



RF TEST REPORT

Applicant ZTE Corporation
FCC ID SRQ-MF985U
Product LTE UFI
Model MF985U
Report No. RXA1712-0441RF03
Issue Date January 29, 2018

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.

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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(b)(10) /27.50(c)(10)	PASS
3	Occupied Bandwidth	2.1049	PASS
4	Band Edge Compliance	27.53(h) /27.53(g) /27.53(f)	PASS
5	Peak-to-Average Power Ratio	27.50(d)/KDB971168 D01(5.7)	PASS
6	Frequency Stability	2.1055 / 27.54	PASS
7	Spurious Emissions at Antenna Terminals	2.1051 27.53(h) /27.53(g) /27.53(f)	PASS
8	Radiates Spurious Emission	2.1053 /27.53(h) /27.53(g) /27.53(f)	PASS
Date of Testing: December 26, 2017 ~ January 18, 2018			
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, 518057, P.R.China
Manufacturer	ZTE Corporation
Manufacturer address	ZTE Plaza, Keji Road South, Hi-Tech, Industrial Park, Nanshan District, Shenzhen, Guangdong, 518057, P.R.China

General information

EUT Description			
Model	MF985U		
IMEI	99000897000163		
Hardware Version	MF985UHW1.0		
Software Version	USCC_US_MF985UV1.0.0B02		
Power Supply	Battery/AC adapter		
Antenna Type	Internal Antenna		
Test Mode(s)	LTE Band 4; LTE Band 12, LTE Band 13;		
Test Modulation	QPSK 16QAM;		
LTE Category	9		
Maximum E.I.R.P./ E.R.P.	LTE Band 4:	19.99dBm	
	LTE Band 12:	13.17dBm	
	LTE Band 13:	12.50dBm	
Rated Power Supply Voltage:	3.85V		
Extreme Voltage	Minimum: 3.4V Maximum: 4.4V		
Extreme Temperature	Lowest: -20°C Highest: +55°C		
Operating Frequency Range(s)	Mode	Tx (MHz)	Rx (MHz)
	LTE Band 4	1710 ~ 1755	2110 ~ 2155
	LTE Band 12	699 ~ 716	729 ~ 746
	LTE Band 13	777 ~ 787	746 ~ 756
EUT Accessory			
Adapter 1	Manufacturer: SHENZHEN RUIJING INDUSTRIAL CO LTD Model: STC-A515A-Z		
Adapter 2	Manufacturer: Jiangsu Chenyang Electron Co., Ltd. Model: STC-A515A-Z		
Adapter 3	Manufacturer: Shenzhen Dokocom Energy Technology Co., Ltd. Model: STC-A515A-Z		
Battery	Manufacturer: ARBIN COSLIGHT POWER CO LTD		



	Model: Li3930T44P4h794659
USB Cable 1	Manufacturer: LUXSHARE-ICT 100cm Cable, Shielded
USB Cable 2	Manufacturer: kingpower-tech 100cm Cable, Shielded
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-E (2016)

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 (X axis, horizontal polarization) and the worst case was recorded.

All mode and data rates and positions and RB size and modulations were investigated.

Subsequently, only the worst case emissions are reported.

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

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

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

Test items	Modes	Bandwidth (MHz)						Modulation		RB			Test Channel		
		1.4	3	5	10	15	20	QPSK	16QAM	1	50%	100%	L	M	H
RF power output	LTE 4	O	O	O	O	O	O	O	O	O	O	O	O	O	O
	LTE 12	O	O	O	O	-	-	O	O	O	O	O	O	O	O
	LTE 13	-	-	O	O	-	-	O	O	O	O	O	O	O	O
Effective Isotropic Radiated power	LTE 4	O	O	O	O	O	O	O	O	-	-	O	O	O	O
	LTE 12	O	O	O	O	-	-	O	O	-	-	O	O	O	O
	LTE 13	-	-	O	O	-	-	O	O	-	-	O	O	O	O
Occupied Bandwidth	LTE 4	O	O	O	O	O	O	O	O	-	-	O	O	O	O
	LTE 12	O	O	O	O	-	-	O	O	-	-	O	O	O	O
	LTE 13	-	-	O	O	-	-	O	O	-	-	O	O	O	O
Band Edge Compliance	LTE 4	O	O	O	O	O	O	O	O	O	-	O	O	-	O
	LTE 12	O	O	O	O	-	-	O	O	O	-	O	O	-	O
	LTE 13	-	-	O	O	-	-	O	O	O	-	O	O	-	O
Peak-to-Average Power Ratio	LTE 4	O	O	O	O	O	O	O	O	-	-	O	O	O	O
	LTE 12	O	O	O	O	-	-	O	O	-	-	O	O	O	O
	LTE 13	-	-	O	O	-	-	O	O	-	-	O	O	O	O
Frequency Stability	LTE 4	O	O	O	O	O	O	O	O	-	-	O	-	O	-
	LTE 12	O	O	O	O	-	-	O	O	-	-	O	-	O	-
	LTE 13	-	-	O	O	-	-	O	O	-	-	O	-	O	-
Spurious Emissions at Antenna Terminals	LTE 4	O	O	O	O	O	O	O	-	O	-	-	O	O	O
	LTE 12	O	O	O	O	-	-	O	-	O	-	-	O	O	O
	LTE 13	-	-	O	O	-	-	O	-	O	-	-	O	O	O
Radiates Spurious Emission	LTE 4	O	O	O	O	O	O	O	-	O	-	-	O	O	O
	LTE 12	O	O	O	O	-	-	O	-	O	-	-	O	O	O
	LTE 13	-	-	O	O	-	-	O	-	O	-	-	O	O	O
Note	1. The mark "O" means that this configuration is chosen for testing. 2. The mark "-" means that this configuration is not testing.														

5 Test 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)		
				19957/1710.7	20175/1732.5	20393/1754.3
1.4MHz	QPSK	1	0	22.35	22.38	22.26
		1	2	22.44	22.43	22.29
		1	5	22.36	22.41	22.30
		3	0	22.39	22.44	22.35
		3	2	22.40	22.46	22.37
		3	3	22.35	22.41	22.43
		6	0	21.56	21.43	21.48
	16QAM	1	0	21.73	21.89	21.72
		1	2	21.81	21.64	21.75
		1	5	21.67	21.83	21.65
		3	0	21.51	21.43	21.41
		3	2	21.46	21.49	21.45
		3	3	21.53	21.47	21.44
		6	0	20.68	20.51	20.64
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				19965/1711.5	20175/1732.5	20385/1753.5
3MHz	QPSK	1	0	22.18	22.17	22.15
		1	7	22.38	22.18	22.45
		1	14	22.14	22.00	22.02
		8	0	21.33	21.33	21.32
		8	4	21.45	21.46	21.45
		8	7	21.34	21.25	21.09
		15	0	21.25	21.32	21.16
	16QAM	1	0	21.51	21.57	21.54
		1	7	21.55	21.51	21.44
		1	14	21.44	21.48	21.45
		8	0	20.46	20.37	20.41
		8	4	20.54	20.52	20.43
		8	7	20.31	20.29	20.20
		15	0	20.35	20.36	20.26
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				19975/1712.5	20175/1732.5	20375/1752.5
5MHz	QPSK	1	0	22.15	22.15	22.11
		1	13	22.36	22.14	22.42
		1	24	22.11	21.95	21.98
		12	0	21.30	21.28	21.28
		12	6	21.43	21.42	21.40
		12	13	21.32	21.23	21.05
		25	0	21.23	21.31	21.14



	16QAM	1	0	21.48	21.53	21.51
		1	13	21.52	21.49	21.41
		1	24	21.41	21.46	21.41
		12	0	20.44	20.33	20.38
		12	6	20.51	20.47	20.39
		12	13	20.28	20.24	20.16
		25	0	20.33	20.32	20.21
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				20000/1715	20175/1732.5	20350/1750
10MHz	QPSK	1	0	22.17	22.16	22.14
		1	25	22.39	22.19	22.46
		1	49	22.13	21.99	22.01
		25	0	21.33	21.33	21.32
		25	13	21.46	21.47	21.44
		25	25	21.34	21.27	21.10
		50	0	21.31	21.33	21.18
	16QAM	1	0	21.50	21.56	21.53
		1	25	21.55	21.53	21.44
		1	49	21.44	21.48	21.44
		25	0	20.47	20.38	20.42
		25	13	20.53	20.51	20.42
		25	25	20.31	20.29	20.20
		50	0	20.36	20.37	20.25
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				20025/1717.5	20175/1732.5	20325/1747.5
15MHz	QPSK	1	0	22.16	22.12	22.12
		1	38	22.37	22.18	22.43
		1	74	22.10	21.94	21.97
		36	0	21.31	21.29	21.29
		36	18	21.43	21.42	21.40
		36	39	21.31	21.24	21.06
		75	0	21.29	21.29	21.13
	16QAM	1	0	21.45	21.54	21.51
		1	38	21.53	21.50	21.42
		1	74	21.41	21.44	21.41
		36	0	20.44	20.36	20.39
		36	18	20.50	20.46	20.38
		36	39	20.29	20.25	20.17
		75	0	20.33	20.32	20.21
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				20050/1720	20175/1732.5	20300/1745
20MHz	QPSK	1	0	22.13	22.08	22.09
		1	50	22.36	22.14	22.41



		1	99	22.08	21.93	21.94
		50	0	21.28	21.24	21.25
		50	25	21.41	21.38	21.37
		50	50	21.28	21.19	21.02
		100	0	21.26	21.24	21.09
	16QAM	1	0	21.43	21.50	21.46
		1	50	21.49	21.48	21.38
		1	99	21.39	21.41	21.39
		50	0	20.41	20.32	20.36
		50	25	20.47	20.44	20.35
		50	50	20.26	20.20	20.13
		100	0	20.31	20.28	20.18
		Note:1) The following testing in worst case based on the maximum RF Output Power.				

LTE Band 12				AV Conducted Power(dBm)		
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				23017/699.7	23095/707.5	23173/715.3
1.4MHz	QPSK	1	0	23.29	23.37	23.44
		1	2	23.26	23.47	23.51
		1	5	23.38	23.35	23.65
		3	0	23.22	23.32	23.49
		3	2	23.24	23.40	23.42
		3	3	23.35	23.34	23.41
		6	0	22.25	22.45	22.52
	16QAM	1	0	22.61	22.59	22.46
		1	2	22.55	22.61	22.49
		1	5	22.49	22.74	22.59
		3	0	22.38	22.40	22.37
		3	2	22.39	22.46	22.44
		3	3	22.44	22.61	22.67
		6	0	21.43	21.51	21.55
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				23025/700.5	23095/707.5	23165/714.5
3MHz	QPSK	1	0	23.42	23.35	23.37
		1	7	23.34	23.48	23.25
		1	14	23.59	23.58	23.63
		8	0	22.37	22.65	22.36
		8	4	22.32	22.49	22.40
		8	7	22.51	22.52	22.41
		15	0	22.50	22.40	22.40
	16QAM	1	0	22.64	22.62	22.26
		1	7	22.57	22.68	22.56
		1	14	22.57	22.68	22.46



		8	0	21.42	21.28	21.32
		8	4	21.48	21.48	21.42
		8	7	21.56	21.51	21.46
		15	0	21.42	21.39	21.44
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				23035/701.5	23095/707.5	23155/713.5
5MHz	QPSK	1	0	23.39	23.33	23.33
		1	13	23.32	23.44	23.22
		1	24	23.56	23.53	23.59
		12	0	22.34	22.60	22.32
		12	6	22.30	22.45	22.35
		12	13	22.49	22.50	22.37
		25	0	22.48	22.39	22.38
	16QAM	1	0	22.61	22.58	22.23
		1	13	22.54	22.66	22.53
		1	24	22.54	22.66	22.42
		12	0	21.40	21.24	21.29
		12	6	21.45	21.43	21.38
		12	13	21.53	21.46	21.42
		25	0	21.40	21.35	21.39
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				23060/704	23095/707.5	23130/711
10MHz	QPSK	1	0	23.37	23.26	23.31
		1	25	23.32	23.44	23.21
		1	49	23.53	23.51	23.55
		25	0	22.32	22.56	22.29
		25	13	22.28	22.41	22.32
		25	25	22.45	22.46	22.34
		50	0	22.51	22.32	22.33
	16QAM	1	0	22.56	22.55	22.18
		1	25	22.51	22.65	22.50
		1	49	22.52	22.61	22.40
		25	0	21.37	21.23	21.27
		25	13	21.41	21.40	21.34
		25	25	21.51	21.42	21.39
		50	0	21.38	21.31	21.36

LTE Band 13				Conducted Power(dBm)		
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				23205/779.5	23230/782	23255/784.5
5MHz	QPSK	1	0	23.56	23.45	23.45
		1	13	23.45	23.61	23.49
		1	24	23.31	23.54	23.33
		12	0	22.19	22.34	22.32
		12	6	22.37	22.45	22.38
		12	13	22.28	22.39	22.29
		25	0	22.28	22.38	22.37
	16QAM	1	0	22.64	22.90	22.40
		1	13	22.54	22.79	22.51
		1	24	22.57	22.69	22.61
		12	0	21.17	21.32	21.26
		12	6	21.39	21.40	21.40
		12	13	21.34	21.41	21.32
		25	0	21.32	21.39	21.47
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				/	23230/782	/
10MHz	QPSK	1	0	/	23.16	/
		1	25	/	23.29	/
		1	49	/	23.25	/
		25	0	/	22.36	/
		25	13	/	22.42	/
		25	25	/	22.29	/
		50	0	/	22.38	/
	16QAM	1	0	/	22.22	/
		1	25	/	22.33	/
		1	49	/	22.25	/
		25	0	/	21.33	/
		25	13	/	21.36	/
		25	25	/	21.27	/
		50	0	/	21.37	/



DL LTE CA Class	PCC						SCC			Power(dBm)		
	PCC Band	PCC Bandwidth (MHz)	PCC UL RB size	PCC UL RB offset	PCC UL Channel	PCC DL Channel	SCC Band	SCC Bandwidth (MHz)	SCC DL Channel	Standalone	CA active	Delta
CA_2A-4A	2	5	1	24	18900	900	4	20	2300	22.97	23.10	0.13
	2	10	1	49	18900	900	4	20	2300	23.01	23.12	0.11
	2	15	1	74	18900	900	4	20	2300	22.96	23.09	0.13
	2	20	1	99	18900	900	4	20	2300	22.95	23.09	0.14
	4	5	1	13	20375	2375	2	20	900	22.42	22.56	0.14
	4	10	1	25	20350	2350	2	20	900	22.46	22.58	0.12
	4	15	1	38	20325	2325	2	20	900	22.43	22.59	0.16
	4	20	1	50	20300	2300	2	20	900	22.41	22.63	0.22
CA_4A-5A	4	5	1	13	20375	2375	5	10	2600	22.42	22.53	0.11
	4	10	1	25	20350	2350	5	10	2600	22.46	22.59	0.13
	4	15	1	38	20325	2325	5	10	2600	22.43	22.44	0.01
	4	20	1	50	20300	2300	5	10	2600	22.41	22.57	0.16
	5	5	1	24	20625	2625	4	20	2300	23.49	23.59	0.10
	5	10	1	49	20600	2600	4	20	2300	23.45	23.48	0.03
CA_4A-12A	4	1.4	1	2	20393	2393	12	10	5130	22.41	22.56	0.15
	4	3	1	7	20385	2385	12	10	5130	22.45	22.52	0.07
	4	5	1	13	20375	2375	12	10	5130	22.42	22.48	0.06
	4	10	1	25	20350	2350	12	10	5130	22.46	22.44	-0.02
	4	15	1	38	20325	2325	12	10	5130	22.43	22.53	0.10
	4	20	1	50	20300	2300	12	10	5130	22.41	22.56	0.15



DL LTE CA Class	PCC						SCC1			SCC2			Power(dBm)		
	PCC Band	PCC Bandwidth (MHz)	PCC UL RB size	PCC UL RB offset	PCC UL Channel	PCC DL Channel	SCC1 Band	SCC1 Bandwidth (MHz)	SCC1 DL Channel	SCC2 Band	SCC2 Bandwidth (MHz)	SCC2 DL Channel	Standalone	CA active	Delta
CA_2A-2A -12A	2	5	1	24	18900	900	2	20	900	12	10	5130	22.43	22.34	-0.09
	2	10	1	49	18900	900	2	20	900	12	10	5130	22.35	22.40	0.05
	2	15	1	74	18900	900	2	20	900	12	10	5130	22.44	22.48	0.04
	2	20	1	99	18900	900	2	20	900	12	10	5130	22.44	22.37	-0.07
	12	10	1	24	23130	5130	2	20	900	2	20	900	23.61	23.64	0.03
	12	10	1	49	23130	5130	2	20	900	2	20	900	23.58	23.52	-0.06
CA_2A-4A -5A	2	5	1	24	18900	900	4	20	2300	5	10	2600	22.43	22.34	-0.09
	2	10	1	49	18900	900	4	20	2300	5	10	2600	22.35	22.40	0.05
	2	15	1	74	18900	900	4	20	2300	5	10	2600	22.44	22.48	0.04
	2	20	1	99	18900	900	4	20	2300	5	10	2600	22.44	22.37	-0.07
	4	5	1	13	20375	2375	2	20	900	5	10	2600	22.44	22.55	0.11
	4	10	1	25	20350	2350	2	20	900	5	10	2600	22.49	22.56	0.07
	4	15	1	38	20325	2325	2	20	900	5	10	2600	22.44	22.56	0.12
	4	20	1	50	20300	2300	2	20	900	5	10	2600	22.43	22.62	0.19
	5	5	1	24	20625	2625	2	20	900	4	20	2300	23.52	23.54	0.02
	5	10	1	49	20600	2600	2	20	900	4	20	2300	23.47	23.60	0.13

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-E (2016).

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.

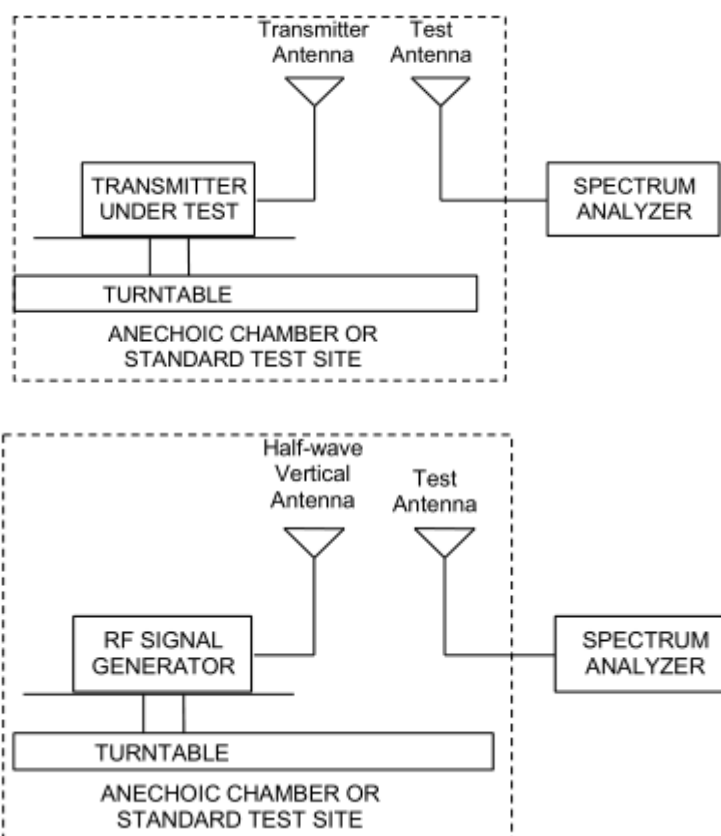
g) When calculating ERP, in addition to knowing the antenna radiation and matching characteristics, it is necessary to know the loss values of all elements (e.g. transmission line attenuation, mismatches, filters, combiners) interposed between the point where transmitter output power is measured, and 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	$\leq 3 \text{ W}$ (34.77 dBm)
Part 27.50(c)(10)Limit	$\leq 3 \text{ W}$ (34.77 dBm)
Part 27.50(d)(4)Limit	$\leq 1 \text{ W}$ (30 dBm)

Measurement Uncertainty

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

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
1.4 MHz (QPSK)	Low	1710.7	Horizontal	-36.41	-54.30	1.44	19.33	30	Pass
	Mid	1732.5	Horizontal	-36.43	-54.32	1.57	19.46	30	Pass
	High	1754.3	Horizontal	-36.33	-54.10	1.72	19.48	30	Pass
3 MHz (QPSK)	Low	1711.5	Horizontal	-36.31	-54.35	1.44	19.48	30	Pass
	Mid	1732.5	Horizontal	-36.50	-54.41	1.57	19.48	30	Pass
	High	1753.5	Horizontal	-36.93	-54.48	1.72	19.26	30	Pass
5 MHz (QPSK)	Low	1712.5	Horizontal	-36.53	-54.34	1.44	19.25	30	Pass
	Mid	1732.5	Horizontal	-36.76	-54.32	1.57	19.12	30	Pass
	High	1752.5	Horizontal	-36.50	-54.13	1.72	19.35	30	Pass
10 MHz (QPSK)	Low	1715	Horizontal	-36.54	-54.32	1.44	19.22	30	Pass
	Mid	1732.5	Horizontal	-36.65	-54.41	1.57	19.33	30	Pass
	High	1750	Horizontal	-36.93	-54.52	1.66	19.25	30	Pass
15 MHz (QPSK)	Low	1717.5	Horizontal	-36.54	-54.35	1.49	19.29	30	Pass
	Mid	1732.5	Horizontal	-36.40	-54.32	1.57	19.49	30	Pass
	High	1747.5	Horizontal	-36.31	-54.17	1.66	19.52	30	Pass
20 MHz (QPSK)	Low	1720	Horizontal	-36.50	-54.44	1.49	19.42	30	Pass
	Mid	1732.5	Horizontal	-35.99	-54.41	1.57	19.99	30	Pass
	High	1745	Horizontal	-36.63	-54.59	1.63	19.59	30	Pass
1.4 MHz (16QAM)	Low	1710.7	Horizontal	-36.54	-54.30	1.44	19.20	30	Pass
	Mid	1732.5	Horizontal	-36.55	-54.32	1.57	19.33	30	Pass
	High	1754.3	Horizontal	-36.46	-54.10	1.72	19.36	30	Pass
3 MHz (16QAM)	Low	1711.5	Horizontal	-36.43	-54.35	1.44	19.36	30	Pass
	Mid	1732.5	Horizontal	-36.63	-54.41	1.57	19.35	30	Pass
	High	1753.5	Horizontal	-37.06	-54.48	1.72	19.14	30	Pass
5 MHz (16QAM)	Low	1712.5	Horizontal	-36.66	-54.34	1.44	19.12	30	Pass
	Mid	1732.5	Horizontal	-36.89	-54.32	1.57	19.00	30	Pass
	High	1752.5	Horizontal	-36.62	-54.13	1.72	19.22	30	Pass
10 MHz (16QAM)	Low	1715	Horizontal	-36.66	-54.32	1.44	19.10	30	Pass
	Mid	1732.5	Horizontal	-36.77	-54.41	1.57	19.20	30	Pass
	High	1750	Horizontal	-37.06	-54.52	1.66	19.12	30	Pass
15 MHz (16QAM)	Low	1717.5	Horizontal	-36.67	-54.35	1.49	19.16	30	Pass
	Mid	1732.5	Horizontal	-36.52	-54.32	1.57	19.36	30	Pass
	High	1747.5	Horizontal	-36.43	-54.17	1.66	19.40	30	Pass
20 MHz (16QAM)	Low	1720	Horizontal	-36.63	-54.44	1.49	19.30	30	Pass
	Mid	1732.5	Horizontal	-36.11	-54.41	1.57	19.86	30	Pass
	High	1745	Horizontal	-36.76	-54.59	1.63	19.46	30	Pass



LTE Band 12									
Bandwidth	Channel	Frequency (MHz)	Polarization	Output Power (dBm)	Losses (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Conclusion
1.4 MHz (QPSK)	Low	699.7	Horizontal	-38.94	-49.12	2.04	12.22	34.77	Pass
	Mid	707.5	Horizontal	-39.01	-49.39	2.03	12.42	34.77	Pass
	High	715.3	Horizontal	-39.63	-49.76	1.99	12.12	34.77	Pass
3 MHz (QPSK)	Low	700.5	Horizontal	-37.82	-48.94	2.04	13.16	34.77	Pass
	Mid	707.5	Horizontal	-38.18	-49.12	2.03	12.97	34.77	Pass
	High	714.5	Horizontal	-38.27	-49.37	2.00	13.10	34.77	Pass
5 MHz (QPSK)	Low	701.5	Horizontal	-38.05	-49.17	2.04	13.17	34.77	Pass
	Mid	707.5	Horizontal	-38.34	-49.39	2.03	13.09	34.77	Pass
	High	713.5	Horizontal	-38.64	-49.72	2.01	13.08	34.77	Pass
10 MHz (QPSK)	Low	704	Horizontal	-37.92	-49.00	2.04	13.12	34.77	Pass
	Mid	707.5	Horizontal	-39.23	-49.12	2.03	11.92	34.77	Pass
	High	711	Horizontal	-38.47	-49.33	2.02	12.87	34.77	Pass
1.4 MHz (16QAM)	Low	699.7	Horizontal	-39.08	-49.12	2.04	12.08	34.77	Pass
	Mid	707.5	Horizontal	-39.15	-49.39	2.03	12.28	34.77	Pass
	High	715.3	Horizontal	-39.76	-49.76	1.99	11.99	34.77	Pass
3 MHz (16QAM)	Low	700.5	Horizontal	-37.95	-48.94	2.04	13.03	34.77	Pass
	Mid	707.5	Horizontal	-38.31	-49.12	2.03	12.84	34.77	Pass
	High	714.5	Horizontal	-38.41	-49.37	2.00	12.96	34.77	Pass
5 MHz (16QAM)	Low	701.5	Horizontal	-38.18	-49.17	2.04	13.04	34.77	Pass
	Mid	707.5	Horizontal	-38.47	-49.39	2.03	12.96	34.77	Pass
	High	713.5	Horizontal	-38.77	-49.72	2.01	12.95	34.77	Pass
10 MHz (16QAM)	Low	704	Horizontal	-38.05	-49.00	2.04	12.99	34.77	Pass
	Mid	707.5	Horizontal	-39.37	-49.12	2.03	11.78	34.77	Pass
	High	711	Horizontal	-38.60	-49.33	2.02	12.74	34.77	Pass



LTE Band 13									
Bandwidth	Channel	Frequency (MHz)	Polarization	Output Power (dBm)	Losses (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Conclusion
5MHz (QPSK)	Low	779.5	Horizontal	-36.32	-47.01	1.81	12.50	34.77	Pass
	Mid	782	Horizontal	-36.77	-47.17	1.81	12.21	34.77	Pass
	High	784.5	Horizontal	-37.29	-47.59	1.83	12.13	34.77	Pass
10MHz (QPSK)	Mid	782	Horizontal	-36.16	-46.58	1.81	12.23	34.77	Pass
5MHz (16QAM)	Low	779.5	Horizontal	-36.45	-47.01	1.81	12.37	34.77	Pass
	Mid	782	Horizontal	-36.90	-47.17	1.81	12.08	34.77	Pass
	High	784.5	Horizontal	-37.42	-47.59	1.83	12.00	34.77	Pass
10MHz (16QAM)	Mid	782	Horizontal	-36.29	-46.58	1.81	12.10	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 51 kHz, VBW is set to 160 kHz for LTE Band 4/12 (1.4MHz).

