



EMC Test Report

Product Name:
HSDPA/UMTS/GPRS/GSM Mobile Phone with Bluetooth

Model Number:
HUAWEI U7520/U7520

Report No: SYBHZ(R)E033062010EB-1
FCC ID: QISU7520

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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 Mobile Phone with Bluetooth |
| | M/N: HUAWEI U7520/U7520 |
| REGULATION | FCC CFR47 Part 15: Subpart B; |
| | FCC CFR47 Part 24: Subpart E; |
| START OF TEST | Jun.21, 2010 |
| END OF TEST | Jun.25, 2010 |
| | |
| Final Judgement: | Pass |

Approver

2010-08-06

Date

张兴海

Name

Signature



Operator

2010-08-06

Date

温剑锋

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 Mobile Phone with Bluetooth |
| MANUFACTURERS MODEL NUMBER | HUAWEI U7520/U7520 |

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 (TM4-TM6) | N/A | Pass | Site1 |
| <u>Conducted Emissions</u> | TC1 (TM1-TM6) | N/A | Pass | Site1 |
| <u>Radiated Spurious Emissions</u> Enclosure Port | TC1 (TM1-TM2) | 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 Mobile Phone with Bluetooth- HUAWEI U7520/U7520 is subscriber equipment in the WCDMA/GSM system. The HSDPA/UMTS frequency band is Band I, it can't be used in this report. The GSM/GPRS frequency band includes GSM900 and DCS1800 and PCS1900, but only PCS1900MHz band test data included in this report. The Mobile Phone implements such functions as RF signal receiving/transmitting, HSDPA/UMTS and GSM/GPRS protocol processing, voice, video, and MMS service 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: | HSDPA/UMTS/GPRS/GSM Mobile Phone with Bluetooth |
| Models: | HUAWEI U7520/U7520 |
| Input Rated Voltage | 3.7V |
| Extreme Voltage | 3.6V and 4.2V |
| Dimensions | 106mm (L)×56.4mm (W)×13.9mm (H) |
| Weight | <100g (with battery) |

Sub-Assembly Identity

| Mode | | Work Frequency | |
|-----------|---------|---------------------------|-------------------------|
| | | Transmitt Frequency (MHz) | Receive Frequency (MHz) |
| GSM | PCS1900 | 1850-1910 | 1930-1990 |
| Bluetooth | | 2400-2483.5 | |

3.2 Sub-Assembly Identity

Sub-Assembly Identity

| Board | | | | |
|---------------------|------|-------------------------------|----------------------------|--|
| Model Name | Qty. | Serial | Description | |
| HD2U752M | 1 | 9Y2AA11052000082 | Main board of Mobile Phone | |
| Accessory | | | | |
| Name | Qty. | Manufacture | Serials number | Description |
| Adapter | 1 | Huawei Technologies Co., Ltd. | HKAA51556725 | Adapter Model: HS-050040U5 Input Voltage : ~100-240V 50/60Hz 0.2A Output Voltage: 5.0V 400mA Rated Power: 2W |
| Adapter | 1 | Huawei Technologies Co., Ltd. | XQH840324675 | Adapter Model: HS-050040U6 Input Voltage : ~100-240V 50/60Hz 0.2A Output Voltage: 5.0V 400mA Rated Power: 2W |
| Rechargeable Li-ion | 1 | Huawei Technologies Co., Ltd. | GAG9B13XC4613091 | Battery Model: HB5A2 Rated capacity: 1000mAh Nominal Voltage: +3.7V Charging Voltage: +4.2V |
| Rechargeable Li-ion | 1 | Huawei Technologies | YACA501HI1824533 | Battery Model: HB5A2H Rated capacity: 1150mAh |



| | | | | |
|--|--|-----------|--|---|
| | | Co., Ltd. | | 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 |
|------------------|----------|---------------|
| AC Power Adapter | 1 | Unshielded |
| 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 | 2009-10-10 |
| Notebook | D810 | DELL | 3105083303 | NA |

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~TM6 |
|---------|---------|

4.3.2 Test Mode

There were 6 test Modes. TM1 to TM6 were shown in the diagrams below:

| | |
|-----|------------------------------------|
| TM1 | operate in traffic mode PCS1900; |
| TM2 | operate in traffic mode GPRS 1900; |
| TM3 | operate in traffic mode Bluetooth; |
| TM4 | operate in idle mode PCS1900; |
| TM5 | operate in idle mode GPRS 1900; |
| TM6 | 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. (GSM see ETSI TS 151.010).

For GSM, 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.

