RF TEST REPORT

Applicant	MOBIKE (HONG KONG) LIMITED
FCC ID	2AK4SLBC-CATM01
Product	Mobike Lock
Brand	mobike
Model	LC_CATM01, LB_CATM01
Report No.	RXA1707-0235RF02R1
Issue Date	September 27, 2017

TA Technology (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in **FCC CFR47 Part 2 (2016)/ FCC CFR47 Part 27C (2016)**. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Jiangpeng Lan

Performed by: Jiangpeng Lan

Kai Xu

Approved by: Kai Xu

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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)	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: August 05, 2017 ~ September 5, 2017			
Note: PASS: The EUT complies with the essential requirements in the standard. FAIL: The EUT does not comply with the essential requirements in the standard.			

1 Test Laboratory

1.1 Notes of the Test Report

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

1.2 Test facility

CNAS (accreditation number: L2264)

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

FCC (recognition number is 428261)

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.
Address:	No.145, Jintang Rd, Tangzhen Industry Park, Pudong Shanghai, China
City:	Shanghai
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2 General Description of Equipment under Test

Client Information

Applicant	MOBIKE (HONG KONG) LIMITED
Applicant address	10/F HONGKONG OFFSHORE CENTRE NO.28 AUSTIN AVENUE TSIM SHA TSUI KL
Manufacturer	MOBIKE (HONG KONG) LIMITED
Manufacturer address	10/F HONGKONG OFFSHORE CENTRE NO.28 AUSTIN AVENUE TSIM SHA TSUI KL

General information

EUT Description			
Model:	LC_CATM01, LB_CATM01		
SN	/		
Hardware Version:	LC_CATM01		
Software Version:	501		
Power Supply:	/		
Antenna Type:	Internal Antenna		
Test Mode(s):	LTE Band 4; LTE Band 12, LTE Band 13;		
Test Modulation	QPSK 16QAM;		
Category	M1		
Maximum E.I.R.P./ E.R.P.	LTE Band 4:	23.95dBm	
	LTE Band 12:	21.63dBm	
	LTE Band 13:	22.65dBm	
Rated Power Supply Voltage:	3.7V		
Extreme Voltage:	Minimum: 3.5V Maximum: 4.2V		
Extreme Temperature:	Lowest: -20°C Highest: +60°C		
Operating Frequency Range(s)	Mode	Tx (MHz)	Rx (MHz)
	LTE Band 4	1710 ~ 1755	2110 ~ 2155
	LTE Band 12	699 ~ 716	729 ~ 746
	LTE Band 13	777 ~ 787	746 ~ 756
Note：1. The information of the EUT is declared by the manufacturer.			

Discrepancy declaration of LC_CATM01 and LB_CATM01:

HARDWARE MODIFICATION	LC_CATM01	LB_CATM01
Mechanical shell	Black, gray	Black
PCB	The same	The same
radio frequency module	The same	The same
Other	The same	The same
Note: 1. LC_CATM01/ LB_CATM01 version has the same hard ware specification, the only difference lies in the shape of the outside shell. 2. During the test, the preliminary test was performed with LC_CATM01 and LB_CATM01, LC_CATM01 was selected as the worst Model and recorded data in this report.		

2.1 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 (2016)

FCC CFR47 Part 27C (2016)

ANSI/TIA-603-D-2010

KDB 971168 D01 Power Meas License Digital Systems v02r02

3 Test Configuration

Radiated measurements are performed by rotating the EUT in three different orthogonal test planes. EUT lie-down stand-up position (X, Y axis)，lie-down position (Z axis),. Receiver antenna polarization (horizontal and vertical), the worst emission was found in position (Z axis, vertical 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 detailin 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 B4	O	O	O	O	O	O	O	O	O	O	O	O	O	O
	LTE B12	O	O	O	O	-	-	O	O	O	O	O	O	O	O
	LTE B13	-	-	O	O	-	-	O	O	O	O	O	O	O	O
Effective Isotropic Radiated power	LTE B4	O	O	O	O	O	O	O	O	O	O	O	O	O	O
	LTE B12	O	O	O	O	-	-	O	O	O	O	O	O	O	O
	LTE B13	-	-	O	O	-	-	O	O	O	O	O	O	O	O
Occupied Bandwidth	LTE B4	O	O	O	O	O	O	O	O	-	-	O	-	O	-
	LTE B12	O	O	O	O	-	-	O	O	-	-	O	-	O	-
	LTE B13	-	-	O	O	-	-	O	O	-	-	O	-	O	-
Band Edge Compliance	LTE B4	O	O	O	O	O	O	O	O	O	-	O	O	-	O
	LTE B12	O	O	O	O	-	-	O	O	O	-	O	O	-	O
	LTE B13	-	-	O	O	-	-	O	O	O	-	O	O	-	O
Peak-to-Average Power Ratio	LTE B4	O	O	O	O	O	O	O	O	-	-	O	-	O	-
	LTE B12	O	O	O	O	-	-	O	O	-	-	O	-	O	-
	LTE B13	-	-	O	O	-	-	O	O	-	-	O	-	O	-
Frequency Stability	LTE B4	O	O	O	O	O	O	O	O	-	-	O	-	O	-
	LTE B12	O	O	O	O	-	-	O	O	-	-	O	-	O	-
	LTE B13	-	-	O	O	-	-	O	O	-	-	O	-	O	-
Spurious Emissions at Antenna Terminals	LTE B4	O	O	O	O	O	O	O	-	O	-	-	O	O	O
	LTE B12	O	O	O	O	-	-	O	-	O	-	-	O	O	O
	LTE B13	-	-	O	O	-	-	O	-	O	-	-	O	O	O

Radiates Spurious Emission	LTE B4	O	O	O	O	O	O	O	-	O	-	-	O	O	O
	LTE B12	O	O	O	O	-	-	O	-	O	-	-	O	O	O
	LTE B13	-	-	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.														

4 Test Information

4.1 RF Power Output

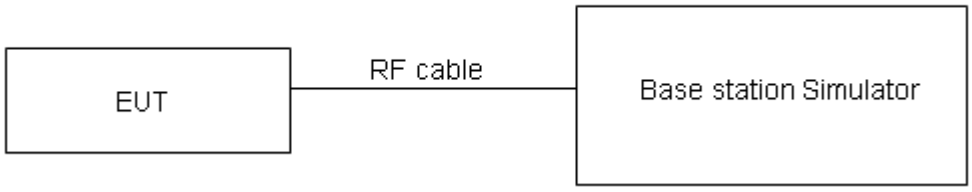
Ambient condition

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

For RF power output test, the worst mode should be reflected in the report.

Mode	Bandwidth	Channel/ Frequency(MHz)	RB	Index	Conducted Power (dBm)	
					QPSK	16QAM
LTE Band 4	1.4MHz	19957/1710.7	1#0	0	24.02	23.52
			6#0	0	22.36	22.44
		20175/1732.5	1#0	0	23.96	23.46
			6#0	0	22.39	22.34
		20393/1754.3	1#5	0	23.87	23.34
			6#0	0	22.16	22.27
	3MHz	19965/1711.5	1#0	0	23.96	23.69
			6#0	0	23.97	24.26
		20175/1732.5	1#0	0	23.96	23.61
			6#0	0	24.13	24.18
		20385/1753.5	1#5	1	24.05	24.03
			6#0	1	23.55	24.20
	5MHz	19975/1712.5	1#0	0	23.93	23.66
			6#0	0	23.95	24.24
		20175/1732.5	1#0	0	23.94	23.57
			6#0	0	24.12	24.14
		20375/1752.5	1#5	3	24.01	23.51
			6#0	3	24.01	24.15
	10MHz	20000/1715	1#0	0	23.95	23.68
			4#0	0	24.03	24.27
		20175/1732.5	1#0	0	23.95	23.60
			4#0	0	24.14	24.19
		20350/1750	1#5	7	24.04	23.54
			4#2	7	24.05	24.19
	15MHz	20025/1717.5	1#0	0	23.94	23.63
			6#0	0	24.01	24.24
		20175/1732.5	1#0	0	23.91	23.58
			6#0	0	24.10	24.14
		20325/1747.5	1#5	11	24.00	23.51
			6#0	11	24.00	24.15
	20MHz	20050/1720	1#0	0	23.91	23.61
			6#0	0	23.98	24.22
		20175/1732.5	1#0	0	23.87	23.54
			6#0	0	24.05	24.10
		20300/1745	1#5	15	23.97	23.49
			6#0	15	23.96	24.12

Mode	Bandwidth	Channel/ Frequency(MHz)	RB	Index	Conducted Power (dBm)	
					QPSK	16QAM
LTE Band 12	1.4MHz	23017/699.7	1#0	0	23.26	22.67
			6#0	0	21.19	21.36
		23095/707.5	1#0	0	23.24	22.82
			6#0	0	21.43	21.51
		23173/715.3	1#5	0	23.09	22.74
			6#0	0	21.28	21.44
	3MHz	23025/700.5	1#0	0	23.13	22.82
			6#0	0	22.74	22.45
		23095/707.5	1#0	0	23.14	22.56
			6#0	0	22.60	22.45
		23165/714.5	1#5	1	23.07	22.80
			6#0	1	22.62	22.50
	5MHz	23035/701.5	1#0	0	23.10	22.79
			6#0	0	22.72	22.43
		23095/707.5	1#0	0	23.12	22.52
			6#0	0	22.59	22.41
		23155/713.5	1#5	3	23.03	22.76
			6#0	3	22.60	22.45
	10MHz	23060/704	1#0	0	23.08	22.74
			4#0	0	22.75	22.41
		23095/707.5	1#0	0	23.05	22.49
			4#0	0	22.52	22.37
		23130/711	1#5	7	22.99	22.74
			4#2	7	22.55	22.42

Mode	Bandwidth	Channel/ Frequency(MHz)	RB	Index	Conducted Power (dBm)	
					QPSK	16QAM
LTE Band 13	5MHz	23205/779.5	1#0	0	23.41	22.96
			6#0	0	22.58	21.64
		23230/782	1#0	0	23.55	23.02
			6#0	0	22.46	21.38
		23255/784.5	1#5	3	23.23	22.87
			6#0	3	22.49	21.43
	10MHz	23230/782	1#0	0	23.31	22.83
			4#0	0	22.55	22.62

4.2 Effective Isotropic Radiated Power

Ambient condition

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

Methods of Measurement

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

a) Connect the equipment as illustrated. Mount the equipment with the manufacturer specified antenna in a vertical orientation on a manufacturer specified mounting surface located on a non-conducting rotating platform of a RF anechoic chamber (preferred) or a standard radiation site.

b) Key the transmitter, then rotate the EUT 360° azimuthally and record spectrum analyzer power level (LVL) measurements at angular increments that are sufficiently small to permit resolution of all peaks. If a standard radiation test site is used, raise and lower the test antenna to obtain a maximum reading at each angular increment. (Note: several batteries may be needed to offset the effect of battery voltage droop, which should not exceed 5% of the manufactured specified battery voltage during transmission).

c) Replace the transmitter under test with a vertically polarized half-wave dipole (or an antenna whose gain is known relative to an ideal half-wave dipole). The center of the antenna should be at the same location as the center of the antenna under test.

d) Connect the antenna to a signal generator with a known output power and record the path loss (in dB) as LOSS. If a standard radiation test site is used, raise and lower the test antenna to obtain a maximum reading.LOSS = Generator Output Power (dBm) – 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 (dBm) = LVL (dBm) + LOSS (dB)

f) The maximum ERP is the maximum value determined in the preceding step.