RBW is set to 100 kHz, VBW is set to 300 kHz for LTE Band 4/12 (3MHz).

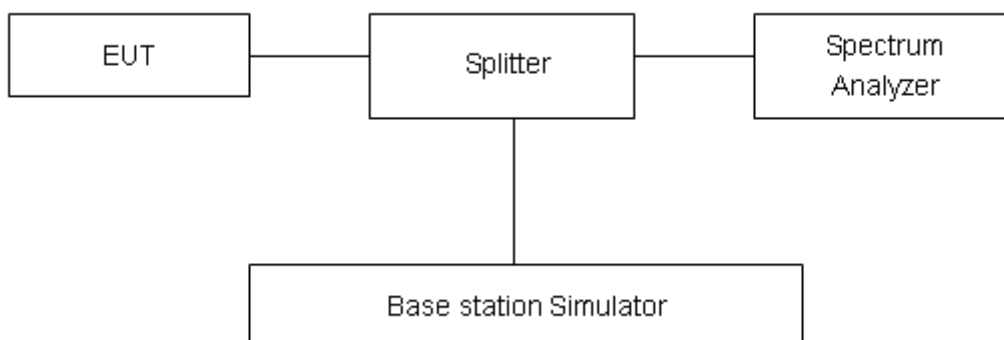
RBW is set to 100 kHz, VBW is set to 300 kHz for LTE Band 4/12/13 (5MHz).

RBW is set to 300 kHz, VBW is set to 1MHz for LTE Band 4/12/13 (10MHz).

RBW is set to 300 kHz, VBW is set to 1MHz for LTE Band 4/7 (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	1.4	19957	1710.7	1.1151	1.283
			20175	1732.5	1.1145	1.282
			20393	1754.3	1.1098	1.284
		3	19965	1711.5	2.7415	3.075
			20175	1732.5	2.7504	3.078
			20385	1753.5	2.7453	3.071
		5	19975	1712.5	4.5268	4.962
			20175	1732.5	4.5091	4.991
			20375	1752.5	4.5012	4.971
		10	20000	1715	9.0294	10.03
			20175	1732.5	9.0602	10.02
			20350	1750	9.0452	9.967
		15	20025	1717.5	13.467	14.77
			20175	1732.5	13.476	14.74
			20325	1747.5	13.459	14.68
		20	20050	1720	17.875	19.14
			20175	1732.5	17.919	19.27
			20300	1745	17.902	19.27
	16QAM	1.4	19957	1710.7	1.1098	1.272
			20175	1732.5	1.11	1.271
			20393	1754.3	1.1165	1.282
		3	19965	1711.5	2.7505	3.046
			20175	1732.5	2.7364	3.075
			20385	1753.5	2.7396	3.075
		5	19975	1712.5	4.5087	4.984
			20175	1732.5	4.5142	4.997
			20375	1752.5	4.5202	4.993
		10	20000	1715	9.0345	9.918
			20175	1732.5	9.0565	9.978
			20350	1750	9.0332	9.952
		15	20025	1717.5	13.468	14.65
			20175	1732.5	13.52	14.74
			20325	1747.5	13.464	14.79
		20	20050	1720	17.932	19.30
			20175	1732.5	17.954	19.48
			20300	1745	17.873	19.35

LTE Band 12						
RB	Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	99% Power Bandwidth(MHz)	-26dBc Bandwidth(MHz)
100%	QPSK	1.4	23017	699.7	1.1131	1.279
			23095	707.5	1.1135	1.284
			23173	715.3	1.1292	1.274
		3	23025	700.5	2.743	3.067
			23095	707.5	2.7487	3.069
			23165	714.5	2.7486	3.061
		5	23035	701.5	4.5307	4.998
			23095	707.5	4.4996	4.935
			23155	713.5	4.5076	4.962
		10	23060	704	9.0703	10.26
			23095	707.5	8.9848	9.878
			23130	711	9.0586	9.991
	16QAM	1.4	23017	699.7	1.113	1.288
			23095	707.5	1.1111	1.266
			23173	715.3	1.1066	1.287
		3	23025	700.5	2.746	3.081
			23095	707.5	2.736	3.058
			23165	714.5	2.7399	3.080
		5	23035	701.5	4.513	4.968
			23095	707.5	4.5134	4.968
			23155	713.5	4.53	4.997
		10	23060	704	9.0658	9.953
			23095	707.5	8.9915	9.890
			23130	711	9.0332	10.02

LTE Band 13						
RB	Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	99% Power Bandwidth(MHz)	-26dBc Bandwidth(MHz)
100%	QPSK	5	23205	779.5	4.5186	4.953
			23230	782	4.51	4.982
			23255	784.5	4.4997	4.950
		10	23230	782	9.0329	10.01
	16QAM	5	23205	779.5	4.5047	4.968
			23230	782	4.5214	4.980
			23255	784.5	4.5207	4.973
		10	23230	782	9.0328	9.875



LTE Band 4 QPSK 1.4MHz CH-Low



LTE Band 4 QPSK 3MHz CH-Low



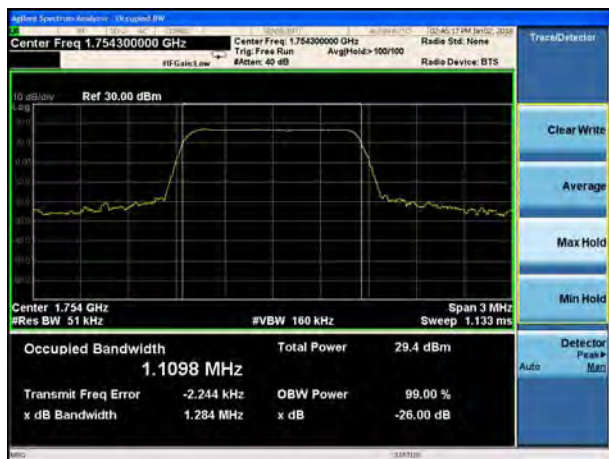
LTE Band 4 QPSK 1.4MHz CH-Middle



LTE Band 4 QPSK 3MHz CH-Middle



LTE Band 4 QPSK 1.4MHz CH-High



LTE Band 4 QPSK 3MHz CH-High





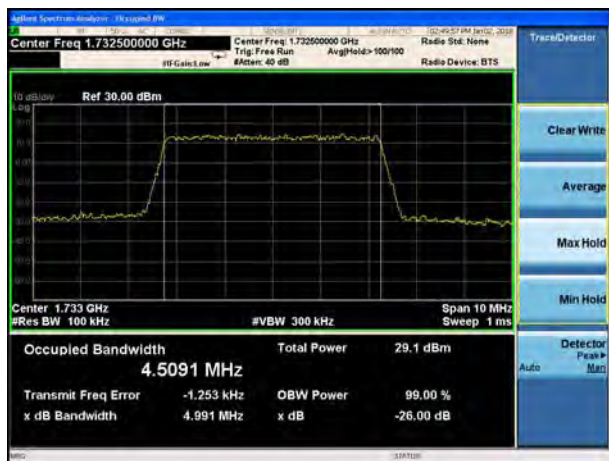
LTE Band 4 QPSK 5MHz CH-Low



LTE Band 4 QPSK 10MHz CH-Low



LTE Band 4 QPSK 5MHz CH-Middle



LTE Band 4 QPSK 10MHz CH-Middle



LTE Band 4 QPSK 5MHz CH-High



LTE Band 4 QPSK 10MHz CH-High





LTE Band 4 QPSK 15MHz CH-Low



LTE Band 4 QPSK 20MHz CH-Low



LTE Band 4 QPSK 15MHz CH-Middle



LTE Band 4 QPSK 20MHz CH-Middle



LTE Band 4 QPSK 15MHz CH-High

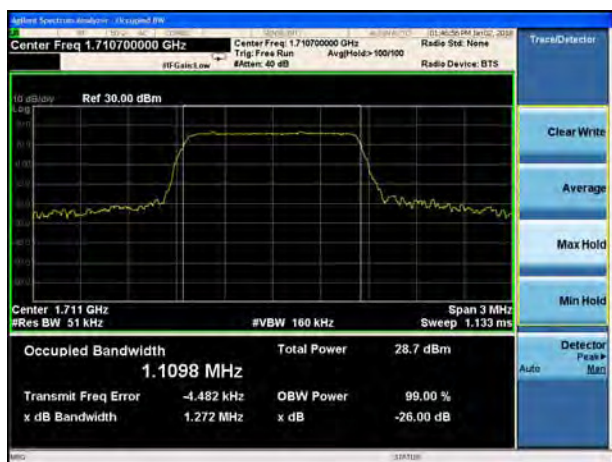


LTE Band 4 QPSK 20MHz CH-High

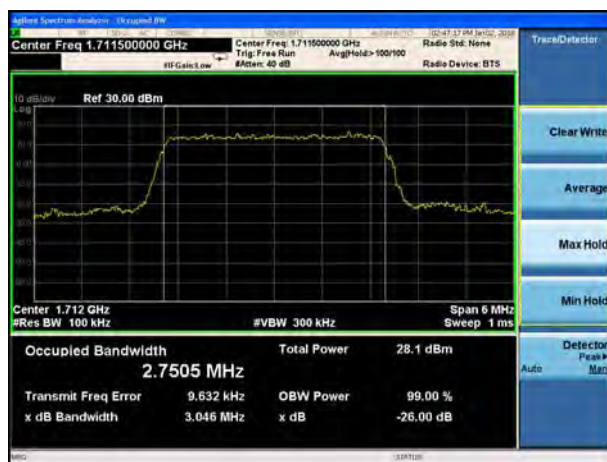




LTE Band 4 16QAM 1.4MHz CH-Low



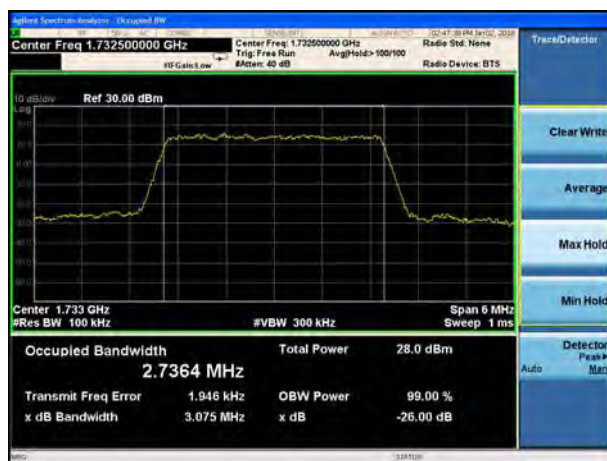
LTE Band 4 16QAM 3MHz CH-Low



LTE Band 4 16QAM 1.4MHz CH-Middle



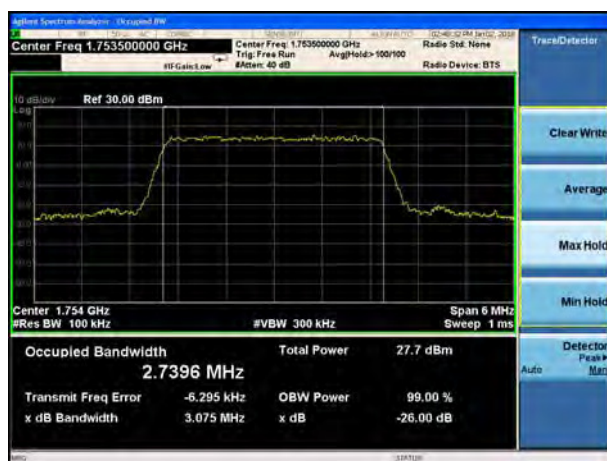
LTE Band 4 16QAM 3MHz CH-Middle



LTE Band 4 16QAM 1.4MHz CH-High



LTE Band 4 16QAM 3MHz CH-High





LTE Band 4 16QAM 5MHz CH-Low



LTE Band 4 16QAM 10MHz CH-Low



LTE Band 4 16QAM 5MHz CH-Middle



LTE Band 4 16QAM 10MHz CH-Middle



LTE Band 4 16QAM 5MHz CH-High



LTE Band 4 16QAM 10MHz CH-High





LTE Band 4 QPSK 15MHz CH-Low



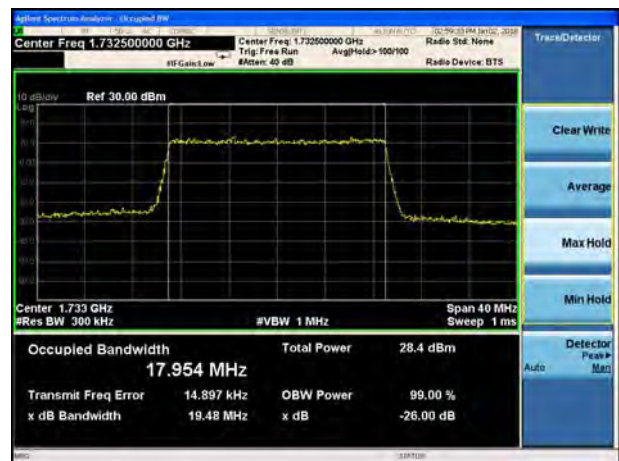
LTE Band 4 QPSK 20MHz CH-Low



LTE Band 4 QPSK 15MHz CH-Middle



LTE Band 4 QPSK 20MHz CH-Middle



LTE Band 4 QPSK 15MHz CH-High

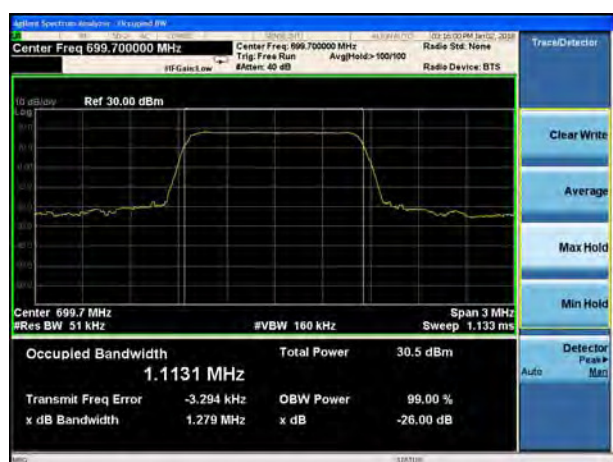


LTE Band 4 QPSK 20MHz CH-High





LTE Band 12 QPSK 1.4MHz CH-Low



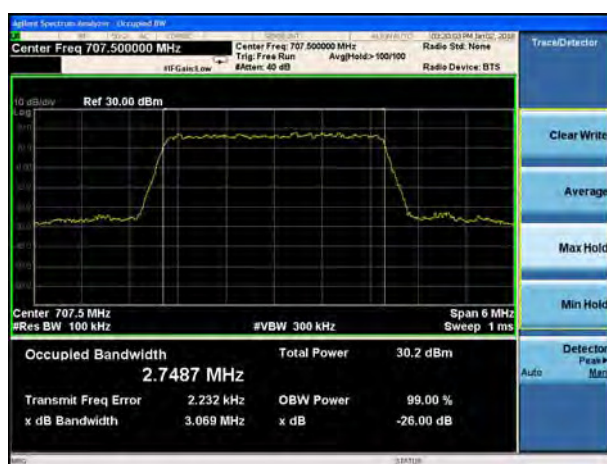
LTE Band 12 QPSK 3MHz CH-Low



LTE Band 12 QPSK 1.4MHz CH-Middle



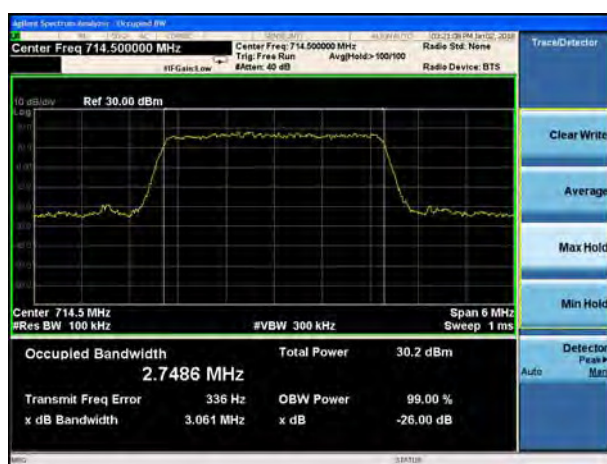
LTE Band 12 QPSK 3MHz CH-Middle



LTE Band 12 QPSK 1.4MHz CH-High



LTE Band 12 QPSK 3MHz CH-High





LTE Band 12 QPSK 5MHz CH-Low



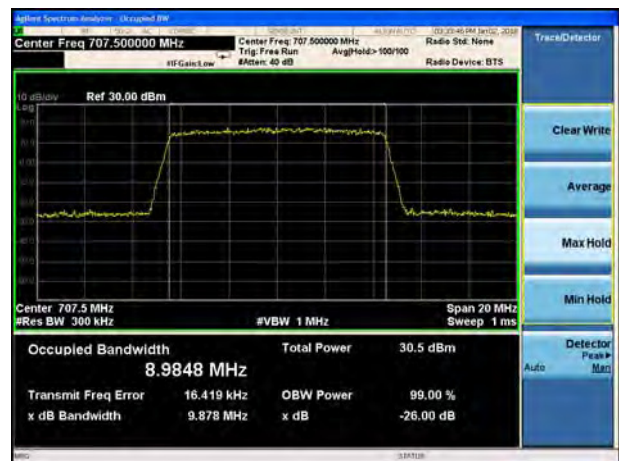
LTE Band 12 QPSK 10MHz CH-Low



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 1.4MHz CH-Low



LTE Band 12 16QAM 3MHz CH-Low



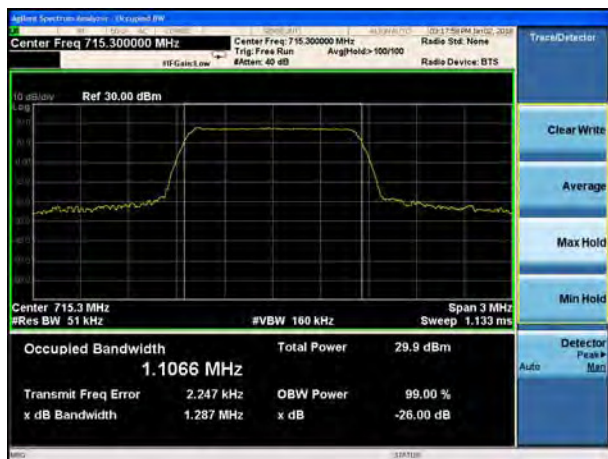
LTE Band 12 16QAM 1.4MHz CH-Middle



LTE Band 12 16QAM 3MHz CH-Middle



LTE Band 12 16QAM 1.4MHz CH-High



LTE Band 12 16QAM 3MHz CH-High





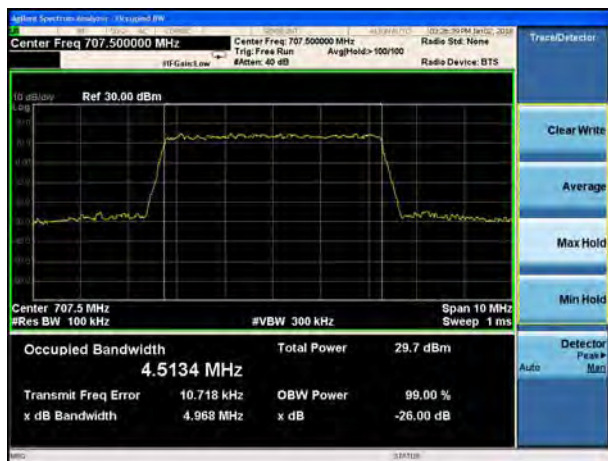
LTE Band 12 16QAM 5MHz CH-Low



LTE Band 12 16QAM 10MHz CH-Low



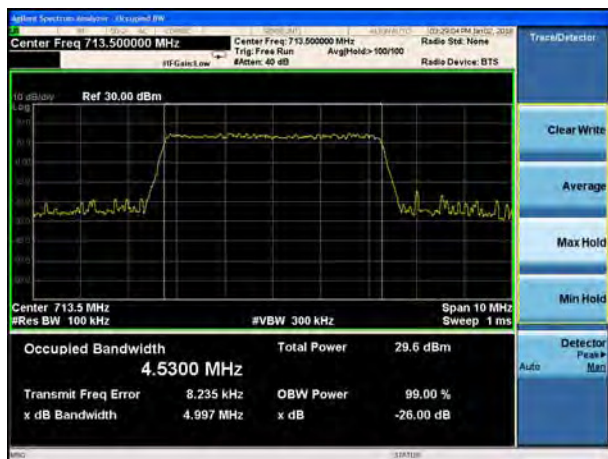
LTE Band 12 16QAM 5MHz CH-Middle



LTE Band 12 16QAM 10MHz CH-Middle



LTE Band 12 16QAM 5MHz CH-High



LTE Band 12 16QAM 10MHz CH-High





LTE Band 13 QPSK 5MHz CH-Low



LTE Band 13 16QAM 5MHz CH-Low



LTE Band 13 QPSK 5MHz CH-Middle



LTE Band 13 16QAM 5MHz CH-Middle



LTE Band 13 QPSK 5MHz CH-High



LTE Band 13 16QAM 5MHz CH-High





LTE Band 13 16QAM 10MHz CH-Middle



LTE Band 13 QPSK 10MHz CH-Middle



5.4 Band Edge Compliance

Ambient condition

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

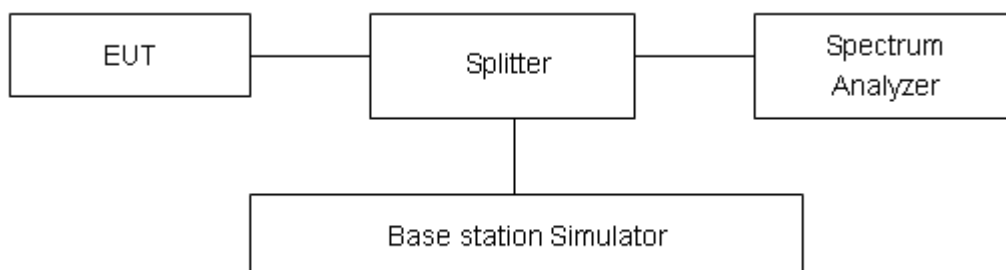
Method of Measurement

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

The testing follows KDB 971168 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.
3. RBW is set to 15 kHz, VBW is set to 51 kHz for LTE Band 4/12 (1.4MHz).
RBW is set to 30 kHz, VBW is set to 100 kHz for LTE Band 4/12 (3MHz).
RBW is set to 51 kHz, VBW is set to 160 kHz for LTE Band 4/12 (5MHz).
RBW is set to 100 kHz, VBW is set to 300kHz for LTE Band 4/12 (10MHz).
RBW is set to 150 kHz, VBW is set to 510 kHz for LTE Band 4 (15MHz).
RBW is set to 200 kHz, VBW is set to 620 kHz for LTE Band 4 (20MHz) on spectrum analyzer.
RBW is set to 10 kHz, VBW is set to 30 kHz for LTE Band 13 (763MHz~775MHz).
RBW is set to 100 kHz, VBW is set to 300 kHz for LTE Band 13 (775MHz~777MHz).
RBW is set to 100 kHz, VBW is set to 300 kHz for LTE Band 13 (787MHz~793MHz).
RBW is set 10 kHz, VBW is set to 30 kHz for LTE Band 13 (793MHz~805MHz).
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.”

Part 27.53(m) (4)/ specifies that “for BRS and EBS stations. For mobile digital stations, the attenuation factor shall be not less than $40 + 10 \log (P)$ dB on all frequencies between the channel edge and 5 megahertz from the channel edge, $43 + 10 \log (P)$ dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and $55 + 10 \log (P)$ dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(4) of this section. In addition, the attenuation factor shall not be less that $43 + 10 \log (P)$ dB on all frequencies between 2490.5 MHz and 2496 MHz and $55 + 10 \log (P)$ dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

Example:

The limit line is derived from $43 + 10 \log (P)$ dB below the transmitter power P(Watts)

= $P(W) - [43 + 10 \log(P)]$ (dB)

= $[30 + 10 \log (P)]$ (dBm) - $[43 + 10 \log(P)]$ (dB) = -13dBm.

