



# RF TEST REPORT

**Applicant** ZTE Corporation  
**FCC ID** SRQ-ZM8300G  
**Product** NB-IoT/eMTC Module  
**Model** ZM8300G  
**Report No.** RXA1709-0333RF06R1  
**Issue Date** November 14, 2017

TA Technology (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in **FCC CFR47 Part 2 (2017)/ FCC CFR47 Part 27C (2017)**. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

*Jiang peng Lan*

*Performed by: Jiangpeng Lan*

*Kai Xu*

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## Table of Contents

1	Test Laboratory.....	4
1.1	Notes of the Test Report.....	4
1.2	Test facility.....	4
1.3	Testing Location.....	5
2	General Description of Equipment under Test.....	6
3	Applied Standards.....	7
4	Test Configuration.....	8
5	Test Information.....	10
5.1	RF Power Output.....	10
5.2	Effective Isotropic Radiated Power.....	13
5.3	Occupied Bandwidth.....	19
5.4	Band Edge Compliance.....	25
5.5	Peak-to-Average Power Ratio (PAPR).....	43
5.6	Frequency Stability.....	45
5.7	Spurious Emissions at Antenna Terminals.....	51
5.8	Radiates Spurious Emission.....	68
6	Main Test Instruments.....	89
ANNEX A:	EUT Appearance and Test Setup.....	90
A.1	EUT Appearance.....	90
A.2	Test Setup.....	92

## Summary of Measurement Results

Number	Test Case	Clause in FCC rules	Verdict
1	RF power output	2.1046	PASS
2	Effective Isotropic Radiated power	27.50(d)(4) /27.50(b)(10) /27.50(c)(10)	PASS
3	Occupied Bandwidth	2.1049	PASS
4	Band Edge Compliance	27.53(h) /27.53(g)	PASS
5	Peak-to-Average Power Ratio	27.50(d)/KDB971168 D01(5.7)	PASS
6	Frequency Stability	2.1055 / 27.54	PASS
7	Spurious Emissions at Antenna Terminals	2.1051 /27.53(h) /27.53(g) /27.53(f)	PASS
8	Radiates Spurious Emission	2.1053 /27.53(h) /27.53(g) /27.53(f)	PASS
Date of Testing: October 13, 2017~ October 30, 2017			
Note: PASS: The EUT complies with the essential requirements in the standard. FAIL: The EUT does not comply with the essential requirements in the standard.			

# 1 Test Laboratory

## 1.1 Notes of the Test Report

This report shall not be reproduced in full or partial, without the written approval of **TA technology (shanghai) co., Ltd.** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein .Measurement Uncertainties were not taken into account and are published for informational purposes only. This report is written to support regulatory compliance of the applicable standards stated above. This report must not be used by the client to claim product certification, approval, or endorsement by any government agencies.

## 1.2 Test facility

### **CNAS (accreditation number: L2264)**

TA Technology (Shanghai) Co., Ltd. has obtained the accreditation of China National Accreditation Service for Conformity Assessment (CNAS).

### **FCC (Designation number: CN1179, Test Firm Registration Number: 446626)**

TA Technology (Shanghai) Co., Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements.

### **IC (recognition number is 8510A)**

TA Technology (Shanghai) Co., Ltd. has been listed by industry Canada to perform electromagnetic emission measurement.

### **VCCI (recognition number is C-4595, T-2154, R-4113, G-10766)**

TA Technology (Shanghai) Co., Ltd. has been listed by industry Japan to perform electromagnetic emission measurement.

### **A2LA (Certificate Number: 3857.01)**

TA Technology (Shanghai) Co., Ltd. has been listed by American Association for Laboratory Accreditation to perform electromagnetic emission measurement.

### 1.3 Testing Location

Company: TA Technology (Shanghai) Co., Ltd.  
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## 2 General Description of Equipment under Test

### Client Information

<b>Applicant</b>	ZTE Corporation
<b>Applicant address</b>	ZTE Plaza, Keji Road South, Hi-Tech, Industrial Park, Nanshan District, Shenzhen, Guangdong, 518057, P.R.China
<b>Manufacturer</b>	ZTE Corporation
<b>Manufacturer address</b>	ZTE Plaza, Keji Road South, Hi-Tech, Industrial Park, Nanshan District, Shenzhen, Guangdong, 518057, P.R.China

### General information

EUT Description			
Model:	ZM8300G		
IMEI:	865199030108496		
Hardware Version:	ek8A		
Software Version:	EN_ZTE_ZM8300GV1.0.0B01		
Power Supply:	External power supply		
Antenna Type:	The EUT don't have standard Antenna, The Antenna used for testing in this report is the after-market accessory (Dipole Antenna)		
Test Mode(s):	LTE Band 4, LTE Band 12, LTE Band 13;		
Test Modulation	QPSK 16QAM;		
Maximum E.R.P.	LTE Band 4:	25.94dBm	
	LTE Band 12:	20.04dBm	
	LTE Band 13:	21.07dBm	
Rated Power Supply Voltage:	3.6V		
Extreme Voltage:	Minimum: 3.0V    Maximum: 4.2V		
Extreme Temperature:	Lowest: -40°C    Highest: +85°C		
Operating Frequency Range(s)	Mode	Tx (MHz)	Rx (MHz)
	LTE Band 4	1710 ~ 1755	2110 ~ 2155
	LTE Band 12	699 ~ 716	729 ~ 746
	LTE Band 13	777 ~ 787	746 ~ 756
Note: 1. The information of the EUT is declared by the manufacturer.			

### **3 Applied Standards**

According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

#### **Test standards**

**FCC CFR47 Part 2 (2017)**

**FCC CFR47 Part 27C (2017)**

**ANSI/TIA-603-D (2010)**

**KDB 971168 D01 Power Meas License Digital Systems v03**

## 4 Test Configuration

Radiated measurements are performed by rotating the EUT in three different orthogonal test planes. EUT stand-up position (Z axis), lie-down position (X, Y axis). Receiver antenna polarization (horizontal and vertical), the worst emission was found in position (Z axis, horizontal polarization) and the worst case was recorded.

All mode and data rates and positions and RB size and modulations were investigated. Subsequently, only the worst case emissions are reported.

The following testing in LTE is set based on the maximum RF Output Power.

The following testing in different Bandwidth is set to detail in the following table:

Test modes are chosen to be reported as the worst case configuration below for LTE Band 4/12/13:

Test items	Modes	Bandwidth (MHz)						Modulation		RB			Test Channel		
		1.4	3	5	10	15	20	QPSK	16QAM	1	50%	100%	L	M	H
RF power output	LTE 4	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	LTE 12	○	○	○	○	-	-	○	○	○	○	○	○	○	○
	LTE 13	-	-	○	○	-	-	○	○	○	○	○	○	○	○
Effective Isotropic Radiated power	LTE 4	○	○	○	○	○	○	○	○	-	-	○	○	○	○
	LTE 12	○	○	○	○	-	-	○	○	-	-	○	○	○	○
	LTE 13	-	-	○	○	-	-	○	○	-	-	○	○	○	○
Occupied Bandwidth	LTE 4	○	○	○	○	○	○	○	○	-	-	○	-	○	-
	LTE 12	○	○	○	○	-	-	○	○	-	-	○	-	○	-
	LTE 13	-	-	○	○	-	-	○	○	-	-	○	-	○	-
Band Edge Compliance	LTE 4	○	○	○	○	○	○	○	○	○	-	○	○	-	○
	LTE 12	○	○	○	○	-	-	○	○	○	-	○	○	-	○
	LTE 13	-	-	○	○	-	-	○	○	○	-	○	○	-	○
Peak-to-Average Power Ratio	LTE 4	○	○	○	○	○	○	○	○	-	-	○	○	○	○
	LTE 12	○	○	○	○	-	-	○	○	-	-	○	○	○	○
	LTE 13	-	-	○	○	-	-	○	○	-	-	○	○	○	○
Frequency Stability	LTE 4	○	○	○	○	○	○	○	○	-	-	○	-	○	-
	LTE 12	○	○	○	○	-	-	○	○	-	-	○	-	○	-
	LTE 13	-	-	○	○	-	-	○	○	-	-	○	-	○	-
Spurious Emissions at Antenna Terminals	LTE 4	○	○	○	○	○	○	○	-	○	-	-	○	○	○
	LTE 12	○	○	○	○	-	-	○	-	○	-	-	○	○	○
	LTE 13	-	-	○	○	-	-	○	-	○	-	-	○	○	○





Radiates Spurious Emission	LTE 4	O	O	O	O	O	O	O	-	O	-	-	O	O	O
	LTE 12	O	O	O	O	-	-	O	-	O	-	-	O	O	O
	LTE 13	-	-	O	O	-	-	O	-	O	-	-	O	O	O
Note	1. The mark "O" means that this configuration is chosen for testing. 2. The mark "-" means that this configuration is not testing.														

## 5 Test Information

### 5.1 RF Power Output

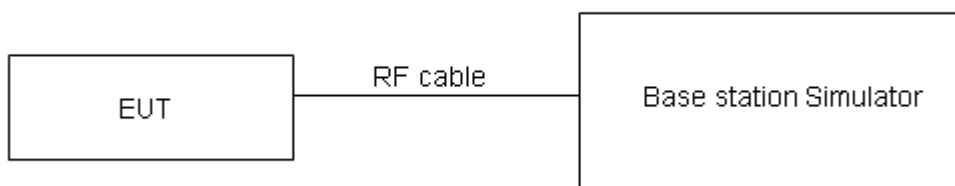
#### Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

#### Methods of Measurement

During the process of the testing, The EUT is controlled by the Base Station Simulator to ensure max power transmission and proper modulation.

#### Test Setup



The loss between RF output port of the EUT and the input port of the tester has been taken into consideration.

#### Limits

No specific RF power output requirements in part 2.1046.

#### Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor  $k = 2$ ,  $U=0.4$  dB.

**Test Results**

Mode	Bandwidth	Channel/ Frequency(MHz)	RB	Index	Conducted Power (dBm)	
					QPSK	16QAM
Band4	1.4MHz	19957 1710.7	1#0	0	23.08	22.71
			6#0	0	21.38	21.09
		20175/1732.5	1#0	0	23.45	21.79
			6#0	0	21.43	21.71
		20393/1754.3	1#5	0	23.45	22.99
			6#0	0	21.76	21.71
	3MHz	19965/1711.5	1#0	0	23.12	22.68
			6#0	0	21.43	21.37
		20175/1732.5	1#0	0	23.11	22.72
			6#0	0	21.55	21.52
		20385/1753.5	1#5	1	23.49	22.98
			6#0	1	21.65	21.70
	5MHz	19975/1712.5	1#0	0	23.17	23.76
			6#0	0	22.45	21.69
		20175/1732.5	1#0	0	23.22	23.77
			6#0	0	22.49	21.63
		20375/1752.5	1#5	3	23.31	23.66
			6#0	3	22.75	21.75
	10MHz	20000/1715	1#0	0	23.35	22.95
			4#0	0	23.56	23.08
		20175/1732.5	1#0	0	23.16	23.46
			4#0	0	23.45	22.39
		20350/1750	1#5	7	23.76	23.44
			4#2	7	23.65	23.18
	15MHz	20025/1717.5	1#0	0	23.12	23.68
			6#0	0	23.33	23.49
		20175/1732.5	1#0	0	23.38	23.22
			6#0	0	23.24	23.46
		20325/1747.5	1#5	11	23.69	23.21
			6#0	11	23.64	23.81
	20MHz	20050/1720	1#0	0	23.39	23.19
			6#0	0	23.17	23.48
20175/1732.5		1#0	0	23.63	23.47	
		6#0	0	23.51	23.39	
20300/1745		1#5	15	23.75	23.21	
		6#0	15	23.73	23.83	

Mode	Bandwidth	Channel/ Frequency(MHz)	RB	Index	Conducted Power (dBm)	
					QPSK	16QAM
Band12	1.4MHz	23017/699.7	1#0	0	23.99	22.25
			6#0	0	22.05	22.34
		23095/707.5	1#0	0	23.48	23.04
			6#0	0	21.77	21.72
		23173/715.3	1#5	0	23.69	23.25
			6#0	0	21.98	21.93
	3MHz	23025/700.5	1#0	0	24.16	22.35
			6#0	0	22.04	22.32
		23095/707.5	1#0	0	23.95	22.31
			6#0	0	21.91	22.23
		23165/714.5	1#5	1	24.09	22.54
			6#0	1	21.93	22.49
	5MHz	23035/701.5	1#0	0	23.75	24.32
			6#0	0	22.98	22.25
		23095/707.5	1#0	0	23.68	24.11
			6#0	0	22.95	22.13
		23155/713.5	1#5	3	23.75	24.26
			6#0	3	22.95	21.91
	10MHz	23060/704	1#0	0	24.03	23.84
			4#0	0	24.15	22.98
		23095/707.5	1#0	0	23.75	24.33
			4#0	0	23.84	22.79
		23130/711	1#5	7	24.07	23.84
			4#2	7	24.01	23.66

Mode	Bandwidth	Channel/ Frequency(MHz)	RB	Index	Conducted Power (dBm)	
					QPSK	16QAM
Band13	5MHz	23205/779.5	1#0	0	24.03	23.89
			6#0	0	23.09	22.04
		23230/782	1#0	0	23.68	24.21
			6#0	0	22.94	22.02
		23255/784.5	1#5	3	23.59	24.29
			6#0	3	22.84	22.04
	10MHz	23230/782	1#0	0	24.08	23.91
			4#0	0	23.98	23.19

## 5.2 Effective Isotropic Radiated Power

### Ambient condition

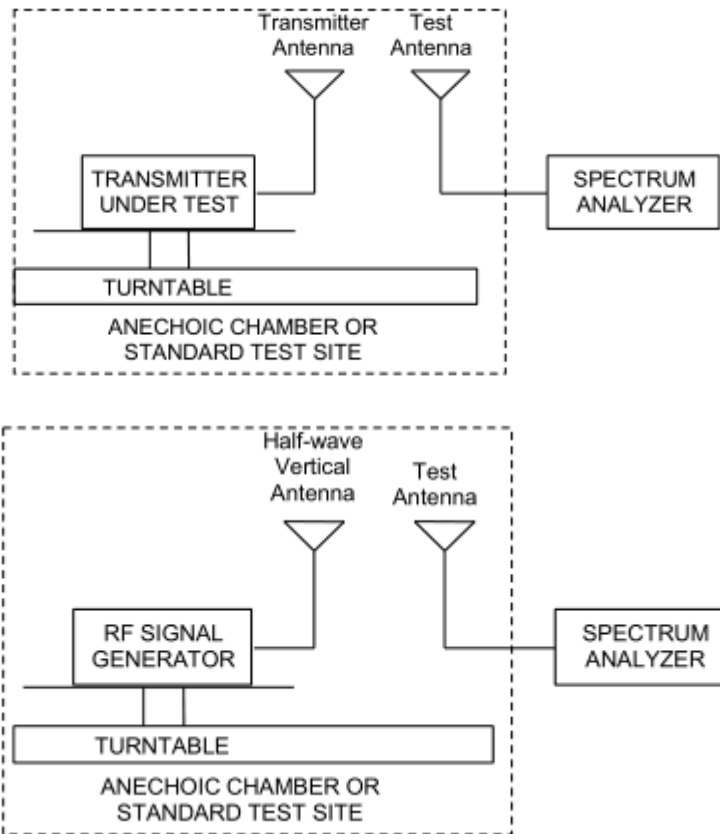
Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

### Methods of Measurement

1. The testing follows FCC KDB 971168 v02r02 Section 5.8 and ANSI/TIA-603-D-2010.

- a) Connect the equipment as illustrated. Mount the equipment with the manufacturer specified antenna in a vertical orientation on a manufacturer specified mounting surface located on a non-conducting rotating platform of a RF anechoic chamber (preferred) or a standard radiation site.
- b) Key the transmitter, then rotate the EUT 360° azimuthally and record spectrum analyzer power level (LVL) measurements at angular increments that are sufficiently small to permit resolution of all peaks. If a standard radiation test site is used, raise and lower the test antenna to obtain a maximum reading at each angular increment. (Note: several batteries may be needed to offset the effect of battery voltage droop, which should not exceed 5% of the manufactured specified battery voltage during transmission).
- c) Replace the transmitter under test with a vertically polarized half-wave dipole (or an antenna whose gain is known relative to an ideal half-wave dipole). The center of the antenna should be at the same location as the center of the antenna under test.
- d) Connect the antenna to a signal generator with a known output power and record the path loss (in dB) as LOSS. If a standard radiation test site is used, raise and lower the test antenna to obtain a maximum reading.  $LOSS = \text{Generator Output Power (dBm)} - \text{Analyzer reading (dBm)}$
- e) Determine the effective radiated output power at each angular position from the readings in steps b) and d) using the following equation:  $ERP \text{ (dBm)} = LVL \text{ (dBm)} + LOSS \text{ (dB)}$
- f) The maximum ERP is the maximum value determined in the preceding step.
- g) When calculating ERP, in addition to knowing the antenna radiation and matching characteristics, it is necessary to know the loss values of all elements (e.g.transmission line attenuation, mismatches, filters, combiners) interposed between the point where transmitter output power is measured, and the point where power is applied to the antenna. ERP can then be calculated as follows:  
 $ERP \text{ (dBm)} = \text{Output Power (dBm)} - \text{Losses (dB)} + \text{Antenna Gain (dBd)}$   
 where: dBd refers to gain relative to an ideal dipole.  
 $EIRP \text{ (dBm)} = ERP \text{ (dBm)} + 2.15 \text{ (dB.)}$

**Test setup**



Note: Area side:2.4mX3.6m

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

**Limits**

Rule Part 27.50(b) (10) specifies that “Portable stations (hand-held devices) transmitting in the 746-757 MHz, 776-788 MHz, and 805-806 MHz bands are limited to 3 watts ERP”

Rule Part 27.50(c) (10) specifies that “Portable stations (hand-held devices) in the 600 MHz uplink band and the 698-746 MHz band, and fixed and mobile stations in the 600 MHz uplink band are limited to 3 watts ERP”

Rule Part 27.50(d) (4) specifies that “Fixed, mobile and portable (hand-held) stations operating in the 1710–1755 MHz band are limited to 1 watt EIRP”

Part 27.50(b)(10)Limit (ERP) -LTE 13	≤ 3 W (34.77 dBm)
Part 27.50(c)(10)Limit (ERP) -LTE 12	≤ 3 W (34.77 dBm)
Part 27.50(d)(4)Limit (EIRP) -LTE 4	≤ 1 W (30 dBm)

**Measurement Uncertainty**

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor  $k = 2$ ,  $U = 1.19$  dB

**Test Results**

The measurement is performed for both of horizontal and vertical antenna Polarization, and only the data of worst mode is recorded in this report

LTE Band 4								
Bandwidth	Channel	Frequency (MHz)	Polarization	Output Power (dBm)	Losses (dB)	Antenna Gain (dBd)	EIRP (dBm)	Conclusion
1.4 MHz (QPSK)	Low	1710.7	Horizontal	-29.89	-54.30	1.44	25.85	Pass
	Mid	1732.5	Horizontal	-29.94	-54.32	1.57	25.94	Pass
	High	1754.3	Horizontal	-30.14	-54.10	1.72	25.68	Pass
3 MHz (QPSK)	Low	1711.5	Horizontal	-30.30	-54.33	1.44	25.48	Pass
	Mid	1732.5	Horizontal	-30.43	-54.32	1.57	25.46	Pass
	High	1753.5	Horizontal	-30.39	-54.11	1.72	25.44	Pass
5 MHz (QPSK)	Low	1712.5	Horizontal	-30.22	-54.34	1.44	25.56	Pass
	Mid	1732.5	Horizontal	-30.23	-54.32	1.57	25.65	Pass
	High	1752.5	Horizontal	-30.23	-54.13	1.72	25.61	Pass
10 MHz (QPSK)	Low	1715	Horizontal	-30.65	-54.33	1.44	25.12	Pass
	Mid	1732.5	Horizontal	-30.73	-54.32	1.57	25.15	Pass
	High	1750	Horizontal	-30.59	-54.12	1.66	25.19	Pass
15 MHz (QPSK)	Low	1717.5	Horizontal	-30.24	-54.35	1.49	25.59	Pass
	Mid	1732.5	Horizontal	-30.20	-54.32	1.57	25.68	Pass
	High	1747.5	Horizontal	-30.18	-54.17	1.66	25.65	Pass
20 MHz (QPSK)	Low	1720	Horizontal	-30.07	-54.37	1.49	25.79	Pass
	Mid	1732.5	Horizontal	-29.99	-54.32	1.57	25.89	Pass
	High	1745	Horizontal	-30.11	-54.23	1.63	25.75	Pass
1.4 MHz (16QAM)	Low	1710.7	Horizontal	-30.16	-54.35	1.44	25.63	Pass
	Mid	1732.5	Horizontal	-30.25	-54.41	1.57	25.73	Pass
	High	1754.3	Horizontal	-30.77	-54.52	1.72	25.46	Pass
3 MHz (16QAM)	Low	1711.5	Horizontal	-30.44	-54.35	1.44	25.35	Pass
	Mid	1732.5	Horizontal	-30.64	-54.41	1.57	25.33	Pass
	High	1753.5	Horizontal	-30.89	-54.48	1.72	25.31	Pass
5 MHz (16QAM)	Low	1712.5	Horizontal	-30.23	-54.13	1.72	25.61	Pass
	Mid	1732.5	Horizontal	-30.48	-54.38	1.44	25.34	Pass
	High	1752.5	Horizontal	-30.54	-54.41	1.57	25.44	Pass
10 MHz (16QAM)	Low	1715	Horizontal	-30.78	-54.32	1.44	24.98	Pass
	Mid	1732.5	Horizontal	-30.97	-54.41	1.57	25.01	Pass
	High	1750	Horizontal	-31.14	-54.52	1.66	25.04	Pass
15 MHz (16QAM)	Low	1717.5	Horizontal	-30.44	-54.39	1.49	25.44	Pass
	Mid	1732.5	Horizontal	-30.45	-54.41	1.57	25.53	Pass
	High	1747.5	Horizontal	-30.67	-54.51	1.66	25.50	Pass
20 MHz (16QAM)	Low	1720	Horizontal	-30.26	-54.44	1.49	25.66	Pass
	Mid	1732.5	Horizontal	-30.21	-54.41	1.57	25.76	Pass
	High	1745	Horizontal	-30.60	-54.59	1.63	25.62	Pass



LTE Band 12								
Bandwidth	Channel	Frequency (MHz)	Polarization	Output Power (dBm)	Losses (dB)	Antenna Gain (dBd)	ERP (dBm)	Conclusion
<b>1.4 MHz (QPSK)</b>	Low	699.7	Horizontal	-30.75	-49.12	2.04	20.42	Pass
	Mid	707.5	Horizontal	-31.07	-49.39	2.03	20.36	Pass
	High	715.3	Horizontal	-31.36	-49.76	1.99	20.40	Pass
<b>3 MHz (QPSK)</b>	Low	700.5	Horizontal	-30.66	-48.91	2.04	20.16	Pass
	Mid	707.5	Horizontal	-30.92	-49.12	2.03	20.20	Pass
	High	714.5	Horizontal	-31.15	-49.43	1.99	20.22	Pass
<b>5 MHz (QPSK)</b>	Low	701.5	Horizontal	-31.03	-49.15	2.04	19.92	Pass
	Mid	707.5	Horizontal	-31.23	-49.39	2.03	19.88	Pass
	High	713.5	Horizontal	-31.51	-49.73	2.00	19.90	Pass
<b>10 MHz (QPSK)</b>	Low	704	Horizontal	-31.06	-48.94	2.04	20.25	Pass
	Mid	707.5	Horizontal	-31.20	-49.12	2.03	20.20	Pass
	High	711	Horizontal	-31.40	-49.37	2.00	20.23	Pass
<b>1.4 MHz (16QAM)</b>	Low	699.7	Horizontal	-31.30	-49.17	2.04	20.29	Pass
	Mid	707.5	Horizontal	-31.55	-49.39	2.03	20.24	Pass
	High	715.3	Horizontal	-31.83	-49.72	2.01	20.27	Pass
<b>3 MHz (16QAM)</b>	Low	700.5	Horizontal	-31.24	-48.95	2.04	19.92	Pass
	Mid	707.5	Horizontal	-31.44	-49.12	2.03	19.95	Pass
	High	714.5	Horizontal	-31.63	-49.35	2.01	19.97	Pass
<b>5 MHz (16QAM)</b>	Low	701.5	Horizontal	-31.04	-49.25	2.04	19.75	Pass
	Mid	707.5	Horizontal	-31.23	-49.39	2.03	19.71	Pass
	High	713.5	Horizontal	-31.44	-49.65	2.02	19.73	Pass
<b>10 MHz (16QAM)</b>	Low	704	Horizontal	-30.91	-49.00	2.04	20.13	Pass
	Mid	707.5	Horizontal	-31.08	-49.12	2.03	20.07	Pass
	High	711	Horizontal	-31.24	-49.33	2.02	20.11	Pass



LTE Band 13								
Bandwidth	Channel	Frequency (MHz)	Polarization	Output Power (dBm)	Losses (dB)	Antenna Gain (dBd)	ERP (dBm)	Conclusion
5MHz (QPSK)	Low	779.5	Horizontal	-27.82	-47.01	1.81	21.00	Pass
	Mid	782	Horizontal	-28.13	-47.17	1.81	20.85	Pass
	High	784.5	Horizontal	-28.36	-47.59	1.83	21.07	Pass
10MHz (QPSK)	Mid	782	Horizontal	-27.62	-46.67	1.81	21.00	Pass
5MHz (16QAM)	Low	779.5	Horizontal	-27.66	-46.56	1.81	20.86	Pass
	Mid	782	Horizontal	-27.76	-46.85	1.83	20.71	Pass
	High	784.5	Horizontal	-27.57	-46.75	1.81	20.93	Pass
10MHz (16QAM)	Mid	782	Horizontal	-27.41	-46.58	1.81	20.99	Pass

Note: 1. EIRP= E.R.P+2.15

### 5.3 Occupied Bandwidth

#### Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

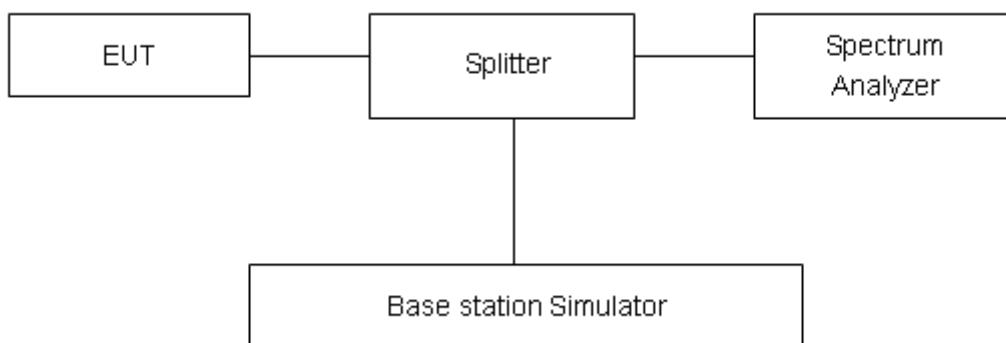
#### Method of Measurement

The EUT was connected to Spectrum Analyzer and Base Station Simulator via power Splitter. The occupied bandwidth is measured using spectrum analyzer.

RBW is set to 51 kHz, VBW is set to 160 kHz for LTE Band 4/12/13

99% power and -26dBc occupied bandwidths are recorded. Spectrum analyzer plots are included on the following pages.

#### Test Setup



#### Limits

No specific occupied bandwidth requirements in part 2.1049.

#### Measurement Uncertainty

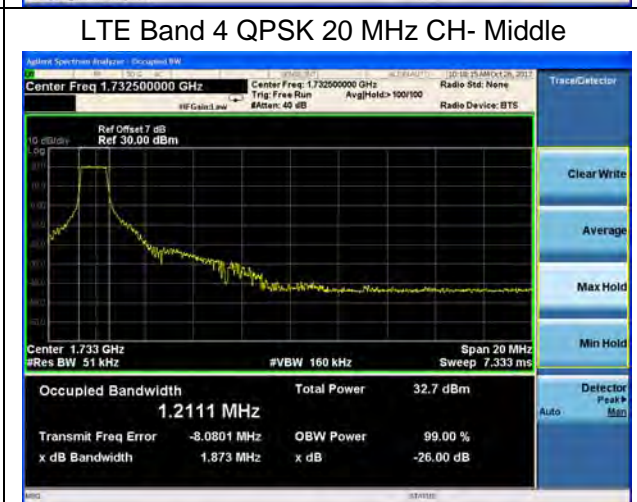
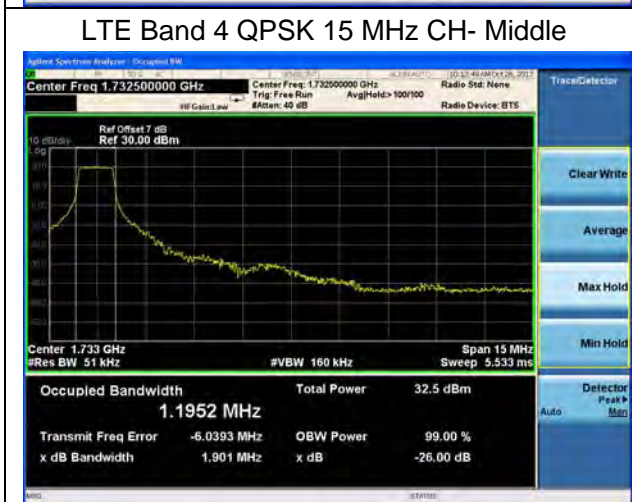
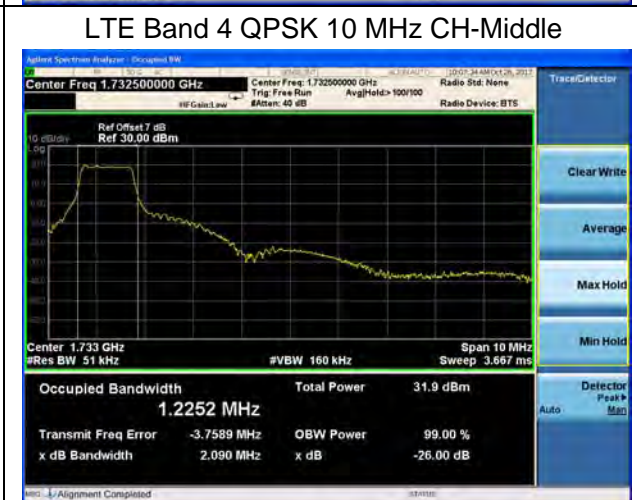
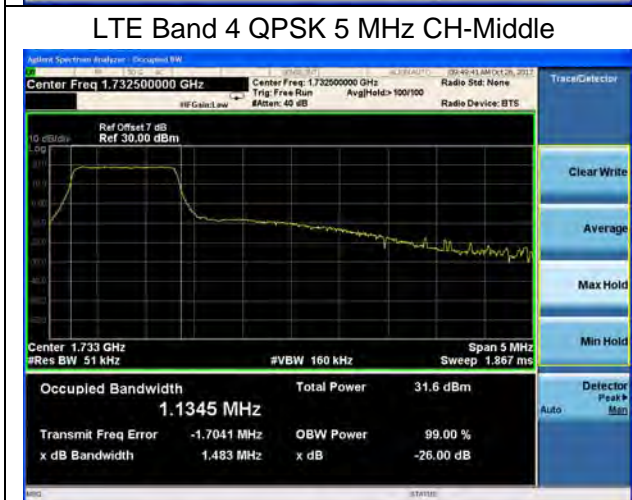
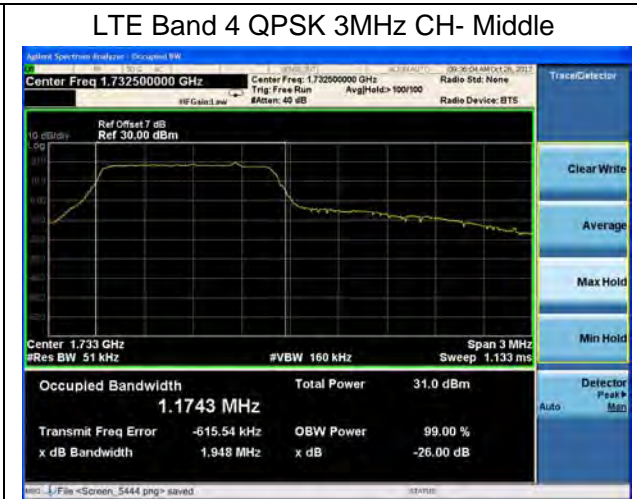
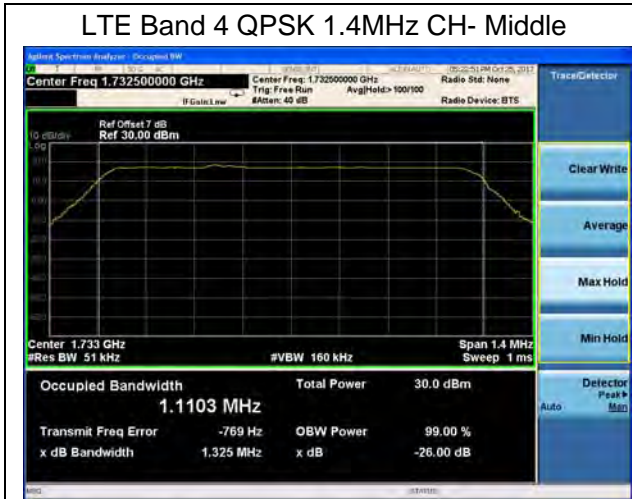
The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor  $k = 2$ ,  $U=624\text{Hz}$ .

