RF TEST REPORT

Applicant	Quectel Wireless Solutions Co., Ltd
FCC ID	XMR202012BG95MF
Product	LTE Cat M1 & Cat NB2 &WIFI Module
Brand	Quectel
Model	BG95-MF
Report No.	R2012A0839-R2
Issue Date	January 19, 2021

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.

Prepared by: Peng Tao

Approved by: Kai Xu

TA Technology (Shanghai) Co., Ltd.

No.145, Jintang Rd, Tangzhen Industry Park, Pudong Shanghai, China

TEL: +86-021-50791141/2/3

FAX: +86-021-50791141/2/3-8000

TABLE OF CONTENT

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: December 7, 2020 ~ January 14, 2021			
Date of Sample Received: December 4, 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 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
Contact:	Xu Kai
Telephone:	+86-021-50791141/2/3
Fax:	+86-021-50791141/2/3-8000
Website:	http://www.ta-shanghai.com
E-mail:	xukai@ta-shanghai.com

2. General Description of Equipment under Test

2.3. Applicant and Manufacturer Information

Applicant	Quectel Wireless Solutions Co., Ltd
Applicant address	Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai, China 200233
Manufacturer	Quectel Wireless Solutions Co., Ltd
Manufacturer address	Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai, China 200233

2.4. General information

EUT Description				
Model		BG95-MF		
IMEI		860612040005002		
Hardware Version		R1.1		
Software Version		BG95MFLAR02A01		
Power Supply		External power supply		
Antenna Type		The EUT don't have standard Antenna, The Antenna used for testing in this report is the after-market accessory (Dipole Antenna)		
Antenna Gain		Band	Frequency(MHz)	Antenna Gain(dBi)
		NB-IOT Band 2/ LTE Band 2	1860	1.25
			1880	1.33
			1900	1.59
		NB-IOT Band 25/ LTE Band 25	1860	1.25
			1880	1.33
			1920	1.36
Test Mode(s)		NB-IOT Band 2/25; LTE Band 2/25;		
LTE	Test Modulation	QPSK 16QAM;		
	Category	M1		
NB-IOT	Test Modulation:	BPSK, QPSK		
	Category	NB2		
	Deployment:	stand-alone		
	Sub-carrier spacing:	3.75KHz, 15KHz		
	Ntones:	single-tone, multi-tone		
Maximum E.I.R.P		NB-IOT Band 2:	22.63dBm	
		NB-IOT Band 25:	22.09dBm	
		LTE Band 2:	22.81dBm	

	LTE Band 25:	22.33dBm	
Rated Power Supply Voltage	3.8V		
Extreme Voltage	Minimum: 3.23V Maximum: 4.37V		
Extreme Temperature	Lowest: -30°C Highest: +50°C		
Operating Voltage	Minimum: 3.3V Maximum: 4.3V		
Operating Temperature	Lowest: -35°C Highest: +75°C		
Frequency Range(s)	Band	Tx (MHz)	Rx (MHz)
	NB-IOT Band 2	1850 ~ 1910	1930 ~ 1990
	NB-IOT Band 25	1850 ~ 1915	1930 ~ 1995
	LTE Band 2	1850 ~ 1910	1930 ~ 1990
	LTE Band 25	1850 ~ 1915	1930 ~ 1995
Note: 1. The EUT is sent from the applicant to TA and the information of the EUT is declared by the applicant.			

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

All modes as Subcarrier Spacing, modulations, Channel were investigated.
Subsequently, only the worst case emissions are reported.
The following testing in NB-IOT is set based on the maximum RF Output Power.
Test modes are chosen to be reported as the worst case configuration below for NB-IOT Band 2/25.

Test items	Deployment mode	Subcarrier Spacing (kHz)		Modulation		Test Channel		
	Stand-alone	3.75	15	BPSK	QPSK	L	M	H
RF Power Output and Effective Isotropic Radiated Power	O	O	O	O	O	O	O	O
Occupied Bandwidth	O	O	O	O	O	-	O	-
Band Edge Compliance	O	O	O	O	O	O	-	O
Peak-to-Average Power Ratio	O	O	O	O	O	-	O	-
Frequency Stability	O	O	O	O	O	-	O	-
Conducted Spurious Emissions	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.

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 2/25:

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	-
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	-
Frequency Stability	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

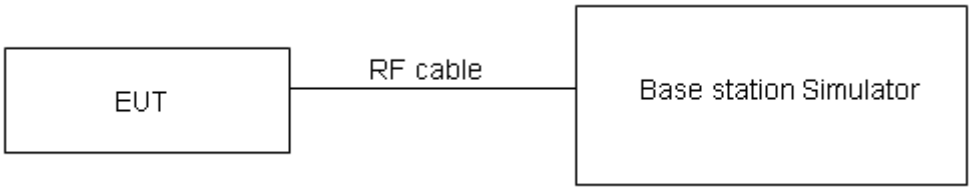
Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

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:
EIRP (dBm) = Output Power (dBm) - Losses (dB) + Antenna Gain (dBi)
where:dBd refers to gain relative to an ideal dipole.
EIRP (dBm) = ERP (dBm) + 2.15 (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	≤ 2 W (33 dBm)

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 for RF power output, k = 2, U= 1.19 dB for EIRP.

Test Results

Mode	Modulation	Sub-carrier spacing (KHz)	Ntones	Maximum Output Power (dBm) for low/middle/high channel			EIRP (dBm)		
				18602 /1850.2MHz	18900 /1880.0MHz	19198 /1909.8MHz	18602 /1850.2MHz	18900 /1880.0MHz	19198 /1909.8MHz
NB-IOT Band 2	BPSK	3.75	1@0	21.01	20.75	20.91	22.26	22.13	22.50
			1@47	20.92	20.71	20.84	22.17	22.09	22.43
		15	1@0	20.92	20.85	21.01	22.17	22.23	22.60
			1@11	20.91	20.83	21.03	22.16	22.21	22.62
	QPSK	3.75	1@0	21.03	20.73	20.88	22.28	22.11	22.47
			1@47	20.95	20.78	20.96	22.20	22.16	22.55
		15	1@0	20.98	20.88	21.00	22.23	22.26	22.59
			1@11	20.84	20.85	21.04	22.09	22.23	22.63
		15	12@0	18.87	18.66	18.79	20.12	20.04	20.38

Mode	Modulation	Sub-carrier spacing (KHz)	Ntones	Maximum Output Power (dBm) for low/middle/high channel			EIRP (dBm)		
				26042 /1850.2MHz	26365 /1882.5MHz	26688 /1914.8MHz	26042 /1850.2MHz	26365 /1882.5MHz	26688 /1914.8MHz
NB-IOT Band 25	BPSK	3.75	1@0	20.77	20.62	20.66	22.02	22.00	22.02
			1@47	20.76	20.56	20.65	22.01	21.94	22.01
		15	1@0	20.84	20.55	20.70	22.09	21.93	22.06
			1@11	20.74	20.50	20.63	21.99	21.88	21.99
	QPSK	3.75	1@0	20.84	20.58	20.72	22.09	21.96	22.08
			1@47	20.82	20.66	20.60	22.07	22.04	21.96
		15	1@0	20.77	20.57	20.59	22.02	21.95	21.95
			1@11	20.79	20.58	20.66	22.04	21.96	22.02
		15	12@0	18.85	18.74	18.59	20.10	20.12	19.95

LTE Band 2	Channel/ Frequency(MHz)	Index	RB# RBstart	Maximum Output Power (dBm)		EIRP (dBm)	
				QPSK	16QAM	QPSK	16QAM
1.4MHz	18607/1850.7	0	1#0	20.64	19.96	21.89	21.21
		0	6#0	18.57	18.66	19.82	19.91
	18900/1880	0	1#0	21.02	19.30	22.40	20.68
		0	6#0	18.31	18.70	19.69	20.08
	19193/1909.3	0	1#5	21.22	19.70	22.81	21.29
		0	6#0	18.63	19.06	20.22	20.65
3MHz	18615/1851.5	0	1#0	20.80	19.40	22.05	20.65
		0	6#0	18.45	18.72	19.70	19.97
	18900/1880	0	1#0	20.67	19.20	22.05	20.58
		0	6#0	18.30	18.53	19.68	19.91
	19185/1908.5	1	1#5	20.87	19.45	22.46	21.04
		0	6#0	18.74	18.92	20.33	20.51
5MHz	18625/1852.5	3	1#0	20.69	20.24	21.94	21.49
		0	6#0	19.53	19.66	20.78	20.91
	18900/1880	0	1#0	20.51	20.77	21.89	22.15
		0	6#0	19.29	19.44	20.67	20.82
	19175/1907.5	0	1#5	20.71	20.31	22.30	21.90
		0	6#0	19.70	19.74	21.29	21.33
10MHz	18650/1855	3	1#0	20.68	20.29	21.93	21.54
		0	4#0	20.70	20.83	21.95	22.08
	18900/1880	0	1#0	20.57	20.21	21.95	21.59
		0	4#0	20.47	20.69	21.85	22.07
	19150/1905	4	1#5	20.71	20.41	22.30	22.00
		7	4#2	20.74	21.05	22.33	22.64
15MHz	18675/1857.5	3	1#0	20.68	20.35	21.93	21.60
		0	6#0	20.56	20.62	21.81	21.87
	18900/1880	0	1#0	20.55	20.35	21.93	21.73
		0	6#0	20.51	20.56	21.89	21.94
	19125/1902.5	8	1#5	20.72	20.44	22.31	22.03
		11	6#0	20.73	20.76	22.32	22.35
20MHz	18700/1860	3	1#0	20.74	20.31	21.99	21.56
		0	6#0	20.62	20.64	21.87	21.89
	18900/1880	0	1#0	20.59	20.35	21.97	21.73
		0	6#0	20.51	20.56	21.89	21.94
	19100/1900	12	1#5	20.70	20.42	22.29	22.01
		15	6#0	20.71	20.77	22.30	22.36

LTE Band 25	Channel/ Frequency(MHz)	Index	RB# RBstart	Maximum Output Power (dBm)		EIRP (dBm)	
				QPSK	16QAM	QPSK	16QAM
1.4MHz	26047/1850.7	0	1#0	20.68	19.92	21.93	21.17
		0	6#0	18.66	18.49	19.91	19.74
	26365/1882.5	0	1#0	20.95	19.30	22.33	20.68
		0	6#0	18.35	18.75	19.73	20.13
	26683/1914.3	0	1#5	20.95	19.48	22.31	20.84
		0	6#0	18.63	19.11	19.99	20.47
3MHz	26055/1851.5	0	1#0	20.90	19.59	22.15	20.84
		0	6#0	18.69	18.92	19.94	20.17
	26365/1882.5	0	1#0	20.74	19.35	22.12	20.73
		0	6#0	18.47	18.67	19.85	20.05
	26675/1913.5	1	1#5	20.88	19.51	22.24	20.87
		0	6#0	18.75	18.97	20.11	20.33
5MHz	26065/1852.5	3	1#0	20.77	20.44	22.02	21.69
		0	6#0	19.68	19.71	20.93	20.96
	26365/1882.5	0	1#0	20.53	20.25	21.91	21.63
		0	6#0	19.40	19.50	20.78	20.88
	26665/1912.5	0	1#5	20.64	20.25	22.00	21.61
		0	6#0	19.72	19.75	21.08	21.11
10MHz	26090/1855	3	1#0	20.69	20.31	21.94	21.56
		0	4#0	20.66	20.96	21.91	22.21
	26365/1882.5	0	1#0	20.56	20.19	21.94	21.57
		0	4#0	20.55	20.76	21.93	22.14
	26640/1910	4	1#5	20.60	20.35	21.96	21.71
		7	4#2	20.65	20.97	22.01	22.33
15MHz	26115/1857.5	3	1#0	20.71	20.44	21.96	21.69
		0	6#0	20.58	20.66	21.83	21.91
	26365/1882.5	0	1#0	20.53	20.90	21.91	22.28
		0	6#0	20.49	20.58	21.87	21.96
	26615/1907.5	8	1#5	20.66	20.28	22.25	21.87
		11	6#0	20.67	20.68	22.26	22.27
20MHz	26140/1860	3	1#0	20.66	20.44	22.07	21.85
		0	6#0	20.64	20.68	22.05	22.09
	26365/1882.5	0	1#0	20.62	20.43	22.00	21.81
		0	6#0	20.45	20.48	21.83	21.86
	26590/1905	12	1#5	20.51	20.32	22.10	21.91
		15	6#0	20.58	20.65	22.17	22.24

5.2. Occupied Bandwidth

Ambient condition

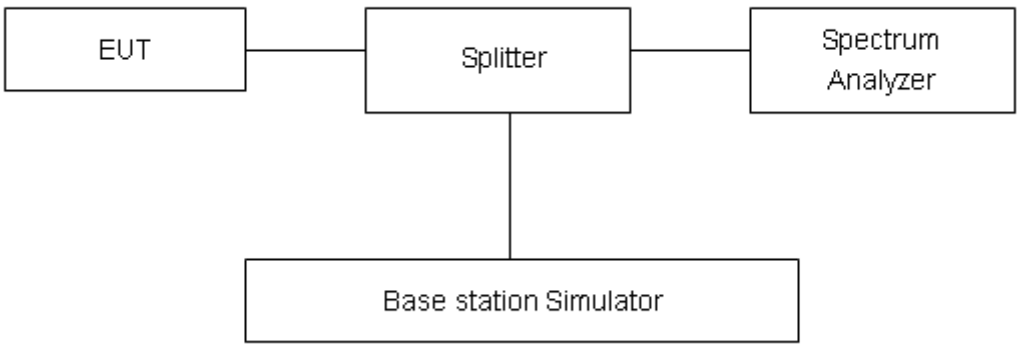
Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

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 51kHz, VBW is set to 160kHz for LTE Band 2/25.
RBW is set to 2kHz, VBW is set to 6.2kHz for NB-IOT Band 2/25(1@0),
RBW is set to 3.9kHz, VBW is set to 12kHz for NB-IOT Band 2/25(12@0).

99% power and -26dBc occupied bandwidths are recorded. Spectrum analyzer plots are included on the following pages.

Test Setup



Limits

No specific occupied bandwidth requirements in part 2.1049.

