

Report No.: FG0D2942-04D

: 02



# **FCC RADIO TEST REPORT**

FCC ID : A4RG9S9B

Equipment : Phone Model Name : G9S9B

Applicant : Google LLC

1600 Amphitheatre Parkway,

Mountain View, California, 94043 USA

Standard : FCC 47 CFR Part 2, Part 27(D)

The product was received on May 27, 2021 and testing was started from Jun. 03, 2021 and completed on Jul. 09, 2021. We, Sporton International Inc. EMC & Wireless Communications Laboratory, would like to declare that the tested sample has been evaluated in accordance with the test procedures given in ANSI / TIA-603-E and has been in 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. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.

Lunis Wu

Approved by: Louis Wu

Sporton International Inc. EMC & Wireless Communications Laboratory

No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)

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Report Template No.: BU5-FGLTE27D Version 2.4

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# History of this test report

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Report No.	Version	Description	Issued Date
FG0D2942-04D	01	Initial issue of report	Aug. 06, 2021
FG0D2942-04D	02	Revise Typo	Aug. 18, 2021

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# **Summary of Test Result**

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Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.2	§2.1046	Conducted Output Power	Reporting only	-
3.3	-	Peak-to-Average Ratio	Reporting only	-
3.4	§27.50 (a)(3)	Effective Isotropic Radiated Power	Pass	-
3.5	§2.1049 Occupied Bandwidth		Reporting only	-
3.6	§2.1051 §27.53 (a)(4)	Conducted Band Edge Measurement	Pass	-
3.7	§2.1051 §27.53 (a)(4)	Conducted Spurious Emission	Pass	-
3.8	§2.1055 §27.54	Frequency Stability Temperature & Voltage	Pass	-
4.2	§2.1053 §27.53 (a)(4)	Radiated Spurious Emission	Pass	Under limit 4.81 dB at 6916.000 MHz for Primary Antenna Under limit 3.07 dB at 6918.000 MHz for ASDIV Antenna

#### Declaration of Conformity:

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

#### **Comments and Explanations:**

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

Reviewed by: William Chen Report Producer: Tina Chuang

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# 1 General Description

# 1.1 Product Feature of Equipment Under Test

Product Feature							
Equipment	Phone						
Model Name	G9S9B						
FCC ID	A4RG9S9B						
EUT supports Radios application	GSM/EGPRS/WCDMA/HSPA/LTE/5G NR/NFC/ GNSS/WPC/WPT WLAN 11b/g/n HT20 WLAN 11a/n HT20/HT40 WLAN 11ac VHT20/VHT40/VHT80/VHT160 WLAN 11ax HE20/HE40/HE80/HE160 Bluetooth BR/EDR/LE						

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Remark: The above EUT's information was declared by manufacturer.

EL	IT Information List
S/N	Performed Test Item
14191FDF60000A	Conducted Measurement EIRP
15211FDF600057	Radiated Spurious Emission

# 1.2 Product Specification of Equipment Under Test

Product Specification subjective to this standard						
Tx Frequency	2307.5 MHz ~ 2312.5 MHz					
Rx Frequency	2352.5 MHz ~ 2357.5 MHz					
Bandwidth	5MHz / 10MHz					
Maximum Output Power to Antenna	<primary antenna="">: 24.24 dBm</primary>					
Maximum Output Power to Antenna	<asdiv antenna="">: 23.72 dBm</asdiv>					
Antenna Type	<primary antenna="">: ILA Antenna type</primary>					
Antenna Type	<a>ASDIV Antenna&gt;: ILA Antenna type</a>					
Type of Modulation	QPSK / 16QAM / 64QAM / 256QAM					

#### <Primary Antenna>

Radio Tech	Band Number	Antenna name	Gain
LTE	B30	Ant 2	-1.7

#### <ASDIV Antenna>

Radio Tech	Band Number	Antenna name	Gain
LTE	B30	Ant 0	-1.4

**Remark:** The above EUT's information was declared by manufacturer. Please refer to Comments and Explanations in report summary.

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# 1.3 Modification of EUT

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

# 1.4 Testing Site

Test Site	Sporton International Inc. EMC & Wireless Communications Laboratory					
Test Site Location	No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.) TEL: +886-3-327-3456 FAX: +886-3-328-4978					
Test Site No.	Sporton Site No.					
rest one ito.	TH03-HY					
Test Engineer	Benjamin Lin					
Temperature	23.5~25.2 ℃					
Relative Humidity	49.4~52.3 %					

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Test Site	Sporton International Inc. Wensan Laboratory				
	No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist.,				
Took Cita I continu	Taoyuan City 333010, Taiwan (R.O.C.)				
Test Site Location	TEL: +886-3-327-0868				
	FAX: +886-3-327-0855				
Test Site No.	Sporton Site No.				
rest site No.	03CH12-HY (TAF Code: 3786)				
Test Engineer	Jack Cheng, Lance Chiang and Chuan Chu				
Temperature	<b>22</b> .6~26.2°ℂ				
Relative Humidity	56.6~68.2%				
Remark	The Radiated Spurious Emission test item subcontracted to Sporton International Inc. Wensan Laboratory.				

Note: The test site complies with ANSI C63.4 2014 requirement.

FCC Designation No.: TW1190 and TW3786

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# 1.5 Applied Standards

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

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- + ANSI C63.26-2015
- FCC 47 CFR Part 2, Part 27(D)
- ANSI / TIA-603-E
- FCC KDB 971168 Power Meas License Digital Systems D01 v03r01
- FCC KDB 412172 D01 Determining ERP and EIRP v01r01
- FCC KDB 414788 D01 Radiated Test Site v01r01

#### Remark:

- 1. All test items were verified and recorded according to the standards and without any deviation during the test.
- 2. The TAF code is not including all the FCC KDB listed without accreditation.

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#### **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.

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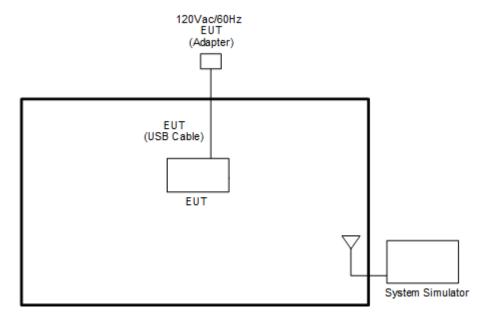
The measured emission level of the EUT was maximized by rotating the EUT on a turntable, adjusting the orientation of the EUT and EUT antenna in three orthogonal axis (X: flat, Y: portrait, Z: landscape), and adjusting the measurement antenna orientation, following C63.26 exploratory test procedures and find <Primary Antenna>: Y Plane with Adapter; <ASDIV Antenna>: Y Plane with Earphone as worst plane.

_		Bandwidth (MHz)			Modulation				RB#			Test Channel					
Test Items	Band	1.4	3	5	10	15	20	QPSK	16QAM	64QAM	256QAM	1	Half	Full	L	М	н
Max. Output Power	30	-	-	v	v	-	-	v	v	v	v	٧	v	v	v	v	v
Peak-to-Avera ge Ratio	30	-	-		v	-	-	v	v	v	v			v		v	
E.I.R.P	30	-	-	٧	v	-		v	v	v	v		1	Max. F	ower		
26dB and 99% Bandwidth	30	-	-	v	v	-	-	v	v	v	v			v		v	
Conducted Band Edge	30	-	-	v	v	-	-	v	v	v	v	٧		v	v		v
Conducted Spurious Emission	30	-		v	v	-	-	v				٧			v	v	<
Frequency Stability	30	-	-		v	-	-	v						v		v	
Radiated Spurious Emission	30							Worst	Case						v	v	v
<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>The device is investigated from 30MHz to 10 times of fundamental signal for radiated spurious emission test ur different RB size/offset and modulations in exploratory test. Subsequently, only the worst case emissions are reported.</li> <li>During the prelimilary test, both charging modes (Adapter mode and WPC Charging mode) were verified. It is determined that the adaptor mode is the worst case for official test.</li> </ol>					are	der											

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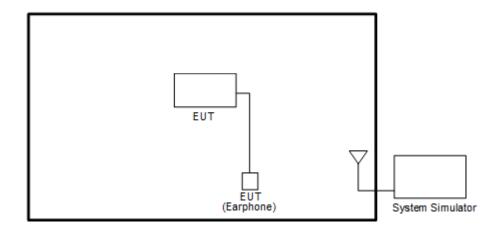
# 2.2 Connection Diagram of Test System

<EUT with Adapter>



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<EUT with Earphone>



# 2.3 Support Unit used in test configuration and system

lt	em	Equipment	ipment Brand Name Model No.		FCC ID	Data Cable	Power Cord
	1.	System Simulator	Anritsu	MT8820C	N/A	N/A	Unshielded, 1.8 m

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# 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.

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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 4.2 dB and 10dB attenuator.

#### Example:

Offset(dB) = RF cable loss(dB) + attenuator factor(dB). = 4.2 + 10 = 14.2 (dB)

# 2.5 Frequency List of Low/Middle/High Channels

	LTE Band 30 Channel and Frequency List										
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest							
10	Channel	-	27710	-							
10	Frequency	-	2310	-							
F	Channel	27685	27710	27735							
5	Frequency	2307.5	2310	2312.5							

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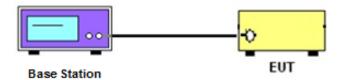
# 3 Conducted Test Items

# 3.1 Measuring Instruments

See list of measuring instruments of this test report.