Part 27.53 (c) For operations in the 746-758 MHz band and the 776-788 MHz band, the power of any emission outside the 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, in accordance with the following:

- (1) On any frequency outside the 746-758 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least $43 + 10 \log (P)$ dB;
- (2) On any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least $43 + 10 \log (P)$ dB;
- (3) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than $76 + 10 \log (P)$ dB in a 6.25 kHz band segment, for base and fixed stations;
- (4) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than $65 + 10 \log (P)$ dB in a 6.25 kHz band segment, for mobile and portable stations;
- (5) Compliance with the provisions of paragraphs (c)(1) and (c)(2) of this section is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 30 kHz may be employed;

Measurement Uncertainty

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



Test Result

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

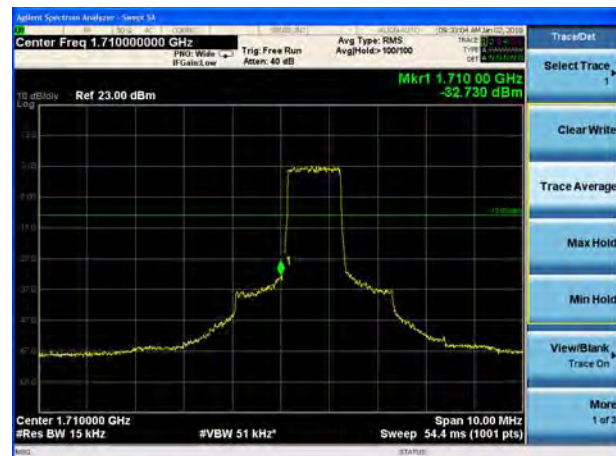
LTE Band 4 QPSK 1.4MHz CH-Low, 1 RB



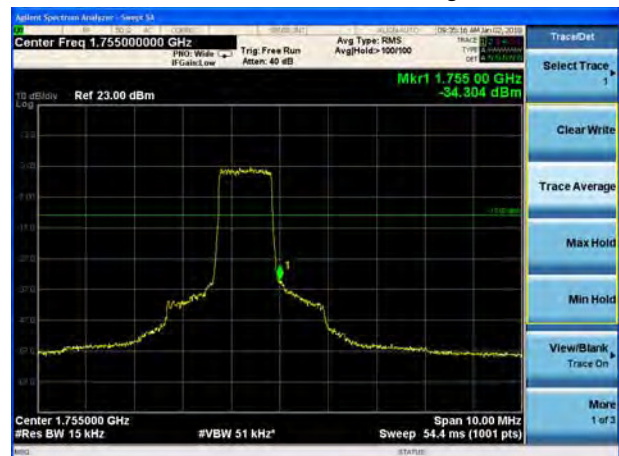
LTE Band 4 QPSK 1.4MHz CH-High, 1 RB



LTE Band 4 QPSK 1.4MHz CH-Low, 100%RB



LTE Band 4 QPSK 1.4MHz CH-High, 100%RB



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



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





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



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



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



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



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



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





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



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



LTE Band 4 QPSK 10MHz CH-Low, 100%RB



LTE Band 4 QPSK 10MHz CH-High, 100%RB



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



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





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



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



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



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



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



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





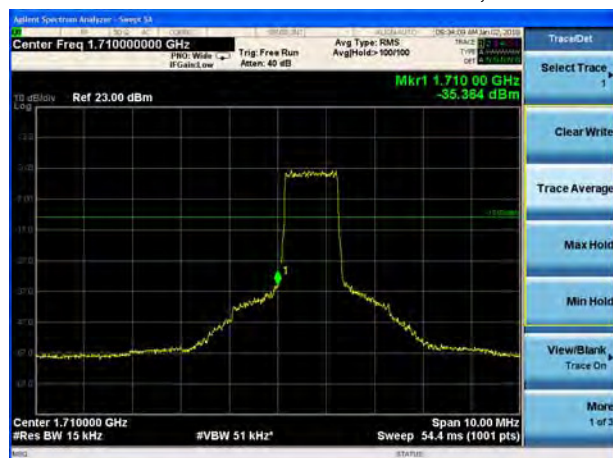
LTE Band 4 16QAM 1.4MHz CH-Low, 1 RB



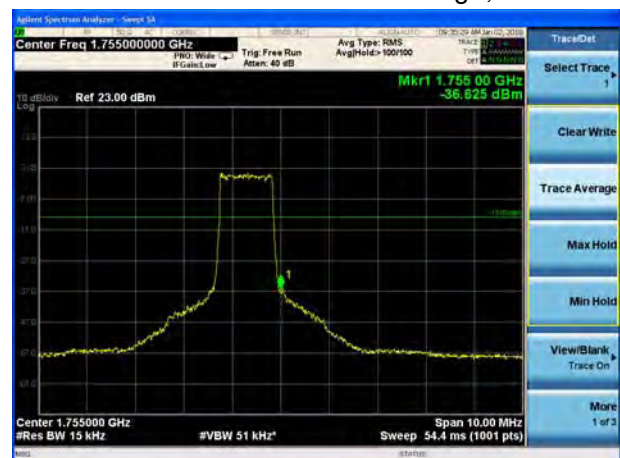
LTE Band 4 16QAM 1.4MHz CH-High, 1 RB



LTE Band 4 16QAM 1.4MHz CH-Low, 100%RB



LTE Band 4 16QAM 1.4MHz CH-High, 100%RB



LTE Band 4 16QAM 3MHz CH-Low, 1 RB



LTE Band 4 16QAM 3MHz CH-High, 1 RB





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



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



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



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



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



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





LTE Band 4 16QAM 10MHz CH-Low, 1 RB



LTE Band 4 16QAM 10MHz CH-High, 1 RB



LTE Band 4 16QAM 10MHz CH-Low, 100%RB



LTE Band 4 16QAM 10MHz CH-High, 100%RB



LTE Band 4 16QAM 15MHz CH-Low, 1 RB



LTE Band 4 16QAM 15MHz CH-High, 1 RB



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



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



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



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



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

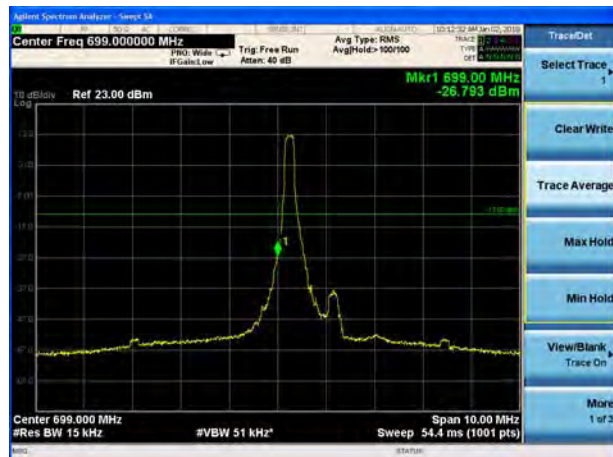


LTE Band 4 16QAM 20MHz CH-High, 100%RB

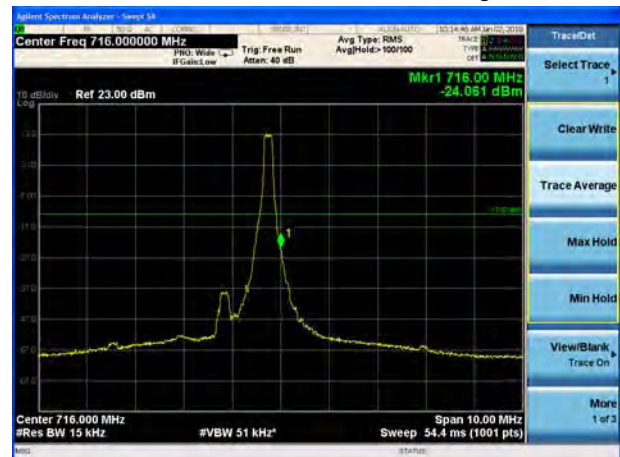




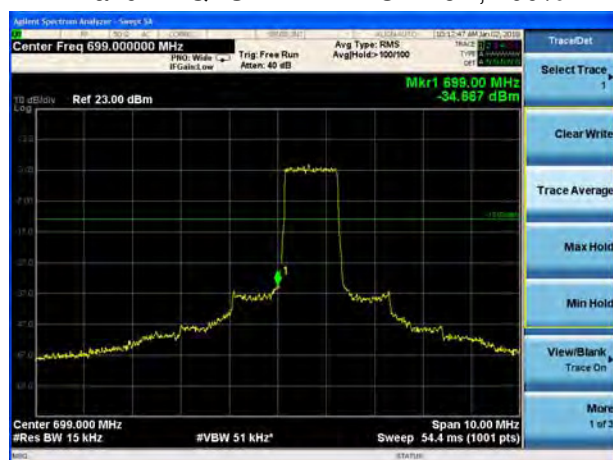
LTE Band 12 QPSK 1.4MHz CH-Low, 1 RB



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



LTE Band 12 QPSK 1.4MHz CH-Low, 100%RB



LTE Band 12 QPSK 1.4MHz CH-High, 100%RB



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



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





LTE Band 12 QPSK 3MHz CH-Low, 100%RB



LTE Band 12 QPSK 3MHz CH-High, 100%RB



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



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



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



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

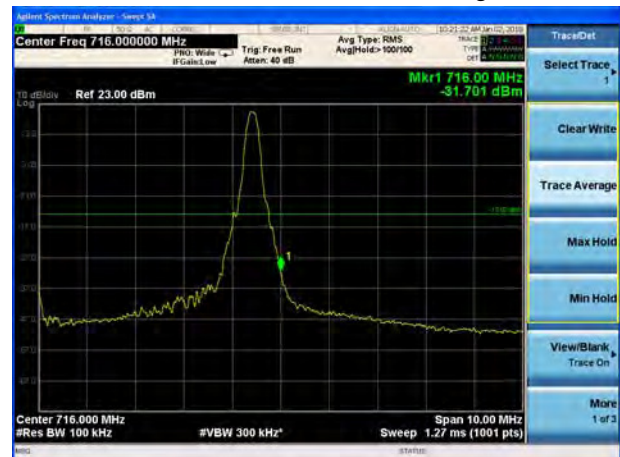




LTE Band 12 QPSK 10MHz CH-Low, 1 RB



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



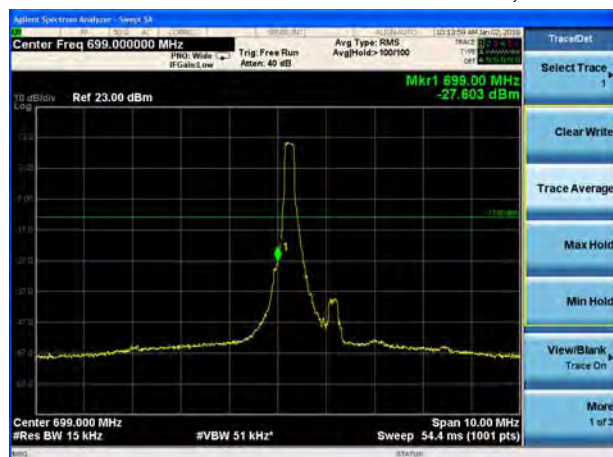
LTE Band 12 QPSK 10MHz CH-Low, 100%RB



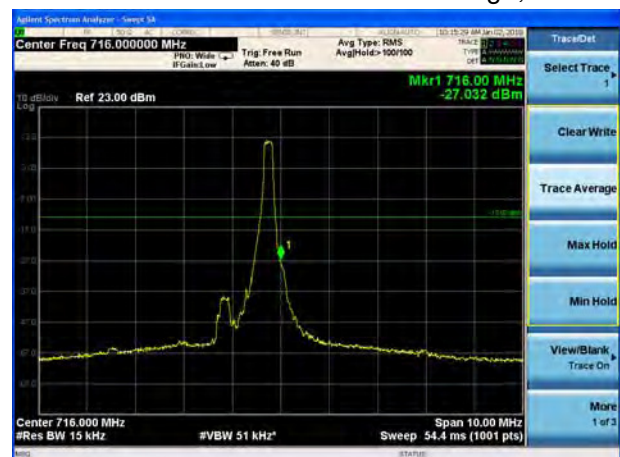
LTE Band 12 QPSK 10MHz CH-High, 100%RB



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

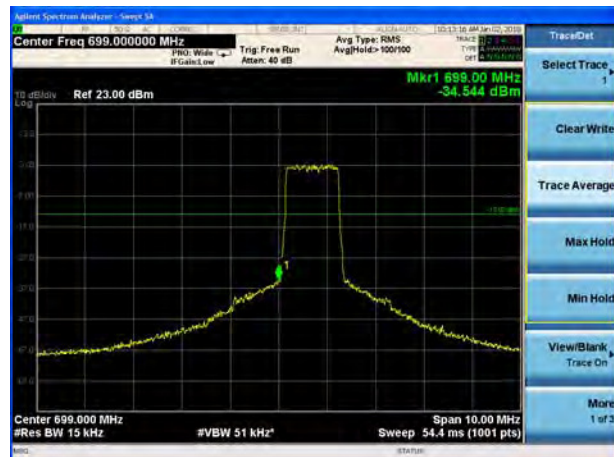


LTE Band 12 16QAM 1.4MHz CH-High, 1 RB

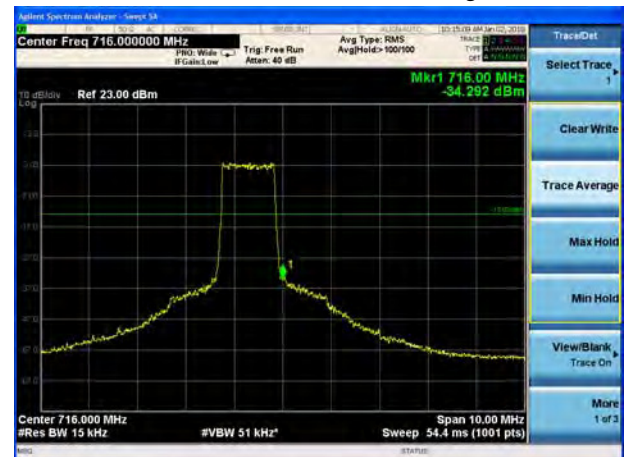




LTE Band 12 16QAM 1.4MHz CH-Low, 100%RB



LTE Band 12 16QAM 1.4MHz CH-High, 100%RB



LTE Band 12 16QAM 3MHz CH-Low, 1 RB



LTE Band 12 16QAM 3MHz CH-High, 1 RB



LTE Band 12 16QAM 3MHz CH-Low, 100%RB

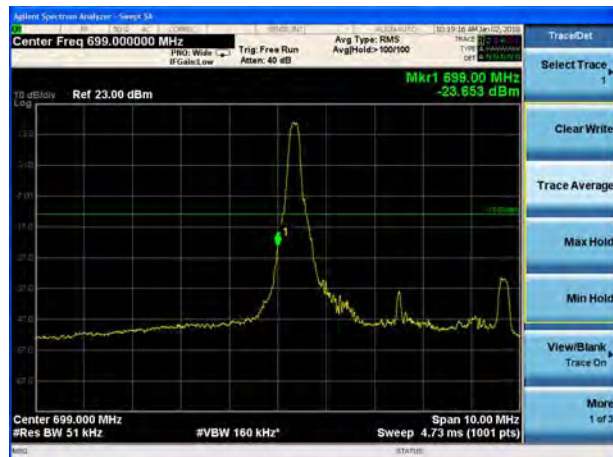


LTE Band 12 16QAM 3MHz CH-High, 100%RB

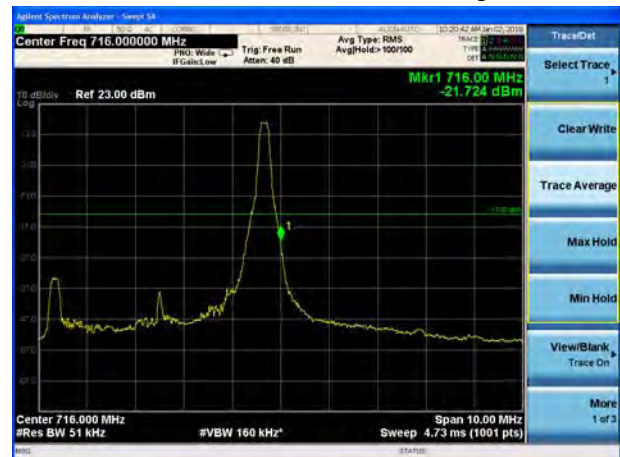




LTE Band 12 16QAM 5MHz CH-Low, 1 RB



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



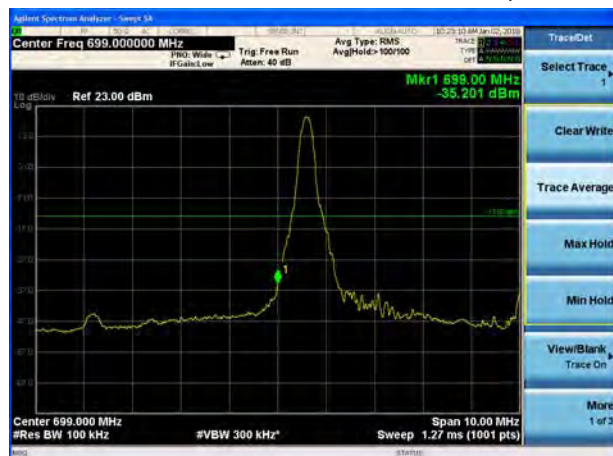
LTE Band 12 16QAM 5MHz CH-Low, 100%RB



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



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



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





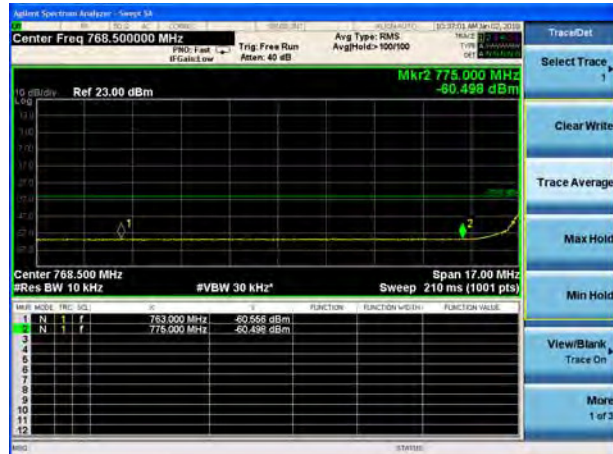
LTE Band 12 16QAM 10MHz CH-Low, 100%RB

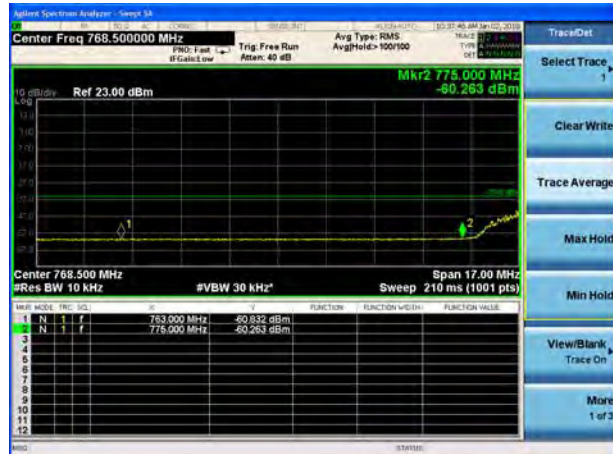


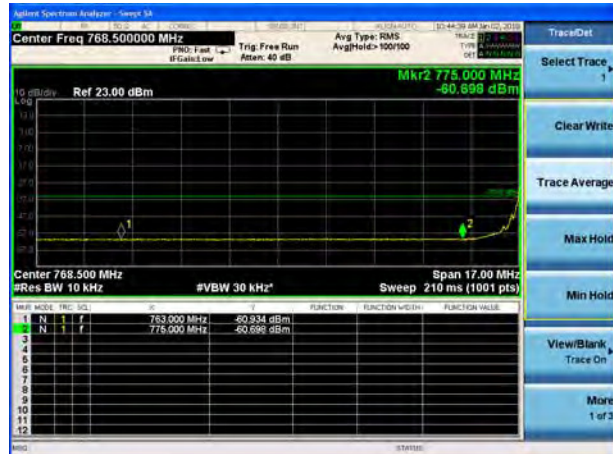
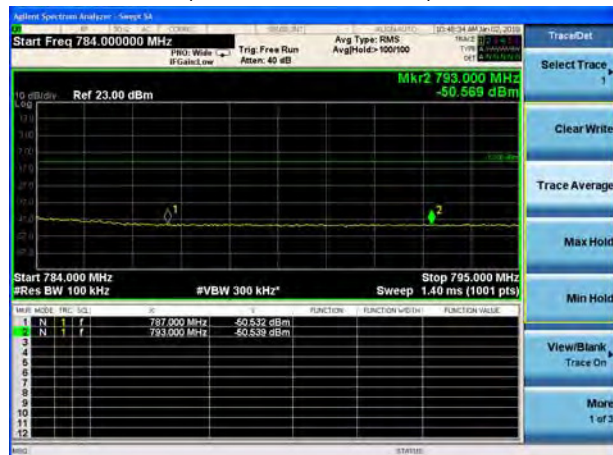
LTE Band 12 16QAM 10MHz CH-High, 100%RB

LTE Band 13 QPSK 5MHz CH-Low, 1 RB
(763MHz ~775MHz)LTE Band 13 QPSK 5MHz CH-Low, 1 RB
(775MHz ~777MHz)LTE Band 13 QPSK 5MHz CH-High, 1 RB
(787MHz ~793MHz)LTE Band 13 QPSK 5MHz CH-High, 1 RB
(793MHz ~805MHz)

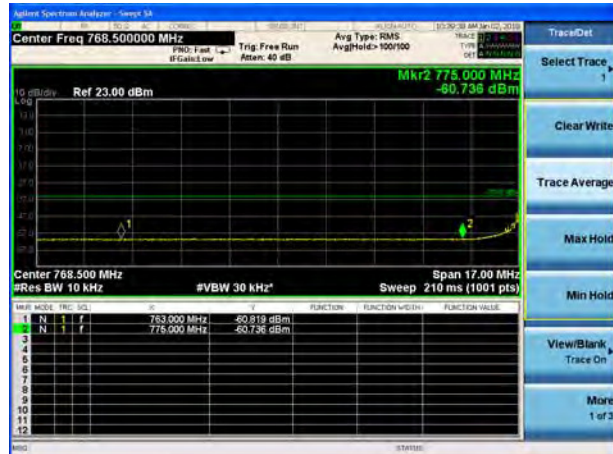
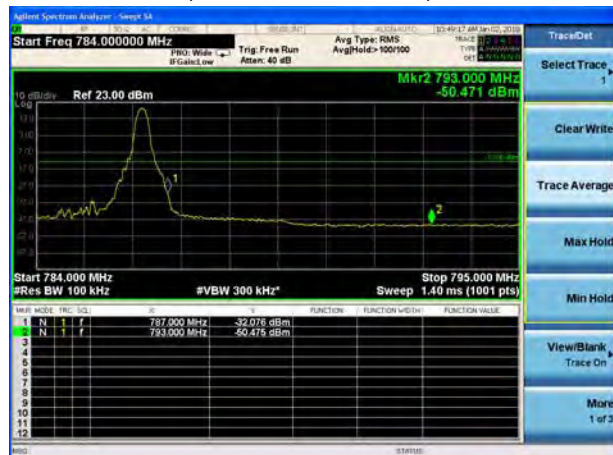
LTE Band 13 QPSK 5MHz CH-Low, 100%RB
(763MHz ~775MHz)LTE Band 13 QPSK 5MHz CH-Low, 100%RB
(775MHz ~777MHz)LTE Band 13 QPSK 5MHz CH-High, 100%RB
(787MHz ~793MHz)LTE Band 13 QPSK 5MHz CH-High, 100%RB
(793MHz ~805MHz)

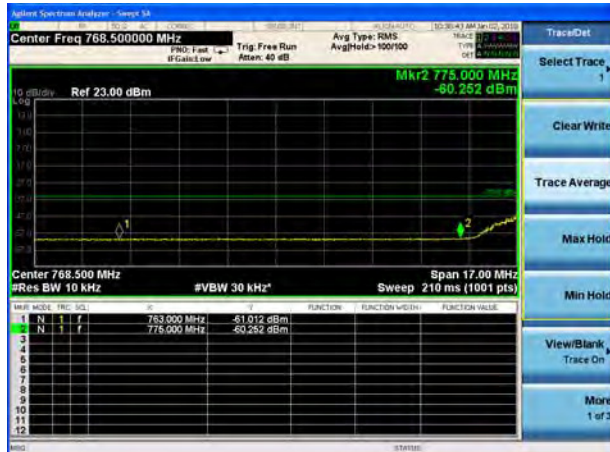
LTE Band 13 QPSK 10MHz CH-Low, 1 RB
(763MHz ~775MHz)LTE Band 13 QPSK 10MHz CH-Low, 1 RB
(775MHz ~777MHz)LTE Band 13 QPSK 10MHz CH-High, 1 RB
(787MHz ~793MHz)LTE Band 13 QPSK 10MHz CH-High, 1 RB
(793MHz ~805MHz)

LTE Band 13 QPSK 10MHz CH-Low, 100%RB
(763MHz ~775MHz)LTE Band 13 QPSK 10MHz CH-Low, 100%RB
(775MHz ~777MHz)LTE Band 13 QPSK 10MHz CH-High, 100%RB
(787MHz ~793MHz)LTE Band 13 QPSK 10MHz CH-High, 100%RB
(793MHz ~805MHz)

LTE Band 13 16QAM 5MHz CH-Low, 1 RB
(763MHz ~775MHz)LTE Band 13 16QAM 5MHz CH-Low, 1 RB
(775MHz ~777MHz)LTE Band 13 16QAM 5MHz CH-High, 1 RB
(787MHz ~793MHz)LTE Band 13 16QAM 5MHz CH-High, 1 RB
(793MHz ~805MHz)

LTE Band 13 16QAM 5MHz CH-Low, 100%RB
(763MHz ~775MHz)LTE Band 13 16QAM 5MHz CH-Low, 100%RB
(775MHz ~777MHz)LTE Band 13 16QAM 5MHz CH-High, 100%RB
(787MHz ~793MHz)LTE Band 13 16QAM 5MHz CH-High, 100%RB
(793MHz ~805MHz)

LTE Band 13 16QAM 10MHz CH-Low, 1 RB
(763MHz ~775MHz)LTE Band 13 16QAM 10MHz CH-Low, 1 RB
(775MHz ~777MHz)LTE Band 13 16QAM 10MHz CH-High, 1 RB
(787MHz ~793MHz)LTE Band 13 16QAM 10MHz CH-High, 1 RB
(793MHz ~805MHz)

LTE Band 13 16QAM 10MHz CH-Low, 100%RB
(763MHz ~775MHz)LTE Band 13 16QAM 10MHz CH-Low, 100%RB
(775MHz ~777MHz)LTE Band 13 16QAM 10MHz CH-High, 100%RB
(787MHz ~793MHz)LTE Band 13 16QAM 10MHz CH-High, 100%RB
(793MHz ~805MHz)

5.5 Peak-to-Average Power Ratio (PAPR)

Ambient condition

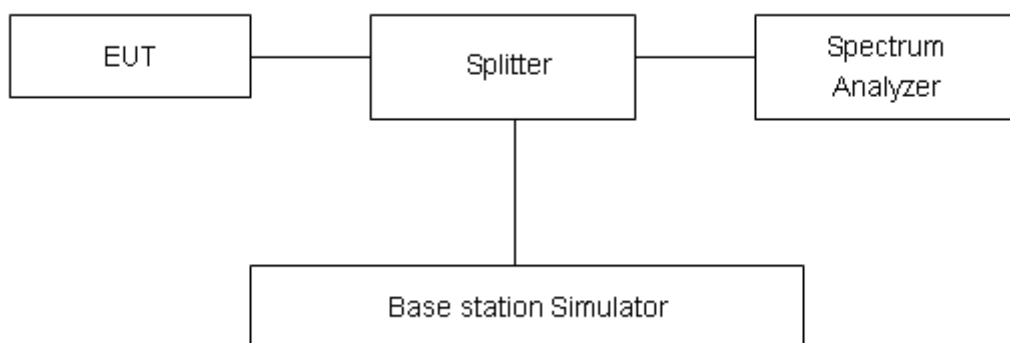
Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

