



**FCC 47 CFR PART 22 SUBPART H AND PART 24 SUBPART E
&
INDUSTRY CANADA RSS-132 & RSS-133
(Class II Permissive Change)**

TEST REPORT

For

LE920-NAG

Trade Name: LE920

Model: LE920-NAG

Issued to

**Telit Communications S.P.A.
Via Stazione di Prosecco 5/B
34010 Sgonico, Trieste - Italy**

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: December 11, 2013**



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Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	July 26, 2013	Initial Issue	ALL	Kelly Cheng
01	December 11, 2013	See the following Note Rev. (01)	ALL	Kelly Cheng

Rev. (01):

- 1. Modify the antenna gain to evaluate maximum antenna gain*
- 2. Other information, please refer to the T130708W02 and this test report.*



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1. JTEST RESULT CERTIFICATION

Applicant: Telit Communications S.P.A.
Via Stazione di Prosecco 5/B
34010 Sgonico, Trieste - Italy

Manufacturer: Telit Communications S.P.A.
Via Stazione di Prosecco 5/B
34010 Sgonico, Trieste - Italy

Equipment Under Test: LE920-NAG

Trade Name: LE920

Model Number: LE920-NAG

Date of Test: July 18 ~December 8, 2013

APPLICABLE STANDARDS	
STANDARD	TEST RESULT
FCC 47 CFR PART 22 SUBPART H AND PART 24 SUBPART E & IC RSS-132 Issue 2: September 2005 and IC RSS-133 Issue 5: 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 22 Subpart H, PART 24 Subpart E, IC RSS-132 Issue 2 and IC RSS-133 Issue 4.

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

Approved by:

Reviewed by:

Miller Lee
Section Manager
Compliance Certification Services Inc.

Angel Cheng
Section Manager
Compliance Certification Services Inc.



2. EUT DESCRIPTION

Product	LE920-NAG	
Trade Name	LE920	
Model Number	LE920-NAG	
Model Discrepancy	N/A	
Received Date	December 04, 2013	
Power Supply	DC 3.8V powered from Host device.	
Frequency Range	LTE Band 2 Channel Bandwidth: 5MHz	1852.5MHz ~1907.5MHz
	LTE Band 2 Channel Bandwidth: 10MHz	1855MHz ~1905MHz
	LTE Band 2 Channel Bandwidth: 20MHz	1860MHz ~1900MHz
	LTE Band 5 Channel Bandwidth: 5MHz	826.5MHz ~846.5MHz
	LTE Band 5 Channel Bandwidth: 10MHz	829MHz ~844MHz
Modulation Technique	LTE Band 2	QPSK, 16QAM
	LTE Band 5	QPSK, 16QAM
Maximum ERP Power	LTE Band 2 Channel Bandwidth: 5MHz	QPSK : 27.71dBm 16QAM : 27.94dBm
	LTE Band 2 Channel Bandwidth: 10MHz	QPSK : 27.92dBm 16QAM : 28.00dBm
	LTE Band 2 Channel Bandwidth: 20MHz	QPSK : 27.00dBm 16QAM : 26.89 dBm
Maximum ERP Power	LTE Band 5 Channel Bandwidth: 5MHz	QPSK : 23.76dBm 16QAM : 24.20dBm
	LTE Band 5 Channel Bandwidth: 10MHz	QPSK : 23.36dBm 16QAM : 22.31dBm
Category	LTE: 3	
Antenna Specification	Antenna gain including cable loss must not exceed 8dBi in the LTE Band 2 and 15.6dBi in the LTE Band 5 for satisfying the requirement of 2.1043 and 2.1091.	
Class II Permissive Change	Modify the antenna gain to evaluate maximum antenna gain	

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: 2009, TIA/EIA-603-C: 2004 and FCC CFR 47, Part 2 and Part 22 Subpart H & Part 24 Subpart E.

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: 2009. 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: 2009.



3.4 DESCRIPTION OF TEST MODES

The EUT (model: LE920-NAG) had been tested under operating condition.

Software used to control the EUT for staying in continuous transmitting mode was programmed.

LTE Band 2: 1850MHz ~ 1910MHz

Three channels had been tested for each channel bandwidth.

Channel Bandwidth	5MHz		10MHz		20MHz	
	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
Low channel (L)	18625	1852.5	18650	1855	18700	1860
Middle channel (M)	18900	1880	18900	1880	18900	1880
High channel (H)	19175	1907.5	19150	1905	19100	1900

LTE Band 5: 824MHz ~ 849MHz

Three channels had been tested for each channel bandwidth.

Channel Bandwidth	5MHz		10MHz	
	Channel	Frequency(MHz)	Channel	Frequency(MHz)
Low channel (L)	20425	826.5	20450	829
Middle channel (M)	20520	836	20520	836
High channel (H)	20625	846.5	20600	844



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	03/20/2014
Power Meter	Anritsu	ML2495A	1012009	06/04/2014
Power Sensor	Anritsu	MA2411A	0917072	06/04/2014

3M Semi Anechoic Chamber				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	US42510268	11/05/2014
EMI Test Receiver	R&S	ESCI	100064	02/17/2014
Pre-Amplifier	Mini-Circuits	ZFL-1000LN	SF350700823	01/12/2014
Bilog Antenna	Sunol Sciences	JB3	A030105	02/17/2014
Bilog Antenna	Sunol Sciences	JB3	A030205	10/01/2014
Horn Antenna	EMCO	3117	00055165	02/17/2014
Horn Antenna	EMCO	3117	00055167	01/28/2014
Horn Antenna	EMCO	3116	26370	01/07/2014
Loop Antenna	EMCO	6502	8905/2356	06/12/2014
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	12/22/2013
Test S/W	EZ-EMC (CCS-3A1RE)			



4.3 MEASUREMENT UNCERTAINTY

PARAMETER	UNCERTAINTY
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, 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., Lujhu Township, Taoyuan County 33841, TAIWAN,
R.O.C.
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: 2009 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	 Testing Laboratory 1309
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.	Device Type	Brand	Model	Series No.	FCC ID	Data Cable	Power Cord
1.	Radio Communication Analyzer (Remote)	Anritsu	MT8820C	6200938900	N/A	N/A	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.



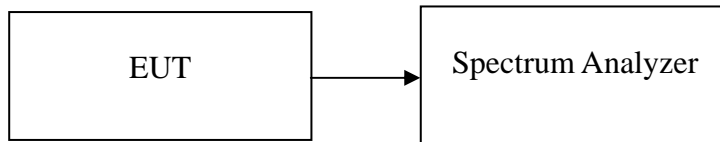
7. FCC PART 22 & 24 REQUIREMENTS & INDUSTRY CANADA RSS-132 & RSS-133

7.199% 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

LTE Band 5

CHANNEL BANDWIDTH: 5MHz / QPSK

Channel	FREQUENCY (MHz)	Occupied bandwidth (MHz)
Low	826.5	5.035
Mid	836	5.075
High	846.5	5.115

CHANNEL BANDWIDTH: 5MHz / 16QAM

Channel	FREQUENCY (MHz)	Occupied bandwidth (MHz)
Low	826.5	5.078
Mid	836	5.040
High	846.5	5.128

CHANNEL BANDWIDTH: 10MHz / QPSK

Channel	FREQUENCY (MHz)	Occupied bandwidth (MHz)
Low	829	9.827
Mid	836	9.927
High	844	10.001

CHANNEL BANDWIDTH: 10MHz / 16QAM

Channel	FREQUENCY (MHz)	Occupied bandwidth (MHz)
Low	829	9.710
Mid	836	9.881
High	844	9.955



LTE Band 2

CHANNEL BANDWIDTH: 5MHz / QPSK

Channel	FREQUENCY (MHz)	Occupied bandwidth (MHz)
Low	1852.5	5.053
Mid	1880	5.054
High	1907.5	5.146

CHANNEL BANDWIDTH: 5MHz / 16QAM

Channel	FREQUENCY (MHz)	Occupied bandwidth (MHz)
Low	1852.5	4.996
Mid	1880	4.996
High	1907.5	5.096

CHANNEL BANDWIDTH: 10MHz / QPSK

Channel	FREQUENCY (MHz)	Occupied bandwidth (MHz)
Low	1855	10.049
Mid	1880	9.901
High	1905	9.958

CHANNEL BANDWIDTH: 10MHz / 16QAM

Channel	FREQUENCY (MHz)	Occupied bandwidth (MHz)
Low	1855	10.008
Mid	1880	9.852
High	1905	9.844



CHANNEL BANDWIDTH: 20MHz / QPSK

Channel	FREQUENCY (MHz)	Occupied bandwidth (MHz)
Low	1860	19.619
Mid	1880	19.685
High	1900	19.385

CHANNEL BANDWIDTH: 20MHz / 16QAM

Channel	FREQUENCY (MHz)	Occupied bandwidth (MHz)
Low	1860	19.702
Mid	1880	19.504
High	1900	19.797



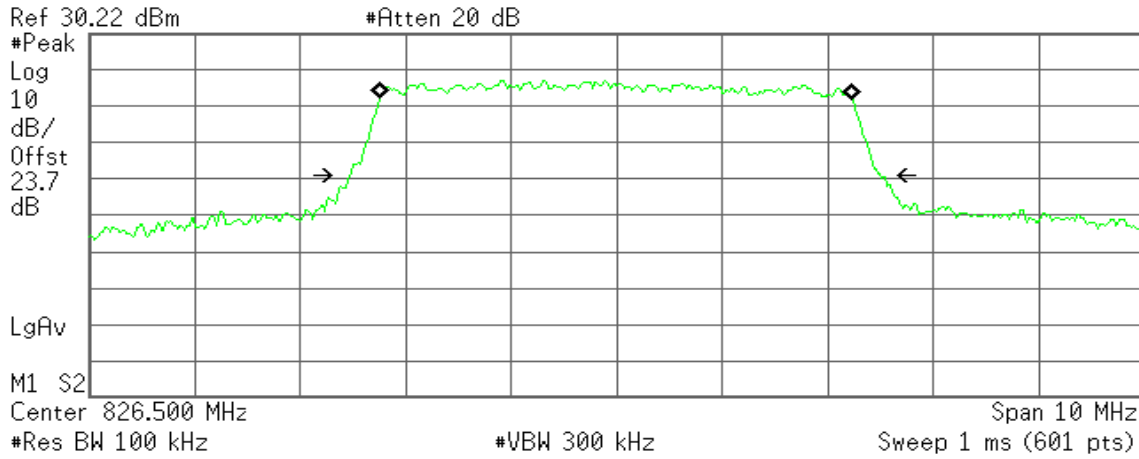
LTE Band 5

CHANNEL BANDWIDTH: 5MHz / QPSK

CH Low

Agilent 20:14:11 Jul 18, 2013

R T



Occupied Bandwidth
4.4906 MHz

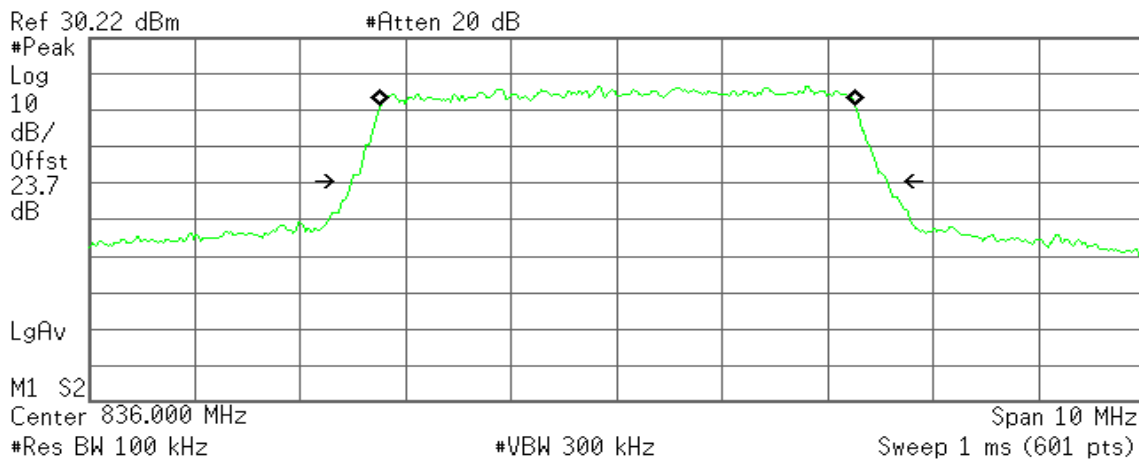
Occ BW % Pwr 99.00 %
x dB -26.00 dB

Transmit Freq Error -4.327 kHz
x dB Bandwidth 5.035 MHz

CH Mid

Agilent 20:12:06 Jul 18, 2013

R T



Occupied Bandwidth
4.5096 MHz

Occ BW % Pwr 99.00 %
x dB -26.00 dB

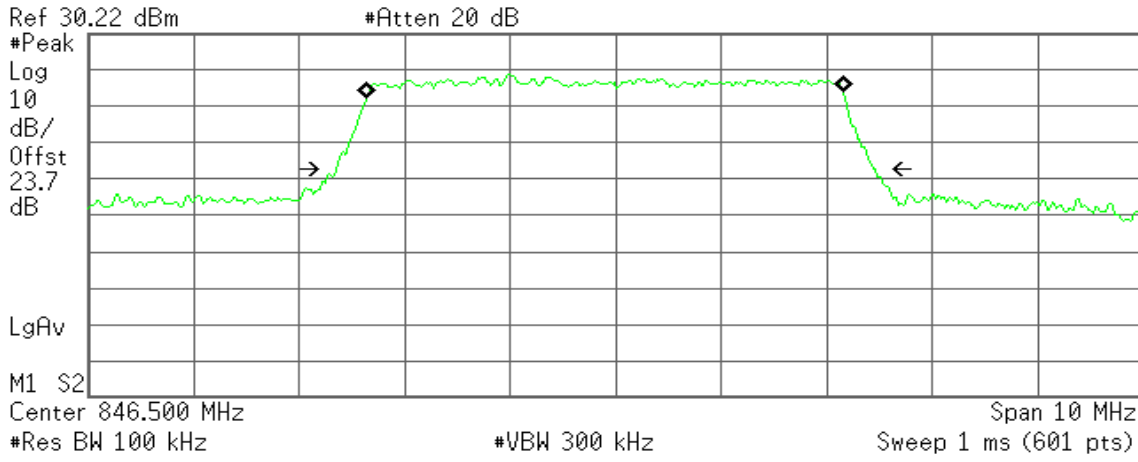
Transmit Freq Error 12.888 kHz
x dB Bandwidth 5.075 MHz



CH High

Agilent 20:13:06 Jul 18, 2013

R T



Occupied Bandwidth
4.5304 MHz

Occ BW % Pwr 99.00 %
x dB -26.00 dB

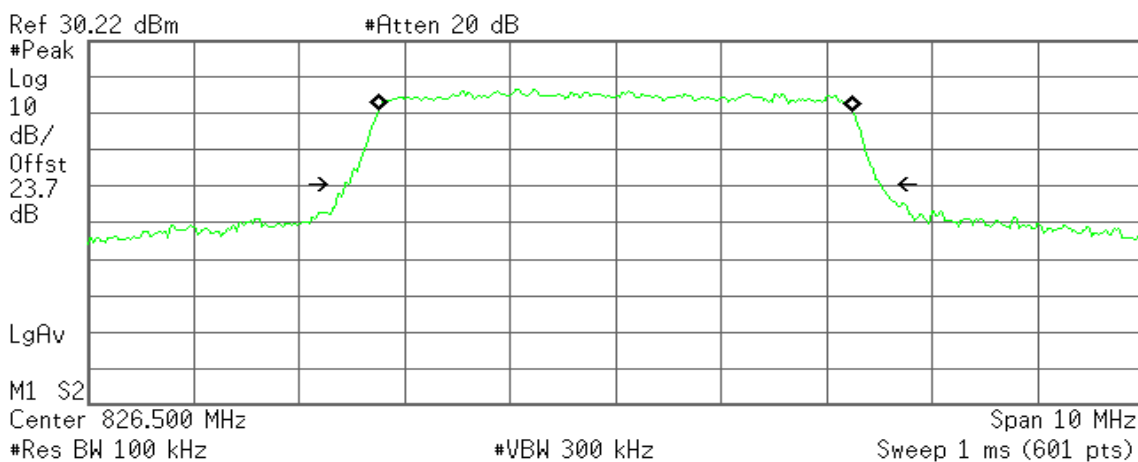
Transmit Freq Error -98.769 kHz
x dB Bandwidth 5.115 MHz

CHANNEL BANDWIDTH: 5MHz / 16QAM

CH Low

Agilent 19:57:19 Jul 18, 2013

R T



Occupied Bandwidth
4.5043 MHz

Occ BW % Pwr 99.00 %
x dB -26.00 dB

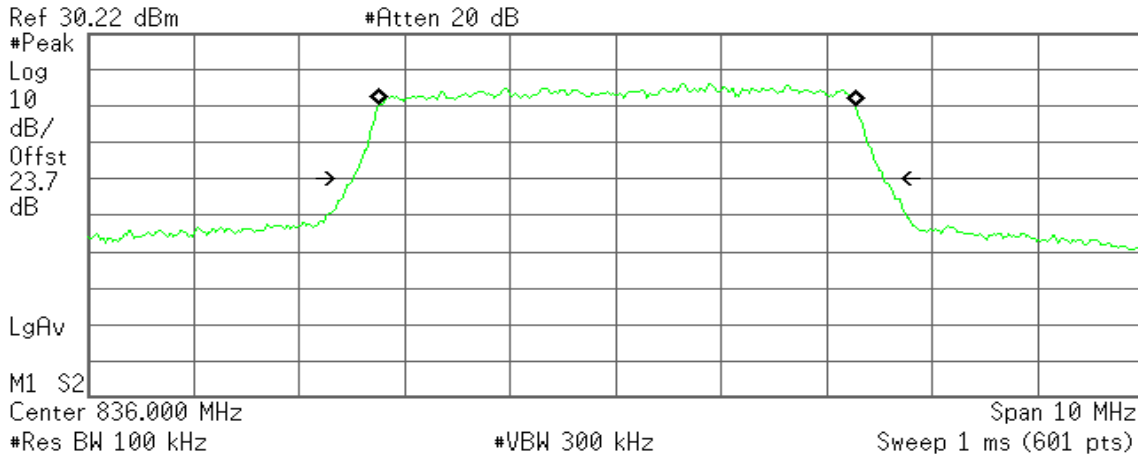
Transmit Freq Error -2.032 kHz
x dB Bandwidth 5.078 MHz



CH Mid

Agilent 19:58:08 Jul 18, 2013

R T



Occupied Bandwidth
4.5220 MHz

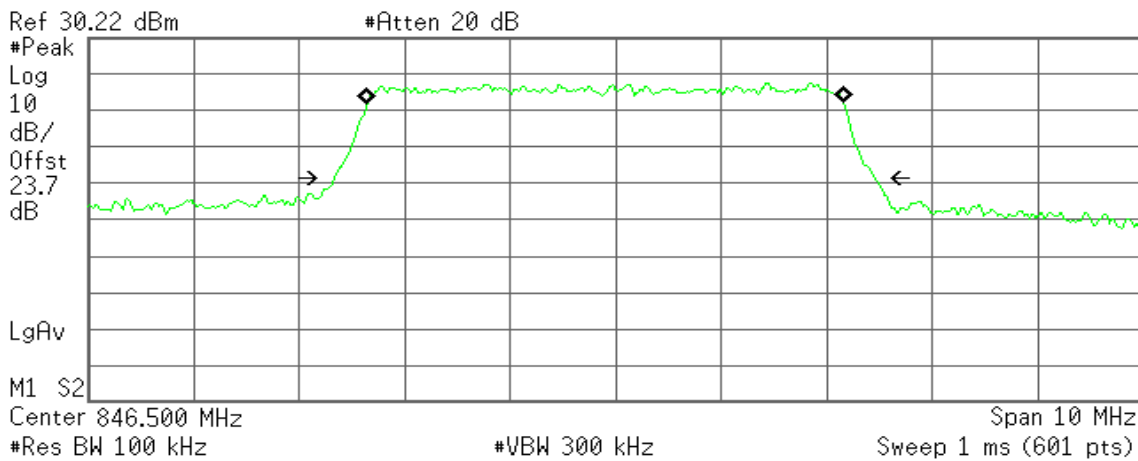
Occ BW % Pwr 99.00 %
x dB -26.00 dB

Transmit Freq Error 14.291 kHz
x dB Bandwidth 5.040 MHz

CH High

Agilent 20:02:29 Jul 18, 2013

R T



Occupied Bandwidth
4.5215 MHz

Occ BW % Pwr 99.00 %
x dB -26.00 dB

Transmit Freq Error -99.474 kHz
x dB Bandwidth 5.128 MHz

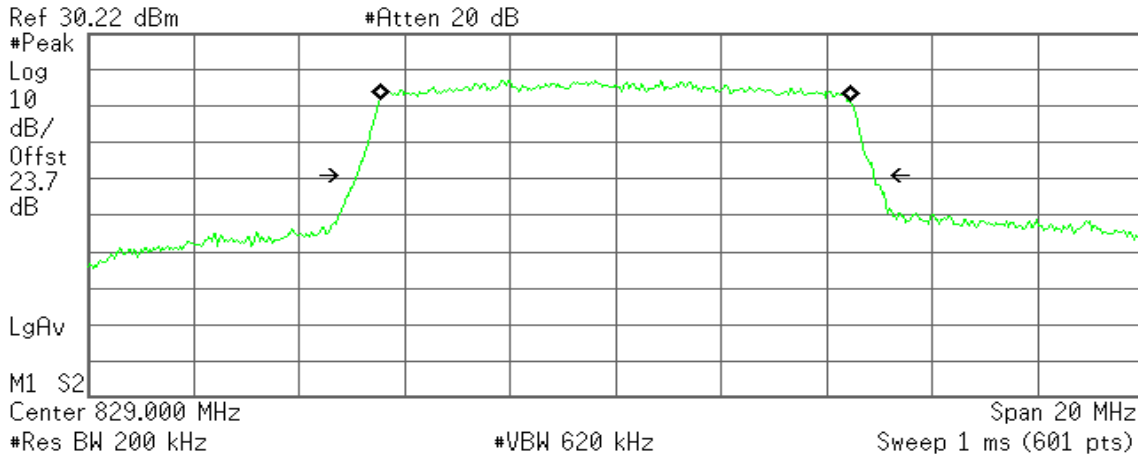


CHANNEL BANDWIDTH: 10MHz / QPSK

CH Low

Agilent 20:06:02 Jul 18, 2013

R T



Occupied Bandwidth
8.9352 MHz

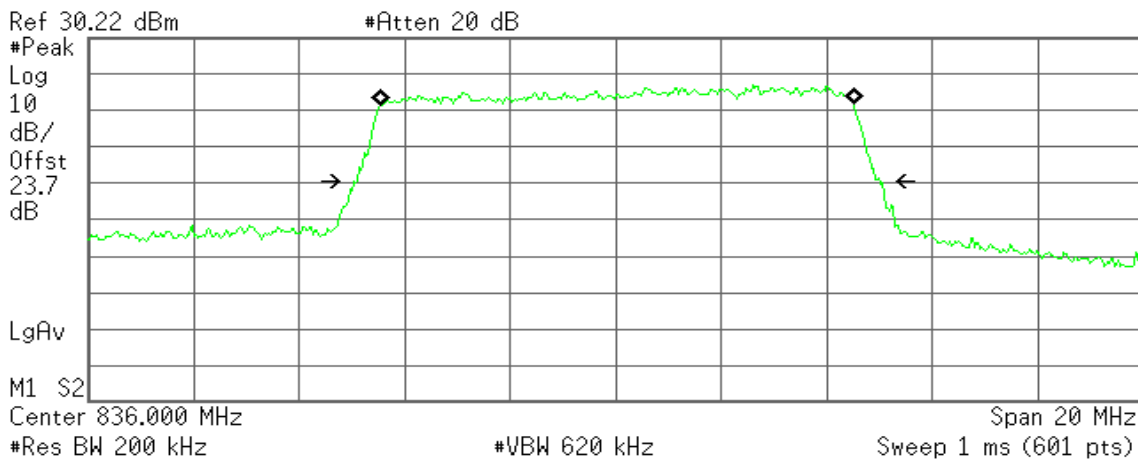
Occ BW % Pwr 99.00 %
x dB -26.00 dB

Transmit Freq Error -6.887 kHz
x dB Bandwidth 9.827 MHz

CH Mid

Agilent 20:06:49 Jul 18, 2013

R T



Occupied Bandwidth
9.0045 MHz

Occ BW % Pwr 99.00 %
x dB -26.00 dB

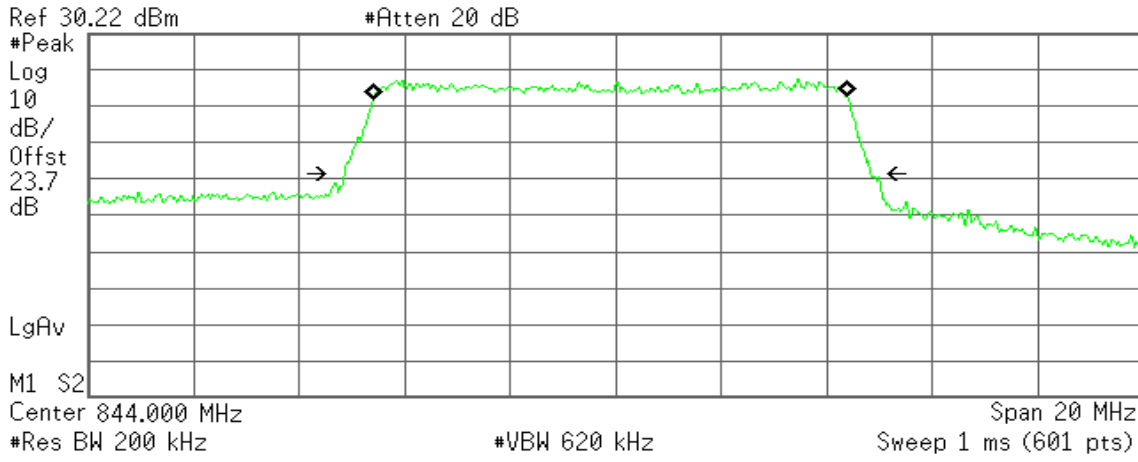
Transmit Freq Error 19.879 kHz
x dB Bandwidth 9.927 MHz



CH High

Agilent 20:08:23 Jul 18, 2013

R T



Occupied Bandwidth
9.0268 MHz

Occ BW % Pwr 99.00 %
x dB -26.00 dB

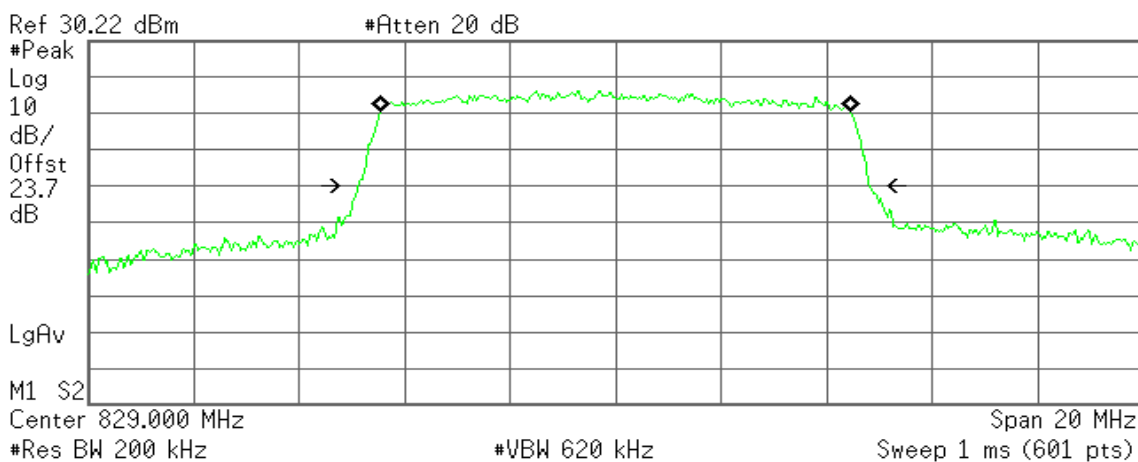
Transmit Freq Error -97.396 kHz
x dB Bandwidth 10.001 MHz

CHANNEL BANDWIDTH: 10MHz / 16QAM

CH Low

Agilent 20:05:16 Jul 18, 2013

R T



Occupied Bandwidth
8.9300 MHz

Occ BW % Pwr 99.00 %
x dB -26.00 dB

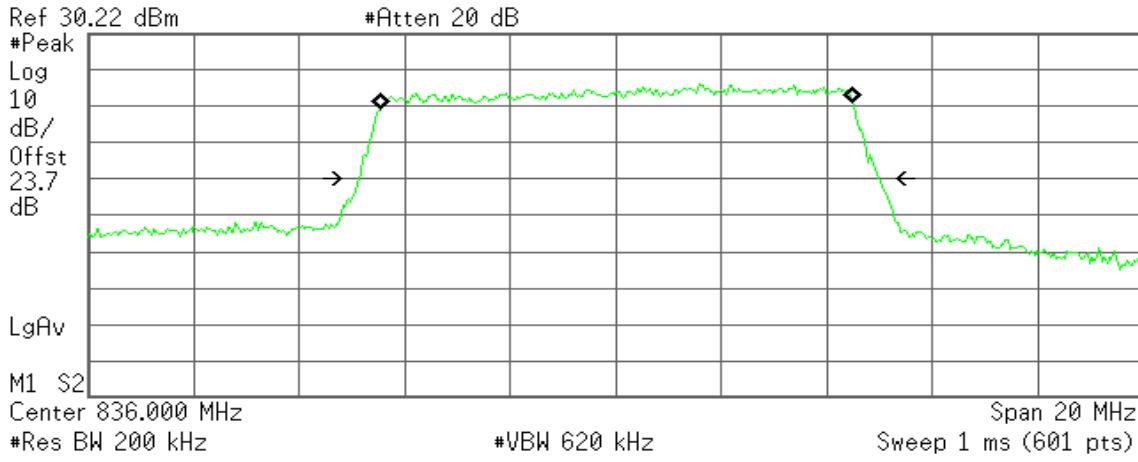
Transmit Freq Error 4.532 kHz
x dB Bandwidth 9.710 MHz



