

FCC Report

WWAN

Product Description: MID

Trade Mark: QUO

Model No.: QD3Gme-710-SL, QD3Gme-710-GD

FCC ID: 2AAPW-QD3GME-710-SL

Applicant: KBX GROUP

**Address: AVENIDA 1ERA. CALLE B Y C MANZANA 58, FRANCE FIELD COLON
PANAMA**

Applicable standards: FCC CFR Title 47 Part 2: 2014
FCC CFR Title 47 Part22 Subpart H: 2014
FCC CFR Title 47 Part24 Subpart E: 2014

Test Date: 08 ~ 26 May, 2015

Issued Date: 26 May, 2015

Test Result: Complied



James Wu
Laboratory Manager

The test result in this test report relate only to the tested samples in this report .

This report shall not be reproduced except in full without the written approval of TMC Rheinland Testing Services Corp Limited

2 Version

| Version No. | Date | Description |
|--------------------|--------------|--------------------|
| 00 | 26 May, 2015 | Original |
| | | |
| | | |
| | | |
| | | |

Young

Prepared By:

Date: 26 May, 2015

Young Li
Project Engineer

Dixon

Check By:

Date: 26 May, 2015

Dixon Hao
Reviewer

3 Contents

| | Page |
|---|-----------|
| 1 COVER PAGE | 1 |
| 2 VERSION | 2 |
| 3 CONTENTS | 3 |
| 4 TEST SUMMARY | 4 |
| 5 GENERAL INFORMATION | 5 |
| 5.1 CLIENT INFORMATION | 5 |
| 5.2 GENERAL DESCRIPTION OF EUT | 5 |
| 5.3 TEST MODE | 7 |
| 5.4 TEST FACILITY | 7 |
| 5.5 TEST LOCATION | 7 |
| 6 TEST INSTRUMENTS LIST | 8 |
| 7 SYSTEM TEST CONFIGURATION | 9 |
| 8 MEASUREMENT DATA AND TEST RESULTS | 10 |
| 8.1 CONDUCTED EMISSIONS | 10 |
| 8.2 CONDUCTED OUTPUT POWER | 15 |
| 8.3 OCCUPY BANDWIDTH | 17 |
| 8.4 MODULATION CHARACTERISTIC | 25 |
| 8.5 OUT OF BAND EMISSION AT ANTENNA TERMINALS | 26 |
| 8.6 ERP, EIRP MEASUREMENT | 40 |
| 8.7 FIELD STRENGTH OF SPURIOUS RADIATION MEASUREMENT | 46 |
| 8.8 FREQUENCY STABILITY V.S. TEMPERATURE MEASUREMENT | 52 |
| 8.9 FREQUENCY STABILITY V.S. VOLTAGE MEASUREMENT | 56 |
| 9 TEST SETUP PHOTO | 58 |
| 10 EUT CONSTRUCTIONAL DETAILS | 59 |

4 Test Summary

| Test Item | Test Method | Result |
|--|---|--------|
| Conducted Output Power | Part 2.1046 | Pass |
| Effective Radiated Power | Part22.913(a)(2) | Pass |
| Equivalent Isotropic Radiated Power | Part 24.232(c) | Pass |
| Occupied Bandwidth | Part 2.1049 Part 22.917 (a) Part 24.238 (a) | Pass |
| Spurious Emissions at Antenna Terminal | Part 2.1051 Part 22.917 (a) Part 24.238 (a) | Pass |
| Field Strength of Spurious Radiation | Part 2.1053 Part 22.917 (a) Part 24.238 (a) | Pass |
| Out of band emission, Band Edge | Part 2.1051 Part 22.917 (a) Part 24.238 (a) | Pass |
| Frequency stability vs. temperature | Part 2.1055(a)(1)(b) | Pass |
| Frequency stability vs. voltage | Part 2.1055(d)(1)(2) | Pass |

Complied: The EUT has complied with the essential requirements in the standard.

5 General Information

5.1 Client Information

| | |
|---------------|---|
| Applicant: | KBX GROUP |
| Address: | AVENIDA 1ERA. CALLE B Y C MANZANA 58, FRANCE FIELD COLON PANAMA |
| Manufacturer: | KBX GROUP |
| Address: | AVENIDA 1ERA. CALLE B Y C MANZANA 58, FRANCE FIELD COLON PANAMA |

5.2 General Description of EUT

| | |
|---------------------|---|
| Product Name: | MID |
| Brand Mark: | QUO |
| Model No.: | QD3Gme-710-SL, QD3Gme-710-GD |
| Test model No.: | QD3Gme-710-SL |
| Software Version: | V1.0 |
| Hardware Version: | V1.0 |
| Mobile phone | |
| Support Networks: | GSM/GPRS/WCDMA |
| TX Frequency: | GSM850/GPRS850: 824.2MHz ~ 848.8MHz GSM1900/GPRS1900: 1850.2MHz ~ 1909.8MHz WCDMA Band V: 826.4MHz ~ 846.6MHz WCDMA Band II: 1852.4MHz ~ 1907.6MHz |
| RX Frequency: | GSM850/GPRS850: 869.2MHz ~ 893.8MHz GSM1900/GPRS1900: 1930.2MHz ~ 1989.8MHz WCDMA Band V: 871.4MHz ~ 891.6MHz WCDMA Band II: 1932.4MHz ~ 1987.6MHz |
| Modulation Type: | GSM/GPRS: GMSK WCDMA/HSPA: QPSK |
| Antenna Type: | Integral Antenna |
| Antenna Gain: | 1dBi |
| AC Adapter: | Model: JHD-AP012U-050200AB Input: AC 100~240V 50/60Hz 0.35A Output: DC 5.0V 2.0A |
| Power supply: | lithium-ion charge battery 3.7V |

Operation Frequency List:

| GSM 850 | | PCS1900 | | WCDMA Band V | | WCDMA Band II | |
|----------|-----------------|----------|-----------------|--------------|-----------------|---------------|-----------------|
| Channel: | Frequency (MHz) | Channel: | Frequency (MHz) | Channel: | Frequency (MHz) | Channel: | Frequency (MHz) |
| 128 | 824.20 | 512 | 1850.20 | 4132 | 826.40 | 9262 | 1852.40 |
| 129 | 824.40 | 513 | 1850.40 | 4133 | 826.60 | 9263 | 1852.60 |
| ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | ⋮ |
| 189 | 836.40 | 660 | 1879.80 | 4182 | 836.40 | 9399 | 1879.80 |
| 190 | 836.60 | 661 | 1880.00 | 4183 | 836.60 | 9400 | 1880.00 |
| 191 | 836.80 | 662 | 1880.20 | 4184 | 836.80 | 9401 | 1880.20 |
| ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | ⋮ |
| 250 | 848.60 | 809 | 1909.60 | 4232 | 846.40 | 9537 | 1907.40 |
| 251 | 848.80 | 810 | 1909.80 | 4233 | 846.6 | 9538 | 1907.60 |

Regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

| Test channel | GSM 850 | | PCS1900 | | WCDMA Band V | | WCDMA Band II | |
|----------------|---------|-----------------|---------|-----------------|--------------|-----------------|---------------|-----------------|
| | Channel | Frequency (MHz) | Channel | Frequency (MHz) | Channel | Frequency (MHz) | Channel | Frequency (MHz) |
| Lowest | 128 | 824.20 | 512 | 1850.20 | 4132 | 826.40 | 9262 | 1852.40 |
| Middle | 190 | 836.60 | 661 | 1880.00 | 4183 | 836.60 | 9400 | 1880.00 |
| Highest | 251 | 848.80 | 810 | 1909.80 | 4233 | 846.6 | 9538 | 1907.60 |

5.3 Test Mode

| | |
|----------------------------|--|
| Communicate mode (GSM 850) | Keep the EUT in communicating mode on GSM 850 Band. |
| Data mode (GPRS850) | Keep the EUT in data communicating mode on GPRS 850 Band. |
| Communicate mode (PCS1900) | Keep the EUT in communicating mode on PCS1900 Band. |
| Data mode (GPRS1900) | Keep the EUT in data communicating mode on GPRS 1900 Band. |
| Data mode (WCDMA Band II) | Keep the EUT in data communicating mode on WCDMA Band II. |
| Data mode (WCDMA Band V) | Keep the EUT in data communicating mode on WCDMA Band V. |

5.4 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

■ **CNAS —Registration No.: CNAS L5775**

CNAS has accredited Global United Technology Services Co., Ltd. to ISO/IEC 17025 General Requirements for the competence of testing and calibration laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

■ **FCC —Registration No.: 600491**

Global United Technology Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in files. Registration 600491.

■ **Industry Canada (IC) —Registration No.: 9079A-2**

The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 9079A-2.

5.5 Test Location

All tests were performed at:

Global United Technology Services Co., Ltd.

Address: 2nd Floor, Block No.2, Laodong Industrial Zone, Xixiang Road Baoan District, Shenzhen, China

6 Test Instruments list

| Instrument | Manufacturer | Model No. | Inventory No. | Next Cal. Date |
|--------------------------------------|--------------------------------|-----------------------------|---------------|----------------|
| 3m Semi- Anechoic Chamber | ZhongYu Electron | 9.2(L)*6.2(W)* 6.4(H) | GTS250 | Mar. 27 2016 |
| Control Room | ZhongYu Electron | 6.2(L)*2.5(W)* 2.4(H) | GTS251 | N/A |
| EMI Test Receiver | Rohde & Schwarz | ESU26 | GTS203 | Jun. 30 2016 |
| BiConiLog Antenna | SCHWARZBECK MESS-ELEKTRONIK | VULB9163 | GTS214 | Feb. 22 2016 |
| Double -ridged waveguide horn | SCHWARZBECK MESS-ELEKTRONIK | 9120D-829 | GTS208 | June 26 2015 |
| Horn Antenna | ETS-LINDGREN | 3160 | GTS217 | Mar. 27 2016 |
| EMI Test Software | AUDIX | E3 | N/A | N/A |
| Coaxial Cable | GTS | N/A | GTS213 | Mar. 28 2016 |
| Coaxial Cable | GTS | N/A | GTS211 | Mar. 28 2016 |
| Coaxial cable | GTS | N/A | GTS210 | Mar. 28 2016 |
| Coaxial Cable | GTS | N/A | GTS212 | Mar. 28 2016 |
| Amplifier(100kHz-3GHz) | HP | 8347A | GTS204 | Jun. 30 2015 |
| Amplifier(2GHz-20GHz) | HP | 8349B | GTS206 | Jun. 30 2015 |
| Pre-amplifier (18-26GHz) | Rohde & Schwarz | AFS33-18002 650-30-8P-44 | GTS218 | June 26 2015 |
| Band filter | Amindeon | 82346 | GTS219 | Mar. 28 2016 |
| Universal radio communication tester | Rohde & Schwarz | CMU200 | GTS235 | May 09 2016 |
| Signal Generator | Rohde & Schwarz | SML03 | GTS236 | May 09 2016 |
| Temp. Humidity/ Barometer | Oregon Scientific | BA-888 | GTS248 | May 09 2016 |
| D.C. Power Supply | Insteck | PS-3030 | GTS232 | NA |
| Splitter | Agilent | 11636B | GTS237 | May 09 2016 |

| Conducted Emission | | | | |
|--------------------|--------------------------------|----------------------|---------------|----------------|
| Instrument | Manufacturer | Model No. | Inventory No. | Next Cal. Date |
| Shielding Room | ZhongYu Electron | 7.0(L)x3.0(W)x3.0(H) | GTS264 | Sep. 06 2015 |
| EMI Test Receiver | Rohde & Schwarz | ESCS30 | GTS223 | Jun. 30 2015 |
| 10dB Pulse Limita | Rohde & Schwarz | N/A | GTS224 | Jun. 30 2015 |
| Coaxial Switch | ANRITSU CORP | MP59B | GTS225 | Jun. 30 2015 |
| LISN | SCHWARZBECK MESS-ELEKTRONIK | NSLK 8127 | GTS226 | Jun. 30 2015 |
| Coaxial Cable | GTS | N/A | GTS227 | Jun. 30 2015 |
| EMI Test Software | AUDIX | E3 | N/A | N/A |

7 System test configuration

☞ EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application

☞ EUT Exercise

The EUT (Transmitter) was operated in the engineering mode to fix the Tx frequency which was for the purpose of the measurements

☞ Test Procedure

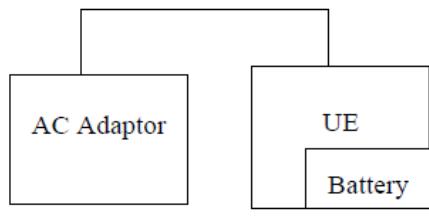
Conducted Emissions

The EUT is placed on a turn table which is 0.8m above ground plane. According to the requirements in Section 7 and 13 of ANSI C63.4-2009. Conducted emissions from the EUT measured in the frequency range between 0.15MHz and 30MHz using CISPR Quasi-Peak and Average detector mode

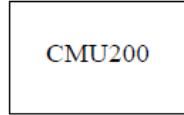
Radiated Emissions

The EUT is placed on a turn table which is 1.0m above ground plane. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes according to the requirements in Section 8 and 13 of ANSI C63.4-2009

☞ Configuration of Tested System



Remote Side



☞ Description of test mode

1. The EUT has been tested under operating condition.
2. EUT staying in continuous transmitting mode. Channel Low, Mid and High for each type band with rated data rate were chosen for full testing.
3. The field strength of spurious radiation emission was measured as EUT stand-up position (H mode) and lie down position (E1, E2 mode) for both GSM/PCS with power adaptors, earphone and Data cable. The worst-case H mode for GSM850, PCS1900, WCDMA Band V and WCDMA Band II.

8 Measurement Data and Test Results

8.1 Conducted Emissions

☞ Standard requirement

FCC Part15 C Section 15.207

☞ Test method

ANSI C63.4:2009

☞ Receiver set

RBW=9KHz, VBW=30KHz, Sweep time=auto

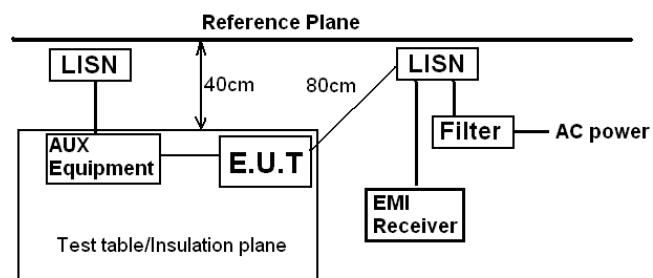
☞ Limit

| Frequency range (MHz) | Limit (dBuV) | |
|-----------------------|--------------|-----------|
| | Quasi-peak | Average |
| 0.15-0.5 | 66 to 56* | 56 to 46* |
| 0.5-5 | 56 | 46 |
| 5-30 | 60 | 50 |

☞ Test mode

Refer to section 5.3 for details

☞ Test setup



Remark:

E.U.T: Equipment Under Test

LISN: Line Impedance Stabilization Network

Test table height=0.8m

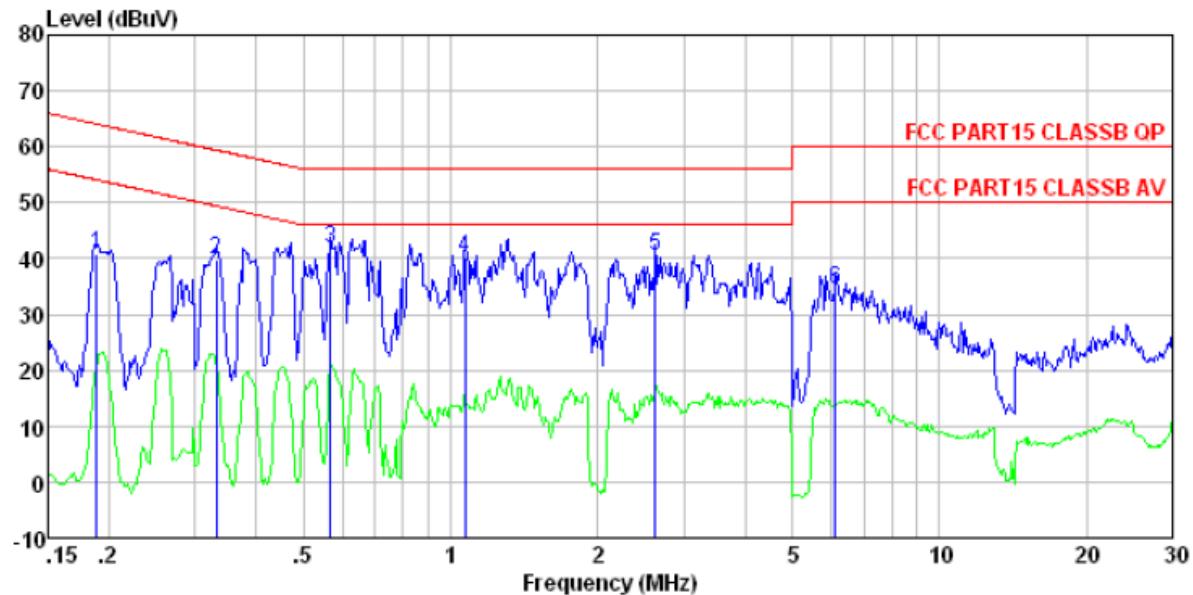
☞ Test mode

1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment.
2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs).
3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4: 2009 on conducted measurement.

