

FCC 47 CFR PART 27 SUBPART L

TEST REPORT

For

Xerox TMS

Model: IVU-4000

Trade Name: xerox

Issued to

Advantech Co.Ltd.

No.1, Alley 20, Lane 26, Rueiguang Road, Neihu District, Taipei 114, Taiwan, R.O.C.

Issued by

Compliance Certification Services Inc.

**No.11, Wugong 6th Rd., Wugu Dist.,
New Taipei City 24891, Taiwan. (R.O.C.)**

<http://www.ccsrf.com>

service@ccsrf.com

Issued Date: June 2, 2016



Note: This report shall not be reproduced except in full, without the written approval of Compliance Certification Services Inc. This document may be altered or revised by Compliance Certification Services Inc. personnel only, and shall be noted in the revision section of the document.

Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	June 2, 2016	Initial Issue	ALL	Doris Chu
01	July 18, 2016	1. Modify Peak and Average power.	P. 14, P. 16	Doris Chu

TABLE OF CONTENTS

1. TEST RESULT CERTIFICATION	4
2. EUT DESCRIPTION.....	5
3. TEST METHODOLOGY.....	6
3.1 EUT CONFIGURATION.....	6
3.2 EUT EXERCISE.....	6
3.3 GENERAL TEST PROCEDURES.....	6
3.4 DESCRIPTION OF TEST MODES.....	7
4. INSTRUMENT CALIBRATION	8
4.1 MEASURING INSTRUMENT CALIBRATION.....	8
4.2 MEASUREMENT EQUIPMENT USED.....	8
4.3 MEASUREMENT UNCERTAINTY.....	9
5. FACILITIES AND ACCREDITATIONS	10
5.1 FACILITIES.....	10
5.2 EQUIPMENT.....	10
5.3 LABORATORY ACCREDITATIONS AND LISTING.....	10
5.4 TABLE OF ACCREDITATIONS AND LISTINGS.....	11
6. SETUP OF EQUIPMENT UNDER TEST	12
6.1 SETUP CONFIGURATION OF EUT	12
6.2 SUPPORT EQUIPMENT	12
7. FCC PART 27 REQUIREMENTS	13
7.1 PEAK POWER	13
7.2 AVERAGE POWER	15
7.3 ERP & EIRP MEASUREMENT	17
7.4 OCCUPIED BANDWIDTH MEASUREMENT.....	20
7.5 OUT OF BAND EMISSION AT ANTENNA TERMINALS.....	28
7.6 FIELD STRENGTH OF SPURIOUS RADIATION MEASUREMENT	39
7.7 FREQUENCY STABILITY V.S. TEMPERATURE MEASUREMENT	65
7.8 FREQUENCY STABILITY V.S. VOLTAGE MEASUREMENT	68
8. APPENDIX II PHOTOGRAPHS OF TEST SETUP.....	71
APPENDIX 1 - PHOTOGRAPHS OF EUT	

1. TEST RESULT CERTIFICATION

Applicant: Advantech Co.Ltd.
 No.1, Alley 20, Lane 26, Rueiguang Road, Neihu District,
 Taipei 114, Taiwan, R.O.C.

Manufacturer: Advantech Co.Ltd.
 No.1, Alley 20, Lane 26, Rueiguang Road, Neihu District,
 Taipei 114, Taiwan, R.O.C.

Equipment Under Test: Xerox TMS

Model: IVU-4000

Trade Name: xerox

Date of Test: May 24 ~ July 14, 2016

APPLICABLE STANDARDS	
STANDARD	TEST RESULT
FCC 47 CFR PART 27 SUBPART L	No non-compliance noted

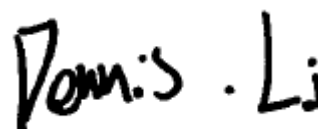
We hereby certify that:

The above equipment was tested by Compliance Certification Services Inc. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in TIA/EIA-603-C and the energy emitted by the sample EUT tested as described in this report is in compliance with radiated emission limits of FCC Rule FCC PART 27 Subpart L.

The test results of this report relate only to the tested sample identified in this report.

Approved by:

Tested by:

Miller Lee
 Manager
 Compliance Certification Services Inc.

Dennis Li
 Engineer
 Compliance Certification Services Inc.

2. EUT DESCRIPTION

Product	Xerox TMS
Model Number	IVU-4000
Trade Name	xerox
Received Date	May 15, 2016
Power Supply	Powered from host device.
Frequency Range	WCDMA / HSDPA / HSUPA Band IV: 1712.4-1752.6 MHz
Transmit Power (ERP & EIRP Power)	WCDMA Band IV: 23.11 dBm HSDPA Band IV: 23.76 dBm HSUPA Band IV: 23.43 dBm
Cellular Phone Protocol	WCDMA: Quadrature Phase Shift Keying (QPSK) with Root-raised cosine pulse shaping filters (roll off = 0.22)
Antenna Gain	1. GSA.8822.B.301111 / DIPOLE Antenna Gain: -1.34 dBi 2. MA230.LBC.002 / MONOPOLE Antenna Gain: 0.42 dBi

Remark: The sample selected for test was engineering sample that approximated to production product and was provided by manufacturer.

3. TEST METHODOLOGY

Both conducted and radiated testing were performed according to the procedures document on ANSI C63.10: 2013, TIA/EIA-603-C: 2004 and FCC CFR 47, Part 27 Subpart L.

3.1 EUT CONFIGURATION

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

3.2 EUT EXERCISE

The EUT was operated in the engineering mode to fix the TX frequency that was for the purpose of the measurements.

3.3 GENERAL TEST PROCEDURES

Conducted Emissions

According to the requirements in ANSI C63.10: 2013. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-peak and average detector modes.

Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane. The turntable 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 maximum emissions, exploratory radiated emission measurements were made according to the requirements in ANSI C63.10: 2013.

3.4 DESCRIPTION OF TEST MODES

The EUT (model: IVU-4000) had been tested under operating condition.

EUT staying in continuous transmitting mode was programmed.

After verification, all tests carried out are with the worst-case test modes as shown below except radiated spurious emission below 1GHz and power line conducted emissions below 30MHz, which worst case was in normal link mode and receiving radiated spurious emission above 1GHz, which worst case was in CH Mid mode only.

WCDMA Band IV:

Channel Low (CH1312), Channel Mid (CH1413) and Channel High (CH1513) were chosen for full testing.

HSDPA Band IV:

Channel Low (CH1312), Channel Mid (CH1413) and Channel High (CH1513) were chosen for full testing.

HSUPA Band IV:

Channel Low (CH1312), Channel Mid (CH1413) and Channel High (CH1513) were chosen for full testing.

The field strength of spurious emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X, Y axis). The worst emission was found in lie-down position (Y axis) and the worst case was recorded.

4. INSTRUMENT CALIBRATION

4.1 MEASURING INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

4.2 MEASUREMENT EQUIPMENT USED

Equipment Used for Emissions Measurement

Remark: Each piece of equipment is scheduled for calibration once a year and Loop Antenna is scheduled for calibration once three years.

Conducted Emissions Test Site					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
DC Power Supplies	GW Instek	SPS-3610	GPE880163	01/19/2016	01/18/2017
Power Meter	Anritsu	ML2495A	1012009	07/04/2016	07/03/2017
Power Sensor	Anritsu	MA2411B	917072	07/04/2016	07/03/2017
Signal Analyzer	R&S	FSV 40	101073	07/20/2015	07/19/2016
Spectrum Analyzer	Agilent	E4446A	US42510268	02/15/2016	02/14/2017
Thermostatic/Hrgrosatic Chamber	TAICHY	MHG-150LF	930619	10/08/2015	10/07/2016
Vector Signal Generator	R&S	SMU 200A	102239	03/10/2016	03/09/2017
AC Power Source	EXTECH	6205	1140845	N.C.R	N.C.R

Wugu 966 Chamber A					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Bilog Antenna	Sunol Sciences	JB3	A030105	08/06/2015	08/05/2016
EMI Test Receiver	R&S	ESCI	100064	06/04/2015	06/03/2016
Horn Antenna	EMCO	3117	55165	02/24/2016	02/23/2017
Horn Antenna	EMCO	3116	26370	01/15/2016	01/14/2017
K Type Cable	Huber+Suhner	SUCOFLEX 102	29406/2	01/12/2016	01/11/2017
K Type Cable	Huber+Suhner	SUCOFLEX 102	22470/2	01/12/2016	01/11/2017
Pre-Amplifier	MITEQ	AMF-6F-2604 00-40-8P	985646	01/14/2016	01/13/2017
Pre-Amplifier	EMCI	EMC 012635	980151	06/05/2015	06/04/2016
Pre-Amplifier	EMCI	EM330	N/A	06/05/2015	06/04/2016
Spectrum Analyzer	Agilent	E4446A	US42510252	12/08/2015	12/07/2016
Antenna Tower	CCS	CC-A-1F	N/A	N.C.R	N.C.R
Controller	CCS	CC-C-1F	N/A	N.C.R	N.C.R
Turn Table	CCS	CC-T-1F	N/A	N.C.R	N.C.R
Software	EZ-EMC (CCS-3A1RE)				

4.3 MEASUREMENT UNCERTAINTY

PARAMETER	UNCERTAINTY
Powerline Conducted Emission	+/-1.2159
3M Semi Anechoic Chamber / 30M~200M	+/-4.0138
3M Semi Anechoic Chamber / 200M~1000M	+/-3.9483
3M Semi Anechoic Chamber / 1G~8G	+/-2.5975
3M Semi Anechoic Chamber / 8G~18G	+/-2.6112
3M Semi Anechoic Chamber / 18G~26G	+/-2.7389
3M Semi Anechoic Chamber / 26G~40G	+/-2.9683

Remark: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

5. FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

All measurement facilities used to collect the measurement data are located at

- No.199, Chungsen Road, Hsintien City, Taipei Hsien, Taiwan, R.O.C.
Tel: 886-2-2217-0894 / Fax: 886-2-2217-1029
- No.11, Wugong 6th Rd., Wugu Dist., New Taipei City 24891, Taiwan. (R.O.C.)
Tel: 886-2-2299-9720 / Fax: 886-2-2298-4045
- No.81-1, Lane 210, Bade 2nd Rd., Luchu Hsiang, Taoyuan Hsien 338, Taiwan
Tel: 886-3-324-0332 / Fax: 886-3-324-5235

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.10: 2013 and CISPR Publication 22.

5.2 EQUIPMENT

Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, biconical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers.



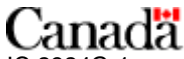
Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

5.3 LABORATORY ACCREDITATIONS AND LISTING

The test facilities used to perform radiated and conducted emissions tests are accredited by American Association for Laboratory Accreditation Program for the specific scope accreditation under Lab Code: 0824-01 to perform Electromagnetic Interference tests according to FCC Part 15 and CISPR 22 requirements. In addition, the test facilities are listed with Industry Canada, Certification and Engineering Bureau, IC 2324G-1 for 3M Semi Anechoic Chamber A, 2324G-2 for 3M Semi Anechoic Chamber B.

5.4 TABLE OF ACCREDITATIONS AND LISTINGS

Country	Agency	Scope of Accreditation	Logo
USA	FCC	3M Semi Anechoic Chamber (FCC MRA: TW1039) to perform FCC Part 15 measurements	 FCC MRA: TW1039
Taiwan	TAF	LP0002, RTTE01, FCC Method-47 CFR Part 15 Subpart C, D, E, RSS-210, RSS-310 IDA TS SRD, AS/NZS 4268, AS/NZS 4771, TS 12.1 & 12.2, ETSI EN 300 440-1, ETSI EN 300 440-2, ETSI EN 300 328, ETSI EN 300 220-1, ETSI EN 300 220-2, ETSI EN 301 893, ETSI EN 301 489-1/3/7/17 FCC OET Bulletin 65 + Supplement C, EN 50360, EN 50361, EN 50371, RSS 102, EN 50383, EN 50385, EN 50392, IEC 62209, CNS 14958-1, CNS 14959 FCC Method -47 CFR Part 15 Subpart B IEC / EN 61000-3-2, IEC / EN 61000-3-3, IEC / EN 61000-4-2/3/4/5/6/8/11	
Canada	Industry Canada	3M Semi Anechoic Chamber (IC 2324G-1 / IC 2324G-2) to perform	 IC 2324G-1 IC 2324G-2

** No part of this report may be used to claim or imply product endorsement by A2LA or any agency of the US Government.*

6. SETUP OF EQUIPMENT UNDER TEST

6.1 SETUP CONFIGURATION OF EUT

See test photographs attached in Appendix II for the actual connections between EUT and support equipment.

6.2 SUPPORT EQUIPMENT

No	Equipment	Brand	Model	Series No.	FCC ID	Data Cable	Power Cord
	N/A						

Remark:

1. *All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.*
2. *Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.*

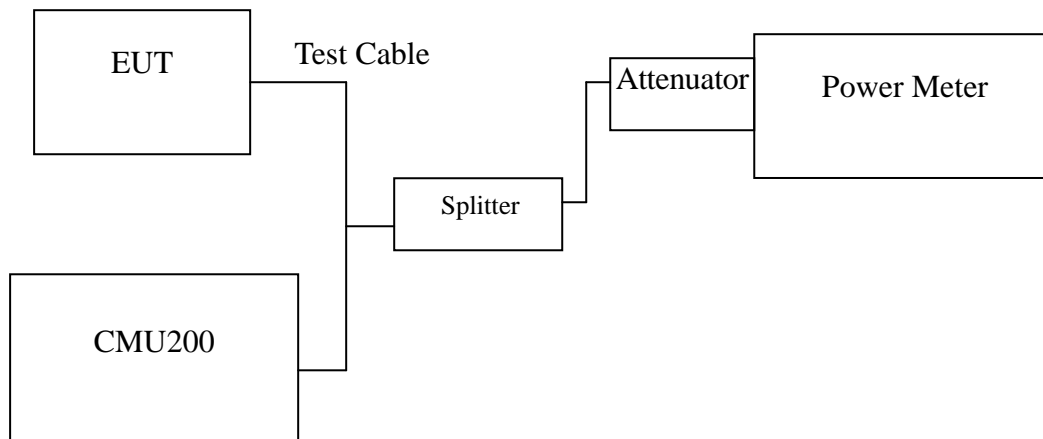
7. FCC PART 27 REQUIREMENTS

7.1 PEAK POWER

LIMIT

According to FCC §2.1046.

Test Configuration



Remark: 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 power meter. Transmitter output was read off the power meter in dBm. The power output at the transmitter antenna port was determined by adding the value of the attenuator to the power meter reading.

TEST RESULTS

No non-compliance noted.

Test Data

Test Mode	CH	Frequency (MHz)	Peak Power (dBm)	Output Power (W)
WCDMA (BAND IV)	1312	1712.40	23.69	0.23388
	1413	1732.60	23.23	0.21038
	1513	1752.60	23.47	0.22233
HSDPA (BAND IV)	1312	1712.40	23.79	0.23933
	1413	1732.60	23.45	0.22131
	1513	1752.60	23.14	0.20606
HSUPA (BAND IV)	1312	1712.40	23.43	0.22029
	1413	1732.60	23.14	0.20606
	1513	1752.60	23.51	0.22439

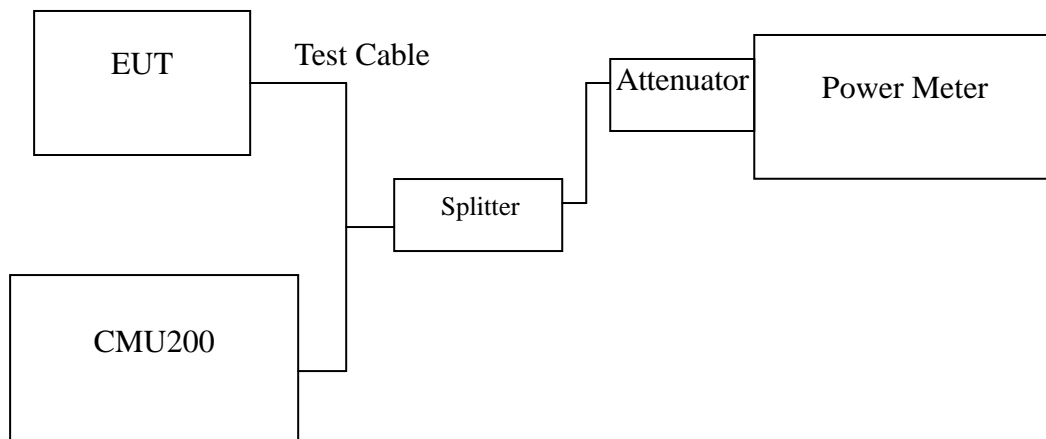
Remark: The value of factor includes both the loss of cable and external attenuator

7.2 AVERAGE POWER

LIMIT

For reporting purposes only.

Test Configuration



Remark: 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 power meter. Transmitter output was read off the power meter in dBm. The power output at the transmitter antenna port was determined by adding the value of the attenuator to the power meter reading.

TEST RESULTS

No non-compliance noted.

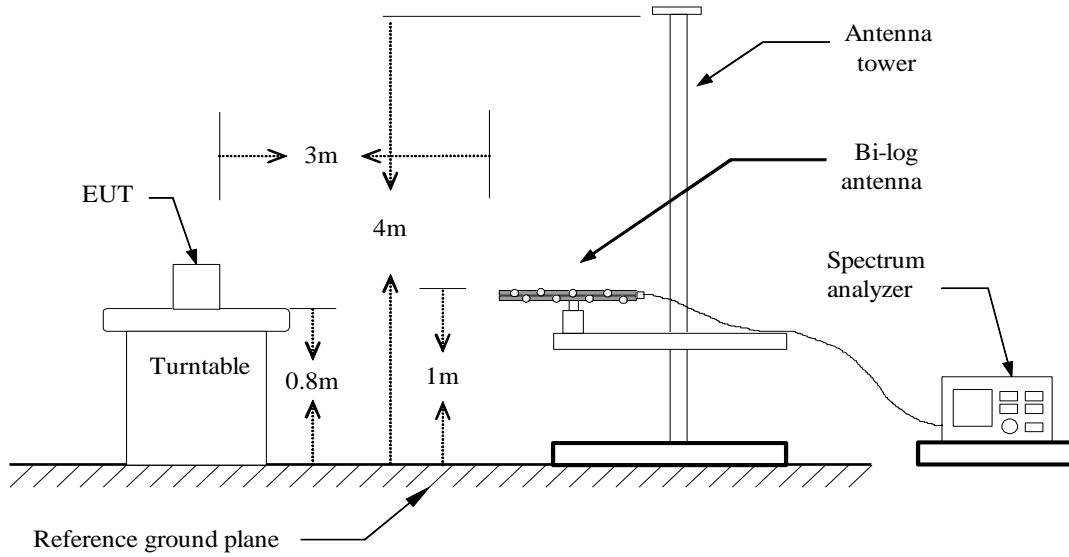
Test Mode	CH	Frequency (MHz)	AVG Power (dBm)	Output Power (W)
WCDMA (BAND IV)	1312	1712.40	21.83	0.15241
	1413	1732.60	21.15	0.13032
	1513	1752.60	21.44	0.13932
HSDPA (BAND IV)	1312	1712.40	21.39	0.13772
	1413	1732.60	21.35	0.13646
	1513	1752.60	21.04	0.12706
HSUPA (BAND IV)	1312	1712.40	20.91	0.12331
	1413	1732.60	20.73	0.11830
	1513	1752.60	21.21	0.13213

Remark: The value of factor includes both the loss of cable and external attenuator

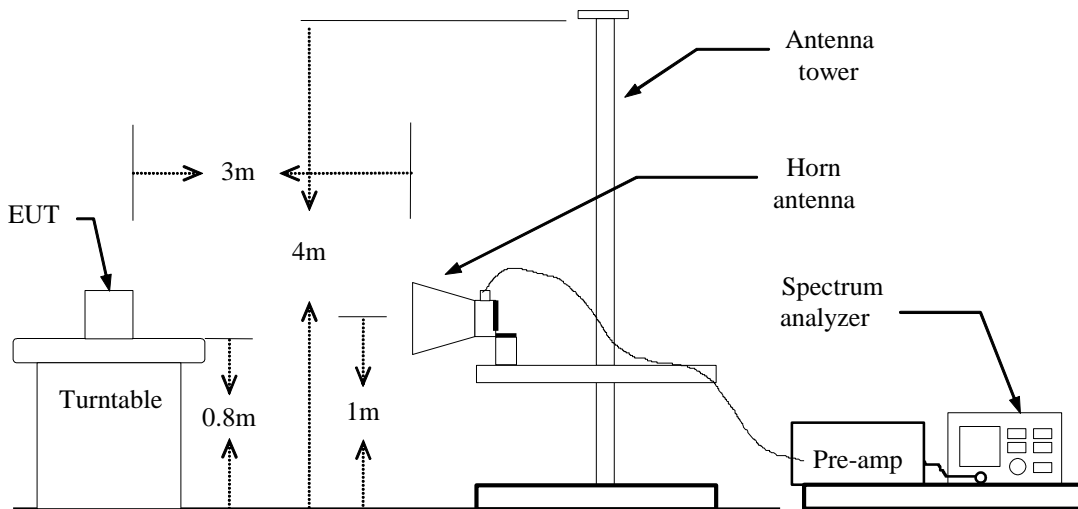
7.3 ERP & EIRP MEASUREMENT

Test Configuration

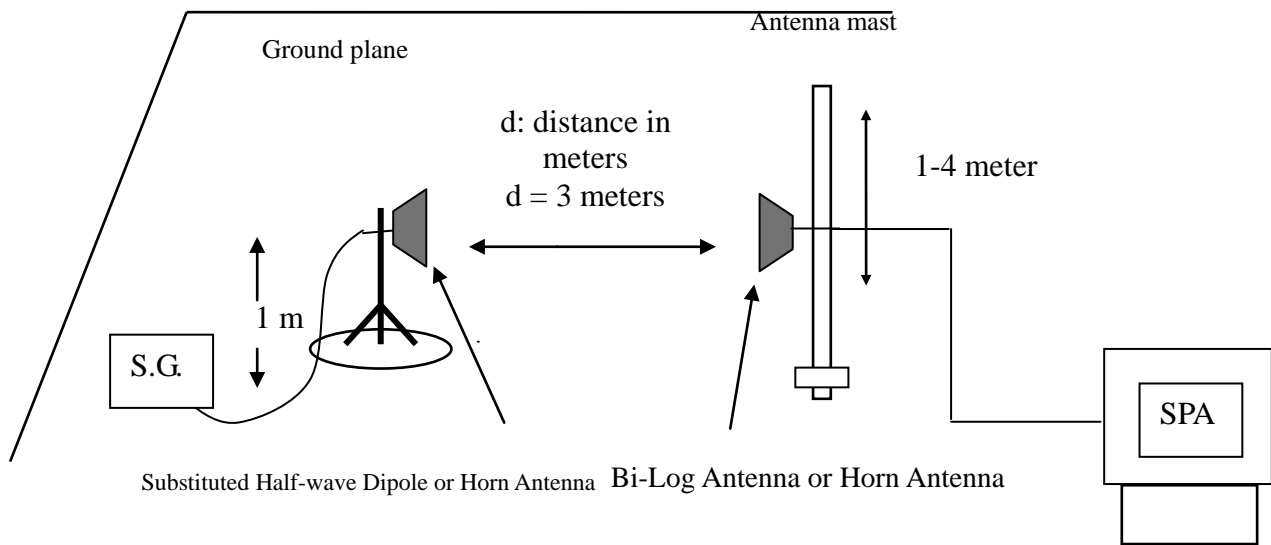
Below 1 GHz



Above 1 GHz



For Substituted Method Test Set-UP



TEST PROCEDURE

The EUT was placed on an 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.

