



RF TEST REPORT

Applicant ZTE Corporation
FCC ID SRQ-WF821B
Product LTE CPE
Brand ZTE
Model WF821/WF821A/WF821+
Report No. RXA1711-0382RF03R1
Issue Date December 25, 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

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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(c)(10)	PASS
3	Occupied Bandwidth	2.1049	PASS
4	Band Edge Compliance	2.1051 /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)	PASS
8	Radiates Spurious Emission	2.1051 /27.53(h) /27.53(g)	PASS
Date of Testing: December 1, 2017 ~ December 11, 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.

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

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

General information

EUT Description			
Model	WF821/WF821A/WF821+		
IMEI	6212017480400004		
Hardware Version	V5.0		
Software Version	WF821_V1.0.0B01		
Power Supply	AC adapter		
Antenna Type	Internal Antenna		
Test Mode(s)	LTE Band 4; LTE Band 12; LTE Band 17;		
Test Modulation	QPSK 16QAM;		
LTE Release:	9		
Maximum E.I.R.P./ E.R.P.	LTE Band 4:	24.96dBm	
	LTE Band 12:	22.18dBm	
	LTE Band 17:	22.19dBm	
Rated Power Supply Voltage:	12V		
Extreme Voltage	Minimum: 9V Maximum: 13V		
Extreme Temperature	Lowest: -10°C Highest: +45°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 17	704 ~ 716	734 ~ 746
EUT Accessory			
Adapter	Manufacturer: AQUILSTARPRECISIONINDUSTRIAL (SHENZHEN)CO., LTD Model: ASSA65A-120100		
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 4/12/17:

Test items	Modes	Bandwidth (MHz)				Modulation		RB			Test Channel		
		5	10	15	20	QPSK	16QAM	1	50%	100%	L	M	H
RF power output	LTE 4	0	0	0	0	0	0	0	0	0	0	0	0
	LTE 12	0	0	-	-	0	0	0	0	0	0	0	0
	LTE 17	0	0	-	-	0	0	0	0	0	0	0	0
Effective Isotropic Radiated power	LTE 4	0	0	0	0	0	0	0	0	0	0	0	0
	LTE 12	0	0	-	-	0	0	0	0	0	0	0	0
	LTE 17	0	0	-	-	0	0	0	0	0	0	0	0
Occupied Bandwidth	LTE 4	0	0	0	0	0	0	-	-	0	0	0	0
	LTE 12	0	0	-	-	0	0	-	-	0	0	0	0
	LTE 17	0	0	-	-	0	0	-	-	0	0	0	0
Band Edge Compliance	LTE 4	0	0	0	0	0	0	0	-	0	0	-	0
	LTE 12	0	0	-	-	0	0	0	-	0	0	-	0
	LTE 17	0	0	-	-	0	0	0	-	0	0	-	0
Peak-to-Average Power Ratio	LTE 4	0	0	0	0	0	0	-	-	0	0	0	0
	LTE 12	0	0	-	-	0	0	-	-	0	0	0	0
	LTE 17	0	0	-	-	0	0	-	-	0	0	0	0
Frequency Stability	LTE 4	0	0	0	0	0	0	-	-	0	-	0	-
	LTE 12	0	0	-	-	0	0	-	-	0	-	0	-
	LTE 17	0	0	-	-	0	0	-	-	0	-	0	-
Spurious Emissions at Antenna Terminals	LTE 4	0	0	0	0	0	-	0	-	-	0	0	0
	LTE 12	0	0	-	-	0	-	0	-	-	0	0	0
	LTE 17	0	0	-	-	0	-	0	-	-	0	0	0
Radiates Spurious	LTE 4	0	0	0	0	0	-	0	-	-	0	0	0
	LTE 12	0	0	-	-	0	-	0	-	-	0	0	0



Emission	LTE 17	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 Case Results

5.1 RF Power Output

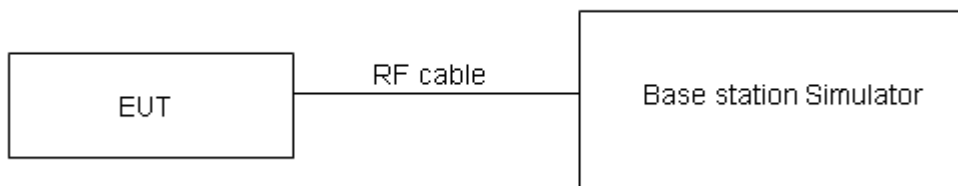
Ambient condition

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

LTE Band 4				AV Conducted Power(dBm)		
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				19975/1712.5	20175/1732.5	20375/1752.5
5MHz	QPSK	1	0	22.03	21.48	20.52
		1	13	21.78	22.87	20.87
		1	24	21.05	23.33	21.13
		12	0	22.01	22.11	20.80
		12	6	21.86	22.78	20.91
		12	13	21.45	23.13	21.07
		25	0	21.74	22.65	20.82
	16QAM	1	0	22.05	21.50	20.65
		1	13	21.75	22.86	21.17
		1	24	21.14	23.27	21.36
		12	0	21.87	22.01	20.72
		12	6	21.75	22.77	20.85
		12	13	21.30	23.05	21.00
		25	0	21.68	22.57	20.82
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				20000/1715	20175/1732.5	20350/1750
10MHz	QPSK	1	0	21.74	20.65	21.25
		1	25	21.21	22.89	21.06
		1	49	20.01	23.62	20.77
		25	0	21.54	21.61	21.04
		25	13	21.19	22.74	21.03
		25	25	20.57	23.31	20.85
		50	0	21.12	22.55	21.04
	16QAM	1	0	21.41	20.75	21.16
		1	25	21.45	22.85	21.25
		1	49	20.03	23.64	21.14
		25	0	21.49	21.64	20.91
		25	13	21.14	22.65	21.07
		25	25	20.54	23.28	20.74
		50	0	21.06	22.43	20.97
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				20025/1717.5	20175/1732.5	20325/1747.5
15MHz	QPSK	1	0	21.11	19.32	22.04
		1	38	20.26	22.62	20.95
		1	74	19.66	22.31	20.04
		36	0	20.81	20.84	21.52
		36	18	20.39	22.33	21.01
		36	39	19.97	23.05	20.43
		75	0	20.29	22.07	21.03



Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				20050/1720	20175/1732.5	20300/1745
	16QAM	1	0	21.04	19.44	22.02
		1	38	20.57	22.59	20.87
		1	74	19.68	22.38	20.16
		36	0	20.67	20.74	21.34
		36	18	20.36	22.21	20.84
		36	39	19.85	23.03	20.33
		75	0	20.21	21.94	20.96
20MHz	QPSK	1	0	22.06	20.36	23.97
		1	50	20.24	22.54	21.80
		1	99	21.44	22.70	21.19
		50	0	20.77	21.04	23.17
		50	25	21.05	22.56	22.11
		50	50	21.12	23.36	21.03
		100	0	20.56	22.30	22.36
	16QAM	1	0	22.04	20.50	24.11
		1	50	20.29	22.87	21.52
		1	99	21.36	22.84	21.26
		50	0	20.66	20.89	22.93
		50	25	21.11	22.49	22.06
		50	50	20.03	23.21	20.91
		100	0	20.47	22.21	22.19

LTE Band 12				AV Conducted Power(dBm)		
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				23035/701.5	23095/707.5	23155/713.5
5MHz	QPSK	1	0	21.01	22.64	21.82
		1	13	22.11	21.92	21.91
		1	24	22.89	21.87	22.30
		12	0	21.33	22.27	21.79
		12	6	21.93	22.04	22.20
		12	13	22.47	21.81	21.97
		25	0	21.98	22.04	21.98
	16QAM	1	0	21.03	22.74	21.73
		1	13	22.14	22.04	21.91
		1	24	22.95	21.94	22.28
		12	0	21.34	22.16	21.69
		12	6	21.97	22.03	22.27
		12	13	22.47	21.75	21.93
		25	0	21.96	21.99	21.97



Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				23060/704	23095/707.5	23130/711
10MHz	QPSK	1	0	21.04	22.54	21.95
		1	25	22.65	21.89	22.03
		1	49	21.79	22.23	21.89
		25	0	22.25	22.45	21.93
		25	13	22.55	22.01	22.14
		25	25	22.21	22.11	22.21
		50	0	22.17	22.19	22.28
	16QAM	1	0	21.17	22.38	22.10
		1	25	22.86	21.97	22.13
		1	49	21.82	22.32	21.95
		25	0	22.23	22.44	21.91
		25	13	22.49	21.91	22.15
		25	25	22.19	22.07	22.24
		50	0	22.18	22.10	22.16

LTE Band 17				Conducted Power(dBm)		
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				23755/706.5	23790/710	23825/713.5
5MHz	QPSK	1	0	22.91	21.90	22.04
		1	13	22.16	21.89	22.32
		1	24	21.86	22.07	22.19
		12	0	22.55	21.77	22.06
		12	6	22.25	21.81	22.24
		12	13	21.94	21.87	22.05
		25	0	22.23	22.09	22.08
	16QAM	1	0	22.87	22.02	22.01
		1	13	22.23	22.01	22.31
		1	24	21.87	22.14	22.28
		12	0	22.45	21.79	21.98
		12	6	22.26	21.82	22.23
		12	13	21.87	21.89	21.95
		25	0	22.15	22.03	22.08
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				23780/709	23790/710	23800/711
10MHz	QPSK	1	0	22.51	22.33	21.91
		1	25	21.86	21.98	21.89
		1	49	22.25	22.05	21.92
		25	0	22.05	21.95	21.89
		25	13	22.01	22.19	22.13
		25	25	22.22	22.25	22.15



		50	0	22.31	22.47	22.26
	16QAM	1	0	22.64	22.45	21.95
		1	25	22.05	22.07	22.35
		1	49	22.36	22.13	22.15
		25	0	22.02	21.91	21.86
		25	13	21.94	22.18	22.07
		25	25	22.23	22.21	22.13
		50	0	22.30	22.39	22.22

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 v03 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.

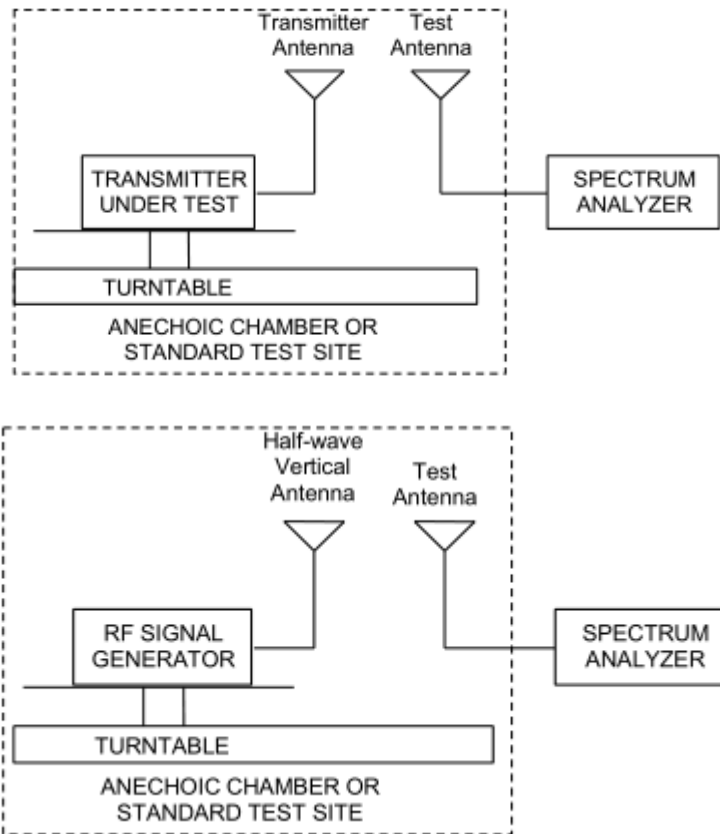
g) When calculating ERP, in addition to knowing the antenna radiation and matching characteristics, it is necessary to know the loss values of all elements (e.g. transmission line attenuation, mismatches, filters, combiners) interposed between the point where transmitter output power is measured, and 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)	≤ 3 W (34.77 dBm)
Part 27.50(c)(10)Limit (ERP)	≤ 3 W (34.77 dBm)
Part 27.50(d)(4)Limit (EIRP)	≤ 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)	Limit (dBm)	Conclusion
5 MHz (QPSK)	Low	1712.5	Horizontal	-32.77	-54.34	1.44	23.01	30	Pass
	Mid	1732.5	Horizontal	-33.25	-54.32	1.57	22.64	30	Pass
	High	1752.5	Horizontal	-33.65	-54.13	1.72	22.19	30	Pass
10 MHz (QPSK)	Low	1715	Horizontal	-32.82	-54.32	1.44	22.94	30	Pass
	Mid	1732.5	Horizontal	-33.81	-54.41	1.57	22.17	30	Pass
	High	1750	Horizontal	-33.84	-54.52	1.66	22.34	30	Pass
15 MHz (QPSK)	Low	1717.5	Horizontal	-33.28	-54.35	1.49	22.55	30	Pass
	Mid	1732.5	Horizontal	-34.83	-54.32	1.57	21.06	30	Pass
	High	1747.5	Horizontal	-32.78	-54.17	1.66	23.05	30	Pass
20 MHz (QPSK)	Low	1720	Horizontal	-32.50	-54.44	1.49	23.42	30	Pass
	Mid	1732.5	Horizontal	-33.66	-54.41	1.57	22.31	30	Pass
	High	1745	Horizontal	-31.26	-54.59	1.63	24.96	30	Pass
5 MHz (16QAM)	Low	1712.5	Horizontal	-32.90	-54.34	1.44	22.88	30	Pass
	Mid	1732.5	Horizontal	-33.38	-54.32	1.57	22.50	30	Pass
	High	1752.5	Horizontal	-33.78	-54.13	1.72	22.06	30	Pass
10 MHz (16QAM)	Low	1715	Horizontal	-32.96	-54.32	1.44	22.80	30	Pass
	Mid	1732.5	Horizontal	-33.94	-54.41	1.57	22.04	30	Pass
	High	1750	Horizontal	-33.97	-54.52	1.66	22.21	30	Pass
15 MHz (16QAM)	Low	1717.5	Horizontal	-33.41	-54.35	1.49	22.43	30	Pass
	Mid	1732.5	Horizontal	-34.95	-54.32	1.57	20.93	30	Pass
	High	1747.5	Horizontal	-32.90	-54.17	1.66	22.93	30	Pass
20 MHz (16QAM)	Low	1720	Horizontal	-32.63	-54.44	1.49	23.30	30	Pass
	Mid	1732.5	Horizontal	-33.78	-54.41	1.57	22.19	30	Pass
	High	1745	Horizontal	-31.39	-54.59	1.63	24.84	30	Pass

LTE Band 12									
Bandwidth	Channel	Frequency (MHz)	Polarization	Output Power (dBm)	Losses (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Conclusion
5 MHz (QPSK)	Low	701.5	Horizontal	-30.72	-49.17	2.04	20.50	34.77	Pass
	Mid	707.5	Horizontal	-29.65	-49.39	2.03	21.78	34.77	Pass
	High	713.5	Horizontal	-30.55	-49.72	2.01	21.17	34.77	Pass
10 MHz (QPSK)	Low	704	Horizontal	-30.55	-49.00	2.04	20.49	34.77	Pass
	Mid	707.5	Horizontal	-28.97	-49.12	2.03	22.18	34.77	Pass
	High	711	Horizontal	-29.81	-49.33	2.02	21.53	34.77	Pass
5 MHz (16QAM)	Low	701.5	Horizontal	-30.84	-49.17	2.04	20.38	34.77	Pass
	Mid	707.5	Horizontal	-29.77	-49.39	2.03	21.66	34.77	Pass
	High	713.5	Horizontal	-30.67	-49.72	2.01	21.05	34.77	Pass
10 MHz (16QAM)	Low	704	Horizontal	-30.55	-49.00	2.04	20.49	34.77	Pass
	Mid	707.5	Horizontal	-28.97	-49.12	2.03	22.18	34.77	Pass
	High	711	Horizontal	-29.81	-49.33	2.02	21.53	34.77	Pass

LTE Band 17									
Bandwidth	Channel	Frequency (MHz)	Polarization	Output Power (dBm)	Losses (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Conclusion
5MHz (QPSK)	Low	706.5	Horizontal	-27.20	-47.47	1.92	22.19	34.77	Pass
	Mid	710	Horizontal	-28.23	-47.75	1.90	21.43	34.77	Pass
	High	713.5	Horizontal	-28.14	-47.72	1.91	21.48	34.77	Pass
10MHz (QPSK)	Low	706.5	Horizontal	-27.49	-47.49	1.91	21.90	34.77	Pass
	Mid	710	Horizontal	-27.57	-47.49	1.90	21.83	34.77	Pass
	High	713.5	Horizontal	-27.77	-47.48	1.90	21.61	34.77	Pass
5MHz (16QAM)	Low	706.5	Horizontal	-27.33	-47.47	1.92	22.06	34.77	Pass
	Mid	710	Horizontal	-28.36	-47.75	1.90	21.30	34.77	Pass
	High	713.5	Horizontal	-28.27	-47.72	1.91	21.35	34.77	Pass
10MHz (16QAM)	Low	706.5	Horizontal	-27.61	-47.49	1.91	21.78	34.77	Pass
	Mid	710	Horizontal	-27.69	-47.49	1.90	21.71	34.77	Pass
	High	713.5	Horizontal	-27.89	-47.48	1.90	21.49	34.77	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.

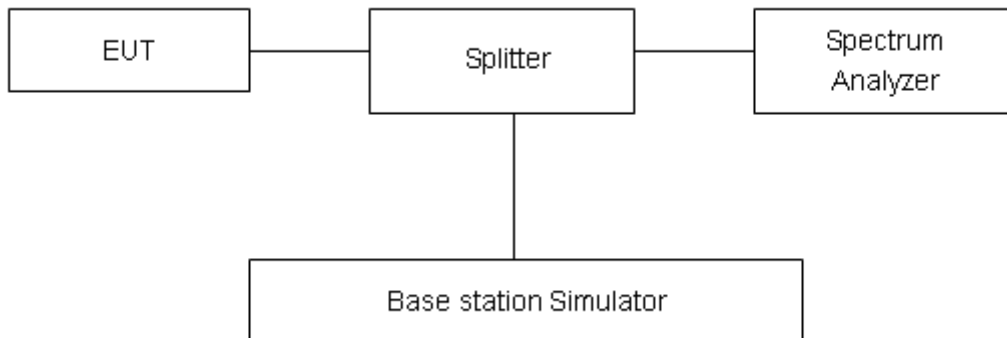
RBW is set to 100 kHz, VBW is set to 300 kHz for LTE Band 4/12/17 (5MHz).

RBW is set to 300 kHz, VBW is set to 1MHz for LTE Band 4/12/17 (10MHz).

RBW is set to 300 kHz, VBW is set to 1MHz for LTE Band 4 (15MHz/20MHz).

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

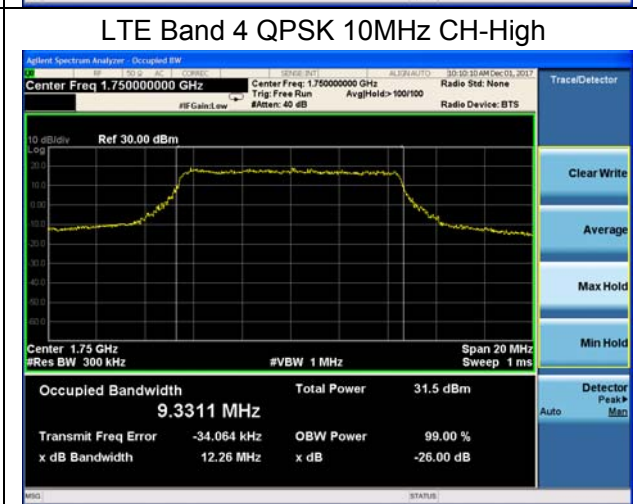
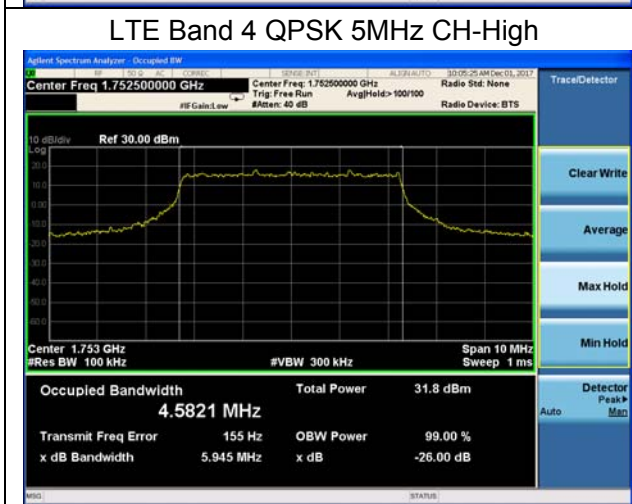
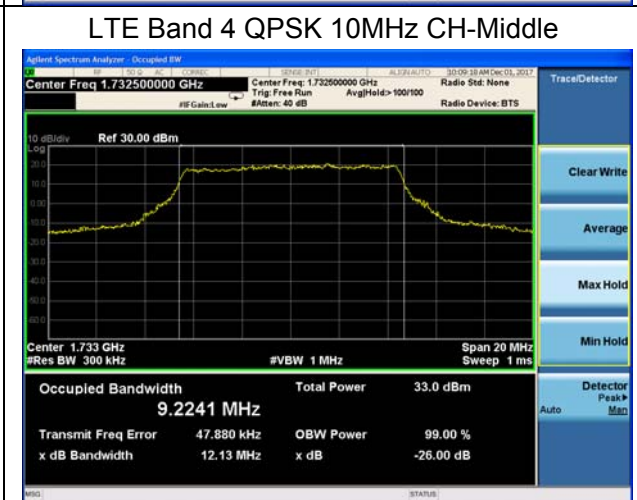
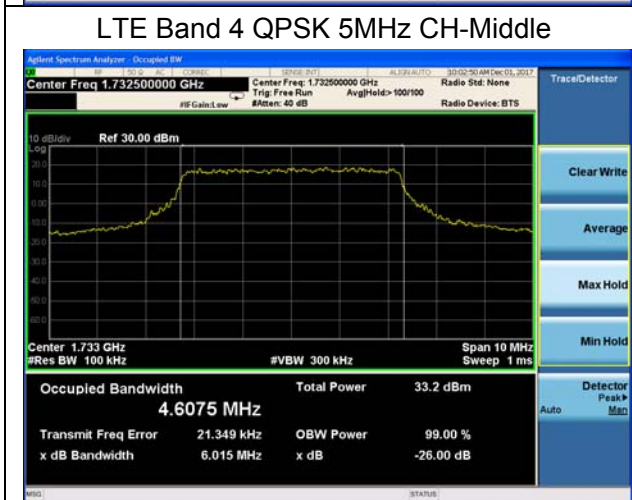
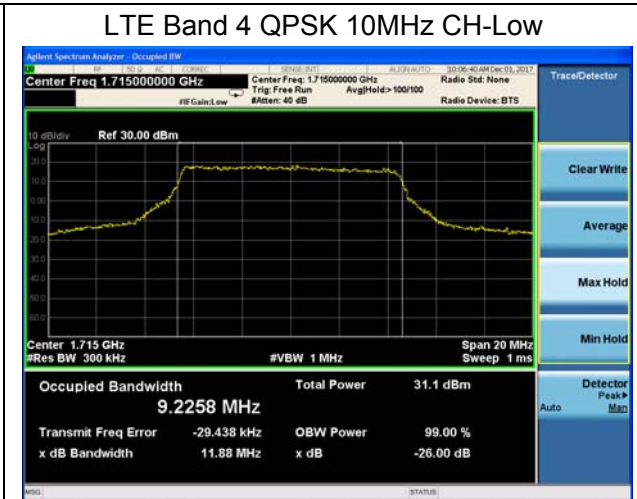
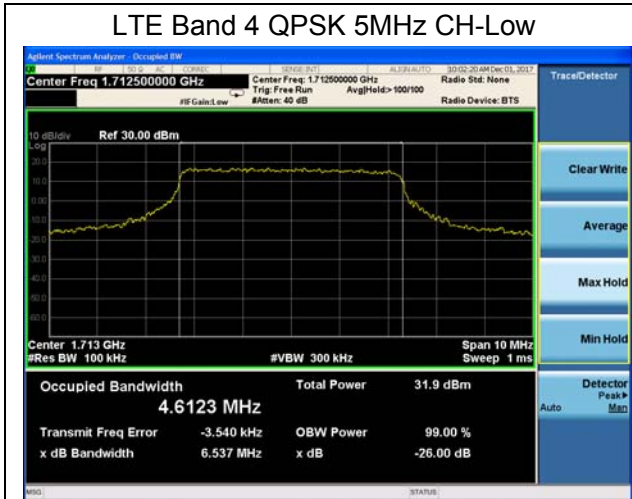
The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 2$, $U=624\text{Hz}$.

