



RF TEST REPORT

Applicant Micron Electronics LLC.
FCC ID ZKQ-MHA
Product LTE Tracker
Brand MobileHelp
Model MH 1000
Marketing MD4.0
Report No. R1803A0116-R3
Issue Date May 31, 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)/27.53(c)	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: March 21,2018 ~ April 8, 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	Micron Electronics LLC.
Applicant address	1001 Yamato Road, Suite 400, Boca Raton, FL 33431, USA
Manufacturer	Micron Electronics LLC.
Manufacturer address	1001 Yamato Road, Suite 400, Boca Raton, FL 33431, USA

General information

EUT Description			
Model	MH 1000		
IMEI	355285081019828		
Hardware Version	F610_V2		
Software Version	L200V01.01B03		
Power Supply	Battery/AC adapter		
Antenna Type	FPC monopole Antenna		
Test Mode(s)	LTE Band 4; LTE Band 12, LTE Band 13;		
Test Modulation	(LTE)QPSK, 16QAM;		
LTE Category	1		
Maximum E.I.R.P./ E.R.P.	LTE Band 4:	20.81dBm	
	LTE Band 12:	15.37dBm	
	LTE Band 13:	14.41dBm	
Rated Power Supply Voltage:	3.8V		
Extreme Voltage	Minimum: 3.45V Maximum: 4.35V		
Extreme Temperature	Lowest: -10°C Highest: +60°C		
	Mode	Tx (MHz)	Rx (MHz)
Operating Frequency Range(s)	LTE Band 4	1710 ~ 1755	2110 ~ 2155
	LTE Band 12	699 ~ 716	729 ~ 746
	LTE Band 13	777 ~ 787	746 ~ 756
EUT Accessory			
Adapter	Manufacturer: Shenzhen Jingrichang Electronics Technology Co., Ltd Model: JT-H050100		
Battery	Manufacturer: Shenzhen BetterPower Battery Co.,Ltd. Model: PL 833338G		
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 v03r01

4 Test Configuration

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

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

Subsequently, only the worst case emissions are reported.

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

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

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

Test items	Modes	Bandwidth (MHz)						Modulation		RB			Test Channel		
		1.4	3	5	10	15	20	QPSK	16QAM	1	50%	100%	L	M	H
RF power output	LTE 4	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	-	O
	LTE 12	O	O	O	O	-	-	O	O	-	-	O	O	-	O
	LTE 13	-	-	O	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	22.41	22.40	22.11
		1	2	22.00	21.77	21.81
		1	5	21.83	21.66	21.52
		3	0	22.10	22.10	21.93
		3	2	21.98	21.96	21.77
		3	3	21.78	21.82	21.69
		6	0	20.95	21.00	20.92
	16QAM	1	0	21.46	21.50	21.60
		1	2	21.09	21.01	21.23
		1	5	21.01	20.95	20.95
		3	0	21.16	21.11	20.95
		3	2	21.13	20.92	20.82
		3	3	20.78	20.78	20.62
		6	0	19.88	19.97	19.93
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				19965/1711.5	20175/1732.5	20385/1753.5
3MHz	QPSK	1	0	22.43	22.44	22.14
		1	7	22.03	21.82	21.85
		1	14	21.86	21.71	21.56
		8	0	21.20	21.22	21.06
		8	4	21.10	21.06	20.89
		8	7	20.88	20.93	20.79
		15	0	20.98	21.04	20.95
	16QAM	1	0	21.49	21.52	21.63
		1	7	21.12	21.06	21.27
		1	14	21.03	20.99	20.98
		8	0	20.27	20.24	20.07
		8	4	20.24	20.05	19.94
		8	7	19.88	19.90	19.75
		15	0	19.91	20.01	19.96
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				19975/1712.5	20175/1732.5	20375/1752.5
5MHz	QPSK	1	0	22.40	22.42	22.10
		1	13	22.01	21.78	21.82
		1	24	21.83	21.66	21.52
		12	0	21.17	21.17	21.02
		12	6	21.08	21.02	20.84
		12	13	20.86	20.91	20.75
		25	0	20.96	21.03	20.93



	16QAM	1	0	21.46	21.48	21.60
		1	13	21.09	21.04	21.24
		1	24	21.00	20.97	20.94
		12	0	20.25	20.20	20.04
		12	6	20.21	20.00	19.90
		12	13	19.85	19.85	19.71
		25	0	19.89	19.97	19.91
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				20000/1715	20175/1732.5	20350/1750
10MHz	QPSK	1	0	22.42	22.43	22.13
		1	25	22.04	21.83	21.86
		1	49	21.85	21.70	21.55
		25	0	21.20	21.22	21.06
		25	13	21.11	21.07	20.88
		25	25	20.88	20.95	20.80
		50	0	21.04	21.05	20.97
	16QAM	1	0	21.48	21.51	21.62
		1	25	21.12	21.08	21.27
		1	49	21.03	20.99	20.97
		25	0	20.28	20.25	20.08
		25	13	20.23	20.04	19.93
		25	25	19.88	19.90	19.75
		50	0	19.92	20.02	19.95
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				20025/1717.5	20175/1732.5	20325/1747.5
15MHz	QPSK	1	0	22.41	22.39	22.11
		1	38	22.02	21.82	21.83
		1	74	21.82	21.65	21.51
		36	0	21.18	21.18	21.03
		36	18	21.08	21.02	20.84
		36	39	20.85	20.92	20.76
		75	0	21.02	21.01	20.92
	16QAM	1	0	21.43	21.49	21.60
		1	38	21.10	21.05	21.25
		1	74	21.00	20.95	20.94
		36	0	20.25	20.23	20.05
		36	18	20.20	19.99	19.89
		36	39	19.86	19.86	19.72
		75	0	19.89	19.97	19.91
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				20050/1720	20175/1732.5	20300/1745
20MHz	QPSK	1	0	22.46	22.36	22.43
		1	50	22.09	22.15	22.31



		1	99	21.93	21.92	22.08
		50	0	21.34	21.40	21.38
		50	25	21.29	21.36	21.27
		50	50	21.13	21.22	21.18
		100	0	21.22	21.31	21.37
	16QAM	1	0	21.53	21.89	21.81
		1	50	21.32	21.68	21.49
		1	99	21.18	21.39	21.28
		50	0	20.34	20.41	20.31
		50	25	20.21	20.37	20.27
		50	50	20.11	20.23	20.15
		100	0	20.26	20.29	20.32

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	22.50	22.48	22.53
		1	2	22.44	22.39	22.54
		1	5	22.67	22.54	22.39
		3	0	22.41	22.48	22.55
		3	2	22.36	22.43	22.51
		3	3	22.37	22.44	22.46
		6	0	21.43	21.59	21.59
	16QAM	1	0	21.90	22.18	21.95
		1	2	21.81	22.06	22.04
		1	5	21.86	22.15	21.84
		3	0	21.49	21.59	21.65
		3	2	21.45	21.61	21.61
		3	3	21.45	21.52	21.58
		6	0	20.62	20.76	20.70
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				23025/700.5	23095/707.5	23165/714.5
3MHz	QPSK	1	0	22.51	22.51	22.55
		1	7	22.48	22.45	22.59
		1	14	22.69	22.58	22.42
		8	0	21.51	21.60	21.68
		8	4	21.49	21.54	21.62
		8	7	21.47	21.57	21.57
		15	0	21.52	21.64	21.64
	16QAM	1	0	21.92	22.19	21.97
		1	7	21.84	22.13	22.08
		1	14	21.88	22.19	21.86



		8	0	20.61	20.73	20.78
		8	4	20.55	20.73	20.72
		8	7	20.55	20.64	20.71
		15	0	20.66	20.81	20.72
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				23035/701.5	23095/707.5	23155/713.5
5MHz	QPSK	1	0	22.50	22.47	22.53
		1	13	22.46	22.44	22.56
		1	24	22.66	22.53	22.38
		12	0	21.49	21.56	21.65
		12	6	21.46	21.49	21.58
		12	13	21.44	21.54	21.53
		25	0	21.50	21.60	21.59
	16QAM	1	0	21.87	22.17	21.95
		1	13	21.82	22.10	22.06
		1	24	21.85	22.15	21.83
		12	0	20.58	20.71	20.75
		12	6	20.52	20.68	20.68
		12	13	20.53	20.60	20.68
		25	0	20.63	20.76	20.68
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				23060/704	23095/707.5	23130/711
10MHz	QPSK	1	0	22.47	22.43	22.50
		1	25	22.45	22.40	22.54
		1	49	22.64	22.52	22.35
		25	0	21.46	21.51	21.61
		25	13	21.44	21.45	21.55
		25	25	21.41	21.49	21.49
		50	0	21.47	21.55	21.55
	16QAM	1	0	21.85	22.13	21.90
		1	25	21.78	22.08	22.02
		1	49	21.83	22.12	21.81
		25	0	20.55	20.67	20.72
		25	13	20.49	20.66	20.65
		25	25	20.50	20.55	20.64
		50	0	20.61	20.72	20.65

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	22.65	22.61	22.42
		1	13	22.62	22.49	22.46
		1	24	22.48	22.47	22.40
		12	0	21.47	21.46	21.53
		12	6	21.43	21.45	21.55
		12	13	21.33	21.49	21.51
		25	0	21.44	21.41	21.47
	16QAM	1	0	21.59	21.49	21.39
		1	13	21.71	21.38	21.49
		1	24	21.61	21.37	21.46
		12	0	20.77	20.47	20.57
		12	6	20.68	20.49	20.54
		12	13	20.49	20.57	20.60
		25	0	20.62	20.51	20.61
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				/	23230/782	/
10MHz	QPSK	1	0	/	22.23	/
		1	25	/	22.31	/
		1	49	/	21.87	/
		25	0	/	21.62	/
		25	13	/	21.53	/
		25	25	/	21.45	/
		50	0	/	21.49	/
	16QAM	1	0	/	21.74	/
		1	25	/	21.81	/
		1	49	/	21.44	/
		25	0	/	20.71	/
		25	13	/	20.68	/
		25	25	/	20.59	/
		50	0	/	20.49	/

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 D01 v03r01 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.

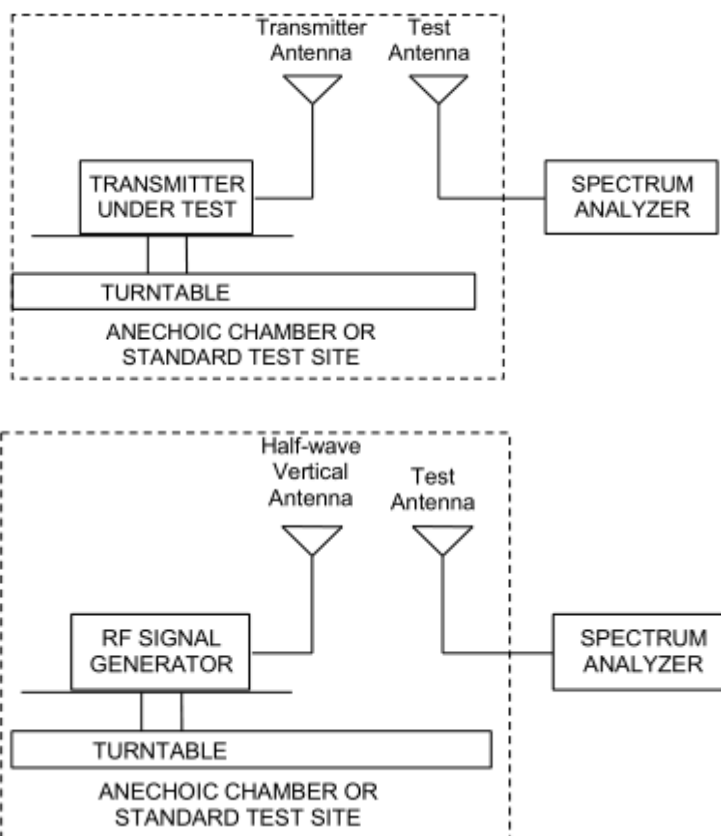
g) When calculating ERP, in addition to knowing the antenna radiation and matching characteristics, it is necessary to know the loss values of all elements (e.g. transmission line attenuation, mismatches, filters, combiners) interposed between the point where transmitter output power is measured, and 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 (ERP)	$\leq 3 \text{ W}$ (34.77 dBm)
Part 27.50(c)(10)Limit (ERP)	$\leq 3 \text{ W}$ (34.77 dBm)
Part 27.50(d)(4)Limit (EIRP)	$\leq 1 \text{ W}$ (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	EIRP (dBm)	Limit (dBm)	Conclusion
1.4 MHz (QPSK)	Low	1710.7	Horizontal	20.44	30	Pass
	Mid	1732.5	Horizontal	20.26	30	Pass
	High	1754.3	Horizontal	20.11	30	Pass
3 MHz (QPSK)	Low	1711.5	Horizontal	20.66	30	Pass
	Mid	1732.5	Horizontal	20.69	30	Pass
	High	1753.5	Horizontal	20.51	30	Pass
5 MHz (QPSK)	Low	1712.5	Horizontal	20.56	30	Pass
	Mid	1732.5	Horizontal	20.38	30	Pass
	High	1752.5	Horizontal	20.23	30	Pass
10 MHz (QPSK)	Low	1715	Horizontal	20.78	30	Pass
	Mid	1732.5	Horizontal	20.81	30	Pass
	High	1750	Horizontal	20.63	30	Pass
15 MHz (QPSK)	Low	1717.5	Horizontal	20.52	30	Pass
	Mid	1732.5	Horizontal	20.34	30	Pass
	High	1747.5	Horizontal	20.19	30	Pass
20 MHz (QPSK)	Low	1720	Horizontal	20.61	30	Pass
	Mid	1732.5	Horizontal	20.64	30	Pass
	High	1745	Horizontal	20.46	30	Pass
1.4 MHz (16QAM)	Low	1710.7	Horizontal	20.21	30	Pass
	Mid	1732.5	Horizontal	20.03	30	Pass
	High	1754.3	Horizontal	19.88	30	Pass
3 MHz (16QAM)	Low	1711.5	Horizontal	20.38	30	Pass
	Mid	1732.5	Horizontal	20.41	30	Pass
	High	1753.5	Horizontal	20.23	30	Pass
5 MHz (16QAM)	Low	1712.5	Horizontal	20.28	30	Pass
	Mid	1732.5	Horizontal	20.10	30	Pass
	High	1752.5	Horizontal	19.95	30	Pass
10 MHz (16QAM)	Low	1715	Horizontal	20.48	30	Pass
	Mid	1732.5	Horizontal	20.51	30	Pass
	High	1750	Horizontal	20.38	30	Pass
15 MHz (16QAM)	Low	1717.5	Horizontal	20.27	30	Pass
	Mid	1732.5	Horizontal	20.09	30	Pass
	High	1747.5	Horizontal	19.94	30	Pass
20 MHz (16QAM)	Low	1720	Horizontal	20.38	30	Pass
	Mid	1732.5	Horizontal	20.41	30	Pass
	High	1745	Horizontal	20.23	30	Pass



LTE Band 12						
Bandwidth	Channel	Frequency (MHz)	Polarization	ERP (dBm)	Limit (dBm)	Conclusion
1.4 MHz (QPSK)	Low	699.7	Horizontal	14.95	34.77	Pass
	Mid	707.5	Horizontal	15.00	34.77	Pass
	High	715.3	Horizontal	15.27	34.77	Pass
3 MHz (QPSK)	Low	700.5	Horizontal	15.08	34.77	Pass
	Mid	707.5	Horizontal	15.37	34.77	Pass
	High	714.5	Horizontal	14.86	34.77	Pass
5 MHz (QPSK)	Low	701.5	Horizontal	15.20	34.77	Pass
	Mid	707.5	Horizontal	15.14	34.77	Pass
	High	713.5	Horizontal	14.84	34.77	Pass
10 MHz (QPSK)	Low	704	Horizontal	15.04	34.77	Pass
	Mid	707.5	Horizontal	15.00	34.77	Pass
	High	711	Horizontal	14.95	34.77	Pass
1.4 MHz (16QAM)	Low	699.7	Horizontal	14.82	34.77	Pass
	Mid	707.5	Horizontal	14.86	34.77	Pass
	High	715.3	Horizontal	15.14	34.77	Pass
3 MHz (16QAM)	Low	700.5	Horizontal	14.95	34.77	Pass
	Mid	707.5	Horizontal	15.24	34.77	Pass
	High	714.5	Horizontal	14.73	34.77	Pass
5 MHz (16QAM)	Low	701.5	Horizontal	15.07	34.77	Pass
	Mid	707.5	Horizontal	15.00	34.77	Pass
	High	713.5	Horizontal	14.70	34.77	Pass
10 MHz (16QAM)	Low	704	Horizontal	14.91	34.77	Pass
	Mid	707.5	Horizontal	14.87	34.77	Pass
	High	711	Horizontal	14.82	34.77	Pass



LTE Band 13						
Bandwidth	Channel	Frequency (MHz)	Polarization	ERP (dBm)	Limit (dBm)	Conclusion
5MHz (QPSK)	Low	779.5	Horizontal	13.75	34.77	Pass
	Mid	782	Horizontal	14.07	34.77	Pass
	High	784.5	Horizontal	14.41	34.77	Pass
10MHz (QPSK)	Mid	782	Horizontal	13.70	34.77	Pass
5MHz (16QAM)	Low	779.5	Horizontal	13.64	34.77	Pass
	Mid	782	Horizontal	13.95	34.77	Pass
	High	784.5	Horizontal	14.20	34.77	Pass
10MHz (16QAM)	Mid	782	Horizontal	13.60	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).

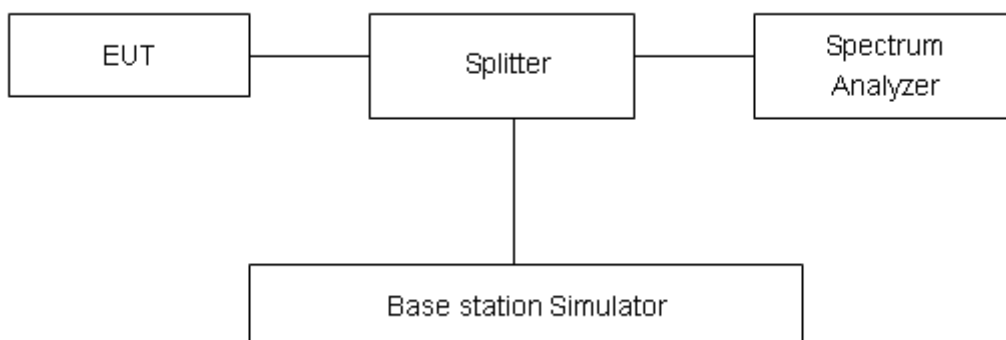
RBW is set to 100 kHz, VBW is set to 300 kHz for LTE Band 4/12/13 (5MHz).