**Test Result**

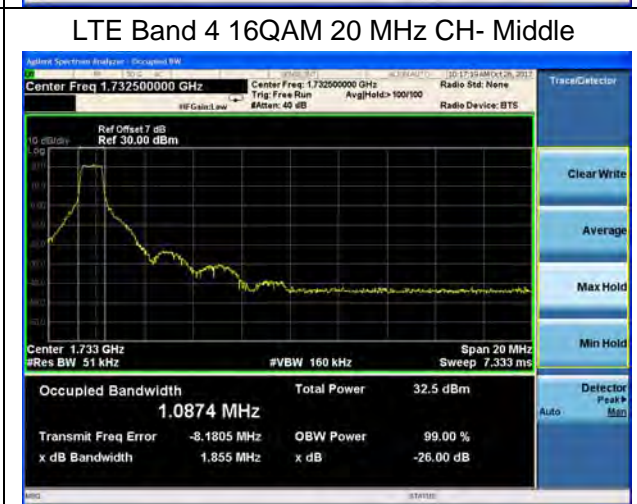
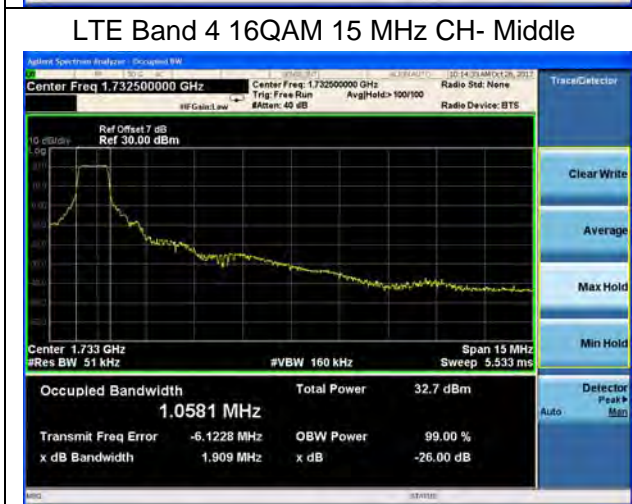
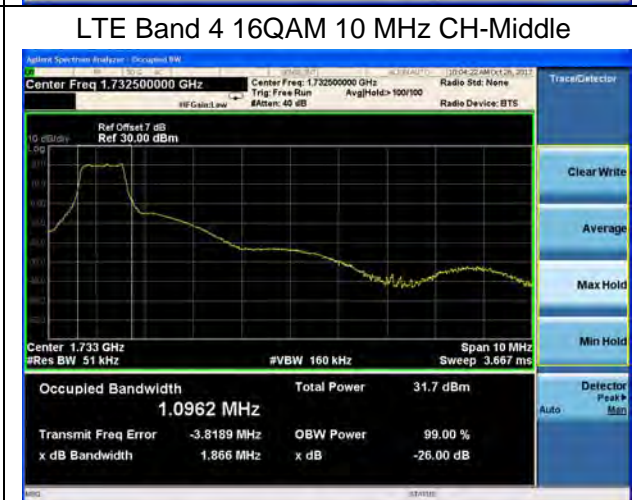
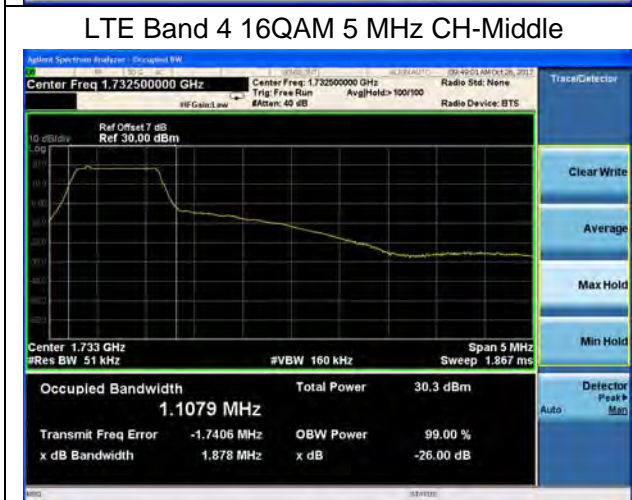
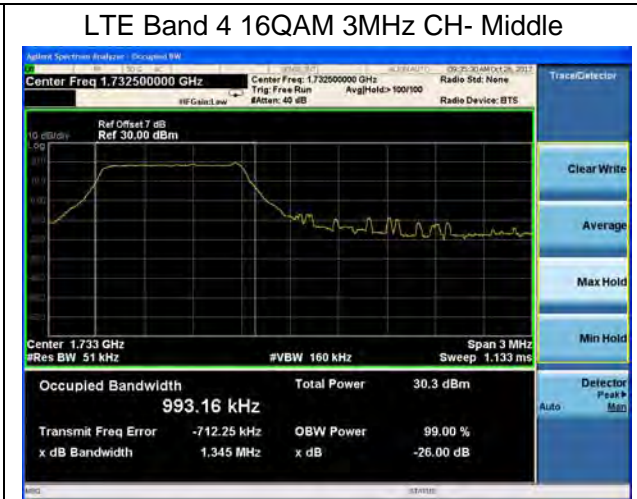
Mode	Bandwidth	Modulation	Channel/ Frequency(MHz)	RB	Index	Bandwidth(KHz)	
						99% Power	-26dBc
Band4	1.4MHz	QPSK	20175/1732.5	6#0	0	1.1103	1.325
		16QAM	20175/1732.5	6#0	0	0.95238	1.223
	3MHz	QPSK	20175/1732.5	6#0	0	1.1743	1.948
		16QAM	20175/1732.5	6#0	0	0.99316	1.345
	5MHz	QPSK	20175/1732.5	6#0	0	1.1345	1.483
		16QAM	20175/1732.5	6#0	0	1.1079	1.878
	10MHz	QPSK	20175/1732.5	6#0	0	1.2252	2.09
		16QAM	20175/1732.5	6#0	0	1.0962	1.866
	15MHz	QPSK	20175/1732.5	6#0	0	1.1952	1.901
		16QAM	20175/1732.5	6#0	0	1.0581	1.909
	20MHz	QPSK	20175/1732.5	6#0	0	1.2111	1.873
		16QAM	20175/1732.5	6#0	0	1.0874	1.855

Mode	Bandwidth	Modulation	Channel/ Frequency(MHz)	RB	Index	Bandwidth(KHz)	
						99% Power	-26dBc
Band12	1.4MHz	QPSK	23095/707.5	6#0	0	1.1106	1.332
		16QAM	23095/707.5	6#0	0	0.94571	1.19
	3MHz	QPSK	23095/707.5	6#0	0	1.1748	1.932
		16QAM	23095/707.5	6#0	0	0.98234	1.337
	5MHz	QPSK	23095/707.5	6#0	0	1.1476	1.587
		16QAM	23095/707.5	6#0	0	1.0139	1.297
	10MHz	QPSK	23095/707.5	6#0	0	1.2093	2.142
		16QAM	23095/707.5	6#0	0	1.0582	1.54

Mode	Bandwidth	Modulation	Channel/ Frequency(MHz)	RB	Index	Bandwidth(KHz)	
						99% Power	-26dBc
Band13	5MHz	QPSK	23230/782	6#0	0	1.1416	1.556
		16QAM	23230/782	6#0	0	1.0005	1.311
	10MHz	QPSK	23230/782	6#0	0	1.1947	1.739
		16QAM	23230/782	6#0	0	1.0512	1.531









### LTE Band 12 QPSK 1.4MHz CH-Middle



### LTE Band 12 QPSK 3MHz CH-Middle



### LTE Band 12 QPSK 5 MHz CH-Middle



### LTE Band 12 QPSK 10MHz CH-Middle



### LTE Band 12 16QAM 1.4MHz CH-Middle



### LTE Band 12 16QAM 3MHz CH-Middle







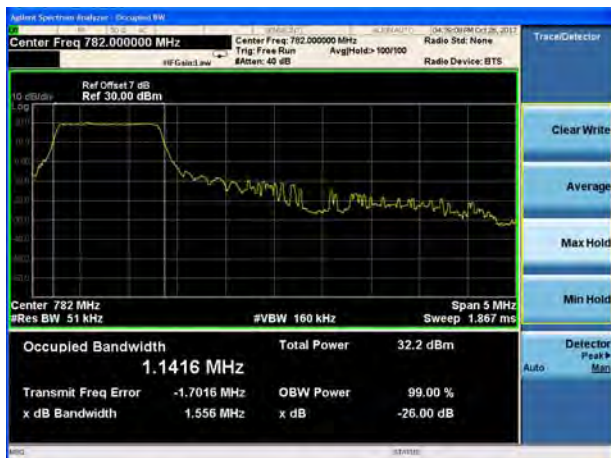
### LTE Band 12 16QAM 5 MHz CH-Middle



### LTE Band 12 16QAM 10MHz CH-Middle



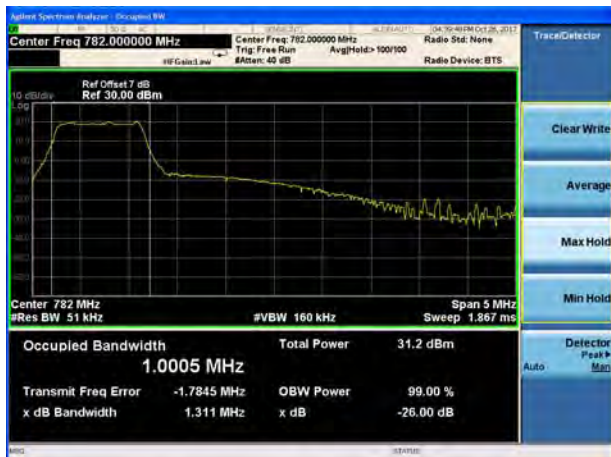
### LTE Band 13 QPSK 5MHz CH-Middle



### LTE Band 13 QPSK 10MHz CH-Middle



### LTE Band 13 16QAM 5MHz CH- Middle



### LTE Band 13 16QAM 10MHz CH- Middle





### 5.4 Band Edge Compliance

#### Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

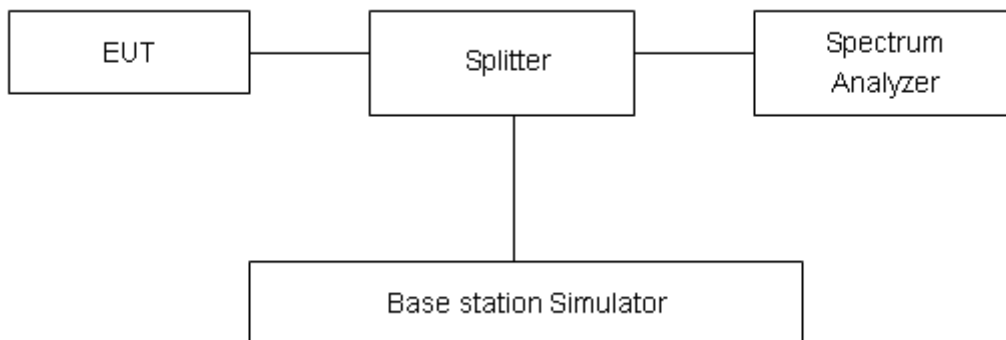
#### Method of Measurement

The EUT was connected to Spectrum Analyzer and Base Station Simulator via power Splitter. The band edge of the lowest and highest channels were measured.

The testing follows KDB 971168 v02r02 Section 6.0

- 1.The EUT was connected to spectrum analyzer and system simulator via a power divider.
2. The band edges of low and high channels for the highest RF powers were measured.
3. RBW is set to 51 kHz, VBW is set to 160 kHz for LTE Band 4/12/13 on spectrum analyzer.
4. Set spectrum analyzer with RMS detector.
5. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
6. Checked that all the results comply with the emission limit line.

#### Test Setup



## Limits

Rule Part 27.53(h) specifies that “ for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least  $43 + 10 \log_{10} (P)$  dB”

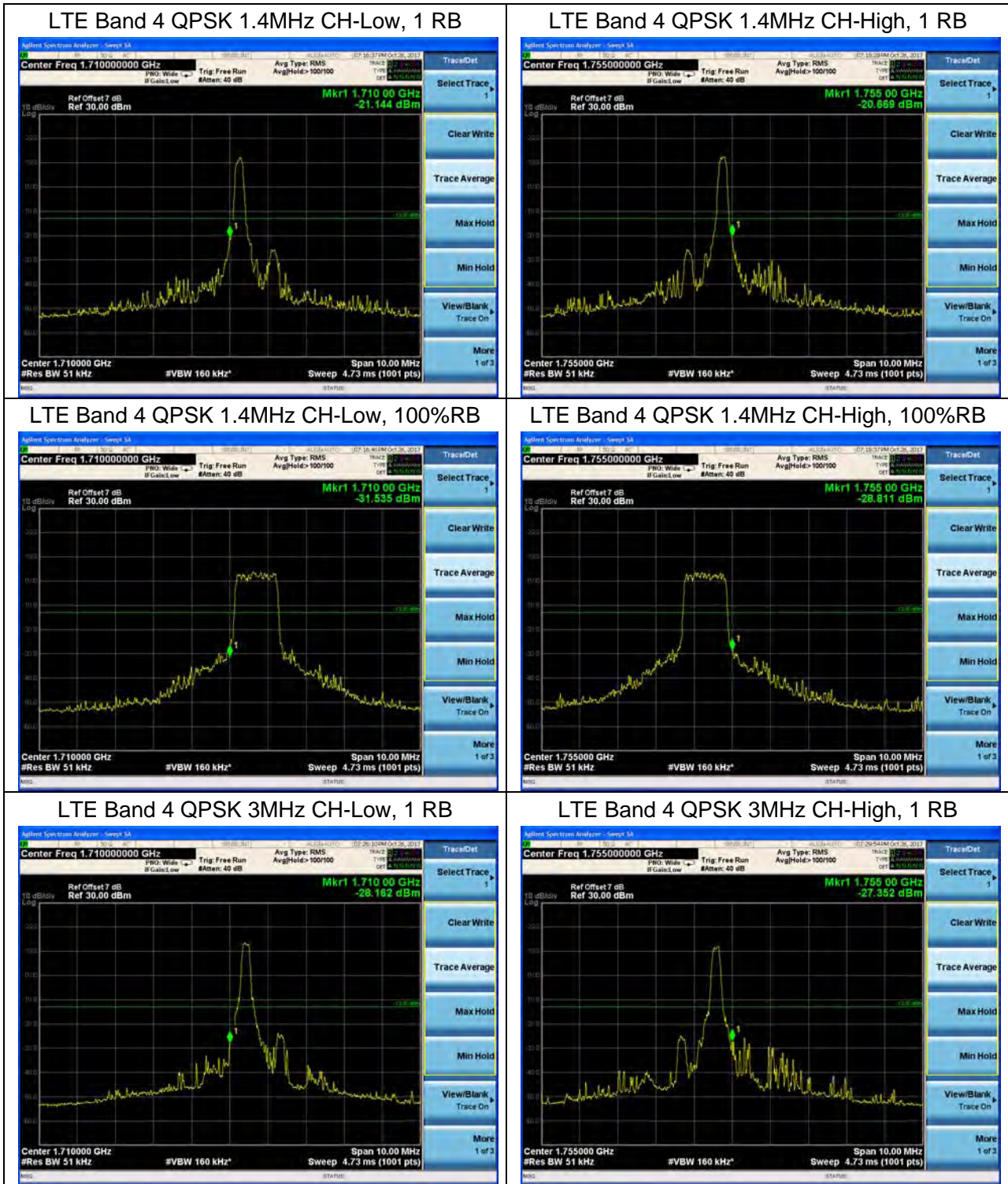
Part 27.53(g) specifies that “ For operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least  $43 + 10 \log_{10} (P)$  dB.”

## Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor  $k = 1.96$ ,  $U=0.684$ dB.

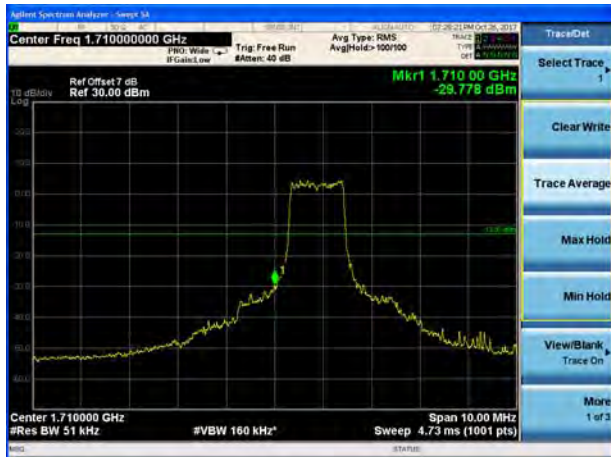
**Test Result**

All the test traces in the plots shows the test results clearly.





LTE Band 4 QPSK 3MHz CH-Low, 100%RB



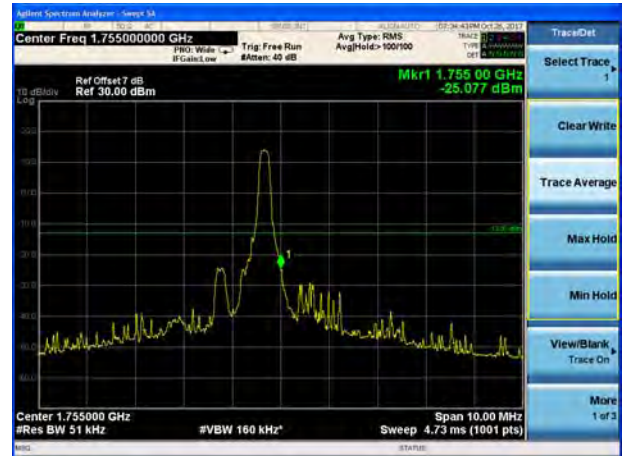
LTE Band 4 QPSK 3MHz CH-High, 100%RB



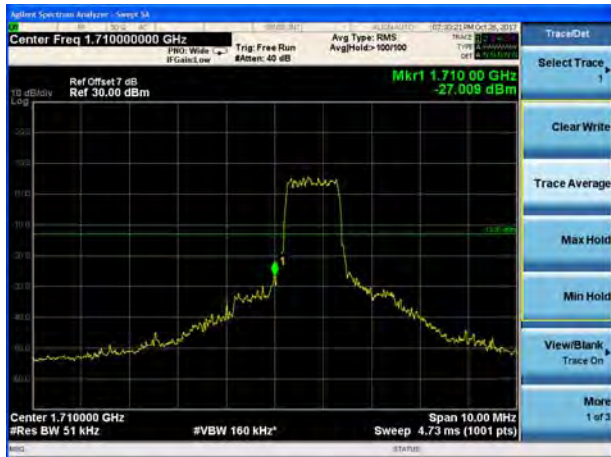
LTE Band 4 QPSK 5MHz CH-Low, 1 RB



LTE Band 4 QPSK 5MHz CH-High, 1 RB



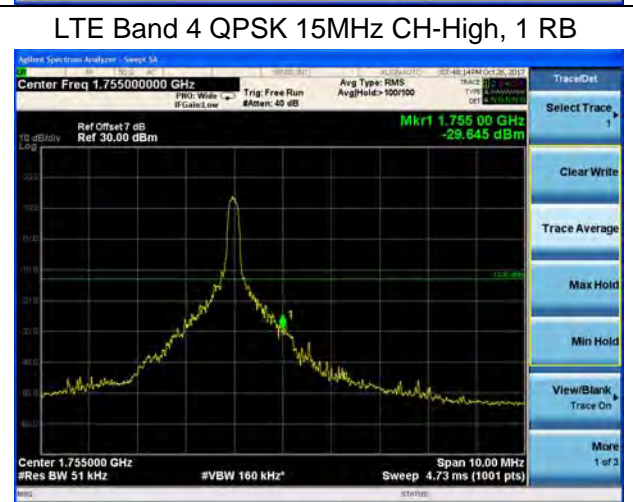
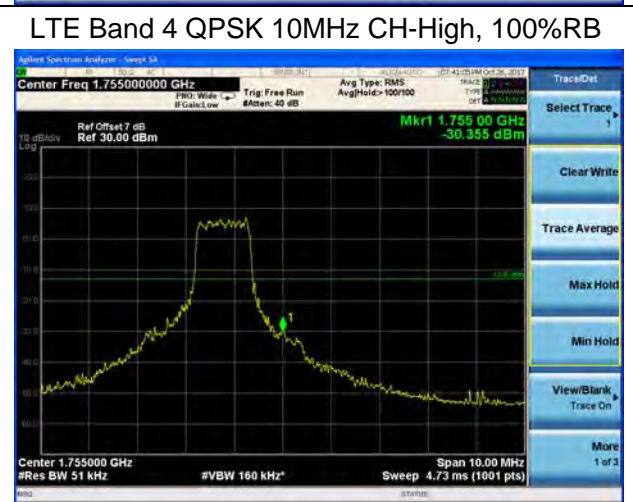
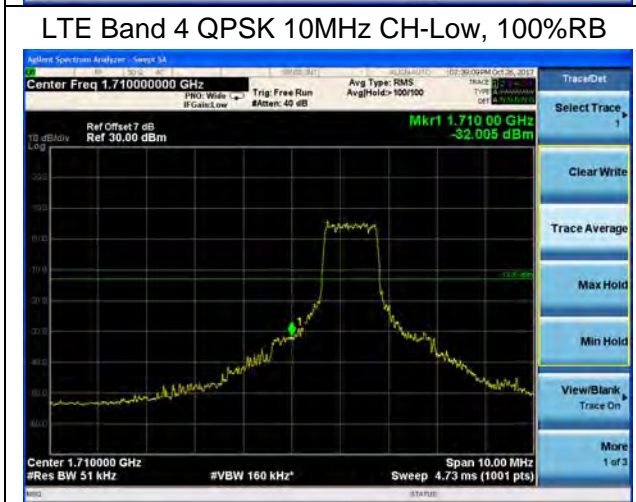
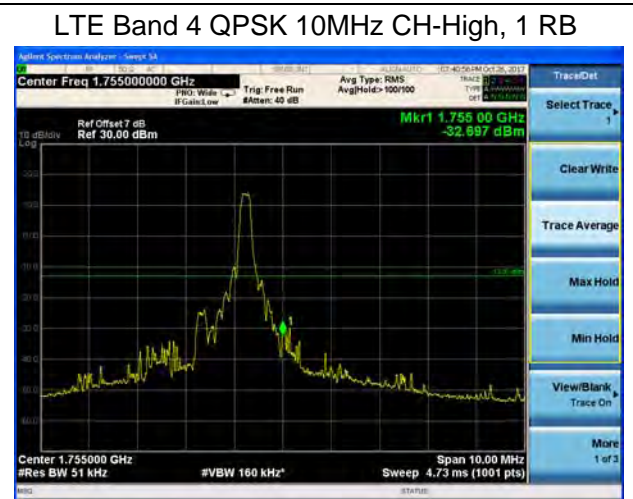
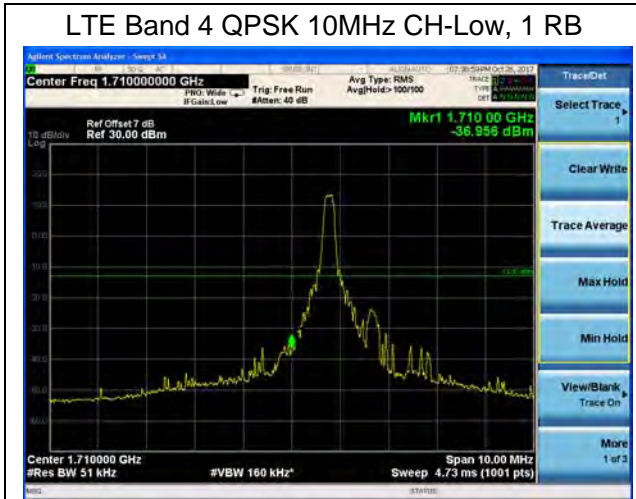
LTE Band 4 QPSK 5MHz CH-Low, 100%RB



LTE Band 4 QPSK 5MHz CH-High, 100%RB

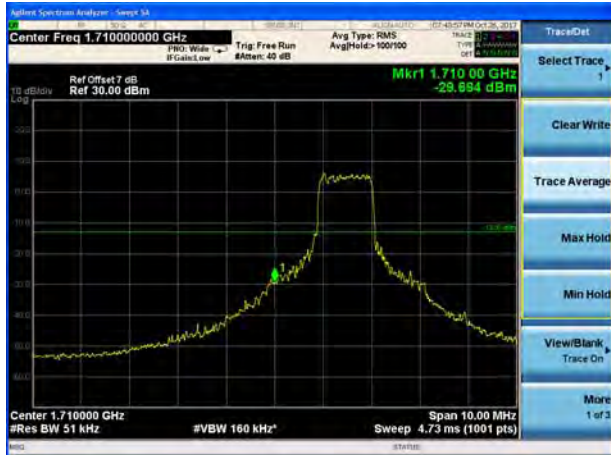








LTE Band 4 QPSK 15MHz CH-Low, 100%RB



LTE Band 4 QPSK 15MHz CH-High, 100%RB



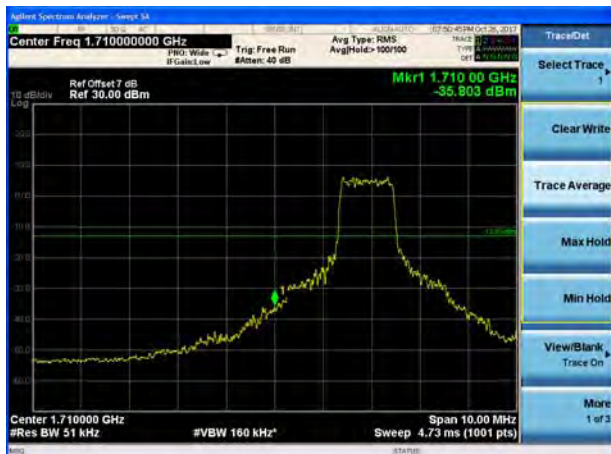
LTE Band 4 QPSK 20MHz CH-Low, 1 RB



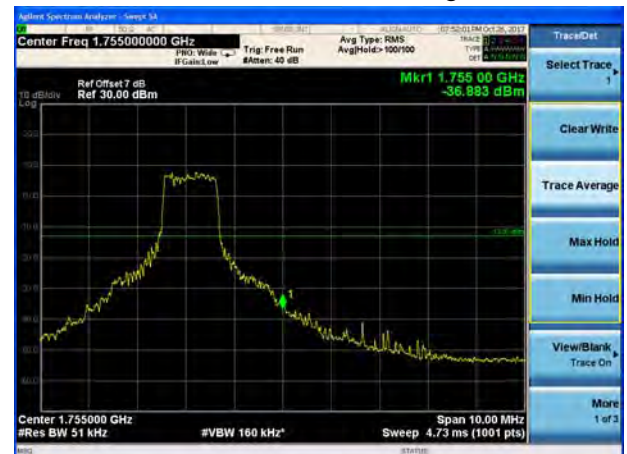
LTE Band 4 QPSK 20MHz CH-High, 1 RB



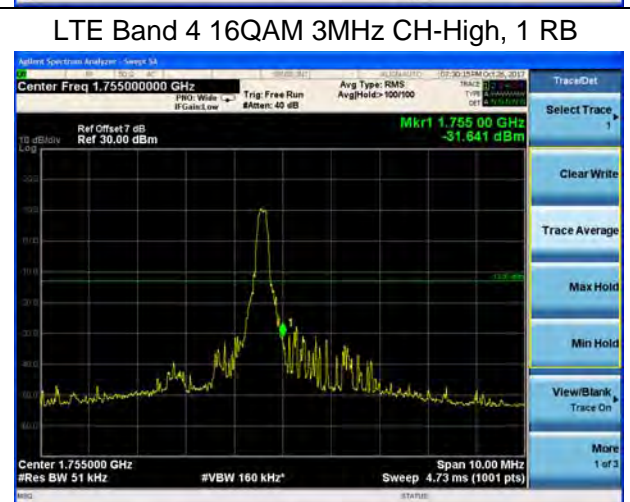
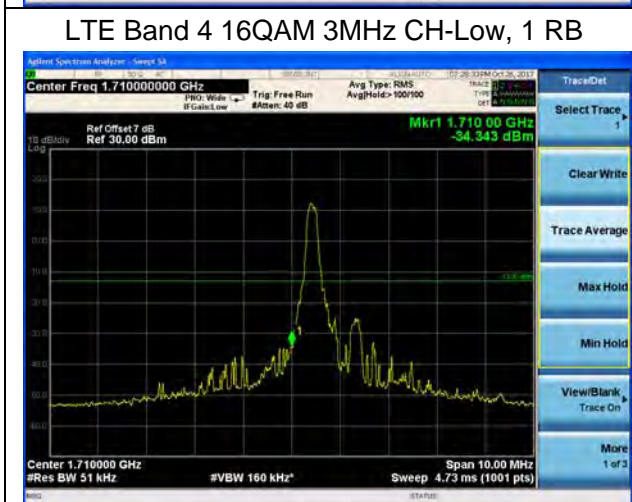
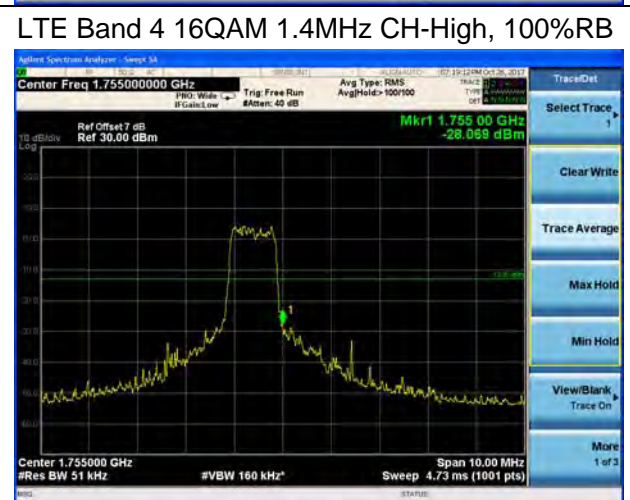
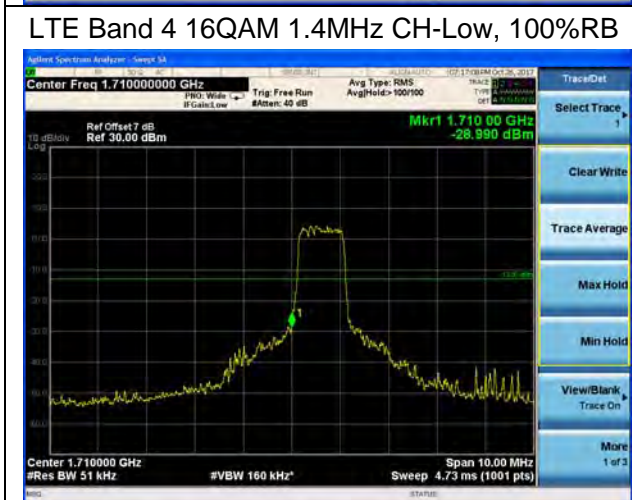
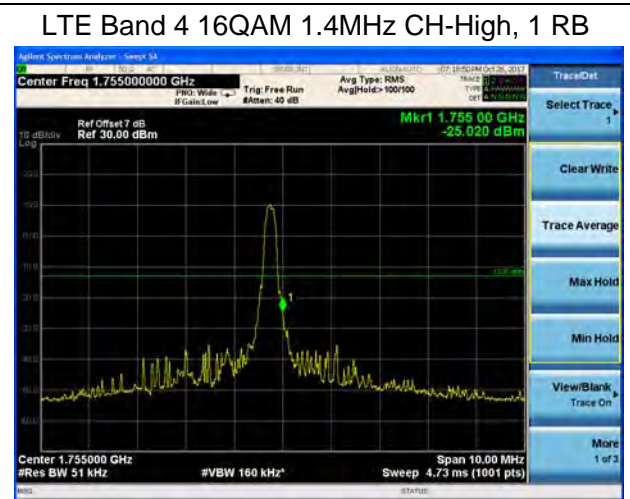
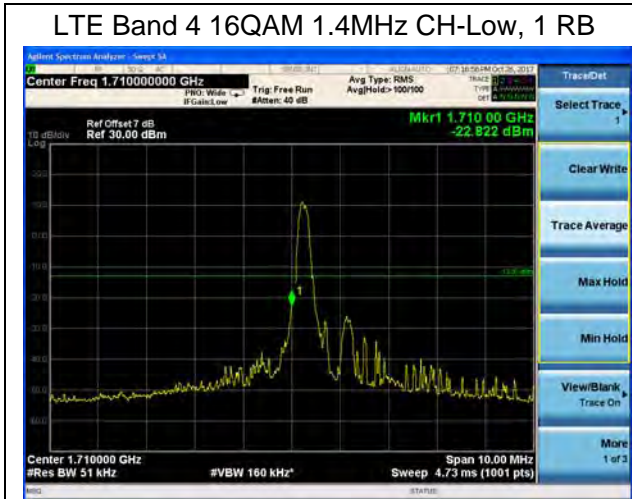
LTE Band 4 QPSK 20MHz CH-Low, 100%RB



