

FCC RF Test Report

APPLICANT : Fibocom Wireless Inc.

EQUIPMENT : LTE Module
BRAND NAME : Fibocom
MODEL NAME : L860-GL-16
FCC ID : ZMOL860GL16

STANDARD : 47 CFR Part 2, 96

CLASSIFICATION : Citizens Band End User Devices (CBE)

EQUIPMENT TYPE: End User Equipment

The product was received on Oct. 30, 2020 and completely tested on Feb. 03, 2021. We, Sporton International (Kunshan) Inc., would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.26 and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International (Kunshan) Inc., the test report shall not be reproduced except in full.

Reviewed by: Jason Jia / Supervisor

JasonJia

Approved by: James Huang / Manager

Sporton International (Kunshan) Inc.

No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China

Sporton International (Kunshan) Inc.

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Report No.: FG0O3022F

Report Version : 01

Cert #5145.02



FCC RF Test Report

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History of this test report

Report No.	Version	Description	Issued Date
FG0O3022F	01	Initial issue of report	Feb. 07, 2021

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Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.2	§2.1046	Conducted Output Power	Reporting only	-
-	§96.41	Peak-to-Average Ratio	Not Required	Not applicable for End User Devices
		Maximum E.I.R.P	Pass	-
3.3	§96.41	Maximum Power Spectral Density	Not Required	Not applicable for End User Devices
3.4	§2.1049 §96.41	Occupied Bandwidth	Reporting only	-
3.5	§2.1051 §96.41	Conducted Band Edge Measurement Adjacent Channel Leakage Ratio	Pass	-
3.6	§2.1051 §96.41	Conducted Spurious Emission	Pass	
3.7	§2.1055	Frequency Stability for Temperature & Voltage	Pass	-
4.4	§2.1051 §96.41	Radiated Spurious Emission	Pass	Under limit 18.85 dB at 14724.000 MHz

Declaration of Conformity:

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

Comments and Explanations:

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

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1 General Description

1.1 Applicant

Fibocom Wireless Inc.

1101,Tower A, Building 6, Shenzhen International Innovation Valley, Dashi 1st Rd, Nanshan,Shenzhen, China

1.2 Manufacturer

Fibocom Wireless Inc.

1101,Tower A, Building 6, Shenzhen International Innovation Valley, Dashi 1st Rd, Nanshan,Shenzhen, China

1.3 Feature of Equipment Under Test

	Product Feature
Equipment	LTE Module
Brand Name	Fibocom
Model Name	L860-GL-16
FCC ID	ZMOL860GL16
Tx Frequency	LTE Band 48: 3550 MHz ~ 3700 MHz
Rx Frequency	LTE Band 48: 3550 MHz ~ 3700 MHz
Bandwidth	5MHz / 10MHz / 15MHz / 20MHz
Maximum Output Power to Antenna	20.88 dBm
Type of Modulation	QPSK / 16QAM / 64QAM
HW Version	V1.3
SW Version	18601.5001.00.01.01.01
EUT Stage	Identical Prototype

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

1.4 Maximum Conducted Power, Frequency Tolerance, and Emission Designator

LTE Band 48			QPSK		16QAM			
BW (MHz)	Frequency Range (MHz)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum Conducted power (W)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum Conducted power (W)	
20	3560~3690	18M0G7D	0.0043	0.1225	17M9W7D	-	0.1019	

Note: Based on engineering evaluation, only the maximum bandwidth and the worst modulation test results are shown in the report.

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1.5 Testing Site

Sporton International (Kunshan) Inc. is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.02.

Test Firm	Sporton International (Kunshan) Inc.							
Test Site Location		n Road, Kunshan Economi 00 People's Republic of C	·					
		TEL: +86-512-57900158 FAX: +86-512-57900958						
Test Site No.	Sporton Site No.	FCC Designation No.	FCC Test Firm Registration No.					
	03CH06-KS TH01-KS	CN1257	314309					

1.6 Test Software

Ite	m	Site	Manufacturer	Name	Version	
1		03CH06-KS	AUDIX	E3	6.2009-8-24al	

1.7 Applied Standards

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

- + ANSI C63.26-2015
- ANSI / TIA-603-E
- 47 CFR Part 2, 96
- FCC KDB 971168 D01 Power Meas. License Digital Systems v03r01
- FCC KDB 940660 D01 Part 96 CBRS v03
- FCC KDB 412172 D01 Determining ERP and EIRP v01r01

Remark:

- 1. All test items were verified and recorded according to the standards and without any deviation during the test.
- 2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

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2 Test Configuration of Equipment Under Test

2.1 Test Mode

Antenna port conducted and radiated test items listed below are performed according to KDB 971168 D01 Power Meas. License Digital Systems v03r01 with maximum output power.

			В	andwid	lth (MH	lz)		ı	Modulation		RB#			Test Channel		
Test Items	Band	1.4	3	5	10	15	20	QPSK	16QAM	64QAM	1	Half	Full	L	М	Н
Max. Output Power	48	-	-	v	v	v	v	v	v	v	v	v	v	v	v	v
26dB and 99% Bandwidth	48	•	-				v	V	V				v		v	
Conducted Band Edge	48	•	•	٧	٧	v	v	v	v		v		v	٧		v
Conducted Spurious Emission	48		-	٧	٧	v	v	v	v		v		v	٧	v	v
E.R.P / E.I.R.P	48	•	-	v	v	v	v	v	v	v	v			v	v	v
Frequency Stability	48	•	-				v	v			v				v	
Radiated Spurious Emission	purious 48 Worst Case v v						v	v								
Remark	 The difference 	e mark e device erent R orted.	"-" mea e is inve B size/	ns that estigate offset a	this ba d from nd mod	ndwidth 30MHz dulation	n is not z to 10 t is in ex		l. Indamenta est. Subse	ıl signal for equently, o						nder

All the radiated test cases were performed with Adapter.

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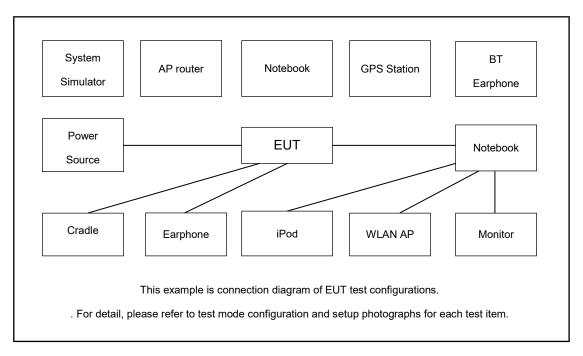
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2.2 Connection Diagram of Test System



2.3 Support Unit used in test configuration

Item	Equipment	Trade Name	Model No.	FCC ID	Data Cable	Power Cord
1.	Power Supply	GWINSTEK	PSS-2002	N/A	N/A	Unshielded, 1.8 m
2.	LTE Base Station	Anritsu	MT8821C	N/A	N/A	Unshielded, 1.8 m
3.	Test jig	N/A	N/A	N/A	N/A	N/A

2.4 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

Offset = RF cable loss.

Following shows an offset computation example with cable loss 8.72 dB.

Example:

 $Offset(dB) = RF \ cable \ loss(dB).$

= 8.72 (dB)

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2.5 Frequency List of Low/Middle/High Channels

	LTE Band 48 Channel and Frequency List											
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest								
20	Channel	55340	55990	56640								
20	Frequency	3560.0	3625.0	3690.0								
15	Channel	55315	55990	56665								
15	Frequency	3557.5	3625.0	3692.5								
10	Channel	55290	55990	56690								
10	Frequency	3555.0	3625.0	3695.0								
5	Channel	55265	55990	56715								
5	Frequency	3552.5	3625.0	3697.5								

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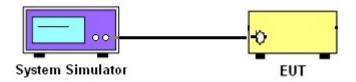
3 Conducted Test Items

3.1 Measuring Instruments

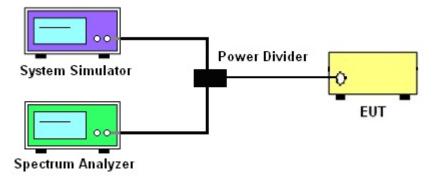
See list of measuring instruments of this test report.

