2014 Research Report

Digital terrestrial TV stations new technical specifications

commissioned research

Final Report

Grantor:

Abstract

Key words: DVB-T2、digital terrestrial TV transmission technology standards

In research mainly for respond the stage of DVB-T and DVB-T2 technique standard operate simultaneously, Must first understand the probably interference and influence the situation of receiving terminal device between the existing DVB-T base station and future DVB-T2 base station. Collect the related national DVB-T and DVB-T2 technology coexist references, in addition testing and evalution the degree of influence of DVB-T by DVB-T2 on the spot, research and analysis the DVB-T2 signal transmitter parameters applies to ROC environmental, and proposed interference improvement plan and draft amendments of current "Digital terrestrial TV stations new technical specifications", as a follow up to the basis of relevant plans.

DVB-T / T2 terrestrial wireless digital TV standard is the world's most widely used, present has more than 150 countries deploy DVB-T / T2 services, By countries to adopt grants TV, set-top box or build transmission station, so it has huge economies of scale, so that people can use a very low price purchase TV or set-top boxes and other receiving devices. This study further reference to international DVB-T2 technology standards, and choose to include the UK, Singapore, France, Germany actual case, and consideration of our existing major DVB-T digital terrestrial TV stations technical specifications, related experimental test is used DVB-T2 6MHz bandwidth of specifications, testing equipment、test validation program and test project.

In addition to exploring the digital terrestrial TV station technical specifications, this study also furthermore the actual test, discuss the effect of existing DVB-T terrestrial TV signals, when the adjacent channel DVB-T2 signal added in the future, also discussed the case of foreign and with international standards to do a complete analysis, propose specific proposal of "Digital terrestrial TV stations new technical specifications" and "Wireless TV stations set up management approach",to match the needs of the requester and to promote the healthy development of digital TV industry.

Chapter 1 Introduction

Driven by global digitized trend, governments have been planning for the wireless TV broadcasting platform digitization, in order to enhance the broadcasting industry transformation and upgrading. To catch up with international standards, acceleration of our wireless TV digitization, since 2010, NCC actively promote build digital terrestrial TV improvements station, efforts in all sectors, wireless digital TV conversion work have completed in july 2012, let our wireless TV into a new era of comprehensive digitized.

Section 1 Background

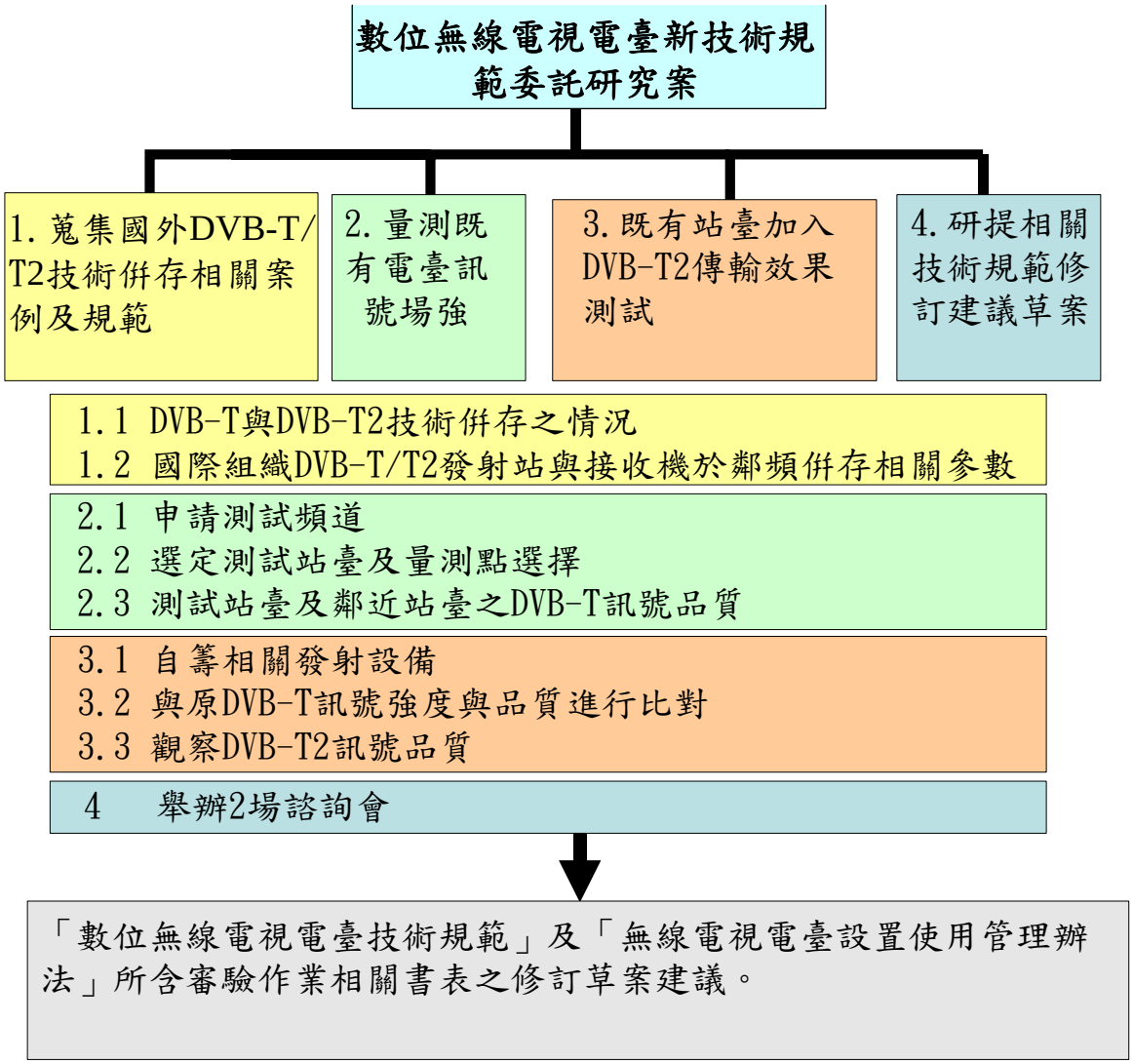
Since 1998, our government have completed nine main transmitting station and former GIO subsidy PTV build the 24 improvements stations, government to further improve the digital TV signal coverage ratio, since 2010 to 2013, aim at areas with inadequate coverage ratio, NCC subsidies to local governments build 60 digital improvements stations, make digital TV signals coverage ratio increased dramatically, provide a better viewing quality to People in remote areas.

