at 5642.

³¹*Id.*

³²SBCA Comments at 4; *see also* DIRECTV Comments at 7.

³³*Id.* at 5643.

1. The competitive market for consumer equipment in the telephone context provides the model of a market we have sought to emulate in this proceeding.³⁴ Previously, consumers leased telephones from their service provider and no marketplace existed for those wishing to purchase their own phone. The *Carterfone* decision allowed consumers to connect CPE to the telephone network if the connections did not cause harm.³⁵ As a result of *Carterfone* and other Commission actions, ownership of telephones moved from the network operator to the consumer. As a result, the choice of features and functions incorporated into a telephone has increased substantially, while the cost of equipment has decreased.

1. The parallel to the telephone has limitations. When customer ownership of telephone CPE became available, the telephone network was effectively a national monopoly. Well developed technical standards existed throughout an almost ubiquitous network. CPE compatible with the telephone network was part of this environment. In contrast, cable networks do not reflect universal attributes, and have substantially different designs. Nor do satellite systems share commonality beyond the most basic elements. Additionally, as Section 629 recognizes, preventing interference to other network users and maintaining the integrity of the system signal is of greater concern for video delivery systems than for telephone systems.³⁶ This *Order* seeks to accommodate these differences from the telephone model.

1. The steps taken in this *Report and Order*, if implemented promptly and in good faith, should result in an evolution of the market for navigation devices so that they become generally and competitively available through commercial retail outlets. To facilitate the emergence of a competitive marketplace for navigation equipment, we adopt several rules to make navigation devices commercially available as quickly as

³⁴*Id.* at 5644.

³⁵See *Carterfone*, 13 FCC 2d 420 (1968), *recon. denied*, 14 FCC 2d 571 (1968); *Telerent Leasing Corp. et al.*, 45 FCC 2d 204 (1974), *aff'd sub nom. North Carolina Utilities Commission v. FCC*, 537 F.2d 787 (4th Cir. 1976), *cert. denied*, 429 U.S. 1027 (1976); *Mebane Home Telephone Co.*, 53 FCC 2d 473 (1975), *aff'd sub nom. Mebane Home Telephone Co. v. FCC*, 535 F.2d 1324 (D.C. Cir. 1976).

³⁶See H. R. Rep. No. 104-204, 104th Cong., 1st Sess. 112 (1995).

possible. For example, we require certain MVPDs to offer separate security modules and preclude MVPDs from offering navigation devices that perform both conditional access functions and other functions in a single device after January 1, 2005.

1. This *Report and Order* is premised on the assumption that commercial interests, fueled by consumer demand, will agree on specifications for digital navigation devices to be submitted to standard-setting organizations, or that common interfaces will emerge that become widely accepted. For the cable television industry, the OpenCable™ project is an initiative being managed through Cable Television Laboratories, Inc. ("CableLabs")³⁷ to develop key interface specifications to foster interoperability among digital navigation devices manufactured by multiple vendors.³⁸ According to CableLabs, it has opened its specifications to several vendors rather than designating a single proprietary solution, with the goal of introducing digital cable ready television sets and other navigation devices into retail distribution.³⁹ The rules we adopt in this *Order* are premised on the representation that the OpenCable initiative will continue, and that others will be undertaken. We expect that entities outside of the membership of CableLabs will be able to participate in the eventual standards setting process.

³⁷CableLabs is a research and development consortium of cable operators representing more than 85% of the cable subscribers in the United States, 75% of the cable subscribers in Canada, and 12% of the cable subscribers in Mexico. NCTA Comments at 32, n. 62. CableLabs acts as a clearinghouse to provide the cable industry with information on current and prospective technological developments and works with other industries to develop interoperable specifications for proposals to national and international standards bodies. *Id.*

³⁸See NCTA Comments at 32 (stating that 85% of the industry is involved in OpenCable). We note that not all of the cable television industry is involved in the OpenCable process and no entities outside of the cable industry are currently participating. See OpenCable website at <<http://www.cablelabs.com>>. See also Letter from Karen B. Possner, Vice-President, Strategic Policy, BellSouth, June 2, 1998.