☞ Test Result

Complied

| | | | |
|-----------------|------------|--------------------|---------|
| Test mode: | WCDMA mode | Temperature: | 24~26°C |
| Phase Polarity: | Line | Relative Humidity: | 50~53% |

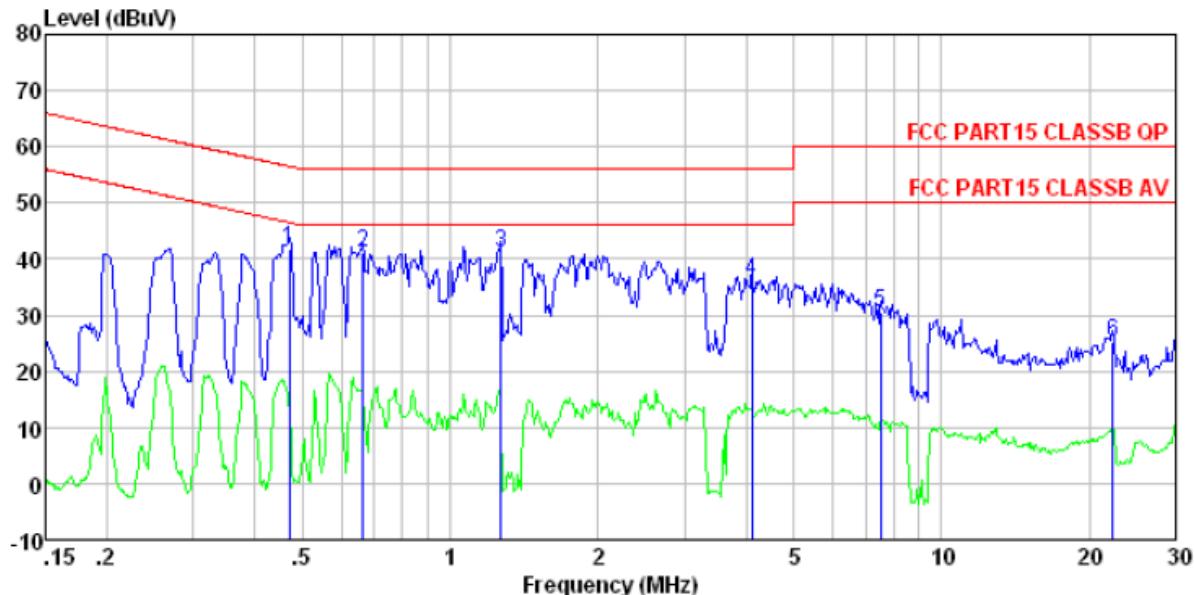


Condition: FCC PART15 CLASSB QP LISN-2013 LINE

Test mode: Traffic mode

| | Read Freq | LISN Level | Cable Factor | Loss | Limit Level | Line Limit | Over Limit | Remark |
|---|-----------|------------|--------------|------|-------------|------------|------------|--------|
| | MHz | dBuV | | dB | dBuV | dBuV | dB | |
| 1 | 0.188 | 40.44 | 0.14 | 0.13 | 40.71 | 64.11 | -23.40 | QP |
| 2 | 0.332 | 39.60 | 0.11 | 0.10 | 39.81 | 59.40 | -19.59 | QP |
| 3 | 0.567 | 41.48 | 0.13 | 0.12 | 41.73 | 56.00 | -14.27 | QP |
| 4 | 1.071 | 39.71 | 0.14 | 0.13 | 39.98 | 56.00 | -16.02 | QP |
| 5 | 2.622 | 40.05 | 0.14 | 0.15 | 40.34 | 56.00 | -15.66 | QP |
| 6 | 6.121 | 33.98 | 0.23 | 0.16 | 34.37 | 60.00 | -25.63 | QP |

| | | | |
|-----------------|------------|--------------------|---------|
| Test mode: | WCDMA mode | Temperature: | 24~26°C |
| Phase Polarity: | Nertral | Relative Humidity: | 50~53% |

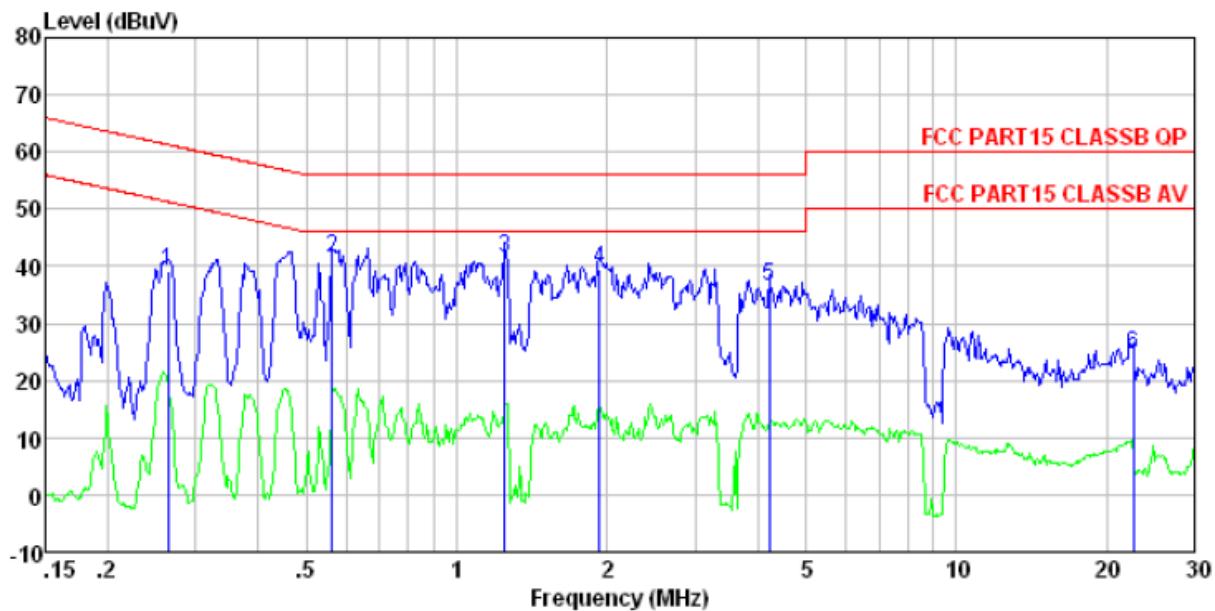


Condition: FCC PART15 CLASSB QP LISN-2013 NEUTRAL

Test mode: Traffic mode

| | Read Freq | LISN Level | Cable Factor | Loss | Limit Level | Line Limit | Over Limit | Remark |
|---|-----------|------------|--------------|------|-------------|------------|------------|--------|
| | MHz | dBuV | | dB | dBuV | dBuV | dB | |
| 1 | 0.471 | 41.56 | 0.06 | 0.11 | 41.73 | 56.49 | -14.76 | QP |
| 2 | 0.665 | 40.95 | 0.07 | 0.13 | 41.15 | 56.00 | -14.85 | QP |
| 3 | 1.269 | 40.81 | 0.08 | 0.13 | 41.02 | 56.00 | -14.98 | QP |
| 4 | 4.114 | 35.98 | 0.14 | 0.15 | 36.27 | 56.00 | -19.73 | QP |
| 5 | 7.526 | 30.26 | 0.19 | 0.18 | 30.63 | 60.00 | -29.37 | QP |
| 6 | 22.298 | 24.20 | 0.76 | 0.22 | 25.18 | 60.00 | -34.82 | QP |

| | | | |
|-----------------|----------|--------------------|---------|
| Test mode: | GSM mode | Temperature: | 24~26°C |
| Phase Polarity: | Line | Relative Humidity: | 50~53% |

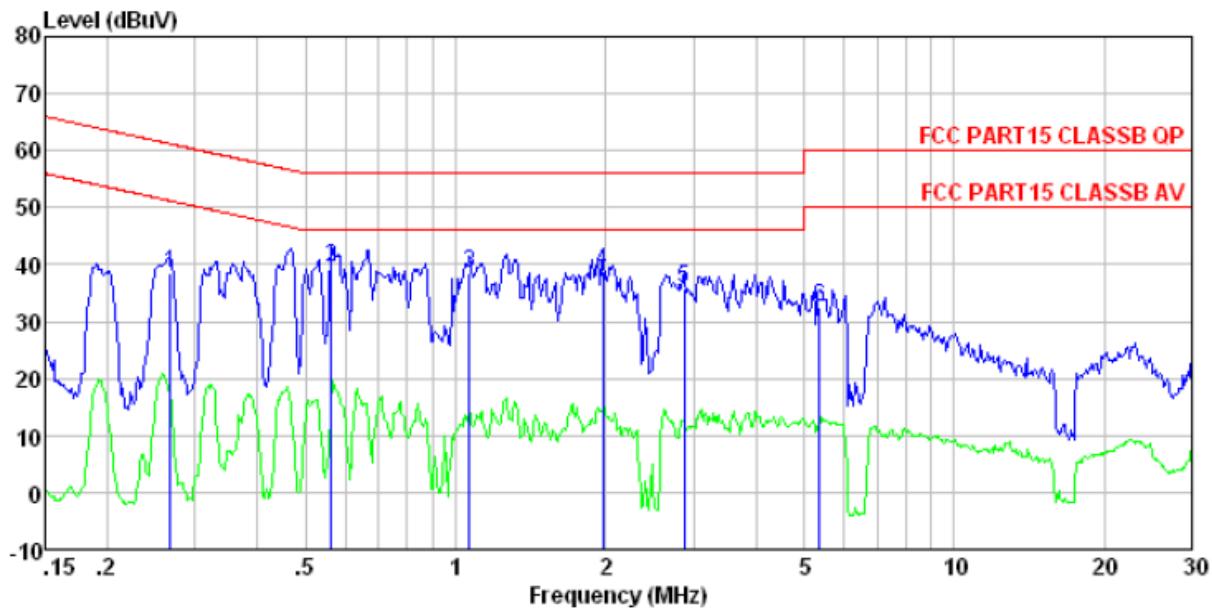


Condition: FCC PART15 CLASSB QP LISN-2013 LINE

Test mode: Traffic mode

| Freq | Read | LISN | Cable | Limit Level | Limit | Over | Remark |
|------|--------|-------|--------|----------------|-------|-------|-----------|
| | MHz | Level | Factor | | Line | Limit | |
| 1 | 0.264 | 38.97 | 0.11 | 0.11 | 39.19 | 61.29 | -22.10 QP |
| 2 | 0.564 | 41.37 | 0.13 | 0.12 | 41.62 | 56.00 | -14.38 QP |
| 3 | 1.249 | 41.38 | 0.13 | 0.13 | 41.64 | 56.00 | -14.36 QP |
| 4 | 1.928 | 39.07 | 0.12 | 0.14 | 39.33 | 56.00 | -16.67 QP |
| 5 | 4.224 | 36.10 | 0.20 | 0.15 | 36.45 | 56.00 | -19.55 QP |
| 6 | 22.655 | 23.41 | 0.90 | 0.23 | 24.54 | 60.00 | -35.46 QP |

| | | | |
|-----------------|----------|--------------------|---------|
| Test mode: | GSM mode | Temperature: | 24~26°C |
| Phase Polarity: | Nertral | Relative Humidity: | 50~53% |



Condition: FCC PART15 CLASSB QP LISN-2013 NEUTRAL

Test mode: Traffic mode

| Freq | Read | LISN | Cable | Limit | Over | Remark |
|------|-------|-------|-------|-------|-------|-----------------|
| | MHz | dBuV | dB | dB | dBuV | |
| 1 | 0.267 | 38.19 | 0.06 | 0.11 | 38.36 | 61.20 -22.84 QP |
| 2 | 0.564 | 39.40 | 0.07 | 0.12 | 39.59 | 56.00 -16.41 QP |
| 3 | 1.065 | 38.15 | 0.07 | 0.13 | 38.35 | 56.00 -17.65 QP |
| 4 | 1.970 | 38.52 | 0.09 | 0.14 | 38.75 | 56.00 -17.25 QP |
| 5 | 2.869 | 35.61 | 0.11 | 0.15 | 35.87 | 56.00 -20.13 QP |
| 6 | 5.362 | 32.10 | 0.15 | 0.15 | 32.40 | 60.00 -27.60 QP |

Notes:

1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Final Level =Receiver Read level + LISN Factor + Cable Loss

8.2 Conducted Output Power

☞ **Standard requirement**

FCC part22.913(a) and FCC part24.232(b)

☞ **Test method**

FCC part2.1046

☞ **Limit**

WCDMA Band V: 7W

WCDMA Band II: 2W

☞ **Test setup**



Note: Measurement setup for testing on Antenna connector

☞ **Test Procedure**

The transmitter output was connected to a calibrated attenuator, the other end of which was connected to a spectrum analysis. Transmitter output was read off the CMU200 in dBm.

☞ **Test mode**

Refer to section 5.3 for details

☞ **Test Result**

Complied

Measurement Data

| Band | | GSM850 | | | PCS1900 | | |
|-----------------|------------------------|---------------|-------|-------|----------------|-------|--------|
| Channel | | 128 | 190 | 251 | 512 | 661 | 810 |
| Frequency (MHz) | | 824.2 | 836.6 | 848.8 | 1850.2 | 1880 | 1909.8 |
| Conducted power | GSM (GMSK 1uplink) | 32.84 | 32.86 | 32.93 | 29.93 | 29.84 | 29.77 |
| | GPRS 8 (GMSK 1uplink) | 32.81 | 32.82 | 32.86 | 29.89 | 29.84 | 29.80 |
| | GPRS 10 (GMSK 2uplink) | 31.75 | 31.78 | 31.82 | 28.88 | 28.80 | 28.72 |
| | GPRS 11 (GMSK 3uplink) | 29.97 | 29.93 | 29.99 | 27.32 | 27.25 | 27.22 |
| | GPRS 12 (GMSK 4uplink) | 28.59 | 28.61 | 28.65 | 25.89 | 25.83 | 25.81 |

| Band | | WCDMA Band II | | | WCDMA Band V | | |
|-----------------|-----------------|----------------------|-------|--------|---------------------|-------|-------|
| Channel | | 9262 | 9400 | 9538 | 4132 | 4182 | 4233 |
| Frequency (MHz) | | 1852.4 | 1880 | 1907.6 | 826.4 | 836.4 | 846.6 |
| Conducted power | AMR | 21.87 | 22.08 | 22.09 | 22.32 | 22.39 | 22.15 |
| | RCM12.2 K | 21.92 | 22.24 | 22.49 | 22.42 | 22.66 | 22.43 |
| | HSDPA Subtest-1 | 21.77 | 22.05 | 22.23 | 21.84 | 22.05 | 21.81 |
| | HSDPA Subtest-2 | 19.95 | 20.56 | 20.78 | 20.36 | 20.59 | 20.36 |
| | HSDPA Subtest-3 | 19.01 | 19.52 | 19.55 | 19.29 | 19.48 | 19.38 |
| | HSDPA Subtest-4 | 18.93 | 19.21 | 19.26 | 19.12 | 19.36 | 18.61 |
| | HSUPA Subtest-1 | 20.33 | 20.64 | 20.79 | 20.25 | 20.47 | 20.33 |
| | HSUPA Subtest-2 | 19.53 | 19.91 | 20.44 | 19.58 | 19.86 | 20.53 |
| | HSUPA Subtest-3 | 18.41 | 18.59 | 19.53 | 18.47 | 18.52 | 19.56 |
| | HSUPA Subtest-4 | 18.21 | 18.42 | 19.65 | 19.26 | 19.49 | 19.66 |
| | HSUPA Subtest-5 | 20.94 | 21.19 | 21.34 | 20.83 | 21.28 | 21.12 |

8.3 Occupy Bandwidth

☞ **Standard requirement**

FCC part22.913(a) and FCC part24.232(b)

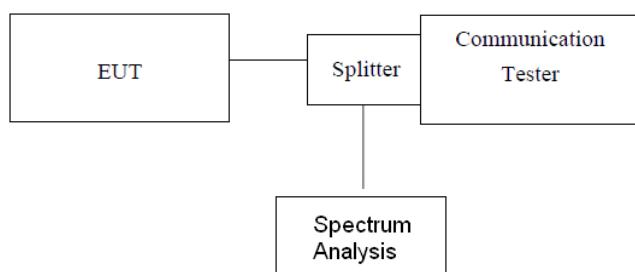
☞ **Test method**

FCC part2.1049

☞ **Limit**

N/A

☞ **Test setup**



Note: Measurement setup for testing on Antenna connector

☞ **Test Procedure**

1. The EUT's output RF connector was connected with a short cable to the spectrum analyzer
2. RBW was set to about 1% of emission BW, VBW= 3 times RBW.
3. -26dBc display line was placed on the screen (or 99% bandwidth), the occupied bandwidth is the delta frequency between the two points where the display line intersects the signal trace.

☞ **Test mode**

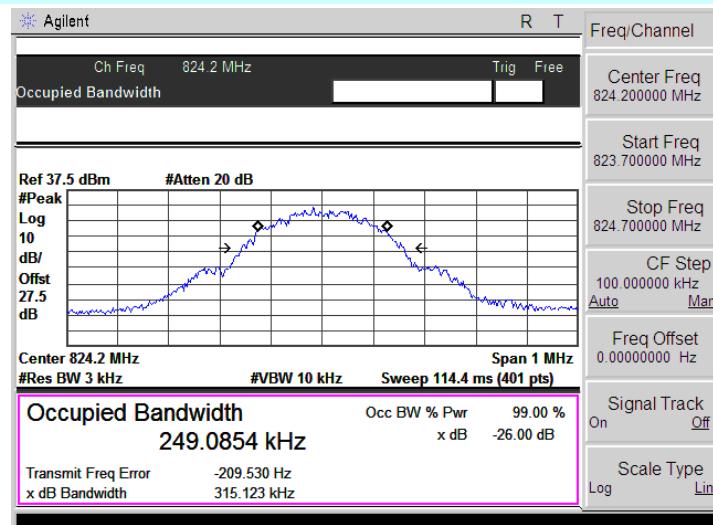
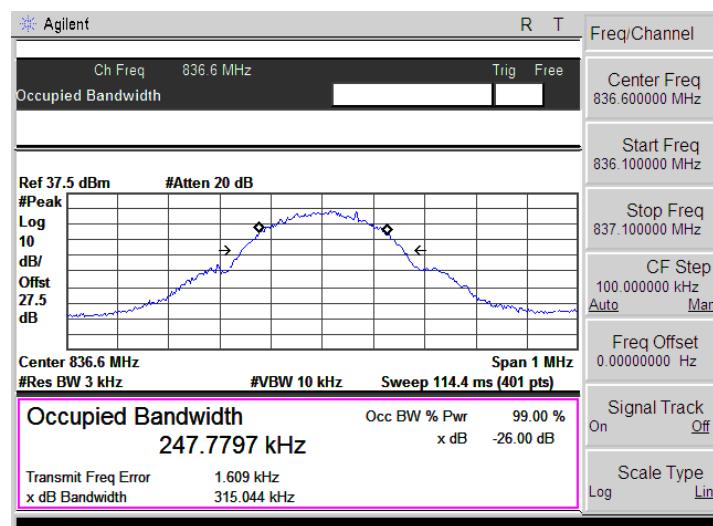
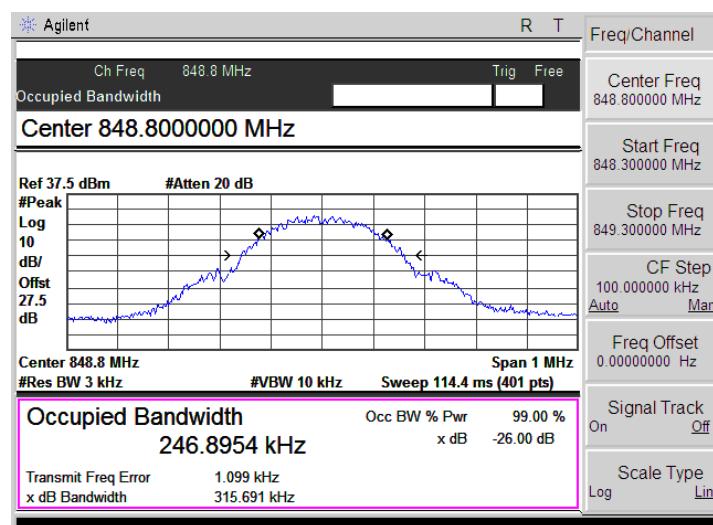
Refer to section 5.3 for details

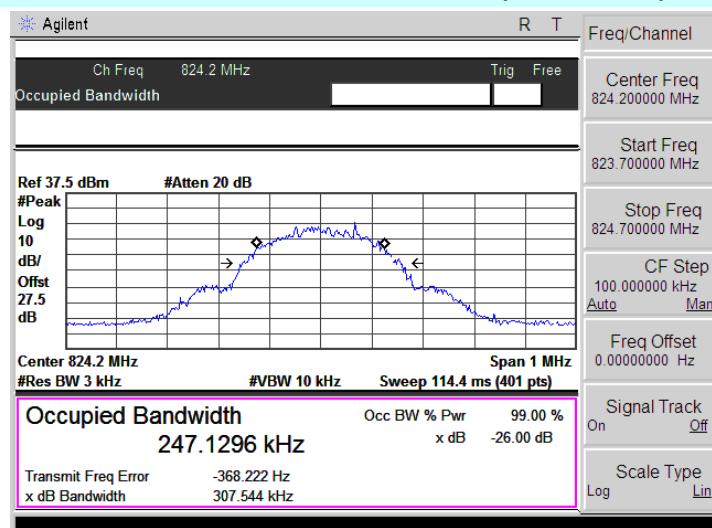
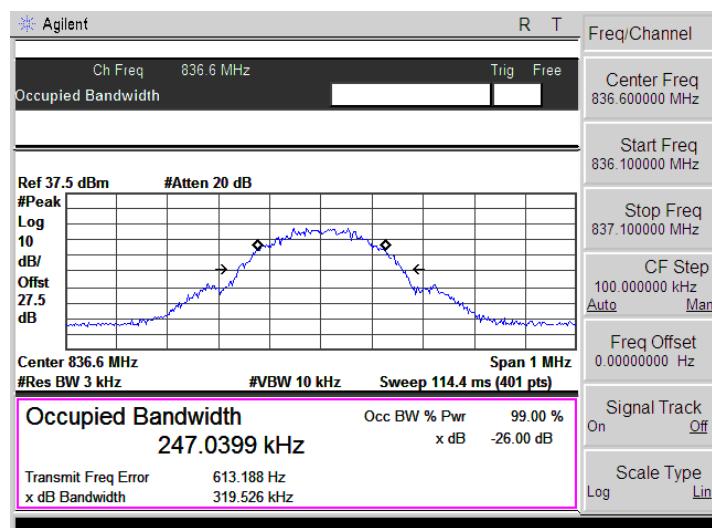
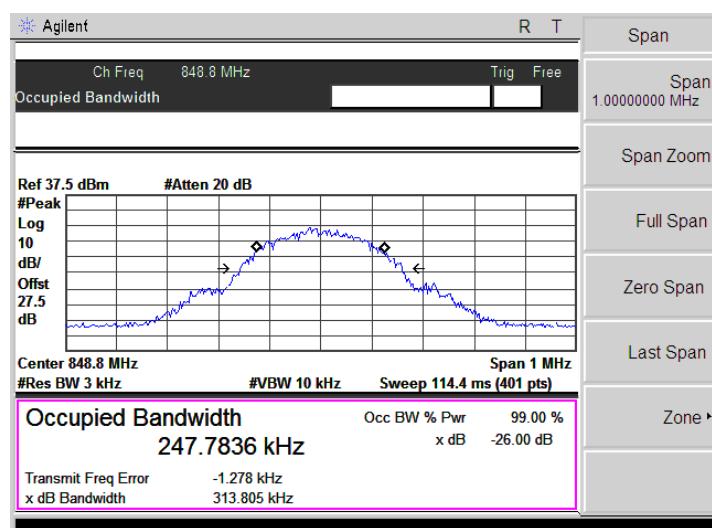
☞ **Test Result**

