

# **FCC RF Test Report**

APPLICANT : Quectel Wireless Solutions Co., Ltd.

**EQUIPMENT** : 5G NR Module

BRAND NAME : QUECTEL MODEL NAME : AG555Q-GL

FCC ID : XMR2024AG555QGL

STANDARD : 47 CFR Part 2, 96

CLASSIFICATION : Citizens Band End User Devices (CBE)

**EQUIPMENT TYPE**: End User Equipment

TEST DATE(S) : Jan. 22, 2024 ~ Apr. 12, 2024

We, Sporton International Inc. (Kunshan), 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 Inc. (Kunshan), the test report shall not be reproduced except in full.

JasonJia

Approved by: Jason Jia



Sporton International Inc. (Kunshan)

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

Sporton International Inc. (Kunshan)

TEL: +86-512-57900158 FCC ID: XMR2024AG555QGL Page Number : 1 of 22 Issued Date : Jun. 06, 2024

Report No.: FG3D1801H

Report Version : 01



## FCC RF Test Report

**Table of Contents** 

His	story o	of this test report	3
Su	mmar	y of Test Result	4
1	Gene	eral Description	5
	1.1	Applicant	5
	1.2	Manufacturer	
	1.3	Feature of Equipment Under Test	5
	1.4	Maximum EIRP Power and Emission Designator	6
	1.5	Testing Site	6
	1.6	Test Software	6
	1.7	Applied Standards	7
2	Test	Configuration of Equipment Under Test	8
	2.1	Test Mode	8
	2.2	Connection Diagram of Test System	9
	2.3	Support Unit used in test configuration	
	2.4	Measurement Results Explanation Example	
	2.5	Frequency List of Low/Middle/High Channels	10
3	Cond	ducted Test Items	11
	3.1	Measuring Instruments	11
	3.2	Test Setup	11
	3.3	Conducted Output Power	
	3.4	EIRP	
	3.5	Occupied Bandwidth	
	3.6	Conducted Band Edge	
	3.7	Conducted Spurious Emission	
	3.8	Frequency Stability	17
4	Radi	ated Test Items	
	4.1	Measuring Instruments	18
	4.2	Test Setup	18
	4.3	Test Result of Radiated Test	
	4.4	Radiated Spurious Emission	20
5	List	of Measuring Equipment	21
6	Meas	surement Uncertainty	22
Αp	pendi	x A. Test Results of Conducted Test	
-	-	x B. Test Results of Radiated Test	
•	•	y C. Toot Sotup Bhotographa	

Appendix C. Test Setup Photographs

# History of this test report

Report No.	Version	Description	Issued Date
FG3D1801H	01	Initial issue of report	Jun. 06, 2024

Sporton International Inc. (Kunshan)

TEL: +86-512-57900158 FCC ID: XMR2024AG555QGL Page Number : 3 of 22 Issued Date : Jun. 06, 2024

Report No.: FG3D1801H

Report Version : 01



**Summary of Test Result** 

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.3	§2.1046	Conducted Output Power	Reporting only	-
-	§96.41	Peak-to-Average Ratio	Not Applicable	Not applicable for End User Devices
		Maximum E.I.R.P	Pass	-
3.4	§96.41	Maximum Power Spectral Density	Not Applicable	Not applicable for End User Devices
3.5	§2.1049 §96.41	Occupied Bandwidth	Reporting only	-
3.6	§2.1051 §96.41	Conducted Band Edge Measurement Adjacent Channel Leakage Ratio	Pass	-
3.7	§2.1051 §96.41	Conducted Spurious Emission	Pass	
3.8	§2.1055	Frequency Stability for Temperature & Voltage	Pass	-
4.4	§2.1051 §96.41	Radiated Spurious Emission	Pass	Under limit 4.87 dB at 7363.00 MHz

#### **Conformity Assessment Condition:**

- The test results (PASS/FAIL) with all measurement uncertainty excluded are presented against the regulation limits or
  in accordance with the requirements stipulated by the applicant/manufacturer who shall bear all the risks of
  non-compliance that may potentially occur if measurement uncertainty is taken into account.
- 2. The measurement uncertainty please refer to each test result in the section "Measurement Uncertainty"

#### Disclaimer:

The product specifications of the EUT presented in the test report that may affect the test assessments are declared by the manufacturer who shall take full responsibility for the authenticity.

Sporton International Inc. (Kunshan)

TEL: +86-512-57900158 FCC ID: XMR2024AG555QGL Page Number : 4 of 22 Issued Date : Jun. 06, 2024

Report No.: FG3D1801H

Report Version : 01



## 1 General Description

## 1.1 Applicant

#### Quectel Wireless Solutions Co., Ltd.

Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai, 200233, China

### 1.2 Manufacturer

#### Quectel Wireless Solutions Co., Ltd.

Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai, 200233, China

## 1.3 Feature of Equipment Under Test

Product Feature								
Equipment	5G NR Module							
Brand Name	QUECTEL							
Model Name	AG555Q-GL							
FCC ID	XMR2024AG555QGL							
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	LTE Band 48 main PA: 21.11dBm LTE Band 48 other PA: 19.84dBm							
Antenna Gain	LTE Band 48: -3.65 dBi							
Type of Modulation	QPSK / 16QAM / 64QAM / 256QAM							
IMEI Code	Conducted: 868637060013398 Radiation: 868637060025087							
HW Version	R1.0							
SW Version	BYA555QGLABR01A01M8G_OCPU							
EUT Stage	Identical Prototype							

#### Remark:

- 1. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.
- 2. The device supports two PAs for LTE Band 48(main PA for single carrier mode and other PA for ENDC mode), both the PA are full tested. The maximum power of main PA is higher than the other PA, therefore, we chose higher power of main PA to calculate the EIRP and show in the report.

 Sporton International Inc. (Kunshan)
 Page Number
 : 5 of 22

 TEL: +86-512-57900158
 Issued Date
 : Jun. 06, 2024

FCC ID: XMR2024AG555QGL Report Version : 01

Report Template No.: BU5-FGLTE96 Version 2.4



## 1.4 Maximum Conducted power and Emission Designator

Ľ	TE Band 48	QP	SK	16QAM/64QAM/256QAM			
BW (MHz)	Frequency Range (MHz)	Maximum Conducted power (W)	Emission Designator (99%OBW)	Maximum Conducted power (W)	Emission Designator (99%OBW)		
5	3552.5~3697.5	0.1253	4M50G7D	0.1081	4M50W7D		
10	3555~3695	0.1262	9M05G7D	0.1081	9M05W7D		
15	3557.5~3692.5	0.1213	13M5G7D	0.1069	13M5W7D		
20	3560~3690	0.1291	17M9G7D	0.1054	17M9W7D		

Note: All modulations have been tested, only the worst test results of PSK & QAM are shown in the report.

## 1.5 Testing Site

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

Test Firm	Sporton International Inc. (Kunshan)									
	No. 1098, Pengxi North Road, Kunshan Economic Development Zone									
Test Site Location	Jiangsu Province 215300 People's Republic of China									
	TEL: +86-512-57900158									
	Sporton Site No.	FCC Designation No.	FCC Test Firm							
Test Site No.	Sporton Site No.	rcc besignation No.	Registration No.							
	03CH04-KS TH01-KS	CN1257	314309							

## 1.6 Test Software

Item	Site	Manufacture	Name	Version	
1.	TH01-KS		FCC LTE_Ver2.0 Auto_china_210503	2.0	
2.	03CH04-KS	AUDIX	E3	210616	

Sporton International Inc. (Kunshan)
TEL: +86-512-57900158

FCC ID: XMR2024AG555QGL

Page Number : 6 of 22 Issued Date : Jun. 06, 2024

Report No.: FG3D1801H

Report Version : 01



## 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
- 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.

Sporton International Inc. (Kunshan)

TEL: +86-512-57900158 FCC ID: XMR2024AG555QGL

: 7 of 22 Page Number Issued Date : Jun. 06, 2024

Report No.: FG3D1801H

Report Version : 01



#### **Test Configuration of Equipment Under Test** 2

## 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.

For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases (X plane) were recorded in this report.

	Bandwidth (MHz)			Modu	lation		RB#			Test Channel							
Test Items	Band	1.4	3	5	10	15	20	QPSK	16 QAM	64 QAM	256 QAM	1	Half	Full	L	М	Н
Max. Output Power	48	•	-	٧	v	v	٧	v	٧	v	v	٧		٧	٧	٧	v
Adjacent Channel Leakage Ratio	48	•	-	v	v	v	٧	v	٧	v	v	v		٧	v	v	v
26dB and 99% Bandwidth	48	•	-	v	v	v	٧	v	٧					v		٧	
Conducted Band Edge	48	•	-	٧	V	v	v	v	V	V	v	٧		V	٧	V	v
Conducted Spurious Emission	48	•	-	v	v	v	v	v				v			v	v	v
E.I.R.P	48	-	-	٧	v	v	v	v	٧	v	٧	٧		v	v	٧	v
Frequency Stability	48	•	-	v				v				٧				٧	
Radiated Spurious Emission	48	Worst Case							v	v	v						
Remark	1. The mark "v" means that this configuration is chosen for testing 2. The mark "-" means that this bandwidth is not supported. 3. The device is investigated from 30MHz to 10 times of fundamental signal for radiated spurious emission test under different RB size/offset and modulations in exploratory test. Subsequently, only the worst case emissions are																

reported.

Sporton International Inc. (Kunshan)

TEL: +86-512-57900158 FCC ID: XMR2024AG555QGL

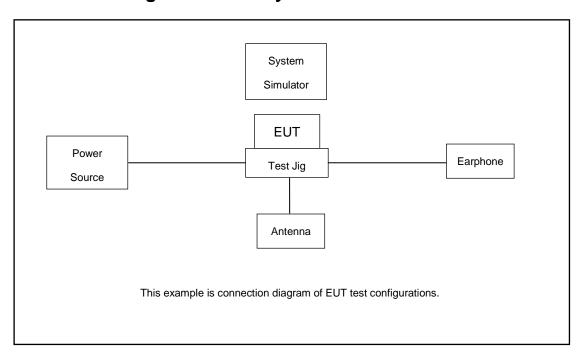
: 8 of 22 Page Number Issued Date : Jun. 06, 2024

Report No.: FG3D1801H

Report Version : 01



## 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.	Base Station	Anritsu	MT8820C	N/A	N/A	Unshielded, 1.8 m
3.	Test jig	N/A	N/A	N/A	N/A	N/A
4.	Antenna	N/A	N/A	N/A	N/A	N/A
5.	Adapter	N/A	N/A	N/A	N/A	N/A
6.	Earphone	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 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.

Offset = RF cable loss.

