#### 5 . Test items and conformance standards

- 5.1 Test items and conformance standards of wireless interface:
- 5.1.1 Operation within the bands 2400-2483.5 MHz
- 5.1.2 The maximum output power:

For frequency hopping systems in the 2400-2483.5 MHz band employing at least 75 hopping channels and all digitally modulated system: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

- 5.1.3 Bandwidth, channel number and other limitations:
- 5.1.3.1 Frequency hopping system:
- 5.1.3.1.1 Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. If at least 75 hopping frequencies are used. The maximum 20 dB bandwidth of the hopping channel is 1 MHz. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo randomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.
- 5.1.3.1.2 Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 non-overlapping channels. The average time of occupancy on any channel shall not be greater than 0.4. Frequency hopping systems which use fewer than 75 hopping frequencies may employ intelligent hopping techniques to avoid interference to other transmissions.
- 5.1.3.1.3 Frequency hopping spread spectrum systems are not required to employ all available hopping channels during each transmission. However, the system, consisting of both the transmitter and the receiver, must be designed to comply with all of the regulations in this section should the transmitter be presented with a continuous data (or information) stream. In addition, a system employing short transmission bursts must comply with the definition of a frequency hopping system and must distribute its transmissions over the minimum number of hopping channels specified in the 5.1.3.1.2.
- 5.1.3.1.4 The incorporation of intelligence within a frequency hopping spread spectrum system that permits the system to recognize other users within the spectrum band so that it individually and independently chooses and adapts its hopsets to avoid hopping on occupied channels is permitted. The coordination of frequency hopping systems in any other manner for the express purpose of avoiding the simultaneous occupancy of individual hopping frequencies by multiple transmitters is not permitted.
- 5.1.3.2 Digital modulation techniques:
- 5.1.3.2.1 For Digitally modulated system, the minimum 6 dB bandwidth shall be at least 500 kHz.
- 5.1.3.2.2 If Digitally modulated techniques system is utilized, at least 11 channels for end user to select

individual and independent channel shall be furnished.

5.1.3.2.3 For digitally modulated systems, the peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

## 5.1.3.3 The hybrid system:

The hybrid systems employ a combination of both frequency hopping and digital modulation techniques.

- 5.1.3.3.1 The frequency hopping operation of the hybrid system, with the digitally modulated operation turned off, shall have an average time of occupancy on any frequency not to exceed 0.4 seconds within a time period in seconds equal to the number of hopping frequencies employed multiplied by 0.4.
- 5.1.3.3.2 The digital modulation operation of the hybrid system, with the frequency hopping turned off, shall comply with the power density requirements of those specified in 5.1.3.2.3.
- **5.1.4** RF Conducted emission outside the frequency band:

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. In addition, radiated emissions which fall in the restricted bands, as defined in "Low-power radio-frequency devices technical specifications" (LP0002) Section 2.7 must also comply with the radiated emission limits specified in Table I.

**5.1.5** Radiated emission outside the frequency band:

Except as specified in the Section 5.14. The emissions outside the frequency band from an

intentional radiator shall not exceed the field strength levels specified in the following table:

Table	I
-------	---

Frequency(MHz)	Field strength(microvolts/meter)	Measurement	
		distance(meters)	
0.009 - 0.490(inclusive)	2,400/F(KHz)	300	
0.490 (exclusive) – 1.705	24 000/ F(KHz)	30	
(inclusive)			
1.705(exclusive) – 30 (exclusive)	30	30	
30 (inclusive) – 88 (inclusive)	100	3	
88 (exclusive)- 216 (inclusive)	150	3	
216 (exclusive)- 960 (inclusive)	200	3	
Above 960 (exclusive)	500	3	

The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector and shall meet the requirement of "Low-power radio-frequency devices technical specifications (LP0002)" Section 5.14.

For measuring emissions at distances other than the distances specified in the above table shall comply with" Low-power radio-frequency devices technical specifications" Section 5.5. In the case of EUTs that can operate on more than one frequency, the number frequencies to be measured shall comply with "Low-power radio-frequency devices technical specifications" Section 5.12.

#### 5.1.6 Antenna requirement:

Radio frequency TTE transmitter or receiver shall utilize a permanently, half- permanently attached antenna or uses a unique coupling at the antenna and at any cable connector between the transmitter and the antenna. The antenna shall be omnidirectional type. The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector or other than authorized is prohibited. Such a standard connectors are for example: BNC, F type, N type, M type, UG type, RCA, SMA, SMB, and other standard type antenna connectors.

