EMC Test Report

Product Name: CDMA 1X Digital Mobile Phone with Bluetooth

Model Number: M635

Report No: SYBH(Z-EMC)072032011-2
FCC ID: QISC6071

Reliability Laboratory of Huawei Technologies Co., Ltd.

Huawei Base, Bantian, Longgang District, Shenzhen 518129, P.R. China

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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 been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements. The site recognition number is 97456.
3. The laboratory has been listed by industry Canada to perform electromagnetic emission measurement. The site recognition number is 6369A-1.
4. The test report is invalid if not marked with "exclusive stamp for the test report".
5. 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.
6. The test report is invalid if there is any evidence of erasure and/or falsification.
7. 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.
8. Normally, the test report is only responsible for the samples that have undergone the test.
9. 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:

Modification Information

Modification Information	1	
	2	
	3	Not Applicable!
	4	
	5	
	6	
	7	

REPORT ON	**EMC TEST OF CDMA 1X Digital Mobile Phone with Bluetooth**
	M/N: M635
REGULATION	**FCC CFR47 Part 15: Subpart B;**
	FCC CFR47 Part 22: Subpart H;
	FCC CFR47 Part 24: Subpart E;
	FCC CFR47 Part 27: Subpart C;
START OF TEST	**Mar.27, 2011**
END OF TEST	**Mar.28, 2011**
Final Judgement:	**Pass**

Approved By	**2011-03-31**	**Liuchunlin**	Liu Chunlin
	Date	**Name**	**Signature**
Reviewed By	**2011-03-31**	**Dailinjun**	Dailinjun
	Date	**Name**	**Signature**
Operator	**2011-03-31**	**Wenjianfeng**	Wenjianfeng
	Date	**Name**	**Signature**

REPORT BODY CONTENT

1 Status

1.1 Product Information

CLIENT:	Huawei Technologies Co., Ltd.
ADDRESS:	Bantian Longgang District Shenzhen, P.R. China
MANUFACTURING DESCRIPTION	CDMA 1X Digital Mobile Phone with Bluetooth
MANUFACTURERS MODEL NUMBER	M635

1.2 Test Site

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

1.3 Test environment condition

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

2 Summary of Results

Table below shows a brief summary of the results obtained.

Summary of results

EUT Classification：Wireless Terminal				
Test Items	**Test Configuration &Test Mode**	**Required Performance Criteria**	**Result**	**Site**
Radiated Emissions Enclosure Port	TC1/TC2 (TM5-TM8)	N/A	Pass	Site1
Conducted Emissions	TC1 (TM1-TM8)	N/A	Pass	Site1
Radiated Spurious Emissions Enclosure Port	TC1 (TM1-TM3)	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

HUAWEI CDMA Mobile Phone M635 is subscriber equipment in the CDMA system. The frequency band is US Cellular, PCS, and AWS. The Mobile Phone implements such functions as RF signal receiving / Transmitting, CDMA protocol processing, voice and SMS service etc. It also provides Bluetooth module to synchronize data between a PC and the phone, or to exchange data with other Bluetooth devices.

3.1.1 Main Equipment Technical Data

Description:	CDMA 1X Digital Mobile Phone with Bluetooth
Models:	M635
Input Rated Voltage	3.7V DC
Rated Consumption Power:	Max 2.0 W
Dimensions	110mm x 61mm x 13.1mm
Weight	About90g (with battery)

Sub-Assembly Identity

Mode	Band Class	Frequency	
		Transmitt Frequency (MHz)	Receive Frequency (MHz)
CDMA	Band Class 0	824-849	869-894
CDMA	Band Class 1	1850-1910	1930-1990
CDMA	Band Class 15	1710-1755	2110-2155
BT	/	2400-2483.5	2400-2483.5

3.2 Sub-Assembly Identity

Sub-Assembly Identity

Board				
Model Name	Qty.		Serial	Description
M635	1		Z7H2B11112100188	Main board of Mobile Phone
Accessory				
Name	Qty.	Manufacture	Serials number	Description
Adapter	1	SHENZHEN HUNTKEY POWER TECHNOLOGY CO., LTD	HKAAC0789488	Model：HS-050040U5 Input voltage: ~100-240V ;50/60Hz Output voltage: ⎓ +5.0V Rate power: 2W
Adapter	1	TECH-POWER ELECTRONICS (SHENZHEN) CO.,LTD	TPAB21512224	Model：HS-050040U5 Input voltage: ~100-240V ;50/60Hz Output voltage: ⎓ +5.0V Rate power: 2W
Battery	1	Huawei Technologies Co.,LTD.	YHCAC31H15304081	Battery Model: HB5D1H Rated capacity: 900mAh Nominal Voltage: ⎓ +3.7V Charging Voltage: ⎓ +4.2V

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

Cable Used during Test

Cable	Quantity	Type of Cable
USB	1	shielded
Earphone	1	Unshielded

4.2 Associated Equipment Used during Test

Associated Equipment Used during Test

Name	Model	Manufacturer	S/N	Cal Date
Radio Communication Tester	CMU200	R&S	3608105673	2010-10-24
Notebook	T43	LENOVO	H3106010123	N/A

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).
TC2:EUT connected to the notebook by USB port.

Configuration table

TC1/TC2	TM1~TM8

4.3.2 Test Mode

There were 8 test Modes. TM1 to TM8 were shown in the diagrams below:

TM1	operate in traffic mode CDMA800;
TM2	operate in traffic mode CDMAAWS;
TM3	operate in traffic mode CDMA1900;
TM4	operate in traffic mode Bluetooth;
TM5	operate in idle mode CDMA800;
TM6	operate in idle mode CDMAAWS;
TM7	operate in idle mode CDMA1900;
TM8	operate in idle mode Bluetooth;

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.

For CDMA, the following conditions shall also be met:
- The EUT shall be commanded to operate at maximum transmit power;

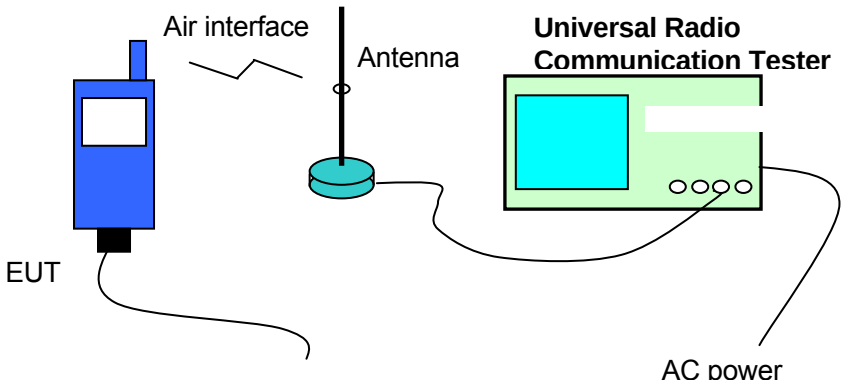


Figure 1.: Test Configuration

Idle Mode:
The EUT 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;

For Cellular, PCS and AWS, 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.

