

Report No.: FG971044-02A



# FCC RADIO TEST REPORT

FCC ID : AK8XT0011

Equipment : IoT Network device

Brand Name : Sony

Applicant : Sony Corporation

1-7-1 Konan Minato-ku, Tokyo,

108-0075 Japan

Manufacturer : Sony Corporation

1-7-1 Konan Minato-ku, Tokyo,

108-0075 Japan

Standard: 47 CFR Part 2, 27

The product was received on Jul. 10, 2019 and testing was started from Oct. 29, 2019 and completed on Jan. 11, 2020. 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 Wu

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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Report Version : 01

# History of this test report

Report No. : FG971044-02A

Report No.	Version	Description	Issued Date
FG971044-02A	01	Initial issue of report	Jan. 21, 2020

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# **Summary of Test Result**

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Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
	§2.1046	Conducted Output Power	Reporting only	
3.2	§27.50 (b)(10) §27.50 (c)(10)	Effective Radiated Power (Band 12) (Band 13)	Door	-
	§27.50 (d)(4)	Equivalent Isotropic Radiated Power (Band 4)	Pass	
3.3	§27.50 (d)(5)	Peak-to-Average Ratio	Pass	-
3.4	§2.1049	Occupied Bandwidth	Reporting only	-
3.5	\$2.1051 \$27.53 (c)(2)(4) \$27.53 (g) \$27.53 (h)	Conducted Band Edge Measurement (Band 4) (Band 12) (Band 13)	Pass	-
3.6	\$2.1051 \$27.53 (c)(2) \$27.53 (g) \$27.53 (h)	Conducted Spurious Emission (Band 4) (Band 12) (Band 13)	Pass	-
3.7	§2.1055 §27.54	Frequency Stability Temperature & Voltage	Pass	-
4.2	\$2.1053 \$27.53 (c)(2) \$27.53 (f) \$27.53 (g) \$27.53 (h)	Radiated Spurious Emission (Band 4) (Band 12) (Band 13)	Pass	Under limit 4.28 dB at 1568.000 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: Ann Lee

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## 1 General Description

## 1.1 Product Feature of Equipment Under Test

LTE, Bluetooth-LE, NFC and GNSS.

	Standards-rel	ated Product Specification
Antenna Type		PIFA Antenna

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EUT Information List										
HW Version	SW Version	S/N	Performed Test Item							
А	00.039	1928PSLC824571473B1	Radiated Spurious Emission ERP/EIRP Test							

	Accessory List						
Dettem	Model Name : AHB482331HPC						
Battery	S/N: N/A						
LICD Calala	Model Name.: W1001-ZZ-0107						
USB Cable	S/N: N/A						
Ome all a	Model Name.: CB403D-0000-202						
Cradle	S/N: N/A						

#### Note:

- 1. Above EUT list used are electrically identical per declared by manufacturer.
- 2. Above the accessories list are used to exercise the EUT during test, and the serial number of each type of accessories is listed in each section of this report.
- 3. For other wireless features of this EUT, test report will be issued separately.

#### 1.2 Modification of EUT

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

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# 1.3 Emission Designator

	LTE Band 4		QPSK			16QAM		
BW (MHz)	Frequency Range (MHz)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum EIRP(W)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum EIRP(W)	
1.4	1710.7~1754.3	1M12G7D	-	0.1081	1M10W7D	-	0.0711	
3	1711.5~1753.5	1M21G7D	-	0.1074	1M17W7D	-	0.0664	
5	1712.5~1752.5	1M17G7D	-	0.1086	1M19W7D	-	0.1119	
10	1715.0~1750.0	1M46G7D	0.0064	0.1079	1M44W7D	-	0.1117	
15	1717.5~1747.5	1M47G7D	-	0.1079	1M44W7D	-	0.1114	
20	1720.0~1745.0	1M52G7D	=	0.1079	1M52W7D	-	0.1119	
	LTE Band 12		QPSK		16QAM			
BW (MHz)	Frequency Range (MHz)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum ERP(W)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum ERP(W)	
1.4	699.7~715.3	1M09G7D	-	0.0020	1M10W7D	-	0.0015	
3	700.5~714.5	1M17G7D	-	0.0019	1M20W7D	-	0.0019	
5	701.5~713.5	1M16G7D	-	0.0019	1M17W7D	-	0.0019	
10	704.0~711.0	1M48G7D	0.0213	0.0019	1M46W7D	-	0.0020	
	LTE Band 13		QPSK		16QAM			
BW (MHz)	Frequency Range (MHz)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum ERP(W)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum ERP(W)	
5	779.5~784.5	1M18G7D	-	0.0043	1M48W7D	-	0.0045	
10	782.0	1M19G7D	0.0165	0.0044	1M46W7D	-	0.0045	

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## 1.4 Testing Location

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.
lest Site No.	TH05-HY
Test Engineer	Aking Chang
Temperature	24~26℃
Relative Humidity	54~56%

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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.
lest site No.	03CH12-HY
Test Engineer	Lance Chiang and CR Liao
Temperature	22~26℃
Relative Humidity	54~60%

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

FCC Designation No.: TW1190 and TW0007

## 1.5 Applicable Standards

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

- ANSI C63.26-2015
- ANSI / TIA-603-E
- 47 CFR Part 2, 27
- FCC KDB 971168 D01 Power Meas. License Digital Systems v03r01

#### Remark:

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

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# 2 Test Configuration of Equipment Under Test

#### 2.1 Test Mode

Antenna port conducted and radiated test items listed below are performed according to KDB 971168 D01 Power Meas. License Digital Systems v03r01 with maximum output power.

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

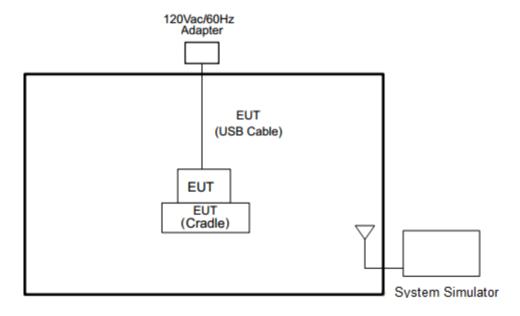
			В	andwi	dth (MI	Hz)		ı	Modulatio	n		RB#		Tes	t Char	nnel
Test Items	Band	1.4	3	5	10	15	20	QPSK	16QAM	64QAM	1	Half	Full	٦	М	Н
Max.	4	v	v	v	v	V	٧	v	v		٧	v	v	٧	v	v
Output	12	v	v	v	V	•	•	v	v	v	٧	v	V	٧	v	v
Power	13	-	-	v	٧	•	•	v	v		>	v	٧	٧	٧	v
	4						v	v	v		٧		V	٧	v	v
Peak-to-Av erage Ratio	12				V	•	-	v	v	v	٧		V	٧	v	v
· ·	13	-	-		٧	•	-	v	v		٧		V	٧	v	v
26dB and	4	v	v	V	V	V	v	v	v				v	V	v	v
99%	12	v	v	V	٧	•	-	v	v	v			V	٧	v	v
Bandwidth	13	-	-	V	V	•	-	v	v				v	V	v	v
	4	v	V	V	V	V	v	v	v		V		V	v		v
Conducted Band Edge	12	v	v	V	V	-	-	v	v	v	٧		V	V		v
	13	-	-	V	V	-	-	v	v		٧		V	٧		v
Conducted	4	v	V	V	٧	٧	v	v	v		٧			٧	v	v
Spurious	12	v	V	V	V	•	-	v	v	v	٧			٧	v	v
Emission	13	-	-	V	V	•	-	v	v		٧			٧	v	v
	4				V			v					V		v	
Frequency Stability	12				V	-	-	v					V		v	
	13	-	-		V	-	-	v					v		v	
	4	v	V	v	V	V	v	v	v		٧			٧	v	v
E.R.P / E.I.R.P	12	v	٧	v	V	•	-	v	v	v	>			٧	٧	v
	13	-	-	v	V	-	-	v	v		V			v	v	v

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Took House	Day		Bandwidth (MHz)					Modulation			RB#			Test Channel			
Test Items	Baı	10	1.4	3	5	10	15	20	QPSK	16QAM	64QAM	1	Half	Full	L	М	н
Radiated	4							W	orst Case	•					v	v	٧
Spurious	12	2	Worst Case									v	v	v			
Emission	1:	3	Worst Case									v	v	v			
	1.	The	mark "v" means that this configuration is chosen for testing														
	2.	The	mark	mark "-" means that this bandwidth is not supported.													
Remark	3.	The	devic	e is inv	estigat/	ed from	30MH	z to 10 t	imes of fu	ndamental	signal for	radiat	ed spur	ious em	ission	test ur	nder
		diffe	rent R	RB size	offset/	and mo	dulation	ns in exp	oloratory te	est. Subse	quently, or	nly the	worst c	ase em	issions	s are	
		repo	orted.														

