



RF TEST REPORT

Applicant Beijing Chusudu Technology Co., Ltd.
FCC ID 2AQ5PAUTORINGA2
Product Vehicular wireless terminal(with 4G function)
Brand AutoRing
Model A2
Report No. R1807A0315-R1V1
Issue Date October 24, 2018

TA Technology (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in **FCC CFR47 Part 2 (2017)/ FCC CFR 47 Part 22H (2017)**. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

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Summary of measurement results

No.	Test Type	Clause in FCC rules	Verdict
1	RF power output	2.1046	PASS
2	Effective Radiated Power	22.913(a)(5)	PASS
3	Occupied Bandwidth	2.1049	PASS
4	Band Edge Compliance	2.1051 / 22.917(a)	PASS
5	Peak-to-Average Power Ratio	22.913(d)/ KDB 971168 D01(5.7)	PASS
6	Frequency Stability	2.1055 / 22.355	PASS
7	Spurious Emissions at Antenna Terminals	2.1051 / 22.917(a)	PASS
8	Radiates Spurious Emission	2.1053 / 22.917 (a)	PASS
Date of Testing: July 8 ,2018 ~ August 1 ,2018			
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	Beijing Chusudu Technology Co., Ltd.
Applicant address	Dongsheng Plaza A,5th Floor,8 Zhongguancun East Rd, Haidian District, Beijing, China
Manufacturer	Beijing Chusudu Technology Co., Ltd.
Manufacturer address	Dongsheng Plaza A,5th Floor,8 Zhongguancun East Rd, Haidian District, Beijing, China

General Information

EUT Description			
Model	A2		
IMEI	863346039069490		
Hardware Version	V3.1		
Software Version	RC108_D2_MT2_C1_BOM_V3.1_S20180622		
Power Supply	External Power Supply		
Antenna Type	Internal Antenna		
Antenna Gain	GSM 850: 1.0dBi WCDMA Band V: 1.5dBi LTE Band 5/26: 1.0dBi		
Test Mode(s)	GSM 850: WCDMA Band V;LTE Band 5/26;		
Test Modulation	(GSM)GMSK,8PSK; (WCDMA)QPSK, 16QAM; (LTE)QPSK,16QAM		
GPRS Multislot Class	12		
EGPRS Multislot Class	12		
HSDPA UE Category	24		
HSUPA UE Category	7		
LTE Category	4		
Maximum E.R.P.	GSM 850:	26.15dBm	
	WCDMA Band V:	19.86dBm	
	LTE Band 5:	19.84dBm	
	LTE Band 26:	15.09dBm	
Rated Power Supply Voltage	3.7V		
Extreme Voltage	Minimum: 3.2V Maximum: 4.2V		
Extreme Temperature	Lowest:- 20°C Highest: +70°C		
Operating Frequency Range(s)	Band	Tx (MHz)	Rx (MHz)
	GSM850	824 ~ 849	869 ~ 894
	WCDMA Band V	824 ~ 849	869 ~ 894
	LTE Band 5	824 ~ 849	869 ~ 894

LTE Band 26		824 ~ 849	869 ~ 894
EUT Accessory			
AutoRing A2 Power Cable	Manufacturer: Shenzhen GuanLiJie Technology Co.,Ltd Model: AutoRing A2 Power cord		
Camera	Manufacturer: Beijing Chusudu Technology Co., Ltd. Model: MMT-AHD-H65		
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:

FCC CFR47 Part 2 (2017)

FCC CFR 47 Part 22H (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 were investigated. Subsequently, only the worst case emissions are reported.

The following testing in GSM/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	
	GSM 850	WCDMA Band V
RF power output	GPRS EGPRS	RMC HSDPA/HSUPA DC-HSDPA/HSPA+
Effective Radiated Power	GPRS(1Tx slot) EGPRS(1Tx slot)	RMC
Occupied Bandwidth	GPRS(1Tx slot) EGPRS(1Tx slot)	RMC
Band Edge Compliance	GPRS(1Tx slot) EGPRS(1Tx slot)	RMC
Peak-to-Average Power Ratio	GPRS(1Tx slot) EGPRS(1Tx slot)	RMC
Frequency Stability	GPRS(1Tx slot) EGPRS(1Tx slot)	RMC
Spurious Emissions at Antenna Terminals	GPRS(1Tx slot)	RMC
Radiates Spurious Emission	GPRS(1Tx slot)	RMC

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	O	O
	LTE 26	O	O	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	O	O	O	O
	LTE 26	O	O	O	O	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
	LTE 26	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

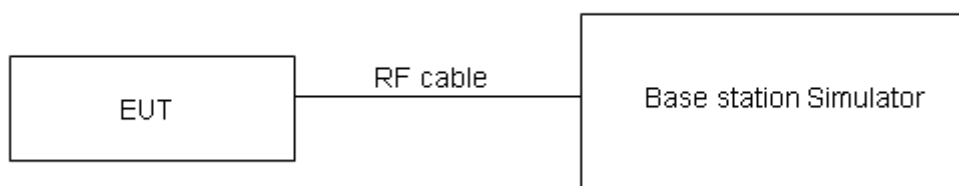
Ambient condition

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	32.76	32.87	32.81
	2TXslots	32.16	32.29	32.23
	3TXslots	30.60	30.71	30.69
	4TXslots	29.50	29.61	29.62
EGPRS (8PSK)	1TXslot	27.37	27.35	27.34
	2TXslots	26.50	26.48	26.52
	3TXslots	24.75	24.76	24.81
	4TXslots	23.77	23.78	23.81

WCDMA Band V		Conducted Power(dBm)		
		Channel 4132	Channel 4183	Channel 4233
		826.4(MHz)	836.6(MHz)	846.6(MHz)
RMC		22.58	22.53	22.64
HSDPA	Sub - Test 1	21.54	21.56	21.64
	Sub - Test 2	21.59	21.59	21.69
	Sub - Test 3	21.13	21.13	21.23
	Sub - Test 4	21.15	21.09	21.19
HSUPA	Sub - Test 1	21.63	21.59	21.70
	Sub - Test 2	21.55	21.56	21.64
	Sub - Test 3	21.16	21.13	21.21
	Sub - Test 4	21.52	21.55	21.63
	Sub - Test 5	21.55	21.54	21.61
DC-HSDPA	Sub - Test 1	22.45	22.40	22.51
	Sub - Test 2	22.54	22.38	22.50
	Sub - Test 3	22.03	21.87	21.99
	Sub - Test 4	22.02	21.86	21.98
HSPA+	16QAM	22.20	22.23	22.33

LTE Band 5				Conducted Power(dBm)		
BW	Modulation	RB size	RB offset	Channel/Frequency(MHz)		
				20407/824.7	20525/836.5	20643/848.3
1.4MHz	QPSK	1	0	23.61	23.59	23.57
		1	2	23.55	23.51	23.60
		1	5	23.55	23.60	23.51
		3	0	23.49	23.54	23.52
		3	2	23.51	23.59	23.69
		3	3	23.48	23.51	23.57
		6	0	22.52	22.59	22.62
	16QAM	1	0	22.93	23.00	23.01
		1	2	22.92	22.94	23.02
		1	5	22.87	23.00	23.02
		3	0	22.57	22.52	22.53
		3	2	22.56	22.44	22.58
		3	3	22.54	22.54	22.58
		6	0	21.63	21.58	21.63
BW	Modulation	RB size	RB offset	Channel/Frequency(MHz)		
				20415/825.5	20525/836.5	20635/847.5
3MHz	QPSK	1	0	23.63	23.63	23.60
		1	7	23.58	23.56	23.64
		1	14	23.58	23.65	23.55
		8	0	22.59	22.66	22.65
		8	4	22.63	22.69	22.81
		8	7	22.58	22.62	22.67
		15	0	22.55	22.63	22.65
	16QAM	1	0	22.96	23.02	23.04
		1	7	22.95	22.99	23.06
		1	14	22.89	23.04	23.05
		8	0	21.68	21.65	21.65
		8	4	21.67	21.57	21.70
		8	7	21.64	21.66	21.71
		15	0	21.66	21.62	21.66
BW	Modulation	RB size	RB offset	Channel/Frequency(MHz)		
				20425/826.5	20525/836.5	20625/846.5
5MHz	QPSK	1	0	23.60	23.61	23.56



		1	13	23.56	23.52	23.61
		1	24	23.55	23.60	23.51
		12	0	22.56	22.61	22.61
		12	6	22.61	22.65	22.76
		12	13	22.56	22.60	22.63
		25	0	22.53	22.62	22.63
	16QAM	1	0	22.93	22.98	23.01
		1	13	22.92	22.97	23.03
		1	24	22.86	23.02	23.01
		12	0	21.66	21.61	21.62
		12	6	21.64	21.52	21.66
		12	13	21.61	21.61	21.67
		25	0	21.64	21.58	21.61
	BW	Modulation	RB size	RB offset	Channel/Frequency(MHz)	
					20450/829	20525/836.5
					20600/844	
10MHz	QPSK	1	0	23.58	23.54	23.54
		1	25	23.56	23.52	23.60
		1	49	23.52	23.58	23.47
		25	0	22.54	22.57	22.58
		25	13	22.59	22.61	22.73
		25	25	22.52	22.56	22.60
		50	0	22.56	22.55	22.58
	16QAM	1	0	22.88	22.95	22.96
		1	25	22.89	22.96	23.00
		1	49	22.84	22.97	22.99
		25	0	21.63	21.60	21.60
		25	13	21.60	21.49	21.62
		25	25	21.59	21.57	21.64
		50	0	21.62	21.54	21.58

LTE Band 26				Conducted Power(dBm)		
BW	Modulation	RB size	RB offset	Channel/Frequency(MHz)		
				26797/824.7	26915/836.5	27033/848.3
1.4MHz	QPSK	1	0	23.63	23.66	23.68
		1	2	23.53	23.56	23.62
		1	5	23.30	23.29	23.07
		3	0	23.55	23.67	23.60
		3	2	23.55	23.73	23.50
		3	3	23.51	23.63	23.56
		6	0	22.56	22.73	22.71
	16QAM	1	0	22.76	23.06	23.19
		1	2	22.65	23.04	22.96
		1	5	22.61	22.95	22.51
		3	0	22.53	22.58	22.55
		3	2	22.54	22.62	22.56
		3	3	22.49	22.62	22.59
		6	0	21.60	21.71	21.66
BW	Modulation	RB size	RB offset	Channel/Frequency(MHz)		
				26805/825.5	26915/836.5	27025/847.5
3MHz	QPSK	1	0	23.65	23.70	23.71
		1	7	23.56	23.61	23.66
		1	14	23.33	23.34	23.11
		8	0	22.65	22.79	22.73
		8	4	22.67	22.83	22.62
		8	7	22.61	22.74	22.66
		15	0	22.59	22.77	22.74
	16QAM	1	0	22.79	23.08	23.22
		1	7	22.68	23.09	23.00
		1	14	22.63	22.99	22.54
		8	0	21.64	21.71	21.67
		8	4	21.65	21.75	21.68
		8	7	21.59	21.74	21.72
		15	0	21.63	21.75	21.69
BW	Modulation	RB size	RB offset	Channel/Frequency(MHz)		
				26815/826.5	26915/836.5	27015/846.5
5MHz	QPSK	1	0	23.64	23.69	23.70



		1	13	23.57	23.62	23.67
		1	24	23.32	23.33	23.10
		12	0	22.65	22.79	22.73
		12	6	22.68	22.84	22.61
		12	13	22.61	22.76	22.67
		25	0	22.65	22.78	22.76
	16QAM	1	0	22.78	23.07	23.21
		1	13	22.68	23.11	23.00
		1	24	22.63	22.99	22.53
		12	0	21.65	21.72	21.68
		12	6	21.64	21.74	21.67
		12	13	21.59	21.74	21.72
		25	0	21.64	21.76	21.68
BW	Modulation	RB size	RB offset	Channel/Frequency(MHz)		
				26840/829	26915/836.5	26990/844
10MHz	QPSK	1	0	23.63	23.65	23.68
		1	25	23.55	23.61	23.64
		1	49	23.29	23.28	23.06
		25	0	22.63	22.75	22.70
		25	13	22.65	22.79	22.57
		25	25	22.58	22.73	22.63
		50	0	22.63	22.74	22.71
	16QAM	1	0	22.73	23.05	23.19
		1	25	22.66	23.08	22.98
		1	49	22.60	22.95	22.50
		25	0	21.62	21.70	21.65
		25	13	21.61	21.69	21.63
		25	25	21.57	21.70	21.69
		50	0	21.61	21.71	21.64
BW	Modulation	RB size	RB offset	Channel/Frequency(MHz)		
				26865/831.5	26915/836.5	26965/841.5
15MHz	QPSK	1	0	23.60	23.61	23.65
		1	38	23.54	23.57	23.62
		1	74	23.27	23.27	23.03
		36	0	22.60	22.70	22.66
		36	18	22.63	22.75	22.54
		36	39	22.55	22.68	22.59



	16QAM	75	0	22.60	22.69	22.67
		1	0	22.71	23.01	23.14
		1	38	22.62	23.06	22.94
		1	74	22.58	22.92	22.48
		36	0	21.59	21.66	21.62
		36	18	21.58	21.67	21.60
		36	39	21.54	21.65	21.65
		75	0	21.59	21.67	21.61

5.2. Effective Radiated Power

Ambient condition

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

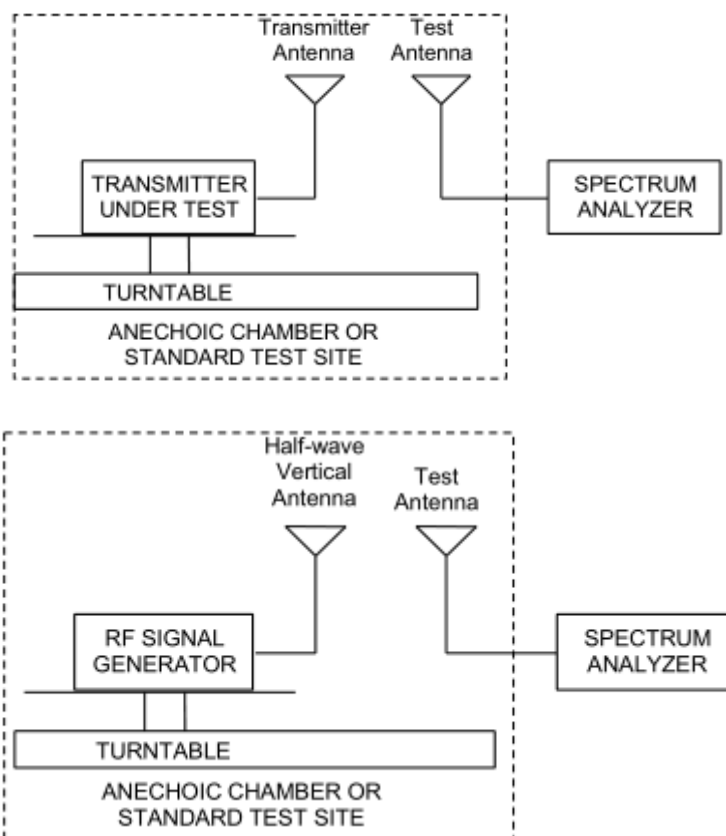
Methods of Measurement

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

- 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.
- 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).
- 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.
- 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. $LOSS = \text{Generator Output Power (dBm)} - \text{Analyzer reading (dBm)}$
- Determine the effective radiated output power at each angular position from the readings in steps b) and d) using the following equation: $ERP \text{ (dBm)} = LVL \text{ (dBm)} + LOSS \text{ (dB)}$
- The maximum ERP is the maximum value determined in the preceding step.
- 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:
 $EIRP \text{ (dBm)} = \text{Output Power (dBm)} - \text{Losses (dB)} + \text{Antenna Gain (dBd)}$
 where: dBd refers to gain relative to an ideal dipole.
 $EIRP \text{ (dBm)} = ERP \text{ (dBm)} + 2.15 \text{ (dB.)}$

The RB allocation refers to section 5.1, using the maximum output power configuration.

Test setup



Limits

Rule Part 22.913(a)(5) specifies that "Mobile/portable stations are limited to 7 watts ERP".

