



RF TEST REPORT

Applicant ZTE Corporation
FCC ID SRQ-Z6750M
Product 5G NR Multi-Mode Mobile Phone
Model Z6750M
Report No. R2008A0534-R2V1
Issue Date October 29, 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 24E (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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Version	Revision description	Issue Date
Rev.0	/	October 21, 2020
Rev.1	Update description in Chapter 5.1.	October 29, 2020
Note This revised report (Report No.: R2008A0534-R2V1) supersedes and replaces the previously issued report (Report No.: R2008A0534-R2). Please discard or destroy the previously issued report and dispose of it accordingly.		

Summary of measurement results

No.	Test Case	Clause in FCC rules	Verdict
1	RF Power Output and Effective Isotropic Radiated Power	2.1046 24.232(c)	PASS
2	Occupied Bandwidth	2.1049	PASS
3	Band Edge Compliance	2.1051 /24.238(a)	PASS
4	Peak-to-Average Power Ratio	24.232/KDB 971168 D01(5.7)	PASS
5	Frequency Stability	2.1055 / 24.235	PASS
6	Spurious Emissions at Antenna Terminals	2.1051 / 24.238(a)	PASS
7	Radiates Spurious Emission	2.1053 / 24.238(a)	PASS
Date of Testing: August 14, 2020 ~ October 12, 2020			
Date of Sample Receiving: August 14, 2020			
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. 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 electromagnetic emission measurement.

1.3. Testing Location

Company: TA Technology (Shanghai) Co., Ltd.
Address: No.145, Jintang Rd, Tangzhen Industry Park, Pudong
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2. General Description of Equipment under Test

2.3. Applicant and Manufacturer Information

Applicant	ZTE Corporation
Applicant address	ZTE Plaza, Keji Road South, Hi-Tech, Industrial Park, Nanshan District, Shenzhen, Guangdong, 518057, P.R.China
Manufacturer	ZTE Corporation
Manufacturer address	ZTE Plaza, Keji Road South, Hi-Tech, Industrial Park, Nanshan District, Shenzhen, Guangdong, 518057, P.R.China

2.4. General information

EUT Description			
Model	Z6750M		
IMEI	865633050021551		
Hardware Version	Z6750MHW1.0		
Software Version	Z6750MV1.0.0B01		
Power Supply	Battery/AC adapter		
Antenna Type	Internal Antenna		
Antenna Gain	-0.67dBi		
Test Mode(s)	LTE Band 2;		
Test Modulation	(LTE)QPSK 16QAM 64QAM;		
LTE Category	18		
Maximum E.I.R.P	LTE Band 2:	23.79dBm	
Rated Power Supply Voltage	4.0V		
Extreme Voltage	Minimum: 3.5V	Maximum: 4.4V	
Extreme Temperature	Lowest: -30°C	Highest: +50°C	
Operating Voltage	Minimum: 3.5V	Maximum: 4.4V	
Operating Temperature	Lowest: -10°C	Highest: +55°C	
Operating Frequency Range(s)	Band	Tx (MHz)	Rx (MHz)
	LTE Band 2	1850 ~ 1910	1930 ~ 1990
EUT Accessory			
Battery	Manufacturer: COSMX Model: Li3939T44P8h756547		
Adapter 1	Manufacturer: SHENZHEN RUIJING INDUSTRIAL CO LTD Model: STC-A5930A1-Z		
Adapter 2	Manufacturer: Jiangsu Chenyang Electron Co., Ltd. Model: STC-A5930A1-Z		
USB Cable 1	Manufacturer: kingpower-tech Model: USB-TC30-W-100-M		
USB Cable 2	Manufacturer: Luxshare Precision industry Co., Ltd.		



	Model: USB-TC30-W-100-M
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Note: 1. The EUT is sent from the applicant to TA and the information of the EUT is declared by the applicant.

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

3. Applied Standards

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

Test standards:

FCC CFR 47 Part 24E (2019)

ANSI C63.26 (2015)

Reference standard:

FCC CFR47 Part 2 (2019)

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, 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.

Test modes are chosen to be reported as the worst case configuration below for LTE Band 2:

Test items	Bandwidth (MHz)						Modulation		RB			Test Channel		
	1.4	3	5	10	15	20	QPSK	16QAM	1	50%	100%	L	M	H
RF Power Output and Effective Isotropic Radiated Power	O	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	O
Band Edge Compliance	O	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	O
Frequency Stability	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Conducted Spurious Emissions	O	O	O	O	O	O	O	-	O	-	-	O	O	O
Radiates Spurious Emission	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 and Effective Isotropic Radiated Power

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 was connected to the Base Station Simulator with a known loss. The EUT is controlled by the Base Station Simulator test set to ensure max power transmission with proper modulation.

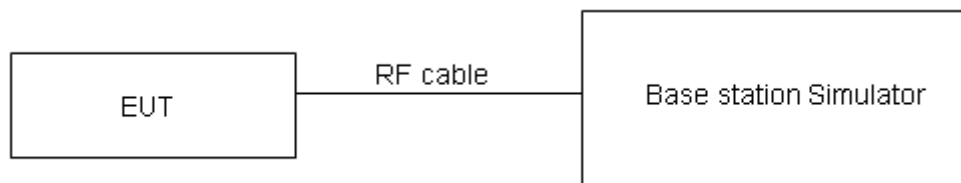
ERP can then be calculated as follows:

$$\text{EIRP (dBm)} = \text{Output Power (dBm)} - \text{Losses (dB)} + \text{Antenna Gain (dBi)}$$

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

$$\text{EIRP (dBm)} = \text{ERP (dBm)} + 2.15 \text{ (dB.)}$$

Test Setup



Limits

No specific RF power output requirements in part 2.1046.

Rule Part 24.232(c) Mobile and portable stations are limited to 2 watts EIRP.

Rule Part 24.232(e) Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage.

Limit	$\leq 2 \text{ W}$ (33 dBm)
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Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 2$, $U = 0.4 \text{ dB}$ for RF power output, $k = 2$, $U = 1.19 \text{ dB}$ for EIRP.

Test Results

LTE Band 2									
Bandwidth	Modulation	RB allocation	offset	Maximum Output Power(dBm)			EIRP (dBm)		
				Channel/Frequency(MHz)					
				18607/ 1850.7	18900/ 1880	19193/ 1909.3	18607/ 1850.7	18900/ 1880	19193/ 1909.3
1.4MHz	QPSK	1	0	24.21	24.28	24.26	23.54	23.61	23.59
		1	2	24.17	24.19	24.15	23.50	23.52	23.48
		1	5	24.10	24.12	24.23	23.43	23.45	23.56
		3	0	24.23	24.35	24.26	23.56	23.68	23.59
		3	2	24.35	24.35	24.42	23.68	23.68	23.75
		3	3	24.46	24.29	24.41	23.79	23.62	23.74
		6	0	23.33	23.32	23.28	22.66	22.65	22.61
	16QAM	1	0	23.12	23.52	23.57	22.45	22.85	22.90
		1	2	23.10	23.45	23.46	22.43	22.78	22.79
		1	5	23.25	23.58	23.64	22.58	22.91	22.97
		3	0	22.90	23.19	23.25	22.23	22.52	22.58
		3	2	22.89	23.19	23.24	22.22	22.52	22.57
		3	3	23.02	23.35	23.38	22.35	22.68	22.71
		6	0	21.93	22.24	22.26	21.26	21.57	21.59
	64QAM	1	0	23.08	23.40	23.61	22.41	22.73	22.94
		1	2	23.17	23.51	23.58	22.50	22.84	22.91
		1	5	22.98	23.33	23.33	22.31	22.66	22.66
		3	0	22.87	23.19	23.25	22.20	22.52	22.58
		3	2	22.92	23.23	23.31	22.25	22.56	22.64
		3	3	22.99	23.32	23.34	22.32	22.65	22.67
		6	0	21.94	22.28	22.33	21.27	21.61	21.66
Bandwidth	Modulation	RB allocation	offset	Maximum Output Power(dBm)			EIRP (dBm)		
				Channel/Frequency(MHz)					
				18615/ 1851.5	18900/ 1880	19185/ 1908.5	18615/ 1851.5	18900/ 1880	19185/ 1908.5
3MHz	QPSK	1	0	24.23	24.32	24.29	23.56	23.65	23.62
		1	7	24.15	24.22	24.19	23.48	23.55	23.52
		1	14	24.13	24.17	24.27	23.46	23.50	23.60
		8	0	23.33	23.47	23.39	22.66	22.80	22.72
		8	4	23.47	23.45	23.54	22.80	22.78	22.87
		8	7	23.56	23.40	23.51	22.89	22.73	22.84
		15	0	23.33	23.36	23.31	22.66	22.69	22.64
	16QAM	1	0	23.15	23.54	23.60	22.48	22.87	22.93
		1	7	23.13	23.45	23.50	22.46	22.78	22.83
		1	14	23.27	23.62	23.67	22.60	22.95	23.00
		8	0	22.01	22.32	22.37	21.34	21.65	21.70



		8	4	22.00	22.32	22.36	21.33	21.65	21.69	
		8	7	22.12	22.47	22.51	21.45	21.80	21.84	
		15	0	21.96	22.28	22.29	21.29	21.61	21.62	
		64QAM	1	0	23.11	23.42	23.64	22.44	22.75	22.97
			1	7	23.20	23.51	23.60	22.53	22.84	22.93
			1	14	23.00	23.32	23.36	22.33	22.65	22.69
			8	0	21.98	22.32	22.37	21.31	21.65	21.70
			8	4	22.03	22.36	22.43	21.36	21.69	21.76
			8	7	22.09	22.44	22.47	21.42	21.77	21.80
			15	0	21.97	22.32	22.36	21.30	21.65	21.69
Bandwidth	Modulation	RB allocation	offset	Maximum Output Power(dBm)			EIRP (dBm)			
				Channel/Frequency(MHz)						
				18625/ 1852.5	18900/ 1880	19175/ 1907.5	18625/ 1852.5	18900/ 1880	19175/ 1907.5	
5MHz	QPSK	1	0	24.20	24.30	24.25	23.53	23.63	23.58	
		1	13	24.13	24.18	24.16	23.46	23.51	23.49	
		1	24	24.10	24.12	24.23	23.43	23.45	23.56	
		12	0	23.30	23.42	23.35	22.63	22.75	22.68	
		12	6	23.45	23.41	23.49	22.78	22.74	22.82	
		12	13	23.54	23.38	23.47	22.87	22.71	22.80	
		25	0	23.33	23.35	23.29	22.66	22.68	22.62	
	16QAM	1	0	23.12	23.50	23.57	22.45	22.83	22.90	
		1	13	23.10	23.43	23.47	22.43	22.76	22.80	
		1	24	23.24	23.60	23.63	22.57	22.93	22.96	
		12	0	21.99	22.28	22.34	21.32	21.61	21.67	
		12	6	21.97	22.27	22.32	21.30	21.60	21.65	
		12	13	22.09	22.42	22.47	21.42	21.75	21.80	
		25	0	21.94	22.24	22.24	21.27	21.57	21.57	
	64QAM	1	0	23.08	23.42	23.61	22.41	22.75	22.94	
		1	13	23.17	23.53	23.57	22.50	22.86	22.90	
		1	24	23.01	23.30	23.32	22.34	22.63	22.65	
		12	0	21.96	22.28	22.38	21.29	21.61	21.71	
		12	6	22.00	22.31	22.39	21.33	21.64	21.72	
		12	13	22.06	22.39	22.43	21.39	21.72	21.76	
		25	0	21.95	22.28	22.31	21.28	21.61	21.64	
Bandwidth	Modulation	RB allocation	offset	Maximum Output Power(dBm)			EIRP (dBm)			
				Channel/Frequency(MHz)						
				18650/ 1855	18900/ 1880	19150/ 1905	18650/ 1855	18900/ 1880	19150/ 1905	
10MHz	QPSK	1	0	24.22	24.31	24.28	23.55	23.64	23.61	
		1	25	24.16	24.23	24.20	23.49	23.56	23.53	
		1	49	24.12	24.16	24.26	23.45	23.49	23.59	
		25	0	23.33	23.47	23.39	22.66	22.80	22.72	



		25	13	23.48	23.46	23.53	22.81	22.79	22.86	
		25	25	23.56	23.42	23.52	22.89	22.75	22.85	
		50	0	23.37	23.37	23.33	22.70	22.70	22.66	
	16QAM	1	0	23.14	23.53	23.59	22.47	22.86	22.92	
		1	25	23.13	23.47	23.50	22.46	22.80	22.83	
		1	49	23.27	23.62	23.66	22.60	22.95	22.99	
		25	0	22.02	22.33	22.38	21.35	21.66	21.71	
		25	13	21.99	22.31	22.35	21.32	21.64	21.68	
		25	25	22.12	22.47	22.51	21.45	21.80	21.84	
		50	0	21.97	22.29	22.28	21.30	21.62	21.61	
		64QAM	1	0	23.10	23.41	23.63	22.43	22.74	22.96
			1	25	23.20	23.53	23.60	22.53	22.86	22.93
	1		49	23.00	23.32	23.35	22.33	22.65	22.68	
	25		0	21.99	22.33	22.38	21.32	21.66	21.71	
	25		13	22.02	22.35	22.42	21.35	21.68	21.75	
	25		25	22.09	22.44	22.47	21.42	21.77	21.80	
	50		0	21.98	22.33	22.35	21.31	21.66	21.68	
Bandwidth	Modulation	RB allocation	offset	Maximum Output Power(dBm)			EIRP (dBm)			
				Channel/Frequency(MHz)						
				18675/ 1857.5	18900/ 1880	19125/ 1902.5	18675/ 1857.5	18900/ 1880	19125/ 1902.5	
15MHz	QPSK	1	0	24.21	24.27	24.26	23.54	23.60	23.59	
		1	38	24.14	24.22	24.17	23.47	23.55	23.50	
		1	74	24.09	24.11	24.22	23.42	23.44	23.55	
		36	0	23.31	23.43	23.36	22.64	22.76	22.69	
		36	18	23.45	23.41	23.49	22.78	22.74	22.82	
		36	39	23.53	23.39	23.48	22.86	22.72	22.81	
		75	0	23.35	23.33	23.28	22.68	22.66	22.61	
	16QAM	1	0	23.09	23.51	23.57	22.42	22.84	22.90	
		1	38	23.11	23.44	23.48	22.44	22.77	22.81	
		1	74	23.24	23.58	23.63	22.57	22.91	22.96	
		36	0	21.99	22.31	22.35	21.32	21.64	21.68	
		36	18	21.96	22.26	22.31	21.29	21.59	21.64	
		36	39	22.10	22.43	22.48	21.43	21.76	21.81	
		75	0	21.94	22.24	22.24	21.27	21.57	21.57	
	64QAM	1	0	23.05	23.39	23.61	22.38	22.72	22.94	
		1	38	23.18	23.50	23.58	22.51	22.83	22.91	
		1	74	23.01	23.31	23.36	22.34	22.64	22.69	
		36	0	21.98	22.35	22.39	21.31	21.68	21.72	
		36	18	22.00	22.32	22.41	21.33	21.65	21.74	
		36	39	22.07	22.40	22.44	21.40	21.73	21.77	
		75	0	21.95	22.28	22.31	21.28	21.61	21.64	
Bandwidth	Modulation	RB	offset	Maximum Output Power(dBm)			EIRP (dBm)			



		allocation		Channel/Frequency(MHz)					
				18700/ 1860	18900/ 1880	19100/ 1900	18700/ 1860	18900/ 1880	19100/ 1900
20MHz	QPSK	1	0	24.18	24.23	24.23	23.51	23.56	23.56
		1	50	24.13	24.18	24.15	23.46	23.51	23.48
		1	99	24.07	24.10	24.19	23.40	23.43	23.52
		50	0	23.28	23.38	23.32	22.61	22.71	22.65
		50	25	23.43	23.37	23.46	22.76	22.70	22.79
		50	50	23.50	23.34	23.44	22.83	22.67	22.77
		100	0	23.32	23.28	23.24	22.65	22.61	22.57
	16QAM	1	0	23.19	23.47	23.52	22.52	22.80	22.85
		1	50	23.07	23.42	23.44	22.40	22.75	22.77
		1	99	23.22	23.55	23.61	22.55	22.88	22.94
		50	0	21.96	22.27	22.32	21.29	21.60	21.65
		50	25	21.93	22.24	22.28	21.26	21.57	21.61
		50	50	22.07	22.38	22.44	21.40	21.71	21.77
		100	0	21.92	22.20	22.21	21.25	21.53	21.54
	64QAM	1	0	23.03	23.35	23.56	22.36	22.68	22.89
		1	50	23.14	23.48	23.54	22.47	22.81	22.87
		1	99	22.95	23.25	23.30	22.28	22.58	22.63
		50	0	21.93	22.27	22.32	21.26	21.60	21.65
		50	25	21.96	22.28	22.35	21.29	21.61	21.68
		50	50	22.04	22.35	22.40	21.37	21.68	21.73
		100	0	21.93	22.24	22.28	21.26	21.57	21.61

5.2.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 30 kHz, VBW is set to 91kHz for LTE Band 2 (1.4MHz),

RBW is set to 62 kHz, VBW is set to 180 kHz for LTE Band 2 (3MHz),

RBW is set to 100 kHz, VBW is set to 300 kHz for LTE Band 2 (5MHz),

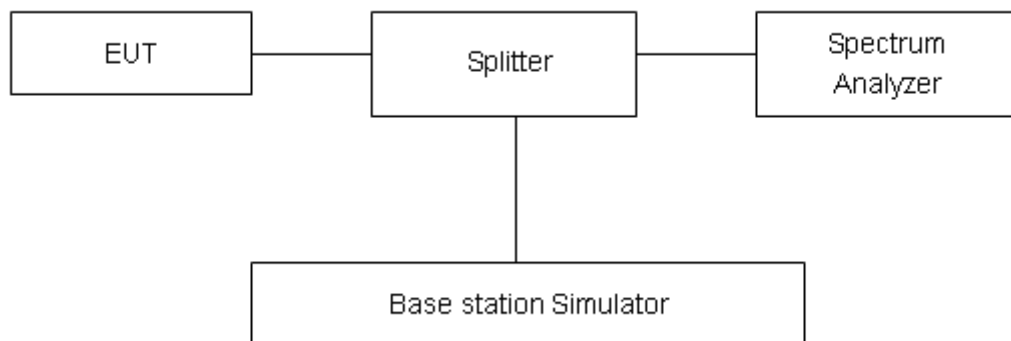
RBW is set to 200 kHz, VBW is set to 620kHz for LTE Band 2 (10MHz),

RBW is set to 300kHz,VBW is set to 910kHz for LTE Band 2 (15MHz).

RBW is set to 430kHz,VBW is set to 1.2MHz for LTE Band 2 (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 $k = 2$, $U = 624\text{Hz}$.