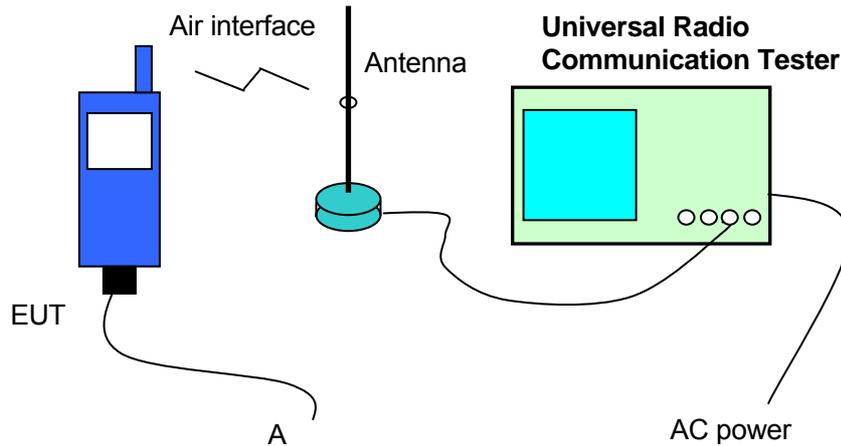


Figure 1.: Test Configuration

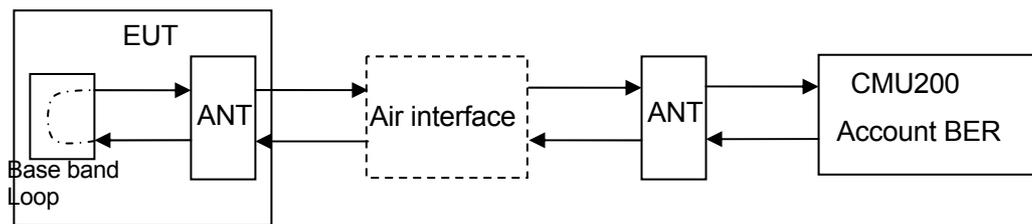
Idle Mode:

The EUT is required to be in the idle mode.

For GSM, 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:



ANT: Antenna

BER: Bit Error Rate

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:

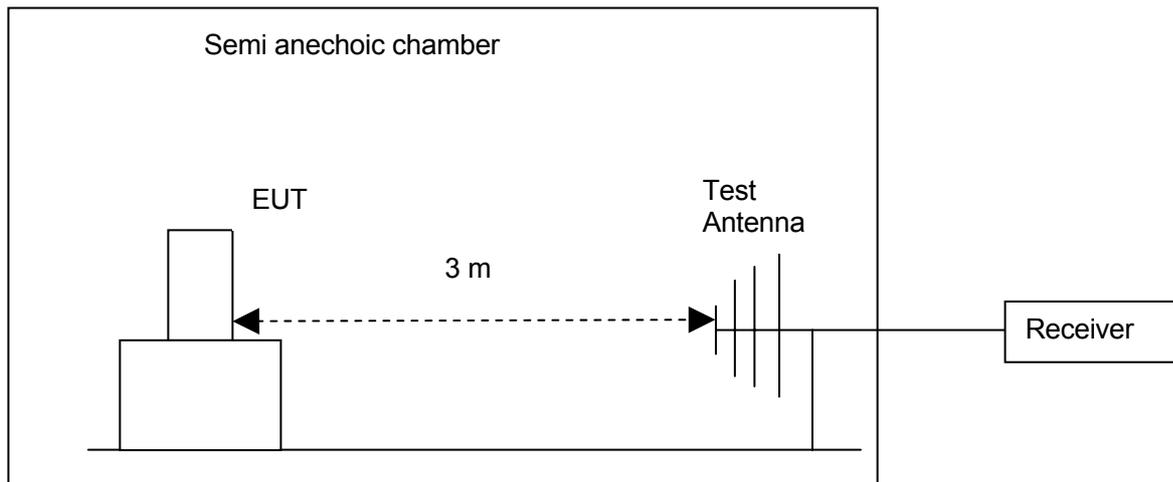


Figure 3. Test set-up

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

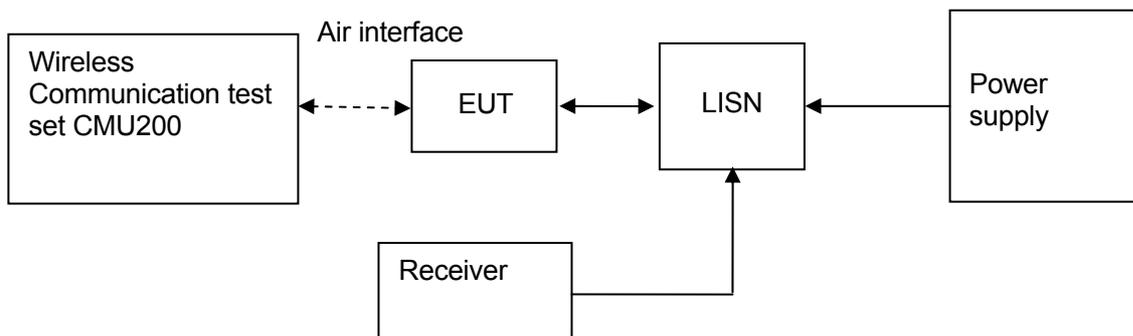


Figure 4. Test Set-up

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

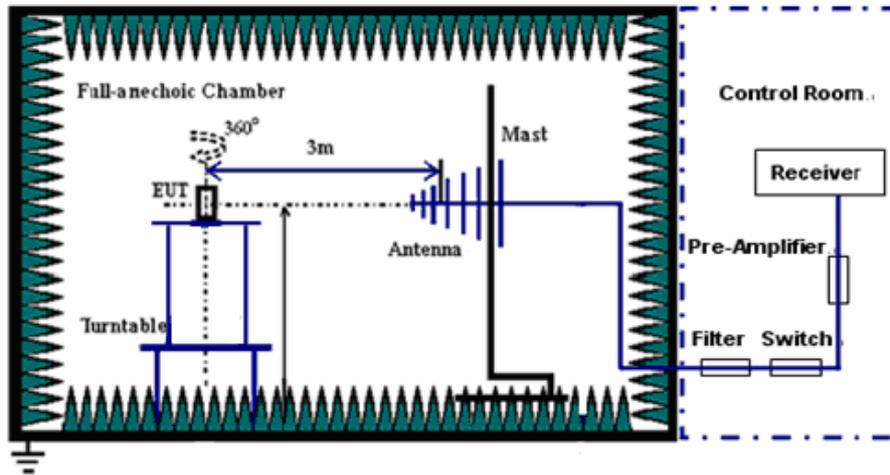
5.3.1 Test Procedure

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:

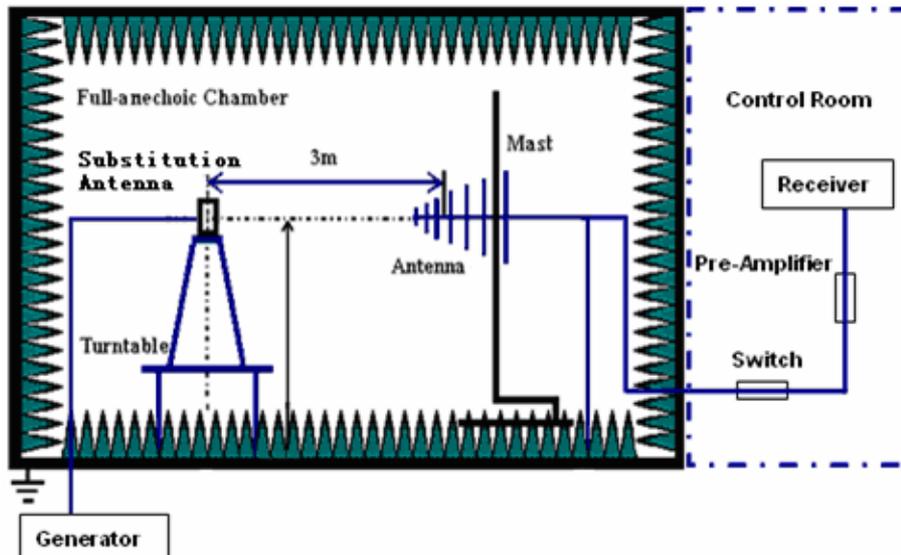
For transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, EIRP shall be measured when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in 2.1033(c)(8). Connect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

Test the Radiated maximum output power by 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 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] | Measurement Value [dBm] | Substitution Antenna Type | Gain [dBd] | Cable Loss [dB] | Signal Generator Level [dBm] | Substitution Level [dBm] | FCC limit [dBm] | Result |
|-------------|-------------------------|---------------------------|------------|-----------------|------------------------------|--------------------------|-----------------|--------|
| | | | | | | | | |

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

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

NOTE: SGP- Signal Generator Level

5.3.2 Test Results

The EUT has met the requirements of FCC Part24 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 | April.22, 2010 | 12 |
| | Broadband Antenna | CBL6112B | SCHAFFNER | Sep.21.2009 | 12 |
| | Horn Antenna | 3117 | ETS-Lindgren | Sep.11.2009 | 12 |
| | Horn Antenna | 3160 | ETS-Lindgren | Sep.21.2009 | 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:

System Measurement Uncertainty

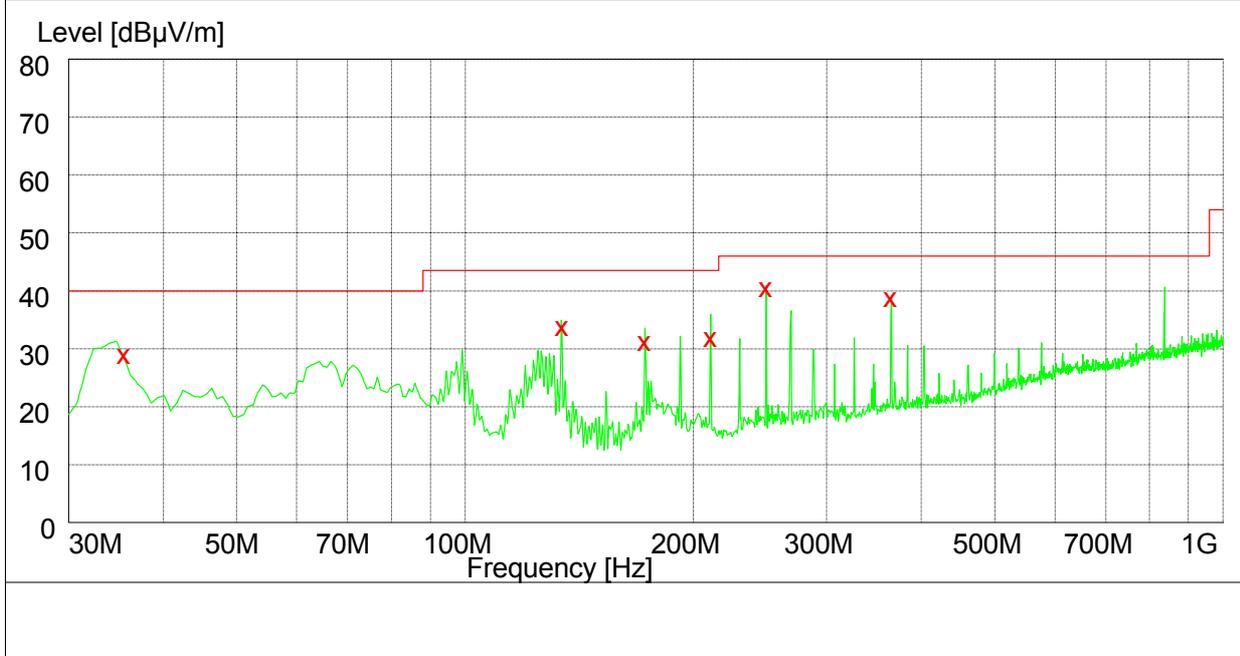
| Items | | Extended Uncertainty |
|-------|----------------------------------|--------------------------|
| RE | Field strength (dB μ V/m) | U=4.1dB; k=2(30MHz-1GHz) |
| RE | Field strength (dB μ V/m) | U=4.1dB; k=2(1GHz-18GHz) |
| RSE | ERP (dBm) | U=2.2dB; k=2 |
| CE | Disturbance Voltage (dB μ V)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