CH Mid

Agilent 20:04:15 Jul 18, 2013

R T



Occupied Bandwidth
8.9710 MHz

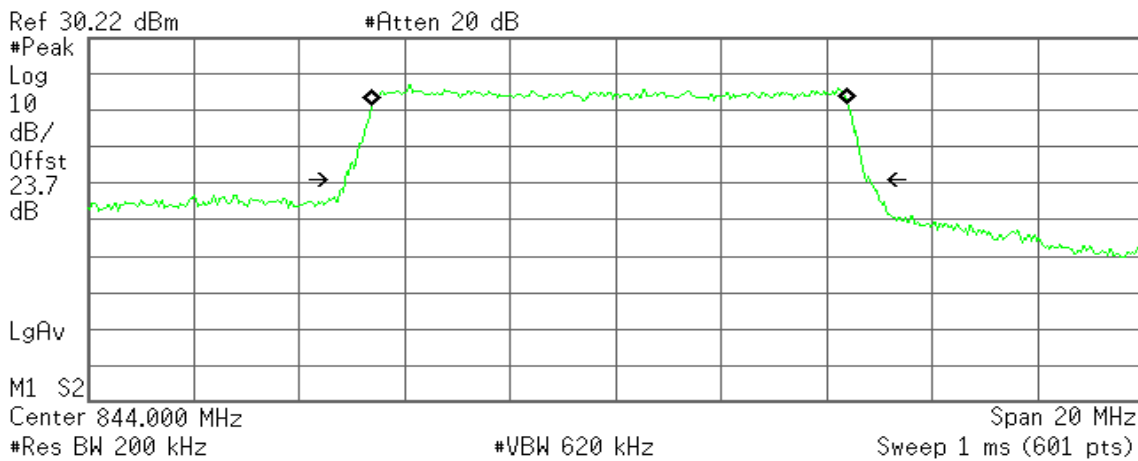
Occ BW % Pwr 99.00 %
x dB -26.00 dB

Transmit Freq Error 22.295 kHz
x dB Bandwidth 9.881 MHz

CH High

Agilent 20:03:38 Jul 18, 2013

R T



Occupied Bandwidth
9.0302 MHz

Occ BW % Pwr 99.00 %
x dB -26.00 dB

Transmit Freq Error -108.642 kHz
x dB Bandwidth 9.955 MHz



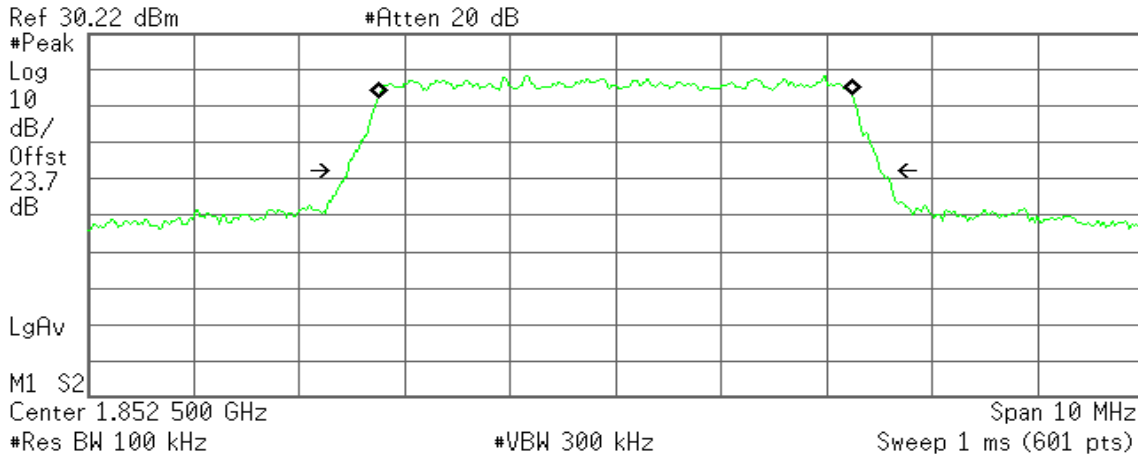
LTE Band 2

CHANNEL BANDWIDTH: 5MHz / QPSK

CH Low

Agilent 21:20:30 Jul 18, 2013

R T



Occupied Bandwidth
4.5052 MHz

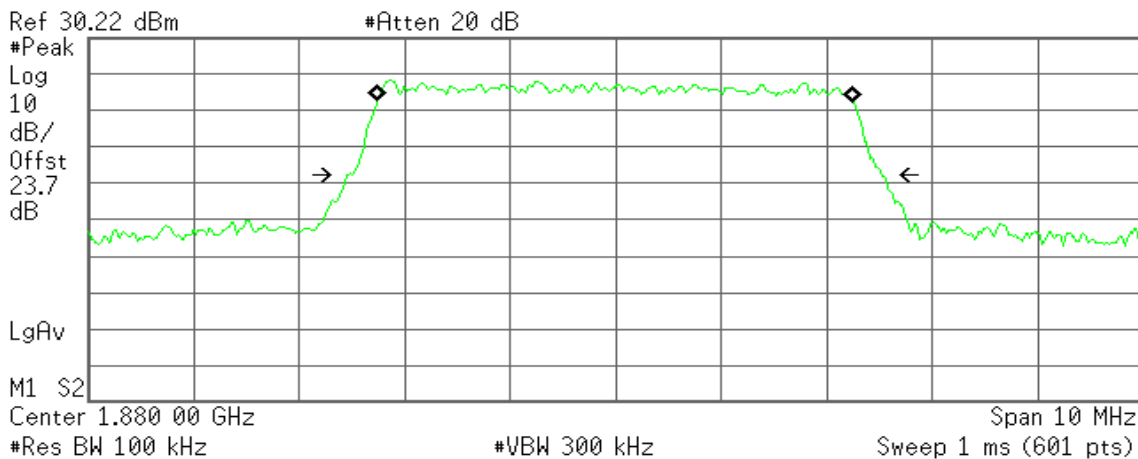
Occ BW % Pwr 99.00 %
x dB -26.00 dB

Transmit Freq Error -2.968 kHz
x dB Bandwidth 5.053 MHz

CH Mid

Agilent 21:20:06 Jul 18, 2013

R T



Occupied Bandwidth
4.5184 MHz

Occ BW % Pwr 99.00 %
x dB -26.00 dB

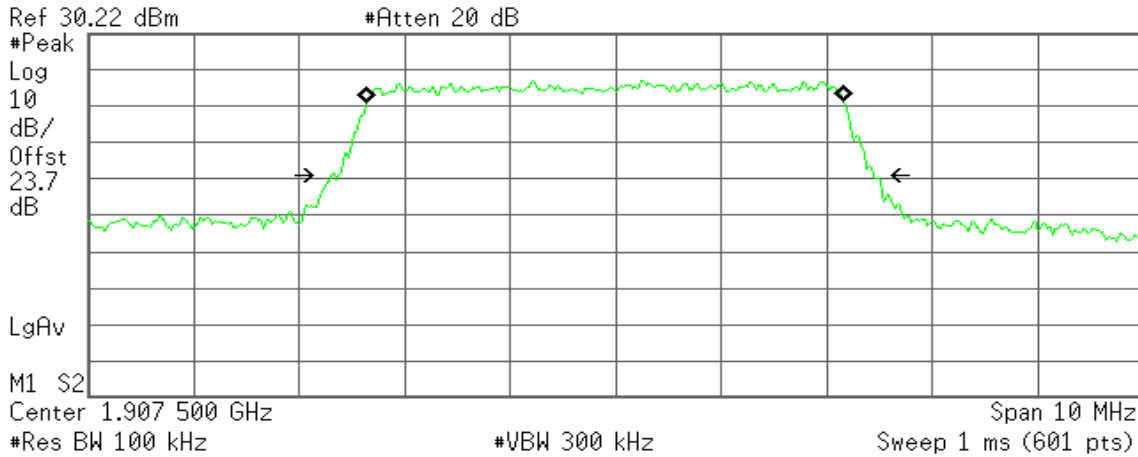
Transmit Freq Error -1.365 kHz
x dB Bandwidth 5.054 MHz



CH High

Agilent 21:19:28 Jul 18, 2013

R T



Occupied Bandwidth
4.5253 MHz

Occ BW % Pwr 99.00 %
x dB -26.00 dB

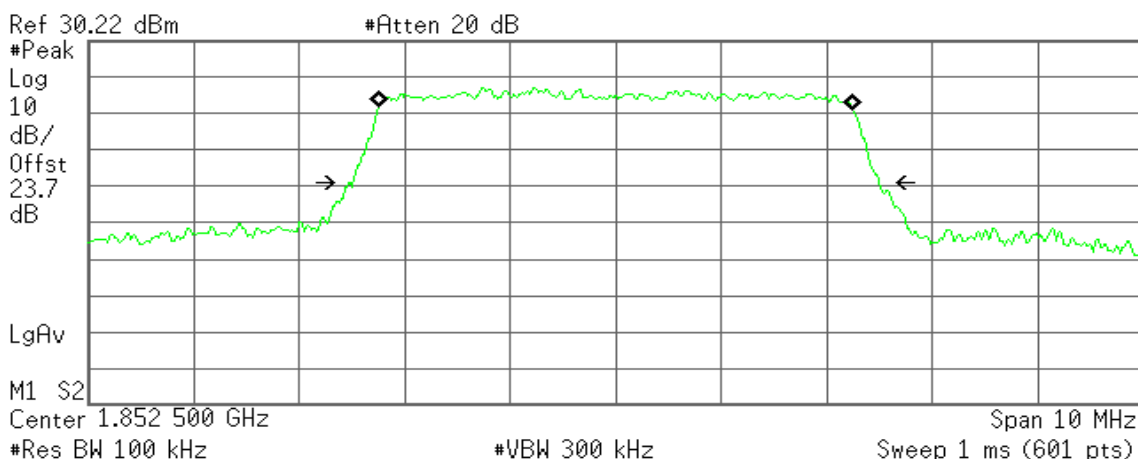
Transmit Freq Error -96.464 kHz
x dB Bandwidth 5.146 MHz

CHANNEL BANDWIDTH: 5MHz / 16QAM

CH Low

Agilent 21:18:25 Jul 18, 2013

R T



Occupied Bandwidth
4.5013 MHz

Occ BW % Pwr 99.00 %
x dB -26.00 dB

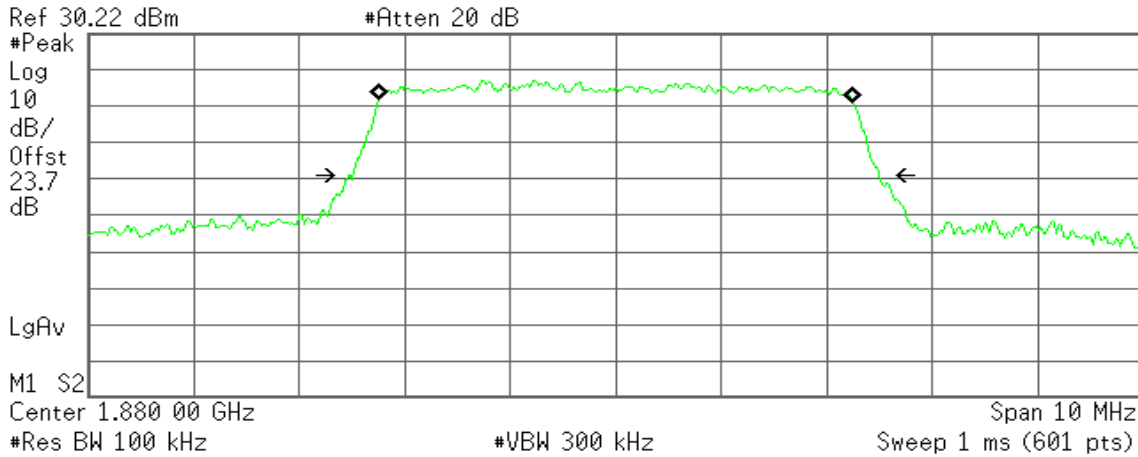
Transmit Freq Error 4.119 kHz
x dB Bandwidth 4.996 MHz



CH Mid

Agilent 21:18:25 Jul 18, 2013

R T



Occupied Bandwidth
4.5013 MHz

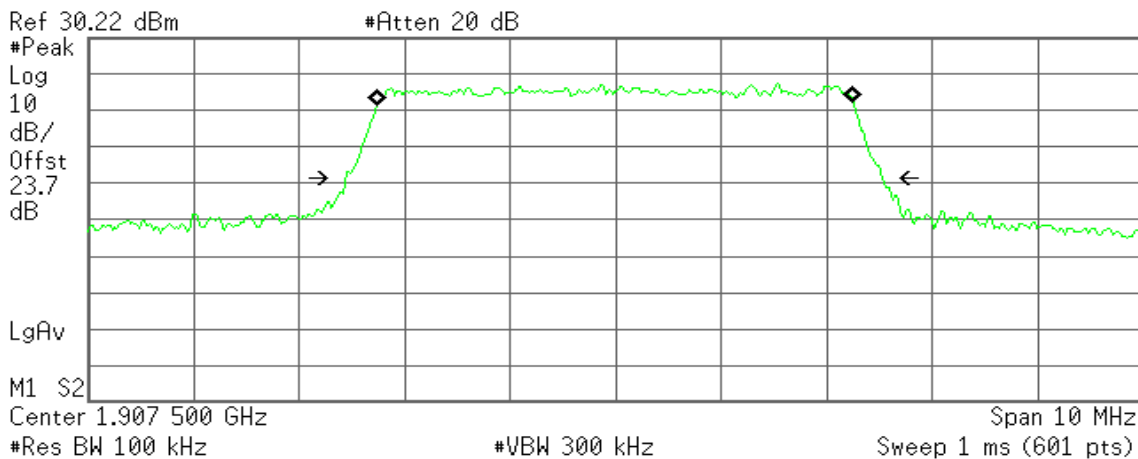
Occ BW % Pwr 99.00 %
x dB -26.00 dB

Transmit Freq Error 4.119 kHz
x dB Bandwidth 4.996 MHz

CH High

Agilent 21:17:49 Jul 18, 2013

R T



Occupied Bandwidth
4.5219 MHz

Occ BW % Pwr 99.00 %
x dB -26.00 dB

Transmit Freq Error -2.733 kHz
x dB Bandwidth 5.096 MHz

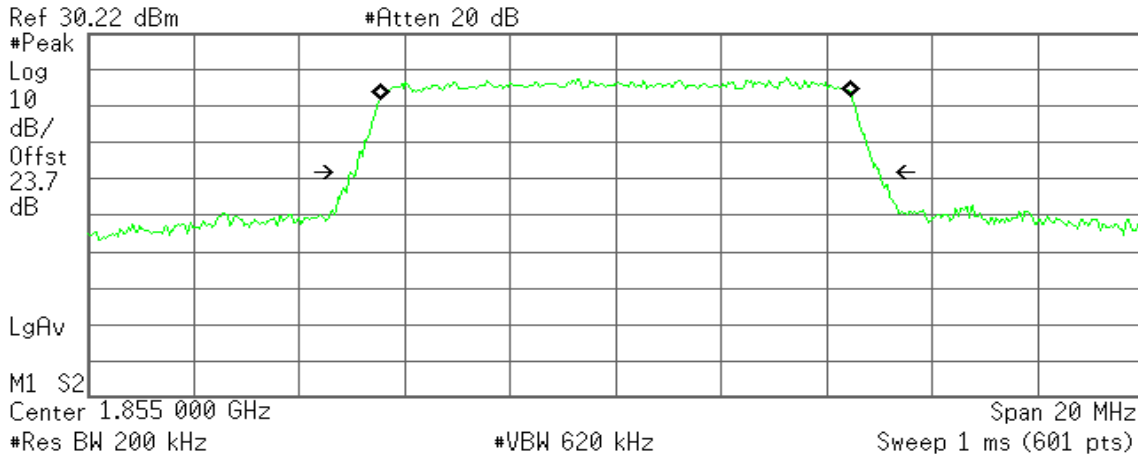


CHANNEL BANDWIDTH: 10MHz / QPSK

CH Low

* Agilent 21:16:29 Jul 18, 2013

R T



Occupied Bandwidth
8.9495 MHz

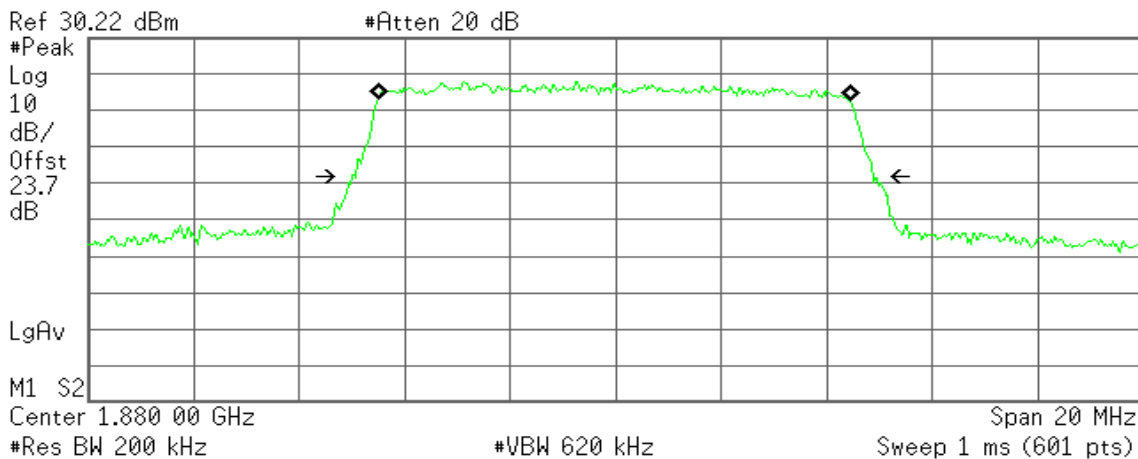
Occ BW % Pwr 99.00 %
x dB -26.00 dB

Transmit Freq Error 5.946 kHz
x dB Bandwidth 10.049 MHz

CH Mid

* Agilent 21:15:57 Jul 18, 2013

R T



Occupied Bandwidth
8.9773 MHz

Occ BW % Pwr 99.00 %
x dB -26.00 dB

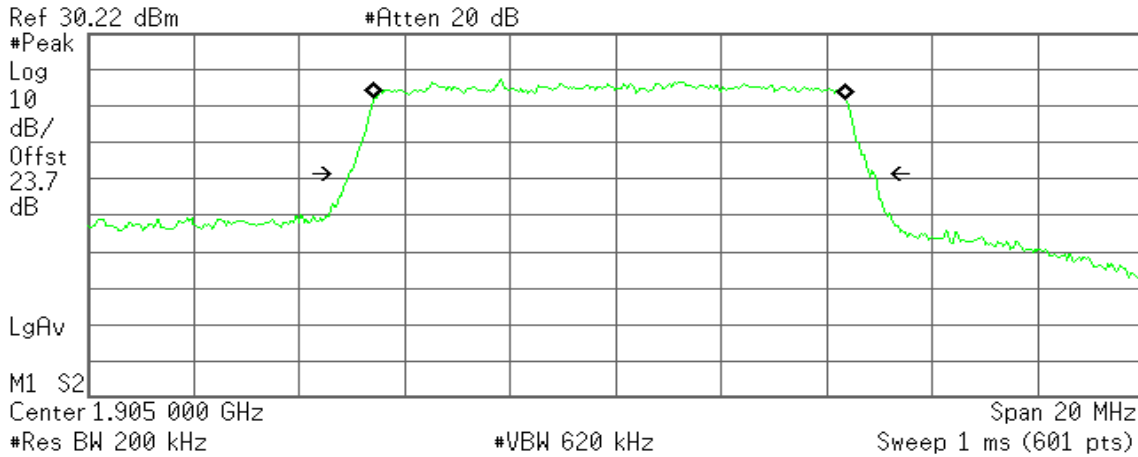
Transmit Freq Error -19.421 kHz
x dB Bandwidth 9.901 MHz



CH High

Agilent 21:15:20 Jul 18, 2013

R T



Occupied Bandwidth
8.9582 MHz

Occ BW % Pwr 99.00 %
x dB -26.00 dB

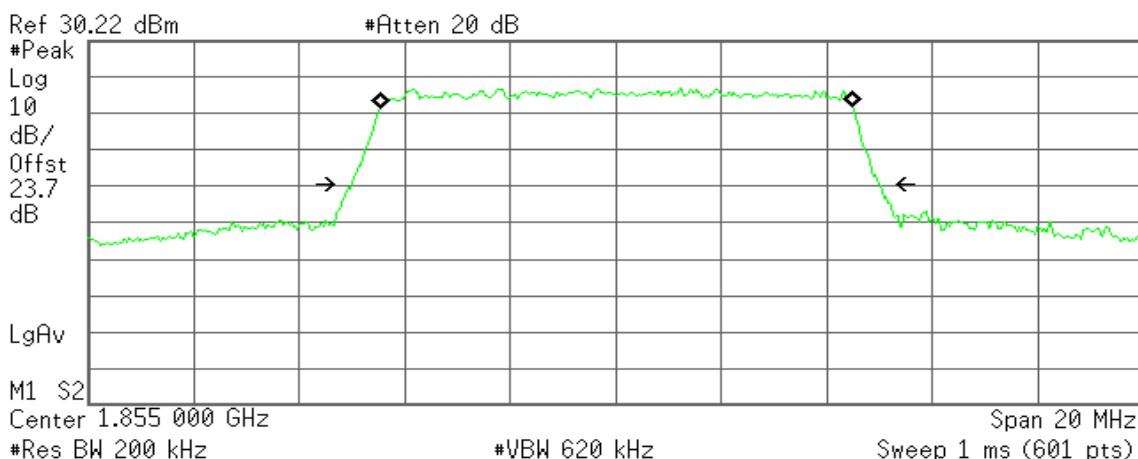
Transmit Freq Error -106.236 kHz
x dB Bandwidth 9.958 MHz

CHANNEL BANDWIDTH: 10MHz / 16QAM

CH Low

Agilent 21:12:40 Jul 18, 2013

R T



Occupied Bandwidth
8.9665 MHz

Occ BW % Pwr 99.00 %
x dB -26.00 dB

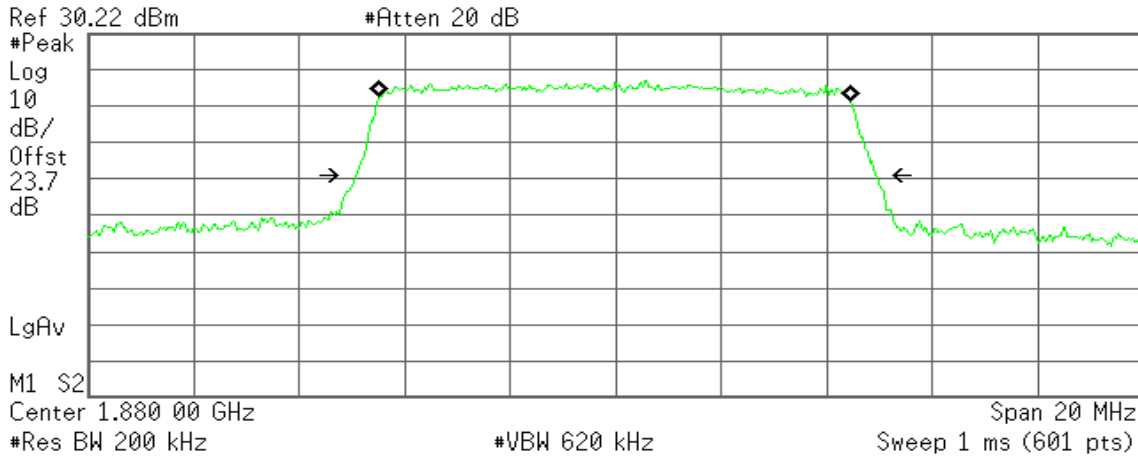
Transmit Freq Error 10.088 kHz
x dB Bandwidth 10.008 MHz



CH Mid

Agilent 21:13:21 Jul 18, 2013

R T



Occupied Bandwidth
8.9596 MHz

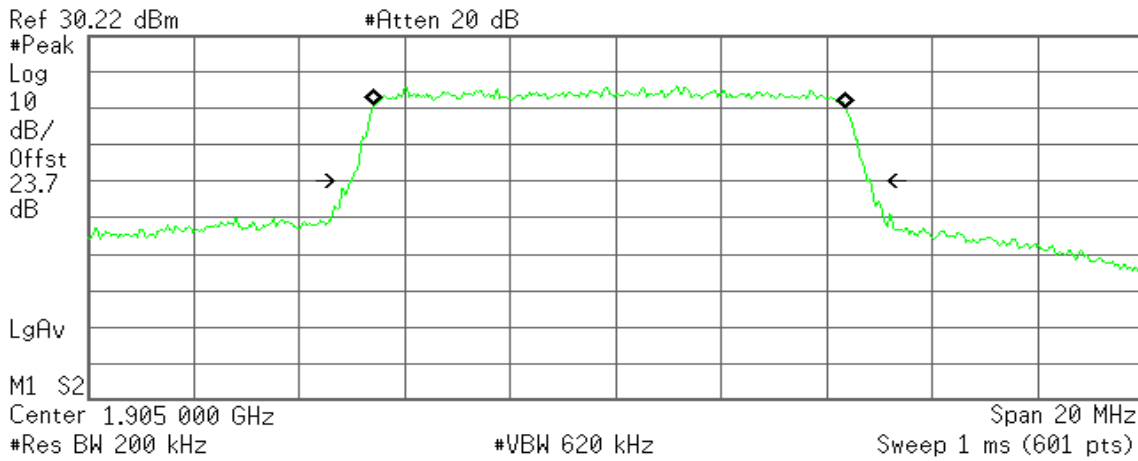
Occ BW % Pwr 99.00 %
x dB -26.00 dB

Transmit Freq Error -20.788 kHz
x dB Bandwidth 9.852 MHz

CH High

Agilent 21:14:18 Jul 18, 2013

R T



Occupied Bandwidth
8.9655 MHz

Occ BW % Pwr 99.00 %
x dB -26.00 dB

Transmit Freq Error -109.860 kHz
x dB Bandwidth 9.844 MHz

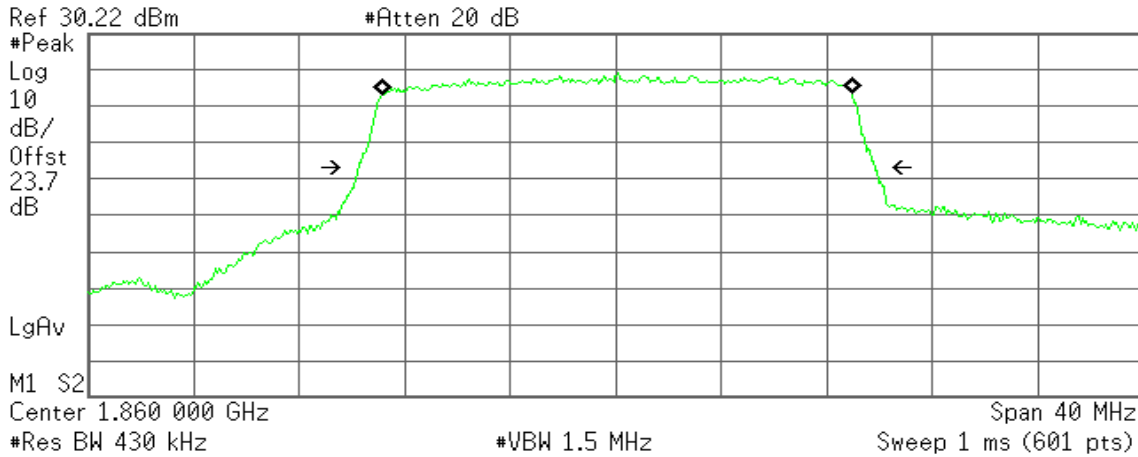


CHANNEL BANDWIDTH: 20MHz / QPSK

CH Low

Agilent 21:09:34 Jul 18, 2013

R T



Occupied Bandwidth
17.8578 MHz

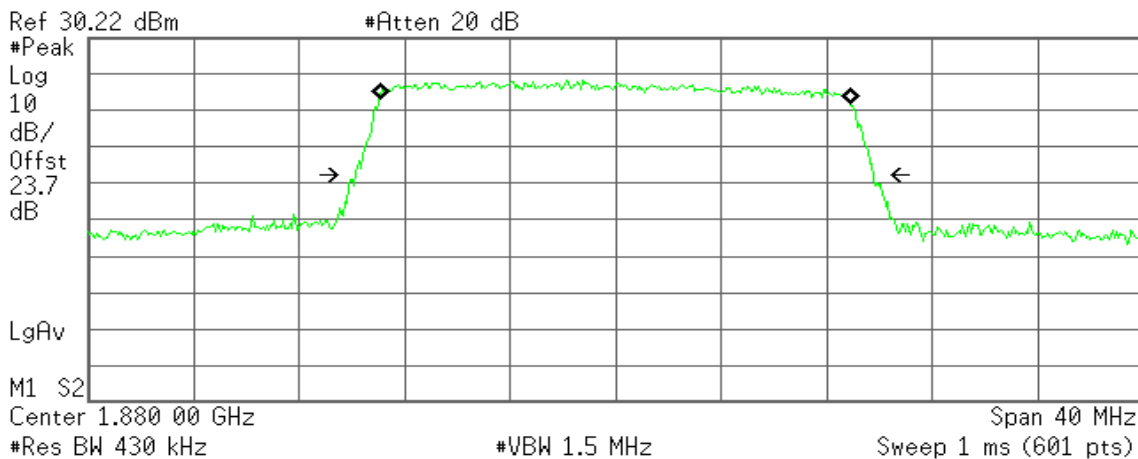
Occ BW % Pwr 99.00 %
x dB -26.00 dB

Transmit Freq Error 41.411 kHz
x dB Bandwidth 19.619 MHz

CH Mid

Agilent 21:06:06 Jul 18, 2013

R T



Occupied Bandwidth
17.8908 MHz

Occ BW % Pwr 99.00 %
x dB -26.00 dB

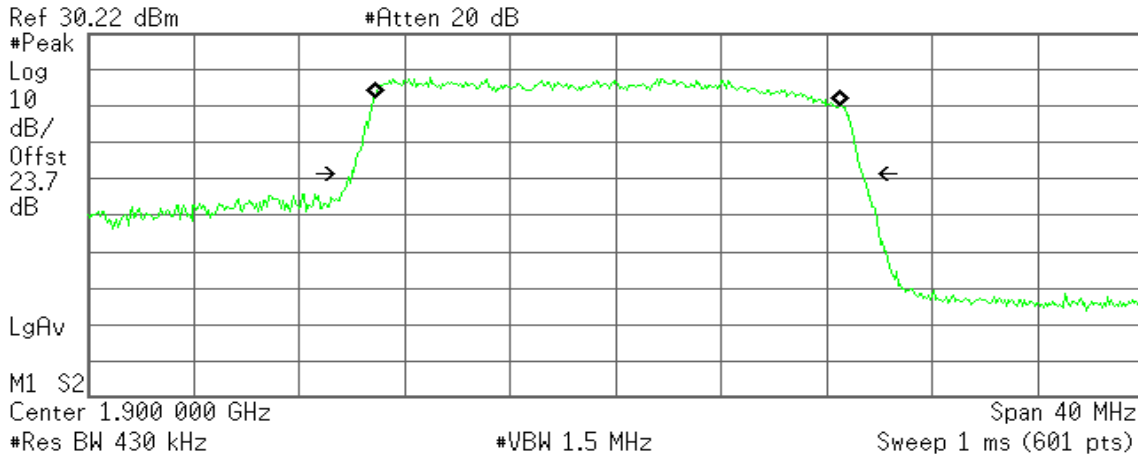
Transmit Freq Error -20.833 kHz
x dB Bandwidth 19.685 MHz



CH High

Agilent 21:05:29 Jul 18, 2013

R T



Occupied Bandwidth
17.7152 MHz

Occ BW % Pwr 99.00 %
x dB -26.00 dB

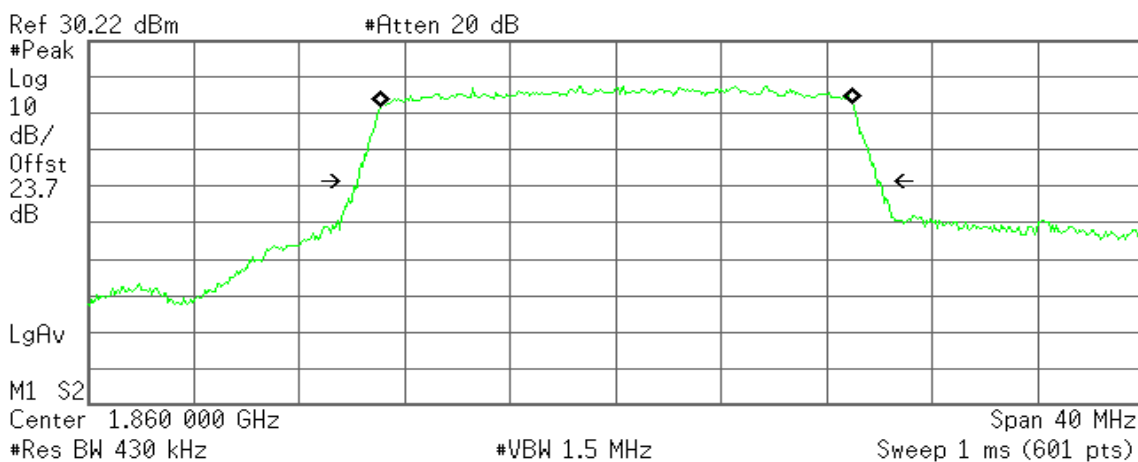
Transmit Freq Error -291.121 kHz
x dB Bandwidth 19.385 MHz

CHANNEL BANDWIDTH: 20MHz / 16QAM

CH Low

Agilent 21:02:46 Jul 18, 2013

R T



Occupied Bandwidth
17.9203 MHz

Occ BW % Pwr 99.00 %
x dB -26.00 dB

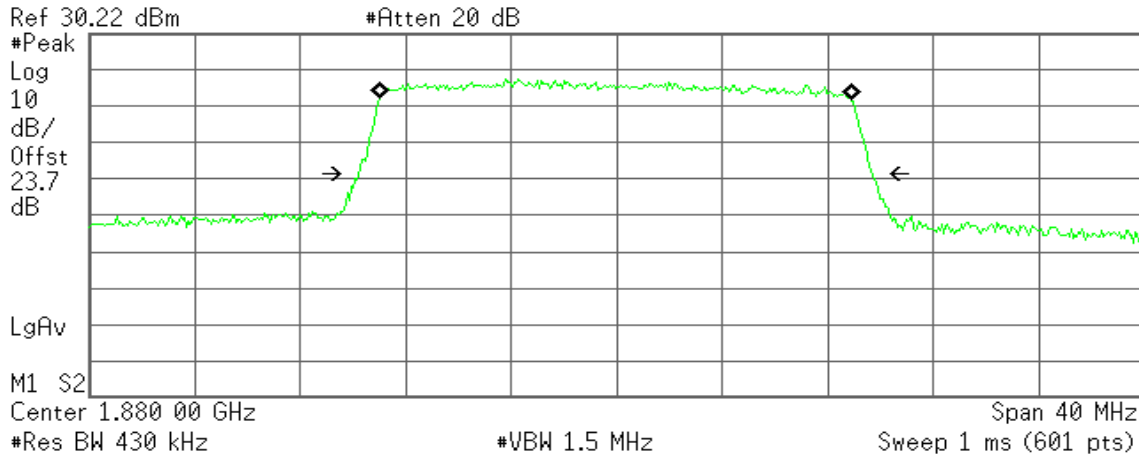
Transmit Freq Error 54.189 kHz
x dB Bandwidth 19.702 MHz