LTE Band 4 QPSK 20MHz CH-High, 100%RB

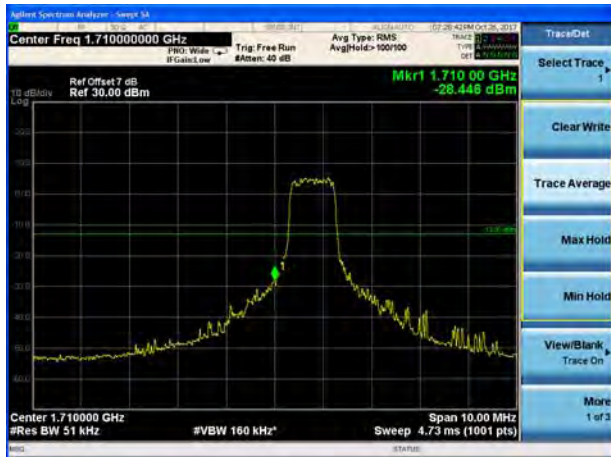




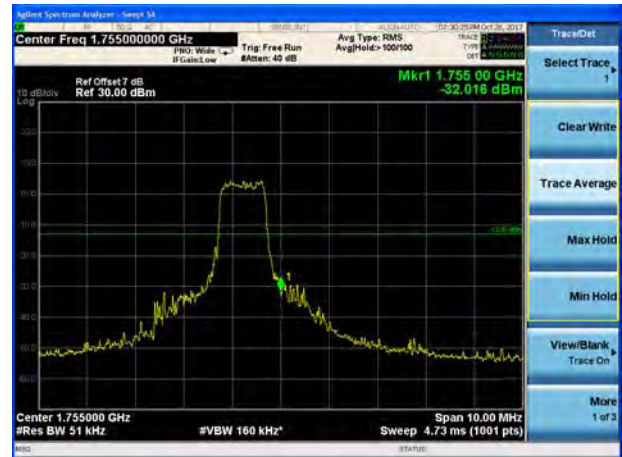




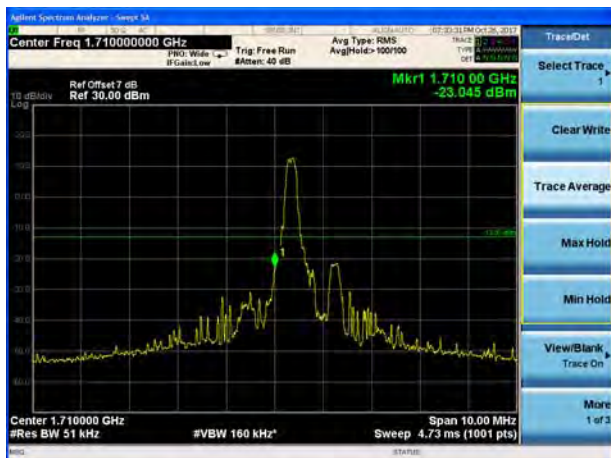
LTE Band 4 16QAM 3MHz CH-Low, 100%RB



LTE Band 4 16QAM 3MHz CH-High, 100%RB



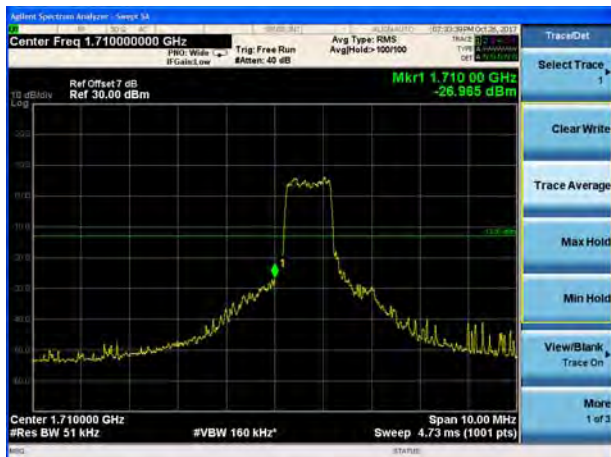
LTE Band 4 16QAM 5MHz CH-Low, 1 RB



LTE Band 4 16QAM 5MHz CH-High, 1 RB



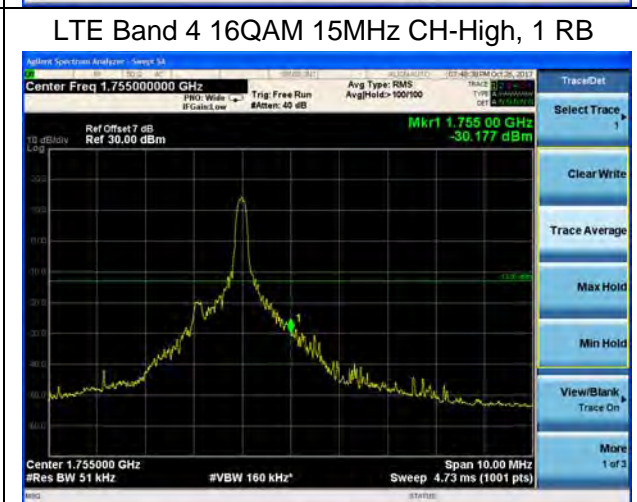
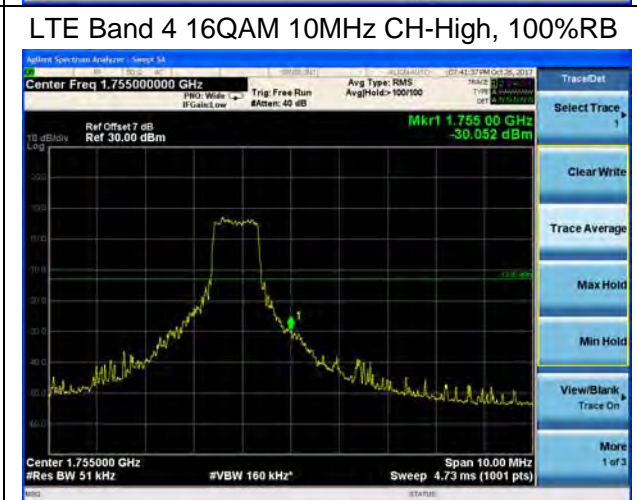
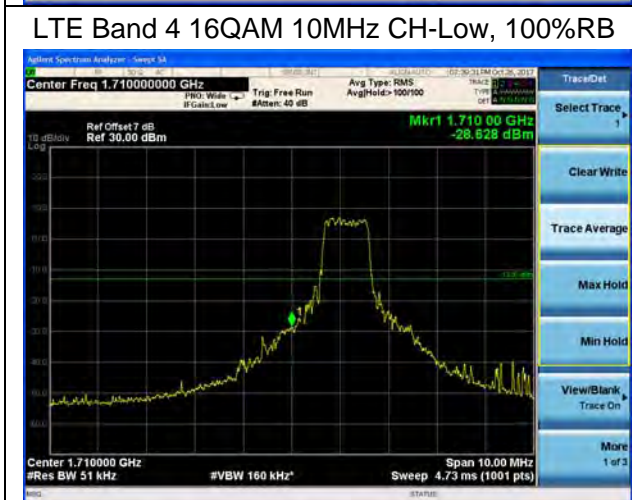
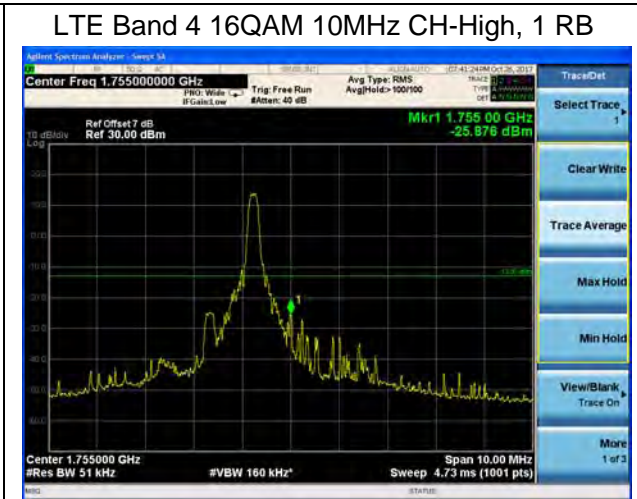
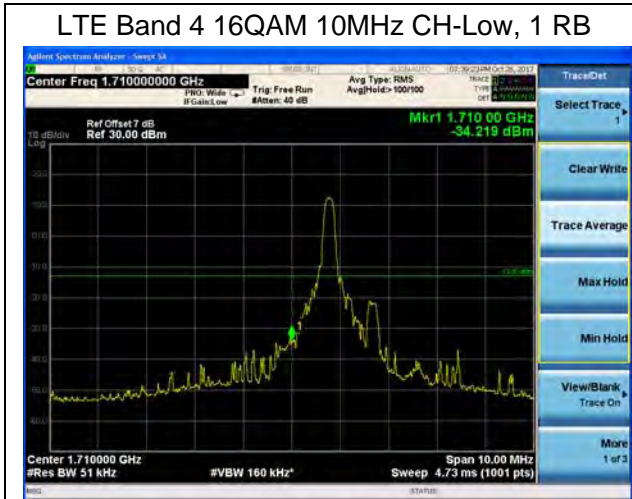
LTE Band 4 16QAM 5MHz CH-Low, 100%RB



LTE Band 4 16QAM 5MHz CH-High, 100%RB





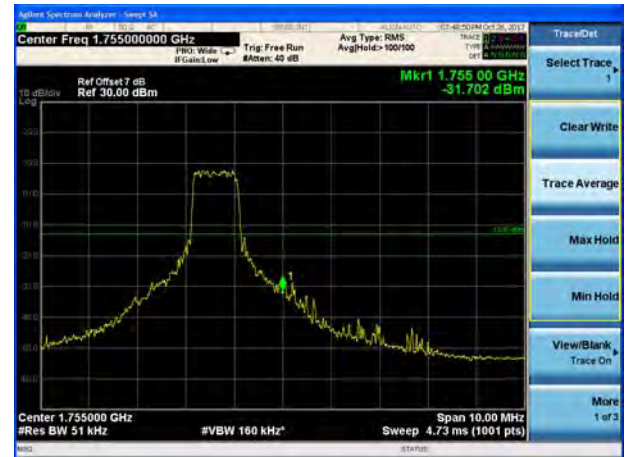




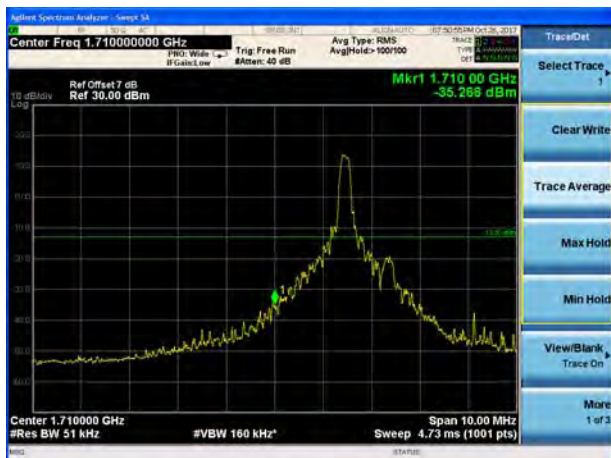
LTE Band 4 16QAM 15MHz CH-Low, 100%RB



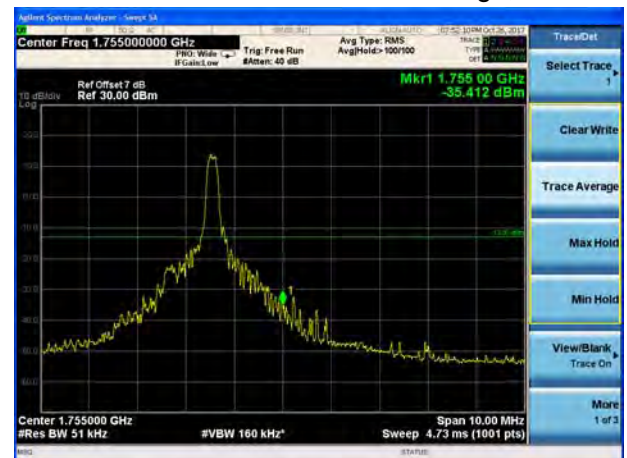
LTE Band 4 16QAM 15MHz CH-High, 100%RB



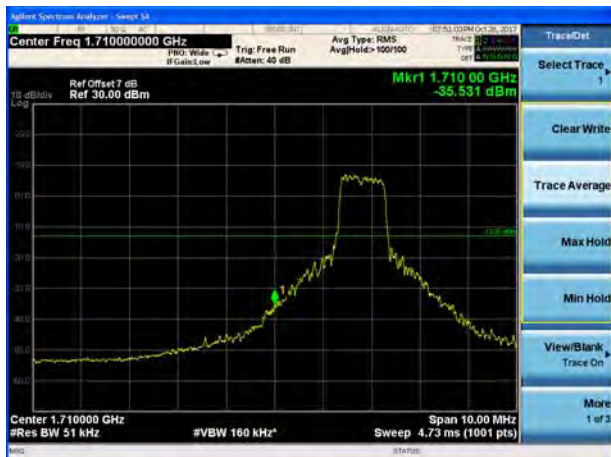
LTE Band 4 16QAM 20MHz CH-Low, 1 RB



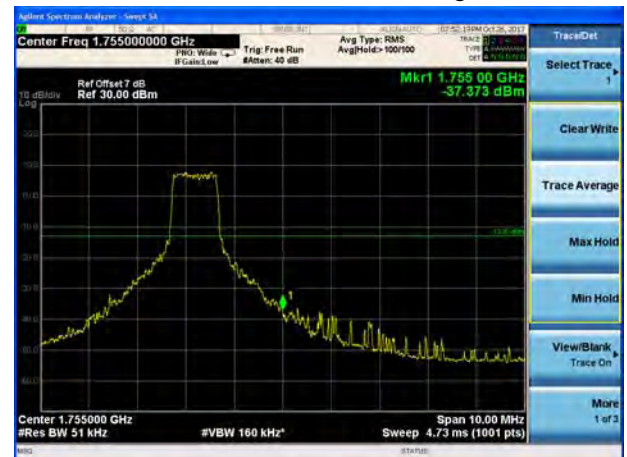
LTE Band 4 16QAM 20MHz CH-High, 1 RB



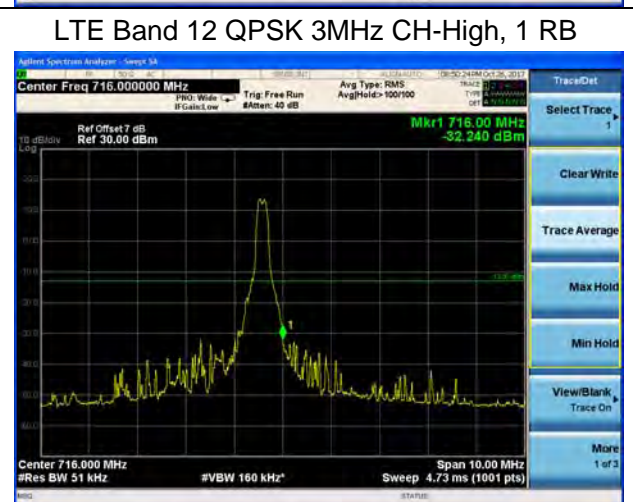
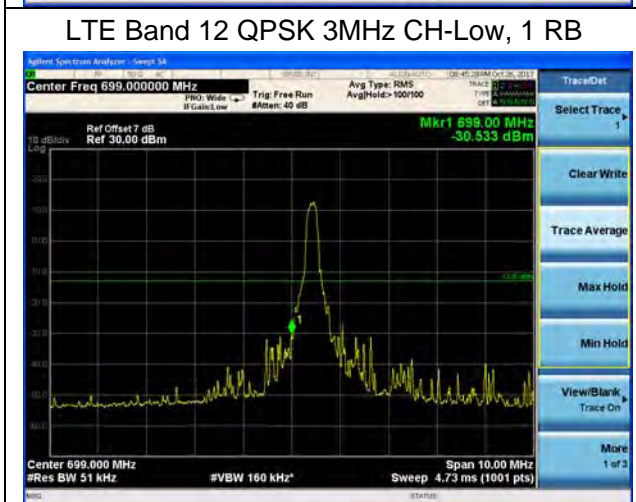
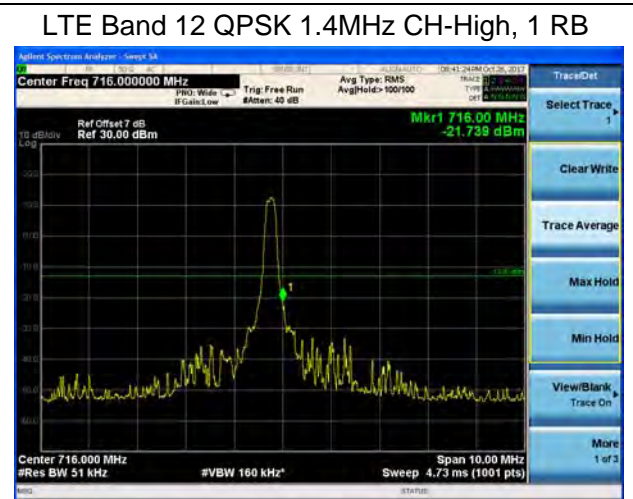
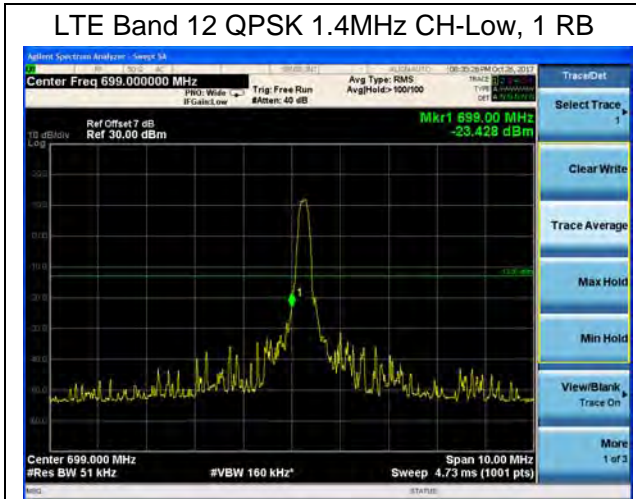
LTE Band 4 16QAM 20MHz CH-Low, 100%RB

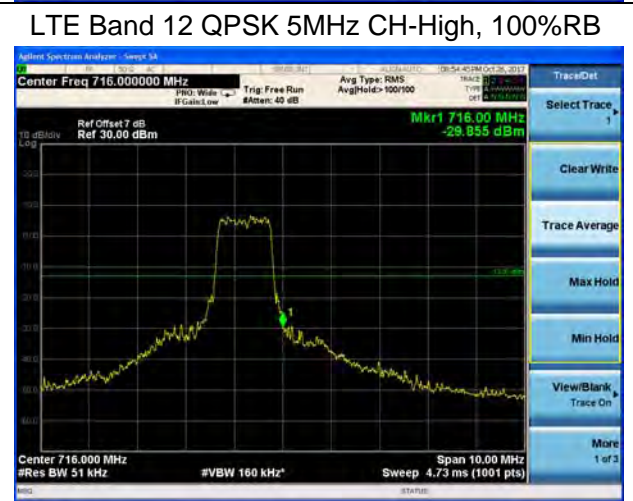
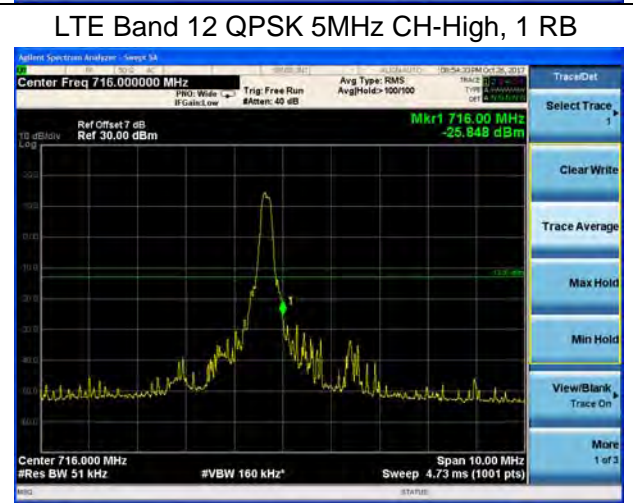
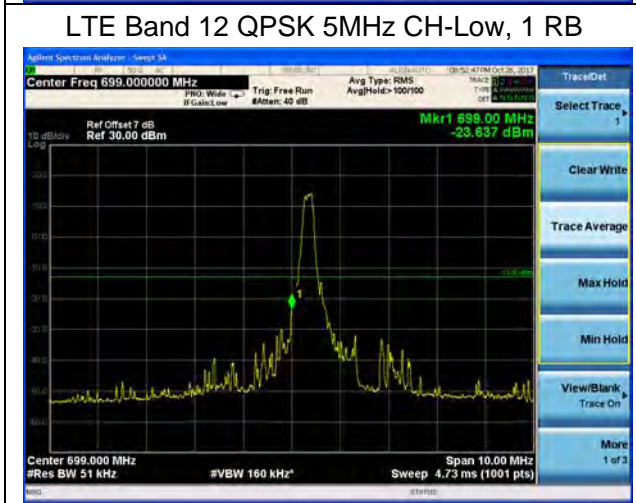
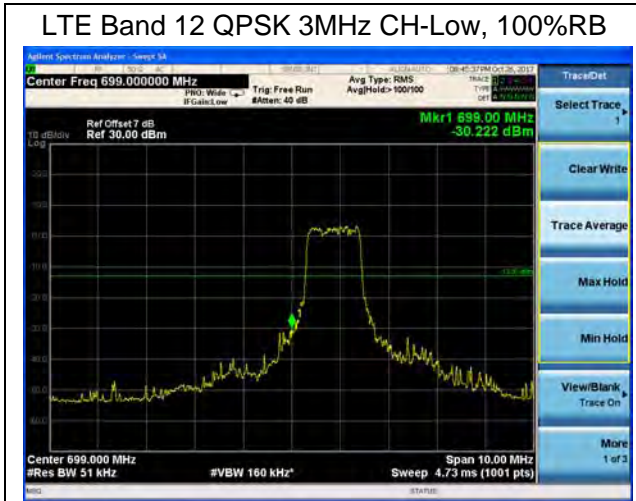


LTE Band 4 16QAM 20MHz CH-High, 100%RB









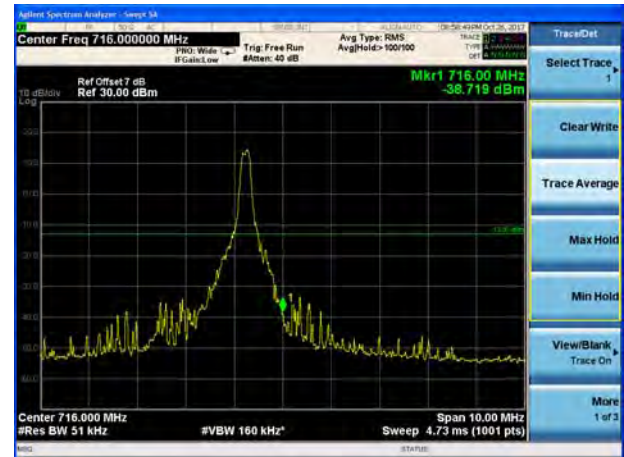




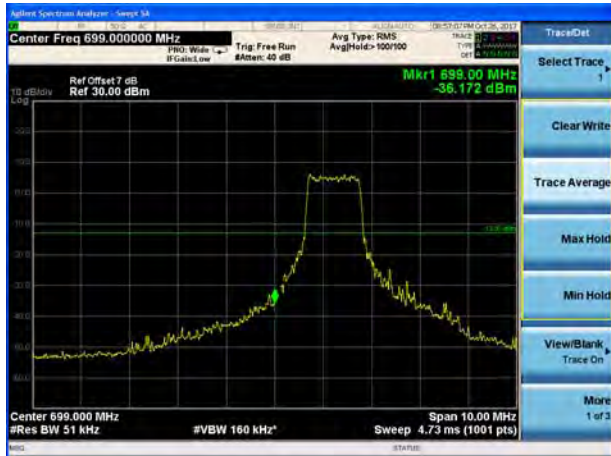
LTE Band 12 QPSK 10MHz CH-Low, 1 RB



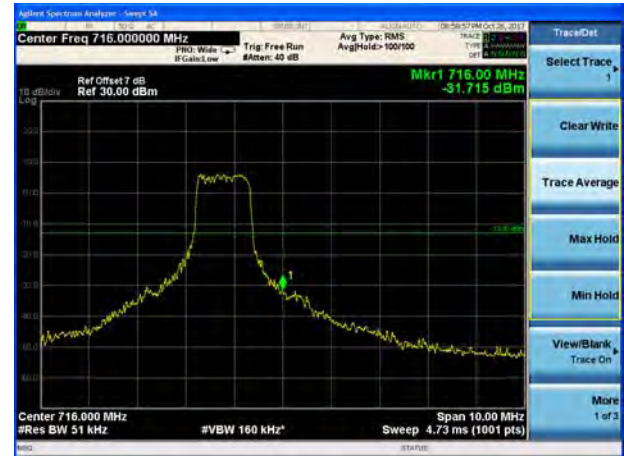
LTE Band 12 QPSK 10MHz CH-High, 1 RB



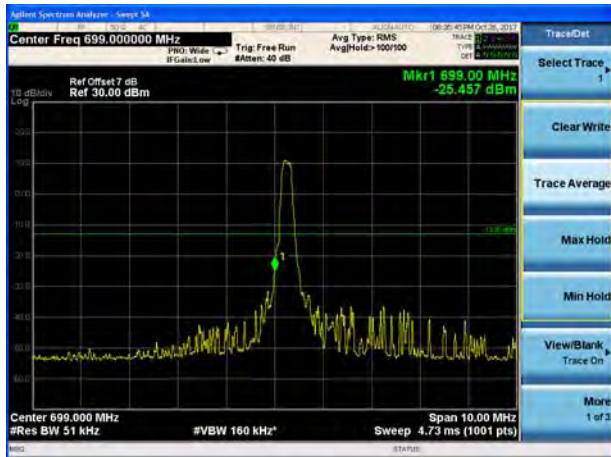
LTE Band 12 QPSK 10MHz CH-Low, 100%RB



LTE Band 12 QPSK 10MHz CH-High, 100%RB

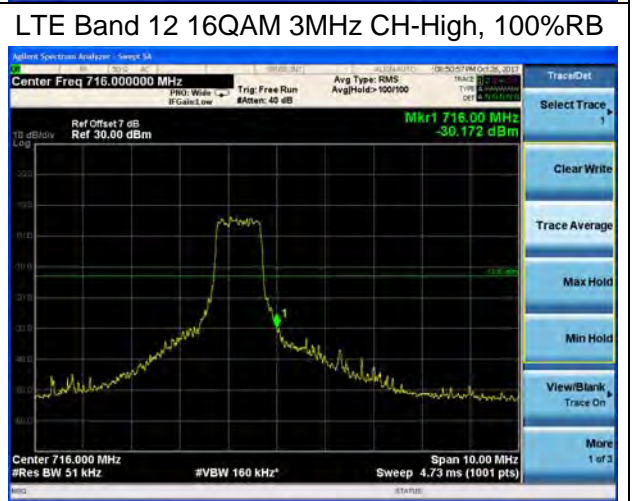
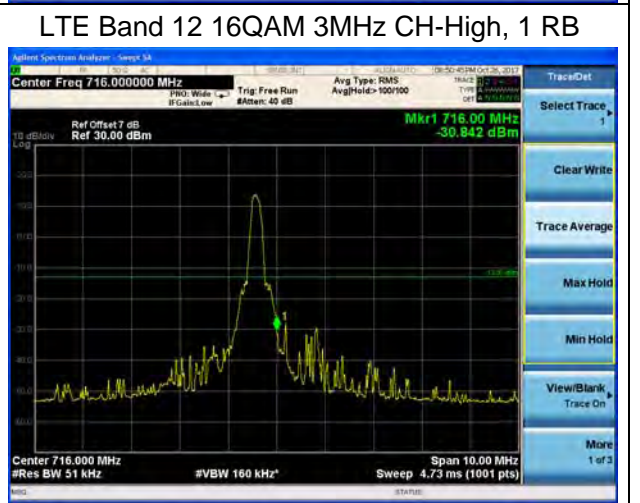
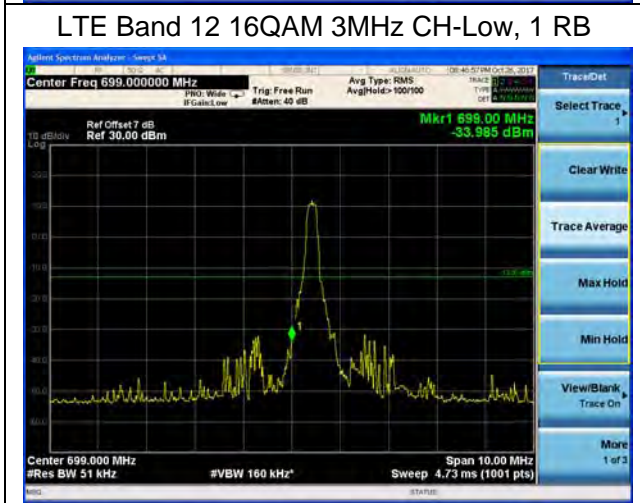
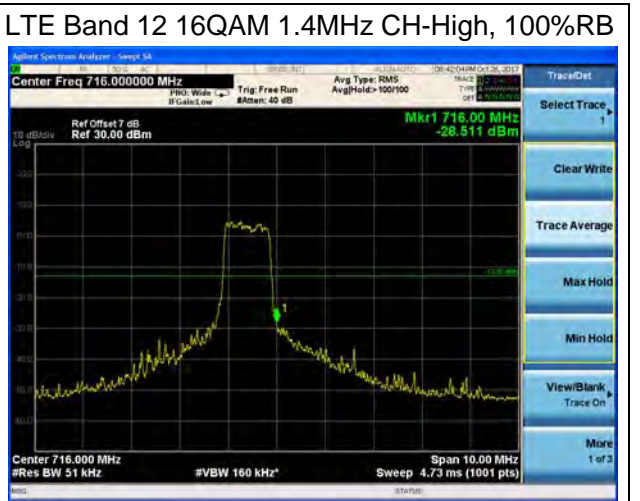
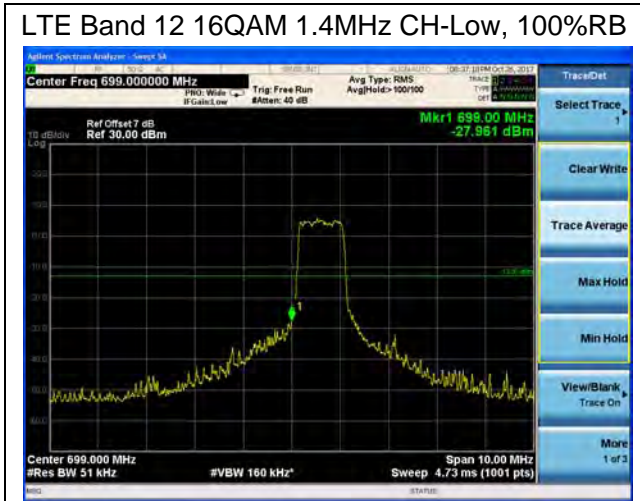