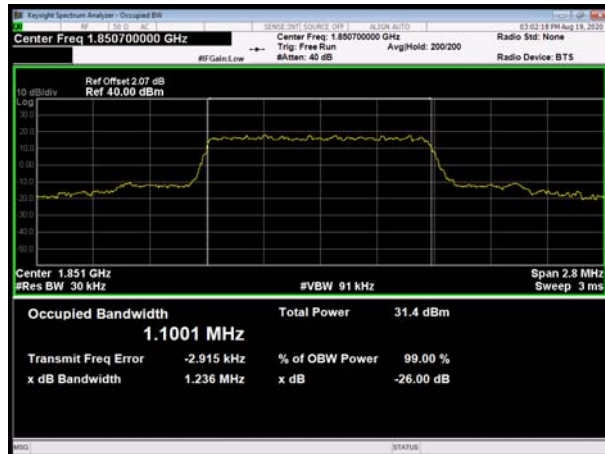
Test Result

LTE Band 2					
Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	99% Power Bandwidth(MHz)	-26dBc Bandwidth(MHz)
QPSK	1.4	18607	1850.7	1.1001	1.236
		18900	1880.0	1.0940	1.229
		19193	1909.3	1.0957	1.239
	3	18615	1851.5	2.7124	3.016
		18900	1880	2.6914	3.033
		19185	1908.5	2.7094	3.017
	5	18625	1852.5	4.5443	4.949
		18900	1880	4.5110	4.934
		19175	1907.5	4.5162	4.971
	10	18650	1855	8.9942	9.727
		18900	1880	8.9807	9.692
		19150	1905	8.9864	9.749
	15	18675	1857.5	13.4640	14.600
		18900	1880	13.4560	14.440
		19125	1902.5	13.5080	14.670
	20	18700	1860	17.8990	19.330
		18900	1880	17.9560	19.510
		19100	1900	17.9750	19.400
16QAM	1.4	18607	1850.7	1.1019	1.256
		18900	1880.0	1.0985	1.236
		19193	1909.3	1.0864	1.228
	3	18615	1851.5	2.7153	3.016
		18900	1880	2.7049	2.992
		19185	1908.5	2.6989	3.017
	5	18625	1852.5	4.5153	4.909
		18900	1880	4.5130	4.968
		19175	1907.5	4.5180	4.990
	10	18650	1855	8.9803	9.721
		18900	1880	8.9672	9.657
		19150	1905	8.9889	9.724



	15	18675	1857.5	13.4570	14.570
		18900	1880	13.4520	14.550
		19125	1902.5	13.4790	14.580
	20	18700	1860	17.9150	19.310
		18900	1880	17.9760	19.450
		19100	1900	17.9590	19.450
646QAM	1.4	18607	1850.7	1.1008	1.244
		18900	1880.0	1.0876	1.229
		19193	1909.3	1.0940	1.228
	3	18615	1851.5	2.7040	3.018
		18900	1880	2.7061	2.992
		19185	1908.5	2.6924	3.025
	5	18625	1852.5	4.5091	4.951
		18900	1880	4.5183	4.933
		19175	1907.5	4.5091	4.974
	10	18650	1855	8.9587	9.688
		18900	1880	8.9672	9.599
		19150	1905	9.0080	9.759
	15	18675	1857.5	13.4950	14.560
		18900	1880	13.5010	14.750
		19125	1902.5	13.4980	15.540
	20	18700	1860	18.0420	19.400
		18900	1880	17.9950	19.500
		19100	1900	17.9740	19.450

