

# FCC RF Test Report

APPLICANT	: Motorola Mobility LLC
EQUIPMENT	: Mobile Cellular Phone
BRAND NAME	: Motorola
MODEL NAME	:XT2165-1, XT2165-2
FCC ID	: IHDT56ZP4
STANDARD	: 47 CFR Part 2, 90(R)
CLASSIFICATION	: PCS Licensed Transmitter Held to Ear (PCE)
TEST DATE(S)	<sub>:</sub> Aug. 30, 2021 ~ Sep. 05, 2021

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

Dornule Chen.

Reviewed by: Derreck Chen / Supervisor

File Shih

Approved by: Eric Shih / Manager



### Sporton International (ShenZhen) Inc.

1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan, Shenzhen, 518055 People's Republic of China

**Sporton International (Shenzhen) Inc.** TEL : 86-755-8637-9589 FAX : 86-755-8637-9595 FCC : IHDT56ZP4





# TABLE OF CONTENTS

RE	VISIO	N HISTORY	3
SU	MMAF	Y OF TEST RESULT	4
1	GEN	ERAL DESCRIPTION	5
•	1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8	Applicant Manufacturer Feature of Equipment Under Test Maximum ERP Power, and Emission Designator Testing Site Test Software Applied Standards Specification of Accessory	5 5 6 6 7
2		CONFIGURATION OF EQUIPMENT UNDER TEST	
	2.1 2.2 2.3 2.4	Test Mode Connection Diagram of Test System Support Unit used in test configuration and system Measurement Results Explanation Example	9 9
3	CON	DUCTED TEST ITEMS	10
	3.1 3.2 3.3 3.4 3.5 3.6 3.7 3.8	Measuring Instruments Conducted Output Power and ERP Peak-to-Average Ratio Occupied Bandwidth Conducted Band Edge Measurement Emission Mask Conducted Spurious Emission Measurement Frequency Stability Measurement	11 12 13 14 15 16 17
4		ATED TEST ITEMS	
	4.1 4.2 4.3 4.4	Measuring Instruments Test Setup Test Result of Radiated Test Radiated Spurious Emission Measurement	18 19
5	LIST	OF MEASURING EQUIPMENT	21
6	UNC	RTAINTY OF EVALUATION	22
AP	PEND	X A. TEST RESULTS OF CONDUCTED TEST	
AP	PEND	X B. TEST RESULTS OF RADIATED TEST	

#### **APPENDIX C. TEST SETUP PHOTOGRAPHS**



# **REVISION HISTORY**

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FG170628-01C	Rev. 01	Initial issue of report	Sep. 16, 2021



Report Section	FCC Rule	Description	Limit	Result	Remark
3.2	§2.1046	Conducted Output Power	_	Reporting only	-
0.2	§90.542 (a)(7)	Effective Radiated Power	ERP < 3Watt	PASS	-
3.3	-	Peak-to-Average Ratio	_	Reporting only	-
3.4	§2.1049	Occupied Bandwidth	_	Reporting only	-
3.5	§2.1053Conducted Band Edge§90.543 (e)(2)(3)Measurement		Refer standard	PASS	-
3.6	§2.1051 §90.210(n)	Emission Mask	Mask B	PASS	-
3.7	§2.1053 §90.543 (e)(3)	Conducted Spurious Emission	< 43+10log <sub>10</sub> (P[Watts])	PASS	-
3.8	§2.1055 §90.539 (e)	Frequency Stability Temperature & Voltage	< ±1.25 ppm	PASS	-
4.4	§2.1053 §90.543 (e)(3) §90.543 (f)	Radiated Spurious Emission	< 43+10log <sub>10</sub> (P[Watts])	PASS	Under limit 21.44 dB at 1581.500 MHz
Declara	tion of Conformit	y:			
The tes	t results with all	measurement uncertainty exc	cluded are presented	in accordanc	e with the

# SUMMARY OF TEST RESULT

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.



# **1** General Description

# 1.1 Applicant

#### Motorola Mobility LLC

222 W, Merchandise Mart Plaza, Chicago IL 60654 USA

### 1.2 Manufacturer

#### Motorola Mobility LLC

222 W, Merchandise Mart Plaza, Chicago IL 60654 USA

### 1.3 Feature of Equipment Under Test

Product Feature								
Equipment	Mobile Cellular Phone							
Brand Name	Motorola							
Model Name	XT2165-1, XT2165-2							
FCC ID	IHDT56ZP4							
Tx Frequency	LTE Band 14: 788 MHz ~ 798 MHz							
Rx Frequency	LTE Band 14: 758 MHz ~ 768 MHz							
Bandwidth	5MHz / 10MHz							
Maximum Output Power to Antenna	22.70 dBm							
Antenna Gain	-4.95 dBi							
Type of Modulation	QPSK / 16QAM / 64QAM							
IMEL Codo	Conducted: 357571280009365							
IMEI Code	Radiation: 357571280016279							
HW Version	DVT2							
SW Version	RRQ31.Q3-51							
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 ERP Power, and Emission Designator

Ľ	TE Band 14	QP	SK	16QAM/64QAM			
BW (MHz)	Frequency Range (MHz)	Maximum ERP(W)	Emission Designator (99%OBW)	Maximum ERP(W)	Emission Designator (99%OBW)		
5	790.5~795.5	0.0361	4M50G7D	0.0304	4M52W7D		
10	793	0.0363	9M09G7D	0.0299	9M09W7D		



### 1.5 Testing Site

#### <FCC>-SZ

Sporton International (Shenzhen) Inc. is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.01.

Test Firm	Sporton International (Shenzhen) Inc.										
Test Site Location	1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan, Shenzhen, 518055 People's Republic of China TEL: +86-755-86379589 FAX: +86-755-86379595										
Test Site No.	Sporton Site No.	FCC Designation No.	FCC Test Firm								
		· · · · · · · · · · · · · · · · · · ·	Registration No.								
	TH01-SZ CN1256 421272										
Test Firm	Sporton International (Sh	enzhen) Inc.									
	101, 1st Floor, Block B, Building 1, No. 2, Tengfeng 4th Road, Fenghuang Community, Fuyong Street, Baoan District, Shenzhen City Guangdong Province China 518103										
Test Site Location	Community, Fuyong Stre										
Test Site Location	Community, Fuyong Stre China 518103 TEL: +86-755-33202398	et, Baoan District, Shenzhe									
Test Site Location	Community, Fuyong Stre China 518103		n Čity Guangdong Province								

### 1.6 Test Software

ltem	Site	Manufacturer	Name	Version	
1.	03CH01-SZ	AUDIX	E3	6.2009-8-24	

# 1.7 Applied Standards

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

- 47 CFR Part 2, Part 90(R)
- ANSI C63.26
- KDB 971168 D01 Power Meas License Digital Systems v03r01
- KDB 412172 D01 Determining ERP and EIRP v01r01

Remark:

**Sporton International (Shenzhen) Inc.** TEL : 86-755-8637-9589 FAX : 86-755-8637-9595 FCC : IHDT56ZP4



- **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.

# **1.8 Specification of Accessory**

	Specification of Accessory										
AC Adapter 1 Brand Name		Motorola(AOHAI)	Model Name	MC-101							
AC Adapter 2	Brand Name	Motorola(Salcomp)	Model Name	MC-101							
AC Adapter 3	Brand Name	Motorola(Chenyang)	Model Name	MC-101							
Battery	Brand Name	Motorola (Sunwoda)	Model Name	JK50							
USB Cable 1	Brand Name	Motorola (Cabletech)	Model Name	SC18C49697							
USB Cable 2	Brand Name	Motorola (Saibao)	Model Name	SC18C24367							
USB Cable 3	Brand Name	Motorola (Luxshare)	Model Name	SC18C24368							
USB Cable 4	Brand Name	Motorola (Saibao)	Model Name	SC18D22297							
USB Cable 5	Brand Name	Motorola (Luxshare)	Model Name	SC18D22299							
USB Cable 6	Brand Name	Motorola (Cabletech)	Model Name	SC18D22298							



# 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.

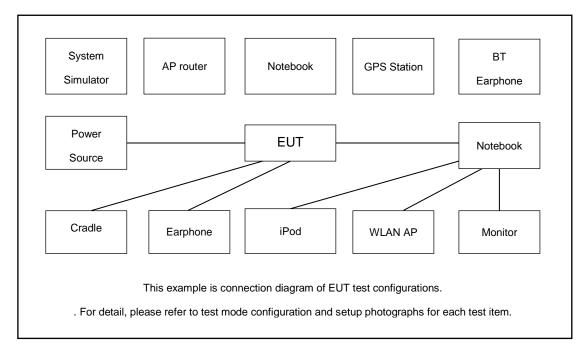
Radiated measurements are performed by rotating the EUT in three different orthogonal test planes to find the maximum emission.

Conducted			В	andwio	lth (MH	lz)			Modulatio	'n		RB #		Test Channel		
Test Cases	Band	1.4	3	5	10	15	20	QPSK	16QAM	64QAM	1	Half	Full	L	м	н
Max. Output	14	-	-	v	-	-	-	v	v	v	v	v	v	v	v	v
Power	14	-	-		v	-	-	v	v	v	v	v	v		v	
Peak-to-Average Ratio	14	-	-		v	-	-	v	v	v	v		v		v	
26dB and 99%	14	-	-	v		-	-	v	v	v			v	v	v	v
Bandwidth	14	-	-		v	-	-	v	v	v			v		v	
Conducted	14	-	-	v		-	-	v	v	v	v		v	v		v
Band Edge	14	-	-		v	-	-	v	v	v	v		v		v	
Emission Mask	14	-	-	۷		-	-	v	v	v	v		v	v	v	v
Emission wask	14	-	-		v	-	-	v	v	v	v		v		v	
Conducted Spurious	14	-	-	v		-	-	v	v	v	v			v	v	v
Emission	14	-	-		v	-	-	v	v	v	v				v	
Frequency Stability	14	-	-		v	-	-	v					v		v	
E.R.P	14	-	-	v		-	-	v	v	v	v			v	v	v
E.R.P	14	-	-		v	-	-	v	v	v	v				v	
Radiated Spurious Emission	14	-	-	v	v	-	-	v			v				v	
Note	2. T 3. T	he ma he dev missio	irk "-" vice is on test	mean inves unde	s that stigate r diffe	this b d fron rent R	andwi n 30M B size	dth is no Hz to 1(	ot suppoi ) times o and mod	n for testii rted. f fundam ulations i	ental	-			•	

**Sporton International (Shenzhen) Inc.** TEL : 86-755-8637-9589 FAX : 86-755-8637-9595 FCC : IHDT56ZP4



# 2.2 Connection Diagram of Test System



# 2.3 Support Unit used in test configuration and system

lte	em Equipment		Trade Name	Model No.	FCC ID	Data Cable	Power Cord
1		LTE Base Station	Anritsu	MT8820C	N/A	N/A	Unshielded, 1.8 m
2		DC Power Supply	GW INSTEK	GPS-3030D	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 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 + attenuator factor.

