



# EMC Test Report

**Product Name: Fixed Wireless Terminal**

**Model Number:ETS1270**

**Report No: SYBH(R)051072008EB-4**

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

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## Notice 1

1. The laboratory has obtained the accreditation of China National Accreditation Service for Conformity Assessment (CNAS), and accreditation number: L0310.
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".
7. The test report is invalid if not marked with the stamps or the signatures of the persons responsible for performing, revising and approving the test report.
8. The test report is invalid if there is any evidence of erasure and/or falsification.
9. If there is any dissidence for the test report, please file objection to the test centre within 15 days from the date of receiving the test report.
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	

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REPORT ON	EMC Test of Fixed Wireless Terminal
	M/N: ETS1270
REGULATION	FCC CFR47 Part 15: Subpart B; FCC CFR47 Part 22: Subpart H; FCC CFR47 Part 24: Subpart E;
START OF TEST	Jul.07, 2008
END OF TEST	Jul.15, 2008
Final Judgement:	Pass

Approver	<u>2008-10-10</u>	张兴海		
	Date	Name		Signature
Reviewer	<u>2008-10-10</u>	余辉		
	Date	Name		Signature
Operator	<u>2008-10-10</u>	张飞		
	Date	Name		Signature

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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 ETS1270

### 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
2.1053	22.917	Radiated Spurious Emission	PASS
2.1053	24.238	Radiated Spurious Emissions	PASS

### 1.3 Test Site

Site 1:  
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~TC3 (TM5-TM8)	N/A	Pass	Site1
<u>Conducted Emissions</u>	TC1~TC3 (TM1~TM8)	N/A	Pass	Site1
<u>Radiated Spurious Emissions</u> Enclosure Port	TC1~TC3 (TM1-TM4)	N/A	Pass	Site1

Note:

- 1, Measurement taken is within the measurement uncertainty of measurement system.
- 2, TC = Test configuration
- 3, NT=no test. Because of not containing devices susceptible to magnetic fields, the EUT has been exempt from immunity test of power frequency magnetic field.

### 3 Equipment Specification

#### 3.1 General Description

ETS1270 Fixed Wireless Terminal is subscriber equipment in the CDMA and CDMA 1X EVDO system. The frequency band is US Cellular and US PCS. The ETS1270 Fixed Wireless Terminal implements such functions as RF signal receiving / Transmitting, CDMA and CDMA 1X EVDO protocol processing, voice and SMS service etc. The ETS1270 Fixed Wireless Terminal uses MSM6800 chipset and Zero-IF technologies.

#### 3.1.1 Main Equipment Technical Data

<b>Description:</b>	Fixed Wireless Terminal
<b>Models:</b>	ETS1270
Input Rated Voltage:	~ 230V
Rated Power:	Normal 2W
Dimensions:	176.5 (depth) ×136 (width) ×37.5 (height) (mm <sup>3</sup> )
Weight:	<500g (with battery)

Table 3 Sub-Assembly Identity

Mode		Work Frequency	
		Transmitt Frequency (MHz)	Receive Frequency (MHz)
CDMA	CDMA 800	824.025MHz~848.985MHz	869.026MHz~893.985MHz
	CDMA1900	1850MHz~1910MHz	1930MHz~1990MHz

#### 3.2 Sub-Assembly Identity

Table 4 Sub-Assembly Identity

Model Name	Qty.	Serial Number	Description	
WLV1TEPU	1	020CFL1067800149	-Module board	
WLV1TIPU	1	0284291067800246	-Interface board	
NA	1	200605200000086	-Battery	
Accessory				
Name	Qty.	Manufacture	Serials number	Description
Adaptor	1	Shenzhen Highlight electronic Co.,Ltd.	DY41F005B	Input: ~230V / 0.08A / 50-60Hz Output: --- +12V, 0.5A Rate power: 6W
Adaptor	1	Dongguan Shilong Fuhua Electronic Co.,Ltd.	UE41120050D G	Input: ~230V / 0.08A / 50-60Hz Output: --- +12V, 0.5A Rate power: 6W
Adaptor	1	Tech-power international Co.,Ltd.	HGP1205C	Input: ~230V / 0.06A / 50-60Hz Output: --- +12V, 0.5A Rate power: 6W
NI-MH	1	HUAWEI Techonoly	HGB-15AAx3	Rated operated voltage (V): 3.6V



Report on EMC Test of  
Fixed Wireless Terminal



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Battery		Co.,Ltd.		
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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
POWER	1.5m	1	Non-shielding

##### 4.2 **Associated Equipment Used during Test**

Table 6 Associated Equipment Used during Test

Name	Model	Manufacturer	S/N	Cal Date
Base Station Simulator	CMU 200	R&S	105822	2008-8-25

##### 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).

Table 7 Configuration table

TC1~TC3	TM1~TM8
---------	---------

TC1:EUT is powered with an adapter(DY41F005B), and connected to the test system (Base Station Simulator).

TC2:EUT is powered with an adapter(UE41120050DG), and connected to the test system (Base Station Simulator).

TC3:EUT is powered with an adapter(HGP1205C), and connected to the test system (Base Station Simulator).

###### 4.3.2 **Test Mode**

There were 4 test Modes. TM1 –TM8 were shown below:

TM1: operate in traffic mode CDMA800;

TM2: operate in traffic mode CDMA1900;

TM3: operate in traffic mode CDMA 1X EVDO 800;

TM4: operate in traffic mode CDMA 1X EVDO 1900;

TM5: operate in idle mode CDMA800;

TM6: operate in idle mode CDMA1900;

TM7: operate in idle mode CDMA 1X EVDO 800;

TM8: operate in idle mode CDMA 1X EVDO 1900;

;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 **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.( CDMA see 3GPP2 C.S0011-B).

For CDMA, the following conditions shall also be met:

Logical Test Interface for details regarding generic call set-up procedure

- set and send continuously up power control commands to the UE;
- The EUT shall be commanded to operate at maximum transmit power;

Assign channel frequency to an appropriate channel number. Set the ARFCN channel number to 283 (833.49MHz) for CDMA800, to 575 (1878.75MHz) for CDMA1900.

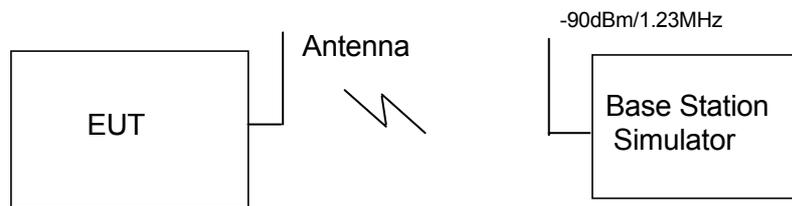


Figure 1.: Test Configuration

Idle Mode:

The EUT is required to be in the idle mode.

For CDMA, the following conditions shall be met:

- UE shall be camped on a cell;
- UE shall perform Location Registration (LR) before the test, but not during the test;
- UE's neighbour cell list shall be empty;
- Paging repetition period and DRX cycle shall be set to minimum (shortest possible time interval).

