



# EMC Test Report

**Product Name: Fixed Wireless Terminal**

**Model Number: FT2260VW**

**Report No: SYBHZ(R)E031062010EB-1**

**QISFT2260**

**Reliability Laboratory of Huawei Technologies Co., Ltd.**

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## Notice 1

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2. The laboratory has obtained the accreditation of THE AMERICAN ASSOCIATION FOR LABORATORY ACCREDITATION (A2LA), and Accreditation Council Certificate Number: 2174.01.
3. The laboratory has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements. The site recognition number is 97456.
4. The laboratory has been listed by industry Canada to perform electromagnetic emission measurement. The site recognition number is 6369A-1.
5. The laboratory also has been listed by the VCCI to perform EMC measurements. The accreditation number is R2364, C2583, and T256.
6. The test report is invalid if not marked with "exclusive stamp for the test report".
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10. Normally, the test report is only responsible for the samples that have undergone the test.
11. Context of the test report cannot be used partially or in full for publicity and/or promotional purposes without previous written approval of the laboratory.



## Notice 2

Modification Information:

Table 1 Modification Information

Modification Information	1	
	2	
	3	<i>Not Applicable!</i>
	4	
	5	
	6	
	7	



**REPORT ON** **EMC TEST OF Fixed Wireless Terminal**

**REGULATION** **M/N: FT2260VW**

**REGULATION** **FCC CFR47 Part 15: Subpart B;**  
**FCC CFR47 Part 22: Subpart H;**  
**FCC CFR47 Part 24: Subpart E;**

**START OF TEST** **Jul.01, 2010**

**END OF TEST** **Jul.06, 2010**

**Final Judgement:** **Pass**

Approver

2010-07-07  
Date

张兴海  
Name

张兴海  
Signature



Operator

2010-07-07  
Date

徐广义  
Name

徐广义  
Signature

**徐广义**



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# 1 Status

## 1.1 Product Information

CLIENT: Huawei Technologies Co., Ltd.  
 ADDRESS: Bantian Longgang District Shenzhen, P.R. China  
 MANUFACTURING DESCRIPTION Fixed Wireless Terminal  
 MANUFACTURERS MODEL NUMBER FT2260VW

## 1.2 Applied Standard

FCC Measurement Specification	FCC Limits Part(s)	Description	Result
	15.107	Conducted Emission at Power Port	PASS
	15.109	Radiated Emission of Enclosure in Idle Mode	PASS
2.1051	22.917&24.238	Radiated Spurious Emission	PASS

## 1.3 Test Site

Site 1:  
 EMC LABORATORY OF RELIABILITY LABORATORY OF HUAWEI TECHNOLOGIES CO., LTD

## 1.4 Test environment condition

Ambient temperature	20~25°C
Relative humidity	40%~52%
Atmospheric pressure	101kPa

## 2 Summary of Results

Table 2 below shows a brief summary of the results obtained.

Table 2 Summary of results

<b>EUT Classification:Wireless Terminal</b>				
<b>Test Items</b>	<b>Test Configuration &amp;Test Mode</b>	<b>Required Performance Criteria</b>	<b>Result</b>	<b>Site</b>
<u>Radiated Emissions</u> Enclosure Port	TC1 (TM1-TM2)	N/A	Pass	Site1
<u>Conducted Emissions</u>	TC1 (TM1-TM4)	N/A	Pass	Site1
<u>Radiated Spurious Emissions</u> Enclosure Port	TC1 (TM3-TM4)	N/A	Pass	Site1

Note:  
1, Measurement taken is within the measurement uncertainty of measurement system.  
2, TC = Test configuration

### 3 Equipment Specification

#### 3.1 General Description

FT2260VW is a CDMA Fixed Wireless Terminal. It's operated in Band Class 0 and Band Class 1. The Wireless Terminal implements such functions as RF signal receiving / Transmitting, CDMA protocol processing, voice, data etc. The TX is 824MHz-849MHz, the RX is 869MHz-894MHz for Band Class 0; The TX is 1850MHz-1910MHz, the RX is 1930MHz-1990MHz for Band Class 1. Externally it provides USB interface (to computers), antenna interface, and power interface, in addition to the charging interface

#### 3.1.1 Main Equipment Technical Data

Description:	Fixed Wireless Terminal
Models:	FT2260VW
Input Rated Voltage:	~ 120V
Rated Consumption Power:	Max 2.0 W
Maximum Emission Power:	Max 30dBm(E.R.P.)
Dimensions:	176.5 (depth) ×136 (width) ×37.5 (height) (mm3)
Weight:	<1kg

Table 3 Sub-Assembly Identity

Mode		Work Frequency	
		Transmitt Frequency(MHz)	Receive Frequency (MHz)
CDMA	CDMA800	824-849	869-894
	CDMA1900	1850-1910	1930-1990

#### 3.2 Sub-Assembly Identity

Table 4 Sub-Assembly Identity

Board				
Model Name	Qty.	Serial		Description
EMC	1	2L2AA11042900091		Centre Processing Unit
Accessory				
Name	Qty.	Manufacture	Serials number	Description
Adaptor	1	Huawei Technologies CO.,LTD	XXXA421000001	Adapter Model:CNR2260 voltage nominal: ~120V Input Voltage : 100-240V ~50/60Hz, 0.2A Output Voltage: === 12V 500mA Rated Power: 6W
Adaptor	1	Huawei Technologies CO.,LTD	XXXA421000001	Adapter Model: HW-120050U5W voltage nominal: ~120V Input Voltage : 100-240V ~50/60Hz, 0.2A Output Voltage: === 12V 500mA Rated Power: 6W
Rechargeable Ni-MH	1	HUAWEI Techonoly Co.,Ltd..	BYDA20510509	Battery Model: HGB-15AAX3 Rated capacity: 1500mAh Nominal Voltage: === +3.7V



				Charging Voltage:  +4.2V
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#### 4 System Configuration during EMC Test

The Equipment under Test (EUT) was functioning correctly during all tests. The EUT was installed within the test site and was configured to simulate a typical user installation.