LTE Band 2 1.4MHz QPSK CH-Low



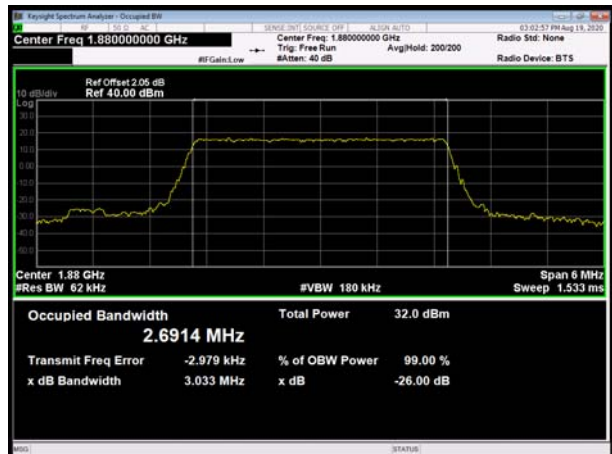
LTE Band 2 3MHz QPSK CH-Low



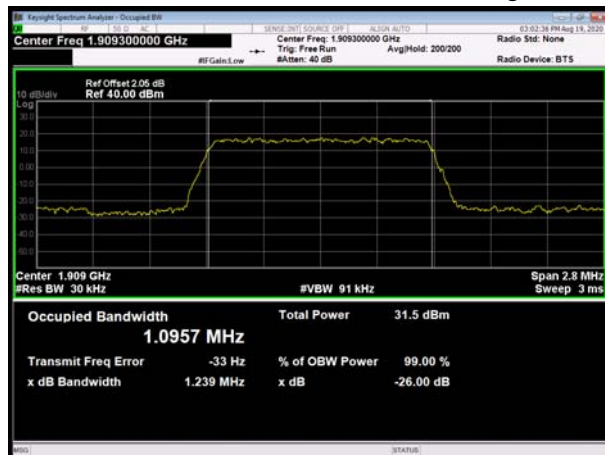
LTE Band 2 1.4MHz QPSK CH-Middle



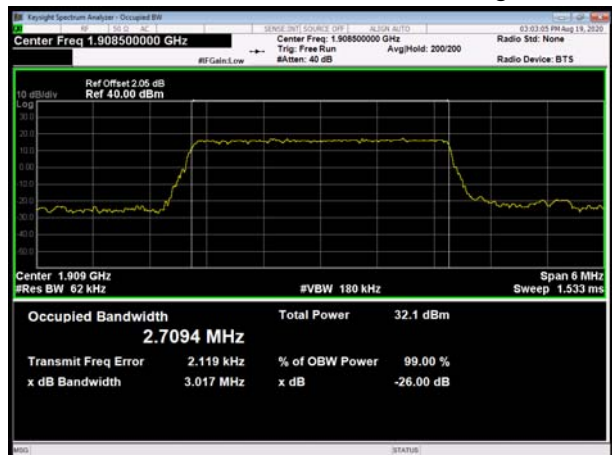
LTE Band 2 3MHz QPSK CH-Middle



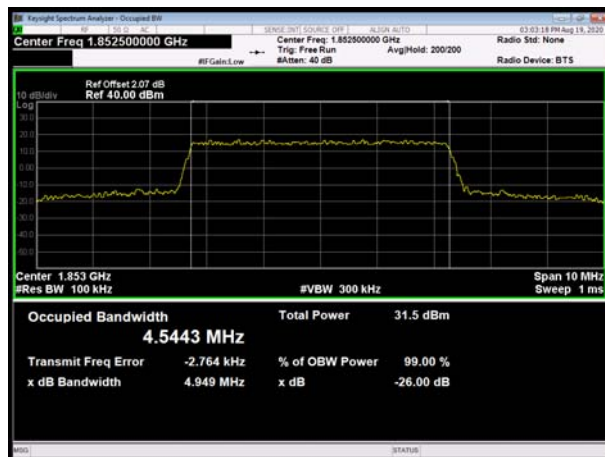
LTE Band 2 1.4MHz QPSK CH-High



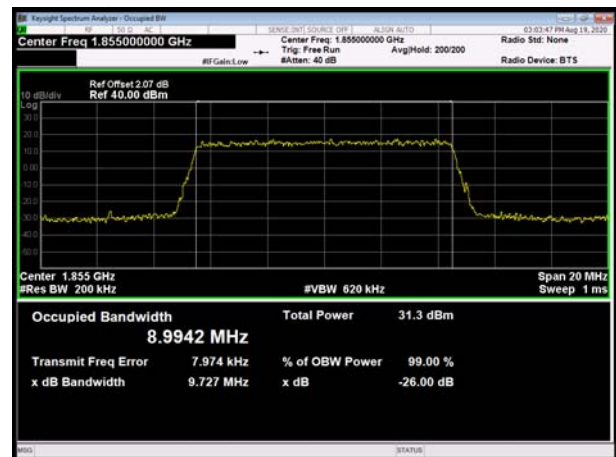
LTE Band 2 3MHz QPSK CH-High



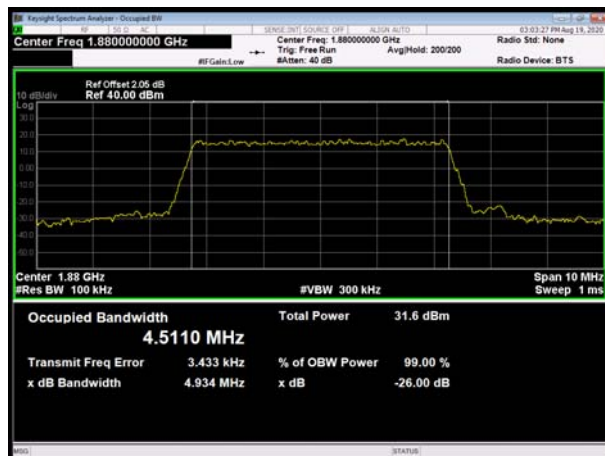
LTE Band 2 5MHz QPSK CH-Low



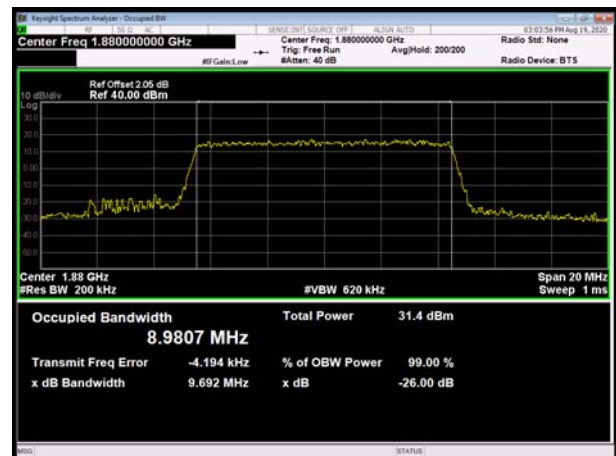
LTE Band 2 10MHz QPSK CH-Low



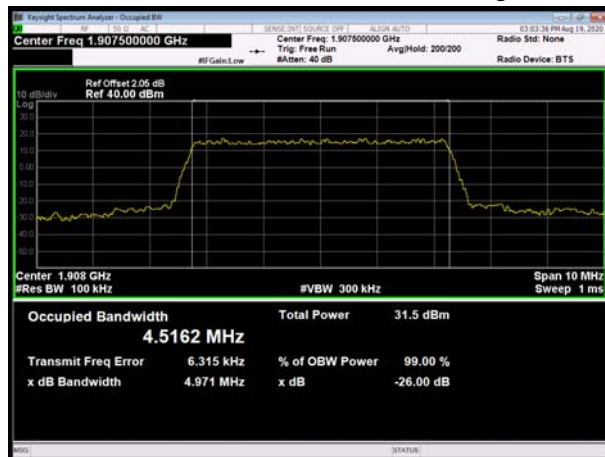
LTE Band 2 5MHz QPSK CH-Middle



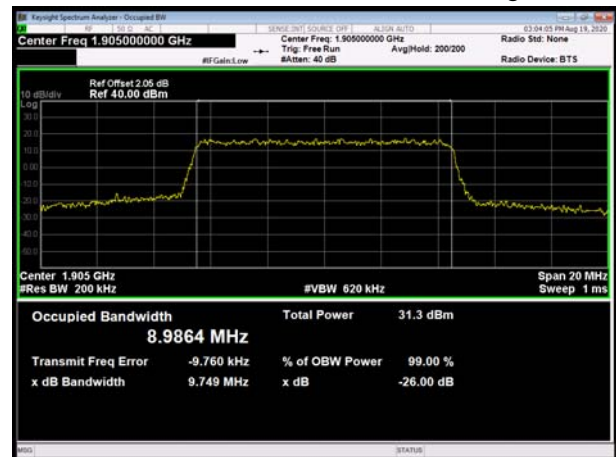
LTE Band 2 10MHz QPSK CH-Middle



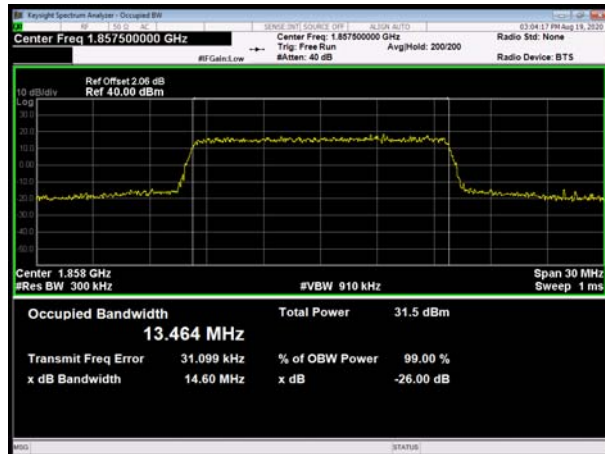
LTE Band 2 5MHz QPSK CH-High



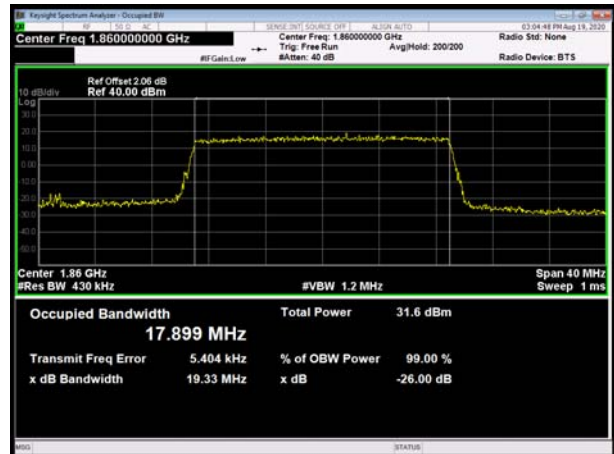
LTE Band 2 10MHz QPSK CH-High



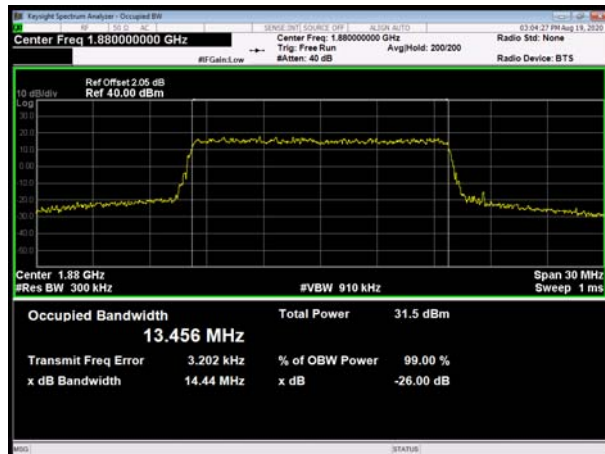
LTE Band 2 15MHz QPSK CH-Low



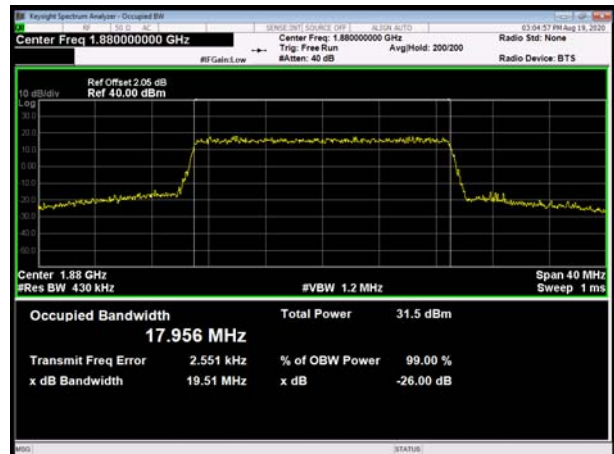
LTE Band 2 20MHz QPSK CH-Low



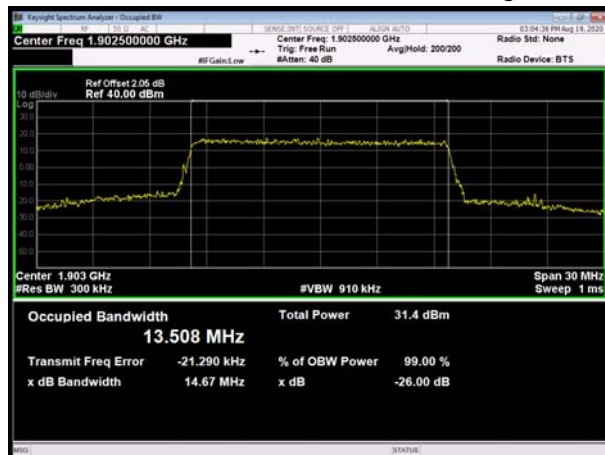
LTE Band 2 15MHz QPSK CH-Middle



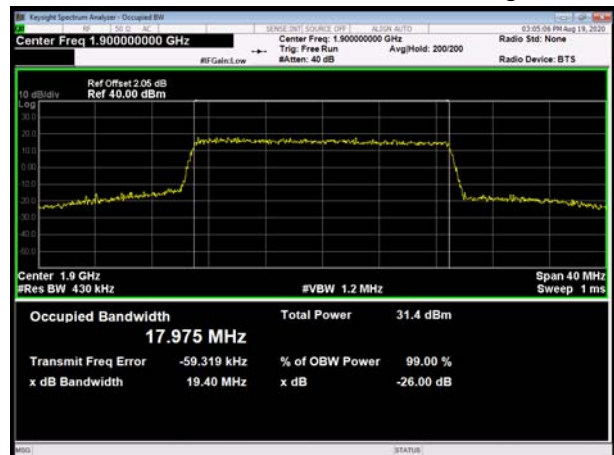
LTE Band 2 20MHz QPSK CH-Middle



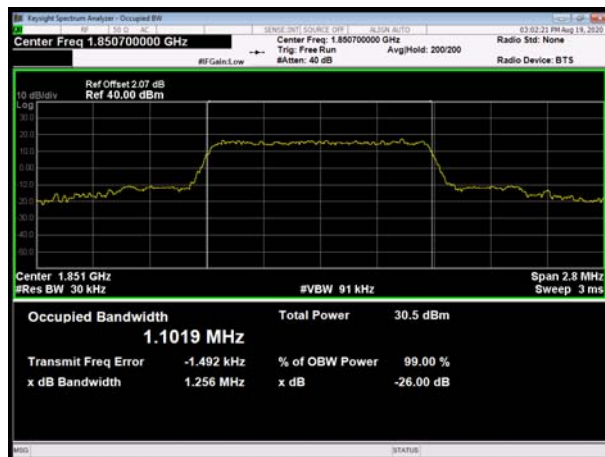
LTE Band 2 15MHz QPSK CH-High



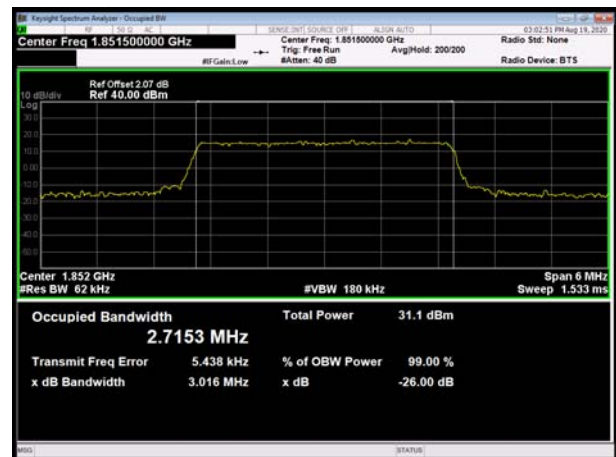
LTE Band 2 20MHz QPSK CH-High



LTE Band 2 1.4MHz 16QAM CH-Low



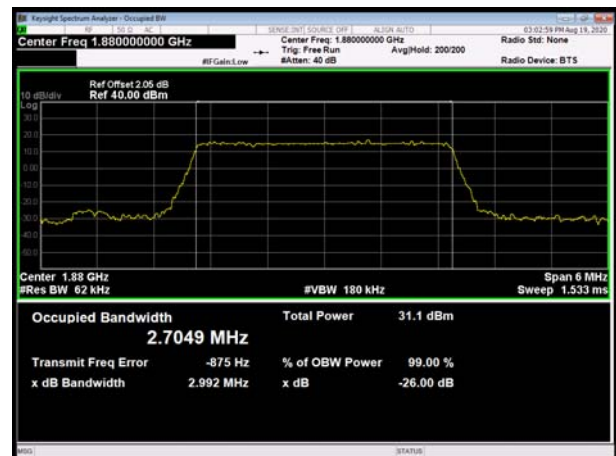
LTE Band 2 3MHz 16QAM CH-Low



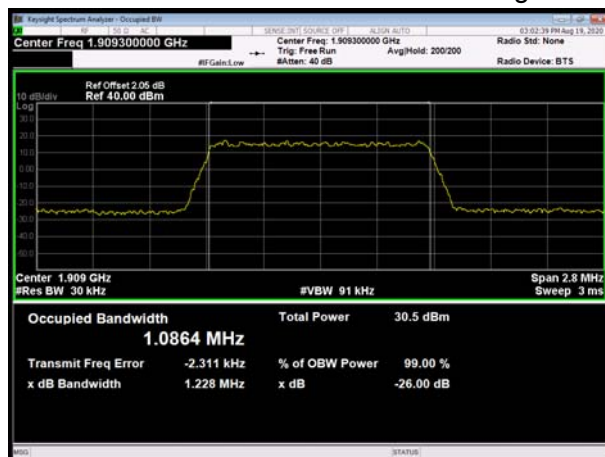
LTE Band 2 1.4MHz 16QAM CH-Middle



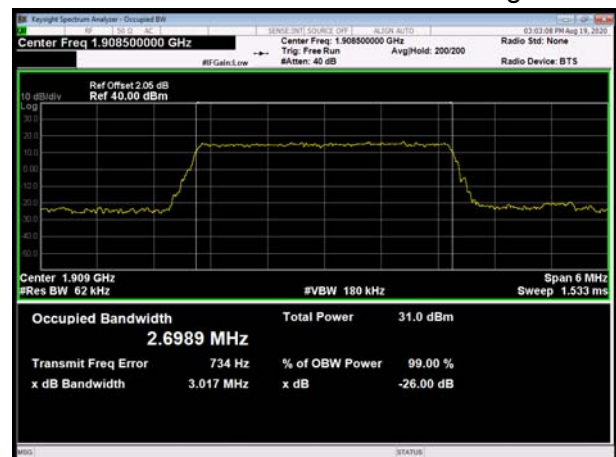
LTE Band 2 3MHz 16QAM CH-Middle



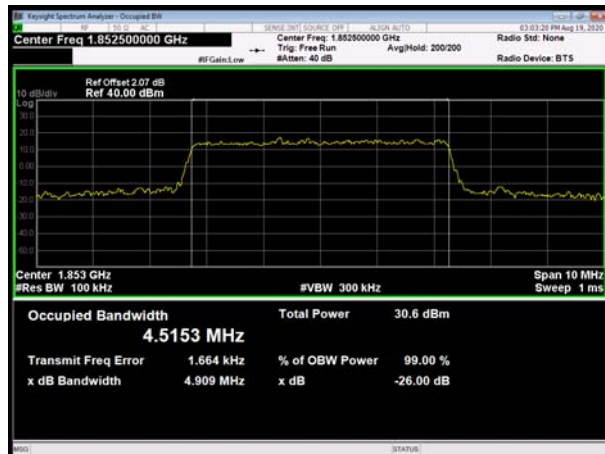
LTE Band 2 1.4MHz 16QAM CH-High



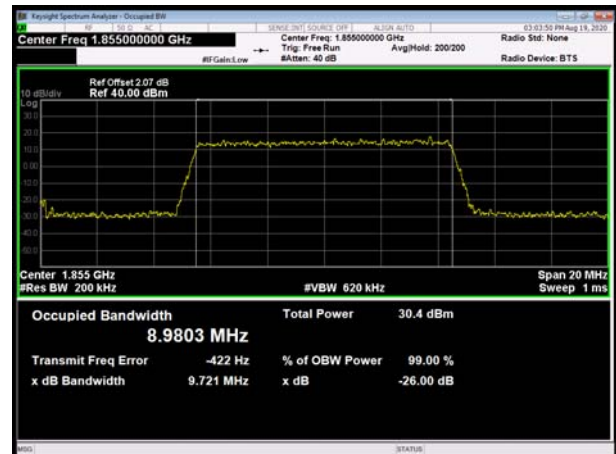
LTE Band 2 3MHz 16QAM CH-High



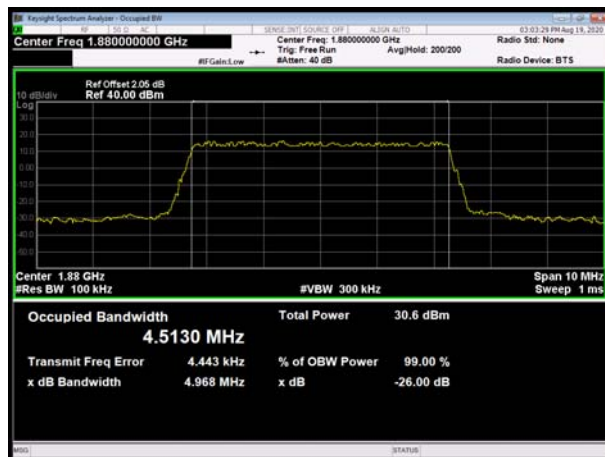
LTE Band 2 5MHz 16QAM CH-Low



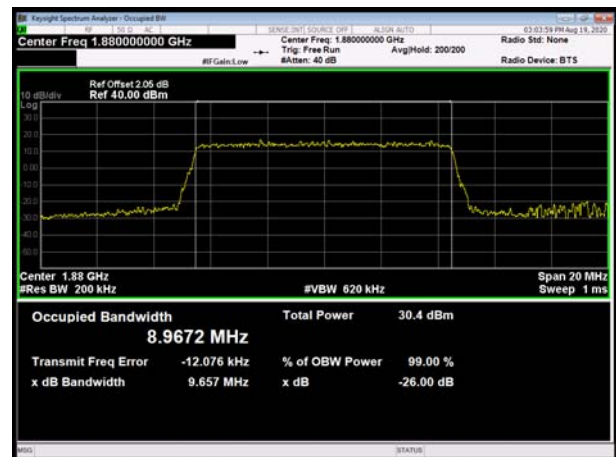
LTE Band 2 10MHz 16QAM CH-Low



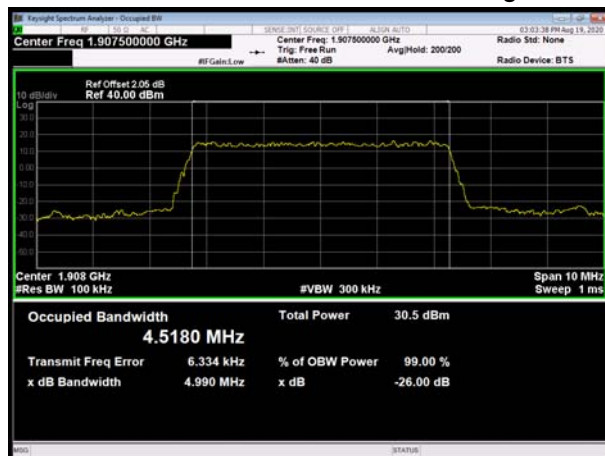
LTE Band 2 5MHz 16QAM CH-Middle



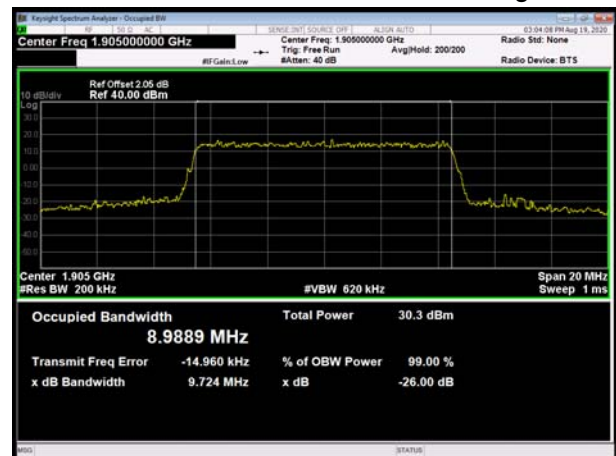
LTE Band 2 10MHz 16QAM CH-Middle



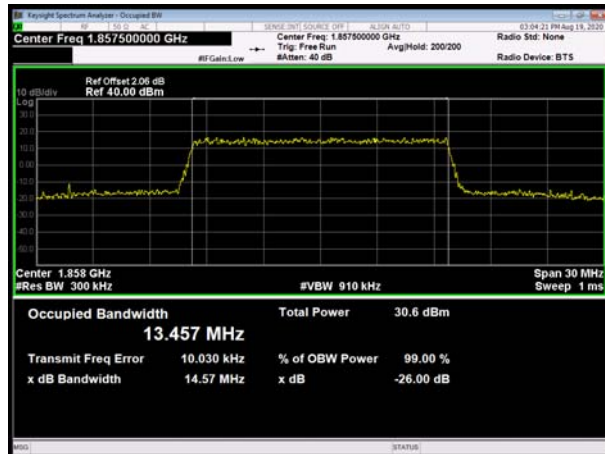
LTE Band 2 5MHz 16QAM CH-High



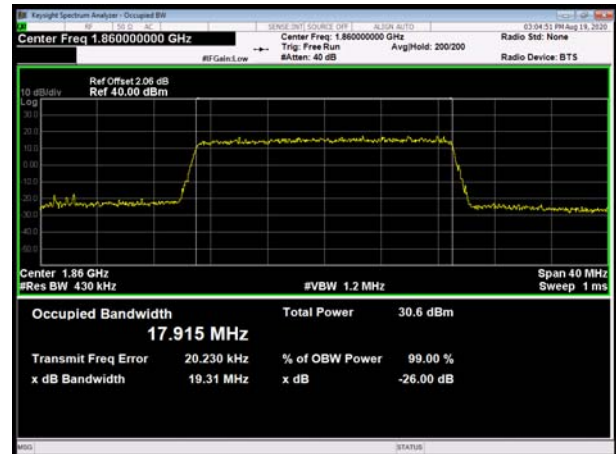
LTE Band 2 10MHz 16QAM CH-High



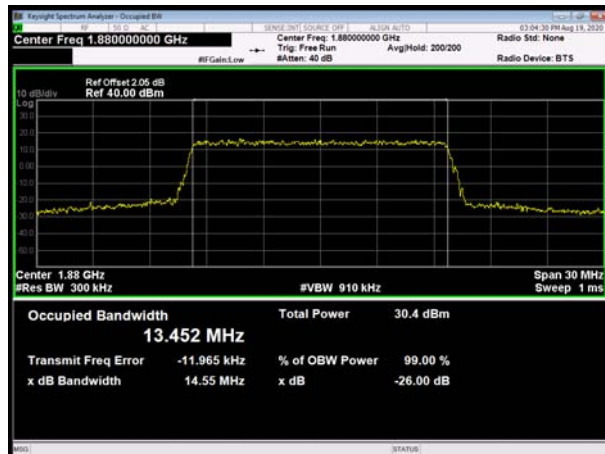
LTE Band 2 15MHz 16QAM CH-Low



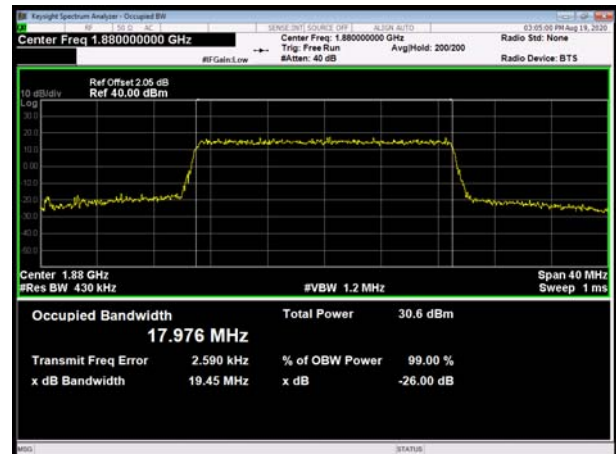
LTE Band 2 20MHz 16QAM CH-Low



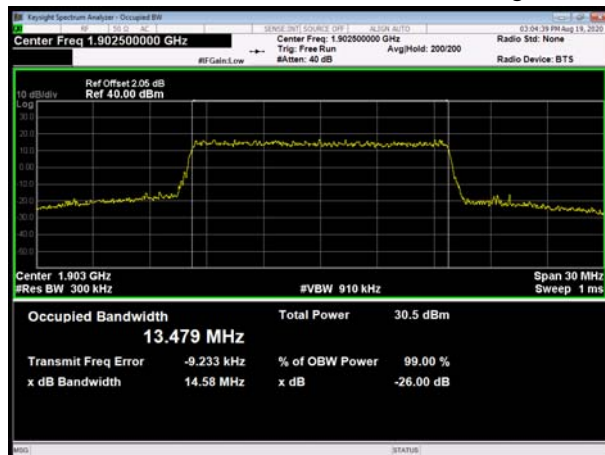
LTE Band 2 15MHz 16QAM CH-Middle



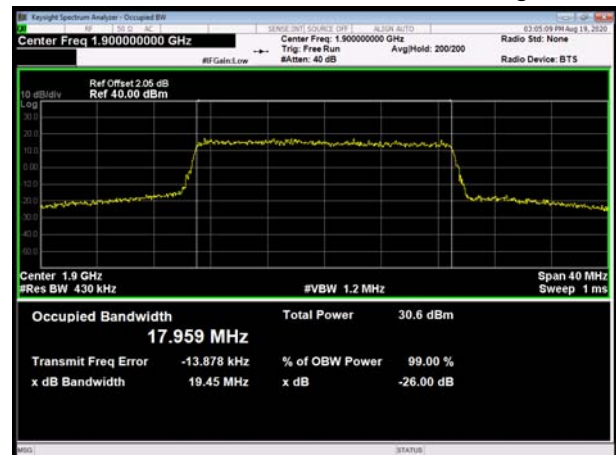
