



RF TEST REPORT

Applicant Smawave Technology Co. ,Ltd

FCC ID 2AU8HSMC411-A

Product LTE-A Hotspot

Brand Smawave

Model SMC411-a

Report No. R2011A0794-R2V2

Issue Date December 31, 2020

TA Technology (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in **FCC CFR47 Part 2 (2019)/ FCC CFR 47 Part 96E (2019)**. 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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TABLE OF CONTENT

1. Test Laboratory.....	5
1.1. Notes of the Test Report.....	5
1.2. Test facility.....	5
1.3. Testing Location.....	5
2. General Description of Equipment under Test.....	6
2.1. Applicant and Manufacturer Information.....	6
2.2. General Information.....	6
3. Applied Standards.....	8
4. Test Configuration.....	9
5. Test Case Results.....	10
5.1. RF Power Output.....	10
5.2. Maximum Effective Isotropic Radiated Power and Maximum Power Spectral Density.....	17
5.3. Occupied Bandwidth.....	19
5.4. Band Edge Compliance.....	28
5.5. Peak-to-Average Power Ratio (PAPR).....	37
5.6. Frequency Stability.....	40
5.7. Spurious Emissions at Antenna Terminals.....	44
5.8. Radiates Spurious Emission.....	48
6. Main Test Instruments.....	51
ANNEX A: The EUT Appearance.....	52
ANNEX B: Test Setup Photos.....	53



Version	Revision description	Issue Date
Rev.0	/	December 25, 2020
Rev.1	Update information for USB and Antenna Type. Add the Antenna Gain. Add standard in page 8. Update the data for chapter 5.1 and 5.2.	December 30, 2020
Rev.2	Update information in page 6.	December 31, 2020
Note: This revised report (Report No. R2011A0794-R2V2) supersedes and replaces the previously issued report (Report No. R2011A0794-R2V1). Please discard or destroy the previously issued report and dispose of it accordingly.		

Summary of measurement results

No.	Test Type	Clause in FCC rules	Verdict
1	RF power output	2.1046/ 96.41(b)	PASS
2	Maximum Effective Isotropic Radiated Power and Maximum Power Spectral Density	96.41(b)	PASS
3	Occupied Bandwidth	2.1049/ 96.41	PASS
4	Band Edge Compliance	2.1051/ 96.41(e)	PASS
5	Peak-to-Average Power Ratio	96.41(g)	PASS
6	Frequency Stability	2.1055	PASS
7	Spurious Emissions at Antenna Terminals	2.1051 / 96.41(e)	PASS
8	Radiates Spurious Emission	2.1051 / 96.41(e)	PASS
Date of Testing: November 18, 2020 ~ December 23, 2020			
Date of Sample Received: November 18, 2020			
Note: NA = Not Applicable. PASS: The EUT complies with the essential requirements in the standard. FAIL: The EUT does not comply with the essential requirements in the standard. All indications of Pass/Fail in this report are opinions expressed by TA Technology (Shanghai) Co., Ltd. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only.			



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

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.

A2LA (Certificate Number: 3857.01)

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

1.3. Testing Location

Company: TA Technology (Shanghai) Co., Ltd.
Address: No.145, Jintang Rd, Tangzhen Industry Park, Pudong
City: Shanghai
Post code: 201201
Country: P. R. China
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Website: <http://www.ta-shanghai.com>
E-mail: xukai@ta-shanghai.com

2. General Description of Equipment under Test

2.1. Applicant and Manufacturer Information

Applicant	Smawave Technology Co. ,Ltd
Applicant address	3/F, Building 8, 1001 North Qinzhou Road, Xuhui District, Shanghai, China
Manufacturer	Smawave Technology Co. ,Ltd
Manufacturer address	3/F, Building 8, 1001 North Qinzhou Road, Xuhui District, Shanghai, China

2.2. General Information

EUT Description			
Model	SMC411-a		
IMEI	862165040847046		
Hardware Version	V1.0		
Software Version	SG628_V1.0.4		
Power Supply	Battery/AC adapter		
Antenna Type	PCB Antenna		
Antenna Gain	Frequency(MHz)	Antenna Gain(dBi)	
	3560	0.5	
	3620	1.2	
	3700	-0.3	
Antenna Working Conditions	Antenna	Working conditions	
	ANT 0	LTE Band 42/43/48 TX	
	ANT 1	LTE RX	
	ANT 2	LTE Band 40 TX, other band RX	
	ANT 3	LTE RX	
Test Mode(s)	LTE Band 42/43/48		
Test Modulation	QPSK,16QAM, 64QAM		
LTE Category	12		
Maximum Conducted Power(dBm)	LTE Band 48:	22.14dBm	
Maximum EIRP(dBm/10MHz)	LTE Band 48:	22.99dBm	
Rated Power Supply Voltage:	3.8V		
Extreme Voltage	Minimum: 3.23V	Maximum: 4.37V	
Extreme Temperature	Lowest: -30℃	Highest: +50℃	
Operating Voltage	Minimum: 3.6V	Maximum: 4.3V	
Operating Temperature	Lowest: -10℃	Highest: +45℃	
Operating Frequency Range(s)	Band	Tx (MHz)	Rx (MHz)
	LTE Band 42	3400-3600	3400-3600



	LTE Band 43	3600-3800	3600-3800
	LTE Band 48	3550-3700	3550-3700
EUT Accessory			
Battery	Manufacturer: HUIZHOU DXDRAGON INC. Model: BTE-4001 Output: 3.8V 4000mAh		
USB Cable	Manufacturer: Chengdu Jingyue Kaibo Electronics Co., Ltd Model:SJM001		
Auxiliary equipment			
Adapter	Manufacturer:SHENZHEN TIANYIN ELECTRONICS CO.,LTD Model:TPA-46050200VU		
Note: 1. The EUT is sent from the applicant to TA and the information of the EUT is declared by the applicant. 2. LTE Band 48 overlaps the entire frequency range of LTE Band 42 and Band 43 under Part 96 rule. Therefore, the test results of LTE Band 48 provided in this report covers Band 42 and Band 43. 3. The EUT don't have standard Adapter, The Adapter used for testing in this report is the after-market accessory.			



3. Applied Standards

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

Test standards:

FCC 47 CFR Part 96E (2019)

ANSI / TIA-603-E

Reference standard:

FCC 47 CFR Part 2 (2019)

KDB 940660 D01 Part 96 CBRS Eqpt v03

KDB 971168 D01 Power Meas License Digital Systems v03r01

KDB 412172 D01 Determining ERP and EIRP v01r01

ANSI C63.26:2015

4. Test Configuration

There is more than one SIM card slot, each one should be applied throughout the compliance test respectively, and however, only the worst case (SIM 1) will be recorded in this report.

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 were investigated. Subsequently, only the worst case emissions are reported.

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

Test modes are chosen to be reported as the worst case configuration below:

Test modes are chosen as the worst case configuration below for LTE Band 48.

