



RF TEST REPORT

Applicant Huawei Technologies Co., Ltd.
FCC ID QISAMN-LX3B
Product Smart Phone
Model AMN-LX3X
Report No. R1904H0063-R3
Issue Date May 6, 2019

TA Technology (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in **FCC CFR47 Part 2 (2018)/ FCC CFR47 Part 27C (2018)**. 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

Number	Test Case	Clause in FCC rules	Verdict
1	RF power output	2.1046	PASS
2	Effective Isotropic Radiated power	27.50(d)(4) /27.50(h)(2)	PASS
3	Occupied Bandwidth	2.1049	PASS
4	Band Edge Compliance	27.53(h) /27.53(m)	PASS
5	Peak-to-Average Power Ratio	27.50(d)/KDB971168 D01(5.7)	PASS
6	Frequency Stability	2.1055 / 27.54	PASS
7	Spurious Emissions at Antenna Terminals	2.1051 /27.53(h) /27.53(m)	PASS
8	Radiates Spurious Emission	2.1053 /27.53(h) /27.53(m)	PASS
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.			
Date of Testing: April 11, 2019~ April 26, 2019			

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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City: Shanghai
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2 General Description of Equipment under Test

Client Information

Applicant	Huawei Technologies Co., Ltd.
Applicant address	Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District, Shenzhen, 518129, P.R.China.
Manufacturer	Huawei Technologies Co., Ltd.
Manufacturer address	Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District, Shenzhen, 518129, P.R.China.

General information

EUT Description			
Model	AMN-LX3X		
SN	BKLNU19330100284		
Hardware Version	HL1AMNMY		
Software Version	9.0.1.75(C900E31R1P2)		
Power Supply	Battery/AC adapter		
Antenna Type	Internal Antenna		
Antenna Gain	WCDMA Band IV: -0.41dBi LTE Band 4: -0.41dBi LTE Band 7: -0.37dBi		
Test Mode(s)	WCDMA Band IV; LTE Band 4; LTE Band7;		
Test Modulation	(WCDMA) BPSK, QPSK,16QAM; (LTE)QPSK 16QAM;		
HSDPA UE Category	14		
HSUPA UE Category	7		
DC-HSDPA UE Category	24		
HSPA+ UE Category	7		
LTE Category	4		
Maximum E.I.R.P./ E.R.P.	WCDMA Band IV:	24.52dBm	
	LTE Band 4:	20.67dBm	
	LTE Band 7:	20.59dBm	
Rated Power Supply Voltage:	3.82V		
Extreme Voltage	Minimum: 3.6V Maximum: 4.4V		
Extreme Temperature	Lowest: -10°C Highest: +55°C		
Operating Frequency Range(s)	Mode	Tx (MHz)	Rx (MHz)
	WCDMA Band IV	1710 ~ 1755	2110 ~ 2155
	LTE Band 4	1710 ~ 1755	2110 ~ 2155
	LTE Band 7	2500 ~ 2570	2620 ~ 2690

EUT Accessory	
Adapter 1	Manufacturer: Huawei Technologies Co., Ltd. (SHENZHEN HUNTKEY ELECTRIC CO., LTD.) Model: HW-050100U01
Adapter 2	Manufacturer: Huawei Technologies Co., Ltd. (HUIZHOU BYD ELECTRONIC CO., LTD.) Model: HW-050100U01
Adapter 3	Manufacturer: Huawei Technologies Co., Ltd. (Dongguan Phitek Electronics Co., Ltd.) Model: HW-050100U01
Battery 1	Manufacturer: Huawei Technologies Co., Ltd. (SCUD (Fujian) Electronics Co., LTD.) Model: HB405979ECW
Battery 2	Manufacturer: Huawei Technologies Co., Ltd. (Desay Battery Electronic Co.,LTD) Model: HB405979ECW
Battery 3	Manufacturer: Huawei Technologies Co., Ltd. (Sunwoda Electronic Co.,LTD) Model: HB405979ECW
Earphone 1	Manufacturer: Jiangxi Lianchuang Hongsheng Electronic Co.,LTD. Model: MEND1532B528A02
Earphone 2	Manufacturer: FOXCONN INTERCONNECT TECHNOLOGY LIMITED Model: EPAB542-2WH05-DH
Earphone 3	Manufacturer: Boluo County Quancheng Electronic Co.,Ltd. Model: 1293-3283-3.5MM-322
USB Cable 1	Manufacturer: HONGLIN TECHNOLOGY CO.,LTD. Model: 130-26654
USB Cable 2	Manufacturer: Dongguan Ming Ji Electronics Co.,Ltd. Model: 203-0786-0
USB Cable 3	Manufacturer: Luxshare Precision industry Co., Ltd. Model: L99U2013-CS-H
USB Cable 4	Manufacturer: NingBo Broad Telecommunication Co., Ltd. Model: WA0007
Note: The information of the EUT is declared by the manufacturer. 2. There are more than one USB Cable, Battery, Earphone and Adapter, each one should be applied throughout the compliance test respectively, however, only the worst case (USB cable 1, Battery 1, Earphone3, Adapter 3) will be recorded in this report.	



3 Applied Standards

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

Test standards

FCC CFR47 Part 2 (2018)

FCC CFR47 Part 27C (2018)

ANSI C63.26 (2015)

KDB 971168 D01 Power Meas License Digital Systems v03r01

4 Test Configuration

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

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.

The following testing in different Bandwidth is set to detail in the following table:

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

Test items	Modes/Modulation
	WCDMA Band IV
RF power output	RMC HSDPA/HSUPA DC-HSDPA/HSPA+
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 4/7:

Test items	Modes	Bandwidth (MHz)						Modulation		RB			Test Channel		
		1.4	3	5	10	15	20	QPSK	16QAM	1	50%	100%	L	M	H
RF power output	LTE 4	O	O	O	O	O	O	O	O	O	O	O	O	O	O
	LTE 7	-	-	O	O	O	O	O	O	O	O	O	O	O	O
Effective Isotropic Radiated power	LTE 4	O	O	O	O	O	O	O	O	O	O	O	O	O	O
	LTE 7	-	-	O	O	O	O	O	O	O	O	O	O	O	O
Occupied Bandwidth	LTE 4	O	O	O	O	O	O	O	O	-	-	O	O	O	O
	LTE 7	-	-	O	O	O	O	O	O	-	-	O	O	O	O
Band Edge Compliance	LTE 4	O	O	O	O	O	O	O	O	O	-	O	O	-	O
	LTE 7	-	-	O	O	O	O	O	O	O	-	O	O	-	O
Peak-to-Average Power Ratio	LTE 4	O	O	O	O	O	O	O	O	-	-	O	O	O	O
	LTE 7	-	-	O	O	O	O	O	O	-	-	O	O	O	O
Frequency Stability	LTE 4	O	O	O	O	O	O	O	O	O	O	O	O	O	O
	LTE 7	-	-	O	O	O	O	O	O	O	O	O	O	O	O
Spurious Emissions at Antenna Terminals	LTE 4	O	O	O	O	O	O	O	-	O	-	-	O	O	O
	LTE 7	-	-	O	O	O	O	O	-	O	-	-	O	O	O
Radiates Spurious Emission	LTE 4	O	-	O	-	-	O	O	-	O	-	-	-	O	-
	LTE 7	-	-	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

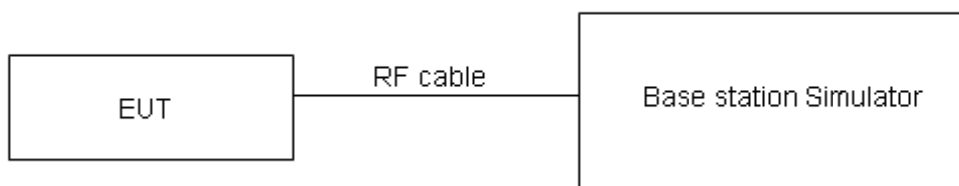
Ambient condition

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 IV		Conducted Power(dBm)		
		Channel 1312	Channel 1413	Channel 1513
		1712.4 (MHz)	1732.6 (MHz)	1752.6(MHz)
RMC	12.2k	23.79	23.80	23.81
	64k	23.80	23.79	23.83
	144k	23.81	23.77	23.82
	384k	23.78	23.78	23.84
HSDPA	Sub - Test 1	23.33	23.44	23.33
	Sub - Test 2	23.17	23.44	23.45
	Sub - Test 3	22.75	22.86	22.95
	Sub - Test 4	22.91	22.74	22.83
HSUPA	Sub - Test 1	21.81	21.84	21.65
	Sub - Test 2	21.67	21.76	21.89
	Sub - Test 3	22.65	22.84	22.79
	Sub - Test 4	21.13	21.14	21.41
	Sub - Test 5	22.95	22.74	22.67
DC-HSDPA	Sub - Test 1	23.31	23.38	23.39
	Sub - Test 2	23.41	23.22	23.45
	Sub - Test 3	22.81	22.70	22.79
	Sub - Test 4	22.63	22.68	22.87
HSPA+	16QAM	22.21	22.16	22.27

LTE Band 4				Conducted Power(dBm)		
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				19957/1710.7	20175/1732.5	20393/1754.3
1.4MHz	QPSK	1	0	23.42	23.31	23.30
		1	2	23.86	23.60	23.71
		1	5	23.21	23.08	23.26
		3	0	23.67	23.77	23.71
		3	2	23.57	23.72	23.78
		3	3	23.60	23.56	23.51
		6	0	22.61	22.66	22.72
	16QAM	1	0	23.10	22.87	22.84
		1	2	23.08	23.08	23.13
		1	5	22.61	22.15	22.75
		3	0	22.61	22.58	22.80
		3	2	22.71	22.73	22.61
		3	3	22.42	22.31	22.54
		6	0	21.69	21.49	21.81
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				19965/1711.5	20175/1732.5	20385/1753.5
3MHz	QPSK	1	0	23.44	23.35	23.33
		1	7	23.84	23.63	23.75
		1	14	23.24	23.13	23.30
		8	0	22.77	22.89	22.84
		8	4	22.69	22.82	22.90
		8	7	22.70	22.67	22.61
		15	0	22.61	22.70	22.75
	16QAM	1	0	23.13	22.89	22.87
		1	7	23.11	23.08	23.17
		1	14	22.63	22.19	22.78
		8	0	21.72	21.71	21.92
		8	4	21.82	21.86	21.73
		8	7	21.52	21.43	21.67
		15	0	21.72	21.53	21.84
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				19975/1712.5	20175/1732.5	20375/1752.5
5MHz	QPSK	1	0	23.41	23.33	23.29
		1	13	23.82	23.59	23.72
		1	24	23.21	23.08	23.26
		12	0	22.74	22.84	22.80
		12	6	22.67	22.78	22.85
		12	13	22.68	22.65	22.57
		25	0	22.61	22.69	22.73



	16QAM	1	0	23.10	22.85	22.84
		1	13	23.08	23.06	23.14
		1	24	22.60	22.17	22.74
		12	0	21.70	21.67	21.89
		12	6	21.79	21.81	21.69
		12	13	21.49	21.38	21.63
		25	0	21.70	21.49	21.79
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				20000/1715	20175/1732.5	20350/1750
10MHz	QPSK	1	0	23.43	23.34	23.32
		1	25	23.85	23.64	23.76
		1	49	23.23	23.12	23.29
		25	0	22.77	22.89	22.84
		25	13	22.70	22.83	22.89
		25	25	22.70	22.69	22.62
		50	0	22.65	22.71	22.77
	16QAM	1	0	23.12	22.88	22.86
		1	25	23.11	23.10	23.17
		1	49	22.63	22.19	22.77
		25	0	21.73	21.72	21.93
		25	13	21.81	21.85	21.72
		25	25	21.52	21.43	21.67
		50	0	21.73	21.54	21.83
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				20025/1717.5	20175/1732.5	20325/1747.5
15MHz	QPSK	1	0	23.42	23.30	23.30
		1	38	23.83	23.63	23.73
		1	74	23.20	23.07	23.25
		36	0	22.75	22.85	22.81
		36	18	22.67	22.78	22.85
		36	39	22.67	22.66	22.58
		75	0	22.63	22.67	22.72
	16QAM	1	0	23.07	22.86	22.84
		1	38	23.09	23.07	23.15
		1	74	22.60	22.15	22.74
		36	0	21.70	21.70	21.90
		36	18	21.78	21.80	21.68
		36	39	21.50	21.39	21.64
		75	0	21.70	21.49	21.79
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				20050/1720	20175/1732.5	20300/1745
20MHz	QPSK	1	0	23.39	23.26	23.27
		1	50	23.82	23.59	23.71