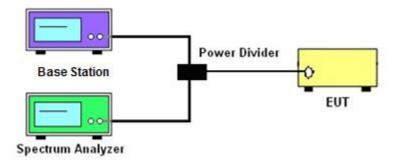
#### 3.1.1 Test Setup

#### 3.1.2 Conducted Output Power

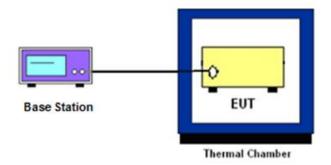


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# 3.1.3 Peak-to-Average Ratio, Occupied Bandwidth, 26dB Bandwidth ,Band-Edge and Conducted Spurious Emission



#### 3.1.4 Frequency Stability



### 3.1.5 Test Result of Conducted Test

Please refer to Appendix A.

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### 3.2 Conducted Output Power Measurement

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

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.

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#### 3.2.2 Test Procedures

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

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### 3.3 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.

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#### 3.3.2 Test Procedures

The testing follows ANSI C63.26-2015 Section 5.2.6

- 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.

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### 3.4 Effective Isotropic Radiated Power

#### 3.4.1 Description of EIRP Power

For mobile and portable stations transmitting in the 2305-2315 MHz band or the 2350-2360 MHz band, the average EIRP must not exceed 50 milliwatts within any 1 megahertz of authorized bandwidth, except that for mobile and portable stations compliant with 3GPP LTE standards or another advanced mobile broadband protocol that avoids concentrating energy at the edge of the operating band the average EIRP must not exceed 250 milliwatts within any 5 megahertz of authorized bandwidth but may exceed 50 milliwatts within any 1 megahertz of authorized bandwidth. For mobile and portable stations using time division duplexing (TDD) technology, the duty cycle must not exceed 38 percent in the 2305-2315 MHz and 2350-2360 MHz bands. Mobile and portable stations using FDD technology are restricted to transmitting in the 2305-2315 MHz band. Power averaging shall not include intervals in which the transmitter is off.

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**Remark:** EIRP use worst case measure the total power to cover per 5MHz Power.

According to KDB 412172 D01 Power Approach,

 $EIRP = P_T + G_T - L_C$ , 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

#### 3.4.2 Test Procedures

The testing follows ANSI C63.26-2015 Section 5.2.4.5

1. Determine the EIRP by adding the effective antenna gain to the adjusted power level

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### 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.

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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.
- 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.
- Determine the reference value: Set the EUT to transmit a modulated signal. Allow the trace to stabilize. Set the spectrum analyzer marker to the highest level of the displayed trace.
   (this is the reference value)
- 6. Determine the "-26 dB down amplitude" as equal to (Reference Value X).
- 7. Place two markers, one at the lowest and the other at the highest frequency of the envelope of the spectral display such that each marker is at or slightly below the "–X dB down amplitude" determined in step 6. If a marker is below this "-X dB down amplitude" value it shall be placed as close as possible to this value. The OBW is the positive frequency difference between the two markers.
- 8. Use the 99 % power bandwidth function of the spectrum analyzer and report the measured bandwidth.

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### 3.6 Conducted Band Edge

#### 3.6.1 Description of Conducted Band Edge Measurement

27.53 (a)(4)

For mobile and portable stations operating in the 2305-2315 MHz and 2350-2360 MHz bands:

(i) By a factor of not less than: 43 + 10 log (P) dB on all frequencies between 2305 and 2320 MHz and on all frequencies between 2345 and 2360 MHz that are outside the licensed band(s) of operation, not less than 55 + 10 log (P) dB on all frequencies between 2320 and 2324 MHz and on all frequencies between 2341 and 2345 MHz, not less than 61 + 10 log (P) dB on all frequencies between 2324 and 2328 MHz and on all frequencies between 2337 and 2341 MHz, and not less than 67 + 10 log (P) dB on all frequencies between 2328 and 2337 MHz.

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(ii) By a factor of not less than 43 + 10 log (P) dB on all frequencies between 2300 and 2305 MHz, 55 + 10 log (P) dB on all frequencies between 2296 and 2300 MHz, 61 + 10 log (P) dB on all frequencies between 2292 and 2296 MHz, 67 + 10 log (P) dB on all frequencies between 2288 and 2292 MHz, and 70 + 10 log (P) dB below 2288 MHz.

(iii) By a factor of not less than 43 + 10 log (P) dB on all frequencies between 2360 and 2365 MHz, and not less than 70 + 10 log (P) dB above 2365 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.
- 5. Set spectrum analyzer with RMS detector.
- The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
- 7. Checked that all the results comply with the emission limit line.

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

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### 3.7 Conducted Spurious Emission

#### 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 70 + 10 log (P) dB.

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It is measured by means of a calibrated spectrum analyzer and scanned from 9 kHz up to a frequency including its 10<sup>th</sup> harmonic.

#### 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.
- 2. 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 derived from 70 + 10log(P)dB below the transmitter power P(Watts)

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### 3.8 Frequency Stability

#### 3.8.1 Description of Frequency Stability Measurement

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

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#### 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 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 measured at the input to the EUT.
- 3. The variation in frequency was measured for the worst case.

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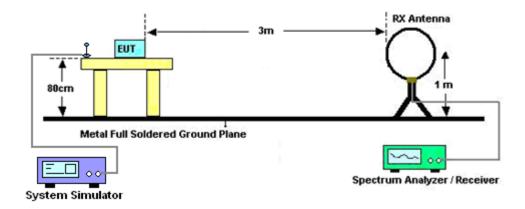
### 4 Radiated Test Items

# 4.1 Measuring Instruments

See list of measuring instruments of this test report.

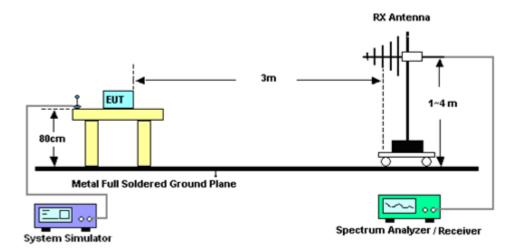
### 4.1.1 Test Setup

#### For radiated test below 30MHz



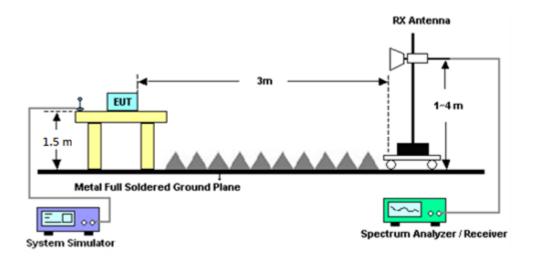
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#### For radiated test from 30MHz to 1GHz



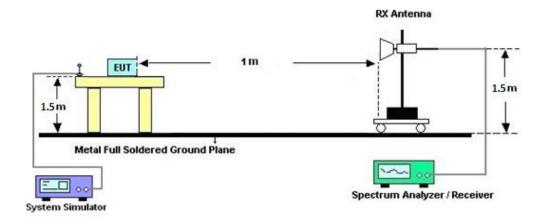
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#### For radiated test from 1GHz to 18GHz



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#### For radiated test above 18GHz



#### 4.1.2 Test Result of Radiated Test

Please refer to Appendix B.

#### Note:

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.

There is adequate comparison measurement of both open-field test site and alternative test site - semi-Anechoic chamber according to 414788 D01 Radiated Test Site v01r01, and the result came out very similar.

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### 4.2 Radiated Spurious Emission Measurement

#### 4.2.1 Description of Radiated Spurious Emission Measurement

The radiated spurious emission was measured by substitution method according to ANSI / TIA-603-E The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least 70 + 10 log (P) dB.

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

#### 4.2.2 Test Procedures

The testing follows FCC KDB 971168 D01 v03r01 Section 7 and ANSI / TIA-603-E Section 2.2.12.

- 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.
- 7. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
- 8. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.

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

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

The limit line is derived from 70 + 10log(P)dB below the transmitter power P(Watts)

- = P(W)- [70 + 10log(P)] (dB)
- = [30 + 10log(P)] (dBm) [70 + 10log(P)] (dB)
- = -40dBm.

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# 5 List of Measuring Equipment

