



1880-1895MHz  
Wireless Private Branch Exchange  
and Radio Terminal Equipment  
Technical Specifications

**National Communications Commission**  
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**\*Should there be any discrepancy between the English and Chinese versions, the Chinese version shall prevail.**



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## 1. Scope

### 1.1 Accordance

The specification is issued pursuant to paragraph 1 of Article 44 of the Telecommunications Management Acts.

### 1.2 Application

#### 1.2.1 Frequency Range

This specification only applies to the operating frequency range from 1880 ~ 1895MHz.

#### 1.2.2 Application Equipment

The cordless system terminal comprises two elements, according to the radio interface referred to as a Fixed Part (FP) and a Portable Part (PP), to connect a public telecommunications network.

FP contains subscriber-owned private branch exchange (PBX), central control fixed part, basestation and home basestation (cordless telephone with wired station).

PP contains cordless telephone portable handset, wireless network relay stations, wireless network terminal.

### 1.3 Contents and Reference

This specification is to ensure no disturbance occurs of radio interface to the public network and applies to indoor cordless system equipment within the operating frequency range from 1880 ~ 1895MHz. The normative reference of the test items, conformance requirement, method of tests and relevant requirements for such terminal equipment are based on ETSI TBR 6, ETSI 300 175, ETSI 300 176 and ETC TBR 6 test arrangements. These limits have been chosen to comply with the international standards.



## 2. Abbreviations

### 2.1 Abbreviations

The abbreviations of these requirements are as follows,

Bn	Rated Bandwidth
BER	Bit Error Ratio
dBm	dB relative to 1 milliwatt
EIRP	Effective Isotropic Radiated Power
EMC	Electromagnetic Compatibility
EUT	Equipment Under Test
FP	Fixed Part
FT	Fixed radio Termination
IPEI	International Portable part Equipment Identity
LT	Lower Tester
NTP	Normal Transmitter Power
PP	Portable Part
PSN	Portable equipment Serial Number
PT	Portable radio Termination
RFP	Radio Fixed Part
TBC	Traffic Bearer Controller
TDMA	Time Division Multiple Access
UT	Upper Tester
dB(NTP m)	NTP dB value relative to 1mW



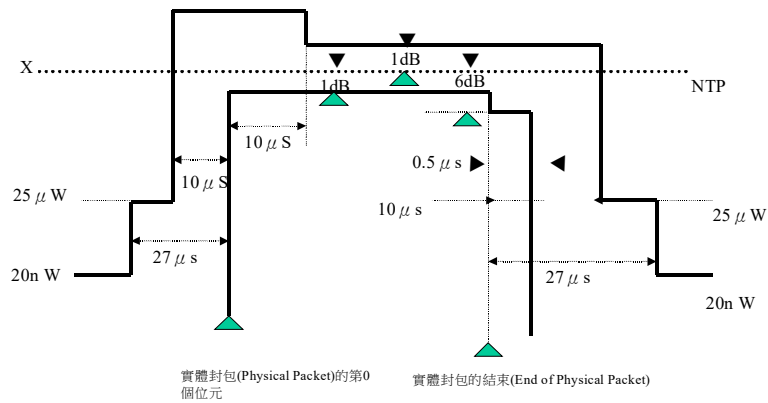
### 3. Required Test Items

Items	Test Items	Conformance requirement	Test result	Compliance
1	Frequency Range & Channel Space	Operating Frequency: 1880 ~1895MHz Disable 1895~1900MHz Channel Space: 1.728MHz		
2	Stability & Accuracy of RF Carriers	RFP: $\leq \pm 50\text{KHz}$ PP: $\leq \pm 100\text{KHz}$ , during the first 1sec, from transmit mode to non-transmitting mode PP: $\leq \pm 50\text{KHz}$ , at any other time		
3	Packet Timing Jitter	RFP & PP: $\leq \pm 1\mu\text{s}$		
4	Reference Timing Accuracy	Multiple Channel RFP: 5 ppm (nominal temperature) 10 ppm (extreme temperature) Single Channel RFP: 10 ppm (extreme temperature)		
5	Packet Transmission Accuracy	PP: $\geq 5\text{ms} - 2\mu\text{s}$ and $\leq 5\text{ms} + 2\mu\text{s}$		
6	Transmission Burst	As Fig. 1		
7	Maximum transmitter output power	RFP & PP: $\leq 250\text{ mW}$		
8	Frequency Deviation of RF Carrier Modulation	Part 1: $\geq \pm 259\text{KHz}$ and $\leq 403\text{KHz}$ (peak) Part 2: $\geq \pm 202\text{KHz}$ and $\leq 403\text{KHz}$ (peak) Part 3: $\geq \pm 202\text{KHz}$ and $\leq 403\text{KHz}$ (peak) Part 4: $\leq \pm 17\text{KHz}$ (average)		
9	Unwanted RF Emissions due to Modulation	"M" is the EUT transmit channel; Y=M $\pm$ 1, emission power $\leq 160\mu\text{W}$ Y=M $\pm$ 2, emission power $\leq 1\mu\text{W}$ Y=M $\pm$ 3, emission power $\leq 40\text{nW}$ Y= at any other channel, emission power $\leq 20\text{nW}$		
10	Unwanted RF Emissions due to Transmitter Transients	"M" is the EUT transmit channel; Y=M $\pm$ 1, emission power $\leq 250\mu\text{W}$ Y=M $\pm$ 2, emission power $\leq 40\mu\text{W}$ Y=M $\pm$ 3, emission power $\leq 4\mu\text{W}$ Y= at any other channel, emission power $\leq 1\mu\text{W}$		
11	Unwanted RF Emissions due to Intermodulation	$\leq 1\mu\text{W}$		
12	Spurious Emissions for Allocated Transmit Channel	<1GHz (outside broadcast bands): $\leq 250\text{nW}$ Broadcast bands(47~74MHz; 87.5~108 MHz; 108~118MHz; 174~230MHz; 470~862MHz): $\leq 20\text{nW}$ > 1GHz: $\leq 1\mu\text{W}$		