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 (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	1.1428	1.419
			20175	1732.5	1.1312	1.492
			20393	1754.3	1.1389	1.452
		3	19965	1711.5	2.7518	3.158
			20175	1732.5	2.7452	3.111
			20385	1753.5	2.7463	3.126
		5	19975	1712.5	4.533	5.108
			20175	1732.5	4.5153	5.155
			20375	1752.5	4.5111	5.069
		10	20000	1715	9.0807	10.57
			20175	1732.5	9.0615	10.56
			20350	1750	9.085	10.57
		15	20025	1717.5	13.563	15.81
			20175	1732.5	13.479	15.79
			20325	1747.5	13.533	15.93
		20	20050	1720	17.922	19.98
			20175	1732.5	17.917	19.91
			20300	1745	18.004	20.45
	16QAM	1.4	19957	1710.7	1.1318	1.395
			20175	1732.5	1.1469	1.390
			20393	1754.3	1.1364	1.406
		3	19965	1711.5	2.7613	3.093
			20175	1732.5	2.7416	3.183
			20385	1753.5	2.7475	3.340
		5	19975	1712.5	4.5077	5.035
			20175	1732.5	4.5344	5.121
			20375	1752.5	4.5404	5.166
		10	20000	1715	9.0905	10.44
			20175	1732.5	9.0767	10.54
			20350	1750	9.0963	10.57
		15	20025	1717.5	13.521	15.88
			20175	1732.5	13.539	15.80
			20325	1747.5	13.548	16.02
		20	20050	1720	17.958	20.18
			20175	1732.5	17.942	20.26
			20300	1745	17.977	20.45

LTE Band 12						
RB	Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	99% Power Bandwidth(MHz)	-26dBc Bandwidth(MHz)
100%	QPSK	1.4	23017	699.7	1.1352	1.473
			23095	707.5	1.1369	1.419
			23173	715.3	1.1413	1.444
		3	23025	700.5	2.7599	3.302
			23095	707.5	2.7482	3.128
			23165	714.5	2.7449	3.129
		5	23035	701.5	4.54	5.184
			23095	707.5	4.5161	5.146
			23155	713.5	4.5107	5.109
		10	23060	704	9.0738	10.39
			23095	707.5	9.0399	10.39
			23130	711	9.1273	10.53
	16QAM	1.4	23017	699.7	1.1482	1.415
			23095	707.5	1.1319	1.408
			23173	715.3	1.1288	1.398
		3	23025	700.5	2.7678	3.128
			23095	707.5	2.7415	3.174
			23165	714.5	2.7546	3.348
		5	23035	701.5	4.5269	5.136
			23095	707.5	4.5174	5.084
			23155	713.5	4.548	5.242
		10	23060	704	9.0507	10.44
			23095	707.5	9.0459	10.51
			23130	711	9.1042	10.53

LTE Band 13						
RB	Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	99% Power Bandwidth(MHz)	-26dBc Bandwidth(MHz)
100%	QPSK	5	23205	779.5	4.5587	5.147
			23230	782	4.5117	5.098
			23255	784.5	4.4898	5.045
		10	23230	782	9.1196	10.53
	16QAM	5	23205	779.5	4.5414	5.106
			23230	782	4.5405	5.122
			23255	784.5	4.5091	5.102
		10	23230	782	9.098	10.47



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





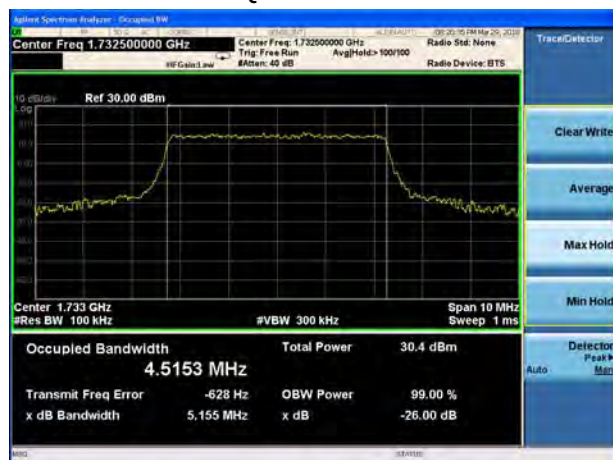
LTE Band 4 QPSK 5MHz CH-Low



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

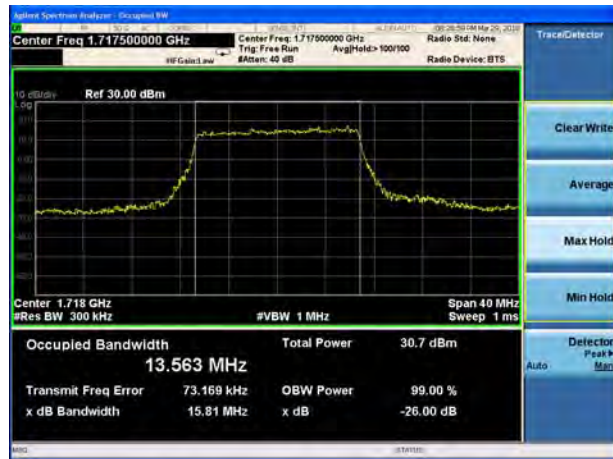


LTE Band 4 QPSK 10MHz CH-High





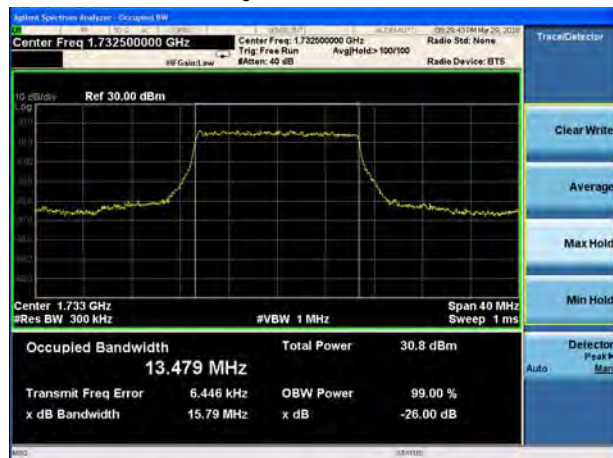
LTE Band 4 QPSK 15MHz CH-Low



LTE Band 4 QPSK 20MHz CH-Low



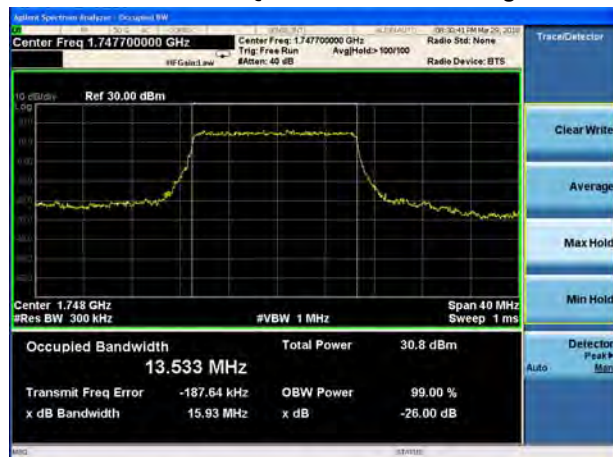
LTE Band 4 QPSK 15MHz CH-Middle



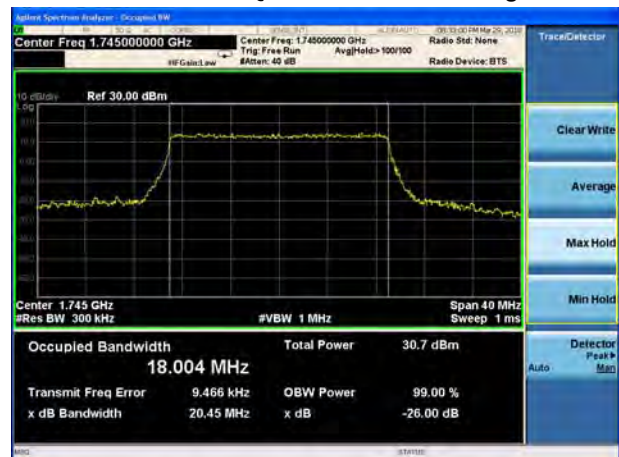
LTE Band 4 QPSK 20MHz CH-Middle



LTE Band 4 QPSK 15MHz CH-High



LTE Band 4 QPSK 20MHz CH-High

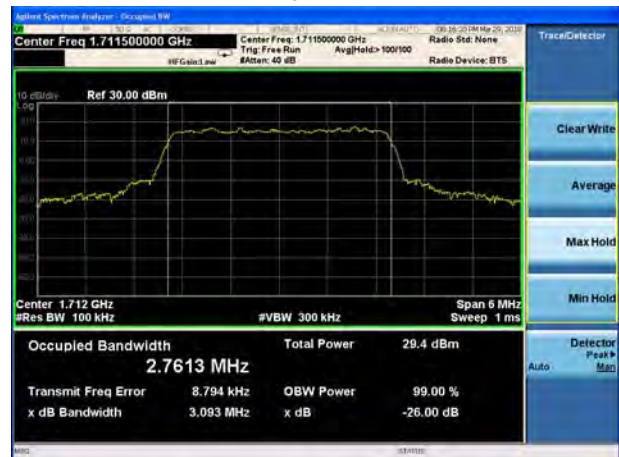




LTE Band 4 16QAM 1.4MHz CH-Low



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



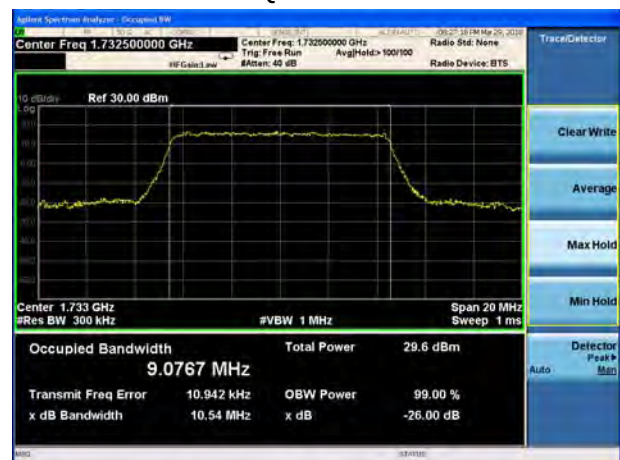
LTE Band 4 16QAM 10MHz CH-Low



LTE Band 4 16QAM 5MHz CH-Middle



LTE Band 4 16QAM 10MHz CH-Middle



LTE Band 4 16QAM 5MHz CH-High

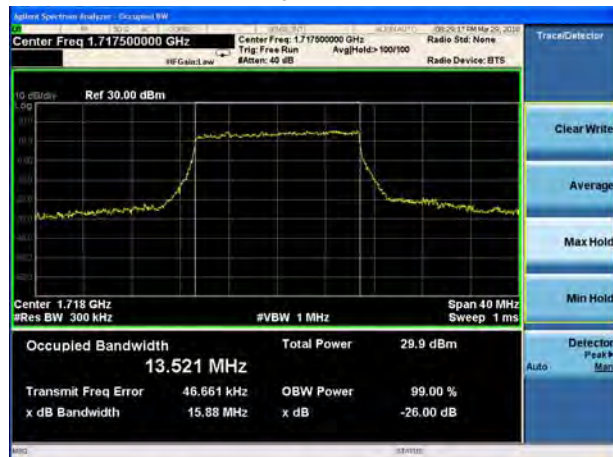


LTE Band 4 16QAM 10MHz CH-High

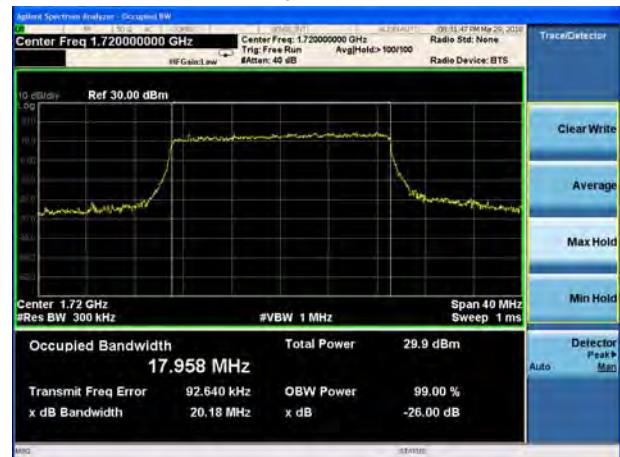




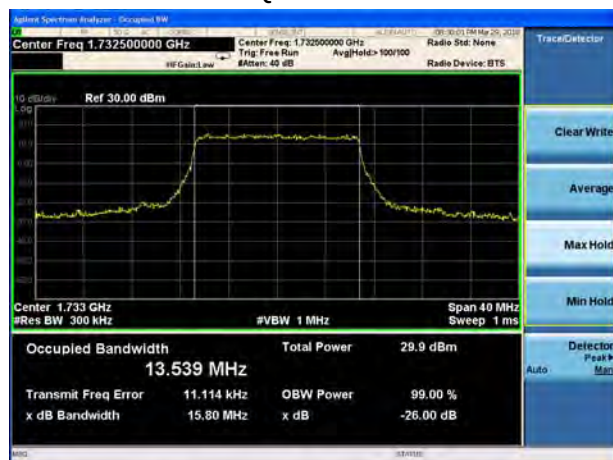
LTE Band 4 16QAM 15MHz CH-Low



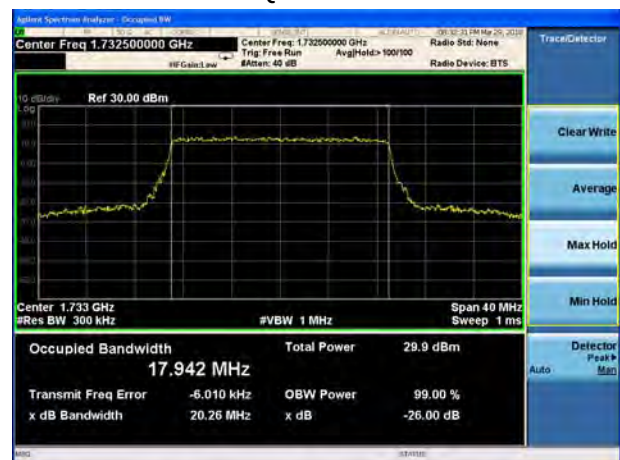
LTE Band 4 16QAM 20MHz CH-Low



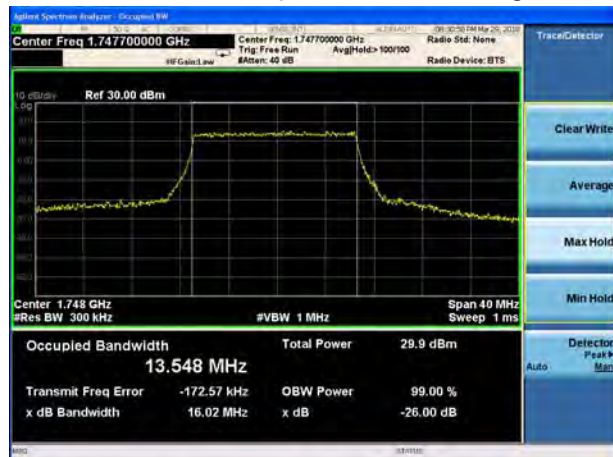
LTE Band 4 16QAM 15MHz CH-Middle



LTE Band 4 16QAM 20MHz CH-Middle



LTE Band 4 16QAM 15MHz CH-High



LTE Band 4 16QAM 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



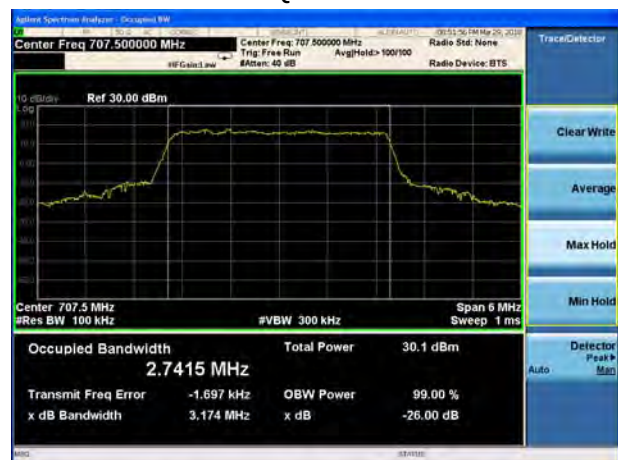
LTE Band 12 16QAM 3MHz CH-Low



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

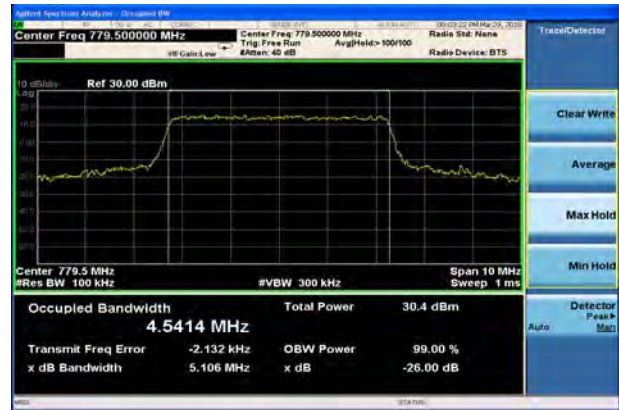




LTE Band 13 QPSK 5MHz CH-Low



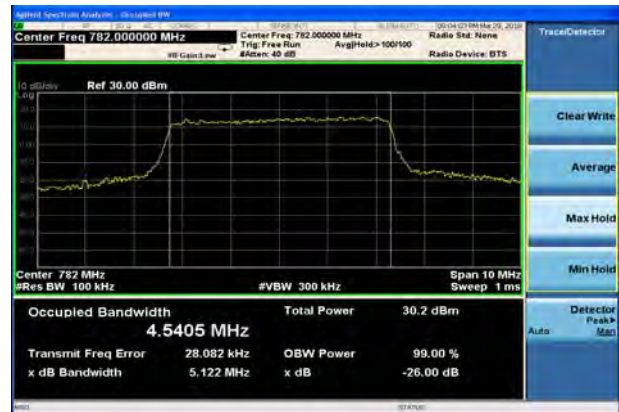
LTE Band 13 16QAM 5MHz CH-Low



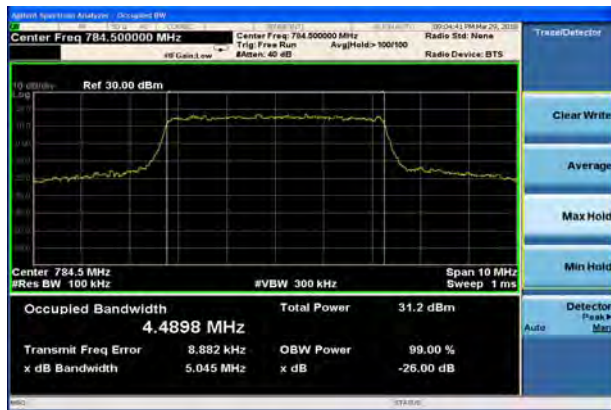
LTE Band 13 QPSK 5MHz CH-Middle



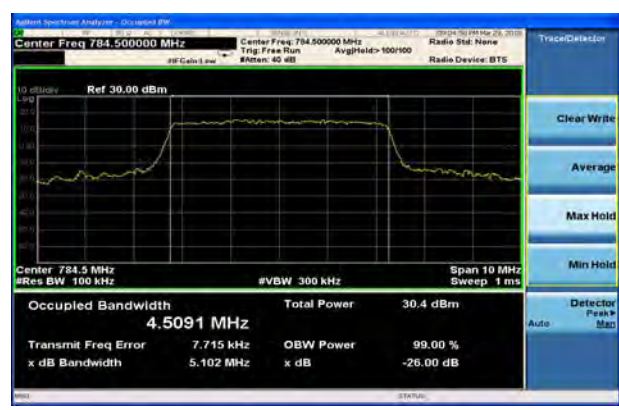
LTE Band 13 16QAM 5MHz CH-Middle



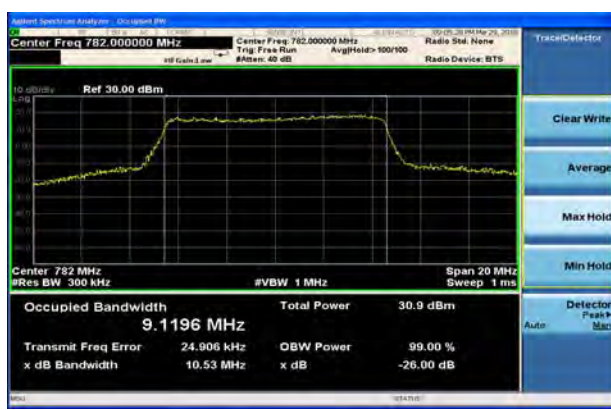
LTE Band 13 QPSK 5MHz CH-High



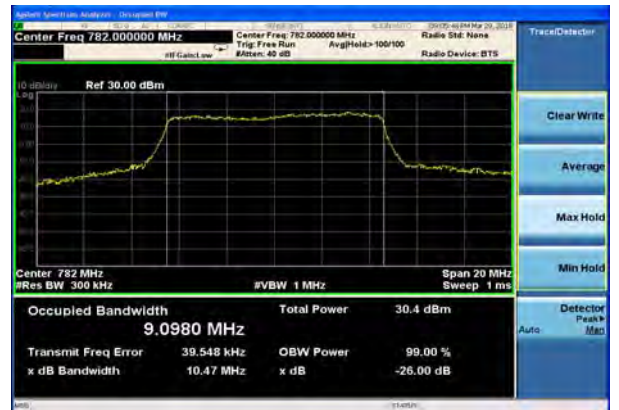
LTE Band 13 16QAM 5MHz CH-High



LTE Band 13 QPSK 10MHz CH-Middle



LTE Band 13 16QAM 10MHz CH-Middle



5.4 Band Edge Compliance

Ambient condition

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

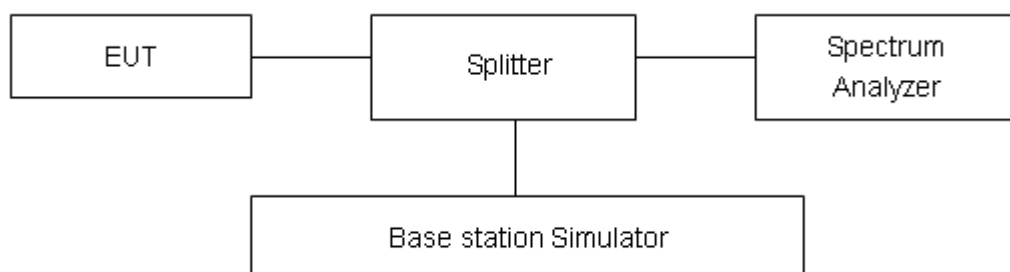
Method of Measurement

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

The testing follows KDB 971168 D01 v03r01 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(1.4MHz).
RBW is set to 30 kHz, VBW is set to 100kHz for LTE Band 4 (3MHz).
RBW is set to 51 kHz, VBW is set to 160 kHz for LTE Band 4 (5MHz).
RBW is set to 100 kHz, VBW is set to 300kHz for LTE Band 4 (10MHz).
RBW is set to 150 kHz, VBW is set to 510 kHz for LTE Band 4(15MHz).
RBW is set to 200 kHz, VBW is set to 620 kHz for LTE Band 4 (20MHz)
RBW is set to 100 kHz, VBW is set to 300kHz for LTE Band 12(1.4MHz/3MHz/5MHz/10MHz).
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(i) By a factor of not less than $43 + 10 \log (P)$ dB on all frequencies between 2305 and 2320 MHz.

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) 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;

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.