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100315	9 kHz~30 MHz	Jan. 04, 2021	Jun. 16, 2021~ Jul. 09, 2021	Jan. 03, 2022	Radiation (03CH12-HY)
Bilog Antenna	TESEQ	CBL 6111D & 00800N1D01 N-06	37059 & 01	30MHz~1GHz	Oct. 11, 2020	Jun. 16, 2021~ Jul. 09, 2021	Oct. 10, 2021	Radiation (03CH12-HY)
Horn Antenna	SCHWARZBE CK	BBHA 9120 D	9120D-132 8	1GHz~18GHz	Nov. 23, 2020	Jun. 16, 2021~ Jul. 09, 2021	Nov. 22, 2021	Radiation (03CH12-HY)
Horn Antenna	SCHWARZBE CK	BBHA 9120 D	9120D-121 2	1GHz~18GHz	May 05, 2021	Jun. 16, 2021~ Jul. 09, 2021	May 04, 2022	Radiation (03CH12-HY)
SHF-EHF Horn Antenna	SCHWARZBE CK	BBHA 9170	00993	18GHz~40GHz	Nov. 19, 2020	Jun. 16, 2021~ Jul. 09, 2021	Nov. 18, 2021	Radiation (03CH12-HY)
SHF-EHF Horn Antenna	SCHWARZBE CK	BBHA 9170	BBHA9170 576	18GHz~40GHz	May 21, 2021	Jun. 16, 2021~ Jul. 09, 2021	May 20, 2022	Radiation (03CH12-HY)
Preamplifier	COM-POWER	PA-103	161075	10MHz~1GHz	Mar. 24, 2021	Jun. 16, 2021~ Jul. 09, 2021	Mar. 23, 2022	Radiation (03CH12-HY)
Preamplifier	Keysight	83017A	MY572801 20	1GHz~26.5GHz	Jul. 20, 2020	Jun. 16, 2021~ Jul. 09, 2021	Jul. 19, 2021	Radiation (03CH12-HY)
Preamplifier	E-INSTRUME NT TECH LTD.	ERA-100M-18 G-56-01-A70	EC190024 9	1GHz-18GHz	Dec. 05, 2020	Jun. 16, 2021~ Jul. 09, 2021	Dec. 04, 2021	Radiation (03CH12-HY)
Preamplifier	EMEC	EM18G40G	060715	18GHz~40GHz	Dec. 11, 2020	Jun. 16, 2021~ Jul. 09, 2021	Dec. 10, 2021	Radiation (03CH12-HY)
Spectrum Analyzer	Agilent	N9010A	MY534701 18	10Hz~44GHz	Jan. 15, 2021	Jun. 16, 2021~ Jul. 09, 2021	Jan. 14, 2022	Radiation (03CH12-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY9837/4 PE	9kHz~30MHz	Mar. 11, 2021	Jun. 16, 2021~ Jul. 09, 2021	Mar. 10, 2022	Radiation (03CH12-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 126E	0058/126E	30MHz~18GHz	Dec. 11, 2020	Jun. 16, 2021~ Jul. 09, 2021	Dec. 10, 2021	Radiation (03CH12-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	505134/2	30MHz~40GHz	Feb. 22, 2021	Jun. 16, 2021~ Jul. 09, 2021	Feb. 21, 2022	Radiation (03CH12-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	800740/2	30MHz~40GHz	Feb. 22, 2021	Jun. 16, 2021~ Jul. 09, 2021	Feb. 21, 2022	Radiation (03CH12-HY)
Antenna Mast	EMEC	AM-BS-4500- B	N/A	1m~4m	N/A	Jun. 16, 2021~ Jul. 09, 2021	N/A	Radiation (03CH12-HY)
Turn Table	EMEC	TT2000	N/A	0~360 Degree	N/A	Jun. 16, 2021~ Jul. 09, 2021	N/A	Radiation (03CH12-HY)
Software	Audix	E3 6.2009-8-24	RK-00098 9	N/A	N/A	Jun. 16, 2021~ Jul. 09, 2021	N/A	Radiation (03CH12-HY)
Filter	Wainwright	WLKS1200-1 2SS	SN2	1.2GHz Low Pass Filter	Mar. 17, 2021	Jun. 16, 2021~ Jul. 09, 2021	Mar. 16, 2022	Radiation (03CH12-HY)
Filter	Wainwright	WHKX12-270 0-3000-18000 -60ST	SN2	3GHz High Pass Filter	Jul. 14, 2020	Jun. 16, 2021~ Jul. 09, 2021	Jul. 13, 2021	Radiation (03CH12-HY)
Filter	Wainwright	WHKX8-5872. 5-6750-18000 -40ST	SN2	6.75GHz High Pass Filter	Mar. 17, 2021	Jun. 16, 2021~ Jul. 09, 2021	Mar. 16, 2022	Radiation (03CH12-HY)

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Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Base Station (Measure)	Anritsu	MT8821C	626200253 41	N/A	Oct. 06, 2020	Jun. 03, 2021~ Jul. 08, 2021	Oct. 05, 2021	Conducted (TH03-HY)
Spectrum Analyzer	Rohde & Schwarz	FSV40	101397	10Hz~40GHz	Nov. 27, 2020	Jun. 03, 2021~ Jul. 08, 2021	Nov. 26, 2021	Conducted (TH03-HY)
Thermal Chamber	Ten Billion	TTH-D3SP	TBN-9307 01	N/A	Aug. 05, 2020	Jun. 03, 2021~ Jul. 08, 2021	Aug. 04, 2021	Conducted (TH03-HY)
Programmable Power Supply	GW Instek	PSS-2005	EL890094	1V~20V 0.5A~5A	Oct. 05, 2020	Jun. 03, 2021~ Jul. 08, 2021	Oct. 04, 2021	Conducted (TH03-HY)
Coupler	Warison	20dB 25W SMA Directional Coupler	#B	1-18GHz	Jan. 09, 2021	Jun. 03, 2021~ Jul. 08, 2021	Jan. 08, 2022	Conducted (TH03-HY)

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# 6 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	3.10 dB

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

Measuring Uncertainty for a Level of	3.39 dB
Confidence of 95% (U = 2Uc(y))	3.39 GB

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

Measuring Uncertainty for a Level of	4.34 dB
Confidence of 95% (U = 2Uc(y))	4.34 UB

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

# Conducted Output Power(Average power &EIRP)

<Primary Antenna>

	LTE I		laximum A	verage Po	wer [dBm]	(GT - LC =	-1.7 dB)	
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest	EIRP (dBm)	EIRP (W)
10	1	0			24.24			
10	1	25			24.08			
10	1	49			24.13			
10	25	0	QPSK		23.13		22.54	0.1795
10	25	12			23.12			
10	25	25			23.18			
10	50	0			23.25			
10	1	0			23.60			
10	1	25			23.38			
10	1	49			23.44			
10	25	0	16-QAM		22.30		21.90	0.1549
10	25	12			22.28			
10	25	25			22.45			
10	50	0		_	22.56	_		
10	1	0		_	22.58	_		
10	1	25			22.42			
10	1	49			22.47			
10	25	0	64-QAM		21.49		20.88	0.1225
10	25	12			21.50			
10	25	25			21.49			
10	50	0			21.54			
10	1	0			19.49			
10	1	25			19.36			
10	1	49			19.34			
10	25	0	256-QAM		19.59		17.91	0.0618
10	25	12			19.55			
10	25	25			19.51			
10	50	0			19.61			
Limit	EIRP	< 250mW/	5MHz		Result		Pa	SS

	LTE	Band 30 N	laximum A	verage Po	wer [dBm]	(GT - LC =	= -1.7 dB)	
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest	EIRP (dBm)	EIRP (W)
5	1	0		24.17	24.23	24.22		
5	1	12		24.15	24.20	24.21		
5	1	24		24.06	24.19	24.20	]	0.1791
5	12	0	QPSK	23.27	23.31	23.30	22.53	
5	12	7		23.31	23.31	23.29		
5	12	13		23.31	23.30	23.24		i
5	25	0		23.35	23.31	23.31		
5	1	0		23.57	23.60	23.58		
5	1	12		23.66	23.67	23.54		0.1574
5	1	24		23.55	23.50	23.43	21.97	
5	12	0	16-QAM	22.32	22.30	22.28		
5	12	7		22.51	22.48	22.37		
5	12	13		22.48	22.46	22.44		
5	25	0		22.53	22.48	22.48		
5	1	0		22.48	22.51	22.56		
5	1	12		22.63	22.52	22.52		
5	1	24		22.52	22.44	22.42		
5	12	0	64-QAM	21.52	21.49	21.48	20.93	0.1239
5	12	7		21.53	21.50	21.45		
5	12	13		21.52	21.46	21.42		
5	25	0		21.56	21.51	21.49		
5	1	0		19.51	19.48	19.48		
5	1	12		19.47	19.44	19.36		
5	1	24		19.48	19.46	19.35		
5	12	0	256-QAM	19.50	19.56	19.54	17.88	0.0614
5	12	7		19.50	19.51	19.49		
5	12	13		19.52	19.49	19.45		
5	25	0		19.58	19.55	19.53		
Limit	EIRP	< 250mW/	5MHz		Result		Pa	ISS

# <ASDIV Antenna>

	LTE I		laximum A	verage Po	wer [dBm]	(GT - LC =	= -1.4 dB)		
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest	EIRP (dBm)	EIRP (W)	
10	1	0			23.72				
10	1	25			23.52				
10	1	49			23.62				
10	25	0	QPSK		22.75		22.32	0.1706	
10	25	12			22.75				
10	25	25			22.75				
10	50	0			22.77				
10	1	0			23.03				
10	1	25			22.84				
10	1	49			22.83				
10	25	0	16-QAM		21.79		21.63	0.1455	
10	25	12			21.77				
10	25	25			21.74				
10	50	0		_	21.78	_			
10	1	0		_	21.90	<u>-</u>			
10	1	25			21.78				
10	1	49			21.76				
10	25	0	64-QAM		20.80		20.50	0.1122	
10	25	12			20.78				
10	25	25			20.77				
10	50	0			20.80				
10	1	0			19.05				
10	1	25			19.11				
10	1	49			19.04				
10	25	0	256-QAM		19.04		17.71	0.0590	
10	25	12			18.97				
10	25	25			18.95				
10	50	0			18.98				
Limit	EIRP	< 250mW/	5MHz		Result		Pass		