Section 2 Purpose

NCC are planning an open 2nd batch of TVB business license, DVB-T2 transmission technology places mainly, respond the stage of DVB-T and DVB-T2 technique standard operate simultaneously, must first understand the probably interference and influence the situation of receiving terminal device between the existing DVB-T base station and future DVB-T2 base station. Therefore, through this commissioned research project, collect the related national DVB-T and DVB-T2 technology coexist references, in addition testing and evalution the degree of influence of DVB-T by DVB-T2 on the spot, research and analysis the DVB-T2 signal transmitter parameters applies to ROC environmental, and proposed interference improvement plan and draft amendments of current "Digital terrestrial TV stations new technical specifications", as a follow up to the basis of relevant plans.

Section 3 Scope of research

The research team based on project objectives, planning architecture of research projects meet the research needs, the main projects include the following:



Source: The team finishing

Figure 1 Research Project Chart

Section 4 Research methods and procedure

1.research method described

To achieve this plan prescribed four research projects, according to the features and scope of research content above, can be summarized into two research modes:(1) Literature analysis research methods with experts forum (2) Experimental research methods.

Table 1 Research projects and reports description

研究項目	報告產出	研究需求說明
1. 蒐集分析國際 DVB-T2 應用實例	(1) 各國 DVB-T2 應用案例	包括英國、新加坡、法國、及德國等國家，頻率配置、發射功率、傳輸參數、站臺佈建
	(2) 國際組織發射機與接收機技術資料	包括鄰頻併存、頻譜遮罩
2. 既有站臺加入 DVB-T2 前，可收視 DVB-T 測試	(3) 申請 CH33、CH35 測試頻道	■ 每站臺 15 處以上量測點 ■ 鄰近測試站臺之主站，其弱訊區 15 處以上量測點 ■ 鄰近測試站臺之改善站，其弱訊區 15 處以上量測點
	(4) 選擇基隆紅淡山站、金門陽山站	
	(5) 量測 CH32、CH33、CH34、CH35 場強，CH32、CH34 MER，記錄訊號來源	
3. 既有站臺加入 DVB-T2 後，原 DVB-T 影響測試與 DVB-T2 接收效果	(6) 固定測試	與既有站臺加入 DVB-T2 前進行比較
	(7) 行動量測	不同車速進行測試，每一站台至少 50 處
	(8) 實驗模擬測試	■ 量測 DVB-T2 發射機性能規格 ■ 量測 DVB-T2 接收機性能規格
4. 研提技術規範修訂建議草案	(9)舉辦兩場諮詢會	台北、高雄各一場
	(10)提出 DVB-T2 建站建議	

Source: The team finishing

Chapter 2 International status analysis of DVB-T2

DVB-T / T2 terrestrial wireless digital TV standard is the world's most widely used, present has more than 150 countries deploy DVB-T / T2 services, By countries to adopt grants TV, set-top box or build transmission station, so it has huge economies of scale, so that people can use a very low price purchase TV or set-top boxes and other receiving devices.

Section 1 Technical overview of DVB-T2

Digital TV conversion, it was supposed to free up more radio spectrum resources, but in view of the development of mobile communications networks and demand for high-definition television programs, evolution of increasingly scarce spectrum resources, DVB organization in order to develop a more efficient use of the spectrum, DVB-T2 technology standard published in 2009, desirable to increase the transmission capacity, transmission stability and the use of existing receive antenna.DVB organizational updated DVB-T2 and increased T2-Lite standard in 2011,To facilitate mobile TV receive signal in move.