Please refer to following figure:

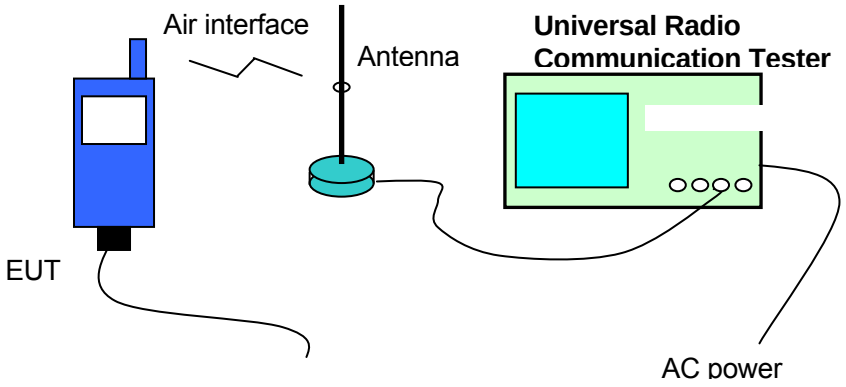


Figure 2. Test Configuration

5 Electromagnetic Interference (EMI)

5.1 Radiated Disturbance 30MHz to 18GHz

5.1.1 Test Procedure

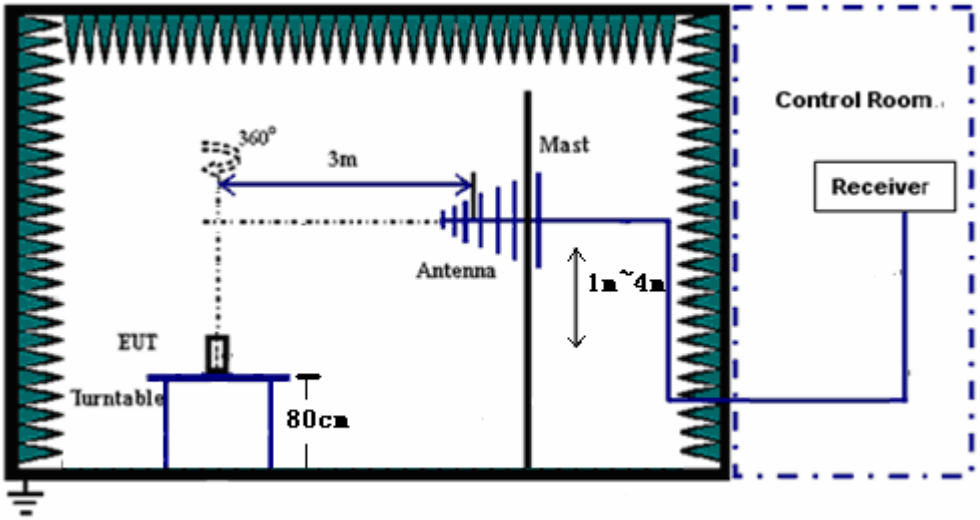
The test site semi-anechoic chamber has met the requirement of NSA tolerance 4dB according to the standards: ANSI C63.4. The test distance was 3m.The set-up and test methods were according to ANSI C63.4.
A preliminary scan and a final scan of the emissions were made from 30 MHz to18 GHz by using test 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:



5.1.2 Test Results

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

Test Limits

Frequency of Emission (MHz)	Radiated Limit	
	Unit(μv/m)	Unit(dBμV/m)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	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.

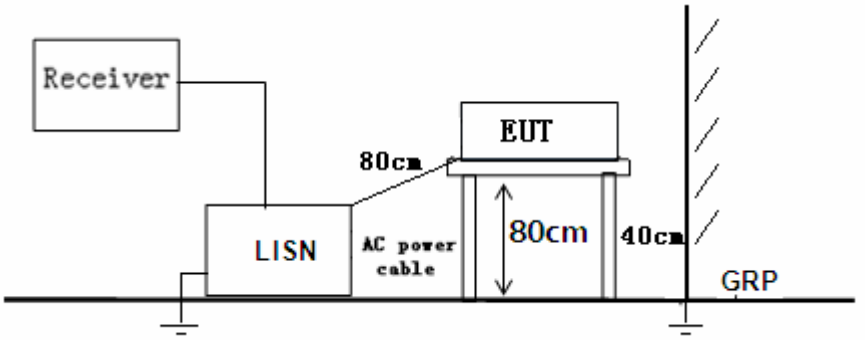
Conducted Disturbance at AC Port measurements were undertaken on the L and N Lines. The emissions were measured using a Quasi-Peak Detector and Average Detector.

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 150kz to 30 MHz: 9 kHz;

Test Set-up figure:

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



5.2.2 Test Results

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

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 dBμV	56~46 dBμV
0.5MHz~5MHz	56 dBμV	46 dBμV
5MHz~30MHz	60 dBμV	50 dBμV

