RF TEST REPORT

Applicant	Quectel Wireless Solutions Co., Ltd
FCC ID	XMR201808EC25AFX
Product	LTE Module
Brand	Quectel
Model	EC25-AFX; EC25-AFX MINIPCIE
Report No.	R1907A0408-R2
Issue Date	September 25, 2019

TA Technology (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in **FCC CFR47 Part 2 (2017)/ FCC CFR 47 Part 24E (2017)**. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Peng Tao

Performed by: Peng Tao

Kai Xu

Approved by: Kai Xu

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Summary of measurement results

No.	Test Case	Clause in FCC rules	Verdict
1	RF power output	2.1046	PASS
2	Effective Isotropic Radiated power	24.232(c)	PASS
3	Occupied Bandwidth	2.1049	PASS
4	Band Edge Compliance	2.1051 /24.238(a)	PASS
5	Peak-to-Average Power Ratio	24.232/KDB 971168 D01(5.7)	PASS
6	Frequency Stability	2.1055 / 24.235	PASS
7	Spurious Emissions at Antenna Terminals	2.1051 / 24.238(a)	PASS
8	Radiates Spurious Emission	2.1053 / 24.238(a)	PASS
Date of Testing: June 29, 2018~ July 16, 2018 and July 30, 2018~ July 31, 2018 and August 3, 2019~ August 13, 2019			
Note: PASS: The EUT complies with the essential requirements in the standard. FAIL: The EUT does not comply with the essential requirements in the standard.			

1. Test Laboratory

1.1. Notes of the test report

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

1.2. Test facility

CNAS (accreditation number: L2264)

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

FCC (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.

IC (recognition number is 8510A)

TA Technology (Shanghai) Co., Ltd. has been listed by industry Canada to perform electromagnetic emission measurement.

VCCI (recognition number is C-4595, T-2154, R-4113, G-10766)

TA Technology (Shanghai) Co., Ltd. has been listed by industry Japan to perform electromagnetic emission measurement.

A2LA (Certificate Number: 3857.01)

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

1.3. Testing Location

Company:	TA Technology (Shanghai) Co., Ltd.
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2. General Description of Equipment under Test

Client 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

General information

EUT Description			
Model	EC25-AFX; EC25-AFX MINIPCIE		
IMEI	EC25-AFX :866834040000767 EC25-AFX MINIPCIE: 866834040002375		
Hardware Version	R1.0		
Software Version	EC25AFXGAR07A01M1G		
Power Supply	External Power Supply		
Antenna Type	The EUT don't have standard Antenna, The Antenna used for tes ting in this report is the after-market accessory (Dipole Antenna)		
Antenna Gain	4dBi		
Test Mode(s)	WCDMA Band II; LTE Band 2;		
Test Modulation	(WCDMA)QPSK; (LTE)QPSK,16QAM		
HSDPA UE Category	24		
HSUPA UE Category	6		
LTE Category	4		
Maximum E.I.R.P	WCDMA Band II:	25.49dBm	
	LTE Band 2:	25.75dBm	
Rated Power Supply Voltage	3.8V		
Extreme Voltage	Minimum: 3.3V Maximum: 4.3V		
Extreme Temperature	Lowest: -40°C Highest: +85°C		
Operating Frequency Range(s)	Band	Tx (MHz)	Rx (MHz)
	WCDMA Band II	1850 ~ 1910	1930 ~ 1990
	LTE Band 2	1850 ~ 1910	1930 ~ 1990
Note: The information of the EUT is declared by the manufacturer.			

Accessory equipment	
Evaluation Board	RF Cable
RS232-to-USB Cable	Antenna: Dipole Antenna
Headset	DC 5V Adaptor

EC25-AFX and EC25-AFX MINIPCIE are all LTE modules. They support the same frequency bands, use the same chipset and share the same software & hardware design. The main difference is on the carrier board.
EC25-AFX MINIPCIE makes up of EC25-AFX module and PCIe transferred board.
The transferred board switches EC25-AFX module to follow PCI Express Mini Card 1.2 standard connector protocol. No any other internal changes in EC25-AFX module.
Two models are identical in interior structure and components, and just connector interface is different for the marketing requirement.

3. Applied Standards

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

FCC CFR47 Part 2 (2017)

FCC CFR 47 Part 24E (2017)

ANSI/TIA-603-E (2016)

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 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 WCDMA/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**
	WCDMA Band II
RF power output	RMC HSDPA/HSUPA DC-HSDPA
Effective Isotropic Radiated power	RMC
Occupied Bandwidth	RMC
Band Edge Compliance	RMC
Peak-to-Average Power Ratio	RMC
Frequency Stability	RMC
Spurious Emissions at Antenna Terminals	RMC
Radiates Spurious Emission	RMC

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	O	O	O	O	O	O	O	O	O	O	O	O	O	O
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
Conducted Spurious Emissions	O	O	O	O	O	O	O	-	O	O	O	O	O	O
Radiates Spurious Emission	-	-	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

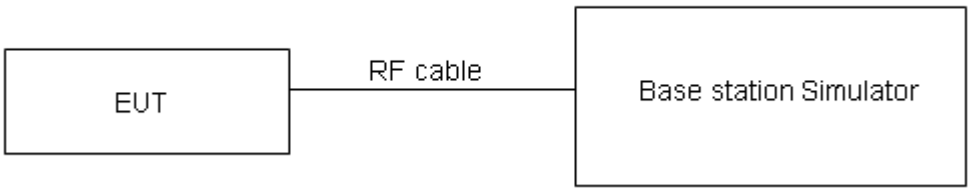
Ambient condition

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

WCDMA Band II		Conducted Power(dBm)		
		Channel 9262	Channel 9400	Channel 9538
		1852.4(MHz)	1880(MHz)	1907.6(MHz)
RMC		23.17	23.01	23.02
HSDPA	Sub - Test 1	22.13	22.03	21.96
	Sub - Test 2	22.12	22.01	21.94
	Sub - Test 3	21.61	21.46	21.43
	Sub - Test 4	21.60	21.57	21.46
HSUPA	Sub - Test 1	22.19	22.05	21.98
	Sub - Test 2	21.58	21.40	21.40
	Sub - Test 3	22.05	21.88	21.89
	Sub - Test 4	21.51	21.37	21.37
	Sub - Test 5	22.12	22.03	21.95
DC-HSDPA	Sub - Test 1	22.51	22.37	22.36
	Sub - Test 2	22.50	22.36	22.35
	Sub - Test 3	22.08	21.85	21.86
	Sub - Test 4	22.07	21.84	21.85

LTE Band 2				Conducted Power(dBm)		
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				18607/1850.7	18900/1880	19193/1909.3
1.4MHz	QPSK	1	0	23.37	23.41	22.99
		1	2	23.41	23.79	22.99
		1	5	23.33	23.26	22.91
		3	0	23.35	23.29	23.12
		3	2	23.18	23.09	23.21
		3	3	23.37	23.26	22.90
		6	0	22.23	22.49	22.07
	16QAM	1	0	22.36	22.91	22.68
		1	2	22.41	22.94	23.00
		1	5	22.20	22.95	23.02
		3	0	22.33	22.19	22.16
		3	2	22.42	22.16	22.07
		3	3	22.31	22.29	22.06
		6	0	21.36	21.29	21.30
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				18615/1851.5	18900/1880	19185/1908.5
3MHz	QPSK	1	0	23.39	23.45	23.02
		1	7	23.44	23.84	23.03
		1	14	23.36	23.31	22.95
		8	0	22.45	22.41	22.25
		8	4	22.30	22.19	22.33
		8	7	22.47	22.37	22.00
		15	0	22.26	22.53	22.10
	16QAM	1	0	22.39	22.93	22.71
		1	7	22.44	22.99	23.04
		1	14	22.22	22.99	23.05
		8	0	21.44	21.32	21.28
		8	4	21.53	21.29	21.19
		8	7	21.41	21.41	21.19
		15	0	21.39	21.33	21.33
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				18625/1852.5	18900/1880	19175/1907.5
5MHz	QPSK	1	0	23.36	23.43	22.98
		1	13	23.42	23.80	23.00
		1	24	23.33	23.26	22.91
		12	0	22.42	22.36	22.21

		12	6	22.28	22.15	22.28
		12	13	22.45	22.35	21.96
		25	0	22.24	22.52	22.08
	16QAM	1	0	22.36	22.89	22.68
		1	13	22.41	22.97	23.01
		1	24	22.19	22.97	23.01
		12	0	21.42	21.28	21.25
		12	6	21.50	21.24	21.15
		12	13	21.38	21.36	21.15
		25	0	21.37	21.29	21.28
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				18650/1855	18900/1880	19150/1905
10MHz	QPSK	1	0	23.38	23.44	23.01
		1	25	23.45	23.85	23.04
		1	49	23.35	23.30	22.94
		25	0	22.45	22.41	22.25
		25	13	22.31	22.20	22.32
		25	25	22.47	22.39	22.01
		50	0	22.32	22.54	22.12
	16QAM	1	0	22.38	22.92	22.70
		1	25	22.44	23.01	23.04
		1	49	22.22	22.99	23.04
		25	0	21.45	21.33	21.29
		25	13	21.52	21.28	21.18
		25	25	21.41	21.41	21.19
		50	0	21.40	21.34	21.32
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				18675/1857.5	18900/1880	19125/1902.5
15MHz	QPSK	1	0	23.37	23.40	22.99
		1	38	23.43	23.84	23.01
		1	74	23.32	23.25	22.90
		36	0	22.43	22.37	22.22
		36	18	22.28	22.15	22.28
		36	39	22.44	22.36	21.97
		75	0	22.30	22.50	22.07
	16QAM	1	0	22.33	22.90	22.68
		1	38	22.42	22.98	23.02
		1	74	22.19	22.95	23.01
		36	0	21.42	21.31	21.26
		36	18	21.49	21.23	21.14

		36	39	21.39	21.37	21.16
		75	0	21.37	21.29	21.28
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				18700/1860	18900/1880	19100/1900
20MHz	QPSK	1	0	23.34	23.36	22.96
		1	50	23.42	23.80	22.99
		1	99	23.30	23.24	22.87
		50	0	22.40	22.32	22.18
		50	25	22.26	22.11	22.25
		50	50	22.41	22.31	21.93
		100	0	22.27	22.45	22.03
	16QAM	1	0	22.31	22.86	22.63
		1	50	22.38	22.96	22.98
		1	99	22.17	22.92	22.99
		50	0	21.39	21.27	21.23
		50	25	21.46	21.21	21.11
		50	50	21.36	21.32	21.12
		100	0	21.35	21.25	21.25

