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TEST REPORT

Report Number: 16071165HKG-002

Application
For
Class II Permissive Change of 47 CFR Part 15 Certification

Unlicensed Personal Communication Service Devices/
2 GHz License-exempt Personal Communications Service Devices

(Base Unit)

FCC ID: EW780-9854-00

Prepared and Checked by:

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September 15, 2016

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GENERAL INFORMATION

Applicant Name:	VTech Telecommunications Ltd.
Applicant Address:	23/F., Tai Ping Industrial Centre, Block 1, 57 Ting Kok Road, Tai Po, Hong Kong.
FCC Specification Standard:	FCC Part 15, October 1, 2014 Edition
FCC ID:	EW780-9854-00
FCC Model(s):	CS5158-3, CS515Z-XY, CS5108, CS510Z-XY, CS5158-3 BS, CS5158-3 HS, CS515Z-XY BS, CS515Z-XY HS, CS5108 HS, CS510Z-XY HS
Type of EUT:	Unlicensed Personal Communications Service Devices
Description of EUT:	DECT 6.0 Cordless Telephone
Serial Number:	N/A
Sample Receipt Date:	July 19, 2016
Date of Test:	July 26 - August 24, 2016
Report Date:	September 15, 2016
Environmental Conditions:	Temperature: +10 to 40°C Humidity: 10 to 90%

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**EXHIBIT 1
TEST RESULTS SUMMARY & STATEMENT OF COMPLIANCE**

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1.0 Test Results Summary & Statement of Compliance

1.1 Summary of Test Results

General Technical Requirements				
Test Items	FCC Part 15 Section	Test Procedure ANSI C63.17 / ANSI C63.4*	Results	Details see section
Antenna Requirement	15.317	---	Pass	4.1
Digital Modulation Techniques	15.319(b)	6.1.4	Pass	4.2
Occupied/Emission Bandwidth	15.323(a)	6.1.3	Pass	4.3
Directional Gain of the Antenna	15.319(e)	4.3.1	Pass	4.4
Power Spectral Density	15.319(d)	6.1.5	Pass	4.7
Automatic Discontinuation of Transmission	15.319(f)	---	Pass	4.8
AC Power Line Conducted Emissions from EUT	15.315	7 *	Pass	4.9
Security Code Information	---	---	Pass	2.2

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1.1 Summary of Test Results (continued)

Specific Requirements for UPCS Device				
Test Items	FCC Part 15 Section	Test Procedure ANSI C63.17	Results	Details see section
Unwanted Emission Inside the Sub-Band	15.323(d)	6.1.6.1	Pass	4.7
Emissions Outside the Sub-Band	15.323(d)	6.1.6.2	Pass	4.8
Frame Repetition Stability	15.323(e)	6.2.2	Pass	4.10
Frame Period and Jitter	15.323(e)	6.2.3	Pass	4.11
Carrier Frequency Stability	15.323(f)	6.2.1	Pass	4.12
Least Interfered Channel (LIC) Selection	15.323(c)(5)	7.3.2	Pass	4.13.2.1
Maximum Reaction Time	15.323(c)(7)	7.5	Pass	4.19

1.2 Statement of Compliance

The equipment under test is found to be complying with the following standards:

FCC Part 15, October 1, 2014 Edition

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**EXHIBIT 2
GENERAL DESCRIPTION**

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2.0 General Description

2.1 Product Description

The CS5158-3 is a DECT 6.0 Cordless Telephone. It operates at frequency range of 1921.536MHz to 1928.448MHz with 5 channels (1921.536MHz, 1923.264MHz, 1924.992MHz, 1926.720MHz and 1928.448MHz). The Base Unit is powered by an adaptor 100-120VAC to 6.0VDC 400mA.

The antenna used in base unit are integral, and the test sample is a prototype.

The Model(s): CS515Z-XY, CS5108, CS510Z-XY, CS5158-3 BS, CS5158-3 HS, CS515Z-XY BS, CS515Z-XY HS, CS5108 HS and CS510Z-XY HS are the same as the Model: CS5158-3 in electrical designs including software & firmware, PCB layout and construction design/physical design/enclosure. The only differences between these models are color and model number to be sold for marketing purpose. Suffix (X, Y, Z) indicates different number of Handset and extra Charger, color of enclosure and package type (material).

Connection between the device and the telephone network is accomplished through the use of USOC RJ11C in the 2-wire loop calling central office line.

2.2 Purpose of Change

The purpose of change is saved with filename: product change.pdf

2.3 Test Methodology

The radiated emission measurements for unintentional radiator (if any) and AC power line-conducted emission measurements were performed according to the test procedures specified in ANSI C63.4 (2014). The radiated emission measurements for intentional radiator contained in UPCS device, conducted emission measurements, Listen Before Transmit (LBT) tests, Time Frame and Frequency Stability tests were performed according to the test procedures specified in ANSI C63.17 (2013). All radiated measurements were performed in radiated emission test site. Preliminary scans were performed in the radiated emission test site only to determine worst case modes. All radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the "Justification Section" of this Application. All other measurements were made in accordance with the procedures in 47 CFR Part 2.

2.4 Test Facility

The radiated emission test site, AC power line conducted measurement facility and antenna port conducted measurement facility used to collect the radiated data, AC Power Line conducted data, and conductive data are at Intertek Testing Services Hong Kong Ltd., which is located at Workshop No. 3, G/F., World-Wide Industrial Centre, 43-47 Shan Mei Street, Fo Tan, Sha Tin, N.T., Hong Kong. This test facility and site measurement data have been fully placed on file with FCC.

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**EXHIBIT 3
SYSTEM TEST CONFIGURATION**

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3.0 System Test Configuration

3.1 Justification

For emissions testing, the equipment under test (EUT) was set up to transmit continuously in burst mode with pseudo-random data to simplify the measurement methodology. Care was taken to ensure proper power supply voltages during testing. During testing, all cables (if any) were manipulated to produce worst-case emissions.

The Base Unit was powered by a 100-120 50HZ 150mA to 6VDC 400mA adaptor. For the measurements, the EUT was attached to a plastic stand if necessary and placed on the wooden turntable. If the EUT is attached to accessories, they were connected and operational (as typical as possible).

The signal was maximized through rotation and placement in the three orthogonal axes. The antenna height and polarization were varied during the search for maximum signal level. The antenna height was varied from 1 to 4 meters. Detector function was in peak mode. Radiated emissions are taken at three meters unless the signal level was too low for measurement at that distance. If necessary, a pre-amplifier was used and/or the test was conducted at a closer distance.

For UPCS transmitter radiated measurement, the spectrum analyzer resolution bandwidth was approximately 1% of EUT emission bandwidth, unless otherwise specified.

Radiated emission measurements for UPCS transmitter were performed from the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

RF IC and circuit layout for base unit of CS5158-3 is the same with original granted model EL52XY5. Therefore conducted emission measurement for listen before transmit requirements except Least Interfered Channel (LIC) Selection and Maximum reaction for CS5158-3 are skipped.

As the base unit has 2 antennas, both have been checked. While conducting the test on one of antennas, another one was being disable its transmission. The data in this report represented the worst-case.

For AC line conducted emission test, the EUT along with its peripherals were placed on a 1.0m(W)x1.5m(L) and 0.8m in height wooden table and the EUT was adjusted to maintain a 0.4 meter space from a vertical reference plane. The EUT was connected to power mains through a line impedance stabilization network (LISN), which provided 50ohm coupling impedance for measuring instrument. The LISN housing, measuring instrument case, reference ground plane, and vertical ground plane were bounded together. The excess power cable between the EUT and the LISN was bundled.