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

Example:

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

=8.72 (dB)

Sporton International Inc. (Kunshan)

TEL: +86-512-57900158 FCC ID: XMR2024AG555QGL Page Number : 9 of 22 Issued Date : Jun. 06, 2024

Report No.: FG3D1801H

Report Version : 01



2.5 Frequency List of Low/Middle/High Channels

LTE Band 48 Channel and Frequency List											
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest							
	Channel	55340	55990	56640							
20	Frequency	3560.0	3625.0	3690.0							
45	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							
F	Channel	55265	55990	56715							
5	Frequency	3552.5	3625.0	3697.5							

Sporton International Inc. (Kunshan)

TEL: +86-512-57900158 FCC ID: XMR2024AG555QGL Page Number : 10 of 22 Issued Date : Jun. 06, 2024

Report No.: FG3D1801H

Report Version : 01



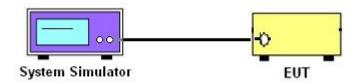
## 3 Conducted Test Items

## 3.1 Measuring Instruments

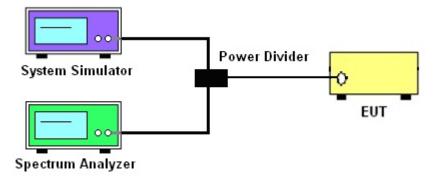
See list of measuring instruments of this test report.

## 3.2 Test Setup

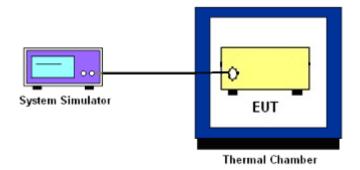
## 3.2.1 Conducted Output Power / ACLR



# 3.2.226dB & 99% Occupied Bandwidth, Conducted Band-Edge and Conducted Spurious Emission



## 3.2.3 Frequency Stability



## 3.2.4 Test Result of Conducted Test

Please refer to Appendix A.

Sporton International Inc. (Kunshan)

TEL: +86-512-57900158 FCC ID: XMR2024AG555QGL Page Number : 11 of 22 Issued Date : Jun. 06, 2024

Report No.: FG3D1801H

Report Version : 01

## 3.3 Conducted Output Power

## 3.3.1 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.

#### 3.3.2 Test Procedures

- 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.

Sporton International Inc. (Kunshan)

TEL: +86-512-57900158 FCC ID: XMR2024AG555QGL

: 12 of 22 Page Number Issued Date : Jun. 06, 2024

Report No.: FG3D1801H

Report Version : 01



#### **3.4 EIRP**

#### 3.4.1 Description of the EIRP Measurement

EIRP limits for CBRS equipment as below table:

D	evice	Maximum EIRP	Maximum PSD
		(dBm/10 MHz)	(dBm/MHz)
Applied	End User Device	23	n/a
	Category A CBSD	30	20
	Category B CBSD	47	37

#### Remark:

 The worst case EIRP shown in this section is found with LTE operating only using 1RB. As such, the EIRP/10MHz and full channel EIRP values will be identical since 1RB is fully contained within all available channel bandwidths for LTE Band 48 (i.e. 5, 10, 15, 20MHz)

#### 3.4.2 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<sub>C</sub> = signal attenuation in the connecting cable between the transmitter and antenna in dB

Sporton International Inc. (Kunshan)
TEL: +86-512-57900158

FCC ID: XMR2024AG555QGL

Page Number : 13 of 22 Issued Date : Jun. 06, 2024

Report No.: FG3D1801H

Report Version : 01

3.5 Occupied Bandwidth

3.5.1 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.

3.5.2 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.

Page Number : 14 of 22 Issued Date : Jun. 06, 2024

Report Version : 01

: 01

Report No.: FG3D1801H

## 3.6 Conducted Band Edge

### 3.6.1 Description of Conducted Band Edge Measurement

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

#### 3.6.2 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.
- 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 or a narrower RBW was used (generally limited to no less than 1% of the OBW) and the measured power was integrated over the full required measurement bandwidth.
- 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.
- The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

Page Number : 15 of 22 Issued Date : Jun. 06, 2024

Report No.: FG3D1801H

Report Version : 01

## 3.7 Conducted Spurious Emission

#### 3.7.1 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.

#### 3.7.2 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.

Sporton International Inc. (Kunshan)

TEL: +86-512-57900158 FCC ID: XMR2024AG555QGL Page Number : 16 of 22 Issued Date : Jun. 06, 2024

Report No.: FG3D1801H

Report Version : 01

# 3.8 Frequency Stability

### 3.8.1 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.

#### 3.8.2 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.
- 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.

#### 3.8.3 Test Procedures for Voltage Variation

The testing follows FCC KDB 971168 D01 v03r01 Section 9.0.

- 1. The EUT was placed in a temperature chamber at 25±5° C and connected with the system simulator.
- 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.

**Sporton International Inc. (Kunshan)** TEL: +86-512-57900158

FCC ID: XMR2024AG555QGL

Page Number : 17 of 22 Issued Date : Jun. 06, 2024

Report No.: FG3D1801H

Report Version : 01



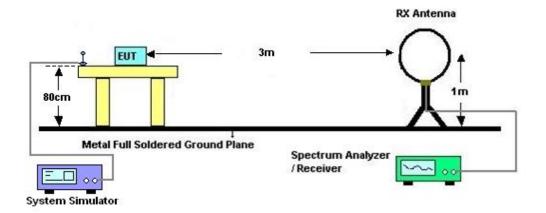
## 4 Radiated Test Items

## 4.1 Measuring Instruments

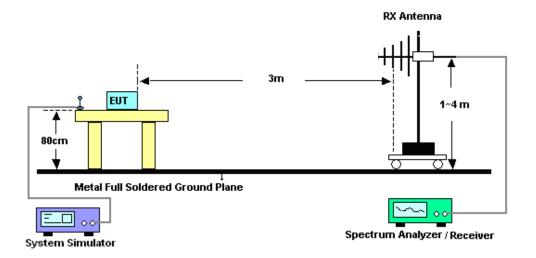
See list of measuring instruments of this test report.

## 4.2 Test Setup

#### 4.2.1 For radiated test below 30MHz



## 4.2.2 For radiated test from 30MHz to 1GHz



Sporton International Inc. (Kunshan)

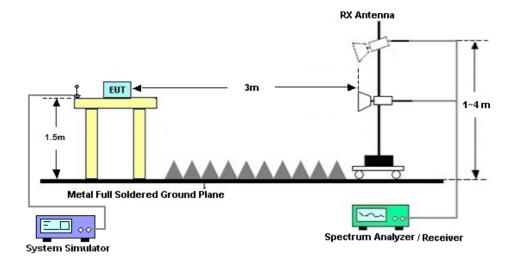
TEL: +86-512-57900158 FCC ID: XMR2024AG555QGL Page Number : 18 of 22 Issued Date : Jun. 06, 2024

Report No.: FG3D1801H

Report Version : 01



#### 4.2.3 For radiated test above 1GHz



## 4.3 Test Result of Radiated Test

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported.

Please refer to Appendix B.

Sporton International Inc. (Kunshan)

TEL: +86-512-57900158 FCC ID: XMR2024AG555QGL Page Number : 19 of 22 Issued Date : Jun. 06, 2024

Report No.: FG3D1801H

Report Version : 01

## 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 C63.26-2015.

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<math>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

Sporton International Inc. (Kunshan)

TEL: +86-512-57900158 FCC ID: XMR2024AG555QGL Page Number : 20 of 22 Issued Date : Jun. 06, 2024

Report No.: FG3D1801H

Report Version : 01



# 5 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSV40	101040	10Hz~40GHz	Oct. 11, 2023	Jan. 22, 2024~ Apr. 12, 2024	Oct. 10, 2024	Conducted (TH01-KS)
Power divider	STI	STI08-0055	-	0.5~40GHz	NCR	Jan. 22, 2024~ Apr. 12, 2024	NCR	Conducted (TH01-KS)
Temperature &h umidity chamber	Hongzhan	LP-150U	H2014011440	-40~+150°C 20%~95%RH	Jul. 06, 2023	Jan. 22, 2024~ Apr. 12, 2024	Jul. 05, 2024	Conducted (TH01-KS)
EXA Spectrum Analyzer	Keysight	N9010B	MY57471079	10Hz-44G,MAX 30dB	Oct. 10, 2023	Mar. 10, 2024	Oct. 09, 2024	Radiation (03CH04-KS)
Loop Antenna	R&S	HFH2-Z2E	101125	9kHz~30MHz	Sep. 11, 2023	Mar. 10, 2024	Sep. 10, 2024	Radiation (03CH04-KS)
Bilog Antenna	TeseQ	CBL6111D	49922	30MHz-1GHz	Apr. 09, 2023	Mar. 10, 2024	Apr. 08, 2024	Radiation (03CH04-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	00251694	1GHz~18GHz	Jul. 12, 2023	Mar. 10, 2024	Jul. 11, 2024	Radiation (03CH04-KS)
SHF-EHF Horn	Com-power	AH-840	101070	18GHz~40GHz	Jan. 05, 2024	Mar. 10, 2024	Jan. 04, 2025	Radiation (03CH04-KS)
Amplifier	SONOMA	310N	380827	9KHz-1GHz	Jul. 06, 2023	Mar. 10, 2024	Jul. 05, 2024	Radiation (03CH04-KS)
Amplifier	MITEQ	EM18G40G GA	060728	18~40GHz	Jan. 05, 2024	Mar. 10, 2024	Jan. 04, 2025	Radiation (03CH04-KS)
high gain Amplifier	EM	EM01G18G A	060840	1Ghz-18Ghz	Oct. 10, 2023	Mar. 10, 2024	Oct. 09, 2024	Radiation (03CH04-KS)
Amplifier	Agilent	8449B	3008A02370	1Ghz-18Ghz	Oct. 10, 2023	Mar. 10, 2024	Oct. 09, 2024	Radiation (03CH04-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Mar. 10, 2024	NCR	Radiation (03CH04-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Mar. 10, 2024	NCR	Radiation (03CH04-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Mar. 10, 2024	NCR	Radiation (03CH04-KS)

NCR: No Calibration Required

Sporton International Inc. (Kunshan)

TEL: +86-512-57900158 FCC ID: XMR2024AG555QGL Page Number : 21 of 22 Issued Date : Jun. 06, 2024

Report No.: FG3D1801H

Report Version : 01

## 6 Measurement Uncertainty

#### **Uncertainty of Conducted Measurement**

Test Item	Uncertainty			
Conducted Spurious Emission & Bandedge	±2.26 dB			
Occupied Channel Bandwidth	±0.1%			
Conducted Power	±0.46 dB			
Frequency Stability	±0.4 Hz			

#### <u>Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)</u>

Measuring Uncertainty for a Level of	3.82dB
Confidence of 95% (U = 2Uc(y))	0.0242

#### Uncertainty of Radiated Emission Measurement (1 GHz ~ 18 GHz)

	*
Measuring Uncertainty for a Level of	3.56dB
Confidence of 95% (U = 2Uc(y))	3.30UB

