RF TEST REPORT

Applicant	Quectel Wireless Solutions Co., Ltd.
FCC ID	XMR201707BG96
Product	Quectel BG96
Brand	Quectel
Model	BG96
Report No.	R2003A0151-R4
Issue Date	August 18, 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 22H (2019)**. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Performed by: Peng Tao

Approved by: Kai Xu

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Summary of measurement results

No.	Test Type	Clause in FCC rules	Verdict
1	RF power output	2.1046	Refer to the Original
2	Effective Radiated Power	22.913(a)(2)	Refer to the Original
3	Occupied Bandwidth	2.1049	Refer to the Original
4	Band Edge Compliance	2.1051 / 22.917(a)	Only test LTE Band
5	Peak-to-Average Power Ratio	22.913(d)/ KDB 971168 D01(5.7)	Refer to the Original
6	Frequency Stability	2.1055 / 22.355	Refer to the Original
7	Spurious Emissions at Antenna Terminals	2.1051 / 22.917(a)	Refer to the Original
8	Radiates Spurious Emission	2.1053 / 22.917 (a)	Refer to the Original
Date of Testing: June 24, 2017~July 3, 2017 and August10, 2020 ~ August12, 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.			

BG96 (Report No.: R2003A0151-R4) is a variant model of BG96 (Report No.: RXA1706-0199RF01R1). Test values partial duplicated from original for variant. There is only tested Band Edge Compliance of LTE Band for variant in this report. The detailed product change description please refers to the Statement letter_BG96.

1. Test Laboratory

1.1. Notes of the Test Report

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

1.2. Test facility

FCC (recognition number is 428261)

TA Technology (Shanghai) Co., Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements.

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
City:	Shanghai
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2. General Description of Equipment under Test

Client Information

Applicant	Quectel Wireless Solutions Co., Ltd.
Applicant address	7th Floor, Hongye Building, No. 1801 Hongmei Road, Xuhui District, Shanghai, China
Manufacturer	Quectel Wireless Solutions Co., Ltd.
Manufacturer address	7th Floor, Hongye Building, No. 1801 Hongmei Road, Xuhui District, Shanghai, China

General Information

EUT Description			
Model	BG96		
IMEI	864508030012063		
Hardware Version	R1.0		
Software Version	BG96MAR02A09M1G		
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)		
Test Mode(s)	GSM 850: LTE Band 5/26;		
Test Modulation	(GSM)GMSK,8PSK; (LTE)QPSK 16QAM;		
LTE Category	M1		
Maximum E.R.P.	GSM 850:	32.13 dBm	
	LTE Band 5:	28.29 dBm	
	LTE Band 26:	28.60 dBm	
Rated Power Supply Voltage	3.8V		
Extreme Voltage	Minimum: 3.3V Maximum: 4.3V		
Extreme Temperature	Lowest: -40°C Highest: +85°C		
Frequency Range(s)	Band	Tx (MHz)	Rx (MHz)
	GSM850	824 ~ 849	869 ~ 894
	LTE Band 5	824 ~ 849	869 ~ 894
	LTE Band 26	824 ~ 849	869 ~ 894
Note: The information of the EUT is declared by the manufacturer.			

3. Applied Standards

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

Test standards:
FCC CFR 47 Part 22H (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 (X, Y axis), lie-down position (Z axis). Receiver antenna polarization (horizontal and vertical), the worst emission was found in position (Z axis, vertical polarization) and the worst case was recorded.

All mode and data rates and positions were investigated. Subsequently, only the worst case emissions are reported.
The following testing in GSM/LTE is set based on the maximum RF Output Power.
Test modes are chosen to be reported as the worst case configuration below:

Test items	Modes/Modulation
	GSM 850
RF power output	GPRS(1Tx slot) EGPRS(1Tx slot)
Occupied Bandwidth	GPRS(1Tx slot) EGPRS(1Tx slot)
Band Edge Compliance	GPRS(1Tx slot) EGPRS(1Tx slot)
Peak-to-Average Power Ratio	GPRS(1Tx slot) EGPRS(1Tx slot)
Frequency Stability	GPRS(1Tx slot) EGPRS(1Tx slot)
Spurious Emissions at Antenna Terminals	GPRS(1Tx slot)
Effective Radiated Power	GPRS(1Tx slot) EGPRS(1Tx slot)
Radiates Spurious Emission	GPRS(1Tx slot)

Test modes are chosen as the worst case configuration below for LTE Band 5/26

Test items	Modes	Bandwidth (MHz)					Modulation		RB			Test Channel		
		1.4	3	5	10	15	QPSK	16QAM	1	50%	100%	L	M	H
RF power output	LTE 5	O	O	O	O	-	O	O	O	O	O	O	O	O
	LTE 26	O	O	O	O	O	O	O	O	O	O	O	O	O
Effective Isotropic Radiated power	LTE 5	O	O	O	O	-	O	O	-	-	O	O	O	O
	LTE 26	O	O	O	O	O	O	O	-	-	O	O	O	O
Occupied Bandwidth	LTE 5	O	O	O	O	-	O	O	-	-	O	O	O	O
	LTE 26	O	O	O	O	O	O	O	-	-	O	O	O	O
Band Edge Compliance	LTE 5	O	O	O	O	-	O	O	O	-	O	O	-	O
	LTE 26	O	O	O	O	O	O	O	O	-	O	O	-	O
Peak-to-Average Power Ratio	LTE 5	O	O	O	O	-	O	O	-	-	O	O	O	O
	LTE 26	O	O	O	O	O	O	O	-	-	O	O	O	O
Frequency Stability	LTE 5	O	O	O	O	-	O	O	-	-	O	-	O	-
	LTE 26	O	O	O	O	O	O	O	-	-	O	-	O	-
Spurious Emissions at Antenna Terminals	LTE 5	O	O	O	O	-	O	-	O	-	-	O	O	O
	LTE 26	O	O	O	O	O	O	-	O	-	-	O	O	O
Radiates Spurious Emission	LTE 5	O	O	O	O	-	O	-	O	-	-	O	O	O
	LTE 26	O	O	O	O	O	O	-	O	-	-	O	O	O
Note	1. The mark “O” means that this configuration is chosen for testing. 2. The mark “-” means that this configuration is not testing.													

5. Test Case Results

5.1. RF Power Output

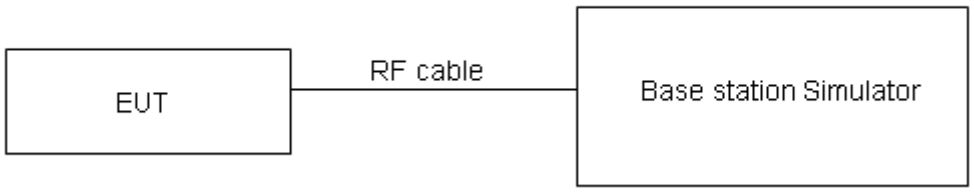
Ambient condition

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

Methods of Measurement

During the process of the testing, The EUT is controlled by the Base Station Simulator to ensure max power transmission and proper modulation.

Test Setup



The loss between RF output port of the EUT and the input port of the tester has been taken into consideration.

Limits

No specific RF power output requirements in part 2.1046.

Measurement Uncertainty

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

Test Results

GSM 850		Conducted Power(dBm)		
		Channel 128	Channel 190	Channel 251
		824.2 (MHz)	836.6 (MHz)	848.8 (MHz)
GPRS (GMSK)	1TXslot	32.25	32.28	32.31
	2TXslots	32.11	32.05	32.10
	3TXslots	31.21	31.26	31.31
	4TXslots	30.01	30.11	30.28
EGPRS (8PSK)	1TXslot	26.58	26.65	26.78
	2TXslots	26.51	26.48	26.61
	3TXslots	26.27	26.28	26.42
	4TXslots	26.05	26.06	26.19

Mode	Bandwidth	Channel/ Frequency(MHz)	Index	RB# RBstart	Conducted Power (dBm)	
					QPSK	16QAM
Band5	1.4MHz	20407/824.7	0	1#0	22.66	23.79
			0	6#0	22.62	22.67
		20525/836.5	0	1#0	23.15	22.63
			0	6#0	22.71	23.20
		20643/848.3	0	1#5	23.21	23.14
			0	6#0	22.86	23.00
	3MHz	20415/825.5	0	1#0	22.68	23.81
			0	6#0	22.70	22.70
		20525/836.5	0	1#0	23.16	22.66
			0	6#0	22.73	23.25
		20635/847.5	1	1#5	23.24	23.16
			1	6#0	22.90	23.04
	5MHz	20425/826.5	3	1#0	22.67	23.76
			0	6#0	22.68	22.67
		20525/836.5	0	1#0	23.12	22.64
			0	6#0	22.69	23.20
		20625/846.5	0	1#5	23.22	23.14
			3	6#0	22.85	23.00
	10MHz	20450/829	3	1#0	22.64	23.74
			0	4#0	22.65	22.65
		20525/836.5	0	1#0	23.08	22.60
			0	4#0	22.64	23.16
		20600/844	4	1#5	23.19	23.09
			7	4#2	22.81	22.97

Band26	Channel/ Frequency(MHz)	Index	RB# RBstart	Conducted Power (dBm)	
				QPSK	16QAM
1.4MHz	26797/824.7	0	1#0	22.49	23.58
		0	6#0	22.76	23.10
	26915/836.5	0	1#0	22.97	22.59
		0	6#0	22.74	23.19
	27033/848.3	0	1#5	22.81	22.70
		0	6#0	22.75	22.87
3MHz	26805/825.5	0	1#0	22.46	23.55
		0	6#0	22.74	23.08
	26915/836.5	0	1#0	22.95	22.53
		0	6#0	22.73	23.15
	27025/847.5	1	1#5	22.77	22.67
		1	6#0	22.73	22.82
5MHz	26815/826.5	3	1#0	22.48	23.57
		0	6#0	22.82	23.11
	26915/836.5	0	1#0	22.96	22.56
		0	6#0	22.75	23.20
	27015/846.5	0	1#5	22.80	22.69
		3	6#0	22.77	22.86
10MHz	26840/829	3	1#0	22.47	23.52
		0	4#0	22.80	23.08
	26915/836.5	0	1#0	22.92	22.54
		0	4#0	22.71	23.15
	26990/844	4	1#5	22.78	22.67
		7	4#2	22.72	22.82
15MHz	26865/831.5	3	1#0	22.44	23.50
		0	6#0	22.77	23.06
	26915/836.5	0	1#0	22.88	22.50
		0	6#0	22.66	23.11
	26965/841.5	8	1#5	22.75	22.62
		11	6#0	22.68	22.79

5.2. Effective Radiated Power

Ambient condition

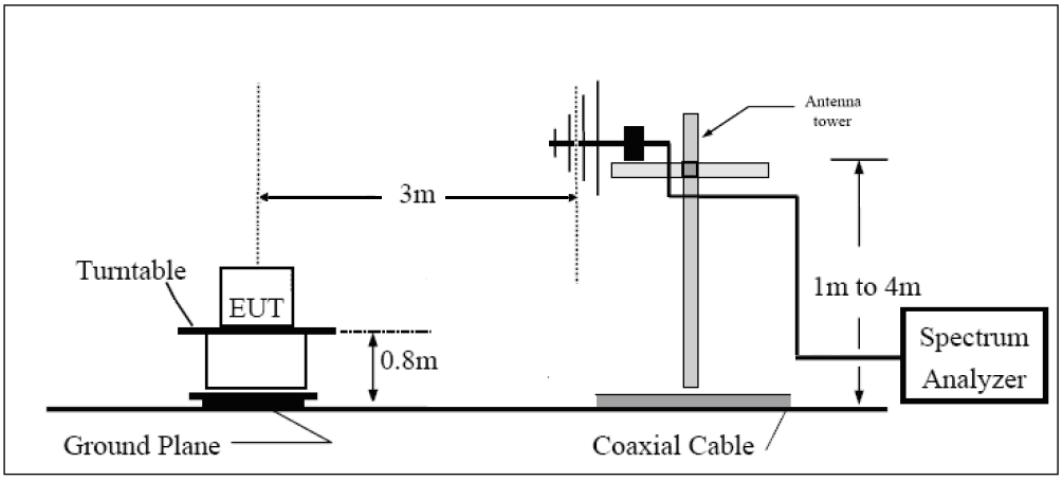
Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Methods of Measurement

