



**FCC 47 CFR PART 27 SUBPART L  
&  
INDUSTRY CANADA RSS-139**

**TEST REPORT**

**For**

**PDA**

**Trade Name: Trimble**

**Model: TNJ32**

*Issued to*

**For FCC**

**Trimble Navigation Ltd.**

**935 Stewart Drive, Sunnyvale, CA 94088-3642 U.S.A.**

**For IC**

**Trimble Navigation Ltd.**

**935 Stewart Drive,**

**Sunnyvale California 94085 United States**

*Issued by*

**Compliance Certification Services Inc.**

**No.11, Wu-Gong 6th Rd., Wugu Industrial Park,**

**New Taipei City 248, Taiwan (R.O.C.)**

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**Issued Date: January 18, 2012**



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**Revision History**

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	January 18, 2012	Initial Issue	ALL	Angel Cheng



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# 1. TEST RESULT CERTIFICATION

**Applicant:** **For FCC**  
 Trimble Navigation Ltd.  
 935 Stewart Drive, Sunnyvale, CA 94088-3642 U.S.A.  
**For IC**  
 Trimble Navigation Ltd.  
 935 Stewart Drive, Sunnyvale California 94085 United States

**Manufacturer:** GOLDTEK Technology Co., Ltd.  
 6F., No. 3, Ln 768, Sec.4, Pateh Rd.,  
 Taipei 115, Taiwan, R.O.C.

**Equipment Under Test:** PDA

**Trade Name:** Trimble

**Model Number:** TNJ32

**Date of Test:** December 23, 2011 ~ January 18, 2012

APPLICABLE STANDARDS	
STANDARD	TEST RESULT
FCC 47 CFR PART 27 SUBPART L & IC RSS-139 Issue 2: February 2009	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, IC RSS-139 Issue 2.

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

Approved by:

Reviewed by:

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Jason Lin  
 Section Manager  
 Compliance Certification Services Inc.

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Gina Lo  
 Section Manager  
 Compliance Certification Services Inc.



## 2. EUT DESCRIPTION

<b>Product</b>	PDA
<b>Trade Name</b>	Trimble
<b>Model Number</b>	TNJ32
<b>Model Discrepancy</b>	N/A
<b>Received Date</b>	December 15, 2011
<b>Power Supply</b>	1. Power Adapter ENG / 3A182WP05 I/P: 100-240V, 50-60Hz, 0.6A O/P: 5V, 3.0A 2. Li-ion Polymer Battery Model: 707-0008-00A Rating: DC 3.7V, 3060mAh, 11.32W/hr
<b>Frequency Range</b>	WCDMA / HSDPA / HSUPA Band IV: 1710-1755 MHz
<b>Transmit Power (ERP &amp; EIRP Power)</b>	WCDMA Band IV: 22.53 dBm HSDPA Band IV: 22.53 dBm HSUPA Band IV: 22.48 dBm
<b>Type of Emission</b>	WCDMA Band IV: 4M14F9W HSDPA Band IV: 4M15F9W HSUPA Band IV: 4M15F9W
<b>Cellular Phone Protocol</b>	WCDMA: Quadrature Phase Shift Keying (QPSK) with Root-raised cosine pulse shaping filters (roll off = 0.22)
<b>Antenna Gain</b>	1.07 dBi
<b>Antenna Type</b>	PIFA Antenna

*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 chapter 13 of ANSI C63.4: 2003, TIA/EIA-603-C: 2004 and FCC CFR 47, Part 27 Subpart L.

The tests documented in this report were performed in accordance with IC RSS-132, SPSR503, RSS-133, SPSR510 and ANSI C63.4 and TIA/EIA-603-C.

#### **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**

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 13.1.4.1 of ANSI C63.4: 2003. 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 Section 13.1.4.1 of ANSI C63.4: 2003.



### 3.4 DESCRIPTION OF TEST MODES

The EUT (model: TNJ32) 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 (CH1427) and Channel High (CH1513) were chosen for full testing.

WCDMA / HSDPA Band IV:

Channel Low (CH1312), Channel Mid (CH1427) and Channel High (CH1513) were chosen for full testing.

WCDMA / HSUPA Band IV:

Channel Low (CH1312), Channel Mid (CH1427) 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 stand-up position (Z 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 Due
Spectrum Analyzer	Agilent	E4446A	MY43360131	03/17/2012
Power Meter	Anritsu	ML2495A	1012009	04/27/2012
Power Sensor	Anritsu	MA2411B	0917072	04/27/2012

3M Semi Anechoic Chamber				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	US42510268	11/15/2012
EMI Test Receiver	R&S	ESCI	100064	02/17/2012
Pre-Amplifier	Mini-Circuits	ZFL-1000LN	SF350700823	01/13/2012
Pre-Amplifier	MITEQ	AFS44-00102650-42-10P-44	1415367	11/20/2012
Bilog Antenna	Sunol Sciences	JB3	A030105	10/03/2012
Bilog Antenna	Sunol Sciences	JB3	A030205	10/03/2012
Horn Antenna	EMCO	3117	00055165	01/12/2012
Horn Antenna	EMCO	3117	00055167	01/04/2013
Horn Antenna	EMCO	3116	00026370	10/12/2012
Loop Antenna	EMCO	6502	8905/2356	06/10/2013
Turn Table	CCS	CC-T-1F	N/A	N.C.R
Antenna Tower	CCS	CC-A-1F	N/A	N.C.R
Controller	CCS	CC-C-1F	N/A	N.C.R
Site NSA	CCS	N/A	N/A	12/25/2012
Test S/W	EZ-EMC (CCS-3A1RE)			

Powerline Conducted Emissions Test Site				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
EMI Test Receiver	R&S	ESCI	101203	07/26/2012
LISN	R&S	ESH3-Z5	848773/014	12/07/2012
LISN	SCHWARZBECK	NSLK 8127	8127-541	12/14/2012
Test S/W	LABVIEW (V 6.1)			





### 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, Chunghsen Road, Hsintien City, Taipei Hsien, Taiwan, R.O.C.  
Tel: 886-2-2217-0894 / Fax: 886-2-2217-1029

No.11, Wu-Gong 6th Rd., Wugu Industrial Park, New Taipei City 248, 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 C63.4: 2003 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
1.	Notebook PC	IBM	1951-I3V(T60)	L3B2188	FCC DoC	N/A	AC I/P: Unshielded, 1.8m DC O/P: Unshielded, 1.8m with a core
2.	LCD Monitor	DELL	3008WFP	CN-0XK290-7161 8-846-169L	FCC DoC	Unshielded, 1.8m	Shielded, 1.8m
3.	GPS Antenna	N/A	N/A	N/A	N/A	N/A	Unshielded, 3m
4.	USB Mouse	DELL	M-UV69a	323617-001	FCC DoC	Shielded, 1.8m	N/A
5.	SD Card	SANDISK	N/A	N/A	N/A	N/A	N/A
6.	SIM Card	N/A	N/A	N/A	N/A	N/A	N/A
7.	Universal Radio Communication Tester (Remote)	R&S	CMU200	101245	N/A	N/A	Unshielded, 1.8m
8.	Notebook PC (Remote)	IBM	2672 (X31)	99PBTKB	FCC DoC	N/A	AC I/P: Unshielded, 1.8m DC O/P: Unshielded, 1.8m with a core

**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.



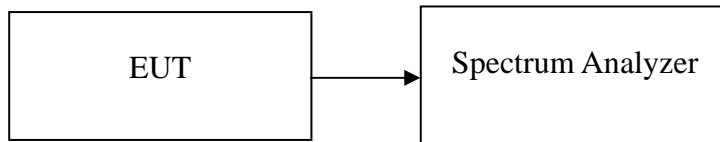
## 7. FCC PART 27 REQUIREMENTS & INDUSTRY CANADA RSS-139

### 7.1 99% BANDWIDTH

#### LIMIT

None; for reporting purposes only.

#### Test Configuration



#### TEST PROCEDURE

The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled.

#### TEST RESULTS

*No non-compliance noted.*

#### Test Data

Test Mode	CH	Frequency (MHz)	99% Bandwidth (MHz)
WCDMA Band IV	1312	1712.40	4.1324
	1427	1735.40	4.1457
	1513	1752.60	4.1414

Test Mode	CH	Frequency (MHz)	99% Bandwidth (MHz)
HSDPA Band IV	1312	1712.40	4.1481
	1427	1735.40	4.1547
	1513	1752.60	4.1506

Test Mode	CH	Frequency (MHz)	99% Bandwidth (MHz)
HSUPA Band IV	1312	1712.40	4.1513
	1427	1735.40	4.1384
	1513	1752.60	4.1365



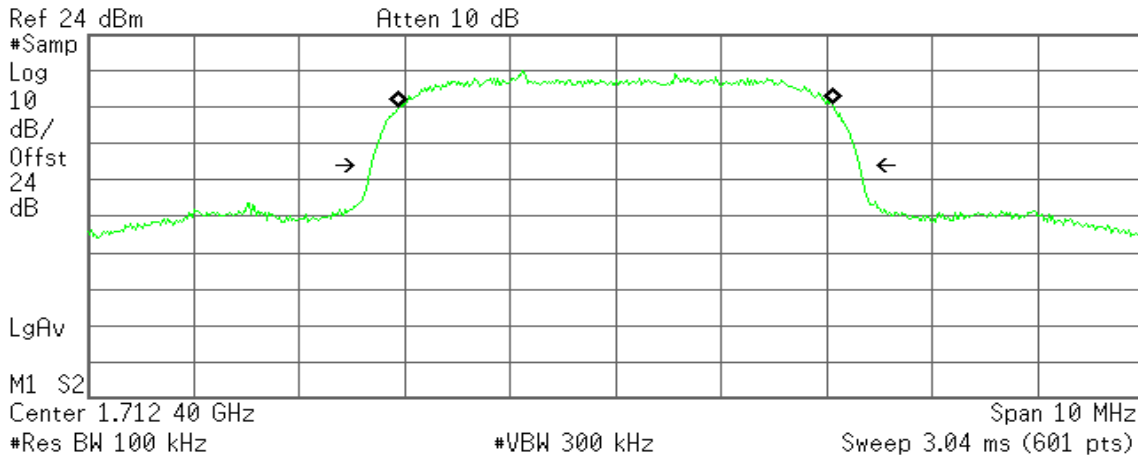
**Test Plot**

**WCDMA Band IV**

**CH Low**

Agilent 14:26:02 Jan 18, 2012

R T



**Occupied Bandwidth**  
4.1324 MHz

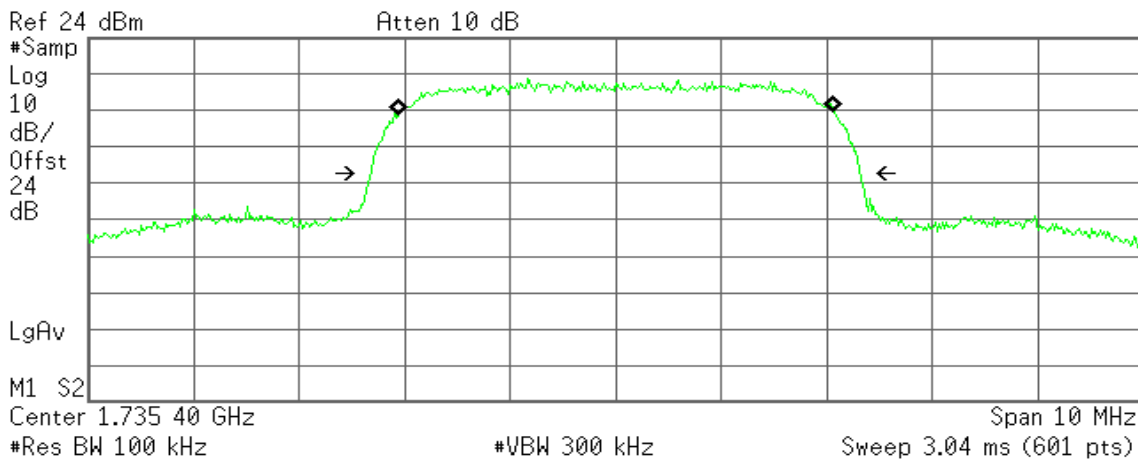
**Occ BW % Pwr** 99.00 %  
**x dB** -26.00 dB

**Transmit Freq Error** -1.674 kHz  
**x dB Bandwidth** 4.641 MHz\*

**CH Mid**

Agilent 14:27:47 Jan 18, 2012

R T



**Occupied Bandwidth**  
4.1457 MHz

**Occ BW % Pwr** 99.00 %  
**x dB** -26.00 dB

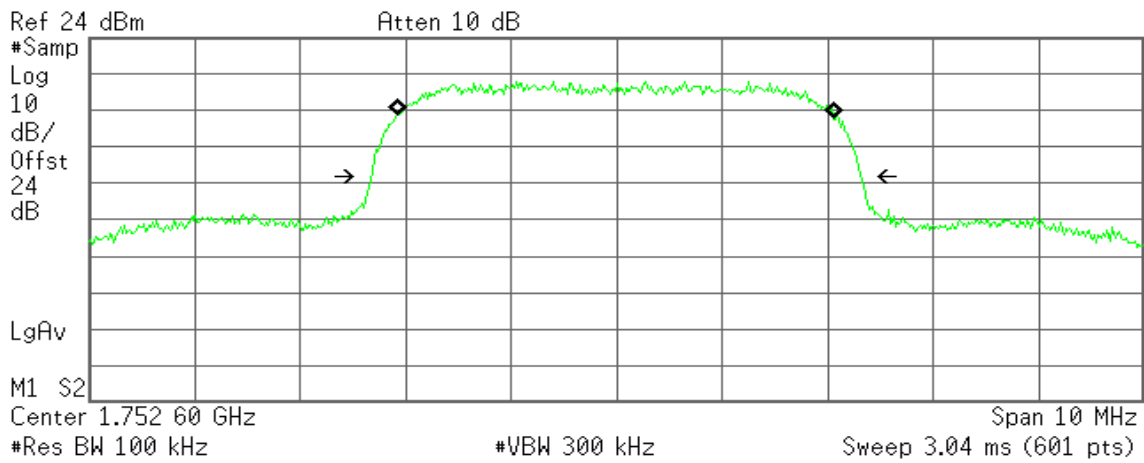
**Transmit Freq Error** 250.420 Hz  
**x dB Bandwidth** 4.643 MHz\*