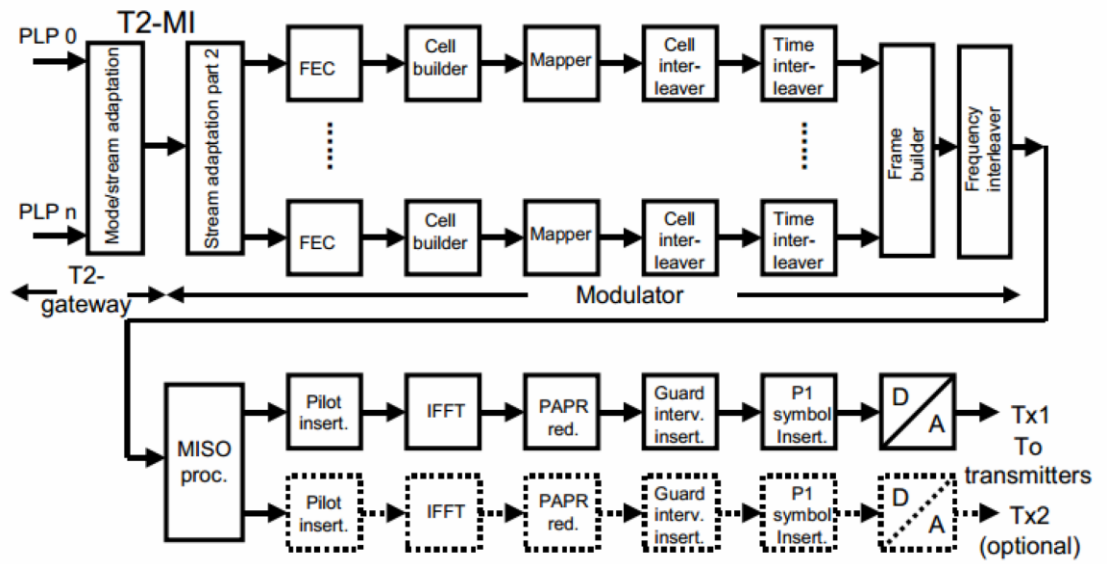


Figure 2 DVB-T2 System Architecture

Table 2　Technology difference between DVB-T and DVB-T2

	DVB-T	DVB-T2
FEC	Convolutional Coding + Reed Solomon 1/2, 2/3, 3/4, 5/6, 7/8	LDPC + BCH 1/2, 3/5, 2/3, 3/4, 4/5, 5/6
Modes	QPSK, 16QAM, 64QAM	QPSK, 16QAM, 64QAM, 256QAM
Guard Interval	1/4, 1/8, 1/16, 1/32	1/4, 19/256, 1/8, 19/128, 1/16, 1/32, 1/128
FFT Size	2k, 8k	1k, 2k, 4k, 8k, 16k, 32k
Scattered Pilots	8% of total	1%, 2%, 4%, 8% of total
Continual Pilots	2.6% of total	0.35% of total

Section 2　The development of　DVB-T2 in world

Now, The wireless digital TV transmission technology in world cotain DVC-T/T2、ATSC、ISDB-T and DTMB. Technology used by countries as shown below. DVB-T/T2 already provide service in more than 150 country. Among operators have adopted total 35 of DVB-T2 technology, performed service deployment in 25 countries.

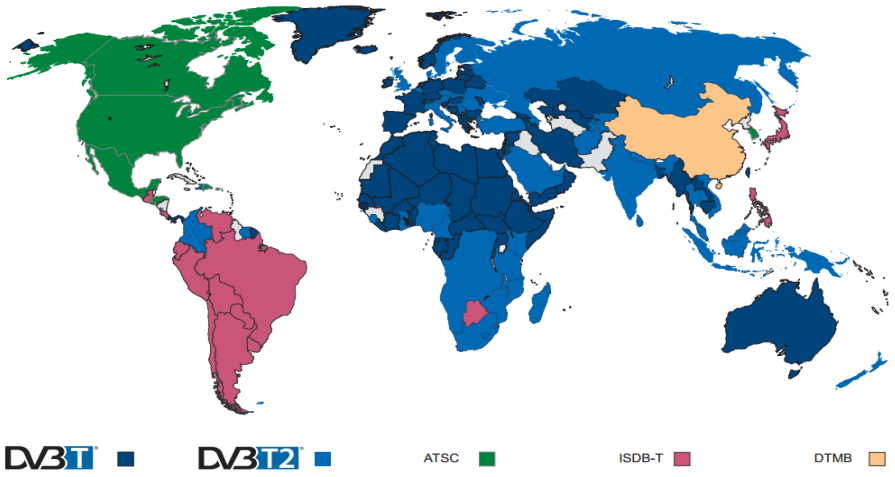


Figure 3 Distribute of use wireless digital TV transmission technology in world.

1. UK DVB-T2 services overview

In March 2010, England is the first country which deploy and provide service DVB-T2 platform.UK digital terrestrial television broadcasting service platform Freeview is jointly established by British five major television and communication transmission providers.Since the November 2009 launch of high-definition TV service（Include：Channel 4 HD, BBC HD and ITV1 HD）. High-quality service will be open gradually area mode, extended to the whole of the UK.

Table3 UK London five major emission standing launch DVB-T2 signal in PSB3.

Site Name	ITV Region	NGR	Aerial Group	Channel	ERP（kW）
Lichfield	Central	SK164043	WH	34	4
Crystal Palace	London	TQ339712	AH	31	10
Black Hill	STV Central	NS828647	E/WH	59	10
Pontop Pike	Tyne Tees	NZ148526	C/DH	63	10
Emley Moor	Yorkshire	SE222128	E/WH	39	4

2. Singapore DVB-T2 services overview

Singapore is expected to convert original analogy and DVB-T into DVB-T2 signal, as shown below. The red area has been converted for DVB-T2 signal emitted region,Yellow and skin color is expected to convert area in 2015,2016 years.