Limit	$\leq 7 \text{ W}$ (38.45 dBm)
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Measurement Uncertainty

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

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	ERP (dBm)	Limit (dBm)	Conclusion
GPRS 850	Low	824.2	Horizontal	24.68	38.45	Pass
	Mid	836.6	Horizontal	25.58	38.45	Pass
	High	848.8	Horizontal	26.15	38.45	Pass
EGPRS 850	Low	824.2	Horizontal	24.17	38.45	Pass
	Mid	836.6	Horizontal	25.39	38.45	Pass
	High	848.8	Horizontal	26.01	38.45	Pass
WCDMA Band V	Low	826.4	Horizontal	19.61	38.45	Pass
	Mid	836.6	Horizontal	19.79	38.45	Pass
	High	846.6	Horizontal	19.86	38.45	Pass

LTE Band 5						
bandwidth	Channel	Frequency (MHz)	Polarization	ERP (dBm)	Limit (dBm)	Conclusion
1.4 MHz (QPSK)	Low	824.7	Horizontal	19.64	38.45	Pass
	Mid	836.5	Horizontal	18.84	38.45	Pass
	High	848.3	Horizontal	19.08	38.45	Pass
3 MHz (QPSK)	Low	825.5	Horizontal	19.42	38.45	Pass
	Mid	836.5	Horizontal	18.88	38.45	Pass
	High	847.5	Horizontal	19.84	38.45	Pass
5 MHz (QPSK)	Low	826.5	Horizontal	18.72	38.45	Pass
	Mid	836.5	Horizontal	17.09	38.45	Pass
	High	846.5	Horizontal	18.27	38.45	Pass
10 MHz (QPSK)	Low	829	Horizontal	19.05	38.45	Pass
	Mid	836.5	Horizontal	17.16	38.45	Pass
	High	844	Horizontal	17.30	38.45	Pass
1.4 MHz (16QAM)	Low	824.7	Horizontal	19.19	38.45	Pass
	Mid	836.5	Horizontal	18.42	38.45	Pass
	High	848.3	Horizontal	18.74	38.45	Pass
3 MHz (16QAM)	Low	825.5	Horizontal	18.88	38.45	Pass
	Mid	836.5	Horizontal	18.42	38.45	Pass
	High	847.5	Horizontal	19.21	38.45	Pass
5 MHz (16QAM)	Low	826.5	Horizontal	18.22	38.45	Pass
	Mid	836.5	Horizontal	16.82	38.45	Pass
	High	846.5	Horizontal	17.88	38.45	Pass
10 MHz (16QAM)	Low	829	Horizontal	18.74	38.45	Pass
	Mid	836.5	Horizontal	15.87	38.45	Pass
	High	844	Horizontal	16.86	38.45	Pass

LTE Band 26						
bandwidth	Channel	Frequency (MHz)	Polarization	ERP (dBm)	Limit (dBm)	Conclusion
1.4 MHz (QPSK)	Low	824.7	Horizontal	13.87	38.45	Pass
	Mid	836.5	Horizontal	13.76	38.45	Pass
	High	848.3	Horizontal	13.76	38.45	Pass
3 MHz (QPSK)	Low	825.5	Horizontal	13.76	38.45	Pass
	Mid	836.5	Horizontal	14.28	38.45	Pass
	High	847.5	Horizontal	13.69	38.45	Pass
5 MHz (QPSK)	Low	826.5	Horizontal	13.44	38.45	Pass
	Mid	836.5	Horizontal	13.97	38.45	Pass
	High	846.5	Horizontal	13.52	38.45	Pass
10 MHz (QPSK)	Low	829	Horizontal	14.32	38.45	Pass
	Mid	836.5	Horizontal	15.09	38.45	Pass
	High	844	Horizontal	14.60	38.45	Pass
15 MHz (QPSK)	Low	831.5	Horizontal	13.67	38.45	Pass
	Mid	836.5	Horizontal	13.64	38.45	Pass
	High	841.5	Horizontal	13.63	38.45	Pass
1.4 MHz (16QAM)	Low	824.7	Horizontal	14.32	38.45	Pass
	Mid	836.5	Horizontal	14.05	38.45	Pass
	High	848.3	Horizontal	13.84	38.45	Pass
3 MHz (16QAM)	Low	825.5	Horizontal	13.55	38.45	Pass
	Mid	836.5	Horizontal	13.56	38.45	Pass
	High	847.5	Horizontal	13.55	38.45	Pass
5 MHz (16QAM)	Low	826.5	Horizontal	13.57	38.45	Pass
	Mid	836.5	Horizontal	14.01	38.45	Pass
	High	846.5	Horizontal	13.41	38.45	Pass
10 MHz (16QAM)	Low	829	Horizontal	13.15	38.45	Pass
	Mid	836.5	Horizontal	13.67	38.45	Pass
	High	844	Horizontal	13.21	38.45	Pass
15 MHz (16QAM)	Low	831.5	Horizontal	14.00	38.45	Pass
	Mid	836.5	Horizontal	14.89	38.45	Pass
	High	841.5	Horizontal	14.39	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 3 kHz, VBW is set to 10 kHz for GSM 850,

RBW is set to 51 kHz, VBW is set to 160 kHz for WCDMA Band V,

RBW is set to 51 kHz, VBW is set to 160 kHz for LTE Band 5/26 (1.4MHz),

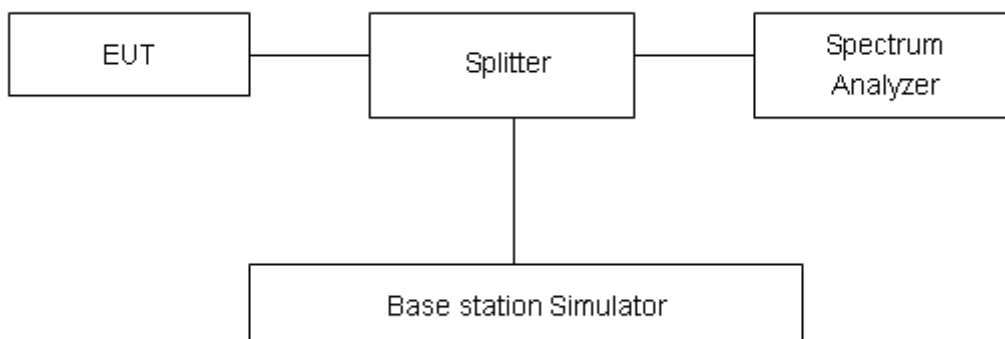
RBW is set to 100 kHz, VBW is set to 300 kHz for LTE Band 5/26 (3MHz/5MHz),

RBW is set to 300 kHz, VBW is set to 1 MHz for LTE Band 5/26 (10MHz),

RBW is set to 300 kHz, VBW is set to 1 MHz for LTE Band 26 (15MHz).

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

Test Setup



Limits

No specific occupied bandwidth requirements in part 2.1049.

Measurement Uncertainty

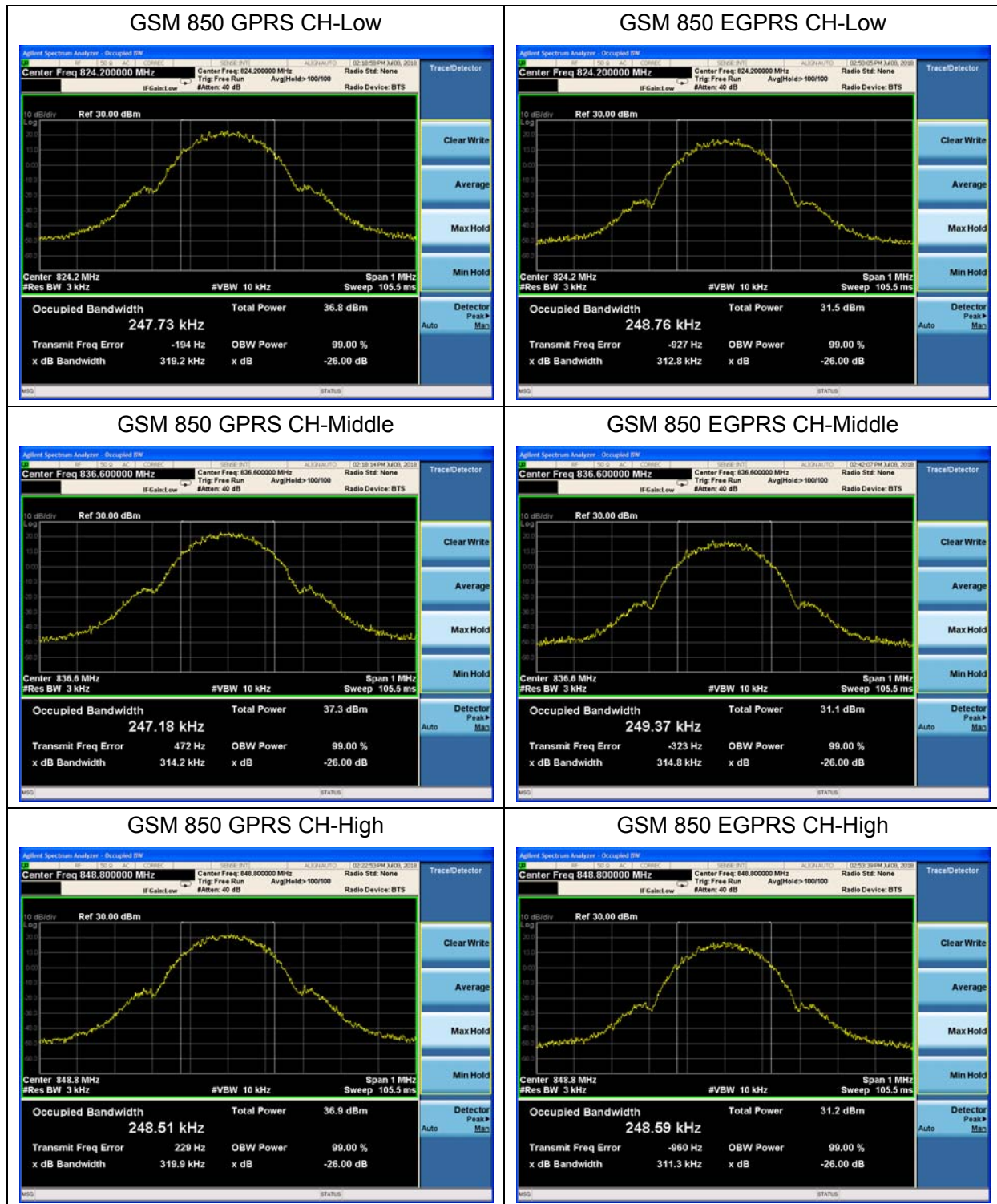
The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 2$, $U = 624\text{Hz}$.

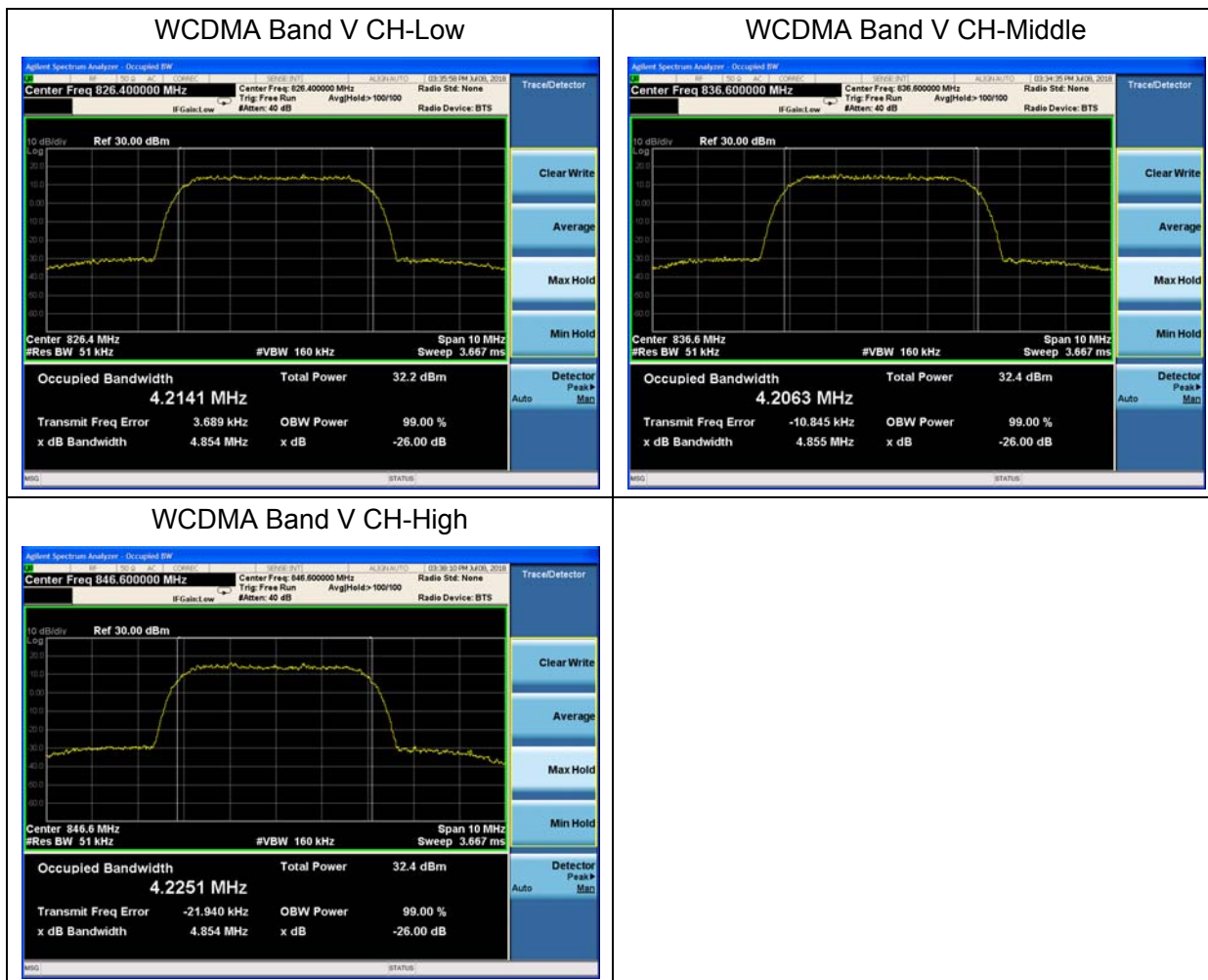
Test Result

Mode	Channel	Frequency (MHz)	99% Power Bandwidth (MHz)	-26dBc Bandwidth(MHz)
GPRS 850 (GMSK)	128	824.2	0.24773	0.3192
	190	836.6	0.24718	0.3142
	251	848.8	0.24851	0.3199
EGPRS 850 (8-PSK)	128	824.2	0.24876	0.3128
	190	836.6	0.24937	0.3148
	251	848.8	0.24859	0.3113
WCDMA Band V (RMC)	4132	826.4	4.2141	4.854
	4183	836.6	4.2063	4.855
	4233	846.6	4.2251	4.854

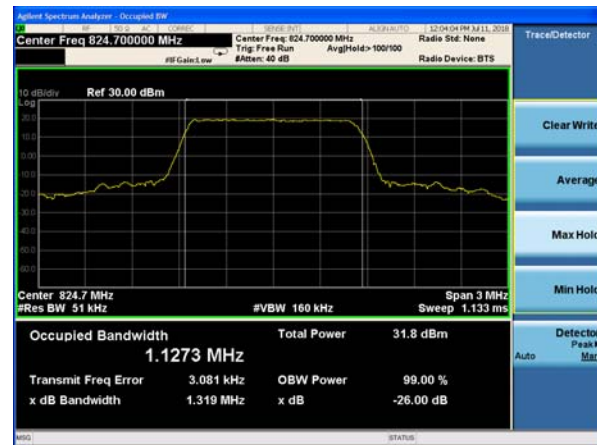
LTE Band 5						
RB	Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	99% Power Bandwidth(MHz)	-26dBc Bandwidth(MHz)
100%	QPSK	1.4	20407	824.7	1.1273	1.319
			20525	836.5	1.1221	1.312
			20643	848.3	1.1350	1.315
		3	20415	825.5	2.7431	3.034
			20525	836.5	2.7376	3.052
			20635	847.5	2.7372	3.039
		5	20425	826.5	4.5298	5.099
			20525	836.5	4.5438	5.090
			20625	846.5	4.5236	5.067
		10	20450	829	9.0426	10.080
			20525	836.5	9.0789	10.180
			20600	844	9.0814	10.190
	16QAM	1.4	20407	824.7	1.1171	1.298
			20525	836.5	1.1248	1.312
			20643	848.3	1.1227	1.308
		3	20415	825.5	2.7336	3.041
			20525	836.5	2.7507	3.059
			20635	847.5	2.7325	3.053
		5	20425	826.5	4.5496	5.091
			20525	836.5	4.5241	5.068
			20625	846.5	4.5543	5.097
		10	20450	829	9.0591	10.140
			20525	836.5	9.0724	10.050
			20600	844	9.0609	10.110