Note: If EUT contains wired interface, it shall comply with the following technical requirements:

- Subscriber-owned PBX shall comply with NCC Technical Specification Requirements PSTN01.

2. Home basestation (cordless telephone with wired station) shall comply with NCC Technical Specification Requirements 0005 and refer to digital low tier radio terminal examination table which apply the test items, conformance requirement of the wired communications interface.



The power level of X shall be less than 315mW, and also shall be less than  $NTP+4dB$ .

Fig. 1 Power-time template for required test item 6 of Transmission Burst





#### 4. Test Item and Requirement-Frequency Range and Channel Space

##### 4.1 Test purpose

To verify that RF carrier of EUT shall comply with the required operating frequency range and the channel spacing.

##### 4.2 Conformance requirement

Operating frequency range:

1880~1895MHz (channel number  $c=2,3,4,5,6,7,8,9$ )

Non-operating frequency range:

1895~1900MHz (channel number  $c=0,1$ )

Channel space: 1.728MHz

( $F_c = F_0 - c \times 1.728\text{MHz}$ , where  $F_0 = 1897.344\text{MHz}$ , and  $c=0$  to  $9$ )

##### 4.3 Method of measurement

- a. The Lower Tester (LT) shall place the EUT in a mode whereby the EUT is positioned in a LT specified slot and RF channel  $c = 0,1,2,3,4,5,6,7,8,9$ . If so equipped, the handover function in the EUT shall be disabled. And EUT shall be placed in a test mode whereby it performs the loopback function with LT.
- b. The LT shall transmit a packet with a test sequence in the loopback field of the packet to EUT when RF channel  $c=2,3,4,5,6,7,8,9$ , except for  $c=0,1$ .

##### 4.4 Test requirement

The test conditions are given in Annex A. The measurement arrangement is given in Annex B. The test shall take place at a test site or in a test fixture. If the EUT has an antenna connector then it shall be used to connect the EUT to LT.



## 5. Test Item and Requirement-Stability & Accuracy of RF Carriers

### 5.1 Test purpose

To verify that stability and accuracy of RF carrier of EUT relative to the absolute frequencies reference or nominal carrier central frequency shall comply with the conformance requirements.

### 5.2 Conformance requirement

RFP:  $\leq \pm 50\text{KHz}$

PP:  $\leq \pm 100\text{KHz}$ , during the first 1sec, from transmit mode to non-transmitting mode

PP:  $\leq \pm 50\text{KHz}$ , at any other time

### 5.3 Method of measurement

- a. The Lower Tester (LT) shall place the EUT in a mode whereby the EUT is positioned in a LT specified slot and RF channel  $c=5$ . If so equipped, the handover function in the EUT shall be disabled.
- b. The EUT shall be placed in a test mode whereby it performs the loopback function.
- c. The LT shall transmit a packet with a test sequence in the loopback field of the packet. This test sequence shall be such that the sequence 0000 1111 0000 1111 is transmitted at the antenna of the EUT in the loopback field of the reply packet.
- d. Using the sampling method to capture a representation of the EUT's transmitted RF signal after allowing the EUT to be in active-locked state for more than 1 sec.
- e. The EUT's carrier frequency for above d. shall be assumed to be the average of the measured absolute frequencies reference of the loopback bits.
- f. According to the EUT type, step c. to e. shall be repeated until the following number of measurements have been made:



A-field only transmit	100
Half-slot transmit	40
Full-slot transmit	10
Double-slot transmit	5

The center frequency  $F_c$  of the EUT is taken to be the mean value of the measurements.

g. Step c. to f. shall be repeated for RF channels  $c=2$  and 9.