³⁹OpenCable website at <<http://www.cablelabs.com>>, 5/4/98 at 3. In Spring 1998, CableLabs released service requirements and functional requirements to the vendor community for their review and comment. These requirements describe what services and technical capabilities will be required in the navigation device and reflect responses from the consumer electronics and computer industries to a request for information from CableLabs.

1. We do not believe, however, that our work with respect to these issues is complete. The markets involved are in the early stages of becoming competitive, and the participants in these markets are on the precipice of a change from analog to digital communications. Because of these changes, this is both a particularly opportune and a particularly perilous time for the adoption of regulations. It is opportune because new patterns are being established and no large embedded base of equipment exists that constrains change.⁴⁰ It is perilous because regulations have the potential to stifle growth, innovation, and technical developments at a time when consumer demands, business plans, and technologies remain unknown, unformed or incomplete.

1. Our objective thus is to ensure that the goals of Section 629 are met without fixing into law the current state of technology.⁴¹ In addition to enforcing the rules we adopt in this *Order*, we intend to monitor the progress of participants in these markets to ensure that the devices continue in the direction of portability, interoperability, wider availability, and increased consumer choice. If we find that market participants are not complying with our rules or are not progressing satisfactorily towards the principles and goals of this proceeding, the Commission will revisit the decisions and take further action to ensure a competitive marketplace and consumer choice in navigation devices. In particular, we will monitor developments with respect to the availability of information to consumers, retailers, and manufacturers necessary to the functioning of a commercial retail market for navigation equipment, as well as developments relating to standard means of attaching and using equipment with the networks of service providers. Further, the broad goals of this proceeding extend beyond making navigation

⁴⁰While some service providers have placed large orders for certain devices that have attracted industry attention, these commitments appear to be flexible enough to accommodate any requirements adopted herein.

⁴¹The portion of the Conference Report for the 1996 Telecommunications Act discussing navigation devices states the Commission should "avoid actions which could have the effect of freezing technologies and services. . . . Thus, in implementing this section, the Commission should take cognizance of the current state of the marketplace and consider the results of private standards setting activities." *Id.* at 181.

equipment commercially available, but in fulfilling the promise of the digital age to bring broader choices and opportunities to a wider group of consumers. If, for example, service providers retain the ability to limit substantially consumer access to content, applications, and other services, this result would not achieve the important goals of the statute. We intend to monitor developments with respect to the compatibility of set-top boxes and digital televisions, and the availability of program guides.

1. There is further risk in moving to an environment where new devices are commercially available. With the technology and market developing, it is unclear how efficiently the market will respond if consumers purchase devices that may not perform all of the functions in the manner that the consumer envisioned. The ability of the consumer to adjust to separate functions of the manufacturer, service provider, and retailer, instead of relying on the service provider alone, will also provide a challenge if the market does not respond adequately. Notably, if neither the manufacturer, retailer nor service provider appear responsible to the consumer for the device's reliability and functionality, the goals of Section 629 are undermined. We also recognize that commercial availability is furthered only if consumers are aware of the availability of equipment from alternative sources.⁴²

1. Section 629's broad goals are especially important to bringing the substantial benefits of digital technology to all Americans. Section 629 may, with its broad goals, require the Commission to examine circumstances where commercial availability does not evolve and access to programming and services is encumbered. We remain committed to these goals.

⁴²For example, in our 1983 proceeding to detariff customer premises equipment, AT&T was required to notify its customers that they had the option to purchase or continue leasing their customer premise equipment from a separate subsidiary of AT&T. *Procedures for Implementing the Detariffing of Customer Premises Equipment and Enhanced Services (Second Computer Inquiry)*, CC Docket No. 81-893, *Report and Order*, 95 FCC 2d 1276, 1415 (1983).

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SBA Accepts Recommendations Made by the National DTV Committee

Singapore, 6 December 2000 - In setting standards for the implementation of Digital Television (DTV) services in Singapore, the Singapore Broadcasting Authority (SBA) is pleased to accept the recommendations made by the National Digital Television (DTV) Committee on the:

- a) Specifications of terrestrial DTV receivers for use in Singapore;
- b) Transmission and reception standards in Singapore; and
- c) Incentives for the implementation of DTV services in Singapore.