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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

lt	em	Equipment Trade Name Model N		Model No.	FCC ID	Data Cable	Power Cord
•	1.	System Simulator	Anritsu	8821C	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.

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:

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

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

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# 2.5 Frequency List of Low/Middle/High Channels

	LTE Band 4 Cha	nnel and Frequenc	cy List	
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
20	Channel	20050	20175	20300
20	Frequency	1720	1732.5	1745
45	Channel	20025	20175	20325
15	Frequency	1717.5	1732.5	1747.5
	Channel	20000	20175	20350
10	Frequency	1715	1732.5	1750
F	Channel	19975	20175	20375
5	Frequency	1712.5	1732.5	1752.5
0	Channel	19965	20175	20385
3	Frequency	1711.5	1732.5	1753.5
4.4	Channel	19957	20175	20393
1.4	Frequency	1710.7	1732.5	1754.3

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	LTE Band 12 Cha	annel and Frequen	cy List	
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
10	Channel	23060	23095	23130
10	Frequency	704	707.5	711
5 -	Channel	23035	23095	23155
5	Frequency	701.5	707.5	713.5
3	Channel	23025	23095	23165
3	Frequency	700.5	707.5	714.5
1.4	Channel	23017	23095	23173
1.4	Frequency	699.7	707.5	715.3

	LTE Band 13 Channel and Frequency List									
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest						
10	Channel	-	23230	-						
10	Frequency	-	782	-						
E	Channel	23205	23230	23255						
5	Frequency	779.5	782	784.5						

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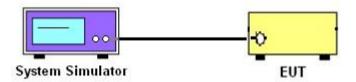
## 3 Conducted Test Items

## 3.1 Measuring Instruments

See list of measuring instruments of this test report.

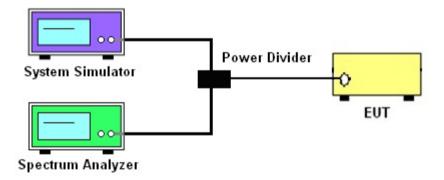
#### 3.1.1 Test Setup

#### 3.1.2 Conducted Output Power

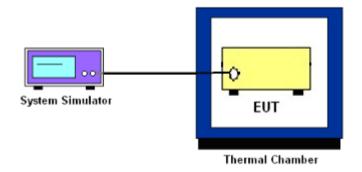


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# 3.1.3 Peak-to-Average Ratio, Occupied Bandwidth ,Conducted Band-Edge and Conducted Spurious Emission



## 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 and ERP/EIRP

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

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

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The ERP of mobile transmitters must not exceed 3 Watts for LTE Band 12 and Band 13

The EIRP of mobile transmitters must not exceed 1 Watts for LTE Band 4

According to KDB 412172 D01 Power Approach,

 $EIRP = P_T + G_T - L_C$ , ERP = EIRP - 2.15, where

 $P_T$  = transmitter output power in dBm

G<sub>T</sub> = 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 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 Occupied Bandwidth

#### 3.4.1 Description of Occupied Bandwidth Measurement

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

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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.

#### 3.4.2 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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## 3.5 Conducted Band Edge

#### 3.5.1 Description of Conducted Band Edge Measurement

27.53 (c)

For operations in the 776-788 MHz band, the FCC limit is  $43 + 10\log_{10}(P[Watts])$  dB below the transmitter power P(Watts) in a 100 kHz bandwidth. However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 30 kHz may be employed. In addition, the power of any unwanted emissions in any 6.25 kHz bandwidth for all frequencies between 763-775 MHz and 793-806 MHz shall be attenuated below the transmitter power, P (dBW), by at least 65 + 10 log10 p(watts), dB, for mobile and portable equipment.

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27.53 (g)

For operations in the 600MHz band and 698 -746 MHz band, the FCC limit is 43 + 10log10(P[Watts]) dB below the transmitter power P(Watts) in a 100 kHz bandwidth. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

27.53 (h)

For operations in the 1710 - 1755 MHz band, the FCC limit is  $43 + 10\log_{10}(P[Watts])$  dB below the transmitter power P(Watts) in a 1 MHz bandwidth. However, in the 1MHz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

#### 3.5.2 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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## 3.6 Conducted Spurious Emission

#### 3.6.1 Description of Conducted Spurious Emission Measurement

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

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

#### 3.6.2 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.
- 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 43 + 10log(P)dB below the transmitter power P(Watts)

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## 3.7 Frequency Stability

#### 3.7.1 Description of Frequency Stability Measurement

27.54

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 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.
- 2. 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.

#### 3.7.3 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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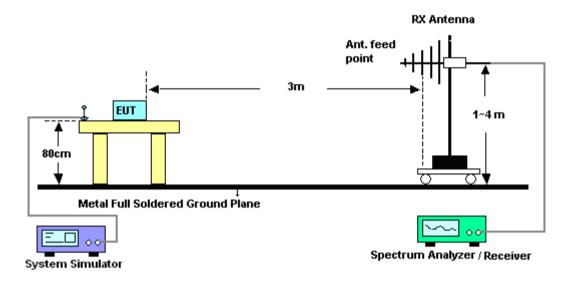
## 4 Radiated Test Items

## 4.1 Measuring Instruments

See list of measuring instruments of this test report.

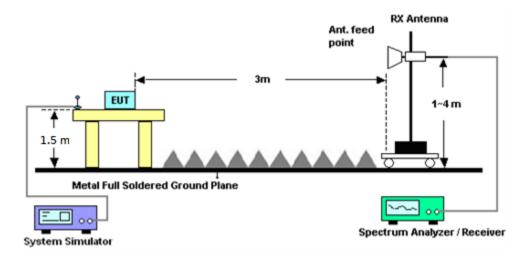
## 4.1.1 Test Setup

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



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#### For radiated test above 1GHz



#### 4.1.2 Test Result of Radiated Test

Please refer to Appendix B.

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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 43 + 10 log (P) dB.

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#### For LTE Band 13

For operations in the 746-758 MHz, 775-788 MHz, and 805-806 MHz bands, emissions in the band 1559-1610 MHz shall be limited to -70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and -80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth.