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:

$$\text{PAPR (dB)} = \text{PPk (dBm)} - \text{PAvg (dBm)}.$$

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	1.4	19957	1710.7	26.41	21.56	4.85	≤13	PASS
		20175	1732.5	26.51	21.43	5.08	≤13	PASS
		20393	1754.3	26.30	21.48	4.82	≤13	PASS
	3	19965	1711.5	26.07	21.25	4.82	≤13	PASS
		20175	1732.5	26.34	21.32	5.02	≤13	PASS
		20385	1753.5	25.96	21.16	4.80	≤13	PASS
	5	19975	1712.5	26.04	21.23	4.81	≤13	PASS
		20175	1732.5	26.41	21.31	5.10	≤13	PASS
		20375	1752.5	25.93	21.14	4.79	≤13	PASS
	10	20000	1715	26.03	21.31	4.72	≤13	PASS
		20175	1732.5	26.39	21.33	5.06	≤13	PASS
		20350	1750	25.92	21.18	4.74	≤13	PASS
	15	20025	1717.5	26.15	21.29	4.86	≤13	PASS
		20175	1732.5	26.48	21.29	5.19	≤13	PASS
		20325	1747.5	25.98	21.13	4.85	≤13	PASS
	20	20050	1720	26.15	21.26	4.89	≤13	PASS
		20175	1732.5	26.33	21.24	5.09	≤13	PASS
		20300	1745	25.94	21.09	4.85	≤13	PASS
16QAM	1.4	19957	1710.7	25.53	20.68	4.85	≤13	PASS
		20175	1732.5	26.46	20.51	5.95	≤13	PASS
		20393	1754.3	26.30	20.64	5.66	≤13	PASS
	3	19965	1711.5	25.99	20.35	5.64	≤13	PASS
		20175	1732.5	26.24	20.36	5.88	≤13	PASS
		20385	1753.5	25.88	20.26	5.62	≤13	PASS
	5	19975	1712.5	25.91	20.33	5.58	≤13	PASS
		20175	1732.5	26.18	20.32	5.86	≤13	PASS
		20375	1752.5	25.74	20.21	5.53	≤13	PASS
	10	20000	1715	25.92	20.36	5.56	≤13	PASS
		20175	1732.5	26.20	20.37	5.83	≤13	PASS
		20350	1750	25.80	20.25	5.55	≤13	PASS
	15	20025	1717.5	25.92	20.33	5.59	≤13	PASS
		20175	1732.5	26.18	20.32	5.86	≤13	PASS
		20325	1747.5	25.78	20.21	5.57	≤13	PASS
	20	20050	1720	25.98	20.31	5.67	≤13	PASS
		20175	1732.5	26.12	20.28	5.84	≤13	PASS
		20300	1745	25.85	20.18	5.67	≤13	PASS

LTE Band 12								
Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	Peak (dBm)	Avg (dBm)	PAPR (dB)	Limit (dB)	Conclusion
QPSK	1.4	23017	699.7	27.34	22.25	5.09	≤13	PASS
		23095	707.5	27.51	22.45	5.06	≤13	PASS
		23173	715.3	27.30	22.52	4.78	≤13	PASS
	3	23025	700.5	27.58	22.50	5.08	≤13	PASS
		23095	707.5	27.43	22.40	5.03	≤13	PASS
		23165	714.5	27.26	22.40	4.86	≤13	PASS
	5	23035	701.5	27.58	22.48	5.10	≤13	PASS
		23095	707.5	27.44	22.39	5.05	≤13	PASS
		23155	713.5	27.37	22.38	4.99	≤13	PASS
	10	23060	704	27.61	22.51	5.10	≤13	PASS
		23095	707.5	27.25	22.32	4.93	≤13	PASS
		23130	711	27.33	22.33	5.00	≤13	PASS
16QAM	1.4	23017	699.7	27.32	21.43	5.89	≤13	PASS
		23095	707.5	27.45	21.51	5.94	≤13	PASS
		23173	715.3	27.20	21.55	5.65	≤13	PASS
	3	23025	700.5	27.35	21.42	5.93	≤13	PASS
		23095	707.5	27.28	21.39	5.89	≤13	PASS
		23165	714.5	27.18	21.44	5.74	≤13	PASS
	5	23035	701.5	27.29	21.40	5.89	≤13	PASS
		23095	707.5	27.20	21.35	5.85	≤13	PASS
		23155	713.5	27.20	21.39	5.81	≤13	PASS
	10	23060	704	27.30	21.38	5.92	≤13	PASS
		23095	707.5	27.15	21.31	5.84	≤13	PASS
		23130	711	27.23	21.36	5.87	≤13	PASS

LTE Band 13								
Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	Peak (dBm)	Avg (dBm)	PAPR (dB)	Limit (dB)	Conclusion
QPSK	5	23205	779.5	27.26	22.28	4.98	≤13	PASS
		23230	782	27.43	22.38	5.05	≤13	PASS
		23255	784.5	27.34	22.37	4.97	≤13	PASS
	10	23230	782	27.33	22.38	4.95	≤13	PASS
16QAM	5	23205	779.5	27.03	21.32	5.71	≤13	PASS
		23230	782	27.22	21.39	5.83	≤13	PASS
		23255	784.5	27.19	21.47	5.72	≤13	PASS
	10	23230	782	27.14	21.37	5.77	≤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 +55°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 +55°C. Allow at least 1.5 hours at each temperature, un-powered, before making measurements.

2. Frequency Stability (Voltage Variation)

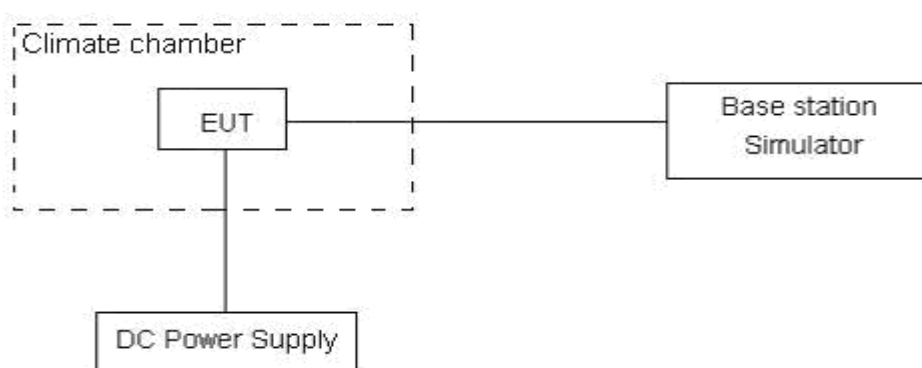
The frequency stability shall be measured with variation of primary supply voltage as follows:

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

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

This transceiver is specified to operate with an input voltage of between 3.4 V and 4.4 V, with a nominal voltage of 3.85V.

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 $k = 3$, $U=0.01$ ppm.

Test Result

Bandwidth	Test status	LTE Band 4 Channel 20175 Test Results (ppm)	
		QPSK	16QAM
1.4MHz	-30°C/Normal Voltage	-0.00203	-0.00072
	-20°C/Normal Voltage	-0.00126	0.00071
	-10°C/Normal Voltage	-0.00361	0.00085
	0°C/Normal Voltage	-0.00055	-0.00095
	10°C/Normal Voltage	-0.00078	-0.00174
	20°C/Normal Voltage	0.00098	0.00081
	30°C/Normal Voltage	0.00114	-0.00115
	40°C/Normal Voltage	0.00123	-0.00080
	50°C/Normal Voltage	-0.00070	0.00111
	55°C/Normal Voltage	-0.00148	-0.00154
	20°C/Min Voltage	0.00100	0.00182
	20°C/Max Voltage	-0.00050	-0.00194
3MHz	-30°C/Normal Voltage	-0.00053	0.00283
	-20°C/Normal Voltage	-0.00040	0.00229
	-10°C/Normal Voltage	-0.00128	0.00077
	0°C/Normal Voltage	0.00139	-0.00155
	10°C/Normal Voltage	-0.00108	-0.00073
	20°C/Normal Voltage	0.00115	0.00238
	30°C/Normal Voltage	-0.00099	0.00181
	40°C/Normal Voltage	-0.00191	0.00118
	50°C/Normal Voltage	0.00122	-0.00080
	55°C/Normal Voltage	0.00095	-0.00034
	20°C/Min Voltage	0.00092	-0.00008
	20°C/Max Voltage	0.00240	0.00297
5MHz	-30°C/Normal Voltage	-0.00075	0.00038
	-20°C/Normal Voltage	-0.00041	-0.00028
	-10°C/Normal Voltage	-0.00126	-0.00188
	0°C/Normal Voltage	0.00078	-0.00115
	10°C/Normal Voltage	-0.00046	-0.00226
	20°C/Normal Voltage	-0.00098	-0.00208
	30°C/Normal Voltage	-0.00361	-0.00051
	40°C/Normal Voltage	-0.00252	-0.00008
	50°C/Normal Voltage	-0.00188	-0.00228
	55°C/Normal Voltage	0.00115	-0.00214
	20°C/Min Voltage	0.00010	0.00174
	20°C/Max Voltage	-0.00231	0.00101



10MHz	-30°C/Normal Voltage	0.00181	0.00068
	-20°C/Normal Voltage	-0.00089	0.00038
	-10°C/Normal Voltage	0.00167	0.00016
	0°C/Normal Voltage	-0.00104	-0.00027
	10°C/Normal Voltage	-0.00046	0.00105
	20°C/Normal Voltage	-0.00300	0.00185
	30°C/Normal Voltage	-0.00256	0.00010
	40°C/Normal Voltage	-0.00123	0.00076
	50°C/Normal Voltage	-0.00151	0.00162
	55°C/Normal Voltage	-0.00539	-0.00248
	20°C/Min Voltage	0.00051	0.00056
	20°C/Max Voltage	-0.00290	-0.00186
15MHz	-30°C/Normal Voltage	-0.00205	0.00342
	-20°C/Normal Voltage	0.00000	0.00073
	-10°C/Normal Voltage	-0.00098	0.00329
	0°C/Normal Voltage	-0.00657	0.00058
	10°C/Normal Voltage	-0.00238	0.00116
	20°C/Normal Voltage	-0.00017	-0.00138
	30°C/Normal Voltage	0.00014	-0.00094
	40°C/Normal Voltage	-0.00074	0.00039
	50°C/Normal Voltage	-0.00028	0.00033
	55°C/Normal Voltage	0.00055	-0.00355
	20°C/Min Voltage	-0.00327	0.00235
	20°C/Max Voltage	0.00014	-0.00106
20MHz	-30°C/Normal Voltage	-0.00092	-0.00008
	-20°C/Normal Voltage	-0.00128	0.00135
	-10°C/Normal Voltage	0.00166	-0.00138
	0°C/Normal Voltage	-0.00048	-0.00069
	10°C/Normal Voltage	-0.00013	-0.00053
	20°C/Normal Voltage	-0.00459	-0.00231
	30°C/Normal Voltage	-0.00246	-0.00126
	40°C/Normal Voltage	-0.00170	-0.00349
	50°C/Normal Voltage	0.00137	0.00091
	55°C/Normal Voltage	0.00040	0.00109
	20°C/Min Voltage	-0.00255	0.00300
	20°C/Max Voltage	0.00013	-0.00251

Bandwidth	Test status	LTE Band 12 Channel 23095 Test Results (ppm)	
		QPSK	16QAM
1.4M	-30°C/Normal Voltage	-0.00014	-0.00360
	-20°C/Normal Voltage	-0.00414	0.00058
	-10°C/Normal Voltage	-0.00085	0.00170
	0°C/Normal Voltage	-0.00158	-0.00433
	10°C/Normal Voltage	-0.00008	-0.00445
	20°C/Normal Voltage	0.00194	-0.00339
	30°C/Normal Voltage	-0.00034	-0.00304
	40°C/Normal Voltage	-0.00312	-0.00058
	50°C/Normal Voltage	-0.00133	-0.00155
	55°C/Normal Voltage	-0.00098	-0.00444
	20°C/Min Voltage	-0.00024	0.00058
	20°C/Max Voltage	0.00114	-0.00178
3M	-30°C/Normal Voltage	-0.00189	-0.00358
	-20°C/Normal Voltage	-0.00140	-0.00023
	-10°C/Normal Voltage	-0.00222	-0.00062
	0°C/Normal Voltage	-0.00072	-0.00180
	10°C/Normal Voltage	-0.00102	-0.00188
	20°C/Normal Voltage	-0.00170	-0.00208
	30°C/Normal Voltage	-0.00014	-0.00041
	40°C/Normal Voltage	-0.00476	-0.00088
	50°C/Normal Voltage	-0.00218	-0.00089
	55°C/Normal Voltage	-0.00311	-0.00123
	20°C/Min Voltage	-0.00533	0.00083
	20°C/Max Voltage	-0.00140	0.00178
5MHz	-30°C/Normal Voltage	-0.00222	-0.00008
	-20°C/Normal Voltage	0.00047	-0.00192
	-10°C/Normal Voltage	-0.00013	-0.00140
	0°C/Normal Voltage	-0.00196	0.00291
	10°C/Normal Voltage	-0.00095	-0.00194
	20°C/Normal Voltage	-0.00315	-0.00499
	30°C/Normal Voltage	-0.00085	-0.00235
	40°C/Normal Voltage	-0.00061	-0.00249
	50°C/Normal Voltage	-0.00188	-0.00332
	55°C/Normal Voltage	-0.00150	-0.00198
	20°C/Min Voltage	-0.00023	-0.00457
	20°C/Max Voltage	-0.00107	-0.00141



10MHz	-30°C/Normal Voltage	-0.00278	0.00076
	-20°C/Normal Voltage	-0.00141	0.00028
	-10°C/Normal Voltage	-0.00136	-0.00126
	0°C/Normal Voltage	0.00240	0.00196
	10°C/Normal Voltage	-0.00172	0.00235
	20°C/Normal Voltage	-0.00218	-0.00116
	30°C/Normal Voltage	-0.00093	0.01004
	40°C/Normal Voltage	-0.00001	-0.00188
	50°C/Normal Voltage	-0.00198	0.00182
	55°C/Normal Voltage	-0.00160	-0.00158
	20°C/Min Voltage	-0.00102	-0.00113
	20°C/Max Voltage	-0.00072	-0.00066

Bandwidth	Test status	LTE Band 13 Channel 23230 Test Results (ppm)	
		QPSK	16QAM
5MHz	-30°C/Normal Voltage	-0.00153	-0.00318
	-20°C/Normal Voltage	-0.00152	0.00168
	-10°C/Normal Voltage	-0.00111	-0.00146
	0°C/Normal Voltage	0.00156	0.00262
	10°C/Normal Voltage	-0.00206	0.00001
	20°C/Normal Voltage	0.00347	0.00078
	30°C/Normal Voltage	-0.00416	-0.00006
	40°C/Normal Voltage	0.00139	-0.00047
	50°C/Normal Voltage	0.00175	-0.00086
	55°C/Normal Voltage	0.00079	-0.00073
	20°C/Min Voltage	-0.00266	-0.00033
	20°C/Max Voltage	-0.00280	-0.00040
10MHz	-30°C/Normal Voltage	0.00047	-0.00079
	-20°C/Normal Voltage	0.00120	-0.00214
	-10°C/Normal Voltage	0.00139	-0.00101
	0°C/Normal Voltage	0.00187	0.00005
	10°C/Normal Voltage	0.00174	-0.00022
	20°C/Normal Voltage	-0.00146	-0.00146
	30°C/Normal Voltage	-0.00110	-0.00194
	40°C/Normal Voltage	-0.00199	0.00088
	50°C/Normal Voltage	-0.00035	-0.00130
	55°C/Normal Voltage	-0.00079	-0.00145
	20°C/Min Voltage	-0.00459	-0.00068
	20°C/Max Voltage	-0.00294	0.00132



5.7 Spurious Emissions at Antenna Terminals

Ambient condition

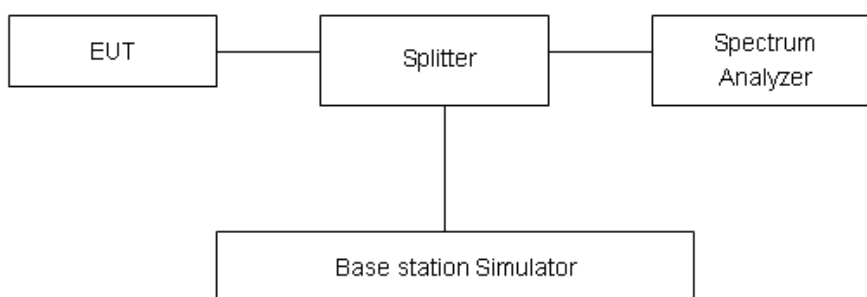
Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Method of Measurement

The EUT was connected to Spectrum Analyzer and Base Station Simulator via power Splitter. The measurement is carried out using a spectrum analyzer. The spectrum analyzer scans from 30MHz to the 10th harmonic of the carrier. The peak detector is used. Set RBW 1MHz and VBW 3MHz, Sweep is set to ATUO.

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

Test setup



Limits

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

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

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

antenna that is representative of the type that will be used with the equipment in normal operation.

Part 27.53 (c) For operations in the 746-758 MHz band and the 776-788 MHz band, the power of any emission outside the 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, in accordance with the following:

- (1) On any frequency outside the 746-758 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least $43 + 10 \log (P)$ dB;
- (2) On any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least $43 + 10 \log (P)$ dB;
- (3) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than $76 + 10 \log (P)$ dB in a 6.25 kHz band segment, for base and fixed stations;
- (4) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than $65 + 10 \log (P)$ dB in a 6.25 kHz band segment, for mobile and portable stations;
- (5) Compliance with the provisions of paragraphs (c)(1) and (c)(2) of this section is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 30 kHz may be employed;

Part 27.53(h)/(g) Limit		-13 dBm
Part 27.53(f) Limit	Limit out of the band 1559-1610 MHz	-13 dBm
	Limit in the band 1559-1610 MHz	-40 dBm

Measurement Uncertainty

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

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

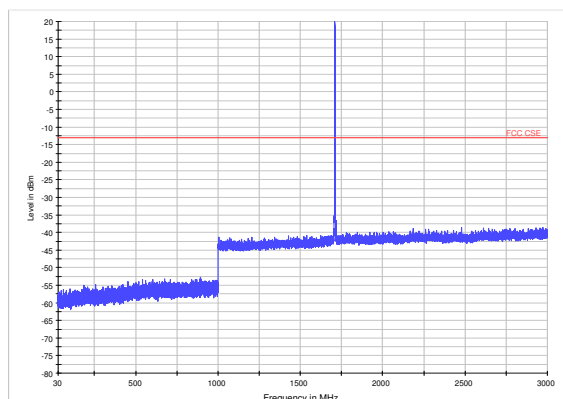
Test Result

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

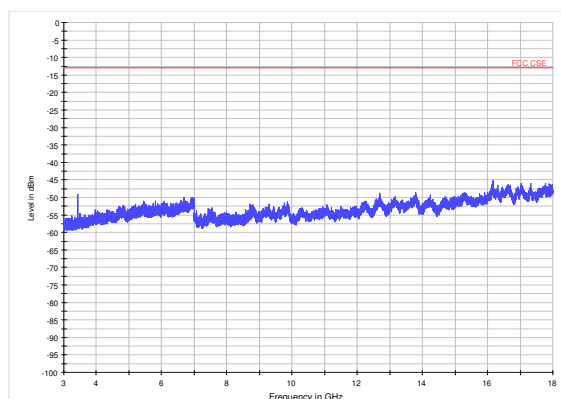
If disturbances were found more than 20dB below limit line, the mark is not required for the EUT.

The signal beyond the limit is carrier.

