



**FCC 47 CFR PART 22 SUBPART H AND PART 24 SUBPART E  
&  
INDUSTRY CANADA RSS-132 & RSS-133**

**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.)**

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**Issued Date: July 26, 2013**



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**Revision History**

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|      |  |               |  |               |             |             |
|      |  |               |  |               |             |             |



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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 ~ 23, 2013

| APPLICABLE STANDARDS                                                                                                                      |                         |
|-------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| STANDARD                                                                                                                                  | TEST RESULT             |
| FCC 47 CFR PART 22 SUBPART H AND<br>PART 24 SUBPART E<br>&<br>IC RSS-132 Issue 2: September 2005 and<br>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

|                              |                                                                                                          |                                      |
|------------------------------|----------------------------------------------------------------------------------------------------------|--------------------------------------|
| <b>Product</b>               | LE920-NAG                                                                                                |                                      |
| <b>Trade Name</b>            | LE920                                                                                                    |                                      |
| <b>Model Number</b>          | LE920-NAG                                                                                                |                                      |
| <b>Model Discrepancy</b>     | N/A                                                                                                      |                                      |
| <b>Received Date</b>         | July 08, 2013                                                                                            |                                      |
| <b>Power Supply</b>          | DC 3.8V powered from Host device.                                                                        |                                      |
| <b>Frequency Range</b>       | LTE Band 2<br>Channel Bandwidth: 5MHz                                                                    | 1852.5MHz ~1907.5MHz                 |
|                              | LTE Band 2<br>Channel Bandwidth: 10MHz                                                                   | 1855MHz ~1905MHz                     |
|                              | LTE Band 2<br>Channel Bandwidth: 20MHz                                                                   | 1860MHz ~1900MHz                     |
|                              | LTE Band 5<br>Channel Bandwidth: 5MHz                                                                    | 826.5MHz ~846.5MHz                   |
|                              | LTE Band 5<br>Channel Bandwidth: 10MHz                                                                   | 829MHz ~844MHz                       |
| <b>Modulation Technique</b>  | LTE Band 2                                                                                               | QPSK, 16QAM                          |
|                              | LTE Band 5                                                                                               | QPSK, 16QAM                          |
| <b>Maximum ERP Power</b>     | LTE Band 2<br>Channel Bandwidth: 5MHz                                                                    | QPSK : 27.71dBm<br>16QAM : 27.94dBm  |
|                              | LTE Band 2<br>Channel Bandwidth: 10MHz                                                                   | QPSK : 27.92dBm<br>16QAM : 28.00dBm  |
|                              | LTE Band 2<br>Channel Bandwidth: 20MHz                                                                   | QPSK : 27.00dBm<br>16QAM : 26.89 dBm |
| <b>Maximum ERP Power</b>     | LTE Band 5<br>Channel Bandwidth: 5MHz                                                                    | QPSK : 23.76dBm<br>16QAM : 24.20dBm  |
|                              | LTE Band 5<br>Channel Bandwidth: 10MHz                                                                   | QPSK : 23.36dBm<br>16QAM : 22.31dBm  |
| <b>Category</b>              | LTE: 3                                                                                                   |                                      |
| <b>Antenna Specification</b> | LTE Band 2: 3-cable Dipole Antenna / Gain: 1.71dBi<br>LTE Band 5: 3-cable Dipole Antenna / Gain: 0.46dBi |                                      |

**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    | 11/06/2013      |
| 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       | 10/02/2013      |
| 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                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <br>FCC MRA: TW1039            |
| Taiwan  | TAF             | LP0002, RTTE01, FCC Method-47 CFR Part 15 Subpart C, D, E, RSS-210, RSS-310<br>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<br>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<br>FCC Method -47 CFR Part 15 Subpart B<br>IEC / EN 61000-3-2, IEC / EN 61000-3-3, IEC / EN 61000-4-2/3/4/5/6/8/11 | <br>Testing Laboratory<br>1309 |
| Canada  | Industry Canada | 3M Semi Anechoic Chamber (IC 2324G-1 / IC 2324G-2) to perform                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <br>IC 2324G-1<br>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.



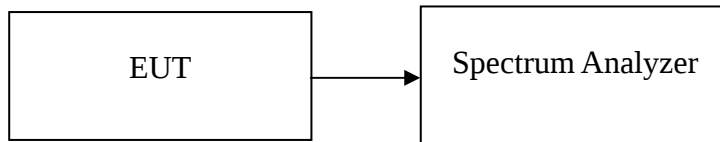
## 7. FCC PART 22 & 24 REQUIREMENTS & INDUSTRY CANADA RSS-132 & RSS-133

### 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<br>(MHz) | Occupied bandwidth<br>(MHz) |
|---------|--------------------|-----------------------------|
| Low     | 826.5              | 5.035                       |
| Mid     | 836                | 5.075                       |
| High    | 846.5              | 5.115                       |

**CHANNEL BANDWIDTH: 5MHz / 16QAM**

| Channel | FREQUENCY<br>(MHz) | Occupied bandwidth<br>(MHz) |
|---------|--------------------|-----------------------------|
| Low     | 826.5              | 5.078                       |
| Mid     | 836                | 5.040                       |
| High    | 846.5              | 5.128                       |

**CHANNEL BANDWIDTH: 10MHz / QPSK**

| Channel | FREQUENCY<br>(MHz) | Occupied bandwidth<br>(MHz) |
|---------|--------------------|-----------------------------|
| Low     | 829                | 9.827                       |
| Mid     | 836                | 9.927                       |
| High    | 844                | 10.001                      |

**CHANNEL BANDWIDTH: 10MHz / 16QAM**

| Channel | FREQUENCY<br>(MHz) | Occupied bandwidth<br>(MHz) |
|---------|--------------------|-----------------------------|
| Low     | 829                | 9.710                       |
| Mid     | 836                | 9.881                       |
| High    | 844                | 9.955                       |

**LTE Band 2****CHANNEL BANDWIDTH: 5MHz / QPSK**

| Channel | FREQUENCY<br>(MHz) | Occupied bandwidth<br>(MHz) |
|---------|--------------------|-----------------------------|
| Low     | 1852.5             | 5.053                       |
| Mid     | 1880               | 5.054                       |
| High    | 1907.5             | 5.146                       |

**CHANNEL BANDWIDTH: 5MHz / 16QAM**

| Channel | FREQUENCY<br>(MHz) | Occupied bandwidth<br>(MHz) |
|---------|--------------------|-----------------------------|
| Low     | 1852.5             | 4.996                       |
| Mid     | 1880               | 4.996                       |
| High    | 1907.5             | 5.096                       |

**CHANNEL BANDWIDTH: 10MHz / QPSK**

| Channel | FREQUENCY<br>(MHz) | Occupied bandwidth<br>(MHz) |
|---------|--------------------|-----------------------------|
| Low     | 1855               | 10.049                      |
| Mid     | 1880               | 9.901                       |
| High    | 1905               | 9.958                       |

**CHANNEL BANDWIDTH: 10MHz / 16QAM**

| Channel | FREQUENCY<br>(MHz) | Occupied bandwidth<br>(MHz) |
|---------|--------------------|-----------------------------|
| Low     | 1855               | 10.008                      |
| Mid     | 1880               | 9.852                       |
| High    | 1905               | 9.844                       |



**CHANNEL BANDWIDTH: 20MHz / QPSK**

| Channel | FREQUENCY<br>(MHz) | Occupied bandwidth<br>(MHz) |
|---------|--------------------|-----------------------------|
| Low     | 1860               | 19.619                      |
| Mid     | 1880               | 19.685                      |
| High    | 1900               | 19.385                      |

**CHANNEL BANDWIDTH: 20MHz / 16QAM**

| Channel | FREQUENCY<br>(MHz) | Occupied bandwidth<br>(MHz) |
|---------|--------------------|-----------------------------|
| Low     | 1860               | 19.702                      |
| Mid     | 1880               | 19.504                      |
| High    | 1900               | 19.797                      |



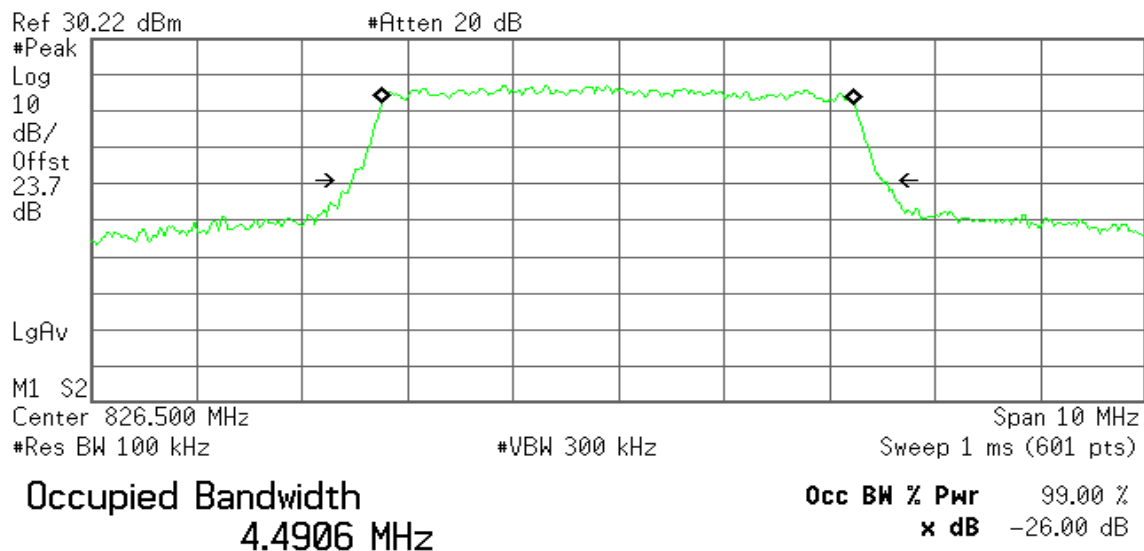
## LTE Band 5

### CHANNEL BANDWIDTH: 5MHz / QPSK

#### CH Low

Agilent 20:14:11 Jul 18, 2013

R T

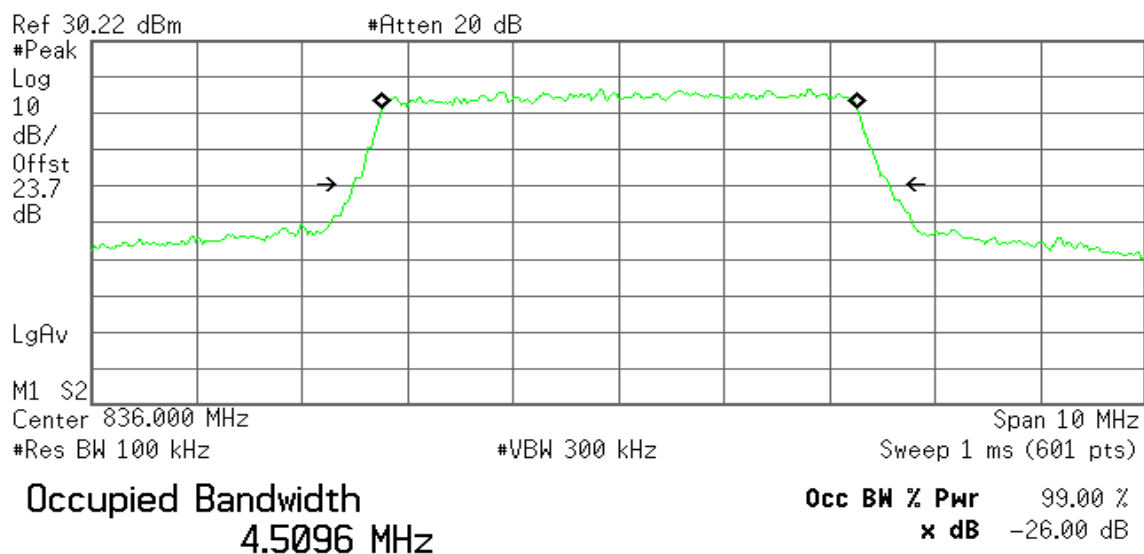


Transmit Freq Error -4.327 kHz  
x dB Bandwidth 5.035 MHz

#### CH Mid

Agilent 20:12:06 Jul 18, 2013

R T

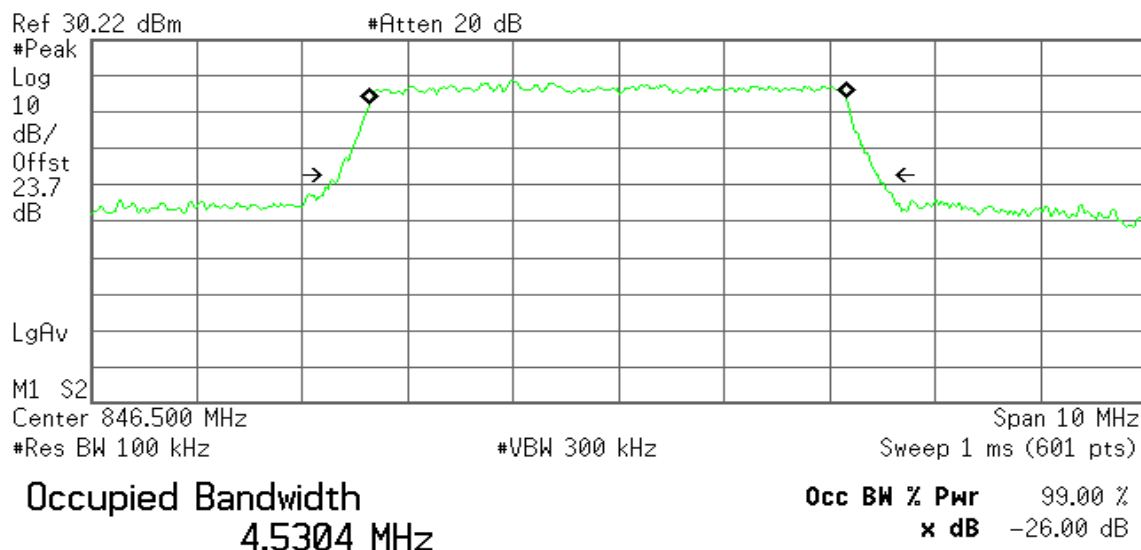


Transmit Freq Error 12.888 kHz  
x dB Bandwidth 5.075 MHz

**CH High**

\* Agilent 20:13:06 Jul 18, 2013

R T

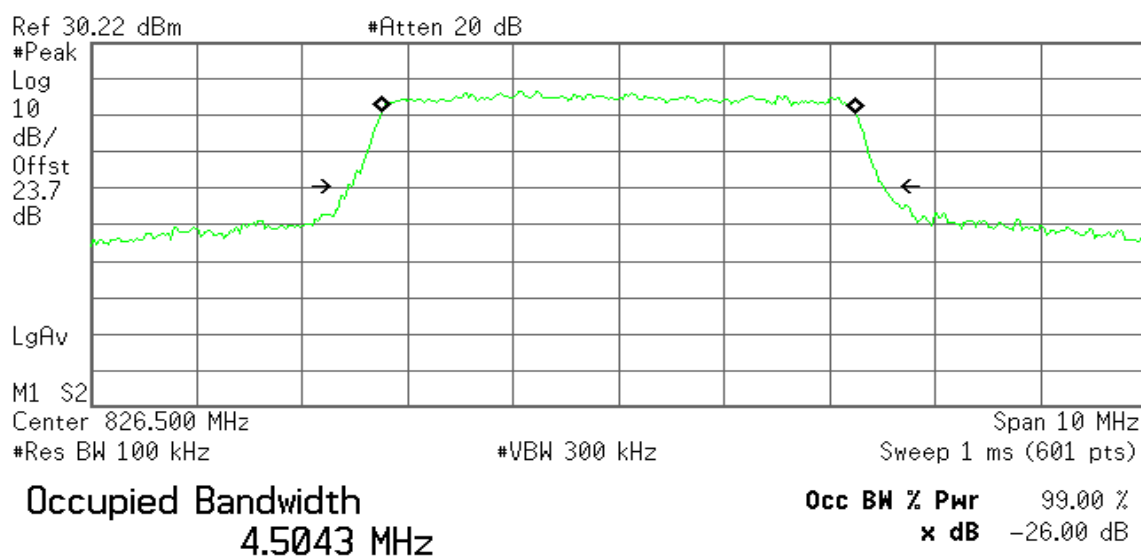


**Transmit Freq Error** -98.769 kHz  
**x dB Bandwidth** 5.115 MHz

**CHANNEL BANDWIDTH: 5MHz / 16QAM****CH Low**

\* Agilent 19:57:19 Jul 18, 2013

R T

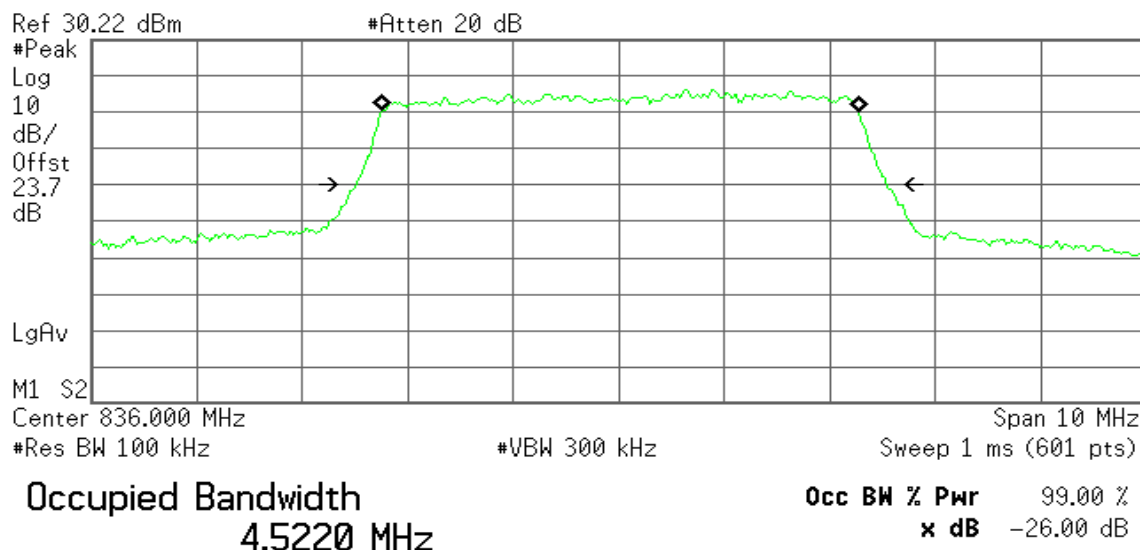


**Transmit Freq Error** -2.032 kHz  
**x dB Bandwidth** 5.078 MHz

**CH Mid**

\* Agilent 19:58:08 Jul 18, 2013

R T

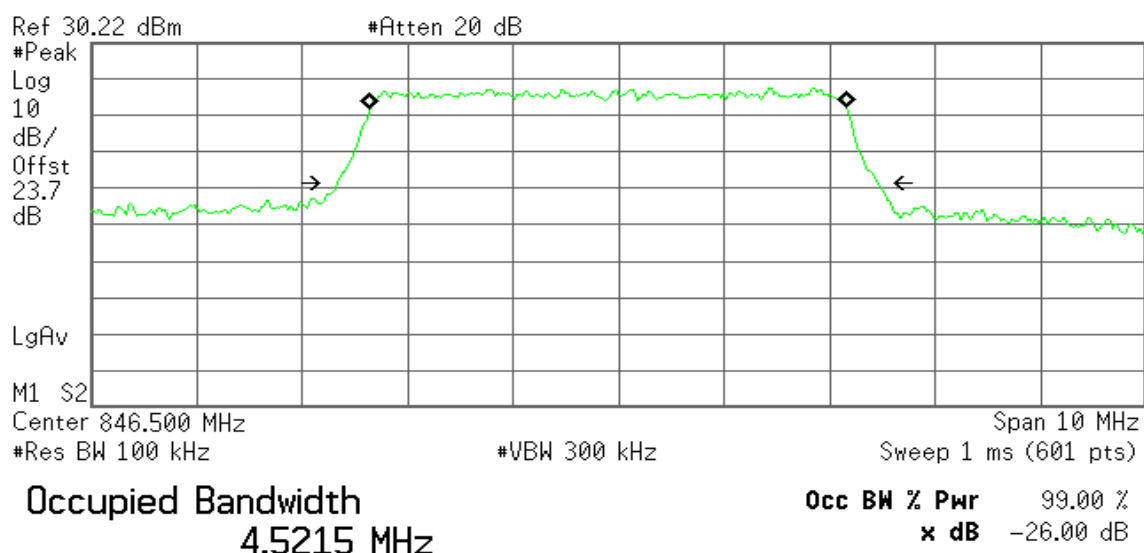


**Transmit Freq Error** 14.291 kHz  
**x dB Bandwidth** 5.040 MHz

**CH High**

\* Agilent 20:02:29 Jul 18, 2013

R T



**Transmit Freq Error** -99.474 kHz  
**x dB Bandwidth** 5.128 MHz

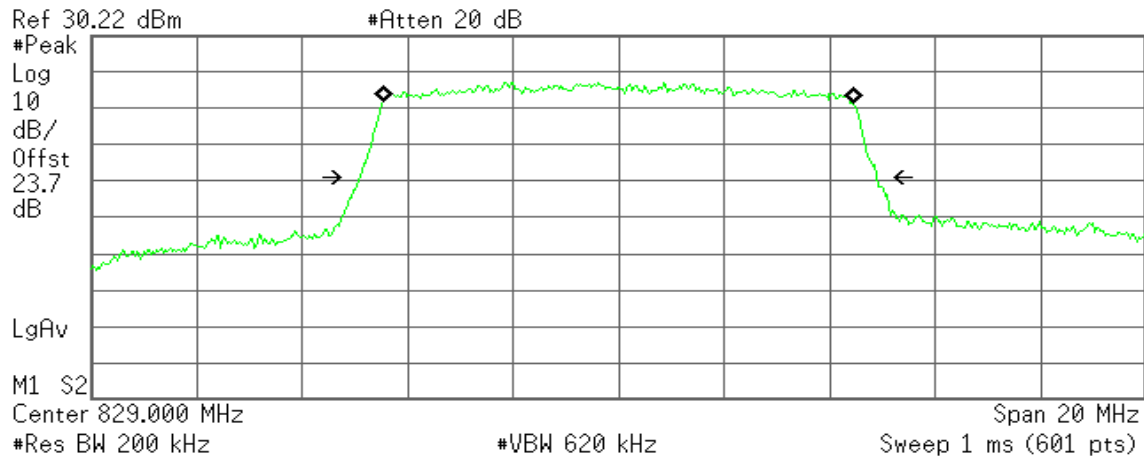


**CHANNEL BANDWIDTH: 10MHz / QPSK**

**CH Low**

✱ Agilent 20:06:02 Jul 18, 2013

R T



Occupied Bandwidth  
8.9352 MHz

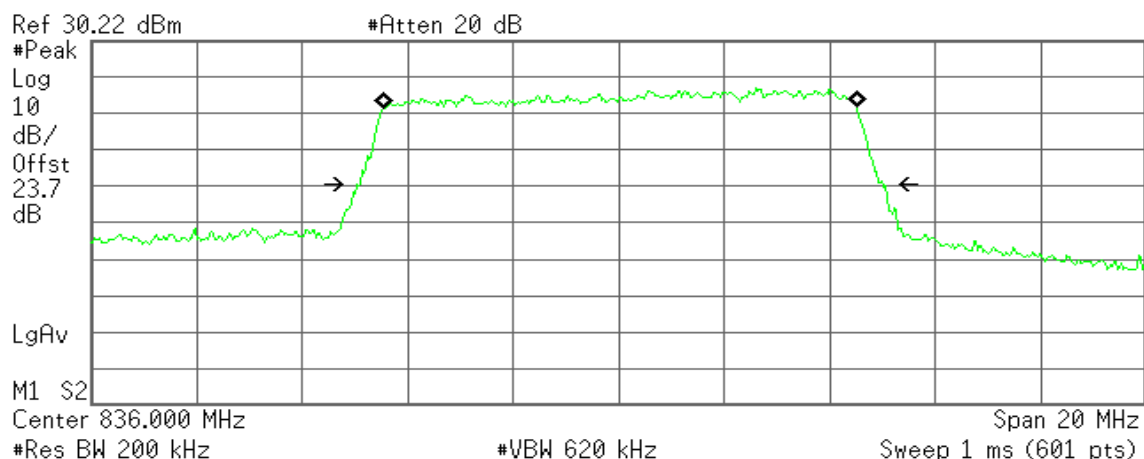
Occ BW % Pwr 99.00 %  
x dB -26.00 dB

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

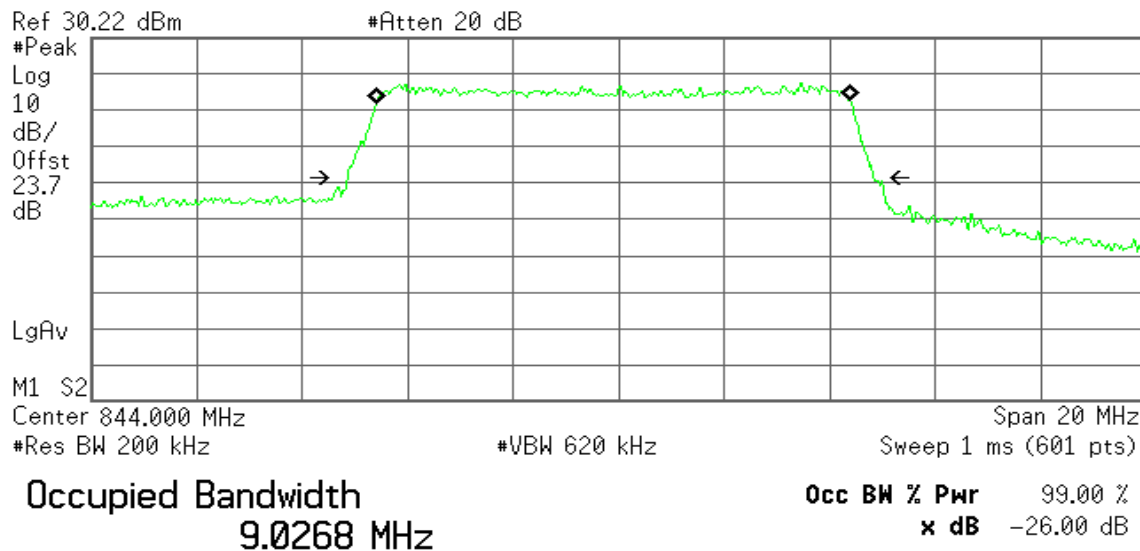
Transmit Freq Error 19.879 kHz  
x dB Bandwidth 9.927 MHz



## CH High

Agilent 20:08:23 Jul 18, 2013

R T



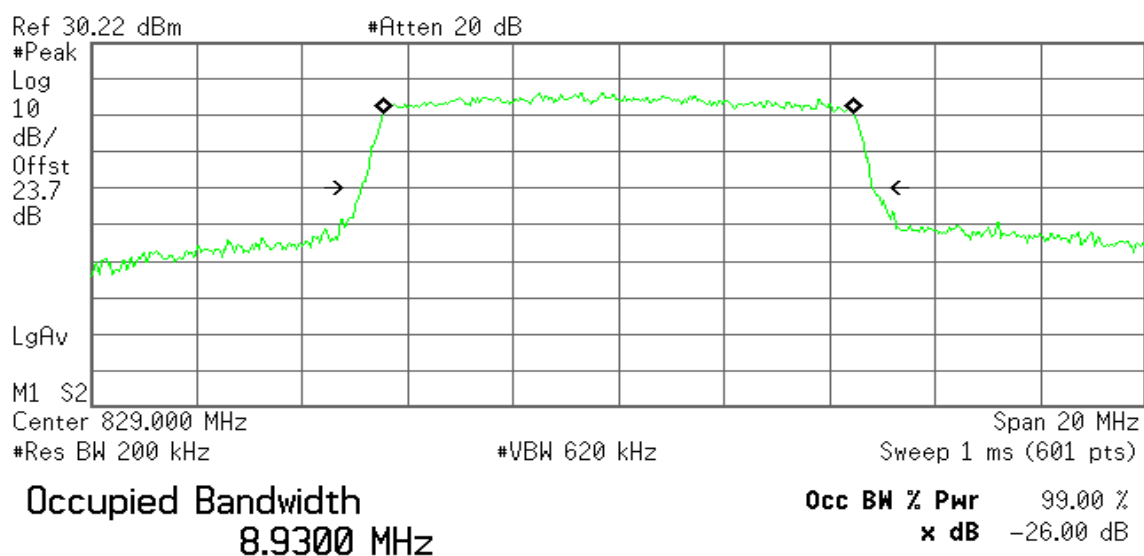
Transmit Freq Error -97.396 kHz  
x dB Bandwidth 10.001 MHz