Test items	Bandwidth (MHz)				Modulation			RB			Test Channel		
	5	10	15	20	QPSK	16QAM	64QAM	1	50%	100%	L	M	H
RF power output	O	O	O	O	O	O	O	O	O	O	O	O	O
Maximum Effective Isotropic Radiated Power and Maximum Power Spectral Density	O	O	O	O	O	O	O	O	O	O	O	O	O
Occupied Bandwidth	O	O	O	O	O	O	O	-	-	O	O	O	O
Band Edge Compliance	O	O	O	O	O	O	O	O	-	O	O	-	O
Peak-to-Average Power Ratio	O	O	O	O	O	O	O	-	-	O	O	O	O
Frequency Stability	O	O	O	O	O	O	O	O	O	O	O	O	O
Spurious Emissions at Antenna Terminals	O	O	O	O	O	-	-	O	-	-	O	O	O
Radiates Spurious Emission	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

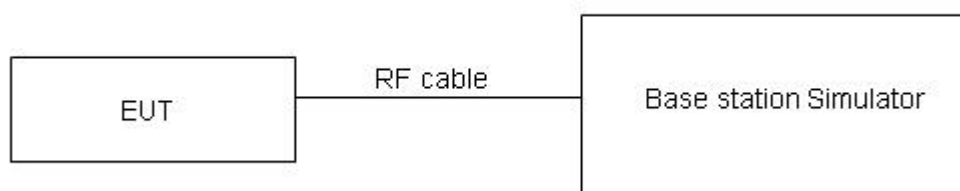
Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Methods of Measurement

A system simulator was used to establish communication with the EUT. Its parameters were set to force the EUT transmitting at maximum output power. The measured power in the radio frequency on the transmitter output terminals shall be reported.

1. The transmitter output port was connected to the system simulator.
2. Set EUT at maximum power through the system simulator.
3. Select lowest, middle, and highest channels for each band and different modulation.
4. Measure and record the power level from the system simulator.

Test Setup



A transmitter port of EUT is connected to the input of a signal analyzer. All measurements are performed as RMS average measurements while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

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**

Band	Bandwidth (MHz)	Modulation	Channel	RB Configuration	Maximum Output Power(dBm)
LTE Band 48	5	QPSK	55265	1RB#0	21.58
LTE Band 48	5	QPSK	55265	1RB#13	21.85
LTE Band 48	5	QPSK	55265	1RB#24	22.14
LTE Band 48	5	QPSK	55265	12RB#0	20.77
LTE Band 48	5	QPSK	55265	12RB#6	20.79
LTE Band 48	5	QPSK	55265	12RB#13	20.98
LTE Band 48	5	QPSK	55265	25RB#0	20.80
LTE Band 48	5	QPSK	55990	1RB#0	21.62
LTE Band 48	5	QPSK	55990	1RB#13	21.47
LTE Band 48	5	QPSK	55990	1RB#24	21.37
LTE Band 48	5	QPSK	55990	12RB#0	20.81
LTE Band 48	5	QPSK	55990	12RB#6	20.60
LTE Band 48	5	QPSK	55990	12RB#13	20.52
LTE Band 48	5	QPSK	55990	25RB#0	20.71
LTE Band 48	5	QPSK	56715	1RB#0	21.23
LTE Band 48	5	QPSK	56715	1RB#13	20.94
LTE Band 48	5	QPSK	56715	1RB#24	21.42
LTE Band 48	5	QPSK	56715	12RB#0	19.86
LTE Band 48	5	QPSK	56715	12RB#6	19.98
LTE Band 48	5	QPSK	56715	12RB#13	20.04
LTE Band 48	5	QPSK	56715	25RB#0	19.87
LTE Band 48	5	16QAM	55265	1RB#0	20.60
LTE Band 48	5	16QAM	55265	1RB#13	20.91
LTE Band 48	5	16QAM	55265	1RB#24	21.18
LTE Band 48	5	16QAM	55265	12RB#0	19.86
LTE Band 48	5	16QAM	55265	12RB#6	19.92
LTE Band 48	5	16QAM	55265	12RB#13	20.07
LTE Band 48	5	16QAM	55265	25RB#0	19.94
LTE Band 48	5	16QAM	55990	1RB#0	21.10
LTE Band 48	5	16QAM	55990	1RB#13	20.38
LTE Band 48	5	16QAM	55990	1RB#24	20.46
LTE Band 48	5	16QAM	55990	12RB#0	19.65
LTE Band 48	5	16QAM	55990	12RB#6	19.46
LTE Band 48	5	16QAM	55990	12RB#13	19.29
LTE Band 48	5	16QAM	55990	25RB#0	19.47
LTE Band 48	5	16QAM	56715	1RB#0	19.84
LTE Band 48	5	16QAM	56715	1RB#13	20.12



LTE Band 48	5	16QAM	56715	1RB#24	19.91
LTE Band 48	5	16QAM	56715	12RB#0	18.96
LTE Band 48	5	16QAM	56715	12RB#6	19.12
LTE Band 48	5	16QAM	56715	12RB#13	19.20
LTE Band 48	5	16QAM	56715	25RB#0	19.01
LTE Band 48	5	64QAM	55265	1RB#0	19.38
LTE Band 48	5	64QAM	55265	1RB#13	19.67
LTE Band 48	5	64QAM	55265	1RB#24	19.93
LTE Band 48	5	64QAM	55265	12RB#0	18.91
LTE Band 48	5	64QAM	55265	12RB#6	19.10
LTE Band 48	5	64QAM	55265	12RB#13	19.12
LTE Band 48	5	64QAM	55265	25RB#0	18.95
LTE Band 48	5	64QAM	55990	1RB#0	19.84
LTE Band 48	5	64QAM	55990	1RB#13	19.12
LTE Band 48	5	64QAM	55990	1RB#24	18.88
LTE Band 48	5	64QAM	55990	12RB#0	19.09
LTE Band 48	5	64QAM	55990	12RB#6	18.81
LTE Band 48	5	64QAM	55990	12RB#13	18.68
LTE Band 48	5	64QAM	55990	25RB#0	18.83
LTE Band 48	5	64QAM	56715	1RB#0	18.58
LTE Band 48	5	64QAM	56715	1RB#13	18.89
LTE Band 48	5	64QAM	56715	1RB#24	18.76
LTE Band 48	5	64QAM	56715	12RB#0	18.08
LTE Band 48	5	64QAM	56715	12RB#6	18.19
LTE Band 48	5	64QAM	56715	12RB#13	18.27
LTE Band 48	5	64QAM	56715	25RB#0	18.09
LTE Band 48	10	QPSK	55290	1RB#0	21.53
LTE Band 48	10	QPSK	55290	1RB#25	21.79
LTE Band 48	10	QPSK	55290	1RB#49	22.07
LTE Band 48	10	QPSK	55290	25RB#0	20.70
LTE Band 48	10	QPSK	55290	25RB#13	20.75
LTE Band 48	10	QPSK	55290	25RB#25	20.91
LTE Band 48	10	QPSK	55290	50RB#0	20.78
LTE Band 48	10	QPSK	55990	1RB#0	21.79
LTE Band 48	10	QPSK	55990	1RB#25	21.43
LTE Band 48	10	QPSK	55990	1RB#49	21.29
LTE Band 48	10	QPSK	55990	25RB#0	20.77
LTE Band 48	10	QPSK	55990	25RB#13	20.56
LTE Band 48	10	QPSK	55990	25RB#25	20.44
LTE Band 48	10	QPSK	55990	50RB#0	20.63
LTE Band 48	10	QPSK	56690	1RB#0	21.17
LTE Band 48	10	QPSK	56690	1RB#25	20.88
LTE Band 48	10	QPSK	56690	1RB#49	21.32