	LTE	Band 30 N	laximum A	verage Po	wer [dBm]	(GT - LC =	= -1.4 dB)	
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest	EIRP (dBm)	EIRP (W)
5	1	0		23.56	23.57	23.47		
5	1	12		23.34	23.31	23.31		
5	1	24		23.32	23.31	23.30		0.1648
5	12	0	QPSK	22.37	22.38	22.37	22.17	
5	12	7		22.42	22.36	22.36		
5	12	13		22.41	22.35	22.34		
5	25	0		22.46	22.43	22.37		
5	1	0		22.75	22.66	22.72		
5	1	12		22.68	22.61	22.61	21.35	0.1365
5	1	24		22.63	22.57	22.56		
5	12	0	16-QAM	21.58	21.57	21.42		
5	12	7		21.68	21.60	21.59		
5	12	13		21.77	21.63	21.54		
5	25	0		21.81	21.73	21.58		
5	1	0		21.89	21.89	21.70		0.1119
5	1	12		21.89	21.85	21.74		
5	1	24		21.86	21.83	21.82		
5	12	0	64-QAM	20.76	20.77	20.74	20.49	
5	12	7		20.77	20.73	20.71		
5	12	13		20.74	20.74	20.71		
5	25	0		20.80	20.80	20.77		
5	1	0		19.02	19.05	19.12		
5	1	12		19.03	19.06	19.05		
5	1	24		18.96	19.04	18.96		
5	12	0	256-QAM	18.99	19.00	19.01	17.72	0.0592
5	12	7		18.94	18.96	18.98		
5	12	13		18.95	18.94	18.95		
5	25	0		18.97	18.95	18.96		
Limit	EIRP	< 250mW/	5MHz		Result		Pa	ISS

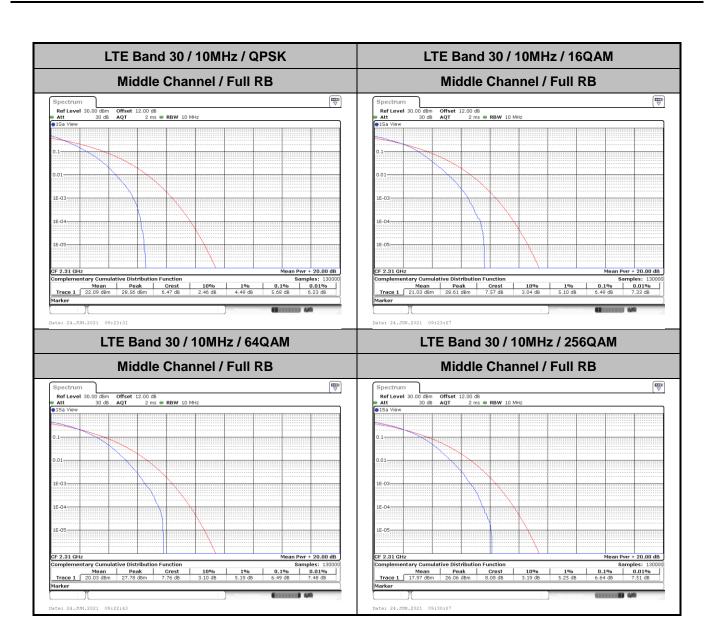
# LTE Band 30

# Peak-to-Average Ratio

Mode		LTE Band 30 / 10MHz								
Mod.	QPSK	16QAM	64QAM	256QAM	Limit: 13dB					
RB Size	Full RB	Full RB	Full RB	Full RB	Result					
Middle CH	5.68	6.49	6.49	6.64	PASS					

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# 26dB Bandwidth

Mode		LTE Band 30 : 26dB BW(MHz)										
BW	1.4MHz		3MHz		5N	5MHz		10MHz		ИHz	20MHz	
Mod.	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Middle CH	-	-	-	-	5.16	5.14	10.13	9.91	-	-	-	-
Mode					LTE Ba	and 30 :	26dB BV	V(MHz)				
BW	1.4	ИНz	3M	lHz	5MHz 10MHz		ЛHz	15MHz		20MHz		
Mod.	64QAM	256 QAM	64QAM	256 QAM	64QAM	256 QAM	64QAM	256 QAM	64QAM	256 QAM	64QAM	256 QAM
Middle CH	-	-	•	-	5.10	4.92	10.73	10.23	•	-	-	-

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LTE Band 30 Middle Channel / 5MHz / QPSK Middle Channel / 5MHz / 16QAM Ref Level 30.00 dBm Offset 12.00 dB ■ RBW 100 kHz 
■ Att 30 dB SWT 19 μs ■ VBW 300 kHz Mode Auto FFT 
SGL Count 100/100 
■ 19t Max 16.13 dB 15.37 dBr 16.13 dBi 2.30833200 GF 26.00 d 5.155000000 MF Q factor 447 450. -10 dBm--30 dBm-50 dBm 
 X-value
 Y-value
 Function

 2.308932 GHz
 16.13 dBm
 nd8 down

 2.307313 GHz
 -9.90 dBm
 nd8

 2.312468 GHz
 -9.83 dBm
 Q factor

 X-value
 Y-value
 Function

 2.311628 GHz
 15.37 dbm
 ndb down

 2.307393 GHz
 -10.67 dbm
 ndb

 2.312527 GHz
 -10.53 dbm
 Q factor
 Type Ref Trc Middle Channel / 10MHz / QPSK Middle Channel / 10MHz / 16QAM **T** Count 100/100 17.82 dBr 2.3134770 GH 26.00 d 10.130000000 MH 228. -20 dBm 40 dBm-CF 2.31 GH Span 20.0 MHz Span 20.0 MHz X-value 2.313477 GHz 2.305085 GHz 2.315215 GHz X-value 2.310979 GHz 2.305145 GHz 2.315055 GHz Type | Ref | Trc | Function m ndB down Function ndB down Date: 24.JUN.2021 09:21:04 Middle Channel / 5MHz / 64QAM Middle Channel / 10MHz / 64QAM Ref Level 30.0 Att Ref Level 30.00 Offset 12.00 dB ● RBW 300 kHz SWT 12.6 µs ● VBW 1 MHz Mode Auto FFT Att 30 dB
 SGL Count 100/100
 1Pk Max 14.16 dB 2.31192800 GF 14.62 dBr 2.3074230 GH dBm--10 dBm 30 dBm CF 2.31 GHz Function Result 10.729 MHz 26.00 dB 215.1 Function Result 5.095 MHz 
 X-value
 Y-value
 Function

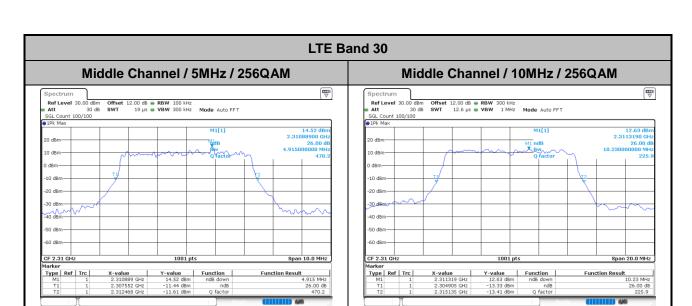
 2.311928 GHz
 14.16 dBm
 ndB down

 Type
 Ref
 Trc
 X-value
 Y-value
 Function

 M1
 1
 2.307423 GHz
 14.62 dBm
 ndB down
 Type | Ref | Trc |

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Date: 24.JUN.2021 09:24:43

# **Occupied Bandwidth**

Mode	LTE Band 30 : 99%OBW(MHz)											
BW	1.4MHz		3MHz		5MHz		10MHz		15MHz		20MHz	
Mod.	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Middle CH	-	-	-	-	4.51	4.48	9.03	9.01	-	-	-	-
Mode	LTE Band 30 : 99%OBW(MHz)											
BW	1.4MHz		3MHz		5MHz		10MHz		15MHz		20MHz	
Mod.	64QAM	256 QAM	64QAM	256 QAM	64QAM	256 QAM	64QAM	256 QAM	64QAM	256 QAM	64QAM	256 QAM
Middle CH	-	-	•	-	4.50	4.52	9.03	9.15	-	-	-	-

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LTE Band 30 Middle Channel / 5MHz / QPSK Middle Channel / 5MHz / 16QAM Ref Level 30.00 dBm Offset 12.00 dB RBW 100 kHz
Att 30 dB SWT 19 µs WBW 300 kHz Mode Auto FFT

61Pk Max 14.64 dBr 10 dBm -10 dBm--10 dBm -20 dBm--30 dBm--30,dBm-40 dBm -50 dBm-50 dBm -60 dBm -60 dBm- 
 X-value
 Y-value
 Function

 2.309121 GHz
 15.60 dBm
 Coc Bw

 2.3077522 GHz
 8.84 dBm
 Occ Bw

 2.3122577 GHz
 10.30 dBm
 Type Ref Trc Middle Channel / 10MHz / QPSK Middle Channel / 10MHz / 16QAM Count 100/100 dBm--20 dBm-30 dBm— 40 dBm 40 dBm -50 dBm CF 2.31 GHz 1001 pts Span 20.0 MHz Span 20.0 MHz 1001 pts X-value Y 2.308541 GHz 2.3055045 GHz 2.3145355 GHz | Y-value | Function |
| 2 | 17.27 dBm |
|2 | 11.21 dBm | Occ Bw |
|2 | 10.58 dBm | X-value 2.307762 GHz 2.3055045 GHz 2.3145155 GHz Type | Ref | Trc | Function Result Function **Function Result** 9.030969031 MHz 9.010989011 MHz Date: 24.JUN.2021 09:20:21 Middle Channel / 5MHz / 64QAM Middle Channel / 10MHz / 64QAM Ref Level 30.00 dBm Offset 12.00 dB ● RBW 300 kHz ■ Att 30 db SWT 12.6 μs ● VBW 1 MHz Mode Auto FFT SGL Count 100/100 ■ IPk Max Ref Level 30.0 Att 15.75 dBn 2.3120380 GHz 9.030969024 M1[1] 13.29 dB 2.31013000 GF 4.495504496 MF M1[1] 20 dBm dBm--10 dBm 30 dBm--40 dBn -50 dBm--50 dBm CF 2.31 GHz 
 Type
 Ref
 Trc
 X-value
 Y-value
 Function