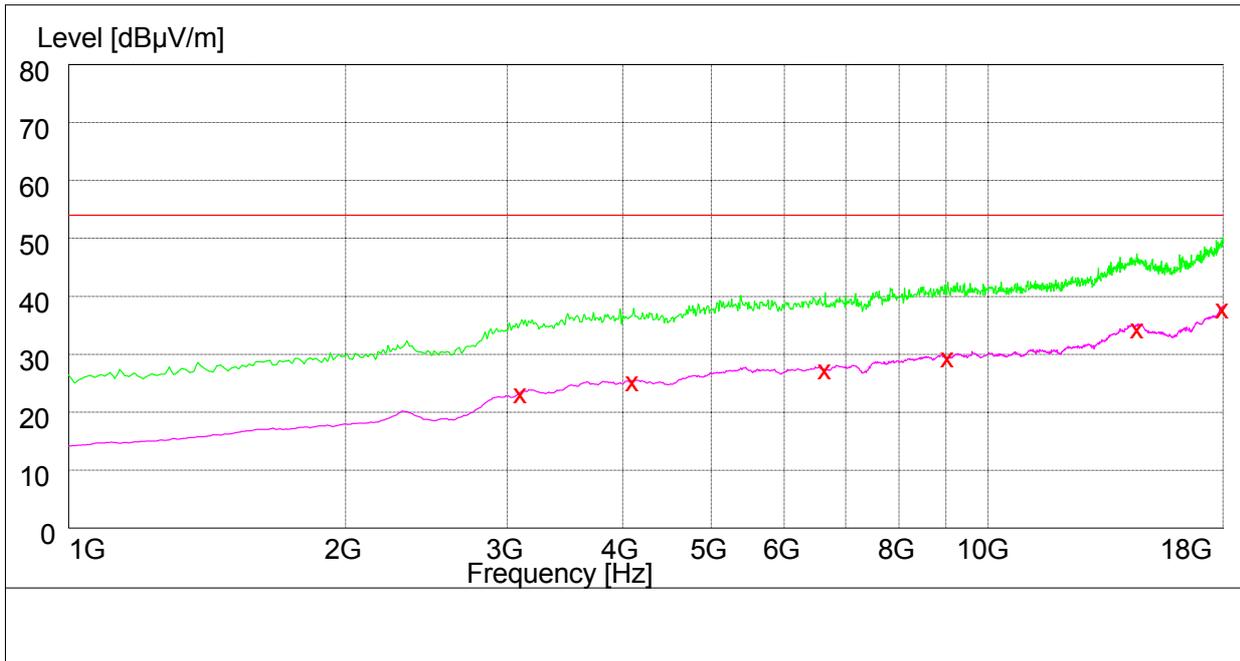
30MHz-1GHz



MEASUREMENT RESULT: QP Detector

| Frequency MHz | Level dBµV/m | Transd dB | Limit dBµV/m | Margin dB | Height cm | Azimuth deg | Polarisation |
|---------------|--------------|-----------|--------------|-----------|-----------|-------------|--------------|
| 35.520000 | 28.90 | 11.9 | 40.0 | 11.1 | 100.0 | 59.00 | VERTICAL |
| 134.400000 | 33.70 | 9.0 | 43.5 | 9.8 | 148.0 | 201.00 | HORIZONTAL |
| 172.800000 | 31.10 | 10.3 | 43.5 | 12.4 | 100.0 | 211.00 | VERTICAL |
| 211.200000 | 31.80 | 12.6 | 43.5 | 11.7 | 102.0 | 194.00 | VERTICAL |
| 249.600000 | 40.30 | 14.1 | 46.0 | 5.7 | 126.0 | 206.00 | HORIZONTAL |
| 364.800000 | 38.70 | 17.4 | 46.0 | 7.3 | 102.0 | 83.00 | HORIZONTAL |