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 for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
- 2. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
- 3. The table was rotated 360 degrees to determine the position of the highest spurious emission.
- 4. The height of the receiving antenna is varied between one meter and four meters to search the maximum spurious emission for both horizontal and vertical polarizations.
- 5. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
- 6. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
- 7. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
- 8. Taking the record of output power at antenna port.
- 9. Repeat step 7 to step 8 for another polarization.
- 10. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

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

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

ERP (dBm) = EIRP - 2.15

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# 5 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100488	9 kHz~30 MHz	Jan. 07, 2019	Oct. 29, 2019~ Jan. 03, 2020	Jan. 06, 2020	Radiation (03CH12-HY)
Bilog Antenna	TESEQ	CBL 6111D & 00800N1D01N -06	41912 & 05	30MHz~1GHz	Feb. 12, 2019	Oct. 29, 2019~ Jan. 03, 2020	Feb. 11, 2020	Radiation (03CH12-HY)
Horn Antenna	SCHWARZBE CK	BBHA 9120D	9120D-1328	1GHz ~ 18GHz	Nov. 09, 2018	Oct. 29, 2019~ Oct. 30, 2019	Nov. 08, 2019	Radiation (03CH12-HY)
Horn Antenna	SCHWARZBE CK	BBHA 9120D	9120D-1328	1GHz ~ 18GHz	Nov. 14, 2019	Jan. 02, 2020~ Jan. 03, 2020	Nov. 13, 2020	Radiation (03CH12-HY)
Horn Antenna	SCHWARZBE CK	BBHA 9120D	9120D-1522	1GHz ~ 18GHz	Sep. 19, 2019	Oct. 29, 2019~ Jan. 03, 2020	Sep. 18, 2020	Radiation (03CH12-HY)
SHF-EHF Horn Antenna	SCHWARZBE CK	BBHA 9170	BBHA917058 4	18GHz ~ 40GHz	Dec. 05, 2018	Oct. 29, 2019~ Oct. 30, 2019	Dec. 04, 2019	Radiation (03CH12-HY)
SHF-EHF Horn Antenna	SCHWARZBE CK	BBHA 9170	BBHA917058 4	18GHz ~ 40GHz	Dec. 10, 2019	Jan. 02, 2020~ Jan. 03, 2020	Dec. 09, 2020	Radiation (03CH12-HY)
Preamplifier	COM-POWER	PA-103	161075	10MHz~1GHz	Mar. 25, 2019	Oct. 29, 2019~ Jan. 03, 2020	Mar. 24, 2020	Radiation (03CH12-HY)
Preamplifier	Jet-Power	JPA00101800- 30-10P	1601180002	1GHz~18GHz	Aug. 01, 2019	Oct. 29, 2019~ Jan. 03, 2020	Jul. 01, 2020	Radiation (03CH12-HY)
Preamplifier	EMEC	EM18G40G	060715	18GHz ~ 40GHz	Dec. 06, 2018	Oct. 29, 2019~ Oct. 30, 2019	Dec. 05, 2019	Radiation (03CH12-HY)
Preamplifier	EMEC	EM18G40G	060715	18GHz ~ 40GHz	Dec. 13, 2019	Jan. 02, 2020~ Jan. 03, 2020	Dec. 12, 2020	Radiation (03CH12-HY)
EMI Test Receiver	Rohde & Schwarz	ESU26	100390	20Hz~26.5GHz	Dec. 26, 2018	Oct. 29, 2019~ Oct. 30, 2019	Dec. 25, 2019	Radiation (03CH12-HY)
EMI Test Receiver	Agilent	N9038A(MXE)	MY53290053	20Hz~26.5GHz	Jan. 23, 2019	Jan. 02, 2020~ Jan. 03, 2020	Jan. 22, 2020	Radiation (03CH12-HY)
Signal Analyzer	Rohde & Schwarz	FSV40	101756	40GHz	Aug. 13, 2019	Jan. 02, 2020~ Jan. 03, 2020	Aug. 12, 2020	Radiation (03CH12-HY)
Signal Generator	Rohde & Schwarz	SMB100A	175727	100kHz~40GHz	Dec. 23, 2018	Oct. 29, 2019~ Oct. 30, 2019	Dec. 23, 2019	Radiation (03CH12-HY)
Signal Generator	Rohde & Schwarz	SMF100A	101107	100kHz~40GHz	Aug. 27, 2019	Jan. 02, 2020~ Jan. 03, 2020	Aug. 26, 2020	Radiation (03CH12-HY)
Hygrometer	TECPEL	DTM-303B	TP161243	N/A	May 11, 2019	Oct. 29, 2019~ Jan. 03, 2020	May 10, 2020	Radiation (03CH12-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 126E	0058/126E	30M-18G	Mar. 13, 2019	Oct. 29, 2019~ Jan. 03, 2020	Mar. 12, 2020	Radiation (03CH12-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	505134/2	30M~40GHz	Feb. 26, 2019	Oct. 29, 2019~ Jan. 03, 2020	Feb. 25, 2020	Radiation (03CH12-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	800740/2	30M~40GHz	Feb. 26, 2019	Oct. 29, 2019~ Jan. 03, 2020	Feb. 25, 2020	Radiation (03CH12-HY)

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Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Controller	EMEC	EM1000	N/A	Control Turn table & Ant Mast	N/A	Oct. 29, 2019~ Jan. 03, 2020	N/A	Radiation (03CH12-HY)
Antenna Mast	EMEC	AM-BS-4500-B	N/A	1m~4m	N/A	Oct. 29, 2019~ Jan. 03, 2020	N/A	Radiation (03CH12-HY)
Turn Table	EMEC	TT2000	N/A	0~360 Degree	N/A	Oct. 29, 2019~ Jan. 03, 2020	N/A	Radiation (03CH12-HY)
Software	Audix	E3 6.2009-8-24	RK-000989	N/A	N/A	Oct. 29, 2019~ Jan. 03, 2020	N/A	Radiation (03CH12-HY)
Base Station (Measure)	Anritsu	MT8821C	6201664755	GSM / GPRS /WCDMA / LTE FDD/TDD with 44) /LTE-3CC DLCA,2CC ULCA	Mar. 03, 2019	Nov. 15, 2019~ Jan. 11, 2020	Mar. 02, 2020	Conducted (TH05-HY)
Spectrum Analyzer	Rohde & Schwarz	FSV40	101749	10Hz~30GHz	Jan. 21, 2019	Nov. 15, 2019~ Jan. 11, 2020	Jan. 20, 2020	Conducted (TH05-HY)
Temperature Chamber	ESPEC	SH-641	92013720	-40°C ~90°C	Sep. 02, 2019	Nov. 15, 2019~ Jan. 11, 2020	Sep. 01, 2020	Conducted (TH05-HY)
Programmable Power Supply	GW Instek	PSS-2005	EL890089	1V~20V 0.5A~5A	Feb. 21, 2019	Nov. 15, 2019~ Jan. 11, 2020	Feb. 20, 2020	Conducted (TH05-HY)
Coupler	Warison	20dB 25W SMA Directional Coupler	#A	1-18GHz	Jan. 14, 2019	Nov. 15, 2019~ Jan. 11, 2020	Jan. 13, 2020	Conducted (TH05-HY)

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# 6 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of	3.36
Confidence of 95% (U = 2Uc(y))	3.30

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

Measuring Uncertainty for a Level of	3.70
Confidence of 95% (U = 2Uc(y))	3.70

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

Measuring Uncertainty for a Level of	3.98
Confidence of 95% (U = 2Uc(y))	3.90

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

## Conducted Output Power(Average power)

		Ľ	TE C	at. N	/11 B	and 4 Maxin	num Average Powe	er [dBm]	
BW [MHz]	RB Size	RB Offset		Index		Mod	Lowest	Middle	Highest
DW [WITIZ]	ND SIZE	ND Offset	L	М	Н	WOO	Lowest	Wildale	riigilest
20	1	0	0	8	15		23.63	23.73	23.53
20	1	5	0	8	15		23.66	23.57	23.49
20	3	0	0	8	15	QPSK	23.53	23.62	23.45
20	3	3	0	8	15		23.59	23.49	23.43
20	6	0	0	8	15		23.51	23.61	23.42
20	1	0	0	8	15		23.89	23.72	23.66
20	1	5	0	8	15		23.82	23.68	23.61
20	3	0	0	8	15	16-QAM	23.72	23.60	23.52
20	3	3	0	8	15		23.70	23.57	23.49
20	6	0	0	8	15		23.66	23.51	23.45
15	1	0	0	6	11		23.73	23.62	23.52
15	1	5	0	6	11		23.69	23.55	23.47
15	3	0	0	6	11	QPSK	23.66	23.52	23.42
15	3	3	0	6	11		23.62	23.49	23.40
15	6	0	0	6	11		23.63	23.51	23.41
15	1	0	0	6	11		23.87	23.73	23.63
15	1	5	0	6	11		23.82	23.68	23.58
15	3	0	0	6	11	16-QAM	23.73	23.59	23.50
15	3	3	0	6	11		23.69	23.56	23.47
15	6	0	0	6	11		23.65	23.51	23.42



