# **FCC RF Test Report**

APPLICANT : Xiaomi Communications Co., Ltd.

**EQUIPMENT**: Mobile Phone

BRAND NAME : Redmi

MODEL NAME : 24090RA29G FCC ID : 2AFZZRA29G

STANDARD : 47 CFR Part 90(S)

**CLASSIFICATION**: PCS Licensed Transmitter Held to Ear (PCE)

TEST DATE(S) : Jul. 23, 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 C63.26-2015 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





Report No.: FG471506D

# 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: 2AFZZRA29G Page Number : 1 of 21
Report Issued Date : Aug. 19, 2024
Report Version : Rev. 01

# **TABLE OF CONTENTS**

RE	VISIC	ON HISTORY	3
SU	ММА	RY OF TEST RESULT	4
1	GEN	IERAL DESCRIPTION	5
	1.1	Applicant	5
	1.2	Manufacturer	
	1.3	Feature of Equipment Under Test	
	1.4	Product Specification of Equipment Under Test	5
	1.5	Modification of EUT	5
	1.6	Maximum Conducted Power and Emission Designator	6
	1.7	Testing Site	6
	1.8	Test Software	6
	1.9	Applied Standards	7
2	TES	T 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 and system	9
	2.4	Measurement Results Explanation Example	9
	2.5	Frequency List of Low/Middle/High Channels	10
3	TES	T RESULT	11
	3.1	Conducted Output Power Measurement	11
	3.2	99% Occupied Bandwidth and 26dB Bandwidth Measurement	
	3.3	Emissions Mask Measurement	13
	3.4	Emissions Mask – Out Of Band Emissions Measurement	15
	3.5	Field Strength of Spurious Radiation Measurement	16
	3.6	Frequency Stability Measurement	19
4	LIST	OF MEASURING EQUIPMENT	21
5	MEA	ASUREMENT UNCERTAINTY	22
ΑP	PEN	DIX A. TEST RESULTS OF CONDUCTED TEST	
ΑP	PEND	DIX B. TEST RESULTS OF RADIATED TEST	
ΑP	PEND	DIX C. TEST SETUP PHOTOGRAPHS	

Sporton International Inc. (Kunshan)

TEL: +86-512-57900158 FCC ID: 2AFZZRA29G Page Number : 2 of 21
Report Issued Date : Aug. 19, 2024
Report Version : Rev. 01

Report No.: FG471506D

# **REVISION HISTORY**

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FG471506D	Rev. 01	Initial issue of report	Aug. 19, 2024

Sporton International Inc. (Kunshan)

TEL: +86-512-57900158 FCC ID: 2AFZZRA29G Page Number : 3 of 21
Report Issued Date : Aug. 19, 2024
Report Version : Rev. 01

Report No.: FG471506D

# **SUMMARY OF TEST RESULT**

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	§2.1046	Conducted Output Power	_	Report only	-
3.2	§2.1049 §90.209	Occupied Bandwidth and 26dB Bandwidth	_		-
3.3	§2.1051 §90.691	Emission masks – In-band emissions	< 50+10log <sub>10</sub> (P[Watts])	PASS	-
3.4	§2.1051 §90.691	Emission masks – Out of band emissions	< 43+10log <sub>10</sub> (P[Watts])	PASS	-
3.5	§2.1053 §90.691	Field Strength of Spurious  Radiation	< 43+10log <sub>10</sub> (P[Watts])	PASS	Under limit 40.04 dB at 2440.00 MHz
3.6	§2.1055 §90.213	Frequency Stability for Temperature & Voltage	< 2.5 ppm	PASS	-

#### **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: 2AFZZRA29G Page Number : 4 of 21
Report Issued Date : Aug. 19, 2024
Report Version : Rev. 01

Report No.: FG471506D

#### **General Description** 1

# 1.1 Applicant

Xiaomi Communications Co., Ltd.

#019, 9th Floor, Building 6, 33 Xi'erqi Middle Road, Haidian District, Beijing, China, 100085

### 1.2 Manufacturer

Xiaomi Communications Co., Ltd.

#019, 9th Floor, Building 6, 33 Xi'erqi Middle Road, Haidian District, Beijing, China, 100085

# 1.3 Feature of Equipment Under Test

	Product Feature
Equipment	Mobile Phone
Brand Name	Redmi
Model Name	24090RA29G
FCC ID	2AFZZRA29G
IMEI Code	Conducted: 861793070041148/861793070041155
INVELOCIO	Radiation: 861793070039324/861793070039332
HW Version	135300O16
SW Version	Xiaomi HyperOS 1.0
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 Product Specification of Equipment Under Test

Product Specification subjective to this standard						
Tx Frequency	814 ~ 824 MHz					
Rx Frequency	859 ~ 869 MHz					
Bandwidth	1.4MHz / 3MHz / 5MHz / 10MHz / 15MHz					
Maximum Output Power to Antenna	<ant1>: 24.24 dBm <ant4>: 24.40 dBm</ant4></ant1>					
Antenna Gain	<ant1>: -4.0 dBi <ant4>: -5.9 dBi</ant4></ant1>					
Type of Modulation	QPSK / 16QAM / 64QAM / 256QAM					

Note: Only maximum conducted Power of Ant.4 is shown in the report.

## 1.5 Modification of EUT

No modifications are made to the EUT during all test items.

Sporton International Inc. (Kunshan) : 5 of 21 Page Number TEL: +86-512-57900158 Report Issued Date: Aug. 19, 2024 FCC ID: 2AFZZRA29G Report Version : Rev. 01

Report Template No.: BU5-FWLTE Version 2.0

# 1.6 Maximum Conducted Power and Emission Designator

Ľ	TE Band 26	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)		
1.4	814.7 ~ 823.3	0.2735	1M10G7D	0.2158	1M10W7D		
3	815.5 ~ 822.5	0.2723	2M69G7D	0.2173	2M73W7D		
5	816.5 ~ 821.5	0.2825	4M49G7D	0.2208	4M50W7D		
10	819.0	0.2754	9M01G7D	0.2178	9M03W7D		
15	824	0.2851	13M5G7D	0.2234	13M4W7D		

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

# 1.7 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 Sito No	ECC Designation No.	FCC Test Firm					
Test Site No.	Sporton Site No.	FCC Designation No.	Registration No.					
	03CH04-KS TH01-KS	CN1257	314309					

## 1.8 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)
 Page Number
 : 6 of 21

 TEL: +86-512-57900158
 Report Issued Date
 : Aug. 19, 2024

 FCC ID: 2AFZZRA29G
 Report Version
 : Rev. 01

Report Template No.: BU5-FWLTE Version 2.0

# 1.9 Applied Standards

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

- 47 CFR 90(S)
- ANSI C63.26-2015
- FCC KDB 971168 D01 Power Meas. License Digital Systems v03r01
- FCC KDB 971168 D02 Misc Rev Approv License Devices v02r01

#### Remark:

- 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: 2AFZZRA29G Page Number : 7 of 21
Report Issued Date : Aug. 19, 2024
Report Version : Rev. 01

Report No.: FG471506D

# 2 Test Configuration of Equipment Under Test

# 2.1 Test Mode

During all testing, EUT is in link mode with base station emulator at maximum power level. The spurious emission measurements were carried out in semi-anechoic chamber with 3-meter test range, and EUT is rotated on three test planes to find out the worst emission.