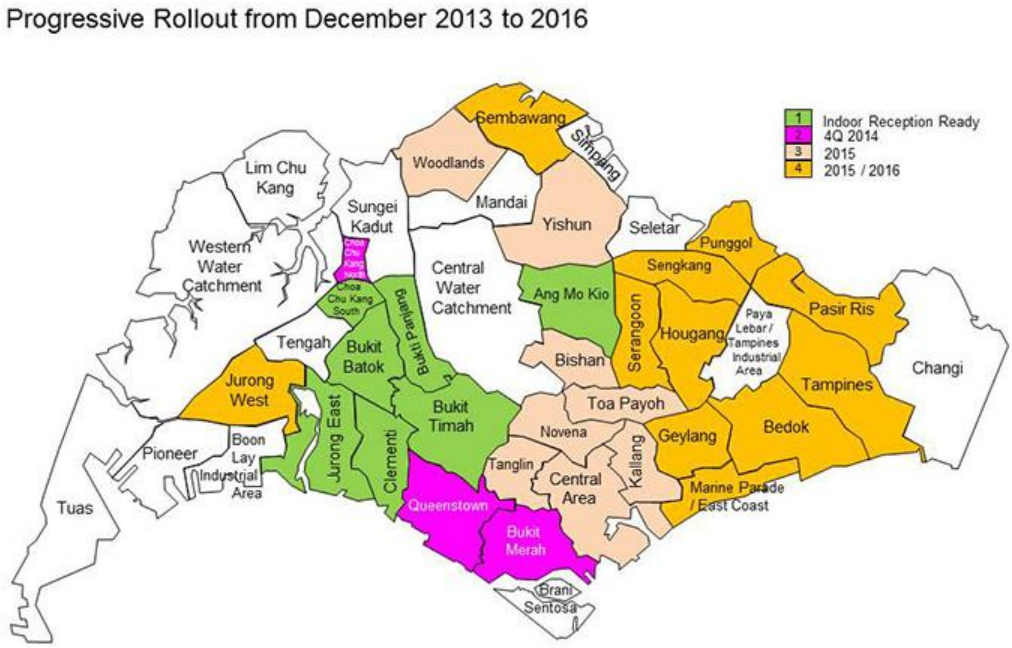


Figure 4 Singapore is expected to perform digital conversion region in 2013 to 2016.

3. France DVB-T2 services overview

France launched a wireless digital TV from 1998, and completed digital conversion in 2012. Wireless digital TV with 18 free channels containing four HD channels, and 10 premium channels containing one HD channels. Different regions, there are other channels broadcast, totaling 50 local channels.

4. Germany

Germany has not yet performed DVB-T2 operation. Bavaria is Germany's largest federal state, geographical high Alps and low mountains and hills, is very representative of the planning network. In the southern region of Bavaria has two main transmission station(Munich Olympic tower and Wen Destin), There are four main transmitting station in east. Munich Olympic Tower as an example, up to 2014 there are six channel emitted, respectively use CH54, CH34, CH35, CH48, CH56, CH52. Transmission parameters same as the DVB-T、16QAM、2/3 Code Rate, shown in the following table. All channels transmit the equivalent radiated power of 100kW, using horizontal polarization transmit, Both German and UK digital television transmitting station using a complex frequency network arrangement.

Table 4 Munich Olympic tower existing DVB-T channels

Channel	Frequency (MHz)	Modulation、FEC、FFT、Guard Interval	Program
CH54	738	16QAM 2/3 8K 1/4	Das Erste, arte, Phoenix, EinsPlus
CH34	578		SAT.1 Gold • Tele 5 • ProSieben MAXX • DMAX
CH35	586		ZDF, 3sat, KiKa / ZDFneo, ZDFinfo
CH48	690		ProSieben, Sat.1, Kabel1, N24
CH56	754		Bayerisches Fernsehen, BR-alpha, SWR, tagesschau24
CH52	722		1-2-3.tv • Sixx • HSE 24 • münchen.tv

5. Nordic

Finland, Sweden and Denmark using the DVB-T2 combined with MPEG-4 AVC standard, provide paid channels service. Free wireless TV channels still use DVB-T / MPEG-2's transmission systems. Danish Radio currently has four high-definition television channels and Sweden has nine high-definition channels. The future of the Nordic market will only appear DVB-T2-top box or TV built-in receiver of DVB-T2, DVB-T products will be gradually withdrawn from the market.

6. Italy and the Czech

At present, pay operators launched of DVB-T2 services, public service broadcaster RAI also provides DVB-T2 services in some areas.Manufacturers by government legislation to require only DVB-T2 and MPEG-4 AVC technology in two terrestrial television receiver, including the top box and the TV.

Section 3 DVB-T2 adjacent frequency protection and spectral mask constraints

Wireless digital TV whether DVB-T / T2 or other digital TV transmission technology, adjacent frequency protection and spectral mask requirements aim primarily to address its adjacent channel interference problems.After the assignment of spectrum requirements for transmit frequency range, but the transmitter characteristics can not be fully only in the assigned frequency band transmit, some overflow waves occupancy, therefore, spectral mask requirements.

Chapter 3 DVB-T2 Erection and Testing

Section 1 Test Architecture

Correlation of test preparation, including the test channel, site location, DVB-T2 test transmit parameters.

1. Apply for test channel and DVB-T2 transmission equipment

R＆S TSE800 and SX801 is DVB-T2 transmitter encoder and actuator, as shown below.

Figure 5 DVB-T2 transmitter encoder, actuators and power amplifier

2. DVB-T2 test station selection

Test sites selected in Lieyu, Kinmen City, Yangshan station and Ren'ai Dist., Keelung City, hóng dàn shan Station. Choose hóng dàn shan stations mainly due to the location of the main emission bamboo hill station, Yehliu Promontory improve the stationa and Rueifang improvements station, the relative positions of the other station have overlapping coverage area. Its map location as shown below.