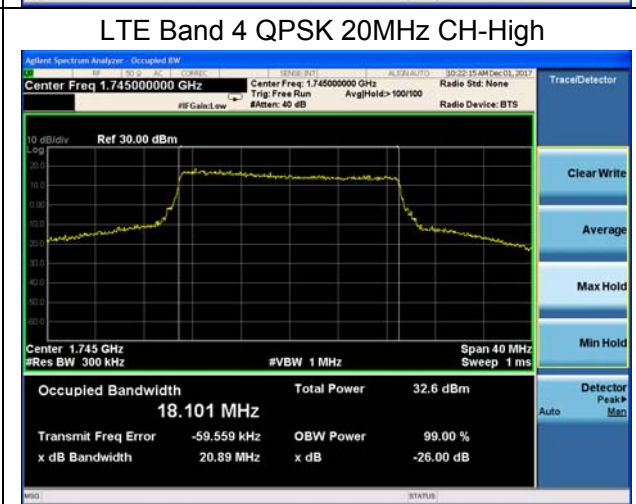
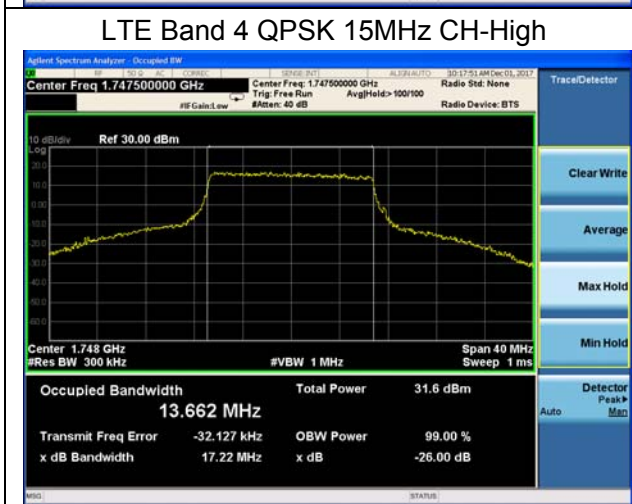
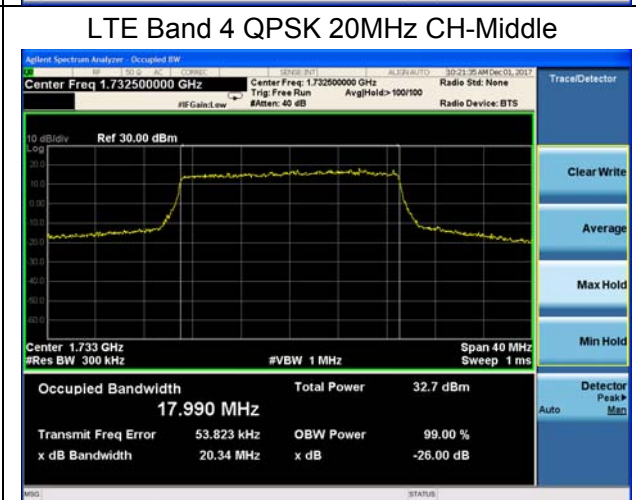
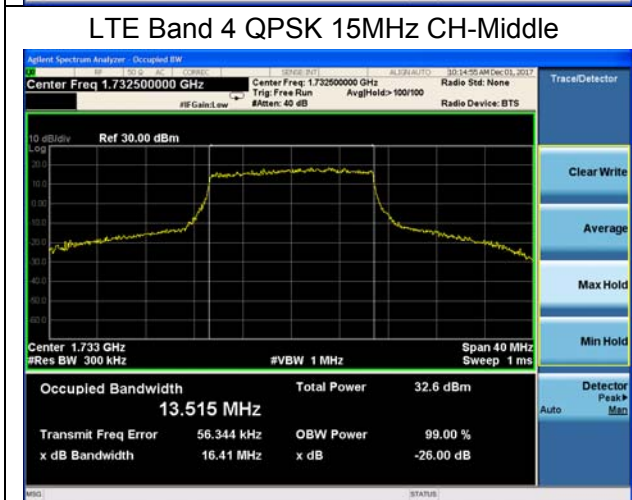
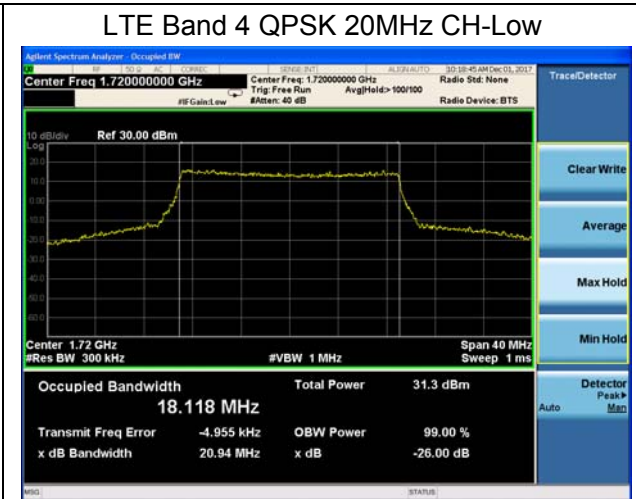
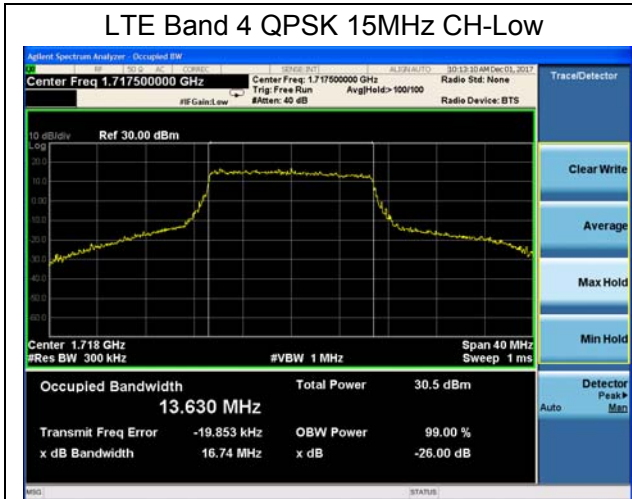
Test Result

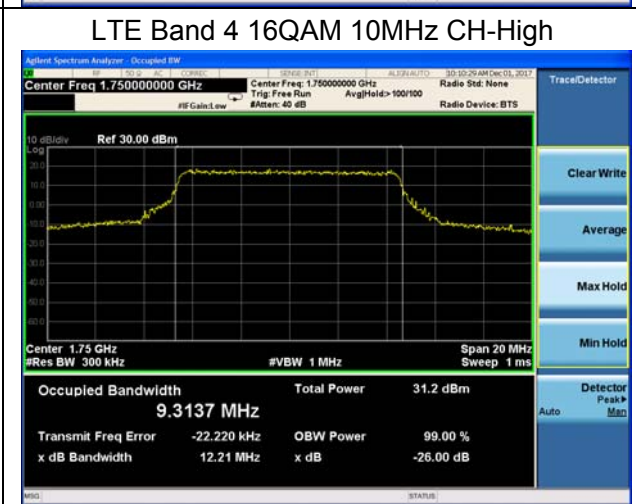
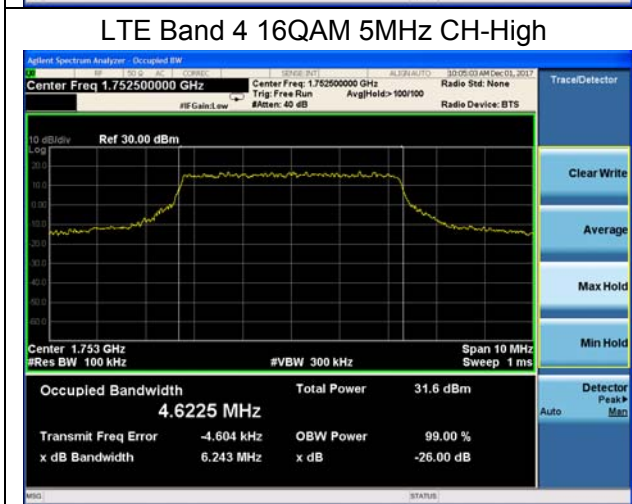
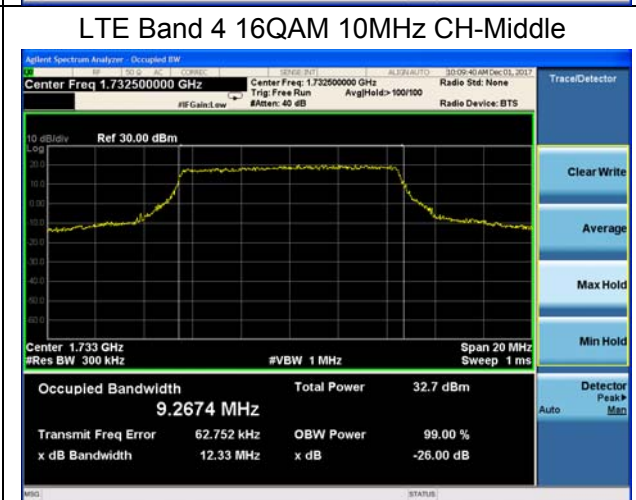
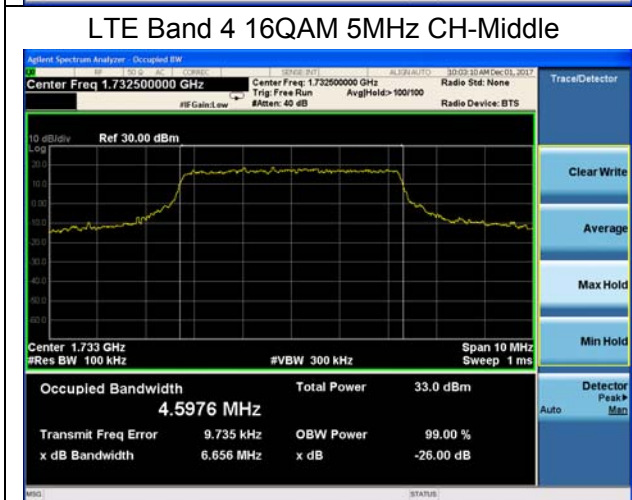
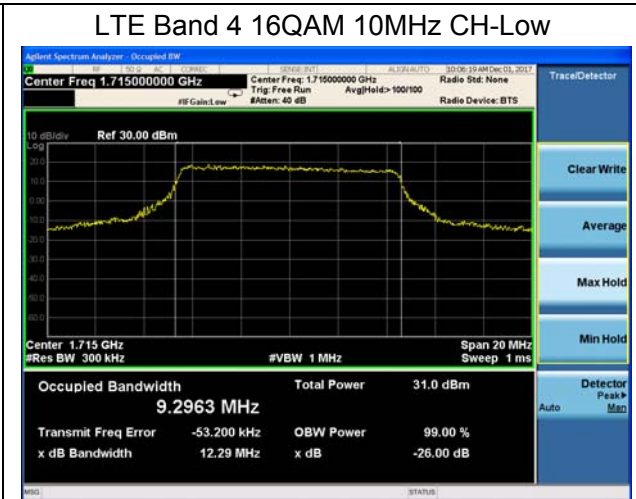
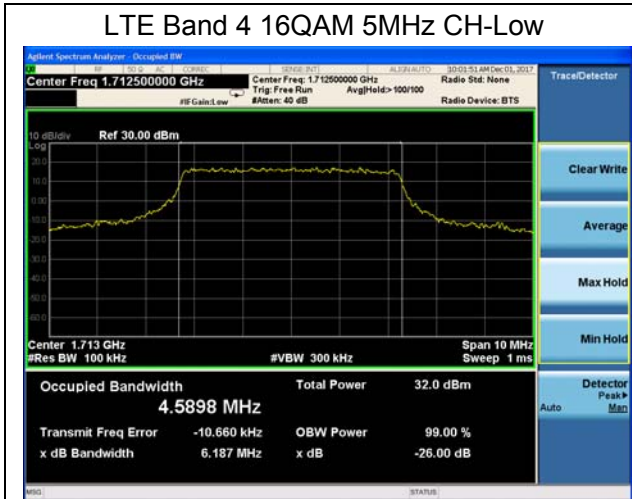
LTE Band 4						
RB	Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	99% Power Bandwidth(MHz)	-26dBc Bandwidth(MHz)
100%	QPSK	5	19975	1712.5	4.6123	6.537
			20175	1732.5	4.6075	6.015
			20375	1752.5	4.5821	5.945
		10	20000	1715	9.2258	11.88
			20175	1732.5	9.2241	12.13
			20350	1750	9.3311	12.26
		15	20025	1717.5	13.63	16.74
			20175	1732.5	13.515	16.41
			20325	1747.5	13.662	17.22
		20	20050	1720	18.118	20.94
			20175	1732.5	17.99	20.34
			20300	1745	18.101	20.89
	16QAM	5	19975	1712.5	4.5898	6.187
			20175	1732.5	4.5976	6.656
			20375	1752.5	4.6225	6.243
		10	20000	1715	9.2963	12.29
			20175	1732.5	9.2674	12.33
			20350	1750	9.3137	12.21
		15	20025	1717.5	13.608	16.58
			20175	1732.5	13.567	16.44
			20325	1747.5	13.685	18.34
20	20050	1720	18.165	20.72		
	20175	1732.5	18.002	20.47		
	20300	1745	18.149	20.59		

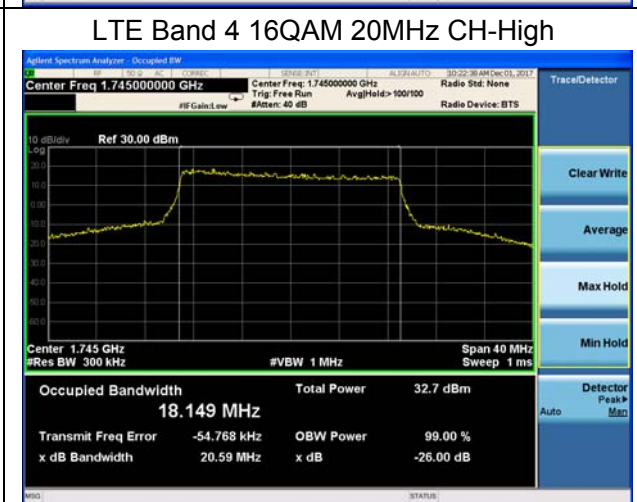
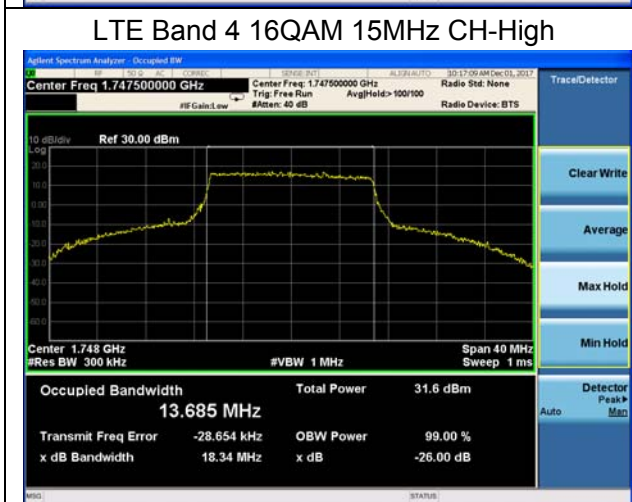
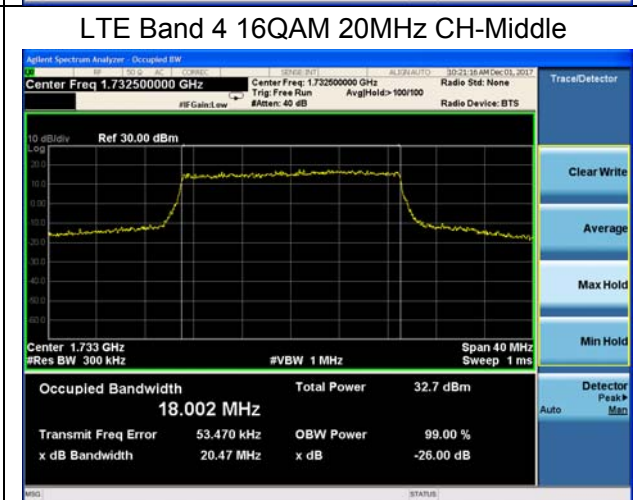
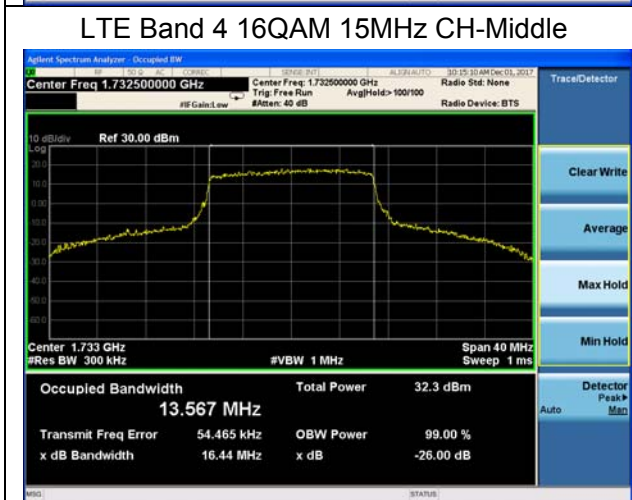
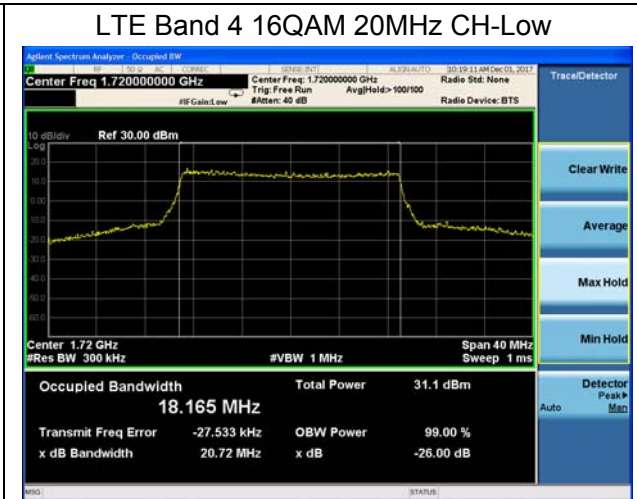
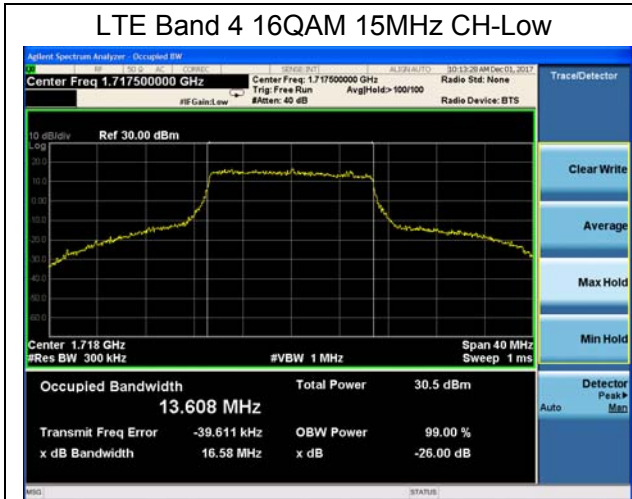
LTE Band 12						
RB	Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	99% Power Bandwidth(MHz)	-26dBc Bandwidth(MHz)
100%	QPSK	5	23035	701.5	4.5989	5.785
			23095	707.5	4.6319	6.194
			23155	713.5	4.5972	5.935
		10	23060	704	9.1906	11.64
			23095	707.5	9.285	11.93
			23130	711	9.2717	11.82
	16QAM	5	23035	701.5	4.5714	5.961
			23095	707.5	4.6215	6.285
			23155	713.5	4.5847	6.066
		10	23060	704	9.1859	11.74
			23095	707.5	9.3317	11.98
			23130	711	9.2375	11.77

LTE Band 17						
RB	Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	99% Power Bandwidth(MHz)	-26dBc Bandwidth(MHz)
100%	QPSK	5	23755	706.5	4.6202	6.072
			23790	710	4.6155	6.049
			23825	713.5	4.5789	5.936
		10	23780	709	9.3465	11.93
			23790	710	9.3049	12.06
			23800	711	9.2842	12.03
	16QAM	5	23755	706.5	4.6186	6.027
			23790	710	4.6337	6.006
			23825	713.5	4.5671	5.908
		10	23780	709	9.3345	11.78
			23790	710	9.3175	12.57
			23800	711	9.3119	12.21











LTE Band 12 QPSK 5MHz CH-Low



LTE Band 12 QPSK 10MHz CH-Low



LTE Band 12 QPSK 5MHz CH-Middle



LTE Band 12 QPSK 10MHz CH-Middle



LTE Band 12 QPSK 5MHz CH-High



LTE Band 12 QPSK 10MHz CH-High





LTE Band 12 16QAM 5MHz CH-Low



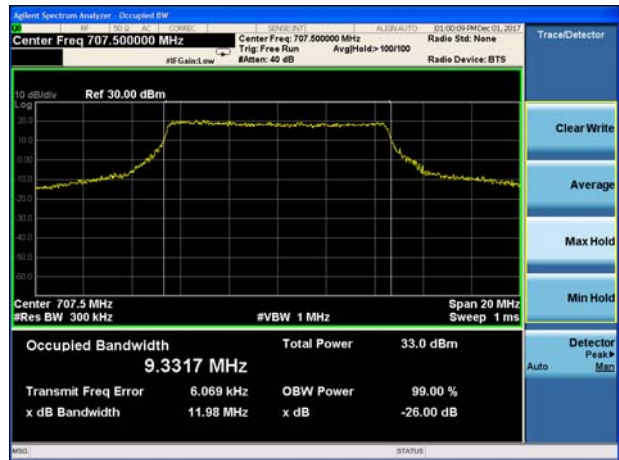
LTE Band 12 16QAM 10MHz CH-Low



LTE Band 12 16QAM 5MHz CH-Middle



LTE Band 12 16QAM 10MHz CH-Middle



LTE Band 12 16QAM 5MHz CH-High



LTE Band 12 16QAM 10MHz CH-High





LTE Band 17 QPSK 5MHz CH-Low



LTE Band 17 QPSK 10MHz CH-Low



LTE Band 17 QPSK 5MHz CH-Middle



LTE Band 17 QPSK 10MHz CH-Middle

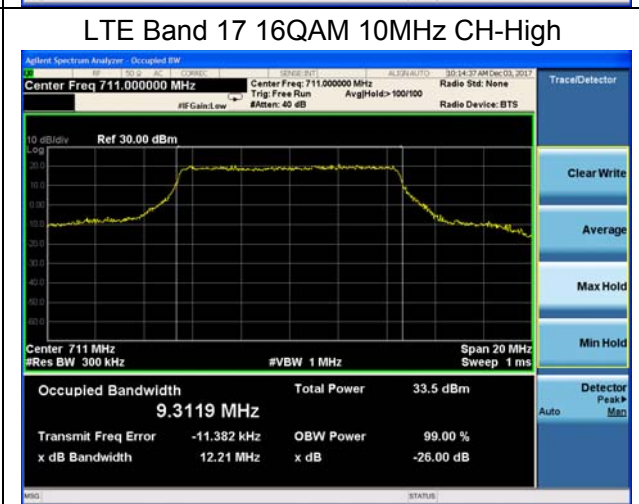
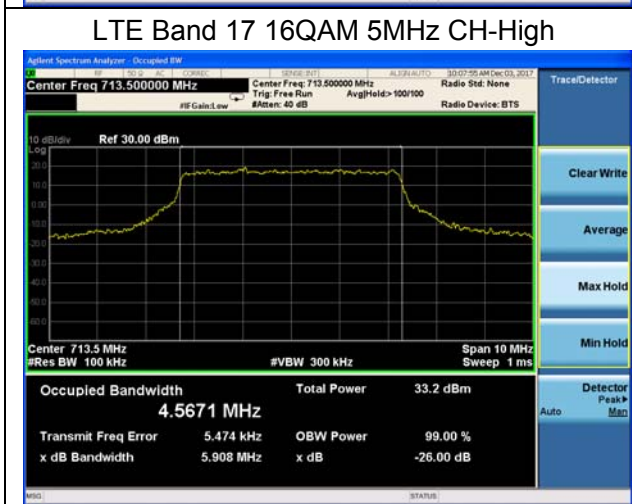
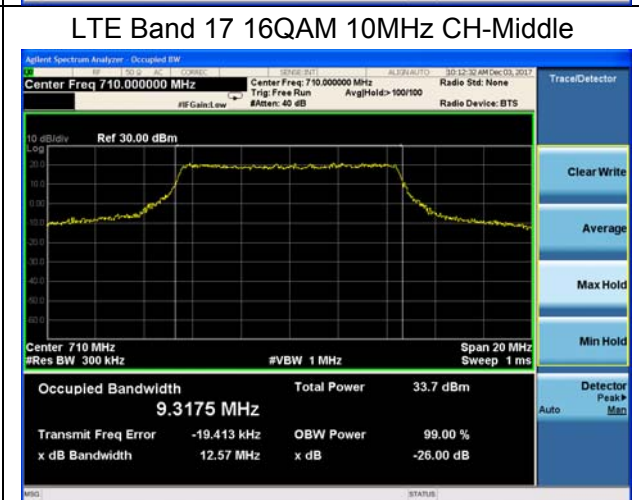
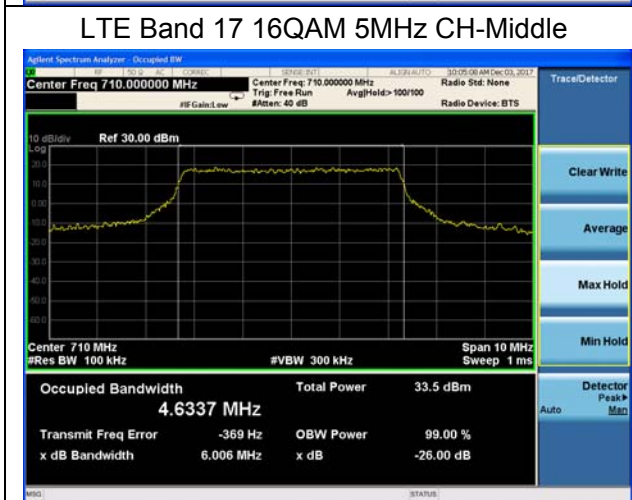
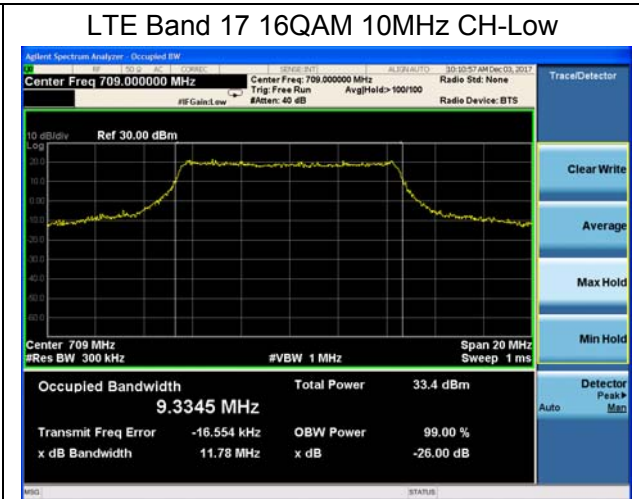
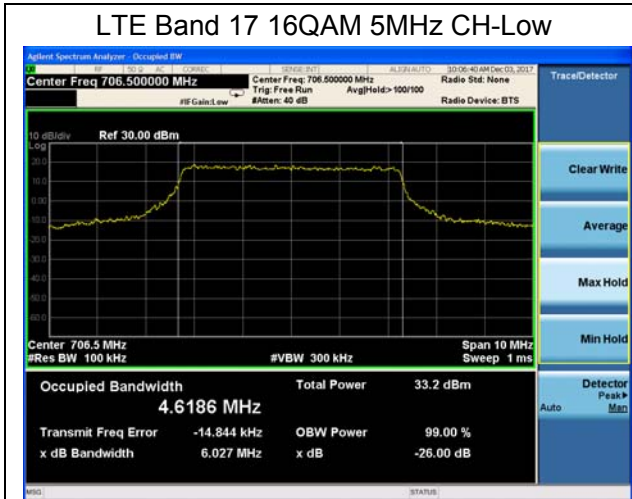


LTE Band 17 QPSK 5MHz CH-High



LTE Band 17 QPSK 10MHz CH-High





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 v03 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.