During the measurement of the EUT, the resolution bandwidth was set 1% to 5% of the OBW and not to exceed 1 MHz. The highest emission was recorded with the rotation of the turntable and the lowering of the test antenna. The reading was recorded and the field strength (E in dBuV/m) was calculated.

EIRP in frequency band 1712-1752MHz were measured using a substitution method. The EUT was replaced by half-wave dipole (1712-1752MHz) connected to a signal generator. The spectrum analyzer reading was recorded and EIRP was calculated as follows:

$$ERP = S.G. \text{ output (dBm)} + \text{Antenna Gain (dBd)} - \text{Cable (dB)}$$

$$EIRP = S.G. \text{ output (dBm)} + \text{Antenna Gain (dBi)} - \text{Cable (dB)}$$

TEST RESULTS

No non-compliance noted.

WCDMA BAND IV Test Data

Channel	Frequency (MHz)	Antenna Pol.	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)
1312	1712.40	V	20.64	5.13	5.92	21.43	33.00	-11.57
	1712.40	H	17.84	5.13	5.92	18.63	33.00	-14.37
1413	1732.60	V	22.25	5.17	5.88	22.96	33.00	-10.04
	1732.60	H	20.87	5.17	5.88	21.58	33.00	-11.42
1513	1752.60	V	22.48	5.21	5.84	*23.11	33.00	-9.89
	1752.60	H	19.88	5.21	5.84	20.51	33.00	-12.49

HSDPA BAND IV Test Data

Channel	Frequency (MHz)	Antenna Pol.	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)
1312	1712.40	V	21.42	5.13	5.92	22.21	33.00	-10.79
	1712.40	H	20.55	5.13	5.92	21.34	33.00	-11.66
1413	1732.60	V	22.55	5.17	5.88	23.26	33.00	-9.74
	1732.60	H	21.22	5.17	5.88	21.93	33.00	-11.07
1513	1752.60	V	23.13	5.21	5.84	*23.76	33.00	-9.24
	1752.60	H	20.48	5.21	5.84	21.11	33.00	-11.89

HSUPA BAND IV Test Data

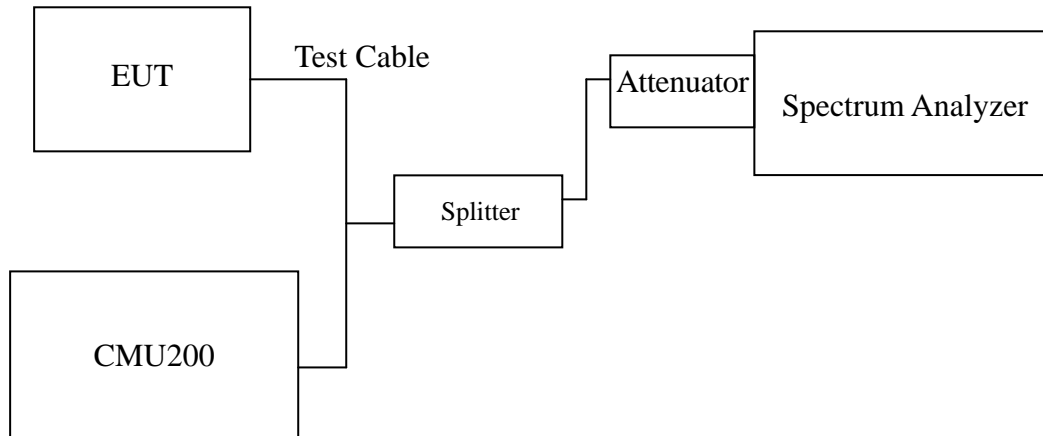
Channel	Frequency (MHz)	Antenna Pol.	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)
1312	1712.40	V	21.25	5.13	5.92	22.04	33.00	-10.96
	1712.40	H	19.12	5.13	5.92	19.91	33.00	-13.09
1413	1732.60	V	22.72	5.17	5.88	*23.43	33.00	-9.57
	1732.60	H	19.99	5.17	5.88	20.70	33.00	-12.30
1513	1752.60	V	22.14	5.21	5.84	22.77	33.00	-10.23
	1752.60	H	19.88	5.21	5.84	20.51	33.00	-12.49

7.4 OCCUPIED BANDWIDTH MEASUREMENT

LIMIT

According to §FCC 2.1049.

Test Configuration



Remark: Measurement setup for testing on Antenna connector

TEST PROCEDURE

The EUT's output RF connector was connected with a short cable to the spectrum analyzer, RBW was set to about 1% of emission BW, VBW is set to 3 times the RBW, -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 RESULTS

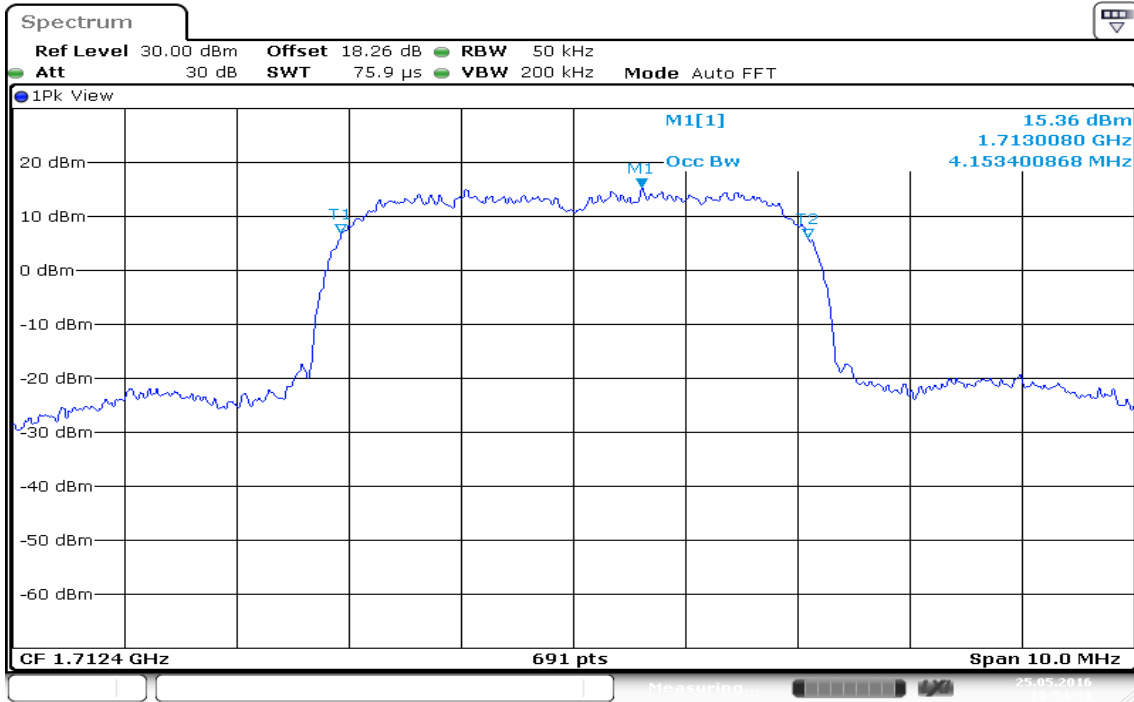
No non-compliance noted

Test Data

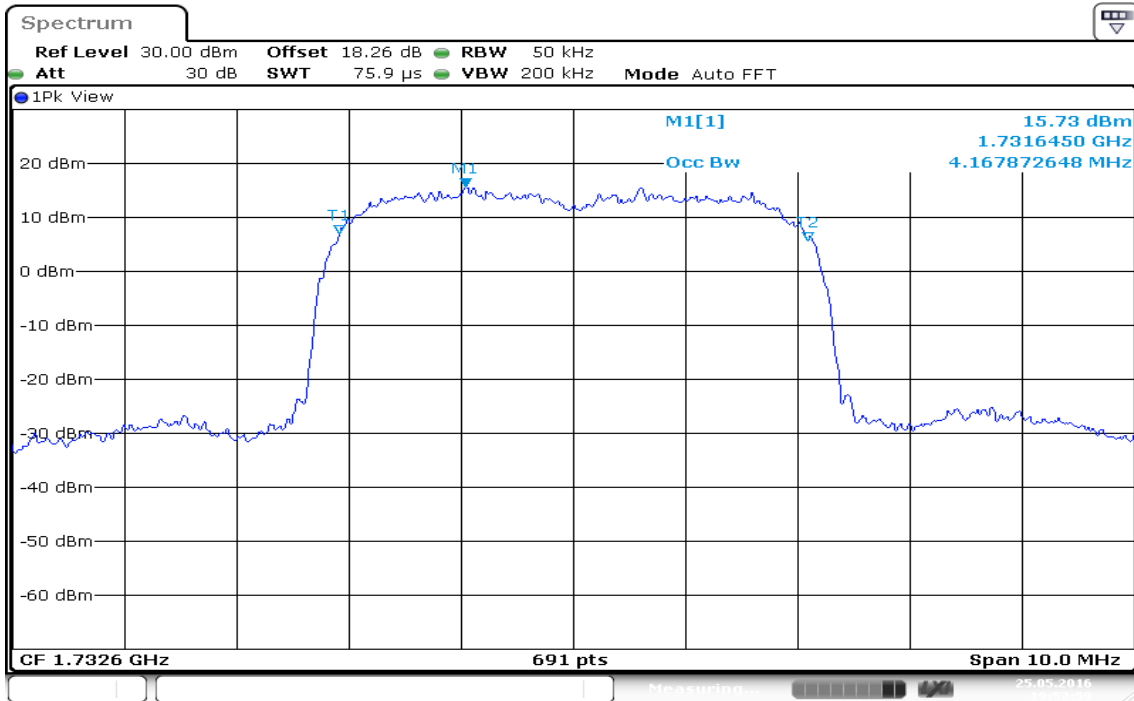
Test Mode	CH	Frequency (MHz)	99% Bandwidth (MHz)
WCDMA (Band IV)	1312	1712.40	4.1534
	1413	1732.60	4.1678
	1513	1752.60	4.1678
HSDPA (Band IV)	1312	1712.40	4.1678
	1413	1732.60	4.1534
	1513	1752.60	4.1678
HSUPA (Band IV)	1312	1712.40	4.1678
	1413	1732.60	4.1534
	1513	1752.60	4.1823

Test Plot

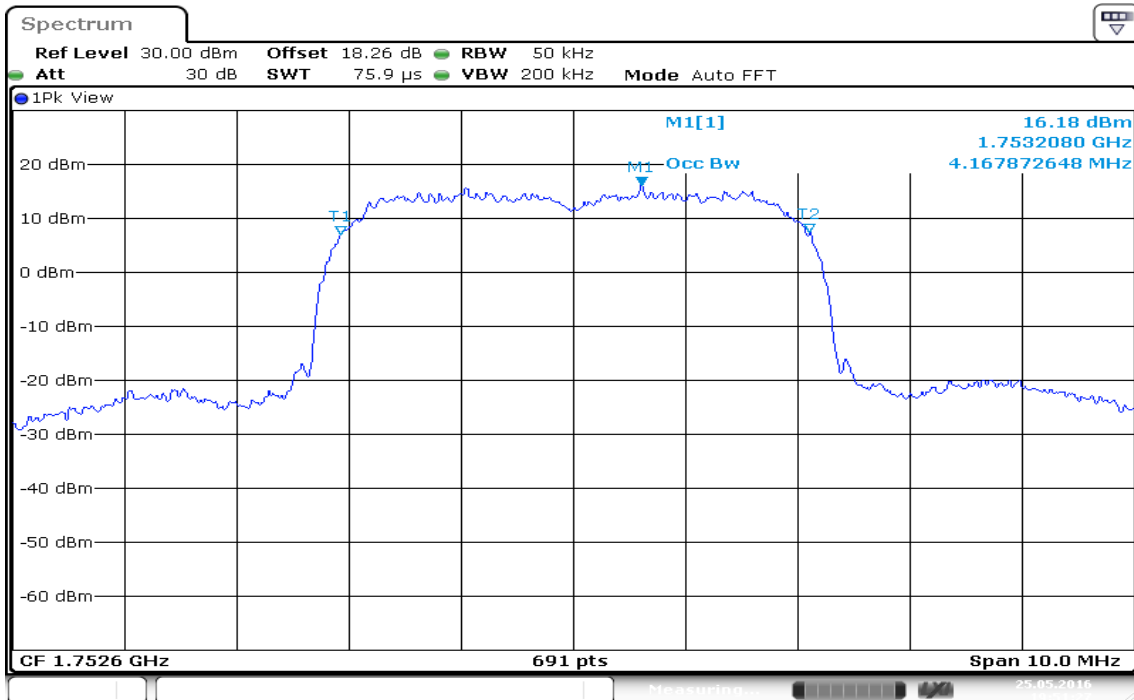
WCDMA Band IV (CH Low)



WCDMA Band IV (CH Mid)

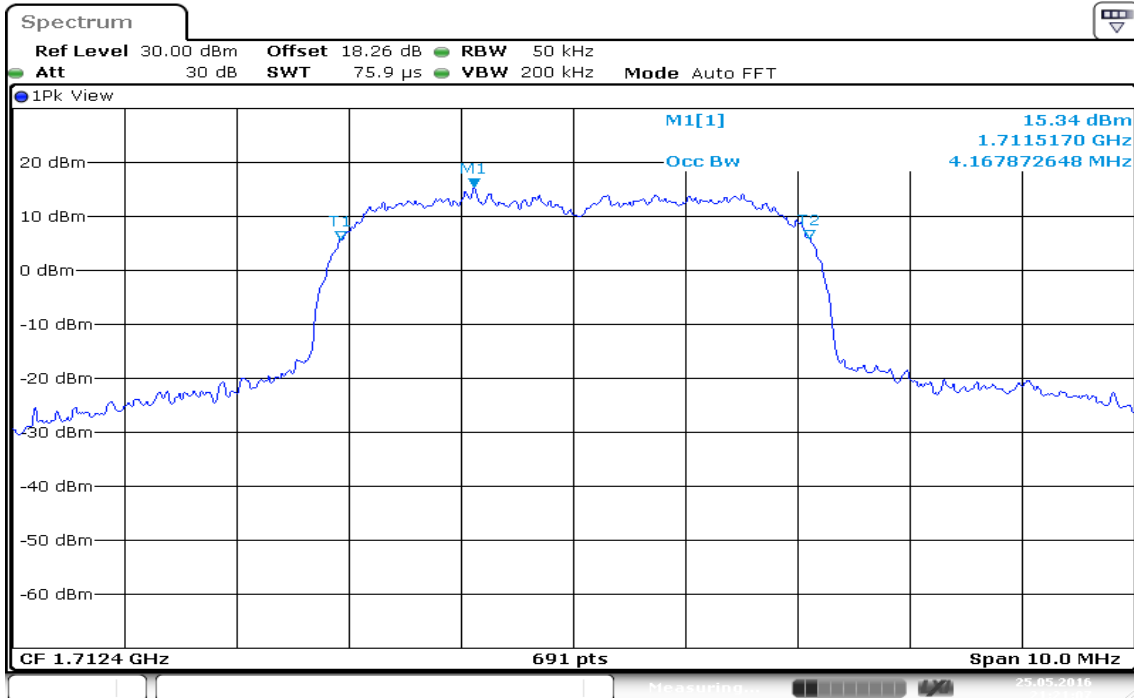


WCDMA Band IV (CH High)



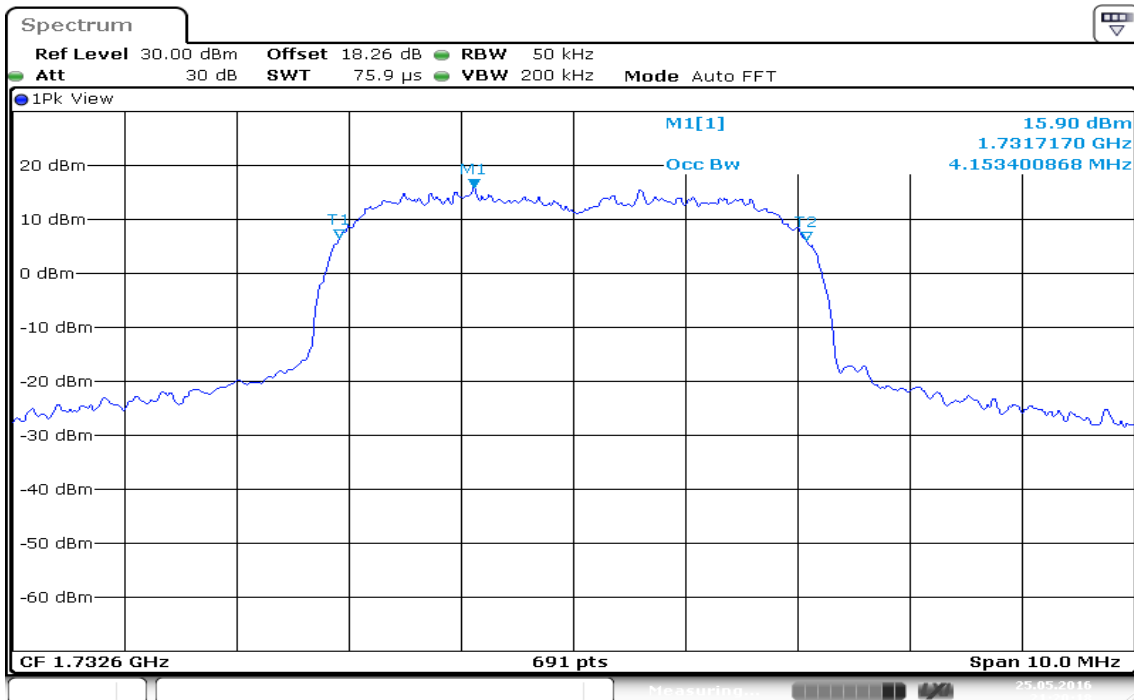
Date: 25 MAY 2016 19:51:27

HSDPA Band IV (CH Low)



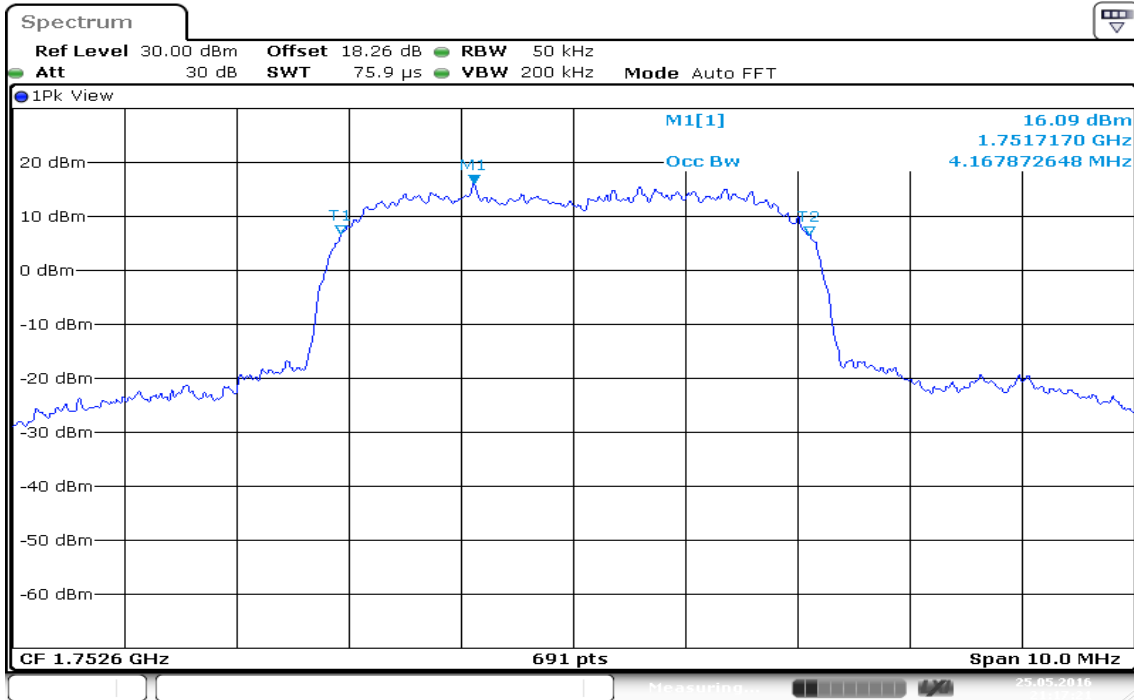
Date: 25 MAY 2016 21:21:07

HSDPA Band IV (CH Mid)



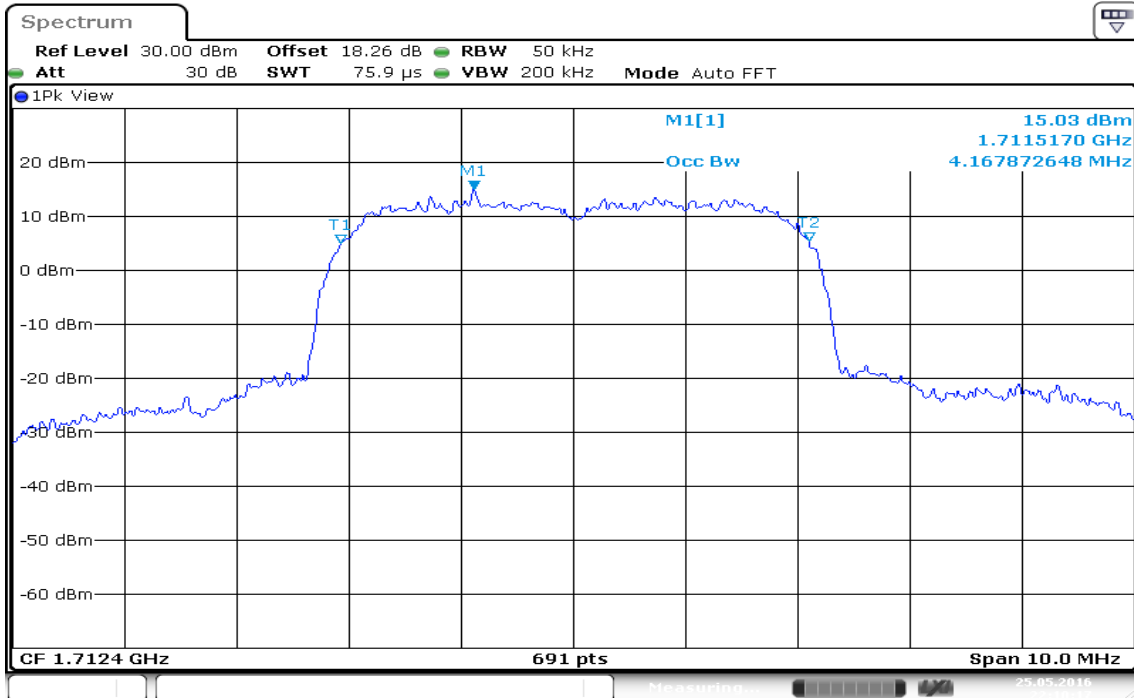
Date: 25 MAY 2016 21:20:19

HSDPA Band IV (CH High)