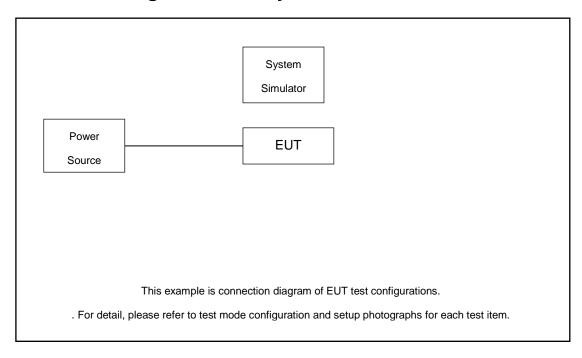
Frequency range investigated for radiated emission is 30 MHz to 9000 MHz.(Z Plane)

			Bandwidth (MHz)			Modulation			RB#			Test Channel					
Test Items	Band	1.4	3	5	10	15	20	QPSK	16 QAM	64 QAM	256 QAM	1	Half	Full	L	M	Н
Max. Output Power	26	v	v	v	v	v	-	v	v	v	v	v		v	v	v	v
26dB and 99%	26	٧	٧	٧	٧		-	v	v					٧		٧	
Bandwidth	26					v		v	v					v			v
Emission masks In-band emissions	26	v	v	v	v	v	-	v	v	v	v	٧		v	v		v
Emission masks – Out of band emissions	26	v	v	v	v	v	-	v				v			v	v	v
Frequency Stability	26				٧		-	٧						V		٧	
Radiated Spurious Emission	26				v		•	v				v				v	
Note	<ol> <li>The mark "v" means that this configuration is chosen for testing</li> <li>The mark "-" means that this bandwidth is not supported.</li> <li>LTE Band26 transmit frequency for part22 rule is 824MHz-849MHz, for part90 rule is 814MHz-824MHz. ERP over 15MHz bandwidth complies the ERP limit line of part22 rule, therefore ERP of the partial frequency spectrum which falls within part 22 also complies.</li> <li>For QAM modulation mode, the whole testing has assessed 16QAM&amp;64QAM mode by referring to the higher conducted power.</li> </ol>																

TEL: +86-512-57900158 FCC ID: 2AFZZRA29G Page Number : 8 of 21
Report Issued Date : Aug. 19, 2024
Report Version : Rev. 01

Report No.: FG471506D

# 2.2 Connection Diagram of Test System



# 2.3 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model No.	FCC ID	Data Cable	Power Cord
1.	System Simulator	Anritsu	MT8820C	N/A	N/A	Unshielded, 1.8 m

# 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 RF conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level will be exactly the RF output level.

The spectrum analyzer offset is derived from RF cable loss.

Offset = RF cable loss.

The following shows an offset computation example with RF cable loss 4.8 dB.

Example:

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

= 4.8 (dB)

Sporton International Inc. (Kunshan)

TEL: +86-512-57900158 FCC ID: 2AFZZRA29G Page Number : 9 of 21 Report Issued Date : Aug. 19, 2024

Report No.: FG471506D

Report Version : Rev. 01

# 2.5 Frequency List of Low/Middle/High Channels

LTE Band 26 Channel and Frequency List										
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest						
10	Channel	-	26740	-						
10	Frequency	-	819	-						
5	Channel	26715	26740	26765						
5	Frequency	816.5	819	821.5						
3	Channel	26705	26740	26775						
3	Frequency	815.5	819	822.5						
1.4	Channel	26697	26740	26783						
1.4	Frequency	814.7	819	823.3						

LTE Band 26 Cross-rule Channel and Frequency List										
BW [MHz]	Channel/Frequency(MHz)	-	Middle	-						
15	Channel	-	26790	-						
15	Frequency	-	824	-						
10	Channel	-	26790	-						
10	Frequency	-	824	-						
5	Channel	-	26790	-						
5	Frequency	-	824	-						
3	Channel	-	26790	-						
3	Frequency	-	824	-						
1.4	Channel	-	26790	-						
1.4	Frequency	-	824	-						

Sporton International Inc. (Kunshan)

TEL: +86-512-57900158 FCC ID: 2AFZZRA29G Page Number : 10 of 21
Report Issued Date : Aug. 19, 2024
Report Version : Rev. 01

Report Template No.: BU5-FWLTE Version 2.0

## 3 Test Result

# 3.1 Conducted Output Power Measurement

## 3.1.1 Description of the Conducted Output Power Measurement

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

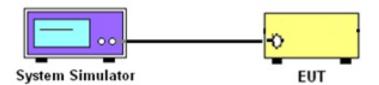
## 3.1.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

### 3.1.3 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.

## 3.1.4 Test Setup



## 3.1.5 Test Result of Conducted Output Power

Please refer to Appendix A.

TEL: +86-512-57900158 FCC ID: 2AFZZRA29G Page Number : 11 of 21
Report Issued Date : Aug. 19, 2024
Report Version : Rev. 01

Report No.: FG471506D

# 3.2 99% Occupied Bandwidth and 26dB Bandwidth Measurement

## 3.2.1 Description of (Occupied) Bandwidth Limitations Measurement

The 99% 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 emission bandwidth is defined as the width of the signal between two points, located at the 2 sides of the carrier frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

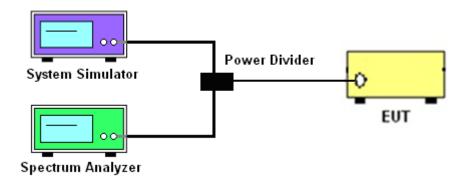
# 3.2.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

#### 3.2.3 Test Procedures

- 1. The EUT was connected to spectrum analyzer and system simulator via a power divider.
- 2. The 26dB and 99% occupied bandwidth (BW) of the middle channel for the highest RF power with full RB sizes were measured.

### 3.2.4 Test Setup



### 3.2.5 Test Result of 99% Occupied Bandwidth and 26dB Bandwidth

Please refer to Appendix A.

Sporton International Inc. (Kunshan)

TEL: +86-512-57900158 FCC ID: 2AFZZRA29G Page Number : 12 of 21
Report Issued Date : Aug. 19, 2024
Report Version : Rev. 01

Report No.: FG471506D

### 3.3 Emissions Mask Measurement

#### 3.3.1 **Description of Emissions Mask Measurement**

Equipment used in this licensed to EA or non-EA systems shall comply with the emission mask provisions of FCC Part 90.691.(a):

- (a) Out-of-band emission requirement shall apply only to the "outer" channels included in an EA license and to spectrum adjacent to interior channels used by incumbent licensees. The emission limits are as follows:
- (1) For any frequency removed from the EA licensee's frequency block by up to and including 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least 116 Log10(f/6.1) decibels or 50 + 10 Log10(P) decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 12.5 kHz.
- (2) For any frequency removed from the EA licensee's frequency block greater than 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least 43 + 10Log10(P) decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 37.5 kHz.

#### 3.3.2 **Measuring Instruments**

The measuring equipment is listed in the section 4 of this test report.

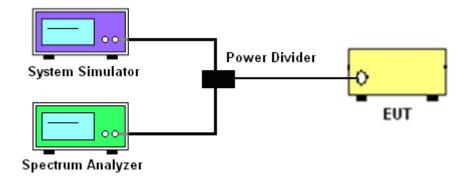
#### 3.3.3 **Test Procedures**

- 1. The EUT was connected to spectrum analyzer and base station via power divider.
- 2. The emissions mask of low and high channels for the highest RF powers were measured.
- 3. The measured RBW and the VBW set 3 times of RBW are then set in spectrum analyzer, and the RBW correction factor 10log (1% of OBW/measured RBW)(dB) was compensated, if required.
- 4. The test results were shown below plots with a correction offset factor including cable loss, insertion loss of power divider.