RBW is set to 51 kHz, VBW is set to 160kHz for LTE Band 4 (5MHz).

RBW is set to 100 kHz, VBW is set to 300kHz for LTE Band 4 (10MHz).

RBW is set to 150 kHz, VBW is set to 510kHz for LTE Band 4 (15MHz).

RBW is set to 200 kHz, VBW is set to 620kHz for LTE Band 4 (20MHz).

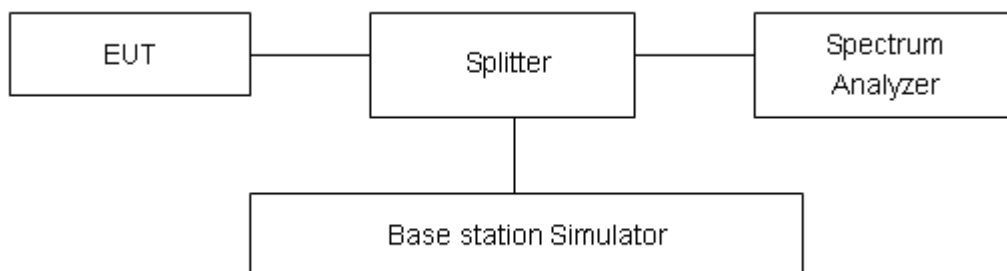
RBW is set to 100 kHz, VBW is set to 300kHz for LTE Band 12/17 (5MHz /10MHz).on spectrum analyzer.

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”



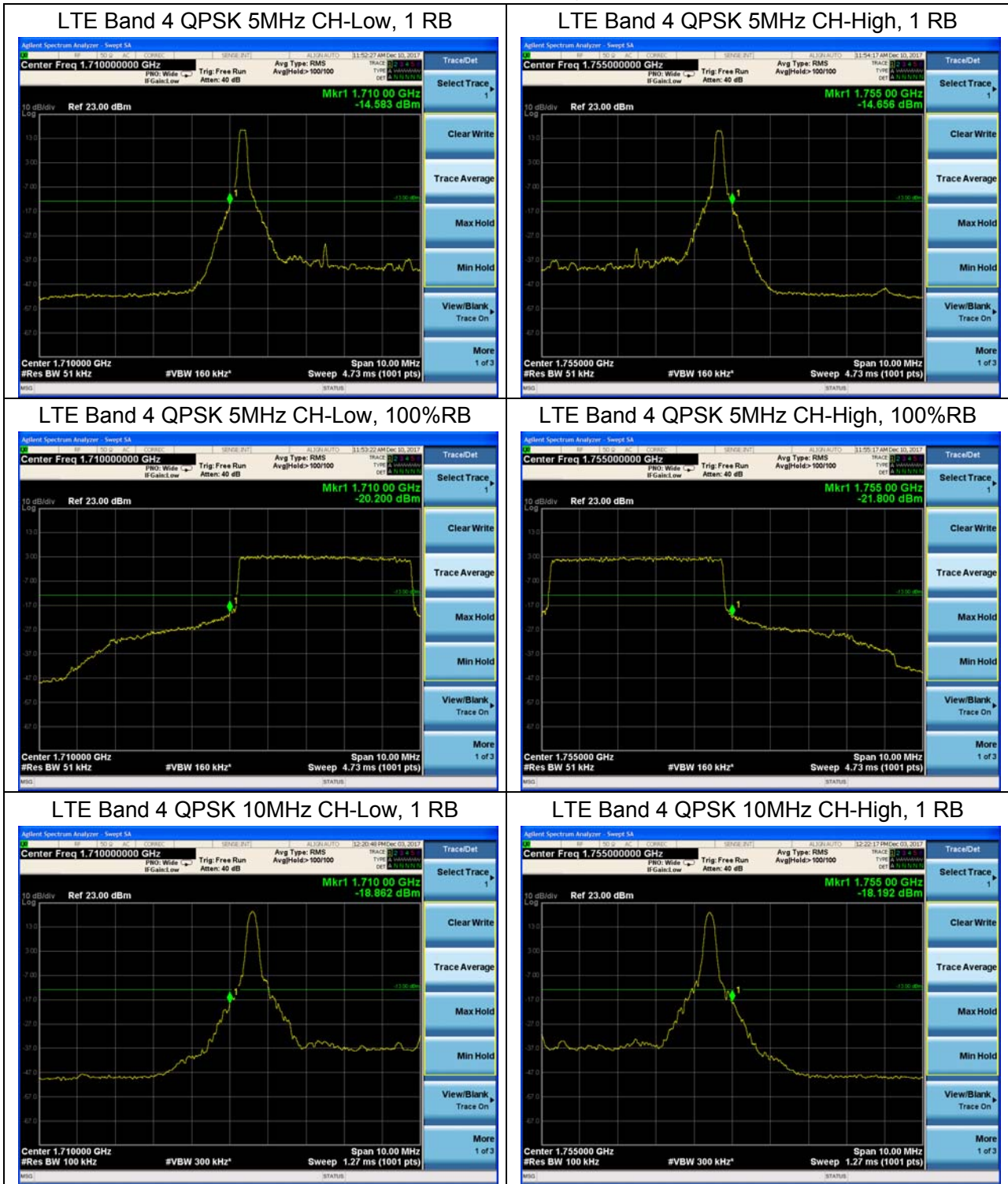
Part 27.53(g) specifies that “ For operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $43 + 10 \log_{10} (P)$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

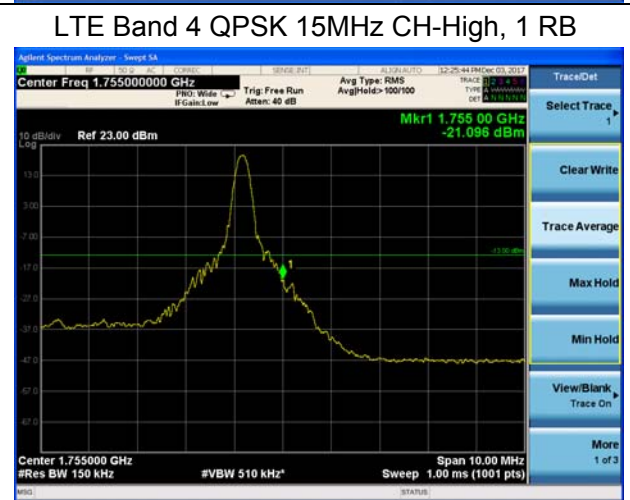
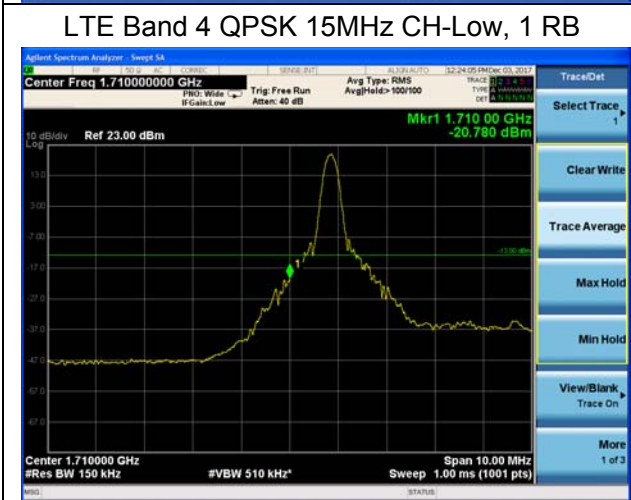
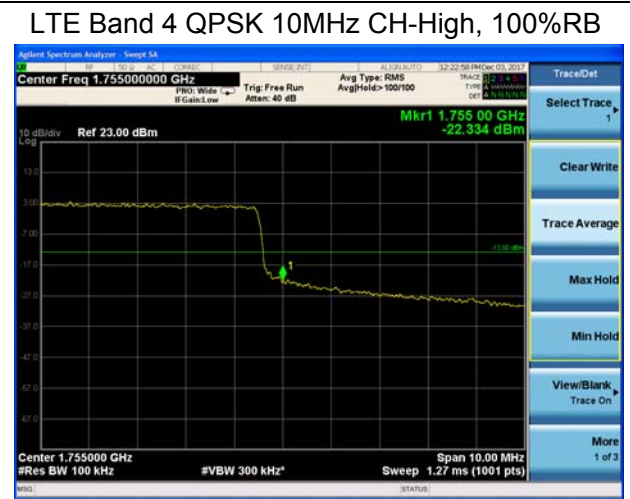
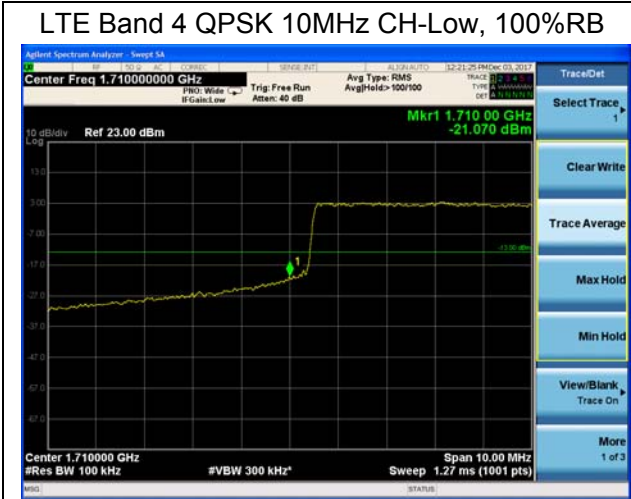
Measurement Uncertainty

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

Test Result

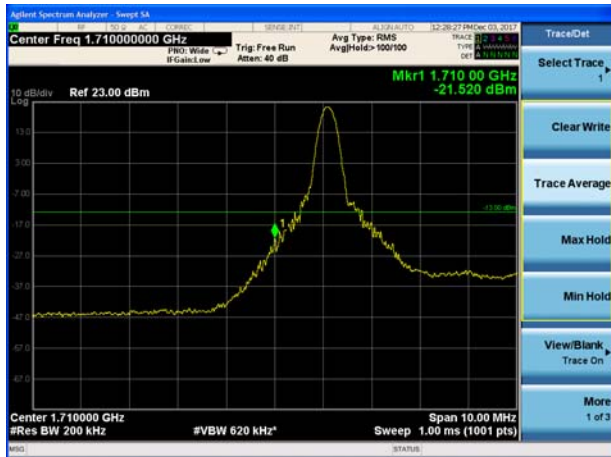
All the test traces in the plots shows the test results clearly.



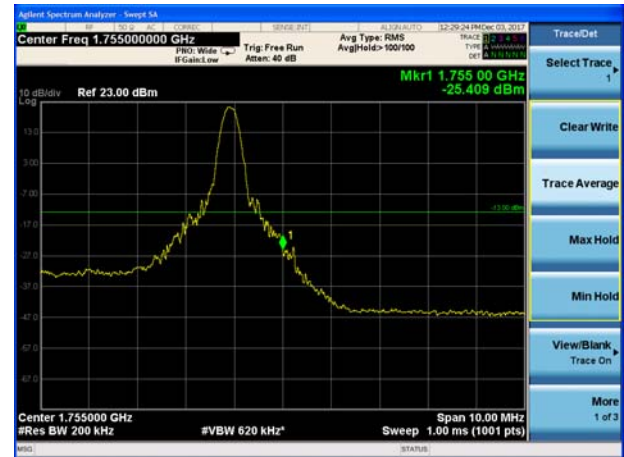




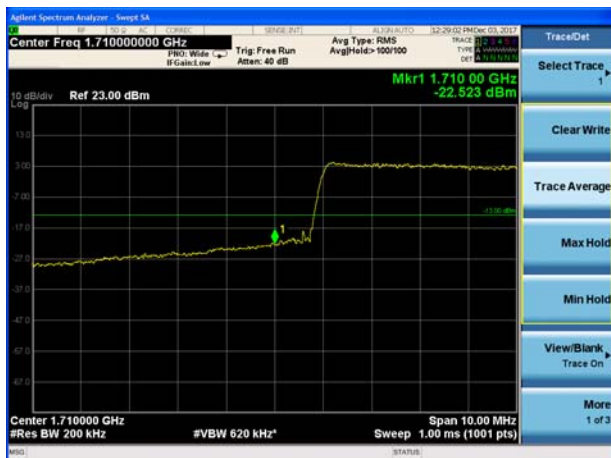
LTE Band 4 QPSK 20MHz CH-Low, 1 RB



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



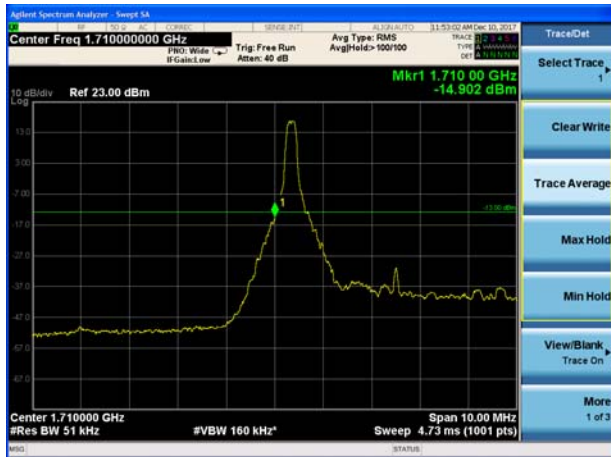
LTE Band 4 QPSK 20MHz CH-Low, 100%RB



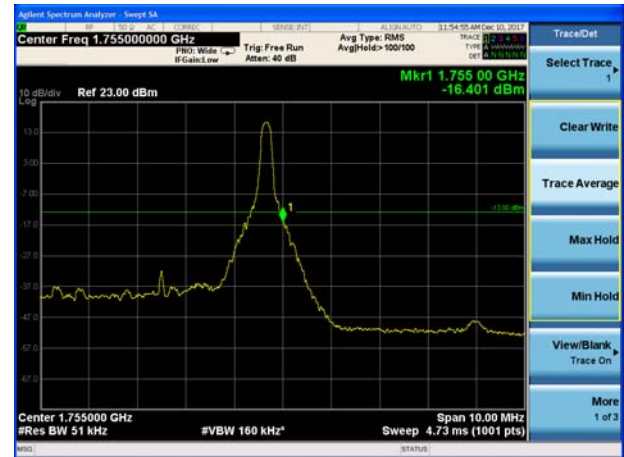
LTE Band 4 QPSK 20MHz CH-High, 100%RB

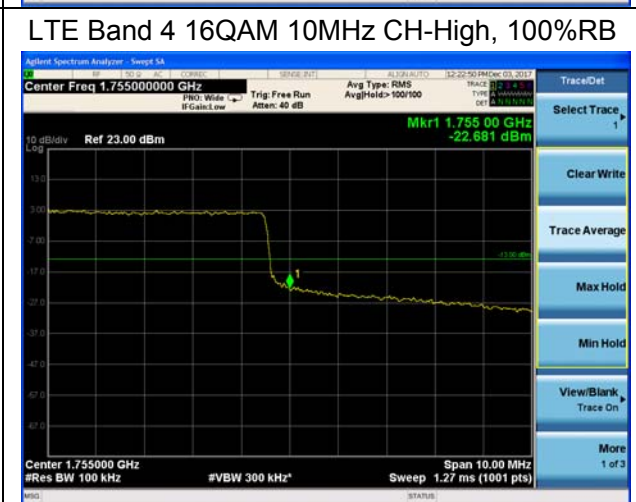
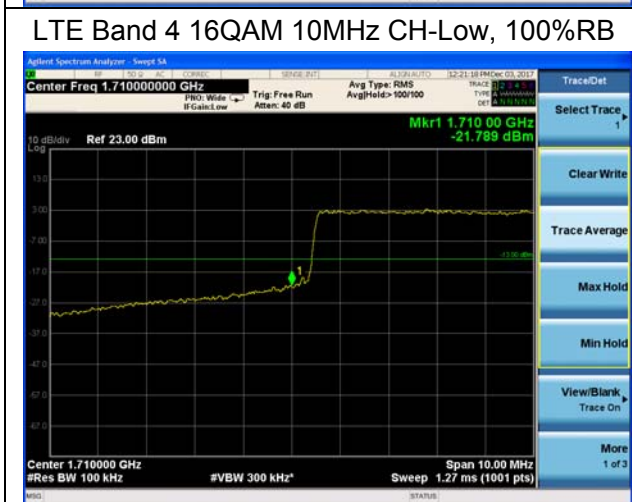
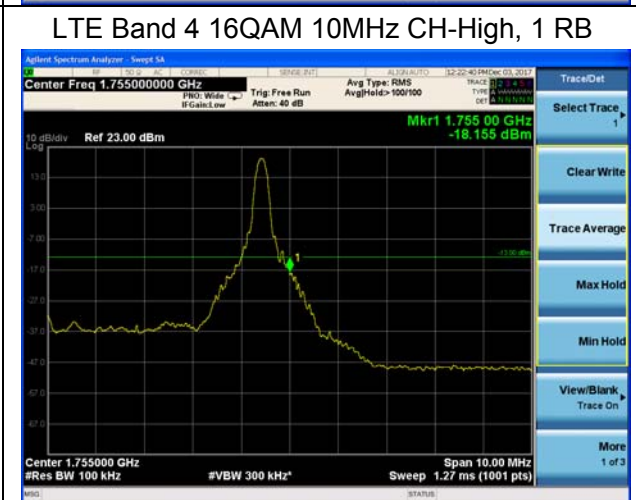
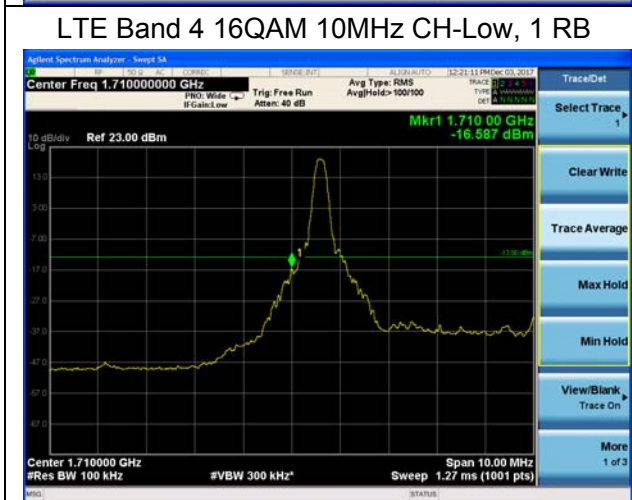
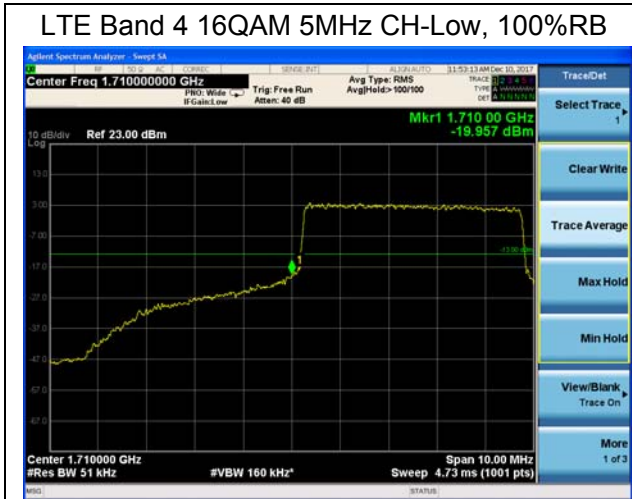