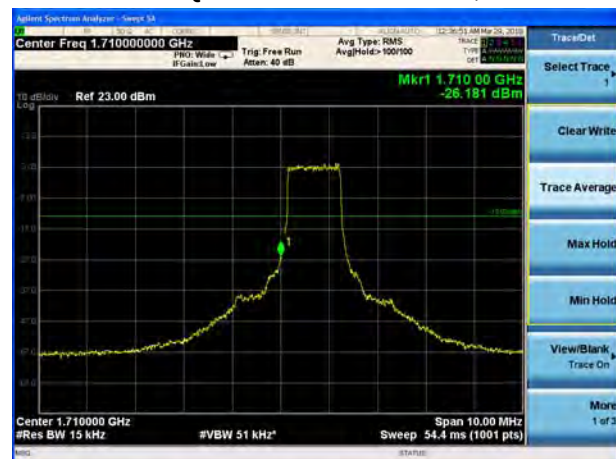
LTE Band 4 QPSK 1.4MHz CH-Low, 1 RB



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



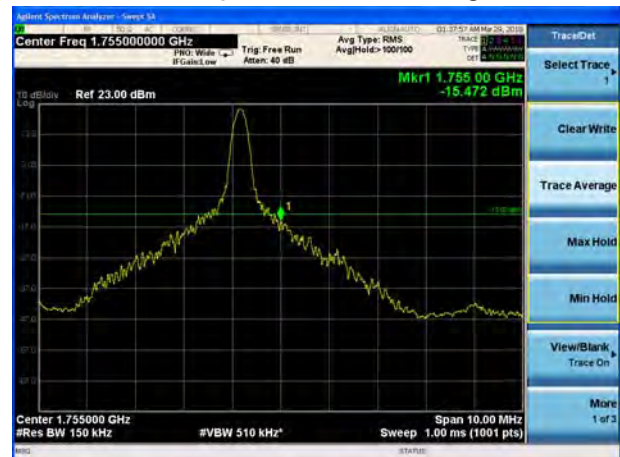
LTE Band 4 QPSK 10MHz CH-High, 100%RB



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



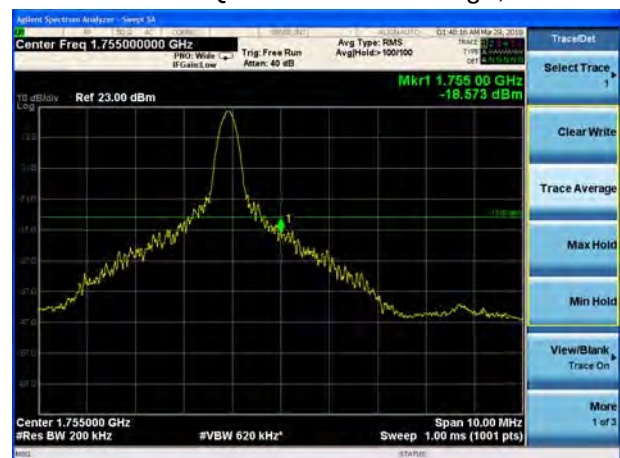
LTE Band 4 QPSK 15MHz CH-High, 100%RB



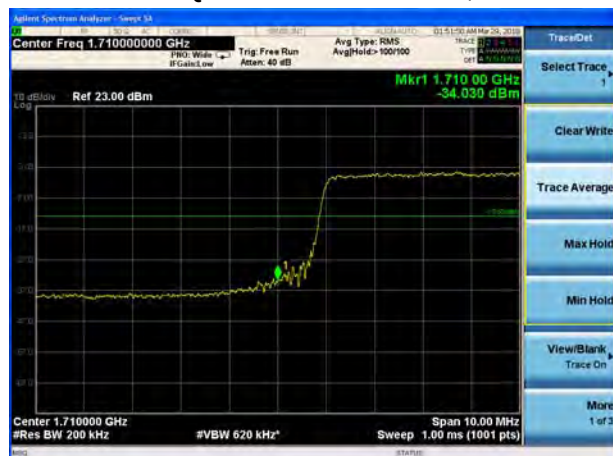
LTE Band 4 QPSK 20MHz CH-Low, 1 RB



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





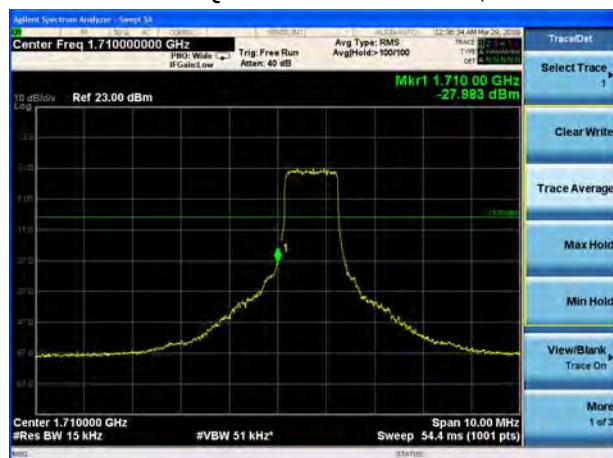
LTE Band 4 16QAM 1.4MHz CH-Low, 1 RB



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



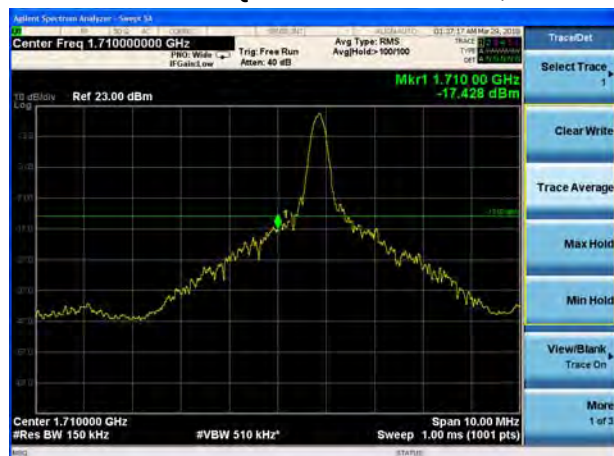
LTE Band 4 16QAM 10MHz CH-Low, 100%RB



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

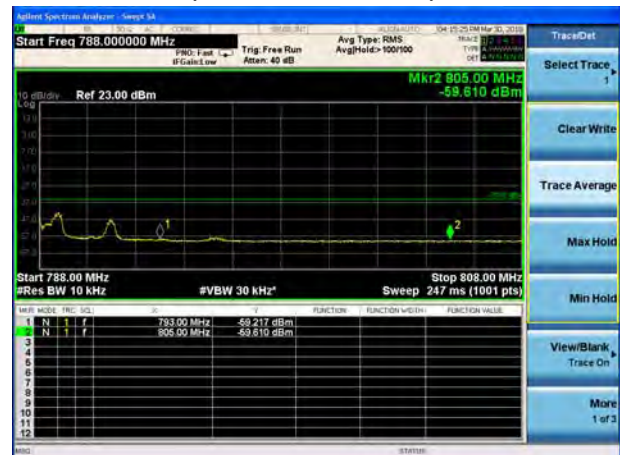


LTE Band 12 16QAM 10MHz CH-Low, 100%RB



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

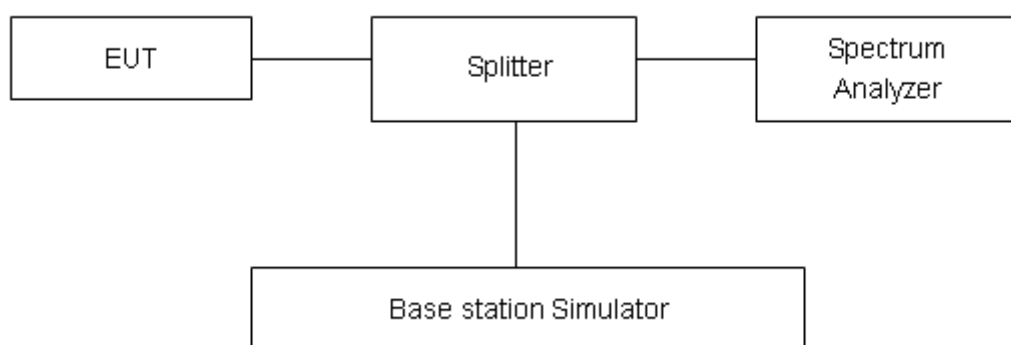
Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

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(a) (3)

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	25.58	20.95	4.63	≤13	PASS
		20175	1732.5	25.82	21.00	4.82	≤13	PASS
		20393	1754.3	25.75	20.92	4.83	≤13	PASS
	3	19965	1711.5	25.73	20.98	4.75	≤13	PASS
		20175	1732.5	25.96	21.04	4.92	≤13	PASS
		20385	1753.5	25.91	20.95	4.96	≤13	PASS
	5	19975	1712.5	25.61	20.96	4.65	≤13	PASS
		20175	1732.5	25.93	21.03	4.90	≤13	PASS
		20375	1752.5	25.85	20.93	4.92	≤13	PASS
	10	20000	1715	25.62	21.04	4.58	≤13	PASS
		20175	1732.5	25.94	21.05	4.89	≤13	PASS
		20350	1750	25.95	20.97	4.98	≤13	PASS
	15	20025	1717.5	25.53	21.02	4.51	≤13	PASS
		20175	1732.5	25.90	21.01	4.89	≤13	PASS
		20325	1747.5	25.99	20.92	5.07	≤13	PASS
	20	20050	1720	25.75	21.22	4.53	≤13	PASS
		20175	1732.5	26.17	21.31	4.86	≤13	PASS
		20300	1745	26.37	21.37	5.00	≤13	PASS
16QAM	1.4	19957	1710.7	25.32	19.88	5.44	≤13	PASS
		20175	1732.5	25.61	19.97	5.64	≤13	PASS
		20393	1754.3	25.59	19.93	5.66	≤13	PASS
	3	19965	1711.5	25.46	19.91	5.55	≤13	PASS
		20175	1732.5	25.73	20.01	5.72	≤13	PASS
		20385	1753.5	25.74	19.96	5.78	≤13	PASS
	5	19975	1712.5	25.28	19.89	5.39	≤13	PASS
		20175	1732.5	25.62	19.97	5.65	≤13	PASS
		20375	1752.5	25.61	19.91	5.70	≤13	PASS
	10	20000	1715	25.29	19.92	5.37	≤13	PASS
		20175	1732.5	25.67	20.02	5.65	≤13	PASS
		20350	1750	25.71	19.95	5.76	≤13	PASS
	15	20025	1717.5	25.15	19.89	5.26	≤13	PASS
		20175	1732.5	25.57	19.97	5.60	≤13	PASS
		20325	1747.5	25.66	19.91	5.75	≤13	PASS
	20	20050	1720	25.58	20.26	5.32	≤13	PASS
		20175	1732.5	25.87	20.29	5.58	≤13	PASS
		20300	1745	26.05	20.32	5.73	≤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	26.61	21.43	5.18	≤13	PASS
		23095	707.5	26.79	21.59	5.20	≤13	PASS
		23173	715.3	26.92	21.59	5.33	≤13	PASS
	3	23025	700.5	27.43	21.52	5.91	≤13	PASS
		23095	707.5	27.57	21.64	5.93	≤13	PASS
		23165	714.5	26.87	21.64	5.23	≤13	PASS
	5	23035	701.5	26.74	21.50	5.24	≤13	PASS
		23095	707.5	26.88	21.60	5.28	≤13	PASS
		23155	713.5	26.89	21.59	5.30	≤13	PASS
	10	23060	704	26.54	21.47	5.07	≤13	PASS
		23095	707.5	26.70	21.55	5.15	≤13	PASS
		23130	711	26.68	21.55	5.13	≤13	PASS
16QAM	1.4	23017	699.7	26.54	20.62	5.92	≤13	PASS
		23095	707.5	26.70	20.76	5.94	≤13	PASS
		23173	715.3	26.78	20.70	6.08	≤13	PASS
	3	23025	700.5	25.86	20.66	5.20	≤13	PASS
		23095	707.5	26.00	20.81	5.19	≤13	PASS
		23165	714.5	26.69	20.72	5.97	≤13	PASS
	5	23035	701.5	26.54	20.63	5.91	≤13	PASS
		23095	707.5	26.68	20.76	5.92	≤13	PASS
		23155	713.5	26.61	20.68	5.93	≤13	PASS
	10	23060	704	26.42	20.61	5.81	≤13	PASS
		23095	707.5	26.60	20.72	5.88	≤13	PASS
		23130	711	26.52	20.65	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	26.59	21.44	5.15	≤13	PASS
		23230	782	26.49	21.41	5.08	≤13	PASS
		23255	784.5	26.31	21.47	4.84	≤13	PASS
	10	23230	782	26.35	21.49	4.86	≤13	PASS
16QAM	5	23205	779.5	26.57	20.62	5.95	≤13	PASS
		23230	782	26.43	20.51	5.92	≤13	PASS
		23255	784.5	26.27	20.61	5.66	≤13	PASS
	10	23230	782	26.22	20.49	5.73	≤13	PASS

5.6 Frequency Stability

Ambient condition

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

Method of Measurement

Frequency Stability (Temperature Variation)

The temperature inside the climate chamber is varied from -30°C to +60°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 +60°C. Allow at least 1.5 hours at each temperature, un-powered, before making measurements.

Frequency Stability (Voltage Variation)

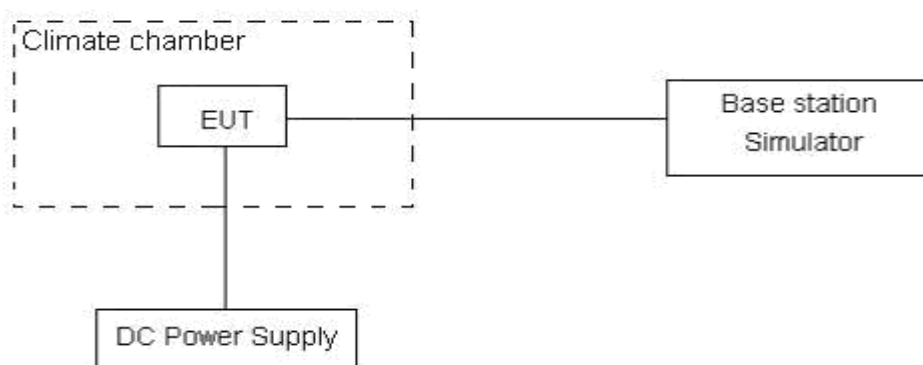
The frequency stability shall be measured with variation of primary supply voltage as follows:

(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 3.45 V and 4.35 V, with a nominal voltage of 3.8V.

Test setup



Limits

No specific frequency stability requirements in part 27.54

Measurement Uncertainty

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

Test Result

LTE Band 4					
(QPSK, 20MHz BANDWIDTH)					
Condition		1710	1755	Delta (Hz)	Frequency Stability(ppm)
Temperature	Voltage	F low@-13dBm(MHz)	F high@-13dBm(MHz)		
Normal (25°C)	Normal	1710.5754	1754.3518	1.21	0.00070
Extreme (60°C)		1710.5754	1754.3519	3.44	0.00199
Extreme (50°C)		1710.5754	1754.3519	1.47	0.00085
Extreme (40°C)		1710.5754	1754.3519	1.58	0.00091
Extreme (30°C)		1710.5754	1754.3519	0.55	0.00032
Extreme (20°C)		1710.5754	1754.3519	3.40	0.00196
Extreme (10C)		1710.5754	1754.3519	-1.19	-0.00069
Extreme (0°C)		1710.5754	1754.3519	0.89	0.00051
Extreme (-10°C)		1710.5754	1754.3519	0.94	0.00054
Extreme (-20°C)		1710.5754	1754.3519	0.49	0.00028
Extreme (-30°C)		1710.5754	1754.3519	1.74	0.00100
25°C	LV	1710.5754	1754.3519	4.83	0.00279
	HV	1710.5754	1754.3519	3.46	0.00200
(16QAM,20MHz BANDWIDTH)					
Condition		1710	1755	Delta (Hz)	Frequency Stability(ppm)
Temperature	Voltage	F low@-13dBm(MHz)	F high@-13dBm(MHz)		
Normal (25°C)	Normal	1710.5678	1754.4403	10.00	0.00577
Extreme (60°C)		1710.5678	1754.4403	11.39	0.00657
Extreme (50°C)		1710.5678	1754.4403	-1.00	-0.00058
Extreme (40°C)		1710.5678	1754.4403	4.13	0.00238
Extreme (30°C)		1710.5678	1754.4403	5.56	0.00321
Extreme (20°C)		1710.5678	1754.4403	12.92	0.00746
Extreme (10C)		1710.5678	1754.4403	-3.18	-0.00184
Extreme (0°C)		1710.5678	1754.4403	12.34	0.00712
Extreme (-10°C)		1710.5678	1754.4403	10.26	0.00592
Extreme (-20°C)		1710.5678	1754.4403	-2.27	-0.00131
Extreme (-30°C)		1710.5678	1754.4403	-1.38	-0.00080
25°C	LV	1710.5678	1754.4403	-1.79	-0.00103
	HV	1710.5678	1754.4403	3.67	0.00212

LTE Band 12					
(QPSK, 10MHz BANDWIDTH)					
Condition		699	716	Delta (Hz)	Frequency Stability(ppm)
Temperature	Voltage	F low@-13dBm(MHz)	F high@-13dBm(MHz)		
Normal (25°C)	Normal	699.2334	715.7062	-1.12	-0.00158
Extreme (60°C)		699.2334	715.7062	7.77	0.01098
Extreme (50°C)		699.2334	715.7062	0.79	0.00112
Extreme (40°C)		699.2334	715.7062	11.60	0.01640
Extreme (30°C)		699.2334	715.7062	-8.86	-0.01252
Extreme (20°C)		699.2334	715.7062	9.20	0.01300
Extreme (10C)		699.2334	715.7062	5.64	0.00797
Extreme (0°C)		699.2334	715.7062	5.66	0.00800
Extreme (-10°C)		699.2334	715.7062	9.38	0.01326
Extreme (-20°C)		699.2334	715.7062	-3.90	-0.00551
Extreme (-30°C)		699.2334	715.7062	4.99	0.00705
25°C	LV	699.2334	715.7062	-1.97	-0.00278
	HV	699.2334	715.7062	-3.34	-0.00472
(16QAM, 10MHz BANDWIDTH)					
Condition		699	716	Delta (Hz)	Frequency Stability(ppm)
Temperature	Voltage	F low@-13dBm(MHz)	F high@-13dBm(MHz)		
Normal (25°C)	Normal	699.2962	715.6649	9.27	0.01310
Extreme (60°C)		699.2962	715.6649	-8.92	-0.01261
Extreme (50°C)		699.2962	715.6649	11.24	0.01589
Extreme (40°C)		699.2962	715.6649	13.21	0.01867
Extreme (30°C)		699.2962	715.6649	6.25	0.00883
Extreme (20°C)		699.2962	715.6649	-7.63	-0.01078
Extreme (10C)		699.2962	715.6649	3.61	0.00510
Extreme (0°C)		699.2962	715.6649	1.66	0.00235
Extreme (-10°C)		699.2962	715.6649	10.12	0.01430
Extreme (-20°C)		699.2962	715.6649	0.17	0.00024
Extreme (-30°C)		699.2962	715.6649	-0.56	-0.00079
25°C	LV	699.2962	715.6649	-7.09	-0.01002
	HV	699.2962	715.6649	6.47	0.00914

LTE Band 13					
(QPSK, 10MHz BANDWIDTH)					
Condition		777	787	Delta (Hz)	Frequency Stability(ppm)
Temperature	Voltage	F low@-13dBm(MHz)	F high@-13dBm(MHz)		
Normal (25°C)	Normal	777.5484	786.5223	4.48	0.00573
Extreme (60°C)		777.5484	786.5223	10.58	0.01353
Extreme (50°C)		777.5484	786.5223	3.90	0.00499
Extreme (40°C)		777.5484	786.5223	10.09	0.01290
Extreme (30°C)		777.5484	786.5223	-3.84	-0.00491
Extreme (20°C)		777.5484	786.5223	5.33	0.00682
Extreme (10C)		777.5484	786.5223	2.43	0.00311
Extreme (0°C)		777.5484	786.5223	4.08	0.00522
Extreme (-10°C)		777.5484	786.5223	5.73	0.00733
Extreme (-20°C)		777.5484	786.5223	7.33	0.00937
Extreme (-30°C)		777.5484	786.5223	2.54	0.00325
25°C	LV	777.5484	786.5223	9.47	0.01211
	HV	777.5484	786.5223	7.59	0.00971
(16QAM, 10MHz BANDWIDTH)					
Condition		777	787	Delta (Hz)	Frequency Stability(ppm)
Temperature	Voltage	F low@-13dBm(MHz)	F high@-13dBm(MHz)		
Normal (25°C)	Normal	777.5488	786.5211	1.65	0.00211
Extreme (60°C)		777.5488	786.5211	-2.39	-0.00306
Extreme (50°C)		777.5488	786.5211	-1.13	-0.00145
Extreme (40°C)		777.5488	786.5211	-1.76	-0.00225
Extreme (30°C)		777.5488	786.5211	-5.79	-0.00740
Extreme (20°C)		777.5488	786.5211	0.48	0.00061
Extreme (10C)		777.5488	786.5211	3.37	0.00431
Extreme (0°C)		777.5488	786.5211	-7.31	-0.00935
Extreme (-10°C)		777.5488	786.5211	6.76	0.00864
Extreme (-20°C)		777.5488	786.5211	7.78	0.00995
Extreme (-30°C)		777.5488	786.5211	-8.81	-0.01127
25°C	LV	777.5488	786.5211	-6.33	-0.00809
	HV	777.5488	786.5211	3.85	0.00492

5.7 Spurious Emissions at Antenna Terminals

Ambient condition

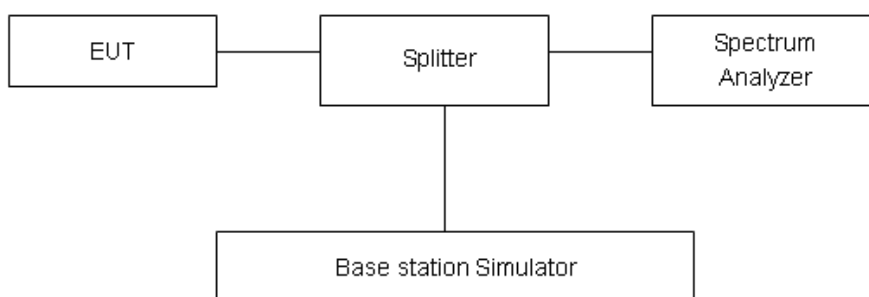
Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

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
Part 27.53(c) Limit	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
9kHz-1GHz	0.684 dB
1GHz-26GHz	1.407 dB

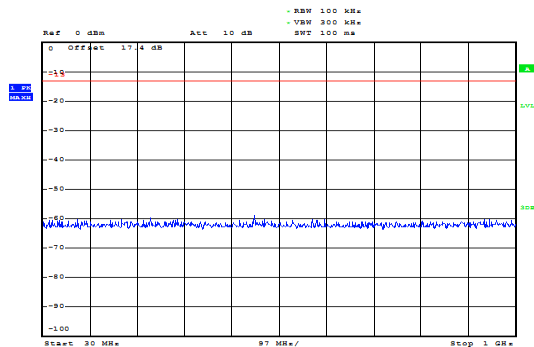
Test Result

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

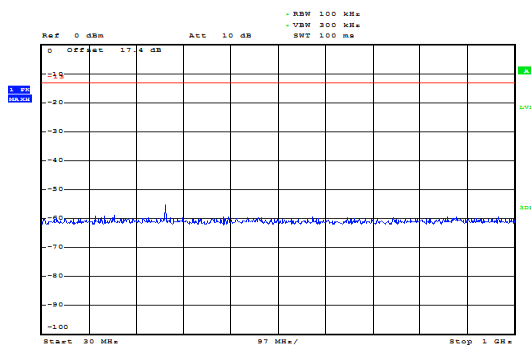
If disturbances were found more than 20dB below limit line, the mark is not required for the EUT.