2 The National DTV Committee, an industry-led group, was formed in September 1999 to advise SBA on issues related to the development and early adoption of digital television services. Three Subcommittees were formed to assist the main DTV Committee in spearheading the development of DTV in Singapore namely the DTV Receivers Subcommittee, the Transmission & Reception Subcommittee and the Industry Development Subcommittee. The report by the National DTV Committee on the latest recommendations can be found at the SBA website at <http://www.sba.gov.sg> under [Broadcasting Scene: Digital Broadcasting](#).

Specifications of Terrestrial DTV Receivers

3 The Committee has set the specifications for DTV receivers DTV receivers here refer to both the set-top box (STB) and Integrated Television Receivers (iDTV) for terrestrial reception.

to define the basic requirements for interactive terrestrial DTV receivers in Singapore. This is necessary in order to establish an open standard for interactive DTV receivers to receive DTV broadcast in Singapore and to enable consumer manufacturers to sell these interactive DTV receivers in any electronic stores in Singapore.

The minimum requirements of the DTV receiver include:

- MPEG 2 decoding (minimum for video);
- MPEG 1 layer 2 (minimum for audio);
- Receiver resolution specification;

- Power regulatory and safety requirements;
- Return path channel; and
- Common Interface.

4 The DTV Receivers Subcommittee also recommends that Singapore adopts DVB-MHP (Multimedia Home Platform) as the Application Programme Interface. An application program interface (API) is a built-in programmer's tool kit for requesting data objects or services located on a particular operating system. Using the API, a programmer writing an application can make requests to the operating system. Examples of applications include the Built-in Navigator, Electronic Programme Guide (EPG), Internet Browser, Email.

(API) for the DTV receivers. MHP is an open standard which enables a single set-top box (STB) to access the services of multiple broadcasters. If different broadcasters adopt different proprietary APIs, viewers would have to acquire separate STBs supporting each broadcaster's adopted API.

5 While waiting for MHP set-top boxes to be commercially available, SBA has given transitional arrangements by early implementers such as Television Corporation of Singapore (TCS) to start with other API standards on condition that they migrate to MHP when the commercial MHP set-top boxes are available.

6 MHP is the standard advocated by the European DVB consortium for interoperability between broadcasters and the Internet. The MHP standard was recently adopted by ETSI. ETSI - European Telecommunications Standards Institute is a non-profit making organisation whose mission is to produce the telecommunications standards that will be used for decades to come throughout Europe and beyond. In July 2000 and commercial deployment of set-top boxes is expected in the second half of next year.

Transmission & Reception Standards in Singapore

7 The DTV Transmission and Reception Subcommittee found that general area coverage for MATV systems at HDB and condominiums rooftops are good for DTV reception. They have defined a minimum field strength of 53dBV/m for fixed service (10 metres above ground) and coverage area of at least 98% of the land area in the main Singapore island (excluding military area to the West) to ensure that the majority of home owners are able to receive the digital signals.

8 To cater for High Definition TV (HDTV) service in future, the Committee has

recommended that a minimum bit rate of 22 Mega bits per second would be required for DTV transmission in Singapore.

9 The Committee also studied the existing MATV systems in Singapore and identified the necessary changes required in order for these MATV systems to receive digital signals. They recommended that there is a need to maintain a parallel MATV system to receive terrestrial digital signals. SBA will study this issue further.

10 The Committee also feels that there is a need to research on Quality of Service measuring methods and verifications for DTV coverage in Singapore. SBA supports the proposal and will work with the DTV Committee on the details of the study.

Incentives for Implementation of DTV Services in Singapore

11 The DTV Industry Development Subcommittee has identified specific areas where incentives are needed to kick-start the implementation of DTV and its continued developments.

12 The Committee recommended that SBA should consider a time frame for the switching off of analogue TV services to stimulate broadcasters and the public to switch to DTV. SBA will study this issue further.

