



EMC Test Report

Product Name:
HSDPA/UMTS/GPRS/GSM/EDGE Mobile Phone

Model Number:
HUAWEI U2800A

Report No: SYBH(Z-EMC)048032011-2
FCC ID: QISU2800A

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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.
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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.
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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	<i>Not Applicable!</i>
	4	
	5	
	6	
	7	

REPORT ON	EMC TEST OF HSDPA/UMTS/GPRS/GSM/EDGE Mobile Phone
	M/N: HUAWEI U2800A
REGULATION	FCC CFR47 Part 15: Subpart B;
	FCC CFR47 Part 22: Subpart H;
	FCC CFR47 Part 24: Subpart E;
START OF TEST	Mar.23, 2011
END OF TEST	Mar.27, 2011
Final Judgement:	Pass

Approved By

2011-03-28

Date

Liuchunlin

Name



Signature

Reviewed By

2011-03-28

Date

Dailinjun

Name



Signature

Operator

2011-03-28

Date

Wenjianfeng

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	HSDPA/UMTS/GPRS/GSM/EDGE Mobile Phone
MANUFACTURERS MODEL NUMBER	HUAWEI U2800A

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 (TM11-M20)	N/A	Pass	Site1
<u>Conducted Emissions</u>	TC1 (TM1-TM20)	N/A	Pass	Site1
<u>Radiated Spurious Emissions</u> Enclosure Port	TC1 (TM1-TM10)	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

HSDPA/UMTS/GPRS/GSM/EDGE Mobile Phone HUAWEI U2800A is subscriber equipment in the WCDMA/GSM system. The HSDPA/UMTS frequency band is Band II and Band V, both band test data included in this report. The GSM/GPRS/EDGE frequency band includes GSM850 and GSM900 and DCS1800 and PCS1900, but only GSM850MHz and PCS1900MHz band 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 and AGPS etc. Externally it provides earphone port(to provide voice service) and USIM card interface.

3.1.1 Main Equipment Technical Data

Description:	HSDPA/UMTS/GPRS/GSM/EDGE Mobile Phone
Models:	HUAWEI U2800A
Input Rated Voltage	3.7V
Dimensions	111 mm × 46.9 mm × 14.4 mm
Weight	about 75g (with battery)

Sub-Assembly Identity

Mode		Work Frequency	
		Transmitt Frequency (MHz)	Receive Frequency (MHz)
GSM	GSM850	824 - 849	869 - 894
	PCS1900	1850-1910	1930-1990
WCDMA	WCDMA850	824 - 849	869 - 894
	WCDMA1900	1850-1910	1930-1990

3.2 Sub-Assembly Identity

Sub-Assembly Identity

Sub Assembly Identity				
Board				
Model Name	Qty.	Serial	Description	
U2800A	1	Q4V2A11121600107	Main board of Mobile Phone	
Accessory				
Name	Qty.	Manufactur e	Serials number	Description
Adapter	1	SHENZHEN HUNTKEY POWER TECHNOLOGY CO., LTD	HKAAC0789489	Adapter Model: HS-050040U5 Input Voltage : ~100-240V 50/60Hz Output Voltage: === 5.0V Rated Power: 2W
Adapter	1	BYD(HUIZHOU) Co., Ltd	BYAA42103728	Adapter Model: HS-050040U5 Input Voltage : ~100-240V 50/60Hz Output Voltage: === 5.0V Rated Power: 2W
Rechargeable Li-ion	1	Huawei Technologi	YACACO1H14910404	Battery Model: HB4A1H Rated capacity: 900mAh



		es Co.,Ltd.		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

Cable Used during Test

Cable	Quantity	Type of Cable
AC Power	1	Unshielded
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

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).

Configuration table

TC1	TM1~TM20
-----	----------

4.3.2 Test Mode

There were TM20 tests Modes. TM1 to TM20 were shown in the diagrams below:

TM1	operate in traffic mode GSM850;
TM2	operate in traffic mode GPRS850;
TM3	operate in traffic mode EDGE850;
TM4	operate in traffic mode GSM1900;
TM5	operate in traffic mode GPRS1900;
TM6	operate in traffic mode EDGE1900;
TM7	operate in traffic mode WCDMA850
TM8	operate in traffic mode HSDPA850;
TM9	operate in traffic mode WCDMA1900
TM10	operate in traffic mode HSDPA1900;
TM11	operate in idle mode GSM850;
TM12	operate in idle mode GPRS850;
TM13	operate in idle mode EDGE850;
TM14	operate in idle mode GSM1900;
TM15	operate in idle mode GPRS1900;
TM16	operate in idle mode EDGE1900;
TM17	operate in idle mode WCDMA850;
TM18	operate in idle mode HSDPA850;
TM19	operate in idle mode WCDMA1900;

TM20

operate in idle mode HSDPA1900;

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 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;

For GSM850 and PCS1900, 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.

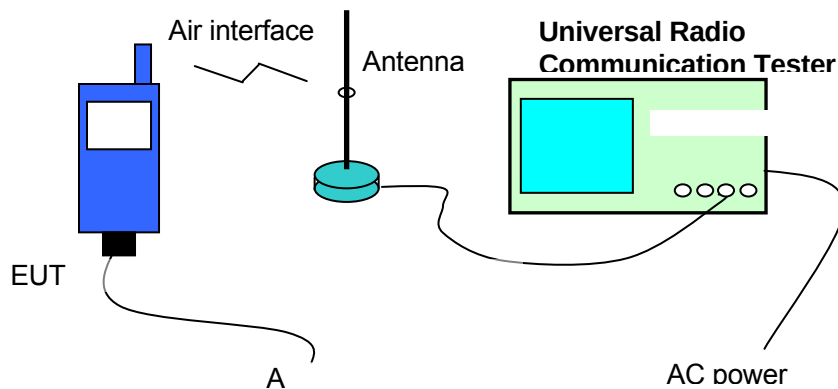


Figure 1.: Test Configuration

Idle Mode:

The EUT is required to be in the idle mode.

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 neighbour cell list shall be empty;

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

For GSM850 and PCS1900, 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:

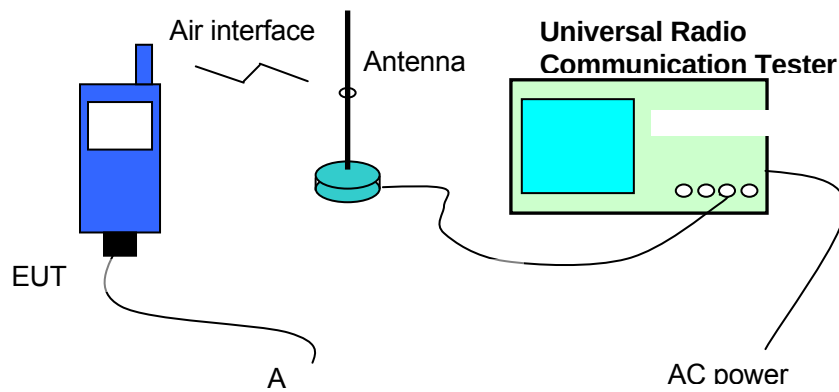


Figure 2. Test Configuration

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 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:

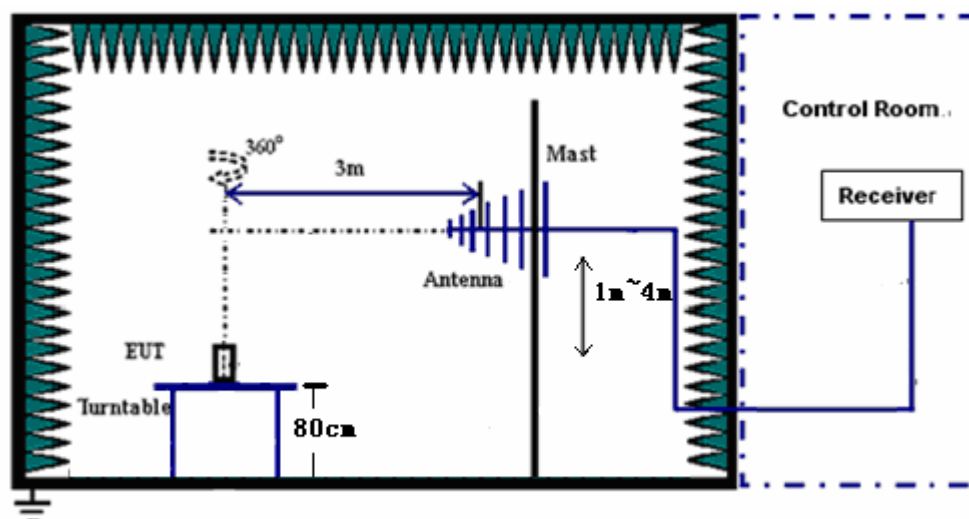


Figure 3. Test set-up

5.1.2 Test Results

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

Test Limits

Frequency of Emission (MHz)	Radiated Limit	
	Unit($\mu\text{V/m}$)	Unit($\text{dB}\mu\text{V/m}$)
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 transmit 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.

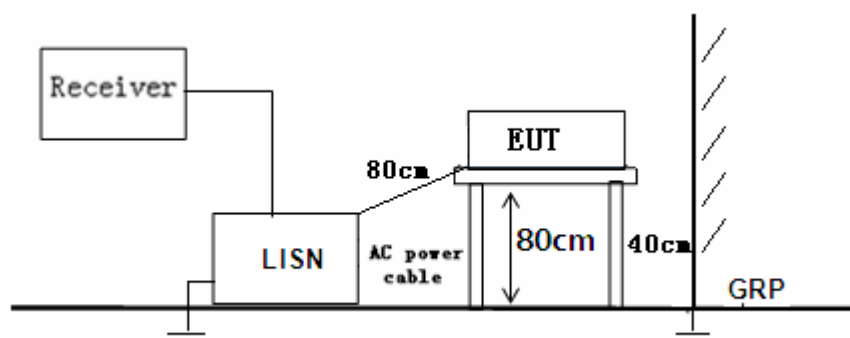


Figure 4. Test Set-up

5.2.2 Test Results

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

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

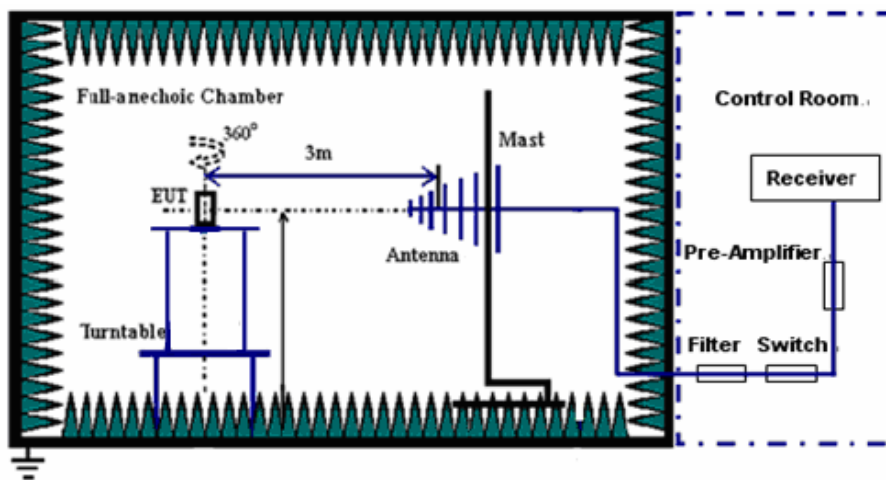
5.3.1 Test Procedure

A test site fulfilling the requirements of ITU-R Recommendation SM329-10 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:

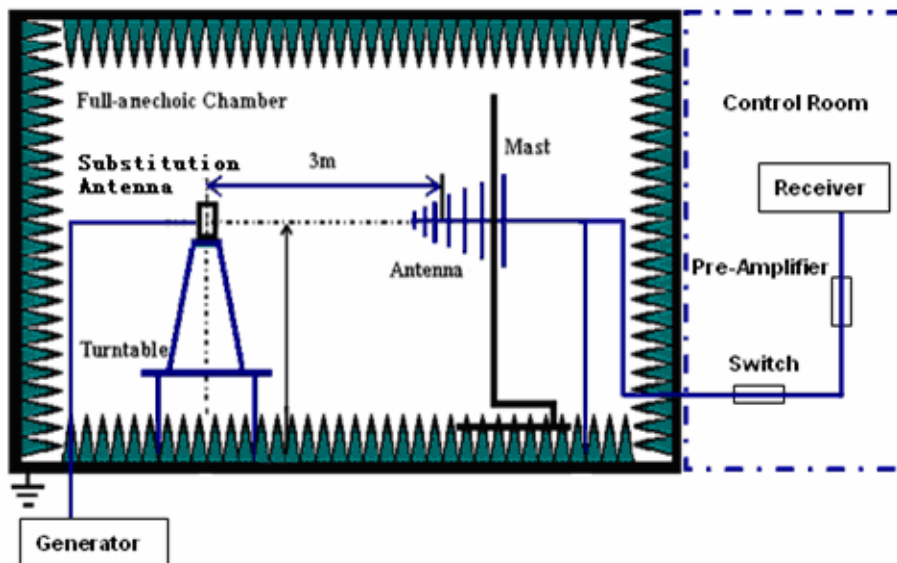
For transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, EIRP shall be measured when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in 2.1033(c)(8). Connect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

Test the Radiated maximum output power by 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.