The signal beyond the limit is carrier.

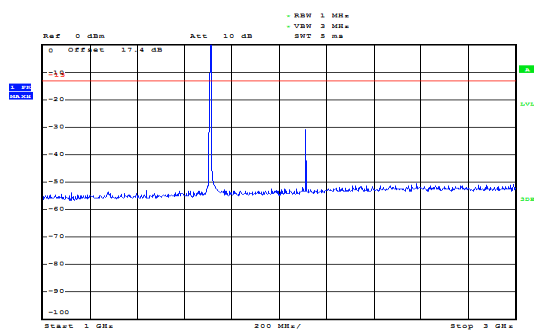
LTE Band 4 1.4MHz CH-Low 30MHz~1GHz



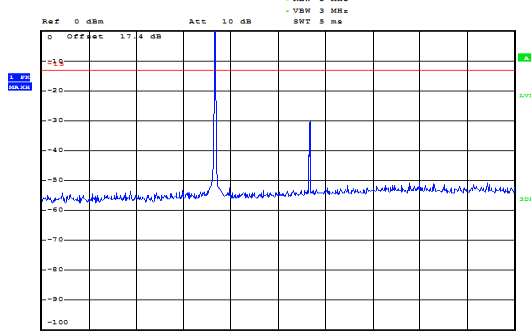
LTE Band 4 1.4MHz CH-Middle 30MHz~1GHz



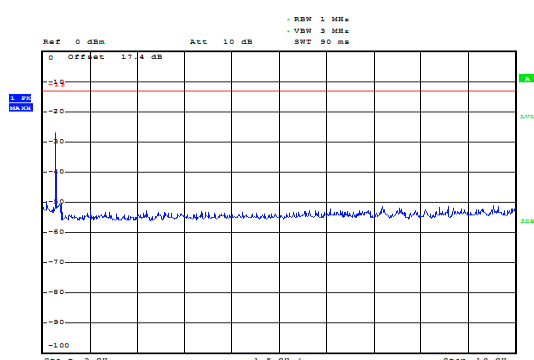
LTE Band 4 1.4MHz CH-Low 1GHz~3GHz



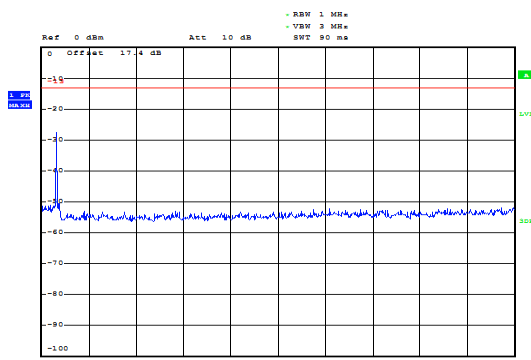
LTE Band 4 1.4MHz CH-Middle 1GHz~3GHz



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

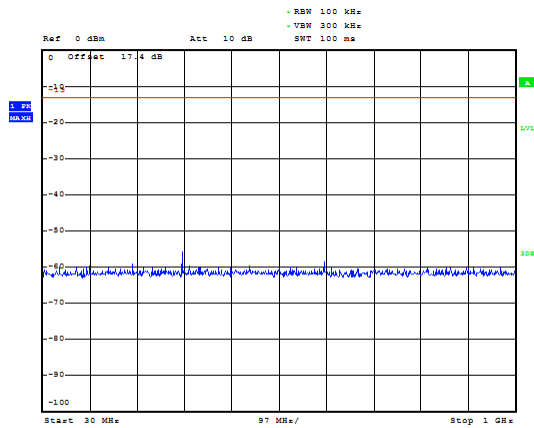


LTE Band 4 1.4MHz CH-Middle 3GHz~18GHz

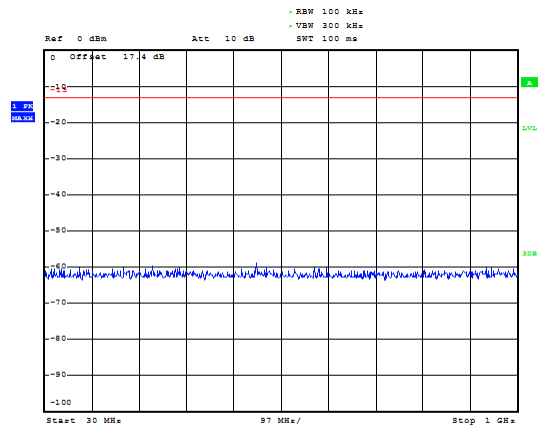




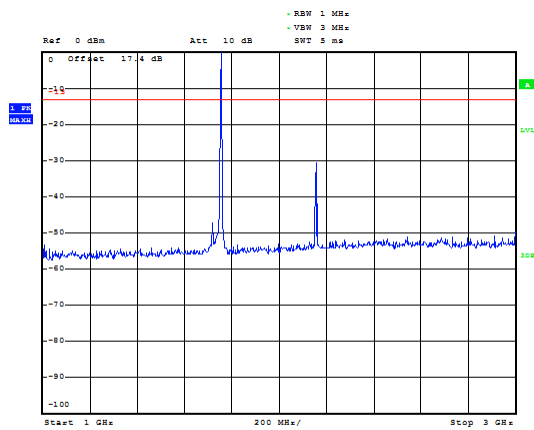
LTE Band 4 1.4MHz CH-High 30MHz~1GHz



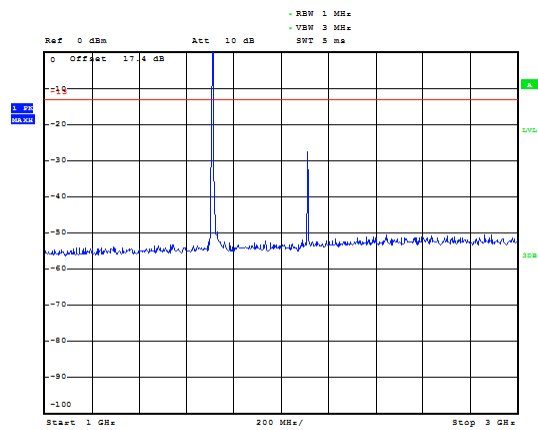
LTE Band 4 3MHz CH-Low 30MHz~1GHz



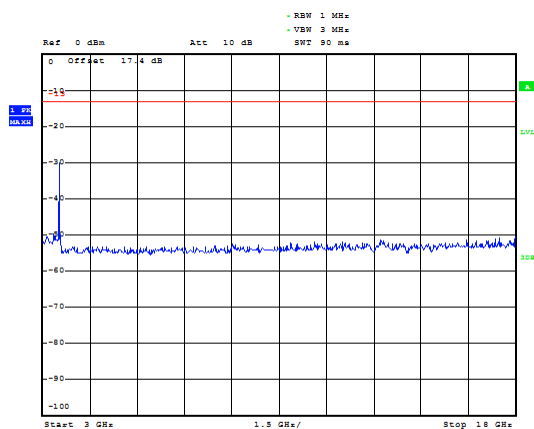
LTE Band 4 1.4MHz CH-High 1GHz~3GHz



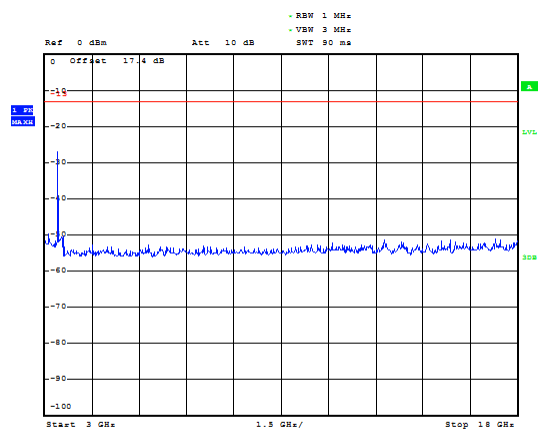
LTE Band 4 3MHz CH-Low 1GHz~3GHz



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

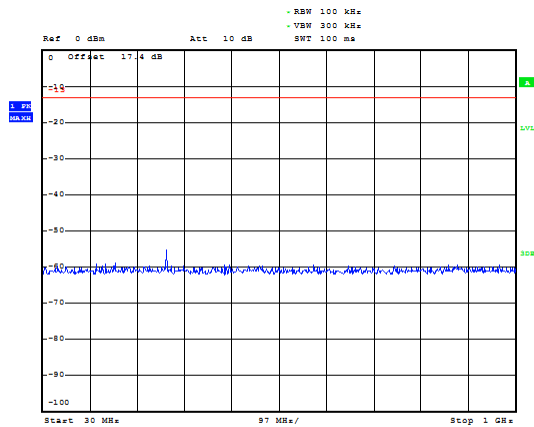


LTE Band 4 3MHz CH-Low 3GHz~18GHz

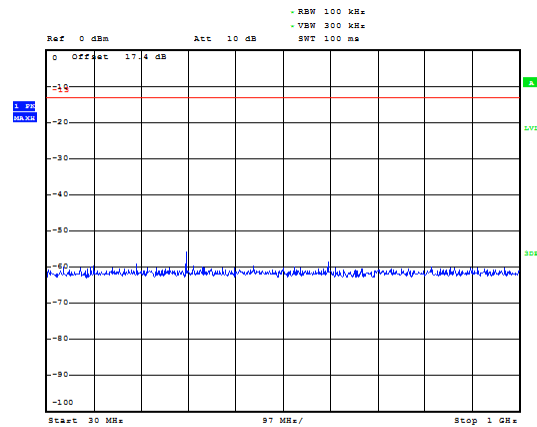




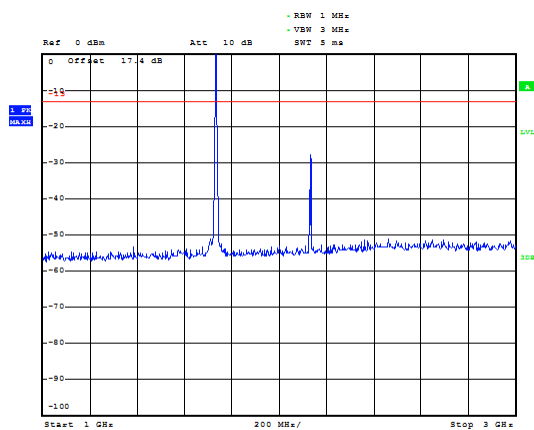
LTE Band 4 3MHz CH-Middle 30MHz~1GHz



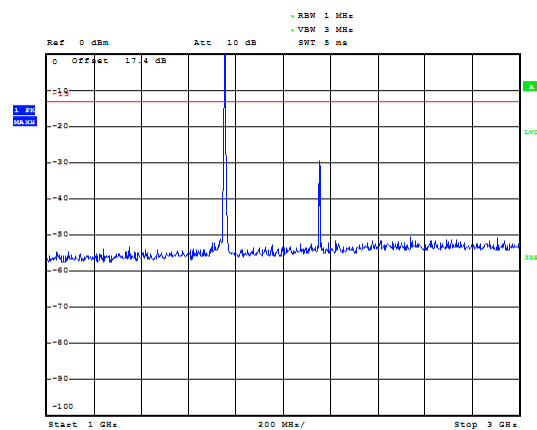
LTE Band 4 3MHz CH-High 30MHz~1GHz



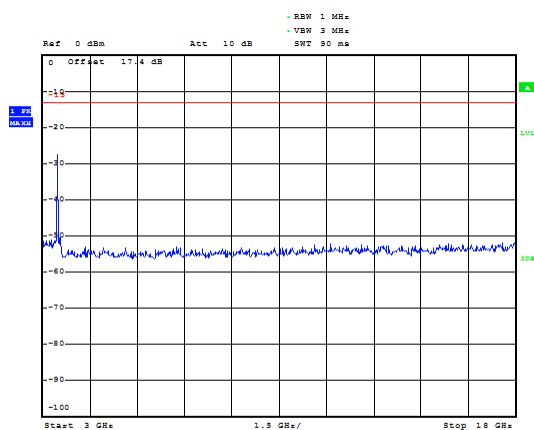
LTE Band 4 3MHz CH-Middle 1GHz~3GHz



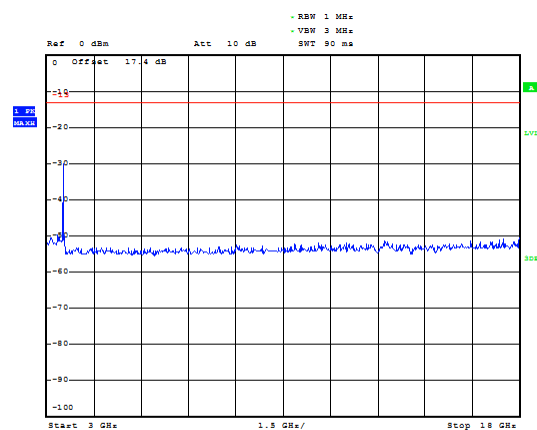
LTE Band 4 3MHz CH-High 1GHz~3GHz



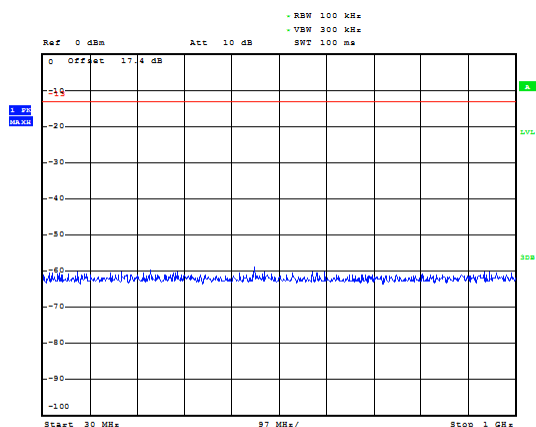
LTE Band 4 3MHz CH-Middle 3GHz~18GHz



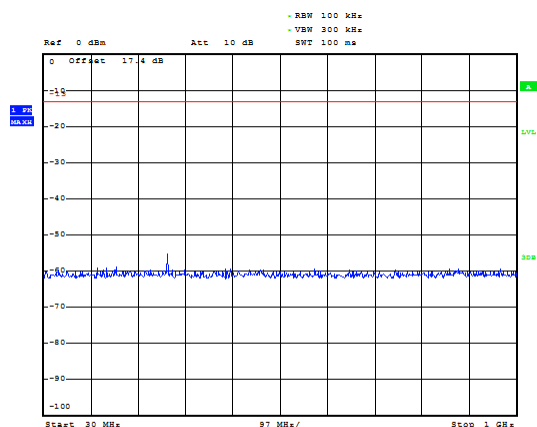
LTE Band 4 3MHz CH-High 3GHz~18GHz



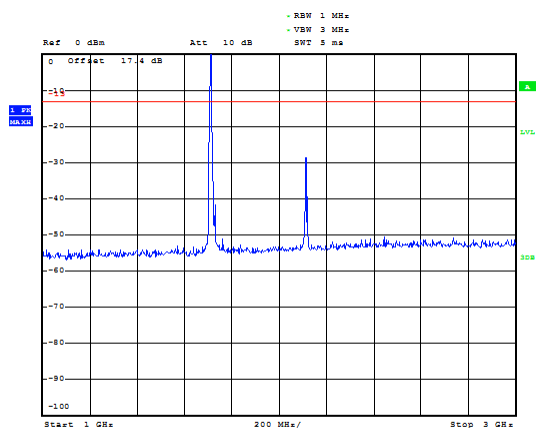
LTE Band 4 5MHz CH-Low 30MHz~1GHz



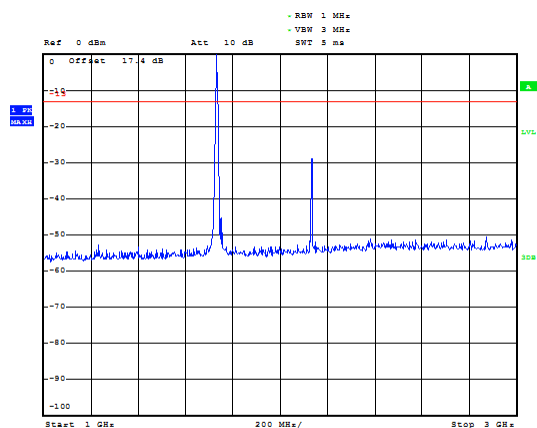
LTE Band 4 5MHz CH-Middle 30MHz~1GHz



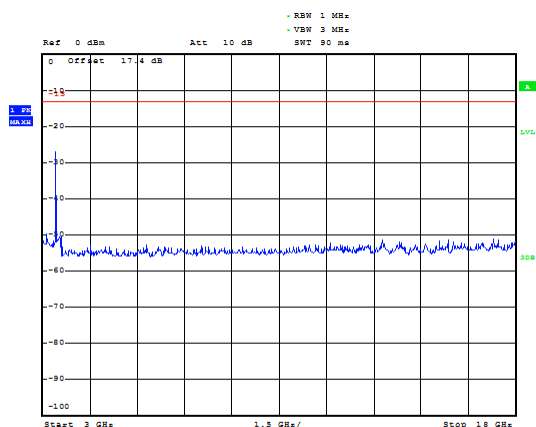
LTE Band 4 5MHz CH-Low 1GHz~3GHz



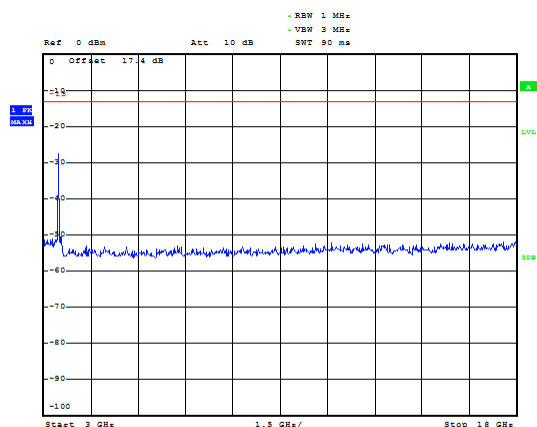
LTE Band 4 5MHz CH-Middle 1GHz~3GHz



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

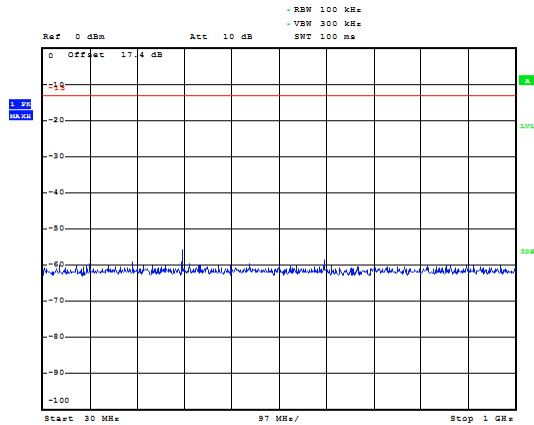


LTE Band 4 5MHz CH-Middle 3GHz~18GHz

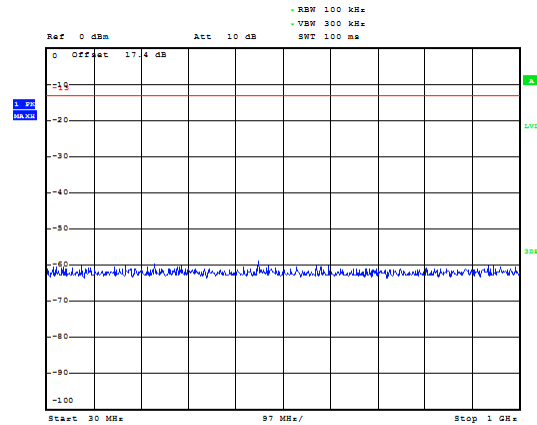




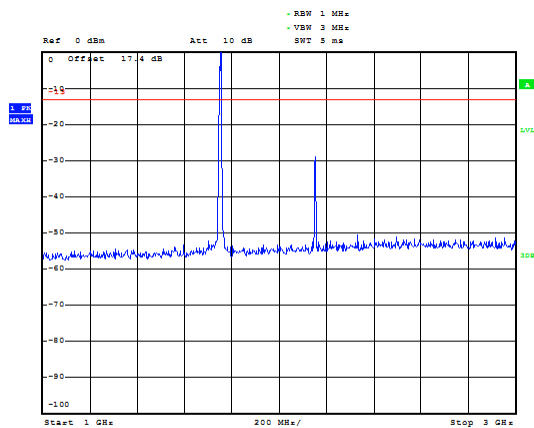
LTE Band 4 5MHz CH-High 30MHz~1GHz