Report Version : Rev. 01

Report Template No.: BU5-FWLTE Version 2.0

# 3.3.4 Test Setup



# 3.3.5 Test Result (Plots) of Conducted Emissions Mask

Please refer to Appendix A.

TEL: +86-512-57900158 FCC ID: 2AFZZRA29G Page Number : 14 of 21
Report Issued Date : Aug. 19, 2024
Report Version : Rev. 01

Report No.: FG471506D

### 3.4 Emissions Mask - Out Of Band Emissions Measurement

## 3.4.1 Description of Conducted Emissions Out of band emissions measurement

The power of any emission FCC Part 90.691 (a)(2) on any frequency removed from the assigned frequency by out of the authorized bandwidth at least 43 + 10 log (P) dB. It is measured by means of a calibrated spectrum analyzer and scanned from 30 MHz up to a frequency including its 10<sup>th</sup> harmonic.

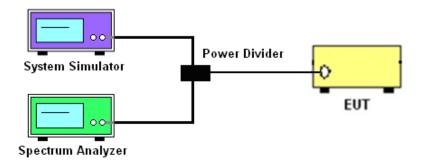
## 3.4.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

#### 3.4.3 Test Procedures

- 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, taking the record of maximum spurious emission.
- The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
- 7. The limit line is derived from 43 + 10log(P)dB below the transmitter power P(Watts)

### 3.4.4 Test Setup



# 3.4.5 Test Result (Plots) of Conducted Emission

Please refer to Appendix A.

Sporton International Inc. (Kunshan)

TEL: +86-512-57900158 FCC ID: 2AFZZRA29G Page Number : 15 of 21
Report Issued Date : Aug. 19, 2024
Report Version : Rev. 01

Report No.: FG471506D

# 3.5 Field Strength of Spurious Radiation Measurement

## 3.5.1 Description of Field Strength of Spurious Radiated Measurement

The radiated spurious emission was measured by substitution method according to ANSI C63.26. The power of any emission FCC Part 90.691 on any frequency removed from the assigned frequency by more than 250 percent of the authorized bandwidth at least 43 + 10 log (P) dB. The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

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 43+10log<sub>10</sub>(P[Watts]) dB. The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

## 3.5.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

#### 3.5.3 Test Procedures

- The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
- 2. The EUT was set 3 meters from the receiving antenna, which was 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 one meter and four meters to search the maximum spurious emission for both horizontal and vertical polarizations.
- Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, Sweep = 500ms, Taking the record of maximum spurious emission.
- 6. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
- 7. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
- 8. Taking the record of output power at antenna port.
- 9. Repeat step 7 to step 8 for another polarization.
- 10. EIRP (dBm) = S.G. Power Tx Cable Loss + Tx Antenna Gain
- 11. ERP (dBm) = EIRP 2.15
- 12. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
- 13. The limit line is derived from 43 + 10log(P) dB below the transmitter power P(Watts)

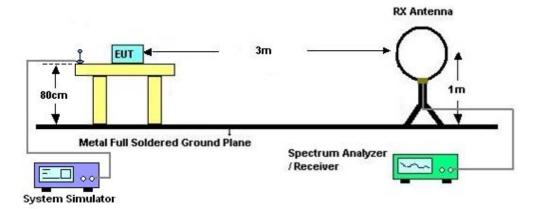
Sporton International Inc. (Kunshan)

TEL: +86-512-57900158 FCC ID: 2AFZZRA29G Page Number : 16 of 21
Report Issued Date : Aug. 19, 2024
Report Version : Rev. 01

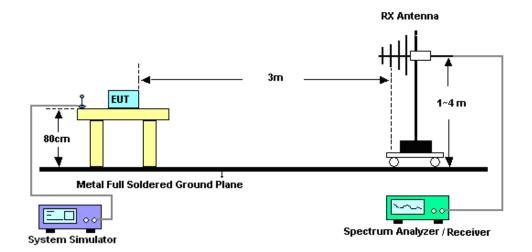
Report No.: FG471506D

## 3.5.4 Test Setup

## For radiated test from 30MHz



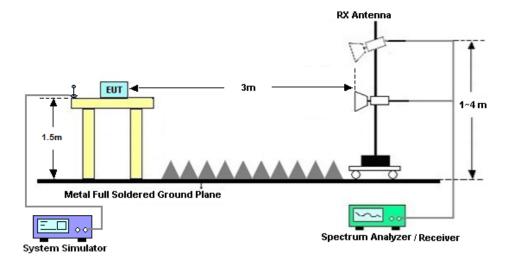
#### For radiated test from 30MHz to 1GHz



TEL: +86-512-57900158 FCC ID: 2AFZZRA29G Page Number : 17 of 21
Report Issued Date : Aug. 19, 2024
Report Version : Rev. 01

Report No.: FG471506D

### For radiated test above 1GHz



# 3.5.5 Test Result of Field Strength of Spurious Radiated

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.

TEL: +86-512-57900158 FCC ID: 2AFZZRA29G Page Number : 18 of 21
Report Issued Date : Aug. 19, 2024
Report Version : Rev. 01

Report No.: FG471506D

# 3.6 Frequency Stability Measurement

#### **Description of Frequency Stability Measurement** 3.6.1

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 according to FCC Part 90.213.

#### 3.6.2 **Measuring Instruments**

The measuring equipment is listed in the section 4 of this test report.

#### 3.6.3 **Test Procedures for Temperature Variation**

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

#### 3.6.4 **Test Procedures for Voltage Variation**

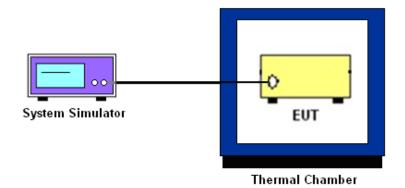
- 1. The EUT was placed in a temperature chamber at 20±5°C and connected with the system simulator.
- 2. The power supply voltage to the EUT was varied from 85% to 115% of the nominal value for other than hand carried battery equipment.
- 3. For hand carried, battery powered equipment, reduce the primary ac or dc supply voltage to the
- 4. battery operating end point, which shall be specified by the manufacturer.
- The variation in frequency was measured for the worst case. 5.

Report Version : Rev. 01

Report Template No.: BU5-FWLTE Version 2.0

: 19 of 21

# 3.6.5 Test Setup



# 3.6.6 Test Result of Temperature Variation

Please refer to Appendix A.