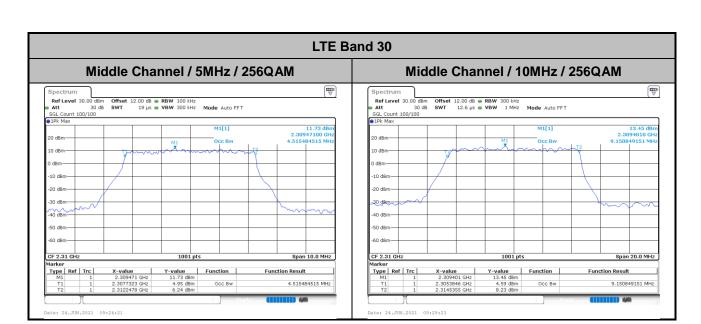
 M1
 1
 2,31013 GHz
 13.29 dBm

 Type
 Ref
 Trc
 X-value
 Y-value
 Function

 M1
 1
 2.312038 GHz
 15.75 dBm
 Function Result 8.03 dBm Occ Bw 7.79 dBm 9.75 dBm Occ Bw 8.94 dBm 4.495504496 MHz 9.030969031 MHz

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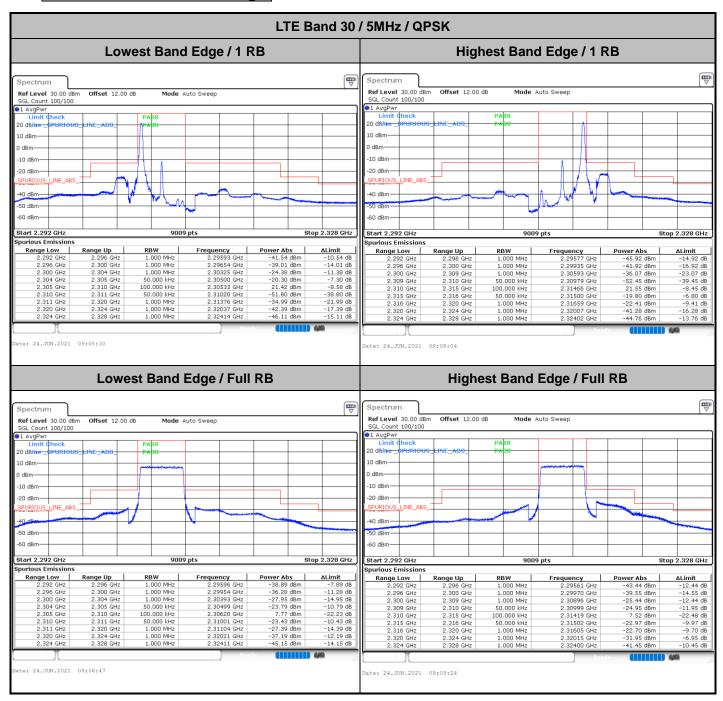
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### **Conducted Band Edge**



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LTE Band 30 / 5MHz / 16QAM Lowest Band Edge / 1 RB Highest Band Edge / 1 RB Spectrum Spectrum Offset 12.00 dB Mode Auto Sweep Ref Level 30.00 dBm SGL Count 100/100 Offset 12.00 dB Mode Auto Sweep Ref Level 30.00 dBm SGL Count 100/100 1 AvgPwr Limit Check 1 AvgPv 20 dBime 10 damdBm -10 dBm -10 dBm -20 dBm--20 dBm-40 dBm-40 dBm-50 d8m-60 dBm-60 dBm-Stop 2.328 GHz 2.292 GHz 2.296 GHz 2.296 GHz 2.300 GHz 2.300 GHz 2.300 GHz 2.310 GHz 2.315 GHz 2.315 GHz 2.320 GHz 2.324 GHz Range Low 2 292 GHz rious Emissions rious Emissions Power Abs
-41.75 dBm
-39.39 dBm
-25.11 dBm
-20.92 dBm
20.36 dBm
-52.09 dBm
-35.61 dBm
-42.70 dBm
-46.23 dBm 1.000 MHz 1.000 MHz 1.000 MHz Frequency
2.29570 GHz
2.29922 GHz
2.30620 GHz
2.30991 GHz
2.31467 GHz
2.31500 GHz
2.31503 GHz
2.31563 GHz
2.32057 GHz
2.32403 GHz Range Up Frequency **∆Limit** -10.75 ALimit
-14.72 dB
-16.51 dB
-23.90 dB
-39.60 dB
-9.56 dB
-8.20 dB
-10.55 dB
-16.47 dB
-13.68 dB -10.75 dB -14.39 dB -12.11 dB -7.92 dB -9.64 dB -39.09 dB -22.61 dB -17.70 dB -15.23 dB 2.300 GHz 2.304 GHz .30350 GHz .304 GHz 2.310 GHz 2.305 GHz 2.310 GHz 2.311 GHz 2.311 GHz 2.320 GHz 50.000 kHz 2.31019 GHz te: 24.JUN.2021 09:05:55 Date: 24.JUN.2021 09:08:29 Lowest Band Edge / Full RB **Highest Band Edge / Full RB** Spectrum Offset 12.00 dB Mode Auto Sweep Ref Level 30.00 dBm Offset 12.00 dB Mode Auto Sweep SGL Count 100/100 1 AvgPwr Limit check SGL Count 100/100 ●1 AvgPwr Limit ¢l 20 dBime 10 dBm 10 dBm dBmdBm -10 dBm--10 dBm-20 dBm -20 dBm-INE\_ABS INE\_ABS PURIOUS 40 dBm 40 dBm 60 dBm 60 dBm-9009 pts Stop 2.328 GHz Start 2.292 GHz Start 2.292 GHz Stop 2.328 GHz urious Emissions
Range Low
2.292 GHz
2.296 GHz
2.300 GHz
2.304 GHz
2.305 GHz
2.311 GHz
2.311 GHz
2.320 GHz
2.320 GHz
2.320 GHz 2.396 GHz 2.300 GHz 2.305 GHz 2.305 GHz 2.305 GHz 2.310 GHz 2.311 GHz 2.320 GHz 2.324 GHz ALimit
-9.41 dB
-11.22 dB
-13.75 dB
-10.70 dB
-23.55 dB
-12.31 dB
-14.62 dB
-15.05 dB
-14.57 dB 2.29580 GHz 2.29580 GHz 2.29996 GHz 2.30314 GHz 2.30499 GHz 2.30679 GHz 2.31103 GHz 2.31103 GHz 2.32008 GHz Prequency
2.29556 GHz
2.29994 GHz
2.30900 GHz
2.31000 GHz
2.31352 GHz
2.31501 GHz
2.31501 GHz
2.32013 GHz
2.32402 GHz Power Abs
-44.75 dBm
-42.00 dBm
-25.51 dBm
-25.14 dBm
-6.63 dBm
-23.87 dBm
-26.35 dBm
-34.73 dBm
-42.89 dBm Range Low Range Up RBW ΔLimit 2.292 GHz 2.296 GHz 2.390 GHz 2.309 GHz 2.310 GHz 2.315 GHz 2.316 GHz 2.320 GHz 2.324 GHz ge up .296 GHz .300 GHz .309 GHz .310 GHz .315 GHz .316 GHz .320 GHz .324 GHz .328 GHz

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Date: 24.JUN.2021 09:09:49

FAX: 886-3-328-4978

te: 24.JUN.2021 09:07:12

LTE Band 30 / 5MHz / 64QAM Lowest Band Edge / 1 RB Highest Band Edge / 1 RB Spectrum Spectrum Offset 12.00 dB Mode Auto Sweep Ref Level 30.00 dBm SGL Count 100/100 Offset 12.00 dB Mode Auto Sweep Ref Level 30.00 dBm SGL Count 100/100 1 AvgPwr Limit Check 1 AvgPv 20 dBime 10 damdBm -10 dBm -20 dBm--20 dBm-40 dBm-40 dBm-50 dBm 60 dBm-60 dBm-Stop 2.328 GHz 2.292 GHz 2.296 GHz 2.296 GHz 2.300 GHz 2.300 GHz 2.300 GHz 2.310 GHz 2.315 GHz 2.315 GHz 2.320 GHz 2.324 GHz Range Low 2 292 GHz rious Emissions ΔLimit
-11.46 dB
-15.53 dB
-13.86 dB
-11.55 dB
-10.08 dB
-39.55 dB
-23.81 dB
-18.34 dB
-15.22 dB rious Emissions 1.000 MHz 1.000 MHz 1.000 MHz Frequency
2.29582 GHz
2.29925 GHz
2.30578 GHz
2.30578 GHz
2.31464 GHz
2.31500 GHz
2.31509 GHz
2.31509 GHz
2.32004 GHz
2.32401 GHz Range Up Frequency Power Abs -42.46 dBn -42.46 dBm -40.53 dBm -26.86 dBm -24.55 dBm 19.92 dBm -52.55 dBm -36.81 dBm -43.34 dBm -46.22 dBm 2.29597 GHz 2.29697 GHz 2.300 GHz 2.304 GHz .304 GHz 2.310 GHz 2.305 GHz 2.310 GHz 2.311 GHz 2.320 GHz 50.000 kHz 2.31034 GHz 2.31405 GHz 2.311 GHz te: 24.JUN.2021 09:06:21 Date: 24.JUN.2021 09:08:55 Lowest Band Edge / Full RB **Highest Band Edge / Full RB** Spectrum Offset 12.00 dB Ref Level 30.00 dBm Offset 12.00 dB Mode Auto Sweep Mode Auto Sweep SGL Count 100/100 1 AvgPwr Limit check SGL Count 100/100 ●1 AvgPwr Limit ¢l 20 dBime 10 dBm 10 dBm dBmdBm -10 dBm--10 dBm-20 dBm -20 dBm-INE\_ABS PURIOUS 40 dBm 40 dBm 60 dBm 60 dBm-9009 pts Stop 2.328 GHz Start 2.292 GHz Start 2.292 GHz Stop 2.328 GHz 2.396 GHz 2.300 GHz 2.304 GHz 2.305 GHz 2.310 GHz 2.311 GHz 2.320 GHz 2.324 GHz 2.328 GHz urious Emissions
Range Low
2.292 GHz
2.296 GHz
2.300 GHz
2.304 GHz
2.305 GHz
2.311 GHz
2.311 GHz
2.320 GHz
2.320 GHz
2.320 GHz Frequency
2.29588 GHz
2.29909 GHz
2.30359 GHz
2.30500 GHz
2.30575 GHz
2.312001 GHz
2.31230 GHz
2.32002 GHz
2.32002 GHz Power Abs
-41.30 dBm
-36.82 dBm
-26.63 dBm
-26.66 dBm
6.02 dBm
-26.11 dBm
-28.99 dBm
-40.78 dBm
-45.97 dBm Erequency
2.29599 GHz
2.2955 GHz
2.30881 GHz
2.30999 GHz
2.31368 GHz
2.31500 GHz
2.31500 GHz
2.32009 GHz
2.32019 GHz Power Abs
-45.43 dBm
-42.53 dBm
-27.33 dBm
-25.23 dBm
5.66 dBm
-25.80 dBm
-26.80 dBm
-35.83 dBm
-43.44 dBm Range Low Range Up RBW ΔLimit 10.30 dB -11.82 dB -13.63 dB -13.26 dB -23.98 dB -13.11 dB -15.99 dB -15.78 dB -14.97 dB 2.292 GHz 2.296 GHz 2.300 GHz 2.309 GHz 2.310 GHz 2.315 GHz 2.316 GHz 2.320 GHz 2.324 GHz ge up .296 GHz .300 GHz .309 GHz .310 GHz .315 GHz .316 GHz .320 GHz .324 GHz .328 GHz te: 24.JUN.2021 09:07:38 Date: 24.JUN.2021 09:10:15