3.1.1 Test Setup

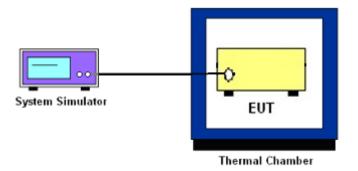
3.1.2 Conducted Output Power



3.1.3 PSD, Occupied Bandwidth, Conducted Band-Edge and Conducted Spurious Emission



3.1.4 Frequency Stability



3.1.5 Test Result of Conducted Test

Please refer to Appendix A.

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3.2 Conducted Output Power

3.2.1 Description of the Conducted Output Power Measurement

A system simulator was used to establish communication with the EUT. Its parameters were set to force the EUT transmitting at maximum output power. The measured power in the radio frequency on the transmitter output terminals shall be reported.

3.2.2 Test Procedures

- 1. The transmitter output port was connected to the system simulator.
- 2. Set EUT at maximum power through the system simulator.
- 3. Select lowest, middle, and highest channels for each band and different modulation.
- 4. Measure and record the power level from the system simulator.

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3.3 EIRP

3.3.1 Description of the EIRP Measurement

EIRP and PSD limits for CBRS equipment as below table:

De	evice	Maximum EIRP	Maximum PSD
		(dBm/10 MHz)	(dBm/MHz)
V	V End User Device		n/a
	Category A CBSD	30	20
	Category B CBSD	47	37

3.3.2 Test Procedures for EIRP

- Establishing a communications link with the call box (Base station) to measure the Maximum conducted power, the parameters were set to force the EUT transmitting at maximum output power level. Use the average power measurement function to measure total channel power of each channel bandwidth (per ANSI C63.26-2015 Section 5.2.1)
- Determining ERP and/or EIRP from conducted RF output power measurements (Per ANSI C63.26-2015 Section 5.2.5.5)

$$EIRP = P_T + G_T - L_C$$
, $ERP = EIRP - 2.15$, where

 P_T = transmitter output power in dBm

 G_T = gain of the transmitting antenna in dBi

L_C = signal attenuation in the connecting cable between the transmitter and antenna in dB

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3.4 Occupied Bandwidth

3.4.1 Description of Occupied Bandwidth Measurement

The occupied bandwidth is the width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5% of the

total mean transmitted power.

The 26 dB emission bandwidth is defined as the frequency range between two points, one above and

one below the carrier frequency, at which the spectral density of the emission is attenuated 26 dB

below the maximum in-band spectral density of the modulated signal. Spectral density (power per unit

bandwidth) is to be measured with a detector of resolution bandwidth equal to approximately 1.0% of

the emission bandwidth.

3.4.2 Test Procedures

The testing follows ANSI C63.26-2015 Section 5.4.3 (26dB) and Section 5.4.4 (99OB)

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

2. The spectrum analyzer center frequency is set to the nominal EUT channel center frequency.

The span range for the spectrum analyzer shall be between two and five times the anticipated

OBW.

3. The nominal resolution bandwidth (RBW) shall be in the range of 1 to 5 % of the anticipated

OBW, and the VBW shall be at least 3 times the RBW.

4. Set the detection mode to peak, and the trace mode to max hold.

5. Determine the reference value: Set the EUT to transmit a modulated signal. Allow the trace to

stabilize. Set the spectrum analyzer marker to the highest level of the displayed trace.

(this is the reference value)

6. Determine the "-26 dB down amplitude" as equal to (Reference Value – X).

7. Place two markers, one at the lowest and the other at the highest frequency of the envelope of

the spectral display such that each marker is at or slightly below the "-X dB down amplitude"

determined in step 6. If a marker is below this "-X dB down amplitude" value it shall be placed as close as possible to this value. The OBW is the positive frequency difference between the

two markers.

8. Use the 99 % power bandwidth function of the spectrum analyzer and report the measured

bandwidth.

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3.5 Conducted Band Edge

3.5.1 Description of Conducted Band Edge Measurement

Part 96.41 (e) (1) (i)

For CBSD the emission limits outside the fundamental are as follows:

Within 0 MHz to 10 MHz above and below the assigned channel ≤ −13 dBm/MHz

Greater than 10 MHz above and below the assigned channel ≤ −25 dBm/MHz

Part 96.41 (e) (1) (ii)

For End User Devices the emission limits outside the fundamental are as follows:

Within 0 MHz to B MHz above and below the assigned channel ≤ −13 dBm/MHz

Greater than B MHz above and below the assigned channel ≤ -25 dBm/MHz

where B is the bandwidth in megahertz of the assigned channel or multiple contiguous channels of the End User Device.

Notwithstanding the emission limits in this paragraph, the Adjacent Channel Leakage Ratio for End User Devices shall be at least 30 dB.

Part 96.41 (e) (2)

For CBSDs and End User Devices, the conducted power of emissions below 3540 MHz or above 3710 MHz shall not exceed -25 dBm/MHz, and the conducted power of emissions below 3530 MHz or above 3720 MHz shall not exceed -40dBm/MHz

3.5.2 Test Procedures

The testing follows FCC KDB 971168 D01 v03r01 Section 6.1.

- 1. The EUT was connected to spectrum analyzer and system simulator via a power divider.
- 2. The band edges of low and high channels for the highest RF powers were measured.
- 3. Set RBW >= 1% EBW in the 1MHz band immediately outside and adjacent to the band edge.
- 4. Beyond the 1 MHz band from the band edge, RBW=1MHz was used
- 5. Offset has included the duty factor for LTE Band 48. Duty factor =10 log (1/x), where x is the measured duty cycle.
- 6. Set spectrum analyzer with RMS detector.
- 7. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

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3.6 Conducted Spurious Emission

3.6.1 Description of Conducted Spurious Emission Measurement

96.41 (e)(2)

The conducted power of any emissions below 3530 MHz or above 3720 MHz shall not exceed -40dBm/MHz.

3.6.2 Test Procedures

The testing follows FCC KDB 971168 D01 v03r01 Section 6.1.

- 1. The EUT was connected to spectrum analyzer and system simulator via a power divider.
- The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator.
 The path loss was compensated to the results for each measurement.
- 3. The middle channel for the highest RF power within the transmitting frequency was measured.
- 4. The conducted spurious emission for the whole frequency range was taken.
- 5. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz.
- 6. Set spectrum analyzer with RMS detector.
- 7. Taking the record of maximum spurious emission.
- 8. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
- 9. The limit line is -40dBm/MHz.

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3.7 Frequency Stability

3.7.1 Description of Frequency Stability Measurement

The frequency stability shall be measured by variation of ambient temperature and variation of primary supply voltage to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within ±0.00025% (±2.5ppm) of the center frequency

3.7.2 Test Procedures for Temperature Variation

The testing follows FCC KDB 971168 D01 v03r01 Section 9.0.

- 1. The EUT was set up in the thermal chamber and connected with the system simulator.
- 2. With power OFF, the temperature was decreased to -30°C and the EUT was stabilized before testing. Power was applied and the maximum change in frequency was recorded within one minute.
- 3. With power OFF, the temperature was raised in 10°C step up to 50°C. The EUT was stabilized at each step for at least half an hour. Power was applied and the maximum frequency change was recorded within one minute.

3.7.3 Test Procedures for Voltage Variation

The testing follows FCC KDB 971168 D01 v03r01 Section 9.0.

- The EUT was placed in a temperature chamber at 25±5° C and connected with the system 1. simulator.
- 2. The power supply voltage to the EUT was varied from 85% to 115% of the nominal value measured at the input to the EUT.
- 3. The variation in frequency was measured for the worst case.

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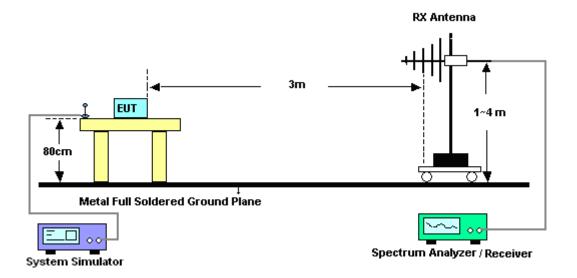
4 Radiated Test Items

4.1 Measuring Instruments

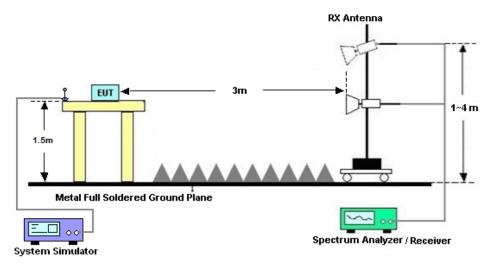
See list of measuring instruments of this test report.

