

Report No.: FG9O2328C



# FCC RADIO TEST REPORT

FCC ID : 2AUWUFAIRPHONE3

Equipment : Smart Phone
Brand Name : Fairphone
Model Name : Fairphone 3
Marketing Name : Fairphone 3
Applicant : FairPhone B.V.

Jollemanhof 17, 1019 GW, Amsterdam, the Netherlands

Manufacturer : FairPhone B.V.

Jollemanhof 17, 1019 GW, Amsterdam, the Netherlands

Standard : FCC 47 CFR Part 2, and 90(S)

The product was received on Oct. 23, 2019 and testing was started from Nov. 05, 2019 and completed on Nov. 16, 2019. 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 report must not be used by the client to claim product certification, approval, or endorsement by TAF or any agency of government.

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.

Louis Win

Approved by: Louis Wu

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory

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

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# History of this test report

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Report No.	Version	Description	Issued Date
FG9O2328C	01	Initial issue of report	Feb. 12, 2020

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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 §90.635	Conducted Output Power and Effective Radiated Power	Pass	-
3.3	-	Peak-to-Average Ratio	Reporting only	-
3.4	§2.1049 §90.209	Occupied Bandwidth and 26dB Bandwidth	Reporting only	-
3.5	§2.1051 §90.691	Emission masks – In-band emissions	Pass	-
3.6	§2.1051 §90.691	Emission masks – Out of band emissions	Pass	-
3.7	§2.1055 §90.213	Frequency Stability for Temperature & Voltage	Pass	-
3.8	§2.1053 §90.691	Field Strength of Spurious Radiation	Pass	Under limit 40.70 dB at 1632.000 MHz

#### **Declaration of Conformity:**

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

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

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

Reviewed by: Wii Chang Report Producer: Yimin Ho

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# 1 General Description

### 1.1 Feature of Equipment Under Test

GSM/WCDMA/LTE, Bluetooth, Wi-Fi 2.4GHz 802.11b/g/n, Wi-Fi 5GHz 802.11a/n/ac, NFC, and GNSS.

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Product Specification subjective to this standard						
Sample 1 EUT with 1st source						
Sample 2	EUT with 2nd source					
	WWAN: PIFA Antenna					
	WLAN: Embedded Inverted-F Antenna					
Antenna Type	Bluetooth: Embedded Inverted-F Antenna					
	GPS / Glonass / BDS : PIFA Antenna					
	NFC: Loop Antenna					

Remark: All test items were performed with Sample 1.

#### 1.2 Modification of EUT

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

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# 1.3 Testing Site

Test Site	SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory					
Test Site Location No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.) TEL: +886-3-327-3456 FAX: +886-3-328-4978						
Test Site No.	Sporton Site No.					
rest site No.	TH05-HY					
Test Engineer	Jacky Wang					
Temperature 23~26°C						
Relative Humidity 55~57%						

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

Test Site	SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory						
Test Site Location  No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist.,  Taoyuan City, Taiwan (R.O.C.)  TEL: +886-3-327-0868  FAX: +886-3-327-0855							
Test Site No.	Sporton Site No.						
rest site No.	03CH11-HY						
Test Engineer	Cookie Ku, Fu Chen and Troye Hsieh						
<b>Temperature</b> 20.2~26.3°C							
Relative Humidity	44~68.1%						

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

FCC Designation No.: TW1190 and TW0007

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#### 1.4 Applied Standards

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

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- FCC 47 CFR Part 2, 90
- ANSI / TIA-603-E
- ANSI C63.26-2015
- FCC KDB 971168 D01 Power Meas. License Digital Systems v03r01
- FCC KDB 412172 D01 Determining ERP and EIRP v01r01
- Interim Guidance for Equipment Authorization of Devices with Channel Bandwidths Combined Across Two Contiguous Service Rule Allocations OET/Lab/EACB, June 6, 2013

#### Remark:

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

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# 2 Test Configuration of Equipment Under Test

#### 2.1 Test Mode

During all testing, EUT is in link mode with base station emulator at maximum power level.

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

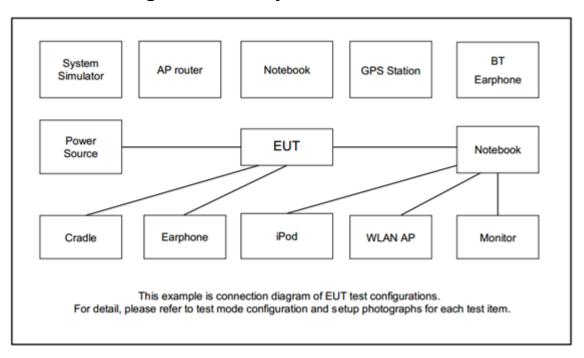
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Frequency range investigated for radiated emission is 30 MHz to 9000 MHz.

Conducted	David	Bandwidth (MHz)				Modulation			RB#			Test Channel				
Test Cases	Band	1.4	3	5	10	15	20	QPSK	16QAM	64QAM	1	Half	Full	L	М	Н
Max. Output Power	26	٧	٧	v	v	v	-	v	v	v	٧	v	v	V	v	v
Peak-to-Average Ratio	26					v	-	V	v	v	>		v		v	
26dB and 99% Bandwidth	26	V	V	v	v	v	-	v	v	v			v	V	v	v
Emission masks In-band emissions	26	٧	٧	v	v	v	-	v	v	v	>		v	V		v
Emission masks – Out of band emissions	26	>	٧	v	v	v	1	v	v	v	>			v	v	v
Frequency Stability	26				v	v	-	v					v	V	v	
E.R.P.	26					v	ı	v	v	v	>			V		
Radiated Spurious Emission 26 Worst Case							V	v	v							
Remark	2. Th 3. LT EI	The mark "-" means that this bandwidth is not supported.														

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#### 2.2 Connection Diagram of Test System



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#### 2.3 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model No.	FCC ID	Data Cable	Power Cord
1.	System Simulator	Anritsu	MT8820C	N/A	N/A	Unshielded, 1.8 m
2.	AC adapter	Samsung	EP-TA20JWS	N/A	N/A	N/A

#### 2.4 Measurement Results Explanation Example

#### For all conducted test items:

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

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

Offset = RF cable loss + attenuator factor.

The following shows an offset computation example with RF cable loss 4.2 dB and a 10dB attenuator.

#### Example:

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

$$= 4.2 + 10 = 14.2 (dB)$$

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# 2.5 Frequency List of Low/Middle/High Channels

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

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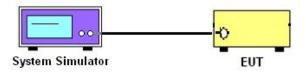
#### 3 Conducted Test Items

#### 3.1 Measuring Instruments

See list of measuring instruments of this test report.

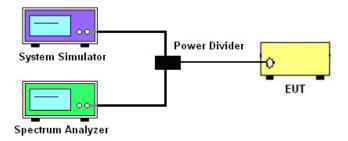
#### 3.1.1 Test Setup

#### 3.1.2 Conducted Output Power

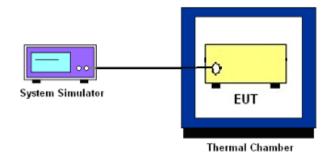


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# 3.1.3 Peak-to-Average Ratio, Occupied Bandwidth, Conducted Band-Edge, Emission Mask, Emissions Mask – Out Of Band Emissions, and Conducted Spurious Emission



#### 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 and ERP Measurement

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

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

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The ERP of mobile transmitters must not exceed 7 Watts for LTE Band 26.

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

#### 3.2.2 Test Procedures

- 1. The transmitter output port was connected to the system simulator.
- 2. Set EUT at maximum power through 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

Reporting only

#### 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.

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- 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 99% Occupied Bandwidth and 26dB Bandwidth Measurement

#### 3.4.1 Description of (Occupied) Bandwidth Limitations Measurement

The 99% occupied bandwidth is the width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5% of the total mean transmitted power.

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

#### 3.4.2 Test Procedures

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

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#### 3.5 Emissions Mask Measurement

#### 3.5.1 Description of Emissions Mask Measurement

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

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

#### 3.5.2 Test Procedures

- 1. The EUT was connected to spectrum analyzer and base station via power divider.
- 2. The emissions mask of low and high channels for the highest RF powers were measured.
- 3. Set RBW and VBW 3 times of RBW to make the measurement with the spectrum analyzer's, and according to KDB 971168 D02 Misc Rev Approve License Devices v02r01 standards, set RBW = 300 Hz to make offsets less than 37.5 kHz from a channel edge, RBW = 100 kHz to make offsets greater than 37.5 kHz, that is allowed.
- 4. The test results were shown below plots with a correction offset factor including cable loss, insertion loss of power divider.

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

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

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

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#### 3.6.2 Test Procedures

- 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. For testing below 1GHz, make the measurement with the spectrum analyzer's RBW = 100 kHz, VBW = 3MHz, taking the record of maximum spurious emission.
- 6. For testing above 1GHz, make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
- The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
- 8. The limit line is derived from 43 + 10log(P)dB below the transmitter power P(Watts)

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#### 3.7 Frequency Stability Measurement

#### 3.7.1 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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#### 3.7.2 Measuring Instruments

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

#### 3.7.3 Test Procedures for Temperature Variation

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

#### 3.7.4 Test Procedures for Voltage Variation

- 1. The EUT was placed in a temperature chamber at 20±5° C and connected with the base station.
- The power supply voltage to the EUT was varied from BEP 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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#### 3.8 Field Strength of Spurious Radiation Measurement

#### 3.8.1 Description of Field Strength of Spurious Radiated Measurement

The radiated spurious emission was measured by direct field strength method according to ANSI C63.26-2015.