## CHANNEL BANDWIDTH: 10MHz / 16QAM

### CH Low

Agilent 20:05:16 Jul 18, 2013

R T

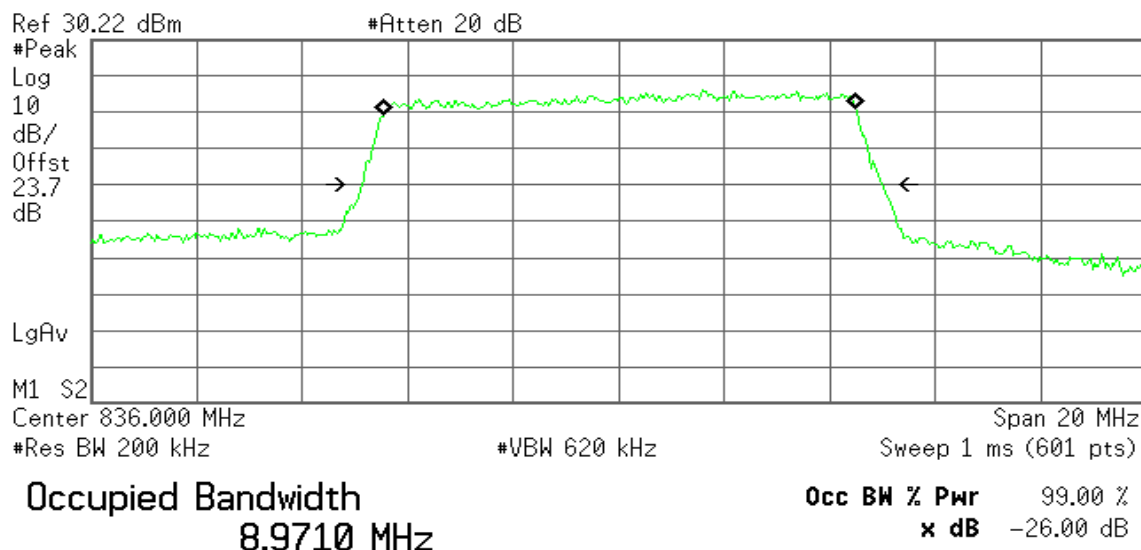


Transmit Freq Error 4.532 kHz  
x dB Bandwidth 9.710 MHz

**CH Mid**

\* Agilent 20:04:15 Jul 18, 2013

R T

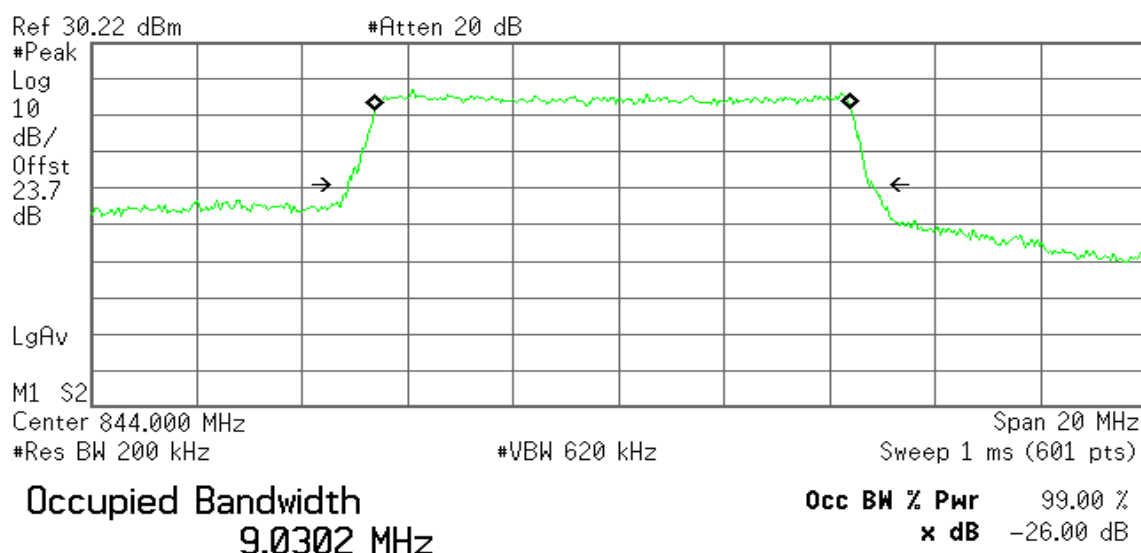


**Transmit Freq Error** 22.295 kHz  
**x dB Bandwidth** 9.881 MHz

**CH High**

\* Agilent 20:03:38 Jul 18, 2013

R T



**Transmit Freq Error** -108.642 kHz  
**x dB Bandwidth** 9.955 MHz



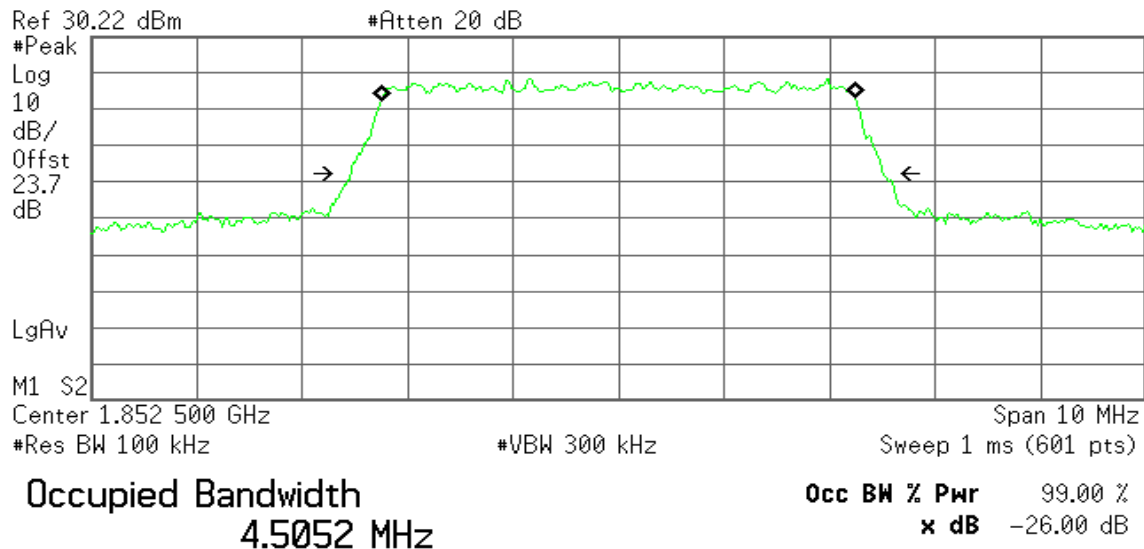
## LTE Band 2

### CHANNEL BANDWIDTH: 5MHz / QPSK

#### CH Low

Agilent 21:20:30 Jul 18, 2013

R T

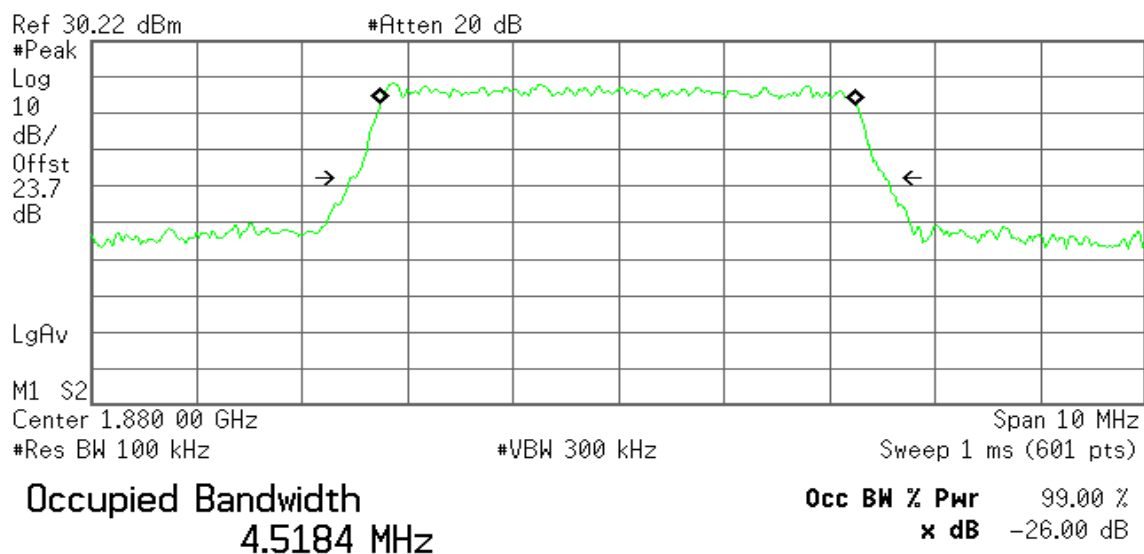


Transmit Freq Error -2.968 kHz  
x dB Bandwidth 5.053 MHz

#### CH Mid

Agilent 21:20:06 Jul 18, 2013

R T



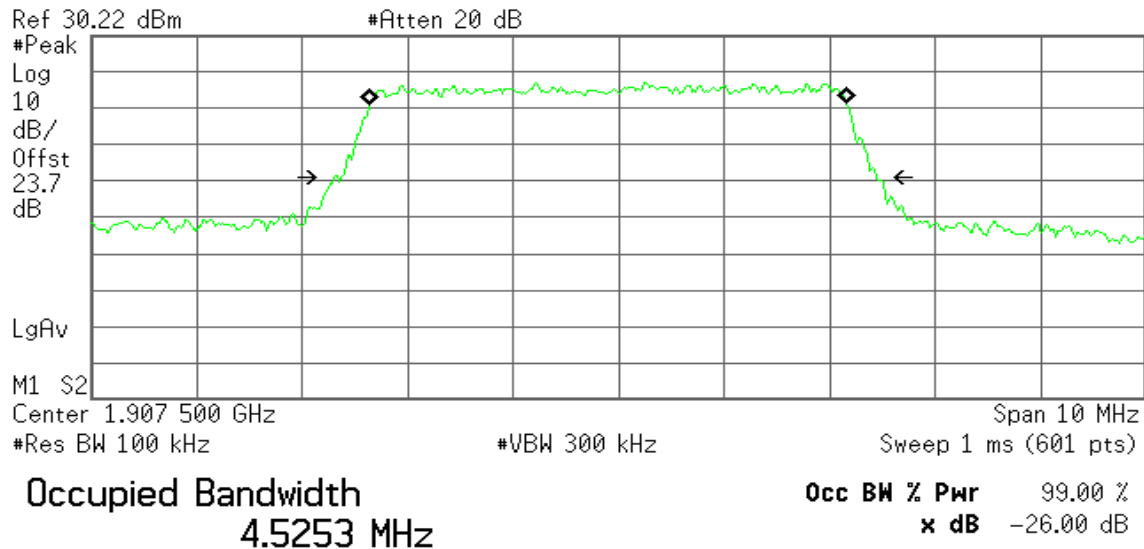
Transmit Freq Error -1.365 kHz  
x dB Bandwidth 5.054 MHz



## CH High

Agilent 21:19:28 Jul 18, 2013

R T



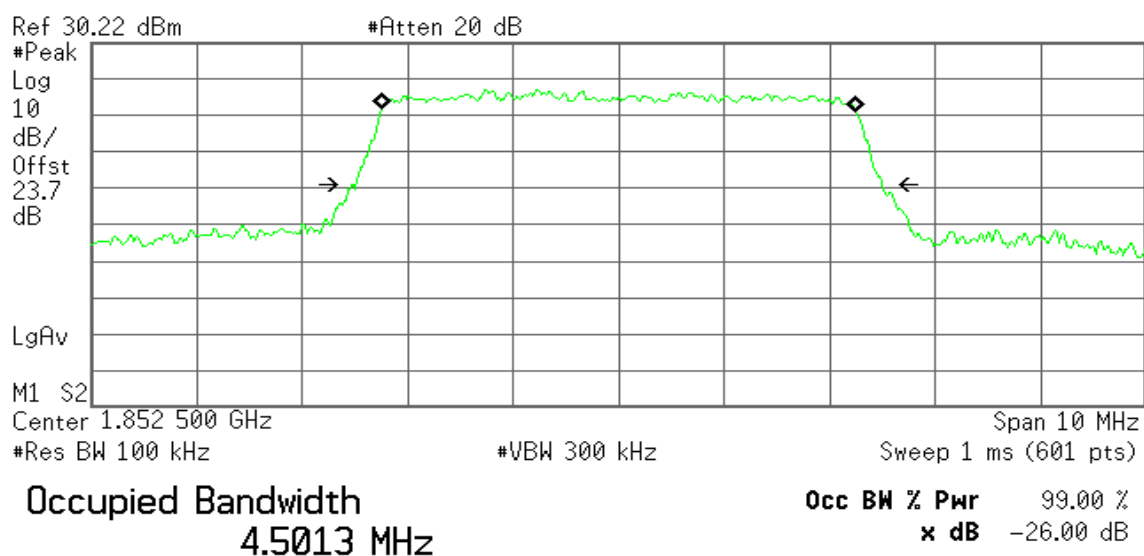
Transmit Freq Error -96.464 kHz  
x dB Bandwidth 5.146 MHz

## CHANNEL BANDWIDTH: 5MHz / 16QAM

### CH Low

Agilent 21:18:25 Jul 18, 2013

R T

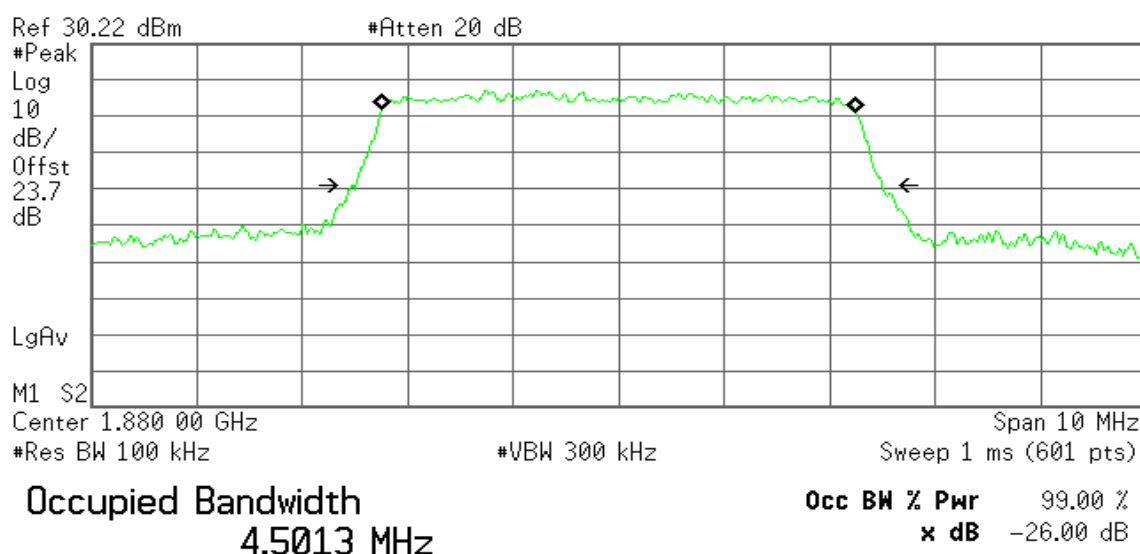


Transmit Freq Error 4.119 kHz  
x dB Bandwidth 4.996 MHz

**CH Mid**

\* Agilent 21:18:25 Jul 18, 2013

R T

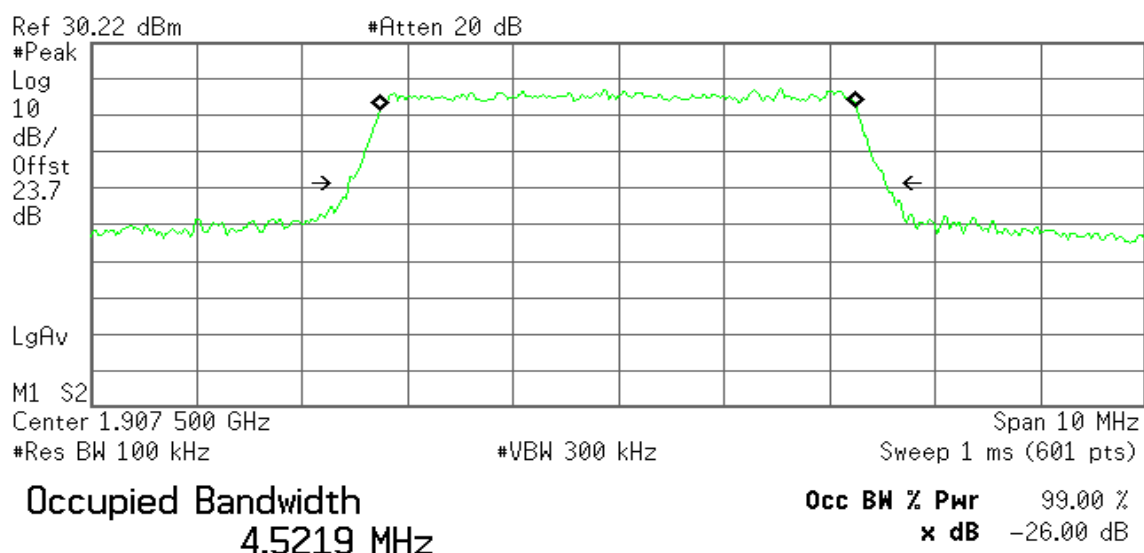


**Transmit Freq Error** 4.119 kHz  
**x dB Bandwidth** 4.996 MHz

**CH High**

\* Agilent 21:17:49 Jul 18, 2013

R T

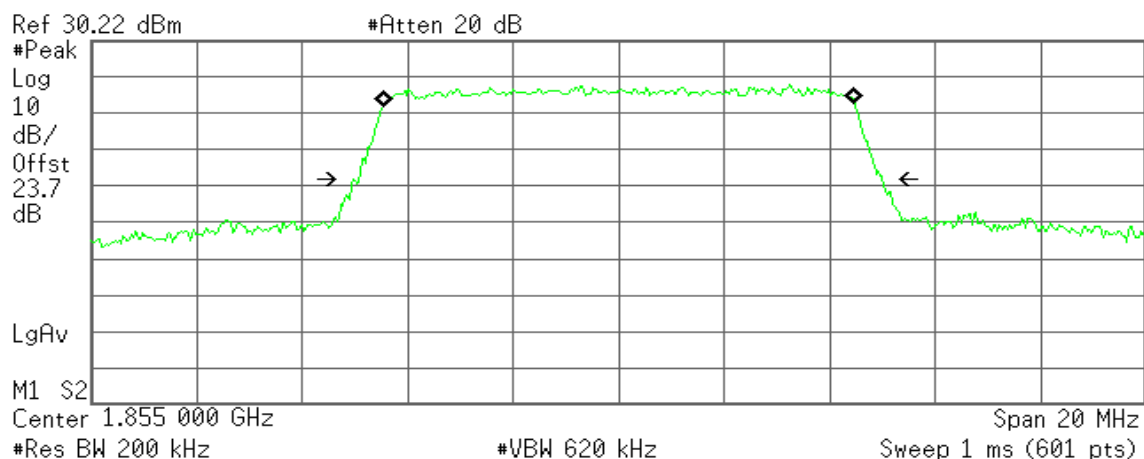


**Transmit Freq Error** -2.733 kHz  
**x dB Bandwidth** 5.096 MHz

**CHANNEL BANDWIDTH: 10MHz / QPSK****CH Low**

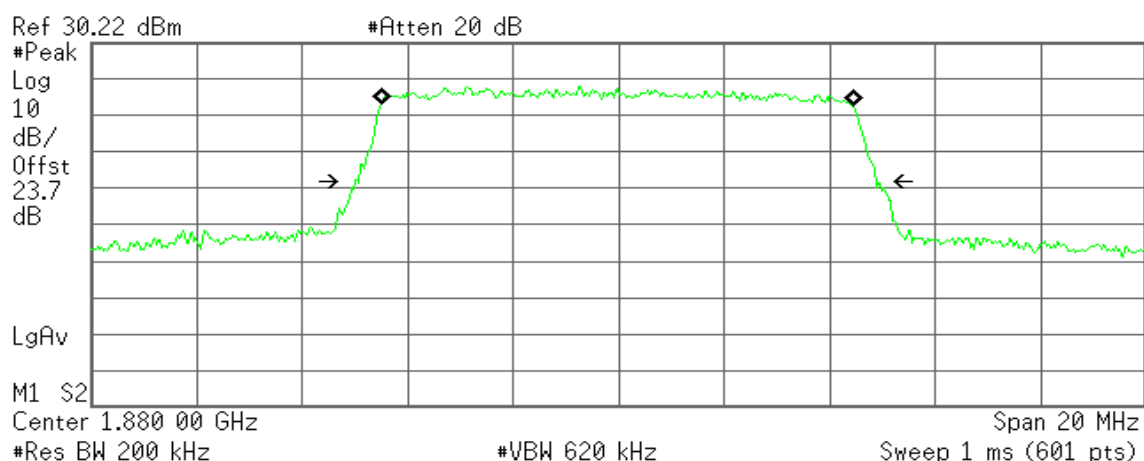
\* Agilent 21:16:29 Jul 18, 2013

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

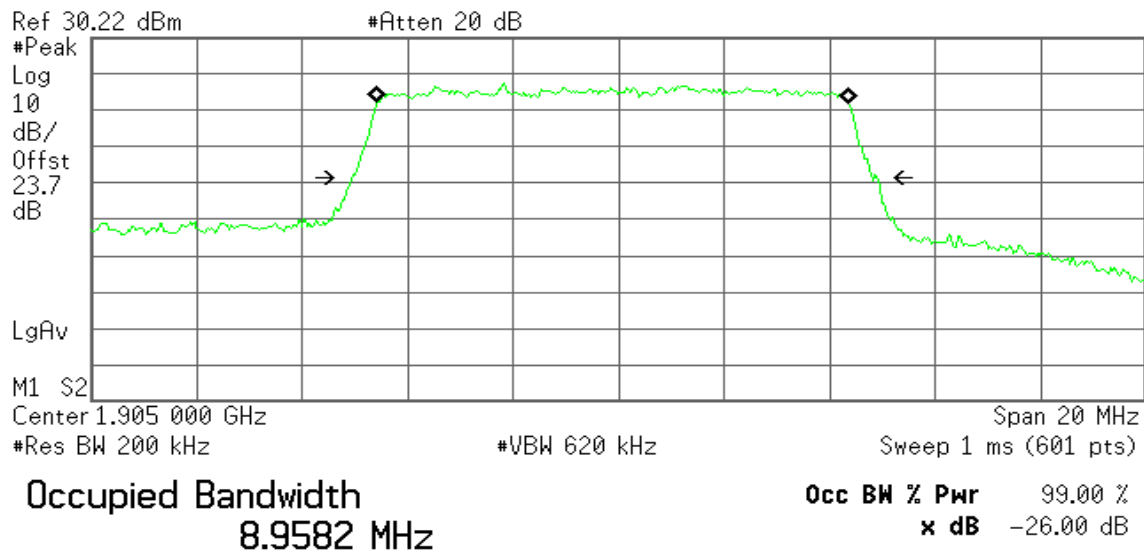
R T

**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

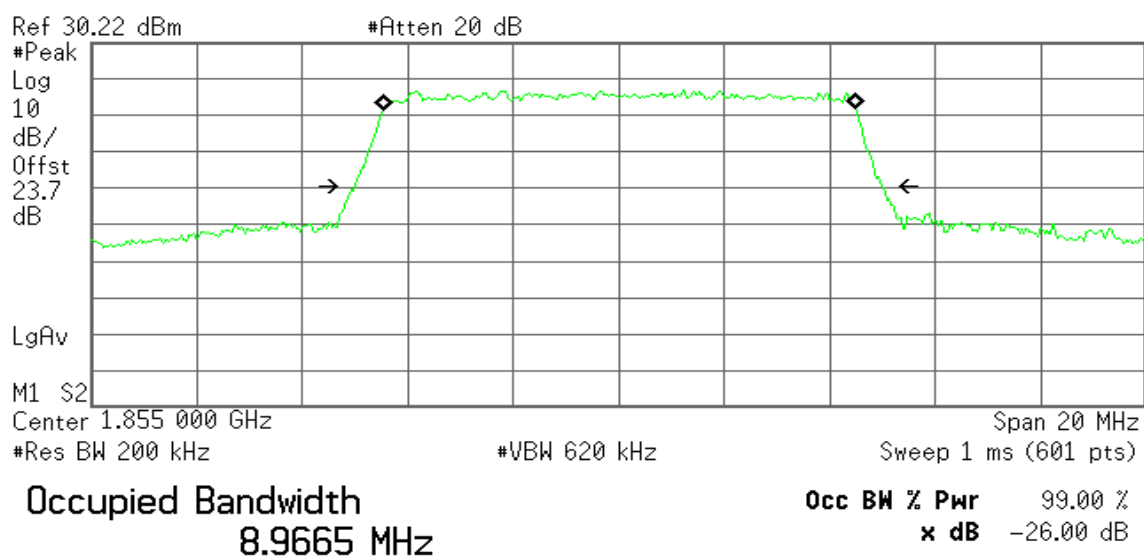


**Transmit Freq Error** -106.236 kHz  
**x dB Bandwidth** 9.958 MHz

**CHANNEL BANDWIDTH: 10MHz / 16QAM****CH Low**

\* Agilent 21:12:40 Jul 18, 2013

R T

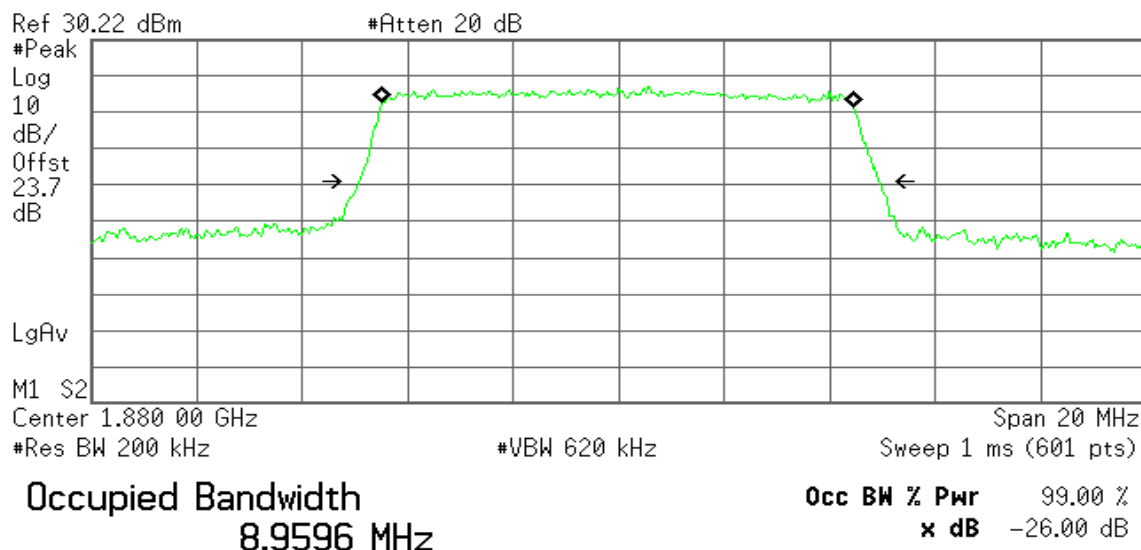


**Transmit Freq Error** 10.088 kHz  
**x dB Bandwidth** 10.008 MHz

CH Mid

❄ **Agilent** 21:13:21 Jul 18, 2013

R T

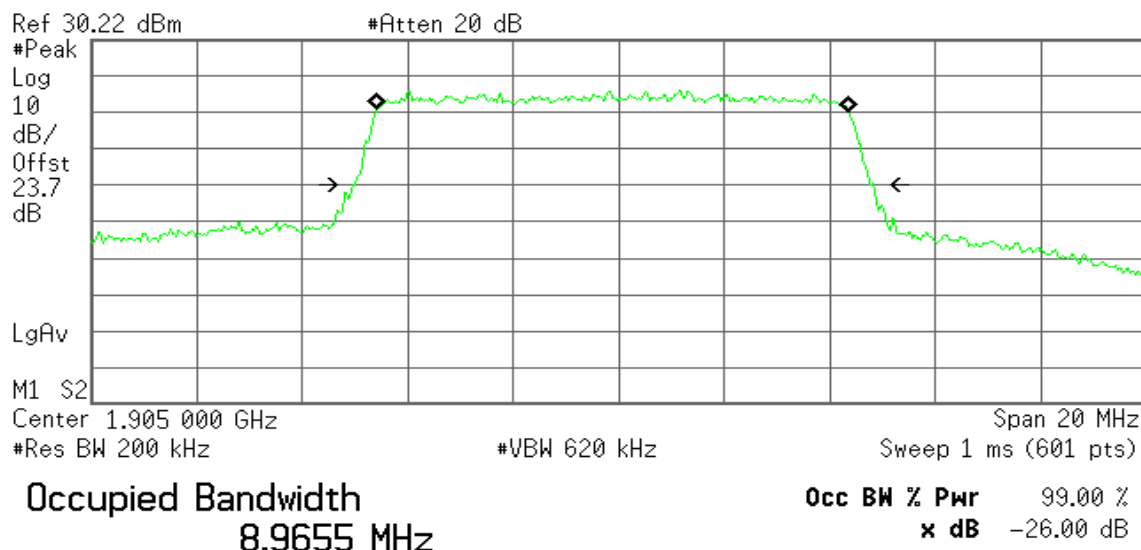


|                     |             |
|---------------------|-------------|
| Transmit Freq Error | -20.788 kHz |
| x dB Bandwidth      | 9.852 MHz   |

CH High

❄ Agilent 21:14:18 Jul 18, 2013

R T

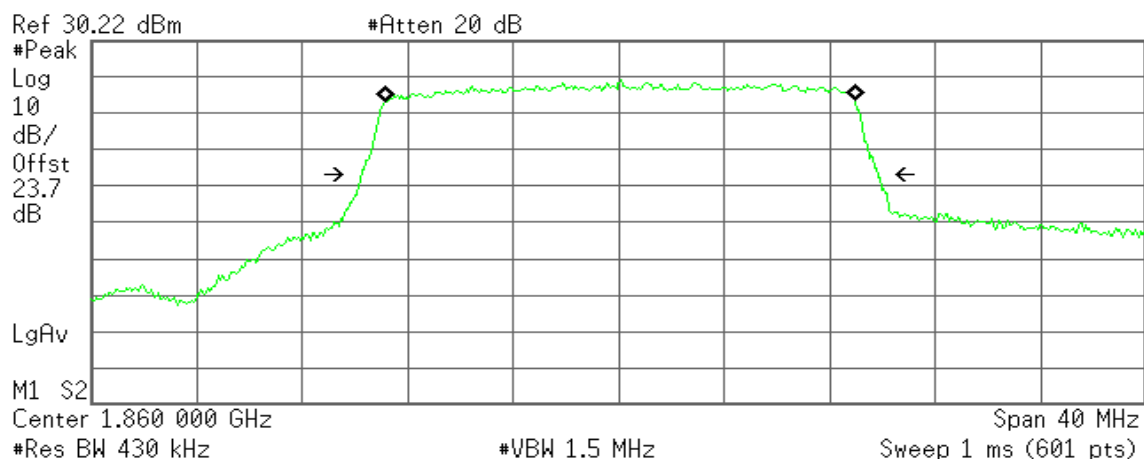


|                     |              |
|---------------------|--------------|
| Transmit Freq Error | -109.860 kHz |
| x dB Bandwidth      | 9.844 MHz    |