4.2 Test Setup

For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



4.3 Test Result of Radiated Test

Please refer to Appendix B.

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4.4 Radiated Spurious Emission

4.4.1 Description of Radiated Spurious Emission Measurement

The radiated spurious emission was measured by substitution method according to ANSI / TIA-603-E.

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least -40dBm / MHz.

The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

4.4.2 Test Procedures

- 1. The EUT was placed on a turntable with 0.8 meter height for frequency below 1GHz and 1.5 meter height for frequency above 1GHz respectively above ground.
- 2. The EUT was set 3 meters from the receiving antenna mounted on the antenna tower.
- 3. The table was rotated 360 degrees to determine the position of the highest spurious emission.
- 4. The height of the receiving antenna is varied between 1m to 4m to search the maximum spurious emission for both horizontal and vertical polarizations.
- 5. During the measurement, the system simulator parameters were set to force the EUT transmitting at maximum output power.
- 6. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
- A horn antenna was substituted in place of the EUT and was driven by a signal generator.
 Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.

EIRP (dBm) = S.G. Power – Tx Cable Loss + Tx Antenna Gain ERP (dBm) = EIRP - 2.15

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

The limit line is -40dBm/MHz

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List of Measuring Equipment 5

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSV40	101040	10Hz~40GHz	Nov. 01, 2020	Feb. 03, 2021	Oct. 31, 2021	Conducted (TH01-KS)
Temperature &hu midity chamber	Hongzhan	LP-150U	H2014011 440	-40~+150°C 20%~95%RH	Jul. 03, 2020	Feb. 03, 2021	Jul. 02, 2021	Conducted (TH01-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY551502 08	10Hz-44GHz	Apr. 14, 2020	Jan. 10, 2021	Apr. 13, 2021	Radiation (03CH06-KS)
Bilog Antenna	TeseQ	CBL6111D	49921	30MHz-1GHz	May 29, 2020	Jan. 10, 2021	May 28, 2021	Radiation (03CH06-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	00218652	1GHz~18GHz	Apr. 27, 2020	Jan. 10, 2021	Apr. 26, 2021	Radiation (03CH06-KS)
SHF-EHF Horn	Com-power	AH-840	101115	18GHz~40GHz	Nov. 06, 2020	Jan. 10, 2021	Nov. 05, 2021	Radiation (03CH06-KS)
Amplifier	SONOMA	310N	187289	9KHz ~1GHZ	Apr. 14, 2020	Jan. 10, 2021	Apr. 13, 2021	Radiation (03CH06-KS)
Amplifier	MITEQ	EM18G40GG A	060728	18~40GHz	Jan. 07, 2021	Jan. 10, 2021	Jan. 06, 2022	Radiation (03CH06-KS)
high gain Amplifier	MITEQ	AMF-7D-0010 1800-30-10P	2025788	1Ghz-18Ghz	Jan. 06, 2021	Jan. 10, 2021	Jan. 05, 2022	Radiation (03CH06-KS)
Amplifier	Keysight	83017A	MY532702 03	500MHz~26.5G Hz	Apr. 15, 2020	Jan. 10, 2021	Apr. 14. 2021	Radiation (03CH06-KS)
AC Power Source	Chroma	61601	F1040900 04	N/A	NCR	Jan. 10, 2021	NCR	Radiation (03CH06-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Jan. 10, 2021	NCR	Radiation (03CH06-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Jan. 10, 2021	NCR	Radiation (03CH06-KS)

NCR: No Calibration Required

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FCC RF Test Report

6 Uncertainty of Evaluation

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of	2.5dB
Confidence of 95% (U = 2Uc(y))	2.50B

<u>Uncertainty of Radiated Emission Measurement (1 GHz ~ 18 GHz)</u>

Measuring Uncertainty for a Level of	0.440
Confidence of 95% (U = 2Uc(y))	2.1dB

Uncertainty of Radiated Emission Measurement (18 GHz ~ 40 GHz)

Measuring Uncertainty for a Level of	2.1dB
Confidence of 95% (U = 2Uc(y))	2.106

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Appendix A. Test Results of Conducted Test

Conducted Output Power(Average power)

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.
	Cha	nnel	55340	55990	56640	
	Frequen	cy (MHz)		3560	3625	3690
20	QPSK	1	0	20.65	20.77	20.70
20	QPSK	1	99	20.60	20.88	20.64
20	QPSK	100	0	19.50	19.75	19.60
20	16QAM	1	0	19.88	19.96	19.85
20	64QAM	1	0	18.60	18.91	18.85
	Cha	nnel		55315	55990	56665
	Frequen	cy (MHz)		3557.5	3625	3692.5
15	QPSK	1	0	20.63	20.75	20.66
15	16QAM	1	0	19.76	20.08	19.78
15	64QAM	1	0	18.52	18.86	18.82
	Cha	nnel		55290	55990	56690
	Frequen	cy (MHz)		3555.5	3625	3695
10	QPSK	1	0	20.65	20.80	20.62
10	16QAM	1	0	19.60	19.73	19.77
10	64QAM	1	0	18.85	19.14	18.85
	Cha	nnel	55265	55990	56715	
	Frequen	cy (MHz)	3552.5	3625	3697.5	
5	QPSK	1	0	20.53	20.69	20.59
5	16QAM	1	0	19.95	19.85	19.82
5	64QAM	1	0	19.52	19.21	19.06

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EIRP

LTE Band 48 (GT - LC = 1.0 dB) QPSK									
Bandwidth	5M								
Channel	55265	55990	56715						
Channel	(Low)	(Mid)	(High)						
Frequency	3552.5	3625	3697.5						
(MHz)	3552.5	3025	3097.3						
Conducted Power (dBm)	20.53	20.69	20.59						
Conducted Power (Watts)	0.1130	0.1172	0.1146						
EIRP(dBm)	21.53	21.69	21.59						
EIRP(Watts)	0.1422	0.1476	0.1442						

LTE Band 48 (GT - LC = 1.0 dB) QPSK										
Bandwidth		10M			15M			20M		
Channel	55290	55990	56690	55315	55990	56665	55340	55990	56640	
Chamie	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)	
Frequency	3555	3625	3695	3557.5	3625	3692.5	3560	3625	3690	
(MHz)	3333	3023	3093	3557.5	3025	3092.5	3360	3025	3690	
Conducted Power (dBm)	20.65	20.80	20.62	20.63	20.75	20.66	20.60	20.88	20.64	
Conducted Power (Watts)	0.1161	0.1202	0.1153	0.1156	0.1189	0.1164	0.1148	0.1225	0.1159	
EIRP(dBm)	21.65	21.80	21.62	21.63	21.75	21.66	21.60	21.88	21.64	
EIRP(Watts)	0.1462	0.1514	0.1452	0.1455	0.1496	0.1466	0.1445	0.1542	0.1459	

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LTE Band 48 (GT - LC = 1.0 dB) 16QAM									
Bandwidth	5M								
Channel	55265	55990	56715						
Channel	(Low)	(Mid)	(High)						
Frequency	3552.5	3625	3697.5						
(MHz)	3552.5	3025	3097.5						
Conducted Power (dBm)	19.95	19.85	19.82						
Conducted Power (Watts)	0.0989	0.0966	0.0959						
EIRP(dBm)	20.95	20.85	20.82						
EIRP(Watts)	0.1245	0.1216	0.1208						

	LTE Band 48 (GT - LC = 1.0 dB) 16QAM									
Bandwidth	10M				15M		20M			
Channel	55290	55990	56690	55315	55990	56665	55340	55990	56640	
Channel	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)	
Frequency	3555	3625	3695	3557.5	3625	3692.5	3560	3625	3690	
(MHz)	3555	3625	3095	3557.5	3625	3092.5	3560	3025	3690	
Conducted Power (dBm)	19.60	19.73	19.77	19.76	20.08	19.78	19.88	19.96	19.85	
Conducted Power (Watts)	0.0912	0.0940	0.0948	0.0946	0.1019	0.0951	0.0973	0.0991	0.0966	
EIRP(dBm)	20.60	20.73	20.77	20.76	21.08	20.78	20.88	20.96	20.85	
EIRP(Watts)	0.1148	0.1183	0.1194	0.1191	0.1282	0.1197	0.1225	0.1247	0.1216	