1GHz-18GHz



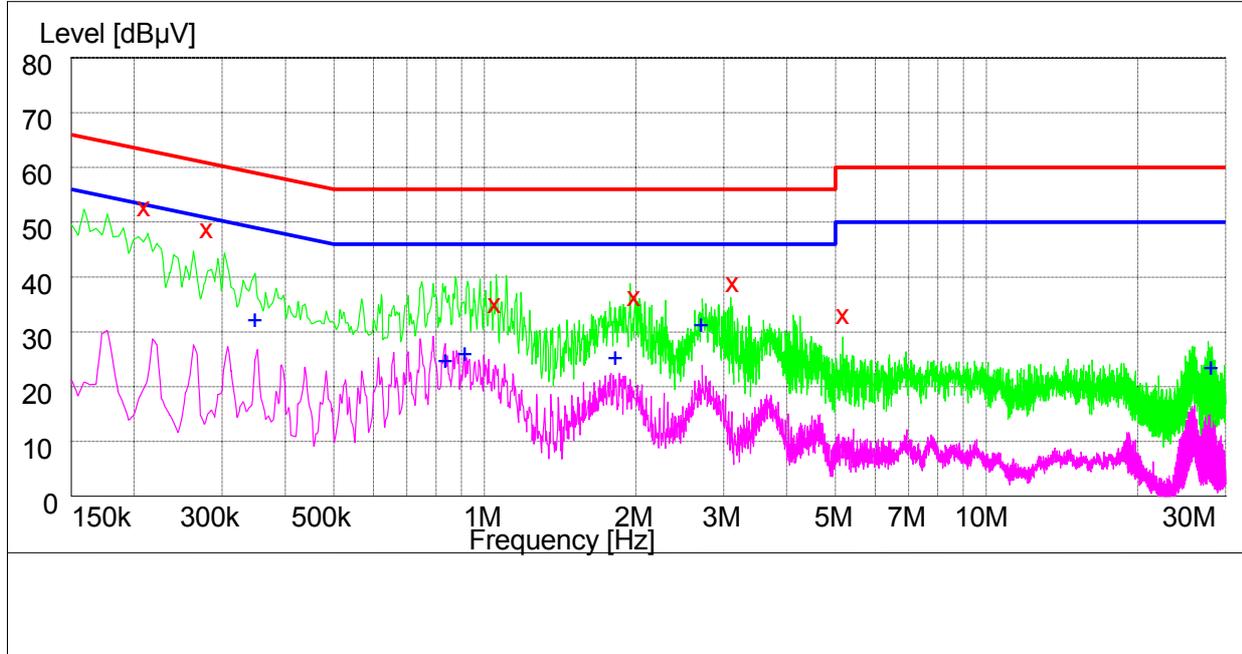
MEASUREMENT RESULT: AV Detector

| Frequency MHz | Level dBµV/m | Transd dB | Limit dBµV/m | Margin dB | Height cm | Azimuth deg | Polarisation |
|---------------|--------------|-----------|--------------|-----------|-----------|-------------|--------------|
| 3103.500000 | 23.00 | -8.7 | 54.0 | 31.0 | 100.0 | 270.00 | VERTICAL |
| 4108.000000 | 25.10 | -5.7 | 54.0 | 28.9 | 109.0 | 334.00 | VERTICAL |
| 6648.500000 | 27.00 | -0.7 | 54.0 | 27.0 | 122.0 | 176.00 | VERTICAL |
| 9038.500000 | 29.10 | 4.2 | 54.0 | 24.9 | 125.0 | 247.00 | VERTICAL |
| 14523.000000 | 34.30 | 12.3 | 54.0 | 19.7 | 139.0 | 223.00 | VERTICAL |
| 17987.000000 | 37.60 | 17.2 | 54.0 | 16.4 | 100.0 | 303.00 | 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 |
|---------------|------------|-----------|------------|-----------|------|-----|
| 0.210000 | 52.80 | 10.0 | 63 | 10.2 | N | FLO |
| 0.280000 | 48.70 | 10.0 | 61 | 12.3 | N | FLO |
| 1.048000 | 35.10 | 10.1 | 56 | 20.9 | N | FLO |
| 1.990000 | 36.40 | 10.1 | 56 | 19.6 | N | FLO |
| 3.126000 | 39.20 | 10.2 | 56 | 16.8 | N | FLO |
| 5.198000 | 34.60 | 10.2 | 60 | 25.4 | N | FLO |

MEASUREMENT RESULT: AV Detector

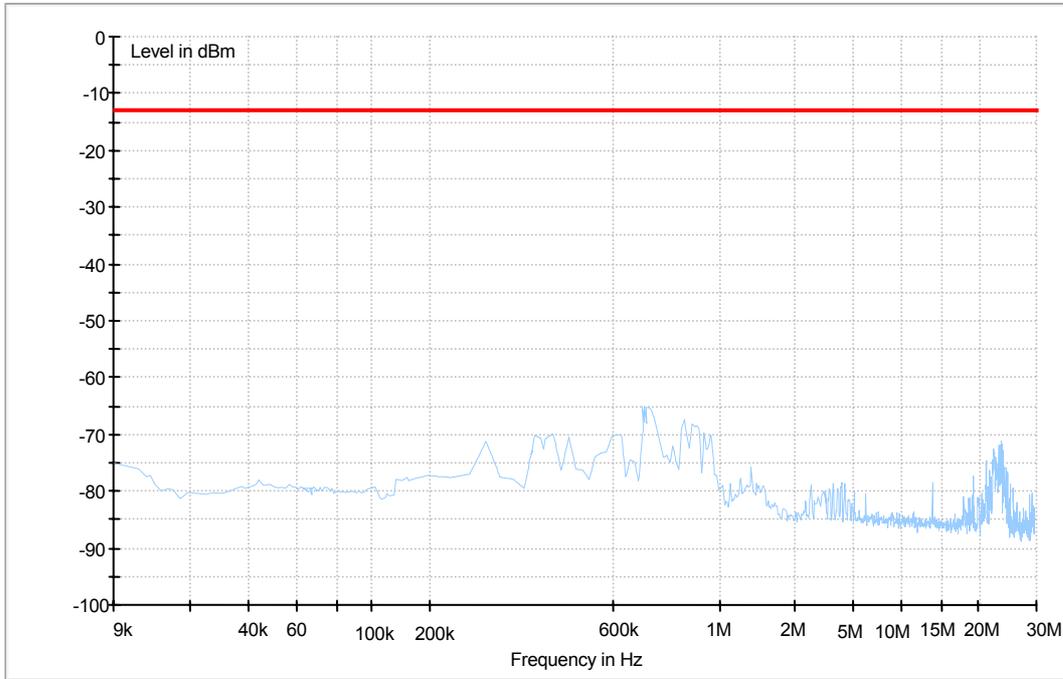
| Frequency MHz | Level dBµV | Transd dB | Limit dBµV | Margin dB | Line | PE |
|---------------|------------|-----------|------------|-----------|------|-----|
| 0.348000 | 31.90 | 10.0 | 49 | 17.1 | N | FLO |
| 0.834000 | 26.00 | 10.1 | 46 | 20.0 | N | FLO |
| 0.912000 | 27.30 | 10.1 | 46 | 18.7 | N | FLO |
| 1.824000 | 26.40 | 10.1 | 46 | 19.6 | N | FLO |
| 2.696000 | 31.10 | 10.2 | 46 | 14.9 | N | FLO |
| 28.014000 | 24.70 | 10.4 | 50 | 25.3 | N | FLO |