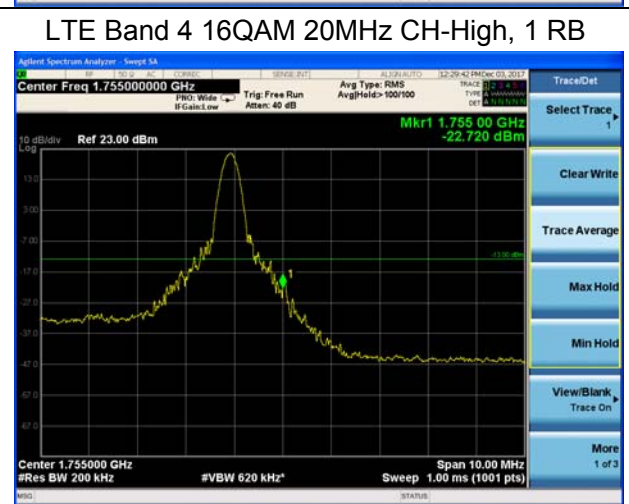
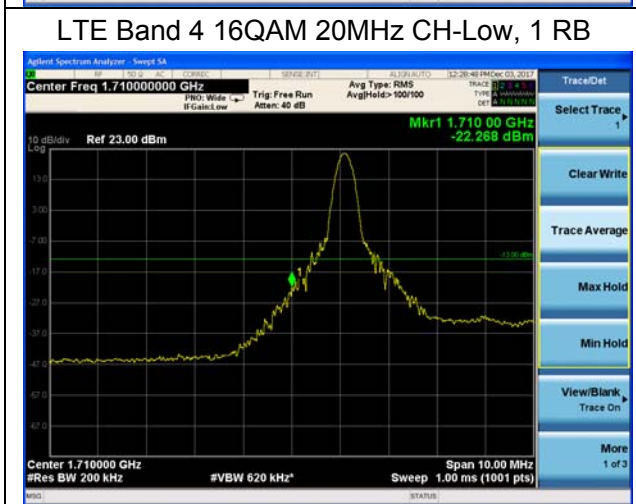
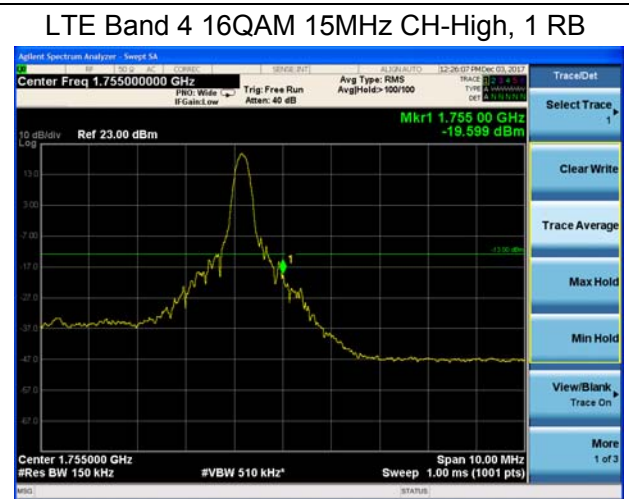
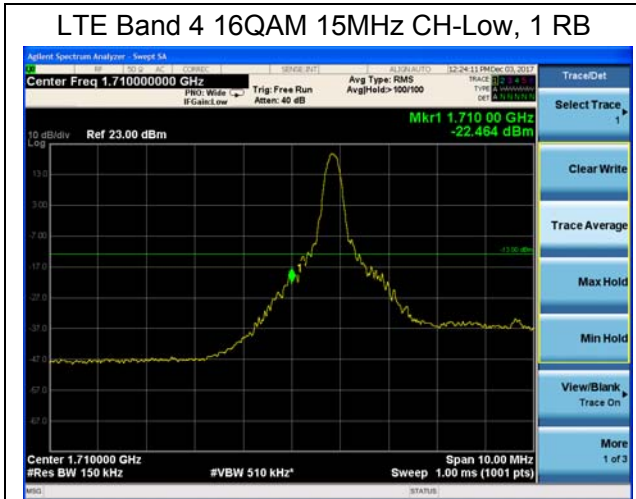
LTE Band 4 16QAM 5MHz CH-Low, 1 RB

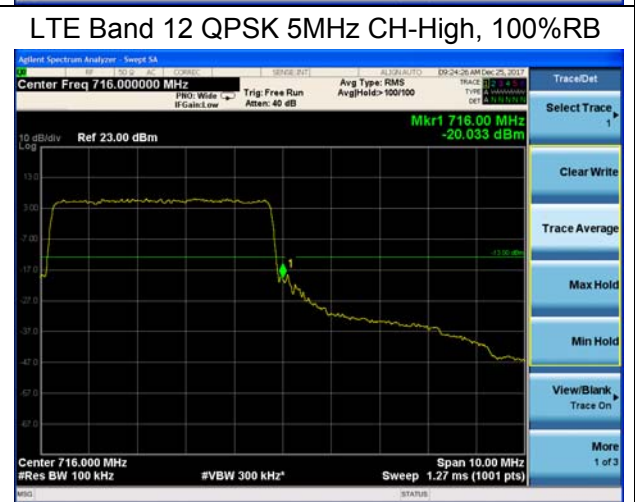
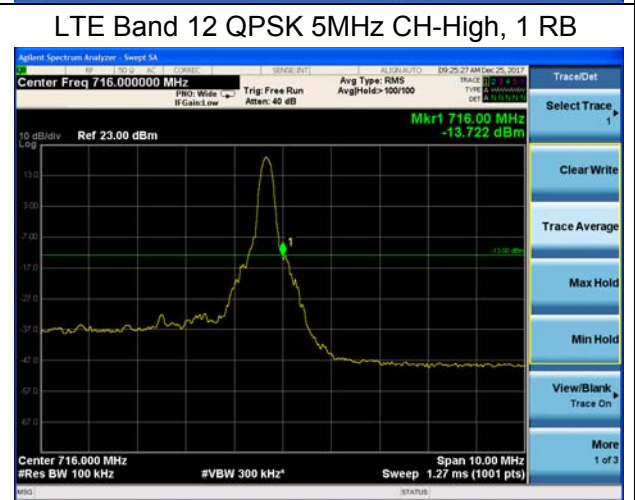
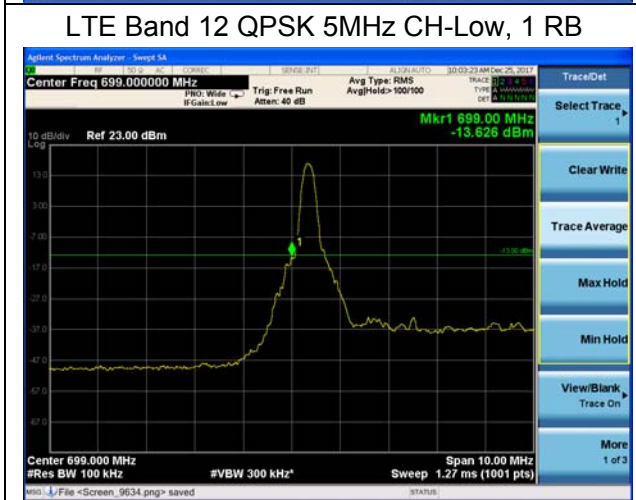
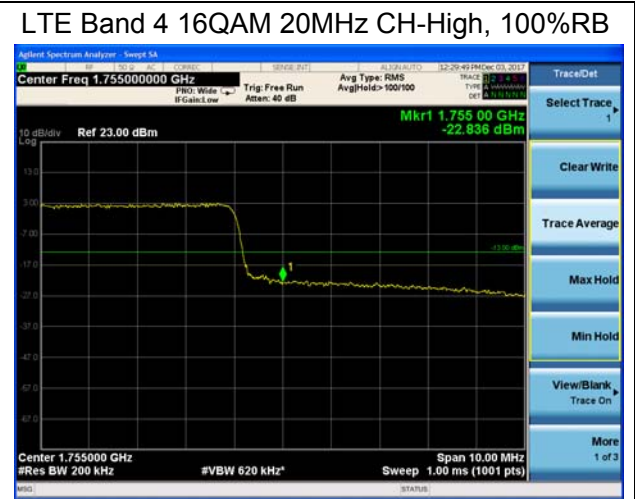


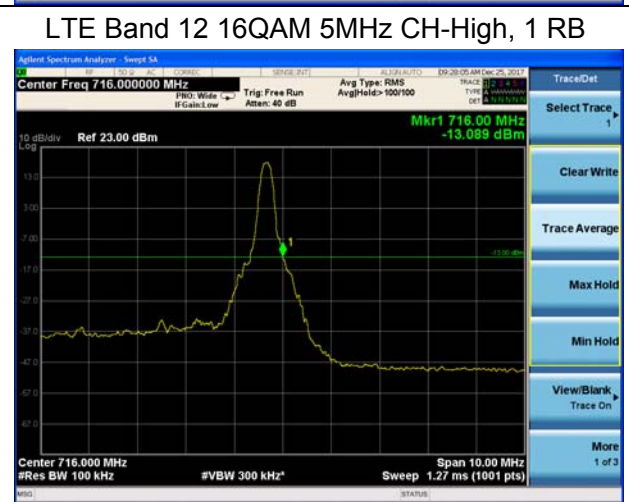
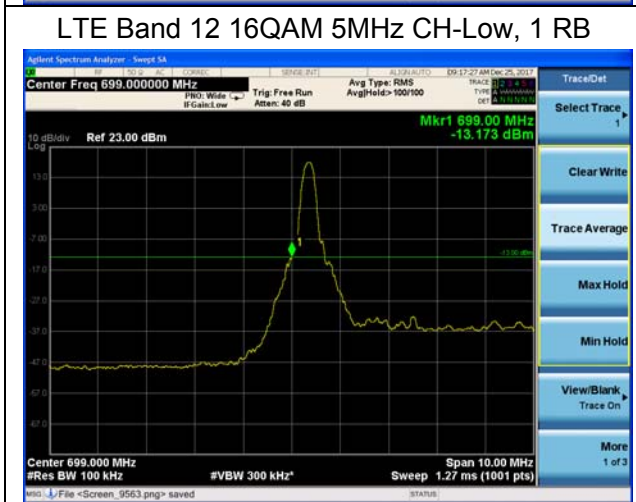
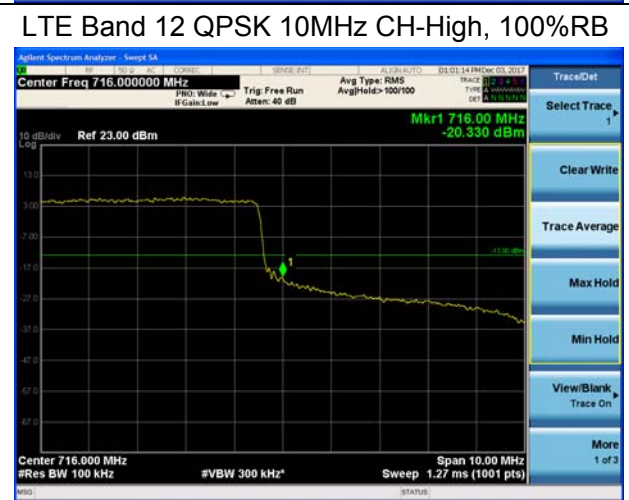
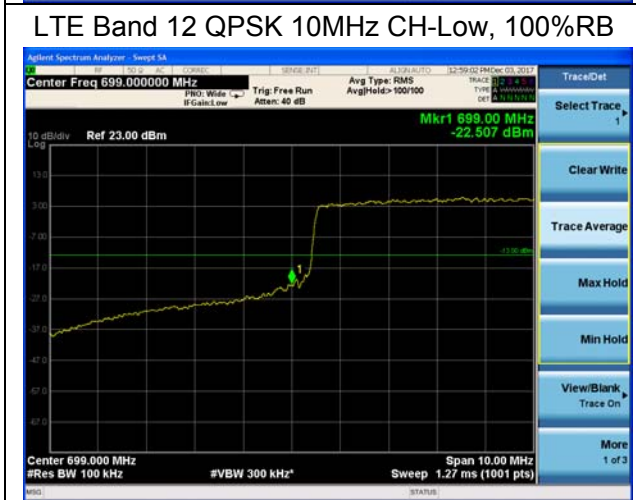
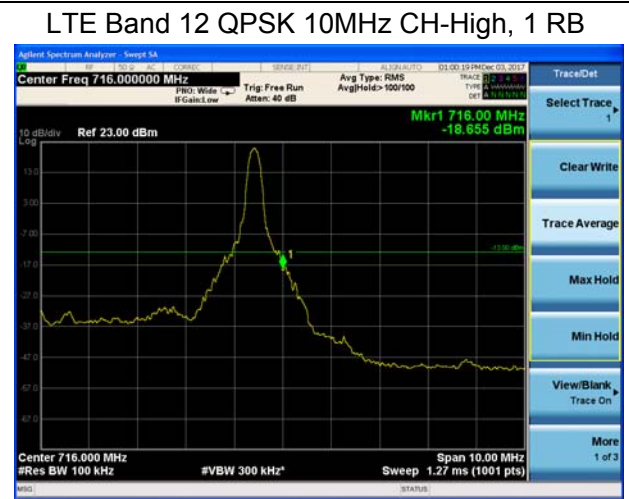
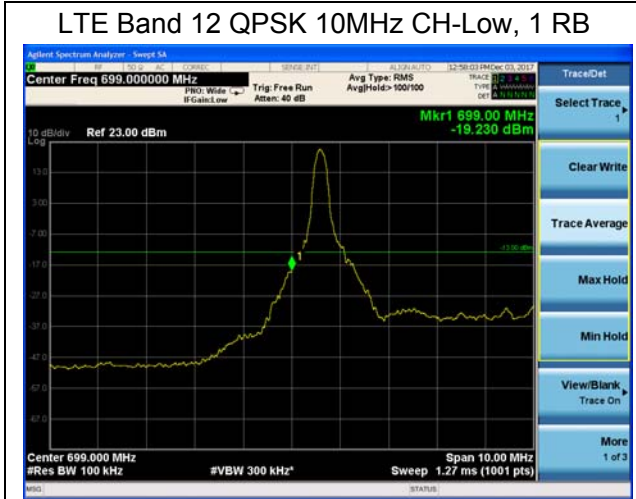
LTE Band 4 16QAM 5MHz CH-High, 1 RB













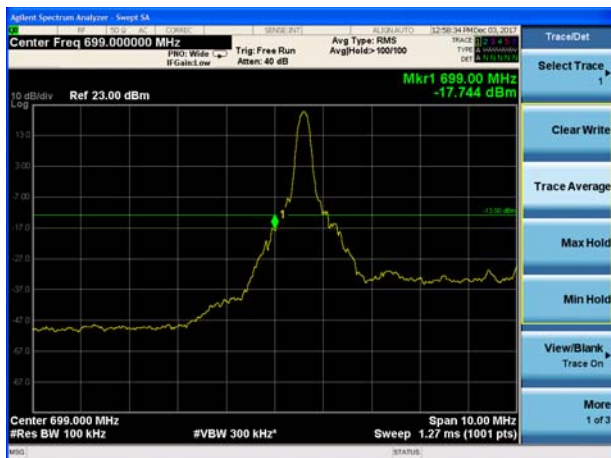
LTE Band 12 16QAM 5MHz CH-Low, 100%RB



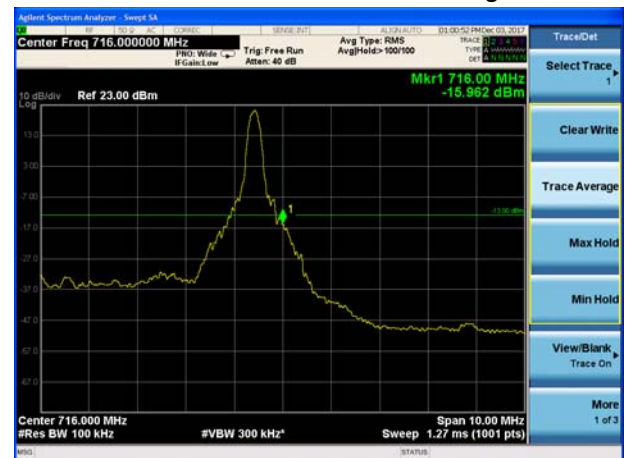
LTE Band 12 16QAM 5MHz CH-High, 100%RB



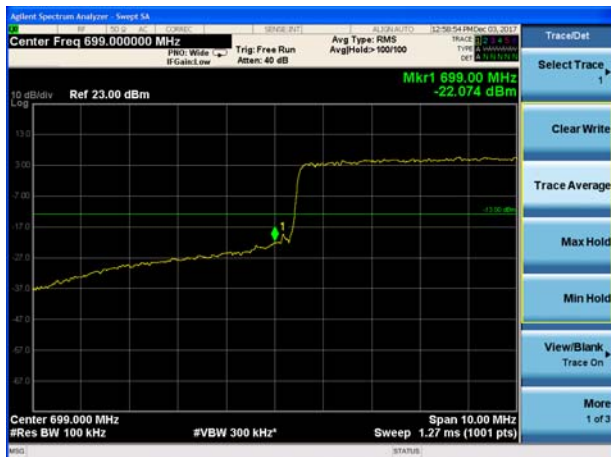
LTE Band 12 16QAM 10MHz CH-Low, 1 RB



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



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

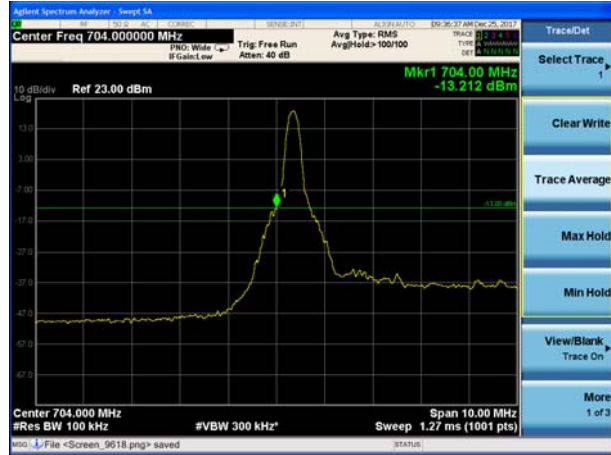


LTE Band 12 16QAM 10MHz CH-High, 100%RB

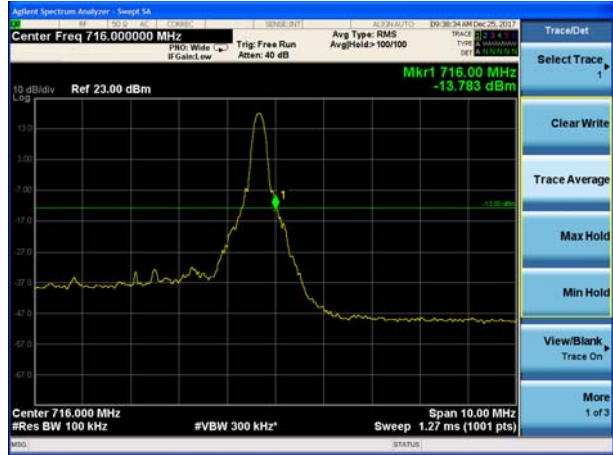




LTE Band 17 QPSK 5MHz CH-Low, 1 RB



LTE Band 17 QPSK 5MHz CH-High, 1 RB



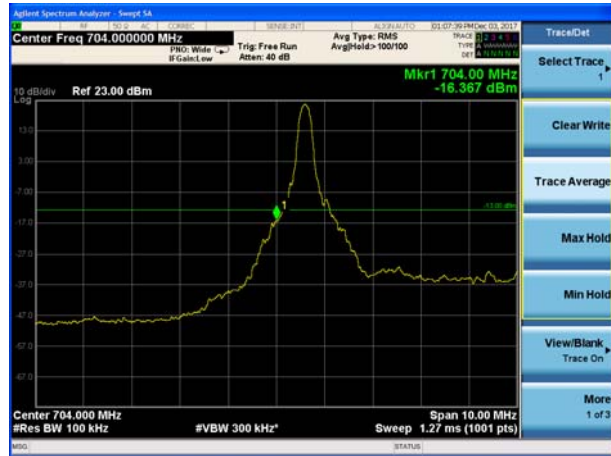
LTE Band 17 QPSK 5MHz CH-Low, 100%RB



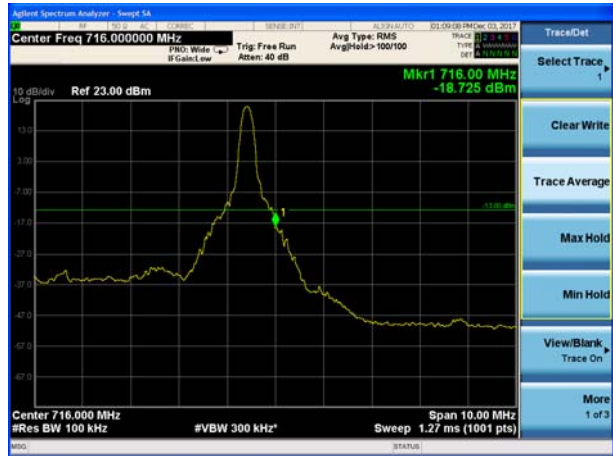
LTE Band 17 QPSK 5MHz CH-High, 100%RB

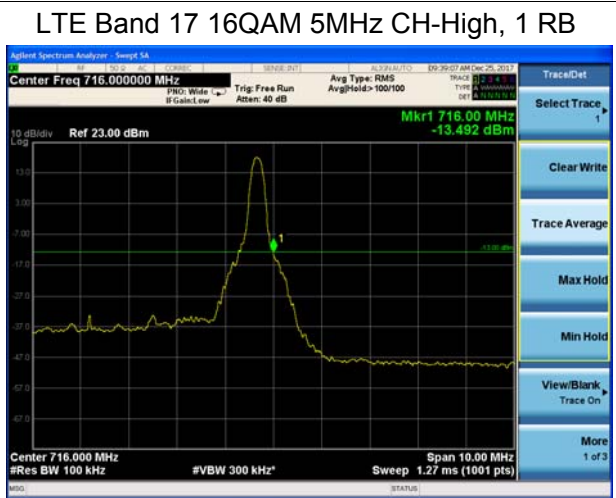
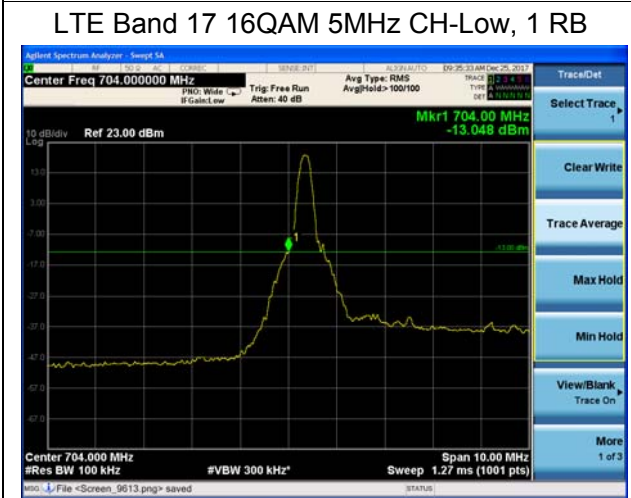
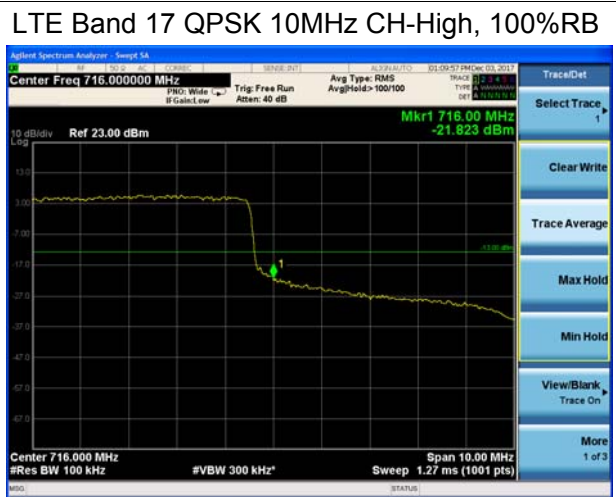
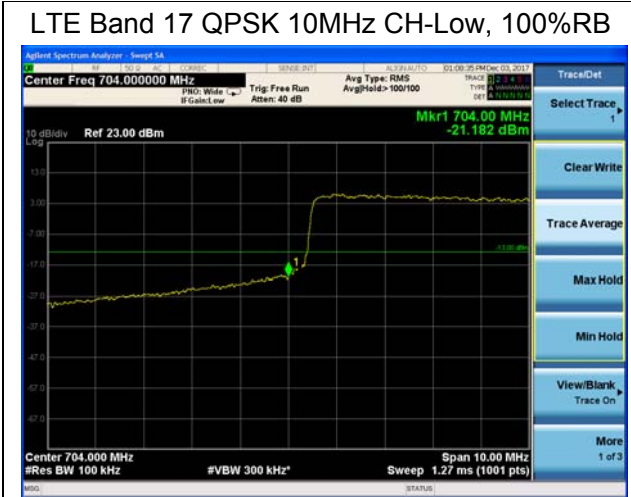