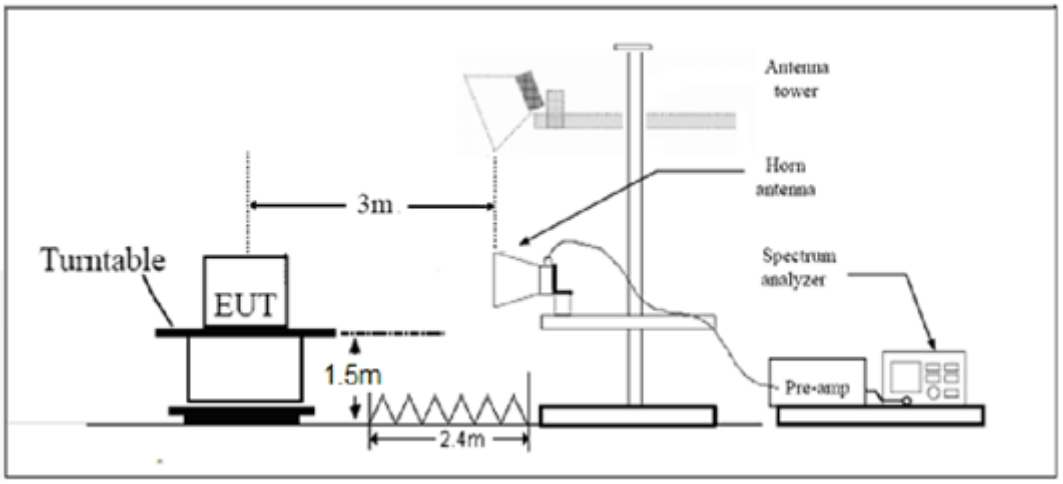
1. The testing follows ANSI C63.26 (2015) Section 5.5.2.3.
2. EUT was placed on a 0.8 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna beteen 1.0m and 4.0m. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all transmit frequencies in three channels (High, Middle, Low) were measured with peak detector.
3. A log-periodic antenna or double-ridged waveguide horn antenna shall be substituted in place of the EUT. The log-periodic antenna will be driven by a signal generator and the level will be adjusted till the same power value on the spectrum analyzer or receiver. The level of the spurious emissions can be calculated through the level of the signal generator, cable loss, the gain of the substitution antenna and the reading of the spectrum analyzer or receiver.
4. The EUT is then put into continuously transmitting mode at its maximum power level during the test.Set Test Receiver or Spectrum RBW=1MHz,VBW=3MHz for above 1GHz and RBW=100kHz,VBW=300kHz for 30MHz to 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:
Power(EIRP)=PMea- PAg - Pcl + Ga
The measurement results are amend as described below:
Power(EIRP)=PMea- Pcl + 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-2.15dBi.

Test configuration

Below 1GHz:



Above 1GHz:



Limits

Rule Part 22.913(a) specifies that "Mobile/portable stations are limited to 7 watts ERP".

Limit	≤ 7 W (38.45 dBm)

Measurement Uncertainty

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

Test Results:

Mode	Polarization	Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBd)	ERP (dBm)	Limit (dBm)	Conclusion
GPRS 850	H	824.2	-24.38	-45.53	0.00	1.06	32.13	38.45	Pass
	H	836.6	-24.85	-45.38	0.00	1.24	31.80	38.45	Pass
	H	848.8	-25.27	-45.37	0.00	1.38	31.09	38.45	Pass
	V	824.2	-28.28	-45.65	0.00	1.06	28.23	38.45	Pass
	V	836.6	-27.19	-45.46	0.00	1.24	27.18	38.45	Pass
	V	848.8	-37.77	-45.49	0.00	1.38	25.68	38.45	Pass
EGPRS 850	H	824.2	-24.16	-45.53	0.00	1.06	26.43	38.45	Pass
	H	836.6	-24.88	-45.38	0.00	1.24	26.50	38.45	Pass
	H	848.8	-25.23	-45.37	0.00	1.38	26.63	38.45	Pass
	V	824.2	-37.36	-45.65	0.00	1.06	24.93	38.45	Pass
	V	836.6	-37.54	-45.46	0.00	1.24	25.00	38.45	Pass
	V	848.8	-37.48	-45.49	0.00	1.38	25.13	38.45	Pass

LTE Band 5									
bandwidth	Polarization	Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBd)	ERP (dBm)	Limit (dBm)	Conclusion
1.4 MHz (QPSK)	H	824.7	-27.63	-47.61	0.00	1.06	26.04	38.45	Pass
	H	836.5	-27.88	-47.75	0.00	1.24	26.98	38.45	Pass
	H	848.3	-28.74	-48.23	0.00	1.38	28.29	38.45	Pass
	V	824.7	-42.56	-47.29	0.00	1.06	23.39	38.45	Pass
	V	836.5	-42.26	-47.15	0.00	1.24	23.29	38.45	Pass
	V	848.3	-42.88	-47.48	0.00	1.38	23.94	38.45	Pass
1.4 MHz (16QAM)	H	824.7	-27.96	-47.61	0.00	1.06	25.70	38.45	Pass
	H	836.5	-28.19	-47.75	0.00	1.24	26.66	38.45	Pass
	H	848.3	-29.06	-48.23	0.00	1.38	27.95	38.45	Pass
	V	824.7	-42.86	-47.29	0.00	1.06	23.07	38.45	Pass
	V	836.5	-42.57	-47.15	0.00	1.24	22.98	38.45	Pass
	V	848.3	-43.20	-47.48	0.00	1.38	23.60	38.45	Pass
3 MHz (QPSK)	H	825.5	-27.89	-47.59	0.00	1.06	25.72	38.45	Pass
	H	836.5	-28.18	-47.75	0.00	1.24	27.17	38.45	Pass
	H	847.5	-28.63	-48.18	0.00	1.38	27.95	38.45	Pass
	V	825.5	-42.57	-47.26	0.00	1.06	23.23	38.45	Pass
	V	836.5	-42.60	-47.15	0.00	1.24	23.59	38.45	Pass
	V	847.5	-43.73	-47.44	0.00	1.38	23.97	38.45	Pass
3 MHz (16QAM)	H	825.5	-27.92	-47.59	0.00	1.06	25.40	38.45	Pass
	H	836.5	-28.49	-47.75	0.00	1.24	26.85	38.45	Pass
	H	847.5	-28.94	-48.18	0.00	1.38	27.65	38.45	Pass
	V	825.5	-42.91	-47.26	0.00	1.06	22.90	38.45	Pass
	V	836.5	-42.91	-47.15	0.00	1.24	23.26	38.45	Pass
	V	847.5	-44.03	-47.44	0.00	1.38	23.65	38.45	Pass
5 MHz (QPSK)	H	826.5	-27.81	-47.60	0.00	1.13	25.49	38.45	Pass
	H	836.5	-28.20	-47.75	0.00	1.24	26.73	38.45	Pass
	H	846.5	-28.85	-48.12	0.00	1.38	27.53	38.45	Pass
	V	826.5	-42.46	-47.24	0.00	1.13	23.20	38.45	Pass
	V	836.5	-42.64	-47.15	0.00	1.24	23.10	38.45	Pass
	V	846.5	-43.02	-47.40	0.00	1.38	22.93	38.45	Pass
5 MHz (16QAM)	H	826.5	-28.11	-47.60	0.00	1.13	25.17	38.45	Pass
	H	836.5	-28.54	-47.75	0.00	1.24	26.40	38.45	Pass
	H	846.5	-29.18	-48.12	0.00	1.38	27.20	38.45	Pass
	V	826.5	-42.77	-47.24	0.00	1.13	22.88	38.45	Pass
	V	836.5	-42.94	-47.15	0.00	1.24	22.77	38.45	Pass
	V	846.5	-43.36	-47.40	0.00	1.38	22.60	38.45	Pass

LTE Band 5									
bandwidth	Polarization	Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBd)	ERP (dBm)	Limit (dBm)	Conclusion
10 MHz (QPSK)	H	829	-27.65	-47.61	0.00	1.13	24.43	38.45	Pass
	H	836.5	-27.96	-47.75	0.00	1.24	26.06	38.45	Pass
	H	844	-28.46	-48.01	0.00	1.33	26.22	38.45	Pass
	V	829	-42.44	-47.19	0.00	1.13	21.91	38.45	Pass
	V	836.5	-42.49	-47.15	0.00	1.24	22.84	38.45	Pass
	V	844	-42.36	-47.29	0.00	1.33	22.03	38.45	Pass
10 MHz (16QAM)	H	829	-27.96	-47.61	0.00	1.13	24.10	38.45	Pass
	H	836.5	-28.24	-47.75	0.00	1.24	25.75	38.45	Pass
	H	844	-28.78	-48.01	0.00	1.33	25.90	38.45	Pass
	V	829	-42.77	-47.19	0.00	1.13	21.60	38.45	Pass
	V	836.5	-42.79	-47.15	0.00	1.24	22.51	38.45	Pass
	V	844	-42.61	-47.29	0.00	1.33	21.70	38.45	Pass

LTE Band 26									
bandwidth	Polarization	Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBd)	ERP (dBm)	Limit (dBm)	Conclusion
1.4 MHz (QPSK)	H	824.7	-27.76	-47.61	0.00	1.06	26.69	38.45	Pass
	H	836.5	-27.84	-47.75	0.00	1.24	27.83	38.45	Pass
	H	848.3	-28.32	-48.23	0.00	1.38	28.11	38.45	Pass
	V	824.7	-38.14	-47.29	0.00	1.06	23.52	38.45	Pass
	V	836.5	-38.81	-47.75	0.00	1.24	24.37	38.45	Pass
	V	848.3	-38.25	-47.48	0.00	1.38	24.74	38.45	Pass
1.4 MHz (16QAM)	H	824.7	-28.25	-47.61	0.00	1.06	26.37	38.45	Pass
	H	836.5	-28.46	-47.75	0.00	1.24	27.50	38.45	Pass
	H	848.3	-29.00	-48.23	0.00	1.38	27.80	38.45	Pass
	V	824.7	-38.59	-47.29	0.00	1.06	23.20	38.45	Pass
	V	836.5	-39.38	-47.75	0.00	1.24	24.06	38.45	Pass
	V	848.3	-39.21	-47.48	0.00	1.38	24.43	38.45	Pass
3 MHz (QPSK)	H	825.5	-27.65	-47.59	0.00	1.06	26.68	38.45	Pass
	H	836.5	-27.73	-47.75	0.00	1.24	27.76	38.45	Pass
	H	847.5	-27.98	-48.18	0.00	1.38	28.60	38.45	Pass
	V	825.5	-38.00	-47.26	0.00	1.06	23.90	38.45	Pass
	V	836.5	-38.50	-47.75	0.00	1.24	24.38	38.45	Pass
	V	847.5	-37.96	-47.44	0.00	1.38	24.50	38.45	Pass
3 MHz (16QAM)	H	825.5	-28.20	-47.59	0.00	1.06	26.37	38.45	Pass
	H	836.5	-28.48	-47.75	0.00	1.24	27.45	38.45	Pass
	H	847.5	-28.93	-48.18	0.00	1.38	28.27	38.45	Pass
	V	825.5	-38.52	-47.26	0.00	1.06	23.60	38.45	Pass

LTE Band 26									
bandwidth	Polarization	Frequency (MHz)	Rt (dBm)	Rs (dBm)	Ps (dBm)	Gs (dBd)	ERP (dBm)	Limit (dBm)	Conclusion
	V	836.5	-39.07	-47.75	0.00	1.24	24.06	38.45	Pass
	V	847.5	-38.62	-47.44	0.00	1.38	24.15	38.45	Pass
5 MHz (QPSK)	H	826.5	-27.97	-47.60	0.00	1.13	26.17	38.45	Pass
	H	836.5	-28.06	-47.75	0.00	1.24	27.43	38.45	Pass
	H	846.5	-28.20	-48.12	0.00	1.38	28.13	38.45	Pass
	V	826.5	-38.39	-47.24	0.00	1.13	23.75	38.45	Pass
	V	836.5	-38.82	-47.75	0.00	1.24	24.22	38.45	Pass
	V	846.5	-38.17	-47.40	0.00	1.38	23.09	38.45	Pass
5 MHz (16QAM)	H	826.5	-28.70	-47.60	0.00	1.13	25.86	38.45	Pass
	H	836.5	-28.83	-47.75	0.00	1.24	27.10	38.45	Pass
	H	846.5	-28.79	-48.12	0.00	1.38	27.82	38.45	Pass
	V	826.5	-39.02	-47.24	0.00	1.13	23.45	38.45	Pass
	V	836.5	-39.40	-47.75	0.00	1.24	23.90	38.45	Pass
	V	846.5	-38.81	-47.40	0.00	1.38	22.78	38.45	Pass
10 MHz (QPSK)	H	829	-27.51	-47.61	0.00	1.13	25.12	38.45	Pass
	H	836.5	-27.99	-47.75	0.00	1.24	25.83	38.45	Pass
	H	844	-27.87	-48.01	0.00	1.33	26.96	38.45	Pass
	V	829	-37.89	-47.19	0.00	1.13	22.16	38.45	Pass
	V	836.5	-38.90	-47.75	0.00	1.24	23.36	38.45	Pass
	V	844	-37.83	-47.29	0.00	1.33	23.63	38.45	Pass
10 MHz (16QAM)	H	829	-28.30	-47.61	0.00	1.13	24.80	38.45	Pass
	H	836.5	-28.14	-47.75	0.00	1.24	25.47	38.45	Pass
	H	844	-28.39	-48.01	0.00	1.33	26.65	38.45	Pass
	V	829	-38.38	-47.19	0.00	1.13	21.85	38.45	Pass
	V	836.5	-39.48	-47.75	0.00	1.24	23.05	38.45	Pass
	V	844	-38.38	-47.29	0.00	1.33	23.30	38.45	Pass
15 MHz (QPSK)	H	831.5	-27.66	-47.64	0.00	1.18	24.68	38.45	Pass
	H	836.5	-28.06	-47.75	0.00	1.24	25.59	38.45	Pass
	H	841.5	-27.85	-47.93	0.00	1.28	26.06	38.45	Pass
	V	831.5	-37.97	-47.15	0.00	1.18	21.88	38.45	Pass
	V	836.5	-38.86	-47.75	0.00	1.24	22.49	38.45	Pass
	V	841.5	-37.93	-47.23	0.00	1.28	22.51	38.45	Pass
15 MHz (16QAM)	H	831.5	-28.29	-47.64	0.00	1.18	24.35	38.45	Pass
	H	836.5	-28.56	-47.75	0.00	1.24	25.17	38.45	Pass
	H	841.5	-28.37	-47.93	0.00	1.28	25.75	38.45	Pass
	V	831.5	-38.49	-47.15	0.00	1.18	21.56	38.45	Pass
	V	836.5	-39.34	-47.75	0.00	1.24	22.15	38.45	Pass
	V	841.5	-38.55	-47.23	0.00	1.28	22.18	38.45	Pass