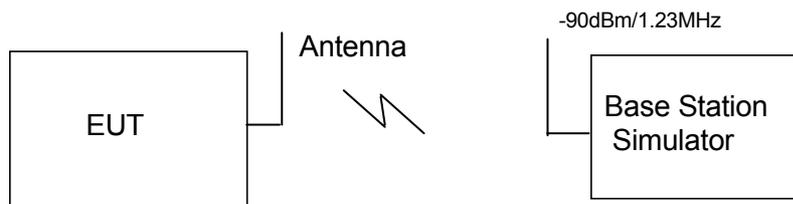


Figure 2. Test Configuration

## 5 Electromagnetic Interference (EMI)

### 5.1 Radiated Disturbance 30MHz to 1000MHz

#### 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 (2003). The test distance was 3m. The EUT was set-up on insulator 80cm above the Ground Plane. The set-up and test methods were according to ANSI C63.4. The Radiated Disturbance measurements were made using a Rohde and Schwarz ESMI Test Receiver and control software ES-K1.

A preliminary scan and a final scan of the emissions were made from 30 MHz to 1GHz by using test script of software; the emissions were measured using a Quasi-Peak Detector. 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.

Huawei Mobile Station was communicated with the BTS simulator through Air interface. The Mobile Station operated on the typical channel and the Mobile Station worked in idle mode, transmitter was not work in this test.

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

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

Test set up figure:

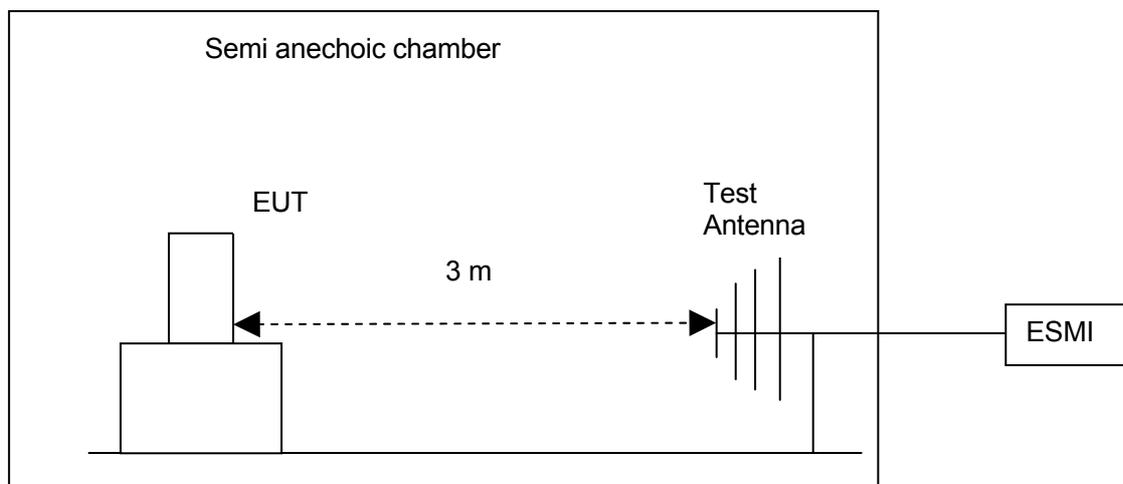


Figure 3. Test set-up

#### 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
960-1000	500	54

## 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.

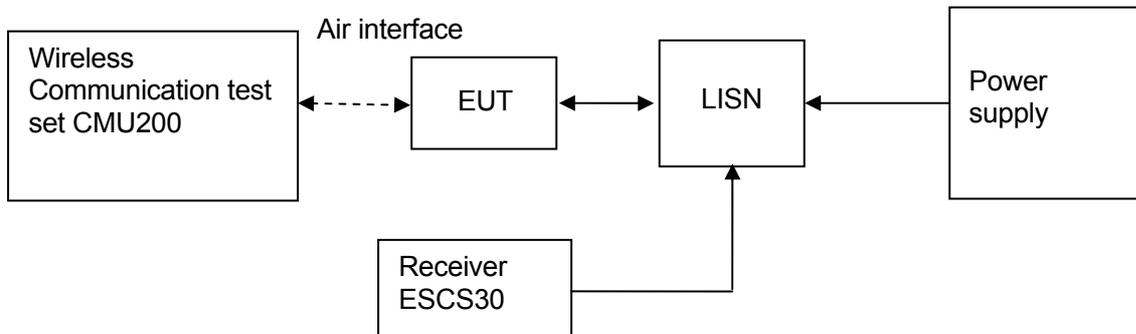


Figure 4. Test Set-up

### 5.2.2 Test Results

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

Table 9 Test Limit of 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

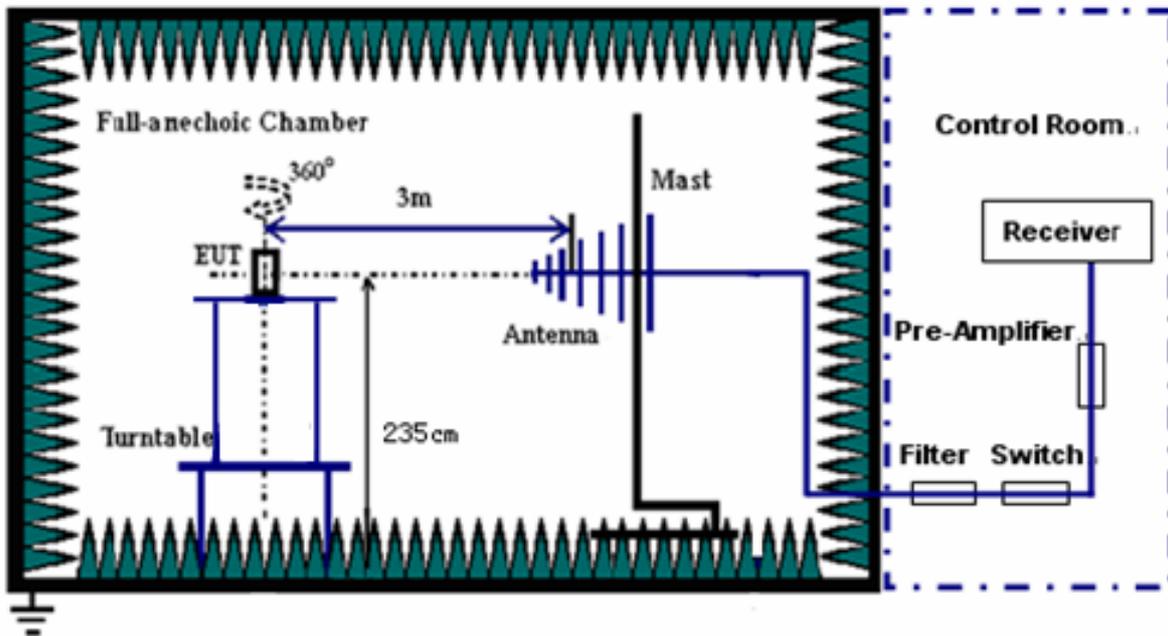
#### 5.3.1 Test Procedure

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:

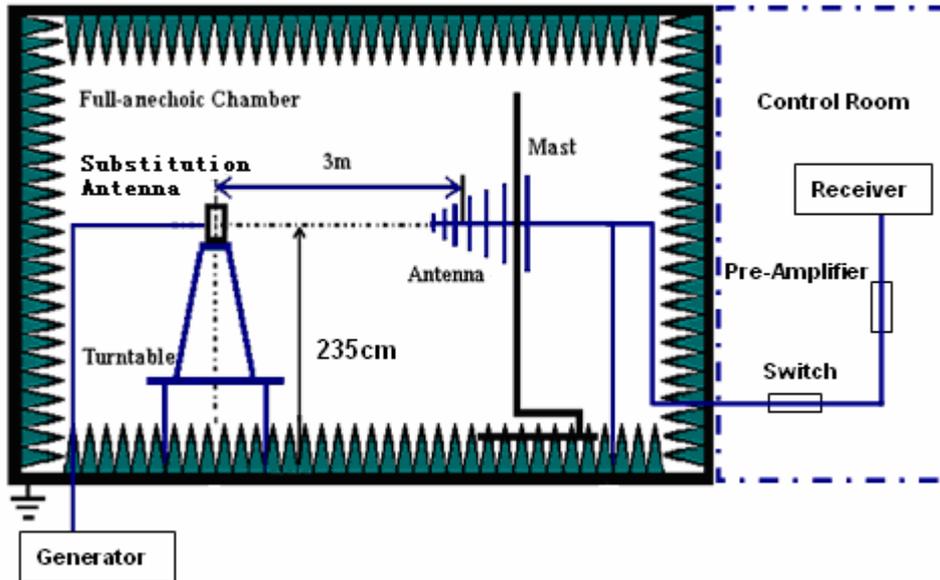
For transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, EIRP shall be measured when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in 2.1033(c)(8). Connect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

Test the Radiated maximum output power by the Rohde and Schwarz ESIB26 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 ESIB26 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

### 5.3.2 Test Results

The EUT has met the requirements of FCC Part 22/24 requirement.

## 6 Main Test Instruments

Table 12 Main Test Equipments

Test item	Test Instrument	Model	Manufacturer	Cal-Date	Cal Interval (month)
RE	EMI Test receiver	ESMI	R&S	April.22, 2008	12
	Broadband Antenna	CBL 6112B (2536)	SCHAFFNER	Oct.17, 2007	12
CE	EMI Test receiver	ESCS30	R&S	May.12, 2008	12
	Artificial Mains Network	ENV4200	R&S	May.12, 2008	12
RSE	EMI Test receiver	ESIB26	R&S	April.22, 2008	12
	Horn Antenna	3117	EMCO	Jul.16, 2007	12
	Broadband Antenna	CBL6112B (2747)	SCHAFFNER	Oct.17.2007	12
	Horn Antenna	3160	EMCO	Aug.03.2007	12
Software Information					
Test Item	Software Name	Manufacturer	Version		
RE/CE	ES-K1	R&S	1.7.1		
RSE	EMC32	R&S	V5.10.99		

## 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:

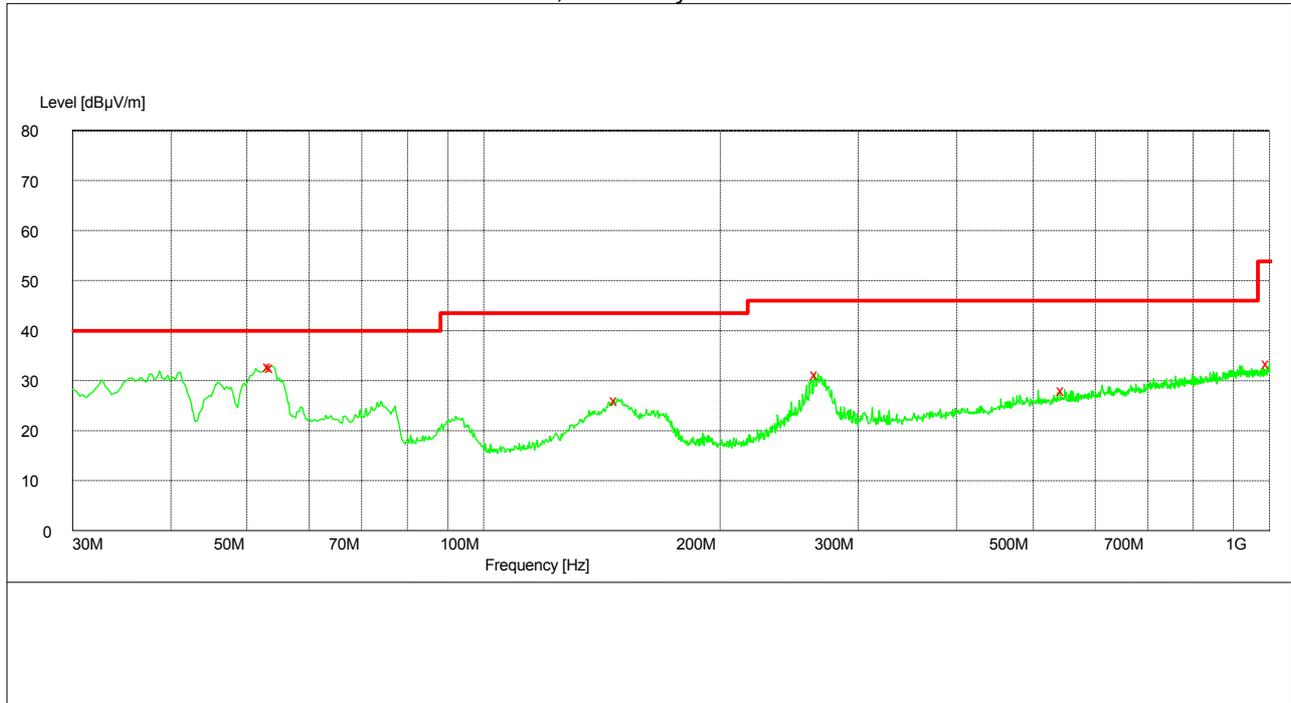
Table 13 System Measurement Uncertainty

Items		Extended Uncertainty
RE	Field strength (dB $\mu$ V/m)	U=4.6dB; k=2(30MHz-1GHz)
RSE	ERP (dBm)	U=2.2dB; k=2
CE	Disturbance Voltage (dB $\mu$ V)	U=3.3dB; 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.