**CHANNEL BANDWIDTH: 20MHz / QPSK****CH Low**

\* Agilent 21:09:34 Jul 18, 2013

R T



Occupied Bandwidth  
17.8578 MHz

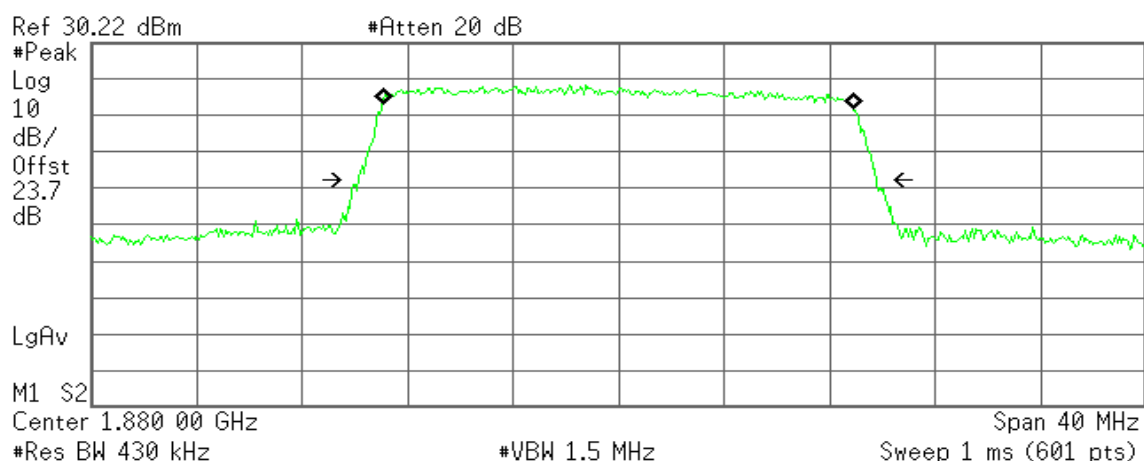
Occ BW % Pwr 99.00 %  
x dB -26.00 dB

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

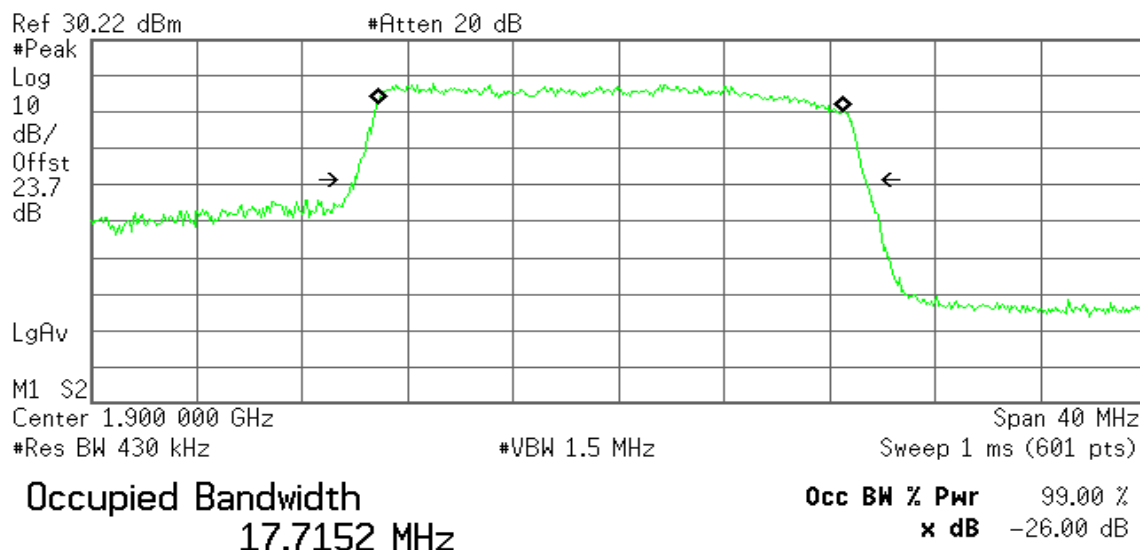
Occ BW % Pwr 99.00 %  
x dB -26.00 dB

Transmit Freq Error -20.833 kHz  
x dB Bandwidth 19.685 MHz

**CH High**

\* Agilent 21:05:29 Jul 18, 2013

R T

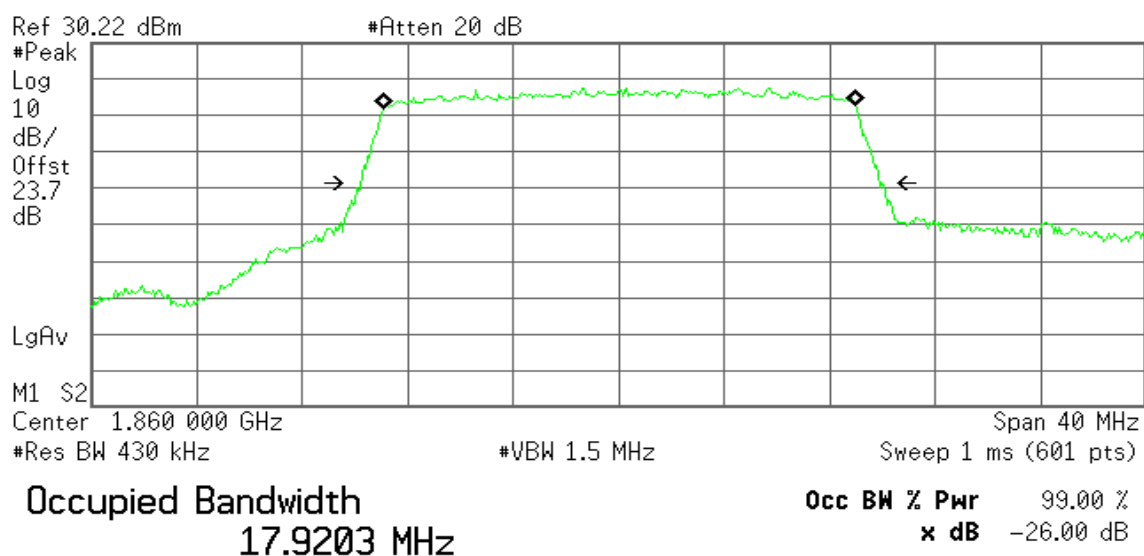


**Transmit Freq Error** -291.121 kHz  
**x dB Bandwidth** 19.385 MHz

**CHANNEL BANDWIDTH: 20MHz / 16QAM****CH Low**

\* Agilent 21:02:46 Jul 18, 2013

R T

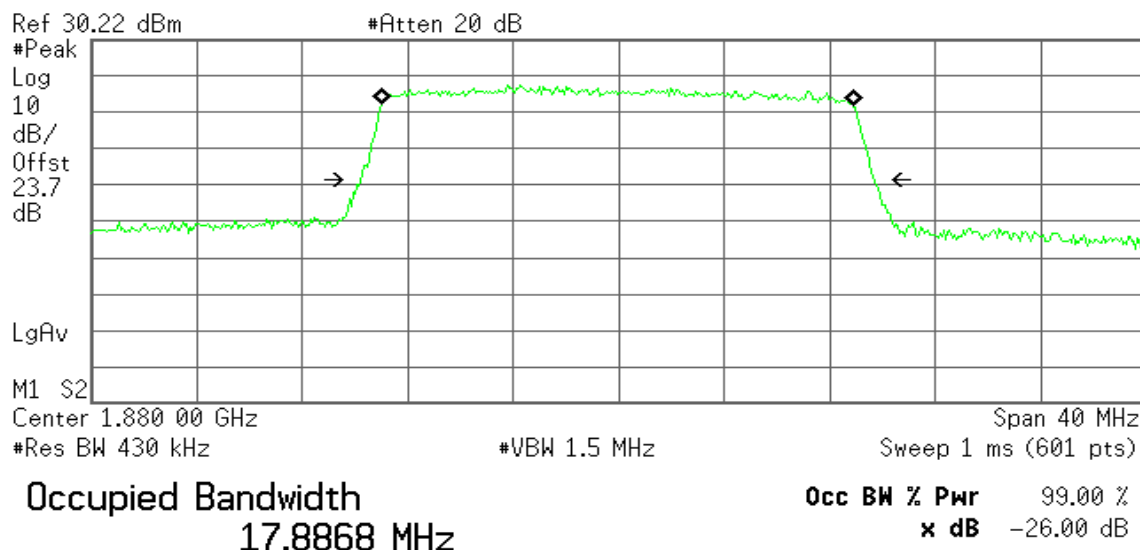


**Transmit Freq Error** 54.189 kHz  
**x dB Bandwidth** 19.702 MHz

**CH Mid**

\* Agilent 21:04:06 Jul 18, 2013

R T

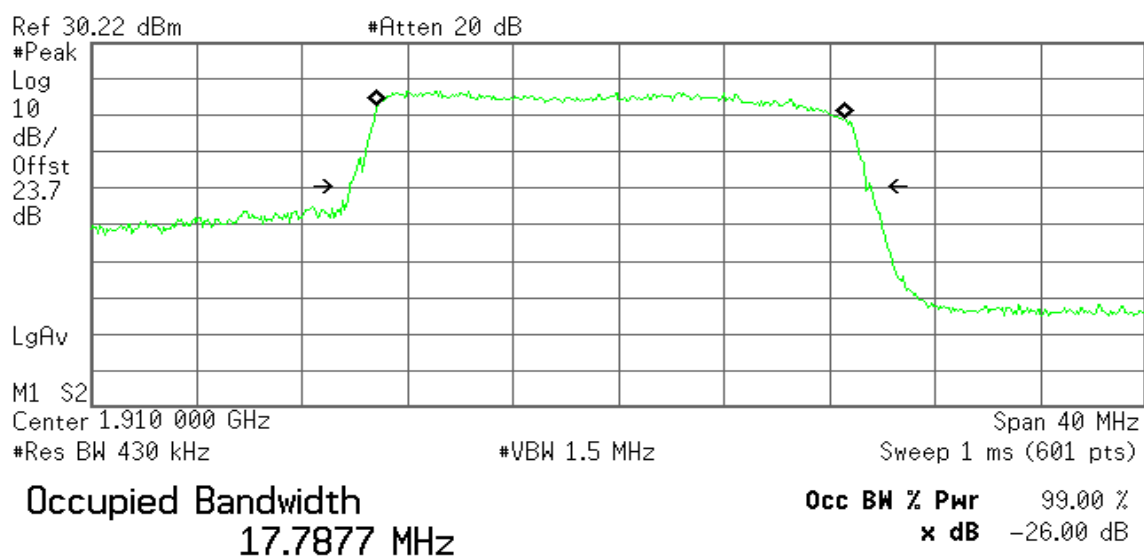


**Transmit Freq Error** -29.047 kHz  
**x dB Bandwidth** 19.504 MHz

**CH High**

\* Agilent 21:04:49 Jul 18, 2013

R T



**Transmit Freq Error** -287.391 kHz  
**x dB Bandwidth** 19.797 MHz

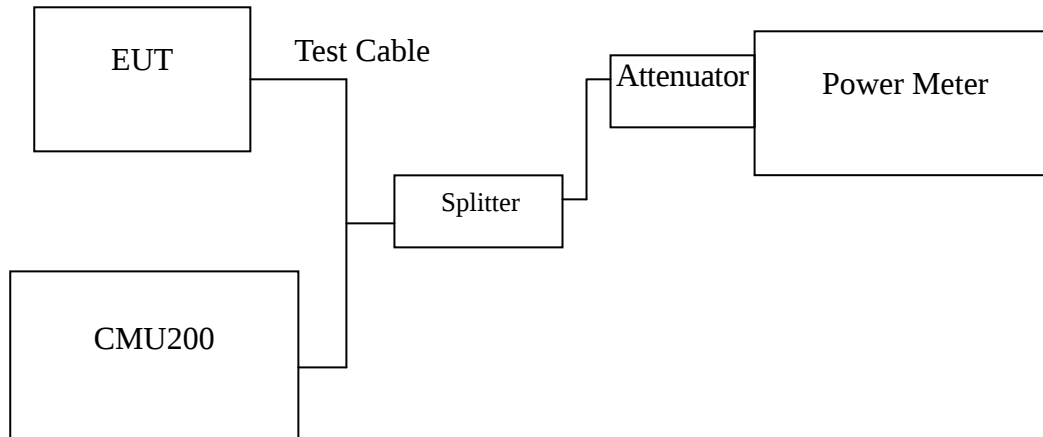


## 7.2 PEAK POWER

### 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**

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

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

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

| <b>Conducted Output Power (16QAM 100% RB ALLOCATION)</b> |                |                     |            |
|----------------------------------------------------------|----------------|---------------------|------------|
| <b>Frequency (MHz)</b>                                   | <b>Channel</b> | <b>Output Power</b> |            |
|                                                          |                | <b>(dBm)</b>        | <b>(W)</b> |
| 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.

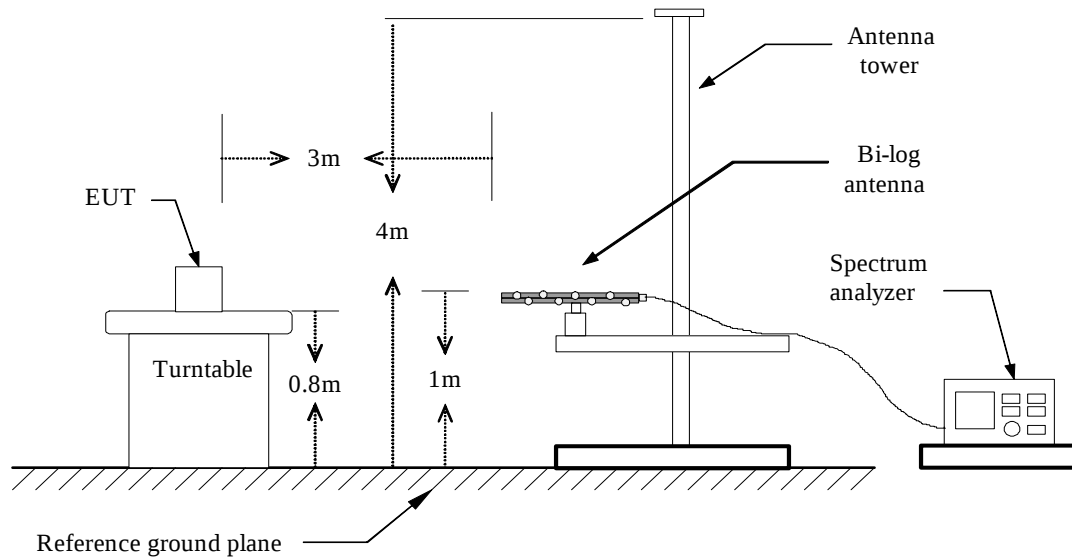
RSS-132 § 4.4 The maximum (ERP) shall be 6.3 Watts for mobile stations.

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

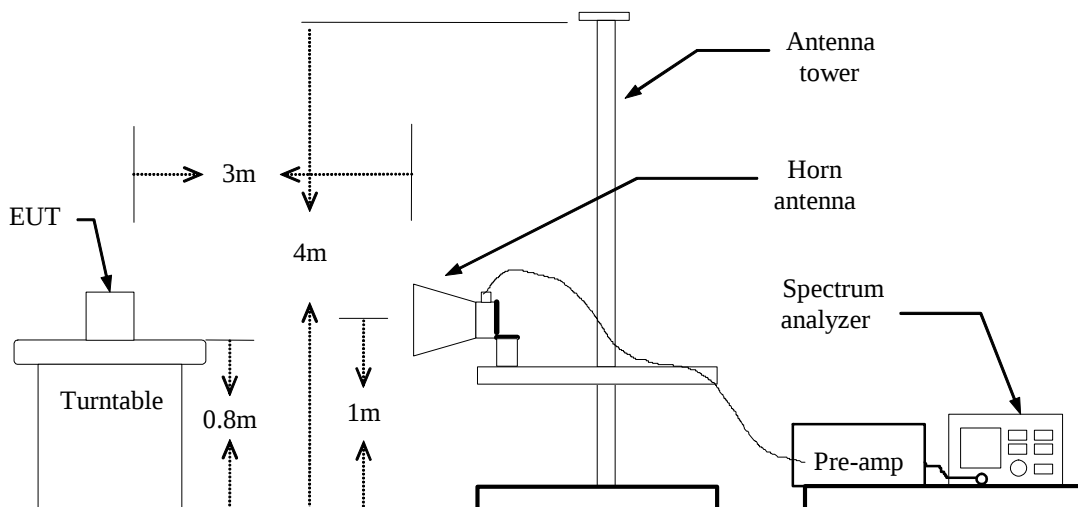
RSS133 § 6.4: Mobile stations and hand-held portables are limited to 2 watts maximum (EIRP).

### Test Configuration

#### Below 1 GHz

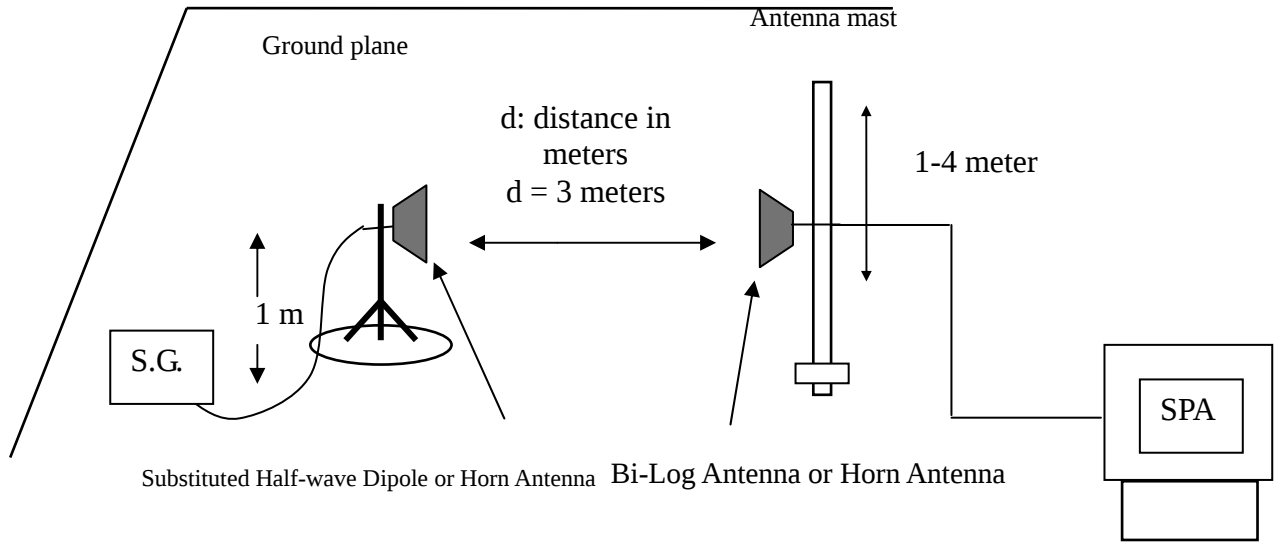


#### Above 1 GHz





## 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.*

**LTE BAND 5****Channel Bandwidth: 5MHz / QPSK**

| Channel | Frequency (MHz) | Antenna Pol. | S.G. (dBm) | Cable loss (dB) | Ant.Gain (dBi) | Emission level (dBm) | Limit (dBm) | Margin (dB) |
|---------|-----------------|--------------|------------|-----------------|----------------|----------------------|-------------|-------------|
| 20425   | 826.5           | V            | 6.41       | 3.39            | 6.28           | 9.30                 | 38.45       | -29.15      |
|         | 826.5           | H            | 19.86      | 3.39            | 6.28           | 22.75                | 38.45       | -15.70      |
| 20520   | 836             | V            | 6.52       | 3.4             | 6.37           | 9.49                 | 38.45       | -28.96      |
|         | 836             | H            | 20.79      | 3.4             | 6.37           | <b>*23.76</b>        | 38.45       | -14.69      |
| 20625   | 846.5           | V            | 6.51       | 3.4             | 6.4            | 9.51                 | 38.45       | -28.94      |
|         | 846.5           | H            | 19.91      | 3.4             | 6.4            | 22.91                | 38.45       | -15.54      |

**Channel Bandwidth: 5MHz / 16QAM**

| Channel | Frequency (MHz) | Antenna Pol. | S.G. (dBm) | Cable loss (dB) | Ant.Gain (dBi) | Emission level (dBm) | Limit (dBm) | Margin (dB) |
|---------|-----------------|--------------|------------|-----------------|----------------|----------------------|-------------|-------------|
| 20425   | 826.5           | V            | 7.33       | 3.39            | 6.29           | 10.23                | 38.45       | -28.22      |
|         | 826.5           | H            | 20.76      | 3.39            | 6.28           | 23.65                | 38.45       | -14.80      |
| 20520   | 836             | V            | 7.42       | 3.41            | 6.38           | 10.39                | 38.45       | -28.06      |
|         | 836             | H            | 21.23      | 3.41            | 6.38           | <b>*24.20</b>        | 38.45       | -14.25      |
| 20625   | 846.5           | V            | 6.25       | 3.4             | 6.4            | 9.25                 | 38.45       | -29.20      |
|         | 846.5           | H            | 19.72      | 3.4             | 6.4            | 22.72                | 38.45       | -15.73      |

**Remark:**

1. Output Power (dBm) = Raw Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = S.G Level + Gain of Substitution horn + TX cable loss.
3. The value in bold is the worst.

**Channel Bandwidth: 10MHz / QPSK**

| Channel | Frequency (MHz) | Antenna Pol. | S.G. (dBm) | Cable loss (dB) | Ant.Gain (dBi) | Emission level (dBm) | Limit (dBm) | Margin (dB) |
|---------|-----------------|--------------|------------|-----------------|----------------|----------------------|-------------|-------------|
| 20450   | 829             | V            | 5.18       | 3.39            | 6.26           | 8.05                 | 38.45       | -30.40      |
|         | 829             | H            | 18.32      | 3.39            | 6.26           | 21.19                | 38.45       | -17.26      |
| 20520   | 836             | V            | 5.22       | 3.41            | 6.38           | 8.19                 | 38.45       | -30.26      |
|         | 836             | H            | 19.38      | 3.41            | 6.39           | <b>*22.36</b>        | 38.45       | -16.09      |
| 20600   | 844             | V            | 5.31       | 3.41            | 6.4            | 8.30                 | 38.45       | -30.15      |
|         | 844             | H            | 18.86      | 3.41            | 6.4            | 21.85                | 38.45       | -16.60      |

**Channel Bandwidth: 10MHz / 16QAM**

| Channel | Frequency (MHz) | Antenna Pol. | S.G. (dBm) | Cable loss (dB) | Ant.Gain (dBi) | Emission level (dBm) | Limit (dBm) | Margin (dB) |
|---------|-----------------|--------------|------------|-----------------|----------------|----------------------|-------------|-------------|
| 20450   | 829             | V            | 5.66       | 3.39            | 6.26           | 8.53                 | 38.45       | -29.92      |
|         | 829             | H            | 19.05      | 3.39            | 6.29           | 21.95                | 38.45       | -16.50      |
| 20520   | 836             | V            | 5.94       | 3.41            | 6.38           | 8.91                 | 38.45       | -29.54      |
|         | 836             | H            | 19.34      | 3.41            | 6.38           | <b>*22.31</b>        | 38.45       | -16.14      |
| 20600   | 844             | V            | 5.07       | 3.41            | 6.4            | 8.06                 | 38.45       | -30.39      |
|         | 844             | H            | 19.13      | 3.41            | 6.4            | 22.12                | 38.45       | -16.33      |

**Remark:**

1. Output Power (dBm) = Raw Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = S.G Level + Gain of Substitution horn + TX cable loss.
3. The value in bold is the worst.

**LTE BAND 2****Channel Bandwidth: 5MHz / QPSK**

| Channel | Frequency (MHz) | Antenna Pol. | S.G. (dBm) | Cable loss (dB) | Ant.Gain (dBi) | Emission level (dBm) | Limit (dBm) | Margin (dB) |
|---------|-----------------|--------------|------------|-----------------|----------------|----------------------|-------------|-------------|
| 18650   | 1852.5          | V            | 10.66      | 5.38            | 5.66           | 10.94                | 33.00       | -22.06      |
|         | 1852.5          | H            | 26.61      | 5.38            | 5.66           | 26.89                | 33.00       | -6.11       |
| 18900   | 1880            | V            | 10.36      | 5.41            | 5.62           | 10.57                | 33.00       | -22.43      |
|         | 1880            | H            | 27.33      | 5.41            | 5.62           | 27.54                | 33.00       | -5.46       |
| 19150   | 1907.5          | V            | 9.37       | 5.46            | 5.57           | 9.48                 | 33.00       | -23.52      |
|         | 1907.5          | H            | 27.6       | 5.46            | 5.57           | <b>*27.71</b>        | 33.00       | -5.29       |

**Channel Bandwidth: 5MHz / 16QAM**

| Channel | Frequency (MHz) | Antenna Pol. | S.G. (dBm) | Cable loss (dB) | Ant.Gain (dBi) | Emission level (dBm) | Limit (dBm) | Margin (dB) |
|---------|-----------------|--------------|------------|-----------------|----------------|----------------------|-------------|-------------|
| 18650   | 1852.5          | V            | 11.07      | 5.38            | 5.66           | 11.35                | 33.00       | -21.65      |
|         | 1852.5          | H            | 26.98      | 5.38            | 5.66           | 27.26                | 33.00       | -5.74       |
| 18900   | 1880            | V            | 10.58      | 5.41            | 5.62           | 10.79                | 33.00       | -22.21      |
|         | 1880            | H            | 27.73      | 5.41            | 5.62           | <b>*27.94</b>        | 33.00       | -5.06       |
| 19150   | 1907.5          | V            | 9.48       | 5.47            | 5.57           | 9.58                 | 33.00       | -23.42      |
|         | 1907.5          | H            | 27.71      | 5.46            | 5.57           | 27.82                | 33.00       | -5.18       |

**Remark:**

1. Output Power (dBm) = Raw Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = S.G Level + Gain of Substitution horn + TX cable loss.
3. The value in bold is the worst.

**Channel Bandwidth: 10MHz / QPSK**

| Channel | Frequency (MHz) | Antenna Pol. | S.G. (dBm) | Cable loss (dB) | Ant.Gain (dBi) | Emission level (dBm) | Limit (dBm) | Margin (dB) |
|---------|-----------------|--------------|------------|-----------------|----------------|----------------------|-------------|-------------|
| 18625   | 1855            | V            | 10.88      | 5.38            | 5.65           | 11.15                | 33.00       | -21.85      |
|         | 1855            | H            | 26.79      | 5.38            | 5.66           | 27.07                | 33.00       | -5.93       |
| 18900   | 1880            | V            | 10.49      | 5.41            | 5.62           | 10.70                | 33.00       | -22.30      |
|         | 1880            | H            | 27.4       | 5.41            | 5.62           | 27.61                | 33.00       | -5.39       |
| 19175   | 1905            | V            | 9.38       | 5.45            | 5.58           | 9.51                 | 33.00       | -23.49      |
|         | 1905            | H            | 27.79      | 5.45            | 5.58           | <b>*27.92</b>        | 33.00       | -5.08       |

**Channel Bandwidth: 10MHz / 16QAM**

| Channel | Frequency (MHz) | Antenna Pol. | S.G. (dBm) | Cable loss (dB) | Ant.Gain (dBi) | Emission level (dBm) | Limit (dBm) | Margin (dB) |
|---------|-----------------|--------------|------------|-----------------|----------------|----------------------|-------------|-------------|
| 18625   | 1855            | V            | 10.88      | 5.38            | 5.65           | 11.15                | 33.00       | -21.85      |
|         | 1855            | H            | 26.79      | 5.38            | 5.66           | 27.07                | 33.00       | -5.93       |
| 18900   | 1880            | V            | 10.42      | 5.41            | 5.62           | 10.63                | 33.00       | -22.37      |
|         | 1880            | H            | 27.08      | 5.41            | 5.62           | 27.29                | 33.00       | -5.71       |
| 19175   | 1905            | V            | 9.47       | 5.45            | 5.58           | 9.60                 | 33.00       | -23.40      |
|         | 1905            | H            | 27.89      | 5.46            | 5.57           | <b>*28.00</b>        | 33.00       | -5.00       |

**Remark:**

1. Output Power (dBm) = Raw Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = S.G Level + Gain of Substitution horn + TX cable loss.
3. The value in bold is the worst.