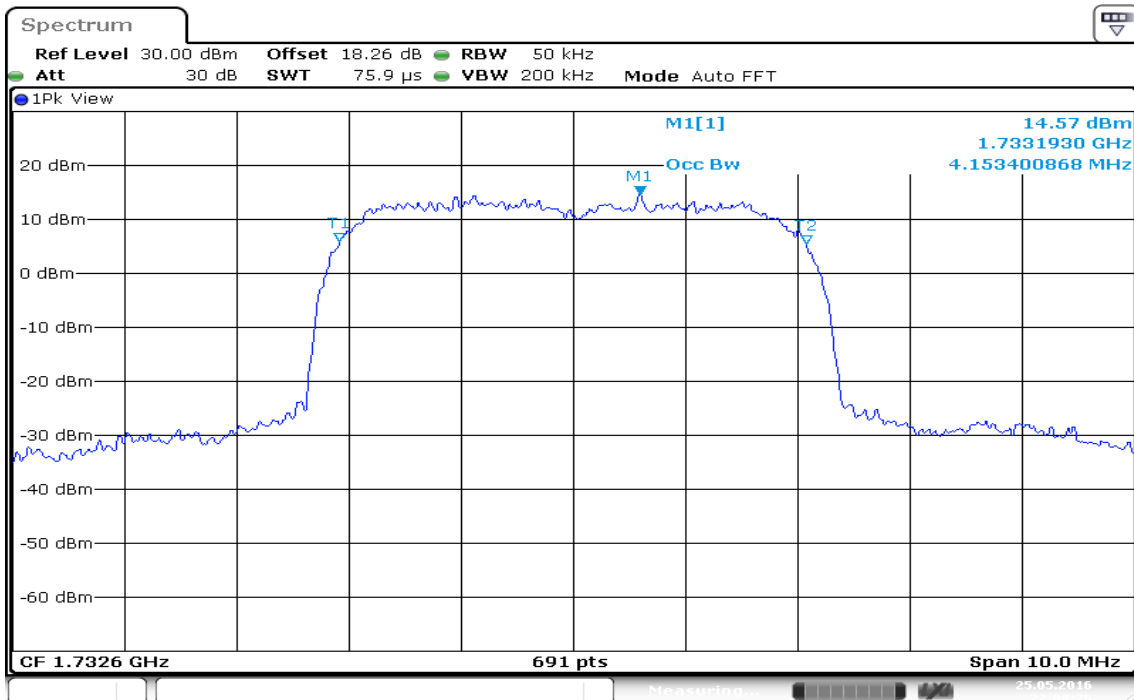
Date: 25 MAY 2016 21:17:21

HSUPA Band IV (CH Low)



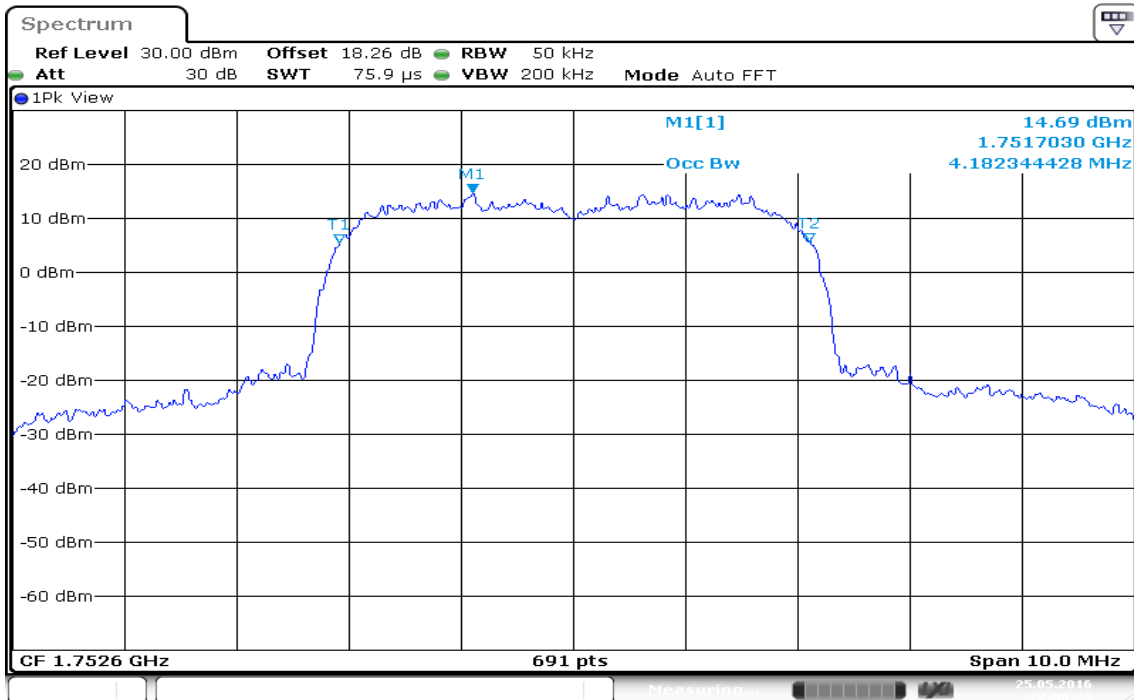
Date: 25 MAY 2016 22:10:17

HSUPA Band IV (CH Mid)



Date: 25 MAY 2016 22:09:26

HSUPA Band IV (CH High)



Date: 25 MAY 2016 22:08:24

7.5 OUT OF BAND EMISSION AT ANTENNA TERMINALS

LIMIT

According to FCC §2.1051, FCC §22.917, FCC §24.238(a), FCC§27.53

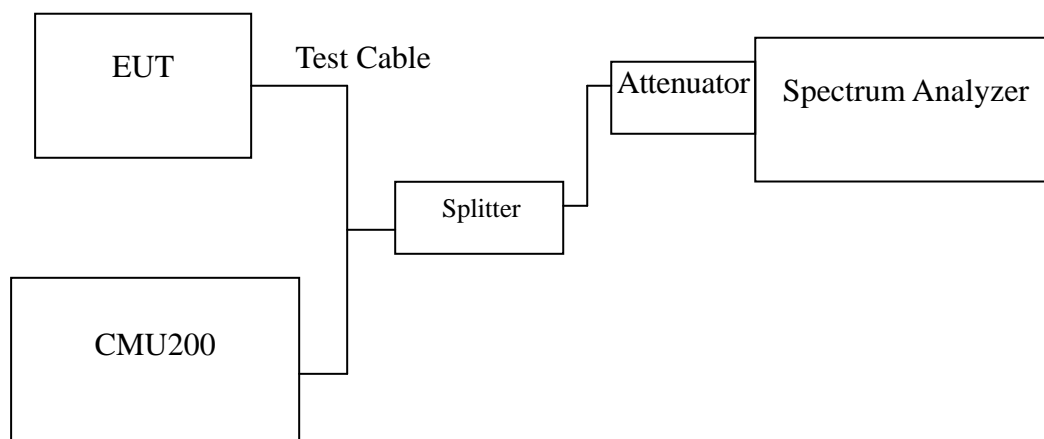
Out of Band Emissions: The mean power of emission must be attenuated below the mean power of the non-modulated carrier (P) on any frequency twice or more than twice the fundamental frequency by at least $43 + 10 \log P$ dB.

Mobile Emissions in Base Frequency Range: The mean power of any emissions appearing in the base station frequency range from cellular mobile transmitters operated must be attenuated to a level not exceed -80 dBm at the transmit antenna connector.

Band Edge Requirements: In the 1MHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 1% of the emission bandwidth of the fundamental emission of the transmitter may be employed to measure the Out of band Emission

Test Configuration

Out of band emission at antenna terminals:



TEST PROCEDURE

The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation. 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.

For the out of band: Set the RBW, VBW = 1MHz, Start=30MHz, Stop= 10 th harmonic. Limit = -13dBm

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. Limit, -13dBm.

TEST RESULTS

No non-compliance noted.

Mode	CH	Location	Description
WCDMA (Band IV)	1312	Figure 8-1	Conducted spurious emissions, 30MHz - 20GHz
	1413	Figure 8-2	Conducted spurious emissions, 30MHz - 20GHz
	1513	Figure 8-3	Conducted spurious emissions, 30MHz - 20GHz
HSDPA (Band IV)	1312	Figure 9-1	Conducted spurious emissions, 30MHz - 20GHz
	1413	Figure 9-2	Conducted spurious emissions, 30MHz - 20GHz
	1513	Figure 9-3	Conducted spurious emissions, 30MHz - 20GHz
HSUPA (Band IV)	1312	Figure 10-1	Conducted spurious emissions, 30MHz - 20GHz
	1413	Figure 10-2	Conducted spurious emissions, 30MHz - 20GHz
	1513	Figure 10-3	Conducted spurious emissions, 30MHz - 20GHz

Mode	CH	Location	Description
WCDMA (Band IV)	1312	Figure 11-1	Band Edge emissions
	1513	Figure 11-2	Band Edge emissions
HSDPA (Band IV)	1312	Figure 12-1	Band Edge emissions
	1513	Figure 12-2	Band Edge emissions
HSUPA (Band IV)	1312	Figure 13-1	Band Edge emissions
	1513	Figure 13-2	Band Edge emissions

Test Plot

WCDMA Band IV

Figure 8-1: Out of Band emission at antenna terminals – WCDMA CH Low

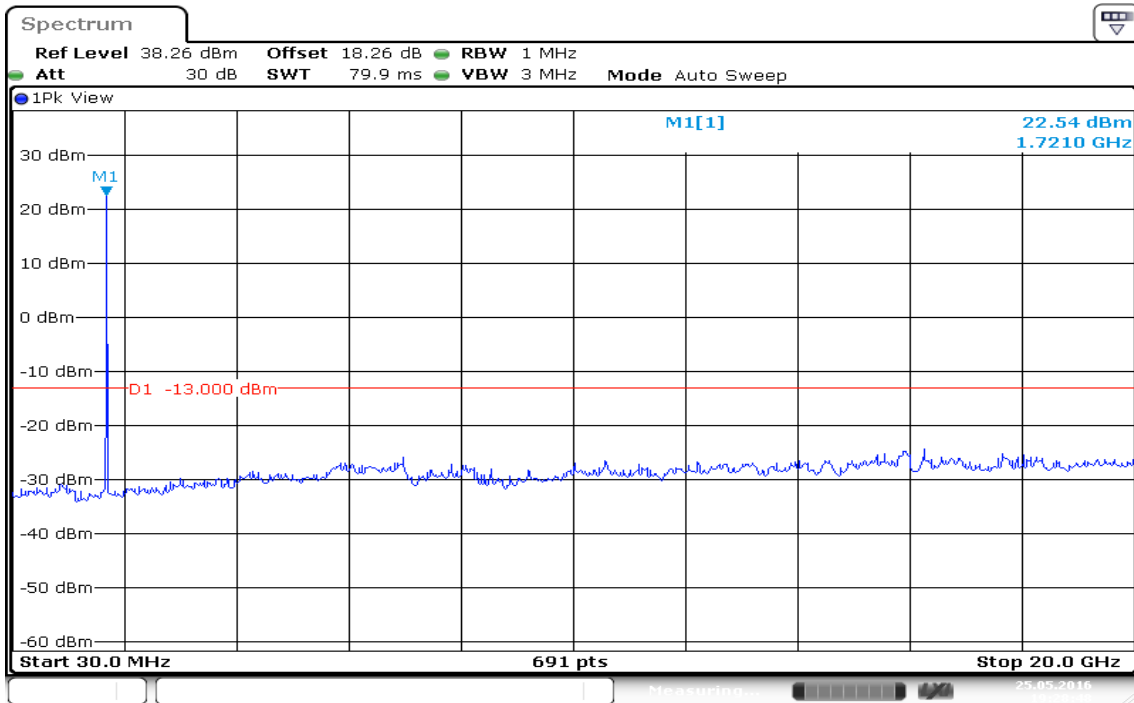


Figure 8-2: Out of Band emission at antenna terminals – WCDMA CH Mid

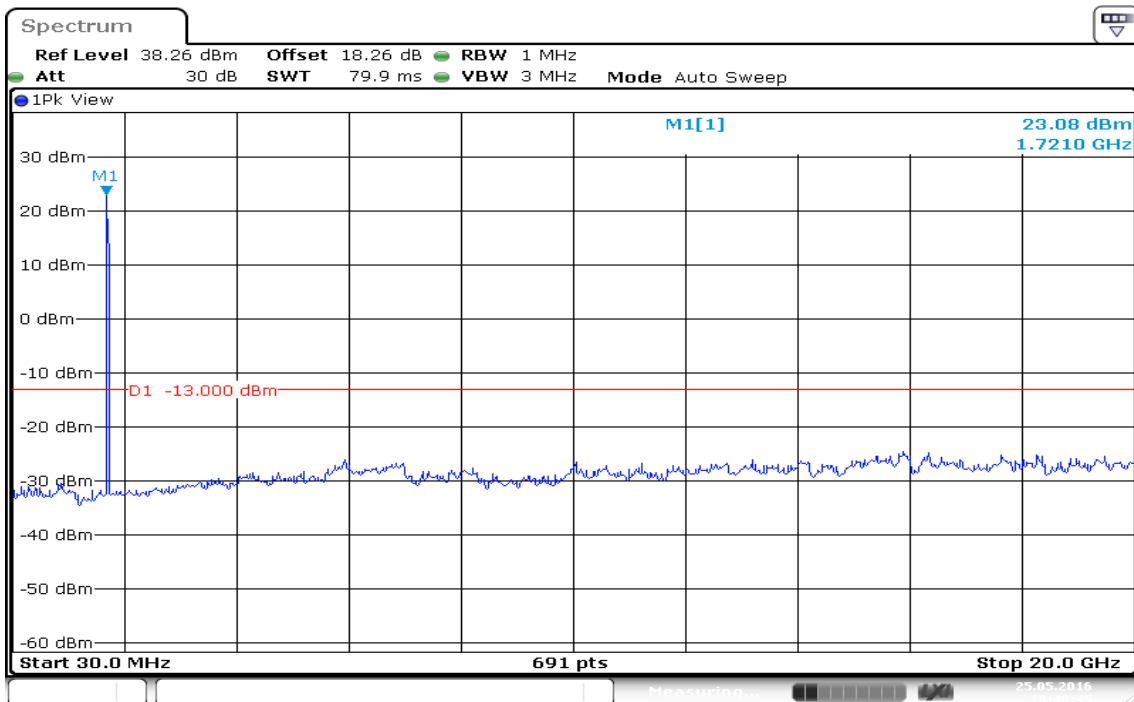
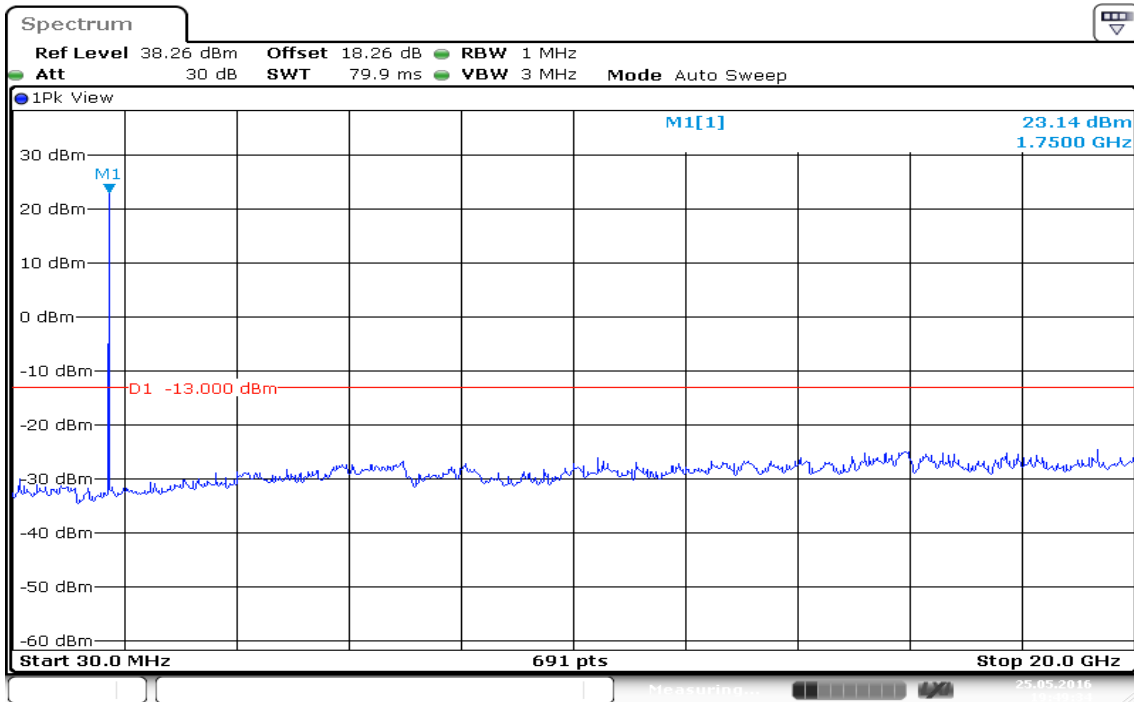


Figure 8-3: Out of Band emission at antenna terminals – WCDMA CH High



Date: 25 MAY 2016 19:49:35

HSDPA Band IV

Figure 9-1: Out of Band emission at antenna terminals – HSDPA CH Low

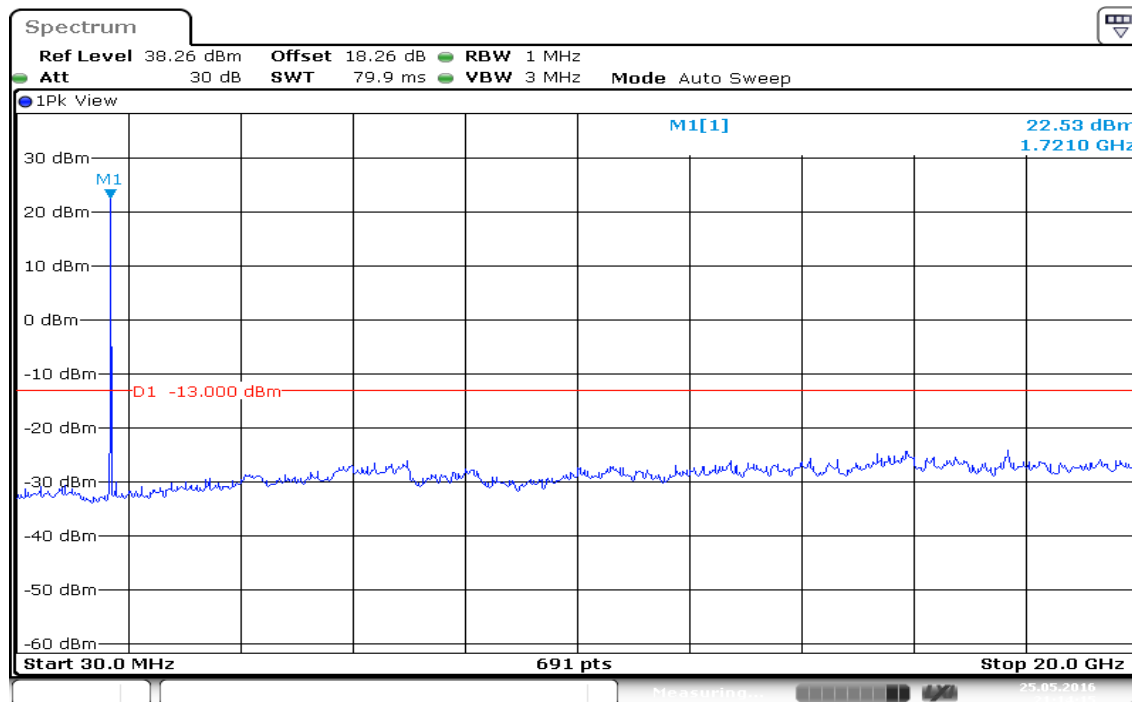


Figure 9-2: Out of Band emission at antenna terminals – HSDPA CH Mid

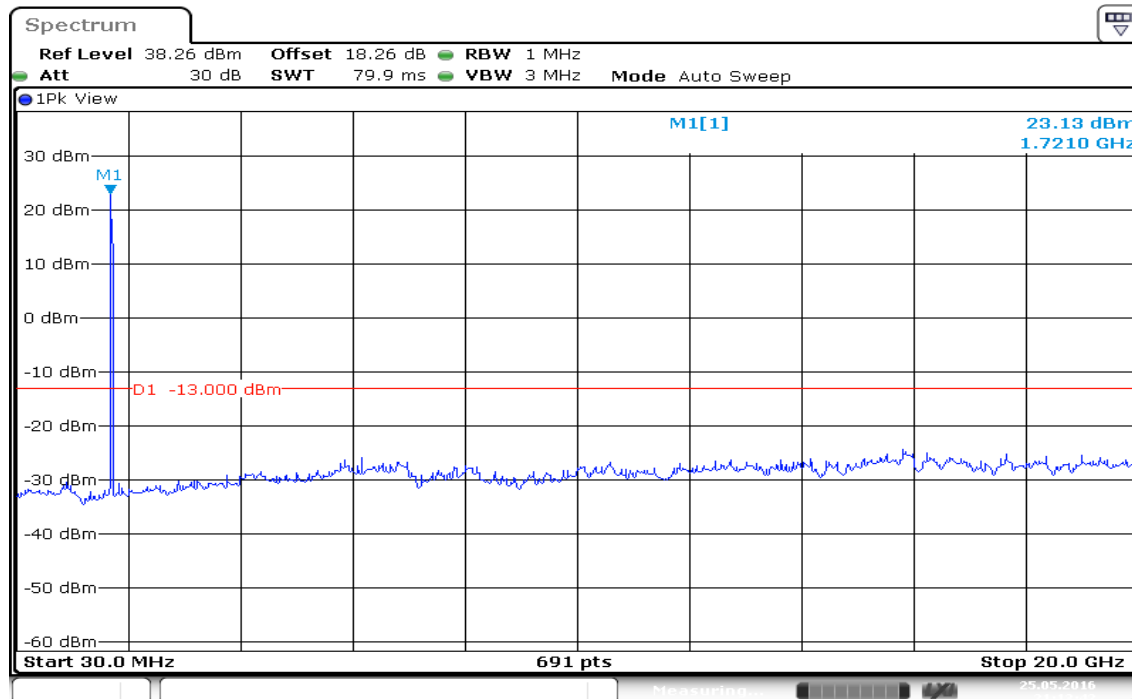
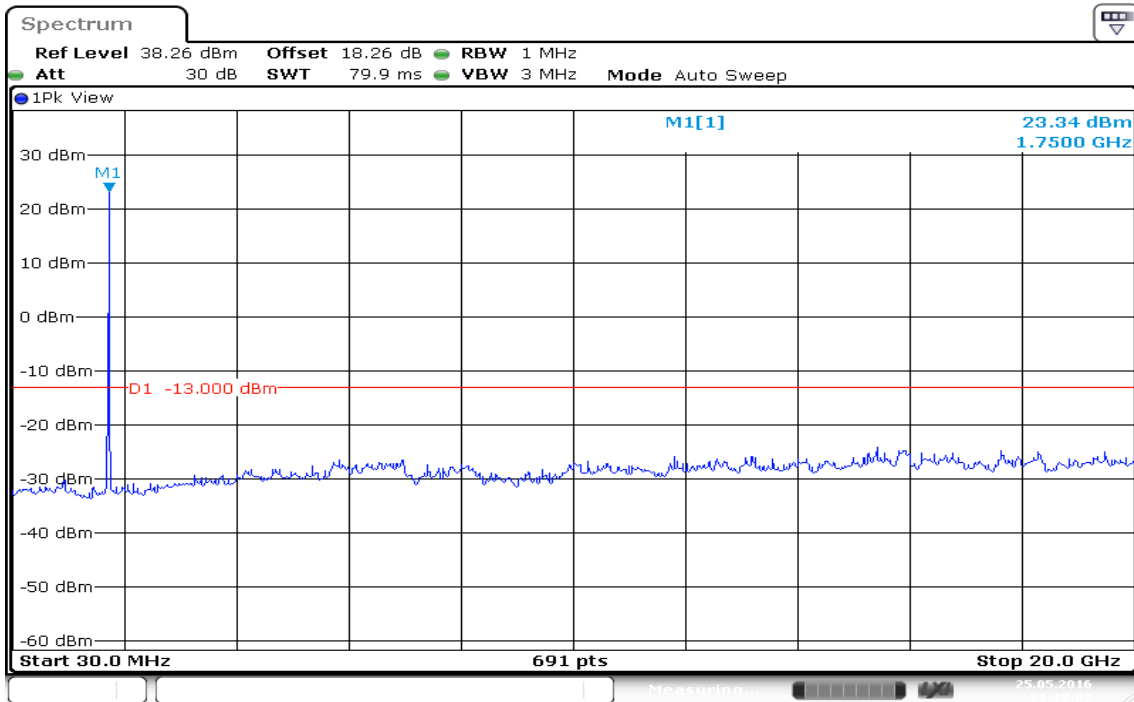