5.2. Effective Isotropic Radiated Power

Ambient condition

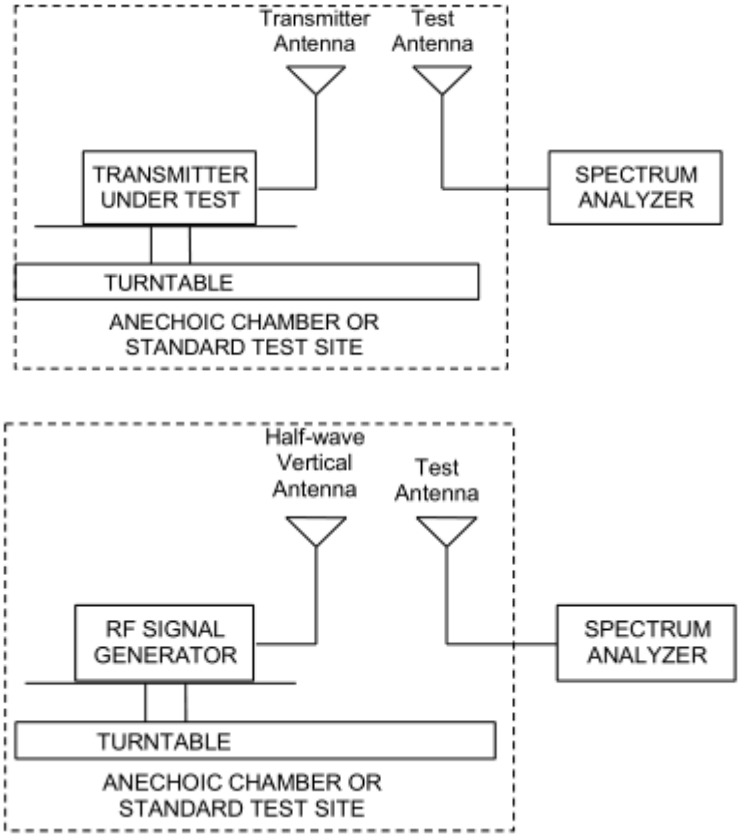
Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Methods of Measurement

The testing follows FCC KDB 971168 v03r01 Section 5.8 and ANSI/TIA-603-E (2016).

a) Connect the equipment as illustrated. Mount the equipment with the manufacturer specified antenna in a vertical orientation on a manufacturer specified mounting surface located on a non-conducting rotating platform of a RF anechoic chamber (preferred) or a standard radiation site.
b) Key the transmitter, then rotate the EUT 360° azimuthally and record spectrum analyzer power level (LVL) measurements at angular increments that are sufficiently small to permit resolution of all peaks. If a standard radiation test site is used, raise and lower the test antenna to obtain a maximum reading at each angular increment. (Note: several batteries may be needed to offset the effect of battery voltage droop, which should not exceed 5% of the manufactured specified battery voltage during transmission).
c) Replace the transmitter under test with a vertically polarized half-wave dipole (or an antenna whose gain is known relative to an ideal half-wave dipole). The center of the antenna should be at the same location as the center of the antenna under test.
d) Connect the antenna to a signal generator with a known output power and record the path loss (in dB) as LOSS. If a standard radiation test site is used, raise and lower the test antenna to obtain a maximum reading.LOSS = Generator Output Power (dBm) – Analyzer reading (dBm)
e) Determine the effective radiated output power at each angular position from the readings in steps b) and d) using the following equation:ERP (dBm) = LVL (dBm) + LOSS (dB)
f) The maximum ERP is the maximum value determined in the preceding step.
g) When calculating ERP, in addition to knowing the antenna radiation and matching characteristics, it is necessary to know the loss values of all elements (e.g.transmission line attenuation, mismatches, filters, combiners) interposed between the point where transmitter output power is measured, and the point where power is applied to the antenna. ERP can then be calculated as follows:
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.)
The RB allocation refers to section 5.1, using the maximum output power configuration.

Test setup



Limits

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= 1.19 dB

Test Results:

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

Mode	Channel	Frequency (MHz)	Polarization	EIRP (dBm)	Limit (dBm)	Conclusion
WCDMA Band II	Low	1852.4	Horizontal	23.76	33	Pass
	Mid	1880	Horizontal	24.38	33	Pass
	High	1907.6	Horizontal	25.49	33	Pass

LTE Band 2						
bandwidth	**Channel**	**Frequency (MHz)**	**Polarization**	**EIRP (dBm)**	**Limit (dBm)**	**Conclusion**
1.4 MHz (QPSK)	Low	1850.7	Horizontal	25.50	33	Pass
	Mid	1880	Horizontal	25.37	33	Pass
	High	1909.3	Horizontal	25.75	33	Pass
3 MHz (QPSK)	Low	1851.5	Horizontal	24.44	33	Pass
	Mid	1880	Horizontal	24.42	33	Pass
	High	1908.5	Horizontal	24.55	33	Pass
5 MHz (QPSK)	Low	1852.5	Horizontal	24.23	33	Pass
	Mid	1880	Horizontal	24.33	33	Pass
	High	1907.5	Horizontal	24.40	33	Pass
10 MHz (QPSK)	Low	1855	Horizontal	25.48	33	Pass
	Mid	1880	Horizontal	25.52	33	Pass
	High	1905	Horizontal	25.66	33	Pass
15 MHz (QPSK)	Low	1857.5	Horizontal	25.32	33	Pass
	Mid	1880	Horizontal	25.24	33	Pass
	High	1902.5	Horizontal	25.68	33	Pass
20 MHz (QPSK)	Low	1860	Horizontal	24.85	33	Pass
	Mid	1880	Horizontal	24.38	33	Pass
	High	1900	Horizontal	24.21	33	Pass
1.4 MHz (16QAM)	Low	1850.7	Horizontal	25.07	33	Pass
	Mid	1880	Horizontal	24.74	33	Pass
	High	1909.3	Horizontal	25.40	33	Pass
3 MHz (16QAM)	Low	1851.5	Horizontal	24.20	33	Pass
	Mid	1880	Horizontal	24.01	33	Pass
	High	1908.5	Horizontal	24.39	33	Pass
5 MHz (16QAM)	Low	1852.5	Horizontal	23.65	33	Pass
	Mid	1880	Horizontal	23.96	33	Pass
	High	1907.5	Horizontal	23.99	33	Pass
10 MHz (16QAM)	Low	1855	Horizontal	25.24	33	Pass
	Mid	1880	Horizontal	25.10	33	Pass
	High	1905	Horizontal	25.43	33	Pass
15 MHz (16QAM)	Low	1857.5	Horizontal	24.94	33	Pass
	Mid	1880	Horizontal	25.10	33	Pass
	High	1902.5	Horizontal	25.44	33	Pass
20 MHz (16QAM)	Low	1860	Horizontal	24.56	33	Pass
	Mid	1880	Horizontal	23.86	33	Pass
	High	1900	Horizontal	23.77	33	Pass

5.3. Occupied Bandwidth

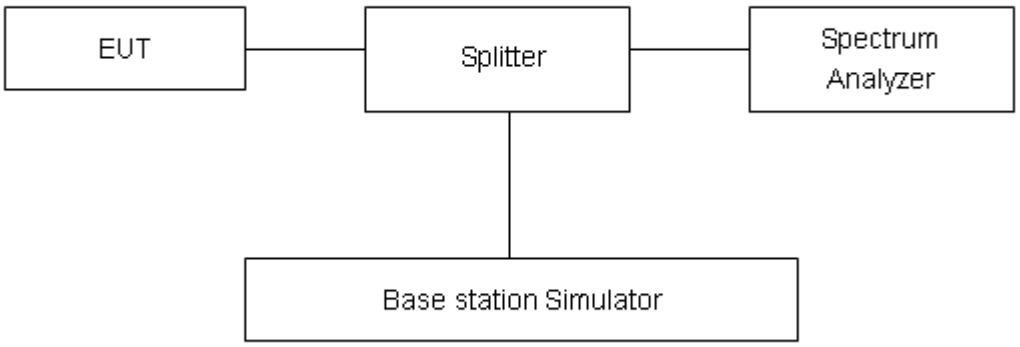
Ambient condition

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 51kHz, VBW is set to 160kHz for WCDMA Band II,
RBW is set to 51kHz, VBW is set to 160kHz for LTE Band 2 (1.4MHz),
RBW is set to 100kHz,VBW is set to 300kHz for LTE Band 2 (3MHz/5MHz),
RBW is set to 300kHz,VBW is set to 1MHz for LTE Band 2 (10MHz/15MHz/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= 624Hz.

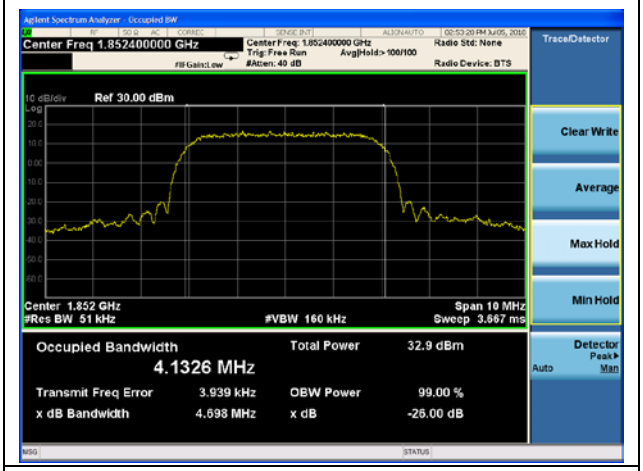
Test Result

Mode	Channel	Frequency (MHz)	99% Power Bandwidth (MHz)	-26dBc Bandwidth(MHz)
WCDMA Band II (RMC)	9262	1852.4	4.1326	4.698
	9400	1880	4.1256	4.703
	9538	1907.6	4.1260	4.695

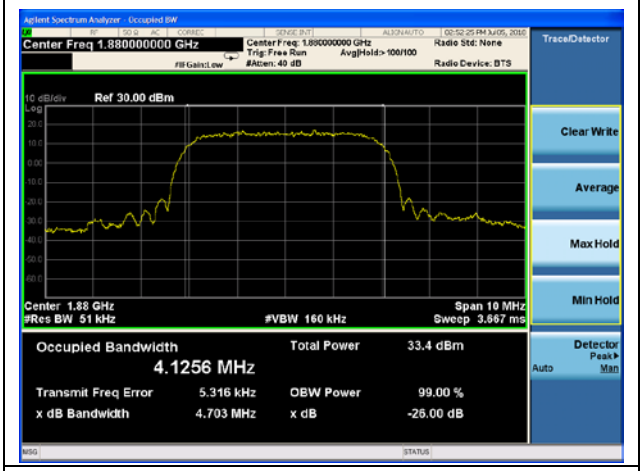
LTE Band 2					
Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	99% Power Bandwidth(MHz)	-26dBc Bandwidth(MHz)
QPSK	1.4	18607	1850.7	1.1283	1.363
		18900	1880.0	1.1245	1.347
		19193	1909.3	1.1360	1.344
	3	18615	1851.5	2.7521	3.071
		18900	1880	2.7423	3.074
		19185	1908.5	2.7429	3.071
	5	18625	1852.5	4.5158	5.049
		18900	1880	4.5340	5.036
		19175	1907.5	4.5091	5.036
	10	18650	1855	8.9999	10.100
		18900	1880	9.0377	10.180
		19150	1905	9.0453	10.070
	15	18675	1857.5	13.4130	14.680
		18900	1880	13.4790	14.810
		19125	1902.5	13.4540	14.800
	20	18700	1860	17.8360	19.250
		18900	1880	17.8820	19.240
		19100	1900	17.8620	19.410
16QAM	1.4	18607	1850.7	1.1258	1.330
		18900	1880.0	1.1317	1.348
		19193	1909.3	1.1225	1.362
	3	18615	1851.5	2.7358	3.059
		18900	1880	2.7655	3.083