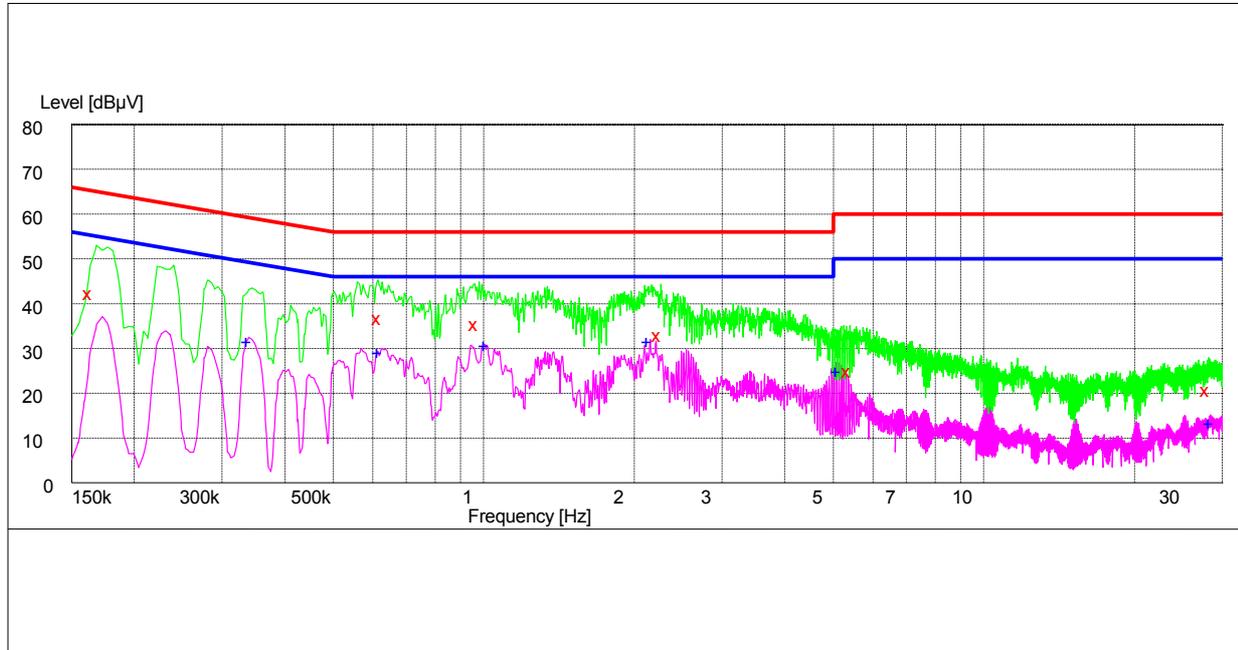
#### MEASUREMENT RESULT: QP Detector

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
53.700000	32.90	-17.2	40.0	7.1	100.0	270.00	VERTICAL
54.000000	32.80	-17.3	40.0	7.2	100.0	270.00	VERTICAL
147.900000	26.30	-14.9	43.5	17.2	200.0	0.00	HORIZONTAL
266.400000	31.40	-10.4	46.0	14.6	100.0	270.00	HORIZONTAL
548.888889	28.20	-4.8	46.0	17.8	100.0	180.00	VERTICAL
999.222222	33.50	1.6	54.0	20.5	100.0	0.00	VERTICAL

## 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
0.163500	43.10	10.0	65	21.9	N	FLO
0.618000	37.50	10.0	56	18.5	N	FLO
0.964500	36.20	10.0	56	19.8	N	FLO
2.242500	33.70	10.1	56	22.3	N	FLO
5.379000	25.70	10.1	60	34.3	N	FLO
28.054500	21.40	10.4	60	38.6	L3	FLO

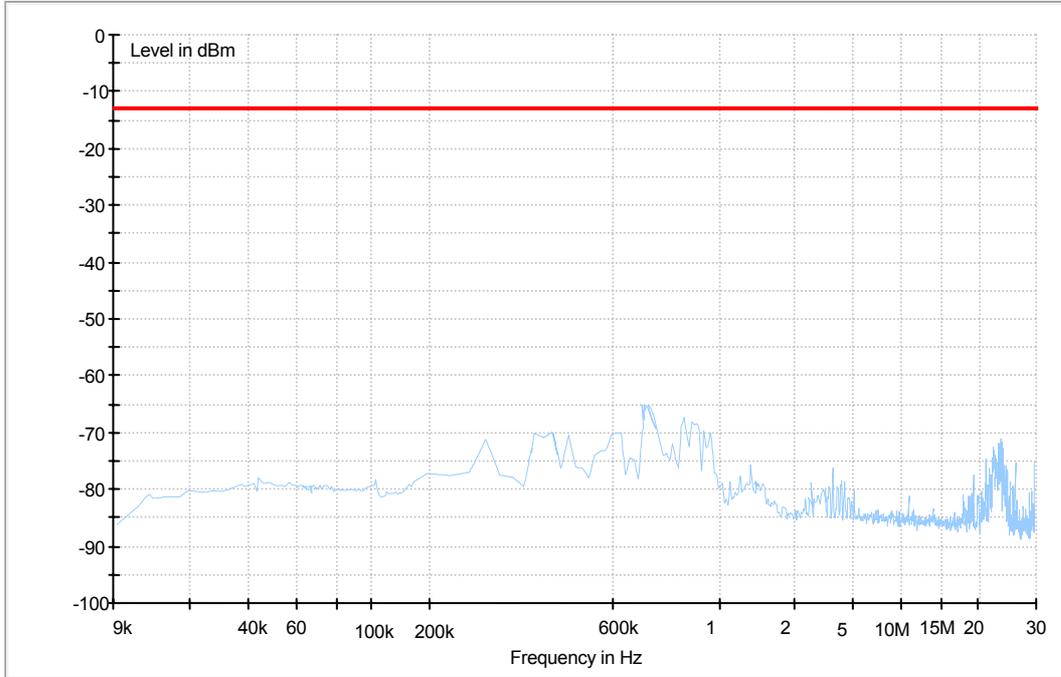
#### MEASUREMENT RESULT: AV Detector

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.339000	32.20	10.1	49	16.8	L3	FLO
0.618000	29.70	10.0	46	16.3	L3	FLO
1.009500	31.10	10.0	46	14.9	L3	FLO
2.139000	32.20	10.1	46	13.8	L3	FLO
5.104500	25.40	10.1	50	24.6	L3	FLO
28.414500	13.80	10.5	50	36.2	L3	FLO