LTE Cat. M1 Band 4 Maximum Average Power [dBm] Index BW [MHz] RB Size RB Offset Mod Lowest Middle Highest М Н 23.73 23.64 23.54 23.70 23.58 23.48 QPSK 23.65 23.54 23.44 23.62 23.51 23.41 21.57 21.53 21.52 23.88 23.75 23.64 23.83 23.68 23.60 16-QAM 23.73 23.60 23.50 23.71 23.57 23.48 20.89 20.81 20.72 23.76 23.63 23.53 23.68 23.56 23.48 QPSK 21.81 21.74 21.73 21.57 21.54 21.52 21.60 21.54 21.50 23.74 23.65 23.89 23.82 23.68 23.60 16-QAM 21.87 21.76 21.78 21.76 21.81 21.72 20.70 20.69 20.79



LTE Cat. M1 Band 4 Maximum Average Power [dBm] Index BW [MHz] RB Size RB Offset Mod Lowest Middle Highest М Н 3 0 0 0 1 23.71 23.59 23.50 3 1 5 0 0 1 23.66 23.52 23.44 QPSK 3 0 0 1 3 0 21.87 21.80 21.77 3 3 3 0 0 1 21.66 21.63 21.55 3 6 0 0 0 1 20.65 20.56 20.58 3 1 0 0 0 1 21.62 21.54 21.51 3 1 5 0 0 1 21.59 21.52 21.49 3 3 0 0 0 1 16-QAM 20.81 20.73 20.72 3 0 3 3 0 20.74 20.68 20.66 0 3 6 0 0 1 20.76 20.74 20.74 1.4 1 0 0 0 0 23.74 23.66 23.54 23.67 1.4 1 5 0 0 0 23.50 23.60 3 1.4 0 0 0 **QPSK** 21.96 21.92 21.91 0 1.4 3 3 0 0 0 21.82 21.72 21.79 1.4 6 0 0 0 0 20.74 20.77 20.83 1.4 0 0 0 0 21.84 21.84 1 21.92 1.4 1 5 0 0 0 21.92 21.82 21.82 1.4 3 0 0 0 0 16-QAM 20.86 20.85 20.76 3 3 0 1.4 0 0 21.01 20.90 20.91 1.4 6 0 0 0 0 20.88 20.88 20.79



LTE Cat. M1 Band 12 Maximum Average Power [dBm] Index BW [MHz] RB Size RB Offset Mod Lowest Middle Highest М Н 22.87 22.82 22.77 22.86 22.82 22.75 QPSK 22.96 22.94 22.89 22.77 22.67 22.63 21.86 21.75 21.76 23.09 22.98 22.96 23.02 22.92 22.94 16-QAM 23.11 23.03 23.01 23.05 22.99 22.96 21.03 21.06 20.93 22.83 22.83 22.78 22.82 22.75 22.77 QPSK 21.98 21.91 21.85 21.73 21.69 21.65 21.81 21.79 21.79 22.98 23.05 23.03 22.95 22.94 22.96 22.30 16-QAM 22.08 22.04 22.03 22.02 21.99 21.13 20.89 20.80



LTE Cat. M1 Band 12 Maximum Average Power [dBm] Index BW [MHz] RB Size RB Offset Mod Lowest Middle Highest М Н 3 0 0 0 1 22.85 22.84 22.82 3 1 5 0 0 1 22.81 22.78 22.75 QPSK 3 0 0 1 3 0 21.95 21.90 22.88 3 3 3 0 0 1 21.75 21.70 22.62 3 6 0 0 0 1 20.90 20.89 20.82 3 1 0 0 0 1 21.83 21.81 23.01 3 1 5 0 0 1 21.71 21.75 22.94 3 3 0 0 0 1 16-QAM 21.09 22.30 21.11 3 0 3 3 0 1 21.05 21.04 21.98 0 3 6 0 0 1 21.14 21.10 20.77 1.4 1 0 0 0 0 23.24 23.17 23.16 1.4 1 5 0 0 0 23.02 23.08 23.10 3 QPSK 1.4 0 0 0 22.05 21.96 21.98 0 1.4 3 3 0 0 0 21.82 21.78 21.75 1.4 6 0 0 0 0 21.03 20.98 21.01 1.4 0 0 0 0 21.99 1 21.96 22.03 1.4 1 5 0 0 0 21.88 21.94 21.91 1.4 3 0 0 0 0 16-QAM 21.33 21.09 21.14 3 3 0 21.25 1.4 0 0 21.17 21.22 1.4 6 0 0 0 0 21.30 21.09 21.15



		L1	TE C	at. N	l1 Ba	and 13 Maxii	mum Average Pow	er [dBm]	
BW [MHz]	RB Size	RB Offset		Index		Mod	Lowest	Middle	Highest
			L	M	Н				<b>3</b>
10	1	0	0	4	7			23.06	
10	1	5	0	4	7			23.08	
10	3	0	0	4	7	QPSK		23.27	
10	3	3	0	4	7			23.01	
10	6	0	0	4	7			22.02	
10	1	0	0	4	7		-	23.35	-
10	1	5	0	4	7			23.30	
10	3	0	0	4	7	16-QAM		23.28	
10	3	3	0	4	7			23.22	
10	6	0	0	4	7			21.15	
5	1	0	0	2	3		23.11	23.08	23.08
5	1	5	0	2	3		23.16	23.08	23.02
5	3	0	0	2	3	QPSK	22.18	22.11	22.00
5	3	3	0	2	3		22.10	22.02	22.01
5	6	0	0	2	3		22.06	22.06	22.04
5	1	0	0	2	3		23.41	23.31	23.33
5	1	5	0	2	3		23.37	23.30	23.23
5	3	0	0	2	3	16-QAM	22.43	22.38	22.44
5	3	3	0	2	3		22.41	22.34	22.40
5	6	0	0	2	3		21.33	21.16	21.10

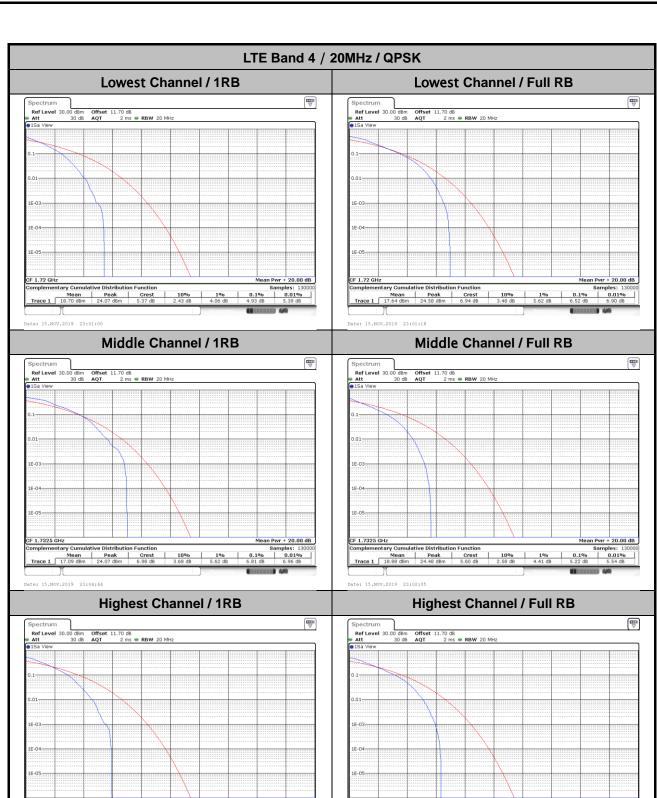
## LTE Band 4

# Peak-to-Average Ratio

Mode		LTE Band 4 / 20MHz								
Mod.	QP	SK	16C	Limit: 13dB						
RB Size	1RB	Full RB	1RB	Full RB	Result					
Lowest CH	4.93	6.52	5.57	6.03						
Middle CH	6.81	5.22	6.41	5.45	PASS					
Highest CH	5.51	5.94	6.96	6.06						