### CH High

Agilent 14:28:10 Jan 18, 2012

R T



**Occupied Bandwidth**  
4.1414 MHz

**Occ BW % Pwr** 99.00 %  
**x dB** -26.00 dB

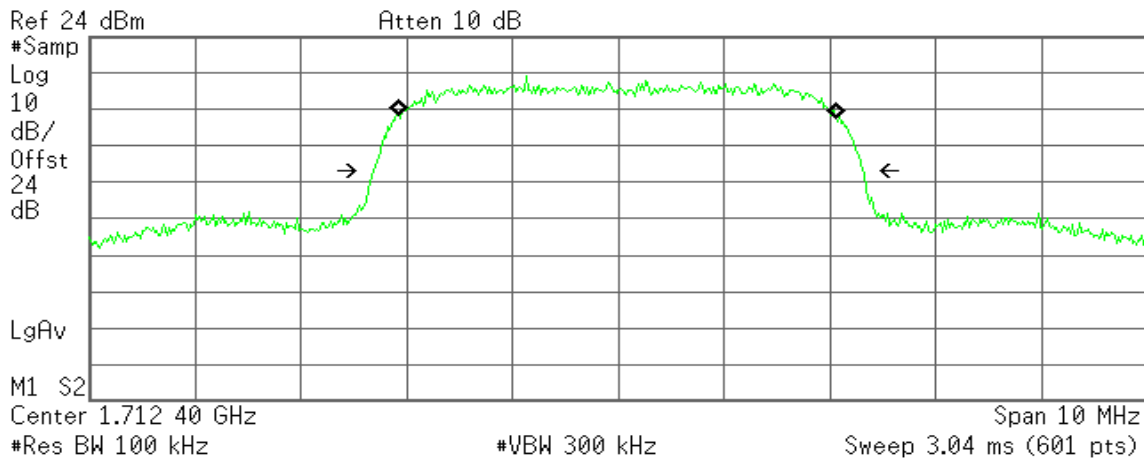
**Transmit Freq Error** -6.925 kHz  
**x dB Bandwidth** 4.648 MHz\*

### HSDPA Band IV

#### CH Low

Agilent 14:29:22 Jan 18, 2012

R T



**Occupied Bandwidth**  
4.1481 MHz

**Occ BW % Pwr** 99.00 %  
**x dB** -26.00 dB

**Transmit Freq Error** -8.125 kHz  
**x dB Bandwidth** 4.635 MHz\*





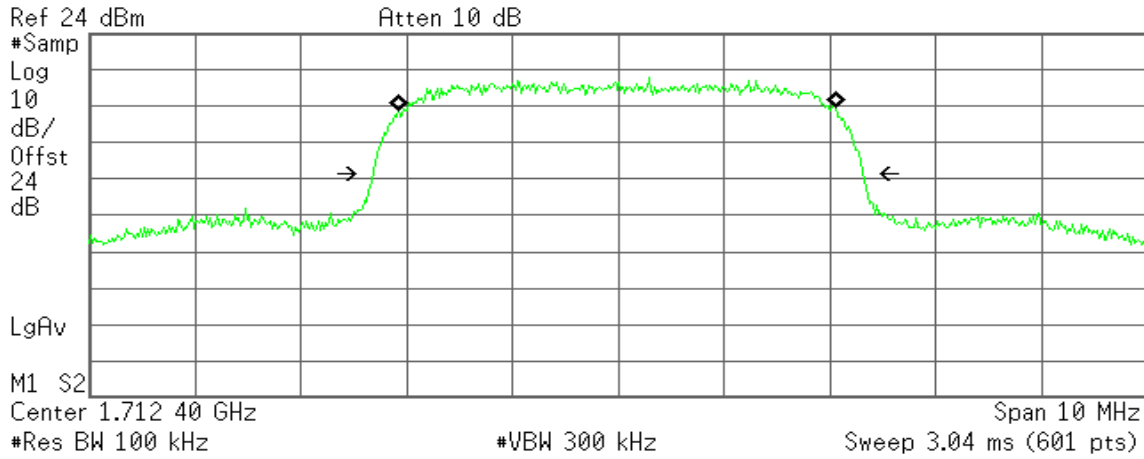


### HSUPA Band IV

#### CH Low

Agilent 14:29:14 Jan 18, 2012

R T



**Occupied Bandwidth**  
4.1513 MHz

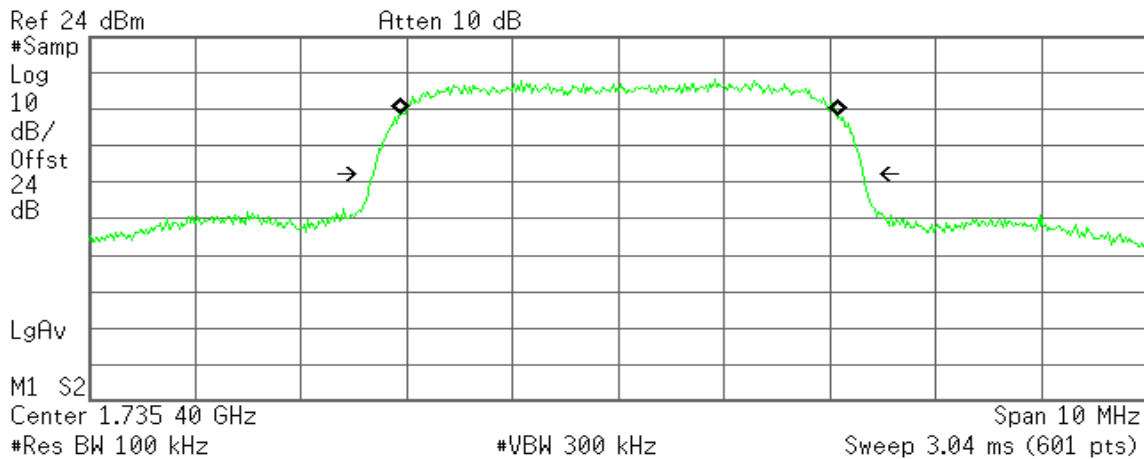
**Occ BW % Pwr** 99.00 %  
**x dB** -26.00 dB

**Transmit Freq Error** -5.588 kHz  
**x dB Bandwidth** 4.644 MHz\*

#### CH Mid

Agilent 14:28:57 Jan 18, 2012

R T



**Occupied Bandwidth**  
4.1384 MHz

**Occ BW % Pwr** 99.00 %  
**x dB** -26.00 dB

**Transmit Freq Error** 5.947 kHz  
**x dB Bandwidth** 4.647 MHz\*



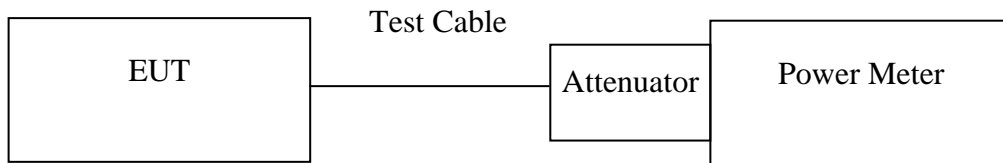


## 7.2 PEAK POWER

### 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)	Peak Power (W)
WCDMA Band IV	1312	1712.40	27.43	0.5534
	1427	1735.40	27.54	0.5675
	1513	1752.60	27.58	0.5728

Test Mode	CH	Frequency (MHz)	Peak Power (dBm)	Peak Power (W)
HSDPA Band IV	1312	1712.40	26.33	0.4295
	1427	1735.40	26.48	0.4446
	1513	1752.60	26.24	0.4207

Test Mode	CH	Frequency (MHz)	Peak Power (dBm)	Peak Power (W)
HSUPA Band IV	1312	1712.40	26.27	0.4236
	1427	1735.40	26.32	0.4285
	1513	1752.60	26.19	0.4159

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

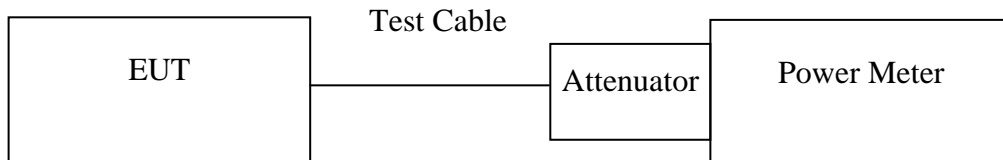


## 7.3 AVERAGE POWER

### 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 Data**

Test Mode	CH	Frequency (MHz)	Average Power (dBm)
WCDMA Band IV	1312	1712.40	24.16
	1427	1735.40	24.25
	1513	1752.60	24.34

Test Mode	CH	Frequency (MHz)	Average Power (dBm)
HSDPA Band IV	1312	1712.40	23.73
	1427	1735.40	23.84
	1513	1752.60	23.68

Test Mode	CH	Frequency (MHz)	Average Power (dBm)
HSUPA Band IV	1312	1712.40	23.61
	1427	1735.40	23.68
	1513	1752.60	23.54

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



## 7.4 OUT OF BAND EMISSION AT ANTENNA TERMINALS

### LIMIT

According to FCC §FCC 47 CFR PART 27 SUBPART L, IC RSS-139 Issue 2.

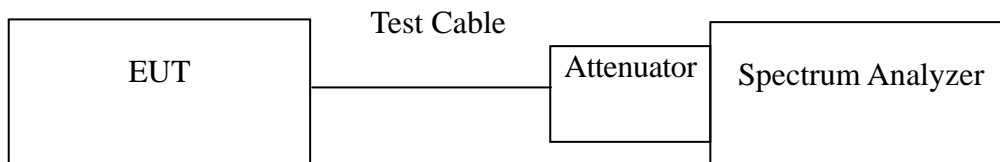
**Out of Band Emissions:** The mean power of emission must be attenuated below the mean power of the non-modulated carrier (P) on any frequency twice or more than twice the fundamental frequency by at least  $43 + 10 \log P$  dB.

**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 (1710-1755 MHz): 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.*



**Test Data**

<b>Mode</b>	<b>CH</b>	<b>Location</b>	<b>Description</b>
WCDMA (Band IV)	1312	Figure 7-1	Conducted spurious emissions, 30MHz - 20GHz
	1427	Figure 7-2	Conducted spurious emissions, 30MHz - 20GHz
	1513	Figure 7-3	Conducted spurious emissions, 30MHz - 20GHz

<b>Mode</b>	<b>CH</b>	<b>Location</b>	<b>Description</b>
HSDPA WCDMA (Band IV)	1312	Figure 7-4	Conducted spurious emissions, 30MHz - 20GHz
	1427	Figure 7-5	Conducted spurious emissions, 30MHz - 20GHz
	1513	Figure 7-6	Conducted spurious emissions, 30MHz - 20GHz

<b>Mode</b>	<b>CH</b>	<b>Location</b>	<b>Description</b>
HSUPA WCDMA (Band IV)	1312	Figure 7-7	Conducted spurious emissions, 30MHz - 20GHz
	1427	Figure 7-8	Conducted spurious emissions, 30MHz - 20GHz
	1513	Figure 7-9	Conducted spurious emissions, 30MHz - 20GHz





**Test Plot**

WCDMA Band IV

Figure 7-1: Out of Band emission at antenna terminals – CH Low

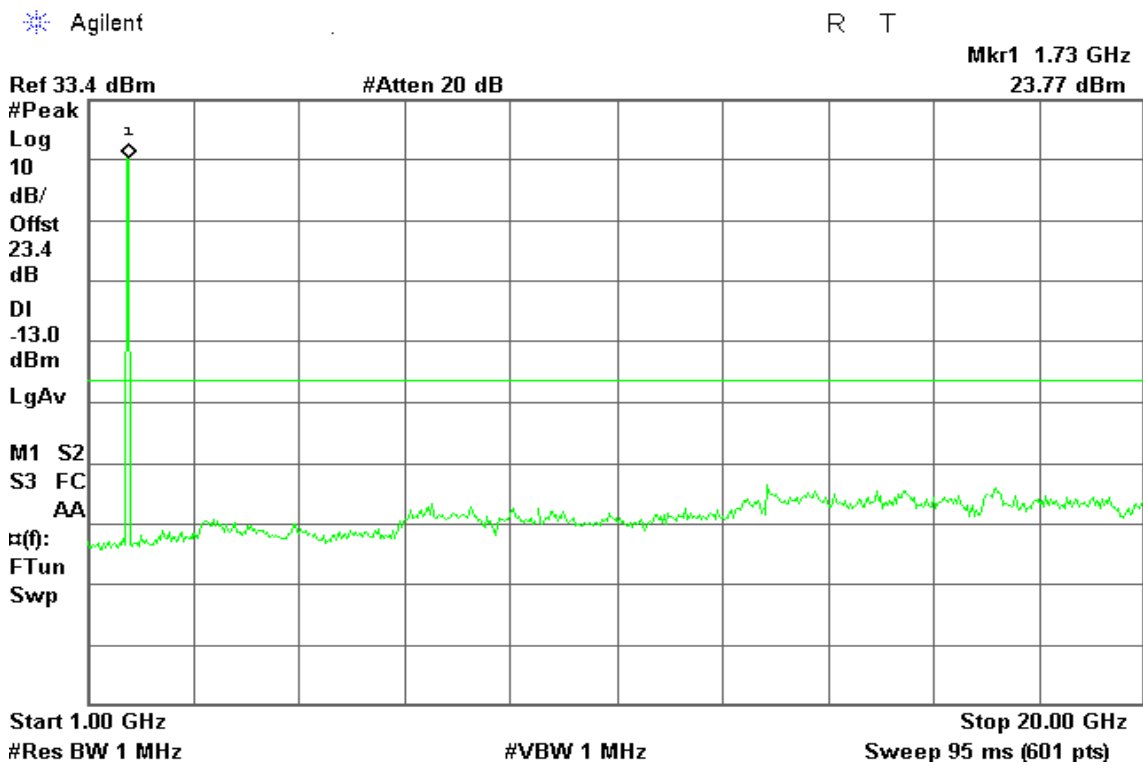
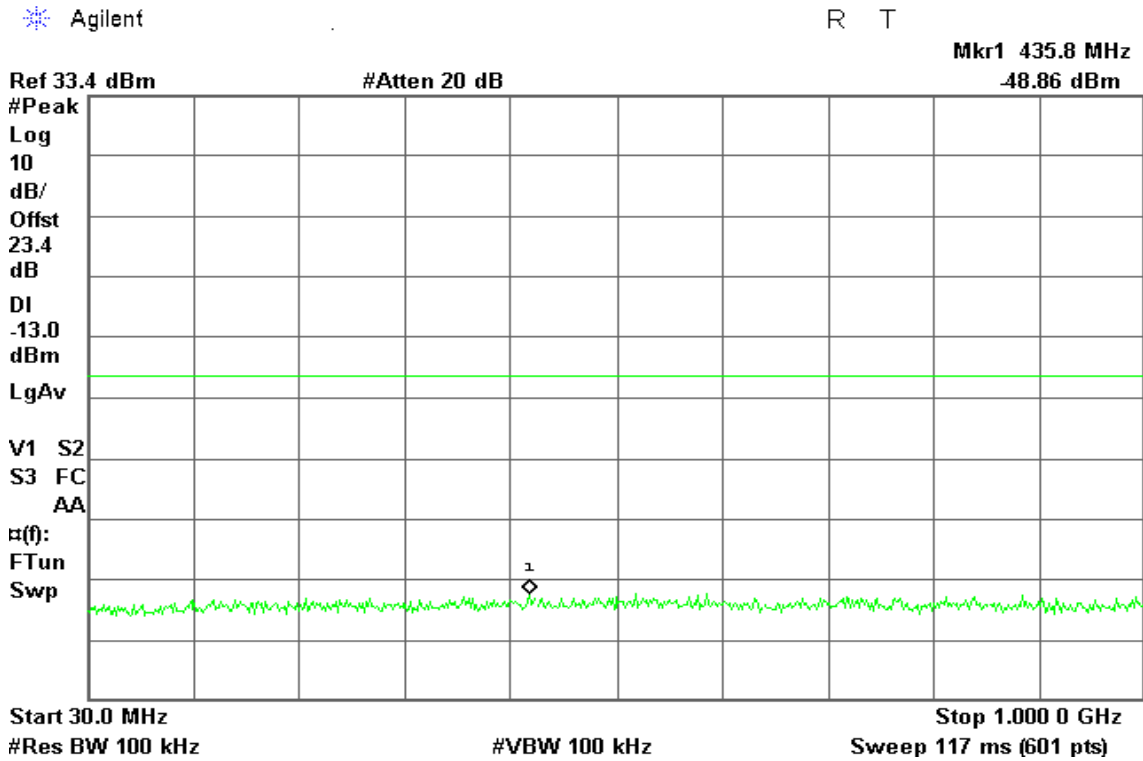