LTE Band 2 20MHz 16QAM CH-Middle



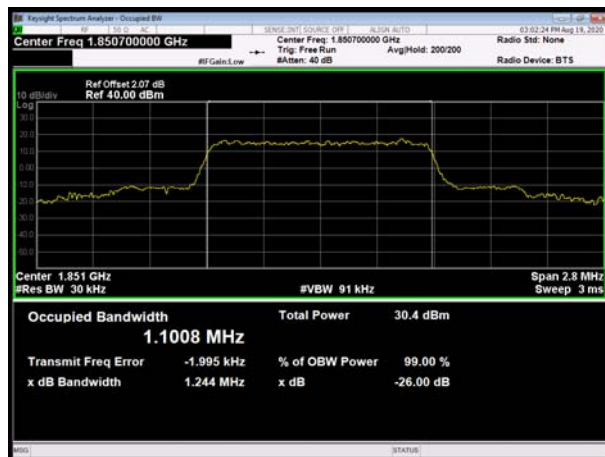
LTE Band 2 15MHz 16QAM CH-High



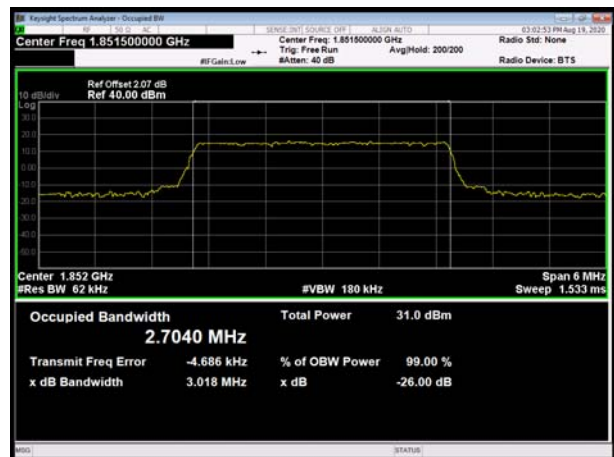
LTE Band 2 20MHz 16QAM CH-High



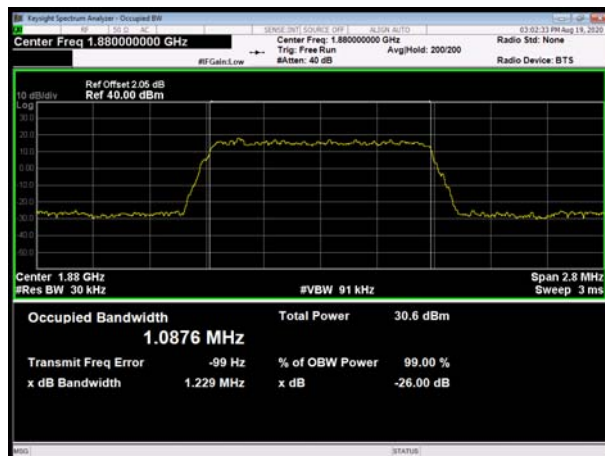
LTE Band 2 1.4MHz 64QAM CH-Low



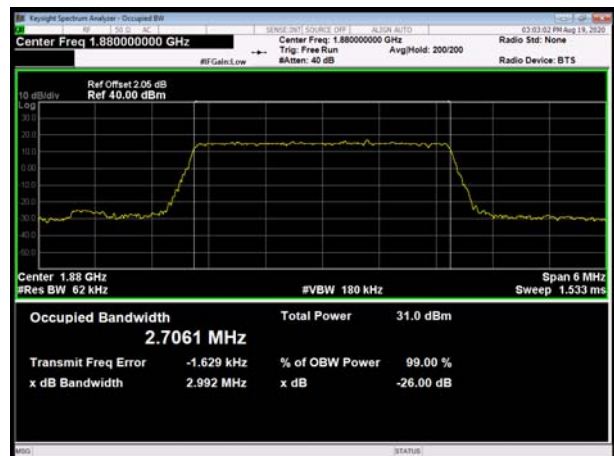
LTE Band 2 3MHz 64QAM CH-Low



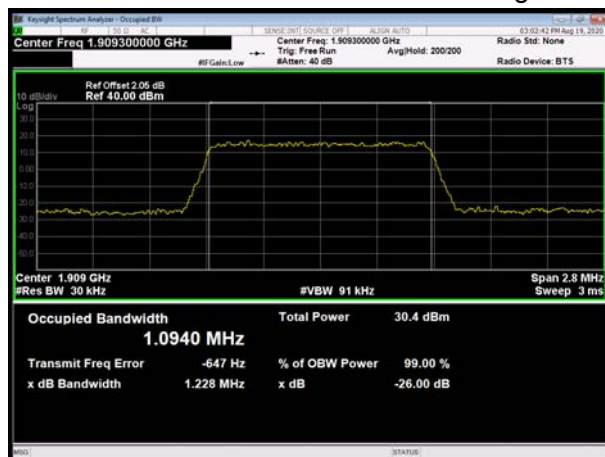
LTE Band 2 1.4MHz 64QAM CH-Middle



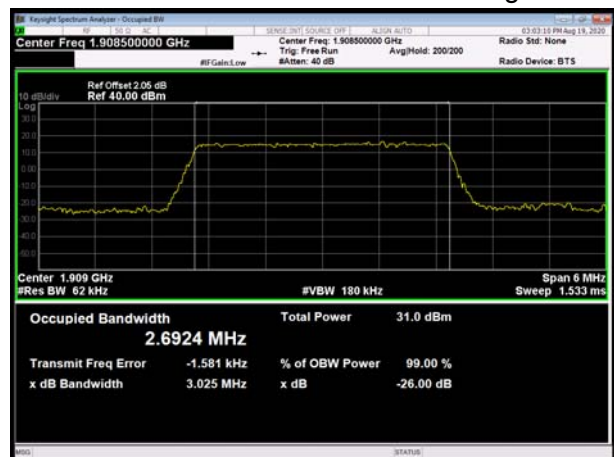
LTE Band 2 3MHz 64QAM CH-Middle



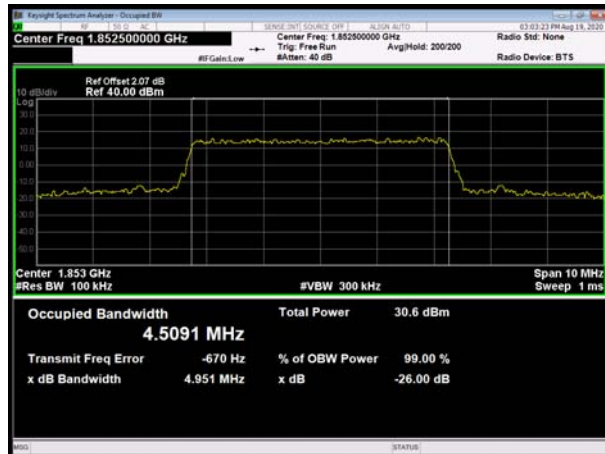
LTE Band 2 1.4MHz 64QAM CH-High



LTE Band 2 3MHz 64QAM CH-High



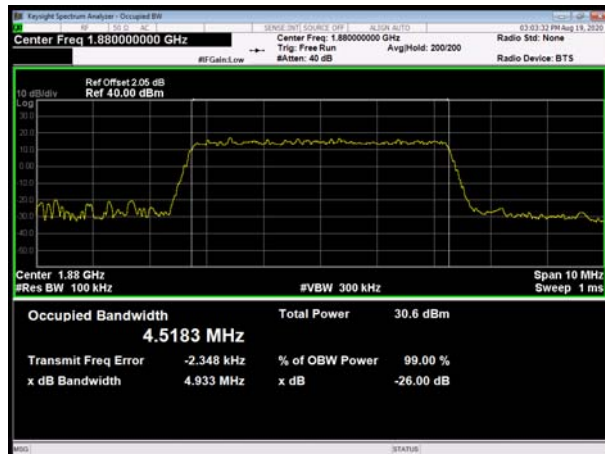
LTE Band 2 5MHz 64QAM CH-Low



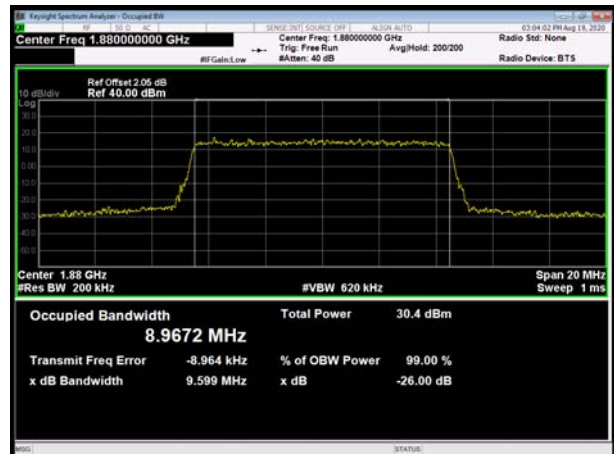
LTE Band 2 10MHz 64QAM CH-Low



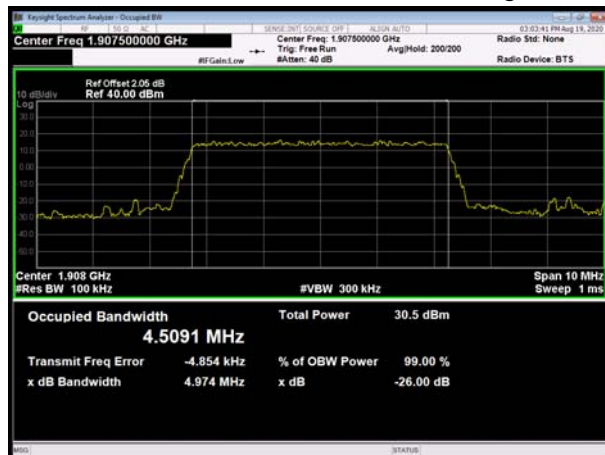
LTE Band 2 5MHz 64QAM CH-Middle



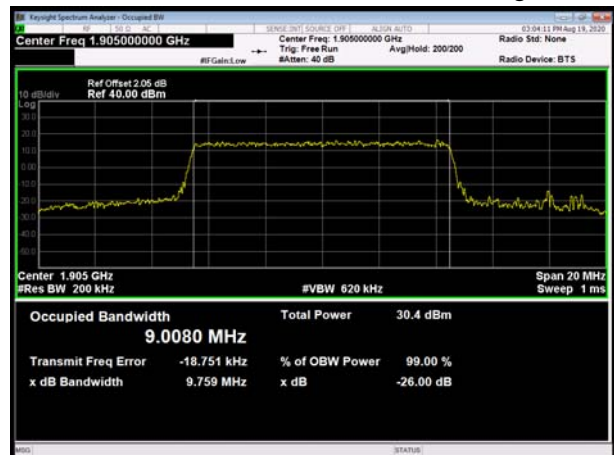
LTE Band 2 10MHz 64QAM CH-Middle



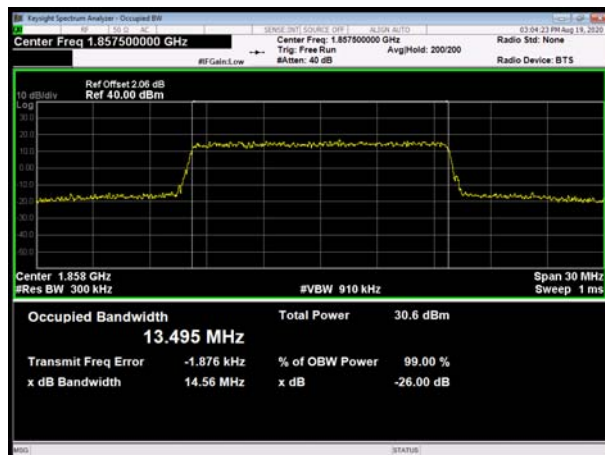
LTE Band 2 5MHz 64QAM CH-High



LTE Band 2 10MHz 64QAM CH-High



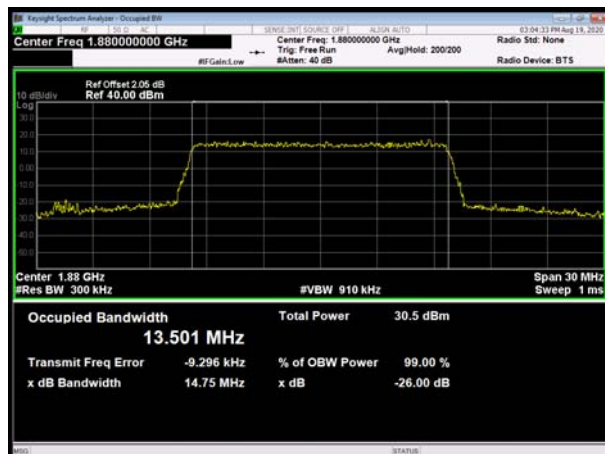
LTE Band 2 15MHz 64QAM CH-Low



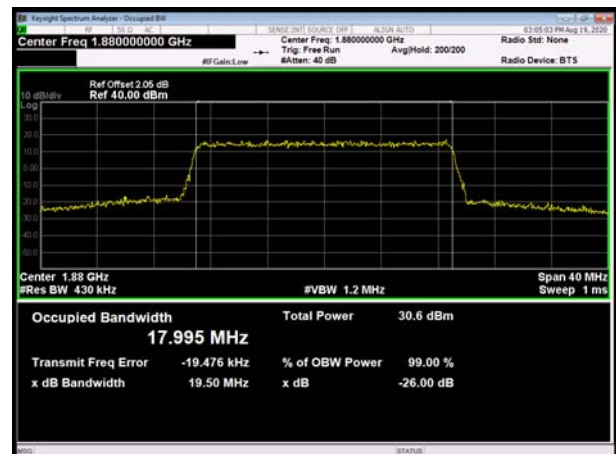
LTE Band 2 20MHz 64QAM CH-Low



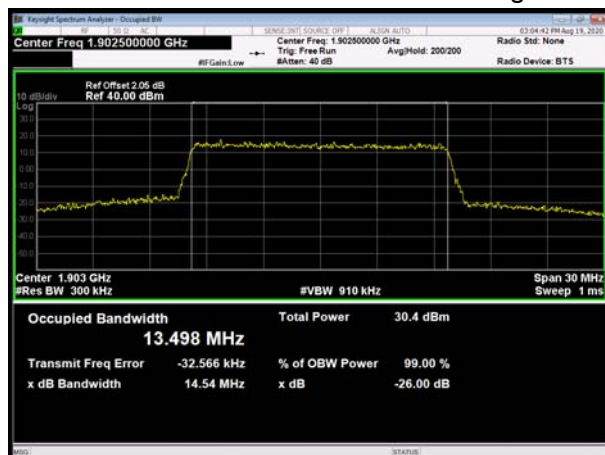
LTE Band 2 15MHz 64QAM CH-Middle



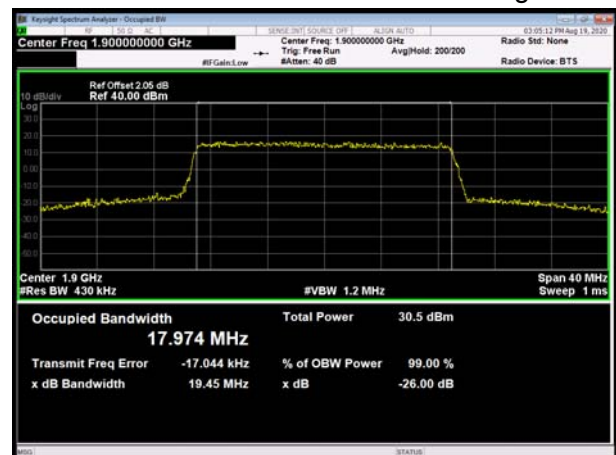
LTE Band 2 20MHz 64QAM CH-Middle



LTE Band 2 15MHz 64QAM CH-High



LTE Band 2 20MHz 64QAM CH-High



5.3.Band Edge Compliance

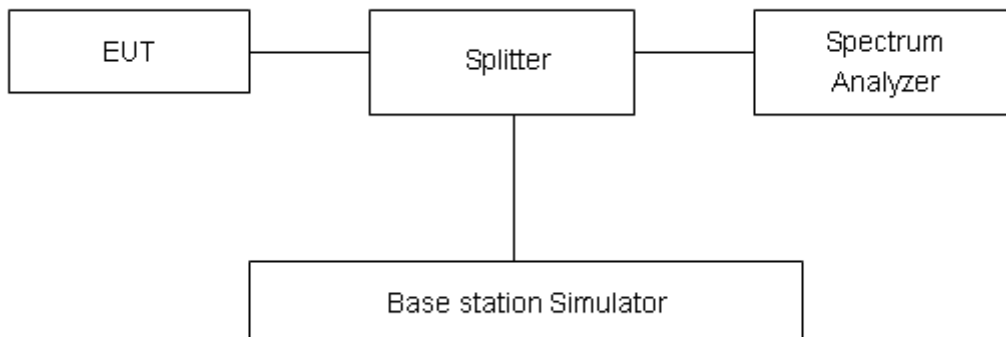
Ambient condition

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 Average detector is used and RBW is set to 15kHz,VBW is set to 43kHz for LTE Band 2 (1.4MHz), RBW is set to 30kHz,VBW is set to 91kHz for LTE Band 2 (3MHz), RBW is set to 51kHz,VBW is set to 150kHz for LTE Band 2 (5MHz), RBW is set to 100kHz,VBW is set to 300kHz for LTE Band 2 (10MHz), RBW is set to 150kHz,VBW is set to 470kHz for LTE Band 2 (15MHz), RBW is set to 200kHz,VBW is set to 620kHz for LTE Band 2 (20MHz). Spectrum analyzer plots are included on the following pages.

Test Setup



Limits

Rule Part 24.238(a) specifies that “on any frequency outside a licensee’s frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least $43 + 10 \log_{10} (P)$ dB.”

Limit	-13 dBm
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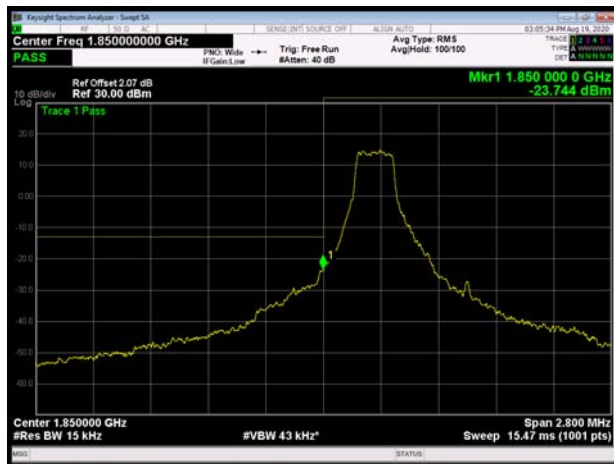
Measurement Uncertainty

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.

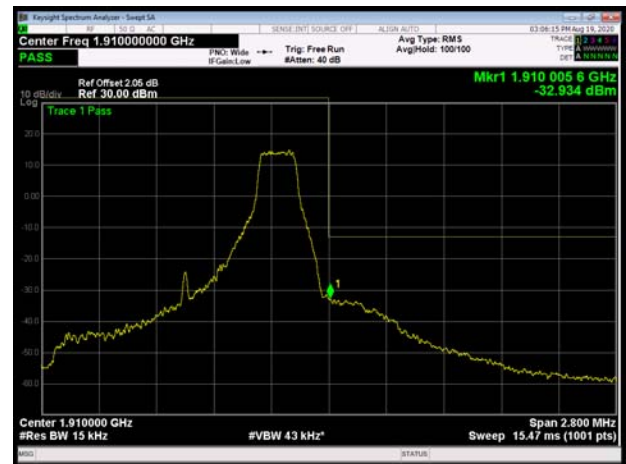


Test Result:

LTE Band 2 1.4MHz QPSK 1RB CH-Low



LTE Band 2 1.4MHz QPSK 1RB CH-High



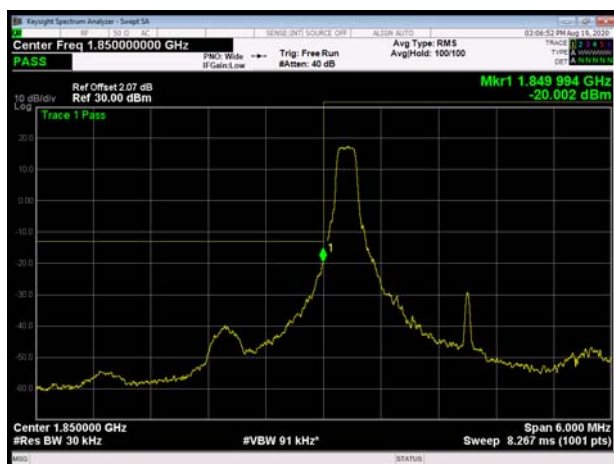
LTE Band 2 1.4MHz QPSK 100%RB CH-Low



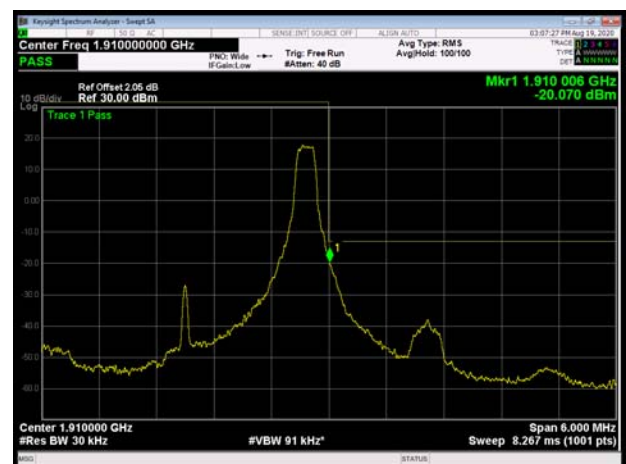
LTE Band 2 1.4MHz QPSK 100%RB CH-High



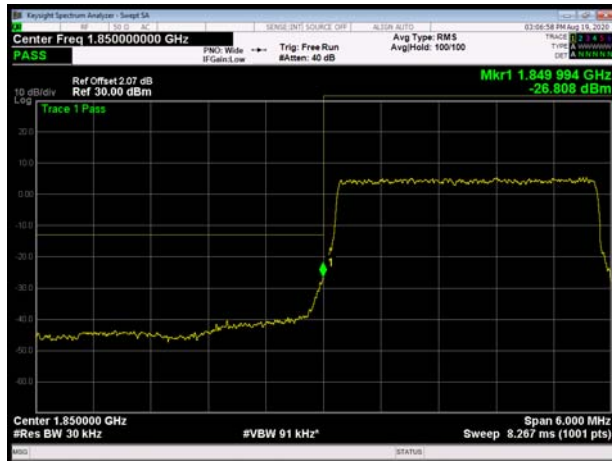
LTE Band 2 3MHz QPSK 1RB CH-Low



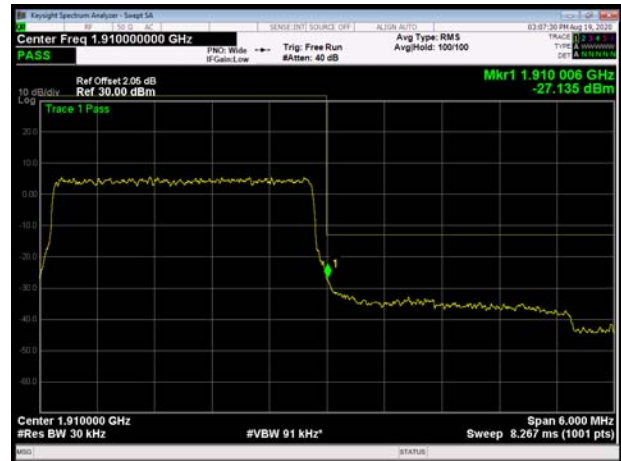
LTE Band 2 3MHz QPSK 1RB CH-High



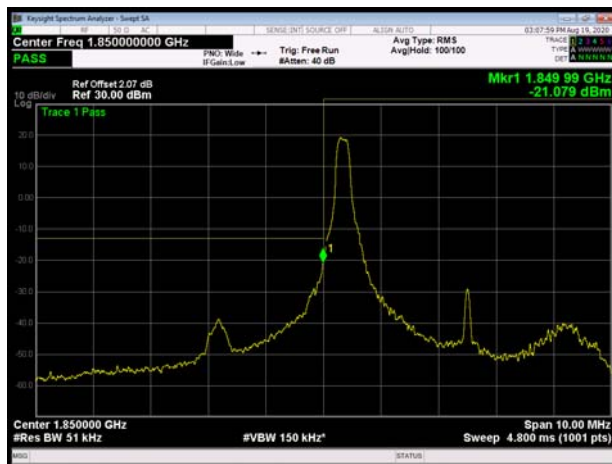
LTE Band 2 3MHz QPSK 100%RB CH-Low



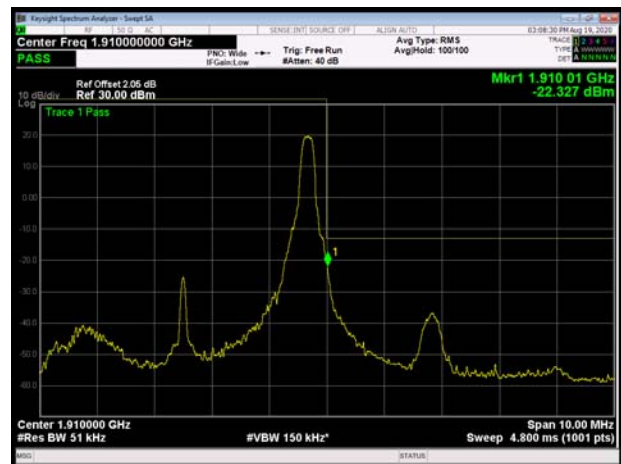
LTE Band 2 3MHz QPSK 100%RB CH-High



LTE Band 2 5MHz QPSK 1RB CH-Low



LTE Band 2 5MHz QPSK 1RB CH-High



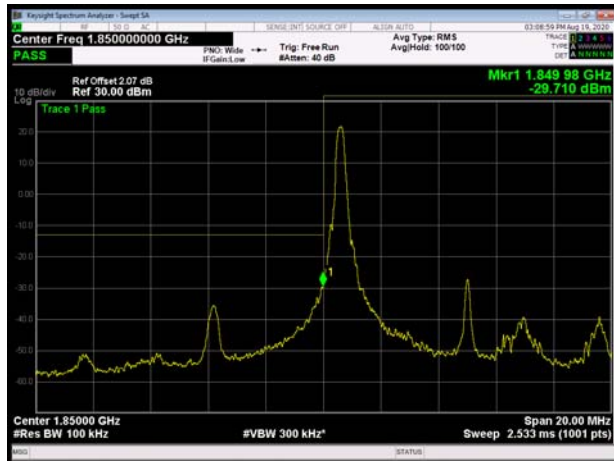
LTE Band 2 5MHz QPSK 100%RB CH-Low



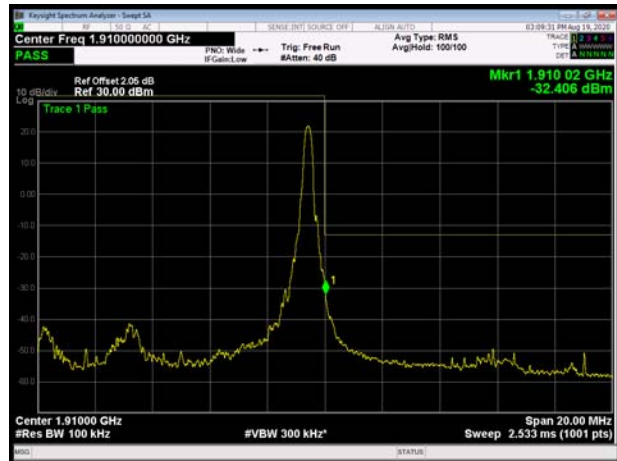
LTE Band 2 5MHz QPSK 100%RB CH-High



LTE Band 2 10MHz QPSK 1RB CH-Low



LTE Band 2 10MHz QPSK 1RB CH-High



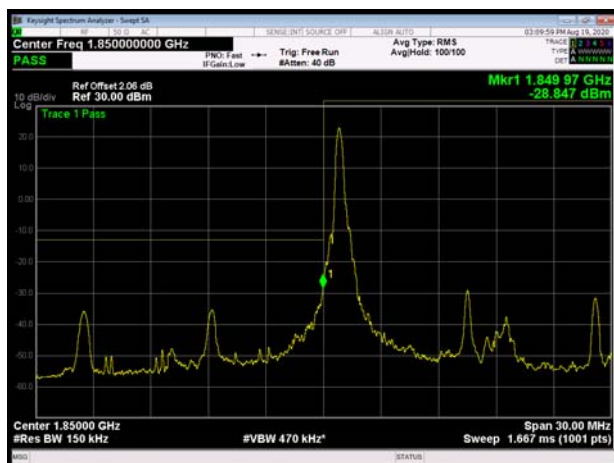
LTE Band 2 10MHz QPSK 100%RB CH-Low



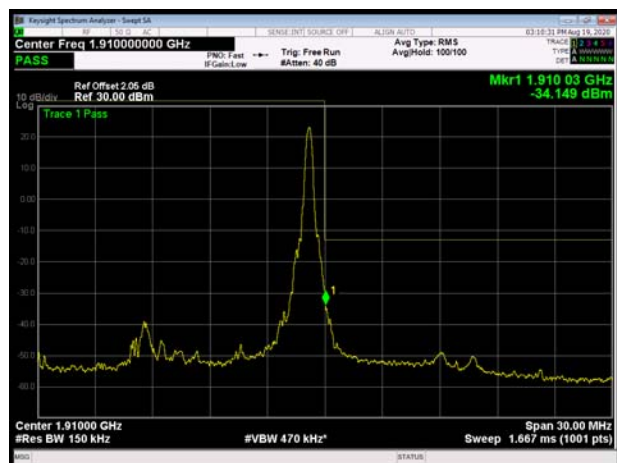
LTE Band 2 10MHz QPSK 100%RB CH-High



LTE Band 2 15MHz QPSK 1RB CH-Low



LTE Band 2 15MHz QPSK 1RB CH-High





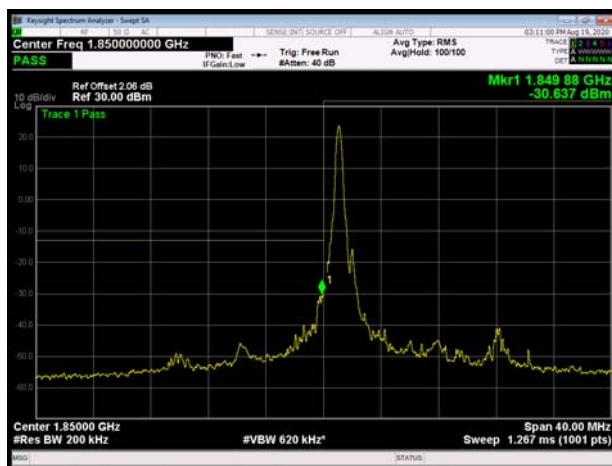
LTE Band 2 15MHz QPSK 100%RB CH-Low



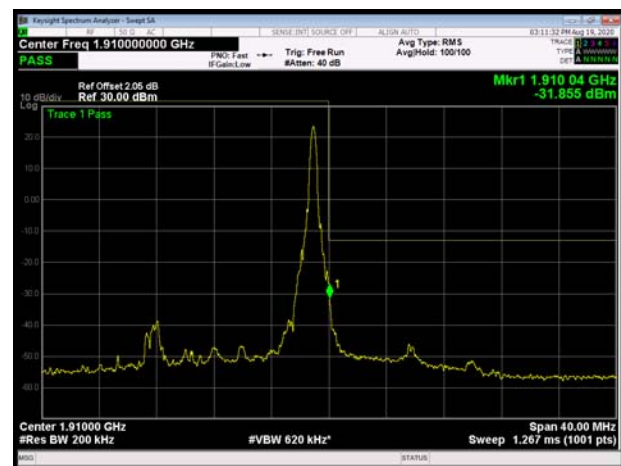
LTE Band 2 15MHz QPSK 100%RB CH-High



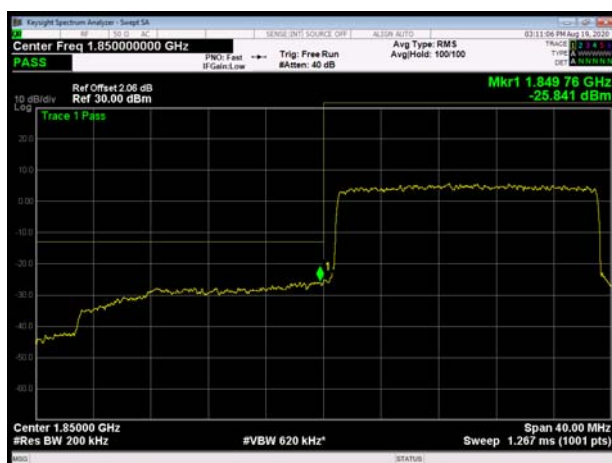
LTE Band 2 20MHz QPSK 1RB CH-Low



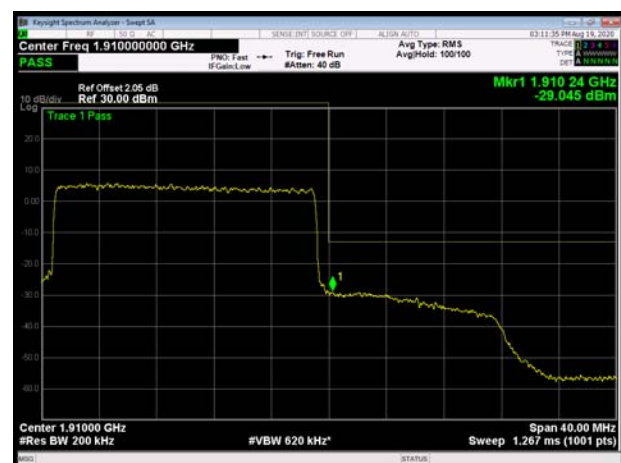
LTE Band 2 20MHz QPSK 1RB CH-High



LTE Band 2 20MHz QPSK 100%RB CH-Low

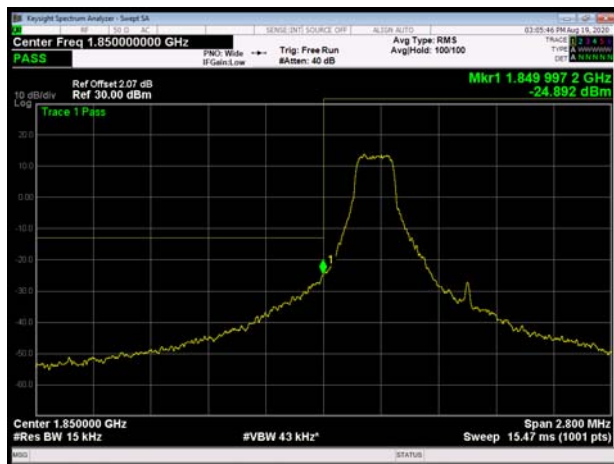


LTE Band 2 20MHz QPSK 100%RB CH-High

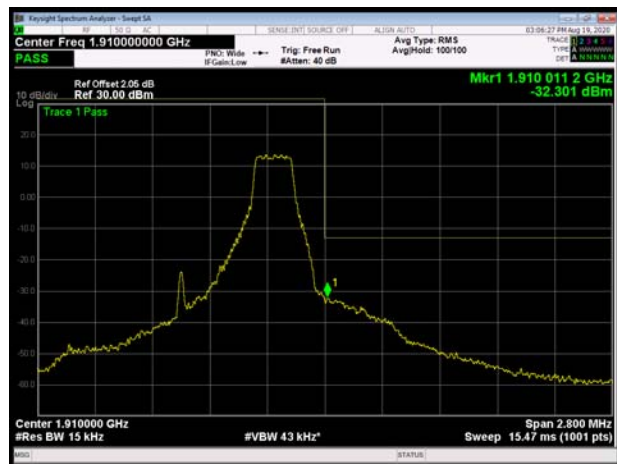




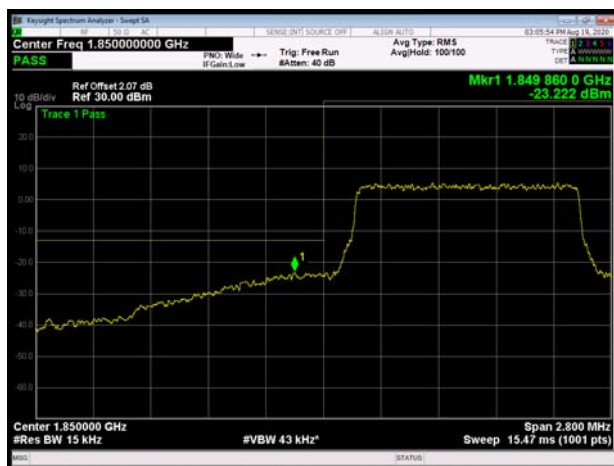
LTE Band 2 1.4MHz 16QAM 1RB CH-Low



LTE Band 2 1.4MHz 16QAM 1RB CH-High



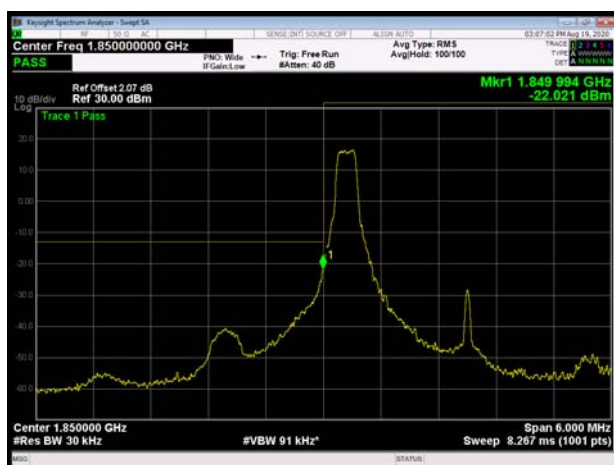
LTE Band 2 1.4MHz 16QAM 100%RB CH-Low



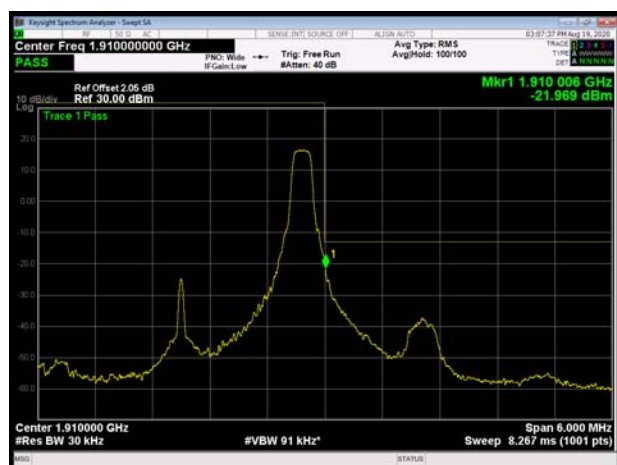
LTE Band 2 1.4MHz 16QAM 100%RB CH-High



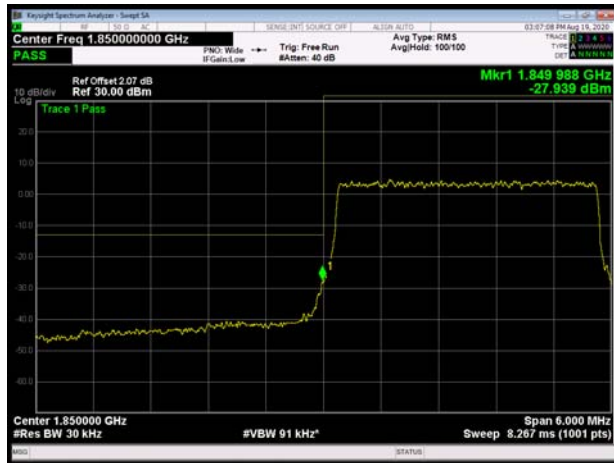
LTE Band 2 3MHz 16QAM 1RB CH-Low



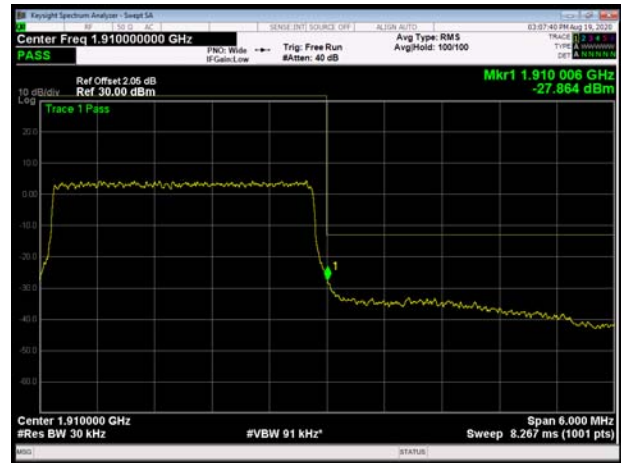
LTE Band 2 3MHz 16QAM 1RB CH-High



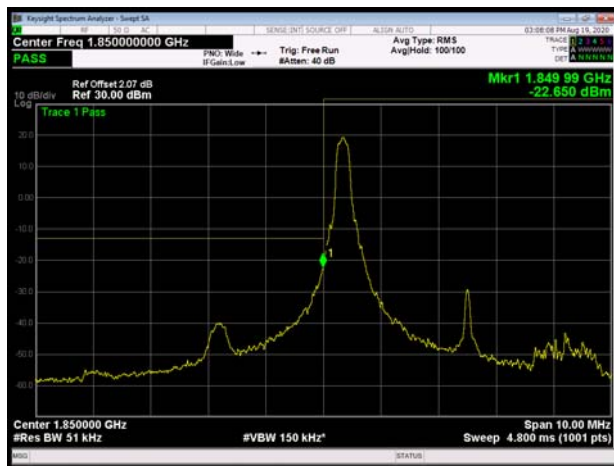
LTE Band 2 3MHz 16QAM 100%RB CH-Low



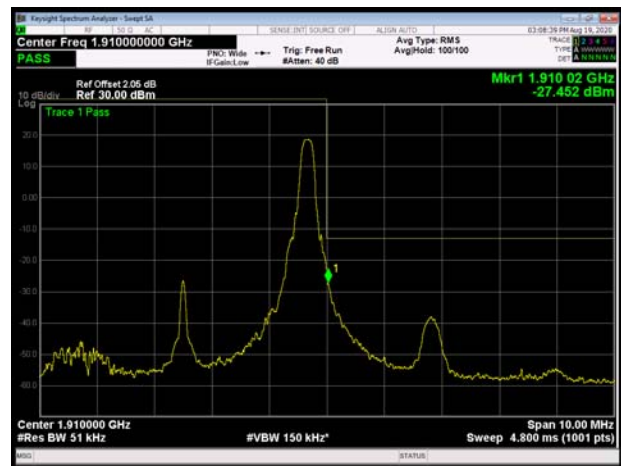
LTE Band 2 3MHz 16QAM 100%RB CH-High



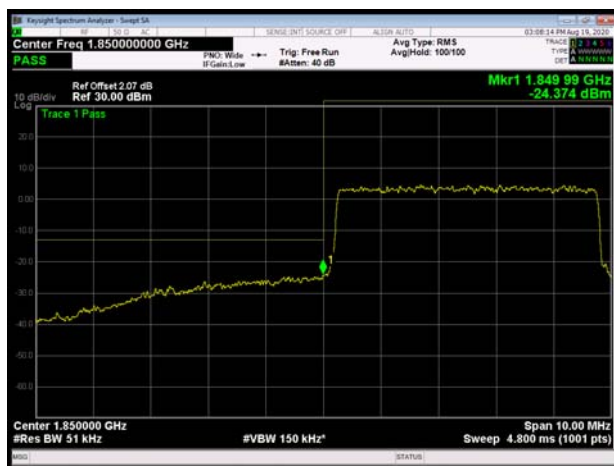
LTE Band 2 5MHz 16QAM 1RB CH-Low



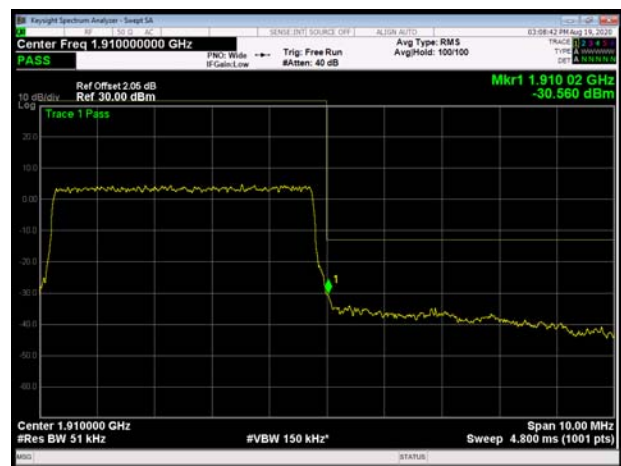
LTE Band 2 5MHz 16QAM 1RB CH-High



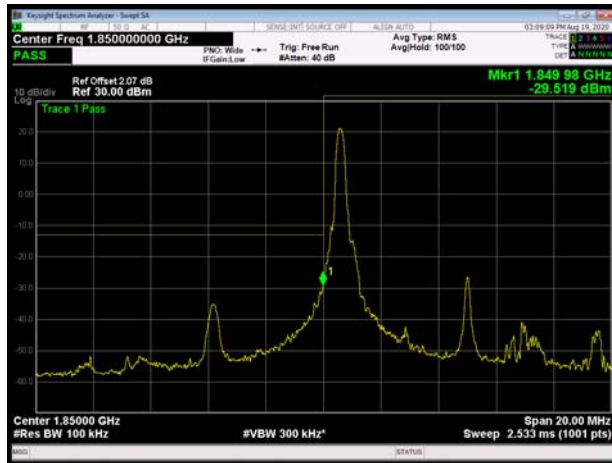
LTE Band 2 5MHz 16QAM 100%RB CH-Low



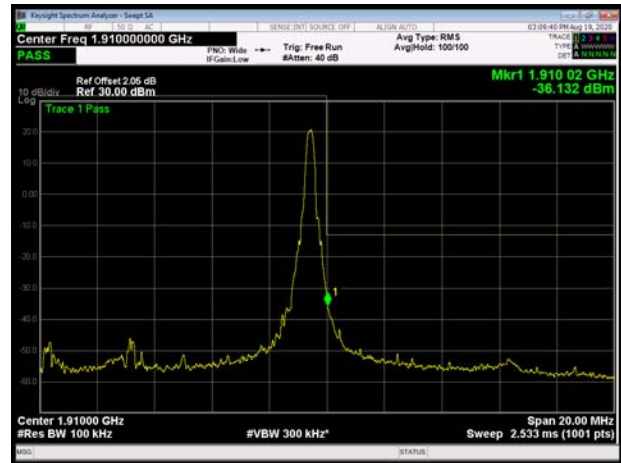
LTE Band 2 5MHz 16QAM 100%RB CH-High



LTE Band 2 10MHz 16QAM 1RB CH-Low



LTE Band 2 10MHz 16QAM 1RB CH-High



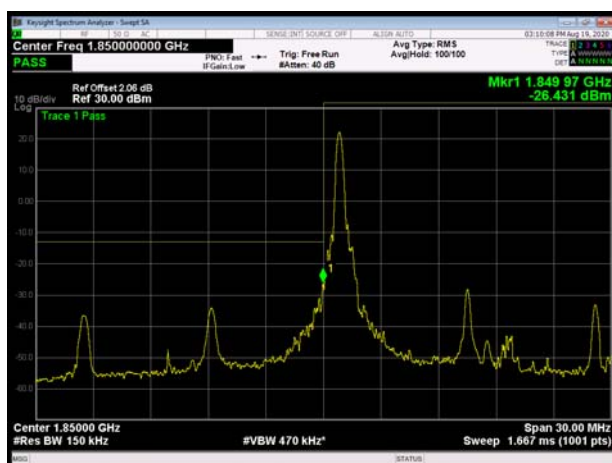
LTE Band 2 10MHz 16QAM 100%RB CH-Low



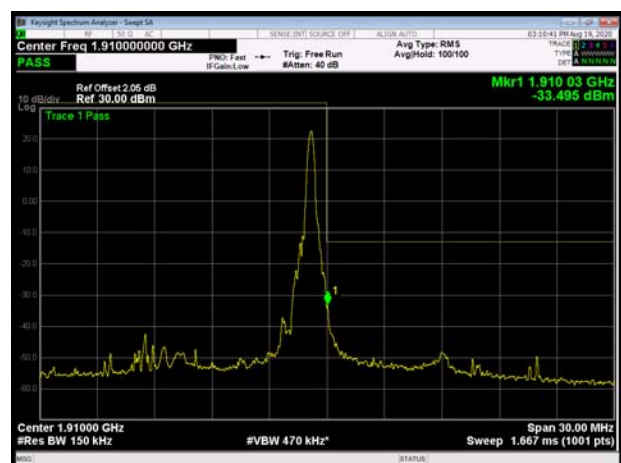
LTE Band 2 10MHz 16QAM 100%RB CH-High



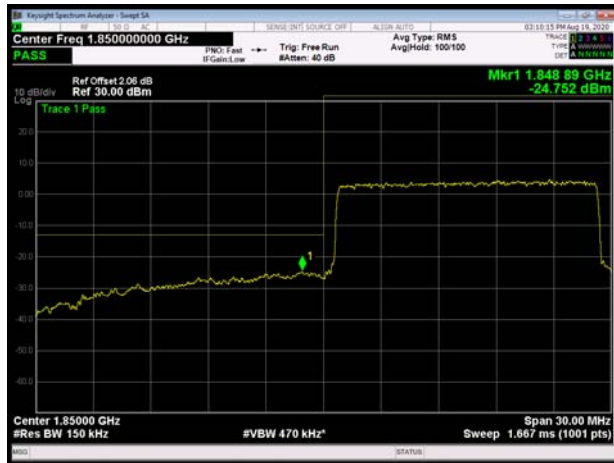
LTE Band 2 15MHz 16QAM 1RB CH-Low



LTE Band 2 15MHz 16QAM 1RB CH-High



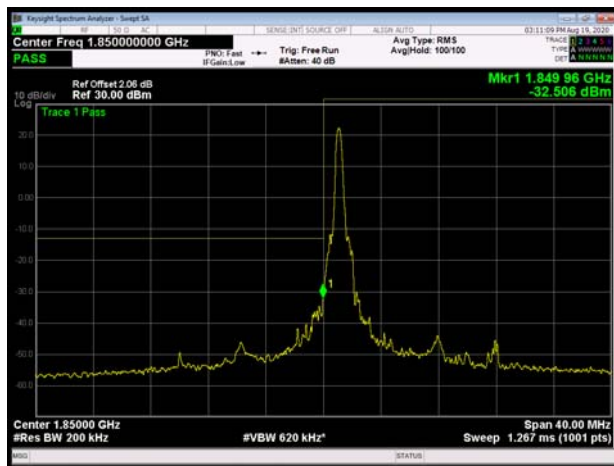
LTE Band 2 15MHz 16QAM 100%RB CH-Low



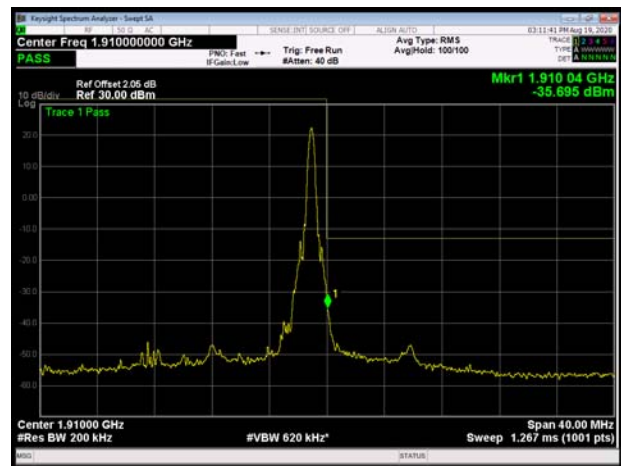
LTE Band 2 15MHz 16QAM 100%RB CH-High



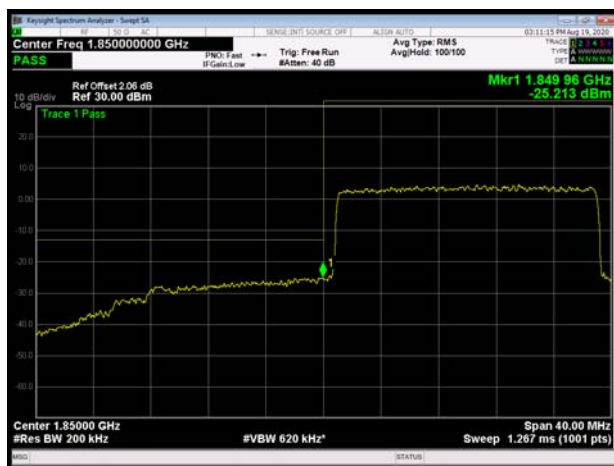
LTE Band 2 20MHz 16QAM 1RB CH-Low



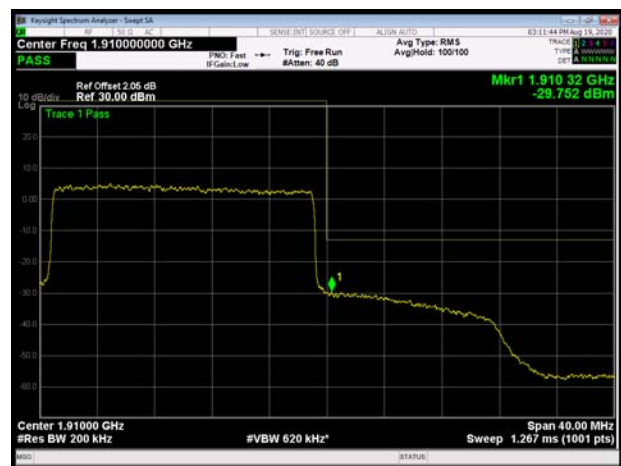
LTE Band 2 20MHz 16QAM 1RB CH-High



LTE Band 2 20MHz 16QAM 100%RB CH-Low

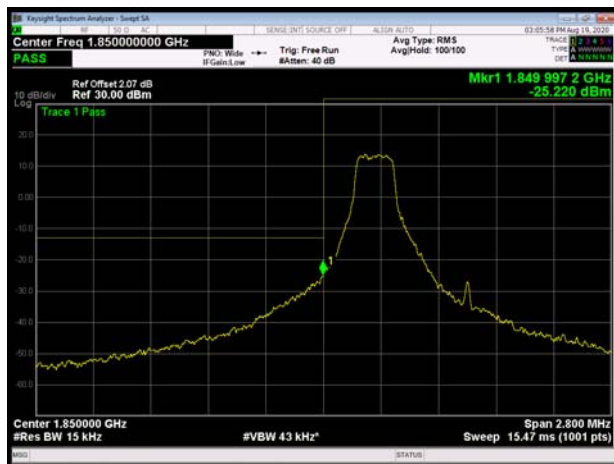


LTE Band 2 20MHz 16QAM 100%RB CH-High

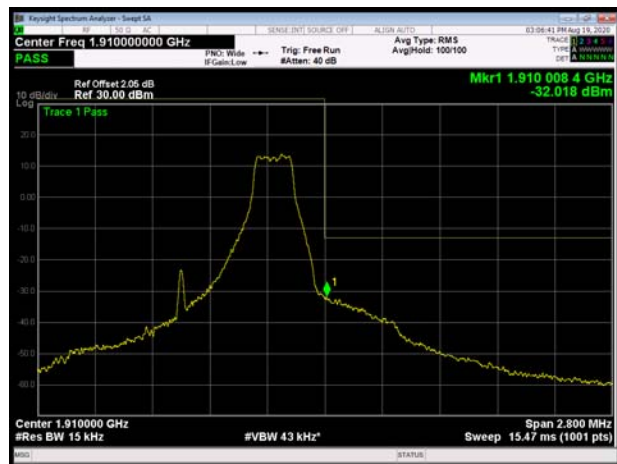




LTE Band 2 1.4MHz 64QAM 1RB CH-Low



LTE Band 2 1.4MHz 64QAM 1RB CH-High



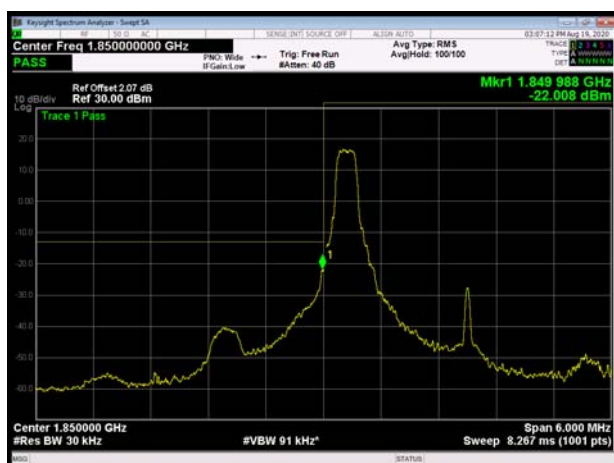
LTE Band 2 1.4MHz 64QAM 100%RB CH-Low



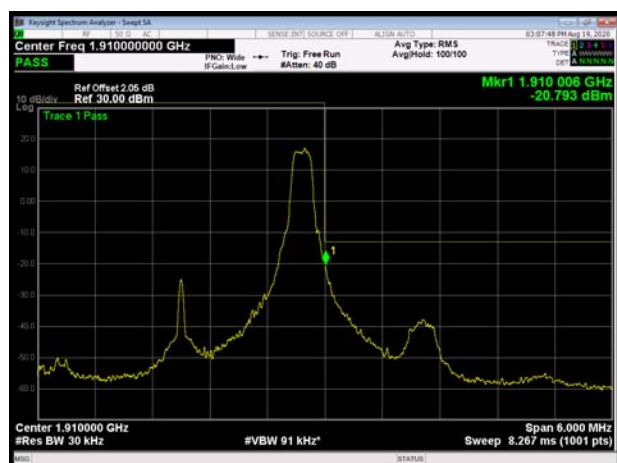
LTE Band 2 1.4MHz 64QAM 100%RB CH-High



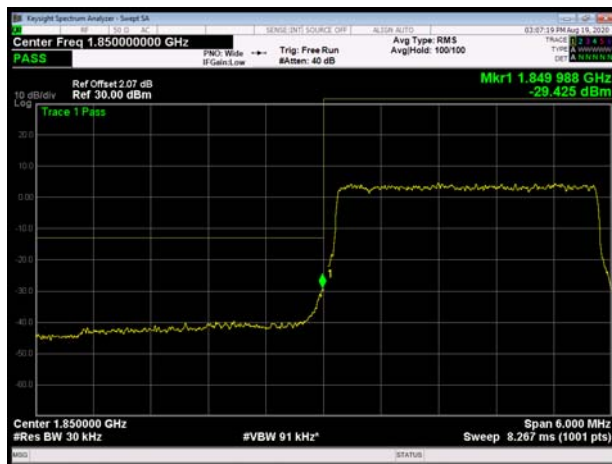
LTE Band 2 3MHz 64QAM 1RB CH-Low



LTE Band 2 3MHz 64QAM 1RB CH-High



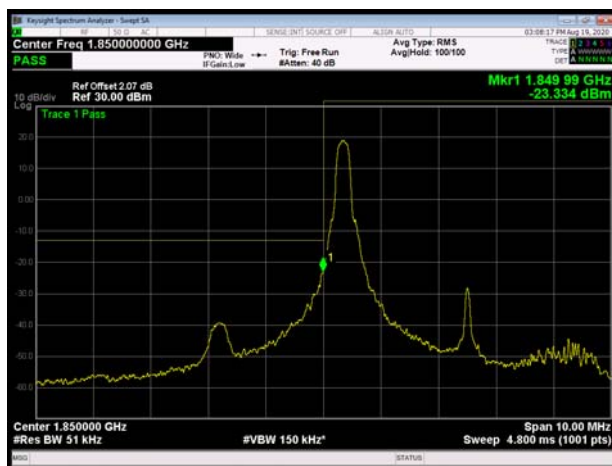