#### 5.4 Test requirement

The test conditions are given in Annex A. The measurement arrangement is given in Annex B. The test shall take place at a test site or in a test fixture. If the EUT has an antenna connector then it shall be used to connect the EUT to LT.

### 6. Test Item and Requirement-Packet Timing Jitter

#### 6.1 Test purpose

To verify that packet timing jitter of EUT shall comply with the conformance requirements.

#### 6.2 Conformance requirement

RFP & PP:  $\leq \pm 1\mu\text{s}$

#### 6.3 Method of measurement

- a. The Lower Tester (LT) shall place the EUT in a mode whereby the EUT is positioned in a LT specified slot and RF channel  $c=5$ . If so equipped, the handover function in the EUT shall be disabled.



- b. Select system simulator for the packet timing jitter test mode described as in TBR 6.
- c. Using the sampled results of 2 consecutive frames of the positions of p0 in the slots (time of frame)
- d. Repeated 1,000 for the averaging time of frames.
- e. The deviation (jitter) of the sampled time of frames and mean of the values measured shall be less than  $\leq \pm 1\mu\text{s}$ .
- f. Display the results on the screen and print the measurement results.
- g. Step b. to f. shall be repeated for RF channels c=2 and 9.

#### 6.4 Test requirement

The test conditions are given in Annex A. The measurement arrangement is given in Annex B. The test shall take place at a test site or in a test fixture. If the EUT has an antenna connector then it shall be used to connect the EUT to LT.

### 7. Test Item and Requirement-Reference Timing Accuracy

#### 7.1 Test purpose

To verify that reference timing accuracy of EUT shall comply with the conformance requirements.

#### 7.2 Conformance requirement

Multiple Channel RFP: 5 ppm (nominal temperature)  
10 ppm (extreme temperature)  
Single Channel RFP: 10 ppm (extreme temperature)



### 7.3 Method of measurement

- a. The Lower Tester (LT) shall place the EUT in a mode whereby the EUT is positioned in a LT specified slot and RF channel  $c=5$ . If so equipped, the handover function in the EUT shall be disabled.
- b. Select system simulator for the reference timing accuracy test mode described as in TBR 6.
- c. A minimum of one duplex bearer shall be setup between the LT and EUT.
- d. Using a sample method, measure the time,  $t_{long}$ , between the transmission of 1,000 frames using the same bit in each slot as the point of reference in each frame.
- e. Display the results on the screen and print the measurement results.
- f. Steps b. to e. shall be repeated for RF channels  $c=2$  and 9.

### 7.4 Test requirement

The test conditions are given in Annex A. The measurement arrangement is given in Annex B. The test shall take place at a test site or in a test fixture. If the EUT has an antenna connector then it shall be used to connect the EUT to LT.

## 8. Test Item and Requirement-Packet Transmission Accuracy

### 8.1 Test purpose

To verify that packet transmission accuracy of EUT shall comply with the conformance requirements.



## 8.2 Conformance requirement

PP:  $\geq 5\text{ms} - 2\mu\text{s}$  and  $\leq 5\text{ms} + 2\mu\text{s}$

## 8.3 Method of measurement

- a. The Lower Tester (LT) shall place the EUT in a mode whereby the EUT is positioned in a LT specified slot and RF channel  $c=5$ . If so equipped, the handover function in the EUT shall be disabled.
- b. Select system simulator for the packet transmission accuracy test mode described as in TBR 6.
- c. A minimum of one duplex bearer shall be setup between the LT and EUT.
- d. Sing a sample method, measure the time,  $t_{\text{long}}$ , between the transmission of 1,000 frames using the same bit in each slot as the point of reference in each frame.
- e. Display the results on the screen and print the measurement results.
- f. Step b. to e. shall be repeated for RF channels  $c=2$  and 9.

## 8.4 Test requirement

The test conditions are given in Annex A. The measurement arrangement is given in Annex B. The test shall take place at a test site or in a test fixture. If the EUT has an antenna connector then it shall be used to connect the EUT to LT.

# 9. Test Item and Requirement-Transmission Burst

## 9.1 Test purpose

To verify that transmission burst of EUT shall comply with the



conformance requirements.

## 9.2 Conformance requirement

### a. Transmitter attack time:

The time taken shall be less than  $10\mu\text{s}$  for the transmitted power to increase from  $25\mu\text{W}$  to the time of bit  $p_0$  of physical packet.