		19185	1908.5	2.7377	3.067
	5	18625	1852.5	4.5387	5.046
		18900	1880	4.5117	5.028
		19175	1907.5	4.5298	5.057
	10	18650	1855	9.0229	10.090
		18900	1880	9.0420	10.020
		19150	1905	9.0252	10.090
	15	18675	1857.5	13.4540	14.740
		18900	1880	13.4620	14.730
		19125	1902.5	13.4640	14.800
	20	18700	1860	17.8810	19.380
		18900	1880	17.9150	19.350
		19100	1900	17.8400	19.300

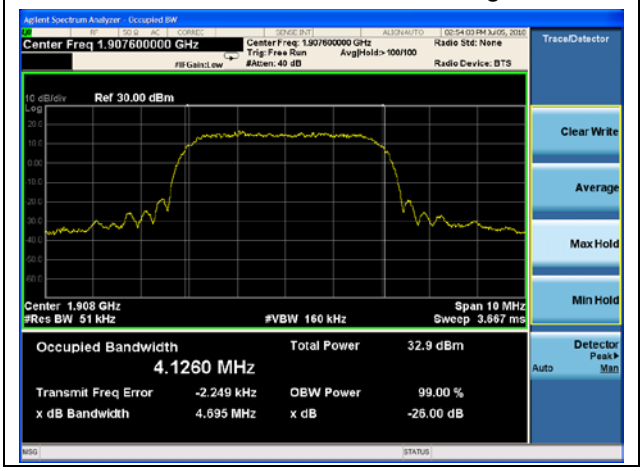
WCDMA Band II RMC CH-LOW



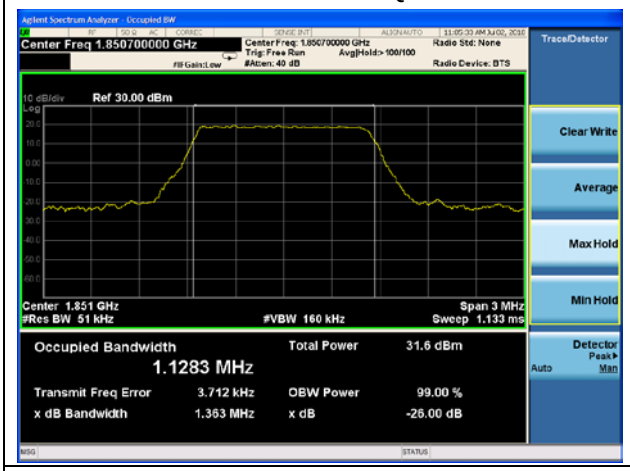
WCDMA Band II RMC CH-Middle



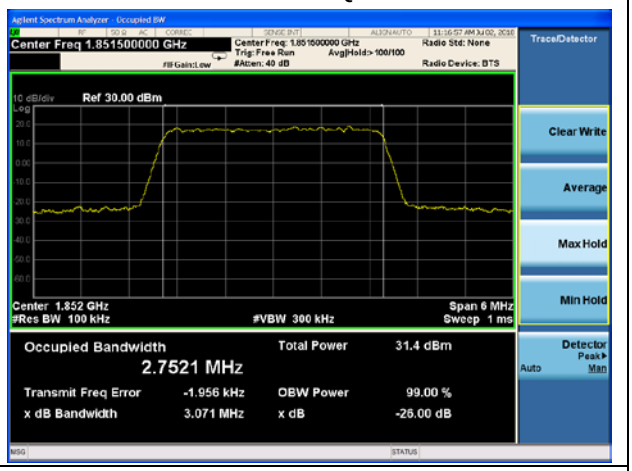
WCDMA Band II RMC CH-High



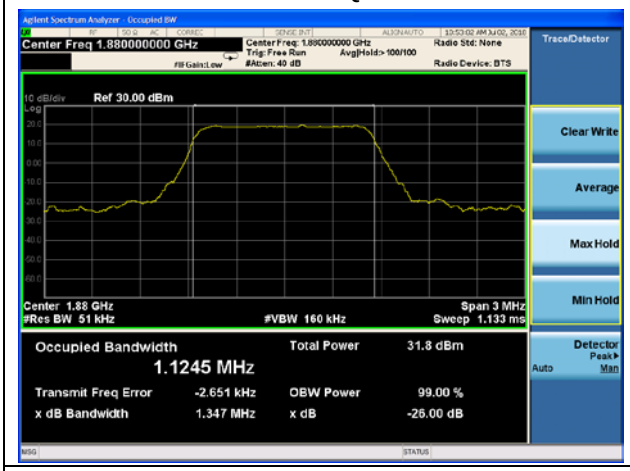
LTE Band 2 1.4MHz QPSK CH-Low



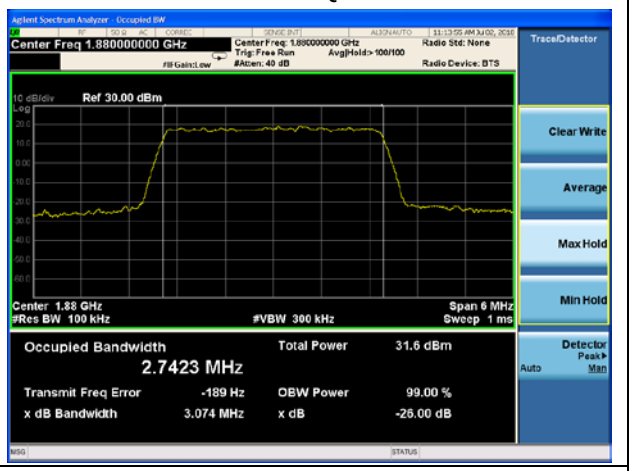
LTE Band 2 3MHz QPSK CH-Low



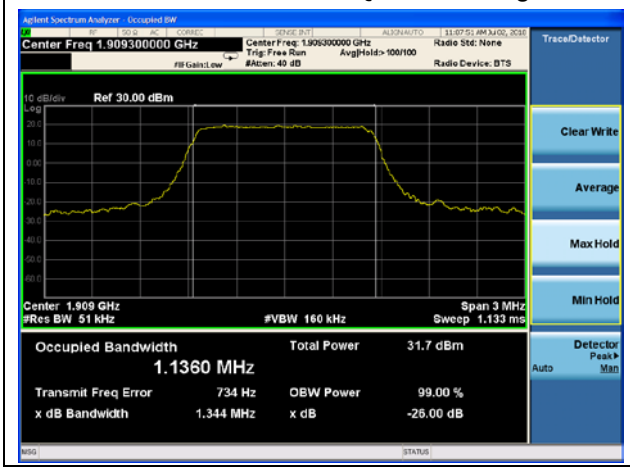
LTE Band 2 1.4MHz QPSK CH-Middle



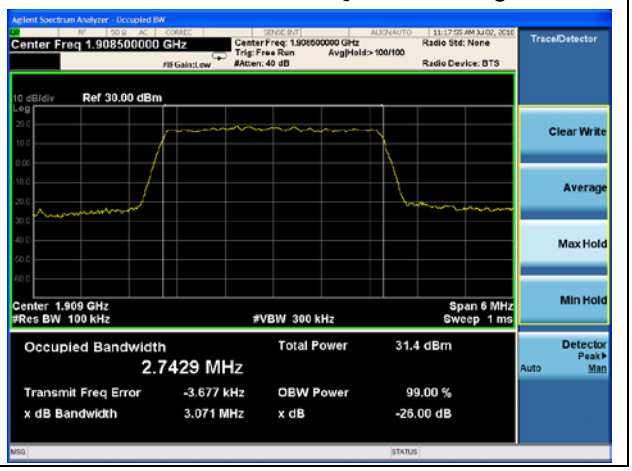
LTE Band 2 3MHz QPSK CH-Middle



LTE Band 2 1.4MHz QPSK CH-High

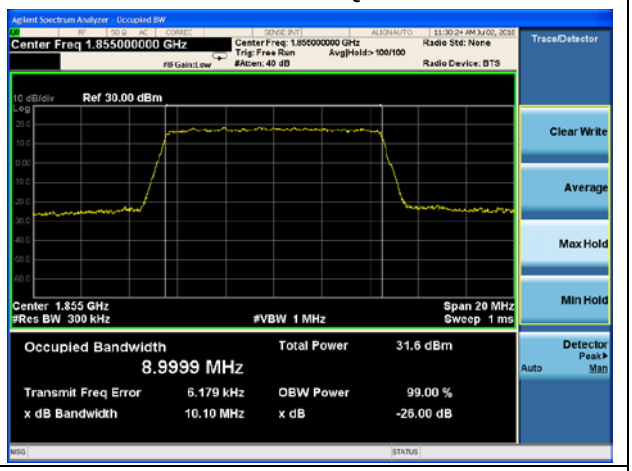


LTE Band 2 3MHz QPSK CH-High

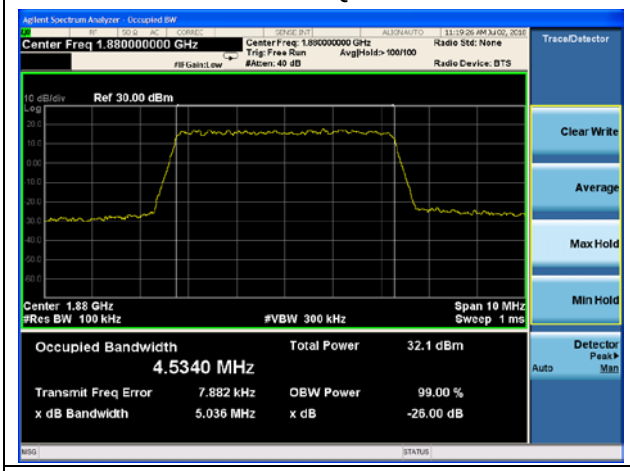