LTE Band 2 3MHz 64QAM 100%RB CH-Low



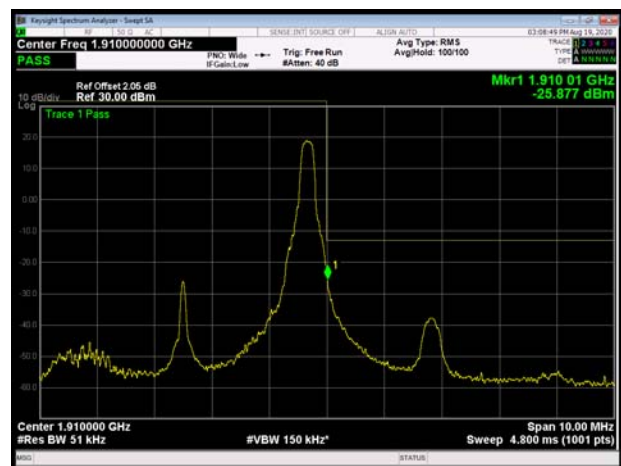
LTE Band 2 3MHz 64QAM 100%RB CH-High



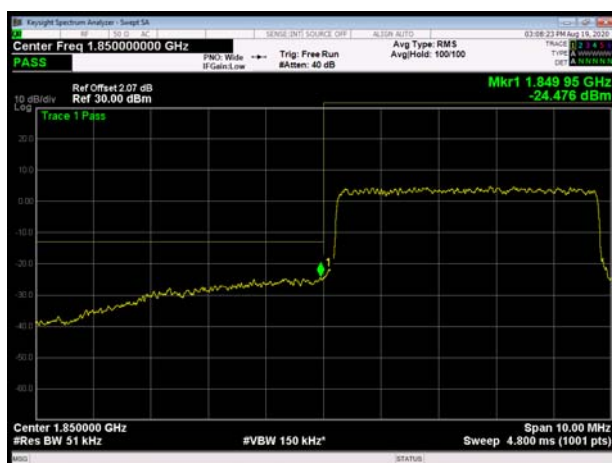
LTE Band 2 5MHz 64QAM 1RB CH-Low



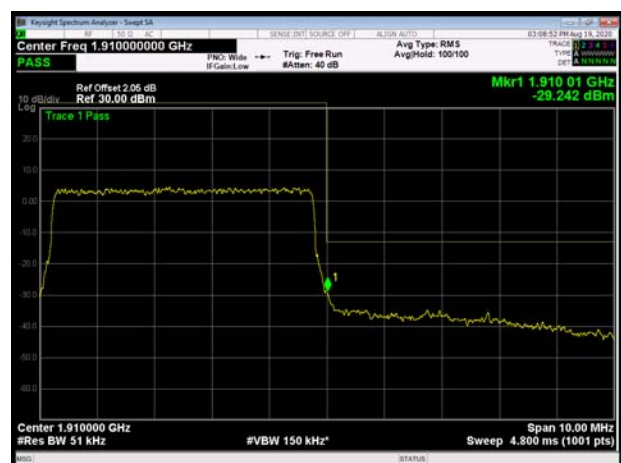
LTE Band 2 5MHz 64QAM 1RB CH-High



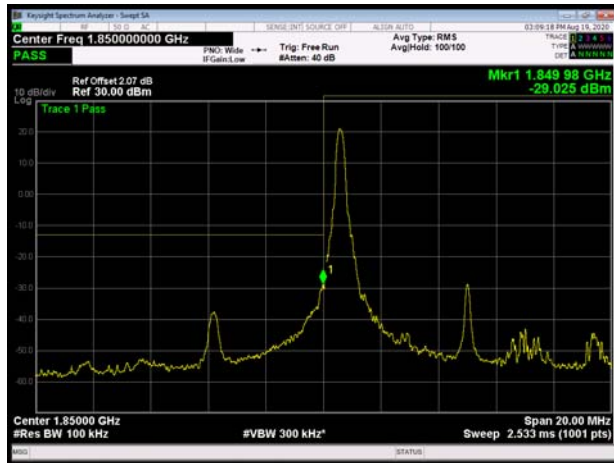
LTE Band 2 5MHz 64QAM 100%RB CH-Low



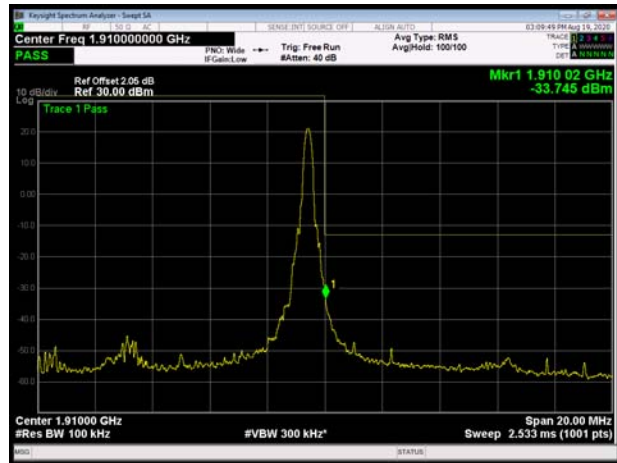
LTE Band 2 5MHz 64QAM 100%RB CH-High



LTE Band 2 10MHz 64QAM 1RB CH-Low



LTE Band 2 10MHz 64QAM 1RB CH-High



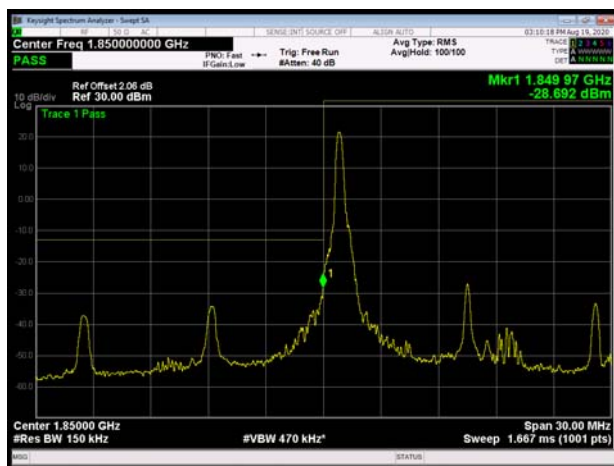
LTE Band 2 10MHz 64QAM 100%RB CH-Low



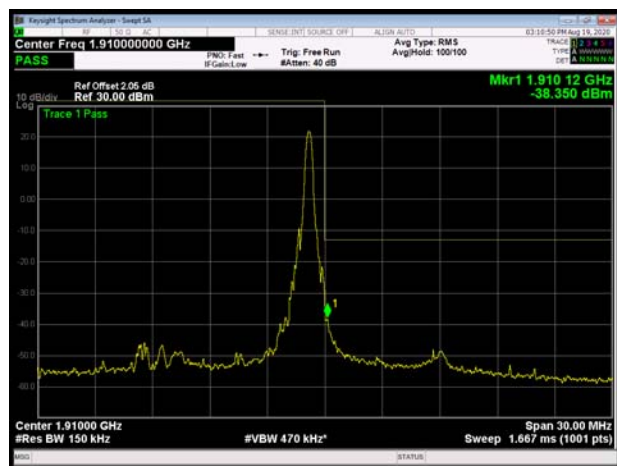
LTE Band 2 10MHz 64QAM 100%RB CH-High



LTE Band 2 15MHz 64QAM 1RB CH-Low



LTE Band 2 15MHz 64QAM 1RB CH-High





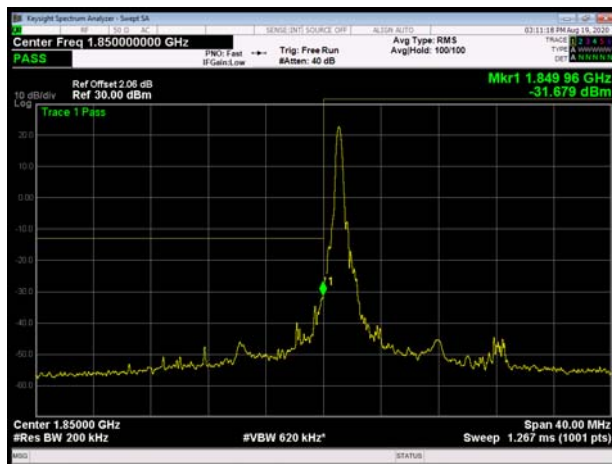
LTE Band 2 15MHz 64QAM 100%RB CH-Low



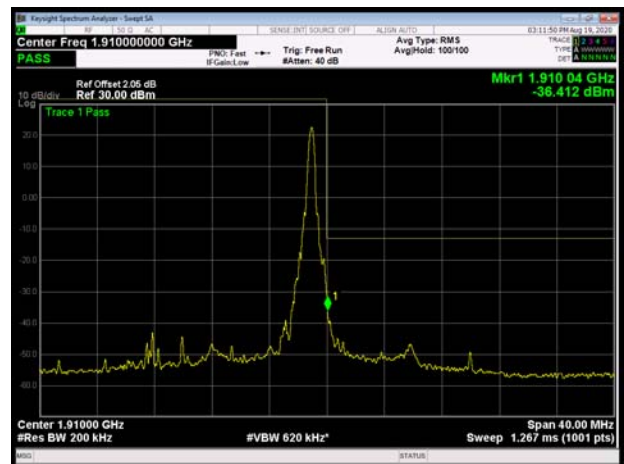
LTE Band 2 15MHz 64QAM 100%RB CH-High



LTE Band 2 20MHz 64QAM 1RB CH-Low



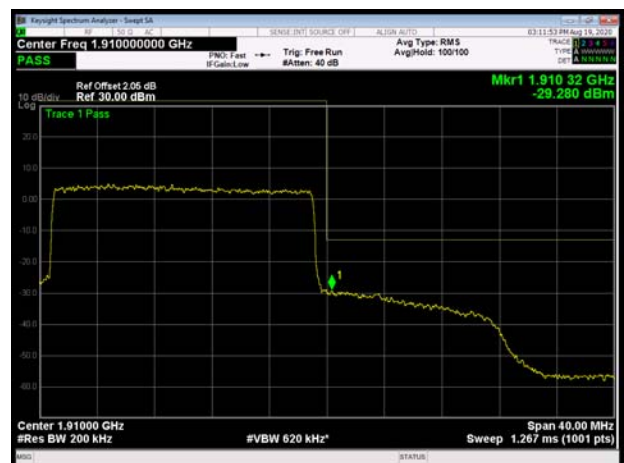
LTE Band 2 20MHz 64QAM 1RB CH-High



LTE Band 2 20MHz 64QAM 100%RB CH-Low



LTE Band 2 20MHz 64QAM 100%RB CH-High



5.4. Peak-to-Average Power Ratio (PAPR)

Ambient condition

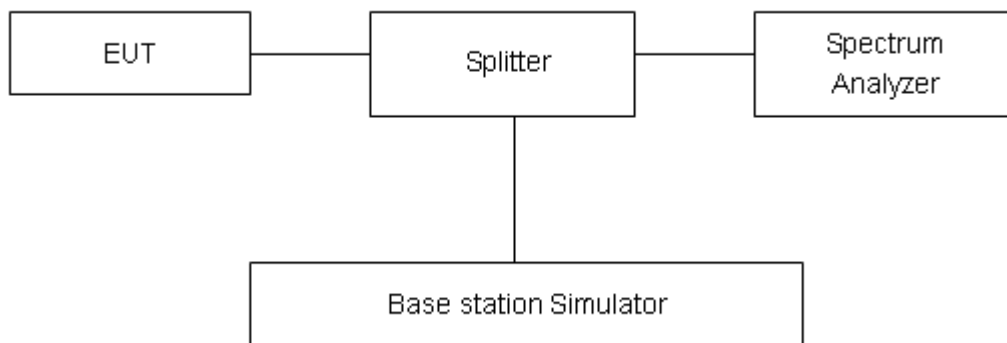
Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

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

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 in 24.232(d).

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 2								
Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	Peak (dBm)	Avg (dBm)	PAPR (dB)	Limit (dB)	Conclusion
QPSK	1.4	18607	1850.7	28.80	23.49	5.31	≤13	PASS
		18900	1880.0	28.84	23.51	5.33	≤13	PASS
		19193	1909.3	28.94	23.43	5.51	≤13	PASS
	3	18615	1851.5	28.74	23.53	5.21	≤13	PASS
		18900	1880	28.73	23.52	5.21	≤13	PASS
		19185	1908.5	28.84	23.54	5.30	≤13	PASS
	5	18625	1852.5	28.87	23.53	5.34	≤13	PASS
		18900	1880	28.79	23.53	5.26	≤13	PASS
		19175	1907.5	28.83	23.50	5.33	≤13	PASS
	10	18650	1855	28.82	23.57	5.25	≤13	PASS
		18900	1880	28.84	23.54	5.30	≤13	PASS
		19150	1905	28.85	23.53	5.32	≤13	PASS
	15	18675	1857.5	29.06	23.59	5.47	≤13	PASS
		18900	1880	29.14	23.53	5.61	≤13	PASS
		19125	1902.5	29.20	23.53	5.67	≤13	PASS
16QAM	1.4	18607	1850.7	28.63	22.55	6.08	≤13	PASS
		18900	1880.0	28.70	22.56	6.14	≤13	PASS
		19193	1909.3	28.58	22.39	6.19	≤13	PASS
	3	18615	1851.5	28.61	22.56	6.05	≤13	PASS
		18900	1880	28.59	22.55	6.04	≤13	PASS
		19185	1908.5	28.64	22.56	6.08	≤13	PASS
	5	18625	1852.5	28.58	22.54	6.04	≤13	PASS
		18900	1880	28.59	22.54	6.05	≤13	PASS
		19175	1907.5	28.60	22.53	6.07	≤13	PASS
	10	18650	1855	28.54	22.53	6.01	≤13	PASS
		18900	1880	28.60	22.52	6.08	≤13	PASS
		19150	1905	28.59	22.49	6.10	≤13	PASS
	15	18675	1857.5	28.71	22.59	6.12	≤13	PASS
		18900	1880	28.71	22.50	6.21	≤13	PASS
		19125	1902.5	28.75	22.54	6.21	≤13	PASS
64QAM	1.4	18607	1850.7	28.54	22.52	6.02	≤13	PASS
		18900	1880.0	28.62	22.54	6.08	≤13	PASS
		19193	1909.3	28.57	22.40	6.17	≤13	PASS



	3	18615	1851.5	28.60	22.53	6.07	≤13	PASS
		18900	1880	28.56	22.53	6.03	≤13	PASS
		19185	1908.5	28.67	22.56	6.11	≤13	PASS
	5	18625	1852.5	28.61	22.54	6.07	≤13	PASS
		18900	1880	28.61	22.57	6.04	≤13	PASS
		19175	1907.5	28.61	22.53	6.08	≤13	PASS
	10	18650	1855	28.57	22.55	6.02	≤13	PASS
		18900	1880	28.60	22.55	6.05	≤13	PASS
		19150	1905	28.58	22.49	6.09	≤13	PASS
	15	18675	1857.5	28.71	22.60	6.11	≤13	PASS
		18900	1880	28.70	22.48	6.22	≤13	PASS
		19125	1902.5	28.73	22.52	6.21	≤13	PASS
	20	18700	1860	28.59	22.62	5.97	≤13	PASS
		18900	1880	28.63	22.53	6.10	≤13	PASS
		19100	1900	28.67	22.57	6.10	≤13	PASS

5.5.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 +55°C in 10°C step size,

(1) With all power removed, the temperature was decreased to 0°C and permitted to stabilize for three hours.