##### 4.1 Cables Used during Test

Table 5 Cable Used during Test

Port	Length	Quantity	Type of Cable
AC Power Port	1.2m	1	Unshielded

##### 4.2 Associated Equipment Used during Test

Table 6 Associated Equipment Used during Test

Name	Model	Manufacturer	S/N	Cal Date
Radio Communication Tester	CMU200	R&S	3608105673	2009-10-10

##### 4.3 Test Configurations and Test Mode

###### 4.3.1 Test Configuration.

The EUT will be connected to test system (Base Station Simulator) in order to simulate normal operating conditions (with reference to the guidance given in the standard for this type of equipment).

TC1:EUT powered with an adapter and connected to the test system (Base Station Simulator).

Table 7 Configuration table

TC1	TM1~TM4
-----	---------

###### 4.3.2 Test Mode

There were 4 test Modes. TM1 to TM4 were shown in the diagrams below:

- TM1: operate in idle mode CDMA800;
- TM2: operate in idle mode CDMA1900;
- TM3: operate in traffic mode CDMA800;
- TM4: operate in traffic mode CDMA1900;

#### 4.4 Test conditions and test Connections

##### 4.4.1 Test Conditions

The EUT will be connected to test system (Base Station Simulator) in order to simulate normal operating conditions (with reference to the guidance given in the standard for this type of equipment).

##### 4.4.2 Test Connections

Traffic Mode:

The EUT is required to be in the traffic mode, a call is set up according to the generic call set up procedure and enter the EUT into loop back test mode.( GSM see 3GPP2 C.S0011).

For CDMA800 and CDMA 1900, the following conditions shall also be met:

The EUT shall be commanded to operate at maximum transmit power;

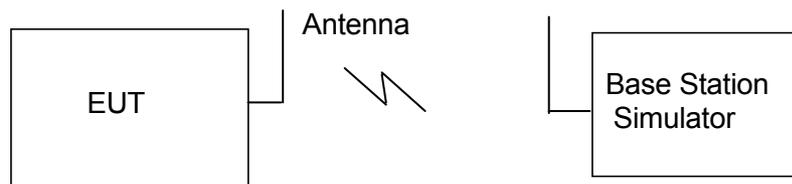


Figure 1.: Test Configuration

Idle Mode:

The EUT will be connected to test system (Base Station Simulator) in order to simulate normal operating conditions (with reference to the guidance given in the standard for this type of equipment). The EUT is required to be in the idle mode.

For CDMA 800 and CDMA1900 the following conditions shall be met:

When the EUT is required to be in the idle mode, the test system shall simulate a Base Station (BS) with Broadcast Control Channel/Common Control Channel (BCCH/CCCH) on one carrier. The EUT shall be synchronized to the BCCH, listening to the CCCH and able to respond to paging messages. Periodic Location Updating shall be disabled.

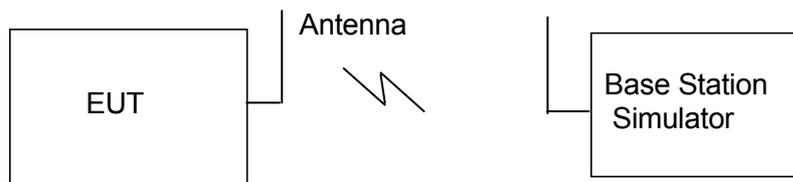


Figure 2. Test Configuration

## 5 Electromagnetic Interference (EMI)

### 5.1 Radiated Disturbance 30MHz to 18GHz

#### 5.1.1 Test Procedure

The test site semi-anechoic chamber has met the requirement of NSA tolerance 4dB according to the standards: ANSI C63.4. The test distance was 3m. The set-up and test methods were according to ANSI 63.4 and CAN/CSA-CEI/IEC CISPR 22

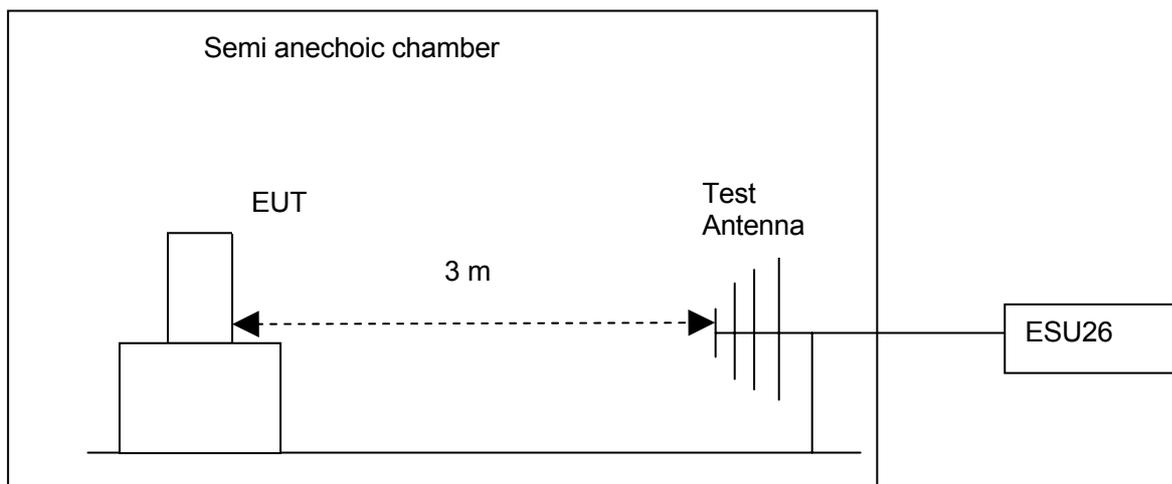
A preliminary scan and a final scan of the emissions were made from 30 MHz to 18 GHz by using test script of software; the emissions were measured using Quasi-Peak Detector (30MHz~1GHz) and AV detector (above 1GHz). The maximal emission value was acquired by adjusting the antenna height, polarisation and turntable azimuth in accordance with the software setup. Normally, the height range of antenna was 1m to 4m, the azimuth range of turntable was 0° to 360°, The receive antenna has two polarizations V and H.