#### 5.1.7 Security code:

It is permissible to provide at least 1000 possible different combinations for both base and handset unit to automatically select security code. (a Declaration of Conformance should be provided by the manufacturer) 5.1.8 Check list for wireless interface is as Table II below:

Мос	lel number: Brand	/Logo: Test da	te: Year	Mont	h Day
	Test items	Conformance standards	Test resu	lt	Verdict
Оре	eration within the band	2400 to 2483.5 MHz			
Max	imum output power:	Digital Modulation Technique $\leq 1W$			
		Frequency Hopping Technique: $\geq$ 75CH $\leq$ 1W<75CH			
B a n d w i	Frequency hopping systems: Separation at minimum 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.	At least 25kHz or 20dB bandwidth whichever is greater, but 20dB bandwidth ≦ 1MHz (≧ 75CH)			
d t h	Digital modulation techniques: the minimum 6 dB bandwidth	≧ 500kHz			
Channe	Hopping channel (in the case of hybrid system, the digitally modulated operation is turned off )	$\ge$ 15 CH(non-overlapping)			
l number	Digital modulation channel(In case of hybrid system, the frequency hopping is turned off)	≧11 CH			
Fre	quency hopping operation:				
The	average time of occupancy on any	≦ 0.4 秒			
freq	uency not to exceed 0.4 seconds within				
a tin	ne period in seconds equal to the number				
of h	opping frequencies employed multiplied				
by C	0.4. (in the case of hybrid, the digitally				
mod	Julated is turned off)				

# Table II

Digital modulation operation:		
The peak power spectral density conducted	$\leq$ 8dBm	
from the intentional radiator to the antenna in		
any 3 kHz band during any time interval of		
continuous transmission. (in the case of		
hybrid system, the hopping frequency is		
turned off)		
RF conducted emission outside the	Pursuant to Sec. 5.1.4	
frequency band:		
Radiated emission limits outside the	Pursuant to Sec. 5.1.5	
frequency band:		
Antenna requirement:	Utilizing permanently, half-	
	permanently attached antenna or	
	uses a unique coupling at the	
	antenna and at any cable	
	connector between the	
	transmitter and the antenna. The	
	antenna shall be omnidirectional	
	type.	

rable il (continueu)
----------------------

Test items	Conformance standards	Test result	Verdict
Security code	It is permissible to provide at		
(A Declaration of Conformance should be	least 1000 possible different		
provided by the manufacturer)	combinations for both base and		
	handset unit to automatically		
	select security code.		
Base unit warning label:	The warning hereunder "is		
	subject to the indoor use only		
	with conditions that no harmful to		
	authorized radio station and free		
	of interference protection" shall		
	be affixed to the appropriated		

	place of base unit. In addition,	
	the warning label shall be posted	
	on the packing craft or instruction	
	manual. Applicant shall provide	
	guarantee letter.	
RF Exposure Warning Label	Warning:	
	"For Reducing RF Influence, Use	
	Properly "	
	Labeling method:	
	Label accordingly on handset,	
	carton, or in user's manual.	
	Applicant shall provide guarantee	
	letter.	
Rate of Absorption Electromagnetic Energy	Head and Trunk SAR: ≤ 2.0	
SAR Limits	W/Kg(1g). Applicant shall provide	
	test report and test data.	
SAR Label	SAR label content:	
	" SAR limit 2.0 W/Kg; after testing	
	value:W/Kg"	
	Labeling method:	
	Label accordingly on handset,	
	carton, or in user's manual.	
	Applicant shall provide guarantee	
	letter.	

### NOTE 1:

test items [base unit warning label] [ RF exposure warning label ] [SAR test report] and [SAR label], is based on Regulations sub-paragraph 5 of Article 11 paragraph 1.

# NOTE 2:

It is require for compliance approval, when the emission power of Radio-frequency Telecommunications terminal equipment in normal operation conditions, exceed 20mW within 20cm distant from human body.

## NOTE 3:

Standard for safety level with respect to human exposure to RF electromagnetic fields 1. FCC PART 2.1093 and ANSI/IEEE C95.3-1992, in normal conditions of RF electromagnetic fields (the distance of MS and human body shall be within 20cm), the standard values of Specific Absorption Rate (SAR) is as described in the technical specifications PLMN01Table 3.

2. ANSI/IEEE C95.1-1999 Edition – "IEEE Standard for Safety Level with respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3KHz~300GHz." for Maximum Permissible Exposure (MPE) to prevent harmful effects in human beings exposed to in the RF range is as described in the technical specifications PLMN01 Table 4 and Table 5.

5.2 PSTN interface and conformance standards is listed as Table III。 Wireline interface test items shall follow PSTN01[Technical Specifications for Terminal Equipment for Connection to Public Switched Telephone Network].