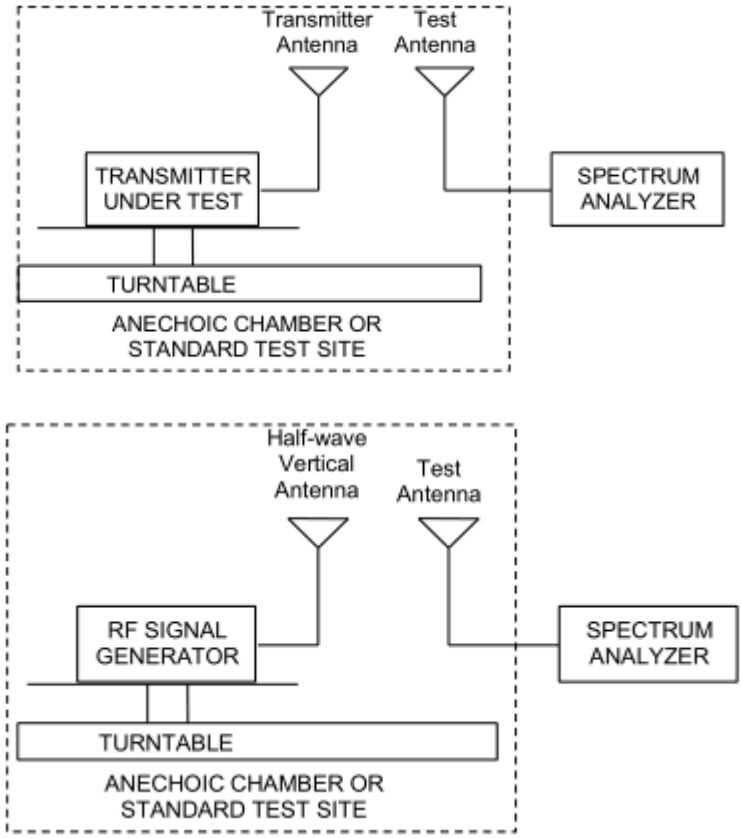
g) When calculating ERP, in addition to knowing the antenna radiation and matching characteristics, it is necessary to know the loss values of all elements (e.g.transmission line attenuation, mismatches, filters, combiners) interposed between the point where transmitter output power is measured, and the point where power is applied to the antenna. ERP can then be calculated as follows:

ERP (dBm) = Output Power (dBm) - Losses (dB) + Antenna Gain (dBd)

where:dBd refers to gain relative to an ideal dipole.

EIRP (dBm) = ERP (dBm) + 2.15 (dB.)

Test setup



Limits

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

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

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

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

Measurement Uncertainty

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

Test Results

For effective radiated power test, the worst mode should be reflected in the report.

Mode	Bandwidth	Modulation	Channel/ Frequency (MHz)	RB	Index	Output Power (dBm)	Losses (dB)	Antenna Gain (dBd)	EIRP (dBm)
LTE Band 4	1.4MHz	QPSK	19957 1710.7	1#0	0	-32.59	-54.30	1.44	23.14
			20175/1732.5	1#2	0	-32.80	-54.32	1.57	23.08
			20393/1754.3	1#5	0	-32.81	-54.10	1.72	23.00
		16QAM	19957 1710.7	1#0	0	-33.15	-54.35	1.44	22.64
			20175/1732.5	1#2	0	-33.39	-54.41	1.57	22.58
			20393/1754.3	1#5	0	-33.82	-54.52	1.72	22.41
	3MHz	QPSK	19965/1711.5	1#0	0	-32.69	-54.33	1.44	23.08
			20175/1732.5	1#5	0	-32.80	-54.32	1.57	23.08
			20385/1753.5	1#5	1	-32.82	-54.11	1.72	23.00
		16QAM	19965/1711.5	1#0	0	-32.98	-54.35	1.44	22.81
			20175/1732.5	1#5	0	-33.24	-54.41	1.57	22.73
			20385/1753.5	1#5	1	-33.48	-54.48	1.72	22.71
	5MHz	QPSK	19975/1712.5	1#0	0	-32.73	-54.34	1.44	23.05
			20175/1732.5	1#5	1	-32.82	-54.32	1.57	23.06
			20375/1752.5	1#5	3	-32.88	-54.13	1.72	22.96
		16QAM	19975/1712.5	1#0	0	-33.04	-54.38	1.44	22.78
			20175/1732.5	1#5	1	-33.28	-54.41	1.57	22.69
			20375/1752.5	1#5	3	-33.55	-54.47	1.72	22.64
	10MHz	QPSK	20000/1715	4#0	0	-32.75	-54.33	1.44	23.03
			20175/1732.5	4#2	3	-32.85	-54.32	1.57	23.03
			20350/1750	4#2	7	-31.83	-54.12	1.66	23.95
		16QAM	20000/1715	4#0	0	-33.13	-54.32	1.44	22.63
			20175/1732.5	4#2	3	-33.42	-54.41	1.57	22.55
			20350/1750	4#2	7	-33.65	-54.52	1.66	22.53
	15MHz	QPSK	20025/1717.5	1#0	0	-32.94	-54.35	1.49	22.89
			20175/1732.5	1#5	5	-33.02	-54.32	1.57	22.86
			20325/1747.5	1#5	11	-33.03	-54.17	1.66	22.80
		16QAM	20025/1717.5	1#0	0	-33.29	-54.39	1.49	22.58
			20175/1732.5	1#5	5	-33.44	-54.41	1.57	22.53
			20325/1747.5	1#5	11	-33.66	-54.51	1.66	22.51
	20MHz	QPSK	20050/1720	6#0	0	-32.99	-54.37	1.49	22.86
			20175/1732.5	6#0	7	-33.06	-54.32	1.57	22.82
			20300/1745	6#0	15	-33.08	-54.23	1.63	22.77
		16QAM	20050/1720	6#0	0	-33.36	-54.44	1.49	22.56
			20175/1732.5	6#0	7	-33.48	-54.41	1.57	22.49
			20300/1745	6#0	15	-33.76	-54.59	1.63	22.46

Mode	Bandwidth	Modulation	Channel/ Frequency (MHz)	RB	Index	Output Power (dBm)	Losses (dB)	Antenna Gain (dBd)	ERP (dBm)
LTE Band 12	1.4MHz	QPSK	23017/699.7	1#0	0	-27.39	-49.12	2.04	21.63
			23095/707.5	1#2	0	-27.67	-49.39	2.03	21.61
			23173/715.3	1#5	0	-28.06	-49.76	1.99	21.55
		16QAM	23017/699.7	1#0	0	-27.77	-48.91	2.04	21.04
			23095/707.5	1#2	0	-27.82	-49.12	2.03	21.19
			23173/715.3	1#5	0	-28.39	-49.43	1.99	20.89
	3MHz	QPSK	23025/700.5	1#0	0	-27.55	-49.15	2.04	21.50
			23095/707.5	1#5	0	-27.77	-49.39	2.03	21.51
			23165/714.5	1#5	1	-28.19	-49.73	2.00	21.39
		16QAM	23025/700.5	1#0	0	-27.65	-48.94	2.04	21.19
			23095/707.5	1#5	0	-28.08	-49.12	2.03	20.93
			23165/714.5	1#5	1	-28.22	-49.37	2.00	21.01
	5MHz	QPSK	23035/701.5	1#0	0	-27.73	-49.17	2.04	21.34
			23095/707.5	1#5	1	-27.92	-49.39	2.03	21.36
			23155/713.5	1#5	3	-28.36	-49.72	2.01	21.22
		16QAM	23035/701.5	1#0	0	-27.81	-48.95	2.04	21.03
			23095/707.5	1#5	1	-28.25	-49.12	2.03	20.76
			23155/713.5	1#5	3	-28.36	-49.35	2.01	20.85
	10MHz	QPSK	23060/704	4#0	0	-27.83	-49.25	2.04	21.32
			23095/707.5	4#2	3	-27.99	-49.39	2.03	21.29
			23130/711	4#2	7	-28.33	-49.65	2.02	21.20
		16QAM	23060/704	4#0	0	-27.92	-49.00	2.04	20.98
			23095/707.5	4#2	3	-28.28	-49.12	2.03	20.73
			23130/711	4#2	7	-28.40	-49.33	2.02	20.80

Mode	Bandwidth	Modulation	Channel/ Frequency (MHz)	RB	Index	Output Power (dBm)	Losses (dB)	Antenna Gain (dBd)	ERP (dBm)
LTE Band 13	5MHz	QPSK	23205/779.5	1#0	0	-24.16	-47.01	1.81	22.51
			23230/782	1#5	1	-24.18	-47.17	1.81	22.65
			23255/784.5	1#5	3	-24.80	-47.59	1.83	22.48
		16QAM	23205/779.5	1#0	0	-24.35	-46.67	1.81	21.98
			23230/782	1#5	1	-24.18	-46.56	1.81	22.04
			23255/784.5	1#5	3	-24.64	-46.85	1.83	21.89
	10MHz	QPSK	23230/782	4#2	3	-24.08	-46.75	1.81	22.33
		16QAM	23230/782	4#2	3	-24.39	-46.58	1.81	21.85

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

4.3 Occupied Bandwidth

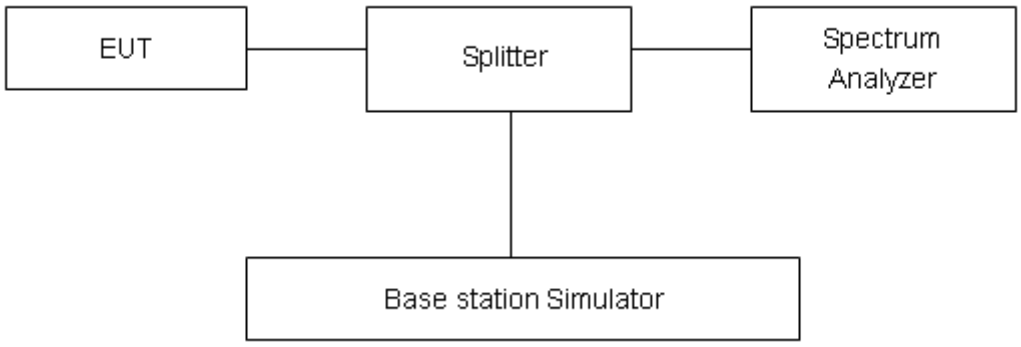
Ambient condition

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

Method of Measurement

The EUT was connected to Spectrum Analyzer and Base Station Simulator via power Splitter. The occupied bandwidth is measured using spectrum analyzer.
RBW is set to 51 kHz, VBW is set to 160 kHz for LTE Band 4/12/13.
99% power and -26dBc occupied bandwidths are recorded. Spectrum analyzer plots are included on the following pages.

Test Setup



Limits

No specific occupied bandwidth requirements in part 2.1049.