Measurement Uncertainty

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

Test Result

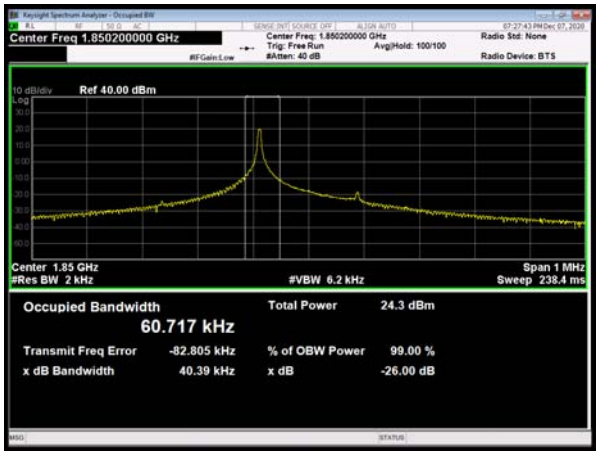
Mode	Modulation	Sub-carrier spacing (KHz)	Ntones	Bandwidth(KHz) for low/ middle /high channel					
				18602/1850.2MHz		18900/1880.0MHz		19198/1909.8MHz	
				99% Power	-26dBc	99% Power	-26dBc	99% Power	-26dBc
NB-IOT Band 2	BPSK	3.75	1@0	60.72	40.39	59.91	41.33	61.08	41.56
	QPSK	3.75	1@0	68.43	39.64	69.24	41.68	69.12	43.01
	BPSK	15	1@0	122.59	115.60	119.48	106.40	118.07	100.60
	QPSK	15	1@0	120.67	129.60	124.46	130.90	115.24	103.10
	QPSK	15	12@0	187.91	252.60	186.61	248.80	186.22	249.70

Mode	Modulation	Sub-carrier spacing (KHz)	Ntones	Bandwidth(KHz) for low/ middle /high channel					
				26042/1850.2MHz		26365/1882.5MHz		26688/1914.8MHz	
				99% Power	-26dBc	99% Power	-26dBc	99% Power	-26dBc
NB-IOT Band 25	BPSK	3.75	1@0	60.83	40.64	61.85	41.45	62.24	41.34
	QPSK	3.75	1@0	67.73	39.37	69.33	42.73	70.02	39.57
	BPSK	15	1@0	137.83	116.20	118.79	101.00	122.02	102.00
	QPSK	15	1@0	122.10	117.10	119.36	116.10	115.84	103.90
	QPSK	15	12@0	186.07	240.10	184.54	241.40	186.15	239.20

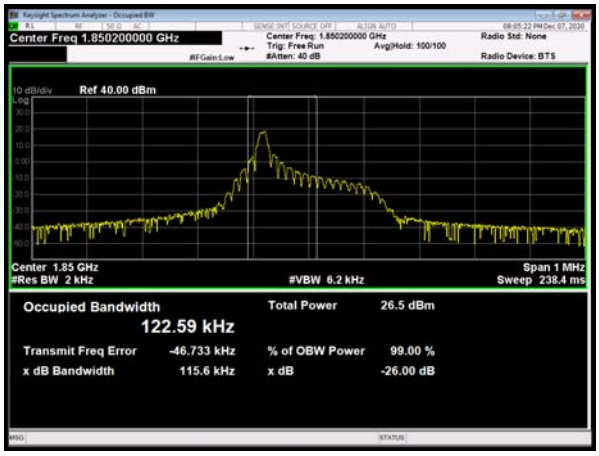
Mode	Bandwidth	Modulation	Channel/ Frequency(MHz)	Bandwidth(MHz)	
				99% Power	-26dBc
LTE Band 2	1.4MHz	QPSK	18900/1880	1.0996	1.359
		16QAM	18900/1880	0.9336	1.196
	3MHz	QPSK	18900/1880	1.1043	1.368
		16QAM	18900/1880	0.9528	1.157
	5MHz	QPSK	18900/1880	1.1074	1.328
		16QAM	18900/1880	0.9494	1.269
	10MHz	QPSK	18900/1880	1.1155	1.304
		16QAM	18900/1880	0.9544	1.217
	15MHz	QPSK	18900/1880	1.1202	1.350
		16QAM	18900/1880	0.9418	1.166
	20MHz	QPSK	18900/1880	1.1363	1.347
		16QAM	18900/1880	0.9543	1.172

Mode	Bandwidth	Modulation	Channel/ Frequency(MHz)	Bandwidth(MHz)	
				99% Power	-26dBc
LTE Band 25	1.4MHz	QPSK	26365/1882.5	1.1052	1.310
		16QAM	26365/1882.5	0.9362	1.212
	3MHz	QPSK	26365/1882.5	1.1046	1.402
		16QAM	26365/1882.5	0.9459	1.156
	5MHz	QPSK	26365/1882.5	1.1086	1.342
		16QAM	26365/1882.5	0.9506	1.228
	10MHz	QPSK	26365/1882.5	1.1163	1.319
		16QAM	26365/1882.5	0.9533	1.224
	15MHz	QPSK	26365/1882.5	1.1216	1.321
		16QAM	26365/1882.5	0.9612	1.148
	20MHz	QPSK	26365/1882.5	1.1135	1.332
		16QAM	26365/1882.5	0.9589	1.216

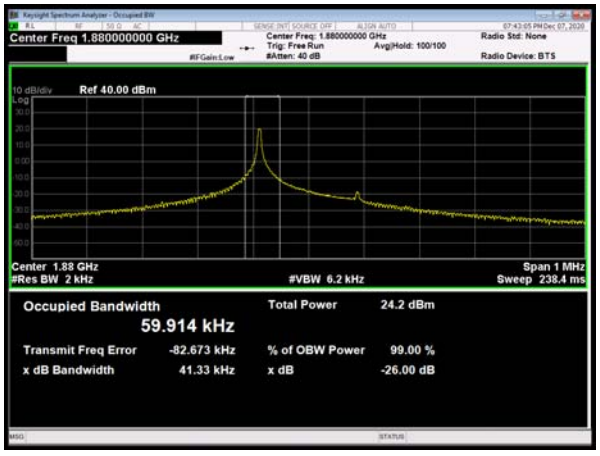
NB-IOT Band 2 BPSK 3.75kHz 1@0 CH-Low



NB-IOT Band 2 BPSK 15kHz 1@0 CH-Low

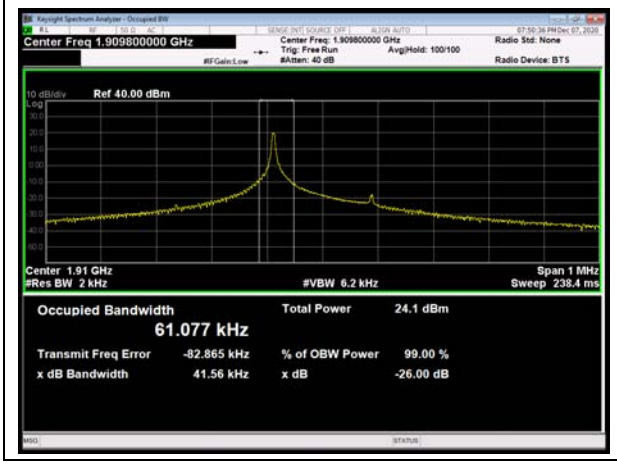


NB-IOT Band 2 BPSK 3.75kHz 1@0 CH-Middle

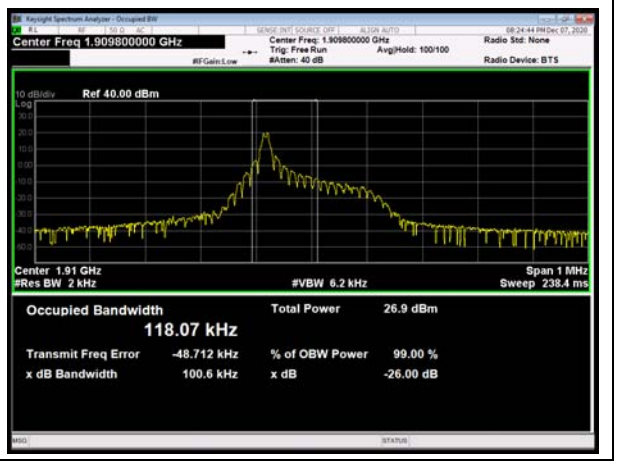


NB-IOT Band 2 BPSK 15kHz 1@0 CH-Middle

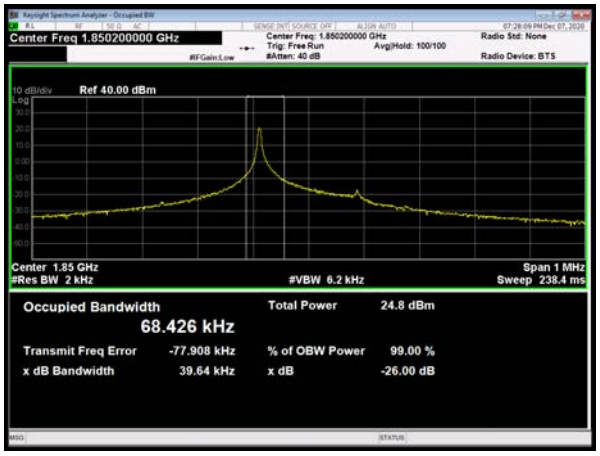
NB-IOT Band 2 BPSK 3.75kHz 1@0 CH-High



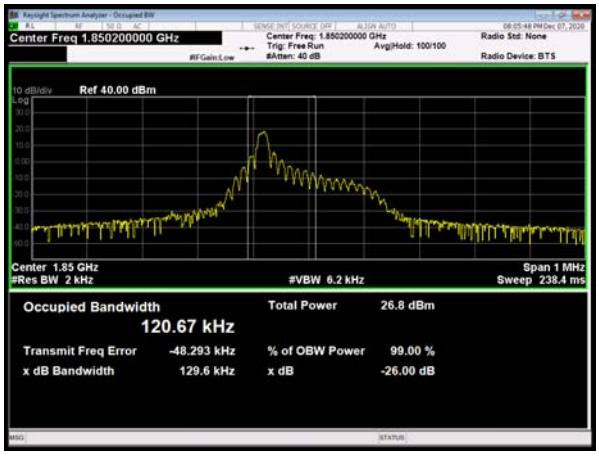
NB-IOT Band 2 BPSK 15kHz 1@0 CH-High



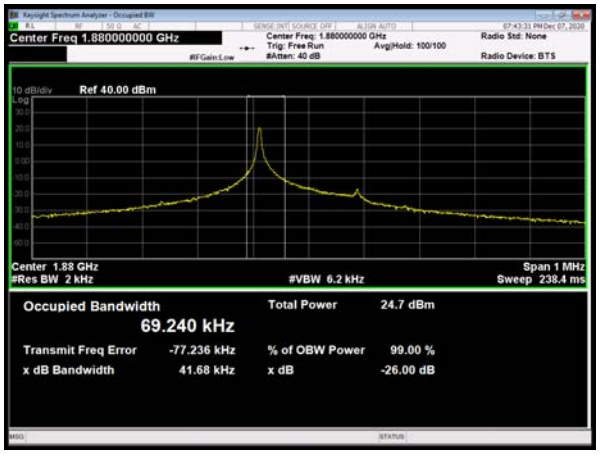
NB-IOT Band 2 QPSK 3.75kHz 1@0 CH-Low



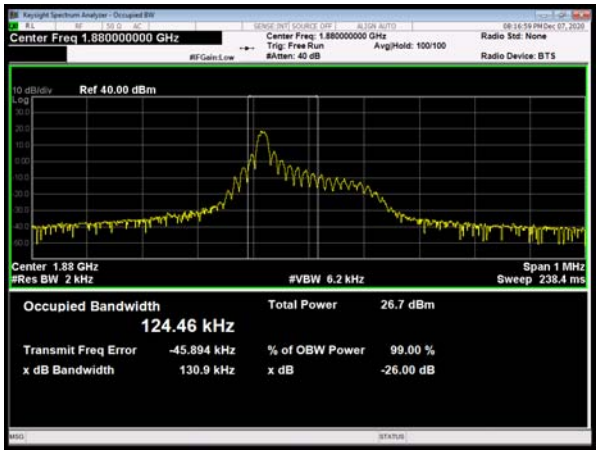
NB-IOT Band 2 QPSK 15kHz 1@0 CH-Low



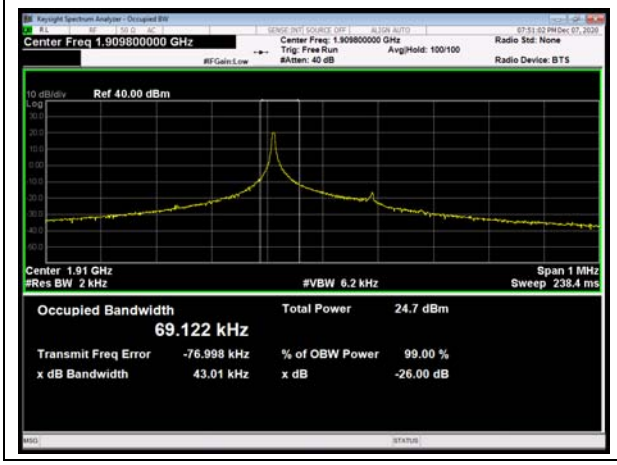
NB-IOT Band 2 QPSK 3.75kHz 1@0 CH-Middle