Following shows an offset computation example with cable loss 4.0 dB and 10dB attenuator.

Example :

Offset(dB) = RF cable loss(dB) + attenuator factor(dB).

= 4.0 + 10 = 14.0 (dB)



# 3 Conducted Test Items

### 3.1 Measuring Instruments

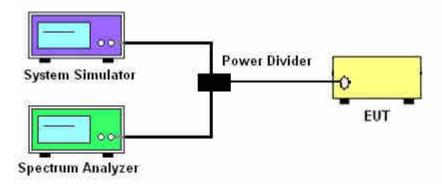
See list of measuring instruments of this test report.

3.1.1 Test Setup

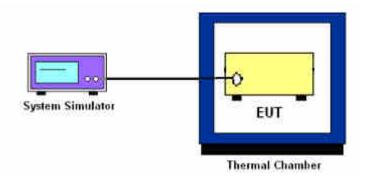
#### 3.1.2 Conducted Output Power



3.1.3 Peak-to-Average Ratio, Occupied Bandwidth, Conducted Band-Edge, Emission Mask, and Conducted Spurious Emission



#### 3.1.4 Frequency Stability



### 3.1.5 Test Result of Conducted Test

Please refer to Appendix A.

**Sporton International (Shenzhen) Inc.** TEL : 86-755-8637-9589 FAX : 86-755-8637-9595 FCC : IHDT56ZP4



# 3.2 Conducted Output Power and ERP

#### 3.2.1 Description of the Conducted Output Power Measurement and ERP

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

The ERP of mobile transmitters must not exceed 3 Watts for LTE Band 14.

According to KDB 412172 D01 Power Approach,

 $EIRP = P_T + G_T - L_C$ , 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

#### 3.2.2 Test Procedures

- 1. The testing follows ANSI C63.26 Section 5.2
- 2. The transmitter output port was connected to the system simulator.
- 3. Set EUT at maximum power through the system simulator.
- 4. Select lowest, middle, and highest channels for each band and different modulation.
- 5. Measure and record the power level from the system simulator.



### 3.3 Peak-to-Average Ratio

#### 3.3.1 Description of the PAR Measurement

Power Complementary Cumulative Distribution Function (CCDF) curves provide a means for characterizing the power peaks of a digitally modulated signal on a statistical basis. A CCDF curve depicts the probability of the peak signal amplitude exceeding the average power level. Most contemporary measurement instrumentation include the capability to produce CCDF curves for an input signal provided that the instrument's resolution bandwidth can be set wide enough to accommodate the entire input signal bandwidth. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

#### 3.3.2 Test Procedures

- 1. The EUT was connected to spectrum and system simulator via a power divider.
- 2. Set the CCDF (Complementary Cumulative Distribution Function) option in spectrum analyzer.
- 3. The highest RF powers were measured and recorded the maximum PAPR level associated with a probability of 0.1 %.
- 4. Record the deviation as Peak to Average Ratio.



### 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

- 1. The testing follows ANSI C63.26 Section 5.4
- 2. The EUT was connected to spectrum analyzer and system simulator via a power divider.
- 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.
- 4. 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.
- 5. Set the detection mode to peak, and the trace mode to max hold.
- 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)
- 7. Determine the "-26 dB down amplitude" as equal to (Reference Value X).
- 8. 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.
- 9. Use the 99 % power bandwidth function of the spectrum analyzer and report the measured bandwidth.



### 3.5 Conducted Band Edge Measurement

#### 3.5.1 Description of Conducted Band Edge Measurement

For operations in the 758-768 MHz and the 788-798 MHz bands

- (1) On all frequencies between 769-775 MHz and 799-805 MHz, by a factor not less than 76 + 10 log
- (P) dB in a 6.25 kHz band segment, for base and fixed stations.
- (2) On all frequencies between 769-775 MHz and 799-805 MHz, by a factor not less than 65 + 10 log
- (P) dB in a 6.25 kHz band segment, for mobile and portable stations.
- (3) On any frequency between 775-788 MHz, above 805 MHz, and below 758 MHz, by at least 43 + 10 log (P) dB.

#### 3.5.2 Test Procedures

- 1. The testing follows ANSI C63.26 section 5.7
- 2. The EUT was connected to spectrum analyzer and system simulator via a power divider.
- 3. The band edges of low and high channels for the highest RF powers were measured.
- 4. Set spectrum analyzer with RMS detector.
- 5. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
- 6. Checked that all the results comply with the emission limit line.

Example:

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

= P(W)- [43 + 10log(P)] (dB)

= [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB) = -13dBm.



### 3.6 Emission Mask

#### 3.6.1 Description of Emission Mask

<Emission Mask B>.

For transmitters that are equipped with an audio low-pass filter, the power of any emission must be attenuated below the unmodulated carrier power (P) as follows:

(1) On any frequency removed from the assigned frequency by more than 50 percent, but not more than 100 percent of the authorized bandwidth: At least 25 dB.

(2) On any frequency removed from the assigned frequency by more than 100 percent, but not more than 250 percent of the authorized bandwidth: At least 35 dB.

(3) On any frequency removed from the assigned frequency by more than 250 percent of the authorized bandwidth: At least 43 + 10 log (P) dB.

#### 3.6.2 Test Procedures

- 1. The testing follows ANSI C63.26 section 5.7
- 2. 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.
- 4. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz.
- 5. Set spectrum analyzer with RMS detector.
- 6. Taking the record of maximum spurious emission.
- 7. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
- 8. The limit line is derived from 43 + 10log(P)dB below the transmitter power P(Watts)
  - = P(W) [43 + 10log(P)] (dB)
  - = [30 + 10log(P)] (dBm) [43 + 10log(P)] (dB)
  - = -13dBm.



### 3.7 Conducted Spurious Emission Measurement

#### 3.7.1 Description of Conducted Spurious Emission Measurement

The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least  $43 + 10 \log (P) dB$ .

It is measured by means of a calibrated spectrum analyzer and scanned from 30MHz up to a frequency including its 10<sup>th</sup> harmonic.

#### 3.7.2 Test Procedures

- 1. The testing follows ANSI C63.26 section 5.7
- 2. The EUT was connected to spectrum analyzer and base station via 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.
- 4. The middle channel for the highest RF power within the transmitting frequency was measured.
- 5. The conducted spurious emission for the whole frequency range was taken.
- Make the measurement with the spectrum analyzer's, for under 1GHz RBW = 100kHz, VBW = 300kHz and for above 1GHz RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
- 7. Set spectrum analyzer with RMS detector.
- 8. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
- 9. The limit line is derived from 43 + 10log(P)dB below the transmitter power P(Watts)
  = P(W)- [43 + 10log(P)] (dB)
  - = [30 + 10log(P)] (dBm) [43 + 10log(P)] (dB)
  - = -13dBm.



### 3.8 Frequency Stability Measurement

#### 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. The frequency stability of the transmitter shall be maintained within  $\pm 1.25$  ppm of the center frequency.

#### 3.8.2 Test Procedures for Temperature Variation

- 1. The testing follows ANSI C63.26 section 5.6.4
- 2. The EUT was set up in the thermal chamber and connected with the system simulator.
- 3. 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.
- 4. 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

- 1. The testing follows ANSI C63.26 section 5.6.5.
- 2. The EUT was placed in a temperature chamber at 20±5°C and connected with the system simulator.
- 3. The power supply voltage to the EUT was varied from 85% to 115% of the nominal value for other than hand carried battery equipment.
- 4. For hand carried, battery powered equipment, reduce the primary ac or dc supply voltage to the battery operating end point, which shall be specified by the manufacturer.
- 5. The variation in frequency was measured for the worst case.



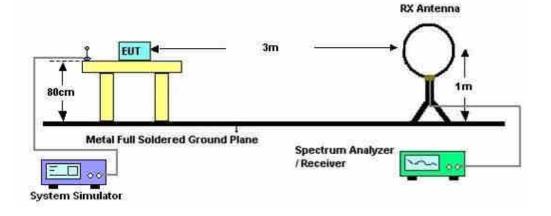
# 4 Radiated Test Items

# 4.1 Measuring Instruments

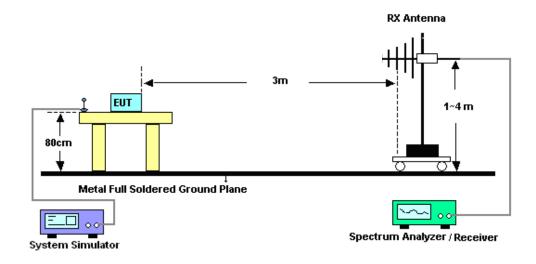
See list of measuring instruments of this test report.

# 4.2 Test Setup

#### 4.2.1 For radiated test below 30MHz

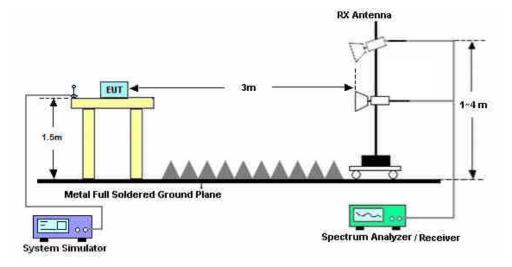


#### 4.2.2 For radiated test from 30MHz to 1GHz





#### 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.



### 4.4 Radiated Spurious Emission Measurement

#### 4.4.1 Description of Radiated Spurious Emission

The radiated spurious emission was measured by substitution method according to ANSI C63.26. 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 + 10 log (P) dB.