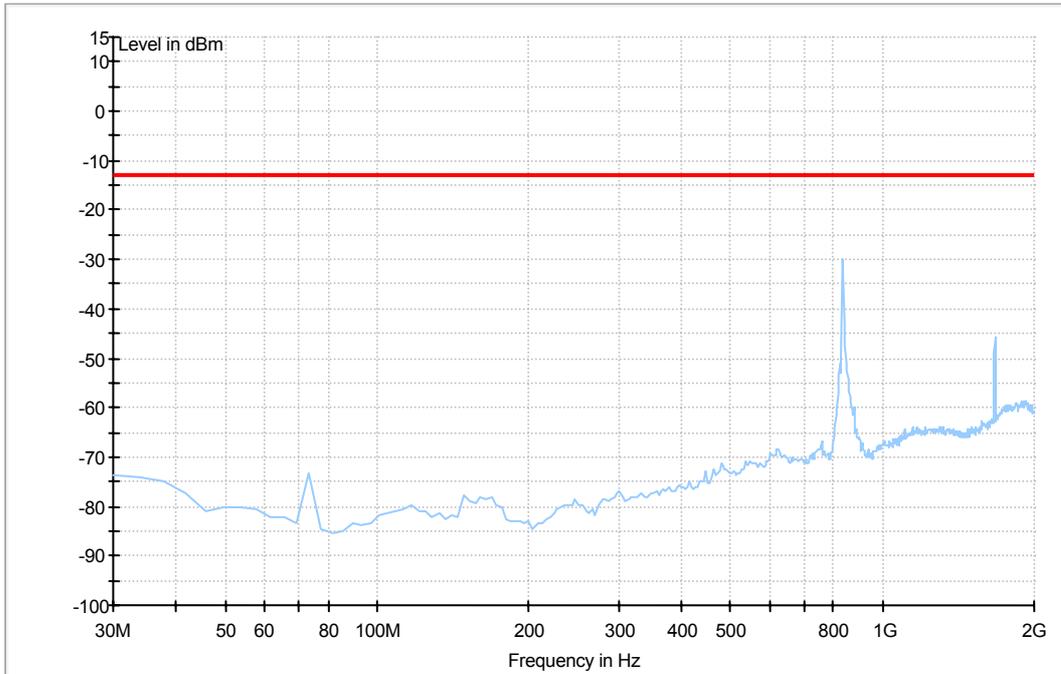
### 8.3 Radiated Spurious Emission

#### 8.3.1 For CDMA800

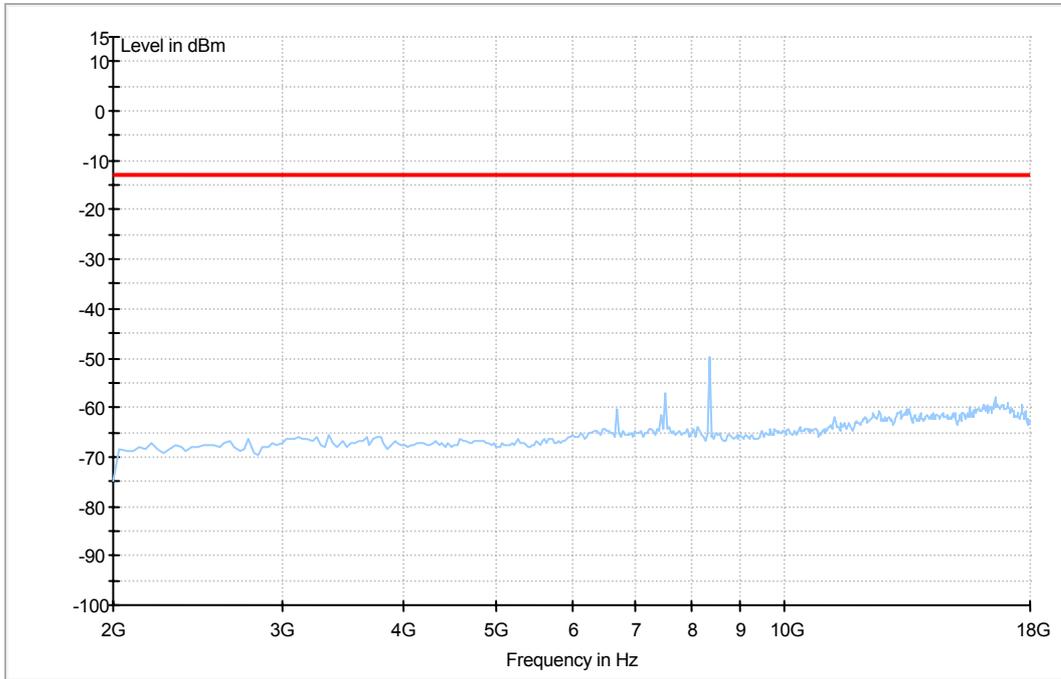
Traffic Mode (9kHz-30MHz)



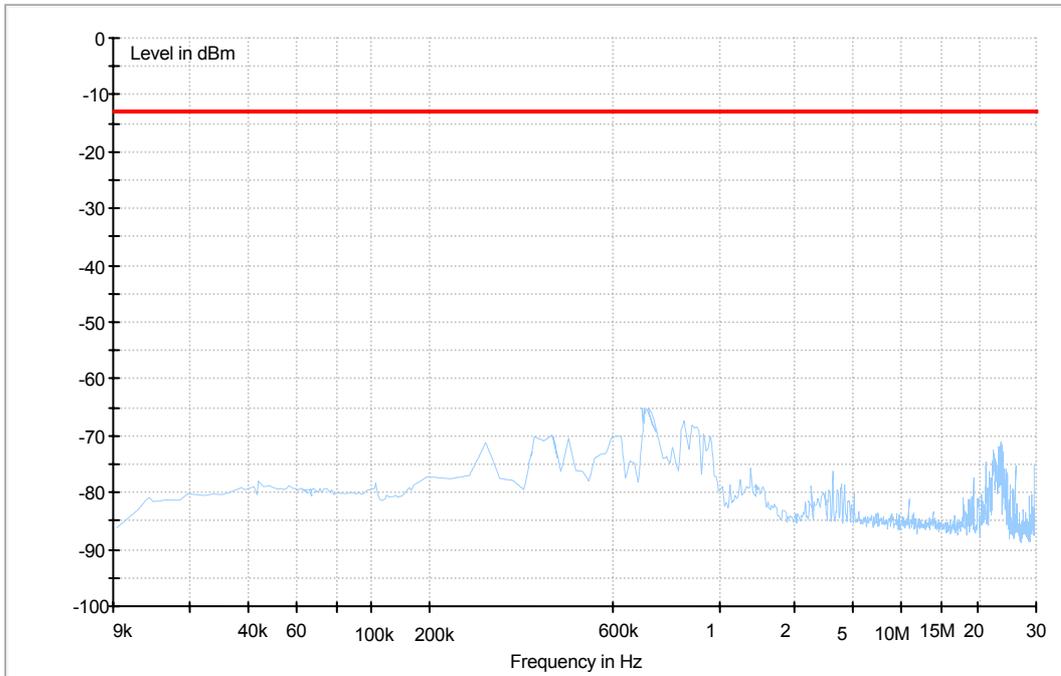
Traffic Mode (30MHz-2GHz)



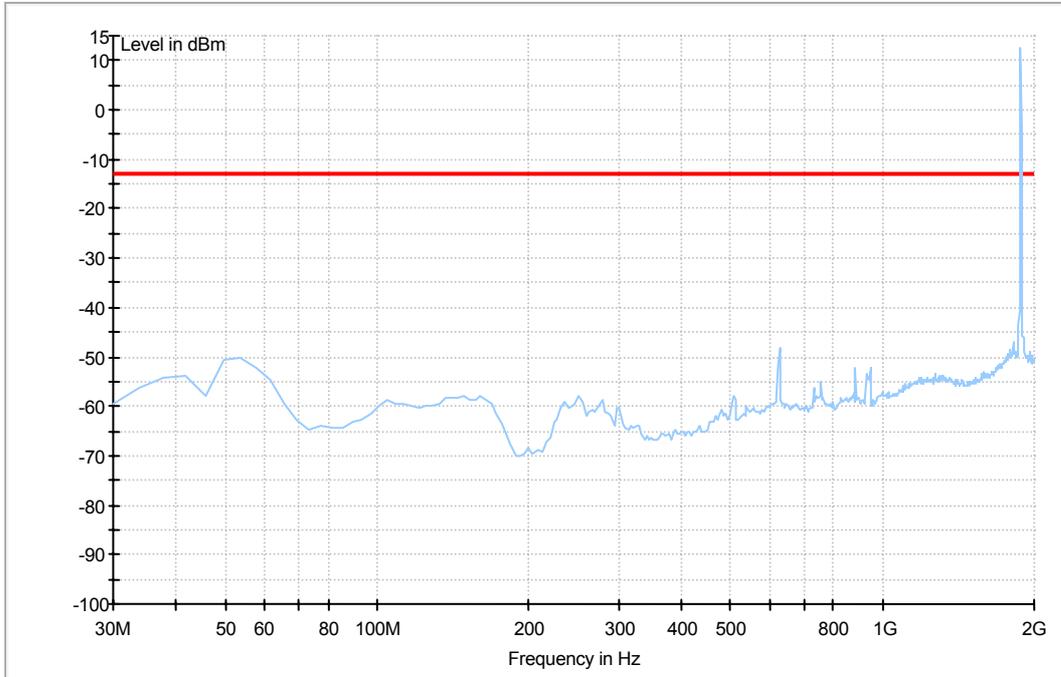
Traffic Mode (2GHz-18GHz)