**Channel Bandwidth: 20MHz / QPSK**

| Channel | Frequency (MHz) | Antenna Pol. | S.G. (dBm) | Cable loss (dB) | Ant.Gain (dBi) | Emission level (dBm) | Limit (dBm) | Margin (dB) |
|---------|-----------------|--------------|------------|-----------------|----------------|----------------------|-------------|-------------|
| 18700   | 1860            | V            | 10.04      | 5.39            | 5.64           | 10.29                | 33.00       | -22.71      |
|         | 1860            | H            | 25.81      | 5.39            | 5.64           | 26.06                | 33.00       | -6.94       |
| 18900   | 1880            | V            | 9.1        | 5.42            | 5.62           | 9.30                 | 33.00       | -23.70      |
|         | 1880            | H            | 26.06      | 5.41            | 5.62           | 26.27                | 33.00       | -6.73       |
| 19100   | 1900            | V            | 8.51       | 5.44            | 5.59           | 8.66                 | 33.00       | -24.34      |
|         | 1900            | H            | 26.85      | 5.44            | 5.59           | <b>*27.00</b>        | 33.00       | -6.00       |

**Channel bandwidth: 20MHz / 16QAM**

| Channel | Frequency (MHz) | Antenna Pol. | S.G. (dBm) | Cable loss (dB) | Ant.Gain (dBi) | Emission level (dBm) | Limit (dBm) | Margin (dB) |
|---------|-----------------|--------------|------------|-----------------|----------------|----------------------|-------------|-------------|
| 18700   | 1860            | V            | 10.37      | 5.39            | 5.64           | 10.62                | 33.00       | -22.38      |
|         | 1860            | H            | 26.25      | 5.39            | 5.64           | 26.50                | 33.00       | -6.50       |
| 18900   | 1880            | V            | 9.63       | 5.41            | 5.62           | 9.84                 | 33.00       | -23.16      |
|         | 1880            | H            | 26.05      | 5.42            | 5.62           | 26.25                | 33.00       | -6.75       |
| 19100   | 1900            | V            | 8.68       | 5.45            | 5.59           | 8.82                 | 33.00       | -24.18      |
|         | 1900            | H            | 26.74      | 5.44            | 5.59           | <b>*26.89</b>        | 33.00       | -6.11       |

**Remark:**

1. Output Power (dBm) = Raw Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = S.G Level + Gain of Substitution horn + TX cable loss.
3. The value in bold is the worst.



## 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).

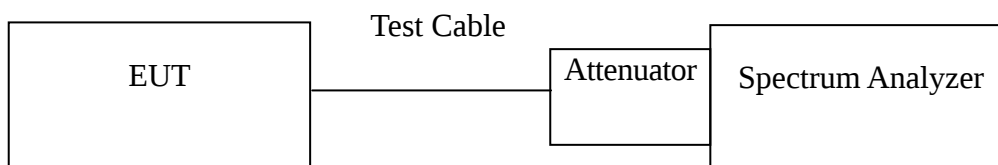
**Out of Band Emissions:** The mean power of emission must be attenuated below the mean power of the non-modulated carrier (P) on any frequency twice or more than twice the fundamental frequency by at least  $43 + 10 \log P$  dB.

**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 |

**Test Plot****LTE Band 5****Channel Bandwidth: 5MHz / QPSK**

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

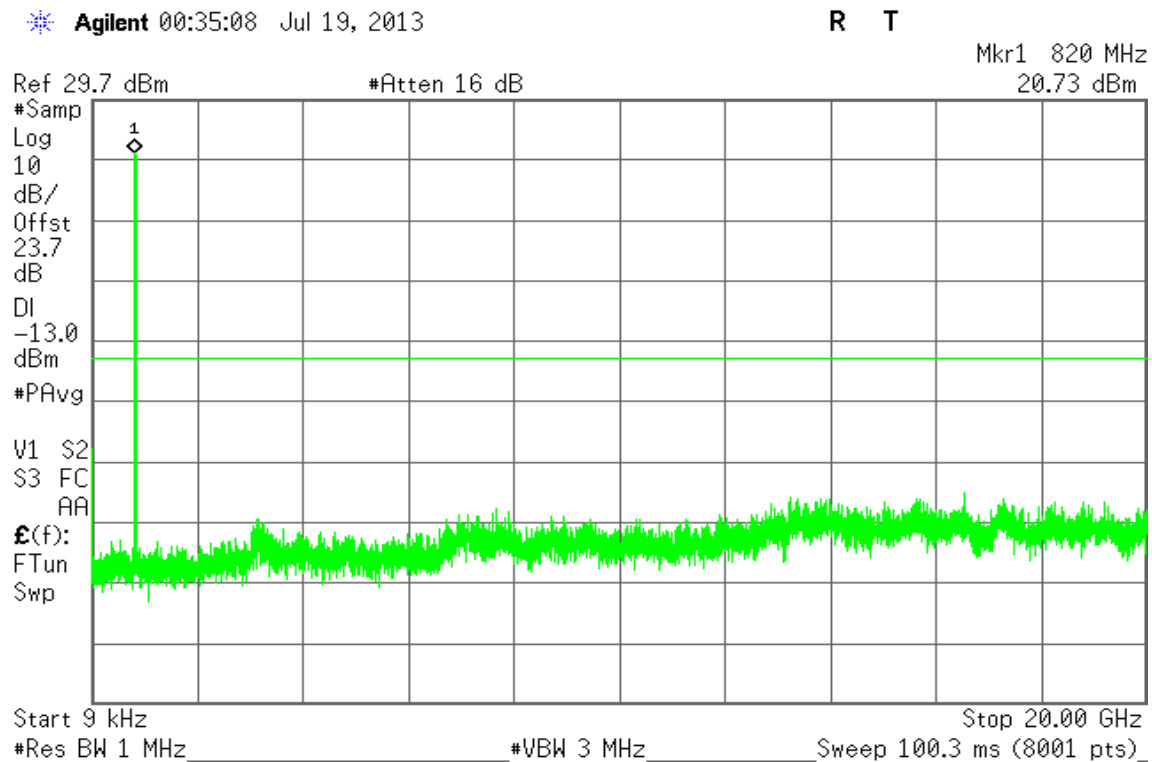


Figure 7-2: Out of Band emission at antenna terminals – CH Mid

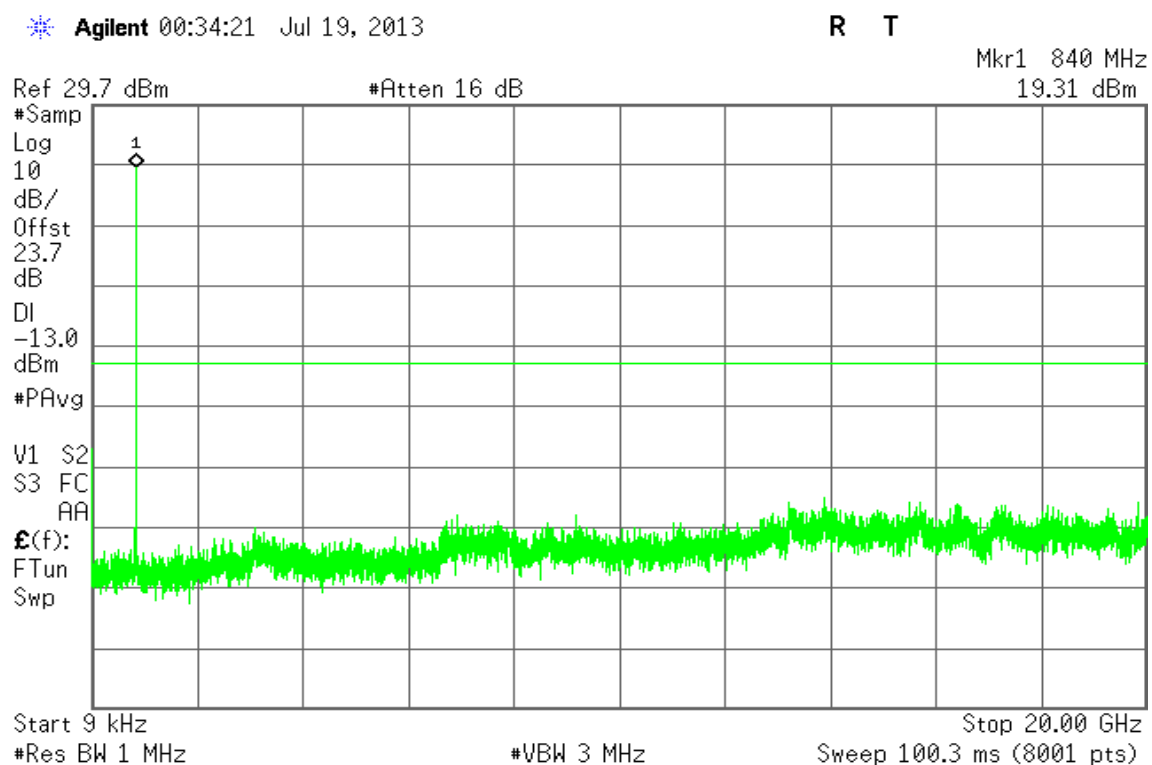
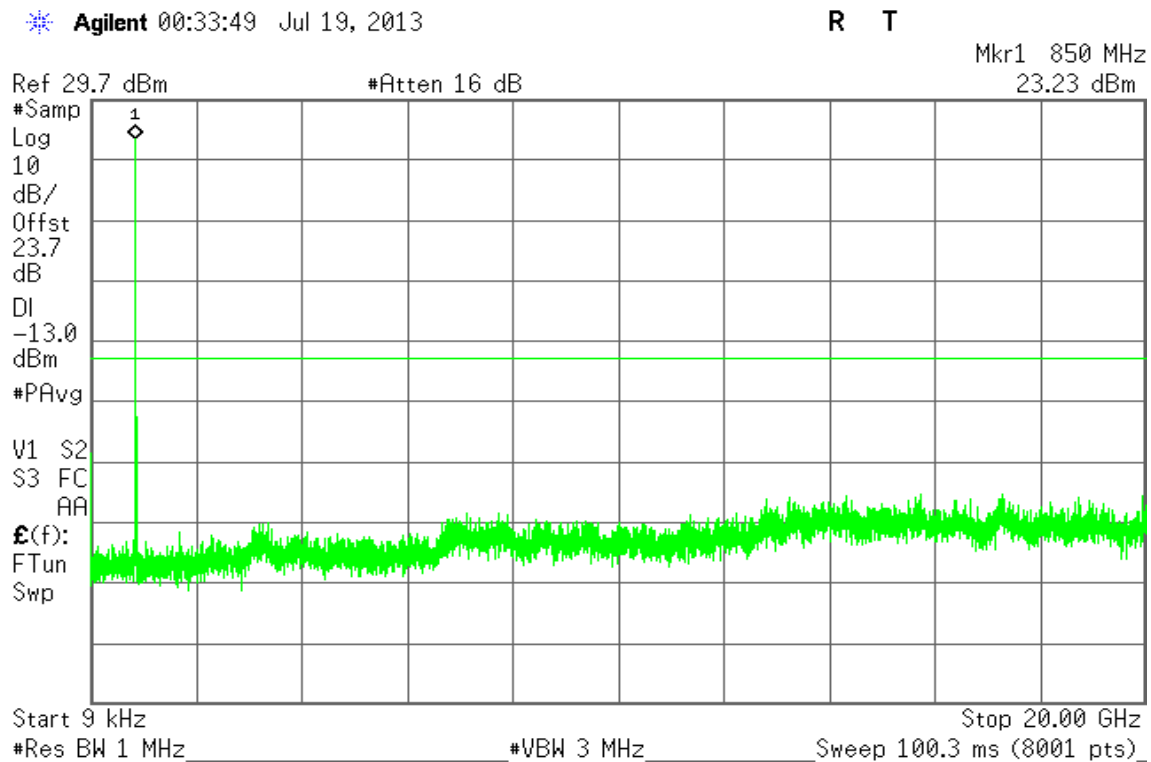




Figure 7-3: Out of Band emission at antenna terminals – CH High



## LTE Band 5

### Channel Bandwidth: 5MHz / 16QAM

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

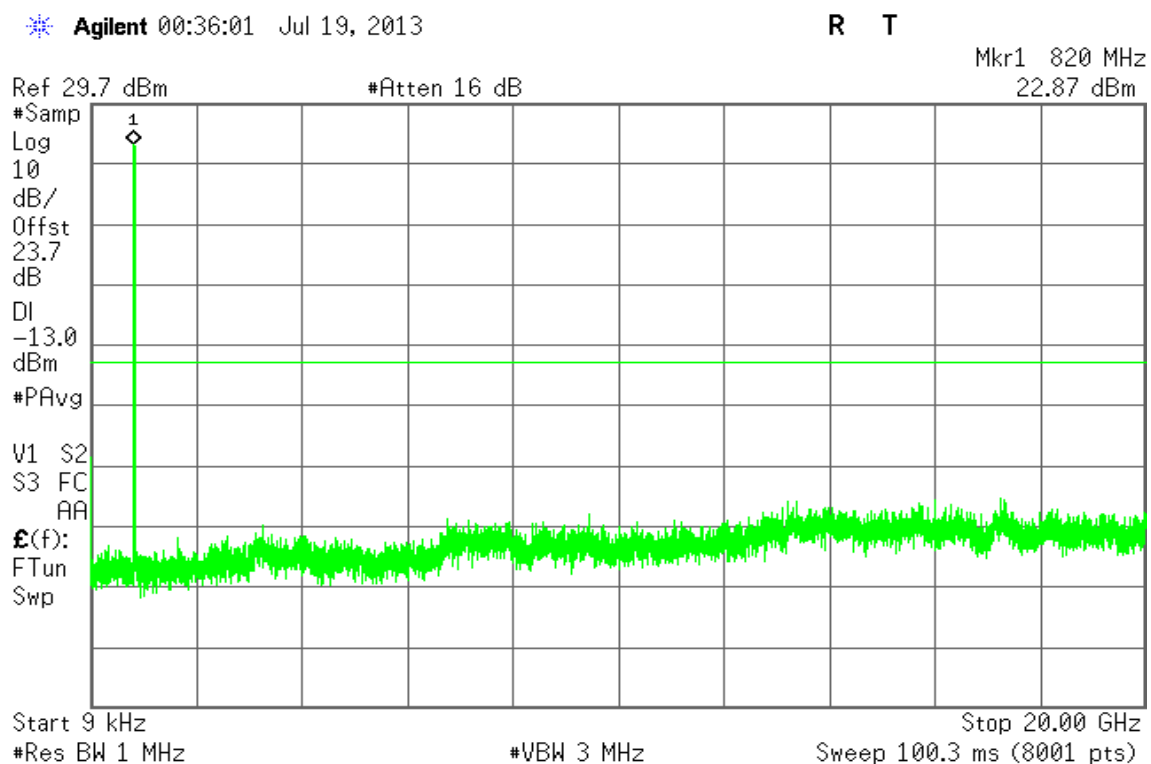




Figure 8-2: Out of Band emission at antenna terminals – CH Mid

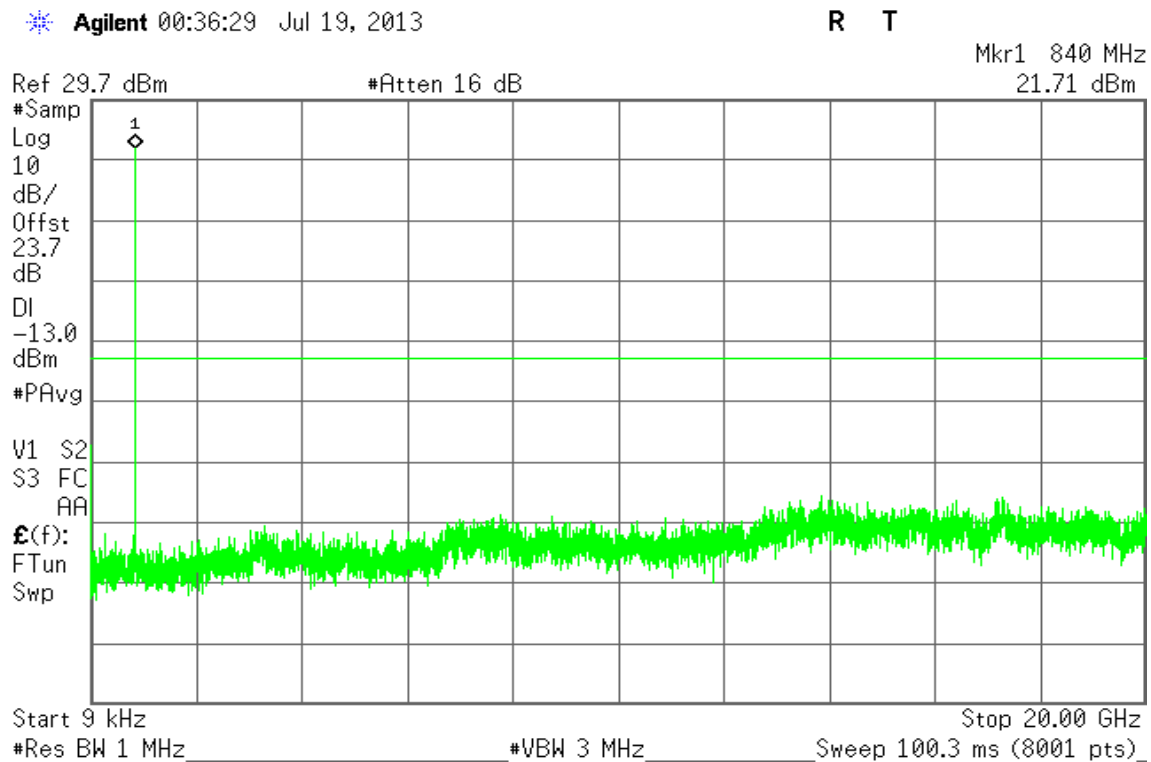
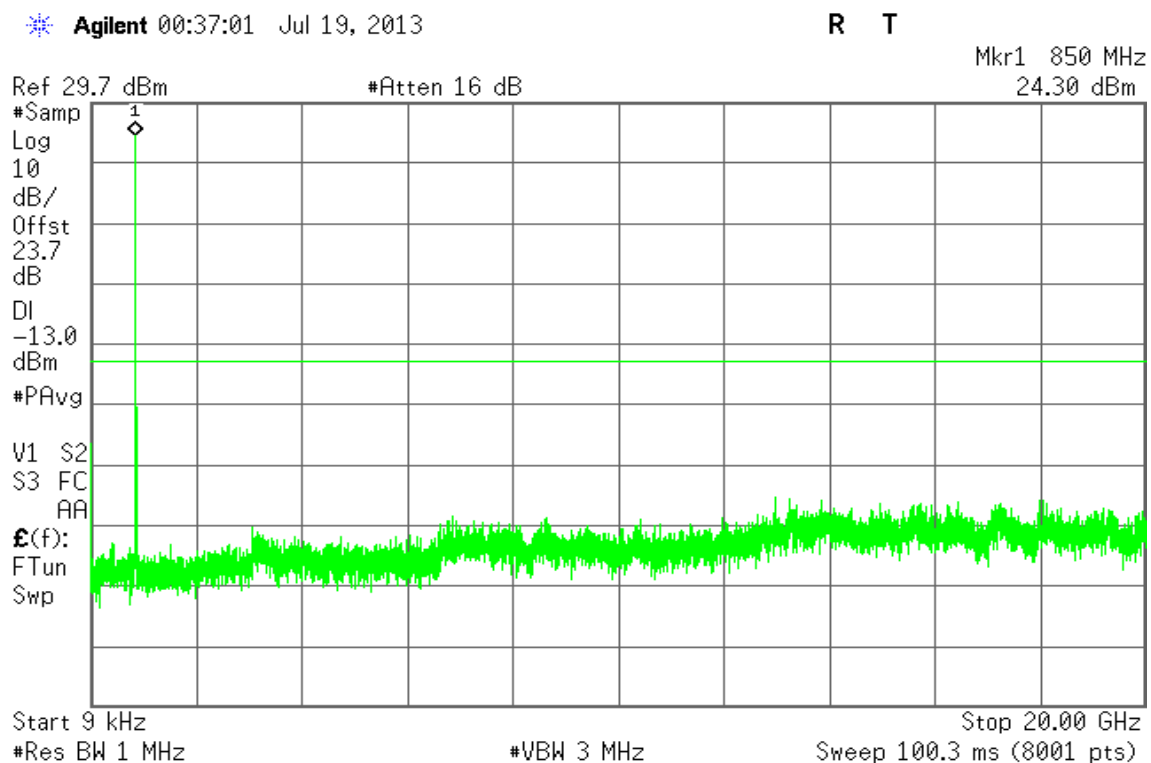