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

#### 4.4.2 Test Procedures

- 1. The testing follows ANSI C63.26 Section 5.5
- 2. 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.
- 3. The EUT was set 3 meters from the receiving antenna mounted on the antenna tower.
- 4. The table was rotated 360 degrees to determine the position of the highest spurious emission.
- 5. The height of the receiving antenna is varied between 1m to 4m to search the maximum spurious emission for both horizontal and vertical polarizations.
- 6. During the measurement, the system simulator parameters were set to force the EUT transmitting at maximum output power.
- 7. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
- 8. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
- 9. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
- 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.

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

= P(W)- [43 + 10log(P)] (dB)

 $= [30 + 10\log(P)] (dBm) - [43 + 10\log(P)] (dB)$ 

= -13dBm.



# 5 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSV40	101078	10Hz~40GHz	Apr. 08, 2021	Aug. 30, 2021	Apr. 07, 2022	Conducted (TH01-SZ)
DC Power Supply	ТТІ	PL330P	290070	Max 32V,3A	Oct. 15, 2020	Aug. 30, 2021	Oct. 14, 2021	Conducted (TH01-SZ)
Power Divider	TOJOIN	PS-2SM-04 265	60.06.020.007 7	0.4GHz~26.5GHz	Dec. 26, 2020	Aug. 30, 2021	Dec. 25, 2021	Conducted (TH01-SZ)
Thermal Chamber	Ten Billion Hongzhangroup	LP-150U	H2014081803	-40~+150°C	Jul. 14, 2021	Aug. 30, 2021	Jul. 13, 2022	Conducted (TH01-SZ)
EMI Test Receiver&SA	Agilent	N9038A	MY52260185	20Hz~26.5GHz	Dec. 03, 2020	Sep. 05, 2021	Dec. 02, 2021	Radiation (03CH01-SZ)
Loop Antenna	R&S	HFH2-Z2	100354	9kHz~30MHz	Jun. 22, 2020	Sep. 05, 2021	Jun. 21, 2022	Radiation (03CH01-SZ)
HF Amplifier	KEYSIGHT	83017A	MY53270105	0.5GHz~26.5Ghz	Oct. 16, 2020	Sep. 05, 2021	Oct. 15, 2021	Radiation (03CH01-SZ)
Bilog Antenna	TeseQ	CBL6112D	35407	30MHz-2GHz	Jul. 15, 2021	Sep. 05, 2021	Jul. 14, 2022	Radiation (03CH01-SZ)
Double Ridge Horn Antenna	ETS-Lindgren	3117	00119436	1GHz~18GHz	Jul. 24, 2021	Sep. 05, 2021	Jul. 23, 2022	Radiation (03CH01-SZ)
SHF-EHF Horn	com-power	AH-840	101071	18Ghz-40GHz	Apr. 11, 2021	Sep. 05, 2021	Apr. 10, 2022	Radiation (03CH01-SZ)
LF Amplifier	Burgeon	BPA-530	102209	0.01~3000Mhz	Apr. 07, 2021	Sep. 05, 2021	Apr. 06, 2022	Radiation (03CH01-SZ)
HF Amplifier	MITEQ	AMF-7D-00 101800-30-1 0P-R	1943528	1GHz~18GHz	Oct. 15, 2020	Sep. 05, 2021	Oct. 14, 2021	Radiation (03CH01-SZ)
HF Amplifier	MITEQ	TTA1840-35 -HG	1871923	18GHz~40GHz	Jul. 20. 2021	Sep. 05, 2021	Jul. 19. 2022	Radiation (03CH01-SZ)
AC Power Source	Chroma	61601	61601000198 5	N/A	NCR	Sep. 05, 2021	NCR	Radiation (03CH01-SZ)
Turn Table	EM	EM1000	N/A	0~360 degree	NCR	Sep. 05, 2021	NCR	Radiation (03CH01-SZ)
Antenna Mast	EM	EM1000	N/A	1 m~4 m	NCR	Sep. 05, 2021	NCR	Radiation (03CH01-SZ)

NCR: No Calibration Required



# 6 Uncertainty of Evaluation

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 Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	2.48dB

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	3.53dB
--	--------

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

Measuring Uncertainty for a Level of	4.02dB
Confidence of 95% (U = 2Uc(y))	4.020B

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



# Appendix A. Test Results of Conducted Test

# Conducted Output Power(Average power)

	LTE Band 14 Maximum Average Power [dBm]										
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest					
5	1	0		22.33	22.39	22.35					
5	1	12		22.68	22.67	22.57					
5	1	24		22.34	22.32	22.39					
5	12	0	QPSK	21.44	21.50	21.51					
5	12	7		21.53	21.53	21.54					
5	12	13		21.50	21.51	21.50					
5	25	0		21.48	21.47	21.51					
5	1	0		21.63	21.69	21.60					
5	1	12		21.93	21.89	21.92					
5	1	24		21.66	21.64	21.67					
5	12	0	16-QAM	20.44	20.51	20.50					
5	12	7		20.57	20.54	20.52					
5	12	13		20.53	20.54	20.53					
5	25	0		20.51	20.50	20.51					
5	1	0		20.55	20.56	20.53					
5	1	12		20.85	20.82	20.76					
5	1	24		20.52	20.55	20.56					
5	12	0	64QAM	19.50	19.55	19.55					
5	12	7		19.59	19.57	19.56					
5	12	13		19.53	19.54	19.52					
5	25	0		19.51	19.50	19.52					



#### Report No. : FG170628-01C

	LTE Band 14 Maximum Average Power [dBm]										
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest					
10	1	0			22.41						
10	1	25			22.70						
10	1	49			22.47						
10	25	0	QPSK		21.53						
10	25	12			21.55						
10	25	25			21.50						
10	50	0			21.53						
10	1	0			21.72						
10	1	25			21.85						
10	1	49			21.73						
10	25	0	16-QAM		20.55						
10	25	12			20.55						
10	25	25			20.54						
10	50	0			20.55						
10	1	0			20.62						
10	1	25			20.73						
10	1	49			20.64						
10	25	0	64QAM		19.52						
10	25	12			19.53						
10	25	25			19.57						
10	50	0			19.54						



)
---

LTE Band 14 (G <sub>T</sub> - L <sub>c</sub> = -4.95 dB) QPSK											
Bandwidth		5M			10M						
Channel	23305	23330	23355		23330						
Channer	(Low)	(Mid)	(High)		(Mid)						
Frequency	790.5	793	795.5		793						
(MHz)	790.5	795	190.0		195						
Conducted Power (dBm)	22.68	22.67	22.57		22.70						
Conducted Power (Watts)	0.1854	0.1849	0.1807		0.1862						
ERP(dBm)	15.58	15.57	15.47		15.60						
ERP(Watts)	0.0361	0.0361	0.0352		0.0363						

LTE Band 14 (G <sub>T</sub> - L <sub>C</sub> = -4.95 dB) 16QAM										
Bandwidth		5M			10M					
Channel	23305	23330	23355		23330					
Channel	(Low)	(Mid)	(High)		(Mid)					
Frequency	790.5	793	795.5		793					
(MHz)	790.5	795	795.5		795					
Conducted Power (dBm)	21.93	21.89	21.92		21.85					
Conducted Power (Watts)	0.1560	0.1545	0.1556		0.1531					
ERP(dBm)	14.83	14.79	14.82		14.75					
ERP(Watts)	0.0304	0.0301	0.0303		0.0299					



	LTE Band 14 ( $G_T$ - $L_c$ = -4.95 dB) 64QAM											
Bandwidth		5M			10M							
Channel	23305	23330	23355		23330							
Channer	(Low)	(Mid)	(High)		(Mid)							
Frequency	790.5	793	795.5		793							
(MHz)	790.5	795	795.5		795							
Conducted Power (dBm)	20.85	20.82	20.76		20.73							
Conducted Power (Watts)	0.1216	0.1208	0.1191		0.1183							
ERP(dBm)	13.75	13.72	13.66		13.63							
ERP(Watts)	0.0237	0.0236	0.0232		0.0231							

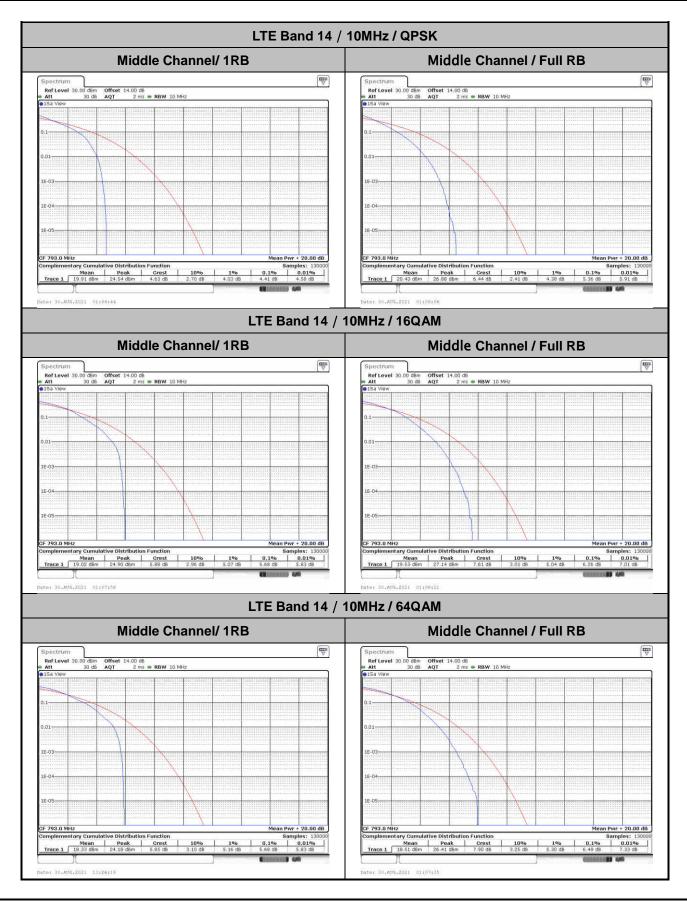


# LTE Band 14

# Peak-to-Average Ratio

Mode						
Mod.	QP	SK	160	QAM	Limit: 13dB	
RB Size	1RB	Full RB	1RB	Full RB	Result	
Lowest CH	-	-	-	-		
Middle CH	4.41	5.36	5.68	6.26	PASS	
Highest CH	-	-	-	-		
Mode		LTE Band	14 / 10MHz			
Mod.	64Q	AM			Limit: 13dB	
RB Size	1RB	Full RB			Result	
Lowest CH	-	-	-	-		
Middle CH	5.68	6.49	-	-	PASS	
Highest CH	-	-	-	-		