Figure 9-3: Out of Band emission at antenna terminals – HSDPA CH High



Date: 25 MAY 2016 21:13:02

HSUPA Band IV

Figure 10-1: Out of Band emission at antenna terminals – HSUPA CH Low

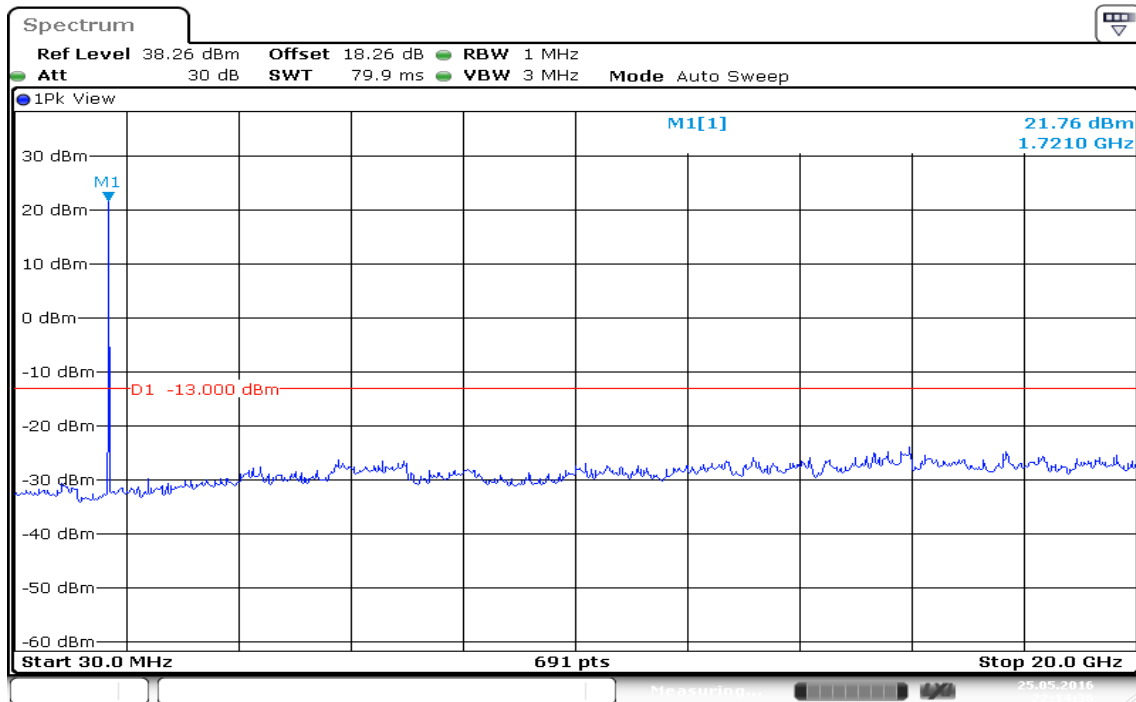


Figure 10-2: Out of Band emission at antenna terminals – HSUPA CH Mid

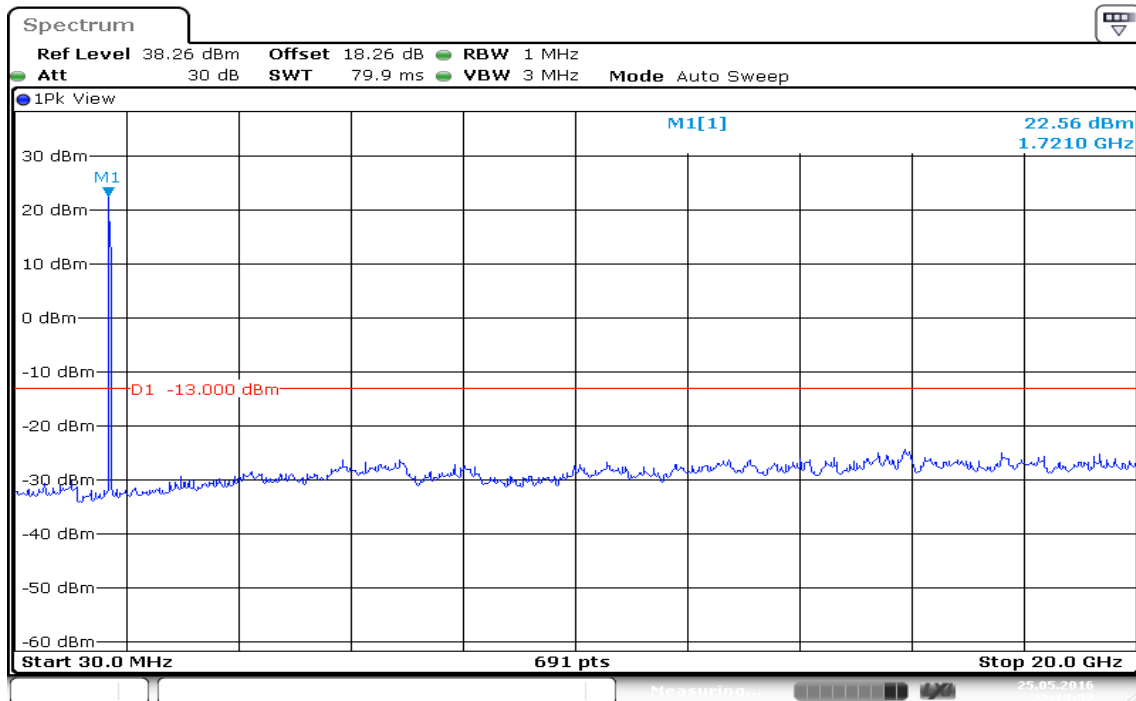
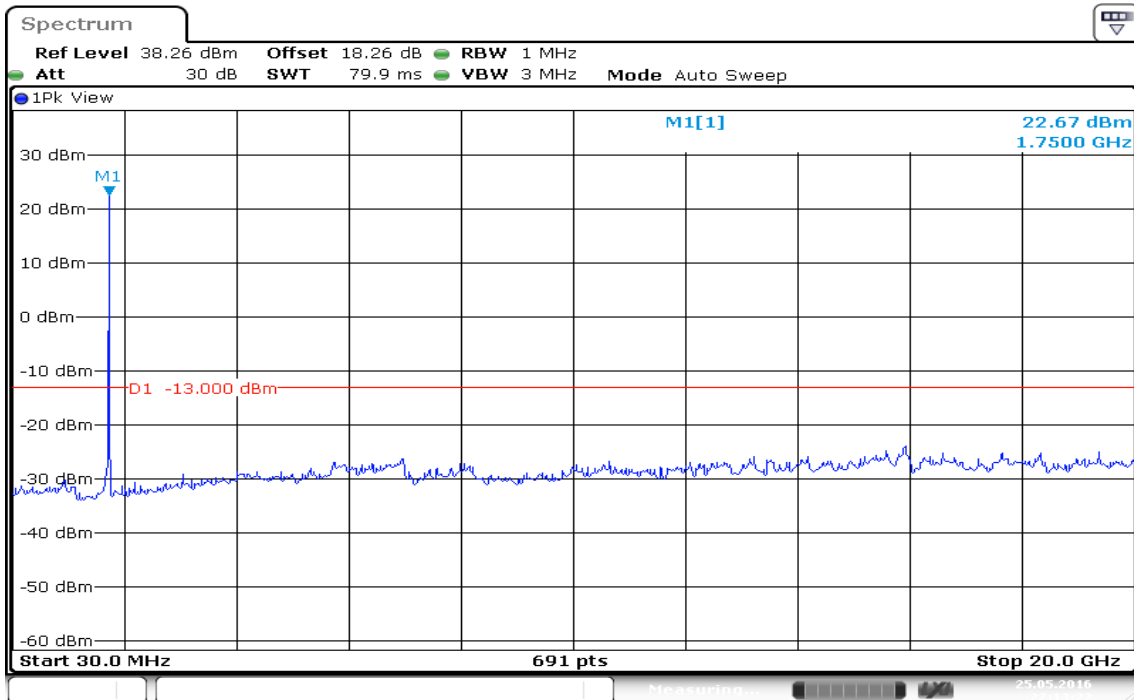


Figure 10-3: Out of Band emission at antenna terminals – HSUPA CH High



Date: 25 MAY 2016 22:13:23

WCDMA Band IV

Figure 11-1: Band Edge emissions – WCDMA CH Low

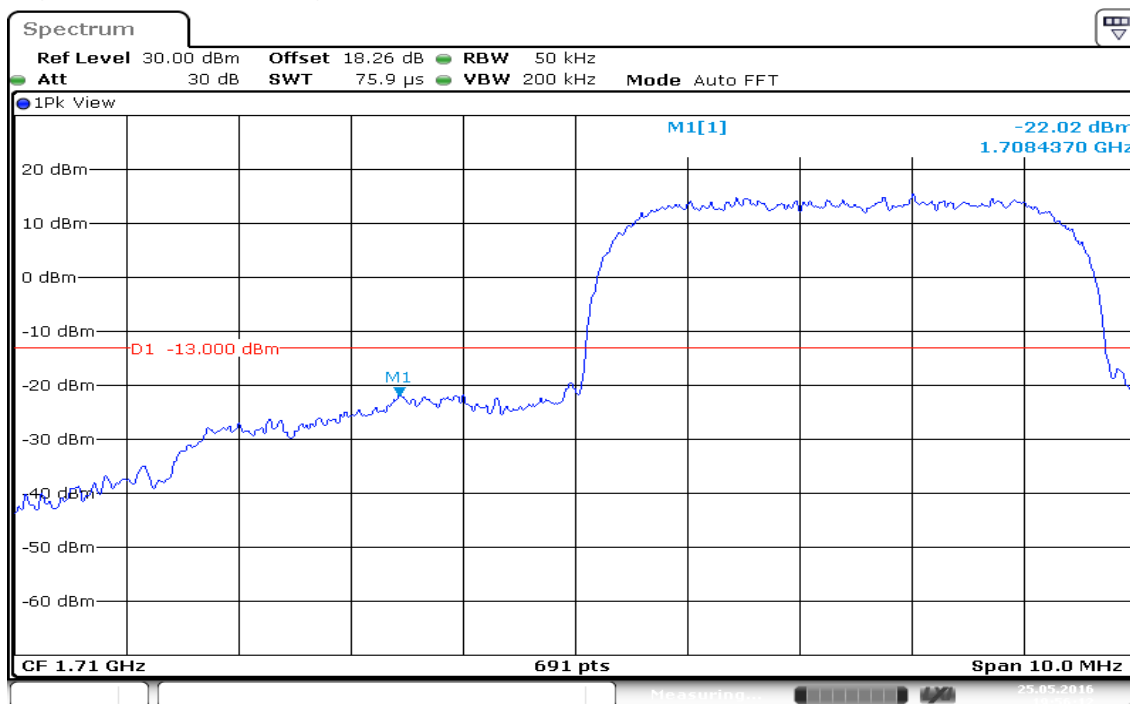
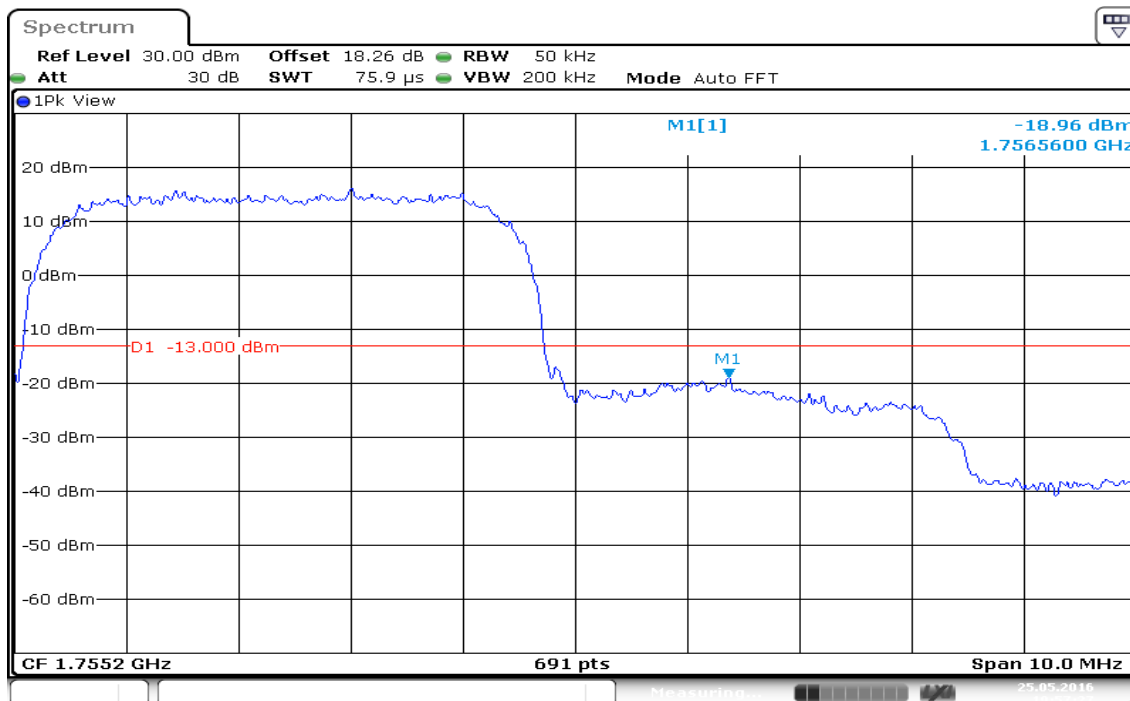


Figure 11-2: Band Edge emissions –WCDMA CH High



HSDPA Band IV

Figure 12-1: Band Edge emissions – HSDPA CH Low

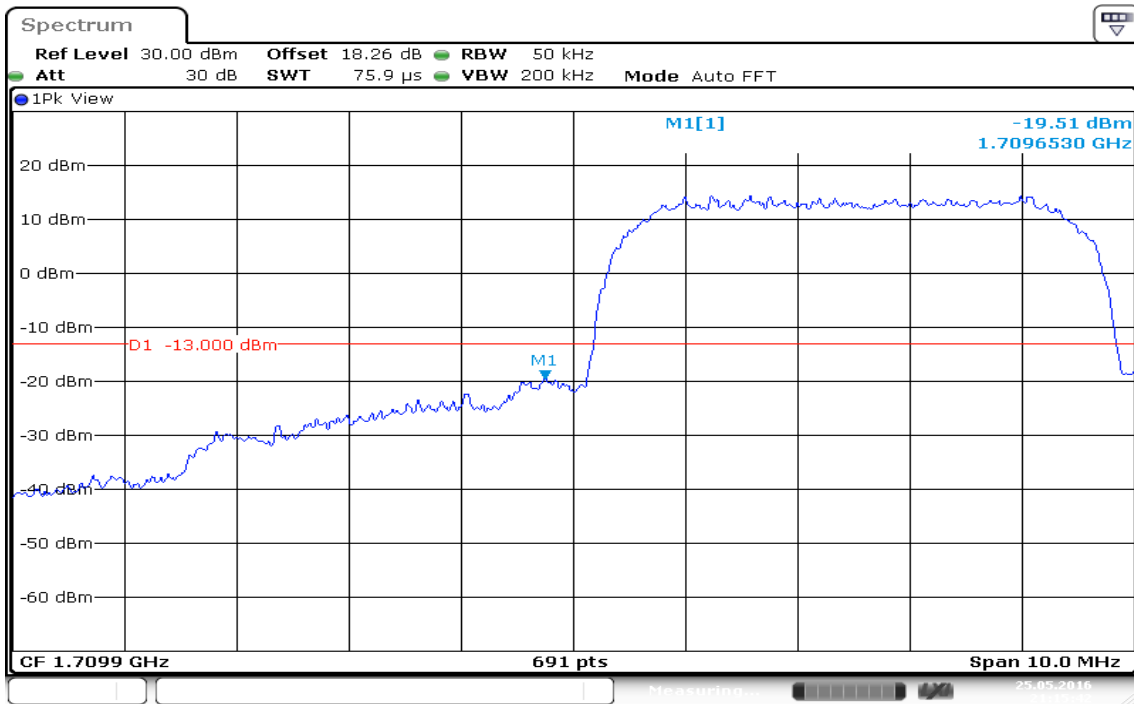
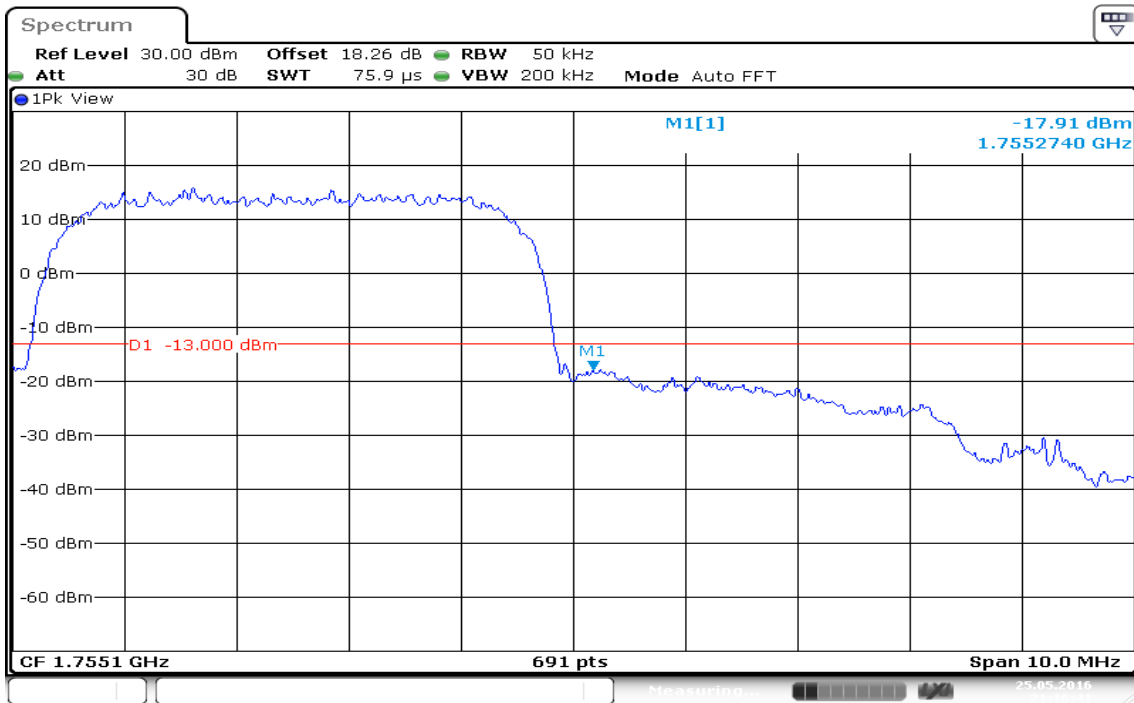


Figure 12-2: Band Edge emissions – HSDPA CH High



HSUPA Band IV

Figure 13-1: Band Edge emissions – HSUPA CH Low

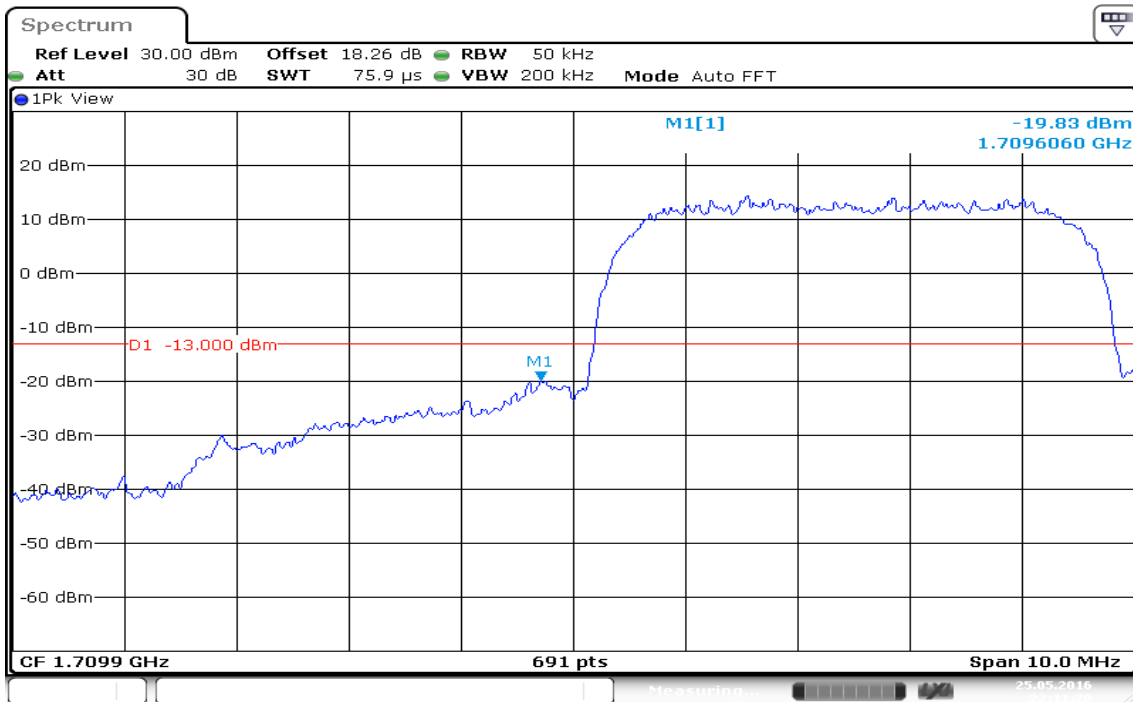
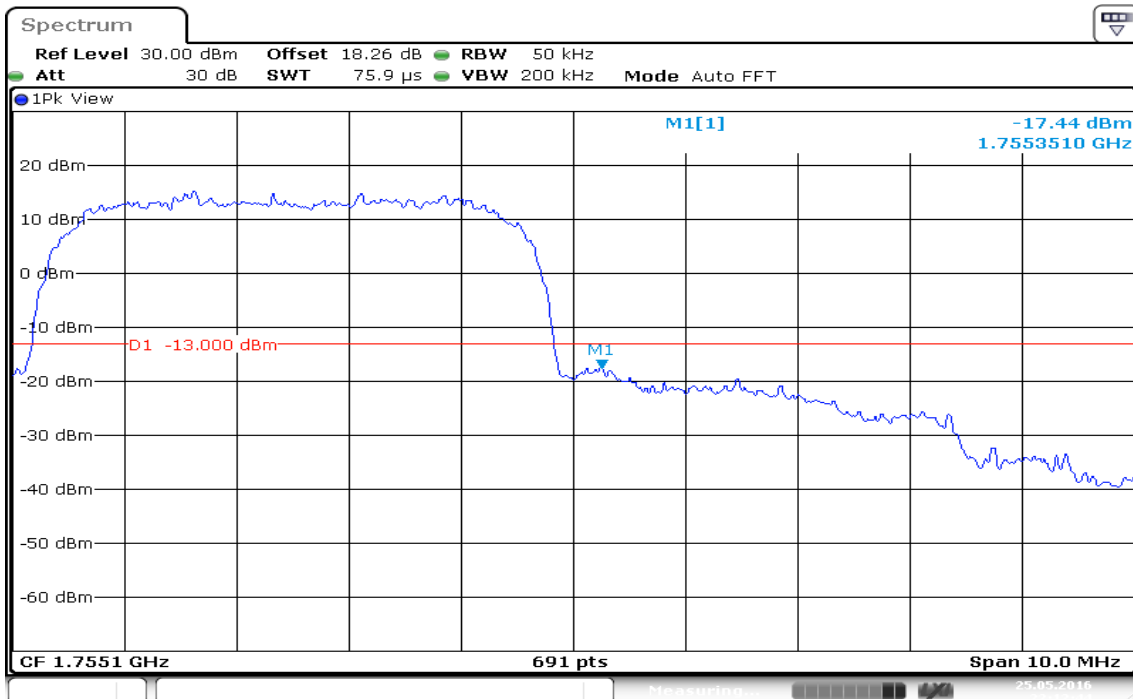