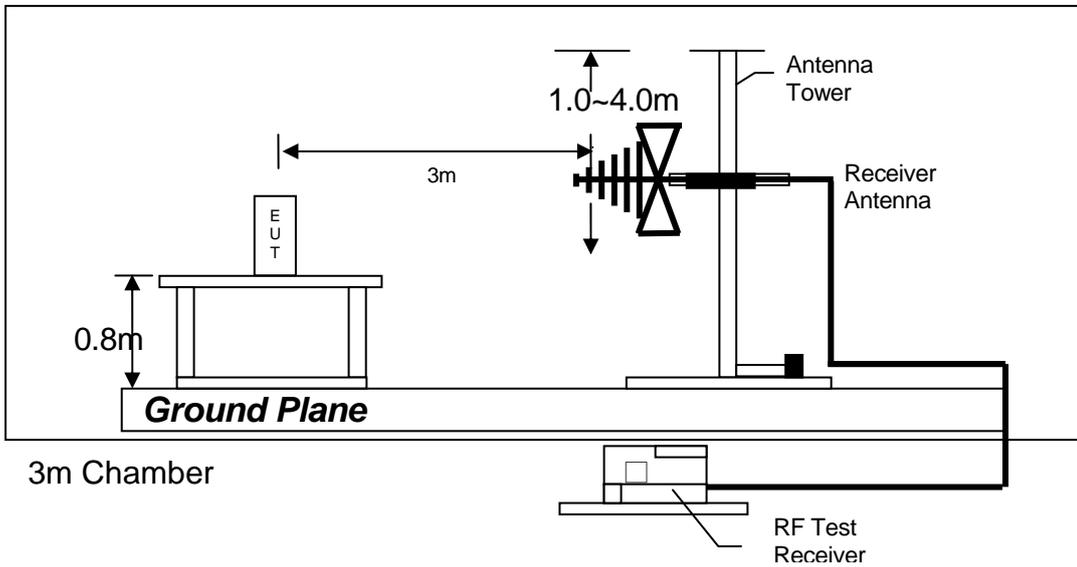
All connecting cables of EUT and peripherals were manipulated to find the maximum emission.

All relevant operation modes have been tested, and the worst case data is included in this report.

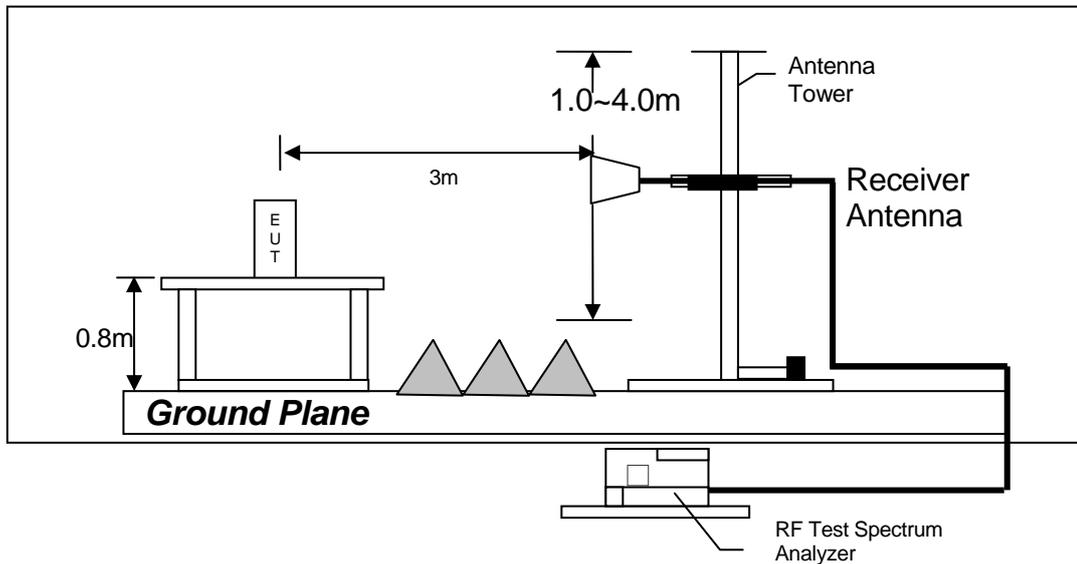
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3.2 Radiated Emission Test Setup

The figure below shows the test setup, which is utilized to make these measurements.



Test setup of radiated emissions up to 1GHz



Test setup of radiated emissions above 1GHz

Figure 3.2.1

3.3 AC Line Conducted Emission Test Setup

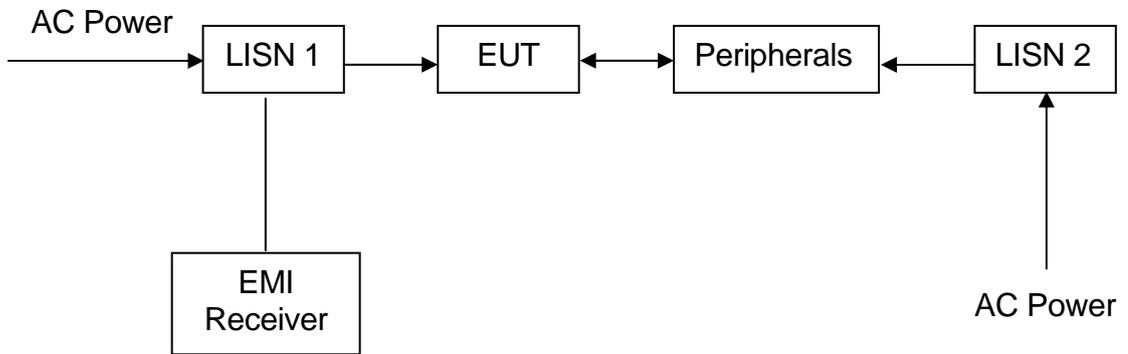


Figure 3.3.1

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3.4 Conducted Emission Test Configuration

The setup and equipment setting were made in accordance with ANSI C63.17. The antenna of EUT transmitter was replaced by a coaxial cable. The impedance matching of connection, cable loss and external RF attenuator are taken into account. The EUT was arranged to communicate via a fixed carrier frequency between its transmitter and a companion device. The transmission was configured in burst mode with pseudo-random data as typical as normal operation.

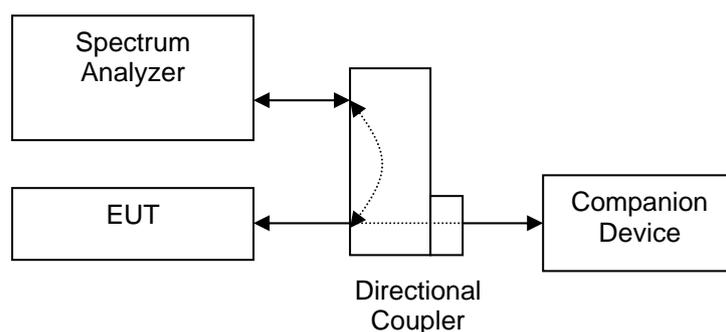


Figure 3.4.1

3.5 Conducted Monitoring and Operation Test Configuration

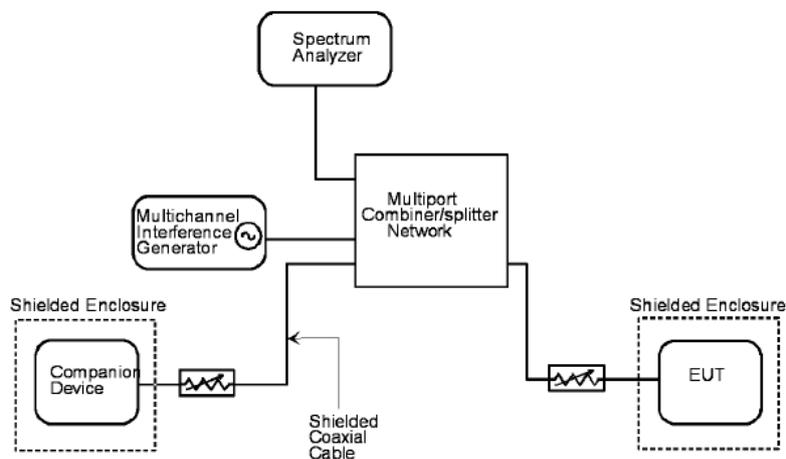


Figure 3.5.1

3.6 EUT Exercising Software

The EUT exercise program (if any) used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use.

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3.7 Details of EUT and Description of Accessories

Details of EUT:

An AC adaptor and/or a battery (provided with the unit) were used to power the device. Their descriptions are listed below.

- (1) Base Unit: An AC adaptor (100-120VAC 60Hz 150mA to 6.0VDC 400mA, Model: S003AKU0600040, Brand: Ten Pao) (Supplied by Client)
- (2) Base Unit: : An AC adaptor (100-120VAC 60Hz 150mA to 6.0VDC 400mA, Model: VT04UUS06040, Brand: VTech) (Supplied by Client)
- (3) Base Unit: : An AC adaptor (100-120VAC 60Hz 150mA to 6.0VDC 400mA, Model: RJ-AS060400U001, Brand: Ruijing) (Supplied by Client)

Description of Accessories:

- (1) Telecommunication cable with RJ11C connectors (1m, unshielded), terminated (Supplied by Intertek)

3.8 Measurement Uncertainty

When determining of the test conclusion, the Measurement Uncertainty of test has been considered. The values of the Measurement uncertainty for radiated emission test, AC line conducted emission test and RF conducted test, frequency stability and timing jitter are $\pm 5.3\text{dB}$, $\pm 4.2\text{dB}$, $\pm 1\text{dB}$, $\pm 23\text{Hz}$, $0.1\mu\text{s}$ respectively.