**Sporton International (Shenzhen) Inc.** TEL : 86-755-8637-9589 FAX : 86-755-8637-9595

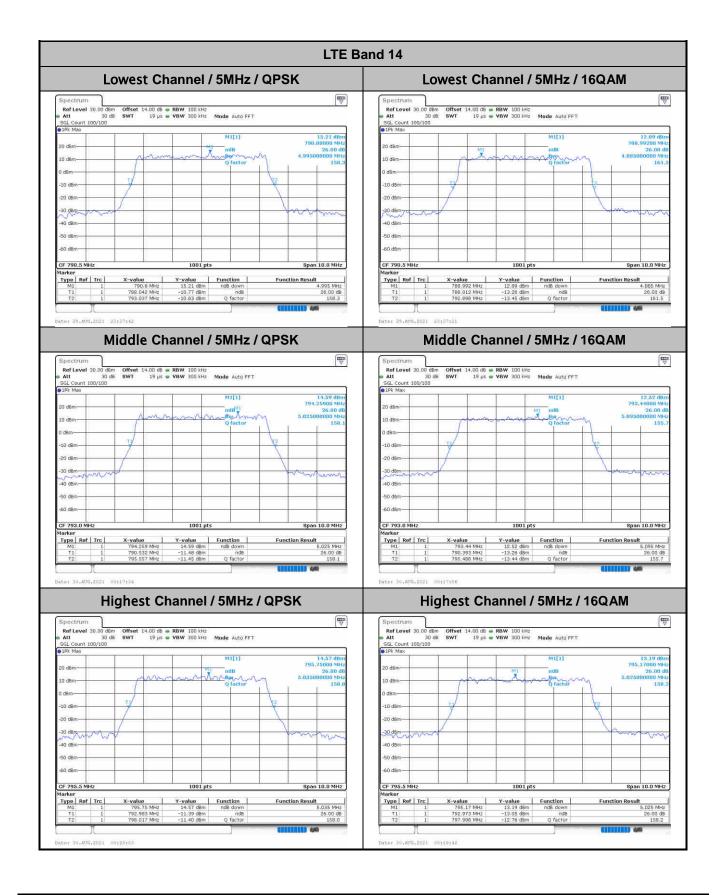
FCC : IHDT56ZP4



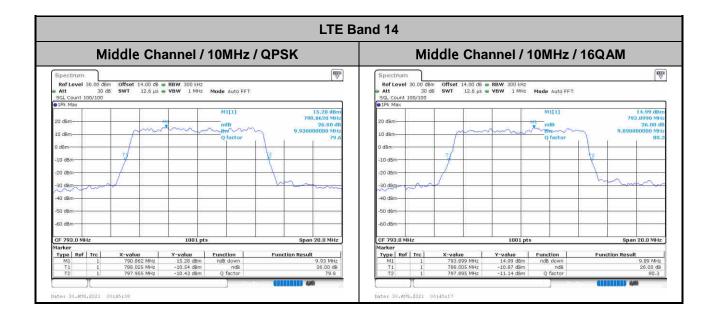
# 26dB Bandwidth

Mode		LTE Band 14 : 26dB BW(MHz)										
BW	1.4	ИHz	3M	lHz	5M	5MHz <sup>·</sup>		10MHz		ЛНz	20MHz	
Mod.	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Lowest CH	-	-	-	-	5.00	4.89			-	-	-	-
Middle CH	-	-	-	-	5.03	5.10	9.93	9.89	-	-	-	-
Highest CH	-	-	-	-	5.04	5.03			-	-	-	-
Mode					LTE Ba	and 14 :	26dB BV	V(MHz)				
BW	1.4	ИHz	3M	lHz	5M	Hz	10	/IHz	15N	ЛНz	201	/IHz
Mod.	64QAM		64QAM		64QAM		64QAM		64QAM		64QAM	
Lowest CH	-	-	-	-	5.06	-	-	-	-	-	-	-
Middle CH	-	-	-	-	5.04	-	9.97	-	-	-	-	-
Highest CH	-	-	-	-	4.97	-	-	-	-	-	-	-



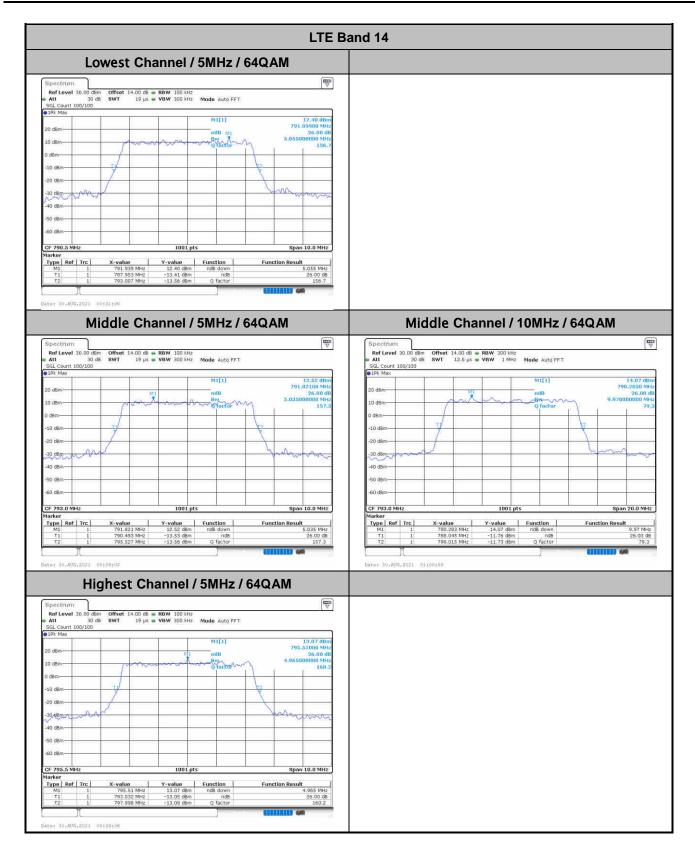








#### Report No. : FG170628-01C

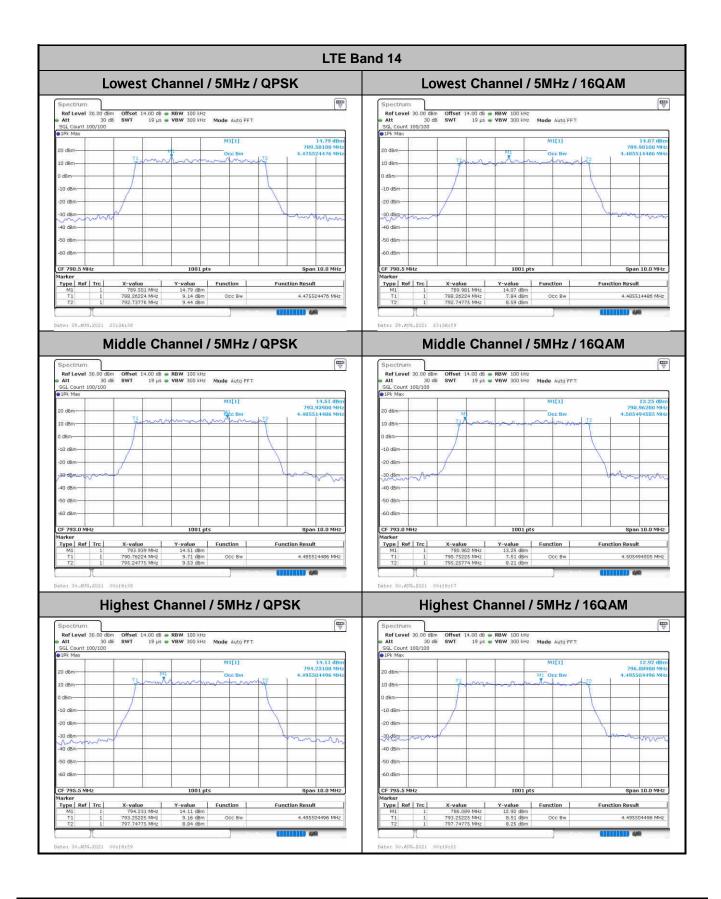




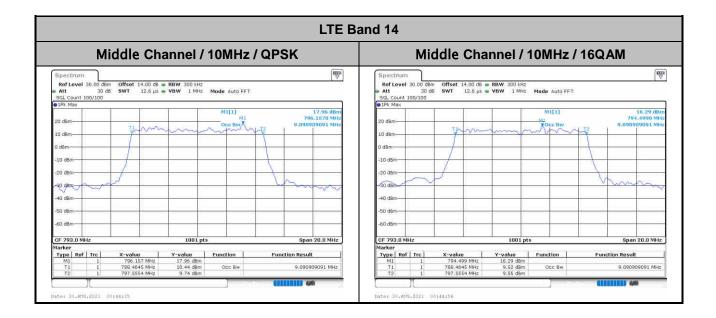
# **Occupied Bandwidth**

Mode		LTE Band 14 : 99%OBW(MHz)										
BW	1.4	ИHz	3M	lHz	5M	5MHz		10MHz		ЛНz	20MHz	
Mod.	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Lowest CH	-	-	-	-	4.48	4.49			-	-	-	-
Middle CH	-	-	-	-	4.49	4.51	9.09	9.09	-	-	-	-
Highest CH	-	-	-	-	4.50	4.50			-	-	-	-
Mode					LTE Ba	and 14 :	99%OBV	V(MHz)				
BW	1.4	ИHz	3M	lHz	5M	5MHz 10MHz			15MHz		20MHz	
Mod.	64QAM		64QAM		64QAM		64QAM		64QAM		64QAM	
Lowest CH	-	-	-	-	4.52	-	-	-	-	-	-	-
Middle CH	-	-	-	-	4.49	-	9.07	-	-	-	-	-
Highest CH	-	-	-	-	4.49	-	-	-	-	-	-	-