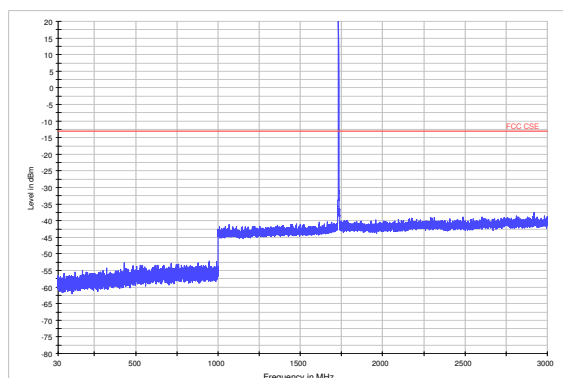
LTE Band 4 1.4MHz CH-Low 30MHz~3GHz



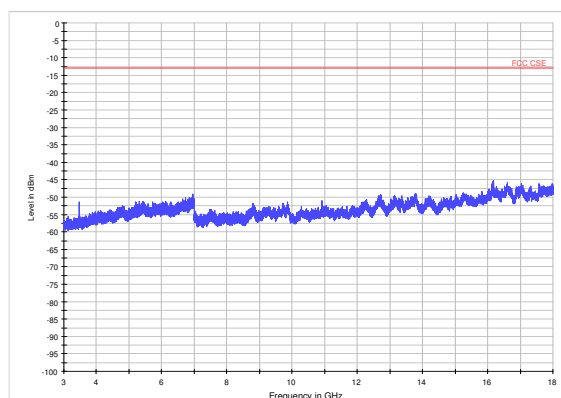
LTE Band 4 1.4MHz CH-Low 3GHz~18GHz



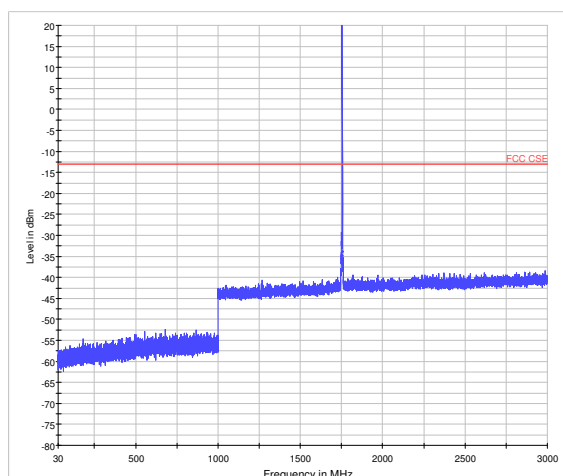
LTE Band 4 1.4MHz CH-Middle 30MHz~3GHz



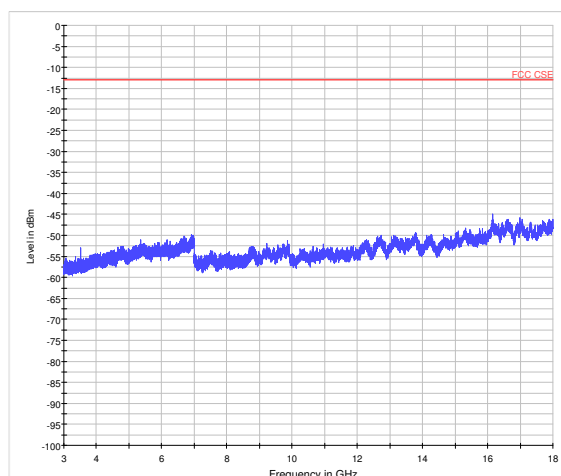
LTE Band 4 1.4MHz CH-Middle 3GHz~18GHz



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

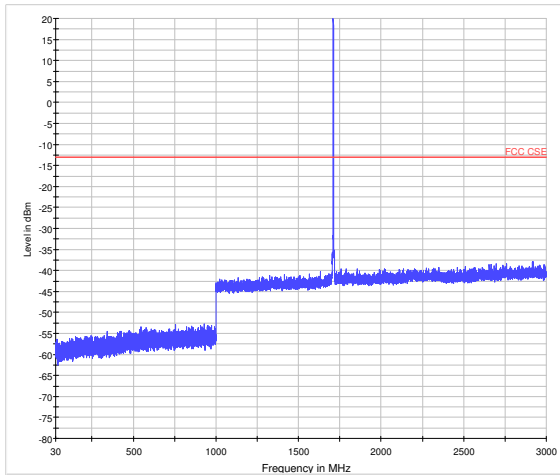


LTE Band 4 1.4MHz CH-High 3GHz~18GHz

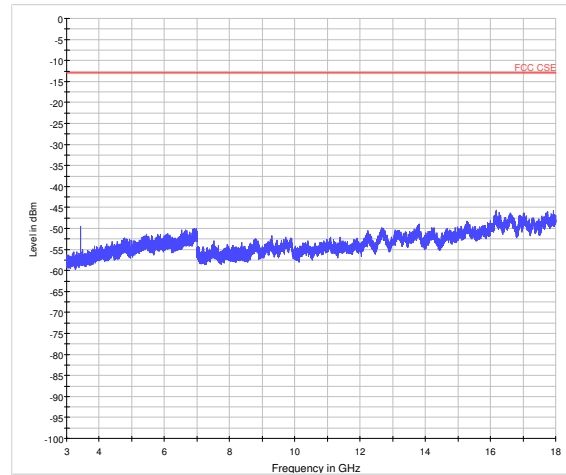




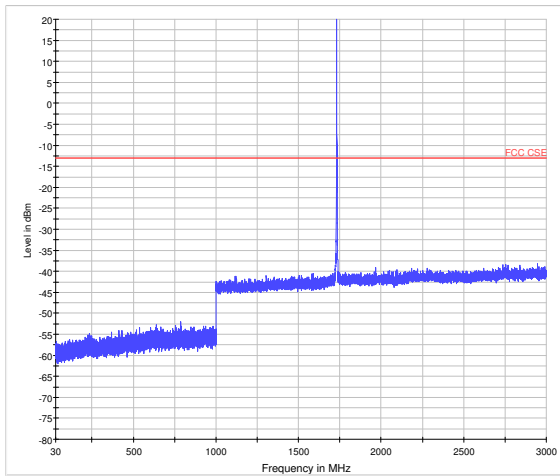
LTE Band 4 3MHz CH-Low 30MHz~3GHz



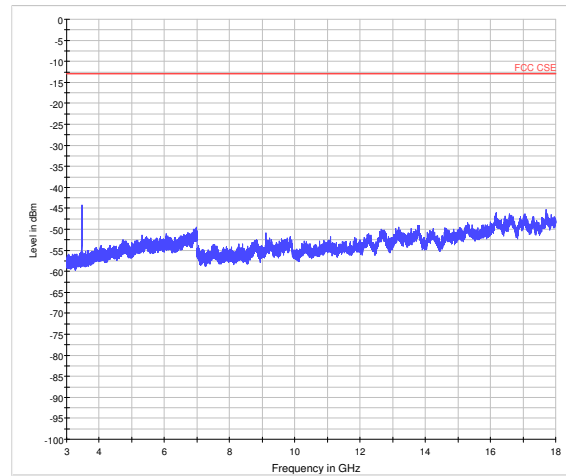
LTE Band 4 3MHz CH-Low 3GHz~18GHz



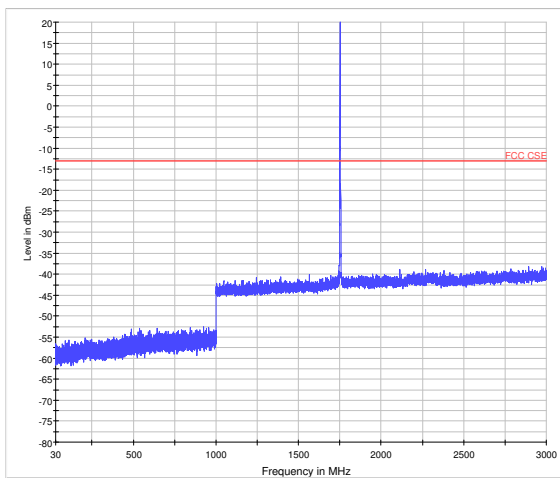
LTE Band 4 3MHz CH-Middle 30MHz~3GHz



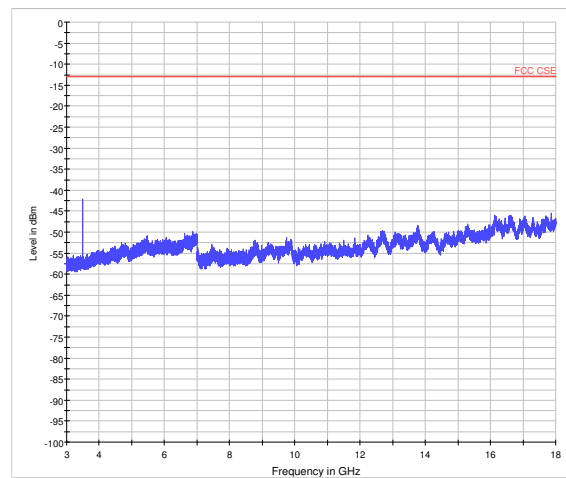
LTE Band 4 3MHz CH-Middle 3GHz~18GHz



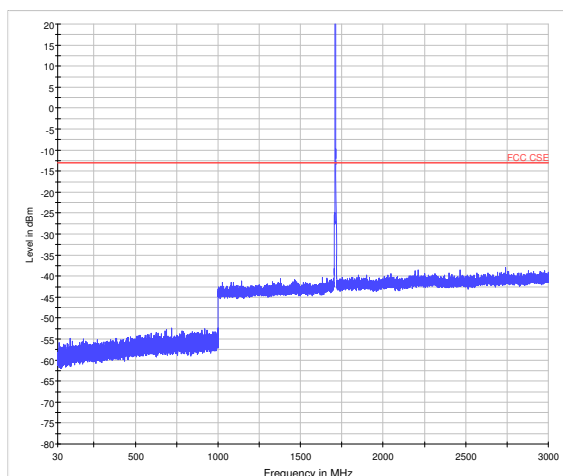
LTE Band 4 3MHz CH-High 30MHz~3GHz



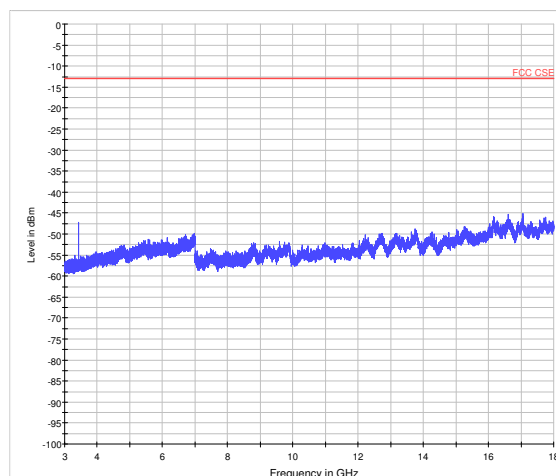
LTE Band 4 3MHz CH-High 3GHz~18GHz



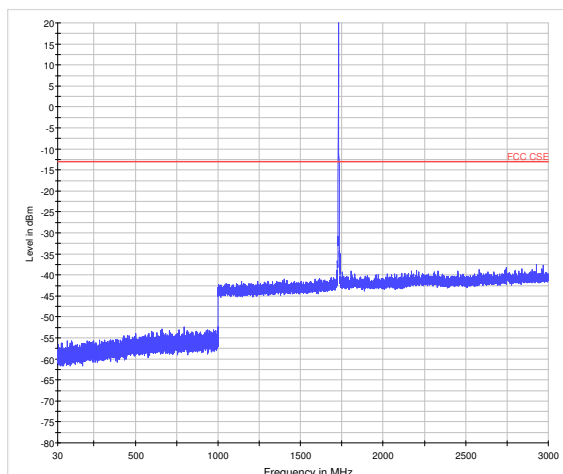
LTE Band 4 5MHz CH-Low 30MHz~3GHz



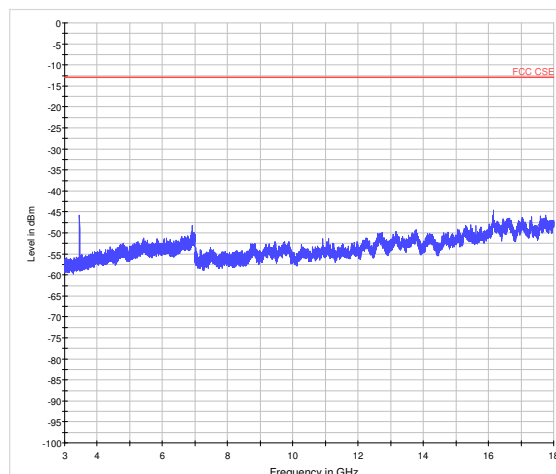
LTE Band 4 5MHz CH-Low 3GHz~18GHz



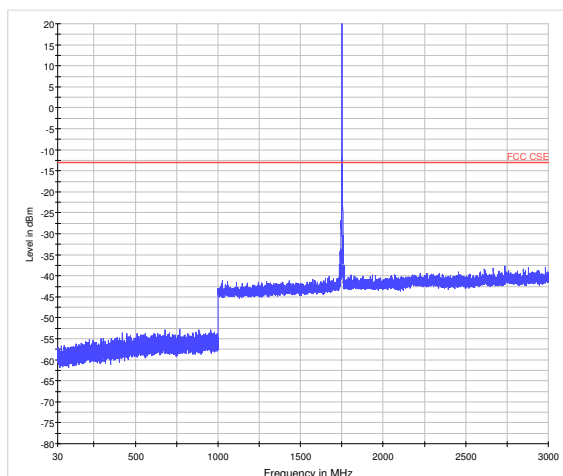
LTE Band 4 5MHz CH-Middle 30MHz~3GHz



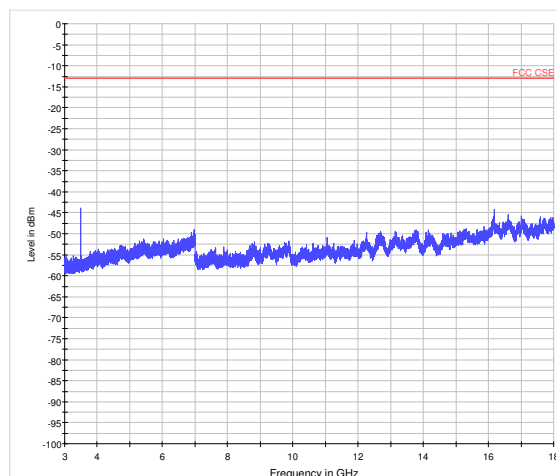
LTE Band 4 5MHz CH-Middle 3GHz~18GHz



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

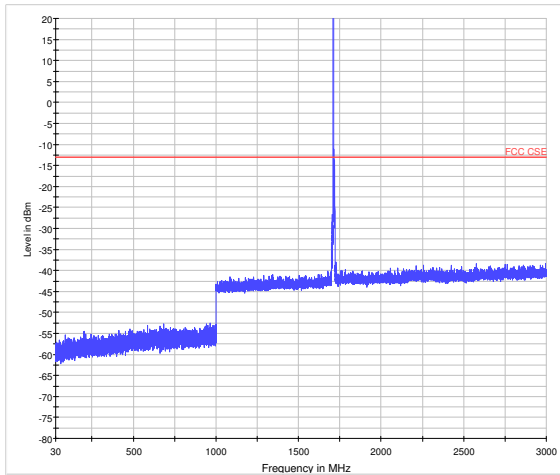


LTE Band 4 5MHz CH-High 3GHz~18GHz

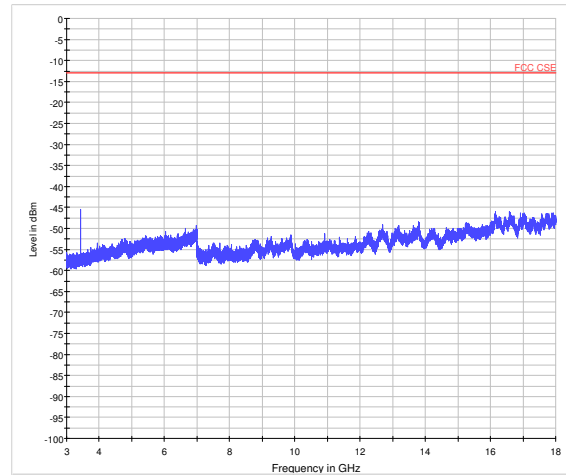




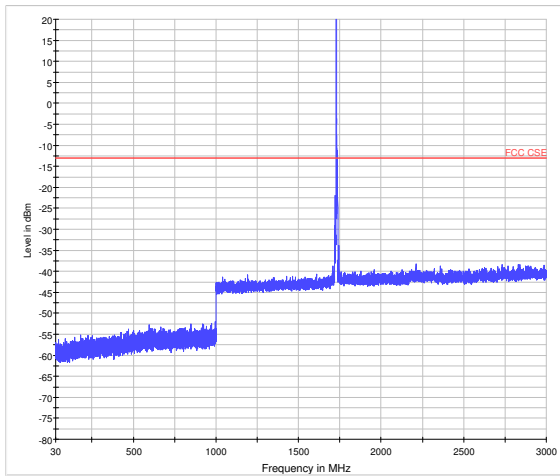
LTE Band 4 10MHz CH-Low 30MHz~3GHz



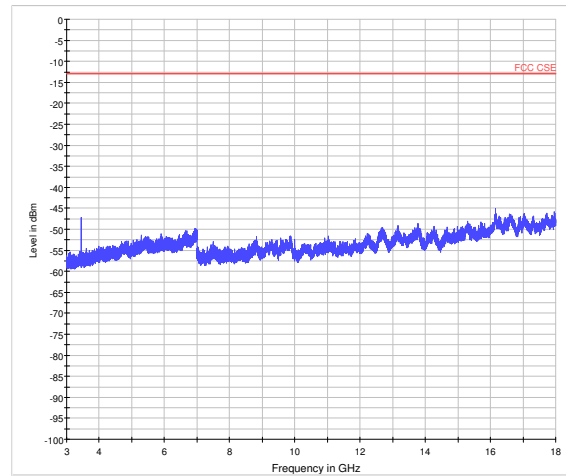
LTE Band 4 10MHz CH-Low 3GHz~18GHz



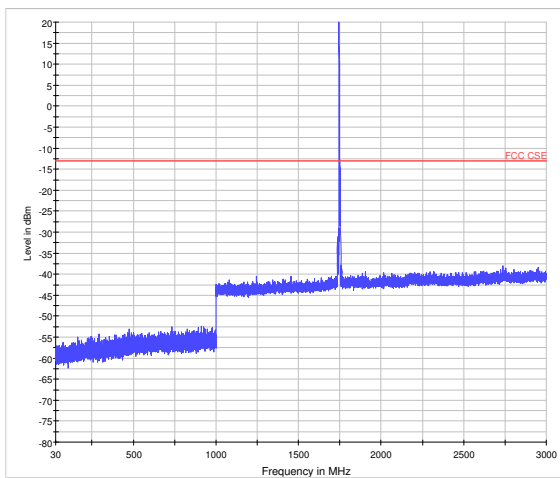
LTE Band 4 10MHz CH-Middle 30MHz~3GHz



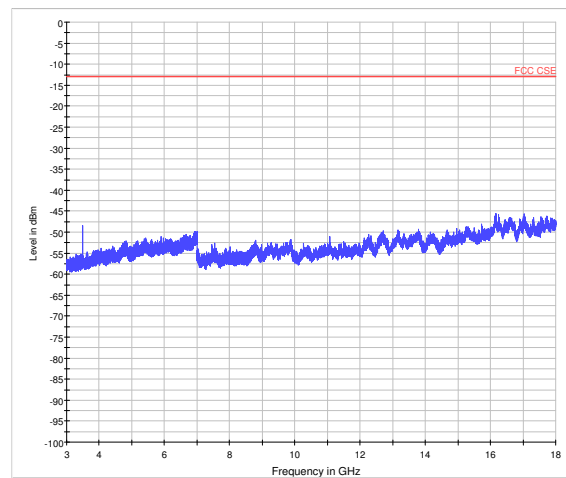
LTE Band 4 10MHz CH-Middle 3GHz~18GHz



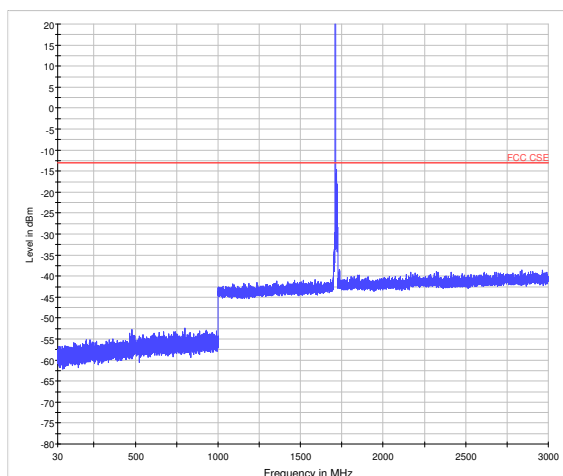
LTE Band 4 10MHz CH-High 30MHz~3GHz



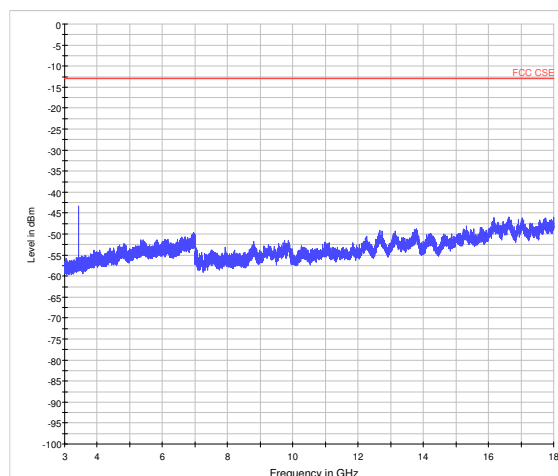
LTE Band 4 10MHz CH-High 3GHz~18GHz



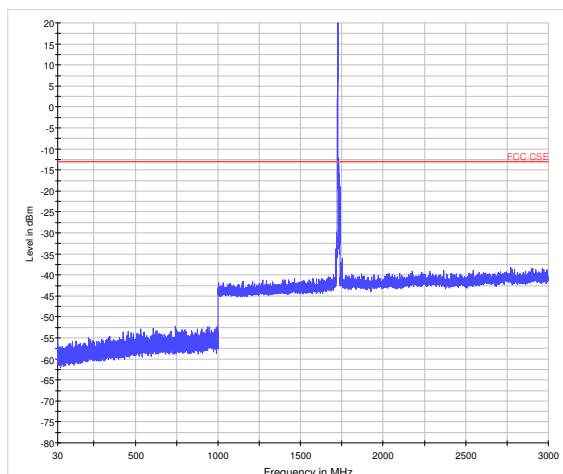
LTE Band 4 15MHz CH-Low 30MHz~3GHz



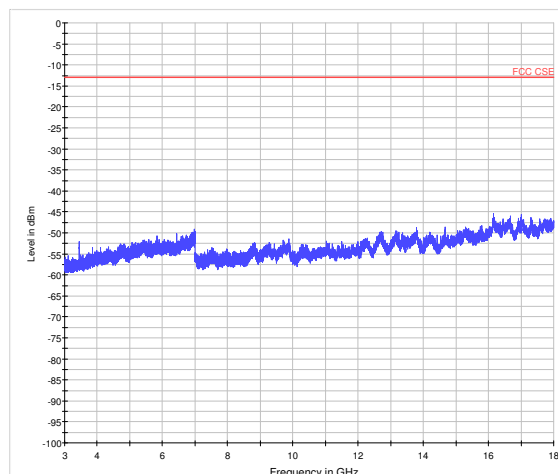
LTE Band 4 15MHz CH-Low 3GHz~18GHz



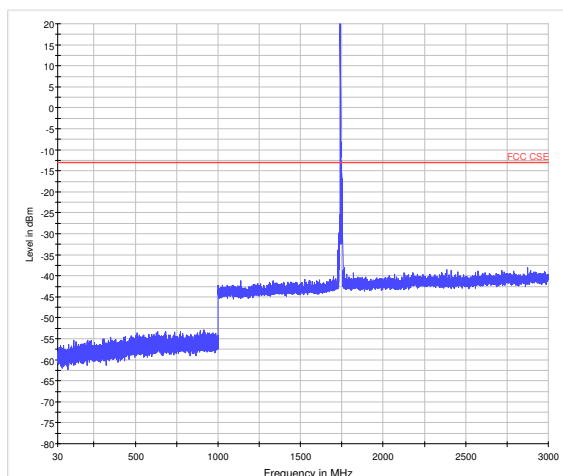