TEL: +86-512-57900158 FCC ID: 2AFZZRA29G Page Number : 20 of 21
Report Issued Date : Aug. 19, 2024
Report Version : Rev. 01

Report No.: FG471506D

# 4 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	Jul. 23, 2024	Oct. 10, 2024	Conducted (TH01-KS)
Power divider	STI	STI08-0055	-	0.5~40GHz	NCR	Jul. 23, 2024	NCR	Conducted (TH01-KS)
Temperature &hu midity chamber	Hongzhan	LP-150U	H201401144 0	-40~+150°C 20%~95%RH	Jul. 04, 2024	Jul. 23, 2024	Jul. 03, 2025	Conducted (TH01-KS)
EXA Spectrum Analyzer	Keysight	N9010B	MY5747107 9	10Hz-44G,MAX 30dB	Oct. 11, 2023	Jul. 23, 2024	Oct. 10, 2024	Radiation (03CH04-KS)
Loop Antenna	R&S	HFH2-Z2E	101125	9kHz~30MHz	Sep. 11 2023	Jul. 23, 2024	Sep. 10, 2024	Radiation (03CH04-KS)
Bilog Antenna	TeseQ	CBL6111D	59913	30MHz-1GHz	Aug. 19, 2023	Jul. 23, 2024	Aug. 18, 2024	Radiation (03CH04-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	75957	1GHz~18GHz	Oct. 23, 2023	Jul. 23, 2024	Oct. 22, 2024	Radiation (03CH04-KS)
SHF-EHF Horn	Com-power	AH-840	101070	18GHz~40GHz	Jan. 27, 2024	Jul. 23, 2024	Jan. 26, 2025	Radiation (03CH04-KS)
Amplifier	SONOMA	310N	413740	9KHz-1GHz	Jan. 03, 2024	Jul. 23, 2024	Jan. 02, 2025	Radiation (03CH04-KS)
Amplifier	EM	EM18G40G A	060728	18~40GHz	Jan. 02, 2024	Jul. 23, 2024	Jan. 01, 2025	Radiation (03CH04-KS)
high gain Amplifier	EM	EM01G18G A	060840	1Ghz-18Ghz	Oct. 11, 2023	Jul. 23, 2024	Oct. 10, 2024	Radiation (03CH04-KS)
Amplifier	EM	EM01G18G A	060892	1Ghz-18Ghz	Oct. 11, 2023	Jul. 23, 2024	Oct. 10, 2024	Radiation (03CH04-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Jul. 23, 2024	NCR	Radiation (03CH04-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Jul. 23, 2024	NCR	Radiation (03CH04-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Jul. 23, 2024	NCR	Radiation (03CH04-KS)

NCR: No Calibration Required

Sporton International Inc. (Kunshan)

TEL: +86-512-57900158 FCC ID: 2AFZZRA29G Page Number : 21 of 21
Report Issued Date : Aug. 19, 2024
Report Version : Rev. 01

Report No.: FG471506D

# 5 Measurement Uncertainty

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI 63.26-2015. All the measurement uncertainty value were shown with a coverage K=2 to indicate 95% level of confidence. The measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-2 and can be compared directly to specified limit to determine compliance.

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

Conducted Spurious Emission & Bandedge	±2.26 dB
Occupied Channel Bandwidth	±0.1%
Conducted Power	±0.46 dB
Peak to Average Ratio	±0.46 dB
Frequency Stability	±0.4 Hz

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

Measuring Uncertainty for a Level of	2.83 dB
Confidence of 95% (U = 2Uc(y))	2.03 UB

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

Measuring Uncertainty for a Level of	2.83 dB
Confidence of 95% (U = 2Uc(y))	2.03 UB

#### <u>Uncertainty of Radiated Emission Measurement (18 GHz ~ 40 GHz)</u>

Measuring Uncertainty for a Level of	
Confidence of 95% (U = 2Uc(y))	2.82 dB

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

 Sporton International Inc. (Kunshan)
 Page Number
 : 22 of 21

 TEL: +86-512-57900158
 Report Issued Date
 : Aug. 19, 2024

 FCC ID: 2AFZZRA29G
 Report Version
 : Rev. 01

Report Template No.: BU5-FWLTE Version 2.0

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

Test Engineer :	Smile Wang	Temperature :	22~23℃
rest Engineer.	Smile Wang	Relative Humidity :	40~42%

# **Conducted Output Power (Average power)**

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.
	Chan	nel			26740	
	Frequency	/ (MHz)			824	
15	QPSK	1	0		24.46	
15	QPSK	1	74		24.55	
15	QPSK	75	0		23.43	
15	16QAM	1	0		23.49	
15	64QAM	1	0		22.55	
15	256QAM	1	0		19.61	
	Chan	nel			26740	
	Frequency	/ (MHz)			819	
10	QPSK	1	0		24.40	
10	QPSK	1	49		24.35	
10	QPSK	50	0		23.32	
10	16QAM	1	0		23.38	
10	64QAM	1	0		22.46	
10	256QAM	1	0		19.45	
	Chan	nel		26715	26740	26765
	Frequency	/ (MHz)		816.5	819	821.5
5	QPSK	1	0	24.33	24.41	24.51
5	16QAM	1	0	23.40	23.44	23.41
	Chan	nel		26705	26740	26775
Frequency (MHz)				815.5	819	822.5
3	QPSK	1	0	24.31	24.32	24.35
3	16QAM	1	0	23.35	23.34	23.37
	Chan	nel	26697	26740	26783	
	Frequency	/ (MHz)	814.7	819	823.3	
1.4	QPSK	1	0	24.34	24.37	24.32
1.4	16QAM	1	0	23.30	23.34	23.31

Sporton International Inc. (Kunshan)