		1	99	23.18	23.06	23.22
		50	0	22.72	22.80	22.77
		50	25	22.65	22.74	22.82
		50	50	22.64	22.61	22.54
		100	0	22.60	22.62	22.68
	16QAM	1	0	22.94	22.82	22.79
		1	50	23.05	23.05	23.11
		1	99	22.58	22.12	22.72
		50	0	21.67	21.66	21.87
		50	25	21.75	21.78	21.65
		50	50	21.47	21.34	21.60
		100	0	21.68	21.45	21.76

LTE Band 7				Conducted Power(dBm)		
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				20775/2502.5	21100/2535	21425/2567.5
5MHz	QPSK	1	0	21.91	21.85	21.75
		1	13	22.32	22.10	22.26
		1	24	21.97	21.85	21.92
		12	0	21.24	21.16	21.13
		12	6	21.32	21.19	21.30
		12	13	21.36	21.21	21.27
		25	0	21.28	21.20	21.17
	16QAM	1	0	21.89	20.97	21.03
		1	13	21.87	21.74	21.60
		1	24	21.17	21.09	21.20
		12	0	20.29	20.09	20.14
		12	6	20.32	20.21	20.19
		12	13	20.27	20.24	20.27
		25	0	20.32	20.07	20.22
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				20800/2505	21100/2535	21400/2565
10MHz	QPSK	1	0	21.93	21.86	21.78
		1	25	22.35	22.15	22.30
		1	49	21.99	21.89	21.95
		25	0	21.27	21.21	21.17
		25	13	21.35	21.24	21.34
		25	25	21.38	21.25	21.32
		50	0	21.32	21.22	21.21
	16QAM	1	0	21.91	21.00	21.05
		1	25	21.90	21.78	21.63
		1	49	21.20	21.11	21.23



		25	0	20.32	20.14	20.18
		25	13	20.34	20.25	20.22
		25	25	20.30	20.29	20.31
		50	0	20.35	20.12	20.26
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				20825/2507.5	21100/2535	21375/2562.5
15MHz	QPSK	1	0	21.92	21.82	21.76
		1	38	22.33	22.14	22.27
		1	74	21.96	21.84	21.91
		36	0	21.25	21.17	21.14
		36	18	21.32	21.19	21.30
		36	39	21.35	21.22	21.28
		75	0	21.30	21.18	21.16
	16QAM	1	0	21.86	20.98	21.03
		1	38	21.88	21.75	21.61
		1	74	21.17	21.07	21.20
		36	0	20.29	20.12	20.15
		36	18	20.31	20.20	20.18
		36	39	20.28	20.25	20.28
		75	0	20.32	20.07	20.22
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				20850/2510	21100/2535	21350/2560
20MHz	QPSK	1	0	21.89	21.78	21.73
		1	50	22.32	22.10	22.25
		1	99	21.94	21.83	21.88
		50	0	21.22	21.12	21.10
		50	25	21.30	21.15	21.27
		50	50	21.32	21.17	21.24
		100	0	21.27	21.13	21.12
	16QAM	1	0	21.03	20.94	20.98
		1	50	21.84	21.73	21.57
		1	99	21.15	21.04	21.18
		50	0	20.26	20.08	20.12
		50	25	20.28	20.18	20.15
		50	50	20.25	20.20	20.24
		100	0	20.30	20.03	20.19

5.2 Effective Isotropic Radiated Power

Ambient condition

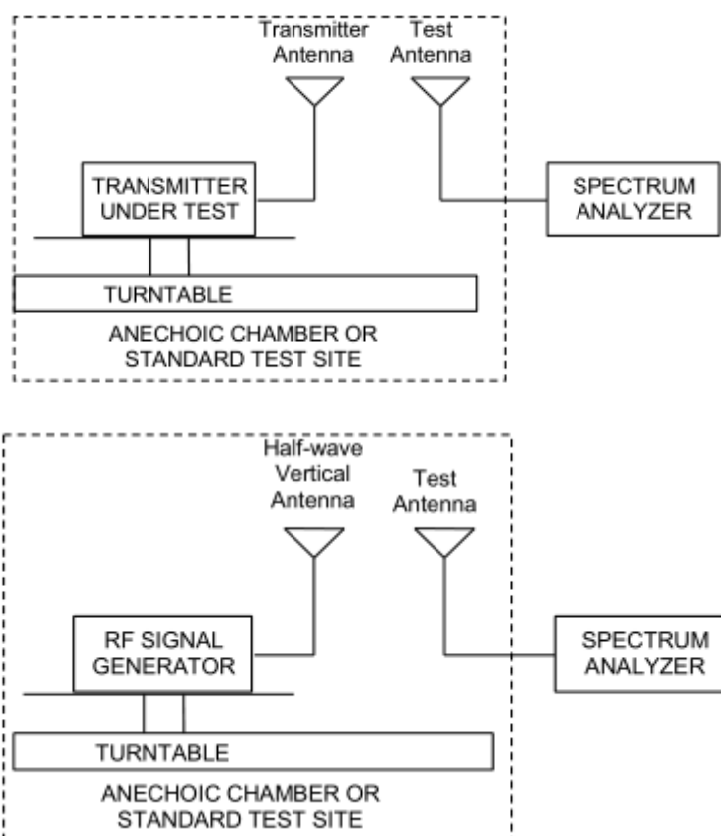
Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Methods of Measurement

1. The testing follows FCC KDB 971168 D01 v03r01 Section 5.8 and ANSI C63.26 (2015).
 - 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. $LOSS = \text{Generator Output Power (dBm)} - \text{Analyzer reading (dBm)}$
 - e) Determine the effective radiated output power at each angular position from the readings in steps b) and d) using the following equation: $ERP \text{ (dBm)} = LVL \text{ (dBm)} + LOSS \text{ (dB)}$
 - 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:
 $EIRP \text{ (dBm)} = \text{Output Power (dBm)} - \text{Losses (dB)} + \text{Antenna Gain (dBi)}$
 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



Note: Area side:2.4mX3.6m

The radiated emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X, Y axis). The worst emission was found in stand-up position (Z axis) and the worst case was recorded.

**Limits**

Rule Part 27.50(d) (4) specifies that “Fixed, mobile and portable (hand-held) stations operating in the 1710–1755 MHz band are limited to 1 watt EIRP”

Rule Part 27.50(h) (2) specifies that “Mobile and other user stations. Mobile stations are limited to 2.0 watts EIRP. All user stations are limited to 2.0 watts transmitter output power.”

Part 27.50(d)(4)Limit	$\leq 1 \text{ W}$ (30 dBm)
Part 27.50(h)(2) Limit	$\leq 2 \text{ W}$ (33 dBm)

Measurement Uncertainty

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

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	EIRP (dBm)	Limit (dBm)	Conclusion
WCDMA Band IV	Low	1712.4	Horizontal	23.59	30	Pass
	Mid	1732.6	Horizontal	24.52	30	Pass
	High	1752.6	Horizontal	24.44	30	Pass

LTE Band 4						
Bandwidth	Channel	Frequency (MHz)	Polarization	EIRP (dBm)	Limit (dBm)	Conclusion
1.4 MHz (QPSK)	Low	1710.7	Horizontal	20.23	30	Pass
	Mid	1732.5	Horizontal	20.32	30	Pass
	High	1754.3	Horizontal	20.67	30	Pass
3 MHz (QPSK)	Low	1711.5	Horizontal	20.10	30	Pass
	Mid	1732.5	Horizontal	20.21	30	Pass
	High	1753.5	Horizontal	20.43	30	Pass
5 MHz (QPSK)	Low	1712.5	Horizontal	20.13	30	Pass
	Mid	1732.5	Horizontal	20.15	30	Pass
	High	1752.5	Horizontal	20.21	30	Pass
10 MHz (QPSK)	Low	1715	Horizontal	19.98	30	Pass
	Mid	1732.5	Horizontal	19.99	30	Pass
	High	1750	Horizontal	20.12	30	Pass
15 MHz (QPSK)	Low	1717.5	Horizontal	20.10	30	Pass
	Mid	1732.5	Horizontal	20.21	30	Pass
	High	1747.5	Horizontal	20.15	30	Pass
20 MHz (QPSK)	Low	1720	Horizontal	19.77	30	Pass
	Mid	1732.5	Horizontal	19.91	30	Pass
	High	1745	Horizontal	20.30	30	Pass
1.4 MHz (16QAM)	Low	1710.7	Horizontal	19.78	30	Pass
	Mid	1732.5	Horizontal	19.81	30	Pass
	High	1754.3	Horizontal	20.07	30	Pass
3 MHz (16QAM)	Low	1711.5	Horizontal	19.70	30	Pass
	Mid	1732.5	Horizontal	19.63	30	Pass
	High	1753.5	Horizontal	20.00	30	Pass
5 MHz (16QAM)	Low	1712.5	Horizontal	19.46	30	Pass
	Mid	1732.5	Horizontal	19.67	30	Pass
	High	1752.5	Horizontal	19.63	30	Pass
10 MHz (16QAM)	Low	1715	Horizontal	19.52	30	Pass
	Mid	1732.5	Horizontal	19.59	30	Pass
	High	1750	Horizontal	19.54	30	Pass



15 MHz (16QAM)	Low	1717.5	Horizontal	19.59	30	Pass
	Mid	1732.5	Horizontal	19.78	30	Pass
	High	1747.5	Horizontal	19.64	30	Pass
20 MHz (16QAM)	Low	1720	Horizontal	19.30	30	Pass
	Mid	1732.5	Horizontal	19.35	30	Pass
	High	1745	Horizontal	19.60	30	Pass

LTE Band 7						
Band width	Channel	Frequency (MHz)	Polarization	EIRP (dBm)	Limit (dBm)	Conclusion
5 MHz (QPSK)	Low	2502.5	Horizontal	19.89	33	Pass
	Mid	2535	Horizontal	19.97	33	Pass
	High	2567.5	Horizontal	20.43	33	Pass
10 MHz (QPSK)	Low	2505	Horizontal	19.46	33	Pass
	Mid	2535	Horizontal	19.80	33	Pass
	High	2565	Horizontal	20.59	33	Pass
15 MHz (QPSK)	Low	2507.5	Horizontal	19.99	33	Pass
	Mid	2535	Horizontal	20.05	33	Pass
	High	2562.5	Horizontal	20.23	33	Pass
20 MHz (QPSK)	Low	2510	Horizontal	20.10	33	Pass
	Mid	2535	Horizontal	20.13	33	Pass
	High	2560	Horizontal	20.32	33	Pass
5 MHz (16QAM)	Low	2502.5	Horizontal	19.43	33	Pass
	Mid	2535	Horizontal	19.57	33	Pass
	High	2567.5	Horizontal	19.85	33	Pass
10 MHz (16QAM)	Low	2505	Horizontal	18.95	33	Pass
	Mid	2535	Horizontal	19.37	33	Pass
	High	2565	Horizontal	20.08	33	Pass
15 MHz (16QAM)	Low	2507.5	Horizontal	19.52	33	Pass
	Mid	2535	Horizontal	19.49	33	Pass
	High	2562.5	Horizontal	19.53	33	Pass
20 MHz (16QAM)	Low	2510	Horizontal	19.65	33	Pass
	Mid	2535	Horizontal	19.68	33	Pass
	High	2560	Horizontal	19.85	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 51 kHz, VBW is set to 160 kHz for WCDMA Band IV.

RBW is set to 51 kHz, VBW is set to 160 kHz for LTE Band 4 (1.4MHz).