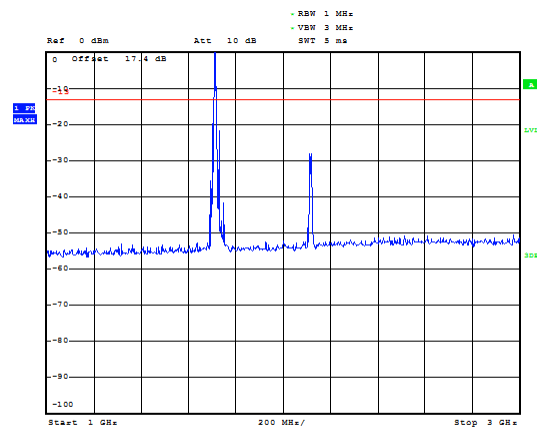
LTE Band 4 10MHz CH-Low 30MHz~1GHz



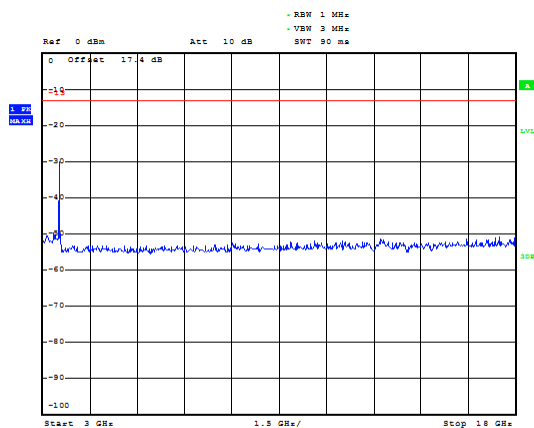
LTE Band 4 5MHz CH-High 1GHz~3GHz



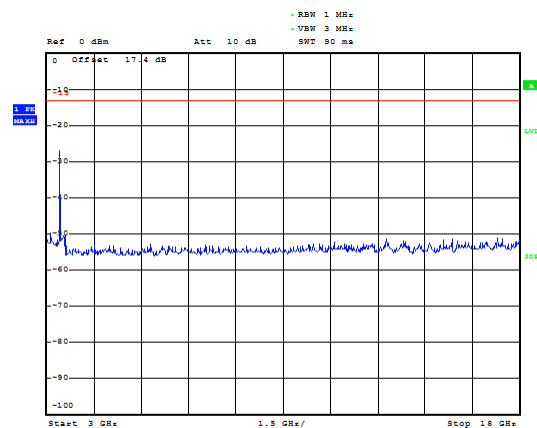
LTE Band 4 10MHz CH-Low 1GHz~3GHz



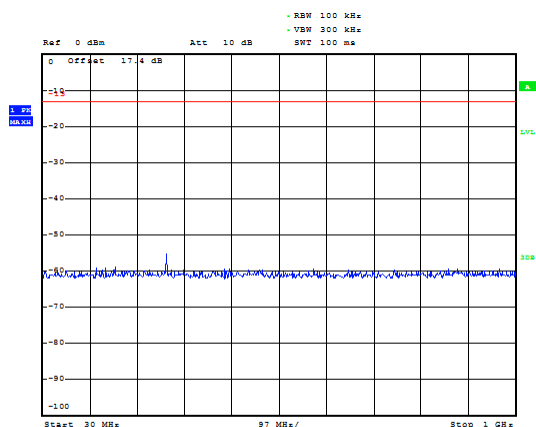
LTE Band 4 5MHz CH-High 3GHz~18GHz



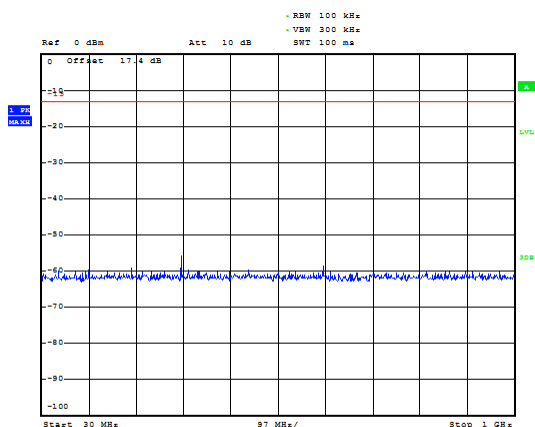
LTE Band 4 10MHz CH-Low 3GHz~18GHz



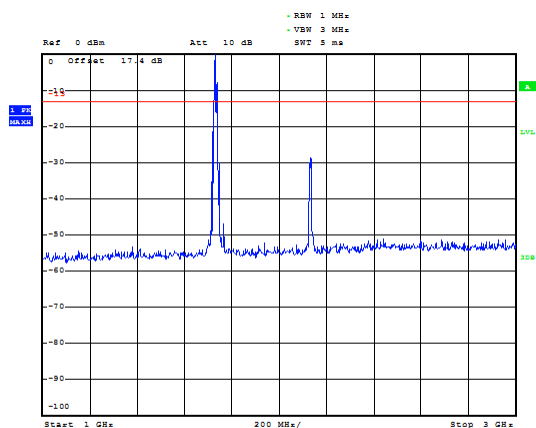
LTE Band 4 10MHz CH-Middle 30MHz~1GHz



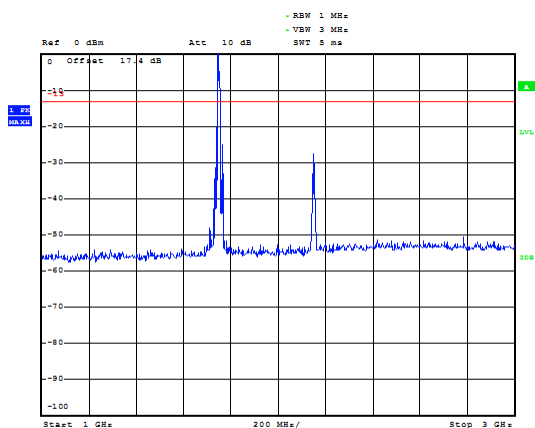
LTE Band 4 10MHz CH-High 30MHz~1GHz



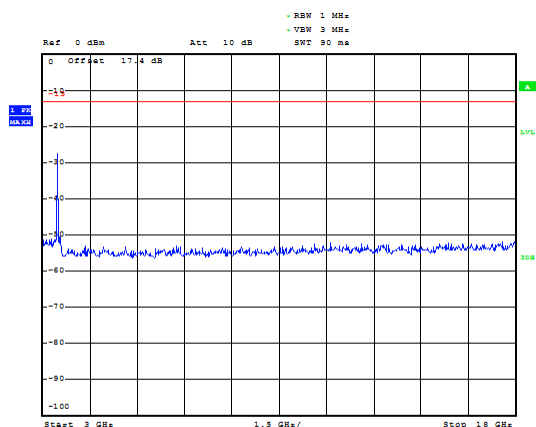
LTE Band 4 10MHz CH-Middle 1GHz~3GHz



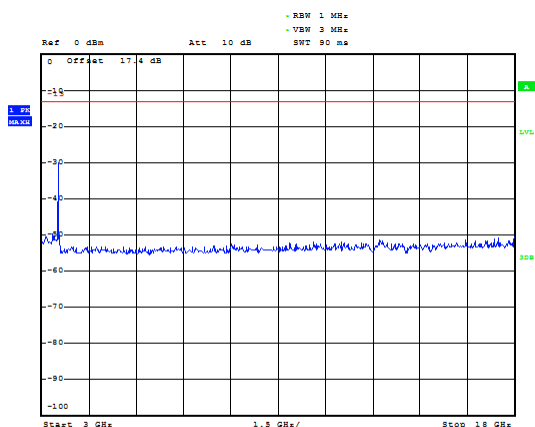
LTE Band 4 10MHz CH-High 1GHz~3GHz



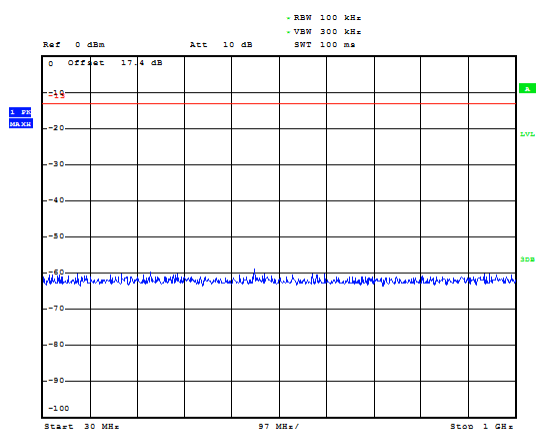
LTE Band 4 10MHz CH-Middle 3GHz~18GHz



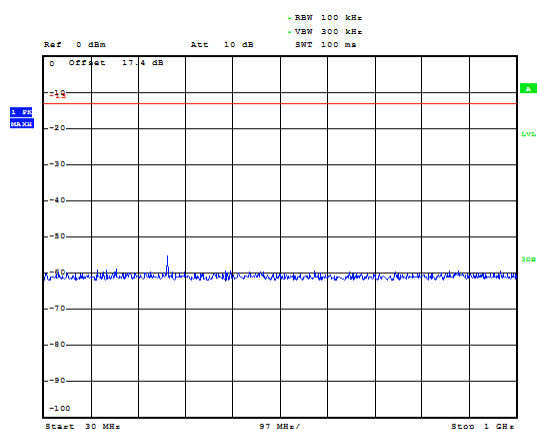
LTE Band 4 10MHz CH-High 3GHz~18GHz



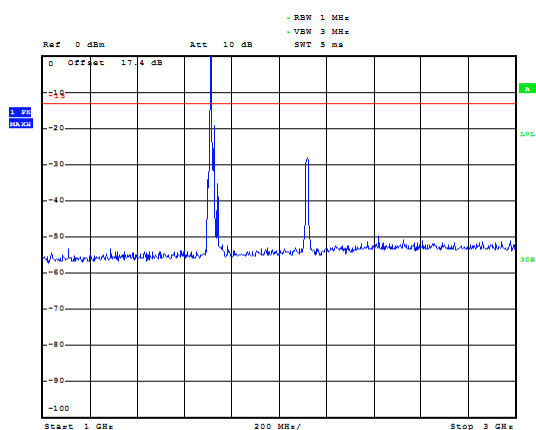
LTE Band 4 15MHz CH-Low 30MHz~1GHz



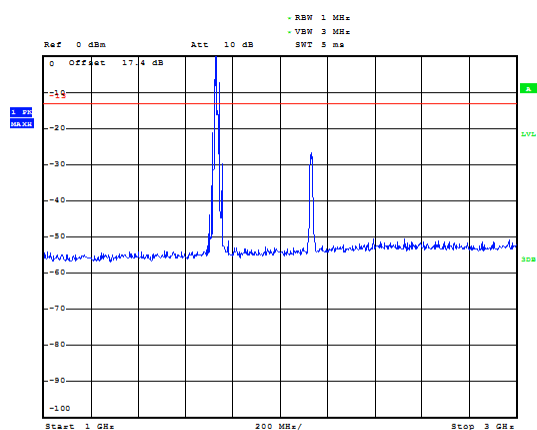
LTE Band 4 15MHz CH-Middle 30MHz~1GHz



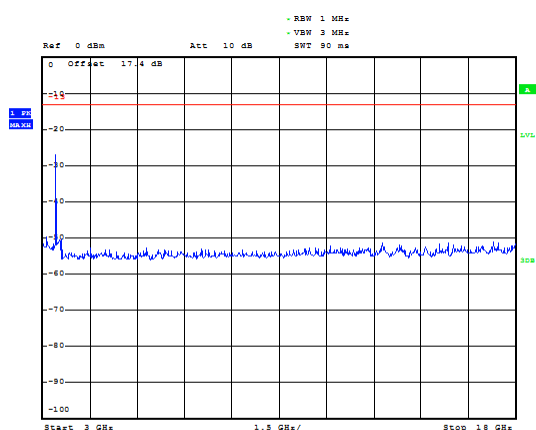
LTE Band 4 15MHz CH-Low 1GHz~3GHz



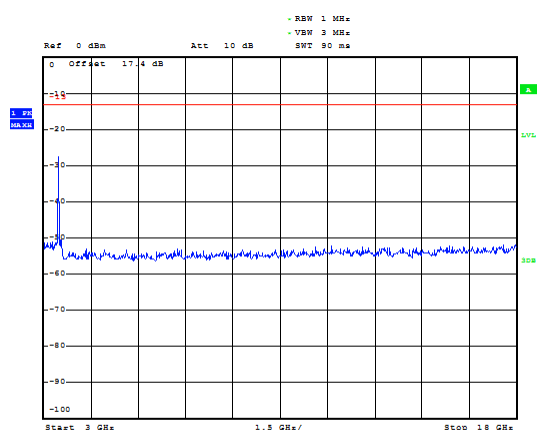
LTE Band 4 15MHz CH-Middle 1GHz~3GHz



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

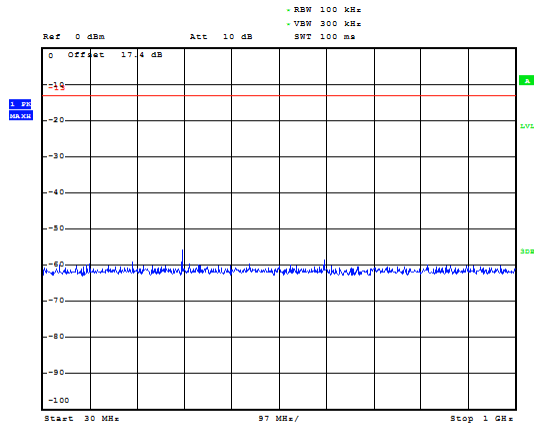


LTE Band 4 15MHz CH-Middle 3GHz~18GHz

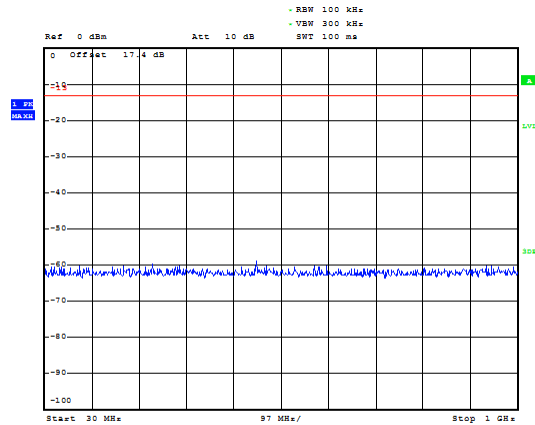




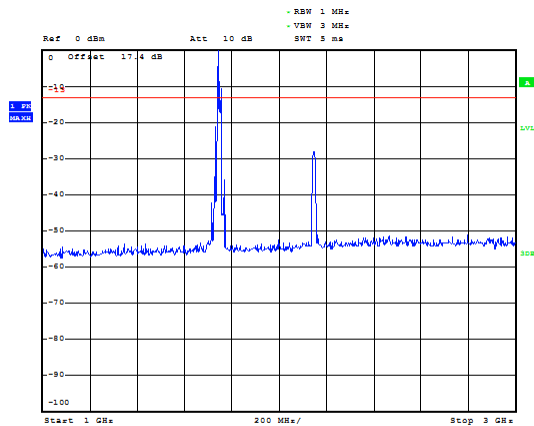
LTE Band 4 15MHz CH-High 30MHz~1GHz



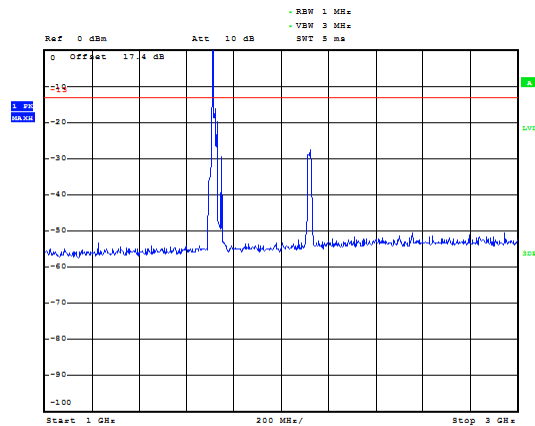
LTE Band 4 20MHz CH-Low 30MHz~1GHz



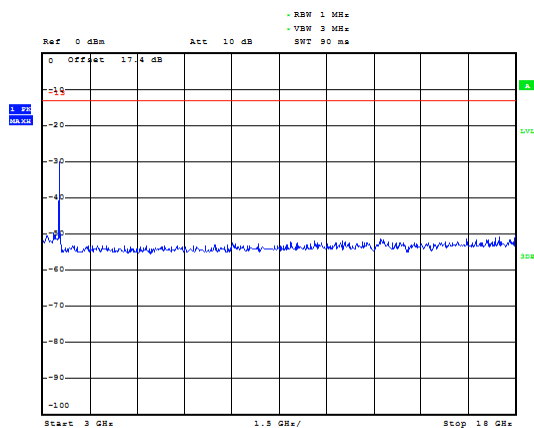
LTE Band 4 15MHz CH-High 1GHz~3GHz



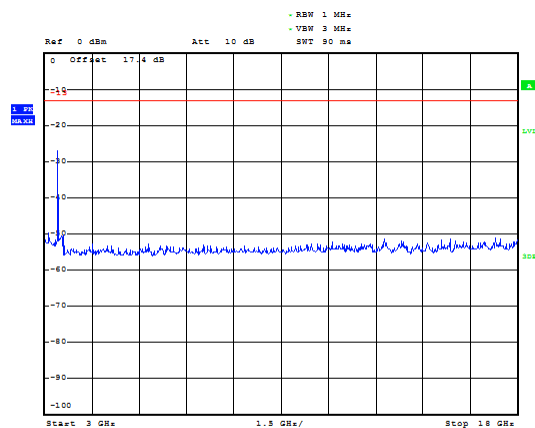
LTE Band 4 20MHz CH-Low 1GHz~3GHz



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

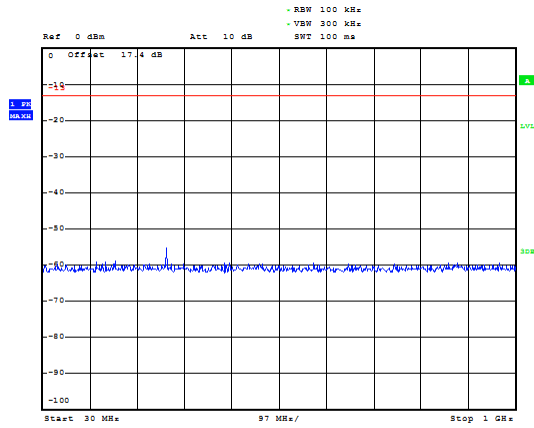


LTE Band 4 20MHz CH-Low 3GHz~18GHz

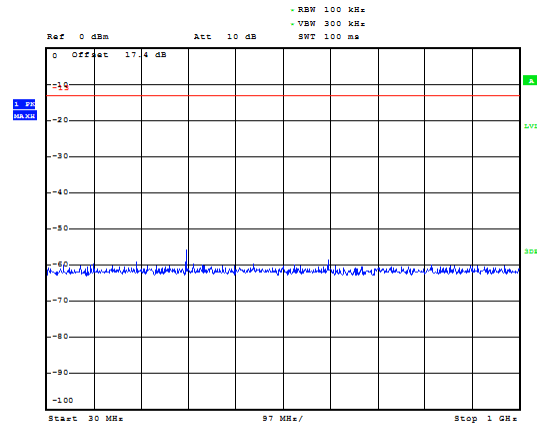




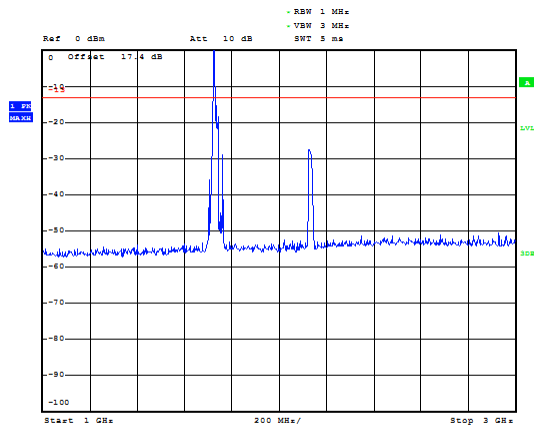
LTE Band 4 20MHz CH-Middle 30MHz~1GHz



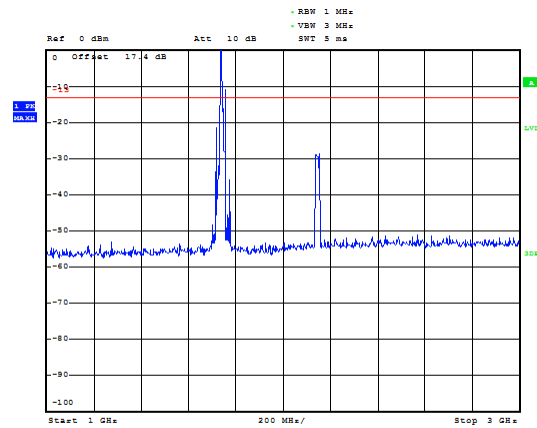
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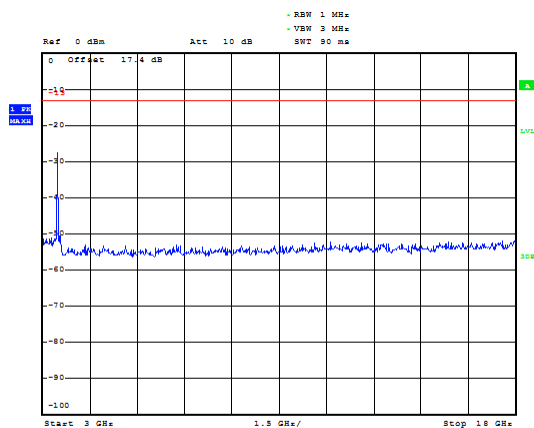
LTE Band 4 20MHz CH-Middle 1GHz~3GHz