LTE Band 48	10	QPSK	56690	25RB#0	19.80
LTE Band 48	10	QPSK	56690	25RB#13	19.93
LTE Band 48	10	QPSK	56690	25RB#25	20.05
LTE Band 48	10	QPSK	56690	50RB#0	19.88
LTE Band 48	10	16QAM	55290	1RB#0	20.57
LTE Band 48	10	16QAM	55290	1RB#25	20.89
LTE Band 48	10	16QAM	55290	1RB#49	21.16
LTE Band 48	10	16QAM	55290	25RB#0	19.83
LTE Band 48	10	16QAM	55290	25RB#13	19.89
LTE Band 48	10	16QAM	55290	25RB#25	20.02
LTE Band 48	10	16QAM	55290	50RB#0	19.92
LTE Band 48	10	16QAM	55990	1RB#0	21.07
LTE Band 48	10	16QAM	55990	1RB#25	20.33
LTE Band 48	10	16QAM	55990	1RB#49	20.39
LTE Band 48	10	16QAM	55990	25RB#0	19.62
LTE Band 48	10	16QAM	55990	25RB#13	19.41
LTE Band 48	10	16QAM	55990	25RB#25	19.29
LTE Band 48	10	16QAM	55990	50RB#0	19.47
LTE Band 48	10	16QAM	56690	1RB#0	19.79
LTE Band 48	10	16QAM	56690	1RB#25	20.08
LTE Band 48	10	16QAM	56690	1RB#49	19.87
LTE Band 48	10	16QAM	56690	25RB#0	18.92
LTE Band 48	10	16QAM	56690	25RB#13	19.06
LTE Band 48	10	16QAM	56690	25RB#25	19.17
LTE Band 48	10	16QAM	56690	50RB#0	18.99
LTE Band 48	10	64QAM	55290	1RB#0	19.33
LTE Band 48	10	64QAM	55290	1RB#25	19.61
LTE Band 48	10	64QAM	55290	1RB#49	19.86
LTE Band 48	10	64QAM	55290	25RB#0	18.84
LTE Band 48	10	64QAM	55290	25RB#13	19.06
LTE Band 48	10	64QAM	55290	25RB#25	19.05
LTE Band 48	10	64QAM	55290	50RB#0	18.93
LTE Band 48	10	64QAM	55990	1RB#0	19.71
LTE Band 48	10	64QAM	55990	1RB#25	19.08
LTE Band 48	10	64QAM	55990	1RB#49	18.80
LTE Band 48	10	64QAM	55990	25RB#0	19.05
LTE Band 48	10	64QAM	55990	25RB#13	18.77
LTE Band 48	10	64QAM	55990	25RB#25	18.60
LTE Band 48	10	64QAM	55990	50RB#0	18.75
LTE Band 48	10	64QAM	56690	1RB#0	18.52
LTE Band 48	10	64QAM	56690	1RB#25	18.83
LTE Band 48	10	64QAM	56690	1RB#49	18.66
LTE Band 48	10	64QAM	56690	25RB#0	18.02



LTE Band 48	10	64QAM	56690	25RB#13	18.14
LTE Band 48	10	64QAM	56690	25RB#25	18.28
LTE Band 48	10	64QAM	56690	50RB#0	18.10
LTE Band 48	15	QPSK	55315	1RB#0	21.52
LTE Band 48	15	QPSK	55315	1RB#38	21.77
LTE Band 48	15	QPSK	55315	1RB#74	22.04
LTE Band 48	15	QPSK	55315	36RB#0	20.68
LTE Band 48	15	QPSK	55315	36RB#18	20.72
LTE Band 48	15	QPSK	55315	36RB#39	20.88
LTE Band 48	15	QPSK	55315	75RB#0	20.76
LTE Band 48	15	QPSK	55990	1RB#0	21.78
LTE Band 48	15	QPSK	55990	1RB#38	21.42
LTE Band 48	15	QPSK	55990	1RB#74	21.24
LTE Band 48	15	QPSK	55990	36RB#0	20.73
LTE Band 48	15	QPSK	55990	36RB#18	20.51
LTE Band 48	15	QPSK	55990	36RB#39	20.41
LTE Band 48	15	QPSK	55990	75RB#0	20.59
LTE Band 48	15	QPSK	56665	1RB#0	21.15
LTE Band 48	15	QPSK	56665	1RB#38	20.85
LTE Band 48	15	QPSK	56665	1RB#74	21.28
LTE Band 48	15	QPSK	56665	36RB#0	19.77
LTE Band 48	15	QPSK	56665	36RB#18	19.89
LTE Band 48	15	QPSK	56665	36RB#39	20.01
LTE Band 48	15	QPSK	56665	75RB#0	19.83
LTE Band 48	15	16QAM	55315	1RB#0	20.52
LTE Band 48	15	16QAM	55315	1RB#38	20.87
LTE Band 48	15	16QAM	55315	1RB#74	21.13
LTE Band 48	15	16QAM	55315	36RB#0	19.80
LTE Band 48	15	16QAM	55315	36RB#18	19.86
LTE Band 48	15	16QAM	55315	36RB#39	20.00
LTE Band 48	15	16QAM	55315	75RB#0	19.89
LTE Band 48	15	16QAM	55990	1RB#0	21.05
LTE Band 48	15	16QAM	55990	1RB#38	20.30
LTE Band 48	15	16QAM	55990	1RB#74	20.35
LTE Band 48	15	16QAM	55990	36RB#0	19.60
LTE Band 48	15	16QAM	55990	36RB#18	19.36
LTE Band 48	15	16QAM	55990	36RB#39	19.25
LTE Band 48	15	16QAM	55990	75RB#0	19.42
LTE Band 48	15	16QAM	56665	1RB#0	19.77
LTE Band 48	15	16QAM	56665	1RB#38	20.06
LTE Band 48	15	16QAM	56665	1RB#74	19.84
LTE Band 48	15	16QAM	56665	36RB#0	18.89
LTE Band 48	15	16QAM	56665	36RB#18	19.02



LTE Band 48	15	16QAM	56665	36RB#39	19.14
LTE Band 48	15	16QAM	56665	75RB#0	18.95
LTE Band 48	15	64QAM	55315	1RB#0	19.32
LTE Band 48	15	64QAM	55315	1RB#38	19.59
LTE Band 48	15	64QAM	55315	1RB#74	19.83
LTE Band 48	15	64QAM	55315	36RB#0	18.82
LTE Band 48	15	64QAM	55315	36RB#18	19.03
LTE Band 48	15	64QAM	55315	36RB#39	19.02
LTE Band 48	15	64QAM	55315	75RB#0	18.91
LTE Band 48	15	64QAM	55990	1RB#0	19.67
LTE Band 48	15	64QAM	55990	1RB#38	19.07
LTE Band 48	15	64QAM	55990	1RB#74	18.75
LTE Band 48	15	64QAM	55990	36RB#0	19.01
LTE Band 48	15	64QAM	55990	36RB#18	18.72
LTE Band 48	15	64QAM	55990	36RB#39	18.57
LTE Band 48	15	64QAM	55990	75RB#0	18.71
LTE Band 48	15	64QAM	56665	1RB#0	18.50
LTE Band 48	15	64QAM	56665	1RB#38	18.80
LTE Band 48	15	64QAM	56665	1RB#74	18.62
LTE Band 48	15	64QAM	56665	36RB#0	17.99
LTE Band 48	15	64QAM	56665	36RB#18	18.10
LTE Band 48	15	64QAM	56665	36RB#39	18.24
LTE Band 48	15	64QAM	56665	75RB#0	18.05
LTE Band 48	20	QPSK	55340	1RB#0	21.49
LTE Band 48	20	QPSK	55340	1RB#50	21.76
LTE Band 48	20	QPSK	55340	1RB#99	22.02
LTE Band 48	20	QPSK	55340	50RB#0	20.65
LTE Band 48	20	QPSK	55340	50RB#25	20.70
LTE Band 48	20	QPSK	55340	50RB#50	20.85
LTE Band 48	20	QPSK	55340	100RB#0	20.73
LTE Band 48	20	QPSK	55990	1RB#0	21.74
LTE Band 48	20	QPSK	55990	1RB#50	21.38
LTE Band 48	20	QPSK	55990	1RB#99	21.23
LTE Band 48	20	QPSK	55990	50RB#0	20.68
LTE Band 48	20	QPSK	55990	50RB#25	20.47
LTE Band 48	20	QPSK	55990	50RB#50	20.36
LTE Band 48	20	QPSK	55990	100RB#0	20.54
LTE Band 48	20	QPSK	56640	1RB#0	21.12
LTE Band 48	20	QPSK	56640	1RB#50	20.83
LTE Band 48	20	QPSK	56640	1RB#99	21.25
LTE Band 48	20	QPSK	56640	50RB#0	19.73
LTE Band 48	20	QPSK	56640	50RB#25	19.86
LTE Band 48	20	QPSK	56640	50RB#50	19.97