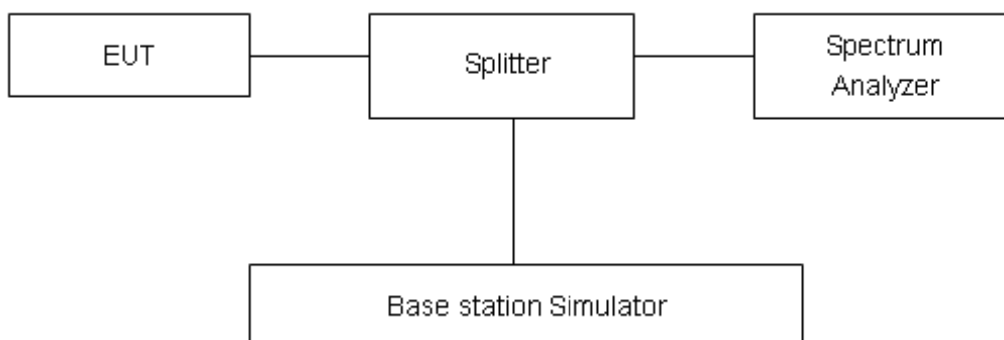
RBW is set to 100 kHz, VBW is set to 300 kHz for LTE Band 4 (3MHz).

RBW is set to 100 kHz, VBW is set to 300 kHz for LTE Band 4/7 (5MHz).

RBW is set to 300 kHz, VBW is set to 1MHz for LTE Band 4/7 (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 $k = 2$, $U=624\text{Hz}$.

Test Result



Mode	Channel	Frequency (MHz)	99% Power Bandwidth(MHz)	-26dBc Bandwidth(MHz)
WCDMA Band IV (RMC)	1312	1712.4	4.1706	4.678
	1413	1732.6	4.1600	4.678
	1513	1752.6	4.1576	4.664

LTE Band 4						
RB	Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	99% Power Bandwidth(MHz)	-26dBc Bandwidth(MHz)
100%	QPSK	1.4	19957	1710.7	1.1174	1.343
			20175	1732.5	1.1187	1.335
			20393	1754.3	1.1167	1.339
		3	19965	1711.5	2.7256	2.999
			20175	1732.5	2.7284	2.986
			20385	1753.5	2.7262	3.002
		5	19975	1712.5	4.5140	4.937
			20175	1732.5	4.5053	4.951
			20375	1752.5	4.4966	4.936
		10	20000	1715	9.0652	10.020
			20175	1732.5	9.0426	9.849
			20350	1750	9.0438	9.913
		15	20025	1717.5	13.4780	14.520
			20175	1732.5	13.4690	14.590
			20325	1747.5	13.4850	14.580
		20	20050	1720	17.9200	19.050
			20175	1732.5	17.9280	19.000
			20300	1745	17.8760	19.180
	16QAM	1.4	19957	1710.7	1.1145	1.325
			20175	1732.5	1.1083	1.307
			20393	1754.3	1.1136	1.338
		3	19965	1711.5	2.7198	2.973
			20175	1732.5	2.7186	3.007
			20385	1753.5	2.7191	2.989
		5	19975	1712.5	4.4974	4.895
			20175	1732.5	4.5140	4.956
			20375	1752.5	4.5161	4.973
		10	20000	1715	9.0473	9.883
			20175	1732.5	9.0366	9.857
			20350	1750	9.0417	9.884
		15	20025	1717.5	13.4850	14.710

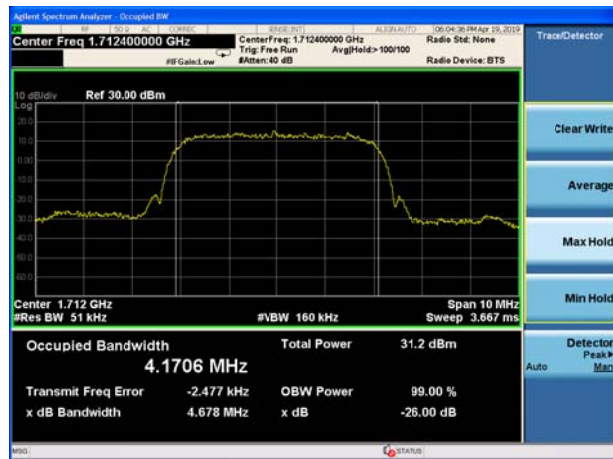


			20175	1732.5	13.4900	14.540
			20325	1747.5	13.4780	14.510
		20	20050	1720	17.9340	19.160
			20175	1732.5	17.9220	19.280
			20300	1745	17.8800	19.150

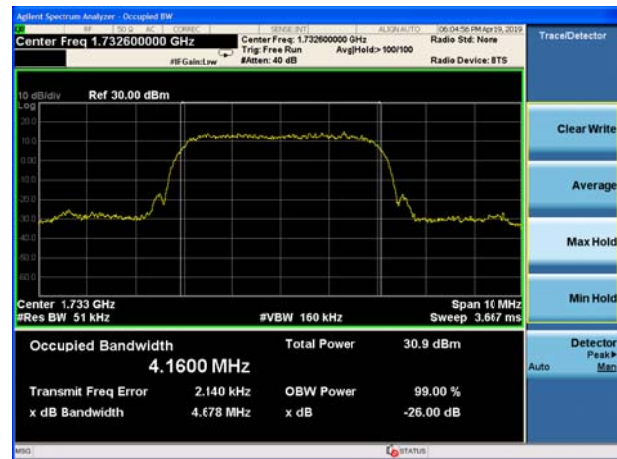
LTE Band 7						
RB	Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	99% Power Bandwidth(MHz)	-26dBc Bandwidth(MHz)
100%	QPSK	5	20775	2502.5	4.5078	4.939
			21100	2535	4.5202	4.934
			21425	2567.5	4.5031	5.094
		10	20800	2505	9.0420	9.965
			21100	2535	9.0391	9.909
			21400	2565	9.0471	9.944
		15	20825	2507.5	13.4860	14.690
			21100	2535	13.4590	14.530
			21375	2562.5	13.4960	14.640
		20	20850	2510	17.8940	19.140
			21100	2535	17.8890	19.210
			21350	2560	17.9080	19.230
	16QAM	5	20775	2502.5	4.5031	4.997
			21100	2535	4.5196	4.932
			21425	2567.5	4.5262	5.072
		10	20800	2505	9.0493	9.909
			21100	2535	9.0160	9.918
			21400	2565	9.0284	9.910
		15	20825	2507.5	13.4960	15.180
			21100	2535	13.4920	14.630
			21375	2562.5	13.5000	14.580
		20	20850	2510	17.9120	19.180
			21100	2535	17.9060	19.210
			21350	2560	17.9270	19.260