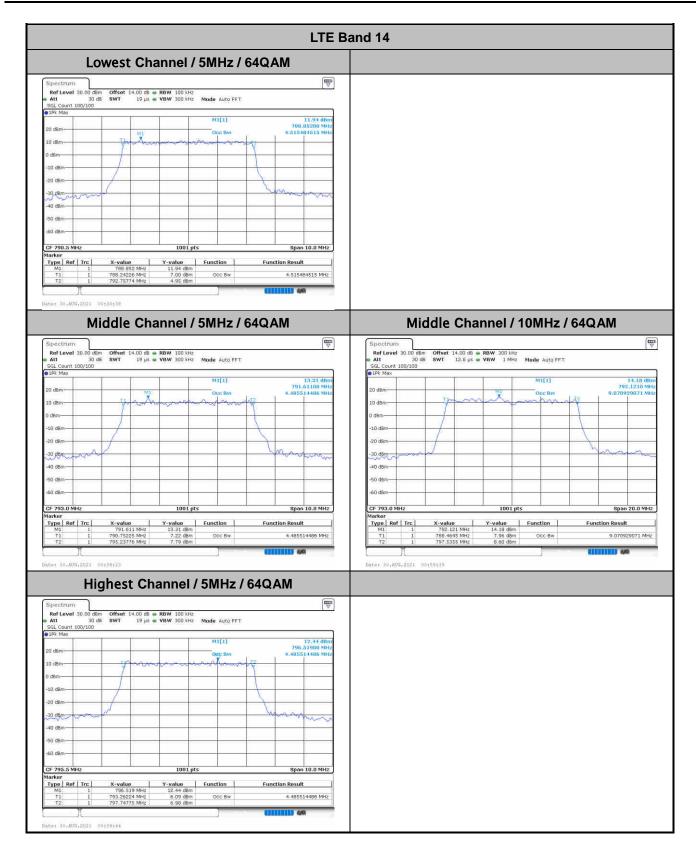








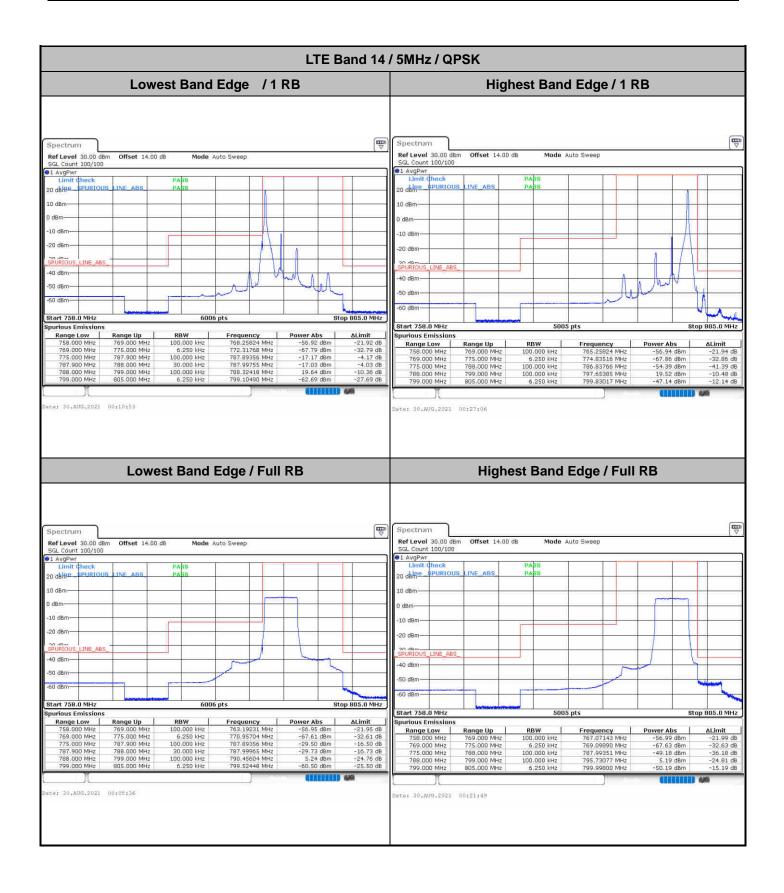
#### Report No. : FG170628-01C



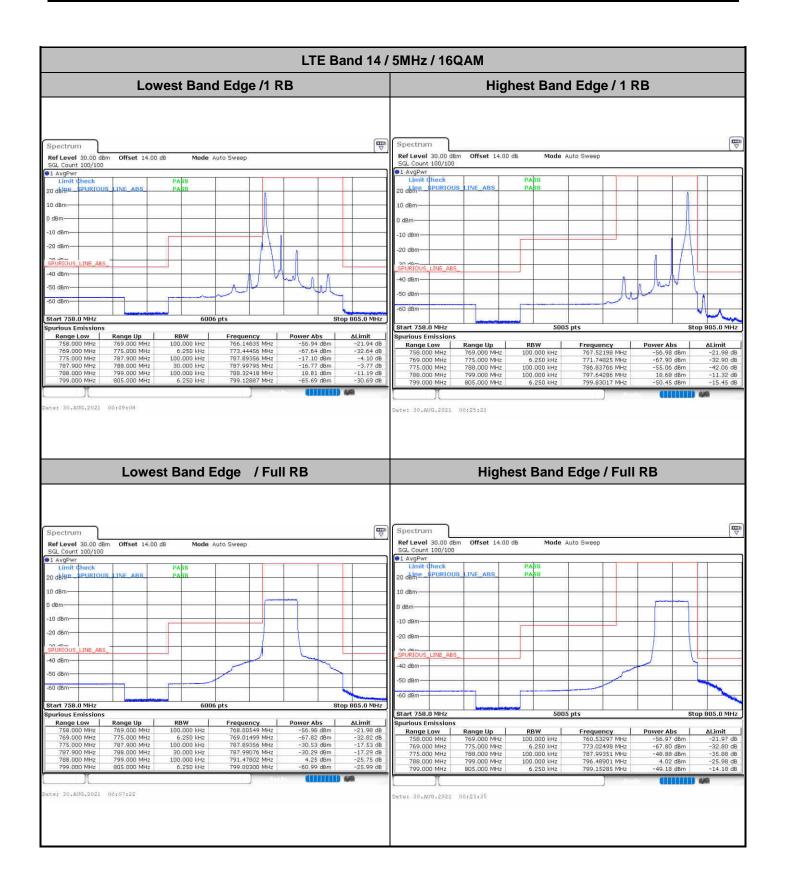


### Conducted Band Edge

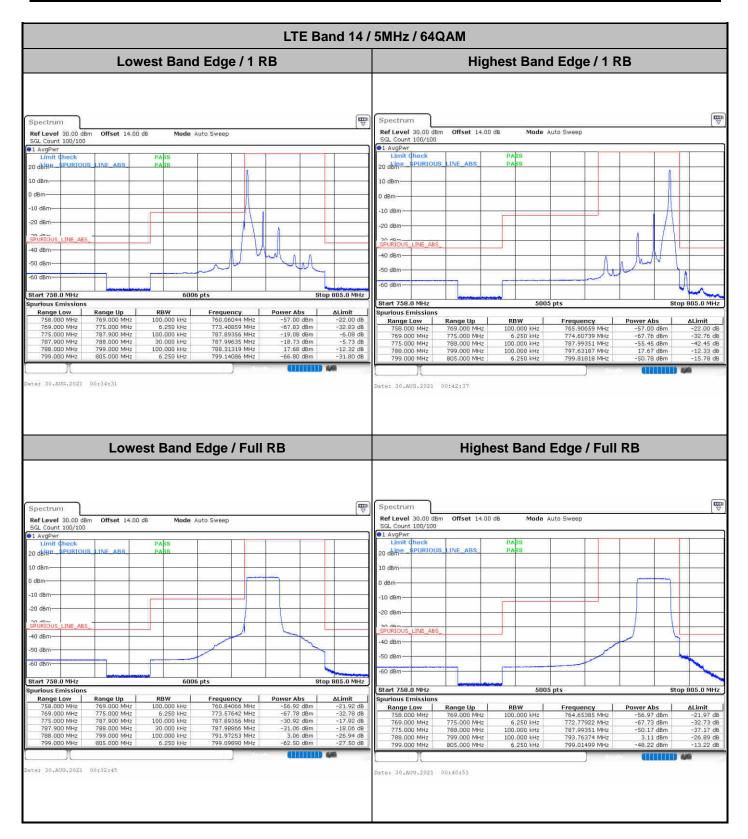




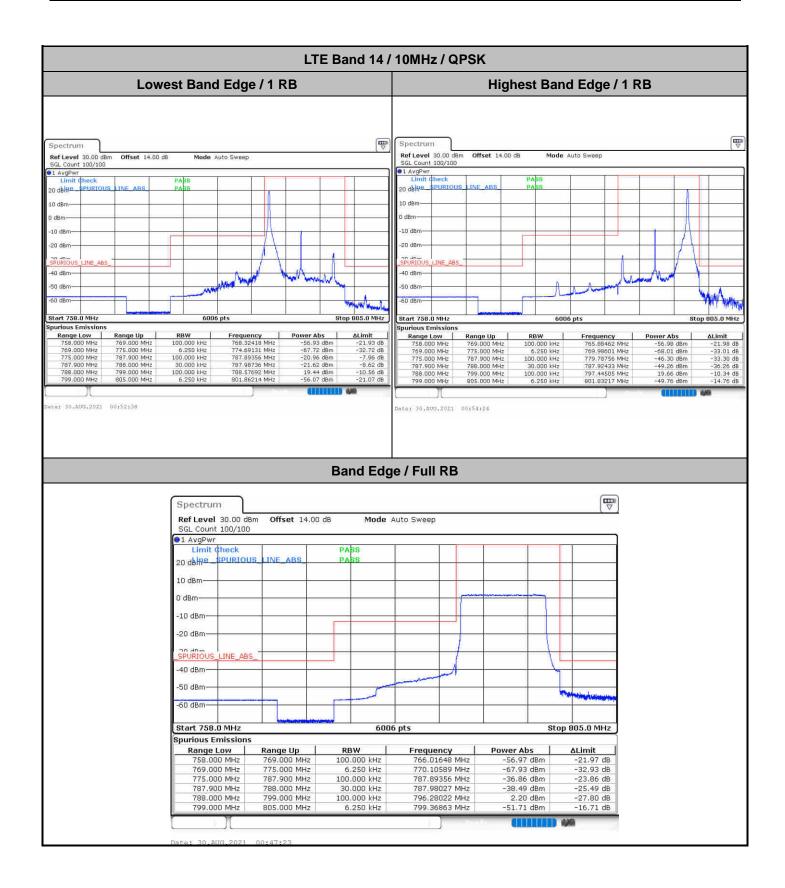




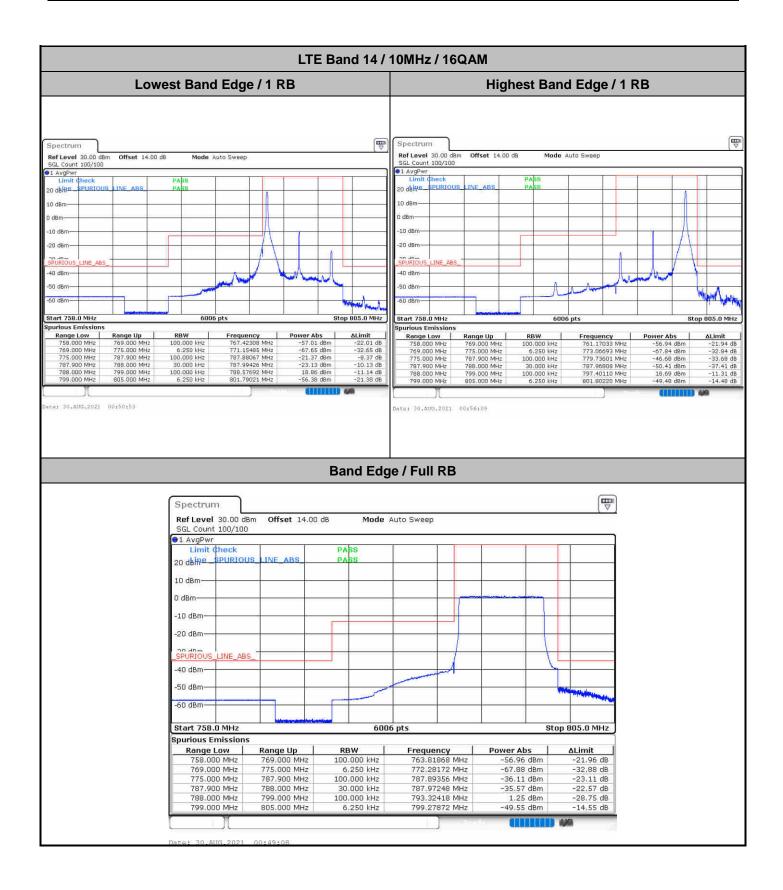






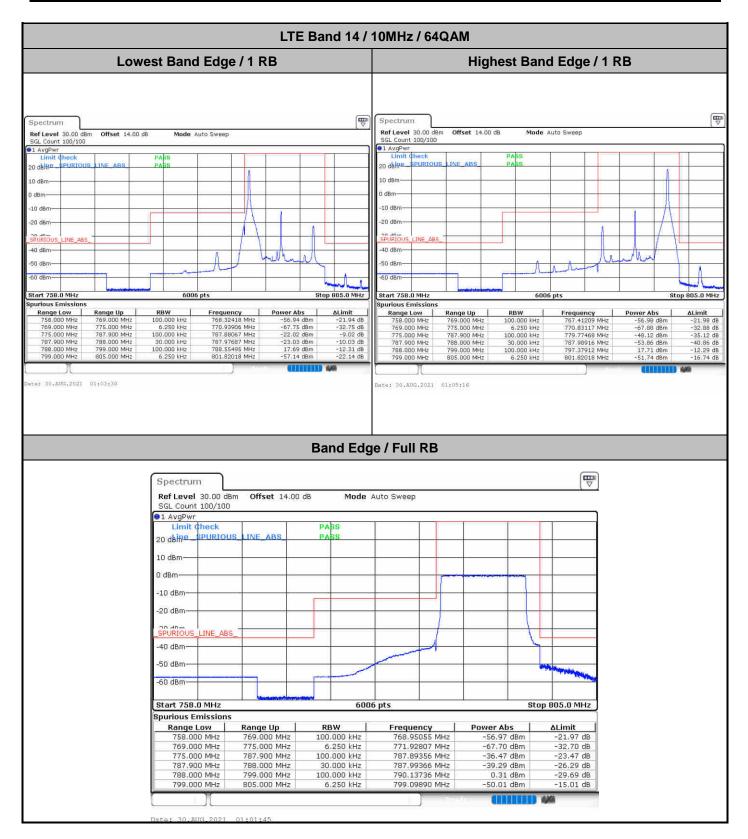






**Sporton International (Shenzhen) Inc.** TEL : 86-755-8637-9589 FAX : 86-755-8637-9595 FCC : IHDT56ZP4

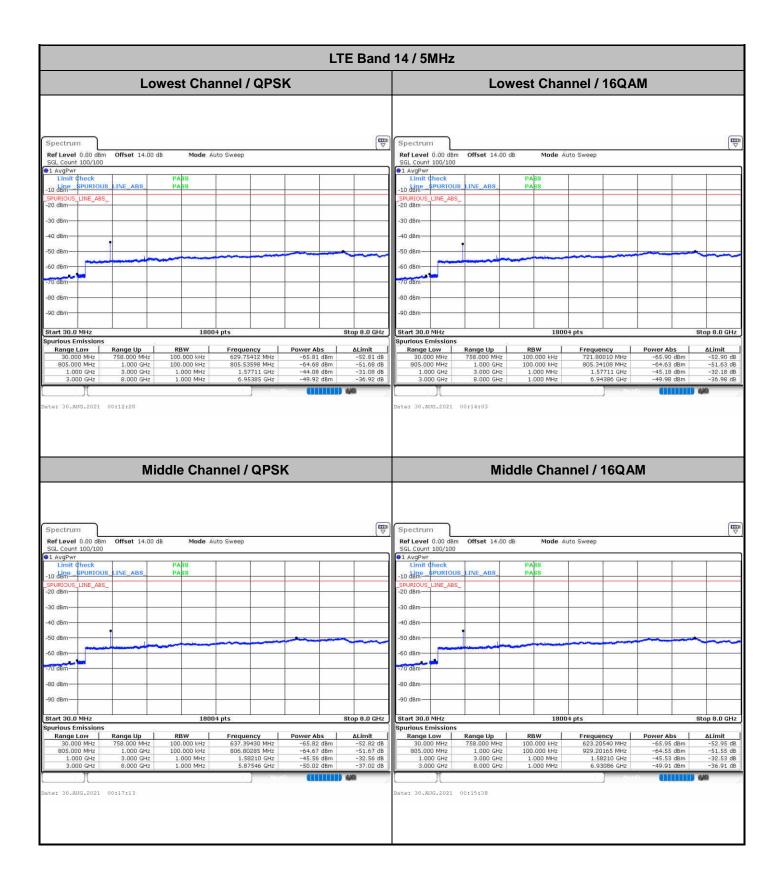




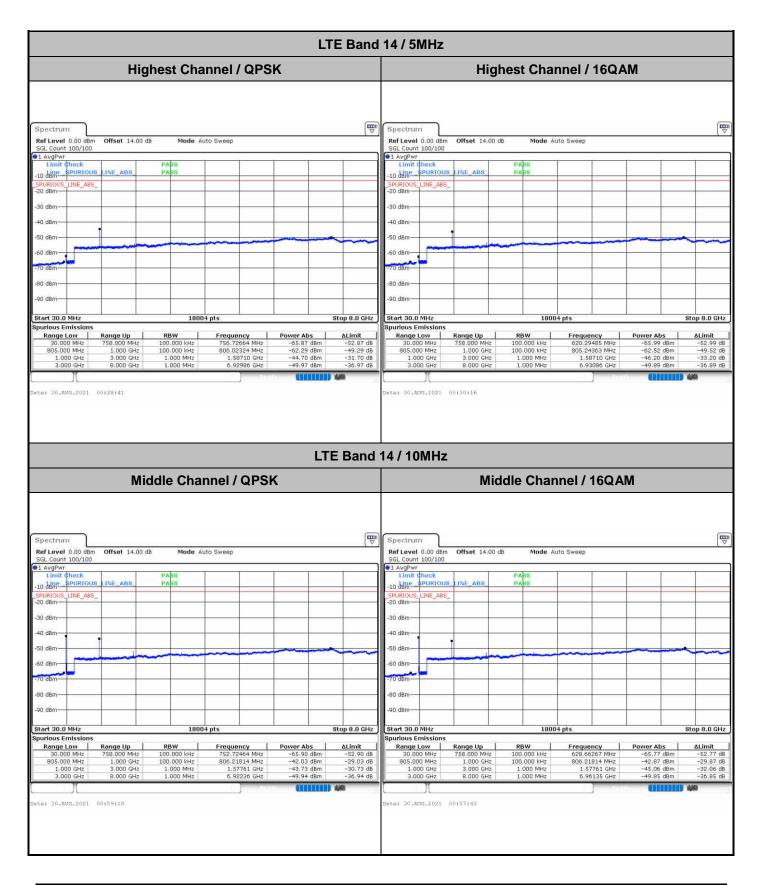


### **Conducted Spurious Emission**



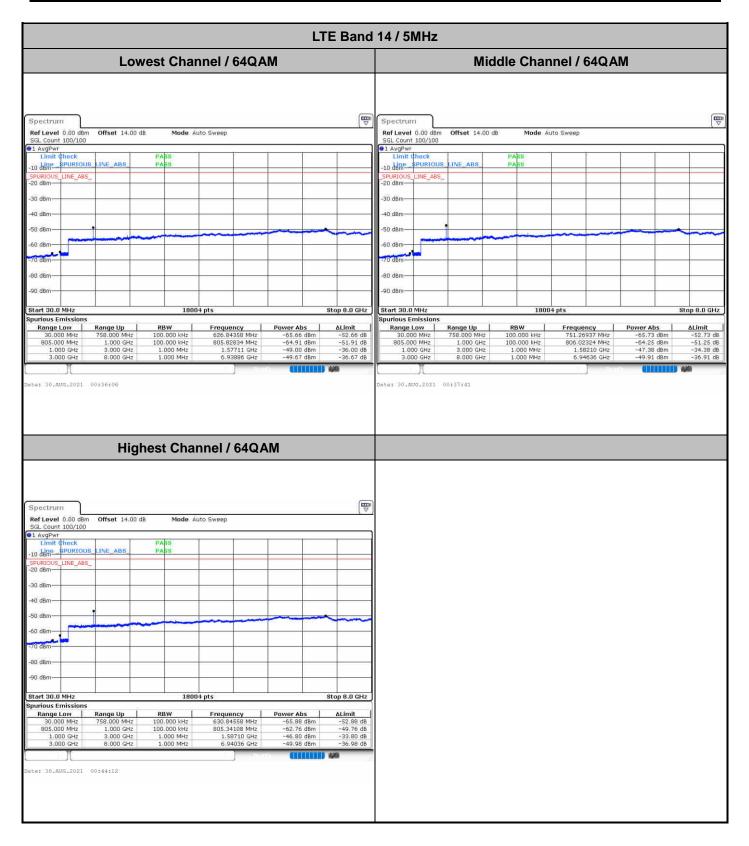






**Sporton International (Shenzhen) Inc.** TEL : 86-755-8637-9589 FAX : 86-755-8637-9595 FCC : IHDT56ZP4





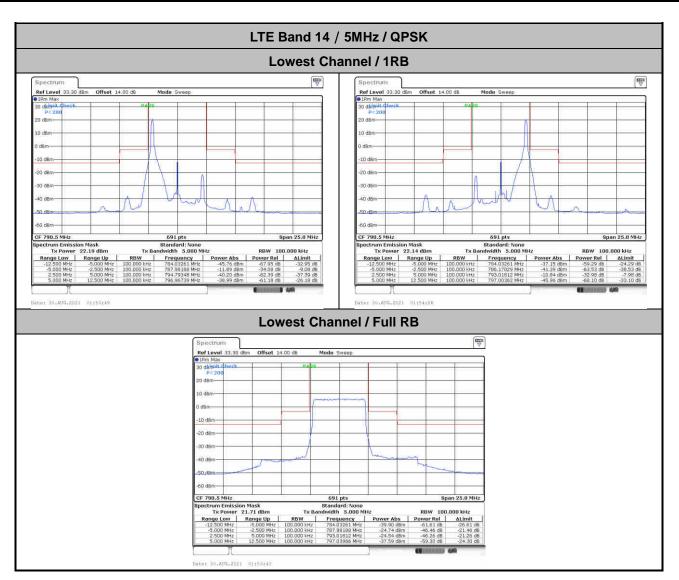


				LT	E Band