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

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 Part22/24 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

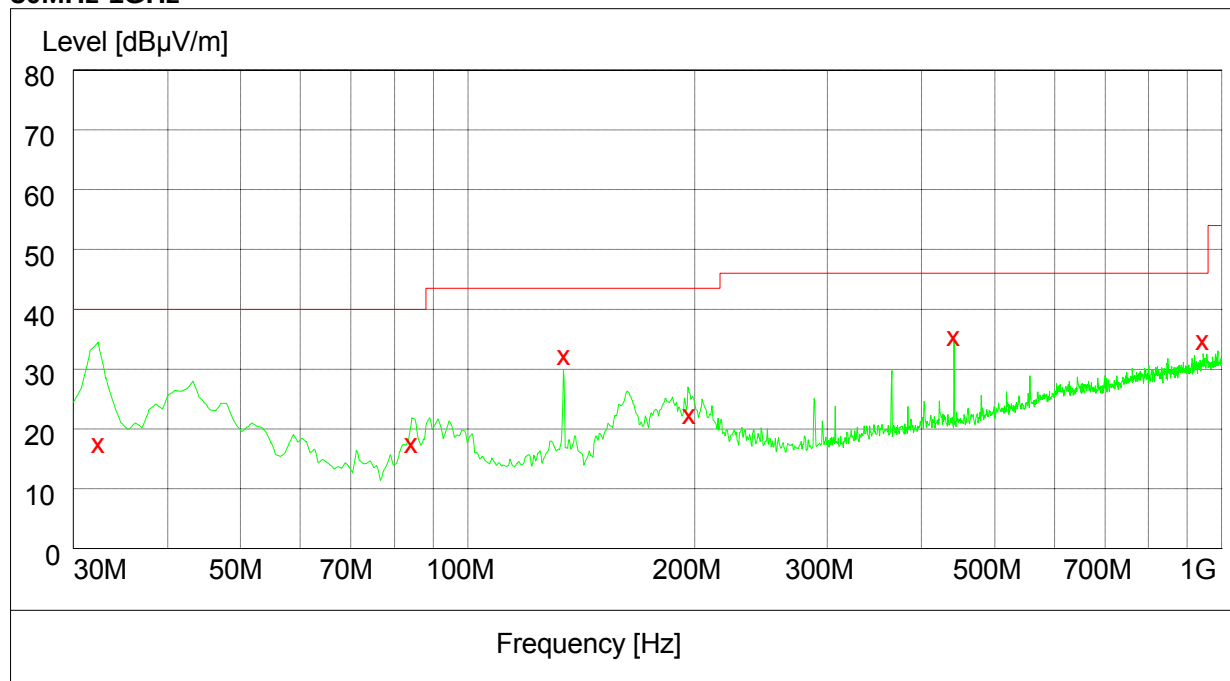
Items		Extended Uncertainty
RE	Field strength (dB μ V/m)	U=4.1dB; k=2(30MHz-1GHz)
RE	Field strength (dB μ V/m)	U=4.1dB; k=2(1GHz-18GHz)
RSE	ERP (dBm)	U=2.2dB; k=2
CE	Disturbance Voltage (dB μ V)	U=3.4dB; k=2

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.

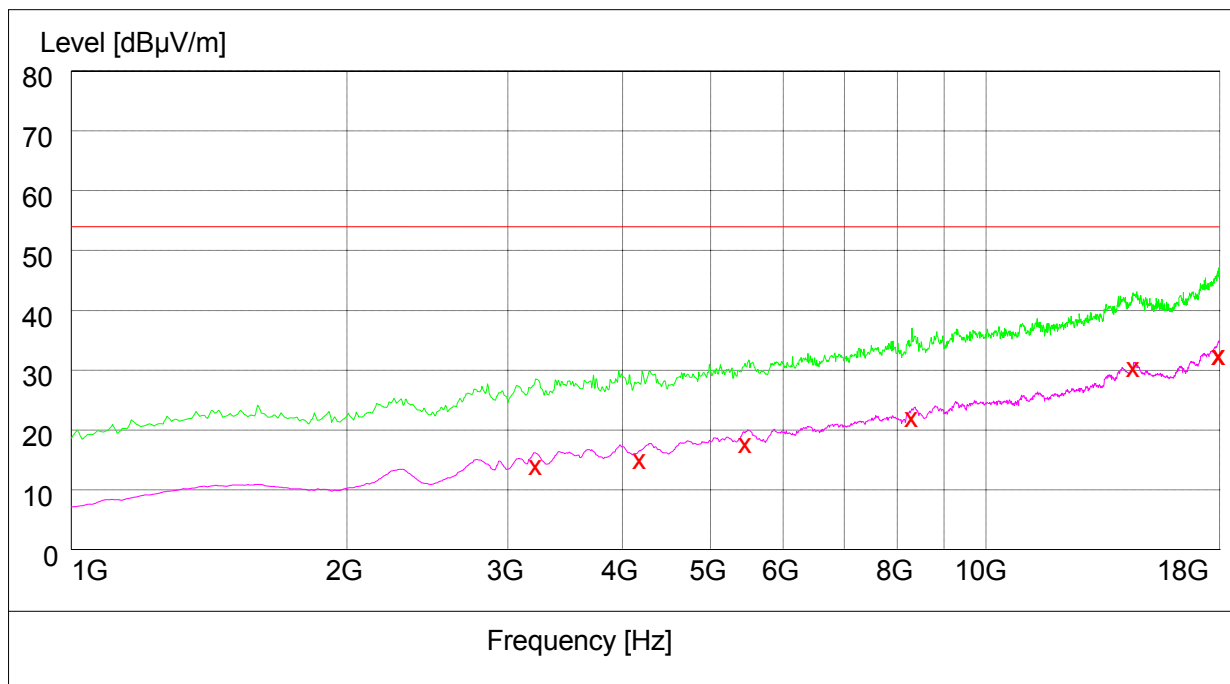
30MHz-1GHz



MEASUREMENT RESULT: QP Detector

Frequency MHz	Level dBμV/m	Transd dB	Limit dBμV/m	Margin dB	Height cm	Azimuth deg	Polarisation
32.388000	18.70	11.7	40.0	21.3	100.0	69.00	HORIZONTAL
84.320000	18.70	9.9	40.0	21.3	108.0	82.00	VERTICAL
134.404000	32.40	9.0	43.5	11.1	149.0	209.00	HORIZONTAL
196.904000	22.50	12.0	43.5	21.0	100.0	319.00	VERTICAL
441.576000	35.60	18.9	46.0	10.4	101.0	272.00	HORIZONTAL
944.900000	34.80	26.6	46.0	11.2	200.0	50.00	VERTICAL

1GHz-18GHz



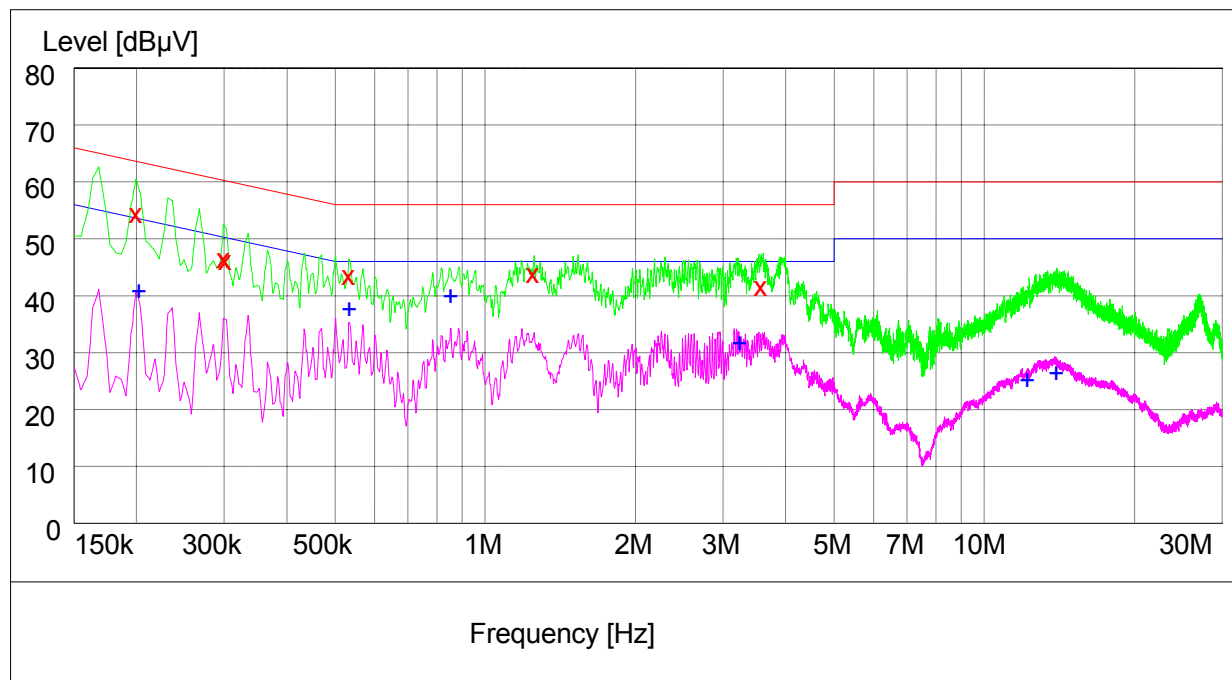
MEASUREMENT RESULT: AV Detector

Frequency MHz	Level dBμV/m	Transd dB	Limit dBμV/m	Margin dB	Height cm	Azimuth deg	Polarisation
3223.300000	15.10	-8.3	54.0	38.9	168.0	242.00	HORIZONTAL
4188.500000	16.10	-5.6	54.0	37.9	200.0	235.00	VERTICAL
5462.300000	18.80	-2.4	54.0	35.2	142.0	0.00	HORIZONTAL
8301.700000	22.60	2.8	54.0	31.4	191.0	358.00	VERTICAL
14511.400000	30.20	12.4	54.0	23.8	125.0	32.00	HORIZONTAL
17975.300000	33.60	17.1	54.0	20.4	100.0	215.00	VERTICAL
17996.500000	33.60	17.3	54.0	20.4	149.0	66.00	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
0.200000	54.70	10.1	64	9.3	N	FLO
0.300000	47.90	10.0	60	12.1	N	FLO
0.302000	47.50	10.0	60	12.5	N	FLO
0.534000	43.80	10.1	56	12.2	N	FLO
1.372000	44.10	10.0	56	11.9	N	FLO
3.572000	42.00	10.2	56	14.0	N	FLO

MEASUREMENT RESULT: AV Detector

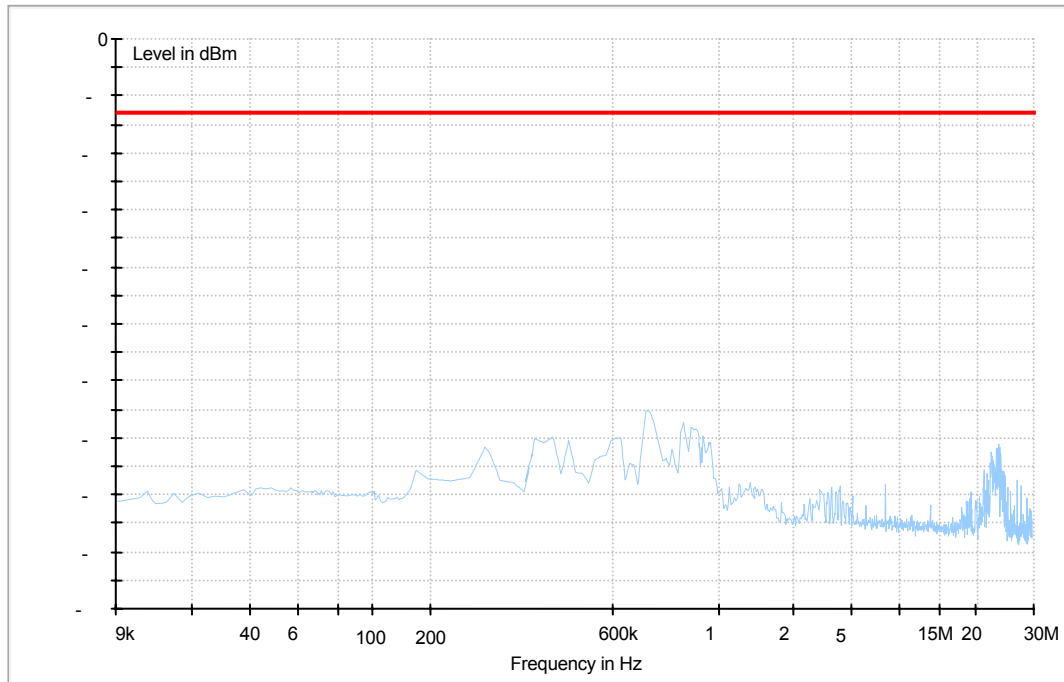
Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.202000	41.40	10.1	54	12.6	N	FLO
0.534000	38.90	10.1	46	7.1	N	FLO
0.852000	40.20	10.1	46	5.8	N	FLO
3.236000	32.80	10.2	46	13.2	N	FLO
12.190000	26.40	10.3	50	23.6	N	FLO
13.958000	27.50	10.3	50	22.5	N	FLO