LTE Band 2 5MHz QPSK CH-Low

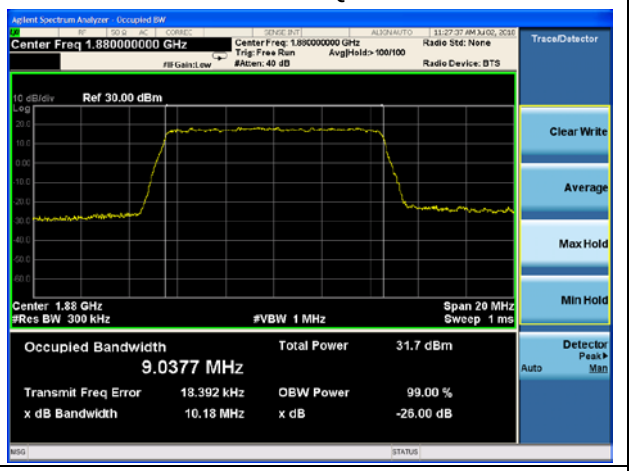
LTE Band 2 10MHz QPSK CH-Low



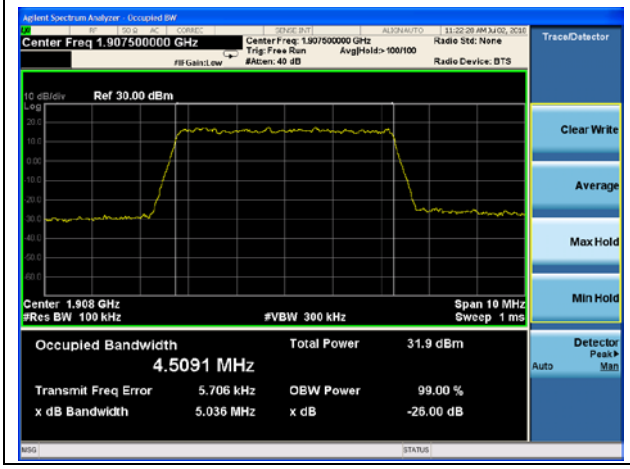
LTE Band 2 5MHz QPSK CH-Middle



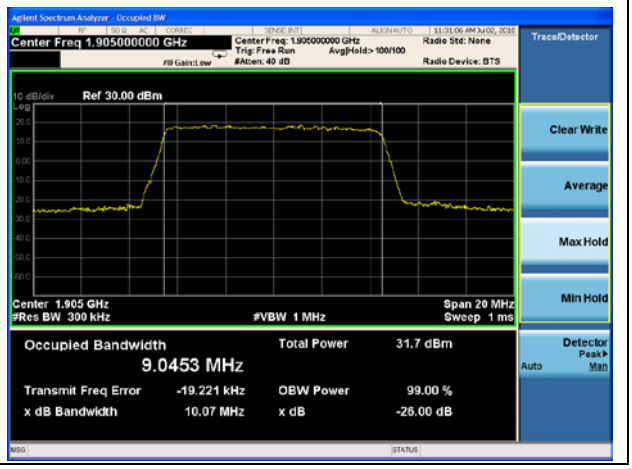
LTE Band 2 10MHz QPSK CH-Middle



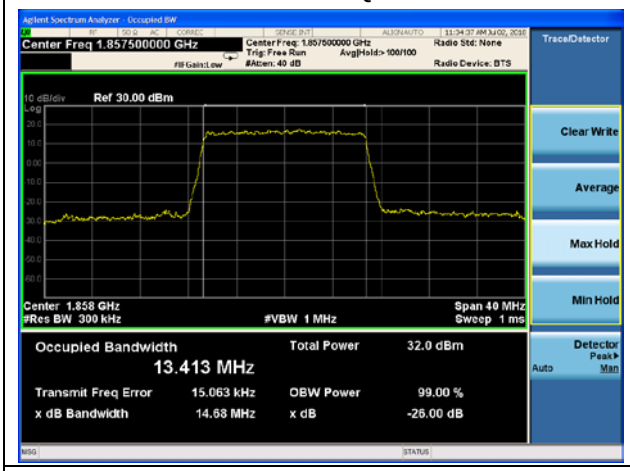
LTE Band 2 5MHz QPSK CH-High



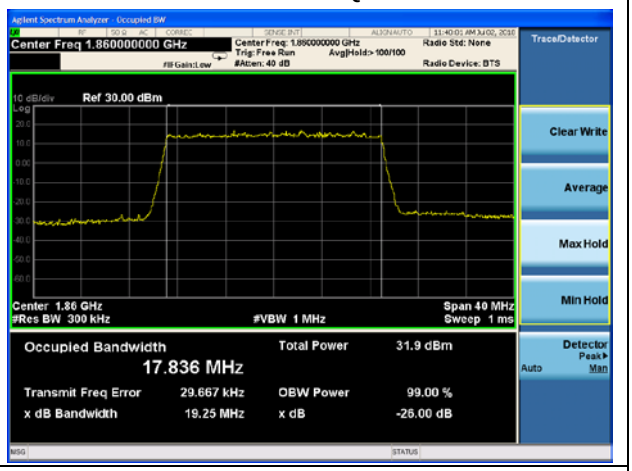
LTE Band 2 10MHz QPSK CH-High



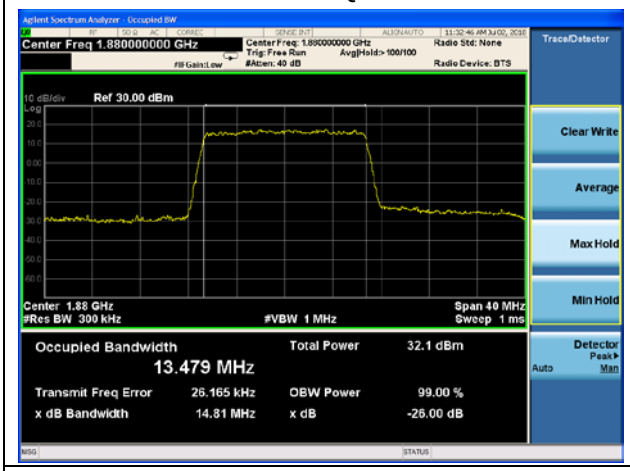
LTE Band 2 15MHz QPSK CH-Low



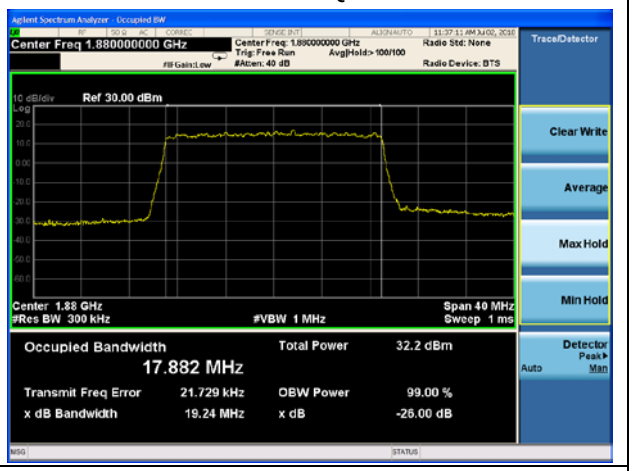
LTE Band 2 20MHz QPSK CH-Low



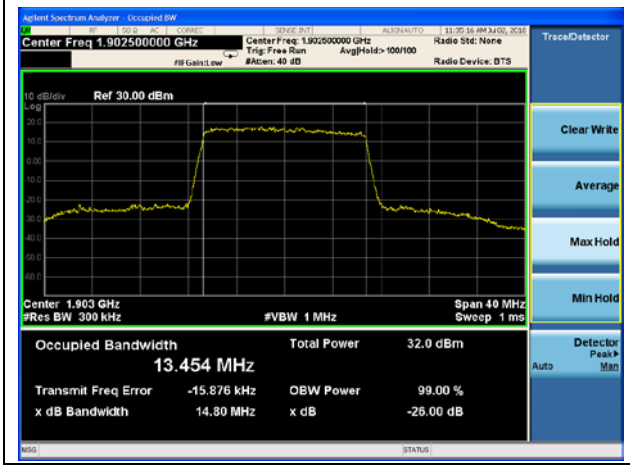
LTE Band 2 15MHz QPSK CH-Middle



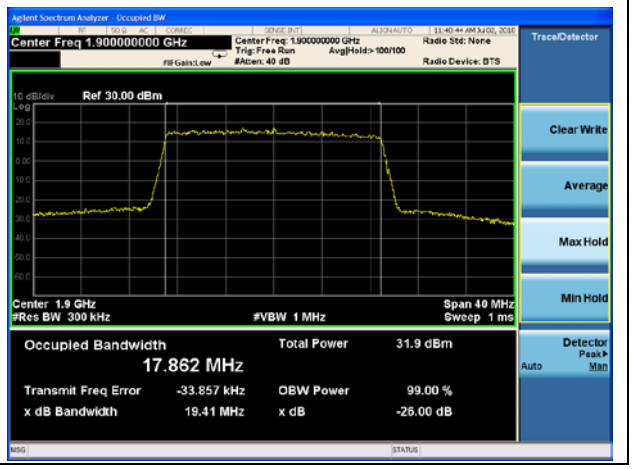
LTE Band 2 20MHz QPSK CH-Middle



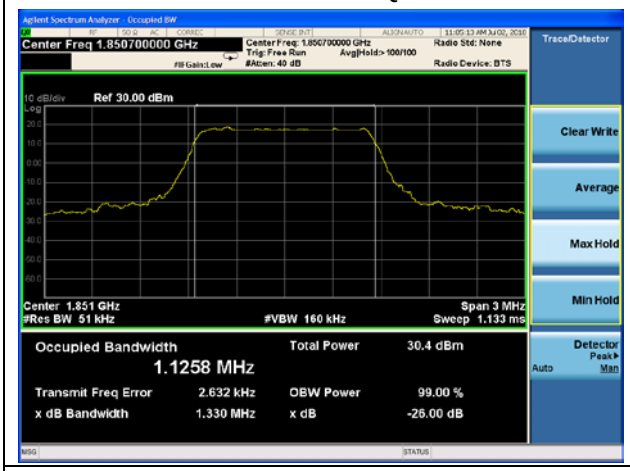
LTE Band 2 15MHz QPSK CH-High



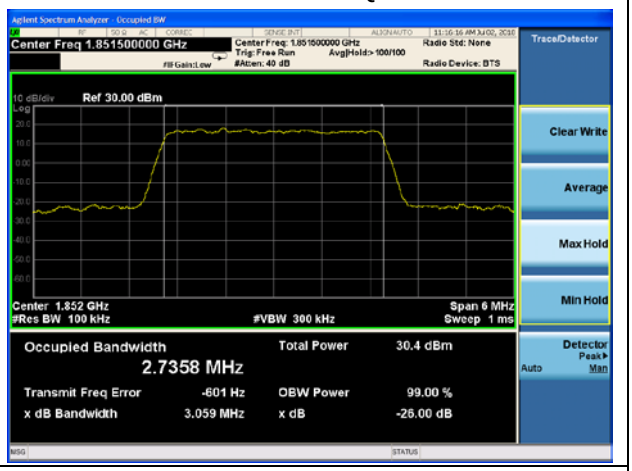
LTE Band 2 20MHz QPSK CH-High



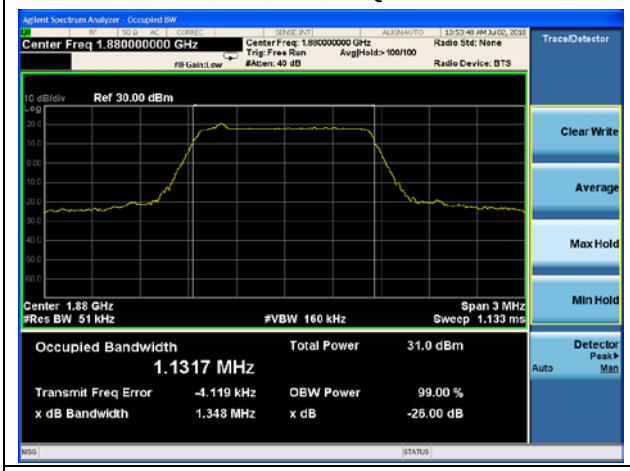
LTE Band 2 1.4MHz 16QAM CH-Low



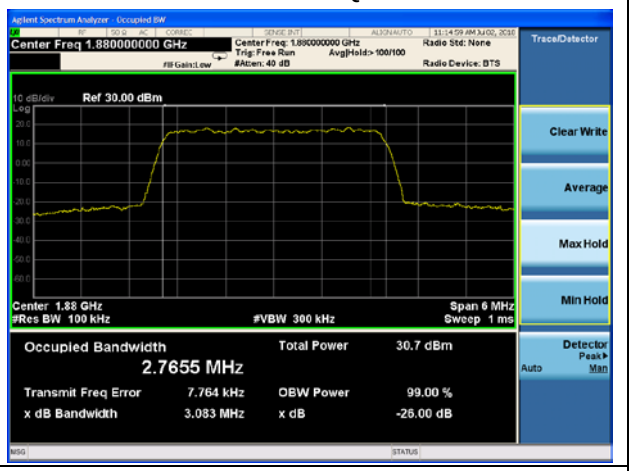
LTE Band 2 3MHz 16QAM CH-Low