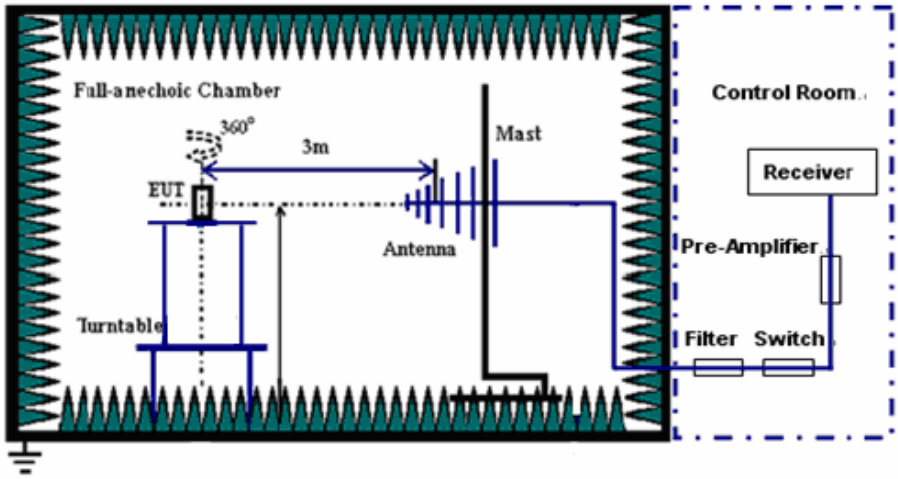
5.3 Radiated Spurious Emissions

5.3.1 Test Procedure

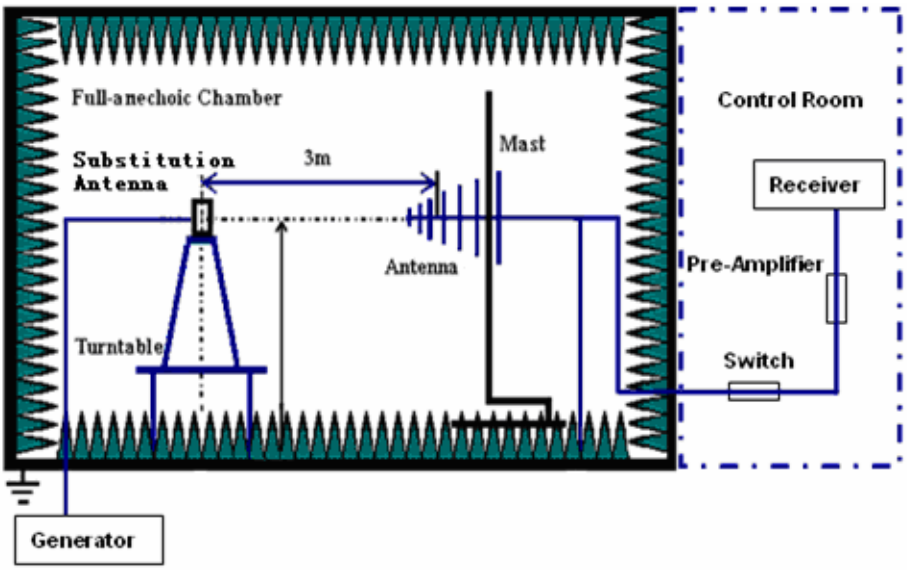
A test site fulfilling the requirements of ITU-R Recommendation SM329-10 was used. The EUT was placed on a non-conducting support in the anechoic chamber and was operated from a power source via an RF filter to avoid radiation from the power leads.

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

Radiated Spurious Emissions Limits

Frequency band	**Minimum requirement (E.R.P) traffic mode**
9KHz~18GHz	-13dBm

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

24.238(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 30MHz up to 26.5GHz: 1MHz;

Radiated Spurious Emissions Limits

Frequency band	**Minimum requirement (E.R.P) traffic mode**
9KHz~26.5GHz	-13dBm

According to part 27.53, the defined measurement bandwidth as following:

27.53(h) 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 30MHz up to 18GHz: 1MHz;

Radiated Spurious Emissions Limits

Frequency band	**Minimum requirement (E.R.P) traffic mode**
9KHz~18GHz	-13dBm

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

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,

E.R.P. [dBm] = SGP [dBm] - Cable Loss [dB] + Gain [dBd]
NOTE: SGP- Signal Generator Level

5.3.2 Test Results

The EUT has met the requirements of FCC Part22/24/27 requirement.

6 Main Test Instruments

Main Test Equipments

Test item	Test Instrument	Model	Manufacturer	Cal-Date	Cal Interval (month)
RE&CE	EMI Test receiver	ESU26	R&S	Jun.25, 2010	12
	Broadband Antenna	VULB 9163	SCHWARZBECK	May.15, 2010	12
	Horn Antenna	HF906	R&S	May.15, 2010	12
	LISN	ENV216	R&S	Jun.25.2010	12
RSE	EMI Test receiver	ESIB26	R&S	Apr.22, 2010	12
	Broadband Antenna	CBL6112B	SCHAFFNER	Dec.11.2010	12
	Horn Antenna	3117	ETS-Lindgren	Oct.20.2010	12
	Horn Antenna	3160	ETS-Lindgren	Sep.29.2010	12

Software Information			
Test Item	Software Name	Manufacturer	Version
RE/CE	ES-K1	R&S	1.7.1
RSE	EMC32	R&S	V8.40.10

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:

System Measurement Uncertainty

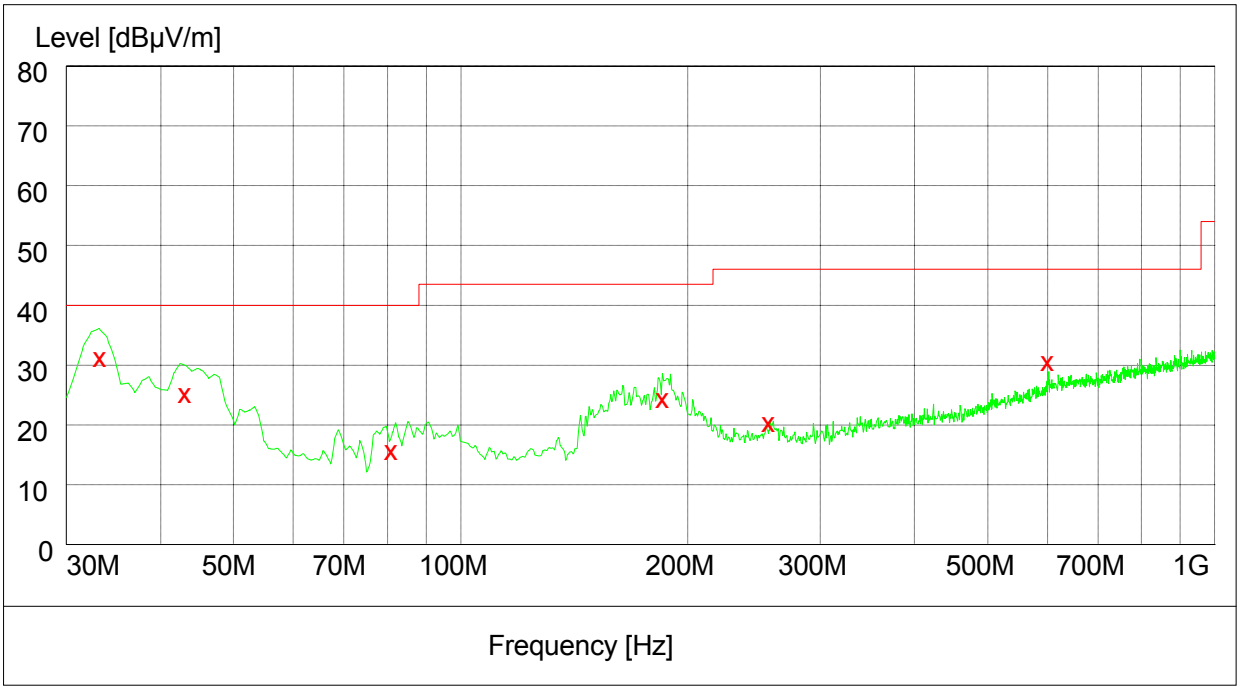
Items		Extended Uncertainty
RE	Field strength (dBμV/m)	U=4.1dB; k=2(30MHz-1GHz)
RE	Field strength (dBμV/m)	U=4.1dB; k=2(1GHz-18GHz)
RSE	ERP (dBm)	U=2.2dB；k=2
CE	Disturbance Voltage (dBμV)	U=3.4dB; k=2

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.