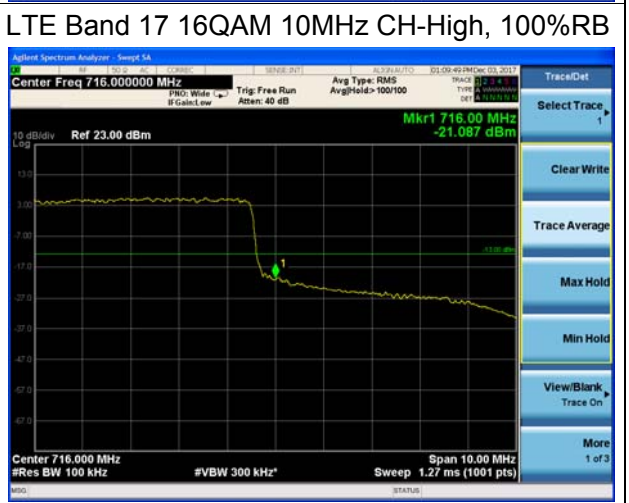
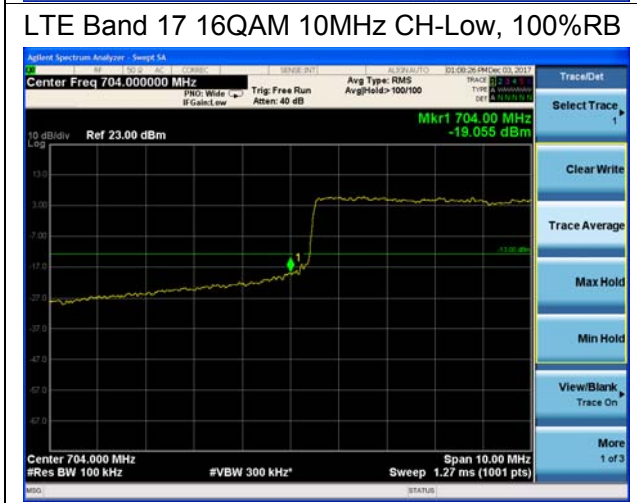
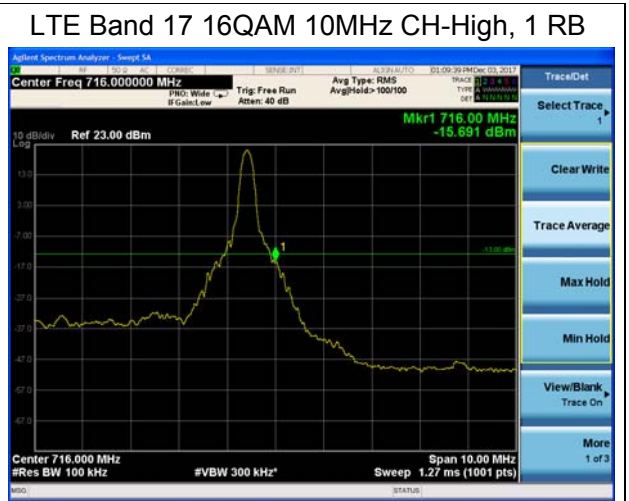
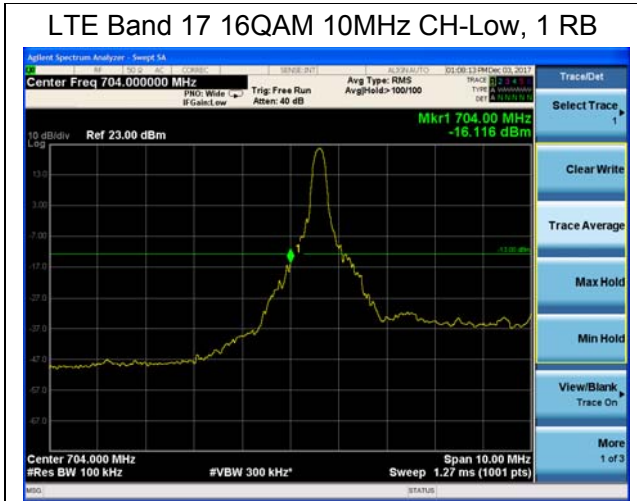
LTE Band 17 QPSK 10MHz CH-Low, 1 RB



LTE Band 17 QPSK 10MHz CH-High, 1 RB







5.5 Peak-to-Average Power Ratio (PAPR)

Ambient condition

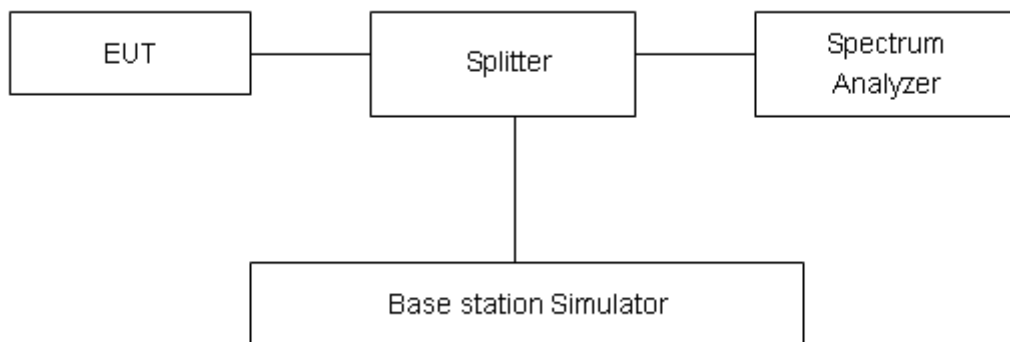
Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

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

LTE Band 4								
Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	Peak (dBm)	Avg (dBm)	PAPR (dB)	Limit (dB)	Conclusion
QPSK	5	19975	1712.5	26.20	21.74	4.46	≤13	PASS
		20175	1732.5	27.18	22.65	4.53	≤13	PASS
		20375	1752.5	25.49	20.82	4.67	≤13	PASS
	10	20000	1715	25.76	21.12	4.64	≤13	PASS
		20175	1732.5	27.16	22.55	4.61	≤13	PASS
		20350	1750	25.79	21.04	4.75	≤13	PASS
	15	20025	1717.5	25.09	20.29	4.80	≤13	PASS
		20175	1732.5	26.57	22.07	4.50	≤13	PASS
		20325	1747.5	25.75	21.03	4.72	≤13	PASS
	20	20050	1720	25.58	20.56	5.02	≤13	PASS
		20175	1732.5	26.83	22.3	4.53	≤13	PASS
		20300	1745	27.09	22.36	4.73	≤13	PASS
16QAM	5	19975	1712.5	26.59	21.68	4.91	≤13	PASS
		20175	1732.5	27.59	22.57	5.02	≤13	PASS
		20375	1752.5	26.00	20.82	5.18	≤13	PASS
	10	20000	1715	26.16	21.06	5.10	≤13	PASS
		20175	1732.5	27.52	22.43	5.09	≤13	PASS
		20350	1750	26.19	20.97	5.22	≤13	PASS
	15	20025	1717.5	25.35	20.21	5.14	≤13	PASS
		20175	1732.5	26.82	21.94	4.88	≤13	PASS
		20325	1747.5	25.97	20.96	5.01	≤13	PASS
	20	20050	1720	25.89	20.47	5.42	≤13	PASS
		20175	1732.5	27.22	22.21	5.01	≤13	PASS
		20300	1745	27.30	22.19	5.11	≤13	PASS

LTE Band 12								
Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	Peak (dBm)	Avg (dBm)	PAPR (dB)	Limit (dB)	Conclusion
QPSK	5	23035	701.5	26.64	21.98	4.66	≤13	PASS
		23095	707.5	26.67	22.04	4.63	≤13	PASS
		23155	713.5	26.52	21.98	4.54	≤13	PASS
	10	23060	704	26.74	22.17	4.57	≤13	PASS
		23095	707.5	27.04	22.19	4.85	≤13	PASS
		23130	711	26.91	22.28	4.63	≤13	PASS
16QAM	5	23035	701.5	27.08	21.96	5.12	≤13	PASS
		23095	707.5	27.00	21.99	5.01	≤13	PASS
		23155	713.5	26.97	21.97	5.00	≤13	PASS
	10	23060	704	27.20	22.18	5.02	≤13	PASS
		23095	707.5	27.32	22.1	5.22	≤13	PASS
		23130	711	27.22	22.16	5.06	≤13	PASS

LTE Band 17								
Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	Peak (dBm)	Avg (dBm)	PAPR (dB)	Limit (dB)	Conclusion
QPSK	5	23755	706.5	26.65	22.23	4.42	≤13	PASS
		23790	710	26.78	22.09	4.69	≤13	PASS
		23825	713.5	26.78	22.08	4.70	≤13	PASS
	10	23780	709	27.05	22.31	4.74	≤13	PASS
		23790	710	27.18	22.47	4.71	≤13	PASS
		23800	711	26.95	22.26	4.69	≤13	PASS
16QAM	5	23755	706.5	26.92	22.15	4.77	≤13	PASS
		23790	710	27.15	22.03	5.12	≤13	PASS
		23825	713.5	27.21	22.08	5.13	≤13	PASS
	10	23780	709	27.43	22.3	5.13	≤13	PASS
		23790	710	27.49	22.39	5.10	≤13	PASS
		23800	711	27.35	22.22	5.13	≤13	PASS

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 -30°C to +50°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 -30°C to +50°C. Allow at least 1.5 hours at each temperature, un-powered, before making measurements.

2. Frequency Stability (Voltage Variation)

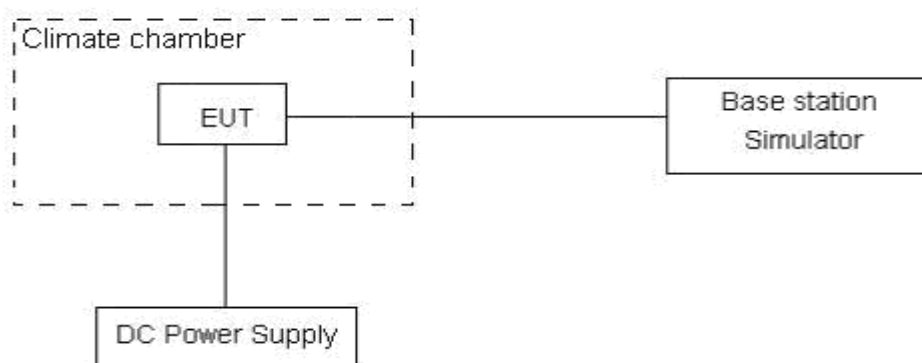
The frequency stability shall be measured with variation of primary supply voltage as follows:

(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 9 V and 13 V, with a nominal voltage of 12V.

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 20175 Test Results (ppm)	
		QPSK	16QAM
5MHz	-30°C/Normal Voltage	0.00003	0.00472
	-20°C/Normal Voltage	0.00143	0.00040
	-10°C/Normal Voltage	-0.00196	0.00182
	0°C/Normal Voltage	0.00155	0.00057
	10°C/Normal Voltage	0.00226	0.00063
	20°C/Normal Voltage	-0.00015	-0.00177
	30°C/Normal Voltage	0.00208	0.00150
	40°C/Normal Voltage	0.00159	-0.00053
	50°C/Normal Voltage	0.00019	-0.00096
	20°C/Min Voltage	0.00114	-0.00060
	20°C/Max Voltage	0.00105	-0.00065
10MHz	-30°C/Normal Voltage	0.00167	0.00139
	-20°C/Normal Voltage	0.00162	0.00114
	-10°C/Normal Voltage	-0.00070	0.00005
	0°C/Normal Voltage	0.00345	-0.00044
	10°C/Normal Voltage	0.00217	0.00021
	20°C/Normal Voltage	-0.00069	0.00110
	30°C/Normal Voltage	-0.00012	0.00068
	40°C/Normal Voltage	0.00154	-0.00176
	50°C/Normal Voltage	-0.00002	0.00087
	20°C/Min Voltage	0.00100	0.00291
	20°C/Max Voltage	0.00031	0.00115
15MHz	-30°C/Normal Voltage	0.00027	0.00188
	-20°C/Normal Voltage	-0.00034	0.00282
	-10°C/Normal Voltage	0.00024	0.00412
	0°C/Normal Voltage	-0.00009	0.00367
	10°C/Normal Voltage	-0.00073	0.00473
	20°C/Normal Voltage	-0.00054	0.00300
	30°C/Normal Voltage	-0.00013	0.00227
	40°C/Normal Voltage	-0.00148	0.00162
	50°C/Normal Voltage	-0.00020	0.00278
	20°C/Min Voltage	0.00125	0.00057
	20°C/Max Voltage	-0.00079	0.00059
20MHz	-30°C/Normal Voltage	0.00028	0.00146
	-20°C/Normal Voltage	-0.00117	0.00311
	-10°C/Normal Voltage	0.00218	0.00317



	0°C/Normal Voltage	-0.00052	0.00069
	10°C/Normal Voltage	0.00048	0.00393
	20°C/Normal Voltage	-0.00261	0.00048
	30°C/Normal Voltage	0.00350	-0.00157
	40°C/Normal Voltage	-0.00038	0.00414
	50°C/Normal Voltage	0.00442	0.00063
	20°C/Min Voltage	0.00027	0.00182
	20°C/Max Voltage	0.00089	-0.00259

Bandwidth	Test status	LTE Band 12 Channel 23095 Test Results (ppm)	
		QPSK	16QAM
5MHz	-30°C/Normal Voltage	0.00362	-0.00033
	-20°C/Normal Voltage	-0.00052	0.00150
	-10°C/Normal Voltage	0.00051	0.00325
	0°C/Normal Voltage	0.00006	0.00098
	10°C/Normal Voltage	0.00229	-0.00281
	20°C/Normal Voltage	0.00008	-0.00137
	30°C/Normal Voltage	0.00144	0.00133
	40°C/Normal Voltage	0.00001	0.00245
	50°C/Normal Voltage	0.00028	-0.00001
	20°C/Min Voltage	-0.00083	-0.00083
	20°C/Max Voltage	0.00127	0.00137
10MHz	-30°C/Normal Voltage	0.00147	-0.00062
	-20°C/Normal Voltage	-0.00112	0.00038
	-10°C/Normal Voltage	0.00215	0.00004
	0°C/Normal Voltage	-0.00085	-0.00113
	10°C/Normal Voltage	-0.00131	0.00088
	20°C/Normal Voltage	-0.00222	-0.00147
	30°C/Normal Voltage	-0.00119	-0.00052
	40°C/Normal Voltage	0.00291	-0.00041
	50°C/Normal Voltage	0.00098	0.00141
	20°C/Min Voltage	-0.00117	0.00116
	20°C/Max Voltage	-0.00018	-0.00072

Bandwidth	Test status	LTE Band 17 Channel 23790 Test Results (ppm)	
		QPSK	16QAM
5MHz	-30°C/Normal Voltage	0.00182	0.00323
	-20°C/Normal Voltage	0.00169	0.00408
	-10°C/Normal Voltage	0.00323	0.00207
	0°C/Normal Voltage	0.00359	0.00277
	10°C/Normal Voltage	0.00187	0.00327
	20°C/Normal Voltage	0.00179	0.00449
	30°C/Normal Voltage	0.00324	0.00401
	40°C/Normal Voltage	0.00346	0.00289
	50°C/Normal Voltage	0.00579	0.00449
	20°C/Min Voltage	0.00061	0.00051
	20°C/Max Voltage	-0.00030	0.00099
10MHz	-30°C/Normal Voltage	0.00061	0.00334
	-20°C/Normal Voltage	-0.00270	0.00217
	-10°C/Normal Voltage	-0.00079	0.00027
	0°C/Normal Voltage	0.00090	0.00348
	10°C/Normal Voltage	-0.00101	-0.00042
	20°C/Normal Voltage	0.00132	-0.00038
	30°C/Normal Voltage	0.00151	0.00032
	40°C/Normal Voltage	0.00290	-0.00080
	50°C/Normal Voltage	0.00159	0.00232
	20°C/Min Voltage	0.00165	0.00052
	20°C/Max Voltage	0.00173	-0.00046

5.7 Spurious Emissions at Antenna Terminals

Ambient condition

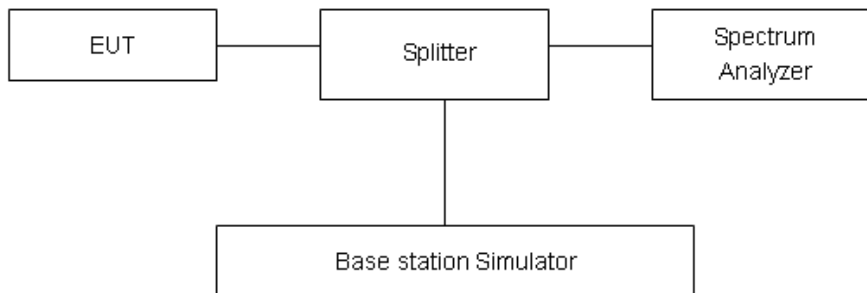
Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

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. RBW are set to 100 kHz and VBW are set to 300 kHz for below 1G, RBW are set to 1MHz and VBW are set to 3MHz for above 1G, 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 log₁₀ (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.

27.53(h) Limit	-13 dBm
27.53(g) Limit	-13 dBm



Measurement Uncertainty

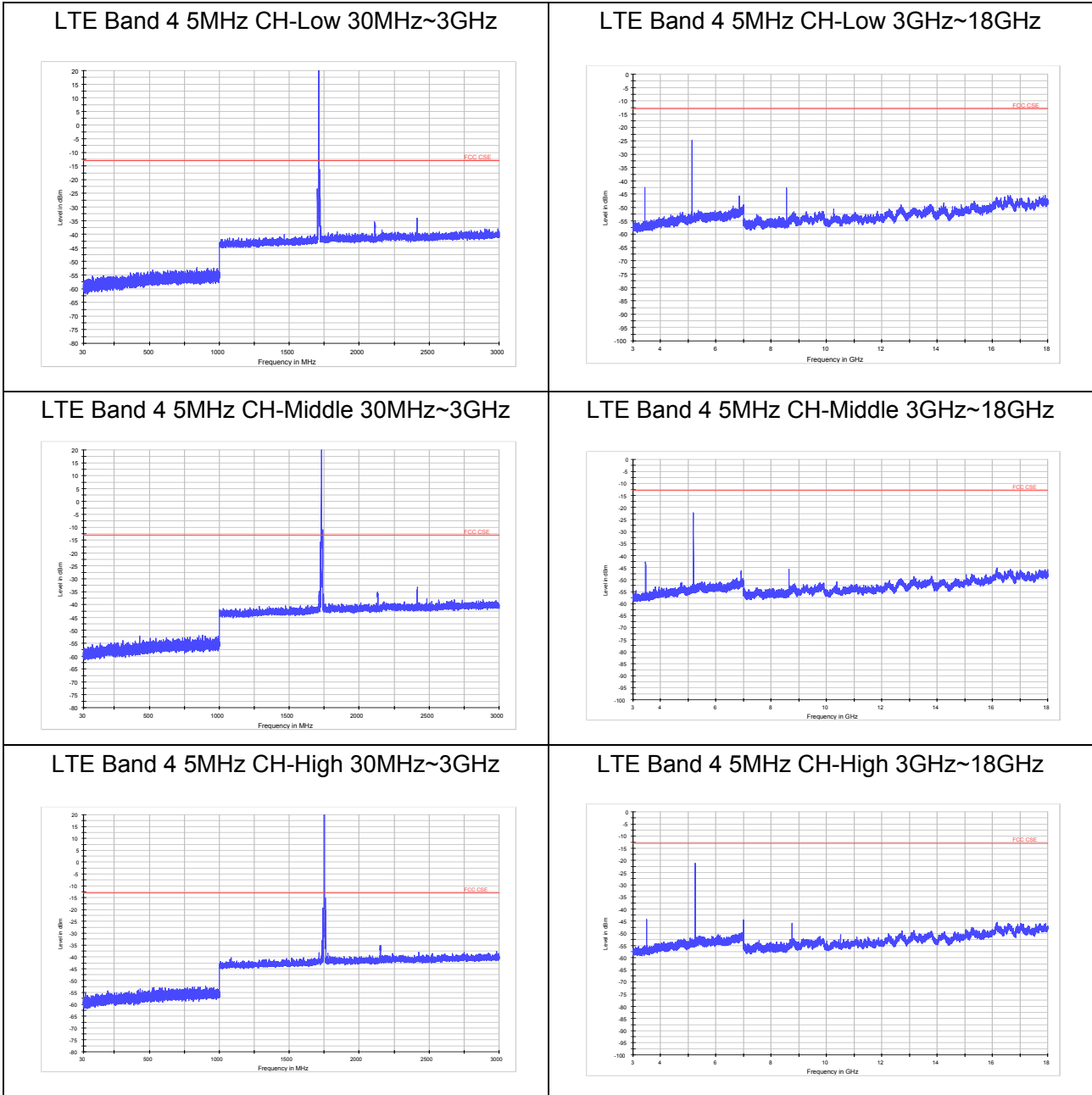
The assessed measurement uncertainty to ensure 99.75% confidence level for the normal distribution is with the coverage factor $k = 1.96$.

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

Test Result

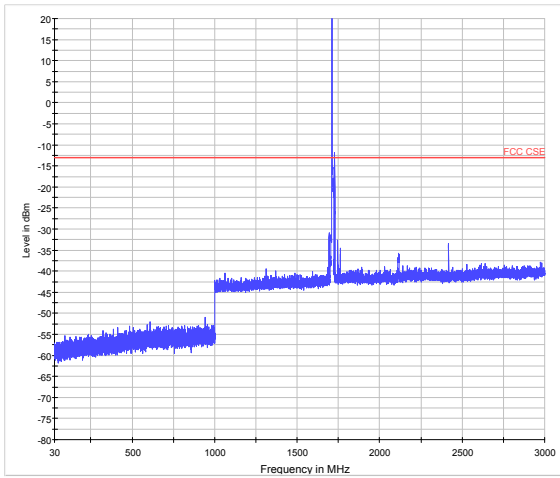
Sweep from 9 kHz to 30MHz, and the emissions more than 20 dB below the permissible value are not reported.