Middle Channel / 64QAM					
					(
Spectrum Ref Level 0.00 dBr		dB Mode A	ito Sweep		
SGL Count 100/100 SGL Count 100/100					
Limit Check	and the second second	PABS			
-10 UDIN	IS_LINE_ABS_	PASS			
_SPURIOUS_LINE_ABS	5				
a the court					
-30 dBm	_				
-40 dBm	_				
-					83
-50 dBm	تا الأحسب ال			and the later state of the	mm
-60 dBm					
-70 dBm					
-80 dBm					
-90 dBm					_
Start 30.0 MHz Spurious Emissions		1800	4 pts		Stop 8.0 GHz
Range Low	Range Up	RBW	Frequency	Power Abs	∆Limit
30.000 MHz	758.000 MHz	100.000 kHz	757.81809 MHz	-65.89 dBm	~52.89 dB
805.000 MHz 1.000 GHz	1,000 GHz 3.000 GHz	100.000 kHz 1.000 MHz	806.21814 MHz 1.57761 GHz	-45.61 dBm -46.87 dBm	-32.61 dB -33.87 dB
3.000 GHz	8.000 GHz	1.000 MHz	6.92386 GHz	-50.03 dBm	~37.03 dB
I III			T. Det	CANADODA	440
Date: 30.8UG.2021	01:06:50				