CH Mid

Agilent 21:04:06 Jul 18, 2013

R T



Occupied Bandwidth
17.8868 MHz

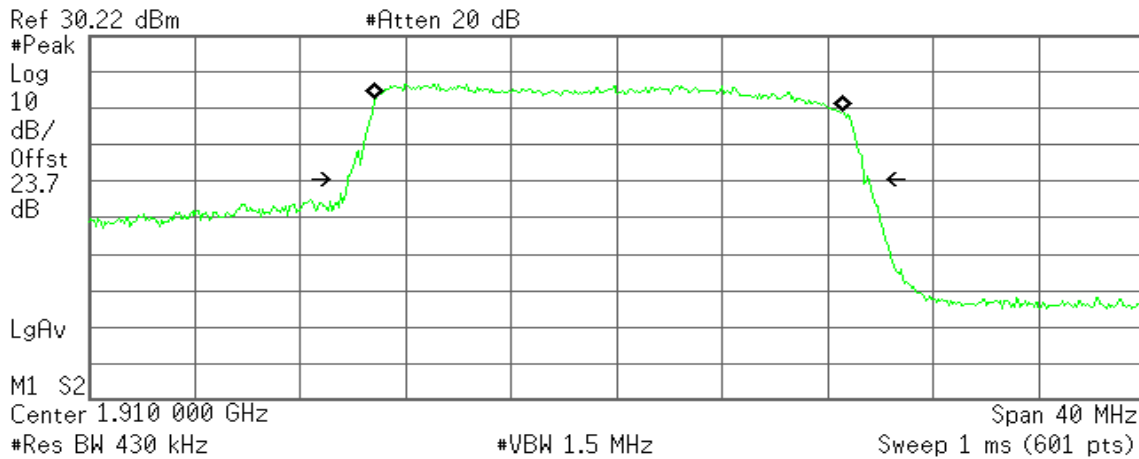
Occ BW % Pwr 99.00 %
x dB -26.00 dB

Transmit Freq Error -29.047 kHz
x dB Bandwidth 19.504 MHz

CH High

Agilent 21:04:49 Jul 18, 2013

R T



Occupied Bandwidth
17.7877 MHz

Occ BW % Pwr 99.00 %
x dB -26.00 dB

Transmit Freq Error -287.391 kHz
x dB Bandwidth 19.797 MHz

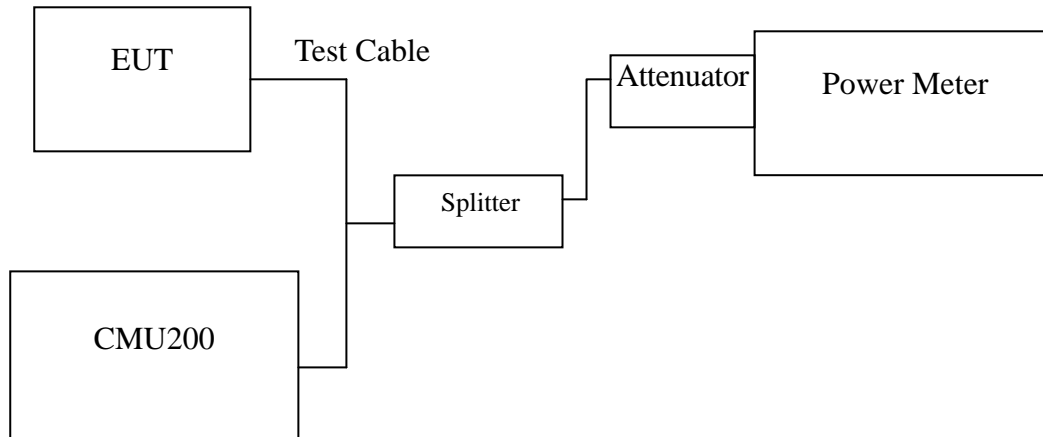


7.2 PEAK POWER

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****LTE Band 5****Channel Bandwidth: 5MHz**

Conducted Output Power (QPSK 1 RB ALLOCATED AT THE LOWER EDGE)			
Frequency (MHz)	Channel	Output Power	
		(dBm)	(W)
826.5	20425	23.78	0.23878
836	20520	23.89	0.24491
846.5	20625	23.98	0.25003

Conducted Output Power (QPSK 1 RB ALLOCATED AT THE UPPER EDGE)			
Frequency (MHz)	Channel	Output Power	
		(dBm)	(W)
826.5	20425	22.86	0.19320
836	20520	22.90	0.19498
846.5	20625	23.13	0.20559

Conducted Output Power (QPSK 50% RB ALLOCATION CENTERED)			
Frequency (MHz)	Channel	Output Power	
		(dBm)	(W)
826.5	20425	22.81	0.19099
836	20520	22.94	0.19679
846.5	20625	23.00	0.19953

Conducted Output Power (QPSK 100% RB ALLOCATION)			
Frequency (MHz)	Channel	Output Power	
		(dBm)	(W)
826.5	20425	21.77	0.15031
836	20520	21.89	0.15453
846.5	20625	22.90	0.19498

Remarks:

1. Output Power (dBm) = Raw Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Power Splitter Loss (dB) + Cable Loss (dB) + 20dB Attenuator.
3. The value in bold is the worst.



Channel Bandwidth: 5MHz

Conducted Output Power (16QAM 1 RB ALLOCATED AT THE LOWER EDGE)			
Frequency (MHz)	Channel	Output Power	
		(dBm)	(W)
826.5	20425	23.05	0.20184
836	20520	23.12	0.20512
846.5	20625	23.20	0.20893

Conducted Output Power (16QAM 1 RB ALLOCATED AT THE UPPER EDGE)			
Frequency (MHz)	Channel	Output Power	
		(dBm)	(W)
826.5	20425	22.75	0.18836
836	20520	22.87	0.19364
846.5	20625	23.03	0.20091

Conducted Output Power (16QAM 50% RB ALLOCATION CENTERED)			
Frequency (MHz)	Channel	Output Power	
		(dBm)	(W)
826.5	20425	21.95	0.15668
836	20520	22.09	0.16181
846.5	20625	22.14	0.16368

Conducted Output Power (16QAM 100% RB ALLOCATION)			
Frequency (MHz)	Channel	Output Power	
		(dBm)	(W)
826.5	20425	21.67	0.14689
836	20520	21.78	0.15066
846.5	20625	22.78	0.18967

Remarks:

1. Output Power (dBm) = Raw Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Power Splitter Loss (dB) + Cable Loss (dB) + 20dB Attenuator.
3. The value in bold is the worst.

**LTE Band 5****Channel Bandwidth: 10MHz**

Conducted Output Power (QPSK 1 RB ALLOCATED AT THE LOWER EDGE)			
Frequency (MHz)	Channel	Output Power	
		(dBm)	(W)
829	20450	23.75	0.23714
836	20520	23.92	0.24660
844	20600	24.06	0.25468

Conducted Output Power (QPSK 1 RB ALLOCATED AT THE UPPER EDGE)			
Frequency (MHz)	Channel	Output Power	
		(dBm)	(W)
829	20450	22.71	0.18664
836	20520	22.87	0.19364
844	20600	22.96	0.19770

Conducted Output Power (QPSK 50% RB ALLOCATION CENTERED)			
Frequency (MHz)	Channel	Output Power	
		(dBm)	(W)
829	20450	22.98	0.19861
836	20520	23.06	0.20230
844	20600	23.13	0.20559

Conducted Output Power (QPSK 100% RB ALLOCATION)			
Frequency (MHz)	Channel	Output Power	
		(dBm)	(W)
829	20450	21.67	0.14689
836	20520	21.78	0.15066
844	20600	22.00	0.15849

Remarks:

1. $Output\ Power\ (dBm) = Raw\ Value\ (dBm) + Correction\ Factor\ (dB)$.
2. $Correction\ Factor\ (dB) = Power\ Splitter\ Loss\ (dB) + Cable\ Loss\ (dB) + 20dB\ Attenuator$.
3. The value in bold is the worst.



Conducted Output Power (16QAM 1 RB ALLOCATED AT THE LOWER EDGE)			
Frequency (MHz)	Channel	Output Power	
		(dBm)	(W)
829	20450	22.25	0.16788
836	20520	22.48	0.17701
844	20600	22.98	0.19861

Conducted Output Power (16QAM 1 RB ALLOCATED AT THE UPPER EDGE)			
Frequency (MHz)	Channel	Output Power	
		(dBm)	(W)
829	20450	21.63	0.14555
836	20520	21.77	0.15031
844	20600	21.92	0.15560

Conducted Output Power (16QAM 50% RB ALLOCATION CENTERED)			
Frequency (MHz)	Channel	Output Power	
		(dBm)	(W)
829	20450	22.10	0.16218
836	20520	22.25	0.16788
844	20600	22.65	0.18408

Conducted Output Power (16QAM 100% RB ALLOCATION)			
Frequency (MHz)	Channel	Output Power	
		(dBm)	(W)
829	20450	20.54	0.11324
836	20520	20.67	0.11668
844	20600	20.83	0.12106

Remarks:

1. Output Power (dBm) = Raw Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Power Splitter Loss (dB) + Cable Loss (dB) + 20dB Attenuator.
3. The value in bold is the worst.

**LTE Band 2****Channel Bandwidth: 5MHz**

Conducted Output Power (QPSK 1 RB ALLOCATED AT THE LOWER EDGE)			
Frequency (MHz)	Channel	Output Power	
		(dBm)	(W)
1852.5	18625	24.14	0.25942
1880	18900	24.33	0.27102
1907.5	19175	24.19	0.26242

Conducted Output Power (QPSK 1 RB ALLOCATED AT THE UPPER EDGE)			
Frequency (MHz)	Channel	Output Power	
		(dBm)	(W)
1852.5	18625	23.10	0.20417
1880	18900	23.35	0.21627
1907.5	19175	23.19	0.20845

Conducted Output Power (QPSK 50% RB ALLOCATION CENTERED)			
Frequency (MHz)	Channel	Output Power	
		(dBm)	(W)
1852.5	18625	23.63	0.23067
1880	18900	23.72	0.23550
1907.5	19175	23.53	0.22542

Conducted Output Power (QPSK 100% RB ALLOCATION)			
Frequency (MHz)	Channel	Output Power	
		(dBm)	(W)
1852.5	18625	22.11	0.16255
1880	18900	22.20	0.16596
1907.5	19175	22.15	0.16406

Remarks:

1. $Output\ Power\ (dBm) = Raw\ Value\ (dBm) + Correction\ Factor\ (dB)$.
2. $Correction\ Factor\ (dB) = Power\ Splitter\ Loss\ (dB) + Cable\ Loss\ (dB) + 20dB\ Attenuator$.
3. The value in bold is the worst.



Channel Bandwidth: 5MHz

Conducted Output Power (16QAM 1 RB ALLOCATED AT THE LOWER EDGE)			
Frequency (MHz)	Channel	Output Power	
		(dBm)	(W)
1852.5	18625	23.40	0.21878
1880	18900	23.76	0.23768
1907.5	19175	23.47	0.22233

Conducted Output Power (16QAM 1 RB ALLOCATED AT THE UPPER EDGE)			
Frequency (MHz)	Channel	Output Power	
		(dBm)	(W)
1852.5	18625	22.04	0.15996
1880	18900	23.08	0.20324
1907.5	19175	22.14	0.16368

Conducted Output Power (16QAM 50% RB ALLOCATION CENTERED)			
Frequency (MHz)	Channel	Output Power	
		(dBm)	(W)
1852.5	18625	21.98	0.15776
1880	18900	22.36	0.17219
1907.5	19175	22.14	0.16368

Conducted Output Power (16QAM 100% RB ALLOCATION)			
Frequency (MHz)	Channel	Output Power	
		(dBm)	(W)
1852.5	18625	21.76	0.14997
1880	18900	22.57	0.18072
1907.5	19175	21.90	0.15488

Remarks:

1. Output Power (dBm) = Raw Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Power Splitter Loss (dB) + Cable Loss (dB) + 20dB Attenuator.
3. The value in bold is the worst.

**LTE Band 2****Channel Bandwidth: 10MHz**

Conducted Output Power (QPSK 1 RB ALLOCATED AT THE LOWER EDGE)			
Frequency (MHz)	Channel	Output Power	
		(dBm)	(W)
1855	18650	24.01	0.25177
1880	18900	24.34	0.27164
1905	19150	24.23	0.26485

Conducted Output Power (QPSK 1 RB ALLOCATED AT THE UPPER EDGE)			
Frequency (MHz)	Channel	Output Power	
		(dBm)	(W)
1855	18650	22.99	0.19907
1880	18900	23.82	0.24099
1905	19150	23.72	0.23550

Conducted Output Power (QPSK 50% RB ALLOCATION CENTERED)			
Frequency (MHz)	Channel	Output Power	
		(dBm)	(W)
1855	18650	23.54	0.22594
1880	18900	23.94	0.24774
1905	19150	23.74	0.23659

Conducted Output Power (QPSK 100% RB ALLOCATION)			
Frequency (MHz)	Channel	Output Power	
		(dBm)	(W)
1855	18650	22.05	0.16032
1880	18900	22.97	0.19815
1905	19150	22.78	0.18967

Remarks:

1. $Output\ Power\ (dBm) = Raw\ Value\ (dBm) + Correction\ Factor\ (dB)$.
2. $Correction\ Factor\ (dB) = Power\ Splitter\ Loss\ (dB) + Cable\ Loss\ (dB) + 20dB\ Attenuator$.
3. The value in bold is the worst.



Conducted Output Power (16QAM RB ALLOCATED AT THE LOWER EDGE)			
Frequency (MHz)	Channel	Output Power	
		(dBm)	(W)
1855	18650	22.20	0.16596
1880	18900	23.52	0.22491
1905	19150	23.38	0.21777

Conducted Output Power (16QAM RB ALLOCATED AT THE UPPER EDGE)			
Frequency (MHz)	Channel	Output Power	
		(dBm)	(W)
1855	18650	22.10	0.16218
1880	18900	22.97	0.19815
1905	19150	22.32	0.17061

Conducted Output Power (16QAM 50% RB ALLOCATION CENTERED)			
Frequency (MHz)	Channel	Output Power	
		(dBm)	(W)
1855	18650	22.09	0.16181
1880	18900	22.21	0.16634
1905	19150	22.12	0.16293

Conducted Output Power (16QAM 100% RB ALLOCATION)			
Frequency (MHz)	Channel	Output Power	
		(dBm)	(W)
1855	18650	21.53	0.14223
1880	18900	22.01	0.15885
1905	19150	21.90	0.15488

Remarks:

1. Output Power (dBm) = Raw Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Power Splitter Loss (dB) + Cable Loss (dB) + 20dB Attenuator.
3. The value in bold is the worst.

**LTE Band 2****Channel Bandwidth: 20MHz**

Conducted Output Power (QPSK 1 RB ALLOCATED AT THE LOWER EDGE)			
Frequency (MHz)	Channel	Output Power	
		(dBm)	(W)
1860	18700	23.24	0.21086
1880	18900	24.64	0.29107
1900	19100	24.29	0.26853

Conducted Output Power (QPSK 1 RB ALLOCATED AT THE UPPER EDGE)			
Frequency (MHz)	Channel	Output Power	
		(dBm)	(W)
1860	18700	21.80	0.15136
1880	18900	23.97	0.24946
1900	19100	23.67	0.23281

Conducted Output Power (QPSK 50% RB ALLOCATION CENTERED)			
Frequency (MHz)	Channel	Output Power	
		(dBm)	(W)
1860	18700	22.08	0.16144
1880	18900	23.97	0.24946
1900	19100	23.19	0.20845

Conducted Output Power (QPSK 100% RB ALLOCATION)			
Frequency (MHz)	Channel	Output Power	
		(dBm)	(W)
1860	18700	22.32	0.17061
1880	18900	23.00	0.19953
1900	19100	22.80	0.19055

Remarks:

1. Output Power (dBm) = Raw Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Power Splitter Loss (dB) + Cable Loss (dB) + 20dB Attenuator.
3. The value in bold is the worst.



Conducted Output Power (16QAM 1 RB ALLOCATED AT THE LOWER EDGE)			
Frequency (MHz)	Channel	Output Power	
		(dBm)	(W)
1860	18700	23.48	0.22284
1880	18900	23.78	0.23878
1900	19100	23.54	0.22594

Conducted Output Power (16QAM 1 RB ALLOCATED AT THE UPPER EDGE)			
Frequency (MHz)	Channel	Output Power	
		(dBm)	(W)
1860	18700	21.48	0.14060
1880	18900	22.04	0.15996
1900	19100	21.70	0.14791

Conducted Output Power (16QAM 50% RB ALLOCATION CENTERED)			
Frequency (MHz)	Channel	Output Power	
		(dBm)	(W)
1860	18700	22.72	0.18707
1880	18900	22.96	0.19770
1900	19100	20.80	0.12023

Conducted Output Power (16QAM 100% RB ALLOCATION)			
Frequency (MHz)	Channel	Output Power	
		(dBm)	(W)
1860	18700	21.00	0.12589
1880	18900	21.76	0.14997
1900	19100	21.22	0.13243

Remarks:

1. Output Power (dBm) = Raw Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Power Splitter Loss (dB) + Cable Loss (dB) + 20dB Attenuator.
3. The value in bold is the worst.



7.3 ERP & EIRP MEASUREMENT

LIMIT

According to FCC §2.1046

FCC 22.913(b): The Effective Radiated Power (ERP) of mobile transmitters must not exceed 7 Watts.

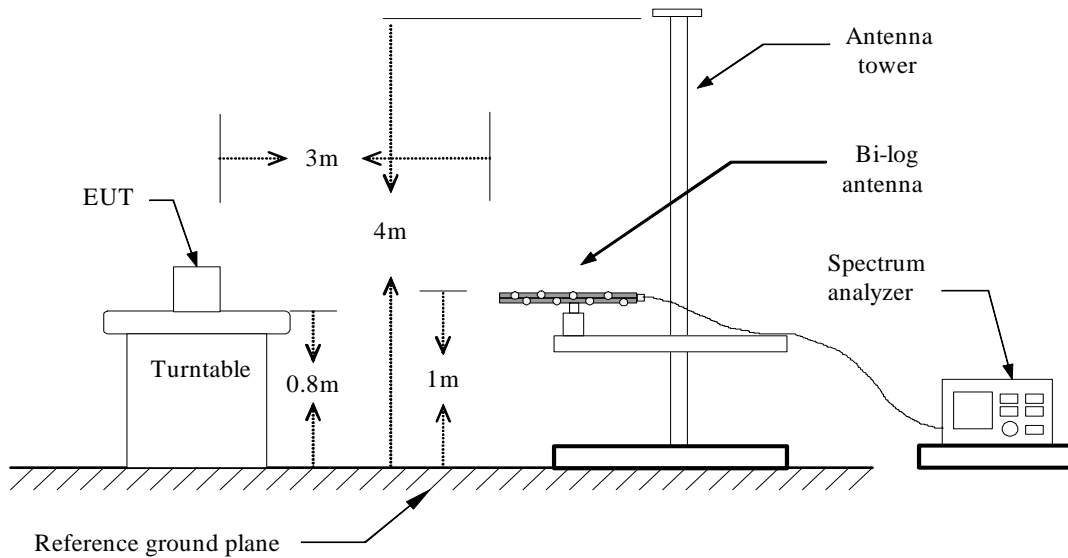
RSS-132 § 4.4 The maximum (ERP) shall be 6.3 Watts for mobile stations.

FCC 24.232(b): The equivalent Isotropic Radiated Power (EIRP) must not exceed 2 Watts.

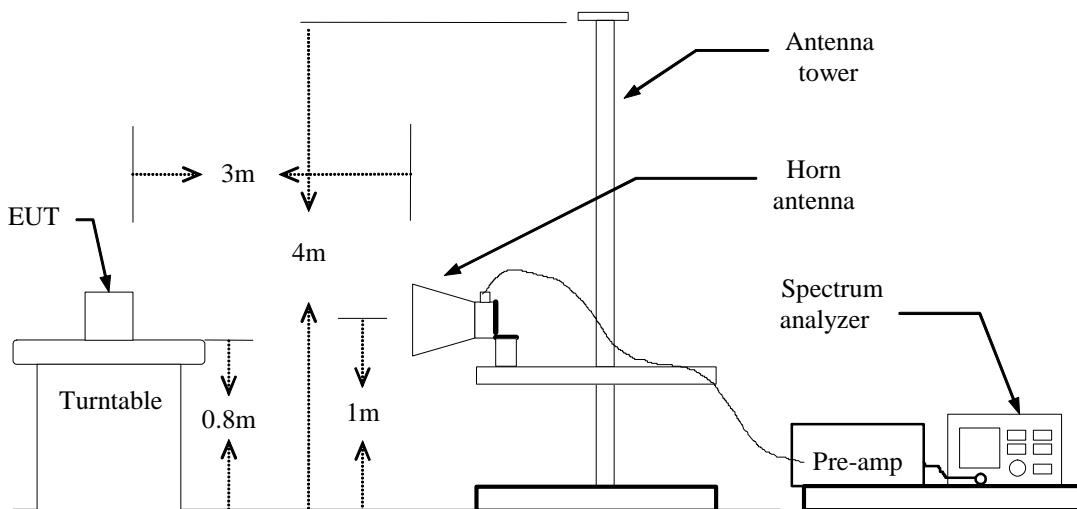
RSS133 § 6.4: Mobile stations and hand-held portables are limited to 2 watts maximum (EIRP).

Test Configuration

Below 1 GHz

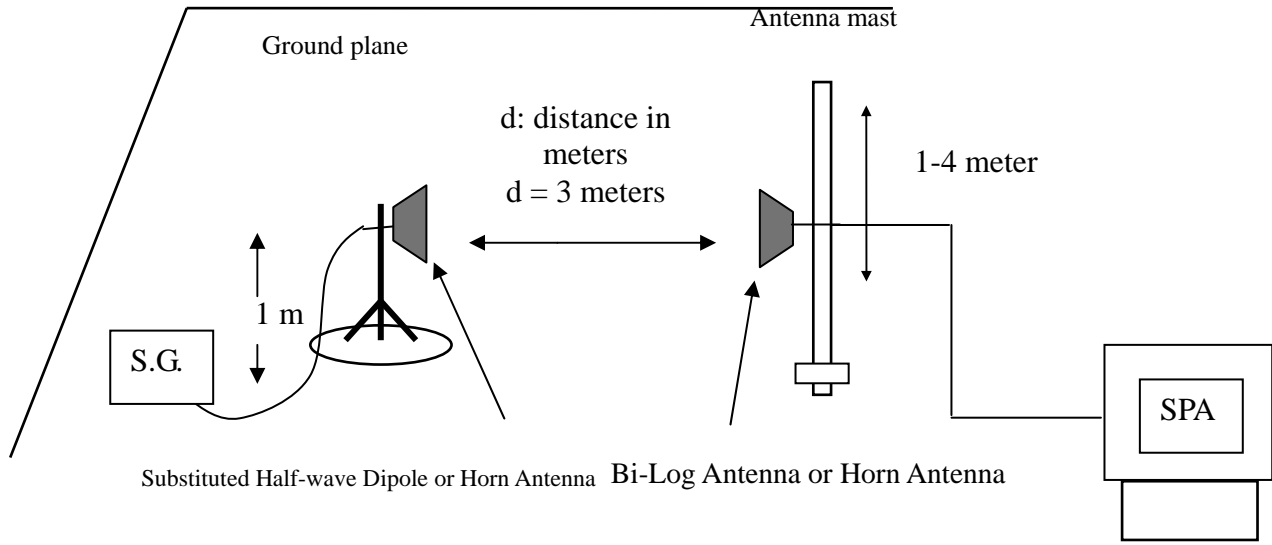


Above 1 GHz





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:

$$\text{ERP} = \text{S.G. output (dBm)} + \text{Antenna Gain (dBi)} - \text{Cable (dB)} - 2.15$$

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

TEST RESULTS

No non-compliance noted.



Calculation of maximum antenna gain

700MHz frequency band				RF Output Power		Calculations to meet ERP limits		
LTE, Band 5				Max peak tune up power		ERP limit	Antenna Gain to meet	
BAND	MODE	Channel	Frequency [MHz]	[dBm]	[W]	[W]	Numerical	[dBi]
LTE,Band 5	5M	20425	826.5	25	0.31623	7	36.303	15.60
		20520	836	25	0.31623	7	36.303	15.60
		20625	846.5	25	0.31623	7	36.303	15.60
	10M	20450	829	25	0.31623	7	36.303	15.60
		20520	836	25	0.31623	7	36.303	15.60
		20600	844	25	0.31623	7	36.303	15.60

1900MHz frequency band				RF Output Power		Calculations to meet ERP limits		
LTE,Band 2				Max peak tune up power		EIRP limit	Antenna Gain to meet	
BAND	MODE	Channel	Frequency [MHz]	[dBm]	[W]	[W]	Numerical	[dBi]
LTE,Band 2	5M	18625	1852.5	25	0.31623	2	6.325	8.01
		18900	1880	25	0.31623	2	6.325	8.01
		19175	1907.5	25	0.31623	2	6.325	8.01
	10M	18650	1855	25	0.31623	2	6.325	8.01
		18900	1880	25	0.31623	2	6.325	8.01
		19150	1905	25	0.31623	2	6.325	8.01
	20M	18700	1860	25	0.31623	2	6.325	8.01
		18900	1880	25	0.31623	2	6.325	8.01
		19100	1900	25	0.31623	2	6.325	8.01



7.4 OUT OF BAND EMISSION AT ANTENNA TERMINALS

LIMIT

According to FCC §2.1051, FCC §22.917, FCC §24.238(a). RSS-132 (4.5.2), RSS-133 (6.6).

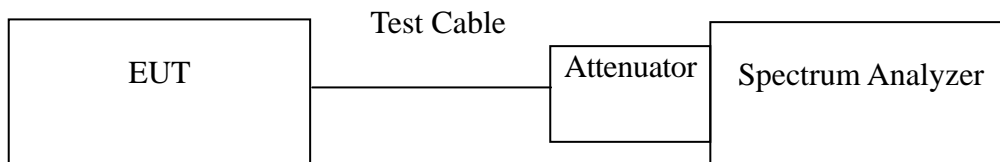
Out of Band Emissions: The mean power of emission must be attenuated below the mean power of the non-modulated carrier (P) on any frequency twice or more than twice the fundamental frequency by at least $43 + 10 \log P$ dB.

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 (824 MHz and 849 MHz /1850MHz and 1910MHz): 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

LTE Band 5

Channel Bandwidth: 5MHz / QPSK

Mode	CH	Location	Description
LTE Band 5	20425	Figure 7-1	Conducted spurious emissions, 9kHz - 20GHz
	20520	Figure 7-2	Conducted spurious emissions, 9kHz - 20GHz
	20625	Figure 7-3	Conducted spurious emissions, 9kHz - 20GHz

Channel Bandwidth: 5MHz / 16QAM

Mode	CH	Location	Description
LTE Band 5	20425	Figure 8-1	Conducted spurious emissions, 9kHz - 20GHz
	20520	Figure 8-2	Conducted spurious emissions, 9kHz - 20GHz
	20625	Figure 8-3	Conducted spurious emissions, 9kHz - 20GHz

Channel Bandwidth: 10MHz / QPSK

Mode	CH	Location	Description
LTE Band 5	20450	Figure 9-1	Conducted spurious emissions, 9kHz - 20GHz
	20520	Figure 9-2	Conducted spurious emissions, 9kHz - 20GHz
	20600	Figure 9-3	Conducted spurious emissions, 9kHz - 20GHz

Mode	CH	Location	Description
LTE Band 5	20450	Figure 10-1	Band Edge emissions
	20600	Figure 10-2	Band Edge emissions

Channel Bandwidth: 10MHz / 16QAM

Mode	CH	Location	Description
LTE Band 5	20450	Figure 11-1	Conducted spurious emissions, 9kHz - 20GHz
	20520	Figure 11-2	Conducted spurious emissions, 9kHz - 20GHz
	20600	Figure 11-3	Conducted spurious emissions, 9kHz - 20GHz

Mode	CH	Location	Description
LTE Band 5	20450	Figure 12-1	Band Edge emissions
	20600	Figure 12-2	Band Edge emissions



LTE Band 2

Channel Bandwidth: 5MHz / QPSK

Mode	CH	Location	Description
LTE Band 2	18625	Figure 13-1	Conducted spurious emissions, 9kHz - 20GHz
	18900	Figure 13-2	Conducted spurious emissions, 9kHz - 20GHz
	19175	Figure 13-3	Conducted spurious emissions, 9kHz - 20GHz

Channel Bandwidth: 5MHz / 16QAM

Mode	CH	Location	Description
LTE Band 2	18625	Figure 14-1	Conducted spurious emissions, 9kHz - 20GHz
	18900	Figure 14-2	Conducted spurious emissions, 9kHz - 20GHz
	19175	Figure 14-3	Conducted spurious emissions, 9kHz - 20GHz

Channel Bandwidth: 10MHz / QPSK

Mode	CH	Location	Description
LTE Band 2	18650	Figure 15-1	Conducted spurious emissions, 9kHz - 20GHz
	18900	Figure 15-2	Conducted spurious emissions, 9kHz - 20GHz
	19150	Figure 15-3	Conducted spurious emissions, 9kHz - 20GHz

Mode	CH	Location	Description
LTE Band 2	18650	Figure 16-1	Band Edge emissions
	19150	Figure 16-2	Band Edge emissions

Channel Bandwidth: 10MHz / 16QAM

Mode	CH	Location	Description
LTE Band 2	18650	Figure 17-1	Conducted spurious emissions, 9kHz - 20GHz
	18900	Figure 17-2	Conducted spurious emissions, 9kHz - 20GHz
	19150	Figure 17-3	Conducted spurious emissions, 9kHz - 20GHz

Mode	CH	Location	Description
LTE Band 2	18650	Figure 18-1	Band Edge emissions
	19150	Figure 18-2	Band Edge emissions



Channel Bandwidth: 20MHz / QPSK

Mode	CH	Location	Description
LTE Band 2	18700	Figure 19-1	Conducted spurious emissions, 9kHz - 20GHz
	18900	Figure 19-2	Conducted spurious emissions, 9kHz - 20GHz
	19100	Figure 19-3	Conducted spurious emissions, 9kHz - 20GHz

Mode	CH	Location	Description
LTE Band 2	18700	Figure 20-1	Band Edge emissions
	19100	Figure 20-2	Band Edge emissions

Channel Bandwidth: 20MHz / 16QAM

Mode	CH	Location	Description
LTE Band 2	18700	Figure 21-1	Conducted spurious emissions, 9kHz - 20GHz
	18900	Figure 21-2	Conducted spurious emissions, 9kHz - 20GHz
	19100	Figure 21-3	Conducted spurious emissions, 9kHz - 20GHz

Mode	CH	Location	Description
LTE Band 2	18700	Figure 22-1	Band Edge emissions
	19100	Figure 22-2	Band Edge emissions



Out of Band emission at antenna terminals						
LTE Band 5 -5MHz QPSK						
Operation Mode	Frequency (MHz)	Emission level (dBm)	Max.Ant.Gain (dBi)	Result (dBm)	Limit (dBm)	Margin (dB)
Low	N/A		15.6		-13	
			15.6		-13	
Mid	N/A		15.6		-13	
			15.6		-13	
High	N/A		15.6		-13	
			15.6		-13	
LTE Band 5 -5MHz 16QAM						
Operation Mode	Frequency (MHz)	Emission level (dBm)	Max.Ant.Gain (dBi)	Result (dBm)	Limit (dBm)	Margin (dB)
Low	N/A		15.6		-13	
			15.6		-13	
Mid	N/A		15.6		-13	
			15.6		-13	
High	N/A		15.6		-13	
			15.6		-13	
LTE Band 5 -10MHz QPSK						
Operation Mode	Frequency (MHz)	Emission level (dBm)	Max.Ant.Gain (dBi)	Result (dBm)	Limit (dBm)	Margin (dB)
Low	N/A		15.6		-13	
			15.6		-13	
Mid	N/A		15.6		-13	
			15.6		-13	
High	N/A		15.6		-13	
			15.6		-13	
LTE Band 5 -10MHz 16QAM						
Operation Mode	Frequency (MHz)	Emission level (dBm)	Max.Ant.Gain (dBi)	Result (dBm)	Limit (dBm)	Margin (dB)
Low	N/A		15.6		-13	
			15.6		-13	
Mid	N/A		15.6		-13	
			15.6		-13	
High	N/A		15.6		-13	
			15.6		-13	