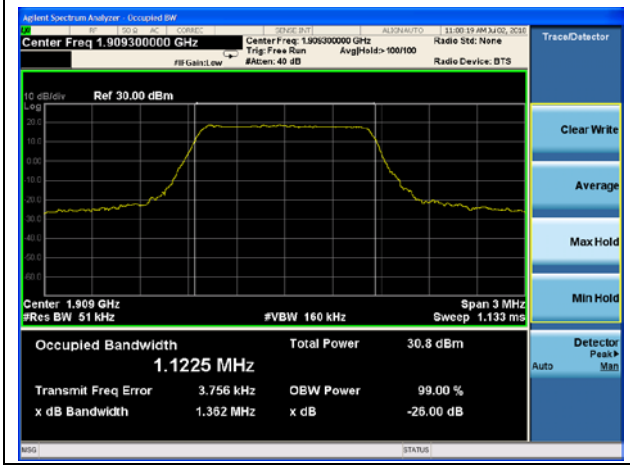
LTE Band 2 1.4MHz 16QAM CH-Middle



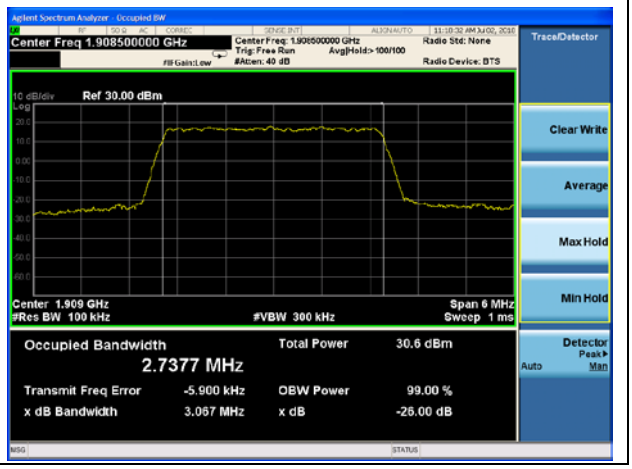
LTE Band 2 3MHz 16QAM CH-Middle



LTE Band 2 1.4MHz 16QAM CH-High

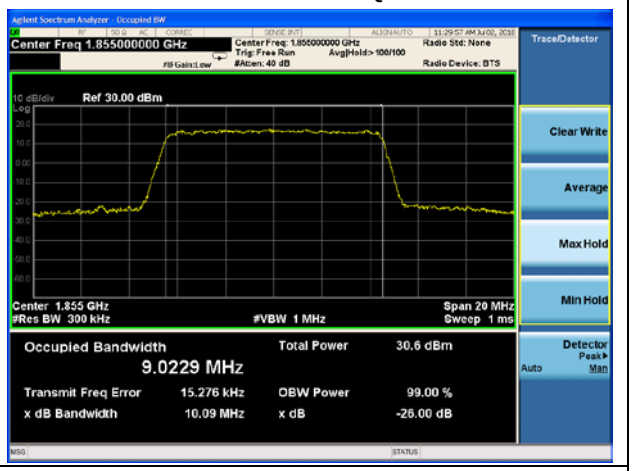


LTE Band 2 3MHz 16QAM CH-High

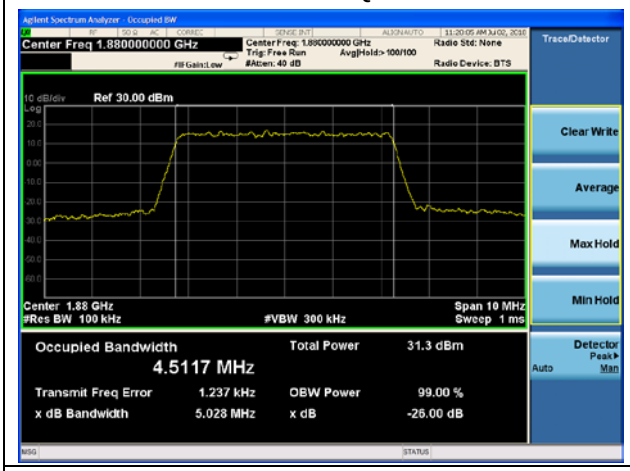


LTE Band 2 5MHz 16QAM CH-Low

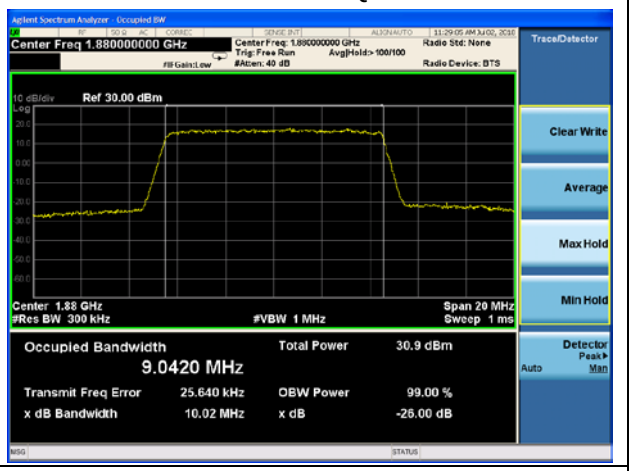
LTE Band 2 10MHz 16QAM CH-Low



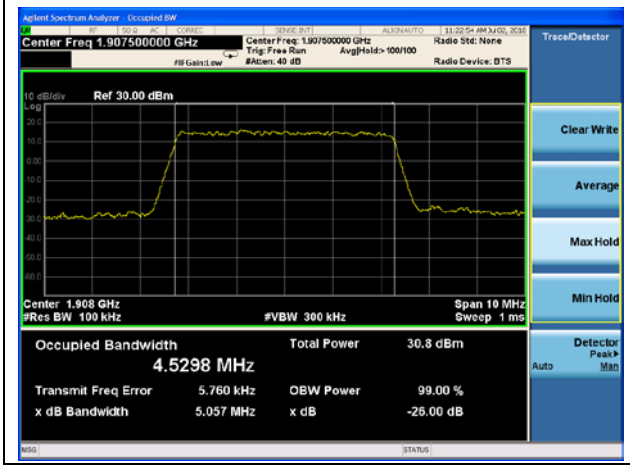
LTE Band 2 5MHz 16QAM CH-Middle



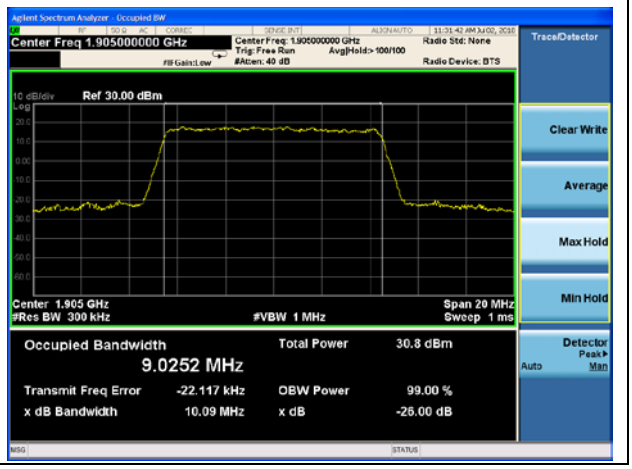
LTE Band 2 10MHz 16QAM CH-Middle



LTE Band 2 5MHz 16QAM CH-High

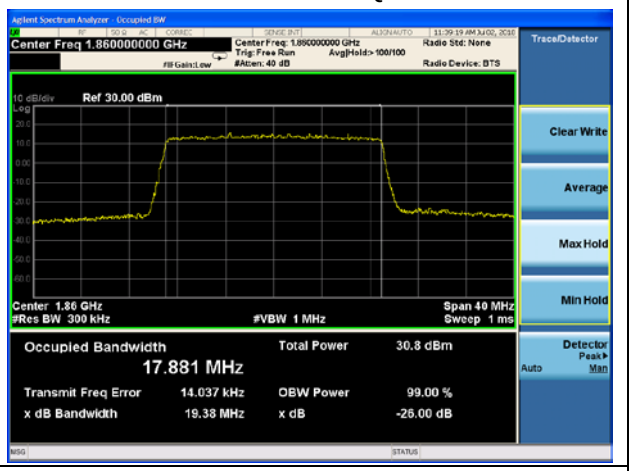


LTE Band 2 10MHz 16QAM CH-High

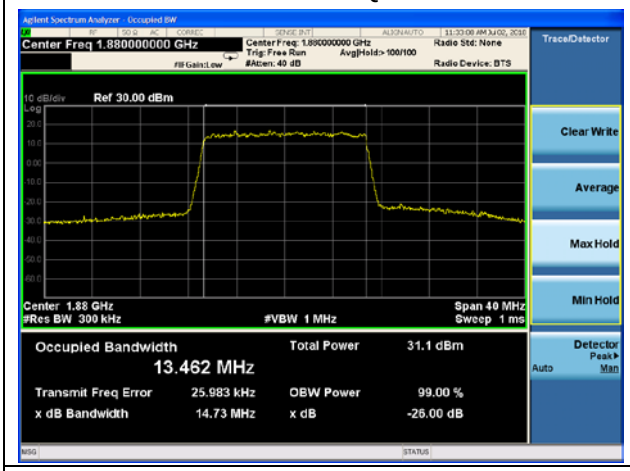


LTE Band 2 15MHz 16QAM CH-Low

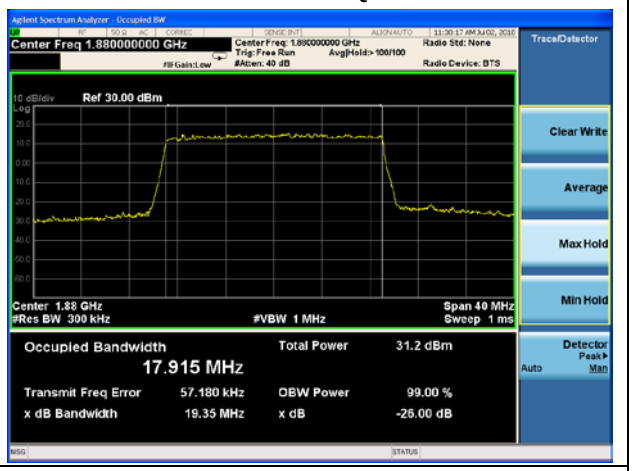
LTE Band 2 20MHz 16QAM CH-Low



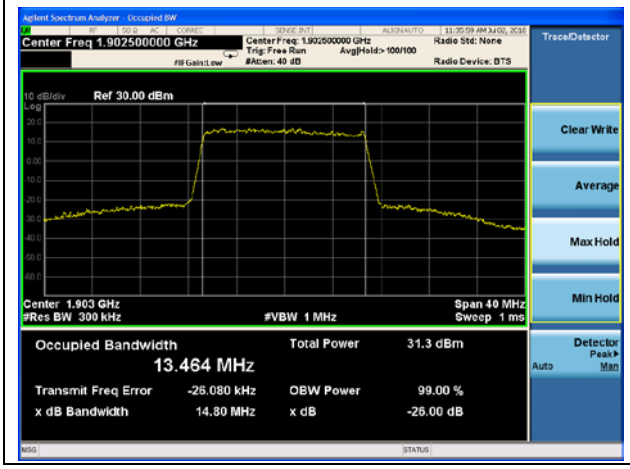
LTE Band 2 15MHz 16QAM CH-Middle



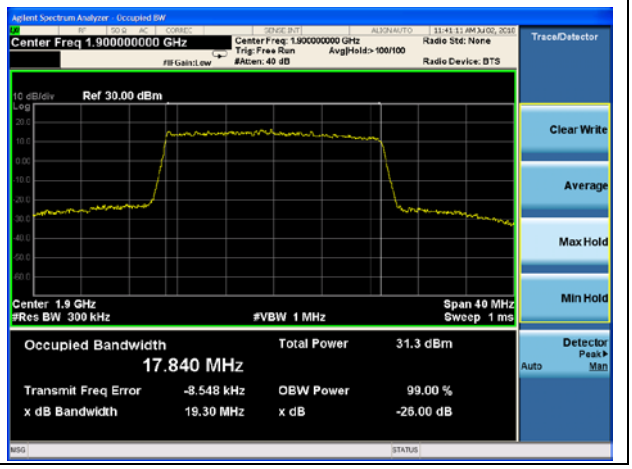
LTE Band 2 20MHz 16QAM CH-Middle



LTE Band 2 15MHz 16QAM CH-High



LTE Band 2 20MHz 16QAM CH-High