### b. Transmitter release time:

The time taken shall be less than  $10\mu\text{s}$  from the end of the physical packet, for the transmitted power to decrease to  $25\mu\text{W}$ .

### c. Minimum power:

From  $p_0$  to the end of the physical packet ( $p_0$  to the end of frame), the transmitted power as measured shall be greater than  $(\text{dB}(\text{NTPm}) - 1\text{dBm})$

### d. Maximum power:

From  $10\mu$  after  $p_0$  to  $10\mu\text{s}$  after the end of physical packet ( $p_0+10\mu\text{s}$  to end of frame+ $10\mu\text{s}$ ), the transmitted power as measured shall be less than  $(\text{dB}(\text{NTPm})+1\text{dB})$

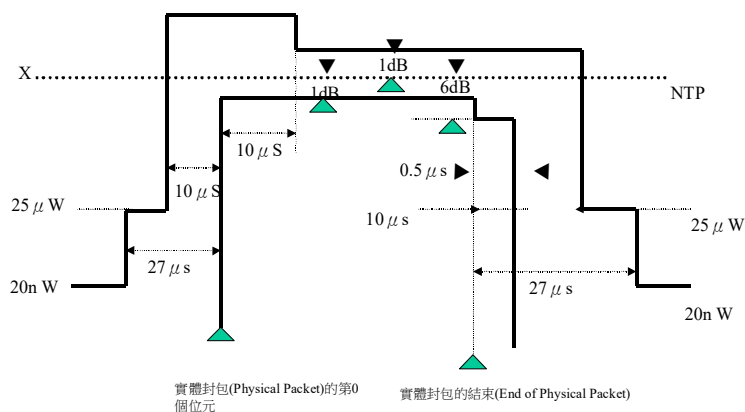
From  $10\mu\text{s}$  before  $p_0$  to  $10\mu\text{sec}$  after  $p_0$  ( $p_0-10\mu\text{s}$  to  $p_0+10\mu\text{s}$ ), the transmitted power as measured shall be less than  $(\text{dB}(\text{NTPm})+4\text{dB})$ , and shall be less than  $315\text{mW}$ .

### e. Maintenance of transmission after packet end:

The transmitted power as measured shall be maintained greater than  $(\text{dB}(\text{NTPm})-6\text{dB})$  for  $0.5\mu\text{s}$  after the end of the physical packet.

### f. Transmitter idle power output:

For the time period starting  $27\mu\text{s}$  after the end of the physical packet, and finishing  $27\mu\text{s}$  before the next transmission of data bit  $p_0$ , the transmitter idle power output shall be less than  $20\text{nW}$ .



This requirement shall apply except when  $p_0$  of the next transmitted packet occurs less than  $54\mu\text{s}$  after the end of the transmitted physical packet. The power level of X shall be less than  $315\text{mW}$ , and also shall be less than  $\text{dB}(\text{NTPm})+4\text{dB}$ .

### 9.3 Method of measurement

- The Lower Tester (LT) shall place the EUT in a mode whereby the EUT is positioned in a LT specified slot and RF channel  $c=5$ . If so equipped, the handover function in the EUT shall be disabled.
- Select system simulator for the transmission burst test mode described as in TBR 6.
- Using a sampling measurement method, capture a representation of the EUT's transmit burst's amplitude and modulation. The measurement bandwidth for RF power shall be  $1\text{MHz}$  for the measurement of transmitter idle power and  $\geq 3\text{MHz}$  for all other.
- For the array of samples the LT shall calculate the position of bit  $p_0$  and the end of the physical packet in each sample to an accuracy





of 0.1 $\mu$ s.

- e. Steps b. to c. are repeated 60 times with intervals of 1sec or longer.
- f. Display the results on the screen and print the measurement results.
- g. Steps b. to f. shall be repeated for RF channels c=2 and 9.

#### 9.4 Test requirement

The test conditions are given in Annex A. The measurement arrangement is given in Annex B. The test shall take place at a test site or in a test fixture. If the EUT has an antenna connector then it shall be used to connect the EUT to LT.

### **10. Test Item and Requirement-Maximum Transmitter Output Power**

#### 10.1 Test purpose

To verify that maximum transmitter output power shall comply with the conformance requirements.

Conformance requirement

The maximum transmitter output power shall be less than 250 mW for both RFP and PP.