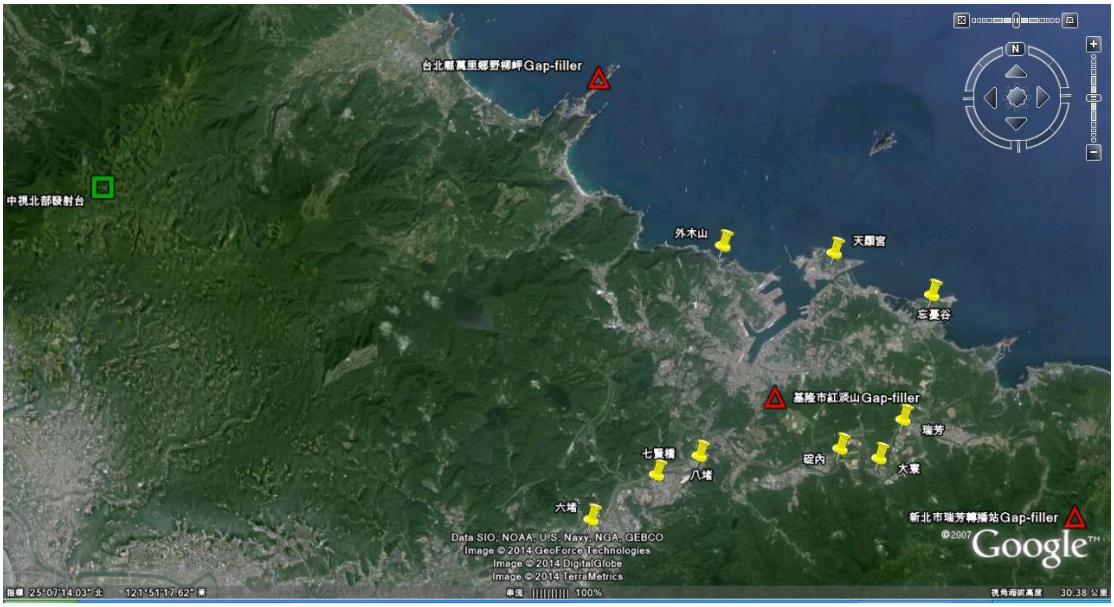


Figure 6 Keelung hóng dàn shan stations and other station relative position.

Select Yangshan station located mainly due to the location of the Islands, Kinmen broadcast stations located in the top of Taiwu Mountain, After receiving satellite signals turn transmit mode, Yangshan improve station is working by transmit signals which received from Kinmen broadcast station.

3. DVB-T2 transmission parameter selection

Taiwan adopt DVB-T 6MHz bandwidth transmission, one of few countries which use that transmission parameters. Mainly from the analog system employs US regulatory NTSC system, therefore, use of 6MHz channel bandwidth planning. In addition, the station layout mining region Single-frequency network is also a case of a few countries. When two DVB-T adjacent channel intermediate insert DVB-T2 and transfer to limit the use of the spectrum. Whether affect existing covers reception of DVB-T, scientific assessment methods should be properly verified.

Table 5 DVB-T SFN website with a maximum protection distance

DVB-T Mode	Guard Interval	Maximum Distance	
		BW = 6MHz	
2K	1/4	74.67us	22.4KM
2K	1/8	37.33us	11.2KM
2K	1/16	18.67us	5.6KM
2K	1/32	9.33us	2.8KM
8K	1/4	298.67us	89.6KM
8K	1/8	149.33us	44.8KM
8K	1/16	74.67us	22.4KM
8K	1/32	37.33us	11.2KM

Section 2 hóng dàn shan station DVB-T2 signal l emission test

During the DVB-T2 signal is sent in Keelung hóng dàn shan CH33 channels, For existing DVB-T CH 32 Channel, there are 5 reception point will cause modulation error ratio deteriorate 2 ~ 8dB, on the test points covered by 15 receiving station; For existing DVB-T CH 34 Channel, there are 10 reception point will cause modulation error ratio deteriorate 2 ~ 10dB, on the test points covered by 15 receiving station. And there are 2 reception point can normally recipient CH32 program before DVB-T2 signal transmitting, but after the DVB-T2 signal transmission cause unable recipient.

Section 3 Yangshan station DVB-T2 signal l emission test

During the DVB-T2 signal is sent in Kinmen, Yangshan station CH33 channels, For existing DVB-T CH 32 Channel, Only 1 reception point will cause modulation error ratio deteriorate 1dB, on the test points covered by 15 receiving station; For existing DVB-T CH 34 Channel, there are 2 reception point will cause modulation error ratio deteriorate 2 ~ 3dB, on the test points covered by 15 receiving station. All receive test points, after the DVB-T2 signal transmitting, can still normally recipient CH32 and CH34 program.

Section 4 DVB-T2 Mobile Test

In Kinmen mobile testing, adopted real-top boxes and DVB-T2 TV mode of operation, as shown below. When the speed exceeds 20 km per hour, screen will appear mosaic problem, also the same problems when the vehicle stops moment. Must wait for a short time (about 5 to 6 seconds), screen play will resume smoothly. Is displayed in the DVB-T2 transmitting signals, 32K subcarrier pattern, 1/16 guard interval, 256QAM, CR = 3/5 and other parameters, are not suitable for mobile action.

Figure 7 DVB-T2 adopted set-top boxes and televisions operations receive test

Section 5 DVB-T2 test at different transmission parameters

1. A subcarrier 8k, 32k mode test

Using different subcarriers 8k, 32k mode test as shown below, 32k mode spectrum is steeper than the 8k mode, described in ETSI TS 102-831 at the same time interval protection, operation mode of the more subcarriers, steeper spectrum, but from the center frequency of 3.2MHz, however 8k mode with a center frequency of the signal attenuation is large.