LTE Band 48	20	QPSK	56640	100RB#0	19.79
LTE Band 48	20	16QAM	55340	1RB#0	20.50
LTE Band 48	20	16QAM	55340	1RB#50	20.83
LTE Band 48	20	16QAM	55340	1RB#99	21.11
LTE Band 48	20	16QAM	55340	50RB#0	19.77
LTE Band 48	20	16QAM	55340	50RB#25	19.83
LTE Band 48	20	16QAM	55340	50RB#50	19.97
LTE Band 48	20	16QAM	55340	100RB#0	19.87
LTE Band 48	20	16QAM	55990	1RB#0	21.01
LTE Band 48	20	16QAM	55990	1RB#50	20.28
LTE Band 48	20	16QAM	55990	1RB#99	20.32
LTE Band 48	20	16QAM	55990	50RB#0	19.56
LTE Band 48	20	16QAM	55990	50RB#25	19.34
LTE Band 48	20	16QAM	55990	50RB#50	19.20
LTE Band 48	20	16QAM	55990	100RB#0	19.38
LTE Band 48	20	16QAM	56640	1RB#0	19.72
LTE Band 48	20	16QAM	56640	1RB#50	20.02
LTE Band 48	20	16QAM	56640	1RB#99	19.82
LTE Band 48	20	16QAM	56640	50RB#0	18.86
LTE Band 48	20	16QAM	56640	50RB#25	18.99
LTE Band 48	20	16QAM	56640	50RB#50	19.10
LTE Band 48	20	16QAM	56640	100RB#0	18.92
LTE Band 48	20	64QAM	55340	1RB#0	19.29
LTE Band 48	20	64QAM	55340	1RB#50	19.58
LTE Band 48	20	64QAM	55340	1RB#99	19.81
LTE Band 48	20	64QAM	55340	50RB#0	18.79
LTE Band 48	20	64QAM	55340	50RB#25	19.01
LTE Band 48	20	64QAM	55340	50RB#50	18.99
LTE Band 48	20	64QAM	55340	100RB#0	18.88
LTE Band 48	20	64QAM	55990	1RB#0	19.63
LTE Band 48	20	64QAM	55990	1RB#50	19.03
LTE Band 48	20	64QAM	55990	1RB#99	18.74
LTE Band 48	20	64QAM	55990	50RB#0	18.96
LTE Band 48	20	64QAM	55990	50RB#25	18.68
LTE Band 48	20	64QAM	55990	50RB#50	18.52
LTE Band 48	20	64QAM	55990	100RB#0	18.66
LTE Band 48	20	64QAM	56640	1RB#0	18.47
LTE Band 48	20	64QAM	56640	1RB#50	18.78
LTE Band 48	20	64QAM	56640	1RB#99	18.59
LTE Band 48	20	64QAM	56640	50RB#0	17.95
LTE Band 48	20	64QAM	56640	50RB#25	18.07
LTE Band 48	20	64QAM	56640	50RB#50	18.20
LTE Band 48	20	64QAM	56640	100RB#0	18.01

5.2. Maximum Effective Isotropic Radiated Power and Maximum Power Spectral Density

Ambient condition

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

Methods of Measurement

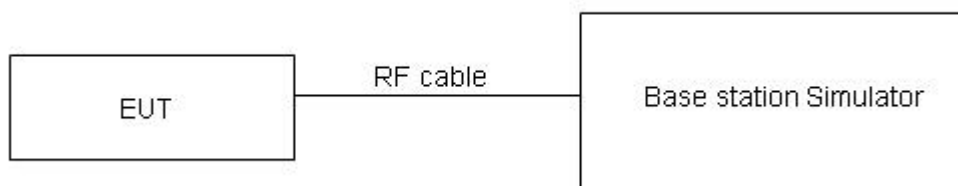
The testing follows procedure in Section 5.2 of ANSI C63.26-2015 and KDB 940660 D01 Section 3.2(b)(2).

Determine the EIRP by adding the effective antenna gain to the measured average conducted power level.

The EIRP of mobile transmitters must not exceed 23 dBm /10 megahertz for Band 48.

The testing follows ANSI C63.26-2015 Section 5.2.5.5

Test setup



A transmitter port of EUT is connected to the input of a signal analyzer. All measurements are performed as RMS average measurements while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

Limits

EIRP for End User Device equipment as below tabel:

Device	Maximum EIRP (dBm/10MHz)	Maximum PSD (dBm/MHz)
End User Device	23	N/A

Measurement Uncertainty

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

**Test Results:**

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

Maximum Effective Isotropic Radiated Power

LTE Band 48 QPSK												
Bandwidth	5MHz			10MHz			15MHz			20MHz		
Channel	(Low)	(Middle)	(High)	(Low)	(Middle)	(High)	(Low)	(Middle)	(High)	(Low)	(Middle)	(High)
Conducted Power (dBm/10MHz)	22.14	21.62	21.42	22.07	21.79	21.32	22.04	21.78	21.28	22.02	21.74	21.25
Conducted Power (Watts/10MHz)	0.164	0.168	0.139	0.161	0.163	0.136	0.160	0.161	0.134	0.159	0.160	0.133
EIRP(dBm/10MHz)	22.64	22.82	21.12	22.57	22.99	21.02	22.54	22.98	20.98	22.52	22.94	20.95
EIRP(Watts/10MHz)	0.184	0.191	0.129	0.181	0.199	0.126	0.179	0.199	0.125	0.179	0.197	0.124
LTE Band 48 16QAM												
Bandwidth	5MHz			10MHz			15MHz			20MHz		
Channel	(Low)	(Middle)	(High)	(Low)	(Middle)	(High)	(Low)	(Middle)	(High)	(Low)	(Middle)	(High)
Conducted Power (dBm/10MHz)	21.18	20.46	20.12	20.89	21.07	20.08	21.13	21.05	20.06	21.11	21.01	20.02
Conducted Power (Watts/10MHz)	0.131	0.111	0.103	0.123	0.128	0.102	0.130	0.127	0.101	0.129	0.126	0.100
EIRP(dBm/10MHz)	21.68	21.66	19.82	21.39	22.27	19.78	21.63	22.25	19.76	21.61	22.21	19.72
EIRP(Watts/10MHz)	0.147	0.147	0.096	0.138	0.169	0.095	0.146	0.168	0.095	0.145	0.166	0.094
LTE Band 48 64QAM												
Bandwidth	5MHz			10MHz			15MHz			20MHz		
Channel	(Low)	(Middle)	(High)	(Low)	(Middle)	(High)	(Low)	(Middle)	(High)	(Low)	(Middle)	(High)
Conducted Power (dBm/10MHz)	19.93	19.84	18.89	19.86	19.71	18.83	19.83	19.67	18.80	19.81	19.63	18.78
Conducted Power (Watts/10MHz)	0.098	0.096	0.077	0.097	0.094	0.076	0.096	0.093	0.076	0.096	0.092	0.076
EIRP(dBm/10MHz)	20.43	21.04	18.59	20.36	20.91	18.53	20.33	20.87	18.50	20.31	20.83	18.48
EIRP(Watts/10MHz)	0.110	0.127	0.072	0.109	0.123	0.071	0.108	0.122	0.071	0.107	0.121	0.070
Note: There are more than one RB configuration, each one should be applied throughout the compliance test respectively, however, only the worst case will be recorded in this report.												