#### 10.2 Method of measurement

- a. The Lower Tester (LT) shall place the EUT in a mode whereby the EUT is positioned in a LT specified slot and RF channel c=5. If so equipped, the handover function in the EUT shall be disabled.
- b. Select system simulator for the maximum transmitter output power test mode described as in TBR 6.
- c. The LT shall command the EUT to operate on a single antenna.
- d. A test antenna with a good directivity to limit reflections is



- connected to a calibrated receiver.
- e. use the sampling method capture a representation of a physical packet transmitted by the EUT;
  - f. determine the position of p0 in the physical packet and the end of the physical packet;
  - g. make a measurement of the received power over the 1 MHz bandwidth centered on the EUT RF channel. This power shall be averaged from the start of bit p0 to the end of the physical packet;
  - h. the substitution antenna shall replace the EUT's transmitter antenna in the same position and polarization. The frequency of the signal generator shall be adjusted to the EUT's nominal channel frequency on which it was transmitting. The test antenna shall be raised or lowered as necessary to ensure that the maximum signal level is received. The input signal level to the substitution antenna shall be adjusted until an equal related level in the test receiver;
  - i. Display the results on the screen and print the measurement results.
  - j. Steps d. to i. shall be repeated for RF channels c=2 and 9.

### 10.3 Test requirement

The test conditions are given in Annex A. The measurement arrangement is given in Annex B. The test shall take place at a test site or in a test fixture. If the EUT has an antenna connector then it shall be used to connect the EUT to LT.



## 11. Test Item and Requirement-Frequency Deviation of RF Carrier Modulation

### 11.1 Test purpose

To verify that frequency deviation of RF carrier modulation shall comply with the conformance requirements.

### 11.2 Conformance requirement

EUT's frequency deviation of RF carrier modulation shall be

Part 1:  $\geq \pm 259\text{KHZ}$  and  $\leq 403\text{KHz}$  (peak)

Part 2:  $\geq \pm 202\text{KHZ}$  and  $\leq 403\text{KHz}$  (peak)

Part 3:  $\geq \pm 202\text{KHZ}$  and  $\leq 403\text{KHz}$  (peak)

Part 4:  $\leq \pm 17\text{KHZ}$  (average)

### 11.3 Method of measurement

- a. The Lower Tester (LT) shall place the EUT in a mode whereby the EUT is positioned in a LT specified slot and RF channel  $c=5$ . If so equipped, the handover function in the EUT shall be disabled.
- b. Select system simulator for the frequency deviation of RF carrier modulation test mode described as in TBR 6.
- c. Part 1 measurement:
  - (a) The LT shall transmit a packet with a test sequence in the loopback field of the sequence of 0000 1111 0000 1111.
  - (b) The EUT shall be set in active-locked state for greater than 1sec.
  - (c) The measurement bandwidth shall be greater than 3MHz. The LT shall calculate the peak frequency deviation,  $f$  within each bit period of a single positive or negative deviation in the loopback field of the transmit burst of the EUT, relative to the measured carrier frequency  $f_c$ .
  - (d) Steps (a) to (c) shall be repeated for EUT until the following

number of measurements have been made:

EUT Type	Number of measurements
A-field only transmit	100
Half-slot transmit	40
Full-slot transmit	10
Double-slot transmit	5

d. Part 2 measurement:

(a) The test data pattern for the measurement shall be the following table of test packet structure:

EUT Type	Test packet structure
A-field only transmit	A-field, 32 data bits, a16~a31=1; a32~a47=0
Half-slot transmit	B-field, 80 data bits, b0~b7=1,0,1,0,1,0,1,0; b8~b39=1; b40~b71=0; b72~b79=1,0,1,0,1,0,1,0
Full-slot transmit	B-field, 320 data bits, b0~b127=1,0,.....,1,0; b128~b191=1; b192~b255=0; b256~b319=1,0,.....,1,0
Double-slot transmit	B-field, 800 data bits, b0~b143=1,0,.....,1,0; b144~b271=1; b272~b335=0; b336~b399=1; b400~b463=0; b464~b527=1; b528~b591=0; b592~b655=1; b656~b799=1,0,.....,1,0

(b) The measurement bandwidth shall be greater than 3MHz. The LT shall calculate the peak frequency deviation,  $f$  within each bit period of a single positive or negative deviation in the loopback field of the transmit burst of the EUT, relative to the measured carrier frequency  $f_c$ .