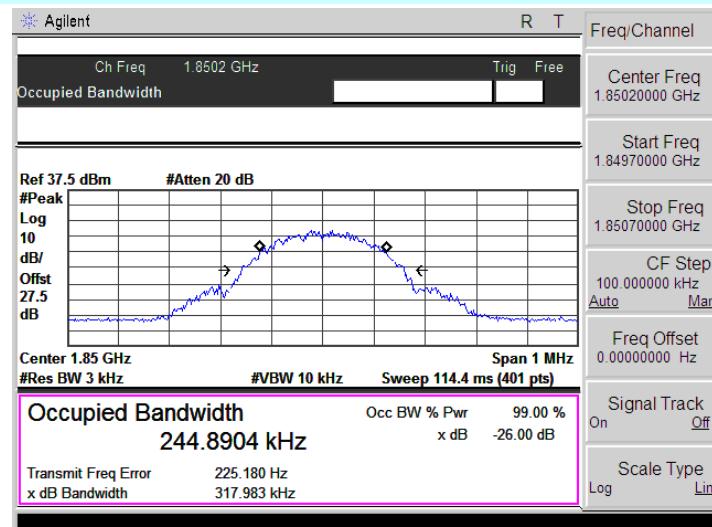
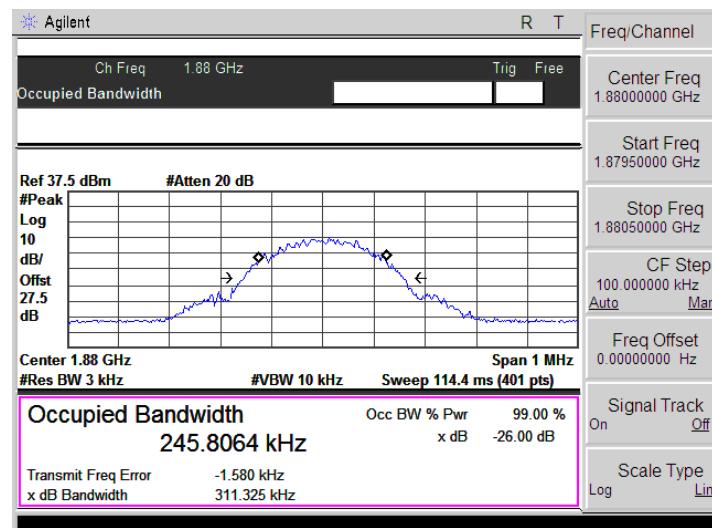
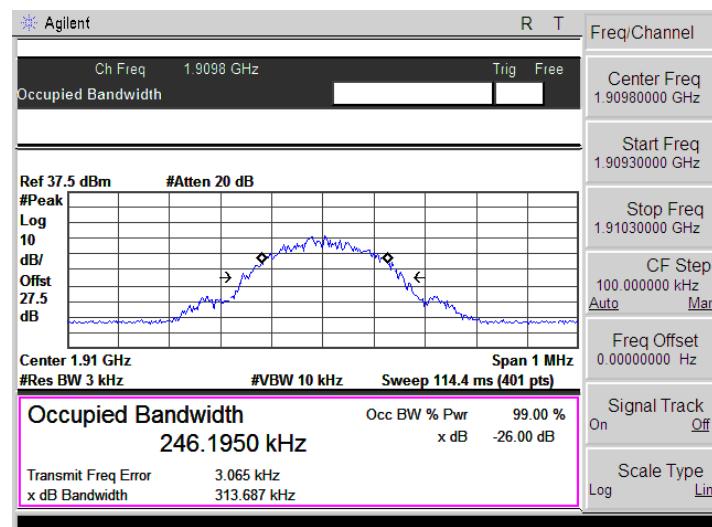
Complied

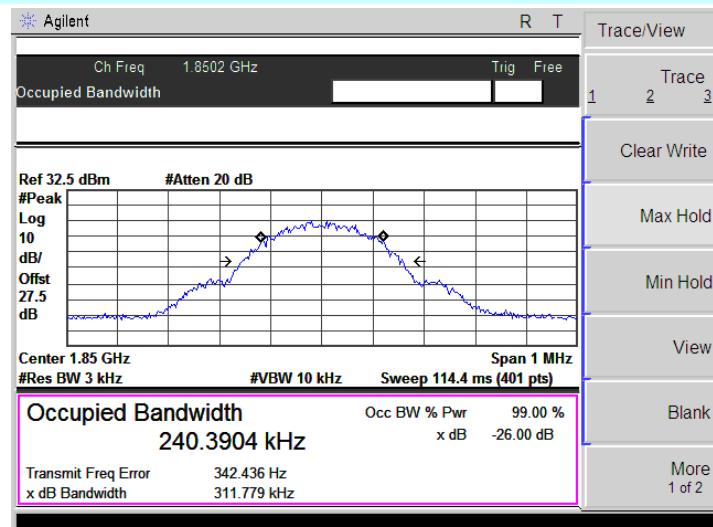
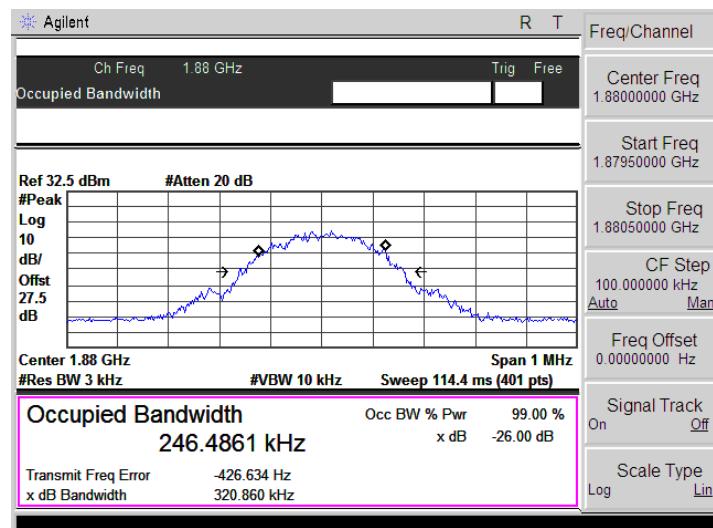
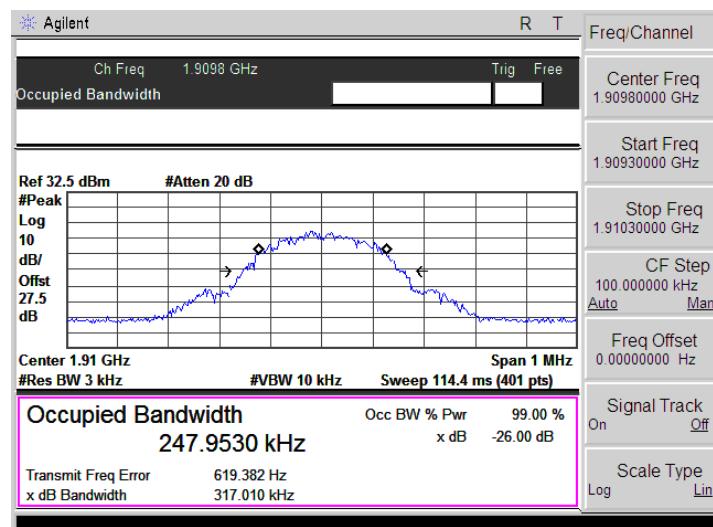
Measurement Data

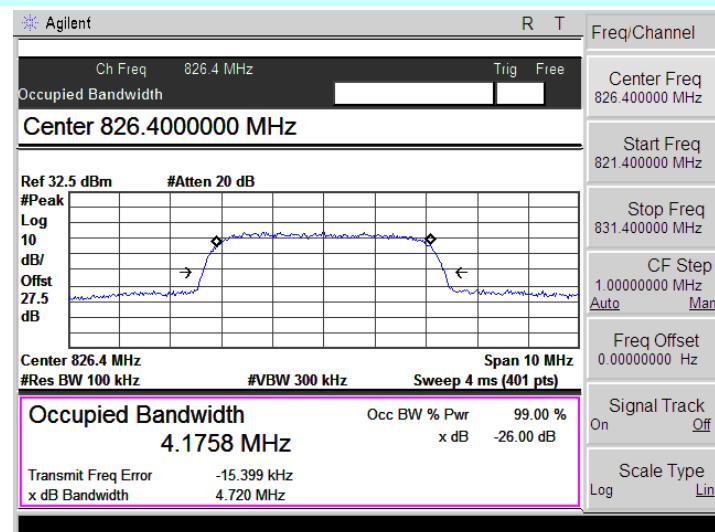
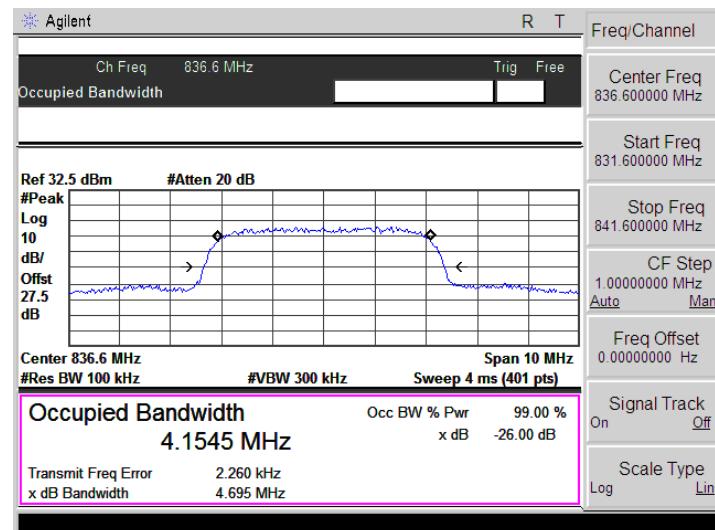
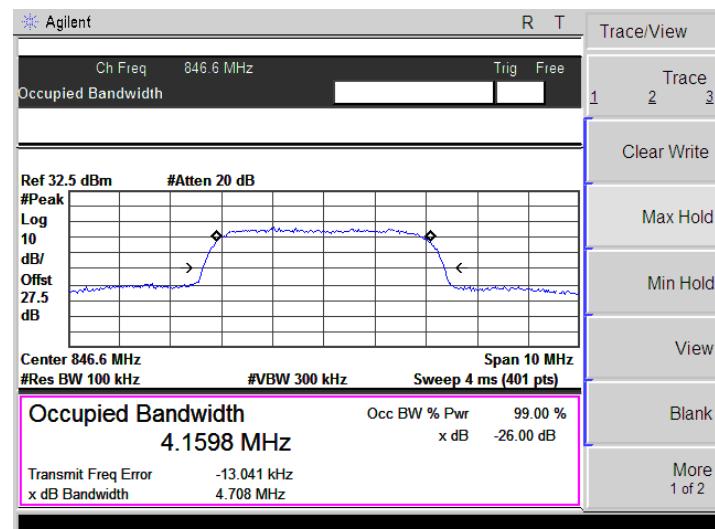
| Mode | Test channel | Frequency (MHz) | 99% Occupy bandwidth (KHz) | -26dB bandwidth (KHz) |
|--------------------------------------|--------------|-----------------|----------------------------|-----------------------|
| GSM 850 (GSM link) | 128 | 824.20 | 249.08 | 315.12 |
| | 190 | 836.60 | 247.77 | 315.04 |
| | 251 | 848.80 | 246.89 | 315.69 |
| GSM 850 (GPRS 1 link) | 128 | 824.20 | 247.12 | 307.54 |
| | 190 | 836.60 | 247.03 | 319.52 |
| | 251 | 848.80 | 247.78 | 313.80 |
| PCS 1900 (GSM link) | 512 | 1850.20 | 244.89 | 317.98 |
| | 661 | 1880.00 | 245.80 | 311.32 |
| | 810 | 1909.80 | 246.19 | 313.68 |
| PCS 1900 (GPRS 1 link) | 512 | 1850.20 | 240.39 | 311.77 |
| | 661 | 1880.00 | 246.48 | 320.86 |
| | 810 | 1909.80 | 247.95 | 317.01 |
| WCDMA Band V (RMC 12.2Kbps link) | 4132 | 826.40 | 4175.80 | 4720.00 |
| | 4183 | 836.60 | 4154.50 | 4695.00 |
| | 4233 | 846.60 | 4159.80 | 4708.00 |
| WCDMA Band II (RMC 12.2Kbps link) | 9262 | 1852.4 | 4158.80 | 4705.00 |
| | 9400 | 1880.0 | 4191.60 | 4720.00 |
| | 9538 | 1907.6 | 4236.70 | 4834.00 |

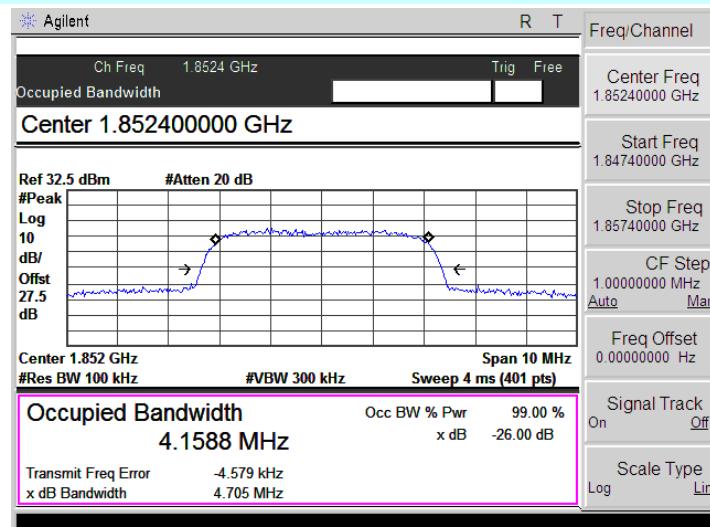
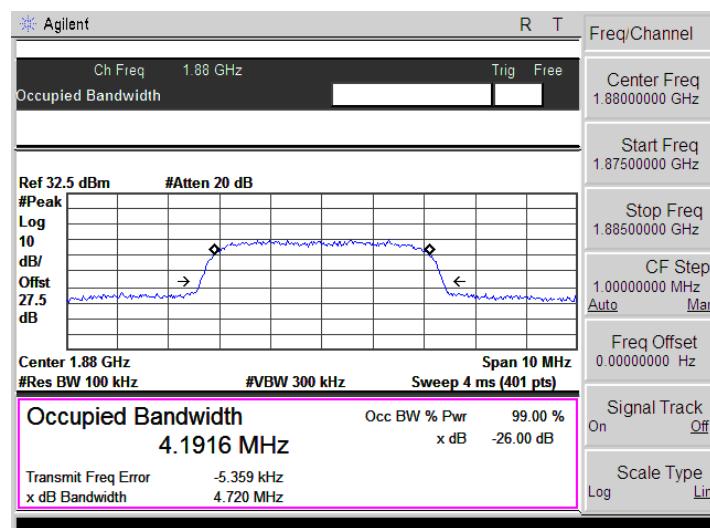
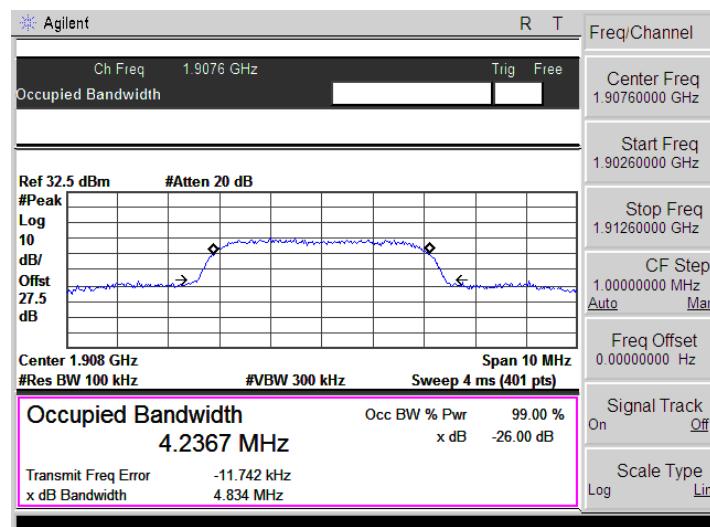
Mode:
GSM 850 (GSM link)

Lowest channel

Middle channel

Highest channel

Mode:
GSM 850 (GPRS 1 link)

Lowest channel

Middle channel

Highest channel

Mode:
PCS 1900 (GSM link)

Lowest channel

Middle channel

Highest channel

Mode:
PCS 1900 (GPRS 1 link)

Lowest channel

Middle channel

Highest channel

Mode:
WCDMA Band V (RMC 12.2Kbps link)

Lowest channel

Middle channel

Highest channel

Mode:
WCDMA Band II (RMC 12.2Kbps link)

Lowest channel

Middle channel

Highest channel

8.4 Modulation characteristic

According to FCC § 2.1047(d), Part 22H & 24E there is no specific requirement for digital modulation, therefore modulation characteristic is not presented.

8.5 Out of band emission at antenna terminals

☞ Standard requirement

FCC part22.917(a) and FCC part24.238(a)

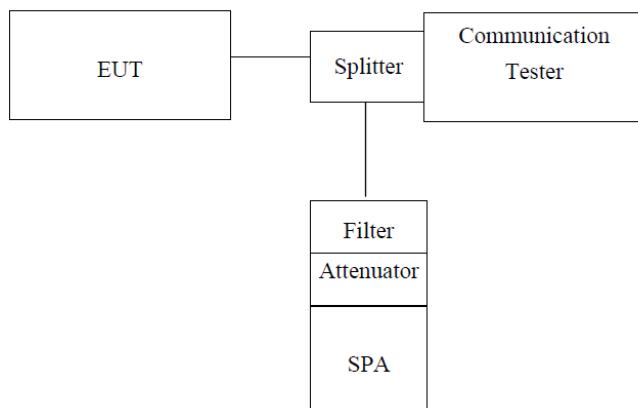
☞ Test method

FCC part2.1051

☞ Limit

-13dBm

☞ Test setup



Note: Measurement setup for testing on Antenna connector

☞ Test Procedure

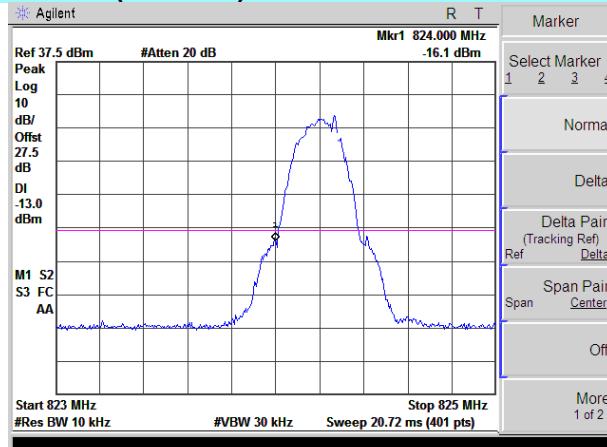
1. The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation.
2. The resolution bandwidth of the spectrum analyzer was set at 1MHz, sufficient scans were taken to show the out of band Emissions if any up to 10th harmonic.
3. For the out of band: Set the RBW, VBW = 1MHz, Start=30MHz, Stop= 10th harmonic.
4. Band Edge Requirements: In the 1 MHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 1 percent of the emission bandwidth of the fundamental emission of the transmitter may be employed to measure the out of band Emissions.