Uncertainty and Compliance - Unless the standard specifically states that measured values are to be extended by the measurement uncertainty in determining compliance, all compliance determinations are based on the actual measured value.

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**EXHIBIT 4
TEST RESULTS**

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4.0 **Measurement Results**

4.1 Antenna Requirement, FCC Rule 15.317:

EUT must meet the antenna requirement of FCC Rule 15.203.

EUT uses permanently attached antenna(s) which is considered sufficient to comply with the provisions of this rule. Please refer to internal photos.pdf for more details.

EUT uses unique antenna jack(s) or electrical connector(s) which is considered sufficient to comply with the provisions of this rule. Please refer to internal photos.pdf for more details.

4.2 Digital Modulation Techniques, FCC Rule 15.319(b):

All transmissions must use only digital modulation techniques.

The requirements are made in accordance with ANSI C63.17 sub-clause 6.1.4.

Attestation:

Please refer to the technical description(descr.pdf) or relevant DECT standards for more details.

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4.3 Emission Bandwidth, FCC Rule 15.323(a):

Operation shall be contained within the 1920 – 1930 MHz band. The emission bandwidth (*B*) shall be less than 2.5 MHz and greater than 50 kHz.

Measurements are made in accordance with ANSI C63.17 sub-clause 6.1.3. Test setup is shown in section 3.4 Figure 3.4.1.

Test Results:

Base unit - Traffic Carrier

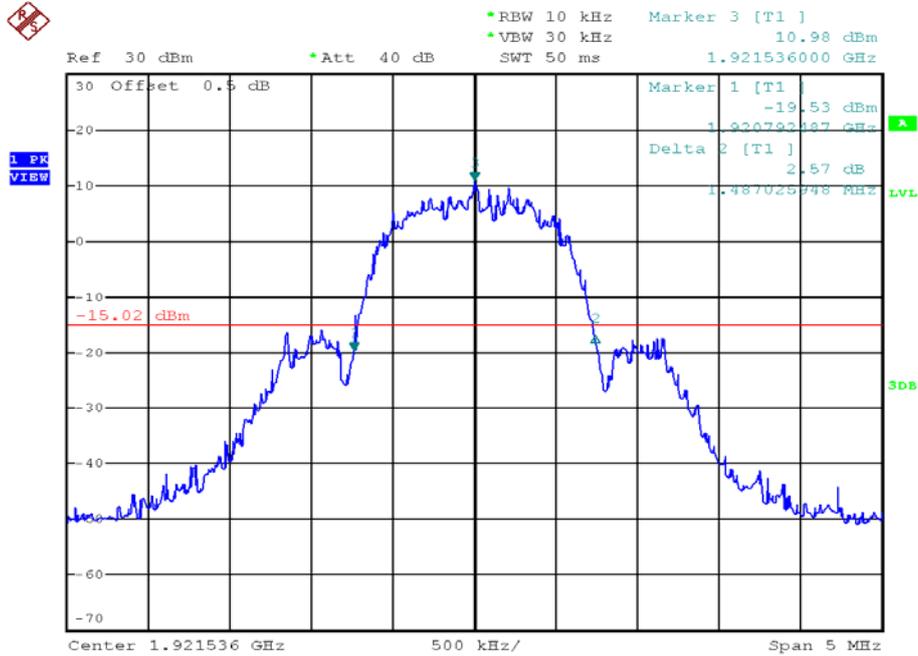
Channel	Channel Frequency (MHz)	Measuring Signal Level	Measured Emission Bandwidth (MHz)	Results
Lowest	1921.536	26 dB down	1.49	Pass
Highest	1928.448	26 dB down	1.45	Pass

The plots of emission bandwidth are saved as below.

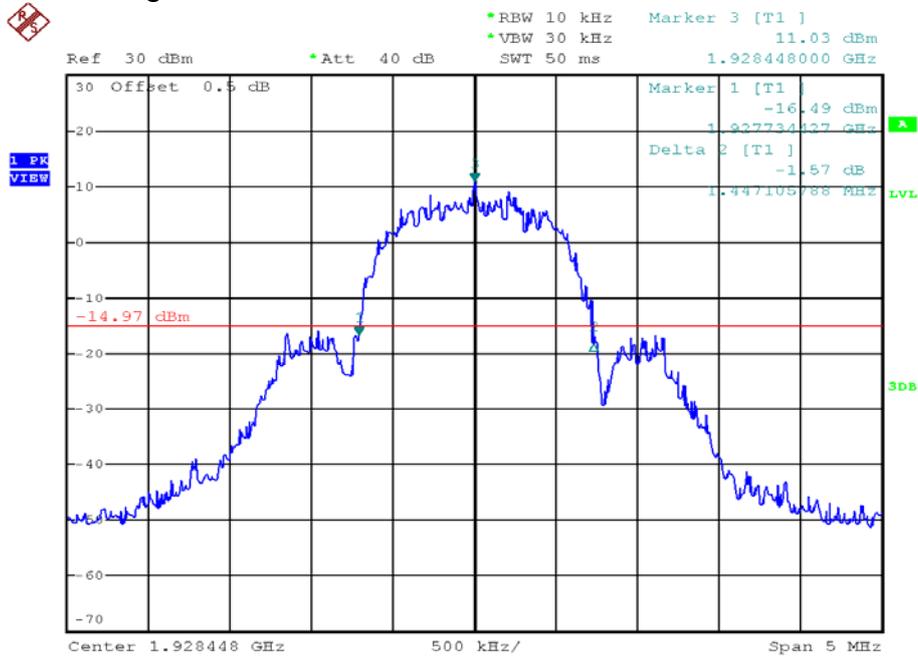
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Plots of emission bandwidth

Base unit, Lowest channel, Traffic carrier



Base unit, Highest channel, Traffic carrier



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4.4 Directional Gain of the Antenna, FCC Rule FCC 15.319(e):

The peak transmit power shall be reduced by the amount in dB that the maximum directional gain of the antenna exceeds 3 dBi.

The requirements are made in accordance with ANSI C63.17 sub-clause 4.3.1.

- Manufacturer declares that the directional gain of the antenna is less than or equal to 3dBi. No peak transmit power reduction is required.
- Manufacturer declares that the directional gain of the antenna is greater than 3dBi. The peak transmit power shall be reduced by ____ dB.

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4.5 Power Spectral Density, FCC Rule 15.319(d):

Power spectral density shall not exceed 3 mW (4.8dBm) in any 3 kHz bandwidth as measured with a spectrum analyzer having a resolution bandwidth of 3 kHz.

Measurements are made in accordance with ANSI C63.17 sub-clause 6.1.5. Test setup is shown in section 3.4 Figure 3.4.1.

Test Results:

Base unit - Traffic Carrier

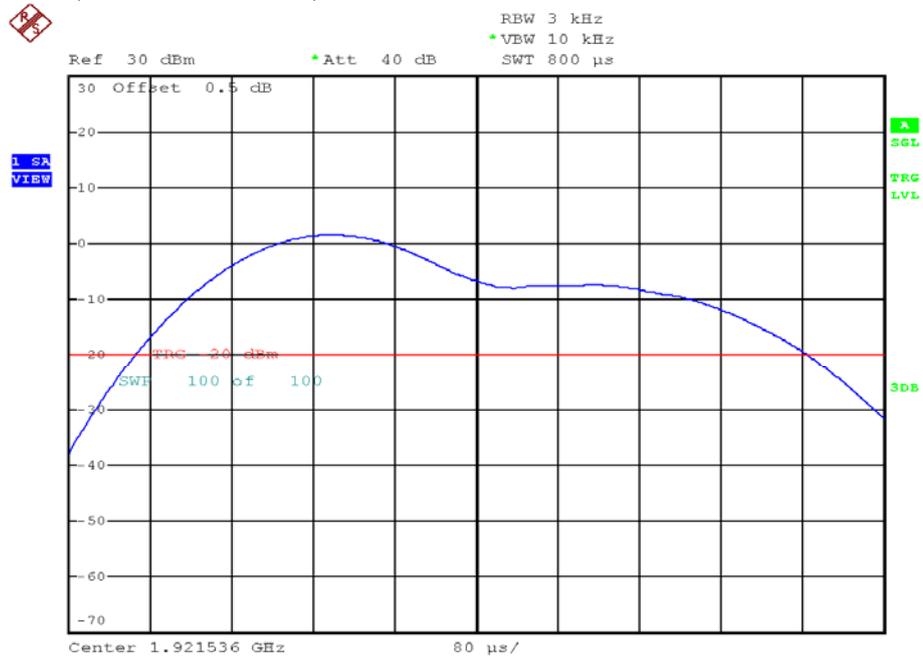
Channel	Channel Frequency (MHz)	Measured Power Spectral Density (dBm/3kHz)	Limit (dBm/3 kHz)	Results
Lowest	1921.536	-4.9	4.8	Pass
Highest	1928.448	-4.6	4.8	Pass

The plots of the power spectral density are as below.