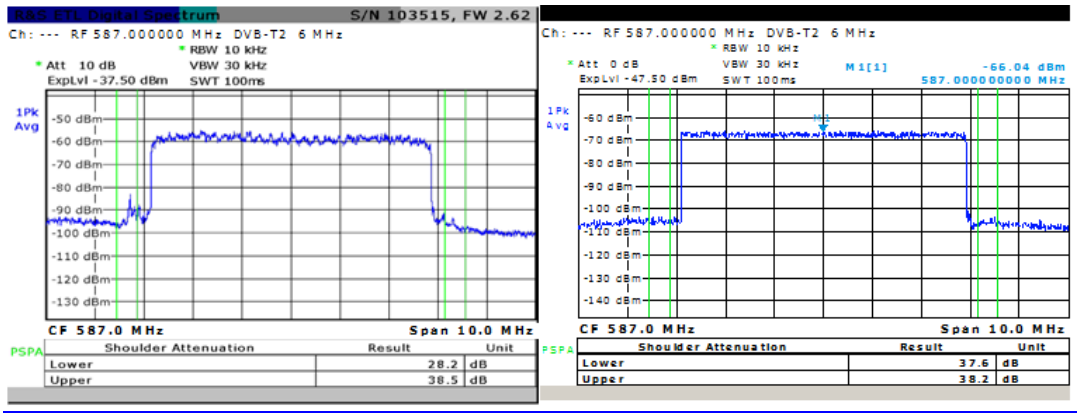
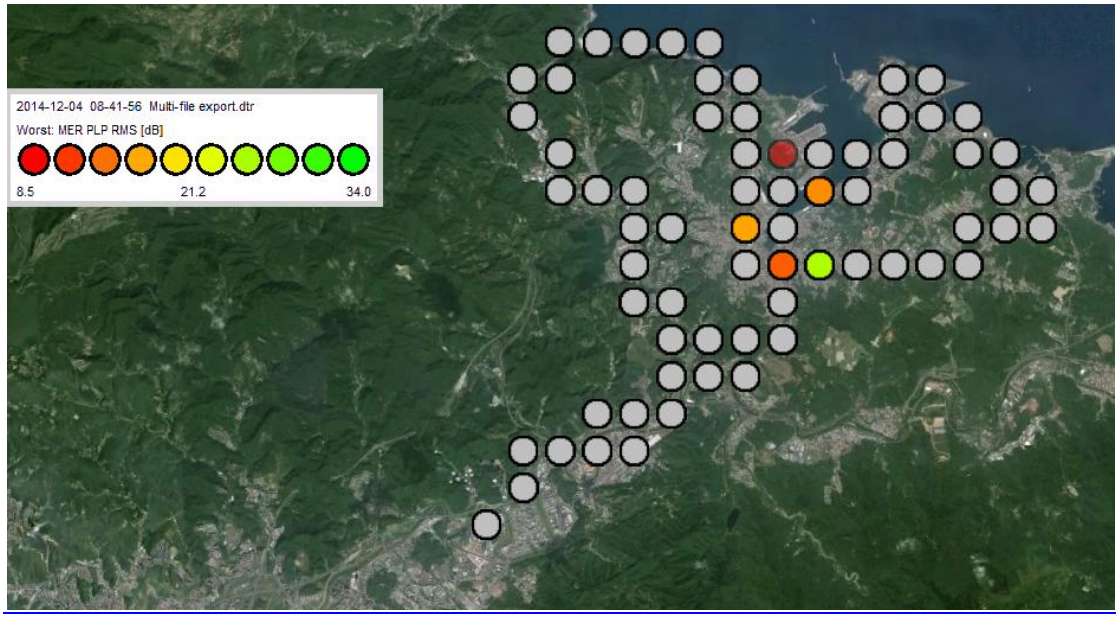


Figure 8 DVB-T uses different subcarriers 8k (left), 32k (right) mode

2. 256QAM And QPSK Test

DVB-T transmission into a DVB-T2 transmission main purpose is to improve the transmission capacity, if using the same subcarrier 8k and 1/4 guard interval, data quantity will decrease about 15%. While solving mobile reception problems, but can not enhance the transmission capacity, and will lose the incentives to change form DVB-T to DVB-T2.In this plan use the physical multiple layer testing, had hoped under QPSK modulation, Signal-to-noise ratio required is relatively low and mobile reception problems can be solved. The actual test results shown below, in 64 test points of mobile, only four test points can receive signals. Also in the moving speed of 26 kilometers per hour or more, will affect the mobile reception.

Figure 9 PLP1 modulation error rate of DVB-T2 mobile receive



Chapter 4 Experts recommend discussion and Comprehensive integration Analysis

Section 1 DVB-T2 Digital TV reception specification discussion

This research invited community of experts brainstorming, discussed the feasibility of DVB-T2 digital TV reception proposals, deliberations the program of Digital terrestrial TV stations new technical specifications applicable to our country. Provide the NCC to promote the DVB-T2 transmission technology set and technical management practices reference.

Research deliberations and topics for discussion are as follows:

1. DVB-T2 digital TV reception specifications subject discussion
   I. DVB-T2 Digital TV receiver performance requirements
      - Receiver sensitivity and adjacent channel protection performance requirements
      - Resolution and image compression technology
   II. TV built-in DVB-T2 receiver function feasibility
      - DVB-T / T2 common technical feasible?
      - TV, set-top box manufacturers are willing to put into the development of 6MHz bandwidth?
   III. Other related topics
      - How many set-top boxes provide to consumers ? Price?
2. DTB-T2 digital TV receiving function specification forum summary record
   I. DTV-T2 digital TV receiver performance requirements
      - TV Manufacturers: Currently DVB-T2 technologies mature, receiver sensitivity and adjacent channel protection performance is not a problem.
      - Telecom Technology Center: All technical feasible, relevant specifications can refer to the Nordic and British DBook NorDig technical specification, in response to domestic and then make adjustments to 6MHz frequency libraries.
      - Professor CHEN, JIN-TA: International DVB-T2 chip costs have fallen, now DVB-T and DVB-T2, whether the TV or set-top boxes cost almost equally, specifications are also in line with the DBook NorDig specifications.