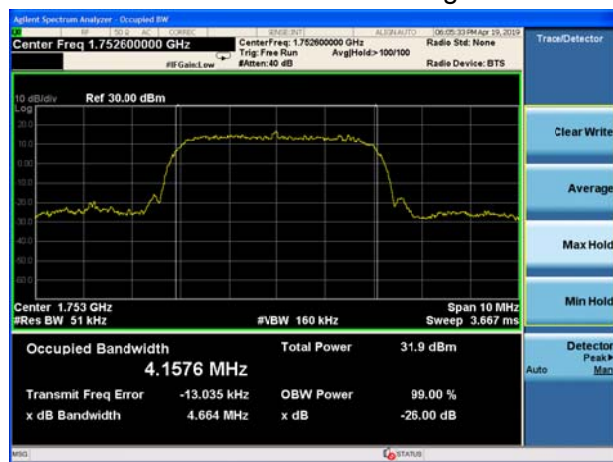
WCDMA Band IV CH-Low



WCDMA Band IV CH Middle

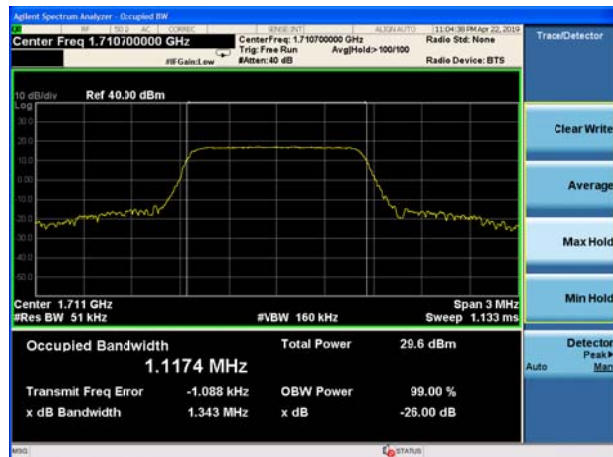


WCDMA Band IV CH High

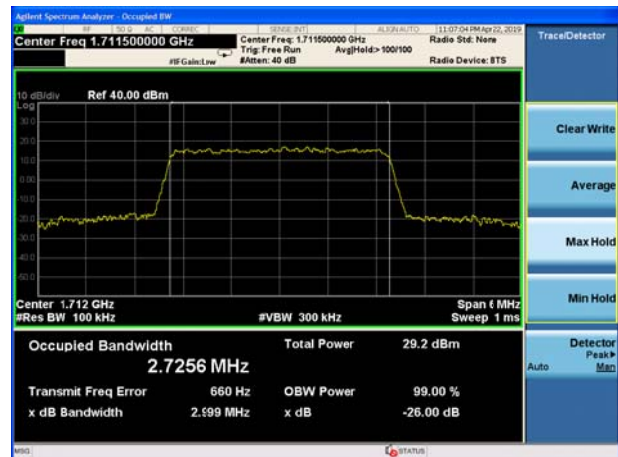




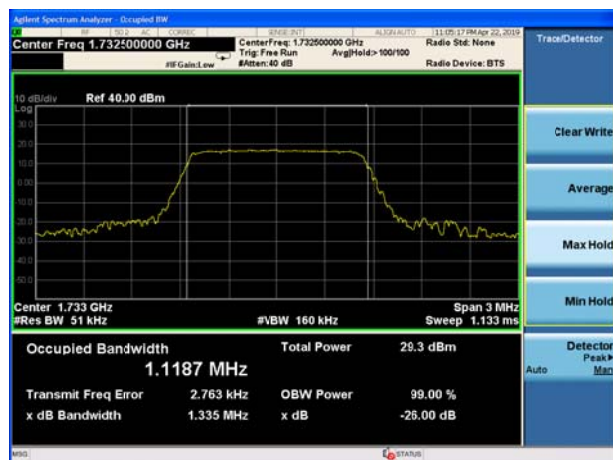
LTE Band 4 QPSK 1.4MHz CH-Low



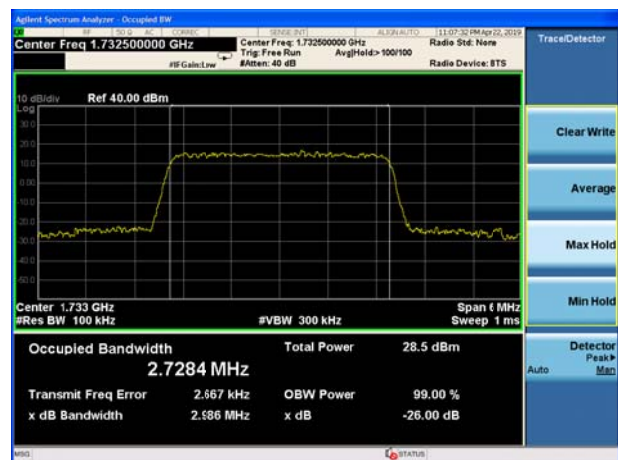
LTE Band 4 QPSK 3MHz CH-Low



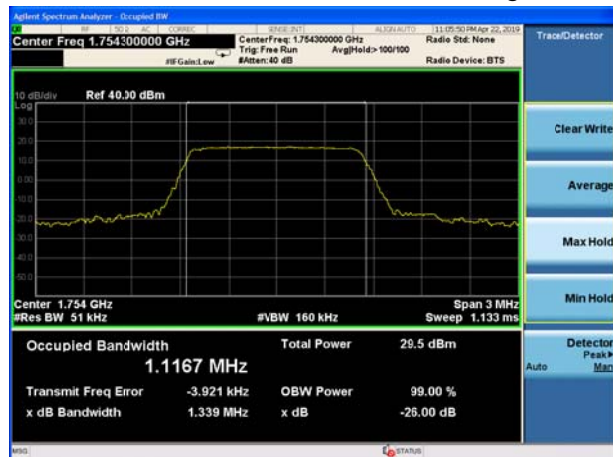
LTE Band 4 QPSK 1.4MHz CH-Middle



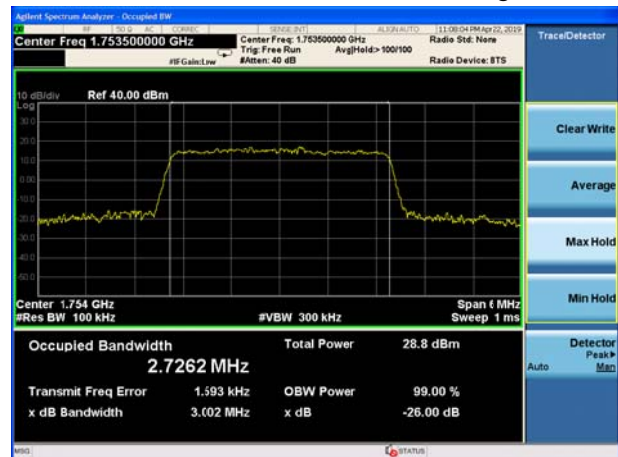
LTE Band 4 QPSK 3MHz CH-Middle



LTE Band 4 QPSK 1.4MHz CH-High

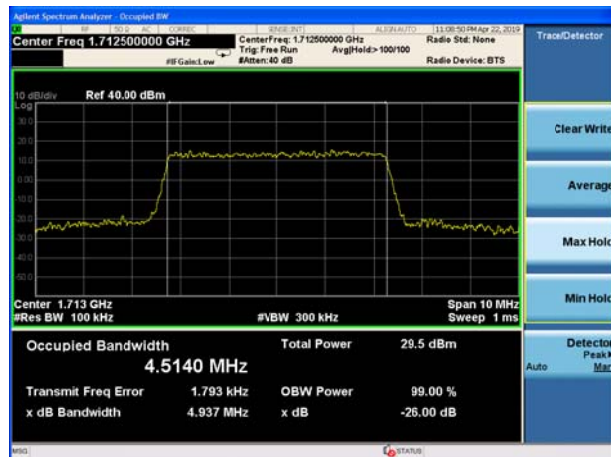


LTE Band 4 QPSK 3MHz CH-High





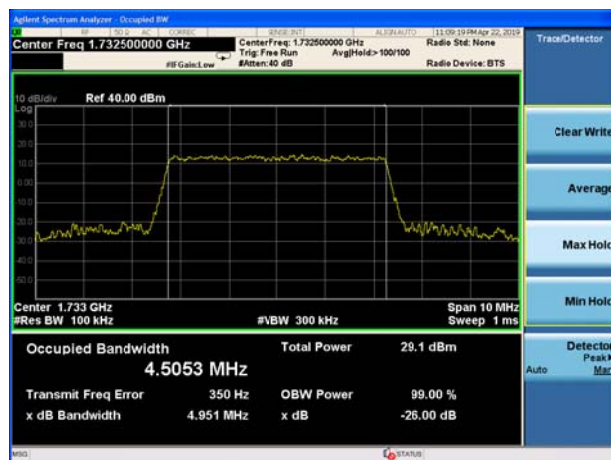
LTE Band 4 QPSK 5MHz CH-Low



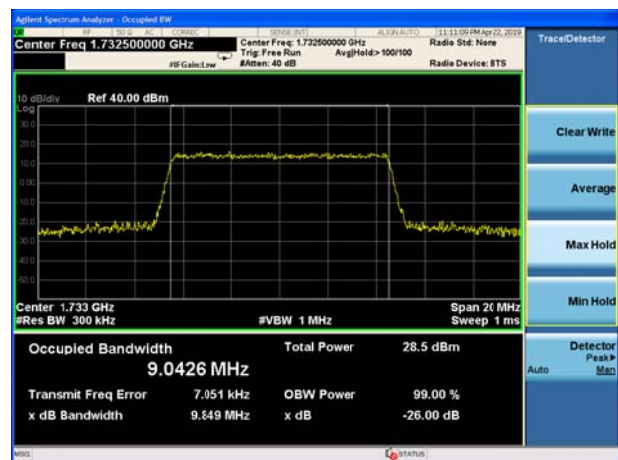
LTE Band 4 QPSK 10MHz CH-Low



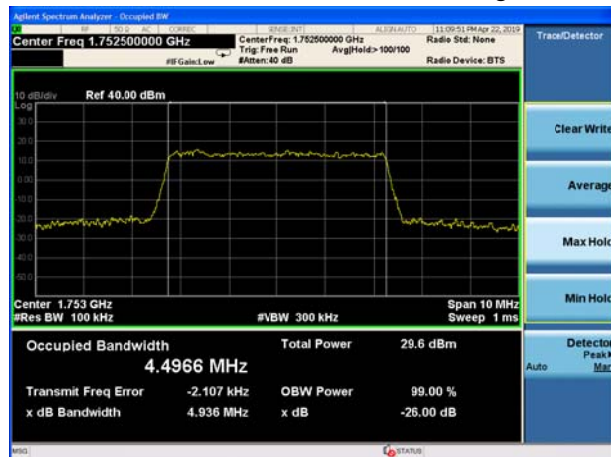
LTE Band 4 QPSK 5MHz CH-Middle



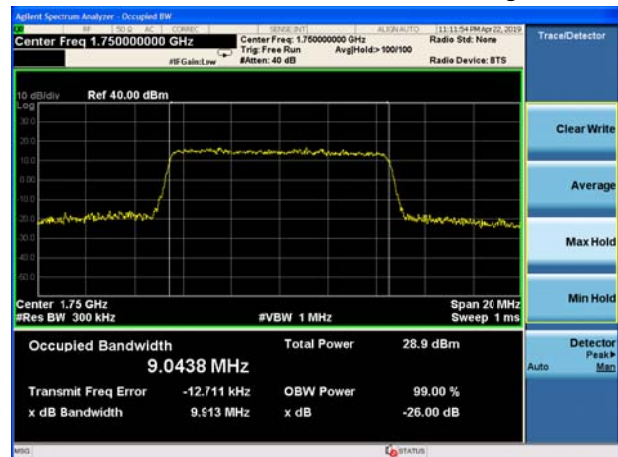
LTE Band 4 QPSK 10MHz CH-Middle



LTE Band 4 QPSK 5MHz CH-High

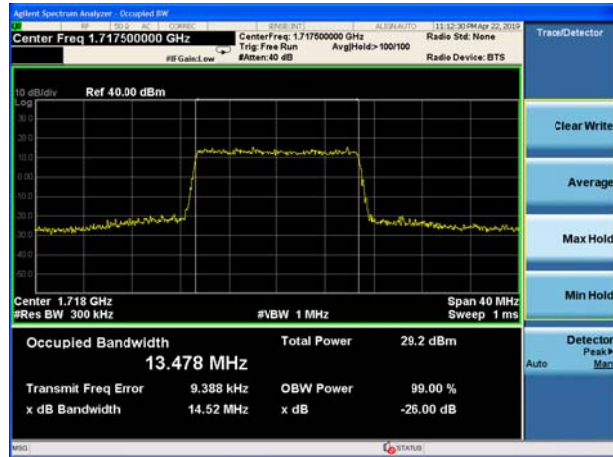


LTE Band 4 QPSK 10MHz CH-High

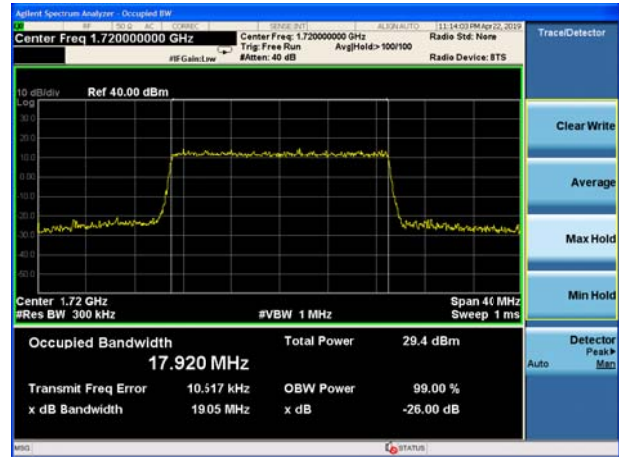




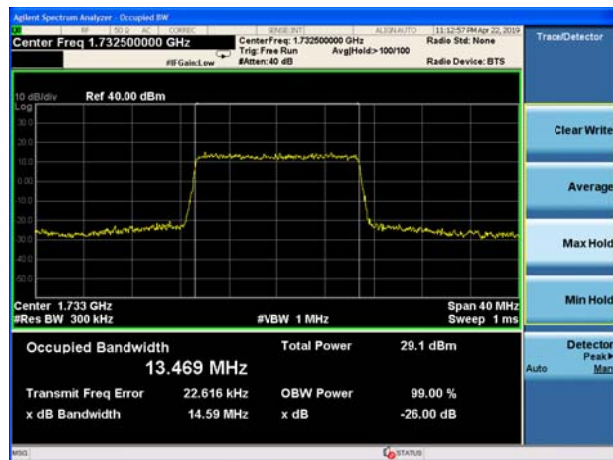
LTE Band 4 QPSK 15MHz CH-Low



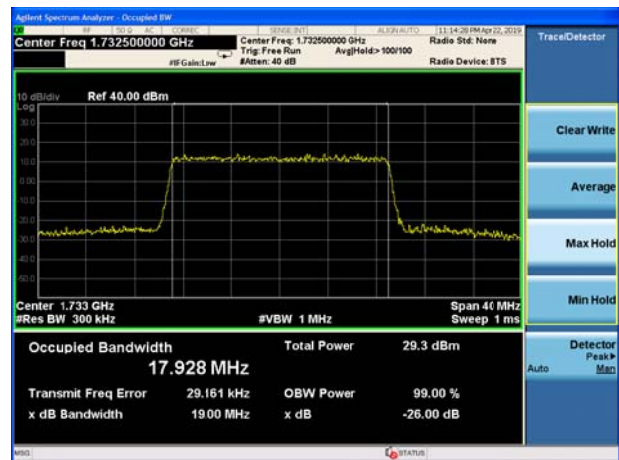
LTE Band 4 QPSK 20MHz CH-Low



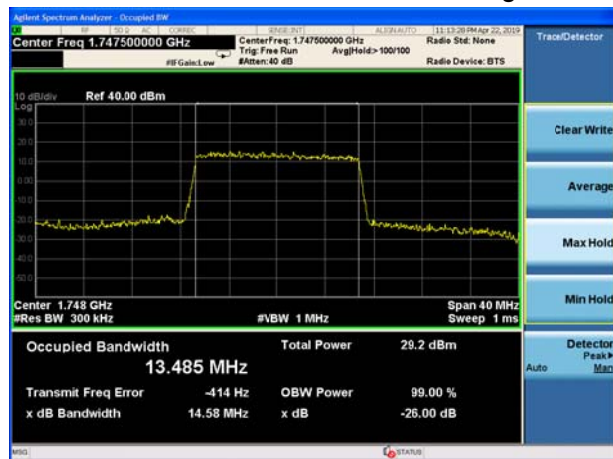
LTE Band 4 QPSK 15MHz CH-Middle



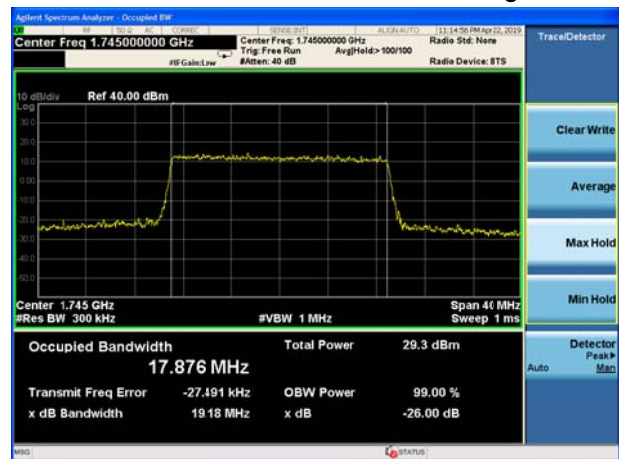
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LTE Band 4 QPSK 15MHz CH-High