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

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least 43+10log<sub>10</sub>(P[Watts]) dB. The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

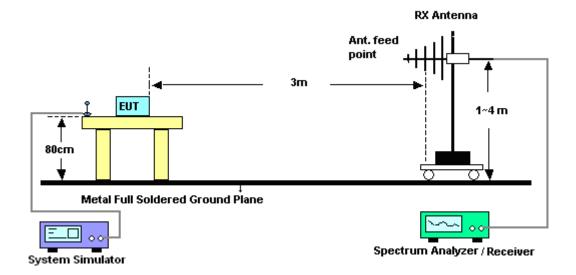
#### 3.8.2 Test Procedures

- The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
- 2. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
- 3. The table was rotated 360 degrees to determine the position of the highest spurious emission.
- 4. When using the direct field strength method and the EUT is manipulated through three different orientations, then the scan height range of the measurement antenna is limited to 2.5 m, or 0.5 m above the top of the EUT, whichever is higher
- 5. For testing below 1GHz, make the measurement with the spectrum analyzer's RBW = 100 kHz, VBW = 3MHz, Sweep = 500ms, Taking the record of maximum spurious emission.
- 6. For testing above 1GHz, make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, Sweep = 500ms, 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.
- 9. Taking the record of output power at antenna port.
- 10. Repeat step 7 to step 8 for another polarization.
- 11. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
- 12. The limit line is derived from 43 + 10log(P) dB below the transmitter power P(Watts)
  E (dBμV/m) = Measured amplitude level (dBμV) + Cable Loss (dB) + Antenna Factor (dB/m)
  EIRP (dBm) = E (dBμV/m) + 20 log D 104.8; where D is the measurement distance in meters
  ERP = EIRP 2.15 (dB); where ERP and EIRP are expressed in consistent units.

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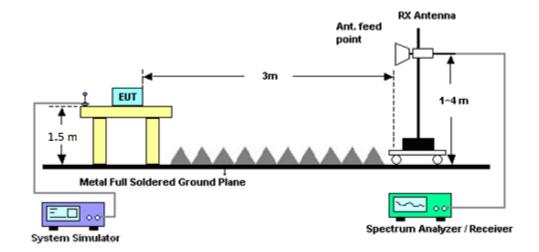
#### 3.8.3 Test Setup

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



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#### For radiated test above 1GHz



#### 3.8.4 Test Result of Field Strength of Spurious Radiated

Please refer to Appendix B.

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# 4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Preamplifier	EMEC	EM18G40G	060715	18GHz ~ 40GHz	Dec. 06, 2018	Nov. 05, 2019~ Nov. 16, 2019	Dec. 05, 2019	Radiation (03CH11-HY)
Amplifier	SONOMA	310N	187312	9kHz~1GHz	Dec. 04, 2018	Nov. 05, 2019~ Nov. 16, 2019	Dec. 03, 2019	Radiation (03CH11-HY)
Bilog Antenna	TESEQ	CBL 6111D & N-6-06	35414 & AT-N0602	30MHz~1GHz	Oct. 12, 2019	Nov. 05, 2019~ Nov. 16, 2019	Oct. 11, 2020	Radiation (03CH11-HY)
Horn Antenna	SCHWARZBE CK	BBHA 9120 D	9120D-152 2	1GHz ~ 18GHz	Sep. 19, 2019	Nov. 05, 2019~ Nov. 16, 2019	Sep. 18, 2020	Radiation (03CH11-HY)
Horn Antenna	SCHWARZBE CK	BBHA 9120D	9120D-121 2	1GHz ~ 18GHz	May 14, 2019	Nov. 05, 2019~ Nov. 16, 2019	May 13, 2020	Radiation (03CH11-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100488	9 kHz~30 MHz	Jan. 07, 2019	Nov. 05, 2019~ Nov. 16, 2019	Jan. 06, 2020	Radiation (03CH11-HY)
Preamplifier	Keysight	83017A	MY532700 80	1GHz~26.5GHz	Nov. 14, 2018	Nov. 05, 2019~ Nov. 12, 2019	Nov. 13, 2019	Radiation (03CH11-HY)
Preamplifier	Keysight	83017A	MY532700 80	1GHz~26.5GHz	Nov. 13, 2019	Nov. 14, 2019~ Nov. 16, 2019	Nov. 12, 2020	Radiation (03CH11-HY)
Spectrum Analyzer	Keysight	N9010A	MY542004 86	10Hz~44GHz	Oct. 28, 2019	Nov. 05, 2019~ Nov. 16, 2019	Oct. 27, 2020	Radiation (03CH11-HY)
Filter	Wainwright	WHKX12-108 0-1200-15000 -60SS	SN2	1.2GHz High Pass Filter	Sep. 15, 2019	Nov. 05, 2019~ Nov. 16, 2019	Sep. 14, 2020	Radiation (03CH11-HY)
Filter	Wainwright	WHKX12-270 0-3000-18000 -60SS	SN3	3GHz High Pass Filter	Sep. 15, 2019	Nov. 05, 2019~ Nov. 16, 2019	Sep. 14, 2020	Radiation (03CH11-HY)
Controller	EMEC	EM 1000	N/A	Control Turn table & Ant Mast	N/A	Nov. 05, 2019~ Nov. 16, 2019	N/A	Radiation (03CH11-HY)
Antenna Mast	EMEC	AM-BS-4500- B	N/A	1~4m	N/A	Nov. 05, 2019~ Nov. 16, 2019	N/A	Radiation (03CH11-HY)
Turn Table	EMEC	TT 2000	N/A	0~360 Degree	N/A	Nov. 05, 2019~ Nov. 16, 2019	N/A	Radiation (03CH11-HY)
EMI Test Receiver	Keysight	N9038A (MXE)	MY554201 70	20MHz~8.4GHz	Mar. 08, 2019	Nov. 05, 2019~ Nov. 16, 2019	Mar. 07, 2020	Radiation (03CH11-HY)
SHF-EHF Horn Antenna	SCHWARZBE CK	BBHA 9170	BBHA9170 584	18GHz- 40GHz	Dec. 05, 2018	Nov. 05, 2019~ Nov. 16, 2019	Dec. 04, 2019	Radiation (03CH11-HY)
Software	Audix	E3 6.2009-8-24	RK-00105 3	N/A	N/A	Nov. 05, 2019~ Nov. 16, 2019	N/A	Radiation (03CH11-HY)
Hygrometer	TECPEL	DTN-303B	TP140325	N/A	Oct. 25, 2019	Nov. 05, 2019~ Nov. 16, 2019	Oct. 24, 2020	Radiation (03CH11-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY9837/4 PE	9kHz-30MHz	Mar. 13, 2019	Nov. 05, 2019~ Nov. 16, 2019	Mar. 12, 2020	Radiation (03CH11-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	MY2859/2	30MHz-40GHz	Mar. 13, 2019	Nov. 05, 2019~ Nov. 16, 2019	Mar. 12, 2020	Radiation (03CH11-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY9837/4 PE	30M-18G	Mar. 13, 2019	Nov. 05, 2019~ Nov. 16, 2019	Mar. 12, 2020	Radiation (03CH11-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	MY4274/2	30MHz-40GHz	Mar. 13, 2019	Nov. 05, 2019~ Nov. 16, 2019	Mar. 12, 2020	Radiation (03CH11-HY)

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Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Base Station(Measure)	Anritsu	MT8821C	620166475 5	GSM / GPRS /WCDMA / LTE FDD/TDD with 44) /LTE-3CC DLCA,2CC ULCA	Mar. 03, 2019	Nov. 06, 2019~ Nov. 15, 2019	Mar. 02, 2020	Conducted (TH05-HY)
Spectrum Analyzer	Rohde & Schwarz	FSV30	103738	10Hz~30GHz	May 23, 2019	Nov. 06, 2019~ Nov. 15, 2019	May 22, 2020	Conducted (TH05-HY)
Temperature Chamber	ESPEC	SH-641	92013720	-40°C ~90°C	Sep. 02, 2019	Nov. 06, 2019~ Nov. 15, 2019	Sep. 01, 2020	Conducted (TH05-HY)
Programmable Power Supply	GW Instek	PSS-2005	EL890089	1V~20V 0.5A~5A	Feb. 21, 2019	Nov. 06, 2019~ Nov. 15, 2019	Feb. 20, 2020	Conducted (TH05-HY)
Coupler	Warison	20dB 25W SMA Directional Coupler	#A	1-18GHz	Jan. 14, 2019	Nov. 06, 2019~ Nov. 15, 2019	Jan. 13, 2020	Conducted (TH05-HY)

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# 5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of	3.37
Confidence of 95% (U = 2Uc(y))	3.37