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LTE Band 30 / 5MHz / 256QAM Lowest Band Edge / 1 RB Highest Band Edge / 1 RB Spectrum Spectrum Offset 12.00 dB Mode Auto Sweep Ref Level 30.00 dBm SGL Count 100/100 Offset 12.00 dB Mode Auto Sweep Ref Level 30.00 dBm SGL Count 100/100 1 AvgPwr Limit Check 1 AvgPv 20 dBime 10 damdBm -10 dBm -10 dBm -20 dBm--20 dBm-40 dBm-40 dBm-50 dBm 60 dBm-60 dBm-Stop 2.328 GHz 2.292 GHz 2.296 GHz 2.296 GHz 2.300 GHz 2.300 GHz 2.300 GHz 2.310 GHz 2.315 GHz 2.315 GHz 2.320 GHz 2.324 GHz Range Low 2 292 GHz rious Emissions rious Emissions 1.000 MHz 1.000 MHz 1.000 MHz Frequency
2.29586 GHz
2.29518 GHz
2.30596 GHz
2.30597 GHz
2.31468 GHz
2.31500 GHz
2.31703 GHz
2.32021 GHz
2.32407 GHz Range Up Frequency Power Abs -43.03 dBn ∆Limit -43.03 dBm -41.26 dBm -27.65 dBm -28.24 dBm 16.43 dBm -53.64 dBm -39.22 dBm -43.73 dBm -46.21 dBm -12.03 dB -16.26 dB -14.65 dB -15.24 dB -13.57 dB -40.64 dB -26.22 dB -18.73 dB -15.21 dB 2.300 GHz 2.304 GHz 2.29592 GHZ 2.29669 GHZ .304 GHz 2.310 GHz 2.305 GHz 2.30534 GHz 2.310 GHz 2.311 GHz 2.311 GHz 2.320 GHz 50.000 kHz 2.31007 GHz 2.31414 GHz te: 24.JUN.2021 09:25:27 Date: 24.JUN.2021 09:26:58 Lowest Band Edge / Full RB **Highest Band Edge / Full RB** Spectrum Offset 12.00 dB Ref Level 30.00 dBm Offset 12.00 dB Mode Auto Sweep Mode Auto Sweep SGL Count 100/100 1 AvgPwr Limit check SGL Count 100/100 ●1 AvgPwr Limit ¢l 20 dBime 10 dBm 10 dBm dBmdBm -10 dBm--10 dBm-20 dBm -20 dBm-INE\_ABS INE\_ABS PURIOUS 40 dBm 40 dBm 60 dBm 60 dBm-9009 pts Stop 2.328 GHz Start 2.292 GHz Start 2.292 GHz Stop 2.328 GHz urious Emissions
Range Low
2.292 GHz
2.296 GHz
2.300 GHz
2.304 GHz
2.305 GHz
2.311 GHz
2.311 GHz
2.320 GHz
2.320 GHz
2.320 GHz 2.396 GHz 2.300 GHz 2.305 GHz 2.305 GHz 2.305 GHz 2.310 GHz 2.311 GHz 2.320 GHz 2.324 GHz 2.29589 GHz 2.29589 GHz 2.29998 GHz 2.30389 GHz 2.30497 GHz 2.30652 GHz 2.31004 GHz 2.31100 GHz 2.32511 GHz 2.32548 GHz Power Abs
-42.72 dBm
-38.64 dBm
-29.53 dBm
-27.89 dBm
-26.20 dBm
-31.08 dBm
-41.94 dBm ALimit
-11.72 dB
-13.64 dB
-16.53 dB
-14.89 dB
-26.24 dB
-13.20 dB
-18.08 dB
-16.94 dB
-15.05 dB 2.29563 GHz 2.29598 GHz 2.29998 GHz 2.30898 GHz 2.313999 GHz 2.31316 GHz 2.31500 GHz 2.31500 GHz 2.32035 GHz 2.32402 GHz Range Low Range Up RBW Power Abs ΔLimit 2.292 GHz 2.296 GHz 2.300 GHz 2.309 GHz 2.310 GHz 2.315 GHz 2.316 GHz 2.320 GHz 2.324 GHz ge up .296 GHz .300 GHz .309 GHz .310 GHz .315 GHz .316 GHz .320 GHz .324 GHz .328 GHz te: 24.JUN.2021 09:26:13 Date: 24.JUN.2021 09:27:43

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LTE Band 30 / 10MHz / QPSK Lowest Band Edge / 1 RB Highest Band Edge / 1 RB Spectrum Spectrum Offset 12.00 dB Ref Level 30.00 dBm Mode Auto Sweep Ref Level 30.00 dBm SGL Count 100/100 Offset 12.00 dB Mode Auto Sweep SGL Count 100/100 1 AvgPwr Limit Check 1 AvgPv 20 dBime 10 dBm dBm -10 dBm -10 dBm -20 dBm--20 dBm-40 dBm--40 dBm-50 dBm 60 dBm-Stop 2.328 GHz Range Up 2 296 GHz Range Low 292 GHz rious Emissions Frequency ° 29594 GHz Range Low
2.292 GHz
2.296 GHz
2.300 GHz
2.304 GHz
2.305 GHz
2.315 GHz
2.316 GHz
2.324 GHz
2.324 GHz rious Emissions Power Abs
-42.86 dBm
-38.92 dBm
-27.13 dBm
-28.37 dBm
21.70 dBm
-48.80 dBm
-40.33 dBm
-40.33 dBm
-40.33 dBm ALimit
-11.86 dB
-13.92 dB
-14.13 dB
-15.37 dB
-8.30 dB
-35.80 dB
-24.82 dB
-15.33 dB
-13.36 dB 1.000 MHz 1.000 MHz 1.000 MHz ΔLimit
-11.28 dB
-14.33 dB
-25.86 dB
-37.62 dB
-8.56 dB
-15.72 dB
-10.46 dB
-13.03 dB
-13.58 dB 2.29594 GHz 2.29999 GHz 2.30123 GHz 2.296 GHz 2.300 GHz 2.304 GHz 2.305 GHz 2.315 GHz 100.000 kHz 100.000 kHz 100.000 kHz .304 GHz 2.305 GHz 2.315 GHz 2.316 GHz 2.30559 GHz 2.31521 GHz 2.31742 GHz 2.32103 GHz 2.32405 GHz 2.316 GHz 2.320 GHz te: 24.JUN.2021 09:10:44 Date: 24.JUN.2021 09:11:58 Band Edge / Full RB Spectrum Ref Level 30.00 dBm Offset 12.00 dB Mode Auto Sweep SGL Count 100/100 1 AvgPwr 10 dBm-0 dBm -10 dBm -20 dBm-LINE\_ABS SPURIOUS -50 dBm -60 dBm Start 2.292 GHz 9009 pts Stop 2.328 GHz purious Emissions Power Abs -38.88 dB 2.29593 GHz 2.29593 GHz 2.29974 GHz 2.30396 GHz 2.30492 GHz 2.31088 GHz 2.31511 GHz 2.31611 GHz 2.32605 GHz 2.32400 GHz Range Up ∆Limit Range Low 2.292 GHz **RBW** 1.000 MHz -7.88 dB -7.11 dB -11.21 dB -13.11 dB -25.39 dB -13.21 dB -10.14 dB -3.33 dB -4.86 dB 2.396 GHz 2.300 GHz 2.304 GHz 2.305 GHz 2.315 GHz 2.316 GHz 2.320 GHz 2.324 GHz -38.88 dBm -32.11 dBm -24.21 dBm -26.11 dBm 4.61 dBm -26.21 dBm -23.14 dBm -28.33 dBm -35.86 dBm 1.000 MHz 1.000 MHz 2.296 GHz 2.300 GHz 2.304 GHz 2.305 GHz 2.315 GHz 2.316 GHz 2.320 GHz 1.000 MHz 100.000 kHz 100.000 kHz 100.000 kHz 1.000 MHz 1.000 MHz 1.000 MHz