TEL: +86-512-57900158 FCC ID: 2AFZZRA29G Page Number

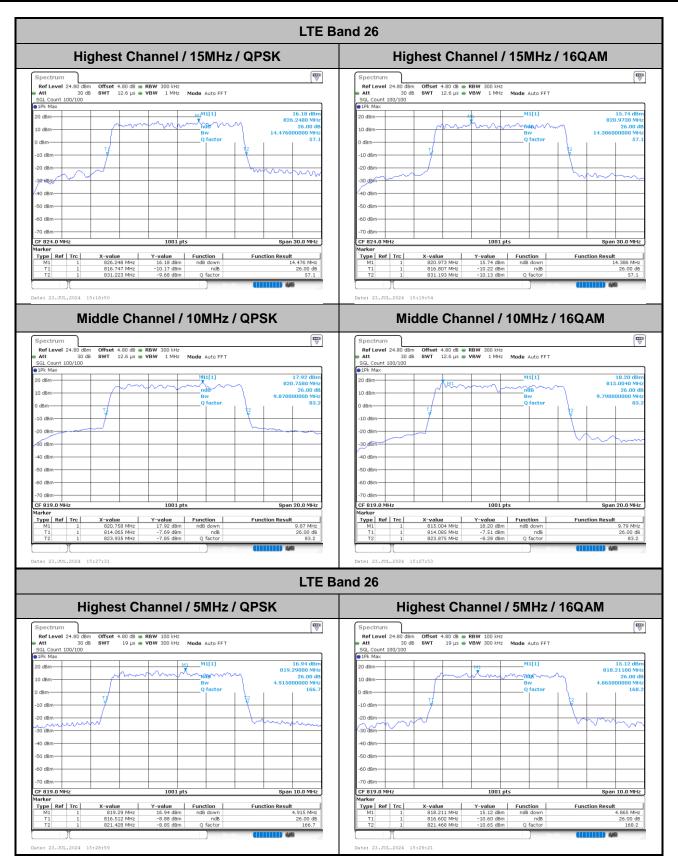
: A1 of A32

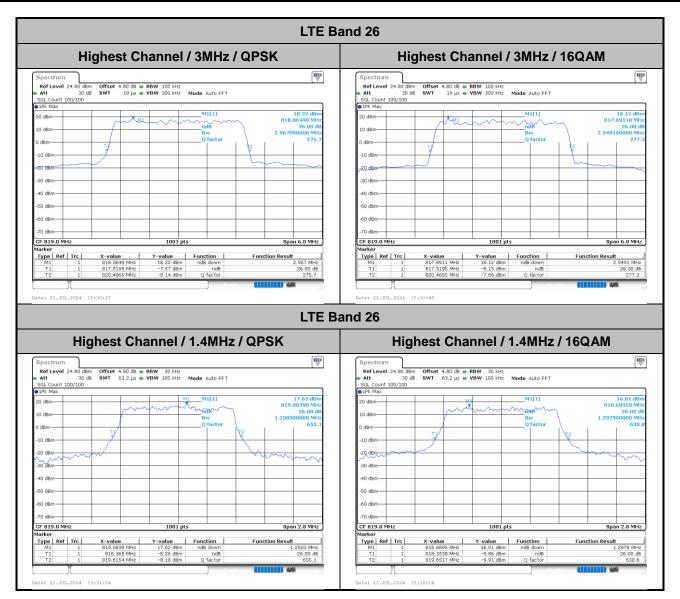
# LTE Band 26\_Part 90S

# 26dB Bandwidth

Mode	LTE Band 26 : 26dB BW(MHz)		
BW	15MHz		
Mod.	QPSK	16QAM	
Hig CH	14.48	14.39	
BW	10MHz		
Mod.	QPSK	16QAM	
Mid CH	9.87	9.79	
BW	5MHz		
Mod.	QPSK	16QAM	
Mid CH	4.92	4.87	
BW	3MHz		
Mod.	QPSK	16QAM	
Mid CH	2.97	2.95	
BW	1.4MHz		
Mod.	QPSK	16QAM	
Mid CH	1.25	1.30	

TEL: +86-512-57900158 FCC ID: 2AFZZRA29G

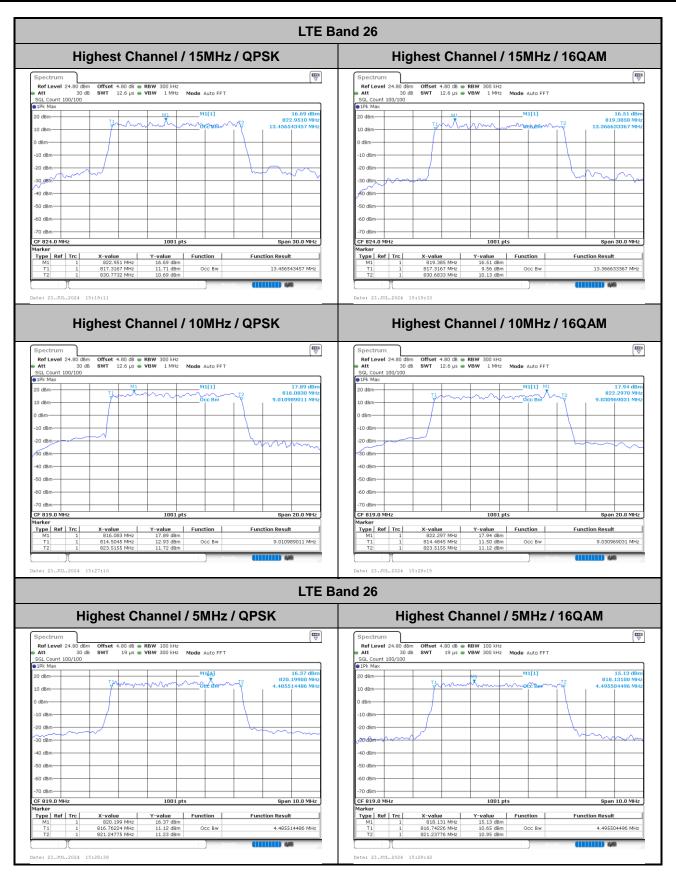


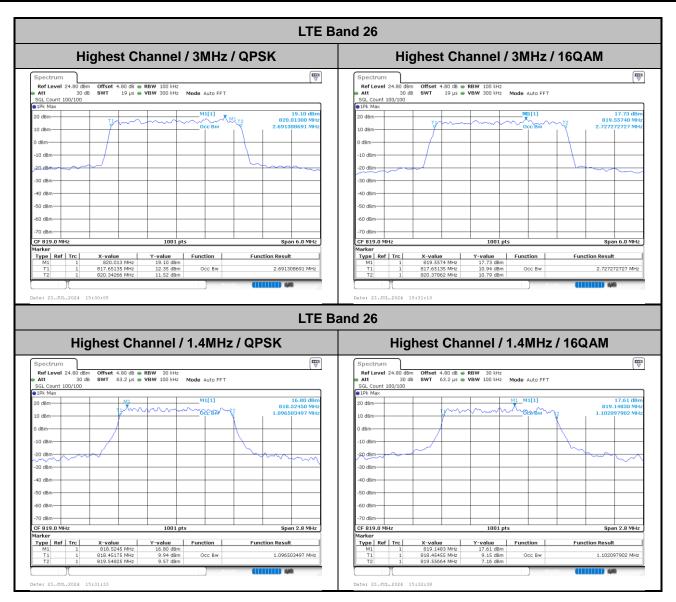


# **Occupied Bandwidth**

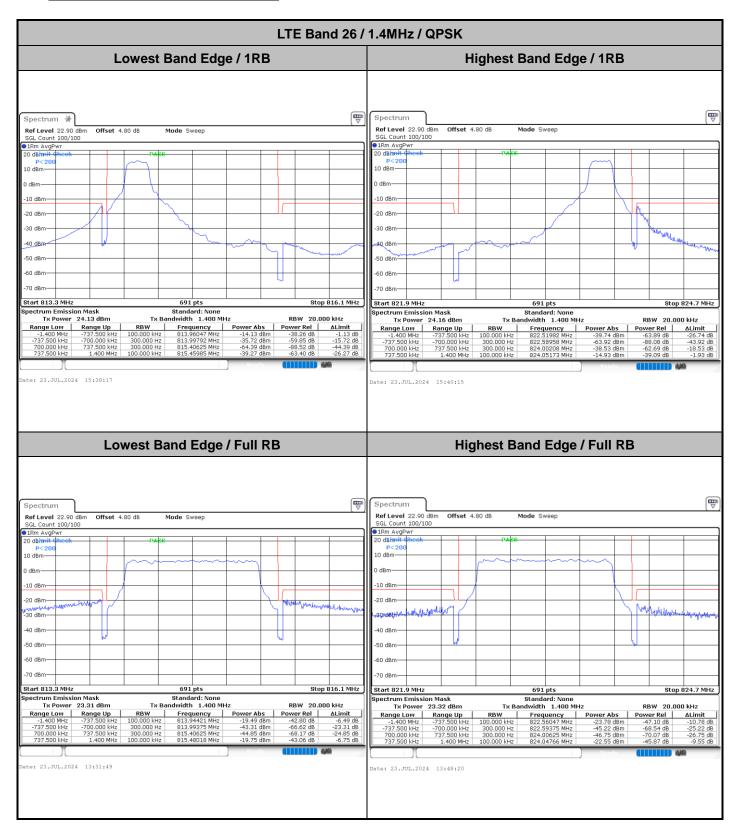
Mode	LTE Band 26 : 99%OBW(MHz)		
BW	15MHz		
Mod.	QPSK	16QAM	
HigCH	13.46	13.37	
BW	10N	//Hz	
Mod.	QPSK	16QAM	
Mid CH	9.01	9.03	
BW	5MHz		
Mod.	QPSK	16QAM	
Mid CH	4.49	4.50	
BW	3MHz		
Mod.	QPSK	16QAM	
Mid CH	2.69	2.73	
BW	1.4MHz		
Mod.	QPSK	16QAM	
Mid CH	1.10	1.10	