5.3. Occupied Bandwidth

Ambient condition

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

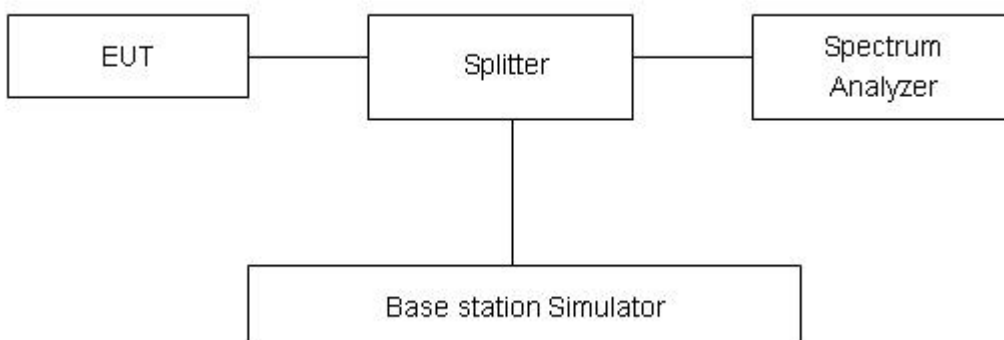
Method of Measurement

The occupied bandwidth is the width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5% of the total mean transmitted power.

The testing follows FCC KDB 971168 D01 v03r01 Section 4.2

1. The EUT was connected to spectrum analyzer and system simulator via a power divider.
2. The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the spectrum analyzer shall be between two and five times the anticipated OBW.
3. The nominal resolution bandwidth (RBW) shall be in the range of 1 to 5 % of the anticipated OBW, and the VBW shall be at least 3 times the RBW.
4. Set the detection mode to peak, and the trace mode to max hold.
5. Determine the reference value: Set the EUT to transmit a modulated signal. Allow the trace to stabilize. Set the spectrum analyzer marker to the highest level of the displayed trace. (this is the reference value)
6. Determine the “-26 dB down amplitude” as equal to (Reference Value – X).
7. Place two markers, one at the lowest and the other at the highest frequency of the envelope of the spectral display such that each marker is at or slightly below the “-X dB down amplitude” determined in step 6. If a marker is below this “-X dB down amplitude” value it shall be placed as close as possible to this value. The OBW is the positive frequency difference between the two markers.
8. Use the 99 % power bandwidth function of the spectrum analyzer and report the measured bandwidth.

Test Setup





Limits

The 26 dB emission bandwidth is defined as the frequency range between two points, one above and one below the carrier frequency, at which the spectral density of the emission is attenuated 26 dB below the maximum in-band spectral density of the modulated signal. Spectral density (power per unit bandwidth) is to be measured with a detector of resolution bandwidth equal to approximately 1.0% of the emission bandwidth.

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 48						
RB	Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	99% Power Bandwidth(MHz)	-26dBc Bandwidth(MHz)
100%	QPSK	5	55265	3552.5	4.5390	5.437
			55990	3625	4.5260	5.284
			56715	3697.5	4.5468	5.489
		10	55290	3555	8.9908	9.968
			55990	3625	8.9641	9.980
			56690	3695	8.9783	9.802
		15	55315	3557.5	13.4780	14.670
			55990	3625	13.4390	14.320
			56665	3692.5	13.4500	14.490
		20	55340	3560	17.9500	19.410
			55990	3625	17.9120	19.170
			56640	3690	17.9480	19.290
	16QAM	5	55265	3552.5	4.5072	5.295
			55990	3625	4.5302	5.269
			56715	3697.5	4.5155	5.209
		10	55290	3555	8.9594	10.000
			55990	3625	8.9756	9.746
			56690	3695	8.9786	9.967
		15	55315	3557.5	13.4760	14.800
			55990	3625	13.4180	14.460
			56665	3692.5	13.4280	14.310
		20	55340	3560	17.8890	19.180
			55990	3625	17.9360	19.200
			56640	3690	17.9040	19.080



	64QAM	5	55265	3552.5	4.5362	5.159
			55990	3625	4.5100	5.257
			56715	3697.5	4.5099	5.073
		10	55290	3555	8.9849	9.907
			55990	3625	8.9962	9.749
			56690	3695	8.9673	9.655
		15	55315	3557.5	13.4050	14.580
			55990	3625	13.4480	14.520
			56665	3692.5	13.3910	14.430
		20	55340	3560	17.9170	19.170
			55990	3625	17.8970	18.990
			56640	3690	17.8860	19.180