Measurement Uncertainty

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

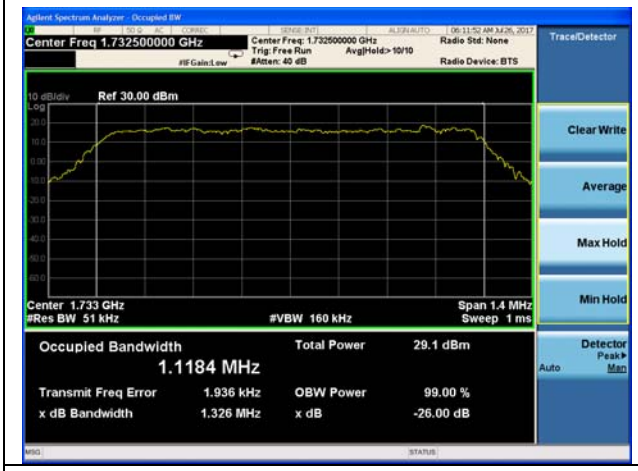
Test Result

Mode	Bandwidth	Modulation	Channel/ Frequency(MHz)	RB	Index	Bandwidth(KHz)	
						99% Power	-26dBc
LTE Band 4	1.4MHz	QPSK	20175/1732.5	6#0	0	1.1184	1.326
		16QAM	20175/1732.5	6#0	0	0.9343	1.136
	3MHz	QPSK	20175/1732.5	6#0	0	1.1827	1.624
		16QAM	20175/1732.5	6#0	0	0.9686	1.332
	5MHz	QPSK	20175/1732.5	6#0	0	1.2374	1.976
		16QAM	20175/1732.5	6#0	0	1.0598	1.649
	10MHz	QPSK	20175/1732.5	6#0	0	1.2307	1.934
		16QAM	20175/1732.5	6#0	0	1.0871	1.796
	15MHz	QPSK	20175/1732.5	6#0	0	1.2443	1.966
		16QAM	20175/1732.5	6#0	0	1.1432	1.769
	20MHz	QPSK	20175/1732.5	6#0	0	1.2509	1.966
		16QAM	20175/1732.5	6#0	0	1.1570	1.820

Mode	Bandwidth	Modulation	Channel/ Frequency(MHz)	RB	Index	Bandwidth(KHz)	
						99% Power	-26dBc
LTE Band 12	1.4MHz	QPSK	23095/707.5	6#0	0	1.1199	1.355
		16QAM	23095/707.5	6#0	0	0.9298	1.147
	3MHz	QPSK	23095/707.5	6#0	0	1.1823	1.542
		16QAM	23095/707.5	6#0	0	0.9643	1.351
	5MHz	QPSK	23095/707.5	6#0	0	1.2380	1.944
		16QAM	23095/707.5	6#0	0	1.0640	1.647
	10MHz	QPSK	23095/707.5	6#0	0	1.2259	1.951
		16QAM	23095/707.5	6#0	0	1.0900	1.689

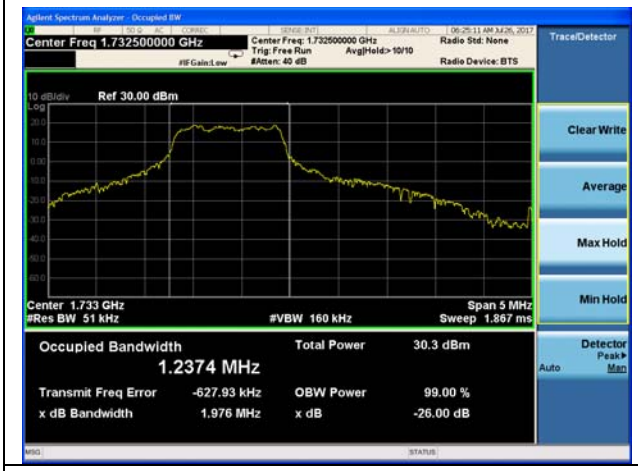
Mode	Bandwidth	Modulation	Channel/ Frequency(MHz)	RB	Index	Bandwidth(KHz)	
						99% Power	-26dBc
LTE Band 13	5MHz	QPSK	23230/782	6#0	0	1.2504	1.968
		16QAM	23230/782	6#0	0	1.0568	1.622
	10MHz	QPSK	23230/782	6#0	0	1.2451	1.969
		16QAM	23230/782	6#0	0	1.0847	1.732

LTE Band 4 QPSK 1.4MHz CH-Middle

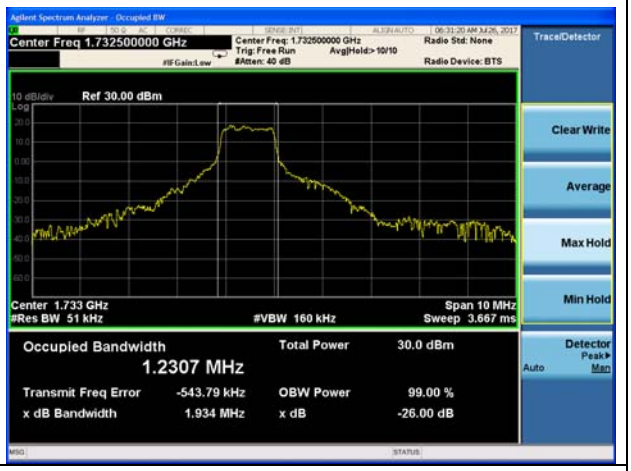


LTE Band 4 QPSK 3 MHz CH-Middle

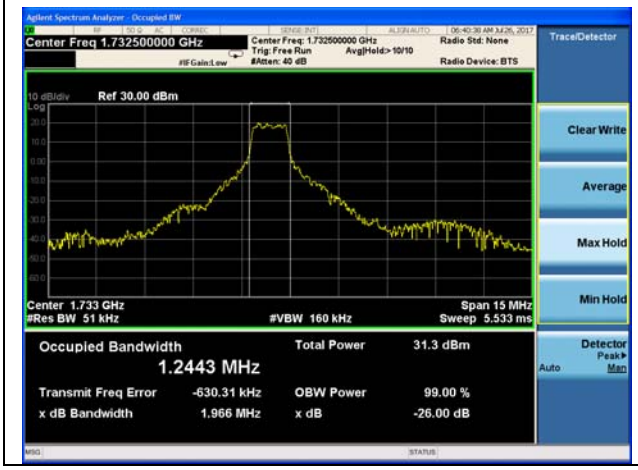
LTE Band 4 QPSK 5 MHz CH-Middle



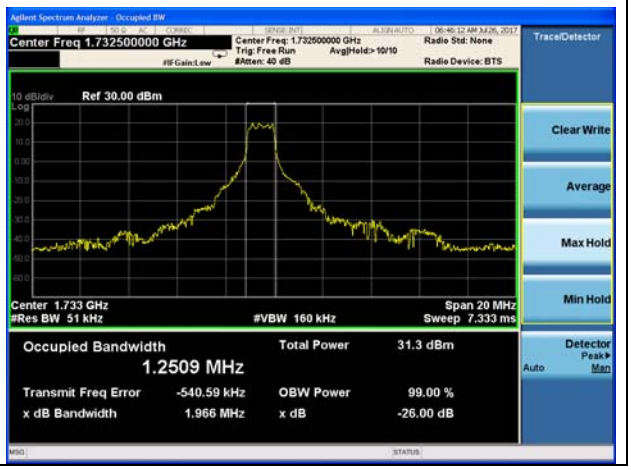
LTE Band 4 QPSK 10 MHz CH-Middle



LTE Band 4 QPSK 15 MHz CH-Middle



LTE Band 4 QPSK 20 MHz CH-Middle



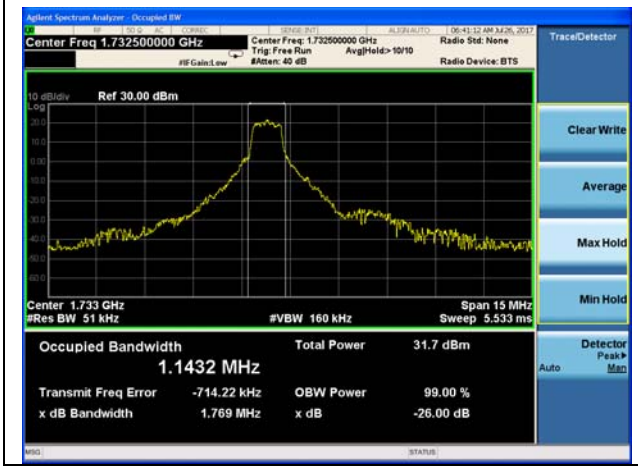
LTE Band 4 16QAM 1.4MHz CH-Middle

LTE Band 4 16QAM 3MHz CH-Middle

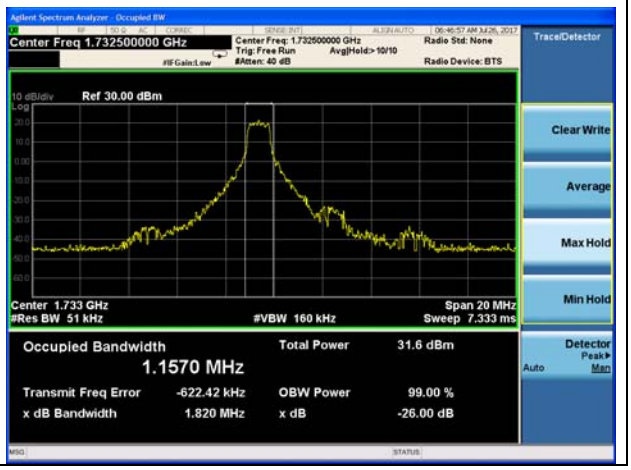
LTE Band 4 16QAM 5MHz CH-Middle

LTE Band 4 16QAM 10 MHz CH-Middle

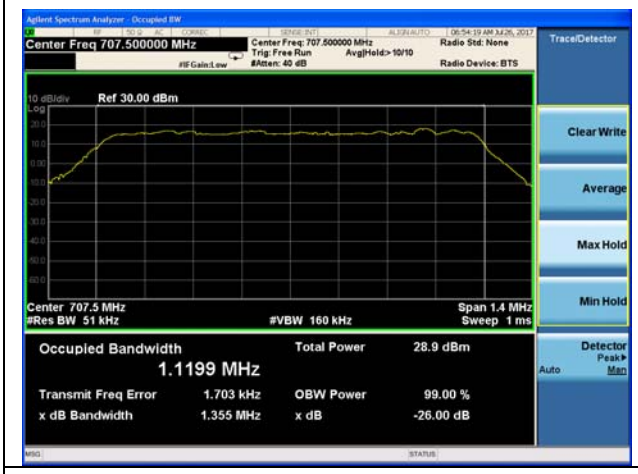
LTE Band 4 16QAM 15 MHz CH-Middle



LTE Band 4 16QAM 20 MHz CH-Middle



LTE Band 12 QPSK 1.4MHz CH-Middle



LTE Band 12 QPSK 3MHz CH-Middle

LTE Band 12 QPSK 5 MHz CH-Middle

LTE Band 12 QPSK 10MHz CH-Middle

LTE Band 12 16QAM 1.4MHz CH-Middle

LTE Band 12 16QAM 3MHz CH-Middle

LTE Band 12 16QAM 5 MHz CH-Middle

LTE Band 12 16QAM 10MHz CH-Middle

LTE Band 13 QPSK 5MHz CH-Middle

LTE Band 13 QPSK 10MHz CH-Middle

LTE Band 13 16QAM 5MHz CH-Middle

LTE Band 13 16QAM 10MHz CH-Middle

4.4 Band Edge Compliance

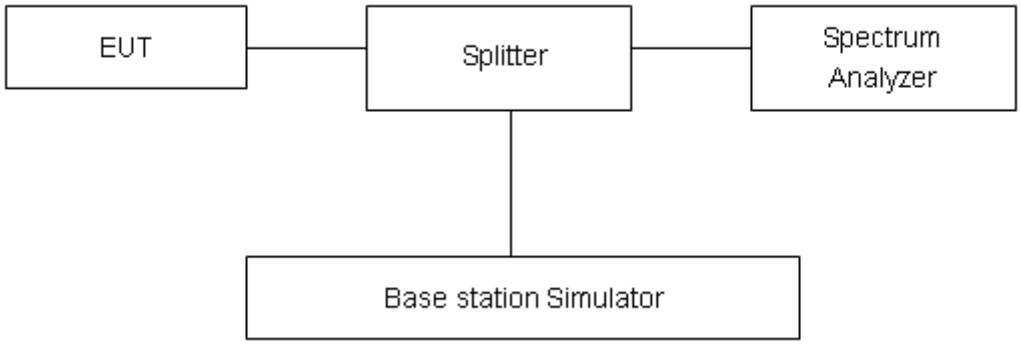
Ambient condition

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

Method of Measurement

The EUT was connected to Spectrum Analyzer and Base Station Simulator via power Splitter. The band edge of the lowest and highest channels were measured.
The testing follows KDB 971168 v02r02 Section 6.0
1.The EUT was connected to spectrum analyzer and system simulator via a power divider.
2. The band edges of low and high channels for the highest RF powers were measured.
3. RBW is set to 51 kHz, VBW is set to 160 kHz for LTE Band 4/12/13 on spectrum analyzer.
4. Set spectrum analyzer with RMS detector.
5. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
6. Checked that all the results comply with the emission limit line.