LTE Band 4 15MHz CH-Middle 30MHz~3GHz



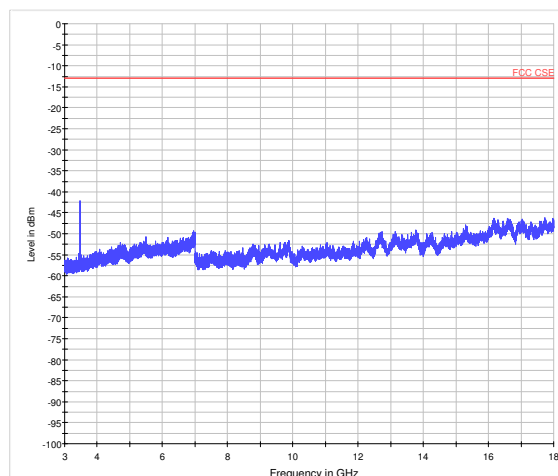
LTE Band 4 15MHz CH-Middle 3GHz~18GHz



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

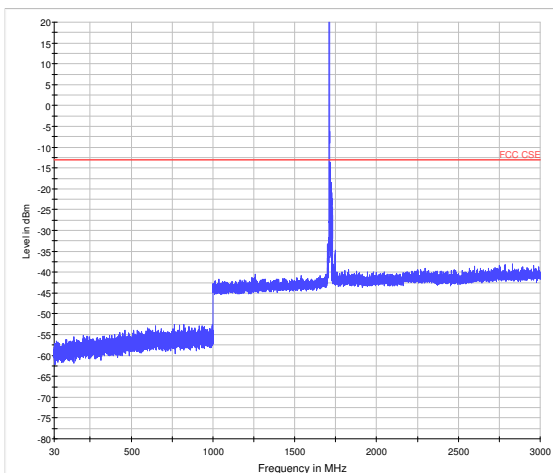


LTE Band 4 15MHz CH-High 3GHz~18GHz

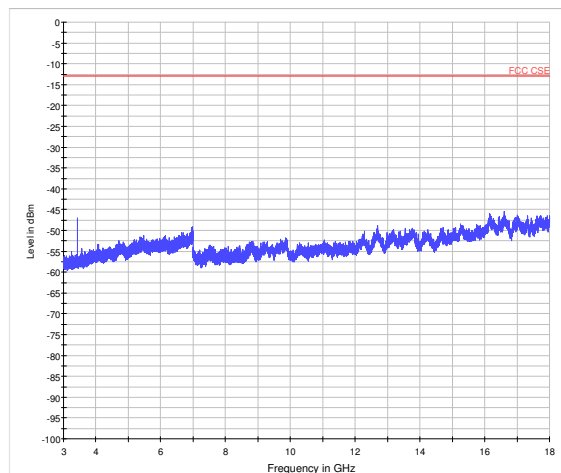




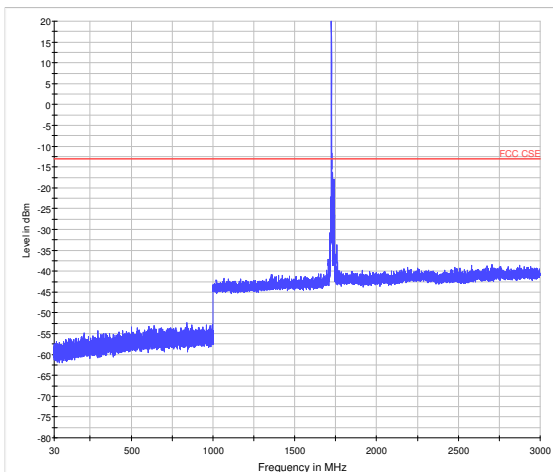
LTE Band 4 20MHz CH-Low 30MHz~3GHz



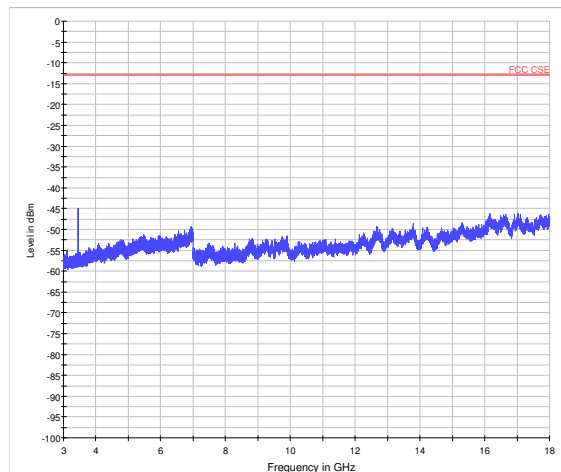
LTE Band 4 20MHz CH-Low 3GHz~18GHz



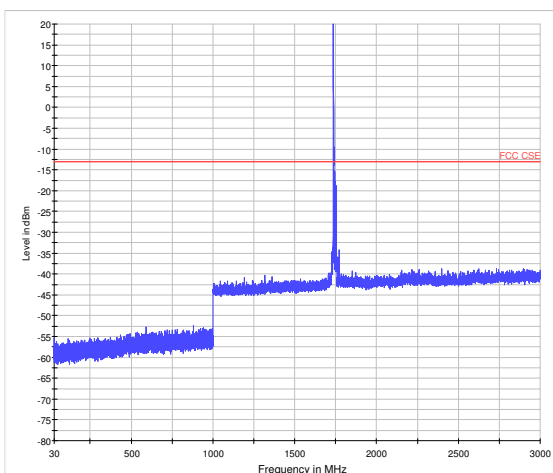
LTE Band 4 20MHz CH-Middle 30MHz~3GHz



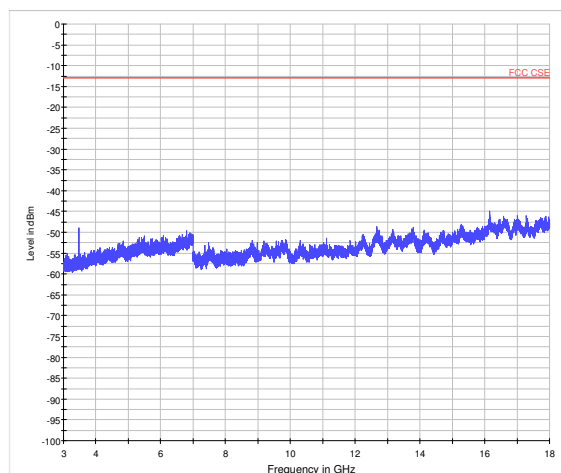
LTE Band 4 20MHz CH-Middle 3GHz~18GHz



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

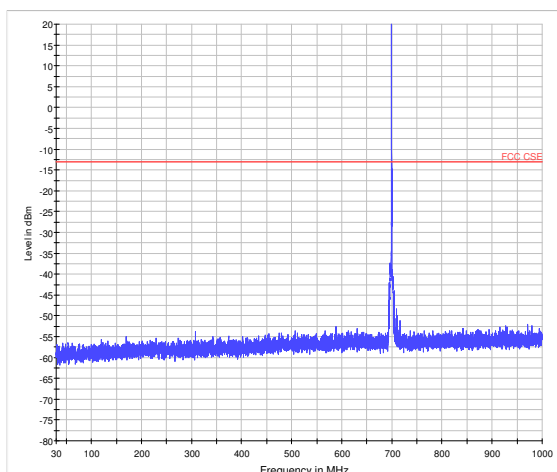


LTE Band 4 20MHz CH-High 3GHz~18GHz

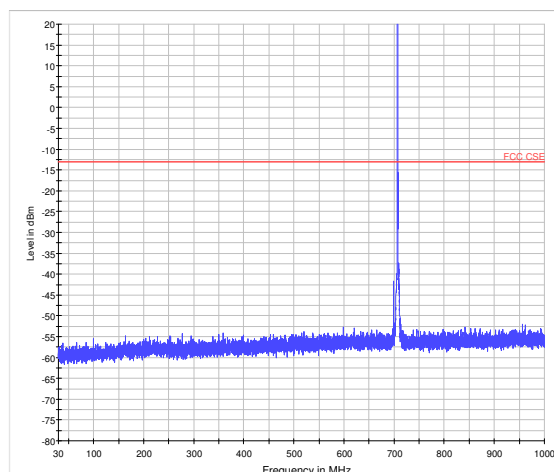




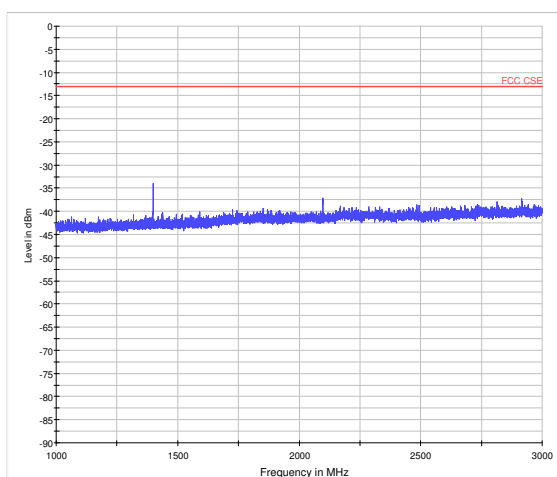
LTE Band 12 1.4MHz CH-Low 30MHz~1GHz



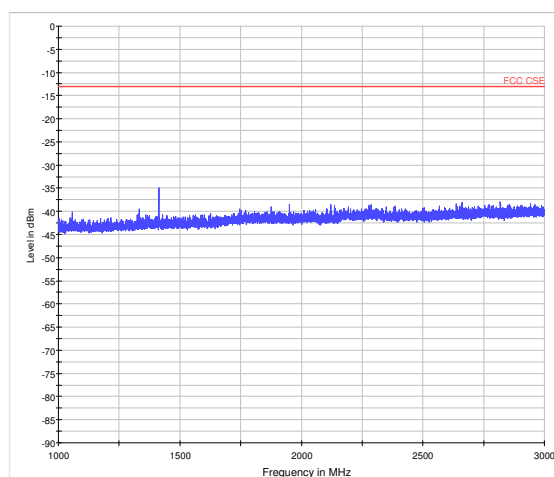
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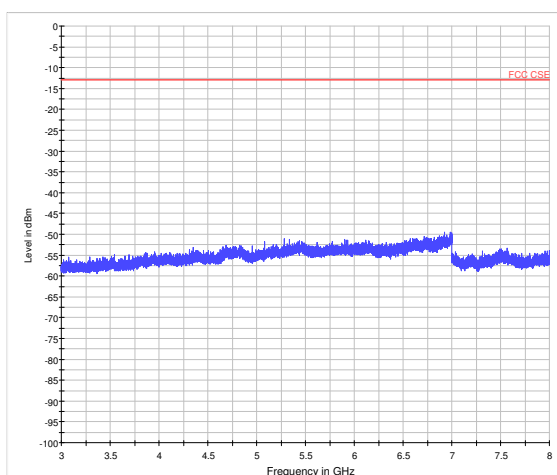
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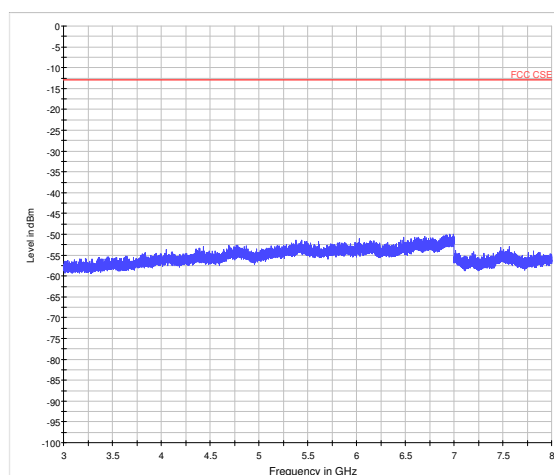
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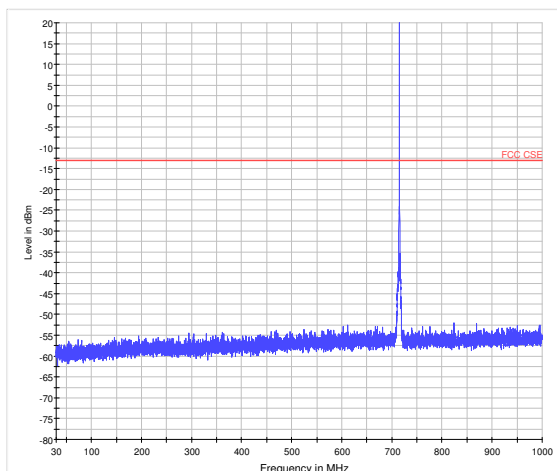
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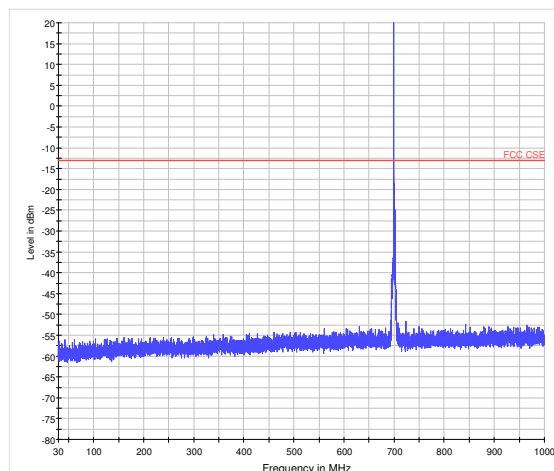
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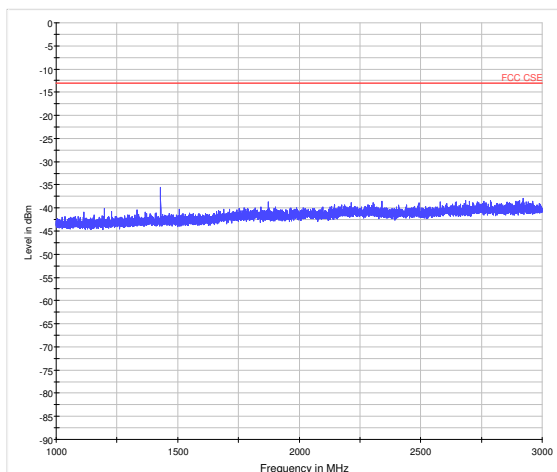
LTE Band 12 1.4MHz CH-High 30MHz~1GHz



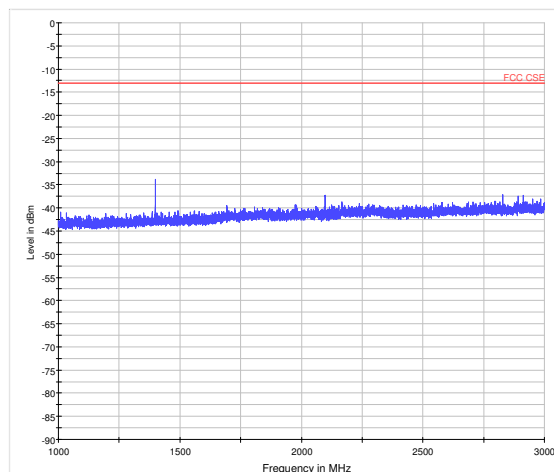
LTE Band 12 3MHz CH-Low 30MHz~1GHz



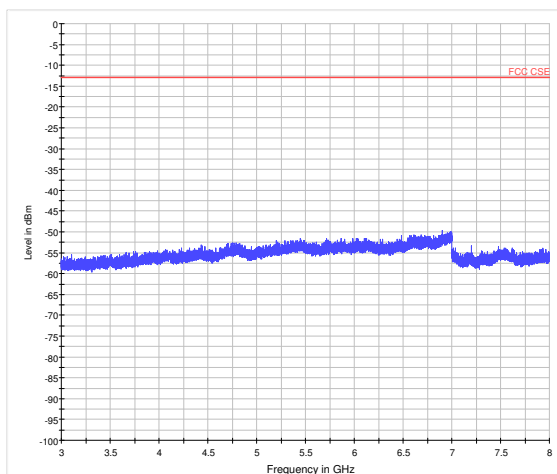
LTE Band 12 1.4MHz CH-High 1GHz~3GHz



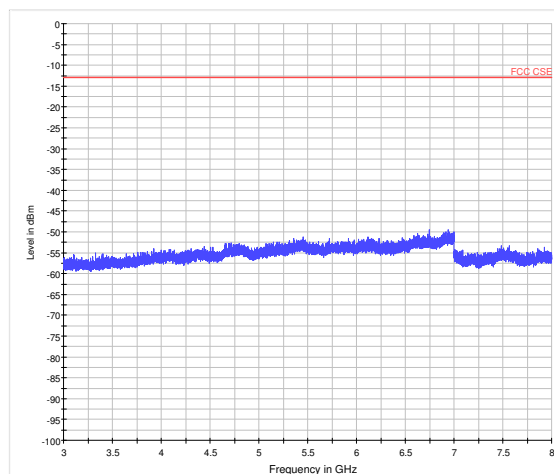
LTE Band 12 3MHz CH-Low 1GHz~3GHz



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

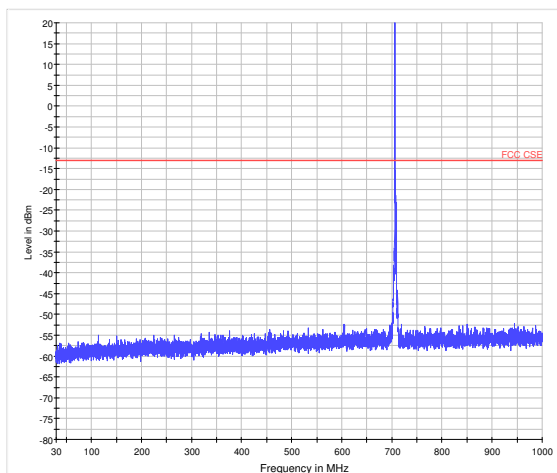


LTE Band 12 3MHz CH-Low 3GHz~8GHz

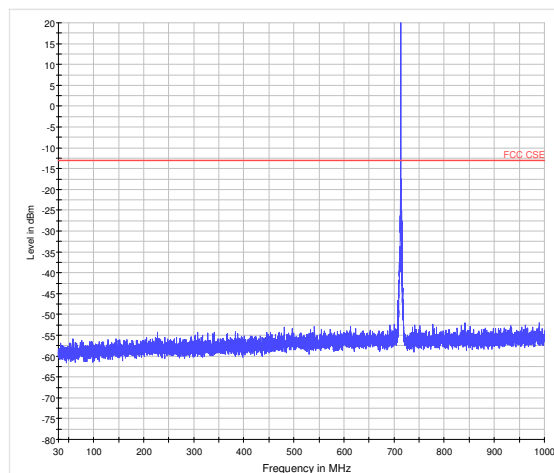




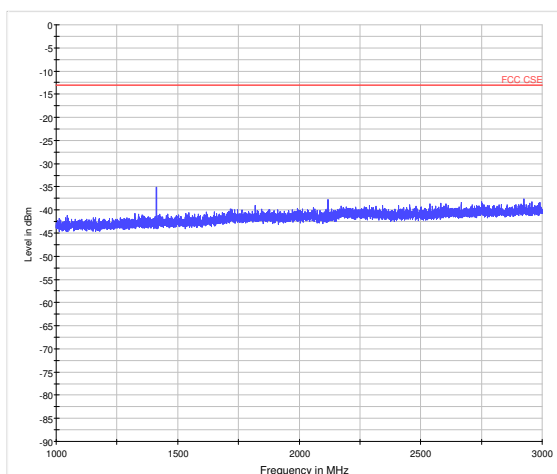
LTE Band 12 3MHz CH-Middle 30MHz~1GHz



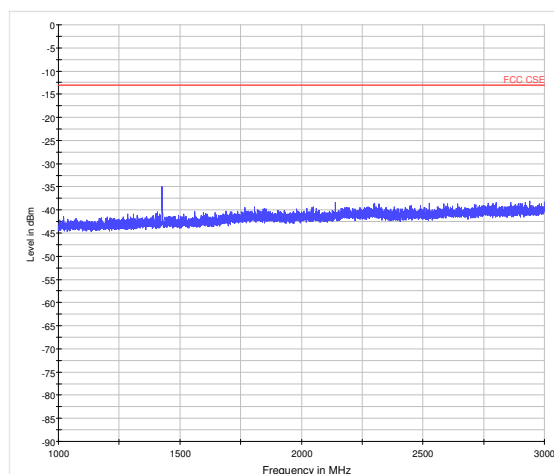
LTE Band 12 3MHz CH-High 30MHz~1GHz



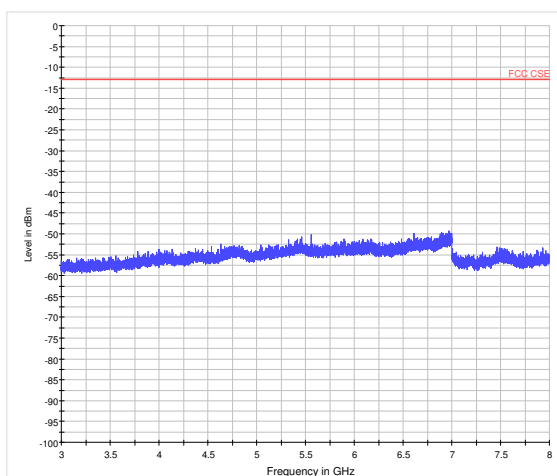
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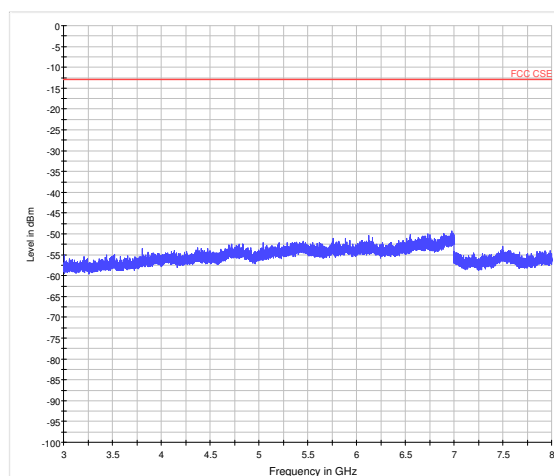
LTE Band 12 3MHz CH-High 1GHz~3GHz