8.3 Radiated Spurious Emission

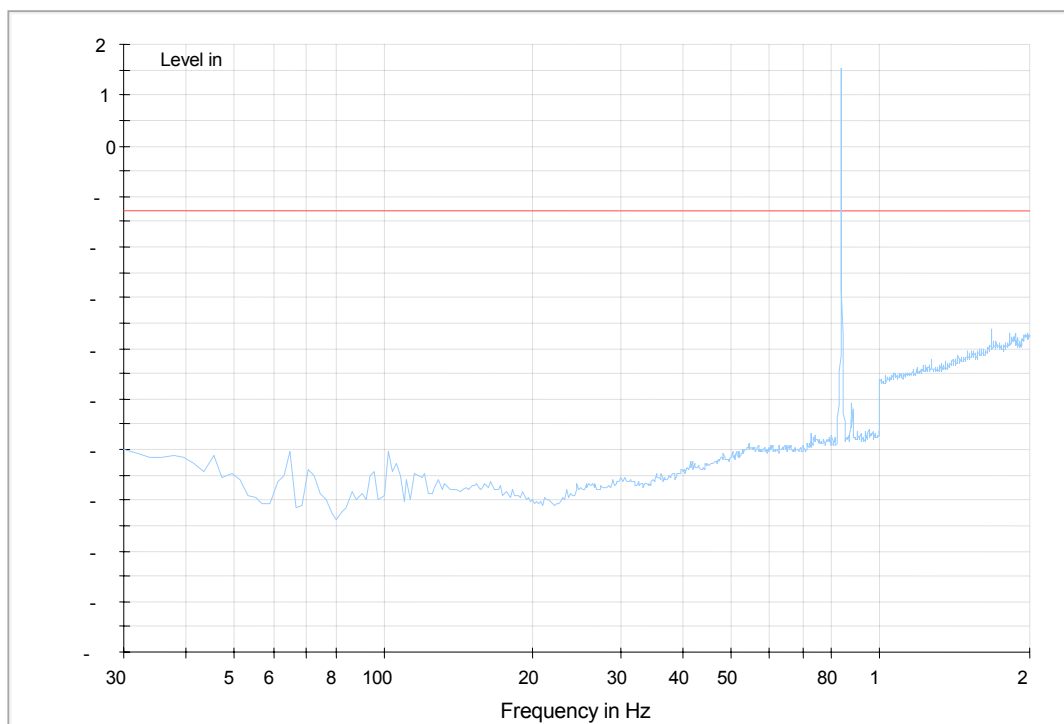
This test results are the maximum level of radiated spurious emissions in vertical and horizontal polarity. The highest peak exceeds the limit line is carrier frequency

8.3.1 For GSM 850

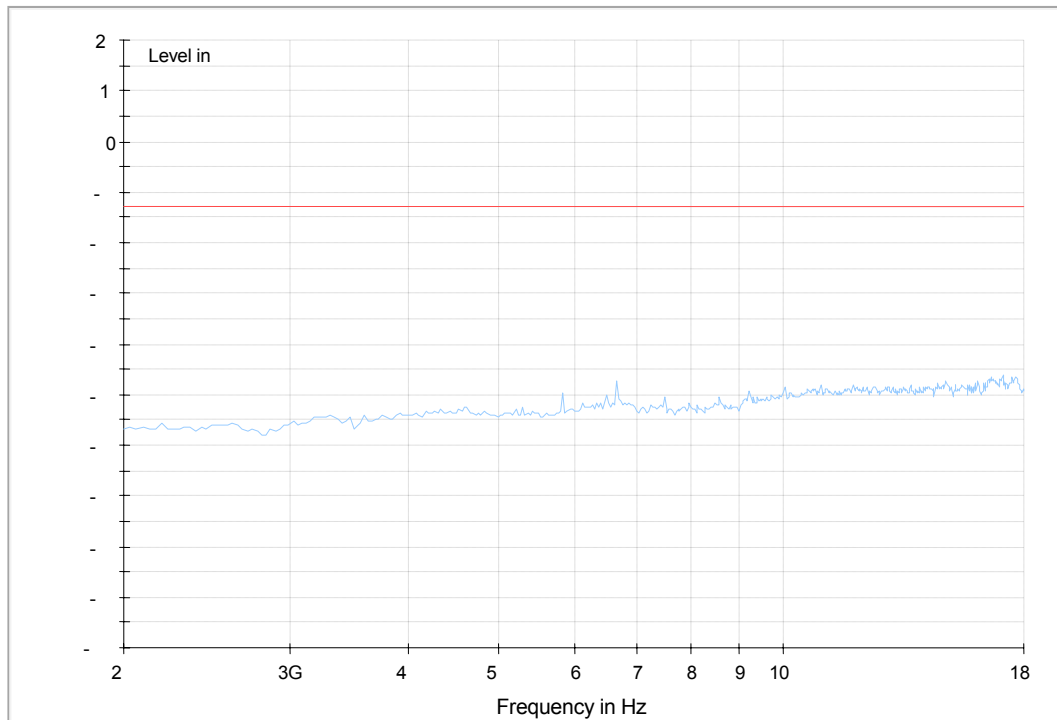
Traffic Mode (9kHz-30MHz)



Traffic Mode (30MHz-2GHz)

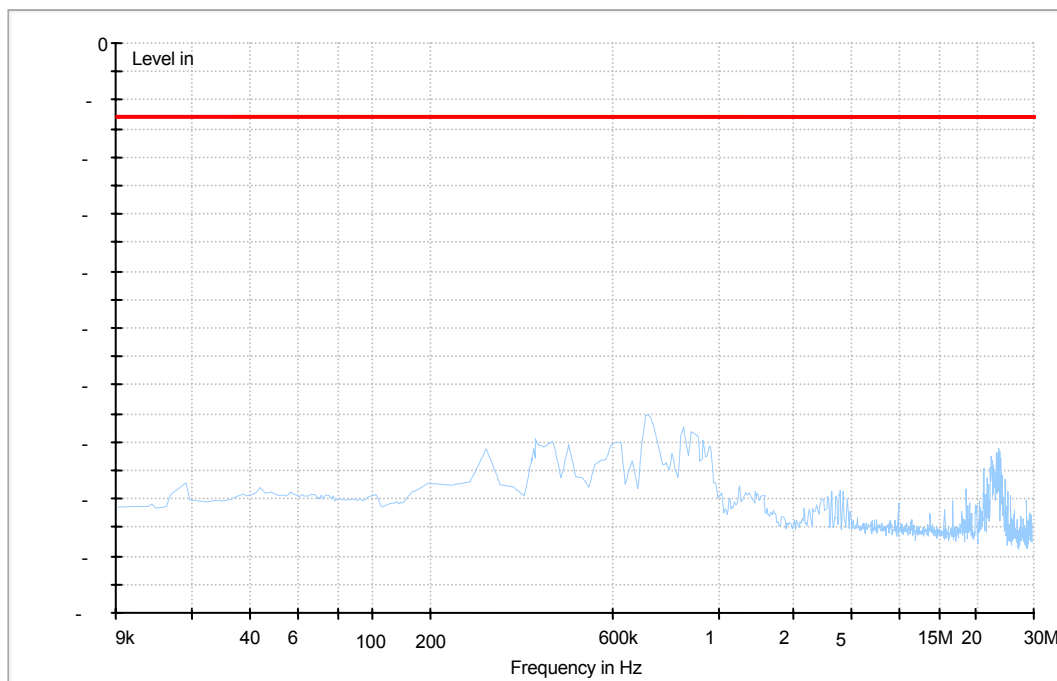


Traffic Mode (2GHz-18GHz)

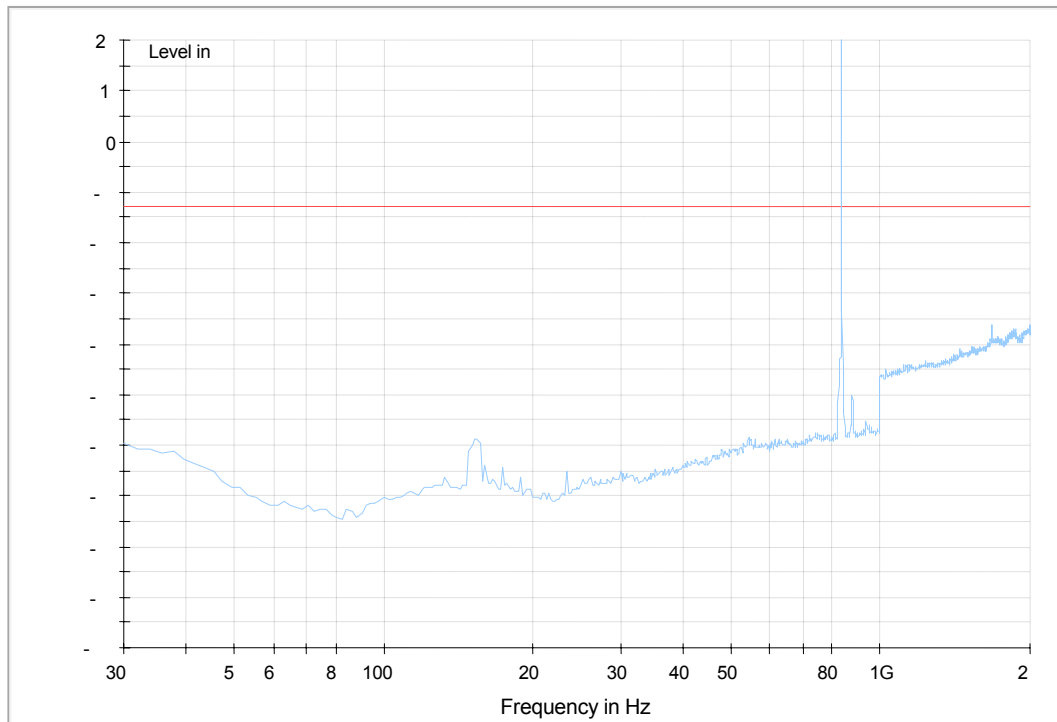


8.3.2 For GPRS 850

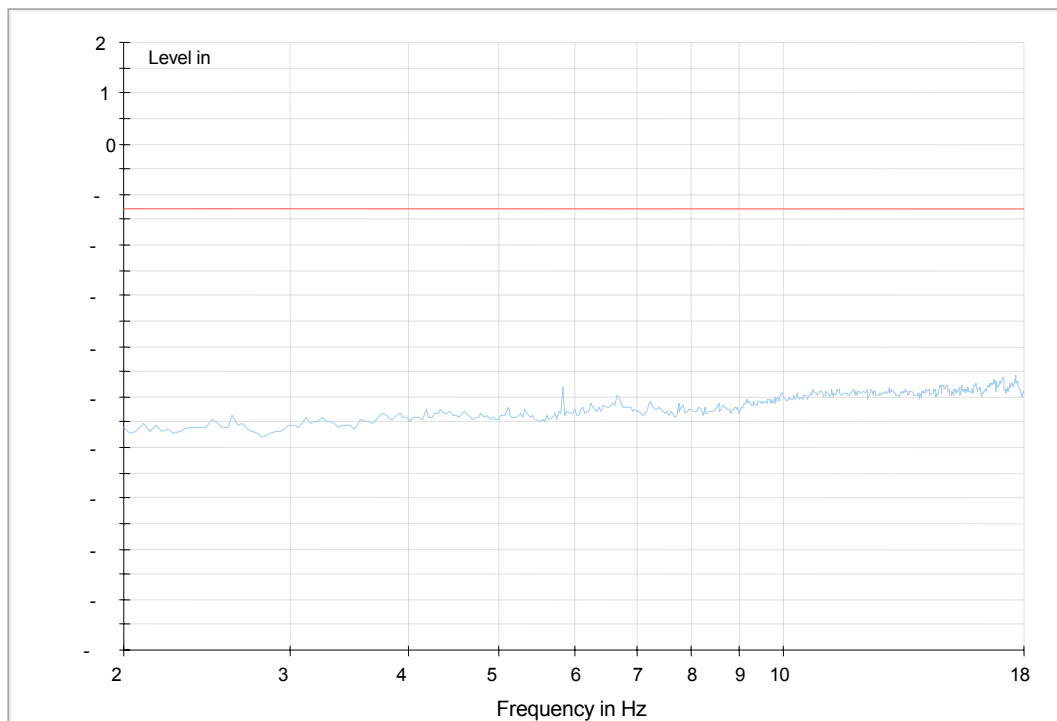
Traffic Mode (9kHz-30MHz)



Traffic Mode (30MHz-2GHz)

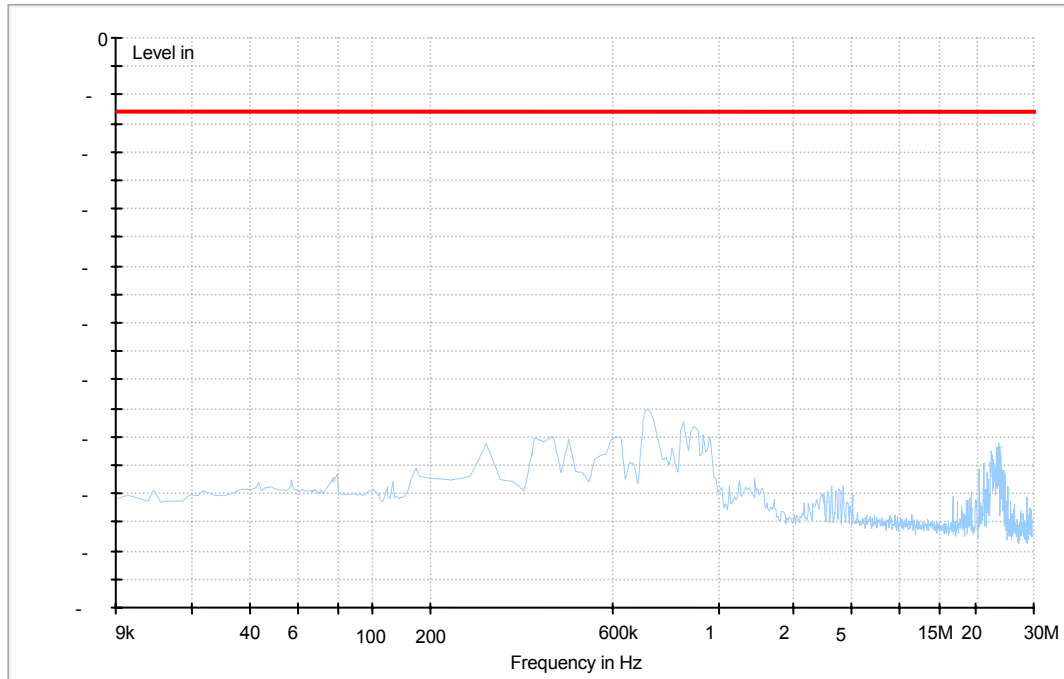


Traffic Mode (2GHz-18GHz)