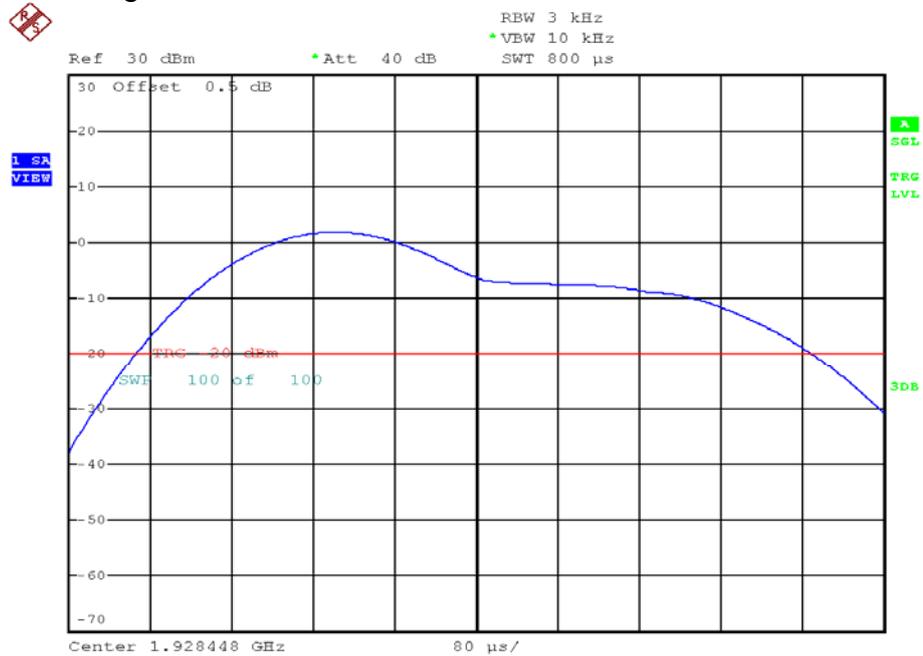
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Plots of the power spectral density

Base unit, Lowest channel, Traffic carrier



Base unit, Highest channel, Traffic carrier



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4.6 Automatic Discontinuation of Transmission, FCC Rule 15.319(f):

The EUT shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. These provisions are not intended to preclude transmission of control and signaling information or use of repetitive codes used by certain digital technologies to complete frame or burst intervals.

The manufacturer declares that the EUT can automatically discontinue transmission in case of either absent information to transmit or operational failure. Please refer to the declaration letter for details, which is saved with filename: declaration.pdf.

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4.7 Unwanted Emission Inside the Sub-Band, FCC Rule 15.323(d):

Emissions inside the sub-band must comply with the following emission mask:

1. In the bands between $1B$ and $2B$ measured from the center of the emission bandwidth, emission shall be at least 30 dB below the permitted peak transmit power.
2. In the bands between $2B$ and $3B$ measured from the center of the emission bandwidth, emission shall be at least 50 dB below the permitted peak transmit power.
3. In the bands between $3B$ and the band edge, emission shall be at least 60 dB below the permitted peak transmit power.

Where B = emission bandwidth in Hz

Measurements are made in accordance with ANSI C63.17 sub-clause 6.1.6.1. Test setup is shown in section 3.4 Figure 3.4.1

Test Results:

Base unit - Traffic Carrier

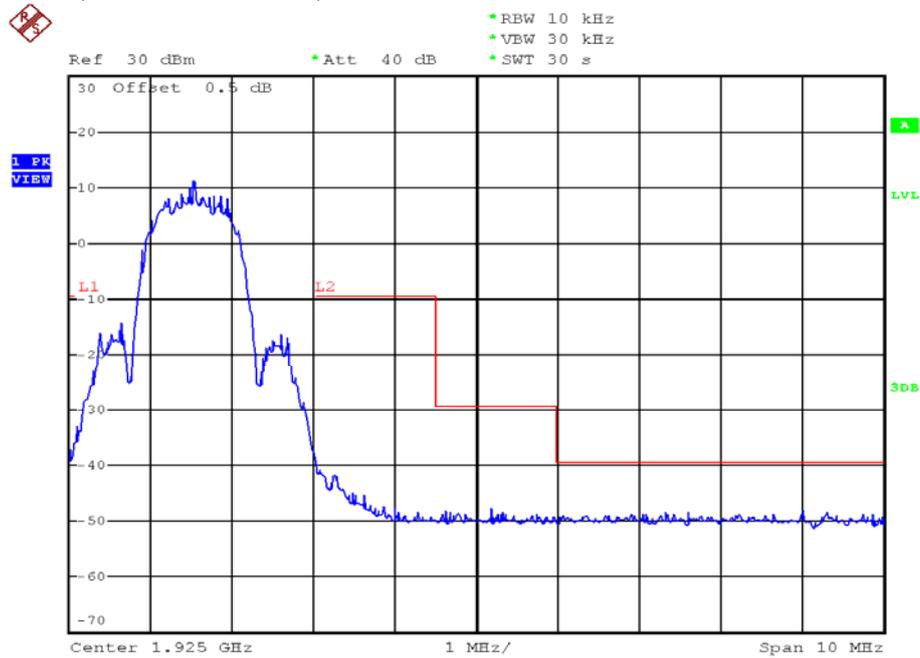
Channel	Channel Frequency (MHz)	Results
Lowest	1921.536	Pass
Middle	1924.992	Pass
Highest	1928.448	Pass

The plots of the unwanted emission inside the sub-band are as below.

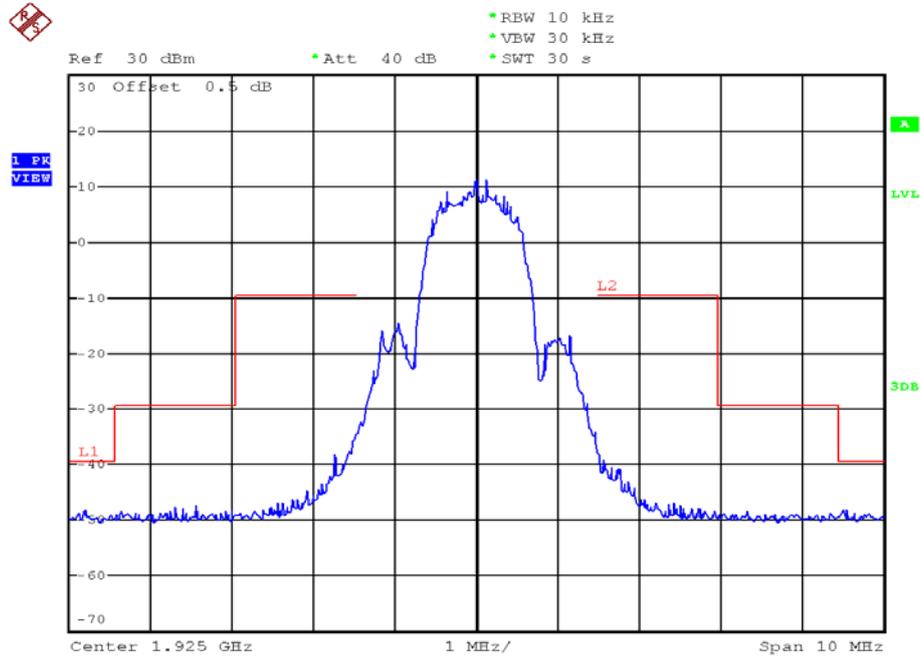
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Plots of the unwanted emission inside the sub-band