- Instrument manufacturers: If use of DVB-T2 transmission technology in the future, domestic is one of few country which use 6MHz bandwidth, technical specifications should be carefully assessed.
- Set-top box manufacturers: Resolution and image compression technology should consider the future of 2K, 4K resolution problem, including whether to use HEVC technology.

II. TV built-in DVB-T2 receiver function feasibility

- TV Manufacturers: Currently DVB-T2 technologies mature, and can be backward compatible DVB-T TV reception. In Britain, for example: There DVB-T and T2 played simultaneously multiplexer, two kinds of signals can be simultaneously viewing by television.
- BSMI: In 2005, with GIO there was a consensus to force the TV built-in digital wireless receiver function, but now TV has built-in DVB-T, if there is consensus on the future policy will be considered for inclusion.
- Telecom Technology Center: Based on existing spectrum planning, DVB-T2 is most possible to adopt 6MHz bandwidth operate in the future, Korea also uses DVB-T2 6MHz, so the market and supply chain should not be a big problem.

III. Other related topics

- Professor SHI, BO-WEN: Future DVB-T2 uses HEVC or H.264 technology, in addition to considering the international standards, industry and government should decide once good, to avoid frequent replace its TV or set-top boxes.
- CFCT: DVB-T and T2 conversion requires to cooperate the user's willingness, if has a incentive for the consumer to do digital conversion, would be willing to cooperate.

3. Digital terrestrial TV new technical specifications forum summary record

I. DVB-T2 transmission parameters discussed

- DaAi TV: At present, the largest distance between stations nearly 80 kilometers away, need to maintain the protection distance requirements.
- CTV: The need for detailed 6MHz applicable to conversion table of DVB-T2 SNR receive requirements, then can be used as the reference for DVB-T2 transmitter parameter.
- FTV: TV and set-top boxes, must support multiple modulation modes, avoid conversion emission parameters or individual stations using different parameters, resulting unable to receive
- DaAi TV: DVB-T2 transmission parameters must have a standard, as a reference to the BSMI in the future.

- CTS: The organizers whether have measured SFN performance.
- Telecom Technology Center: Recommended 256 QAM, 32K subcarrier mode, GI = 1/16, CR = 3/5, the required information noise ratio of about 19.4 dB, the transmission flow rate of about 25 Mbps.

II. RF spectrum mask requirements

- Telecom Technology Center: DVB-T / T2 adjacent channel protection and spectral mask constraints should be the same, within 5.7053 MHz bandwidth currently used, in order to meet future DVB-T2 should be amended, In addition, spectrum mask specification shall be depending on the power of transmit stations.
- CTV: DVB-T2 signal more steeper, existing platform technical specifications for DVB-T2 is too lenient? The transmitter manufacturers should be provide related specifications to do further study.

III. The available electric field strength

- CTS: Mobile and fixed reception, Whether different of available electric field strength should be stipulated, for example , earlier electric field strength requirements of mobile receive more 6dB than fixed reception.
- Telecom Technology Center: BER proposal to abolish and change to TS packet error ratio PER <1 * 10-7, If the original available electric field strength 48 dBuV / m is in DVB-T 16QAM (C / N = 11.1) recommends to calculate the C / N of DVB-T2 required, available electric field strength = 48 dBuV / m + DVB-T2 (C / N) -11.1.

IV. Other important recommendations of digital wireless television station new technology specification

- FTV: Should be include 2K / 4K resolution and HEVC video compression technology in the future.
- CTV: To 6MHz bandwidth currently have 1HD + 3SD, for the applicable of image quality requirements, should not stipulate the number of programs, the industry should consider the bandwidth problem and then make decisions.

Chapter 5 Technical specification recommends

Section 1 Existing specifications adapt to DVB-T2 transmission technology considerations

1. SFN protection distance requirements

   prior art did not standardize the launch parameters and modulation techniques, For example: 256QAM, 16QAM or coding rate, subcarrier mode, the guard interval, etc, Retention elastic modifiers of station transmitter parameters, for example, the existing DVB-T use of 16QAM modulation, and afterward changed to 64QAM modulation. Considering the station plan in the future, SFN protection distance requirements, must be with the existing DVB-T 8K mode 1/4 guard interval, same as the compatible parameters of protect distance of the platform, so DVB-T2 needs to select the same protection distance with the same parameters.

2. Allowable Signal-to-noise ratio requirement

   Prior art stipulate the minimum co-channel protection ratio is 19.8dB, therefore, no matter which transmission parameters, their Signal-to-noise ratio must be less than the co-channel protection ratio requirements.

3. Recommended parameters

   The research team recommends DVB-T2 transmission parameters, 256 QAM 32K GI = 1/16, T = 3/5 Signal-to-noise ratio about 19.4 dB and transfer traffic about 25 Mbps.

4. RF spectrum mask requirements

   National which while using both DVB-T and DVB-T2 technology, such as: UK. DVB-T and DVB-T2 are using the same radio frequency spectrum mask criteria, EBU is also adopt the same specification, therefore, DVB-T / T2 adjacent channel protection and spectral mask constraints should be the same, Now DVB-T use within 5.7053 MHz bandwidth, and should be relaxed correction.

5. Usable electric field strength

   Original DVB-T specification Bit Error Ratio must be less than 2 × 10-4 before the Viterbi decoder, DVB-T uses Reed - Solomon coding, so adopt Bit Error Ratio mode. DVB-T2 uses LDPC code, there is no accurate data of Bit Error Ratio, for allowable standards recommended packet error rate must be less than 1 × 10-7.