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

Measuring Uncertainty for a Level of	3.67
Confidence of 95% (U = 2Uc(y))	3.07

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

Measuring Uncertainty for a Level of	4.03
Confidence of 95% (U = 2Uc(y))	4.03

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

## Conducted Output Power(Average power)

LTE Band 26 Maximum Average Power [dBm]									
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest			
15	1	0		23.69	-	-			
15	1	37		23.22	-	-			
15	1	74		23.73	-	-			
15	36	0	QPSK	22.65	-	-			
15	36	20		22.35	-	-			
15	36	39		22.25	-	-			
15	75	0		22.38	-	-			
15	1	0		22.87	-	-			
15	1	37		22.48	-	-			
15	1	74		22.98	-	-			
15	36	0	16-QAM	21.60	-	-			
15	36	20		21.29	-	-			
15	36	39		21.22	-	-			
15	75	0		21.44	-	-			
15	1	0		21.79	-	-			
15	1	37		21.58	-	-			
15	1	74		21.89	-	-			
15	36	0	64-QAM	20.64	-	-			
15	36	20		20.31	-	-			
15	36	39		20.24	-	-			
15	75	0		20.33	-	-			
10	1	0		-	23.54	-			
10	1	25		-	22.73	-			
10	1	49		-	23.15	-			
10	25	0	QPSK	-	21.91	-			
10	25	12		-	21.91	-			
10	25	25		-	21.90	-			
10	50	0		-	21.93	-			
10	1	0		-	22.26	-			
10	1	25		-	22.02	-			
10	1	49		-	22.42	-			
10	25	0	16-QAM	-	20.88	-			
10	25	12		-	20.85	-			
10	25	25		-	20.90	-			
10	50	0		-	20.95	-			
10	1	0		-	21.22	-			
10	1	25		-	21.00	-			
10	1	49		-	21.34	-			
10	25	0	64-QAM	-	19.89	-			
10	25	12		-	19.89	-			
10	25	25		-	19.91	-			
10	50	0		-	19.93	-			



	LTE Band 26 Maximum Average Power [dBm]									
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest				
5	1	0		23.50	23.26	23.42				
5	1	12		22.77	22.78	22.66				
5	1	24		22.80	22.79	22.63				
5	12	0	QPSK	21.91	21.85	21.81				
5	12	7		21.84	21.87	21.79				
5	12	13		21.86	21.85	21.73				
5	25	0		21.87	21.84	21.77				
5	1	0		22.12	22.06	22.00				
5	1	12		22.03	21.99	21.92				
5	1	24		22.17	22.07	21.84				
5	12	0	16-QAM	20.97	20.86	20.80				
5	12	7		20.87	20.91	20.79				
5	12	13		20.89	20.84	20.73				
5	25	0		20.79	20.85	20.76				
5	1	0		21.08	21.05	20.94				
5	1	12		21.12	20.97	20.86				
5	1	24		21.14	21.03	20.81				
5	12	0	64-QAM	19.93	19.87	19.85				
5	12	7		19.89	19.91	19.80				
5	12	13		19.90	19.88	19.77				
5	25	0		19.79	19.78	19.77				
3	1	0		23.51	23.30	23.37				
3	1	8		22.85	22.80	22.65				
3	1	14	QPSK	22.70	22.71	22.55				
3	8	0		21.90	21.83	21.69				
3	8	4		21.92	21.86	21.72				
3	8	7		21.77	21.79	21.69				
3	15	0		21.92	21.84	21.70				
3	1	0		22.03	22.01	21.91				
3	1	8		22.15	22.04	21.94				
3	1	14		22.00	21.98	21.84				
3	8	0	16-QAM	20.97	20.88	20.80				
3	8	4		20.98	20.90	20.76				
3	8	7		20.87	20.93	20.73				
3	15	0		20.91	20.85	20.71				
3	1	0		20.93	20.95	20.86				
3	1	8		21.23	21.03	20.84				
3	1	14		20.97	20.97	20.75				
3	8	0	64-QAM	19.94	19.88	19.74				
3	8	4		19.97	19.85	19.76				
3	8	7		19.84	19.84	19.71				
3	15	0		19.89	19.81	19.71				

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# FCC RADIO TEST REPORT

		LTE	Band 26 Ma	ximum Average Po	wer [dBm]	
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
1.4	1	0		23.38	23.28	23.33
1.4	1	3		22.78	22.71	22.61
1.4	1	5		22.70	22.69	22.52
1.4	3	0	QPSK	22.78	22.75	22.58
1.4	3	1		22.80	22.75	22.60
1.4	3	3		22.78	22.72	22.56
1.4	6	0		21.82	21.79	21.64
1.4	1	0	16-QAM	21.98	21.95	21.84
1.4	1	3		22.07	21.99	21.88
1.4	1	5		22.02	21.93	21.80
1.4	3	0		21.84	21.81	21.64
1.4	3	1		21.87	21.80	21.66
1.4	3	3		21.81	21.79	21.56
1.4	6	0		20.96	20.86	20.69
1.4	1	0		20.94	20.95	20.81
1.4	1	3		20.94	20.90	20.77
1.4	1	5		21.01	20.91	20.70
1.4	3	0	64-QAM	20.91	20.85	20.73
1.4	3	1		20.93	20.91	20.77
1.4	3	3		20.92	20.85	20.70
1.4	6	0		19.83	19.75	19.62

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# LTE Band 26\_Part 90S

# Peak-to-Average Ratio

Mode						
Mod.	QP	SK	16	Limit: 13dB		
RB Size	1RB Full RB		1RB	Full RB	Result	
Lowest CH			-	-		
Middle CH	3.74	5.04	4.41	5.91	PASS	
Highest CH	-	-	-	-		
Mode						
ii.ouc		LI L Ballu i	26 / 10MHz			
Mod.	64C	AM	207 TOWN 12		Limit: 13dB	
	640 1RB		207 10191112		Limit: 13dB Result	
Mod.		AM	-	-		
Mod. RB Size	1RB	PAM Full RB		-		

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Report No.: FG9O2328C LTE Band 26 / 10MHz / QPSK Middle Channel / 1RB Middle Channel / Full RB Samples: 130000 0.1% 0.01% 3.74 dB 3.80 dB Samples: 130000 0.01% LTE Band 26 / 10MHz / 16QAM Middle Channel / 1RB Middle Channel / Full RB Ref Level 30. 00 dBm Offset 10.80 dB 30 dB AQT 2 ms 30 dB AQT 8amples: 130000 0.01% 4.46 dB Samples: 130000 0.1% Date: 11.NOV.2019 20:32:46 LTE Band 26 / 10MHz / 64QAM Middle Channel / 1RB Middle Channel / Full RB 

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Date: 11.NOV.2019 20:33:47

0.1% 6.35 dB

Samples: 13 0.1% 0.01% 5.51 dB 5.59 dB

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Date: 11.NOV.2019 20:33:36

# 26dB Bandwidth

Mode		LTE Band 26 : 26dB BW(MHz)										
BW	1.4	ИНz	3M	lHz	5M	5MHz 10MHz			15MHz		20MHz	
Mod.	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Lowest CH	1.28	1.28	3.01	3.02	4.84	4.97	-	-	14.15	14.42	-	-
Middle CH	1.29	1.30	3.03	2.97	4.99	4.82	9.71	9.63	-	-	-	-
Highest CH	1.27	1.27	2.98	3.05	4.89	4.97	-	-	-	-	-	-
Mode					LTE Ba	and 26 :	26dB BV	V(MHz)				
BW	1.4	ИНz	3M	lHz	5MHz 10MHz			15MHz		20MHz		
Mod.	64QAM		64QAM		64QAM		64QAM		64QAM		64QAM	
Lowest CH	1.26	-	2.96	-	5.00	-	-	-	14.21	-	-	-
Middle CH	1.29	-	2.97	-	4.93	-	9.83	-	-	-	-	-
Highest CH	1.27	-	3.03	-	4.85	-	-	-	-	-	-	-

Report No. : FG9O2328C

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Report No.: FG9O2328C LTE Band 26 Lowest Channel / 1.4MHz / QPSK Lowest Channel / 1.4MHz / 16QAM Ref Level 30.00 dBm

Att 30 dB

SGL Count 100/100

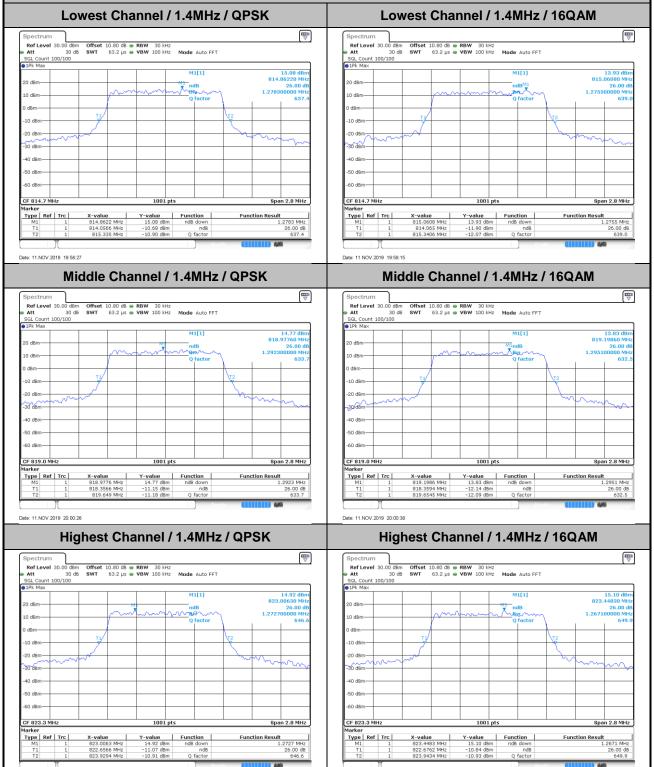
1Pk Max 15.08 dBi 814.86220 MF 26.00 d 1.278300000 MF 10 dBm 637 -10 dBm 40 dBm Span 2.8 MHz CF 814.7 MHz Span 2.8 MHz Type Ref Trc -11.90 dBm -12.07 dBm Middle Channel / 1.4MHz / QPSK Middle Channel / 1.4MHz / 16QAM 10.80 dB • RBW 30 kHz 63.2 µs • VBW 100 kHz Mode Auto FFT 10.80 dB **RBW** 30 kHz 63.2 μs **VBW** 100 kHz **Mode** Auto FFT 14.77 dBr 818.97760 MF -30 dBm 40 dBn 40 dBm -50 dBm Function Result 1.2923 MHz 26.00 dB 633.7 Function Result