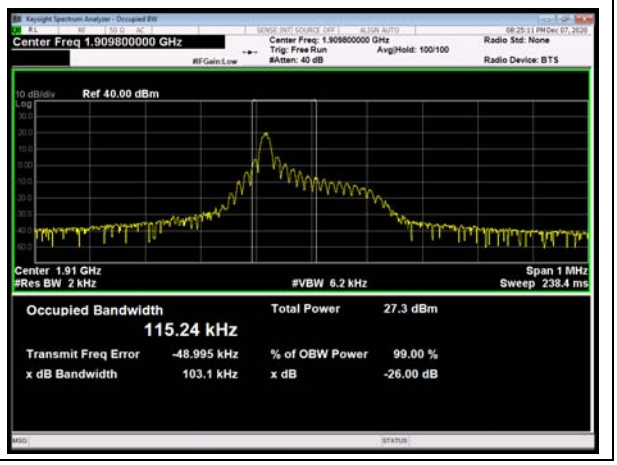
NB-IOT Band 2 QPSK 15kHz 1@0 CH-Middle



NB-IOT Band 2 QPSK 3.75kHz 1@0 CH-High

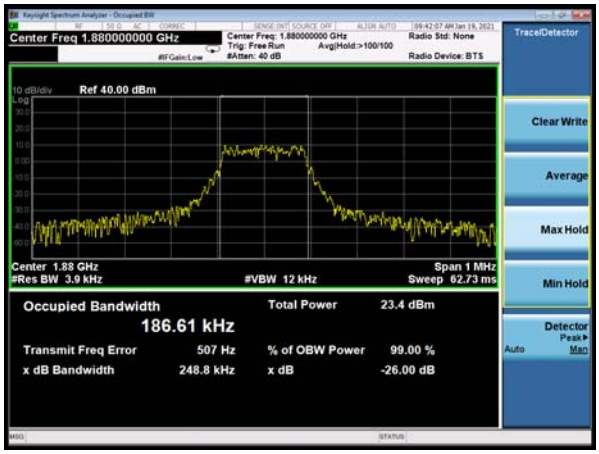


NB-IOT Band 2 QPSK 15kHz 1@0 CH-High

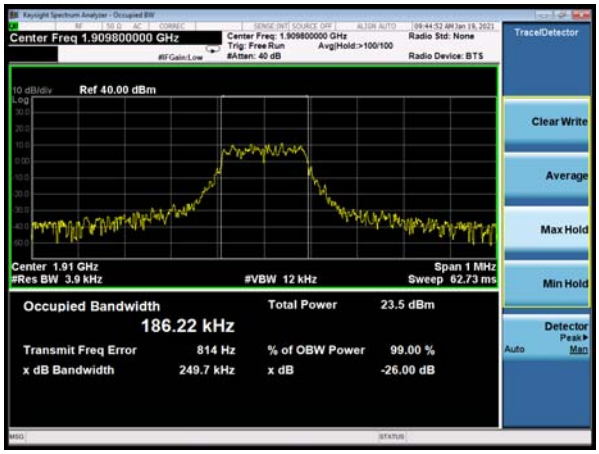


NB-IOT Band 2 QPSK 15kHz 12@0 CH-Low

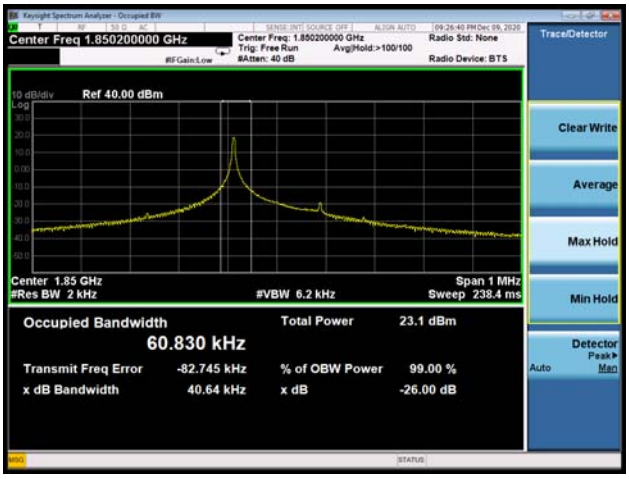
NB-IOT Band 2 QPSK 15kHz 12@0 CH-Middle



NB-IOT Band 2 QPSK 15kHz 12@0 CH-High

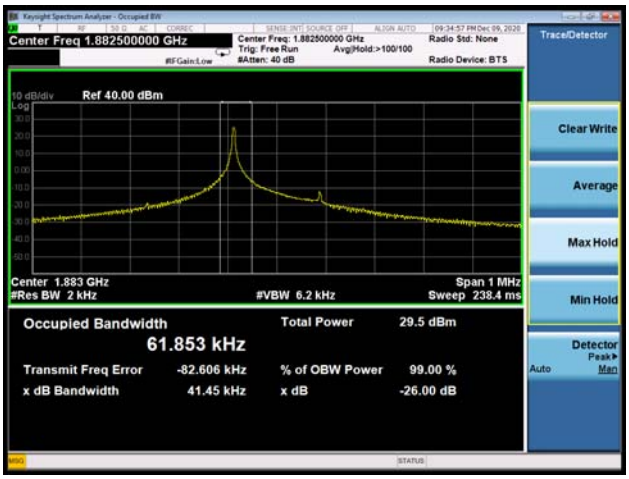


NB-IOT Band 25 BPSK 3.75kHz 1@0 CH-Low

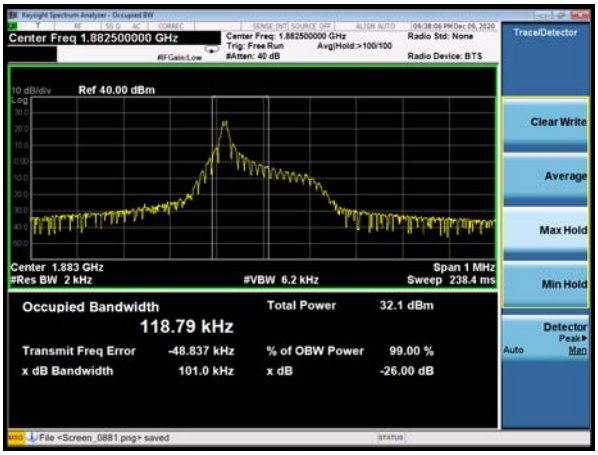


NB-IOT Band 25 BPSK 15kHz 1@0 CH-Low

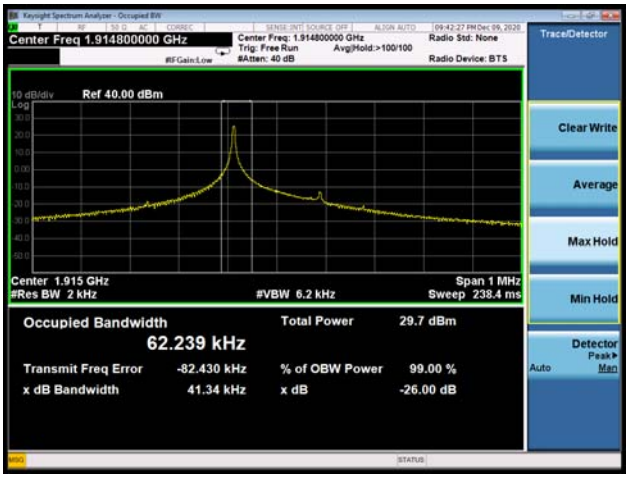
NB-IOT Band 25 BPSK 3.75kHz 1@0 CH-Middle