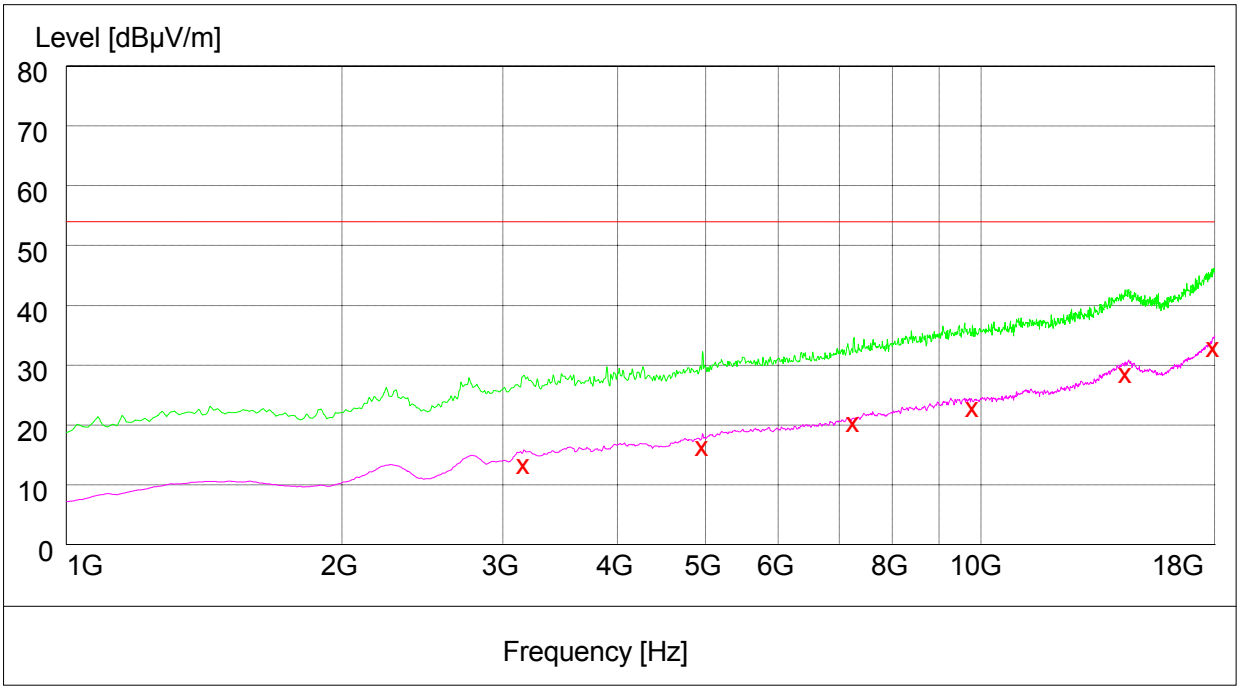
30MHz-1GHz



MEASUREMENT RESULT: QP Detector

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
33.284000	32.40	11.7	40.0	7.6	100.0	188.00	VERTICAL
43.136000	26.30	13.1	40.0	13.7	100.0	316.00	VERTICAL
81.092000	16.80	8.8	40.0	23.2	200.0	64.00	VERTICAL
185.380000	25.50	11.5	43.5	18.0	100.0	326.00	HORIZONTAL
256.528000	21.50	14.2	46.0	24.5	106.0	332.00	HORIZONTAL
601.788000	30.20	22.5	46.0	15.8	140.0	175.00	VERTICAL

1GHz-18GHz



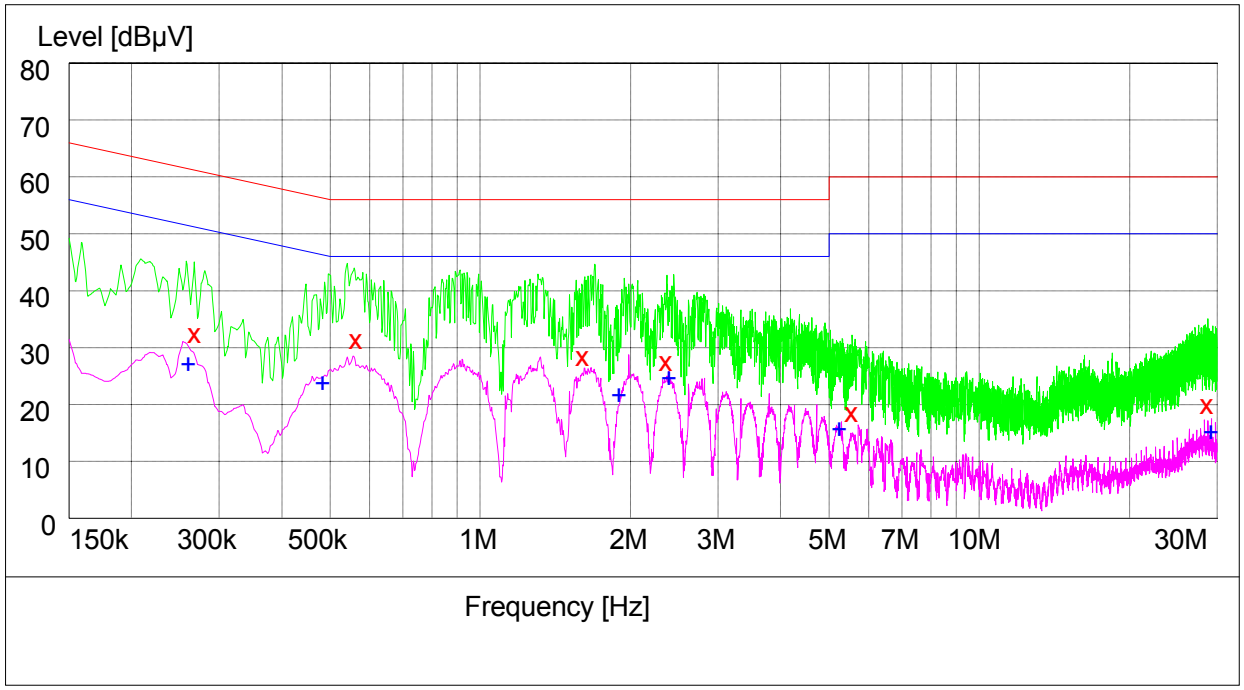
MEASUREMENT RESULT: AV Detector

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
3159.900000	14.50	-8.4	54.0	39.5	101.0	148.00	VERTICAL
4957.100000	17.50	-3.8	54.0	36.5	192.0	59.00	VERTICAL
7254.000000	20.40	0.6	54.0	33.6	100.0	2.00	HORIZONTAL
9801.700000	23.20	5.1	54.0	30.8	195.0	200.00	HORIZONTAL
14394.500000	29.30	12.1	54.0	24.7	100.0	212.00	HORIZONTAL
17939.500000	33.30	16.9	54.0	20.7	187.0	359.00	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
0.268000	32.20	10.0	61	28.8	N	FLO
0.566000	30.50	10.1	56	25.5	N	FLO
1.608000	28.90	10.1	56	27.1	N	FLO
2.358000	27.90	10.1	56	28.1	N	FLO
5.562000	18.90	10.2	60	41.1	N	FLO
28.636000	20.00	10.4	60	40.0	L1	FLO