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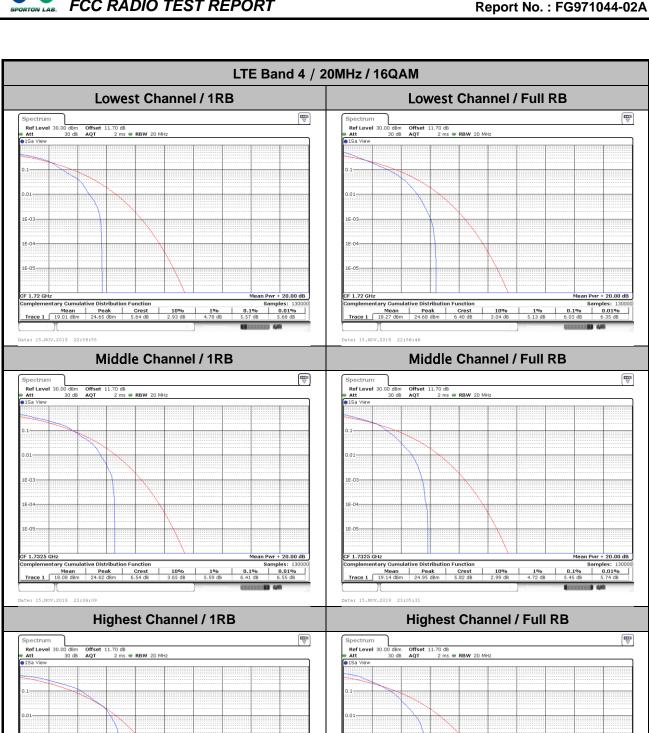


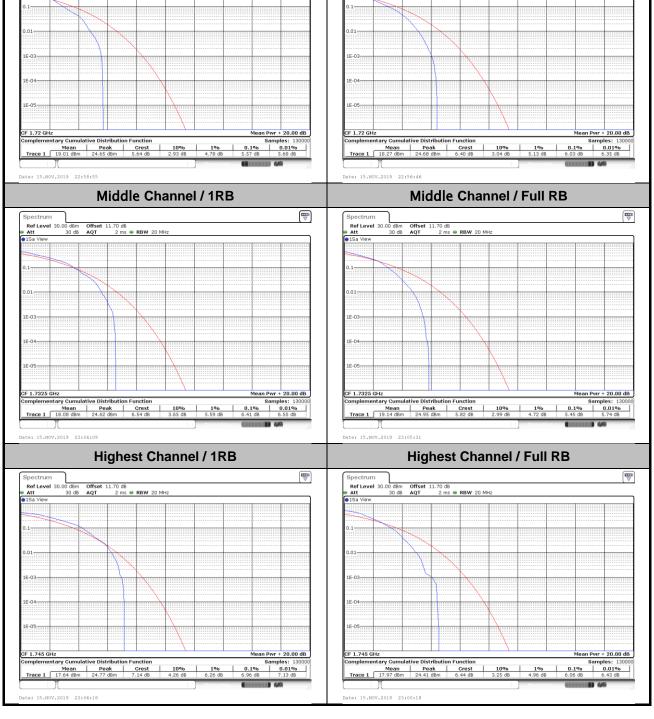
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Samples: 130000 0.1% 0.01% 5.94 dB 6.29 dB

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| Samples: 130000 | 0.1% | 0.01% | | 5.51 dB | 5.91 dB |





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# 26dB Bandwidth

Mode		LTE Band 4 : 26dB BW(MHz)											
BW	1.41	MHz	31/	lHz	5MHz 10MHz			15N	ИНz	20MHz			
Mod.	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	
Lowest CH	1.28	1.29	1.38	1.34	1.43	1.36	1.82	1.78	1.80	1.83	1.84	1.76	
Middle CH	1.30	1.29	1.41	1.40	1.34	1.40	1.78	1.76	1.80	1.83	1.76	1.84	
Highest CH	1.31	1.28	1.35	1.34	1.41	1.35	1.84	1.80	1.77	1.80	1.88	1.84	

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LTE Band 4 Lowest Channel / 1.4MHz / QPSK Lowest Channel / 1.4MHz / 16QAM 13.28 dB 12.72 dBr M1[1] 10 dBm 1332 1329. -10 dBm-30 dBm√ -50 dBm- 
 X-value
 Y-value
 Function

 1.7103923 GHz
 12.72 dBm
 ndB down

 1.7100594 GHz
 -13.21 dBm
 ndB

 1.7113462 GHz
 -13.51 dBm
 Q factor
 Type Ref Trc Middle Channel / 1.4MHz / QPSK Middle Channel / 1.4MHz / 16QAM Ref Level 30.00 dBm Att 30 dB SGL Count 100/100 13.01 dBi 1.73207480 GF 26.00 d 1.297900000 MF 1334 1.73225380 GH 26.00 d 1.289500000 MH 1343. -20 dBm-40 dBm CF 1.7325 GHz Span 2.8 MHz Span 2.8 MHz Y-value 2 13.87 dBm 2 -12.16 dBm 2 -12.22 dBm Type | Ref | Trc | Function n ndB down Function ndB down Highest Channel / 1.4MHz / QPSK Highest Channel / 1.4MHz / 16QAM 00 dBm Offset 30 dB SWT 11.70 dB • RBW 30 kHz 63.2 μs • VBW 100 kHz Mode Auto FFT 11.70 dB **RBW** 30 kHz 63.2 μs **VBW** 100 kHz **Mode** Auto FFT SGL Count 100/100 11.47 dBn 1.75444550 GH M1[1] M1[1] 12.26 dBn 1.75431400 GH 20 dBm dBm--20 dBm -20 dBr -50 dBm-CF 1.7543 GHz CF 1.7543 GHz Function Result 1.2839 MHz 26.00 dB 1366.4 Function Result

1.3091 MHz
26.00 dB
1340.2 | Market | Trc | X-value | Y-value | Function | M1 | 1 | 1.754314 GHz | 12.26 dBm | ndB down | T1 | 1 | 1.758435 GHz | -1.01 dBm | ndB | T2 | 1 | 1.7584294 GHz | -13.65 dBm | Q factor | 
 X-value
 Y-value
 Function

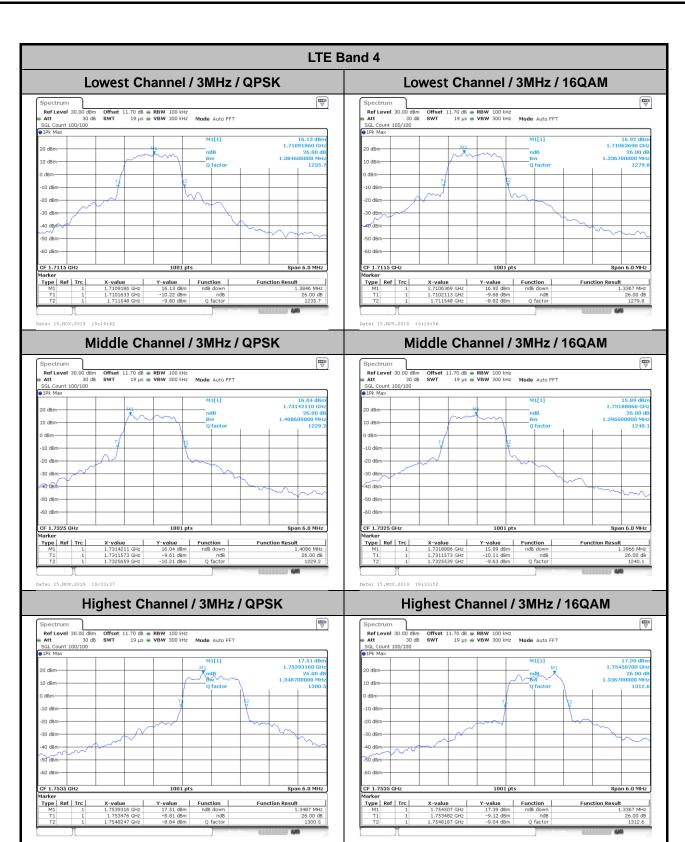
 1.75444455 GHz
 11.47 dBm
 ndB down

 1.7536427 GHz
 -14.75 dBm
 ndB

 1.7549517 GHz
 -14.65 dBm
 Q factor
 Type | Ref | Trc |

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LTE Band 4 Lowest Channel / 5MHz / QPSK Lowest Channel / 5MHz / 16QAM Ref Level 30.00 dBm Offset 11.70 dB ■ RBW 100 kHz
■ Att 30 dB SWT 19 μs ■ VBW 300 kHz Mode Auto FFT