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))  3.54dB	

----- THE END -----

Sporton International Inc. (Kunshan)
TEL: +86-512-57900158

FCC ID: XMR2024AG555QGL

Page Number : 22 of 22 Issued Date : Jun. 06, 2024

Report No.: FG3D1801H

Report Version : 01



## **Appendix A. Test Results of Conducted Test**

Test Engineer :	Smile Wang	Temperature :	22~23°C	
		Relative Humidity :	40~42%	

# Conducted Output Power(Average power) and EIRP

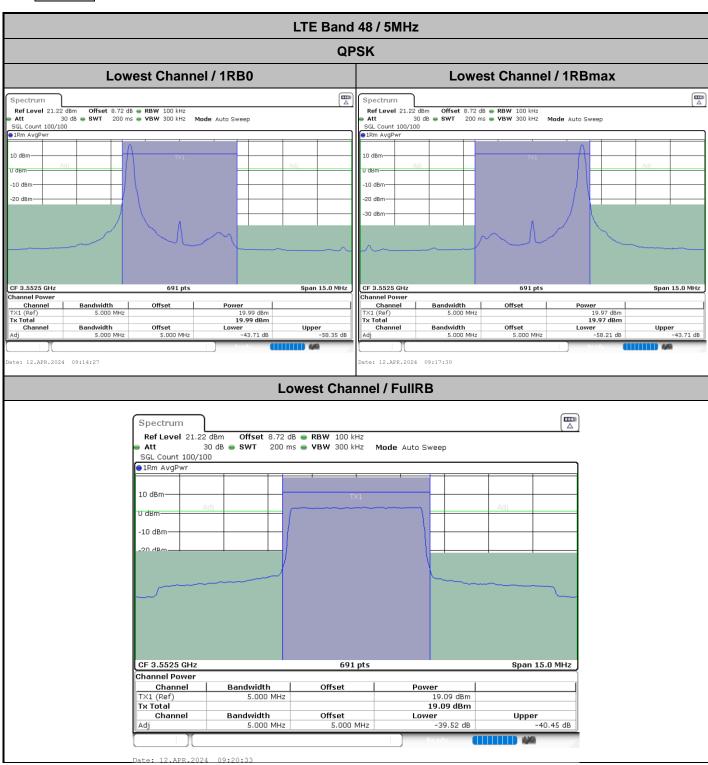
BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	EIRP(W)		
Channel			55340	55990	56640				
	Frequency (MHz)			3560	3625	3690	L	M	Н
20	QPSK	1	0	20.94	20.98	20.62	0.0536	0.0541	0.0498
20	QPSK	1	99	20.96	21.11	20.96	0.0538	0.0557	0.0538
20	QPSK	100	0	20.01	20.13	19.79	0.0433	0.0445	0.0411
20	16QAM	1	0	20.23	20.16	19.93	0.0455	0.0448	0.0425
20	64QAM	1	0	18.96	18.81	18.68	0.0340	0.0328	0.0318
20	256QAM	1	0	16.05	16.03	15.87	0.0174	0.0173	0.0167
Channel			55315	55990	56665	EIRP(W)			
Frequency (MHz)			3557.5	3625	3692.5	L	M	Н	
15	QPSK	1	0	20.84	20.77	20.64	0.0524	0.0515	0.0500
15	16QAM	1	0	20.29	20.12	19.94	0.0461	0.0444	0.0426
Channel			55290	55990	56690	EIRP(W)			
	Frequency (MHz)			3555	3625	3695 L M H			Н
10	QPSK	1	0	21.01	20.96	20.85	0.0545	0.0538	0.0525
10	16QAM	1	0	20.29	20.34	20.16	0.0461	0.0467	0.0448
Channel			55265	55990	56715	EIRP(W)			
Frequency (MHz)			3552.5	3625	3697.5	L	M	Н	
5	QPSK	1	0	20.87	20.98	20.82	0.0527	0.0541	0.0521
5	16QAM	1	0	20.34	20.31	20.13	0.0467	0.0463	0.0445