Base unit, Lowest channel, Traffic carrier



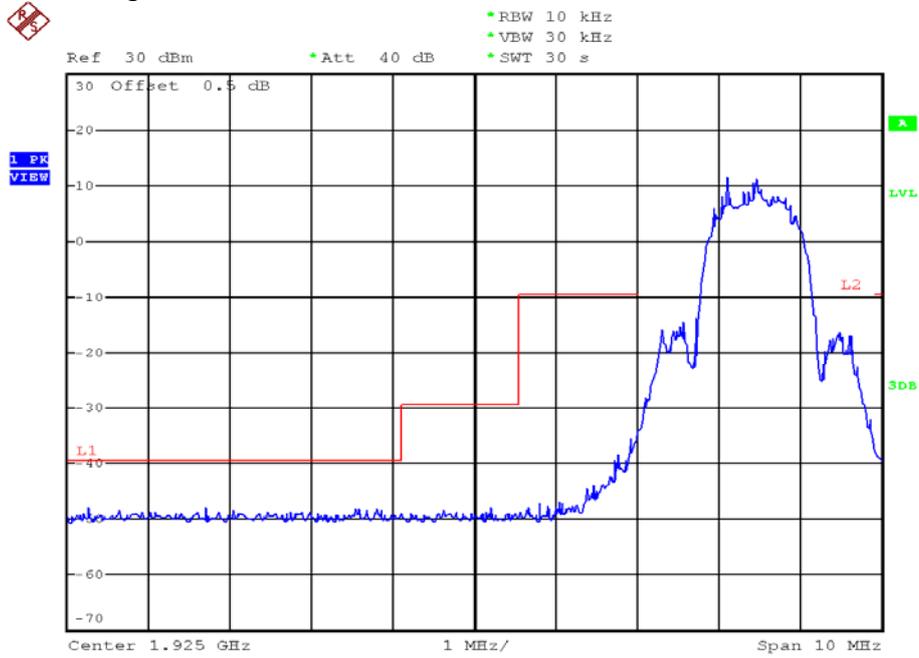
Base unit, Middle channel, Traffic carrier



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Plots of the unwanted emission inside the sub-band

Base unit, Highest channel, Traffic carrier



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4.8 Emissions Outside the Sub-Band, FCC Rule 15.323(d):

Emissions outside the sub-band shall be attenuated below a reference power of 112 mW (20.5 dBm) as follows:

1. 30 dB between the band edge and 1.25 MHz above or below the band;
2. 50 dB between 1.25 and 2.5 MHz above or below the band; and
3. 60 dB at 2.5 MHz or greater above or below the band, or shall meet the requirement of FCC Rule 15.319(g) which shall not exceed the limits of FCC Rule 15.209.

Example: Calculation of Limit for emissions between the band edge and 1.25 MHz (1920.000 – 1918.750 MHz)

The emissions shall not exceed the Limit: 20.5 dBm – 30 dB = -9.5 dBm

Measurements are made in accordance with ANSI C63.17 sub-clause 6.1.6.2. Radiated emissions test method is used. Emissions that are directly caused by digital circuits in the transmit path and transmitter portion are measured.

Test setup is shown in section 3.2 Figure 3.2.1

Test Results:

Channel	Carrier Frequency (MHz)	Measured Band (MHz)	Limit (dBm)	Results
Lowest	1921.536	1920.000 - 1918.750	-9.5	Pass
		1918.750 - 1917.500	-29.5	Pass
		0.009 - 1917.500 & 1932.500 - 19300.000	-39.5 / FCC Rule 15.209	Pass
Highest	1928.448	1930.000 - 1931.250	-9.5	Pass
		1931.250 - 1932.500	-29.5	Pass
		0.009 – 1917.500 & 1932.500 - 19300.000	-39.5 / FCC Rule 15.209	Pass

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4.8.1 Radiated Emissions Configuration Photographs:

Worst Case Radiated Emission
at

Base unit with adaptor "Ten Pao": 225.966 MHz

The worst case radiated emission configuration photographs are saved with filename: config photos.pdf

4.8.2 Radiated Emissions Data:

Data are included of the worst case configuration (the configuration which resulted in the highest emission levels). A sample calculation, configuration photographs and data tables of the emissions are included. All measurements were performed with peak detection unless otherwise specified.

The data in table 1-3 list the significant emission frequencies, the limit and the margin of compliance.

Judgement:

Base unit with adaptor "Ten Pao" - Passed more than 20 dB margin

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Mode: Talk with adaptor "Ruijing"

Table 1, Base Unit

Radiated Emissions Data
Pursuant To FCC Part 15 Section 15.323 (d) Emissions Requirements

Polarization	Frequency (MHz)	Measured Power (dBm)	Power Limit (dBm)	Margin (dB)
V	45.126	-73.8	-39.5	-34.3
V	58.448	-73.1	-39.5	-33.6
V	133.496	-72.2	-39.5	-32.7
V	198.248	-71.9	-39.5	-32.4
V	228.996	-69.1	-39.5	-29.6
V	352.659	-70.2	-39.5	-30.7

NOTES:

1. Peak detector is used for the emission measurement.
2. All measurements were made at 3 meters.
3. Negative value in the margin column shows emission below limit.

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Mode: Talk with adaptor "Ten Pao"

Table 2, Base Unit

Radiated Emissions Data
Pursuant To FCC Part 15 Section 15.323 (d) Emissions Requirements

Polarization	Frequency (MHz)	Measured Power (dBm)	Power Limit (dBm)	Margin (dB)
V	41.599	-74.8	-39.5	-35.3
V	52.455	-72.1	-39.5	-32.6
V	130.565	-72.2	-39.5	-32.7
V	194.888	-70.9	-39.5	-31.4
V	225.966	-69.9	-39.5	-30.4
V	356.639	-72.3	-39.5	-32.8

NOTES:

1. Peak detector is used for the emission measurement.
2. All measurements were made at 3 meters.
3. Negative value in the margin column shows emission below limit.

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Mode: Talk with adaptor "VTech"

Table 3, Base Unit

Radiated Emissions Data
Pursuant To FCC Part 15 Section 15.323 (d) Emissions Requirements

Polarization	Frequency (MHz)	Measured Power (dBm)	Power Limit (dBm)	Margin (dB)
V	42.159	-74.8	-39.5	-35.3
V	54.448	-74.1	-39.5	-34.6
V	132.496	-72.2	-39.5	-32.7
V	195.289	-70.9	-39.5	-31.4
V	221.965	-70.1	-39.5	-30.6
V	295.632	-72.2	-39.5	-32.7

NOTES:

1. Peak detector is used for the emission measurement.
2. All measurements were made at 3 meters.
3. Negative value in the margin column shows emission below limit.

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4.8.3 Field Strength Calculation

The field strength is calculated by adding the reading on the Spectrum Analyzer to the factors associated with preamplifiers (if any), antennas, cables, pulse desensitization and average factors (when specified limit is in average and measurements are made with peak detectors). A sample calculation is included below.

$$FS = RA + AF + CF - AG + PD + AV$$

Where

- FS = Field Strength in dB μ V/m
- RA = Receiver Amplitude (including preamplifier) in dB μ V
- CF = Cable Attenuation Factor in dB
- AF = Antenna Factor in dB
- AG = Amplifier Gain in dB
- PD = Pulse Desensitization in dB
- AV = Average Factor in -dB

In the radiated emission table which follows, the reading shown on the data table may reflect the preamplifier gain. An example of the calculations, where the reading does not reflect the preamplifier gain, follows:

$$FS = RA + AF + CF - AG + PD + AV$$

Example

Assume a receiver reading of 62.0 dB μ V is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29.0 dB is subtracted. The pulse desensitization factor of the spectrum analyzer is 0.0 dB, and the resultant average factor is -10.0 dB. The net field strength for comparison to the appropriate emission limit is 32.0 dB μ V/m. This value in dB μ V/m is converted to its corresponding level in μ V/m.

RA = 62.0 dB μ V
AF = 7.4 dB
CF = 1.6 dB
AG = 29.0 dB
PD = 0.0 dB
AV = -10 dB

$$FS = 62.0 + 7.4 + 1.6 - 29.0 + 0.0 + (-10.0) = 32.0 \text{ dB}\mu\text{V/m}$$

$$\text{Level in } \mu\text{V/m} = \text{Common Antilogarithm} [(32.0 \text{ dB}\mu\text{V/m})/20] = 39.8 \mu\text{V/m}$$

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4.8.4 Average Factor Calculation and Transmitter ON Time Measurements, FCC Rule 15.35(b, c)

- The EUT antenna output port was connected to the input of the spectrum analyzer. The analyzer center frequency was set to EUT RF channel carrier. The SPAN function on the analyzer was set to ZERO. The transmitter ON time was determined from the resultant time-amplitude display:

Please refer to the attached plots for more details:

The plots of Transmitter ON Time Measurements are as below.