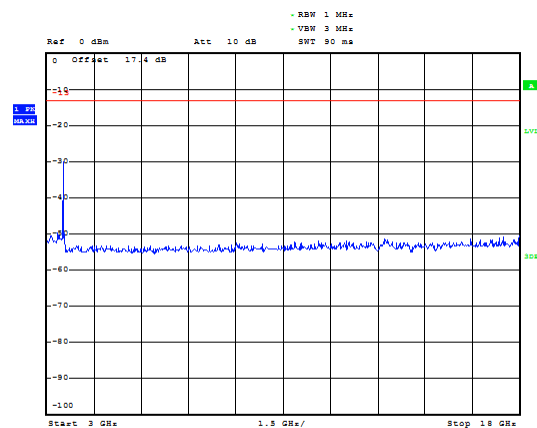
LTE Band 4 20MHz CH-High 1GHz~3GHz



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

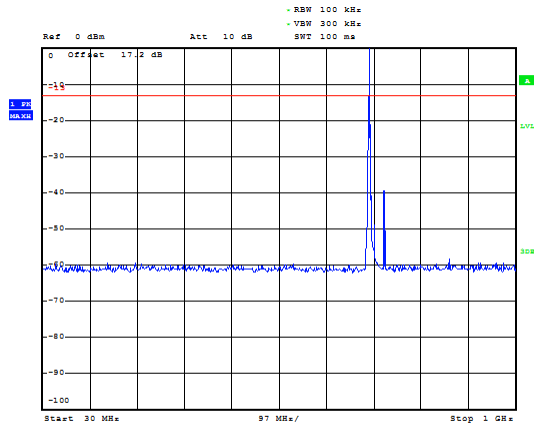


LTE Band 4 20MHz CH-High 3GHz~18GHz

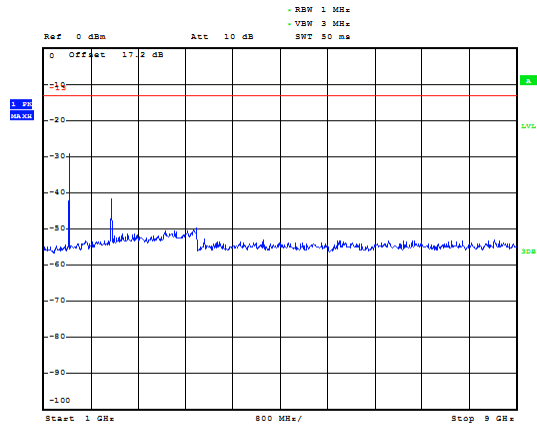




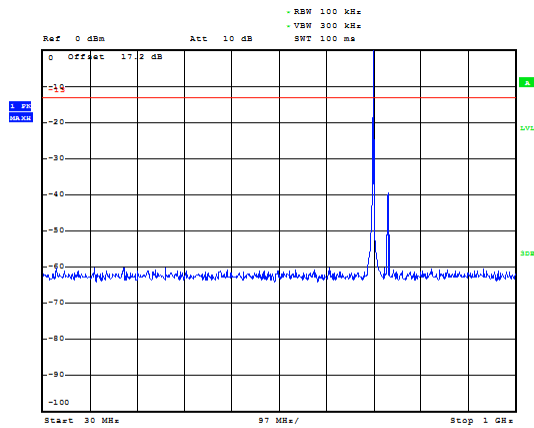
LTE Band 12 1.4MHz CH-Low 30MHz~1GHz



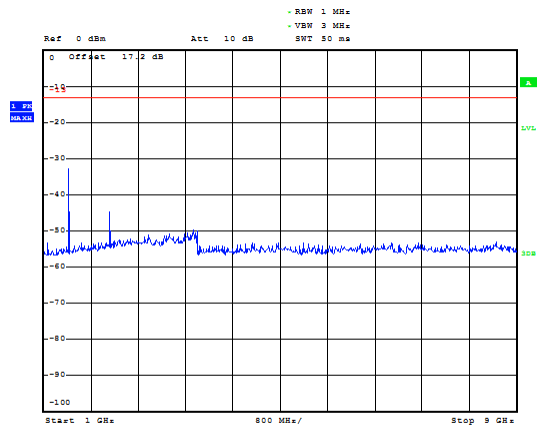
LTE Band 12 1.4MHz CH-Low 1GHz~9GHz



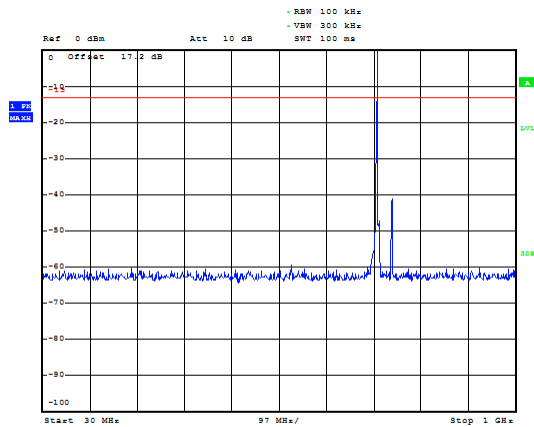
LTE Band 12 1.4MHz CH- Middle 30MHz~1GHz