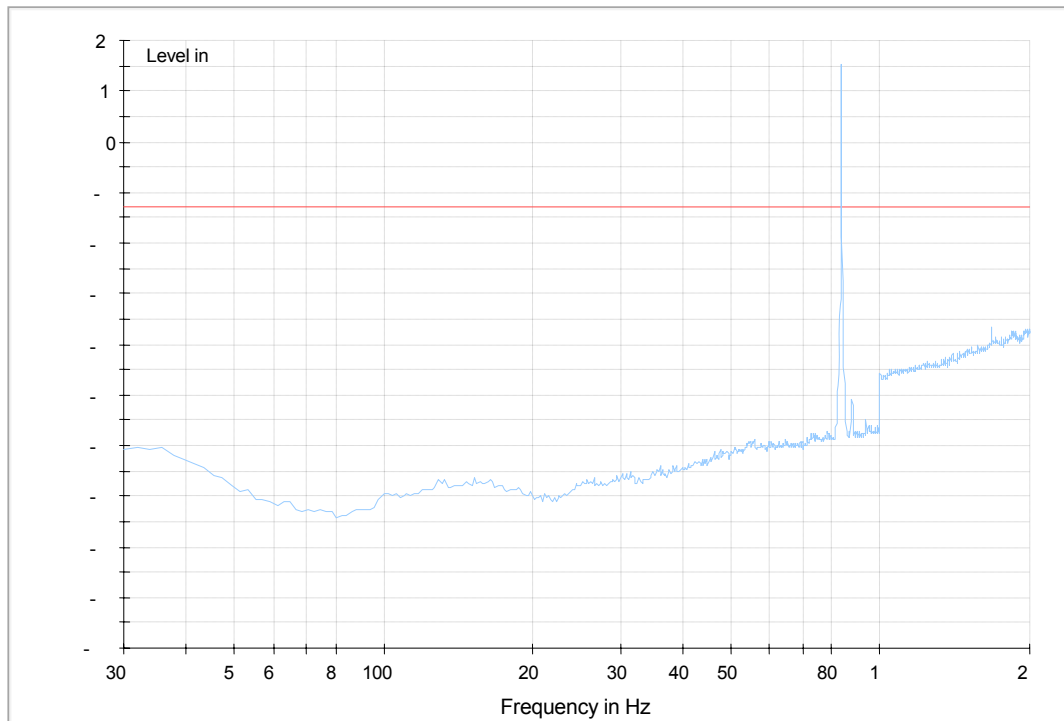


8.3.3 For EDGE 850

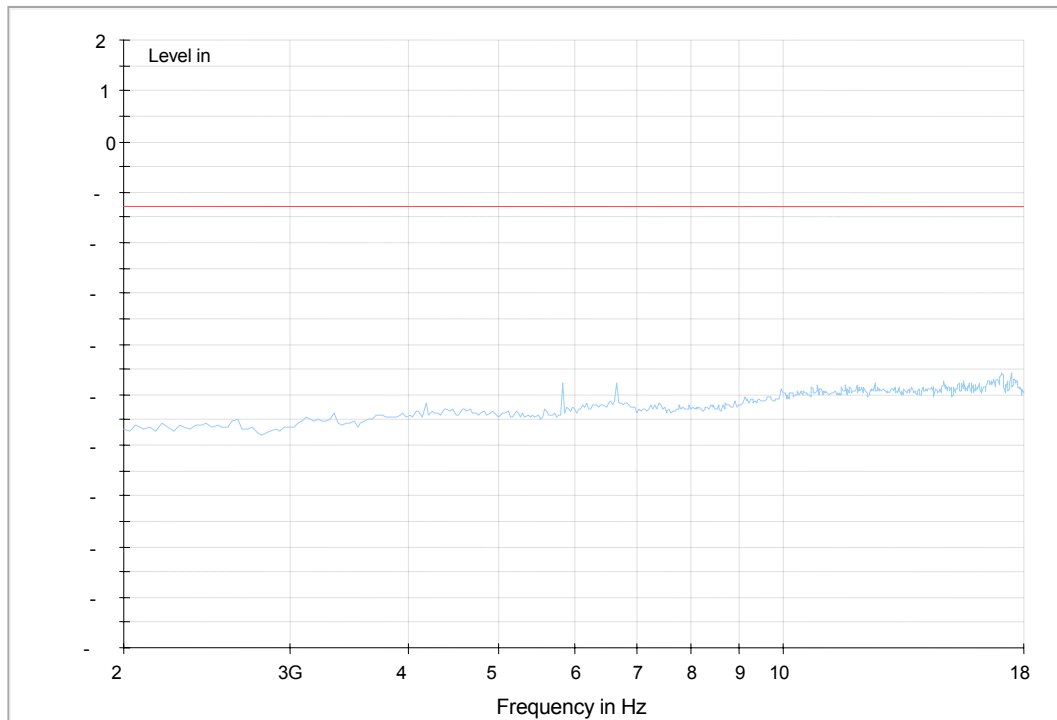
Traffic Mode (9kHz-30MHz)



Traffic Mode (30MHz-2GHz)

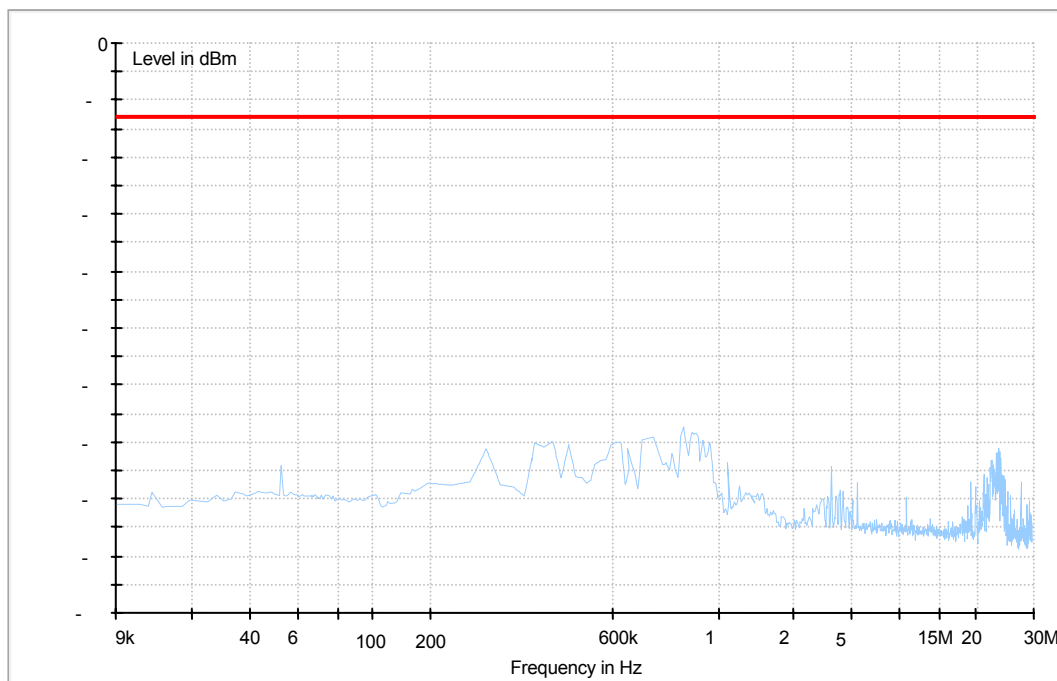


Traffic Mode (2GHz-18GHz)

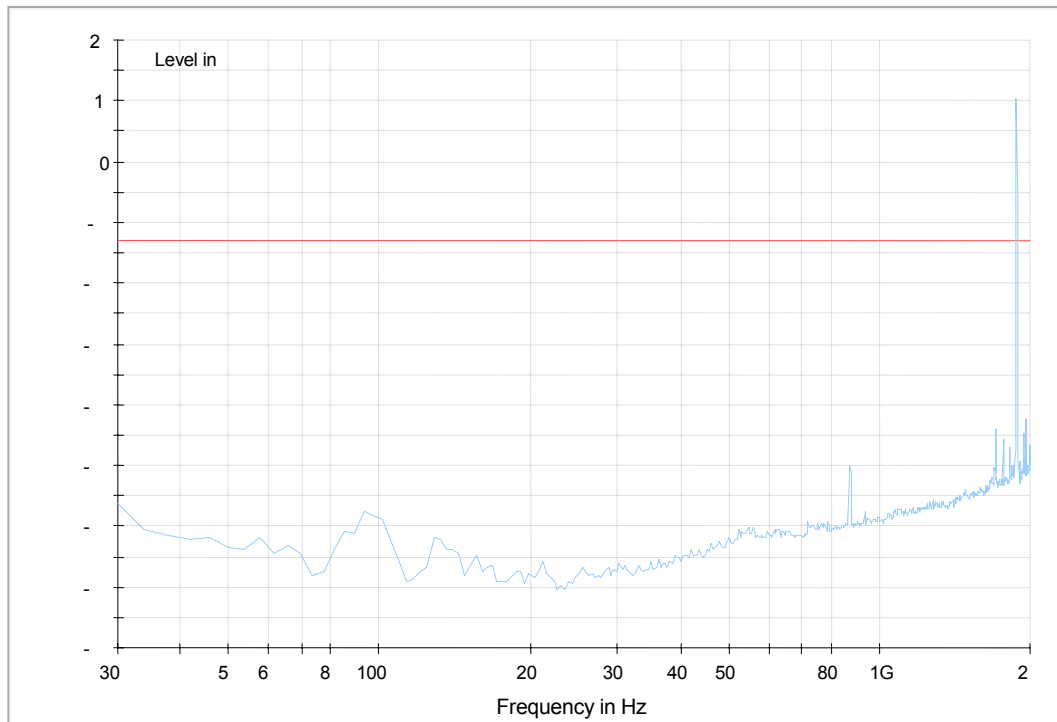


8.3.4 For GSM 1900

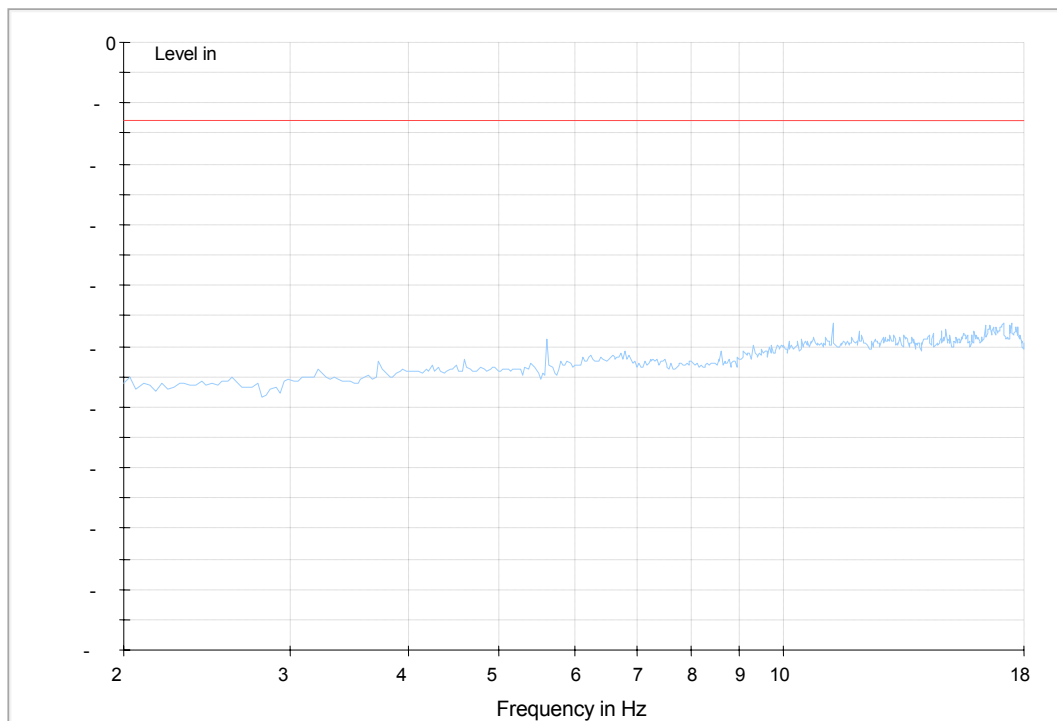
Traffic Mode (9kHz-30MHz)



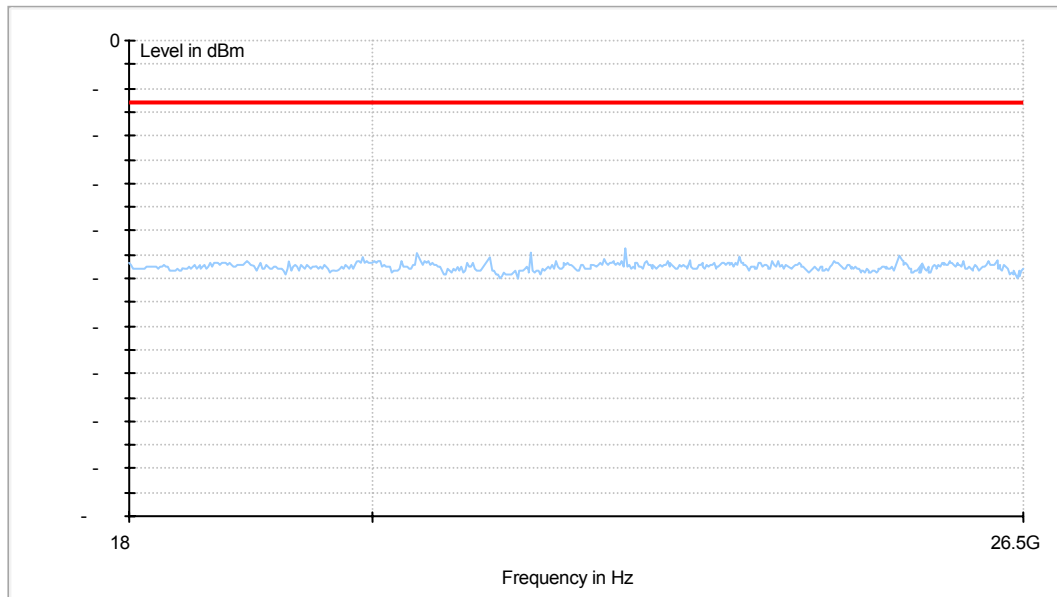
Traffic Mode (30MHz-2GHz)