1.2951 MHz
26.00 dB
632.5 
 X-value
 Y-value
 Function

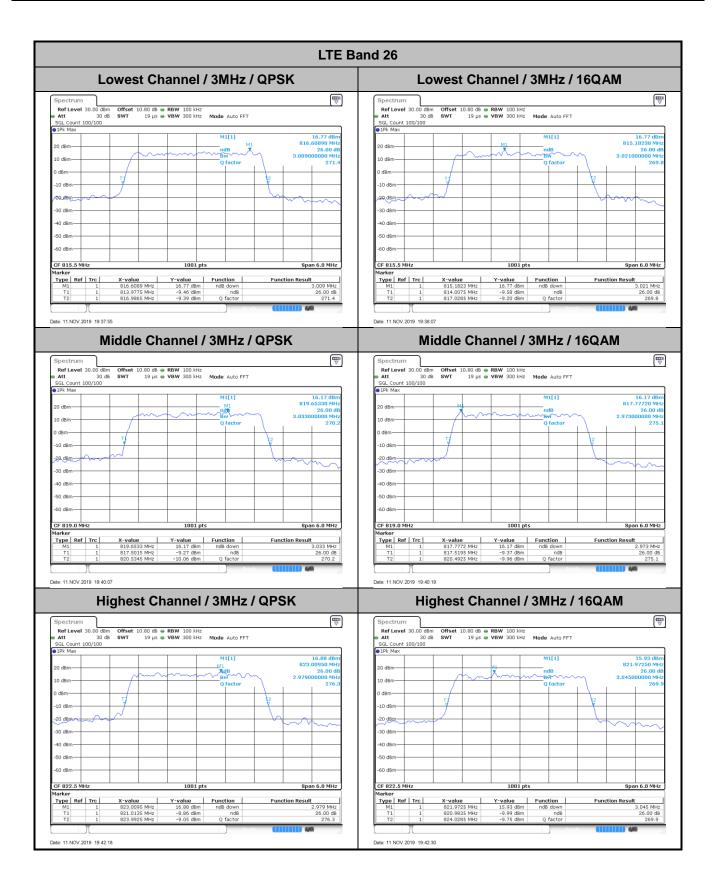
 818.9776 MHz
 14.77 dBm
 ndB down

 818.3566 MHz
 -11.15 dBm
 ndB

 819.649 MHz
 -11.18 dBm
 Q factor
 Type Ref Trc Type Ref Trc Date: 11.NOV.2019 20:00:26 Date: 11.NOV.2019 20:00:38 Highest Channel / 1.4MHz / QPSK Highest Channel / 1.4MHz / 16QAM Offset 10.80 dB ● RBW 30 kHz SWT 63.2 µs ● VBW 100 kHz Mode Auto FFT Att 30 dB
 SGL Count 100/100
 1Pk Max 15.10 dB 823.44830 MF 14.92 dB 823.00630 M



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Report No.: FG9O2328C LTE Band 26 Lowest Channel / 5MHz / QPSK Lowest Channel / 5MHz / 16QAM Ref Level 30.00 dBm

Att 30 dB

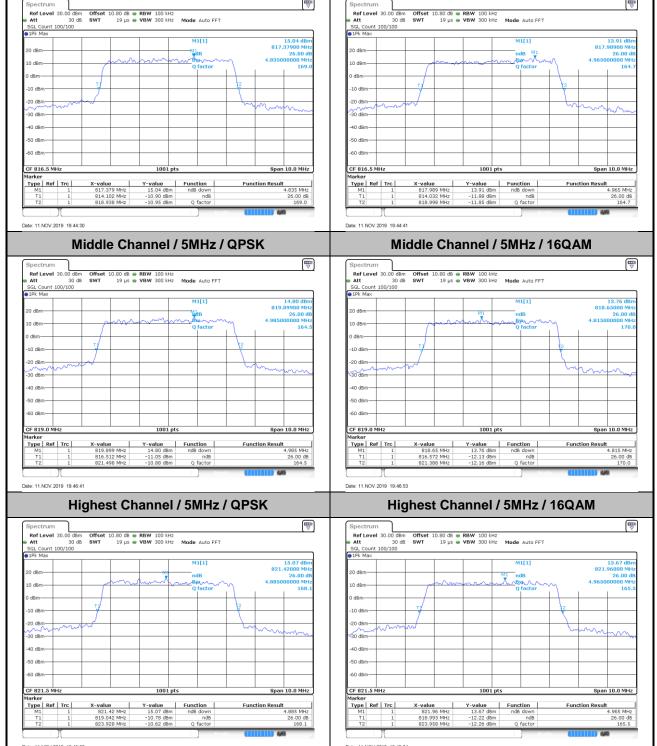
SGL Count 100/100

1Pk Max 15.04 dBi 817.37900 MH 26.00 d 4.835000000 MH 169 164 -10 dBm 40 dBm Span 10.0 MHz CF 816.5 MHz Span 10.0 MHz Type Ref Trc -11.88 dBm -11.85 dBm Middle Channel / 5MHz / QPSK Middle Channel / 5MHz / 16QAM .80 dB • RBW 100 kHz 19 µs • VBW 300 kHz Mode Auto FFT Offset 10.80 dB ● RBW 100 kHz SWT 19 µs ● VBW 300 kHz Mode Auto FFT 13.76 dBn 818.65000 14.80 dBi 819.899nn Mi-M1[1] 26.00 d 30 dBm 40 dBm Function Result 4.985 MHz 26.00 dB 164.5 Function Result 4.815 MHz 26.00 dB 170.0 
 X-value
 Y-value
 Function

 819,899 MHz
 14,80 dBm
 ndB down

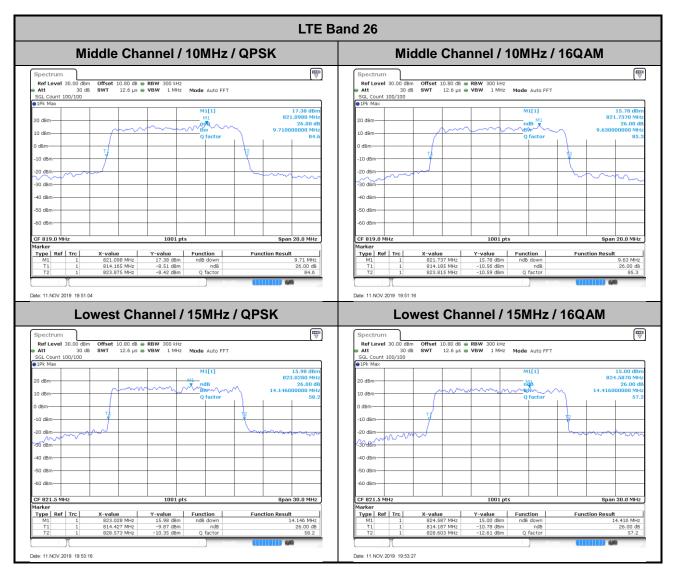
 916.512 MHz
 -11,05 dBm
 ndB

 821.498 MHz
 -10.88 dBm
 Q factor
 Type Ref Trc Type Ref Trc Function n ndB down Date: 11.NOV.2019 19:46:41 Date: 11.NOV.2019 19:46:53 Highest Channel / 5MHz / QPSK Highest Channel / 5MHz / 16QAM ♥ Offset 10.80 dB ● RBW 100 kHz SWT 19 µs ● VBW 300 kHz Mode Auto FFT



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C RADIO TEST REPORT Report No. : FG902328C



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Report No.: FG9O2328C LTE Band 26 Lowest Channel / 1.4MHz / 64QAM Lowest Channel / 3MHz / 64QAM Ref Level 30.00 dBm