(c) Steps (a) to (c) shall be repeated for EUT until the following number of measurements have been made:

EUT Type	Number of measurements
A-field only transmit	100
Half-slot transmit	40
Full-slot transmit	10
Double-slot transmit	5



e. Part 3 measurement:

- (a) The LT shall transmit a packet with a test sequence in the loopback field of the sequence of 0000 1111 0000 1111.
- (b) The measurement bandwidth shall be greater than 3MHz. The LT shall calculate the peak frequency deviation,  $f$  within each bit period in the first 16 bits of the synchronization field (preamble) and the loopback field of the transmit burst of the EUT, relative to the measured carrier frequency  $f_c$ .
- (c) Steps (a) to (b) shall be repeated for EUT until the following number of measurements have been made:

EUT Type	Number of measurements
A-field only transmit	100
Half-slot transmit	40
Full-slot transmit	10
Double-slot transmit	5

f. Part 4 measurement:

- (a) The LT shall transmit a packet with a test sequence in the loopback field of the sequence of 0000 1111 0000 1111.
- (b) The EUT shall be set in active-locked state for greater than 1sec. The measurement bandwidth shall be greater than 3MHz.
- (c) The LT shall calculate the average frequency,  $f_s$  of the last 14 bits of the first 16 bits of the synchronization field.
- (d) The LT shall calculate the average frequency,  $f_l$  of the last 14 bits of the first 16 bits of the loopback field.
- (e) Steps (a) to (e) shall be repeated until 200 measurements have been made. Calculate the mean frequency drift for  $f_l - f_s$ .

g. Display the results on the screen and print the measurement results.

h. Steps b. to g. shall be repeated for RF channels  $c=2$  and 9.

#### 11.4 Test requirement

The test conditions are given in Annex A. The measurement



arrangement is given in Annex B. The test shall take place at a test site or in a test fixture. If the EUT has an antenna connector then it shall be used to connect the EUT to LT.

## 12. Test Item and Requirement-Unwanted RF Emissions due to Modulation

### 12.1 Test purpose

To verify that unwanted RF emissions due to modulation shall comply with the conformance requirements.

### 12.2 Conformance requirement

The unwanted emissions of EUT, as measured, shall not be greater than the power levels stated in table below:

M is the EUT transmit channel:

$Y=M\pm 1$ , emission power  $\leq 160\mu\text{W}$

$Y=M\pm 2$ , emission power  $\leq 1\mu\text{W}$

$Y=M\pm 3$ , emission power  $\leq 40\text{nW}$

Y= at any other channel, emission power  $\leq 20\text{nW}$

### 12.3 Method of measurement

a. If the EUT has an external antenna connector then this shall be used to connect the EUT to the LT. Otherwise, the transmitted signal shall be applied to the LT via a coupling device which provides the appropriate signal level to the system. The analyzing system in the LT shall be operated under the following conditions:

Frequency sweep: 1MHz

Resolution bandwidth: 100KHz

Video bandwidth: greater than resolution

bandwidth

Peak hold: on

Sweep time: greater than 12secs



Filtering type:                      synchronously tuned

The total sample time used for measurement is 60% to 80% of the duration of the physical packet, starting before 25% of the slot time has expired but after the transmission of the synchronization word. The LT shall determine the start of the physical packet (bit p0) transmitted by the EUT.

- b. The LT shall place the EUT in a mode whereby the EUT is positioned in a LT specified slot and RF channel  $c=5$ . If so equipped, the handover function in the EUT shall be disabled.
- c. The EUT shall be placed in a test mode whereby it performs the loopback function.
- d. Select system simulator for the unwanted RF emissions due to modulation test mode described as in TBR 6. A test modulation signal D-M2 is generated by the LT.
- e. Using the analyzing system, a measurement of the EUT's transmitted power on channel M is made during the sampling time. This power measurement shall be called Pref.
- f. Using the analyzing system, a measurement of the EUT's transmitted power during the sampling time on channel
  - M-3 shall be called Prm-3 and recorded in dB as a value relative to Pref.
  - M-2 shall be called Prm-2 and recorded in dB as a value relative to Pref.
  - M-1 shall be called Prm-1 and recorded in dB as a value relative to Pref.
  - M+1 shall be called Prm+1 and recorded in dB as a value relative to Pref.
  - M+2 shall be called Prm+2 and recorded in dB as a value relative to Pref.
  - M+3 shall be called Prm+3 and recorded in dB as a value relative to Pref.
- g. Using the measured value of normal transmitted power, NTP. The LT shall calculate the power emissions on adjacent channel:  
$$\text{dB (P emissions on channel M-1)} = \text{dB (NTP}_m) + \text{dB (Prm-1)}$$



- h. The values calculated in g. shall be converted from dBm to Watts.
- i. Display the results on the screen and print the measurement results.
- j. Steps b. to i. shall be repeated for RF channels c=2 and 9.

#### 12.4 Test requirement

The test conditions are given in Annex A. The measurement arrangement is given in Annex B. The test shall take place at a test site or in a test fixture. If the EUT has an antenna connector then it shall be used to connect the EUT to LT.

### 13. Test Item and Requirement-Unwanted RF Emissions due to transmitter transients

#### 13.1 Test purpose

To verify that unwanted RF emissions due to transmitter transients shall comply with the conformance requirements.