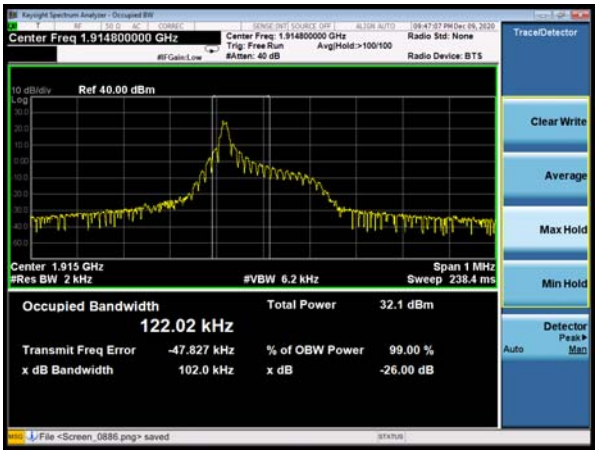
NB-IOT Band 25 BPSK 15kHz 1@0 CH-Middle



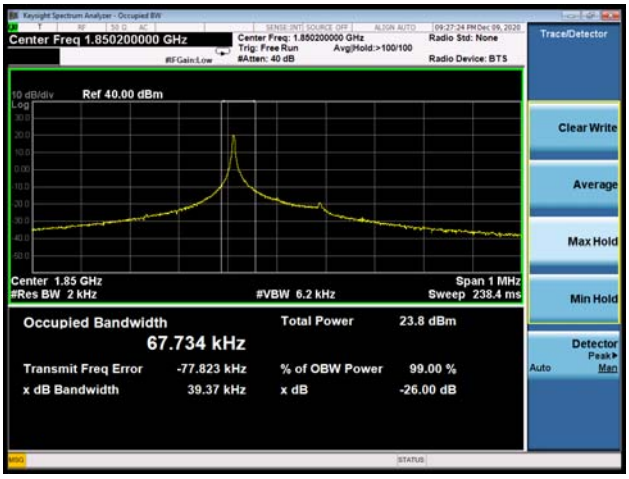
NB-IOT Band 25 BPSK 3.75kHz 1@0 CH-High



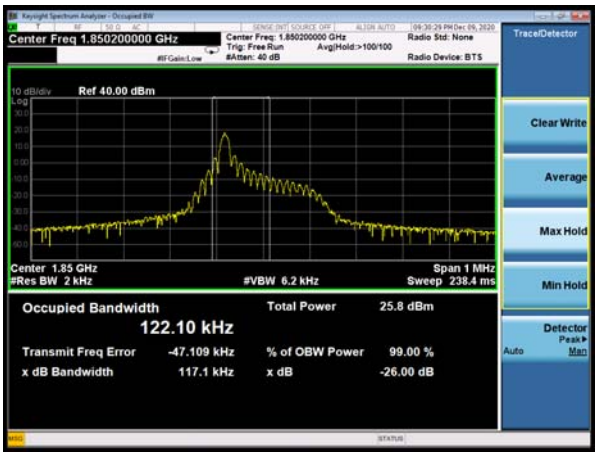
NB-IOT Band 25 BPSK 15kHz 1@0 CH-High



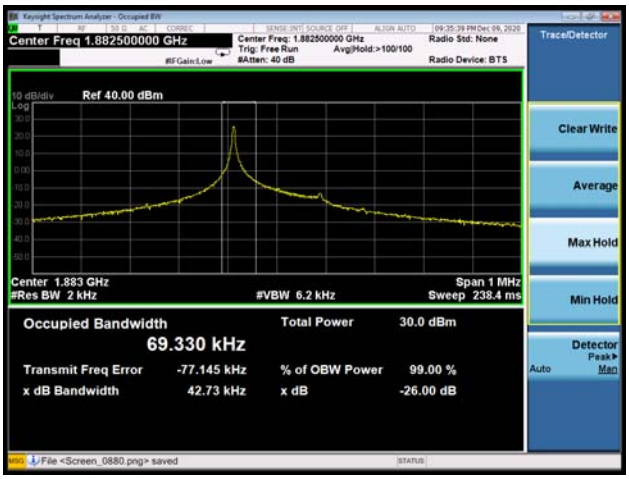
NB-IOT Band 25 QPSK 3.75kHz 1@0 CH-Low



NB-IOT Band 25 QPSK 15kHz 1@0 CH-Low

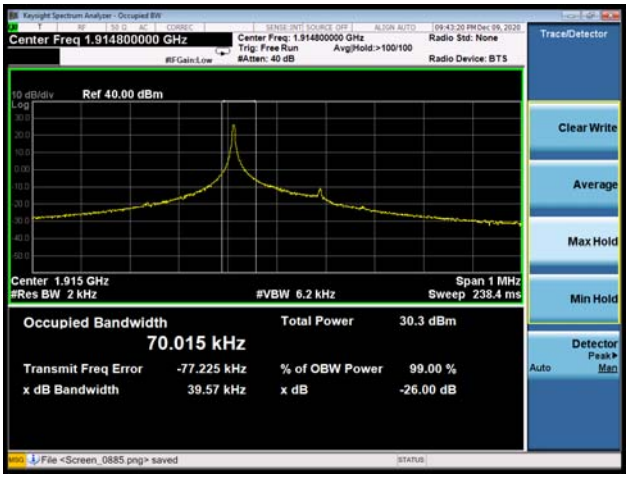


NB-IOT Band 25 QPSK 3.75kHz 1@0 CH-Middle

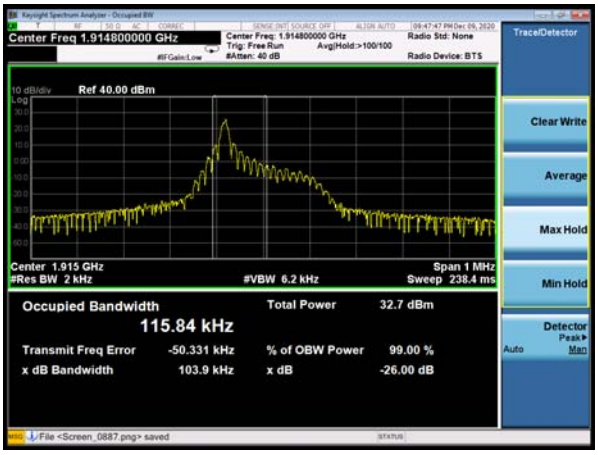


NB-IOT Band 25 QPSK 15kHz 1@0 CH-Middle

NB-IOT Band 25 QPSK 3.75kHz 1@0 CH-High



NB-IOT Band 25 QPSK 15kHz 1@0 CH-High



NB-IOT Band 25 QPSK 15kHz 12@0 CH-Low

NB-IOT Band 25 QPSK 15kHz 12@0 CH-Middle

NB-IOT Band 25 QPSK 15kHz 12@0 CH-High

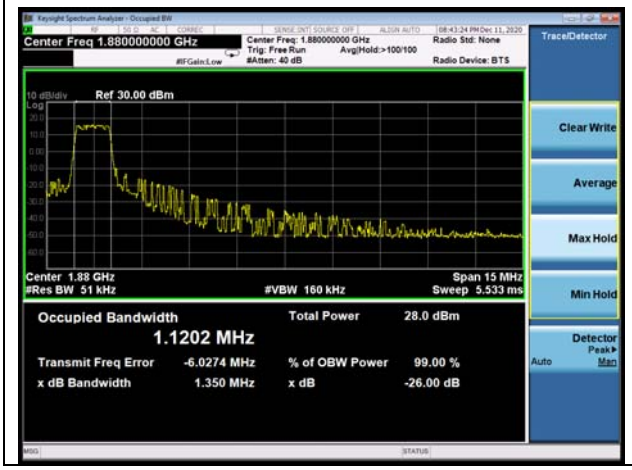
LTE Band 2 1.4MHz QPSK CH-Middle

LTE Band 2 3MHz QPSK CH-Middle

LTE Band 2 5MHz QPSK CH-Middle

LTE Band 2 10MHz QPSK CH-Middle

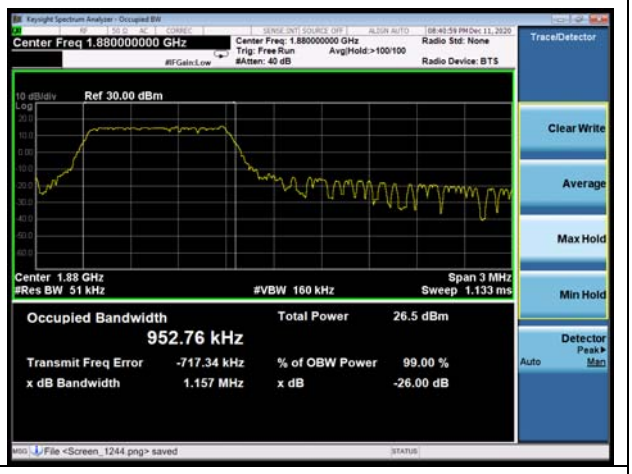
LTE Band 2 15MHz QPSK CH-Middle



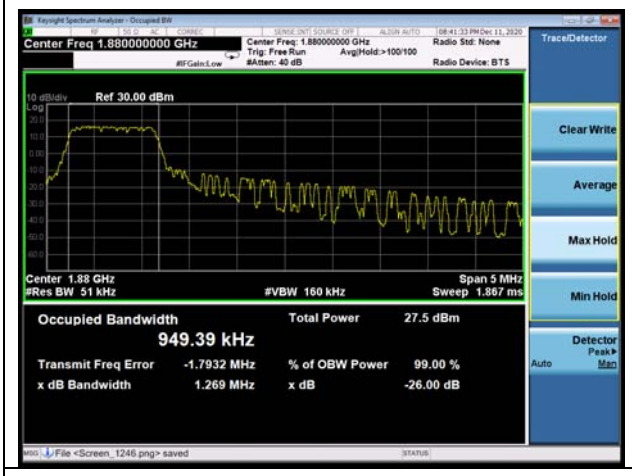
LTE Band 2 20MHz QPSK CH-Middle

LTE Band 2 1.4MHz 16QAM CH-Middle

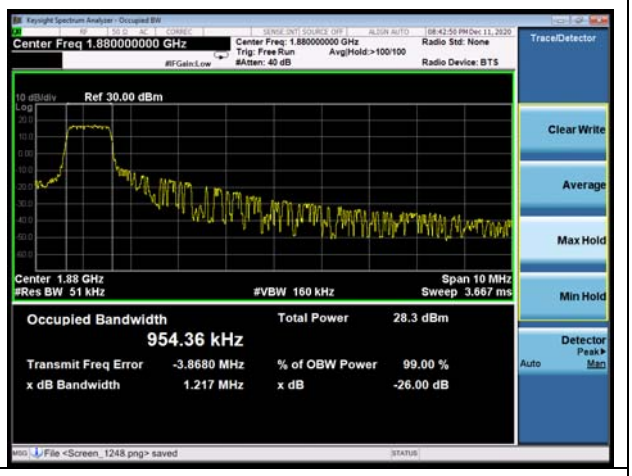
LTE Band 2 3MHz 16QAM CH-Middle



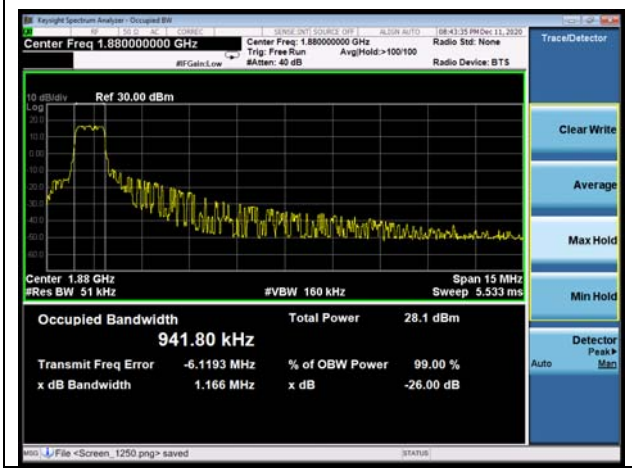
LTE Band 2 5MHz 16QAM CH-Middle



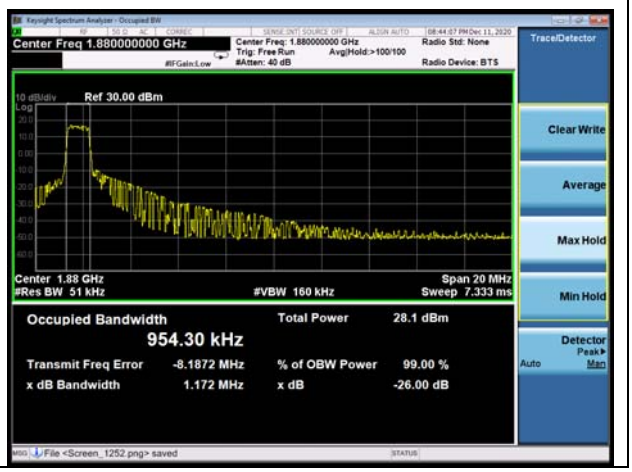
LTE Band 2 10MHz 16QAM CH-Middle



LTE Band 2 15MHz 16QAM CH-Middle



LTE Band 2 20MHz 16QAM CH-Middle



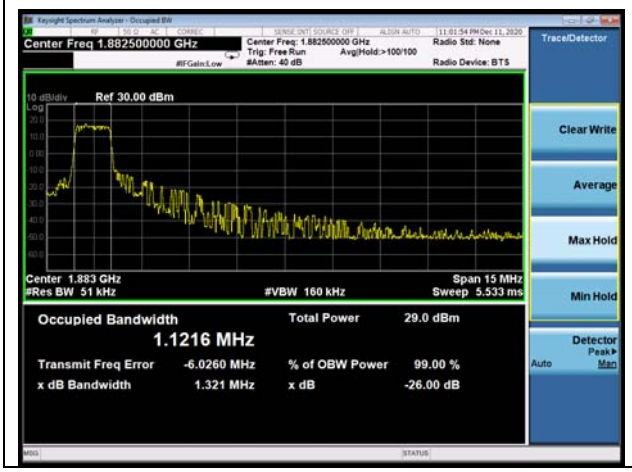
LTE Band 25 1.4MHz QPSK CH-Middle

LTE Band 25 3MHz QPSK CH-Middle

LTE Band 25 5MHz QPSK CH-Middle

LTE Band 25 10MHz QPSK CH-Middle

LTE Band 25 15MHz QPSK CH-Middle

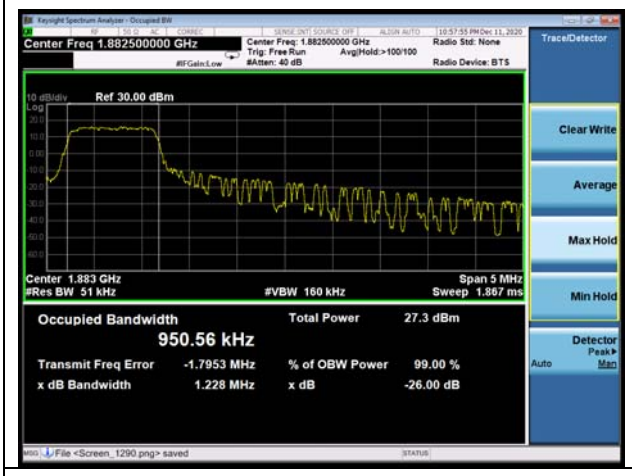


LTE Band 25 20MHz QPSK CH-Middle

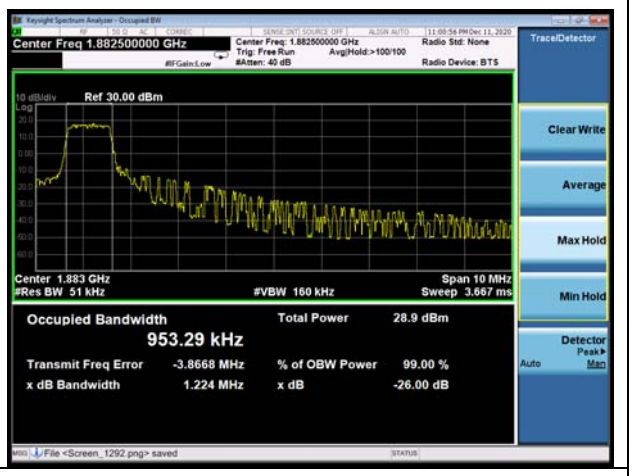
LTE Band 25 1.4MHz 16QAM CH-Middle

LTE Band 25 3MHz 16QAM CH-Middle

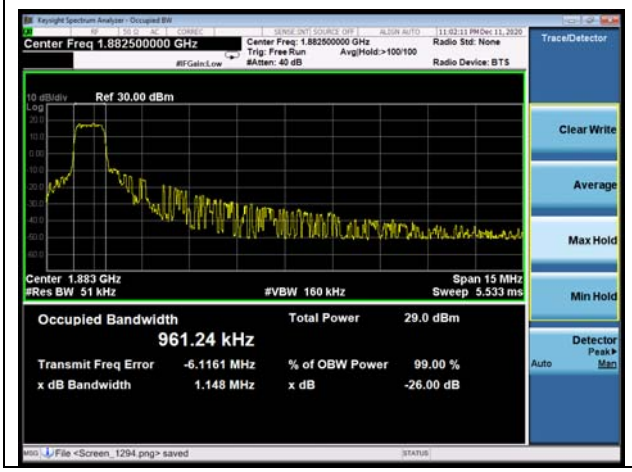
LTE Band 25 5MHz 16QAM CH-Middle



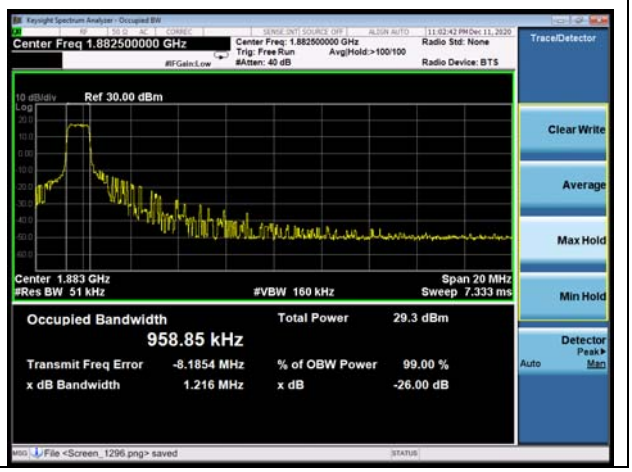
LTE Band 25 10MHz 16QAM CH-Middle



LTE Band 25 15MHz 16QAM CH-Middle



LTE Band 25 20MHz 16QAM CH-Middle



5.3. Band Edge Compliance

Ambient condition

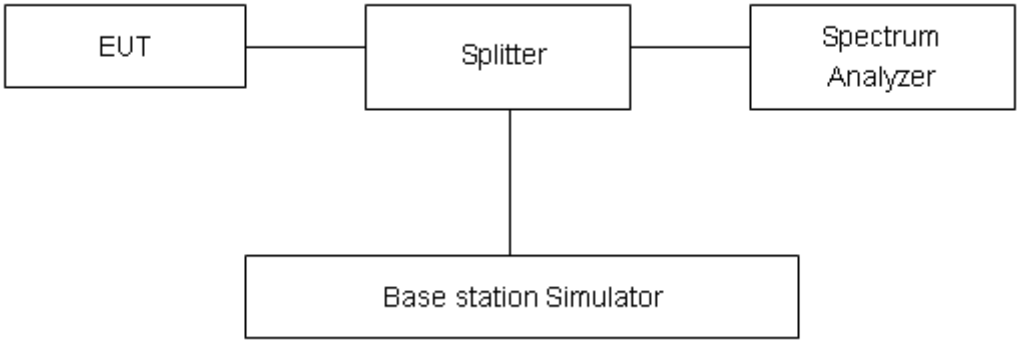
Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

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 51kHz, VBW is set to 160kHz for LTE Band 2/25,
RBW is set to ≥1%EBW, VBW is set to 3x RBW for NB-IOT Band 2/25.

Spectrum analyzer plots are included on the following pages.

Test Setup



Limits

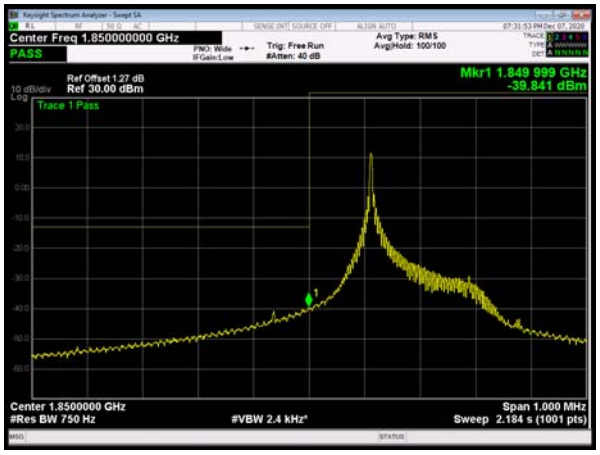
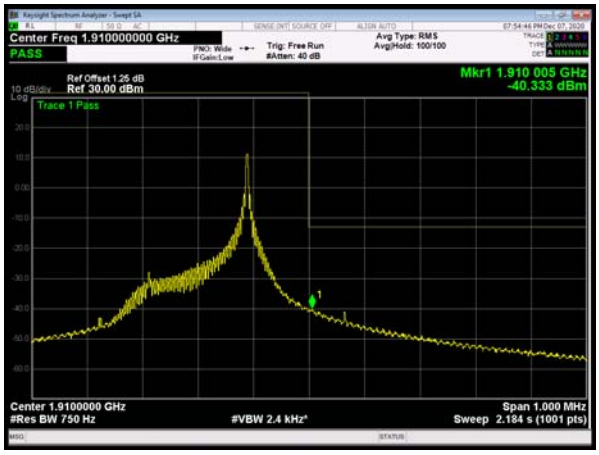
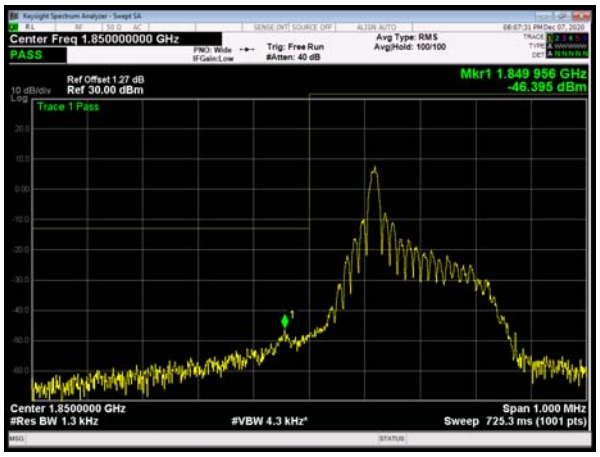
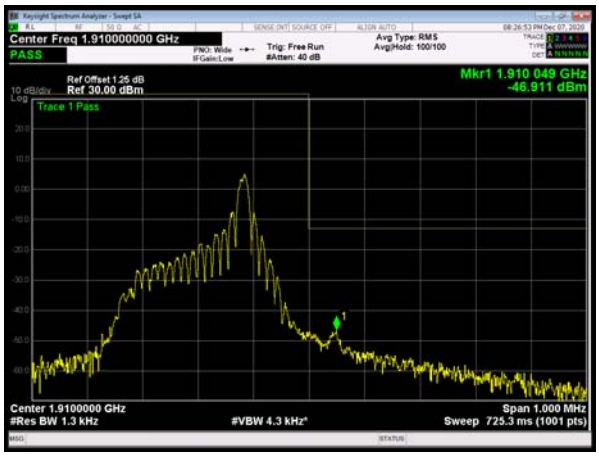
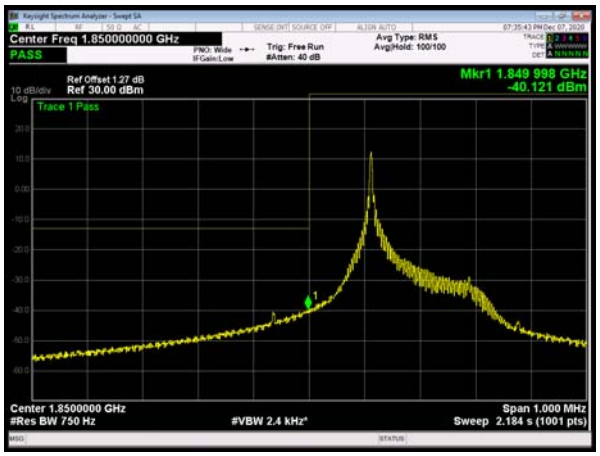
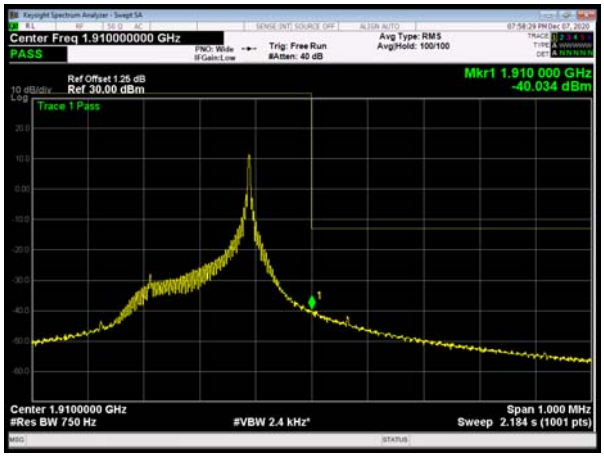
Rule Part 24.238(a) specifies that “on any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least 43 + 10 log10 (P) dB.”