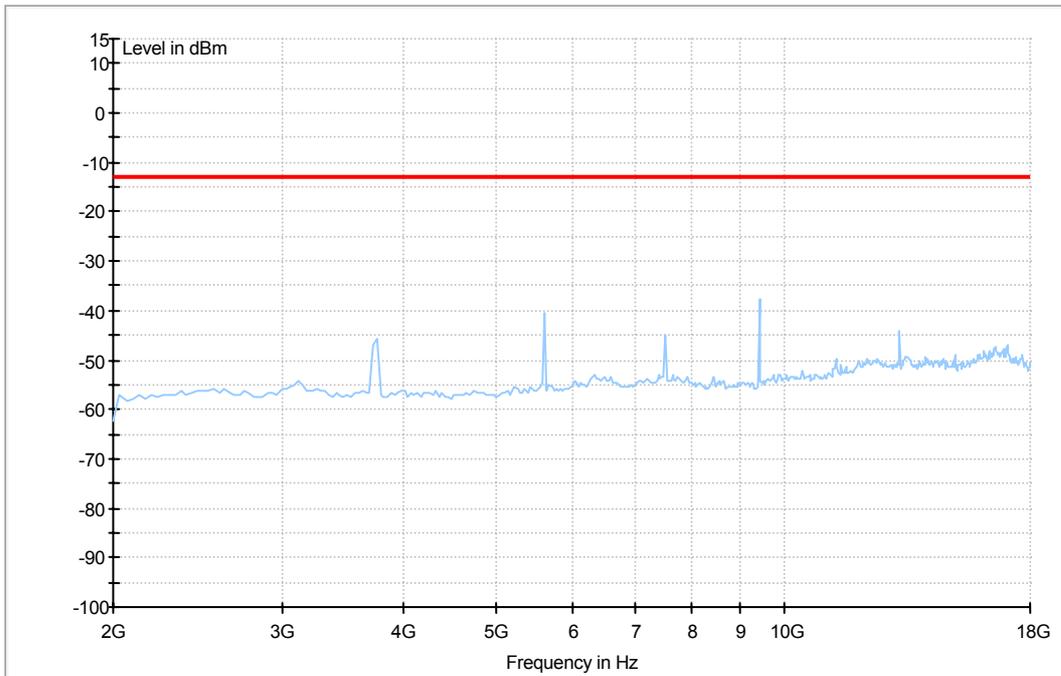
**8.3.2 For CDMA 1900**  
Traffic Mode (9kHz-30MHz)



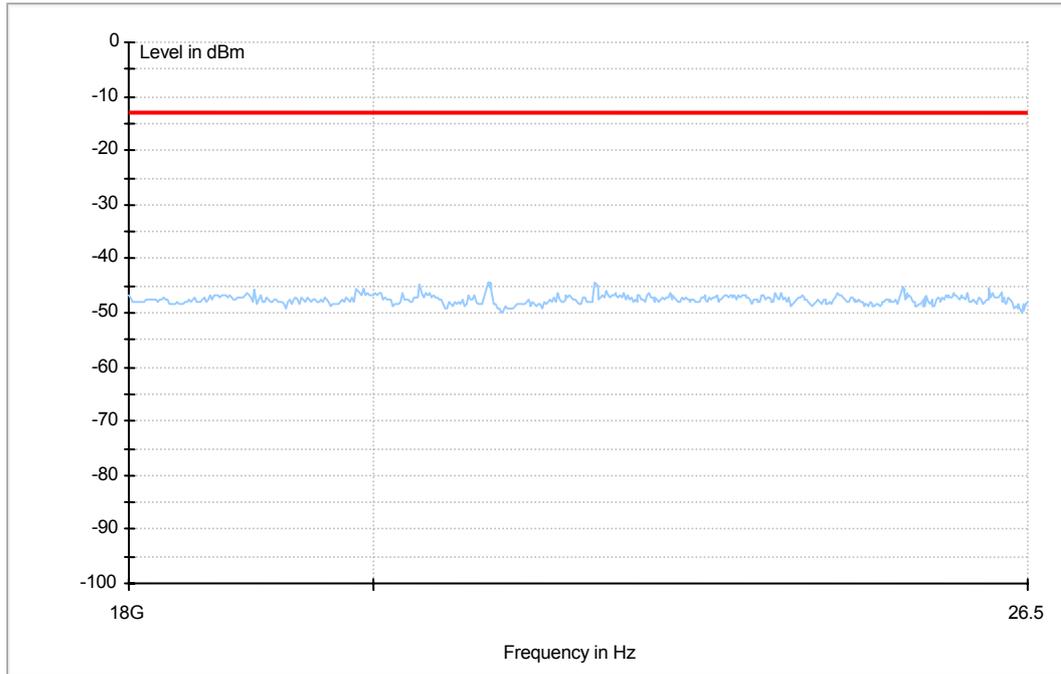
Traffic Mode (30MHz-2GHz)



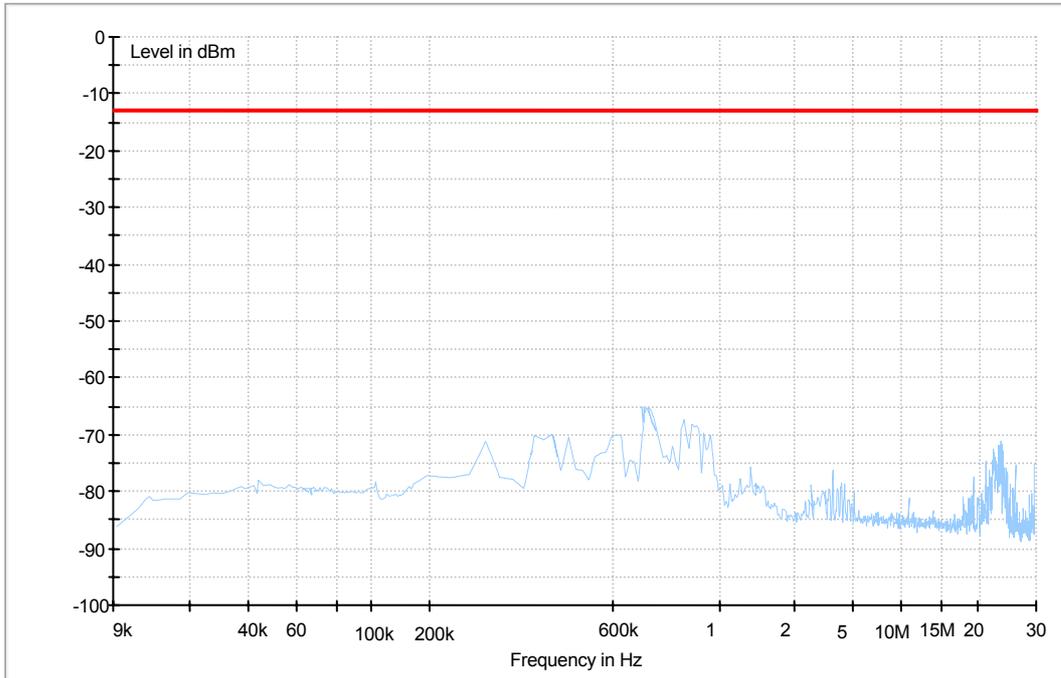
Traffic Mode (2GHz-18GHz)