LTE Band 26						
RB	Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	99% Power Bandwidth(MHz)	-26dBc Bandwidth(MHz)
100%	QPSK	1.4	26797	824.7	1.1265	1.316
			26915	836.5	1.1210	1.312
			27033	848.3	1.1346	1.314
		3	26805	825.5	2.7444	3.038
			26915	836.5	2.7398	3.055
			27025	847.5	2.7390	3.049
		5	26815	826.5	4.5272	5.096
			26915	836.5	4.5410	5.081
			27015	846.5	4.5259	5.092
		10	26840	829	9.0247	10.100
			26915	836.5	9.0556	10.170
			26990	844	9.0639	10.160
		15	26865	831.5	13.4620	14.850
			26915	836.5	13.5080	14.920
			26965	841.5	13.4930	14.950
	16QAM	1.4	26797	824.7	1.1196	1.298
			26915	836.5	1.1264	1.310
			27033	848.3	1.1234	1.312
		3	26805	825.5	2.7344	3.043
			26915	836.5	2.7535	3.061
			27025	847.5	2.7341	3.054
		5	26815	826.5	4.5476	5.073
			26915	836.5	4.5262	5.073
			27015	846.5	4.5598	5.107
		10	26840	829	9.0412	10.120
			26915	836.5	9.0664	10.080
			26990	844	9.0475	10.110
		15	26865	831.5	13.5030	14.820
			26915	836.5	13.5060	14.780
			26965	841.5	13.4970	14.820