Traffic Mode (2GHz-18GHz)

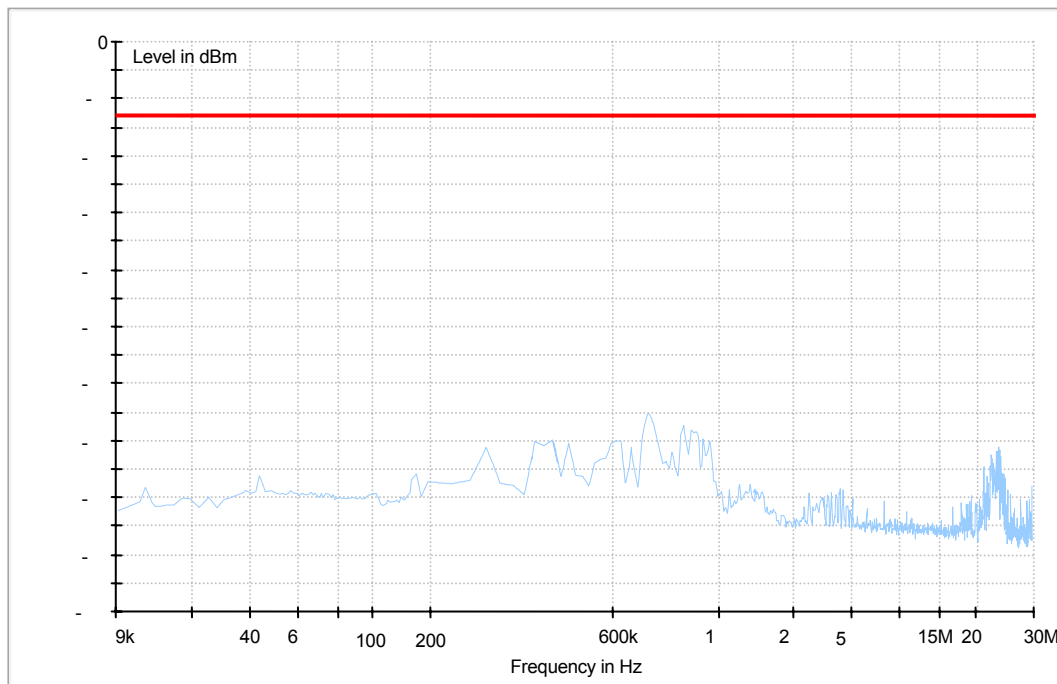


Traffic Mode (18GHz-26.5GHz)

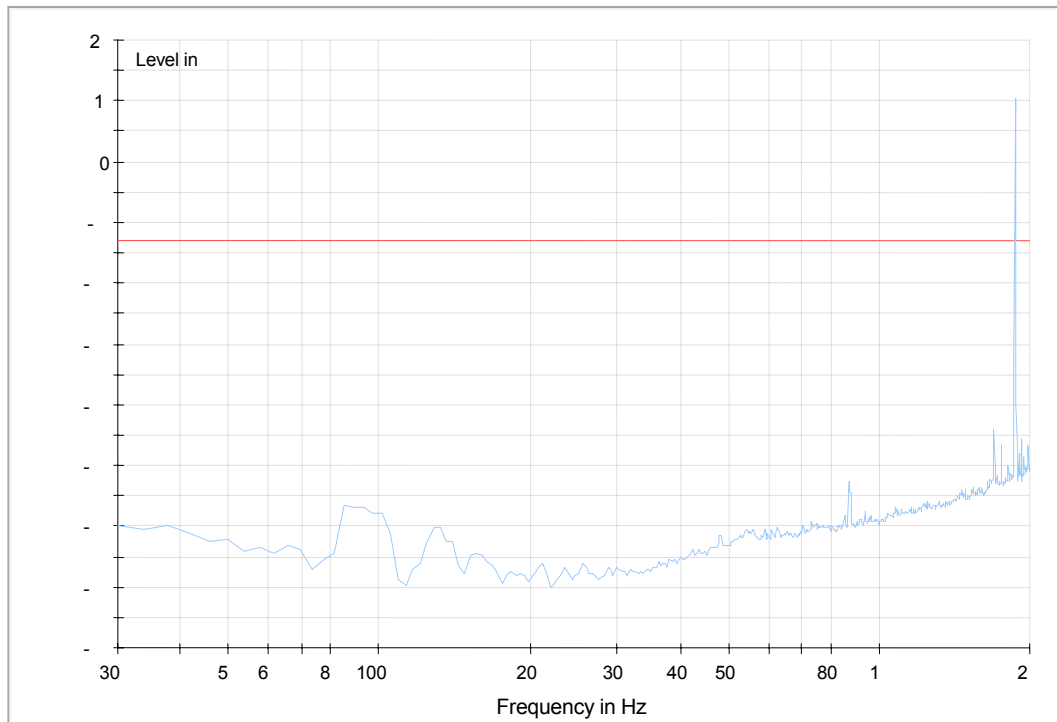


8.3.5 For GPRS 1900

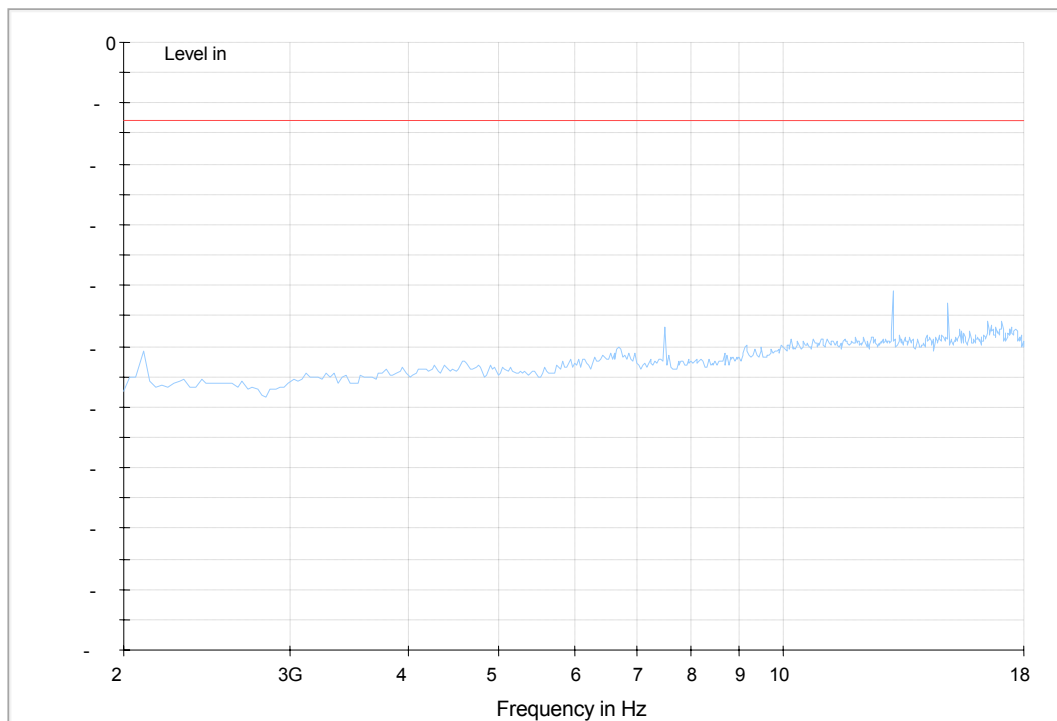
Traffic Mode (9kHz-30MHz)



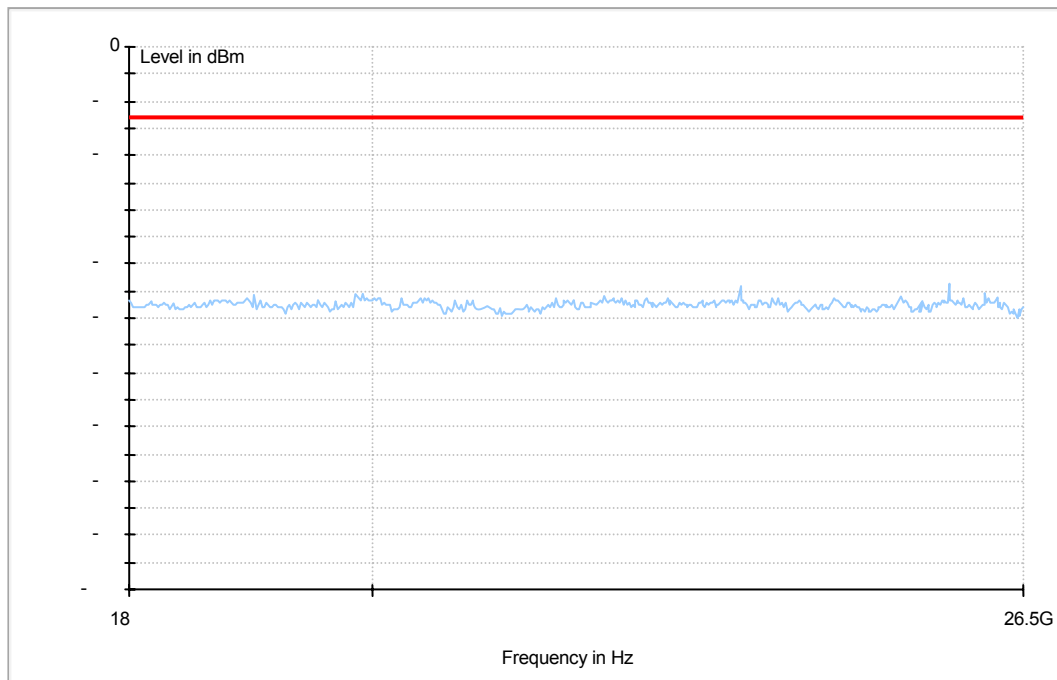
Traffic Mode (30MHz-2GHz)



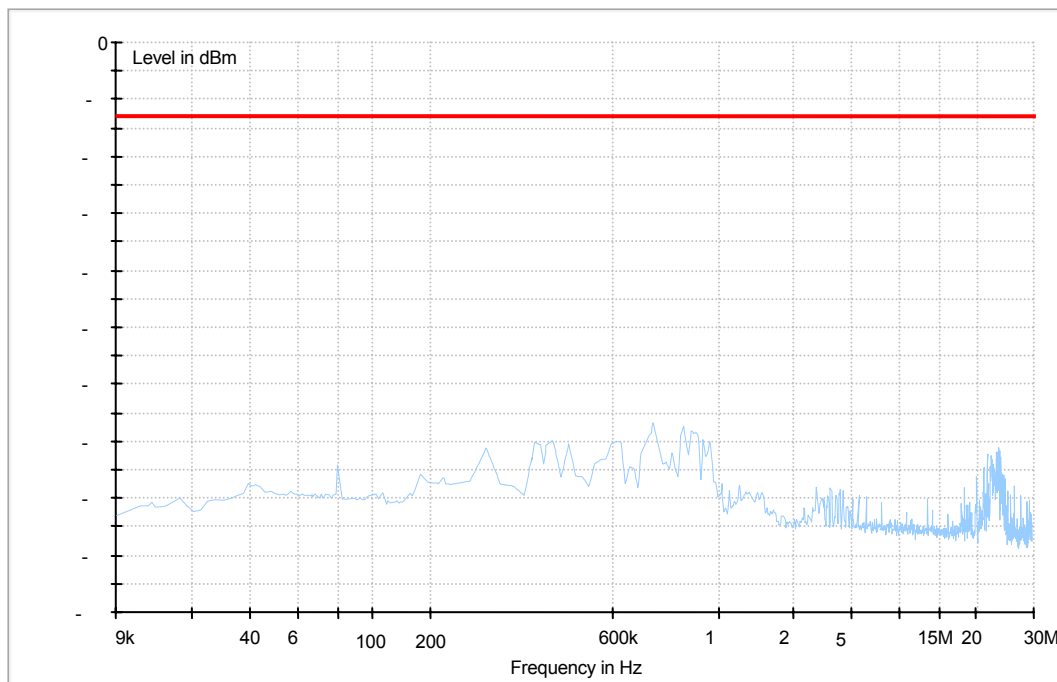
Traffic Mode (2GHz-18GHz)



