



EMC Test Report

**Product Name: HUAWEI IDEOS X1;
HSDPA/UMTS/GPRS/GSM/EDGE Mobile Phone with Bluetooth;
IDEOS X1;GAGA;Gaga**

Model Number: HUAWEI U8180-7/U8180-7

Report No: SYBH(Z-EMC)102032011-2

FCC ID:QISU8180-7

Reliability Laboratory of Huawei Technologies Co., Ltd.

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Notice 1

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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-2.
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Modification Information

Modification Information	1	
	2	
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	4	
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REPORT ON	HUAWEI IDEOS X1; HSDPA/UMTS/GPRS/GSM/EDGE Mobile Phone with Bluetooth; IDEOS X1;GAGA;Gaga
	HUAWEI U8180-7/U8180-7
REGULATION	FCC CFR47 Part 15: Subpart B; FCC CFR47 Part 22: Subpart H; FCC CFR47 Part 24: Subpart E;
START OF TEST	May.8,2011
END OF TEST	May.10,2011
Final Judgement:	Pass

Approved By

2011-05-10
Date

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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	HUAWEI IDEOS X1; HSDPA/UMTS/GPRS/GSM/EDGE Mobile Phone with Bluetooth; IDEOS X1;GAGA;Gaga
MANUFACTURERS MODEL NUMBER	HUAWEI U8180-7/U8180-7

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
<u>Radiated Emissions</u> Enclosure Port	TC1/TC2 (TM12-TM22)	N/A	Pass	Site1
<u>Conducted Emissions</u>	TC1 (TM1-TM22)	N/A	Pass	Site1
<u>Radiated Spurious Emissions</u> Enclosure Port	TC1 (TM1-TM8, TM12-TM19)	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 U8180-7/U8180-7 is subscriber equipment in the WCDMA/GSM system. The HSDPA/UMTS frequency band is Band I and Band V, but only Band V test data included in this report. The GSM/GPRS/EDGE frequency band includes GSM850 and GSM900 and DCS1800 and PCS1900, but only GSM850 and PCS1900 bands test data included in this report. The Mobile Phone implements such functions as RF signal receiving/transmitting, HSDPA/UMTS and GSM/GPRS/EDGE protocol processing, voice, video, MMS service, GPS, AGPS and WIFI etc. Externally it provides micro SD card interface, earphone port(to provide voice service) and USIM card interface. It also provides Bluetooth module to synchronize data between a PC and the phone, or to use the built-in modem of the phone to access the Internet with a PC, or to exchange data with other Bluetooth devices.

3.1.1 Main Equipment Technical Data

Description:	HUAWEI IDEOS X1; HSDPA/UMTS/GPRS/GSM/EDGE Mobile Phone with Bluetooth; IDEOS X1;GAGA;Gaga
Models:	HUAWEI U8180-7/U8180-7
Input Rated Voltage	3.7V
Extreme Voltage	3.6V and 4.2V
Rated Power	Normal 3W ,Max 8 W
Dimensions	104mm(L)×56mm(W)×13mm(H)
Weight	<100g (with battery)

Sub-Assembly Identity

Mode		Work Frequency	
		Transmitt Frequency (MHz)	Receive Frequency (MHz)
GSM	GSM 850	824 - 849	869 - 894
	PCS1900	1850-1910	1930-1990
WCDMA	WCDMA850	824 - 849	869 - 894
GPS			1575.42
Bluetooth		2400-2483.5	
Wi-Fi		2400-2483.5	

Sub-Assembly Identity

Board				
Model Name	Qty.	Serial	Description	
HD1U813M	1	Q8Z7NA1132200029	Main board of Mobile Phone	
Accessory				
Name	Qty.	Manufacture	Serials number	Description
Adapter	1	Huawei Technologies Co., Ltd.	TPAB30108784	Adapter Model: HS-050040E7 Input Voltage : ~100-240V 50/60Hz 0.2A Output Voltage: 5V  400mA Rated Power: 2W
Adapter	1	Huawei Technologies Co., Ltd.	BYAAB1018388	Adapter Model: HS-050040B7 Input Voltage : ~100-240V 50/60Hz 0.2A Output Voltage: 5V  400mA



				Rated Power:2W
Adapter	1	Huawei Technologies Co., Ltd.	BYAB31828545	Adapter Model: HS-050040U6 Input Voltage : ~100-240V 50/60Hz 0.2A Output Voltage: 5V 400mA Rated Power:2W
Rechargeable Li-ion	1	Huawei Technologies Co., Ltd.	UNHB508XA192296 8	Battery Model: HB4J1H Rated capacity: 1200mAh Nominal Voltage: +3.7V Charging Voltage: +4.2V
Rechargeable Li-ion	1	Huawei Technologies Co., Ltd.	LACB429HI1801265	Battery Model: HB4J1H Rated capacity: 1200mAh 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	3607111817	2010-7-23
Notebook	T61	IBM	3108052508	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~TM22
---------	----------

4.3.2 Test Mode

There were 22 test Modes. TM1 to TM22 were shown in the diagrams below:

TM1	operate in traffic mode GSM 850;
TM2	operate in traffic mode GPRS 850;
TM3	operate in traffic mode EDGE 850;
TM4	operate in traffic mode GSM 1900;
TM5	operate in traffic mode GPRS 1900;
TM6	operate in traffic mode EDGE 1900;
TM7	operate in traffic mode WCDMA 850;
TM8	operate in traffic mode HSDPA 850;
TM9	operate in traffic mode GPS;
TM10	operate in traffic mode Bluetooth;
TM11	operate in traffic mode WIFI;
TM12	operate in idle mode GSM 850;
TM13	operate in idle mode GPRS 850;
TM14	operate in idle mode EDGE 850;
TM15	operate in idle mode GSM 1900;
TM16	operate in idle mode GPRS1900;

TM17	operate in idle mode EDGE 1900;
TM18	operate in idle mode WCDMA 850;
TM19	operate in idle mode HSDPA 850;
TM20	operate in idle mode GPS;
TM21	operate in idle mode Bluetooth;
TM22	operate in idle mode WIFI;

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 GSM and PCS, the following conditions shall also be met:

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

The downlink RXQUAL shall be monitored.

Assign channel frequency to an appropriate channel number.

For WCDMA, the following conditions shall also be met:

Logical Test Interface for details regarding generic call set-up procedure and BER, BLER test loop scenarios:

Set and send continuously up power control commands to the UE;

The DTX shall be disabled;

Inner Loop Power Control shall be enabled;

Transmitting and/or receiving (UL/DL) bit rate for reference test channel shall be 12.2 kbit / s.

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

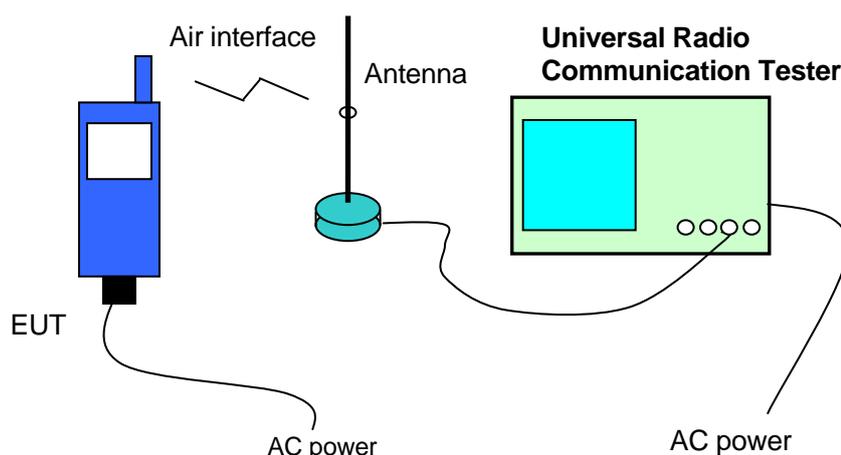


Figure 1.: Test Configuration

Idle Mode:

The EUT is required to be in the idle mode.

For GSM and PCS, 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.

For WCDMA, 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 neighbor cell list shall be empty;

Paging repetition period and DRX cycle shall be set to minimum (shortest possible time interval).

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 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 kHz

Measurement bandwidth: 1GHz – 18GHz: 1MHz

Test set up figure:

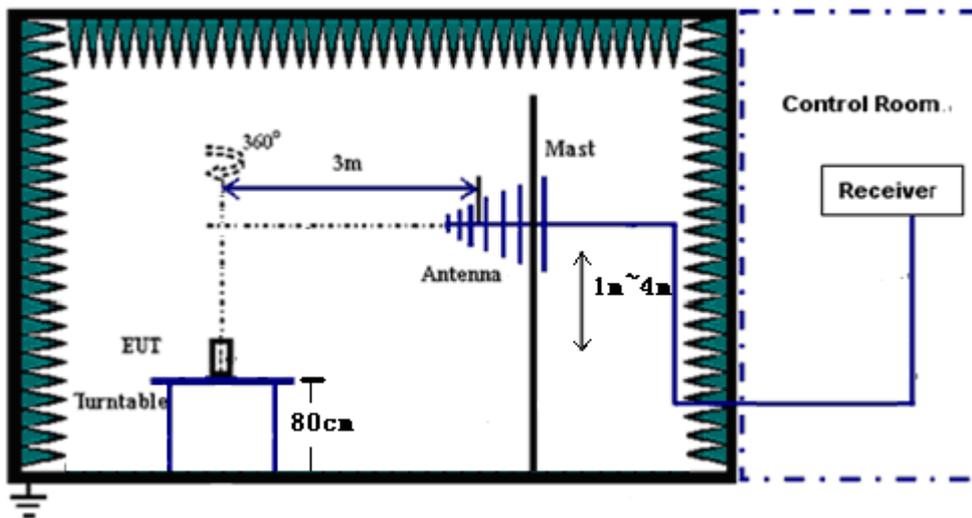


Figure 2. Test set-up

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($\mu\text{V}/\text{m}$)	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

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 150kHz to 30 MHz: 9 kHz;

Test Set-up figure:

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

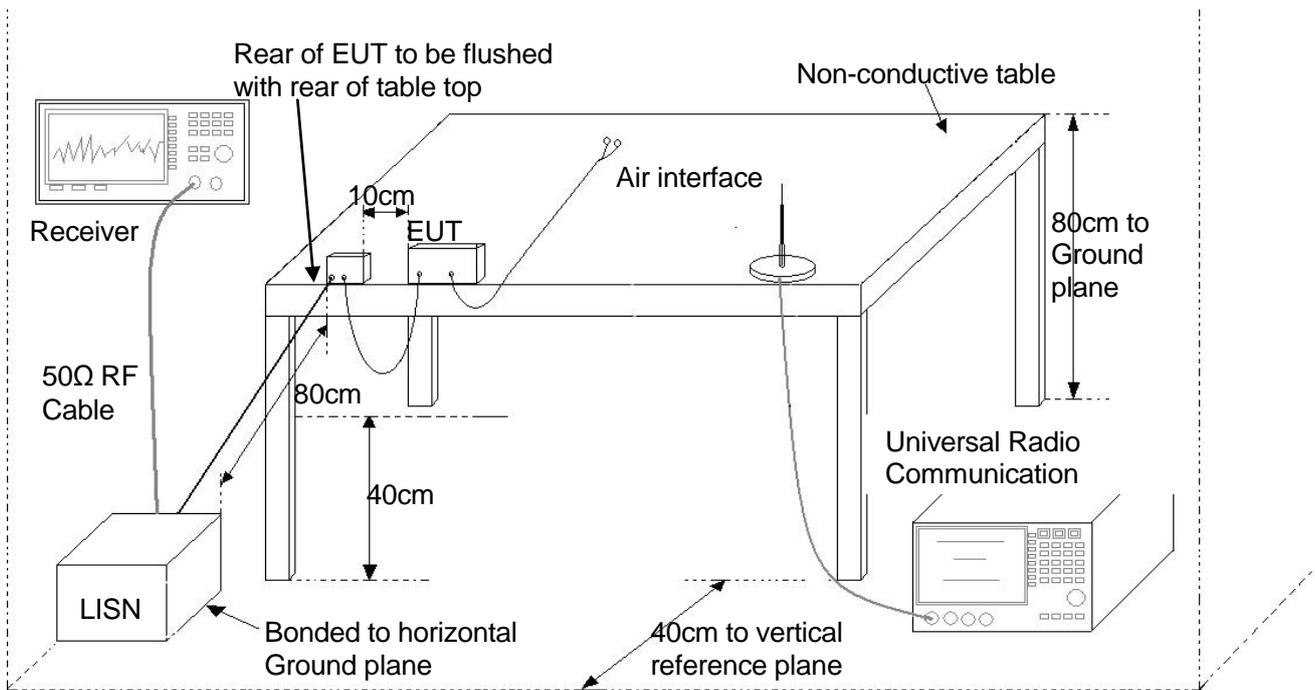


Figure 1. Test Set-up

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 dB μ V	56~46 dB μ V



0.5MHz~5MHz	56 dB μ V	46 dB μ V
5MHz~30MHz	60 dB μ V	50 dB μ V

5.3 Radiated Spurious Emissions

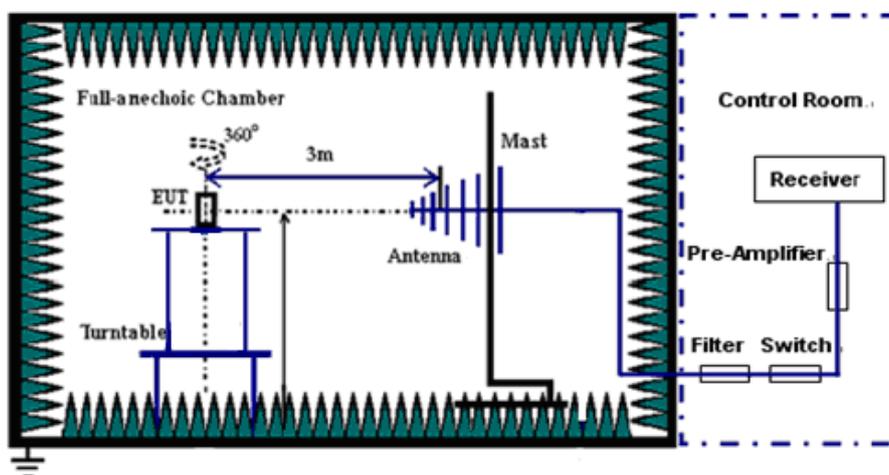
5.3.1 Test Procedure

A test site fulfilling the requirements of ITU-R Recommendation SM329 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:

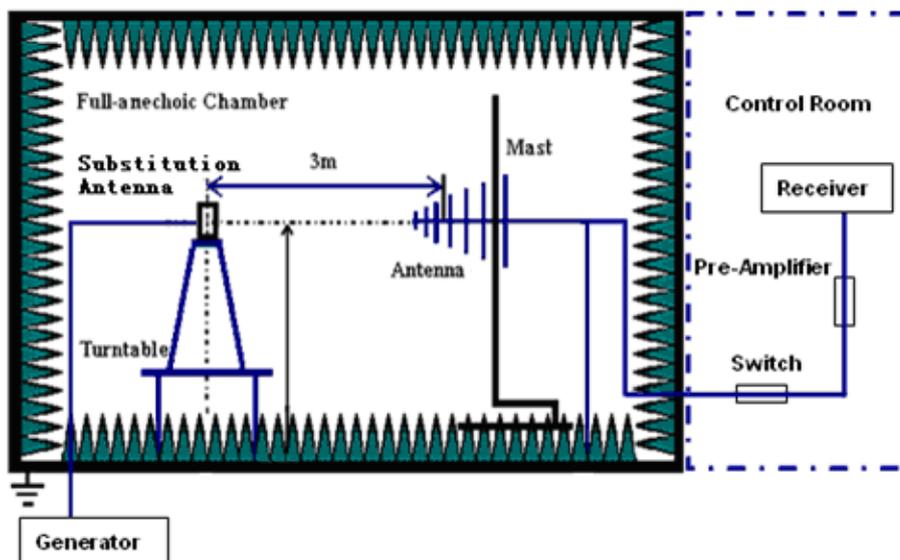
For transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, EIRP shall be measured when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in 2.1033(c)(8). Connect 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 Test Receiver, and record the power level of Signal Generator. Of course, the cable loss at the test frequency should be compensated.



Test should be performed in normal voltage condition.

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: 10 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: 10 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

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]	Measure ment 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 Part 22/24.

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	FSU40	R&S	Jun.24,2010	12
	Broadband Antenna	VULB 9163	SCHWARZBECK	Jun.29,2010	12
	Horn Antenna	HF906	R&S	Sep.29,2010	12
	Pyramidal Horn	3160-09	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	V8.10.10		



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:

System Measurement Uncertainty

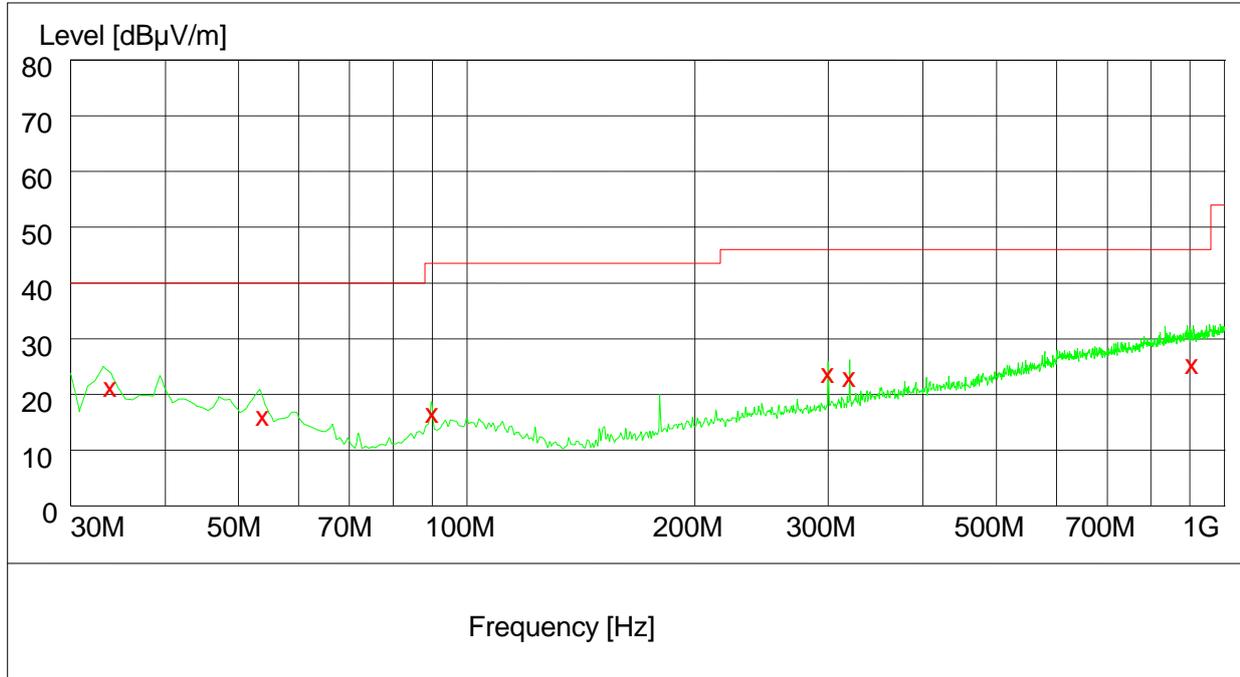
Items		Extended Uncertainty
RE	Field strength (dB μ V/m)	U=4.1dB; k=2(30MHz-1GHz)
RE	Field strength (dB μ V/m)	U=4.1dB; k=2(1GHz-18GHz)
RSE	ERP (dBm)	U=2.8dB; k=2
CE	Disturbance Voltage (dB μ V)	U=3.4dB; k=2

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.

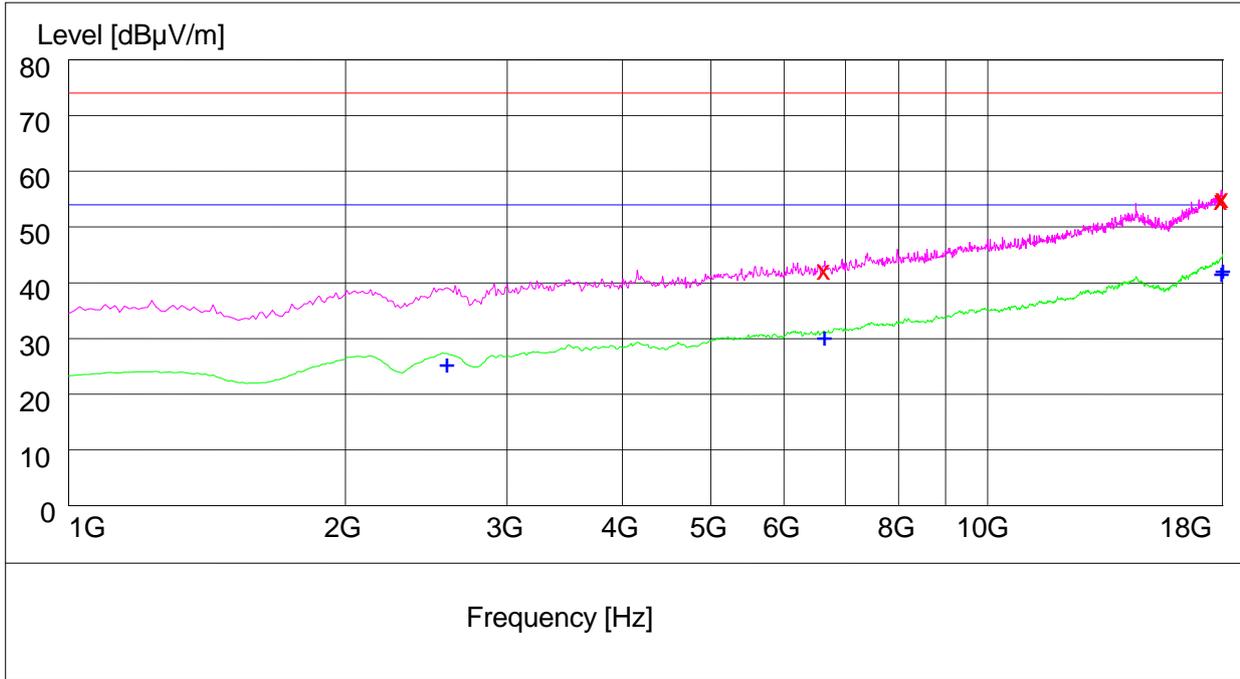
30MHz-1GHz



MEASUREMENT RESULT: QP Detector

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
33.900000	21.10	11.7	40.0	18.9	102.0	41.00	VERTICAL
53.880000	16.60	12.7	40.0	23.4	100.0	263.00	VERTICAL
90.000000	17.30	11.8	43.5	26.2	115.0	92.00	VERTICAL
300.000000	25.00	15.5	46.0	21.0	100.0	241.00	HORIZONTAL
319.980000	24.50	16.0	46.0	21.5	117.0	335.00	HORIZONTAL
906.420000	26.70	26.2	46.0	19.3	100.0	69.00	VERTICAL