SGL Count 100/100

1Pk Max 16.87 dB M1[1] 17.68 dBr 1197 1258. -10 dBm -30 dBm -50 dBm-Type Ref Trc Middle Channel / 5MHz / QPSK Middle Channel / 5MHz / 16QAM **T**  
 Ref Level
 30.00 dBm
 Offset
 11.70 dB
 RBW
 100 kHz
 Mode
 Auto FFT

 Att
 30 dB
 SWT
 19 μs
 VBW
 300 kHz
 Mode
 Auto FFT
 1.73066200 GH 26.00 d 1.339000000 MH 1292 -20 dBm--40 dBm-SO dBm CF 1.7325 GHz Span 10.0 MHz Span 10.0 MHz Function n ndB down Type | Ref | Trc | Function ndB down Date: 15.Nov.2019 20:02:46 Highest Channel / 5MHz / QPSK Highest Channel / 5MHz / 16QAM 00 dBm Offset 30 dB SWT .70 dB • RBW 100 kHz 19 µs • VBW 300 kHz Mode Auto FFT 11.70 dB **RBW** 100 kHz 19 μs **VBW** 300 kHz **Mode** Auto FFT SGL Count 100/100 16.19 dBn 1.75373900 c 17.65 dBr 1.75441800 GH 26.00 di 1.349000000 MH dBm--20 dB 50 dBm CF 1.7525 GHz

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Function Result

Y-value Function

Function Result

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Type | Ref | Trc |

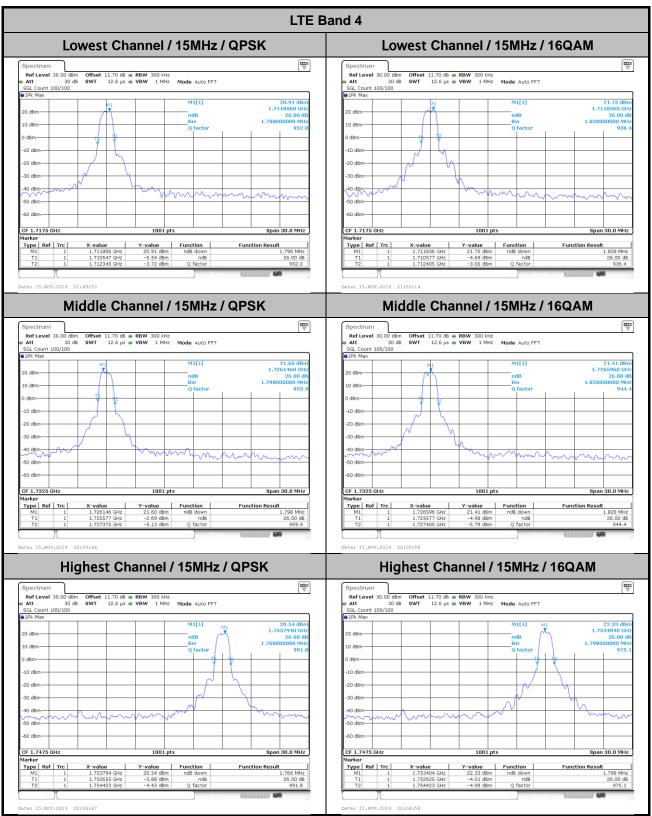
LTE Band 4 Lowest Channel / 10MHz / QPSK Lowest Channel / 10MHz / 16QAM 19.94 dB M1[1] 20.32 dBr 10 dBm 941 962. -10 dBm--10 dBm -30 dBm -30 dBr -50 dBm--60 dBm Middle Channel / 10MHz / QPSK Middle Channel / 10MHz / 16QAM **T** Ref Level 30.00 dBm Att 30 dB SGL Count 100/100 
 Ref Level
 30.00 dBm
 Offset
 11.70 dB
 RBW
 300 kHz

 Att
 30 dB
 SWT
 12.6 μs
 VBW
 1 MHz
 Mode
 Auto FFT
 Offset 11.70 dB ● RBW 300 kHz SWT 12.6 µs ● VBW 1 MHz Mode Auto FFT 19.55 dBi 1.7287640 GF 26.00 d 1.778000000 MF 972. -20 dBm-CF 1.7325 GHz Span 20.0 MHz Span 20.0 MHz Function
m ndB down
m ndB
m O factor Type | Ref | Trc | Function ndB down Highest Channel / 10MHz / QPSK Highest Channel / 10MHz / 16QAM 00 dBm Offset 30 dB SWT 11.70 dB • RBW 300 kHz 12.6 µs • VBW 1 MHz Mode Auto FFT 11.70 dB **RBW** 300 kHz 12.6 μs **VBW** 1 MHz **Mode** Auto FFT SGL Count 100/100 1Pk Max 19.41 dBn 1.7539560 cm M1[1] 20 dBm 26.00 df 1.798000000 MH 975. dBm--10 dBm -20 dBr CF 1.75 GHz | Market | Trc | X-value | Y-value | Function | M1 | 1 | 1.753836 GHz | 18.91 dBm | ndB down | T1 | 1 | 1.752877 GHz | -5.51 dBm | ndB | M3 | T2 | 1 | 1.754675 GHz | -7.81 dBm | Q factor | Type | Ref | Trc | Function Result Function Result

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LTE Band 4 Lowest Channel / 20MHz / QPSK Lowest Channel / 20MHz / 16QAM 21.27 dBr 1.7116080 GH 26.00 d 1.838000000 MH M1[1] 22.63 dBr 10 dBm 931 973. -10 dBm--30 dBm-50 dBm- 
 X-value
 Y-value
 Function

 1.711848 GHz
 22.63 dBm
 nd8 down

 1.711009 GHz
 -3.25 dBm
 nd8

 1.712767 GHz
 -1.69 dBm
 Q factor
 Type Ref Trc Middle Channel / 20MHz / QPSK Middle Channel / 20MHz / 16QAM Offset 11.70 dB ● RBW 300 kHz SWT 18.9 µs ● VBW 1 MHz Mode Auto FFT -20 dBm-CF 1.7325 GHz 40.0 MHz Function
m ndB down
m ndB
m O factor Function ndB down Type | Ref | Trc | Highest Channel / 20MHz / QPSK Highest Channel / 20MHz / 16QAM 00 dBm Offset 30 dB SWT 11.70 dB • RBW 300 kHz 18.9 µs • VBW 1 MHz Mode Auto FFT 11.70 dB **RBW** 300 kHz 18.9 μs **VBW** 1 MHz **Mode** Auto FFT SGL Count 100/100 M1[1] 20.89 dBn 1.7528320 GH 21.74 dBr 1.7534720 GH 20 dBm dBm--20 dBr CF 1.745 GH 

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Function Result

Y-value Function
2 21.74 dBm ndR down

Function Result

Type | Ref | Trc |

## **Occupied Bandwidth**

Mode	LTE Band 4 : 99%OBW(MHz)											
BW	1.4MHz		3MHz		5MHz		10MHz		15MHz		20MHz	
Mod.	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Lowest CH	1.12	1.10	1.19	1.17	1.16	1.18	1.44	1.44	1.47	1.44	1.52	1.48
Middle CH	1.09	1.10	1.19	1.15	1.16	1.19	1.46	1.44	1.47	1.44	1.44	1.44
Highest CH	1.10	1.09	1.21	1.17	1.17	1.15	1.46	1.44	1.44	1.44	1.44	1.52