   The original specification of Electric field intensity is 48 dBuV / m, in DVB-T2 recommends available electric field strength, is calculated in the following manner:

   Electric field strength=48 dBuV/m + DVB-T2(C/N) - 11.1

Chapter 6 Conclusion

1. DVB-T2 Technology

DVB-T2 coding technology use the LDPC code, in addition, in the portion of the outer random debugging code, use the BCH code to replace the original Reed - Solomon codes, DVB-T2 have been used LDPC code, do not need such a high debug RS code, by using BCH code to reduce the debugging code which packet needed, part of the information capacity will enhance. Because OFDM has a crest factor, the transmitter will require greater linearity requirements, therefore, DVB-T2 uses two ways to solve the problem of linearity. One is reserved for carrier method, one is reserved for carrier method, the principle is use the portion of the carrier which transmitter reserved, used to generate the signals to suppress the peak power, and the receiver ignores the information on the reserved carriers, second Adaptive Constellation Extension, by rotation of constellation diagram, reducing the needed of peak power output for transmitter. DVB-T2 transmission capacity is more 1.5 times than existing DVB-T, for current DVB-T SNR, in the future use of DVB-T2, increase capacity by existing 15Mbps to 23Mbps.

2. Discussion current situation of DVB-T2 of each countries

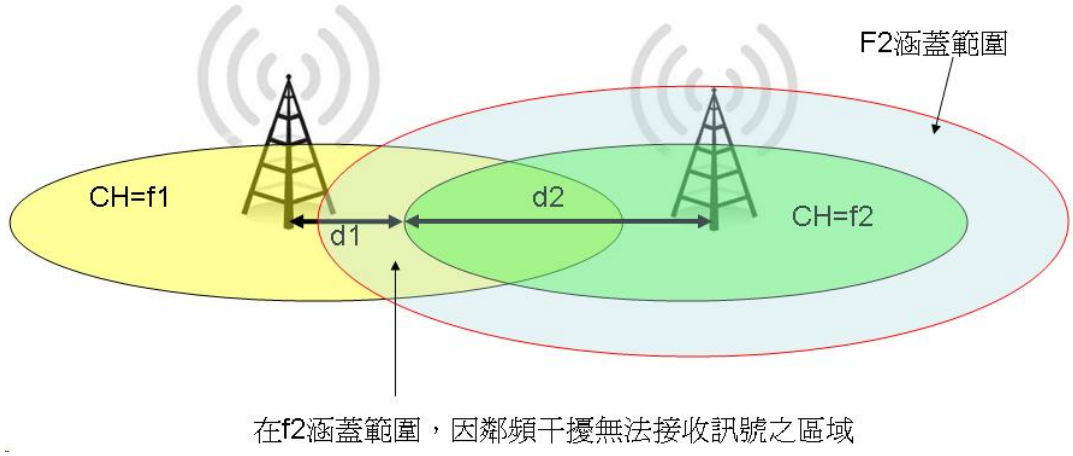
In UK DVB-T or DVB-T2 deployment launch platform, did not use a whole region SFN, some small transmitter stations use different channels too, for digital TV SFN deployment, there are many limitations in technology, unable to achieve the best of the entire network. Therefore, it is necessary to set aside portion of the channel to improved small transmitting station, in addition to frequency, using different antenna polarization can also avoid interference problem between the different stations. In countries that have not popularize digital conversion of digital TV, most of them directly select the DVB-T2 technology, can obtain higher transmission capacity.

Because HEVC (H.265) video compression technology appears, will affect all network television and radio television in the future, in networks, using the decoding software, means to need a faster processor for decoding work. France and Germany, believes that use of DVB-T2 while using HEVC video compression technology in the future, so that have the incentive to Digital Converters. And at the present stage used MPEG 2 and H.264 for Video compression technology, set-top box and TV which used MPEG2 and DVB-T receiver can’t viewing the program of H.264, nor can viewing video program compressed by H.265 in the future, In response to the new video

compression technology and new transmission technologies (eg: DVB-T2) has been established to replace cycle of product, For example, after what period of time, no longer sell the receiver only having DVB-T / MPEG2, and then no longer sell the receiver which have DVB-T/H.264, let wireless digital TV receiver to replace quickly, worth our reference.

3. DVB-T2 Adjacent channel protection and Spectral mask constraints

Currently digital wireless television and radio technical specifications, RF spectrum of main station and improve station, shoulder attenuation values at the transmitter output should be greater than 36 dB (± 3.2MHz), or the behind the output of BPF should be greater than 32 dB (± 2.92MHz). Whether DVB-T / T2 are all applicable, DVB-T must be use within 5.7053 MHz bandwidth, and should be relaxed correction, actual Adjacent affect can confirmed by this study. EBU requirements for adjacent channel protection is 30 ~ 33dB, and then solve the problem of affecting adjacent channel, reference national programs are still in a total station transmitter, if emitted adjacent channel signals in the vicinity of the original transmitting station, that do not need to worry about adjacent channel interference, If not in the locations nearby original transmitting station, the location nearby the two stations, are more likely to happen adjacent channel interference problem, as shown below.



Figere 10 Adjacent channel interference schematic diagram

DVB-T2 Establish station plan and adjacent channel interference protection measures

1. Aforementioned DVB-T2 adjacent channel protection and spectral mask constraints, so common tower and common antenna, common tower and single antenna or independent transmit by establish new station, as long as transmit station Located at the same location or building nearby locations, there will not be adjacent channel interference.

2. There are only DVB-T signal or only DVB-T2 signal in weak reception area, Limited by the receiver quality, adjacent channel interference is exist.
3. Adjacent channel interference from common station plan, no matter common antenna, common tower or common station, it can be as long as the same place.
4. Adjacent channel interference of the receiver, can refer to the Nordic NorDig and UK DBook specification, and make adjustments in response to domestic 6MHz frequency libraries.