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	LTE Band 48 (GT - LC = 1.0 dB) 64QAM								
Bandwidth	5M								
Channel	55265	55990	56715						
Channel	(Low)	(Mid)	(High)						
Frequency	3552.5	3625	3697.5						
(MHz)	3952.5	3025	3097.5						
Conducted Power (dBm)	19.52	19.21	19.06						
Conducted Power (Watts)	0.0895	0.0834	0.0805						
EIRP(dBm)	20.52	20.21	20.06						
EIRP(Watts)	0.1127	0.1050	0.1014						

LTE Band 48 (GT - LC = 1.0 dB) 64QAM									
Bandwidth	10M				15M		20M		
Channel	55290	55990	56690	55315	55990	56665	55340	55990	56640
Channel	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)
Frequency	3555	3625	3695	3557.5	3625	3692.5	3560	3625	3690
(MHz)	3555	3625	3695	3557.5	3025	3092.5	3560	3625	3690
Conducted Power (dBm)	18.85	19.14	18.85	18.52	18.86	18.82	18.60	18.91	18.85
Conducted Power (Watts)	0.0767	0.0820	0.0767	0.0711	0.0769	0.0762	0.0724	0.0778	0.0767
EIRP(dBm)	19.85	20.14	19.85	19.52	19.86	19.82	19.60	19.91	19.85
EIRP(Watts)	0.0966	0.1033	0.0966	0.0895	0.0968	0.0959	0.0912	0.0979	0.0966

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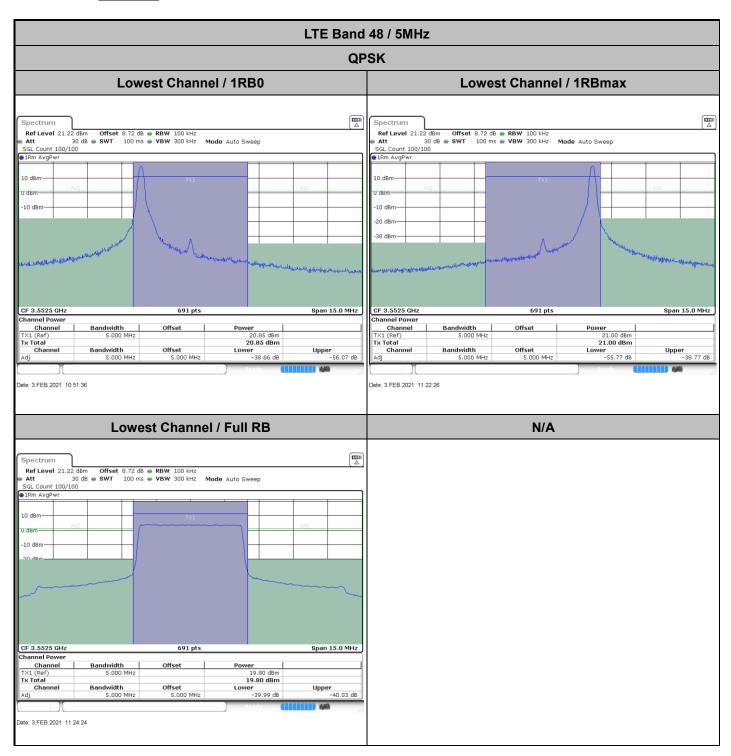
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LTE Band 48

ACLR



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LTE Band 48 / 5MHz **QPSK** Middle Channel / 1RB0 Middle Channel / 1RBmax Mode Auto Sweep Mode Auto Sweep -10 dBm CF 3.625 GHz 691 pts Span 15.0 MHz CF 3.625 GHz Span 15.0 MHz 691 pts Bandwidth 5.000 MHz 20.97 dBm 20.97 dBm 20.97 dBm Lower -56.03 dB 20.89 dBm 20.89 dBm Lower -38.29 dB Channel Offset Tx Total Chan Upper -56.28 dB Upper -38.47 dB Bandwidth 5.000 MHz Bandwidth 5.000 MHz ate: 3.FEB.2021 11:29:15 Middle Channel / Full RB N/A Spectrum -10 dBm CF 3.625 GHz 691 pts Span 15.0 MHz 19.76 dBm 19.76 dBm 19.76 dBm Lower -38.40 dB Channel Bandwidth 5.000 MH ate: 3.FEB.2021 11:33:35

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LTE Band 48 / 5MHz **QPSK** Highest Channel / 1RB0 **Highest Channel / 1RBmax** Mode Auto Sweep Mode Auto Sweep -10 dBm CF 3.6975 GHz 691 pts Span 15.0 MHz CF 3.6975 GHz Span 15.0 MHz 691 pts Bandwidth 5.000 MHz 21.31 dBm 21.31 dBm 21.31 dBm Lower -55.90 dB 21.63 dBm 21.63 dBm Lower -38.66 dB Channel Offset Tx Total Chan Upper -55.87 dB Upper -37.88 dB Bandwidth 5.000 MHz ate: 3.FEB.2021 13:00:30 **Highest Channel / Full RB** N/A Spectrum -10 dBm CF 3.6975 GHz 691 pts Span 15.0 MHz Channel 20.08 dBm 20.08 dBm 20.08 dBm Lower -39.71 dB Bandwidth 5.000 MH

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ate: 3.FEB.2021 13:05:28

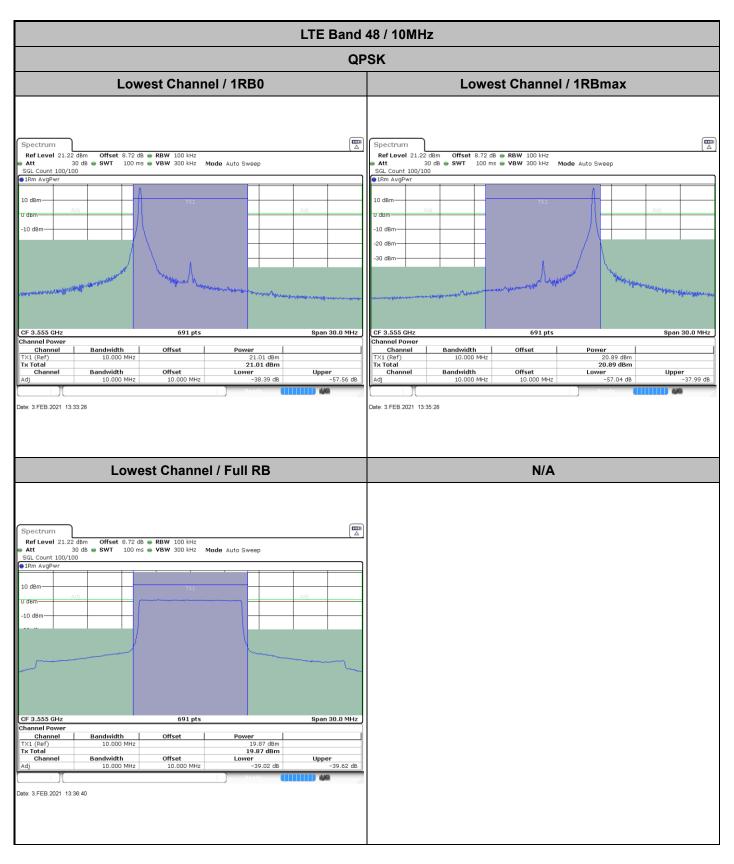
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LTE Band 48 / 10MHz **QPSK** Middle Channel / 1RB0 Middle Channel / 1RBmax Mode Auto Sweep Mode Auto Sweep -10 dBm CF 3.625 GHz 691 pts Span 30.0 MHz CF 3.625 GHz 691 pts Span 30.0 MHz 20.90 dBm 20.90 dBm 20.90 dBm Lower -57.22 dB 21.09 dBm 21.09 dBm 21.09 dBm Lower -38.72 dB Channel Bandwidth 10.000 MH: Offset Tx Total Chan Upper -57.76 dB Upper -38.02 dB Bandwidth 10.000 MHz Bandwidth 10.000 MHz Offset 10.000 MHz ate: 3.FEB.2021 13:48:58 Middle Channel / Full RB N/A Spectrum -10 dBm CF 3.625 GHz 691 pts Span 30.0 MHz Channel Power 19.89 dBm 19.89 dBm Lower -37.32 dB Bandwidth 10.000 MHz Date: 3.FEB.2021 13:50:13