- Please refer to the attached transmitter timing diagram that are provided by manufacturer
- Not applicable - No average factor is required.
- Please refer to Technical Description (descri.pdf) for more details

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4.9 AC Power Line Conducted Emissions, FCC Rule 15.315:

The AC power line conducted emission shall not exceed the limits of FCC Rule 15.207.

Measurements are made in accordance with ANSI C63.4 sub-clause 7. Emissions that are directly caused by digital circuits in the transmit path and transmitter portion are measured.

Test setup is shown in section 3.3 Figure 3.3.1.

- Not applicable – EUT is only powered by battery for operation.

- EUT connects to AC power line. Emission Data is listed in following pages.

- Base Unit connects to AC power line and has transmission. Handset connects to AC power line (indirectly) but has no transmission. Emission Data of Base Unit is listed in following pages.

- Handset connects to AC power line (indirectly) only during charging. Emission Data is listed in following pages.

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4.9.1 AC Power Line Conducted Emissions Configuration Photographs:

Worst Case AC Power Line Conducted Emission
at

Base unit with adaptor "VTech": 460.5 kHz

The worst case AC power Line conducted emission configuration photographs are saved with filename: config photos.pdf

4.9.2 AC Power Line Conducted Emissions Data:

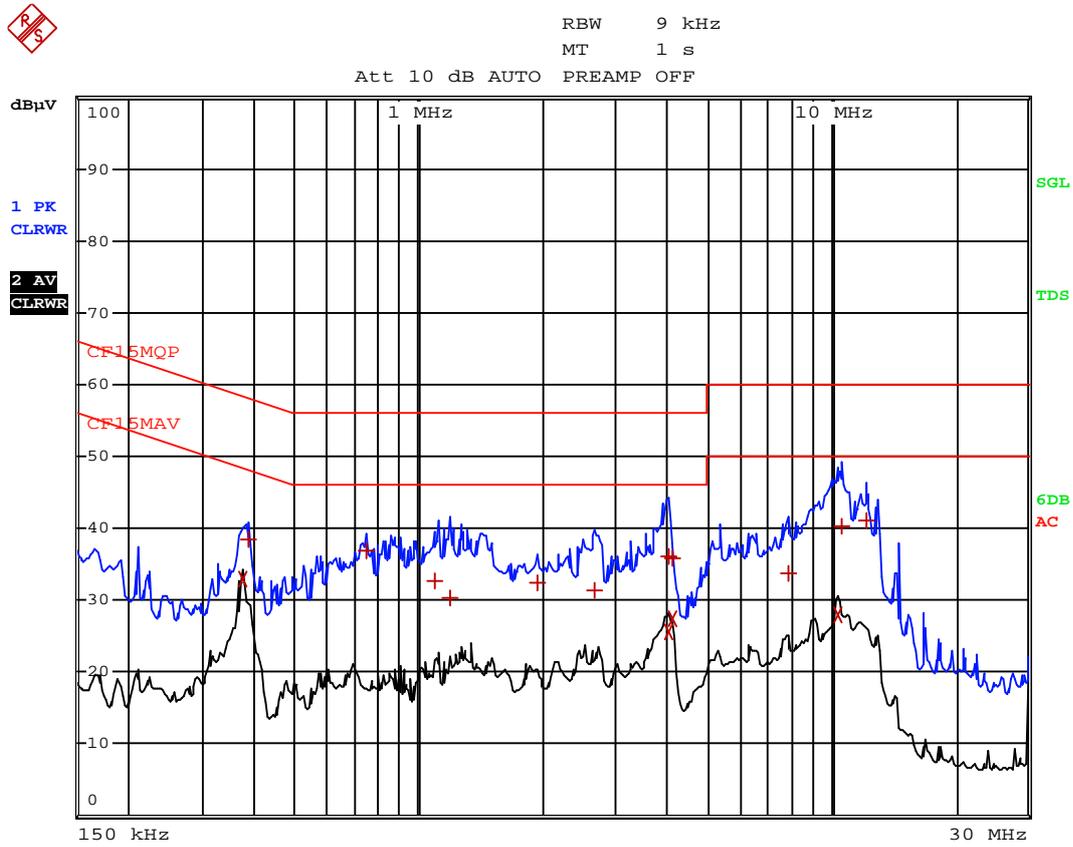
The plot(s) and data in the following pages list the significant emission frequencies, the limit and the worst case margin of compliance.

Judgment:

Base unit with adaptor "VTech": Passed by 10.9 dB margin compared with CISPR average limit

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Worst Case: Talk with adaptor "Ruijing"



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Worst Case: Talk with adaptor "Ruijing"

EDIT PEAK LIST (Final Measurement Results)				
Trace1:	CF15MQP			
Trace2:	CF15MAV			
Trace3:	---			
	TRACE	FREQUENCY	LEVEL dBμV	DELTA LIMIT dB
2	CISPR Average	375 kHz	33.06 L1	-15.32
1	Quasi Peak	384 kHz	38.45 L1	-19.73
1	Quasi Peak	748.5 kHz	36.83 L1	-19.16
1	Quasi Peak	1.0905 MHz	32.69 L1	-23.30
1	Quasi Peak	1.194 MHz	30.26 N	-25.73
1	Quasi Peak	1.941 MHz	32.41 N	-23.58
1	Quasi Peak	2.6835 MHz	31.24 N	-24.75
1	Quasi Peak	4.0335 MHz	36.14 L1	-19.85
2	CISPR Average	4.065 MHz	25.54 N	-20.45
2	CISPR Average	4.1235 MHz	27.53 N	-18.46
1	Quasi Peak	4.1325 MHz	35.90 N	-20.09
1	Quasi Peak	7.9485 MHz	33.71 N	-26.28
2	CISPR Average	10.383 MHz	27.99 L1	-22.00
1	Quasi Peak	10.5855 MHz	40.37 L1	-19.62
1	Quasi Peak	12.1695 MHz	41.03 L1	-18.96

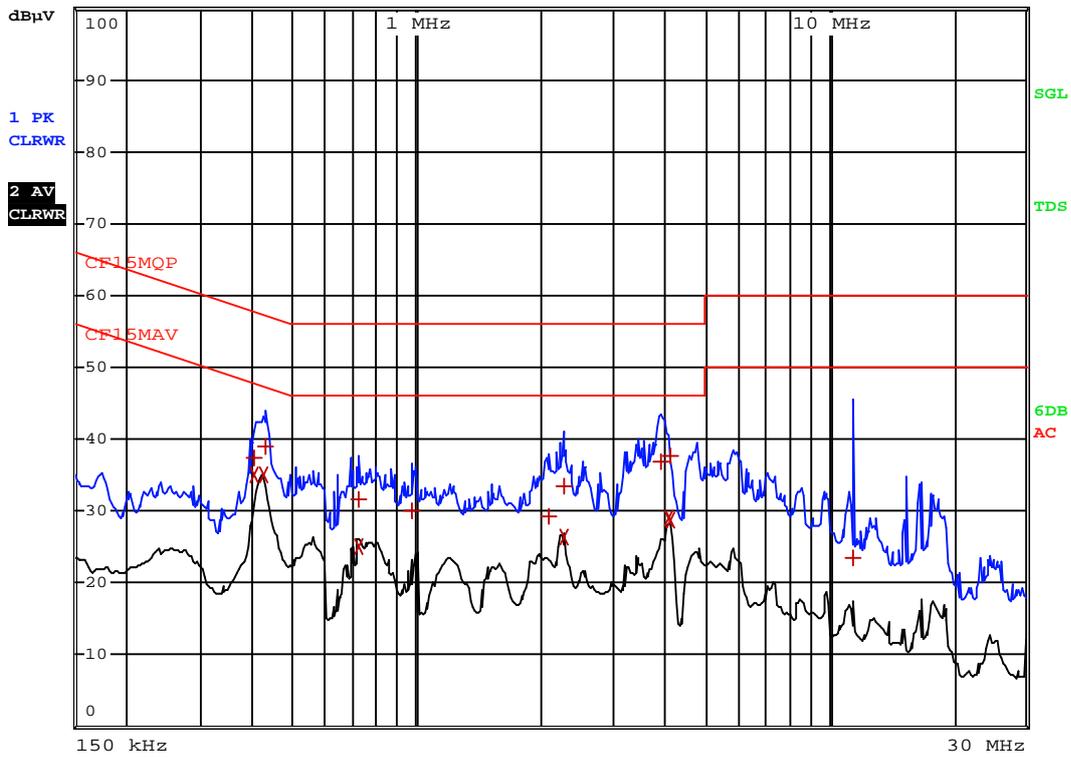
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Worst Case: Talk with adaptor "Ten Pao"