LTE Band 12 16QAM 1.4MHz CH-Low, 1 RB



LTE Band 12 16QAM 1.4MHz CH-High, 1 RB







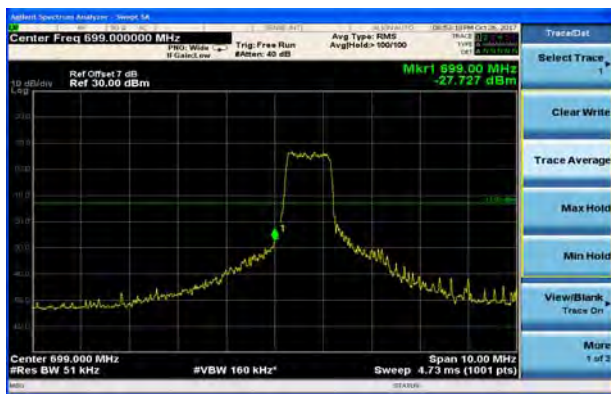
LTE Band 12 16QAM 5MHz CH-Low, 1 RB



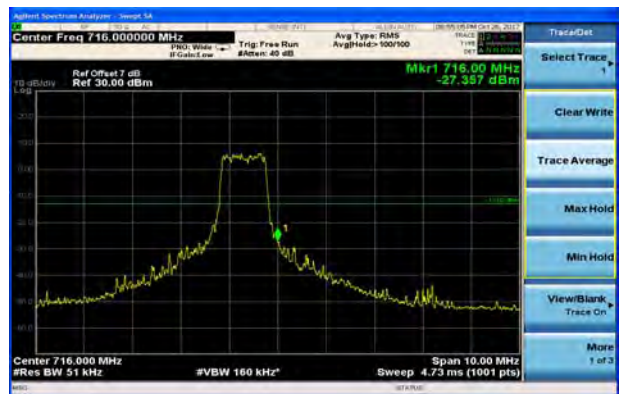
LTE Band 12 16QAM 5MHz CH-High, 1 RB



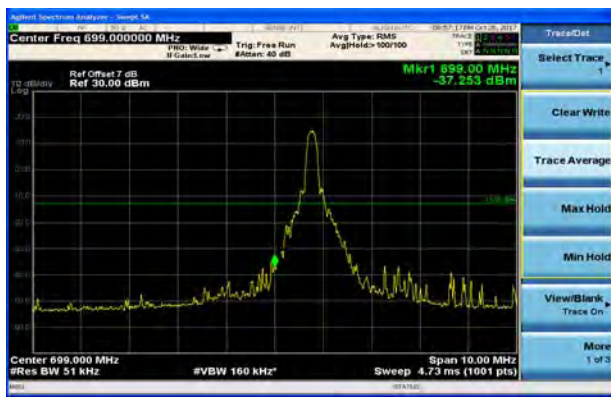
LTE Band 12 16QAM 5MHz CH-Low, 100%RB



LTE Band 12 16QAM 5MHz CH-High, 100%RB



LTE Band 12 16QAM 10MHz CH-Low, 1 RB



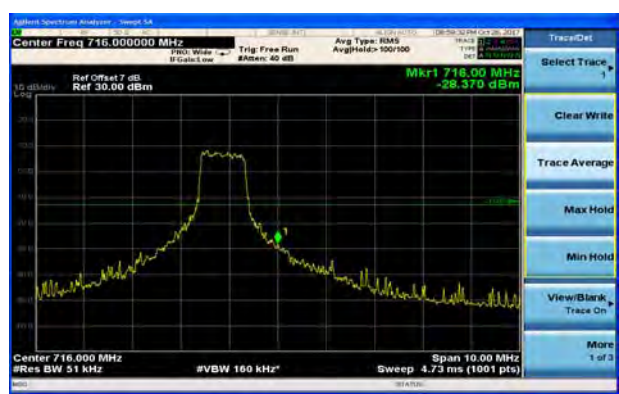
LTE Band 12 16QAM 10MHz CH-High, 1 RB



LTE Band 12 16QAM 10MHz CH-Low, 100%RB

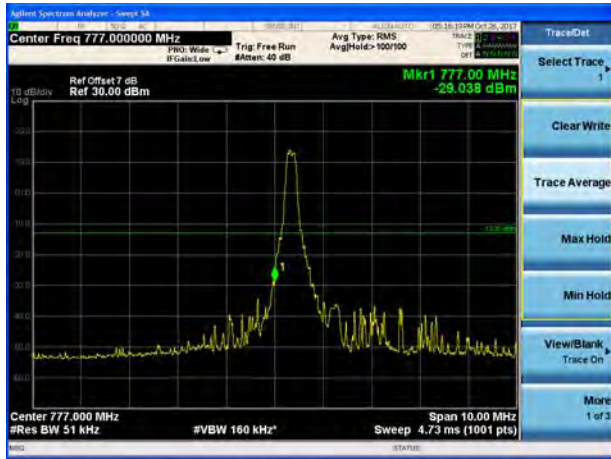


LTE Band 12 16QAM 10MHz CH-High, 100%RB

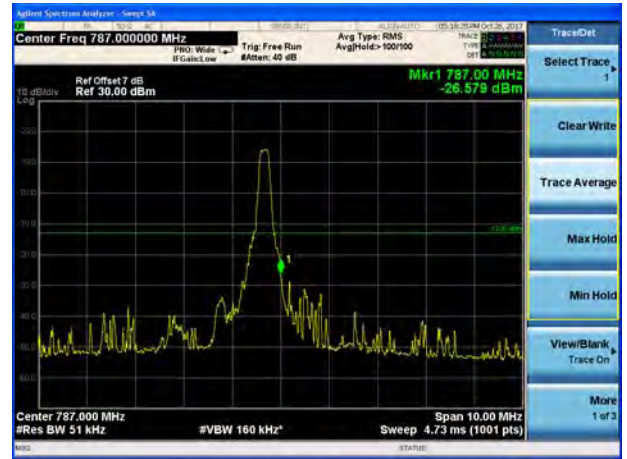




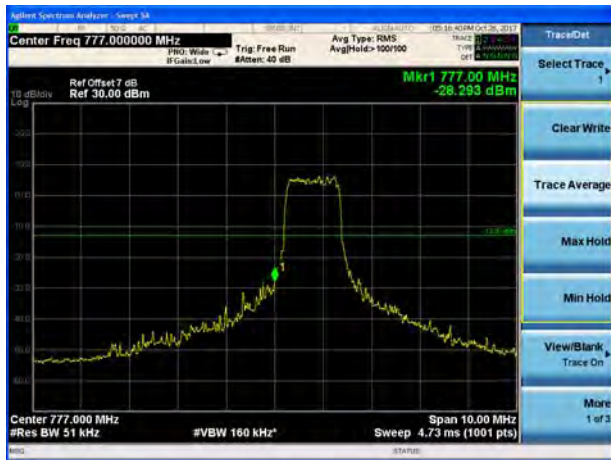
LTE Band 13 QPSK 5MHz CH-Low, 1 RB



LTE Band 13 QPSK 5MHz CH-High, 1 RB



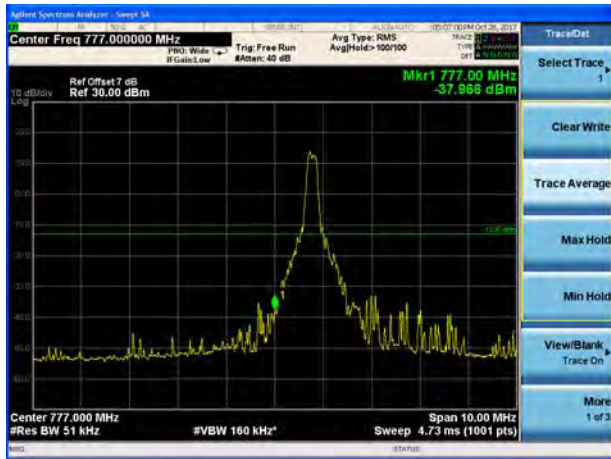
LTE Band 13 QPSK 5MHz CH-Low, 100%RB



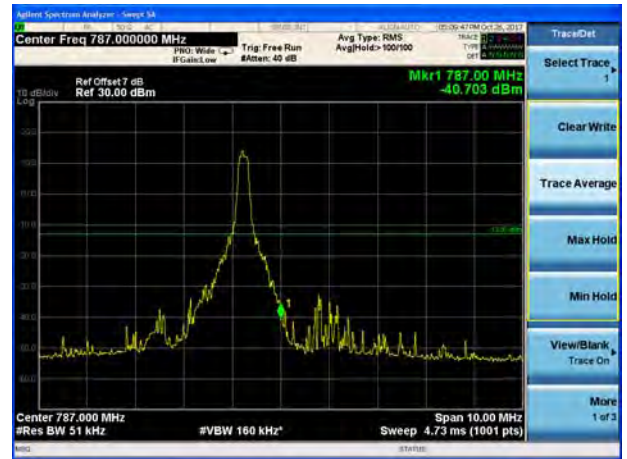
LTE Band 13 QPSK 5MHz CH-High, 100%RB



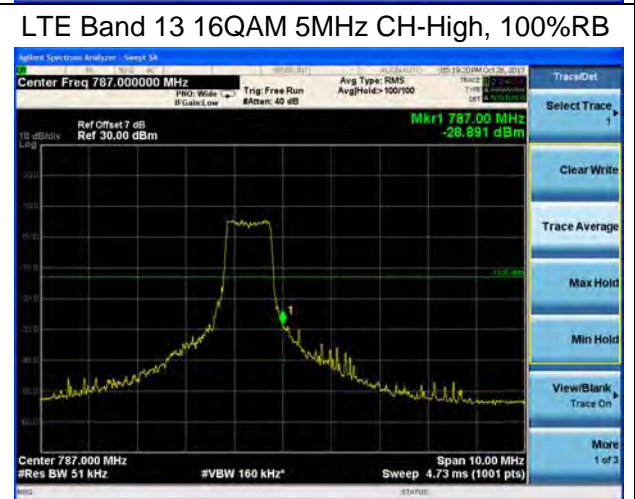
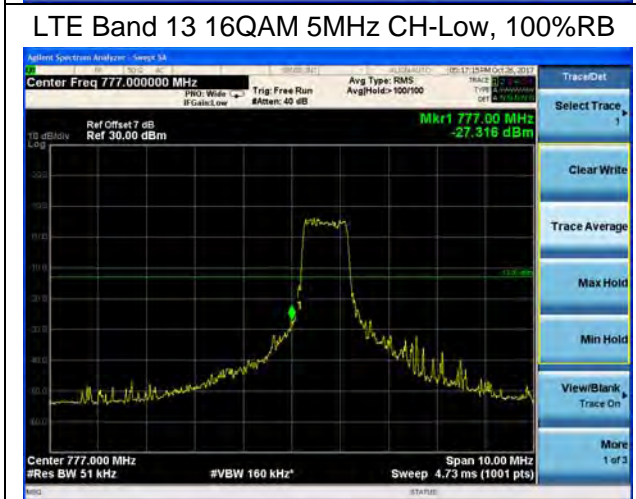
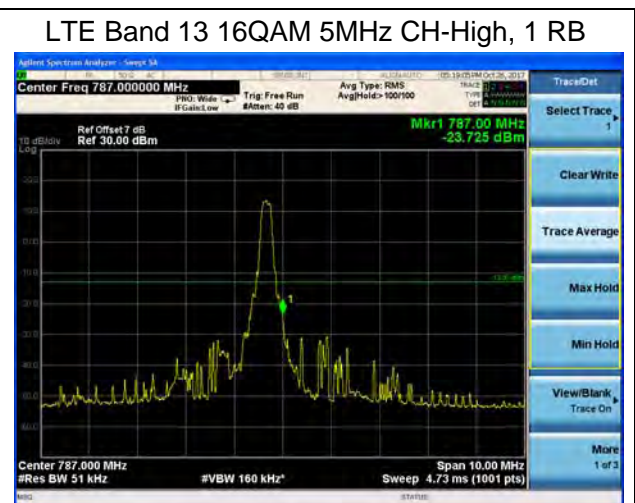
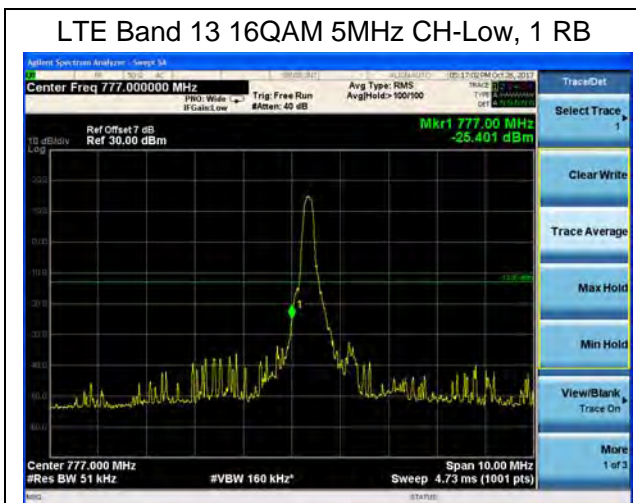
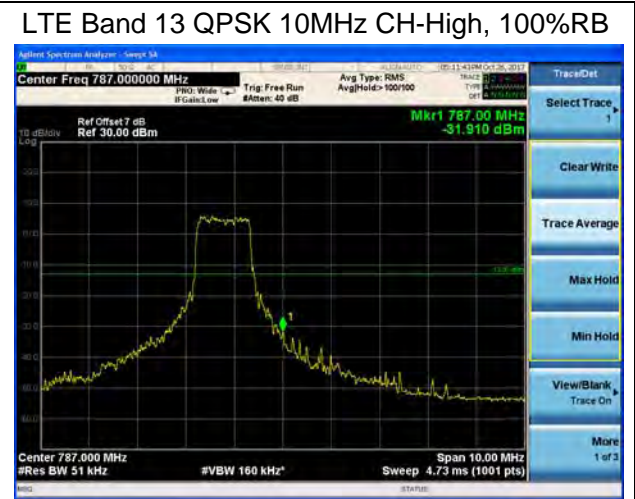
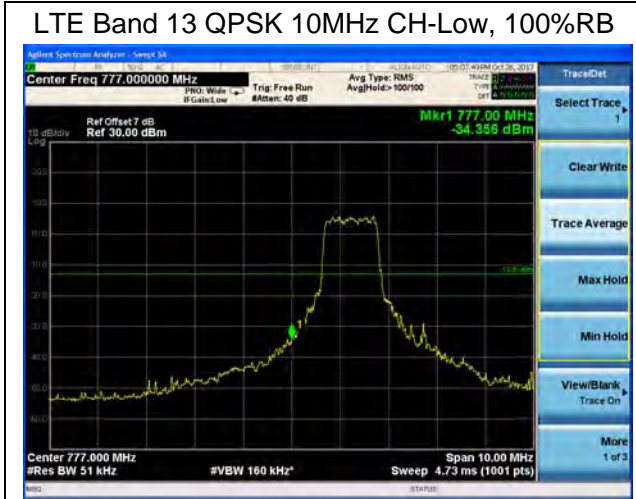
LTE Band 13 QPSK 10MHz CH-Low, 1 RB

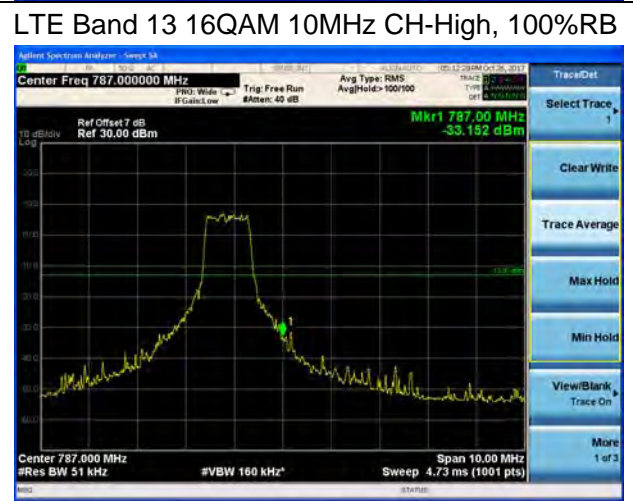
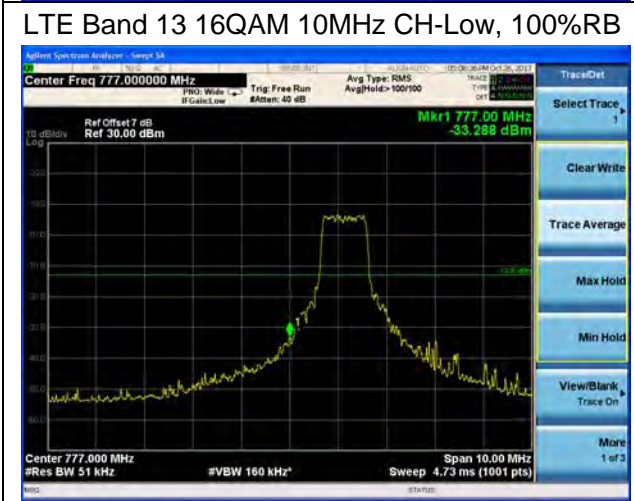
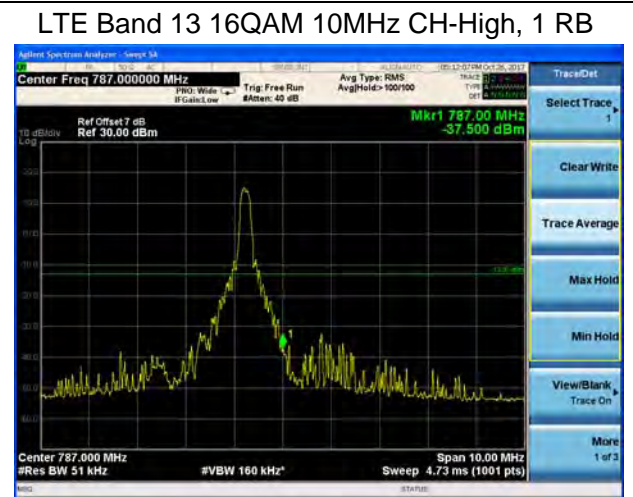
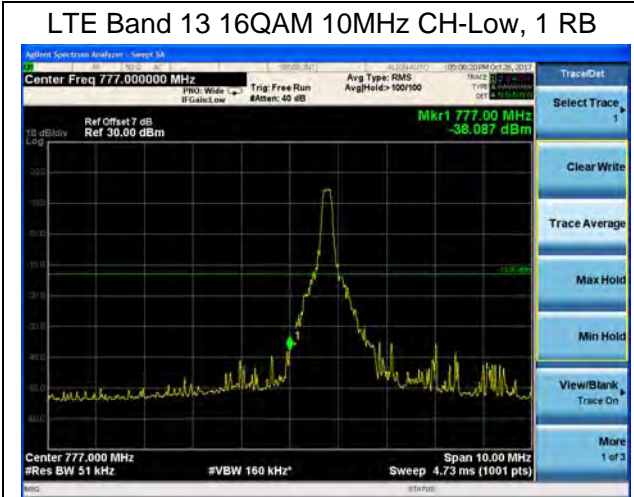


LTE Band 13 QPSK 10MHz CH-High, 1 RB









### 5.5 Peak-to-Average Power Ratio (PAPR)

#### Ambient condition

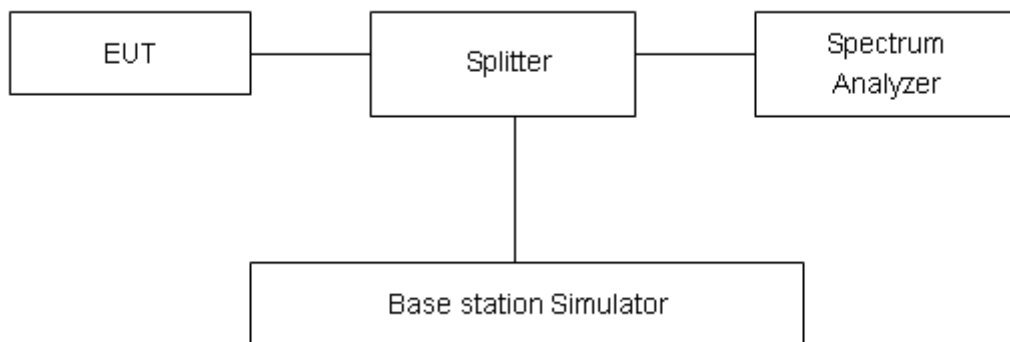
Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

#### Methods of Measurement

Measure the total peak power and record as PPk. And measure the total average power and record as PAvg. Both the peak and average power levels must be expressed in the same logarithmic units (e.g., dBm). Determine the PAPR from:

$$PAPR (dB) = PPk (dBm) - PAvg (dBm).$$

#### Test Setup



#### Limits

Rule Part 27.50(d)(5) Equipment employed must be authorized in accordance with the provisions of 24.51. Power measurements for transmissions by stations authorized under this section may be made either in accordance with a Commission-approved average power technique or in compliance with paragraph (d)(6) of this section. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

#### Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor  $k = 2$ ,  $U = 0.4$  dB.

**Test Results**

Mode	Bandwidth	Modulation	Channel/ Frequency(MHz)	Peak-to-Average Power Ratio (PAPR)		
				Peak(dBm)	Avg(dBm)	PAPR(dB)
Band4	1.4MHz	QPSK	20175/1732.5	32.07	23.45	8.62
		16QAM	20175/1732.5	32.26	21.79	10.47
	3MHz	QPSK	20175/1732.5	32.19	23.11	9.08
		16QAM	20175/1732.5	33.29	22.72	10.57
	5MHz	QPSK	20175/1732.5	32.14	23.22	8.92
		16QAM	20175/1732.5	32.24	23.77	8.47
	10MHz	QPSK	20175/1732.5	32.56	23.16	9.40
		16QAM	20175/1732.5	33.15	23.46	9.69
	15MHz	QPSK	20175/1732.5	32.95	23.38	9.57
		16QAM	20175/1732.5	32.90	23.22	9.68
20MHz	QPSK	20175/1732.5	33.07	23.63	9.44	
	16QAM	20175/1732.5	32.50	23.47	9.03	

Mode	Bandwidth	Modulation	Channel/ Frequency(MHz)	Peak-to-Average Power Ratio (PAPR)		
				Peak(dBm)	Avg(dBm)	PAPR(dB)
Band12	1.4MHz	QPSK	23095/707.5	31.84	23.48	8.36
		16QAM	23095/707.5	32.98	23.04	9.94
	3MHz	QPSK	23095/707.5	31.56	23.95	7.61
		16QAM	23095/707.5	31.41	22.31	9.10
	5MHz	QPSK	23095/707.5	31.39	23.68	7.71
		16QAM	23095/707.5	33.25	24.11	9.14
	10MHz	QPSK	23095/707.5	32.79	23.75	9.04
		16QAM	23095/707.5	33.24	24.33	8.91

Mode	Bandwidth	Modulation	Channel/ Frequency(MHz)	Peak-to-Average Power Ratio (PAPR)		
				Peak(dBm)	Avg(dBm)	PAPR(dB)
Band13	5MHz	QPSK	23230/782	33.26	23.68	9.58
		16QAM	23230/782	34.07	24.21	9.86
	10MHz	QPSK	23230/782	32.86	24.08	8.78
		16QAM	23230/782	33.28	23.91	9.37



## 5.6 Frequency Stability

### Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

### Method of Measurement

#### 1. Frequency Stability (Temperature Variation)

The temperature inside the climate chamber is varied from -40°C to +85°C in 10°C step size.

(1)With all power removed, the temperature was decreased to -10°C and permitted to stabilize for three hours.

(2)Measure the carrier frequency with the test equipment in a “call mode”. These measurements should be made within 1 minute of powering up the mobile station, to prevent significant self warming.

(3) Repeat the above measurements at 10°C increments from -40°C to +85°C. Allow at least 1.5 hours at each temperature, un-powered, before making measurements.

#### 2. Frequency Stability (Voltage Variation)

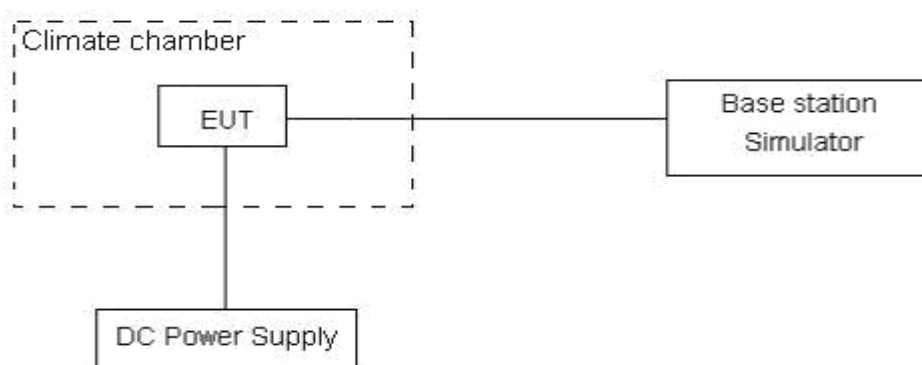
The frequency stability shall be measured with variation of primary supply voltage as follows:

(1) Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.

(2) For hand carried, battery powered equipment, reduce primary supply voltage to the battery-operating end point which shall be specified by the manufacturer.

This transceiver is specified to operate with an input voltage of between 3.0V and 4.2 V, with a nominal voltage of 3.6V.

### Test setup



### Limits

No specific frequency stability requirements in part 27.54

### Measurement Uncertainty

The assessed measurement uncertainty to ensure 99.75% confidence level for the normal distribution is with the coverage factor  $k = 3, U=0.01\text{ppm}$ .

**Test Result**

Bandwidth	Test status	LTE Band 4 Channel 20525 Test Results (ppm)	
		QPSK	16QAM
1.4MHz	-40°C/Normal Voltage	-0.00126	0.00147
	-30°C/Normal Voltage	-0.00105	0.00080
	-20°C/Normal Voltage	-0.00219	0.00184
	-10°C/Normal Voltage	0.00086	-0.00115
	0°C/Normal Voltage	0.00144	-0.00042
	10°C/Normal Voltage	0.00071	0.00166
	20°C/Normal Voltage	-0.00110	0.00054
	30°C/Normal Voltage	-0.00111	-0.00066
	40°C/Normal Voltage	-0.00074	0.00246
	50°C/Normal Voltage	-0.00133	-0.00054
	60°C/Normal Voltage	0.00035	0.00013
	70°C/Normal Voltage	0.00009	0.00021
	80°C/Normal Voltage	0.00011	0.00036
	85°C/Normal Voltage	0.00050	0.00019
	20°C/Minimum Voltage	-0.00224	-0.00125
	20°C/Maximum Voltage	-0.00186	-0.00228
3MHz	-40°C/Normal Voltage	0.00050	-0.00197
	-30°C/Normal Voltage	-0.00220	-0.00250
	-20°C/Normal Voltage	0.00111	-0.00069
	-10°C/Normal Voltage	0.00011	0.00074
	0°C/Normal Voltage	-0.00109	-0.00096
	10°C/Normal Voltage	-0.00264	-0.00042
	20°C/Normal Voltage	-0.00107	-0.00107
	30°C/Normal Voltage	-0.00048	-0.00062
	40°C/Normal Voltage	-0.00186	-0.00259
	50°C/Normal Voltage	-0.00136	-0.00159
	60°C/Normal Voltage	-0.00071	-0.00059
	70°C/Normal Voltage	-0.00073	-0.00014
	80°C/Normal Voltage	-0.00009	-0.00016
	85°C/Normal Voltage	-0.00015	-0.00035
	20°C/Minimum Voltage	-0.00077	0.00141
	20°C/Maximum Voltage	0.00128	-0.00094
5MHz	-40°C/Normal Voltage	-0.00102	-0.00015
	-30°C/Normal Voltage	0.00194	-0.00043
	-20°C/Normal Voltage	-0.00023	0.00014
	-10°C/Normal Voltage	-0.00057	-0.00015
	0°C/Normal Voltage	0.00101	-0.00165
	10°C/Normal Voltage	0.00016	-0.00100
	20°C/Normal Voltage	0.00155	0.00124
	30°C/Normal Voltage	0.00077	0.00057



	40°C/Normal Voltage	0.00108	0.00161
	50°C/Normal Voltage	0.00186	0.00083
	60°C/Normal Voltage	-0.00123	-0.00030
	70°C/Normal Voltage	-0.00061	-0.00155
	80°C/Normal Voltage	-0.00009	-0.00010
	85°C/Normal Voltage	-0.00033	-0.00006
	20°C/Minimum Voltage	0.00024	-0.00188
	20°C/Maximum Voltage	0.00133	-0.00160
10MHz	-40°C/Normal Voltage	-0.00104	-0.00117
	-30°C/Normal Voltage	-0.00161	-0.00134
	-20°C/Normal Voltage	-0.00054	-0.00261
	-10°C/Normal Voltage	-0.00088	-0.00139
	0°C/Normal Voltage	-0.00046	-0.00182
	10°C/Normal Voltage	0.00119	0.00140
	20°C/Normal Voltage	0.00060	-0.00233
	30°C/Normal Voltage	-0.00017	-0.00340
	40°C/Normal Voltage	-0.00085	-0.00398
	50°C/Normal Voltage	-0.00370	-0.00410
	60°C/Normal Voltage	-0.00053	-0.00003
	70°C/Normal Voltage	-0.00074	-0.00087
	80°C/Normal Voltage	-0.00023	-0.00033
	85°C/Normal Voltage	-0.00009	-0.00150
	20°C/Minimum Voltage	-0.00068	-0.00079
	20°C/Maximum Voltage	-0.00131	-0.00259
15MHz	-40°C/Normal Voltage	0.00080	-0.00276
	-30°C/Normal Voltage	-0.00320	-0.01629
	-20°C/Normal Voltage	0.00280	-0.02147
	-10°C/Normal Voltage	0.00075	-0.01184
	0°C/Normal Voltage	0.00256	-0.00070
	10°C/Normal Voltage	0.00061	-0.01460
	20°C/Normal Voltage	0.00228	-0.01684
	30°C/Normal Voltage	0.00029	-0.00142
	40°C/Normal Voltage	0.00321	-0.01994
	50°C/Normal Voltage	0.00096	-0.00685
	60°C/Normal Voltage	-0.00040	-0.00021
	70°C/Normal Voltage	-0.00074	-0.00074
	80°C/Normal Voltage	-0.00252	-0.00149
	85°C/Normal Voltage	-0.00077	-0.00033
	20°C/Minimum Voltage	-0.00050	-0.00887
	20°C/Maximum Voltage	-0.00034	-0.01560
20MHz	-40°C/Normal Voltage	-0.00527	-0.00154
	-30°C/Normal Voltage	-0.00625	-0.00346
	-20°C/Normal Voltage	-0.00086	0.00008



	-10°C/Normal Voltage	0.00178	-0.00242
	0°C/Normal Voltage	0.00023	0.00061
	10°C/Normal Voltage	0.00107	0.00024
	20°C/Normal Voltage	0.00767	-0.00249
	30°C/Normal Voltage	0.00288	-0.00033
	40°C/Normal Voltage	0.00001	-0.00016
	50°C/Normal Voltage	0.00671	-0.00104
	60°C/Normal Voltage	-0.00034	-0.00063
	70°C/Normal Voltage	-0.00040	-0.00130
	80°C/Normal Voltage	-0.00038	-0.00170
	85°C/Normal Voltage	-0.00020	-0.00017
	20°C/Minimum Voltage	-0.00266	-0.00155
	20°C/Maximum Voltage	-0.00055	-0.00152

Bandwidth	Test status	LTE Band 12 Channel 23095 Test Results (ppm)	
		QPSK	16QAM
1.4MHz	-40°C/Normal Voltage	-0.00220	-0.00226
	-30°C/Normal Voltage	-0.00384	-0.00500
	-20°C/Normal Voltage	-0.00225	-0.00018
	-10°C/Normal Voltage	-0.00563	-0.00131
	0°C/Normal Voltage	-0.00342	-0.00144
	10°C/Normal Voltage	-0.00498	-0.00208
	20°C/Normal Voltage	-0.00257	0.00160
	30°C/Normal Voltage	-0.00249	-0.00187
	40°C/Normal Voltage	-0.00442	-0.00307
	50°C/Normal Voltage	-0.00307	0.00088
	60°C/Normal Voltage	-0.00174	-0.00148
	70°C/Normal Voltage	-0.00178	-0.00078
	80°C/Normal Voltage	-0.00021	-0.00038
	85°C/Normal Voltage	-0.00037	-0.00086
	20°C/Minimum Voltage	-0.00189	-0.00488
20°C/Maximum Voltage	-0.00236	0.00048	
3MHz	-40°C/Normal Voltage	-0.00083	-0.00293
	-30°C/Normal Voltage	-0.00278	-0.00271
	-20°C/Normal Voltage	-0.00437	-0.00146
	-10°C/Normal Voltage	-0.00342	-0.00379
	0°C/Normal Voltage	-0.00034	-0.00172
	10°C/Normal Voltage	-0.00534	-0.00018
	20°C/Normal Voltage	-0.00581	-0.00164
	30°C/Normal Voltage	-0.00503	-0.00277
	40°C/Normal Voltage	-0.00433	-0.00076
	50°C/Normal Voltage	-0.00188	-0.00582





	60°C/Normal Voltage	-0.00301	-0.00073
	70°C/Normal Voltage	-0.00150	-0.00324
	80°C/Normal Voltage	-0.00023	-0.00024
	85°C/Normal Voltage	-0.00082	-0.00014
	20°C/Minimum Voltage	-0.00372	-0.00321
	20°C/Maximum Voltage	-0.00020	-0.00066
5MHz	-40°C/Normal Voltage	-0.00030	-0.00459
	-30°C/Normal Voltage	0.00150	-0.00612
	-20°C/Normal Voltage	-0.00131	-0.00235
	-10°C/Normal Voltage	0.00198	-0.00404
	0°C/Normal Voltage	-0.00694	-0.00530
	10°C/Normal Voltage	-0.00475	-0.00455
	20°C/Normal Voltage	0.00150	-0.00663
	30°C/Normal Voltage	0.00222	-0.00957
	40°C/Normal Voltage	0.00065	-0.00620
	50°C/Normal Voltage	-0.00075	-0.00396
	60°C/Normal Voltage	-0.00129	-0.00007
	70°C/Normal Voltage	-0.00181	-0.00071
	80°C/Normal Voltage	-0.00055	-0.00079
	85°C/Normal Voltage	-0.00021	-0.00367
	20°C/Minimum Voltage	-0.00349	-0.00569
	20°C/Maximum Voltage	-0.00319	-0.00442
10MHz	-40°C/Normal Voltage	-0.00417	-0.00553
	-30°C/Normal Voltage	-0.00315	-0.00568
	-20°C/Normal Voltage	-0.00291	-0.00465
	-10°C/Normal Voltage	-0.00147	-0.00277
	0°C/Normal Voltage	-0.00192	-0.00772
	10°C/Normal Voltage	-0.00346	-0.00202
	20°C/Normal Voltage	-0.00264	-0.00363
	30°C/Normal Voltage	-0.00211	-0.00421
	40°C/Normal Voltage	-0.00291	-0.00724
	50°C/Normal Voltage	-0.00567	-0.00531
	60°C/Normal Voltage	-0.00098	-0.00044
	70°C/Normal Voltage	-0.00182	-0.00181
	80°C/Normal Voltage	-0.00616	0.00041
	85°C/Normal Voltage	-0.00189	-0.00081
	20°C/Minimum Voltage	-0.00131	-0.00616
	20°C/Maximum Voltage	-0.00185	-0.00433

Bandwidth	Test status	LTE Band 13 Channel 23230 Test Results (ppm)	
		QPSK	16QAM
5MHz	-40°C/Normal Voltage	0.00277	-0.00513
	-30°C/Normal Voltage	-0.00159	-0.00280
	-20°C/Normal Voltage	0.00098	-0.00483
	-10°C/Normal Voltage	-0.00281	-0.00646
	0°C/Normal Voltage	-0.00528	-0.00335
	10°C/Normal Voltage	-0.00184	-0.00459
	20°C/Normal Voltage	-0.00120	-0.00297
	30°C/Normal Voltage	-0.00192	0.00072
	40°C/Normal Voltage	-0.00234	-0.00183
	50°C/Normal Voltage	-0.00137	-0.00492
	60°C/Normal Voltage	-0.00157	-0.00134
	70°C/Normal Voltage	-0.00161	-0.00070
	80°C/Normal Voltage	-0.00019	-0.00035
	85°C/Normal Voltage	-0.00033	-0.00078
	20°C/Minimum Voltage	-0.00058	-0.00233
	20°C/Maximum Voltage	-0.00340	-0.00267
10MHz	-40°C/Normal Voltage	-0.00143	-0.00221
	-30°C/Normal Voltage	0.00124	-0.00184
	-20°C/Normal Voltage	0.00272	0.00216
	-10°C/Normal Voltage	0.00150	0.00020
	0°C/Normal Voltage	0.00072	-0.00146
	10°C/Normal Voltage	-0.00136	-0.00298
	20°C/Normal Voltage	0.00340	-0.00313
	30°C/Normal Voltage	0.00280	0.00123
	40°C/Normal Voltage	0.00386	-0.00513
	50°C/Normal Voltage	0.00272	-0.00175
	60°C/Normal Voltage	-0.00272	-0.00066
	70°C/Normal Voltage	-0.00136	-0.00293
	80°C/Normal Voltage	-0.00020	-0.00022
	85°C/Normal Voltage	-0.00074	-0.00013
	20°C/Minimum Voltage	0.00625	-0.00301
20°C/Maximum Voltage	-0.00150	0.00239	

## 5.7 Spurious Emissions at Antenna Terminals

### Ambient condition

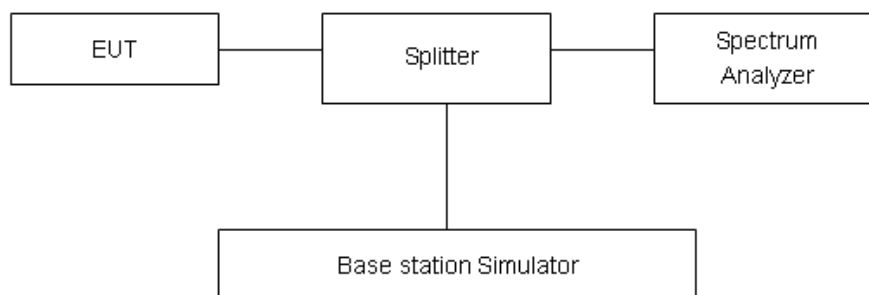
Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

### Method of Measurement

The EUT was connected to Spectrum Analyzer and Base Station Simulator via power Splitter. The measurement is carried out using a spectrum analyzer. The spectrum analyzer scans from 30MHz to the 10th harmonic of the carrier. The peak detector is used. Set RBW 1MHz and VBW3MHz, Sweep is set to ATUO.