Figure 7-2: Out of Band emission at antenna terminals – CH Mid

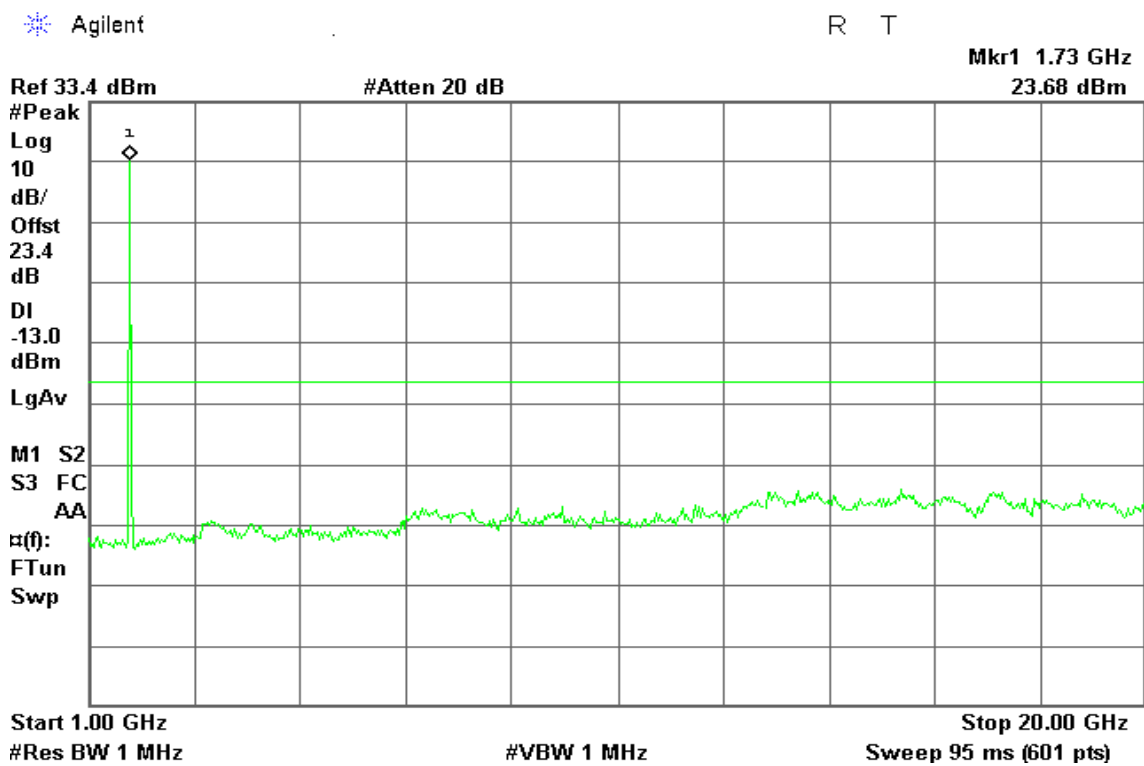
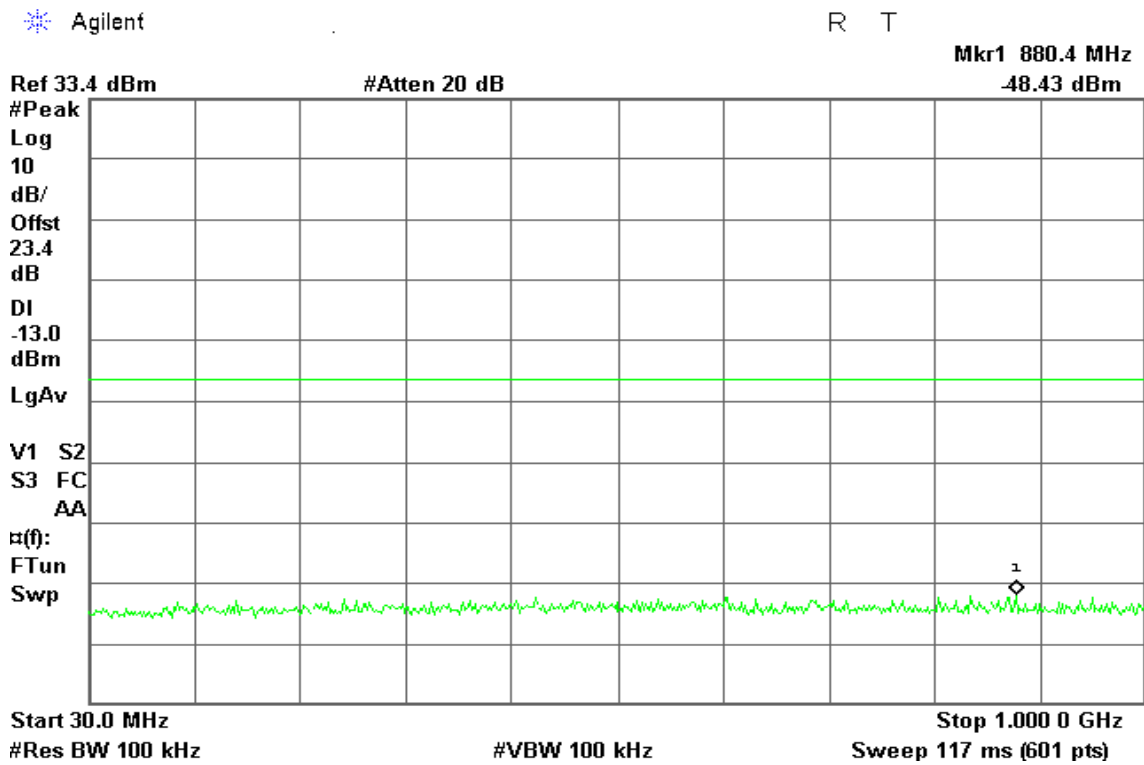
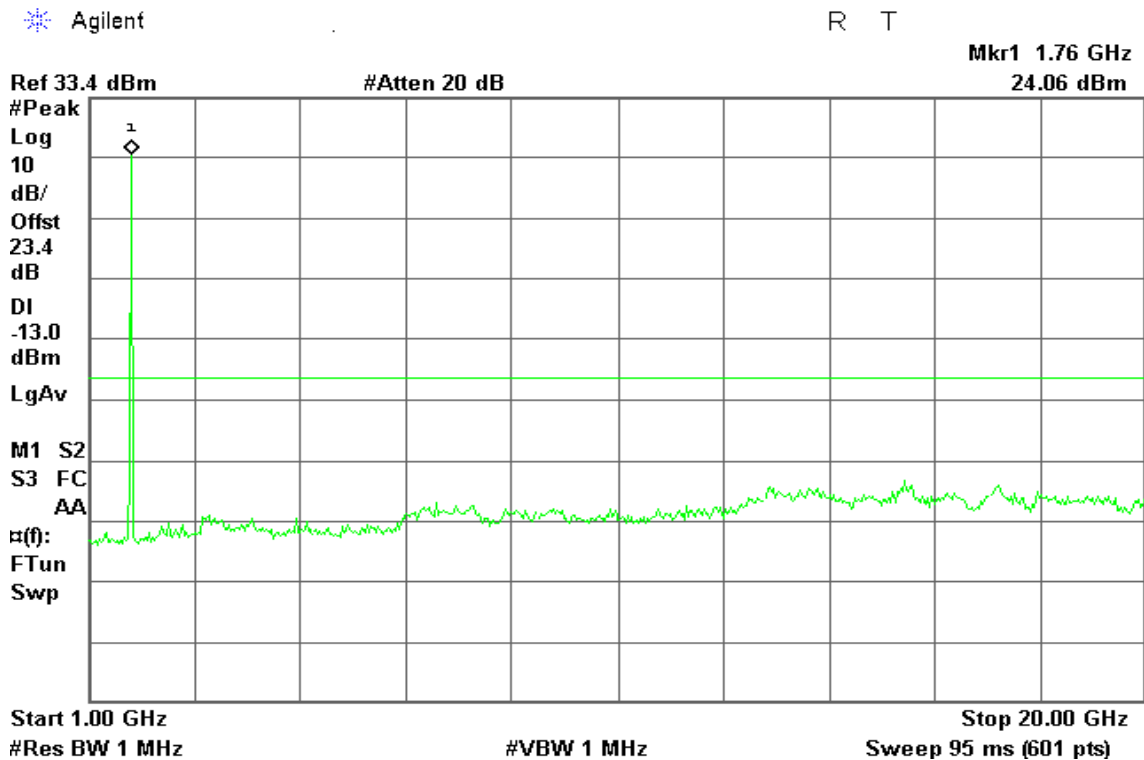
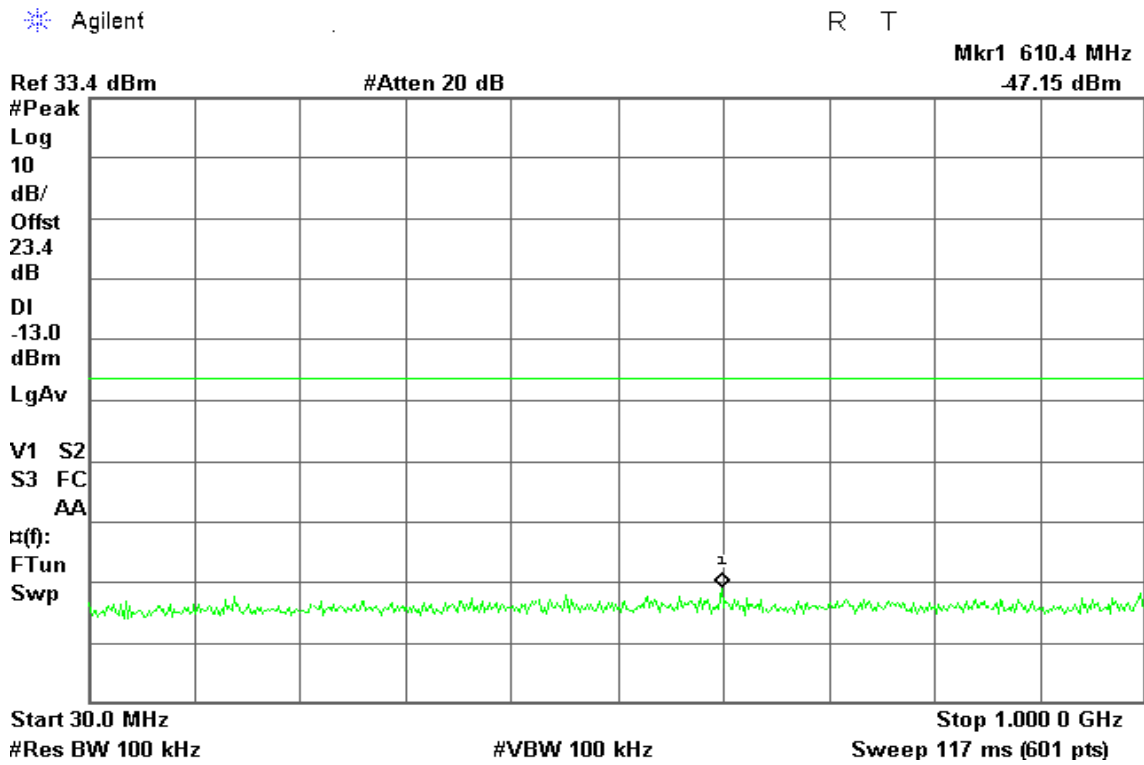