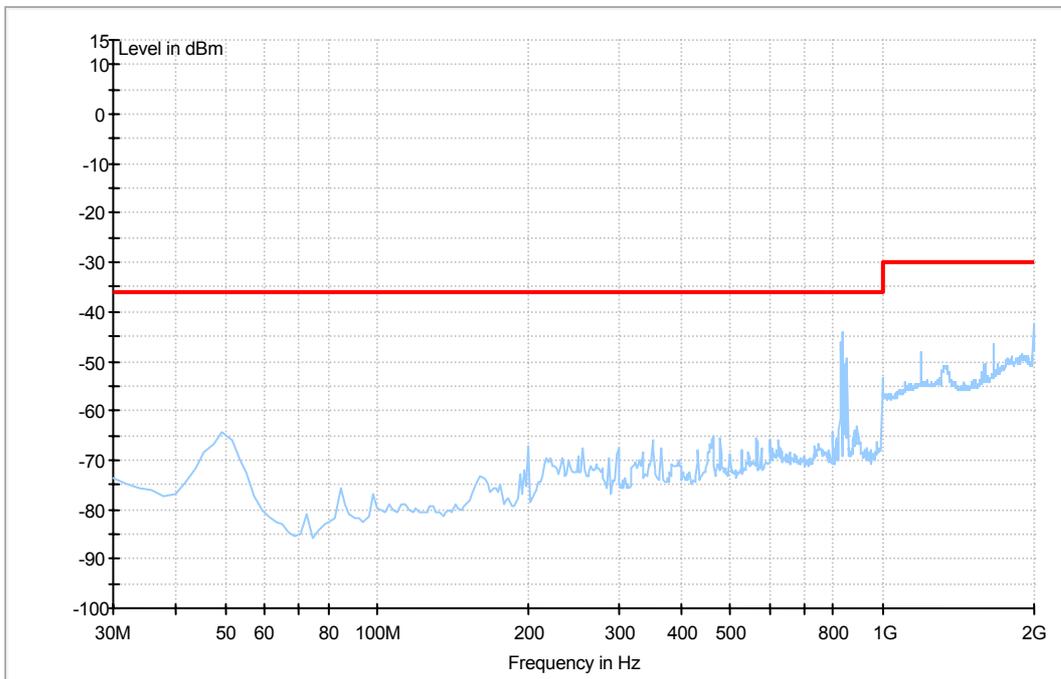
Traffic Mode (18GHz-26.5GHz)



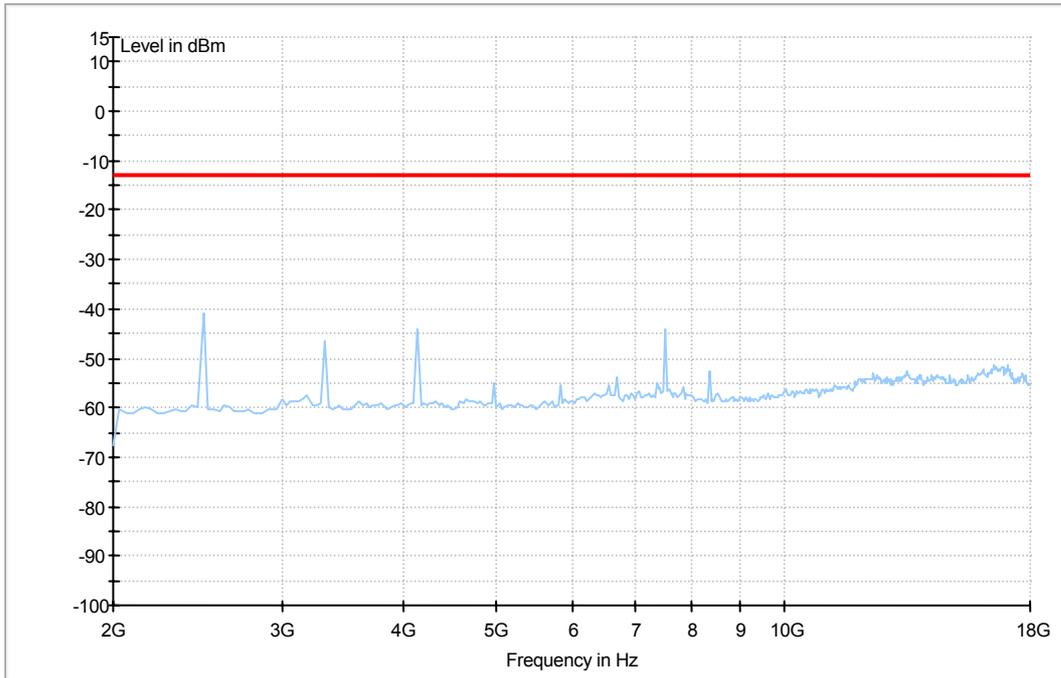
;  
**8.3.3 For CDMA 1X EVDO 800**  
Traffic Mode (9kHz-30MHz)



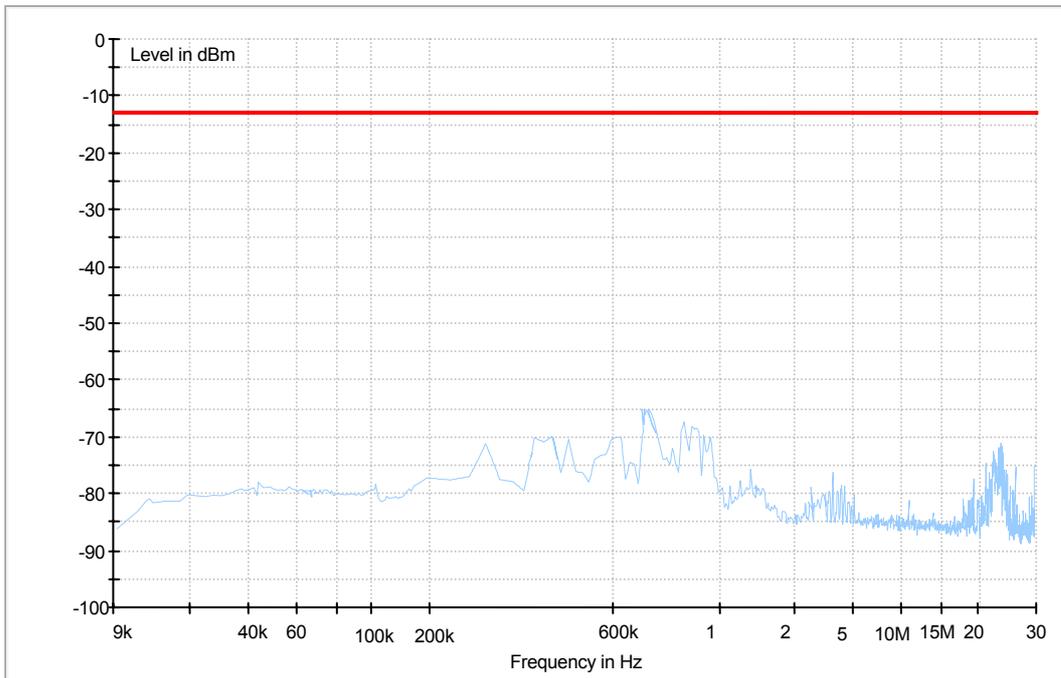
Traffic Mode (30MHz-2GHz)