MEASUREMENT RESULT: AV Detector

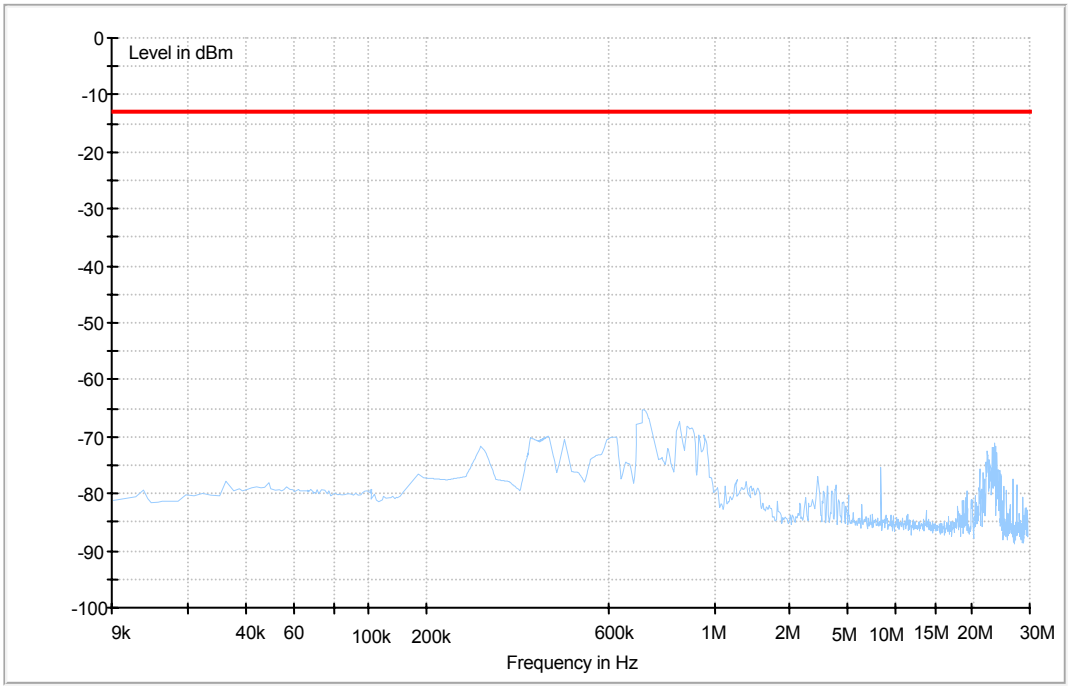
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.260000	27.80	10.0	51	23.2	N	FLO
0.484000	24.10	10.1	46	21.9	N	FLO
1.896000	22.00	10.1	46	24.0	N	FLO
2.388000	26.30	10.1	46	19.7	N	FLO
5.232000	17.20	10.2	50	32.8	N	FLO
29.162000	15.60	10.4	50	34.4	N	FLO

8.3 Radiated Spurious Emission

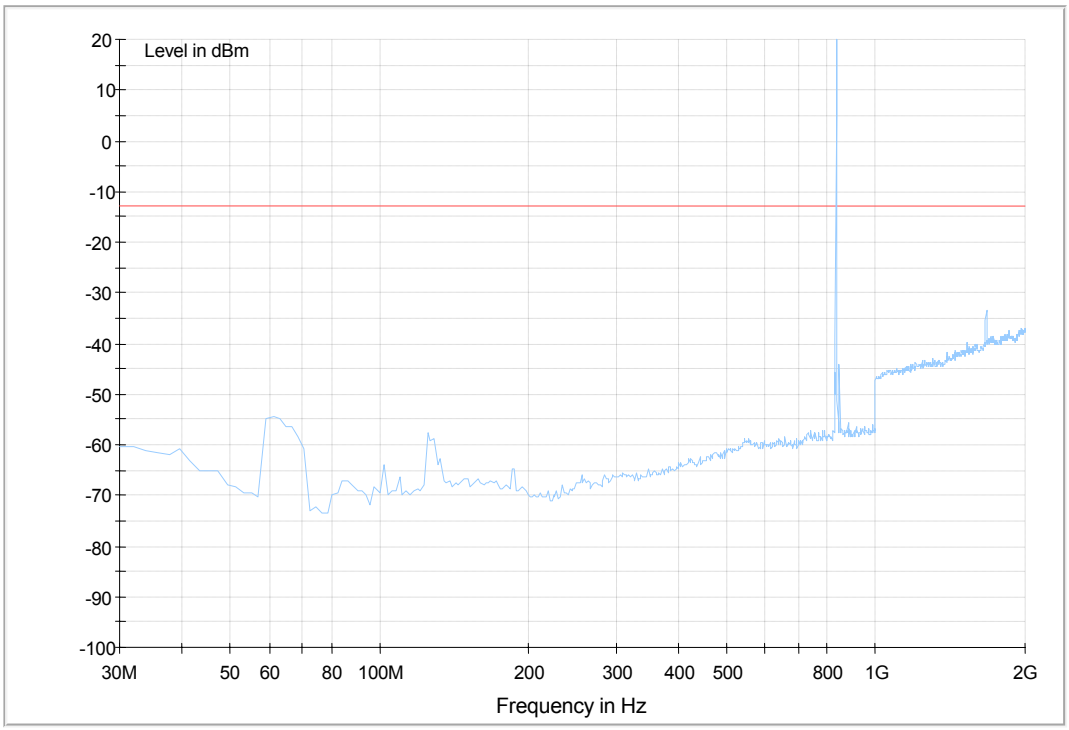
This test results are the maximum level of radiated spurious emissions in vertical and horizontal polarity. The highest peak exceeds the limit line is carrier frequency