LTE Band 2 -5MHz QPSK						
Operation Mode	Frequency (MHz)	Emission level (dBm)	Max.Ant.Gain (dBi)	Result (dBm)	Limit (dBm)	Margin (dB)
Low	N/A		8		-13	
			8		-13	
Mid	N/A		8		-13	
			8		-13	
High	N/A		8		-13	
			8		-13	
LTE Band 2 -5MHz 16QAM						
Operation Mode	Frequency (MHz)	Emission level (dBm)	Max.Ant.Gain (dBi)	Result (dBm)	Limit (dBm)	Margin (dB)
Low	N/A		8		-13	
			8		-13	
Mid	N/A		8		-13	
			8		-13	
High	3080	-37.83	8	-29.83	-13	-16.83
	3820	-35.95	8	-27.95	-13	-14.95
LTE Band 2 -10MHz QPSK						
Operation Mode	Frequency (MHz)	Emission level (dBm)	Max.Ant.Gain (dBi)	Result (dBm)	Limit (dBm)	Margin (dB)
Low	N/A		8		-13	
			8		-13	
Mid	3760	-42.76	8	-34.76	-13	-21.76
			8		-13	
High	N/A		8		-13	
			8		-13	
LTE Band 2 -10MHz 16QAM						
Operation Mode	Frequency (MHz)	Emission level (dBm)	Max.Ant.Gain (dBi)	Result (dBm)	Limit (dBm)	Margin (dB)
Low	N/A		8		-13	
			8		-13	
Mid	3760	-44.56	8	-36.56	-13	-23.56
			8		-13	
High	N/A		8		-13	
			8		-13	
LTE Band 2 -20MHz QPSK						
Operation Mode	Frequency (MHz)	Emission level (dBm)	Max.Ant.Gain (dBi)	Result (dBm)	Limit (dBm)	Margin (dB)
Low	N/A		8		-13	
			8		-13	
Mid	N/A		8		-13	
			8		-13	
High	N/A		8		-13	
			8		-13	
LTE Band 2 -20MHz 16QAM						
Operation Mode	Frequency (MHz)	Emission level (dBm)	Max.Ant.Gain (dBi)	Result (dBm)	Limit (dBm)	Margin (dB)
Low	N/A		8		-13	
			8		-13	
Mid	N/A		8		-13	
			8		-13	
High	N/A		8		-13	
			8		-13	

Remark: Data of measurement within this frequency range shown “ N/A ” in the table above means the emission is too small to be measured



Test Plot

LTE Band 5

Channel Bandwidth: 5MHz / QPSK

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

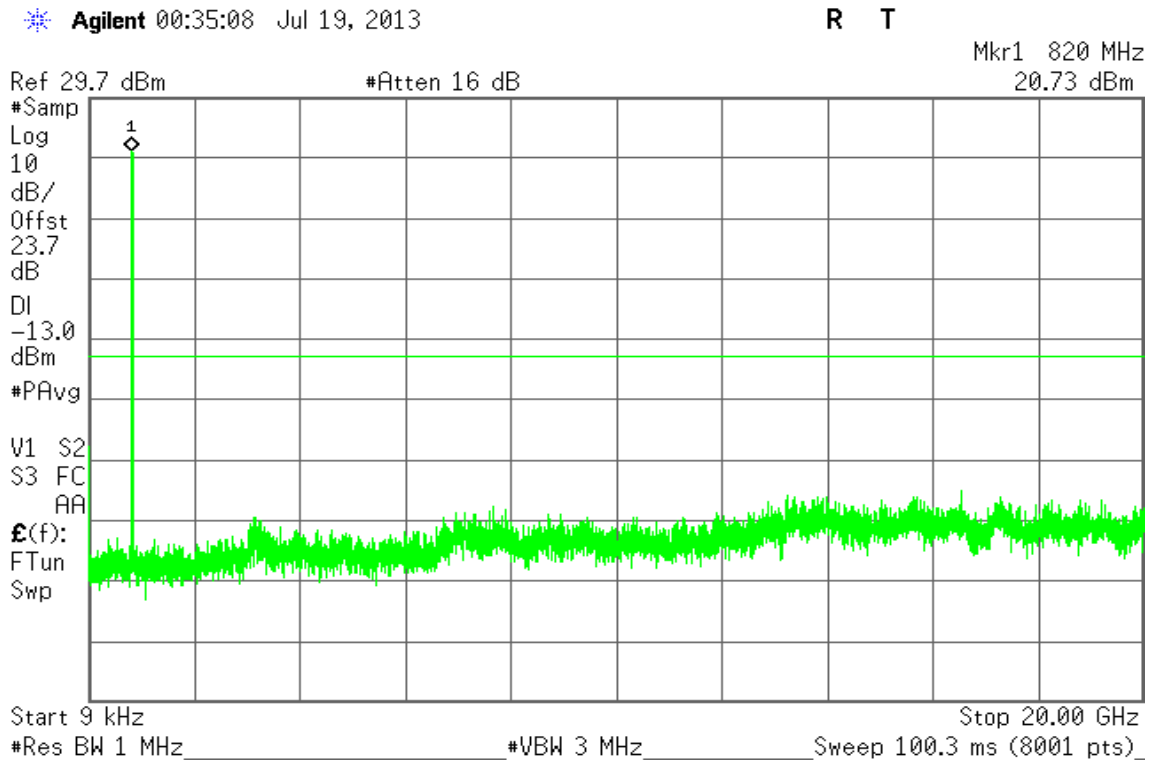


Figure 7-2: Out of Band emission at antenna terminals – CH Mid

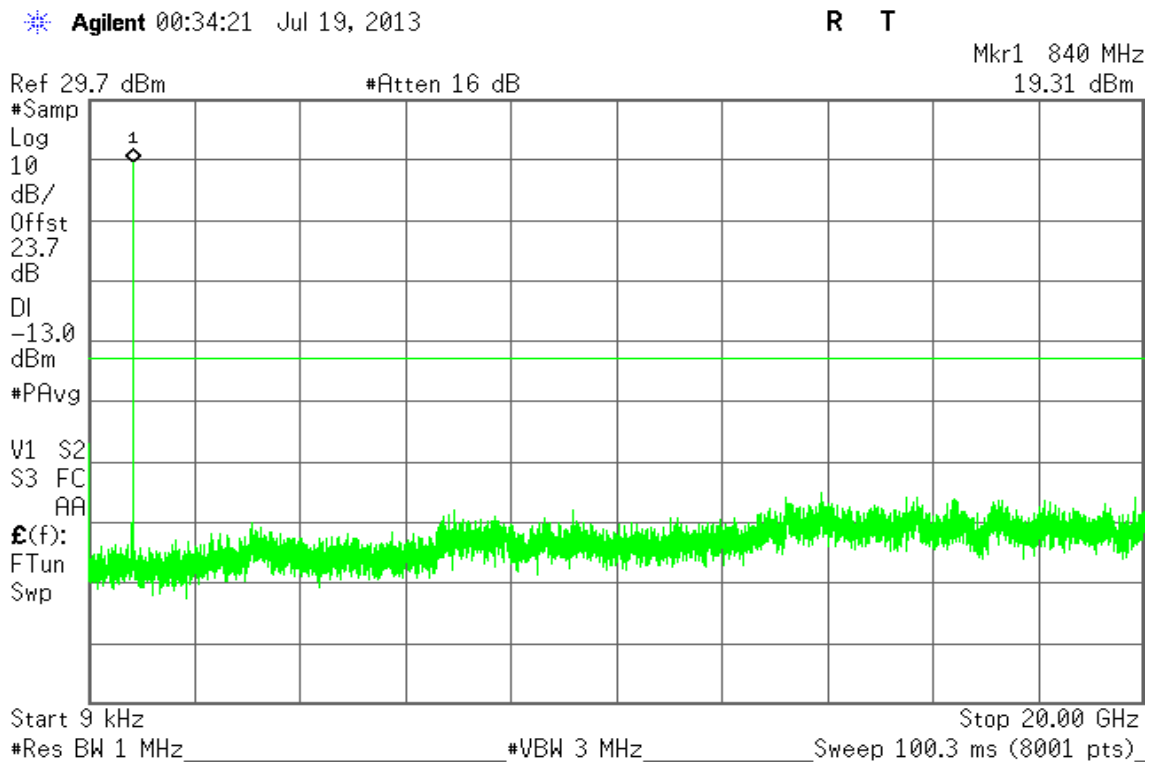
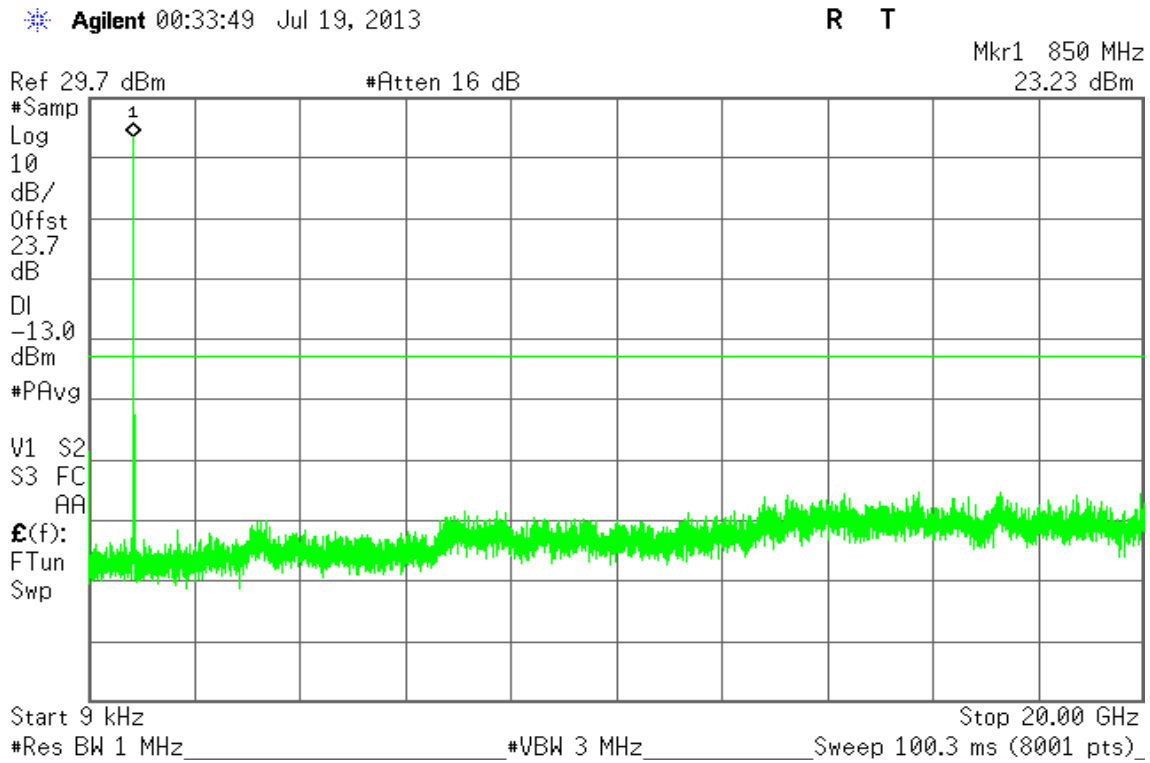




Figure 7-3: Out of Band emission at antenna terminals – CH High



LTE Band 5

Channel Bandwidth: 5MHz / 16QAM

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

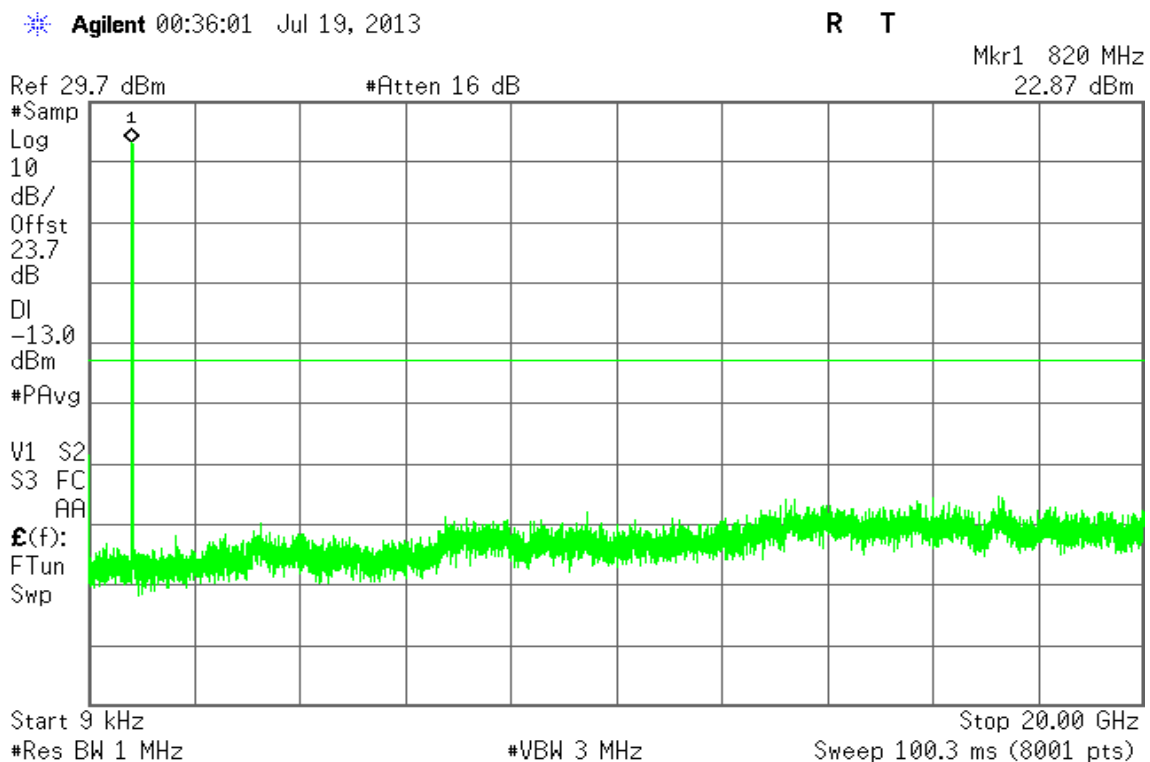




Figure 8-2: Out of Band emission at antenna terminals – CH Mid

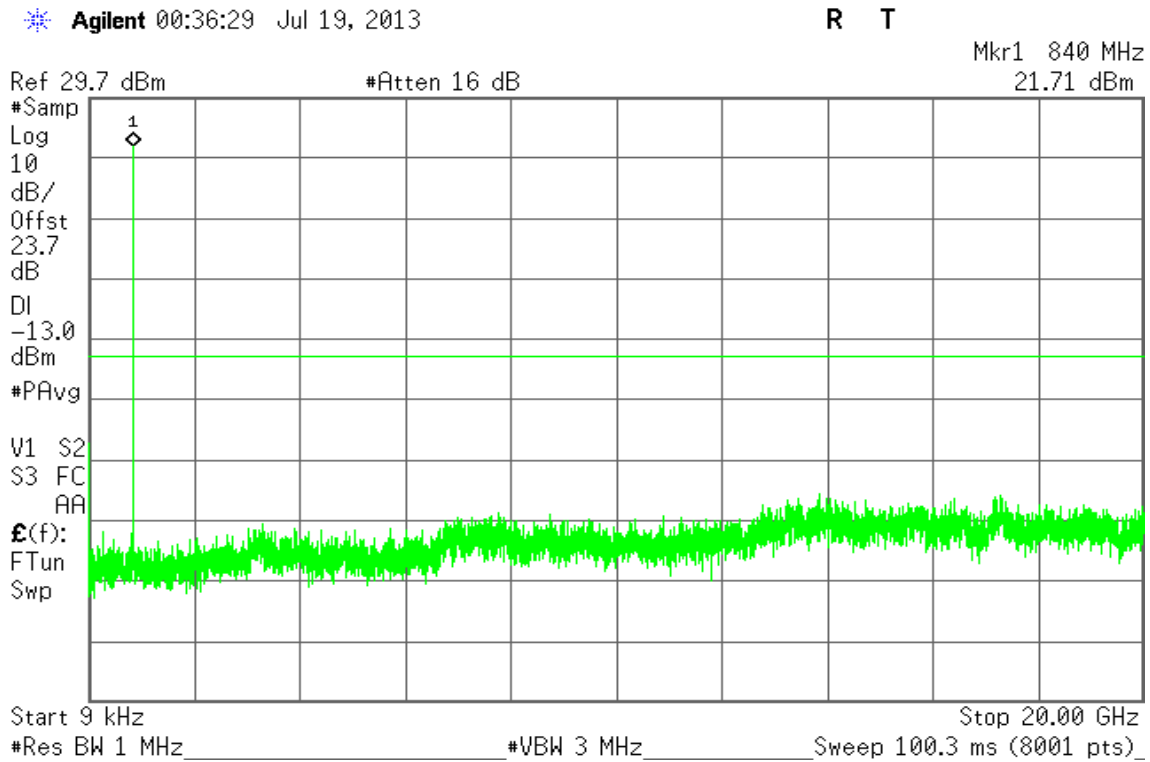
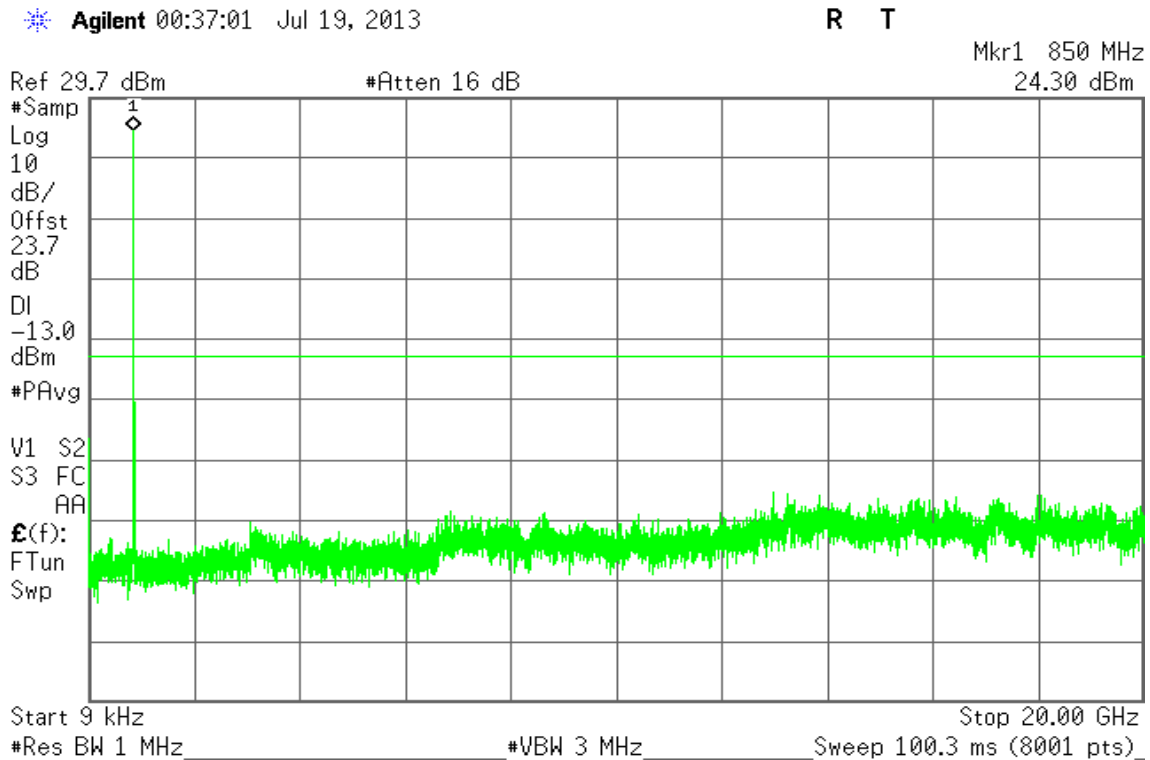


Figure 8-3: Out of Band emission at antenna terminals – CH High





LTE Band 5

Channel Bandwidth: 10MHz / QPSK

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

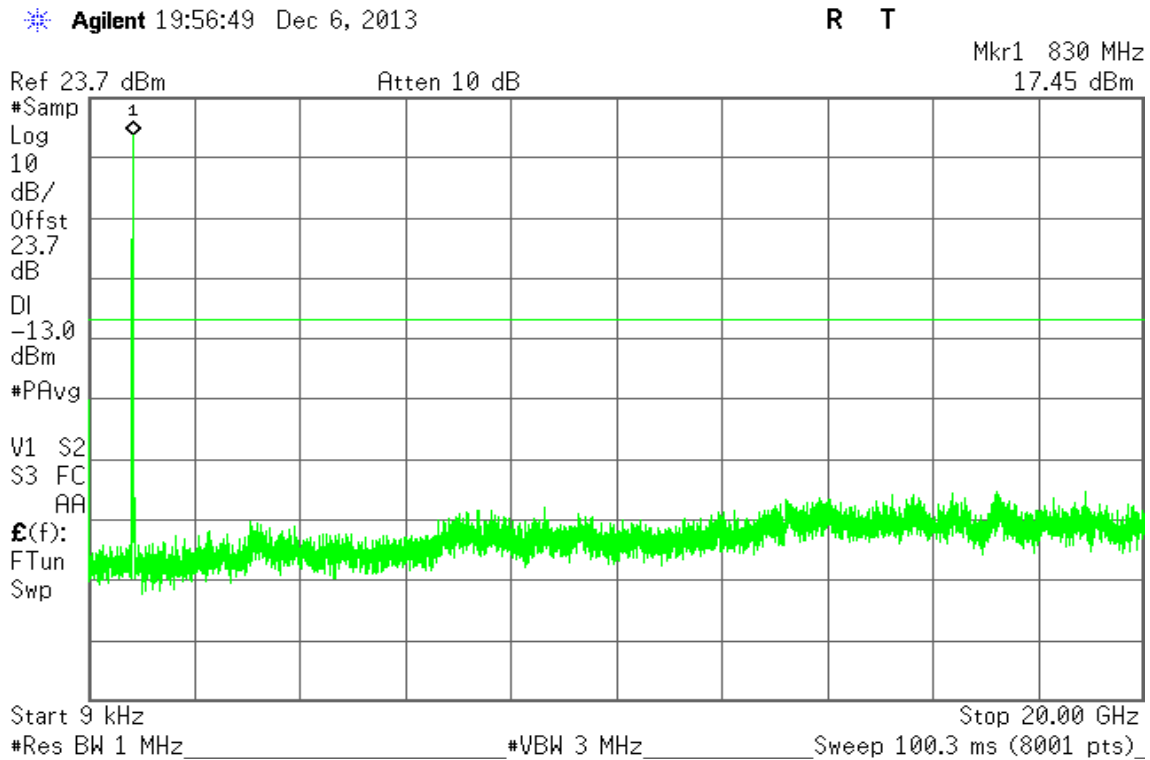


Figure 9-2: Out of Band emission at antenna terminals – CH Mid

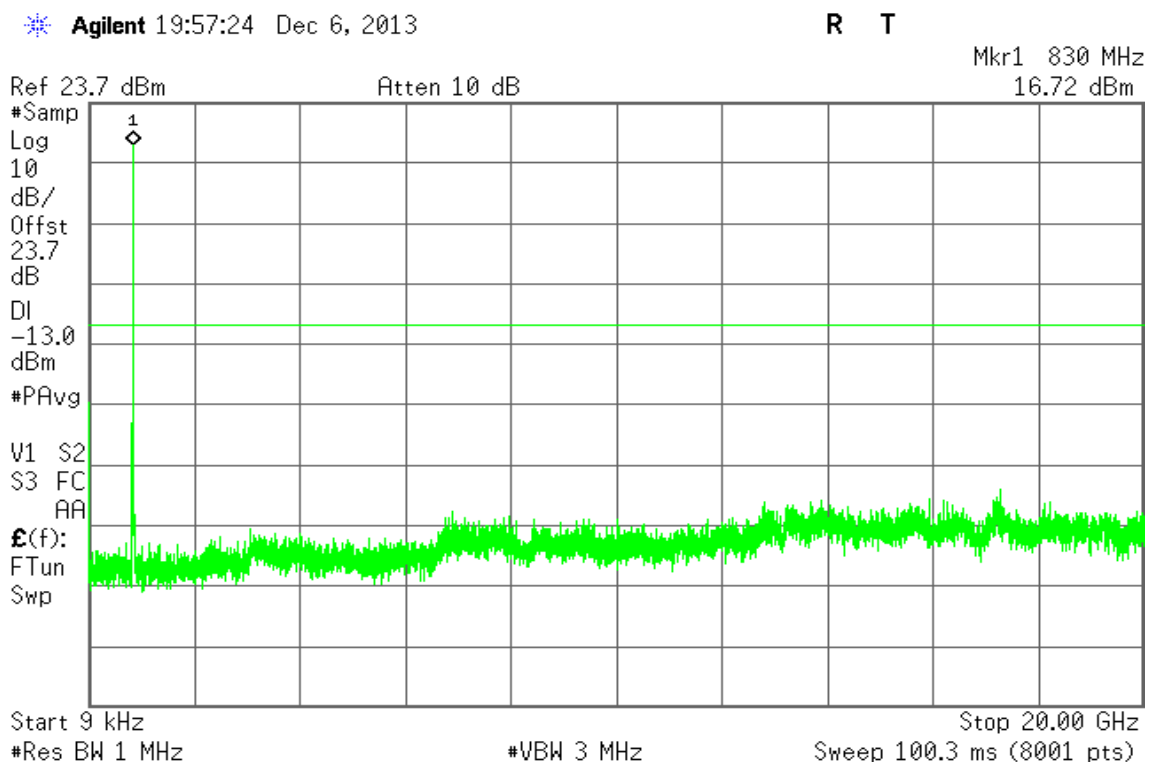




Figure 9-3: Out of Band emission at antenna terminals – CH High

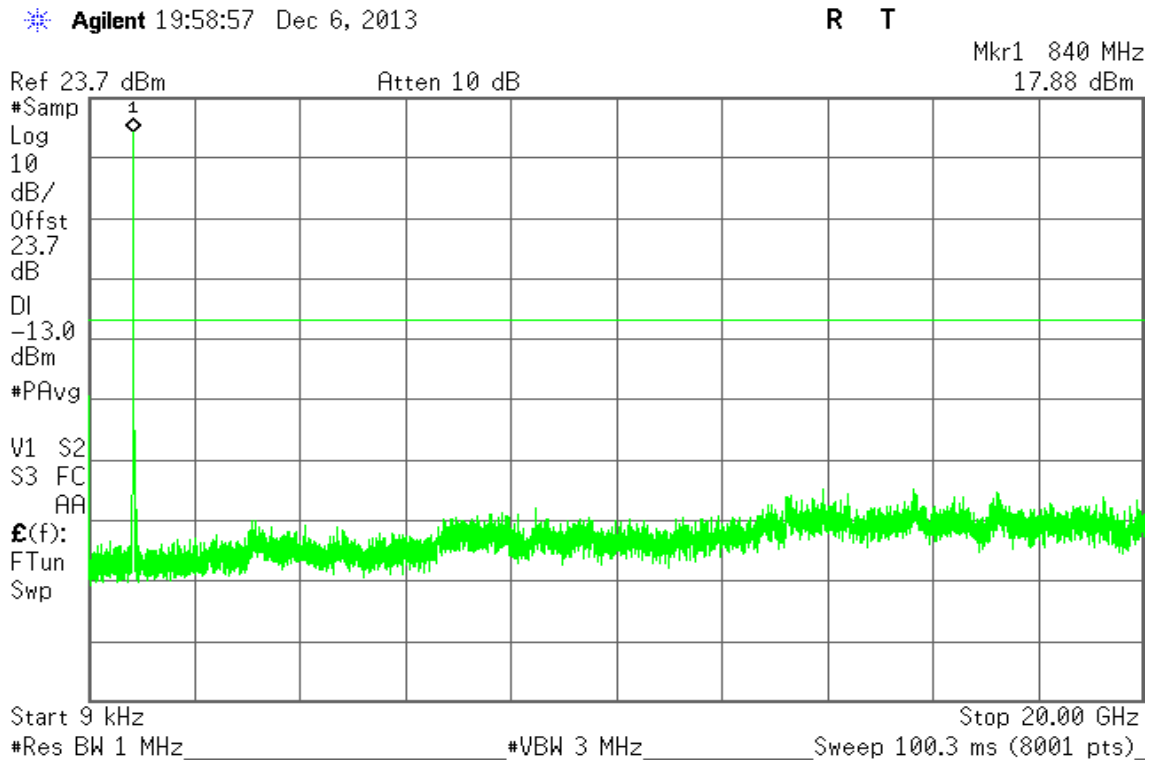


Figure 10-1: Band Edge emissions – CH Low

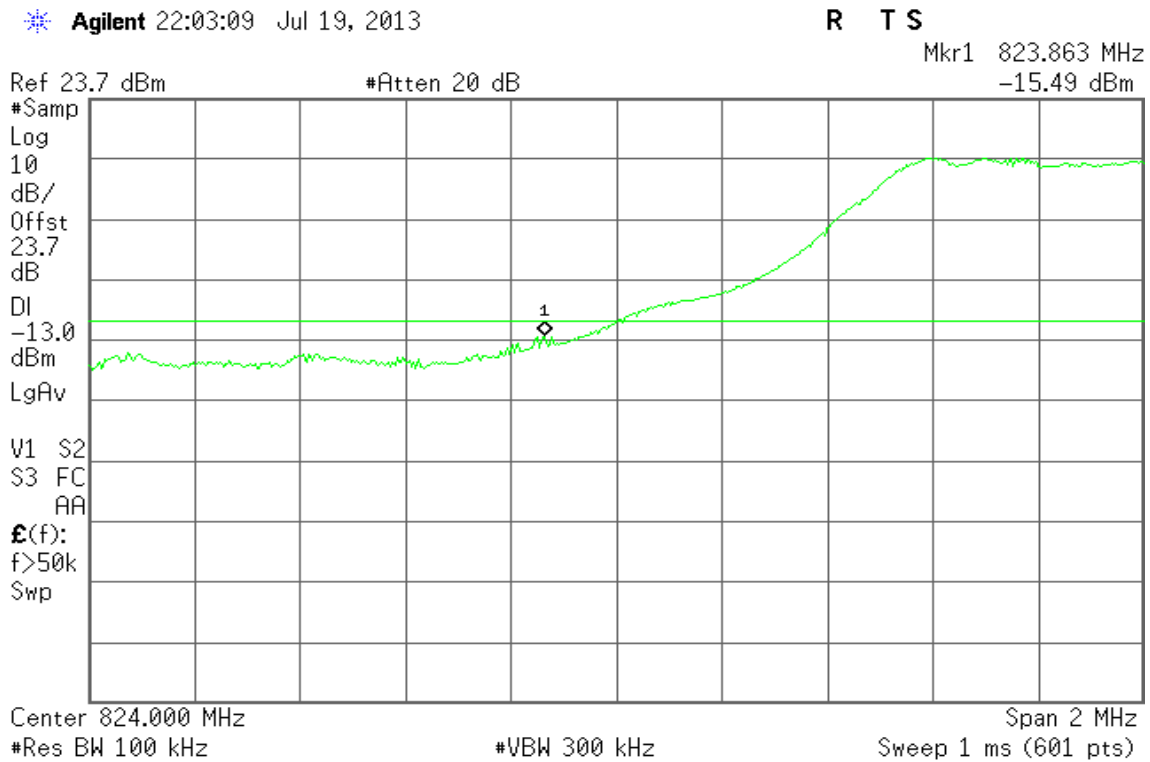
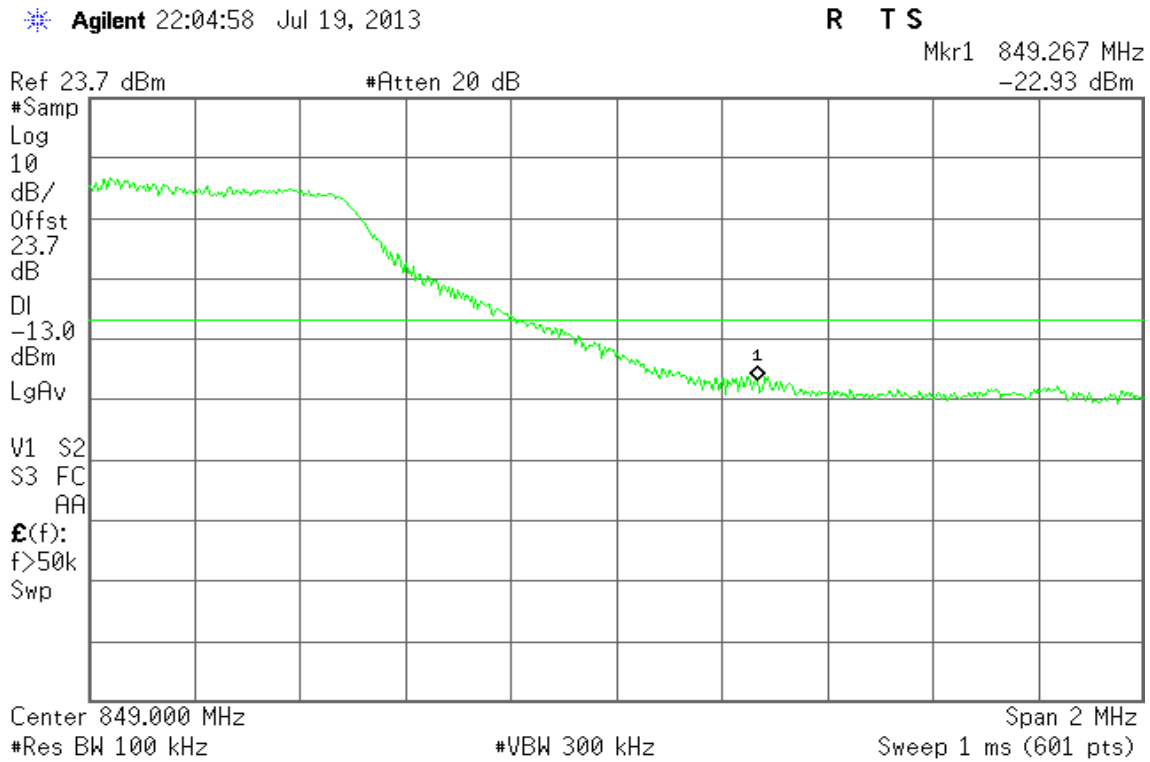