1GHz-18GHz



MEASUREMENT RESULT: AV Detector

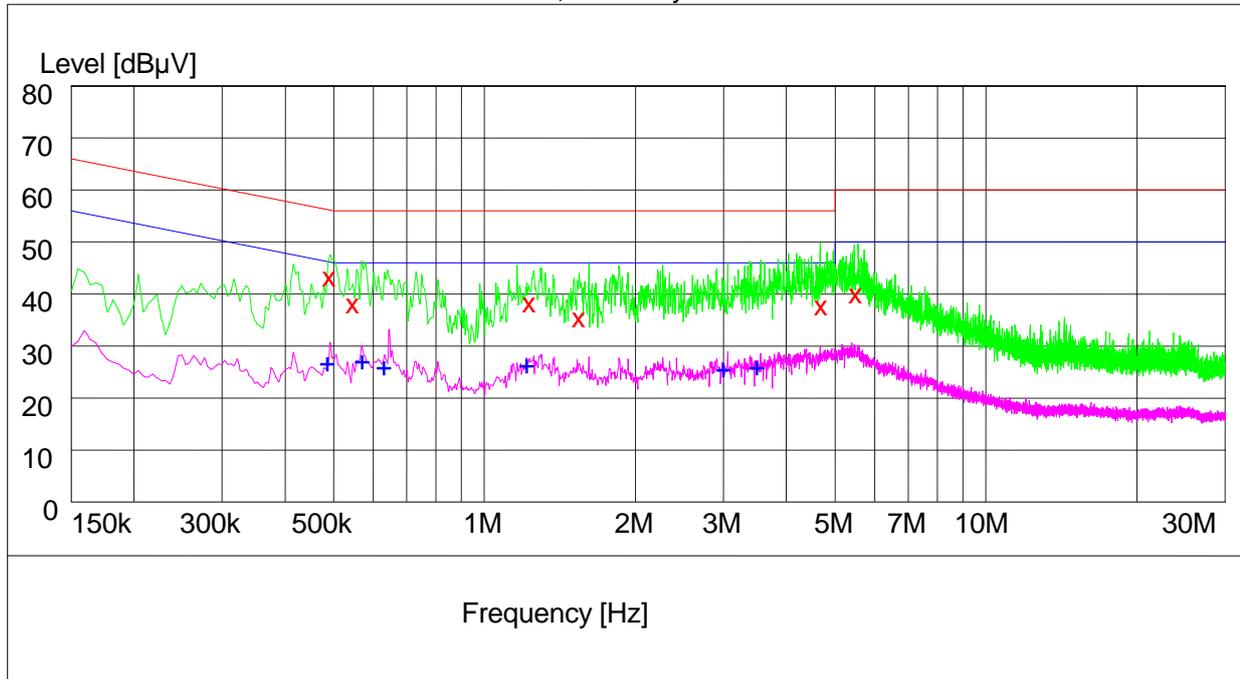
Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
2576.000000	26.70	0.3	54.0	27.3	117.0	268.00	VERTICAL
6637.500000	30.50	9.7	54.0	23.5	103.0	304.00	VERTICAL
17934.500000	43.10	27.3	54.0	10.9	148.0	198.00	VERTICAL
17998.500000	43.50	27.7	54.0	10.5	107.0	280.00	VERTICAL

MEASUREMENT RESULT: PK Detector

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
6641.500000	43.60	9.7	74.0	30.4	117.0	351.00	VERTICAL
17939.000000	56.10	27.3	74.0	17.9	100.0	168.00	VERTICAL
17998.500000	56.50	27.7	74.0	17.5	100.0	337.00	VERTICAL

8.2 Conducted 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	Transd dB	Limit dBµV	Margin dB	Line	PE
0.492000	44.20	10.1	56	11.8	N	FLO
0.548000	39.60	10.1	56	16.4	N	FLO
1.232000	39.90	10.1	56	16.1	N	FLO
1.548000	36.90	10.1	56	19.1	N	FLO
4.706000	39.30	10.2	56	16.7	N	FLO
5.508000	40.10	10.2	60	19.9	N	FLO

MEASUREMENT RESULT: AV Detector

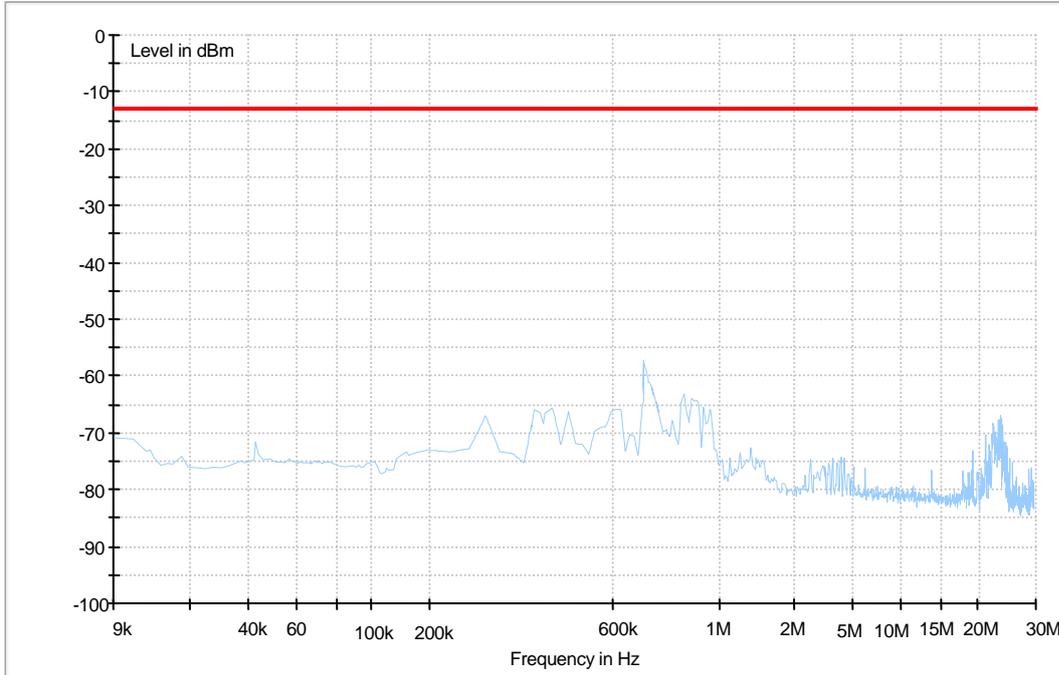
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.486000	28.40	10.1	46	17.6	N	FLO
0.570000	28.70	10.1	46	17.3	N	FLO
0.630000	27.60	10.1	46	18.4	N	FLO
1.212000	27.90	10.1	46	18.1	N	FLO
2.992000	27.10	10.2	46	18.9	N	FLO
3.482000	27.50	10.2	46	18.5	N	FLO

8.3 Radiated Spurious Emission

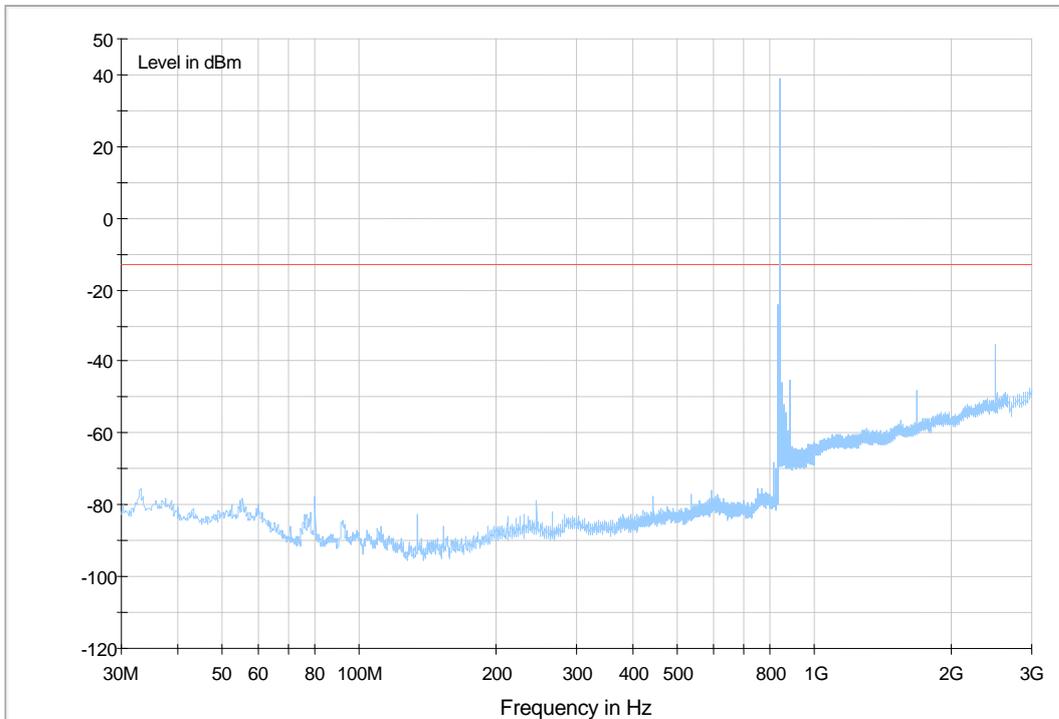
This test results are the maximum level of radiated spurious emissions in vertical and horizontal polarity. The highest peak exceeds the limit line is carrier frequency

8.3.1 For GSM 850

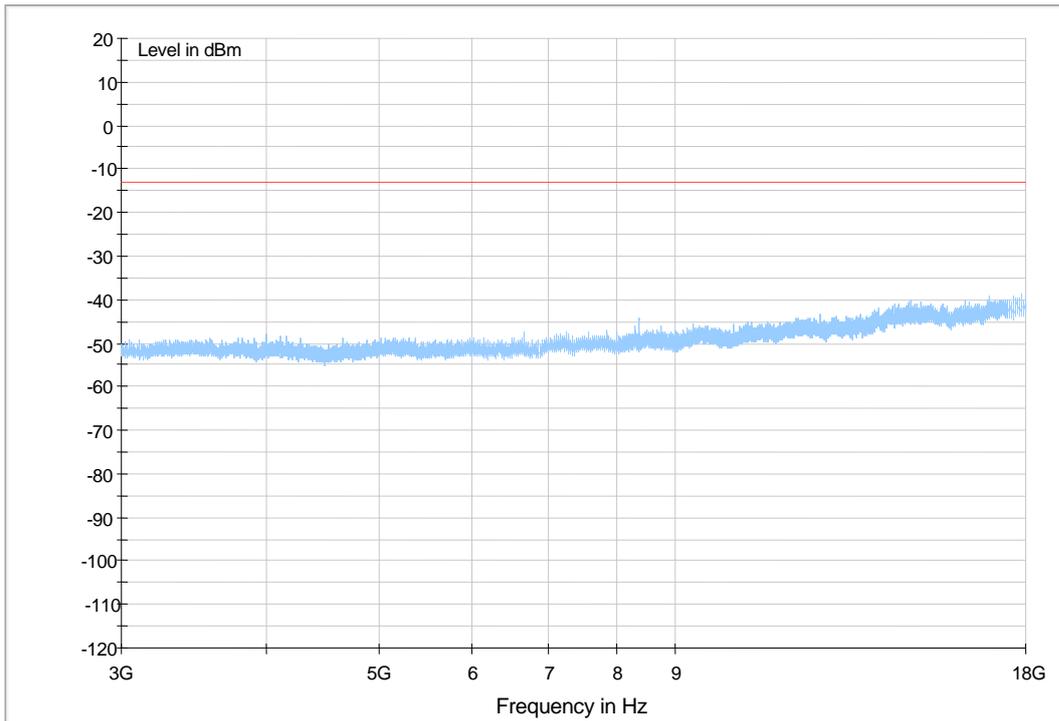
Traffic Mode (9kHz-30MHz)



Traffic Mode (30MHz-3GHz)