Of those disturbances below (limit – 20 dB), the mark is not required for the EUT.

### Test setup



### Limits

Rule Part 27.53(h) specifies that “for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least  $43 + 10 \log_{10}(P)$  dB..”

Rule Part 27.53 (g) For operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least  $43 + 10 \log(P)$  dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

Rule Part 27.53(f) For operations in the 746-758 MHz, 775-788 MHz, and 805-806 MHz bands, emissions in the band 1559-1610 MHz shall be limited to  $-70$  dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and  $-80$  dBW EIRP for discrete emissions of less than 700 Hz bandwidth. For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation.

**LTE B4/12 Limit**

Limit	-13 dBm
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**LTE B13 Limit**

Limit out of the band 1559-1610 MHz	-13 dBm
Limit in the band 1559-1610 MHz	-40 dBm

**Measurement Uncertainty**

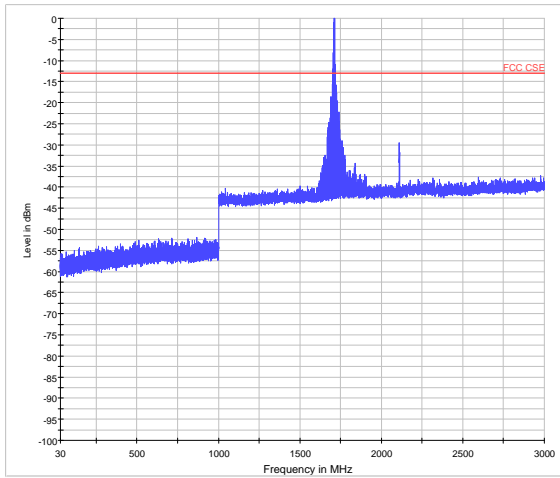
The assessed measurement uncertainty to ensure 99.75% confidence level for the normal distribution is with the coverage factor  $k = 1.96$ .

Frequency	Uncertainty
100kHz-2GHz	0.684 dB
2GHz-18GHz	1.407 dB

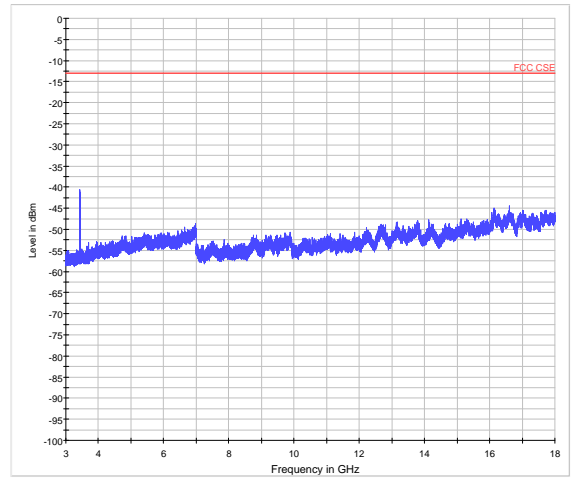
**Test Result: PASS**

The signal beyond the limit is carrier in the following plots.

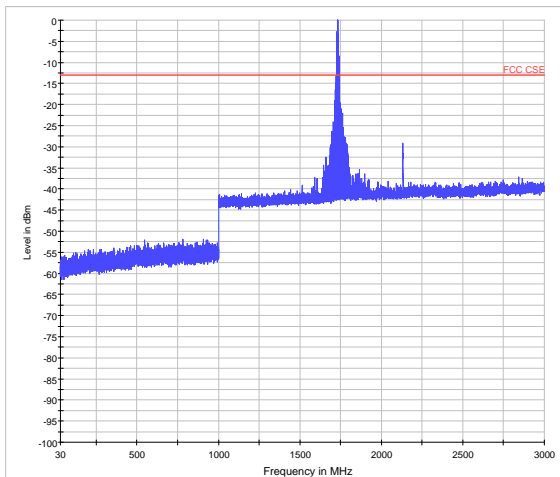
LTE Band 4 1.4MHz CH-Low 30MHz~3GHz



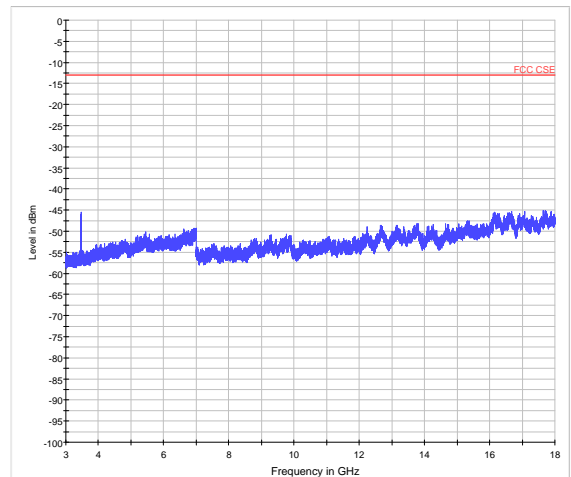
LTE Band 4 1.4MHz CH-Low 3GHz~18GHz



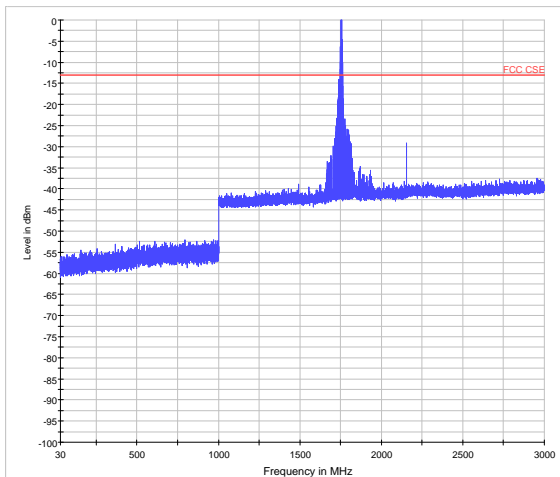
LTE Band 4 1.4MHz CH-Middle 30MHz~3GHz



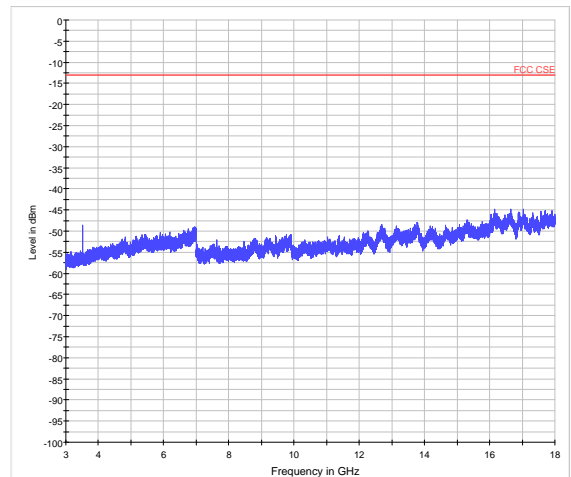
LTE Band 4 1.4MHz CH-Middle 3GHz~18GHz



LTE Band 4 1.4MHz CH-High 30MHz~3GHz

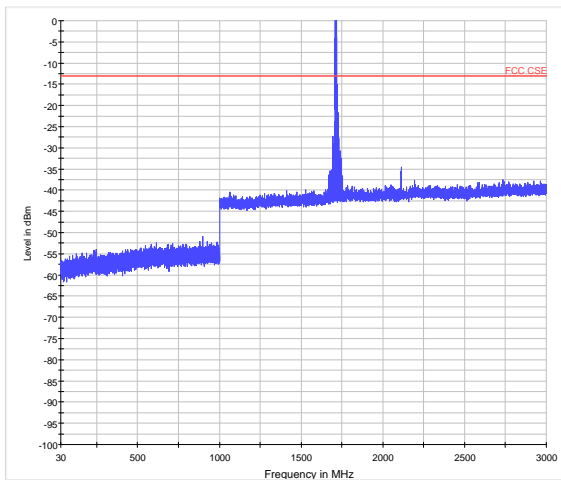


LTE Band 4 1.4MHz CH-High 3GHz~18GHz

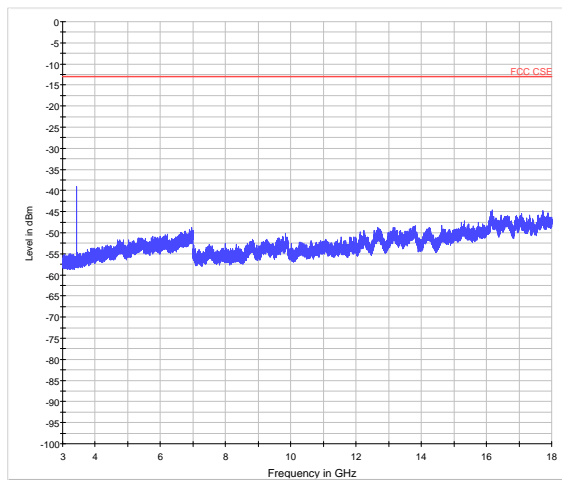




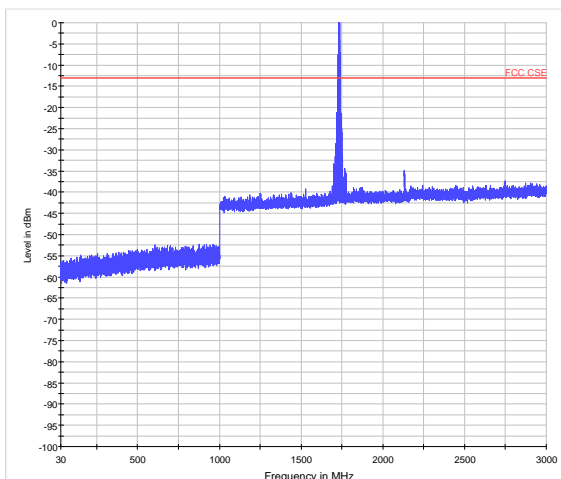
LTE Band 4 3MHz CH-Low 30MHz~3GHz



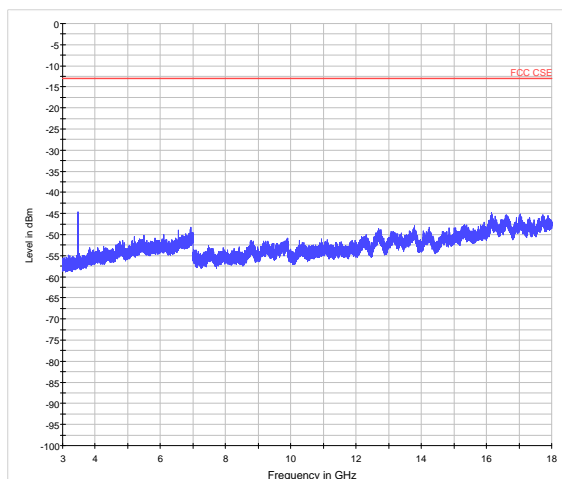
LTE Band 4 3MHz CH-Low 3GHz~18GHz



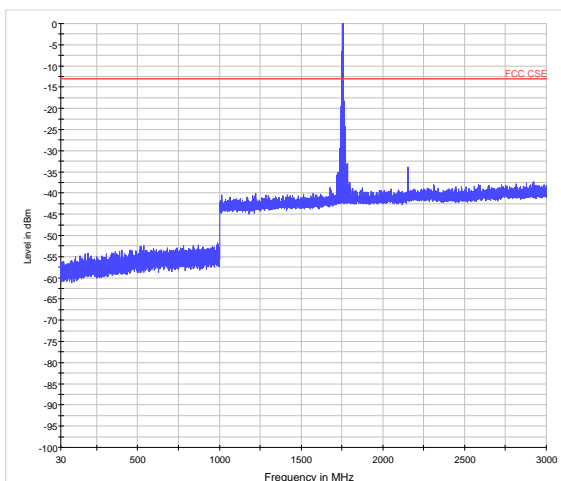
LTE Band 4 3MHz CH-Middle 30MHz~3GHz



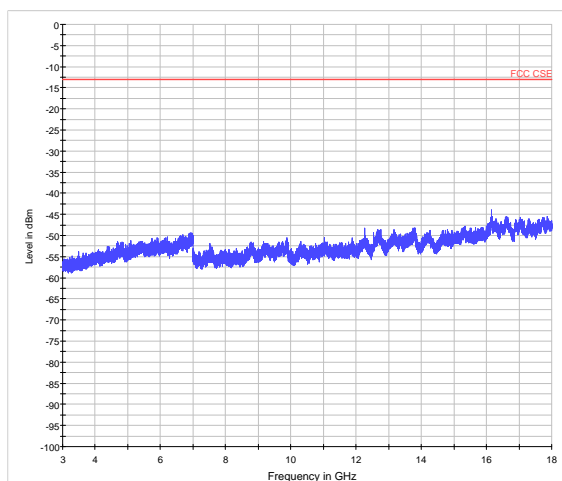
LTE Band 4 3MHz CH-Middle 3GHz~18GHz



LTE Band 4 3MHz CH-High 30MHz~3GHz

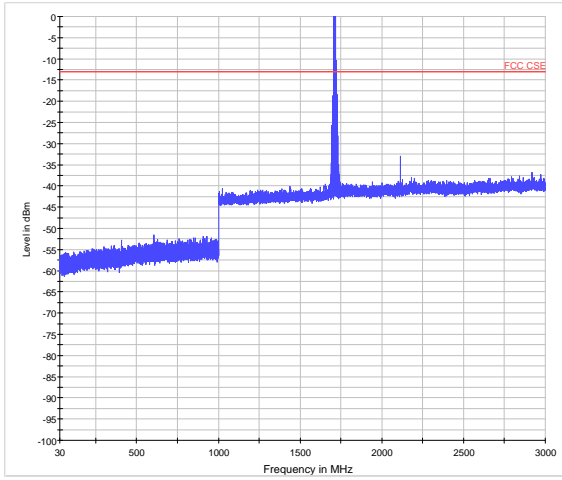


LTE Band 4 3MHz CH-High 3GHz~18GHz

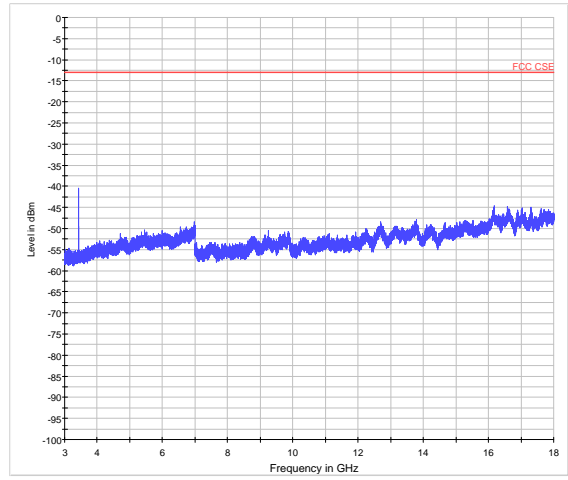




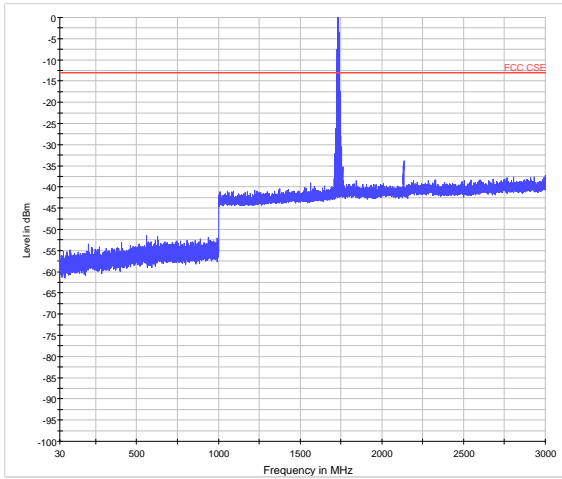
LTE Band 4 5MHz CH-Low 30MHz~3GHz



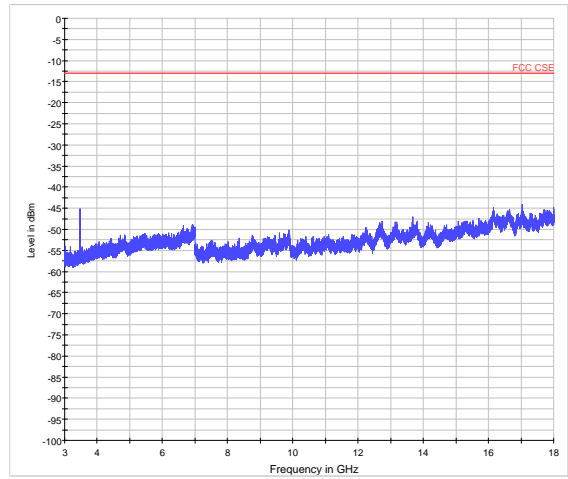
LTE Band 4 5MHz CH-Low 3GHz~18GHz



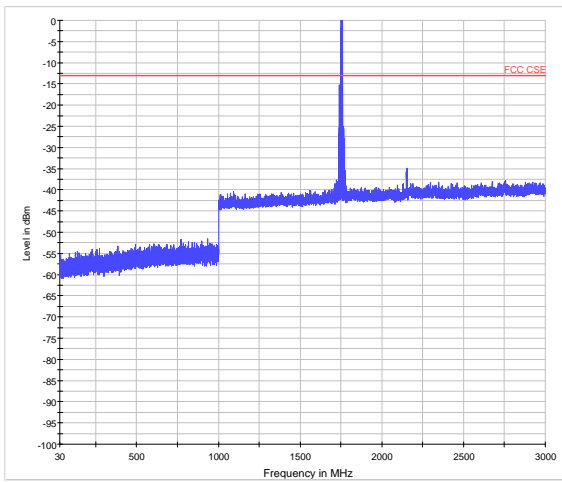
LTE Band 4 5MHz CH-Middle 30MHz~3GHz



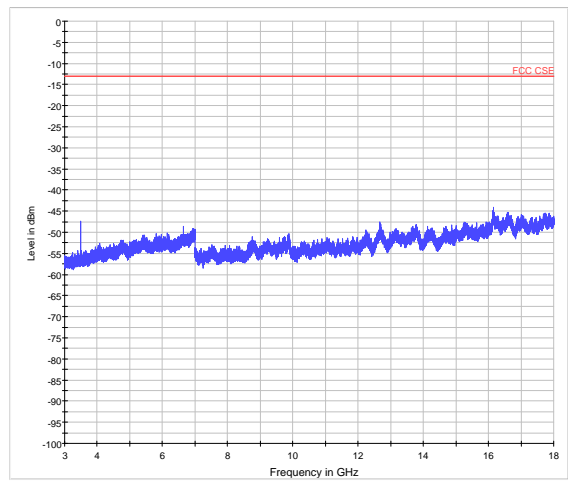
LTE Band 4 5MHz CH-Middle 3GHz~18GHz



LTE Band 4 5MHz CH-High 30MHz~3GHz



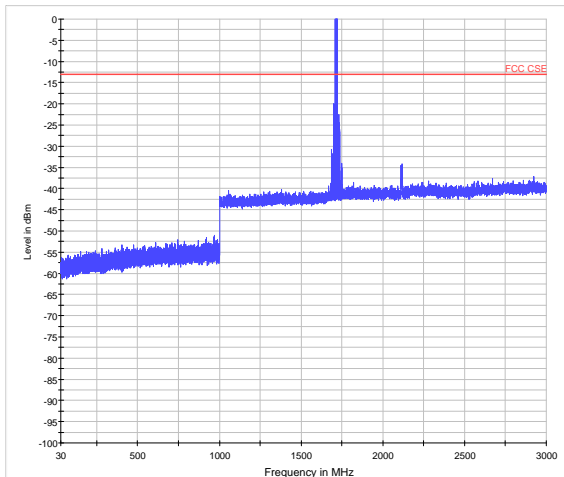
LTE Band 4 5MHz CH-High 3GHz~18GHz



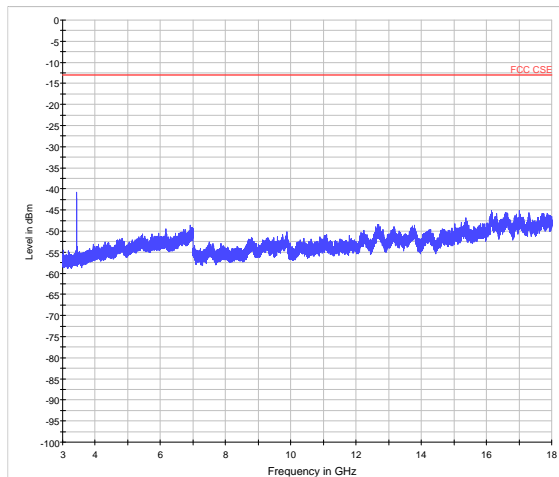




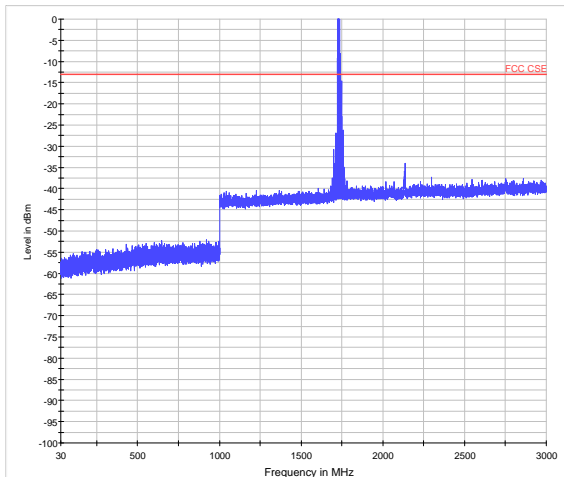
LTE Band 4 10MHz CH-Low 30MHz~3GHz



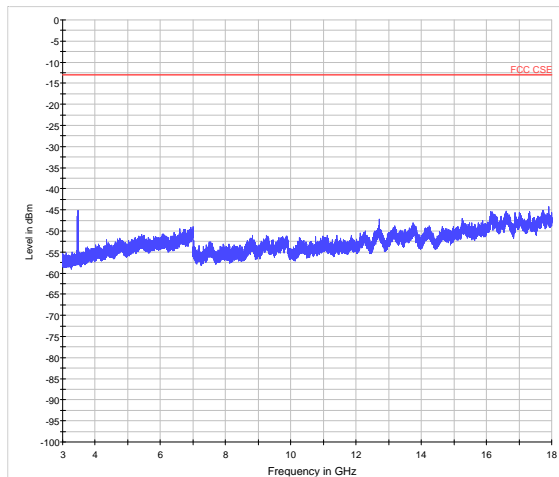
LTE Band 4 10MHz CH-Low 3GHz~18GHz



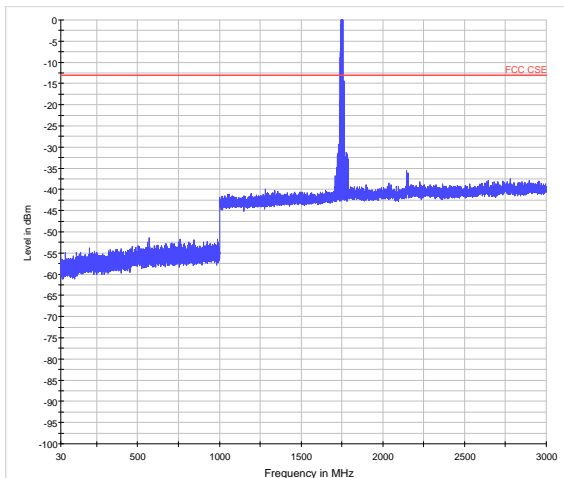
LTE Band 4 10MHz CH-Middle 30MHz~3GHz



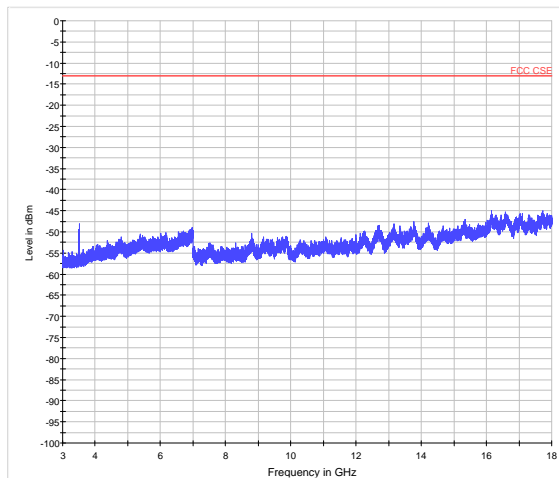
LTE Band 4 10MHz CH-Middle 3GHz~18GHz



LTE Band 4 10MHz CH-High 30MHz~3GHz

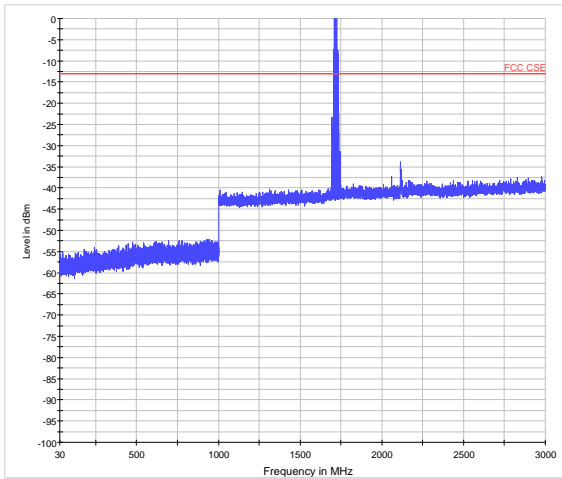


LTE Band 4 10MHz CH-High 3GHz~18GHz

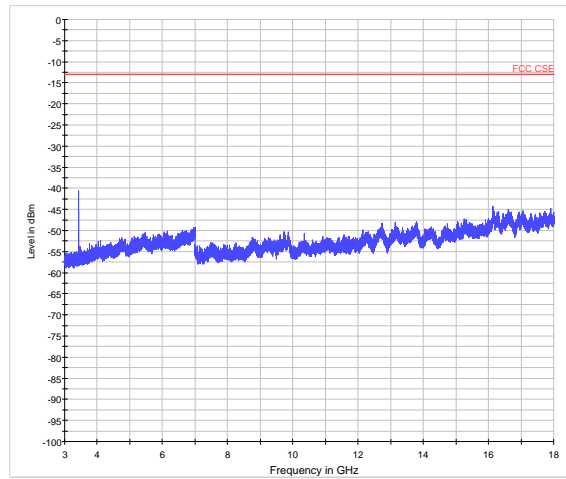




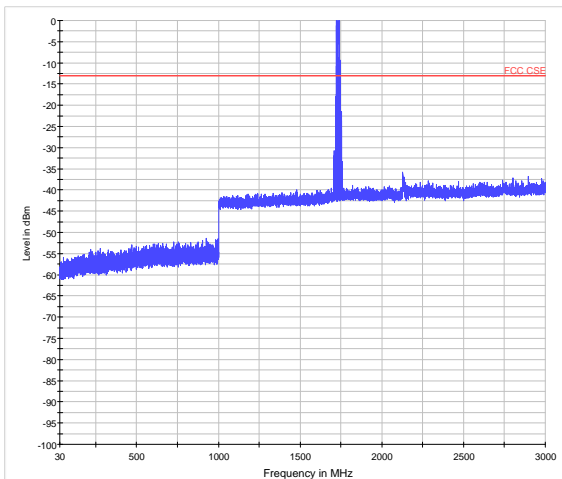
LTE Band 4 15MHz CH-Low 30MHz~3GHz



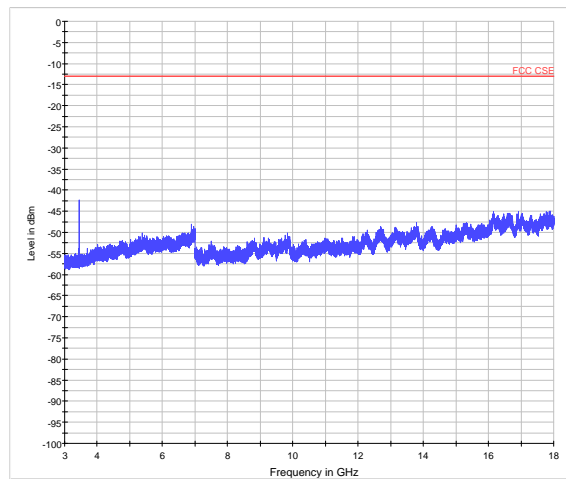
LTE Band 4 15MHz CH-Low 3GHz~18GHz



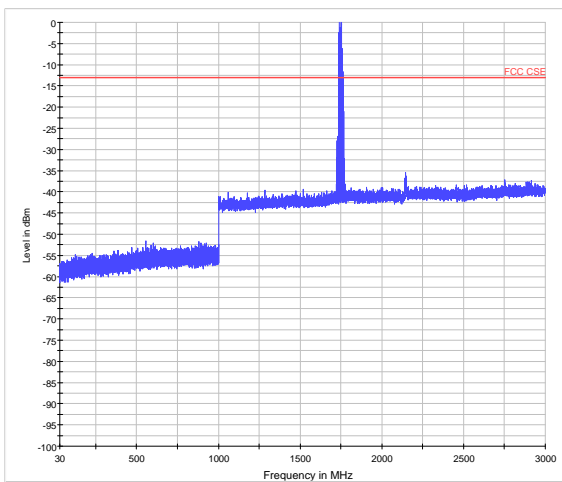
LTE Band 4 15MHz CH-Middle 30MHz~3GHz



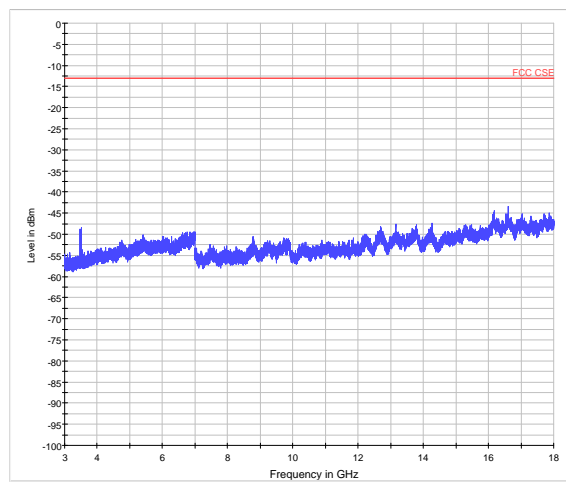
LTE Band 4 15MHz CH-Middle 3GHz~18GHz



LTE Band 4 15MHz CH-High 30MHz~3GHz

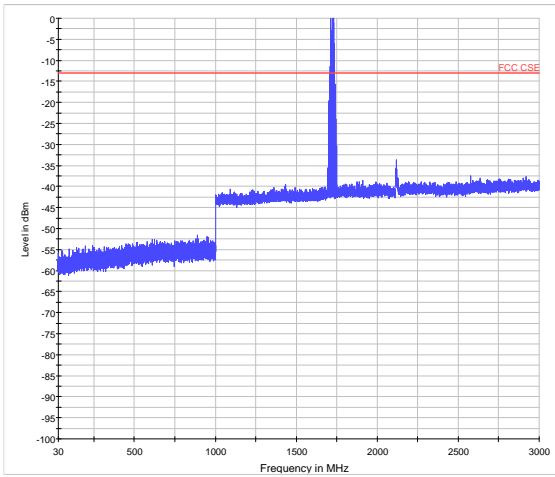


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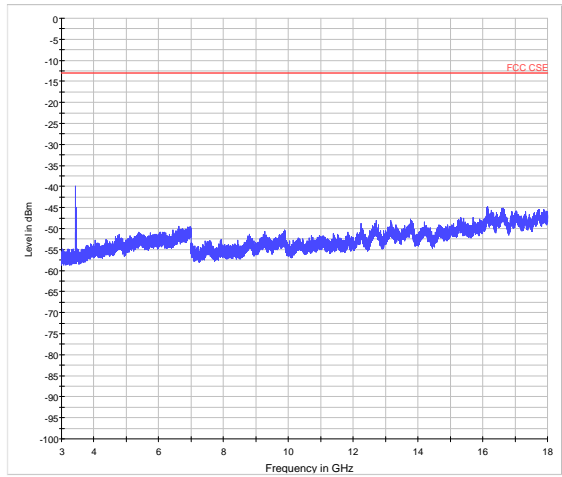