#### 13.2 Conformance requirement

The unwanted emissions, as measured, shall not be greater than the power levels stated in the following table:

M is the EUT transmit channel:

$Y=M\pm 1$ , emission power  $\leq 250\mu W$

$Y=M\pm 2$ , emission power  $\leq 40\mu W$

$Y=M\pm 3$ , emission power  $\leq 4\mu W$

$Y=$  at any other channel, emission power  $\leq 1\mu W$

#### 13.3 Method of measurement

- a. If the EUT has an external antenna connector then this shall be





used to connect the EUT to the LT. Otherwise, the transmitted signal shall be applied to the LT via a coupling device which provides the appropriate signal level to the system. The analyzing system in the LT shall be operated under the following conditions:

Frequency sweep: 1MHz  
Resolution bandwidth: 100KHz  
Video bandwidth: greater than resolution

bandwidth

Peak hold: on  
Filtering type: 4 or 5 pole synchronously tuned

The total sample time used for measurement is 60% to 80% of the duration of the physical packet, starting before 25% of the slot time has expired but after the transmission of the synchronization word. The LT shall determine the start of the physical packet (bit p0) transmitted by the EUT.

- b. The LT shall place the EUT in a mode whereby the EUT is positioned in a LT specified slot and RF channel  $c=5$ . If so equipped, the handover function in the EUT shall be disabled.
- c. The EUT shall be placed in a test mode whereby it performs the loopback function.
- d. Select system simulator for the unwanted RF emissions due to transmitter transients test mode described as in TBR 6. A test modulation signal D-M2 generated by the LT.
- e. Using the analyzing system, a measurement of the EUT's transmitted power on channel M is made during the sampling time. This power measurement shall be called Pref.
- f. Using the analyzing system, a measurement of the EUT's transmitted power during the sampling time on channel  
M-3 shall be called Prm-3 and recorded in dB as a value relative to Pref.  
M-2 shall be called Prm-2 and recorded in dB as a value relative to Pref.  
M-1 shall be called Prm-1 and recorded in dB as a value relative to Pref.



M+1 shall be called Prm+1 and recorded in dB as a value relative to Pref.

M+2 shall be called Prm+2 and recorded in dB as a value relative to Pref.

M+3 shall be called Prm+3 and recorded in dB as a value relative to Pref.

g. Using the measured value of normal transmitted power, NTP. The LT shall calculate the power emissions on adjacent channel:

$$\text{dB (P emissions on channel M-1)} = \text{dB (NTPm)} + \text{dB (P rm-1)}$$

h. The values calculated in g. shall be converted from dBm to Watts.

i. Display the results on the screen and print the measurement results.

j. Steps b. to i. shall be repeated for RF channels c=2 and 9.

#### 13.4 Test requirement

The test conditions are given in Annex A. The measurement arrangement is given in Annex B. The test shall take place at a test site or in a test fixture. If the EUT has an antenna connector then it shall be used to connect the EUT to LT.

### 14. Test Item and Requirement-Unwanted RF Emissions due to Intermodulation

#### 14.1 Test purpose

To verify that unwanted RF emissions due to intermodulation shall comply with the conformance requirements.

#### 14.2 Conformance requirement

The unwanted emissions due to intermodulation shall not be greater than 1  $\mu\text{W}$  as measured in the measurement channels.



### 14.3 Method of measurement

- a. If the EUT has an external antenna connector then this shall be used to connect the EUT to the LT. Otherwise, the transmitted signal shall be applied to the LT via a coupling device which provides the appropriate signal level to the system. The analyzing system in the LT shall be operated under the following conditions:

Frequency sweep:	1MHz
Resolution bandwidth:	100KHz
Video bandwidth:	greater than resolution bandwidth
Peak hold:	on
Sweep time:	greater than 12 seconds
Filtering type:	synchronously tuned

The total sample time used for measurement is 60% to 80% of the duration of the physical packet, starting before 25% of the slot time has expired but after the transmission of the synchronization word. The LT shall determine the start of the physical packet (bit p0) transmitted by the EUT.

- b. The LT shall place the EUT in a mode whereby the EUT is positioned in a LT specified slot and RF channel  $c=5$ . If so equipped, the handover function in the EUT shall be disabled.
- c. The EUT shall be placed in a test mode whereby it performs the loopback function for both transceivers.
- d. Select system simulator for the unwanted RF emissions due to intermodulation test mode described as in TBR 6. A test modulation signal D-M2 is generated by the LT.
- e. Using the analyzing system, a measurement of the transmitted powers on channels  $M = 0$  and  $M = 4$  shall be made during the sample time for a transmitter in the EUT. These measurements shall be called  $P_{ref_0}$  and  $P_{ref_4}$ .
- f. The EUT shall be placed in a mode whereby two of the transmitters shall be made to operate on the same slot in the frame but on different RF channels. The RF channels shall be  $M = 1$  and  $M = 3$ . If so equipped, the handover function in the EUT shall be disabled.