8.3.1 For CDMA 800

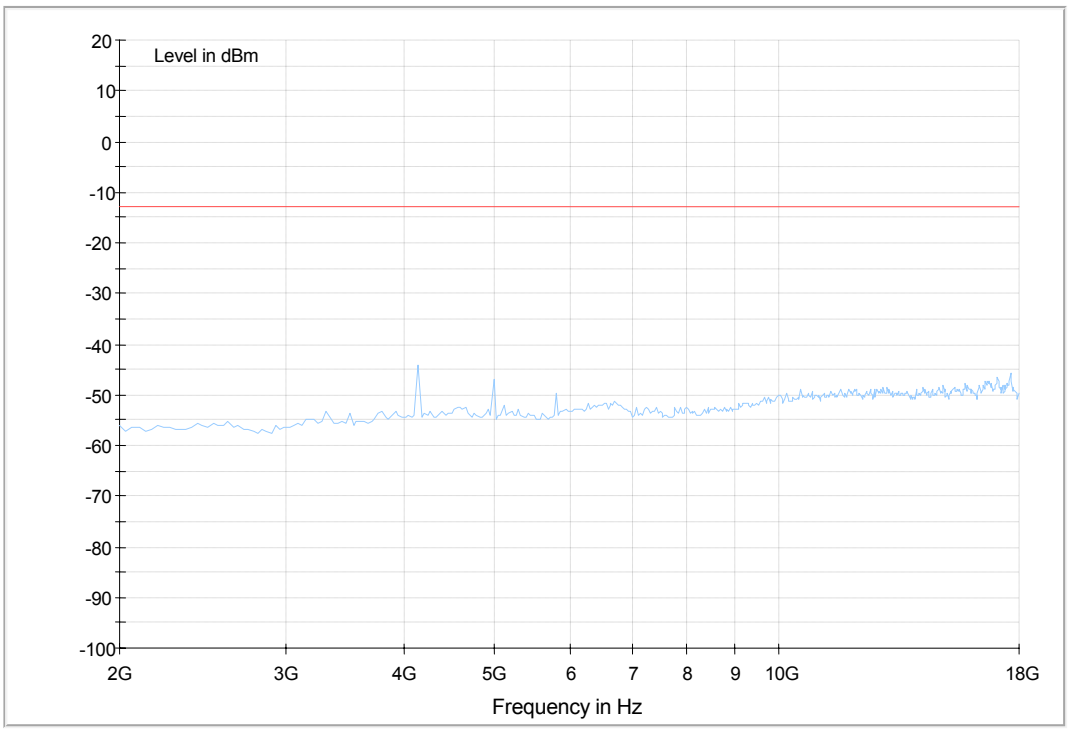
Traffic Mode (9kHz-30MHz)



Traffic Mode (30MHz-2GHz)

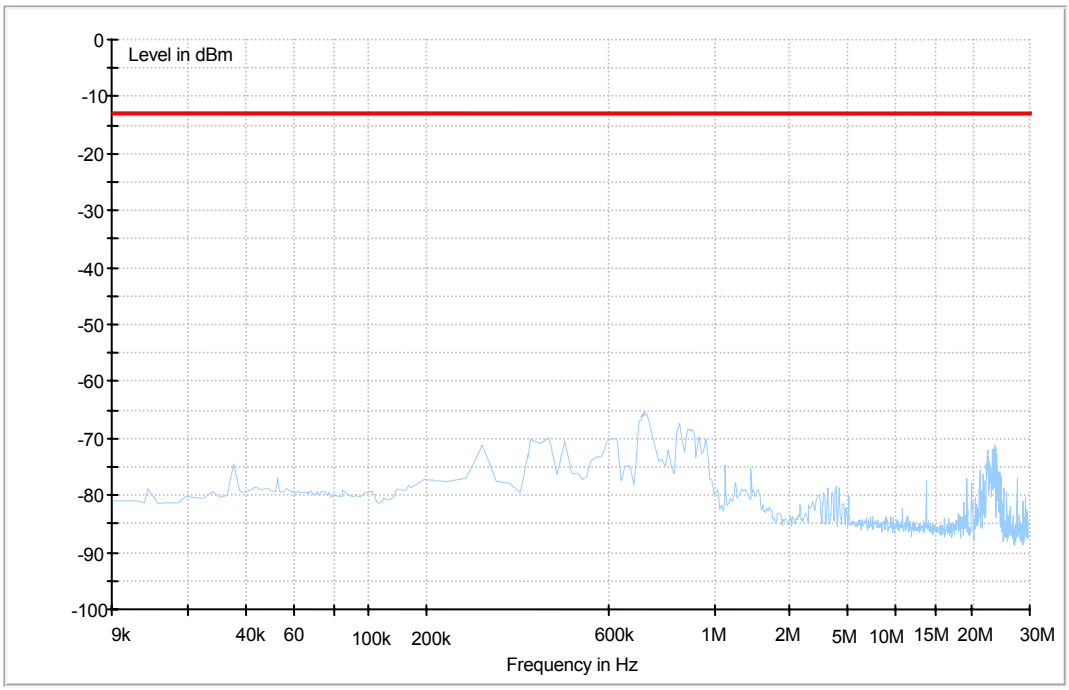


Traffic Mode (2GHz-18GHz)