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LTE Band 4 Lowest Channel / 1.4MHz / QPSK Lowest Channel / 1.4MHz / 16QAM Ref Level 30.00 dBm Offset 11.70 dB = RBW 30 kHz ■ Att 30 dB SWT 63.2 μs = VBW 100 kHz Mode Auto FFT SGL Count 100/100 Φ 1Pk Max 13.74 dBn 1.71116150 GH M1[1] 10 dBm--10 dBm--20 dBm-40 dBm -50 dBm--60 dBm- 
 X-value
 Y-value
 Function
 Function Result

 1.7103915 GHz
 12.89 d8m
 1.710267 GHz
 1.71026 
 Note | New Person
 Trc
 X-value
 Y-value
 Function
 Function Result

 M1
 1
 1.7111615 GHz
 13.74 dBm
 11.711649 TH
 11 Type Ref Trc Middle Channel / 1.4MHz / QPSK Middle Channel / 1.4MHz / 16QAM Ref Lavel 30.00 dBm Offset 11.70 dB = RBW 30 kHz 4tt 93 db SWT 63.2 µs = VBW 100 kHz Mode Auto FFT SGL Count 100/100 
 Ref Level
 30.00 dBm
 Offset
 11.70 dB ● RBW
 30 kHz

 Att
 30 dB
 SWT
 63.2 µs ● VBW
 100 kHz
 Mode
 Auto FFT
 SGL Count 100/100 -20 dBm -20 dBm--40 dBm 40 dBm -50 dBm CF 1.7325 GHz 1001 pts Span 2.8 MHz 
 rc
 X-value
 Y-value
 Function

 1
 1.7321951 GHz
 13.29 dBm

 1
 1.73194056 GHz
 2.89 dBm
 Occ Bw

 1
 1.73303986 GHz
 6.00 dBm
 Occ Bw
 Type | Ref | Trc | Type Ref Trc Function Result **Function Result** 1.093706294 MHz 1.099300699 MHz Highest Channel / 1.4MHz / QPSK Highest Channel / 1.4MHz / 16QAM 00 dBm Offset 30 dB SWT 11.70 dB • RBW 30 kHz 63.2 µs • VBW 100 kHz Mode Auto FFT 11.70 dB **RBW** 30 kHz 63.2 μs **VBW** 100 kHz **Mode** Auto FFT SGL Count 100/100 12.73 dBn 1.75391680 GH: 1.093706294 MH: 12.77 dBn 1.75396150 GH 1.096503497 MH M1[1] M1[1] 20 dBm dBm--10 dBm -20 dBm--20 dBr MV an dish -50 dBm-CF 1.7543 GHz CF 1.7543 GHz Span 2.8 MHz | Marker | Trc | X-value | Y-value | Function | Function Result | M1 | 1 | 1.7539615 GHz | 12.77 dbm | | 1 | 1.75399615 GHz | 4.82 dbm | Occ Bw | 1.096503 | T2 | 1 | 1.75494545 GHz | 4.43 dbm | C | W | 1.096503 | C | W | W Function Result 1.096503497 MHz 1.093706294 MHz

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LTE Band 4 Lowest Channel / 3MHz / QPSK Lowest Channel / 3MHz / 16QAM 16.27 dBn 1.71116430 GH 1.168831169 MH M1[1] 15.70 dB 10 dBm -10 dBm--30 dBm -50 dBm- 
 X-value
 Y-value
 Function

 1.7111643 GHz
 16.27 dBm
 1.7102952 GHz

 1.7102952 GHz
 6.18 dBm
 Occ Bw

 1.71146404 GHz
 6.01 dBm
 Type Ref Trc Middle Channel / 3MHz / QPSK Middle Channel / 3MHz / 16QAM 
 Ref Level
 30.00 dBm
 Offset
 11.70 dB
 RBW
 100 kHz
 Mode
 Auto FFT

 Att
 30 dB
 SWT
 19 μs
 VBW
 300 kHz
 Mode
 Auto FFT
 -20 dBm--50 dBm-CF 1.7325 GHz 1001 pts Span 6.0 MHz Span 6.0 MHz Type | Ref | Trc | Type Ref Trc Function Result Function **Function Result** 1.186813187 MHz 1.144855145 MHz Highest Channel / 3MHz / QPSK Highest Channel / 3MHz / 16QAM 00 dBm Offset 30 dB SWT 11.70 dB • RBW 100 kHz 19 µs • VBW 300 kHz Mode Auto FFT SGL Count 100/100 SGL Count 100/100 91Pk Max 16.36 dBn 1.75387160 GH: 1.210789211 MH: 17.23 dBn 1.75388360 GH 1.168831169 MH M1[1] 20 dBm dBm--10 dBm -20 dBm -20 dBr -30 dBm--50 dBm CF 1.7535 GHz CF 1.7535 GHz Span 6.0 MHz Type | Ref | Trc | Function Result

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1.168831169 MHz

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1.210789211 MHz

LTE Band 4 Lowest Channel / 5MHz / QPSK Lowest Channel / 5MHz / 16QAM 17.05 dBn 1.71042200 GH 1.178821179 MH M1[1] 18.32 dB M1[1] 10 dBm -10 dBm--20 dBm--30 dBm--30 dBn 40 dBm--50 dBm- 
 X-value
 Y-value
 Function

 1.710902 GHz
 18.32 dBm
 1.7102233 GHz

 7.7102233 GHz
 7.06 dBm
 Occ Bw

 1.7113811 GHz
 7.11 dBm
 | X-value | Y-value | Function | 1.710422 GHz | 17.05 dBm | 1.710223 GHz | 7.49 dBm | Occ Bw | 1.7113811 GHz | 7.78 dBm | Middle Channel / 5MHz / QPSK Middle Channel / 5MHz / 16QAM 
 Ref Level
 30.00 dBm
 Offset
 11.70 dB
 RBW
 100 kHz
 Mode
 Auto FFT

 Att
 30 dB
 SWT
 19 μs
 VBW
 300 kHz
 Mode
 Auto FFT
 16.98 dB 1.73039200 GF 1.158841159 MF -20 dBm -20 dBm-40 dBm 40/dBm -50 dBm-CF 1.7325 GHz 1001 pts Span 10.0 MHz 
 X-value
 Y-value

 1.731251 GHz
 19.29 dBm

 1.7302123 GHz
 9.32 dBm

 1.7314011 GHz
 7.54 dBm
 Type Ref Trc Type | Ref | Trc | Function Result Function 1.158841159 MHz 1.188811189 MHz Highest Channel / 5MHz / QPSK Highest Channel / 5MHz / 16QAM 00 dBm Offset 30 dB SWT 11.70 dB • RBW 100 kHz 19 µs • VBW 300 kHz Mode Auto FFT SGL Count 100/100 SGL Count 100/100 1Pk Max 17.01 dBn 1.75372900 GH 1.168831169 MH 16.96 dBn 1.75436800 GH 1.148851149 MH M1[1] 20 dBm dBm--10 dBm -20 dBm -20 dBr -30 dBm-SO dem -50 dBM CF 1.7525 GHz 
 X-value
 Y-value
 Function
 Function Result

 1.753729 GHz
 1.7.01 dBm
 Coc Bw
 1.168831

 1.7536239 GHz
 10.09 dBm
 Occ Bw
 1.168831

 1.7547977 GHz
 8.42 dBm
 0cc Bw
 1.200 dBm
 Type | Ref | Trc | Function Result

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1.148851149 MHz

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1.168831169 MHz

 Marker
 Trope
 Ref
 Trc
 X-value
 Y-value
 Function
 Function Result

 M1
 1
 1.753616 GHz
 19.15 dbm
 Process
 11
 1
 1.753659 GHz
 7.90 dbm
 Occ Bw
 1.45854