Limit	-13 dBm

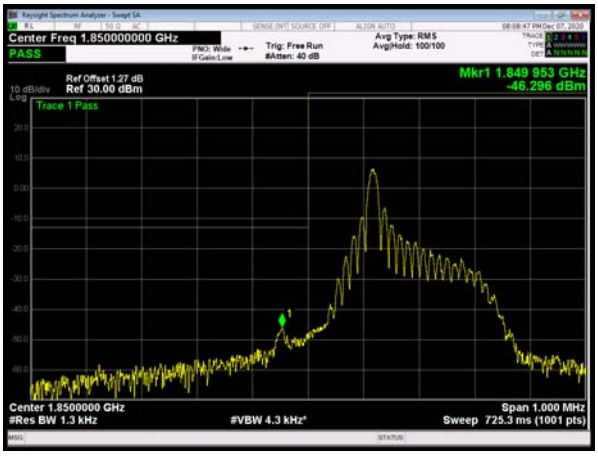
Measurement Uncertainty

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

Test Result:

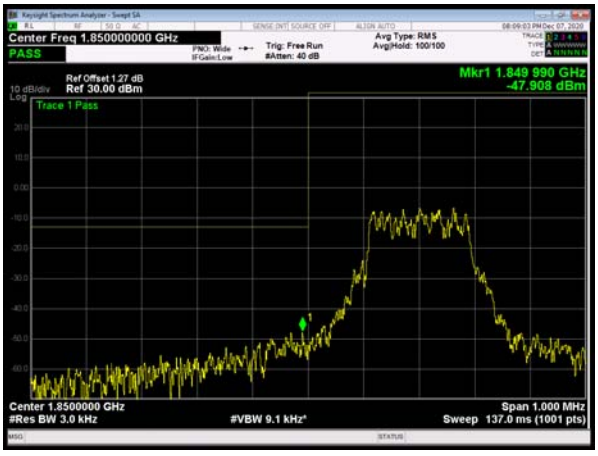
NB-IOT Band 2 BPSK 3.75kHz 1@0 CH-Low	NB-IOT Band 2 BPSK 3.75kHz 1@47 CH-High
	
NB-IOT Band 2 BPSK 15kHz 1@0 CH-Low	NB-IOT Band 2 BPSK 15kHz 1@11 CH-High
	
NB-IOT Band 2 QPSK 3.75kHz 1@0 CH-Low	NB-IOT Band 2 QPSK 3.75kHz 1@47 CH-High
	

NB-IOT Band 2 QPSK 15kHz 1@0 CH-Low

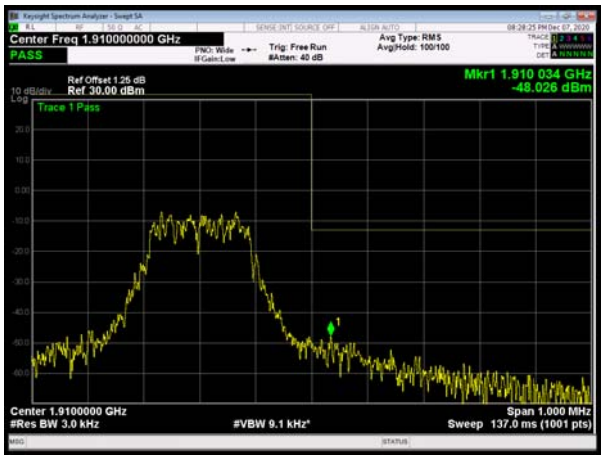


NB-IOT Band 2 QPSK 15kHz 1@11 CH-High

NB-IOT Band 2 QPSK 15kHz 12@0 CH-Low

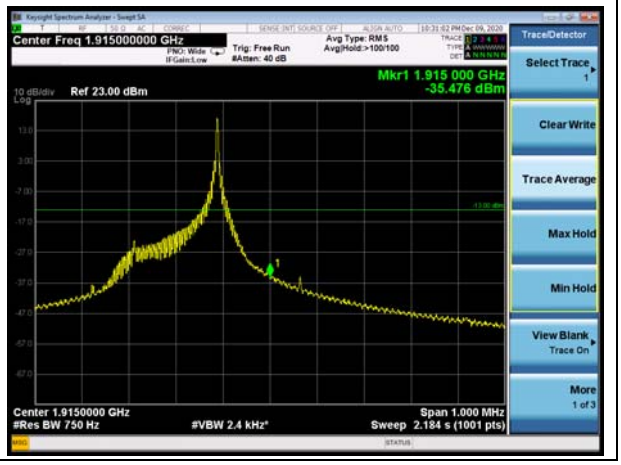


NB-IOT Band 2 QPSK 15kHz 12@0 CH-High

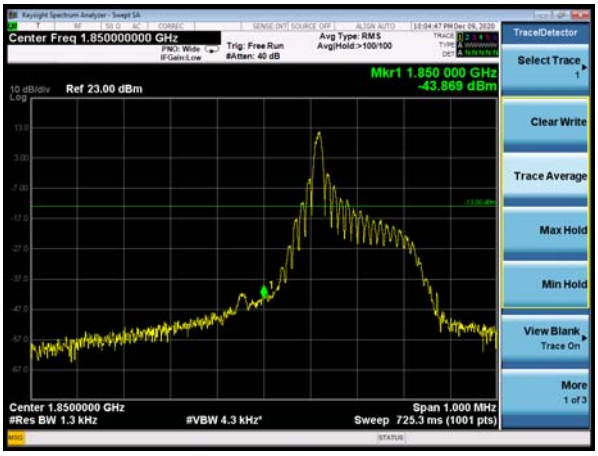


NB-IOT Band 25 BPSK 3.75kHz 1@0 CH-Low

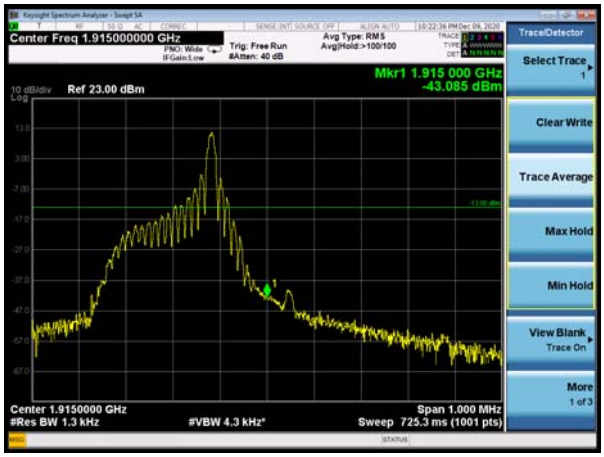
NB-IOT Band 25 BPSK 3.75kHz 1@47 CH-High