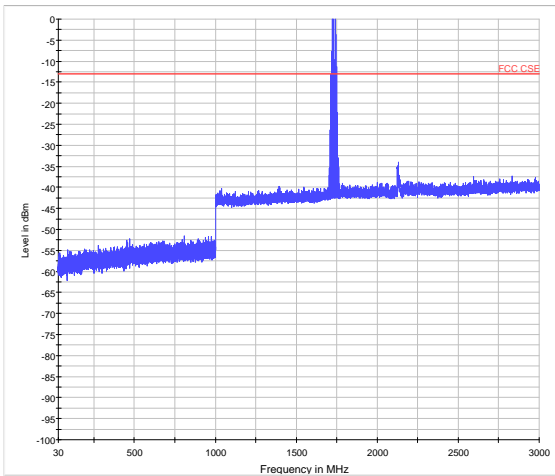
LTE Band 4 20MHz CH-Low 30MHz~3GHz



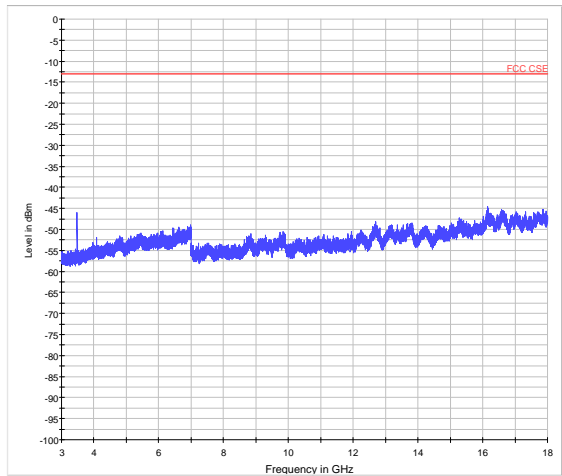
LTE Band 4 20MHz CH-Low 3GHz~18GHz



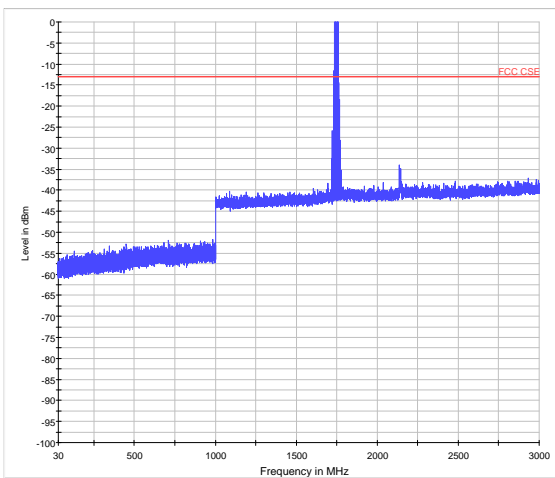
LTE Band 4 20MHz CH-Middle 30MHz~3GHz



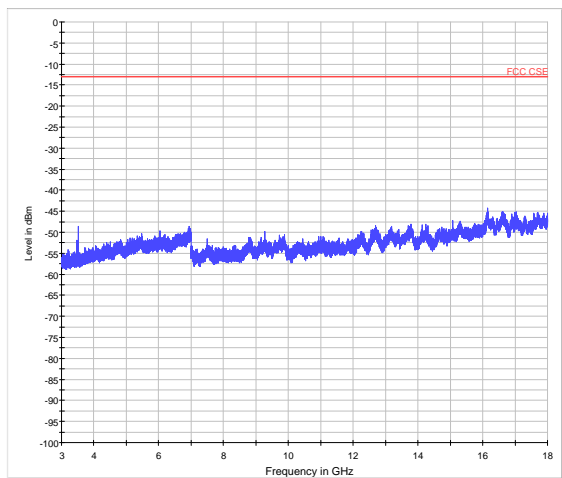
LTE Band 4 20MHz CH-Middle 3GHz~18GHz



LTE Band 4 20MHz CH-High 30MHz~3GHz

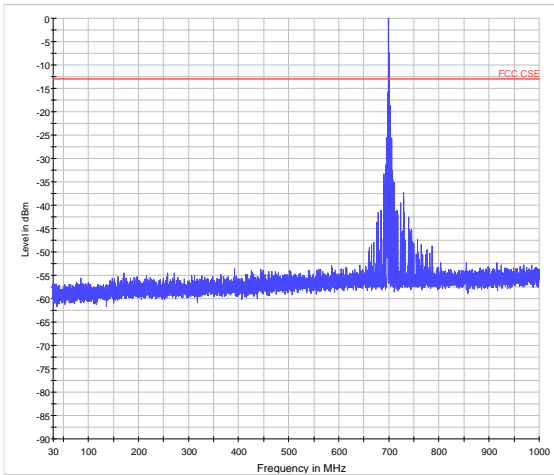


LTE Band 4 20MHz CH-High 3GHz~18GHz

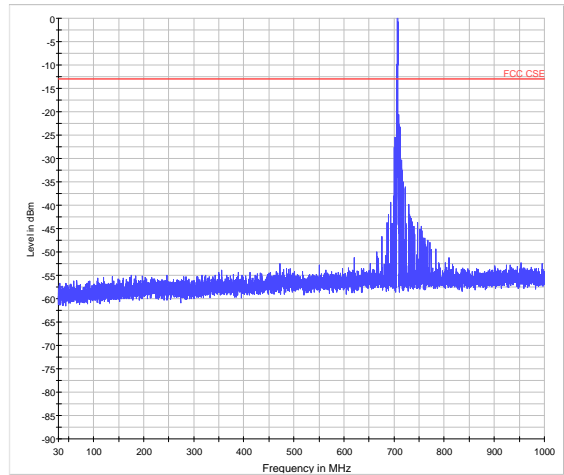




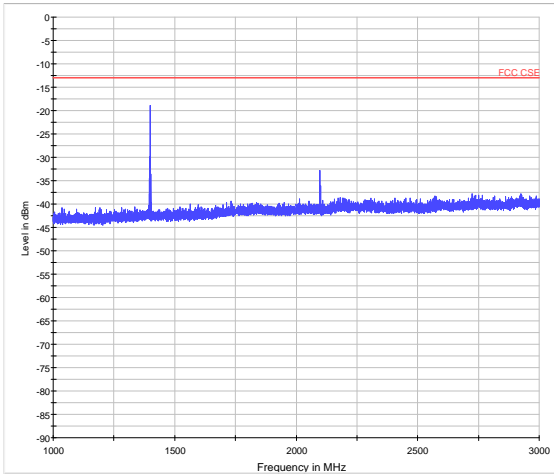
LTE Band 12 1.4MHz CH-Low 30MHz~1GHz



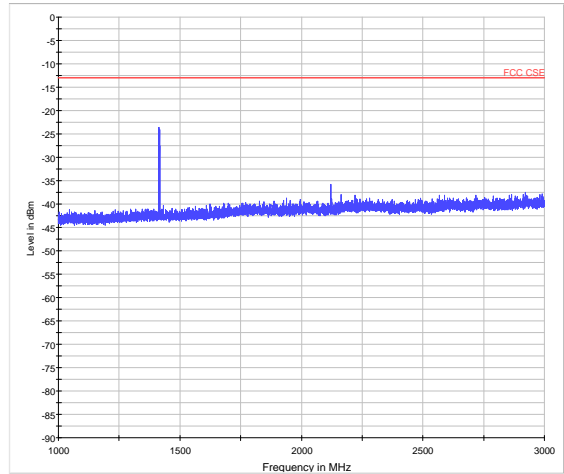
LTE Band 12 1.4MHz CH-Middle 30MHz~1GHz



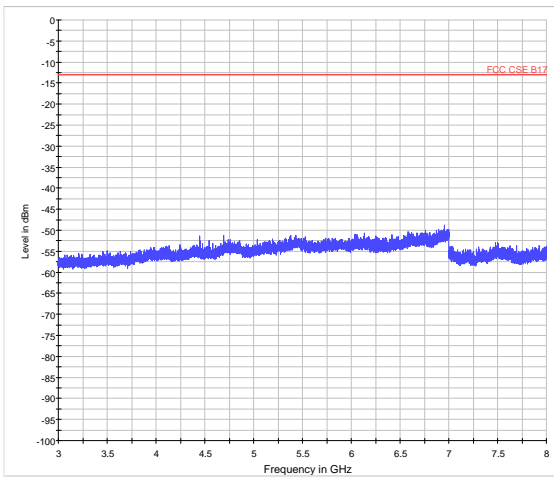
LTE Band 12 1.4MHz CH-Low 1GHz~3GHz



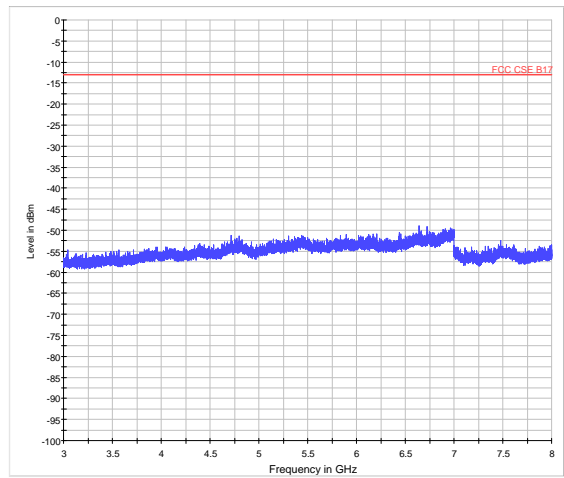
LTE Band 12 1.4MHz CH-Middle 1GHz~3GHz



LTE Band 12 1.4MHz CH-Low 3GHz~8GHz

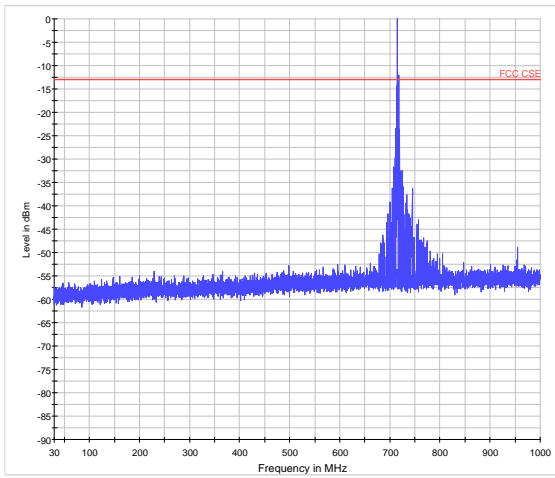


LTE Band 12 1.4MHz CH-Middle 3GHz~8GHz

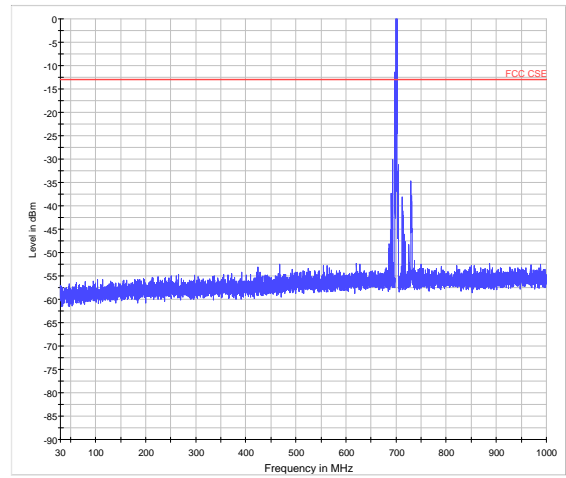




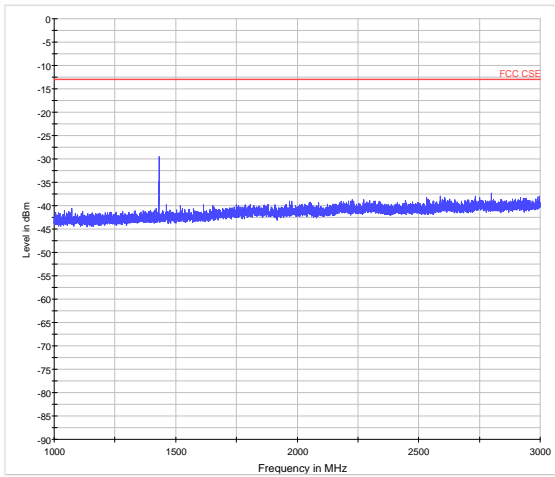
LTE Band 12 1.4MHz CH-High 30MHz~1GHz



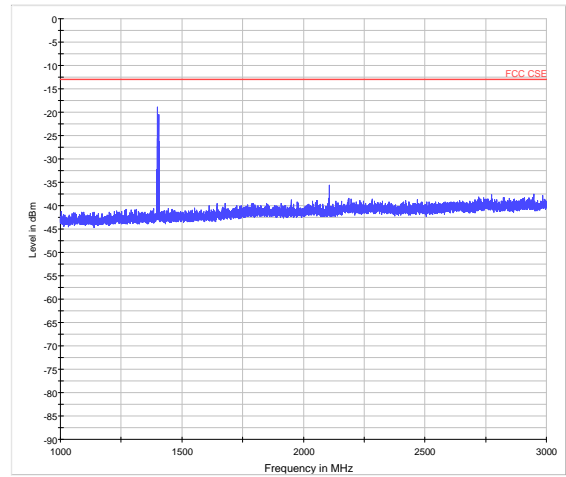
LTE Band 12 3MHz CH-Low 30MHz~1GHz



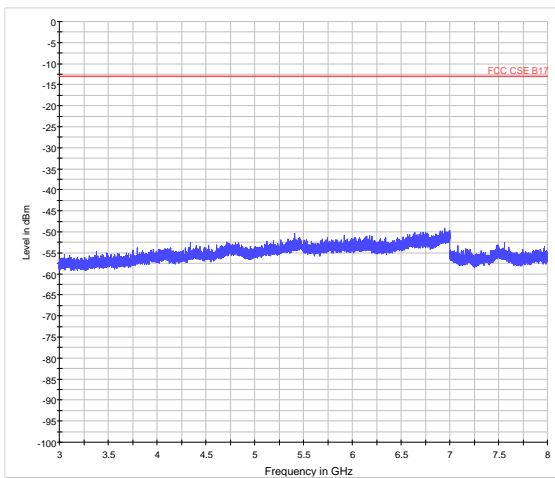
LTE Band 12 1.4MHz CH-High 1GHz~3GHz



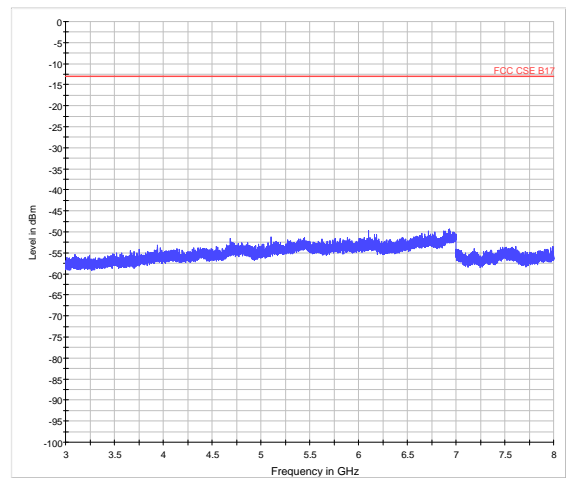
LTE Band 12 3MHz CH-Low 1GHz~3GHz



LTE Band 12 1.4MHz CH-High 3GHz~8GHz



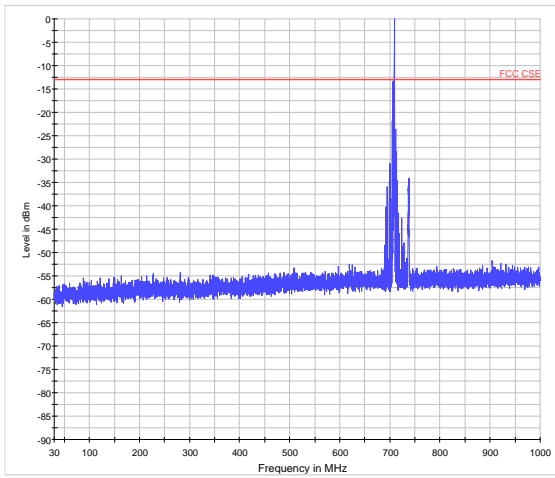
LTE Band 12 3MHz CH-Low 3GHz~8GHz



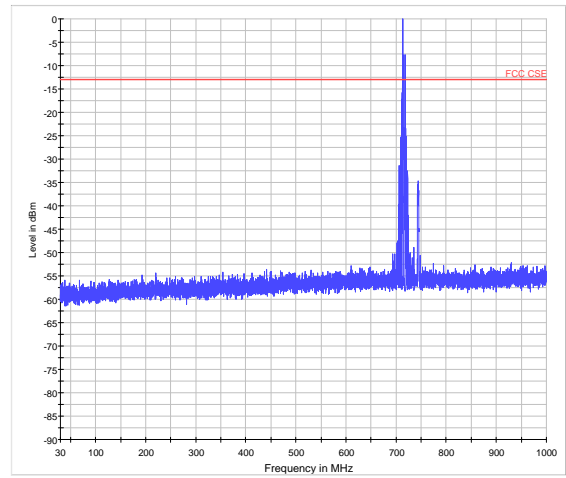




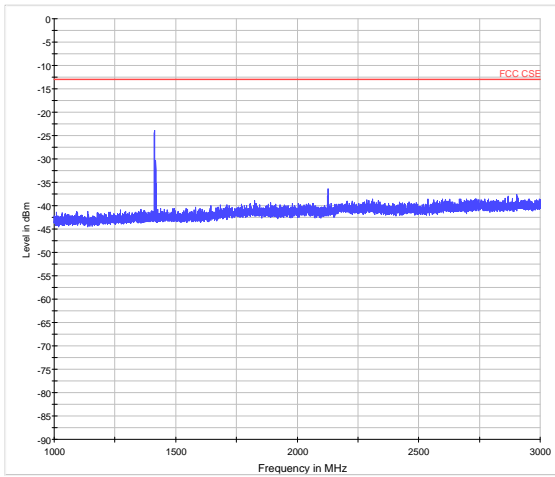
LTE Band 12 3MHz CH-Middle 30MHz~1GHz



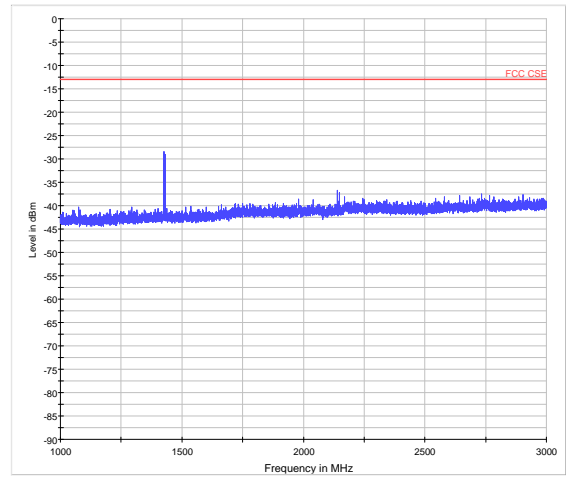
LTE Band 12 3MHz CH-High 30MHz~1GHz



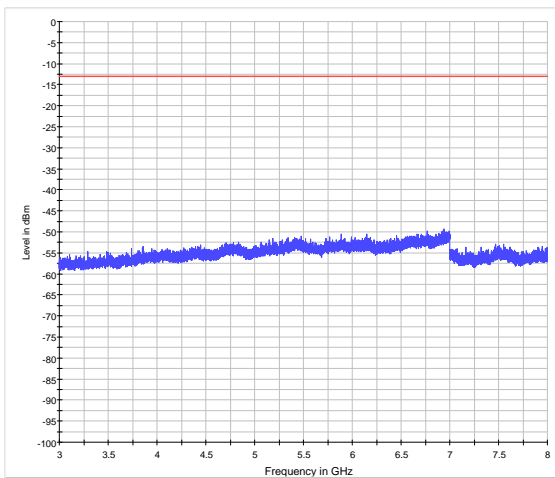
LTE Band 12 3MHz CH-Middle 1GHz~3GHz



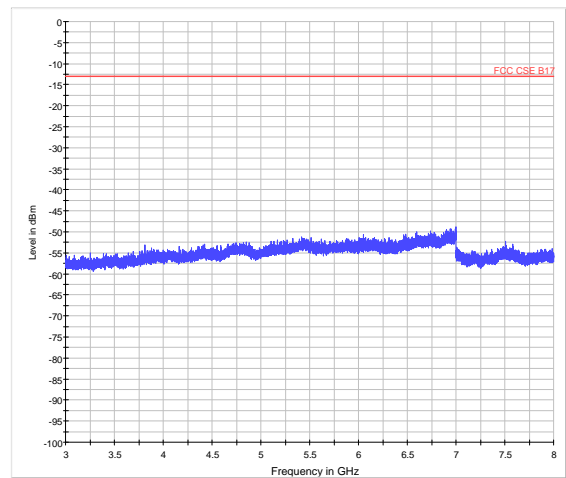
LTE Band 12 3MHz CH-High 1GHz~3GHz



LTE Band 12 3MHz CH-Middle 3GHz~8GHz

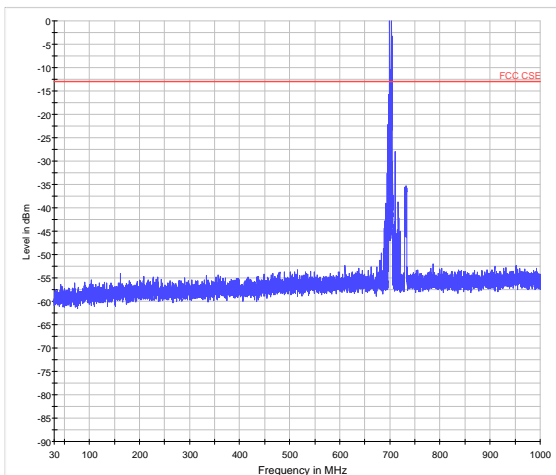


LTE Band 12 3MHz CH-High 3GHz~8GHz

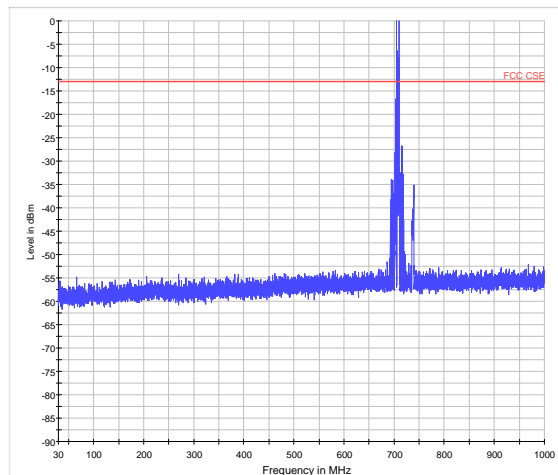




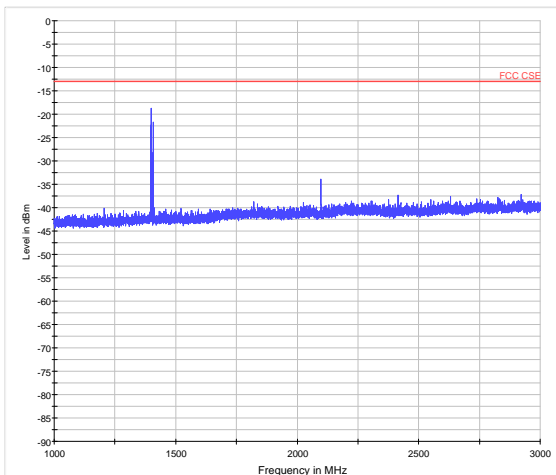
LTE Band 12 5MHz CH-Low 30MHz~1GHz



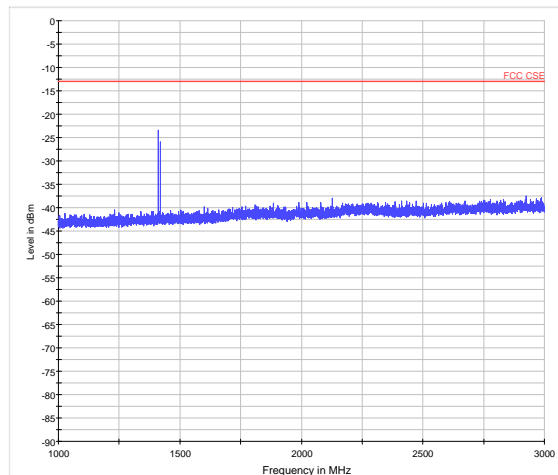
LTE Band 12 5MHz CH-Middle 30MHz~1GHz



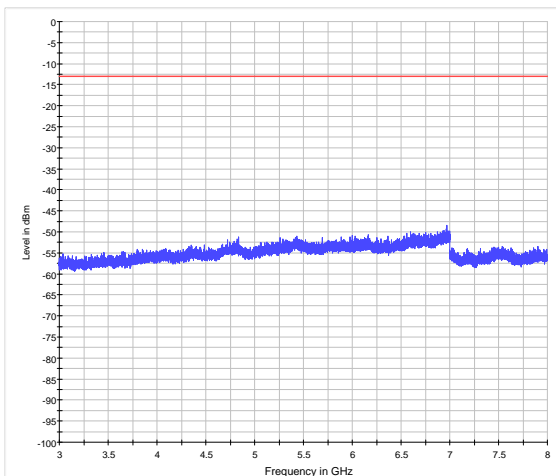
LTE Band 12 5MHz CH-Low 1GHz~3GHz



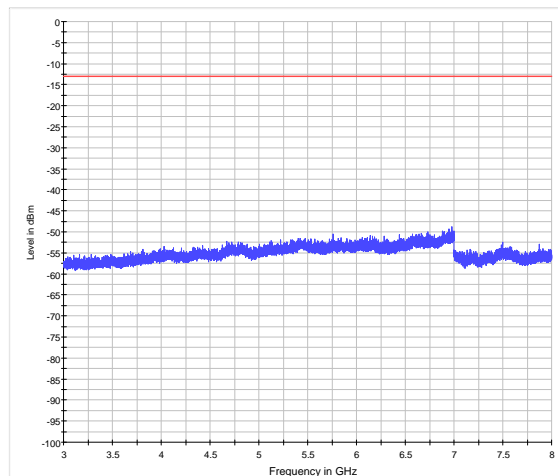
LTE Band 12 5MHz CH-Middle 1GHz~3GHz



LTE Band 12 5MHz CH-Low 3GHz~8GHz

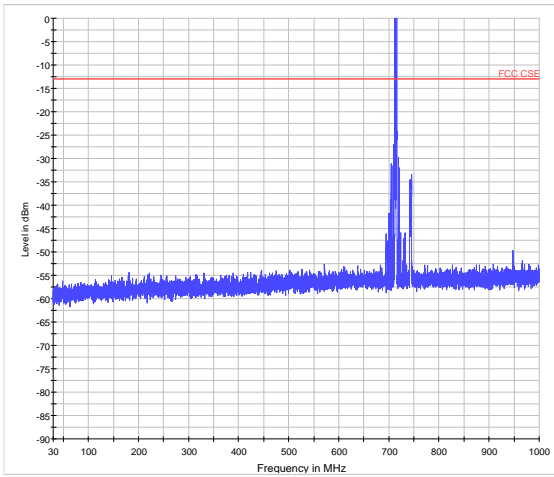


LTE Band 12 5MHz CH-Middle 3GHz~8GHz

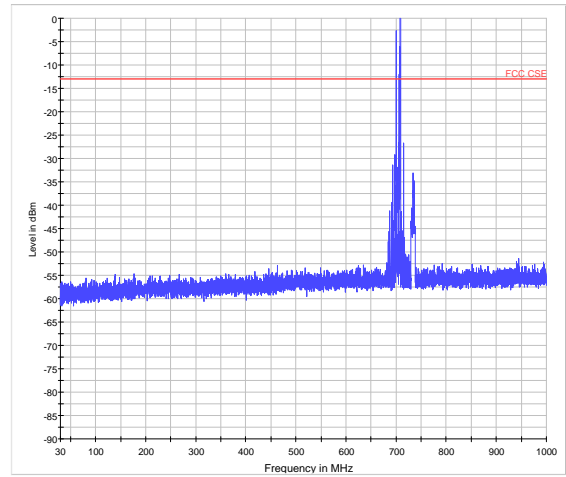




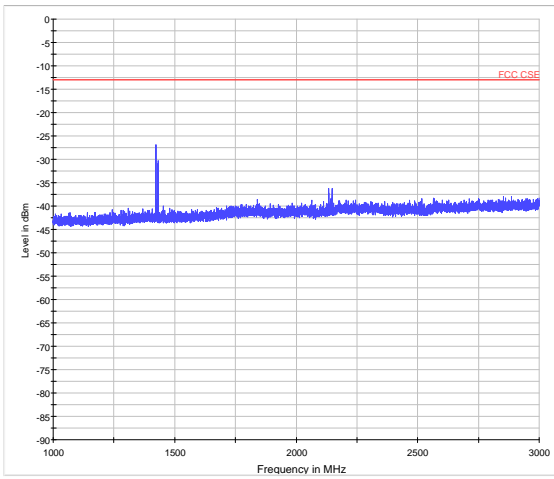
LTE Band 12 5MHz CH-High 30MHz~1GHz



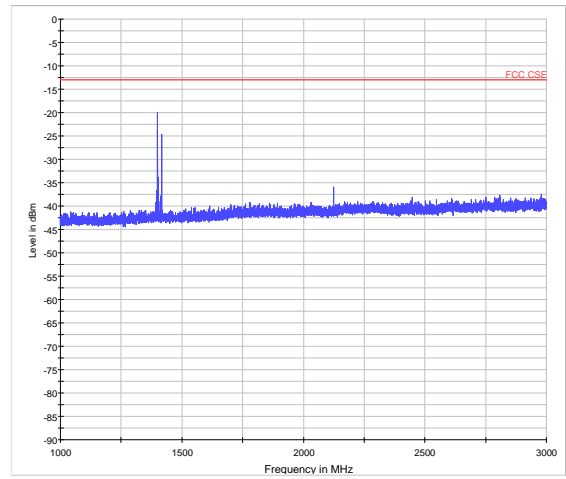
LTE Band 12 10MHz CH-Low 30MHz~1GHz



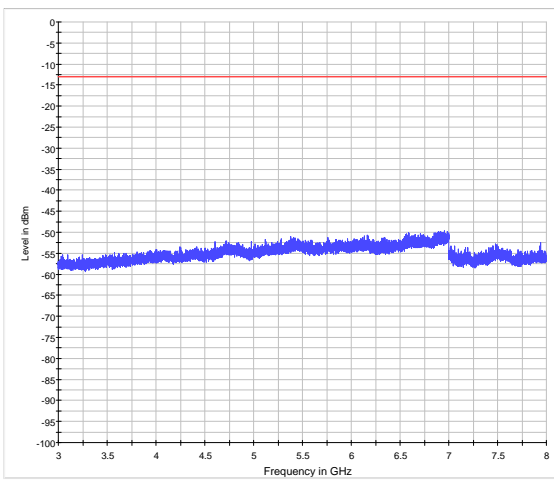
LTE Band 12 5MHz CH-High 1GHz~3GHz



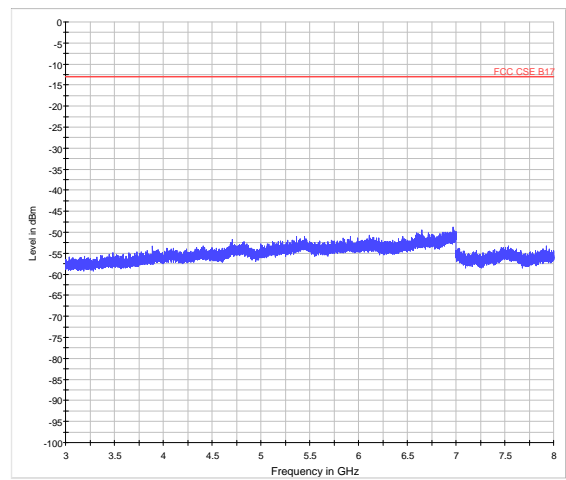
LTE Band 12 10MHz CH-Low 1GHz~3GHz



LTE Band 12 5MHz CH-High 3GHz~8GHz

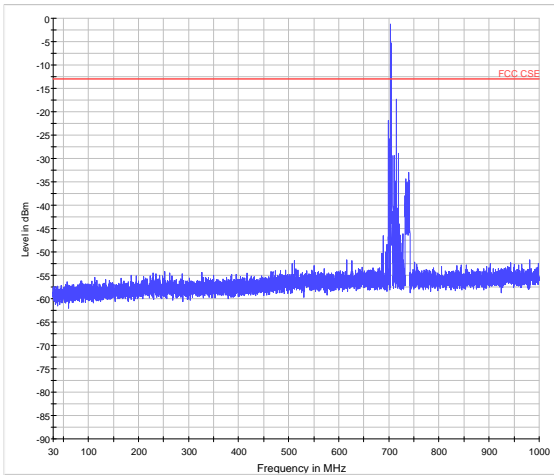


LTE Band 12 10MHz CH-Low 3GHz~8GHz

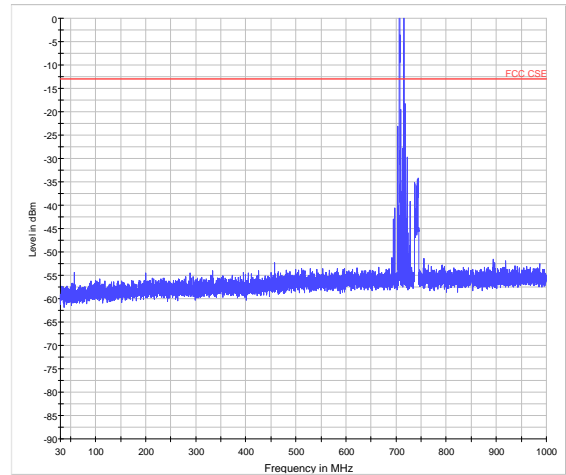




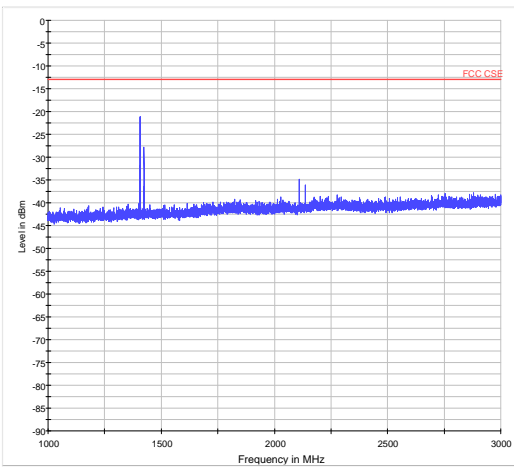
LTE Band 12 10MHz CH-Middle 30MHz~1GHz



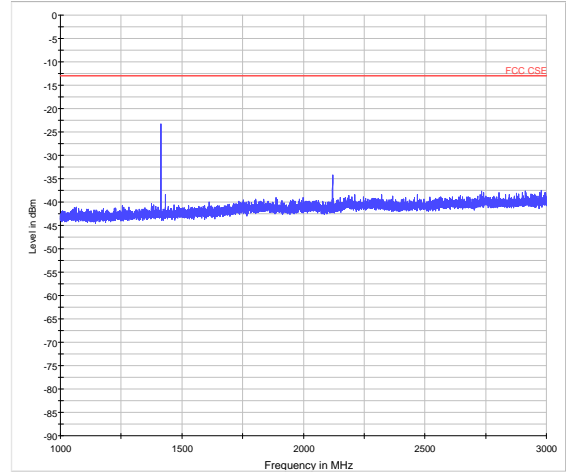
LTE Band 12 10MHz CH-High 30MHz~1GHz



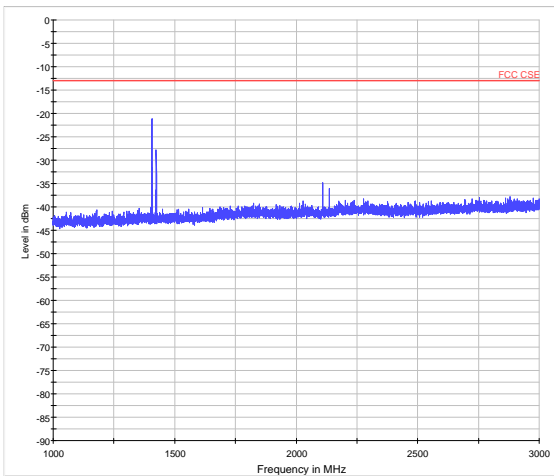
LTE Band 12 10MHz CH-Middle 1GHz~3GHz



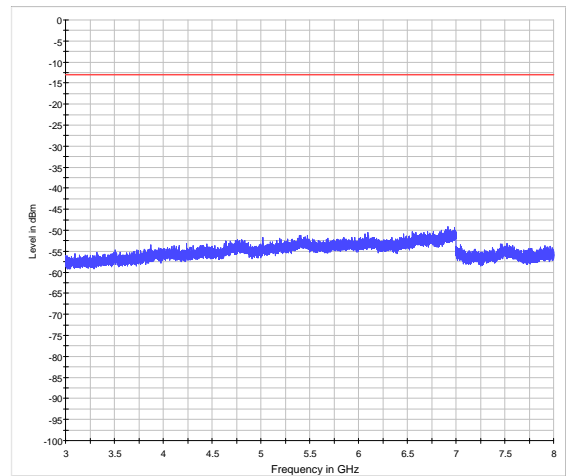
LTE Band 12 10MHz CH-High 1GHz~3GHz



LTE Band 12 10MHz CH-Middle 3GHz~8GHz



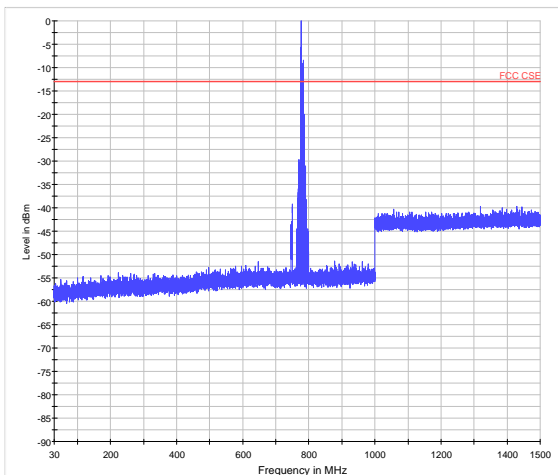
LTE Band 12 10MHz CH-High 3GHz~8GHz



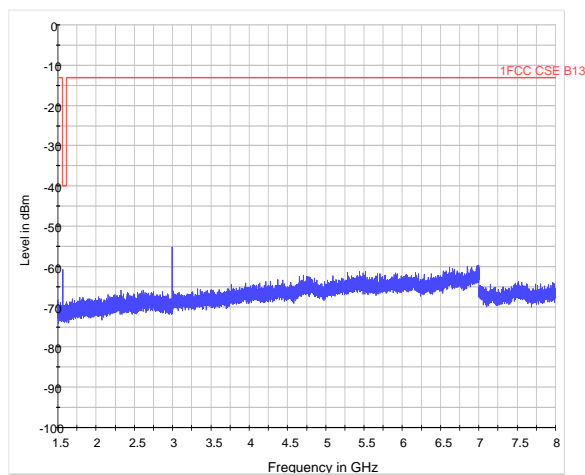




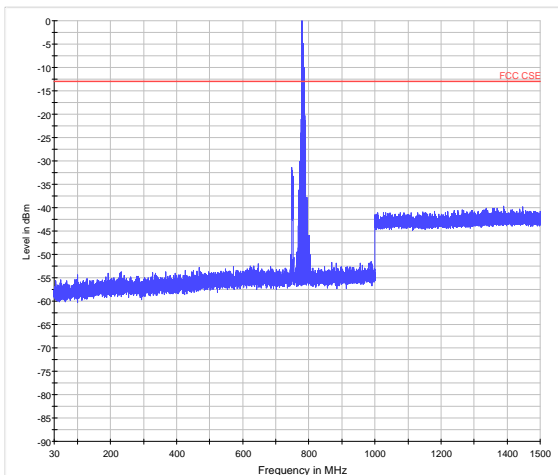
LTE Band 13 5MHz CH-Low 30MHz~1.5GHz



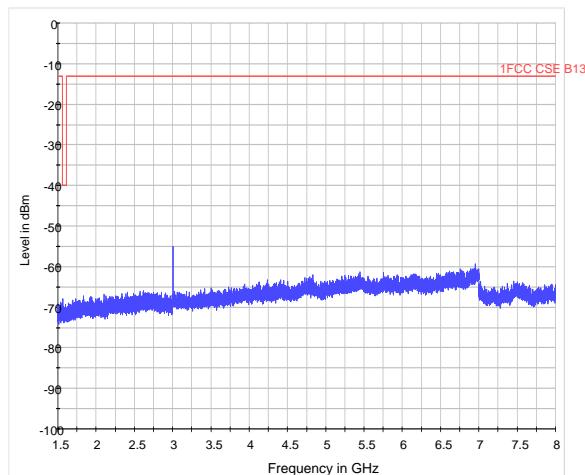
LTE Band 13 5MHz CH-Low 1.5GHz~8GHz



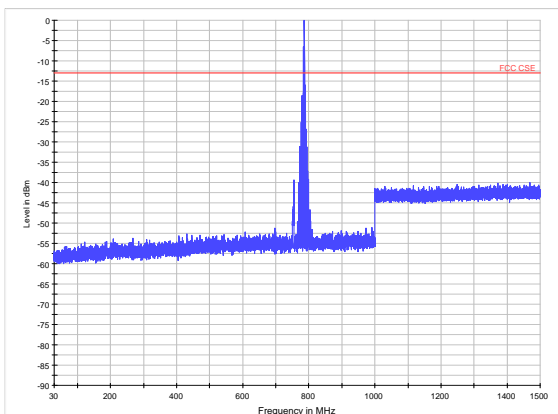
LTE Band 13 5MHz CH-Middle 30MHz~1.5GHz



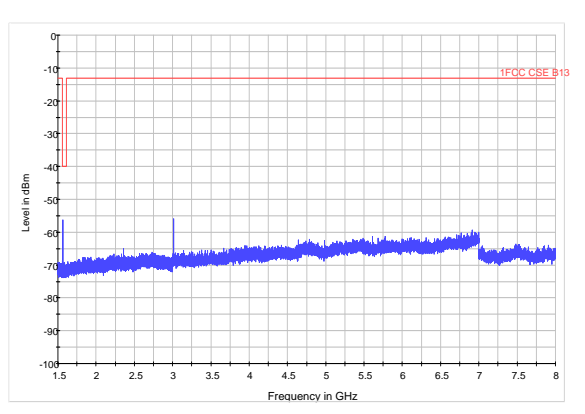
LTE Band 13 5MHz CH-Middle 1.5GHz~8GHz



LTE Band 13 5MHz CH-High 30MHz~1.5GHz

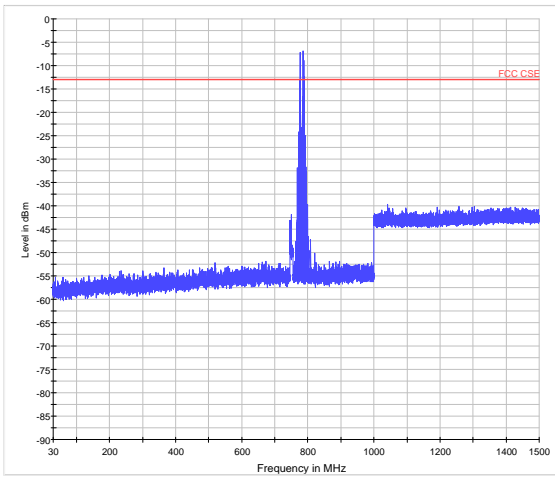


LTE Band 13 5MHz CH-High 1.5GHz~8GHz

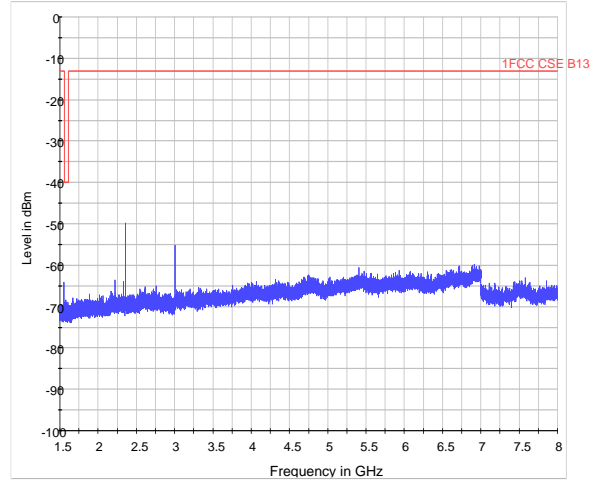




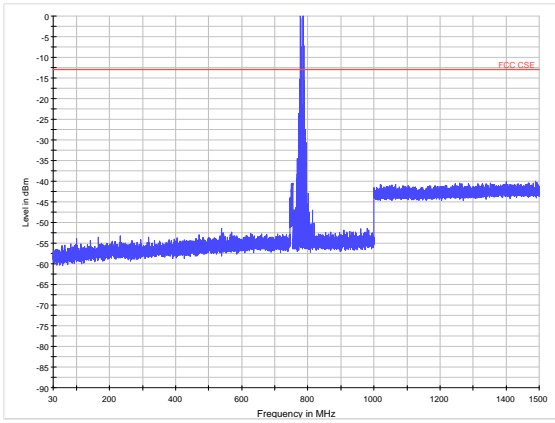
LTE Band 13 10MHz CH- Low 30MHz~1.5GHz



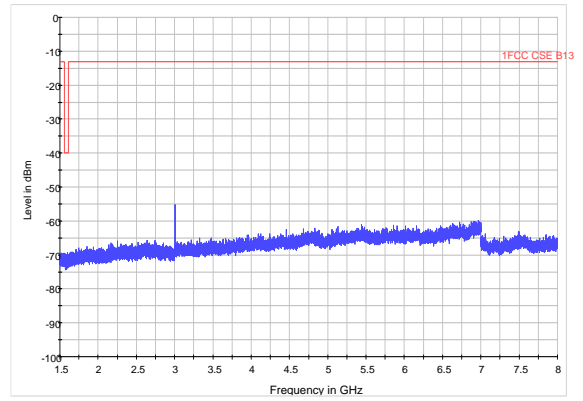
LTE Band 13 10MHz CH- Low 1.5G~8GHz



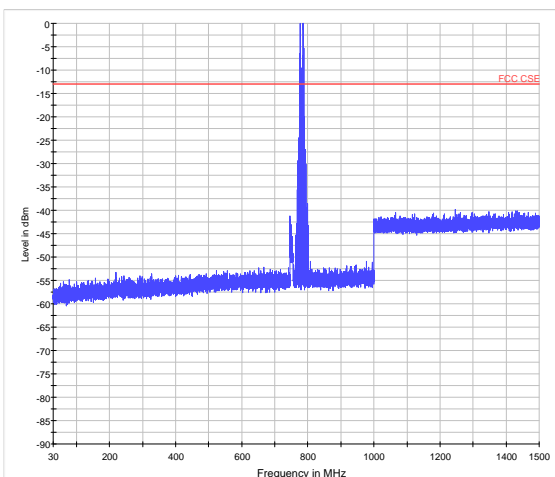
LTE Band 13 10MHz CH-Middle 30MHz~1.5GHz



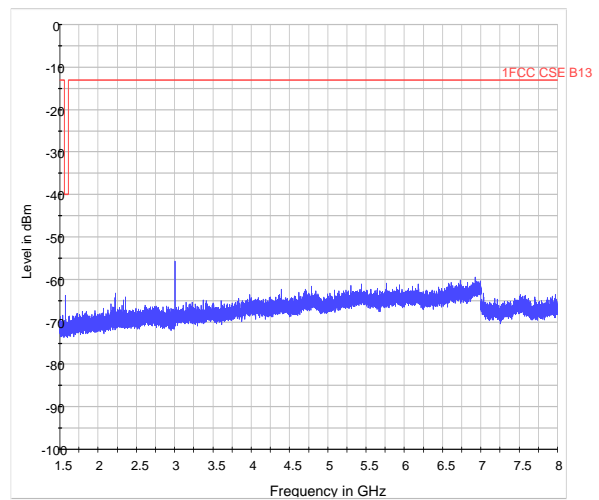
LTE Band 13 10MHz CH-Middle 1.5GHz~8GHz



LTE Band 13 10MHz CH- High 30MHz~1.5GHz



LTE Band 13 10MHz CH- High 1.5GHz~8GHz



If disturbances were found more than 20dB below limit line, the mark is not required for the EUT.

Test Data File Name	Frequency (MHz)	Peak (dBm)	Limit (dBm)	Margin (dB)
LTE B12_CHLOW_1.4M_RB1_1-3GHz	1398.5	-18.96	-13.00	5.96
LTE B12_CHMID_1.4M_RB1_1-3GHz	1413.8	-23.64	-13.00	10.64
LTE B12_CHHIGH_1.4M_RB1_1-3GHz	1431.5	-29.59	-13.00	16.59
LTE B12_CHLOW_3M_RB1_1-3GHz	1398.8	-18.84	-13.00	5.84
LTE B12_CHMID_3M_RB1_1-3GHz	1412.5	-23.89	-13.00	10.89
LTE B12_CHHIGH_3M_RB1_1-3GHz	1427.0	-28.44	-13.00	15.44
LTE B12_CHLOW_5M_RB1_1-3GHz	1398.5	-18.82	-13.00	5.82
LTE B12_CHMID_5M_RB1_1-3GHz	1411.0	-23.39	-13.00	10.39
LTE B12_CHHIGH_5M_RB1_1-3GHz	1422.5	-26.92	-13.00	13.92
LTE B12_CHLOW_10M_RB1_1-3GHz	1399.8	-20.04	-13.00	7.04
LTE B12_CHMID_10M_RB1_1-3GHz	1406.5	-21.06	-13.00	8.06
LTE B12_CHHIGH_10M_RB1_1-3GHz	1413.5	-23.22	-13.00	10.22

## 5.8 Radiates Spurious Emission

### Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

### Method of Measurement

1. The testing follows FCC KDB 971168 v02r02 Section 5.8 and ANSI/TIA-603-D-2010.
2. The EUT is placed on a turntable 0.8 meters above the ground in the chamber, 3 meter away from the antenna. The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable azimuth. Normally, the height range of antenna is 1 m to 4 m, the azimuth range of turntable is 0° to 360°, and the receive antenna has two polarizations Vertical (V) and Horizontal (H).
3. A log-periodic antenna or double-ridged waveguide horn antenna shall be substituted in place of the EUT. The log-periodic antenna will be driven by a signal generator and the level will be adjusted till the same power value on the spectrum analyzer or receiver. The level of the spurious emissions can be calculated through the level of the signal generator, cable loss, the gain of the substitution antenna and the reading of the spectrum analyzer or receiver.
4. The EUT is then put into continuously transmitting mode at its maximum power level during the test. Set Test Receiver or Spectrum RBW=1MHz, VBW=3MHz, And the maximum value of the receiver should be recorded as (Pr).
5. The EUT shall be replaced by a substitution antenna. In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (PMea) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver reach the previously recorded (Pr). The power of signal source (PMea) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.
6. A amplifier should be connected to the Signal Source output port. And the cable should be connect between the Amplifier and the Substitution Antenna. The cable loss (Pcl) ,the Substitution Antenna Gain (Ga) and the Amplifier Gain (PAg) should be recorded after test.
7. The measurement results are obtained as described below:  

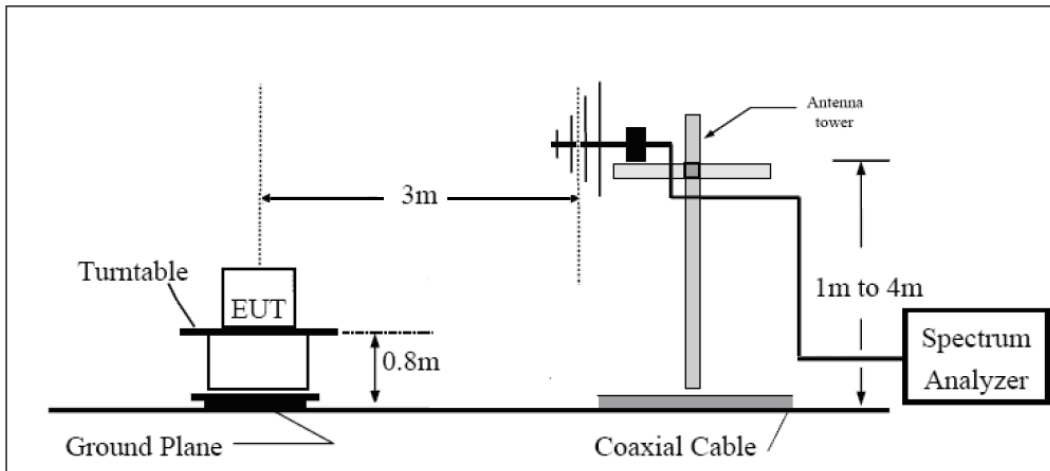
$$\text{Power(EIRP)} = \text{PMea} - \text{PAg} - \text{Pcl} + \text{Ga}$$
 The measurement results are amend as described below:  

$$\text{Power(EIRP)} = \text{PMea} - \text{Pcl} + \text{Ga}$$
8. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power. ERP can be calculated from EIRP by subtracting the gain of the dipole,  $\text{ERP} = \text{EIRP} - 2.15\text{dBi}$ .

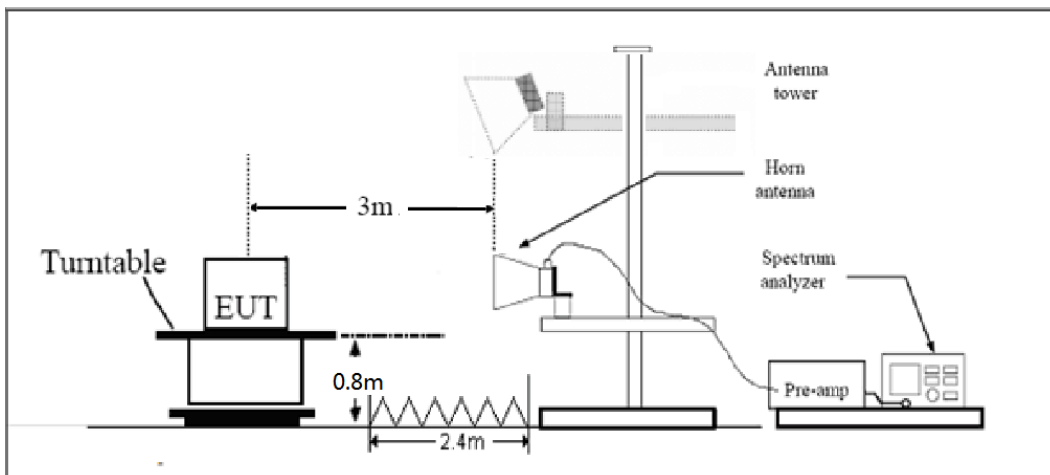


**Test setup**

**30MHz~~~ 1GHz**



**Above 1GHz**



Note: Area side:2.4mX3.6m

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

**Limits**

LTE -4 Rule Part 27.53(h) specifies that “for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least 43 + 10 log<sub>10</sub> (P) dB..”

LTE -12 Rule Part 27.53 (g) For operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least 43 + 10 log (P) dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands



immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