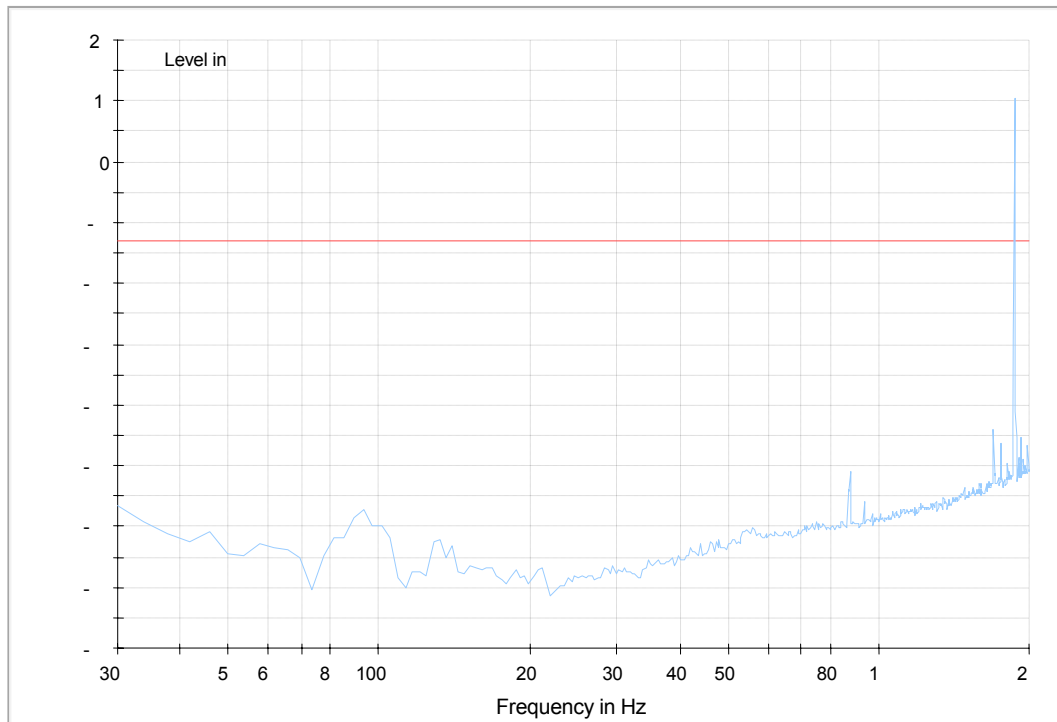
Traffic Mode (18GHz-26.5GHz)



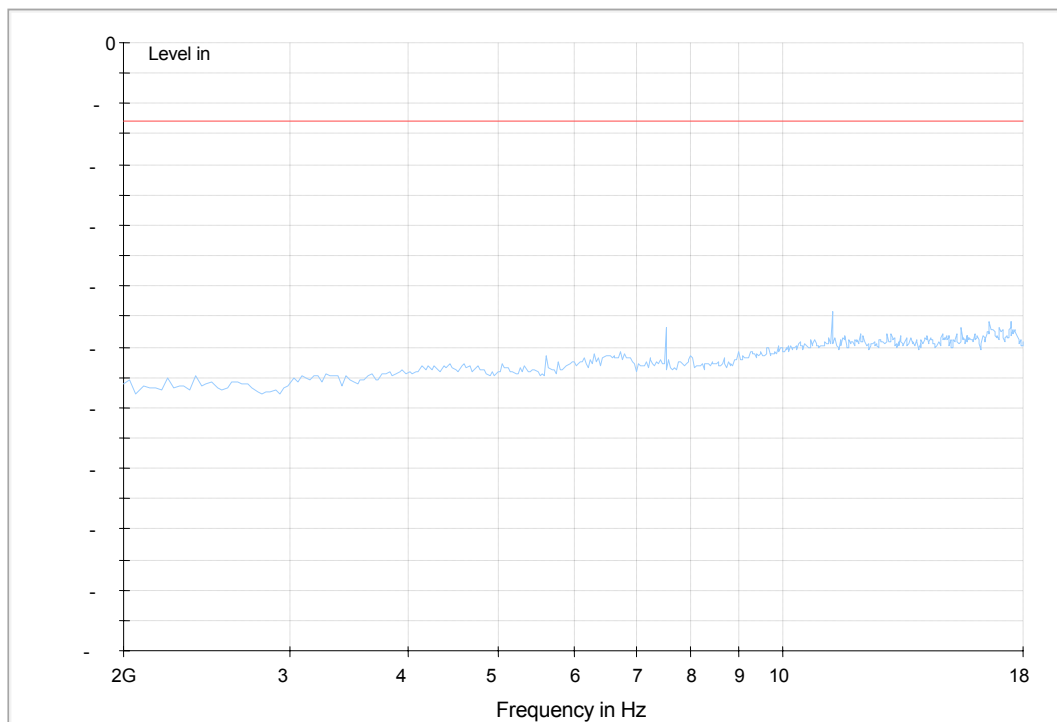
8.3.6 For EDGE 1900 Traffic Mode (9kHz-30MHz)



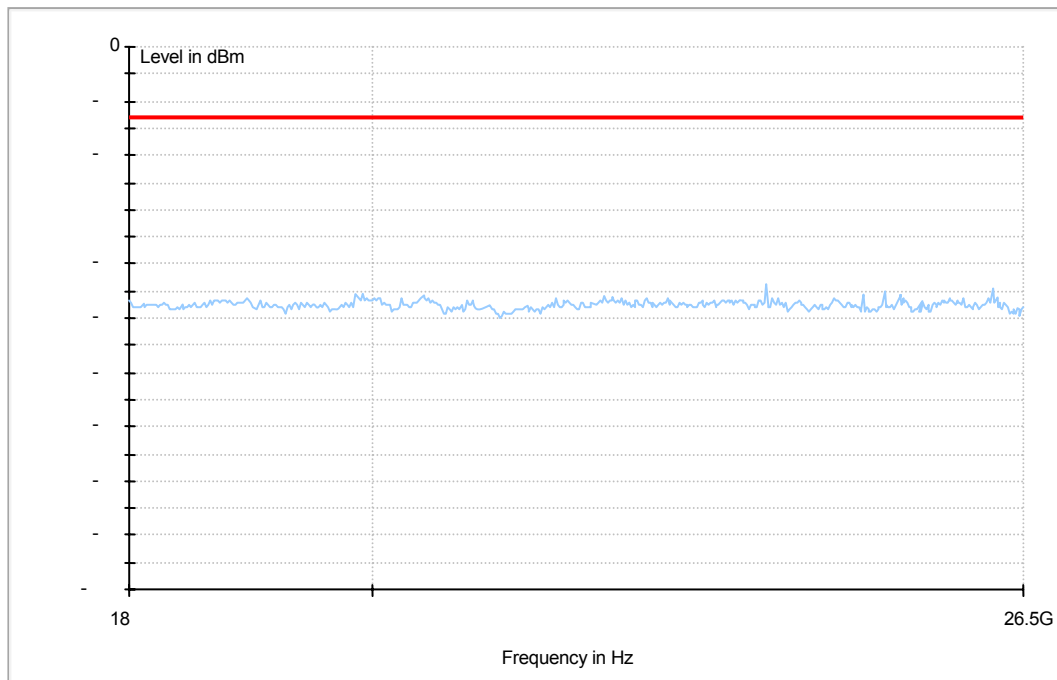
Traffic Mode (30MHz-2GHz)



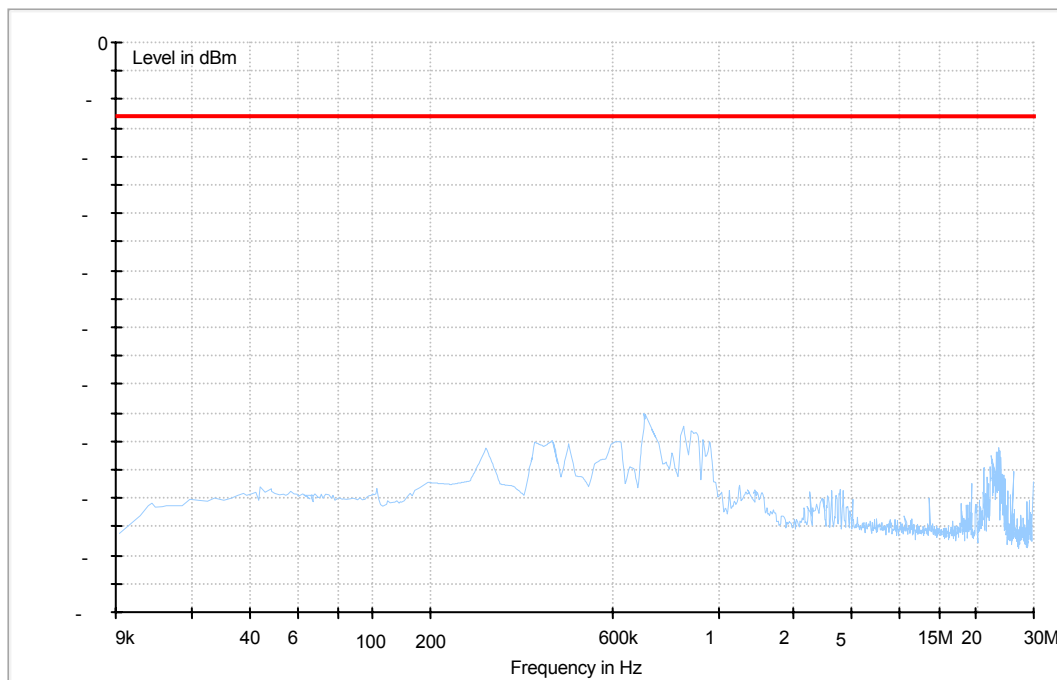
Traffic Mode (2GHz-18GHz)



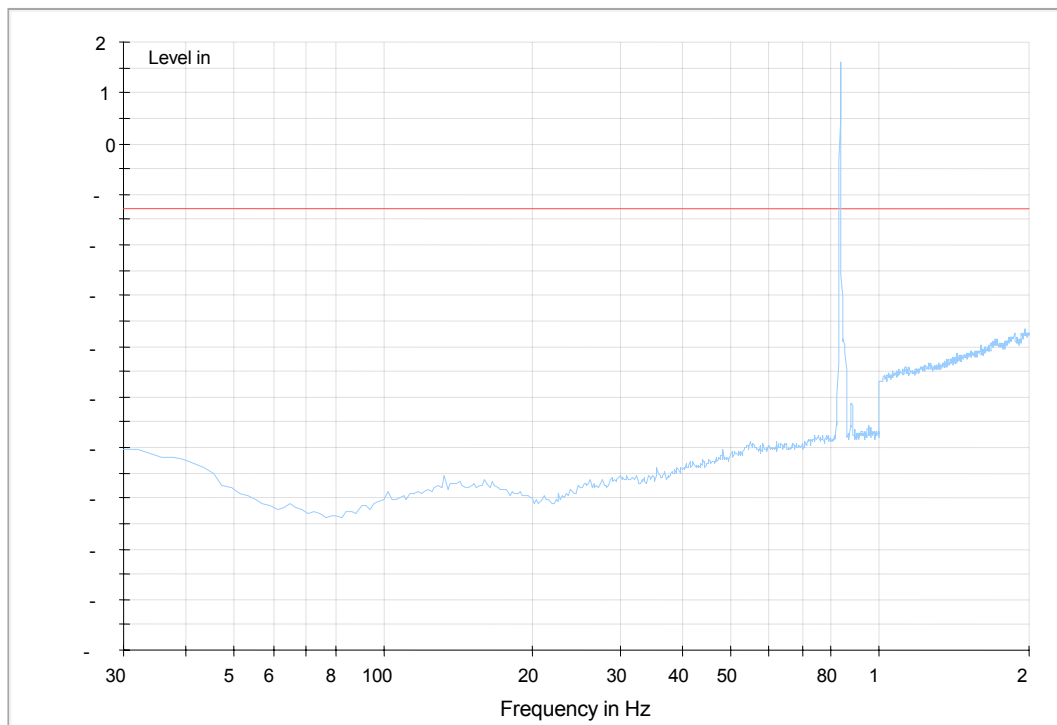
Traffic Mode (18GHz-26.5GHz)



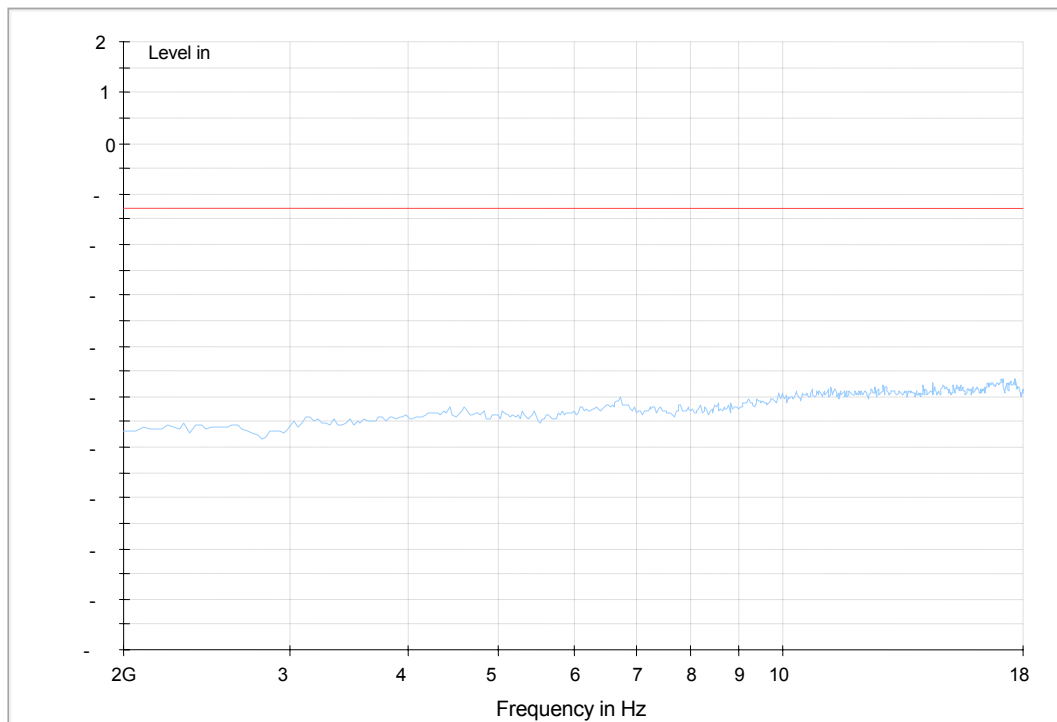
8.3.7 For WCDMA 850 Traffic Mode (9kHz-30MHz)