Test Setup



Limits

Rule Part 27.53(h)/ specifies that " for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least 43 + 10 $\log_{10}$ (P) dB"
Part 27.53(g) specifies that " For operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least 43 + 10 log10 (P) dB."

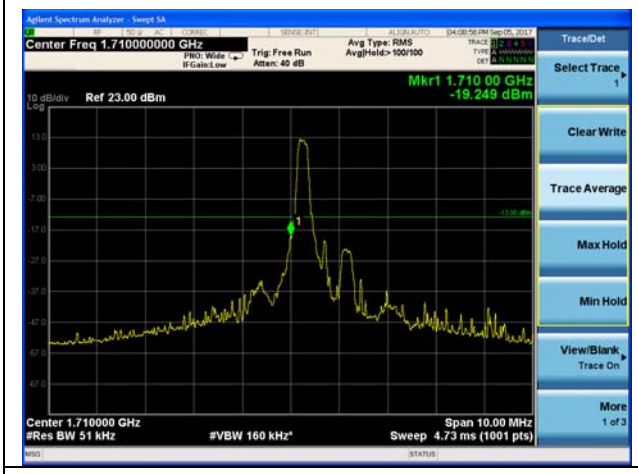
Measurement Uncertainty

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

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, 6RB

LTE Band 4 QPSK 1.4MHz CH-High, 6RB

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, 6RB

LTE Band 4 QPSK 3MHz CH-High, 6RB

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

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

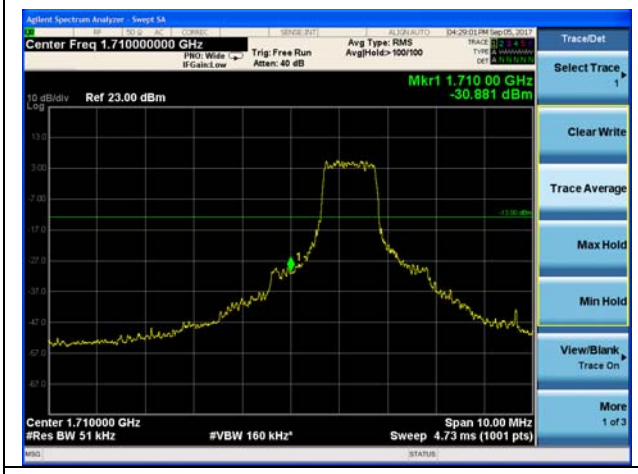
LTE Band 4 QPSK 5MHz CH-Low, 6RB

LTE Band 4 QPSK 5MHz CH-High, 6RB

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

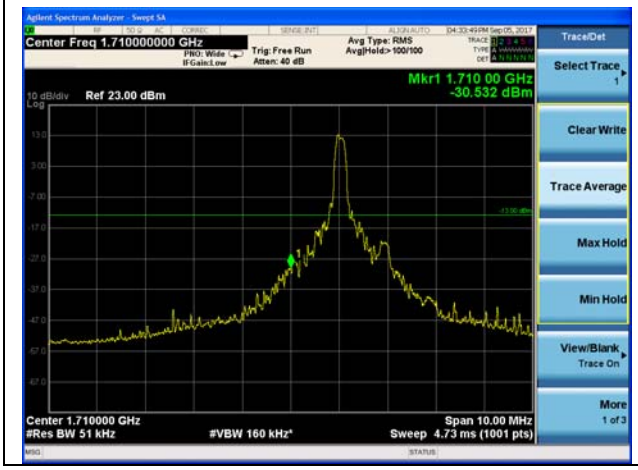
LTE Band 4 QPSK 10MHz CH-High, 1 RB

LTE Band 4 QPSK 10MHz CH-Low, 6RB



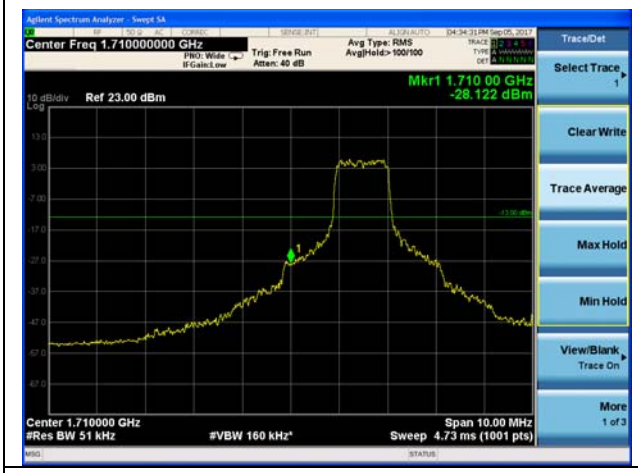
LTE Band 4 QPSK 10MHz CH-High, 6RB

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



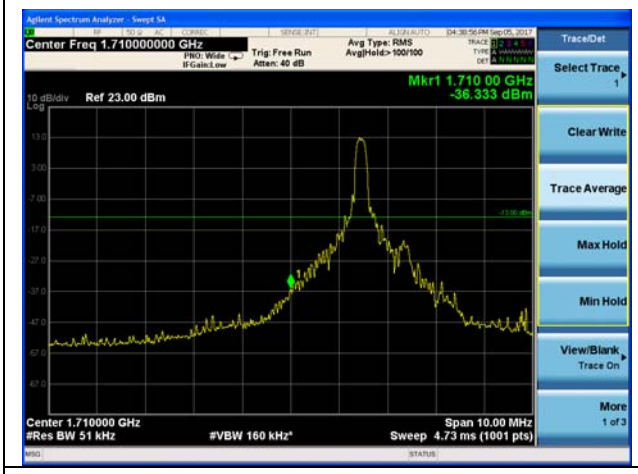
LTE Band 4 QPSK 15MHz CH-High, 1 RB

LTE Band 4 QPSK 15MHz CH-Low, 6RB



LTE Band 4 QPSK 15MHz CH-High, 6RB

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



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

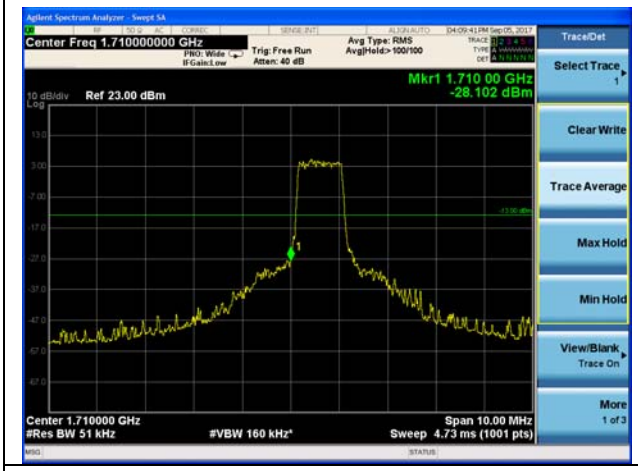
LTE Band 4 QPSK 20MHz CH-Low, 6RB

LTE Band 4 QPSK 20MHz CH-High, 6RB

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, 6RB