FCC ID: 2AFZZRA29G



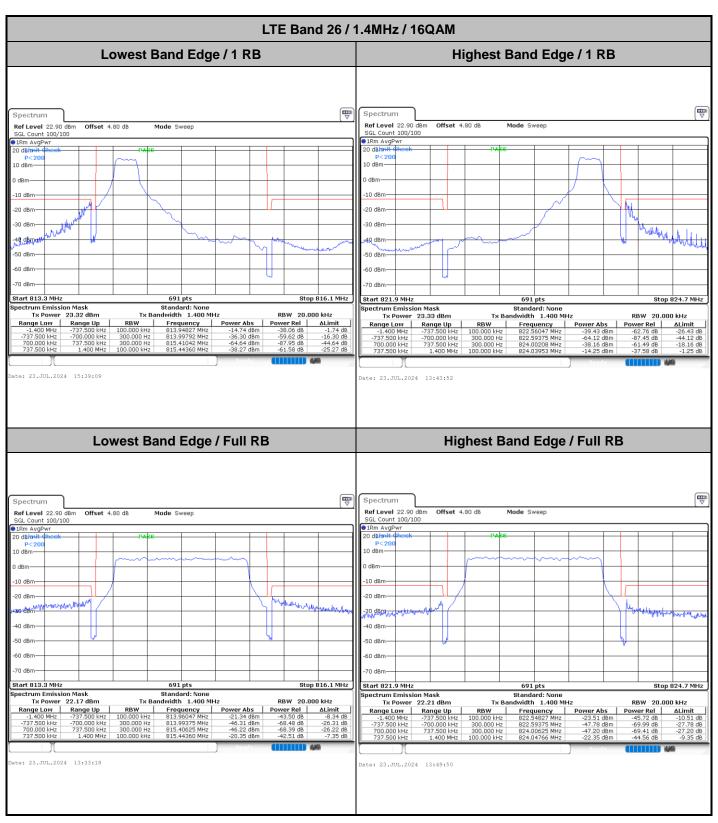


# **Conducted Band Edge**



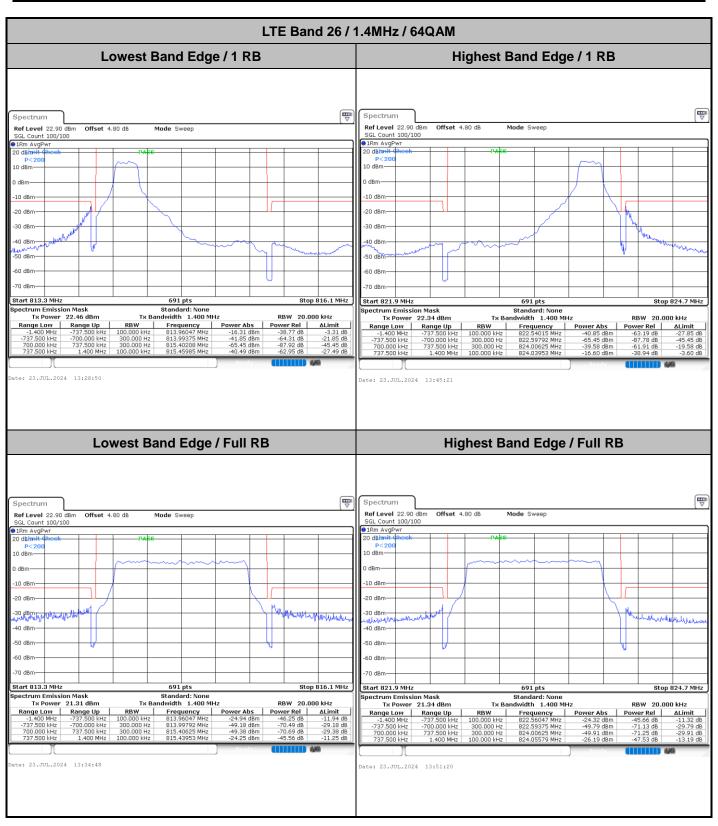
Sporton International Inc. (Kunshan)

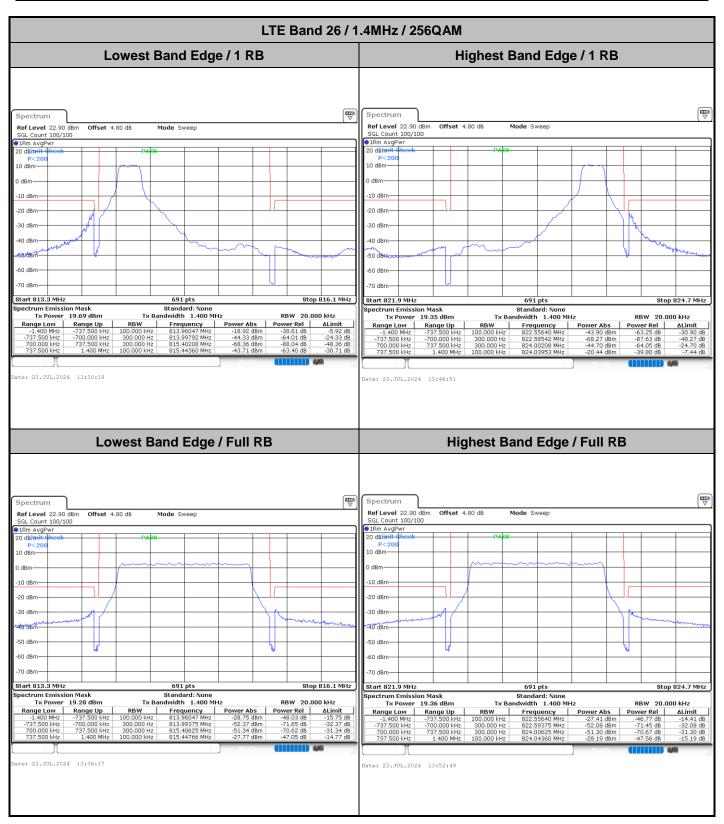
TEL: +86-512-57900158 FCC ID: 2AFZZRA29G Page Number : A8 of A32