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

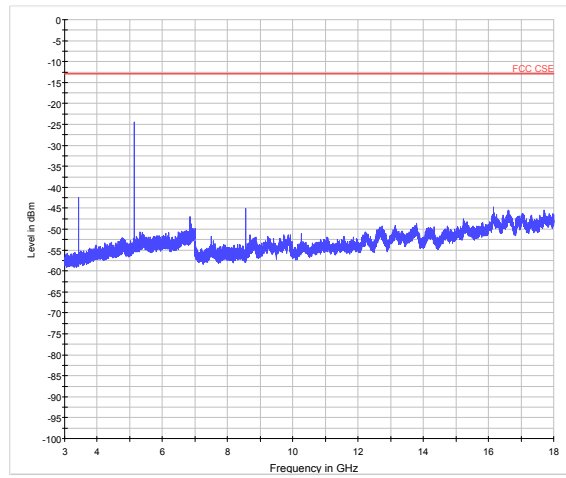




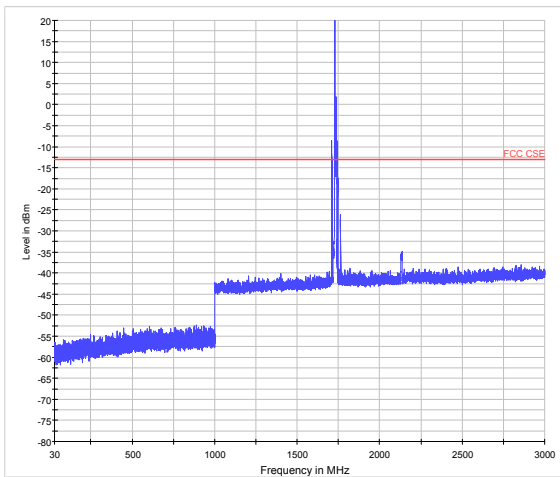
LTE Band 4 10MHz CH-Low 30MHz~3GHz



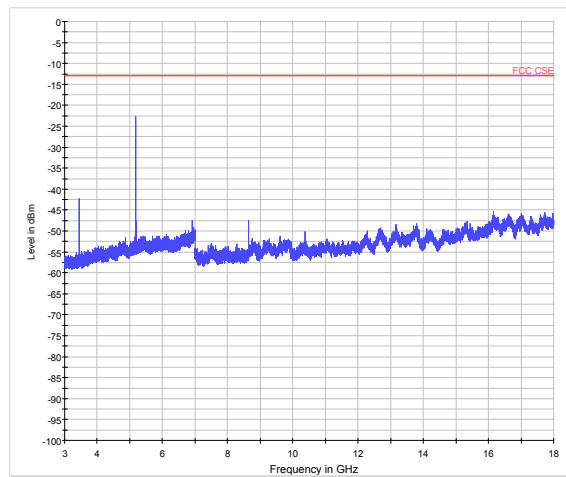
LTE Band 4 10MHz CH-Low 3GHz~18GHz



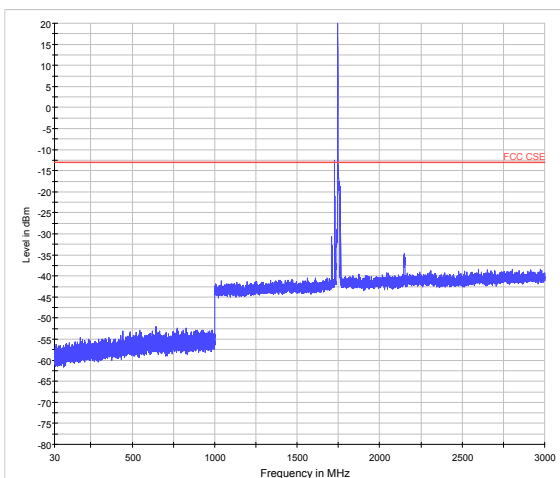
LTE Band 4 10MHz CH-Middle 30MHz~3GHz



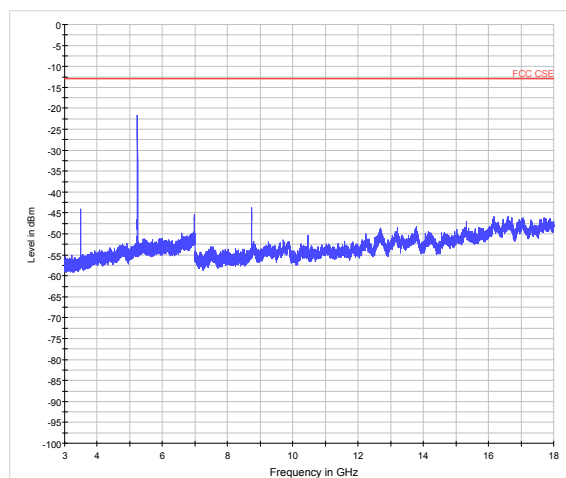
LTE Band 4 10MHz CH-Middle 3GHz~18GHz



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

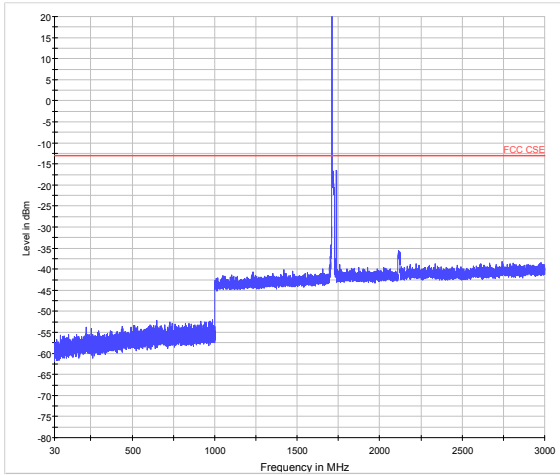


LTE Band 4 10MHz CH-High 3GHz~18GHz

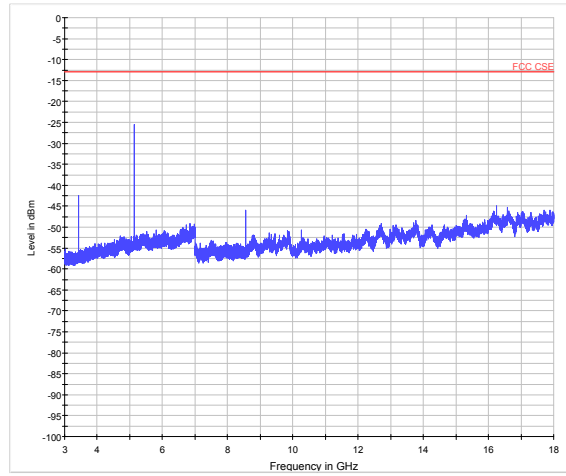




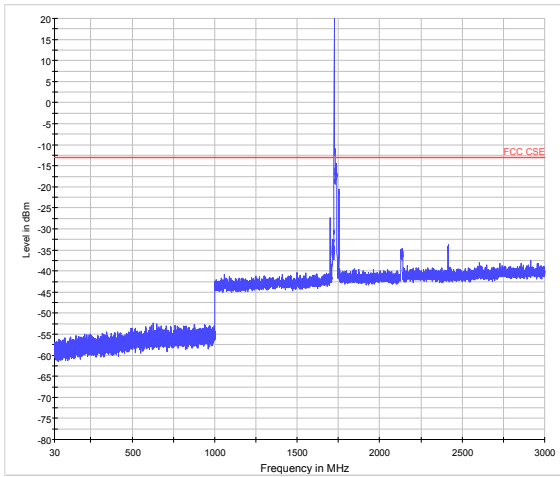
LTE Band 4 15MHz CH-Low 30MHz~3GHz



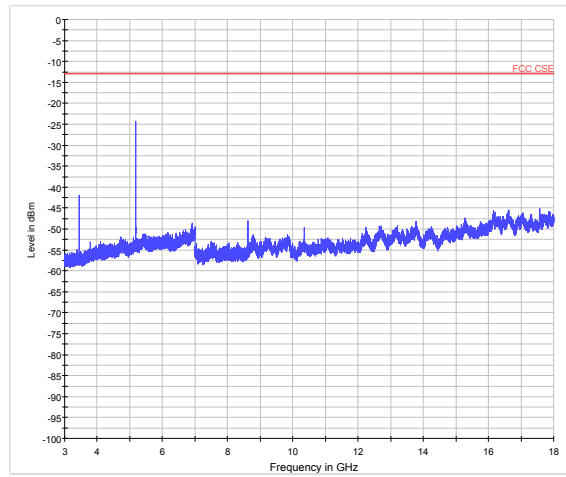
LTE Band 4 15MHz CH-Low 3GHz~18GHz



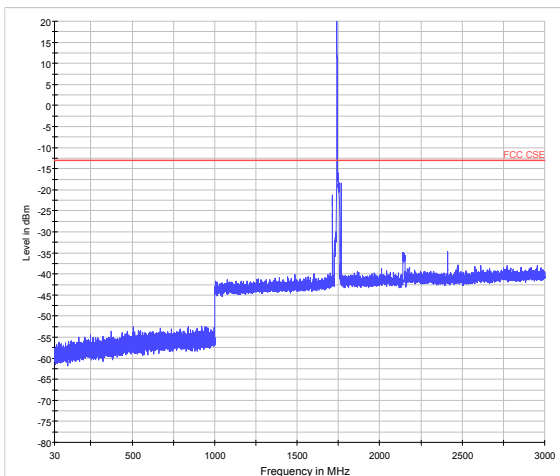
LTE Band 4 15MHz CH-Middle 30MHz~3GHz



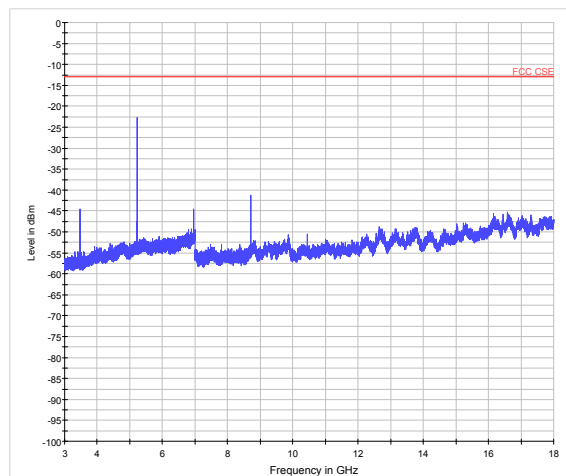
LTE Band 4 15MHz CH-Middle 3GHz~18GHz



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

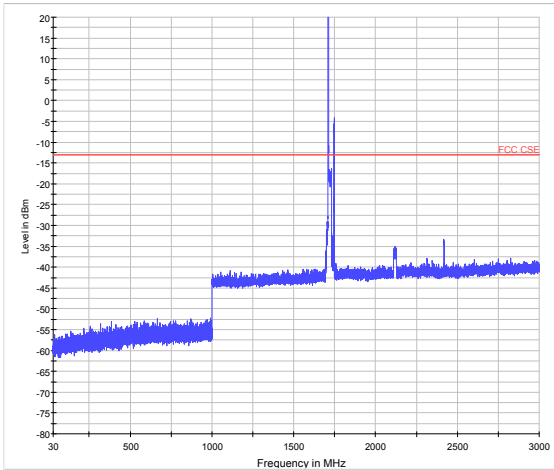


LTE Band 4 15MHz CH-High 3GHz~18GHz

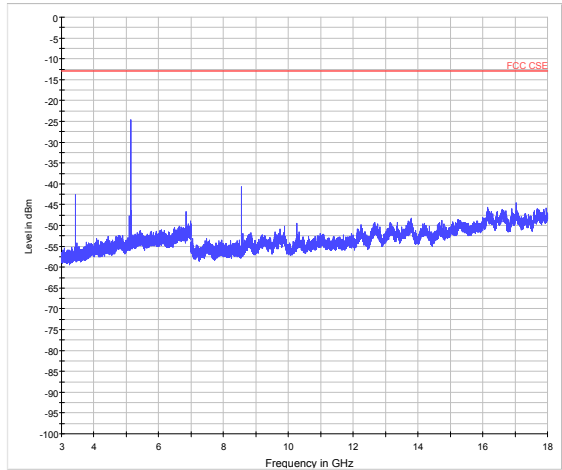




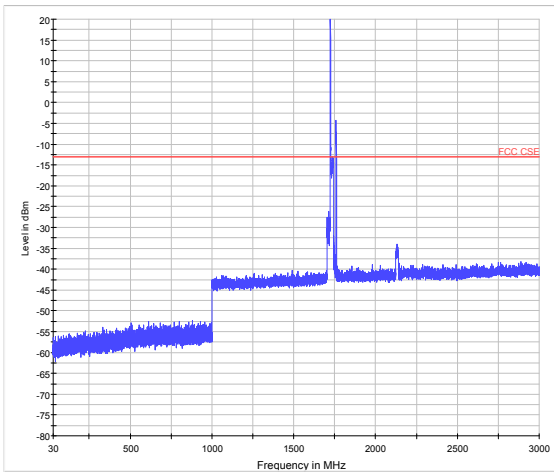
LTE Band 4 20MHz CH-Low 30MHz~3GHz



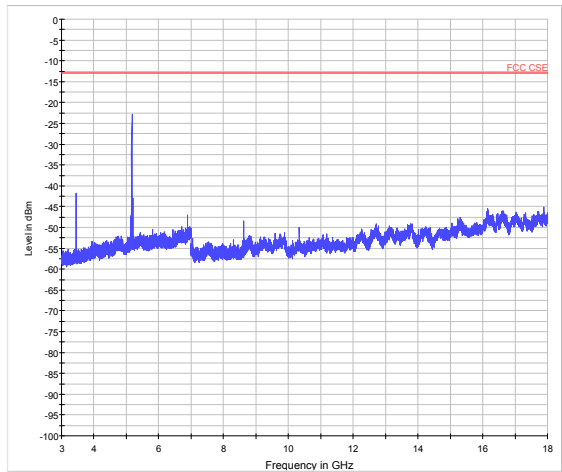
LTE Band 4 20MHz CH-Low 3GHz~18GHz



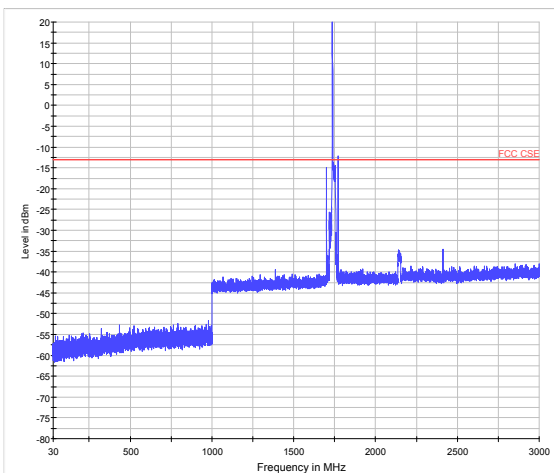
LTE Band 4 20MHz CH-Middle 30MHz~3GHz



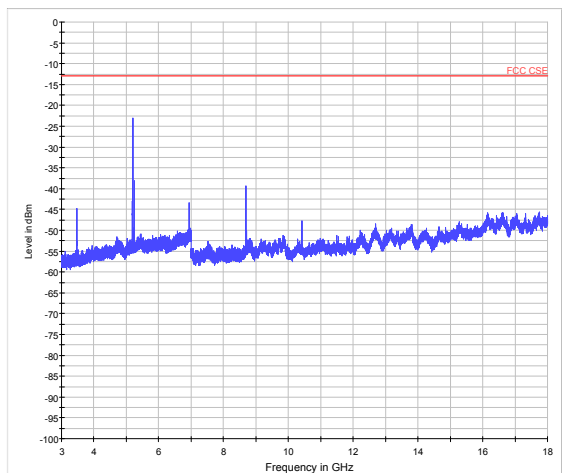
LTE Band 4 20MHz CH-Middle 3GHz~18GHz



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

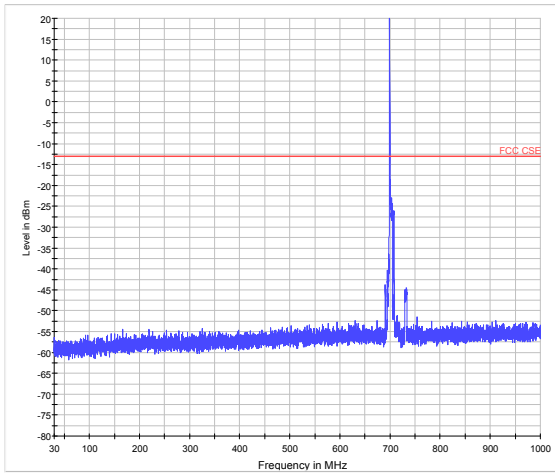


LTE Band 4 20MHz CH-High 3GHz~18GHz

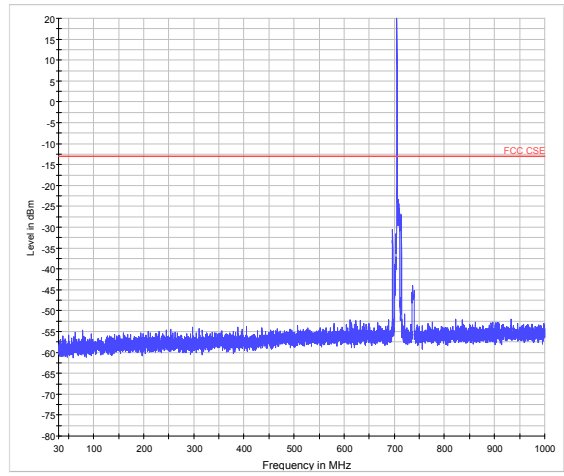




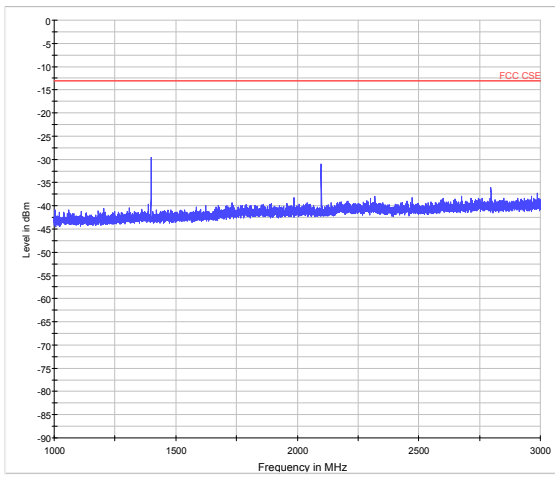
LTE Band 12 5MHz CH-Low 30MHz~1GHz



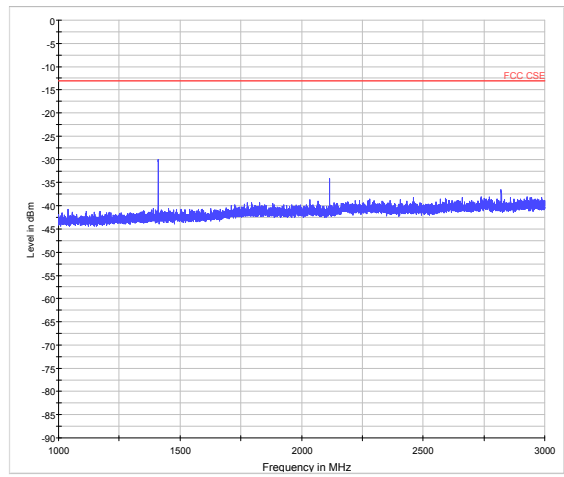
LTE Band 12 5MHz CH-Middle 30MHz~1GHz



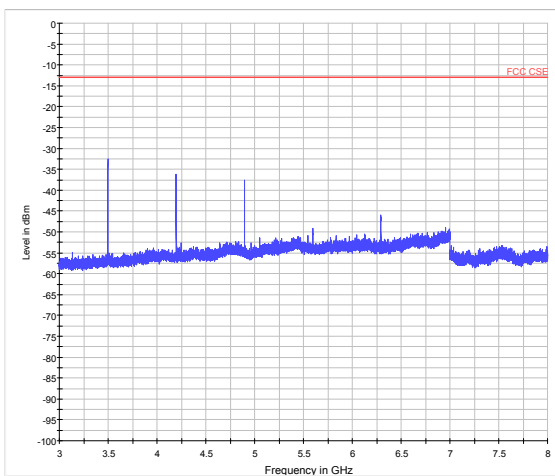
LTE Band 12 5MHz CH-Low 1GHz~3GHz



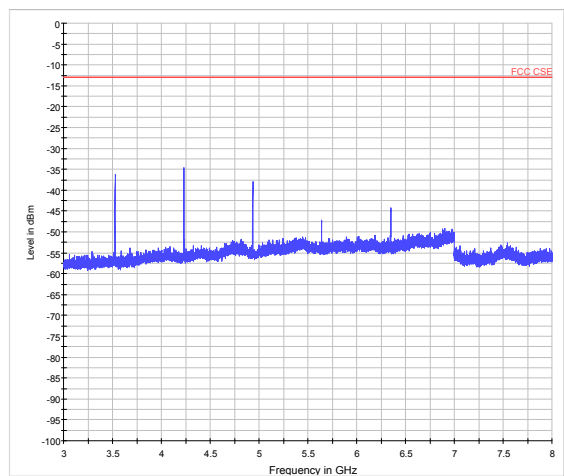
LTE Band 12 5MHz CH-Middle 1GHz~3GHz



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

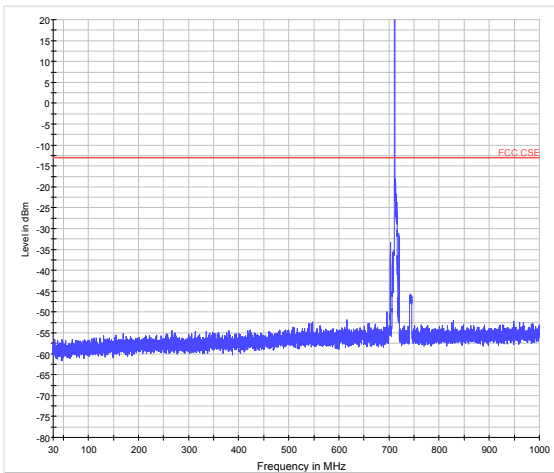


LTE Band 12 5MHz CH-Middle 3GHz~8GHz

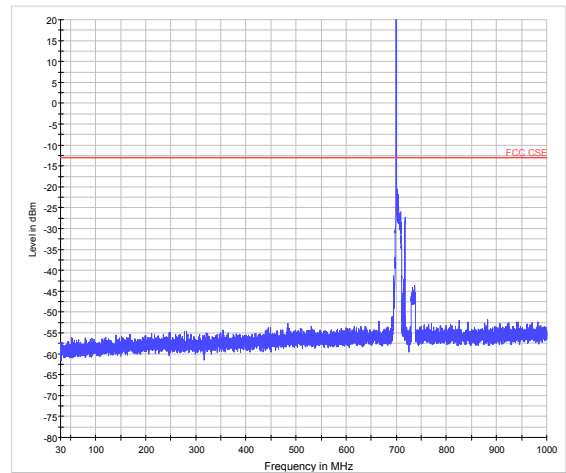




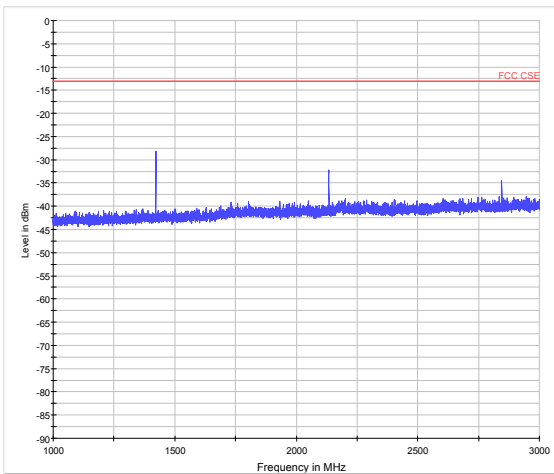
LTE Band 12 5MHz CH-High 30MHz~1GHz



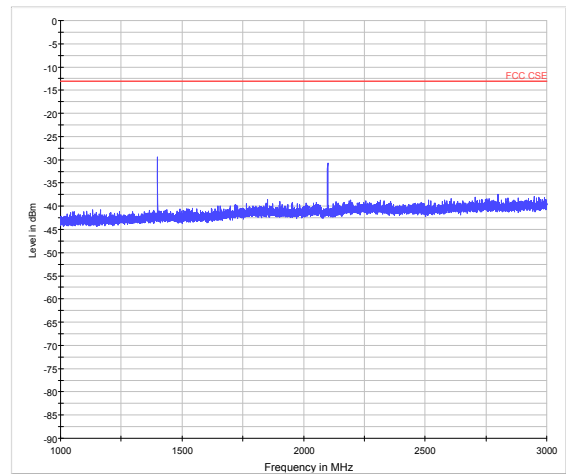
LTE Band 12 10MHz CH-Low 30MHz~1GHz



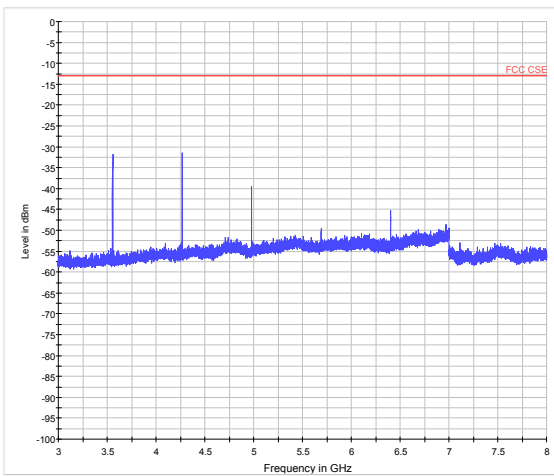
LTE Band 12 5MHz CH-High 1GHz~3GHz



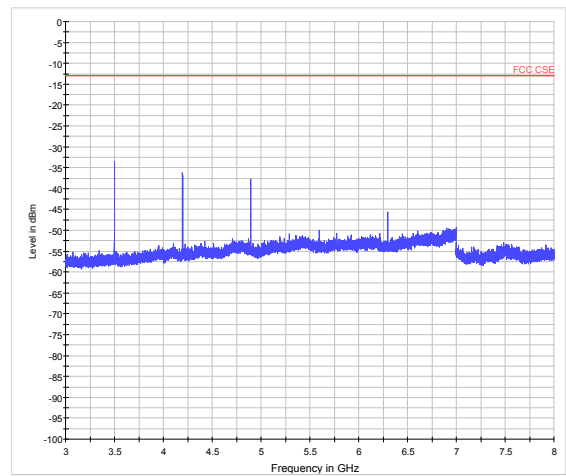
LTE Band 12 10MHz CH-Low 1GHz~3GHz



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

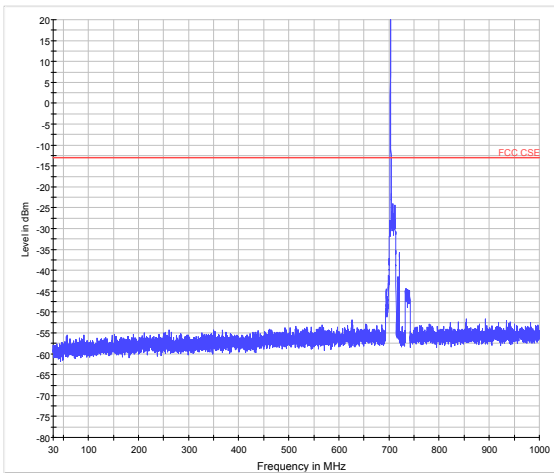


LTE Band 12 10MHz CH-Low 3GHz~8GHz

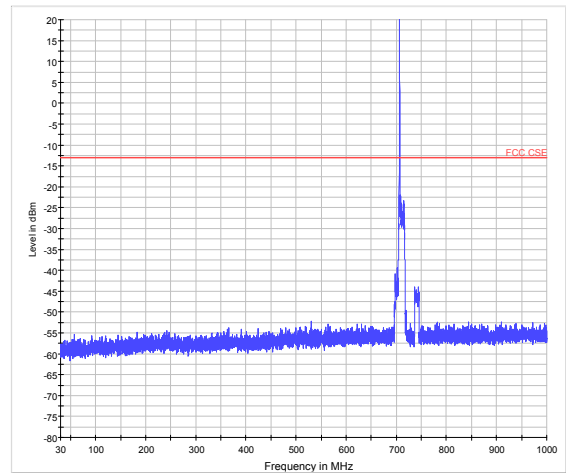




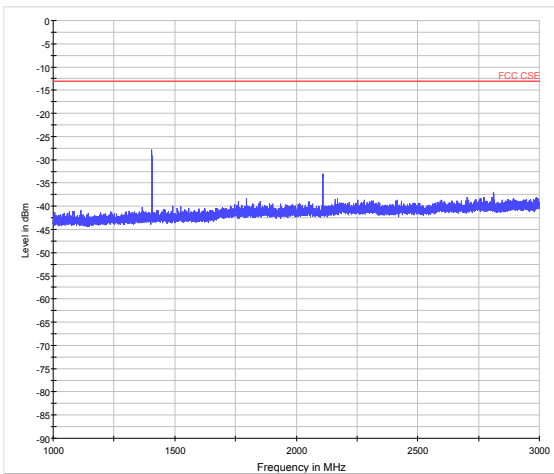
LTE Band 12 10MHz CH-Middle 30MHz~1GHz



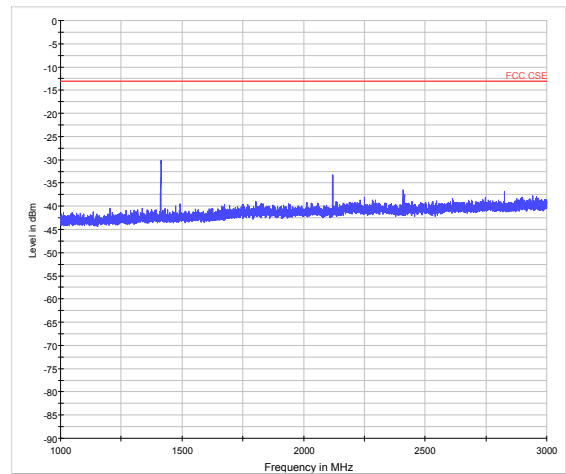
LTE Band 12 10MHz CH-High 30MHz~1GHz



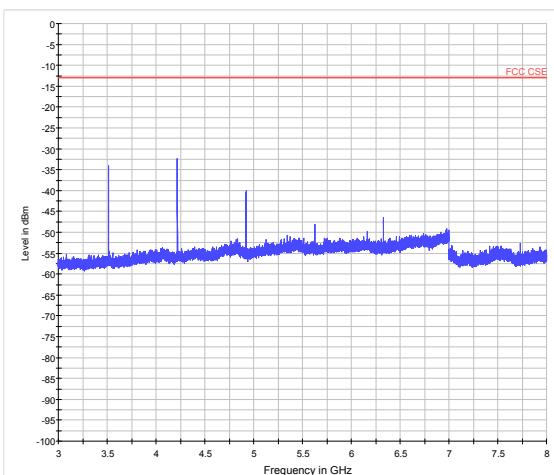
LTE Band 12 10MHz CH-Middle 1GHz~3GHz



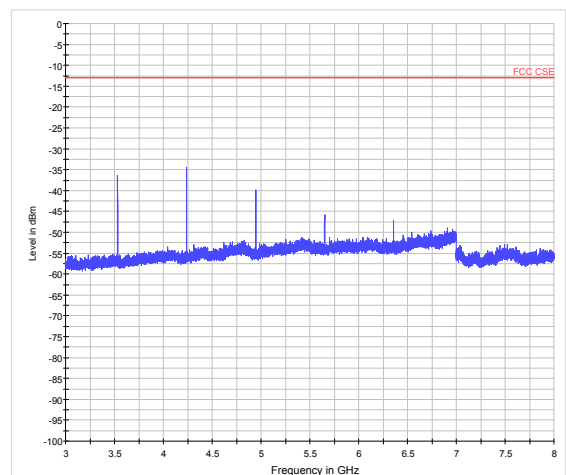
LTE Band 12 10MHz CH-High 1GHz~3GHz



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

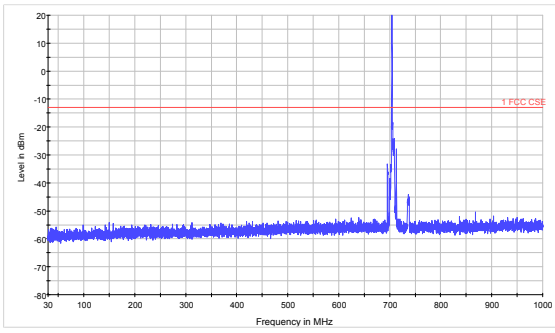


LTE Band 12 10MHz CH-High 3GHz~8GHz

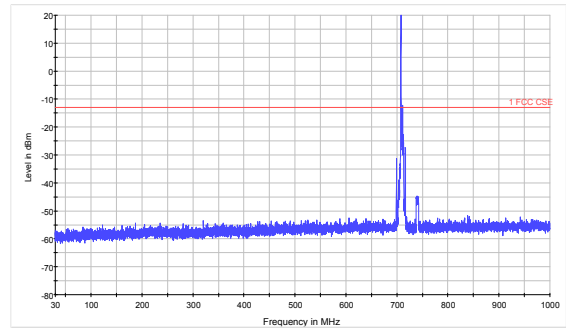




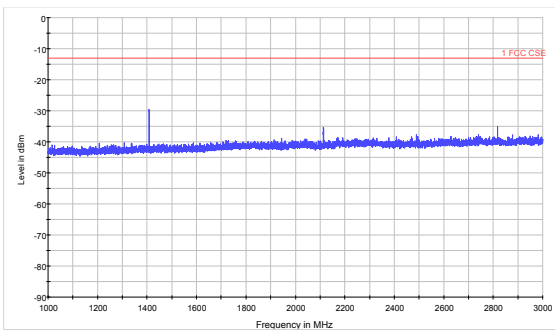
LTE Band 17 5MHz CH-Low 30MHz~1GHz



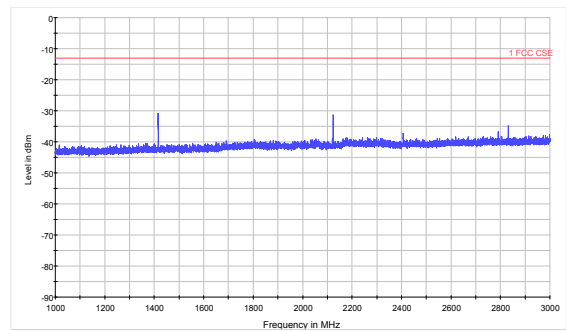
LTE Band 17 5MHz CH-Middle 30MHz~1GHz



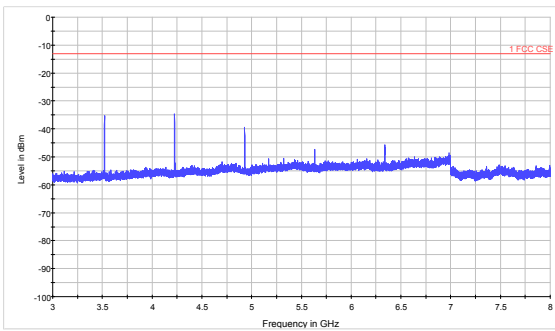
LTE Band 17 5MHz CH-Low 1GHz~3GHz



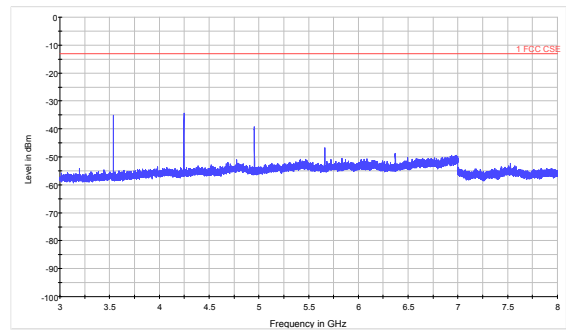