Figure 8-3: Out of Band emission at antenna terminals – CH High





## LTE Band 5

### Channel Bandwidth: 10MHz / QPSK

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

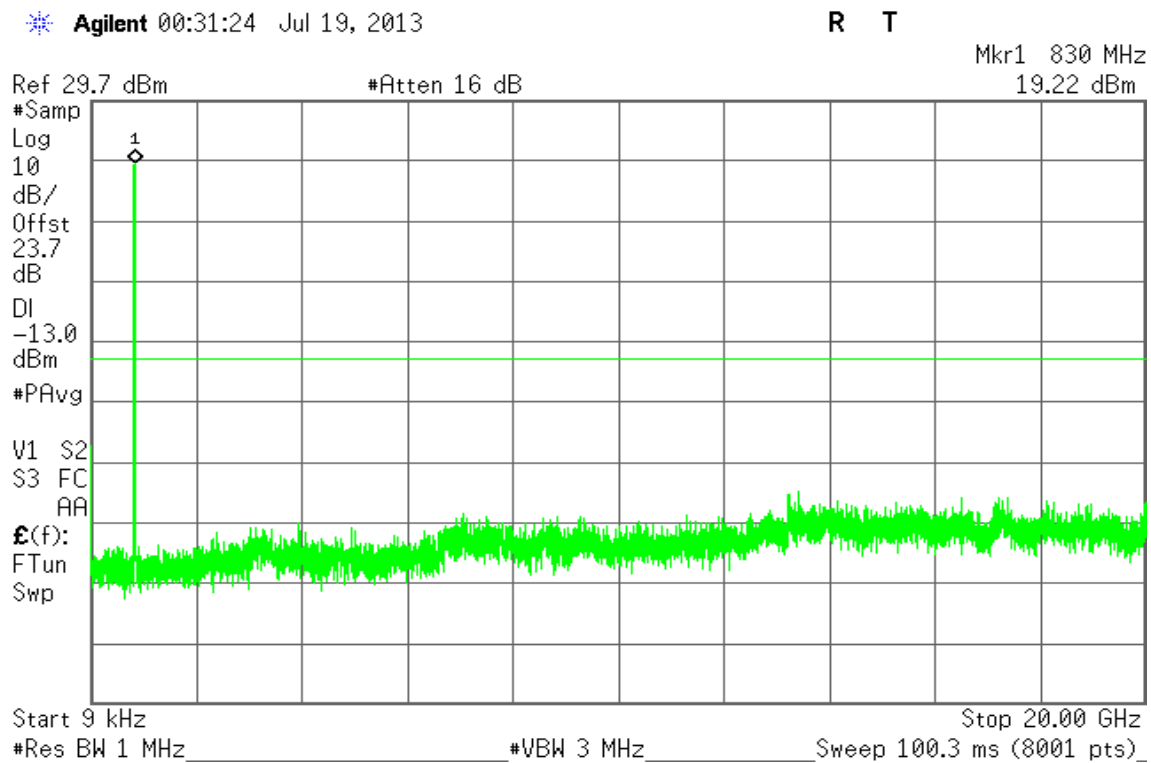


Figure 9-2: Out of Band emission at antenna terminals – CH Mid

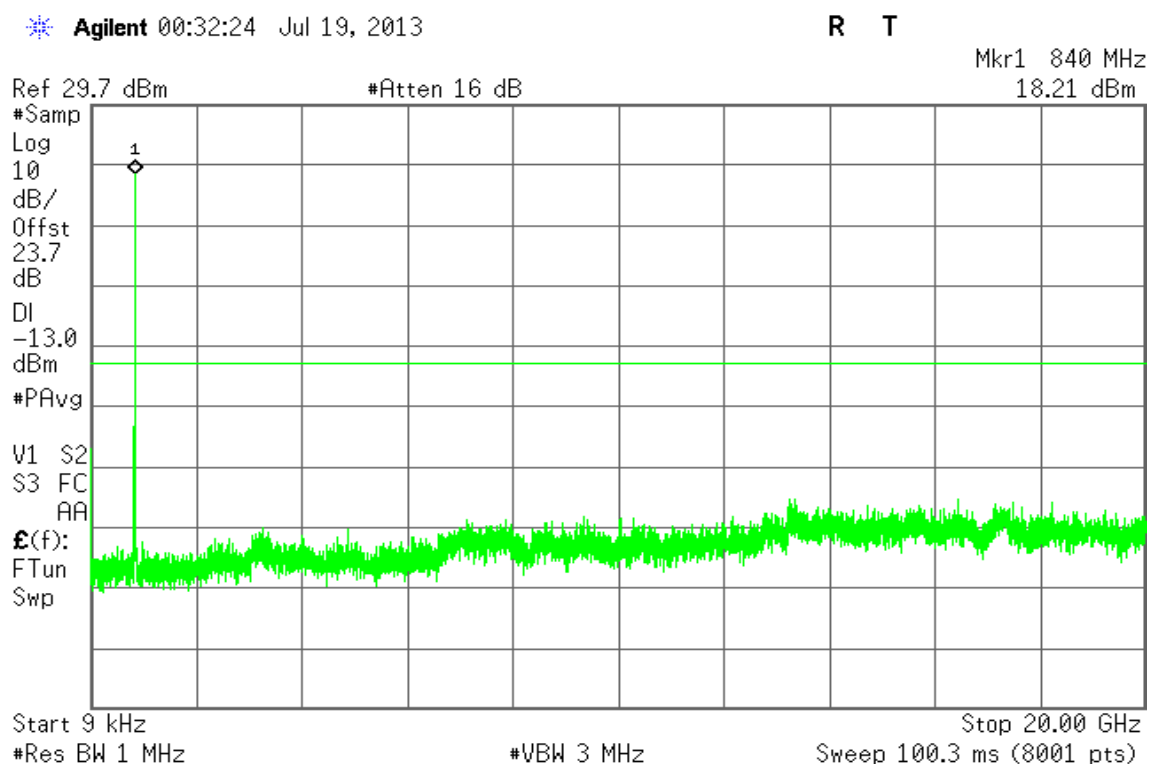




Figure 9-3: Out of Band emission at antenna terminals – CH High

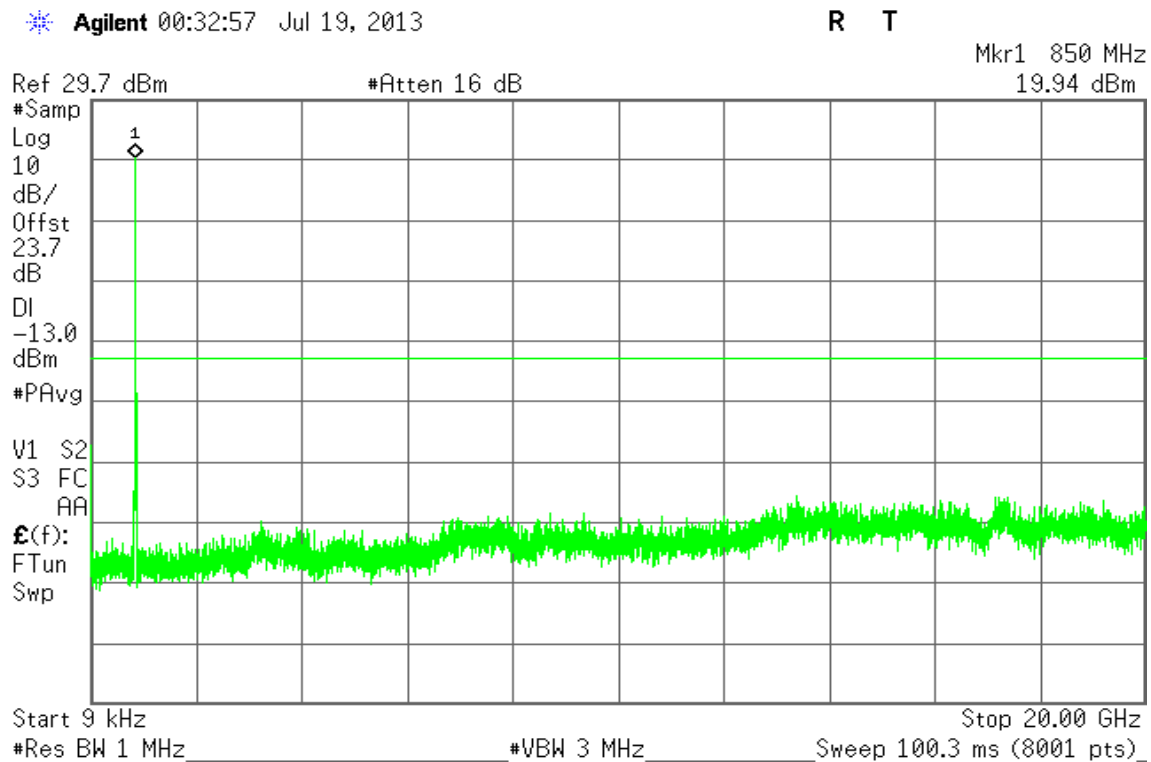


Figure 10-1: Band Edge emissions – CH Low

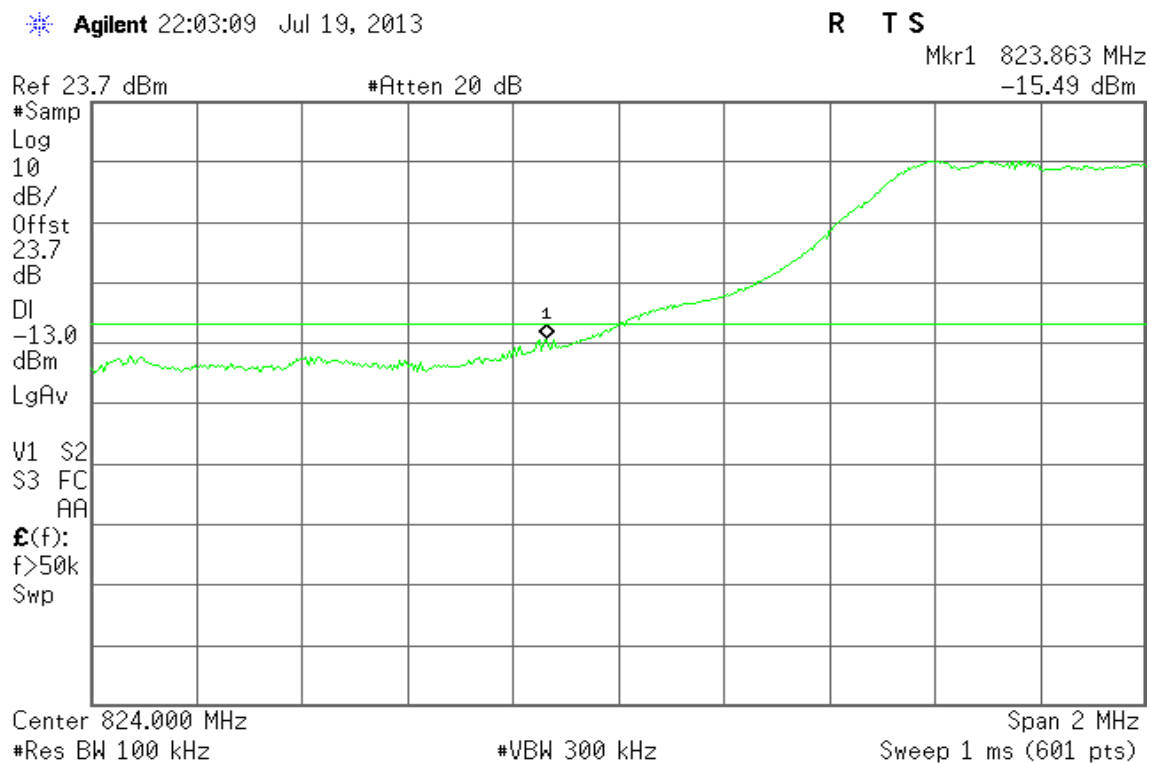




Figure 10-2: Band Edge emissions – CH High

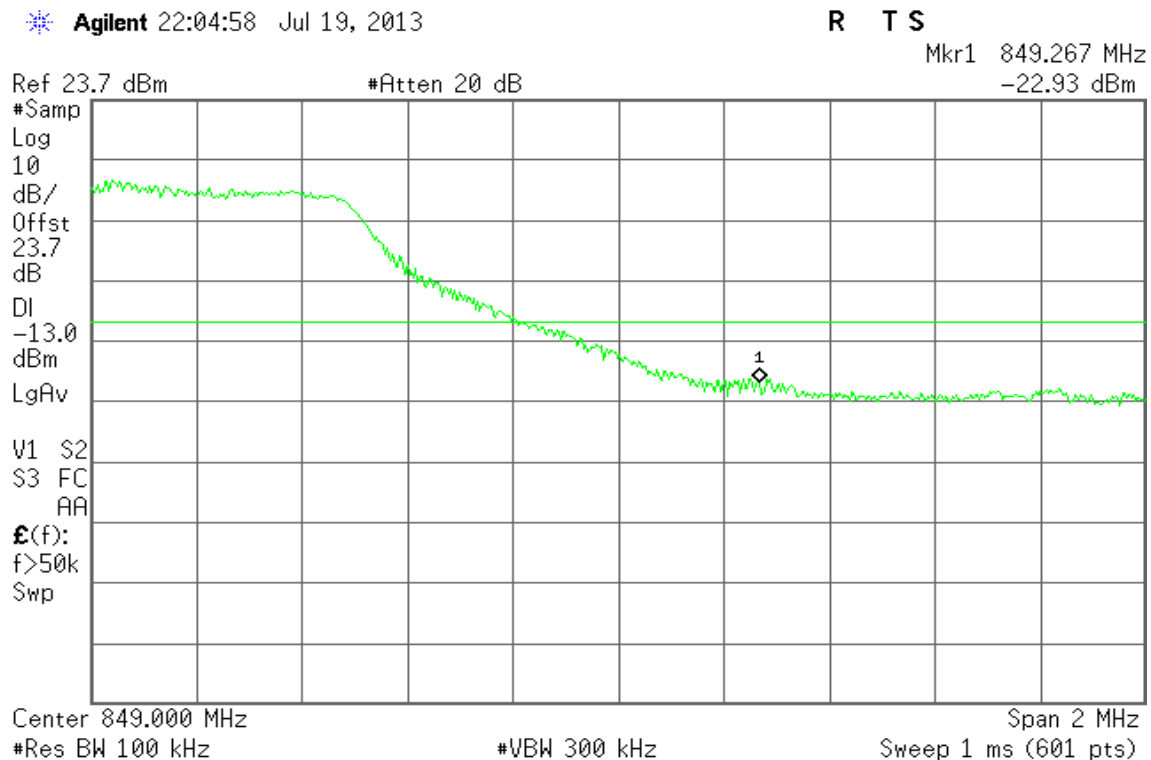
**LTE Band 5****Channel Bandwidth: 10MHz / 16QAM**

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

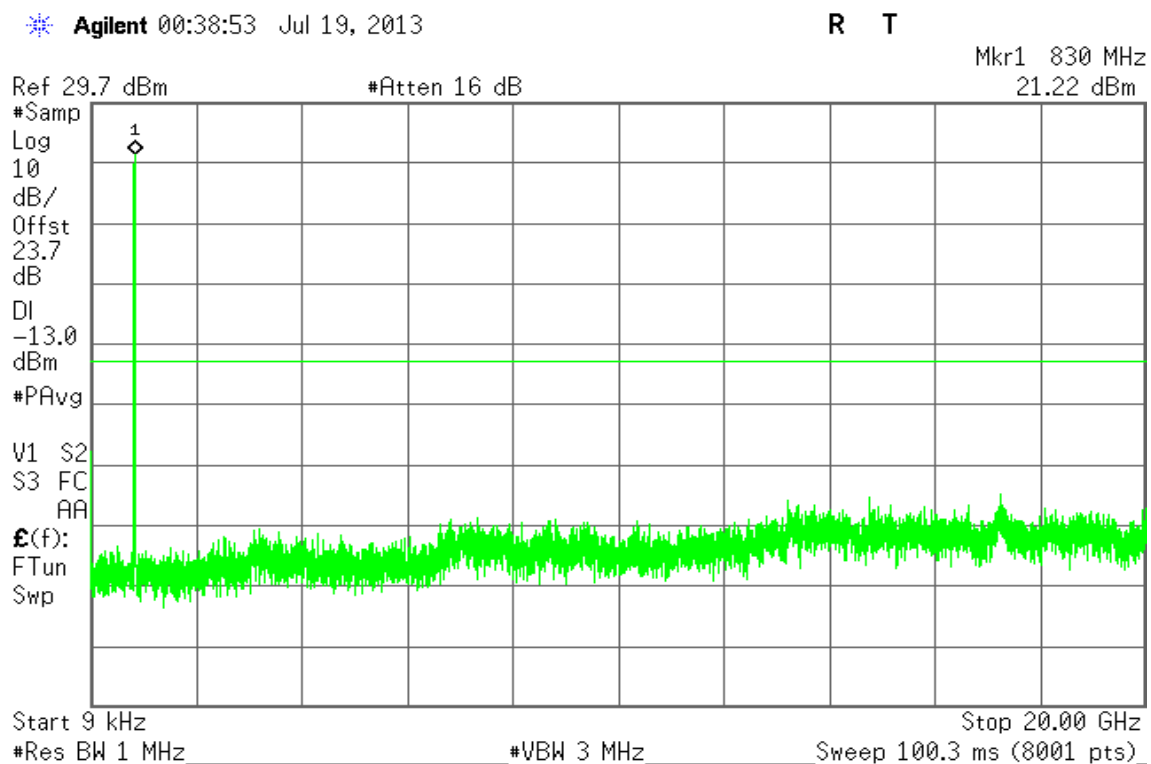




Figure 11-2: Out of Band emission at antenna terminals – CH Mid

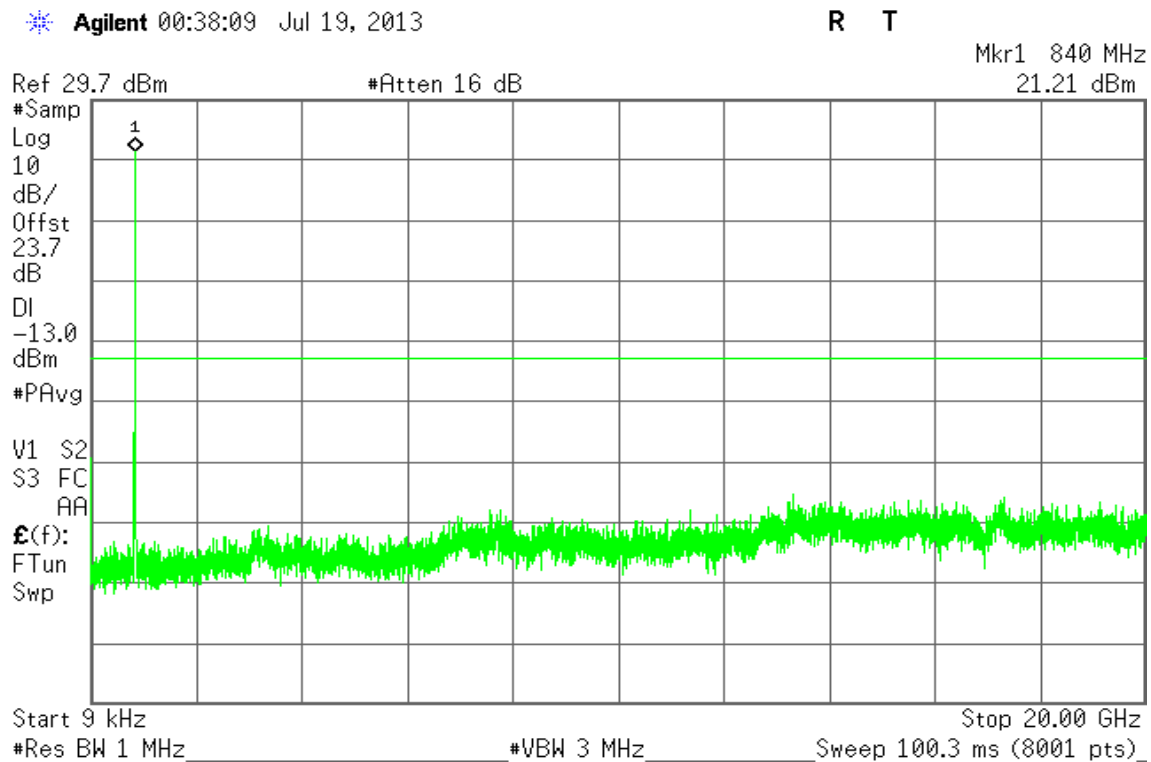


Figure 11-3: Out of Band emission at antenna terminals – CH High

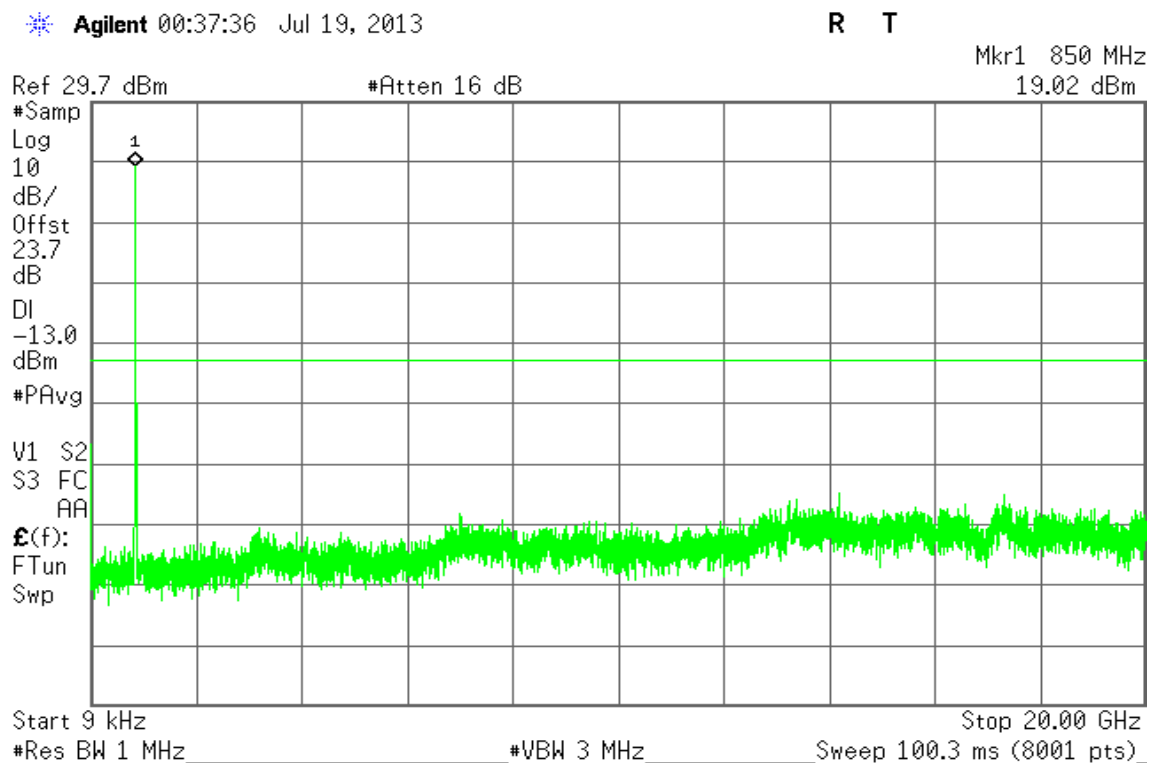




Figure 12-1: Band Edge emissions – CH Low

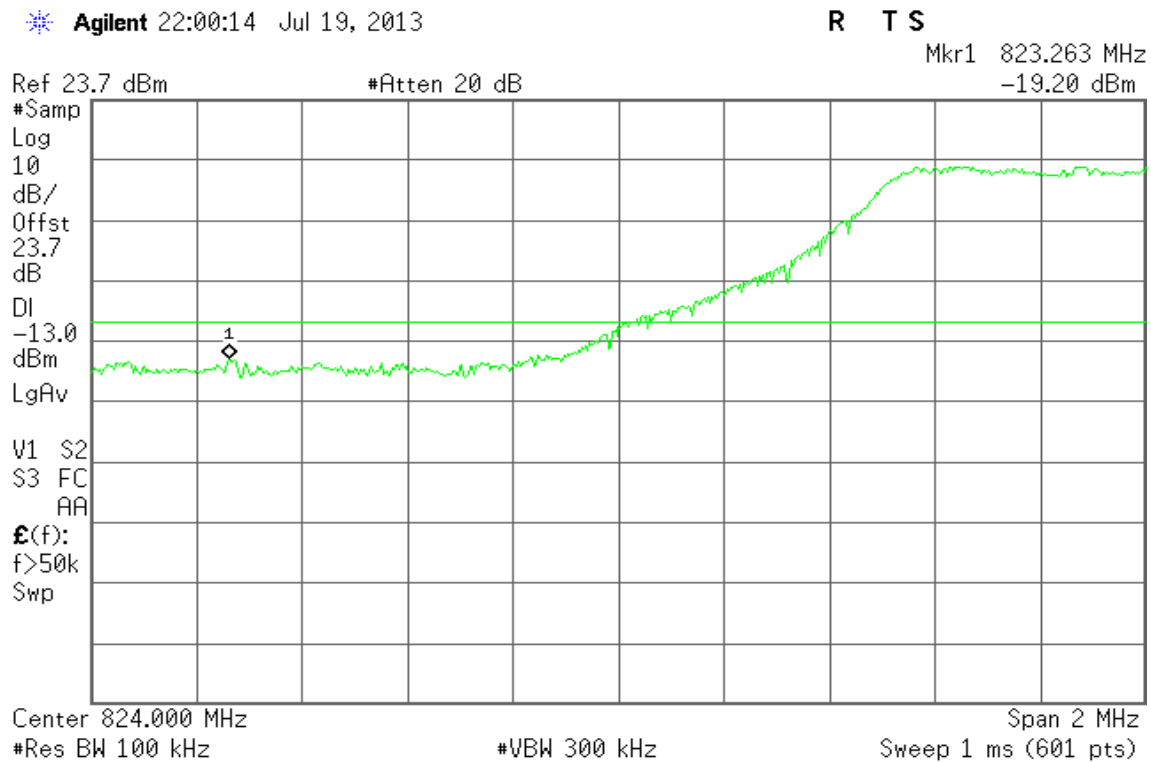
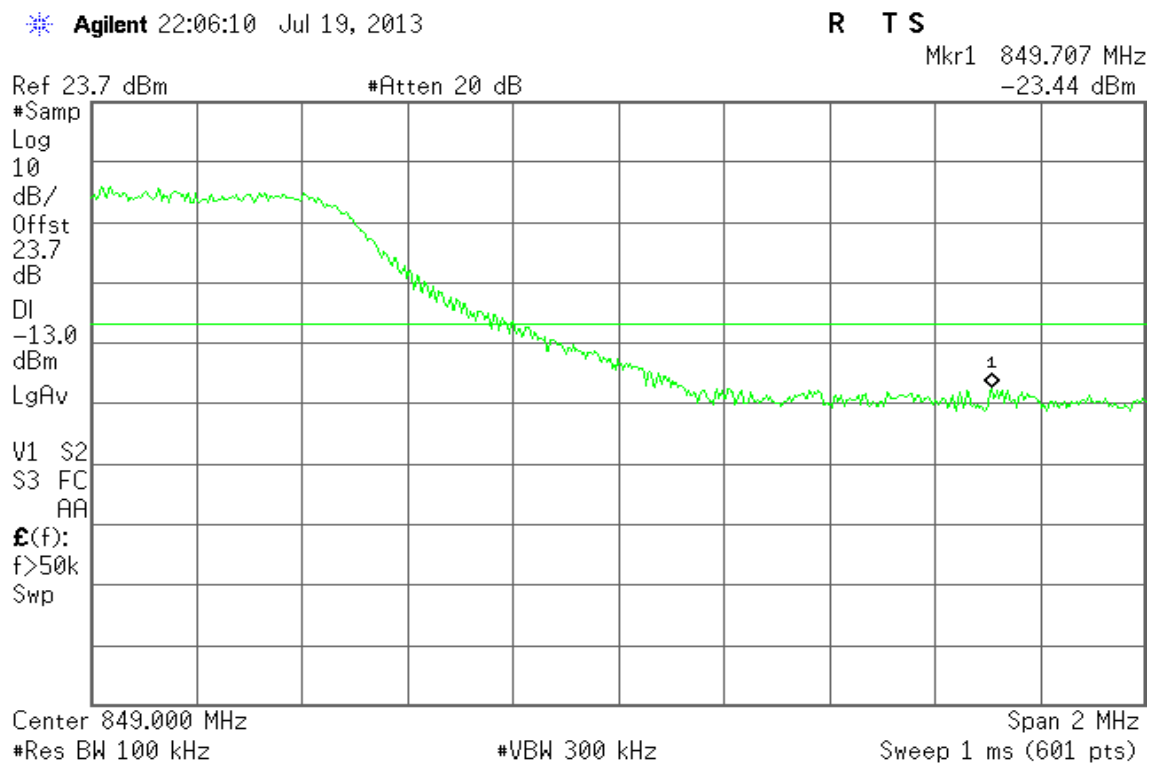


Figure 12-2: Band Edge emissions – CH High



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

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

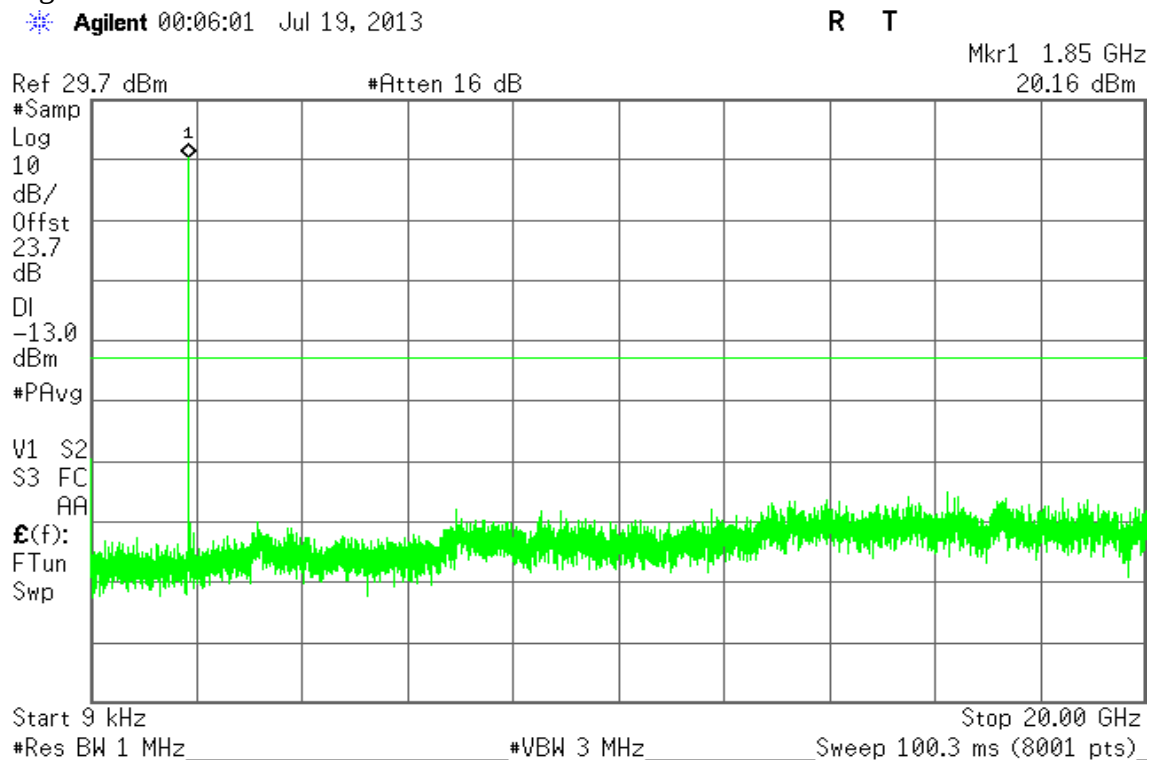


Figure 13-2: Out of Band emission at antenna terminals – CH Mid

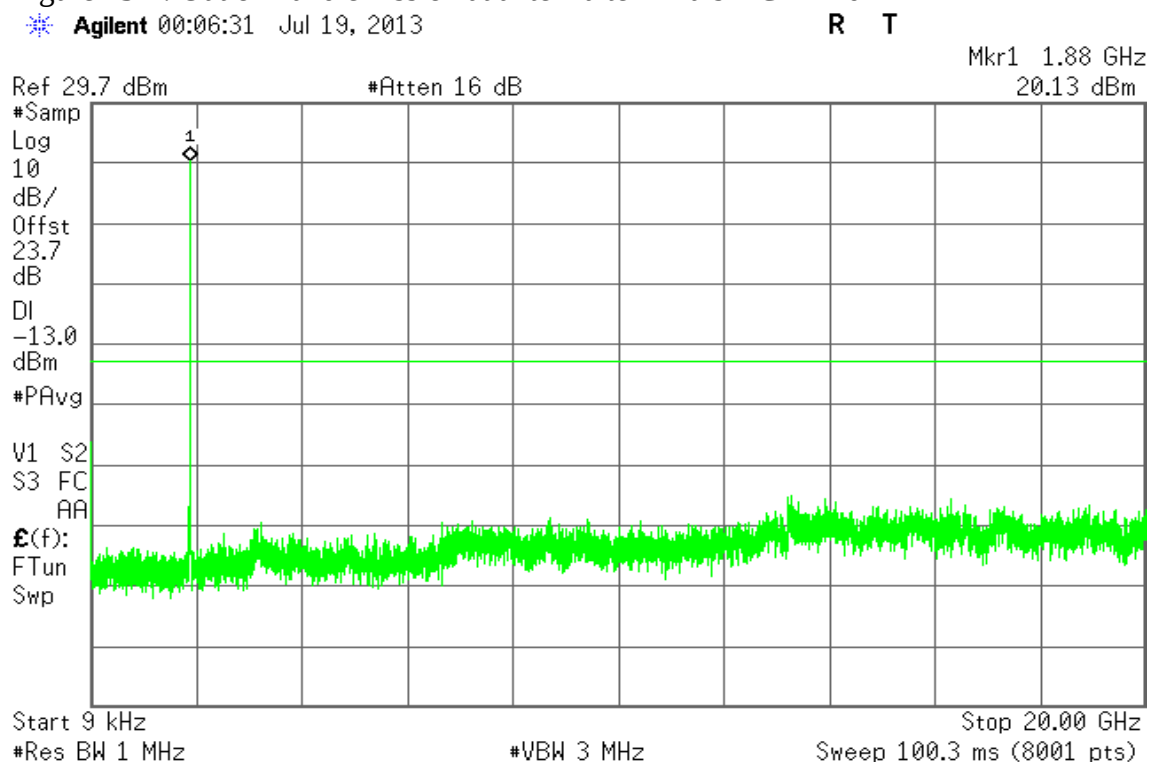
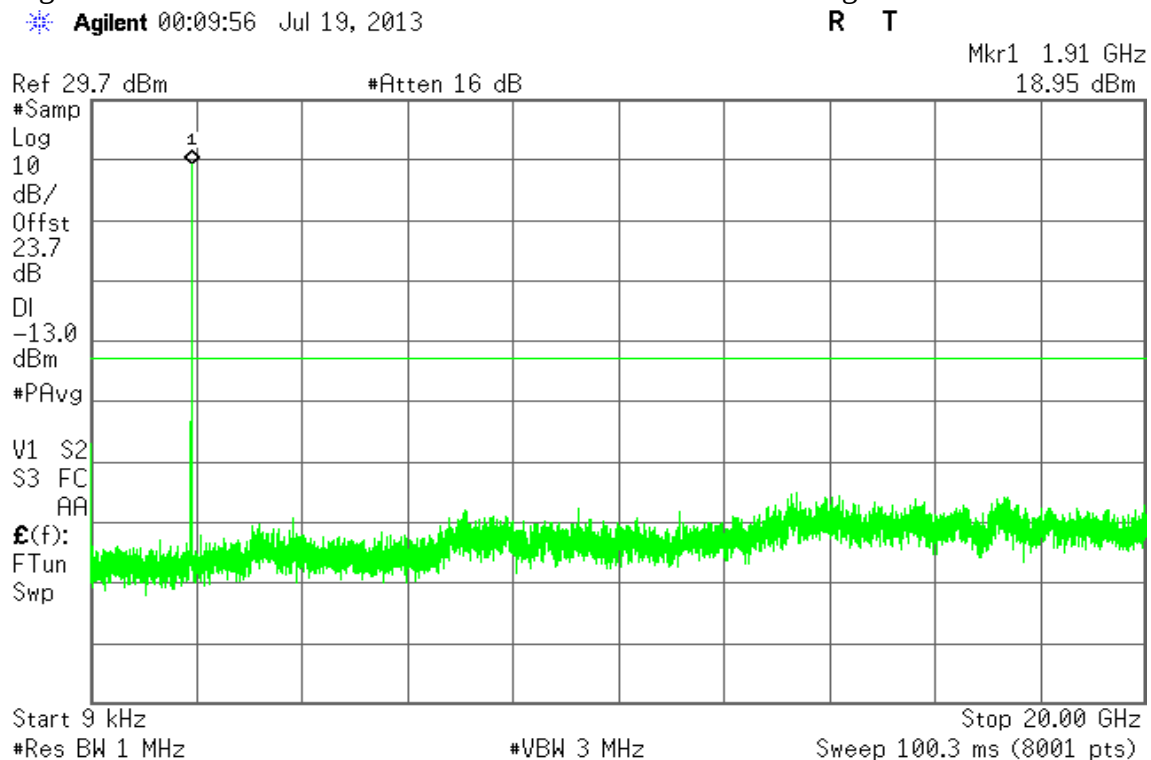