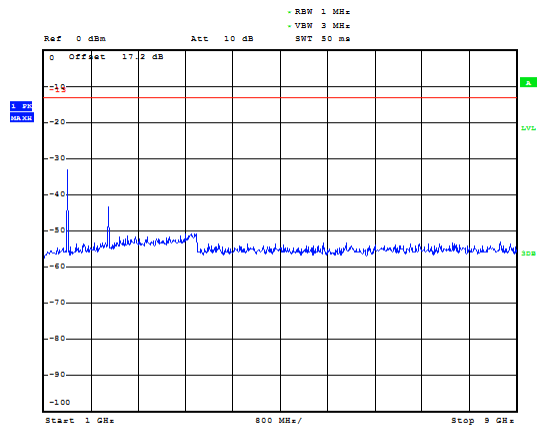
LTE Band 12 1.4MHz CH- Middle 1GHz~9GHz



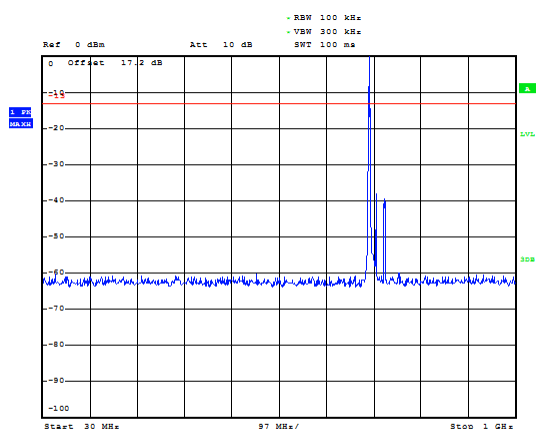
LTE Band 12 1.4MHz CH-High 30MHz~1GHz



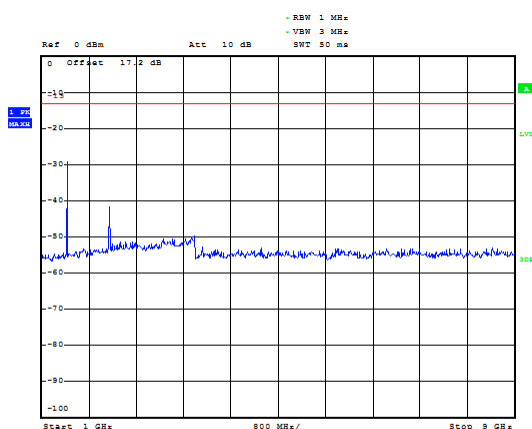
LTE Band 12 1.4MHz CH-High 1GHz~9GHz



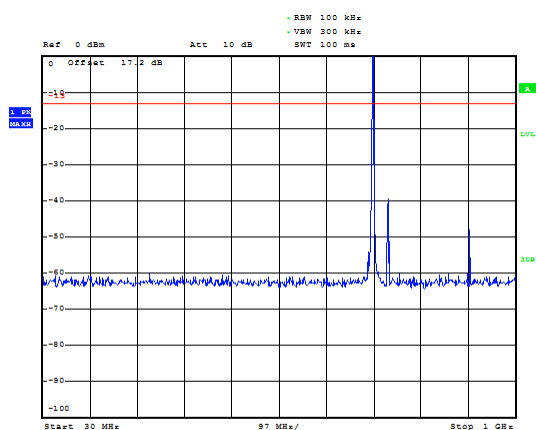
LTE Band 12 3MHz CH-Low 30MHz~1GHz



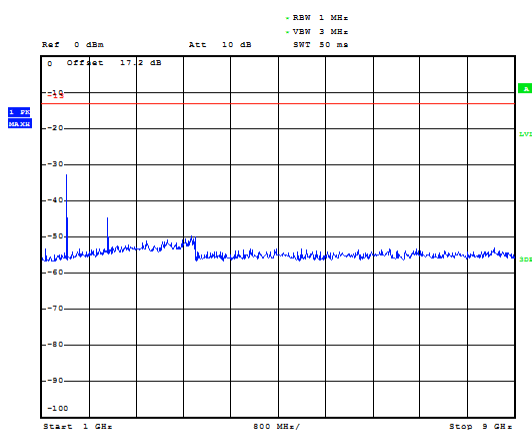
LTE Band 12 3MHz CH-Low 1GHz~9GHz



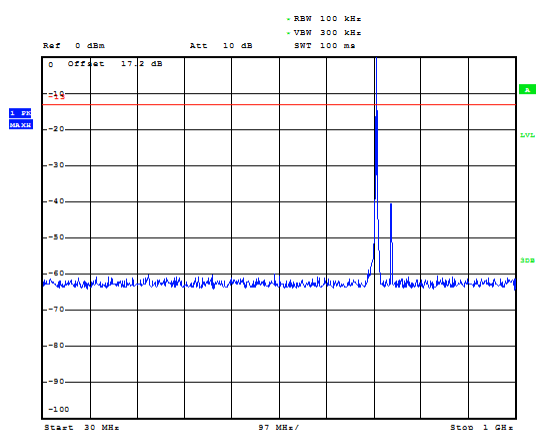
LTE Band 12 3MHz CH- Middle 30MHz~1GHz



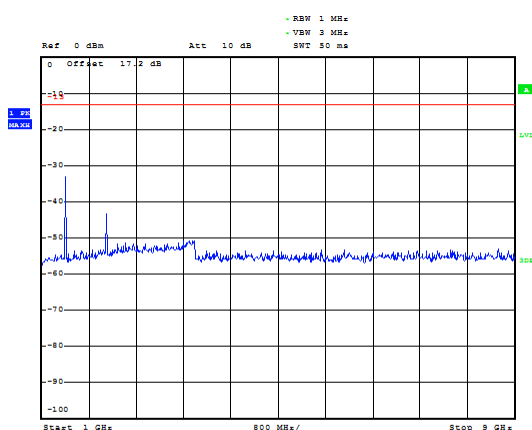
LTE Band 12 3MHz CH- Middle 1GHz~9GHz



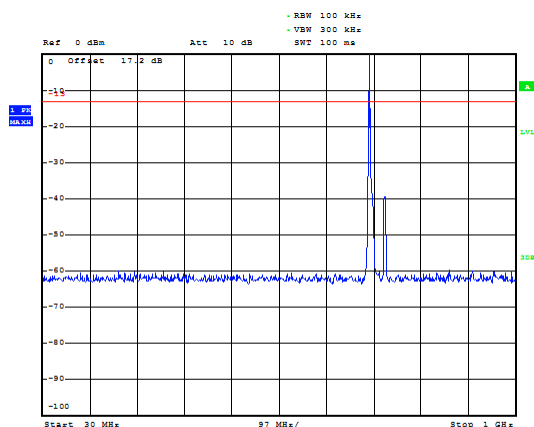
LTE Band 12 3MHz CH-High 30MHz~1GHz



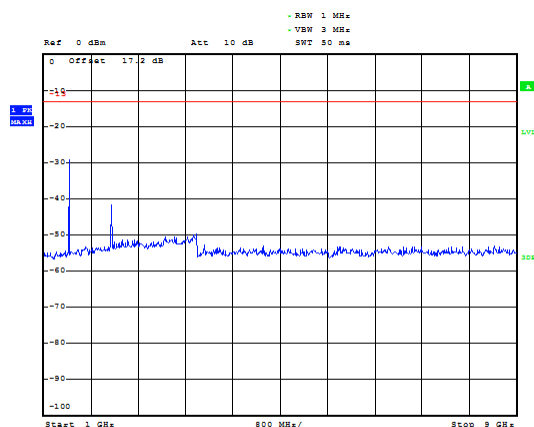
LTE Band 12 3MHz CH-High 1GHz~9GHz



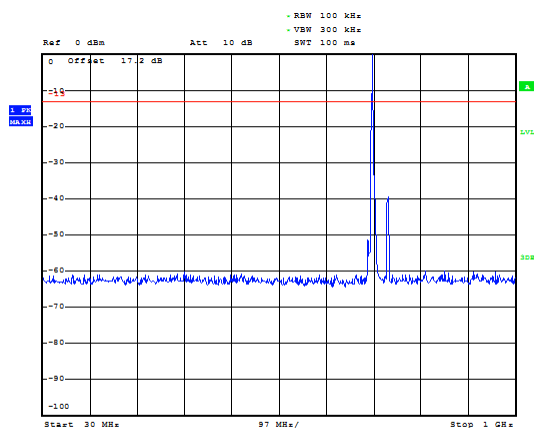
LTE Band 12 5MHz CH-Low 30MHz~1GHz



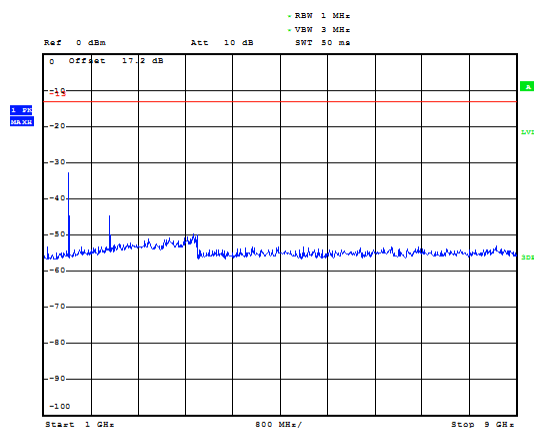
LTE Band 12 5MHz CH-Low 1GHz~9GHz



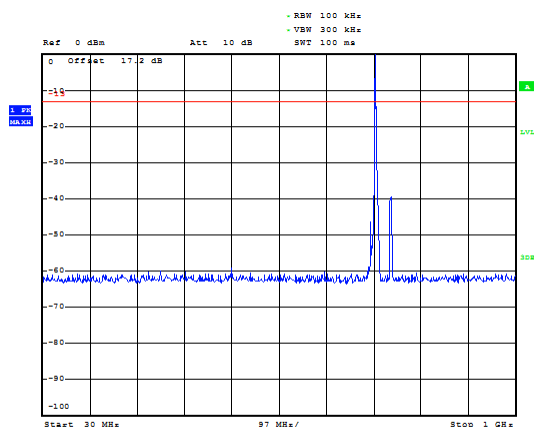
LTE Band 12 5MHz CH- Middle 30MHz~1GHz



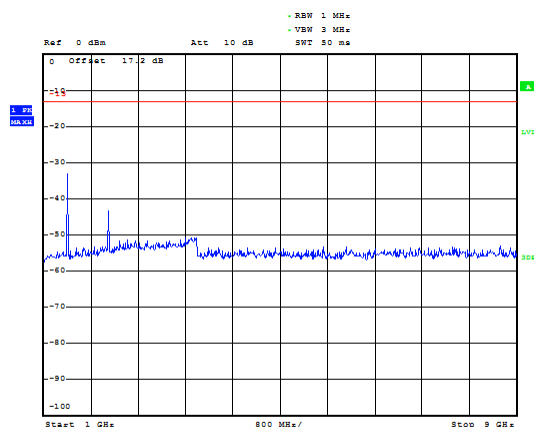
LTE Band 12 5MHz CH- Middle 1GHz~9GHz



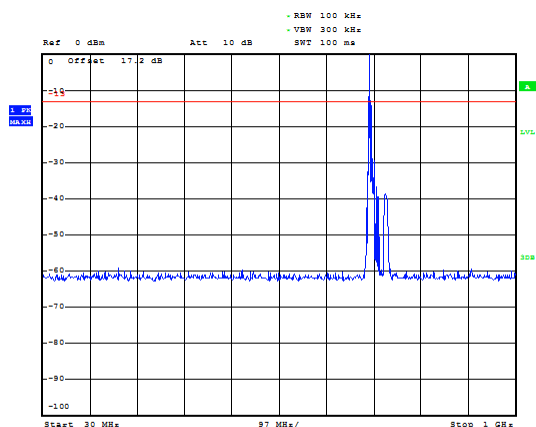
LTE Band 12 5MHz CH-High 30MHz~1GHz



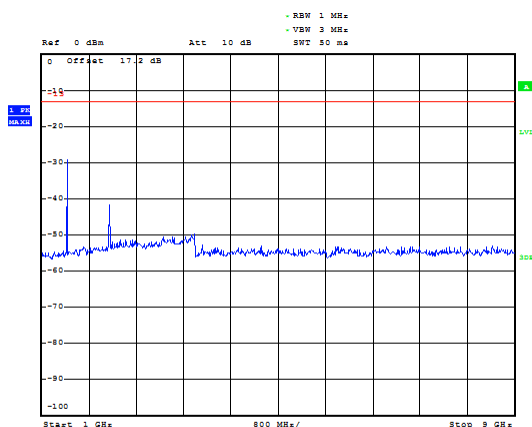
LTE Band 12 5MHz CH-High 1GHz~9GHz



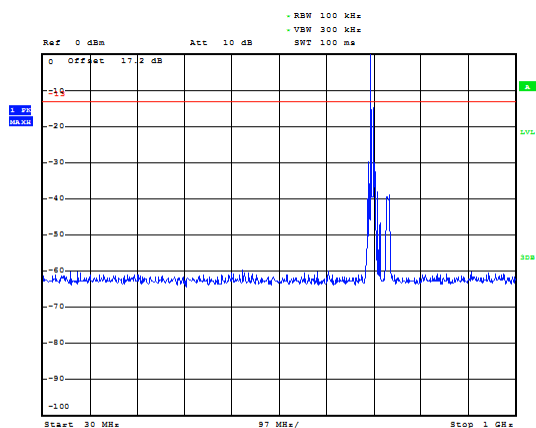
LTE Band 12 10MHz CH-Low 30MHz~1GHz



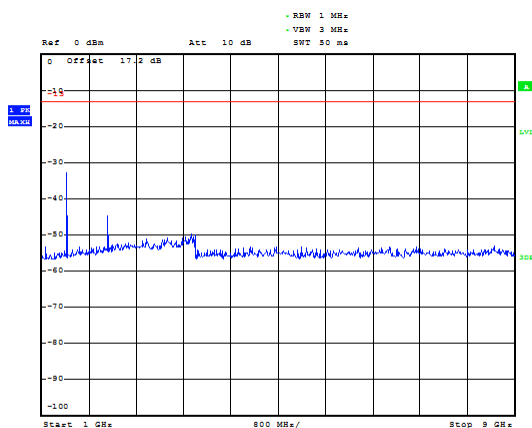
LTE Band 12 10MHz CH-Low 1GHz~9GHz



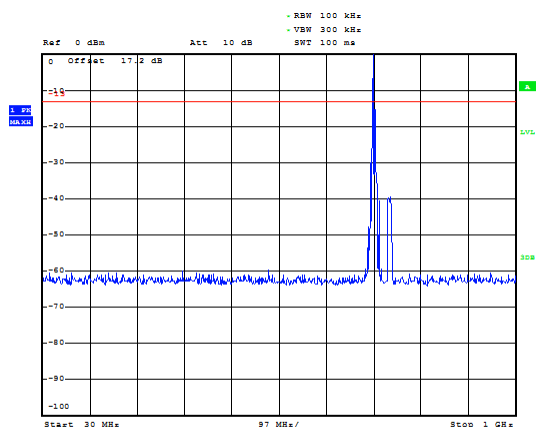
LTE Band 12 10MHz CH- Middle 30MHz~1GHz



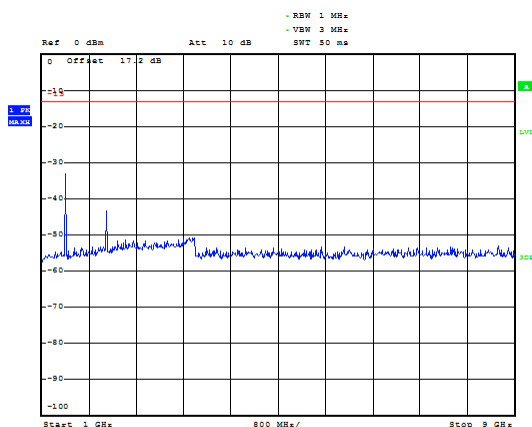
LTE Band 12 10MHz CH- Middle 1GHz~9GHz



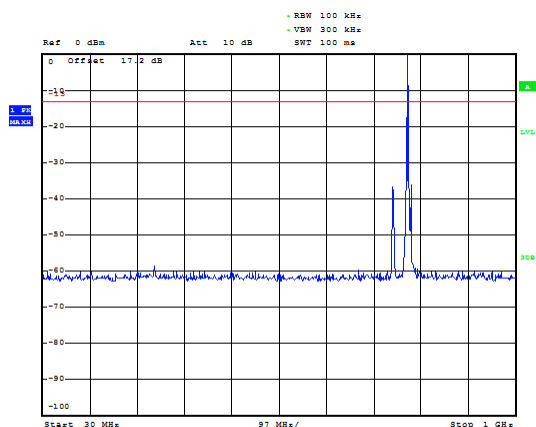
LTE Band 12 10MHz CH-High 30MHz~1GHz



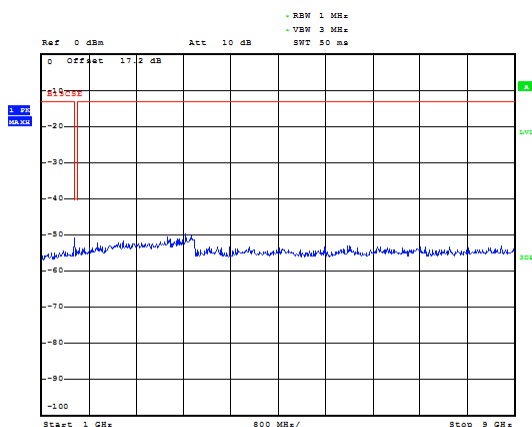
LTE Band 12 10MHz CH-High 1GHz~9GHz



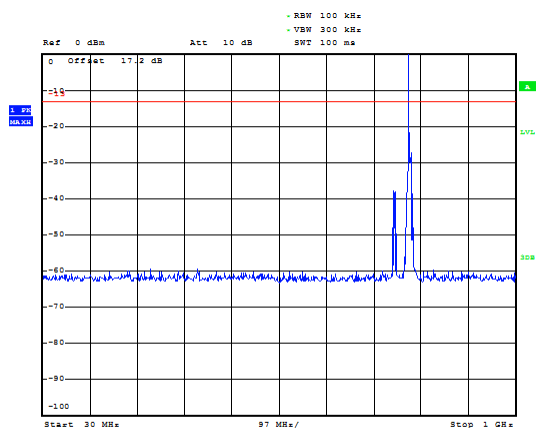
LTE Band 13 5MHz CH-Low 30MHz~1GHz



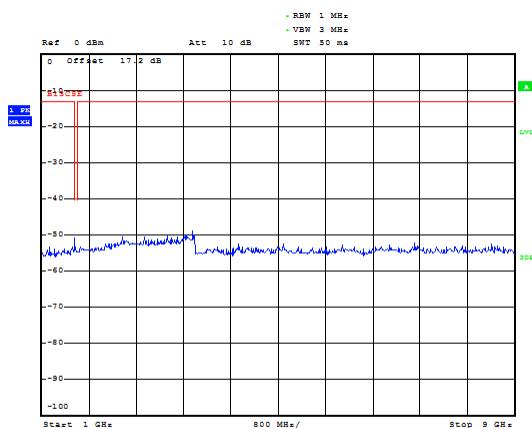
LTE Band 13 5MHz CH-Low 1GHz~9GHz



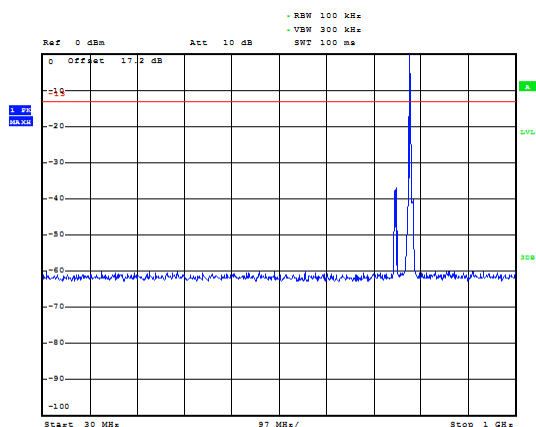
LTE Band 13 5MHz CH-Middle 30MHz~1GHz



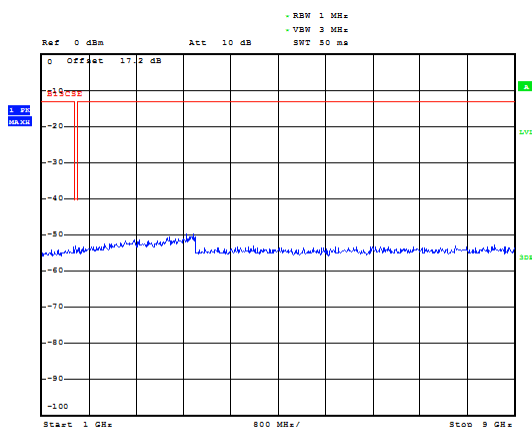
LTE Band 13 5MHz CH-Middle 1GHz~9GHz



LTE Band 13 5MHz CH-High 30MHz~1GHz

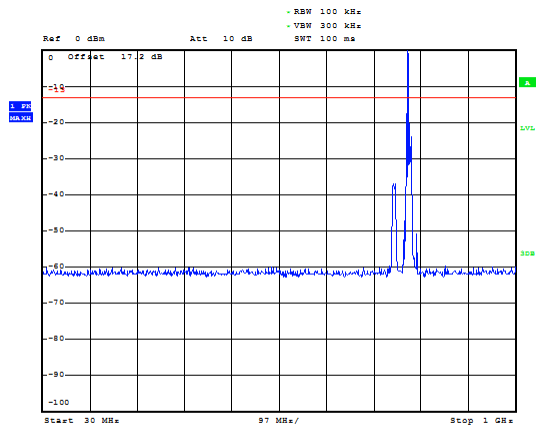


LTE Band 13 5MHz CH-High 1GHz~9GHz

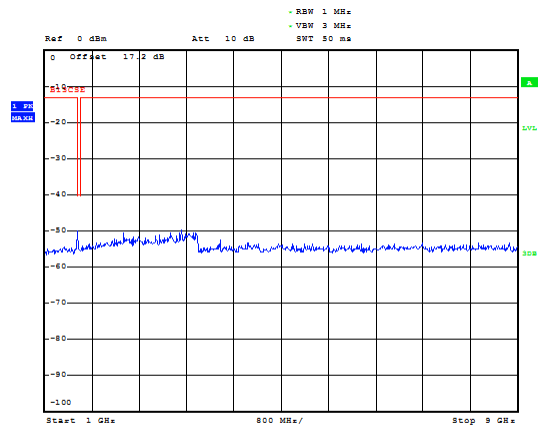




LTE Band 13 10MHz CH-Middle 30MHz~1GHz



LTE Band 13 10MHz CH-Middle 1GHz~9GHz





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

Test Data File Name	Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)
B4_CHLOW_1.4M_RB1_1-3GHz	2109.3	-30.405	-13	17.405
B4_CHMID_1.4M_RB1_1-3GHz	2127.8	-30.792	-13	17.792
B4_CHHIGH_1.4M_RB1_1-3GHz	2147.1	-30.298	-13	17.298
B4_CHLOW_3M_RB1_1-3GHz	2105.5	-28.712	-13	15.712
B4_CHMID_3M_RB1_1-3GHz	2126.2	-27.745	-13	14.745
B4_CHHIGH_3M_RB1_1-3GHz	2150.4	-30.048	-13	17.048
B4_CHLOW_5M_RB1_1-3GHz	2111.6	-29.112	-13	16.112
B4_CHMID_5M_RB1_1-3GHz	2135.3	-29.057	-13	16.057
B4_CHHIGH_5M_RB1_1-3GHz	2148.0	-30.131	-13	17.131
B4_CHLOW_10M_RB1_1-3GHz	2109.0	-29.781	-13	16.781
B4_CHMID_10M_RB1_1-3GHz	2128.3	-30.010	-13	17.01
B4_CHHIGH_10M_RB1_1-3GHz	2150.0	-28.812	-13	15.812
B4_CHLOW_15M_RB1_1-3GHz	2116.2	-28.508	-13	15.508
B4_CHMID_15M_RB1_1-3GHz	2130.7	-28.301	-13	15.301
B4_CHHIGH_15M_RB1_1-3GHz	2140.6	-28.776	-13	15.776
B4_CHLOW_20M_RB1_1-3GHz	2117.3	-29.489	-13	16.489
B4_CHMID_20M_RB1_1-3GHz	2132.6	-29.410	-13	16.41
B4_CHHIGH_20M_RB1_1-3GHz	2142.9	-29.869	-13	16.869
B12_CHLOW_1.4M_RB1_1-9GHz	1353.8	-29.231	-13	16.231
B12_CHMID_1.4M_RB1_1-9GHz	1363.5	-32.049	-13	19.049
B12_CHHIGH_1.4M_RB1_1-9GHz	1375.6	-32.933	-13	19.933
B12_CHLOW_3M_RB1_1-9GHz	1359.6	-29.231	-13	16.231
B12_CHMID_3M_RB1_1-9GHz	1365.5	-31.916	-13	18.916
B12_CHHIGH_3M_RB1_1-9GHz	1384.6	-32.646	-13	19.646
B12_CHLOW_5M_RB1_1-9GHz	1366.1	-28.973	-13	15.973
B12_CHMID_5M_RB1_1-9GHz	1375.8	-31.791	-13	18.791
B12_CHHIGH_5M_RB1_1-9GHz	1387.9	-32.675	-13	19.675
B12_CHLOW_10M_RB1_1-9GHz	1371.9	-28.966	-13	15.966
B12_CHMID_10M_RB1_1-9GHz	1377.8	-31.658	-13	18.658
B12_CHHIGH_10M_RB1_1-9GHz	1396.9	-32.376	-13	19.376

5.8 Radiates Spurious Emission

Ambient condition

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

Method of Measurement

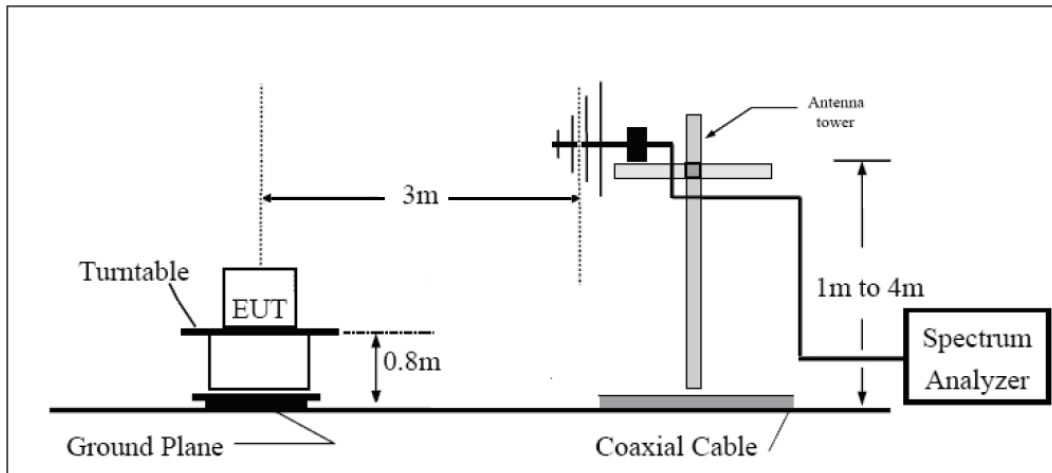
1. The testing follows FCC KDB 971168 D01 v03r01 Section 5.8 and ANSI/TIA-603-E (2016).
2. The EUT is placed on a turntable 0.8 meters above the ground in the chamber, 3 meter away from the antenna. The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable azimuth. 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:

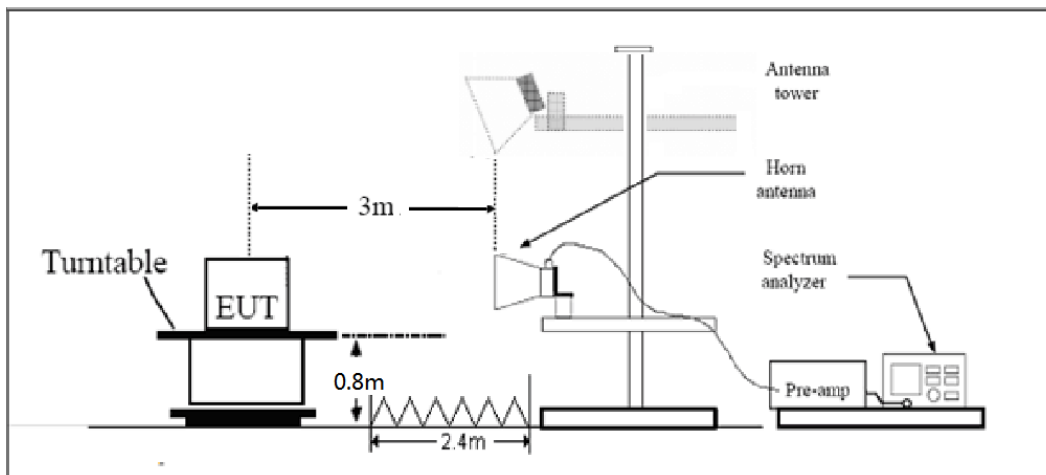
$$\text{Power(EIRP)} = \text{PMea} - \text{Pcl} + \text{Ga}$$
8. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power. ERP can be calculated from EIRP by subtracting the gain of the dipole, $\text{ERP} = \text{EIRP} - 2.15\text{dBi}$.

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.

Rule Part 27.53(i) By a factor of not less than $43 + 10 \log (P)$ dB on all frequencies between 2305 and 2320 MHz.

Part 27.53 (h)/(g) Limit		-13 dBm
Part 27.53(f) Limit	Limit out of the band 1559-1610 MHz	-13 dBm
Part 27.53(c) Limit	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	-48.85	2.6	10.15	Horizontal	-41.3	-13.0	28.3	0
3	5131.1	-55.15	2.4	11.35	Horizontal	-46.2	-13.0	33.2	315
4	6842.8	-37.75	4.5	10.85	Horizontal	-31.4	-13.0	18.4	225
5	8553.5	-47.95	5.1	11.35	Horizontal	-41.7	-13.0	28.7	270
6	10264.2	-54.25	5.3	11.95	Horizontal	-47.6	-13.0	34.6	180
7	11974.9	-57.85	5.5	13.55	Horizontal	-49.8	-13.0	36.8	270
8	13685.6	-47.65	6.3	13.75	Horizontal	-40.2	-13.0	27.2	225
9	15396.3	-49.85	6.7	13.85	Horizontal	-42.7	-13.0	29.7	315
10	17107.0	-51.15	6.8	14.25	Horizontal	-43.7	-13.0	30.7	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 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	-45.25	2.6	10.75	Horizontal	-37.1	-13.0	24.1	0
3	5197.5	-52.05	2.4	11.05	Horizontal	-43.4	-13.0	30.4	315
4	6930.0	-41.95	4.5	11.15	Horizontal	-35.3	-13.0	22.3	180
5	8662.5	-51.35	5.1	11.35	Horizontal	-45.1	-13.0	32.1	270
6	10395.0	-55.25	5.3	11.95	Horizontal	-48.6	-13.0	35.6	45
7	12127.5	-54.45	5.5	13.55	Horizontal	-46.4	-13.0	33.4	0
8	13860.0	-51.25	6.3	13.75	Horizontal	-43.8	-13.0	30.8	180
9	15592.5	-50.65	6.7	13.85	Horizontal	-43.5	-13.0	30.5	225
10	17325.0	-50.15	6.8	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 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	-44.35	2.6	10.15	Horizontal	-36.8	-13.0	23.8	0
3	5261.6	-42.95	2.4	11.05	Horizontal	-34.3	-13.0	21.3	315
4	7017.2	-44.25	4.5	11.15	Horizontal	-37.6	-13.0	24.6	90
5	8771.5	-49.55	5.1	11.35	Horizontal	-43.3	-13.0	30.3	45
6	10525.8	-54.15	5.3	11.95	Horizontal	-47.5	-13.0	34.5	0
7	12280.1	-52.55	5.5	13.55	Horizontal	-44.5	-13.0	31.5	90
8	14034.4	-49.65	6.3	13.75	Horizontal	-42.2	-13.0	29.2	0
9	15788.7	-52.45	6.7	13.85	Horizontal	-45.3	-13.0	32.3	225
10	17543.0	-51.55	6.8	14.25	Horizontal	-44.1	-13.0	31.1	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 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	-48.05	2.6	10.15	Horizontal	-40.5	-13.0	27.5	180
3	5134.5	-55.85	2.4	11.35	Horizontal	-46.9	-13.0	33.9	315
4	6846.0	-37.95	4.5	10.85	Horizontal	-31.6	-13.0	18.6	135
5	8557.5	-49.65	5.1	11.35	Horizontal	-43.4	-13.0	30.4	315
6	10269.0	-55.45	5.3	11.95	Horizontal	-48.8	-13.0	35.8	135
7	11980.5	-55.85	5.5	13.55	Horizontal	-47.8	-13.0	34.8	90
8	13692.0	-49.05	6.3	13.75	Horizontal	-41.6	-13.0	28.6	270
9	15403.5	-51.25	6.7	13.85	Horizontal	-44.1	-13.0	31.1	135
10	17115.0	-49.25	6.8	14.25	Horizontal	-41.8	-13.0	28.8	0
Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor. 2. The worst emission was found in the antenna is 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	-43.85	2.6	10.75	Horizontal	-35.7	-13.0	22.7	0
3	5197.5	-55.25	2.4	11.05	Horizontal	-46.6	-13.0	33.6	315
4	6930.0	-42.75	4.5	11.15	Horizontal	-36.1	-13.0	23.1	270
5	8662.5	-51.35	5.1	11.35	Horizontal	-45.1	-13.0	32.1	90
6	10395.0	-55.15	5.3	11.95	Horizontal	-48.5	-13.0	35.5	180
7	12127.5	-55.75	5.5	13.55	Horizontal	-47.7	-13.0	34.7	315
8	13860.0	-51.85	6.3	13.75	Horizontal	-44.4	-13.0	31.4	45
9	15592.5	-50.85	6.7	13.85	Horizontal	-43.7	-13.0	30.7	225
10	17325.0	-49.45	6.8	14.25	Horizontal	-42.0	-13.0	29.0	0
Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor. 2. The worst emission was found in the antenna is 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	-46.25	2.6	10.15	Horizontal	-38.7	-13.0	25.7	0
3	5256.8	-43.75	2.4	11.05	Horizontal	-35.1	-13.0	22.1	45
4	7014.0	-44.75	4.5	11.15	Horizontal	-38.1	-13.0	25.1	315
5	8767.5	-49.05	5.1	11.35	Horizontal	-42.8	-13.0	29.8	270
6	10521.0	-54.75	5.3	11.95	Horizontal	-48.1	-13.0	35.1	0
7	12274.5	-52.35	5.5	13.55	Horizontal	-44.3	-13.0	31.3	0
8	14028.0	-49.65	6.3	13.75	Horizontal	-42.2	-13.0	29.2	270
9	15781.5	-50.05	6.7	13.85	Horizontal	-42.9	-13.0	29.9	225
10	17535.0	-49.75	6.8	14.25	Horizontal	-42.3	-13.0	29.3	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 5MHz CH-Low, RB 1

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3425.0	-49.85	2.6	10.15	Horizontal	-42.3	-13.0	29.3	0
3	5131.1	-55.85	2.4	11.35	Horizontal	-46.9	-13.0	33.9	315
4	6850.0	-36.15	4.5	10.85	Horizontal	-29.8	-13.0	16.8	135
5	8562.5	-44.65	5.1	11.35	Horizontal	-38.4	-13.0	25.4	90
6	10275.0	-52.15	5.3	11.95	Horizontal	-45.5	-13.0	32.5	270
7	11987.5	-54.85	5.5	13.55	Horizontal	-46.8	-13.0	33.8	180
8	13700.0	-49.65	6.3	13.75	Horizontal	-42.2	-13.0	29.2	180
9	15412.5	-51.05	6.7	13.85	Horizontal	-43.9	-13.0	30.9	45
10	17125.0	-51.95	6.8	14.25	Horizontal	-44.5	-13.0	31.5	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 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	-43.25	2.6	10.75	Horizontal	-35.1	-13.0	22.1	0
3	5191.5	-56.35	2.4	11.05	Horizontal	-47.7	-13.0	34.7	315
4	6930.0	-40.75	4.5	11.15	Horizontal	-34.1	-13.0	21.1	180
5	8662.5	-48.75	5.1	11.35	Horizontal	-42.5	-13.0	29.5	90
6	10395.0	-53.05	5.3	11.95	Horizontal	-46.4	-13.0	33.4	0
7	12127.5	-53.05	5.5	13.55	Horizontal	-45.0	-13.0	32.0	270
8	13860.0	-48.95	6.3	13.75	Horizontal	-41.5	-13.0	28.5	315
9	15592.5	-44.95	6.7	13.85	Horizontal	-37.8	-13.0	24.8	180
10	17325.0	-49.95	6.8	14.25	Horizontal	-42.5	-13.0	29.5	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 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	-42.75	2.6	10.15	Horizontal	-35.2	-13.0	22.2	0
3	5250.8	-53.45	2.4	11.05	Horizontal	-44.8	-13.0	31.8	135
4	7010.0	-44.95	4.5	11.15	Horizontal	-38.3	-13.0	25.3	270
5	8762.5	-46.35	5.1	11.35	Horizontal	-40.1	-13.0	27.1	225
6	10515.0	-50.35	5.3	11.95	Horizontal	-43.7	-13.0	30.7	270
7	12267.5	-49.65	5.5	13.55	Horizontal	-41.6	-13.0	28.6	270
8	14020.0	-43.45	6.3	13.75	Horizontal	-36.0	-13.0	23.0	315
9	15772.5	-50.15	6.7	13.85	Horizontal	-43.0	-13.0	30.0	270
10	17525.0	-50.05	6.8	14.25	Horizontal	-42.6	-13.0	29.6	90
Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor. 2. The worst emission was found in the antenna is Horizontal position.									