LTE -13 Rule Part 27.53(f) For operations in the 746-758 MHz, 775-788 MHz, and 805-806 MHz bands, emissions in the band 1559-1610 MHz shall be limited to -70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and -80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth. For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation.

**LTE B4/12 Limit**

Limit	-13 dBm
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**LTE B13 Limit**

Limit out of the band 1559-1610 MHz	-13 dBm
Limit in the band 1559-1610 MHz	-40 dBm

**Measurement Uncertainty**

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor  $k = \pm 1.96$ ,  $U = \pm 3.55$  dB.

**Test Result**

LTE Band 4 QPSK 1.4MHz CH-Low, RB 1

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3421.4	-57.25	2.6	10.15	Horizontal	-49.7	-13.0	36.70	315
3	5132.1	-56.15	2.4	11.35	Horizontal	-47.2	-13.0	34.20	270
4	6842.8	-50.75	4.5	10.85	Horizontal	-44.4	-13.0	31.40	135
5	8553.5	-49.35	5.1	11.35	Horizontal	-43.1	-13.0	30.10	225
6	10264.2	-46.75	5.3	11.95	Horizontal	-40.1	-13.0	27.10	180
7	11974.9	-47.45	5.5	13.55	Horizontal	-39.4	-13.0	26.40	45
8	13685.6	-45.15	6.3	13.75	Horizontal	-37.7	-13.0	24.67	315
9	15396.3	-44.95	6.7	13.85	Horizontal	-37.8	-13.0	24.80	270
10	17107.0	-43.65	6.8	14.25	Horizontal	-36.2	-13.0	23.20	135

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.

2. The worst emission was found in the antenna is Horizontal position.

LTE Band 4 QPSK 1.4MHz CH-Middle, RB 1

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3465.0	-55.05	2.6	10.75	Horizontal	-46.9	-13.0	33.90	90
3	5197.5	-54.75	2.4	11.05	Horizontal	-46.1	-13.0	33.10	225
4	6930.0	-51.35	4.5	11.15	Horizontal	-44.7	-13.0	31.70	180
5	8662.5	-47.65	5.1	11.35	Horizontal	-41.4	-13.0	28.40	225
6	10395.0	-46.25	5.3	11.95	Horizontal	-39.6	-13.0	26.60	180
7	12127.5	-46.85	5.5	13.55	Horizontal	-38.8	-13.0	25.80	45
8	13860.0	-43.45	6.3	13.75	Horizontal	-36.0	-13.0	23.00	270
9	15592.5	-44.95	6.7	13.85	Horizontal	-37.8	-13.0	24.80	90
10	17325.0	-43.55	6.8	14.25	Horizontal	-36.1	-13.0	23.10	180

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.

2. The worst emission was found in the antenna is Horizontal position.

**LTE Band 4 QPSK 1.4MHz CH-High, RB 1**

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3508.6	-54.05	2.6	10.15	Horizontal	-46.5	-13.0	33.50	315
3	5262.9	-57.75	2.4	11.05	Horizontal	-49.1	-13.0	36.10	270
4	7017.2	-50.85	4.5	11.15	Horizontal	-44.2	-13.0	31.20	135
5	8771.5	-48.25	5.1	11.35	Horizontal	-42.0	-13.0	29.00	225
6	10525.8	-45.25	5.3	11.95	Horizontal	-38.6	-13.0	25.60	180
7	12280.1	-47.45	5.5	13.55	Horizontal	-39.4	-13.0	26.40	45
8	14034.4	-44.45	6.3	13.75	Horizontal	-37.0	-13.0	24.00	315
9	15788.7	-46.45	6.7	13.85	Horizontal	-39.3	-13.0	26.30	270
10	17543.0	-45.15	6.8	14.25	Horizontal	-37.7	-13.0	24.70	135

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.

2. The worst emission was found in the antenna is Horizontal position.

**LTE Band 4 QPSK 3MHz CH-Low, RB 1**

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3423.0	-60.65	2.6	10.15	Horizontal	-53.1	-13.0	40.10	90
3	5134.5	-55.45	2.4	11.35	Horizontal	-46.5	-13.0	33.50	225
4	6846.0	-50.55	4.5	10.85	Horizontal	-44.2	-13.0	31.20	315
5	8557.5	-48.95	5.1	11.35	Horizontal	-42.7	-13.0	29.70	270
6	10269.0	-47.75	5.3	11.95	Horizontal	-41.1	-13.0	28.10	135
7	11980.5	-46.85	5.5	13.55	Horizontal	-38.8	-13.0	25.80	225
8	13692.0	-44.75	6.3	13.75	Horizontal	-37.3	-13.0	24.30	180
9	15403.5	-46.45	6.7	13.85	Horizontal	-39.3	-13.0	26.30	45
10	17115.0	-44.65	6.8	14.25	Horizontal	-37.2	-13.0	24.20	315

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.

2. The worst emission was found in the antenna is Horizontal position.



**LTE Band 4 QPSK 3MHz CH-Middle, RB 1**

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3465.0	-56.15	2.6	10.75	Horizontal	-48.0	-13.0	35.00	270
3	5197.5	-55.75	2.4	11.05	Horizontal	-47.1	-13.0	34.10	135
4	6930.0	-51.05	4.5	11.15	Horizontal	-44.4	-13.0	31.40	90
5	8662.5	-47.95	5.1	11.35	Horizontal	-41.7	-13.0	28.70	225
6	10395.0	-46.85	5.3	11.95	Horizontal	-40.2	-13.0	27.20	180
7	12127.5	-47.05	5.5	13.55	Horizontal	-39.0	-13.0	26.00	225
8	13860.0	-44.15	6.3	13.75	Horizontal	-36.7	-13.0	23.70	180
9	15592.5	-45.35	6.7	13.85	Horizontal	-38.2	-13.0	25.20	45
10	17325.0	-43.35	6.8	14.25	Horizontal	-35.9	-13.0	22.90	315

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.

2. The worst emission was found in the antenna is Horizontal position.

**LTE Band 4 QPSK 3MHz CH-High, RB 1**

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3507.0	-54.05	2.6	10.15	Horizontal	-46.5	-13.0	33.50	45
3	5260.5	-57.55	2.4	11.05	Horizontal	-48.9	-13.0	35.90	315
4	7014.0	-51.85	4.5	11.15	Horizontal	-45.2	-13.0	32.20	90
5	8767.5	-48.15	5.1	11.35	Horizontal	-41.9	-13.0	28.90	180
6	10521.0	-46.15	5.3	11.95	Horizontal	-39.5	-13.0	26.50	225
7	12274.5	-47.75	5.5	13.55	Horizontal	-39.7	-13.0	26.70	90
8	14028.0	-44.65	6.3	13.75	Horizontal	-37.2	-13.0	24.20	270
9	15781.5	-45.85	6.7	13.85	Horizontal	-38.7	-13.0	25.70	135
10	17535.0	-44.55	6.8	14.25	Horizontal	-37.1	-13.0	24.10	270

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.

2. The worst emission was found in the antenna is Horizontal position.

**LTE Band 4 QPSK 5MHz CH-Low, RB 1**

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3425.0	-59.95	2.6	10.15	Horizontal	-52.4	-13.0	39.40	180
3	5137.5	-56.75	2.4	11.35	Horizontal	-47.8	-13.0	34.80	270
4	6850.0	-51.85	4.5	10.85	Horizontal	-45.5	-13.0	32.50	45
5	8562.5	-48.25	5.1	11.35	Horizontal	-42.0	-13.0	29.00	225
6	10275.0	-47.05	5.3	11.95	Horizontal	-40.4	-13.0	27.40	315
7	11987.5	-47.35	5.5	13.55	Horizontal	-39.3	-13.0	26.30	90
8	13700.0	-44.65	6.3	13.75	Horizontal	-37.2	-13.0	24.20	45
9	15412.5	-47.15	6.7	13.85	Horizontal	-40.0	-13.0	27.00	315
10	17125.0	-44.05	6.8	14.25	Horizontal	-36.6	-13.0	23.60	180

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.

2. The worst emission was found in the antenna is Horizontal position.

**LTE Band 4 QPSK 5MHz CH-Middle, RB 1**

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3465.0	-56.25	2.6	10.75	Horizontal	-48.1	-13.0	35.10	45
3	5197.5	-55.85	2.4	11.05	Horizontal	-47.2	-13.0	34.20	315
4	6930.0	-51.25	4.5	11.15	Horizontal	-44.6	-13.0	31.60	90
5	8662.5	-48.65	5.1	11.35	Horizontal	-42.4	-13.0	29.40	180
6	10395.0	-47.65	5.3	11.95	Horizontal	-41.0	-13.0	28.00	270
7	12127.5	-46.85	5.5	13.55	Horizontal	-38.8	-13.0	25.80	315
8	13860.0	-43.35	6.3	13.75	Horizontal	-35.9	-13.0	22.90	225
9	15592.5	-46.85	6.7	13.85	Horizontal	-39.7	-13.0	26.70	45
10	17325.0	-43.35	6.8	14.25	Horizontal	-35.9	-13.0	22.90	180

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.

2. The worst emission was found in the antenna is Horizontal position.

**LTE Band 4 QPSK 5MHz CH-High, RB 1**

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3505.0	-54.55	2.6	10.15	Horizontal	-47.0	-13.0	34.00	90
3	5257.5	-56.85	2.4	11.05	Horizontal	-48.2	-13.0	35.20	315
4	7010.0	-52.05	4.5	11.15	Horizontal	-45.4	-13.0	32.40	270
5	8762.5	-48.55	5.1	11.35	Horizontal	-42.3	-13.0	29.30	45
6	10515.0	-44.65	5.3	11.95	Horizontal	-38.0	-13.0	25.00	180
7	12267.5	-47.35	5.5	13.55	Horizontal	-39.3	-13.0	26.30	90
8	14020.0	-44.85	6.3	13.75	Horizontal	-37.4	-13.0	24.40	225
9	15772.5	-46.15	6.7	13.85	Horizontal	-39.0	-13.0	26.00	270
10	17525.0	-44.25	6.8	14.25	Horizontal	-36.8	-13.0	23.80	315

- Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.  
2. The worst emission was found in the antenna is Horizontal position.

**LTE Band 4 QPSK 10MHz CH-Low, RB 1**

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3430.0	-60.65	2.6	10.15	Horizontal	-53.1	-13.0	40.10	270
3	5145.0	-56.65	2.4	11.35	Horizontal	-47.7	-13.0	34.70	180
4	6860.0	-51.75	4.5	10.85	Horizontal	-45.4	-13.0	32.40	45
5	8575.0	-48.15	5.1	11.35	Horizontal	-41.9	-13.0	28.90	225
6	10290.0	-48.15	5.3	11.95	Horizontal	-41.5	-13.0	28.50	180
7	12005.0	-48.15	5.5	13.55	Horizontal	-40.1	-13.0	27.10	315
8	13720.0	-45.05	6.3	13.75	Horizontal	-37.6	-13.0	24.60	45
9	15435.0	-46.65	6.7	13.85	Horizontal	-39.5	-13.0	26.50	225
10	17150.0	-43.95	6.8	14.25	Horizontal	-36.5	-13.0	23.50	90

- Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.  
2. The worst emission was found in the antenna is Horizontal position.