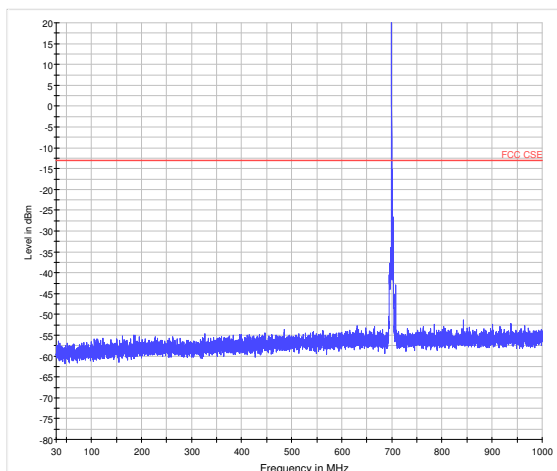
LTE Band 12 3MHz CH-Middle 3GHz~8GHz



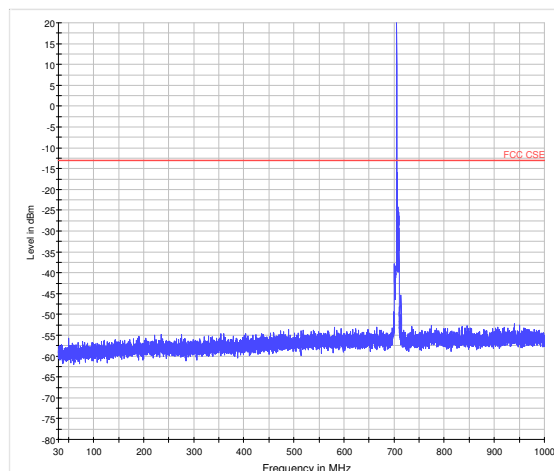
LTE Band 12 3MHz CH-High 3GHz~8GHz



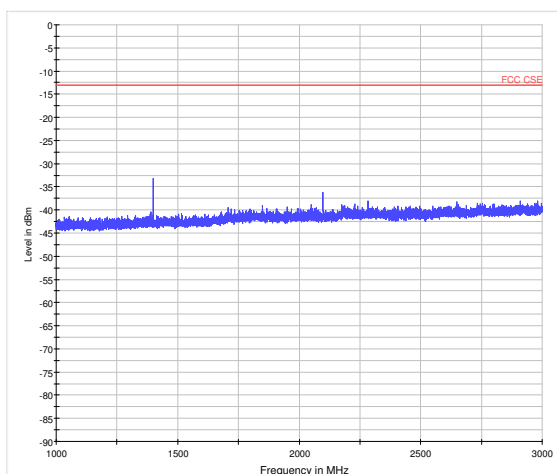
LTE Band 12 5MHz CH-Low 30MHz~1GHz



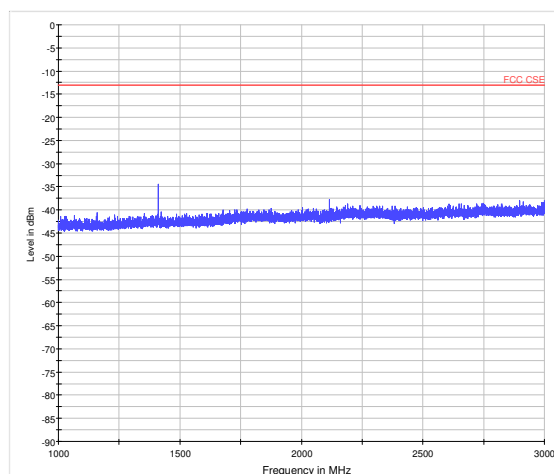
LTE Band 12 5MHz CH-Middle 30MHz~1GHz



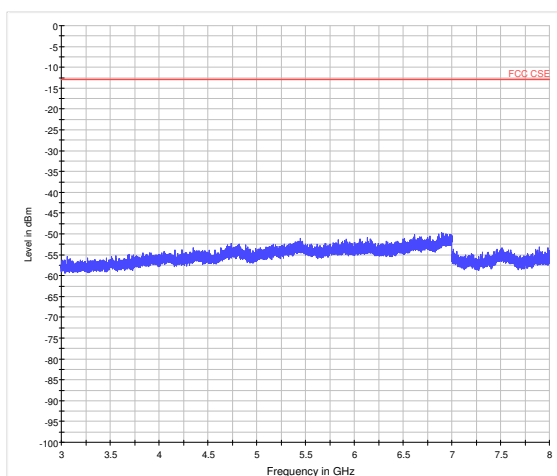
LTE Band 12 5MHz CH-Low 1GHz~3GHz



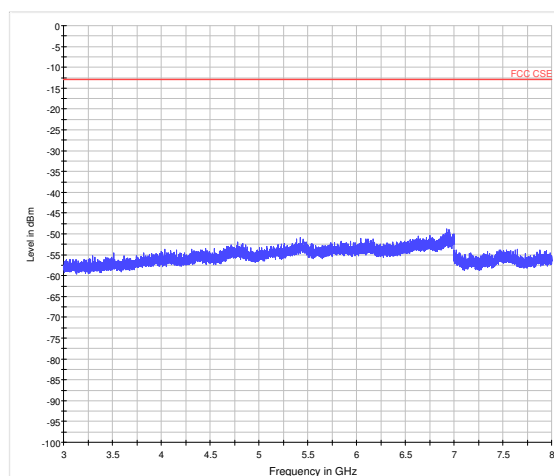
LTE Band 12 5MHz CH-Middle 1GHz~3GHz



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

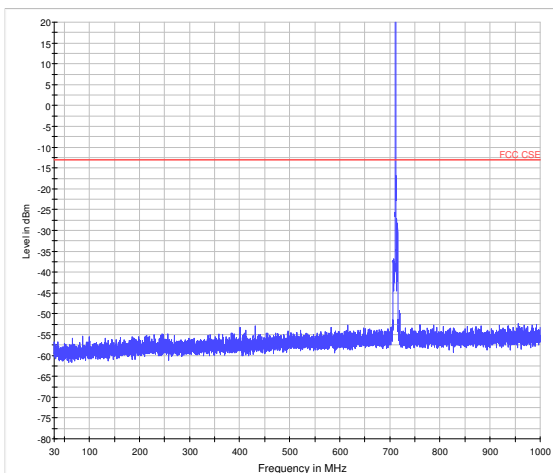


LTE Band 12 5MHz CH-Middle 3GHz~8GHz

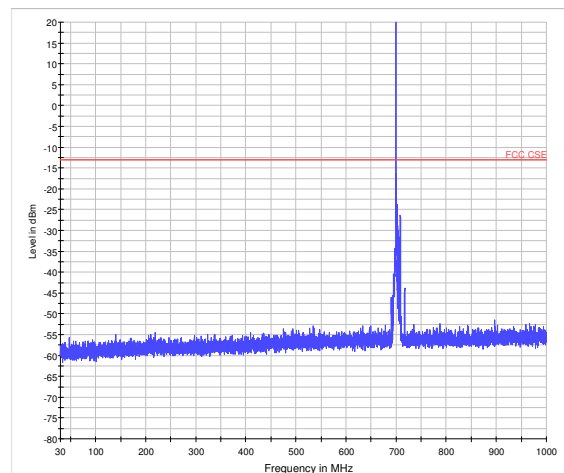




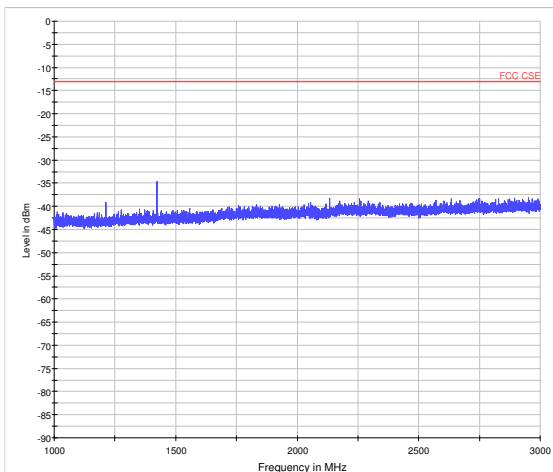
LTE Band 12 5MHz CH-High 30MHz~1GHz



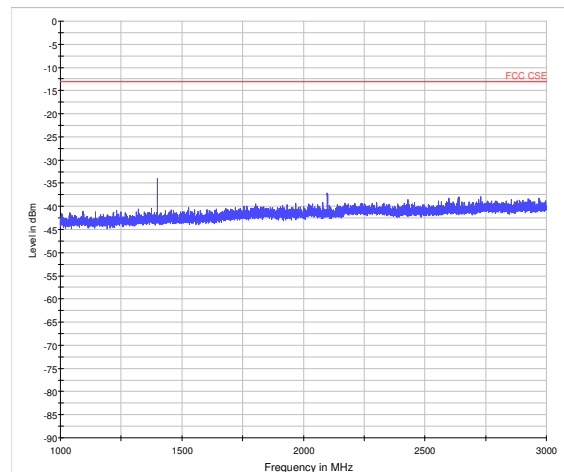
LTE Band 12 10MHz CH-Low 30MHz~1GHz



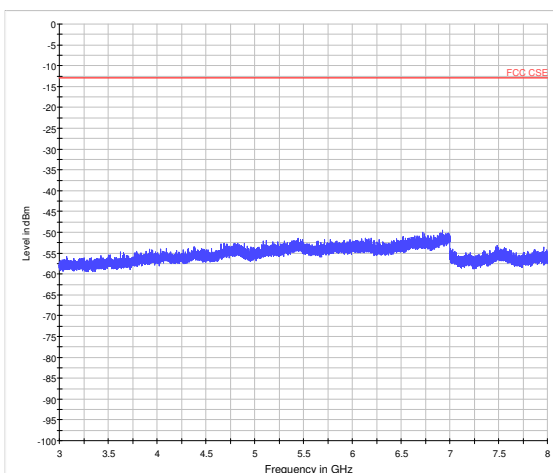
LTE Band 12 5MHz CH-High 1GHz~3GHz



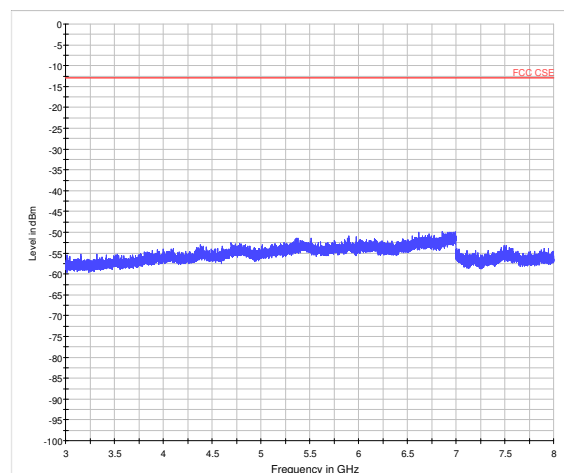
LTE Band 12 10MHz CH-Low 1GHz~3GHz



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

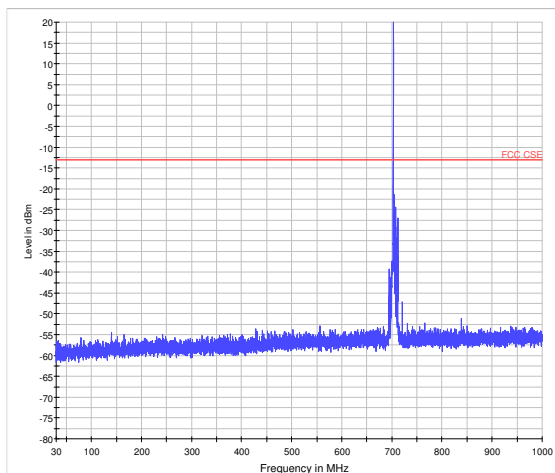


LTE Band 12 10MHz CH-Low 3GHz~8GHz

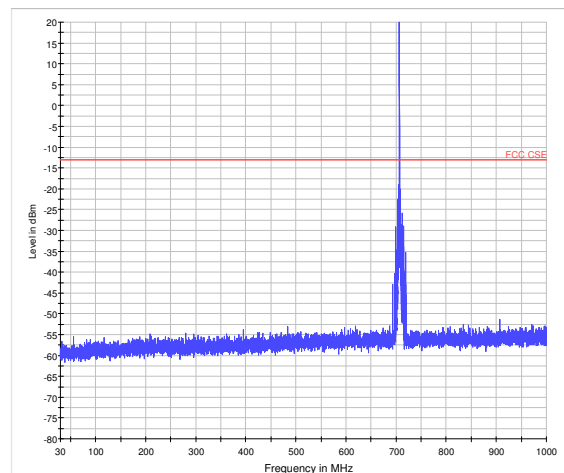




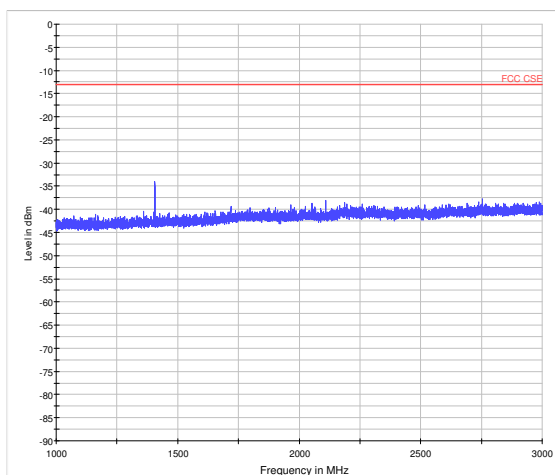
LTE Band 12 10MHz CH-Middle 30MHz~1GHz



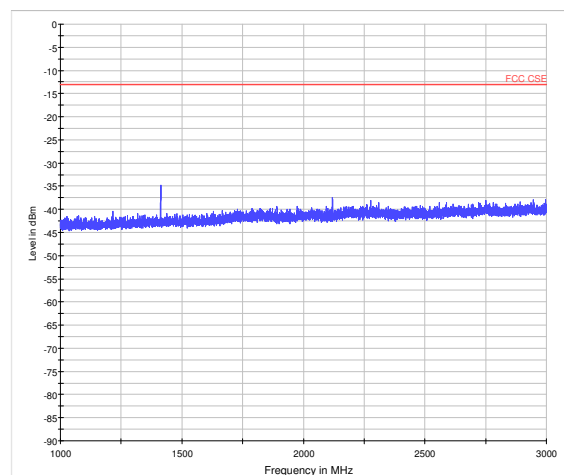
LTE Band 12 10MHz CH-High 30MHz~1GHz



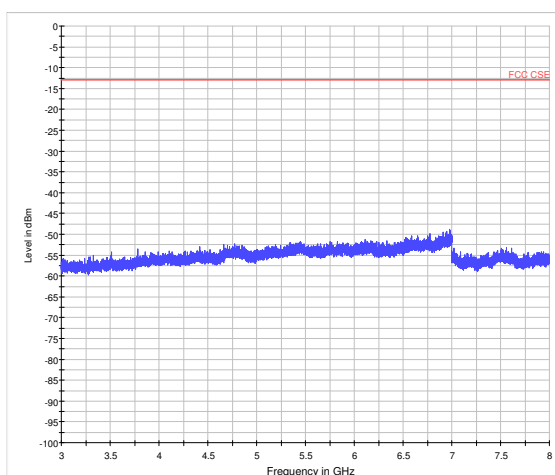
LTE Band 12 10MHz CH-Middle 1GHz~3GHz



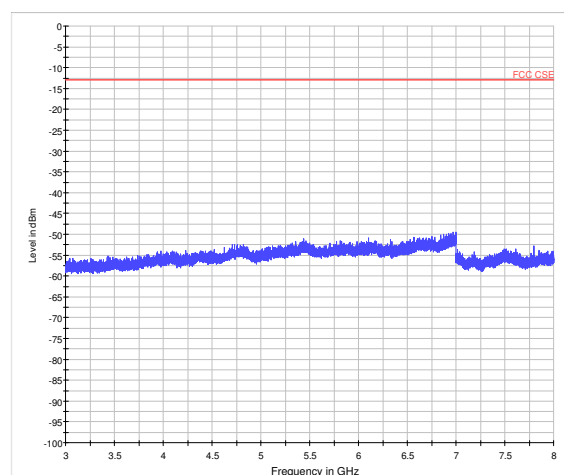
LTE Band 12 10MHz CH-High 1GHz~3GHz



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

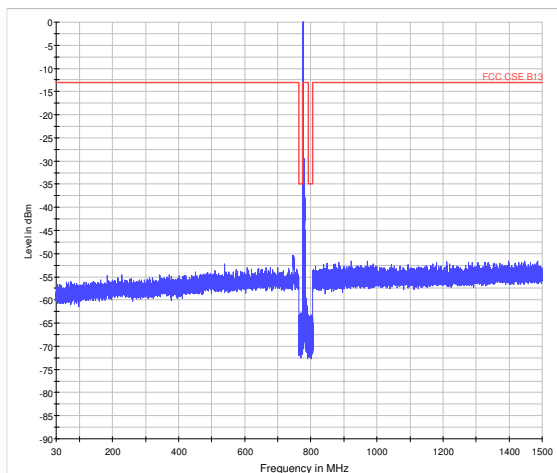


LTE Band 12 10MHz CH-High 3GHz~8GHz

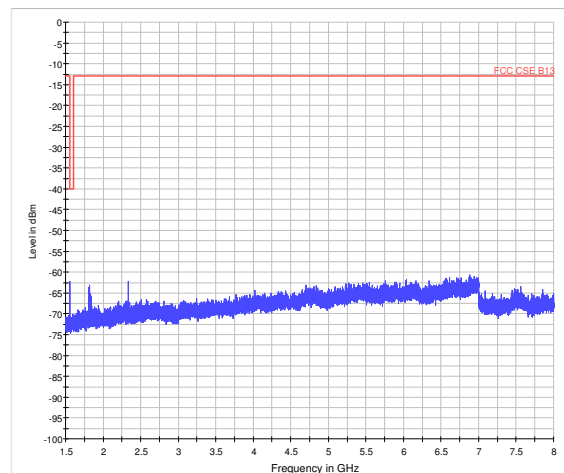




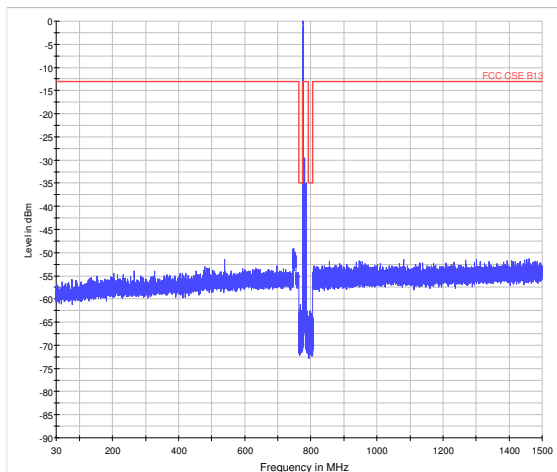
LTE Band 13 5MHz CH-Low 30MHz~1.5GHz



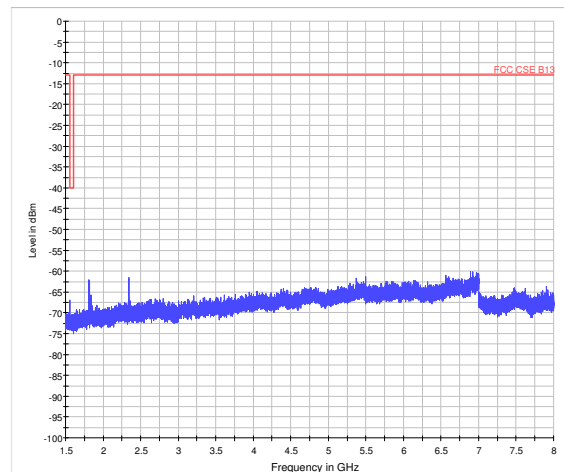
LTE Band 13 5MHz CH-Low 1.5GHz~8GHz



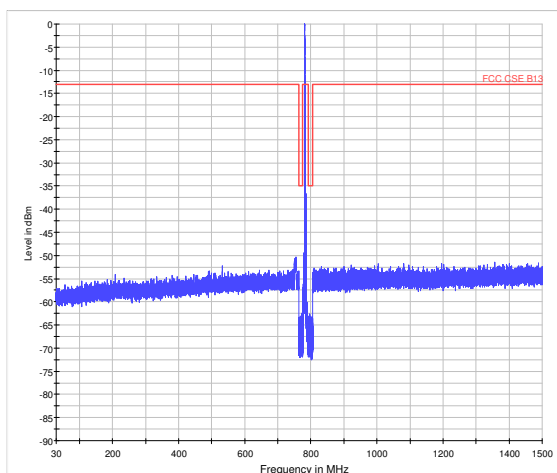
LTE Band 13 5MHz CH-Middle 30MHz~1.5GHz



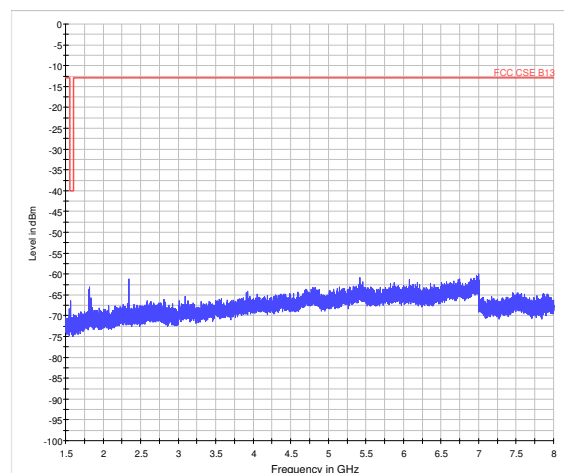
LTE Band 13 5MHz CH-Middle 1.5GHz~8GHz



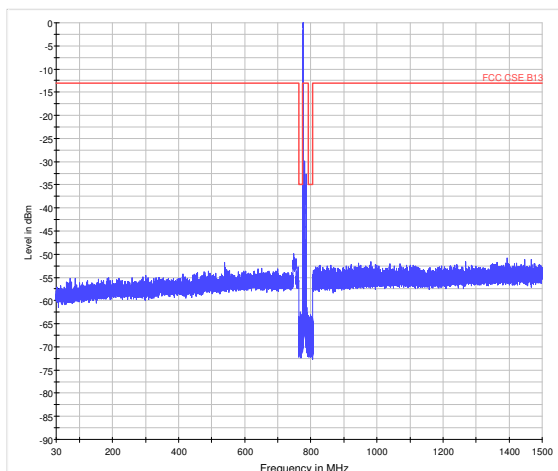
LTE Band 13 5MHz CH-High 30MHz~1.5GHz



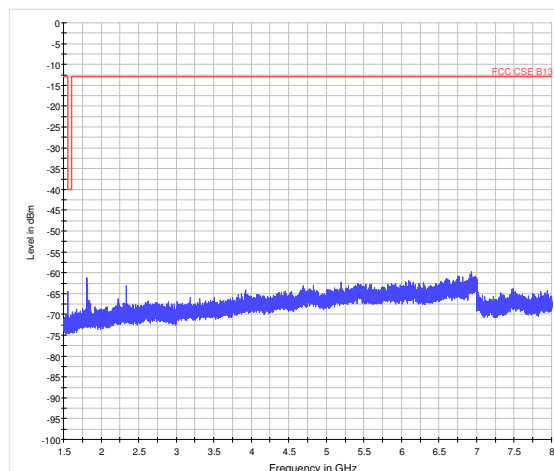
LTE Band 13 5MHz CH-High 1.5GHz~8GHz



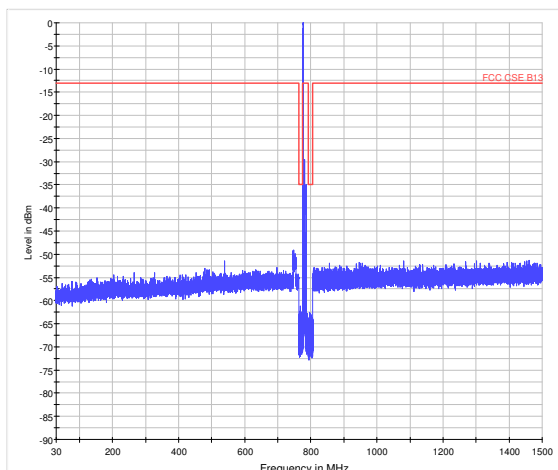
LTE Band 13 10MHz CH-Low 30MHz~1.5GHz



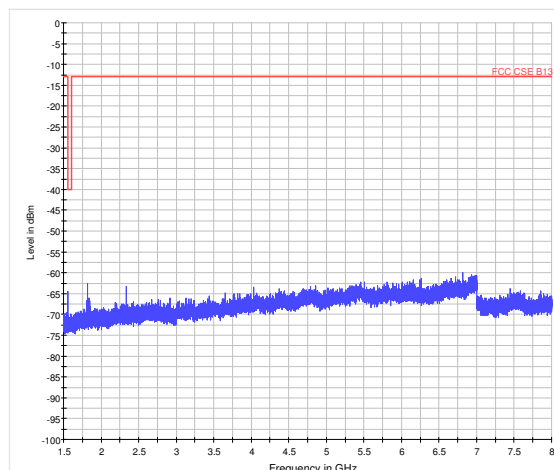
LTE Band 13 10MHz CH-Low 1.5GHz~8GHz



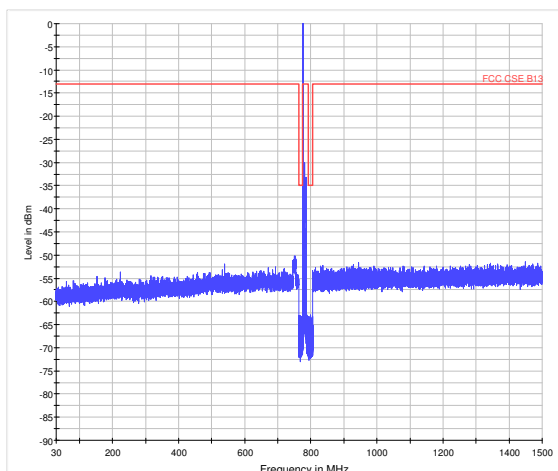
LTE Band 13 10MHz CH-Middle 30MHz~1.5GHz



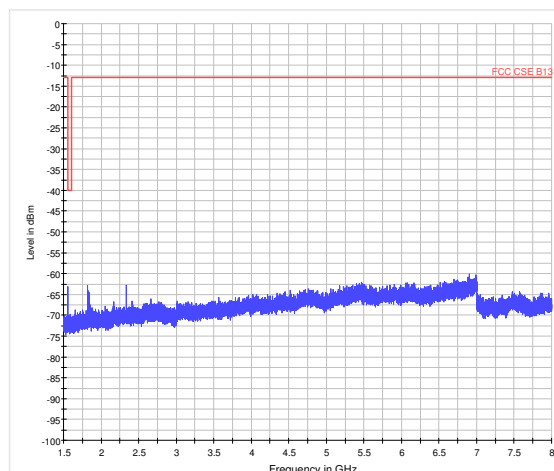
LTE Band 13 10MHz CH-Middle 1.5GHz~8GHz



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



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



5.8 Radiates Spurious Emission

Ambient condition

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

Method of Measurement

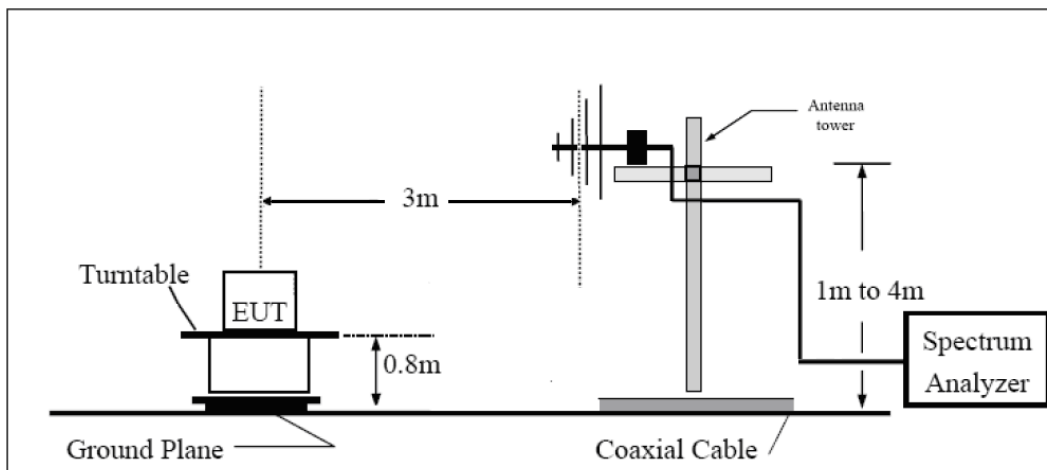
1. The testing follows FCC KDB 971168 v03 Section 5.8 and ANSI/TIA-603-E (2016).
2. The EUT is placed on a turntable 0.8 meters above the ground in the chamber, 3 meter away from the antenna. The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable azimuth. Normally, the height range of antenna is 1 m to 4 m, the azimuth range of turntable is 0° to 360°, and the receive antenna has two polarizations Vertical (V) and Horizontal (H).
3. A log-periodic antenna or double-ridged waveguide horn antenna shall be substituted in place of the EUT. The log-periodic antenna will be driven by a signal generator and the level will be adjusted till the same power value on the spectrum analyzer or receiver. The level of the spurious emissions can be calculated through the level of the signal generator, cable loss, the gain of the substitution antenna and the reading of the spectrum analyzer or receiver.
4. The EUT is then put into continuously transmitting mode at its maximum power level during the test. Set Test Receiver or Spectrum RBW=1MHz, VBW=3MHz, And the maximum value of the receiver should be recorded as (Pr).
5. The EUT shall be replaced by a substitution antenna. In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (PMea) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver reach the previously recorded (Pr). The power of signal source (PMea) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.
6. A amplifier should be connected to the Signal Source output port. And the cable should be connect between the Amplifier and the Substitution Antenna. The cable loss (Pcl) ,the Substitution Antenna Gain (Ga) and the Amplifier Gain (PAg) should be recorded after test.
7. The measurement results are obtained as described below:

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

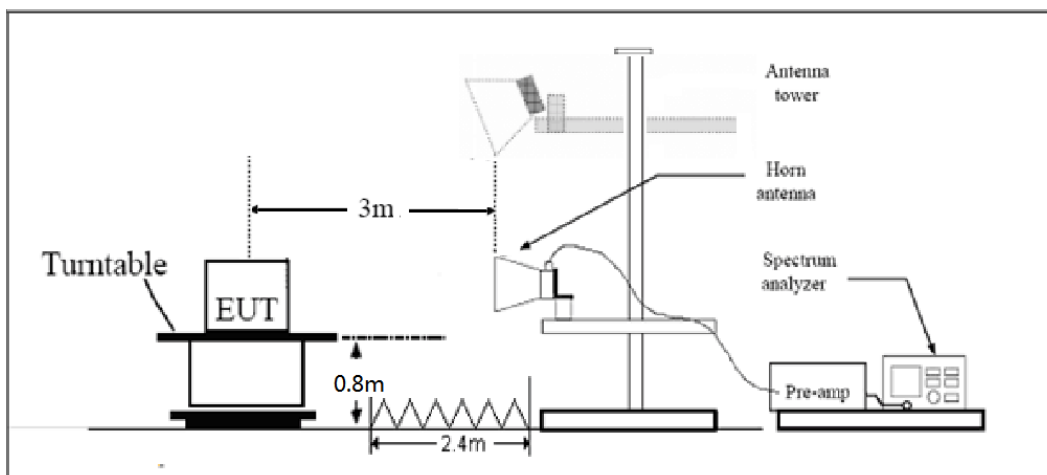
$$\text{Power(EIRP)} = \text{PMea} - \text{Pcl} + \text{Ga}$$
8. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power. ERP can be calculated from EIRP by subtracting the gain of the dipole, $\text{ERP} = \text{EIRP} - 2.15\text{dBi}$.

Test setup

30MHz~~~ 1GHz



Above 1GHz



Note: Area side:2.4mX3.6m

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

Limits

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

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



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

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

LTE B4/12 Limit		-13 dBm
LTE B13 Limit	Limit out of the band 1559-1610 MHz	-13 dBm
	Limit in the band 1559-1610 MHz	-40 dBm

Measurement Uncertainty

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

Test Result

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

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3421.4	-58.35	2.6	10.15	Horizontal	-50.8	-13.0	37.8	270
3	5131.1	-53.05	2.4	11.35	Horizontal	-44.1	-13.0	31.1	180
4	6842.8	-51.15	4.5	10.85	Horizontal	-44.8	-13.0	31.8	135
5	8553.5	-46.55	5.1	11.35	Horizontal	-40.3	-13.0	27.3	270
6	10264.2	-45.85	5.3	11.95	Horizontal	-39.2	-13.0	26.2	180
7	11974.9	-46.75	5.5	13.55	Horizontal	-38.7	-13.0	25.7	225
8	13685.6	-43.95	6.3	13.75	Horizontal	-36.5	-13.0	23.5	45
9	15396.3	-42.45	6.7	13.85	Horizontal	-35.3	-13.0	22.3	270
10	17107.0	-42.15	6.8	14.25	Horizontal	-34.7	-13.0	21.7	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 1.4MHz CH-Middle, RB 1

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3464.3	-58.55	2.6	10.75	Horizontal	-50.4	-13.0	37.4	135
3	5197.5	-52.55	2.4	11.05	Horizontal	-43.9	-13.0	30.9	270
4	6930.0	-51.55	4.5	11.15	Horizontal	-44.9	-13.0	31.9	180
5	8662.5	-46.85	5.1	11.35	Horizontal	-40.6	-13.0	27.6	225
6	10395.0	-46.35	5.3	11.95	Horizontal	-39.7	-13.0	26.7	270
7	12127.5	-45.45	5.5	13.55	Horizontal	-37.4	-13.0	24.4	180
8	13860.0	-44.25	6.3	13.75	Horizontal	-36.8	-13.0	23.8	135
9	15592.5	-44.55	6.7	13.85	Horizontal	-37.4	-13.0	24.4	270
10	17325.0	-42.25	6.8	14.25	Horizontal	-34.8	-13.0	21.8	180

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



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

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3507.8	-57.75	2.6	10.15	Horizontal	-50.2	-13.0	37.2	225
3	5261.6	-52.95	2.4	11.05	Horizontal	-44.3	-13.0	31.3	45
4	7017.2	-49.75	4.5	11.15	Horizontal	-43.1	-13.0	30.1	270
5	8771.5	-47.55	5.1	11.35	Horizontal	-41.3	-13.0	28.3	180
6	10525.8	-46.05	5.3	11.95	Horizontal	-39.4	-13.0	26.4	135
7	12280.1	-45.65	5.5	13.55	Horizontal	-37.6	-13.0	24.6	270
8	14034.4	-43.85	6.3	13.75	Horizontal	-36.4	-13.0	23.4	180
9	15788.7	-42.85	6.7	13.85	Horizontal	-35.7	-13.0	22.7	225
10	17543.0	-41.65	6.8	14.25	Horizontal	-34.2	-13.0	21.2	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 3MHz CH-Low, RB 1

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3423.0	-58.85	2.6	10.15	Horizontal	-51.3	-13.0	38.3	90
3	5134.5	-55.05	2.4	11.35	Horizontal	-46.1	-13.0	33.1	270
4	6846.0	-50.05	4.5	10.85	Horizontal	-43.7	-13.0	30.7	180
5	8557.5	-49.05	5.1	11.35	Horizontal	-42.8	-13.0	29.8	135
6	10269.0	-46.05	5.3	11.95	Horizontal	-39.4	-13.0	26.4	270
7	11980.5	-46.35	5.5	13.55	Horizontal	-38.3	-13.0	25.3	180
8	13692.0	-45.05	6.3	13.75	Horizontal	-37.6	-13.0	24.6	225
9	15403.5	-43.55	6.7	13.85	Horizontal	-36.4	-13.0	23.4	45
10	17115.0	-42.95	6.8	14.25	Horizontal	-35.5	-13.0	22.5	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 3MHz CH-Middle, RB 1

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3465.0	-59.35	2.6	10.75	Horizontal	-51.2	-13.0	38.2	180
3	5197.5	-54.35	2.4	11.05	Horizontal	-45.7	-13.0	32.7	270
4	6930.0	-50.05	4.5	11.15	Horizontal	-43.4	-13.0	30.4	45
5	8662.5	-48.35	5.1	11.35	Horizontal	-42.1	-13.0	29.1	90
6	10395.0	-46.05	5.3	11.95	Horizontal	-39.4	-13.0	26.4	135
7	12127.5	-44.05	5.5	13.55	Horizontal	-36.0	-13.0	23.0	225
8	13860.0	-43.35	6.3	13.75	Horizontal	-35.9	-13.0	22.9	180
9	15592.5	-44.65	6.7	13.85	Horizontal	-37.5	-13.0	24.5	270
10	17325.0	-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 3MHz CH-High, RB 1