LTE Band 4 QPSK 10MHz CH-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	-46.55	2.6	10.15	Horizontal	-39.0	-13.0	26.0	135
3	5131.9	-52.45	2.4	11.35	Horizontal	-43.5	-13.0	30.5	315
4	6860.0	-39.75	4.5	10.85	Horizontal	-33.4	-13.0	20.4	225
5	8575.0	-45.75	5.1	11.35	Horizontal	-39.5	-13.0	26.5	45
6	10290.0	-50.45	5.3	11.95	Horizontal	-43.8	-13.0	30.8	180
7	12005.0	-52.15	5.5	13.55	Horizontal	-44.1	-13.0	31.1	225
8	13720.0	-45.55	6.3	13.75	Horizontal	-38.1	-13.0	25.1	90
9	15435.0	-47.15	6.7	13.85	Horizontal	-40.0	-13.0	27.0	180
10	17150.0	-51.85	6.8	14.25	Horizontal	-44.4	-13.0	31.4	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 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	-45.95	2.6	10.75	Horizontal	-37.8	-13.0	24.8	0
3	5184.4	-56.05	2.4	11.05	Horizontal	-47.4	-13.0	34.4	315
4	6930.0	-42.35	4.5	11.15	Horizontal	-35.7	-13.0	22.7	90
5	8662.5	-47.45	5.1	11.35	Horizontal	-41.2	-13.0	28.2	45
6	10395.0	-51.85	5.3	11.95	Horizontal	-45.2	-13.0	32.2	180
7	12127.5	-55.05	5.5	13.55	Horizontal	-47.0	-13.0	34.0	270
8	13860.0	-46.95	6.3	13.75	Horizontal	-39.5	-13.0	26.5	225
9	15592.5	-46.65	6.7	13.85	Horizontal	-39.5	-13.0	26.5	270
10	17325.0	-49.75	6.8	14.25	Horizontal	-42.3	-13.0	29.3	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	-47.05	2.6	10.15	Horizontal	-39.5	-13.0	26.5	135
3	5236.9	-51.05	2.4	11.05	Horizontal	-42.4	-13.0	29.4	135
4	7000.0	-44.45	4.5	11.15	Horizontal	-37.8	-13.0	24.8	90
5	8750.0	-47.25	5.1	11.35	Horizontal	-41.0	-13.0	28.0	45
6	10500.0	-51.55	5.3	11.95	Horizontal	-44.9	-13.0	31.9	90
7	12250.0	-51.85	5.5	13.55	Horizontal	-43.8	-13.0	30.8	270
8	14000.0	-47.15	6.3	13.75	Horizontal	-39.7	-13.0	26.7	315
9	15750.0	-46.15	6.7	13.85	Horizontal	-39.0	-13.0	26.0	45
10	17500.0	-52.05	6.8	14.25	Horizontal	-44.6	-13.0	31.6	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 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	-45.65	2.6	10.15	Horizontal	-38.1	-13.0	25.1	135
3	5132.6	-52.95	2.4	11.35	Horizontal	-44.0	-13.0	31.0	315
4	6870.0	-38.85	4.5	10.85	Horizontal	-32.5	-13.0	19.5	180
5	8587.5	-44.05	5.1	11.35	Horizontal	-37.8	-13.0	24.8	45
6	10305.0	-47.85	5.3	11.95	Horizontal	-41.2	-13.0	28.2	135
7	12022.5	-51.85	5.5	13.55	Horizontal	-43.8	-13.0	30.8	135
8	13740.0	-46.05	6.3	13.75	Horizontal	-38.6	-13.0	25.6	180
9	15457.5	-45.95	6.7	13.85	Horizontal	-38.8	-13.0	25.8	225
10	17175.0	-50.35	6.8	14.25	Horizontal	-42.9	-13.0	29.9	180
Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor. 2. The worst emission was found in the antenna is Horizontal position.									



LTE Band 4 QPSK 15MHz CH-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	-40.15	2.6	10.75	Horizontal	-32.0	-13.0	19.0	0
3	5217.8	-56.85	2.4	11.05	Horizontal	-48.2	-13.0	35.2	315
4	6930.0	-41.55	4.5	11.15	Horizontal	-34.9	-13.0	21.9	270
5	8662.5	-47.55	5.1	11.35	Horizontal	-41.3	-13.0	28.3	0
6	10395.0	-50.75	5.3	11.95	Horizontal	-44.1	-13.0	31.1	45
7	12127.5	-52.15	5.5	13.55	Horizontal	-44.1	-13.0	31.1	135
8	13860.0	-48.25	6.3	13.75	Horizontal	-40.8	-13.0	27.8	225
9	15592.5	-49.25	6.7	13.85	Horizontal	-42.1	-13.0	29.1	180
10	17325.0	-51.25	6.8	14.25	Horizontal	-43.8	-13.0	30.8	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 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	-42.15	2.6	10.15	Horizontal	-34.6	-13.0	21.6	180
3	5262.8	-51.65	2.4	11.05	Horizontal	-43.0	-13.0	30.0	135
4	6990.0	-44.55	4.5	11.15	Horizontal	-37.9	-13.0	24.9	0
5	8737.5	-46.75	5.1	11.35	Horizontal	-40.5	-13.0	27.5	0
6	10485.0	-51.05	5.3	11.95	Horizontal	-44.4	-13.0	31.4	135
7	12232.5	-50.45	5.5	13.55	Horizontal	-42.4	-13.0	29.4	315
8	13980.0	-45.65	6.3	13.75	Horizontal	-38.2	-13.0	25.2	225
9	15727.5	-43.35	6.7	13.85	Horizontal	-36.2	-13.0	23.2	180
10	17475.0	-49.75	6.8	14.25	Horizontal	-42.3	-13.0	29.3	45
Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor. 2. The worst emission was found in the antenna is Horizontal position.									

LTE Band 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	-41.85	2.6	10.15	Horizontal	-34.3	-13.0	21.3	135
3	5133.0	-50.85	2.4	11.35	Horizontal	-41.9	-13.0	28.9	45
4	6880.0	-37.55	4.5	10.85	Horizontal	-31.2	-13.0	18.2	180
5	8600.0	-45.35	5.1	11.35	Horizontal	-39.1	-13.0	26.1	270
6	10320.0	-49.75	5.3	11.95	Horizontal	-43.1	-13.0	30.1	45
7	12040.0	-51.85	5.5	13.55	Horizontal	-43.8	-13.0	30.8	45
8	13760.0	-44.35	6.3	13.75	Horizontal	-36.9	-13.0	23.9	180
9	15480.0	-46.95	6.7	13.85	Horizontal	-39.8	-13.0	26.8	225
10	17200.0	-50.55	6.8	14.25	Horizontal	-43.1	-13.0	30.1	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 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	-42.65	2.6	10.75	Horizontal	-34.5	-13.0	21.5	315
3	5170.5	-56.45	2.4	11.05	Horizontal	-47.8	-13.0	34.8	0
4	6930.0	-41.95	4.5	11.15	Horizontal	-35.3	-13.0	22.3	45
5	8662.5	-46.85	5.1	11.35	Horizontal	-40.6	-13.0	27.6	135
6	10395.0	-51.85	5.3	11.95	Horizontal	-45.2	-13.0	32.2	45
7	12127.5	-51.25	5.5	13.55	Horizontal	-43.2	-13.0	30.2	315
8	13860.0	-48.95	6.3	13.75	Horizontal	-41.5	-13.0	28.5	270
9	15592.5	-49.85	6.7	13.85	Horizontal	-42.7	-13.0	29.7	225
10	17325.0	-50.35	6.8	14.25	Horizontal	-42.9	-13.0	29.9	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 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	-50.85	2.6	10.15	Horizontal	-36.6	-13.0	23.6	225
3	5208.4	-42.55	2.4	11.05	Horizontal	-43.8	-13.0	30.8	135
4	6980.0	-43.15	4.5	11.15	Horizontal	-36.2	-13.0	23.2	315
5	8725.0	-48.35	5.1	11.35	Horizontal	-40.1	-13.0	27.1	0
6	10470.0	-46.05	5.3	11.95	Horizontal	-44.9	-13.0	31.9	225
7	12215.0	-44.95	5.5	13.55	Horizontal	-41.7	-13.0	28.7	270
8	13960.0	-44.95	6.3	13.75	Horizontal	-36.9	-13.0	23.9	0
9	15705.0	-45.25	6.7	13.85	Horizontal	-39.9	-13.0	26.9	45
10	17450.0	-43.45	6.8	14.25	Horizontal	-45.1	-13.0	32.1	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 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	-47.20	2.00	10.15	Horizontal	-41.2	-13.0	28.2	45
3	2099.10	-53.50	2.50	11.35	Horizontal	-46.8	-13.0	33.8	225
4	2798.80	-52.30	4.20	10.85	Horizontal	-47.8	-13.0	34.8	180
5	3498.50	-55.90	5.20	11.35	Horizontal	-51.9	-13.0	38.9	225
6	4198.20	-50.20	5.50	11.95	Horizontal	-45.9	-13.0	32.9	270
7	4897.90	-55.70	5.70	13.55	Horizontal	-50.0	-13.0	37.0	135
8	5597.60	-53.40	6.30	13.75	Horizontal	-48.1	-13.0	35.1	180
9	6297.30	-53.50	6.80	13.85	Horizontal	-48.6	-13.0	35.6	315
10	6997.00	-54.60	6.90	14.25	Horizontal	-49.4	-13.0	36.4	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 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	-51.50	2.00	10.75	Horizontal	-44.9	-13.0	31.9	90
3	2122.50	-56.69	2.51	11.05	Horizontal	-50.3	-13.0	37.3	270
4	2830.00	-57.30	4.20	11.15	Horizontal	-52.5	-13.0	39.5	90
5	3537.50	-61.50	5.20	11.15	Horizontal	-57.7	-13.0	44.7	270
6	4245.00	-59.80	5.50	11.95	Horizontal	-55.5	-13.0	42.5	135
7	4952.50	-60.60	5.70	13.55	Horizontal	-54.9	-13.0	41.9	180
8	5660.00	-58.30	6.30	13.75	Horizontal	-53.0	-13.0	40.0	315
9	6367.50	-56.10	6.80	13.85	Horizontal	-51.2	-13.0	38.2	225
10	7075.00	-57.60	6.90	14.25	Horizontal	-52.4	-13.0	39.4	270
Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor. 2. The worst emission was found in the antenna is Horizontal position.									

LTE Band 12 QPSK 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	-50.90	2.00	10.15	Horizontal	-44.9	-13.0	31.9	225
3	2145.90	-57.99	2.51	11.05	Horizontal	-51.6	-13.0	38.6	45
4	2861.20	-55.60	4.20	11.15	Horizontal	-50.8	-13.0	37.8	180
5	3576.50	-58.70	5.20	11.15	Horizontal	-54.9	-13.0	41.9	45
6	4291.80	-59.60	5.50	11.95	Horizontal	-55.3	-13.0	42.3	270
7	5007.10	-57.20	5.70	13.55	Horizontal	-51.5	-13.0	38.5	180
8	5722.40	-52.80	6.30	13.75	Horizontal	-47.5	-13.0	34.5	90
9	6437.70	-54.70	6.80	13.85	Horizontal	-49.8	-13.0	36.8	135
10	7153.00	-54.70	6.90	14.25	Horizontal	-49.5	-13.0	36.5	270
Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor. 2. The worst emission was found in the antenna is Horizontal position.									

LTE Band 12 QPSK 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	-46.80	2.00	10.15	Horizontal	-40.8	-13.0	27.8	270
3	2101.50	-54.89	2.51	11.35	Horizontal	-48.2	-13.0	35.2	180
4	2802.00	-52.60	4.20	10.85	Horizontal	-48.1	-13.0	35.1	225
5	3502.50	-55.40	5.20	11.35	Horizontal	-51.4	-13.0	38.4	90
6	4203.00	-52.50	5.50	11.95	Horizontal	-48.2	-13.0	35.2	45
7	4903.50	-57.00	5.70	13.55	Horizontal	-51.3	-13.0	38.3	180
8	5604.00	-52.20	6.30	13.75	Horizontal	-46.9	-13.0	33.9	270
9	6304.50	-54.50	6.80	13.85	Horizontal	-49.6	-13.0	36.6	225
10	7005.00	-54.30	6.90	14.25	Horizontal	-49.1	-13.0	36.1	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 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	-51.00	2.00	10.75	Horizontal	-44.4	-13.0	31.4	270
3	2122.50	-56.99	2.51	11.05	Horizontal	-50.6	-13.0	37.6	135
4	2830.00	-56.20	4.20	11.15	Horizontal	-51.4	-13.0	38.4	180
5	3537.50	-54.40	5.20	11.15	Horizontal	-50.6	-13.0	37.6	225
6	4245.00	-56.80	5.50	11.95	Horizontal	-52.5	-13.0	39.5	315
7	4952.50	-56.70	5.70	13.55	Horizontal	-51.0	-13.0	38.0	180
8	5660.00	-55.90	6.30	13.75	Horizontal	-50.6	-13.0	37.6	270
9	6367.50	-56.20	6.80	13.85	Horizontal	-51.3	-13.0	38.3	315
10	7075.00	-57.40	6.90	14.25	Horizontal	-52.2	-13.0	39.2	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-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	-50.40	2.00	10.15	Horizontal	-44.4	-13.0	31.4	315
3	2143.50	-58.69	2.51	11.05	Horizontal	-52.3	-13.0	39.3	225
4	2858.00	-58.00	4.20	11.15	Horizontal	-53.2	-13.0	40.2	45
5	3572.50	-55.90	5.20	11.15	Horizontal	-52.1	-13.0	39.1	45
6	4287.00	-55.50	5.50	11.95	Horizontal	-51.2	-13.0	38.2	180
7	5001.50	-56.60	5.70	13.55	Horizontal	-50.9	-13.0	37.9	270
8	5716.00	-57.20	6.30	13.75	Horizontal	-51.9	-13.0	38.9	180
9	6430.50	-56.30	6.80	13.85	Horizontal	-51.4	-13.0	38.4	225
10	7145.00	-57.00	6.90	14.25	Horizontal	-51.8	-13.0	38.8	270

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

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

LTE Band 12 QPSK 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	-56.40	2.00	10.15	Horizontal	-50.4	-13.0	37.4	270
3	2104.50	-62.40	2.50	11.35	Horizontal	-55.7	-13.0	42.7	180
4	2806.00	-59.10	4.20	10.85	Horizontal	-54.6	-13.0	41.6	90
5	3507.50	-53.50	5.20	11.35	Horizontal	-49.5	-13.0	36.5	135
6	4209.00	-53.60	5.50	11.95	Horizontal	-49.3	-13.0	36.3	180
7	4910.50	-52.80	5.70	13.55	Horizontal	-47.1	-13.0	34.1	315
8	5612.00	-55.50	6.30	13.75	Horizontal	-50.2	-13.0	37.2	225
9	6313.50	-54.50	6.80	13.85	Horizontal	-49.6	-13.0	36.6	45
10	7015.00	-57.10	6.90	14.25	Horizontal	-51.9	-13.0	38.9	270

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

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

LTE Band 12 QPSK 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	-57.30	2.00	10.75	Horizontal	-50.7	-13.0	37.7	135
3	2122.50	-64.39	2.51	11.05	Horizontal	-58.0	-13.0	45.0	90
4	2830.00	-58.30	4.20	11.15	Horizontal	-53.5	-13.0	40.5	45
5	3537.50	-61.20	5.20	11.15	Horizontal	-57.4	-13.0	44.4	180
6	4245.00	-58.90	5.50	11.95	Horizontal	-54.6	-13.0	41.6	90
7	4952.50	-60.30	5.70	13.55	Horizontal	-54.6	-13.0	41.6	135
8	5660.00	-58.20	6.30	13.75	Horizontal	-52.9	-13.0	39.9	90
9	6367.50	-56.90	6.80	13.85	Horizontal	-52.0	-13.0	39.0	45
10	7075.00	-57.50	6.90	14.25	Horizontal	-52.3	-13.0	39.3	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 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	-55.90	2.00	10.15	Horizontal	-49.9	-13.0	36.9	180
3	2140.50	-65.29	2.51	11.05	Horizontal	-58.9	-13.0	45.9	270
4	2854.00	-58.90	4.20	11.15	Horizontal	-54.1	-13.0	41.1	45
5	3567.50	-52.10	5.20	11.15	Horizontal	-48.3	-13.0	35.3	270
6	4281.00	-57.50	5.50	11.95	Horizontal	-53.2	-13.0	40.2	45
7	4994.50	-57.80	5.70	13.55	Horizontal	-52.1	-13.0	39.1	180
8	5708.00	-53.20	6.30	13.75	Horizontal	-47.9	-13.0	34.9	225
9	6421.50	-56.30	6.80	13.85	Horizontal	-51.4	-13.0	38.4	270
10	7135.00	-55.70	6.90	14.25	Horizontal	-50.5	-13.0	37.5	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-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	-56.20	2.00	10.15	Horizontal	-50.2	-13.0	37.2	180
3	2112.00	-63.29	2.51	11.35	Horizontal	-56.6	-13.0	43.6	225
4	2816.00	-62.20	4.20	10.85	Horizontal	-57.7	-13.0	44.7	225
5	3520.00	-53.00	5.20	11.35	Horizontal	-49.0	-13.0	36.0	180
6	4224.00	-53.20	5.50	11.95	Horizontal	-48.9	-13.0	35.9	315
7	4928.00	-57.80	5.70	13.55	Horizontal	-52.1	-13.0	39.1	45
8	5632.00	-54.80	6.30	13.75	Horizontal	-49.5	-13.0	36.5	315
9	6336.00	-56.70	6.80	13.85	Horizontal	-51.8	-13.0	38.8	0
10	7040.00	-57.60	6.90	14.25	Horizontal	-52.4	-13.0	39.4	0
Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor. 2. The worst emission was found in the antenna is 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	-59.40	2.00	10.75	Horizontal	-52.8	-13.0	39.8	270
3	2122.50	-63.29	2.51	11.05	Horizontal	-56.9	-13.0	43.9	135
4	2830.00	-59.10	4.20	11.15	Horizontal	-54.3	-13.0	41.3	180
5	3537.50	-53.50	5.20	11.15	Horizontal	-49.7	-13.0	36.7	315
6	4245.00	-52.40	5.50	11.95	Horizontal	-48.1	-13.0	35.1	90
7	4952.50	-52.70	5.70	13.55	Horizontal	-47.0	-13.0	34.0	0
8	5660.00	-52.30	6.30	13.75	Horizontal	-47.0	-13.0	34.0	90
9	6367.50	-53.30	6.80	13.85	Horizontal	-48.4	-13.0	35.4	90
10	7075.00	-57.90	6.90	14.25	Horizontal	-52.7	-13.0	39.7	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.									

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	-57.60	2.00	10.15	Horizontal	-51.6	-13.0	38.6	315
3	2133.00	-61.69	2.51	11.05	Horizontal	-55.3	-13.0	42.3	225
4	2844.00	-60.40	4.20	11.15	Horizontal	-55.6	-13.0	42.6	180
5	3555.00	-55.20	5.20	11.15	Horizontal	-51.4	-13.0	38.4	135
6	4266.00	-57.90	5.50	11.95	Horizontal	-53.6	-13.0	40.6	90
7	4977.00	-56.70	5.70	13.55	Horizontal	-51.0	-13.0	38.0	0
8	5688.00	-55.10	6.30	13.75	Horizontal	-49.8	-13.0	36.8	45
9	6399.00	-56.40	6.80	13.85	Horizontal	-51.5	-13.0	38.5	135
10	7110.00	-57.70	6.90	14.25	Horizontal	-52.5	-13.0	39.5	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 13 QPSK 5MHz CH-Low, RB 1

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1559.0	-56.10	2.00	10.15	Horizontal	-50.1	-40.0	10.1	45
3	2338.5	-63.30	2.50	11.35	Horizontal	-56.6	-13.0	43.6	135
4	3118.0	-53.90	4.20	10.85	Horizontal	-49.4	-13.0	36.4	315
5	3897.5	-50.30	5.20	11.35	Horizontal	-46.3	-13.0	33.3	315
6	4677.0	-52.90	5.50	11.95	Horizontal	-48.6	-13.0	35.6	135
7	5456.5	-47.80	5.70	13.55	Horizontal	-42.1	-13.0	29.1	270
8	6236.0	-56.70	6.30	13.75	Horizontal	-51.4	-13.0	38.4	135
9	7015.5	-56.70	6.80	13.85	Horizontal	-51.8	-13.0	38.8	135
10	7795.0	-57.20	6.90	14.25	Horizontal	-52.0	-13.0	39.0	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-Middle, RB 1

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1564.0	-57.30	2.00	10.75	Horizontal	-50.7	-40.0	10.7	315
3	2346.0	-59.89	2.51	11.05	Horizontal	-53.5	-13.0	40.5	180
4	3128.0	-53.80	4.20	11.15	Horizontal	-49.0	-13.0	36.0	90
5	3910.0	-50.60	5.20	11.15	Horizontal	-46.8	-13.0	33.8	45
6	4692.0	-52.30	5.50	11.95	Horizontal	-48.0	-13.0	35.0	90
7	5474.0	-52.50	5.70	13.55	Horizontal	-46.8	-13.0	33.8	0
8	6256.0	-56.60	6.30	13.75	Horizontal	-51.3	-13.0	38.3	180
9	7038.0	-57.00	6.80	13.85	Horizontal	-52.1	-13.0	39.1	45
10	7820.0	-55.70	6.90	14.25	Horizontal	-50.5	-13.0	37.5	270
Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor. 2. The worst emission was found in the antenna is Horizontal position.									

LTE Band 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	-56.30	2.00	10.15	Horizontal	-50.3	-40.0	10.3	270
3	2353.5	-62.49	2.51	11.05	Horizontal	-56.1	-13.0	43.1	270
4	3138.0	-55.90	4.20	11.15	Horizontal	-51.1	-13.0	38.1	180
5	3922.5	-53.50	5.20	11.15	Horizontal	-49.7	-13.0	36.7	270
6	4707.0	-53.50	5.50	11.95	Horizontal	-49.2	-13.0	36.2	135
7	5491.5	-50.40	5.70	13.55	Horizontal	-44.7	-13.0	31.7	180
8	6276.0	-50.80	6.30	13.75	Horizontal	-45.5	-13.0	32.5	270
9	7060.5	-55.10	6.80	13.85	Horizontal	-50.2	-13.0	37.2	135
10	7845.0	-56.70	6.90	14.25	Horizontal	-51.5	-13.0	38.5	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	-57.90	2.00	10.75	Horizontal	-51.3	-40.0	11.3	0
3	2346.0	-62.49	2.51	11.05	Horizontal	-56.1	-13.0	43.1	45
4	3128.0	-54.20	4.20	11.15	Horizontal	-49.4	-13.0	36.4	270
5	3910.0	-50.30	5.20	11.15	Horizontal	-46.5	-13.0	33.5	135
6	4692.0	-53.40	5.50	11.95	Horizontal	-49.1	-13.0	36.1	180
7	5474.0	-51.20	5.70	13.55	Horizontal	-45.5	-13.0	32.5	270
8	6256.0	-54.70	6.30	13.75	Horizontal	-49.4	-13.0	36.4	135
9	7038.0	-55.30	6.80	13.85	Horizontal	-50.4	-13.0	37.4	45
10	7820.0	-56.10	6.90	14.25	Horizontal	-50.9	-13.0	37.9	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
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	2020-01-29
Climatic Chamber	Re Ce	PT-30B	20101891	2015-07-18	2018-07-17
RF Cable	Agilent	SMA 15cm	0001	NA	NA
Preamplifier	R&S	SCU18	102327	2017-06-18	2018-06-17
MOB COMMS DC SUPPLY	Keysight	66319D	MY43004105	2017-05-14	2018-05-13
Software	R&S	EMC32	V 8.52.0	NA	NA

*******END OF REPORT *******