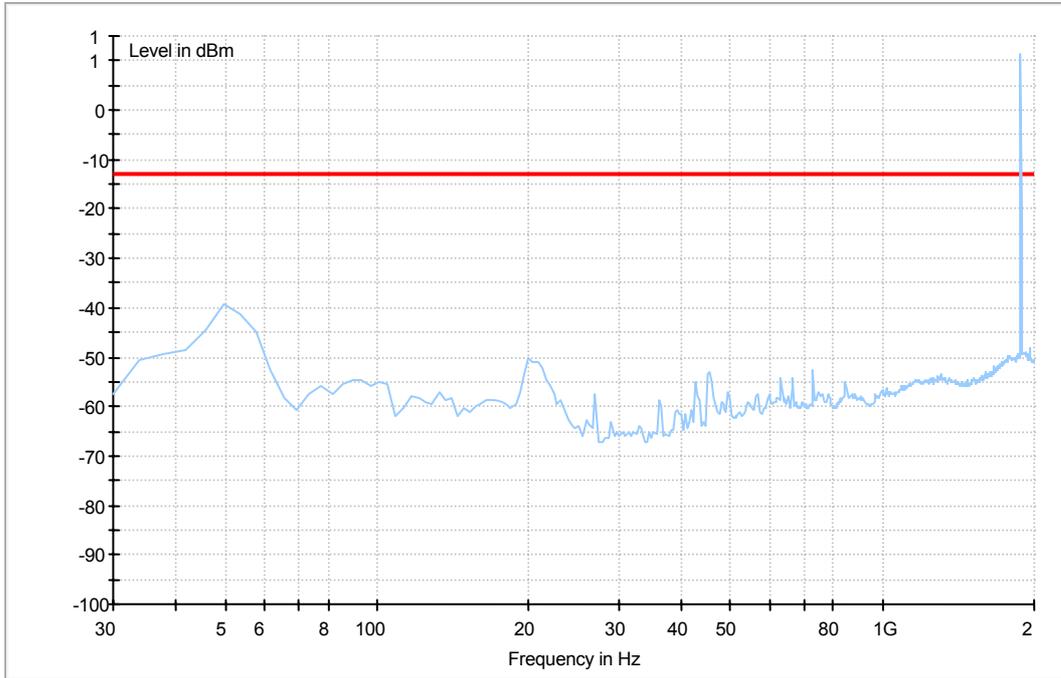
Traffic Mode (2GHz-18GHz)



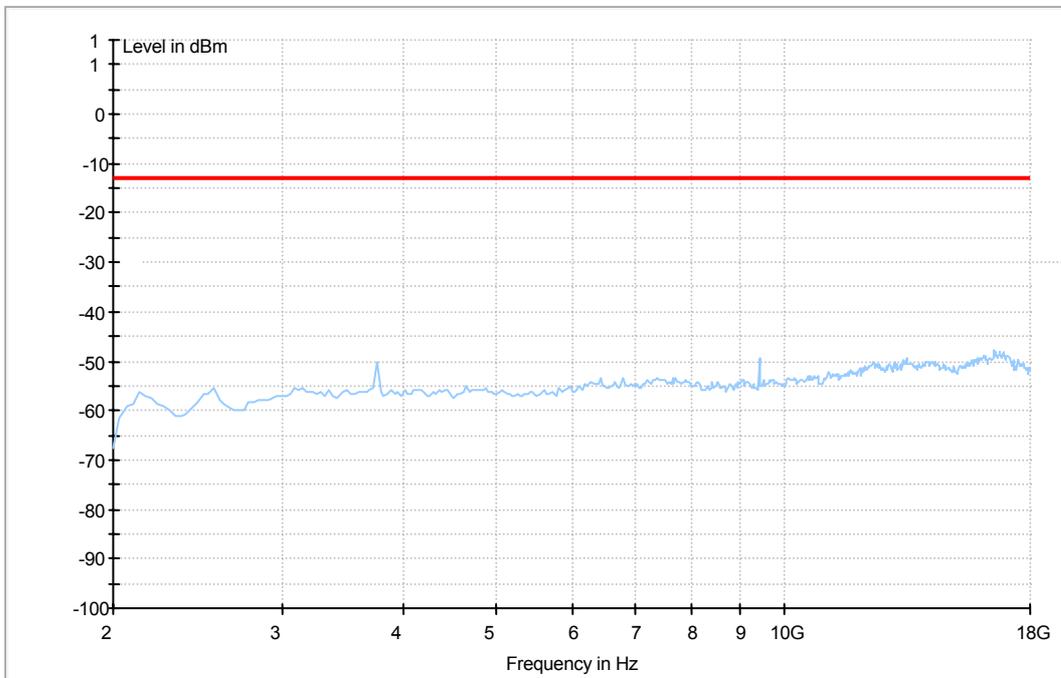
8.3.4 For CDMA 1X EVDO 1900  
Traffic Mode (9kHz-30MHz)



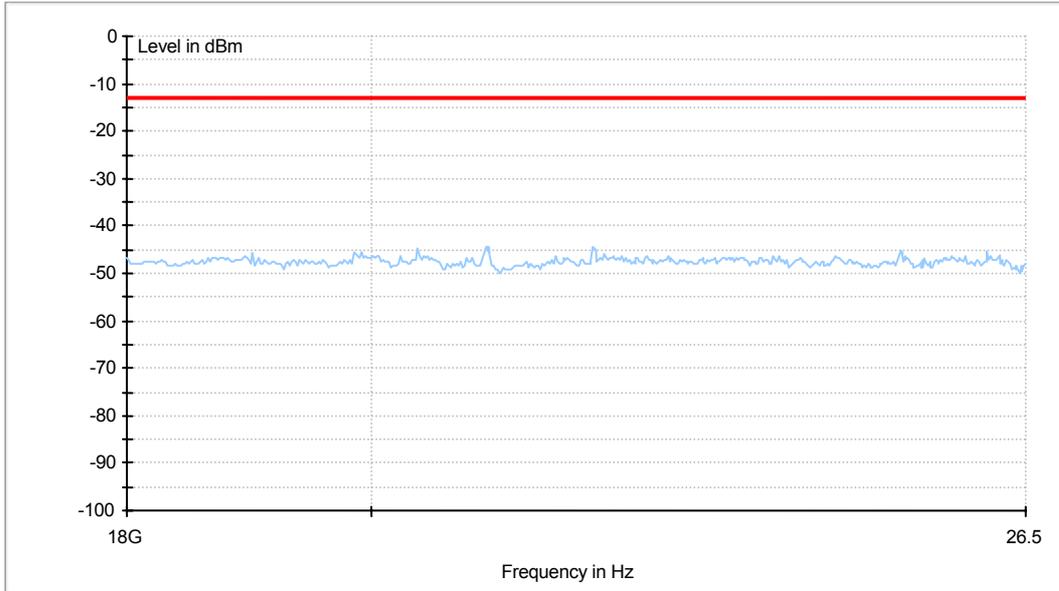
Traffic Mode (30MHz-2GHz)



Traffic Mode (2GHz-18GHz)



Traffic Mode (18GHz-26.5GHz)



**END**