Test items	Conformance standards	Test result	Verdict
1. Public switch telephone network	Pursuant to PSTN01 Section 5.1		
interface requirement			
2. Basic requirement	Pursuant to PSTN01 Section 5.1.1		
3. Surge Protection	Pursuant to PSTN01 Section 5.1.2		
4. Telephone Line Surge Test	Pursuant to PSTN01 Section 5.1.2.1		
5. AC Power Line Surge Test	Pursuant to PSTN01 Section 5.1.2.2		
6. Line polarity	Pursuant to PSTN01 Section 5.1.3		
7. Leakage current limitations	Pursuant to PSTN01 Section 5.1.4		
8. Insulation resistance	Pursuant to PSTN01 Section 5.1.5		
9. Characteristics of TE for ringing	Pursuant to PSTN01 Section 5.1.6		
signals			
10. Response to ringing signal	Pursuant to PSTN01 Section 5.1.6.1		
11. Ringing impedance	Pursuant to PSTN01 Section 5.1.6.2		
12. On-hook AC impedance	Pursuant to PSTN01 Section 5.1.6.3		
13. Off-hook DC resistance	Pursuant to PSTN01 Section 5.1.7		
14. Sending level limitation of Signals	Pursuant to PSTN01 Section 5.1.8		
15. Transverse balance limitations	Pursuant to PSTN01 Section 5.1.9		
16. Return loss	Pursuant to PSTN01 Section 5.1.10		
17. Pulse dialing	Pursuant to PSTN01 Section 5.1.11		
18. Dual tone multiple frequency (DTMF) dialing	Pursuant to PSTN01 Section 5.1.12		
19. Frequency combination	Pursuant to PSTN01 Section 5.1.12.1		
20. Signaling level	Pursuant to PSTN01 Section 5.1.12.2		

### Table III

21. Signaling level difference	Pursuant to PSTN01 Section 5.1.12.3	
22. Tone duration	Pursuant to PSTN01 Section 5.1.12.4	
23. Pause duration	Pursuant to PSTN01 Section 5.1.12.5	
24. Series equipment	Pursuant to PSTN01 Section 5.1.13	
25. DC voltage drop of series equipment	Pursuant to PSTN01 Section 5.1.13.1	
26. Insertion loss of series Equipment	Pursuant to PSTN01 Section 5.1.13.2	
27. Handset function	Pursuant to PSTN01 Section 5.2	

## Table III (continued)

Test items	Conformance standards	Test result	Verdict
28. Transmission objective reference Equivalent	Pursuant to PSTN01 Section 5.2.1		
29. Sending objective reference equivalent	Pursuant to PSTN01 Section 5.2.1.1		
30. Receiving objective reference equivalent	Pursuant to PSTN01 Section 5.2.1.2		
31. Transmission characteristics frequency response	Pursuant to PSTN01 Section 5.2.2		
32. Sending frequency response	Pursuant to PSTN01 Section 5.2.2.1		
33. Receiving frequency response	Pursuant to PSTN01 Section 5.2.2.2		
34. Side-tone objective reference equivalent	Pursuant to PSTN01 Section 5.2.3		
35. Distortion	Pursuant to PSTN01 Section 5.2.4		
36. Sending distortion	Pursuant to PSTN01 Section 5.2.4.1		
37. Receiving distortion	Pursuant to PSTN01 Section 5.2.4.2		
38. Receiver volume control	Pursuant to PSTN01 Section 5.2.5		
39. Continuous sound pressure level of receiver	Pursuant to PSTN01 Section 5.2.6		
40. Quiescent state noise	Pursuant to PSTN01 Section 5.4.2		
41. Transmission loss	Pursuant to PSTN01 Section 5.4.3		
42. Cross talk	Pursuant to PSTN01 Section 5.4.4		
43. Protocol requirement	Pursuant to PSTN01 Section 5.5		
44. Caller ID requirement	Pursuant to PSTN01 Section 5.6		
45. FSK signals inspection standard	Pursuant to PSTN01 Section 5.6.1		

46. DC / AC Termination	Pursuant to PSTN01 Section 5.6.1.1	
47. Timing	Pursuant to PSTN01 Section 5.6.1.2	
48. Signaling case	Pursuant to PSTN01 Section 5.6.1.3	
49. Packet case	Pursuant to PSTN01 Section 5.6.1.4	
50. Presentation layer messages case	Pursuant to PSTN01 Section 5.6.1.5	
51. DTMF signaling Test criteria	Pursuant to PSTN01 Section 5.6.2	
52. DC resistance in the NIT state	Pursuant to PSTN01 Section 5.6.2.1	
53. Leaving the NIT state	Pursuant to PSTN01 Section 5.6.2.2	
54. DTMF signaling	Pursuant to PSTN01 Section 5.6.2.3	
55. DTMF Code/Number	Pursuant to PSTN01 Section 5.6.2.4	
56. Guarding against interference from the parallel equipment	Pursuant to PSTN01 Section 5.6.2.5	
57. Automatic dialing function requirement	Pursuant to PSTN01 Section 5.7	
58. Automatic dialing function requirement	Pursuant to PSTN01 Section 5.7.1	