Report No.: FG0D2942-04D

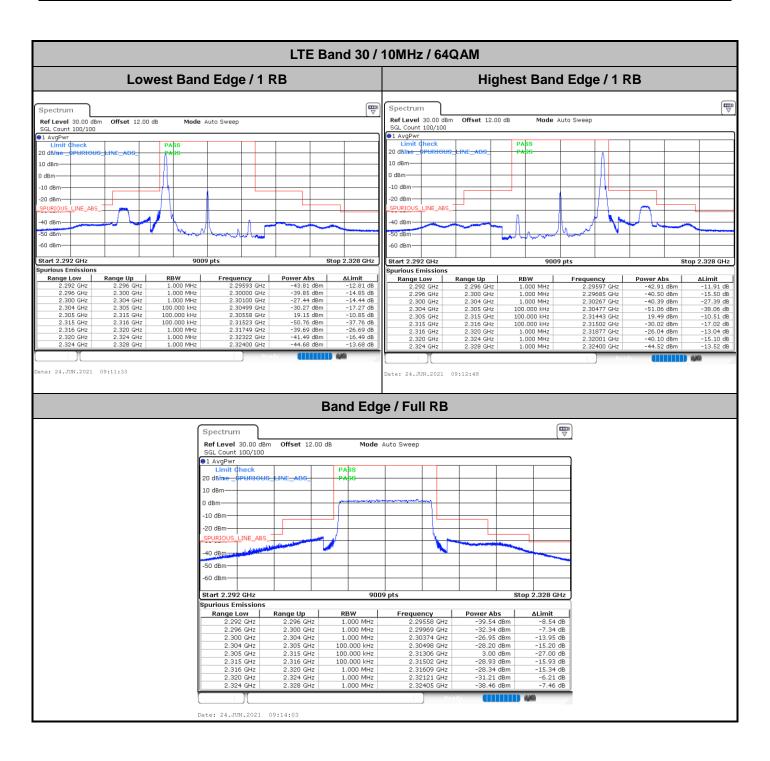
TEL: 886-3-327-3456 Page Number : A2-13 of 19

Date: 24.JUN.2021 09:13:13

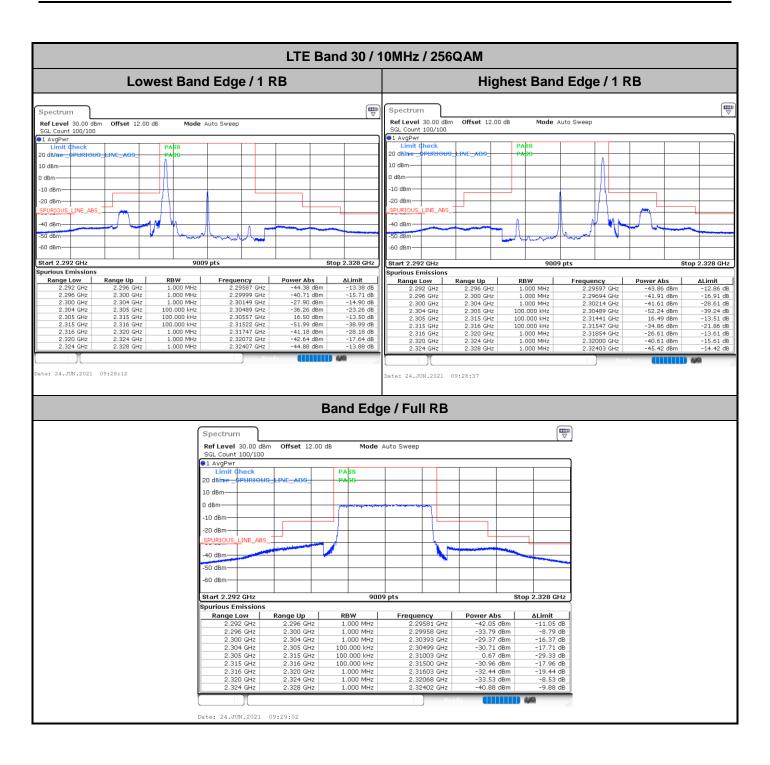
LTE Band 30 / 10MHz / 16QAM Lowest Band Edge / 1 RB Highest Band Edge / 1 RB Spectrum Spectrum Offset 12.00 dB Ref Level 30.00 dBm Mode Auto Sweep Ref Level 30.00 dBm SGL Count 100/100 Offset 12.00 dB Mode Auto Sweep SGL Count 100/100 ●1 AvgPwr Limit Check 1 AvgPv 20 dBime 10 dBm dBm -10 dBm -10 dBm -20 dBm--20 dBm-40 dBm-40 dBm-50 dBm 60 dBm-60 dBm Stop 2.328 GHz 9009 pts Range Up 2 296 GHz rious Emissions Range Low
2.292 GHz
2.296 GHz
2.300 GHz
2.304 GHz
2.305 GHz
2.315 GHz
2.316 GHz
2.324 GHz
2.324 GHz rious Emissions Power Abs
-43.24 dBm
-39.33 dBm
-27.56 dBm
-28.13 dBm
20.47 dBm
-49.70 dBm
-40.72 dBm
-40.72 dBm
-44.27 dBm ALimit
-12.24 dB
-14.33 dB
-14.56 dB
-15.13 dB
-9.53 dB
-36.70 dB
-25.34 dB
-15.72 dB
-13.27 dB 1.000 MHz 1.000 MHz 1.000 MHz Frequency
2.29590 GHz
2.29699 GHz
2.30253 GHz
2.30484 GHz
2.31438 GHz
2.31501 GHz
2.31874 GHz
2.32005 GHz
2.32401 GHz Range Low 2.292 GHz ΔLimit
-11.54 dB
-14.51 dB
-26.34 dB
-37.61 dB
-9.55 dB
-15.50 dB
-11.36 dB
-13.98 dB
-13.47 dB 2.296 GHz 2.300 GHz 2.304 GHz 2.305 GHz 2.315 GHz 2.29600 GHz 2.29999 GHz 2.30097 GHz 100.000 kHz 100.000 kHz 100.000 kHz .304 GHz 2.305 GHz 2.315 GHz 2.316 GHz 2.30558 GHz 2.31516 GHz 2.31744 GHz 2.32090 GHz 2.32402 GHz 2.316 GHz 2.320 GHz te: 24.JUN.2021 09:11:09 Date: 24.JUN.2021 09:12:23 Band Edge / Full RB Spectrum Ref Level 30.00 dBm Offset 12.00 dB Mode Auto Sweep SGL Count 100/100 1 AvgPwr 10 dBm-0 dBm -10 dBm -20 dBm--50 dBm -60 dBm Start 2.292 GHz 9009 pts Stop 2.328 GHz purious Emissions Range Up ΔLimit Range Low 2.292 GHz **RBW** 1.000 MHz Frequency 2.29562 GHz -38.00 dB 2.29562 GHz 2.29963 GHz 2.30396 GHz 2.30499 GHz 2.31045 GHz 2.31505 GHz 2.31503 GHz 2.32038 GHz 2.32406 GHz -7.00 dB -5.27 dB -11.42 dB -14.75 dB -26.35 dB -14.56 dB -14.85 dB -4.48 dB -5.85 dB 2.396 GHz 2.300 GHz 2.304 GHz 2.305 GHz 2.315 GHz 2.316 GHz 2.320 GHz 2.324 GHz 1.000 MHz 1.000 MHz -30.27 dBm 2.296 GHz 2.300 GHz -30.27 dBm -24.42 dBm -27.75 dBm 3.65 dBm -27.56 dBm -27.56 dBm -29.48 dBm -36.85 dBm 1.000 MHz 100.000 kHz 100.000 kHz 100.000 kHz 1.000 MHz 1.000 MHz 1.000 MHz Date: 24.JUN.2021 09:13:38

Report No.: FG0D2942-04D

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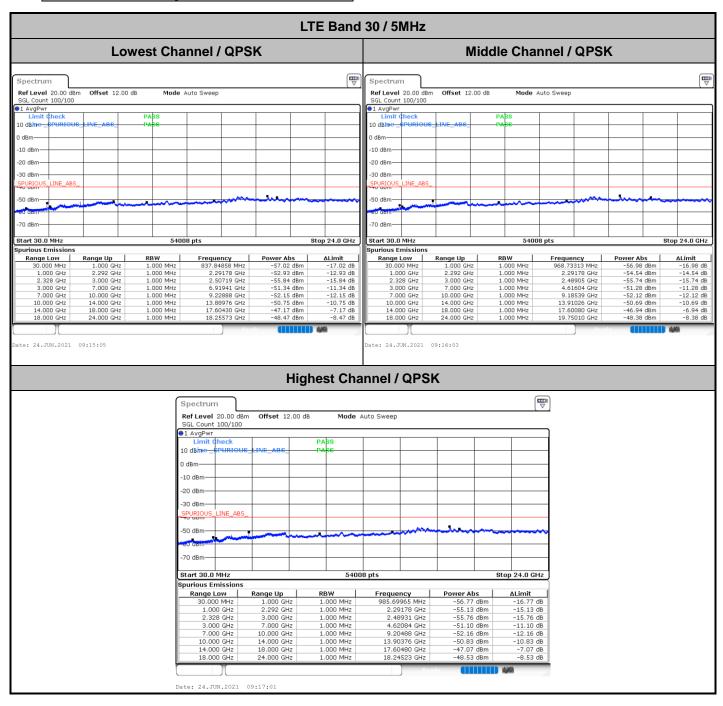