☞ Test mode

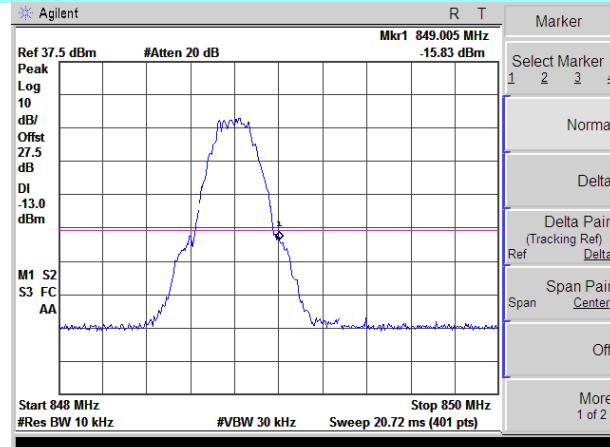
Refer to section 5.3 for details

☞ Test Result

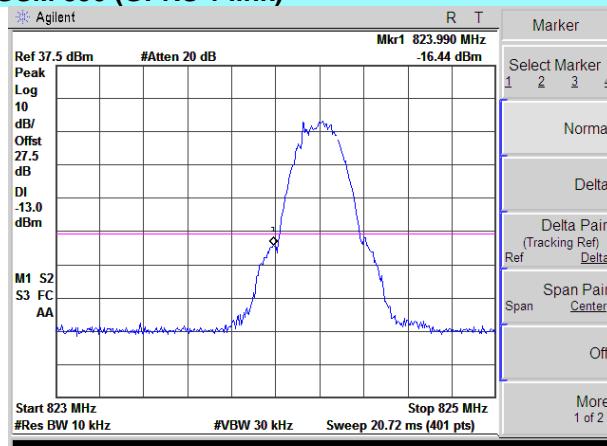
Complied

GSM 850 (GSM link)


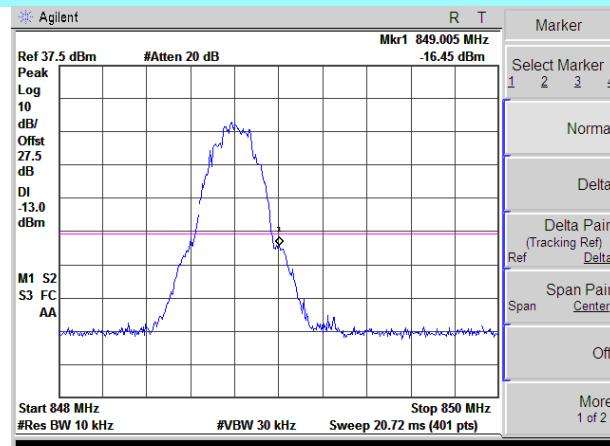
Channel 128



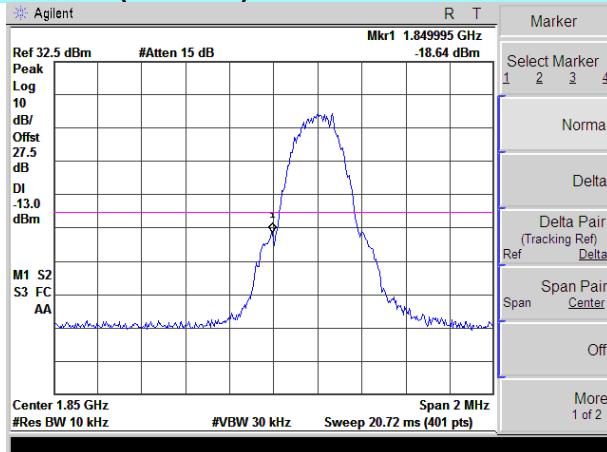
Channel 251

GSM 850 (GPRS 1 link)


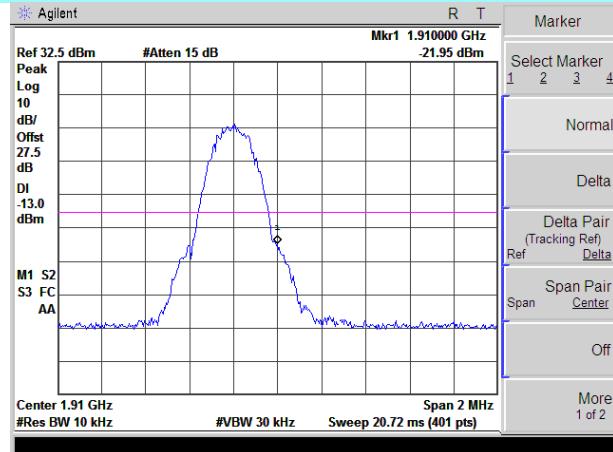
Channel 128



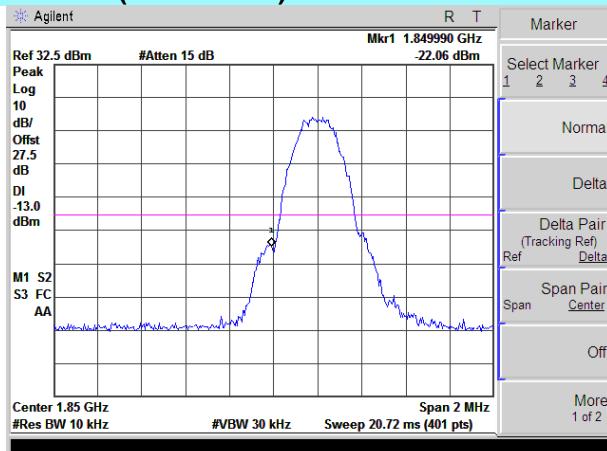
Channel 251

PCS1900 (GSM link)


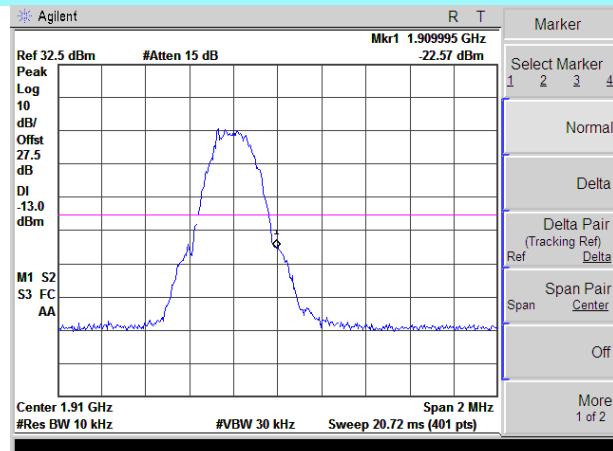
Channel 512



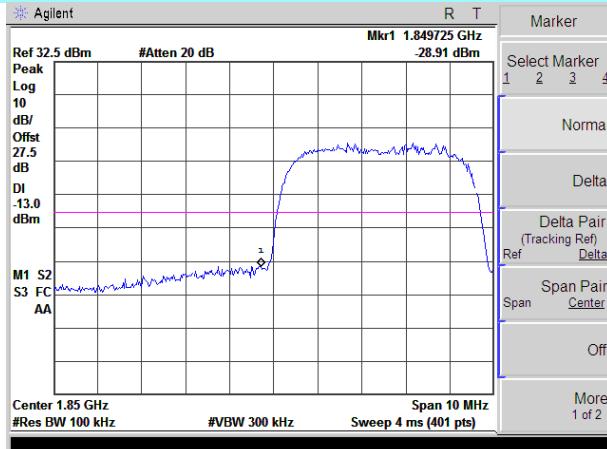
Channel 810

PCS1900 (GPRS 1 link)


Channel 512



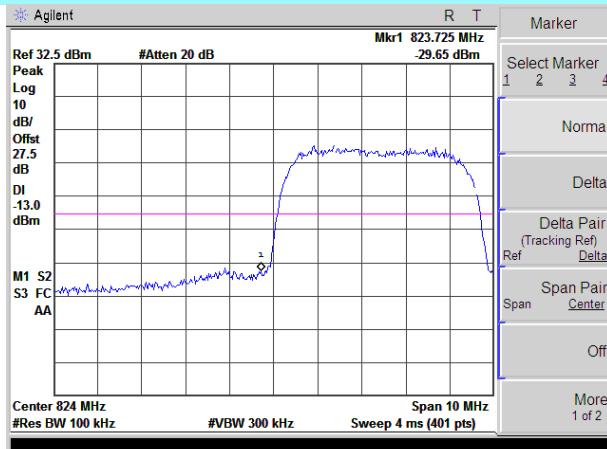
Channel 810

WCDMA Band II


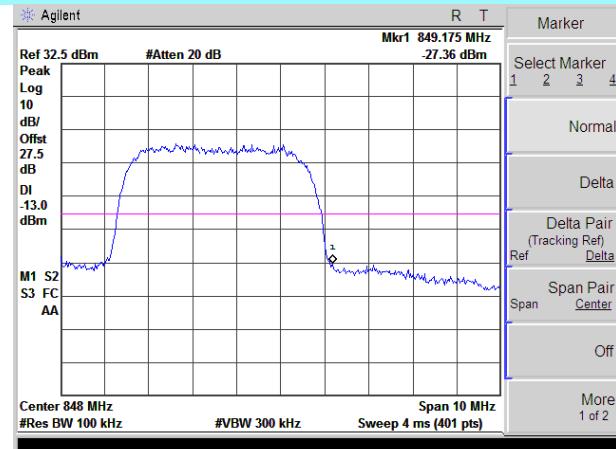
Channel 9262



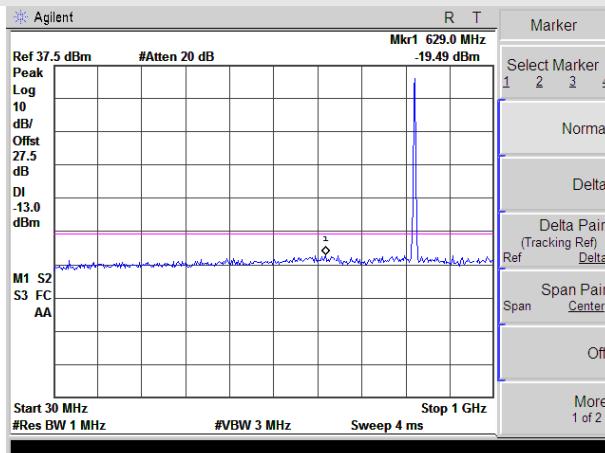
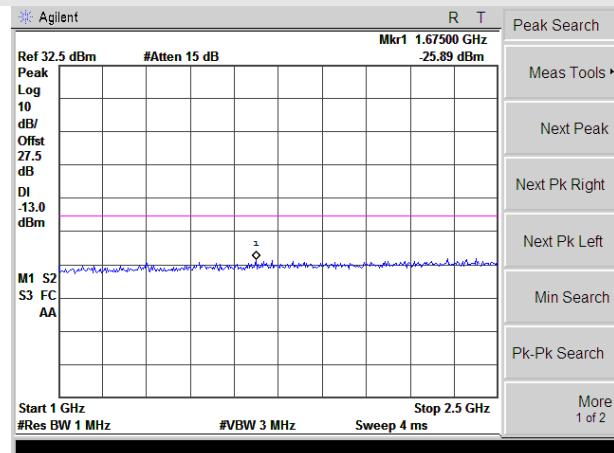
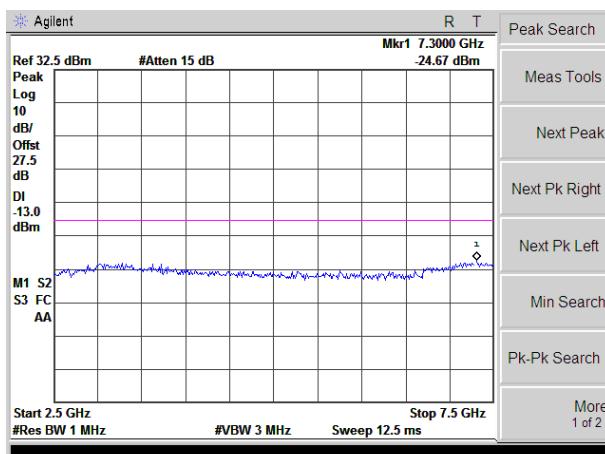
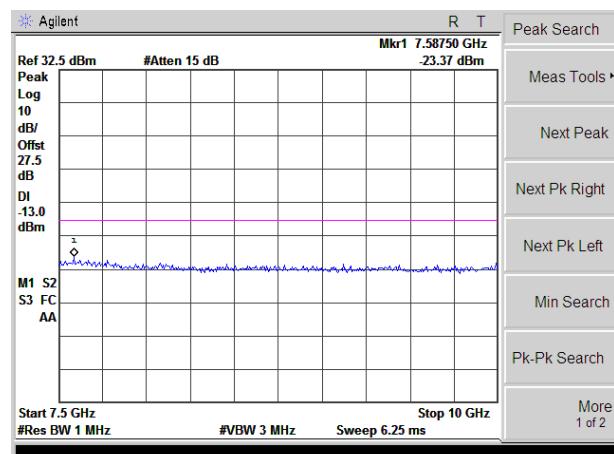
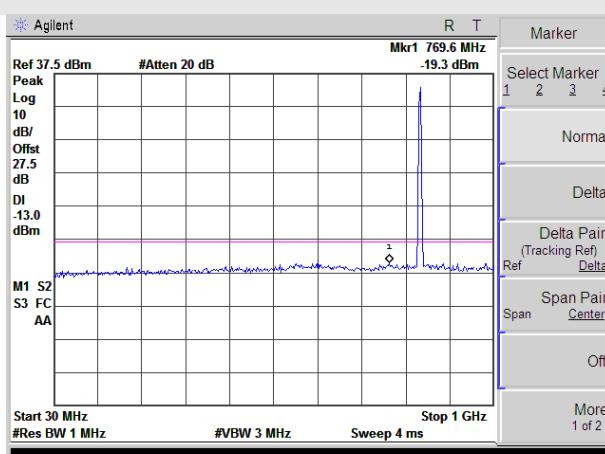
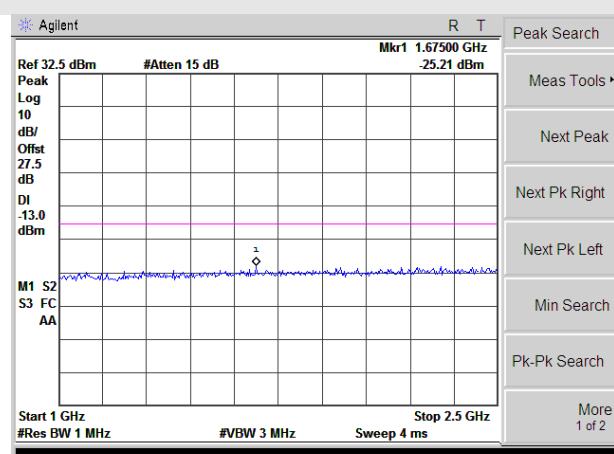
Channel 9538

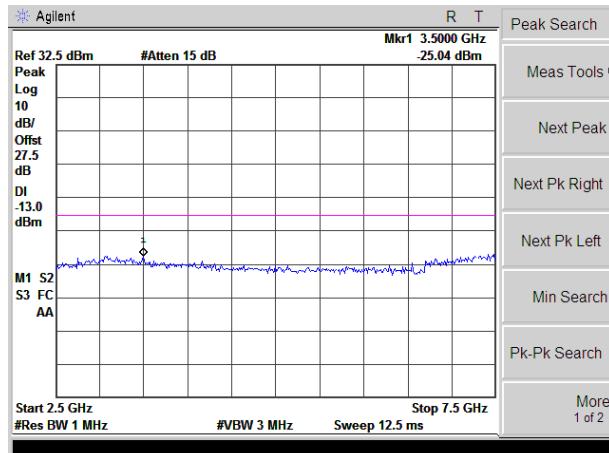
WCDMA Band V


Channel 4132

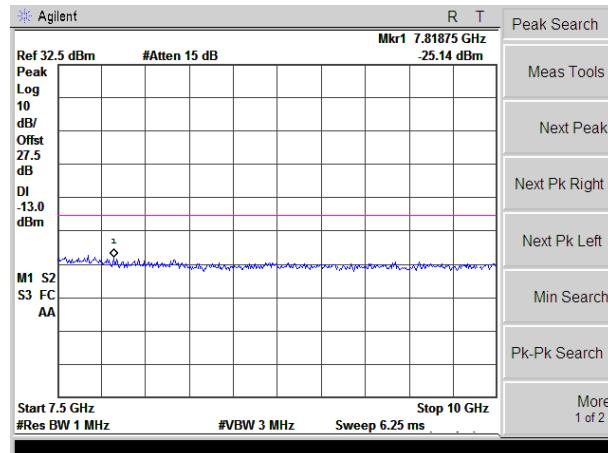


Channel 4233

Test item:
Spurious emission
Mode:
GSM 850 (GSM link)
Test channel:

Lowest channel

30MHz~1GHz

1GHz~2.5GHz

2.5GHz~7.5GHz
7.5GHz~10GHz
Test channel:

Middle channel

30MHz~1GHz
1GHz~2.5GHz

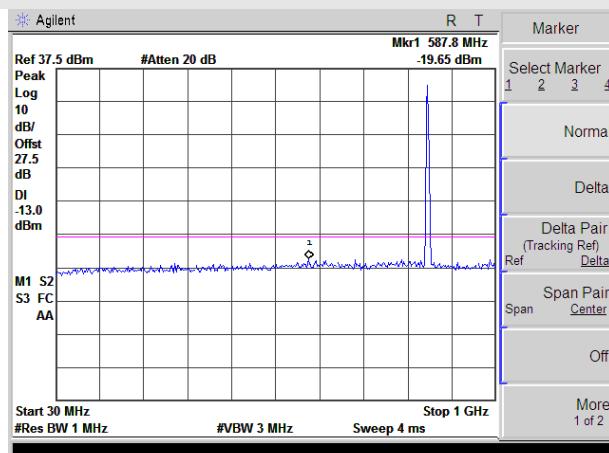


2.5GHz~7.5GHz



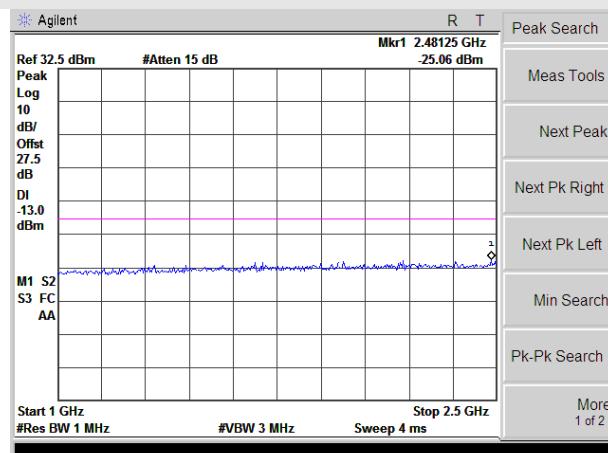
7.5GHz~10GHz

Test channel:

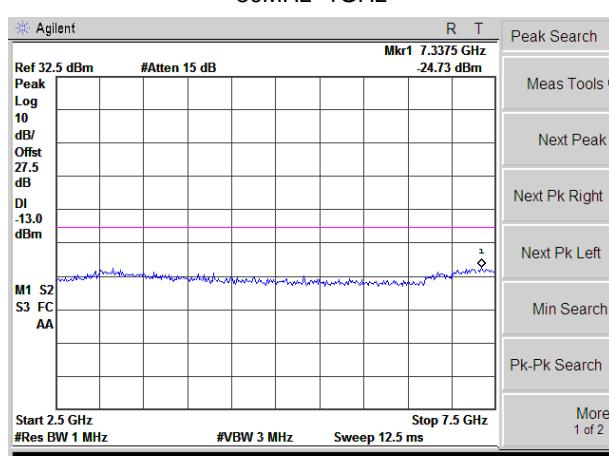


30MHz~1GHz

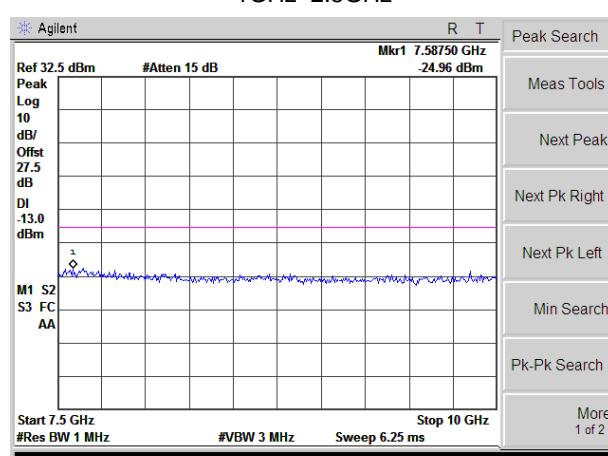
Highest channel



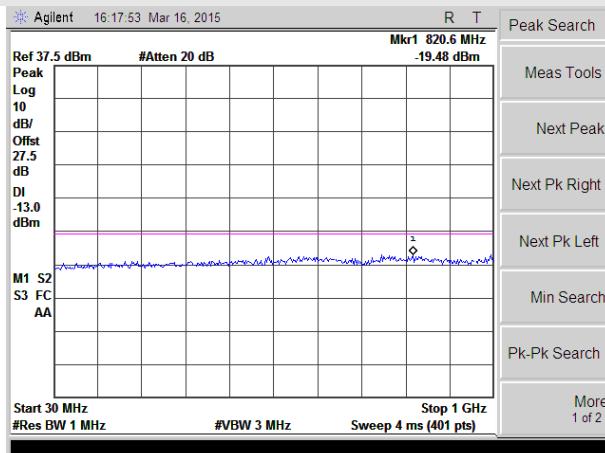
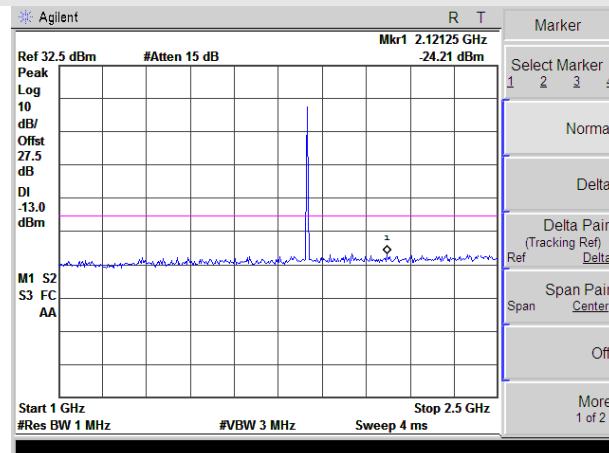
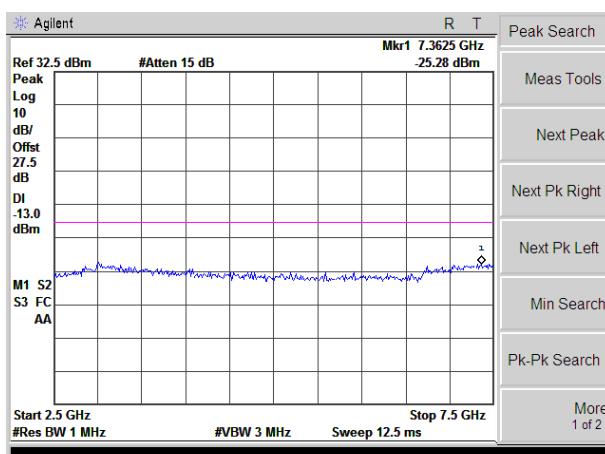
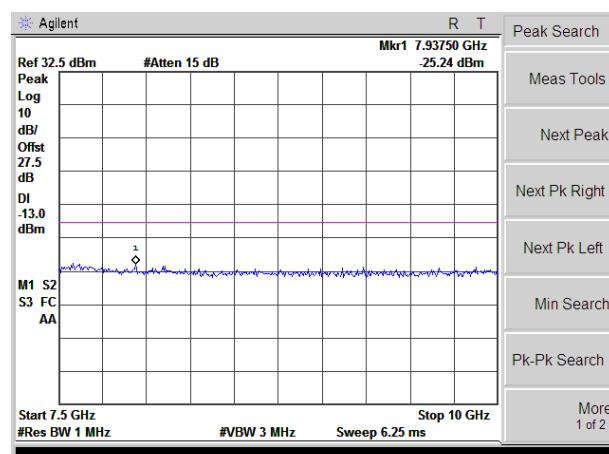
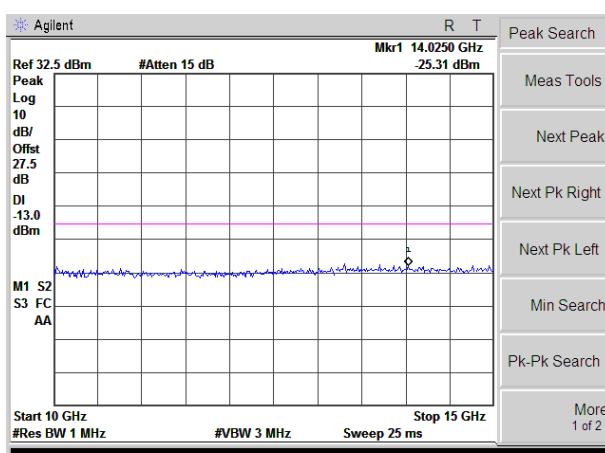
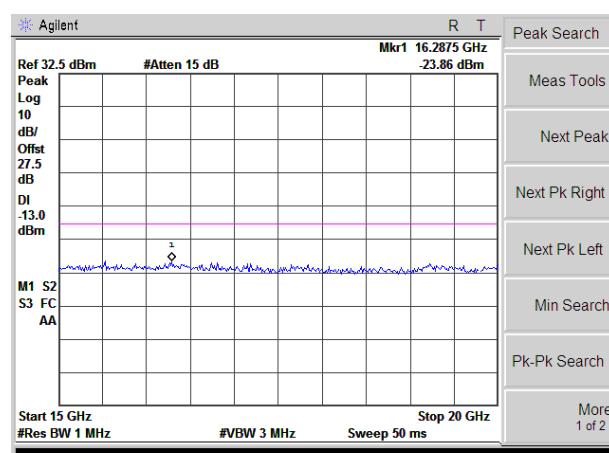
1GHz~2.5GHz



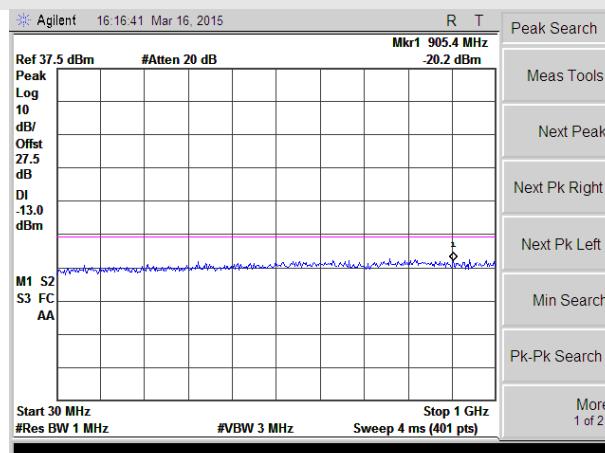
2.5GHz~7.5GHz



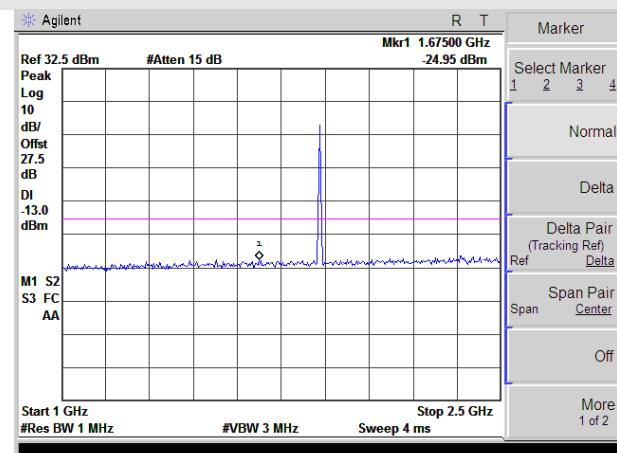
7.5GHz~10GHz

Test item:
Spurious emission
Mode:
PCS1900 (GSM link)
Test channel:

Lowest channel

30MHz~1GHz

1GHz~2.5GHz

2.5GHz~7.5GHz

7.5GHz~10GHz

10GHz~15GHz
15GHz~20GHz

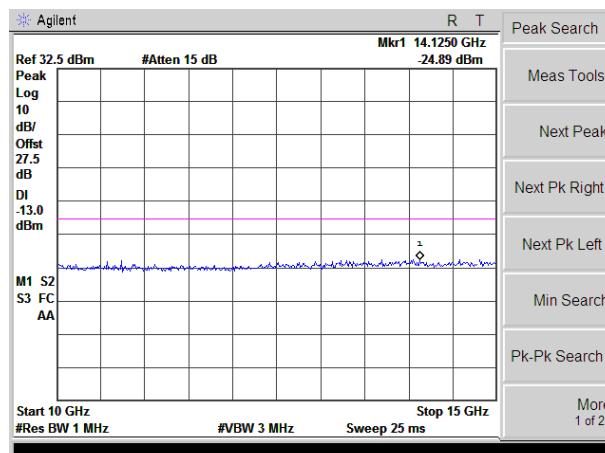
Test channel:



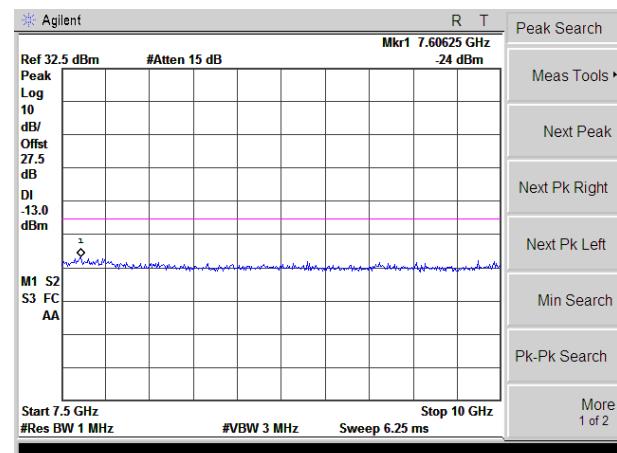
Middle channel



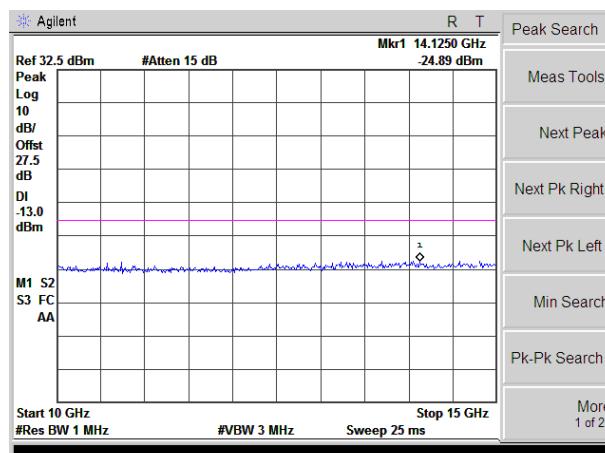
30MHz~1GHz



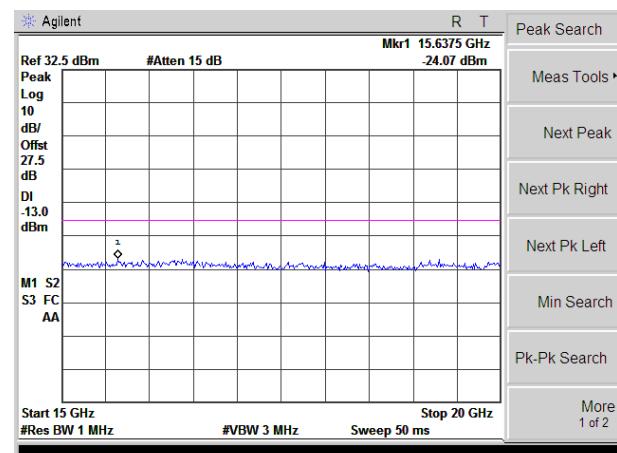
1GHz~2.5GHz



2.5GHz~7.5GHz



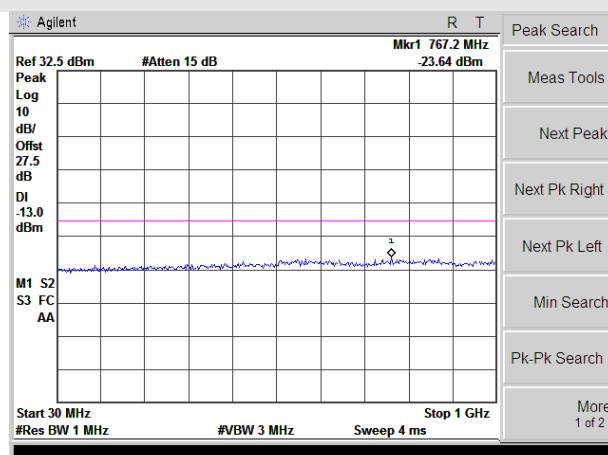
7.5GHz~10GHz



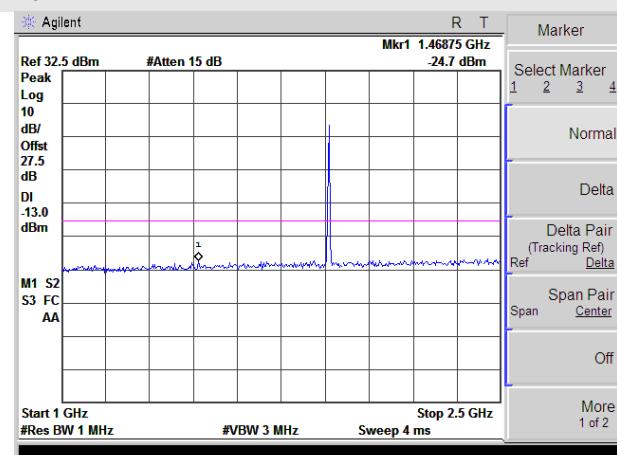
10GHz~15GHz

15GHz~20GHz

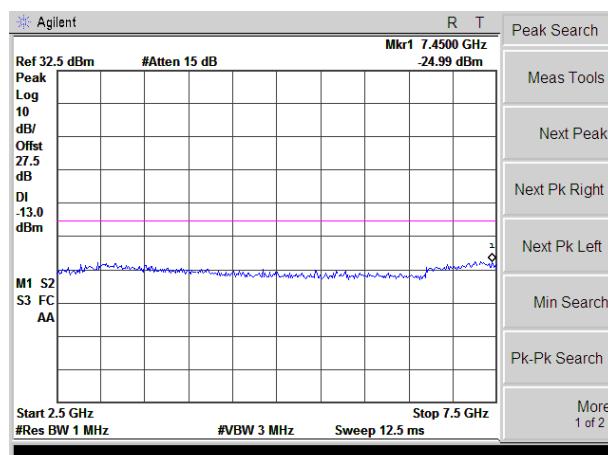
Test channel:



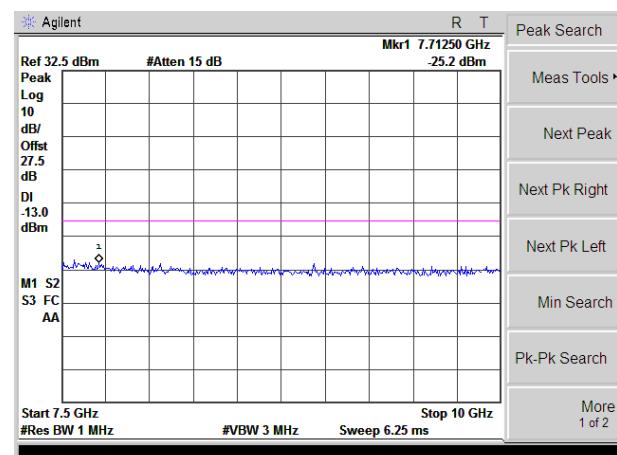
Highest channel



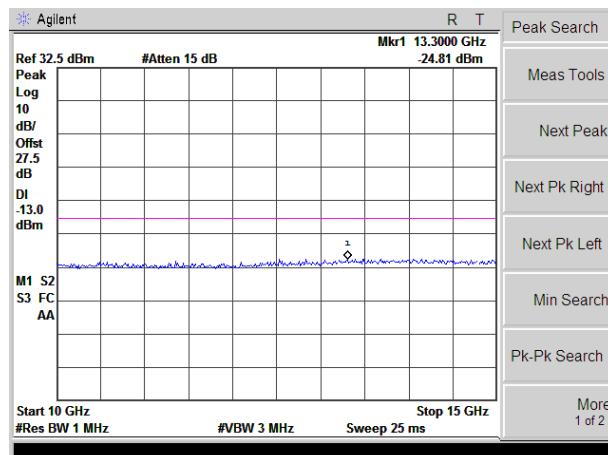
30MHz~1GHz



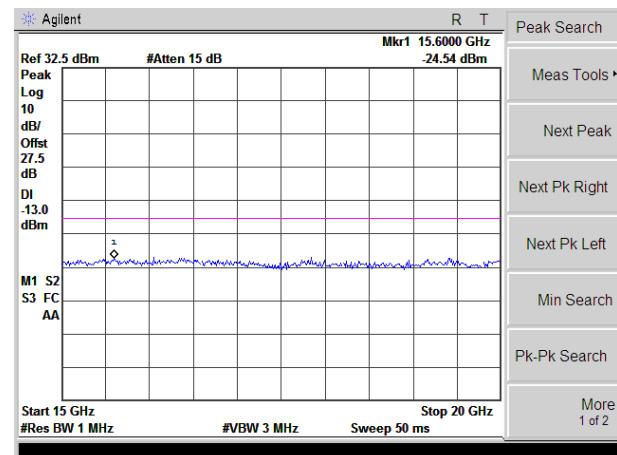
1GHz~2.5GHz



2.5GHz~7.5GHz

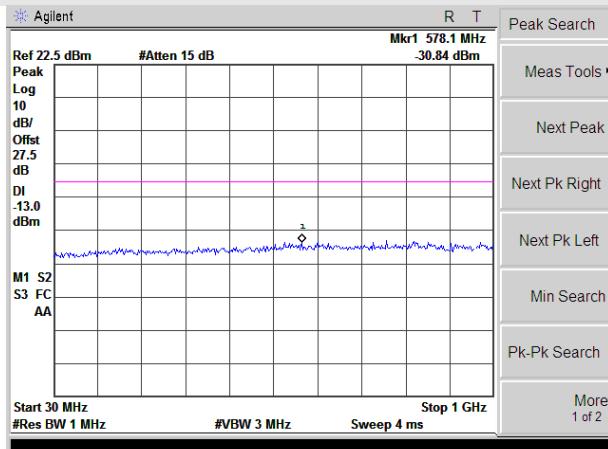
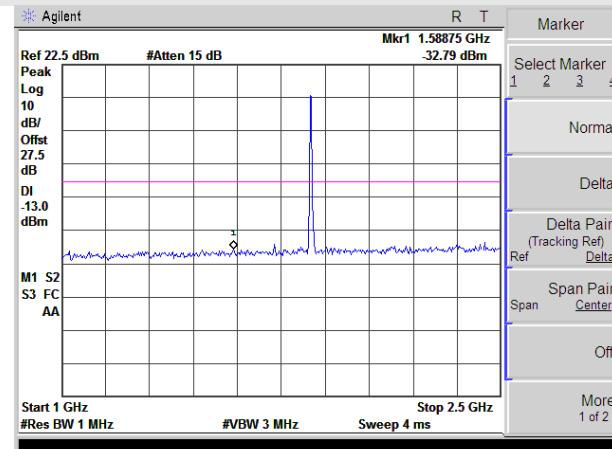
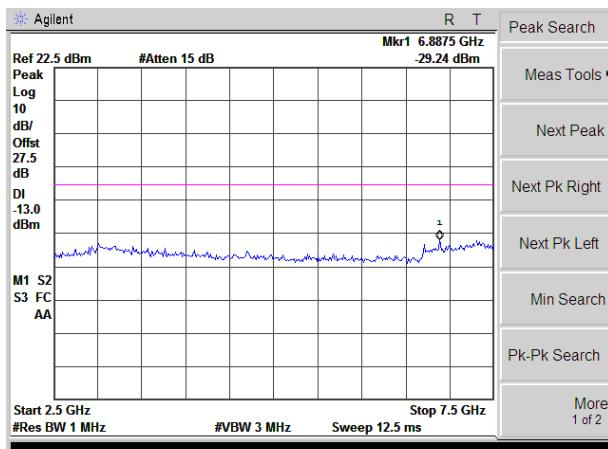
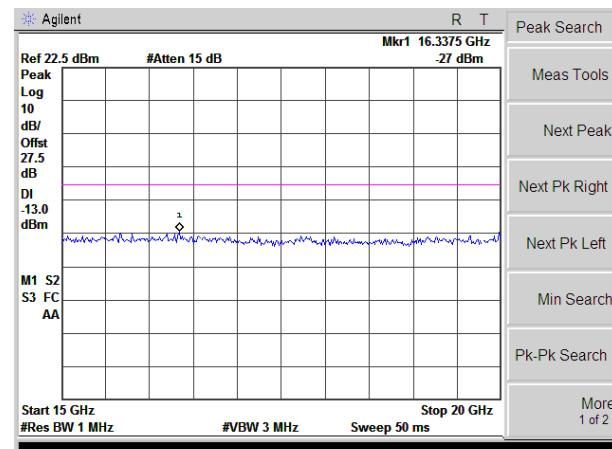
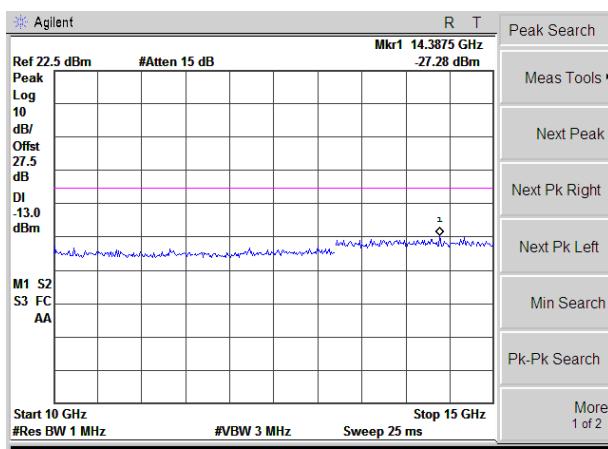
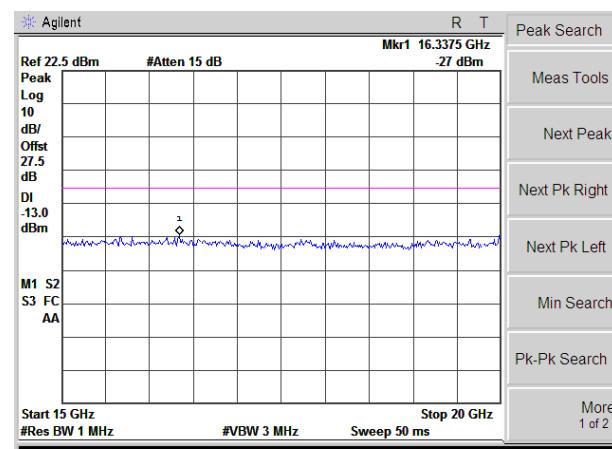


7.5GHz~10GHz

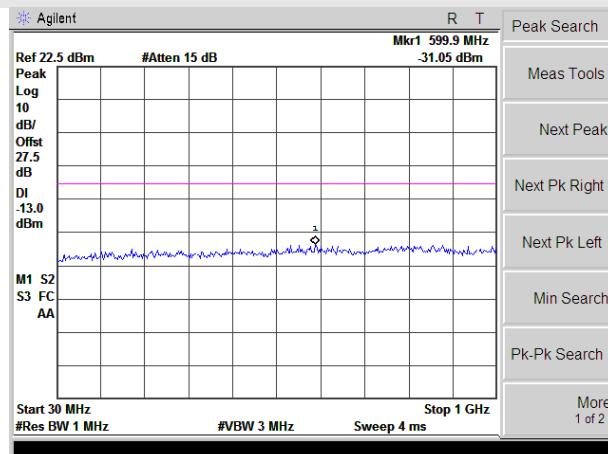


10GHz~15GHz

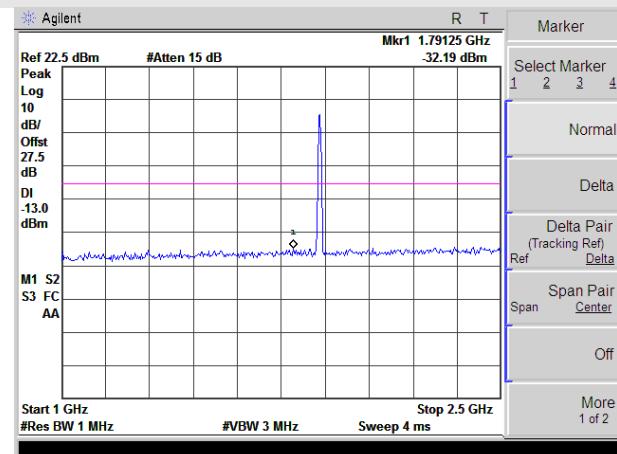
15GHz~20GHz

Test item:
Spurious emission
Mode:
**WCDMA Band II
((RMC 12.2Kbps link))**
Test channel:

Lowest channel

30MHz~1GHz

1GHz~2.5GHz

2.5GHz~7.5GHz

7.5GHz~10GHz

10GHz~15GHz
15GHz~20GHz

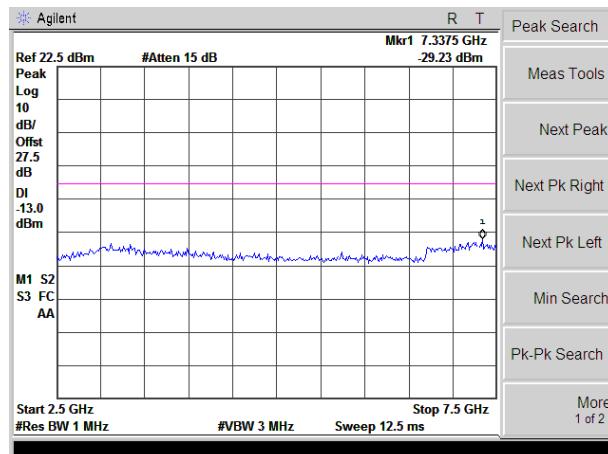
Test channel:



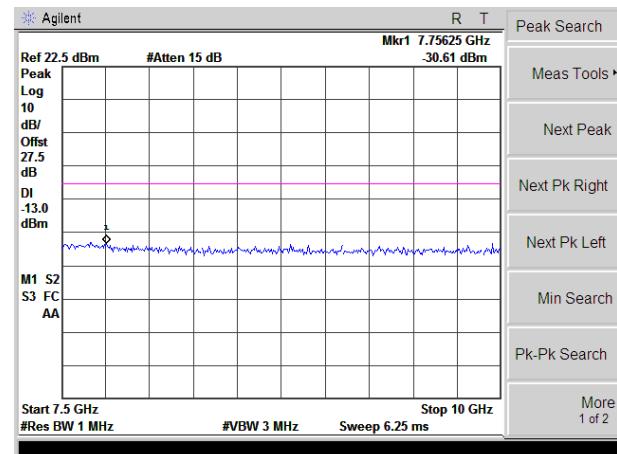
Middle channel



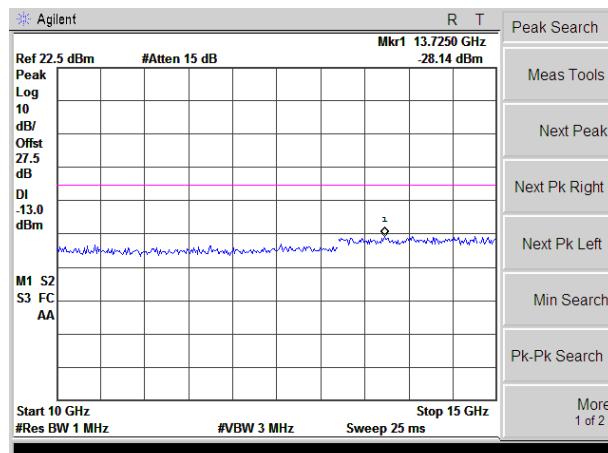
30MHz~1GHz



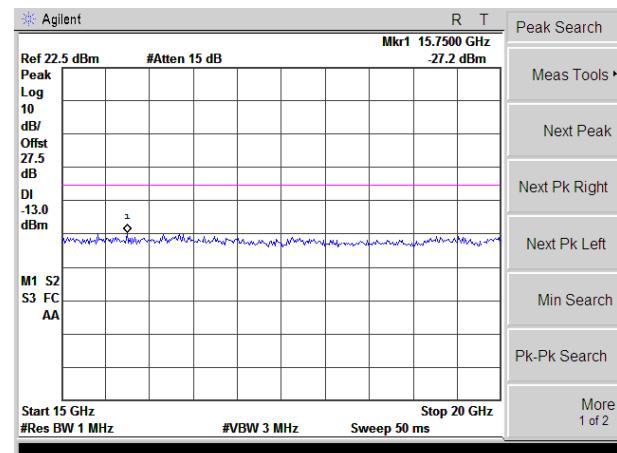
1GHz~2.5GHz



2.5GHz~7.5GHz



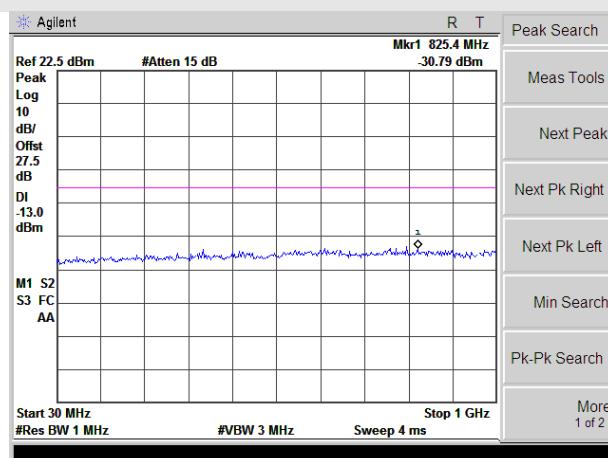
7.5GHz~10GHz



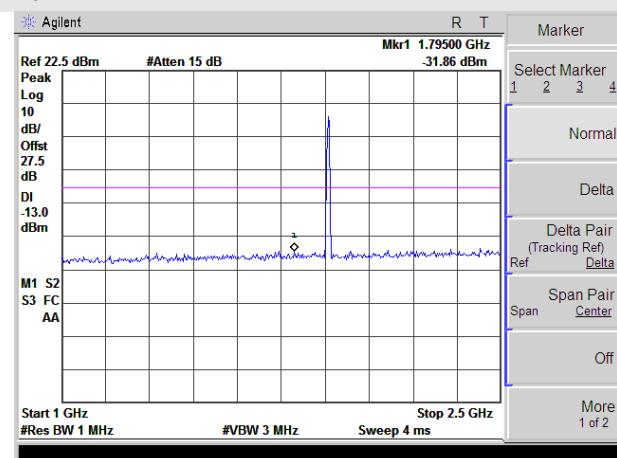
10GHz~15GHz

15GHz~20GHz

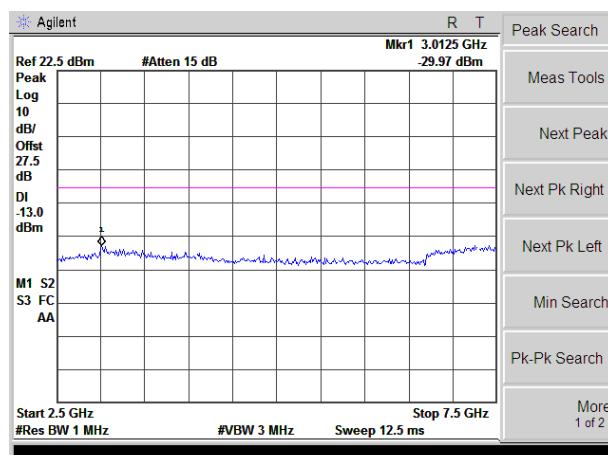
Test channel:



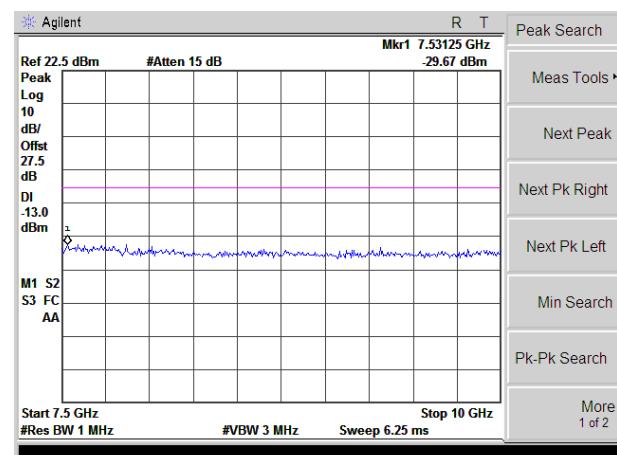
Highest channel



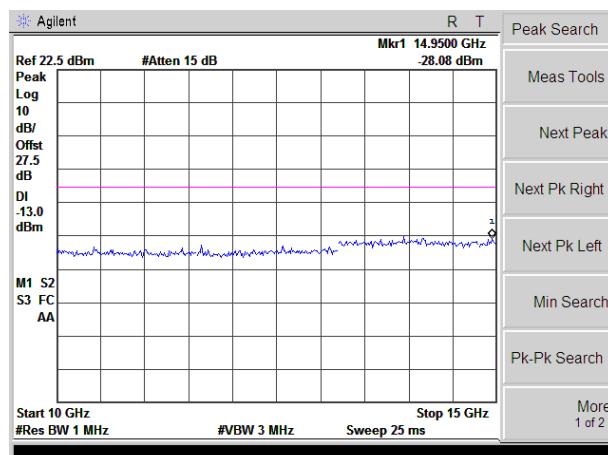
30MHz~1GHz



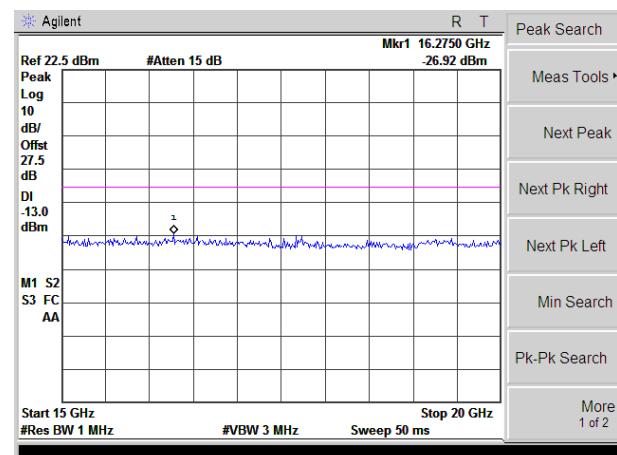
1GHz~2.5GHz

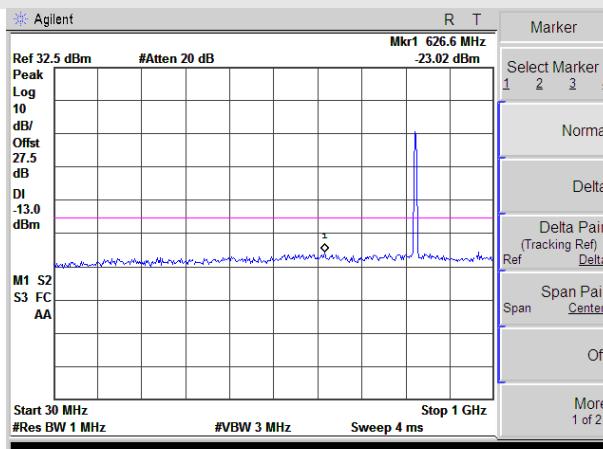
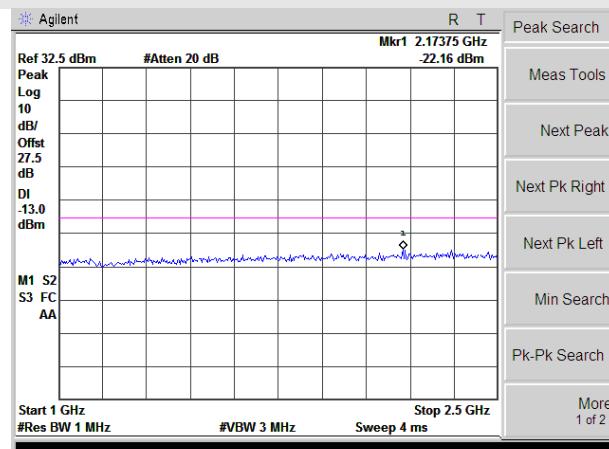
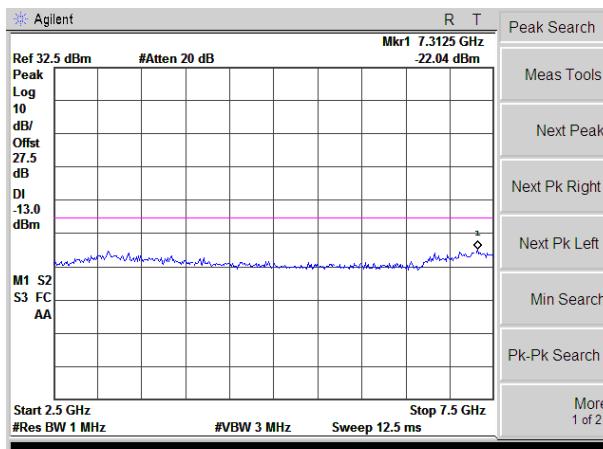
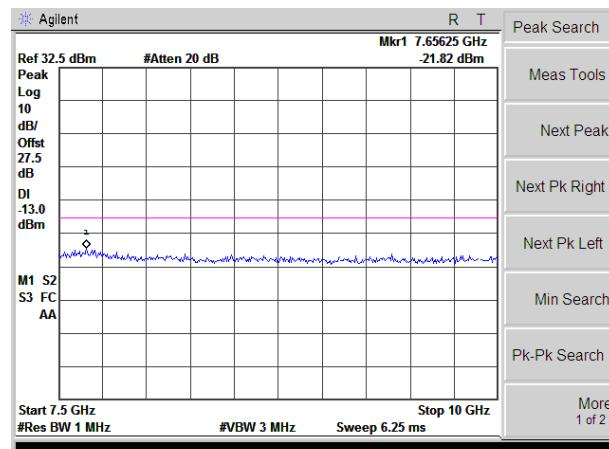
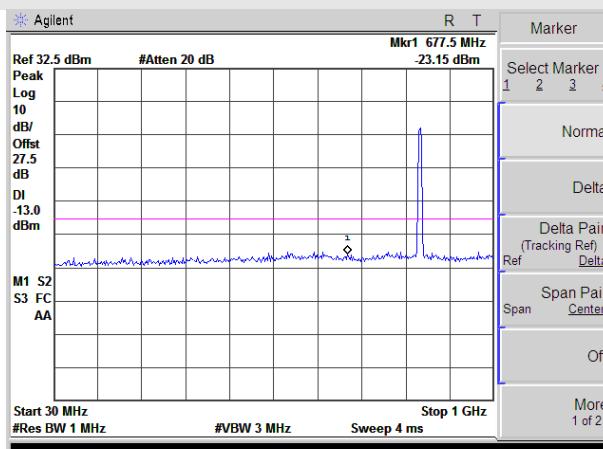
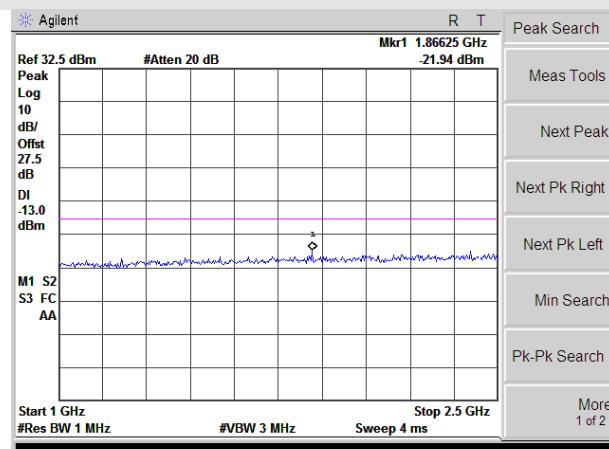