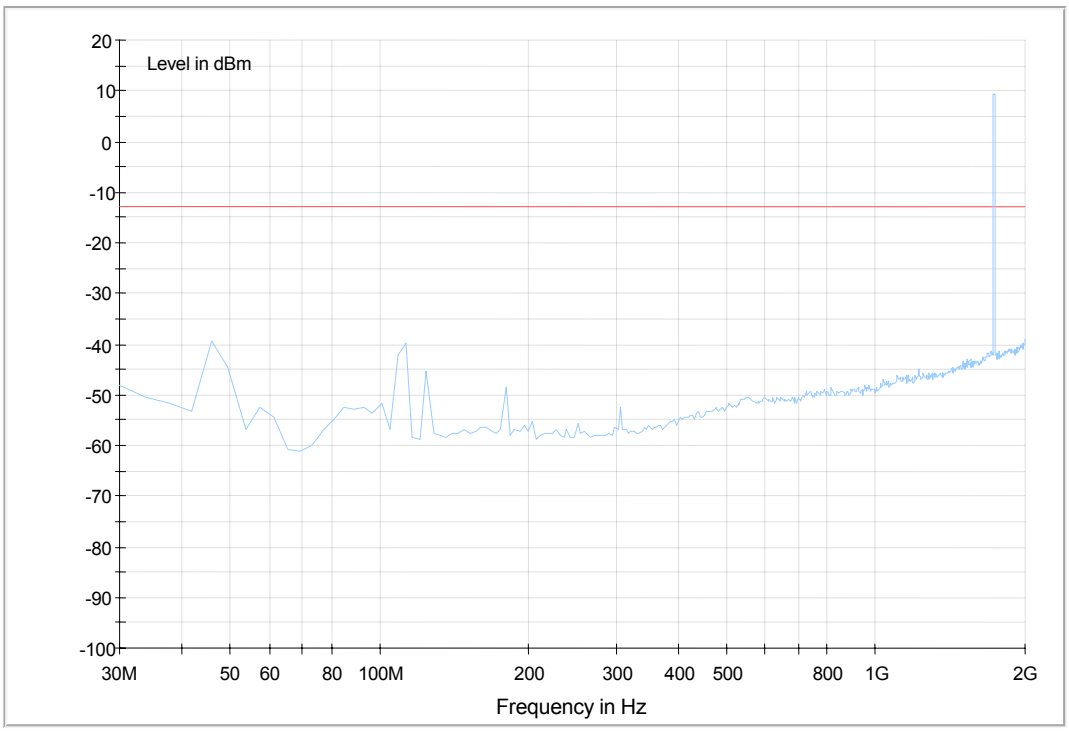


8.3.2 For CDMA AWS

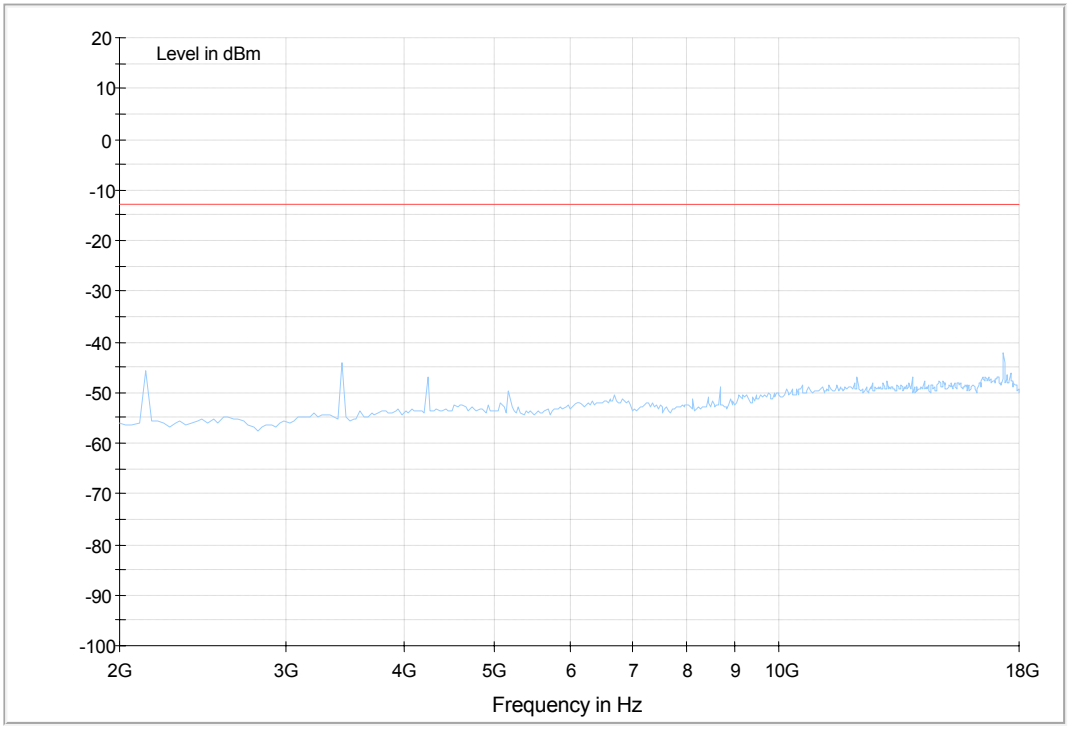
Traffic Mode (9kHz-30MHz)



Traffic Mode (30MHz-2GHz)

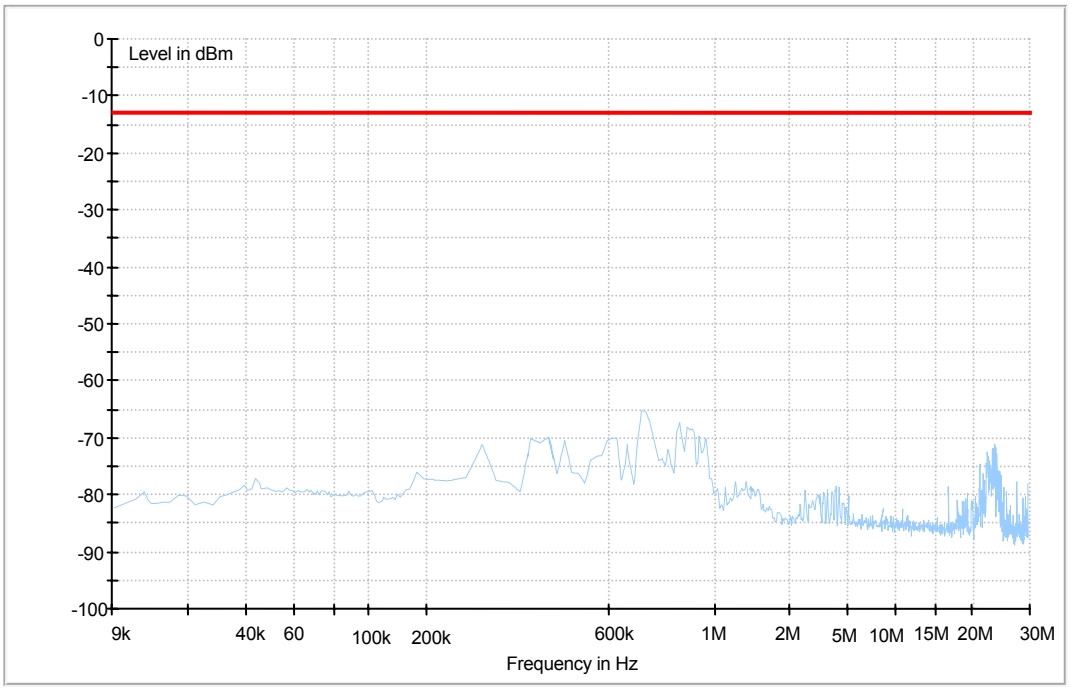


Traffic Mode (2GHz-18GHz)