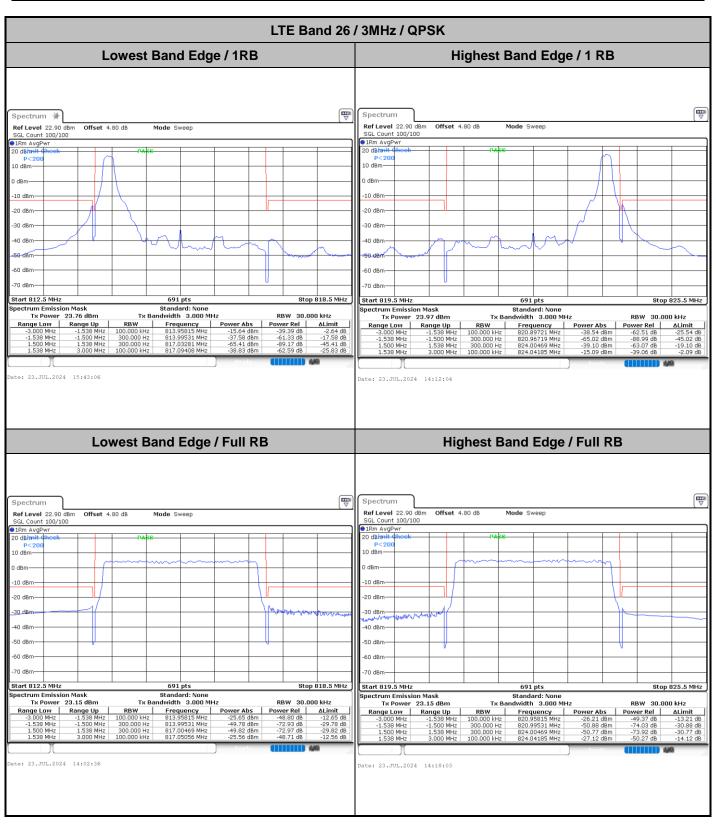


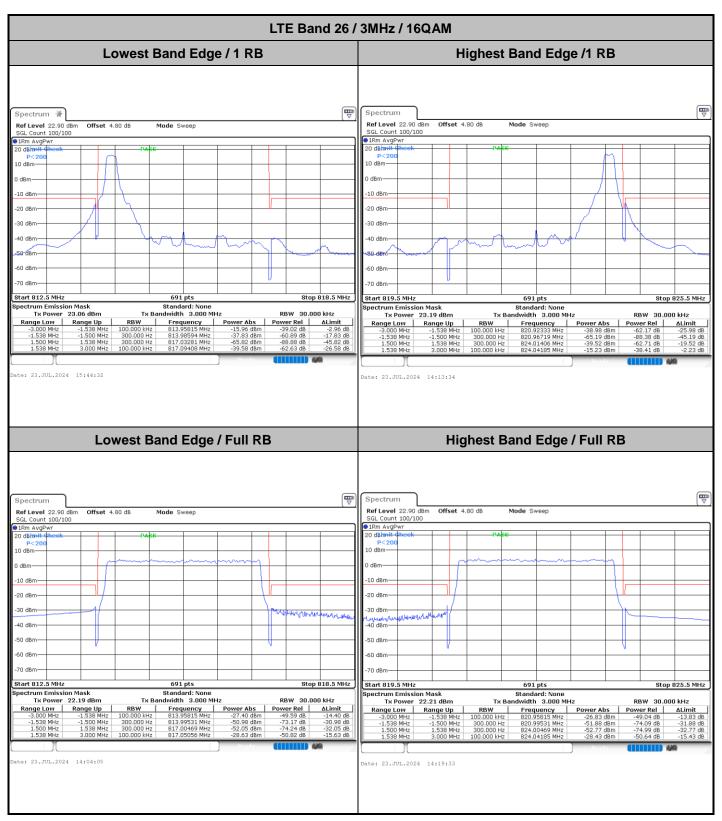
Page Number

: A9 of A32



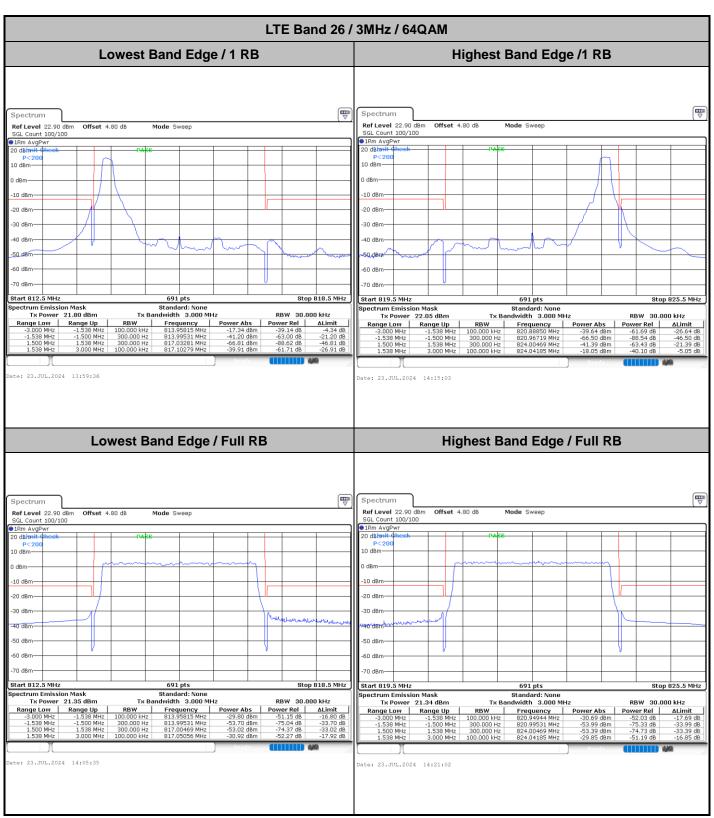


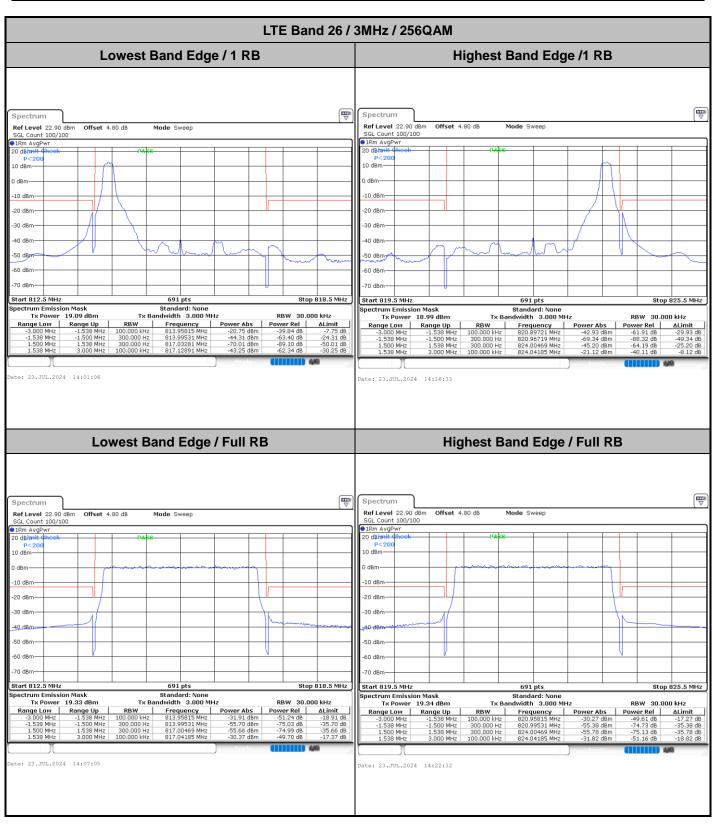


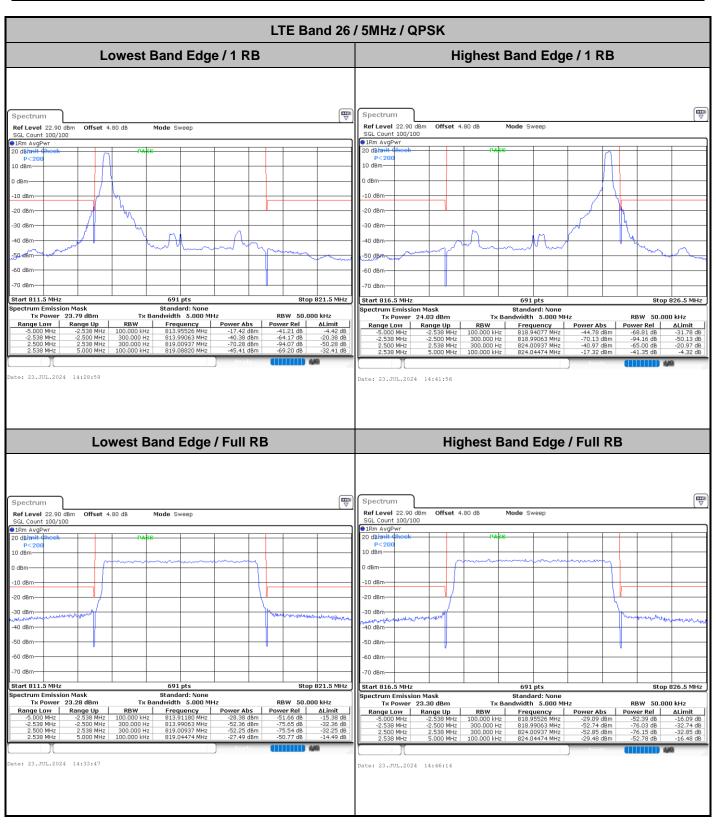