LTE Band 4 QPSK 20MHz CH-High

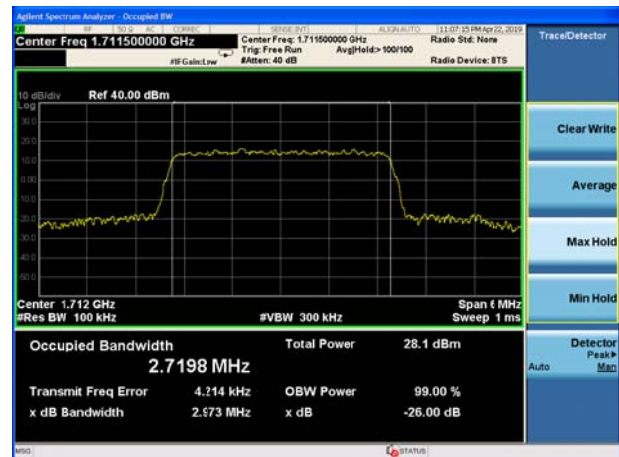




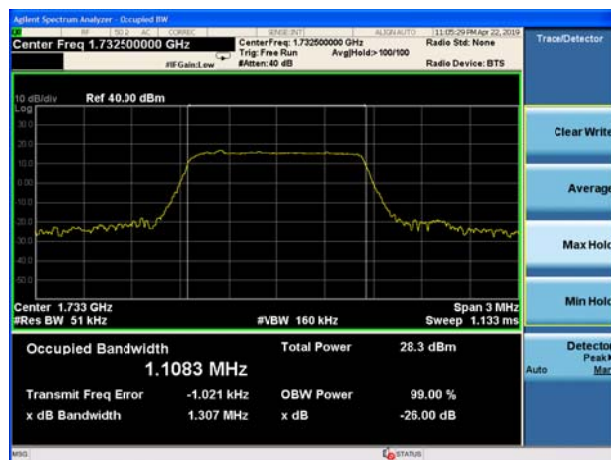
LTE Band 4 16QAM 1.4MHz CH-Low



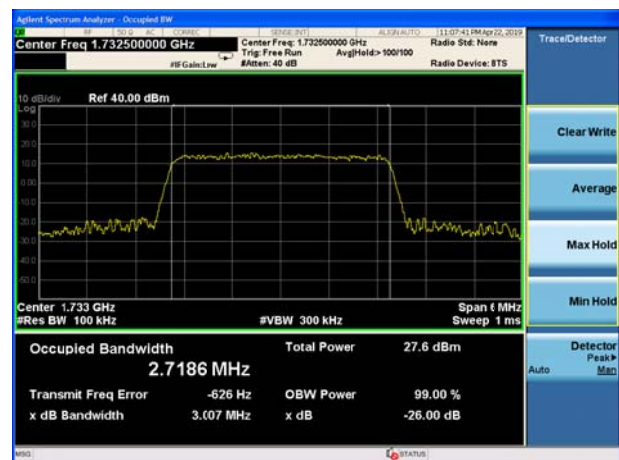
LTE Band 4 16QAM 3MHz CH-Low



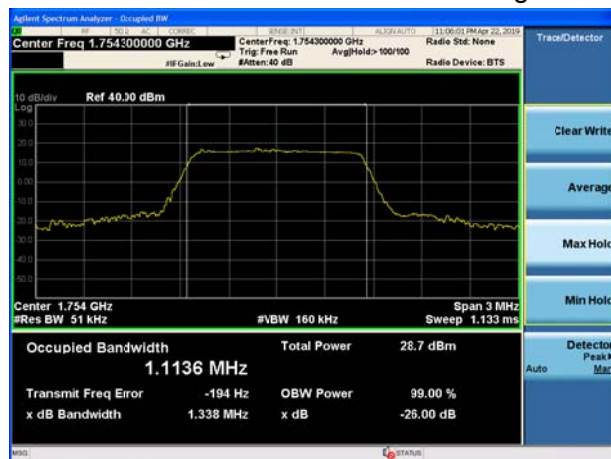
LTE Band 4 16QAM 1.4MHz CH-Middle



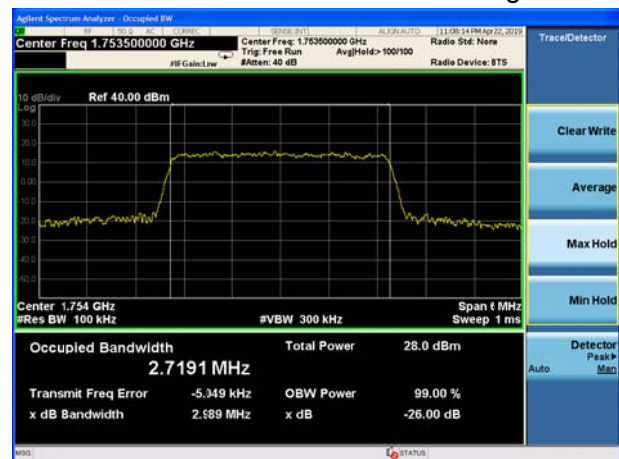
LTE Band 4 16QAM 3MHz CH-Middle



LTE Band 4 16QAM 1.4MHz CH-High

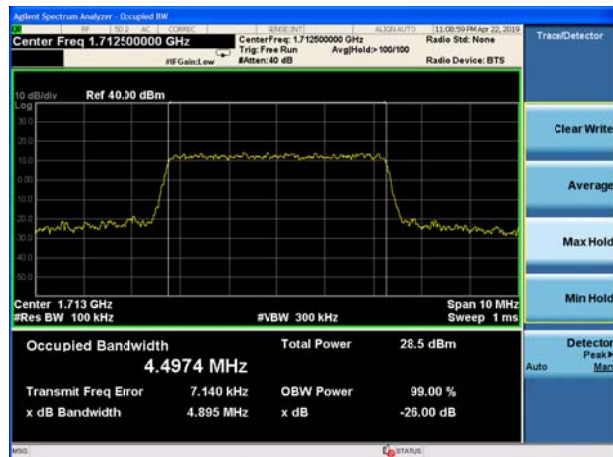


LTE Band 4 16QAM 3MHz CH-High

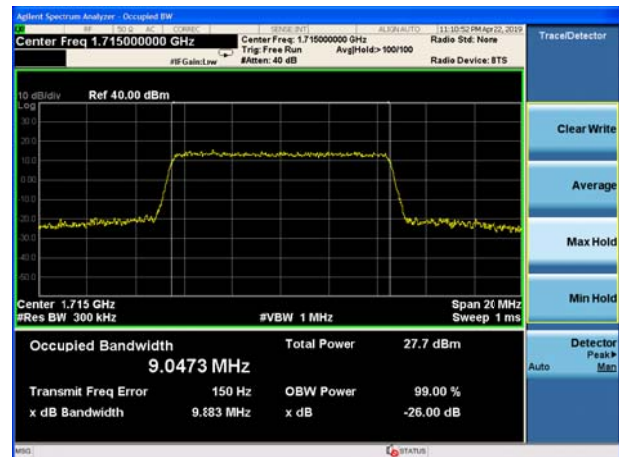




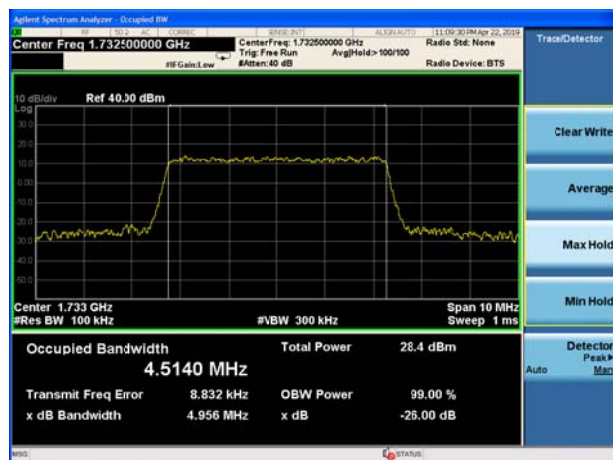
LTE Band 4 16QAM 5MHz CH-Low



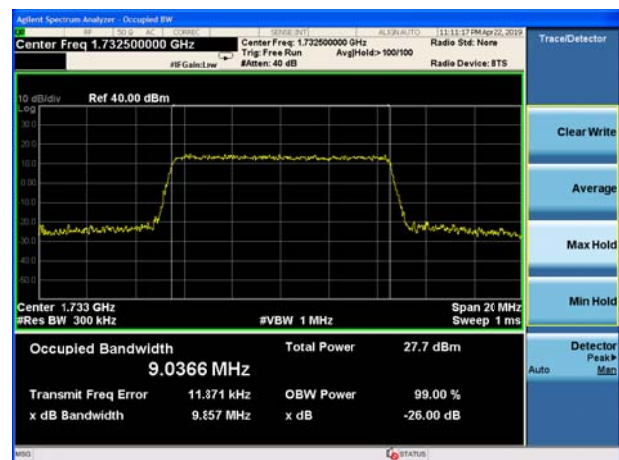
LTE Band 4 16QAM 10MHz CH-Low



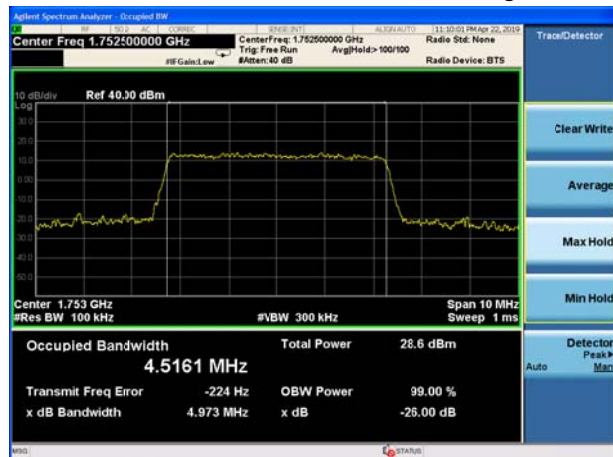
LTE Band 4 16QAM 5MHz CH-Middle



LTE Band 4 16QAM 10MHz CH-Middle



LTE Band 4 16QAM 5MHz CH-High

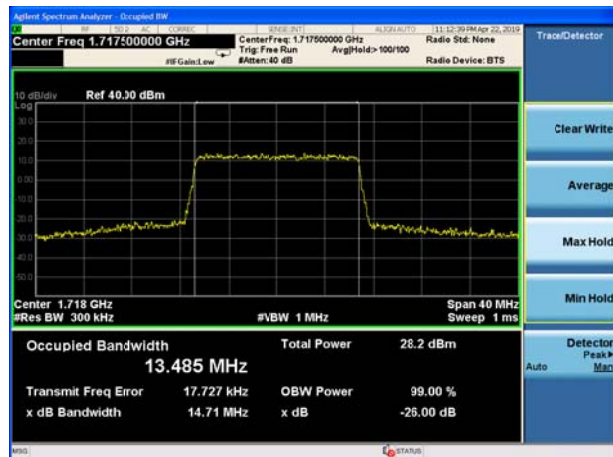


LTE Band 4 16QAM 10MHz CH-High

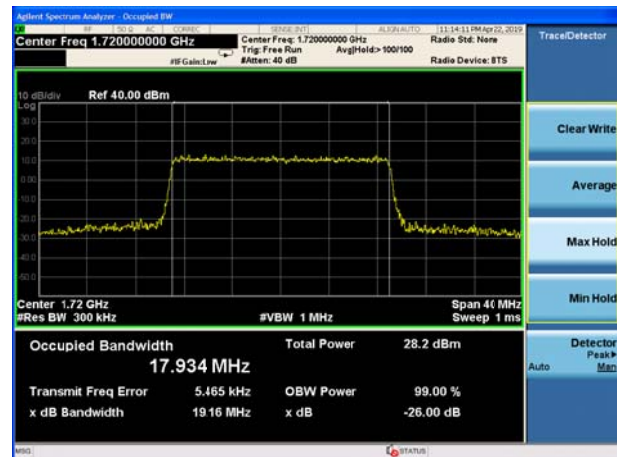




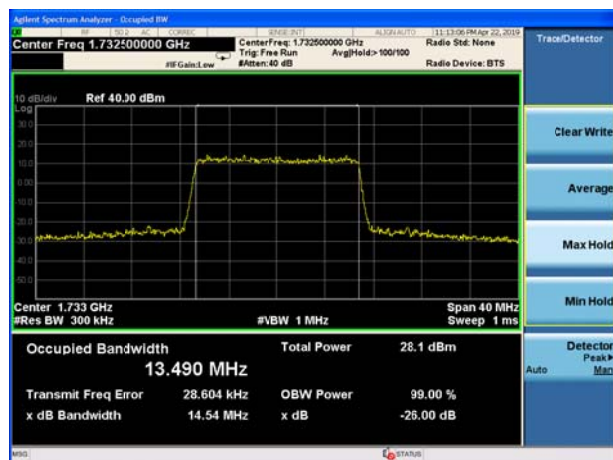
LTE Band 4 16QAM 15MHz CH-Low



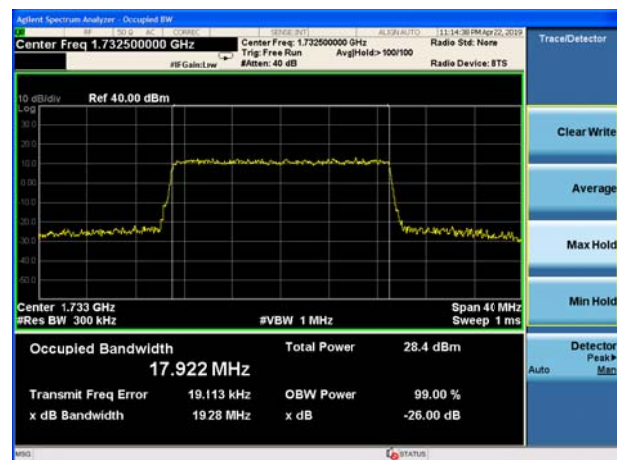
LTE Band 4 16QAM 20MHz CH-Low



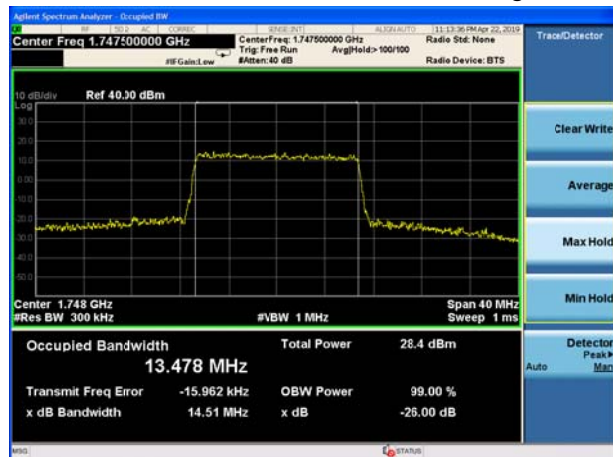
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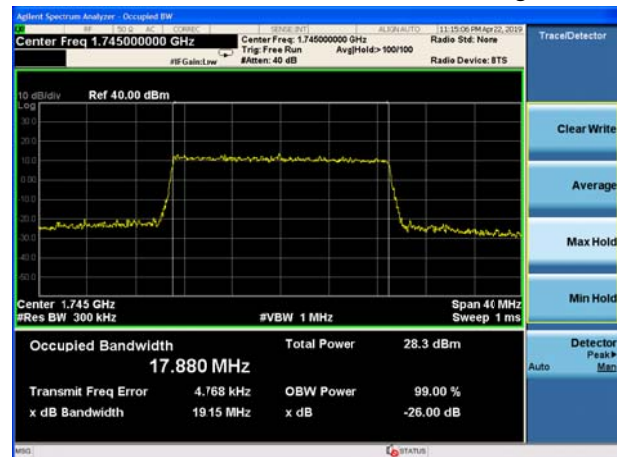
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LTE Band 4 16QAM 15MHz CH-High