RBW 9 kHz
MT 1 s

Att 10 dB AUTO PREAMP OFF



INTERTEK TESTING SERVICES

Worst Case: Talk with adaptor "Ten Pao"

EDIT PEAK LIST (Final Measurement Results)				
Trace1:	CF15MQP			
Trace2:	CF15MAV			
Trace3:	---			
	TRACE	FREQUENCY	LEVEL dB μ V	DELTA LIMIT dB
1	Quasi Peak	402 kHz	37.29 N	-20.51
2	CISPR Average	402 kHz	35.07 N	-12.73
2	CISPR Average	424.5 kHz	35.15 L1	-12.20
1	Quasi Peak	429 kHz	39.05 L1	-18.22
1	Quasi Peak	721.5 kHz	31.51 L1	-24.48
2	CISPR Average	721.5 kHz	25.08 L1	-20.91
1	Quasi Peak	978 kHz	30.05 L1	-25.94
1	Quasi Peak	2.0895 MHz	29.38 N	-26.62
1	Quasi Peak	2.2695 MHz	33.44 N	-22.55
2	CISPR Average	2.283 MHz	26.28 N	-19.71
1	Quasi Peak	3.9075 MHz	36.90 L1	-19.09
2	CISPR Average	4.092 MHz	29.05 L1	-16.94
2	CISPR Average	4.1235 MHz	28.77 L1	-17.22
1	Quasi Peak	4.1325 MHz	37.74 N	-18.25
1	Quasi Peak	11.4045 MHz	23.43 N	-36.56

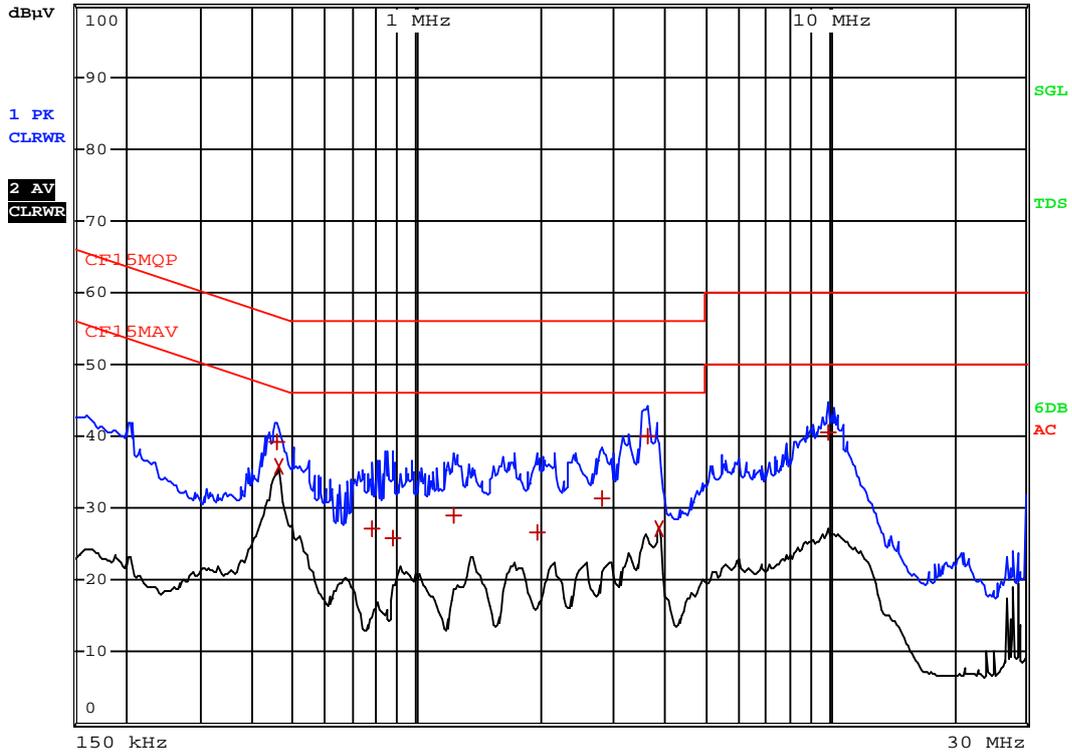
INTERTEK TESTING SERVICES

Worst Case: Talk with adaptor "VTech"



RBW 9 kHz
MT 1 s

Att 10 dB AUTO PREAMP OFF



INTERTEK TESTING SERVICES

Worst Case: Talk with adaptor "VTech"

EDIT PEAK LIST (Final Measurement Results)					
TRACE		FREQUENCY	LEVEL dB μ V		DELTA LIMIT dB
Trace1:	CF15MQP				
Trace2:	CF15MAV				
Trace3:	---				
1	Quasi Peak	456 kHz	39.11	L1	-17.65
2	CISPR Average	460.5 kHz	35.78	L1	-10.89
1	Quasi Peak	775.5 kHz	27.09	L1	-28.90
1	Quasi Peak	879 kHz	25.87	L1	-30.13
1	Quasi Peak	1.23 MHz	29.00	N	-26.99
1	Quasi Peak	1.959 MHz	26.51	L1	-29.48
1	Quasi Peak	2.805 MHz	31.38	N	-24.61
1	Quasi Peak	3.624 MHz	40.02	L1	-15.97
2	CISPR Average	3.8715 MHz	27.11	L1	-18.88
1	Quasi Peak	9.978 MHz	40.64	L1	-19.35

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4.10 Frame Repetition Stability, FCC Rule 15.323(e):

- [] EUT implements Time Division Duplex (TDD) (not include TDMA) in order to support duplex connection on a given frequency carrier shall maintain a frame repetition rate whereby 3 x standard deviation of the frequency stability shall not exceed 50 ppm, not including a shift of the mean.
- [x] EUT uses Time Division Multiple Access (TDMA) in order to support multiple communication links on a given frequency carrier shall maintain a frame repetition rate whereby 3 x standard deviation of the frequency stability shall not exceed 10 ppm, not including a shift of the mean.

Measurements are made in accordance with ANSI C63.17 sub-clause 6.2.2. Test setup is shown in section 3.4 Figure 3.4.1. A spectrum analyzer measures the time duration between rising edges of two consecutive frames over a time period of at least 1000 frame periods. These measurement values are used to compute the 3 x standard deviation of the frequency stability.

Test Results:

I. Base unit

Maximum Frame Repetition Stability (ppm)	Limit (ppm)	Results
-0.1719	±10	Pass

II. Handset

Maximum Frame Repetition Stability (ppm)	Limit (ppm)	Results
-0.2718	±10	Pass

INTERTEK TESTING SERVICES

4.11 Frame Period and Jitter, FCC Rule 15.323(e):

The frame period (a set of consecutive time slots in which the position of each time slot can be identified by reference to a synchronizing source) of EUT operating in these sub-bands shall be 20 ms or 10 ms/X where X is a positive whole number.

The jitter (time-related, abrupt, spurious variations in the duration of the frame interval) introduced at the two ends of such a communication link shall not exceed 25 μ s for any two consecutive transmissions. Transmissions shall be continuous in every time and spectrum window during the frame period defined for EUT.

Measurements are made in accordance with ANSI C63.17 sub-clause 6.2.3. Test setup is shown in section 3.4 Figure 3.4.1. A spectrum analyzer measures the time duration between the rising edges of two consecutive frames. The measurements are taken over 100,000 frames. These measurement values are used to compute mean value and the difference between any two consecutive frame periods. The mean value is the frame period.

Test Results:

I. Base unit

Measured Maximum Jitter (μ s)	Limit (μ s)	Result
>-0.0001 & <0.0001	\pm 25	Pass

II. Handset

Measured Maximum Jitter (μ s)	Limit (μ s)	Result
>-0.0001 & <0.0001	\pm 25	Pass

INTERTEK TESTING SERVICES

4.12 Carrier Frequency Stability, FCC Rule 15.323(f):

The carrier frequency stability of EUT shall be maintained within +/-10 ppm at the following conditions:

1. Over 1 hour at nominal supply voltage and a temperature of +20 °C;
2. Over a variation in the primary supply voltage of 85 % to 115 % of nominal supply voltage at a temperature of +20 °C. This test does not apply to an EUT that is only powered by battery for operation;
3. Over a temperature variation of -20 °C to +50 °C or at extreme temperatures as declared by manufacturer, and at nominal supply voltage.