LTE Band 48 5MHz QPSK CH-Low



LTE Band 48 10MHz QPSK CH-Low



LTE Band 48 5MHz QPSK CH-Middle



LTE Band 48 10MHz QPSK CH-Middle



LTE Band 48 5MHz QPSK CH-High



LTE Band 48 10MHz QPSK CH-High





LTE Band 48 15MHz QPSK CH-Low



LTE Band 48 20MHz QPSK CH-Low



LTE Band 48 15MHz QPSK CH-Middle



LTE Band 48 20MHz QPSK CH-Middle



LTE Band 48 15MHz QPSK CH-High



LTE Band 48 20MHz QPSK CH-High





LTE Band 48 5MHz 16QAM CH-Low



LTE Band 48 10MHz 16QAM CH-Low



LTE Band 48 5MHz 16QAM CH-Middle



LTE Band 48 10MHz 16QAM CH-Middle



LTE Band 48 5MHz 16QAM CH-High



LTE Band 48 10MHz 16QAM CH-High





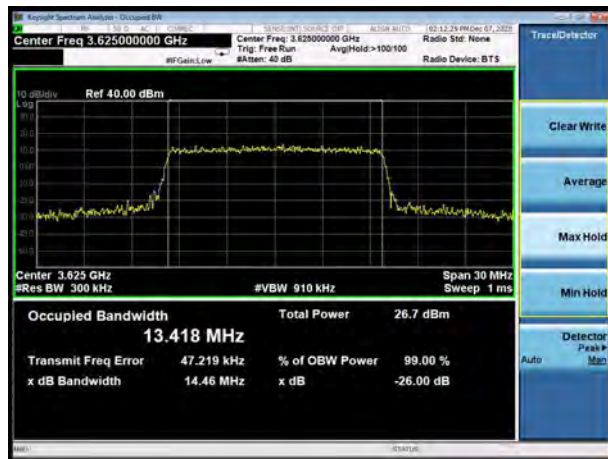
LTE Band 48 15MHz 16QAM CH-Low



LTE Band 48 20MHz 16QAM CH-Low



LTE Band 48 15MHz 16QAM CH-Middle



LTE Band 48 20MHz 16QAM CH-Middle



LTE Band 48 15MHz 16QAM CH-High



LTE Band 48 20MHz 16QAM CH-High





LTE Band 48 5MHz 64QAM CH-Low



LTE Band 48 10MHz 64QAM CH-Low



LTE Band 48 5MHz 64QAM CH-Middle



LTE Band 48 10MHz 64QAM CH-Middle



LTE Band 48 5MHz 64QAM CH-High



LTE Band 48 10MHz 64QAM CH-High





LTE Band 48 15MHz 64QAM CH-Low



LTE Band 48 20MHz 64QAM CH-Low



LTE Band 48 15MHz 64QAM CH-Middle



LTE Band 48 20MHz 64QAM CH-Middle



LTE Band 48 15MHz 64QAM CH-High



LTE Band 48 20MHz 64QAM CH-High



5.4. Band Edge Compliance

Ambient condition

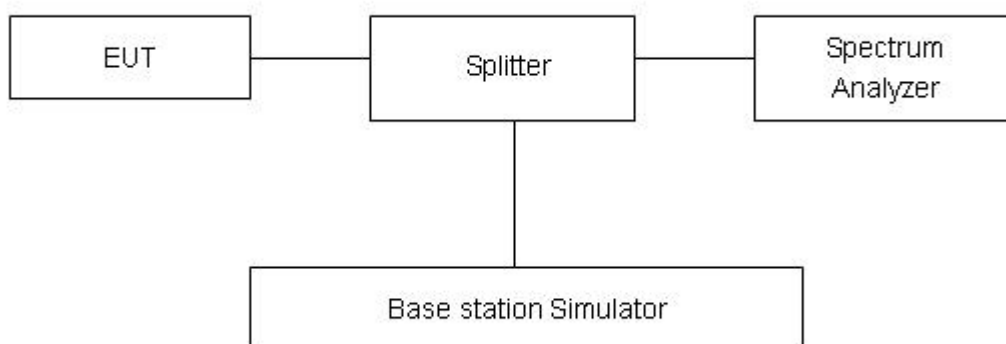
Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Method of Measurement

The testing follows FCC 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. Set RBW $\geq$ 1% EBW in the 1MHz band immediately outside and adjacent to the band edge.
4. Beyond the 1 MHz band from the band edge, RBW=1MHz was used
5. Set spectrum analyzer with RMS detector.
6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

Test Setup



Limits

Rule Part 96.41(e) (1) (i) specifies that “Except as otherwise specified in paragraph (e)(2) of this section, for channel and frequency assignments made by the SAS to CBSDs, the conducted power of any CBSD emission outside the fundamental emission bandwidth as specified in paragraph (e)(3) of this section (whether the emission is inside or outside of the authorized band) shall not exceed –13 dBm/MHz within 0-10 megahertz above the upper SAS-assigned channel edge and within 0-10 megahertz below the lower SAS-assigned channel edge. At all frequencies greater than 10 megahertz above the upper SAS assigned channel edge and less than 10 MHz below the lower SAS assigned channel edge, the conducted power of any CBSD emission shall not exceed –25 dBm/MHz. The upper and lower SAS assigned channel edges are the upper and lower limits of any channel assigned to a CBSD by an SAS, or in the case of multiple contiguous channels, the upper and lower limits of the combined contiguous channels.”

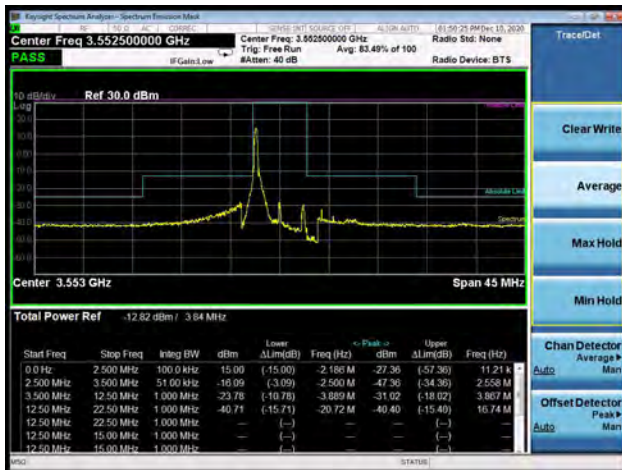


Measurement Uncertainty

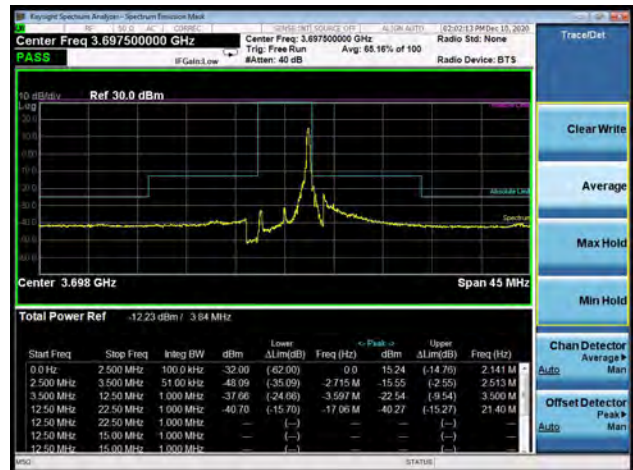
The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 1.96$, $U=0.684\text{dB}$.

Test Result:

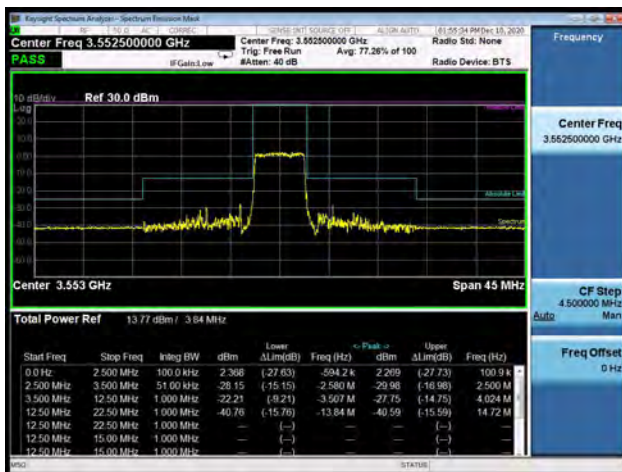
LTE Band 48 QPSK 5MHz CH-Low, 1 RB



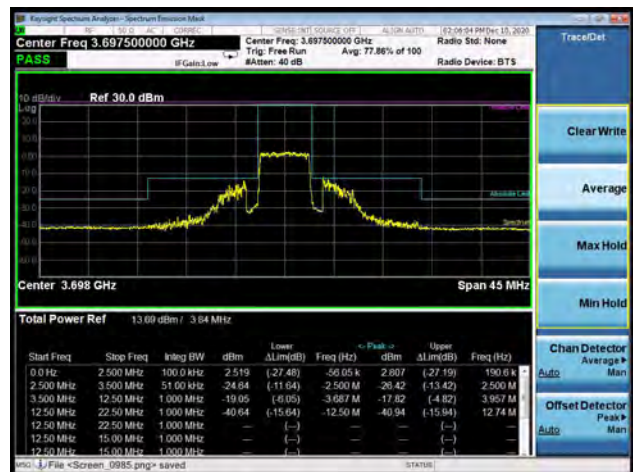
LTE Band 48 QPSK 5MHz CH-High, 1 RB



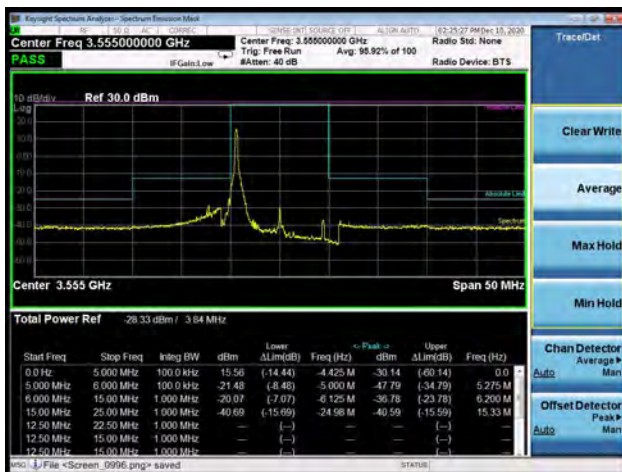
LTE Band 48 QPSK 5MHz CH-Low, 100%RB



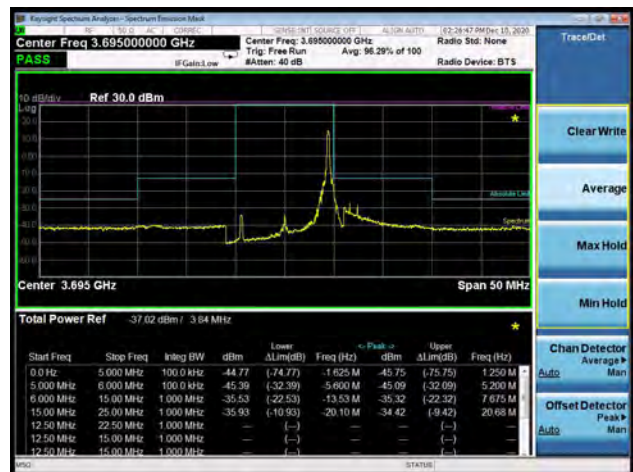
LTE Band 48 QPSK 5MHz CH-High, 100%RB



LTE Band 48 QPSK 10MHz CH-Low, 1 RB

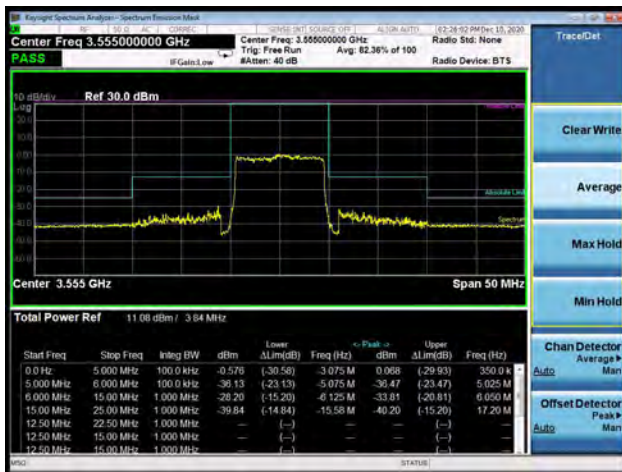


LTE Band 48 QPSK 10MHz CH-High, 1 RB





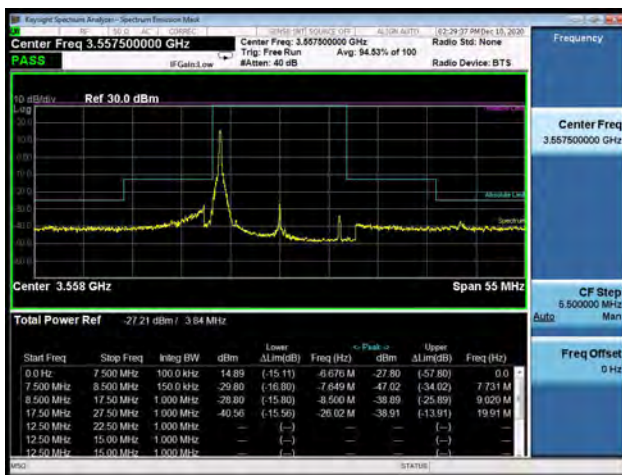
LTE Band 48 QPSK 10MHz CH-Low, 100%RB



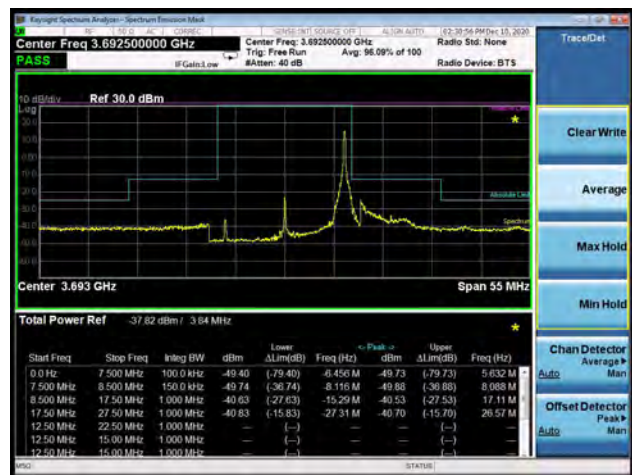
LTE Band 48 QPSK 10MHz CH-High, 100%RB



LTE Band 48 QPSK 15MHz CH-Low, 1 RB



LTE Band 48 QPSK 15MHz CH-High, 1 RB



LTE Band 48 QPSK 15MHz CH-Low, 100%RB



LTE Band 48 QPSK 15MHz CH-High, 100%RB

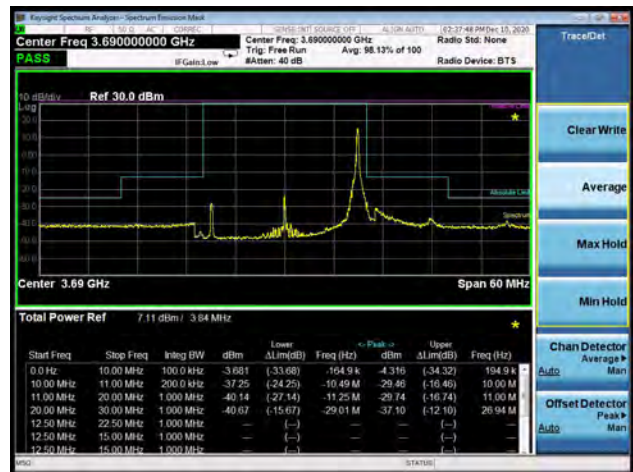




LTE Band 48 QPSK 20MHz CH-Low, 1 RB



LTE Band 48 QPSK 20MHz CH-High, 1 RB



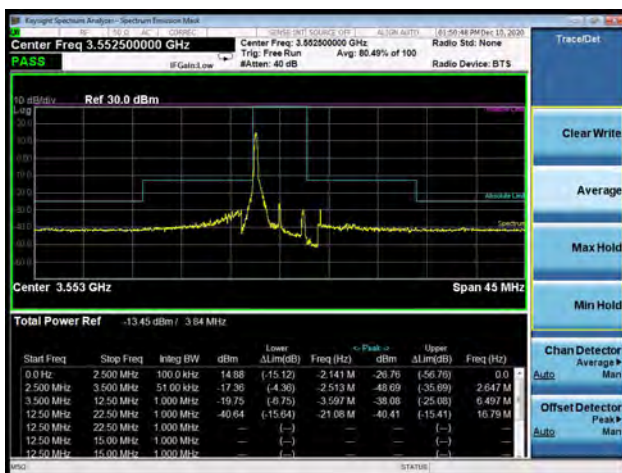