EUT was configured in idle mode and the test performed at worst emission state.

Measurement bandwidth: 30 MHz – 1000 MHz: 120 k Hz

Measurement bandwidth: 1GHz – 18GHz: 1MHz

Test set up figure:



**Figure 3.** Test set-up

#### 5.1.2 Test Results

The EUT has met the requirements for Radiated Emission of enclosure port.

**Table 8** Test Limits

Frequency of Emission (MHz)	Radiated Limit	
	Unit( $\mu\text{V}/\text{m}$ )	Unit( $\text{dB}\mu\text{V}/\text{m}$ )
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

Note: Highest frequency generated or used in the device or on which the device operates or tunes less than 108MHz.

## 5.2 Conducted Disturbance 0.15 MHz to 30MHz

### 5.2.1 Test Procedure

The Table-top EUT was placed upon a non-metallic table 0.8 m above the horizontal metal reference ground plane. EUT was connected to LISN and LISN was connected to reference Ground Plane. EUT was 80cm from LISN. The set-up and test methods were according to ANSI C63.4: 2003.

Conducted Disturbance at AC Port measurements were undertaken on the L and N Lines. The emissions were measured using a Quasi-Peak Detector and Average Detector.

Huawei Mobile Station was communicated with the BTS simulator through Air interface, the BTS simulator controls the Mobile Station to transmitter the maximum power which defined in specification of product. The Mobile Station operated on the typical channel.

Measurement bandwidth (RBW) for 150kHz to 30 MHz: 9 kHz;

Test Set-up figure:

The Mobile Station was setup in the screened chamber and operated under nominal conditions.

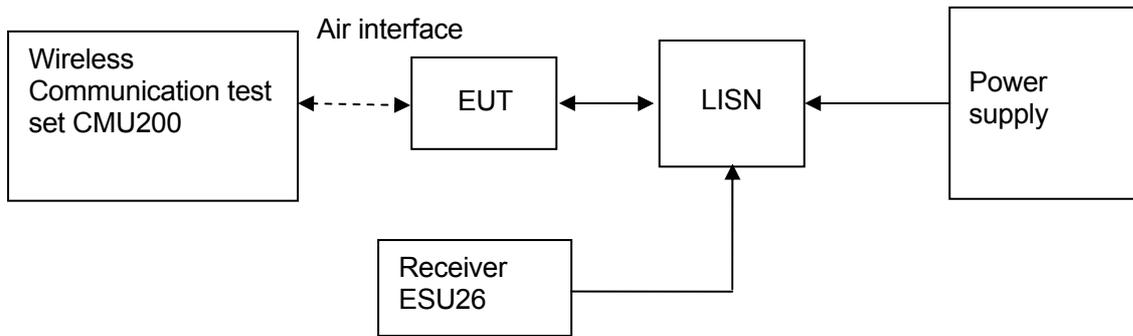


Figure 4. Test Set-up

### 5.2.2 Test Results

The EUT has met requirements for Conducted disturbance of power lines.

Table 9 Test Limit of DC&AC Power Port

Frequency range	150kHz~ 30MHz	
Classification	Class B	
Limit(Class B)	Voltage limits	
	QP	AV
0.15MHz~0.5MHz	66~56 dB $\mu$ V	56~46 dB $\mu$ V
0.5MHz~5MHz	56 dB $\mu$ V	46 dB $\mu$ V
5MHz~30MHz	60 dB $\mu$ V	50 dB $\mu$ V

## 5.3 Radiated Spurious Emissions

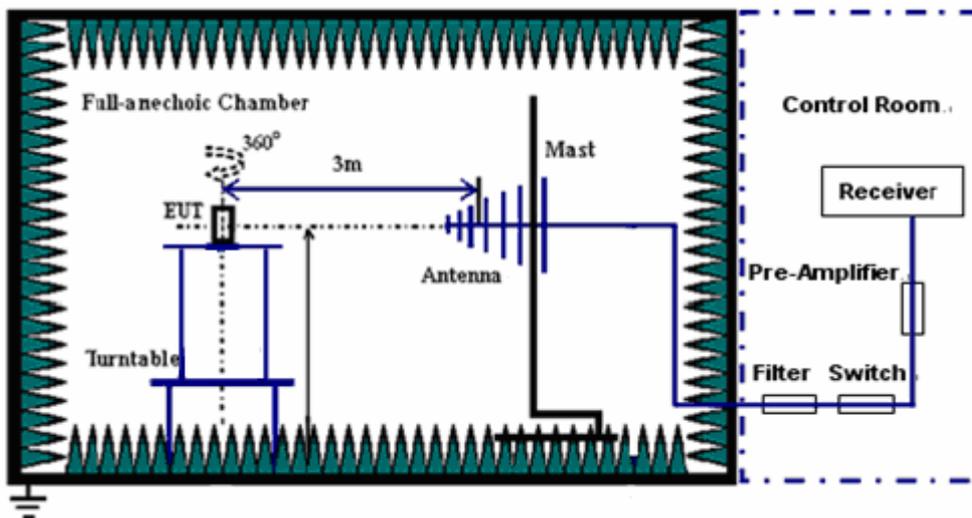
### 5.3.1 Test Procedure

A test site fulfilling the requirements of ITU-R Recommendation SM329-10 was used. The EUT was placed on a non-conducting support in the anechoic chamber and was operated from a power source via an RF filter to avoid radiation from the power leads.