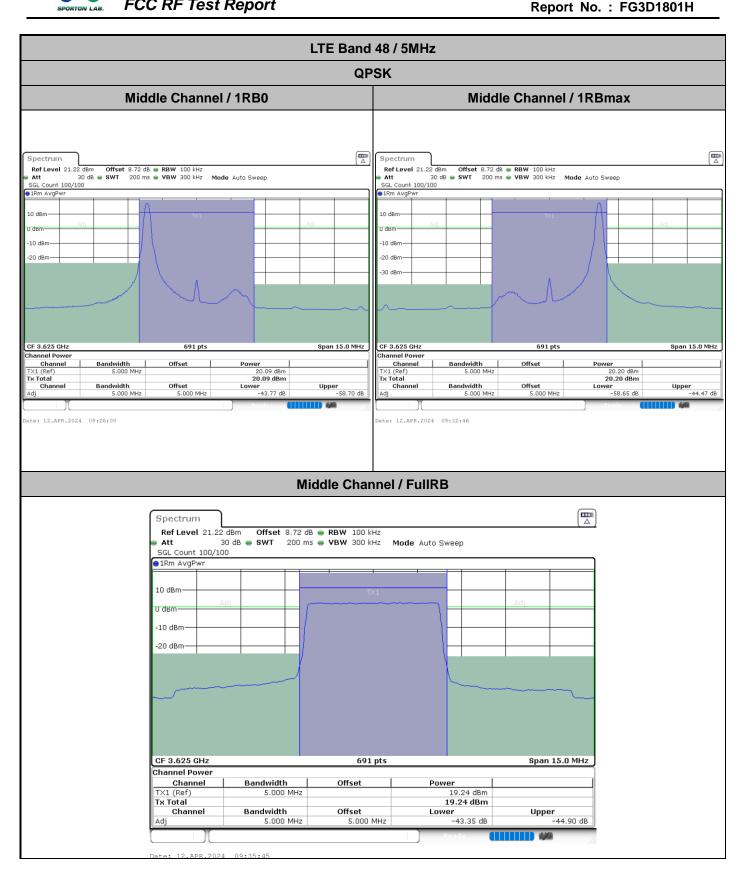
est Report No. : FG3D1801H

## LTE Band 48 Main PA

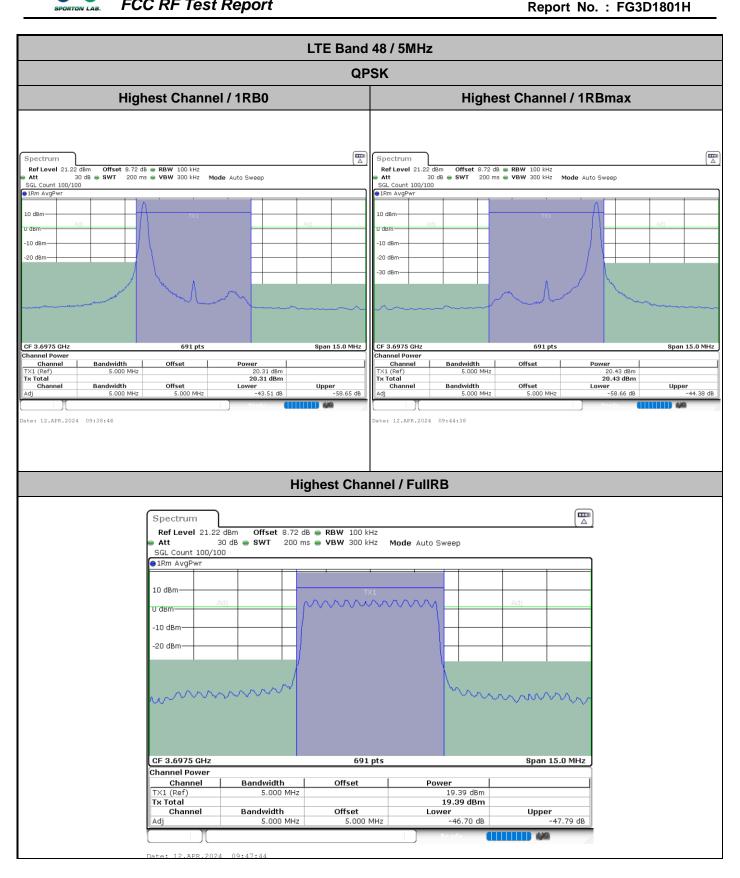










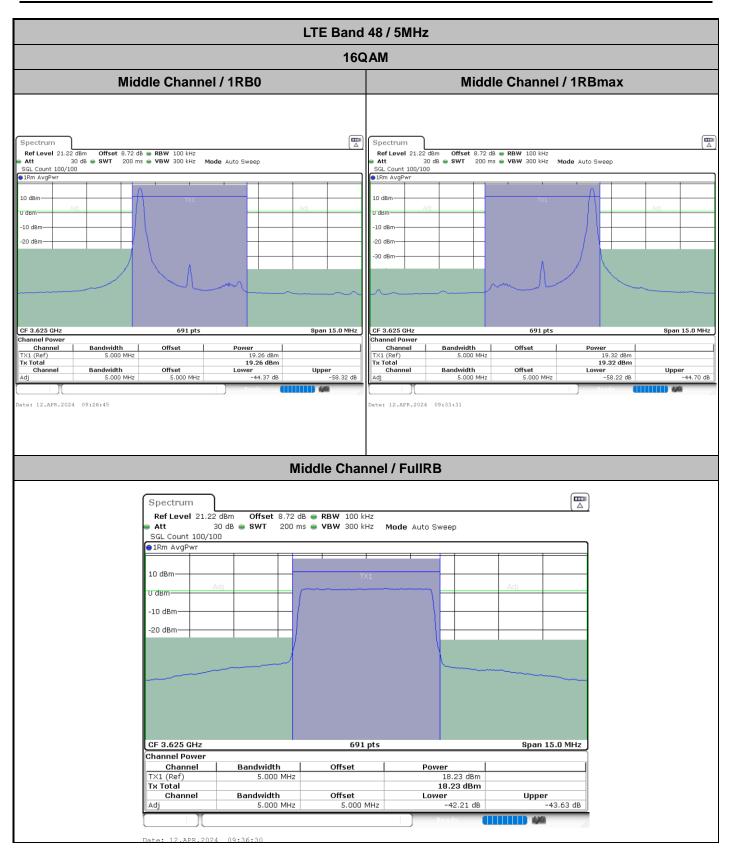




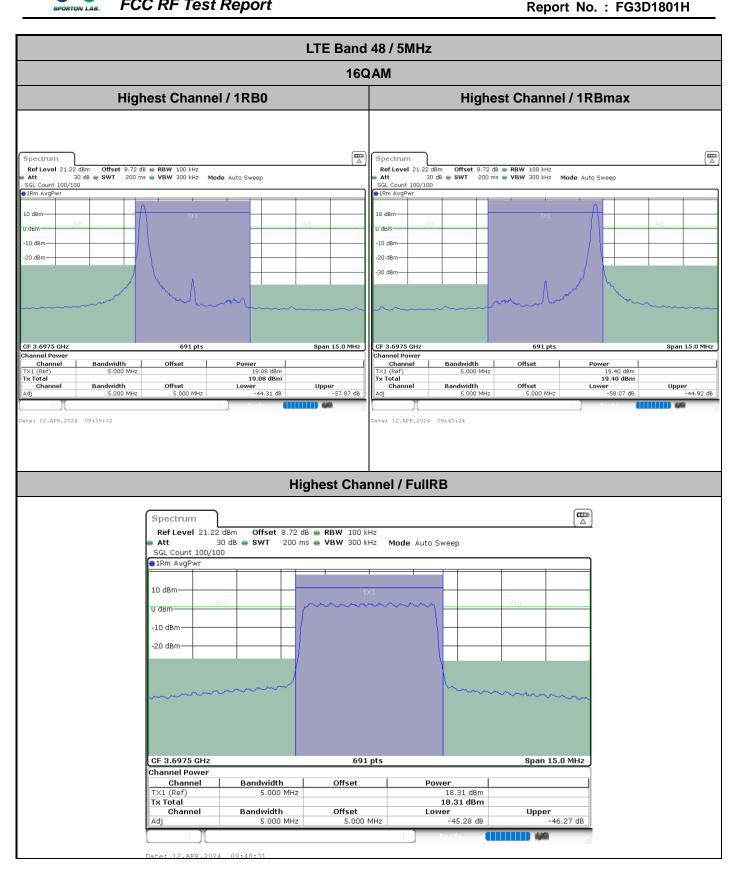
LTE Band 48 / 5MHz **16QAM** Lowest Channel / 1RB0 **Lowest Channel / 1RBmax** Mode Auto Sweep -10 dBm -20 dBm CF 3.5525 GHz 691 pts Span 15.0 MHz CF 3.5525 GHz 691 pts Span 15.0 MHz Power 19.10 dBm 19.10 dBm Lower -43.55 dB Bandwidth Power 19.10 dBm 19.10 dBm Lower -57.75 dB Channel Upper -57.85 dB **Upper** -44.17 dB Bandwidth 5.000 MHz Offset 5.000 MH Bandwidth 5.000 MH te: 12.APR.2024 09:15:12 **Lowest Channel / FullRB** Spectrum Ref Level 21.22 dBm Offset 8.72 dB • RBW 100 kHz 30 dB • SWT 200 ms • VBW 300 kHz Att Mode Auto Sweep SGL Count 100/100 ●1Rm AvgPwr 10 dBm-U dBm -10 dBm CF 3.5525 GHz 691 pts Span 15.0 MHz Channel Power Bandwidth 5.000 MHz Channel Offset Power 18.13 dBm TX1 (Ref) Tx Total 18.13 dBm Lower -38.41 dB Upper -39.32 dB Bandwidth Offset Channel 5.000 MHz

TEL: +86-512-57900158 FCC ID: XMR2024AG555QGL











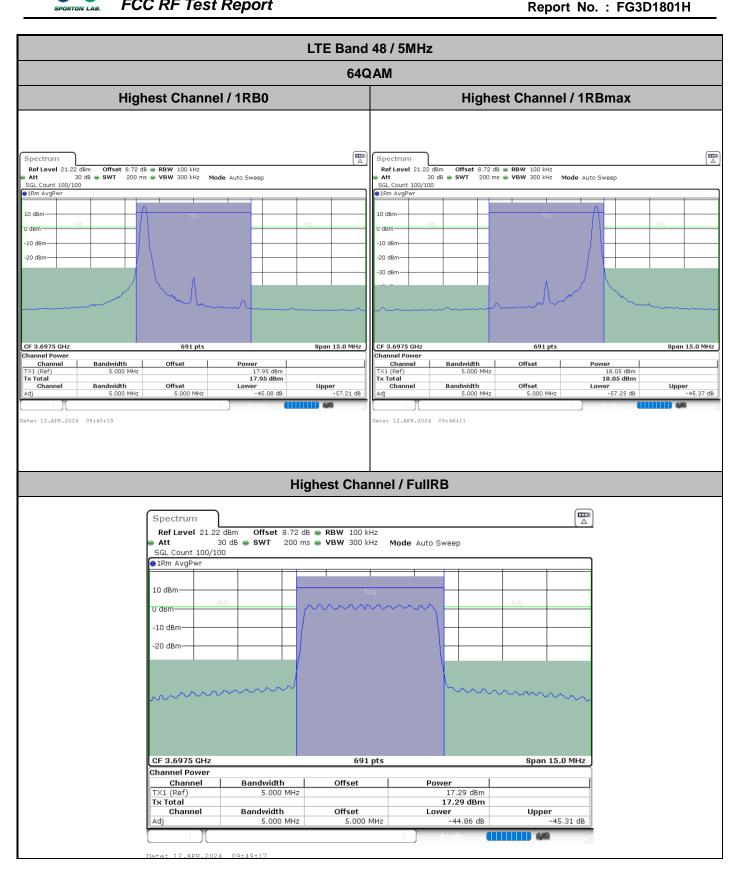
LTE Band 48 / 5MHz 64QAM Lowest Channel / 1RB0 **Lowest Channel / 1RBmax** -10 dBm -20 dBm CF 3.5525 GHz 691 pts Span 15.0 MHz CF 3.5525 GHz 691 pts Span 15.0 MHz Bandwidth Power 17.99 dBm 17.99 dBm Lower -57.08 dB Channel Upper -57.78 dB Bandwidth 5.000 MHz Offset 5.000 MH **Upper** -44.54 dB Bandwidth 5.000 MH te: 12.APR.2024 09:15:58 **Lowest Channel / FullRB** Spectrum Ref Level 21.22 dBm Offset 8.72 dB • RBW 100 kHz 30 dB • SWT 200 ms • VBW 300 kHz Att Mode Auto Sweep SGL Count 100/100 ●1Rm AvgPwr 10 dBm-U dBm -10 dBm CF 3.5525 GHz 691 pts Span 15.0 MHz Channel Power Bandwidth 5.000 MHz Channel Offset Power 17.09 dBm TX1 (Ref) Tx Total 17.09 dBm Lower -38.22 dB **Upper** -38.76 dB Bandwidth Offset Channel 5.000 MHz