(2) Measure the carrier frequency with the test equipment in a “call mode”. These measurements should be made within 1 minute of powering up the mobile station, to prevent significant self warming.

(3) Repeat the above measurements at 10°C increments from -30°C to +55°C. Allow at least 1.5 hours at each temperature, un-powered, before making measurements.

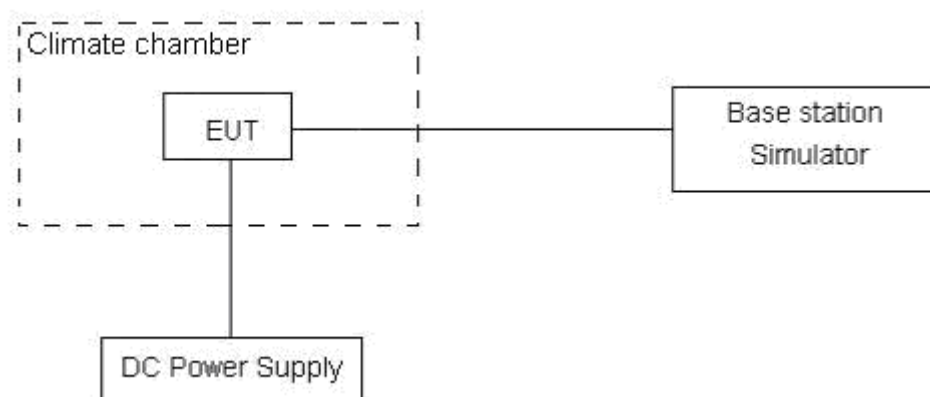
Frequency Stability (Voltage Variation)

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

Primary Supply Voltage: The primary supply voltage is varied from 85% to 115% of the nominal value for non hand-carried battery and AC powered equipment. For hand-carried, battery-powered equipment, primary supply voltage is reduced 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 3.5 V and 4.4V, with a nominal voltage of 4.0 V.

Test setup



**Limits**

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block

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 2								
Condition		Freq.Error (Hz)	Freq.Error (Hz)	Freq.Error (Hz)	Frequency Stability (ppm)	Frequency Stability (ppm)	Frequency Stability (ppm)	Verdict
BANDWIDTH	1.4MHz							
Temperature	Voltage	64QAM	16QAM	QPSK	64QAM	16QAM	QPSK	
Normal (25℃)	Normal	5.93	7.23	8.61	0.00315	0.00384	0.00458	PASS
Extreme (50℃)		13.51	4.10	3.61	0.00719	0.00218	0.00192	PASS
Extreme (40℃)		3.55	8.10	12.33	0.00189	0.00431	0.00656	PASS
Extreme (30℃)		4.18	5.86	2.72	0.00223	0.00311	0.00145	PASS
Extreme (20℃)		5.34	15.62	1.30	0.00284	0.00831	0.00069	PASS
Extreme (10℃)		6.83	2.45	14.54	0.00363	0.00130	0.00773	PASS
Extreme (0℃)		5.88	13.65	4.65	0.00313	0.00726	0.00247	PASS
Extreme (-10℃)		1.63	9.49	12.56	0.00087	0.00505	0.00668	PASS
Extreme (-20℃)		10.36	9.05	10.61	0.00551	0.00481	0.00564	PASS
Extreme (-30℃)		10.40	1.78	12.63	0.00553	0.00095	0.00672	PASS
25℃	LV	15.20	5.42	1.85	0.00809	0.00288	0.00098	PASS
	HV	11.73	6.19	17.24	0.00624	0.00329	0.00917	PASS
Condition		Freq.Error (Hz)	Freq.Error (Hz)	Freq.Error (Hz)	Frequency Stability (ppm)	Frequency Stability (ppm)	Frequency Stability (ppm)	Verdict
BANDWIDTH	3MHz							
Temperature	Voltage	64QAM	16QAM	QPSK	64QAM	16QAM	QPSK	
Normal (25℃)	Normal	8.01	11.46	1.60	0.00426	0.00609	0.00085	PASS
Extreme (50℃)		11.46	1.74	12.91	0.00610	0.00093	0.00687	PASS
Extreme (40℃)		11.06	3.30	3.94	0.00588	0.00175	0.00209	PASS
Extreme (30℃)		9.48	5.52	10.81	0.00504	0.00293	0.00575	PASS
Extreme (20℃)		2.67	9.01	5.63	0.00142	0.00479	0.00300	PASS
Extreme (10℃)		1.91	10.59	8.31	0.00101	0.00563	0.00442	PASS
Extreme (0℃)		3.64	9.41	17.85	0.00193	0.00500	0.00949	PASS
Extreme (-10℃)		4.59	7.41	9.39	0.00244	0.00394	0.00500	PASS
Extreme (-20℃)		4.80	4.56	15.07	0.00256	0.00242	0.00801	PASS
Extreme (-30℃)		5.03	7.64	3.26	0.00267	0.00406	0.00173	PASS
25℃	LV	7.19	4.22	7.03	0.00382	0.00224	0.00374	PASS
	HV	15.45	16.08	4.72	0.00822	0.00856	0.00251	PASS
Condition		Freq.Error (Hz)	Freq.Error (Hz)	Freq.Error (Hz)	Frequency Stability (ppm)	Frequency Stability (ppm)	Frequency Stability (ppm)	Verdict
BANDWIDTH	5MHz							
Temperature	Voltage	64QAM	16QAM	QPSK	64QAM	16QAM	QPSK	
Normal (25℃)	Normal	16.21	1.84	6.94	0.00862	0.00098	0.00369	PASS
Extreme (50℃)		8.46	17.68	11.96	0.00450	0.00941	0.00636	PASS



Extreme (40℃)		17.80	15.04	12.65	0.00947	0.00800	0.00673	PASS
Extreme (30℃)		4.36	3.17	2.34	0.00232	0.00169	0.00125	PASS
Extreme (20℃)		4.85	6.66	17.06	0.00258	0.00354	0.00908	PASS
Extreme (10℃)		5.24	6.50	7.12	0.00279	0.00346	0.00379	PASS
Extreme (0℃)		4.78	16.07	2.04	0.00254	0.00855	0.00108	PASS
Extreme (-10℃)		15.11	12.99	11.63	0.00804	0.00691	0.00619	PASS
Extreme (-20℃)		15.74	9.10	7.29	0.00837	0.00484	0.00388	PASS
Extreme (-30℃)		3.09	3.79	12.74	0.00164	0.00202	0.00678	PASS
25℃	LV	17.38	10.71	17.00	0.00925	0.00570	0.00904	PASS
	HV	1.47	4.30	2.98	0.00078	0.00229	0.00158	PASS
Condition		Freq.Error	Freq.Error	Freq.Error	Frequency	Frequency	Frequency	Verdict
BANDWIDTH	10MHz	(Hz)	(Hz)	(Hz)	Stability	Stability	Stability	
Temperature	Voltage	64QAM	16QAM	QPSK	(ppm)	(ppm)	(ppm)	
Normal (25℃)	Normal	14.11	14.49	8.36	0.00750	0.00771	0.00445	PASS
Extreme (50℃)		5.90	10.25	5.74	0.00314	0.00545	0.00305	PASS
Extreme (40℃)		10.76	5.53	13.58	0.00573	0.00294	0.00722	PASS
Extreme (30℃)		12.23	12.21	10.46	0.00651	0.00649	0.00557	PASS
Extreme (20℃)		6.87	1.85	16.25	0.00365	0.00098	0.00864	PASS
Extreme (10℃)		13.79	11.26	15.10	0.00734	0.00599	0.00803	PASS
Extreme (0℃)		7.64	5.89	5.94	0.00406	0.00313	0.00316	PASS
Extreme (-10℃)		13.15	9.96	1.14	0.00699	0.00530	0.00061	PASS
Extreme (-20℃)		10.01	9.27	11.55	0.00533	0.00493	0.00614	PASS
Extreme (-30℃)		9.01	16.34	13.45	0.00479	0.00869	0.00716	PASS
25℃	LV	5.21	8.12	8.26	0.00277	0.00432	0.00440	PASS
	HV	11.18	15.84	15.73	0.00595	0.00843	0.00837	PASS
Condition		Freq.Error	Freq.Error	Freq.Error	Frequency	Frequency	Frequency	Verdict
BANDWIDTH	15MHz	(Hz)	(Hz)	(Hz)	Stability	Stability	Stability	
Temperature	Voltage	64QAM	16QAM	QPSK	(ppm)	(ppm)	(ppm)	
Normal (25℃)	Normal	4.78	17.87	3.44	0.00255	0.00951	0.00183	PASS
Extreme (50℃)		8.81	10.44	9.04	0.00469	0.00556	0.00481	PASS
Extreme (40℃)		17.94	17.45	12.94	0.00954	0.00928	0.00688	PASS
Extreme (30℃)		14.56	7.49	17.32	0.00774	0.00398	0.00921	PASS
Extreme (20℃)		6.67	10.00	12.92	0.00355	0.00532	0.00687	PASS
Extreme (10℃)		1.73	1.61	9.19	0.00092	0.00086	0.00489	PASS
Extreme (0℃)		12.54	7.18	16.91	0.00667	0.00382	0.00900	PASS
Extreme (-10℃)		5.17	10.30	7.72	0.00275	0.00548	0.00411	PASS
Extreme (-20℃)		17.67	6.29	5.73	0.00940	0.00334	0.00305	PASS
Extreme (-30℃)		7.31	10.01	6.59	0.00389	0.00532	0.00351	PASS
25℃	LV	12.94	1.05	12.59	0.00688	0.00056	0.00669	PASS



	HV	3.85	6.98	2.10	0.00205	0.00371	0.00112	PASS
Condition		Freq.Error	Freq.Error	Freq.Error	Frequency	Frequency	Frequency	Verdict
BANDWIDTH	20MHz	(Hz)	(Hz)	(Hz)	Stability	Stability	Stability	
Temperature	Voltage	64QAM	16QAM	QPSK	(ppm)	(ppm)	(ppm)	
Normal (25℃)	Normal	9.47	6.02	13.41	64QAM	16QAM	QPSK	PASS
Extreme (50℃)		4.64	4.99	15.40	0.00504	0.00320	0.00713	PASS
Extreme (40℃)		16.11	14.24	11.46	0.00247	0.00265	0.00819	PASS
Extreme (30℃)		15.61	9.52	5.48	0.00857	0.00757	0.00610	PASS
Extreme (20℃)		4.78	5.78	3.71	0.00830	0.00506	0.00291	PASS
Extreme (10℃)		13.00	11.55	12.56	0.00254	0.00308	0.00197	PASS
Extreme (0℃)		12.07	4.93	15.94	0.00691	0.00615	0.00668	PASS
Extreme (-10℃)		10.03	6.88	4.03	0.00642	0.00262	0.00848	PASS
Extreme (-20℃)		2.40	11.35	2.52	0.00533	0.00366	0.00214	PASS
Extreme (-30℃)		11.07	12.37	4.78	0.00128	0.00603	0.00134	PASS
25℃	LV	6.15	7.34	14.26	0.00589	0.00658	0.00255	PASS
	HV	6.40	7.41	7.71	0.00327	0.00390	0.00759	PASS
					0.00340	0.00394	0.00410	PASS

5.6. 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 9kHz to the 10th harmonic of the carrier. The peak detector is used.

RBW is set to 100kHz, VBW is set to 300kHz for 30MHz~1GHz

RBW is set to 1MHz, VBW is set to 3MHz for above 1GHz, Sweep is set to ATUO.

RBW is set to 1 kHz (0.009MHz~ 0.15 MHz),

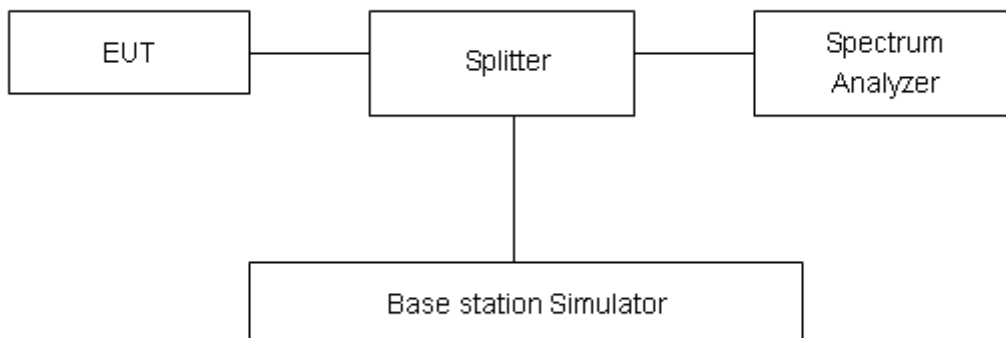
RBW is set to 10 kHz (0.15 MHz~ 30 MHz)

RBW is set to 100 kHz (30MHz~1000 MHz)

RBW is set to 1000 kHz (above 1000MHz)

The modulation mode and RB allocation refer to section 5.1, using the maximum output power configuration.

Test setup



Limits

Rule Part 24.238(a) specifies that “on any frequency outside a licensee’s frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least $43 + 10 \log_{10} (P)$ dB.”

Limit	-13 dBm
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Measurement Uncertainty

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



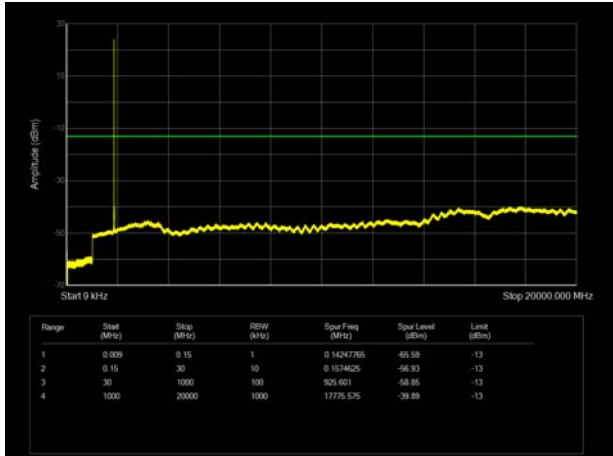
Frequency	Uncertainty
9kHz-1GHz	0.684 dB
1GHz-20GHz	1.407 dB

Test Result

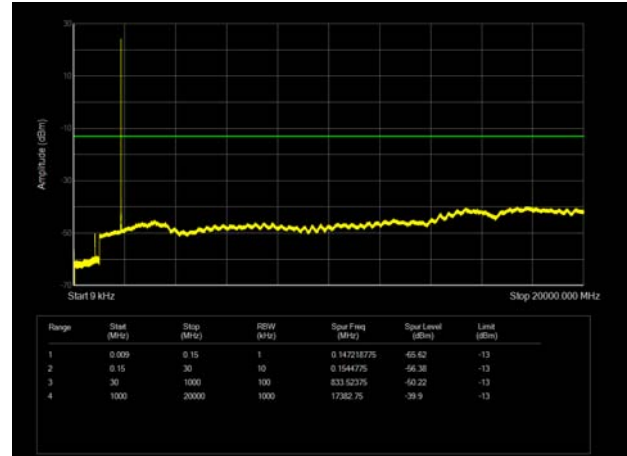
Sweep the whole frequency band through the range from 9kHz to the 10th harmonic of the carrier, the emissions more than 20 dB below the limit are not reported.

The signal beyond the limit is carrier.