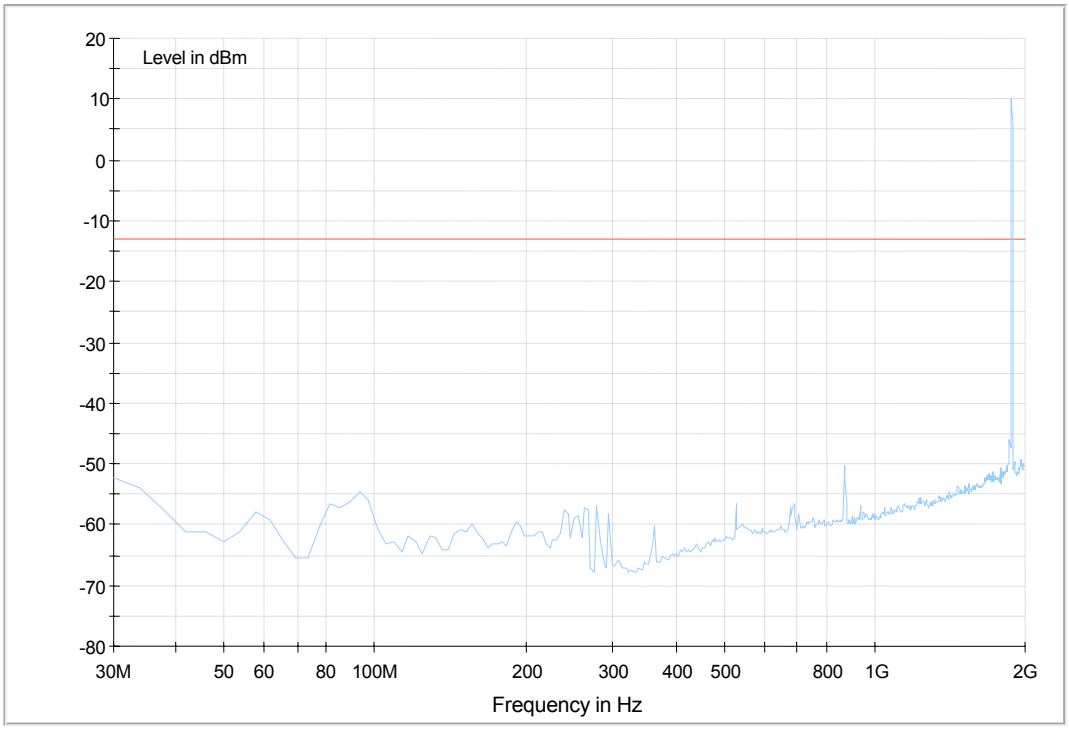


8.3.3 For CDMA 1900

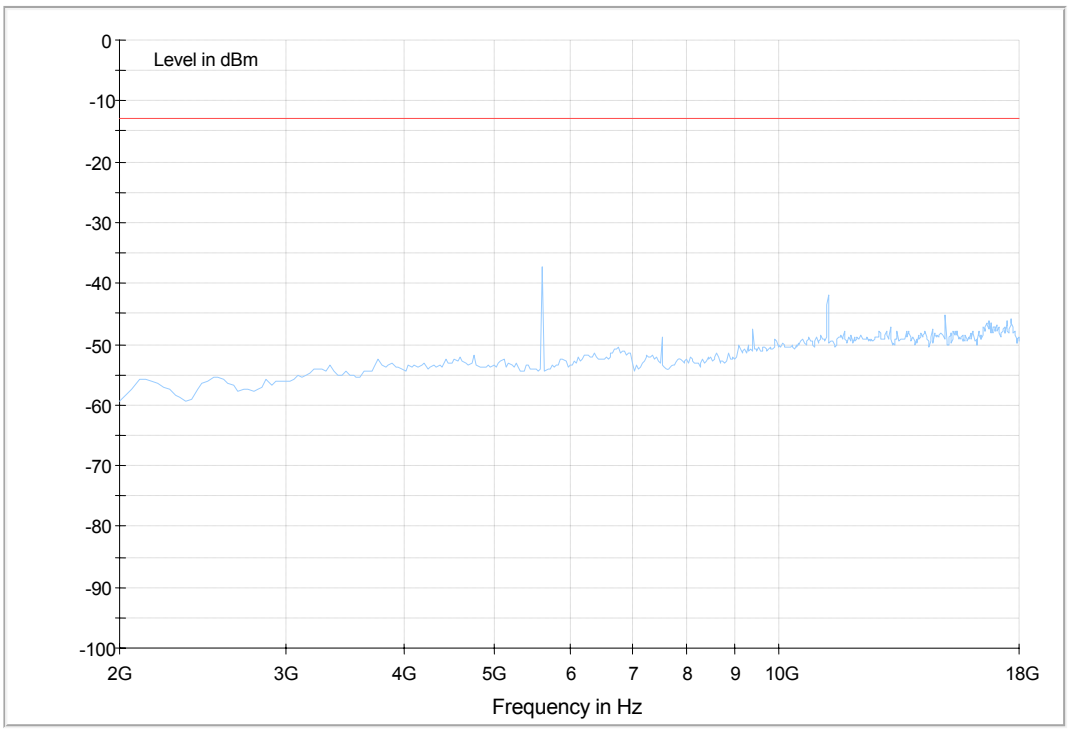
Traffic Mode (9kHz-30MHz)



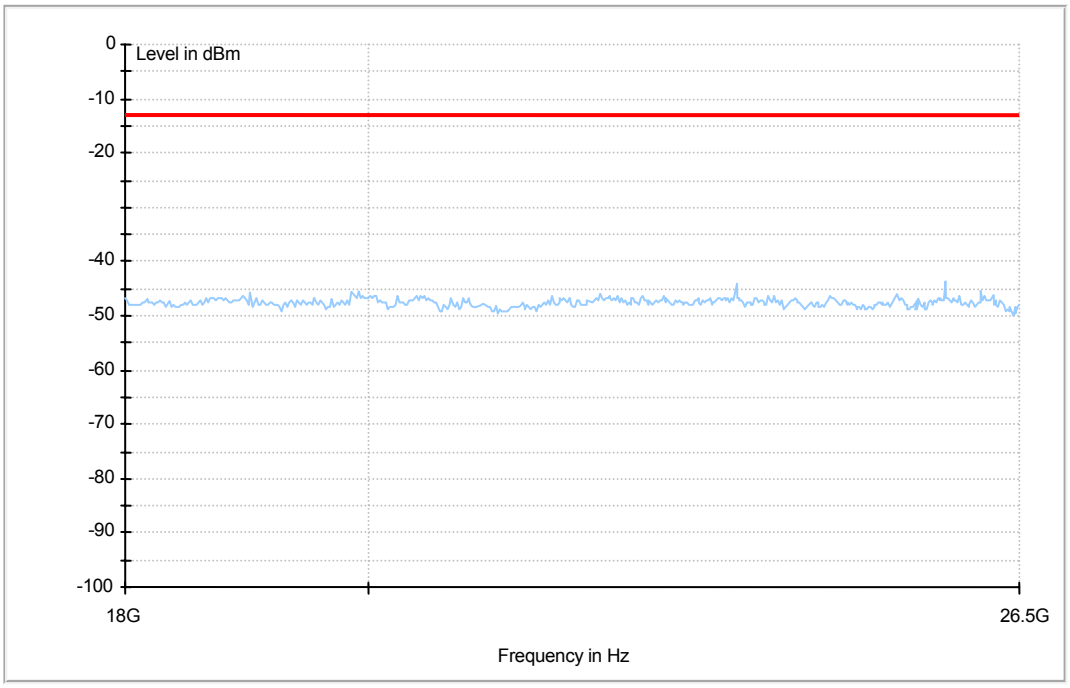
Traffic Mode (30MHz-2GHz)



Traffic Mode (2GHz-18GHz)



Traffic Mode (18GHz-26.5GHz)



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