5.4. Band Edge Compliance

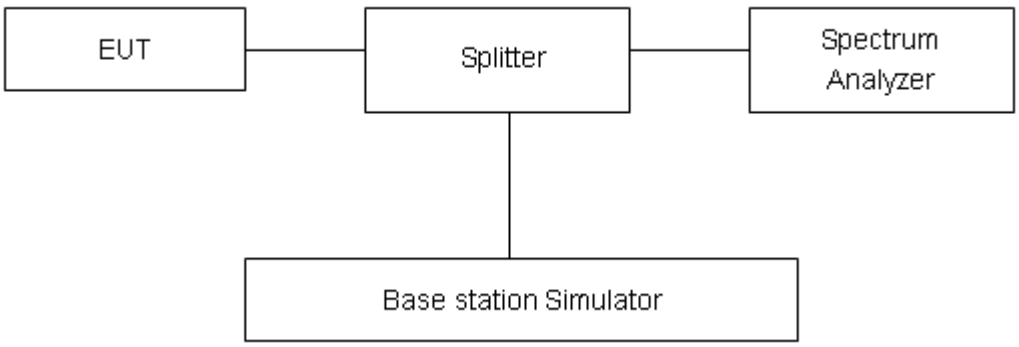
Ambient condition

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 and
RBW is set to 51kHz, VBW is set to 160kHz for WCDMA Band II,
RBW is set to 15kHz, VBW is set to 51kHz for LTE Band 2 (1.4MHz),
RBW is set to 30kHz,VBW is set to 100kHz for LTE Band 2 (3MHz),
RBW is set to 51kHz,VBW is set to 160kHz 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 510kHz 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

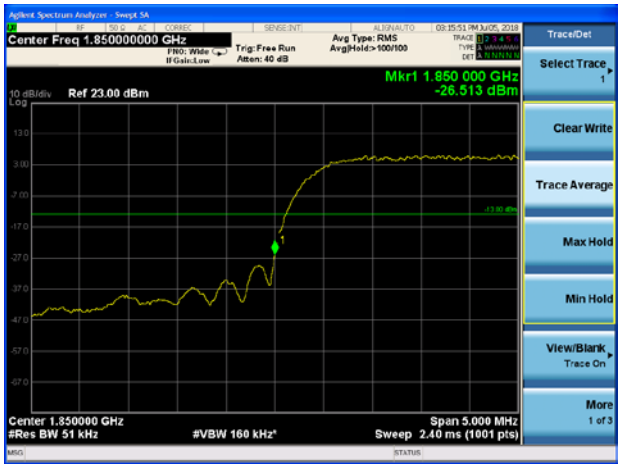
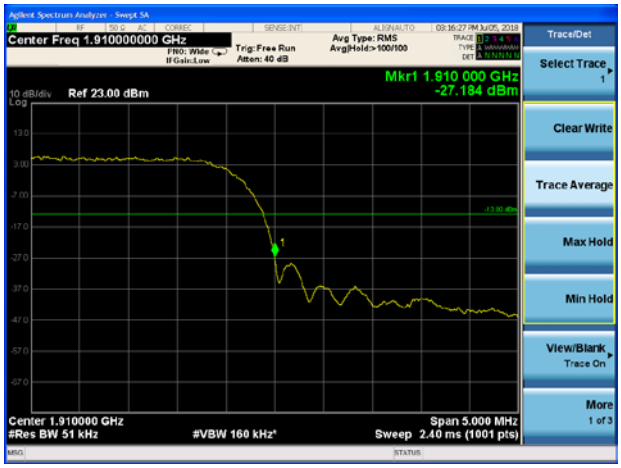
Rule Part 24.238(a) specifies that “on any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least 43 + 10 log10 (P) dB.”

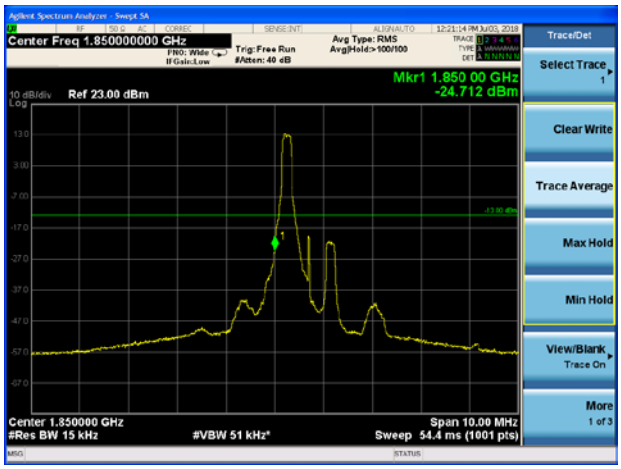
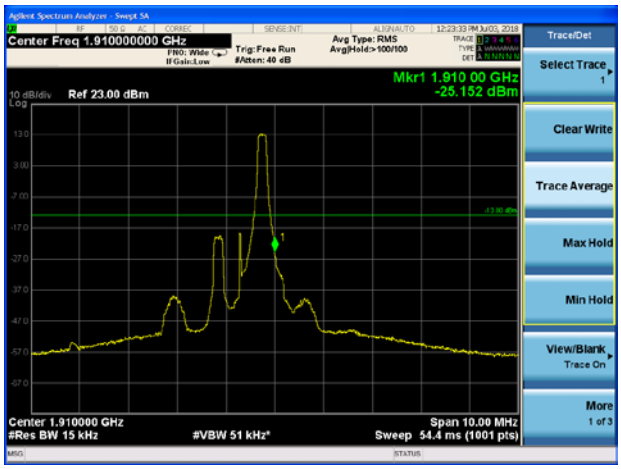
Limit	-13 dBm

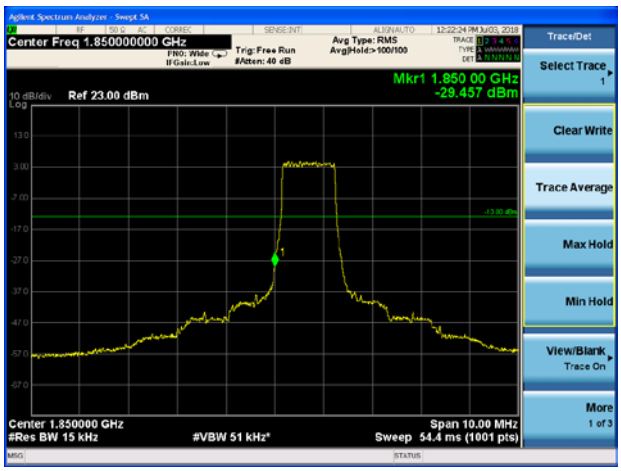
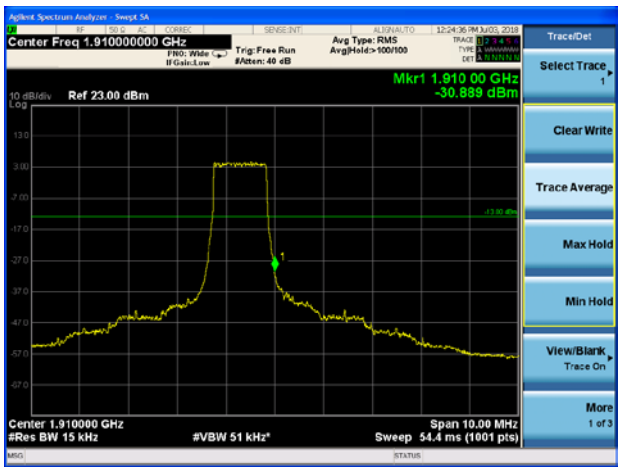
Measurement Uncertainty

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

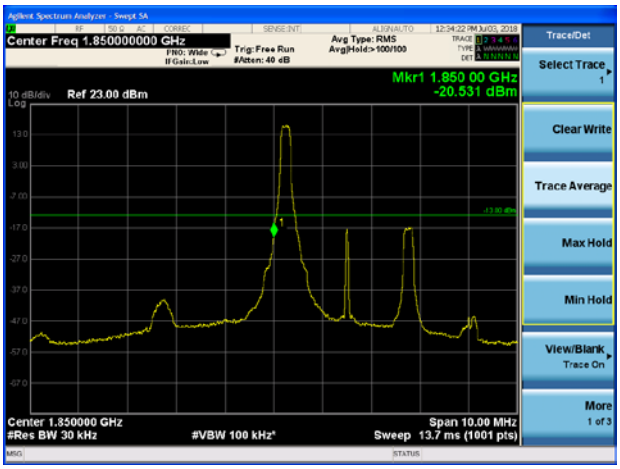
Test Result:

WCDMA Band II RMC CH-Low	WCDMA Band II RMC CH-High
	

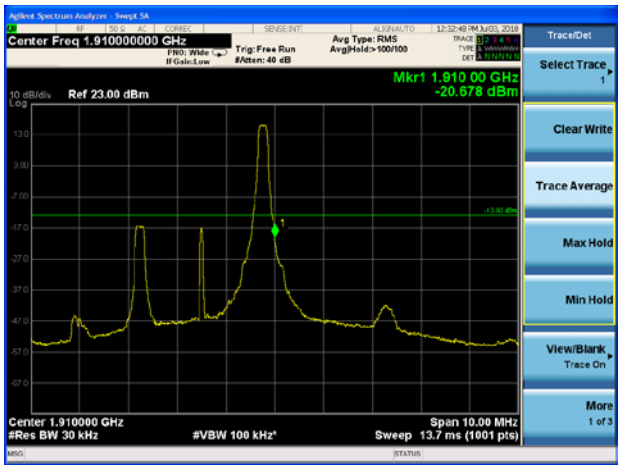
LTE Band 2 1.4MHz QPSK 1RB CH-Low	LTE Band 2 1.4MHz QPSK 1RB CH-High
	

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

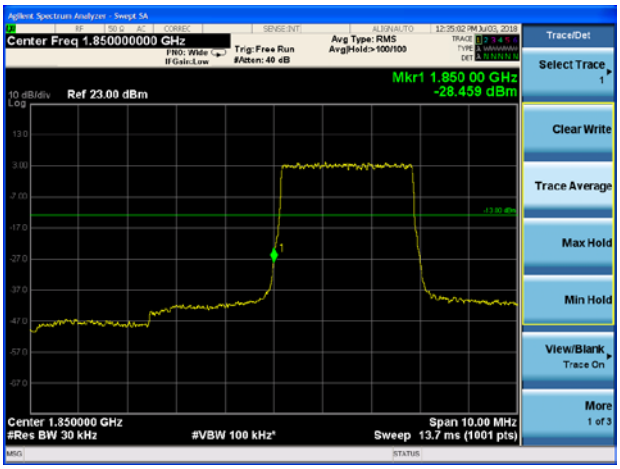
LTE Band 2 3MHz QPSK 1RB CH-Low



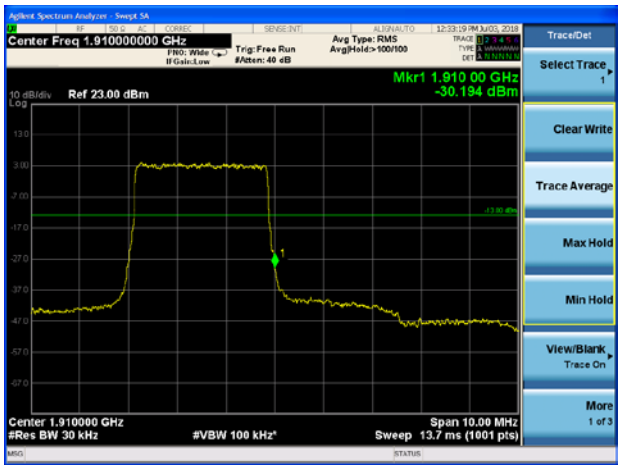
LTE Band 2 3MHz QPSK 1RB CH-High



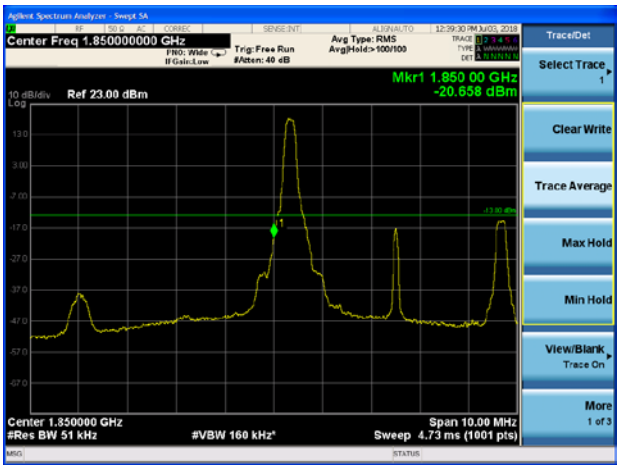
LTE Band 2 3MHz QPSK 100%RB CH-Low



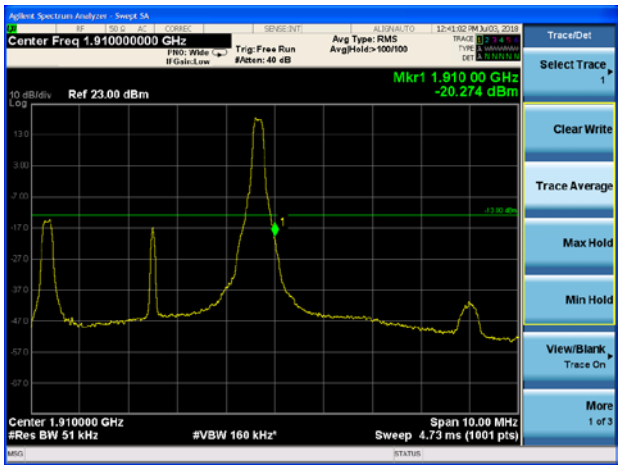
LTE Band 2 3MHz QPSK 100%RB CH-High



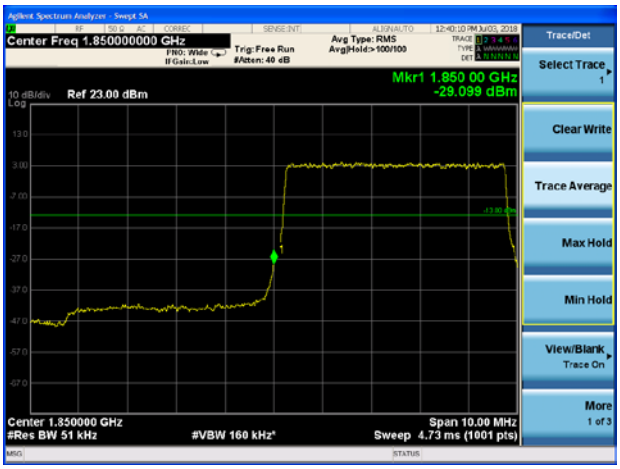
LTE Band 2 5MHz QPSK 1RB CH-Low



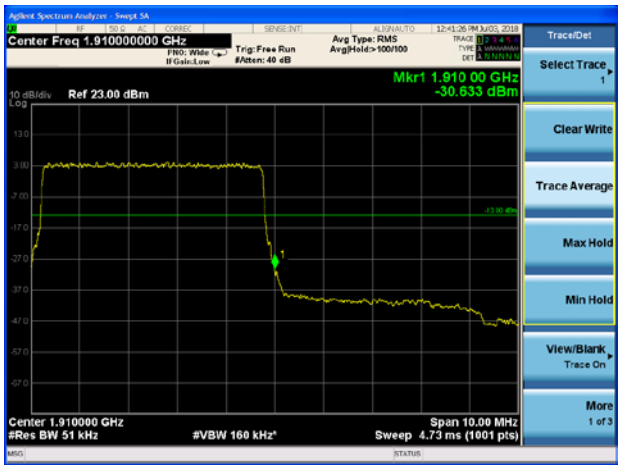
LTE Band 2 5MHz QPSK 1RB CH-High



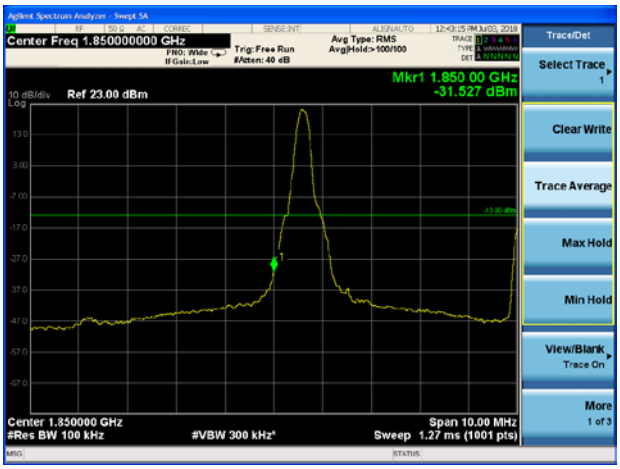
LTE Band 2 5MHz QPSK 100%RB CH-Low



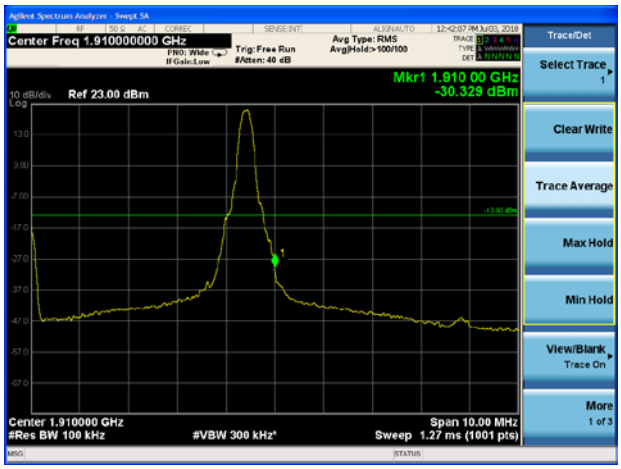
LTE Band 2 5MHz QPSK 100%RB CH-High



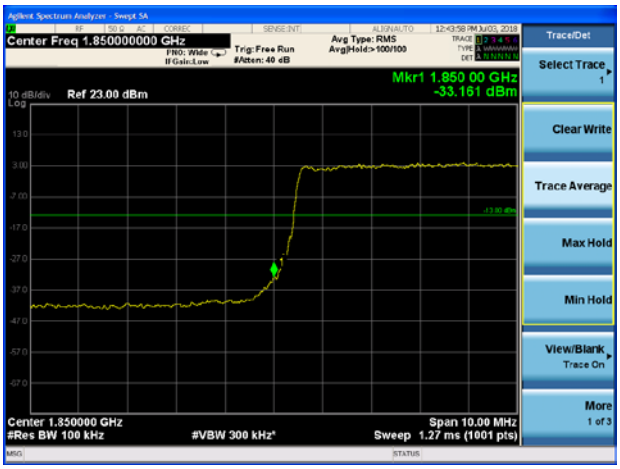
LTE Band 2 10MHz QPSK 1RB CH-Low