Figure 10-2: Band Edge emissions – CH High



LTE Band 5

Channel Bandwidth: 10MHz / 16QAM

Figure 11-1: Out of Band emission at antenna terminals – CH Low

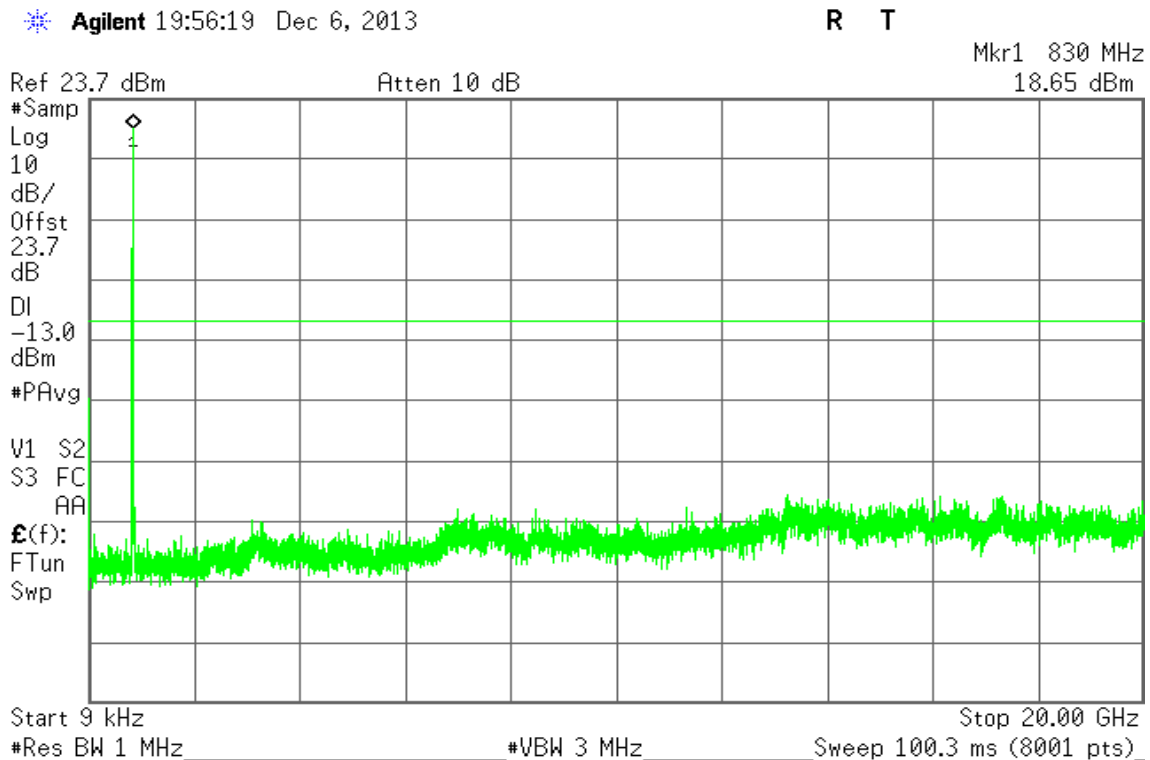




Figure 11-2: Out of Band emission at antenna terminals – CH Mid

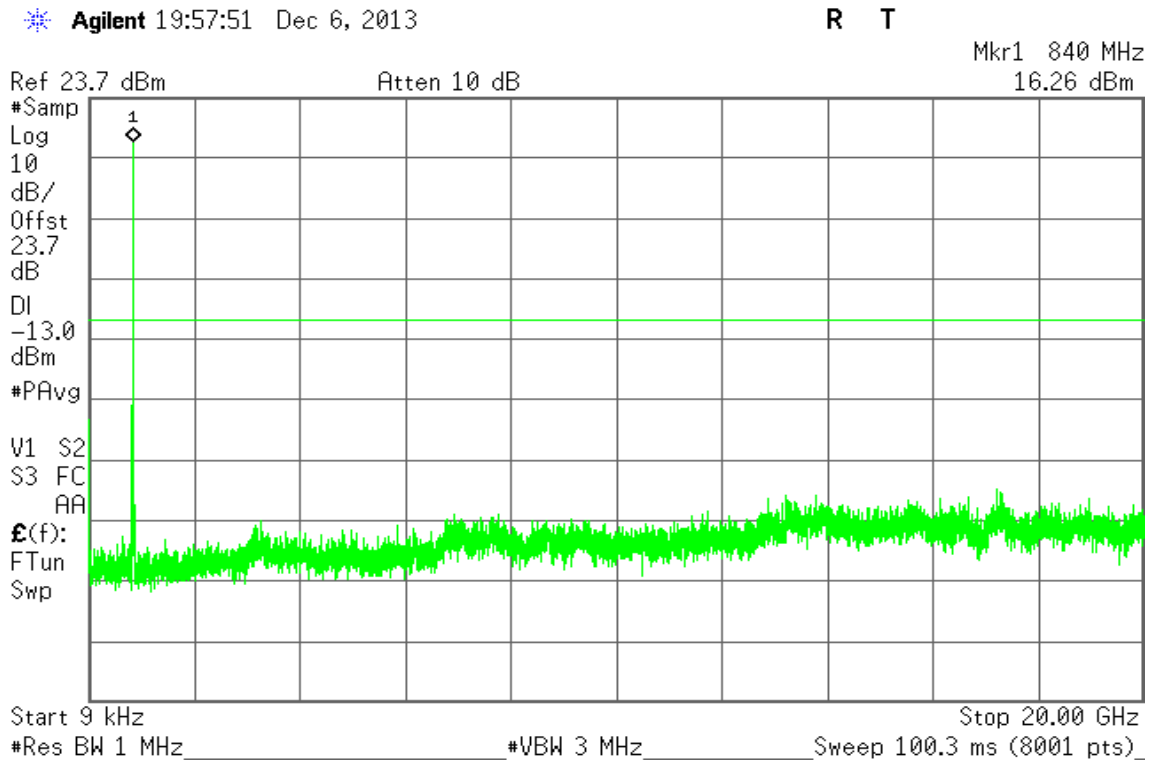


Figure 11-3: Out of Band emission at antenna terminals – CH High

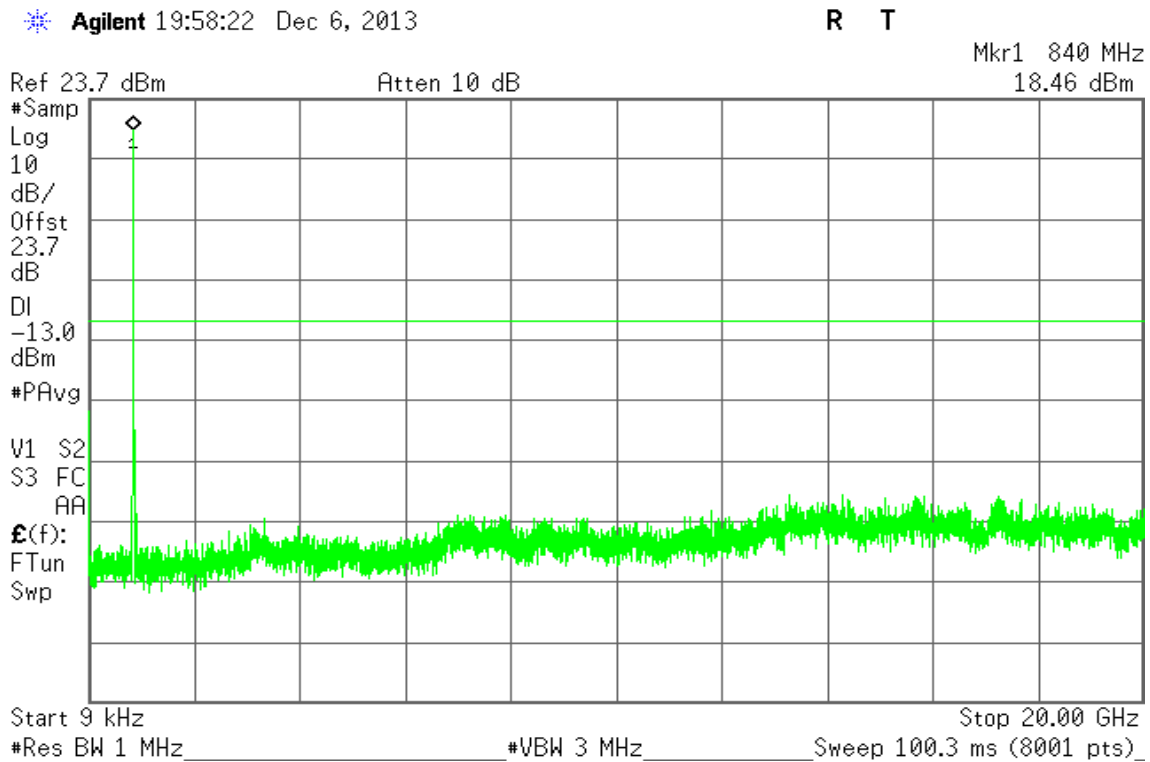




Figure 12-1: Band Edge emissions – CH Low

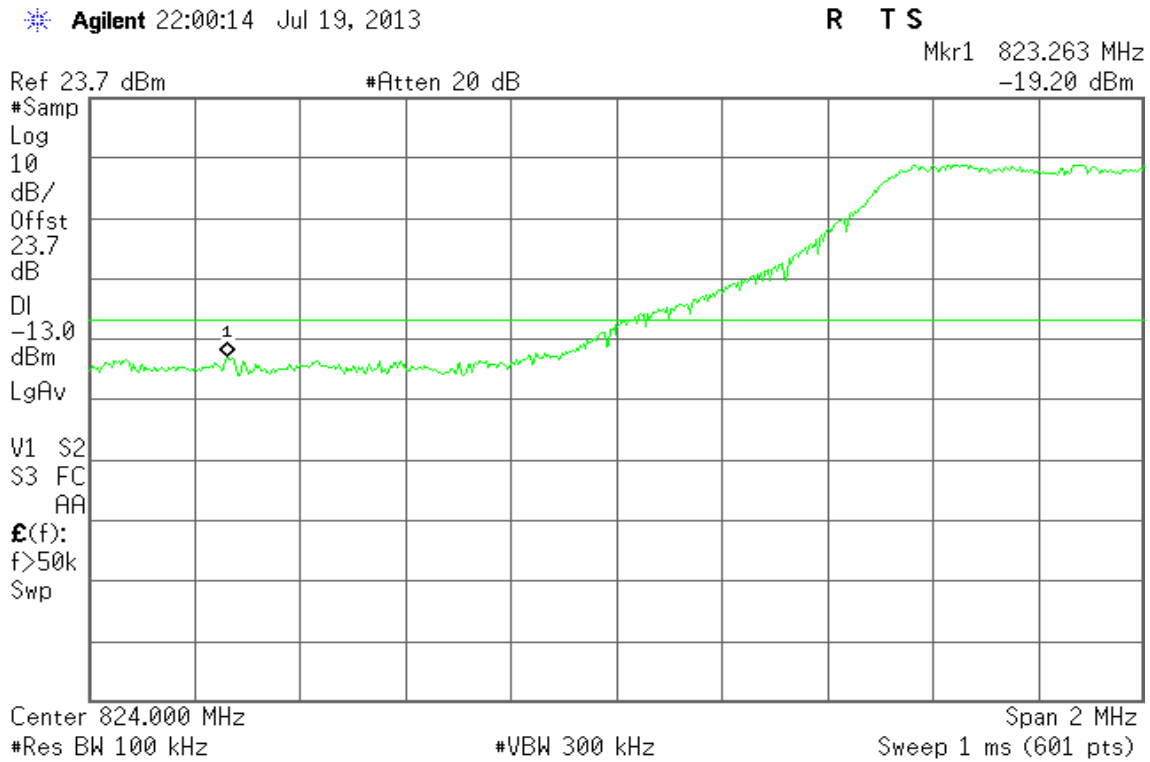
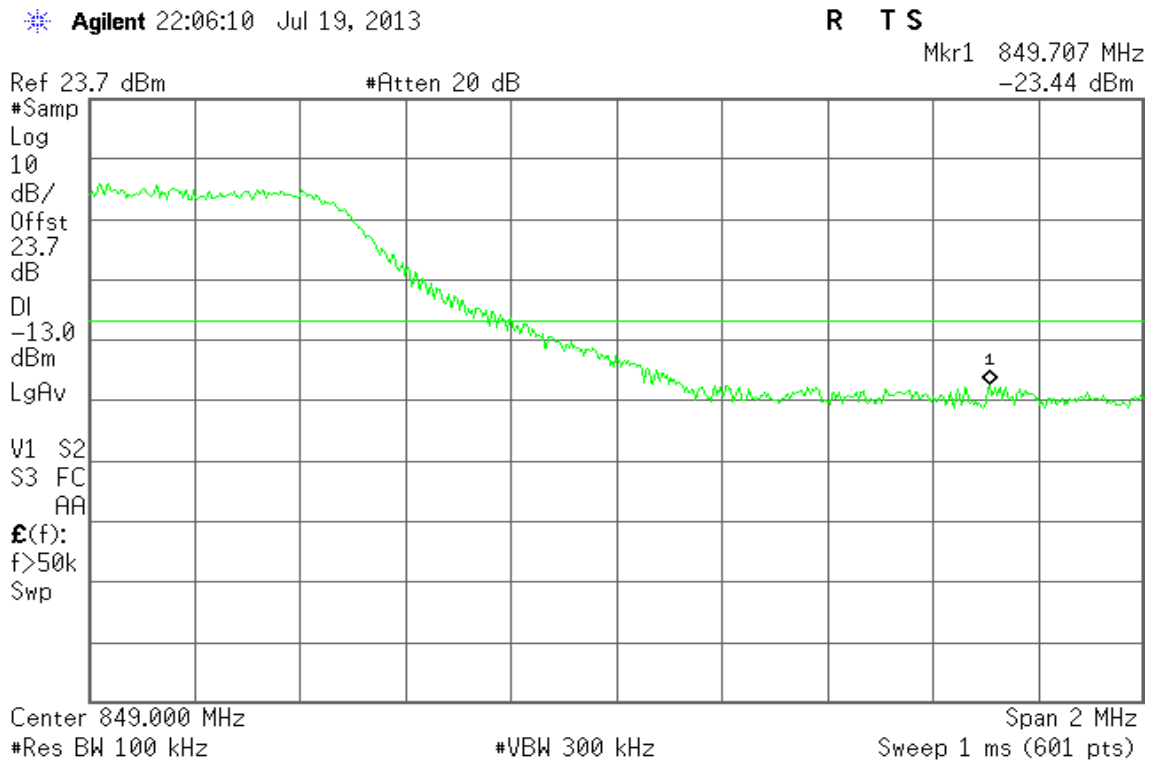


Figure 12-2: Band Edge emissions – CH High





LTE Band 2

Channel Bandwidth: 5MHz / QPSK

Figure 13-1: Out of Band emission at antenna terminals – CH Low

Agilent 00:06:01 Jul 19, 2013

R T

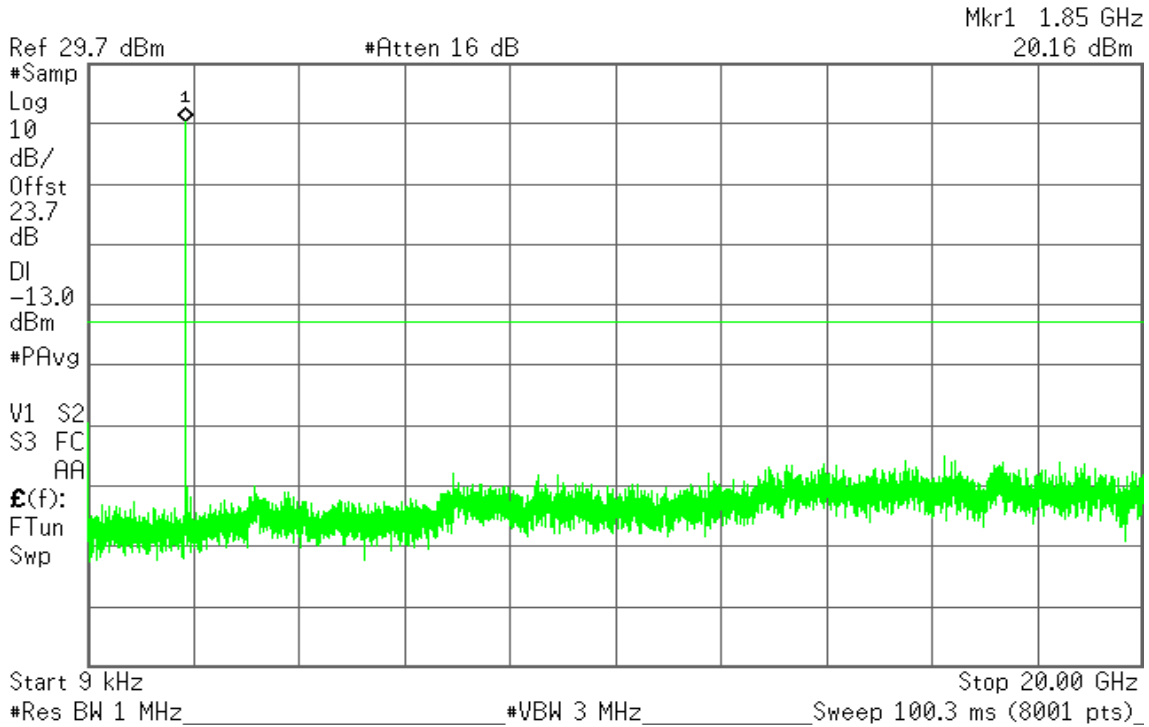


Figure 13-2: Out of Band emission at antenna terminals – CH Mid

Agilent 00:06:31 Jul 19, 2013

R T

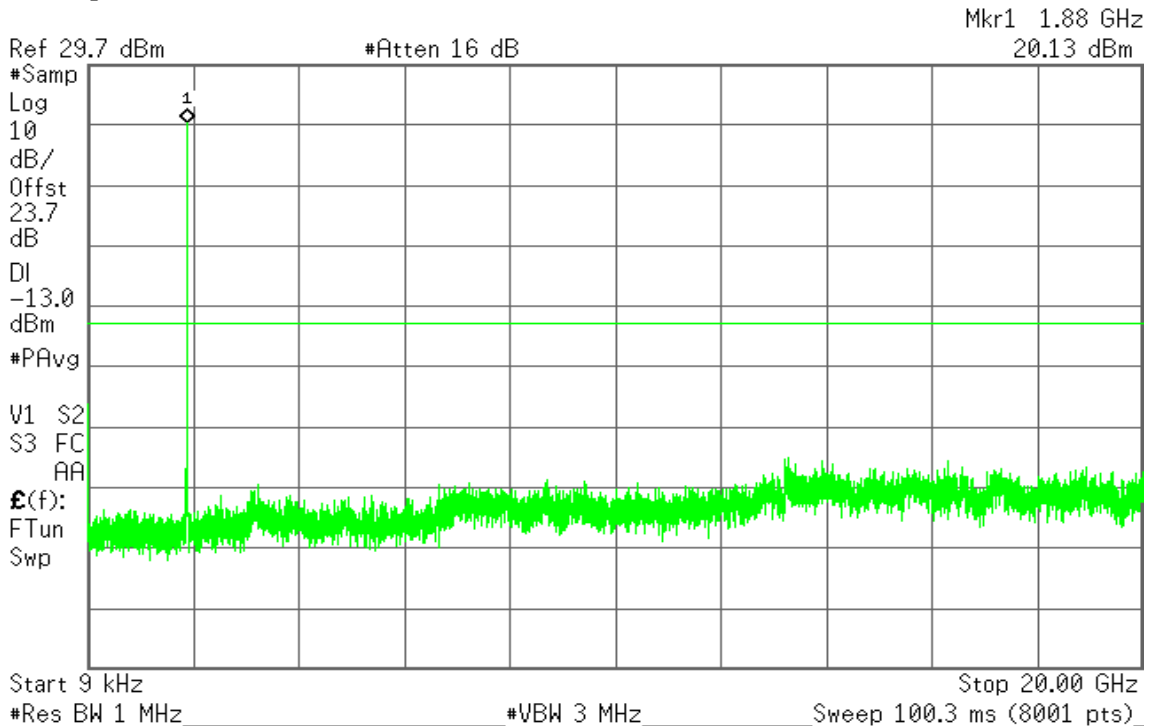
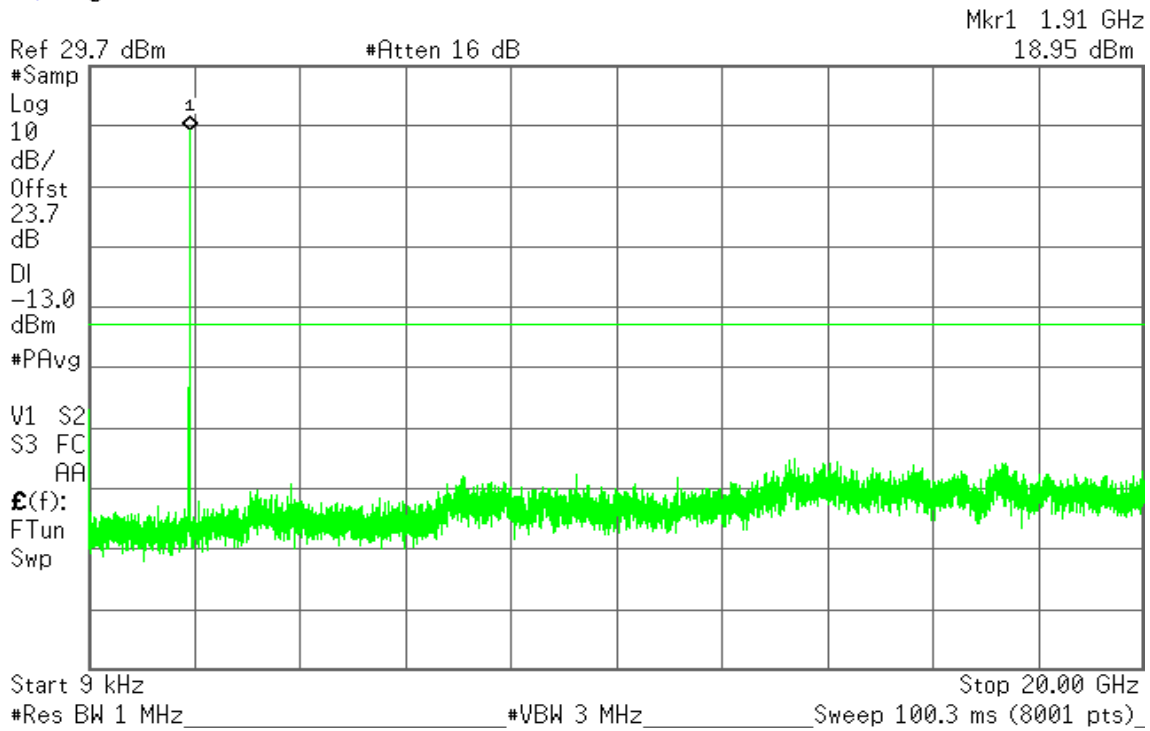




Figure 13-3: Out of Band emission at antenna terminals – CH High

Agilent 00:09:56 Jul 19, 2013

R T



LTE Band 2

Channel Bandwidth: 5MHz / 16QAM

Figure 14-1: Out of Band emission at antenna terminals – CH Low

Agilent 00:12:48 Jul 19, 2013

R T

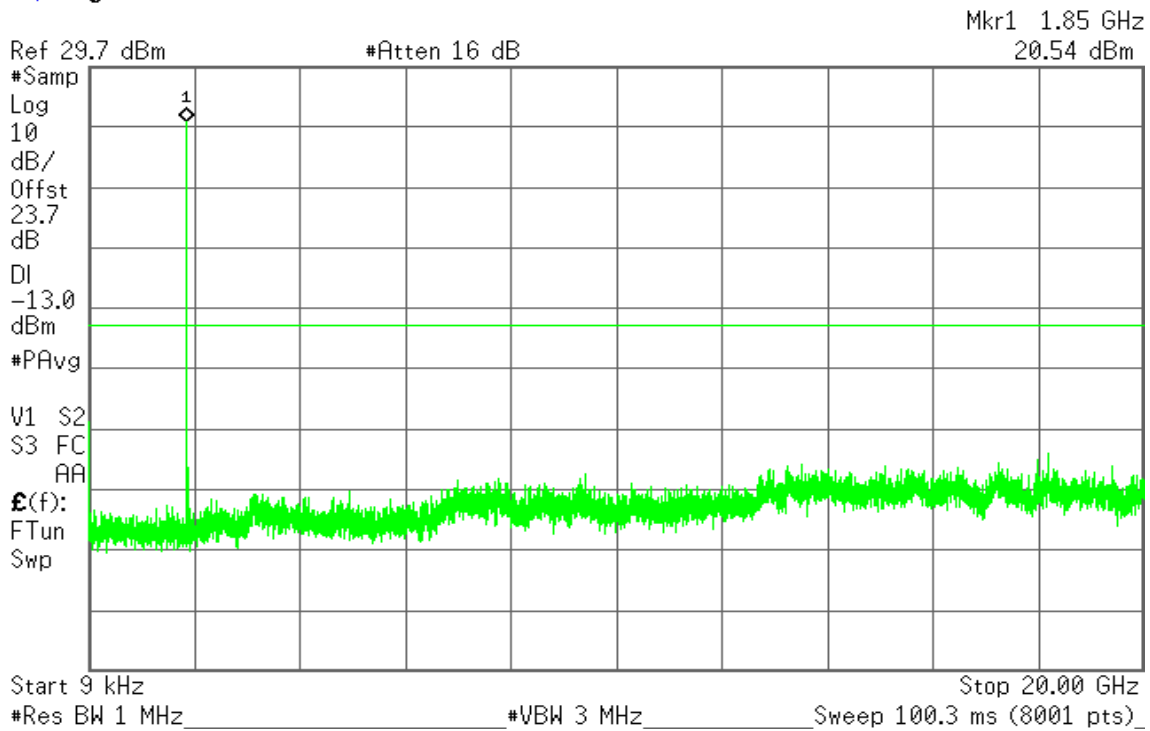




Figure 14-2: Out of Band emission at antenna terminals – CH Mid

Agilent 00:13:17 Jul 19, 2013

R T

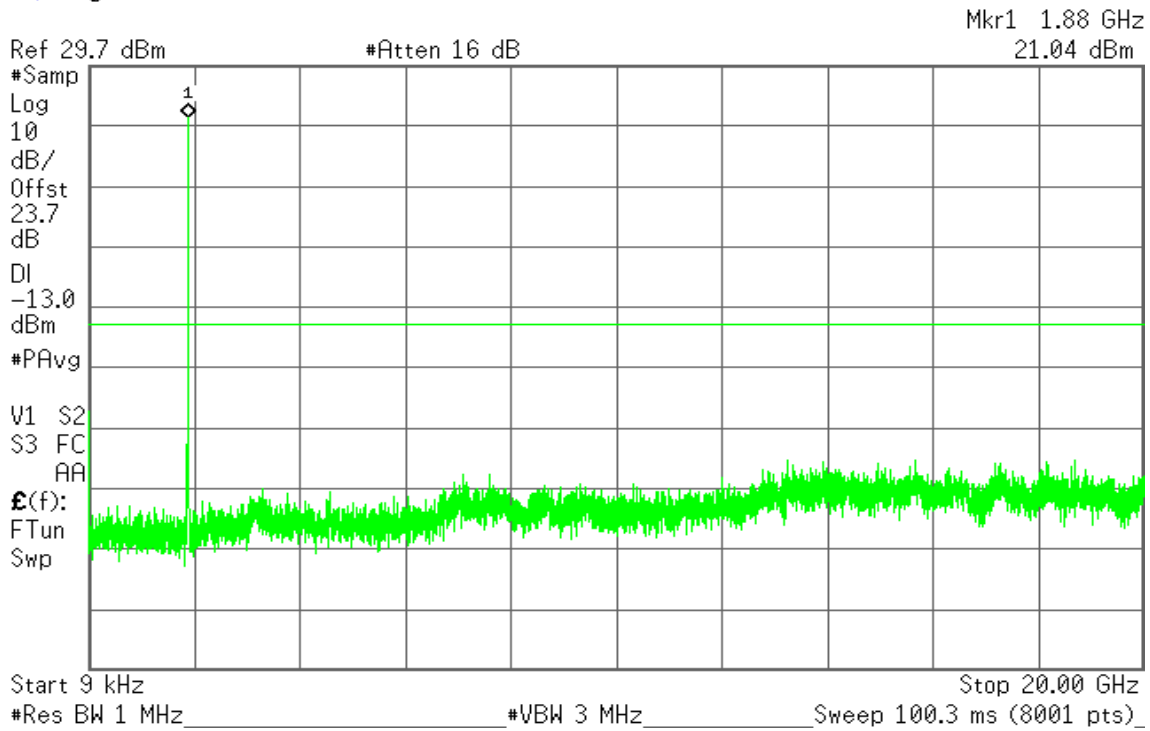
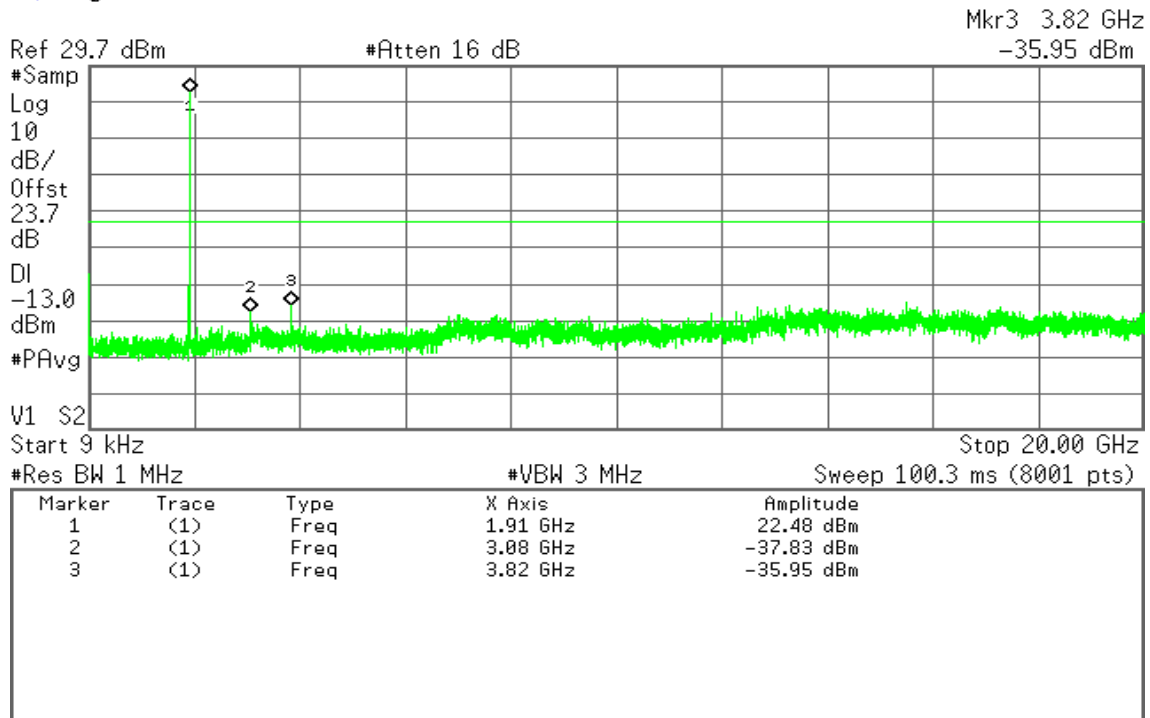