Step 1:

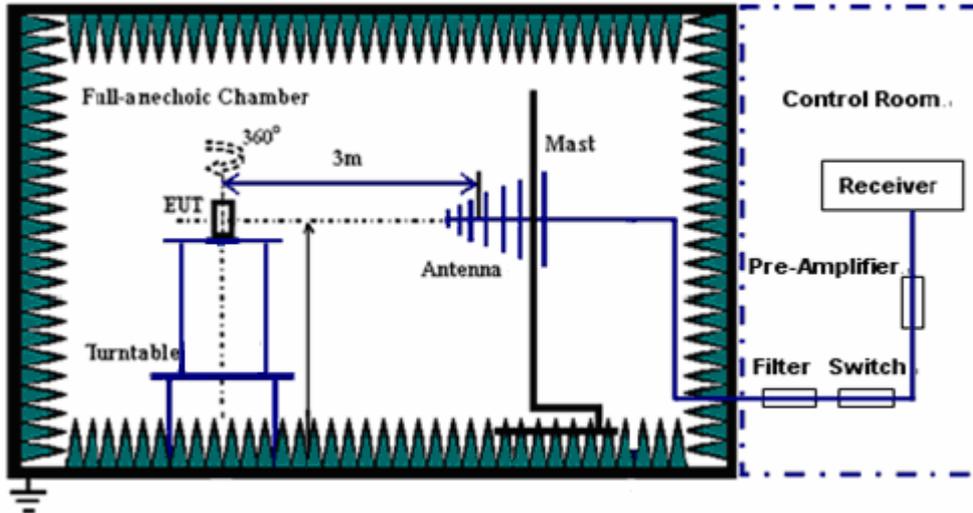
For transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, EIRP shall be measured when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in 2.1033(c)(8). Connect the EUT to the BTS simulator via the air interface.

Test the Radiated maximum output power by the Rohde and Schwarz FSU43 Test Receiver from test antenna.



Step 2:

Use substitution method to verify the maximum output power. The EUT is substituted by a dipole antenna. The dipole is connected to a signal generator. And then adjust the output level of the signal generator to get the same received power recorded in step1 on FSU43 Test Receiver, and record the power level of Signal Generator. Of course, the cable loss at the test frequency should be compensated.



According to part 22.917, the defined measurement bandwidth as following:

22.917(b) Measurement procedure: Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater.

- Measurement bandwidth (RBW) for 9 kHz up to 150 kHz: 1 kHz;
- Measurement bandwidth (RBW) for 150 kHz up to 30 MHz: 10 kHz;
- Measurement bandwidth (RBW) for 30 MHz up to 1 GHz: 100 kHz;
- Measurement bandwidth (RBW) for 1GHz up to 18 GHz: 1MHz;

Table 10 Radiated Spurious Emissions Limits

Frequency band	Minimum requirement (E.R.P) traffic mode
30MHz~18GHz	-13dBm

According to part 24.238, the defined measurement bandwidth as following:

24.238 (b) Measurement procedure: Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater.

- Measurement bandwidth (RBW) for 9 kHz up to 150 kHz: 1 kHz;
- Measurement bandwidth (RBW) for 150 kHz up to 30 MHz: 10 kHz;
- Measurement bandwidth (RBW) for 30 MHz up to 26.5 GHz: 1 MHz;

Table 11 Radiated Spurious Emissions Limits

Frequency band	Minimum requirement (E.R.P) traffic mode
30MHz~26.5GHz	-13dBm

No peak found in pre- test. All frequency points' margin is bigger than 20dB, so the substitution method isn't used.

Calculation Sample:

Table 12 Substitution Results

Freq. [MHz]	Measurement Value [dBm]	Substitution Antenna Type	Gain [dBd]	Cable Loss [dB]	Signal Generator Level [dBm]	Substitution Level [dBm]	FCC limit [dBm]	Result

Note: For get the E.R.P. (Efficient Radiated Power) in substitution method, the following formula should take to calculate it,

$$\text{E.R.P. [dBm]} = \text{SGP [dBm]} - \text{Cable Loss [dB]} + \text{Gain [dBd]}$$

NOTE: SGP- Signal Generator Level

### 5.3.2 Test Results

The EUT has met the requirements of FCC Part22/Part24requirement.

## 6 Main Test Instruments

Table 13 Main Test Equipments

Test item	Test Instrument	Model	Manufacturer	Cal-Date	Cal Interval (month)
RE	EMI Test receiver	ESU26	R&S	Jun.25, 2010	12
	Broadband Antenna	VULB 9163	SCHAFFNER	May.15, 2010	12
	Horn Antenna	HF906	R&S	May.15, 2010	12
CE	EMI Test receiver	ESU26	R&S	Jun.25, 2010	12
	Artificial Mains Network	ENV216	R&S	Jun.25, 2010	12
RSE	EMI Test receiver	FSU43	R&S	Jun.24, 2010	12
	Broadband Antenna	VULB 9163	SCHAFFNER	Sep.21, 2009	12
	Horn Antenna	HF906	R&S	May.15, 2010	12
	Broadband Antenna	VUBA 9117	SCHWARZBECK	May.15, 2010	12
	Horn Antenna	3160	ETS-Lindgren	Sep.22.2009	12
Software Information					
Test Item	Software Name	Manufacturer	Version		
RE/CE	ES-K1	R&S	1.7.1		
RSE	EMC32	R&S	V8.10.10		

## 7 System Measurement Uncertainty

For a 95% confidence level, the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 were:

Table 14 System Measurement Uncertainty

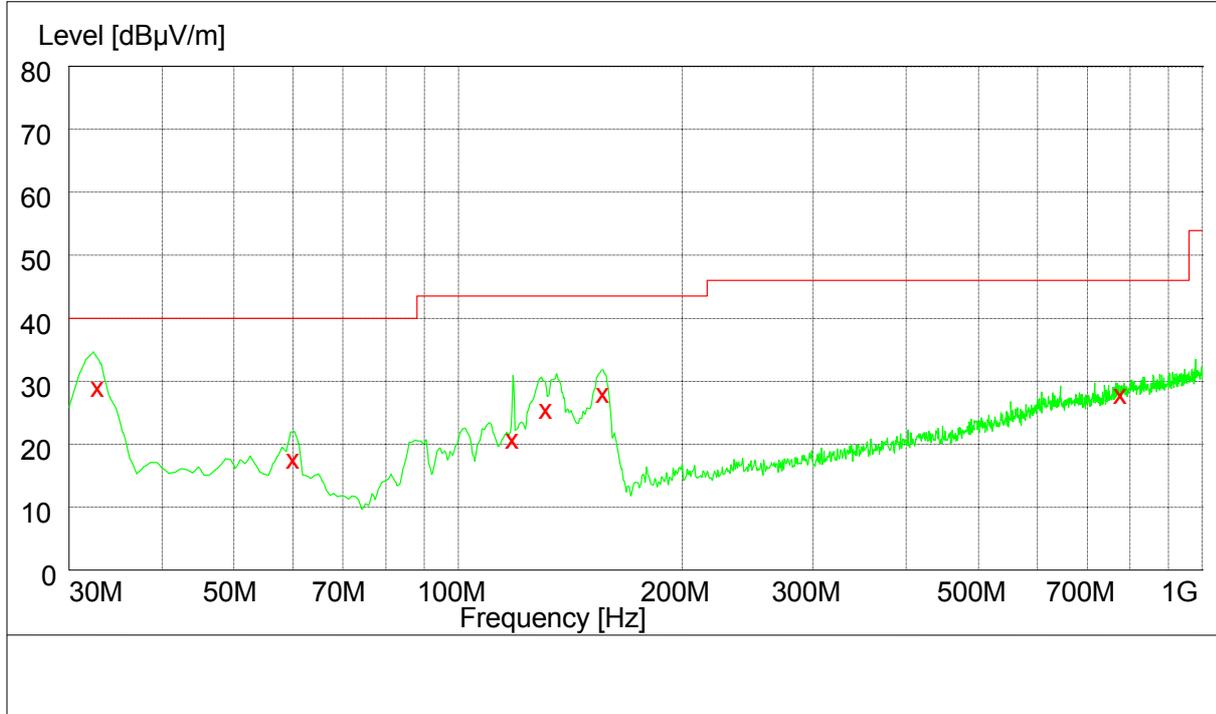
Items	Extended Uncertainty
RE	Field strength (dB $\mu$ V/m) U=4.1dB; k=2(30MHz-1GHz)
RSE	ERP (dBm) U=2.8dB; k=2
CE	Disturbance Voltage (dB $\mu$ V) U=3.4dB; k=2

## 8 Graph and Data of Emission Test

### 8.1 Radiated Disturbance

This test was carried out in all the test modes, Here only the worst test result was shown.

#### 30MHz-1GHz



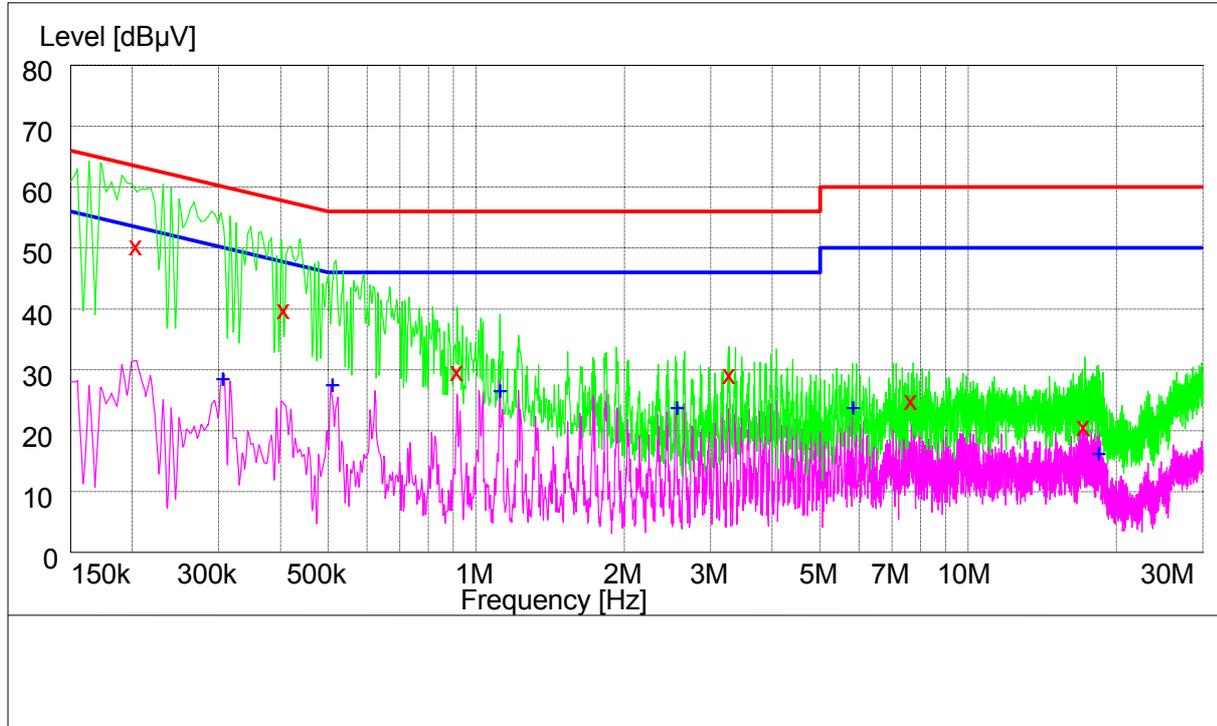
#### MEASUREMENT RESULT: QP Detector

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
32.820000	30.00	11.7	40.0	10.0	100.0	231.00	VERTICAL
59.820000	18.60	11.4	40.0	21.4	120.0	325.00	HORIZONTAL
127.960000	21.20	9.2	43.5	22.3	105.0	171.00	VERTICAL
143.210000	25.40	7.4	43.5	18.1	150.0	123.00	HORIZONTAL
156.600000	29.00	7.8	43.5	14.5	100.0	268.00	VERTICAL
782.320000	28.20	21.0	46.0	17.8	112.0	100.00	HORIZONTAL

## 8.2 Conducted Disturbance

This test was carried out in all the test modes, Here only the worst test result was shown.