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LTE Band 48 / 10MHz **QPSK** Highest Channel / 1RB0 **Highest Channel / 1RBmax** Mode Auto Sweep -10 dBm CF 3.695 GHz 691 pts Span 30.0 MHz CF 3.695 GHz 691 pts Span 30.0 MHz 21.17 dBm 21.17 dBm 21.17 dBm Lower -38.33 dB Power 21.47 dBm **21.47 dBm Lower** -57.63 dB Channel Bandwidth 10.000 MH: Offset Tx Total Chan Upper -56.80 dB Upper -37.64 dB Bandwidth 10.000 MHz Bandwidth 10.000 MHz Offset 10.000 MHz ate: 3.FEB.2021 13:53:22 **Highest Channel / Full RB** N/A Spectrum -10 dBm CF 3.695 GHz 691 pts Span 30.0 MHz Channel Power 20.22 dBm 20.22 dBm Lower -39.27 dB Bandwidth 10.000 MHz Date: 3.FEB.2021 13:57:54

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LTE Band 48 / 15MHz **QPSK** Lowest Channel / 1RB0 **Lowest Channel / 1RBmax** Ref Level 21.22 dBm Offset
Att 30 dB SWT
SGL Count 100/100 Ref Level 21.22 dBm Offset 8.72 dB • RBW
Att 30 dB • SWT 100 ms • VBW
SGL Count 100/100 8.72 dB • RBW 100 ms • VBW Mode Auto Sweep Mode Auto Sweep -10 dBm CF 3.5575 GHz 691 pts Span 45.0 MHz CF 3.5575 GHz Span 45.0 MHz 691 pts 20.77 dBm 20.77 dBm 20.77 dBm Lower -55.82 dB 20.85 dBm 20.85 dBm Lower -34.32 dB Channel Bandwidth 15.000 MH: Offset Tx Total Chan Upper -56.43 dB Upper -35.01 dB Bandwidth 15.000 MHz Bandwidth 15.000 MHz Offset 15.000 MHz ate: 3.FEB.2021 14:02:55 Lowest Channel / Full RB N/A Spectrum -10 dBm CF 3.5575 GHz 691 pts Span 45.0 MHz Power 19.90 dBm 19.90 dBm Lower -38.49 dB Channel Bandwidth 15.000 MHz ate: 3.FEB.2021 14:06:39

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LTE Band 48 / 15MHz **QPSK** Middle Channel / 1RB0 Middle Channel / 1RBmax Ref Level 21.22 dBm Offset
Att 30 dB SWT
SGL Count 100/100 Ref Level 21.22 dBm Offset 8.72 dB • RBW
Att 30 dB • SWT 100 ms • VBW
SGL Count 100/100 8.72 dB • RBW 100 ms • VBW Mode Auto Sweep Mode Auto Sweep -10 dBm CF 3.625 GHz 691 pts Span 45.0 MHz CF 3.625 GHz Span 45.0 MHz 691 pts 20.92 dBm 20.92 dBm 20.92 dBm Lower -56.01 dB 21.28 dBm 21.28 dBm 21.28 dBm Lower -34.99 dB Channel Bandwidth 15.000 MH: Offset Tx Total Chan Upper -56.78 dB Upper -35.16 dB Bandwidth 15.000 MHz Bandwidth 15.000 MHz Offset 15.000 MHz ate: 3.FEB.2021 14:09:21 Middle Channel / Full RB N/A Spectrum -10 dBm CF 3.625 GHz 691 pts Span 45.0 MHz Channel Power 19.90 dBm 19.90 dBm Lower -37.03 dB Bandwidth 15.000 MHz ate: 3.FEB.2021 14:08:46

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LTE Band 48 / 15MHz **QPSK** Highest Channel / 1RB0 **Highest Channel / 1RBmax** Ref Level 21.22 dBm Offset 8.72 dB RBW Att 30 dB SWT 100 ms VBW SGL Count 100/100 Ref Level 21.22 dBm Offset 8.72 dB • RBW
Att 30 dB • SWT 100 ms • VBW
SGL Count 100/100 Mode Auto Sweep Mode Auto Sweep -10 dBm CF 3.6925 GHz 691 pts Span 45.0 MHz CF 3.6925 GHz Span 45.0 MHz 691 pts 21.00 dBm 21.00 dBm 21.00 dBm Lower -34.55 dB Power 21.37 dBm 21.37 dBm Lower -56.67 dB Channel Bandwidth 15.000 MH: Offset Tx Total Chan Upper -55.63 dB Upper -35.06 dB Bandwidth 15.000 MHz Bandwidth 15.000 MHz Offset 15.000 MHz ate: 3.FEB.2021 14:14:29 **Highest Channel / Full RB** N/A Spectrum -10 dBm CF 3.6925 GHz 691 pts Span 45.0 MHz Channel 20.17 dBm 20.17 dBm 20.17 dBm Lower -39.12 dB Bandwidth 15.000 MHz Date: 3.FEB.2021 14:15:07

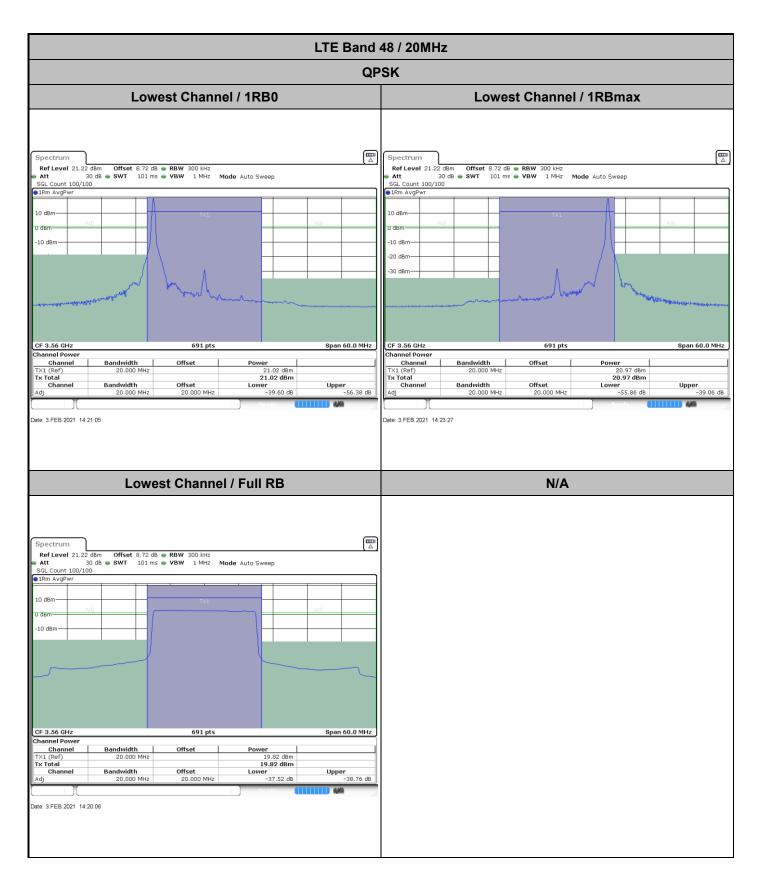
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LTE Band 48 / 20MHz **QPSK** Middle Channel / 1RB0 Middle Channel / 1RBmax Ref Level 21.22 dBm Offset 8.72 dB RBW Att 30 dB SWT 100 ms VBW SGL Count 100/100 Ref Level 21.22 dBm Offset 8.72 dB • RBW
Att 30 dB • SWT 100 ms • VBW
SGL Count 100/100 300 kHz 1 MHz Mode Auto Sweep Mode Auto Sweep -10 dBm CF 3.625 GHz 691 pts Span 60.0 MHz CF 3.625 GHz Span 60.0 MHz 691 pts Power 21.07 dBm **21.07 dBm Lower** -39.54 dB Power 20.95 dBm **20.95 dBm Lower** -55.83 dB Channel Bandwidth 20.000 MHz Offset Tx Total Chan Upper -56.30 dB Upper -39.20 dB Bandwidth 20.000 MHz Bandwidth 20.000 MHz Offset 20.000 MHz ate: 3.FEB.2021 14:28:17 Middle Channel / Full RB N/A Spectrum -10 dBm CF 3.625 GHz 691 pts Span 60.0 MHz 19.90 dBm 19.90 dBm Lower -36.18 dB Channel Bandwidth 20.000 MHz ate: 3.FEB.2021 14:29:00