Traffic Mode (30MHz-2GHz)

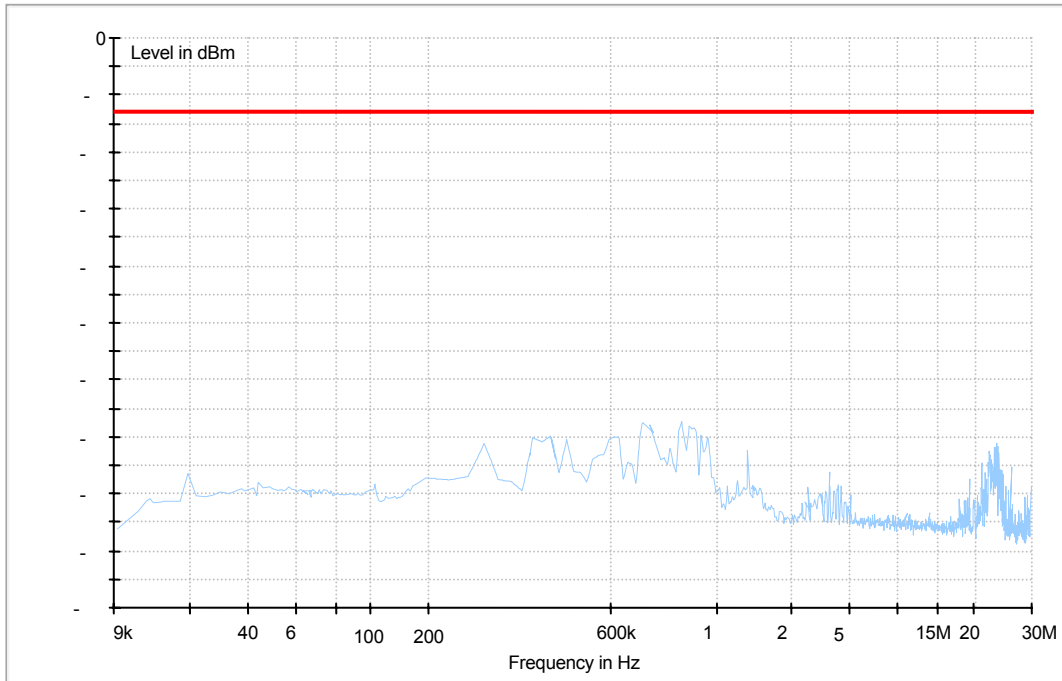


Traffic Mode (2GHz-18GHz)

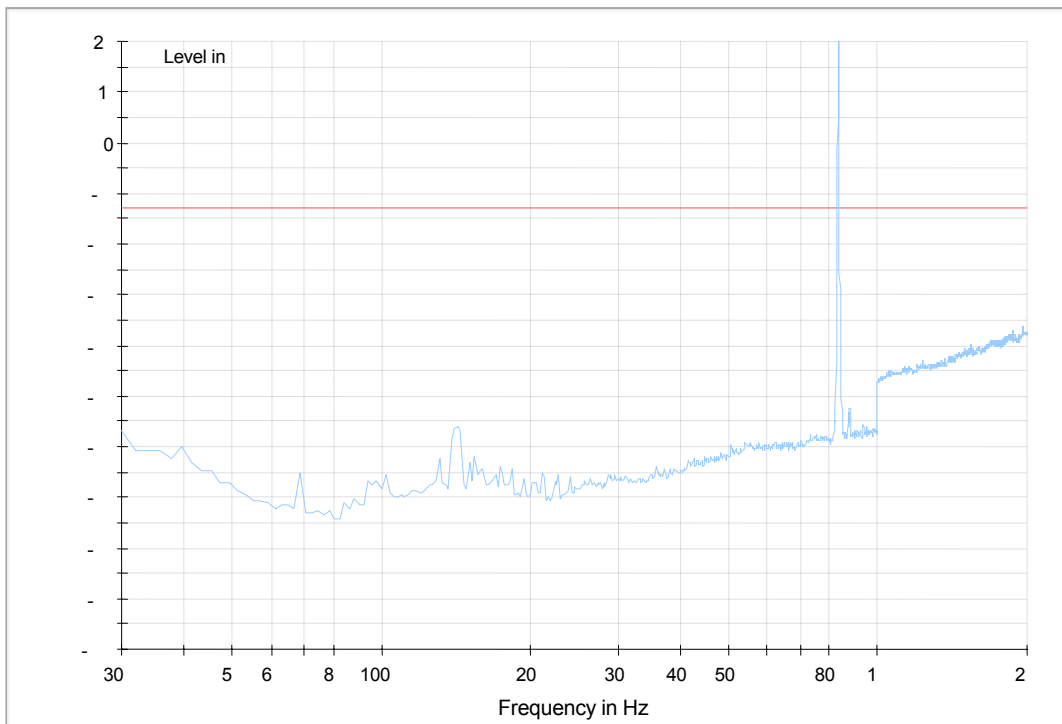


8.3.8 For HSDPA 850

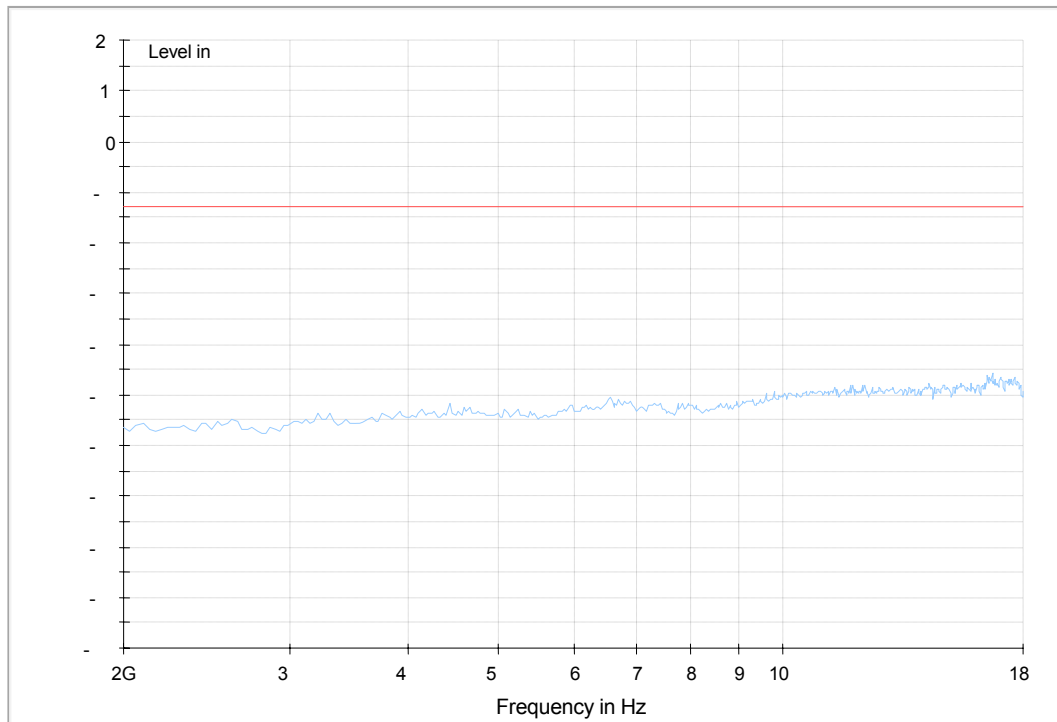
Traffic Mode (9kHz-30MHz)



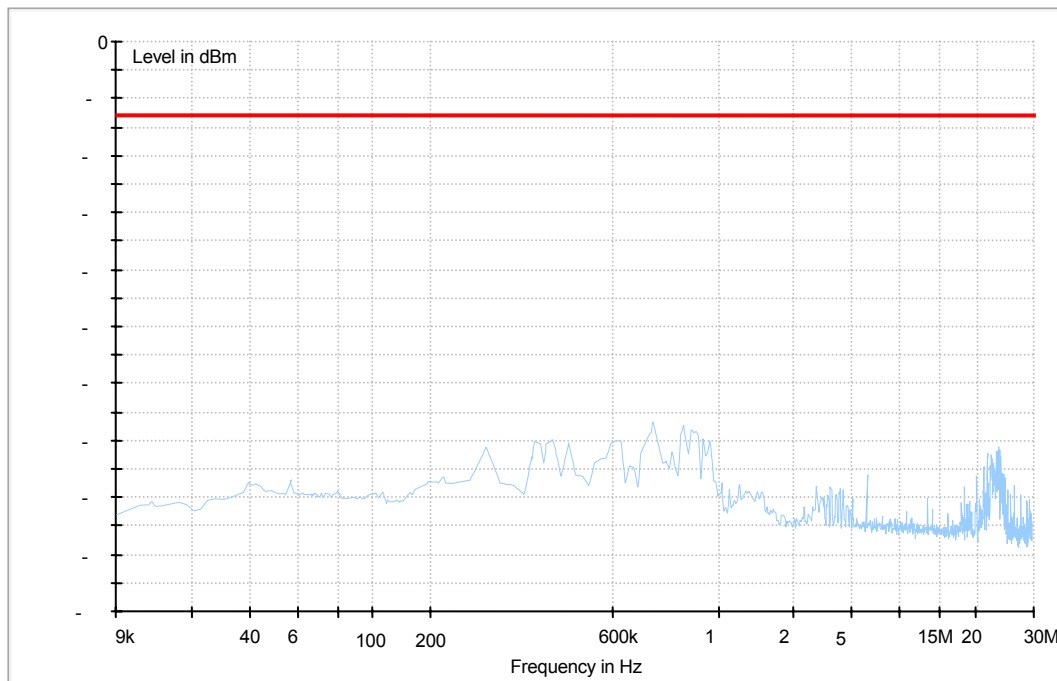
Traffic Mode (30MHz-2GHz)



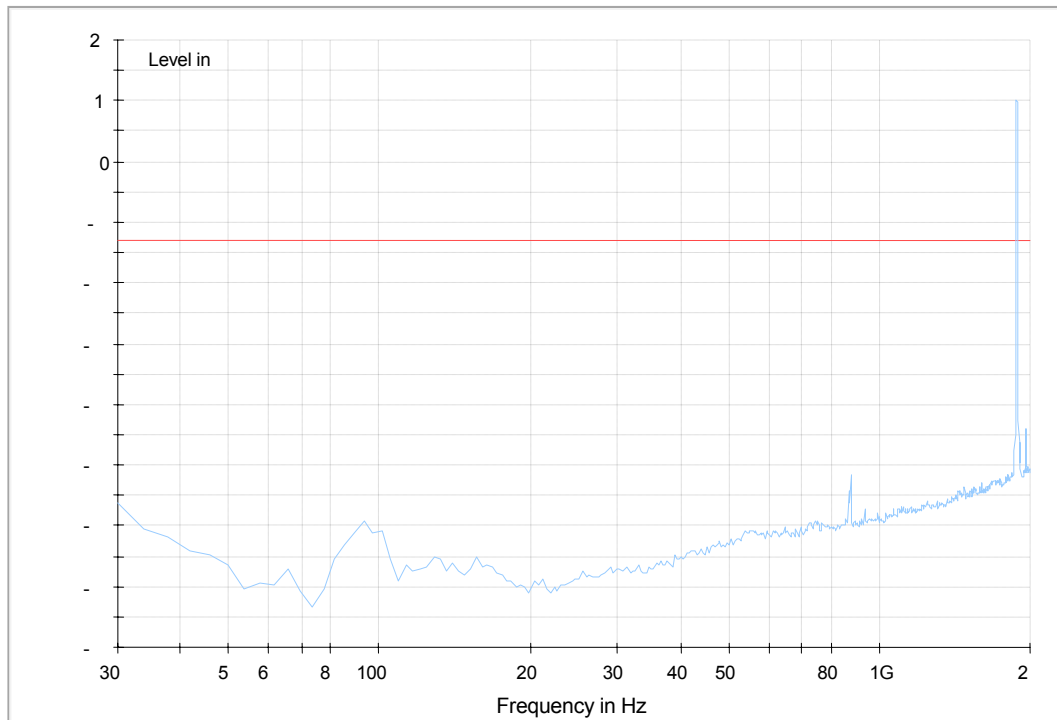
Traffic Mode (2GHz-18GHz)