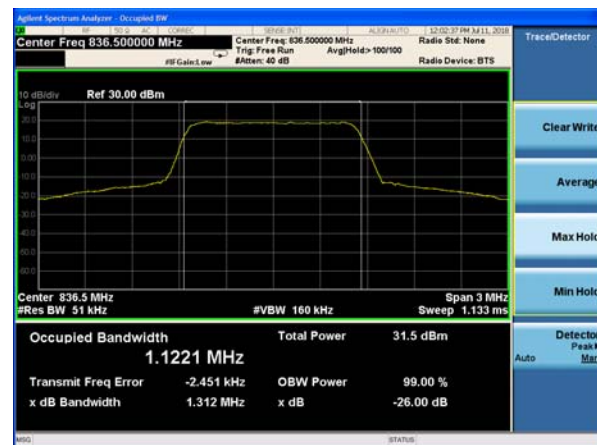
LTE Band 5 QPSK 1.4MHz CH-Low



LTE Band 5 QPSK 3MHz CH-Low



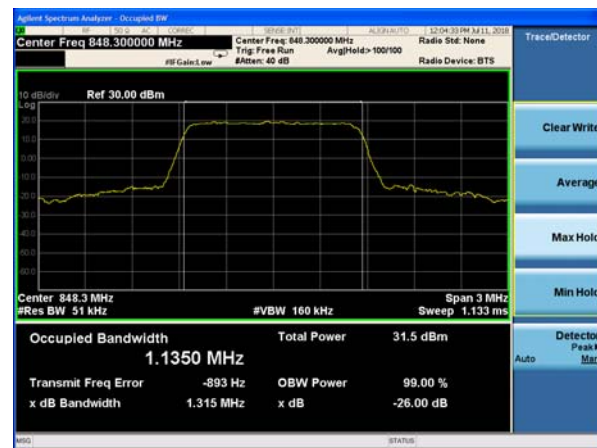
LTE Band 5 QPSK 1.4MHz CH-Middle



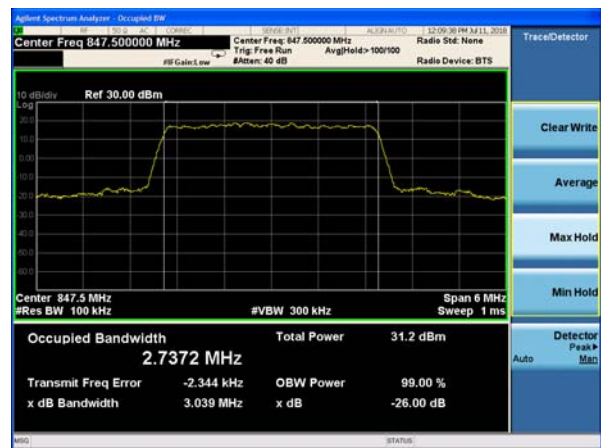
LTE Band 5 QPSK 3MHz CH-Middle

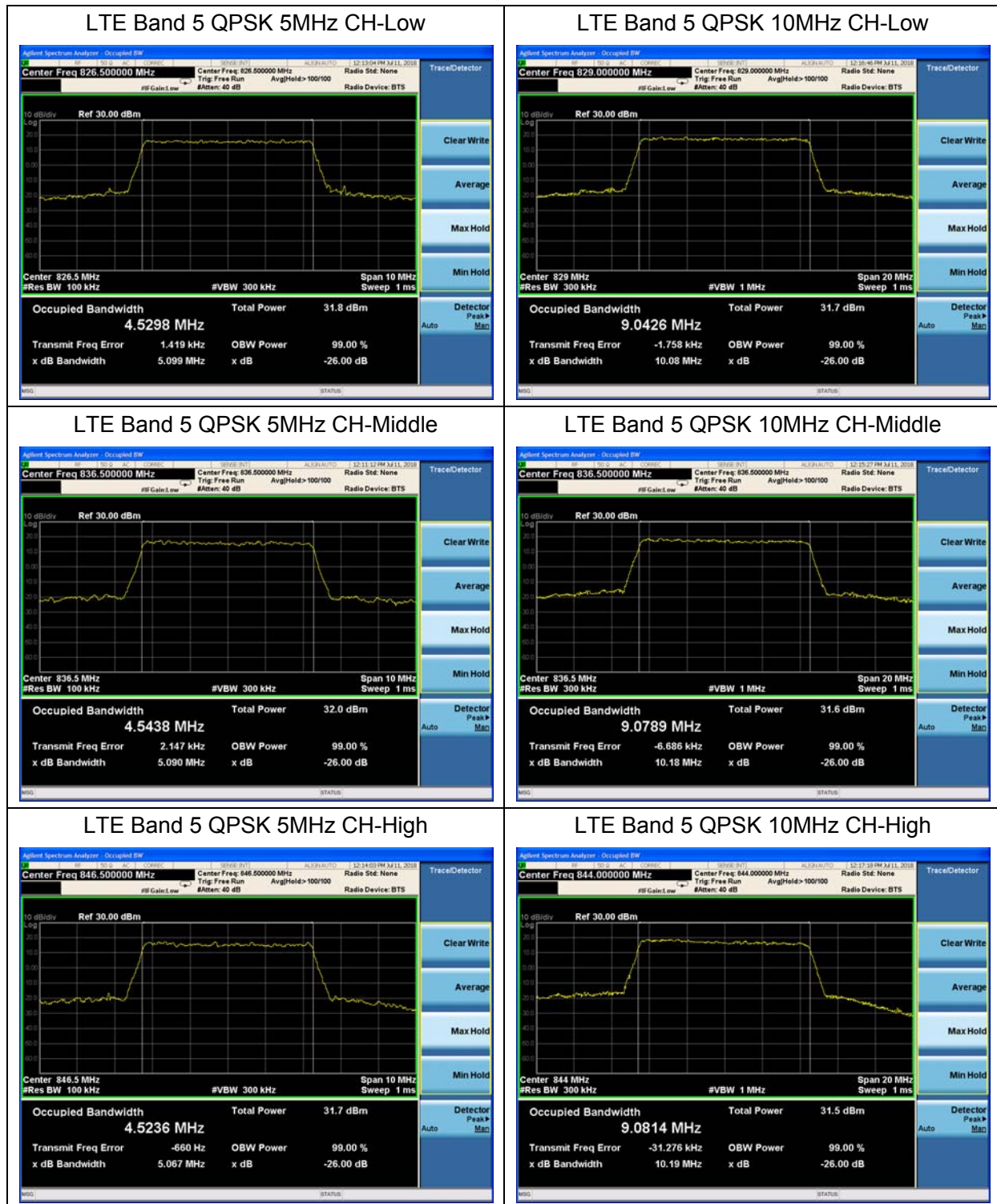


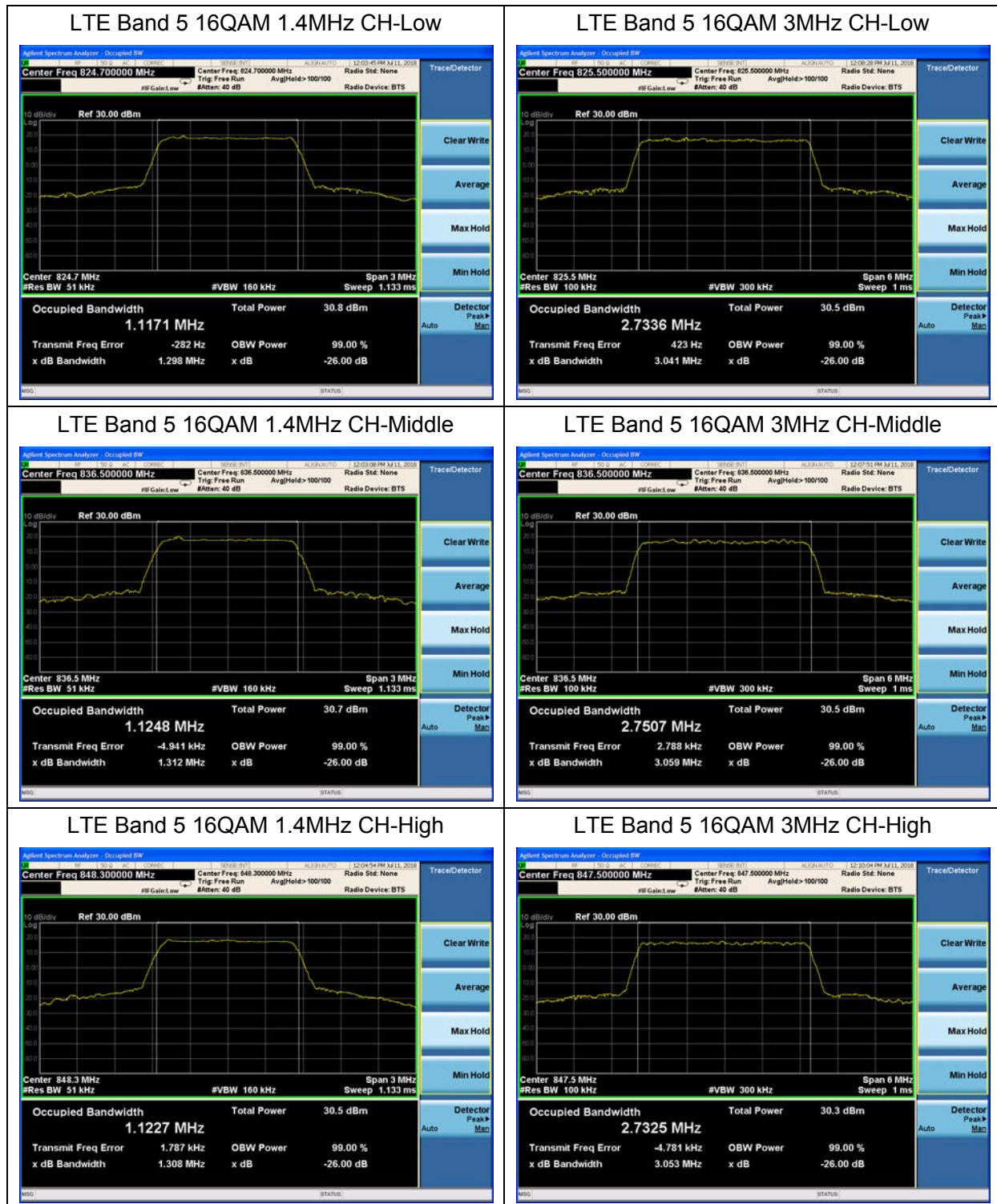
LTE Band 5 QPSK 1.4MHz CH-High



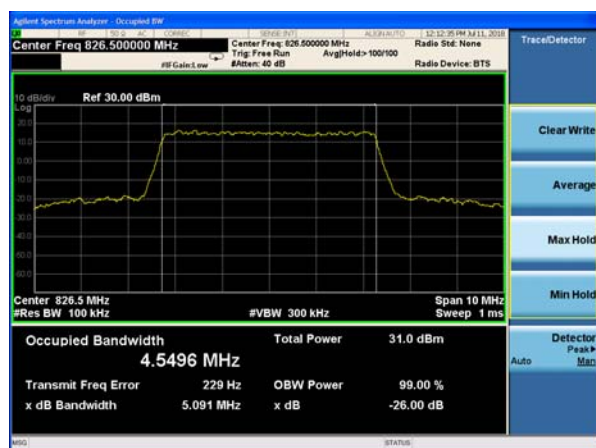
LTE Band 5 QPSK 3MHz CH-High



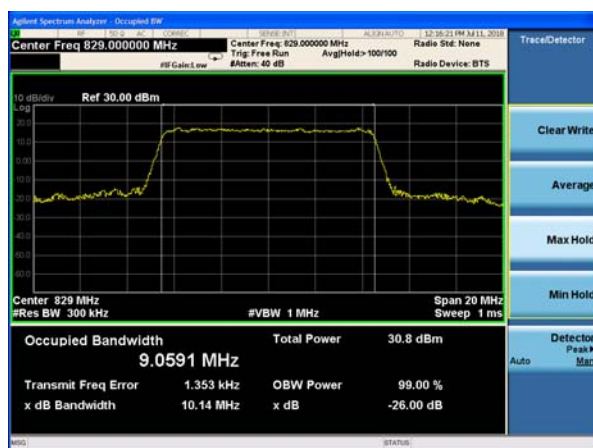




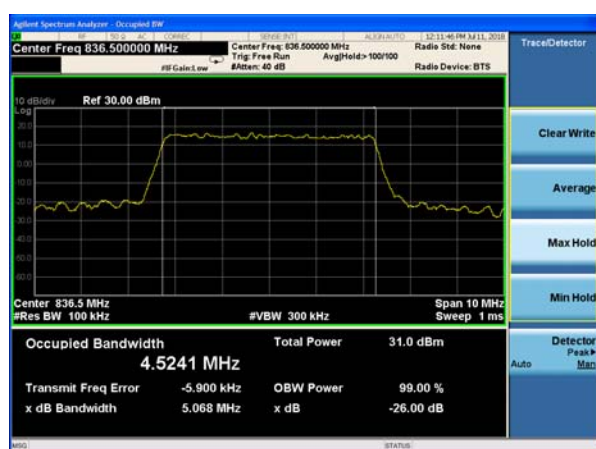
LTE Band 5 16QAM 5MHz CH-Low



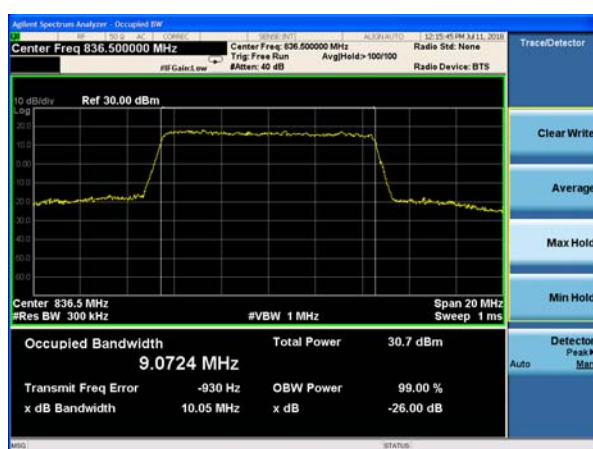
LTE Band 5 16QAM 10MHz CH-Low



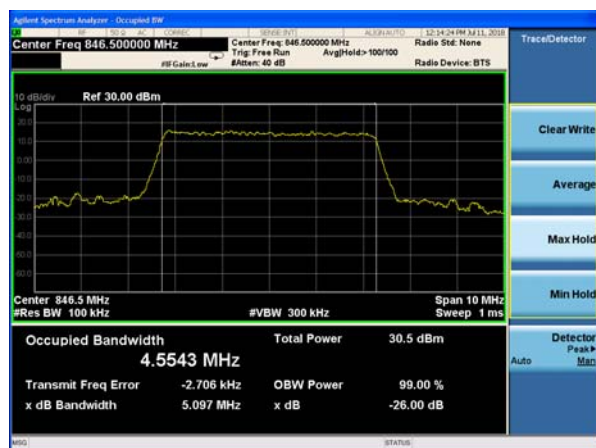
LTE Band 5 16QAM 5MHz CH-Middle



LTE Band 5 16QAM 10MHz CH-Middle



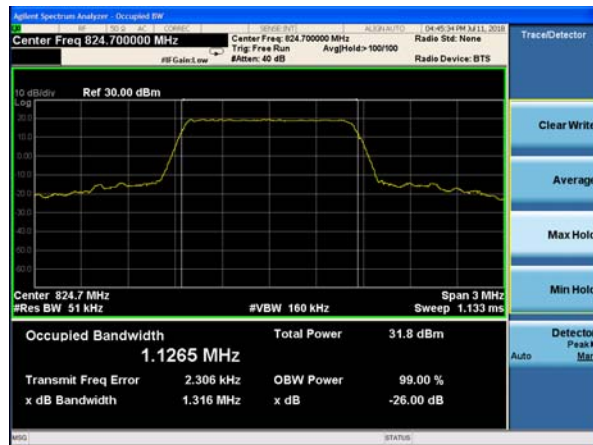
LTE Band 5 16QAM 5MHz CH-High



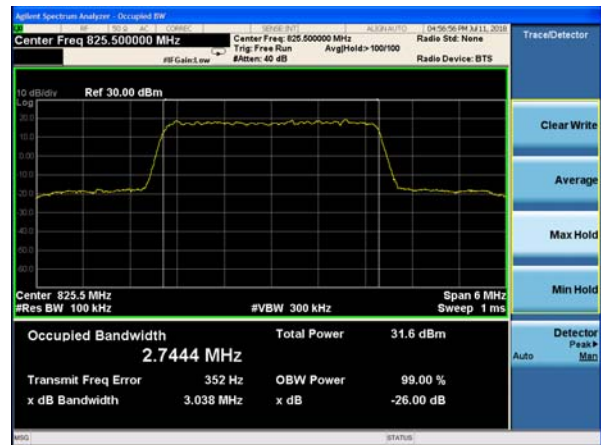
LTE Band 5 16QAM 10MHz CH-High



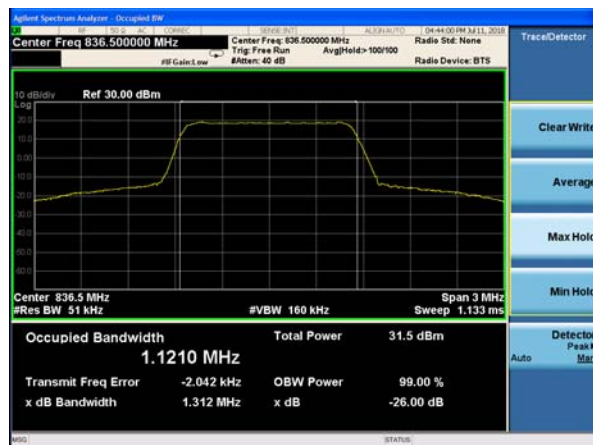
LTE Band 26 QPSK 1.4MHz CH-Low



LTE Band 26 QPSK 3MHz CH-Low



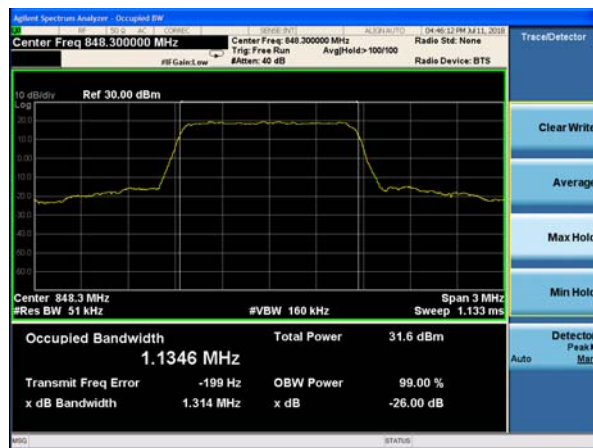
LTE Band 26 QPSK 1.4MHz CH-Middle



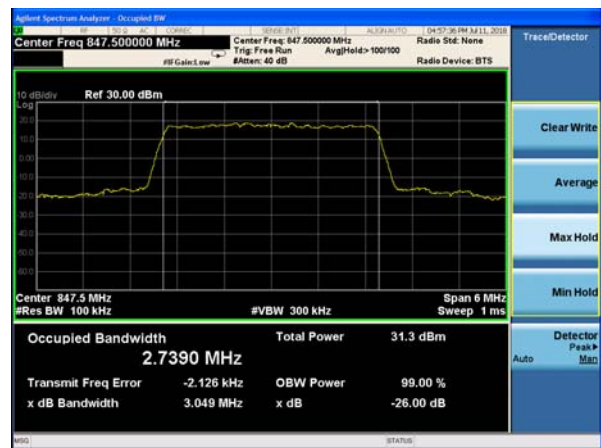
LTE Band 26 QPSK 3MHz CH-Middle



LTE Band 26 QPSK 1.4MHz CH-High



LTE Band 26 QPSK 3MHz CH-High



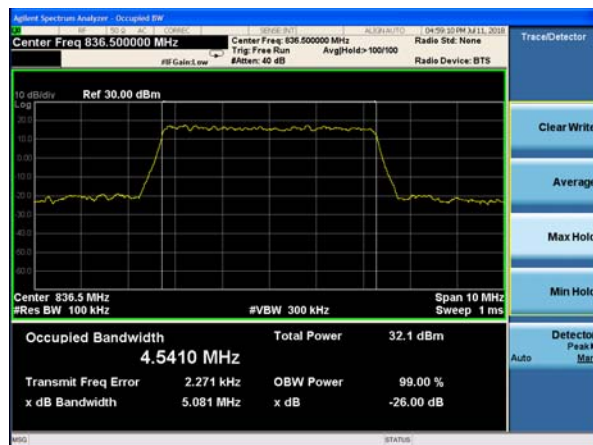
LTE Band 26 QPSK 5MHz CH-Low



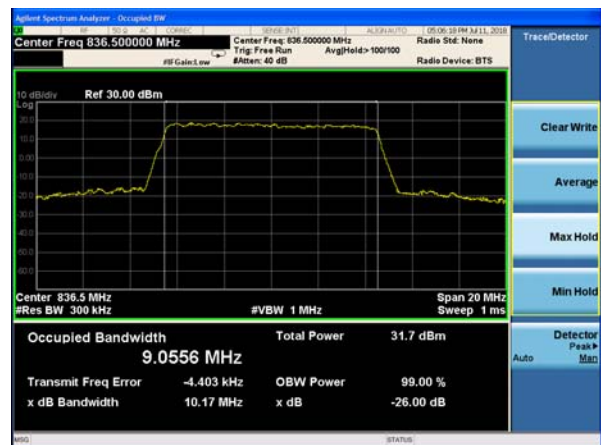
LTE Band 26 QPSK 10MHz CH-Low



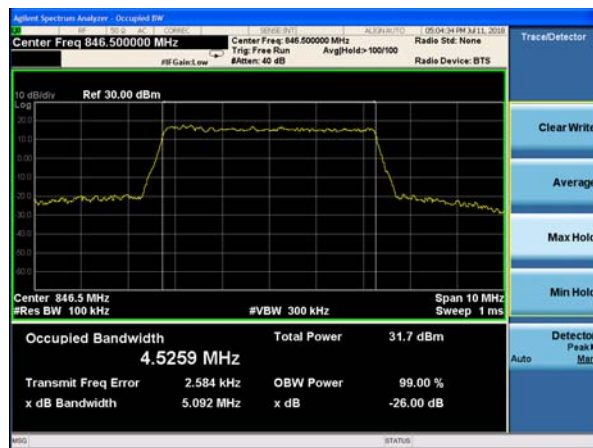
LTE Band 26 QPSK 5MHz CH-Middle



LTE Band 26 QPSK 10MHz CH-Middle



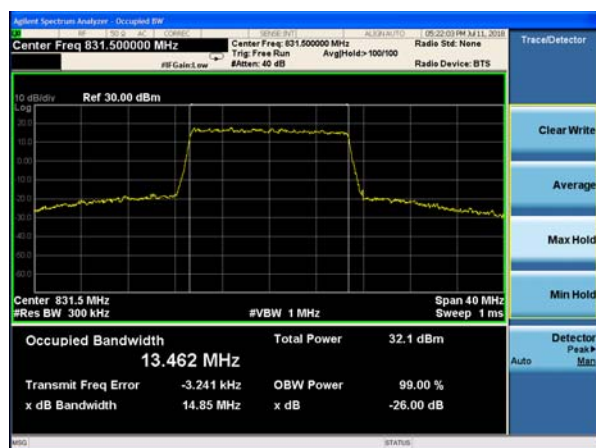
LTE Band 26 QPSK 5MHz CH-High



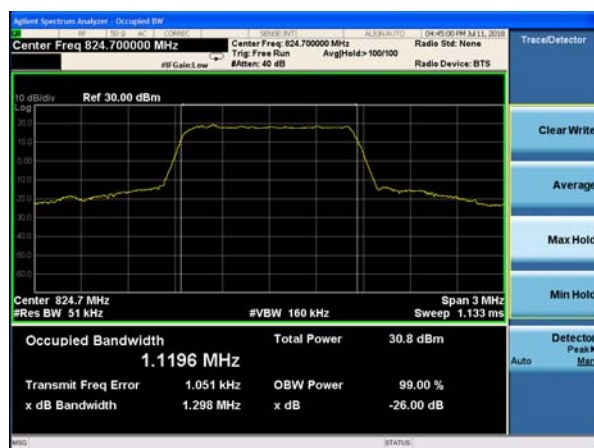
LTE Band 26 QPSK 10MHz CH-High



LTE Band 26 QPSK 15MHz CH-Low



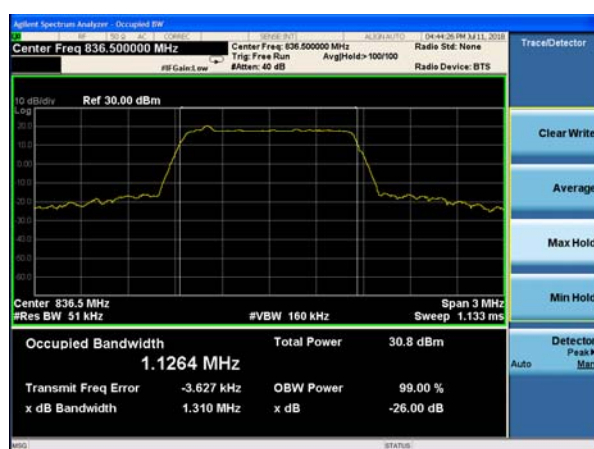
LTE Band 26 16QAM 1.4MHz CH-Low