5.3. Occupied Bandwidth

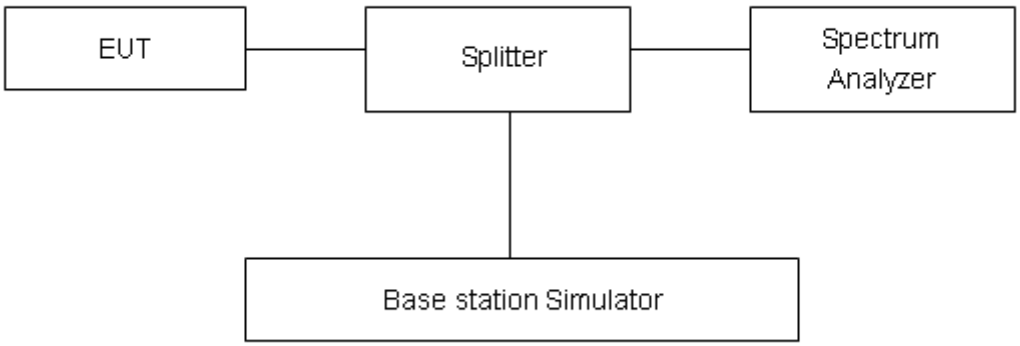
Ambient condition

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

Method of Measurement

The EUT was connected to Spectrum Analyzer and Base Station Simulator via power Splitter. The occupied bandwidth is measured using spectrum analyzer.
RBW is set to 3kHz, VBW is set to 10kHz for GSM 850,
RBW is set to 51 kHz, VBW is set to 160 kHz for LTE Band 5/26,
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.

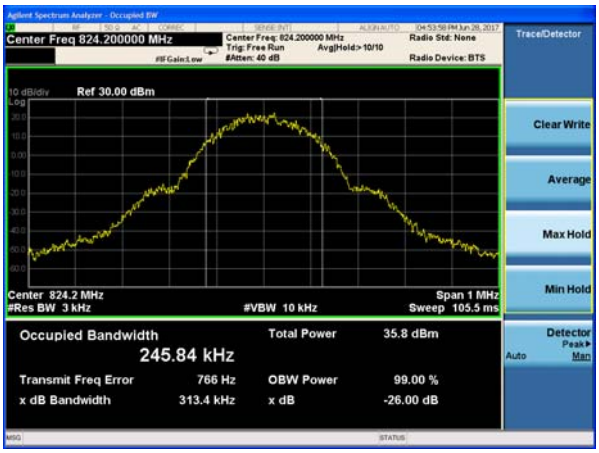
Test Result

Mode	Channel	Frequency (MHz)	99% Power Bandwidth (MHz)	-26dBc Bandwidth(MHz)
GPRS 850 (GMSK)	128	824.2	0.24584	0.3134
	190	836.6	0.24471	0.3148
	251	848.8	0.24419	0.3039
EGPRS 850 (8-PSK)	128	824.2	0.24858	0.2973
	190	836.6	0.24438	0.3111
	251	848.8	0.24744	0.3130

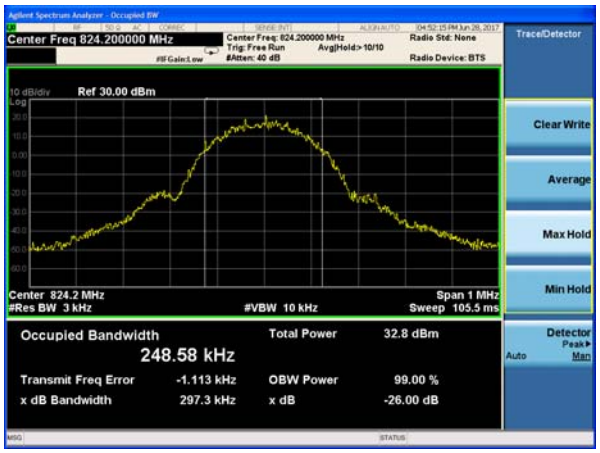
LTE Band 5						
RB	Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	99% Power Bandwidth(MHz)	-26dBc Bandwidth(MHz)
100%	QPSK	1.4	20407	824.7	1.1075	1.316
			20525	836.5	1.1074	1.329
			20643	848.3	1.1082	1.348
		3	20415	825.5	1.1606	1.845
			20525	836.5	1.1561	1.848
			20635	847.5	1.1630	1.859
		5	20425	826.5	1.1552	1.879
			20525	836.5	1.1536	1.866
			20625	846.5	1.1629	1.986
		10	20450	829	1.2027	1.767
			20525	836.5	1.1952	1.920
			20600	844	1.1780	1.735
	16QAM	1.4	20407	824.7	0.94471	1.214
			20525	836.5	0.94726	1.198
			20643	848.3	0.94381	1.173
		3	20415	825.5	0.97884	1.373
			20525	836.5	0.98345	1.345
			20635	847.5	0.98361	1.339
		5	20425	826.5	1.0052	1.451
			20525	836.5	1.0072	1.453
			20625	846.5	1.0025	1.447
		10	20450	829	1.0349	1.513
			20525	836.5	1.0457	1.661
			20600	844	1.0258	1.504

LTE Band 26						
RB	Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	99% Power Bandwidth(MHz)	-26dBc Bandwidth(MHz)
100%	QPSK	1.4	26797	824.7	1.1080	1.320
			26915	836.5	1.1092	1.331
			27033	848.3	1.1071	1.322
		3	26805	825.5	1.1343	1.535
			26915	836.5	1.1398	1.623
			27025	847.5	1.1666	1.86
		5	26815	826.5	1.1524	1.466
			26915	836.5	1.1531	1.488
			27015	846.5	1.1296	1.472
		10	26840	829	1.211	2.049
			26915	836.5	1.1901	2.035
			26990	844	1.1955	2.044
		15	26865	831.5	1.1982	1.841
			26915	836.5	1.1913	1.961
			26965	841.5	1.2049	1.972
	16QAM	1.4	26797	824.7	0.94796	1.212
			26915	836.5	0.94121	1.205
			27033	848.3	0.94791	1.214
		3	26805	825.5	0.98579	1.334
			26915	836.5	0.98773	1.345
			27025	847.5	0.99320	1.410
		5	26815	826.5	0.99601	1.549
			26915	836.5	1.0185	1.578
			27015	846.5	1.0013	1.578
		10	26840	829	1.0527	1.660
			26915	836.5	1.0557	1.671
			26990	844	1.0551	1.662
		15	26865	831.5	1.060	1.642
			26915	836.5	1.0588	1.632
			26965	841.5	1.0577	1.649