Figure 7-3: Out of Band emission at antenna terminals – CH High





HSDPA Band IV

Figure 7-4: Out of Band emission at antenna terminals – CH Low

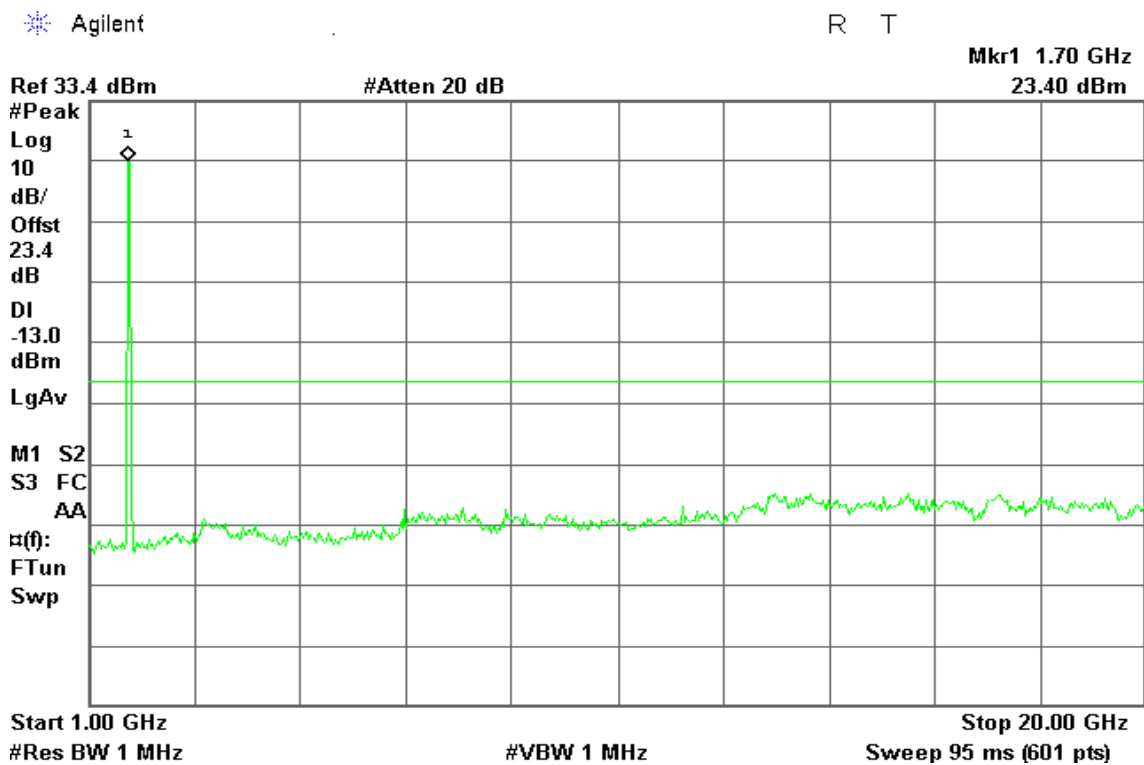
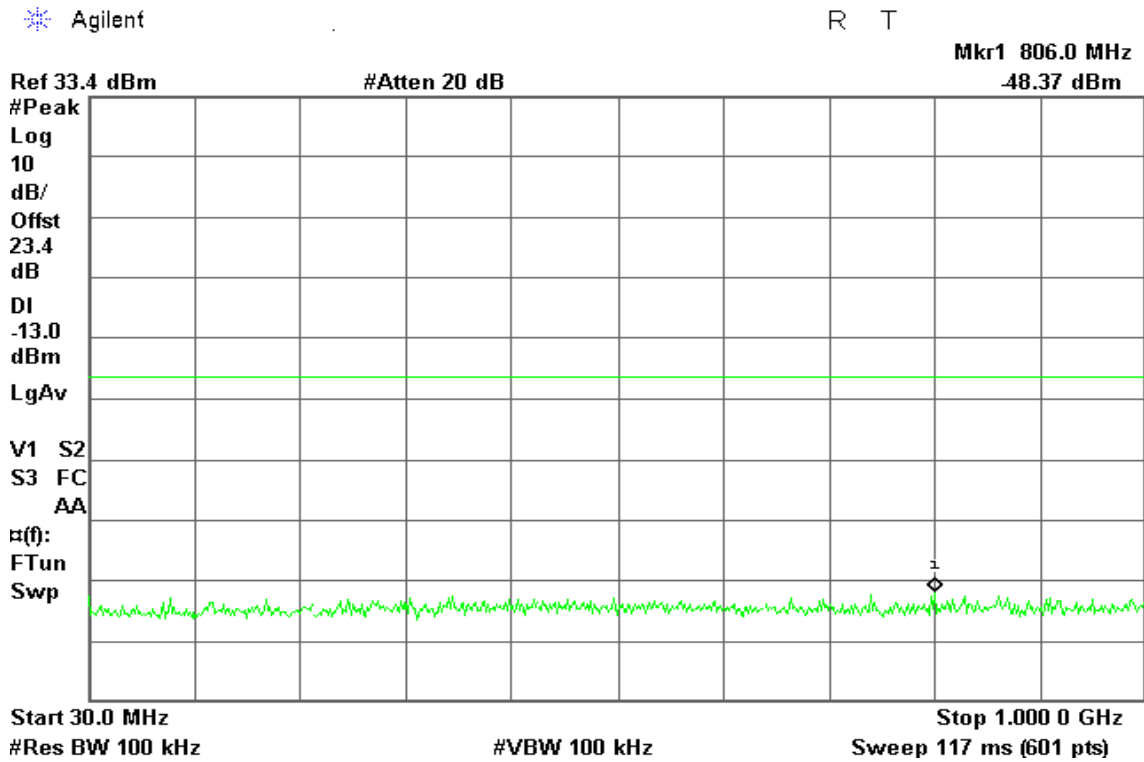




Figure 7-5: Out of Band emission at antenna terminals – CH Mid

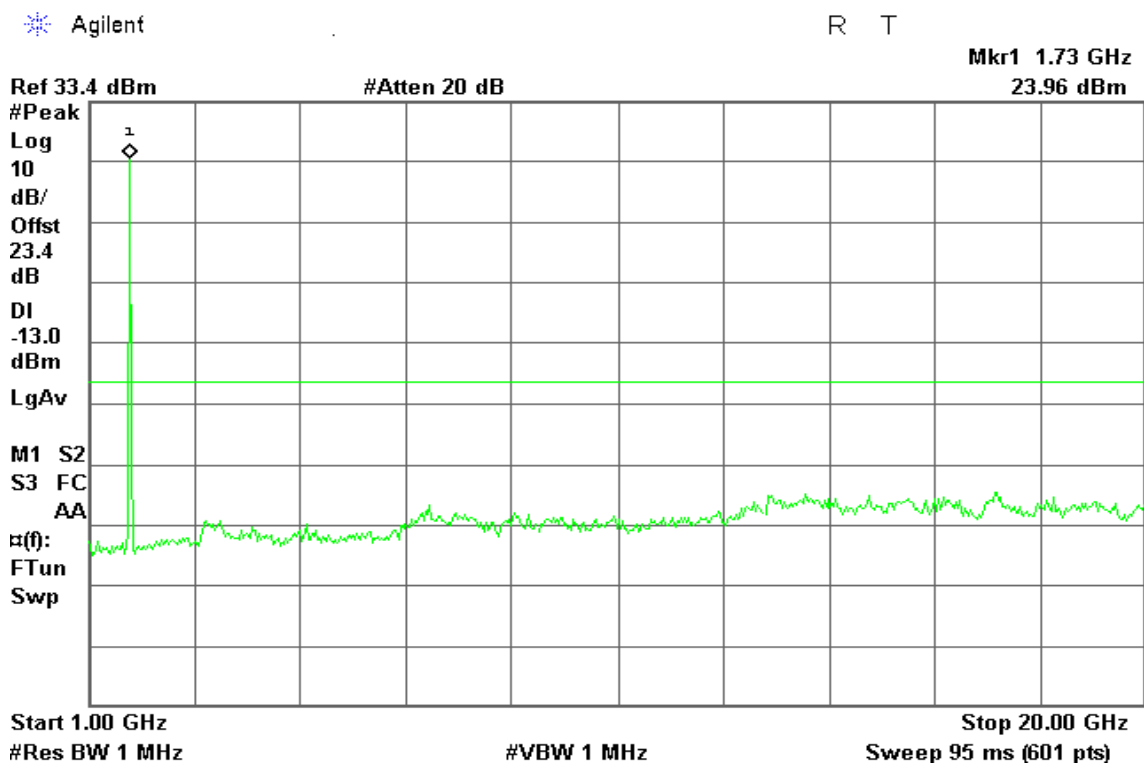
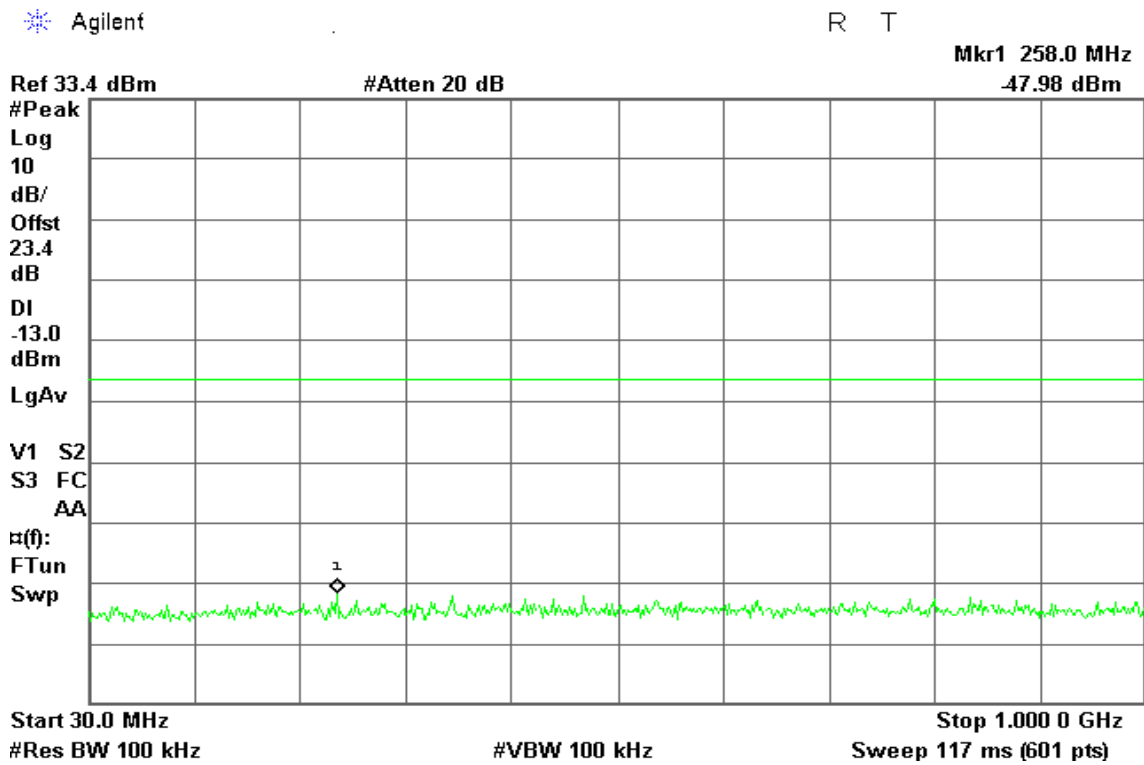
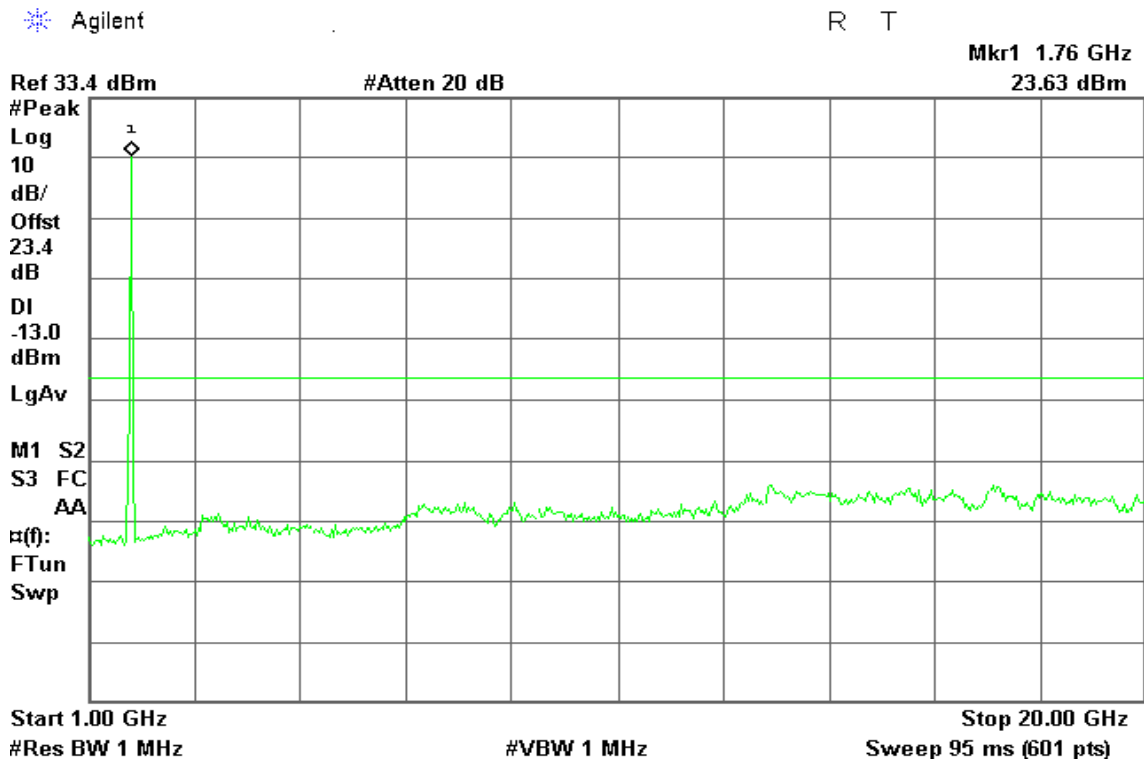
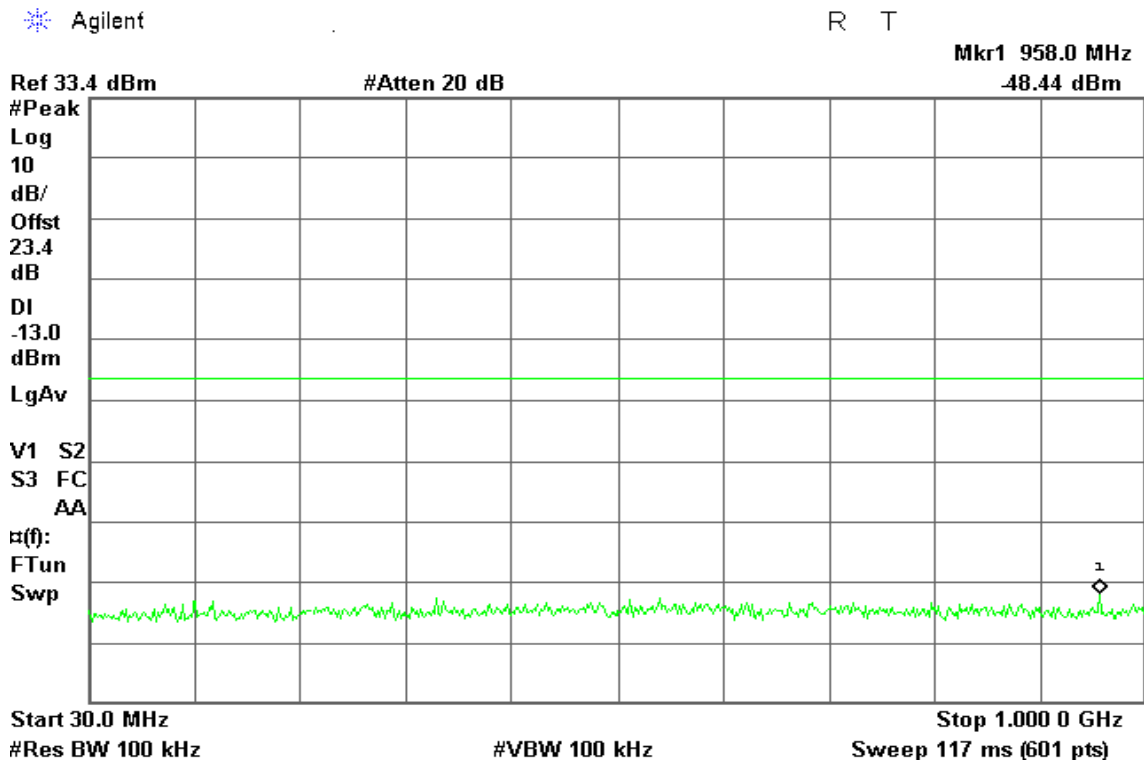