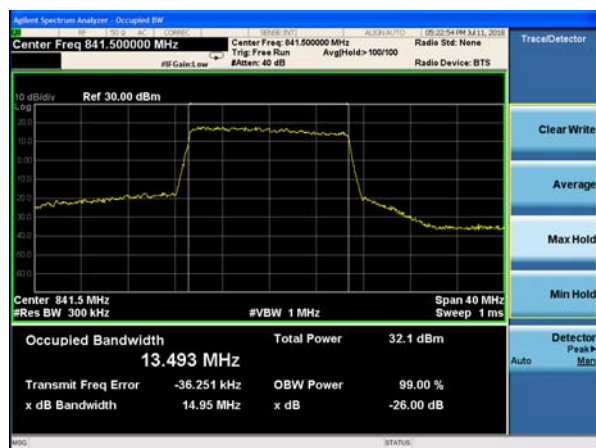
LTE Band 26 QPSK 15MHz CH-Middle



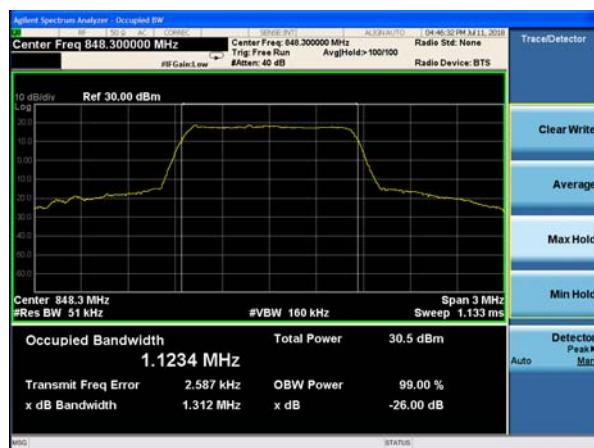
LTE Band 26 16QAM 1.4MHz CH-Middle



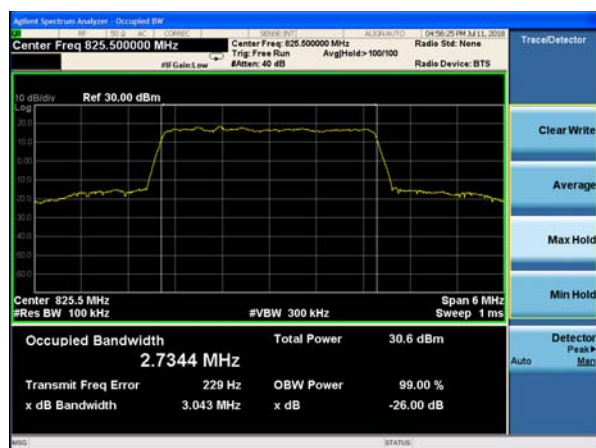
LTE Band 26 QPSK 15MHz CH-High



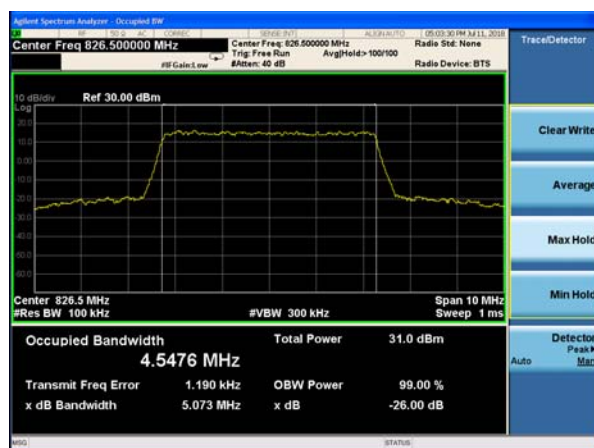
LTE Band 26 16QAM 1.4MHz CH-High



LTE Band 26 16QAM 3MHz CH-Low



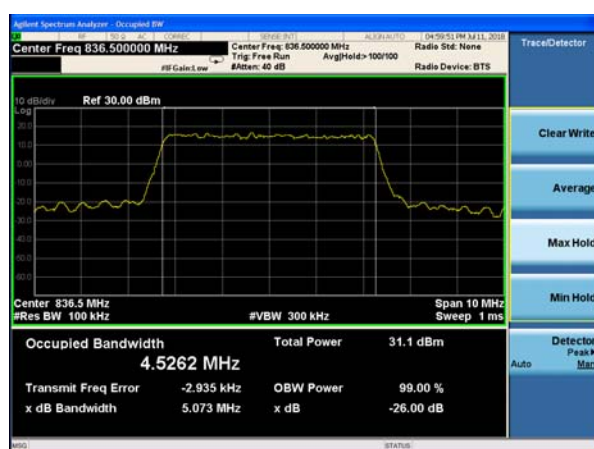
LTE Band 26 16QAM 5MHz CH-Low



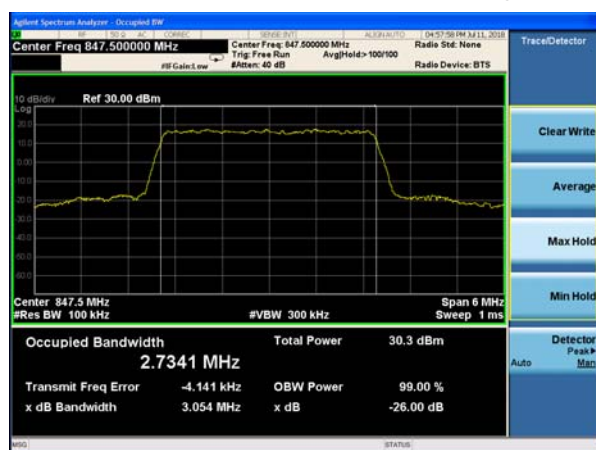
LTE Band 26 16QAM 3MHz CH-Middle



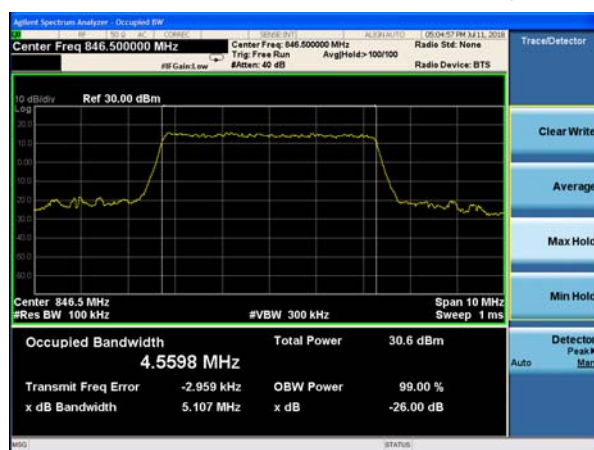
LTE Band 26 16QAM 5MHz CH-Middle



LTE Band 26 16QAM 3MHz CH-High



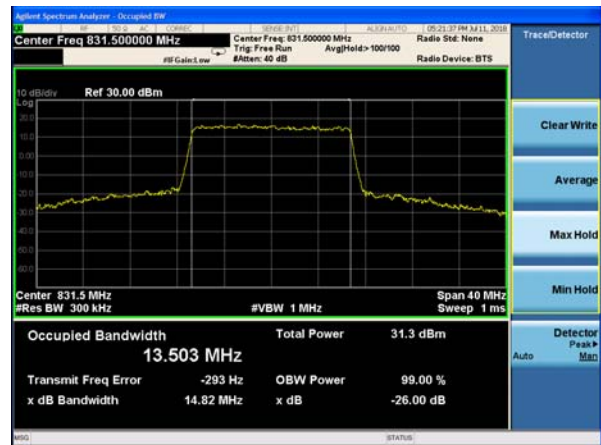
LTE Band 26 16QAM 5MHz CH-High



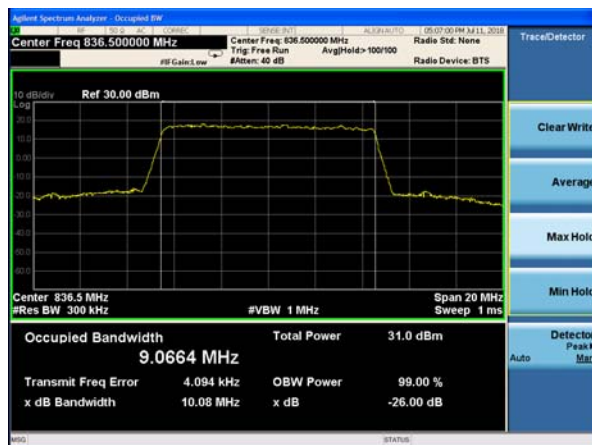
LTE Band 26 16QAM 10MHz CH-Low



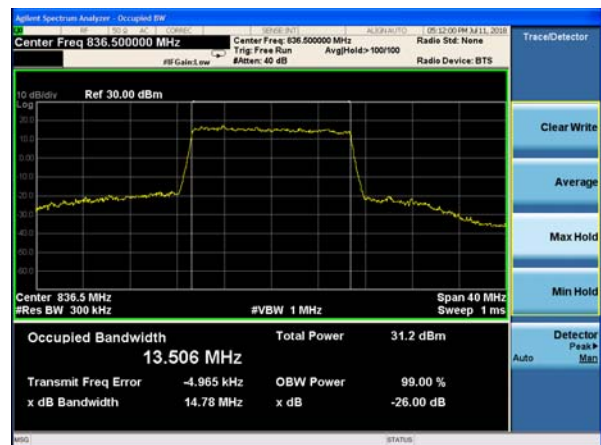
LTE Band 26 16QAM 15MHz CH-Low



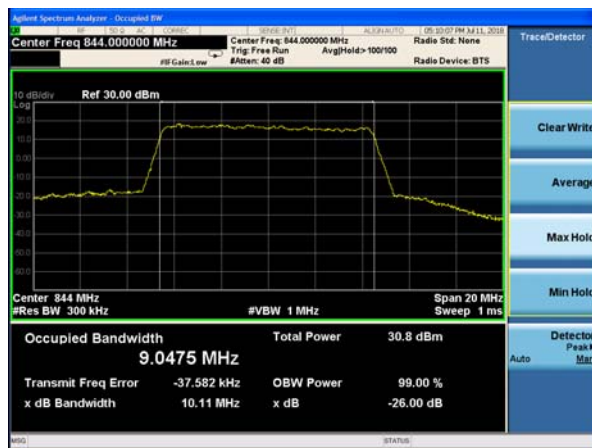
LTE Band 26 16QAM 10MHz CH-Middle



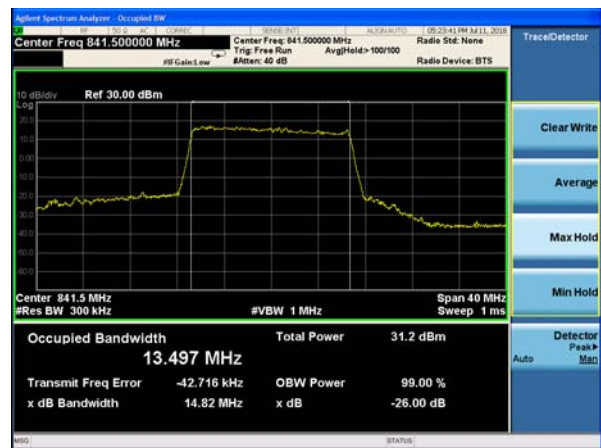
LTE Band 26 16QAM 15MHz CH-Middle



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 51kHz,VBW is set to 160kHz for WCDMA Band V,

RBW is set to 15 kHz, VBW is set to 51 kHz for LTE Band 5/26 (1.4MHz),

RBW is set to 30 kHz, VBW is set to 100 kHz for LTE Band 5/26 (3MHz),

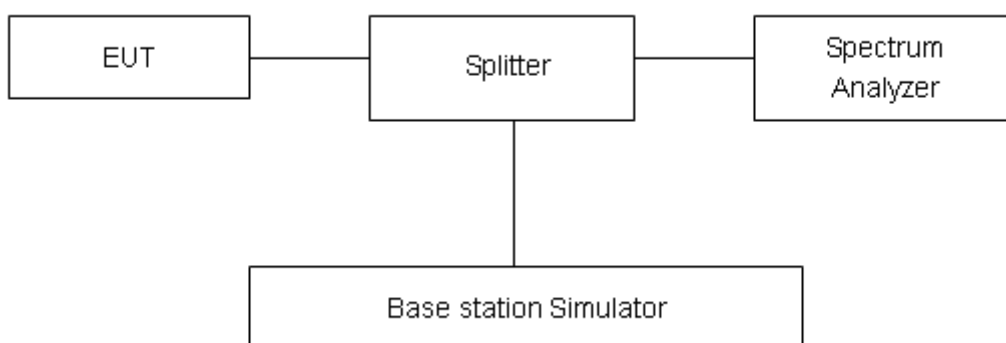
RBW is set to 51 kHz, VBW is set to 160 kHz for LTE Band 5/26 (5MHz),

RBW is set to 100 kHz, VBW is set to 300 kHz for LTE Band 5/26 (10MHz),

RBW is set to 150 kHz, VBW is set to 510kHz for LTE Band 26 (15MHz).

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.”

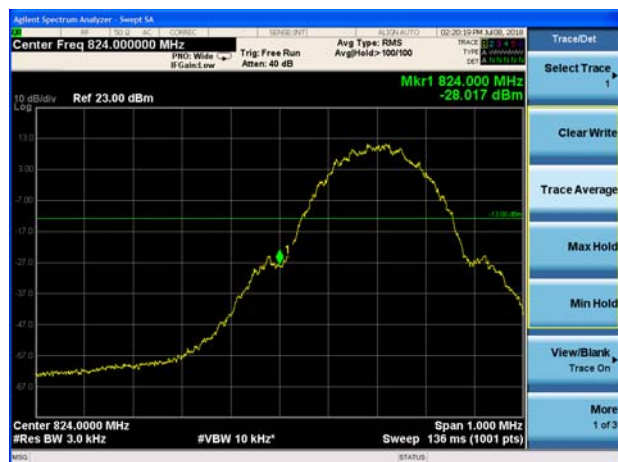
Limit	-13 dBm
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Measurement Uncertainty

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

Test Result:

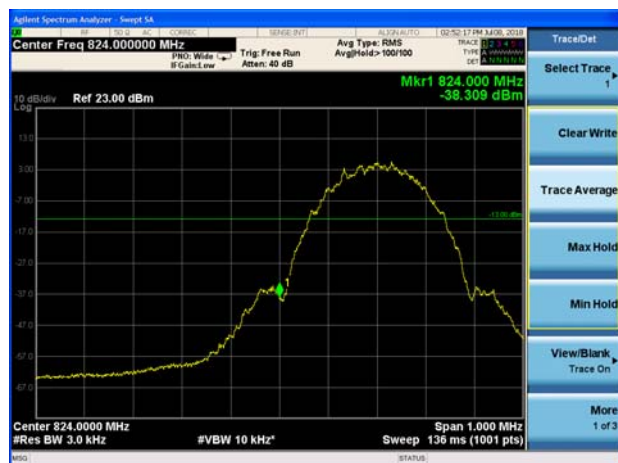
GSM 850 GPRS CH-Low



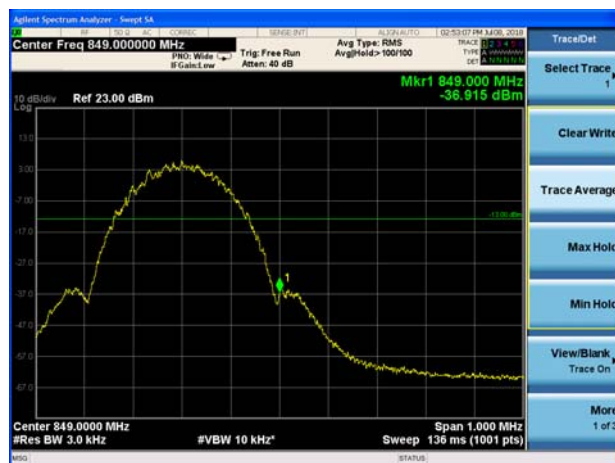
GSM 850 GPRS CH-High



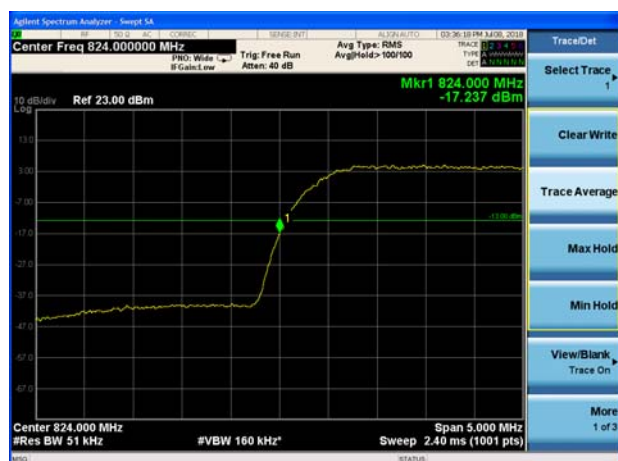
GSM 850 EGPRS CH-Low



GSM 850 EGPRS CH-High



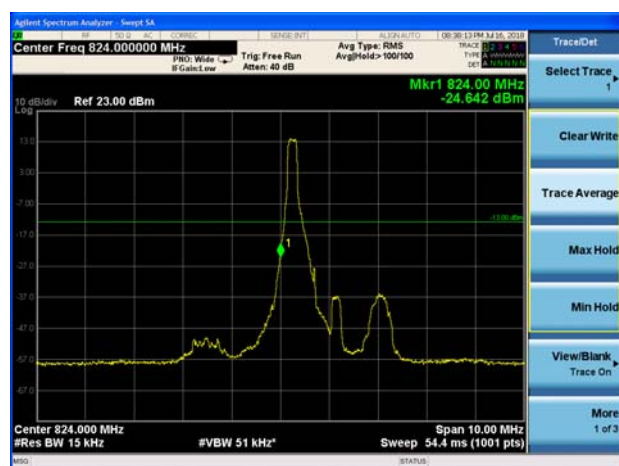
WCDMA Band V CH-Low



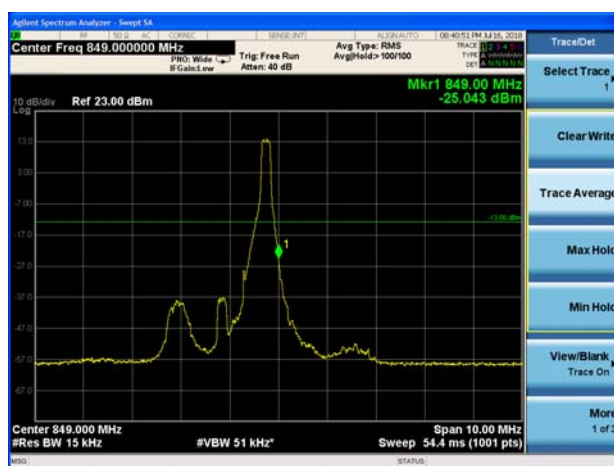
WCDMA Band V CH-High



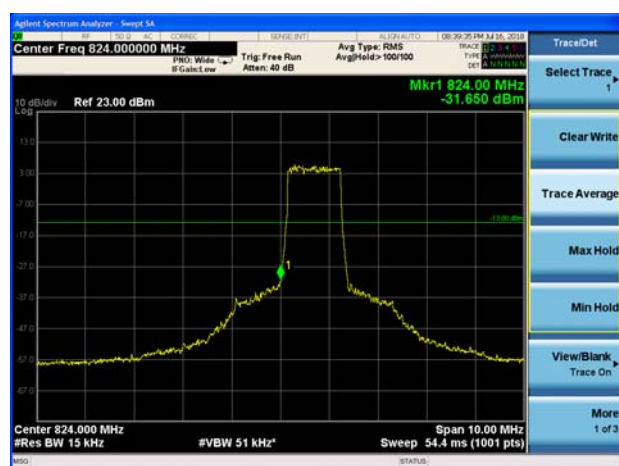
LTE Band 5 QPSK 1.4MHz CH-Low 1RB



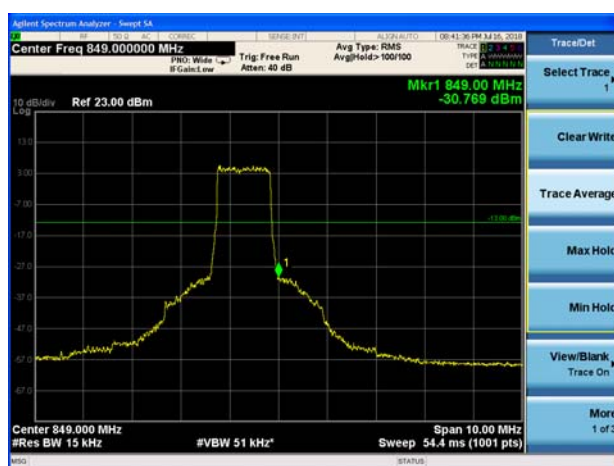
LTE Band 5 QPSK 1.4MHz CH-High 1RB



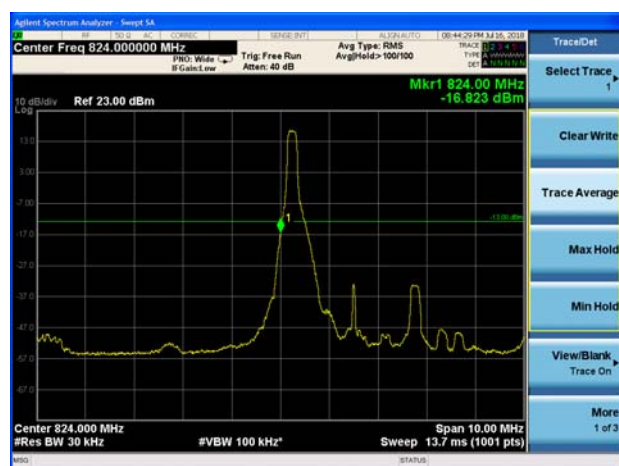
LTE Band 5 QPSK 1.4MHz CH-Low 100%RB



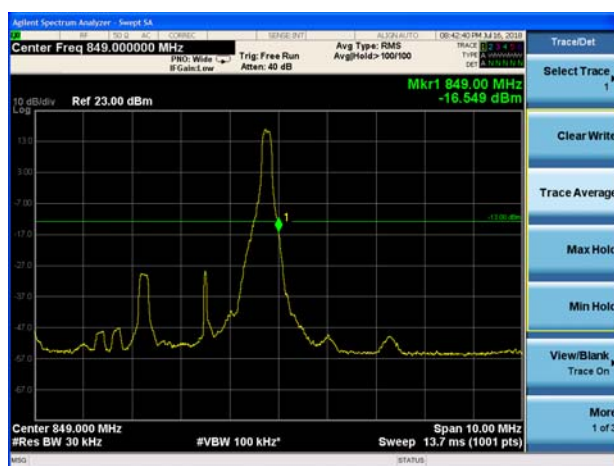
LTE Band 5 QPSK 1.4MHz CH-High 100%RB



LTE Band 5 QPSK 3MHz CH-Low 1RB



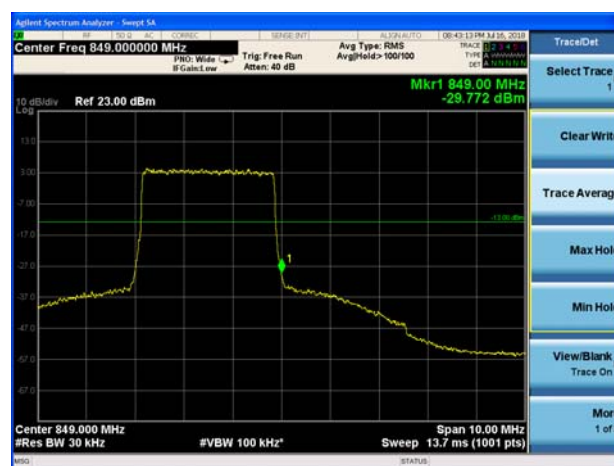
LTE Band 5 QPSK 3MHz CH-High 1RB



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



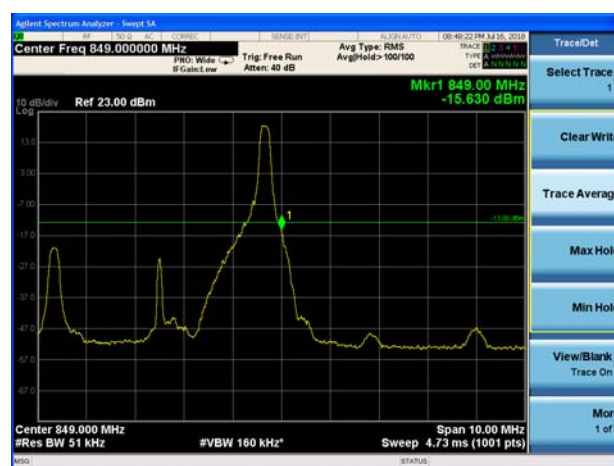
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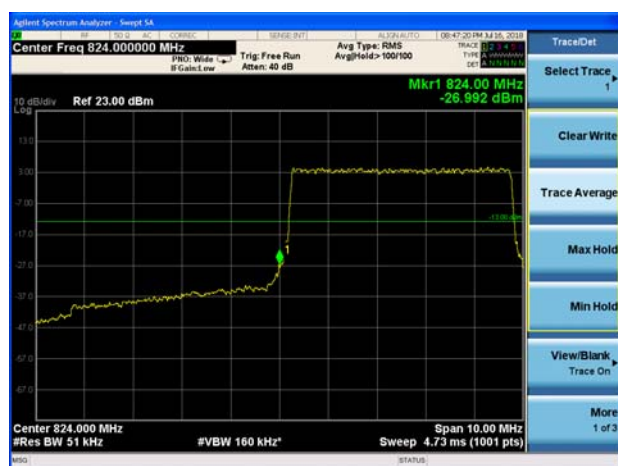
LTE Band 5 QPSK 5MHz CH-Low 1RB



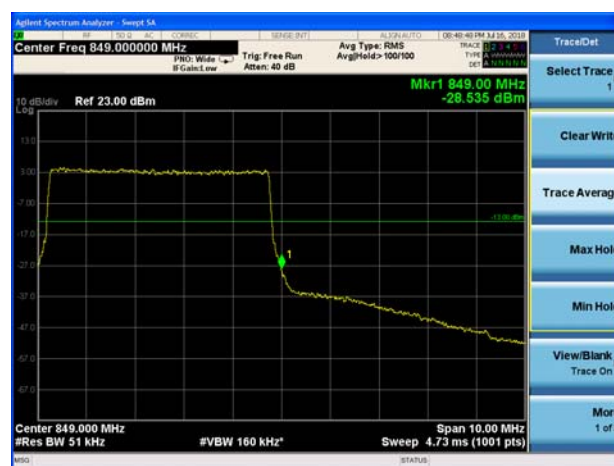
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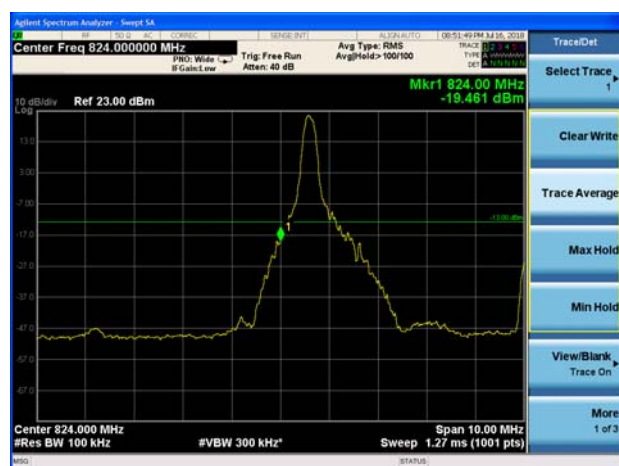
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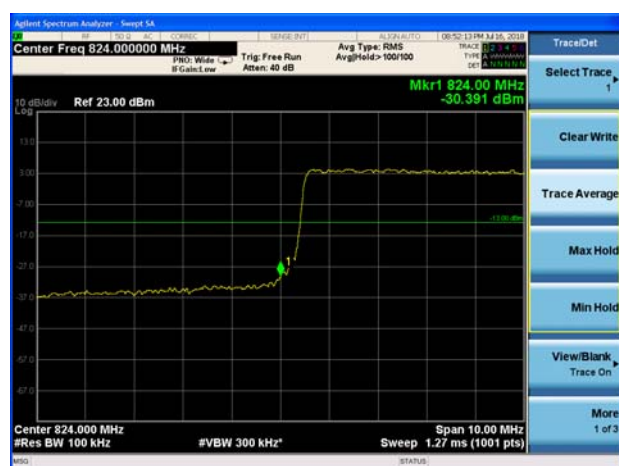
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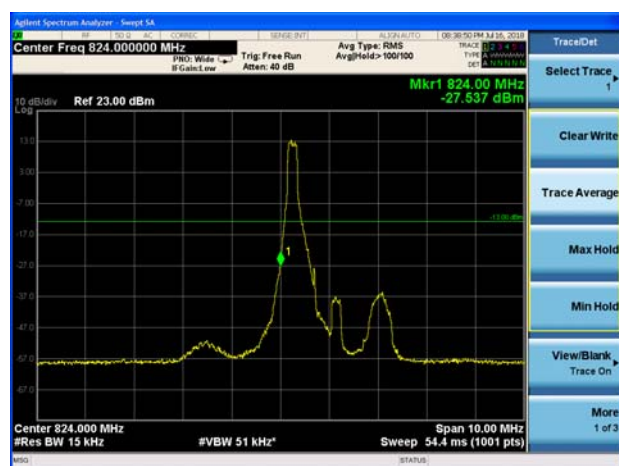
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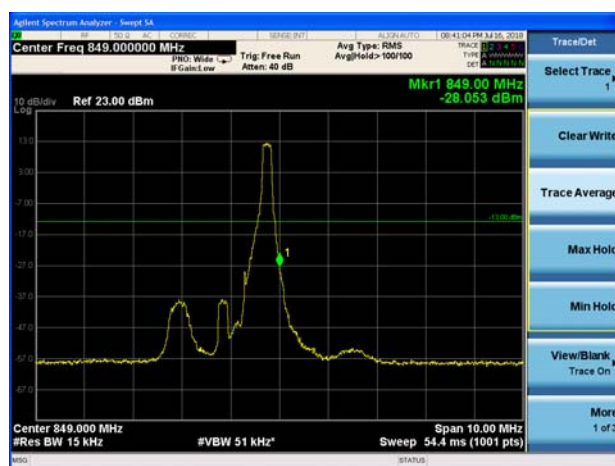
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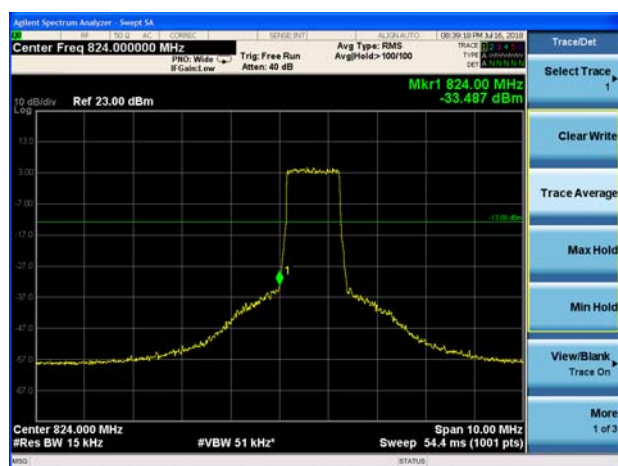
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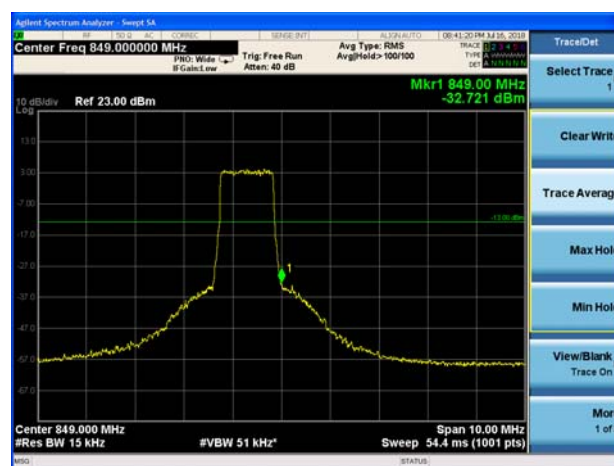
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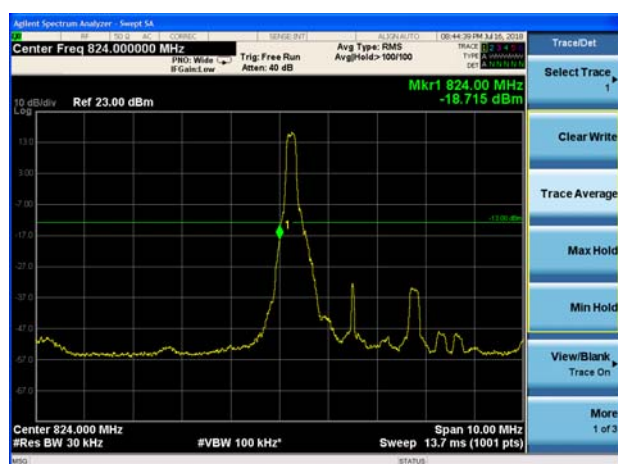
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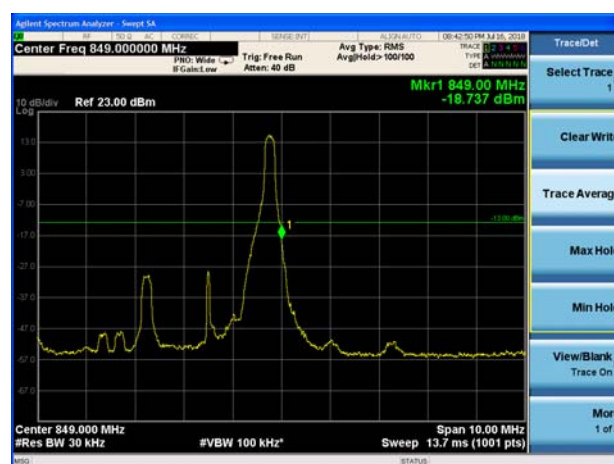
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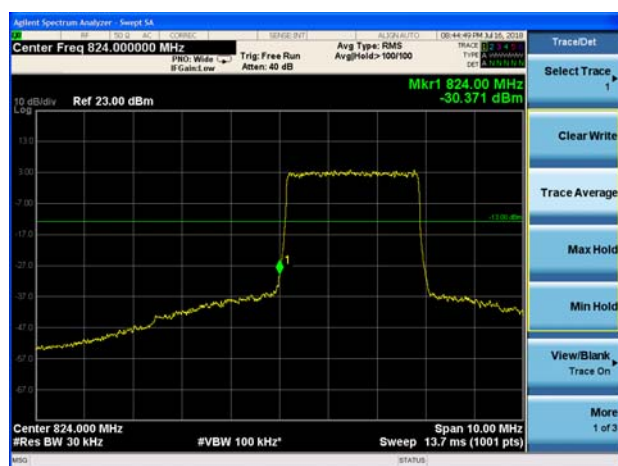
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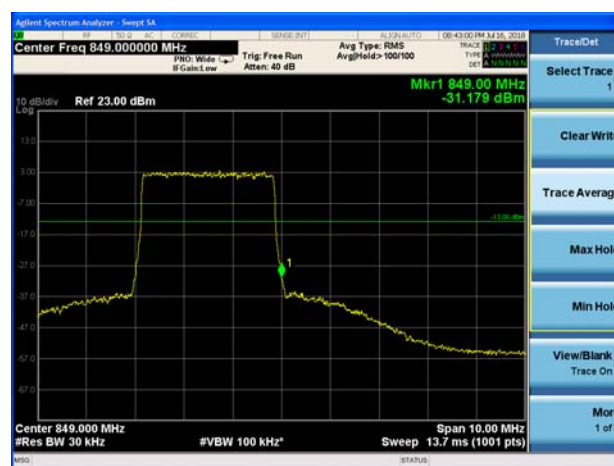
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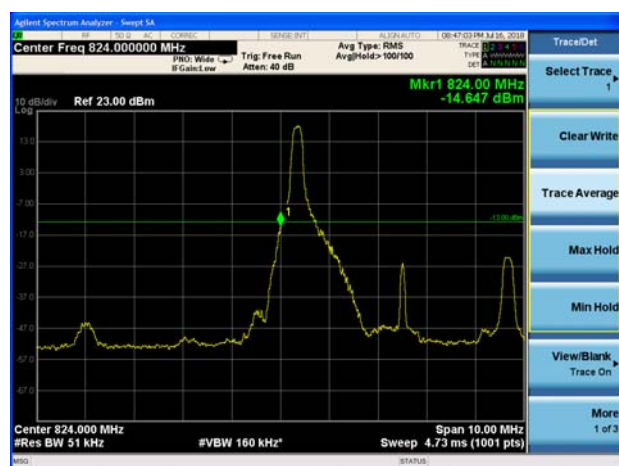
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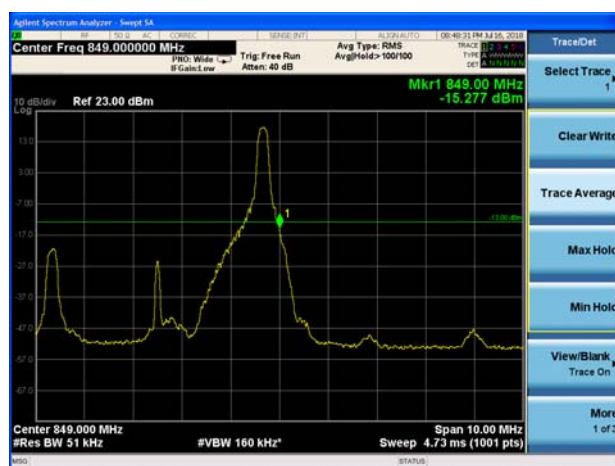
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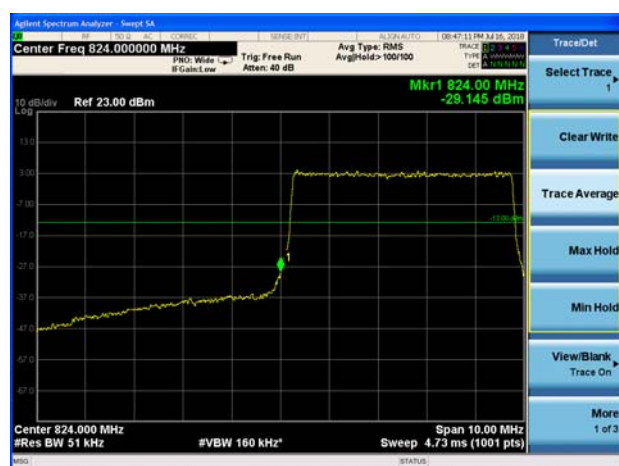
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LTE Band 5 16QAM 5MHz CH-High 1RB