### AC Power Port Test Data



### MEASUREMENT RESULT: QP Detector

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.204000	51.40	10.1	63	11.6	L1	FLO
0.408000	41.00	10.0	58	17.0	L1	FLO
0.916000	30.80	10.1	56	25.2	L1	FLO
3.274000	30.20	10.2	56	25.8	L1	FLO
7.682000	26.00	10.2	60	34.0	L1	FLO
17.218000	21.80	10.3	60	38.2	L1	FLO

### MEASUREMENT RESULT: AV Detector

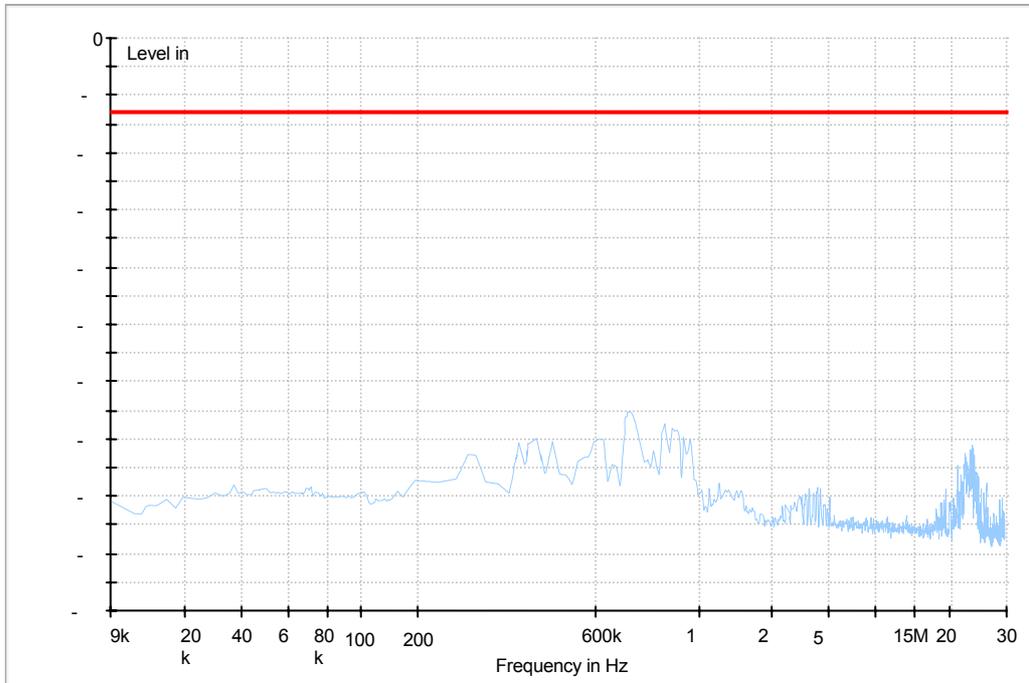
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.306000	29.40	10.0	50	20.6	L1	FLO
0.510000	28.50	10.1	46	17.5	L1	FLO
1.120000	27.40	10.1	46	18.6	L1	FLO
2.560000	24.70	10.1	46	21.3	L1	FLO
5.836000	24.60	10.2	50	25.4	L1	FLO
18.448000	17.20	10.3	50	32.8	L1	FLO

### 8.3 Radiated Spurious Emission

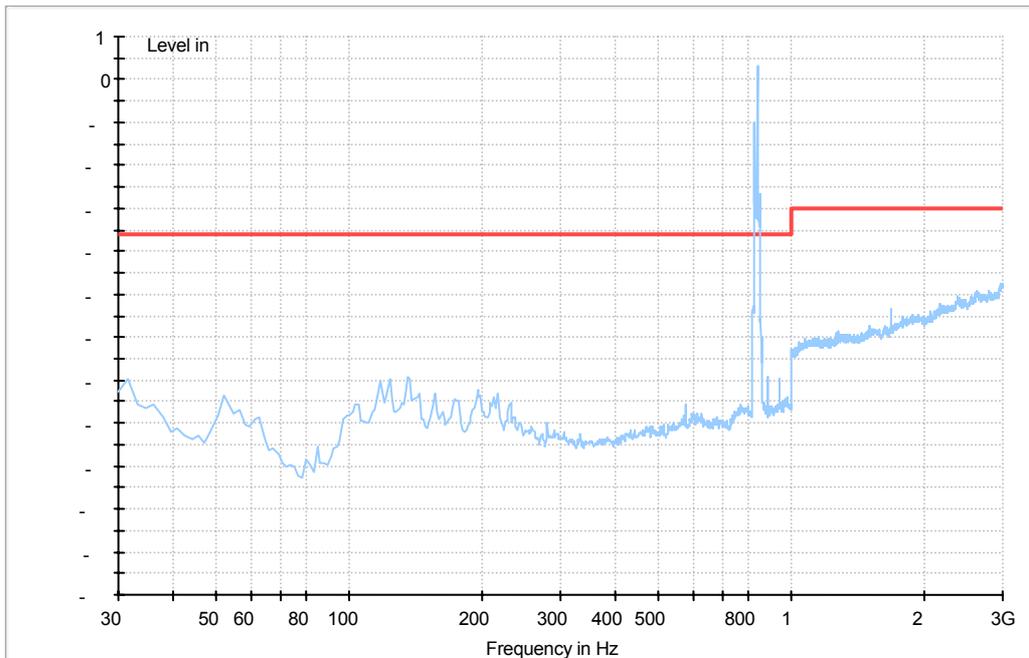
This test results are the maximum level of radiated spurious emissions in vertical and horizontal polarity.