Att 30 dB

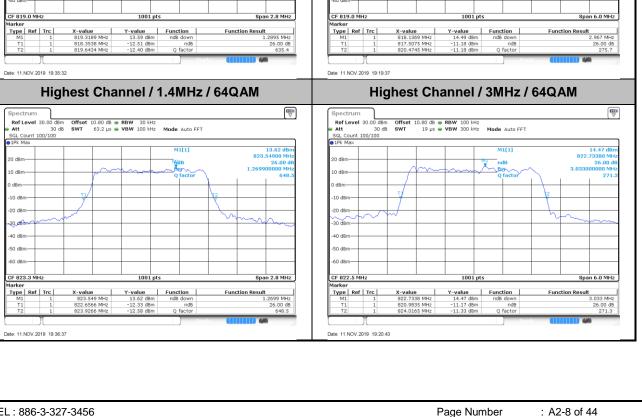
SGL Count 100/100

1Pk Max 26 1.25590000 275 -10 dBm -40 dBm 40 dBm Span 2.8 MHz CF 815.5 MHz 6.0 MHz X-value 814.8035 MHz 814.0874 MHz 815.3434 MHz Type Ref Trc -11.09 dBm -11.18 dBm Middle Channel / 1.4MHz / 64QAM Middle Channel / 3MHz / 64QAM 10.80 dB • RBW 30 kHz 63.2 µs • VBW 100 kHz Mode Auto FFT 10.80 dB **RBW** 100 kHz 19 μs **VBW** 300 kHz **Mode** Auto FFT 13.59 dB 819.31890 MF 40 dBm Function Result 1.2895 MHz 26.00 dB 635.4 Function Result 2.967 MHz 26.00 dB 275.7 
 X-value
 Y-value
 Function

 819.3189 MHz
 13.59 dBm
 ndB down

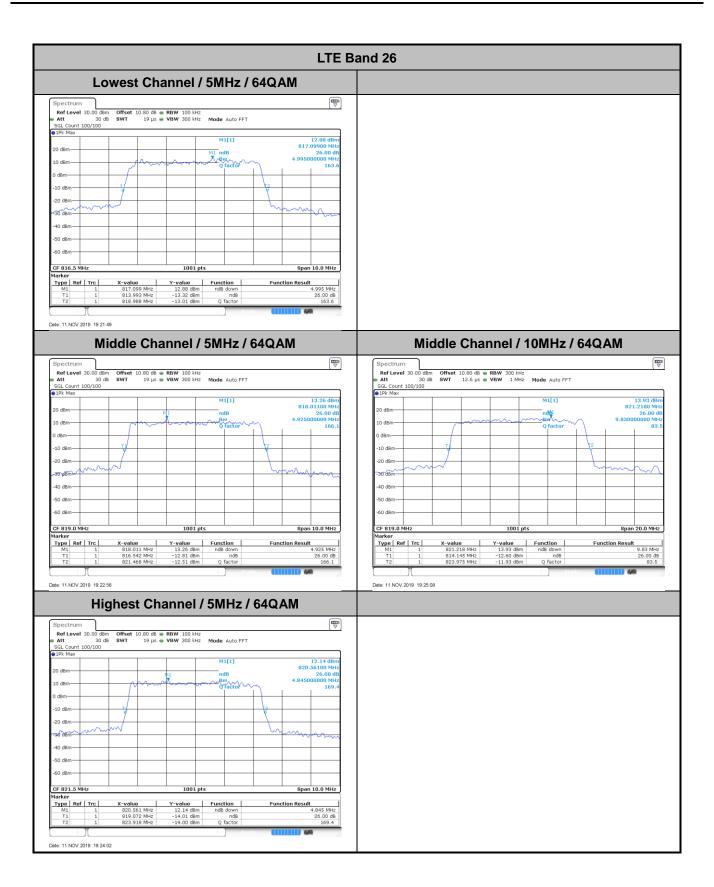
 818.3538 MHz
 -12.51 dBm
 ndB

 819.6434 MHz
 -12.40 dBm
 Q factor
 Type Ref Trc Type Ref Trc Date: 11.NOV.2019 19:35:32 Date: 11.NOV.2019 19:19:37 Highest Channel / 1.4MHz / 64QAM Highest Channel / 3MHz / 64QAM Offset 10.80 dB ● RBW 100 kHz SWT 19 µs ● VBW 300 kHz Mode Auto FFT Att 30 dB
 SGL Count 100/100
 1Pk Max M1[1] 13.62 dB 823.54900 MF 14.47 dB 822.73380 MF



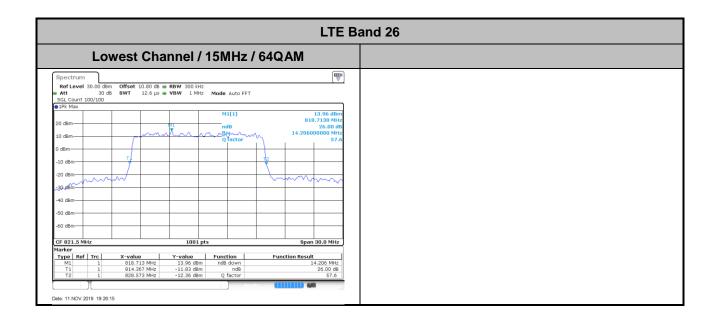
TEL: 886-3-327-3456

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# **Occupied Bandwidth**

Mode	LTE Band 26 : 99%OBW(MHz)											
BW	1.4	ИHz	3M	lHz	5MHz 10MHz			15MHz		20MHz		
Mod.	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Lowest CH	1.09	1.09	2.72	2.72	4.49	4.49	-	-	13.40	13.46		-
Middle CH	1.10	1.09	2.73	2.72	4.49	4.50	9.01	9.01	-	-	-	-
Highest CH	1.10	1.10	2.73	2.73	4.50	4.50	-	-	-	-	-	-
Mode					LTE Ba	and 26 : 9	99%OBV	V(MHz)				
BW	1.4	ИHz	3MHz		5MHz		10MHz		15MHz		20MHz	
Mod.	64QAM		64QAM		64QAM		64QAM		64QAM		64QAM	
Lowest CH	1.09	-	2.72	-	4.49	-	-	-	13.46	-	-	-
Middle CH	1.10	-	2.71	-	4.48	-	9.05	-	-	-	-	-
Highest CH	1.09	-	2.72	-	4.51	-	-	-	-	-	-	-

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Report No.: FG9O2328C LTE Band 26 Lowest Channel / 1.4MHz / QPSK Lowest Channel / 1.4MHz / 16QAM Ref Level 30.00 dBm Att 30 dB SGL Count 100/100 -20 dBm 40 dBm- 
 X-value
 Y-value
 Function

 814.4991 MHz
 15.01 dBm

 814.15175 MHz
 7.72 dBm
 Occ Bw

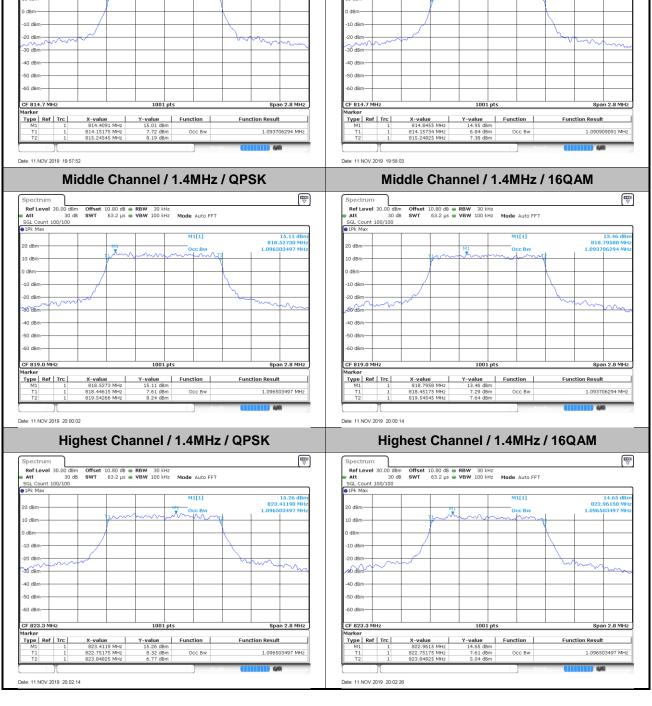
 815.24545 MHz
 8.19 dBm

 X-value
 Y-value
 Function

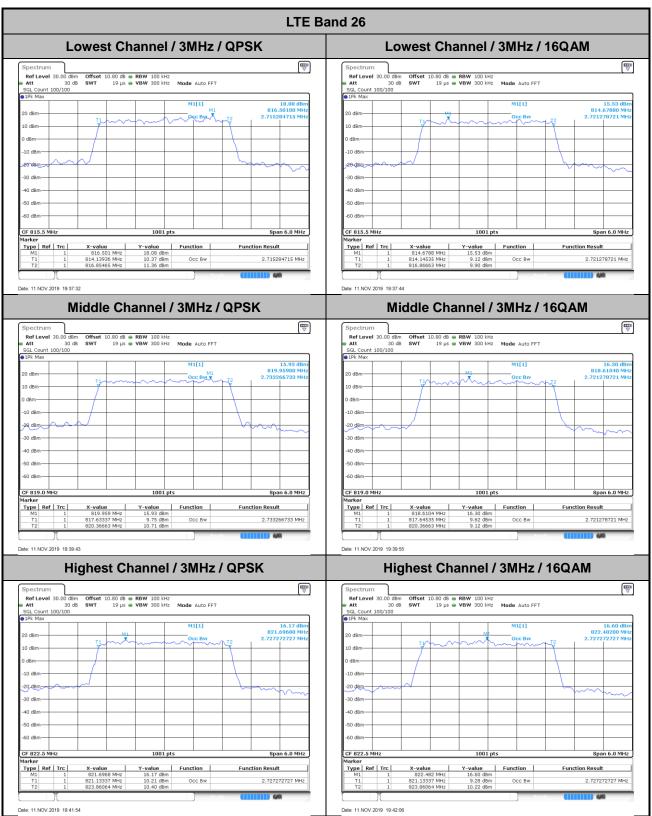
 814.8455 MHz
 14.95 dBm
 814.15734 MHz
 6.84 dBm
 Occ Bw