Figure 14-3: Out of Band emission at antenna terminals – CH High

Agilent 00:14:24 Jul 19, 2013

R T





LTE Band 2

Channel Bandwidth: 10MHz / QPSK

Figure 15-1: Out of Band emission at antenna terminals – CH Low

Agilent 19:51:30 Dec 6, 2013

R T

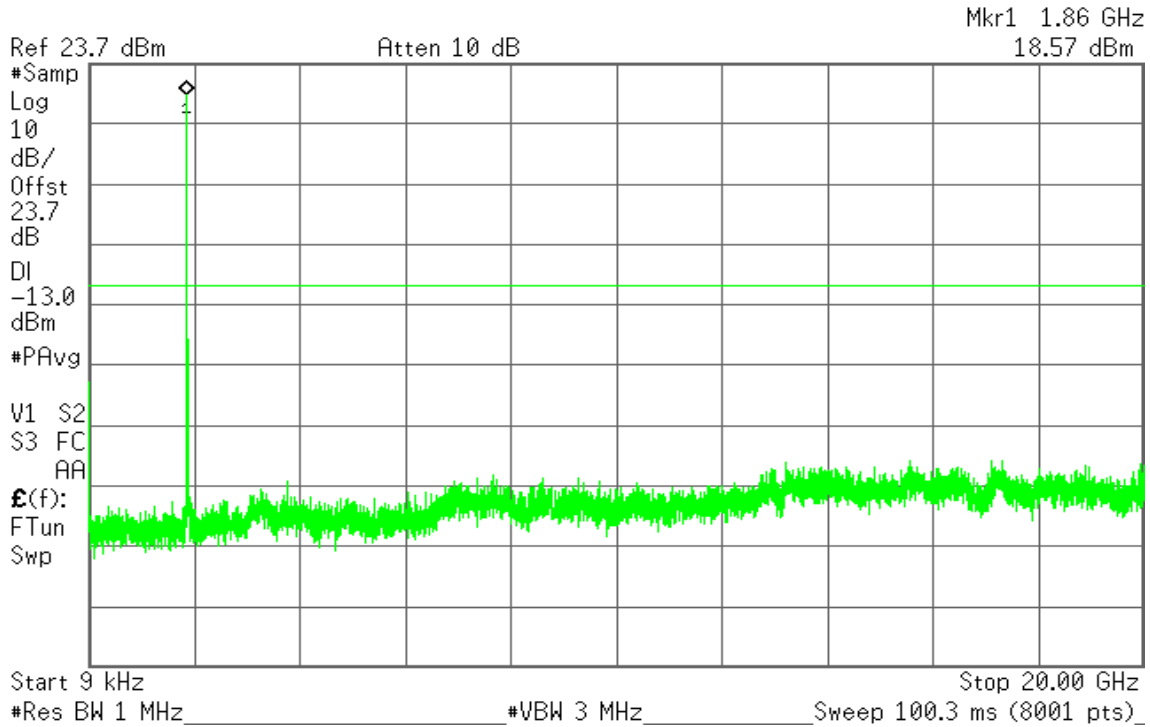


Figure 15-2: Out of Band emission at antenna terminals – CH Mid

Agilent 19:53:03 Dec 6, 2013

R T

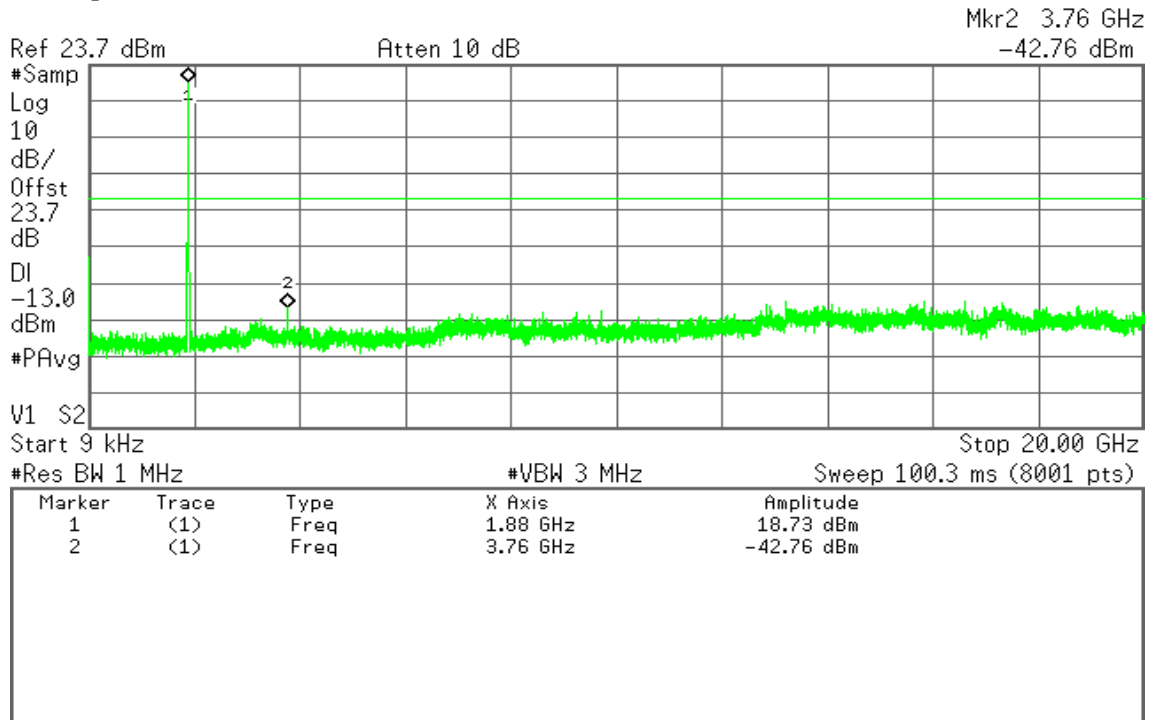




Figure 15-3: Out of Band emission at antenna terminals – CH High

Agilent 19:55:17 Dec 6, 2013

R T

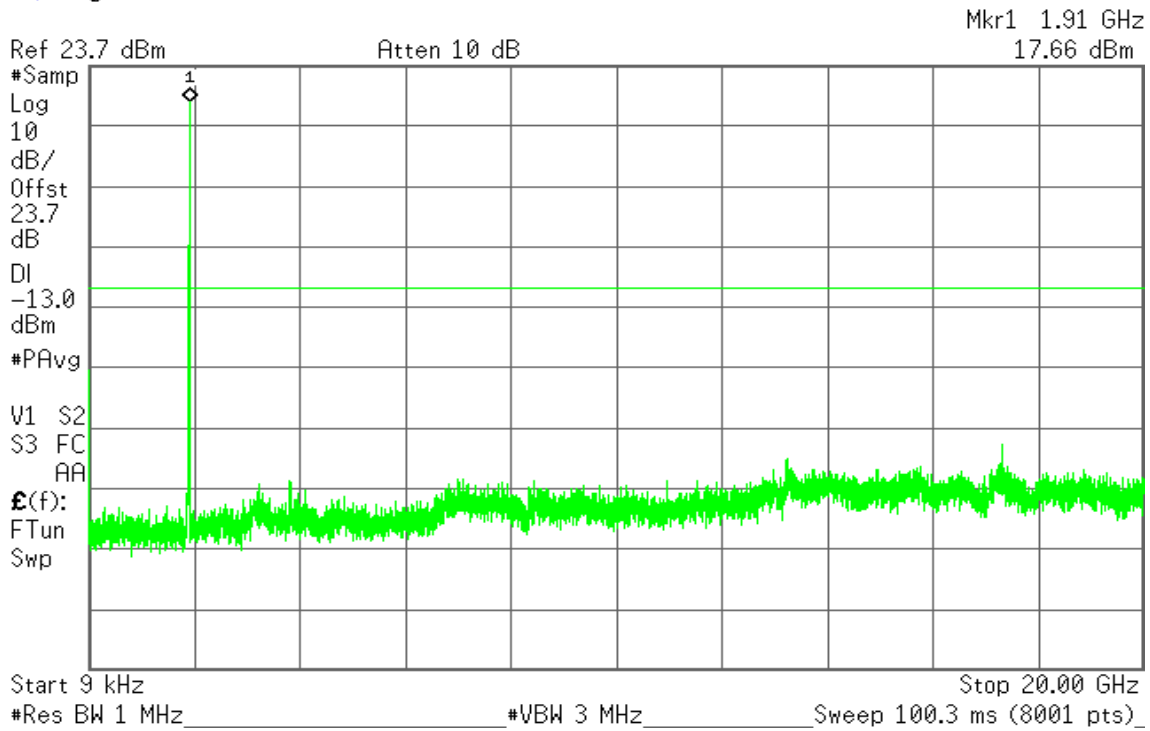


Figure 16-1: Band Edge emissions – CH Low

Agilent 22:44:32 Jul 19, 2013

R T S

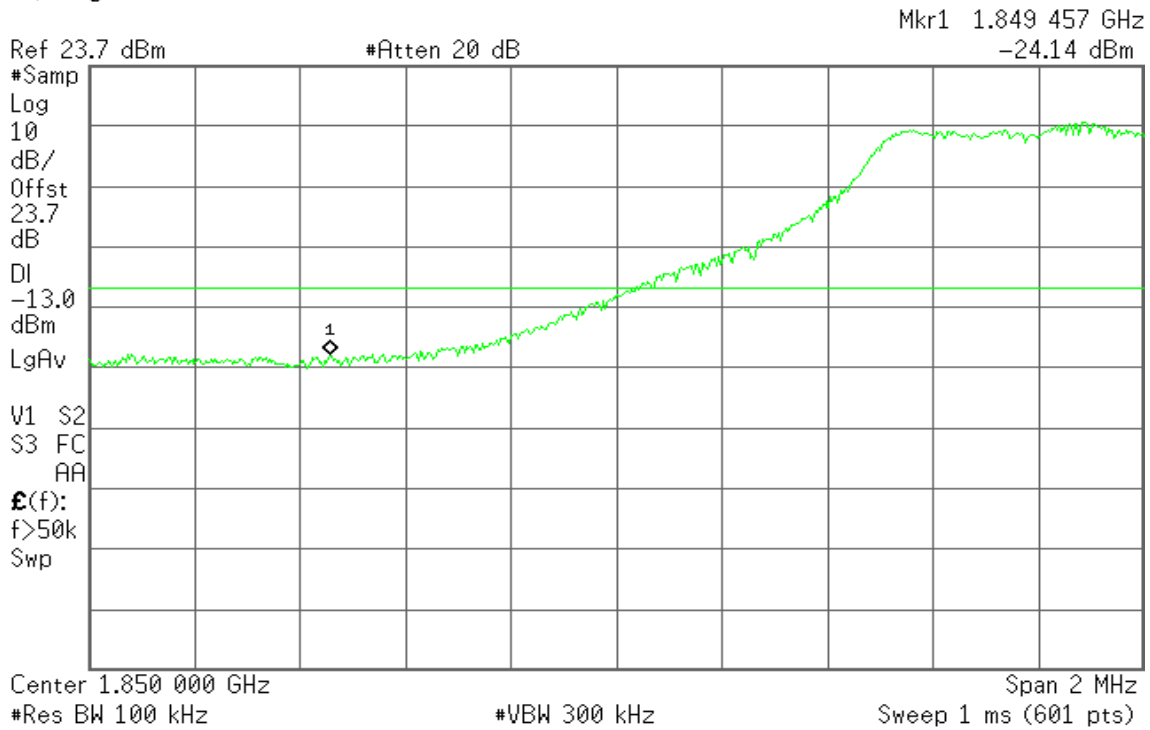




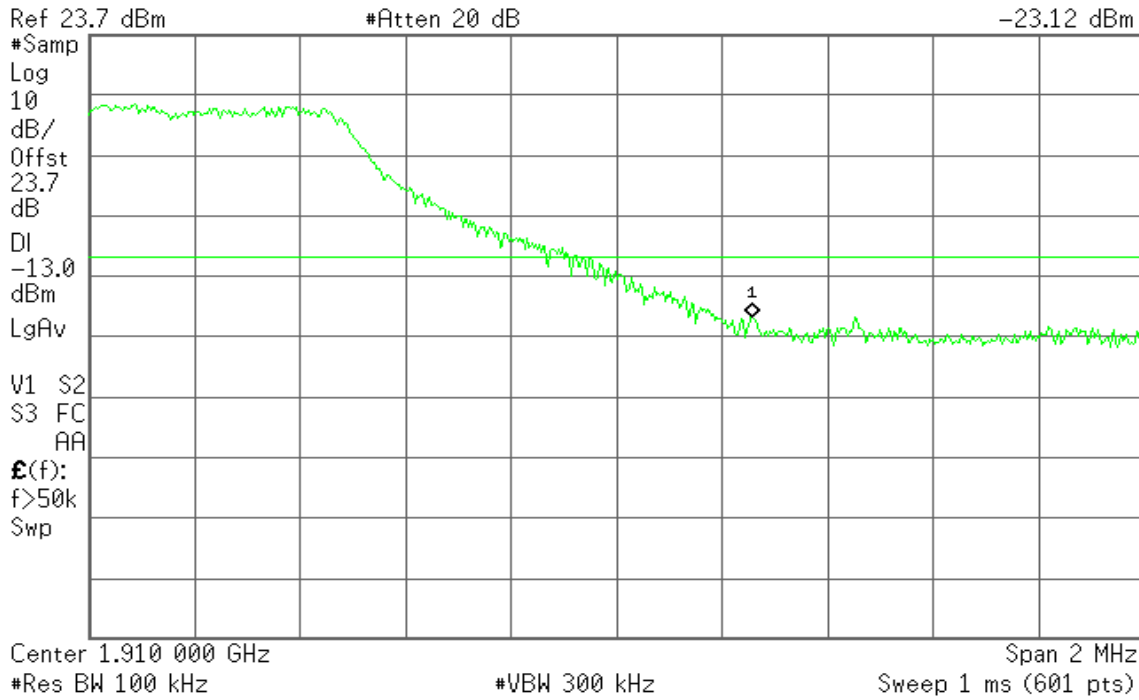
Figure 16-2: Band Edge emissions – CH High

Agilent 22:47:02 Jul 19, 2013

R T S

Mkr1 1.910 257 GHz

-23.12 dBm



LTE Band 2

Channel Bandwidth: 10MHz / 16QAM

Figure 17-1: Out of Band emission at antenna terminals – CH Low

Agilent 19:50:45 Dec 6, 2013

R T

Mkr1 1.85 GHz

19.11 dBm

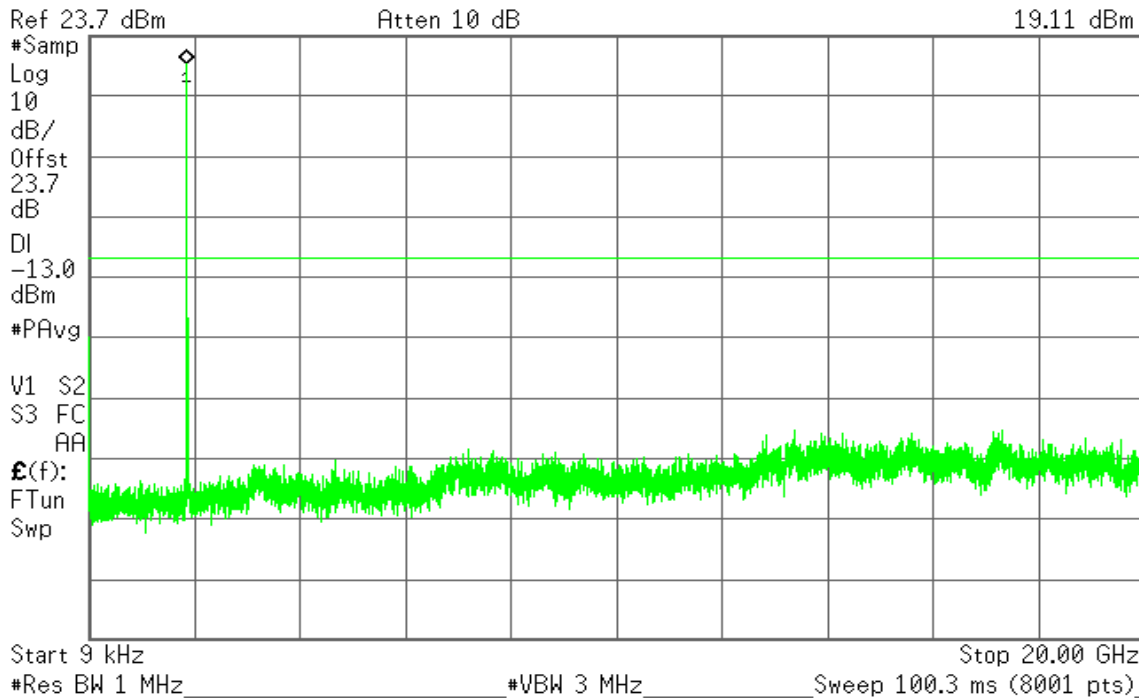




Figure 17-2: Out of Band emission at antenna terminals – CH Mid

Agilent 19:53:56 Dec 6, 2013

R T

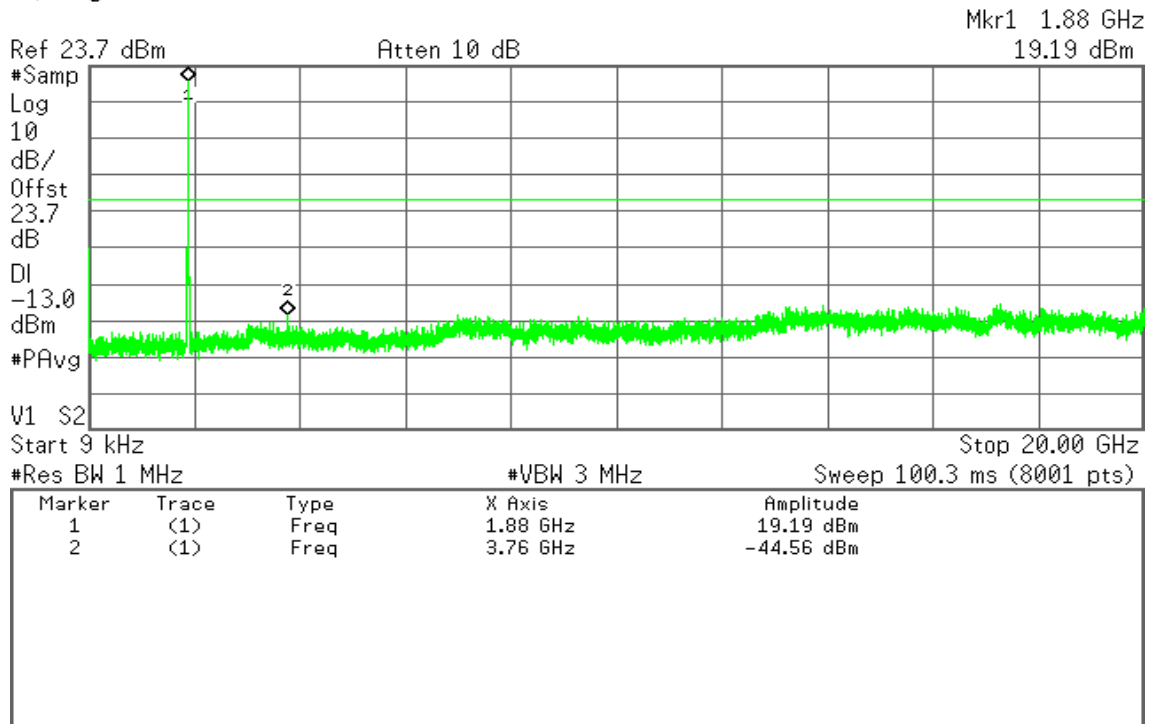


Figure 17-3: Out of Band emission at antenna terminals – CH High

Agilent 19:54:44 Dec 6, 2013

R T

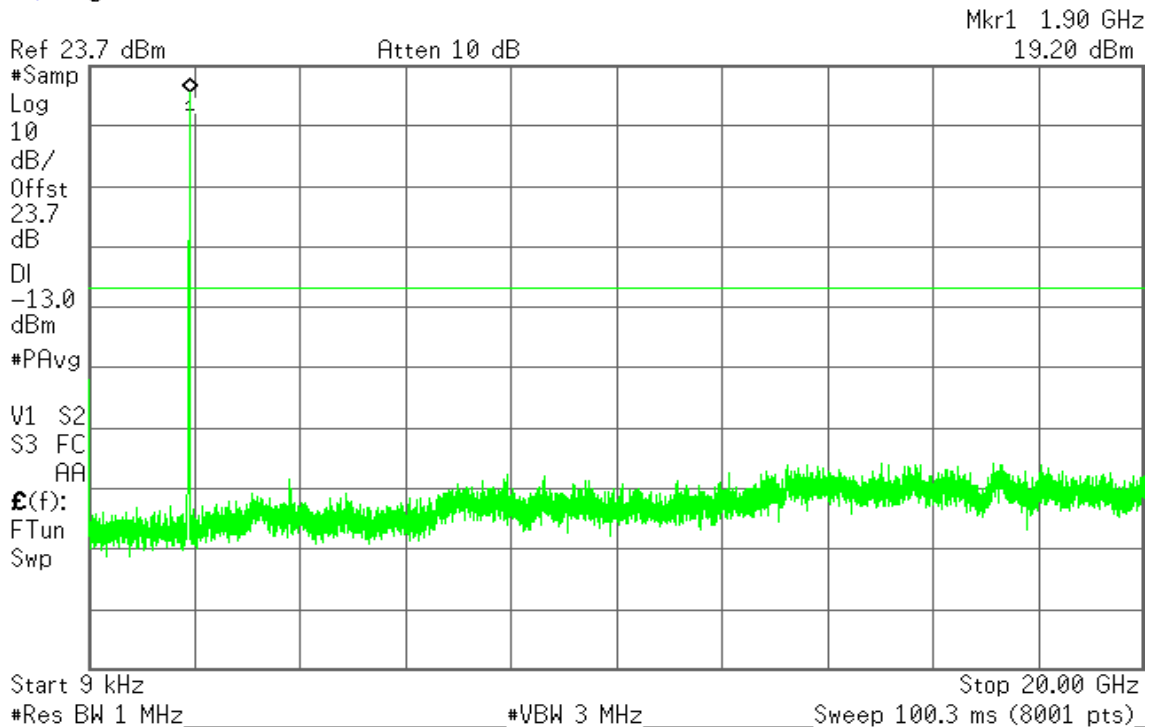




Figure 18-1: Band Edge emissions – CH Low

Agilent 22:42:42 Jul 19, 2013

R T S

Mkr1 1.849 367 GHz

-24.00 dBm

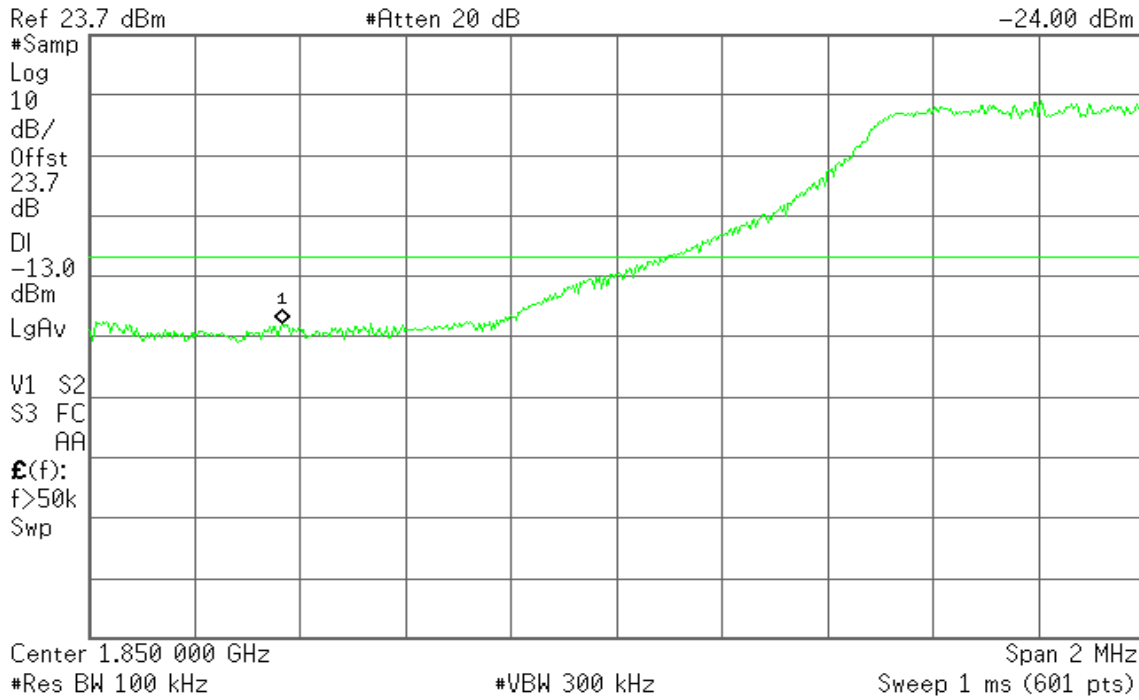


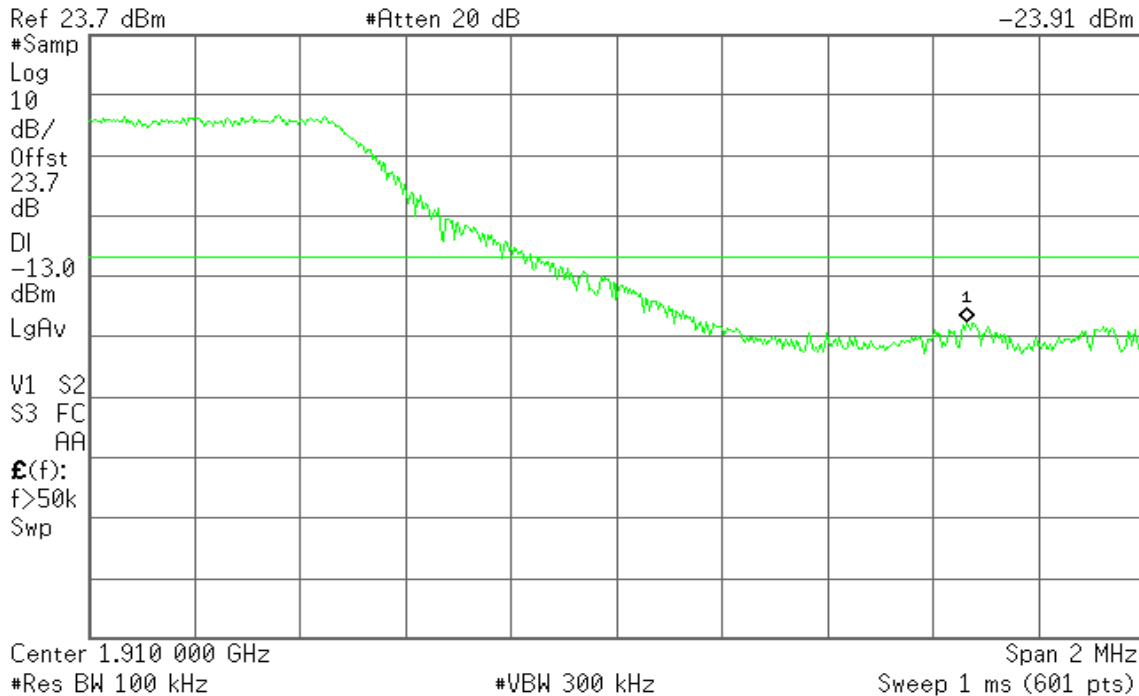
Figure 18-2: Band Edge emissions – CH High