Figure 7-6: Out of Band emission at antenna terminals – CH High





### HSUPA Band IV

Figure 7-7: Out of Band emission at antenna terminals – CH Low

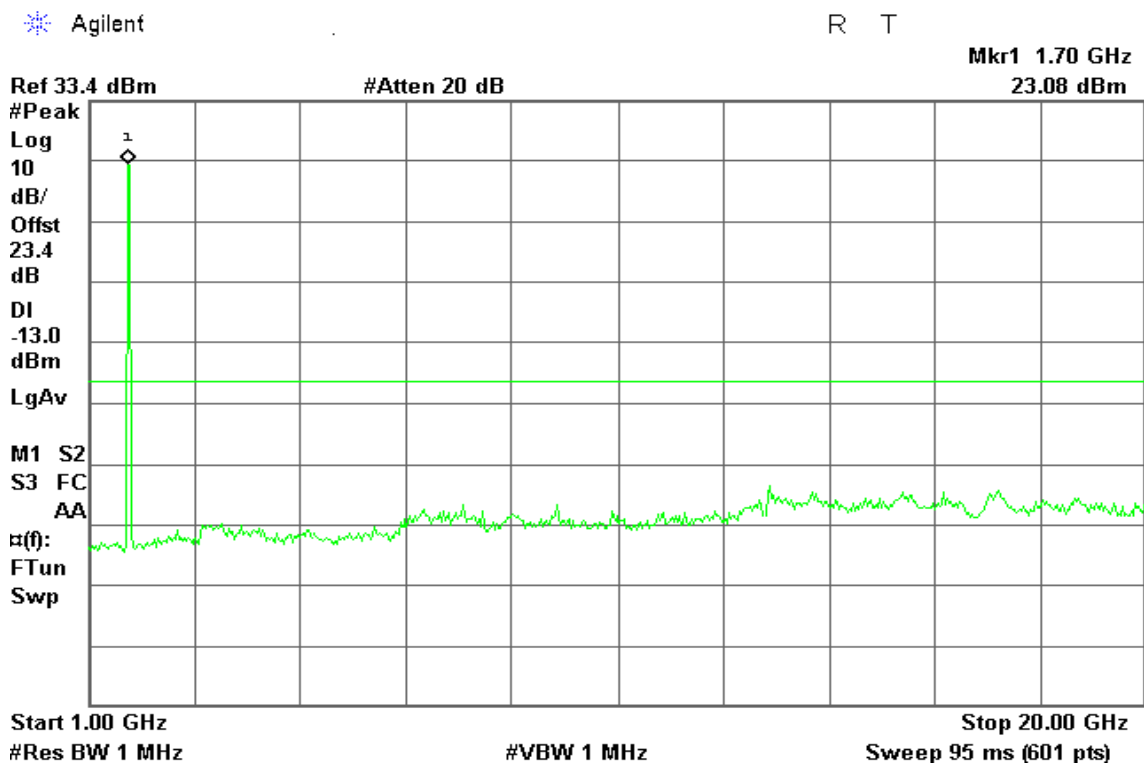
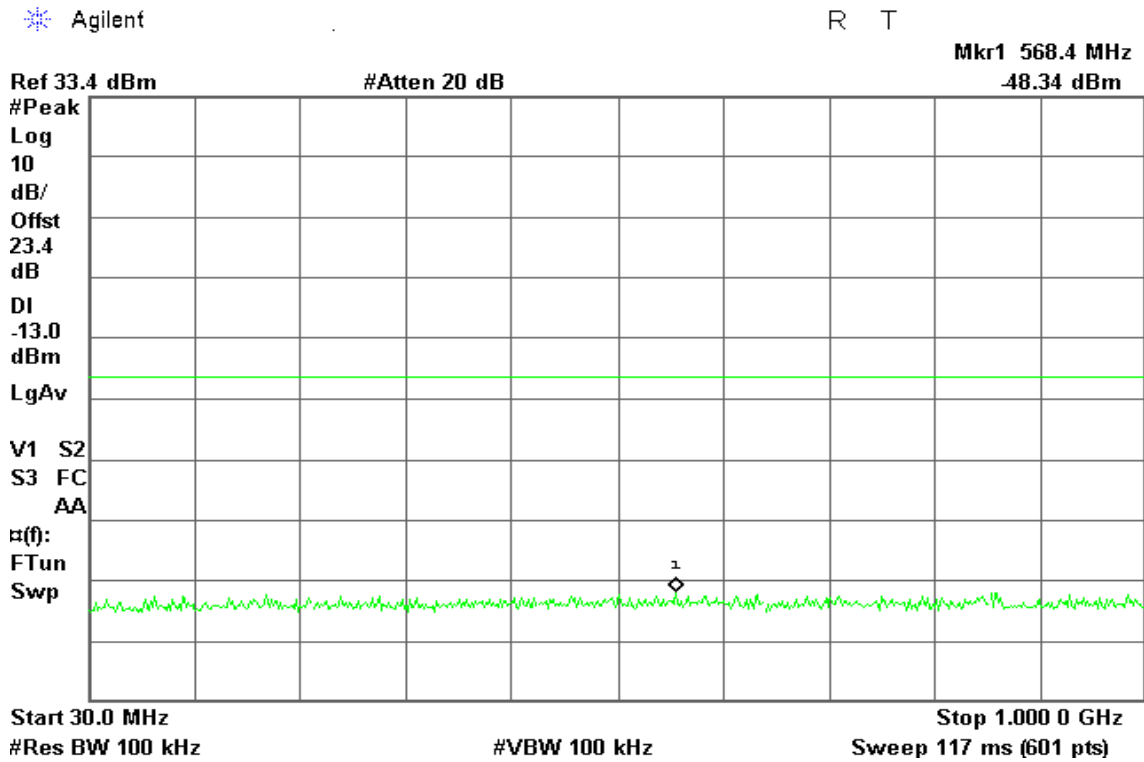




Figure 7-8: Out of Band emission at antenna terminals – CH Mid

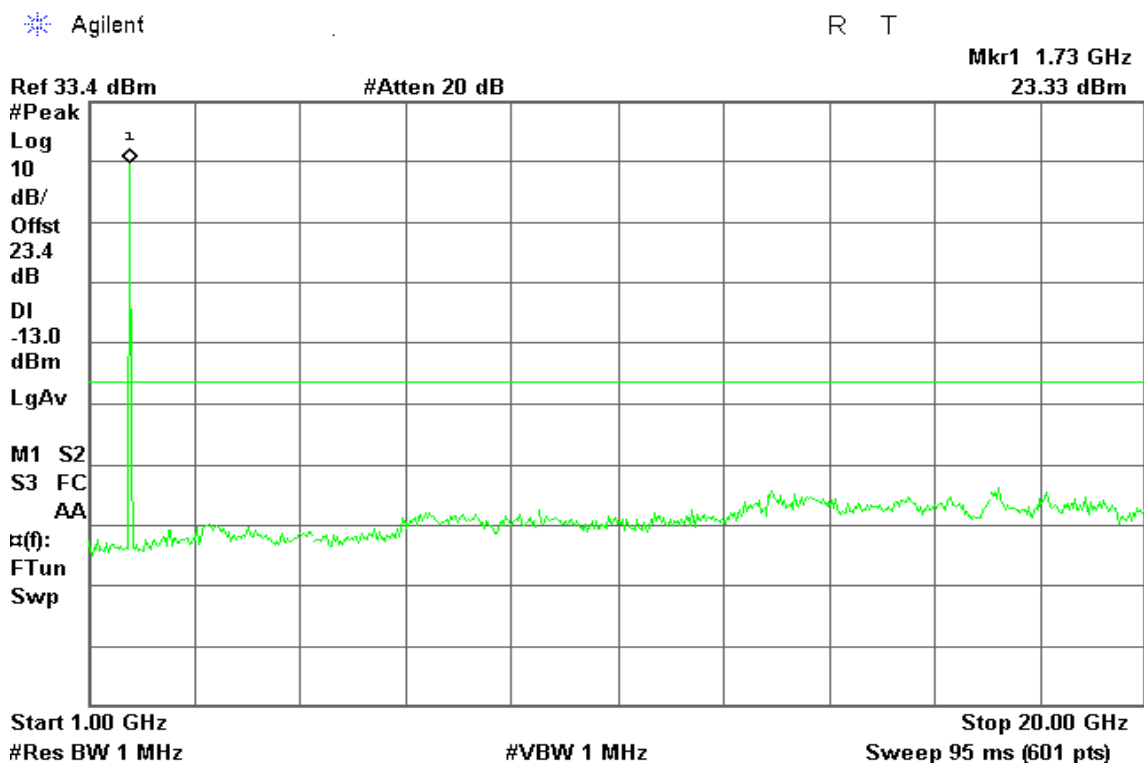
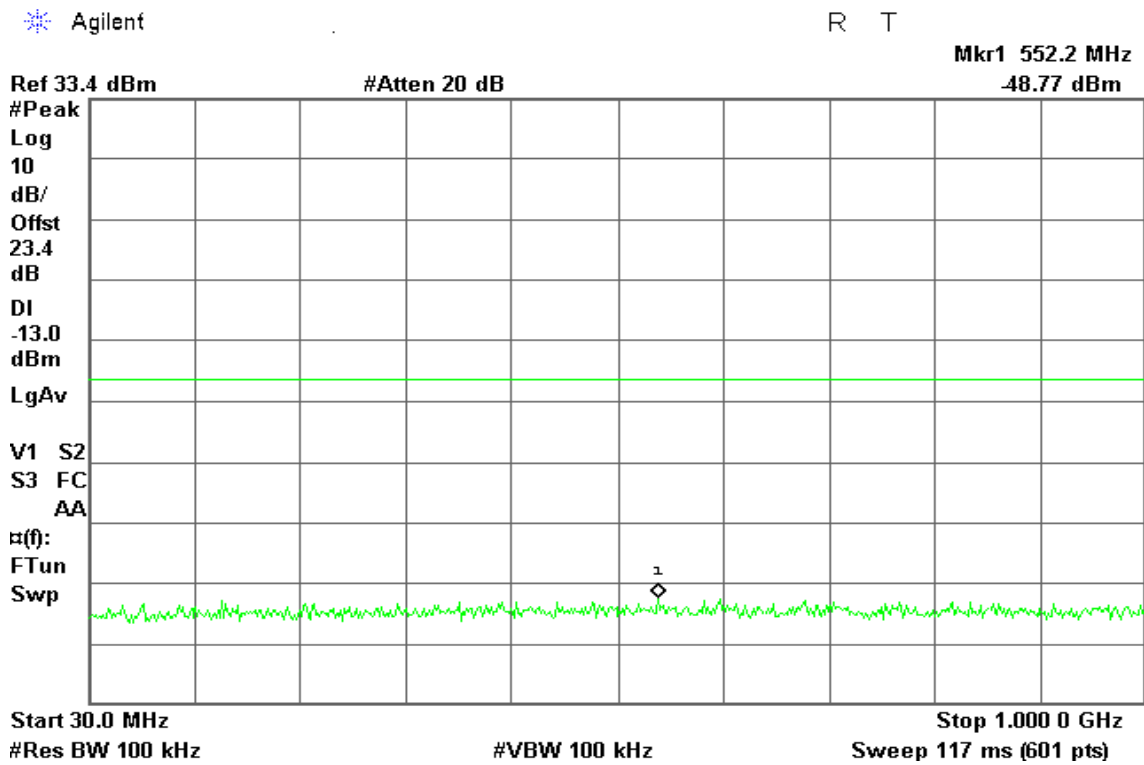
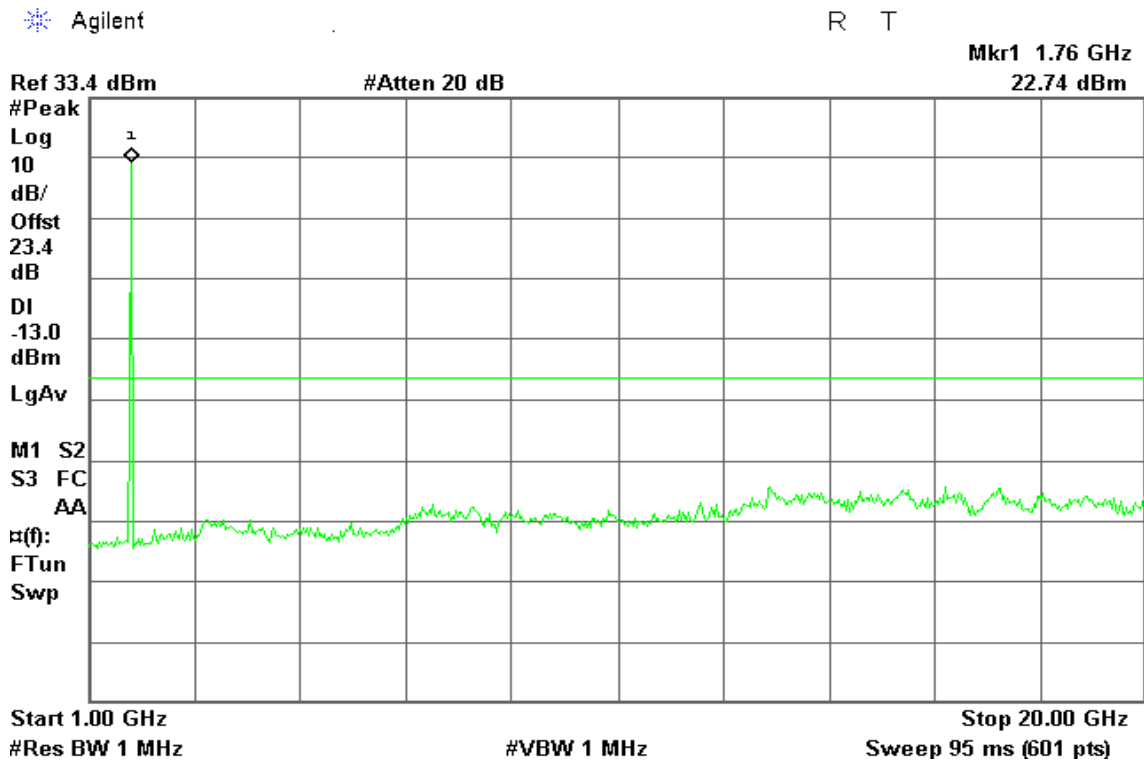
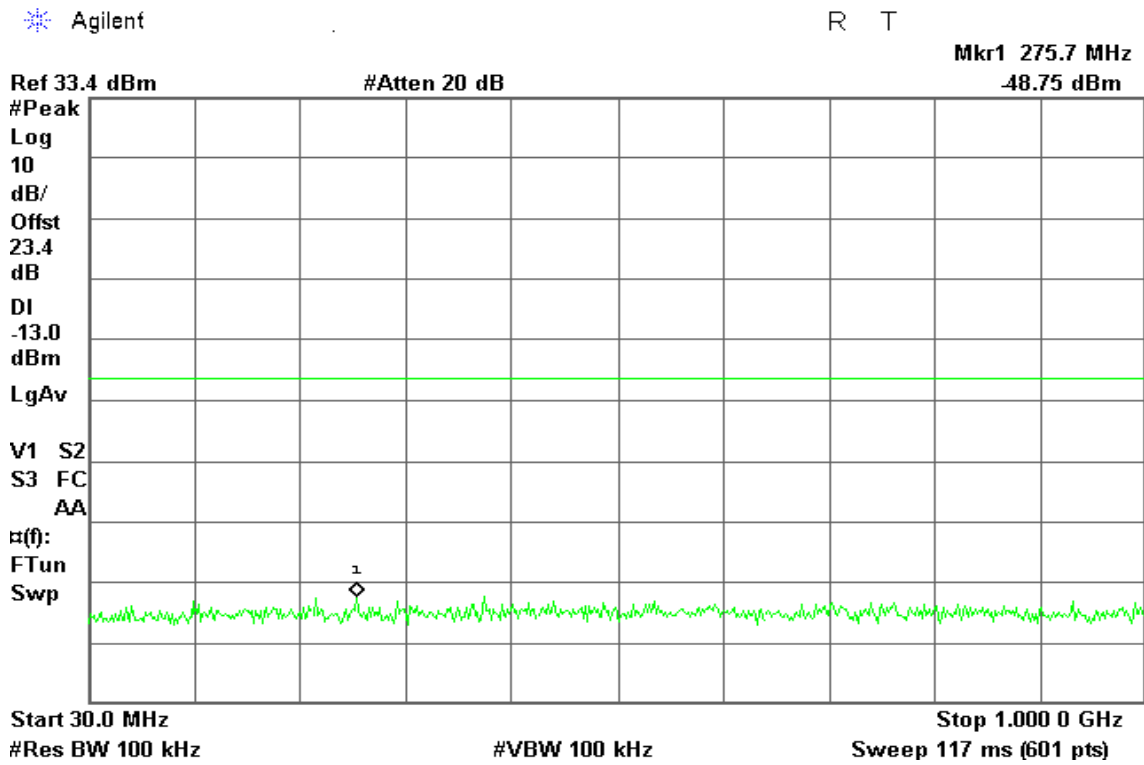