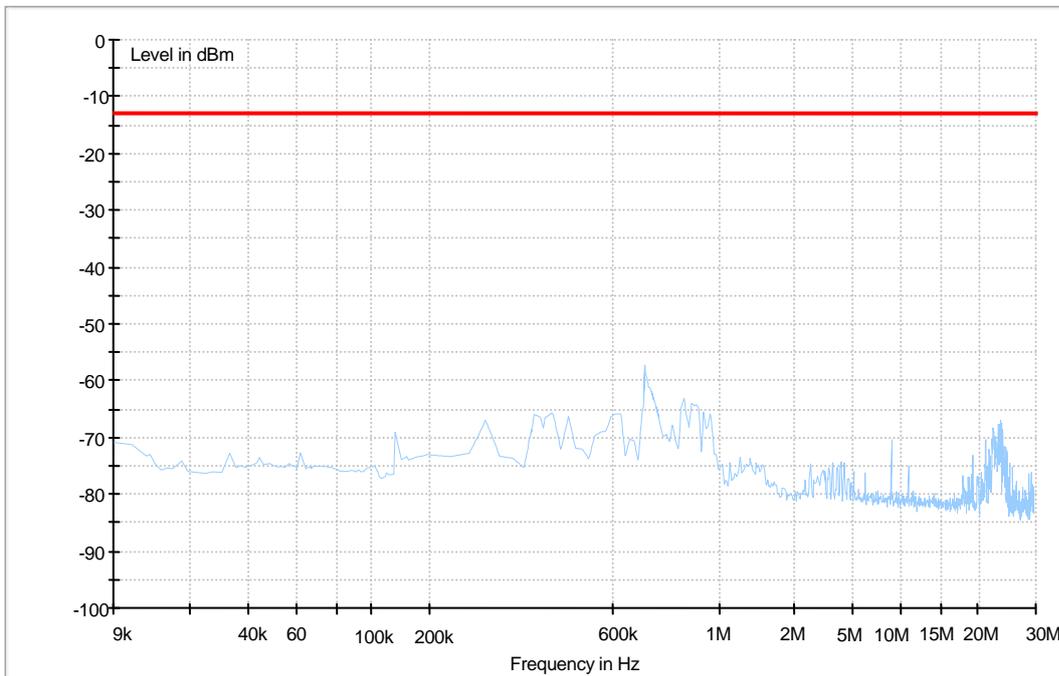


Traffic Mode (3GHz-18GHz)

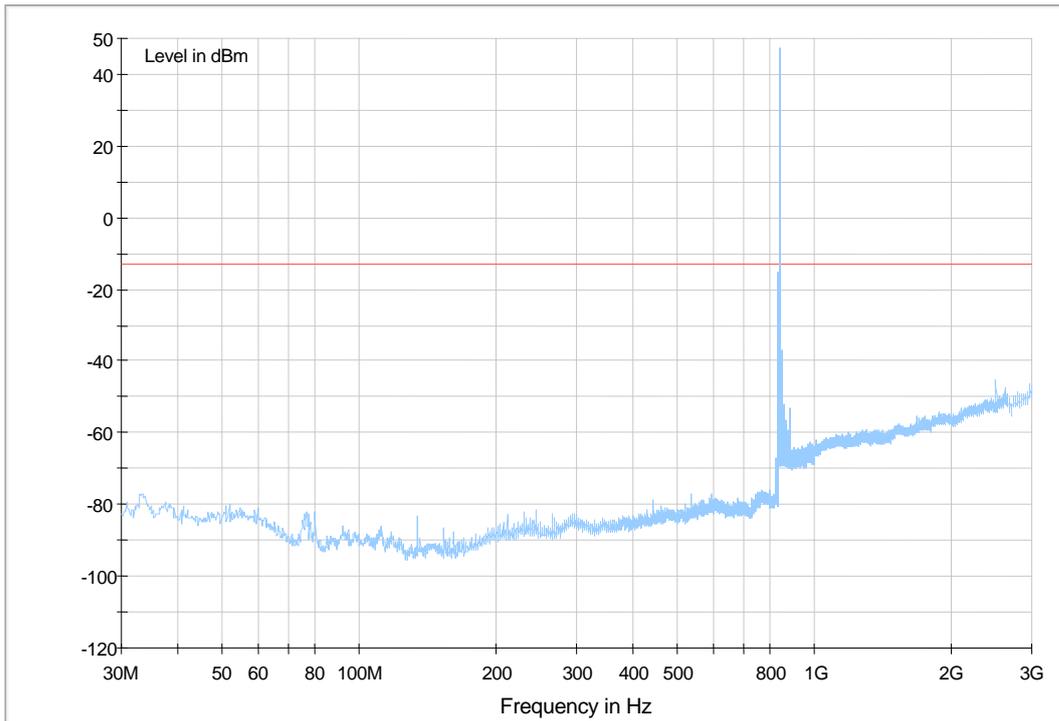


8.3.2 For GPRS 850

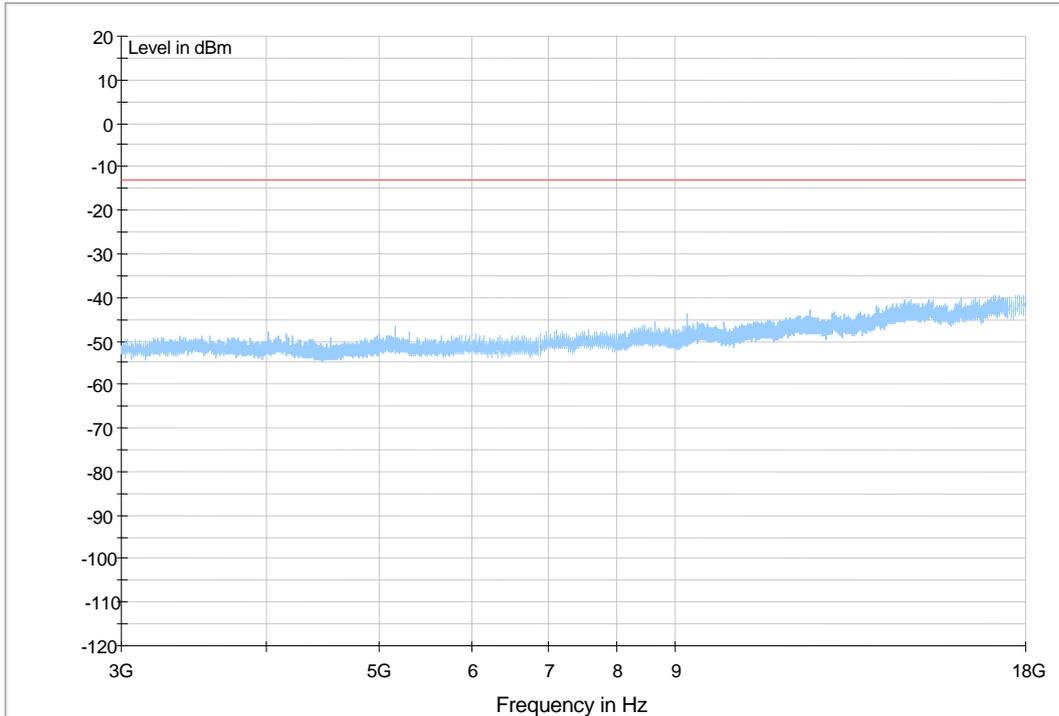
Traffic Mode (9kHz-30MHz)



Traffic Mode (30MHz-3GHz)

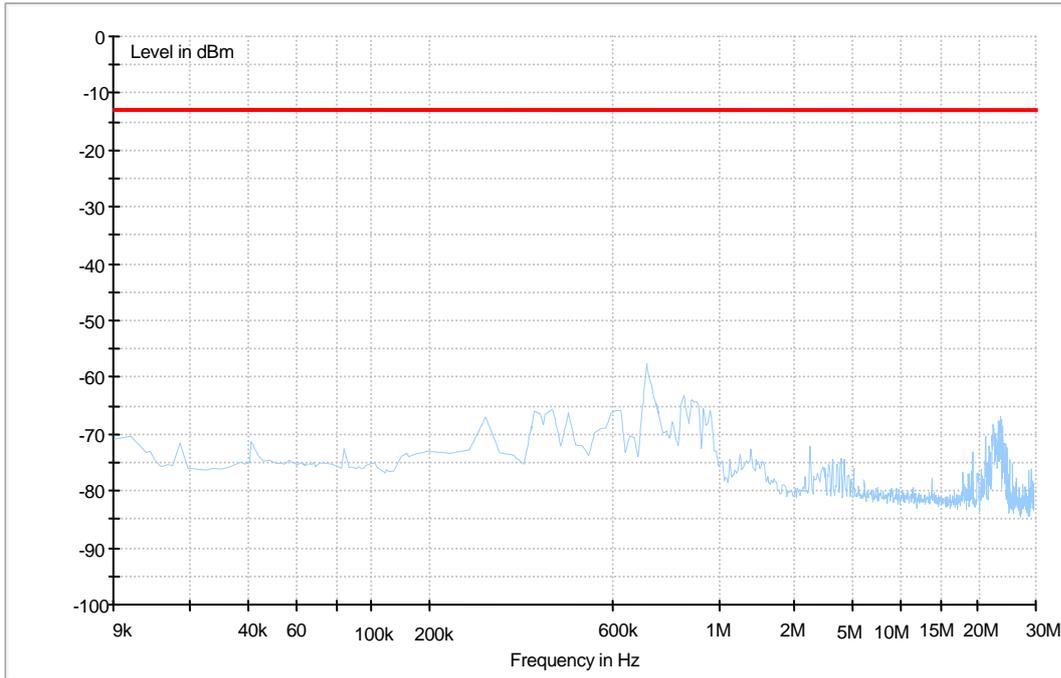


Traffic Mode (3GHz-18GHz)