8.3 Radiated Spurious Emission

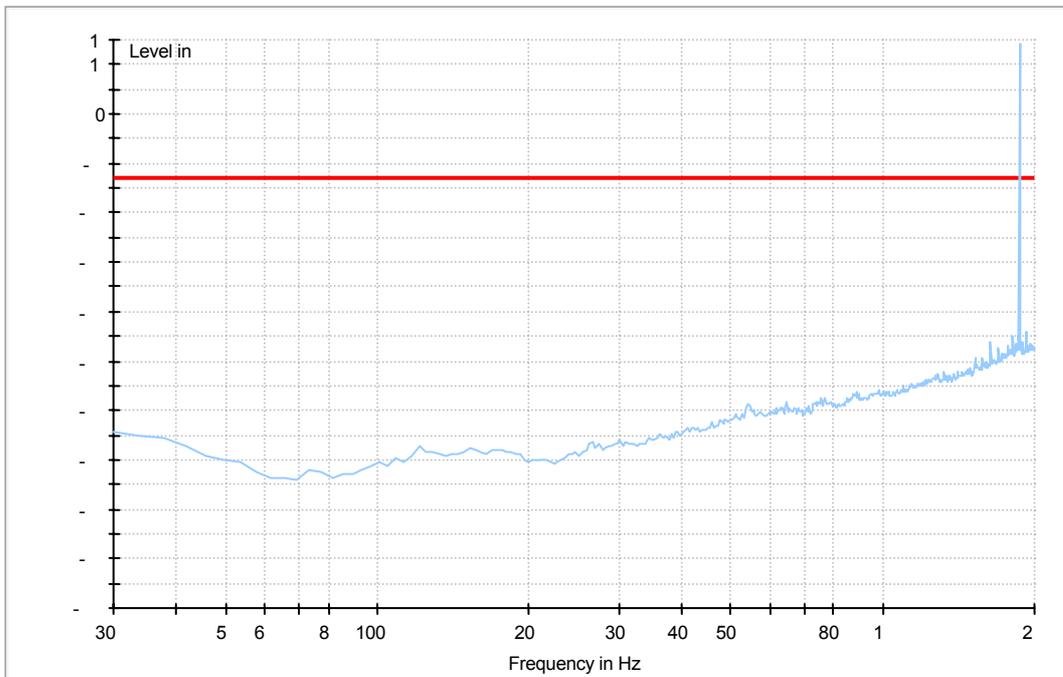
This test results are the maximum level of radiated spurious emissions in vertical and horizontal polarity.

8.3.1 For PCS1900

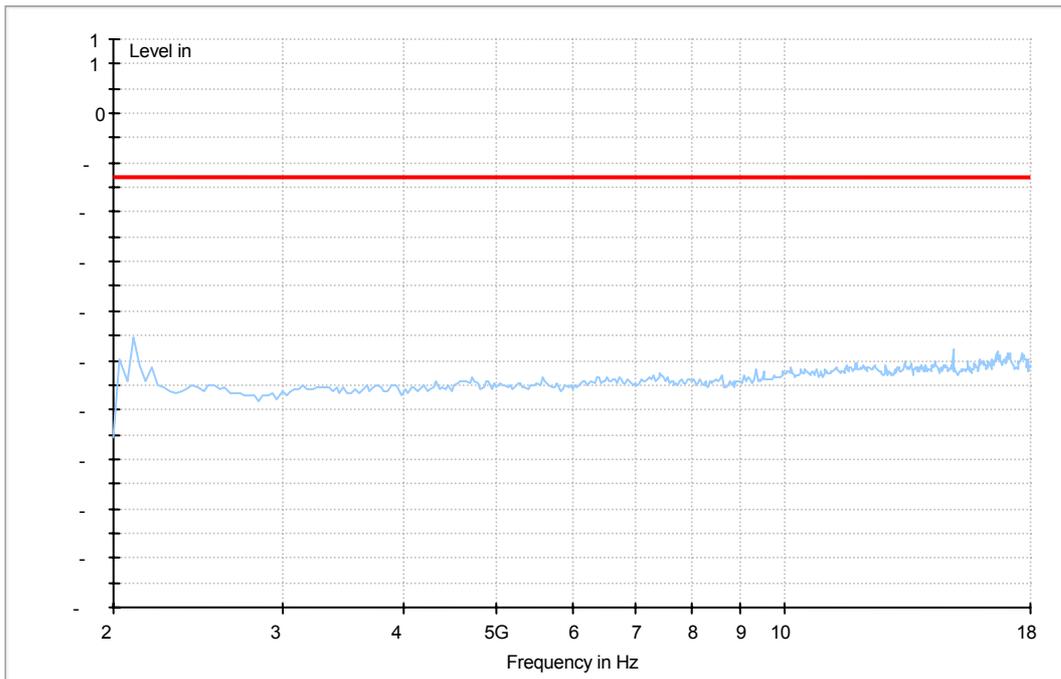
Traffic Mode (9kHz-30MHz)