LTE Band 17 5MHz CH-Middle 1GHz~3GHz



LTE Band 17 5MHz CH-Low 3GHz~8GHz

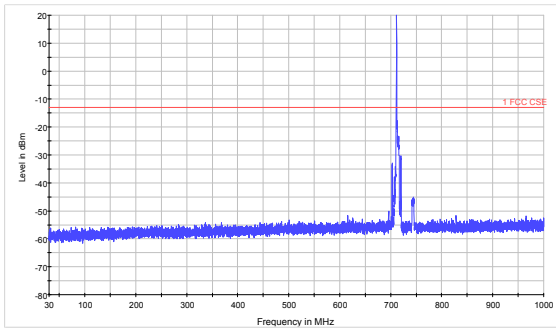


LTE Band 17 5MHz CH-Middle 3GHz~8GHz

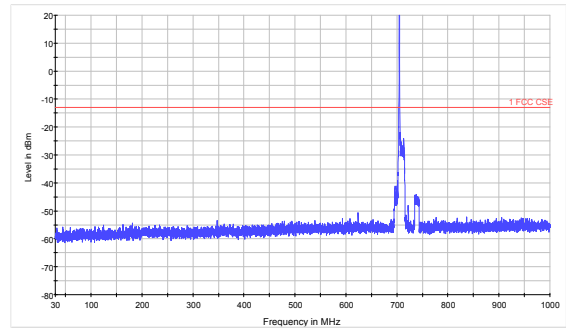




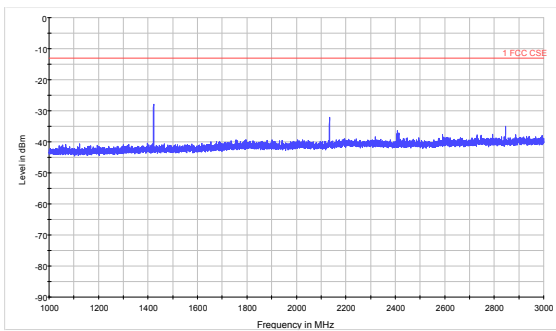
LTE Band 17 5MHz CH-High 30MHz~1.5GHz



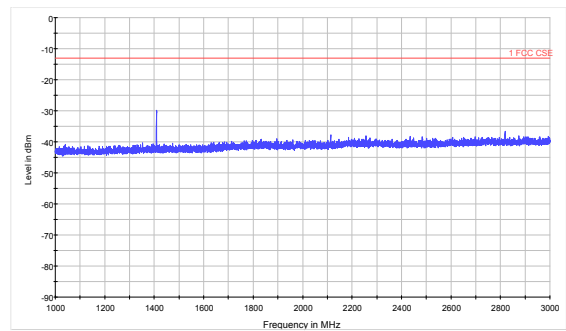
LTE Band 17 10MHz CH-Low 30MHz~1.5GHz



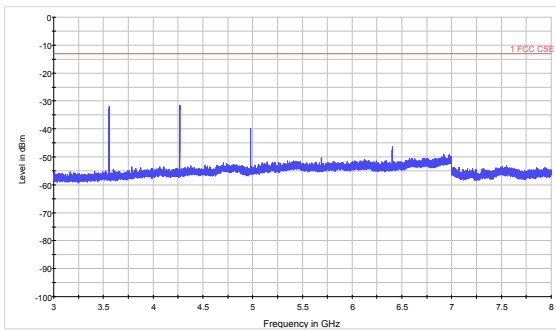
LTE Band 17 5MHz CH-High 1GHz~3GHz



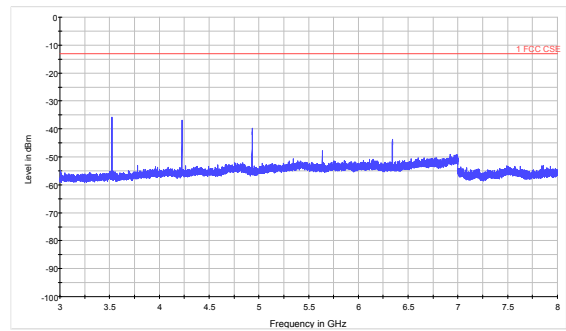
LTE Band 17 10MHz CH- Low 1GHz~3GHz

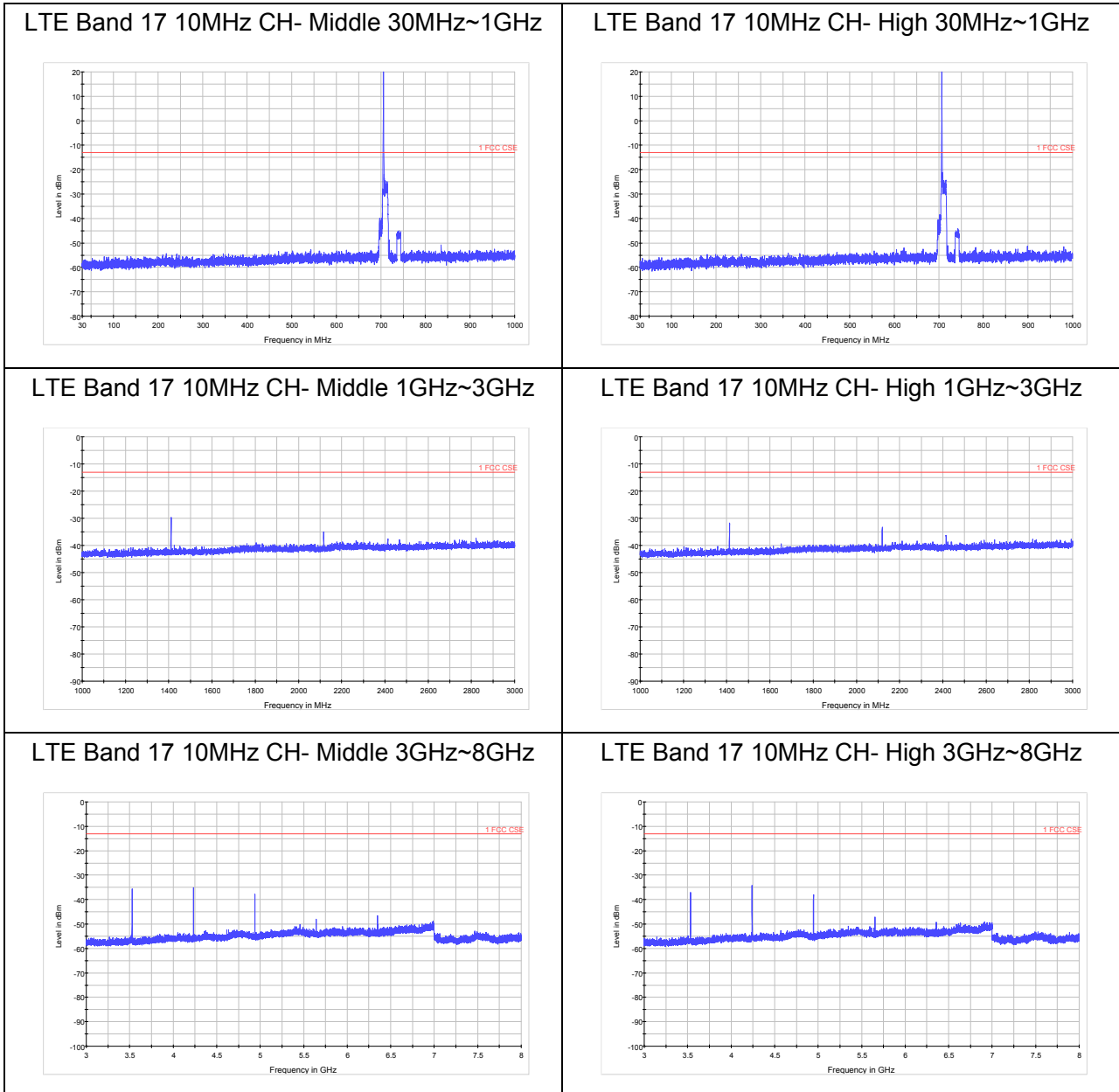


LTE Band 17 5MHz CH-High 3GHz~8GHz



LTE Band 17 10MHz CH- Low 3GHz~8GHz





If disturbances were found more than 20dB below limit line, the mark is not required for the EUT. The signal beyond the limit is carrier in the following plots.

Test Data File Name	Frequency (MHz)	Peak (dBm)	Limit (dBm)	Margin(dB)
CSE_LTE B4_CHLOW_5M_RB1_3-18GHz_	5131.1	-24.75	-13.00	11.75
CSE_LTE B4_CHMID_5M_RB1_3-18GHz_	5191.1	-22.12	-13.00	9.12
CSE_LTE B4_CHHIGH_5M_RB1_3-18GHz_	5251.1	-21.16	-13.00	8.16
CSE_LTE B4_CHLOW_10M_RB1_3-18GHz_	5131.9	-24.48	-13.00	11.48
CSE_LTE B4_CHMID_10M_RB1_3-18GHz_	5184.4	-22.65	-13.00	9.65



CSE_LTE B4_CHHIGH_10M_RB1_3-18GHz_	5236.9	-21.68	-13.00	8.68
CSE_LTE B4_CHLOW_15M_RB1_3-18GHz_	5132.6	-26.02	-13.00	13.02
CSE_LTE B4_CHMID_15M_RB1_3-18GHz_	5177.6	-24.31	-13.00	11.31
CSE_LTE B4_CHHIGH_15M_RB1_3-18GHz_	5222.6	-22.75	-13.00	9.75
CSE_LTE B4_CHLOW_20M_RB1_3-18GHz_	5133.0	-25.19	-13.00	12.19
CSE_LTE B4_CHMID_20M_RB1_3-18GHz_	5170.9	-22.99	-13.00	9.99
CSE_LTE B4_CHHIGH_20M_RB1_3-18GHz_	5208.0	-23.43	-13.00	10.43
CSE_LTE B12_CHLOW_5M_RB1_1-3GHz_	1398.8	-29.62	-13.00	16.62
CSE_LTE B12_CHLOW_5M_RB1_3-8GHz_	3496.5	-32.47	-13.00	19.47
CSE_LTE B12_CHMID_5M_RB1_1-3GHz_	1410.5	-30.06	-13.00	17.06
CSE_LTE B12_CHHIGH_5M_RB1_1-3GHz_	1422.8	-28.16	-13.00	15.16
CSE_LTE B12_CHHIGH_5M_RB1_3-8GHz_	4267.9	-31.41	-13.00	18.41
CSE_LTE B12_CHLOW_10M_RB1_1-3GHz_	1399.3	-29.46	-13.00	16.46
CSE_LTE B12_CHMID_10M_RB1_1-3GHz_	1406.0	-27.82	-13.00	14.82
CSE_LTE B12_CHMID_10M_RB1_3-8GHz_	4218.4	-32.63	-13.00	19.63
CSE_LTE B12_CHHIGH_10M_RB1_1-3GHz_	1413.0	-30.27	-13.00	17.27
CSE_LTE B17_CHLOW_5M_RB1_1-3GHz_	1408.8	-29.54	-13.00	16.54
CSE_LTE B17_CHMID_5M_RB1_1-3GHz_	1415.8	-30.82	-13.00	17.82
CSE_LTE B17_CHHIGH_5M_RB1_1-3GHz_	1422.5	-27.89	-13.00	14.89
CSE_LTE B17_CHHIGH_5M_RB1_3-8GHz_	4268.3	-31.56	-13.00	18.56
CSE_LTE B17_CHLOW_10M_RB1_1-3GHz_	1409.0	-29.78	-13.00	16.78
CSE_LTE B17_CHMID_10M_RB1_1-3GHz_	1411.3	-29.64	-13.00	16.64
CSE_LTE B17_CHHIGH_10M_RB1_1-3GHz_	1413.3	-31.71	-13.00	18.71

5.8 Radiates Spurious Emission

Ambient condition

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

Method of Measurement

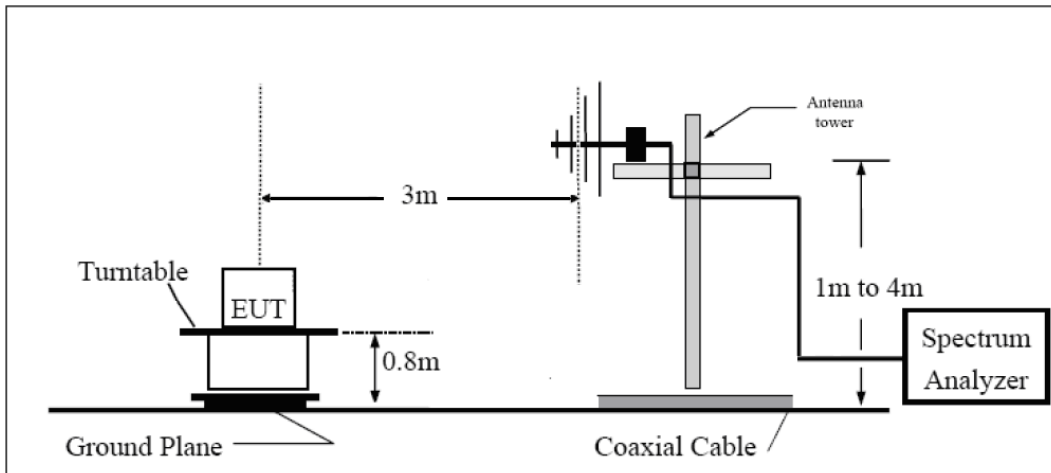
1. The testing follows FCC KDB 971168 v03 Section 5.8 and ANSI/TIA-603-D-2010.
2. The EUT is placed on a turntable 0.8 meters above the ground in the chamber, 3 meter away from the antenna. The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable azimuth. Normally, 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:

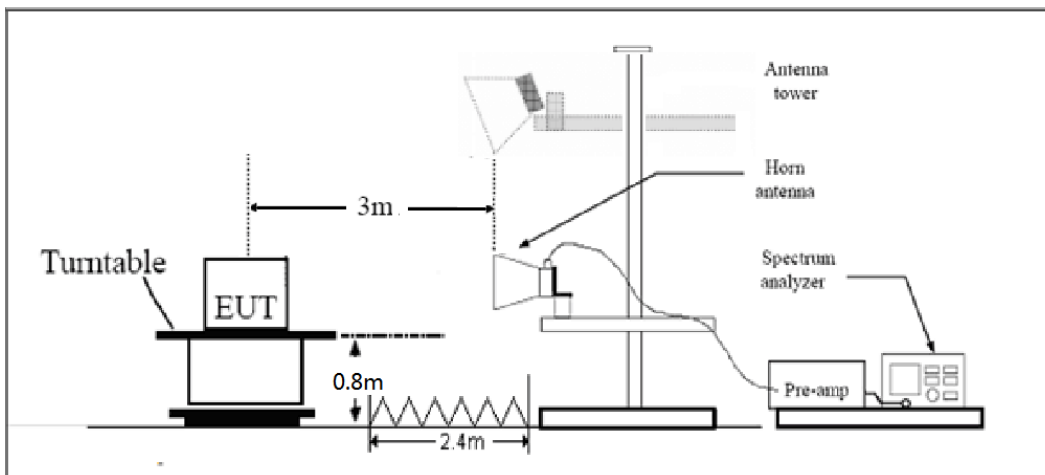
$$\text{Power(EIRP)} = \text{PMea} - \text{Pcl} + \text{Ga}$$
8. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP-2.15dBi.

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

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.