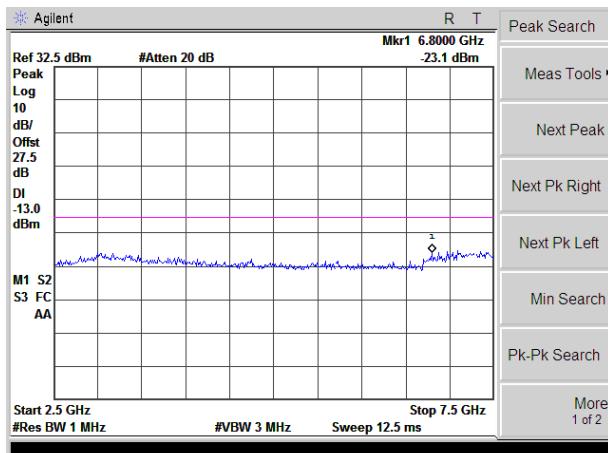
2.5GHz~7.5GHz



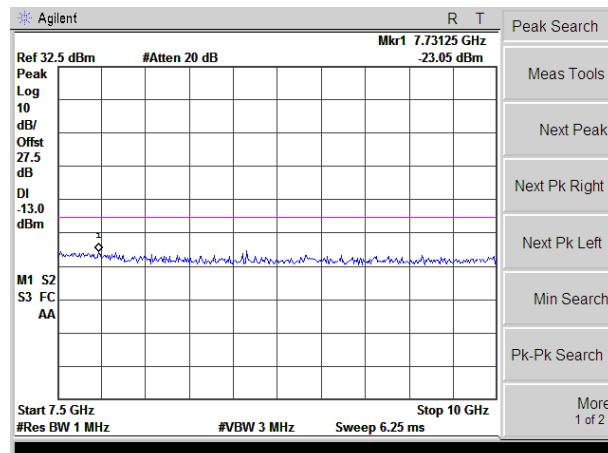
7.5GHz~10GHz



Test item:
Spurious emission
Mode:
**WCDMA Band V
(RMC 12.2Kbps link)**
Test channel:

Lowest channel

30MHz~1GHz

1GHz~2.5GHz

2.5GHz~7.5GHz
7.5GHz~10GHz
Test channel:

Middle channel

30MHz~1GHz
1GHz~2.5GHz

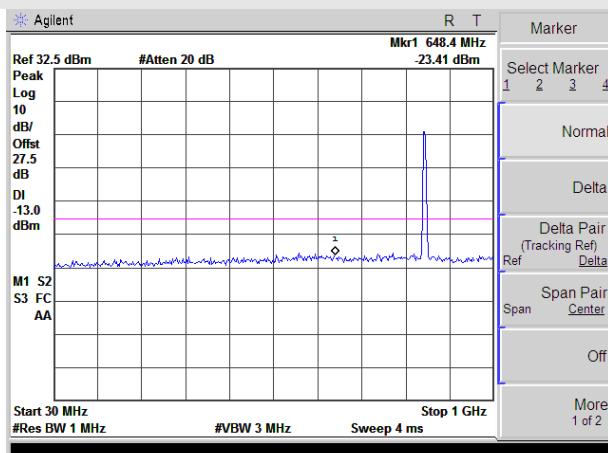


2.5GHz~7.5GHz



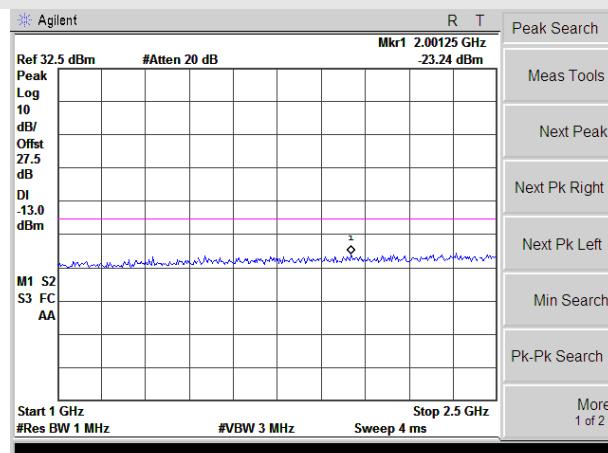
7.5GHz~10GHz

Test channel:

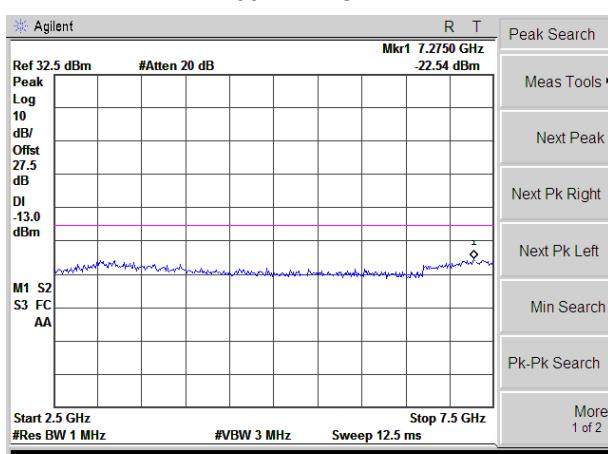


30MHz~1GHz

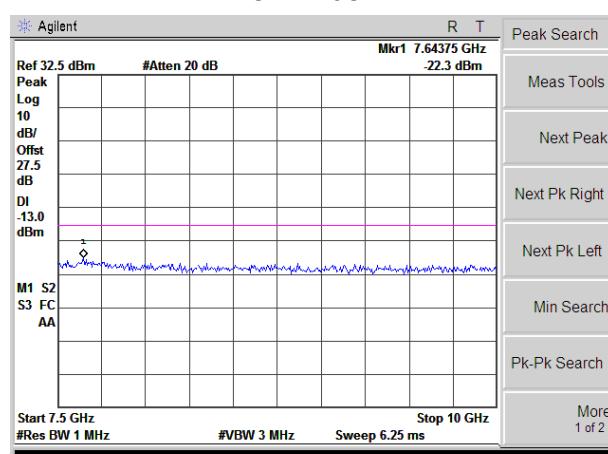
Highest channel



1GHz~2.5GHz



2.5GHz~7.5GHz



7.5GHz~10GHz

8.6 ERP, EIRP Measurement

☒ Standard requirement

FCC part22.913(a) and FCC part24.232(b)

☒ Test method

FCC part2.1046

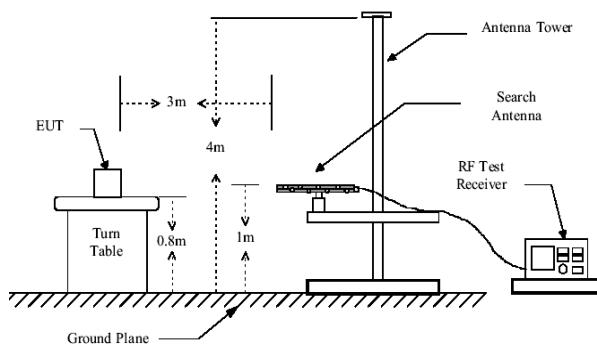
☒ Limit

GSM850 / WCDMA Band V: 7W ERP

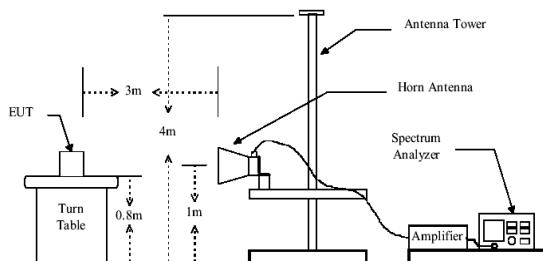
PCS1900 / WCDMA Band II: 2W EIRP

☒ Test setup

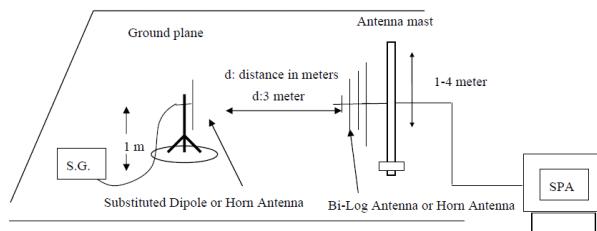
Below 1GHz



Above 1GHz



Substituted method:



☞ **Test Procedure**

1. The EUT was placed on a non-conductive turntable using a non-conductive support. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and EMI spectrum analyzer.
2. During the measurement, the EUT was in communication with the station. The highest emission was recorded with the rotation of the turntable and the lowering of the test antenna from 4m to 1m. The reading was recorded and the field strength (E in dBuV/m) was calculated.
3. ERP in frequency band 824.2 –848.80.8MHz were measured using a substitution method. The EUT was replaced by dipole antenna connected, the S.G. output was recorded and ERP was calculated as follows:
$$\text{ERP} = \text{S.G. output (dBm)} + \text{Antenna Gain (dBd)} - \text{Cable Loss (dB)}$$
4. EIRP in frequency band 1850.2 –1909.8MHz were measured using a substitution method. The EUT was replaced by or horn antenna connected, the S.G. output was recorded and EIRP was calculated as follows:
$$\text{EIRP} = \text{S.G. output (dBm)} + \text{Antenna Gain (dBi)} - \text{Cable Loss (dB)}$$

☞ **Test mode**

Refer to section 5.3 for details

☞ **Test Result**

Complied

Measurement Data

| GSM850 / GPRS850 Band | | | | | | |
|-----------------------|-------------------------|----------|--------------|----------|-------------|--------|
| Channel | Mode | EUT Pol. | Antenna Pol. | ERP(dBm) | Limit (dBm) | Result |
| Lowest 824.2MHz | GSM850 (GSM link) | H | V | 33.36 | 38.45 | Pass |
| | | | H | 30.36 | | |
| | | E1 | V | 25.14 | | |
| | | | H | 30.83 | | |
| | | E2 | V | 24.39 | | |
| | | | H | 28.68 | | |
| | GSM850 (GPRS 1 link) | H | V | 33.17 | | |
| Middle 836.6MHz | GSM850 (GSM link) | H | V | 33.69 | 38.45 | Pass |
| | | | H | 30.83 | | |
| | | E1 | V | 25.71 | | |
| | | | H | 31.44 | | |
| | | E2 | V | 26.22 | | |
| | | | H | 29.42 | | |
| | GSM850 (GPRS 1 link) | H | V | 32.49 | | |
| Highest 848.8MHz | GSM850 (GSM link) | H | V | 33.38 | 38.45 | Pass |
| | | | H | 30.44 | | |
| | | E1 | V | 25.52 | | |
| | | | H | 30.19 | | |
| | | E2 | V | 23.99 | | |
| | | | H | 29.59 | | |
| | GSM850 (GPRS 1 link) | H | V | 32.31 | | |

| PCS1900 / GPRS1900 Band | | | | | | |
|-------------------------|--------------------------|----------|--------------|-----------|-------------|--------|
| Channel | Mode | EUT Pol. | Antenna Pol. | EIRP(dBm) | Limit (dBm) | Result |
| Lowest 1850.2MHz | PCS1900 (GSM link) | H | V | 29.48 | 33.01 | Pass |
| | | | H | 26.74 | | |
| | | E1 | V | 22.07 | | |
| | | | H | 27.20 | | |
| | | E2 | V | 21.43 | | |
| | | | H | 25.28 | | |
| | PCS1900 (GPRS 1 link) | H | V | 29.29 | | |
| | | | | | | |
| Middle 1880MHz | PCS1900 (GSM link) | H | V | 29.84 | 33.01 | Pass |
| | | | H | 27.21 | | |
| | | E1 | V | 22.65 | | |
| | | | H | 27.80 | | |
| | | E2 | V | 23.14 | | |
| | | | H | 26.00 | | |
| | PCS1900 (GPRS 1 link) | H | V | 27.58 | | |
| | | | | | | |
| Highest 1909.8MHz | PCS1900 (GSM link) | H | V | 30.29 | 33.01 | Pass |
| | | | H | 26.97 | | |
| | | E1 | V | 22.58 | | |
| | | | H | 26.77 | | |
| | | E2 | V | 21.24 | | |
| | | | H | 29.45 | | |
| | PCS1900 (GPRS 1 link) | H | V | 21.54 | | |
| | | | | | | |

| WCDMA Band V Band | | | | | | |
|---------------------|-----------------|----------|--------------|----------|-------------|--------|
| Channel | Mode | EUT Pol. | Antenna Pol. | ERP(dBm) | Limit (dBm) | Result |
| Lowest 826.4MHz | WCDMA Band V | H | V | 26.40 | 38.45 | Pass |
| | | | H | 24.43 | | |
| | | E1 | V | 21.07 | | |
| | | | H | 24.75 | | |
| | | E2 | V | 20.65 | | |
| | | | H | 23.41 | | |
| | | H | V | 26.26 | | |
| | | | H | 24.86 | | |
| Middle 836MHz | WCDMA Band V | E1 | V | 21.59 | 38.45 | Pass |
| | | | H | 25.29 | | |
| | | E2 | V | 21.96 | | |
| | | | H | 24.02 | | |
| | | H | V | 26.33 | | |
| | | | H | 23.21 | | |
| | | E1 | V | 20.05 | | |
| | | | H | 23.08 | | |
| Highest 846.6MHz | WCDMA Band V | E2 | V | 19.13 | 38.45 | Pass |
| | | | H | 22.72 | | |

| WCDMA Band II Band | | | | | | |
|----------------------|------------------|----------|--------------|-----------|-------------|--------|
| Channel | Mode | EUT Pol. | Antenna Pol. | EIRP(dBm) | Limit (dBm) | Result |
| Lowest 1852.4MHz | WCDMA Band II | H | V | 25.77 | 33.01 | Pass |
| | | | H | 22.14 | | |
| | | E1 | V | 20.76 | | |
| | | | H | 24.33 | | |
| | | E2 | V | 21.62 | | |
| | | | H | 24.86 | | |
| | | H | V | 26.13 | | |
| | | | H | 21.68 | | |
| Middle 1880MHz | WCDMA Band V | E1 | V | 20.47 | 33.01 | Pass |
| | | | H | 25.23 | | |
| | | E2 | V | 20.96 | | |
| | | | H | 24.15 | | |
| | | H | V | 26.18 | | |
| | | | H | 21.54 | | |
| | | E1 | V | 20.22 | | |
| | | | H | 23.94 | | |
| Highest 1907.6MHz | WCDMA Band V | E2 | V | 19.14 | 33.01 | Pass |
| | | | H | 23.68 | | |

8.7 Field strength of spurious radiation measurement

☞ Standard requirement

FCC part22.917(a) and FCC part24.238(a)

☞ Test method

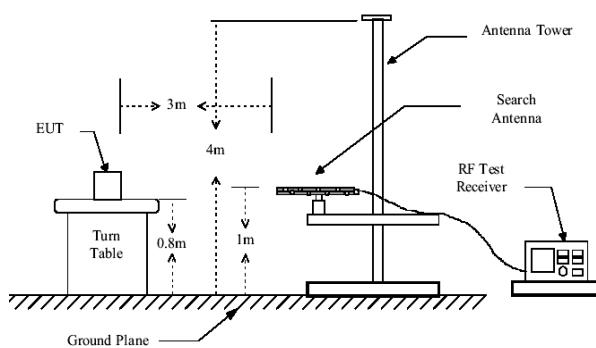
FCC part2.1053

☞ Limit

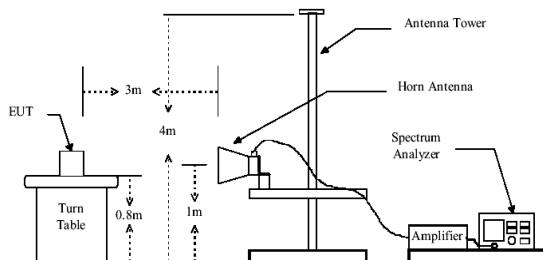
-13dBm

☞ Test setup

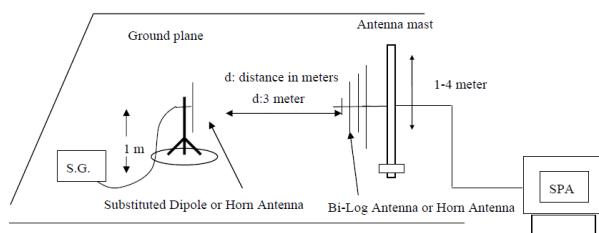
Below 1GHz



Above 1GHz



Substituted method:



☞ **Test Procedure**

1. The EUT was placed on a non-conductive turntable using a non-conductive support. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and EMI spectrum analyzer.
2. During the measurement, the EUT was in communication with the station. The highest emission was recorded with the rotation of the turntable and the lowering of the test antenna from 4m to 1m. The reading was recorded and the field strength (E in dBuV/m) was calculated.
3. ERP in frequency band 824.2 –848.80.8MHz were measured using a substitution method. The EUT was replaced by dipole antenna connected, the S.G. output was recorded and ERP was calculated as follows:
$$\text{ERP} = \text{S.G. output (dBm)} + \text{Antenna Gain (dBd)} - \text{Cable Loss (dB)}$$
4. EIRP in frequency band 1850.2 –1909.8MHz were measured using a substitution method. The EUT was replaced by or horn antenna connected, the S.G. output was recorded and EIRP was calculated as follows:
$$\text{EIRP} = \text{S.G. output (dBm)} + \text{Antenna Gain (dBi)} - \text{Cable Loss (dB)}$$

☞ **Test mode**

Refer to section 5.3 for details

☞ **Test Result**

Complied

Measurement Data

| Test mode: | GSM850 | | Test channel: | Lowest |
|-----------------|-------------------|-------------|---------------|---------|
| Frequency (MHz) | Spurious Emission | | Limit (dBm) | Result |
| | Polarization | Level (dBm) | | |
| 1648.40 | Vertical | -33.29 | -13.00 | Pass |
| 2472.60 | V | -36.20 | | |
| 3296.80 | V | -38.28 | | |
| 4121.00 | V | -39.88 | | |
| 4945.20 | V | --- | | |
| 1648.40 | Horizontal | -37.85 | | |
| 2472.60 | H | -41.72 | | |
| 3296.80 | H | -43.91 | | |
| 4121.00 | H | -46.50 | | |
| 4945.20 | H | --- | | |
| Test mode: | GSM850 | | Test channel: | Middle |
| Frequency (MHz) | Spurious Emission | | Limit (dBm) | Result |
| | Polarization | Level (dBm) | | |
| 1673.20 | Vertical | -34.70 | -13.00 | Pass |
| 2509.80 | V | -37.17 | | |
| 3346.40 | V | -38.90 | | |
| 4183.00 | V | -40.15 | | |
| 5019.60 | V | --- | | |
| 1673.20 | Horizontal | -38.42 | | |
| 2509.80 | H | -41.68 | | |
| 3346.40 | H | -43.61 | | |
| 4183.00 | H | -45.77 | | |
| 5019.60 | H | --- | | |
| Test mode: | GSM850 | | Test channel: | Highest |
| Frequency (MHz) | Spurious Emission | | Limit (dBm) | Result |
| | Polarization | Level (dBm) | | |
| 1697.60 | Vertical | -35.01 | -13.00 | Pass |
| 2546.40 | V | -37.25 | | |
| 3395.20 | V | -38.76 | | |
| 4244.00 | V | -39.83 | | |
| 5092.80 | V | --- | | |
| 1697.60 | Horizontal | -38.27 | | |
| 2546.40 | H | -41.19 | | |
| 3395.20 | H | -42.97 | | |
| 4244.00 | H | -44.89 | | |
| 5092.80 | H | --- | | |