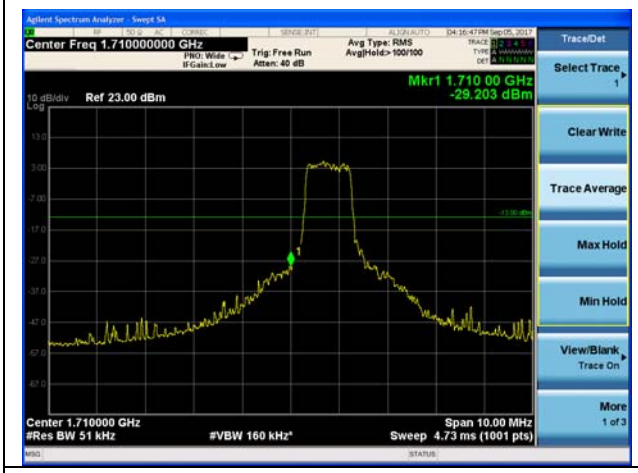


LTE Band 4 16QAM 1.4MHz CH-High, 6RB

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, 6RB



LTE Band 4 16QAM 3MHz CH-High, 6RB

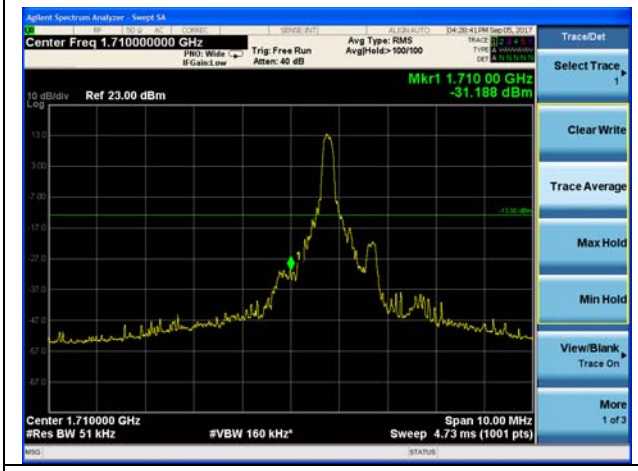
LTE Band 4 16QAM 5MHz CH-Low, 1 RB

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

LTE Band 4 16QAM 5MHz CH-Low, 6RB

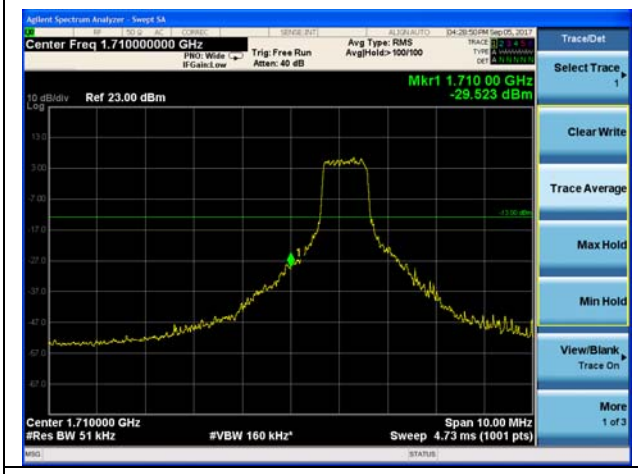
LTE Band 4 16QAM 5MHz CH-High, 6RB

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

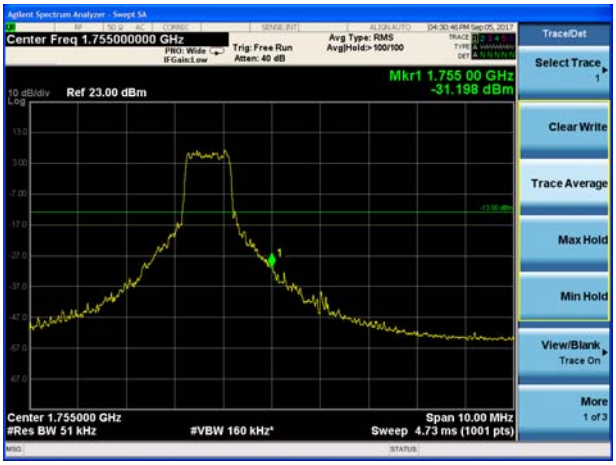


LTE Band 4 16QAM 10MHz CH-High, 1 RB

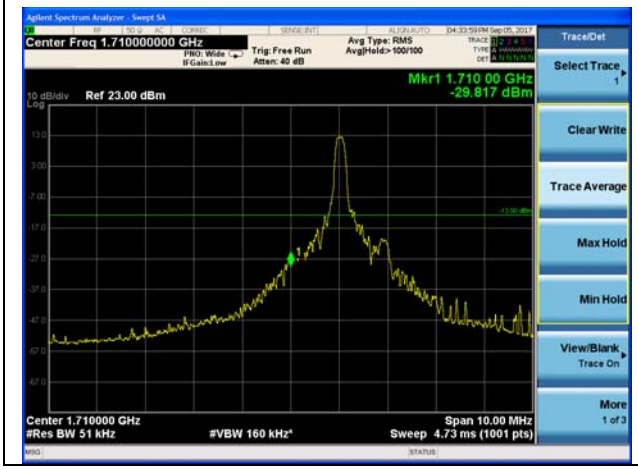
LTE Band 4 16QAM 10MHz CH-Low, 6RB



LTE Band 4 16QAM 10MHz CH-High, 6RB

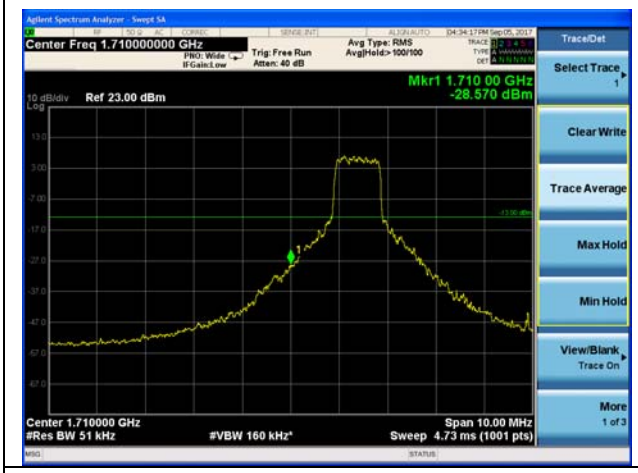


LTE Band 4 16QAM 15MHz CH-Low, 1 RB

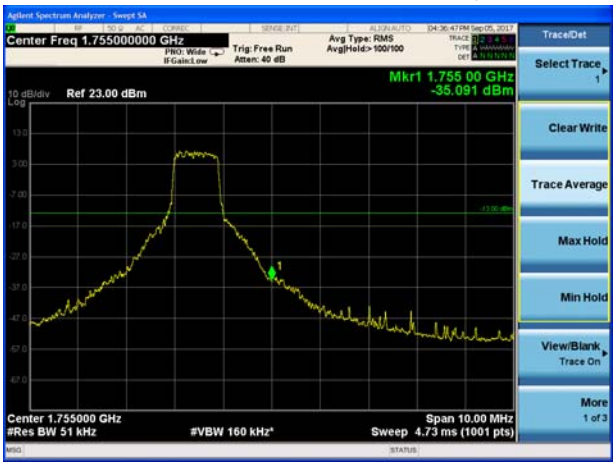


LTE Band 4 16QAM 15MHz CH-High, 1 RB

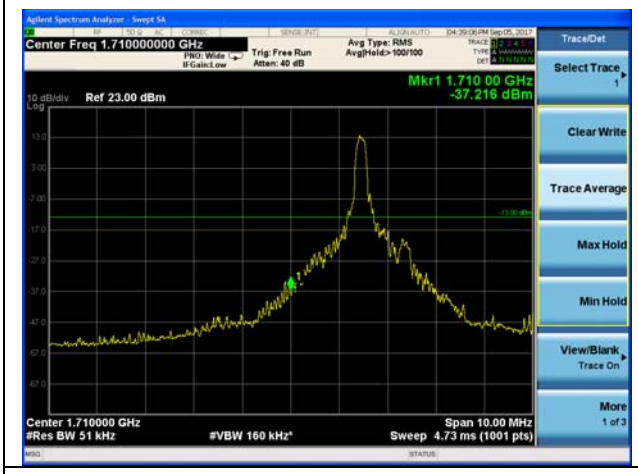
LTE Band 4 16QAM 15MHz CH-Low, 6RB



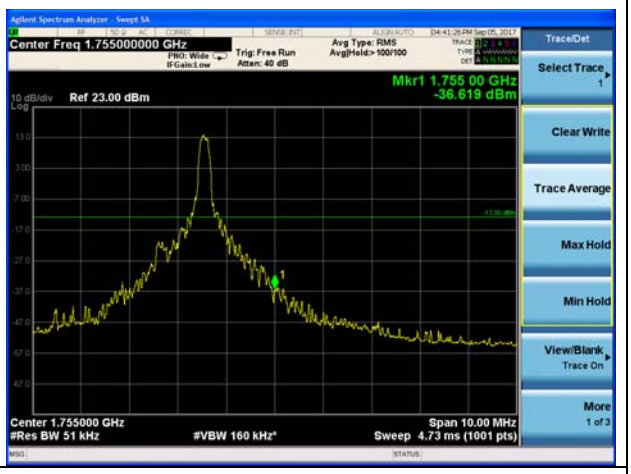
LTE Band 4 16QAM 15MHz CH-High, 6RB



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

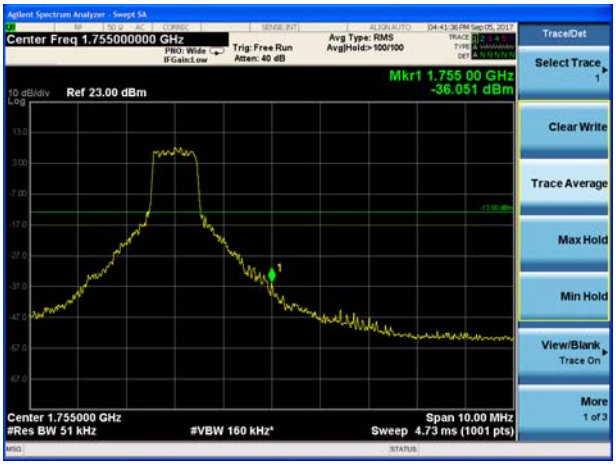


LTE Band 4 16QAM 20MHz CH-High, 1 RB

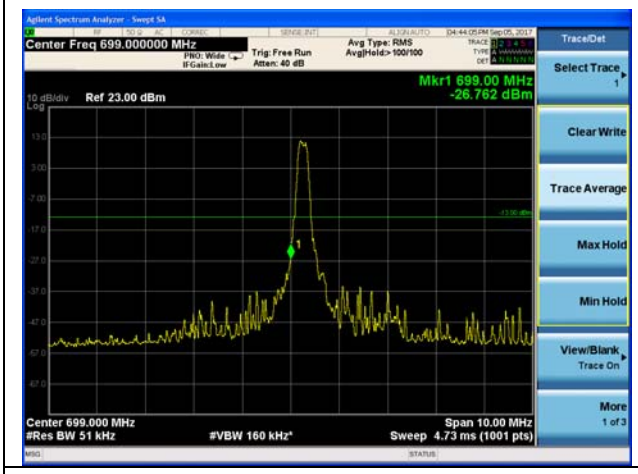


LTE Band 4 16QAM 20MHz CH-Low, 6RB

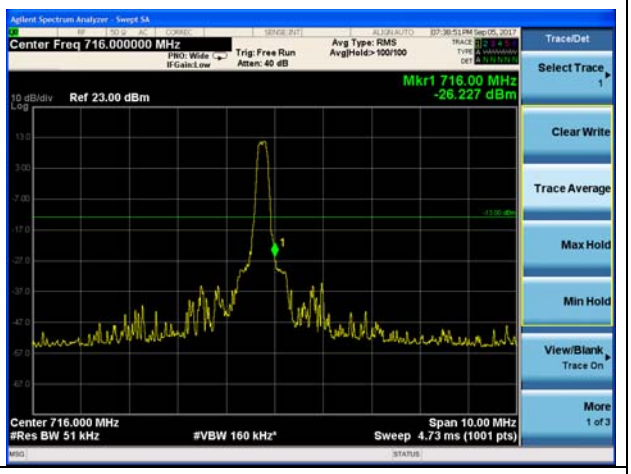
LTE Band 4 16QAM 20MHz CH-High, 6RB



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

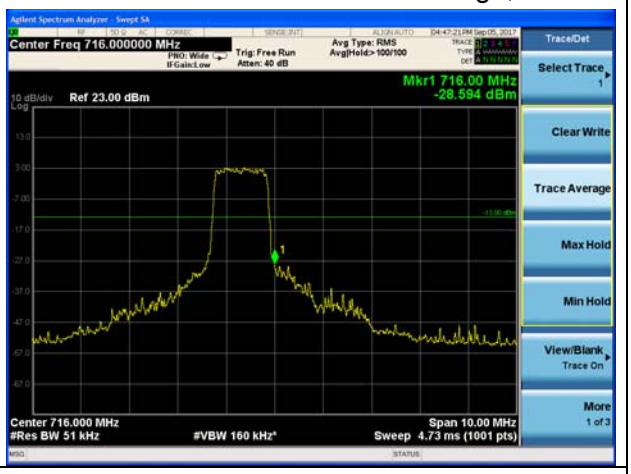


LTE Band 12 QPSK 1.4MHz CH-High, 1 RB

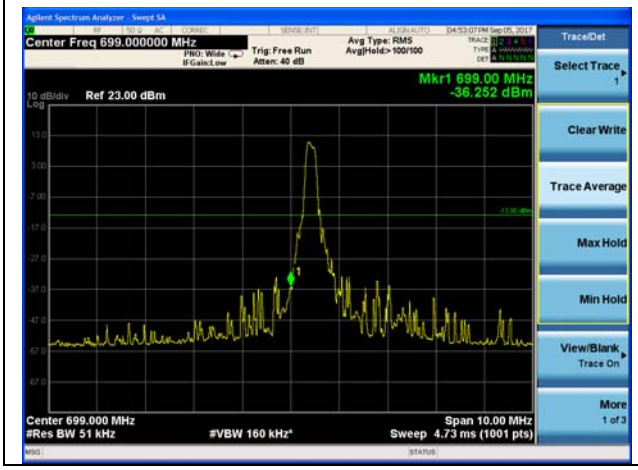


LTE Band 12 QPSK 1.4MHz CH-Low, 6RB

LTE Band 12 QPSK 1.4MHz CH-High, 6RB