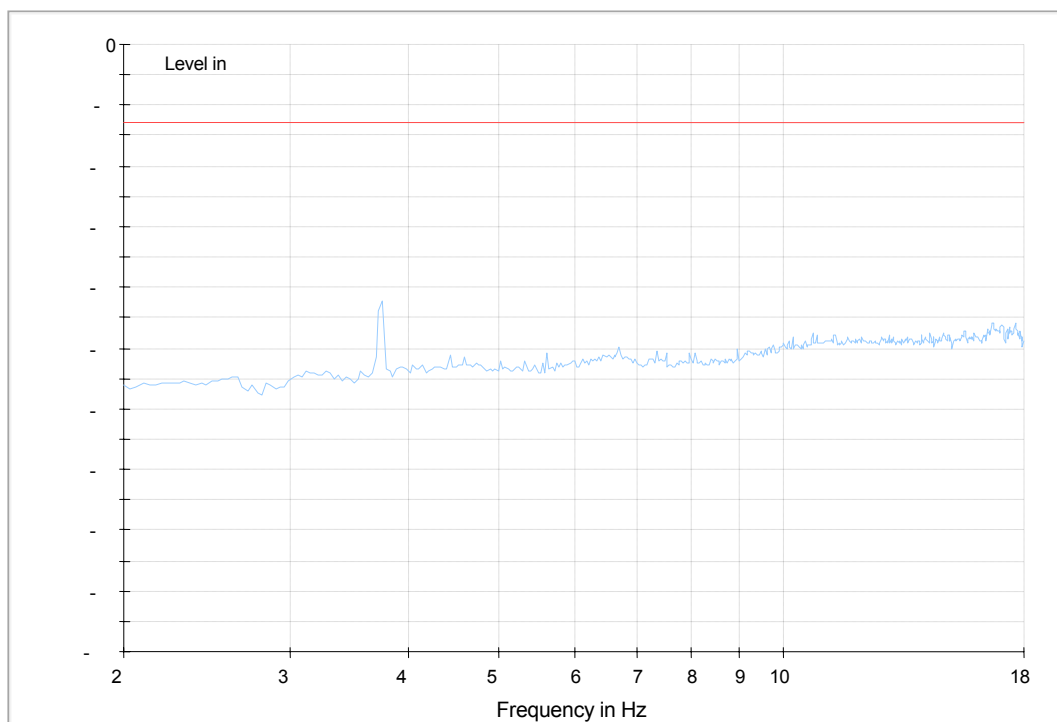
8.3.9 For WCDMA 1900 Traffic Mode (9kHz-30MHz)



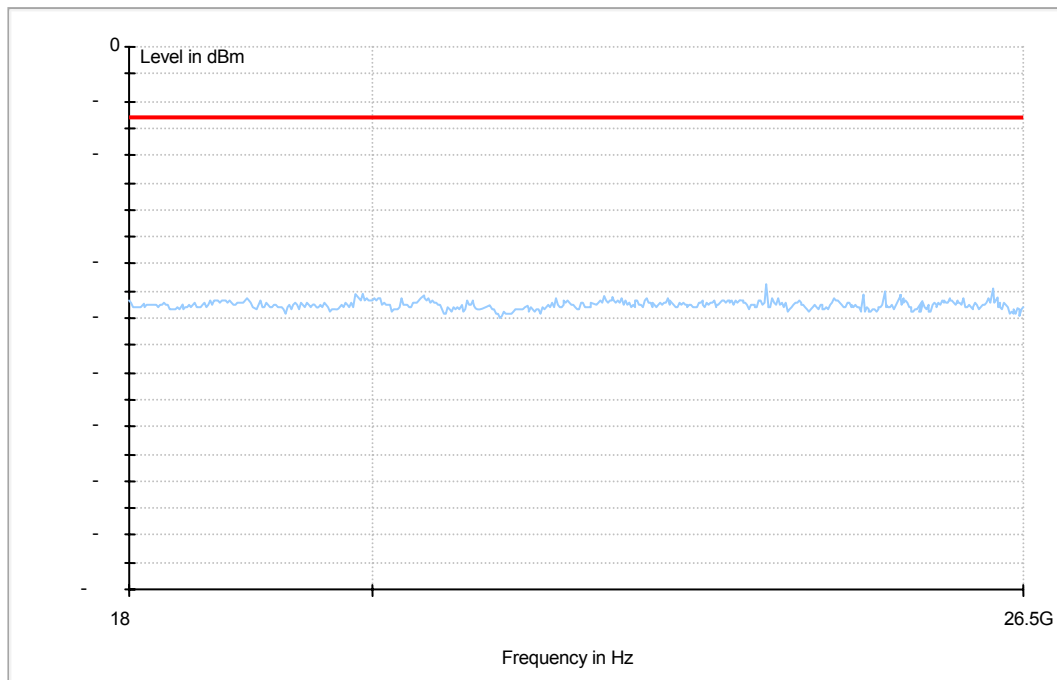
Traffic Mode (30MHz-2GHz)



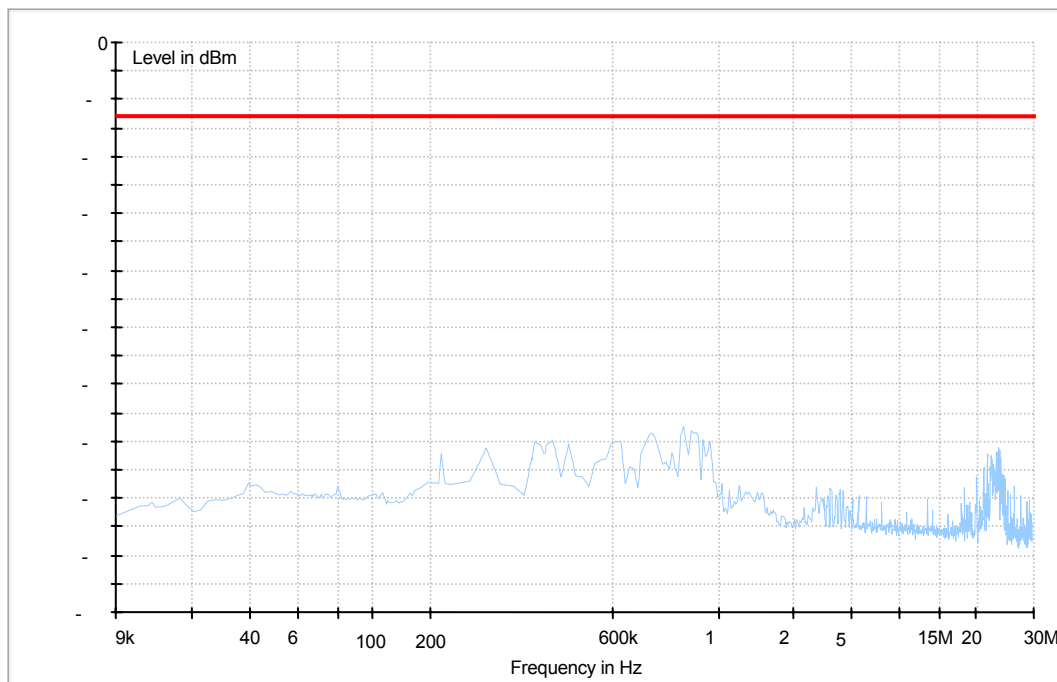
Traffic Mode (2GHz-18GHz)



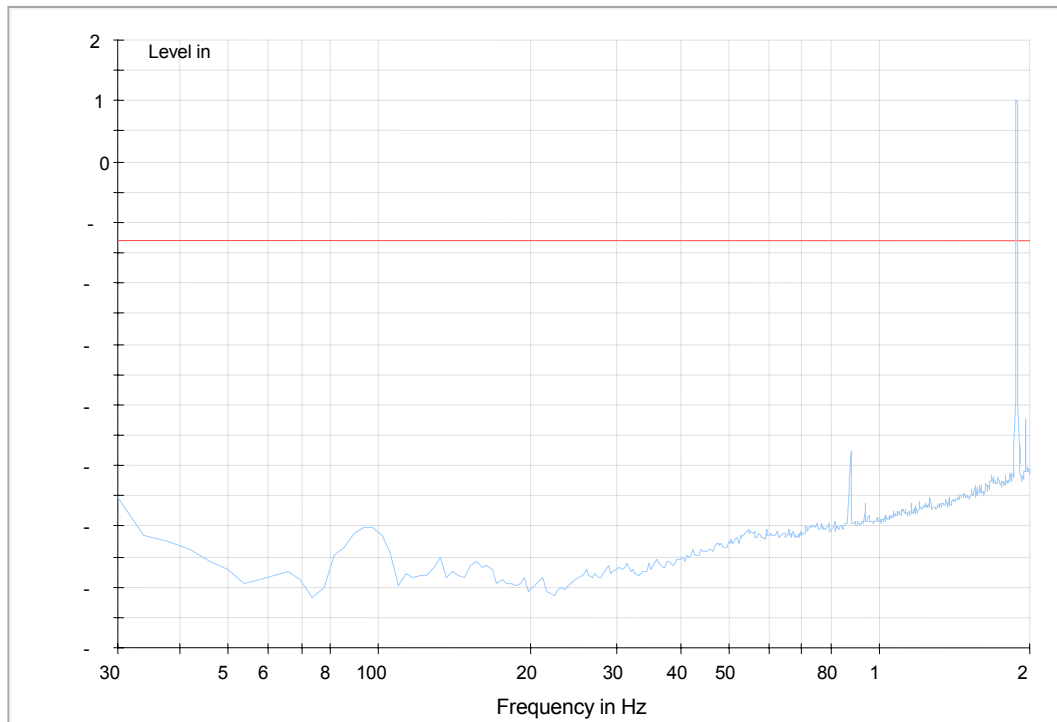
Traffic Mode (18GHz-26.5GHz)



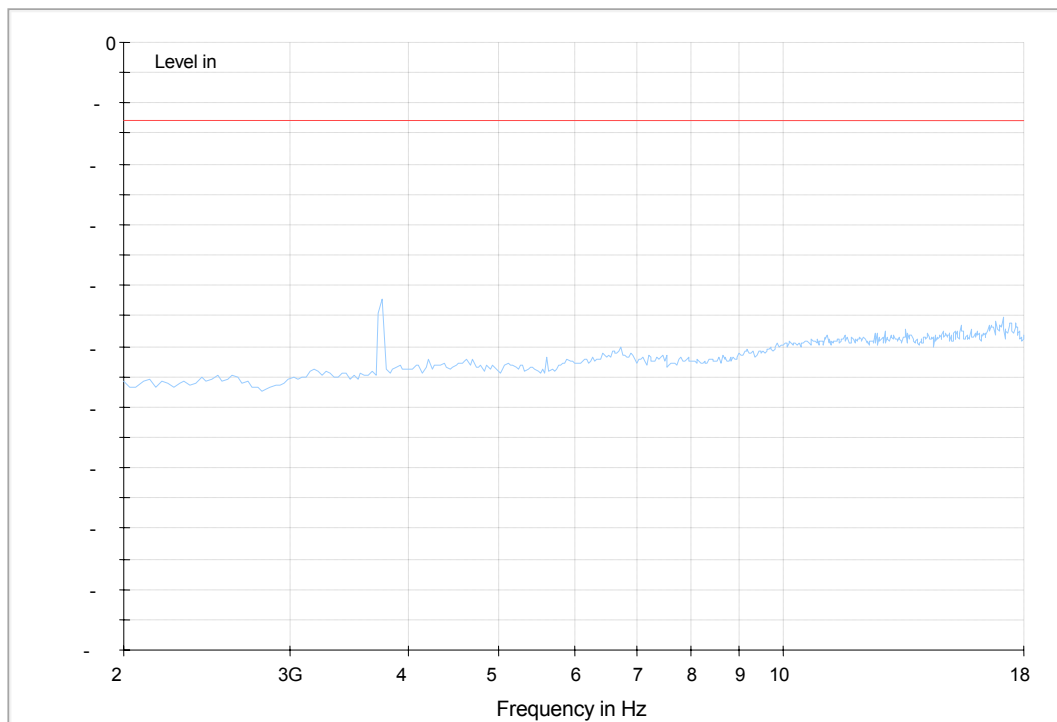
8.3.10 For HSDPA 1900 Traffic Mode (9kHz-30MHz)



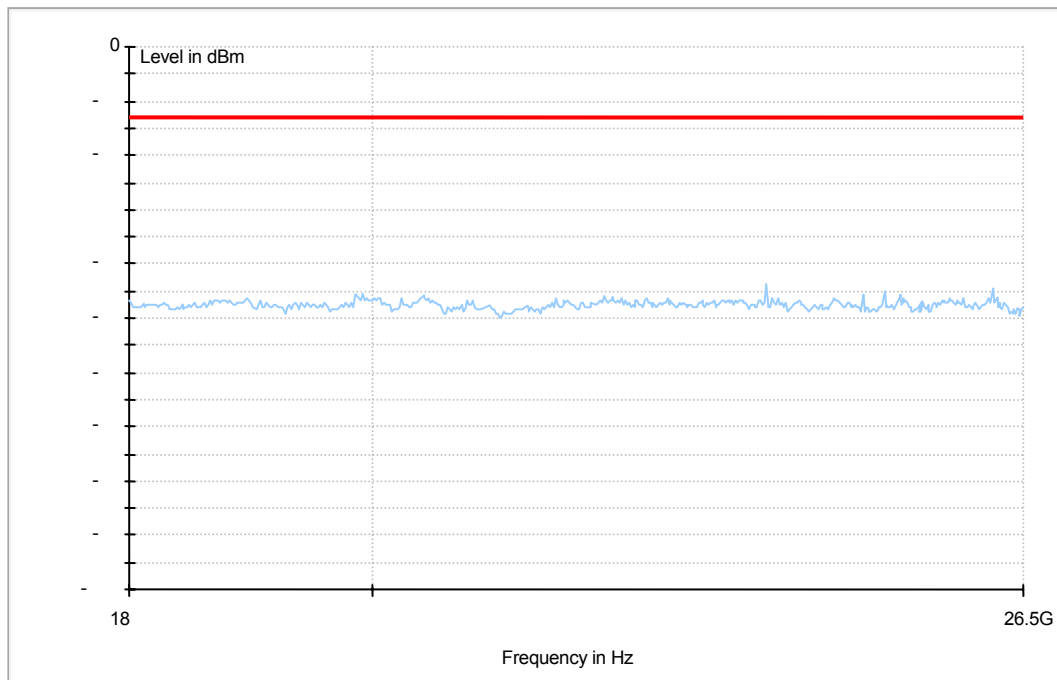
Traffic Mode (30MHz-2GHz)



Traffic Mode (2GHz-18GHz)



Traffic Mode (18GHz-26.5GHz)



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