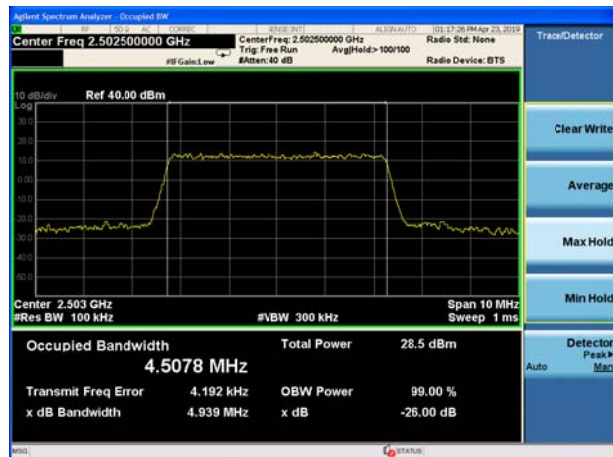


LTE Band 4 16QAM 20MHz CH-High

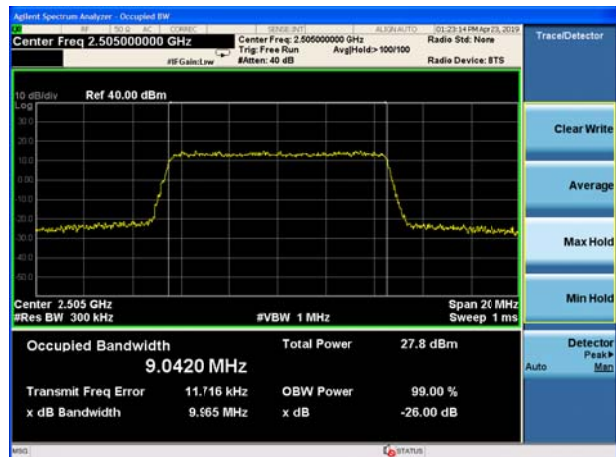




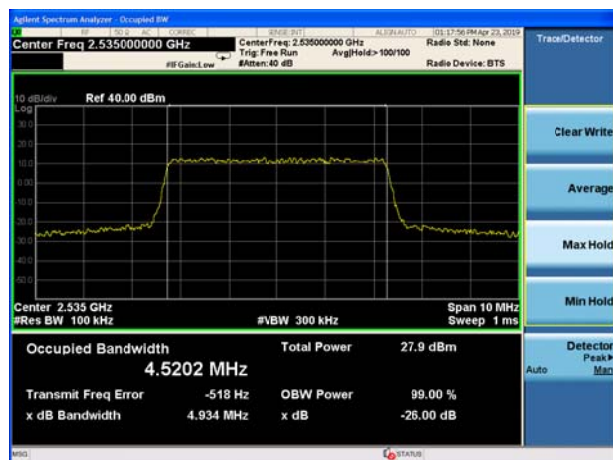
LTE Band 7 QPSK 5MHz CH-Low



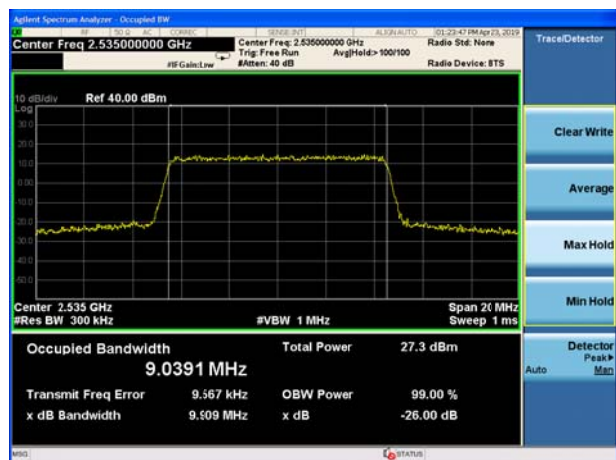
LTE Band 7 QPSK 10MHz CH-Low



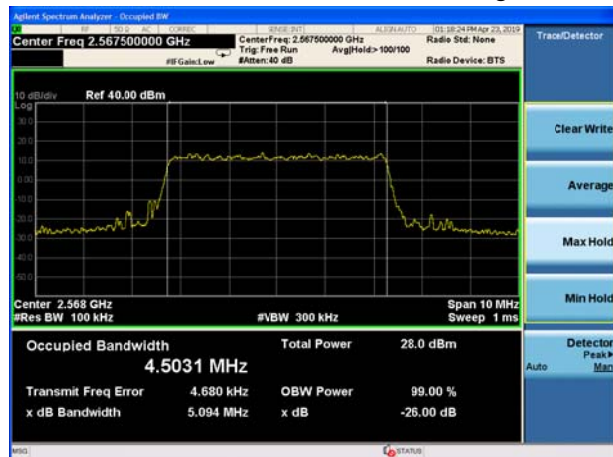
LTE Band 7 QPSK 5MHz CH-Middle



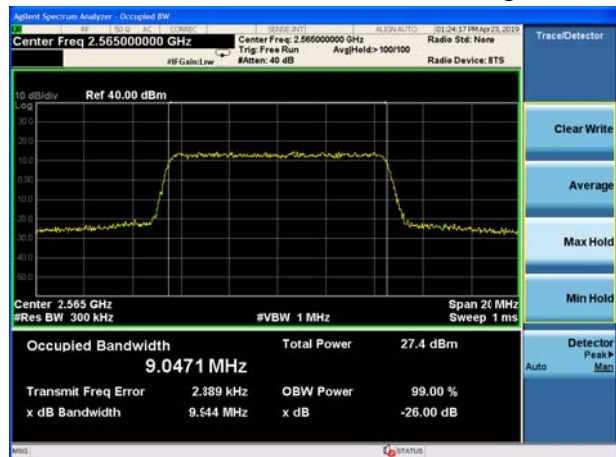
LTE Band 7 QPSK 10MHz CH-Middle



LTE Band 7 QPSK 5MHz CH-High

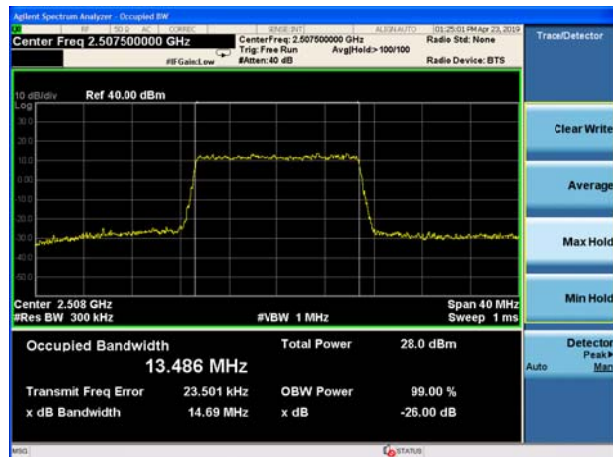


LTE Band 7 QPSK 10MHz CH-High

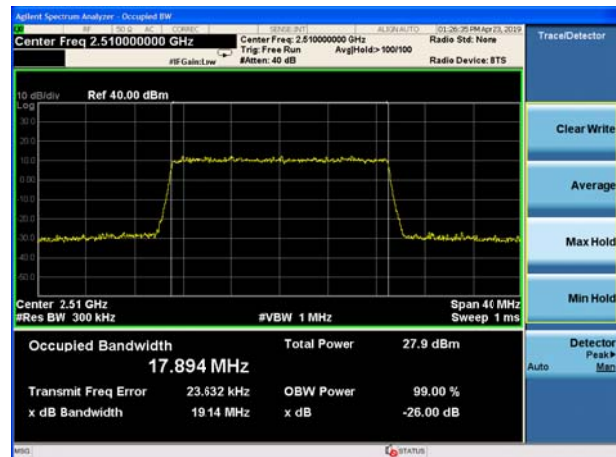




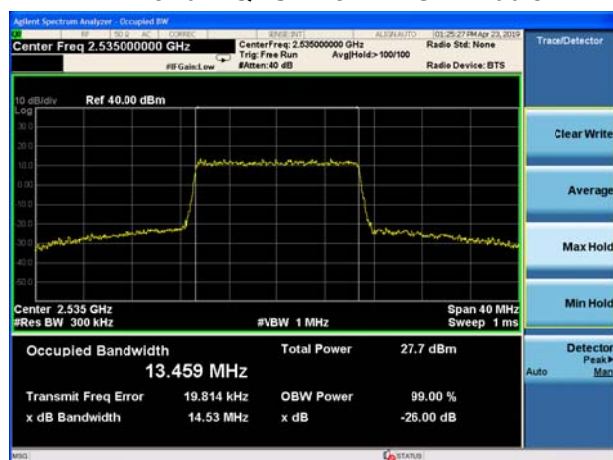
LTE Band 7 QPSK 15MHz CH-Low



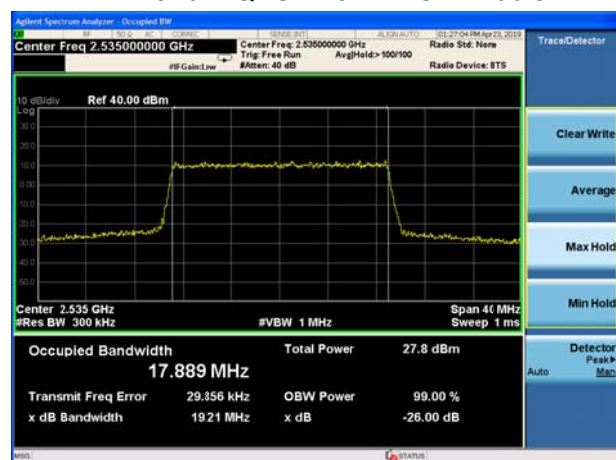
LTE Band 7 QPSK 20MHz CH-Low



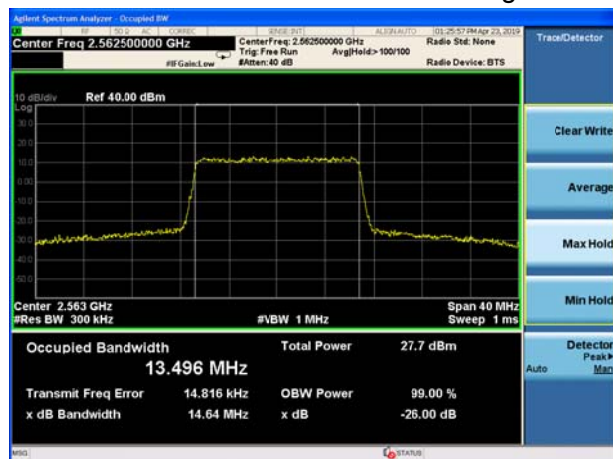
LTE Band 7 QPSK 15MHz CH-Middle



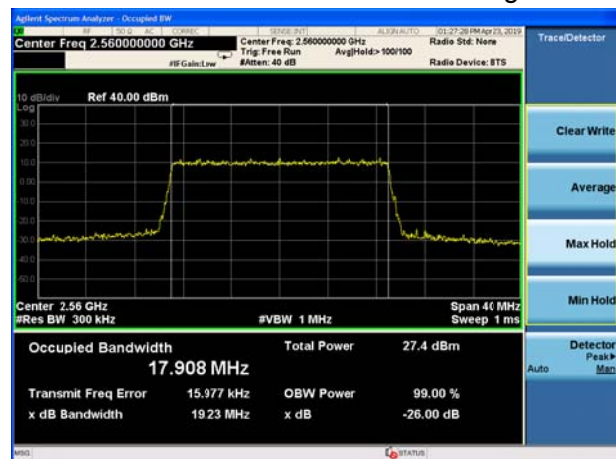
LTE Band 7 QPSK 20MHz CH-Middle



LTE Band 7 QPSK 15MHz CH-High

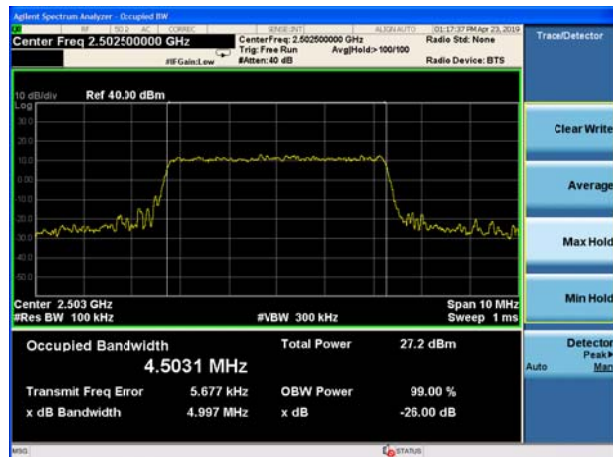


LTE Band 7 QPSK 20MHz CH-High

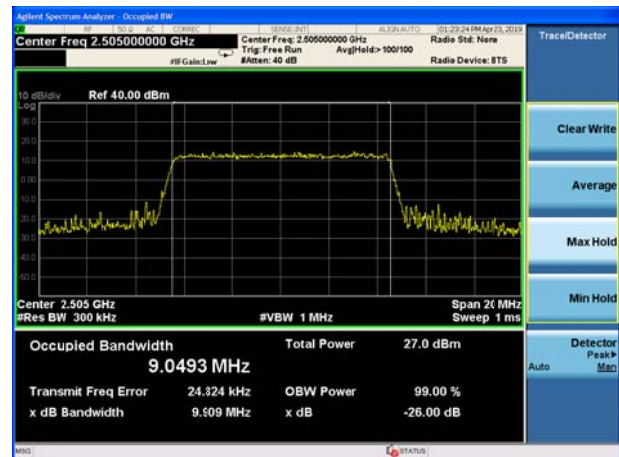




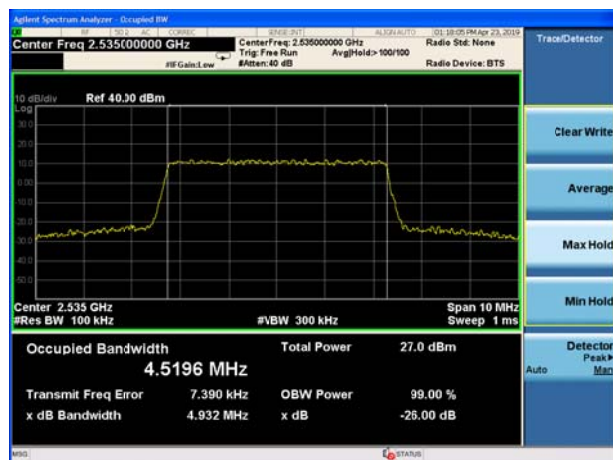
LTE Band 7 16QAM 5MHz CH-Low



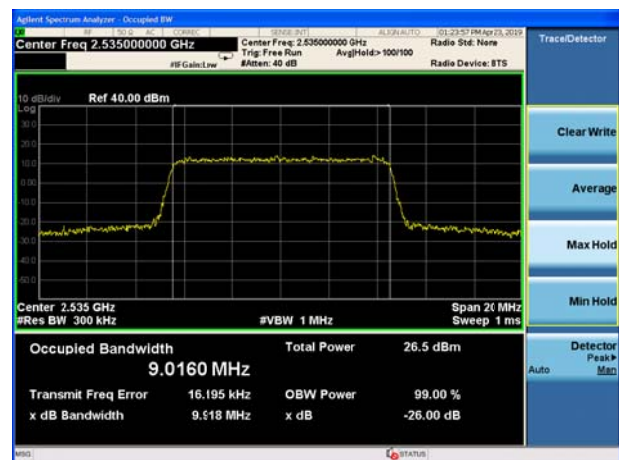
LTE Band 7 16QAM 10MHz CH-Low



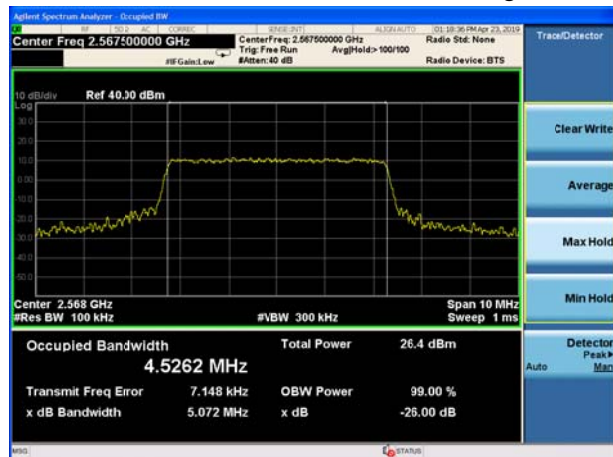
LTE Band 7 16QAM 5MHz CH-Middle



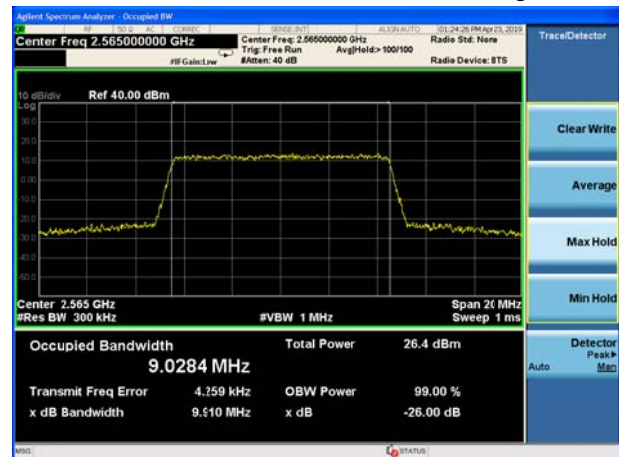
LTE Band 7 16QAM 10MHz CH-Middle



LTE Band 7 16QAM 5MHz CH-High

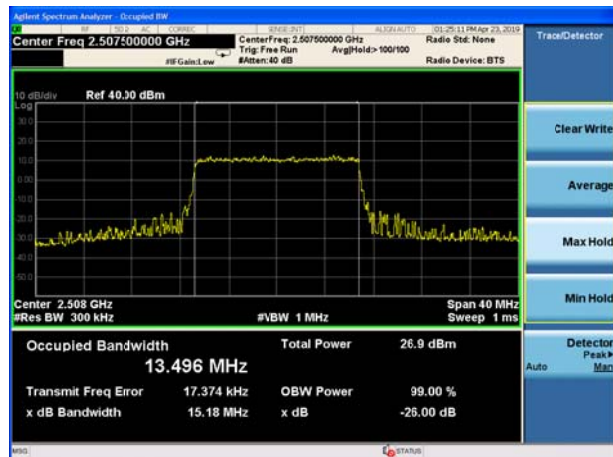


LTE Band 7 16QAM 10MHz CH-High

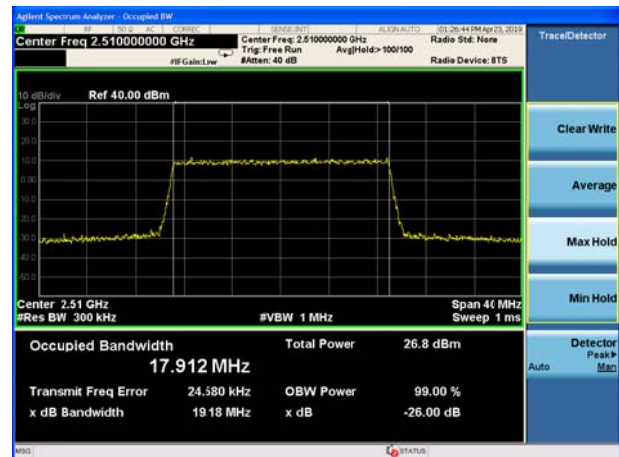




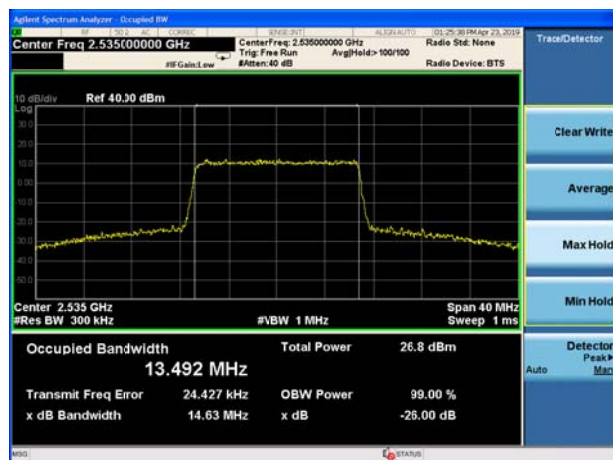
LTE Band 7 16QAM 15MHz CH-Low



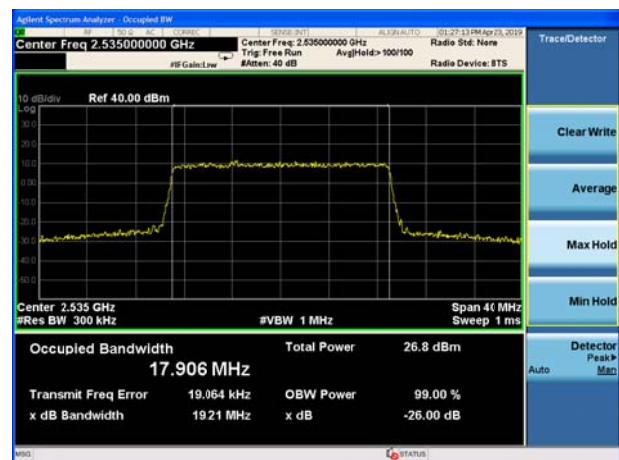
LTE Band 7 16QAM 20MHz CH-Low



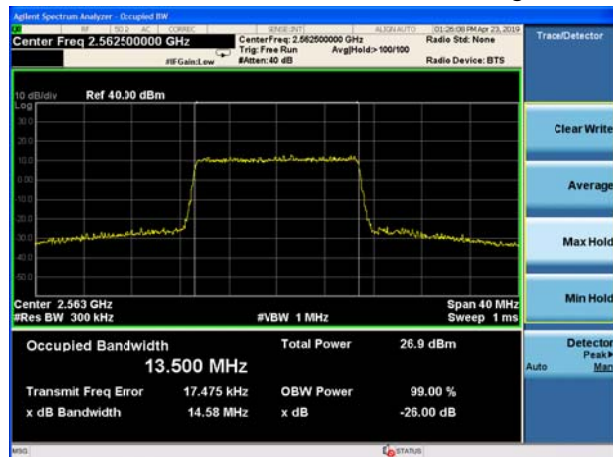
LTE Band 7 16QAM 15MHz CH-Middle



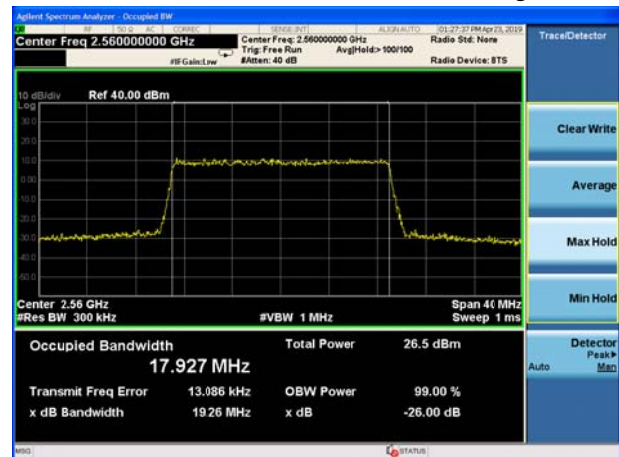
LTE Band 7 16QAM 20MHz CH-Middle



LTE Band 7 16QAM 15MHz CH-High



LTE Band 7 16QAM 20MHz 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 testing follows KDB 971168 D01 v03r01 Section 6.0