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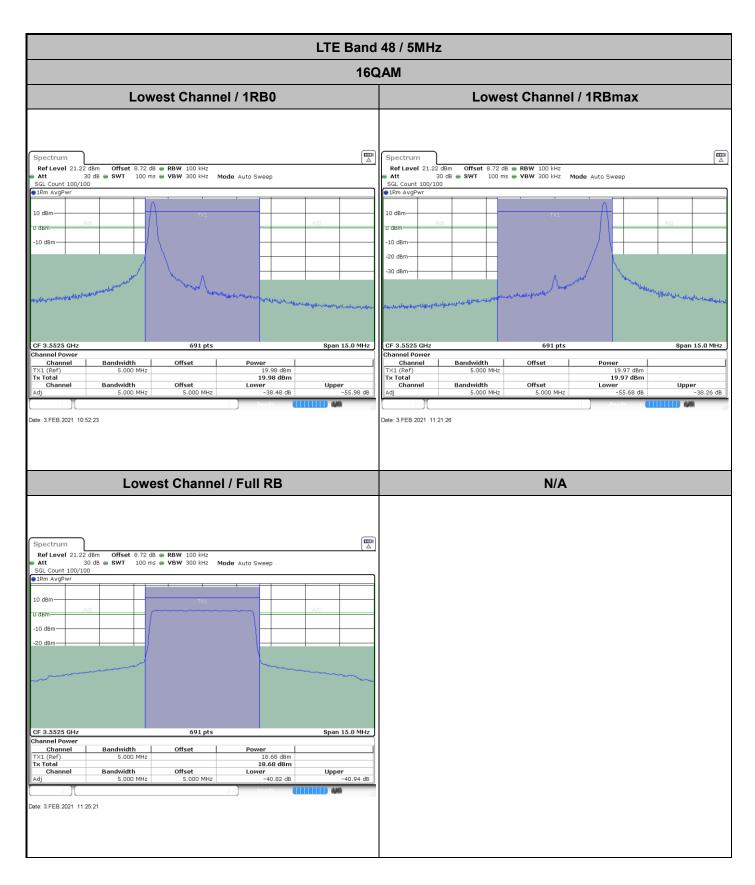
LTE Band 48 / 20MHz **QPSK** Highest Channel / 1RB0 **Highest Channel / 1RBmax** Ref Level 21.22 dBm Offset 8.72 dB RBW Att 30 dB SWT 100 ms VBW SGL Count 100/100 Ref Level 21.22 dBm Offset 8.72 dB • RBW
Att 30 dB • SWT 100 ms • VBW
SGL Count 100/100 Mode Auto Sweep Mode Auto Sweep -10 dBm CF 3.69 GHz 691 pts Span 60.0 MHz CF 3.69 GHz Span 60.0 MHz 691 pts 21.15 dBm 21.15 dBm 21.15 dBm Lower -39.77 dB Power 21.53 dBm **21.53 dBm Lower** -56.58 dB Channel Bandwidth 20.000 MHz Offset Tx Total Chan Upper -55.56 dB Upper -39.15 dB Bandwidth 20.000 MHz Bandwidth 20.000 MHz Offset 20.000 MHz ate: 3.FEB.2021 14:31:24 **Highest Channel / Full RB** N/A Spectrum -10 dBm CF 3.69 GHz 691 pts Span 60.0 MHz Channel Power 20.13 dBm 20.13 dBm Lower -38.39 dB Bandwidth 20.000 MHz Date: 3.FEB.2021 14:30:51

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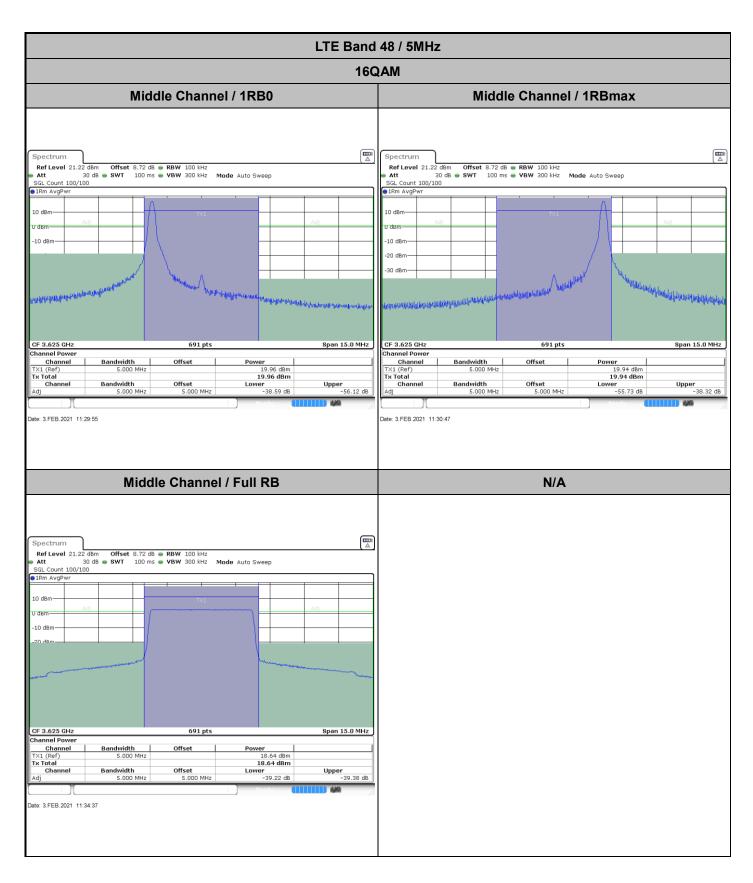


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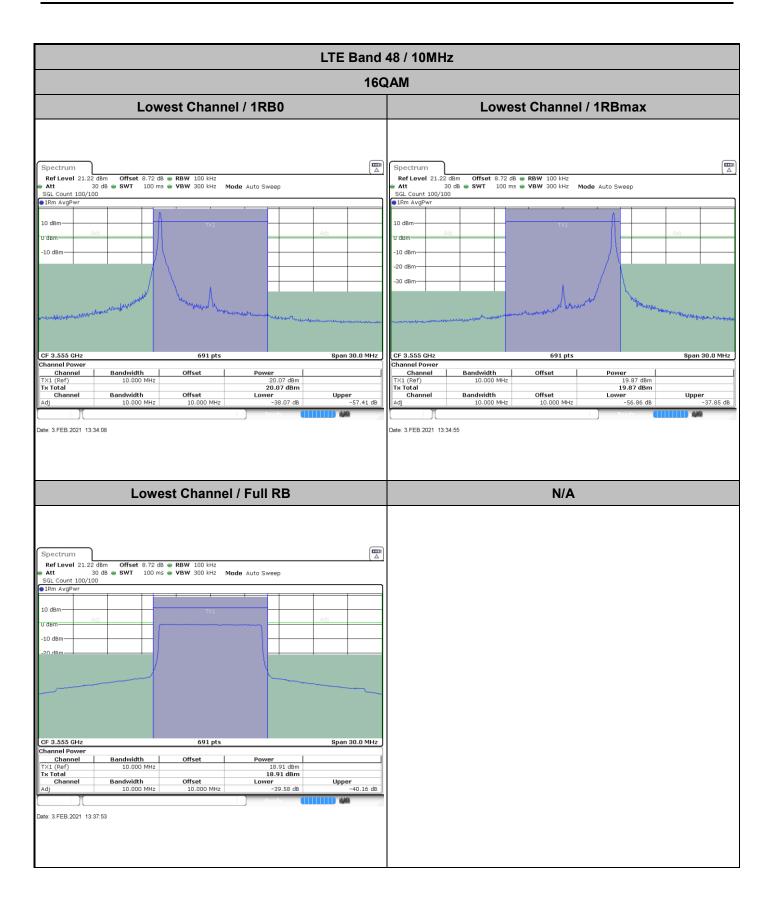
LTE Band 48 / 5MHz **16QAM** Highest Channel / 1RB0 **Highest Channel / 1RBmax** Ref Level 21.22 dBm Offset 8.72 dB RBW 100 kHz
Att 30 dB SWT 100 ms VBW 300 kHz
SGL Count 100/100 Mode Auto Sweep Mode Auto Sweep -10 dBm CF 3.6975 GHz 691 pts Span 15.0 MHz CF 3.6975 GHz Span 15.0 MHz 691 pts Bandwidth 5.000 MHz 20.04 dBm 20.04 dBm 20.04 dBm Lower -37.63 dB Power 20.35 dBm **20.35 dBm Lower** -55.78 dB Channel Offset Tx Total Chan Upper -55.13 dB Upper -37.73 dB Bandwidth 5.000 MHz ate: 3.FEB.2021 13:01:34 **Highest Channel / Full RB** N/A Spectrum -10 dBm CF 3.6975 GHz 691 pts Span 15.0 MHz Channel Power 19.00 dBm 19.00 dBm Lower -39.73 dB Bandwidth 5.000 MH ate: 3.FEB.2021 13:04:42