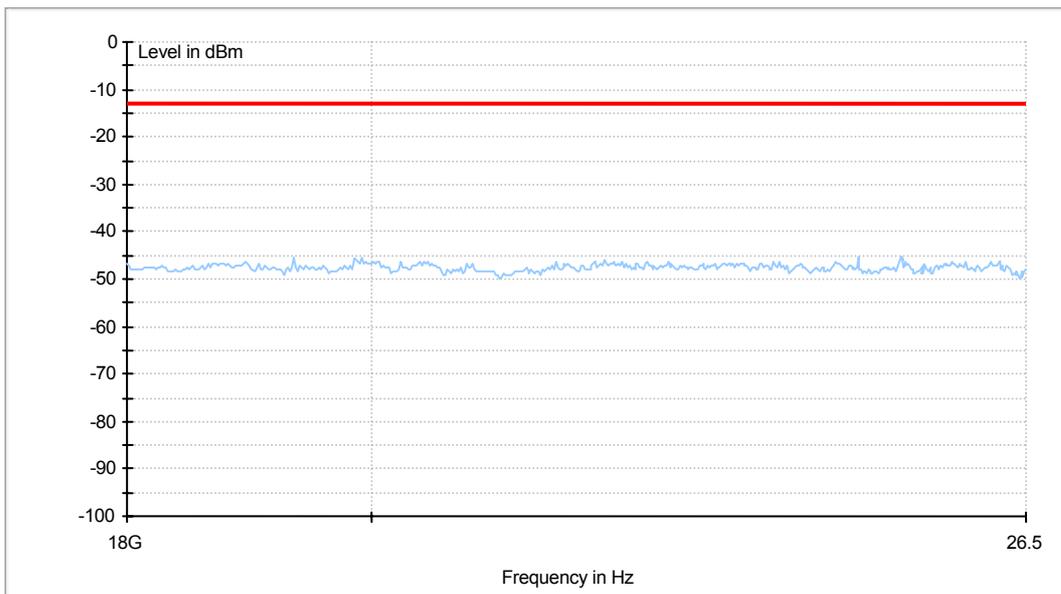
Traffic Mode (30MHz-2GHz)



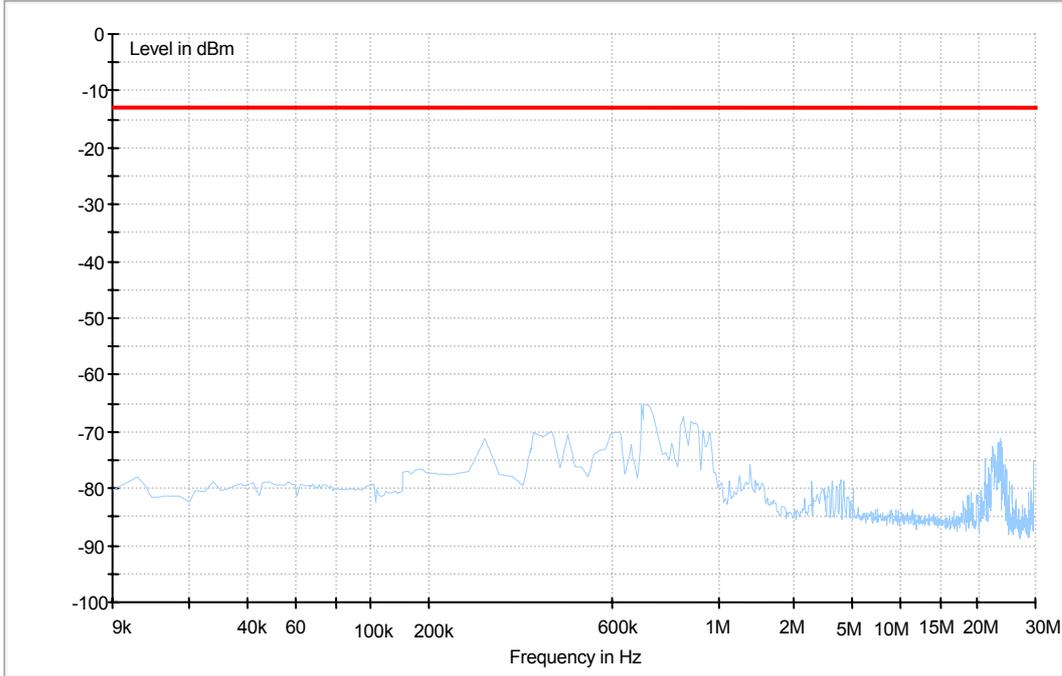
Traffic Mode (2GHz-18GHz)



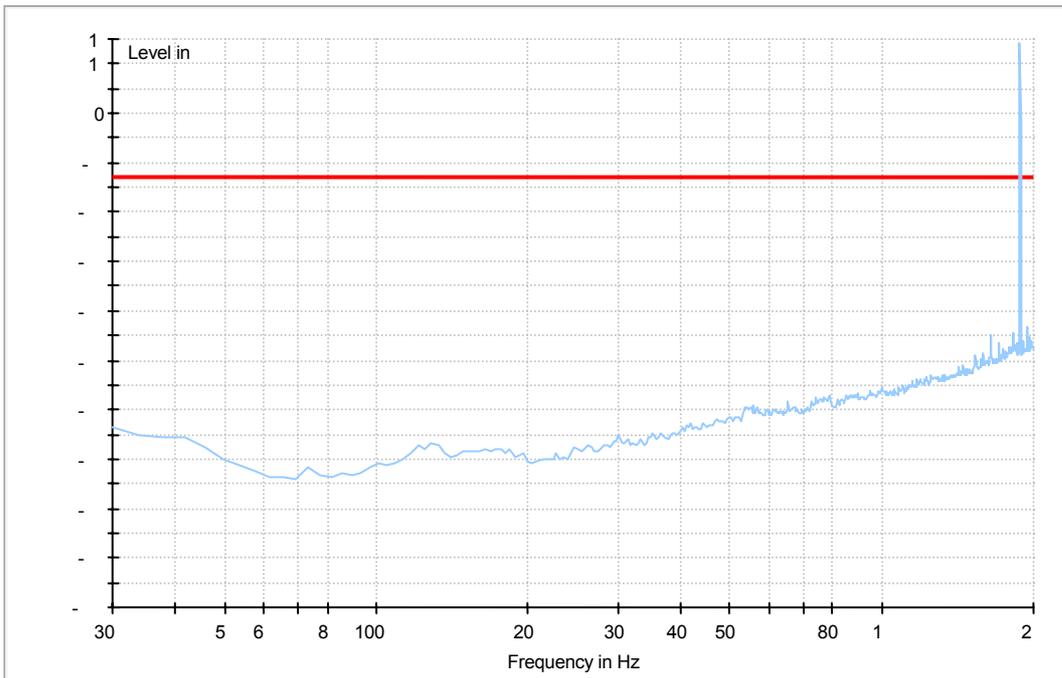
Traffic Mode (18GHz-26.5GHz)