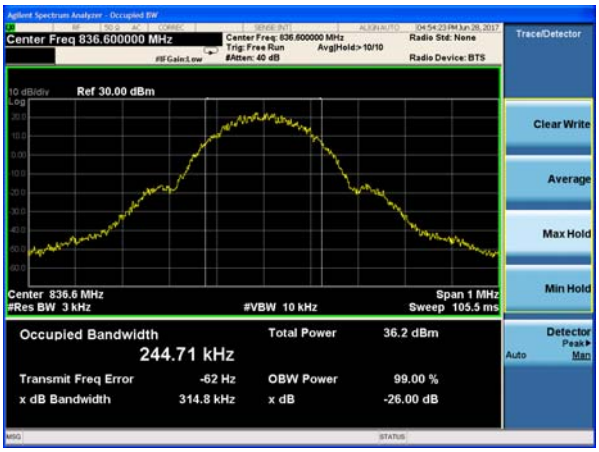
GSM 850 GPRS CH-Low



GSM 850 EGPRS CH-Low

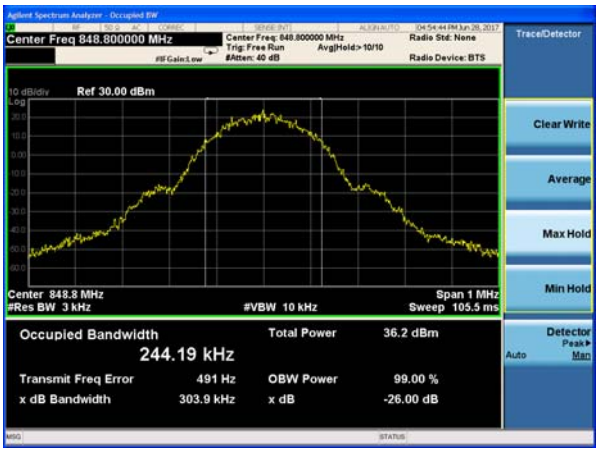


GSM 850 GPRS CH-Middle



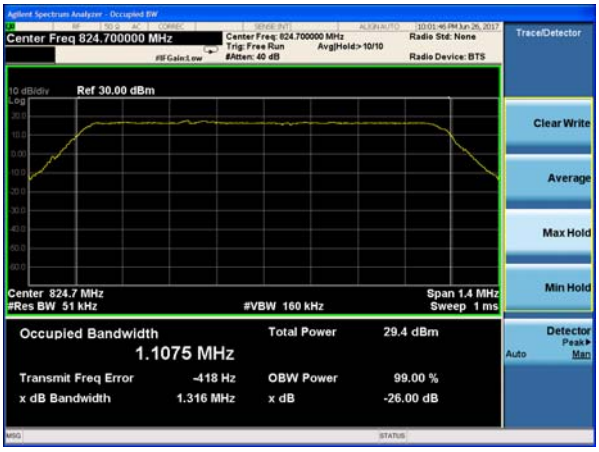
GSM 850 EGPRS CH-Middle

GSM 850 GPRS CH-High



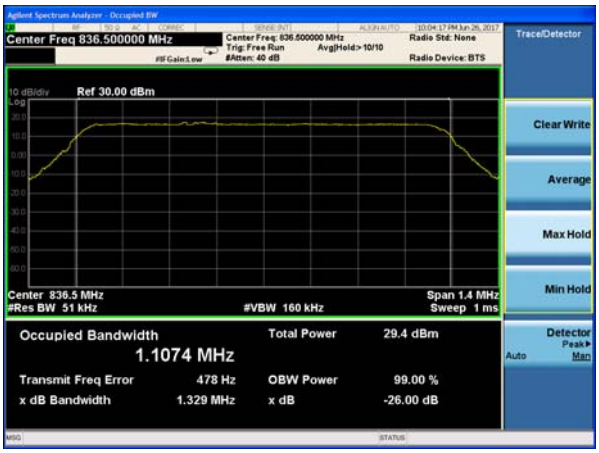
GSM 850 EGPRS CH-High

LTE Band 5 QPSK 1.4MHz CH-Low



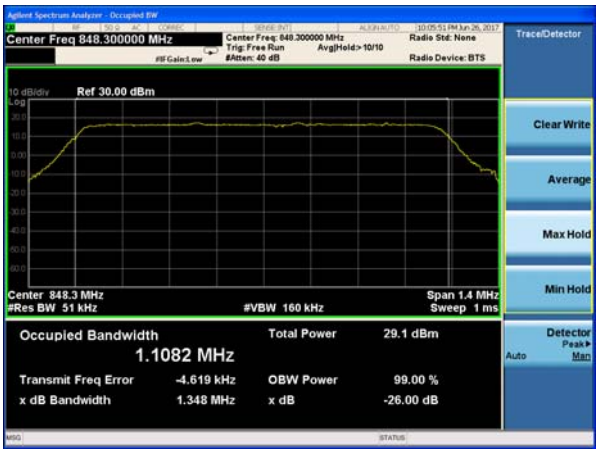
LTE Band 5 QPSK 3MHz CH-Low

LTE Band 5 QPSK 1.4MHz CH-Middle



LTE Band 5 QPSK 3MHz CH-Middle

LTE Band 5 QPSK 1.4MHz CH-High



LTE Band 5 QPSK 3MHz CH-High

LTE Band 5 QPSK 5MHz CH-Low

LTE Band 5 QPSK 10MHz CH-Low

LTE Band 5 QPSK 5MHz CH-Middle

LTE Band 5 QPSK 10MHz CH-Middle

LTE Band 5 QPSK 5MHz CH-High

LTE Band 5 QPSK 10MHz CH-High

LTE Band 5 16QAM 1.4MHz CH-Low

LTE Band 5 16QAM 3MHz CH-Low

LTE Band 5 16QAM 1.4MHz CH-Middle

LTE Band 5 16QAM 3MHz CH-Middle

LTE Band 5 16QAM 1.4MHz CH-High

LTE Band 5 16QAM 3MHz CH-High

LTE Band 5 16QAM 5MHz CH-Low

LTE Band 5 16QAM 10MHz CH-Low

LTE Band 5 16QAM 5MHz CH-Middle

LTE Band 5 16QAM 10MHz CH-Middle

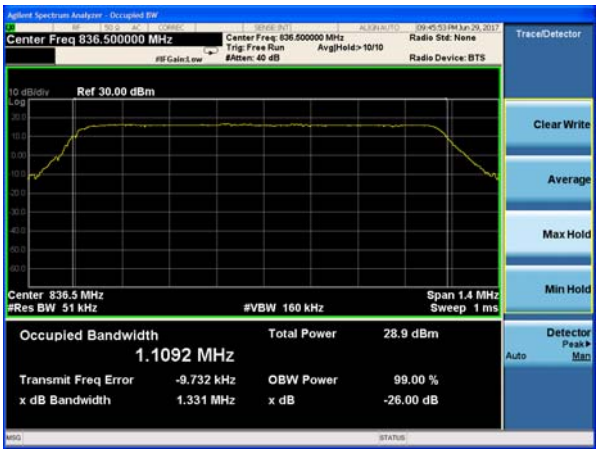
LTE Band 5 16QAM 5MHz CH-High

LTE Band 5 16QAM 10MHz CH-High

LTE Band 26 QPSK 1.4MHz CH-Low

LTE Band 26 QPSK 3MHz CH-Low

LTE Band 26 QPSK 1.4MHz CH-Middle



LTE Band 26 QPSK 3MHz CH-Middle

LTE Band 26 QPSK 1.4MHz CH-High

LTE Band 26 QPSK 3MHz CH-High

LTE Band 26 QPSK 5MHz CH-Low

LTE Band 26 QPSK 10MHz CH-Low

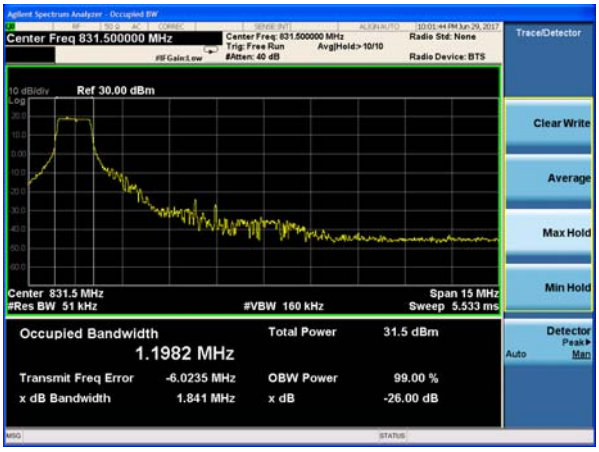
LTE Band 26 QPSK 5MHz CH-Middle

LTE Band 26 QPSK 10MHz CH-Middle

LTE Band 26 QPSK 5MHz CH-High

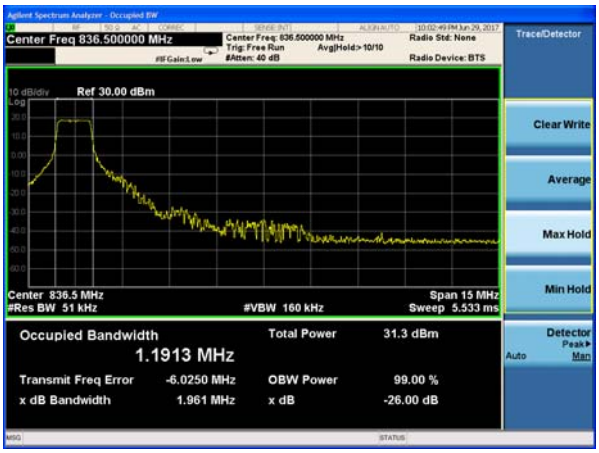
LTE Band 26 QPSK 10MHz CH-High

LTE Band 26 QPSK 15MHz CH-Low



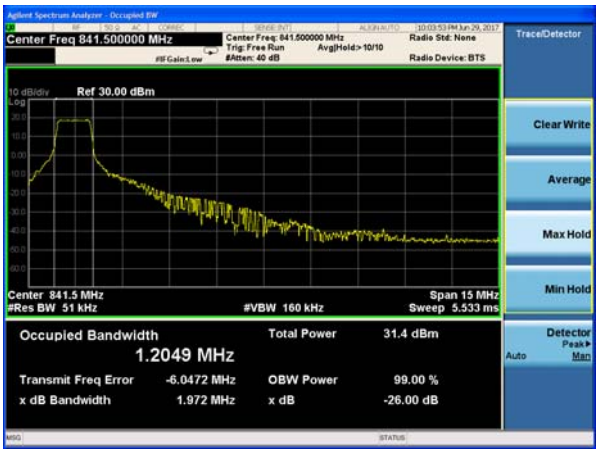
LTE Band 26 16QAM 1.4MHz CH-Low

LTE Band 26 QPSK 15MHz CH-Middle



LTE Band 26 16QAM 1.4MHz CH-Middle

LTE Band 26 QPSK 15MHz CH-High



LTE Band 26 16QAM 1.4MHz CH-High

LTE Band 26 16QAM 3MHz CH-Low

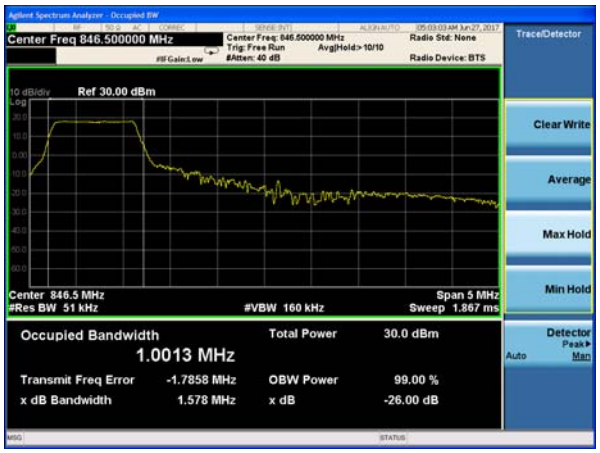
LTE Band 26 16QAM 5MHz CH-Low

LTE Band 26 16QAM 3MHz CH-Middle

LTE Band 26 16QAM 5MHz CH-Middle

LTE Band 2616QAM 3MHz CH-High

LTE Band 26 16QAM 5MHz CH-High



LTE Band 26 16QAM 10MHz CH-Low

LTE Band 26 16QAM 15MHz CH-Low

LTE Band 26 16QAM 10MHz CH-Middle

LTE Band 26 16QAM 15MHz CH-Middle

LTE Band 26 16QAM 10MHz CH-High

LTE Band 26 16QAM 15MHz CH-High

5.4. Band Edge Compliance

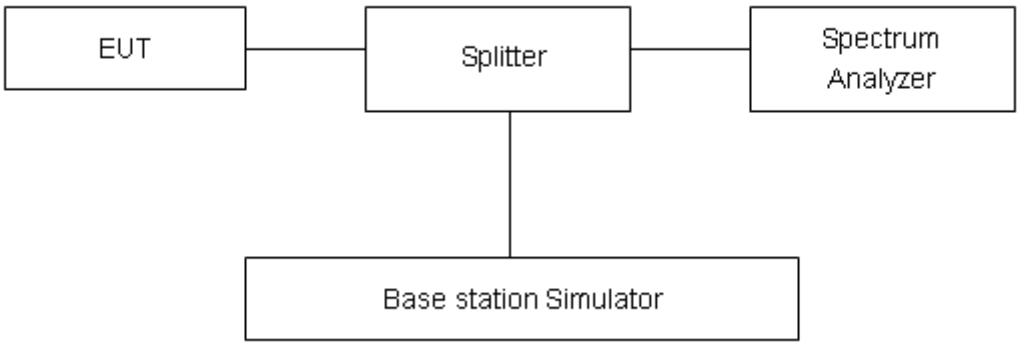
Ambient condition

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

Method of Measurement

The 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.
RBW is set to 3kHz,VBW is set to 10kHz for GSM 850,
RBW is set to 51 kHz, VBW is set to 160 kHz for LTE Band 5/26.
Spectrum analyzer plots are included on the following pages.

Test Setup



Limits

Rule Part 22.917(a) specifies that “The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(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:

Original

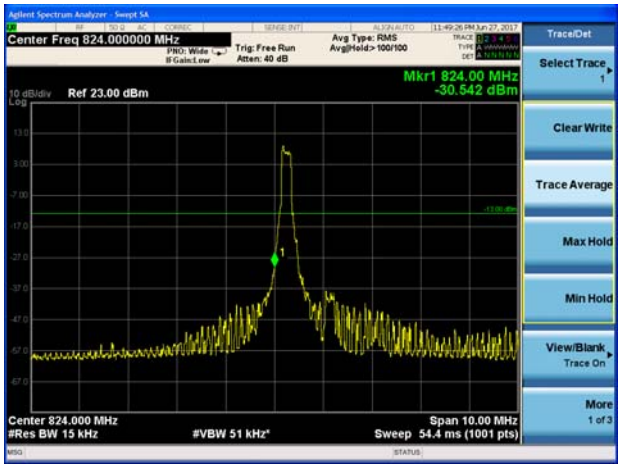
GSM 850 GPRS CH-Low

GSM 850 GPRS CH-High

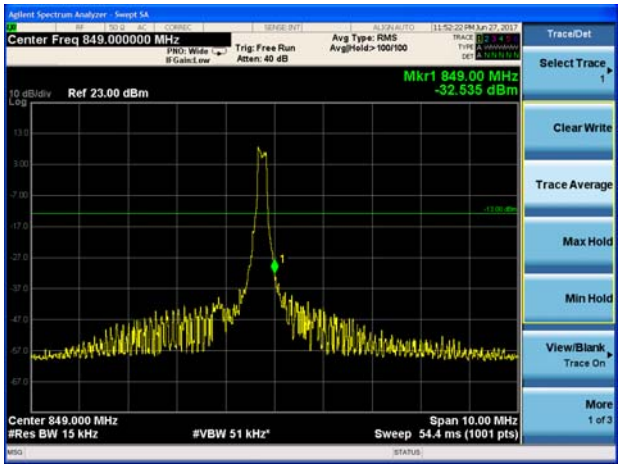
GSM 850 EGPRS CH-Low

GSM 850 EGPRS CH-High

LTE Band 5 QPSK 1.4MHz CH-Low 1RB

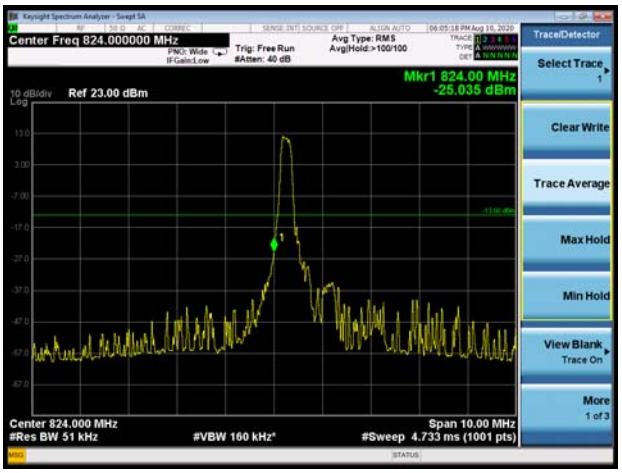


LTE Band 5 QPSK 1.4MHz CH-High 1RB

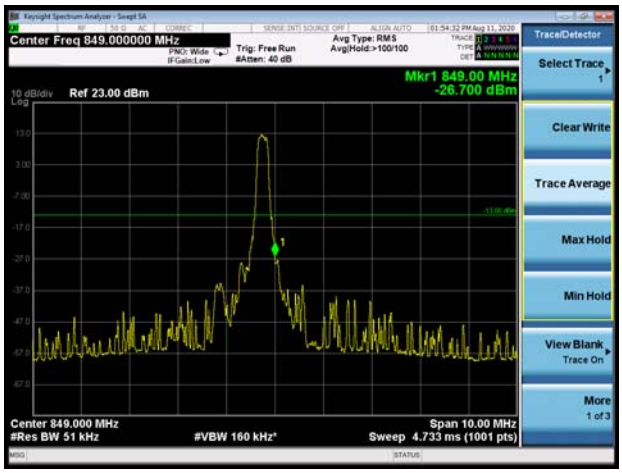


Variant

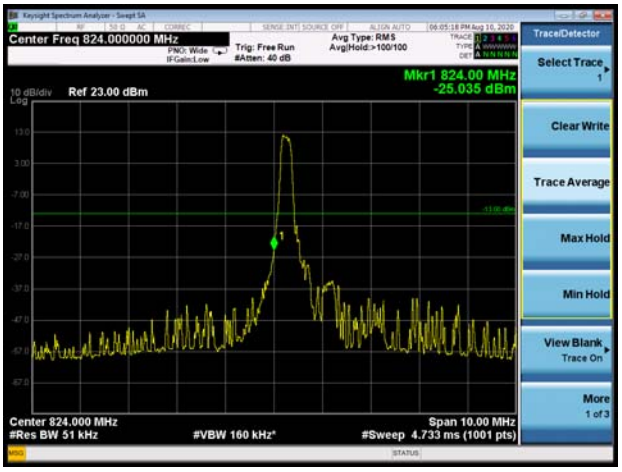
LTE Band 5 QPSK 1.4MHz CH-Low 1RB



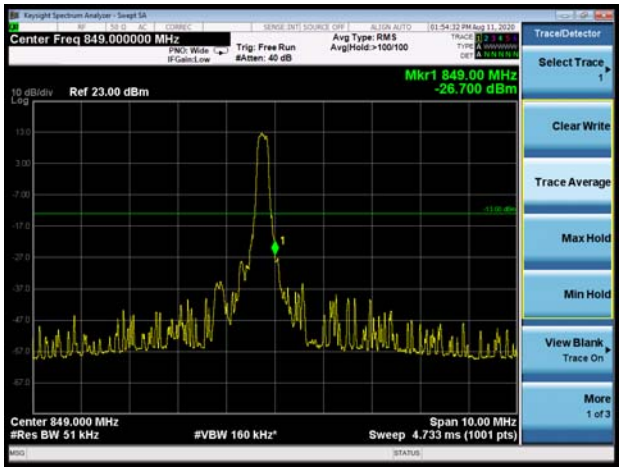
LTE Band 5 QPSK 1.4MHz CH-High 1RB



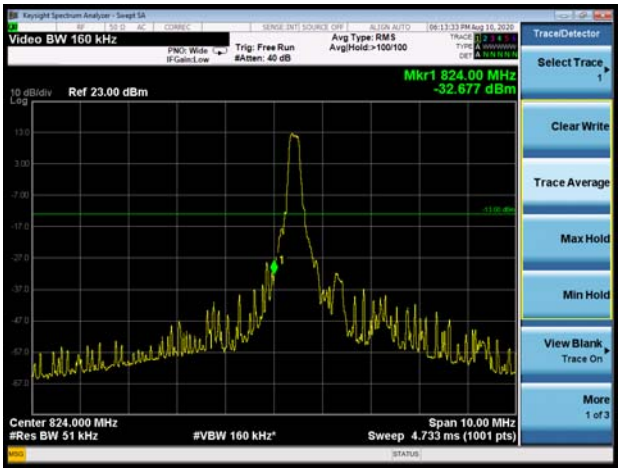
LTE Band 5 QPSK 1.4MHz CH-Low 100%RB



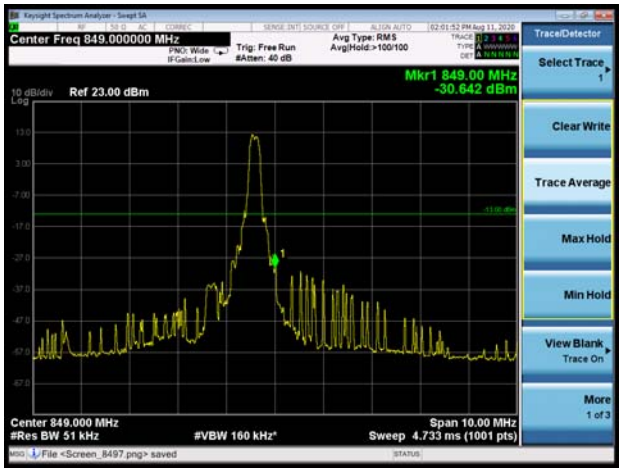
LTE Band 5 QPSK 1.4MHz CH-High 100%RB



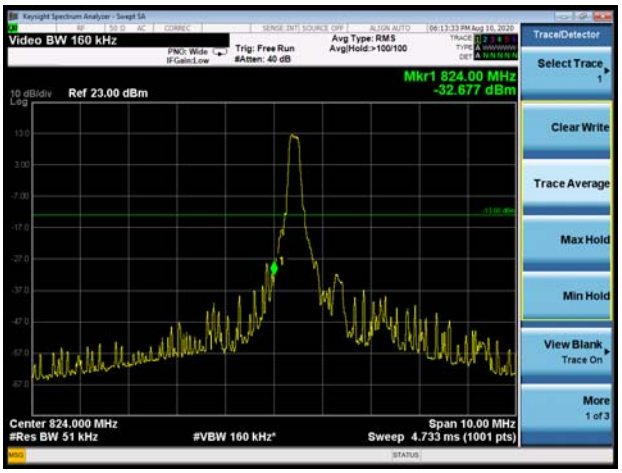
LTE Band 5 QPSK 3MHz CH-Low 1RB



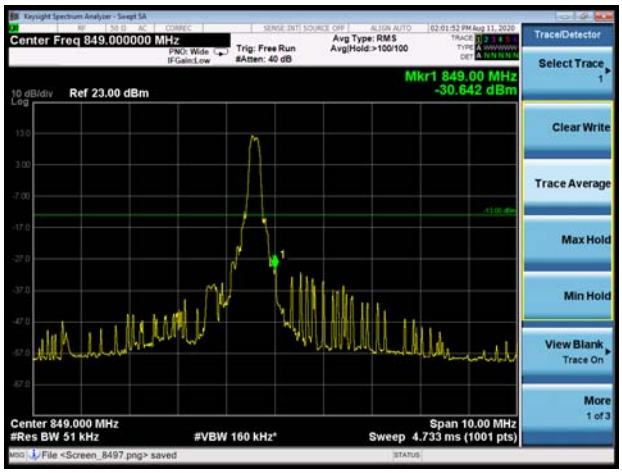
LTE Band 5 QPSK 3MHz CH-High 1RB



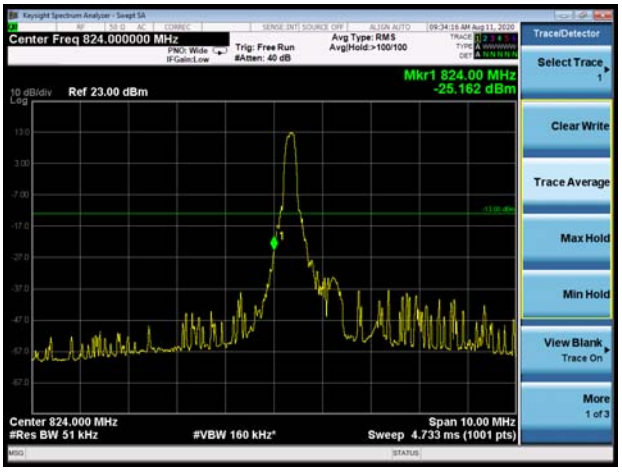
LTE Band 5 QPSK 3MHz CH-Low 100%RB



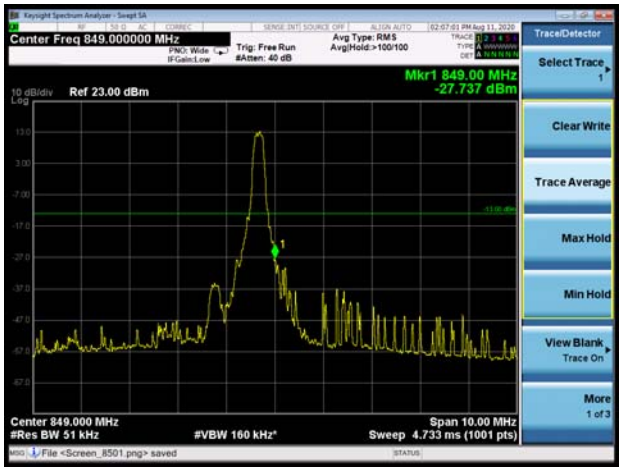
LTE Band 5 QPSK 3MHz CH-High 100%RB



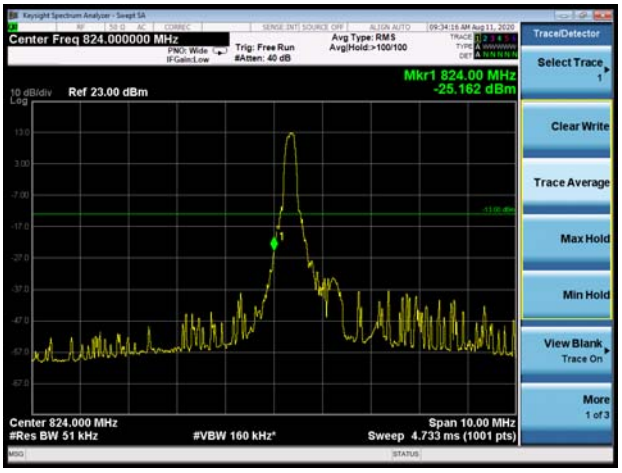
LTE Band 5 QPSK 5MHz CH-Low 1RB



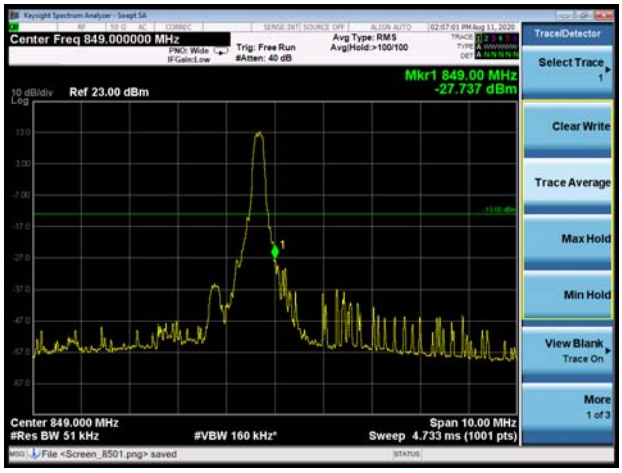