LTE Band 48 QPSK 20MHz CH-Low, 100%RB



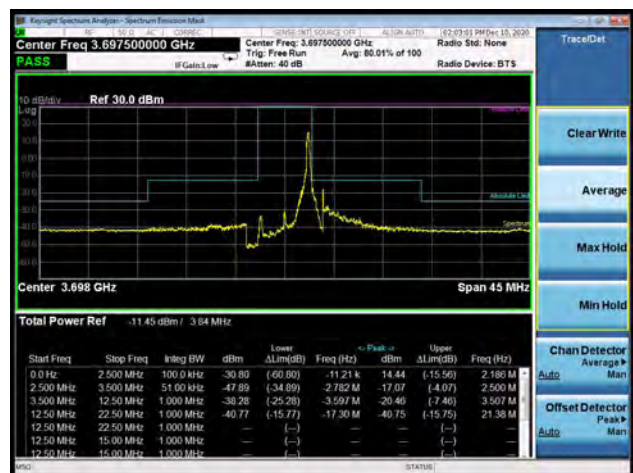
LTE Band 48 QPSK 20MHz CH-High, 100%RB



LTE Band 48 16QAM 5MHz CH-Low, 1 RB

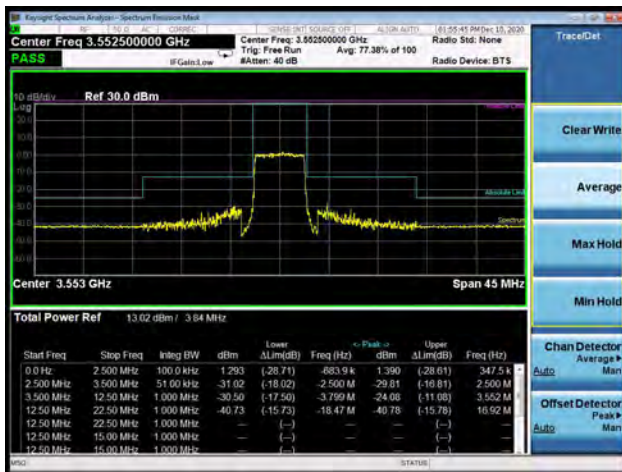


LTE Band 48 16QAM 5MHz CH-High, 1 RB

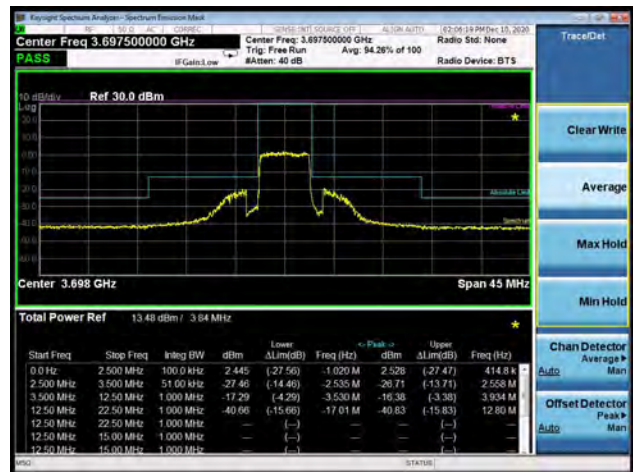




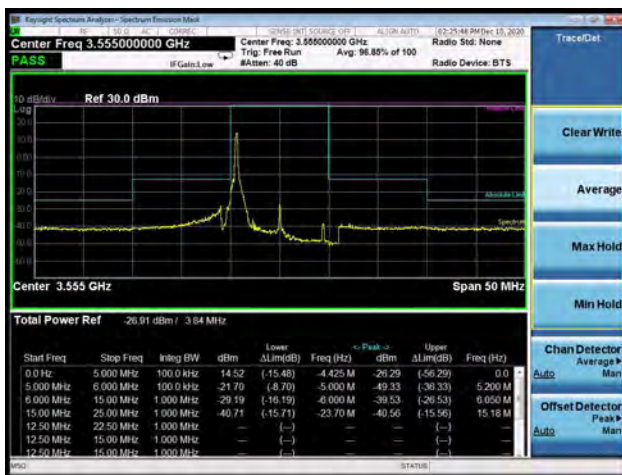
LTE Band 48 16QAM 5MHz CH-Low, 100%RB



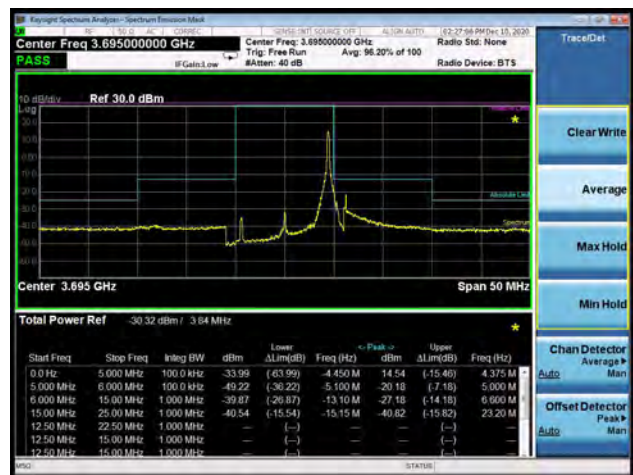
LTE Band 48 16QAM 5MHz CH-High, 100%RB



LTE Band 48 16QAM 10MHz CH-Low, 1 RB



LTE Band 48 16QAM 10MHz CH-High, 1 RB



LTE Band 48 16QAM 10MHz CH-Low, 100%RB

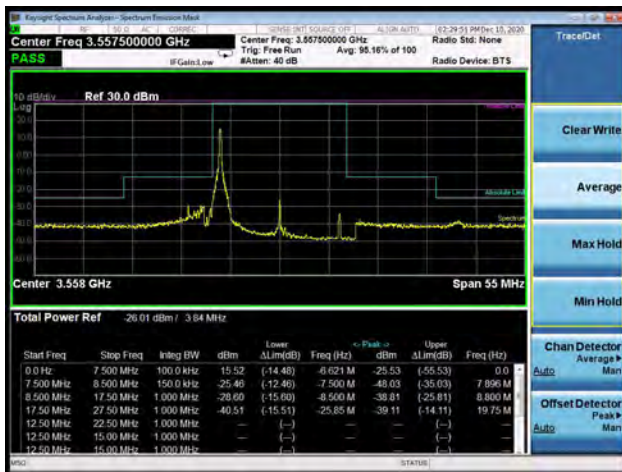


LTE Band 48 16QAM 10MHz CH-High, 100%RB

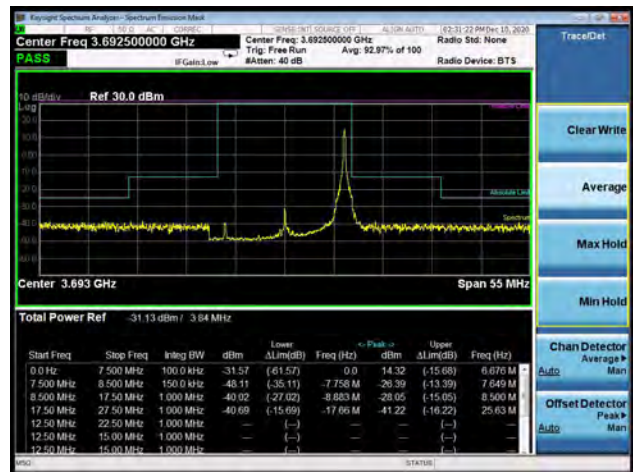




LTE Band 48 16QAM 15MHz CH-Low, 1 RB



LTE Band 48 16QAM 15MHz CH-High, 1 RB



LTE Band 48 16QAM 15MHz CH-Low, 100%RB



LTE Band 48 16QAM 15MHz CH-High, 100%RB



LTE Band 48 16QAM 20MHz CH-Low, 1 RB



LTE Band 48 16QAM 20MHz CH-High, 1 RB