Agilent 22:49:18 Jul 19, 2013

R T S

Mkr1 1.910 663 GHz

-23.91 dBm





LTE Band 2

Channel Bandwidth: 20MHz / QPSK

Figure 19-1: Out of Band emission at antenna terminals – CH Low

Agilent 00:01:57 Jul 19, 2013

R T

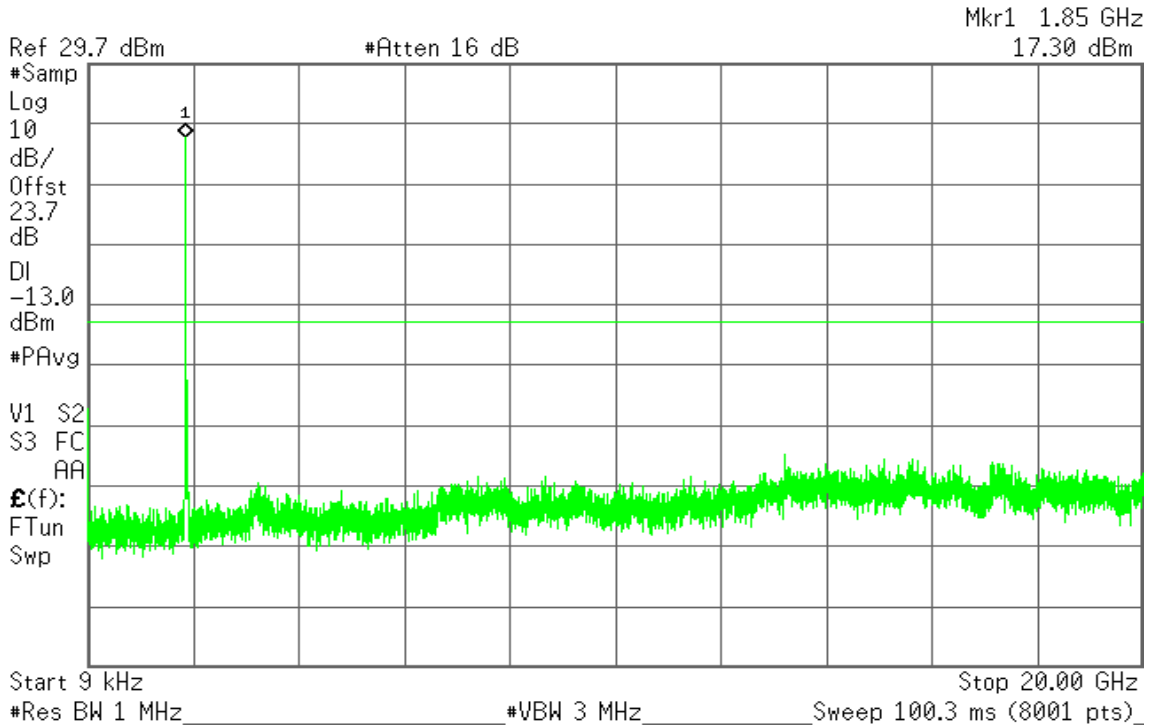


Figure 19-2: Out of Band emission at antenna terminals – CH Mid

Agilent 00:02:47 Jul 19, 2013

R T

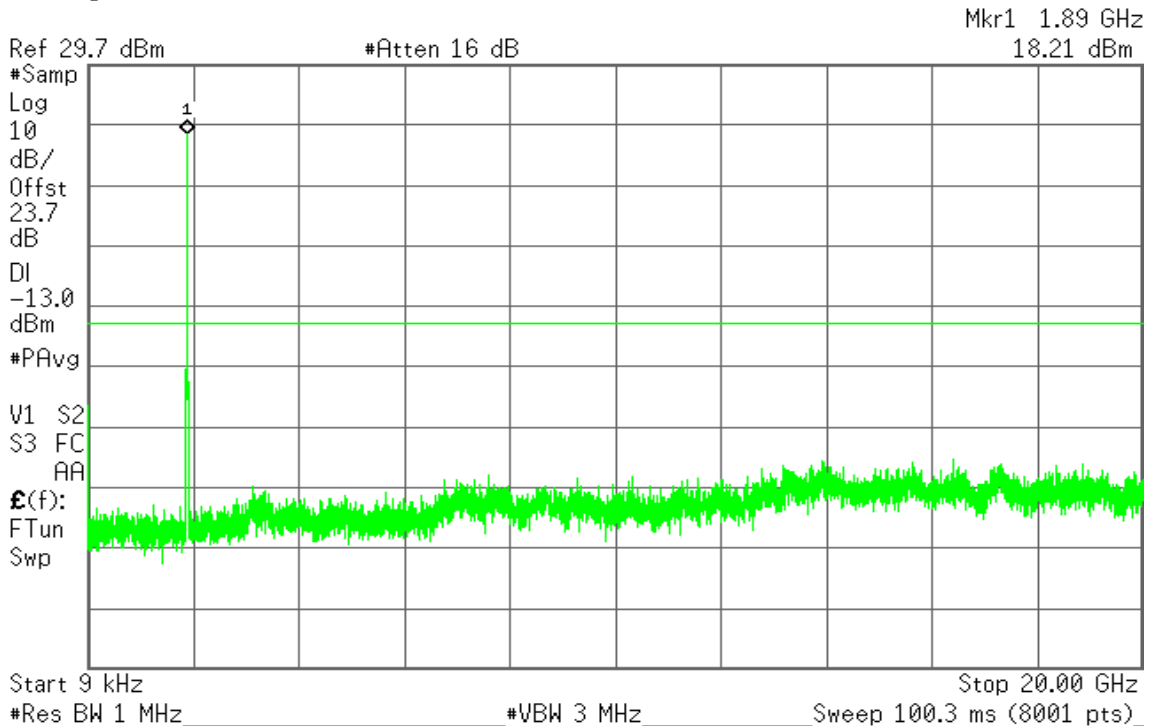




Figure 19-3: Out of Band emission at antenna terminals – CH High

Agilent 00:03:30 Jul 19, 2013

R T

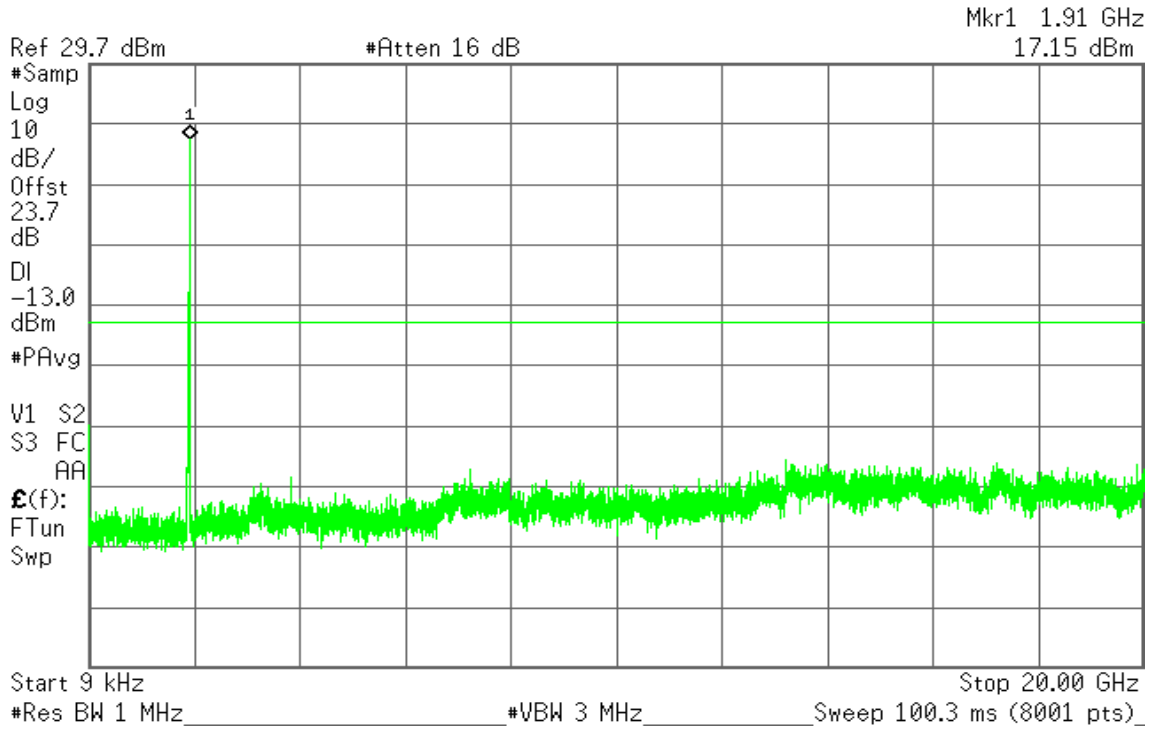


Figure 20-1: Band Edge emissions – CH Low

Agilent 22:56:46 Jul 19, 2013

R T S

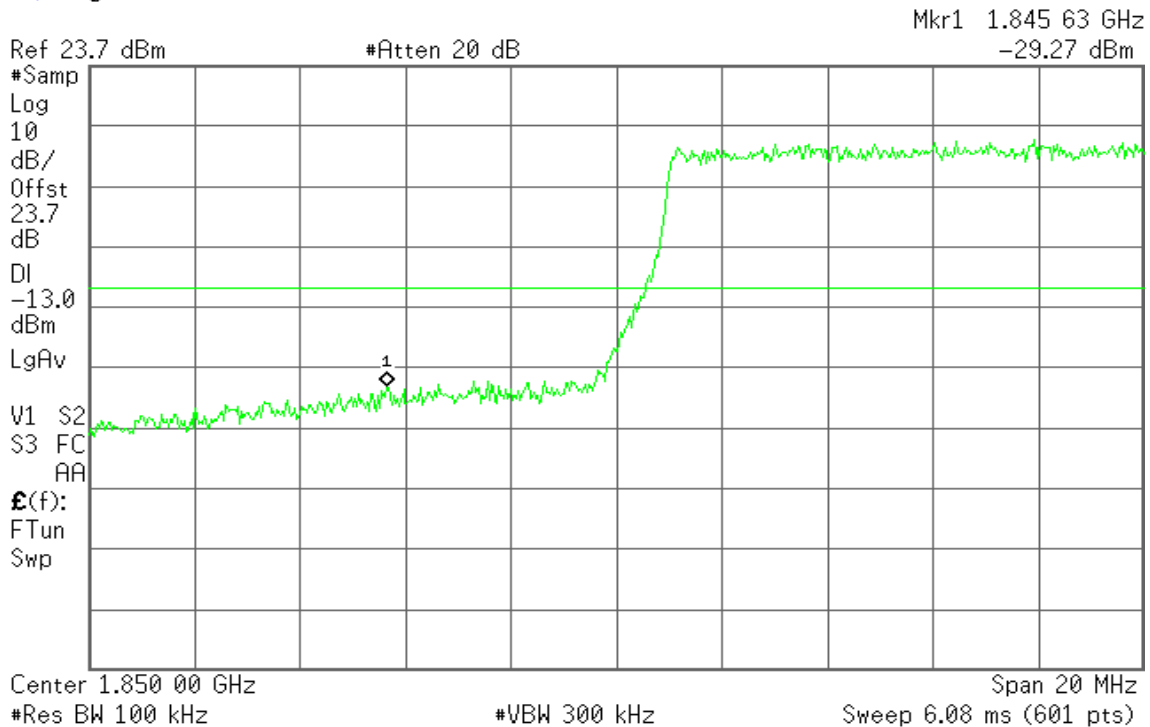




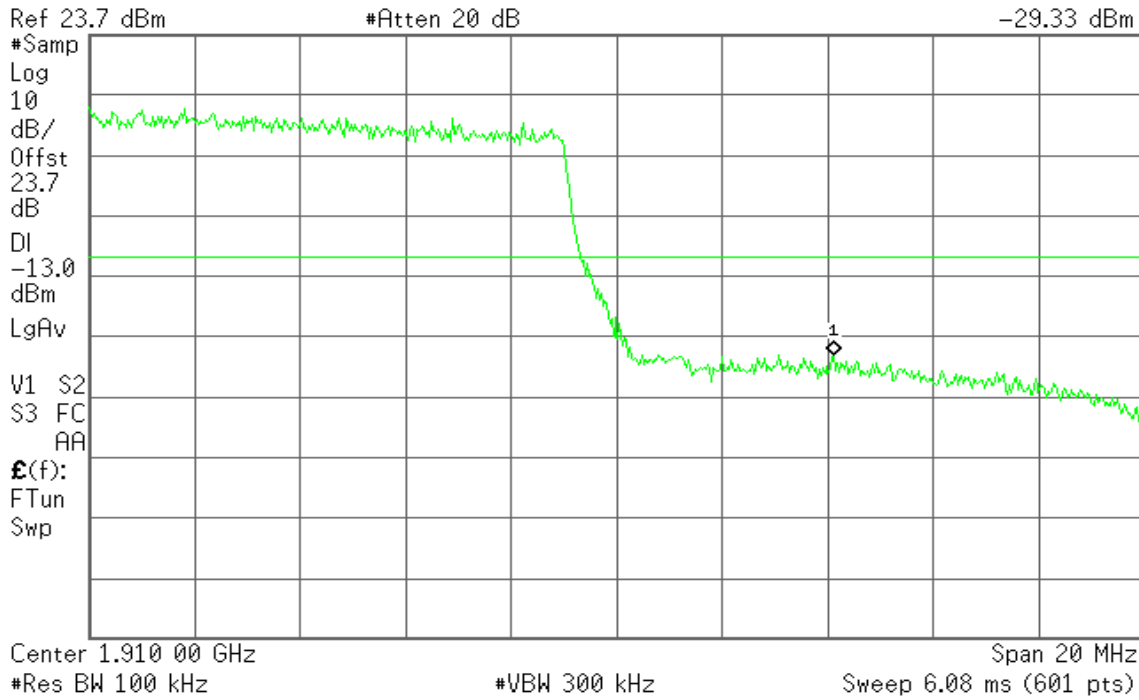
Figure 20-2: Band Edge emissions – CH High

Agilent 22:53:29 Jul 19, 2013

R T S

Mkr1 1.914 13 GHz

-29.33 dBm



LTE Band 2

Channel Bandwidth: 20MHz / 16QAM

Figure 21-1: Out of Band emission at antenna terminals – CH Low

Agilent 00:16:58 Jul 19, 2013

R T

Mkr1 1.86 GHz

17.47 dBm

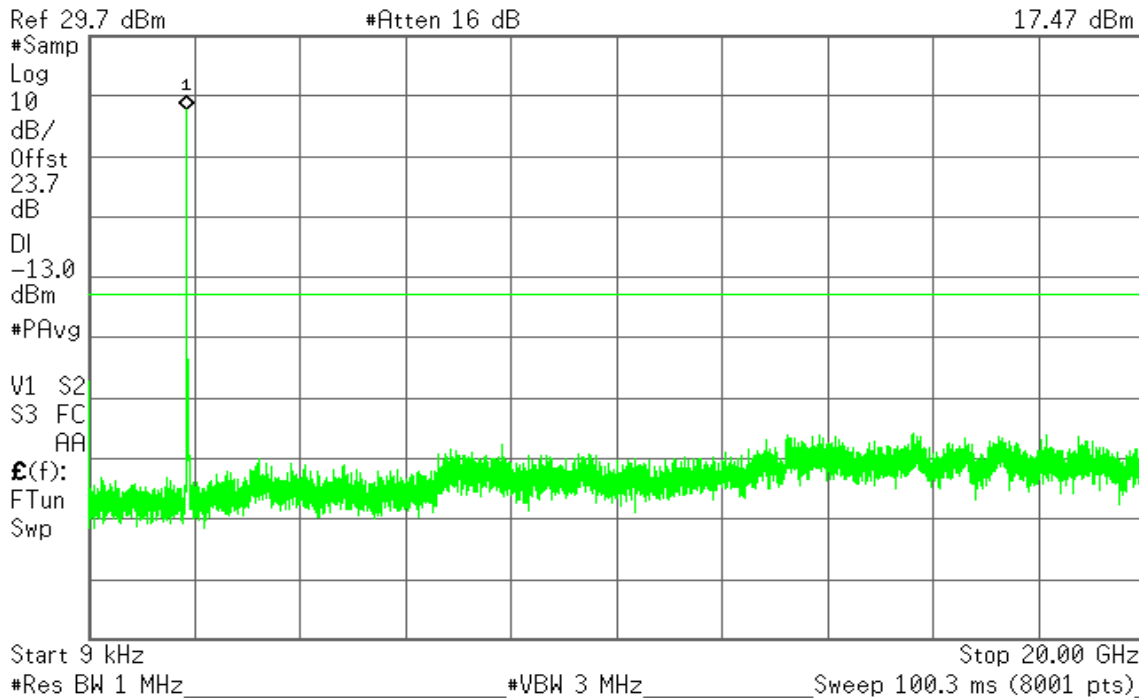




Figure 21-2: Out of Band emission at antenna terminals – CH Mid

Agilent 00:15:48 Jul 19, 2013

R T

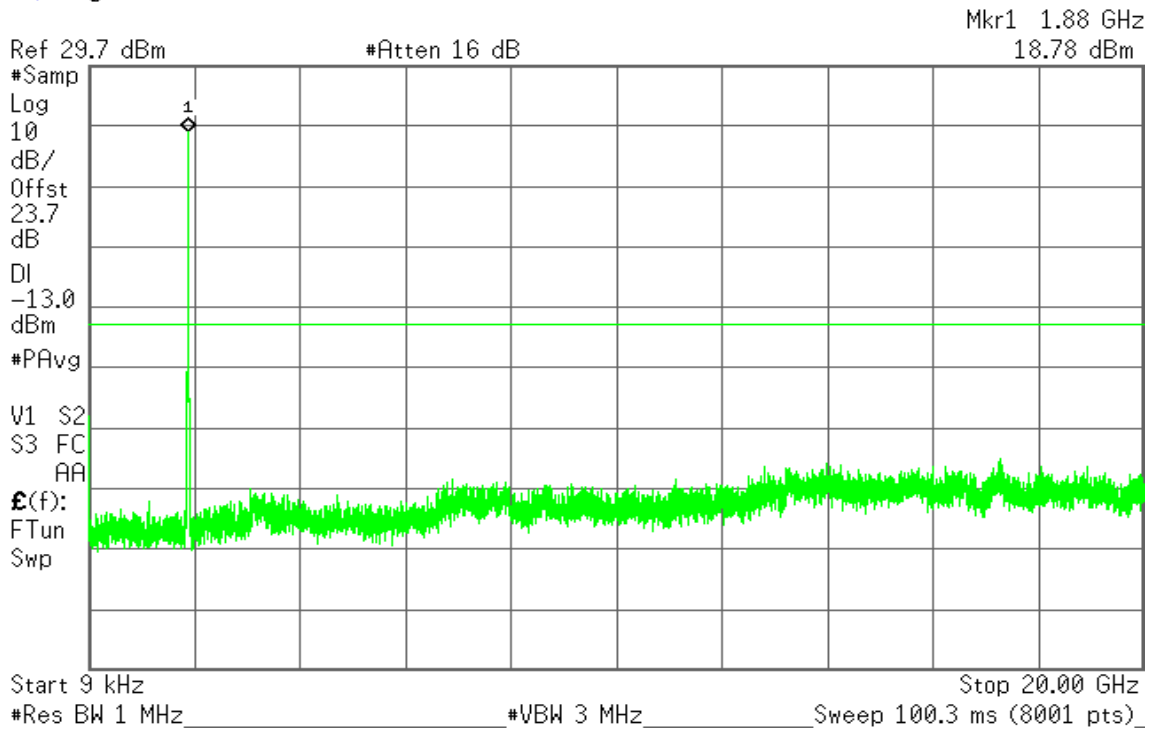


Figure 21-3: Out of Band emission at antenna terminals – CH High

Agilent 00:16:31 Jul 19, 2013

R T

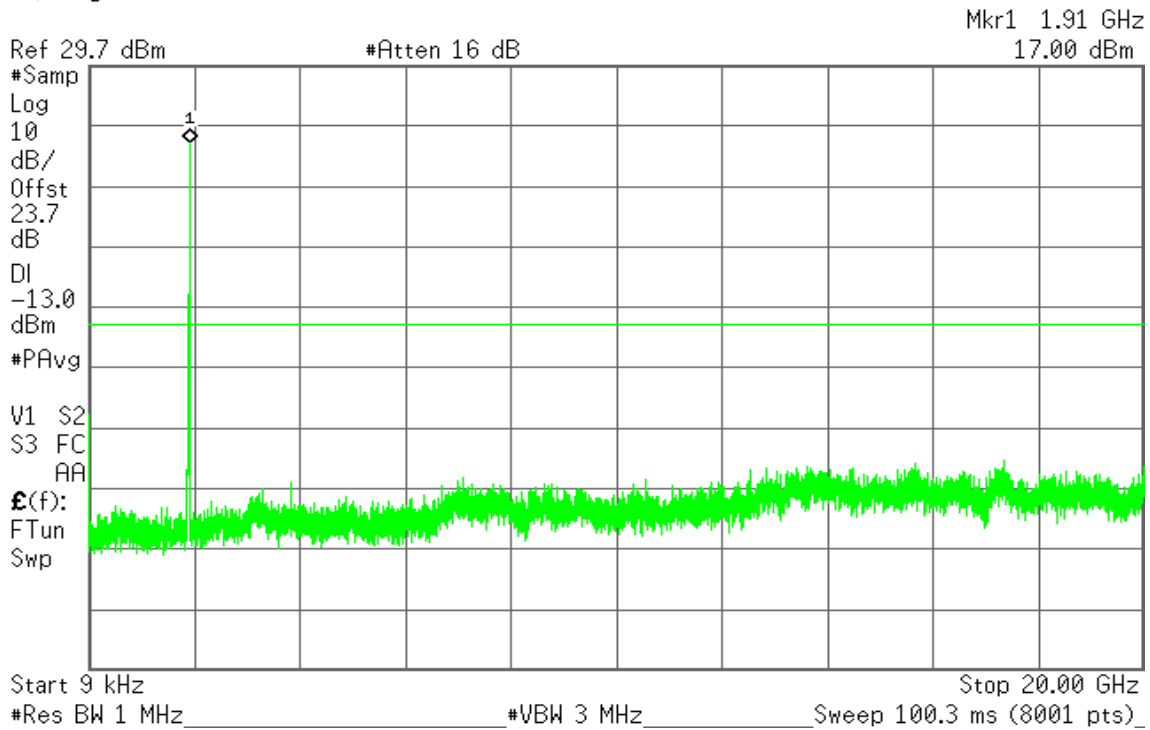




Figure 22-1: Band Edge emissions – CH Low

Agilent 22:55:47 Jul 19, 2013

R T S

Mkr1 1.846 17 GHz

-30.03 dBm

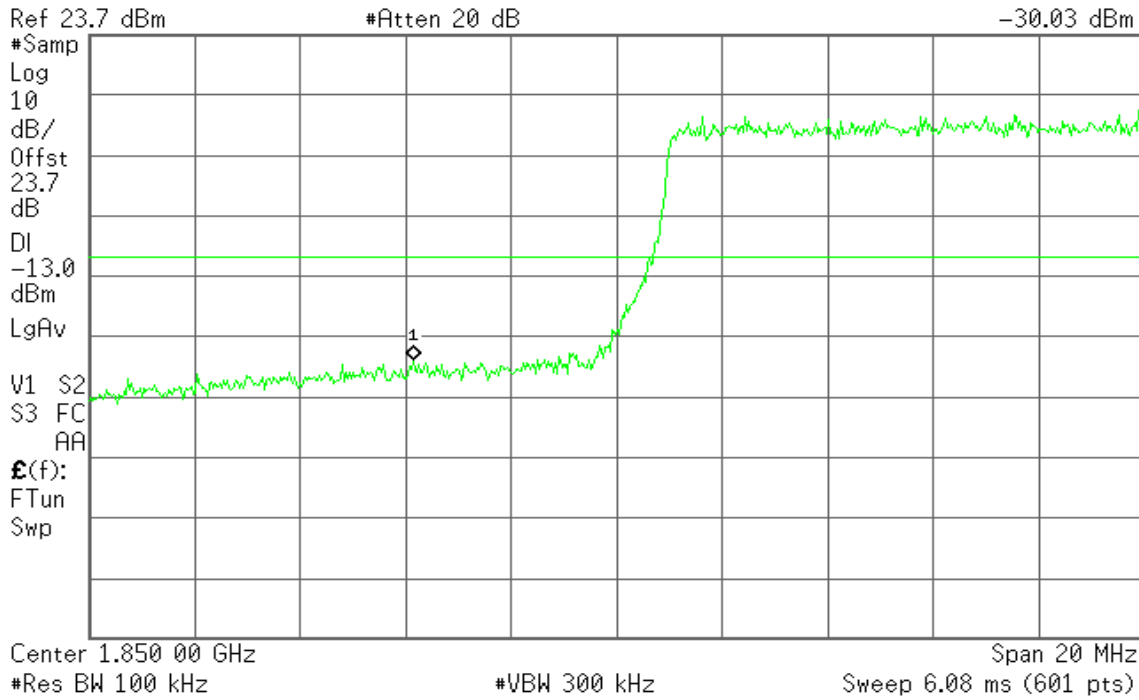


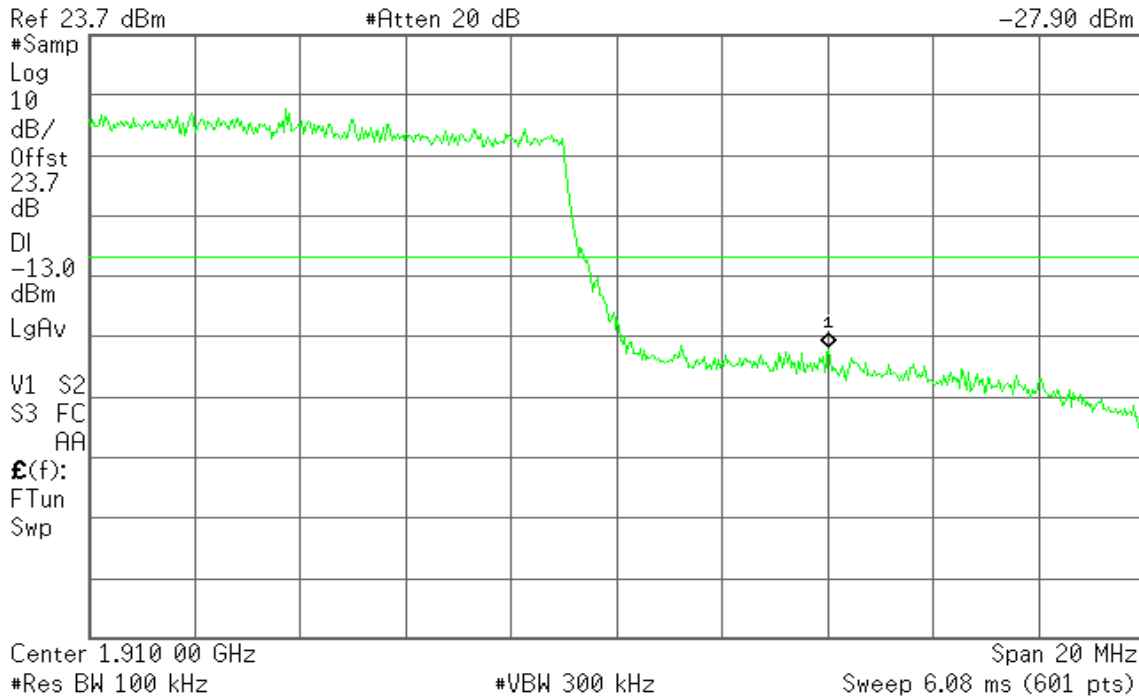
Figure 22-2: Band Edge emissions – CH High

Agilent 22:54:28 Jul 19, 2013

R T S

Mkr1 1.914 03 GHz

-27.90 dBm





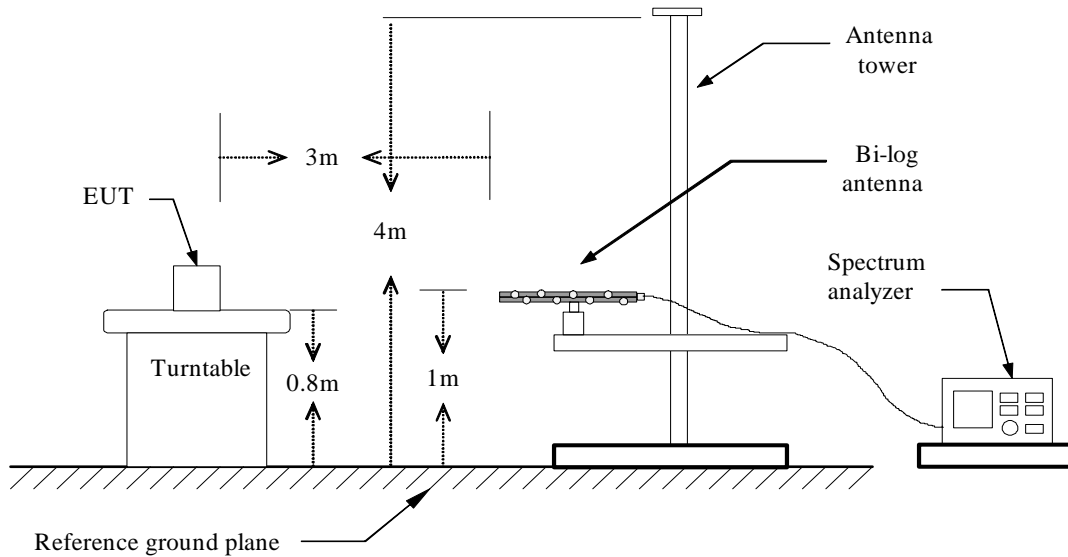
7.5 FIELD STRENGTH OF SPURIOUS RADIATION MEASUREMENT

LIMIT

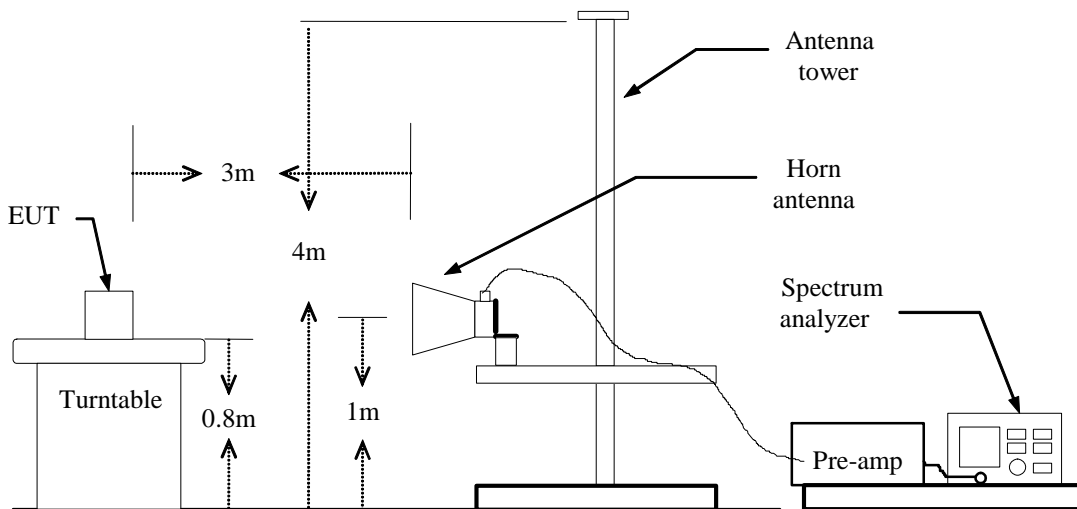
According to FCC §2.1053, RSS-132 (4.6) & RSS-133 (6.5).

Test Configuration

Below 1 GHz

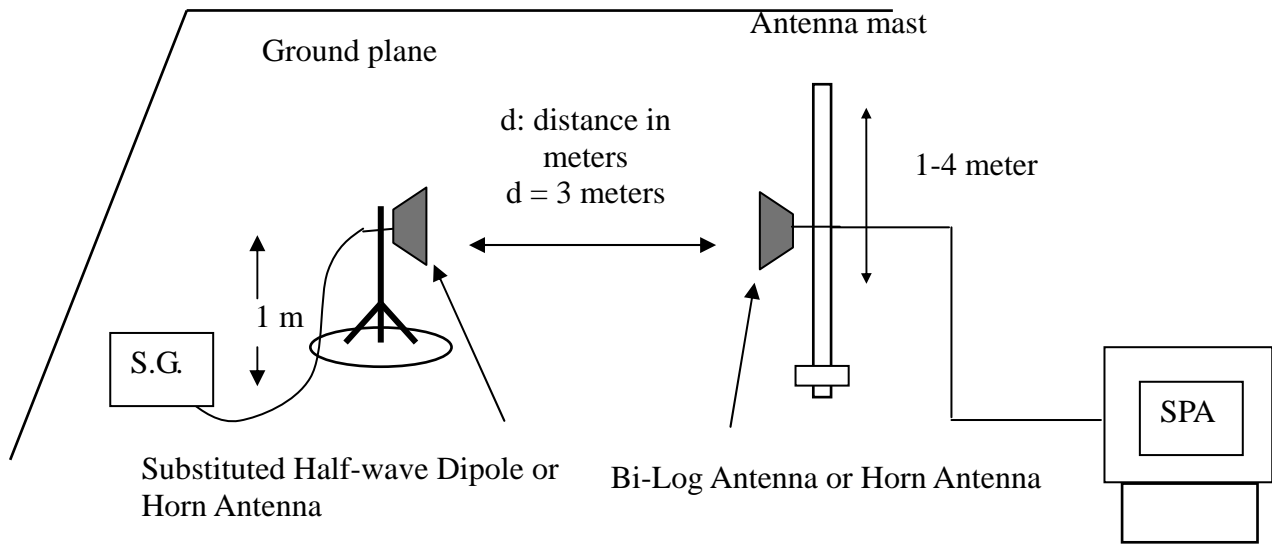


Above 1 GHz





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.