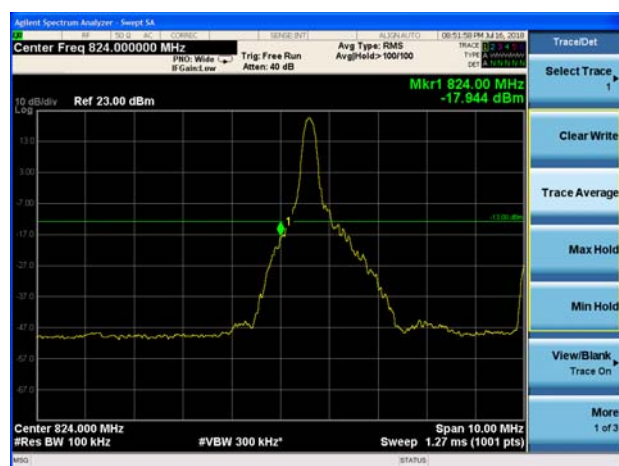
LTE Band 5 16QAM 5MHz CH-Low 100%RB



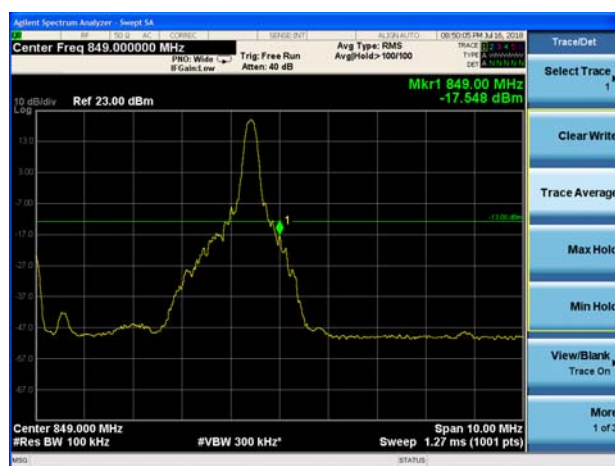
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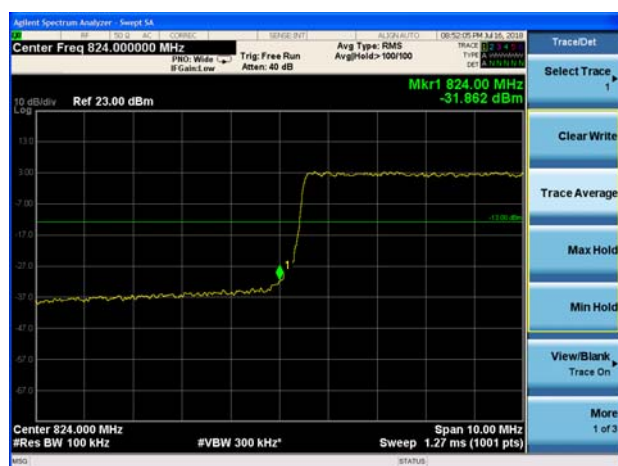
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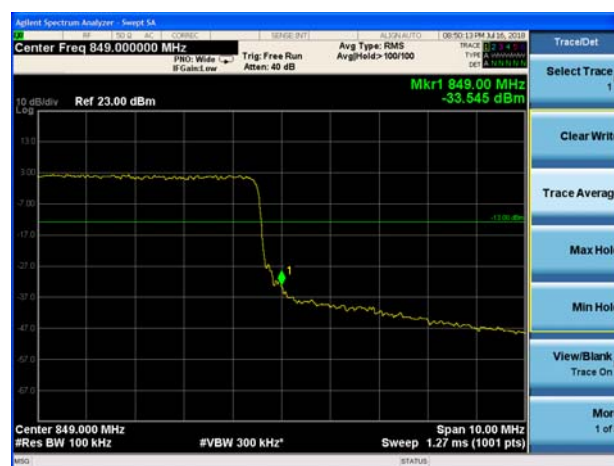
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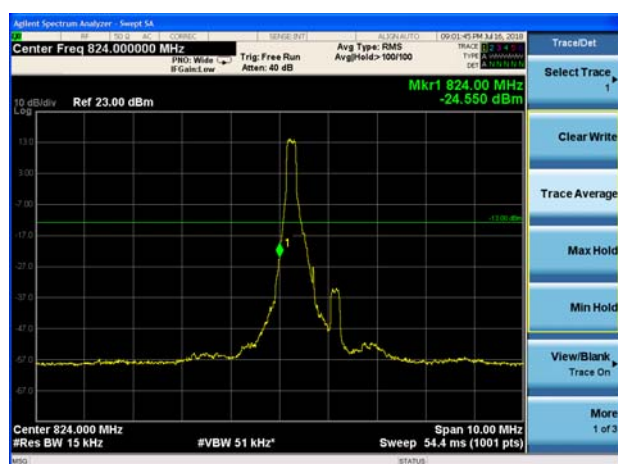
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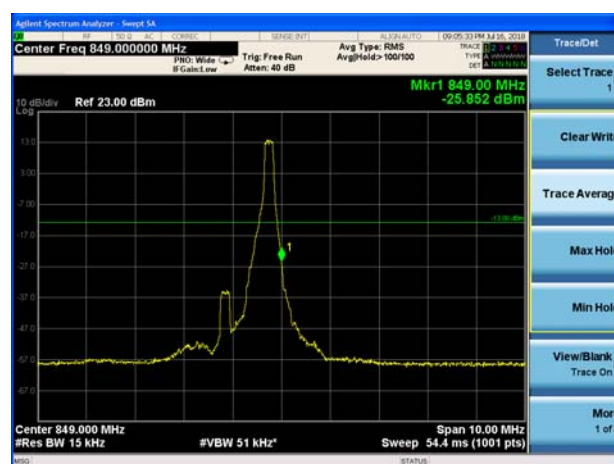
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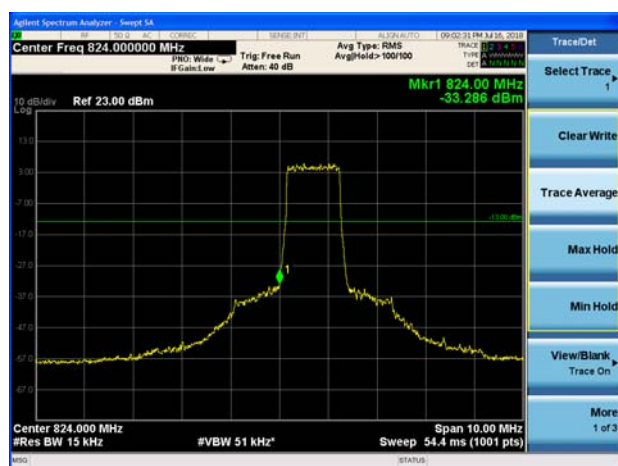
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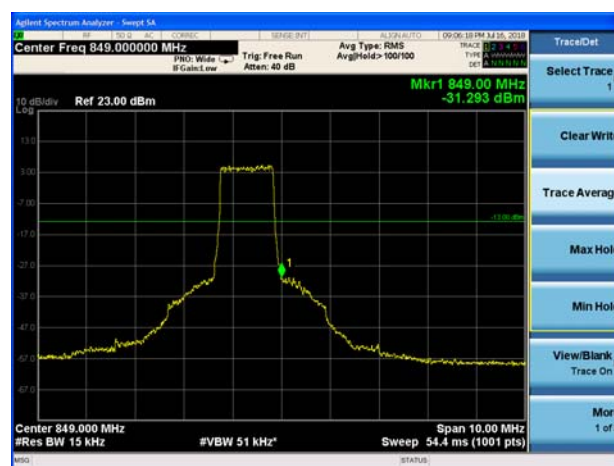
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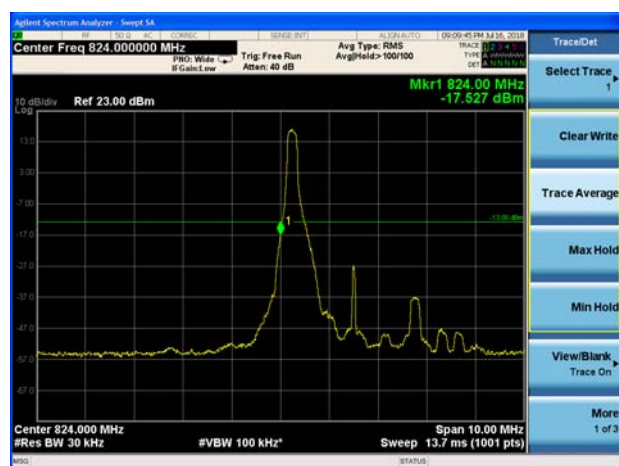
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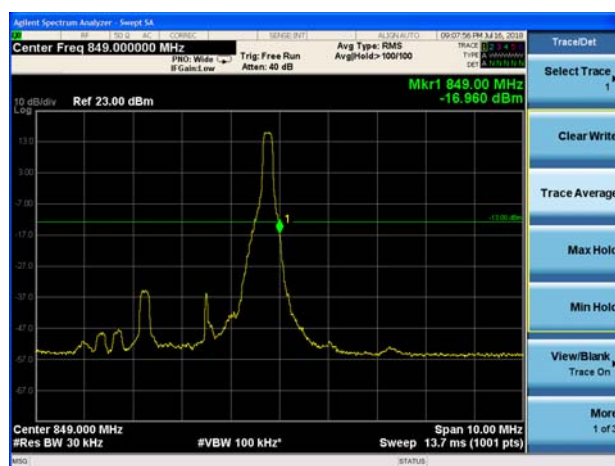
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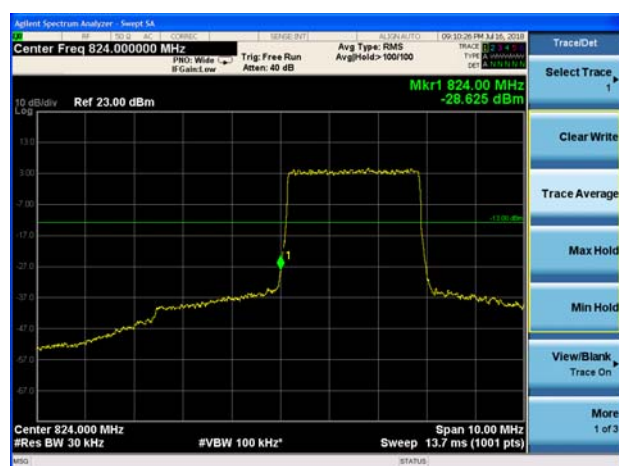
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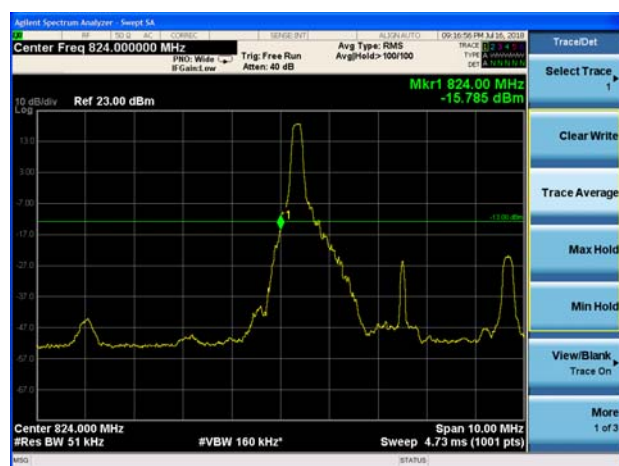
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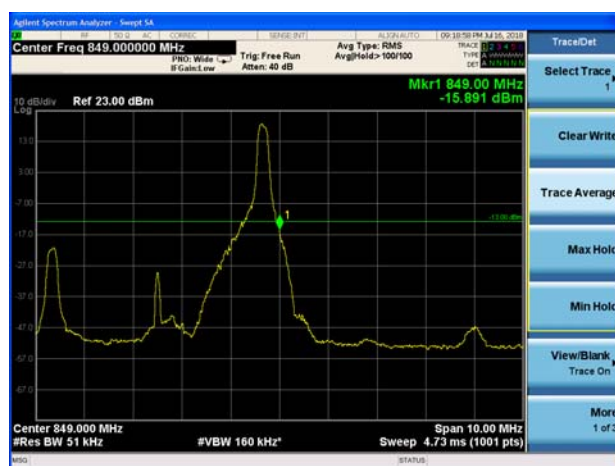
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LTE Band 26 QPSK 5MHz CH-Low 1RB