**LTE Band 4 QPSK 10MHz CH-Middle, RB 1**

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3465.0	-60.25	2.6	10.75	Horizontal	-52.1	-13.0	39.10	225
3	5197.5	-56.75	2.4	11.05	Horizontal	-48.1	-13.0	35.10	180
4	6930.0	-51.75	4.5	11.15	Horizontal	-45.1	-13.0	32.10	90
5	8662.5	-46.35	5.1	11.35	Horizontal	-40.1	-13.0	27.10	270
6	10395.0	-47.05	5.3	11.95	Horizontal	-40.4	-13.0	27.40	45
7	12127.5	-48.15	5.5	13.55	Horizontal	-40.1	-13.0	27.10	225
8	13860.0	-44.45	6.3	13.75	Horizontal	-37.0	-13.0	24.00	315
9	15592.5	-46.65	6.7	13.85	Horizontal	-39.5	-13.0	26.50	180
10	17325.0	-42.85	6.8	14.25	Horizontal	-35.4	-13.0	22.40	135

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.

2. The worst emission was found in the antenna is Horizontal position.

**LTE Band 4 QPSK 10MHz CH-High, RB 1**

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3500.0	-56.15	2.6	10.15	Horizontal	-48.6	-13.0	35.60	315
3	5250.0	-57.65	2.4	11.05	Horizontal	-49.0	-13.0	36.00	90
4	7000.0	-52.65	4.5	11.15	Horizontal	-46.0	-13.0	33.00	270
5	8750.0	-48.85	5.1	11.35	Horizontal	-42.6	-13.0	29.60	45
6	10500.0	-46.65	5.3	11.95	Horizontal	-40.0	-13.0	27.00	225
7	12250.0	-48.35	5.5	13.55	Horizontal	-40.3	-13.0	27.30	180
8	14000.0	-44.85	6.3	13.75	Horizontal	-37.4	-13.0	24.40	270
9	15750.0	-45.85	6.7	13.85	Horizontal	-38.7	-13.0	25.70	315
10	17500.0	-45.15	6.8	14.25	Horizontal	-37.7	-13.0	24.70	180

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.

2. The worst emission was found in the antenna is Horizontal position.



## LTE Band 4 QPSK 15MHz CH Low, RB 1

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3435.0	-59.65	2.6	10.15	Horizontal	-52.1	-13.0	39.10	225
3	5152.5	-56.95	2.4	11.35	Horizontal	-48.0	-13.0	35.00	180
4	6870.0	-51.65	4.5	10.85	Horizontal	-45.3	-13.0	32.30	270
5	8587.5	-49.55	5.1	11.35	Horizontal	-43.3	-13.0	30.30	45
6	10305.0	-48.45	5.3	11.95	Horizontal	-41.8	-13.0	28.80	135
7	12022.5	-48.95	5.5	13.55	Horizontal	-40.9	-13.0	27.90	90
8	13740.0	-45.05	6.3	13.75	Horizontal	-37.6	-13.0	24.60	135
9	15457.5	-46.45	6.7	13.85	Horizontal	-39.3	-13.0	26.30	225
10	17175.0	-45.65	6.8	14.25	Horizontal	-38.2	-13.0	25.20	315

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.

2. The worst emission was found in the antenna is Horizontal position.

## LTE Band 4 QPSK 15MHz CH-Middle, RB 1

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3465.0	-61.15	2.6	10.75	Horizontal	-53.0	-13.0	40.00	180
3	5197.5	-56.65	2.4	11.05	Horizontal	-48.0	-13.0	35.00	315
4	6930.0	-50.15	4.5	11.15	Horizontal	-43.5	-13.0	30.50	90
5	8662.5	-48.85	5.1	11.35	Horizontal	-42.6	-13.0	29.60	225
6	10395.0	-47.15	5.3	11.95	Horizontal	-40.5	-13.0	27.50	270
7	12127.5	-47.25	5.5	13.55	Horizontal	-39.2	-13.0	26.20	45
8	13860.0	-44.45	6.3	13.75	Horizontal	-37.0	-13.0	24.00	180
9	15592.5	-46.75	6.7	13.85	Horizontal	-39.6	-13.0	26.60	90
10	17325.0	-43.75	6.8	14.25	Horizontal	-36.3	-13.0	23.30	135

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.

2. The worst emission was found in the antenna is Horizontal position.



**LTE Band 4 QPSK 15MHz CH-High, RB 1**

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3495.0	-59.85	2.6	10.15	Horizontal	-52.3	-13.0	39.30	225
3	5242.5	-56.55	2.4	11.05	Horizontal	-47.9	-13.0	34.90	45
4	6990.0	-50.25	4.5	11.15	Horizontal	-43.6	-13.0	30.60	270
5	8737.5	-48.45	5.1	11.35	Horizontal	-42.2	-13.0	29.20	315
6	10485.0	-48.15	5.3	11.95	Horizontal	-41.5	-13.0	28.50	90
7	12232.5	-47.75	5.5	13.55	Horizontal	-39.7	-13.0	26.70	225
8	13980.0	-44.25	6.3	13.75	Horizontal	-36.8	-13.0	23.80	45
9	15727.5	-46.25	6.7	13.85	Horizontal	-39.1	-13.0	26.10	180
10	17475.0	-43.25	6.8	14.25	Horizontal	-35.8	-13.0	22.80	90

- Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.  
2. The worst emission was found in the antenna is Horizontal position.

**LTE Band 4 QPSK 20MHz CH-Low, RB 1**

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3440.0	-59.25	2.6	10.15	Horizontal	-51.7	-13.0	38.70	315
3	5160.0	-56.75	2.4	11.35	Horizontal	-47.8	-13.0	34.80	270
4	6880.0	-49.65	4.5	10.85	Horizontal	-43.3	-13.0	30.30	45
5	8600.0	-48.05	5.1	11.35	Horizontal	-41.8	-13.0	28.80	225
6	10320.0	-47.35	5.3	11.95	Horizontal	-40.7	-13.0	27.70	180
7	12040.0	-47.15	5.5	13.55	Horizontal	-39.1	-13.0	26.10	270
8	13760.0	-43.75	6.3	13.75	Horizontal	-36.3	-13.0	23.30	90
9	15480.0	-46.05	6.7	13.85	Horizontal	-38.9	-13.0	25.90	90
10	17200.0	-42.75	6.8	14.25	Horizontal	-35.3	-13.0	22.30	225

- Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.  
2. The worst emission was found in the antenna is Horizontal position.

**LTE Band 4 QPSK 20MHz CH-Middle, RB 1**

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3465.0	-59.55	2.6	10.75	Horizontal	-51.4	-13.0	38.40	45
3	5197.5	-55.65	2.4	11.05	Horizontal	-47.0	-13.0	34.00	225
4	6930.0	-49.85	4.5	11.15	Horizontal	-43.2	-13.0	30.20	270
5	8662.5	-48.15	5.1	11.35	Horizontal	-41.9	-13.0	28.90	90
6	10395.0	-47.85	5.3	11.95	Horizontal	-41.2	-13.0	28.20	225
7	12127.5	-47.35	5.5	13.55	Horizontal	-39.3	-13.0	26.30	315
8	13860.0	-43.65	6.3	13.75	Horizontal	-36.2	-13.0	23.20	180
9	15592.5	-46.25	6.7	13.85	Horizontal	-39.1	-13.0	26.10	45
10	17325.0	-42.75	6.8	14.25	Horizontal	-35.3	-13.0	22.30	180

- Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.  
2. The worst emission was found in the antenna is Horizontal position.

**LTE Band 4 QPSK 20MHz CH-High, RB 1**

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3490.0	-59.25	2.6	10.15	Horizontal	-51.7	-13.0	38.70	315
3	5235.0	-56.55	2.4	11.05	Horizontal	-47.9	-13.0	34.90	225
4	6980.0	-50.25	4.5	11.15	Horizontal	-43.6	-13.0	30.60	45
5	8725.0	-48.05	5.1	11.35	Horizontal	-41.8	-13.0	28.80	180
6	10470.0	-47.85	5.3	11.95	Horizontal	-41.2	-13.0	28.20	270
7	12215.0	-46.85	5.5	13.55	Horizontal	-38.8	-13.0	25.80	315
8	13960.0	-43.65	6.3	13.75	Horizontal	-36.2	-13.0	23.20	90
9	15705.0	-46.15	6.7	13.85	Horizontal	-39.0	-13.0	26.00	180
10	17450.0	-42.65	6.8	14.25	Horizontal	-35.2	-13.0	22.20	135

- Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.  
2. The worst emission was found in the antenna is Horizontal position.

**LTE Band 12 QPSK 1.4MHz CH-Low, RB 1**

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1399.40	36.60	2.00	10.15	Vertical	42.60	-13.00	-55.60	225
3	2099.10	-52.50	2.50	11.35	Vertical	-45.80	-13.00	32.80	270
4	2798.80	-54.90	4.20	10.85	Vertical	-50.40	-13.00	37.40	180
5	3498.50	-55.34	5.20	11.35	Vertical	-51.34	-13.00	38.34	180
6	4198.20	-53.56	5.50	11.95	Vertical	-49.26	-13.00	36.26	45
7	4897.90	-54.41	5.70	13.55	Vertical	-48.71	-13.00	35.71	135
8	5597.60	-53.18	6.30	13.75	Vertical	-47.88	-13.00	34.88	225
9	6297.30	-51.44	6.80	13.85	Vertical	-46.54	-13.00	33.54	90
10	6997.00	-49.96	6.90	14.25	Vertical	-44.76	-13.00	31.76	180

- Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.  
 2. The worst emission was found in the antenna is vertical position.

**LTE Band 12 QPSK 1.4MHz CH-Middle, RB 1**

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1415.00	-42.80	2.00	10.75	Vertical	-36.20	-13.00	23.20	180
3	2122.50	-49.79	2.51	11.05	Vertical	-43.40	-13.00	30.40	90
4	2830.00	-55.70	4.20	11.15	Vertical	-50.90	-13.00	37.90	135
5	3537.50	-55.60	5.20	11.15	Vertical	-51.80	-13.00	38.80	0
6	4245.00	-54.29	5.50	11.95	Vertical	-49.99	-13.00	36.99	45
7	4952.50	-53.70	5.70	13.55	Vertical	-48.00	-13.00	35.00	180
8	5660.00	-53.63	6.30	13.75	Vertical	-48.33	-13.00	35.33	45
9	6367.50	-50.94	6.80	13.85	Vertical	-46.04	-13.00	33.04	135
10	7075.00	-47.66	6.90	14.25	Vertical	-42.46	-13.00	29.46	225

- Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.  
 2. The worst emission was found in the antenna is vertical position.

**LTE Band 12 QPSK 1.4MHz CH-High, RB 1**

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1430.60	36.90	2.00	10.15	Vertical	42.90	-13.00	-55.90	270
3	2145.90	-49.19	2.51	11.05	Vertical	-42.80	-13.00	29.80	45
4	2861.20	-55.20	4.20	11.15	Vertical	-50.40	-13.00	37.40	135
5	3576.50	-53.72	5.20	11.15	Vertical	-49.92	-13.00	36.92	90
6	4291.80	-52.96	5.50	11.95	Vertical	-48.66	-13.00	35.66	180
7	5007.10	-52.82	5.70	13.55	Vertical	-47.12	-13.00	34.12	0
8	5722.40	-52.84	6.30	13.75	Vertical	-47.54	-13.00	34.54	45
9	6437.70	-52.01	6.80	13.85	Vertical	-47.11	-13.00	34.11	180
10	7153.00	-47.89	6.90	14.25	Vertical	-42.69	-13.00	29.69	45

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.

2. The worst emission was found in the antenna is vertical position.

**LTE Band 12 QPSK 3MHz CH-Low, RB 1**

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1401.00	-44.00	2.00	10.15	Vertical	-38.00	-13.00	25.00	90
3	2101.50	-52.89	2.51	11.35	Vertical	-46.20	-13.00	33.20	270
4	2802.00	-55.20	4.20	10.85	Vertical	-50.70	-13.00	37.70	45
5	3502.50	-55.36	5.20	11.35	Vertical	-51.36	-13.00	38.36	45
6	4203.00	-54.29	5.50	11.95	Vertical	-49.99	-13.00	36.99	180
7	4903.50	-54.52	5.70	13.55	Vertical	-48.82	-13.00	35.82	45
8	5604.00	-53.44	6.30	13.75	Vertical	-48.14	-13.00	35.14	135
9	6304.50	-50.39	6.80	13.85	Vertical	-45.49	-13.00	32.49	225
10	7005.00	-50.09	6.90	14.25	Vertical	-44.89	-13.00	31.89	90

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.

2. The worst emission was found in the antenna is vertical position.

**LTE Band 12 QPSK 3MHz CH-Middle, RB 1**

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1415.00	-42.90	2.00	10.75	Vertical	-36.30	-13.00	23.30	270
3	2122.50	-51.19	2.51	11.05	Vertical	-44.80	-13.00	31.80	45
4	2830.00	-55.50	4.20	11.15	Vertical	-50.70	-13.00	37.70	135
5	3537.50	-55.93	5.20	11.15	Vertical	-52.13	-13.00	39.13	0
6	4245.00	-54.62	5.50	11.95	Vertical	-50.32	-13.00	37.32	45
7	4952.50	-54.63	5.70	13.55	Vertical	-48.93	-13.00	35.93	180
8	5660.00	-53.42	6.30	13.75	Vertical	-48.12	-13.00	35.12	45
9	6367.50	-51.33	6.80	13.85	Vertical	-46.43	-13.00	33.43	45
10	7075.00	-48.97	6.90	14.25	Vertical	-43.77	-13.00	30.77	180

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.  
 2. The worst emission was found in the antenna is vertical position.

**LTE Band 12 QPSK 3MHz CH-High, RB 1**

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1429.00	-43.80	2.00	10.15	Vertical	-37.80	-13.00	24.80	90
3	2143.50	36.11	2.51	11.05	Vertical	42.50	-13.00	-55.50	270
4	2858.00	-55.60	4.20	11.15	Vertical	-50.80	-13.00	37.80	45
5	3572.50	-54.75	5.20	11.15	Vertical	-50.95	-13.00	37.95	180
6	4287.00	-53.49	5.50	11.95	Vertical	-49.19	-13.00	36.19	225
7	5001.50	-52.76	5.70	13.55	Vertical	-47.06	-13.00	34.06	0
8	5716.00	-53.59	6.30	13.75	Vertical	-48.29	-13.00	35.29	180
9	6430.50	-50.87	6.80	13.85	Vertical	-45.97	-13.00	32.97	135
10	7145.00	-47.29	6.90	14.25	Vertical	-42.09	-13.00	29.09	0

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.  
 2. The worst emission was found in the antenna is vertical position.



**LTE Band 12 QPSK 5MHz CH-Low, RB 1**

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1403.00	-43.40	2.00	10.15	Vertical	-37.40	-13.00	24.40	225
3	2104.50	-52.70	2.50	11.35	Vertical	-46.00	-13.00	33.00	90
4	2806.00	45.70	4.20	10.85	Vertical	50.20	-13.00	-63.20	225
5	3507.50	-54.50	5.20	11.35	Vertical	-50.50	-13.00	37.50	90
6	4209.00	-52.80	5.50	11.95	Vertical	-48.50	-13.00	35.50	135
7	4910.50	-52.40	5.70	13.55	Vertical	-46.70	-13.00	33.70	225
8	5612.00	-51.60	6.30	13.75	Vertical	-46.30	-13.00	33.30	270
9	6313.50	-50.10	6.80	13.85	Vertical	-45.20	-13.00	32.20	180
10	7015.00	-49.00	6.90	14.25	Vertical	-43.80	-13.00	30.80	45

- Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.  
 2. The worst emission was found in the antenna is vertical position.

**LTE Band 12 QPSK 5MHz CH-Middle, RB 1**

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1415.00	-42.50	2.00	10.75	Vertical	-35.90	-13.00	22.90	180
3	2122.50	-49.59	2.51	11.05	Vertical	-43.20	-13.00	30.20	45
4	2830.00	-54.60	4.20	11.15	Vertical	-49.80	-13.00	36.80	135
5	3537.50	-54.60	5.20	11.15	Vertical	-50.80	-13.00	37.80	135
6	4245.00	-54.20	5.50	11.95	Vertical	-49.90	-13.00	36.90	225
7	4952.50	-52.00	5.70	13.55	Vertical	-46.30	-13.00	33.30	90
8	5660.00	-51.70	6.30	13.75	Vertical	-46.40	-13.00	33.40	135
9	6367.50	-50.70	6.80	13.85	Vertical	-45.80	-13.00	32.80	225
10	7075.00	-49.20	6.90	14.25	Vertical	-44.00	-13.00	31.00	270

- Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.  
 2. The worst emission was found in the antenna is vertical position.

**LTE Band 12 QPSK 5MHz CH-High, RB 1**

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1427.00	-50.10	2.00	10.15	Vertical	-44.10	-13.00	31.10	90
3	2140.50	-48.39	2.51	11.05	Vertical	-42.00	-13.00	29.00	180
4	2854.00	-55.40	4.20	11.15	Vertical	-50.60	-13.00	37.60	90
5	3567.50	-54.50	5.20	11.15	Vertical	-50.70	-13.00	37.70	180
6	4281.00	-54.90	5.50	11.95	Vertical	-50.60	-13.00	37.60	90
7	4994.50	-52.20	5.70	13.55	Vertical	-46.50	-13.00	33.50	180
8	5708.00	-52.00	6.30	13.75	Vertical	-46.70	-13.00	33.70	90
9	6421.50	-50.20	6.80	13.85	Vertical	-45.30	-13.00	32.30	135
10	7135.00	-49.10	6.90	14.25	Vertical	-43.90	-13.00	30.90	225

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.

2. The worst emission was found in the antenna is vertical position.

**LTE Band 12 QPSK 10MHz CH-Low, RB 1**

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1408.00	-48.70	2.00	10.15	Vertical	-42.70	-13.00	29.70	225
3	2112.00	-48.89	2.51	11.35	Vertical	-42.20	-13.00	29.20	270
4	2816.00	-55.00	4.20	10.85	Vertical	-50.50	-13.00	37.50	180
5	3520.00	-54.00	5.20	11.35	Vertical	-50.00	-13.00	37.00	270
6	4224.00	-53.80	5.50	11.95	Vertical	-49.50	-13.00	36.50	45
7	4928.00	-52.80	5.70	13.55	Vertical	-47.10	-13.00	34.10	135
8	5632.00	-52.60	6.30	13.75	Vertical	-47.30	-13.00	34.30	225
9	6336.00	-50.00	6.80	13.85	Vertical	-45.10	-13.00	32.10	90
10	7040.00	38.60	6.90	14.25	Vertical	43.80	-13.00	-56.80	270

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.

2. The worst emission was found in the antenna is vertical position.

**LTE Band 12 QPSK 10MHz CH-Middle, RB 1**

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1415.00	-45.00	2.00	10.75	Vertical	-38.40	-13.00	25.40	135
3	2122.50	-50.79	2.51	11.05	Vertical	-44.40	-13.00	31.40	225
4	2830.00	-55.40	4.20	11.15	Vertical	-50.60	-13.00	37.60	90
5	3537.50	-54.20	5.20	11.15	Vertical	-50.40	-13.00	37.40	45
6	4245.00	-52.80	5.50	11.95	Vertical	-48.50	-13.00	35.50	225
7	4952.50	-53.00	5.70	13.55	Vertical	-47.30	-13.00	34.30	270
8	5660.00	-52.00	6.30	13.75	Vertical	-46.70	-13.00	33.70	45
9	6367.50	-50.10	6.80	13.85	Vertical	-45.20	-13.00	32.20	135
10	7075.00	-49.80	6.90	14.25	Vertical	-44.60	-13.00	31.60	225

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.

2. The worst emission was found in the antenna is vertical position.

**LTE Band 12 QPSK 10MHz CH-High, RB 1**

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1422.00	-44.50	2.00	10.15	Vertical	-38.50	-13.00	25.50	270
3	2133.00	-50.19	2.51	11.05	Vertical	-43.80	-13.00	30.80	0
4	2844.00	-55.60	4.20	11.15	Vertical	-50.80	-13.00	37.80	45
5	3555.00	-54.60	5.20	11.15	Vertical	-50.80	-13.00	37.80	90
6	4266.00	-54.90	5.50	11.95	Vertical	-50.60	-13.00	37.60	270
7	4977.00	-53.20	5.70	13.55	Vertical	-47.50	-13.00	34.50	45
8	5688.00	-51.20	6.30	13.75	Vertical	-45.90	-13.00	32.90	135
9	6399.00	-50.50	6.80	13.85	Vertical	-45.60	-13.00	32.60	225
10	7110.00	-49.60	6.90	14.25	Vertical	-44.40	-13.00	31.40	90

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.

2. The worst emission was found in the antenna is vertical position.

**LTE Band 13 QPSK 5MHz CH-Low, RB 1**

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1559.0	-58.10	2.00	10.15	Vertical	-52.10	-40.00	12.10	90
3	2338.5	-38.90	2.50	11.35	Vertical	-32.20	-13.00	19.20	90
4	3118.0	-53.00	4.20	10.85	Vertical	-48.50	-13.00	35.50	225
5	3897.5	-52.30	5.20	11.35	Vertical	-48.30	-13.00	35.30	0
6	4677.0	-50.00	5.50	11.95	Vertical	-45.70	-13.00	32.70	135
7	5456.5	-51.90	5.70	13.55	Vertical	-46.20	-13.00	33.20	90
8	6236.0	-47.10	6.30	13.75	Vertical	-41.80	-13.00	28.80	135
9	7015.5	-46.10	6.80	13.85	Vertical	-41.20	-13.00	28.20	225
10	7795.0	-44.50	6.90	14.25	Vertical	-39.30	-13.00	26.30	270

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.

2. The worst emission was found in the antenna is vertical position.

**LTE Band 13 QPSK 5MHz CH-Middle, RB 1**

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1564.0	-57.50	2.00	10.75	Vertical	-50.90	-40.00	10.90	45
3	2346.0	-39.99	2.51	11.05	Vertical	-33.60	-13.00	20.60	90
4	3128.0	-53.70	4.20	11.15	Vertical	-48.90	-13.00	35.90	180
5	3910.0	-52.50	5.20	11.15	Vertical	-48.70	-13.00	35.70	45
6	4692.0	-50.30	5.50	11.95	Vertical	-46.00	-13.00	33.00	135
7	5474.0	-51.20	5.70	13.55	Vertical	-45.50	-13.00	32.50	225
8	6256.0	-52.00	6.30	13.75	Vertical	-46.70	-13.00	33.70	90
9	7038.0	-46.20	6.80	13.85	Vertical	-41.30	-13.00	28.30	180
10	7820.0	-46.40	6.90	14.25	Vertical	-41.20	-13.00	28.20	90

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.

2. The worst emission was found in the antenna is vertical position.

**LTE Band 13 QPSK 5MHz CH-High, RB 1**

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1569.0	-59.30	2.00	10.15	Vertical	-53.30	-40.00	13.30	135
3	2353.5	-53.59	2.51	11.05	Vertical	-47.20	-13.00	34.20	225
4	3138.0	-54.90	4.20	11.15	Vertical	-50.10	-13.00	37.10	135
5	3922.5	-53.30	5.20	11.15	Vertical	-49.50	-13.00	36.50	225
6	4707.0	-51.10	5.50	11.95	Vertical	-46.80	-13.00	33.80	270
7	5491.5	-52.40	5.70	13.55	Vertical	-46.70	-13.00	33.70	90
8	6276.0	-50.60	6.30	13.75	Vertical	-45.30	-13.00	32.30	135
9	7060.5	-45.10	6.80	13.85	Vertical	-40.20	-13.00	27.20	225
10	7845.0	-45.00	6.90	14.25	Vertical	-39.80	-13.00	26.80	270

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.

2. The worst emission was found in the antenna is vertical position.

**LTE Band 13 QPSK 10MHz CH-Low, RB 1**

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1564.0	-60.10	2.00	10.15	Vertical	-54.10	-40.00	14.10	270
3	2346.0	-44.29	2.51	11.35	Vertical	-37.60	-13.00	24.60	180
4	3128.0	-54.70	4.20	10.85	Vertical	-50.20	-13.00	37.20	180
5	3910.0	-53.60	5.20	11.35	Vertical	-49.60	-13.00	36.60	45
6	4692.0	-50.60	5.50	11.95	Vertical	-46.30	-13.00	33.30	135
7	5474.0	-52.50	5.70	13.55	Vertical	-46.80	-13.00	33.80	225
8	6256.0	-51.00	6.30	13.75	Vertical	-45.70	-13.00	32.70	90
9	7038.0	-45.70	6.80	13.85	Vertical	-40.80	-13.00	27.80	135
10	7820.0	-44.90	6.90	14.25	Vertical	-39.70	-13.00	26.70	90

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.

2. The worst emission was found in the antenna is vertical position.



**LTE Band 13 QPSK 10MHz CH-Middle, RB 1**

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1564.0	-56.80	2.00	10.75	Vertical	-50.20	-40.00	10.20	45
3	2346.0	-40.29	2.51	11.05	Vertical	-33.90	-13.00	20.90	135
4	3128.0	-54.60	4.20	11.15	Vertical	-49.80	-13.00	36.80	135
5	3910.0	-53.30	5.20	11.15	Vertical	-49.50	-13.00	36.50	225
6	4692.0	-51.10	5.50	11.95	Vertical	-46.80	-13.00	33.80	270
7	5474.0	-52.00	5.70	13.55	Vertical	-46.30	-13.00	33.30	180
8	6256.0	-50.50	6.30	13.75	Vertical	-45.20	-13.00	32.20	45
9	7038.0	-45.70	6.80	13.85	Vertical	-40.80	-13.00	27.80	135
10	7820.0	-45.30	6.90	14.25	Vertical	-40.10	-13.00	27.10	225

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.

2. The worst emission was found in the antenna is vertical position.

**LTE Band 13 QPSK 10MHz CH-High, RB 1**

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1564.0	-58.50	2.00	10.15	Vertical	-52.50	-40.00	12.50	225
3	2346.0	-40.99	2.51	11.05	Vertical	-34.60	-13.00	21.60	90
4	3128.0	-55.00	4.20	11.15	Vertical	-50.20	-13.00	37.20	45
5	3910.0	-53.10	5.20	11.15	Vertical	-49.30	-13.00	36.30	270
6	4692.0	-51.00	5.50	11.95	Vertical	-46.70	-13.00	33.70	90
7	5474.0	-51.90	5.70	13.55	Vertical	-46.20	-13.00	33.20	270
8	6256.0	-51.00	6.30	13.75	Vertical	-45.70	-13.00	32.70	135
9	7038.0	-45.00	6.80	13.85	Vertical	-40.10	-13.00	27.10	135
10	7820.0	-45.20	6.90	14.25	Vertical	-40.00	-13.00	27.00	90

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.

2. The worst emission was found in the antenna is vertical position.

## 6 Main Test Instruments

Name	Manufacturer	Type	Serial Number	Calibration Date	Expiration Time
Base Station Simulator	R&S	CMW500	113645	2017-05-14	2018-05-13
Power Splitter	Hua Xiang	SHX-GF2-2-13	10120101	2017-05-14	2018-05-13
Universal Radio Communication Tester	Agilent	E5515C	MY48367192	2017-05-14	2018-05-13
Spectrum Analyzer	Agilent	N9010A	MY47191109	2017-05-14	2018-05-13
Signal Analyzer	R&S	FSV30	100815	2016-12-16	2017-12-15
Signal generator	R&S	SMB 100A	102594	2017-05-14	2018-05-13
EMI Test Receiver	R&S	ESCI	100948	2017-05-20	2018-05-19
Trilog Antenna	SCHWARZBECK	VUBL 9163	9163-201	2014-12-06	2017-12-05
Horn Antenna	R&S	HF907	100126	2014-12-06	2017-12-05
Horn Antenna	ETS-Lindgren	3160-09	00102643	2015-01-30	2018-01-29
Climatic Chamber	Re Ce	PT-30B	20101891	2015-07-18	2018-07-17
RF Cable	Agilent	SMA 15cm	0001	2017-08-04	2018-02-03
Preamplifier	R&S	SCU18	102327	2017-06-18	2018-06-17

## ANNEX A: EUT Appearance and Test Setup

### A.1 EUT Appearance



Front Side



Back Side



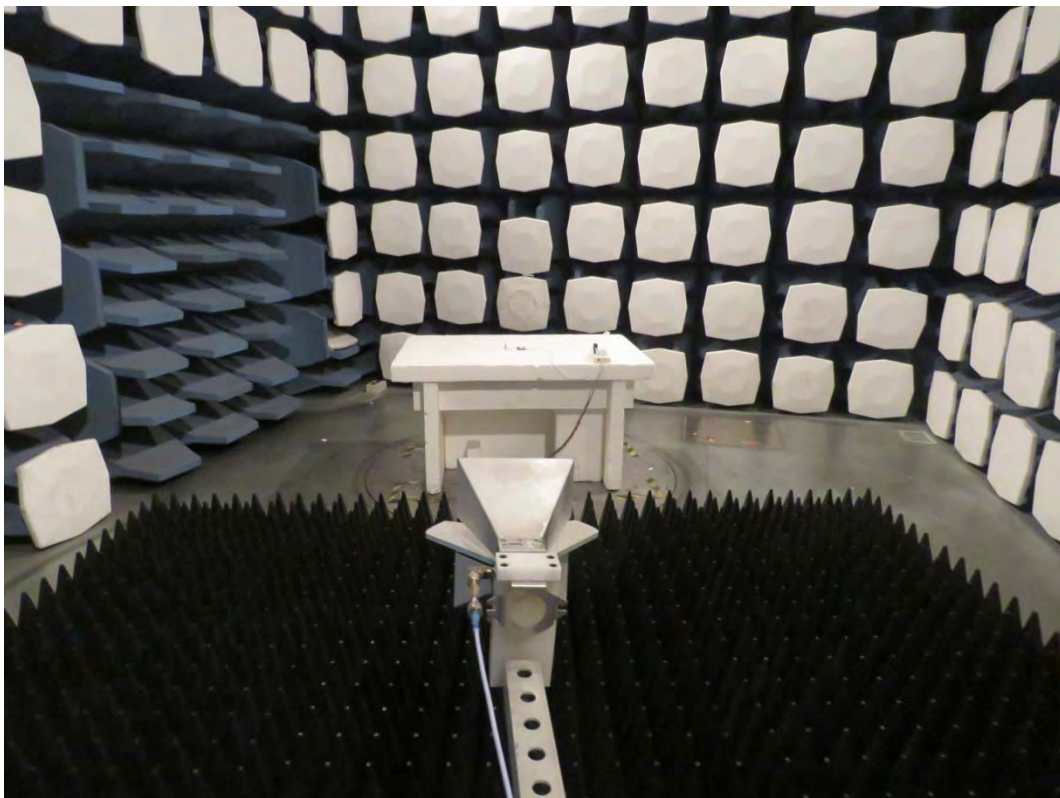
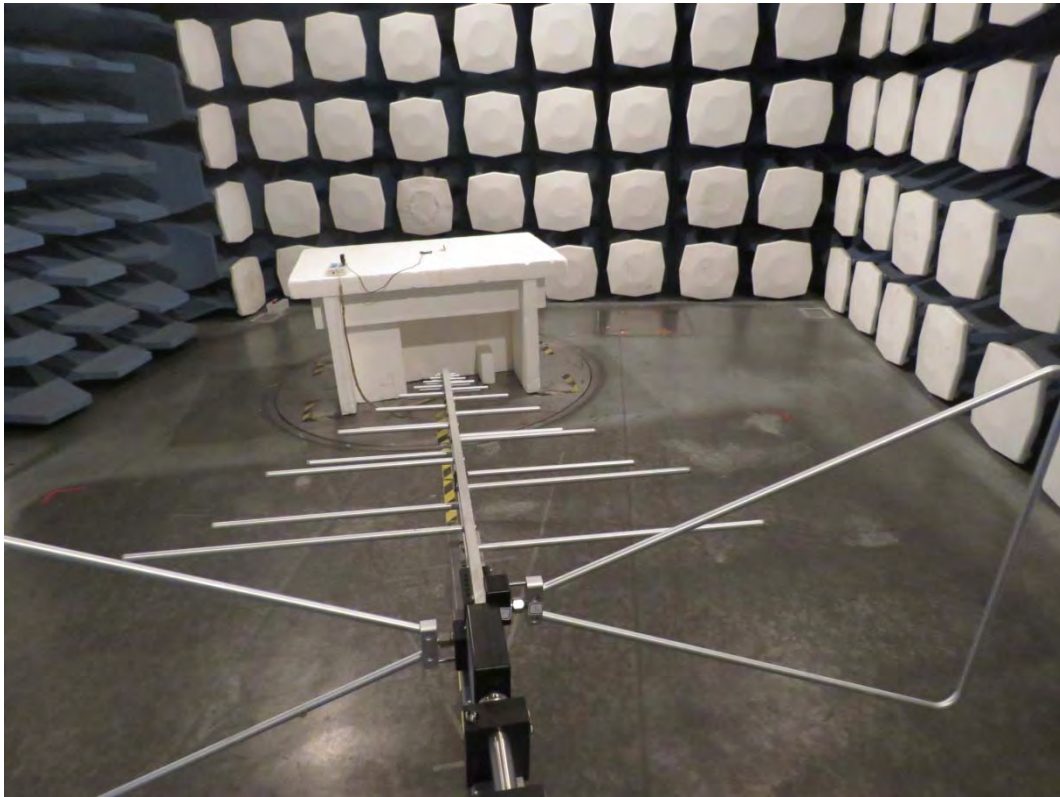
Shield

a: EUT

**Picture 1 EUT and Accessory**



## A.2 Test Setup



Picture 2: Radiated Spurious Emissions Test setup