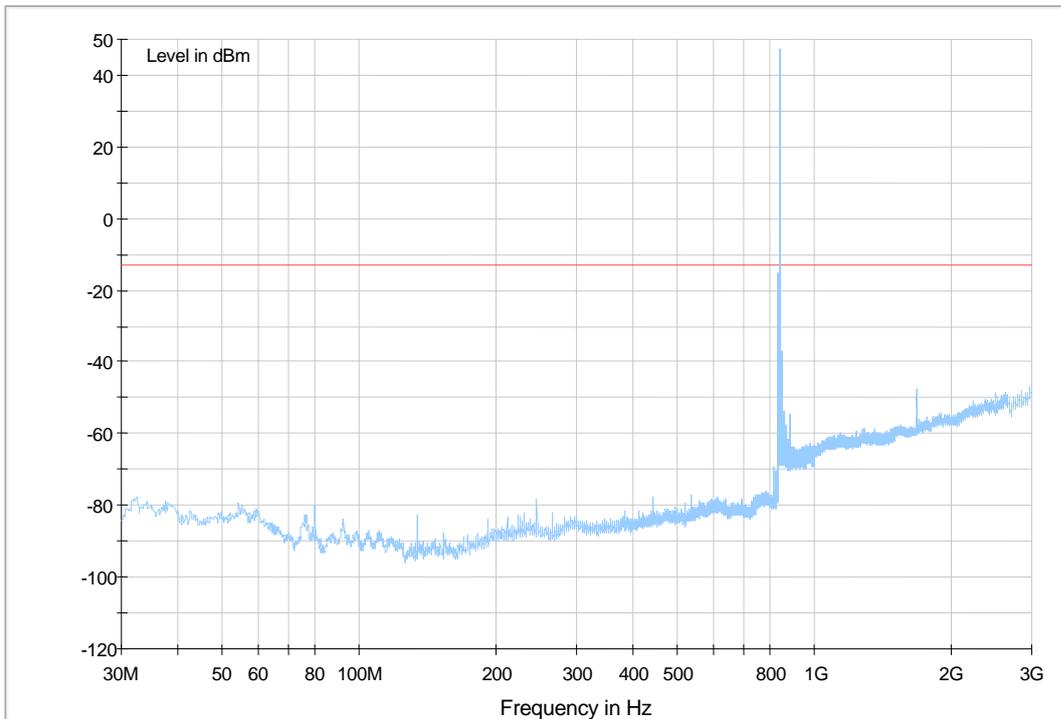


8.3.3 For EDGE 850

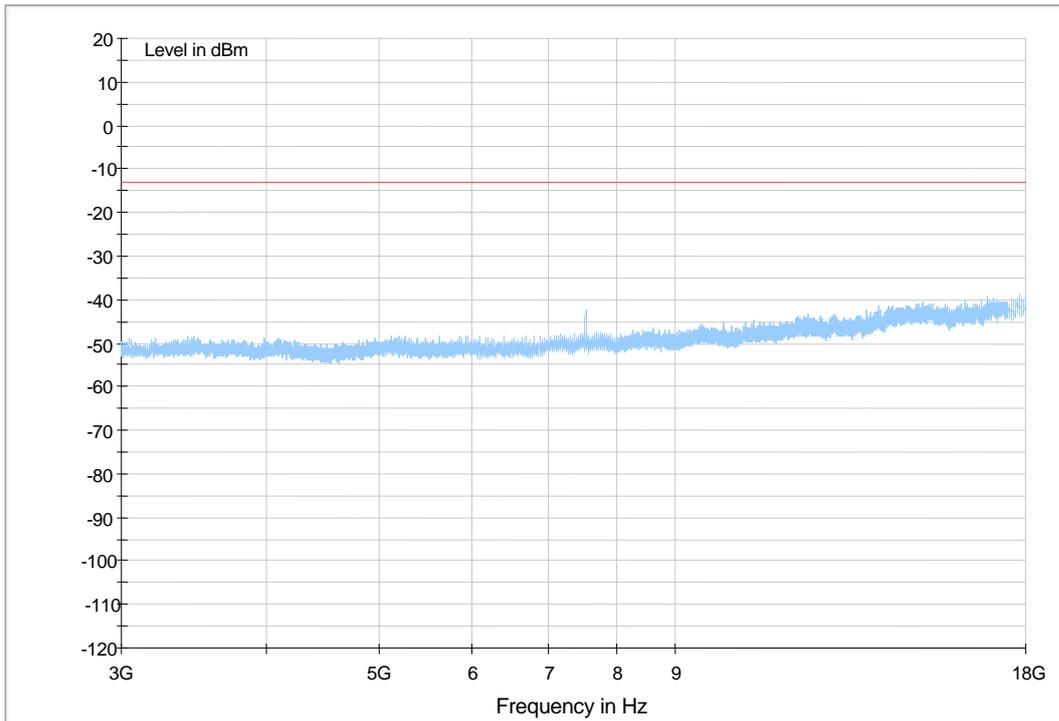
Traffic Mode (9kHz-30MHz)



Traffic Mode (30MHz-3GHz)

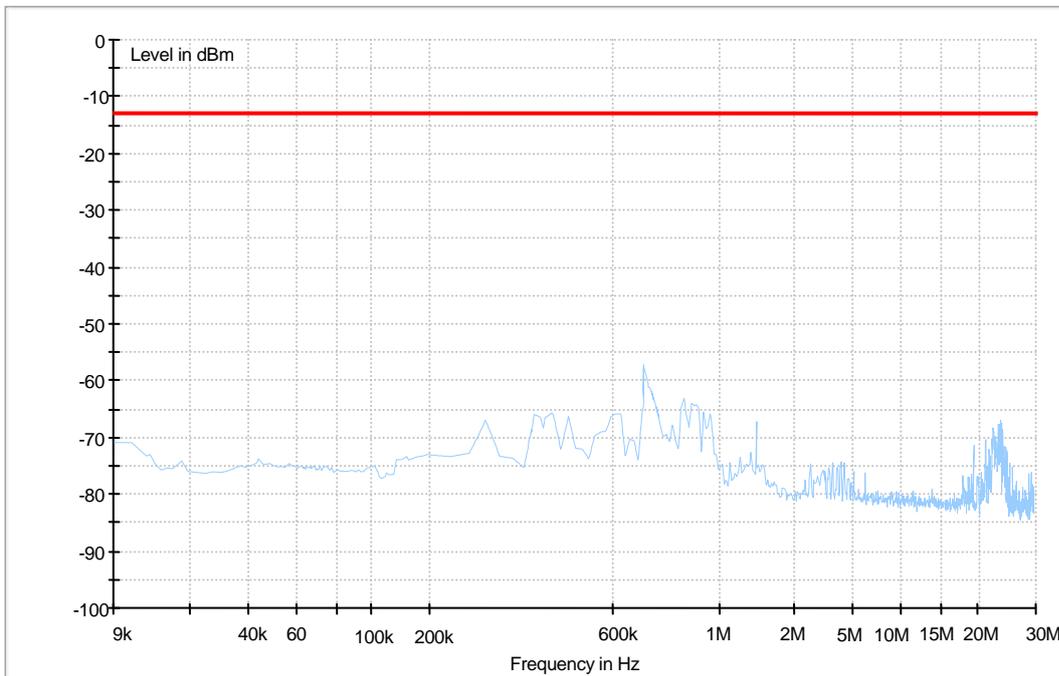


Traffic Mode (3GHz-18GHz)

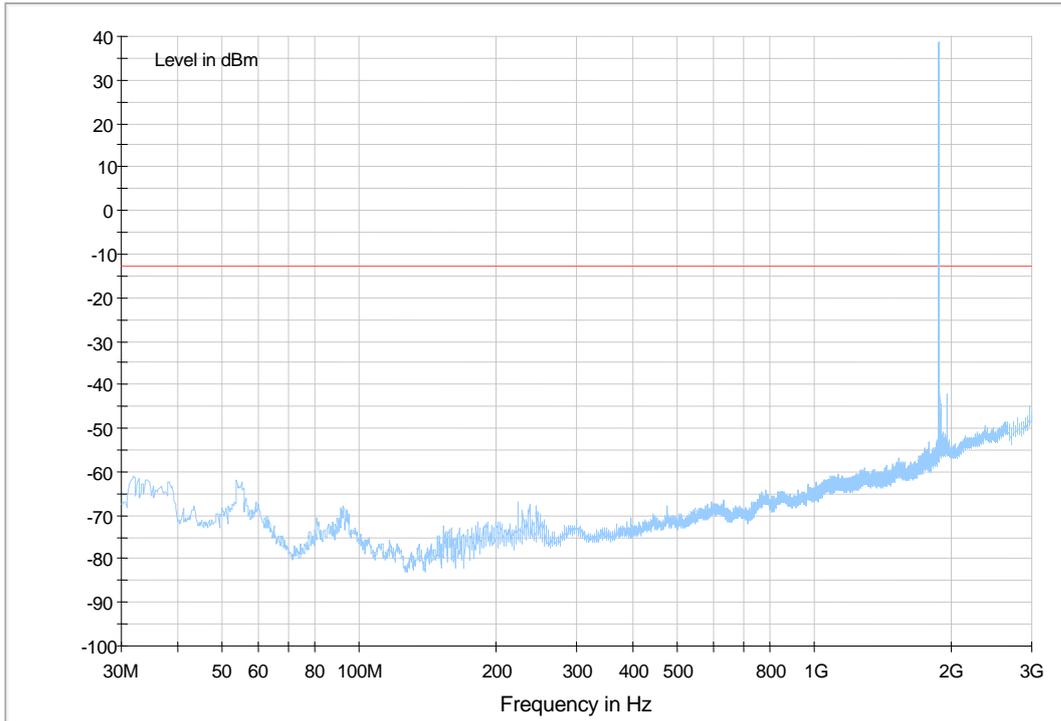


8.3.4 For GSM 1900

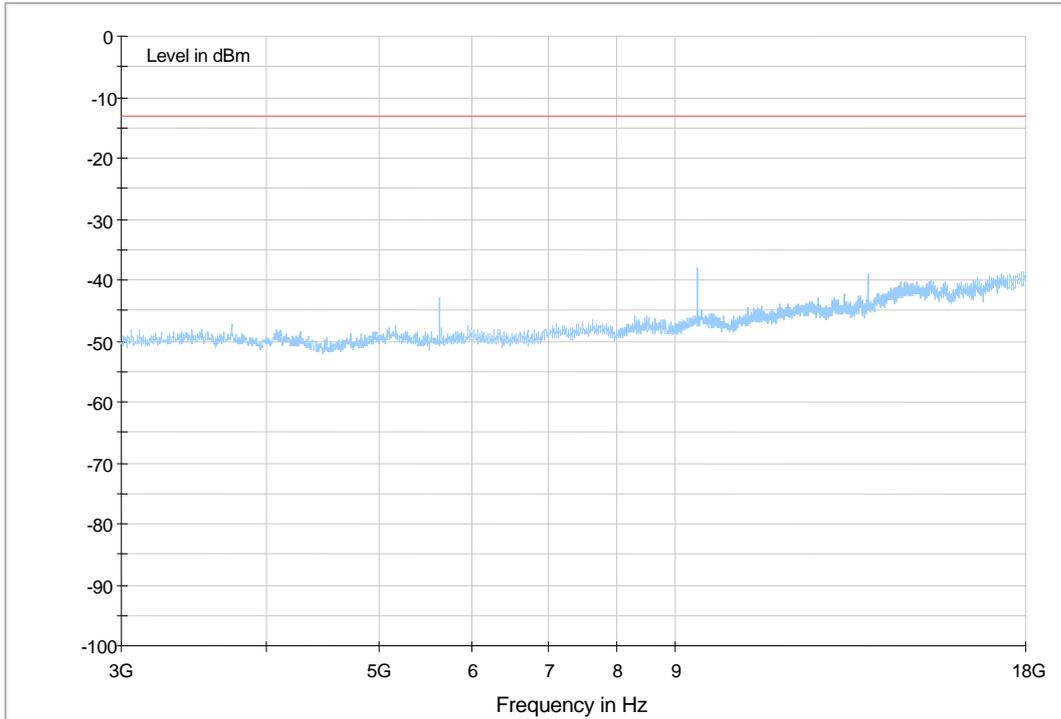
Traffic Mode (9kHz-30MHz)



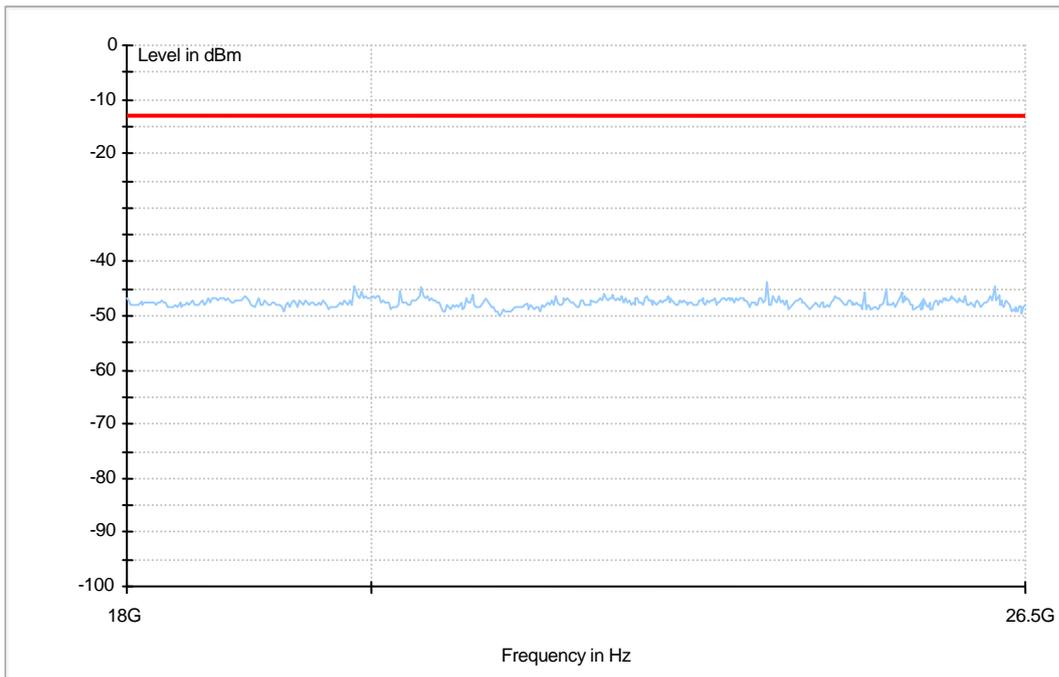
Traffic Mode (30MHz-3GHz)