Remark :

1. The emission behaviour belongs to narrowband spurious emission.
2. Remark "---" means that the emission level is too low to be measured
3. The emission levels of other frequencies are very lower than the limit and not show in test report.

| Test mode: | PCS1900 | | Test channel: | Lowest |
|-----------------|-------------------|-------------|---------------|---------|
| Frequency (MHz) | Spurious Emission | | Limit (dBm) | Result |
| | Polarization | Level (dBm) | | |
| 3700.40 | Vertical | -33.53 | -13.00 | Pass |
| 5550.60 | V | -36.08 | | |
| 7400.80 | V | -37.88 | | |
| 9251.00 | V | -39.21 | | |
| 11101.20 | V | --- | | |
| 3700.40 | Horizontal | -37.43 | | |
| 5550.60 | H | -40.81 | | |
| 7400.80 | H | -42.77 | | |
| 9251.00 | H | -45.03 | | |
| 11101.20 | H | --- | | |
| Test mode: | PCS1900 | | Test channel: | Middle |
| Frequency (MHz) | Spurious Emission | | Limit (dBm) | Result |
| | Polarization | Level (dBm) | | |
| 3760.00 | Vertical | -32.88 | -13.00 | Pass |
| 5640.00 | V | -33.51 | | |
| 7520.00 | V | -35.41 | | |
| 9400.00 | V | -36.84 | | |
| 11280.00 | V | --- | | |
| 3760.00 | Horizontal | -35.00 | | |
| 5640.00 | H | -38.49 | | |
| 7520.00 | H | -40.50 | | |
| 9400.00 | H | -42.87 | | |
| 11280.00 | H | --- | | |
| Test mode: | PCS1900 | | Test channel: | Highest |
| Frequency (MHz) | Spurious Emission | | Limit (dBm) | Result |
| | Polarization | Level (dBm) | | |
| 3819.60 | Vertical | -32.24 | -13.00 | Pass |
| 5729.40 | V | -34.80 | | |
| 7639.20 | V | -36.63 | | |
| 9549.00 | V | -37.98 | | |
| 11458.80 | V | --- | | |
| 3819.60 | Horizontal | -36.19 | | |
| 5729.40 | H | -39.58 | | |
| 7639.20 | H | -41.55 | | |
| 9549.00 | H | -43.82 | | |
| 11458.80 | H | --- | | |

Remark :

1. The emission behaviour belongs to narrowband spurious emission.
2. Remark "---" means that the emission level is too low to be measured
3. The emission levels of other frequencies are very lower than the limit and not show in test report.

| Test mode: | WCDMA Band V | | Test channel: | Lowest |
|-----------------|-------------------|-------------|---------------|---------|
| Frequency (MHz) | Spurious Emission | | Limit (dBm) | Result |
| | Polarization | Level (dBm) | | |
| 1652.80 | Vertical | -37.15 | -13.00 | Pass |
| 2479.20 | V | -40.32 | | |
| 3305.60 | V | -42.57 | | |
| 4132.00 | V | -44.35 | | |
| 4958.40 | V | --- | | |
| 1652.80 | Horizontal | -42.12 | | |
| 2479.20 | H | -46.35 | | |
| 3305.60 | H | -48.71 | | |
| 4132.00 | H | -51.51 | | |
| 4958.40 | H | --- | | |
| Test mode: | WCDMA Band V | | Test channel: | Middle |
| Frequency (MHz) | Spurious Emission | | Limit (dBm) | Result |
| | Polarization | Level (dBm) | | |
| 1672.80 | Vertical | -37.69 | -13.00 | Pass |
| 2509.20 | V | -40.72 | | |
| 3345.60 | V | -42.85 | | |
| 4182.00 | V | -44.52 | | |
| 5018.40 | V | --- | | |
| 1672.80 | Horizontal | -42.39 | | |
| 2509.20 | H | -46.42 | | |
| 3345.60 | H | -48.70 | | |
| 4182.00 | H | -51.35 | | |
| 5018.40 | H | --- | | |
| Test mode: | WCDMA Band V | | Test channel: | Highest |
| Frequency (MHz) | Spurious Emission | | Limit (dBm) | Result |
| | Polarization | Level (dBm) | | |
| 1693.20 | Vertical | -36.86 | -13.00 | Pass |
| 2539.80 | V | -39.71 | | |
| 3386.40 | V | -41.69 | | |
| 4233.00 | V | -43.22 | | |
| 5079.60 | V | --- | | |
| 1693.20 | Horizontal | -41.23 | | |
| 2539.80 | H | -45.00 | | |
| 3386.40 | H | -47.15 | | |
| 4233.00 | H | -49.63 | | |
| 5079.60 | H | --- | | |

Remark :

1. The emission behaviour belongs to narrowband spurious emission.
2. Remark "---" means that the emission level is too low to be measured
3. The emission levels of other frequencies are very lower than the limit and not show in test report.

| Test mode: | WCDMA Band II | | Test channel: | Lowest |
|-----------------|-------------------|-------------|---------------|---------|
| Frequency (MHz) | Spurious Emission | | Limit (dBm) | Result |
| | Polarization | Level (dBm) | | |
| 3704.80 | Vertical | -37.03 | -13.00 | Pass |
| 5557.20 | V | -40.20 | | |
| 7409.60 | V | -42.44 | | |
| 9262.00 | V | -44.22 | | |
| 11114.40 | V | --- | | |
| 3704.80 | Horizontal | -42.00 | | Pass |
| 5557.20 | H | -46.21 | | |
| 7409.60 | H | -48.56 | | |
| 9262.00 | H | -51.35 | | |
| 11114.40 | H | --- | | |
| Test mode: | WCDMA Band II | | Test channel: | Middle |
| Frequency (MHz) | Spurious Emission | | Limit (dBm) | Result |
| | Polarization | Level (dBm) | | |
| 3760.00 | Vertical | -37.57 | -13.00 | Pass |
| 5640.00 | V | -40.60 | | |
| 7520.00 | V | -42.72 | | |
| 9400.00 | V | -44.38 | | |
| 11280.00 | V | --- | | |
| 3760.00 | Horizontal | -42.27 | | Pass |
| 5640.00 | H | -46.28 | | |
| 7520.00 | H | -48.55 | | |
| 9400.00 | H | -51.20 | | |
| 11280.00 | H | --- | | |
| Test mode: | WCDMA Band II | | Test channel: | Highest |
| Frequency (MHz) | Spurious Emission | | Limit (dBm) | Result |
| | Polarization | Level (dBm) | | |
| 3815.20 | Vertical | -36.74 | -13.00 | Pass |
| 5722.80 | V | -39.59 | | |
| 7630.40 | V | -41.56 | | |
| 9538.00 | V | -43.09 | | |
| 11445.60 | V | --- | | |
| 3815.20 | Horizontal | -41.10 | | Pass |
| 5722.80 | H | -44.86 | | |
| 7630.40 | H | -47.01 | | |
| 9538.00 | H | -49.48 | | |
| 11445.60 | H | --- | | |

Remark :

1. The emission behaviour belongs to narrowband spurious emission.
2. Remark"---" means that the emission level is too low to be measured
3. The emission levels of other frequencies are very lower than the limit and not show in test report.

8.8 Frequency stability V.S. Temperature measurement

☞ Standard requirement

FCC Part2.1055(a)(1)(b)

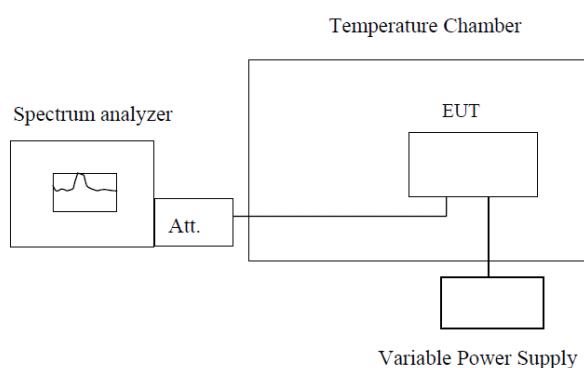
☞ Test method

FCC Part2.1055(a)(1)(b)

☞ Limit

2.5ppm

☞ Test setup



Note : Measurement setup for testing on Antenna connector

☞ Test Procedure

1. The equipment under test was connected to an external DC power supply and input rated voltage.
2. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators.
3. The EUT was placed inside the temperature chamber.
4. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 25°C operating frequency as reference frequency.
5. Turn EUT off and set the chamber temperature to -20°C. After the temperature stabilized for approximately 30 minutes recorded the frequency.
6. Repeat step measure with 10°C increased per stage until the highest temperature of +50°C reached.

☞ Test mode

Refer to section 5.3 for details

☞ Test Result

Complied

Measurement Data

| Reference Frequency: GSM850 (GSM link) Middle channel=190 channel=836.6MHz | | | | | |
|--|------------------|-----------------|--------|-------------|--------|
| Power supplied (Vdc) | Temperature (°C) | Frequency error | | Limit (ppm) | Result |
| | | Hz | ppm | | |
| 3.70 | -30 | 24 | 0.0284 | 2.5 | Pass |
| | -20 | 32 | 0.0385 | | |
| | -10 | 24 | 0.0281 | | |
| | 0 | 23 | 0.0275 | | |
| | 10 | 22 | 0.0261 | | |
| | 20 | 19 | 0.0227 | | |
| | 30 | 30 | 0.0363 | | |
| | 40 | 31 | 0.0372 | | |
| | 50 | 27 | 0.0325 | | |

| Reference Frequency: GSM850 (GPRS 1 link) Middle channel=190 channel=836.6MHz | | | | | |
|---|------------------|-----------------|--------|-------------|--------|
| Power supplied (Vdc) | Temperature (°C) | Frequency error | | Limit (ppm) | Result |
| | | Hz | ppm | | |
| 3.70 | -30 | 20 | 0.0238 | 2.5 | Pass |
| | -20 | 26 | 0.0316 | | |
| | -10 | 20 | 0.0234 | | |
| | 0 | 21 | 0.0247 | | |
| | 10 | 18 | 0.0216 | | |
| | 20 | 16 | 0.0193 | | |
| | 30 | 27 | 0.0318 | | |
| | 40 | 26 | 0.0308 | | |
| | 50 | 22 | 0.0267 | | |

| Reference Frequency: PCS1900 (GSM link) Middle channel=661 channel=1880MHz | | | | | |
|--|------------------|-----------------|--------|-------------|--------|
| Power supplied (Vdc) | Temperature (°C) | Frequency error | | Limit (ppm) | Result |
| | | Hz | ppm | | |
| 3.70 | -30 | 33 | 0.0177 | 2.5 | Pass |
| | -20 | 43 | 0.0229 | | |
| | -10 | 34 | 0.0182 | | |
| | 0 | 35 | 0.0184 | | |
| | 10 | 33 | 0.0177 | | |
| | 20 | 29 | 0.0157 | | |
| | 30 | 46 | 0.0243 | | |
| | 40 | 45 | 0.0240 | | |
| | 50 | 41 | 0.0217 | | |

| Reference Frequency: PCS1900 (GPRS 1 link) Middle channel=661 channel=1880MHz | | | | | |
|---|------------------|-----------------|--------|-------------|--------|
| Power supplied (Vdc) | Temperature (°C) | Frequency error | | Limit (ppm) | Result |
| | | Hz | ppm | | |
| 3.70 | -30 | 32 | 0.0172 | 2.5 | Pass |
| | -20 | 41 | 0.0218 | | |
| | -10 | 31 | 0.0167 | | |
| | 0 | 31 | 0.0165 | | |
| | 10 | 31 | 0.0167 | | |
| | 20 | 26 | 0.0136 | | |
| | 30 | 42 | 0.0222 | | |
| | 40 | 40 | 0.0211 | | |
| | 50 | 38 | 0.0201 | | |

| Reference Frequency: WCDMA Band V Middle channel=4183 channel=836.6MHz | | | | | |
|--|------------------|-----------------|--------|-------------|--------|
| Power supplied (Vdc) | Temperature (°C) | Frequency error | | Limit (ppm) | Result |
| | | Hz | ppm | | |
| 3.70 | -30 | 27 | 0.0325 | 2.5 | Pass |
| | -20 | 25 | 0.0303 | | |
| | -10 | 24 | 0.0281 | | |
| | 0 | 26 | 0.0316 | | |
| | 10 | 20 | 0.0238 | | |
| | 20 | 17 | 0.0204 | | |
| | 30 | 22 | 0.0261 | | |
| | 40 | 28 | 0.0334 | | |
| | 50 | 23 | 0.0278 | | |

| Reference Frequency: WCDMA Band II Middle channel=9400 channel=1880.0MHz | | | | | |
|--|------------------|-----------------|--------|-------------|--------|
| Power supplied (Vdc) | Temperature (°C) | Frequency error | | Limit (ppm) | Result |
| | | Hz | ppm | | |
| 3.70 | -30 | 38 | 0.0200 | 2.5 | Pass |
| | -20 | 36 | 0.0191 | | |
| | -10 | 34 | 0.0180 | | |
| | 0 | 37 | 0.0197 | | |
| | 10 | 28 | 0.0150 | | |
| | 20 | 25 | 0.0131 | | |
| | 30 | 31 | 0.0164 | | |
| | 40 | 39 | 0.0205 | | |
| | 50 | 33 | 0.0178 | | |

8.9 Frequency stability V.S. Voltage measurement

☞ **Standard requirement**

FCC Part2.1055(d)(1)(2)

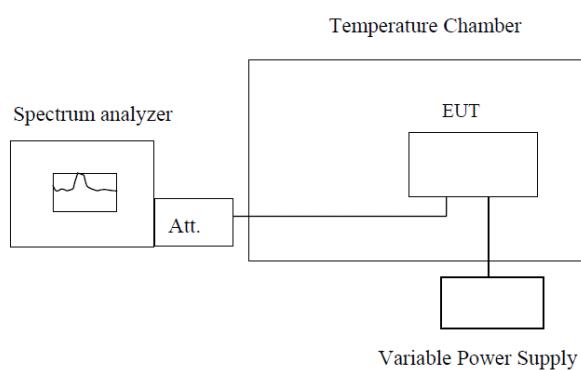
☞ **Test method**

FCC Part2.1055(d)(1)(2)

☞ **Limit**

2.5ppm

☞ **Test setup**



Note : Measurement setup for testing on Antenna connector

☞ **Test Procedure**

1. Set chamber temperature to 25°C. Use a variable DC power source to power the EUT and set the voltage to rated voltage.
2. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and recorded the frequency.
3. Reduce the input voltage to specified extreme voltage variation (+/- 15%) and endpoint, record the maximum frequency change.

☞ **Test mode**

Refer to section 5.3 for details

☞ **Test Result**

Complied

Measurement Data

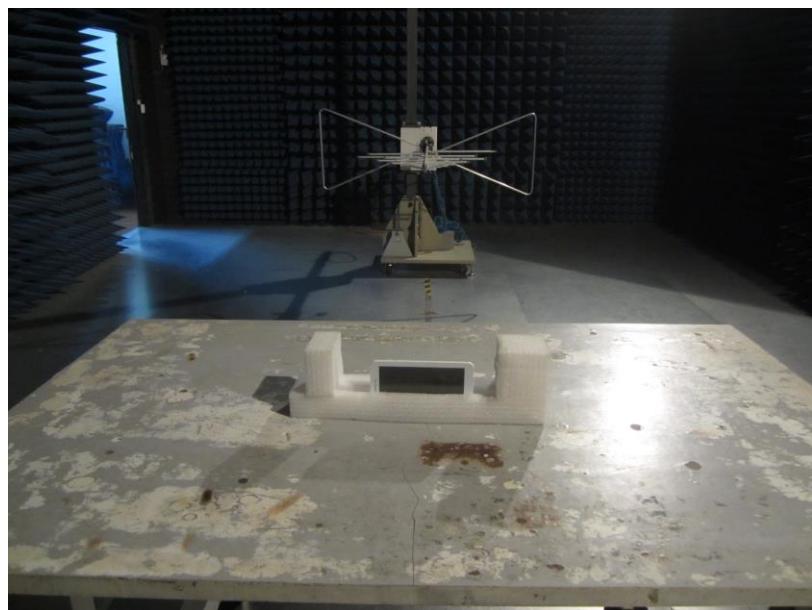
| Reference Frequency: GSM850 (GSM link) Middle channel=190 channel=836.6MHz | | | | | |
|---|----------------------|-----------------|--------|-------------|--------|
| Temperature (°C) | Power supplied (Vdc) | Frequency error | | Limit (ppm) | Result |
| | | Hz | ppm | | |
| 25 | 4.25 | 14 | 0.0167 | 2.5 | Pass |
| | 3.70 | 21 | 0.0251 | | |
| | 3.40 | 25 | 0.0299 | | |
| Reference Frequency: GSM850 (GPRS 1 link) Middle channel=190 channel=836.6MHz | | | | | |
| Temperature (°C) | Power supplied (Vdc) | Frequency error | | Limit (ppm) | Result |
| | | Hz | ppm | | |
| 25 | 4.25 | 27 | 0.0323 | 2.5 | Pass |
| | 3.70 | 22 | 0.0263 | | |
| | 3.40 | 31 | 0.0371 | | |
| Reference Frequency: PCS1900 (GSM link) Middle channel=661 channel=1880MHz | | | | | |
| Temperature (°C) | Power supplied (Vdc) | Frequency error | | Limit (ppm) | Result |
| | | Hz | ppm | | |
| 25 | 4.25 | 30 | 0.0160 | 2.5 | Pass |
| | 3.70 | 32 | 0.0170 | | |
| | 3.40 | 38 | 0.0202 | | |
| Reference Frequency: PCS1900 (GPRS 1 link) Middle channel=661 channel=1880MHz | | | | | |
| Temperature (°C) | Power supplied (Vdc) | Frequency error | | Limit (ppm) | Result |
| | | Hz | ppm | | |
| 25 | 4.25 | 28 | 0.0149 | 2.5 | Pass |
| | 3.70 | 34 | 0.0181 | | |
| | 3.40 | 37 | 0.0197 | | |
| Reference Frequency: WCDMA Band V Middle channel=4183 channel=836.6MHz | | | | | |
| Temperature (°C) | Power supplied (Vdc) | Frequency error | | Limit (ppm) | Result |
| | | Hz | ppm | | |
| 25 | 4.25 | 22 | 0.0263 | 2.5 | Pass |
| | 3.70 | 20 | 0.0239 | | |
| | 3.40 | 27 | 0.0323 | | |
| Reference Frequency: WCDMA Band II Middle channel=940 channel=1880.0MHz | | | | | |
| Temperature (°C) | Power supplied (Vdc) | Frequency error | | Limit (ppm) | Result |
| | | Hz | ppm | | |
| 25 | 4.25 | 25 | 0.0133 | 2.5 | Pass |
| | 3.70 | 26 | 0.0138 | | |
| | 3.40 | 33 | 0.0176 | | |

9 Test Setup Photo

Conducted emissions:



Radiated emissions:



10 EUT Constructional Details

Reference to the test report No.: TMC1505036501

-----End-----