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LTE Band 48 / 10MHz **16QAM** Middle Channel / 1RB0 Middle Channel / 1RBmax Ref Level 21.22 dBm Offset 8.72 dB RBW 100 kHz
Att 30 dB SWT 100 ms VBW 300 kHz
SGL Count 100/100 Mode Auto Sweep Mode Auto Sweep -10 dBm CF 3.625 GHz 691 pts Span 30.0 MHz CF 3.625 GHz 691 pts Span 30.0 MHz Power 19.92 dBm 19.92 dBm Lower -56.92 dB Power 20.14 dBm **20.14 dBm Lower** -38.41 dB Channel Bandwidth 10.000 MH: Offset Tx Total Chan Upper -57.47 dB Upper -37.80 dB Bandwidth 10.000 MHz Bandwidth 10.000 MHz Offset 10.000 MHz ate: 3.FEB.2021 13:38:38 Middle Channel / Full RB N/A Spectrum
 Ref Level
 21.22 dBm
 Offset
 8.72 dB
 ■ RBW
 100 kHz

 Att
 30 dB
 SWT
 100 ms
 ■ VBW
 300 kHz
 Mode Auto Sweep -10 dBm CF 3.625 GHz 691 pts Span 30.0 MHz Channel Bandwidth 10.000 MHz Power 18.91 dBm 18.91 dBm Lower -37.92 dB

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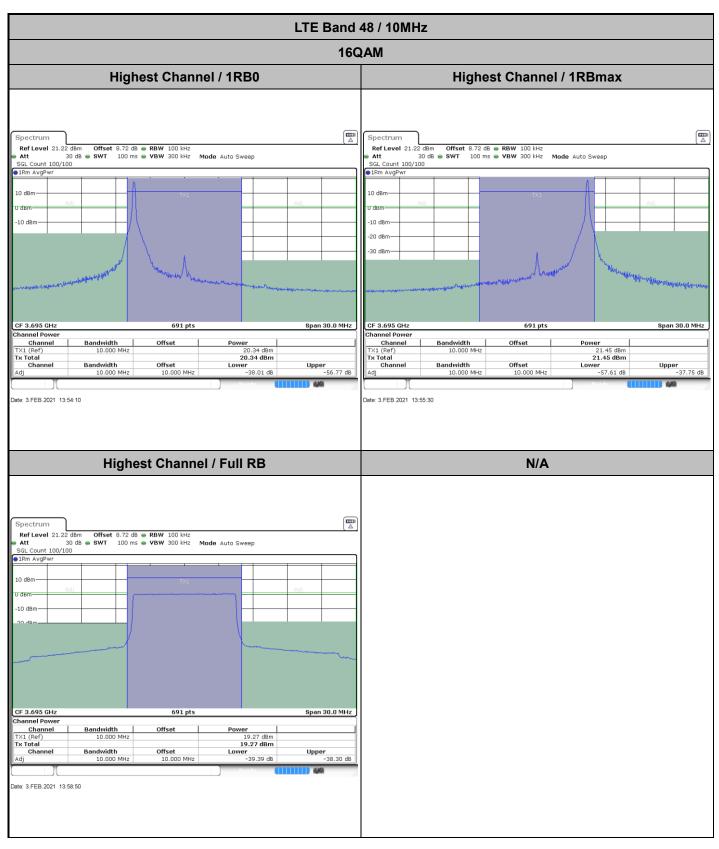
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Date: 3.FEB.2021 13:50:48

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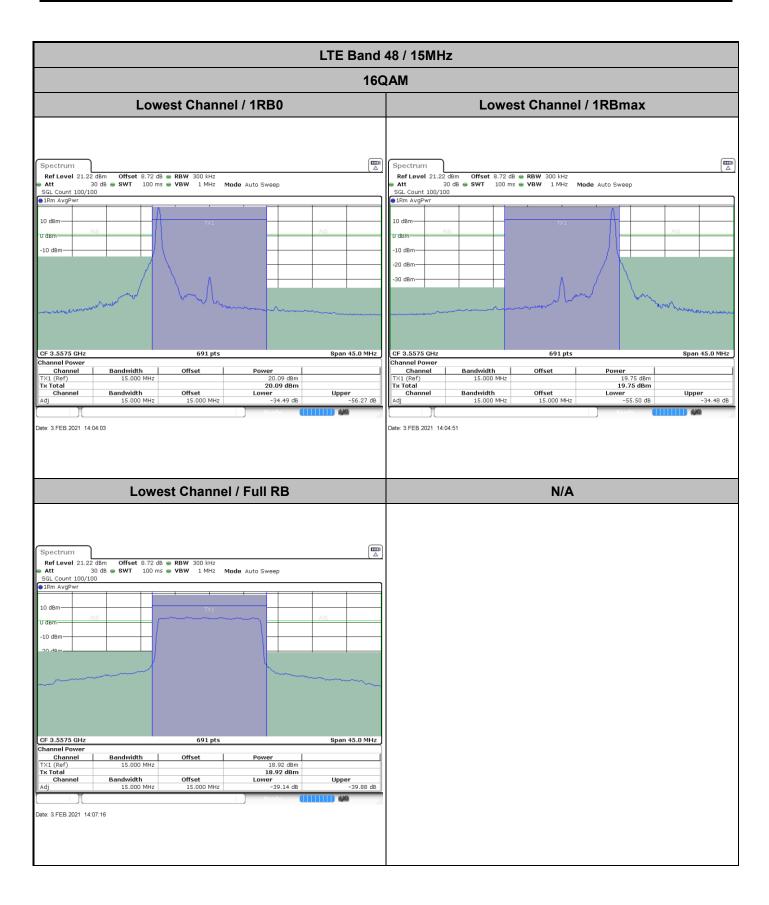


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TEL: +86-512-57900158 FAX: +86-512-57900958 FCC ID: ZMOL860GL16

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LTE Band 48 / 15MHz **16QAM** Middle Channel / 1RB0 Middle Channel / 1RBmax Ref Level 21.22 dBm Offset
Att 30 dB SWT
SGL Count 100/100 Ref Level 21.22 dBm Offset 8.72 dB • RBW
Att 30 dB • SWT 100 ms • VBW
SGL Count 100/100 8.72 dB • RBW 100 ms • VBW Mode Auto Sweep Mode Auto Sweep -10 dBm CF 3.625 GHz 691 pts Span 45.0 MHz CF 3.625 GHz Span 45.0 MHz 691 pts 20.33 dBm 20.33 dBm 20.33 dBm Lower -56.07 dB Power 19.87 dBm **19.87 dBm Lower** -33.95 dB Channel Bandwidth 15.000 MH: Offset Tx Total Chan Upper -55.94 dB Upper -35.35 dB Bandwidth 15.000 MHz Bandwidth 15.000 MHz Offset 15.000 MHz ate: 3.FEB.2021 14:09:56 Middle Channel / Full RB N/A Spectrum
 Ref Level
 21.22 dBm
 Offset
 8.72 dB
 ■ RBW

 Att
 30 dB
 ■ SWT
 100 ms
 ■ VBW
 300 kHz 1 MHz **Mode** Auto Sweep -10 dBm CF 3.625 GHz 691 pts Span 45.0 MHz Channel Power 18.92 dBm 18.92 dBm Lower -37.70 dB Bandwidth 15.000 MHz