LTE Band 5 QPSK 5MHz CH-High 1RB



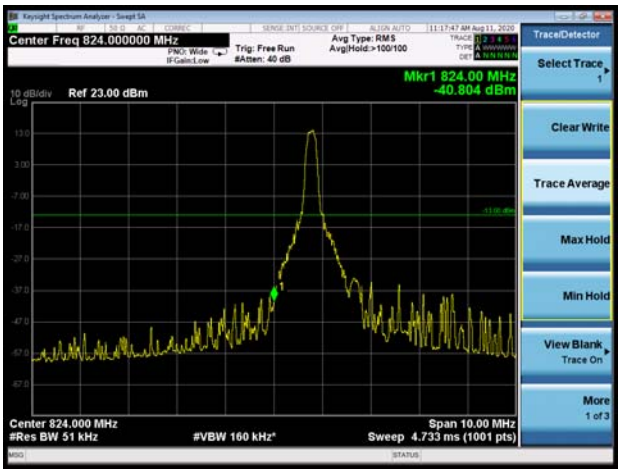
LTE Band 5 QPSK 5MHz CH-Low 100%RB



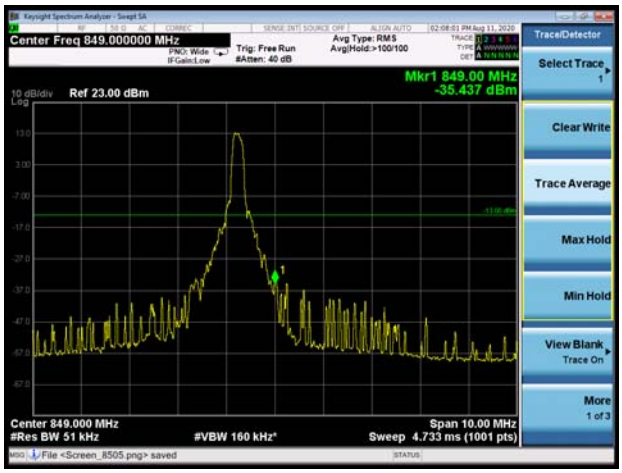
LTE Band 5 QPSK 5MHz CH-High 100%RB



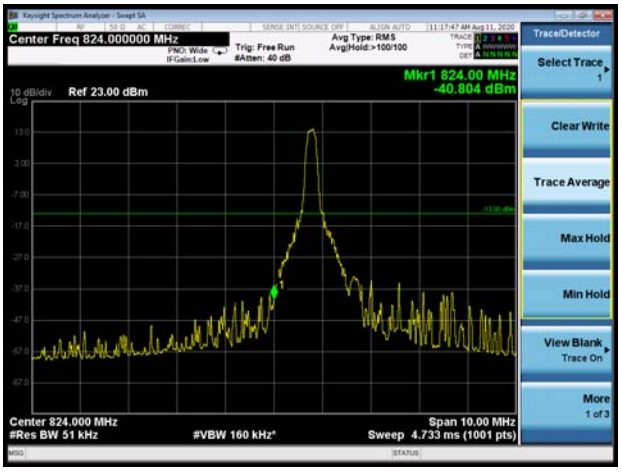
LTE Band 5 QPSK 10MHz CH-Low 1RB



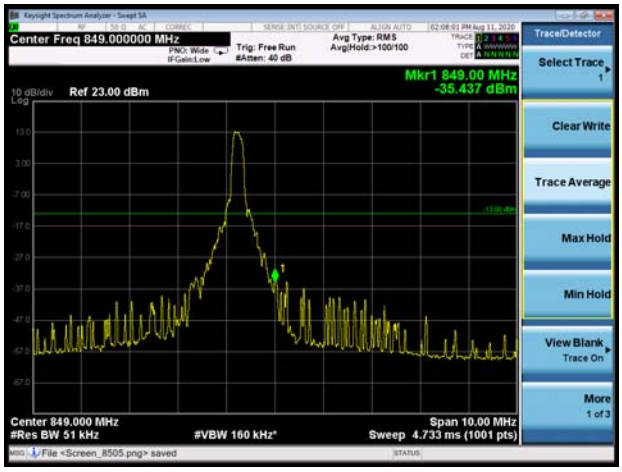
LTE Band 5 QPSK 10MHz CH-High 1RB



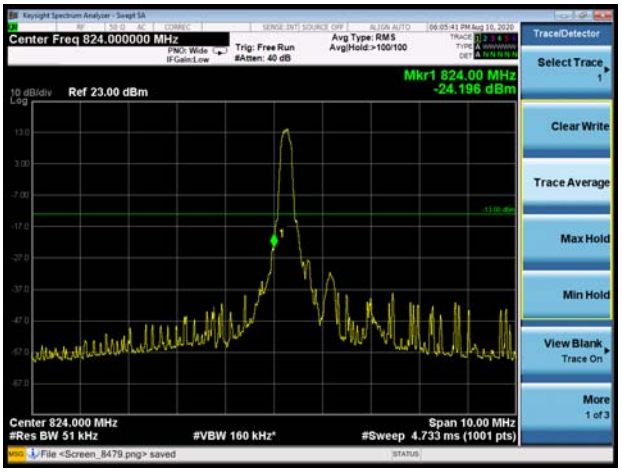
LTE Band 5 QPSK 10MHz CH-Low 100%RB



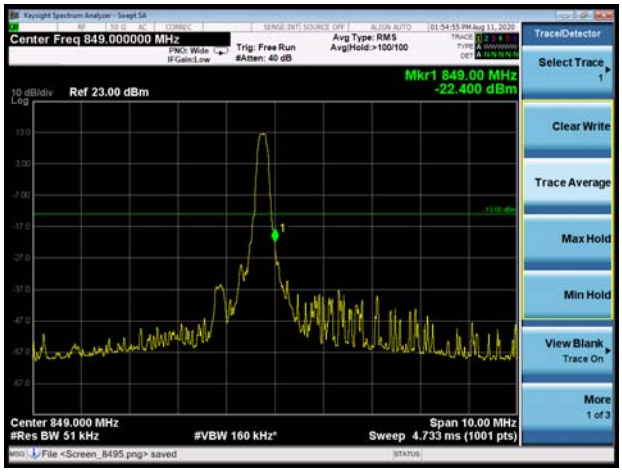
LTE Band 5 QPSK 10MHz CH-High 100%RB



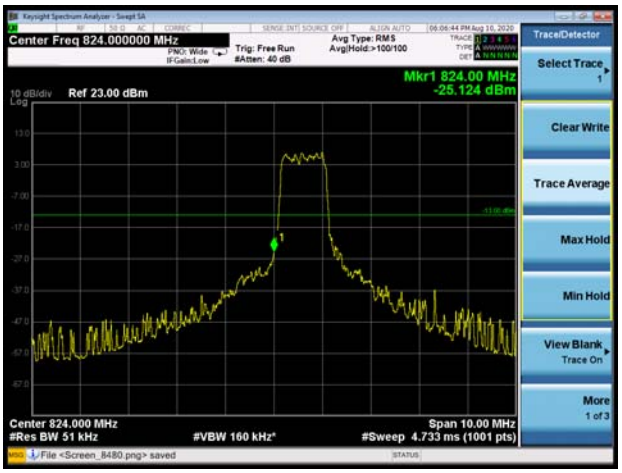
LTE Band 5 16QAM 1.4MHz CH-Low 1RB



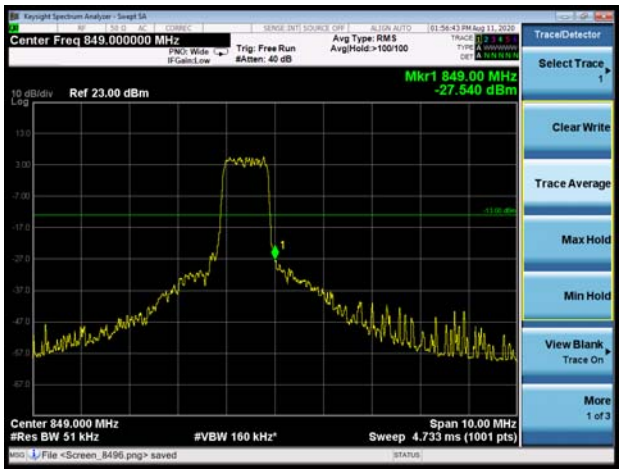
LTE Band 5 16QAM 1.4MHz CH-High 1RB



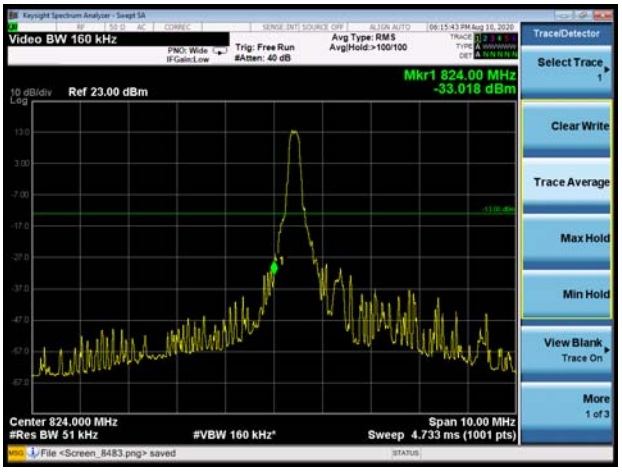
LTE Band 5 16QAM 1.4MHz CH-Low 100%RB



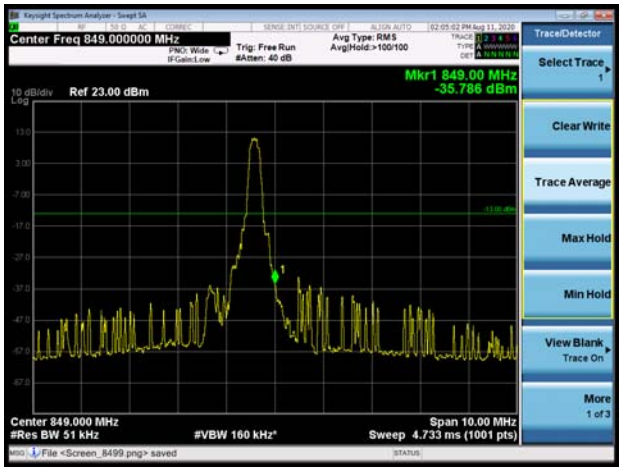
LTE Band 5 16QAM 1.4MHz CH-High 100%RB



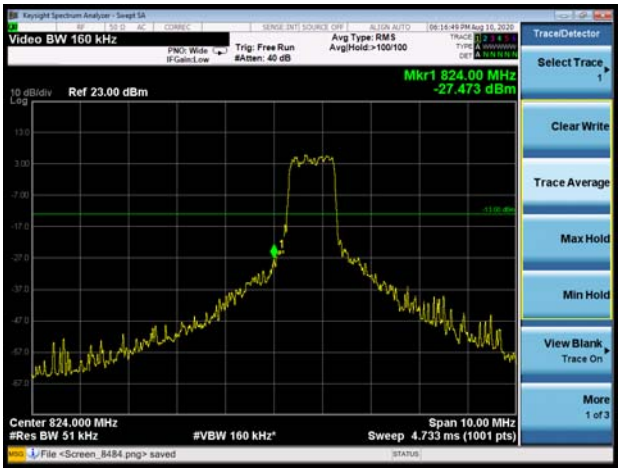
LTE Band 5 16QAM 3MHz CH-Low 1RB



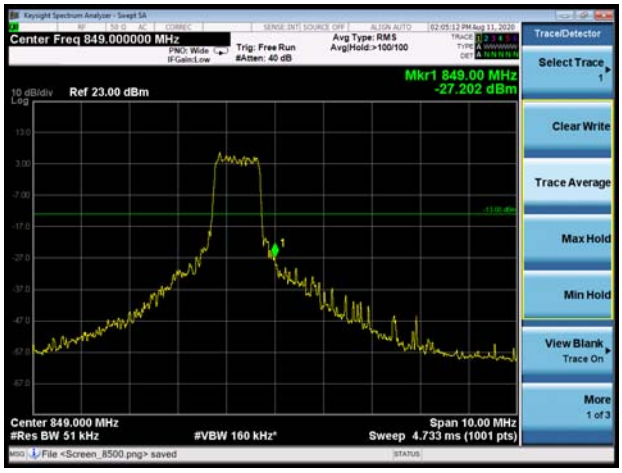
LTE Band 5 16QAM 3MHz CH-High 1RB



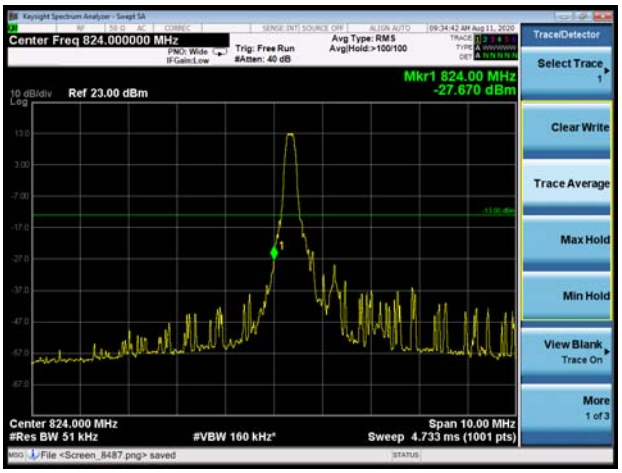
LTE Band 5 16QAM 3MHz CH-Low 100%RB



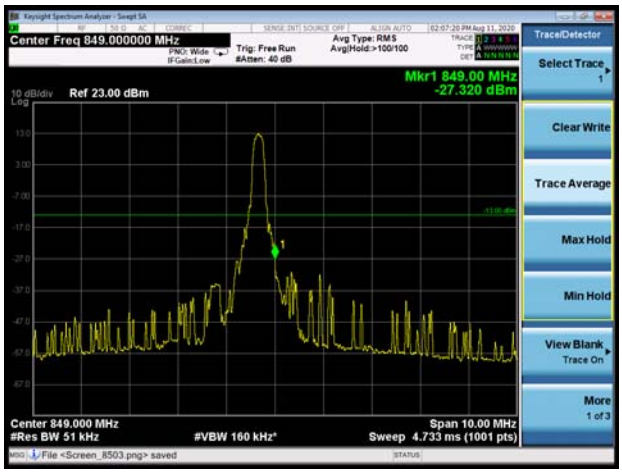