27.53(h) Limit	-13 dBm
27.53(g) Limit	-13 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 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	-49.25	2.6	10.15	Horizontal	-41.7	-13.0	28.7	225
3	5131.1	-30.85	2.4	11.35	Horizontal	-21.9	-13.0	8.9	45
4	6850.0	-43.95	4.5	10.85	Horizontal	-37.6	-13.0	24.6	90
5	8562.5	-47.35	5.1	11.35	Horizontal	-41.1	-13.0	28.1	180
6	10275.0	-46.95	5.3	11.95	Horizontal	-40.3	-13.0	27.3	270
7	11987.5	-46.35	5.5	13.55	Horizontal	-38.3	-13.0	25.3	180
8	13700.0	-44.65	6.3	13.75	Horizontal	-37.2	-13.0	24.2	225
9	15412.5	-45.45	6.7	13.85	Horizontal	-38.3	-13.0	25.3	45
10	17125.0	-43.35	6.8	14.25	Horizontal	-35.9	-13.0	22.9	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 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	3460.5	-48.15	2.6	10.75	Horizontal	-40.0	-13.0	27.0	180
3	5191.5	-29.55	2.4	11.05	Horizontal	-20.9	-13.0	7.9	135
4	6930.0	-43.35	4.5	11.15	Horizontal	-36.7	-13.0	23.7	270
5	8662.5	-48.75	5.1	11.35	Horizontal	-42.5	-13.0	29.5	180
6	10395.0	-46.05	5.3	11.95	Horizontal	-39.4	-13.0	26.4	225
7	12127.5	-44.75	5.5	13.55	Horizontal	-36.7	-13.0	23.7	45
8	13860.0	-44.25	6.3	13.75	Horizontal	-36.8	-13.0	23.8	90
9	15592.5	-43.25	6.7	13.85	Horizontal	-36.1	-13.0	23.1	270
10	17325.0	-42.45	6.8	14.25	Horizontal	-35.0	-13.0	22.0	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	3500.6	-49.75	2.6	10.15	Horizontal	-42.2	-13.0	29.2	225
3	5250.8	-32.85	2.4	11.05	Horizontal	-24.2	-13.0	11.2	45
4	7010.0	-48.35	4.5	11.15	Horizontal	-41.7	-13.0	28.7	135
5	8762.5	-47.15	5.1	11.35	Horizontal	-40.9	-13.0	27.9	180
6	10515.0	-45.25	5.3	11.95	Horizontal	-38.6	-13.0	25.6	225
7	12267.5	-44.75	5.5	13.55	Horizontal	-36.7	-13.0	23.7	45
8	14020.0	-45.35	6.3	13.75	Horizontal	-37.9	-13.0	24.9	90
9	15772.5	-43.95	6.7	13.85	Horizontal	-36.8	-13.0	23.8	270
10	17525.0	-46.15	6.8	14.25	Horizontal	-38.7	-13.0	25.7	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 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	3420.8	-50.95	2.6	10.15	Horizontal	-43.4	-13.0	30.4	225
3	5131.9	-32.45	2.4	11.35	Horizontal	-23.5	-13.0	10.5	45
4	6860.0	-49.65	4.5	10.85	Horizontal	-43.3	-13.0	30.3	90
5	8575.0	-47.25	5.1	11.35	Horizontal	-41.0	-13.0	28.0	180
6	10290.0	-45.55	5.3	11.95	Horizontal	-38.9	-13.0	25.9	270
7	12005.0	-47.15	5.5	13.55	Horizontal	-39.1	-13.0	26.1	135
8	13720.0	-42.75	6.3	13.75	Horizontal	-35.3	-13.0	22.3	180
9	15435.0	-45.15	6.7	13.85	Horizontal	-38.0	-13.0	25.0	225
10	17150.0	-43.35	6.8	14.25	Horizontal	-35.9	-13.0	22.9	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 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	3456.0	-49.55	2.6	10.75	Horizontal	-41.4	-13.0	28.4	90
3	5184.4	-32.35	2.4	11.05	Horizontal	-23.7	-13.0	10.7	180
4	6930.0	-49.85	4.5	11.15	Horizontal	-43.2	-13.0	30.2	270
5	8662.5	-46.65	5.1	11.35	Horizontal	-40.4	-13.0	27.4	180
6	10395.0	-45.85	5.3	11.95	Horizontal	-39.2	-13.0	26.2	225
7	12127.5	-46.15	5.5	13.55	Horizontal	-38.1	-13.0	25.1	45
8	13860.0	-42.15	6.3	13.75	Horizontal	-34.7	-13.0	21.7	90
9	15592.5	-45.95	6.7	13.85	Horizontal	-38.8	-13.0	25.8	180
10	17325.0	-42.65	6.8	14.25	Horizontal	-35.2	-13.0	22.2	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	3490.9	-51.25	2.6	10.15	Horizontal	-43.7	-13.0	30.7	270
3	5236.9	-31.95	2.4	11.05	Horizontal	-23.3	-13.0	10.3	180
4	7000.0	-49.65	4.5	11.15	Horizontal	-43.0	-13.0	30.0	225
5	8750.0	-47.15	5.1	11.35	Horizontal	-40.9	-13.0	27.9	45
6	10500.0	-45.05	5.3	11.95	Horizontal	-38.4	-13.0	25.4	90
7	12250.0	-45.65	5.5	13.55	Horizontal	-37.6	-13.0	24.6	180
8	14000.0	-44.05	6.3	13.75	Horizontal	-36.6	-13.0	23.6	270
9	15750.0	-45.25	6.7	13.85	Horizontal	-38.1	-13.0	25.1	45
10	17500.0	-44.15	6.8	14.25	Horizontal	-36.7	-13.0	23.7	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 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	3448.1	-50.75	2.6	10.15	Horizontal	-43.2	-13.0	30.2	45
3	5132.6	-32.45	2.4	11.35	Horizontal	-23.5	-13.0	10.5	90
4	6870.0	-49.05	4.5	10.85	Horizontal	-42.7	-13.0	29.7	90
5	8587.5	-46.55	5.1	11.35	Horizontal	-40.3	-13.0	27.3	45
6	10305.0	-45.35	5.3	11.95	Horizontal	-38.7	-13.0	25.7	135
7	12022.5	-45.65	5.5	13.55	Horizontal	-37.6	-13.0	24.6	225
8	13740.0	-43.55	6.3	13.75	Horizontal	-36.1	-13.0	23.1	45
9	15457.5	-45.85	6.7	13.85	Horizontal	-38.7	-13.0	25.7	90
10	17175.0	-43.95	6.8	14.25	Horizontal	-36.5	-13.0	23.5	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-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	3478.1	-49.25	2.6	10.75	Horizontal	-41.1	-13.0	28.1	135
3	5217.8	-33.85	2.4	11.05	Horizontal	-25.2	-13.0	12.2	45
4	6930.0	-49.85	4.5	11.15	Horizontal	-43.2	-13.0	30.2	90
5	8662.5	-46.75	5.1	11.35	Horizontal	-40.5	-13.0	27.5	180
6	10395.0	-44.95	5.3	11.95	Horizontal	-38.3	-13.0	25.3	270
7	12127.5	-45.95	5.5	13.55	Horizontal	-37.9	-13.0	24.9	225
8	13860.0	-43.45	6.3	13.75	Horizontal	-36.0	-13.0	23.0	135
9	15592.5	-44.85	6.7	13.85	Horizontal	-37.7	-13.0	24.7	225
10	17325.0	-42.05	6.8	14.25	Horizontal	-34.6	-13.0	21.6	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 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	3508.1	-51.15	2.6	10.15	Horizontal	-43.6	-13.0	30.6	90
3	5262.8	-31.85	2.4	11.05	Horizontal	-23.2	-13.0	10.2	135
4	6990.0	-50.25	4.5	11.15	Horizontal	-43.6	-13.0	30.6	225
5	8737.5	-47.05	5.1	11.35	Horizontal	-40.8	-13.0	27.8	45
6	10485.0	-44.55	5.3	11.95	Horizontal	-37.9	-13.0	24.9	90
7	12232.5	-46.05	5.5	13.55	Horizontal	-38.0	-13.0	25.0	135
8	13980.0	-43.25	6.3	13.75	Horizontal	-35.8	-13.0	22.8	135
9	15727.5	-44.05	6.7	13.85	Horizontal	-36.9	-13.0	23.9	90
10	17475.0	-42.85	6.8	14.25	Horizontal	-35.4	-13.0	22.4	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-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	3421.9	-50.05	2.6	10.15	Horizontal	-42.5	-13.0	29.5	135
3	5133.0	-30.85	2.4	11.35	Horizontal	-21.9	-13.0	8.9	90
4	6880.0	-49.55	4.5	10.85	Horizontal	-43.2	-13.0	30.2	45
5	8600.0	-46.75	5.1	11.35	Horizontal	-40.5	-13.0	27.5	90
6	10320.0	-45.45	5.3	11.95	Horizontal	-38.8	-13.0	25.8	90
7	12040.0	-45.95	5.5	13.55	Horizontal	-37.9	-13.0	24.9	135
8	13760.0	-43.75	6.3	13.75	Horizontal	-36.3	-13.0	23.3	225
9	15480.0	-45.75	6.7	13.85	Horizontal	-38.6	-13.0	25.6	135
10	17200.0	-42.55	6.8	14.25	Horizontal	-35.1	-13.0	22.1	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-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	3447.0	-48.35	2.6	10.75	Horizontal	-40.2	-13.0	27.2	90
3	5170.5	-30.65	2.4	11.05	Horizontal	-22.0	-13.0	9.0	45
4	6930.0	-49.95	4.5	11.15	Horizontal	-43.3	-13.0	30.3	45
5	8662.5	-47.65	5.1	11.35	Horizontal	-41.4	-13.0	28.4	180
6	10395.0	-44.95	5.3	11.95	Horizontal	-38.3	-13.0	25.3	270
7	12127.5	-45.55	5.5	13.55	Horizontal	-37.5	-13.0	24.5	225
8	13860.0	-42.95	6.3	13.75	Horizontal	-35.5	-13.0	22.5	135
9	15592.5	-44.95	6.7	13.85	Horizontal	-37.8	-13.0	24.8	180
10	17325.0	-42.25	6.8	14.25	Horizontal	-34.8	-13.0	21.8	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-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	3472.1	-52.35	2.6	10.15	Horizontal	-44.8	-13.0	31.8	45
3	5208.4	-32.05	2.4	11.05	Horizontal	-23.4	-13.0	10.4	225
4	6980.0	-49.65	4.5	11.15	Horizontal	-43.0	-13.0	30.0	135
5	8725.0	-47.05	5.1	11.35	Horizontal	-40.8	-13.0	27.8	90
6	10470.0	-44.35	5.3	11.95	Horizontal	-37.7	-13.0	24.7	45
7	12215.0	-45.25	5.5	13.55	Horizontal	-37.2	-13.0	24.2	90
8	13960.0	-43.55	6.3	13.75	Horizontal	-36.1	-13.0	23.1	45
9	15705.0	-44.95	6.7	13.85	Horizontal	-37.8	-13.0	24.8	135
10	17450.0	-42.45	6.8	14.25	Horizontal	-35.0	-13.0	22.0	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 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	-36.20	2.00	10.15	Horizontal	-30.2	-13.0	17.2	270
3	2104.50	-43.50	2.50	11.35	Horizontal	-36.8	-13.0	23.8	135
4	2806.00	-45.80	4.20	10.85	Horizontal	-41.3	-13.0	28.3	270
5	3507.50	-37.70	5.20	11.35	Horizontal	-33.7	-13.0	20.7	135
6	4209.00	-37.30	5.50	11.95	Horizontal	-33.0	-13.0	20.0	270
7	4910.50	-42.90	5.70	13.55	Horizontal	-37.2	-13.0	24.2	315
8	5612.00	-51.50	6.30	13.75	Horizontal	-46.2	-13.0	33.2	315
9	6313.50	-51.20	6.80	13.85	Horizontal	-46.3	-13.0	33.3	270
10	7015.00	-50.50	6.90	14.25	Horizontal	-45.3	-13.0	32.3	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 Horizontal 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	-42.90	2.00	10.75	Horizontal	-36.3	-13.0	23.3	315
3	2122.50	-46.09	2.51	11.05	Horizontal	-39.7	-13.0	26.7	135
4	2830.00	-47.50	4.20	11.15	Horizontal	-42.7	-13.0	29.7	270
5	3537.50	-47.60	5.20	11.15	Horizontal	-43.8	-13.0	30.8	315
6	4245.00	-38.20	5.50	11.95	Horizontal	-33.9	-13.0	20.9	90
7	4952.50	-43.20	5.70	13.55	Horizontal	-37.5	-13.0	24.5	225
8	5660.00	-53.60	6.30	13.75	Horizontal	-48.3	-13.0	35.3	180
9	6367.50	-47.90	6.80	13.85	Horizontal	-43.0	-13.0	30.0	45
10	7075.00	-48.10	6.90	14.25	Horizontal	-42.9	-13.0	29.9	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 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	-30.10	2.00	10.15	Horizontal	-24.1	-13.0	11.1	315
3	2140.50	-38.99	2.51	11.05	Horizontal	-32.6	-13.0	19.6	315
4	2854.00	-44.90	4.20	11.15	Horizontal	-40.1	-13.0	27.1	270
5	3567.50	-38.90	5.20	11.15	Horizontal	-35.1	-13.0	22.1	270
6	4281.00	-35.90	5.50	11.95	Horizontal	-31.6	-13.0	18.6	135
7	4994.50	-42.00	5.70	13.55	Horizontal	-36.3	-13.0	23.3	270
8	5708.00	-53.00	6.30	13.75	Horizontal	-47.7	-13.0	34.7	315
9	6421.50	-51.30	6.80	13.85	Horizontal	-46.4	-13.0	33.4	225
10	7135.00	-48.90	6.90	14.25	Horizontal	-43.7	-13.0	30.7	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 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	-34.80	2.00	10.15	Horizontal	-28.8	-13.0	15.8	270
3	2112.00	-43.29	2.51	11.35	Horizontal	-36.6	-13.0	23.6	45
4	2816.00	-46.60	4.20	10.85	Horizontal	-42.1	-13.0	29.1	315
5	3520.00	-41.20	5.20	11.35	Horizontal	-37.2	-13.0	24.2	45
6	4224.00	-37.00	5.50	11.95	Horizontal	-32.7	-13.0	19.7	225
7	4928.00	-43.90	5.70	13.55	Horizontal	-38.2	-13.0	25.2	180
8	5632.00	-53.70	6.30	13.75	Horizontal	-48.4	-13.0	35.4	45
9	6336.00	-51.70	6.80	13.85	Horizontal	-46.8	-13.0	33.8	315
10	7040.00	-48.80	6.90	14.25	Horizontal	-43.6	-13.0	30.6	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 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	-39.60	2.00	10.75	Horizontal	-33.0	-13.0	20.0	90
3	2122.50	-46.19	2.51	11.05	Horizontal	-39.8	-13.0	26.8	225
4	2830.00	-44.00	4.20	11.15	Horizontal	-39.2	-13.0	26.2	180
5	3537.50	-43.50	5.20	11.15	Horizontal	-39.7	-13.0	26.7	270
6	4245.00	-40.60	5.50	11.95	Horizontal	-36.3	-13.0	23.3	45
7	4952.50	-42.90	5.70	13.55	Horizontal	-37.2	-13.0	24.2	315
8	5660.00	-53.20	6.30	13.75	Horizontal	-47.9	-13.0	34.9	90
9	6367.50	-50.20	6.80	13.85	Horizontal	-45.3	-13.0	32.3	225
10	7075.00	-49.60	6.90	14.25	Horizontal	-44.4	-13.0	31.4	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 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	-40.40	2.00	10.15	Horizontal	-34.4	-13.0	21.4	45
3	2133.00	-43.59	2.51	11.05	Horizontal	-37.2	-13.0	24.2	315
4	2844.00	-48.50	4.20	11.15	Horizontal	-43.7	-13.0	30.7	270
5	3555.00	-47.10	5.20	11.15	Horizontal	-43.3	-13.0	30.3	45
6	4266.00	-38.50	5.50	11.95	Horizontal	-34.2	-13.0	21.2	315
7	4977.00	-47.80	5.70	13.55	Horizontal	-42.1	-13.0	29.1	270
8	5688.00	-52.80	6.30	13.75	Horizontal	-47.5	-13.0	34.5	135
9	6399.00	-52.00	6.80	13.85	Horizontal	-47.1	-13.0	34.1	270
10	7110.00	-49.10	6.90	14.25	Horizontal	-43.9	-13.0	30.9	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 17 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	1413.0	-38.10	2.00	10.15	Horizontal	-32.1	-13.0	19.1	90
3	2119.5	-48.00	2.50	11.35	Horizontal	-41.3	-13.0	28.3	135
4	2826.0	-47.20	4.20	10.85	Horizontal	-42.7	-13.0	29.7	225
5	3532.5	-48.00	5.20	11.35	Horizontal	-44.0	-13.0	31.0	45
6	4239.0	-40.30	5.50	11.95	Horizontal	-36.0	-13.0	23.0	90
7	4945.5	-39.90	5.70	13.55	Horizontal	-34.2	-13.0	21.2	45
8	5652.0	-53.20	6.30	13.75	Horizontal	-47.9	-13.0	34.9	135
9	6358.5	-50.20	6.80	13.85	Horizontal	-45.3	-13.0	32.3	90
10	7065.0	-48.00	6.90	14.25	Horizontal	-42.8	-13.0	29.8	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 Horizontal position.

LTE Band 17 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	1420.0	-40.90	2.00	10.75	Horizontal	-34.3	-13.0	21.3	135
3	2130.0	-39.79	2.51	11.05	Horizontal	-33.4	-13.0	20.4	90
4	2840.0	-48.30	4.20	11.15	Horizontal	-43.5	-13.0	30.5	90
5	3550.0	-46.60	5.20	11.15	Horizontal	-42.8	-13.0	29.8	135
6	4260.0	-38.00	5.50	11.95	Horizontal	-33.7	-13.0	20.7	45
7	4970.0	-46.00	5.70	13.55	Horizontal	-40.3	-13.0	27.3	90
8	5680.0	-51.70	6.30	13.75	Horizontal	-46.4	-13.0	33.4	90
9	6390.0	-50.40	6.80	13.85	Horizontal	-45.5	-13.0	32.5	45
10	7100.0	-48.80	6.90	14.25	Horizontal	-43.6	-13.0	30.6	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 17 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	1427.0	-30.40	2.00	10.15	Horizontal	-24.4	-13.0	11.4	45
3	2140.5	-38.69	2.51	11.05	Horizontal	-32.3	-13.0	19.3	45
4	2854.0	-44.70	4.20	11.15	Horizontal	-39.9	-13.0	26.9	180
5	3567.5	-38.20	5.20	11.15	Horizontal	-34.4	-13.0	21.4	225
6	4281.0	-35.80	5.50	11.95	Horizontal	-31.5	-13.0	18.5	45
7	4994.5	-42.00	5.70	13.55	Horizontal	-36.3	-13.0	23.3	90
8	5708.0	-51.20	6.30	13.75	Horizontal	-45.9	-13.0	32.9	135
9	6421.5	-51.20	6.80	13.85	Horizontal	-46.3	-13.0	33.3	135
10	7135.0	-47.20	6.90	14.25	Horizontal	-42.0	-13.0	29.0	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 Horizontal position.

LTE Band 17 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	1418.0	-41.70	2.00	10.15	Horizontal	-35.7	-13.0	22.7	270
3	2127.0	-47.59	2.51	11.35	Horizontal	-40.9	-13.0	27.9	225
4	2836.0	-47.50	4.20	10.85	Horizontal	-43.0	-13.0	30.0	135
5	3545.0	-40.20	5.20	11.35	Horizontal	-36.2	-13.0	23.2	90
6	4254.0	-36.90	5.50	11.95	Horizontal	-32.6	-13.0	19.6	180
7	4963.0	-43.40	5.70	13.55	Horizontal	-37.7	-13.0	24.7	270
8	5672.0	-52.70	6.30	13.75	Horizontal	-47.4	-13.0	34.4	225
9	6381.0	-50.40	6.80	13.85	Horizontal	-45.5	-13.0	32.5	135
10	7090.0	-48.50	6.90	14.25	Horizontal	-43.3	-13.0	30.3	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 17 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	1420.0	-40.60	2.00	10.75	Horizontal	-34.0	-13.0	21.0	180
3	2130.0	-45.89	2.51	11.05	Horizontal	-39.5	-13.0	26.5	225
4	2840.0	-48.80	4.20	11.15	Horizontal	-44.0	-13.0	31.0	45
5	3550.0	-47.20	5.20	11.15	Horizontal	-43.4	-13.0	30.4	45
6	4260.0	-38.60	5.50	11.95	Horizontal	-34.3	-13.0	21.3	90
7	4970.0	-47.30	5.70	13.55	Horizontal	-41.6	-13.0	28.6	135
8	5680.0	-52.30	6.30	13.75	Horizontal	-47.0	-13.0	34.0	225
9	6390.0	-50.20	6.80	13.85	Horizontal	-45.3	-13.0	32.3	45
10	7100.0	-48.20	6.90	14.25	Horizontal	-43.0	-13.0	30.0	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 17 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	1422.0	-40.20	2.00	10.15	Horizontal	-34.2	-13.0	21.2	225
3	2133.0	-42.79	2.51	11.05	Horizontal	-36.4	-13.0	23.4	135
4	2844.0	-48.90	4.20	11.15	Horizontal	-44.1	-13.0	31.1	90
5	3555.0	-46.60	5.20	11.15	Horizontal	-42.8	-13.0	29.8	135
6	4266.0	-37.40	5.50	11.95	Horizontal	-33.1	-13.0	20.1	135
7	4977.0	-47.50	5.70	13.55	Horizontal	-41.8	-13.0	28.8	90
8	5688.0	-52.20	6.30	13.75	Horizontal	-46.9	-13.0	33.9	225
9	6399.0	-50.90	6.80	13.85	Horizontal	-46.0	-13.0	33.0	135
10	7110.0	-47.20	6.90	14.25	Horizontal	-42.0	-13.0	29.0	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.

6 Main Test Instruments

Name	Manufacturer	Type	Serial Number	Calibration Date	Expiration Date
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	2017-11-18	2020-11-17
Horn Antenna	R&S	HF907	100126	2014-12-06	2019-12-05
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
Software	R&S	EMC32	V 8.52.0	NA	NA

ANNEX A: EUT Appearance and Test Setup

A.1 EUT Appearance



Front Side



Back Side

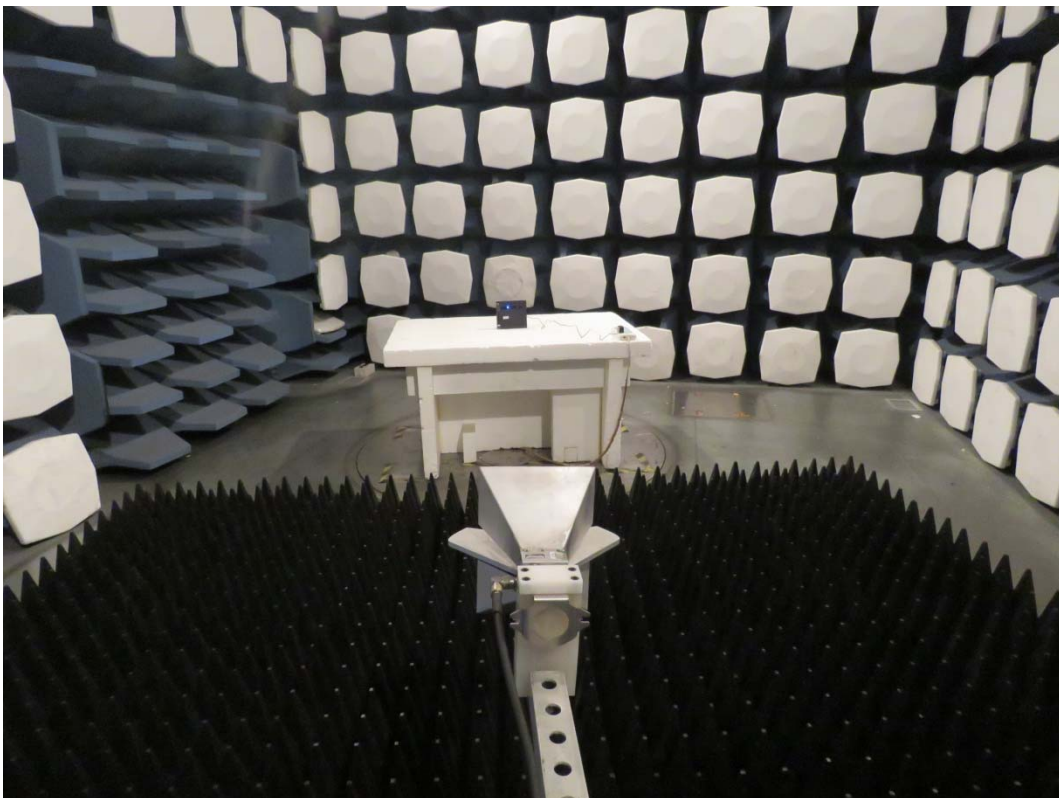
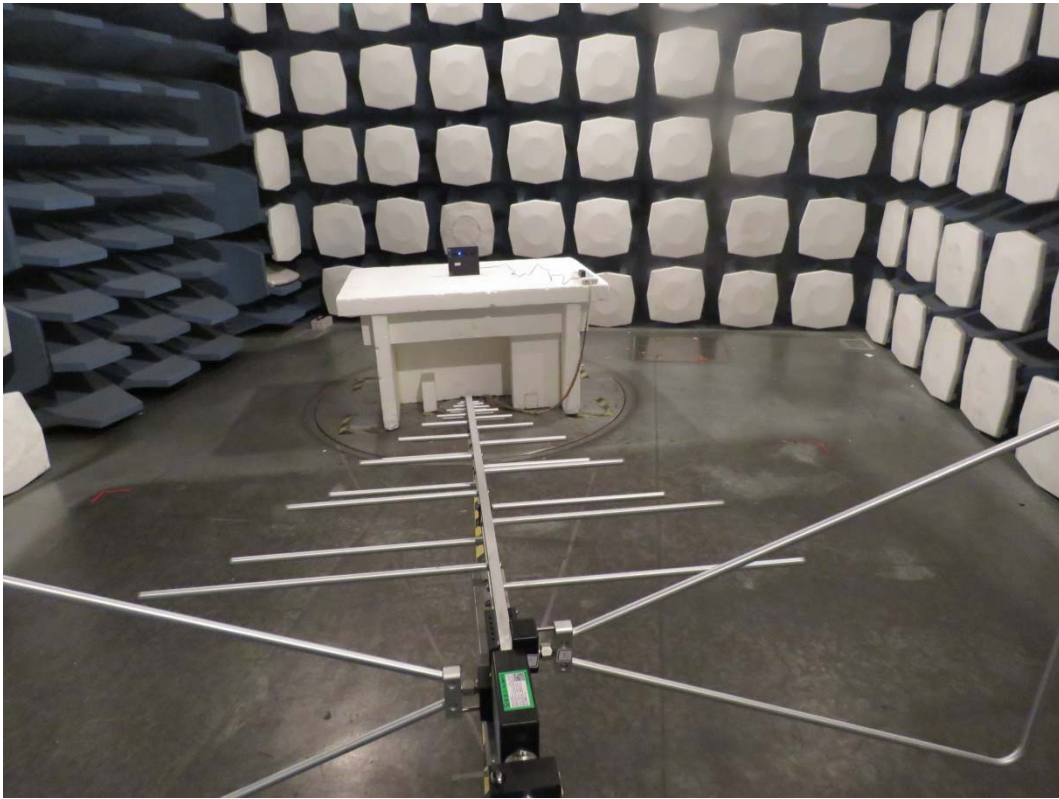
a: EUT



b: Adapter

Picture 1 EUT and Accessory

A.2 Test Setup



Picture 2: Radiated Spurious Emissions Test setup