Figure 13-3: Out of Band emission at antenna terminals – CH High



## LTE Band 2

### Channel Bandwidth: 5MHz / 16QAM

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

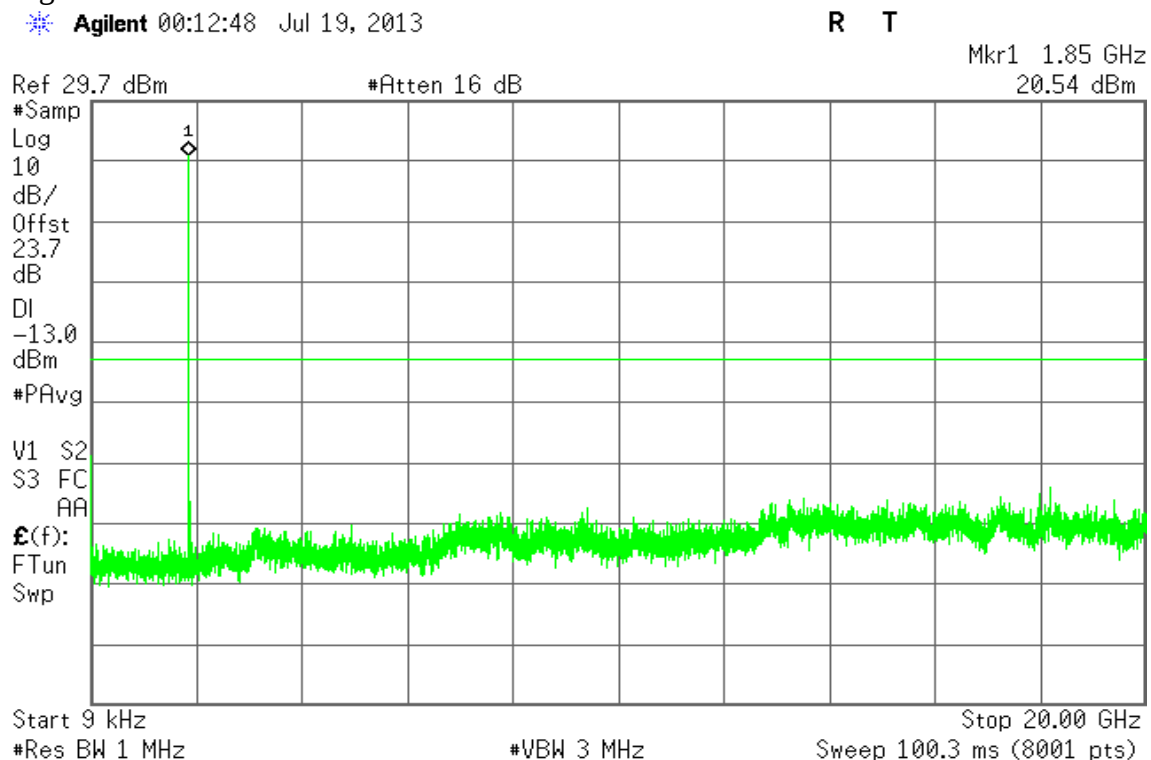




Figure 14-2: Out of Band emission at antenna terminals – CH Mid

Agilent 00:13:17 Jul 19, 2013

R T

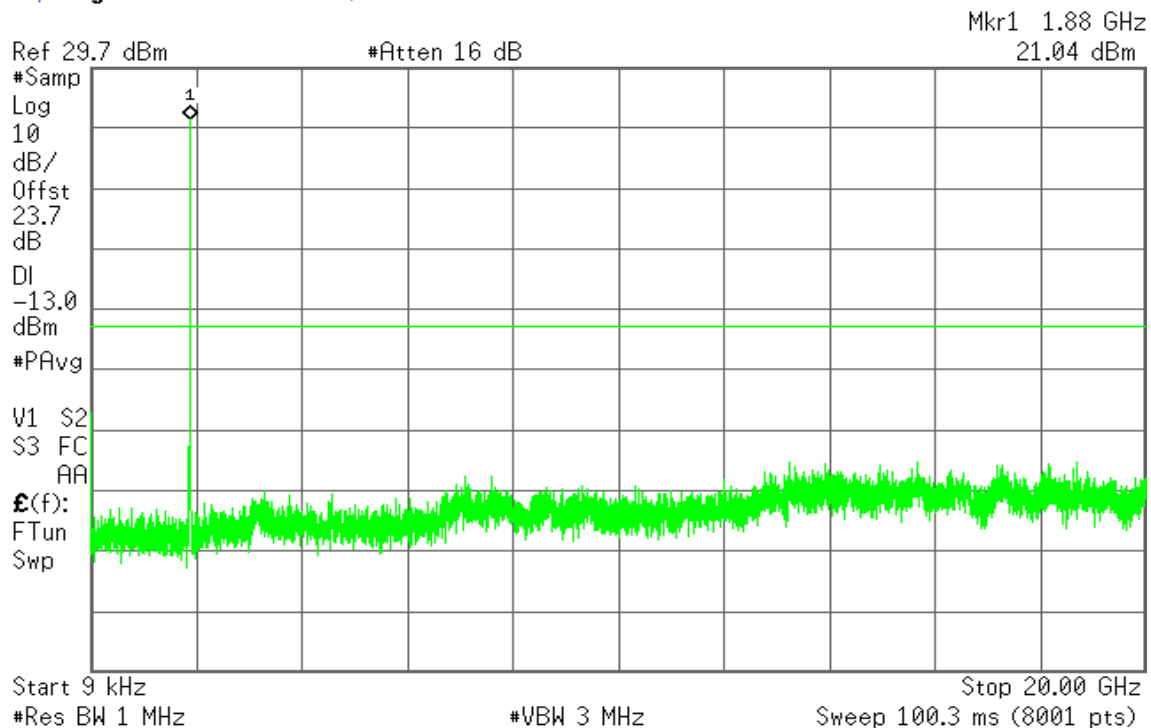
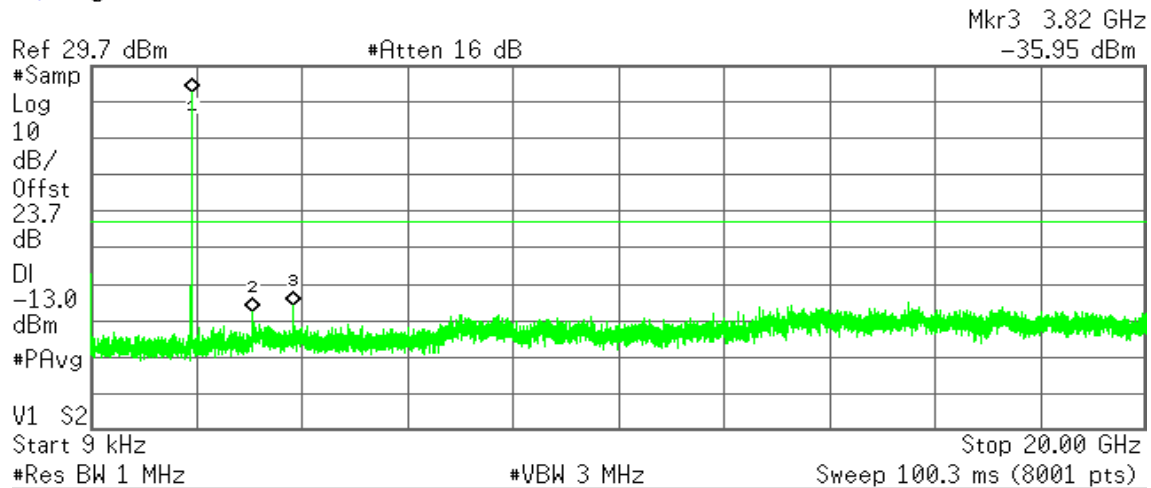


Figure 14-3: Out of Band emission at antenna terminals – CH High

Agilent 00:14:24 Jul 19, 2013

R T



| Marker | Trace | Type | X Axis   | Amplitude  |
|--------|-------|------|----------|------------|
| 1      | (1)   | Freq | 1.91 GHz | 22.48 dBm  |
| 2      | (1)   | Freq | 3.08 GHz | -37.83 dBm |
| 3      | (1)   | Freq | 3.82 GHz | -35.95 dBm |

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

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

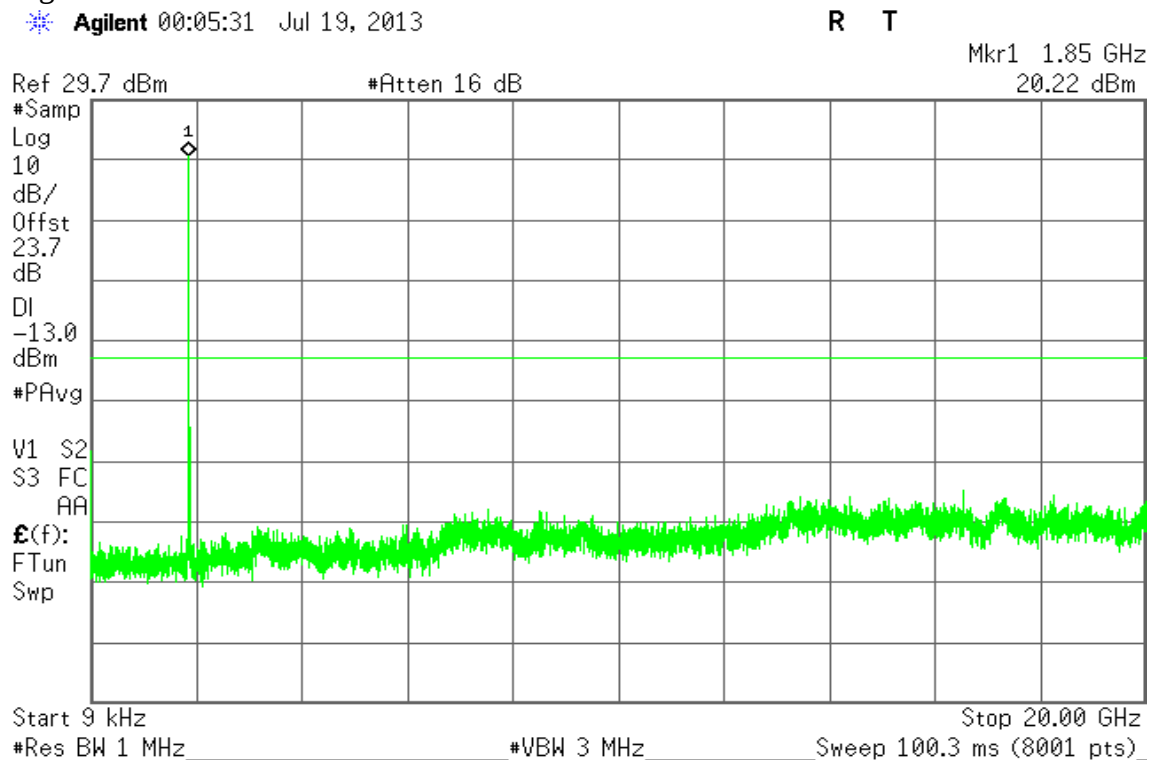


Figure 15-2: Out of Band emission at antenna terminals – CH Mid

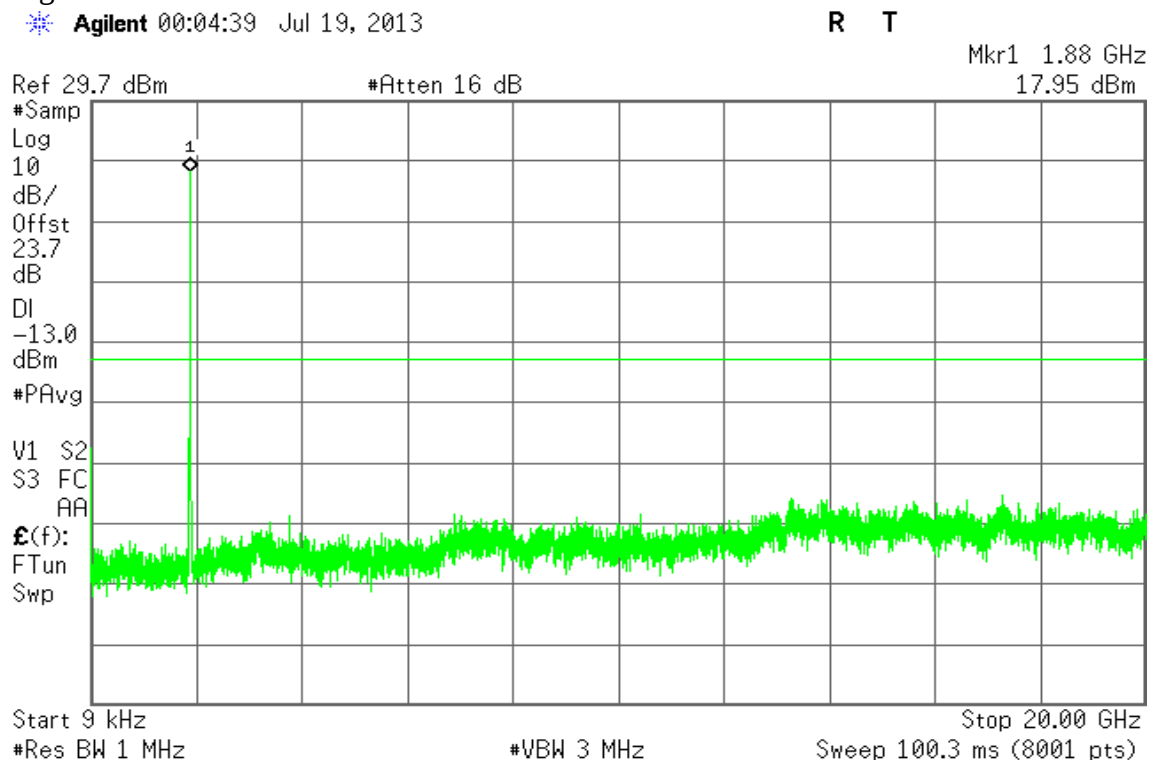




Figure 15-3: Out of Band emission at antenna terminals – CH High

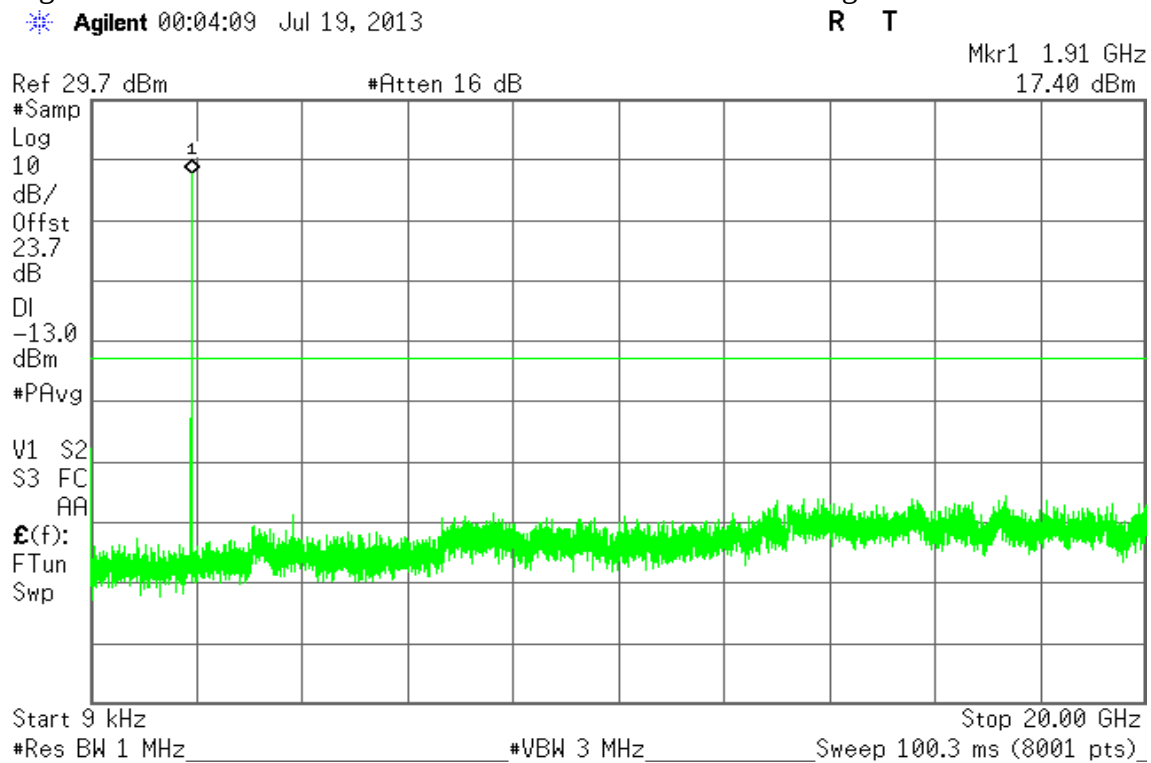


Figure 16-1: Band Edge emissions – CH Low

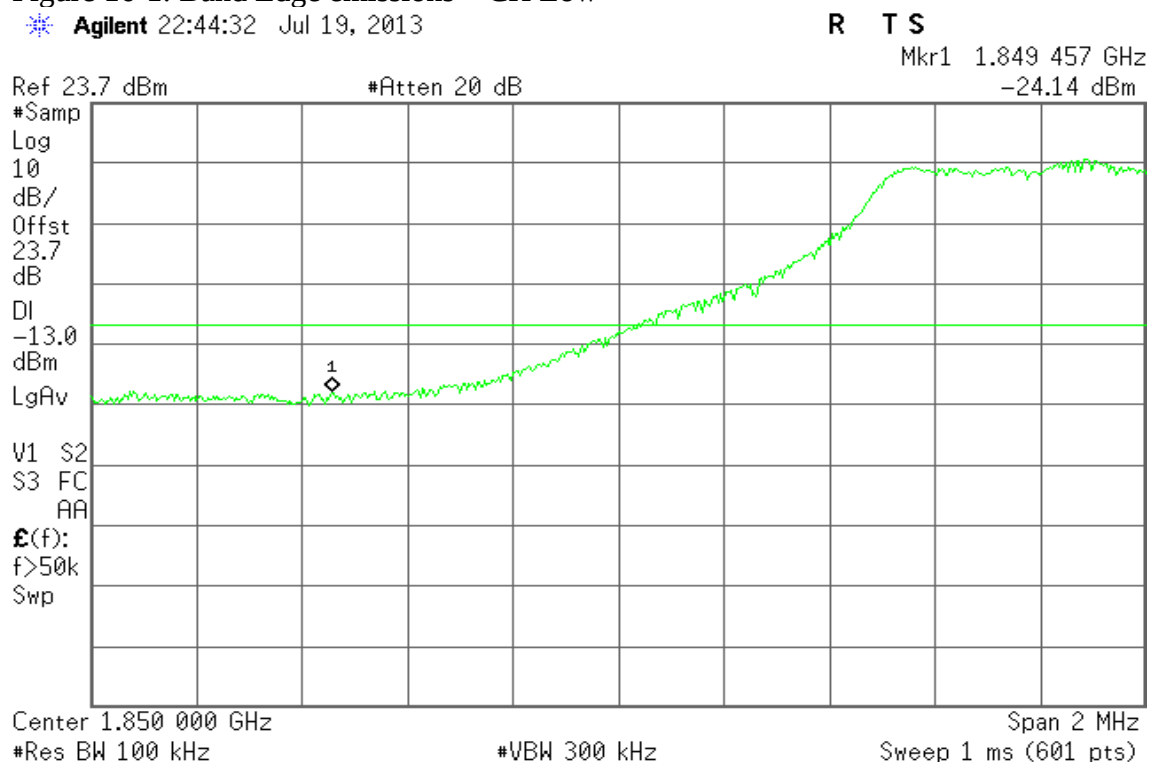
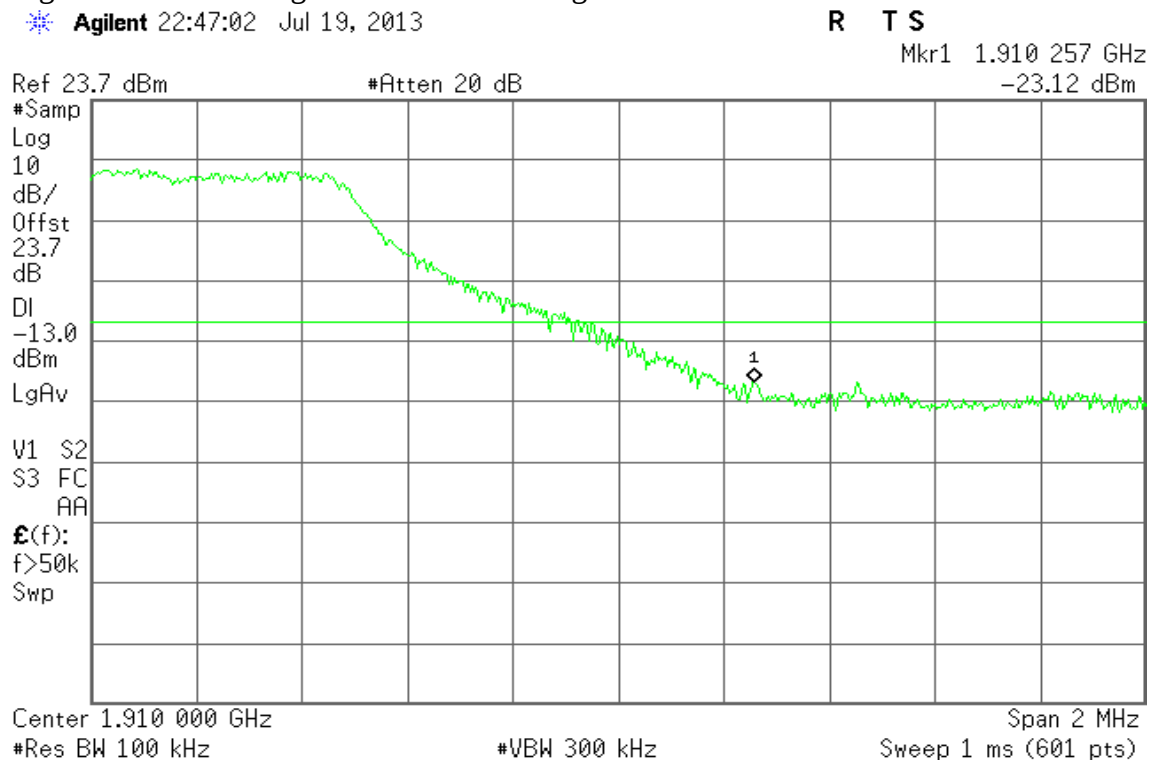