TEL: +86-512-57900158 FCC ID: XMR2024AG555QGL

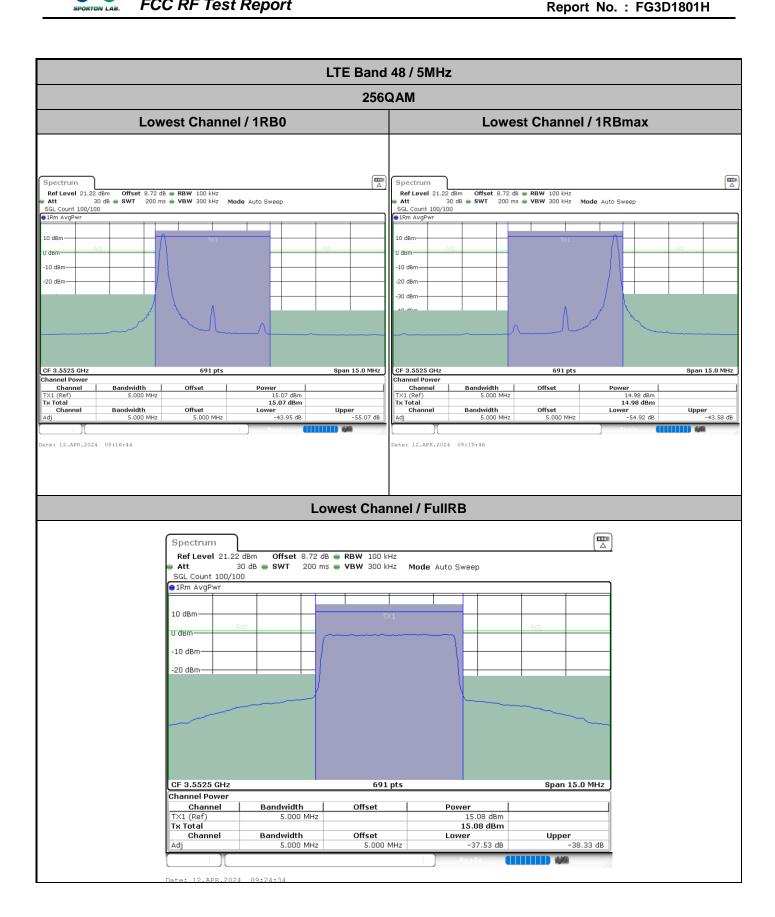




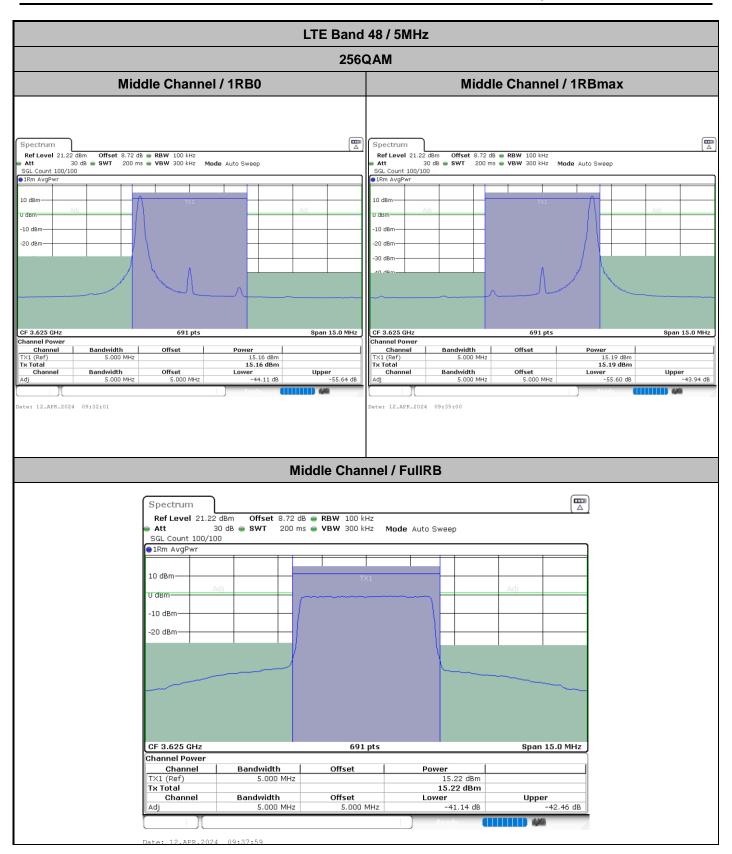




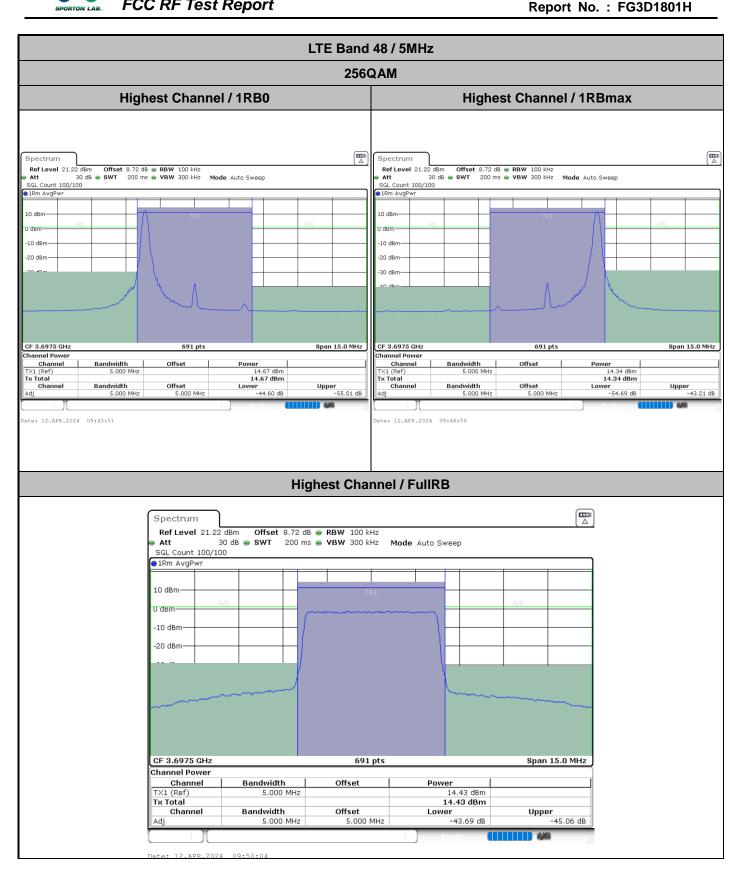






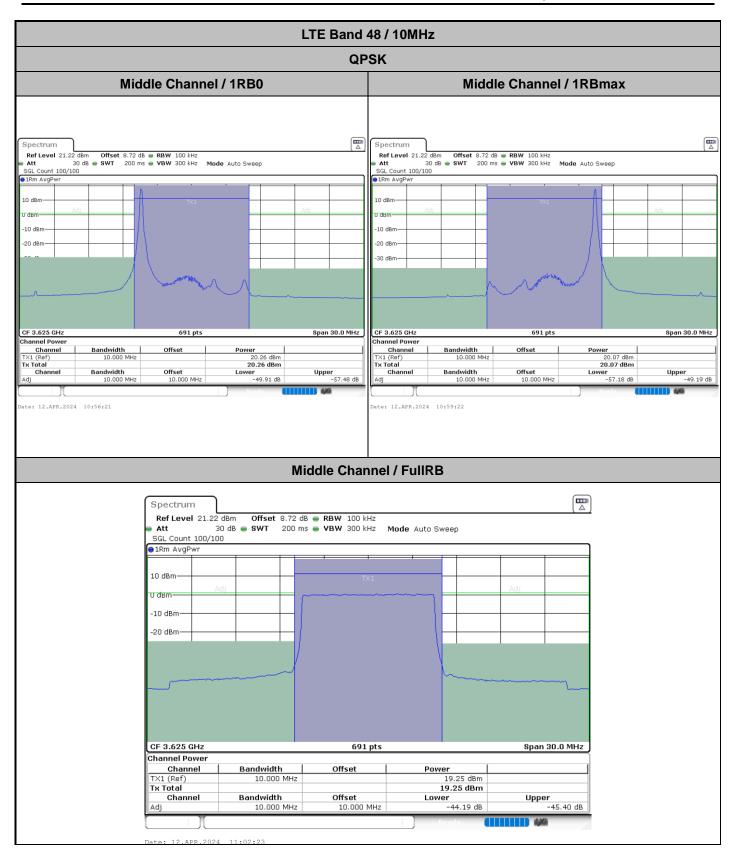




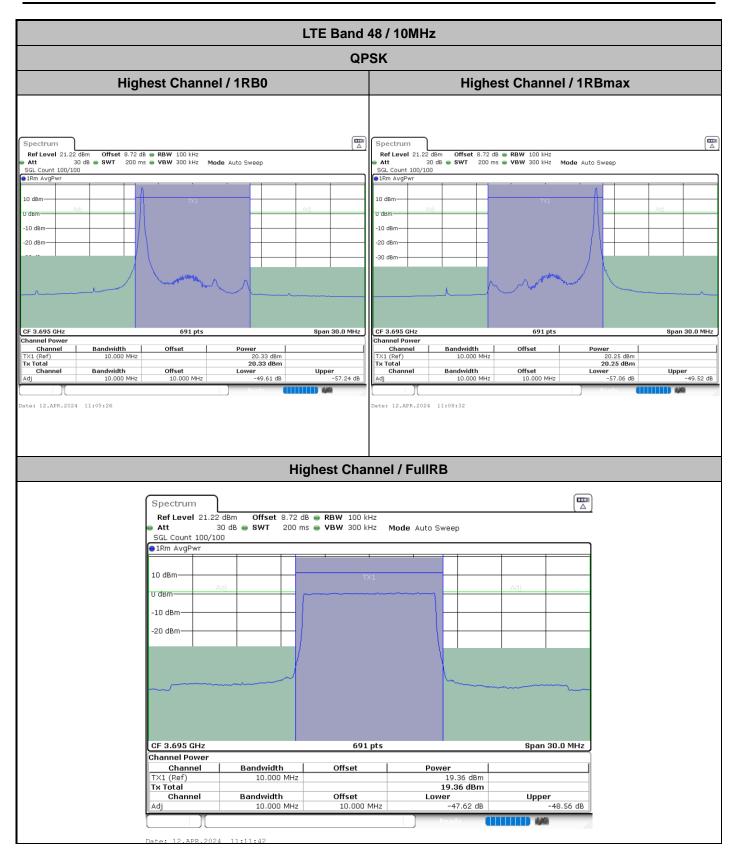




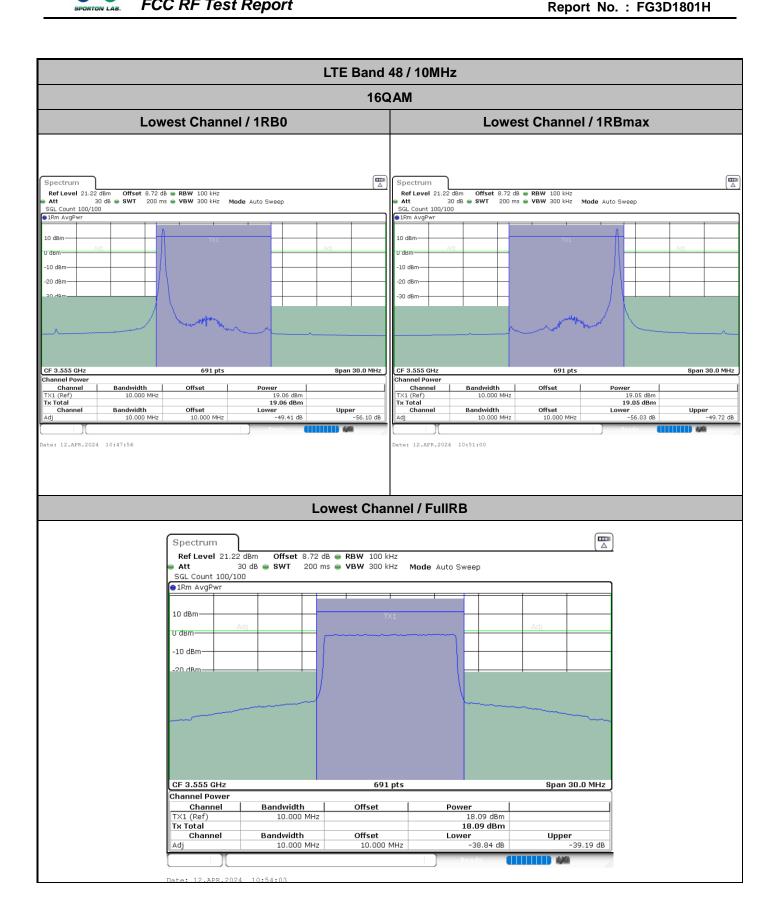




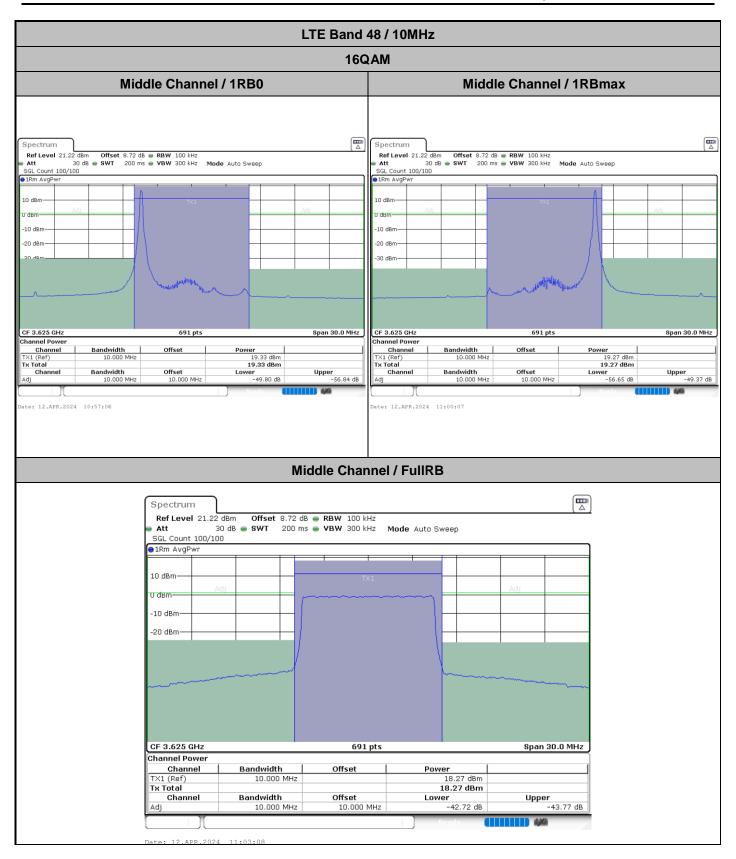




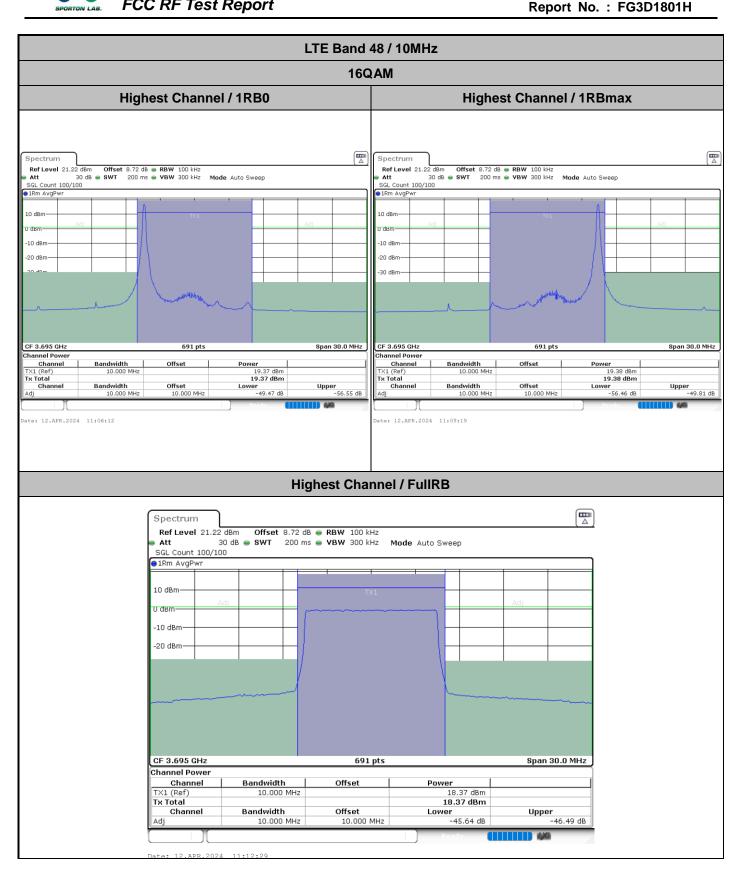




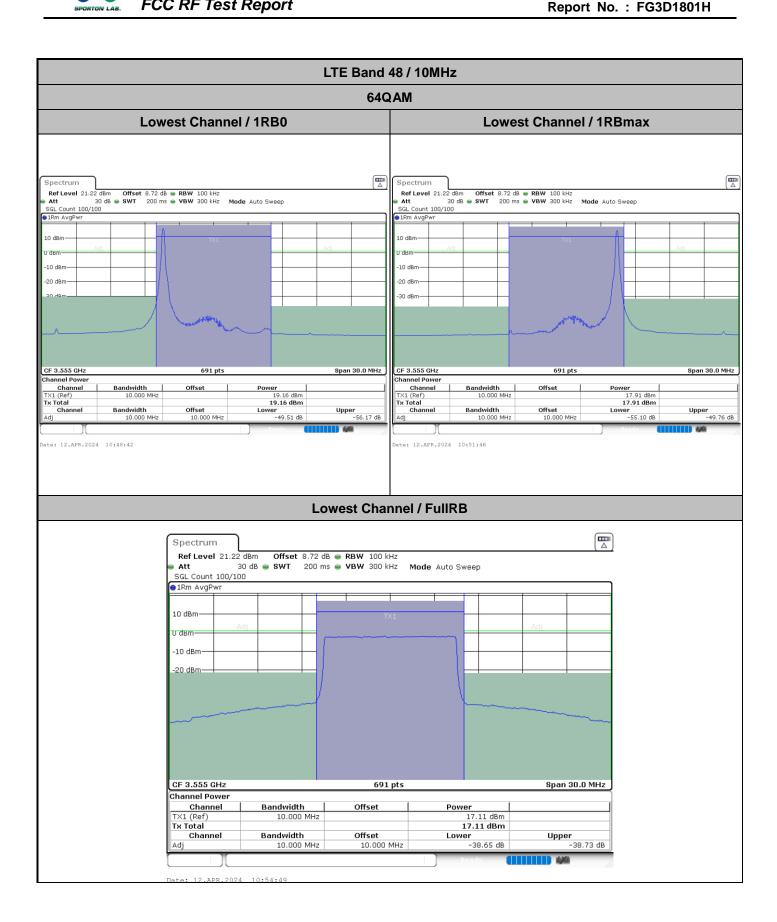


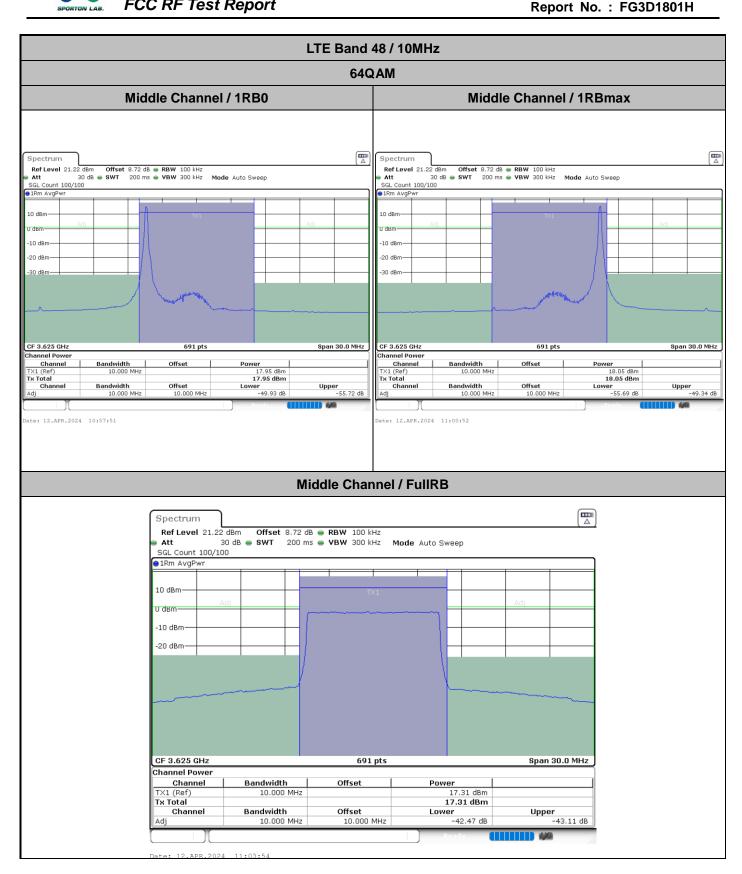