LTE Band 26 QPSK 5MHz CH-High 1RB



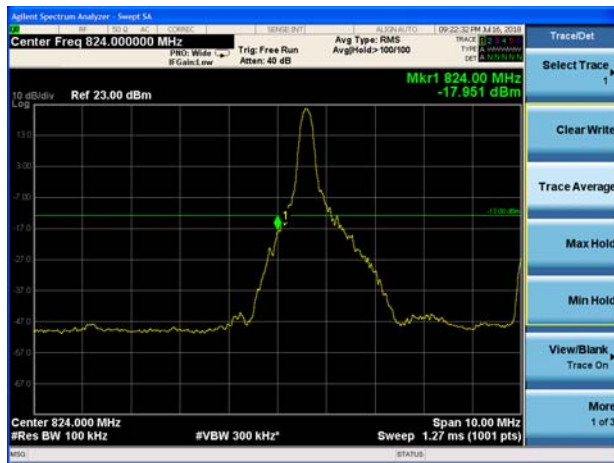
LTE Band 26 QPSK 5MHz CH-Low 100%RB



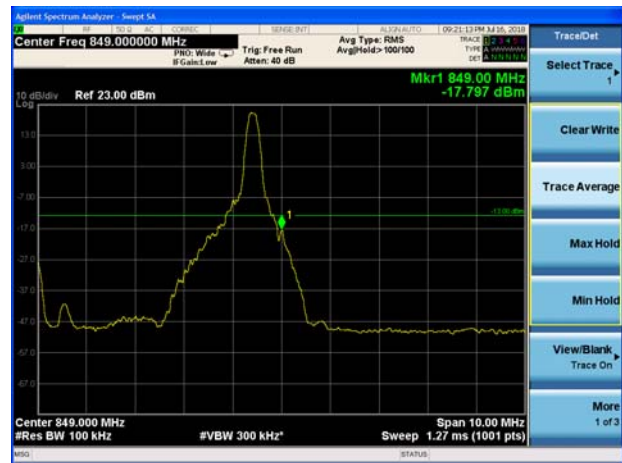
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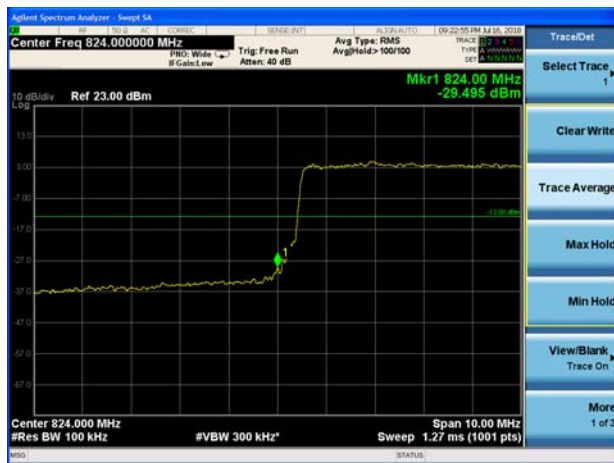
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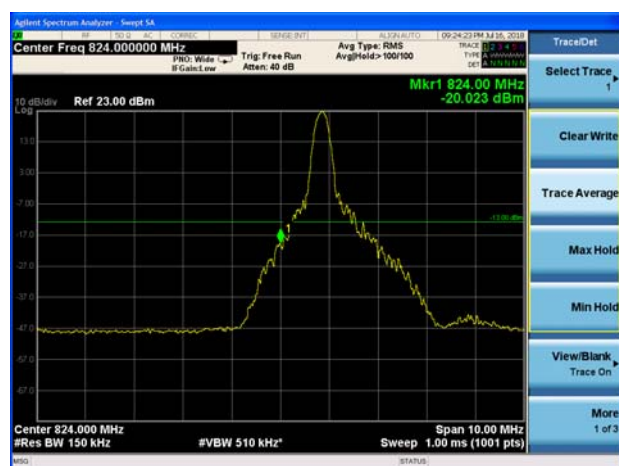
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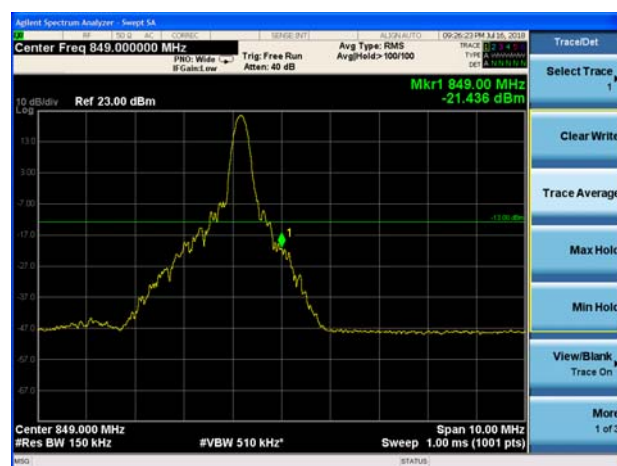
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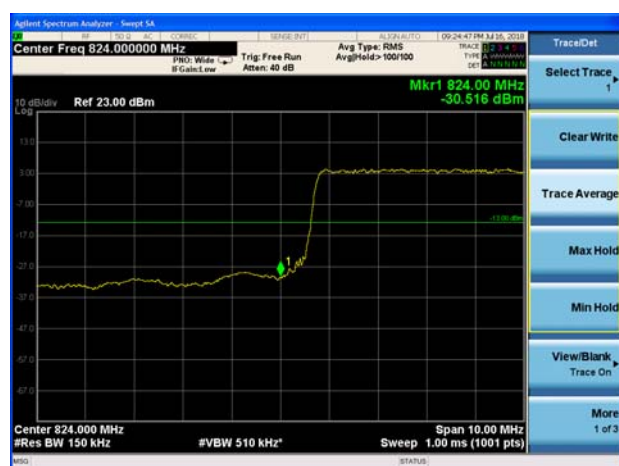
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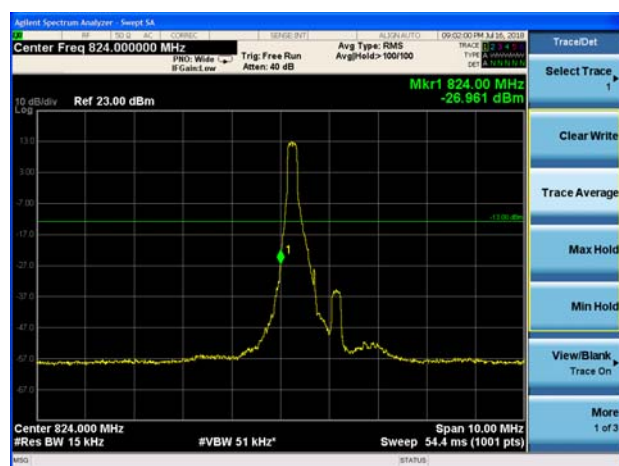
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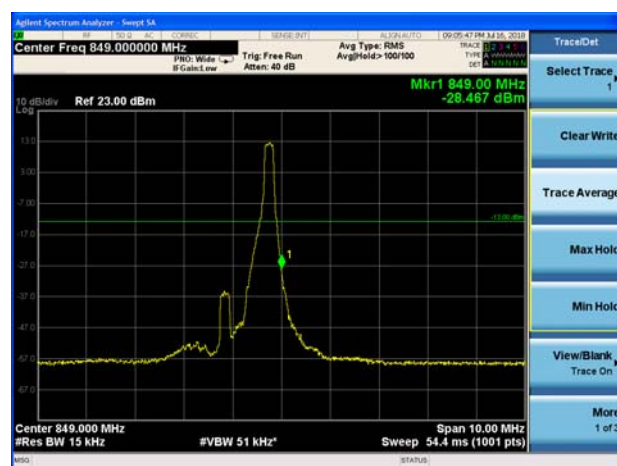
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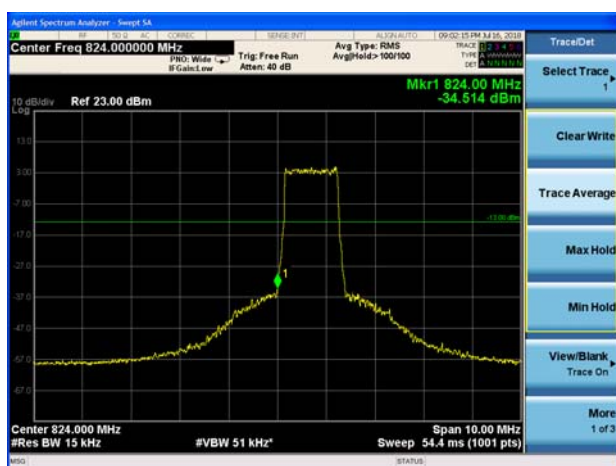
LTE Band 26 16QAM 1.4MHz CH-Low 1RB



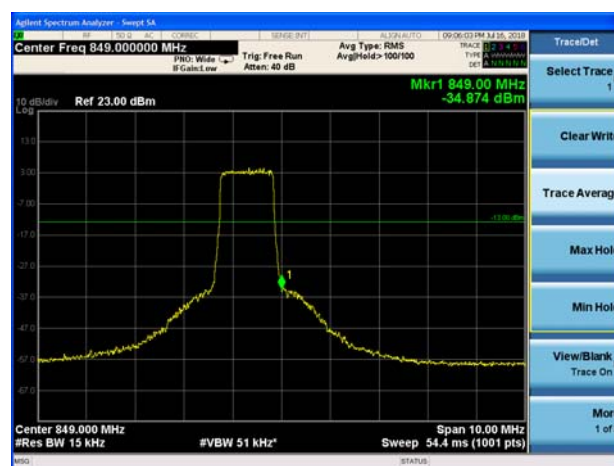
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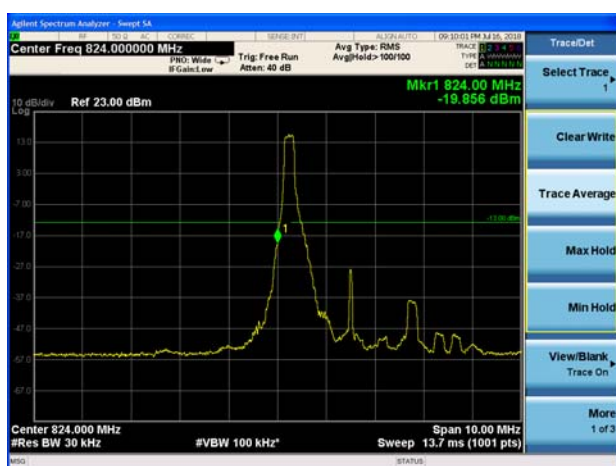
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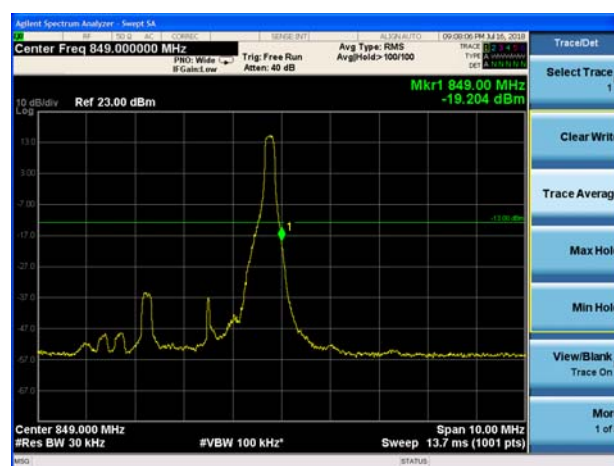
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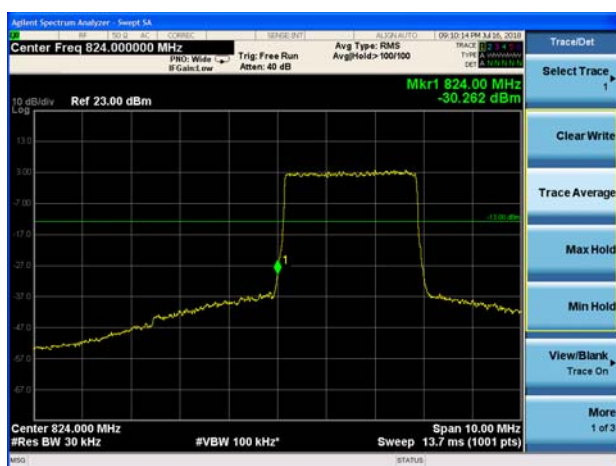
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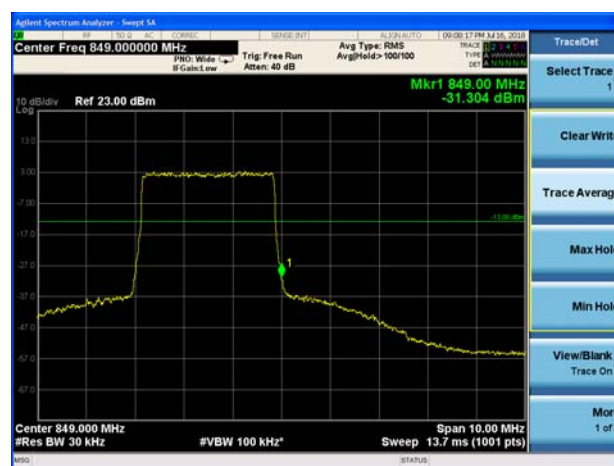
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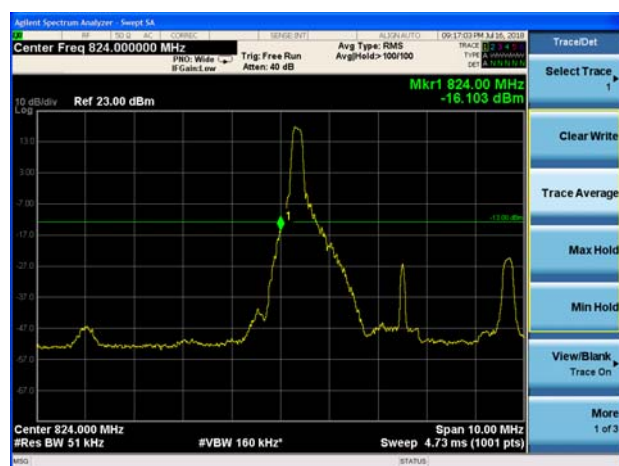
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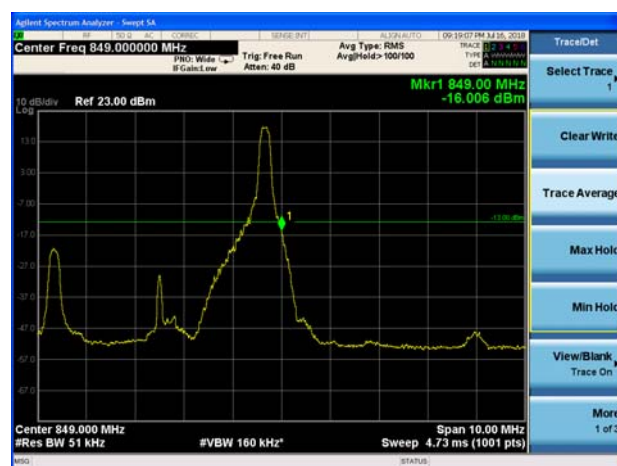
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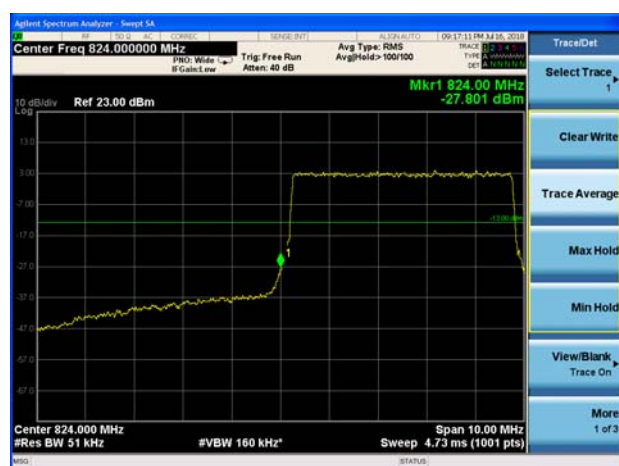
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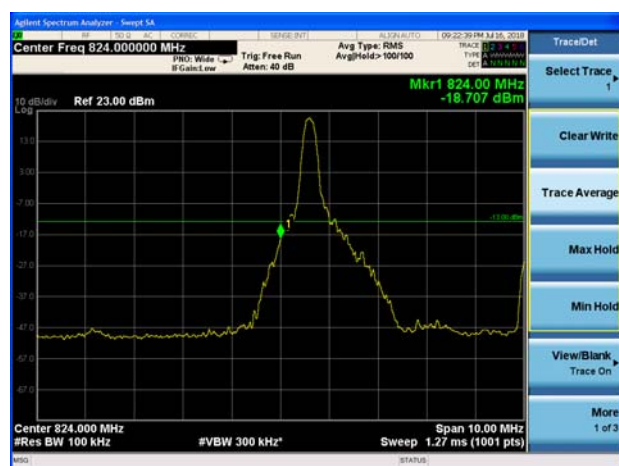
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LTE Band 26 16QAM 5MHz CH-High 100%RB



LTE Band 26 16QAM 10MHz CH-Low 1RB



LTE Band 26 16QAM 10MHz CH-High 1RB