Figure 16-2: Band Edge emissions – CH High



## LTE Band 2

### Channel Bandwidth: 10MHz / 16QAM

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

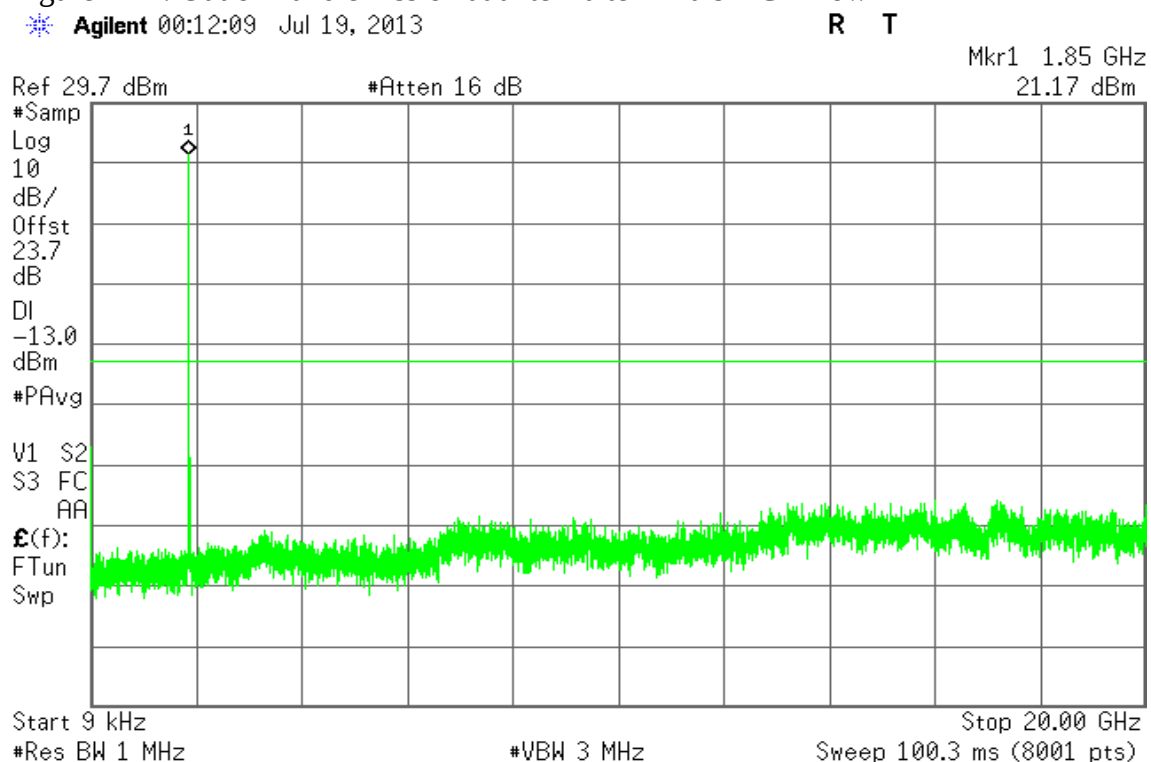




Figure 17-2: Out of Band emission at antenna terminals – CH Mid

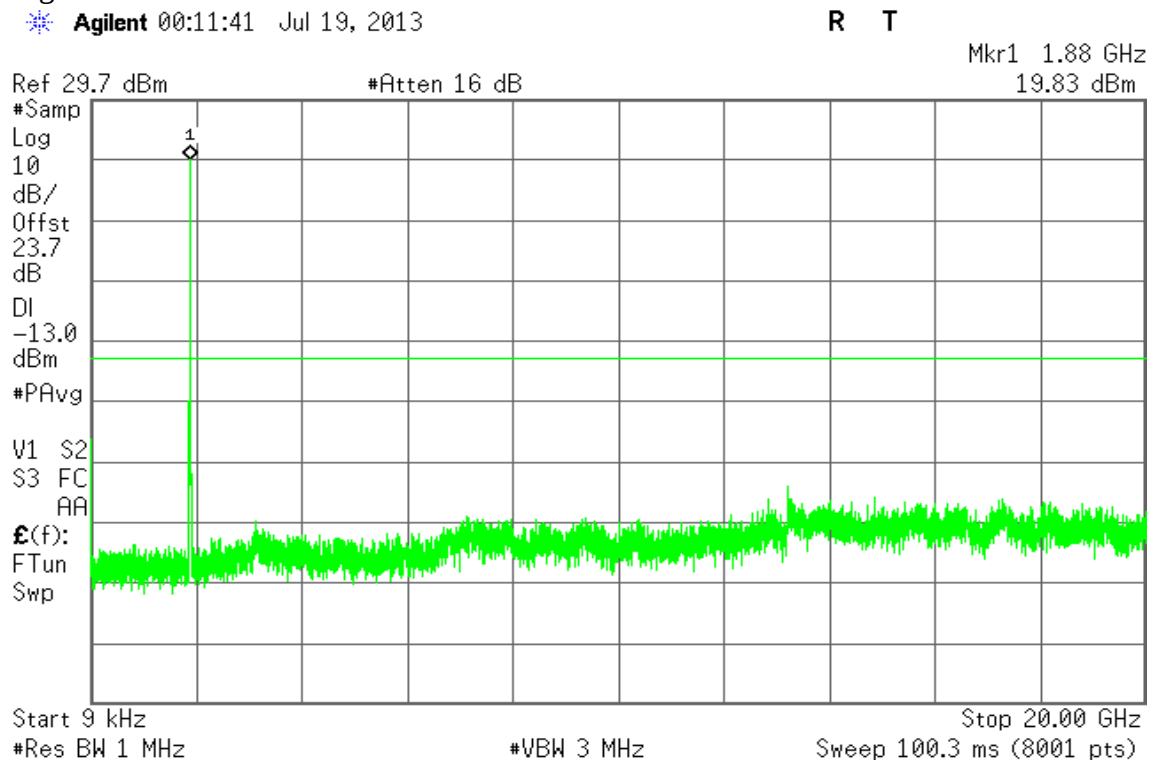


Figure 17-3: Out of Band emission at antenna terminals – CH High

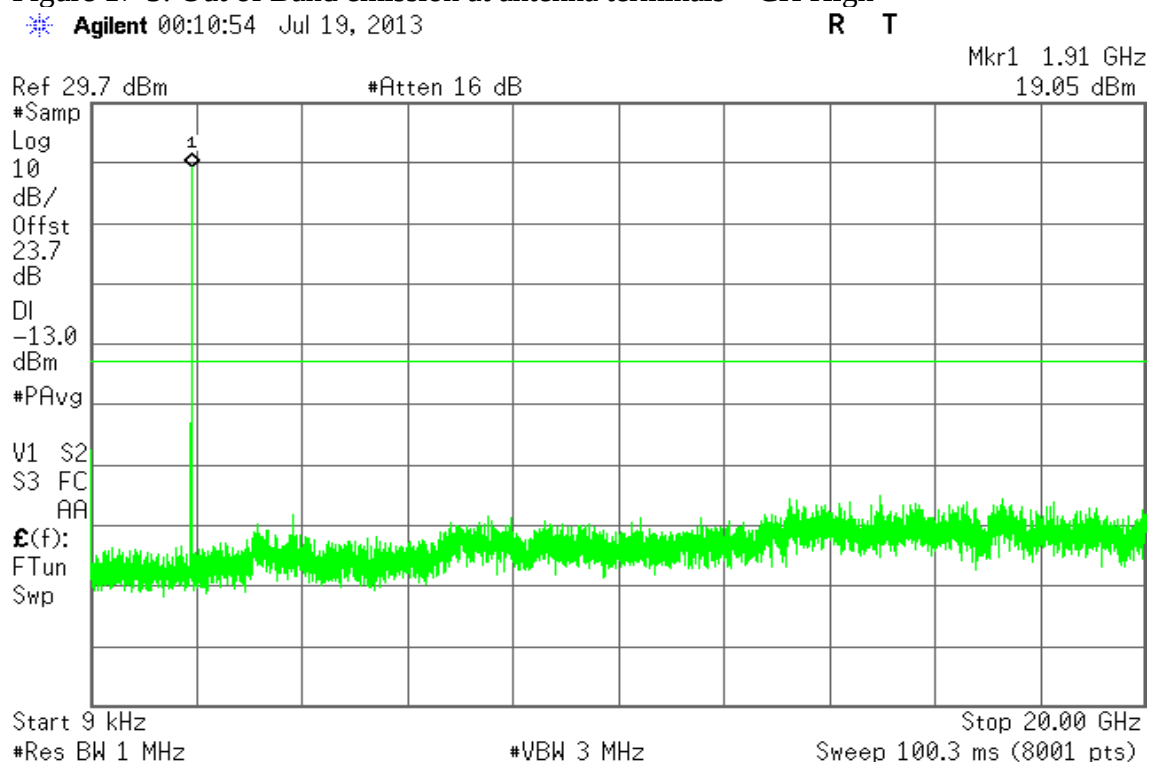




Figure 18-1: Band Edge emissions – CH Low

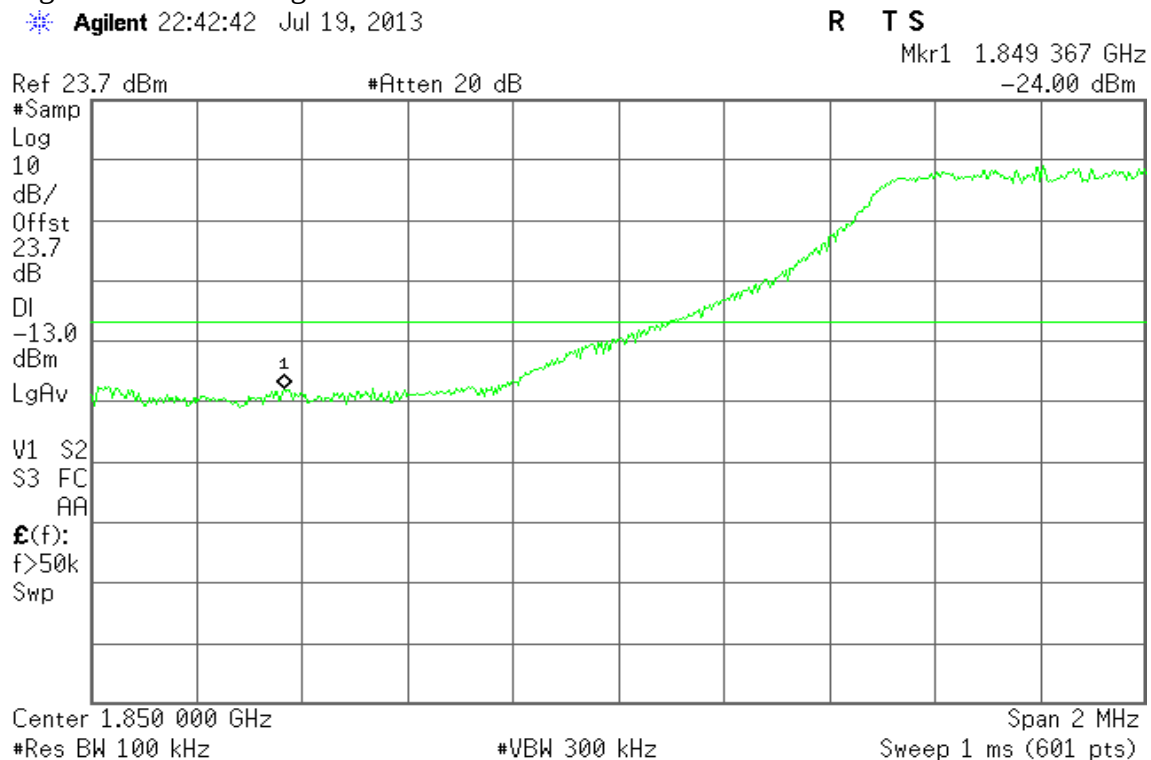
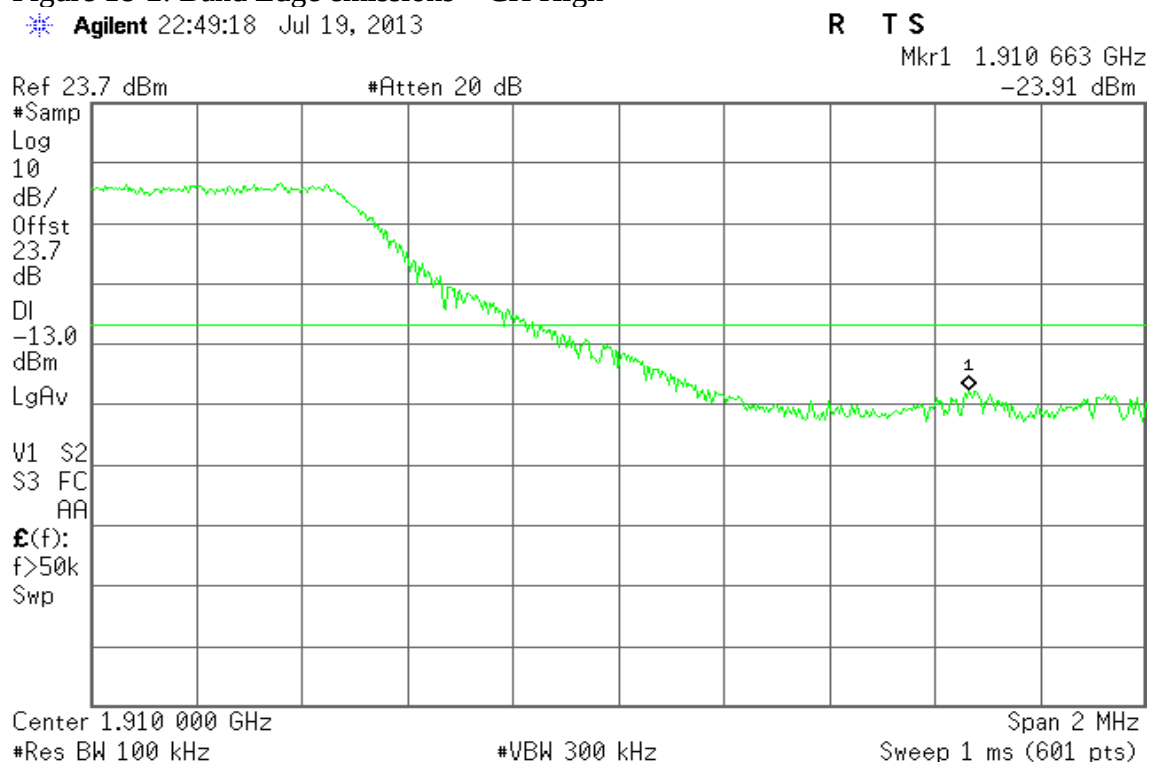


Figure 18-2: Band Edge emissions – CH High





## LTE Band 2

### Channel Bandwidth: 20MHz / QPSK

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

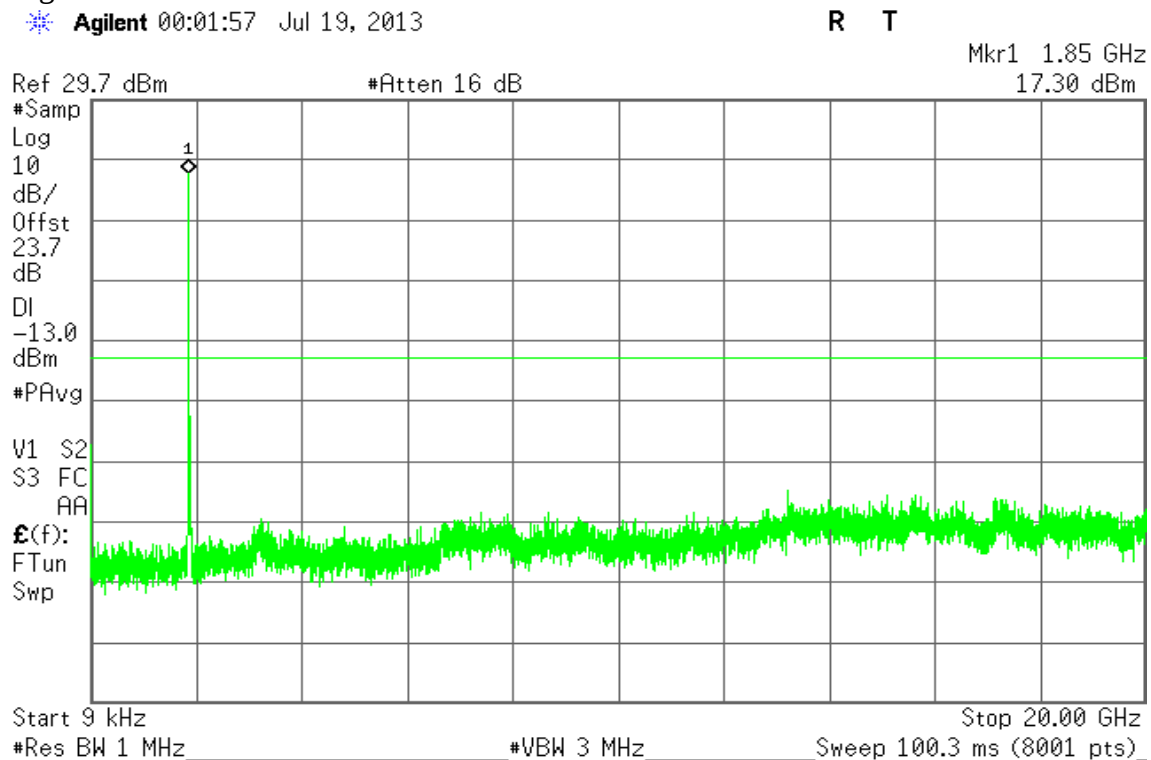


Figure 19-2: Out of Band emission at antenna terminals – CH Mid

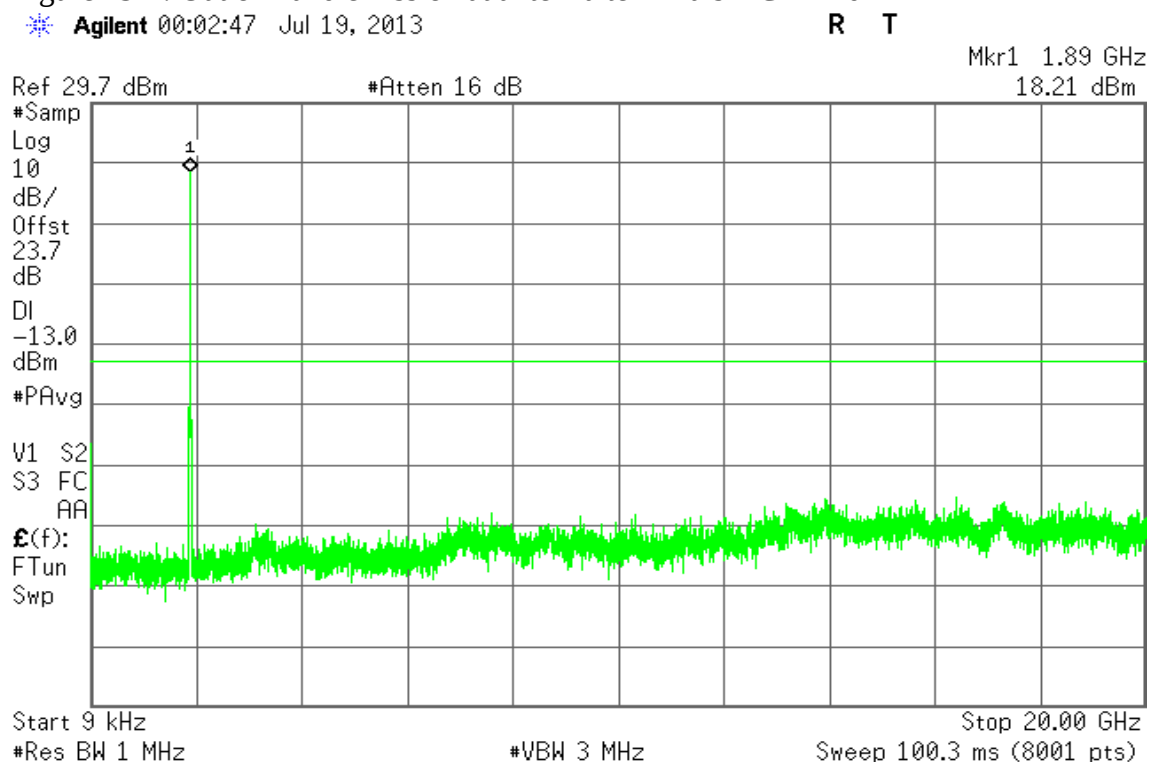




Figure 19-3: Out of Band emission at antenna terminals – CH High

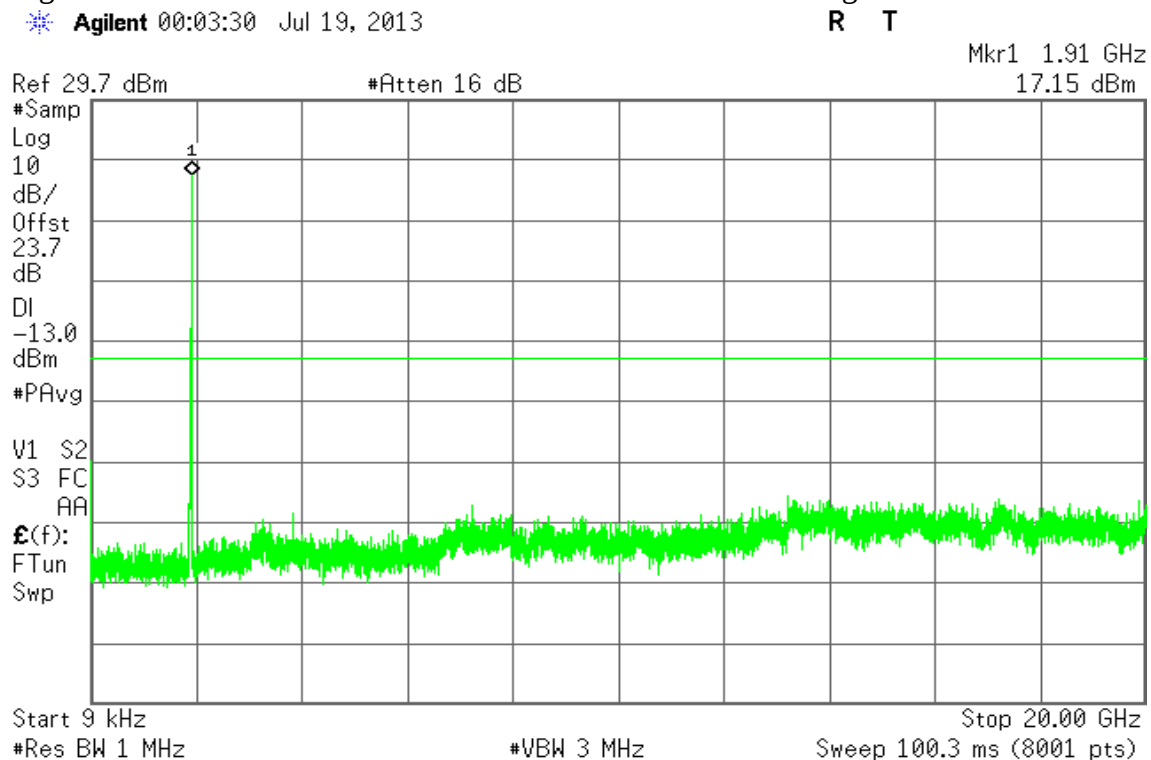


Figure 20-1: Band Edge emissions – CH Low

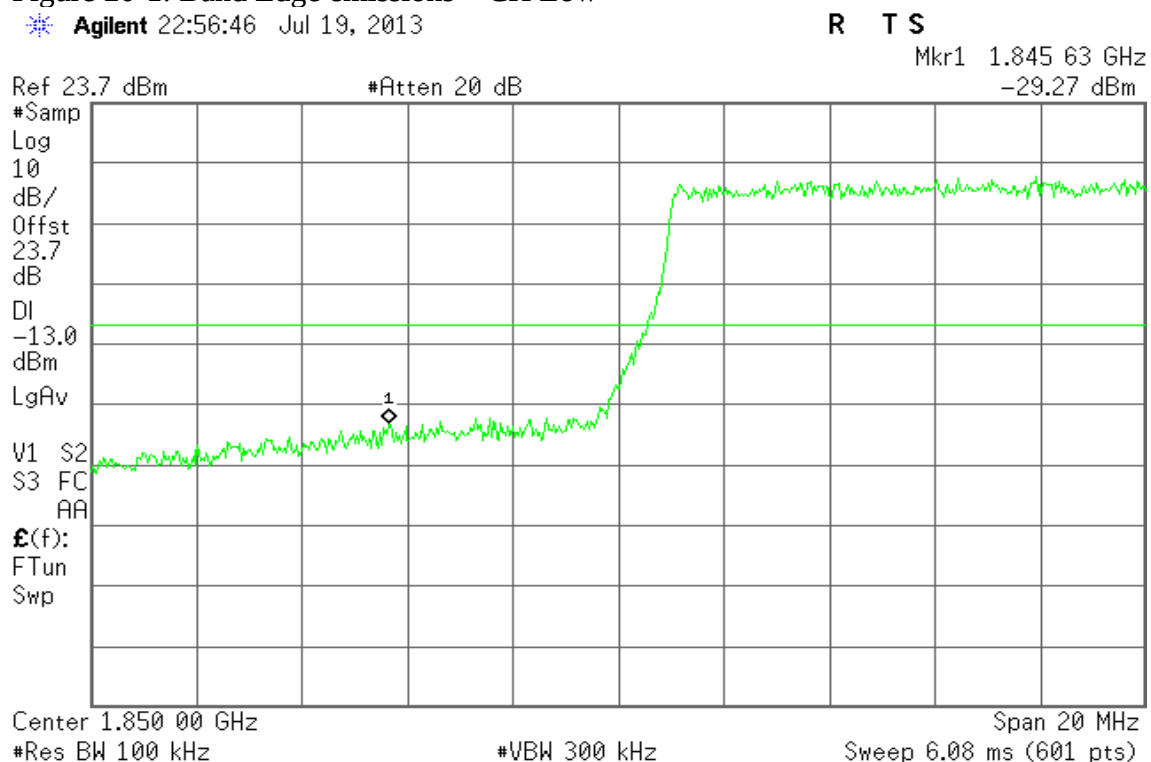
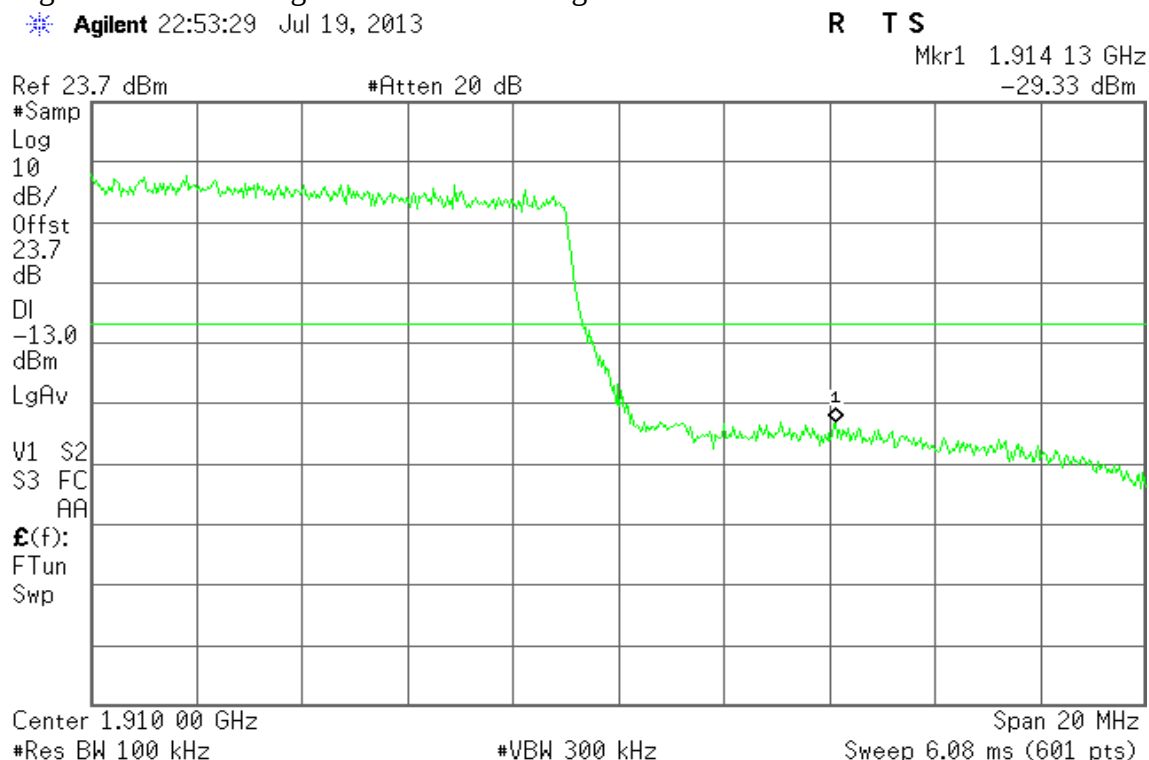