Traffic Mode (3GHz-18GHz)

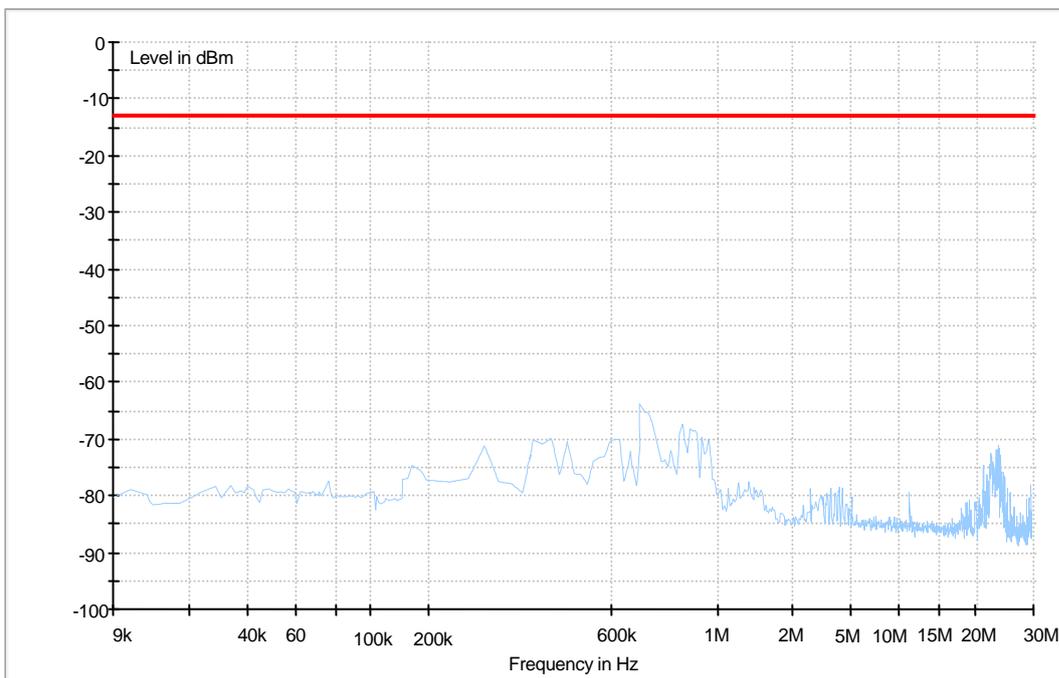


Traffic Mode (18GHz-26.5GHz)

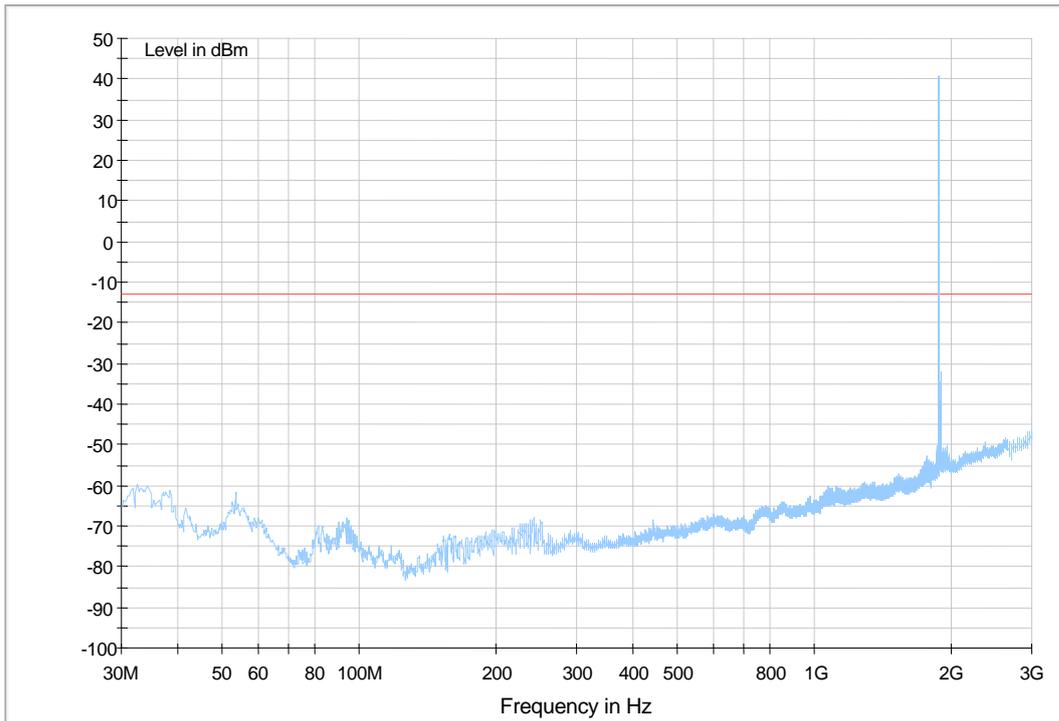


8.3.5 For GPRS 1900

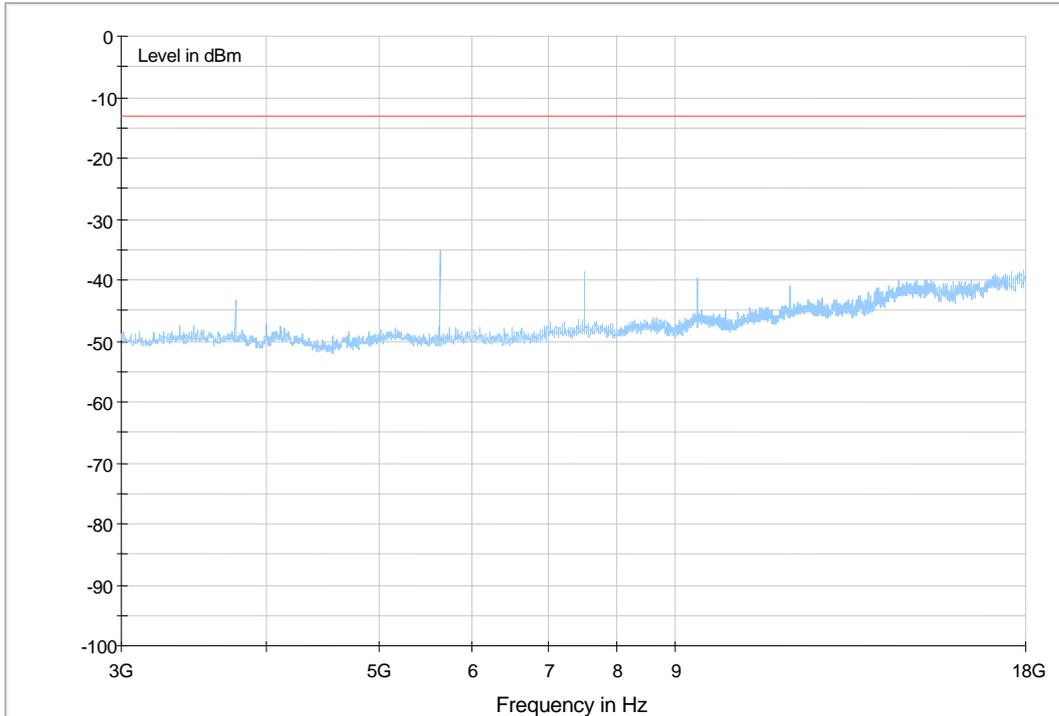
Traffic Mode (9kHz-30MHz)



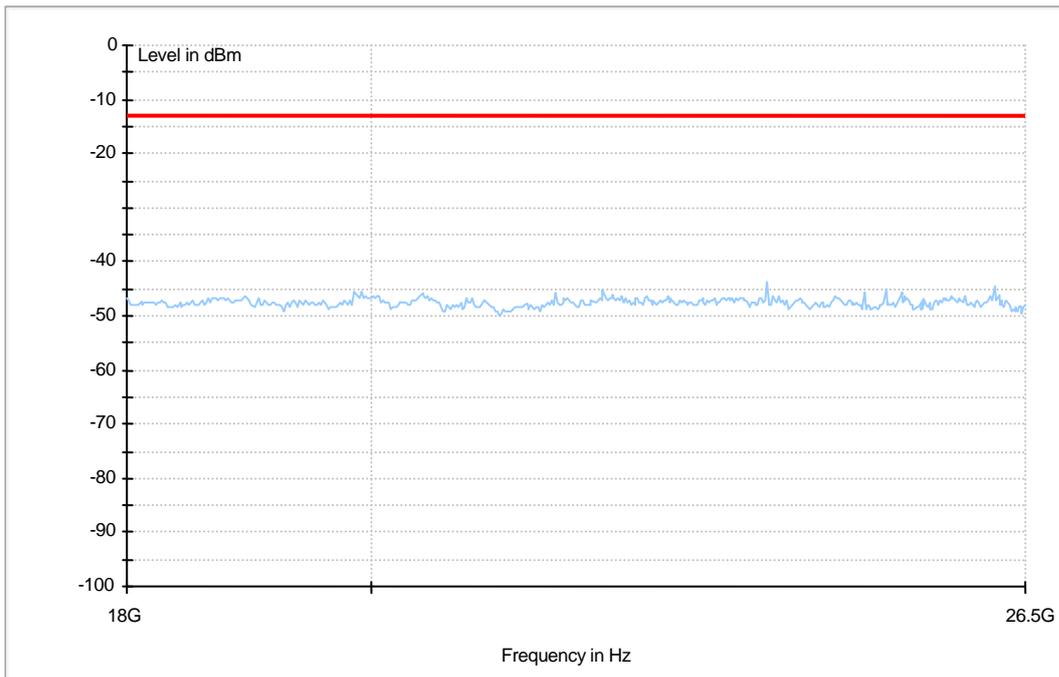
Traffic Mode (30MHz-3GHz)