#### 8.3.1 For CDMA 800

Traffic Mode (9kHz-30MHz)

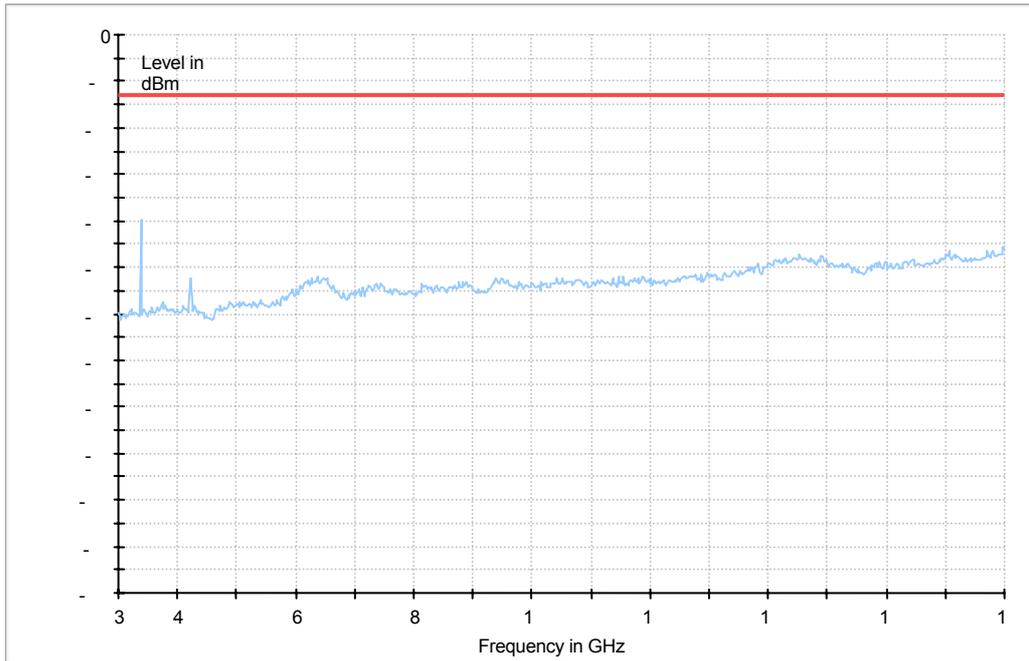


Traffic Mode (30MHz-3GHz)

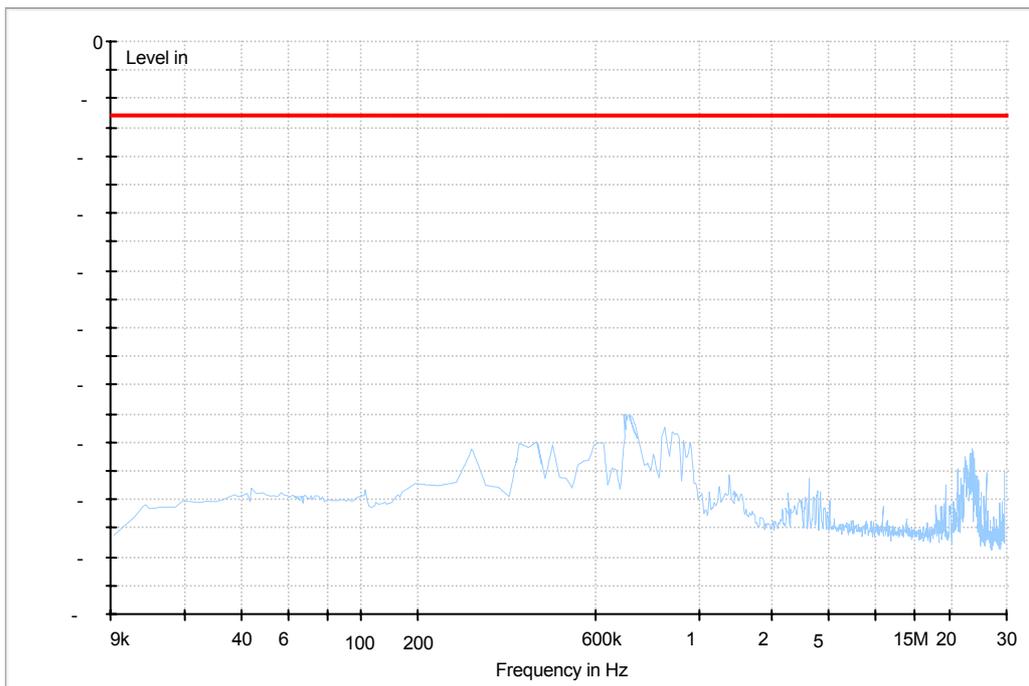


Note: The peak nears the limit line is carrier frequency.