# Table III (continued)

Test items	Conformance standards	Test result	Verdict
59. Automatic repeated call attempts	Pursuant to PSTN01 Section 5.7.1.1		
60. Disconnecting Time of automatic dialing	Pursuant to PSTN01 Section 5.7.1.2		
61. Automatic answer function requirement	Pursuant to PSTN01 Section 5.7.2		
62. T1/E1 equipment shall have a	Pursuant to FCC Part 68 or IEC		
protection device if city electricity	1000-4-5 Class 2		
(110/220V, 60Hz) is connected to			
the equipment. (Protection device			
does not need to be part of the			
subscriber equipment.)			

l est items	Conformance standards	Test result	Verdict	
63. T1 line interface requirements	(1) shall have 1544 kb/s transmission			
	rate.			
	(a) Transmission rate tolerance shall be			
	<u>&lt;</u> 50 ppm			
	(b) receiving rate tolerance shall be $\pm$ 50			
	ppm			
	(2) DS1 line code shall use AMI			
	( bipolar) or B8ZS with 50% duty cycle,			
	and meet at least 12.5% pulse density			
	requirement. There shall have no more			
	then 15 consecutive zeros in the line			
	code.			
	(3) Frame Format: It shall comply with			
	the recommendation of ITU-T G.704,			
	G.706 at the 1544kb/s interface.			
	(4) Pulse Shape shall comply with ITU-T			
	G.703 pulse mask for interface at 1.544			
	kb/s recommendation.			
	(5) Signal level shall comply with ITU-T			
	G.703 Digital Interface at 1544 kb/s			
	recommendation.			
	(6) Test load impedance shall be			
	100 $\Omega\pm5\%$ (resistance).			

Table III (continued)					
Test items	Conformance standards	Test result	Verdict		
63.	(7)Jitter Tolerance and Jitter Generation Jitter Tolerance : at least meet the requirement: Jitter Generation : in 10 Hz-40kHz < 1 Ulpp Ulpp : Unit Interval ( Peak to Peak ) 5Ulpp 0.1Ulpp 10 500 8K 40K Hz				
64. T1/E1 clock synchronization 65. T1/E1 Fault isolation capability	Clock synchronization shall provide accuracy as Stratum 4 internal clock source and ability to synchronized if use synchronization signal from T1/E1 network CPE terminal equipment device and channel modules shall provide self-test				
	and loop testing (activated by other equipment) functions.				

Test items	Conformance standards	Test result	Verdic
66. E1 line interface requirements	(1) shall have 2048 kb/s transmission		
	rate.		
	(a) transmission rate tolerance shall be		
	± 50 ppm.		
	(b) receiving rate tolerance shall be $\pm$ 50		
	ppm.		
	(2) E1 line code shall use HDB3 with		
	50% duty cycle		
	(3) Frame Format: It shall meet the		
	ITU-T G.704, G.706 interface at 2048		
	Kb/s recommendation.		
	(4) Pulse Shape shall comply with ITU-T		
	G.703 pulse mask for interface at		
	2048 kb/s recommendation.		
	(5) Test load impedance shall be		
	120 $\Omega \pm 5\%$ (resistance, balanced).		
	(6) Ratio of the widths of positive and		
	negative pulses at the nominal half		
	amplitude 0.95 to 1.05		
	(7) Ratio of the amplitudes of positive		
	and negative pulses at the centre of		
	the pulses interval 0.95 to 1.05		
	(8) Maximum peak-to-peak litter at the		
	output port shall comply with ITLLT		
	G.823 recommendation.		

# Table III (continued)

67. E1 Earthing of outer conductor	The outer conductor of the coaxial pair	
or screen	or the screen of the symmetrical pair	
	shall be connected to the earth at the	
	output port and provision shall be made	
	for connecting the outer conductor of the	
	coaxial pair or the screen of the	
	symmetrical pair to earth if required, at	
	the input port	

NOTE: test items form 62 to 67 is only applicable to T1/E1 equipment .

- 5.3 In terms of Telecommunications terminal equipment with PLMN interface, the test items and conformance standards shall refer to technical specification from PLMN01 to PLMN08.
- 5.4 EMC : Quote from CNS 13438 C6357 <sup>「</sup> Limits and methods of measurement of radio interference characteristics of information technology equipment 」 。
- 5.5 Safety : Quote from CNS 14336 C5268 <sup>「</sup> Safety of information technology equipment 」