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LTE Band 48 / 15MHz **16QAM** Highest Channel / 1RB0 **Highest Channel / 1RBmax** Ref Level 21.22 dBm Offset 8.72 dB RBW Att 30 dB SWT 100 ms VBW SGL Count 100/100 Ref Level 21.22 dBm Offset 8.72 dB • RBW
Att 30 dB • SWT 100 ms • VBW
SGL Count 100/100 Mode Auto Sweep Mode Auto Sweep -10 dBm CF 3.6925 GHz 691 pts Span 45.0 MHz CF 3.6925 GHz Span 45.0 MHz 691 pts 20.49 dBm 20.49 dBm 20.49 dBm Lower -56.33 dB 20.13 dBm 20.13 dBm 20.13 dBm Lower -34.62 dB Channel Bandwidth 15.000 MH: Offset Tx Total Chan Upper -55.43 dB Upper -34.61 dB Bandwidth 15.000 MHz Bandwidth 15.000 MHz Offset 15.000 MHz ate: 3.FEB.2021 14:13:40 **Highest Channel / Full RB** N/A Spectrum
 Ref Level
 21.22 dBm
 Offset
 8.72 dB
 ■ RBW

 Att
 30 dB
 ■ SWT
 100 ms
 ■ VBW
 300 kHz 1 MHz **Mode** Auto Sweep -10 dBm CF 3.6925 GHz 691 pts Span 45.0 MHz Channel Power 19.20 dBm **19.20 dBm Lower** -39.37 dB Bandwidth 15.000 MHz

Sporton International (Kunshan) Inc.

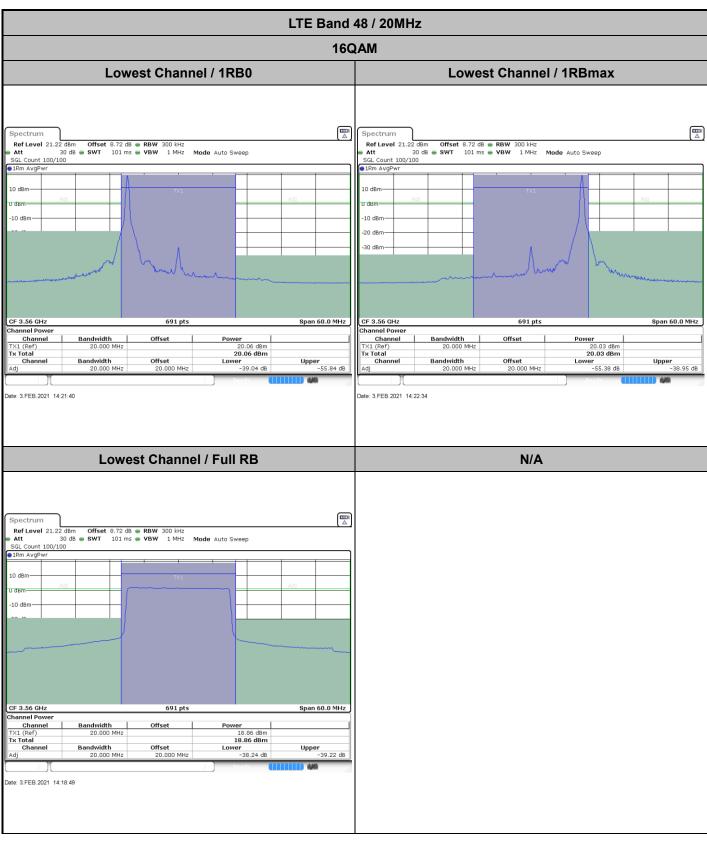
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Report No.: FG0O3022F LTE Band 48 / 20MHz **16QAM** Middle Channel / 1RB0 Middle Channel / 1RBmax Ref Level 21.22 dBm Offset 8.72 dB RBW Att 30 dB SWT 100 ms VBW SGL Count 100/100 Ref Level 21.22 dBm Offset 8.72 dB • RBW
Att 30 dB • SWT 100 ms • VBW
SGL Count 100/100 Mode Auto Sweep Mode Auto Sweep -10 dBm CF 3.625 GHz 691 pts Span 60.0 MHz CF 3.625 GHz Span 60.0 MHz 691 pts Power 20.12 dBm **20.12 dBm Lower** -39.15 dB Power 19.96 dBm 19.96 dBm Lower -55.30 dB Channel Bandwidth 20.000 MHz Offset Tx Total Chan Upper -55.75 dB Upper -38.82 dB Bandwidth 20.000 MHz Bandwidth 20.000 MHz Offset 20.000 MHz ate: 3.FEB.2021 14:27:37 Middle Channel / Full RB N/A Spectrum
 Ref Level
 21.22 dBm
 Offset
 8.72 dB
 ■ RBW

 Att
 30 dB
 ■ SWT
 100 ms
 ■ VBW
 300 kHz 1 MHz **Mode** Auto Sweep -10 dBm CF 3.625 GHz 691 pts Span 60.0 MHz Power 18.93 dBm 18.93 dBm Lower -36.93 dB Channel Bandwidth 20.000 MHz

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LTE Band 48 / 20MHz **16QAM** Highest Channel / 1RB0 **Highest Channel / 1RBmax** Ref Level 21.22 dBm Offset 8.72 dB RBW Att 30 dB SWT 100 ms VBW SGL Count 100/100 Ref Level 21.22 dBm Offset 8.72 dB • RBW
Att 30 dB • SWT 100 ms • VBW
SGL Count 100/100 Mode Auto Sweep Mode Auto Sweep -10 dBm CF 3.69 GHz 691 pts Span 60.0 MHz CF 3.69 GHz Span 60.0 MHz 691 pts 20.06 dBm 20.06 dBm Lower -38.93 dB Power 20.36 dBm **20.36 dBm Lower** -55.79 dB Channel Bandwidth 20.000 MHz Offset Tx Total Chan Upper -54.95 dB Upper -38.40 dB Bandwidth 20.000 MHz Bandwidth 20.000 MHz Offset 20.000 MHz ate: 3.FEB.2021 14:31:59 **Highest Channel / Full RB** N/A Spectrum
 Ref Level
 21.22 dBm
 Offset
 8.72 dB
 ■ RBW

 Att
 30 dB
 ■ SWT
 100 ms
 ■ VBW
 300 kHz 1 MHz **Mode** Auto Sweep -10 dBm CF 3.69 GHz 691 pts Span 60.0 MHz Channel Bandwidth 20.000 MHz Upper -37.11 dB

Sporton International (Kunshan) Inc.

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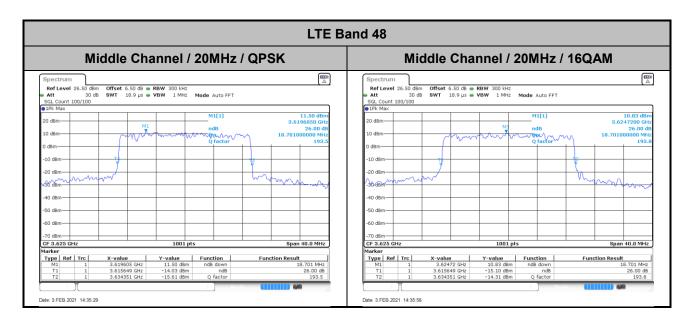
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26dB Bandwidth

Mode	LTE Band 48 : 26dB BW(MHz)	
BW	20MHz	
Mod.	QPSK	16QAM
Middle CH	18.701	18.701



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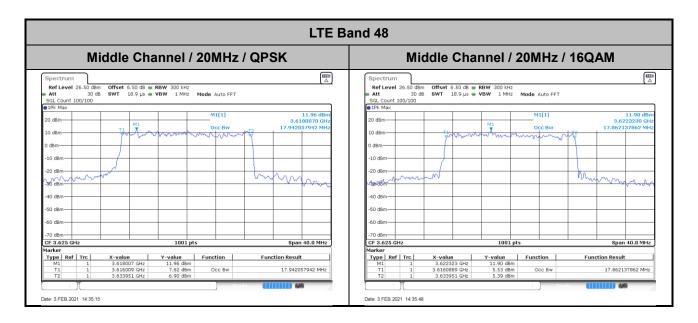
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Occupied Bandwidth

Mode	LTE Band 48 : 99%OBW(MHz)	
BW	20MHz	
Mod.	QPSK	16QAM
Middle CH	17.96	17.86



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