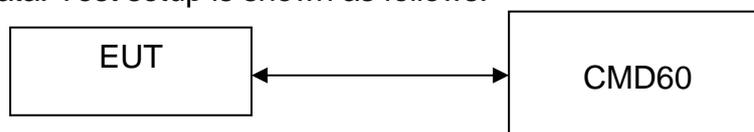
For base unit:

The nominal supply voltage: 115 VAC and the extreme temperatures of -20°C to +50°C are declared by manufacturer.

For handset:

The nominal supply voltage: 2.4 VDC and the extreme temperatures of -20°C to +50°C are/is declared by manufacturer.

Measurements are made in accordance with ANSI C63.17 sub-clause 6.2.1 The EUT and CMD60 is connected with shielded coaxial cable. The EUT is controlled by DECT Radio Communication Tester, CMD60, to use a fixed frequency channel during test as well as record the frequency offset. The transmission of EUT is in burst mode with pseudo-random data. Test setup is shown as follows.



Test Results:

I a. Carrier Frequency Stability over time - base unit

Supply Voltage	Temperature (°C)	Measured Frequency Offset Over an hour (ppm)		Limit (ppm)	Result
		Max.	Min.		
Nominal	+20°C	0.91	-0.13	±10	Pass

I b. Carrier Frequency Stability over Power Supply Voltage - base unit

Supply Voltage	Temperature (°C)	Measured Frequency Offset (ppm)	Limit (ppm)	Results
85%	+20°C	0.39	±10	Pass
115%	+20°C	0.39	±10	Pass

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4.12 Carrier Frequency Stability, FCC Rule 15.323(f): -Continued

I c. Carrier Frequency Stability over Temperature - base unit

Supply Voltage	Temperature (°C)	Measured Frequency Offset (ppm)	Limit (ppm)	Results
Nominal	-20°C	1.43	±10	Pass
Nominal	+50°C	-1.17	±10	Pass

II a. Carrier Frequency Stability over time - handset

Supply Voltage	Temperature (°C)	Measured Frequency Offset Over an hour (ppm)		Limit (ppm)	Result
		Max.	Min.		
Nominal	+20°C	1.64	-2.00	±10	Pass

II b. Carrier Frequency Stability over Power Supply Voltage - handset

Supply Voltage	Temperature (°C)	Measured Frequency Offset (ppm)	Limit (ppm)	Results
85%	+20°C	NA	±10	NA
115%	+20°C	NA	±10	NA

II c. Carrier Frequency Stability over Temperature -handset

Supply Voltage	Temperature (°C)	Measured Frequency Offset (ppm)	Limit (ppm)	Results
Nominal	-20°C	-0.44	±10	Pass
Nominal	+50°C	-5.11	±10	Pass

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4.13 Least Interfered Channel, LIC, FCC Rule 15.323(c)(5):

- Not implemented – EUT met monitoring threshold requirements. Please refer to the section 4.14.1 for more details
- If access to spectrum is not available as determined by section 4.14.1 and a minimum of 20 duplex system access channels are defined for the EUT, the time and spectrum windows with the lowest power level may be accessed

Number of duplex channels per frequency channel = 12

Number of frequency channel = 5

Total Duplex Channels = 60

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4.13.1 Least Interfered Channel (LIC) Selection, FCC Rule 15.323(c)(5):

The criteria are specified in section 4.14.2. In addition, the power measurement resolution for this comparison must be accurate to within 6 dB.

Measurements are made in accordance with ANSI C63.17 sub-clause 7.3.2. Test setup is shown in section 3.5 Figure 3.5.1. RF signal generators apply uniform CW interference on all EUT carriers except two carriers (designated f_1 and f_2), each at level $T_L + U_M + 14\text{dB}$ (cases 1 and 2) and $T_L + U_M + 8\text{dB}$ (cases 3 and 4). EUT can only transmit on f_2 carrier (cases 1 and 3) and f_1 carrier (cases 2 and 4).

Test Descriptions and Results:

I. LIC Procedure - Base unit

	Test Descriptions	EUT transmits on	Results
1	Apply interference on f_1 at level $T_L + U_M + 7\text{ dB}$. Apply interference on f_2 at level $T_L + U_M$. Initiate transmission. Verify transmission on f_2 . Terminate transmission. Repeat 5 times.	f_2	Pass
2	Apply interference on f_1 at level $T_L + U_M$. Apply interference on f_2 at level $T_L + U_M + 7\text{ dB}$. Initiate transmission. Verify transmission on f_1 . Terminate transmission. Repeat 5 times.	f_1	Pass
3	Apply interference on f_1 at level $T_L + U_M + 1\text{ dB}$. Apply interference on f_2 at level $T_L + U_M - 6\text{ dB}$. Initiate transmission. Verify transmission on f_2 . Terminate transmission. Repeat 5 times.	f_2	Pass
4	Apply interference on f_1 at level $T_L + U_M - 6\text{ dB}$. Apply interference on f_2 at level $T_L + U_M + 1\text{ dB}$. Initiate transmission. Verify transmission on f_1 . Terminate transmission. Repeat 5 times.	f_1	Pass

NA - Not applicable

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4.14 Maximum Reaction Time, FCC Rule 15.323(c)(7).2:

The monitoring system bandwidth must have a maximum reaction time less than $50 \times \text{SQRT}(1.25/\text{emission bandwidth } B \text{ in MHz}) \mu\text{s}$ for signals at the applicable threshold level but shall not be required to be less than $50 \mu\text{s}$. If a signal is detected that is 6 dB or more above the applicable threshold level, the maximum reaction time shall be $35 \times \text{SQRT}(1.25/\text{emission bandwidth } B \text{ in MHz}) \mu\text{s}$ but shall not be required to be less than $35 \mu\text{s}$.

Measurements are made in accordance with ANSI C63.17 sub-clause 7.5. Test setup is shown in section 3.5 Figure 3.5.1.

Test Results:

	Test	Reaction of EUT	Results
1	Apply Interference Pulse $50\mu\text{s}$ on f_1 at pulsed level $T_L + U_m$, then apply a CW signal on f_2 at the level T_L	f_2	Pass
2	Change Interference Pulse to $35\mu\text{s}$ on f_1 at pulsed level $T_L + U_m + 6\text{dB}$,	f_2	Pass

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**EXHIBIT 5
EQUIPMENT LIST**

INTERTEK TESTING SERVICES

5.0 Equipment List

1) Radiated Emissions Test

Equipment	Biconical Antenna	Log Periodic Antenna	Double Ridged Guide Antenna
Registration No.	EW-0571	EW-0447	EW-1133
Manufacturer	EMCO	EMCO	EMCO
Model No.	3104C	3146	3115
Calibration Date	Jun. 23, 2015	Mar. 16, 2015	Nov. 05, 2015
Calibration Due Date	Dec. 23, 2016	Sep. 16, 2016	May 05, 2017

Equipment	EMI Test Receiver	Spectrum Analyzer
Registration No.	EW-3095	EW-2466
Manufacturer	R&S	R&S
Model No.	ESCI	FSP30
Calibration Date	Nov. 5, 2015	Sep. 16, 2015
Calibration Due Date	Nov. 5, 2016	Aug. 20, 2016

2) Conducted Emissions Test

Equipment	EMI Test Receiver	LISN
Registration No.	EW-3095	EW-2501
Manufacturer	R&S	R&S
Model No.	ESCI	ENV-216
Calibration Date	Nov 5, 2015	Jan 28, 2016
Calibration Due Date	Nov 5, 2016	Jan 28, 2017

3) Conductive Measurement Test

Equipment	Coaxial directional coupler	Spectrum Analyzer	Digital Radiocommunication Tester for DECT
Registration No.	EW-2337	EW-3110	EW-1739
Manufacturer	MAGNA	R&S	ROHDESCHWARZ
Model No.	4222-16	FSP30	CMD60
Calibration Date	Nil*	Jan. 14, 2016	Aug. 10, 2015
Calibration Due Date	Nil*	Jan. 14, 2017	Aug. 10. 2016

Equipment	Vector Signal Generator	Temperature & Humidity Chamber	Digital Multimeter
Registration No.	EW-2411	EW-2134	EW-1021
Manufacturer	R&S	GIANT FORCE	FLUKE
Model No.	SMU200A	GTH-750-40-CP-SD	87-IV
Calibration Date	Aug. 10, 2015	Sep. 16, 2015	Oct. 29, 2015
Calibration Due Date	Aug. 10. 2016	Sep. 16. 2016	Nov. 29, 2016

END OF TEST REPORT