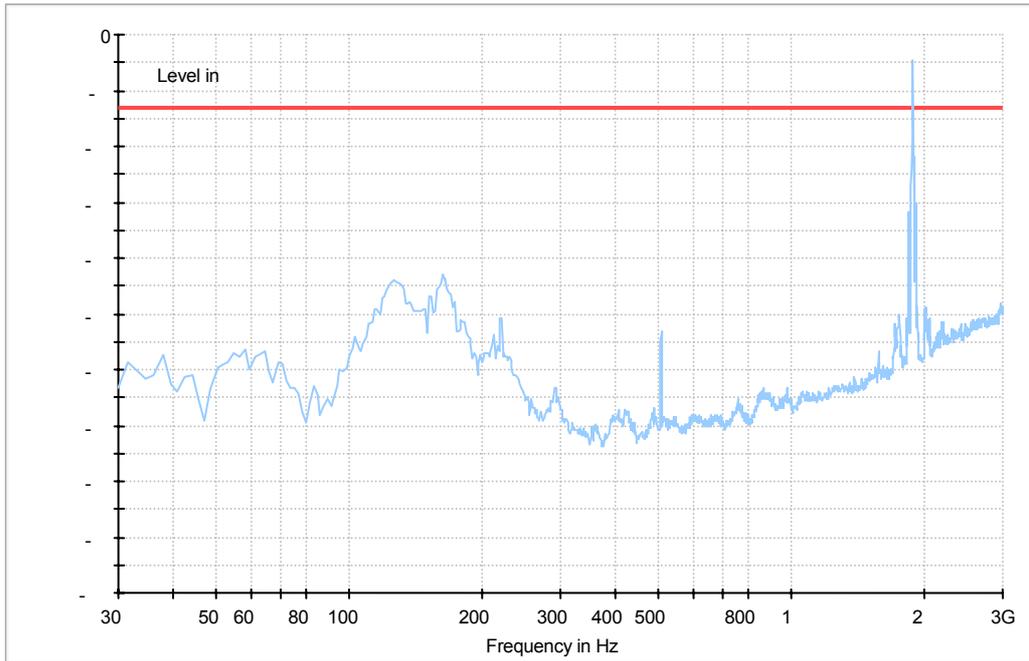
### Traffic Mode (3GHz-18GHz)



### 8.3.2 For CDMA 1900 Traffic Mode (9kHz-30MHz)

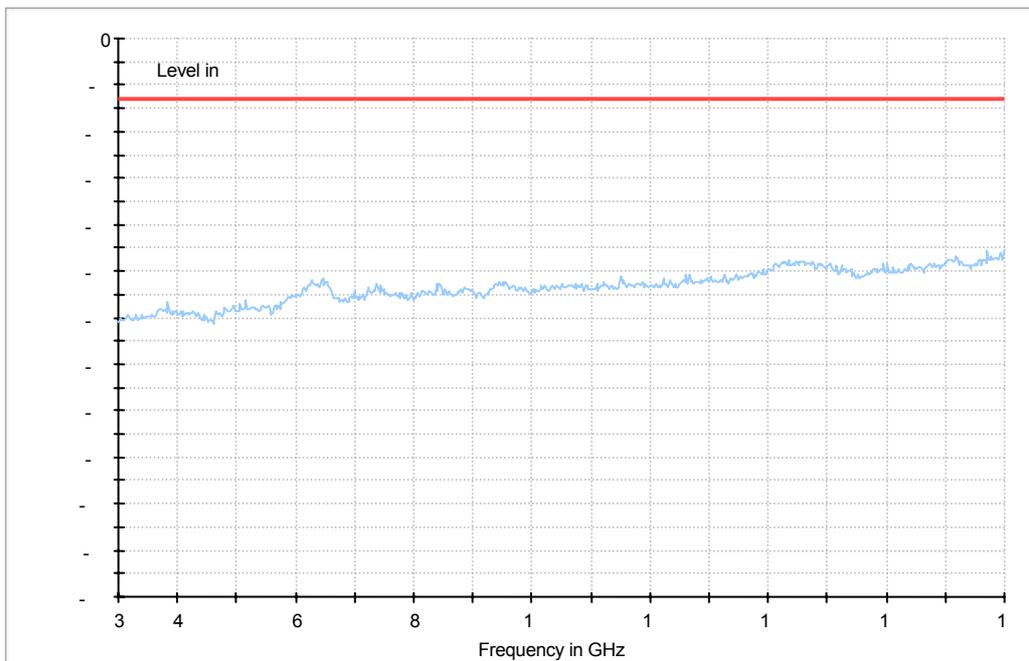


### Traffic Mode (30MHz-3GHz)



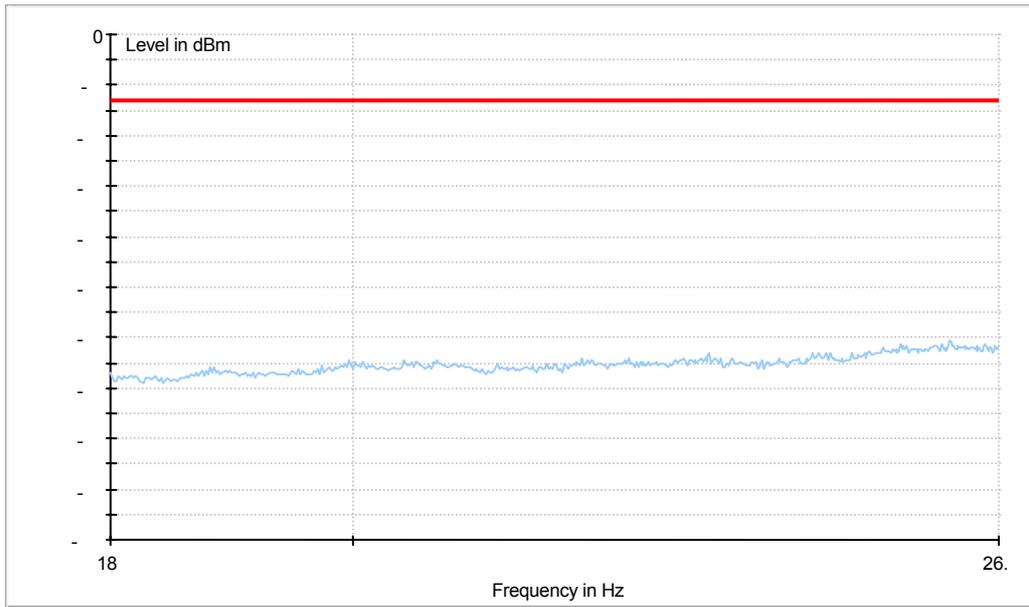
Note: The peak nears the limit line is carrier frequency.

### Traffic Mode (3GHz-18GHz)





Traffic Mode (18GHz-26.5GHz)



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**END**