Figure 13-2: Band Edge emissions – HSUPA CH High



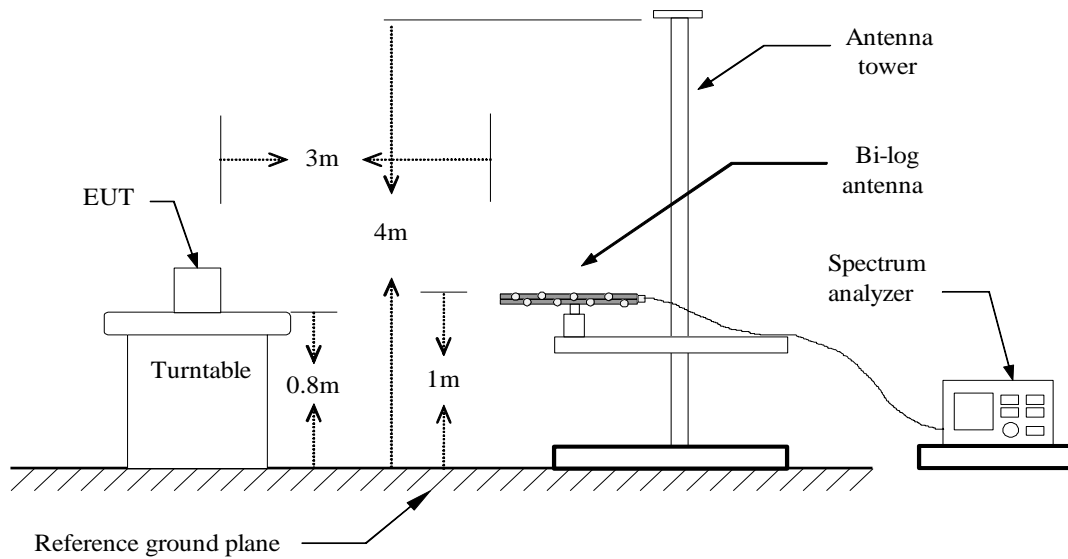
7.6 FIELD STRENGTH OF SPURIOUS RADIATION MEASUREMENT

LIMIT

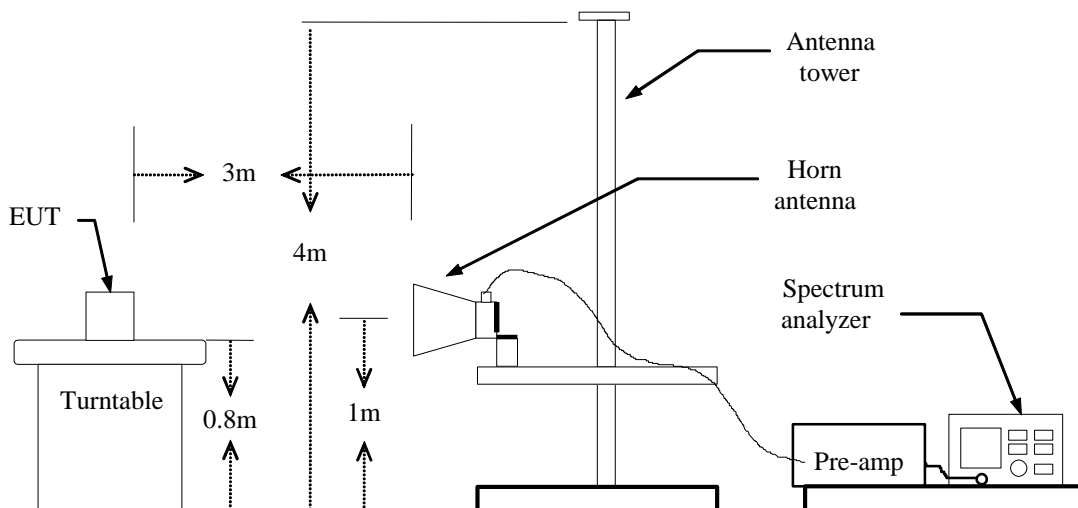
According to FCC §2.1053

Test Configuration

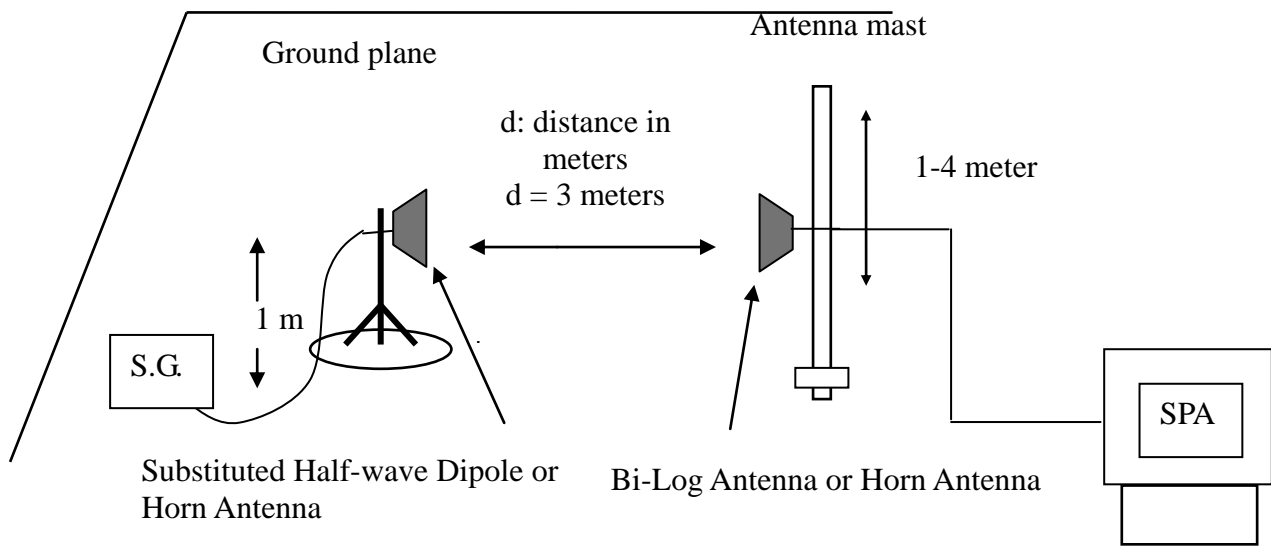
Below 1 GHz



Above 1 GHz



Substituted Method Test Set-up



TEST PROCEDURE

The EUT was placed on a non-conductive, the measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.

The frequency range up to tenth harmonic was investigated for each of three fundamental frequency (low, middle and high channels). Once spurious emission were identified, the power of the emission was determined using the substitution method.

The spurious emissions attenuation was calculated as the difference between radiated power at the fundamental frequency and the spurious emissions frequency.

$$ERP = \text{S.G. output (dBm)} + \text{Antenna Gain (dBd)} - \text{Cable (dB)}$$

$$EIRP = \text{S.G. output (dBm)} + \text{Antenna Gain (dBi)} - \text{Cable (dB)}$$

TEST RESULTS

Refer to the attached tabular data sheets.

Operation Mode: WCDMA Band IV / TX / CH 1413

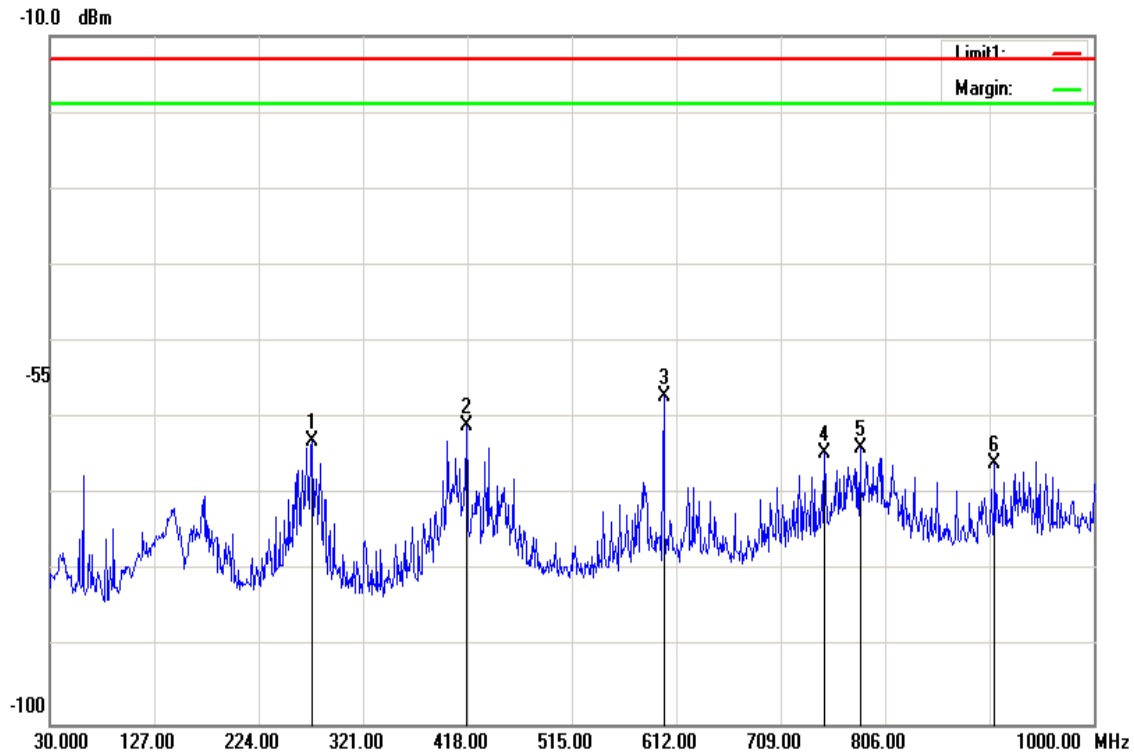
Test Date: May 24, 2016

Temperature: 22.6°C

Tested by: Dennis Li

Humidity: 57.2 % RH

Polarity: Ver.



Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
273.4700	-66.2	1.99	5.17	-63.02	-13.00	-50.02	V
417.0300	-64.38	2.46	5.84	-61.00	-13.00	-48.00	V
600.3600	-60.65	2.9	6.4	-57.15	-13.00	-44.15	V
749.7400	-67.4	3.2	6.1	-64.50	-13.00	-51.50	V
782.7200	-66.71	3.31	6.14	-63.88	-13.00	-50.88	V
907.8500	-69.02	3.56	6.6	-65.98	-13.00	-52.98	V

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with "N/A" remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

Operation Mode: WCDMA Band IV / TX / CH 1413

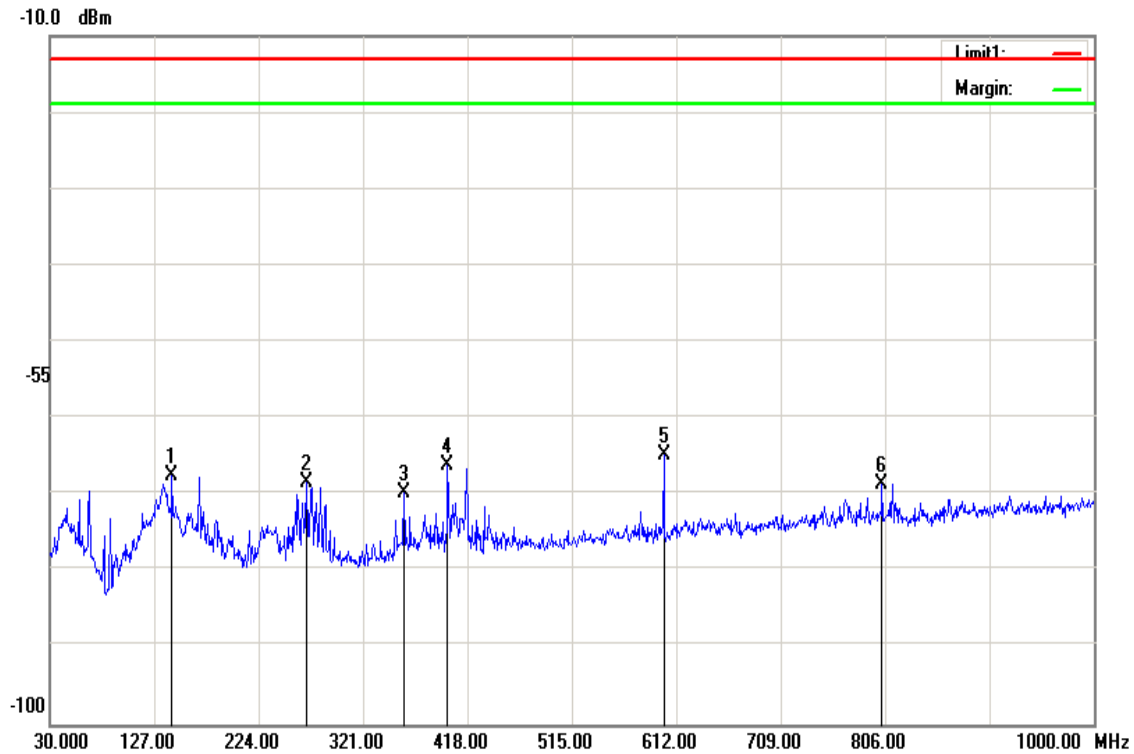
Test Date: May 24, 2016

Temperature: 22.6°C

Tested by: Dennis Li

Humidity: 57.2 % RH

Polarity: Hor.



Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
143.4900	-66.18	1.4	0.08	-67.50	-13.00	-54.50	H
268.6200	-71.6	1.97	5.17	-68.40	-13.00	-55.40	H
358.8300	-73.08	2.27	5.71	-69.64	-13.00	-56.64	H
399.5700	-69.67	2.39	5.98	-66.08	-13.00	-53.08	H
600.3600	-68.18	2.9	6.4	-64.68	-13.00	-51.68	H
803.0900	-71.67	3.33	6.48	-68.52	-13.00	-55.52	H

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

Operation Mode: HSDPA Band IV / TX / CH 1413

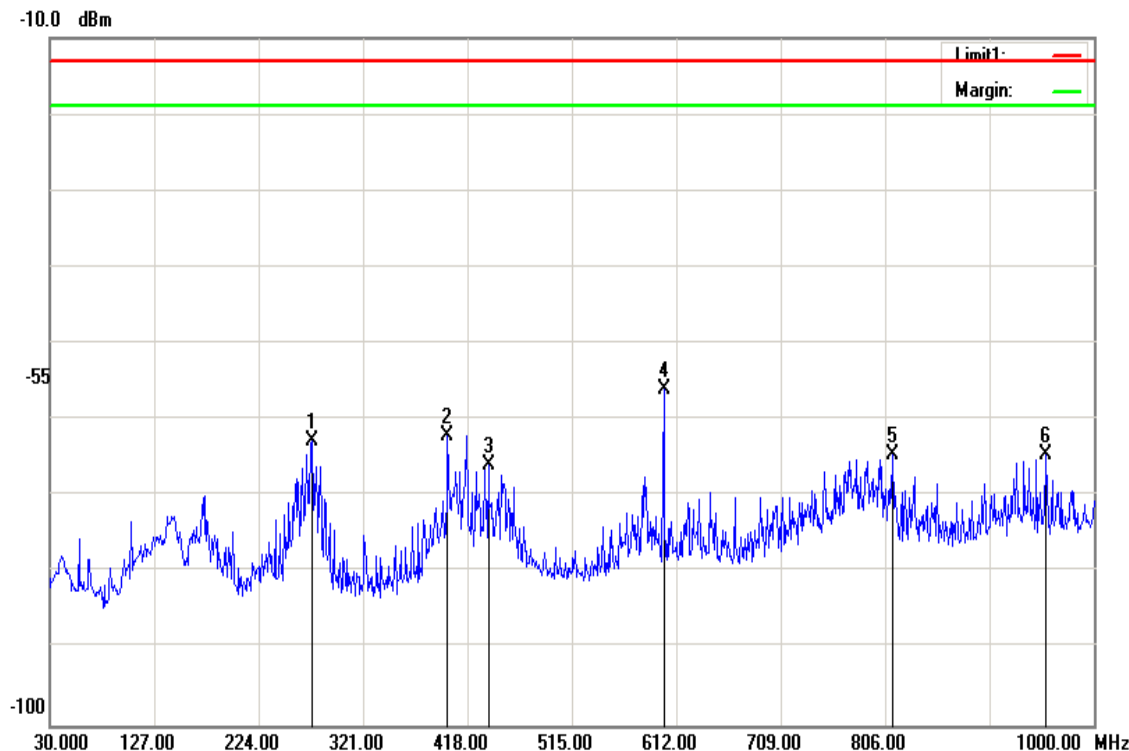
Test Date: May 24, 2016

Temperature: 22.6°C

Tested by: Dennis Li

Humidity: 57.2 % RH

Polarity: Ver.



Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
273.4700	-65.97	1.99	5.17	-62.79	-13.00	-49.79	V
399.5700	-65.75	2.39	5.98	-62.16	-13.00	-49.16	V
437.4000	-69.34	2.52	5.88	-65.98	-13.00	-52.98	V
600.3600	-59.49	2.9	6.4	-55.99	-13.00	-42.99	V
812.7900	-67.35	3.35	6.2	-64.50	-13.00	-51.50	V
955.3800	-67.24	3.65	6.37	-64.52	-13.00	-51.52	V

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

Operation Mode: HSDPA Band IV / TX / CH 1413

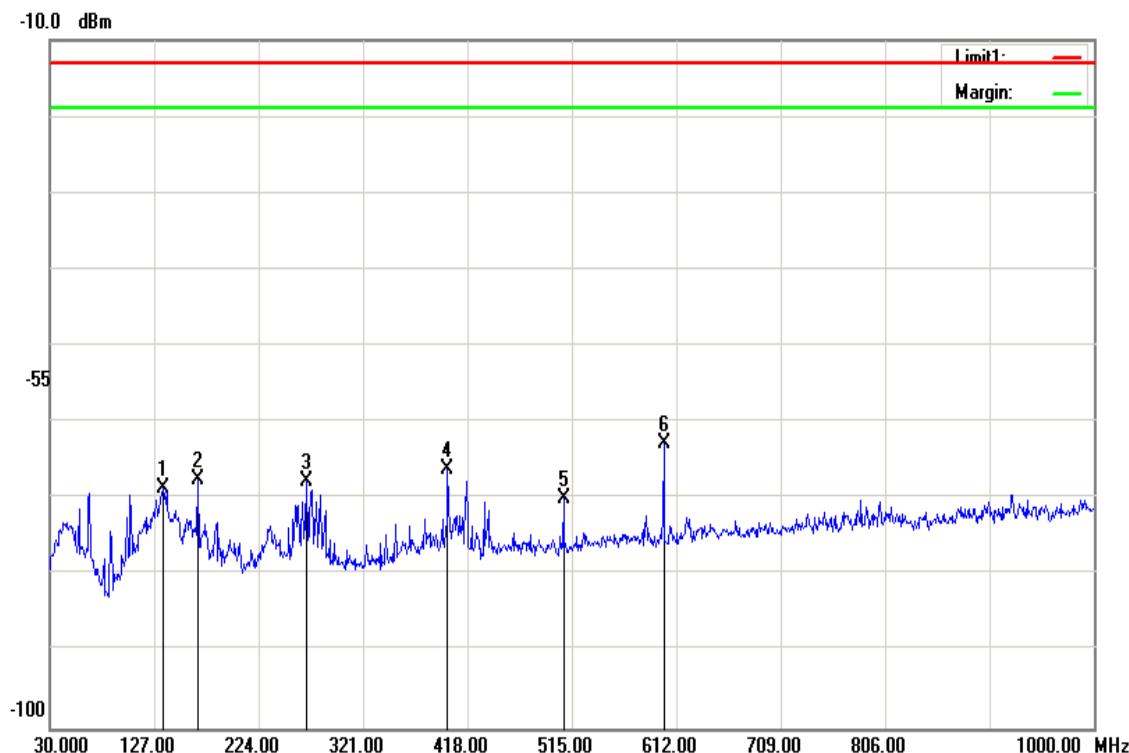
Test Date: May 24, 2016

Temperature: 22.6°C

Tested by: Dennis Li

Humidity: 57.2 % RH

Polarity: Hor.



Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
134.7600	-66.43	1.37	-0.84	-68.64	-13.00	-55.64	H
167.7400	-68.25	1.55	2.26	-67.54	-13.00	-54.54	H
268.6200	-70.88	1.97	5.17	-67.68	-13.00	-54.68	H
399.5700	-69.78	2.39	5.98	-66.19	-13.00	-53.19	H
507.2400	-73.3	2.69	5.97	-70.02	-13.00	-57.02	H
600.3600	-66.18	2.9	6.4	-62.68	-13.00	-49.68	H

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

Operation Mode: HSUPA Band IV / TX / CH 1413

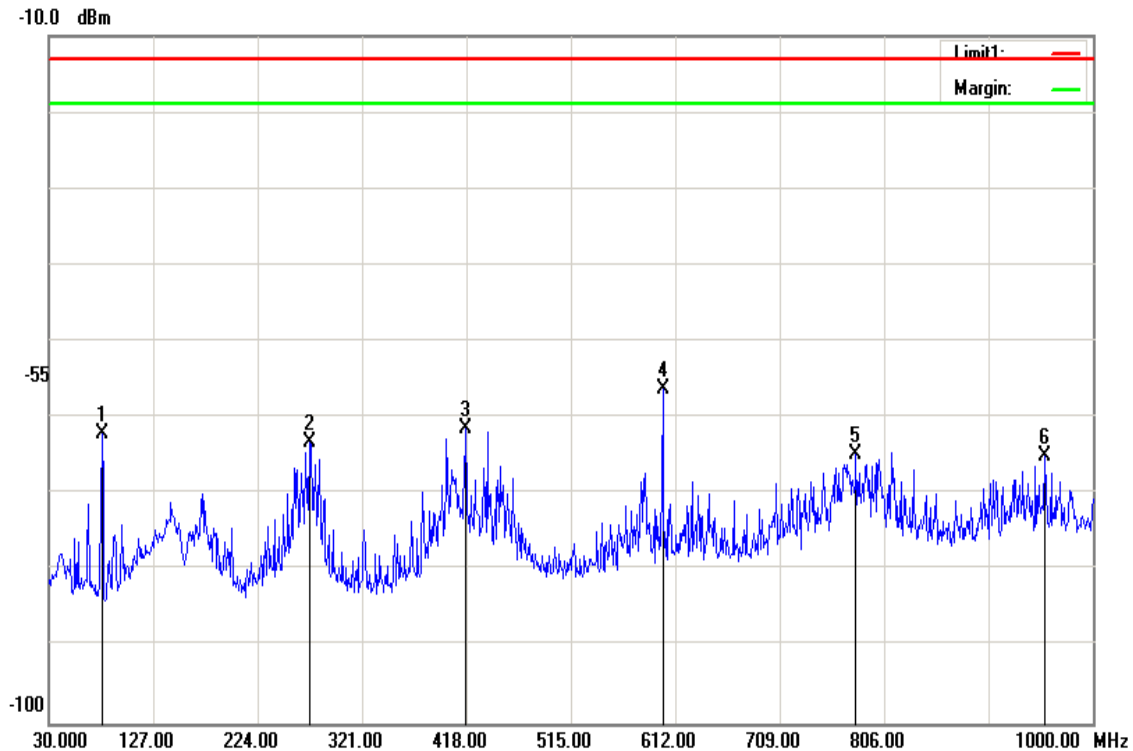
Test Date: May 24, 2016

Temperature: 22.6°C

Tested by: Dennis Li

Humidity: 57.2 % RH

Polarity: Ver.



Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
79.4700	-60.73	1.04	-0.26	-62.03	-13.00	-49.03	V
272.5000	-66.33	1.99	5.15	-63.17	-13.00	-50.17	V
417.0300	-64.79	2.46	5.84	-61.41	-13.00	-48.41	V
600.3600	-59.73	2.9	6.4	-56.23	-13.00	-43.23	V
779.8100	-67.54	3.3	6.11	-64.73	-13.00	-51.73	V
955.3800	-67.81	3.65	6.37	-65.09	-13.00	-52.09	V

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with "N/A" remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

Operation Mode: HSUPA Band IV / TX / CH 1413

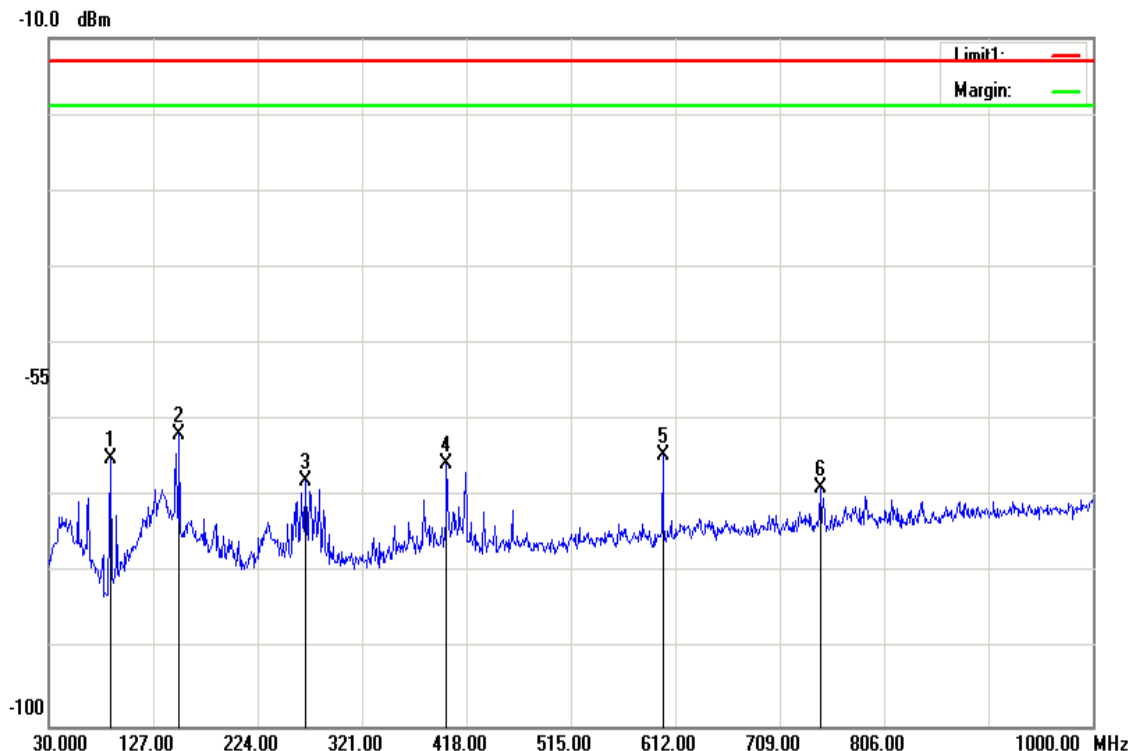
Test Date: May 24, 2016

Temperature: 22.6°C

Tested by: Dennis Li

Humidity: 57.2 % RH

Polarity: Hor.



Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
87.2300	-64.69	1.09	0.73	-65.05	-13.00	-52.05	H
151.2500	-61.16	1.43	0.8	-61.79	-13.00	-48.79	H
268.6200	-71.05	1.97	5.17	-67.85	-13.00	-54.85	H
399.5700	-69.37	2.39	5.98	-65.78	-13.00	-52.78	H
600.3600	-68.16	2.9	6.4	-64.66	-13.00	-51.66	H
746.8300	-71.79	3.2	6.1	-68.89	-13.00	-55.89	H

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with "N/A" remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

Above 1GHz

Operation Mode: WCDMA Band IV / TX / CH 1312

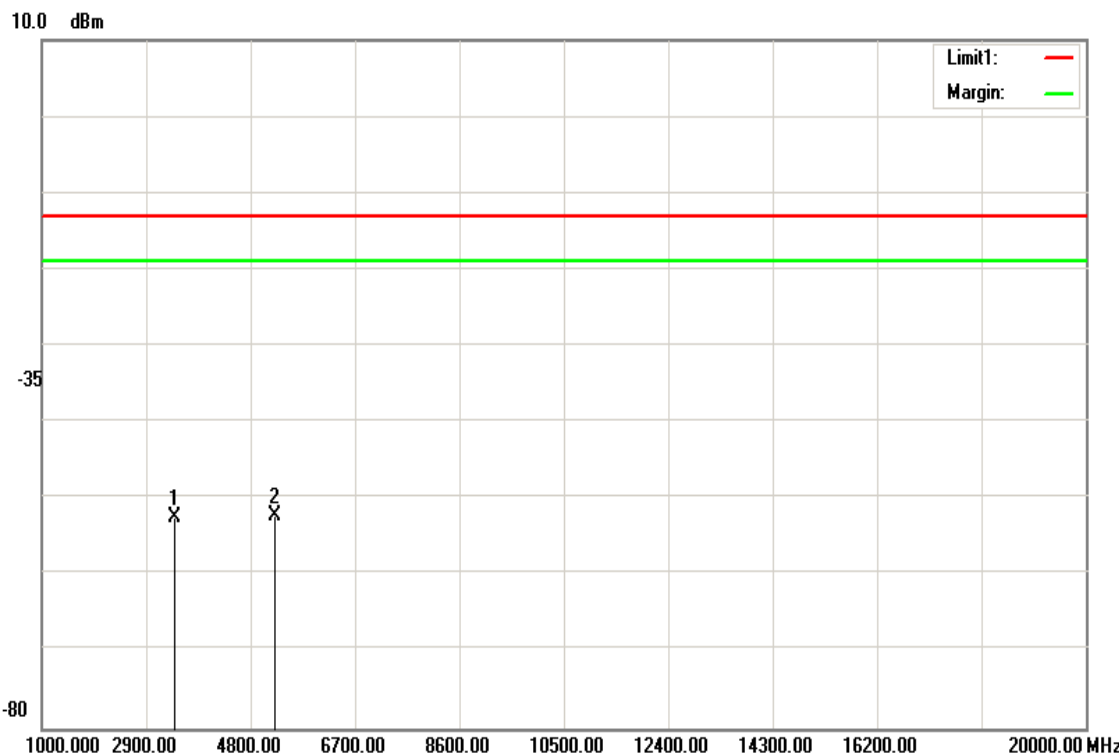
Test Date: May 26, 2016

Temperature: 22.6°C

Tested by: Dennis Li

Humidity: 57.2 % RH

Polarity: Ver.



Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3422.000	-53.42	7.64	8.67	-52.39	-13.00	-39.39	V
5235.000	-53.3	9.59	10.69	-52.20	-13.00	-39.20	V
N/A							

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

Operation Mode: WCDMA Band IV / TX / CH 1312

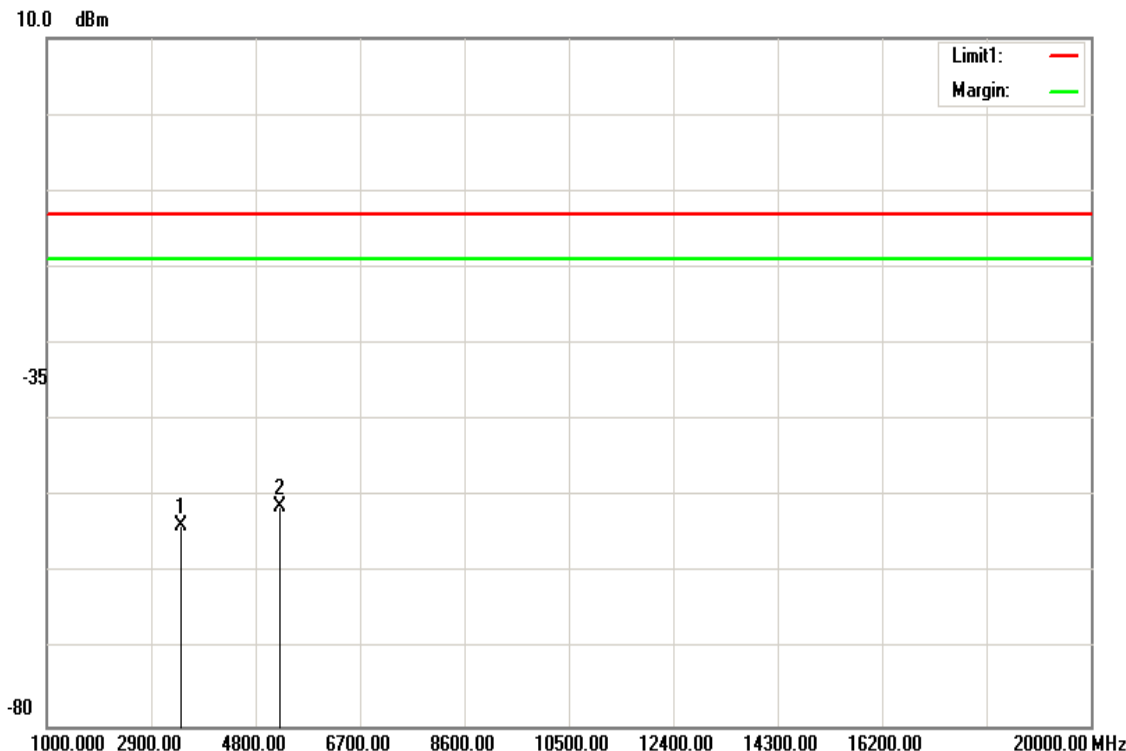
Test Date: May 26, 2016

Temperature: 22.6°C

Tested by: Dennis Li

Humidity: 57.2 % RH

Polarity: Hor.



Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3457.000	-54.88	7.74	8.77	-53.85	-13.00	-40.85	H
5242.000	-52.47	9.6	10.7	-51.37	-13.00	-38.37	H
N/A							

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

Operation Mode: WCDMA Band IV / TX / CH 1413

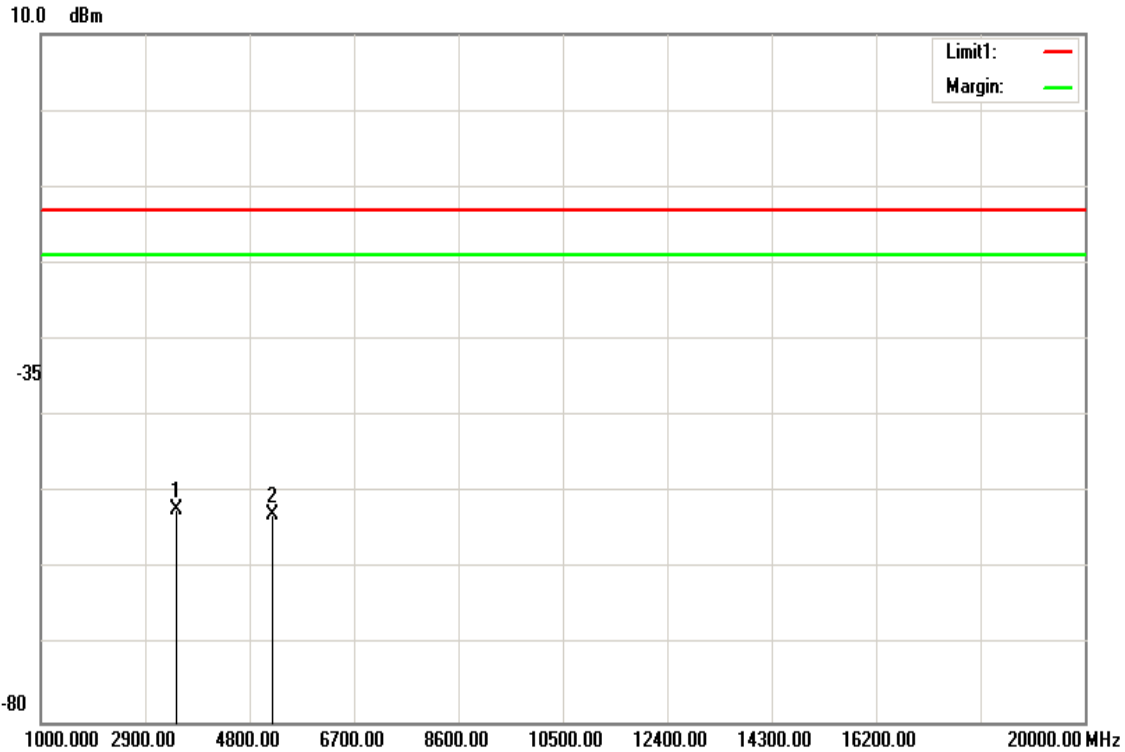
Test Date: May 26, 2016

Temperature: 22.6°C

Tested by: Dennis Li

Humidity: 57.2 % RH

Polarity: Ver.



Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3471.000	-53.31	7.78	8.81	-52.28	-13.00	-39.28	V
5228.000	-54	9.59	10.69	-52.90	-13.00	-39.90	V
N/A							

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

Operation Mode: WCDMA Band IV / TX / CH 1413

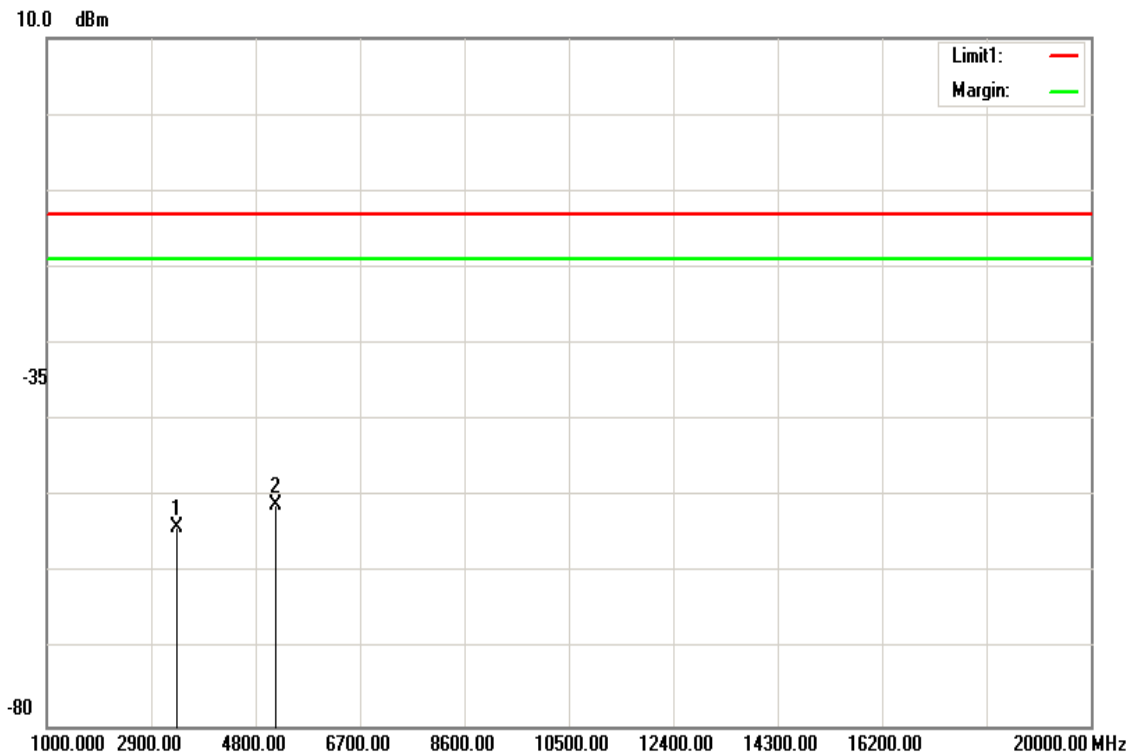
Test Date: May 26, 2016

Temperature: 22.6°C

Tested by: Dennis Li

Humidity: 57.2 % RH

Polarity: Hor.



Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3366.000	-54.93	7.53	8.5	-53.96	-13.00	-40.96	H
5158.000	-52.3	9.51	10.66	-51.15	-13.00	-38.15	H
N/A							

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with "N/A" remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

Operation Mode: WCDMA Band IV / TX / CH 1513

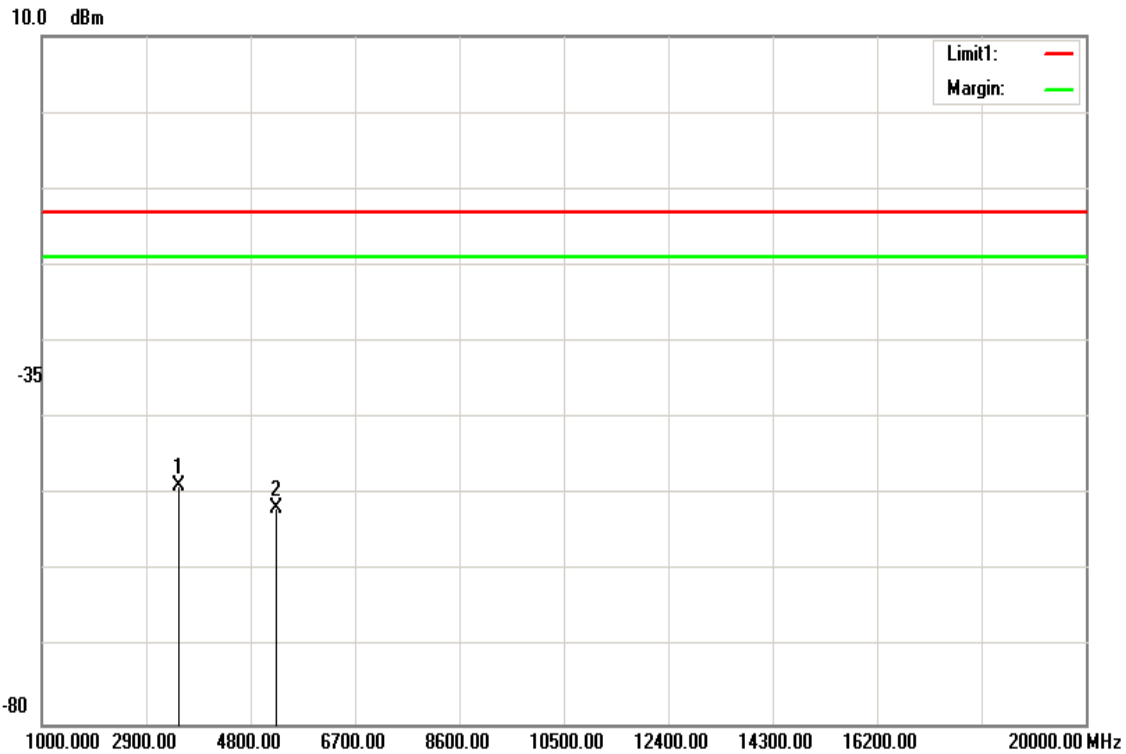
Test Date: May 26, 2016

Temperature: 22.6°C

Tested by: Dennis Li

Humidity: 57.2 % RH

Polarity: Ver.



Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3506.000	-49.89	7.88	8.91	-48.86	-13.00	-35.86	V
5277.000	-52.93	9.63	10.71	-51.85	-13.00	-38.85	V
N/A							

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with "N/A" remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

Operation Mode: WCDMA Band IV / TX / CH 1513

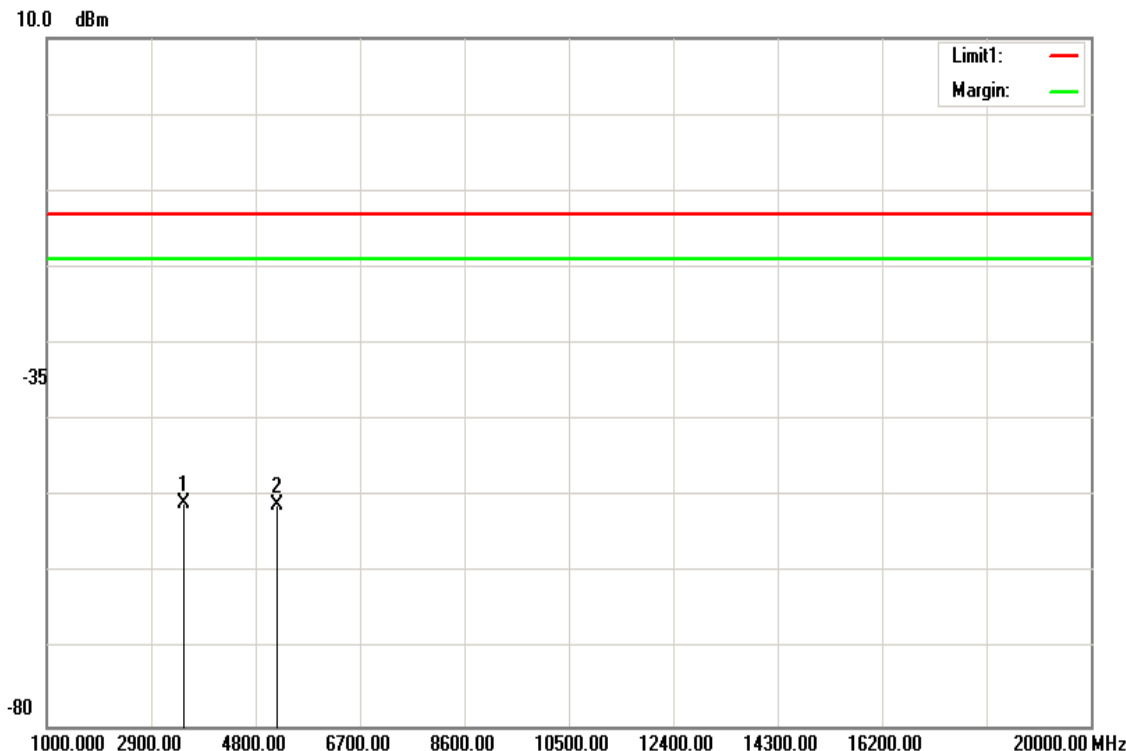
Test Date: May 26, 2016

Temperature: 22.6°C

Tested by: Dennis Li

Humidity: 57.2 % RH

Polarity: Hor.



Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3506.000	-51.8	7.88	8.91	-50.77	-13.00	-37.77	H
5193.000	-52.32	9.55	10.68	-51.19	-13.00	-38.19	H
N/A							

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with "N/A" remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

Operation Mode: HSDPA Band IV / TX / CH 1312

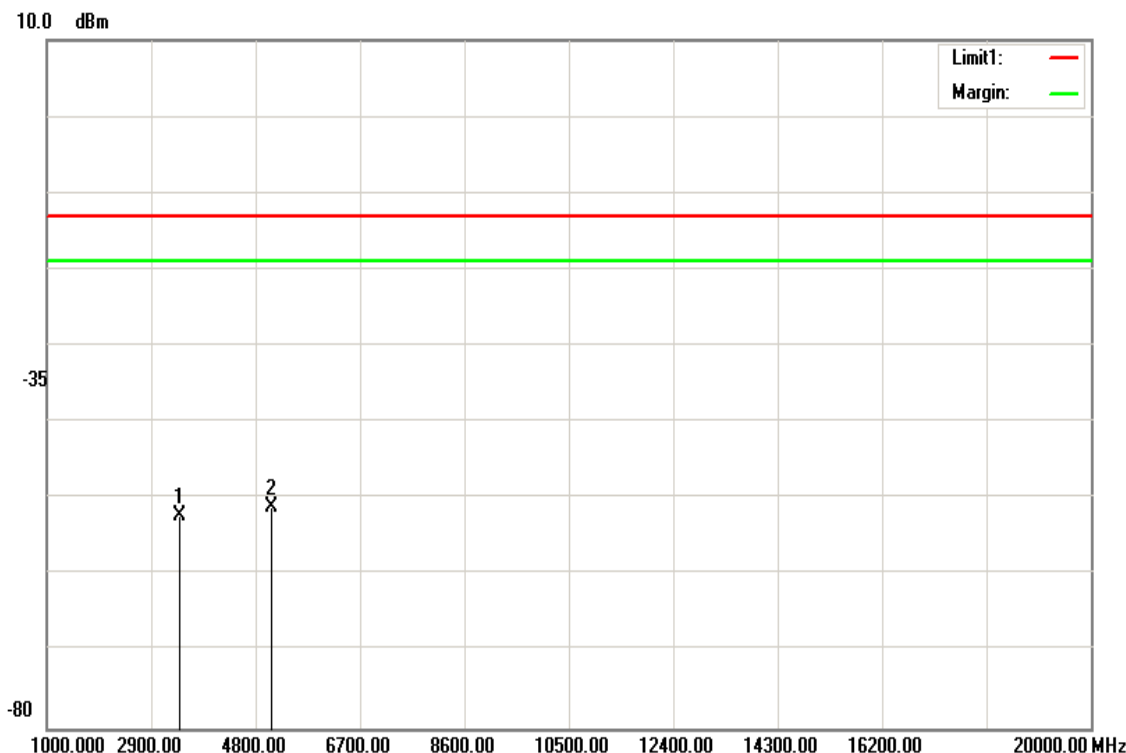
Test Date: May 26, 2016

Temperature: 22.6°C

Tested by: Dennis Li

Humidity: 57.2 % RH

Polarity: Ver.



Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3422.000	-53.3	7.64	8.67	-52.27	-13.00	-39.27	V
5102.000	-52.37	9.45	10.64	-51.18	-13.00	-38.18	V
N/A							

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with "N/A" remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

Operation Mode: HSDPA Band IV / TX / CH 1312

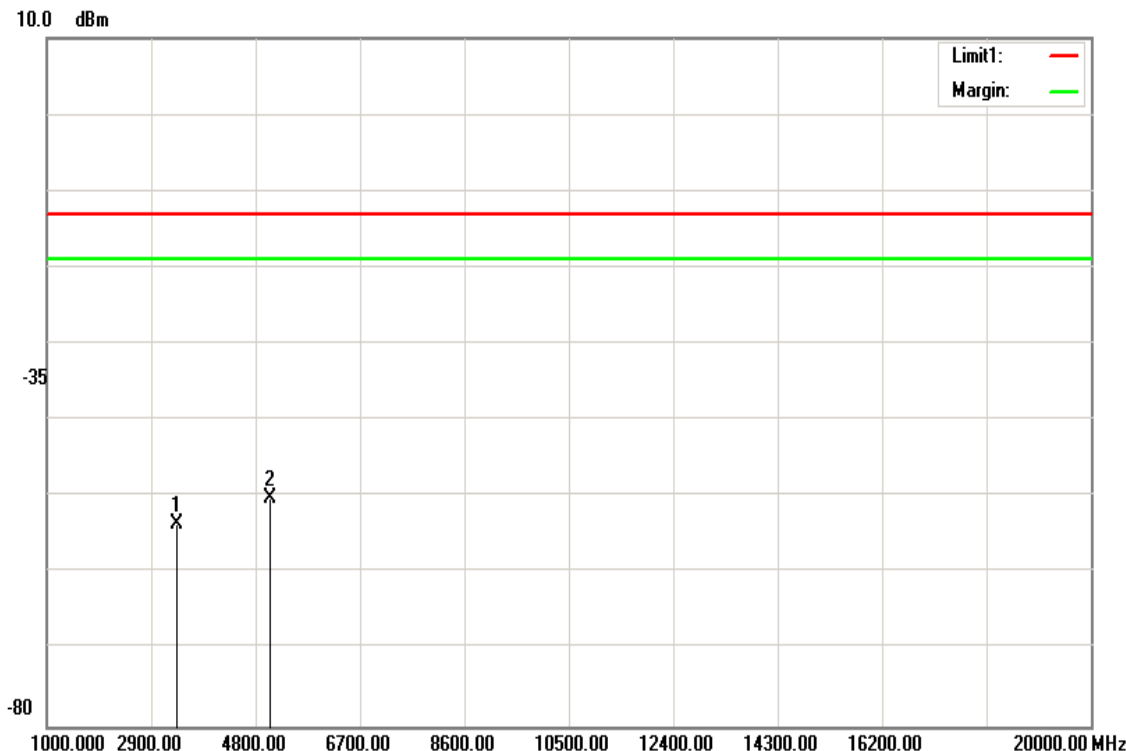
Test Date: May 26, 2016

Temperature: 22.6°C

Tested by: Dennis Li

Humidity: 57.2 % RH

Polarity: Hor.



Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3359.000	-54.49	7.52	8.48	-53.53	-13.00	-40.53	H
5074.000	-51.49	9.44	10.63	-50.30	-13.00	-37.30	H
N/A							

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with "N/A" remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

Operation Mode: HSDPA Band IV / TX / CH 1413

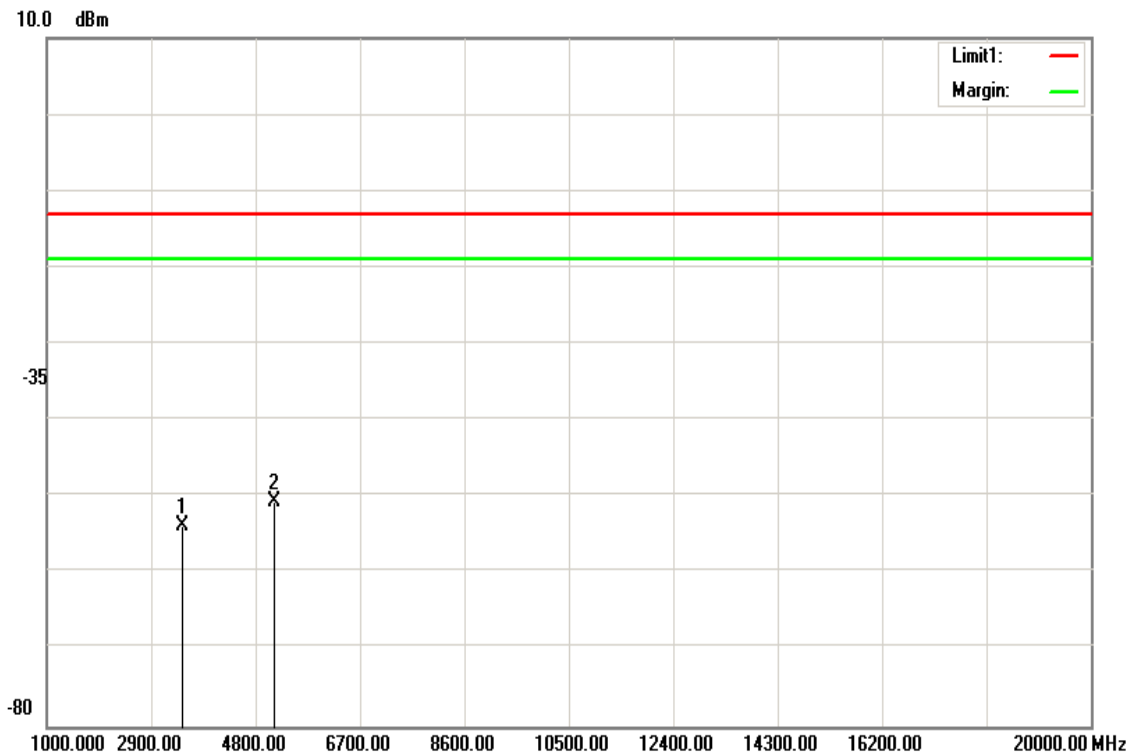
Test Date: May 26, 2016

Temperature: 22.6°C

Tested by: Dennis Li

Humidity: 57.2 % RH

Polarity: Ver.



Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3471.000	-54.8	7.78	8.81	-53.77	-13.00	-40.77	V
5130.000	-51.83	9.48	10.65	-50.66	-13.00	-37.66	V
N/A							

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with "N/A" remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

Operation Mode: HSDPA Band IV / TX / CH 1413

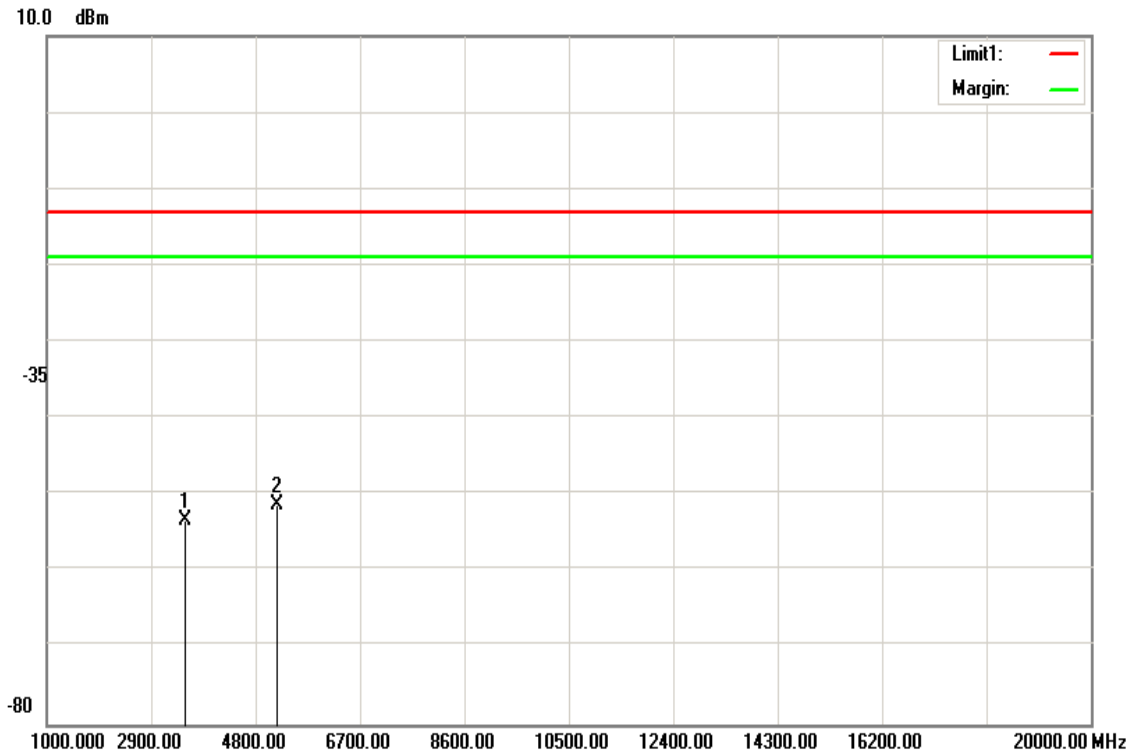
Test Date: May 26, 2016

Temperature: 22.6°C

Tested by: Dennis Li

Humidity: 57.2 % RH

Polarity: Hor.



Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3520.000	-54.33	7.92	8.92	-53.33	-13.00	-40.33	H
5200.000	-52.51	9.56	10.68	-51.39	-13.00	-38.39	H
N/A							

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with "N/A" remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

Operation Mode: HSDPA Band IV / TX / CH 1513

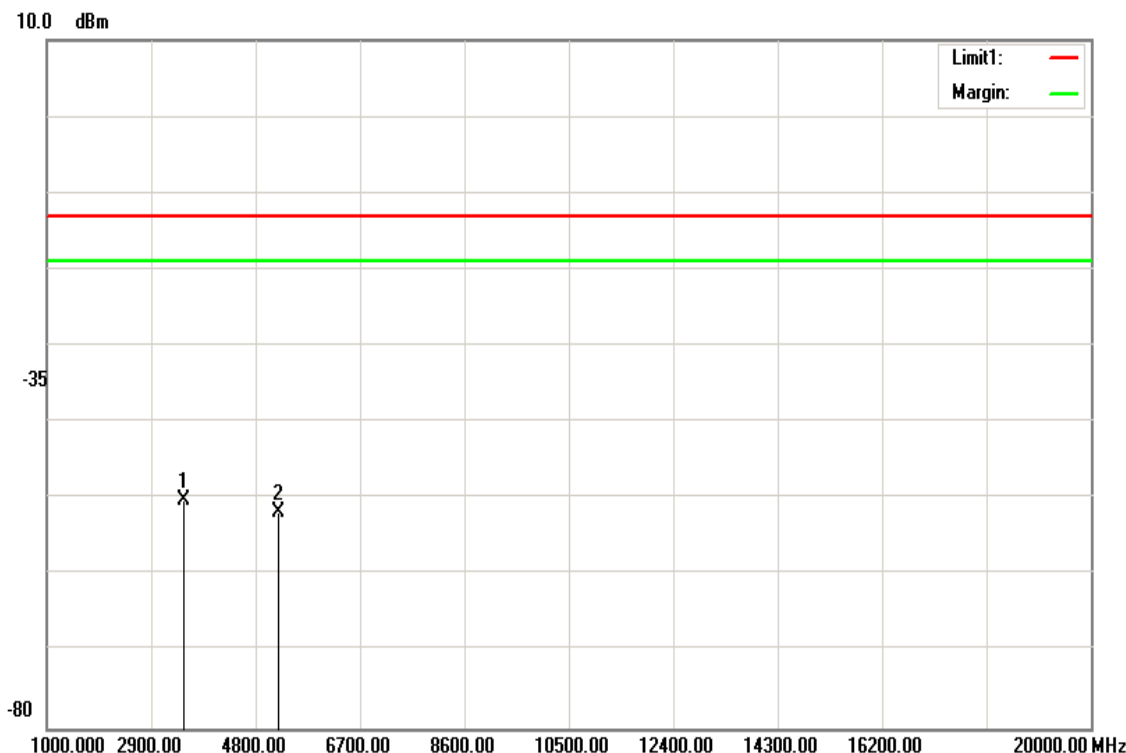
Test Date: May 26, 2016

Temperature: 22.6°C

Tested by: Dennis Li

Humidity: 57.2 % RH

Polarity: Ver.



Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3506.000	-51.28	7.88	8.91	-50.25	-13.00	-37.25	V
5228.000	-52.85	9.59	10.69	-51.75	-13.00	-38.75	V
N/A							

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with "N/A" remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

Operation Mode: HSDPA Band IV / TX / CH 1513

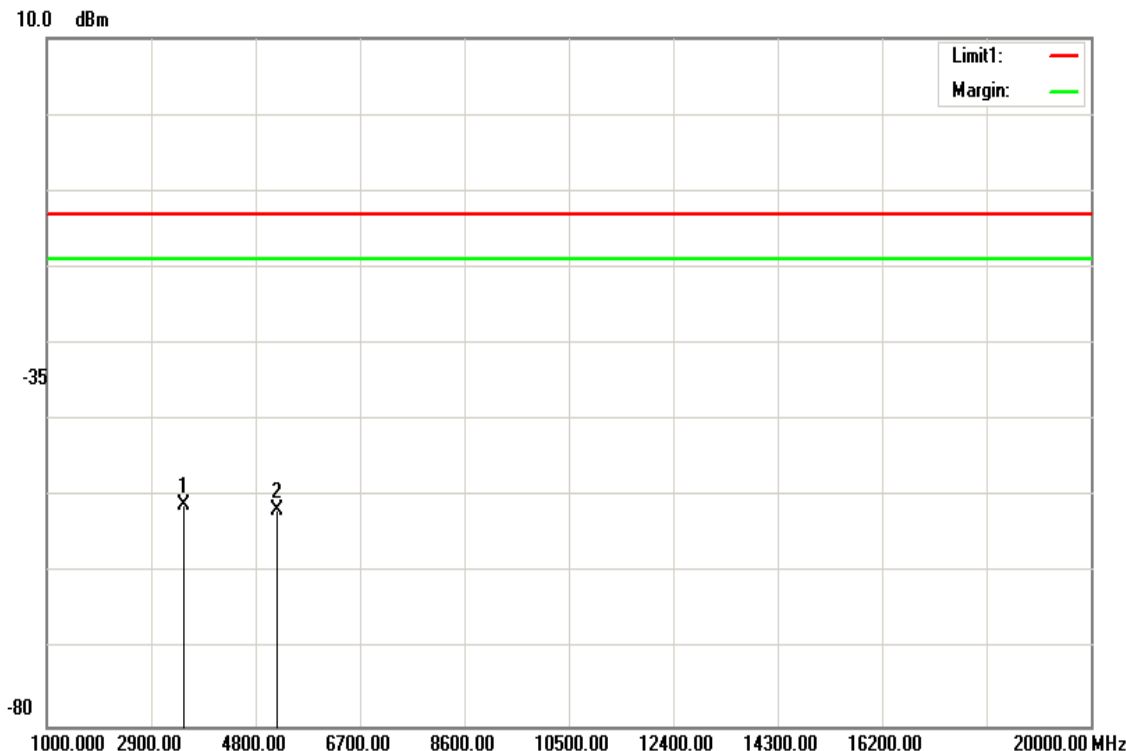
Test Date: May 26, 2016

Temperature: 22.6°C

Tested by: Dennis Li

Humidity: 57.2 % RH

Polarity: Hor.



Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3506.000	-52.09	7.88	8.91	-51.06	-13.00	-38.06	H
5193.000	-52.86	9.55	10.68	-51.73	-13.00	-38.73	H
N/A							

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with "N/A" remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

Operation Mode: HSUPA Band IV / TX / CH 1312

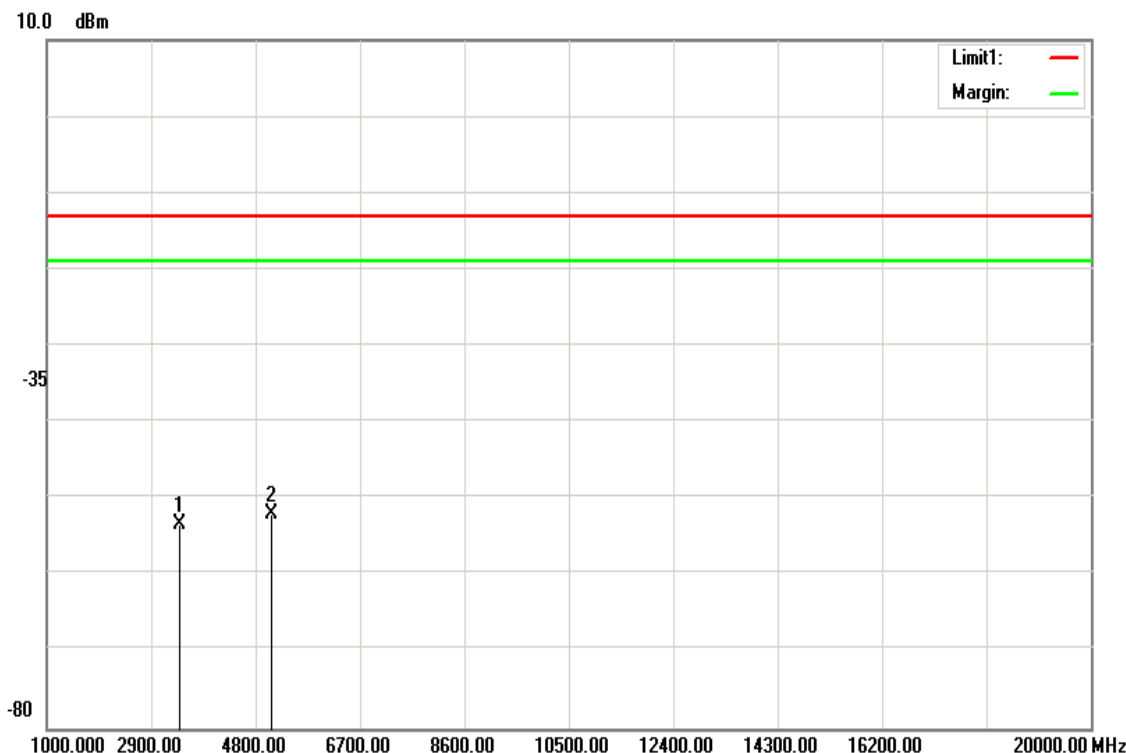
Test Date: May 26, 2016

Temperature: 22.6°C

Tested by: Dennis Li

Humidity: 57.2 % RH

Polarity: Ver.



Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3429.000	-54.29	7.66	8.69	-53.26	-13.00	-40.26	V
5095.000	-53.15	9.45	10.64	-51.96	-13.00	-38.96	V
N/A							

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

Operation Mode: HSUPA Band IV / TX / CH 1312

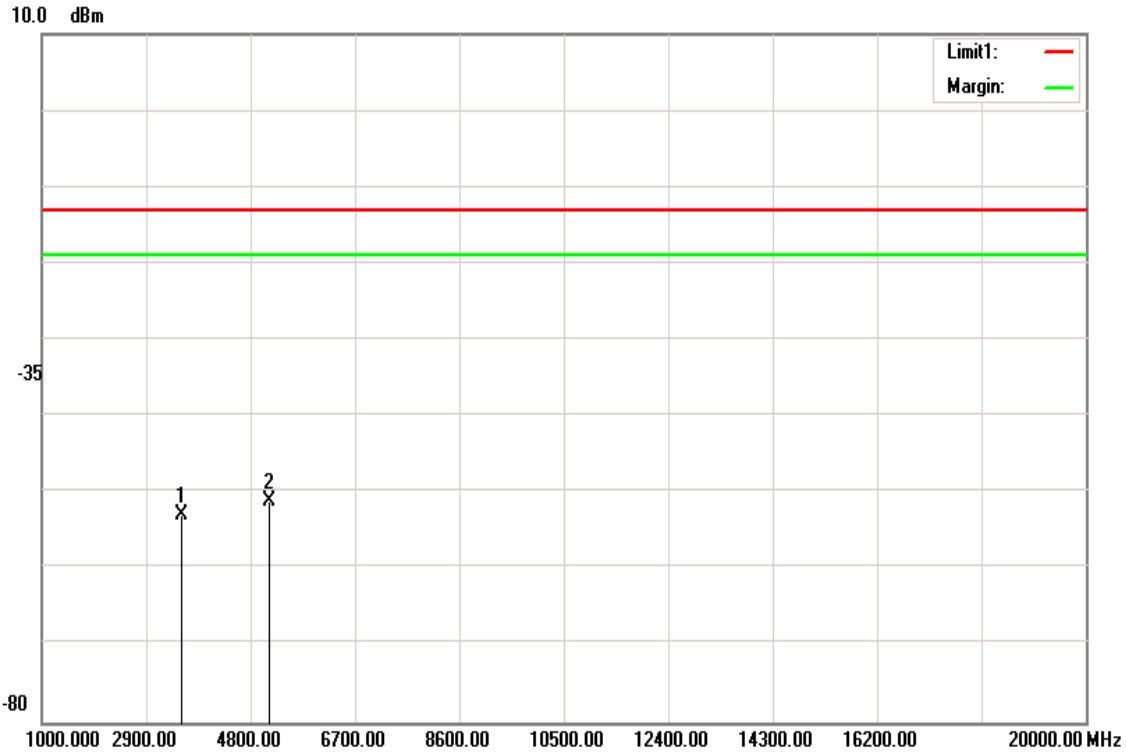
Test Date: May 26, 2016

Temperature: 22.6°C

Tested by: Dennis Li

Humidity: 57.2 % RH

Polarity: Hor.



Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3534.000	-53.83	7.95	8.93	-52.85	-13.00	-39.85	H
5137.000	-52.2	9.49	10.65	-51.04	-13.00	-38.04	H
N/A							

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with "N/A" remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

Operation Mode: HSUPA Band IV / TX / CH 1413

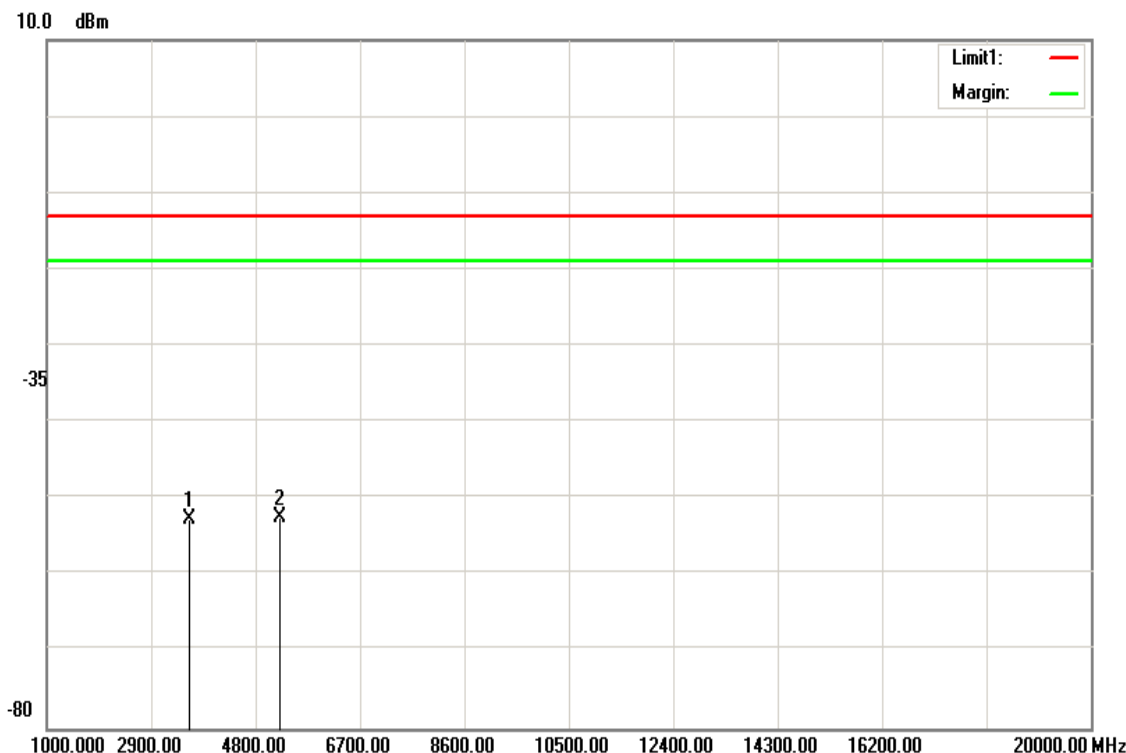
Test Date: May 26, 2016

Temperature: 22.6°C

Tested by: Dennis Li

Humidity: 57.2 % RH

Polarity: Ver.



Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3590.000	-53.57	8.09	8.99	-52.67	-13.00	-39.67	V
5249.000	-53.54	9.6	10.7	-52.44	-13.00	-39.44	V
N/A							

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

Operation Mode: HSUPA Band IV / TX / CH 1413

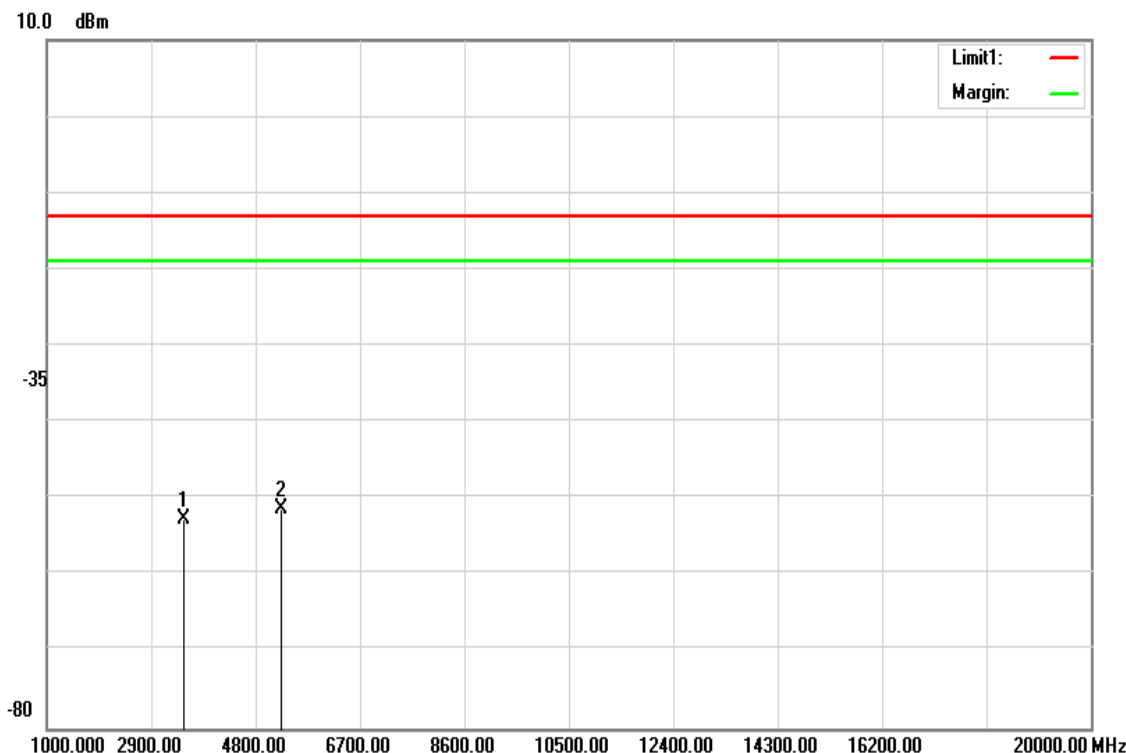
Test Date: May 26, 2016

Temperature: 22.6°C

Tested by: Dennis Li

Humidity: 57.2 % RH

Polarity: Hor.



Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3485.000	-53.68	7.83	8.86	-52.65	-13.00	-39.65	H
5263.000	-52.34	9.62	10.71	-51.25	-13.00	-38.25	H
N/A							

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with "N/A" remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

Operation Mode: HSUPA Band IV / TX / CH 1513

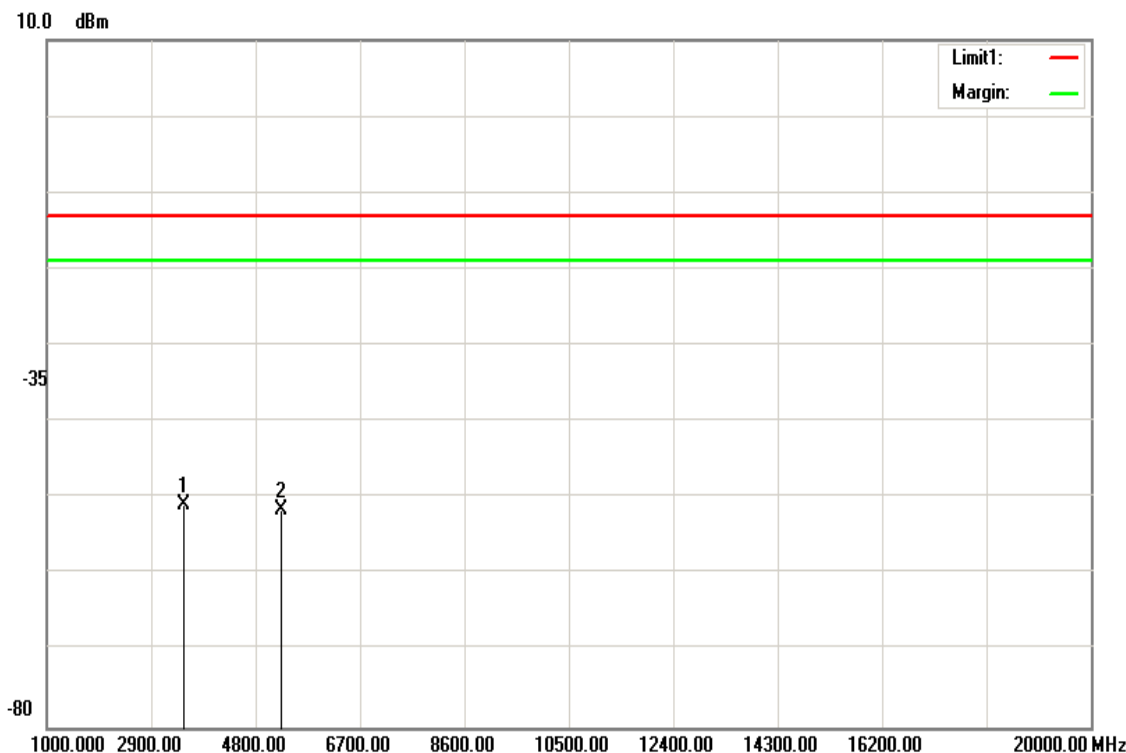
Test Date: May 26, 2016

Temperature: 22.6°C

Tested by: Dennis Li

Humidity: 57.2 % RH

Polarity: Ver.



Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3506.000	-51.93	7.88	8.91	-50.90	-13.00	-37.90	V
5270.000	-52.65	9.62	10.71	-51.56	-13.00	-38.56	V
N/A							

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with "N/A" remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

Operation Mode: HSUPA Band IV / TX / CH 1513

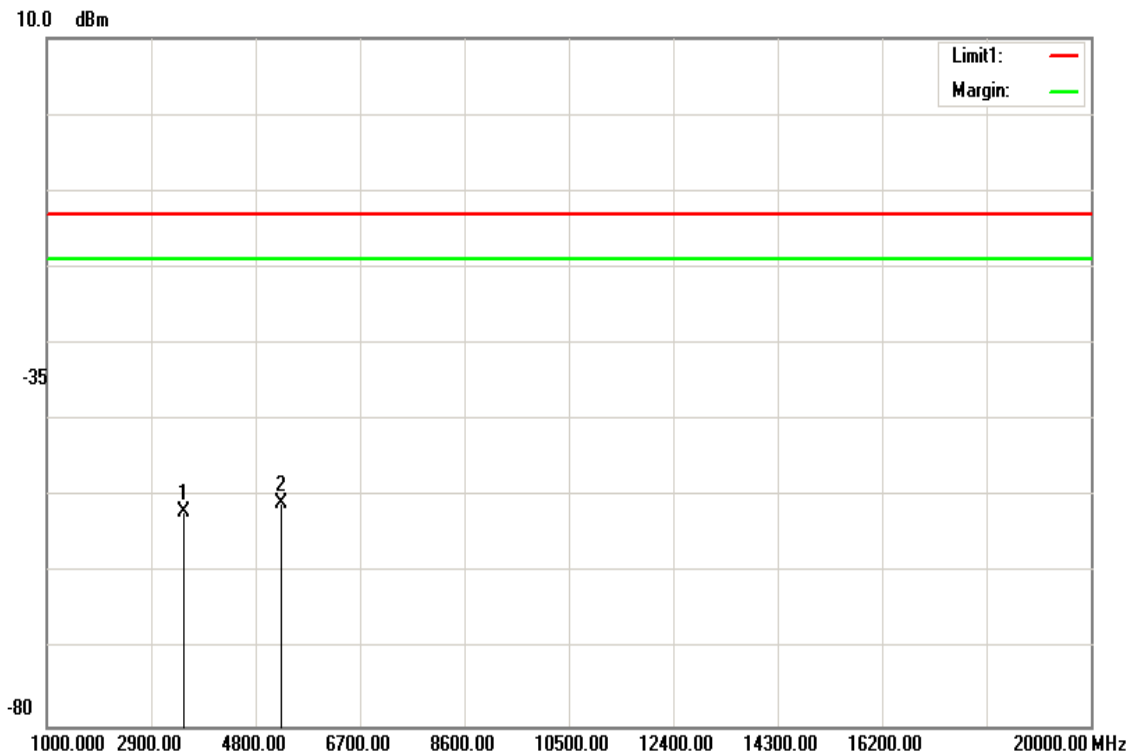
Test Date: May 26, 2016

Temperature: 22.6°C

Tested by: Dennis Li

Humidity: 57.2 % RH

Polarity: Hor.



Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3506.000	-52.98	7.88	8.91	-51.95	-13.00	-38.95	H
5256.000	-51.95	9.61	10.7	-50.86	-13.00	-37.86	H
N/A							

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with "N/A" remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

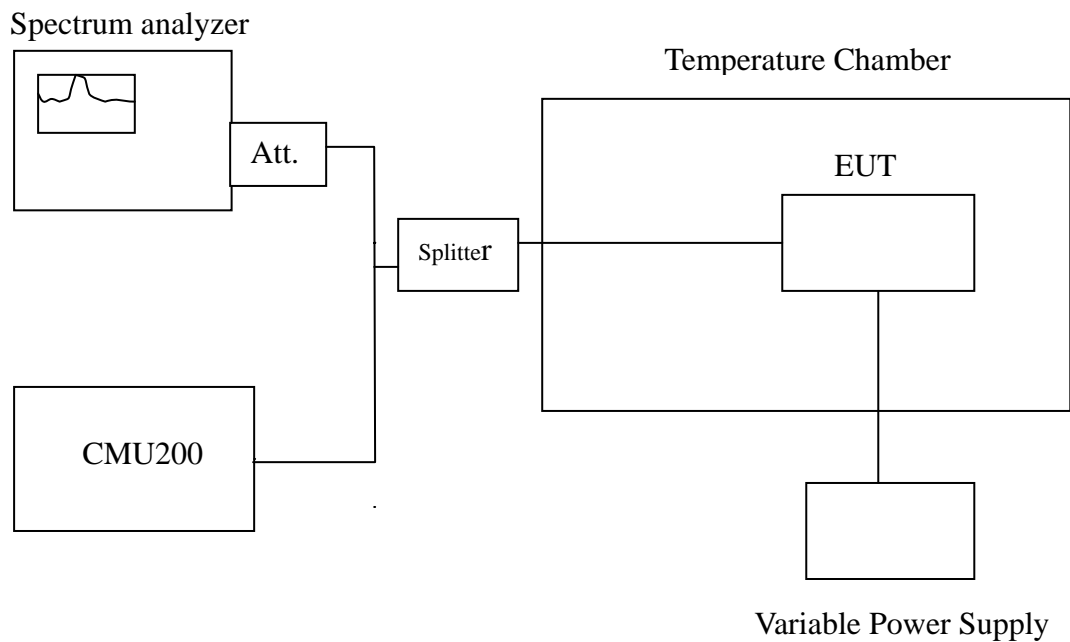
7.7 FREQUENCY STABILITY V.S. TEMPERATURE MEASUREMENT

LIMIT

According to FCC §2.1055, FCC §22.355, .FCC §24.235, FCC§27.54.

The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

Test Configuration



Remark: Measurement setup for testing on Antenna connector

TEST PROCEDURE

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

TEST RESULTS

No non-compliance noted.

Reference Frequency: WCDMA Mid Channel 1732.6 MHz @ 20°C				
Limit: +/- 2.5 ppm = 4331.25 Hz				
Power Supply Vdc	Environment Temperature (°C)	Frequency (Hz)	Frequency Error (ppm)	Limit (ppm)
12	50	5.53	0.0032	2.5
	40	-6.02	-0.0035	
	30	-6.89	-0.0040	
	20	-7.87	-0.0045	
	10	-8.16	-0.0047	
	0	4.41	0.0025	
	-10	-5.44	-0.0031	
	-20	-6.59	-0.0038	
	-30	-6.23	-0.0036	

Reference Frequency: HSDPA Mid Channel 1732.6 MHz @ 20°C				
Limit: +/- 2.5 ppm = 4331.25 Hz				
Power Supply Vdc	Environment Temperature (°C)	Frequency (Hz)	Frequency Error (ppm)	Limit (ppm)
12	50	-5.40	-0.0031	2.5
	40	3.61	0.0021	
	30	-1.27	-0.0007	
	20	-5.44	-0.0031	
	10	-6.59	-0.0038	
	0	-6.23	-0.0036	
	-10	-10.42	-0.0060	
	-20	-10.48	-0.0060	
	-30	-9.86	-0.0057	

Reference Frequency: HSUPA Mid Channel 1732.6 MHz @ 20°C				
Limit: +/- 2.5 ppm = 4331.25 Hz				
Power Supply Vdc	Environment Temperature (°C)	Frequency (Hz)	Frequency Error (ppm)	Limit (ppm)
12	50	-15.93	-0.0092	2.5
	40	-12.77	-0.0074	
	30	-13.38	-0.0077	
	20	-12.34	-0.0071	
	10	-12.84	-0.0074	
	0	-6.12	-0.0035	
	-10	-12.22	-0.0071	
	-20	-12.63	-0.0073	
	-30	-7.44	-0.0043	

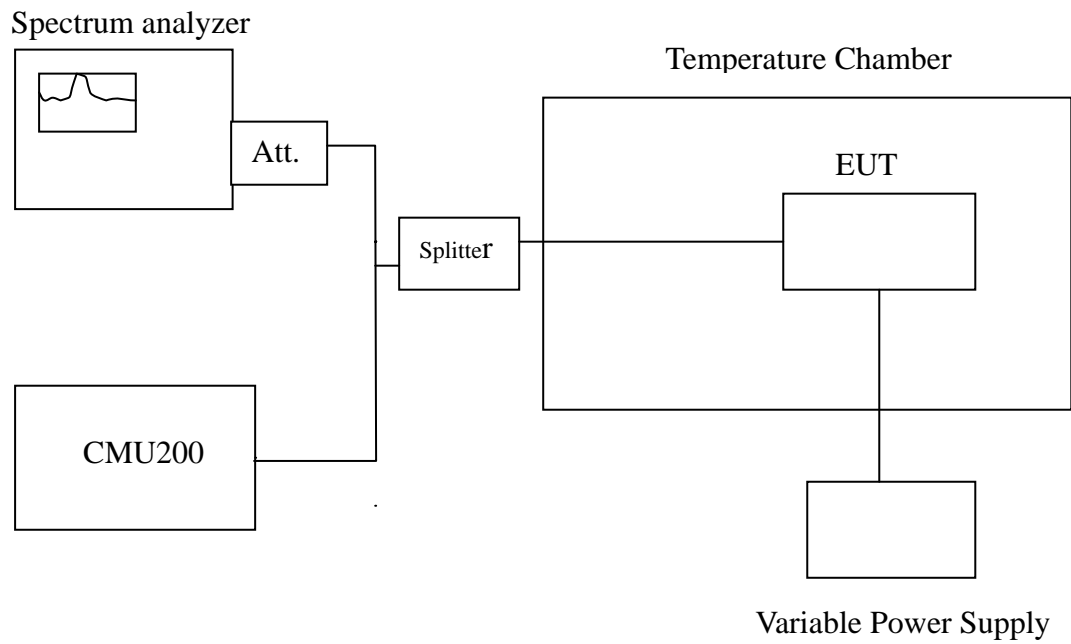
7.8 FREQUENCY STABILITY V.S. VOLTAGE MEASUREMENT

LIMIT

According to FCC §2.1055, FCC §22.355, .FCC §24.235, FCC§27.54.

The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

Test Configuration



Remark: Measurement setup for testing on Antenna connector.

TEST PROCEDURE

Set chamber temperature to 20°C. Use a variable AC power supply / DC power source to power the EUT and set the voltage to rated voltage. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and recorded the frequency.

Reduce the input voltage to specify extreme voltage variation ($\pm 15\%$) and endpoint, record the maximum frequency change.

TEST RESULTS

No non-compliance noted.

Reference Frequency: WCDMA Mid Channel 1732.6 MHz @ 20°C				
Limit: +/- 2.5 ppm = 4331.25 Hz				
Power Supply Vdc	Environment Temperature (°C)	Frequency (Hz)	Delta (ppm)	Limit (ppm)
10.2	20	-8.42	-0.0049	2.5
12		-7.87	-0.0045	
13.8		-8.96	-0.0052	

Reference Frequency: HSDPA Mid Channel 1732.6 MHz @ 20°C				
Limit: +/- 2.5 ppm = 4331.25 Hz				
Power Supply Vdc	Environment Temperature (°C)	Frequency (Hz)	Delta (ppm)	Limit (ppm)
10.2	20	-6.52	-0.0038	2.5
12		-5.44	-0.0031	
13.8		-6.98	-0.0040	

Reference Frequency: HSUPA Mid Channel 1732.6 MHz @ 20°C				
Limit: +/- 2.5 ppm = 4331.25 Hz				
Power Supply Vdc	Environment Temperature (°C)	Frequency (Hz)	Delta (ppm)	Limit (ppm)
10.2	20	-11.99	-0.0069	2.5
12		-12.34	-0.0071	
13.8		-12.58	-0.0073	