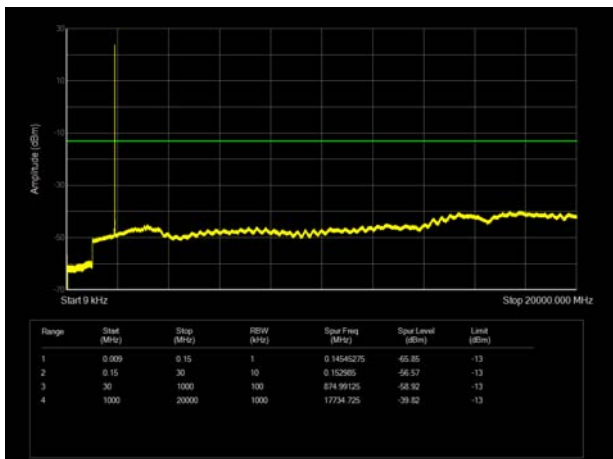
LTE Band 2 1.4MHz CH-Low 9kHz~20GHz



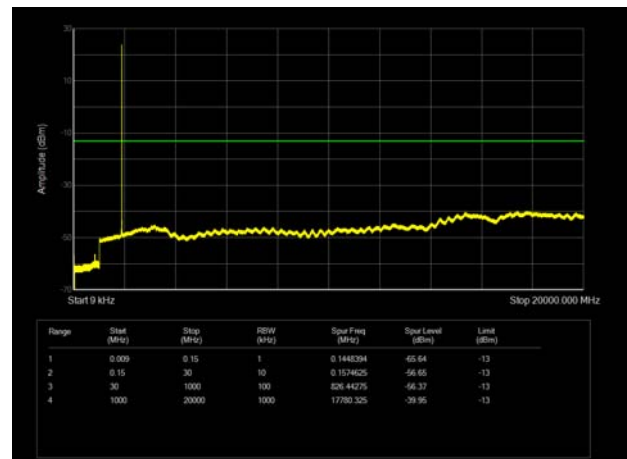
LTE Band 2 3MHz CH-Low 9kHz~20GHz



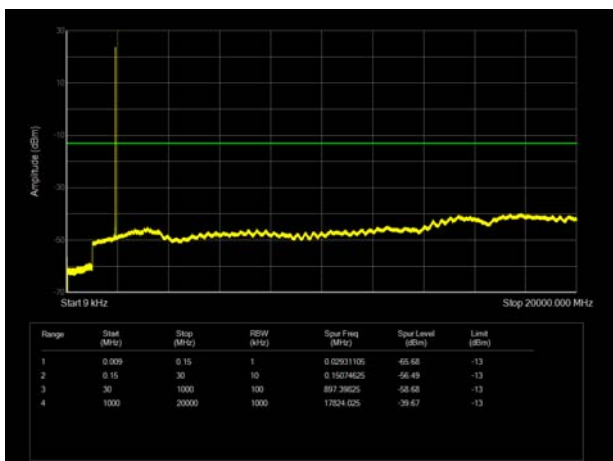
LTE Band 2 1.4MHz CH-Middle 9kHz~20GHz



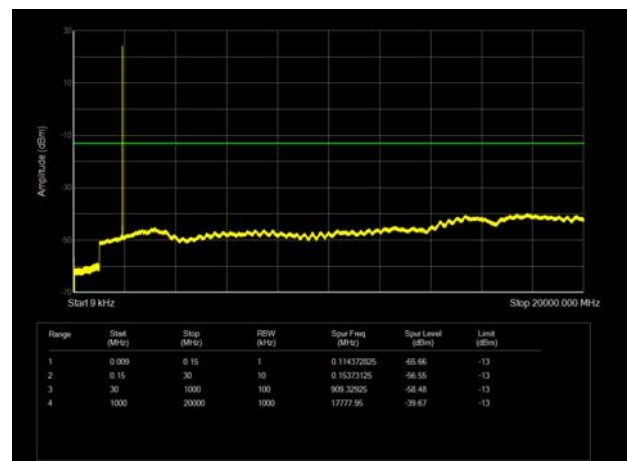
LTE Band 2 3MHz CH-Middle 9kHz~20GHz



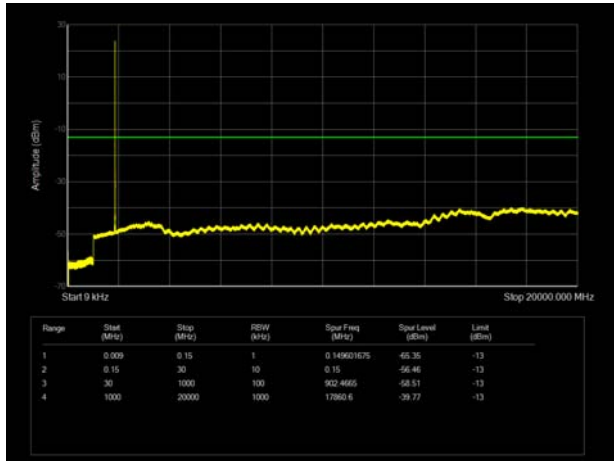
LTE Band 2 1.4MHz CH-High 9kHz~20GHz



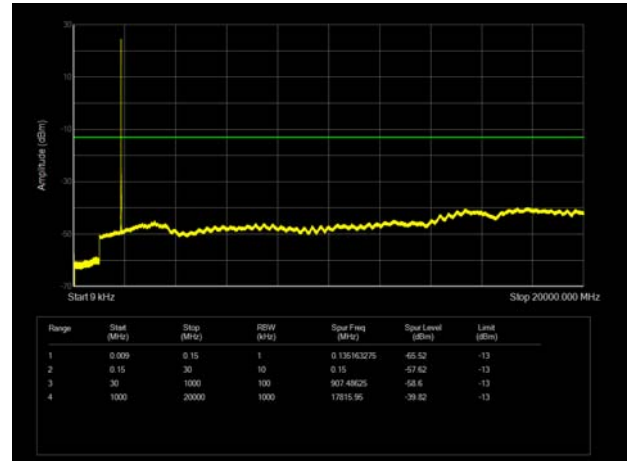
LTE Band 2 3MHz CH-High 9kHz~20GHz



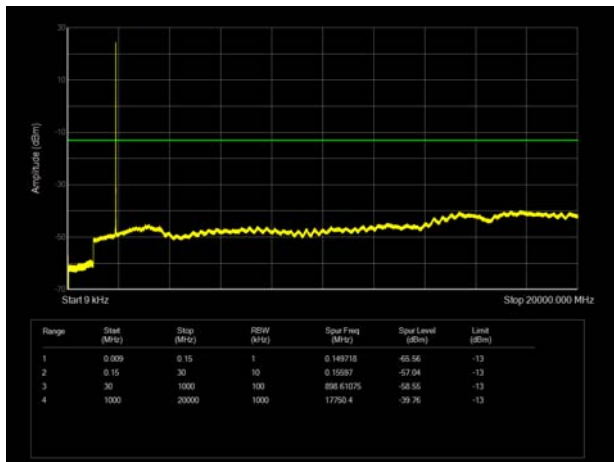
LTE Band 2 5MHz CH-Low 9kHz~20GHz



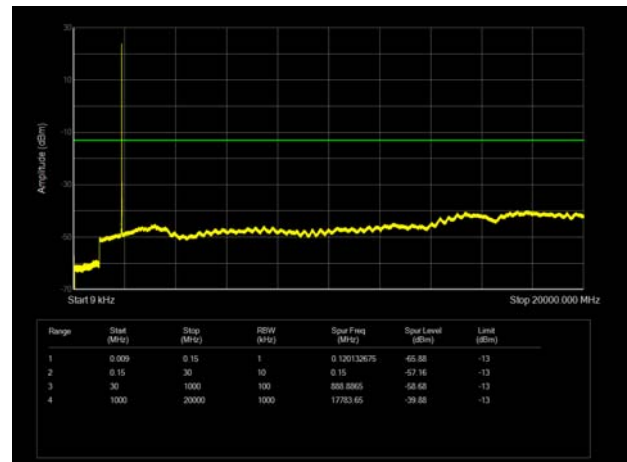
LTE Band 2 10MHz CH-Low 9kHz~20GHz



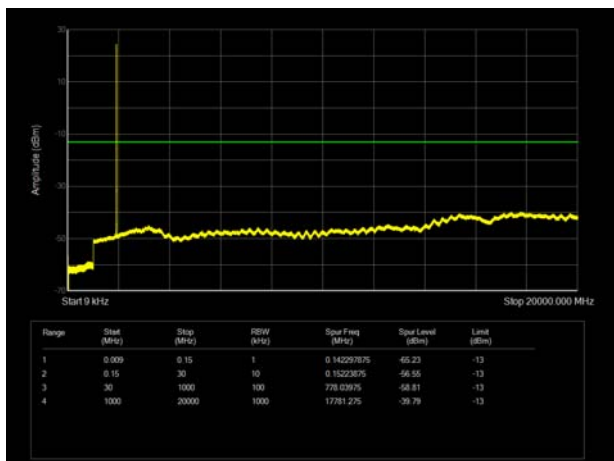
LTE Band 2 5MHz CH-Middle 9kHz~20GHz



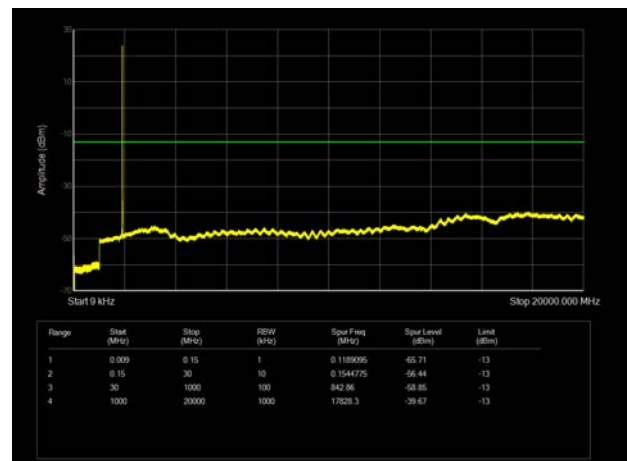
LTE Band 2 10MHz CH-Middle 9kHz~20GHz



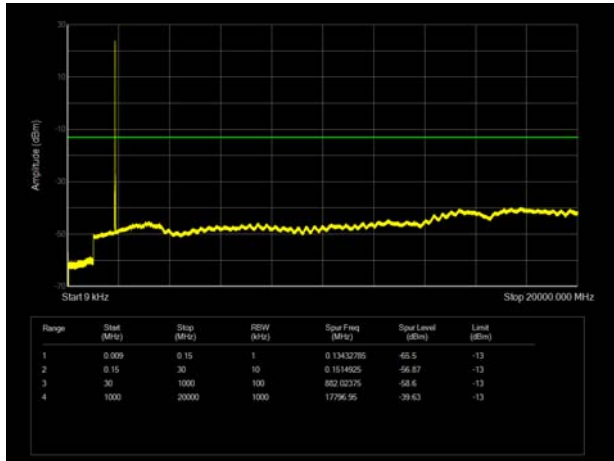
LTE Band 2 5MHz CH-High 9kHz~20GHz



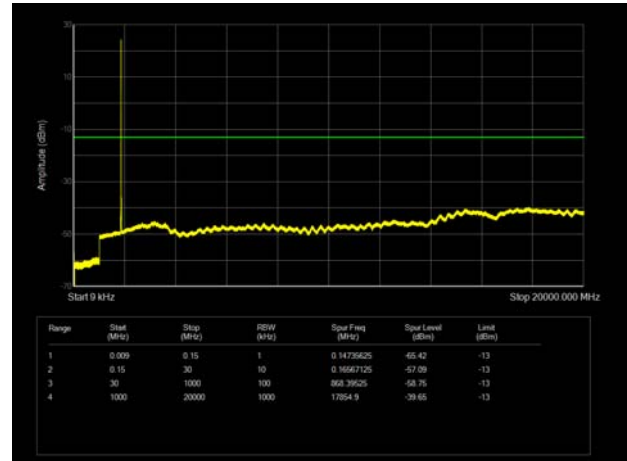
LTE Band 2 10MHz CH-High 9kHz~20GHz



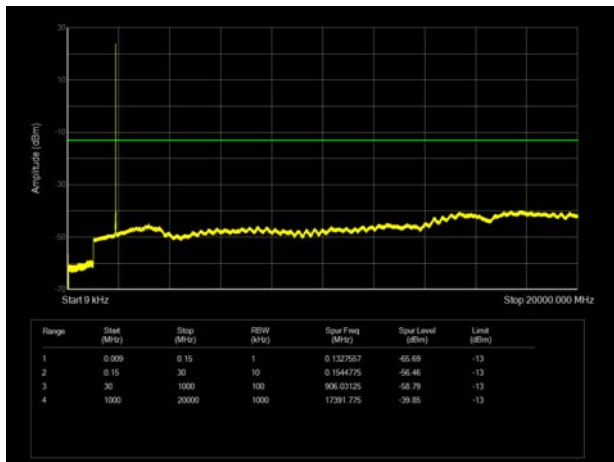
LTE Band 2 15MHz CH-Low 9kHz~20GHz



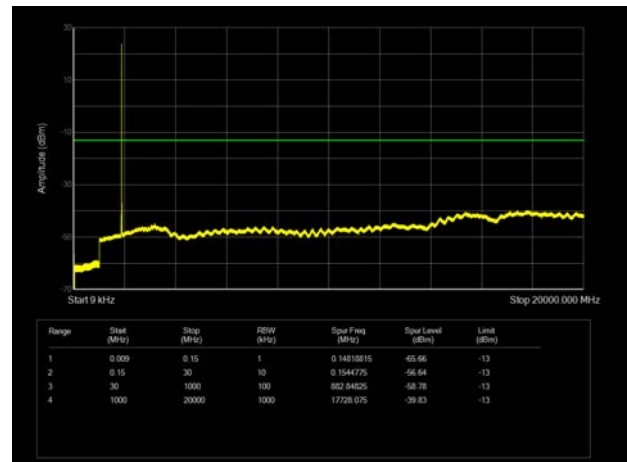
LTE Band 2 20MHz CH-Low 9kHz~20GHz



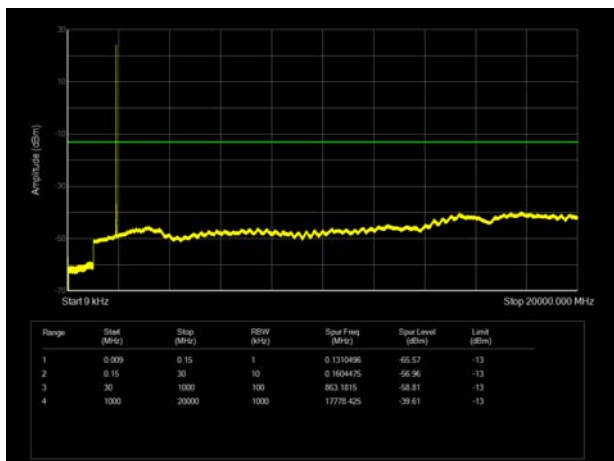
LTE Band 2 15MHz CH-Middle 9kHz~20GHz



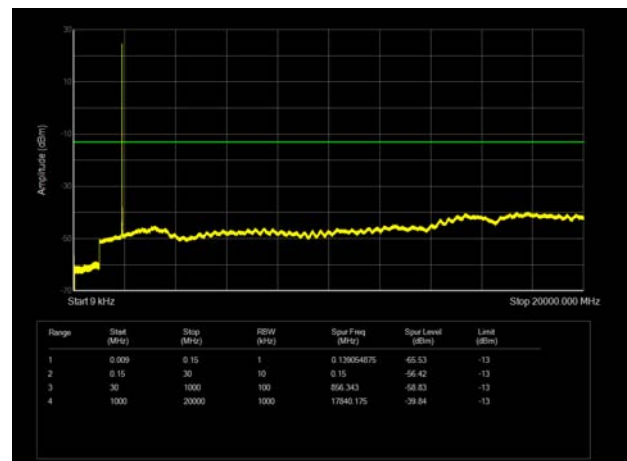
LTE Band 2 20MHz CH-Middle 9kHz~20GHz



LTE Band 2 15MHz CH-High 9kHz~20GHz



LTE Band 2 20MHz CH-High 9kHz~20GHz



5.7. 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 v03r01 Section 5.8 and ANSI C63.26 (2015).
2. Below 1GHz: 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). Above 1GHz: (Note: the FCC's permission to use 1.5m as an alternative per TCBC Conf call of Dec. 2, 2014.) The EUT is placed on a turntable 1.5 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 loop antenna, A log-periodic antenna or 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=200Hz,VBW=600Hz for 9kHz-150kHz , RBW=10kHz, VBW=30kHz 150kHz-30MHz , RBW=100kHz,VBW=300kHz for 30MHz to 1GHz and RBW=1MHz, VBW=3MHz for above 1GHz, And the maximum value of the receiver should be recorded as (Pr).
5. The EUT shall be replaced by a substitution antenna. In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (PMea) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver reach the previously recorded (Pr). The power of signal source (PMea) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.
6. A amplifier should be connected to the Signal Source output port. And the cable should be connect between the Amplifier and the Substitution Antenna. The cable loss (Pcl) ,the Substitution Antenna Gain (Ga) and the Amplifier Gain (PAg) should be recorded after test.
7. The measurement results are obtained as described below:

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

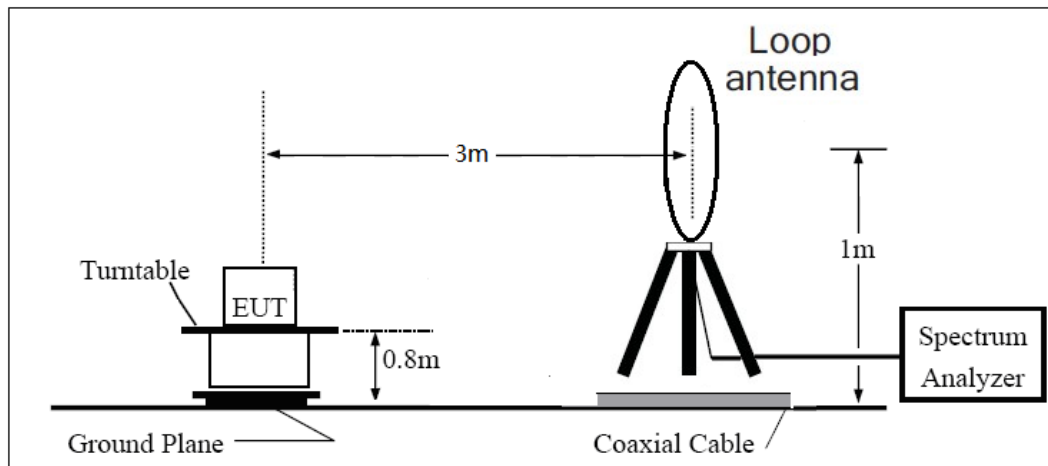
$$\text{Power(EIRP)} = \text{PMea} - \text{Pcl} + \text{Ga}$$
8. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi)

and known input power. ERP can be calculated from EIRP by subtracting the gain of the dipole, $ERP = EIRP - 2.15\text{dBi}$.

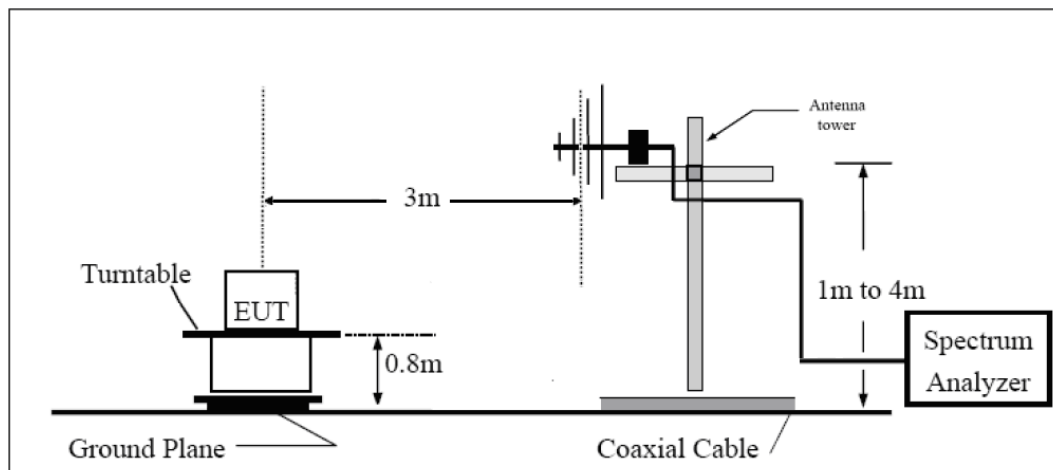
The modulation mode and RB allocation refer to section 5.1, using the maximum output power configuration.

Test setup

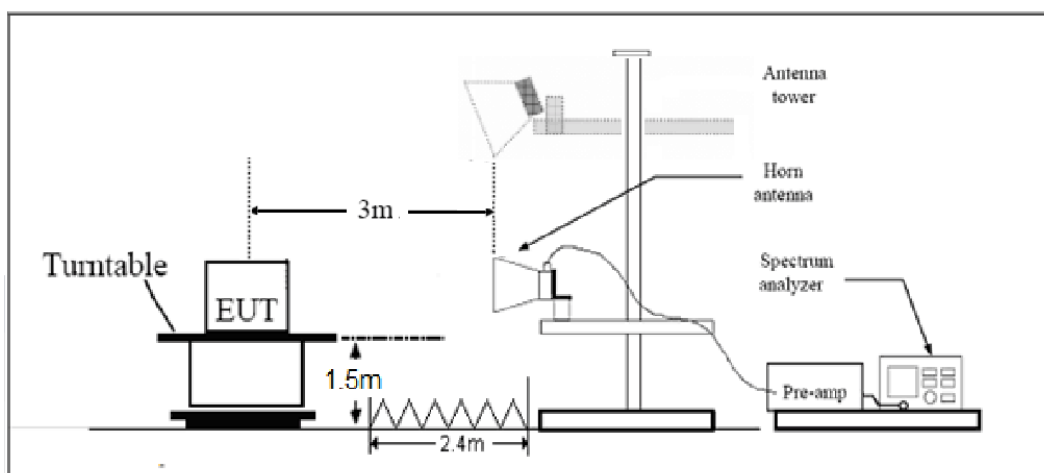
9KHz ~ 30MHz



30MHz ~ 1GHz



Above 1GHz





Note: Area side: 2.4mX3.6m

Limits

Rule Part 24.238(a) specifies that “on any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least $43 + 10 \log_{10} (P)$ dB.”

Limit	-13 dBm
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Measurement Uncertainty

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

Test Result

Sweep the whole frequency band through the range from 9kHz to the 10th harmonic of the carrier, the emissions below the noise floor will not be recorded in the report.

LTE Band 2 1.4MHz CH-Middle

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3760.5	-59.12	5.10	11.05	Horizontal	-53.17	-13.00	40.17	45
3	5638.9	-58.45	5.42	12.65	Horizontal	-51.22	-13.00	38.22	180
4	7520.0	-56.82	6.70	13.85	Horizontal	-49.67	-13.00	36.67	90
5	9400.0	-54.88	7.01	14.75	Horizontal	-47.14	-13.00	34.14	315
6	11280.0	-54.16	7.48	15.95	Horizontal	-45.69	-13.00	32.69	45
7	13160.0	-51.60	7.51	16.55	Horizontal	-42.56	-13.00	29.56	90
8	15040.0	-50.96	8.24	15.35	Horizontal	-43.85	-13.00	30.85	315
9	16920.0	-47.55	8.41	14.95	Horizontal	-41.01	-13.00	28.01	45
10	18800.0	-	-	-	-	-	-	-	-

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 2 5MHz CH-Middle

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3755.6	-59.04	5.10	11.05	Horizontal	-53.09	-13.00	40.09	90
3	5633.6	-57.28	5.42	12.65	Horizontal	-50.05	-13.00	37.05	315
4	7520.0	-55.33	6.70	13.85	Horizontal	-48.18	-13.00	35.18	45
5	9400.0	-54.37	7.01	14.75	Horizontal	-46.63	-13.00	33.63	270
6	11280.0	-53.08	7.48	15.95	Horizontal	-44.61	-13.00	31.61	90
7	13160.0	-50.97	7.51	16.55	Horizontal	-41.93	-13.00	28.93	315
8	15040.0	-49.18	8.24	15.35	Horizontal	-42.07	-13.00	29.07	45
9	16920.0	-47.04	8.41	14.95	Horizontal	-40.50	-13.00	27.50	90
10	18800.0	-	-	-	-	-	-	-	-

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 2 20MHz CH-Middle

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3742.1	-58.95	5.10	11.05	Horizontal	-53.00	-13.00	40.00	90
3	5613.4	-57.50	5.42	12.65	Horizontal	-50.27	-13.00	37.27	45
4	7484.6	-56.01	6.70	13.85	Horizontal	-48.86	-13.00	35.86	270
5	9400.0	-51.87	7.01	14.75	Horizontal	-44.13	-13.00	31.13	45
6	11280.0	-53.01	7.48	15.95	Horizontal	-44.54	-13.00	31.54	135
7	13160.0	-51.76	7.51	16.55	Horizontal	-42.72	-13.00	29.72	270
8	15040.0	-49.50	8.24	15.35	Horizontal	-42.39	-13.00	29.39	90
9	16920.0	-47.07	8.41	14.95	Horizontal	-40.53	-13.00	27.53	45
10	18800.0	-	-	-	-	-	-	-	-

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.

6. Main Test Instruments

Name	Manufacturer	Type	Serial Number	Calibration Date	Expiration Date
Base Station Simulator	R&S	CMU200	118133	2020-05-17	2021-05-16
Base Station Simulator	R&S	CMW500	113824	2020-05-18	2021-05-17
Power Splitter	Hua Xiang	SHX-GF2-2-13	10120101	/	/
Spectrum Analyzer	Key sight	N9010A	MY50210259	2020-05-18	2021-05-17
Universal Radio Communication Tester	Key sight	E5515C	MY48367192	2020-05-27	2021-05-26
Signal Analyzer	R&S	FSV30	100815	2019-12-15	2020-12-14
Loop Antenna	SCHWARZBECK	FMZB1519	1519-047	2020-04-02	2023-04-01
Trilog Antenna	SCHWARZBECK	VUBL 9163	9163-201	2017-11-18	2020-11-17
Horn Antenna	R&S	HF907	102723	2018-08-11	2021-08-10
Horn Antenna	ETS-Lindgren	3160-09	00102643	2018-06-20	2021-06-19
Signal generator	R&S	SMB 100A	102594	2020-05-18	2021-05-17
Climatic Chamber	ESPEC	SU-242	93000506	2017-12-17	2020-12-16
Preamplifier	R&S	SCU18	102327	2020-05-18	2021-05-17
MOB COMMS DC SUPPLY	Keysight	66319D	MY43004105	2020-05-18	2021-05-17
RF Cable	Agilent	SMA 15cm	0001	2020-06-12	2020-12-11
Software	R&S	EMC32	9.26.0	/	/

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



ANNEX A: The EUT Appearance

The EUT Appearance are submitted separately.



ANNEX B: Test Setup Photos

The Test Setup Photos are submitted separately.