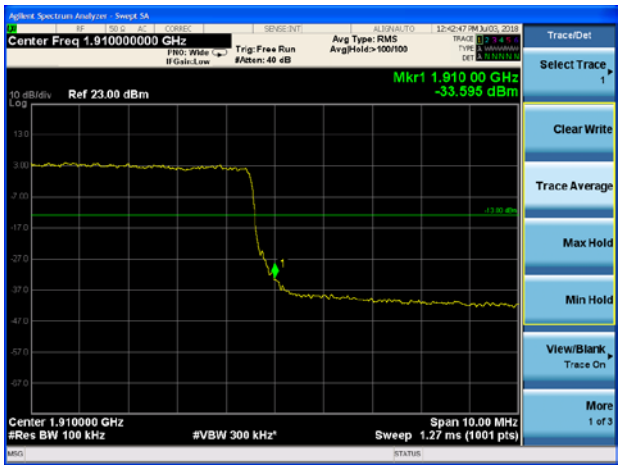
LTE Band 2 10MHz QPSK 1RB CH-High



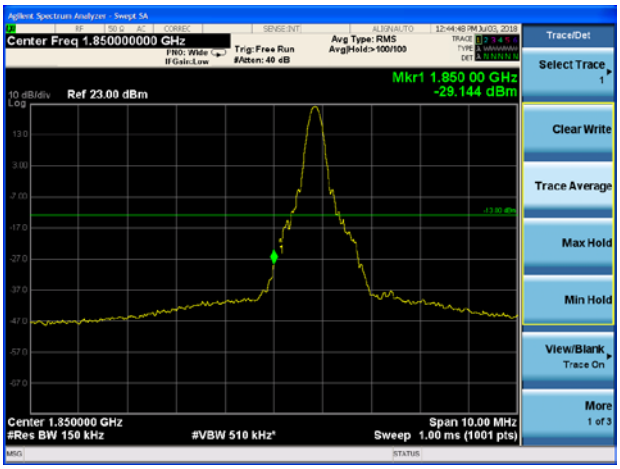
LTE Band 2 10MHz QPSK 100%RB CH-Low



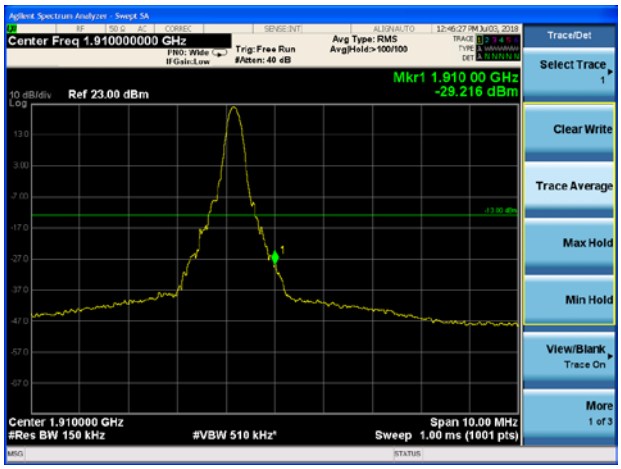
LTE Band 2 10MHz QPSK 100%RB CH-High



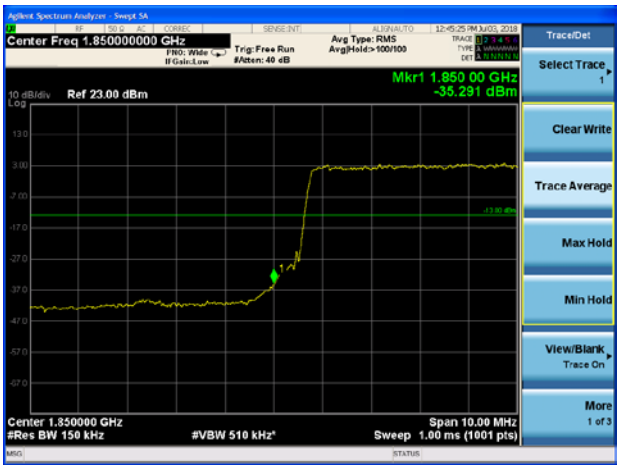
LTE Band 2 15MHz QPSK 1RB CH-Low



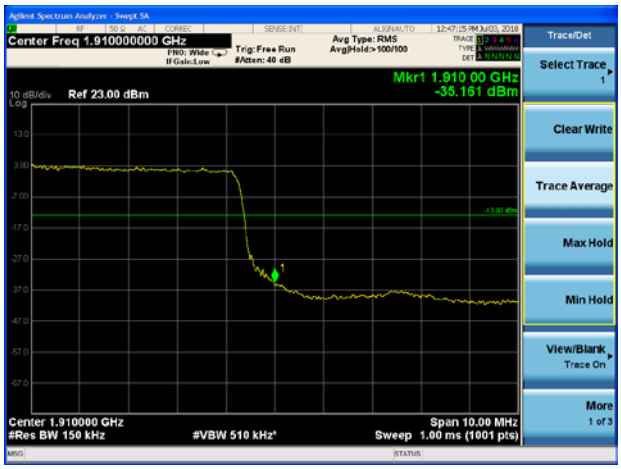
LTE Band 2 15MHz QPSK 1RB CH-High



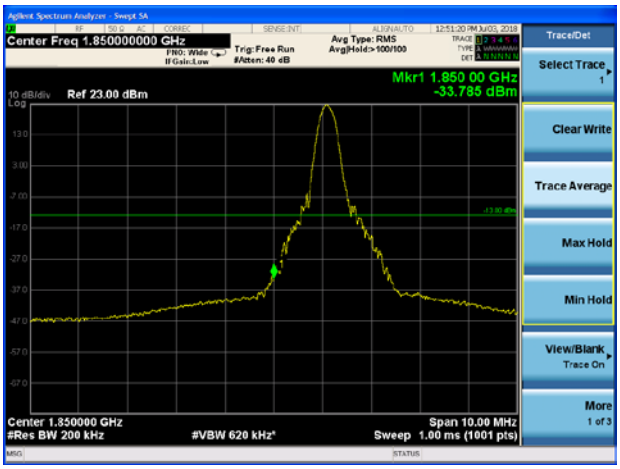
LTE Band 2 15MHz QPSK 100%RB CH-Low



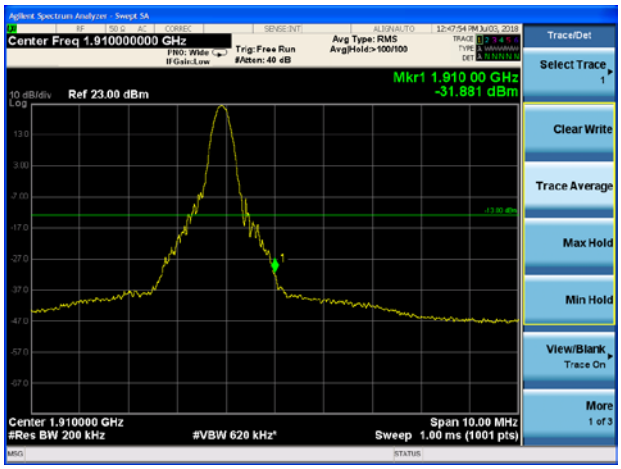
LTE Band 2 15MHz QPSK 100%RB CH-High



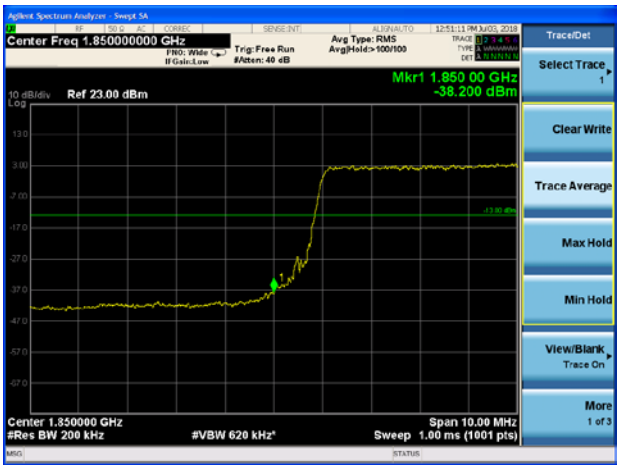
LTE Band 2 20MHz QPSK 1RB CH-Low



LTE Band 2 20MHz QPSK 1RB CH-High

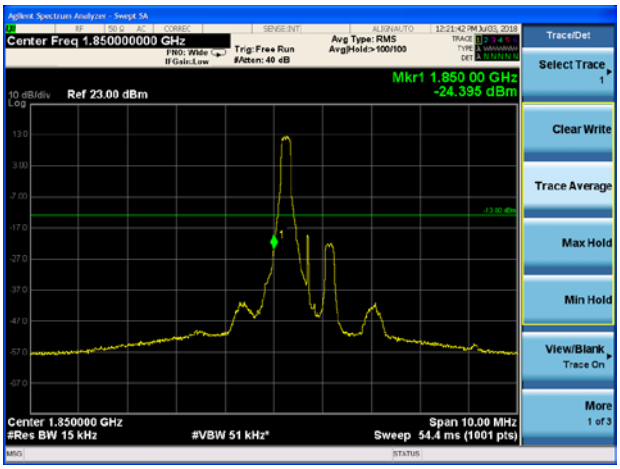


LTE Band 2 20MHz QPSK 100%RB CH-Low

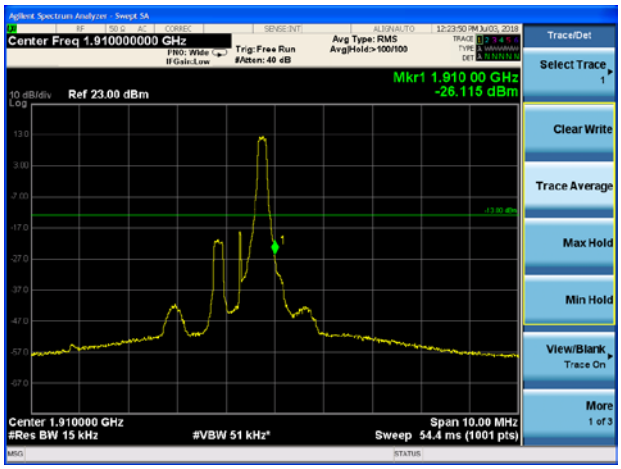


LTE Band 2 20MHz QPSK 100%RB CH-High

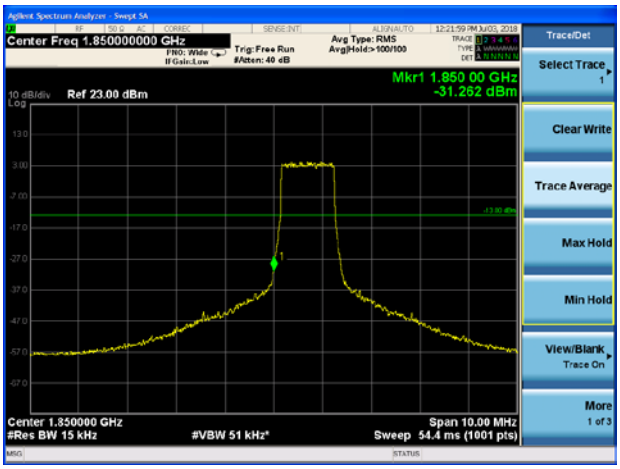
LTE Band 2 1.4MHz 16QAM 1RB CH-Low



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