TEL: 886-3-327-3456 Page Number : A2-15 of 19 FAX: 886-3-328-4978



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### **Conducted Spurious Emission**



Report No.: FG0D2942-04D

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Date: 24.JUN.2021 09:18:02

LTE Band 30 / 10MHz Middle Channel / QPSK Spectrum Ref Level 20.00 dBm Offset 12.00 dB SGL Count 100/100

1 AvgPwr
Limit check Mode Auto Sweep 10 dBine PURIOUS 0 dBm -10 dBm -20 dBm-PURIOUS\_LINE\_ABS -70 dBm-54008 pts Stop 24.0 GHz purious Emissions Range Low 30.000 MHz 1.000 GHz 2.328 GHz 3.000 GHz 7.000 GHz 10.000 GHz 14.000 GHz 18.000 GHz Range Up
1.000 GHz
2.292 GHz
3.000 GHz
7.000 GHz
10.000 GHz
14.000 GHz
18.000 GHz
24.000 GHz RBW 1.000 MHz 839.78761 MHz 2.29178 GHz 2.51377 GHz 6.90181 GHz 9.20188 GHz 13.91076 GHz 17.61130 GHz 18.24873 GHz Power Abs
-57.16 dBm
-53.04 dBm
-55.85 dBm
-51.15 dBm
-52.06 dBm
-50.76 dBm
-47.14 dBm
-48.45 dBm ∆Limit ALimit
-17.16 dB
-13.04 dB
-15.85 dB
-11.15 dB
-12.06 dB
-10.76 dB
-7.14 dB
-8.45 dB

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# Frequency Stability

Test (	Conditions	LTE Band 30 (QPSK) / Middle Channel	Limit		
Temperature	Voltage	Voltage BW 10MHz			
(°C)	(Volt)	Deviation (ppm)	Result		
50	Normal Voltage	0.0044			
40	Normal Voltage	0.0031			
30	Normal Voltage	0.0050			
20(Ref.)	Normal Voltage	0.0000			
10	Normal Voltage	0.0042			
0	Normal Voltage	0.0006	DAGG		
-10	Normal Voltage	0.0010	PASS		
-20	Normal Voltage	0.0033			
-30	Normal Voltage	0.0032			
20	Maximum Voltage	0.0023			
20	Normal Voltage	0.0000			
20	Battery End Point	0.0051			

Report No.: FG0D2942-04D

#### Note:

- 1. Normal Voltage =3.86 V.; Battery End Point (BEP) =3.6 V.; Maximum Voltage =4.45 V.
- 2. The frequency fundamental emissions stay within the authorized frequency block.

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### **Appendix B. Test Results of Radiated Test**

<Primary Antenna>

<Ant. 2>

## LTE Band 30

Report No.: FG0D2942-04D

LTE Band 30 / 5MHz / QPSK										
Channel	Frequency (MHz)	EIRP ( dBm )	Limit ( dBm )	Over Limit ( dB )	SPA Reading (dBm)	S.G. Power ( dBm )	TX Cable loss ( dB )	TX Antenna Gain (dBi)	Polarization (H/V)	
	4610	-62.57	-40	-22.57	-49.57	-73.79	1.45	12.68	Н	
	6916	-59.78	-40	-19.78	-54.38	-70.07	1.73	12.02	Н	
	9225	-59.00	-40	-19.00	-54.09	-68.62	2.16	11.78	Н	
									Н	
Louiset									Н	
Lowest	4610	-63.73	-40	-23.73	-49.95	-74.95	1.45	12.68	V	
	6916	-44.81	-40	-4.81	-38.97	-55.10	1.73	12.02	V	
	9225	-58.34	-40	-18.34	-54.43	-67.96	2.16	11.78	V	
									V	
									V	
	4615	-63.16	-40	-23.16	-50.19	-74.38	1.46	12.68	Н	
	6923	-59.69	-40	-19.69	-54.33	-69.97	1.73	12.01	Н	
	9231	-59.28	-40	-19.28	-54.37	-68.89	2.16	11.77	Н	
									Н	
NAC LUL.									Н	
Middle	4615	-63.89	-40	-23.89	-50.14	-75.11	1.46	12.68	V	
	6923	-49.32	-40	-9.32	-43.51	-59.60	1.73	12.01	V	
	9231	-58.13	-40	-18.13	-54.23	-67.74	2.16	11.77	V	
									V	
									V	

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-74.14 4620 -62.92 -40 -22.92 -49.96 1.46 12.68 Н 6931 -59.95 -40 -19.95 -54.64 -70.22 1.73 12.00 Н 9241 11.76 -59.18 -40 -19.18 -54.26 -68.78 2.16 Η Η Н Highest -50.04 ٧ 4620 -40 -23.77 -74.99 12.68 -63.77 1.46 6931 -60.20 -40 -20.20 -54.43 -70.47 1.73 12.00 ٧ 9241 -58.21 -40 -18.21 -54.32 -67.81 2.16 11.76 V ٧ ٧

Report No.: FG0D2942-04D

Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.

TEL: 886-3-327-3456 Page Number: B1 - 2 of 3

	LTE Band 30 / 10MHz / QPSK										
Channel	Frequency ( MHz )	EIRP (dBm)	Limit ( dBm )	Over Limit ( dB )	SPA Reading (dBm)	S.G. Power ( dBm )	TX Cable loss ( dB )	TX Antenna Gain (dBi)	Polarization (H/V)		
	4611	-62.81	-40	-22.81	-49.81	-74.03	1.45	12.68	Н		
	6916	-59.62	-40	-19.62	-54.22	-69.91	1.73	12.02	Н		
	9225	-58.97	-40	-18.97	-54.06	-68.59	2.16	11.78	Н		
									Н		
Middle									Н		
Middle	4611	-63.38	-40	-23.38	-49.6	-74.60	1.45	12.68	V		
	6916	-52.07	-40	-12.07	-46.23	-62.36	1.73	12.02	V		
	9225	-58.33	-40	-18.33	-54.42	-67.95	2.16	11.78	V		
									V		
		·							V		

Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.

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<ASDIV Antenna>

<Ant. 0>

### LTE Band 30

Report No.: FG0D2942-04D

LTE Band 30 / 5MHz / QPSK										
Channel	Frequency ( MHz )	EIRP (dBm)	Limit ( dBm )	Over Limit ( dB )	SPA Reading (dBm)	S.G. Power ( dBm )	TX Cable loss ( dB )	TX Antenna Gain (dBi)	Polarization (H/V)	
	4608	-59.91	-40	-19.91	-46.91	-71.14	1.45	12.68	Н	
	6918	-47.07	-40	-7.07	-41.68	-57.35	1.73	12.01	Н	
	9225	-59.44	-40	-19.44	-54.53	-69.06	2.16	11.78	Н	
									Н	
Laurant									Н	
Lowest	4608	-61.56	-40	-21.56	-47.77	-72.79	1.45	12.68	V	
	6916	-50.80	-40	-10.80	-44.96	-61.09	1.73	12.02	V	
	9225	-58.12	-40	-18.12	-54.21	-67.74	2.16	11.78	V	
									V	
									V	
	4614	-61.41	-40	-21.41	-48.42	-72.63	1.46	12.68	Н	
	6924	-48.89	-40	-8.89	-43.54	-59.17	1.73	12.01	Н	
	9234	-59.11	-40	-19.11	-54.2	-68.72	2.16	11.77	Н	
									Н	
N 41 - 1 - 11 -									Н	
Middle	4614	-62.76	-40	-22.76	-49	-73.98	1.46	12.68	V	
	6923	-50.76	-40	-10.76	-44.95	-61.04	1.73	12.01	V	
	9234	-53.57	-40	-13.57	-54.57	-63.18	2.16	11.77	V	
									V	
									V	

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	4620	-59.15	-40	-19.15	-46.19	-70.37	1.46	12.68	Н
	6930	-47.05	-40	-7.05	-41.73	-57.32	1.73	12.00	Н
	9243	-59.18	-40	-19.18	-54.26	-68.77	2.16	11.76	Н
									Н
Llimboot									Н
Highest	4620	-61.93	-40	-21.93	-48.2	-73.15	1.46	12.68	V
	6930	-49.21	-40	-9.21	-43.44	-59.48	1.73	12.00	V
	9243	-58.45	-40	-18.45	-54.56	-68.04	2.16	11.76	V
									V
									V

Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.

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	LTE Band 30 / 10MHz / QPSK										
Channel	Frequency ( MHz )	EIRP (dBm)	Limit ( dBm )	Over Limit ( dB )	SPA Reading (dBm)	S.G. Power ( dBm )	TX Cable loss ( dB )	TX Antenna Gain (dBi)	Polarization (H/V)		
	4614	-60.65	-40	-20.65	-47.66	-71.87	1.46	12.68	Н		
	6918	-45.60	-40	-5.60	-40.21	-55.88	1.73	12.01	Н		
	9225	-59.03	-40	-19.03	-54.12	-68.65	2.16	11.78	Н		
									Н		
Middle									Н		
Middle	4614	-61.23	-40	-21.23	-47.47	-72.45	1.46	12.68	V		
	6918	-43.07	-40	-3.07	-37.24	-53.35	1.73	12.01	V		
	9225	-58.26	-40	-18.26	-54.35	-67.88	2.16	11.78	V		
									V		
									V		

Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.



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