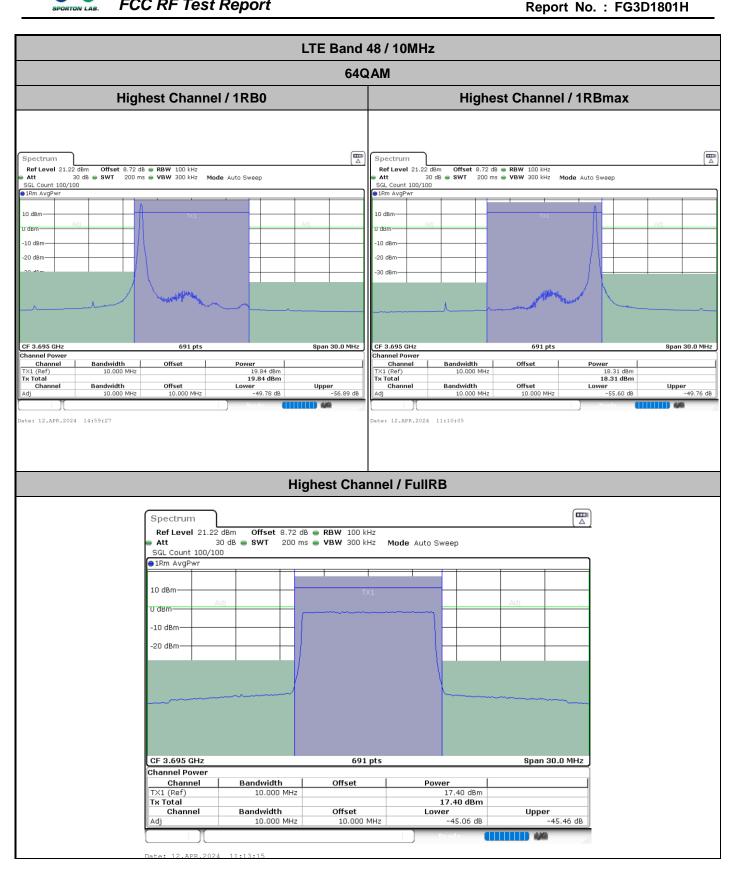




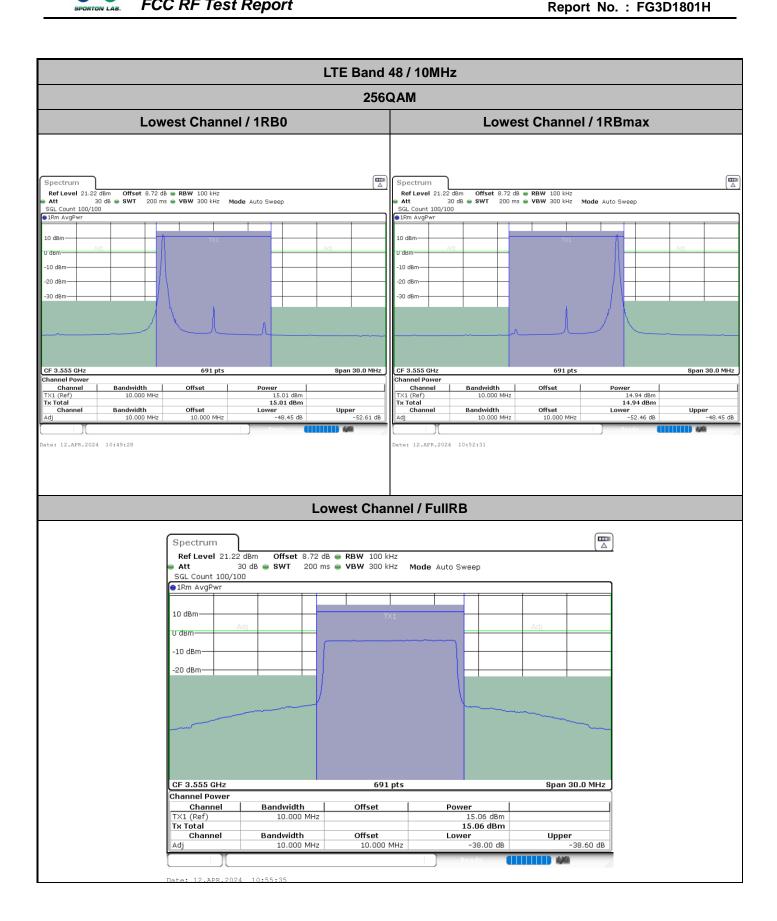




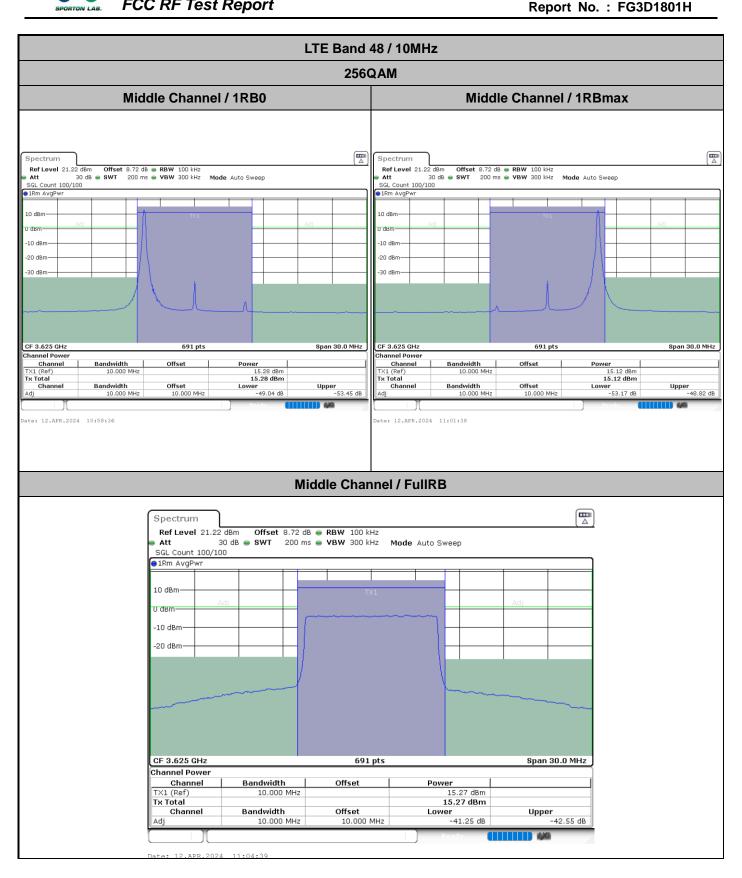


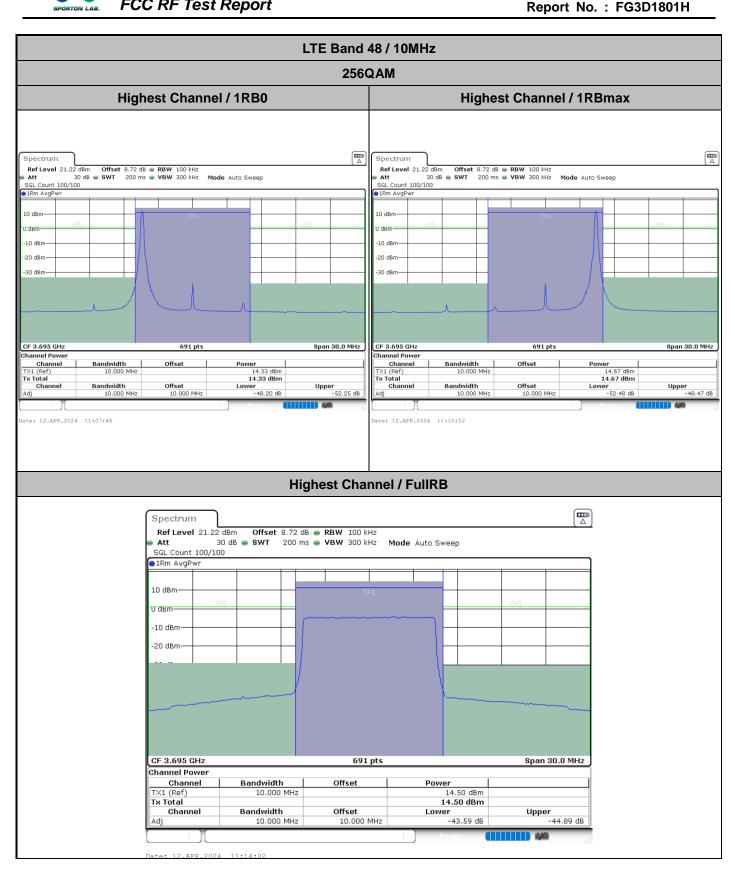




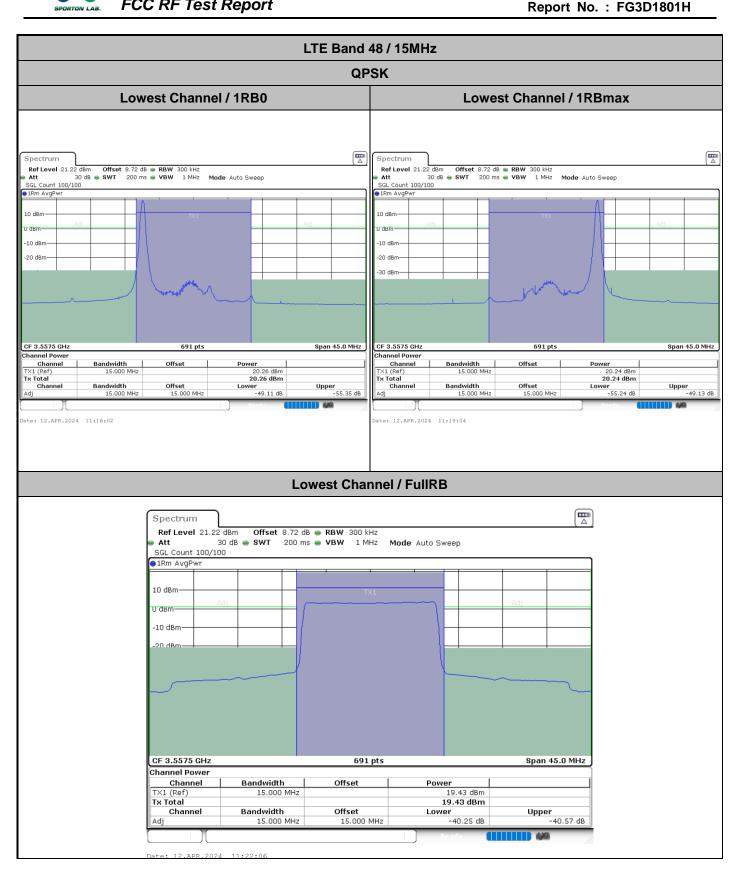




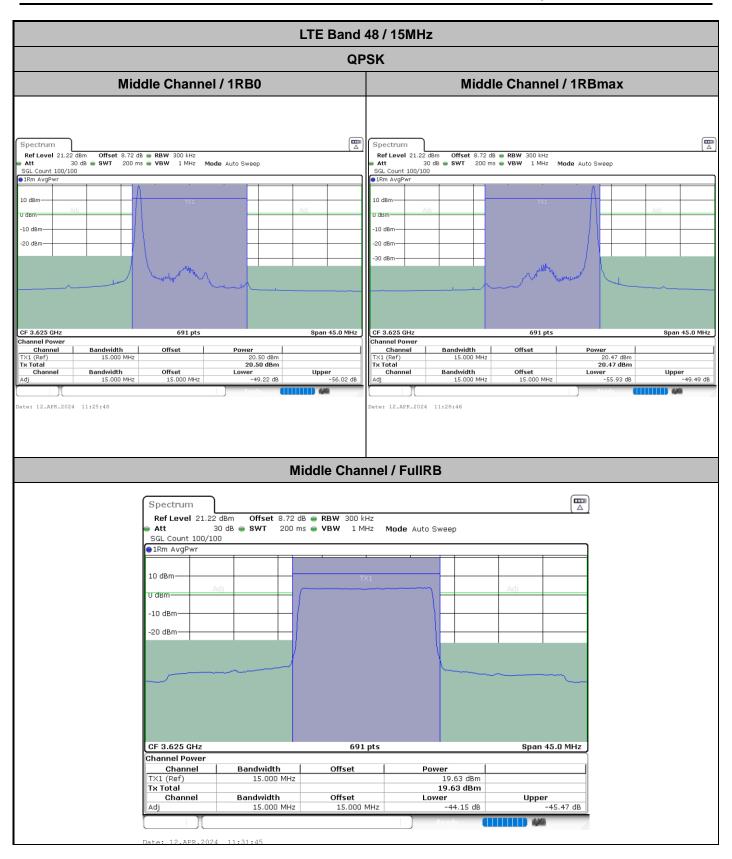




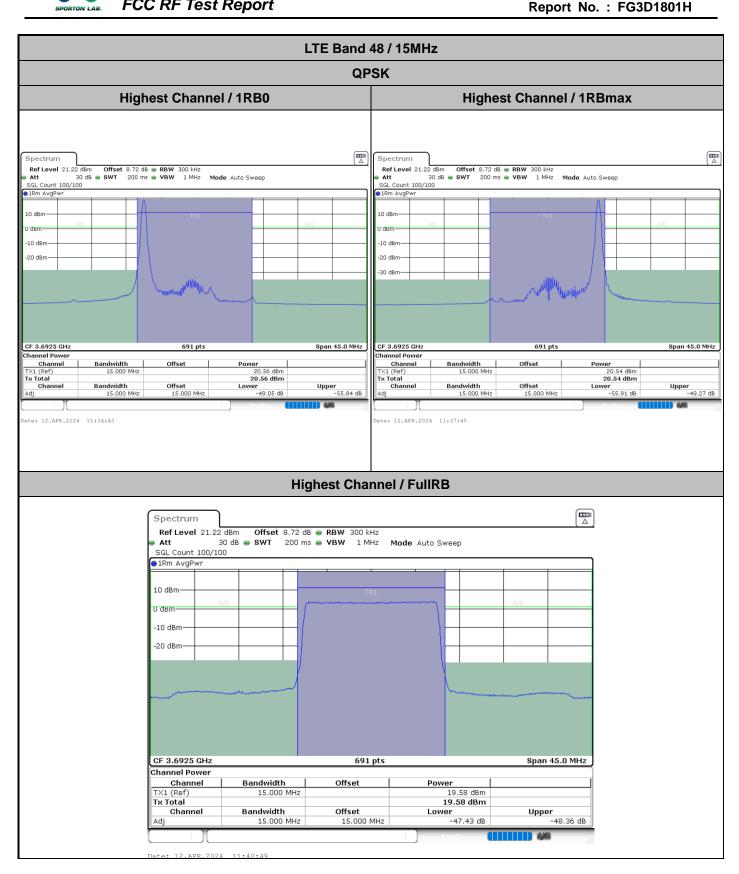






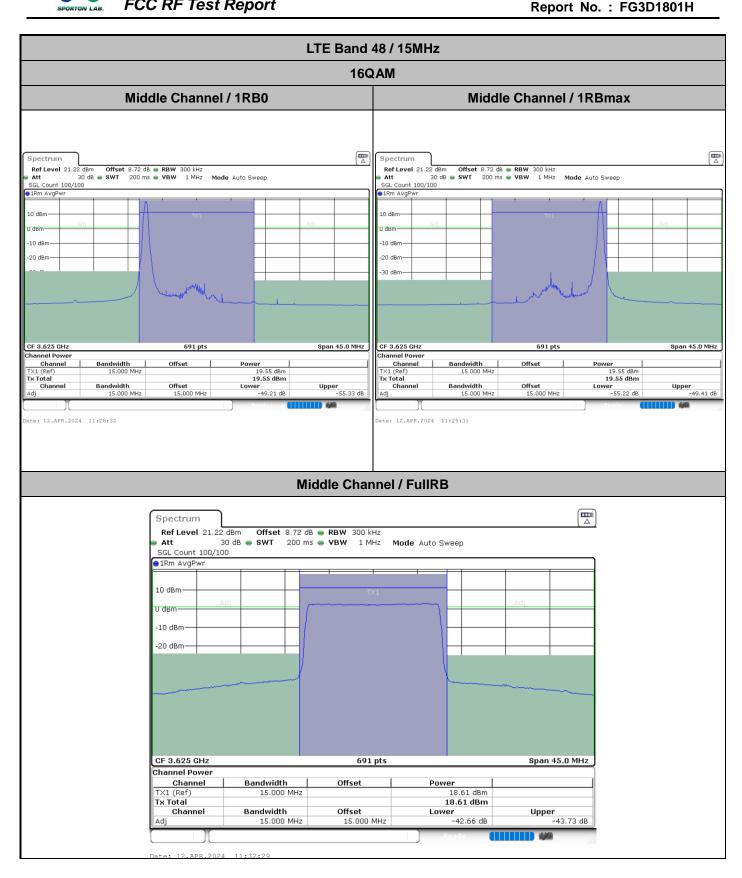


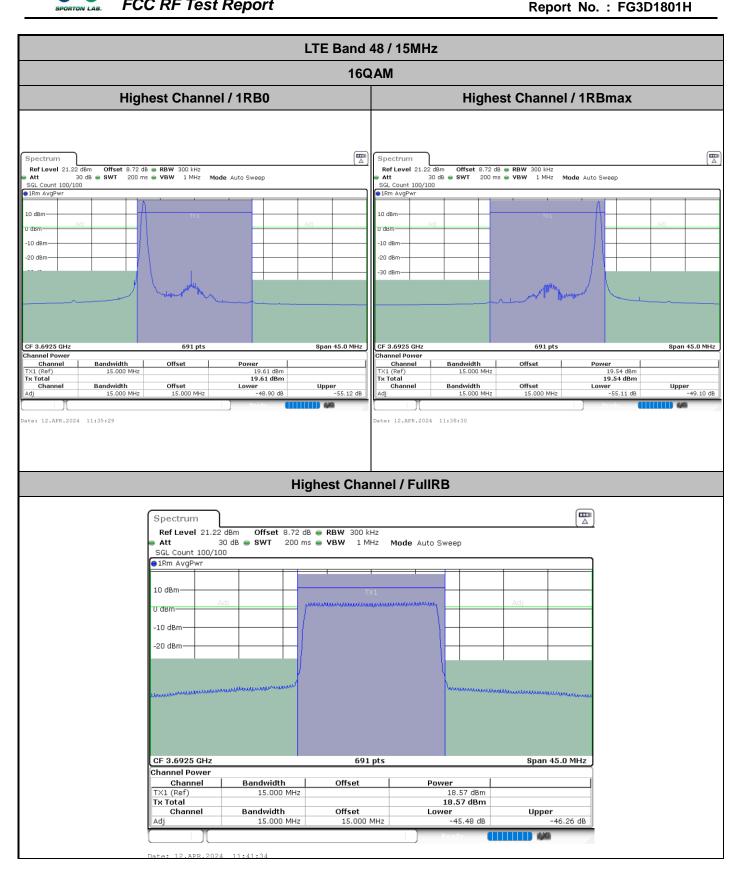


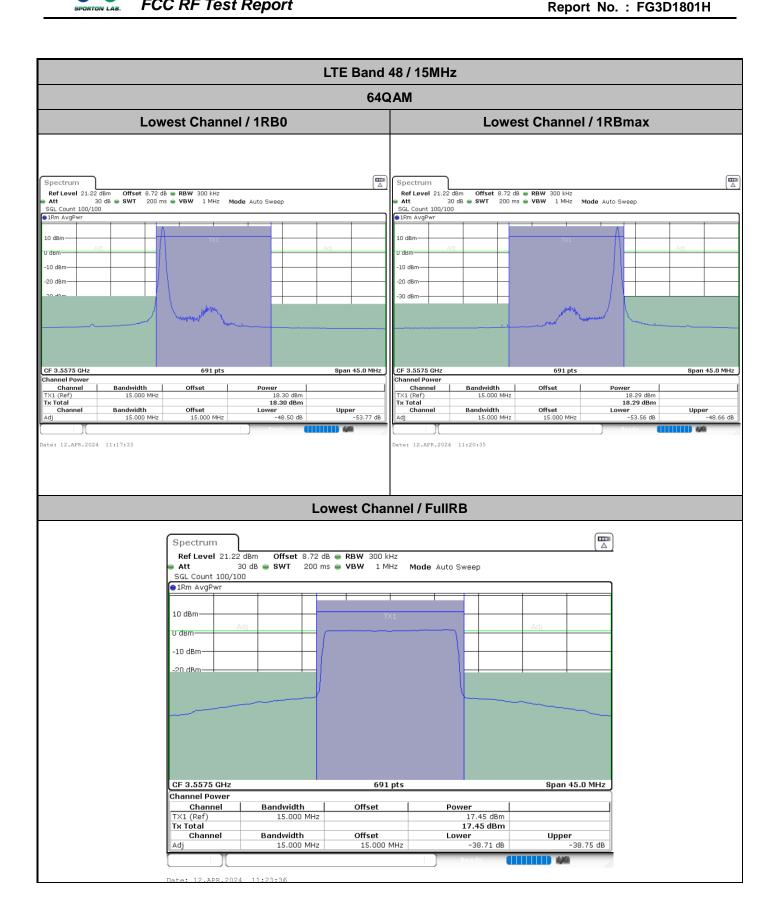




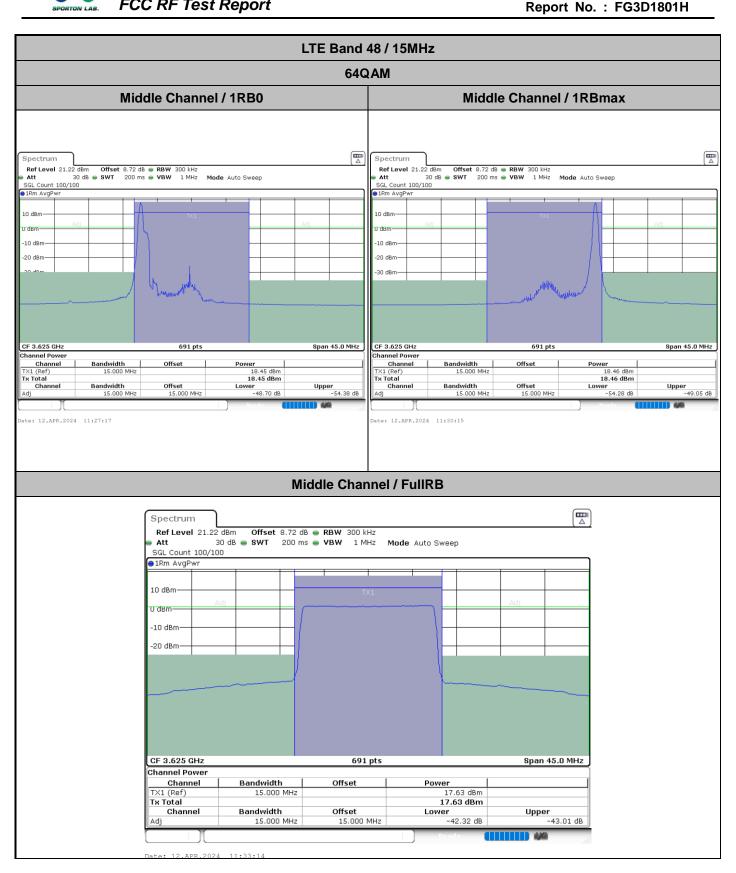




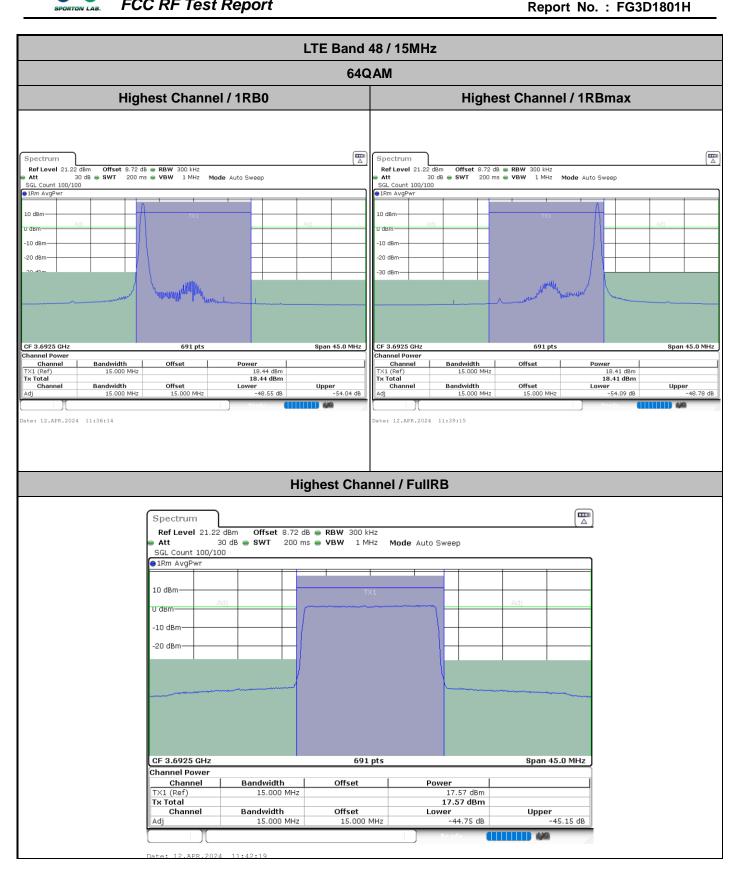