Figure 7-9: Out of Band emission at antenna terminals – CH High

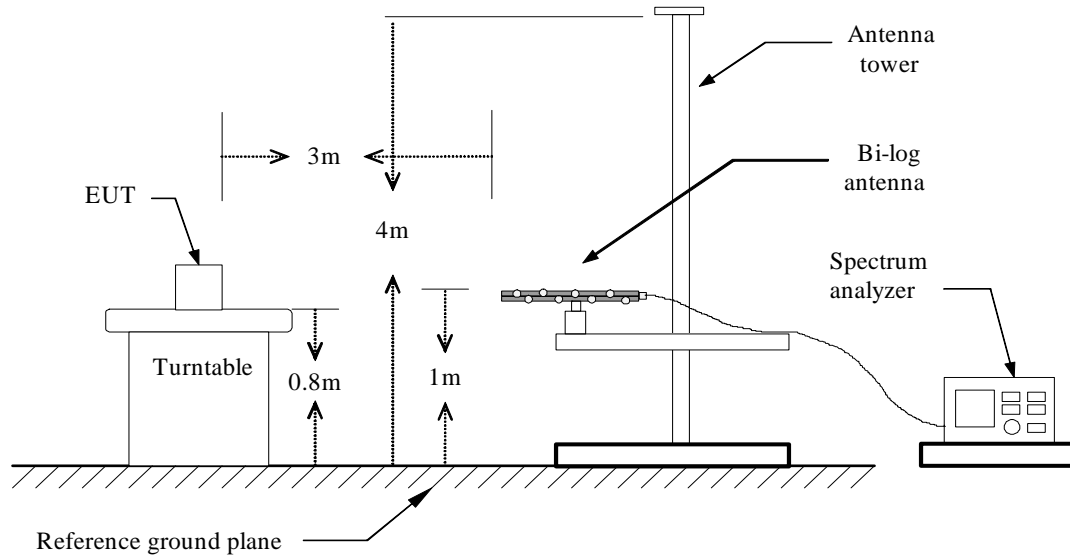




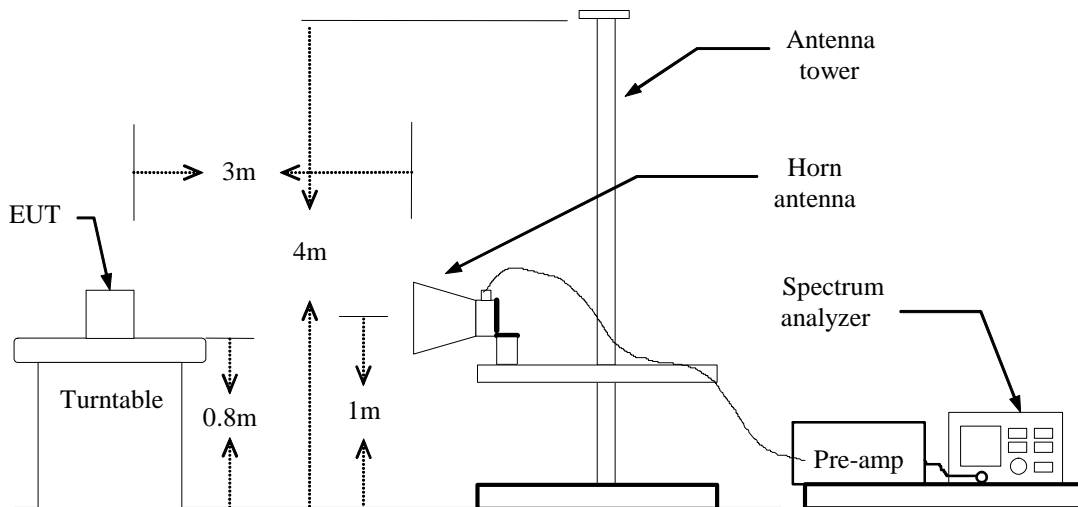
## 7.5 ERP & EIRP MEASUREMENT

### Test Configuration

#### Below 1 GHz

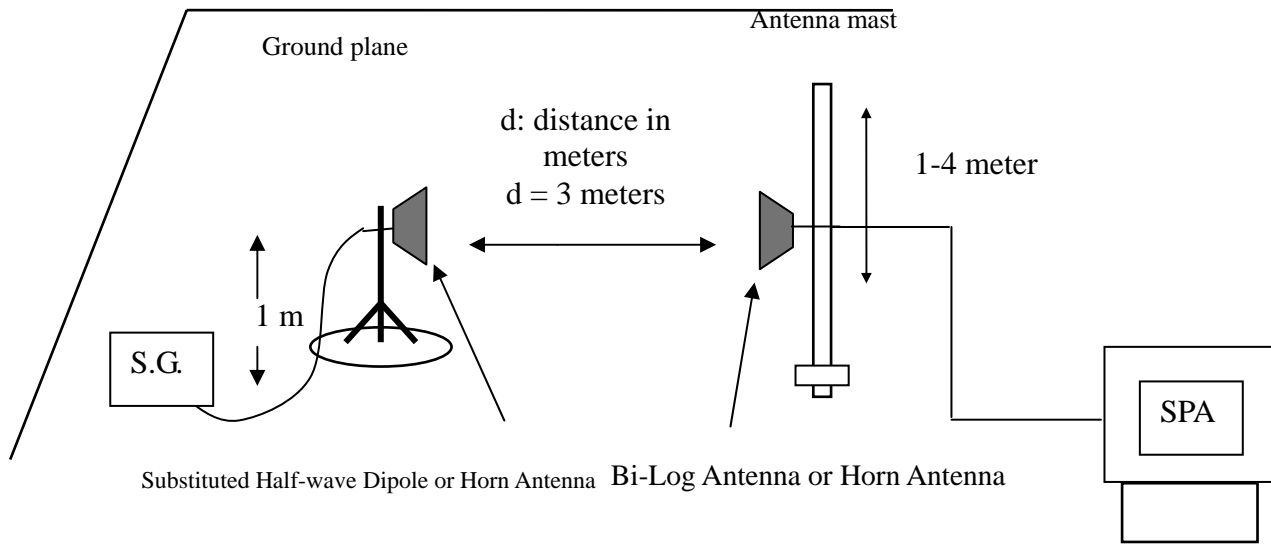


#### Above 1 GHz





### For Substituted Method Test Set-UP



### TEST PROCEDURE

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.

During the measurement of the EUT, the resolution bandwidth was set to 3MHz and the average bandwidth was set to 3MHz. 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.

ERP in frequency band 824-849MHz, and EIRP in frequency band 1851.25 –1910MHz were measured using a substitution method. The EUT was replaced by half-wave dipole (824-849MHz) or horn antenna (1851.25-1910MHz) connected to a signal generator. The spectrum analyzer reading was recorded and ERP/EIRP was calculated as follows:

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

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

### 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	17.95	5.13	5.92	18.74	33.00	-14.26
	1712.40	H	20.97	5.13	5.92	21.76	33.00	-11.24
1427	1735.40	V	17.61	5.17	5.88	18.32	33.00	-14.68
	1735.40	H	20.88	5.17	5.88	21.59	33.00	-11.41
1513	1752.60	V	18.68	5.21	5.84	19.31	33.00	-13.69
	1752.60	H	21.9	5.21	5.84	<b>*22.53</b>	33.00	-10.47

**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	17.92	5.13	5.92	18.71	33.00	-14.29
	1712.40	H	21.05	5.13	5.92	21.84	33.00	-11.16
1427	1735.40	V	17.53	5.17	5.88	18.24	33.00	-14.76
	1735.40	H	20.86	5.17	5.88	21.57	33.00	-11.43
1513	1752.60	V	18.64	5.21	5.84	19.27	33.00	-13.73
	1752.60	H	21.9	5.21	5.84	<b>*22.53</b>	33.00	-10.47

**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	17.93	5.13	5.92	18.72	33.00	-14.28
	1712.40	H	20.92	5.13	5.92	21.71	33.00	-11.29
1427	1735.40	V	17.57	5.18	5.87	18.26	33.00	-14.74
	1735.40	H	20.82	5.17	5.88	21.53	33.00	-11.47
1513	1752.60	V	18.53	5.2	5.85	19.18	33.00	-13.82
	1752.60	H	21.85	5.21	5.84	<b>*22.48</b>	33.00	-10.52



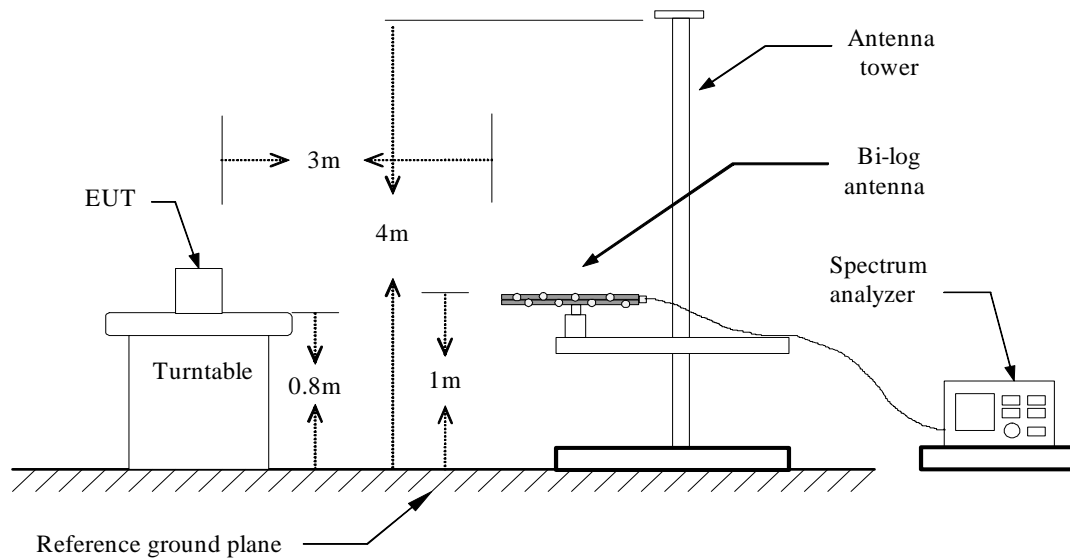
## 7.6 FIELD STRENGTH OF SPURIOUS RADIATION MEASUREMENT

### LIMIT

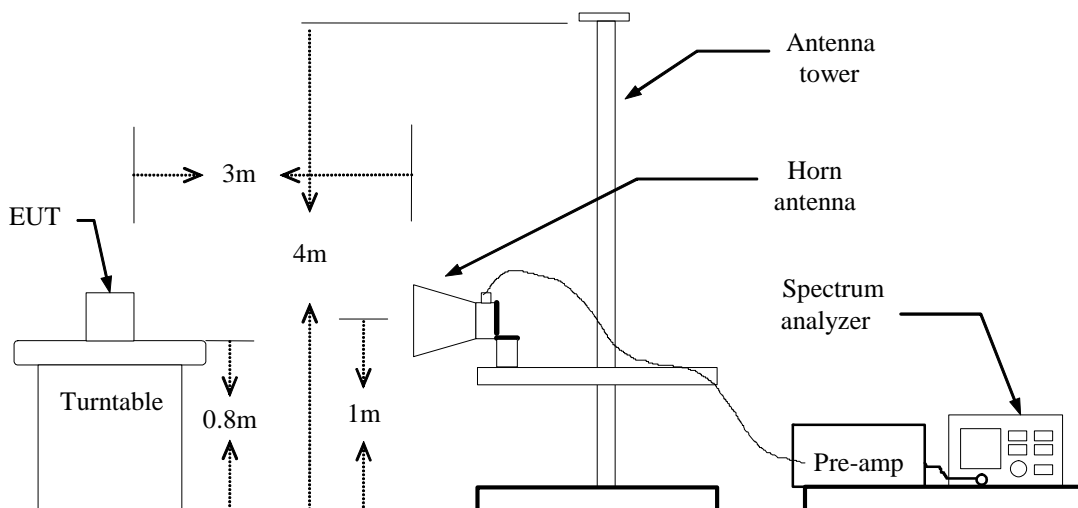
§27.53 (g) and RSS-139 § 6.5 For operations in the 1710–1755MHz and 2110–2155 MHz bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least  $43 + 10 \log_{10} (P)$  dB.