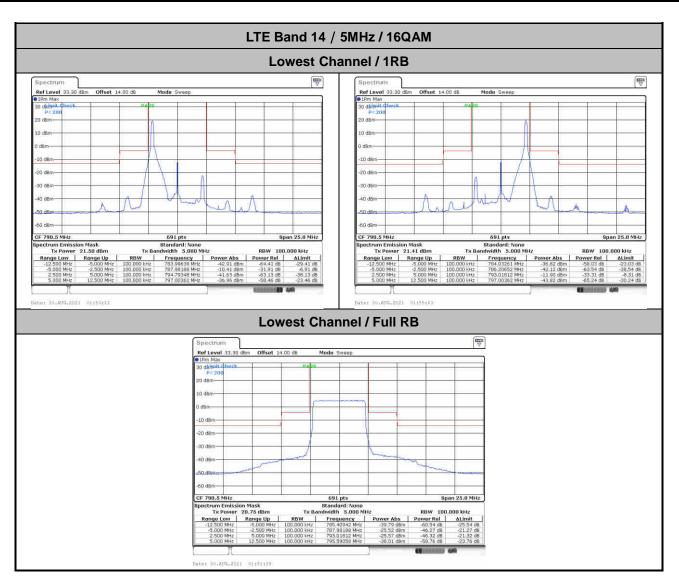


Mask

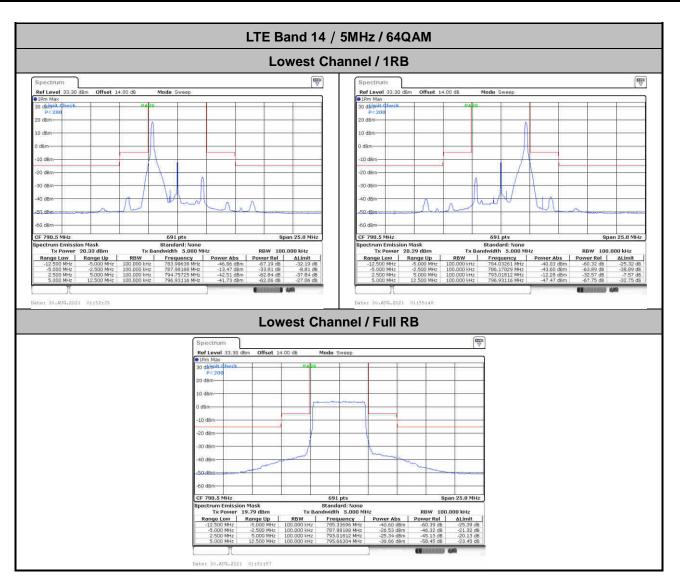




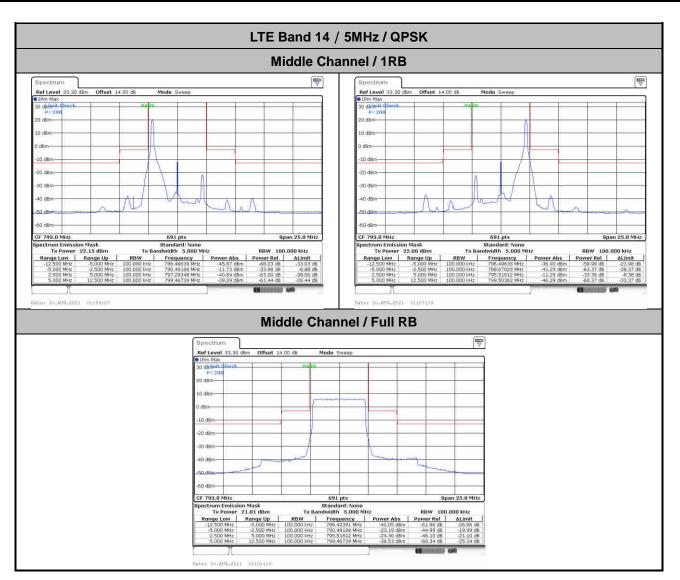




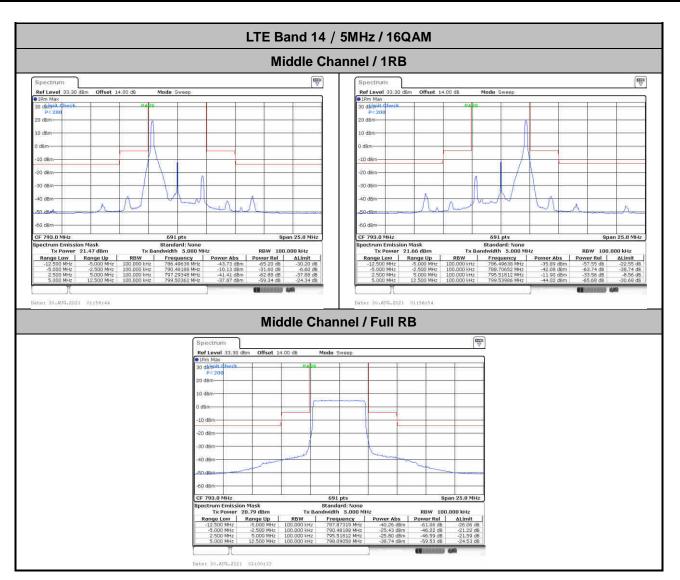




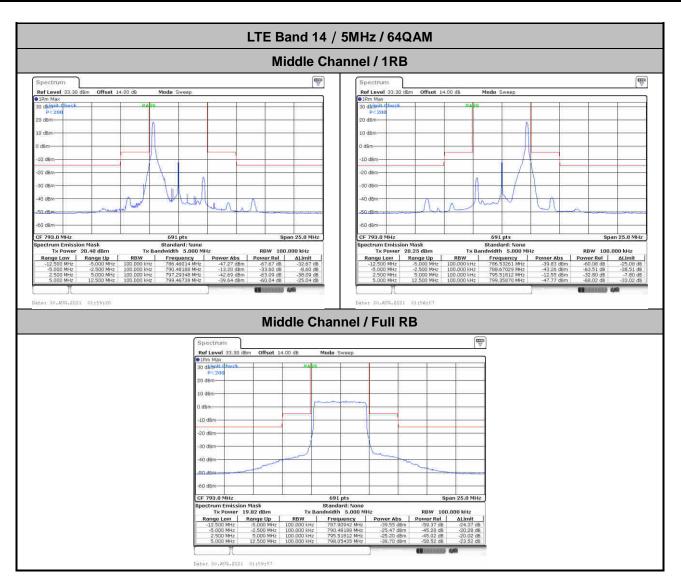




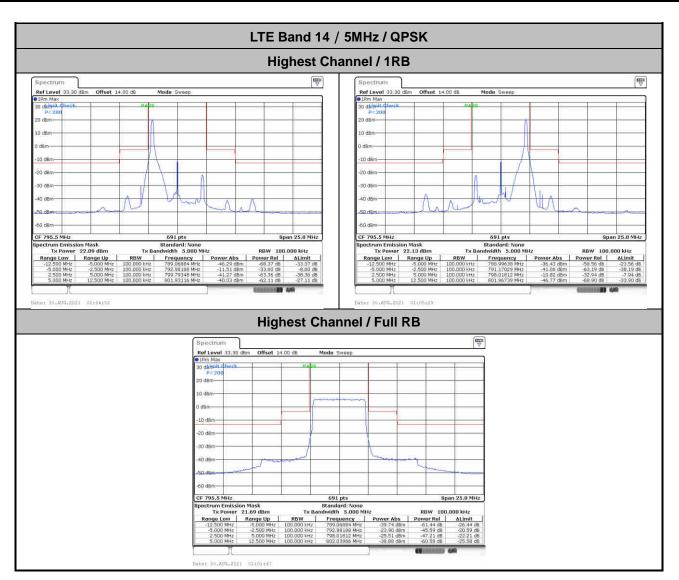




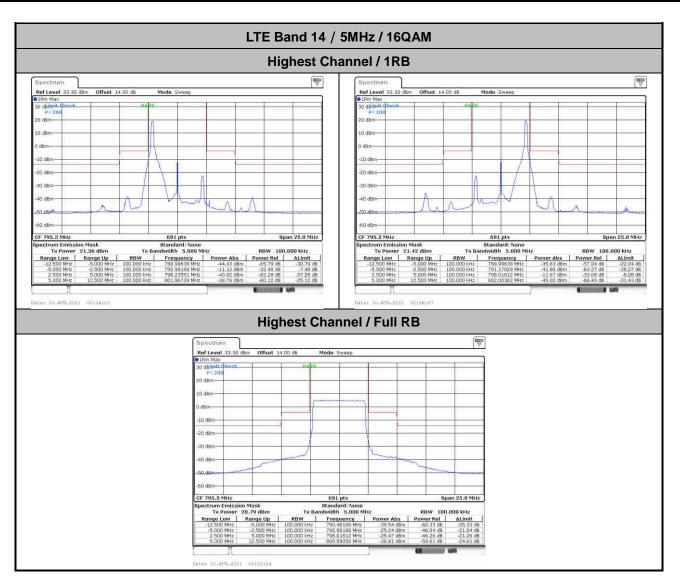




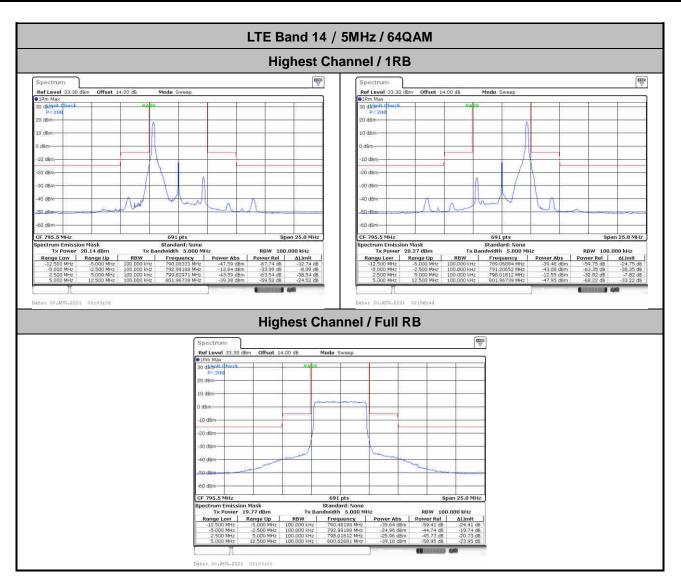




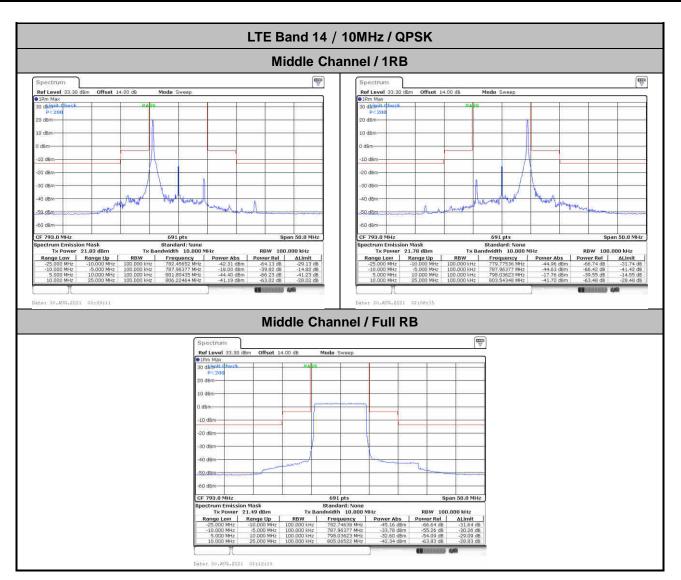




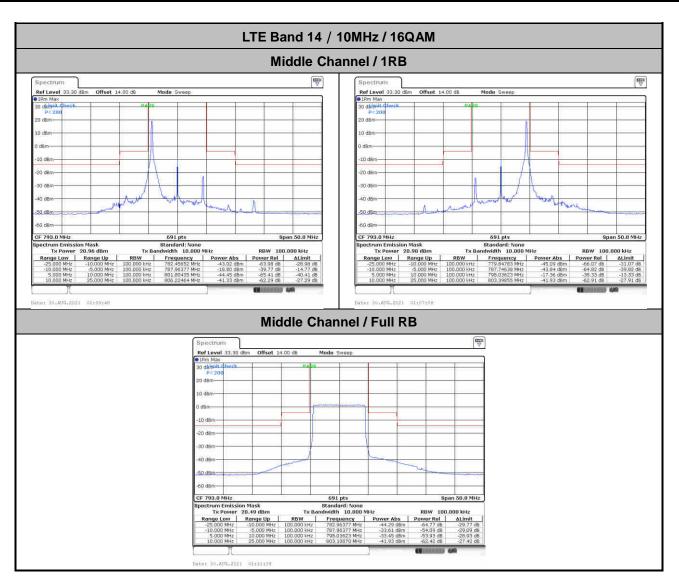




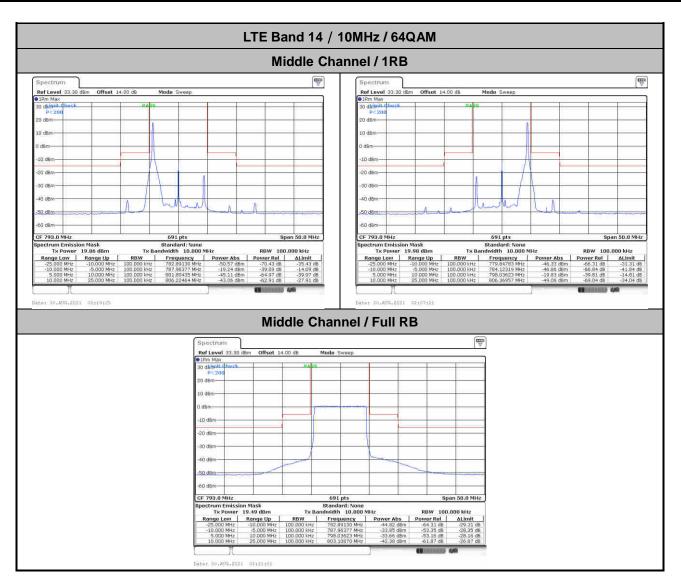














## Frequency Stability

Test C	Conditions	LTE Band 14 (QPSK) / Middle Channel			
		BW 10MHz	Note 2.		
Temperature (°C)	Voltage (Volt)	Deviation (ppm)	Result		
50	Normal Voltage	0.0019			
40	Normal Voltage	0.0026			
30	Normal Voltage	0.0033			
20(Ref.)	Normal Voltage	0.0000			
10	Normal Voltage	0.0014			
0	Normal Voltage	0.0015			
-10	Normal Voltage	0.0024	PASS		
-20	Normal Voltage	0.0029			
-30	Normal Voltage	0.0009			
20	Maximum Voltage	0.0003			
20	Normal Voltage	0.0000			
20	Battery End Point	0.0006			

#### Note:

- 1. Normal Voltage =3.8 V. ; Battery End Point (BEP) =3.6 V. ; Maximum Voltage =4.4 V.