LTE Band 5 16QAM 3MHz CH-High 100%RB



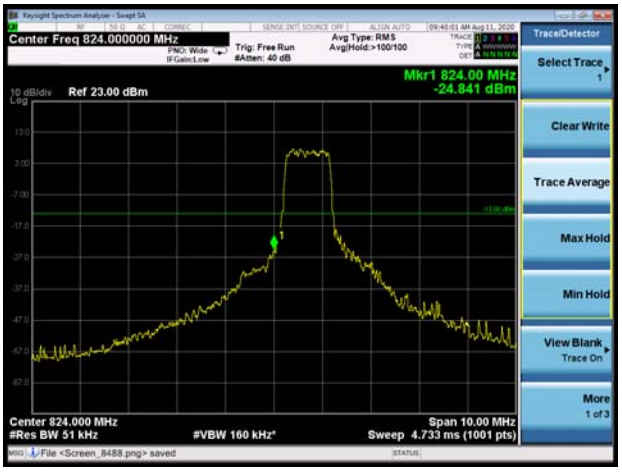
LTE Band 5 16QAM 5MHz CH-Low 1RB



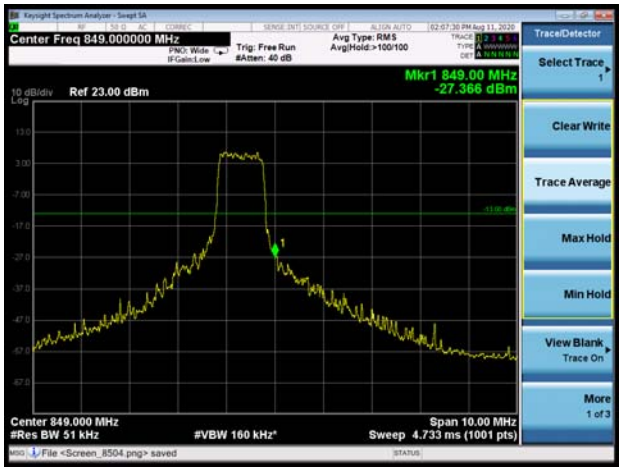
LTE Band 5 16QAM 5MHz CH-High 1RB



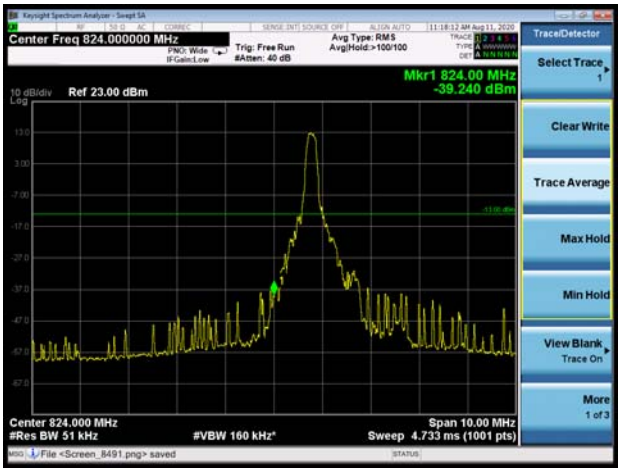
LTE Band 5 16QAM 5MHz CH-Low 100%RB



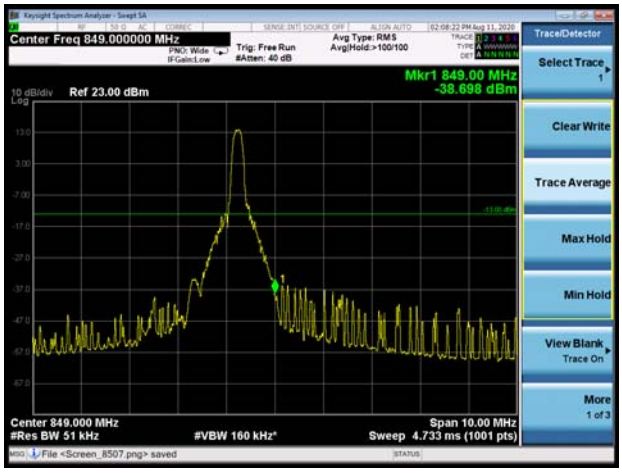
LTE Band 5 16QAM 5MHz CH-High 100%RB



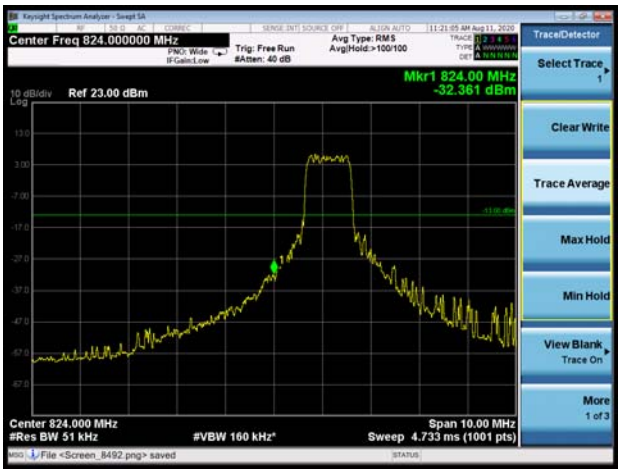
LTE Band 5 16QAM 10MHz CH-Low 1RB



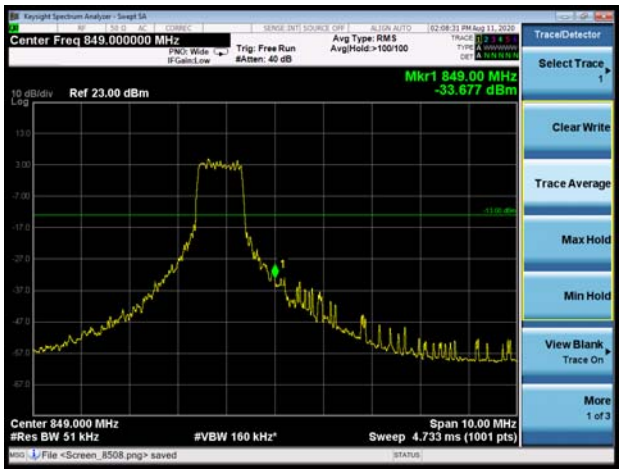
LTE Band 5 16QAM 10MHz CH-High 1RB



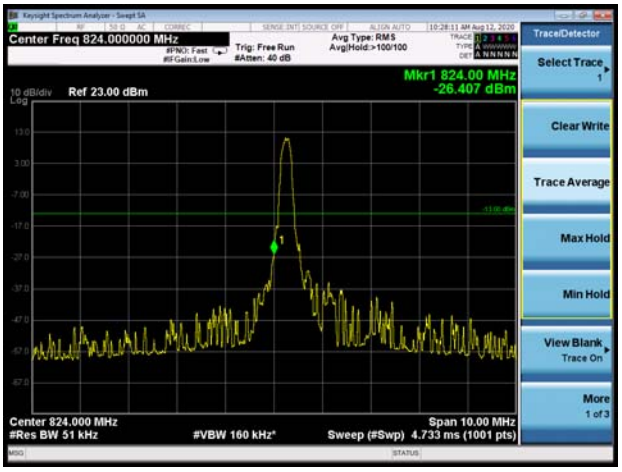
LTE Band 5 16QAM 10MHz CH-Low 100%RB



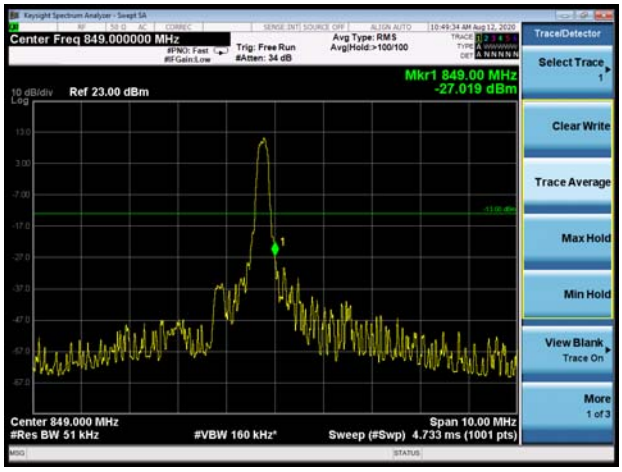
LTE Band 5 16QAM 10MHz CH-High 100%RB



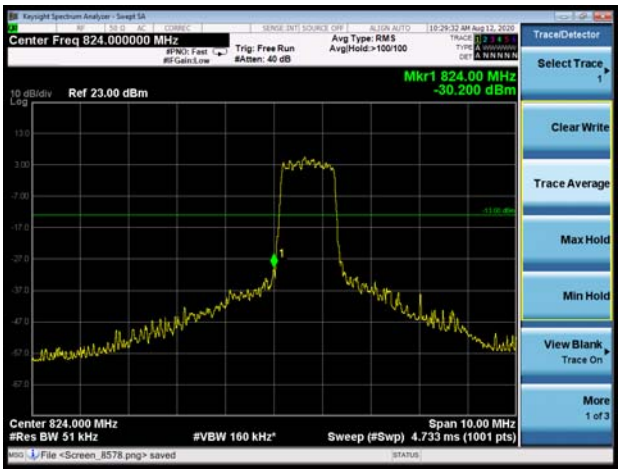
LTE Band 26 QPSK 1.4MHz CH-Low 1RB



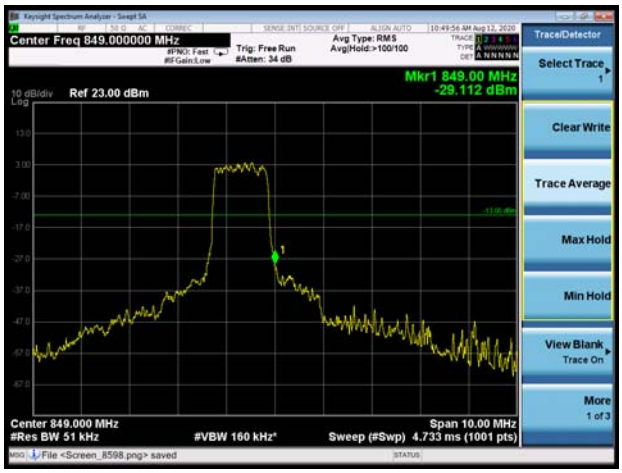
LTE Band 26 QPSK 1.4MHz CH-High 1RB



LTE Band 26 QPSK 1.4MHz CH-Low 100%RB

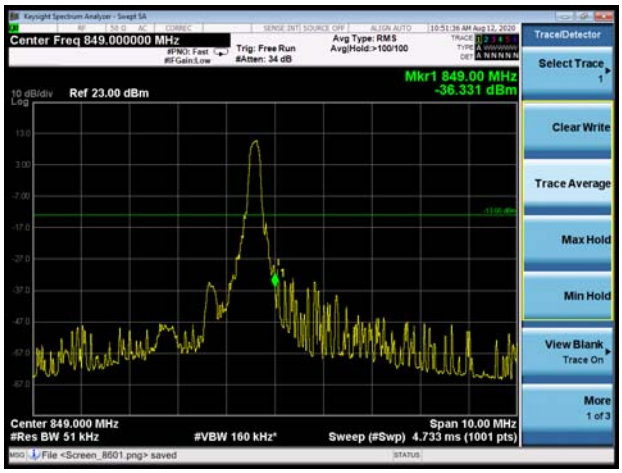


LTE Band 26 QPSK 1.4MHz CH-High 100%RB

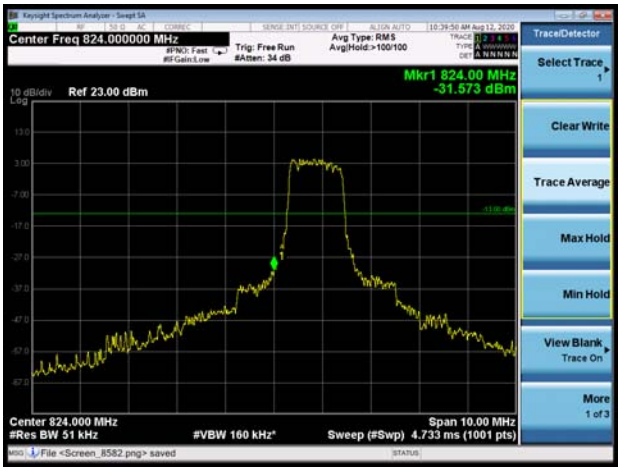


LTE Band 26 QPSK 3MHz CH-Low 1RB

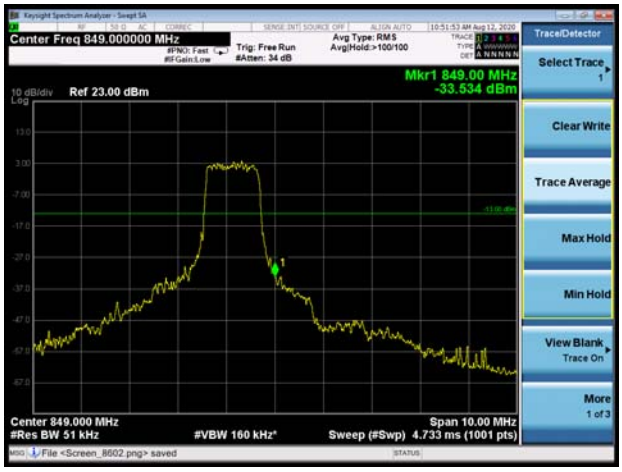
LTE Band 26 QPSK 3MHz CH-High 1RB