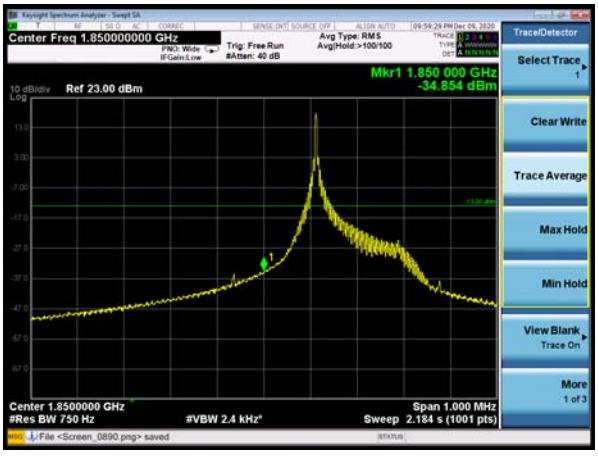
NB-IOT Band 25 BPSK 15kHz 1@0 CH-Low



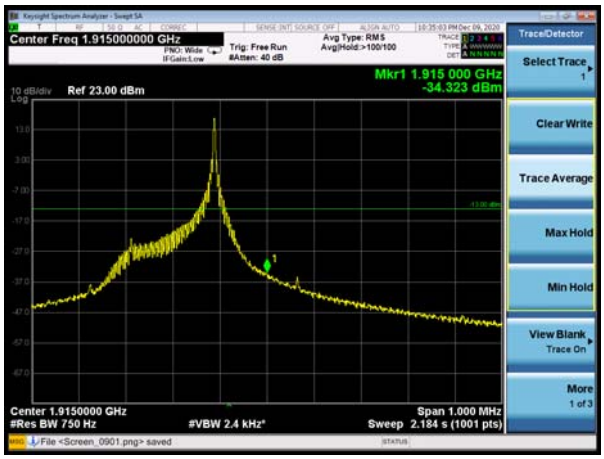
NB-IOT Band 25 BPSK 15kHz 1@11 CH-High



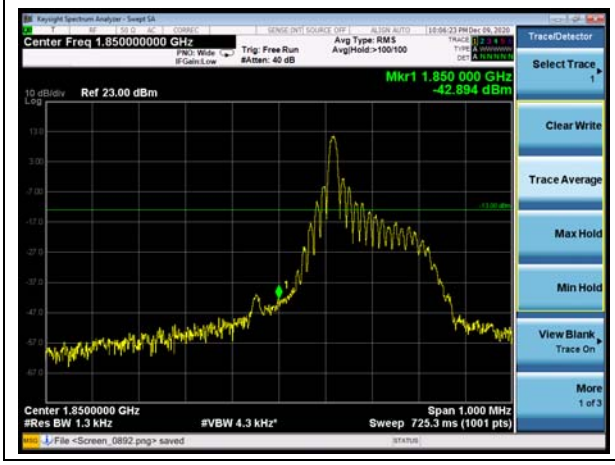
NB-IOT Band 25 QPSK 3.75kHz 1@0 CH-Low



NB-IOT Band 25 QPSK 3.75kHz 1@47 CH-High



NB-IOT Band 25 QPSK 15kHz 1@0 CH-Low

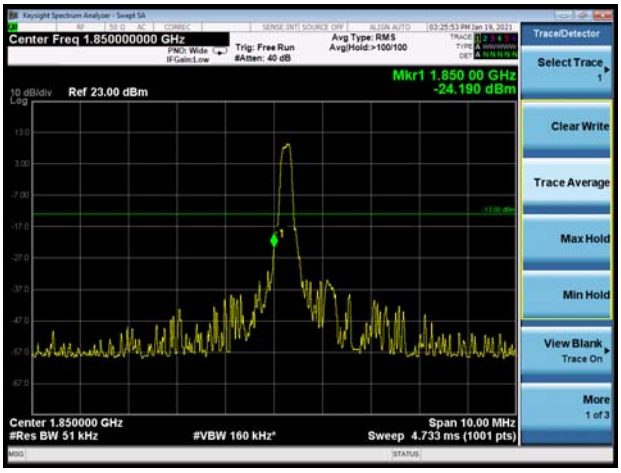


NB-IOT Band 25 QPSK 15kHz 1@11 CH-High

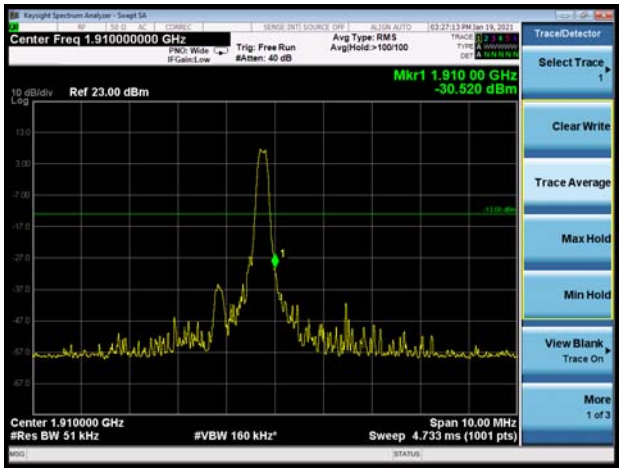
NB-IOT Band 25 QPSK 15kHz 12@0 CH-Low

NB-IOT Band 25 QPSK 15kHz 12@0 CH-High

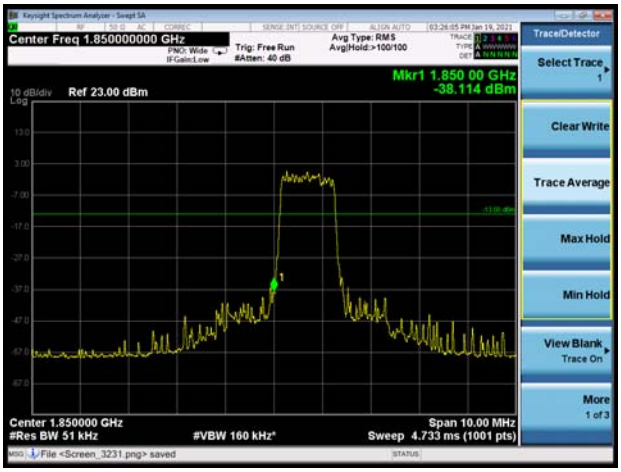
LTE Band 2 1.4MHz QPSK 1RB CH-Low



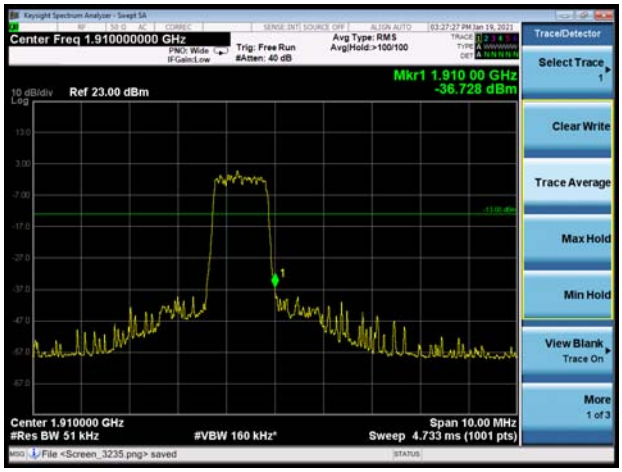
LTE Band 2 1.4MHz QPSK 1RB CH-High



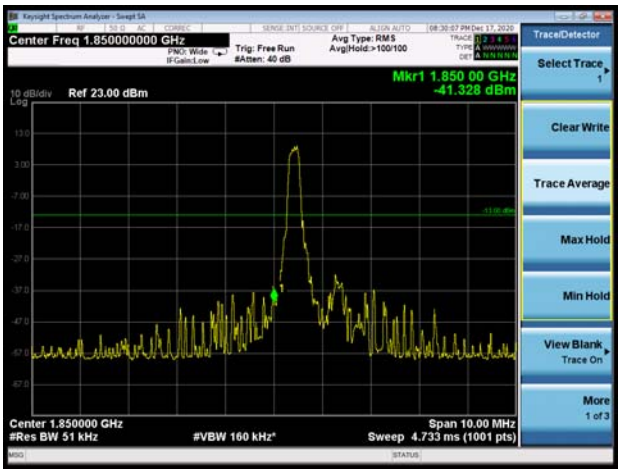
LTE Band 2 1.4MHz QPSK 100%RB CH-Low



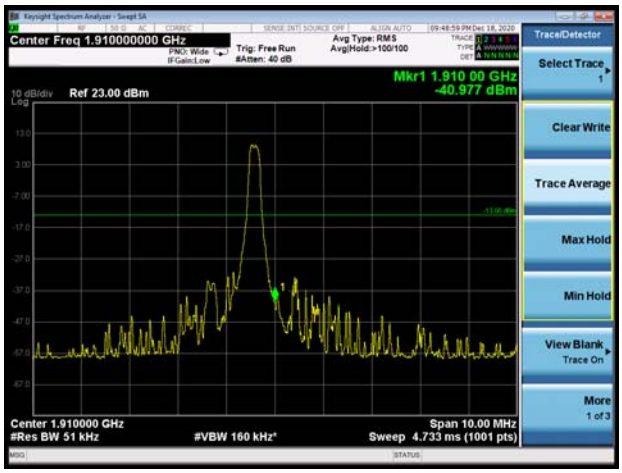
LTE Band 2 1.4MHz QPSK 100%RB CH-High



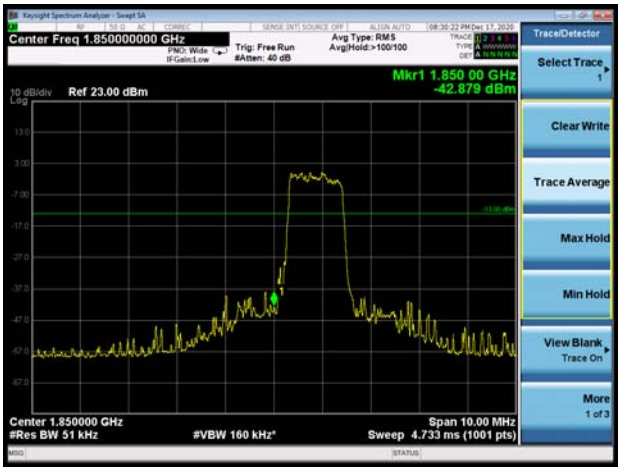
LTE Band 2 3MHz QPSK 1RB CH-Low



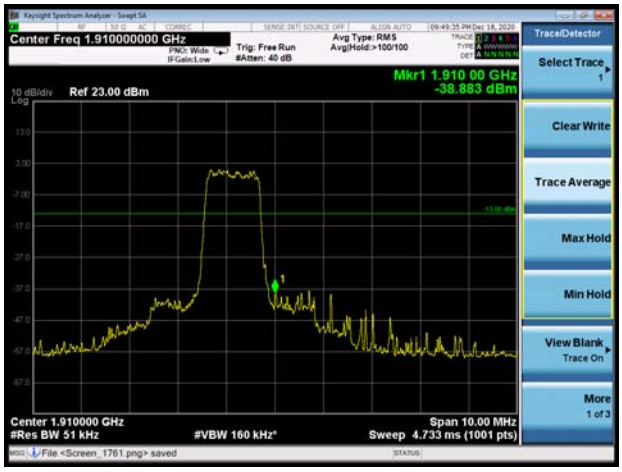
LTE Band 2 3MHz QPSK 1RB CH-High



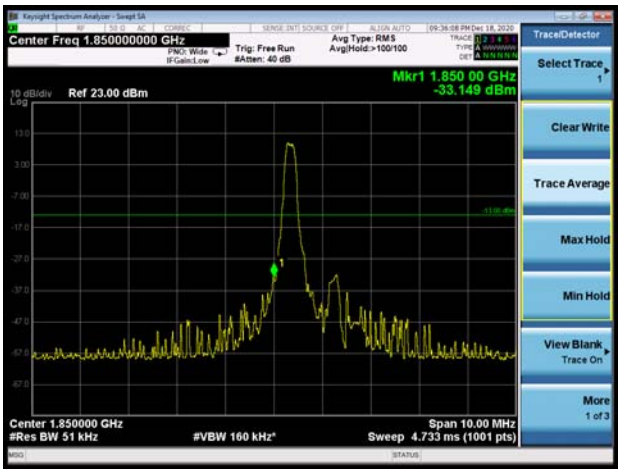
LTE Band 2 3MHz QPSK 100%RB CH-Low



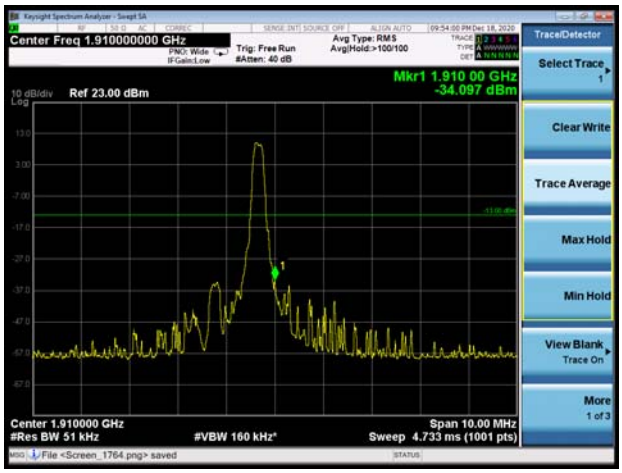
LTE Band 2 3MHz QPSK 100%RB CH-High



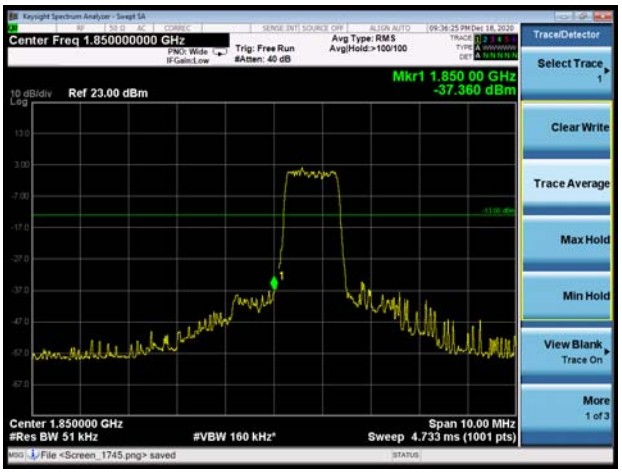
LTE Band 2 5MHz QPSK 1RB CH-Low



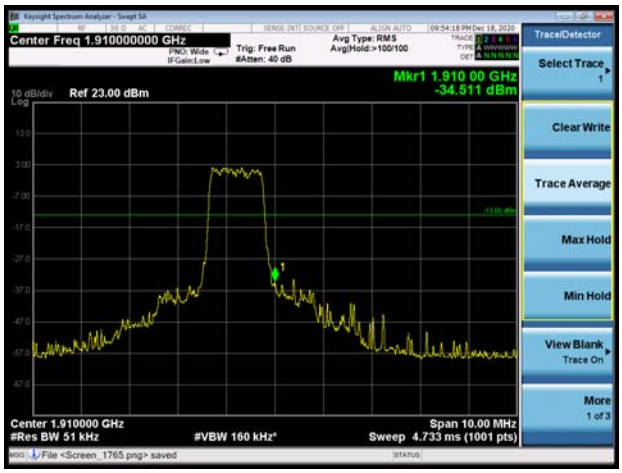
LTE Band 2 5MHz QPSK 1RB CH-High



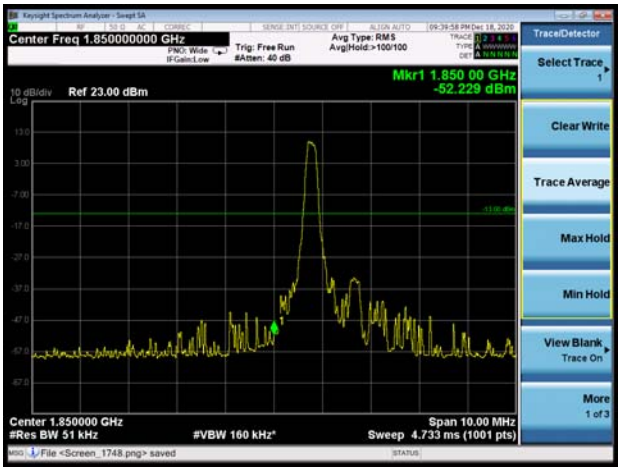
LTE Band 2 5MHz QPSK 100%RB CH-Low



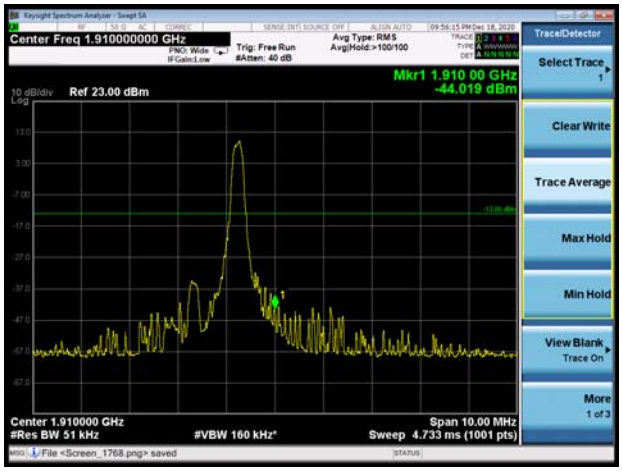
LTE Band 2 5MHz QPSK 100%RB CH-High



LTE Band 2 10MHz QPSK 1RB CH-Low

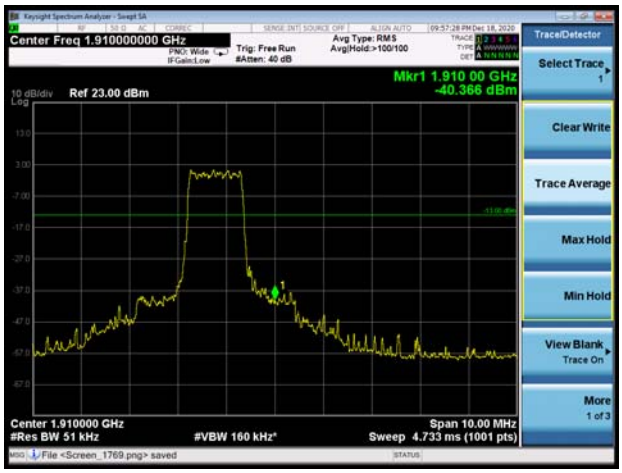


LTE Band 2 10MHz QPSK 1RB CH-High

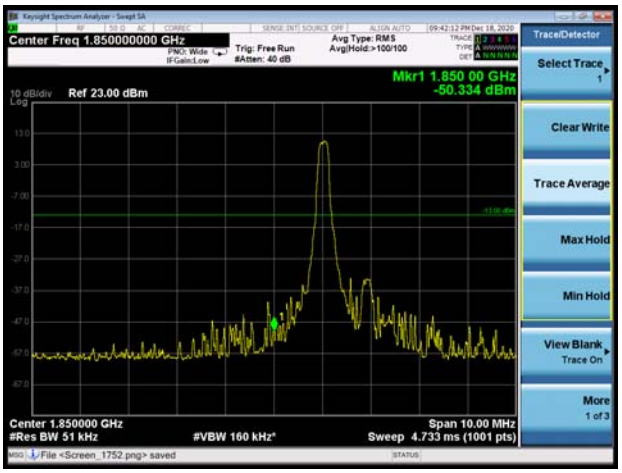