- 2. Note: The frequency fundamental emissions stay within the authorized frequency block.



## Appendix B. Test Results of Radiated Test

# Field Strength of Spurious Radiated

LTE Band 14 / QPSK / RB Size 1 Offset 0										
Bandwidth	Frequency (MHz)	ERP ( dBm )	Limit ( dBm )	Over Limit ( dB )	SPA Reading (dBm)	S.G. Power ( dBm )	TX Cable loss ( dB )	TX Antenna Gain (dBi)	Polarization (H/V)	
5MHz	1581.5	-63.85	-42.15	-21.70	-75.17	-67.10	4.00	9.40	Н	
	2372.25	-57.93	-13	-44.93	-75.90	-61.50	4.88	10.60	Н	
	3163	-56.89	-13	-43.89	-77.06	-61.82	5.52	12.60	Н	
	1581.5	-63.59	-42.15	-21.44	-75.48	-66.84	4.00	9.40	V	
	2372.25	-57.82	-13	-44.82	-76.33	-61.39	4.88	10.60	V	
	3163	-55.20	-13	-42.20	-77.30	-60.13	5.52	12.60	V	
	1577	-64.06	-42.15	-21.91	-75.36	-67.31	4.00	9.40	Н	
10MHz	2365.5	-58.08	-13	-45.08	-76.05	-61.65	4.88	10.60	Н	
	3154	-56.94	-13	-43.94	-77.11	-61.87	5.52	12.60	Н	
	1577	-63.72	-42.15	-21.57	-75.59	-66.97	4.00	9.40	V	
	2365.5	-57.80	-13	-44.80	-76.23	-61.37	4.88	10.60	V	
	3154	-55.29	-13	-42.29	-77.39	-60.22	5.52	12.60	V	
Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.										
Test Result					PASS					