LTE Band 48 / 15MHz 256QAM Lowest Channel / 1RB0 **Lowest Channel / 1RBmax** Ref Level 21.22 dBm Offset 8.72 dB RBW Att 30 dB SWT 200 ms VBW SGL Count 100/100 Ref Level 21.22 dBm Offset 8.72 dB • RBW
Att 30 dB • SWT 200 ms • VBW
SGL Count 100/100 300 kHz 1 MHz Mode Auto Sweep -10 dBm -20 dBm CF 3.5575 GHz 691 pts CF 3.5575 GHz 691 pts Span 45.0 MHz Span 45.0 MHz Bandwidth Power 15.33 dBm 15.33 dBm Lower -47.94 dB Power 15.41 dBm 15.41 dBm Lower -50.86 dB Channel Upper -50.98 dB **Upper** -47.79 dB Bandwidth 15.000 MH; Bandwidth 15.000 MHz Offset 15.000 MH te: 12.APR.2024 11:18:19 **Lowest Channel / FullRB** Spectrum Ref Level 21.22 dBm Offset 8.72 dB 🖷 RBW 300 kHz 30 dB • SWT 200 ms • VBW 1 MHz Att Mode Auto Sweep SGL Count 100/100 ●1Rm AvgPwr 10 dBm-U dBm -10 dBm -20 dBm CF 3.5575 GHz 691 pts Span 45.0 MHz Channel Power Bandwidth 15.000 MHz Channel Offset Power 15.45 dBm TX1 (Ref) Tx Total 15.45 dBm Lower -38.09 dB Upper -38.66 dB Bandwidth Offset Channel 15.000 MHz

TEL: +86-512-57900158 FCC ID: XMR2024AG555QGL