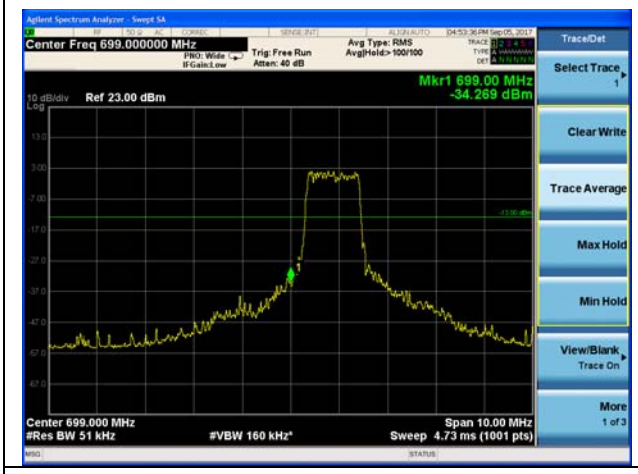


LTE Band 12 QPSK 3MHzCH-Low, 1 RB



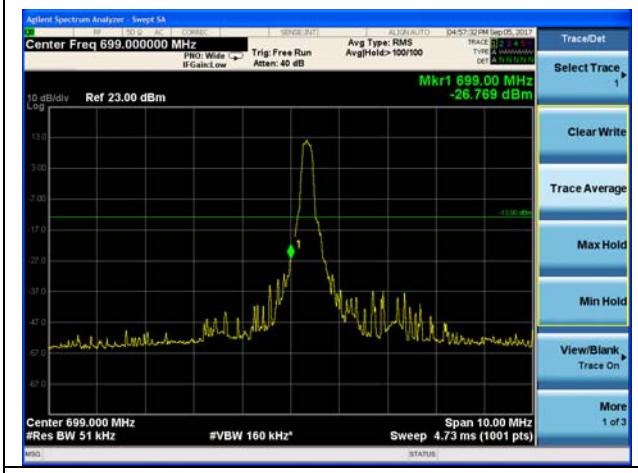
LE Band 12 QPSK 3MHz CH-High, 1 RB

LTE Band 12 QPSK 3MHz CH-Low, 6RB



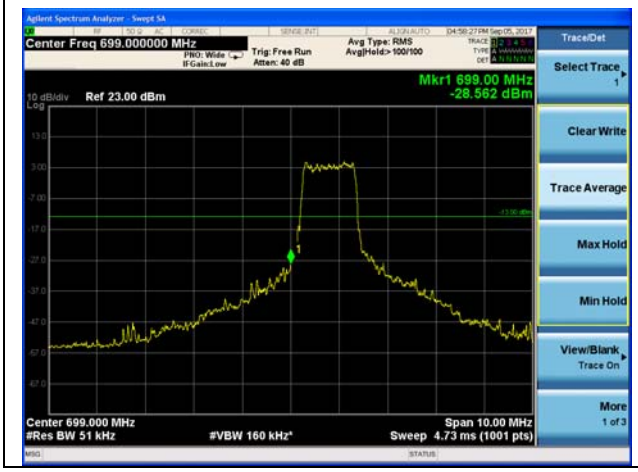
LTE Band 12 QPSK 3MHz CH-High, 6RB

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

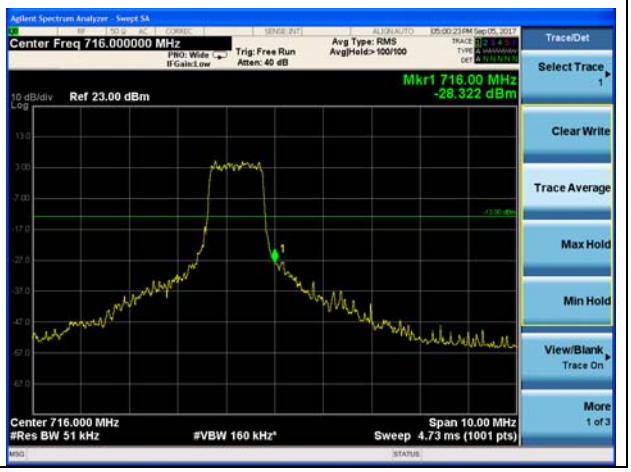


LTE Band 12 QPSK 5MHz CH-High, 1 RB

LTE Band 12 QPSK 5MHz CH-Low, 6RB



LTE Band 12 QPSK 5MHz CH-High, 6RB

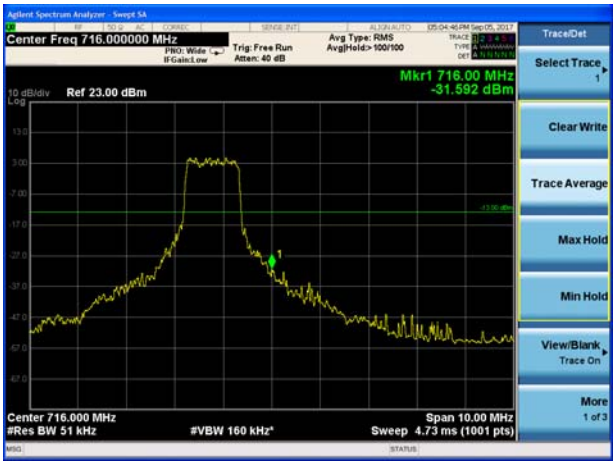


LTE Band 12 QPSK 10MHz CH-Low, 1 RB

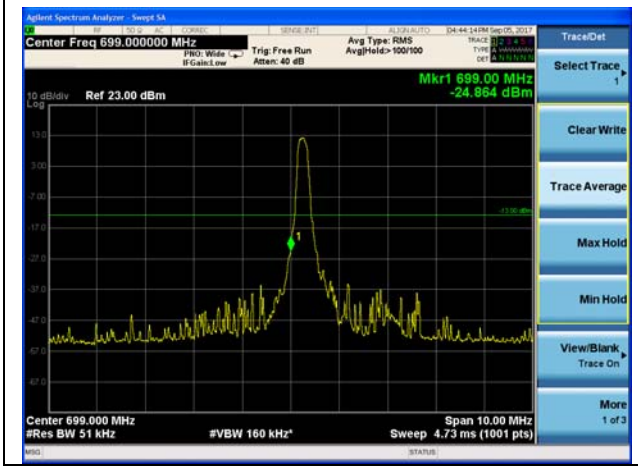
LTE Band 12 QPSK 10MHz CH-High, 1 RB

LTE Band 12 QPSK 10MHz CH-Low, 6RB

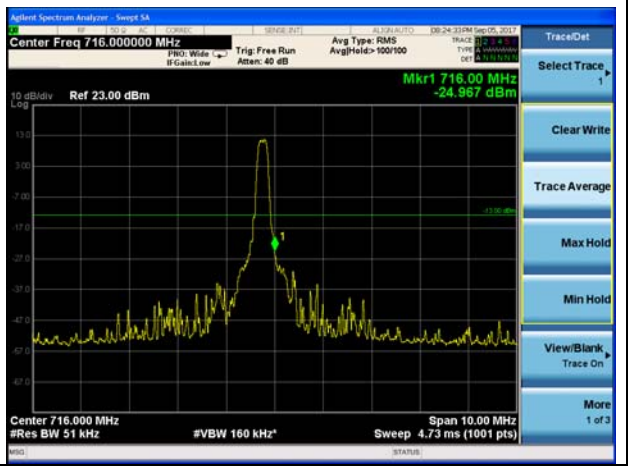
LTE Band 12 QPSK 10MHz CH-High, 6RB



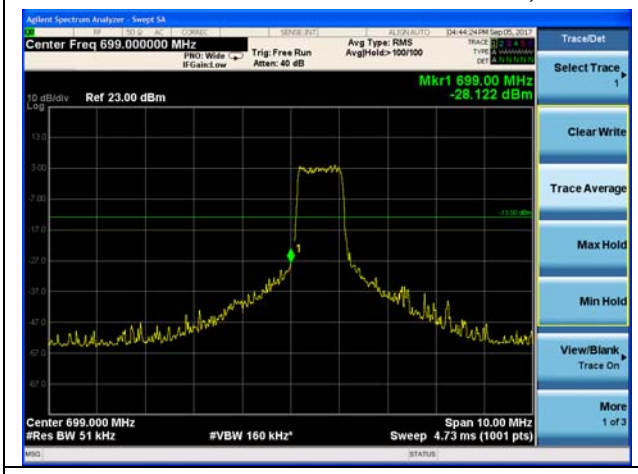
LTE Band 12 16QAM 1.4MHz CH-Low, 1 RB



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

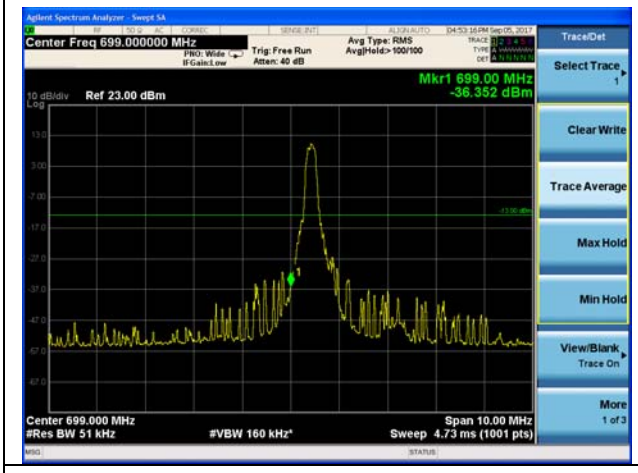


LTE Band 12 16QAM 1.4MHz CH-Low, 6RB

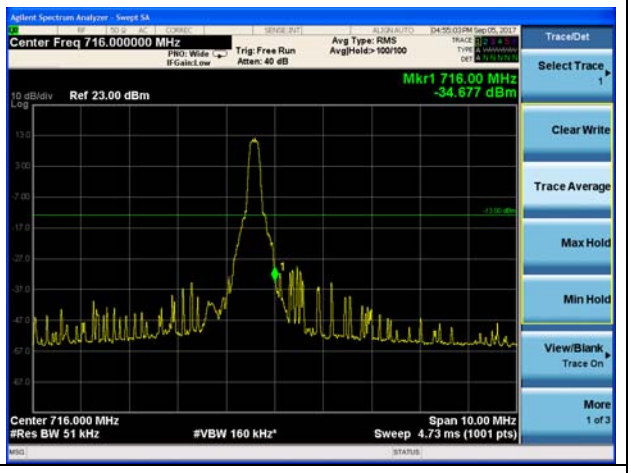


LTE Band 12 16QAM 1.4MHz CH-High, 6RB

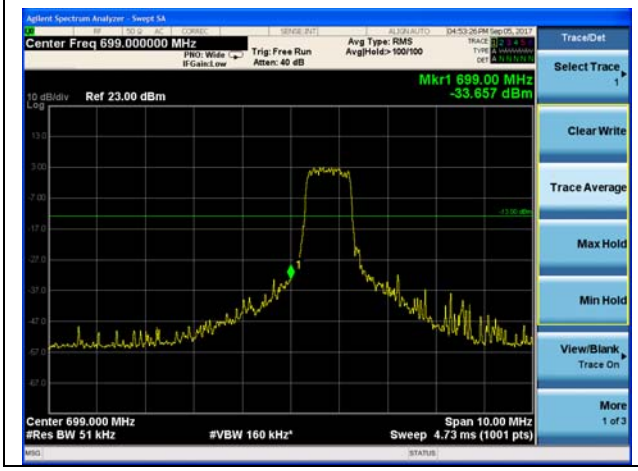
LTE Band 12 16QAM 3MHz CH-Low, 1 RB



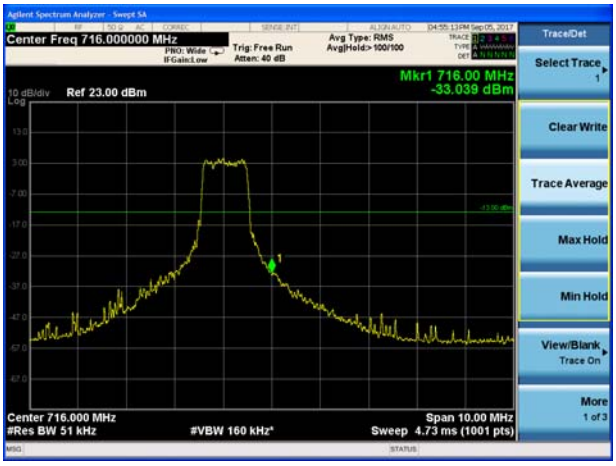
LTE Band 12 16QAM 3MHz CH-High, 1 RB



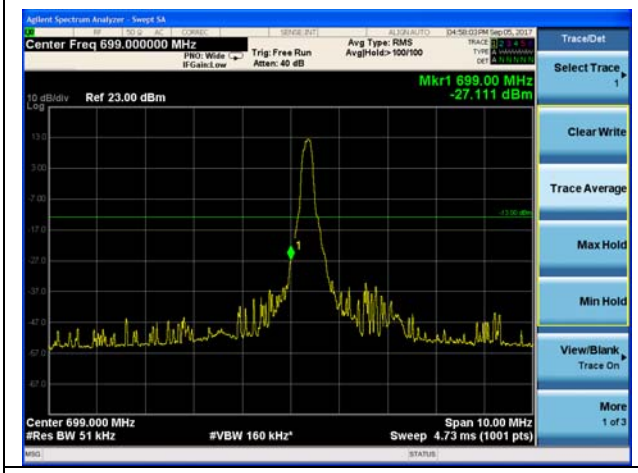
LTE Band 12 16QAM 3MHz CH-Low, 6RB



LTE Band 12 16QAM 3MHz CH-High, 6RB

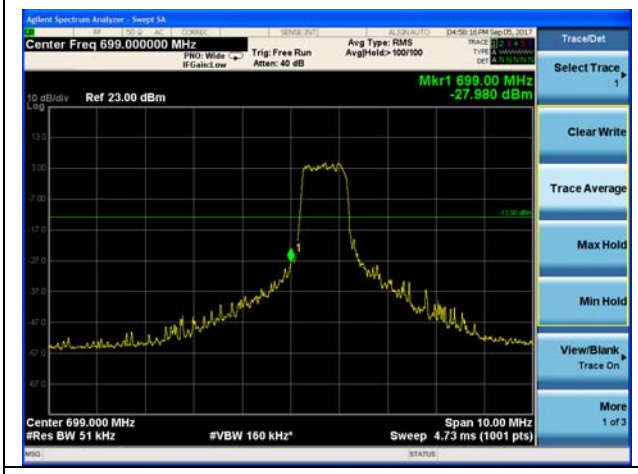


LTE Band 12 16QAM 5MHz CH-Low, 1 RB

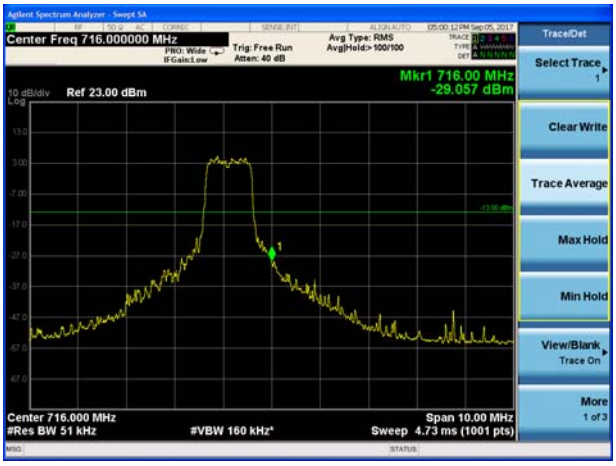


LTE Band 12 16QAM 5MHz CH-High, 1 RB

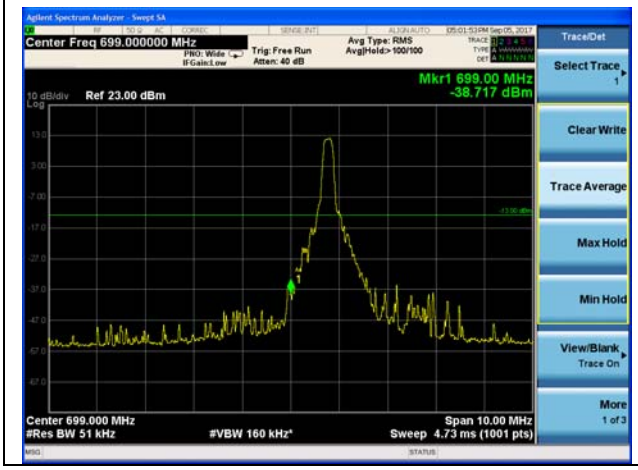
LTE Band 12 16QAM 5MHz CH-Low, 6RB