 815.24825 MHz
 7.38 dBm
 Occ Bw
 7.38 dBm
 Occ Bw
 Type Ref Trc Function Result Type Ref Trc 1.093706294 MHz 1.090909091 MHz Date: 11 NOV 2019 19:58:03 Middle Channel / 1.4MHz / QPSK Middle Channel / 1.4MHz / 16QAM Ref Level 30.00 15.11 dBi 818.52730 MF 1.096503497 MF M1[1] M1[1] 30 dBm-Type | Ref | Trc | Function Result 
 Type
 Ref
 Trc
 X-value
 Y-value
 Function

 M1
 1
 818.7958 MHz
 13.46 dBm
 13.46 dBm 7.29 dBm Occ Bw 7.64 dBm 15.11 dBm 7.61 dBm Occ Bw 8.24 dBm 1.093706294 MHz 1.096503497 MHz Date: 11.NOV:2019 20:00:14 Highest Channel / 1.4MHz / QPSK Highest Channel / 1.4MHz / 16QAM Ref Level 30.00 dBm
Att 30 dB
SGL Count 100/100 M1[1] M1[1] 10 dBm-10 dBm--10 dBm



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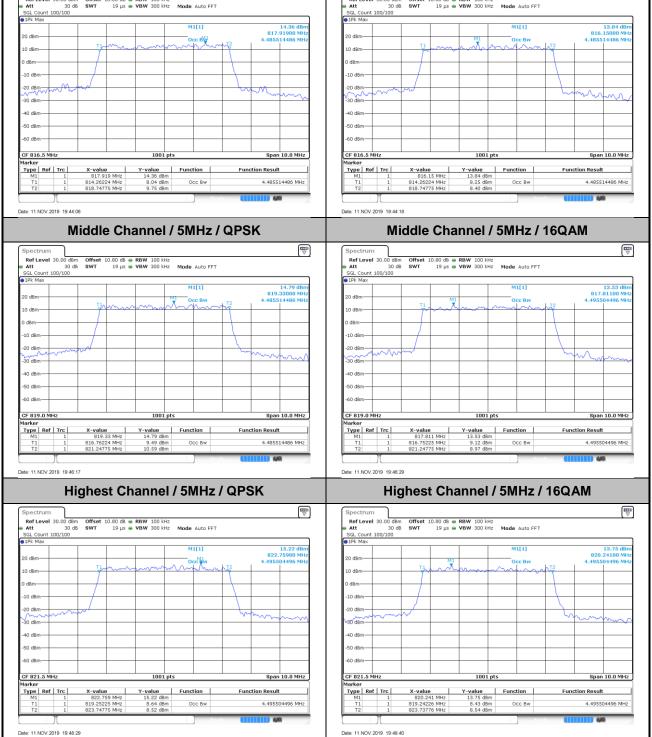
Report No.: FG9O2328C LTE Band 26 Lowest Channel / 5MHz / QPSK Lowest Channel / 5MHz / 16QAM Ref Level 30.00 dBm
Att 30 dB
SGL Count 100/100 10 dBm -10 dBm -10 dBm -40 dBm 40 dBm -60 dBn -60 dBm Span 10.0 MHz CF 816.5 MHz CF 816.5 MHz 1001 pts X-value 815.15 MHz 814.26224 MHz 818.74775 MHz X-value 817.919 MHz 814.26224 MHz 818.74775 MHz Y-value 13.84 dBm 8.25 dBm 8.40 dBm Type Ref Trc Type Ref Trc Middle Channel / 5MHz / QPSK Middle Channel / 5MHz / 16QAM 10.80 dB • RBW 100 kHz 19 µs • VBW 300 kHz Mode Auto FFT 14.79 dBi 819.33000 MF 4.485514486 MF 13.53 dBn 817.81100 MH 4.495504496 MH dBm--20 dBm 40 dBm 40 dBm -50 dBm-CF 819.0 MHz X-value Y-value Function

817.811 MHz 13.53 dBm
816.75225 MHz 9.12 dBm Occ Bw
821.24775 MHz 8.97 dBm Type Ref Trc 
 X-value
 Y-value
 Function

 819.33 MHz
 14.79 dBm

 816.76224 MHz
 9.49 dBm
 Occ Bw

 821.24775 MHz
 10.59 dBm
 Type Ref Trc Function Result **Function Result** 4.485514486 MHz 4.495504496 MHz Date: 11.NOV.2019 19:46:17 Date: 11.NOV.2019 19:46:29 Highest Channel / 5MHz / QPSK Highest Channel / 5MHz / 16QAM Ref Level 30.00 dBm Offset 10.80 dB ● RBW 100 kHz ■ Att 30 db SWT 19 µs ● VBW 300 kHz Mode Auto FFT SGL Count 100/100 
■ 1Pk Max 20 dBm dBm-



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LTE Band 26 Middle Channel / 10MHz / QPSK Middle Channel / 10MHz / 16QAM Ref Level 30.00 dBm
Att 30 dB
SGL Count 100/100 10 dBm -10 dBm--10 dBm -40 dBm--40 dBm--60 dBm 1001 pts CF 819.0 MHz Span 20.0 MHz CF 819.0 MHz Span 20.0 MHz Type Ref Trc Function Function Result Type Ref Trc Date: 11.NOV.2019 19:50:40 Date: 11.NOV.2019 19:50:52 LTE Band 26 Lowest Channel / 15MHz / QPSK Lowest Channel / 15MHz / 16QAM 16.24 dBr 818.0230 MH 96603397 MH 20 dBm 10 dBm--10 dBm--30 dBm -50 dBm--60 dBm CF 821.5 MHz 
 X-value
 Y-value
 Function

 818.023 MHz
 16.24 dBm

 914.9167 MHz
 10.63 dBm
 Occ Bw

 828.2133 MHz
 11.30 dBm
 Marker
Type Ref Trc 
 Type
 Ref
 Trc
 X-value
 Y-value
 Function

 M1
 1
 815.266 MHz
 15.86 dBm

Report No.: FG9O2328C

Occ Bw

13.456543457 MHz

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13.396603397 MHz

Date: 11.NOV.2019 19:53:04

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Date: 11.NOV.2019 19:52:52

 X-value
 Y-value
 Function

 823.4874 MHz
 13.77 dbm
 828.22.75734 MHz
 8.18 dbm
 Occ Bw

 823.84545 MHz
 7.01 dbm
 7.01 dbm
 7.01 dbm
 7.01 dbm

Type | Ref | Trc |

Date: 11.NOV.2019 19:36:26

Report No.: FG9O2328C LTE Band 26 Lowest Channel / 1.4MHz / 64QAM Lowest Channel / 3MHz / 64QAM Ref Level 30.00 dBm Att 30 dB SGL Count 100/100 -20 dBm-40 dBm- 
 X-value
 Y-value
 Function

 815.0161 MHz
 14.33 dBm
 B15.2455 MHz

 814.15455 MHz
 8.52 dBm
 Occ Bw

 815.24545 MHz
 7.28 dBm

 X-value
 Y-value
 Function

 815.7458 MHz
 14.61 dBm
 814.1453 MHz
 7.73 dBm
 Occ Bw

 916.86064 MHz
 7.39 dBm
 7.39 dBm
 Occ Bw
 Type Ref Trc **Function Result** Type Ref Trc 1.090909091 MHz 2.715284715 MHz Date: 11 NOV 2019 19:18:19 Middle Channel / 1.4MHz / 64QAM Middle Channel / 3MHz / 64QAM Ref Level 30.00 dBm Offset 10.80 dB ● RBW 100 kHz ■ Att 30 dB SWT 19 µs ● VBW 300 kHz Mode Auto FFT SGL Count 100/100 ■ 1Pk Max 13.95 dBr 818.99440 MF 1.099300699 MF M1F11 -10 dBm 30 dBm 30 d8m Type | Ref | Trc | 
 X-value
 Y-value
 Function