Figure 20-2: Band Edge emissions – CH High



## LTE Band 2

### Channel Bandwidth: 20MHz / 16QAM

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

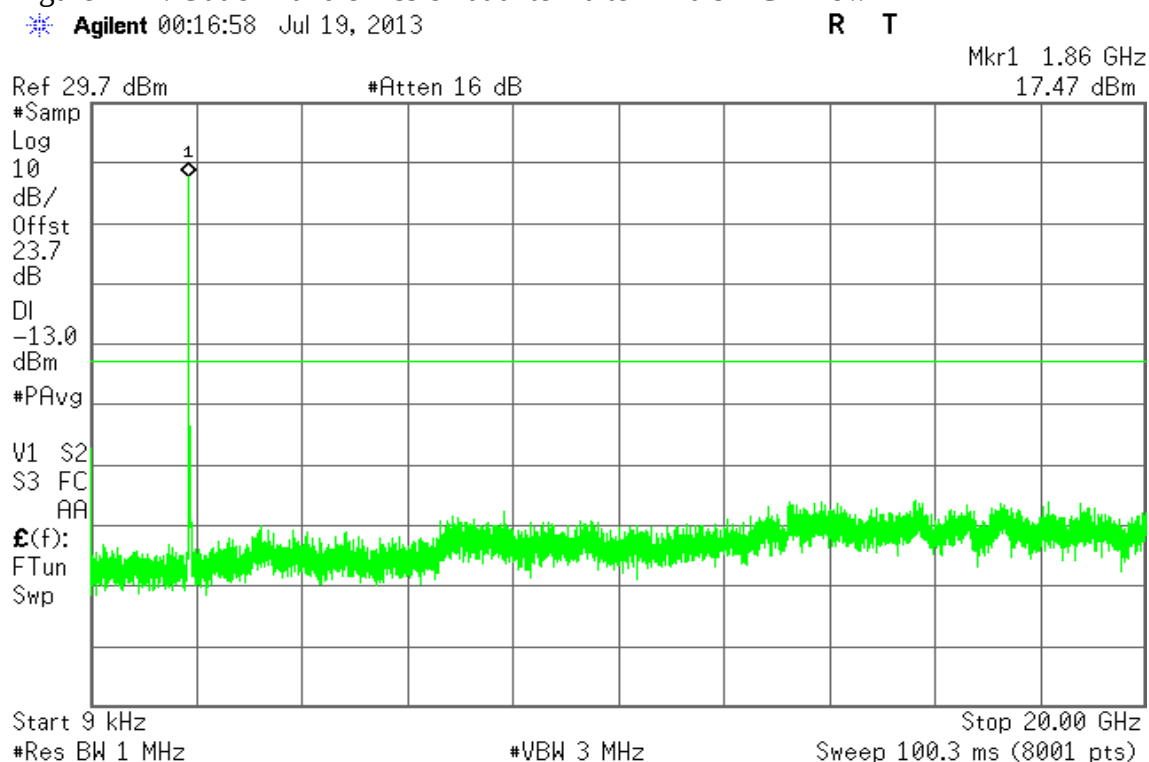




Figure 21-2: Out of Band emission at antenna terminals – CH Mid

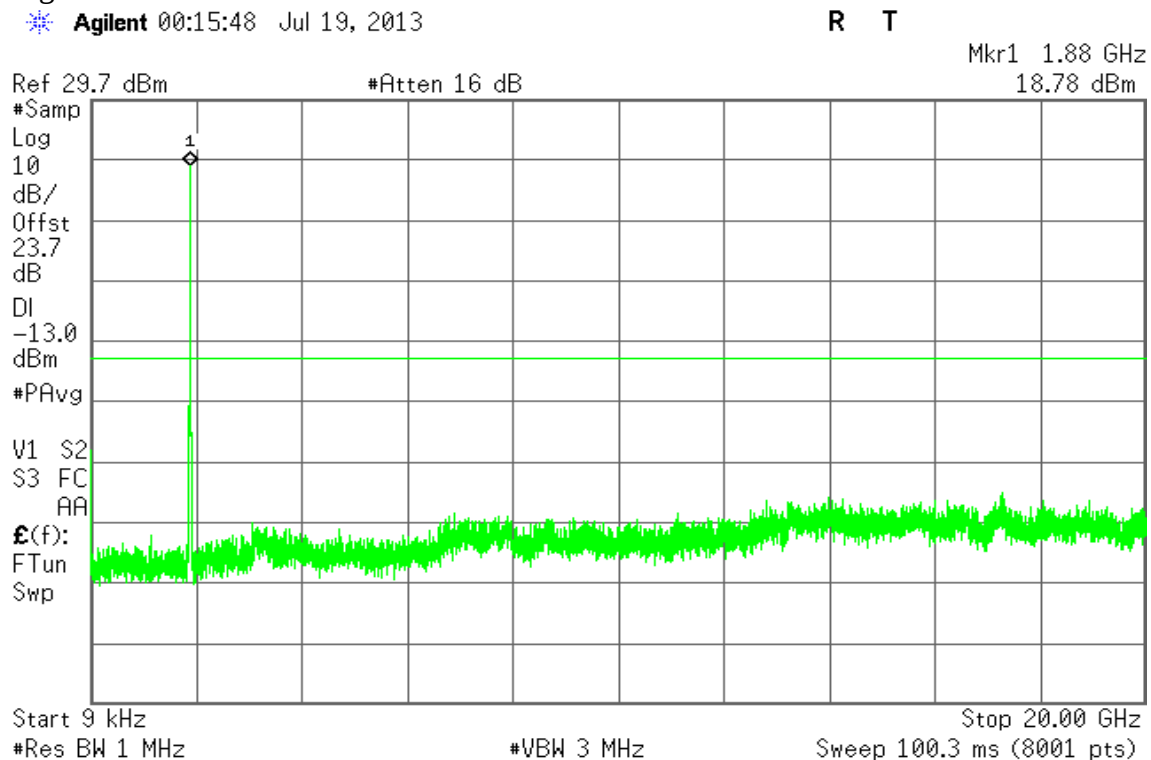


Figure 21-3: Out of Band emission at antenna terminals – CH High

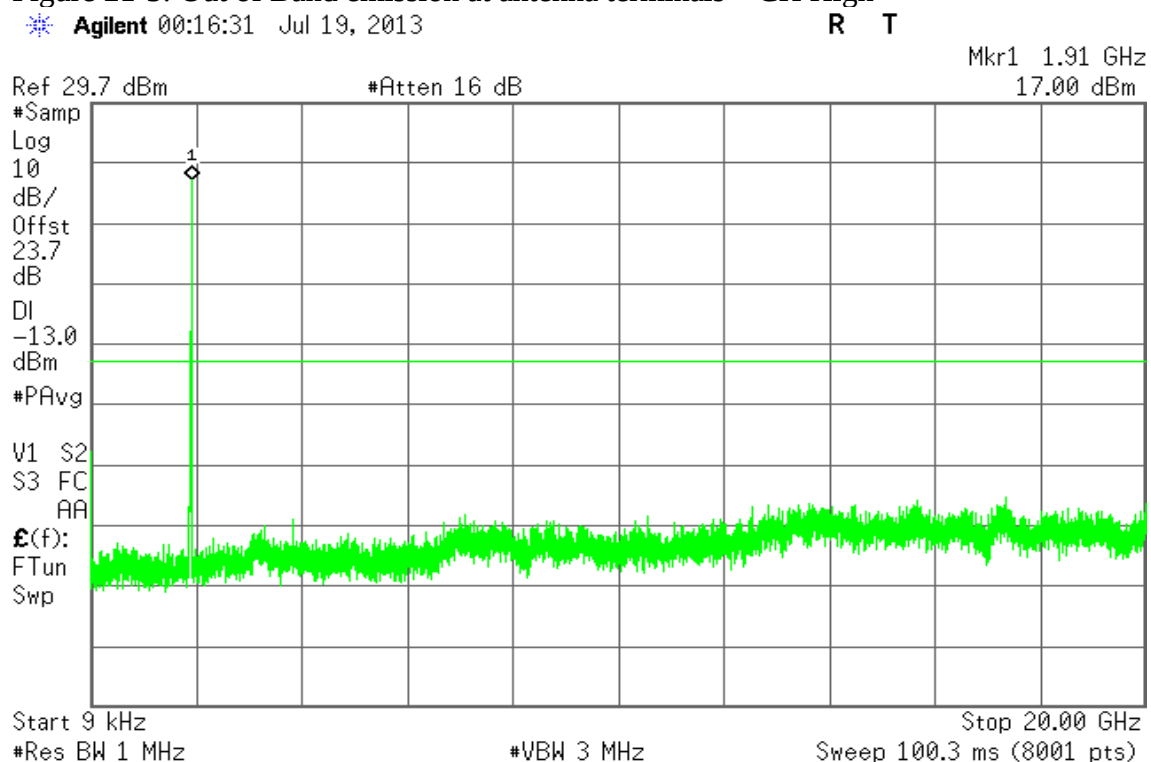




Figure 22-1: Band Edge emissions – CH Low

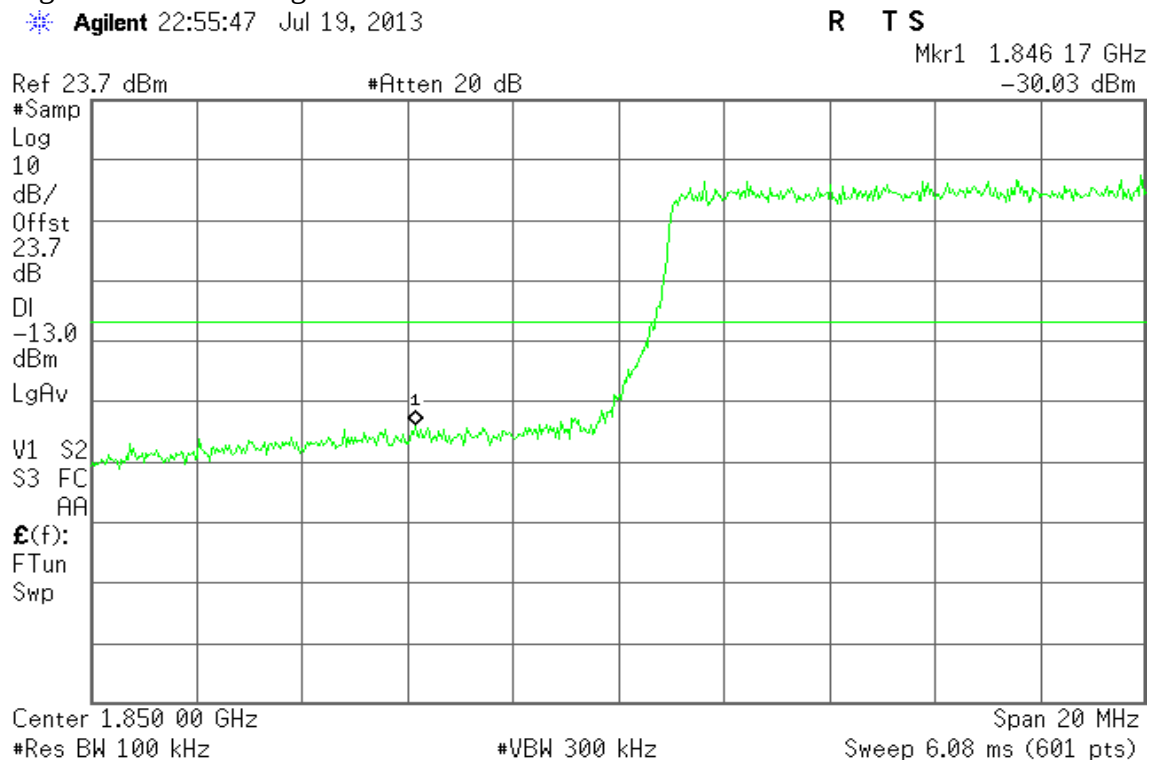
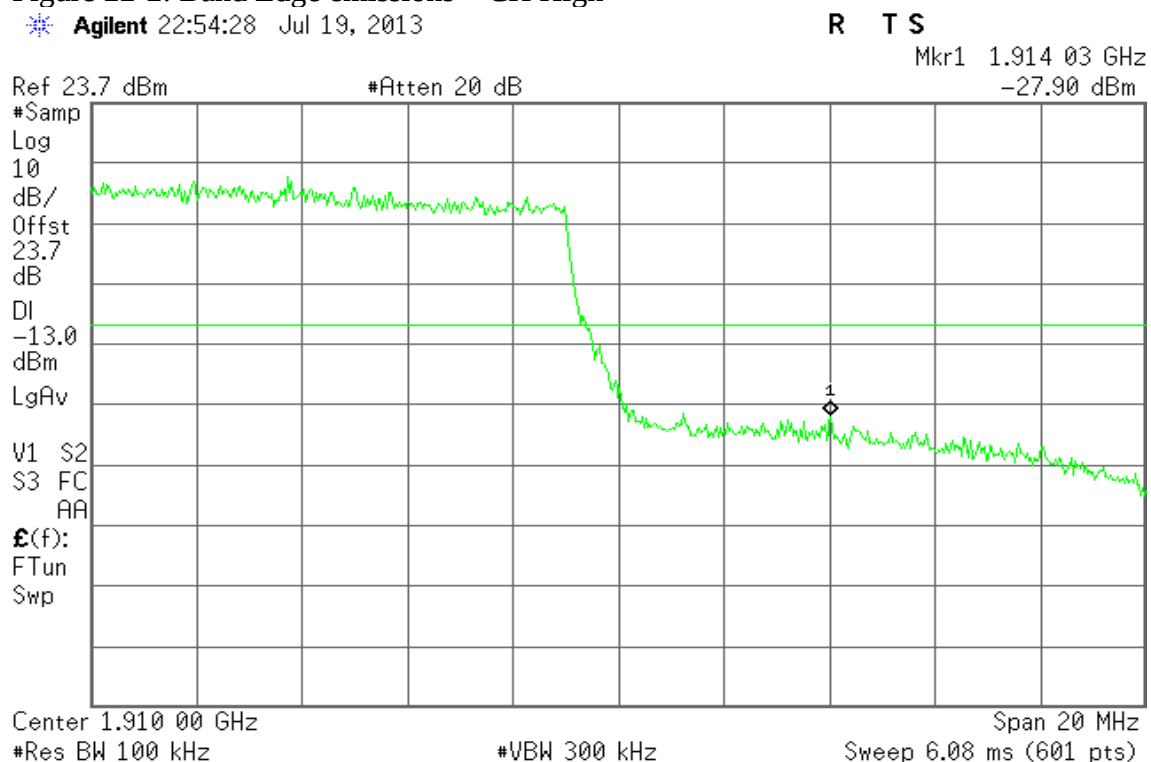


Figure 22-2: Band Edge emissions – CH High





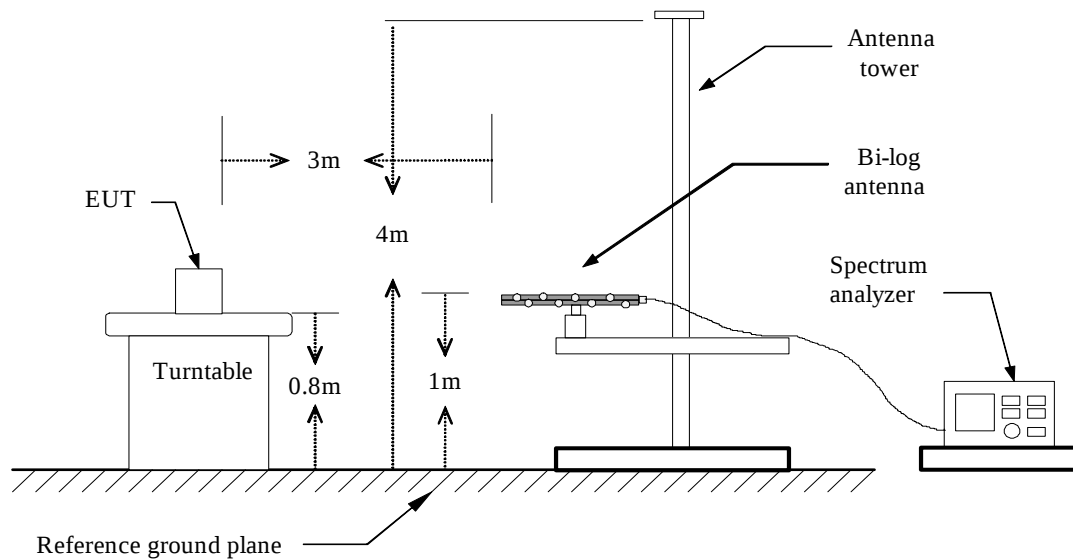
## 7.5 FIELD STRENGTH OF SPURIOUS RADIATION MEASUREMENT

### LIMIT

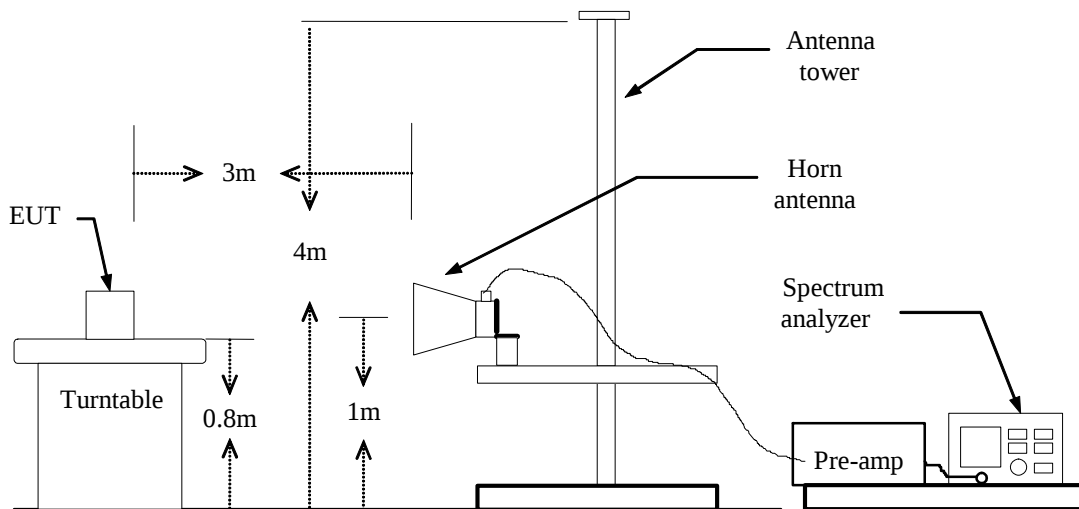
According to FCC §2.1053, RSS-132 (4.6) & RSS-133 (6.5).

### Test Configuration

#### Below 1 GHz

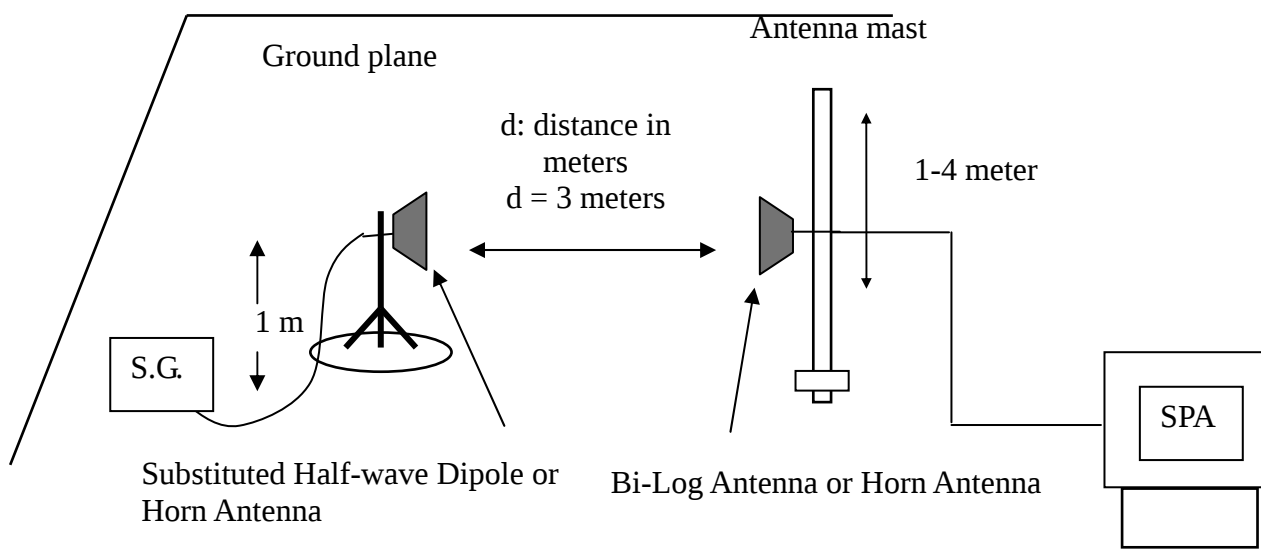


#### Above 1 GHz





## 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:** 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         | -58.97     | 0.97            | -1.61          | -61.55               | -13.00      | -48.55      | V                          |
| 150.2800        | -68.22     | 1.43            | 0.71           | -68.94               | -13.00      | -55.94      | V                          |
| 256.0100        | -80.43     | 1.88            | 5.63           | -76.68               | -13.00      | -63.68      | V                          |
| 309.3600        | -79.4      | 2.13            | 5.78           | -75.75               | -13.00      | -62.75      | V                          |
| 354.9500        | -74.61     | 2.25            | 5.75           | -71.11               | -13.00      | -58.11      | V                          |
| 450.9800        | -79.17     | 2.59            | 5.74           | -76.02               | -13.00      | -63.02      | V                          |
| 71.7100         | -47.66     | 0.97            | -1.61          | -50.24               | -13.00      | -37.24      | H                          |
| 150.2800        | -60.22     | 1.43            | 0.71           | -60.94               | -13.00      | -47.94      | H                          |
| 312.2700        | -71.69     | 2.14            | 5.76           | -68.07               | -13.00      | -55.07      | H                          |
| 369.5000        | -70.66     | 2.3             | 5.8            | -67.16               | -13.00      | -54.16      | H                          |
| 499.4800        | -74.97     | 2.7             | 5.89           | -71.78               | -13.00      | -58.78      | H                          |
| 824.4300        | -68.8      | 3.39            | 6.24           | -65.95               | -13.00      | -52.95      | 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         | -59.35     | 0.97            | -1.61          | -61.93               | -13.00      | -48.93      | V                          |
| 150.2800        | -68.24     | 1.43            | 0.71           | -68.96               | -13.00      | -55.96      | V                          |
| 234.6700        | -81.72     | 1.8             | 5.38           | -78.14               | -13.00      | -65.14      | V                          |
| 354.9500        | -75.33     | 2.25            | 5.75           | -71.83               | -13.00      | -58.83      | V                          |
| 390.8400        | -76.96     | 2.32            | 6              | -73.28               | -13.00      | -60.28      | V                          |
| 450.9800        | -79.06     | 2.59            | 5.74           | -75.91               | -13.00      | -62.91      | V                          |
| 71.7100         | -48.2      | 0.97            | -1.61          | -50.78               | -13.00      | -37.78      | H                          |
| 95.9600         | -55.65     | 1.13            | 0.26           | -56.52               | -13.00      | -43.52      | H                          |
| 150.2800        | -60.47     | 1.43            | 0.71           | -61.19               | -13.00      | -48.19      | H                          |
| 296.7500        | -72.6      | 2.07            | 5.53           | -69.14               | -13.00      | -56.14      | H                          |
| 357.8600        | -69.35     | 2.26            | 5.72           | -65.89               | -13.00      | -52.89      | H                          |
| 415.0900        | -74.79     | 2.45            | 5.86           | -71.38               | -13.00      | -58.38      | 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         | -59.35     | 0.97            | -1.61          | -61.93               | -13.00      | -48.93      | V                          |
| 150.2800        | -68.41     | 1.43            | 0.71           | -69.13               | -13.00      | -56.13      | V                          |
| 252.1300        | -80.96     | 1.85            | 5.68           | -77.13               | -13.00      | -64.13      | V                          |
| 354.9500        | -74.91     | 2.25            | 5.75           | -71.41               | -13.00      | -58.41      | V                          |
| 450.9800        | -79.42     | 2.59            | 5.74           | -76.27               | -13.00      | -63.27      | V                          |
| 529.5500        | -80.6      | 2.75            | 6              | -77.35               | -13.00      | -64.35      | V                          |
| 71.7100         | -48.08     | 0.97            | -1.61          | -50.66               | -13.00      | -37.66      | H                          |
| 150.2800        | -59.64     | 1.43            | 0.71           | -60.36               | -13.00      | -47.36      | H                          |
| 304.5100        | -70.98     | 2.11            | 5.69           | -67.40               | -13.00      | -54.40      | H                          |
| 357.8600        | -69.87     | 2.26            | 5.72           | -66.41               | -13.00      | -53.41      | H                          |
| 516.9400        | -75.45     | 2.7             | 6.07           | -72.08               | -13.00      | -59.08      | H                          |
| 604.2400        | -77.15     | 2.92            | 6.36           | -73.71               | -13.00      | -60.71      | 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**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         | -59.79     | 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:** 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         | -60.26     | 0.97            | -1.61          | -62.84               | -13.00      | -49.84      | V                          |
| 150.2800        | -68.84     | 1.43            | 0.71           | -69.56               | -13.00      | -56.56      | V                          |
| 354.9500        | -77.16     | 2.25            | 5.75           | -73.66               | -13.00      | -60.66      | V                          |
| 450.9800        | -78.61     | 2.59            | 5.74           | -75.46               | -13.00      | -62.46      | V                          |
| 529.5500        | -80.22     | 2.75            | 6              | -76.97               | -13.00      | -63.97      | V                          |
| 721.6100        | -78.99     | 3.17            | 6.49           | -75.67               | -13.00      | -62.67      | V                          |
| 71.7100         | -48.94     | 0.97            | -1.61          | -51.52               | -13.00      | -38.52      | H                          |
| 150.2800        | -60.14     | 1.43            | 0.71           | -60.86               | -13.00      | -47.86      | H                          |
| 234.6700        | -74.28     | 1.8             | 5.38           | -70.70               | -13.00      | -57.70      | H                          |
| 357.8600        | -71.14     | 2.26            | 5.72           | -67.68               | -13.00      | -54.68      | H                          |
| 459.7100        | -75.57     | 2.6             | 5.88           | -72.29               | -13.00      | -59.29      | H                          |
| 589.6900        | -75.4      | 2.89            | 6.19           | -72.10               | -13.00      | -59.10      | 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         | -60.21     | 0.97            | -1.61          | -62.79               | -13.00      | -49.79      | V                          |
| 150.2800        | -68.86     | 1.43            | 0.71           | -69.58               | -13.00      | -56.58      | V                          |
| 249.2200        | -82.79     | 1.84            | 5.65           | -78.98               | -13.00      | -65.98      | V                          |
| 354.9500        | -75.78     | 2.25            | 5.75           | -72.28               | -13.00      | -59.28      | V                          |
| 450.9800        | -79.21     | 2.59            | 5.74           | -76.06               | -13.00      | -63.06      | V                          |
| 691.5400        | -79.62     | 3.13            | 6.48           | -76.27               | -13.00      | -63.27      | V                          |
| 71.7100         | -49.05     | 0.97            | -1.61          | -51.63               | -13.00      | -38.63      | H                          |
| 150.2800        | -60.35     | 1.43            | 0.71           | -61.07               | -13.00      | -48.07      | H                          |
| 231.7600        | -73.62     | 1.8             | 5.4            | -70.02               | -13.00      | -57.02      | H                          |
| 345.2500        | -71.3      | 2.2             | 5.8            | -67.70               | -13.00      | -54.70      | H                          |
| 516.9400        | -76.2      | 2.7             | 6.07           | -72.83               | -13.00      | -59.83      | H                          |
| 577.0800        | -76.23     | 2.88            | 6.04           | -73.07               | -13.00      | -60.07      | 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         | -60.04     | 0.97            | -1.61          | -62.62               | -13.00      | -49.62      | V                          |
| 150.2800        | -68.52     | 1.43            | 0.71           | -69.24               | -13.00      | -56.24      | V                          |
| 352.0400        | -76.17     | 2.24            | 5.78           | -72.63               | -13.00      | -59.63      | V                          |
| 448.0700        | -79.46     | 2.58            | 5.74           | -76.30               | -13.00      | -63.30      | V                          |
| 516.9400        | -80.28     | 2.7             | 6.07           | -76.91               | -13.00      | -63.91      | V                          |
| 721.6100        | -77.99     | 3.17            | 6.49           | -74.67               | -13.00      | -61.67      | V                          |
| 71.7100         | -48.95     | 0.97            | -1.61          | -51.53               | -13.00      | -38.53      | H                          |
| 150.2800        | -60.91     | 1.43            | 0.71           | -61.63               | -13.00      | -48.63      | H                          |
| 234.6700        | -74.92     | 1.8             | 5.38           | -71.34               | -13.00      | -58.34      | H                          |
| 357.8600        | -69.89     | 2.26            | 5.72           | -66.43               | -13.00      | -53.43      | H                          |
| 499.4800        | -75.46     | 2.7             | 5.89           | -72.27               | -13.00      | -59.27      | H                          |
| 733.2500        | -74.25     | 3.19            | 6.31           | -71.13               | -13.00      | -58.13      | 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**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) |
|-----------------|------------|-----------------|----------------|----------------------|-------------|-------------|----------------------------|
| 2358.000        | -57.65     | 6.13            | 5.9            | -57.88               | -13.00      | -44.88      | V                          |
| 4479.000        | -55.27     | 8.85            | 9.78           | -54.34               | -13.00      | -41.34      | V                          |
| N/A             |            |                 |                |                      |             |             |                            |
|                 |            |                 |                |                      |             |             |                            |
|                 |            |                 |                |                      |             |             |                            |
|                 |            |                 |                |                      |             |             |                            |
| 1658.000        | -50.98     | 5.06            | 6.02           | -50.02               | -13.00      | -37.02      | H                          |
| 3541.000        | -56.72     | 7.97            | 8.94           | -55.75               | -13.00      | -42.75      | 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) |
|-----------------|------------|-----------------|----------------|----------------------|-------------|-------------|----------------------------|
| 2260.000        | -58.36     | 6.02            | 5.76           | -58.62               | -13.00      | -45.62      | V                          |
| 4206.000        | -55.24     | 8.5             | 9.56           | -54.18               | -13.00      | -41.18      | V                          |
| N/A             |            |                 |                |                      |             |             |                            |
|                 |            |                 |                |                      |             |             |                            |
|                 |            |                 |                |                      |             |             |                            |
|                 |            |                 |                |                      |             |             |                            |
| 1672.000        | -50.81     | 5.07            | 5.99           | -49.89               | -13.00      | -36.89      | H                          |
| 2995.000        | -56.58     | 7.02            | 7.39           | -56.21               | -13.00      | -43.21      | H                          |
| N/A             |            |                 |                |                      |             |             |                            |
|                 |            |                 |                |                      |             |             |                            |
|                 |            |                 |                |                      |             |             |                            |
|                 |            |                 |                |                      |             |             |                            |

**Remark:**

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

**Operation Mode:** 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) |
|-----------------|------------|-----------------|----------------|----------------------|-------------|-------------|----------------------------|
| 2232.000        | -58.21     | 5.99            | 5.72           | -58.48               | -13.00      | -45.48      | V                          |
| 2974.000        | -56.52     | 7.05            | 7.33           | -56.24               | -13.00      | -43.24      | V                          |
| N/A             |            |                 |                |                      |             |             |                            |
|                 |            |                 |                |                      |             |             |                            |
|                 |            |                 |                |                      |             |             |                            |
|                 |            |                 |                |                      |             |             |                            |
| 1686.000        | -47.48     | 5.09            | 5.97           | -46.60               | -13.00      | -33.60      | H                          |
| 2946.000        | -56.19     | 7.09            | 7.26           | -56.02               | -13.00      | -43.02      | 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: 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             |            |                 |                |                      |             |             | 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) |
|-----------------|------------|-----------------|----------------|----------------------|-------------|-------------|----------------------------|
| 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:** 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) |
|-----------------|------------|-----------------|----------------|----------------------|-------------|-------------|----------------------------|
| 3163.000        | -57.27     | 7.23            | 7.89           | -56.61               | -13.00      | -43.61      | V                          |
| 4430.000        | -55.61     | 8.72            | 9.74           | -54.59               | -13.00      | -41.59      | V                          |
| N/A             |            |                 |                |                      |             |             |                            |
|                 |            |                 |                |                      |             |             |                            |
|                 |            |                 |                |                      |             |             |                            |
|                 |            |                 |                |                      |             |             |                            |
| 3702.000        | -48.27     | 8.2             | 9.1            | -47.37               | -13.00      | -34.37      | H                          |
| 5557.000        | -53.21     | 10.08           | 10.81          | -52.48               | -13.00      | -39.48      | 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.

**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) |
|-----------------|------------|-----------------|----------------|----------------------|-------------|-------------|----------------------------|
| 3100.000        | -57.2      | 7.17            | 7.7            | -56.67               | -13.00      | -43.67      | V                          |
| 3758.000        | -54.71     | 8.23            | 9.16           | -53.78               | -13.00      | -40.78      | V                          |
| N/A             |            |                 |                |                      |             |             |                            |
|                 |            |                 |                |                      |             |             |                            |
|                 |            |                 |                |                      |             |             |                            |
|                 |            |                 |                |                      |             |             |                            |
| 3758.000        | -39.97     | 8.23            | 9.16           | -39.04               | -13.00      | -26.04      | H                          |
| 5641.000        | -52.58     | 10.18           | 10.83          | -51.93               | -13.00      | -38.93      | 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) |
|-----------------|------------|-----------------|----------------|----------------------|-------------|-------------|----------------------------|
| 3814.000        | -52.91     | 8.28            | 9.21           | -51.98               | -13.00      | -38.98      | V                          |
| 5158.000        | -54.87     | 9.51            | 10.66          | -53.72               | -13.00      | -40.72      | V                          |
| N/A             |            |                 |                |                      |             |             |                            |
|                 |            |                 |                |                      |             |             |                            |
|                 |            |                 |                |                      |             |             |                            |
|                 |            |                 |                |                      |             |             |                            |
| 3821.000        | -37.14     | 8.29            | 9.22           | -36.21               | -13.00      | -23.21      | H                          |
| 5718.000        | -51.86     | 10.21           | 10.84          | -51.23               | -13.00      | -38.23      | 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.



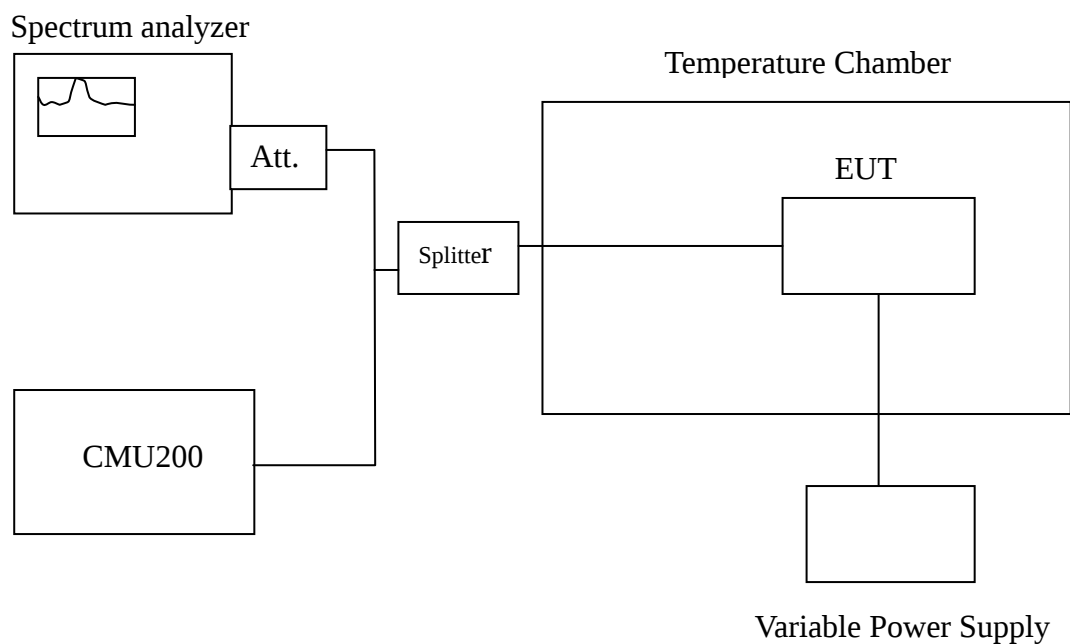
## 7.6 FREQUENCY STABILITY V.S. TEMPERATURE MEASUREMENT

### 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: $\pm 2.5$ 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: $\pm 2.5$ 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

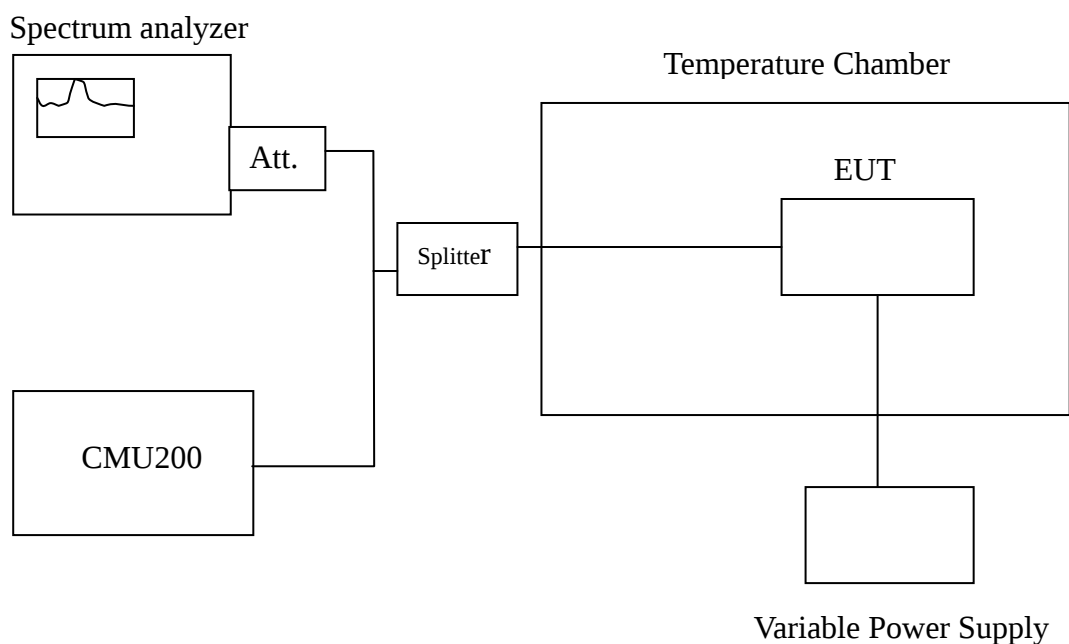
According to FCC §2.1055, FCC §24.235,

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  $\pm 2.5$  ppm for mobile stations and  $\pm 1.0$  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 ( $\pm 15\%$ ) 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: $\pm 2.5$ 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: $\pm 2.5$ 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         |            |