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3504.8	-58.45	2.6	10.15	Horizontal	-50.9	-13.0	37.9	270
3	5256.8	-52.95	2.4	11.05	Horizontal	-44.3	-13.0	31.3	180
4	7014.0	-50.25	4.5	11.15	Horizontal	-43.6	-13.0	30.6	225
5	8767.5	-47.75	5.1	11.35	Horizontal	-41.5	-13.0	28.5	45
6	10521.0	-45.75	5.3	11.95	Horizontal	-39.1	-13.0	26.1	90
7	12274.5	-46.45	5.5	13.55	Horizontal	-38.4	-13.0	25.4	180
8	14028.0	-44.15	6.3	13.75	Horizontal	-36.7	-13.0	23.7	270
9	15781.5	-44.45	6.7	13.85	Horizontal	-37.3	-13.0	24.3	135
10	17535.0	-43.55	6.8	14.25	Horizontal	-36.1	-13.0	23.1	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-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	-57.85	2.6	10.15	Horizontal	-50.3	-13.0	37.3	225
3	5131.1	-54.25	2.4	11.35	Horizontal	-45.3	-13.0	32.3	45
4	6850.0	-50.85	4.5	10.85	Horizontal	-44.5	-13.0	31.5	90
5	8562.5	-46.95	5.1	11.35	Horizontal	-40.7	-13.0	27.7	180
6	10275.0	-46.35	5.3	11.95	Horizontal	-39.7	-13.0	26.7	270
7	11987.5	-46.45	5.5	13.55	Horizontal	-38.4	-13.0	25.4	180
8	13700.0	-44.95	6.3	13.75	Horizontal	-37.5	-13.0	24.5	225
9	15412.5	-43.75	6.7	13.85	Horizontal	-36.6	-13.0	23.6	45
10	17125.0	-43.85	6.8	14.25	Horizontal	-36.4	-13.0	23.4	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	-55.95	2.6	10.75	Horizontal	-47.8	-13.0	34.8	180
3	5191.5	-54.75	2.4	11.05	Horizontal	-46.1	-13.0	33.1	135
4	6930.0	-50.75	4.5	11.15	Horizontal	-44.1	-13.0	31.1	270
5	8662.5	-47.95	5.1	11.35	Horizontal	-41.7	-13.0	28.7	180
6	10395.0	-46.55	5.3	11.95	Horizontal	-39.9	-13.0	26.9	225
7	12127.5	-45.65	5.5	13.55	Horizontal	-37.6	-13.0	24.6	45
8	13860.0	-43.25	6.3	13.75	Horizontal	-35.8	-13.0	22.8	90
9	15592.5	-43.85	6.7	13.85	Horizontal	-36.7	-13.0	23.7	270
10	17325.0	-43.55	6.8	14.25	Horizontal	-36.1	-13.0	23.1	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	-57.95	2.6	10.15	Horizontal	-50.4	-13.0	37.4	225
3	5250.8	-55.95	2.4	11.05	Horizontal	-47.3	-13.0	34.3	45
4	7010.0	-50.45	4.5	11.15	Horizontal	-43.8	-13.0	30.8	135
5	8762.5	-46.45	5.1	11.35	Horizontal	-40.2	-13.0	27.2	180
6	10515.0	-45.25	5.3	11.95	Horizontal	-38.6	-13.0	25.6	225
7	12267.5	-45.45	5.5	13.55	Horizontal	-37.4	-13.0	24.4	45
8	14020.0	-43.95	6.3	13.75	Horizontal	-36.5	-13.0	23.5	90
9	15772.5	28.75	6.7	13.85	Horizontal	-35.9	-13.0	22.9	270
10	17525.0	-43.15	6.8	14.25	Horizontal	-35.7	-13.0	22.7	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	-58.75	2.6	10.15	Horizontal	-51.2	-13.0	38.2	225
3	5131.9	-55.65	2.4	11.35	Horizontal	-46.7	-13.0	33.7	45
4	6860.0	-49.65	4.5	10.85	Horizontal	-43.3	-13.0	30.3	90
5	8575.0	-47.85	5.1	11.35	Horizontal	-41.6	-13.0	28.6	180
6	10290.0	-46.45	5.3	11.95	Horizontal	-39.8	-13.0	26.8	270
7	12005.0	-47.15	5.5	13.55	Horizontal	-39.1	-13.0	26.1	135
8	13720.0	-43.55	6.3	13.75	Horizontal	-36.1	-13.0	23.1	180
9	15435.0	-44.55	6.7	13.85	Horizontal	-37.4	-13.0	24.4	225
10	17150.0	-43.25	6.8	14.25	Horizontal	-35.8	-13.0	22.8	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 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	-59.05	2.6	10.75	Horizontal	-50.9	-13.0	37.9	90
3	5184.4	-54.85	2.4	11.05	Horizontal	-46.2	-13.0	33.2	180
4	6930.0	-49.55	4.5	11.15	Horizontal	-42.9	-13.0	29.9	270
5	8662.5	-47.75	5.1	11.35	Horizontal	-41.5	-13.0	28.5	180
6	10395.0	-45.95	5.3	11.95	Horizontal	-39.3	-13.0	26.3	225
7	12127.5	-46.65	5.5	13.55	Horizontal	-38.6	-13.0	25.6	45
8	13860.0	-42.85	6.3	13.75	Horizontal	-35.4	-13.0	22.4	90
9	15592.5	-44.85	6.7	13.85	Horizontal	-37.7	-13.0	24.7	180
10	17325.0	-42.95	6.8	14.25	Horizontal	-35.5	-13.0	22.5	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 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	-58.55	2.6	10.15	Horizontal	-51.0	-13.0	38.0	270
3	5236.9	-54.55	2.4	11.05	Horizontal	-45.9	-13.0	32.9	180
4	7000.0	-48.95	4.5	11.15	Horizontal	-42.3	-13.0	29.3	225
5	8750.0	-47.25	5.1	11.35	Horizontal	-41.0	-13.0	28.0	45
6	10500.0	-46.05	5.3	11.95	Horizontal	-39.4	-13.0	26.4	90
7	12250.0	-46.25	5.5	13.55	Horizontal	-38.2	-13.0	25.2	180
8	14000.0	-43.05	6.3	13.75	Horizontal	-35.6	-13.0	22.6	270
9	15750.0	-44.45	6.7	13.85	Horizontal	-37.3	-13.0	24.3	45
10	17500.0	-42.55	6.8	14.25	Horizontal	-35.1	-13.0	22.1	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	-58.85	2.6	10.15	Horizontal	-51.3	-13.0	38.3	45
3	5132.6	-56.35	2.4	11.35	Horizontal	-47.4	-13.0	34.4	90
4	6870.0	-50.15	4.5	10.85	Horizontal	-43.8	-13.0	30.8	90
5	8587.5	-47.45	5.1	11.35	Horizontal	-41.2	-13.0	28.2	45
6	10305.0	-45.35	5.3	11.95	Horizontal	-38.7	-13.0	25.7	135
7	12022.5	-45.95	5.5	13.55	Horizontal	-37.9	-13.0	24.9	225
8	13740.0	-42.85	6.3	13.75	Horizontal	-35.4	-13.0	22.4	45
9	15457.5	-44.25	6.7	13.85	Horizontal	-37.1	-13.0	24.1	90
10	17175.0	-43.05	6.8	14.25	Horizontal	-35.6	-13.0	22.6	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 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	-60.05	2.6	10.75	Horizontal	-51.9	-13.0	38.9	135
3	5217.8	-56.25	2.4	11.05	Horizontal	-47.6	-13.0	34.6	45
4	6930.0	-49.85	4.5	11.15	Horizontal	-43.2	-13.0	30.2	90
5	8662.5	-46.85	5.1	11.35	Horizontal	-40.6	-13.0	27.6	180
6	10395.0	-44.95	5.3	11.95	Horizontal	-38.3	-13.0	25.3	270
7	12127.5	-46.45	5.5	13.55	Horizontal	-38.4	-13.0	25.4	225
8	13860.0	-43.35	6.3	13.75	Horizontal	-35.9	-13.0	22.9	135
9	15592.5	-44.65	6.7	13.85	Horizontal	-37.5	-13.0	24.5	225
10	17325.0	-42.65	6.8	14.25	Horizontal	-35.2	-13.0	48.2	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	-58.85	2.6	10.15	Horizontal	-51.3	-13.0	38.3	90
3	5262.8	-54.85	2.4	11.05	Horizontal	-46.2	-13.0	33.2	135
4	6990.0	-49.55	4.5	11.15	Horizontal	-42.9	-13.0	29.9	225
5	8737.5	-46.45	5.1	11.35	Horizontal	-40.2	-13.0	27.2	45
6	10485.0	-44.75	5.3	11.95	Horizontal	-38.1	-13.0	25.1	90
7	12232.5	-45.95	5.5	13.55	Horizontal	-37.9	-13.0	24.9	135
8	13980.0	-43.25	6.3	13.75	Horizontal	-35.8	-13.0	22.8	135
9	15727.5	-43.65	6.7	13.85	Horizontal	-36.5	-13.0	23.5	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	-58.95	2.6	10.15	Horizontal	-51.4	-13.0	38.4	135
3	5133.0	-55.65	2.4	11.35	Horizontal	-46.7	-13.0	33.7	90
4	6880.0	-49.45	4.5	10.85	Horizontal	-43.1	-13.0	30.1	45
5	8600.0	-49.05	5.1	11.35	Horizontal	-42.8	-13.0	29.8	90
6	10320.0	-46.35	5.3	11.95	Horizontal	-39.7	-13.0	26.7	90
7	12040.0	-46.15	5.5	13.55	Horizontal	-38.1	-13.0	25.1	135
8	13760.0	-43.95	6.3	13.75	Horizontal	-36.5	-13.0	23.5	225
9	15480.0	-44.35	6.7	13.85	Horizontal	-37.2	-13.0	24.2	135
10	17200.0	-43.55	6.8	14.25	Horizontal	-36.1	-13.0	23.1	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	-59.25	2.6	10.75	Horizontal	-51.1	-13.0	38.1	90
3	5170.5	-55.15	2.4	11.05	Horizontal	-46.5	-13.0	33.5	45
4	6930.0	-50.25	4.5	11.15	Horizontal	-43.6	-13.0	30.6	45
5	8662.5	-48.35	5.1	11.35	Horizontal	-42.1	-13.0	29.1	180
6	10395.0	-46.25	5.3	11.95	Horizontal	-39.6	-13.0	26.6	270
7	12127.5	-45.55	5.5	13.55	Horizontal	-37.5	-13.0	24.5	225
8	13860.0	-43.75	6.3	13.75	Horizontal	-36.3	-13.0	23.3	135
9	15592.5	-45.05	6.7	13.85	Horizontal	-37.9	-13.0	24.9	180
10	17325.0	-43.75	6.8	14.25	Horizontal	-36.3	-13.0	23.3	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 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	-58.45	2.6	10.15	Horizontal	-50.9	-13.0	37.9	45
3	5208.4	-54.45	2.4	11.05	Horizontal	-45.8	-13.0	32.8	225
4	6980.0	-50.15	4.5	11.15	Horizontal	-43.5	-13.0	30.5	135
5	8725.0	-48.15	5.1	11.35	Horizontal	-41.9	-13.0	28.9	90
6	10470.0	-46.05	5.3	11.95	Horizontal	-39.4	-13.0	26.4	45
7	12215.0	-44.95	5.5	13.55	Horizontal	-36.9	-13.0	23.9	90
8	13960.0	-43.65	6.3	13.75	Horizontal	-36.2	-13.0	23.2	45
9	15705.0	-44.45	6.7	13.85	Horizontal	-37.3	-13.0	24.3	135
10	17450.0	-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 12 QPSK 1.4MHz CH-Low, RB 1

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1399.40	-60.70	2.00	10.15	Horizontal	-54.7	-13.0	41.7	45
3	2099.10	-59.60	2.50	11.35	Horizontal	-52.9	-13.0	39.9	270
4	2798.80	-55.70	4.20	10.85	Horizontal	-51.2	-13.0	38.2	45
5	3498.50	-55.10	5.20	11.35	Horizontal	-51.1	-13.0	38.1	180
6	4198.20	-54.60	5.50	11.95	Horizontal	-50.3	-13.0	37.3	270
7	4897.90	-53.20	5.70	13.55	Horizontal	-47.5	-13.0	34.5	135
8	5597.60	-53.00	6.30	13.75	Horizontal	-47.7	-13.0	34.7	45
9	6297.30	-51.60	6.80	13.85	Horizontal	-46.7	-13.0	33.7	270
10	6997.00	-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 1.4MHz CH-Middle, RB 1

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1415.00	-60.80	2.00	10.75	Horizontal	-54.2	-13.0	41.2	270
3	2122.50	-59.29	2.51	11.05	Horizontal	-52.9	-13.0	39.9	180
4	2830.00	-56.70	4.20	11.15	Horizontal	-51.9	-13.0	38.9	270
5	3537.50	-54.50	5.20	11.15	Horizontal	-50.7	-13.0	37.7	270
6	4245.00	-53.40	5.50	11.95	Horizontal	-49.1	-13.0	36.1	270
7	4952.50	-53.70	5.70	13.55	Horizontal	-48.0	-13.0	35.0	135
8	5660.00	-52.00	6.30	13.75	Horizontal	-46.7	-13.0	33.7	45
9	6367.50	-50.70	6.80	13.85	Horizontal	-45.8	-13.0	32.8	270
10	7075.00	-47.50	6.90	14.25	Horizontal	-42.3	-13.0	29.3	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 1.4MHz CH-High, RB 1

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1430.60	-61.40	2.00	10.15	Horizontal	-55.4	-13.0	42.4	135
3	2145.90	-57.39	2.51	11.05	Horizontal	-51.0	-13.0	38.0	45
4	2861.20	-55.90	4.20	11.15	Horizontal	-51.1	-13.0	38.1	180
5	3576.50	-54.60	5.20	11.15	Horizontal	-50.8	-13.0	37.8	270
6	4291.80	-54.10	5.50	11.95	Horizontal	-49.8	-13.0	36.8	135
7	5007.10	-52.40	5.70	13.55	Horizontal	-46.7	-13.0	33.7	180
8	5722.40	-52.40	6.30	13.75	Horizontal	-47.1	-13.0	34.1	270
9	6437.70	-51.30	6.80	13.85	Horizontal	-46.4	-13.0	33.4	135
10	7153.00	-48.80	6.90	14.25	Horizontal	-43.6	-13.0	30.6	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 12 QPSK 3MHz CH-Low, RB 1

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1401.00	-60.90	2.00	10.15	Horizontal	-54.9	-13.0	41.9	45
3	2101.50	-58.39	2.51	11.35	Horizontal	-51.7	-13.0	38.7	270
4	2802.00	-55.50	4.20	10.85	Horizontal	-51.0	-13.0	38.0	180
5	3502.50	-55.90	5.20	11.35	Horizontal	-51.9	-13.0	38.9	270
6	4203.00	-55.00	5.50	11.95	Horizontal	-50.7	-13.0	37.7	180
7	4903.50	-54.70	5.70	13.55	Horizontal	-49.0	-13.0	36.0	270
8	5604.00	-54.20	6.30	13.75	Horizontal	-48.9	-13.0	35.9	135
9	6304.50	-51.70	6.80	13.85	Horizontal	-46.8	-13.0	33.8	90
10	7005.00	-51.70	6.90	14.25	Horizontal	-46.5	-13.0	33.5	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 12 QPSK 3MHz CH-Middle, RB 1

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1415.00	-60.60	2.00	10.75	Horizontal	-54.0	-13.0	41.0	270
3	2122.50	-58.69	2.51	11.05	Horizontal	-52.3	-13.0	39.3	135
4	2830.00	-56.50	4.20	11.15	Horizontal	-51.7	-13.0	38.7	45
5	3537.50	-54.50	5.20	11.15	Horizontal	-50.7	-13.0	37.7	90
6	4245.00	-54.10	5.50	11.95	Horizontal	-49.8	-13.0	36.8	135
7	4952.50	-53.80	5.70	13.55	Horizontal	-48.1	-13.0	35.1	225
8	5660.00	-52.10	6.30	13.75	Horizontal	-46.8	-13.0	33.8	225
9	6367.50	-50.80	6.80	13.85	Horizontal	-45.9	-13.0	32.9	180
10	7075.00	-47.40	6.90	14.25	Horizontal	-42.2	-13.0	29.2	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 3MHz CH-High, RB 1

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1429.00	-62.00	2.00	10.15	Horizontal	-56.0	-13.0	43.0	180
3	2143.50	-57.89	2.51	11.05	Horizontal	-51.5	-13.0	38.5	45
4	2858.00	-56.40	4.20	11.15	Horizontal	-51.6	-13.0	38.6	180
5	3572.50	-54.50	5.20	11.15	Horizontal	-50.7	-13.0	37.7	225
6	4287.00	-54.50	5.50	11.95	Horizontal	-50.2	-13.0	37.2	180
7	5001.50	-53.20	5.70	13.55	Horizontal	-47.5	-13.0	34.5	45
8	5716.00	-52.20	6.30	13.75	Horizontal	-46.9	-13.0	33.9	315
9	6430.50	-49.40	6.80	13.85	Horizontal	-44.5	-13.0	31.5	270
10	7145.00	-48.40	6.90	14.25	Horizontal	-43.2	-13.0	30.2	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-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	-60.20	2.00	10.15	Horizontal	-54.2	-13.0	41.2	45
3	2104.50	-58.50	2.50	11.35	Horizontal	-51.8	-13.0	38.8	270
4	2806.00	-55.60	4.20	10.85	Horizontal	-51.1	-13.0	38.1	180
5	3507.50	-54.30	5.20	11.35	Horizontal	-50.3	-13.0	37.3	270
6	4209.00	-54.20	5.50	11.95	Horizontal	-49.9	-13.0	36.9	135
7	4910.50	-54.20	5.70	13.55	Horizontal	-48.5	-13.0	35.5	90
8	5612.00	-51.60	6.30	13.75	Horizontal	-46.3	-13.0	33.3	225
9	6313.50	-51.00	6.80	13.85	Horizontal	-46.1	-13.0	33.1	180
10	7015.00	-50.10	6.90	14.25	Horizontal	-44.9	-13.0	31.9	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 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	-61.10	2.00	10.75	Horizontal	-54.5	-13.0	41.5	270
3	2122.50	-58.49	2.51	11.05	Horizontal	-52.1	-13.0	39.1	135
4	2830.00	-56.40	4.20	11.15	Horizontal	-51.6	-13.0	38.6	45
5	3537.50	-53.10	5.20	11.15	Horizontal	-49.3	-13.0	36.3	225
6	4245.00	-53.50	5.50	11.95	Horizontal	-49.2	-13.0	36.2	180
7	4952.50	-54.30	5.70	13.55	Horizontal	-48.6	-13.0	35.6	45
8	5660.00	-52.10	6.30	13.75	Horizontal	-46.8	-13.0	33.8	315
9	6367.50	-50.40	6.80	13.85	Horizontal	-45.5	-13.0	32.5	270
10	7075.00	-48.00	6.90	14.25	Horizontal	-42.8	-13.0	29.8	135
Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor. 2. The worst emission was found in the antenna is Horizontal position.									



LTE Band 12 QPSK 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	-60.60	2.00	10.15	Horizontal	-54.6	-13.0	41.6	180
3	2140.50	-59.29	2.51	11.05	Horizontal	-52.9	-13.0	39.9	45
4	2854.00	-56.10	4.20	11.15	Horizontal	-51.3	-13.0	38.3	180
5	3567.50	-55.90	5.20	11.15	Horizontal	-52.1	-13.0	39.1	90
6	4281.00	-54.00	5.50	11.95	Horizontal	-49.7	-13.0	36.7	225
7	4994.50	-54.10	5.70	13.55	Horizontal	-48.4	-13.0	35.4	180
8	5708.00	-51.20	6.30	13.75	Horizontal	-45.9	-13.0	32.9	45
9	6421.50	-50.40	6.80	13.85	Horizontal	-45.5	-13.0	32.5	225
10	7135.00	-48.00	6.90	14.25	Horizontal	-42.8	-13.0	29.8	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	-60.20	2.00	10.15	Horizontal	-54.2	-13.0	41.2	270
3	2112.00	-59.49	2.51	11.35	Horizontal	-52.8	-13.0	39.8	135
4	2816.00	-56.90	4.20	10.85	Horizontal	-52.4	-13.0	39.4	45
5	3520.00	-55.30	5.20	11.35	Horizontal	-51.3	-13.0	38.3	135
6	4224.00	-54.20	5.50	11.95	Horizontal	-49.9	-13.0	36.9	0
7	4928.00	-53.90	5.70	13.55	Horizontal	-48.2	-13.0	35.2	90
8	5632.00	-53.40	6.30	13.75	Horizontal	-48.1	-13.0	35.1	135
9	6336.00	-51.90	6.80	13.85	Horizontal	-47.0	-13.0	34.0	270
10	7040.00	-49.30	6.90	14.25	Horizontal	-44.1	-13.0	31.1	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 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	-61.00	2.00	10.75	Horizontal	-54.4	-13.0	41.4	270
3	2122.50	-58.39	2.51	11.05	Horizontal	-52.0	-13.0	39.0	180
4	2830.00	-56.10	4.20	11.15	Horizontal	-51.3	-13.0	38.3	270
5	3537.50	-54.10	5.20	11.15	Horizontal	-50.3	-13.0	37.3	135
6	4245.00	-53.80	5.50	11.95	Horizontal	-49.5	-13.0	36.5	225
7	4952.50	-54.00	5.70	13.55	Horizontal	-48.3	-13.0	35.3	135
8	5660.00	-52.20	6.30	13.75	Horizontal	-46.9	-13.0	33.9	0
9	6367.50	-50.30	6.80	13.85	Horizontal	-45.4	-13.0	32.4	45
10	7075.00	-47.70	6.90	14.25	Horizontal	-42.5	-13.0	29.5	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 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	-59.30	2.00	10.15	Horizontal	-53.3	-13.0	40.3	135
3	2133.00	-59.59	2.51	11.05	Horizontal	-53.2	-13.0	40.2	45
4	2844.00	-56.50	4.20	11.15	Horizontal	-51.7	-13.0	38.7	180
5	3555.00	-54.70	5.20	11.15	Horizontal	-50.9	-13.0	37.9	0
6	4266.00	-55.00	5.50	11.95	Horizontal	-50.7	-13.0	37.7	90
7	4977.00	-53.60	5.70	13.55	Horizontal	-47.9	-13.0	34.9	135
8	5688.00	-52.90	6.30	13.75	Horizontal	-47.6	-13.0	34.6	270
9	6399.00	-51.30	6.80	13.85	Horizontal	-46.4	-13.0	33.4	225
10	7110.00	-48.60	6.90	14.25	Horizontal	-43.4	-13.0	30.4	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 13 QPSK 5MHz CH-Low, RB 1

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1555.8	-60.40	2.00	10.15	Horizontal	-54.4	-13.0	41.4	45
3	2338.5	-58.60	2.50	11.35	Horizontal	-51.9	-13.0	38.9	315
4	3118.0	-55.70	4.20	10.85	Horizontal	-51.2	-13.0	38.2	45
5	3897.5	-54.20	5.20	11.35	Horizontal	-50.2	-13.0	37.2	315
6	4677.0	-52.60	5.50	11.95	Horizontal	-48.3	-13.0	35.3	135
7	5456.5	-53.70	5.70	13.55	Horizontal	-48.0	-13.0	35.0	180
8	6236.0	-52.90	6.30	13.75	Horizontal	-47.6	-13.0	34.6	45
9	7015.5	-49.70	6.80	13.85	Horizontal	-44.8	-13.0	31.8	45
10	7795.0	-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 13 QPSK 5MHz CH-Middle, RB 1

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1564.0	-61.40	2.00	10.75	Horizontal	-54.8	-40.0	14.8	45
3	2346.0	-57.29	2.51	11.05	Horizontal	-50.9	-13.0	37.9	180
4	3128.0	-55.20	4.20	11.15	Horizontal	-50.4	-13.0	37.4	135
5	3910.0	-53.50	5.20	11.15	Horizontal	-49.7	-13.0	36.7	270
6	4692.0	-52.30	5.50	11.95	Horizontal	-48.0	-13.0	35.0	315
7	5474.0	-54.40	5.70	13.55	Horizontal	-48.7	-13.0	35.7	315
8	6256.0	-50.80	6.30	13.75	Horizontal	-45.5	-13.0	32.5	45
9	7038.0	-48.20	6.80	13.85	Horizontal	-43.3	-13.0	30.3	180
10	7820.0	-48.10	6.90	14.25	Horizontal	-42.9	-13.0	29.9	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 13 QPSK 5MHz CH-High, RB 1

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1569.0	-60.60	2.00	10.15	Horizontal	-54.6	-40.0	14.6	45
3	2353.5	-57.39	2.51	11.05	Horizontal	-51.0	-13.0	38.0	45
4	3138.0	-56.10	4.20	11.15	Horizontal	-51.3	-13.0	38.3	45
5	3922.5	-54.70	5.20	11.15	Horizontal	-50.9	-13.0	37.9	135
6	4707.0	-53.00	5.50	11.95	Horizontal	-48.7	-13.0	35.7	315
7	5491.5	-52.60	5.70	13.55	Horizontal	-46.9	-13.0	33.9	45
8	6276.0	-51.00	6.30	13.75	Horizontal	-45.7	-13.0	32.7	180
9	7060.5	-48.60	6.80	13.85	Horizontal	-43.7	-13.0	30.7	45
10	7845.0	-48.30	6.90	14.25	Horizontal	-43.1	-13.0	30.1	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 13 QPSK 10MHz CH-Low, RB 1

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1564.0	-61.40	2.00	10.15	Horizontal	-55.4	-40.0	15.4	135
3	2346.0	-57.79	2.51	11.35	Horizontal	-51.1	-13.0	38.1	270
4	3128.0	-55.50	4.20	10.85	Horizontal	-51.0	-13.0	38.0	135
5	3910.0	-53.20	5.20	11.35	Horizontal	-49.2	-13.0	36.2	270
6	4692.0	-51.50	5.50	11.95	Horizontal	-47.2	-13.0	34.2	315
7	5474.0	-54.50	5.70	13.55	Horizontal	-48.8	-13.0	35.8	315
8	6256.0	-51.10	6.30	13.75	Horizontal	-45.8	-13.0	32.8	45
9	7038.0	-47.90	6.80	13.85	Horizontal	-43.0	-13.0	30.0	180
10	7820.0	-47.90	6.90	14.25	Horizontal	-42.7	-13.0	29.7	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 13 QPSK 10MHz CH-Middle, RB 1

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1564.0	-60.90	2.00	10.75	Horizontal	-54.3	-40.0	14.3	315
3	2346.0	-57.79	2.51	11.05	Horizontal	-51.4	-13.0	38.4	90
4	3128.0	-54.90	4.20	11.15	Horizontal	-50.1	-13.0	37.1	45
5	3910.0	-52.80	5.20	11.15	Horizontal	-49.0	-13.0	36.0	315
6	4692.0	-52.50	5.50	11.95	Horizontal	-48.2	-13.0	35.2	45
7	5474.0	-54.30	5.70	13.55	Horizontal	-48.6	-13.0	35.6	180
8	6256.0	-51.00	6.30	13.75	Horizontal	-45.7	-13.0	32.7	45
9	7038.0	-48.00	6.80	13.85	Horizontal	-43.1	-13.0	30.1	45
10	7820.0	-47.90	6.90	14.25	Horizontal	-42.7	-13.0	29.7	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 13 QPSK 10MHz CH-High, RB 1

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1564.0	-60.30	2.00	10.15	Horizontal	-54.3	-40.0	14.3	180
3	2346.0	-58.09	2.51	11.05	Horizontal	-51.7	-13.0	38.7	45
4	3128.0	-55.50	4.20	11.15	Horizontal	-50.7	-13.0	37.7	270
5	3910.0	-53.30	5.20	11.15	Horizontal	-49.5	-13.0	36.5	315
6	4692.0	-53.00	5.50	11.95	Horizontal	-48.7	-13.0	35.7	90
7	5474.0	-54.30	5.70	13.55	Horizontal	-48.6	-13.0	35.6	180
8	6256.0	-50.80	6.30	13.75	Horizontal	-45.5	-13.0	32.5	45
9	7038.0	-48.20	6.80	13.85	Horizontal	-43.3	-13.0	30.3	315
10	7820.0	-47.90	6.90	14.25	Horizontal	-42.7	-13.0	29.7	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.									

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	2017-12-17	2018-12-16
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

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