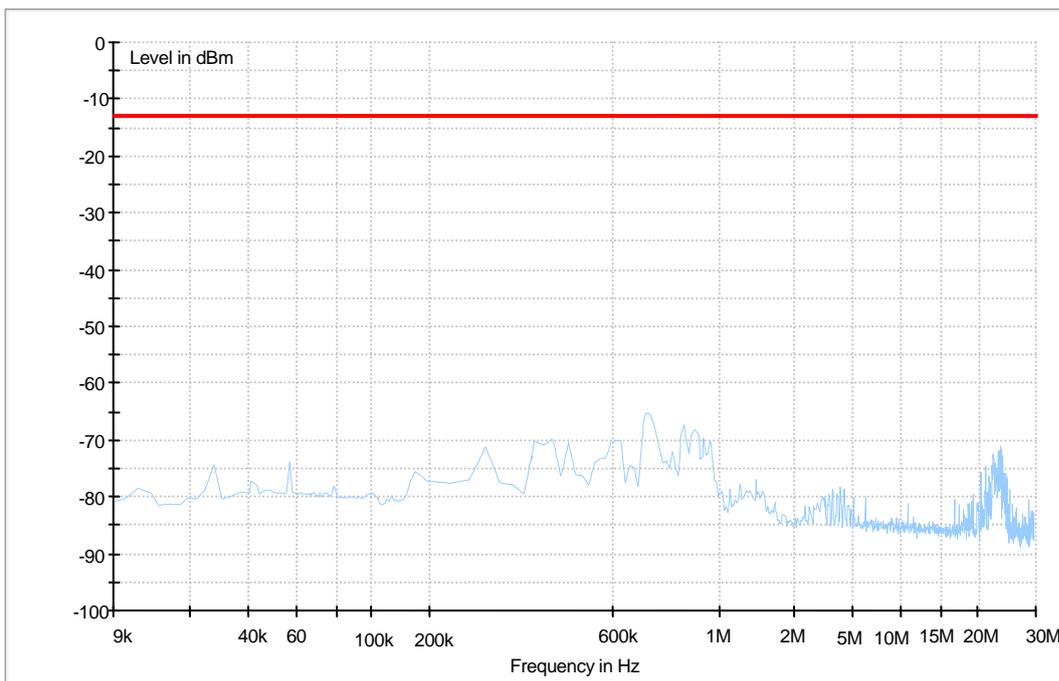
Traffic Mode (3GHz-18GHz)



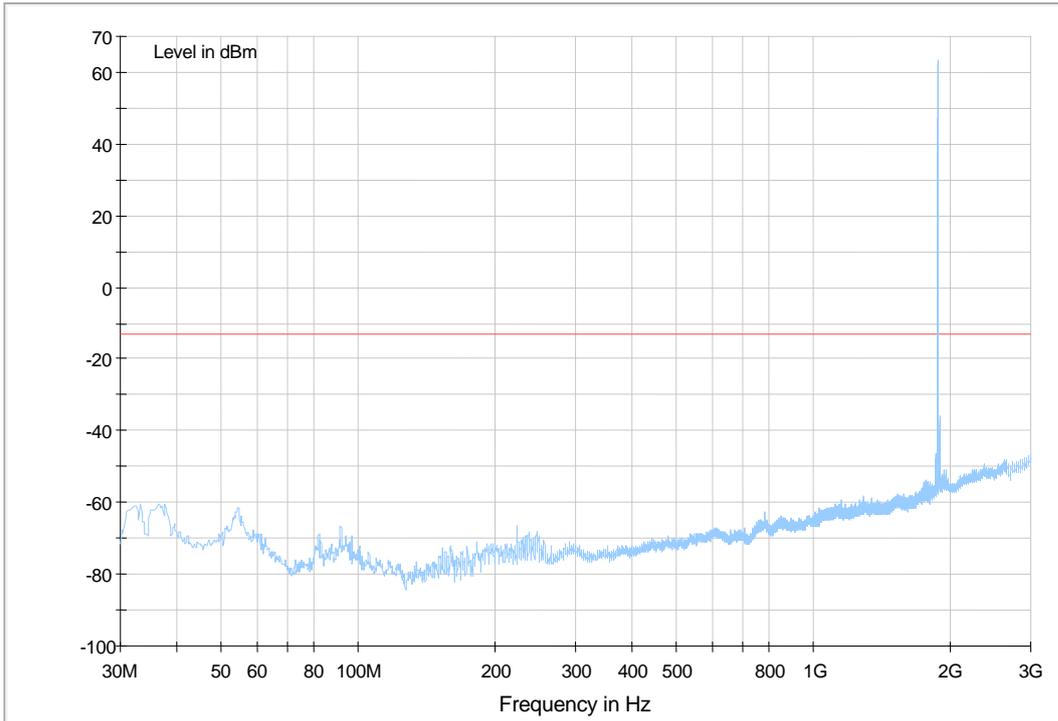
Traffic Mode (18GHz-26.5GHz)



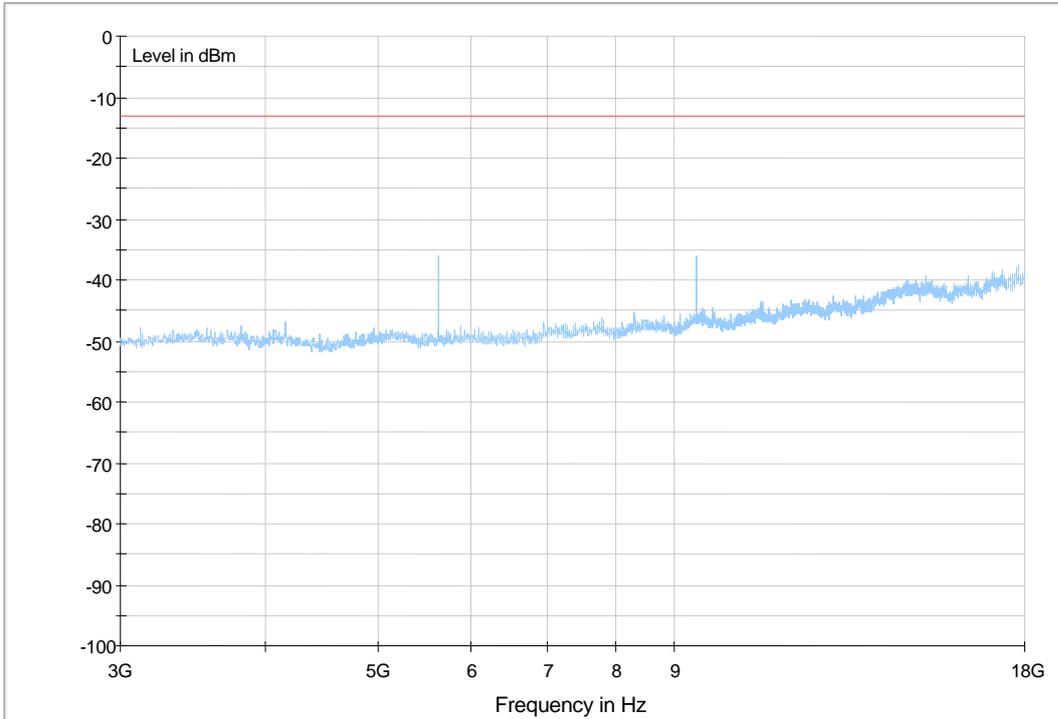
8.3.6 For EDGE 1900
Traffic Mode (9kHz-30MHz)



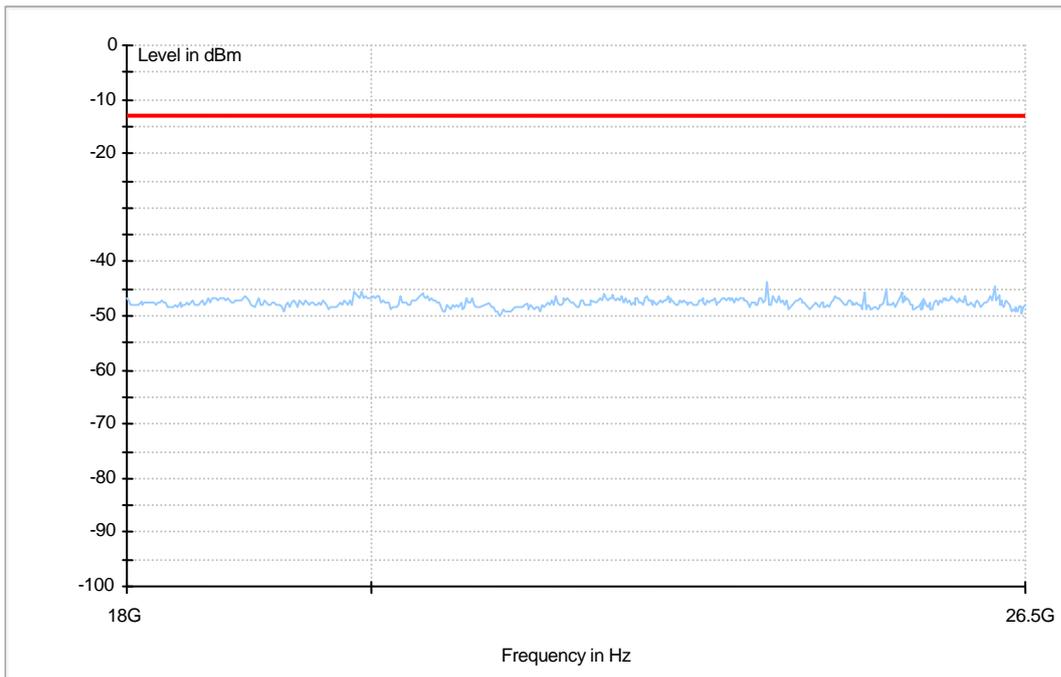
Traffic Mode (30MHz-3GHz)



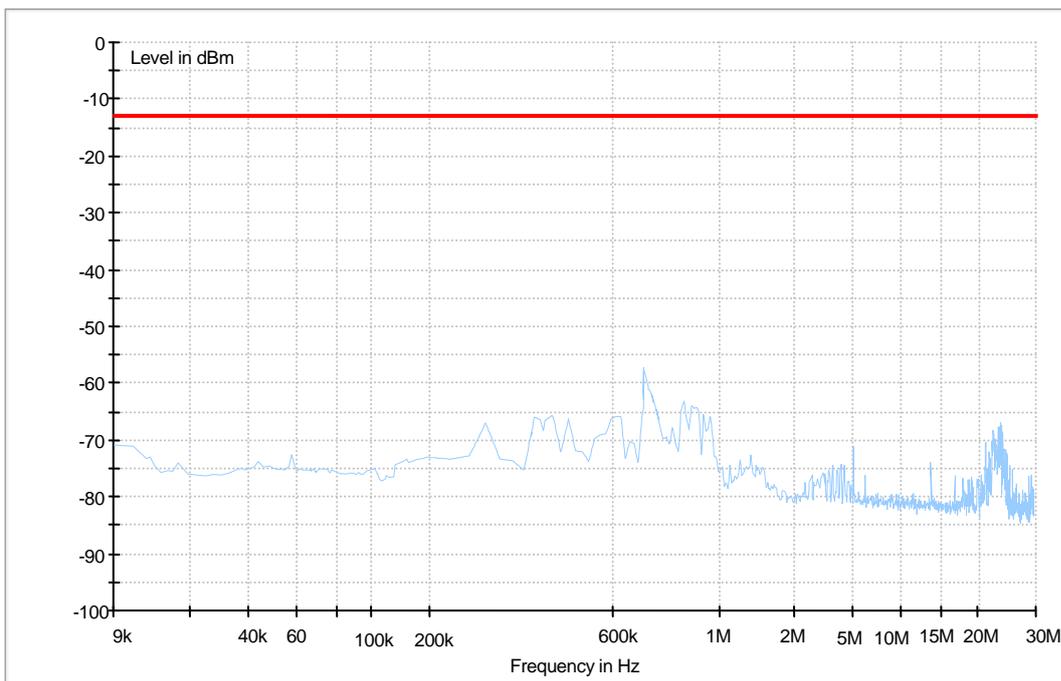
Traffic Mode (3GHz-18GHz)