Radiated Spurious Emission Measurement Result / Below 1GHz

LTE Band 5 / channel bandwidth: 5MHz

Operation Mode: Tx / Low channel

Test Date: July 23, 2013

Temperature: 26°C

Tested by: Wayne Tasi

Humidity: 60 % 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)
71.7100	-59.39	0.97	-1.61	-61.97	-13.00	-48.97	V
150.2800	-68.82	1.43	0.71	-69.54	-13.00	-56.54	V
256.0100	-82.19	1.88	5.63	-78.44	-13.00	-65.44	V
309.3600	-81.16	2.13	5.78	-77.51	-13.00	-64.51	V
354.9500	-75.97	2.25	5.75	-72.47	-13.00	-59.47	V
448.0700	-79.58	2.58	5.74	-76.42	-13.00	-63.42	V
71.7100	-48.1	0.97	-1.61	-50.68	-13.00	-37.68	H
150.2800	-60.54	1.43	0.71	-61.26	-13.00	-48.26	H
234.6700	-74.59	1.8	5.38	-71.01	-13.00	-58.01	H
342.3400	-70.32	2.18	5.8	-66.70	-13.00	-53.70	H
415.0900	-74.45	2.45	5.86	-71.04	-13.00	-58.04	H
516.9400	-75.18	2.7	6.07	-71.81	-13.00	-58.81	H

Remark:

- 1. The emission behaviour belongs to narrowband spurious emission.*
- 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: Tx / Middle channel

Test Date: July 23, 2013

Temperature: 26°C

Tested by: Wayne Tasi

Humidity: 60 % 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)
71.7100	-59.28	0.97	-1.61	-61.86	-13.00	-48.86	V
150.2800	-68.51	1.43	0.71	-69.23	-13.00	-56.23	V
276.3800	-81.98	1.99	5.23	-78.74	-13.00	-65.74	V
354.9500	-76.26	2.25	5.75	-72.76	-13.00	-59.76	V
450.9800	-79.7	2.59	5.74	-76.55	-13.00	-63.55	V
516.9400	-80.81	2.7	6.07	-77.44	-13.00	-64.44	V
71.7100	-48.25	0.97	-1.61	-50.83	-13.00	-37.83	H
150.2800	-60.2	1.43	0.71	-60.92	-13.00	-47.92	H
234.6700	-73.02	1.8	5.38	-69.44	-13.00	-56.44	H
319.0600	-72.31	2.17	5.71	-68.77	-13.00	-55.77	H
379.2000	-70.81	2.31	5.98	-67.14	-13.00	-54.14	H
511.1200	-75.13	2.69	6.01	-71.81	-13.00	-58.81	H

Remark:

1. *The emission behaviour belongs to narrowband spurious emission.*
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: Tx / High channel

Test Date: July 23, 2013

Temperature: 26°C

Tested by: Wayne Tasi

Humidity: 60 % 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)
71.7100	-59.33	0.97	-1.61	-61.91	-13.00	-48.91	V
150.2800	-68.69	1.43	0.71	-69.41	-13.00	-56.41	V
297.7200	-81.83	2.08	5.55	-78.36	-13.00	-65.36	V
354.9500	-75.76	2.25	5.75	-72.26	-13.00	-59.26	V
448.0700	-77.81	2.58	5.74	-74.65	-13.00	-61.65	V
516.9400	-80.39	2.7	6.07	-77.02	-13.00	-64.02	V
71.7100	-48.53	0.97	-1.61	-51.11	-13.00	-38.11	H
120.2100	-57.68	1.27	-2.06	-61.01	-13.00	-48.01	H
306.4500	-72.26	2.12	5.73	-68.65	-13.00	-55.65	H
357.8600	-69.46	2.26	5.72	-66.00	-13.00	-53.00	H
499.4800	-75.41	2.7	5.89	-72.22	-13.00	-59.22	H
577.0800	-76.64	2.88	6.04	-73.48	-13.00	-60.48	H

Remark:

1. *The emission behaviour belongs to narrowband spurious emission.*
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.*



LTE Band 5 / channel bandwidth: 10MHz

Operation Mode: Tx / Low channel

Test Date: December 8, 2013

Temperature: 26°C

Tested by: David Shu

Humidity: 60 % 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)
95.9600	-59.28	1.13	0.26	-60.15	-13.00	-47.15	V
150.2800	-64.57	1.43	0.71	-65.29	-13.00	-52.29	V
222.0600	-79.68	1.77	5.34	-76.11	-13.00	-63.11	V
330.7000	-74.89	2.16	5.71	-71.34	-13.00	-58.34	V
402.4800	-74.33	2.41	5.97	-70.77	-13.00	-57.77	V
616.8500	-74.71	2.94	6.16	-71.49	-13.00	-58.49	V
95.9600	-62.98	1.13	0.26	-63.85	-13.00	-50.85	H
150.2800	-71.59	1.43	0.71	-72.31	-13.00	-59.31	H
279.2900	-81.1	2	5.29	-77.81	-13.00	-64.81	H
342.3400	-75.74	2.18	5.8	-72.12	-13.00	-59.12	H
448.0700	-78.72	2.58	5.74	-75.56	-13.00	-62.56	H
601.3300	-80.73	2.91	6.39	-77.25	-13.00	-64.25	H

Remark:

- 1. The emission behaviour belongs to narrowband spurious emission.*
- 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: Tx / Middle channel

Test Date: December 8, 2013

Temperature: 26°C

Tested by: David Shu

Humidity: 60 % 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)
95.9600	-62.83	1.13	0.26	-63.70	-13.00	-50.70	V
150.2800	-72.31	1.43	0.71	-73.03	-13.00	-60.03	V
222.0600	-82.94	1.77	5.34	-79.37	-13.00	-66.37	V
342.3400	-75.5	2.18	5.8	-71.88	-13.00	-58.88	V
497.5400	-80.17	2.69	5.87	-76.99	-13.00	-63.99	V
619.7600	-80.83	2.94	6.11	-77.66	-13.00	-64.66	V
95.9600	-58.81	1.13	0.26	-59.68	-13.00	-46.68	H
150.2800	-64.8	1.43	0.71	-65.52	-13.00	-52.52	H
191.9900	-76.94	1.62	3.79	-74.77	-13.00	-61.77	H
390.8400	-73.73	2.32	6	-70.05	-13.00	-57.05	H
468.4400	-76.4	2.62	5.8	-73.22	-13.00	-60.22	H
616.8500	-75.32	2.94	6.16	-72.10	-13.00	-59.10	H

Remark:

1. *The emission behaviour belongs to narrowband spurious emission.*
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: Tx / High channel

Test Date: December 8, 2013

Temperature: 26°C

Tested by: David Shu

Humidity: 60 % 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)
95.9600	-62.96	1.13	0.26	-63.83	-13.00	-50.83	V
222.0600	-81.1	1.77	5.34	-77.53	-13.00	-64.53	V
342.3400	-76.12	2.18	5.8	-72.50	-13.00	-59.50	V
402.4800	-80.25	2.41	5.97	-76.69	-13.00	-63.69	V
448.0700	-79.9	2.58	5.74	-76.74	-13.00	-63.74	V
601.3300	-81.39	2.91	6.39	-77.91	-13.00	-64.91	V
101.7800	-59.06	1.16	-0.64	-60.86	-13.00	-47.86	H
150.2800	-64.21	1.43	0.71	-64.93	-13.00	-51.93	H
342.3400	-75.28	2.18	5.8	-71.66	-13.00	-58.66	H
402.4800	-73.46	2.41	5.97	-69.90	-13.00	-56.90	H
516.9400	-77.77	2.7	6.07	-74.40	-13.00	-61.40	H
649.8300	-75.19	3.03	6.28	-71.94	-13.00	-58.94	H

Remark:

1. *The emission behaviour belongs to narrowband spurious emission.*
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.*



LTE Band 2 / channel bandwidth: 5MHz

Operation Mode: GSM 1900 / TX / CH 512

Temperature: 26°C

Humidity: 60 % RH

Test Date: July 23, 2013

Tested by: Wayne Tasi

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)
71.7100	-59.79	0.97	-1.61	-62.37	-13.00	-49.37	V
150.2800	-69.07	1.43	0.71	-69.79	-13.00	-56.79	V
306.4500	-80.27	2.12	5.73	-76.66	-13.00	-63.66	V
352.0400	-75.77	2.24	5.78	-72.23	-13.00	-59.23	V
450.9800	-78.91	2.59	5.74	-75.76	-13.00	-62.76	V
781.7500	-75.77	3.31	6.13	-72.95	-13.00	-59.95	V
71.7100	-48.65	0.97	-1.61	-51.23	-13.00	-38.23	H
120.2100	-56.23	1.27	-2.06	-59.56	-13.00	-46.56	H
153.1900	-62	1.44	0.94	-62.50	-13.00	-49.50	H
234.6700	-73.74	1.8	5.38	-70.16	-13.00	-57.16	H
330.7000	-72.11	2.16	5.71	-68.56	-13.00	-55.56	H
369.5000	-71.42	2.3	5.8	-67.92	-13.00	-54.92	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: Tx / Middle channel

Test Date: July 23, 2013

Temperature: 26°C

Tested by: Wayne Tasi

Humidity: 60 % 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)
71.7100	-59.8	0.97	-1.61	-62.38	-13.00	-49.38	V
150.2800	-68.82	1.43	0.71	-69.54	-13.00	-56.54	V
252.1300	-81.84	1.85	5.68	-78.01	-13.00	-65.01	V
354.9500	-75.81	2.25	5.75	-72.31	-13.00	-59.31	V
456.8000	-78.99	2.6	5.84	-75.75	-13.00	-62.75	V
781.7500	-74.06	3.31	6.13	-71.24	-13.00	-58.24	V
71.7100	-48.84	0.97	-1.61	-51.42	-13.00	-38.42	H
150.2800	-61	1.43	0.71	-61.72	-13.00	-48.72	H
309.3600	-71.75	2.13	5.78	-68.10	-13.00	-55.10	H
369.5000	-71.63	2.3	5.8	-68.13	-13.00	-55.13	H
505.3000	-75.15	2.69	5.95	-71.89	-13.00	-58.89	H
685.7200	-75.05	3.11	6.5	-71.66	-13.00	-58.66	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: Tx / High channel

Test Date: July 23, 2013

Temperature: 26°C

Tested by: Wayne Tasi

Humidity: 60 % 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)
71.7100	-60.25	0.97	-1.61	-62.83	-13.00	-49.83	V
150.2800	-68.78	1.43	0.71	-69.50	-13.00	-56.50	V
309.3600	-79.84	2.13	5.78	-76.19	-13.00	-63.19	V
354.9500	-75.61	2.25	5.75	-72.11	-13.00	-59.11	V
450.9800	-79.13	2.59	5.74	-75.98	-13.00	-62.98	V
781.7500	-75.48	3.31	6.13	-72.66	-13.00	-59.66	V
71.7100	-48.99	0.97	-1.61	-51.57	-13.00	-38.57	H
150.2800	-60.86	1.43	0.71	-61.58	-13.00	-48.58	H
207.5100	-73	1.67	4.95	-69.72	-13.00	-56.72	H
321.9700	-71.19	2.18	5.7	-67.67	-13.00	-54.67	H
369.5000	-70.93	2.3	5.8	-67.43	-13.00	-54.43	H
505.3000	-74.77	2.69	5.95	-71.51	-13.00	-58.51	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.*



LTE Band 2 / channel bandwidth: 10MHz

Operation Mode: Tx / Low channel

Test Date: December 6, 2013

Temperature: 26°C

Tested by: David Shu

Humidity: 60 % 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)
95.9600	-63.53	1.13	0.26	-64.40	-13.00	-51.40	V
222.0600	-81.82	1.77	5.34	-78.25	-13.00	-65.25	V
342.3400	-76.62	2.18	5.8	-73.00	-13.00	-60.00	V
448.0700	-80.16	2.58	5.74	-77.00	-13.00	-64.00	V
733.2500	-76.86	3.19	6.31	-73.74	-13.00	-60.74	V
871.9600	-75.1	3.45	6.55	-72.00	-13.00	-59.00	V
95.9600	-58.92	1.13	0.26	-59.79	-13.00	-46.79	H
150.2800	-64.54	1.43	0.71	-65.26	-13.00	-52.26	H
390.8400	-74.04	2.32	6	-70.36	-13.00	-57.36	H
448.0700	-77.01	2.58	5.74	-73.85	-13.00	-60.85	H
683.7800	-69.94	3.11	6.5	-66.55	-13.00	-53.55	H
960.2300	-70.68	3.67	6.39	-67.96	-13.00	-54.96	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: Tx / Middle channel

Test Date: December 6, 2013

Temperature: 26°C

Tested by: David Shu

Humidity: 60 % 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)
95.9600	-63.63	1.13	0.26	-64.50	-13.00	-51.50	V
150.2800	-72.58	1.43	0.71	-73.30	-13.00	-60.30	V
222.0600	-80.21	1.77	5.34	-76.64	-13.00	-63.64	V
345.2500	-76.2	2.2	5.8	-72.60	-13.00	-59.60	V
721.6100	-78.18	3.17	6.49	-74.86	-13.00	-61.86	V
838.0100	-74.05	3.41	6.38	-71.08	-13.00	-58.08	V
95.9600	-58.88	1.13	0.26	-59.75	-13.00	-46.75	H
120.2100	-59	1.27	-2.06	-62.33	-13.00	-49.33	H
150.2800	-64.13	1.43	0.71	-64.85	-13.00	-51.85	H
345.2500	-74.25	2.2	5.8	-70.65	-13.00	-57.65	H
469.4100	-76.17	2.62	5.79	-73.00	-13.00	-60.00	H
683.7800	-69.85	3.11	6.5	-66.46	-13.00	-53.46	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: Tx / High channel

Test Date: December 6, 2013

Temperature: 26°C

Tested by: David Shu

Humidity: 60 % 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)
95.9600	-63.52	1.13	0.26	-64.39	-13.00	-51.39	V
150.2800	-72.98	1.43	0.71	-73.70	-13.00	-60.70	V
222.0600	-80.9	1.77	5.34	-77.33	-13.00	-64.33	V
342.3400	-75.99	2.18	5.8	-72.37	-13.00	-59.37	V
649.8300	-80.62	3.03	6.28	-77.37	-13.00	-64.37	V
733.2500	-75.88	3.19	6.31	-72.76	-13.00	-59.76	V
101.7800	-58.44	1.16	-0.64	-60.24	-13.00	-47.24	H
153.1900	-66.57	1.44	0.94	-67.07	-13.00	-54.07	H
342.3400	-73.38	2.18	5.8	-69.76	-13.00	-56.76	H
511.1200	-77.54	2.69	6.01	-74.22	-13.00	-61.22	H
683.7800	-69.22	3.11	6.5	-65.83	-13.00	-52.83	H
842.8600	-74.25	3.41	6.4	-71.26	-13.00	-58.26	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.*



LTE Band 2 / channel bandwidth: 20MHz

Operation Mode: Tx / Low channel

Test Date: July 23, 2013

Temperature: 26°C

Tested by: Wayne Tasi

Humidity: 60 % 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)
71.7100	-60.01	0.97	-1.61	-62.59	-13.00	-49.59	V
150.2800	-68.85	1.43	0.71	-69.57	-13.00	-56.57	V
261.8300	-81.22	1.92	5.51	-77.63	-13.00	-64.63	V
354.9500	-75.62	2.25	5.75	-72.12	-13.00	-59.12	V
448.0700	-79.21	2.58	5.74	-76.05	-13.00	-63.05	V
605.2100	-82.47	2.92	6.35	-79.04	-13.00	-66.04	V
71.7100	-48.91	0.97	-1.61	-51.49	-13.00	-38.49	H
150.2800	-60.16	1.43	0.71	-60.88	-13.00	-47.88	H
234.6700	-75.14	1.8	5.38	-71.56	-13.00	-58.56	H
369.5000	-71.67	2.3	5.8	-68.17	-13.00	-55.17	H
511.1200	-75.48	2.69	6.01	-72.16	-13.00	-59.16	H
745.8600	-74.3	3.2	6.1	-71.40	-13.00	-58.40	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: Tx / Middle channel

Test Date: July 23, 2013

Temperature: 26°C

Tested by: Wayne Tasi

Humidity: 60 % 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)
71.7100	-60.04	0.97	-1.61	-62.62	-13.00	-49.62	V
150.2800	-69.22	1.43	0.71	-69.94	-13.00	-56.94	V
256.0100	-82.77	1.88	5.63	-79.02	-13.00	-66.02	V
354.9500	-76.06	2.25	5.75	-72.56	-13.00	-59.56	V
448.0700	-78.57	2.58	5.74	-75.41	-13.00	-62.41	V
516.9400	-80.6	2.7	6.07	-77.23	-13.00	-64.23	V
71.7100	-49.26	0.97	-1.61	-51.84	-13.00	-38.84	H
150.2800	-59.86	1.43	0.71	-60.58	-13.00	-47.58	H
267.6500	-74.73	1.96	5.22	-71.47	-13.00	-58.47	H
369.5000	-70.44	2.3	5.8	-66.94	-13.00	-53.94	H
529.5500	-74.28	2.75	6	-71.03	-13.00	-58.03	H
685.7200	-75.84	3.11	6.5	-72.45	-13.00	-59.45	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: Tx / High channel

Test Date: July 23, 2013

Temperature: 26°C

Tested by: Wayne Tasi

Humidity: 60 % 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)
71.7100	-60.35	0.97	-1.61	-62.93	-13.00	-49.93	V
150.2800	-69.06	1.43	0.71	-69.78	-13.00	-56.78	V
234.6700	-82.15	1.8	5.38	-78.57	-13.00	-65.57	V
354.9500	-76.77	2.25	5.75	-73.27	-13.00	-60.27	V
450.9800	-78.03	2.59	5.74	-74.88	-13.00	-61.88	V
598.4200	-80.99	2.9	6.37	-77.52	-13.00	-64.52	V
71.7100	-48.48	0.97	-1.61	-51.06	-13.00	-38.06	H
150.2800	-60.25	1.43	0.71	-60.97	-13.00	-47.97	H
234.6700	-73.74	1.8	5.38	-70.16	-13.00	-57.16	H
382.1100	-70.81	2.31	5.99	-67.13	-13.00	-54.13	H
499.4800	-74.58	2.7	5.89	-71.39	-13.00	-58.39	H
589.6900	-75.96	2.89	6.19	-72.66	-13.00	-59.66	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

LTE Band 5 / channel bandwidth: 5MHz

Operation Mode: Tx / Low channel

Test Date: July 23, 2013

Temperature: 26°C

Tested by: Wayne Tasi

Humidity: 60 % 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)
1749.000	-45.51	5.2	5.85	-44.86	-13.00	-31.86	V
3856.000	-55.49	8.33	9.26	-54.56	-13.00	-41.56	V
N/A							
1658.000	-49.29	5.06	6.02	-48.33	-13.00	-35.33	H
3898.000	-54.63	8.39	9.3	-53.72	-13.00	-40.72	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: Tx / Middle channel

Test Date: July 23, 2013

Temperature: 26°C

Tested by: Wayne Tasi

Humidity: 60 % 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)
1749.000	-42.99	5.2	5.85	-42.34	-13.00	-29.34	V
3884.000	-55.29	8.37	9.28	-54.38	-13.00	-41.38	V
N/A							
1672.000	-48.67	5.07	5.99	-47.75	-13.00	-34.75	H
3338.000	-56.03	7.5	8.41	-55.12	-13.00	-42.12	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: Tx / High channel

Test Date: July 23, 2013

Temperature: 26°C

Tested by: Wayne Tasi

Humidity: 60 % 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)
2211.000	-58.51	5.96	5.7	-58.77	-13.00	-45.77	V
3107.000	-56.44	7.18	7.72	-55.90	-13.00	-42.90	V
N/A							
1686.000	-46.68	5.09	5.97	-45.80	-13.00	-32.80	H
3107.000	-56.57	7.18	7.72	-56.03	-13.00	-43.03	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.



LTE Band 5 / channel bandwidth: 10MHz

Operation Mode: GPRS 850 / TX / CH 128

Temperature: 26°C

Humidity: 60 % RH

Test Date: December 8, 2013

Tested by: David Shu

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)
2498.000	-52.08	6.35	6.1	-52.33	-13.00	-39.33	V
3317.000	-45.07	7.48	8.35	-44.20	-13.00	-31.20	V
4990.000	-50.44	9.39	10.58	-49.25	-13.00	-36.25	V
N/A							
2484.000	-52.58	6.32	6.08	-52.82	-13.00	-39.82	H
3317.000	-49.31	7.48	8.35	-48.44	-13.00	-35.44	H
5501.000	-51.57	9.94	10.8	-50.71	-13.00	-37.71	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: Tx / Middle channel

Test Date: December 8, 2013

Temperature: 26°C

Tested by: David Shu

Humidity: 60 % 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)
2498.000	-51.28	6.35	6.1	-51.53	-13.00	-38.53	V
3345.000	-45.81	7.51	8.44	-44.88	-13.00	-31.88	V
4997.000	-49.96	9.41	10.6	-48.77	-13.00	-35.77	V
N/A							
2505.000	-54.49	6.36	6.11	-54.74	-13.00	-41.74	H
3345.000	-50.1	7.51	8.44	-49.17	-13.00	-36.17	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: Tx / High channel

Test Date: December 8, 2013

Temperature: 26°C

Tested by: David Shu

Humidity: 60 % 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)
2533.000	-51.86	6.4	6.19	-52.07	-13.00	-39.07	V
3373.000	-45.58	7.54	8.52	-44.60	-13.00	-31.60	V
4990.000	-49.99	9.39	10.58	-48.80	-13.00	-35.80	V
N/A							
2533.000	-54.06	6.4	6.19	-54.27	-13.00	-41.27	H
3373.000	-50.3	7.54	8.52	-49.32	-13.00	-36.32	H
4752.000	-52.27	9.23	10.2	-51.30	-13.00	-38.30	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.



LTE Band 2 / channel bandwidth: 5MHz

Operation Mode: Tx / Low channel

Test Date: July 23, 2013

Temperature: 26°C

Tested by: Wayne Tasi

Humidity: 60 % 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)
3709.000	-53.39	8.21	9.11	-52.49	-13.00	-39.49	V
6215.000	-51.84	11.15	11.07	-51.92	-13.00	-38.92	V
N/A							
3709.000	-44.2	8.21	9.11	-43.30	-13.00	-30.30	H
5564.000	-47.46	10.1	10.81	-46.75	-13.00	-33.75	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: Tx / Middle channel

Test Date: July 23, 2013

Temperature: 26°C

Tested by: Wayne Tasi

Humidity: 60 % 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)
3758.000	-52.49	8.23	9.16	-51.56	-13.00	-38.56	V
5074.000	-54.86	9.44	10.63	-53.67	-13.00	-40.67	V
N/A							
3758.000	-34.59	8.23	9.16	-33.66	-13.00	-20.66	H
5641.000	-49.74	10.18	10.83	-49.09	-13.00	-36.09	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: Tx / High channel

Test Date: July 23, 2013

Temperature: 26°C

Tested by: Wayne Tasi

Humidity: 60 % 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)
3807.000	-53.38	8.27	9.21	-52.44	-13.00	-39.44	V
5662.000	-53.76	10.17	10.83	-53.10	-13.00	-40.10	V
N/A							
3814.000	-38.3	8.28	9.21	-37.37	-13.00	-24.37	H
5718.000	-48.79	10.21	10.84	-48.16	-13.00	-35.16	H
N/A							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.



LTE Band 2 / channel bandwidth: 10MHz

Operation Mode: Tx / Low channel

Test Date: December 6, 2013

Temperature: 26°C

Tested by: David Shu

Humidity: 60 % 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)
2498.000	-50.81	6.35	6.1	-51.06	-13.00	-38.06	V
3709.000	-48.25	8.21	9.11	-47.35	-13.00	-34.35	V
4976.000	-49.71	9.37	10.56	-48.52	-13.00	-35.52	V
N/A							
3709.000	-51.22	8.21	9.11	-50.32	-13.00	-37.32	H
4661.000	-53.6	9.13	10.06	-52.67	-13.00	-39.67	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: Tx / Middle channel

Test Date: December 6, 2013

Temperature: 26°C

Tested by: David Shu

Humidity: 60 % 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)
2498.000	-52.42	6.35	6.1	-52.67	-13.00	-39.67	V
3758.000	-47.42	8.23	9.16	-46.49	-13.00	-33.49	V
4976.000	-50.68	9.37	10.56	-49.49	-13.00	-36.49	V
N/A							
3758.000	-50.94	8.23	9.16	-50.01	-13.00	-37.01	H
4997.000	-52.66	9.41	10.6	-51.47	-13.00	-38.47	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.



Operation Mode: Tx / High channel

Test Date: December 6, 2013

Temperature: 26°C

Tested by: David Shu

Humidity: 60 % 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)
2498.000	-53.15	6.35	6.1	-53.40	-13.00	-40.40	V
3807.000	-47.39	8.27	9.21	-46.45	-13.00	-33.45	V
4990.000	-50.65	9.39	10.58	-49.46	-13.00	-36.46	V
N/A							
3807.000	-50.43	8.27	9.21	-49.49	-13.00	-36.49	H
4990.000	-52.67	9.39	10.58	-51.48	-13.00	-38.48	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.



LTE Band 2 / channel bandwidth: 20MHz

Operation Mode: Tx / Low channel

Test Date: July 23, 2013

Temperature: 26°C

Tested by: Wayne Tasi

Humidity: 60 % 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)
2750.000	-57.73	6.77	6.75	-57.75	-13.00	-44.75	V
3723.000	-54.8	8.21	9.12	-53.89	-13.00	-40.89	V
N/A							
3730.000	-42.49	8.22	9.13	-41.58	-13.00	-28.58	H
5578.000	-50.53	10.13	10.82	-49.84	-13.00	-36.84	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: Tx / Middle channel

Test Date: July 23, 2013

Temperature: 26°C

Tested by: Wayne Tasi

Humidity: 60 % 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)
3758.000	-53.47	8.23	9.16	-52.54	-13.00	-39.54	V
4948.000	-55.18	9.33	10.52	-53.99	-13.00	-40.99	V
N/A							
3758.000	-38.43	8.23	9.16	-37.50	-13.00	-24.50	H
5641.000	-52.03	10.18	10.83	-51.38	-13.00	-38.38	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: Tx / High channel

Test Date: July 23, 2013

Temperature: 26°C

Tested by: Wayne Tasi

Humidity: 60 % 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)
3800.000	-54.08	8.26	9.2	-53.14	-13.00	-40.14	V
4969.000	-54.88	9.36	10.55	-53.69	-13.00	-40.69	V
N/A							
3793.000	-46.94	8.26	9.19	-46.01	-13.00	-33.01	H
5690.000	-52.85	10.16	10.84	-52.17	-13.00	-39.17	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.



Calculation of maximum antenna gain

LTE Band 5						
Operation Mode	Frequency	Emission level	Max. Ant. Gain	Result	Limit	Margin
	(MHz)	(dBm)	(dBi)	(dBm)	(dBm)	(dB)
Low	3317	-44.2	15.6	-28.6	-13	-15.6
Mid	1749	-42.34	15.6	-26.74	-13	-13.74
High	3373	-44.6	15.6	-29	-13	-16
LTE Band 2						
Operation Mode	Frequency	Emission level	Max. Ant. Gain	Result	Limit	Margin
	(MHz)	(dBm)	(dBi)	(dBm)	(dBm)	(dB)
Low	3730	-41.58	8	-33.58	-13	-20.58
Mid	3758	-33.66	8	-25.66	-13	-12.66
High	3814	-37.37	8	-29.37	-13	-16.37

Remark: Data of measurement within this frequency range shown " N/A " in the table above means the emission is too small to be measured



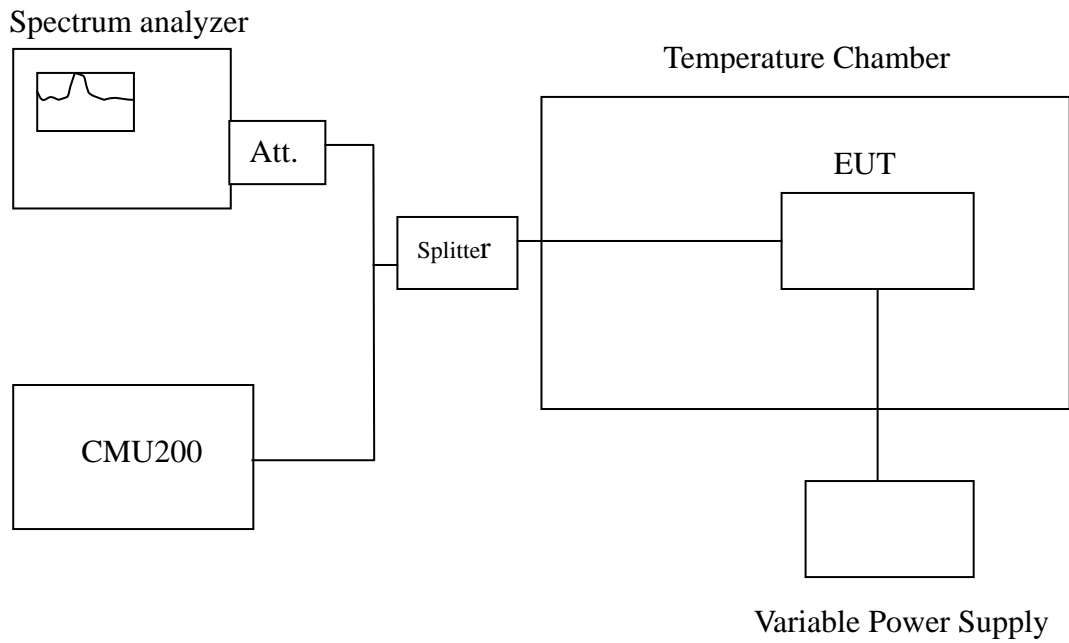
7.6 FREQUENCY STABILITY V.S. TEMPERATURE MEASUREMENT

LIMIT

According to FCC §2.1055, FCC §24.235, RSS-132 (4.3) & RSS-133 (6.3).

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.

LTE Band 5

Reference Frequency: LTE Band 5 836 MHz @ 20°C						
Limit: ± 2.5 ppm = 4331Hz						
Power Supply Vdc	Environment Temperature (°C)	5M Frequency (Hz)	Delta (Hz)	10M Frequency (Hz)	Delta (Hz)	Limit (Hz)
3.8	50	836499997	-6	836500006	2	4331
3.8	40	836499998	-5	836499992	-12	
3.8	30	836499999	-4	836499996	-8	
3.8	20	836500003	0	836500004	0	
3.8	10	836499993	-10	836499994	-10	
3.8	0	836499992	-11	836499997	-7	
3.8	-10	836499994	-9	836499994	-10	
3.8	-20	836499991	-12	836499995	-9	
3.8	-30	836500008	5	836499999	-5	

LTE Band 2

Reference Frequency: LTE Band 2 1880 MHz @ 20°C								
Limit: ± 2.5 ppm = 4700Hz								
Power Supply Vdc	Environment Temperature (°C)	5M Frequency (Hz)	Delta (Hz)	10M Frequency (Hz)	Delta (Hz)	20M Frequency (Hz)	Delta (Hz)	Limit (Hz)
3.8	50	1879999998	-9	1879999996	-10	1879999972	-34	4700
3.8	40	1879999996	-11	1879999998	-8	1880000038	32	
3.8	30	1879999999	-8	1880000000	-6	1880000033	27	
3.8	20	1880000007	0	1880000006	0	1880000030	0	
3.8	10	1879999992	-15	1879999998	-8	1879999967	-39	
3.8	0	1879999988	-19	1880000004	-2	1879999975	-31	
3.8	-10	1879999989	-18	1879999995	-11	1880000032	26	
3.8	-20	1879999998	-9	1879999994	-12	1880000034	28	
3.8	-30	1879999997	-10	1879999993	-13	1879999963	-43	



7.7 FREQUENCY STABILITY V.S. VOLTAGE MEASUREMENT

LIMIT

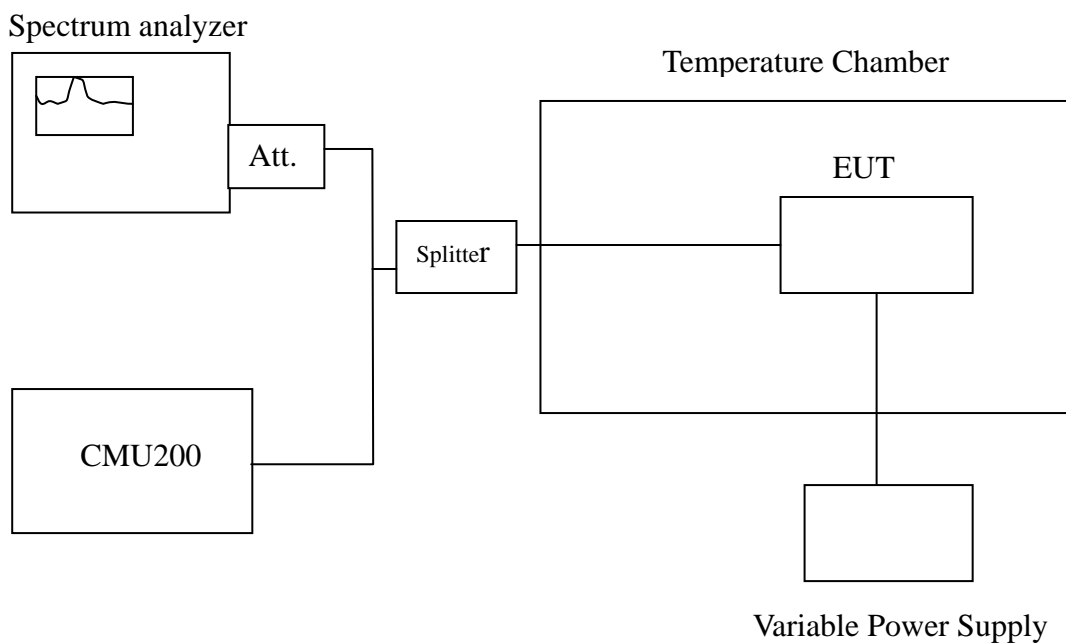
According to FCC §2.1055, FCC §24.235,

Frequency Tolerance: 2.5 ppm.

According to RSS-132 (4.3) & RSS-133 (6.3).

The carrier frequency shall not depart from the reference frequency in excess of ± 2.5 ppm for mobile stations and ± 1.0 ppm for base stations.

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 (± 15%) and endpoint, record the maximum frequency change.

TEST RESULTS

No non-compliance noted.

LTE Band 5

Reference Frequency: LTE Band 5 836 MHz @ 20°C						
Limit: ± 2.5 ppm = 2091Hz						
Power Supply Vdc	Environment Temperature (°C)	5M Frequency (Hz)	Delta (Hz)	10M Frequency (Hz)	Delta (Hz)	Limit (Hz)
4.18	20	836500000	-3	836500003	-1	2091
3.8		836500003	0	836500004	0	
3.23		836500077	74	836500084	80	

LTE Band 2

Reference Frequency: LTE Band 2 1880 MHz @ 20°C								
Limit: ± 2.5 ppm = 4700Hz								
Power Supply Vdc	Environment Temperature (°C)	5M Frequency (Hz)	Delta (Hz)	10M Frequency (Hz)	Delta (Hz)	20M Frequency (Hz)	Delta (Hz)	Limit (Hz)
4.18	20	1880000009	2	1880000003	-3	1880000044	14	4700
3.8		1880000007	0	1880000006	0	1880000030	0	
3.23		1880000087	80	1880000069	63	1880000057	27	