LTE Band 2 10MHz QPSK 100%RB CH-Low

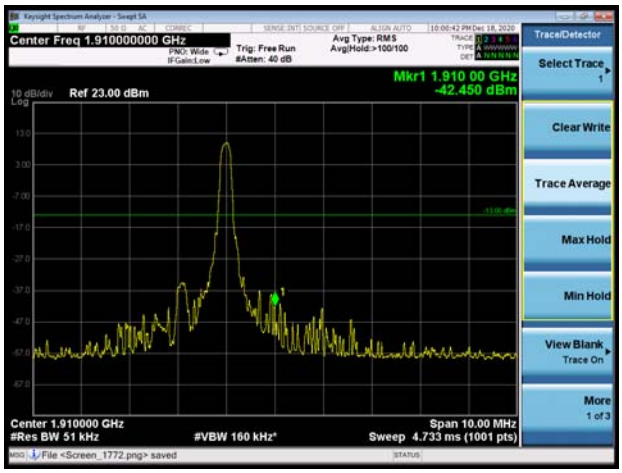
LTE Band 2 10MHz QPSK 100%RB CH-High



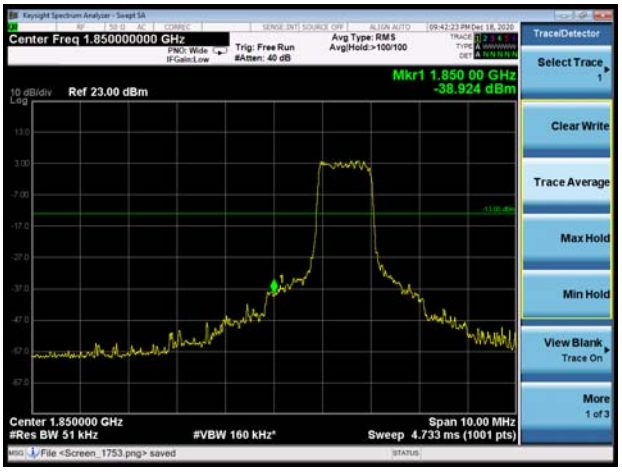
LTE Band 2 15MHz QPSK 1RB CH-Low



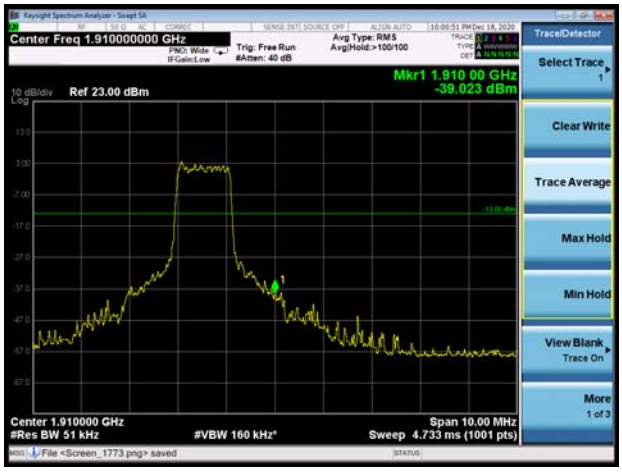
LTE Band 2 15MHz QPSK 1RB CH-High



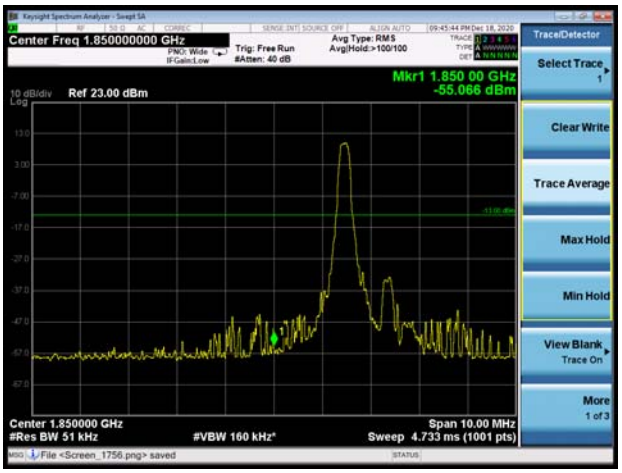
LTE Band 2 15MHz QPSK 100%RB CH-Low



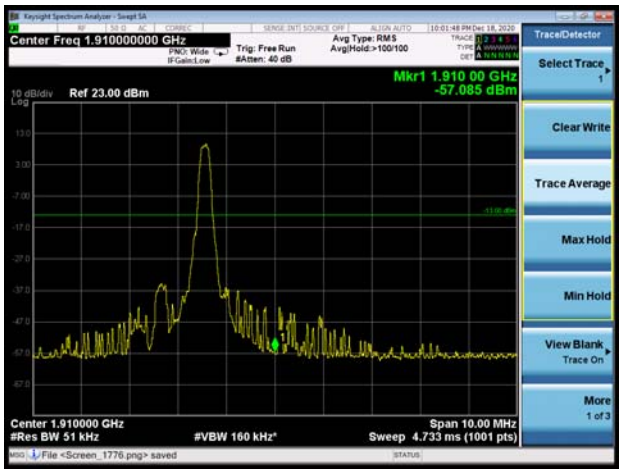
LTE Band 2 15MHz QPSK 100%RB CH-High



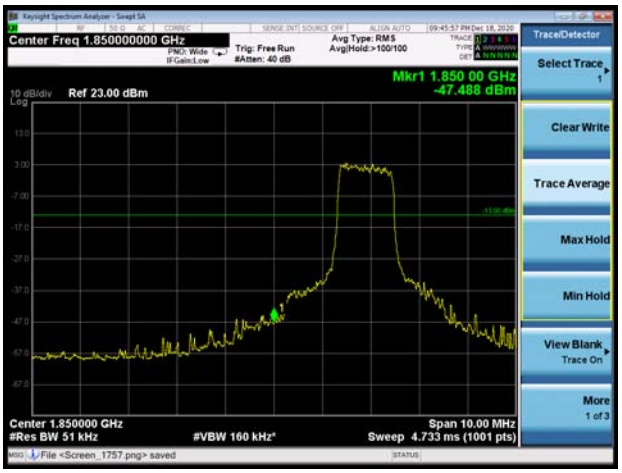
LTE Band 2 20MHz QPSK 1RB CH-Low



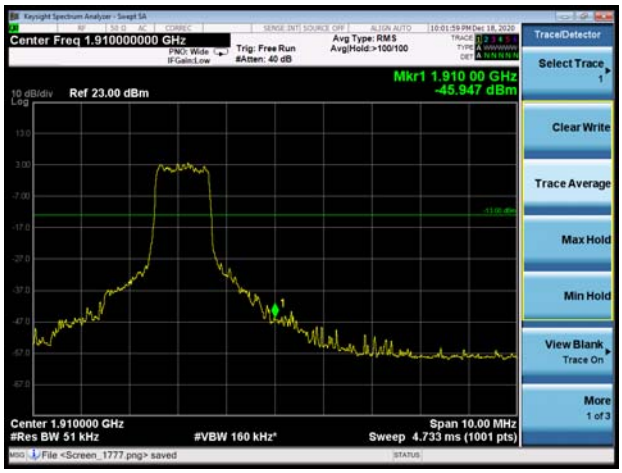
LTE Band 2 20MHz QPSK 1RB CH-High



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

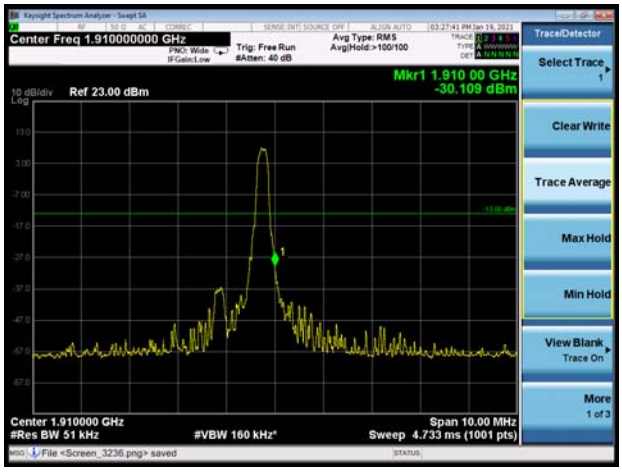


LTE Band 2 20MHz QPSK 100%RB CH-High

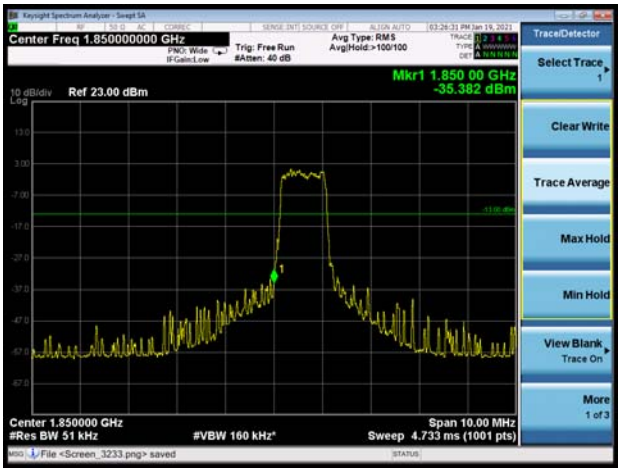


LTE Band 2 1.4MHz 16QAM 1RB CH-Low

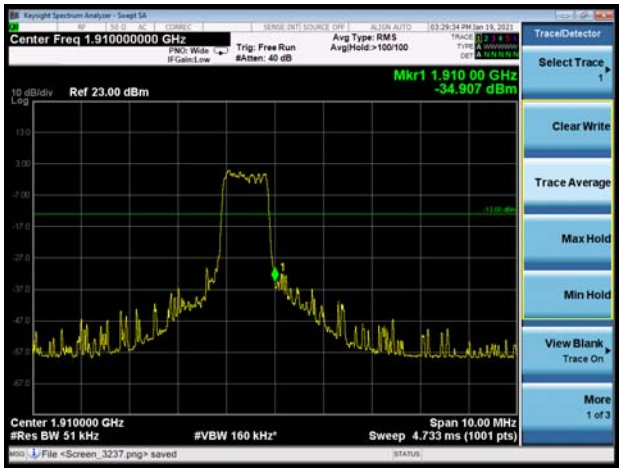
LTE Band 2 1.4MHz 16QAM 1RB CH-High



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

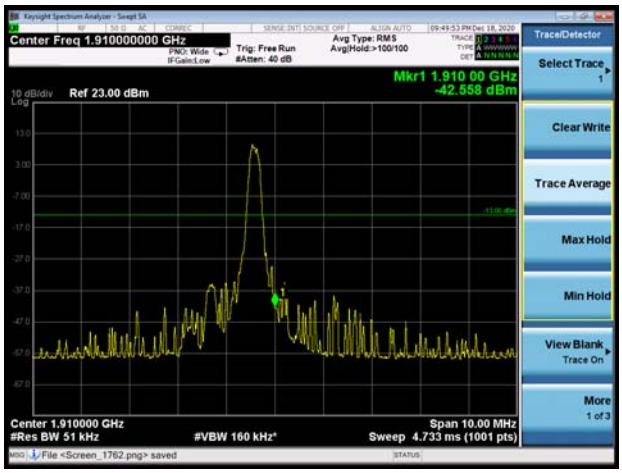


LTE Band 2 1.4MHz 16QAM 100%RB CH-High

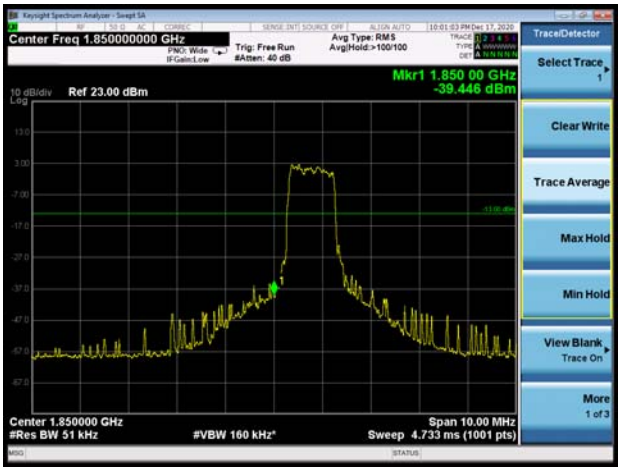


LTE Band 2 3MHz 16QAM 1RB CH-Low

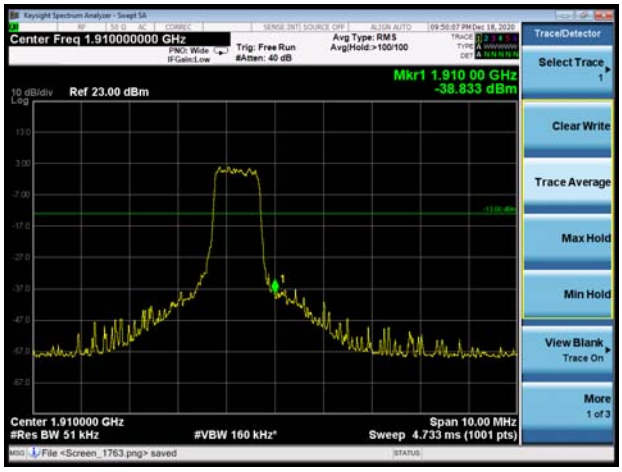
LTE Band 2 3MHz 16QAM 1RB CH-High



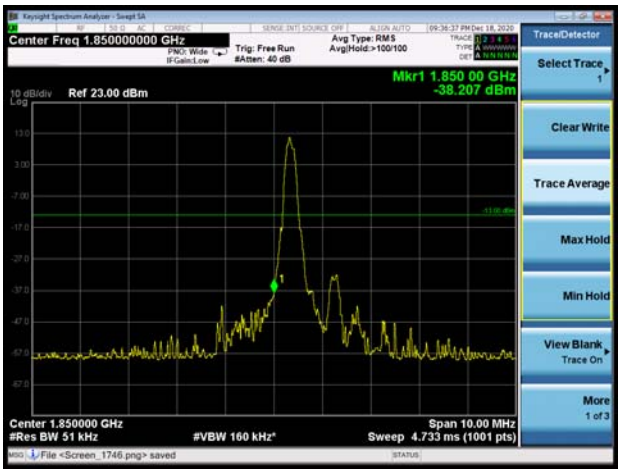
LTE Band 2 3MHz 16QAM 100%RB CH-Low



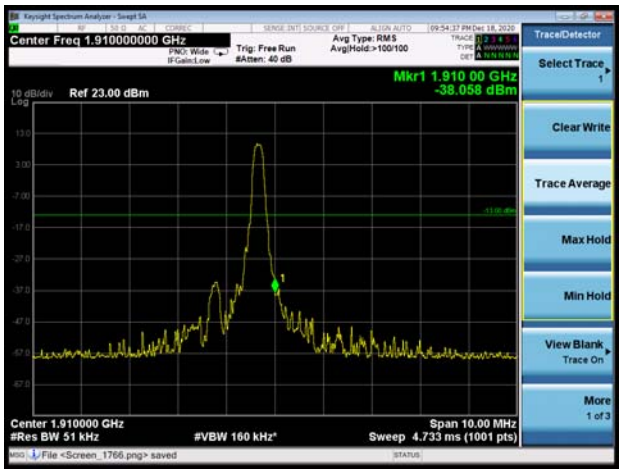
LTE Band 2 3MHz 16QAM 100%RB CH-High



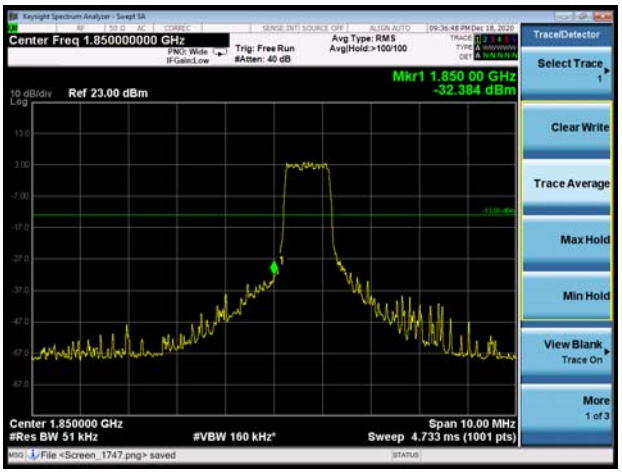
LTE Band 2 5MHz 16QAM 1RB CH-Low



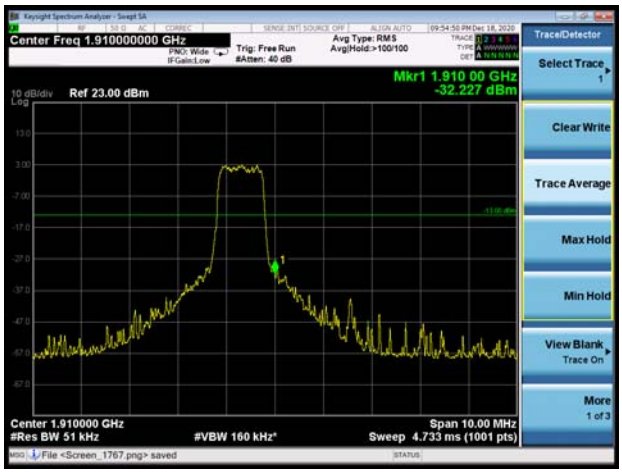
LTE Band 2 5MHz 16QAM 1RB CH-High



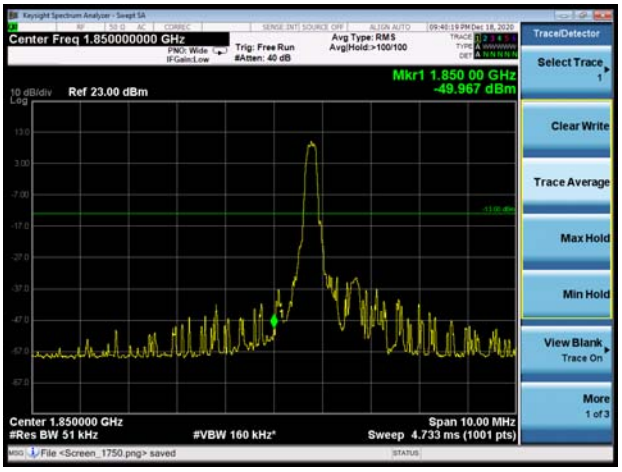
LTE Band 2 5MHz 16QAM 100%RB CH-Low



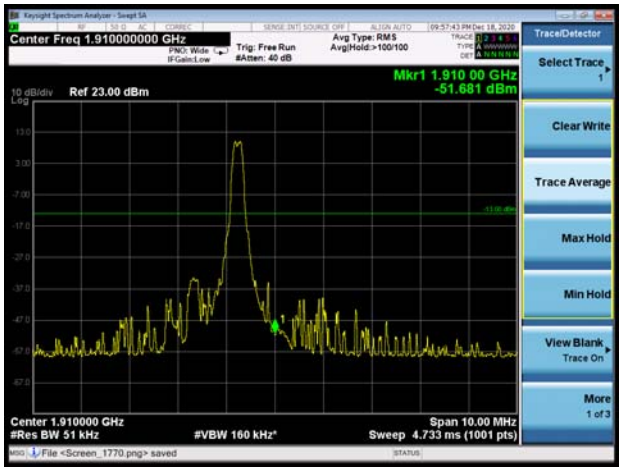