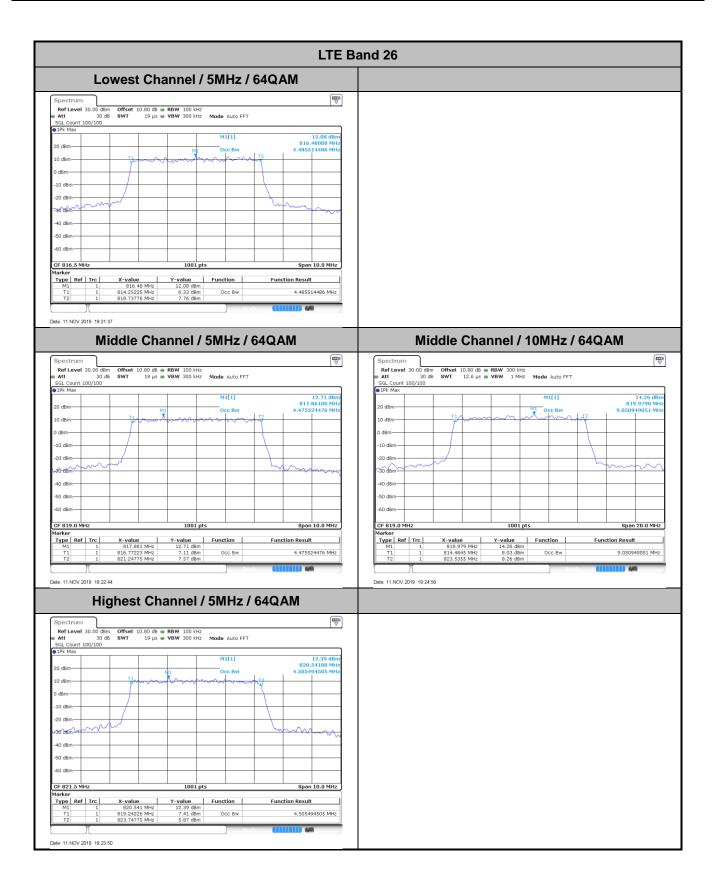
 818.9944 MHz
 13.95 dBm
 Type Ref Trc X-value Y-value Function 818.7902 MHz 14.68 dBm Function Result 14.68 dBm 7.34 dBm Occ Bw 7.86 dBm 818.9944 MHz 13.95 dBm 818.45175 MHz 6.57 dBm Occ Bw 819.55105 MHz 5.13 dBm 818.7902 MHz 817.65135 MHz 820.36064 MHz 1.099300699 MHz 2.709290709 MHz Date: 11.NOV.2019 19:19:25 Highest Channel / 1.4MHz / 64QAM Highest Channel / 3MHz / 64QAM Ref Level 30.00 dBm
Att 30 dB
SGL Count 100/100 13.77 dBi 823.48740 MF 1.088111888 MF M1[1] M1[1] 10 dBm-10 dBm--10 dBm -60 dBm-

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Type | Ref | Trc |

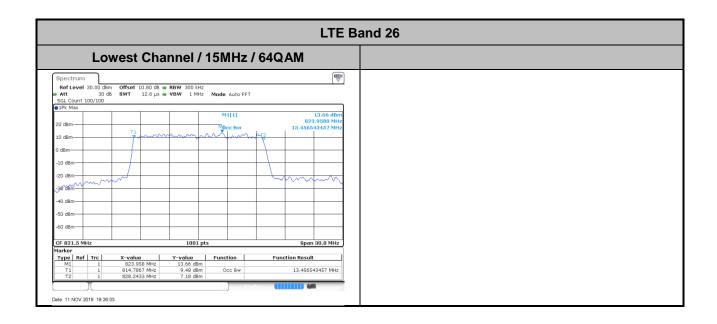
2.715284715 MHz

RADIO TEST REPORT Report No. : FG902328C



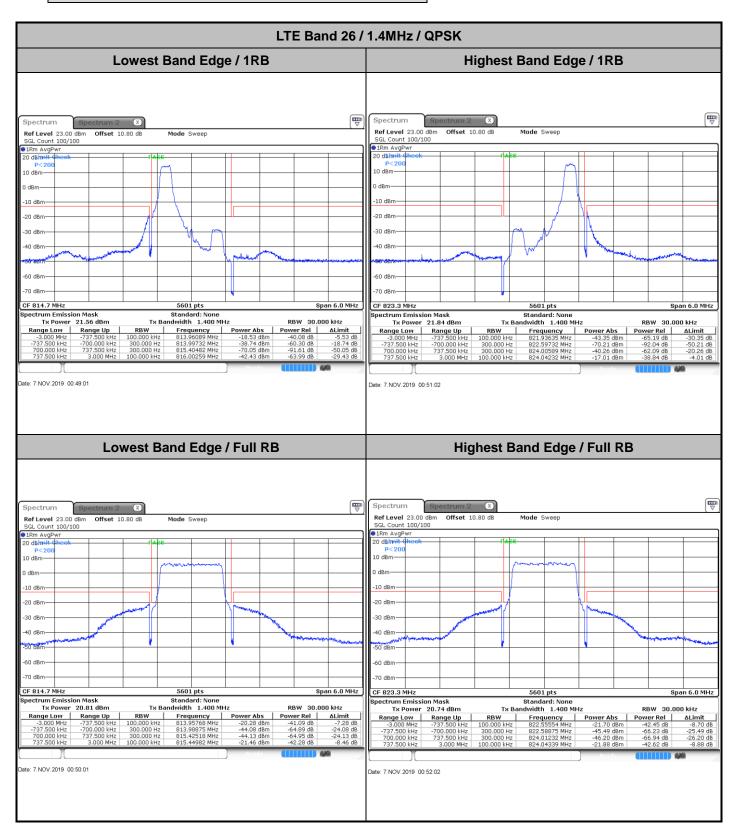
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Report No.: FG9O2328C



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## Emission masks - In-band emissions



Report No.: FG9O2328C

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Report No.: FG9O2328C LTE Band 26 / 1.4MHz / 16QAM Lowest Band Edge / 1 RB Highest Band Edge / 1 RB Spectrum Spectrum Ref Level 23.00 dBm Offset 10.80 dB Mode Sweep Ref Level 23.00 dBm Offset 10.80 dB Mode Sweep SGL Count 100/100 ●1Rm AvgPwr -10 dBm 20 dBn -20 dBr -30 dBm 40 dBm CF 814.7 MHz 5601 pts Span 6.0 MHz CF 823.3 MHz pectrum Emission Mask
Tx Power 20.64 dBm
Range Low Range Up | Spectrum Emission Mask | Tx Power | 20.86 dBm | Range Low | Power | 20.86 dBm | 2-30.00 MHz | 2-37.500 kHz | 2-700.000 kHz | 700.000 kHz | 737.500 kHz | 373.500 kHz | 33.000 MHz | 2-30.000 kHz | 33.000 MHz | 2-30.000 kHz | 33.000 MHz | 2-30.000 kHz | 2-30.000 Standard: None ndwidth 1.400 MHz Tx Ba RBW 30.000 kHz | Power Rel | ΔLimit |
-38.18 dB | -4.55 |
-60.97 dB | -20.34 |
-89.54 dB | -48.90 |
-64.30 dB | -30.66 
 Frequency
 Power Abs

 821.96742 MHz
 -44.05 dBm

 822.59625 MHz
 -70.40 dBm

 824.00375 MHz
 -40.91 dBm

 824.03804 MHz
 -18.97 dBm

 Power Rel
 ∆Limit

 -64.91 dB
 -31.05 dB

 -91.27 dB
 -50.40 dB

 -61.77 dB
 -20.91 dB

 -39.83 dB
 -5.97 dB
 Frequency 813.96196 MHz 813.99732 MHz Date: 7.NOV.2019 00:49:31 Date: 7.NOV.2019 00:51:32 Lowest Band Edge / Full RB **Highest Band Edge / Full RB** Spectrum Spectrum Spectrum 2 Mode Sweep Ref Level 23.00 dBm Offset 10.80 dB Ref Level 23.00 dBm Offset 10.80 dB Mode Sweep SGL Count 100/100 ●1Rm AvgPwr CF 814.7 MHz 5601 pts Span 6.0 MHz 5601 pts pectrum Emission Mask Tx Power 19.88 dBm Standard: None Tx Bandwidth 1.400 MHz ectrum Emission Mask Standard: None Tx Bandwidth 1.400 MHz Tx Power 19.84 dBm RBW 30,000 kHz Frequency 813,93947 MHz 
 Power Rel
 ∆Limit

 n
 -42.02 dB
 -9.15

 n
 -64.89 dB
 -25.01

 n
 -65.56 dB
 -25.68

 n
 -42.38 dB
 -9.50
 Range Low Range Up Range Low Range Up Frequency | Power Abs | 822.56196 MHz | -23.26 dBn

TEL: 886-3-327-3456 Page Number : A2-20 of 44

Date: 7.NOV.2019 00:52:32

FAX: 886-3-328-4978

ate: 7 NOV 2019 00:50:31

Report No.: FG9O2328C LTE Band 26 / 1.4MHz / 64QAM Lowest Band Edge / 1 RB Highest Band Edge / 1 RB Spectrum Spectrum Ref Level 23.00 dBm Offset 10.80 dB Mode Sweep Ref Level 23.00 dBm Offset 10.80 dB Mode Sweep SGL Count 100/100 ●1Rm AvgPwr -10 dBm 20 dBn -20 dBr -30 dBm 40 dBm CF 814.7 MHz 5601 pts Span 6.0 MHz CF 823.3 MHz pectrum Emission Mask
Tx Power 19.89 dBm
Range Low Range Up | Spectrum Emission Mask | Tx Power | 20.04 dBm | Range Low | Range Up | -3.000 MHz | -737.500 kHz | -700.000 kHz | 737.500 kHz | 737.500 kHz | 33.000 MHz | -737.500 kHz | 737.500 kHz | 737.500 kHz | -737.500 kHz | -Standard: None ndwidth 1.400 MHz Tx Ba RBW 30.000 kHz 
 Frequency
 Power Abs