13 The Committee feels that there is a need to ensure that provision of "enhanced programme services" Enhanced programme services are services linked with traditional "linear" programme services i.e. TV and radio programmes. Using digital technology, viewers will have the opportunity to interact both with programmes (e.g. calling up additional editorial material or advertising material) and with advertisements (e.g. to get more information about a product.)

is a licence requirement for provision of DTV services and to introduce a new advertisement framework for DTV. Without these enhanced programme services, we would not be maximising the potential of DTV.

14 SBA agrees with the recommendation made by the Committee and will mandate DTV programme service operators to provide a minimum of seven hours of enhanced programme services a week during prime time. SBA will introduce a new advertising framework for DTV. In cases of linear advertising, i.e. advertising in its present format, the analogue rules apply, i.e. an advertising limit of 14 minutes per hour. However, for enhanced programme services where viewers can interact with programmes and/or

advertisements to obtain information in addition to what is presented on the main linear service, the 14-minute per hour advertising limit would not apply.

15 The Subcommittee also recommends that there should be incentives to promote the content creation industry. SBA agrees that this is an important element for the success of DTV given that DTV is at its infancy and encourages industry to apply for the SBA Digital Broadcasting Development Fund (DBDF) to develop more original, innovative and high-quality content and services for digital broadcasting. The Fund aims to assist our local players to compete in the global market by developing value-add digital broadcasting services and applications.

16 Mr Lim Hock Chuan, SBA's Chief Executive Officer, said, "SBA applauds the work that the National DTV Committee and its Subcommittees have done since its formation a year ago. The recommendations will help the industry to move forward with their plans for DTV. Content creators, technology specialists and media players will be able to develop DTV applications and services that can reap the full benefits of the technology as they now have clearer guidelines on DTV standards for Singapore."

17 Mr Lim added, "TV programmes will no longer be the same for Singaporeans anymore. Viewers would be able to put forth queries, reply to emails and conduct T-commerce (Television Commerce) activities through their remote controls. With these enhancements to the TV viewing experience, DTV will bring interactive TV to new heights."

Task Force set up to look into the implementation of interactive Digital TV services in Singapore

Singapore, 22 June 2001 - The National DTV Committee, the industry-led group which advises the Singapore Broadcasting Authority (SBA) on the implementation of digital TV (DTV) in Singapore, recently set up a MHP (Multimedia Home Platform) Task Force to address the implementation of interactive DTV services in Singapore, using the DVB-MHP standard.

This was announced by Mr Lim Hock Chuan, Chief Executive Officer, SBA at the DVB-MHP Seminar and Dot.Com Workshop on "Data Broadcasting" today, held in conjunction with BroadcastAsia2001. It is the first time that such a seminar was organised in the Asia-Pacific region.

In November 2000, following a study of the various standards for Application Programme Interface (API), the National DTV Committee recommended that Singapore adopts the DVB-MHP standard as it allows the use of a common set-top box for any interactive digital TV service. The recommendation was accepted by SBA.

On the role of the Task Force, Mr Lim said, "The Singapore MHP Task Force aims to build up expertise in MHP to ensure co-ordination and success in its development in Singapore. They will work closely with local industry players, the DVB-MHP Group and other MHP implementers around the world in order to identify and advise on the application of available solutions for local players. They will also serve as an independent moderator for MHP implementations carried out by individual broadcasters and advise SBA on regulatory requirements."

On DTV developments ahead, Mr Lim also said, "The work of the Singapore MHP Task Force would be of great help to our broadcasters as they roll out DTV services. We also look forward to the roll-out of fully compliant MHP set-top boxes soon so that our broadcasters can implement enhanced and interactive TV on a wider scale."

SBA recognises the potential of MHP and encourages industry players to participate actively in MHP development. To facilitate this area of development, besides creating a conducive environment for growth, SBA has established a \$5 million Digital Broadcasting Development Fund in June 2000 to assist industry players to develop more original, innovative and high quality applications and services for digital broadcasting.

The DVB-MHP Seminar also featured heavyweights from the European industry who are at the forefront of MHP developments. They included Mr Wilfried Geuen from Panasonic AVC European Laboratory; Mr Rainer Schaefer from Institut für Rundfunktechnik (IRT); and Mr Peter MacAvock from DVB Project Office.

附錄六：座談會投影片

附錄七：期中、期末報告投影片