LTE Band 2 5MHz 16QAM 100%RB CH-High



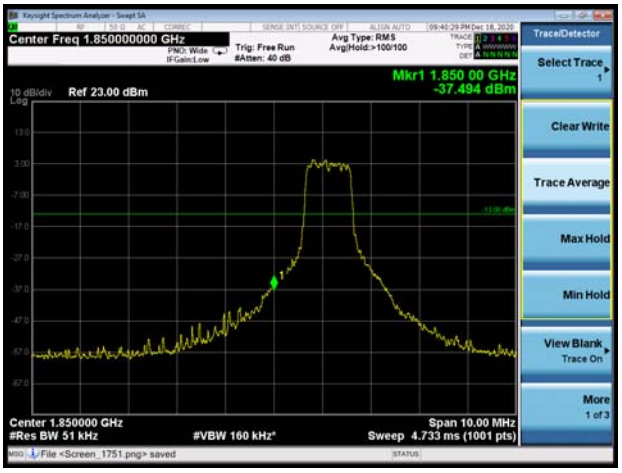
LTE Band 2 10MHz 16QAM 1RB CH-Low



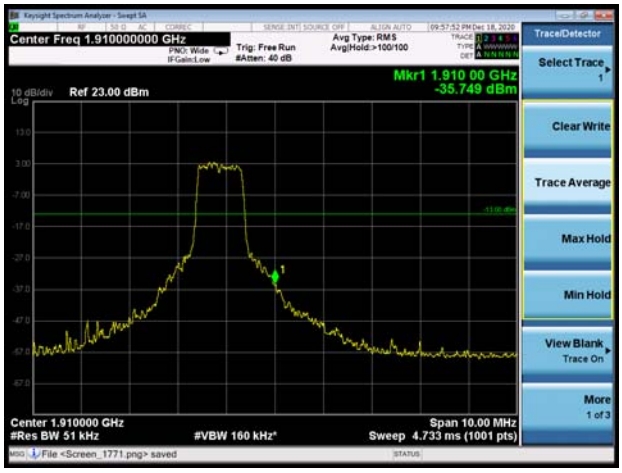
LTE Band 2 10MHz 16QAM 1RB CH-High



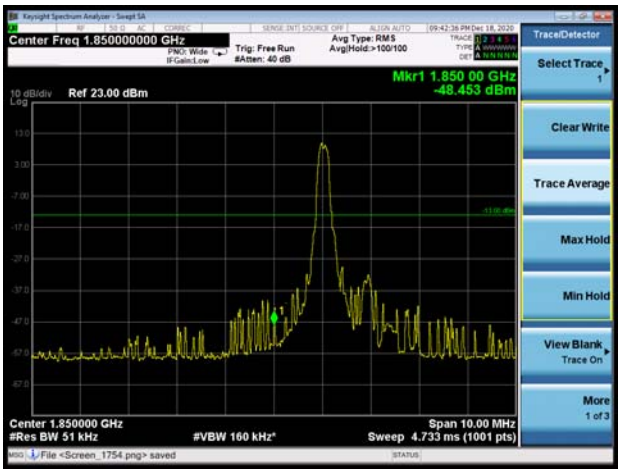
LTE Band 2 10MHz 16QAM 100%RB CH-Low



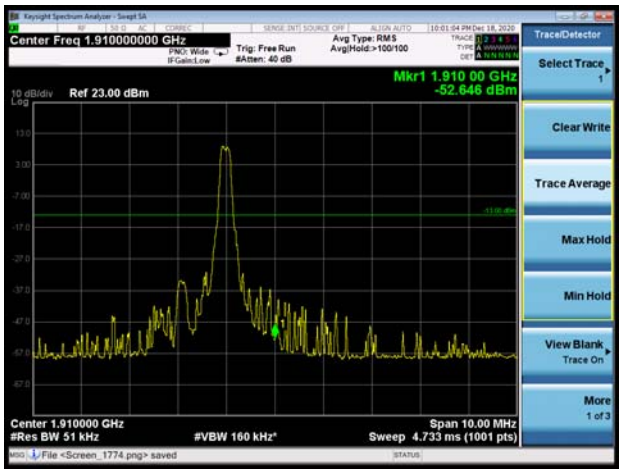
LTE Band 2 10MHz 16QAM 100%RB CH-High



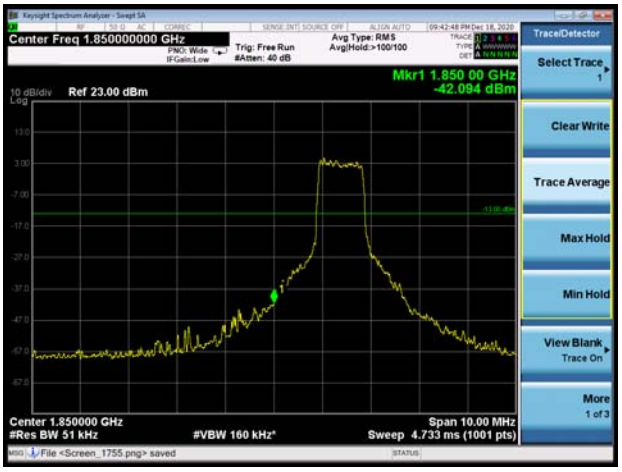
LTE Band 2 15MHz 16QAM 1RB CH-Low



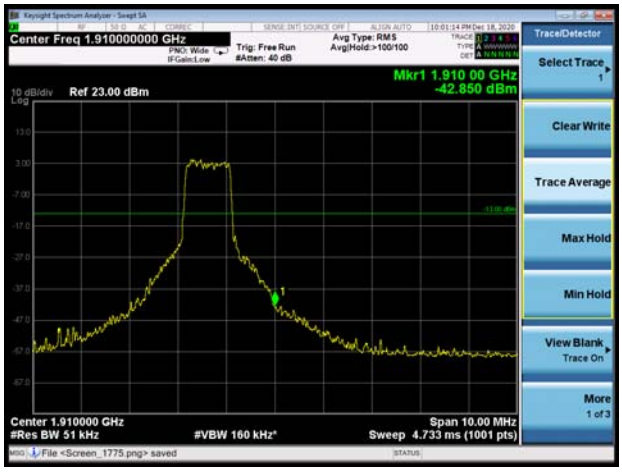
LTE Band 2 15MHz 16QAM 1RB CH-High



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

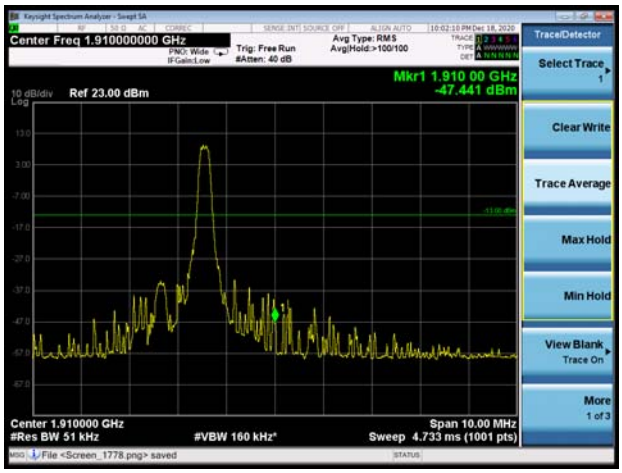


LTE Band 2 15MHz 16QAM 100%RB CH-High

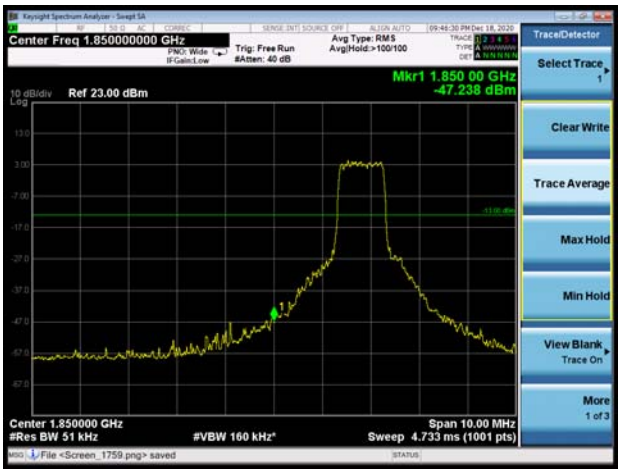


LTE Band 2 20MHz 16QAM 1RB CH-Low

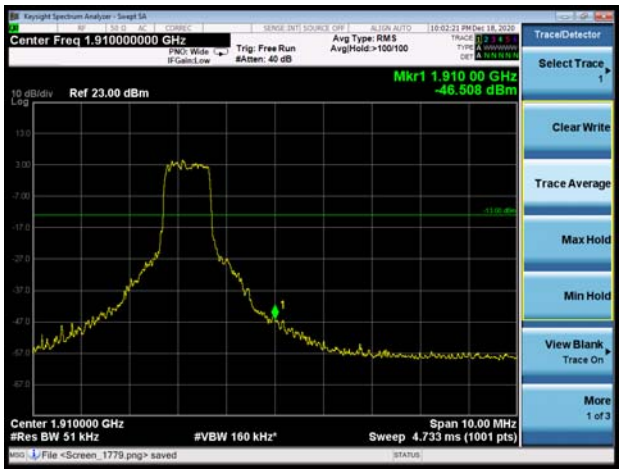
LTE Band 2 20MHz 16QAM 1RB CH-High



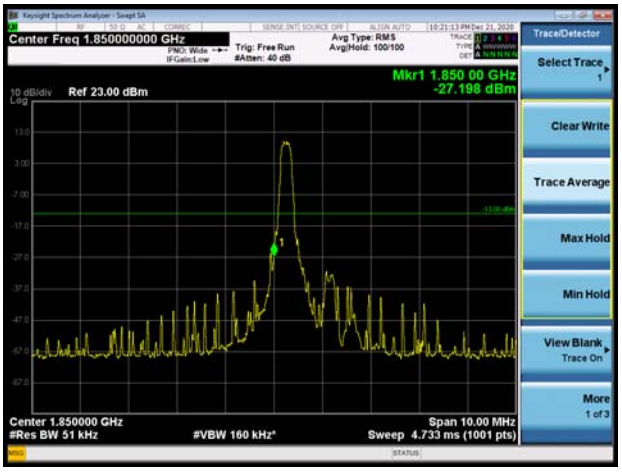
LTE Band 2 20MHz 16QAM 100%RB CH-Low



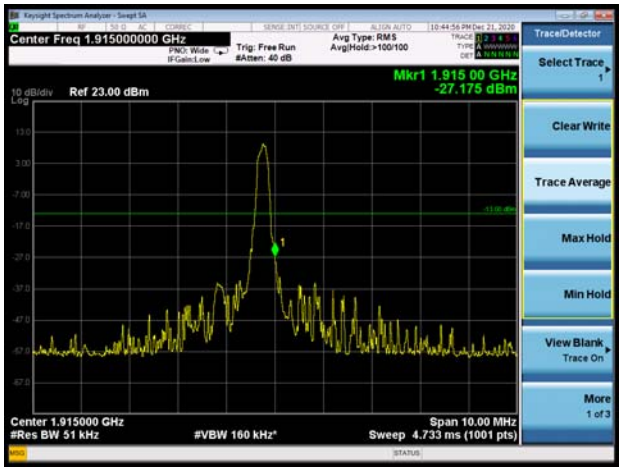
LTE Band 2 20MHz 16QAM 100%RB CH-High



LTE Band 25 1.4MHz QPSK 1RB CH-Low

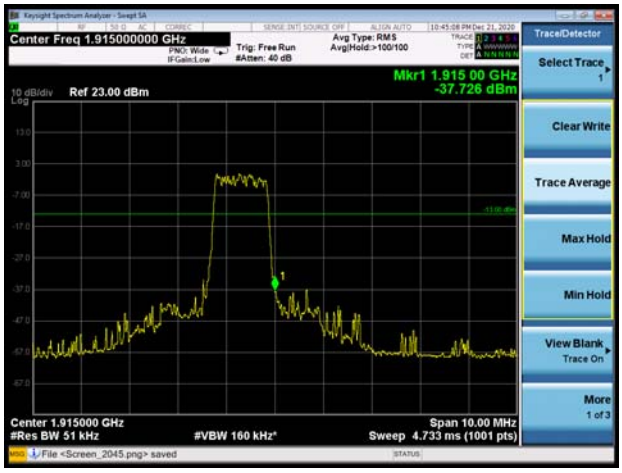


LTE Band 25 1.4MHz QPSK 1RB CH-High

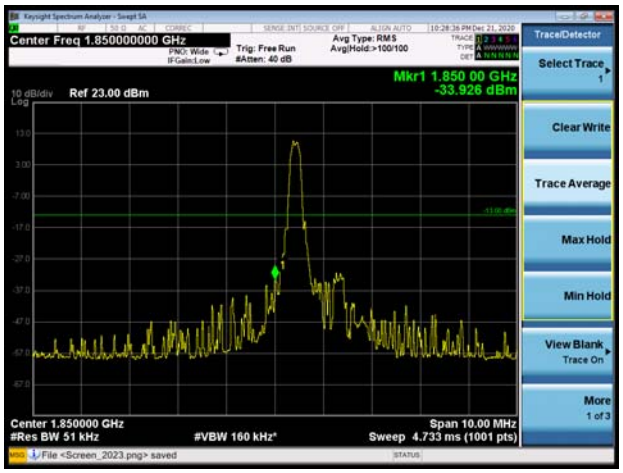


LTE Band 25 1.4MHz QPSK 100%RB CH-Low

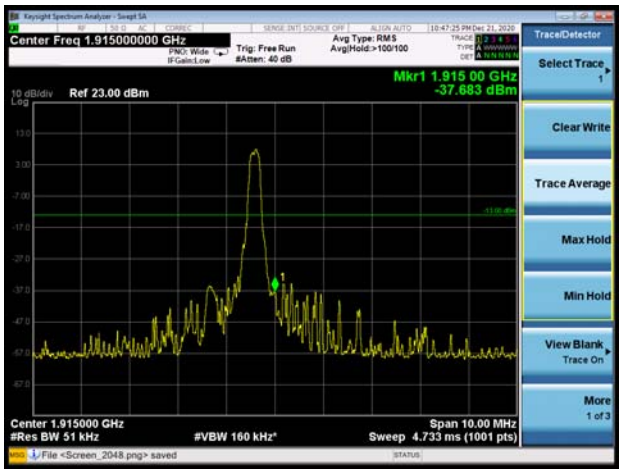
LTE Band 25 1.4MHz QPSK 100%RB CH-High



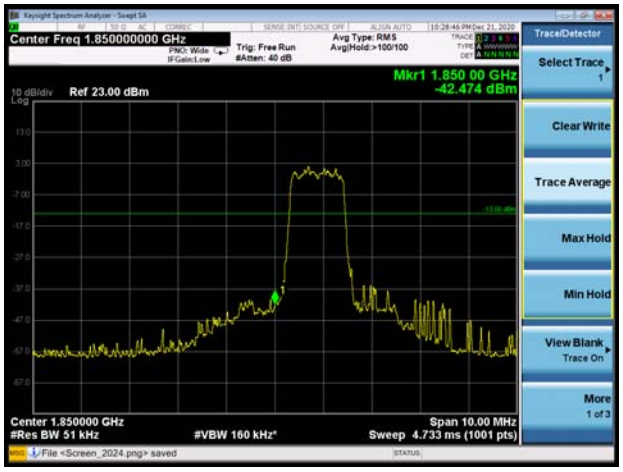
LTE Band 25 3MHz QPSK 1RB CH-Low



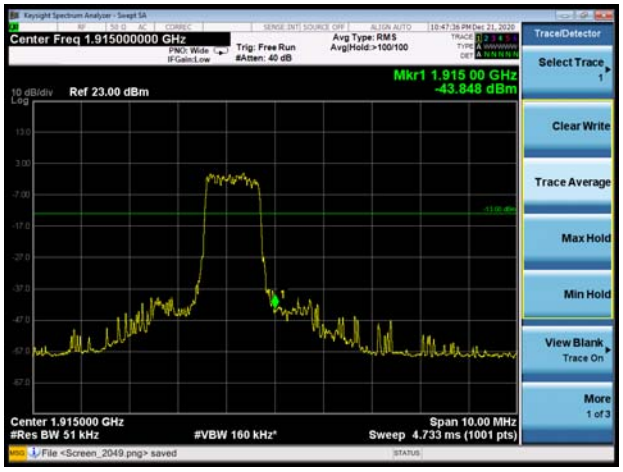
LTE Band 25 3MHz QPSK 1RB CH-High



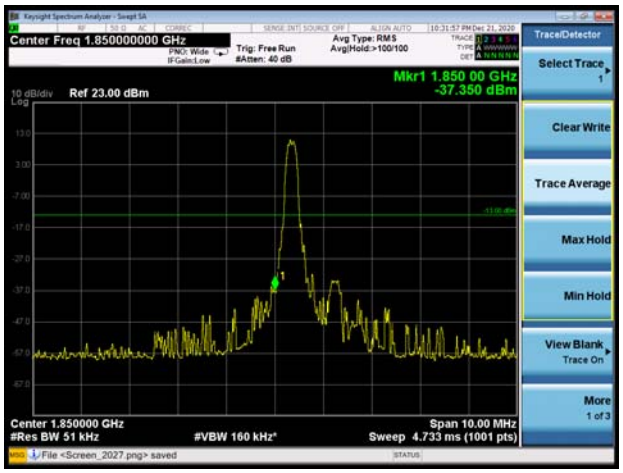
LTE Band 25 3MHz QPSK 100%RB CH-Low



LTE Band 25 3MHz QPSK 100%RB CH-High



LTE Band 25 5MHz QPSK 1RB CH-Low



LTE Band 25 5MHz QPSK 1RB CH-High