The EUT was connected to spectrum analyzer and system simulator via a power divider.

The band edges of low and high channels for the highest RF powers were measured.

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

RBW is set to 15 kHz, VBW is set to 51 kHz for LTE Band 4 (1.4MHz).

RBW is set to 30 kHz, VBW is set to 100 kHz for LTE Band 4 (3MHz).

RBW is set to 51 kHz, VBW is set to 160 kHz for LTE Band 4/7 (5MHz).

RBW is set to 100 kHz, VBW is set to 300kHz for LTE Band 4/7 (10MHz).

RBW is set to 150 kHz, VBW is set to 510 kHz for LTE Band 4/7 (15MHz).

RBW is set to 200 kHz, VBW is set to 620 kHz for LTE Band 4/7 (20MHz)

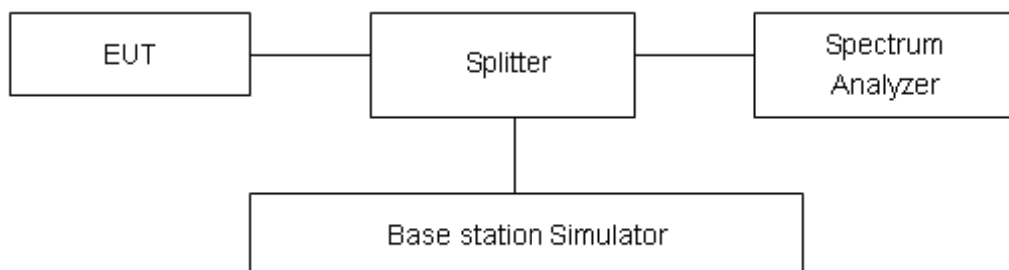
on spectrum analyzer.

Set spectrum analyzer with RMS detector.

The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

Checked that all the results comply with the emission limit line.

Test Setup



Limits

Rule Part 27.53(i) By a factor of not less than $43 + 10 \log (P)$ dB on all frequencies between 2305 and 2320 MHz.



Rule Part 27.53(h) specifies that “ for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10} (P)$ dB”

Rule Part 27.53(g) For operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $43 + 10 \log (P)$ dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

Rule Part 27.53(m) (4)/ specifies that “for BRS and EBS stations. For mobile digital stations, the attenuation factor shall be not less than $40 + 10 \log (P)$ dB on all frequencies between the channel edge and 5 megahertz from the channel edge, $43 + 10 \log (P)$ dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and $55 + 10 \log (P)$ dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(4) of this section. In addition, the attenuation factor shall not be less that $43 + 10 \log (P)$ dB on all frequencies between 2490.5 MHz and 2496 MHz and $55 + 10 \log (P)$ dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