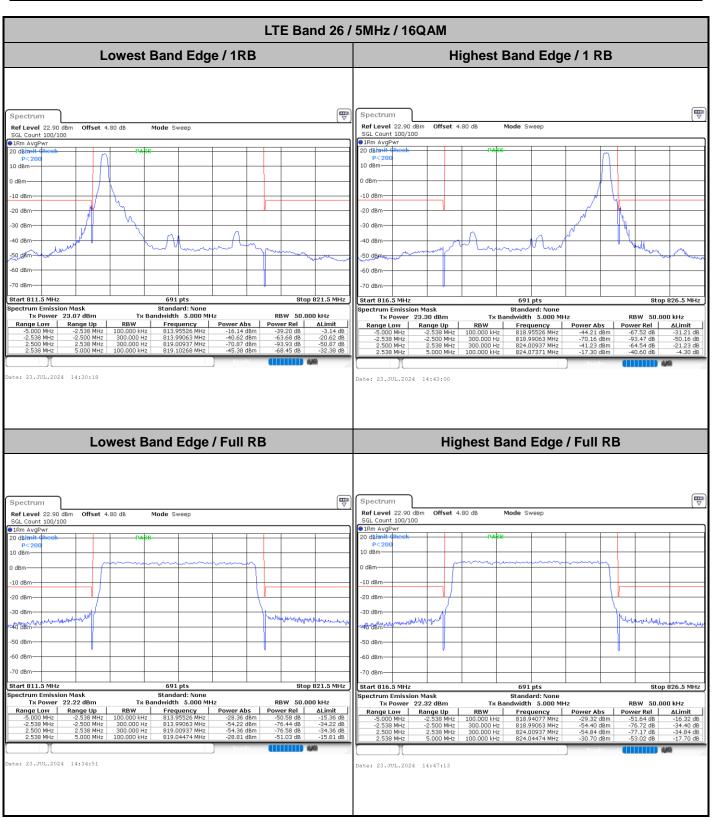
: A13 of A32

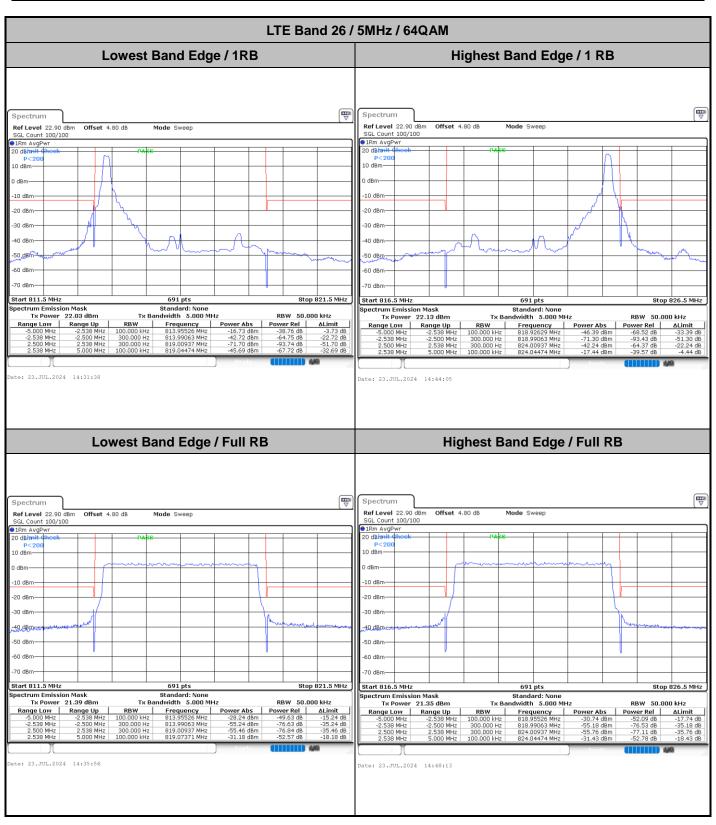
Page Number





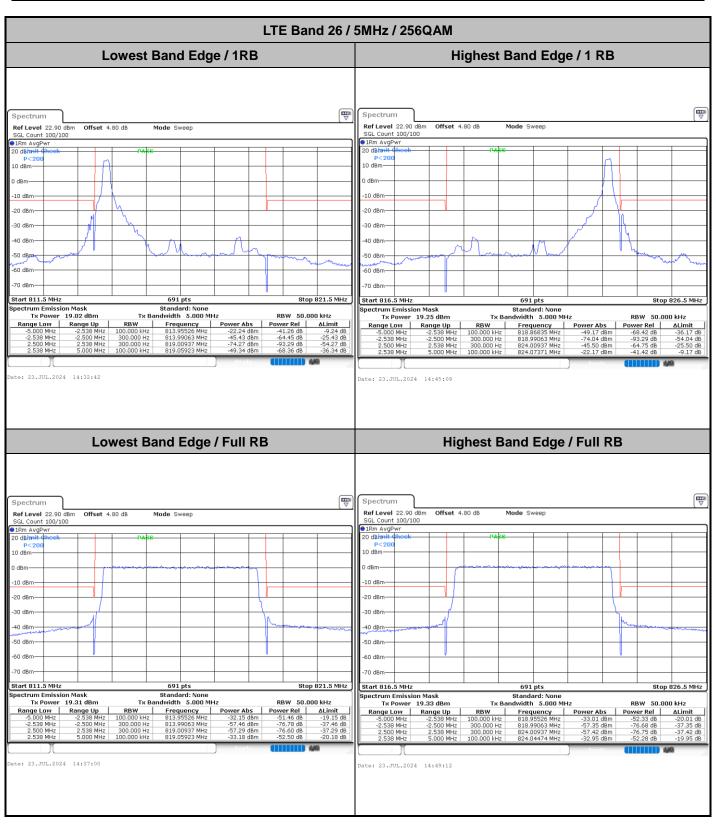






: A18 of A32

Page Number



: A19 of A32

Page Number