LTE Band 12 16QAM 5MHz CH-High, 6RB

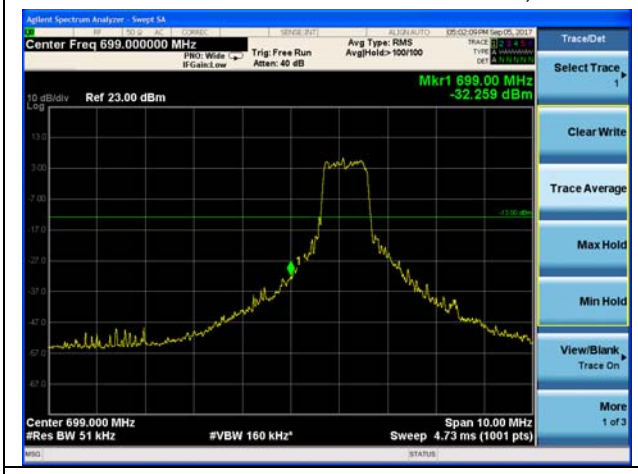


LTE Band 12 16QAM 10MHz CH-Low, 1 RB



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

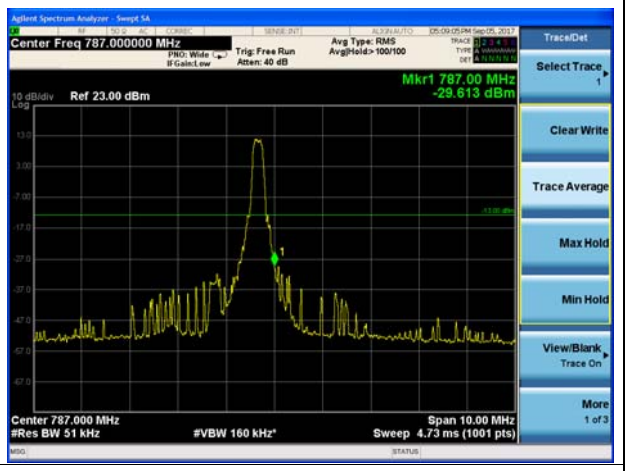
LTE Band 12 16QAM 10MHz CH-Low, 6RB



LTE Band 12 16QAM 10MHz CH-High, 6RB

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

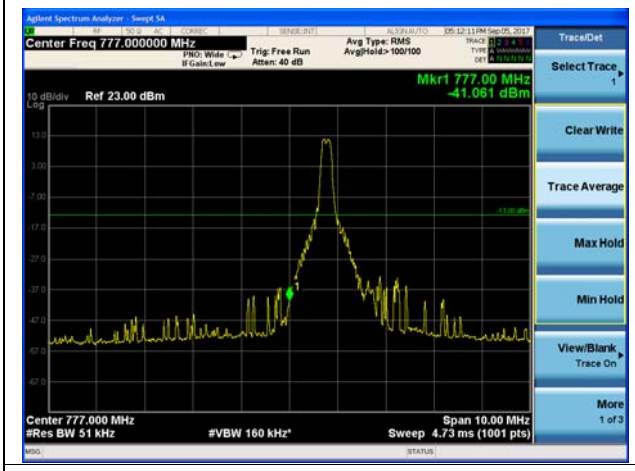
LTE Band 13 QPSK 5MHz CH-High, 1 RB



LTE Band 13 QPSK 5MHz CH-Low, 6RB

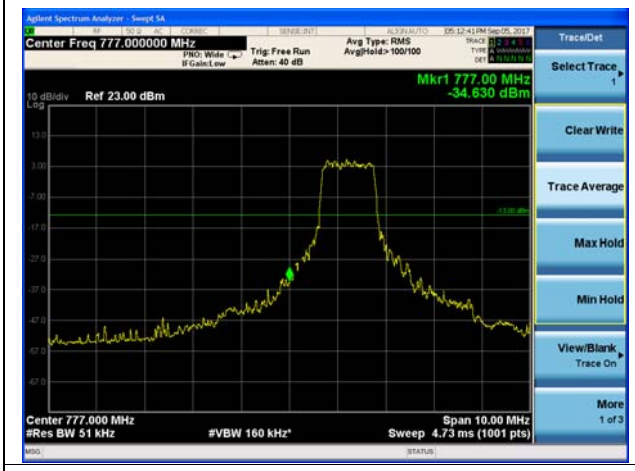
LTE Band 13 QPSK 5MHz CH-High, 6RB

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

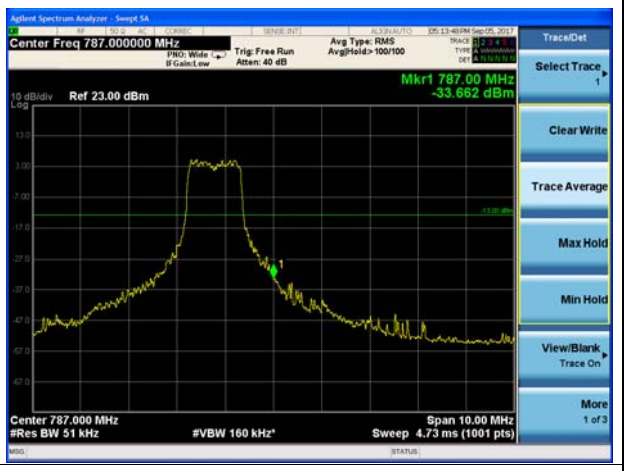


LTE Band 13 QPSK 10MHz CH- High, 1 RB

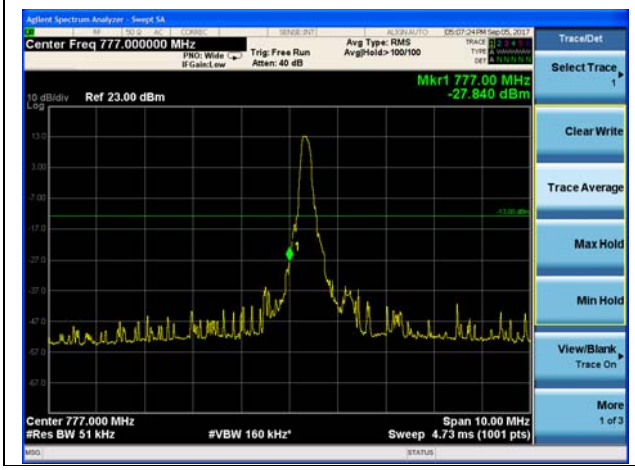
LTE Band 13 QPSK 10MHz CH- Low, 100 RB



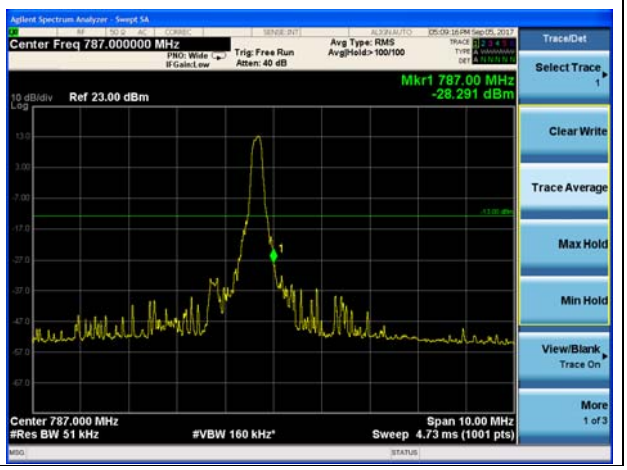
LTE Band 13 QPSK 10MHz CH-High, 6RB



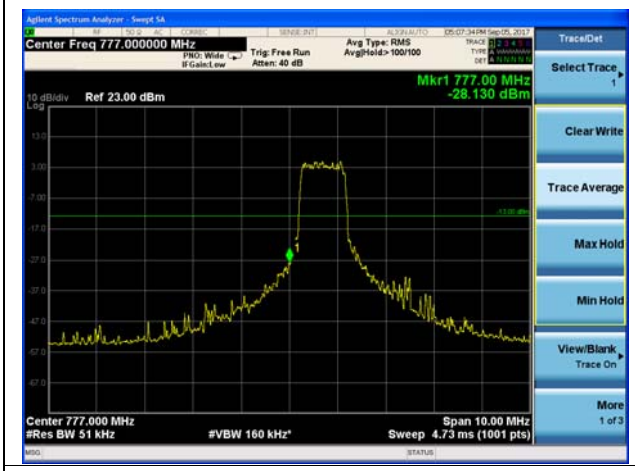
LTE Band 13 16QAM 5MHz CH-Low, 1 RB



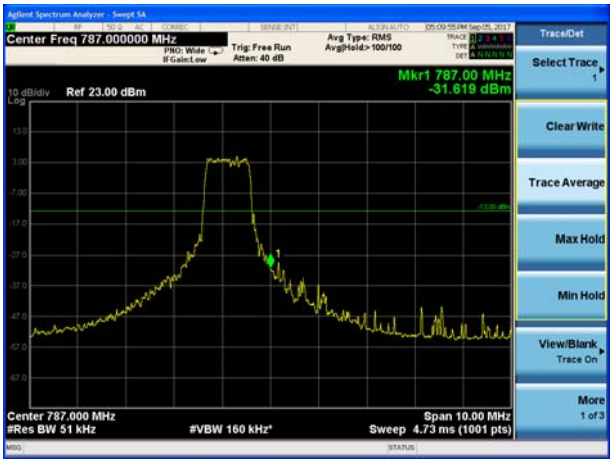
LTE Band 13 16QAM 5MHz CH-High, 1 RB



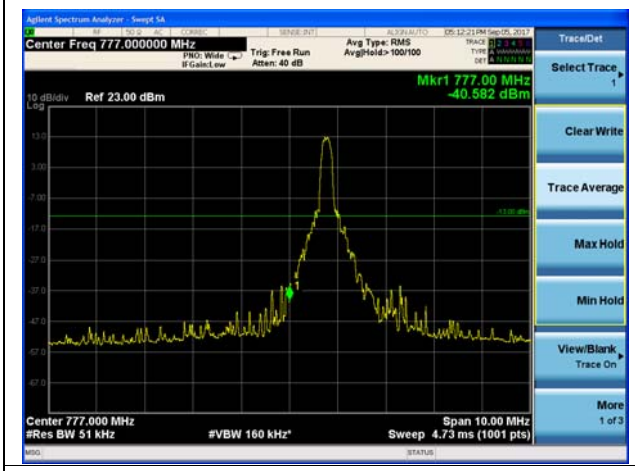
LTE Band 13 16QAM 5MHz CH-Low, 6RB



LTE Band 13 16QAM 5MHz CH-High, 6RB

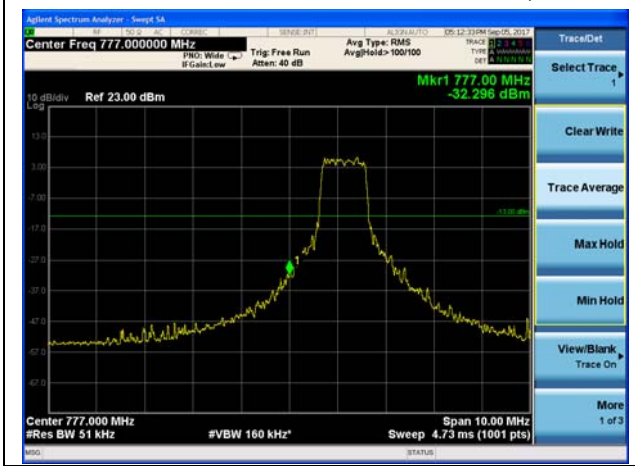


LTE Band 13 16QAM 10MHz CH-Low, 1 RB

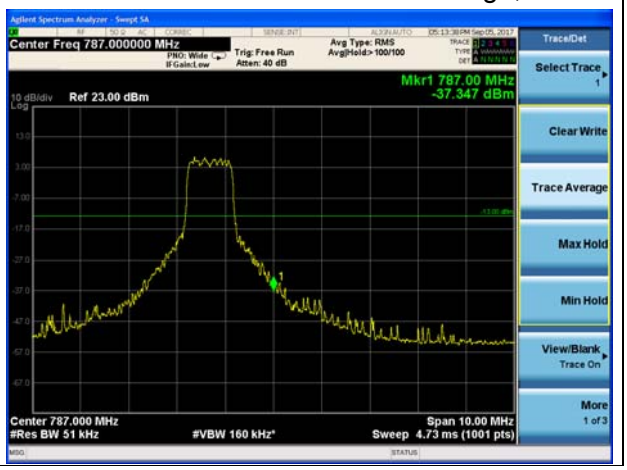


LTE Band 13 16QAM 10MHz CH- High, 1 RB

LTE Band 13 16QAM 10MHz CH- Low, 6RB



LTE Band 13 16QAM 10MHz CH- High, 6RB



4.5 Peak-to-Average Power Ratio (PAPR)

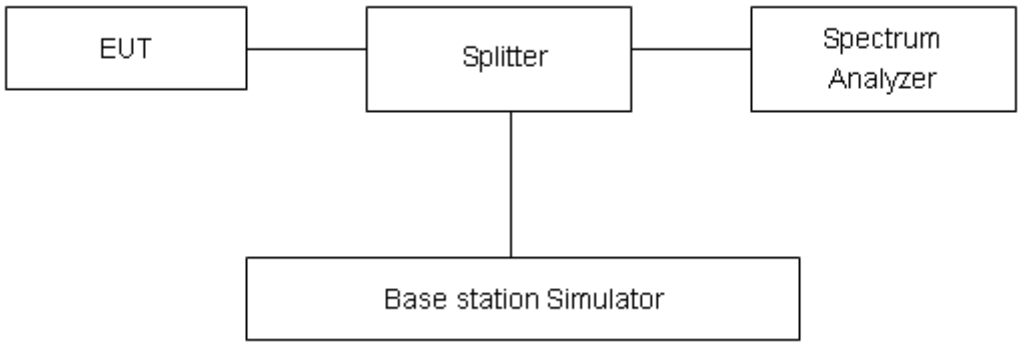
Ambient condition

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

Methods of Measurement