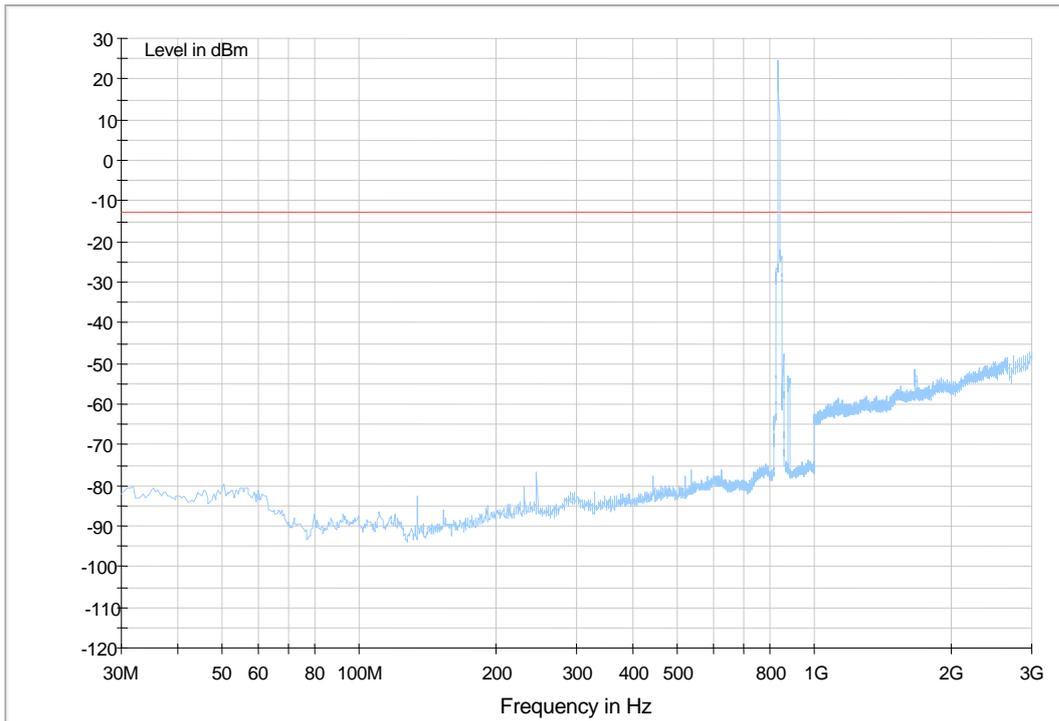
Traffic Mode (18GHz-26.5GHz)



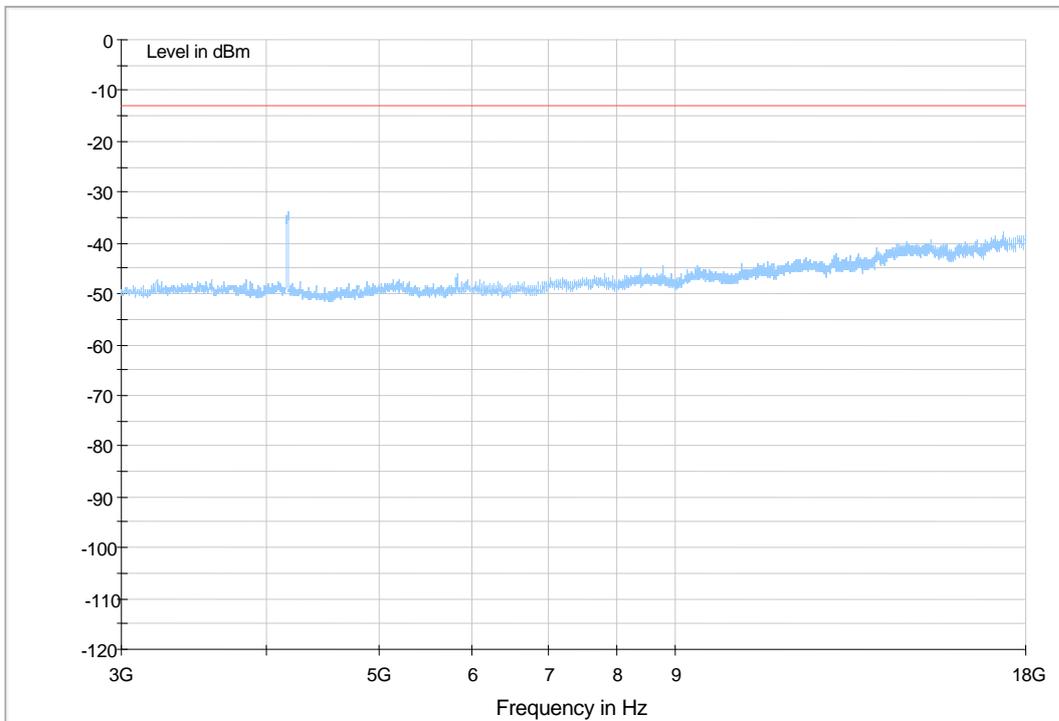
8.3.7 For WCDMA 850
Traffic Mode (9kHz-30MHz)



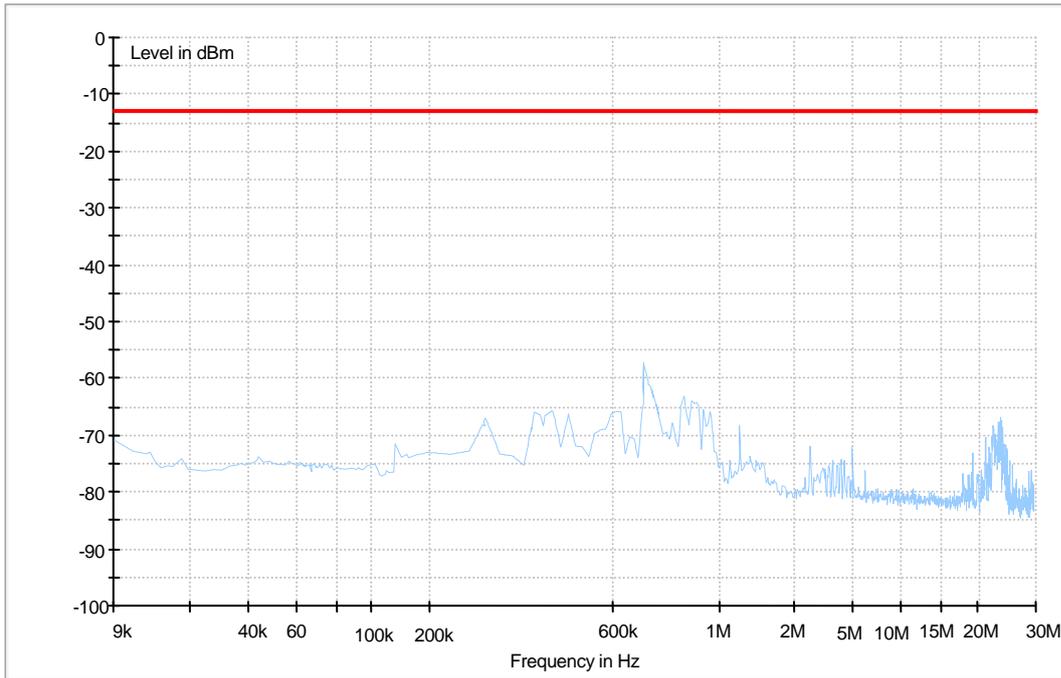
Traffic Mode (30MHz-3GHz)



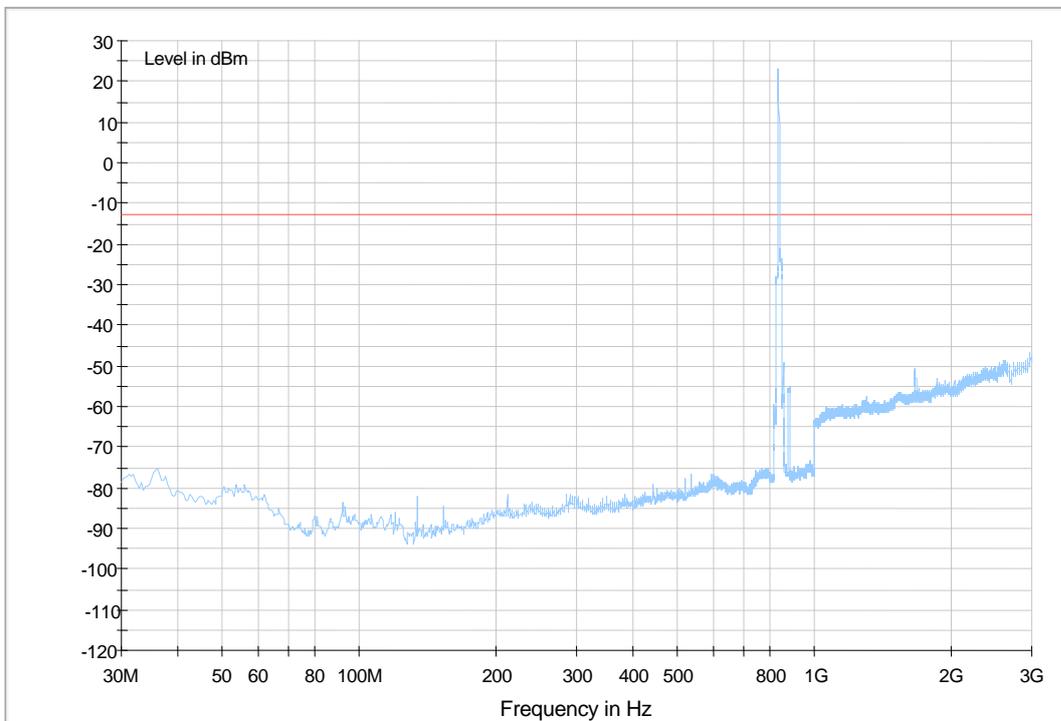
Traffic Mode (3GHz-18GHz)



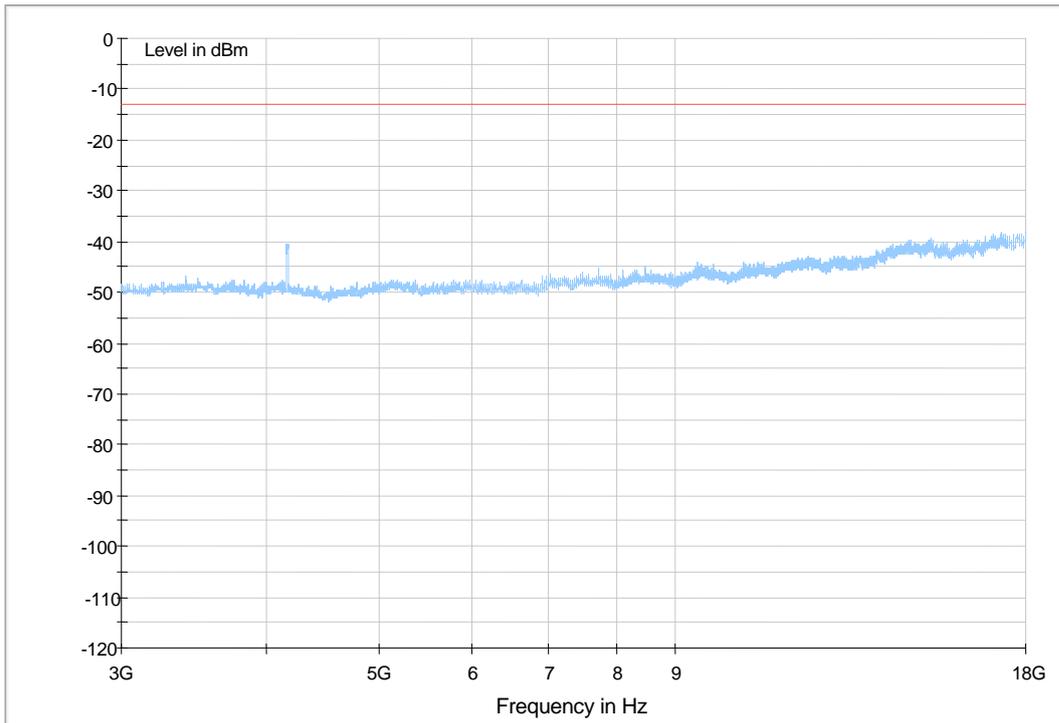
8.3.8 For HSDPA 850 Traffic Mode (9kHz-30MHz)



Traffic Mode (30MHz-3GHz)



Traffic Mode (3GHz-18GHz)



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