Example:

The limit line is derived from $43 + 10 \log (P)$ dB below the transmitter power P(Watts)

$$= P(W) - [43 + 10 \log(P)] \text{ (dB)}$$

$$= [30 + 10 \log (P)] \text{ (dBm)} - [43 + 10 \log(P)] \text{ (dB)} = -13 \text{ dBm.}$$

Rule Part 27.53(f) For operations in the 746-758 MHz, 775-788 MHz, and 805-806 MHz bands, emissions in the band 1559-1610 MHz shall be limited to -70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and -80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth. For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation.

Rule Part 27.53 (c) For operations in the 746-758 MHz band and the 776-788 MHz band, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following:

- (1) On any frequency outside the 746-758 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least $43 + 10 \log (P)$ dB;
- (2) On any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least $43 + 10 \log (P)$ dB;
- (3) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than $76 + 10 \log (P)$ dB in a 6.25 kHz band segment, for base and fixed stations;



- (4) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than $65 + 10 \log$ (P) dB in a 6.25 kHz band segment, for mobile and portable stations;
- (5) Compliance with the provisions of paragraphs (c)(1) and (c)(2) of this section is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 30 kHz may be employed;

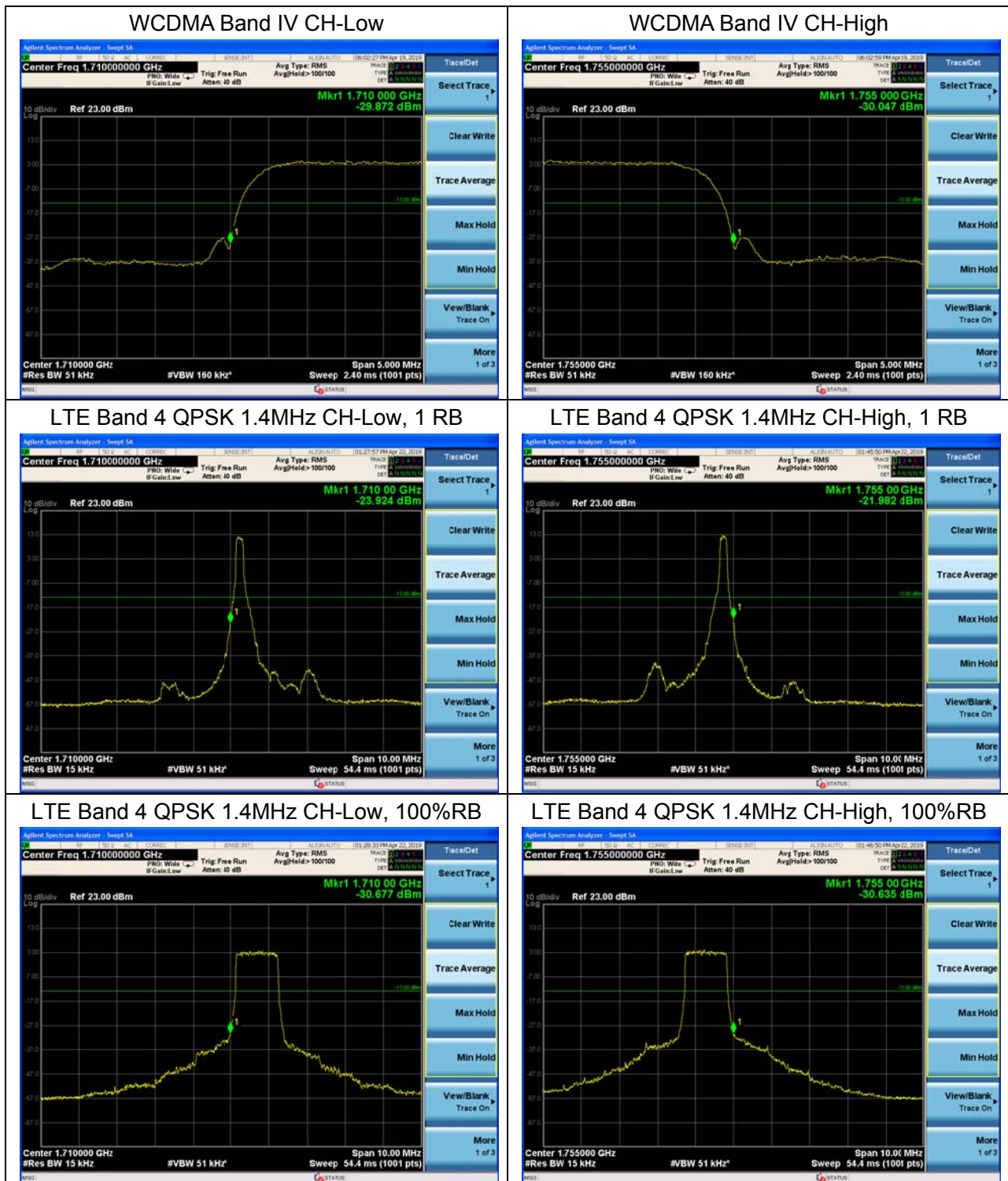
Measurement Uncertainty

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



Test Result

All the test traces in the plots shows the test results clearly.





LTE Band 4 QPSK 3MHz CH-Low, 1 RB



LTE Band 4 QPSK 3MHz CH-High, 1 RB



LTE Band 4 QPSK 3MHz CH-Low, 100%RB



LTE Band 4 QPSK 3MHz CH-High, 100%RB



LTE Band 4 QPSK 5MHz CH-Low, 1 RB



LTE Band 4 QPSK 5MHz CH-High, 1 RB