### Test Configuration

#### Below 1 GHz

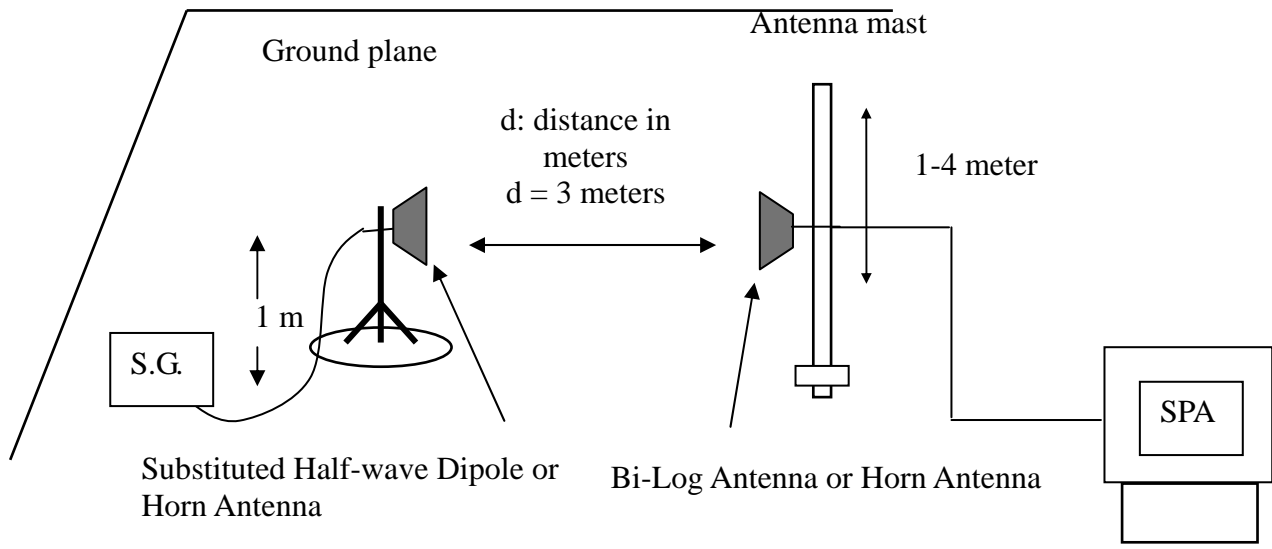


#### Above 1 GHz





## 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.

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

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

## TEST RESULTS

*Refer to the attached tabular data sheets.*



**Operation Mode:** WCDMA Band IV / TX / CH 1312

**Test Date:** December 23, 2011

**Temperature:** 25°C

**Tested by:** Edward Lin

**Humidity:** 45 % RH

**Polarity:** Ver. / Hor.

Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
44.5500	-71.11	0.76	-8.84	-80.71	-13.00	-67.71	V
136.7000	-78.49	1.38	-0.61	-80.48	-13.00	-67.48	V
185.2000	-76.9	1.61	3.81	-74.70	-13.00	-61.70	V
347.6750	-83.18	2.21	5.8	-79.59	-13.00	-66.59	V
461.6500	-85.29	2.6	5.86	-82.03	-13.00	-69.03	V
774.4750	-81.58	3.28	6.25	-78.61	-13.00	-65.61	V
44.5500	-66.49	0.76	-8.84	-76.09	-13.00	-63.09	H
127.0000	-71.59	1.32	-1.63	-74.54	-13.00	-61.54	H
257.9500	-81.72	1.89	5.61	-78.00	-13.00	-65.00	H
325.8500	-79.22	2.17	5.71	-75.68	-13.00	-62.68	H
427.7000	-79.79	2.48	5.8	-76.47	-13.00	-63.47	H
454.3750	-79.82	2.59	5.79	-76.62	-13.00	-63.62	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:** WCDMA Band IV / TX / CH 1427

**Test Date:** December 23, 2011

**Temperature:** 25°C

**Tested by:** Edward Lin

**Humidity:** 45 % RH

**Polarity:** Ver. / Hor.

Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
39.7000	-67.22	0.72	-12.6	-80.54	-13.00	-67.54	V
156.1000	-77.68	1.46	1.15	-77.99	-13.00	-64.99	V
192.4750	-83.73	1.62	3.74	-81.61	-13.00	-68.61	V
439.8250	-85.08	2.53	5.9	-81.71	-13.00	-68.71	V
612.0000	-83.89	2.94	6.25	-80.58	-13.00	-67.58	V
839.9500	-81.24	3.41	6.4	-78.25	-13.00	-65.25	V
44.5500	-66.59	0.76	-8.84	-76.19	-13.00	-63.19	H
127.0000	-70.16	1.32	-1.63	-73.11	-13.00	-60.11	H
187.6250	-78.64	1.62	3.9	-76.36	-13.00	-63.36	H
267.6500	-81.91	1.96	5.22	-78.65	-13.00	-65.65	H
427.7000	-81.22	2.48	5.8	-77.90	-13.00	-64.90	H
866.6250	-77.22	3.44	6.48	-74.18	-13.00	-61.18	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:** WCDMA Band IV / TX / CH 1513

**Test Date:** December 23, 2011

**Temperature:** 25°C

**Tested by:** Edward Lin

**Humidity:** 45 % RH

**Polarity:** Ver. / Hor.

Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
39.7000	-69.13	0.72	-12.6	-82.45	-13.00	-69.45	V
114.8750	-75.25	1.24	-1.9	-78.39	-13.00	-65.39	V
151.2500	-80.24	1.43	0.8	-80.87	-13.00	-67.87	V
287.0500	-83.81	2.01	5.37	-80.45	-13.00	-67.45	V
607.1500	-83.74	2.93	6.33	-80.34	-13.00	-67.34	V
820.5500	-81.14	3.39	6.2	-78.33	-13.00	-65.33	V
46.9750	-68.25	0.78	-6.96	-75.99	-13.00	-62.99	H
127.0000	-69.59	1.32	-1.63	-72.54	-13.00	-59.54	H
180.3500	-72.51	1.61	3.62	-70.50	-13.00	-57.50	H
272.5000	-72.85	1.99	5.15	-69.69	-13.00	-56.69	H
427.7000	-79.34	2.48	5.8	-76.02	-13.00	-63.02	H
728.4000	-78.94	3.18	6.41	-75.71	-13.00	-62.71	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:** WCDMA / HSDPA Band IV /  
TX / CH 1312

**Test Date:** December 23, 2011

**Temperature:** 25°C

**Tested by:** Edward Lin

**Humidity:** 45 % RH

**Polarity:** Ver. / Hor.

Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
42.1250	-68	0.74	-10.72	-79.46	-13.00	-66.46	V
153.6750	-83.17	1.45	0.98	-83.64	-13.00	-70.64	V
262.8000	-81.71	1.93	5.46	-78.18	-13.00	-65.18	V
454.3750	-85.58	2.59	5.79	-82.38	-13.00	-69.38	V
621.7000	-84.14	2.95	6.13	-80.96	-13.00	-67.96	V
806.0000	-81.18	3.33	6.38	-78.13	-13.00	-65.13	V
51.8250	-69.9	0.82	-4.37	-75.09	-13.00	-62.09	H
127.0000	-70.34	1.32	-1.63	-73.29	-13.00	-60.29	H
219.1500	-77.84	1.76	5.32	-74.28	-13.00	-61.28	H
430.1250	-80.93	2.49	5.8	-77.62	-13.00	-64.62	H
633.8250	-79.08	2.99	6.18	-75.89	-13.00	-62.89	H
750.2250	-77.82	3.2	6.1	-74.92	-13.00	-61.92	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:** WCDMA / HSDPA Band IV /  
TX / CH 1427

**Test Date:** December 23, 2011

**Temperature:** 25°C

**Tested by:** Edward Lin

**Humidity:** 45 % RH

**Polarity:** Ver. / Hor.

Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
90.6250	-78.67	1.11	1.13	-78.65	-13.00	-65.65	V
175.5000	-79.71	1.59	3.1	-78.20	-13.00	-65.20	V
318.5750	-82.61	2.17	5.72	-79.06	-13.00	-66.06	V
403.4500	-86.52	2.41	5.96	-82.97	-13.00	-69.97	V
551.3750	-85.54	2.81	6.17	-82.18	-13.00	-69.18	V
725.9750	-82.81	3.17	6.44	-79.54	-13.00	-66.54	V
127.0000	-68.38	1.32	-1.63	-71.33	-13.00	-58.33	H
180.3500	-75.08	1.61	3.62	-73.07	-13.00	-60.07	H
250.6750	-76.25	1.84	5.7	-72.39	-13.00	-59.39	H
325.8500	-82.82	2.17	5.71	-79.28	-13.00	-66.28	H
563.5000	-80.05	2.85	6.02	-76.88	-13.00	-63.88	H
772.0500	-78.4	3.28	6.32	-75.36	-13.00	-62.36	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:** WCDMA / HSDPA Band IV /  
TX / CH 1513

**Test Date:** December 23, 2011

**Temperature:** 25°C

**Tested by:** Edward Lin

**Humidity:** 45 % RH

**Polarity:** Ver. / Hor.

Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
37.2750	-65.61	0.7	-15.05	-81.36	-13.00	-68.36	V
124.5750	-77.53	1.31	-1.78	-80.62	-13.00	-67.62	V
192.4750	-81.63	1.62	3.74	-79.51	-13.00	-66.51	V
316.1500	-80.82	2.16	5.73	-77.25	-13.00	-64.25	V
425.2750	-86.29	2.47	5.8	-82.96	-13.00	-69.96	V
818.1250	-81.7	3.38	6.2	-78.88	-13.00	-65.88	V
131.8500	-64.64	1.35	-1.18	-67.17	-13.00	-54.17	H
253.1000	-78.49	1.86	5.67	-74.68	-13.00	-61.68	H
454.3750	-80.18	2.59	5.79	-76.98	-13.00	-63.98	H
565.9250	-80.51	2.86	6.05	-77.32	-13.00	-64.32	H
704.1500	-78.91	3.13	6.35	-75.69	-13.00	-62.69	H
898.1500	-77.52	3.51	6.63	-74.40	-13.00	-61.40	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:** WCDMA / HSUPA Band IV / TX / CH 1312    **Test Date:** December 23, 2011

**Temperature:** 25°C    **Tested by:** Edward Lin

**Humidity:** 45 % RH    **Polarity:** Ver. / Hor.

Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
114.8750	-75.25	1.24	-1.9	-78.39	-13.00	-65.39	V
165.8000	-78.77	1.53	2.05	-78.25	-13.00	-65.25	V
311.3000	-88.09	2.14	5.76	-84.47	-13.00	-71.47	V
425.2750	-86.35	2.47	5.8	-83.02	-13.00	-70.02	V
573.2000	-84.4	2.88	6.08	-81.20	-13.00	-68.20	V
733.2500	-82.43	3.19	6.31	-79.31	-13.00	-66.31	V
127.0000	-71.08	1.32	-1.63	-74.03	-13.00	-61.03	H
194.9000	-73.15	1.63	3.47	-71.31	-13.00	-58.31	H
253.1000	-80.06	1.86	5.67	-76.25	-13.00	-63.25	H
454.3750	-79.93	2.59	5.79	-76.73	-13.00	-63.73	H
548.9500	-80.7	2.8	6.19	-77.31	-13.00	-64.31	H
645.9500	-79.18	3.02	6.21	-75.99	-13.00	-62.99	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:** WCDMA / HSUPA Band IV / TX / CH 1427    **Test Date:** December 23, 2011

**Temperature:** 25°C    **Tested by:** Edward Lin

**Humidity:** 45 % RH    **Polarity:** Ver. / Hor.

Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
127.0000	-75.39	1.32	-1.63	-78.34	-13.00	-65.34	V
192.4750	-72.12	1.62	3.74	-70.00	-13.00	-57.00	V
270.0750	-87.72	1.98	5.1	-84.60	-13.00	-71.60	V
379.2000	-87.95	2.31	5.98	-84.28	-13.00	-71.28	V
553.8000	-84.44	2.82	6.13	-81.13	-13.00	-68.13	V
696.8750	-82.68	3.11	6.42	-79.37	-13.00	-66.37	V
44.5500	-66.35	0.76	-8.84	-75.95	-13.00	-62.95	H
127.0000	-68.96	1.32	-1.63	-71.91	-13.00	-58.91	H
211.8750	-80.57	1.7	5.42	-76.85	-13.00	-63.85	H
454.3750	-80.78	2.59	5.79	-77.58	-13.00	-64.58	H
568.3500	-80.91	2.87	6.08	-77.70	-13.00	-64.70	H
745.3750	-78.21	3.21	6.1	-75.32	-13.00	-62.32	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:** WCDMA / HSUPA Band IV / TX / CH 1513    **Test Date:** December 23, 2011