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

Test Setup



Limits

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

Measurement Uncertainty

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

Test Results

Mode	Bandwidth	Modulation	Channel/ Frequency(MHz)	Peak-to-Average Power Ratio (PAPR)		
				Peak(dBm)	Avg(dBm)	PAPR(dB)
LTE Band 4	1.4MHz	QPSK	20175/1732.5	34.76	23.96	10.80
		16QAM	20175/1732.5	34.33	23.46	10.87
	3MHz	QPSK	20175/1732.5	33.49	23.96	9.53
		16QAM	20175/1732.5	33.90	23.61	10.29
	5MHz	QPSK	20175/1732.5	33.29	23.94	9.35
		16QAM	20175/1732.5	33.60	23.57	10.03
	10MHz	QPSK	20175/1732.5	32.93	23.95	8.98
		16QAM	20175/1732.5	32.41	23.60	8.81
	15MHz	QPSK	20175/1732.5	32.81	23.91	8.90
		16QAM	20175/1732.5	32.47	23.58	8.89
	20MHz	QPSK	20175/1732.5	33.55	23.87	9.68
		16QAM	20175/1732.5	32.74	23.54	9.20

Mode	Bandwidth	Modulation	Channel/ Frequency(MHz)	Peak-to-Average Power Ratio (PAPR)		
				Peak(dBm)	Avg(dBm)	PAPR(dB)
LTE Band 12	1.4MHz	QPSK	23095/707.5	32.50	23.24	9.26
		16QAM	23095/707.5	34.04	22.82	11.22
	3MHz	QPSK	23095/707.5	33.16	23.14	10.02
		16QAM	23095/707.5	32.88	22.56	10.32
	5MHz	QPSK	23095/707.5	32.90	23.12	9.78
		16QAM	23095/707.5	33.03	22.52	10.51
	10MHz	QPSK	23095/707.5	32.07	23.05	9.02
		16QAM	23095/707.5	31.81	22.49	9.32

Mode	Bandwidth	Modulation	Channel/ Frequency(MHz)	Peak-to-Average Power Ratio (PAPR)		
				Peak(dBm)	Avg(dBm)	PAPR(dB)
LTE Band 13	5MHz	QPSK	23230/782	33.99	23.55	10.44
		16QAM	23230/782	33.43	23.02	10.41
	10MHz	QPSK	23230/782	32.64	23.31	9.33
		16QAM	23230/782	32.99	22.83	10.16