 821.97706 MHz
 -45.14 dBm

 822.59518 MHz
 -72.82 dBm

 824.00482 MHz
 -42.74 dBm

 824.05089 MHz
 -21.24 dBm

 Power Rel
 ∆Limit

 -65.18 dB
 -32.14 dB

 -92.86 dB
 -52.82 dB

 -62.78 dB
 -22.74 dB

 -41.28 dB
 -8.24 dB
 Frequency 813.96196 MHz Date: 7.NOV.2019 01:07:13 Date: 7.NOV.2019 01:08:14 Lowest Band Edge / Full RB **Highest Band Edge / Full RB** Spectrum Spectrum Spectrum 2 Mode Sweep Ref Level 23.00 dBm Offset 10.80 dB Ref Level 23.00 dBm Offset 10.80 dB Mode Sweep SGL Count 100/100 ●1Rm AvgPwr CF 814.7 MHz 5601 pts Span 6.0 MHz 5601 pts pectrum Emission Mask Tx Power 18.85 dBm Standard: None Tx Bandwidth 1.400 MHz ectrum Emission Mask Standard: None Tx Bandwidth 1.400 MHz Tx Power 18.57 dBm RBW 30,000 kHz Frequency 012 95018 MHz Range Low Range Up Range Low Range Up 

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Date: 7.NOV.2019 01:08:44

FAX: 886-3-328-4978

ate: 7 NOV 2019 01:07:43

Report No.: FG9O2328C LTE Band 26 / 3MHz / QPSK Lowest Band Edge / 1RB Highest Band Edge / 1 RB Spectrum Spectrum Ref Level 23.00 dBm Offset 10.80 dB Mode Sweep Ref Level 23.00 dBm Offset 10.80 dB Mode Sweep SGL Count 100/100 ●1Rm AvgPwr -10 dBm 20 dBn -20 dBr -30 dBm 40 dBm 70 dBm | CF 822.5 MHz | Spectrum Emission Mask | Tx Power 21.32 dBm | Range Low | Range Up | -5.000 MHz | -1.538 MHz | -1.538 MHz | -1.538 MHz | -1.538 MHz | -5.000 MHz | -1.538 MHz | -1.500 MHz | -1.538 MHz | -1. CF 815.5 MHz 5601 pts Span 10.0 MHz | Table | Tabl Standard: None ndwidth 3.000 MHz RBW 30.000 kHz 
 Power Rel
 ΔLimit

 -39.75 dB
 -5.31 dB

 -61.81 dB
 -20.38 dB

 -93.94 dB
 -52.50 dB

 -62.96 dB
 -28.52 dB

 Frequency
 Power Abs

 819.95804 MHz
 -42.28 dBm

 820.97589 MHz
 -72.55 dBm

 824.00089 MHz
 -40.18 dBm

 824.03839 MHz
 -18.03 dBm

 Power Rel
 ∆Limit

 -63.61 dB
 -29.28 dB

 -93.87 dB
 -52.55 dB

 -61.51 dB
 -20.18 dB

 -39.35 dB
 -5.03 dB
 Frequency 813.96161 MHz 813.98661 MHz Date: 7.NOV.2019 00:53:03 Date: 7.NOV.2019 00:55:05 Lowest Band Edge / Full RB **Highest Band Edge / Full RB** Spectrum Spectrum Spectrum 2 Mode Sweep Ref Level 23.00 dBm Offset 10.80 dB SGL Count 100/100 Ref Level 23.00 dBm Offset 10.80 dB Mode Sweep SGL Count 100/100 ●1Rm AvgPwr CF 815.5 MHz 5601 pts 5601 pts ectrum Emission Mask Tx Power 20.79 dBm Standard: None Tx Bandwidth 3.000 MHz ectrum Emission Mask Standard: None Tx Bandwidth 3.000 MHz Tx Power 20.76 dBm RBW 30,000 kHz Frequency 013 95089 MHz Range Low Range Up Range Low Range Up -5.000 MHz -1.538 MHz 
 Frequency
 Power Abs

 820.95982 MHz
 -23.15 dBn

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Date: 7.NOV.2019 00:56:06

FAX: 886-3-328-4978

Date: 7 NOV 2019 00:54:04

Date: 7 NOV 2019 00:54:35

FAX: 886-3-328-4978

Report No.: FG9O2328C LTE Band 26 / 3MHz / 16QAM Lowest Band Edge / 1 RB Highest Band Edge /1 RB Spectrum Spectrum Ref Level 23.00 dBm Offset 10.80 dB Mode Sweep Ref Level 23.00 dBm Offset 10.80 dB Mode Sweep SGL Count 100/100 ●1Rm AvgPwr -10 dBm 20 dBn -20 dBr -30 dBm -40 dBm 70 dBm | CF 822.5 MHz | Spectrum Emission Mask | Tx Power 20.75 dBm | Range Low | Range Up | -5.000 MHz | -1.538 MHz | -1.538 MHz | -1.538 MHz | -1.538 MHz | -5.000 MHz | -1.538 MHz | -5.000 MHz | -5. CF 815.5 MHz 5601 pts Span 10.0 MHz | Telephone | Tele Standard: None ndwidth 3.000 MHz RBW 30.000 kHz 
 Frequency
 Power Abs

 813.96161 MHz
 -18.75 dBm

 813.99018 MHz
 -41.38 dBm

 817.00446 MHz
 -73.18 dBm

 818.02054 MHz
 -42.33 dBm

 Power Rel
 ΔLimit

 -39.46 dB
 -5.75

 -62.08 dB
 -21.38

 -93.88 dB
 -53.18

 -63.03 dB
 -29.33
 RBW 100.000 kHz 300.000 Hz 300.000 Hz 100.000 kHz 
 Frequency
 Power Abs

 819.91518 MHz
 -42.92 dBm

 820.97054 MHz
 -73.35 dBm

 824.00268 MHz
 -41.25 dBm

 824.05268 MHz
 -18.79 dBm

 Power Rel
 ∆Limit

 -63.68 dB
 -29.92 dB

 -94.11 dB
 -53.35 dB

 -62.01 dB
 -21.25 dB

 -39.54 dB
 -5.79 dB
 Date: 7.NOV.2019 00:53:34 Date: 7.NOV.2019 00:55:35 Lowest Band Edge / Full RB **Highest Band Edge / Full RB** Spectrum Spectrum Spectrum 2 Mode Sweep Ref Level 23.00 dBm Offset 10.80 dB SGL Count 100/100 Ref Level 23.00 dBm Offset 10.80 dB Mode Sweep SGL Count 100/100 ●1Rm AvgPwr 50 dBm CF 815.5 MHz 5601 pts 5601 pts pectrum Emission Mask
Tx Power 19.80 dBm
Range Low Range Up
-5.000 MHz -1.538 MH Standard: None Tx Bandwidth 3.000 MHz ectrum Emission Mask Standard: None Tx Bandwidth 3.000 MHz Tx Power 19.76 dBm RBW 30,000 kHz Frequency 813,93482 MHz Range Low Range Up Power Rel ΔLimit
-44.34 dB -11.55 

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Date: 7.NOV.2019 00:56:36

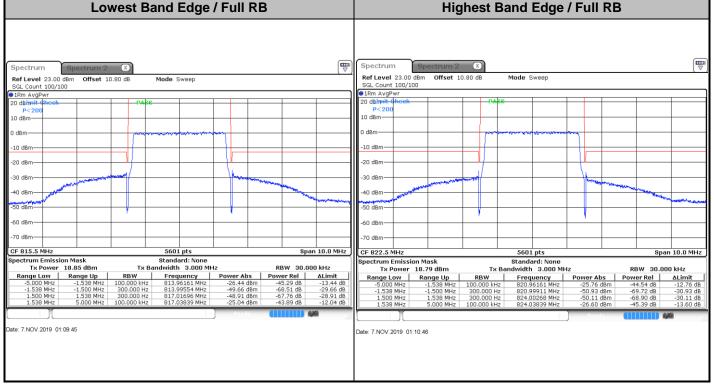
Report No.: FG9O2328C LTE Band 26 / 3MHz / 64QAM Lowest Band Edge / 1 RB Highest Band Edge /1 RB Spectrum Spectrum Ref Level 23.00 dBm Offset 10.80 dB Mode Sweep Ref Level 23.00 dBm Offset 10.80 dB Mode Sween 20 dBn -20 dBm 60 dBn CF 815.5 MHz 5601 pts Span 10.0 MHz CF 822.5 MHz 5601 pts Span 10.0 MHz | Telephone | Tele Standard: None RBW 100.000 kHz 300.000 Hz 300.000 Hz 100.000 kHz Power Abs : -43.26 dBm : -73.63 dBm : -43.17 dBm : -19.65 dBm 
 Frequency
 Power Abs

 813.96161 MHz
 -20.26 dB

 813.99911 MHz
 -44.36 dB

 817.00625 MHz
 -73.88 dB

 818.08839 MHz
 -42.77 dB
 Frequency 819.92411 MHz 820.97054 MHz Date: 7.NOV.2019 01:09:15 Date: 7.NOV.2019 01:10:16



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