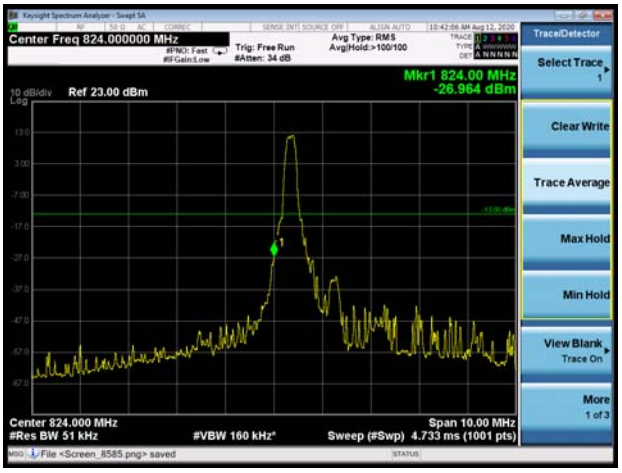
LTE Band 26 QPSK 3MHz CH-Low 100%RB



LTE Band 26 QPSK 3MHz CH-High 100%RB

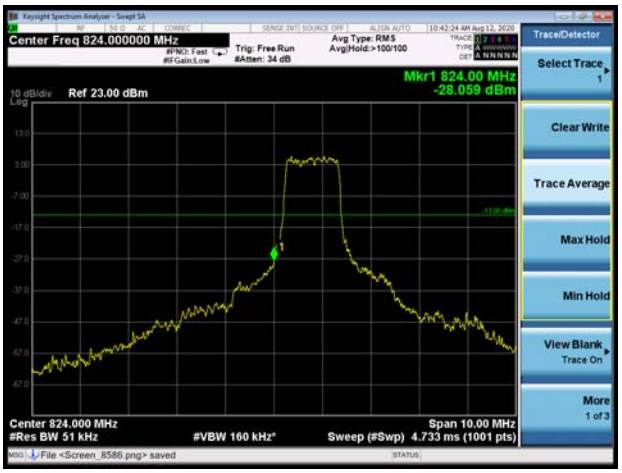


LTE Band 26 QPSK 5MHz CH-Low 1RB

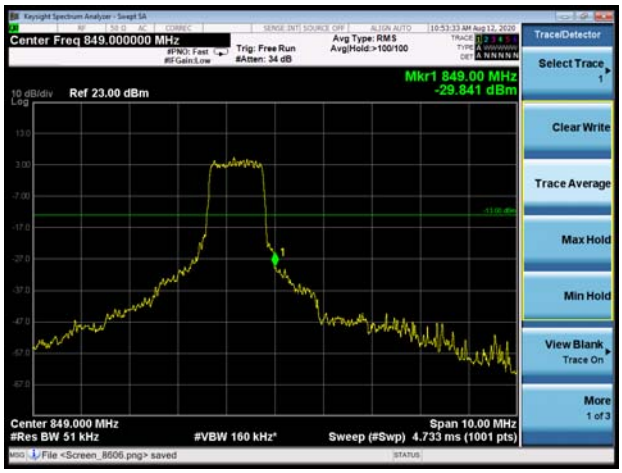


LTE Band 26 QPSK 5MHz CH-High 1RB

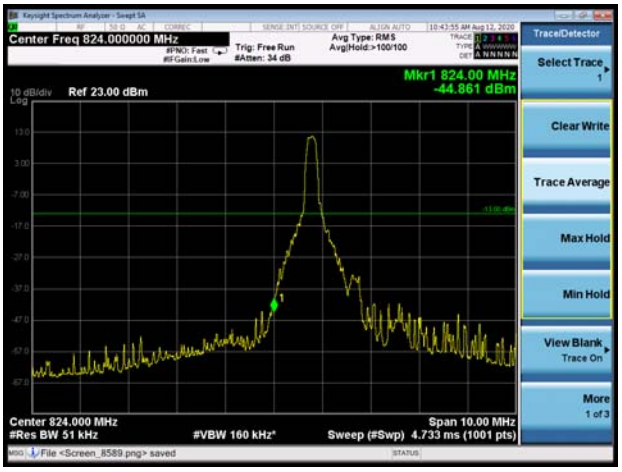
LTE Band 26 QPSK 5MHz CH-Low 100%RB



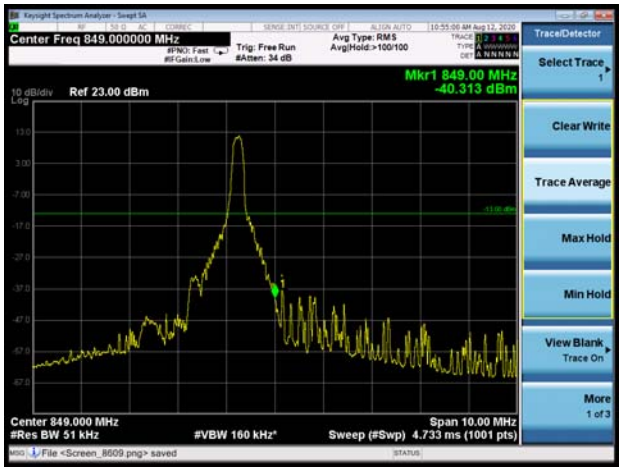
LTE Band 26 QPSK 5MHz CH-High 100%RB



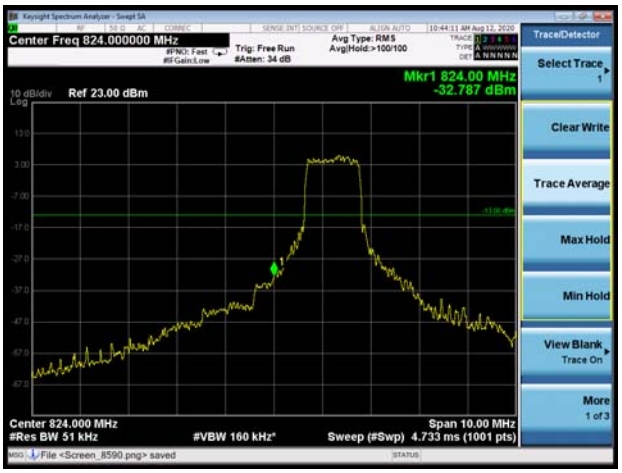
LTE Band 26 QPSK 10MHz CH-Low 1RB



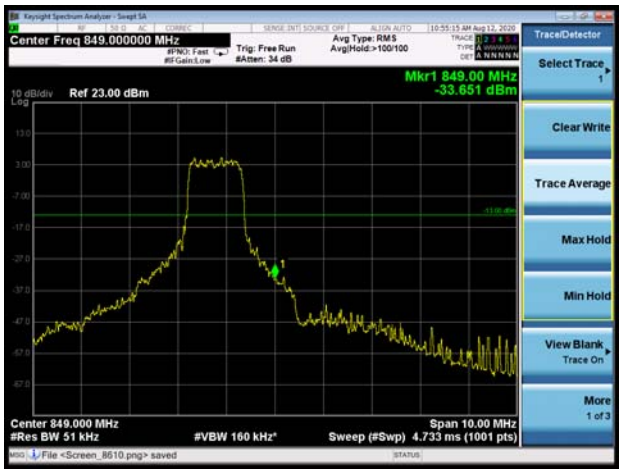
LTE Band 26 QPSK 10MHz CH-High 1RB



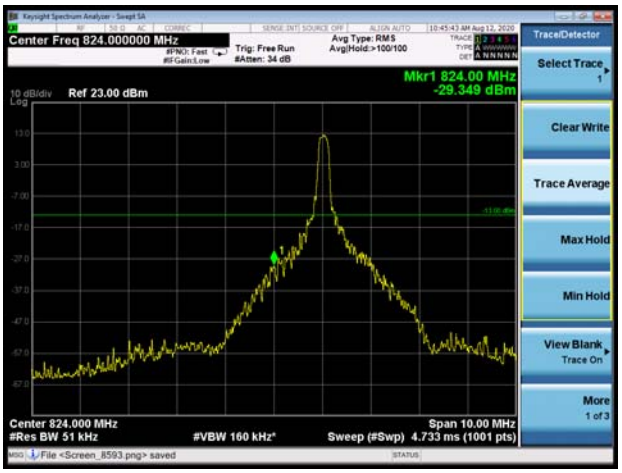
LTE Band 26 QPSK 10MHz CH-Low 100%RB



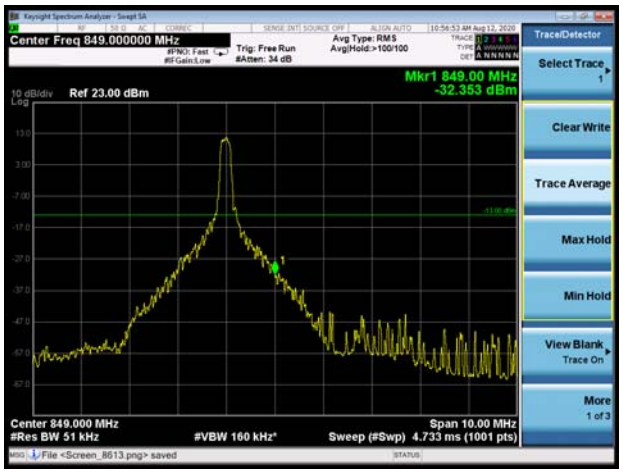
LTE Band 26 QPSK 10MHz CH-High 100%RB



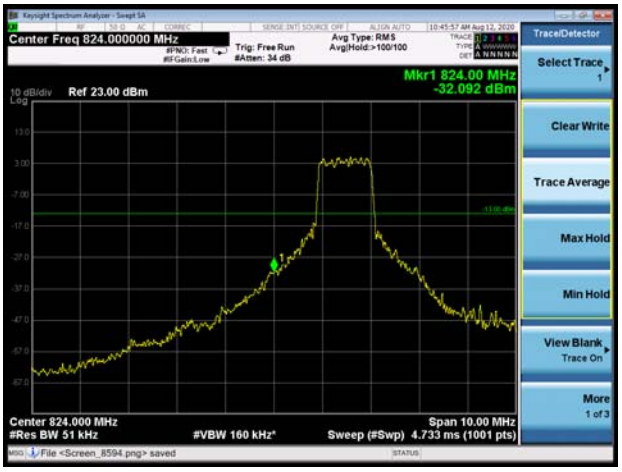
LTE Band 26 QPSK 15MHz CH-Low 1RB



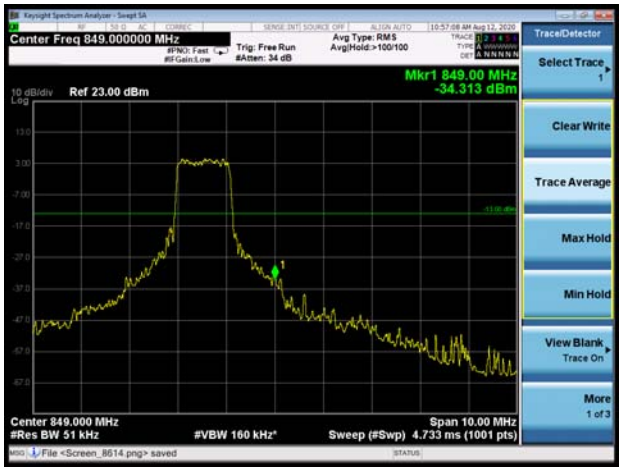
LTE Band 26 QPSK 15MHz CH-High 1RB



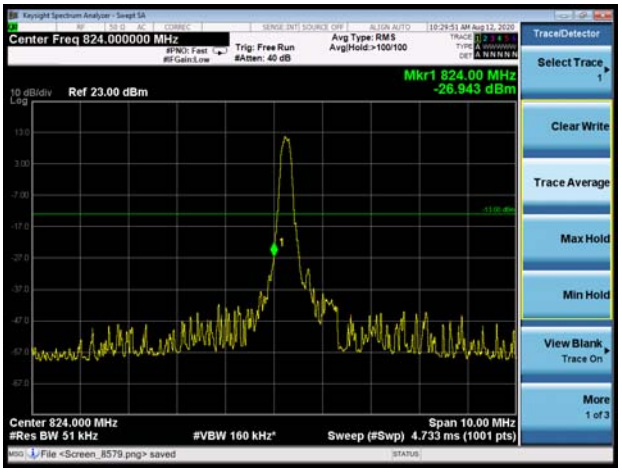
LTE Band 26 QPSK 15MHz CH-Low 100%RB



LTE Band 26 QPSK 15MHz CH-High 100%RB



LTE Band 26 16QAM 1.4MHz CH-Low 1RB



LTE Band 26 16QAM 1.4MHz CH-High 1RB