**Temperature:** 25°C    **Tested by:** Edward Lin

**Humidity:** 45 % RH    **Polarity:** Ver. / Hor.

Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
39.7000	-67.67	0.72	-12.6	-80.99	-13.00	-67.99	V
134.2750	-78.92	1.36	-0.9	-81.18	-13.00	-68.18	V
182.7750	-83.23	1.61	3.72	-81.12	-13.00	-68.12	V
253.1000	-82.11	1.86	5.67	-78.30	-13.00	-65.30	V
393.7500	-87.27	2.34	5.99	-83.62	-13.00	-70.62	V
774.4750	-81.14	3.28	6.25	-78.17	-13.00	-65.17	V
46.9750	-67.62	0.78	-6.96	-75.36	-13.00	-62.36	H
127.0000	-70.4	1.32	-1.63	-73.35	-13.00	-60.35	H
163.3750	-79.96	1.51	1.77	-79.70	-13.00	-66.70	H
243.4000	-78.28	1.82	5.43	-74.67	-13.00	-61.67	H
454.3750	-79.97	2.59	5.79	-76.77	-13.00	-63.77	H
677.4750	-78.58	3.08	6.45	-75.21	-13.00	-62.21	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:** December 23, 2011

**Temperature:** 25°C

**Tested by:** Edward Lin

**Humidity:** 45 % RH

**Polarity:** Ver. / Hor.

Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3432.500	-53.32	7.67	8.7	-52.29	-13.00	-39.29	V
5147.500	-51.04	9.5	10.66	-49.88	-13.00	-36.88	V
N/A							
3432.500	-50.39	7.67	8.7	-49.36	-13.00	-36.36	H
5147.500	-49.75	9.5	10.66	-48.59	-13.00	-35.59	H
6005.000	-50.29	10.82	10.9	-50.21	-13.00	-37.21	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 1427

**Test Date:** December 23, 2011

**Temperature:** 25°C

**Tested by:** Edward Lin

**Humidity:** 45 % RH

**Polarity:** Ver. / Hor.

Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3467.500	-54.37	7.77	8.8	-53.34	-13.00	-40.34	V
3940.000	-54.77	8.37	9.34	-53.80	-13.00	-40.80	V
5217.500	-51.02	9.58	10.69	-49.91	-13.00	-36.91	V
6460.000	-49.97	11.11	11.27	-49.81	-13.00	-36.81	V
N/A							
3485.000	-49.69	7.83	8.86	-48.66	-13.00	-35.66	H
5217.500	-50.61	9.58	10.69	-49.50	-13.00	-36.50	H
7352.500	-44.5	12.07	12.46	-44.11	-13.00	-31.11	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:** December 23, 2011

**Temperature:** 25°C

**Tested by:** Edward Lin

**Humidity:** 45 % RH

**Polarity:** Ver. / 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	-52.13	7.92	8.92	-51.13	-13.00	-38.13	V
5270.000	-50.32	9.62	10.71	-49.23	-13.00	-36.23	V
7002.500	-46.63	11.55	11.9	-46.28	-13.00	-33.28	V
N/A							
3520.000	-50.4	7.92	8.92	-49.40	-13.00	-36.40	H
5270.000	-49.91	9.62	10.71	-48.82	-13.00	-35.82	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 / HSDPA Band IV / TX / CH 1312    **Test Date:** December 23, 2011

**Temperature:** 25°C    **Tested by:** Edward Lin

**Humidity:** 45 % RH    **Polarity:** Ver. / Hor.

Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3432.500	-52.39	7.67	8.7	-51.36	-13.00	-38.36	V
5147.500	-50.38	9.5	10.66	-49.22	-13.00	-36.22	V
N/A							
3432.500	-50.14	7.67	8.7	-49.11	-13.00	-36.11	H
5147.500	-50.47	9.5	10.66	-49.31	-13.00	-36.31	H
6495.000	-49.17	11.05	11.3	-48.92	-13.00	-35.92	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 / HSDPA Band IV / TX / CH 1427    **Test Date:** December 23, 2011

**Temperature:** 25°C    **Tested by:** Edward Lin

**Humidity:** 45 % RH    **Polarity:** Ver. / 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	-54.76	7.83	8.86	-53.73	-13.00	-40.73	V
5217.500	-50.39	9.58	10.69	-49.28	-13.00	-36.28	V
N/A							
3485.000	-49.26	7.83	8.86	-48.23	-13.00	-35.23	H
5217.500	-50.8	9.58	10.69	-49.69	-13.00	-36.69	H
6512.500	-49.16	11.06	11.32	-48.90	-13.00	-35.90	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 / HSDPA Band IV / TX / CH 1513    **Test Date:** December 23, 2011

**Temperature:** 25°C    **Tested by:** Edward Lin

**Humidity:** 45 % RH    **Polarity:** Ver. / Hor.

Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
2155.000	-46.15	5.87	5.62	-46.40	-13.00	-33.40	V
3520.000	-50.56	7.92	8.92	-49.56	-13.00	-36.56	V
5270.000	-49.49	9.62	10.71	-48.40	-13.00	-35.40	V
6827.500	-47.19	11.36	11.69	-46.86	-13.00	-33.86	V
N/A							
3520.000	-49.62	7.92	8.92	-48.62	-13.00	-35.62	H
5270.000	-50.53	9.62	10.71	-49.44	-13.00	-36.44	H
6635.000	-48.15	11.25	11.46	-47.94	-13.00	-34.94	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 / HSUPA Band IV / TX / CH 1312 **Test Date:** December 23, 2011

**Temperature:** 25°C

**Tested by:** Edward Lin

**Humidity:** 45 % RH

**Polarity:** Ver. / Hor.

Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3432.500	-53.39	7.67	8.7	-52.36	-13.00	-39.36	V
5147.500	-50.75	9.5	10.66	-49.59	-13.00	-36.59	V
6232.500	-50.49	11.07	11.09	-50.47	-13.00	-37.47	V
N/A							
3432.500	-49.26	7.67	8.7	-48.23	-13.00	-35.23	H
5147.500	-50.1	9.5	10.66	-48.94	-13.00	-35.94	H
6862.500	-46.96	11.44	11.73	-46.67	-13.00	-33.67	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 / HSUPA Band IV / TX / CH 1427 **Test Date:** December 23, 2011

**Temperature:** 25°C

**Tested by:** Edward Lin

**Humidity:** 45 % RH

**Polarity:** Ver. / 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	-53.63	7.83	8.86	-52.60	-13.00	-39.60	V
5200.000	-51.3	9.56	10.68	-50.18	-13.00	-37.18	V
N/A							
3485.000	-50.05	7.83	8.86	-49.02	-13.00	-36.02	H
5217.500	-51.11	9.58	10.69	-50.00	-13.00	-37.00	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 / HSUPA Band IV / TX / CH 1513 **Test Date:** December 23, 2011

**Temperature:** 25°C

**Tested by:** Edward Lin

**Humidity:** 45 % RH

**Polarity:** Ver. / Hor.

Frequency (MHz)	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
2155.000	-47.41	5.87	5.62	-47.66	-13.00	-34.66	V
3502.500	-51.47	7.88	8.9	-50.45	-13.00	-37.45	V
5270.000	-48.95	9.62	10.71	-47.86	-13.00	-34.86	V
6687.500	-47.73	11.29	11.52	-47.50	-13.00	-34.50	V
N/A							
3502.500	-47.41	7.88	8.9	-46.39	-13.00	-33.39	H
5270.000	-48.82	9.62	10.71	-47.73	-13.00	-34.73	H
6495.000	-47.72	11.05	11.3	-47.47	-13.00	-34.47	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.





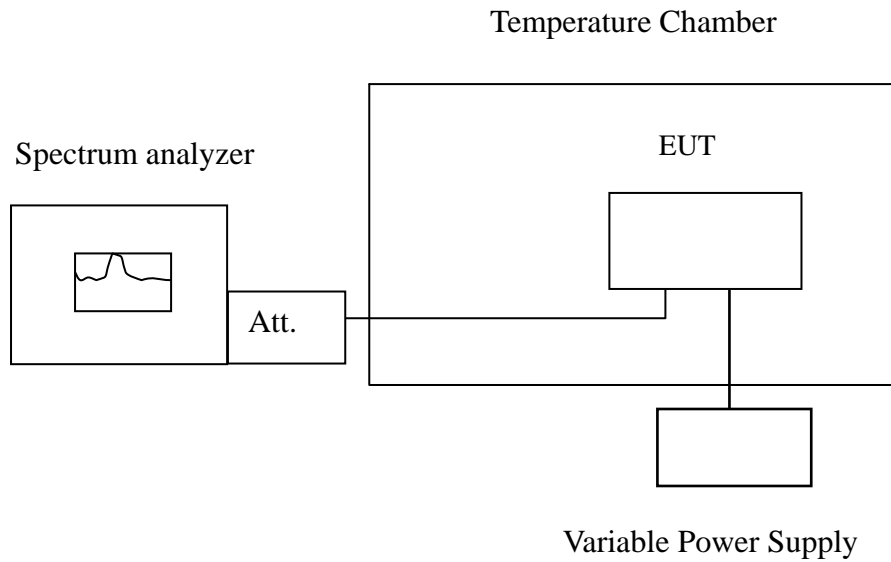
## 7.7 FREQUENCY STABILITY V.S. TEMPERATURE MEASUREMENT

### LIMIT

According to FCC §27.54, RSS-139.

Frequency Tolerance: 2.5 ppm

### 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.*

<b>Reference Frequency: WCDMA Band IV Mid Channel 1735.40 MHz @ 20°C</b>				
Limit: ± 2.5 ppm = 4700Hz				
Power Supply Vdc	Environment Temperature (°C)	Frequency (Hz)	Delta (Hz)	Limit (Hz)
3.7	50	1735400001	-23	4700
	40	1735400005	-19	
	30	1735400010	-14	
	20	1735400024	0	
	10	1735399996	-28	
	0	1735399994	-30	
	-10	1735400009	-15	
	-20	1735400012	-12	
	-30	1735399976	-48	

<b>Reference Frequency: HSDPA Band IV Mid Channel 1735.40 MHz @ 20°C</b>				
Limit: ± 2.5 ppm = 4700Hz				
Power Supply Vdc	Environment Temperature (°C)	Frequency (Hz)	Delta (Hz)	Limit (Hz)
3.7	50	1735400003	2	4700
	40	1735399998	-3	
	30	1735399999	-2	
	20	1735400001	0	
	10	1735399994	-7	
	0	1735400009	8	
	-10	1735400002	1	
	-20	1735400023	22	
	-30	1735400013	12	



<b>Reference Frequency: HSUPA Band IV Mid Channel 1735.40 MHz @ 20°C</b>				
Limit: $\pm 2.5$ ppm = 4700Hz				
Power Supply Vdc	Environment Temperature (°C)	Frequency (Hz)	Delta (Hz)	Limit (Hz)
3.7	50	1735399998	-23	4700
	40	1735399994	-27	
	30	1735399995	-26	
	20	1735400021	0	
	10	1735399997	-24	
	0	1735400002	-19	
	-10	1735400005	-16	
	-20	1735399998	-23	
	-30	1735400010	-11	



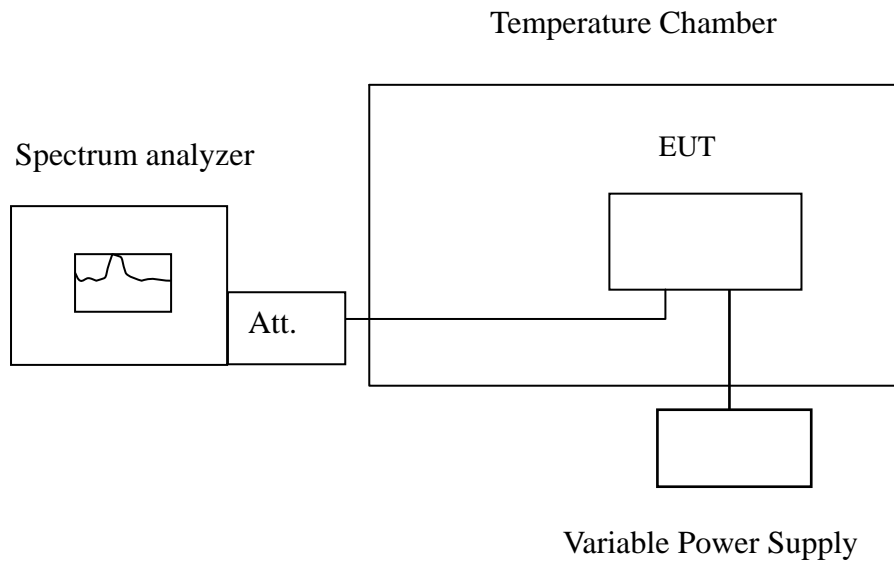
## 7.8 FREQUENCY STABILITY V.S. VOLTAGE MEASUREMENT

### LIMIT

According to FCC §27.54, RSS-139.

Frequency Tolerance: 2.5 ppm.

### 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.*

<b>Reference Frequency: WCDMA Band IV Mid Channel 1735.40 MHz @ 20°C</b>				
Limit: ± 2.5 ppm = 4700Hz				
Power Supply Vdc	Environment Temperature (°C)	Frequency (Hz)	Delta (Hz)	Limit (Hz)
4.255	20	1735400001	-23	4700
3.7		1735400024	0	
3.145		1735400012	-12	
3END		1735399902	-122	

<b>Reference Frequency: HSDPA Band IV Mid Channel 1735.40 MHz @ 20°C</b>				
Limit: ± 2.5 ppm = 4700Hz				
Power Supply Vdc	Environment Temperature (°C)	Frequency (Hz)	Delta (Hz)	Limit (Hz)
4.255	20	1735400002	1	4700
3.7		1735400001	0	
3.145		1735399995	-6	
3END		1735400094	93	

<b>Reference Frequency: HSUPA Band IV Mid Channel 1735.40 MHz @ 20°C</b>				
Limit: ± 2.5 ppm = 4700Hz				
Power Supply Vdc	Environment Temperature (°C)	Frequency (Hz)	Delta (Hz)	Limit (Hz)
4.255	20	1735400002	-19	4700
3.7		1735400021	0	
3.145		1735400017	-4	
3END		1735400070	49	