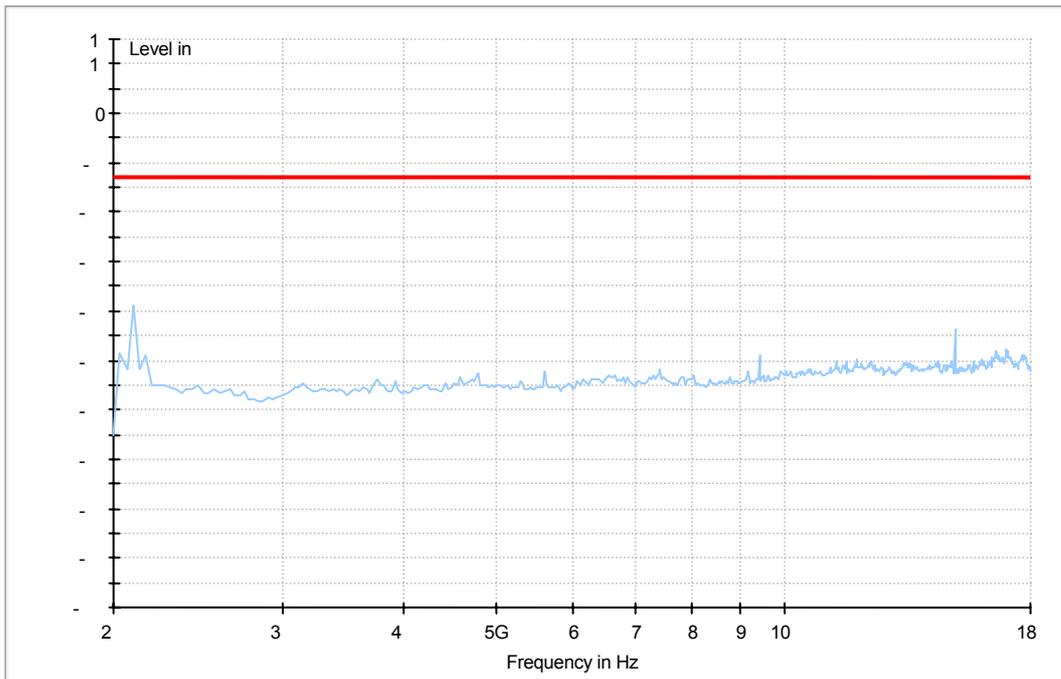
8.3.2 For GPRS 1900 Traffic Mode (9kHz-30MHz)



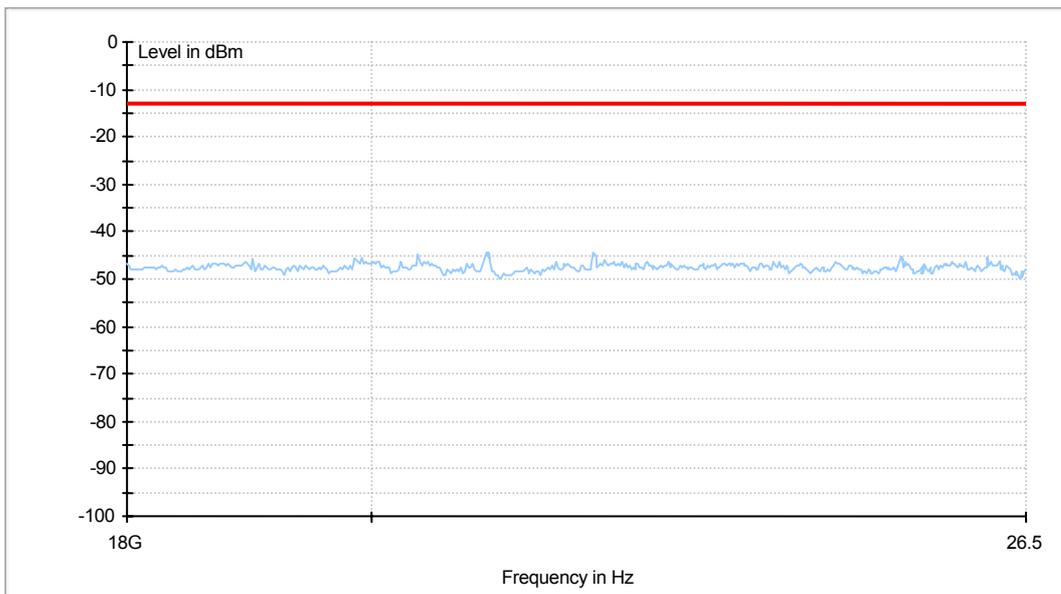
Traffic Mode (30MHz-2GHz)



Traffic Mode (2GHz-18GHz)



Traffic Mode (18GHz-26.5GHz)



-----**END**-----