- g. Using the analyzing system, a measurement of the power levels on channels  $c = 0$  and  $c = 4$  shall be made during the sample time for a transmitter in the EUT. These power measurements shall be called  $P_{m_0}$  and  $P_{m_4}$ .
- h. Display the results on the screen and print the measurement results.
- i. Steps b. to h. shall be repeated for RF channels  $c=2$  and 9.

#### 14.4 Test requirement

The test conditions are given in Annex A. The measurement arrangement is given in Annex B. The test shall take place at a test site or in a test fixture. If the EUT has an antenna connector then it shall be used to connect the EUT to LT.

### 15. Test Item and Requirement-Spurious Emissions for Allocated Transmit Channel

#### 15.1 Test purpose

To verify that spurious emissions for allocated transmit channel shall comply with the conformance requirements.

#### 15.2 Conformance requirement

The spurious emissions for allocated transmit channel of EUT, as measured, shall not be greater than the power levels stated in the following table:

<1GHz (outside broadcast bands):  $\leq 250\text{nW}$

Broadcast bands (47~74MHz;  
87.5~108 MHz; 108~118 MHz;  
174~230 MHz; 470~862 MHz):  $\leq 20\text{nW}$

> 1GHz:  $\leq 1\ \mu\text{W}$

### 15.3 Method of measurement

- a. The test equipment shall be calibrated for the minimum power level by the signal generator.
- b. Select system simulator and EUT for the spurious emissions for allocated transmit channel test mode described as in TBR 6 to simulate the EUT in the operating mode.
- c. The measurement of the maximum spurious emissions of the RF channels shall be made by a receiving antenna of EUT for horizontal and vertical polarization.
- d. The substitution antenna and signal generator shall replace the EUT in the same position and polarization for the EUT's EIRP by the output of signal generator of adjusted RF channels.
- e. Repeat step d. for adjusting the RF channel.

Frequency range and resolution:

Frequency Range	Measurement Bandwidth
$0\text{MHz} \leq f_o \leq 2\text{MHz}$	30KHz
$2\text{MHz} \leq f_o \leq 5\text{MHz}$	30KHz
$5\text{MHz} \leq f_o \leq 10\text{MHz}$	100KHz
$10\text{MHz} \leq f_o \leq 20\text{MHz}$	300KHz
$20\text{MHz} \leq f_o \leq 30\text{MHz}$	1MHz
$30\text{MHz} \leq f_o \leq 4,000\text{MHz (radiated)}$	3MHz
Broadcast band	100KHz

### 15.4 Test requirement

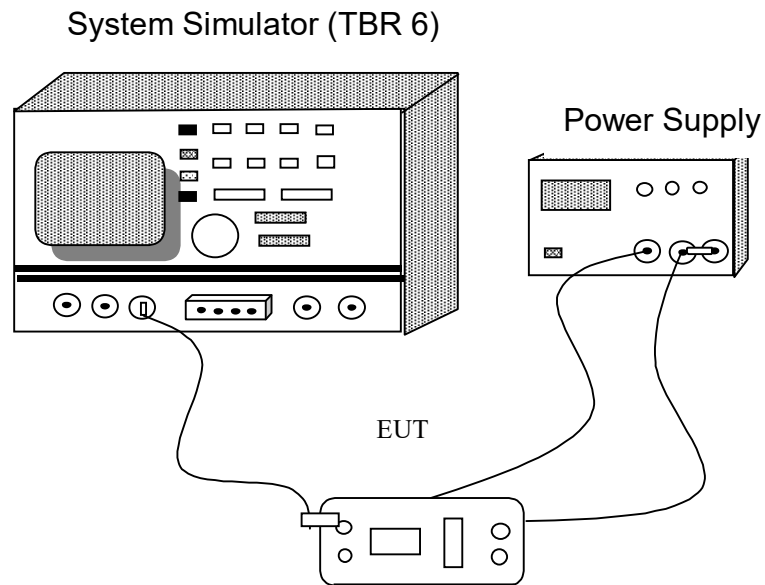
The test conditions are given in Annex A. The measurement arrangement is given in Annex C.





Absolute packet timing:	$\pm 1 \mu s$
Timing stability of Fixed Radio Termination (FT):	1ppm
Transmitter burst transient time:	$\pm 20\%$ (of measured value)
Packet drift frequency:	$\pm 10\text{KHz}$

### Annex B Test Arrangement for Required Test Items 1 to 11





### Annex C Test Arrangement for Required Test Items 12