 T2
 1
 1.7545155 GHz
 7.91 dbm
 Occ Bw
 1.45854

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LTE Band 4 Lowest Channel / 10MHz / QPSK Lowest Channel / 10MHz / 16QAM 21.72 dBn 1.7116430 GH 1.438561439 MH M1[1] M1[1] 10 dBm -10 dBm--10 dBm -20 dBm--30 dBm--30 dBm -50 dBm-50 dBm -60 dBm -60 dBm- 
 X-value
 Y-value
 Function

 1.710944 GHz
 20.46 dBm
 1.710944 GHz
 20.46 dBm

 1.7105045 GHz
 8.71 dBm
 Occ Bw

 1.7119431 GHz
 9.87 dBm
 Occ Bw
 | X-value | Y-value | Function | 1.711643 GHz | 21.72 dBm | 1.7110445 GHz | 10.15 dBm | Occ Bw | 1.7119431 GHz | 10.89 dBm | Type Ref Trc Middle Channel / 10MHz / QPSK Middle Channel / 10MHz / 16QAM 
 Ref Level
 30.00 dBm
 Offset
 11.70 dB
 RBW
 300 kHz

 Att
 30 dB
 SWT
 12.6 μs
 VBW
 1 MHz
 Mode
 Auto FFT
 SGL Count 100/100 1Pk Max dBm--20 dBm -20 dBm--40 dBm--50 dBm-CF 1.7325 GHz 1001 pts Span 20.0 MHz X-value Y-value
1.728924 GHz 19.68 dBm
1.7280045 GHz 8.61 dBm
1.7294431 GHz 9.30 dBm Type Ref Trc Function Type | Ref | Trc | Function Result **Function Result** 1.458541459 MHz 1.438561439 MHz Highest Channel / 10MHz / QPSK Highest Channel / 10MHz / 16QAM SGL Count 100/100 SGL Count 100/100 1Pk Max 19.15 dBn 1.7536160 GH 1.458541459 MH 20.21 dBn 1.7533770 GH 1.438561439 MH 20 dBm dBm--10 dBm -20 dBm -20 dBr -30 dBm--50 dBm 50 dBm CF 1.75 GHz

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1.458541459 MHz

1.438561439 MHz

Type | Ref | Trc |

LTE Band 4 Lowest Channel / 15MHz / QPSK Lowest Channel / 15MHz / 16QAM 20.71 dBr 1.7115360 GF 1.468531469 MF M1[1] M1[1] 22.82 dBr 10 dBm -10 dBm--10 dBm -20 dBm--30 dBm--30 dBn -50 dBm -60 dBm- 
 X-value
 Y-value
 Function

 1.711536 GHz
 20.71 dBm
 1.7107268 GHz
 8.23 dBm
 Occ Bw

 1.7107269 GHz
 10.10 dBm
 Occ Bw
 1.7121953 GHz
 Occ Bw
 Type Ref Trc Middle Channel / 15MHz / QPSK Middle Channel / 15MHz / 16QAM 21.14 dBn 1.7263560 GH 1.438561439 MH dBm--20 dBm -20 dBm-CF 1.7325 GHz 1001 pts Span 30.0 MHz 1001 pts X-value 1.726776 GHz 1.7257268 GHz 1.7271953 GHz Type Ref Trc X-value 1.726356 GHz 1.7257567 GHz 1.7271953 GHz Function Type | Ref | Trc | Function Result Function Result 1.468531469 MHz 1.438561439 MHz Highest Channel / 15MHz / QPSK Highest Channel / 15MHz / 16QAM SGL Count 100/100 SGL Count 100/100 1Pk Max 21.05 dBn 1.7532240 GH 1.438561439 MH 22.24 dBn 1.7534640 GH 1.438561439 MH 20 dBm dBm--10 dBm -20 dBm -20 dBr -30 dBm--50 dBm CF 1.7475 GHz 
 X-value
 Y-value
 Function
 Function Result

 1.753224 GHz
 2.1.05 dBm
 Coc Bw
 1.438561

 1.7582937 GHz
 11.16 dBm
 Occ Bw
 1.438561
 

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Function Result

1.438561439 MHz

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1.438561439 MHz

LTE Band 4 Lowest Channel / 20MHz / QPSK Lowest Channel / 20MHz / 16QAM 21.16 dBr 1.7114890 GF 1.518481518 MF M1[1] M1[1] 21.91 dBr 10 dBm -10 dBm--10 dBm -20 dBm--30 dBm--30 dBr -40 dBm--50 dBmmanyour m -60 dBm -60 dBm- 
 X-value
 Y-value
 Function

 1.711489 GHz
 21.16 dBm
 1.711688 GHz
 10.23 dBm
 Occ Bw

 1.7126873 GHz
 8.83 dBm
 Occ Bw
 Type Ref Trc Middle Channel / 20MHz / QPSK Middle Channel / 20MHz / 16QAM 22.05 dBn 1.7240280 GH 1.438561439 MH -20 dBm -20 dBm-CF 1.7325 GHz 1001 pts Span 40.0 MHz | Y-value | Function |
| 2 | 22.05 dBm | |
| 2 | 10.09 dBm | Occ Bw |
| 2 | 9.83 dBm | X-value 1.724708 GHz 1.7236688 GHz 1.7251074 GHz Type Ref Trc X-value 1.724028 GHz 1.7236688 GHz 1.7251074 GHz Type | Ref | Trc | Function Result Function Result 1.438561439 MHz 1.438561439 MHz Highest Channel / 20MHz / QPSK Highest Channel / 20MHz / 16QAM SGL Count 100/100 SGL Count 100/100 91Pk Max 21.03 dBn 1.7533920 GH 1.438561439 MH 21.71 dBn 1.7531520 GH 1.518481518 MH 20 dBm dBm--10 dBm -20 dBm -20 dBn -30 dBm-CF 1.745 GHz 

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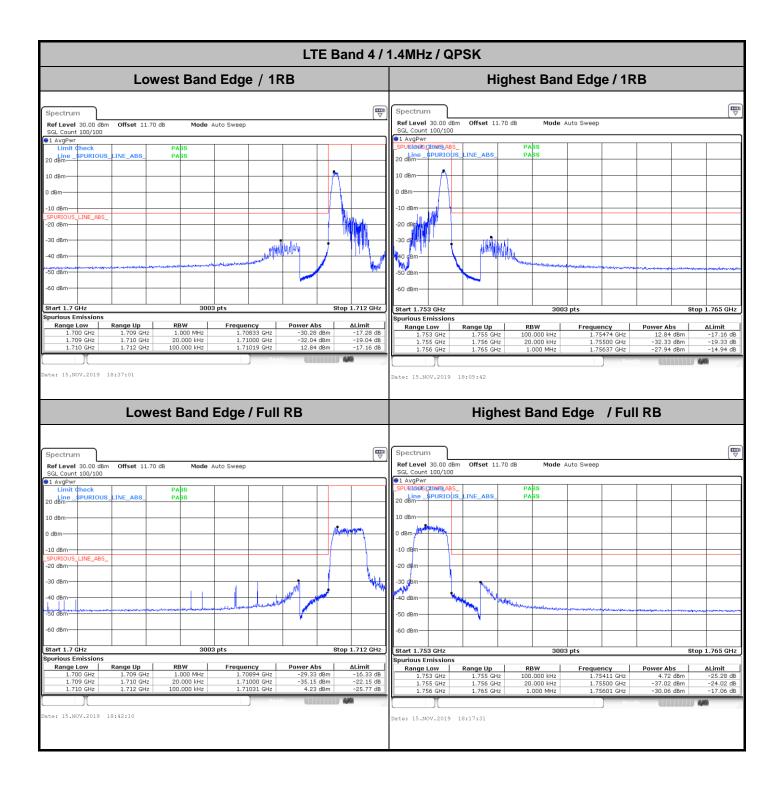
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1.438561439 MHz

Function Result

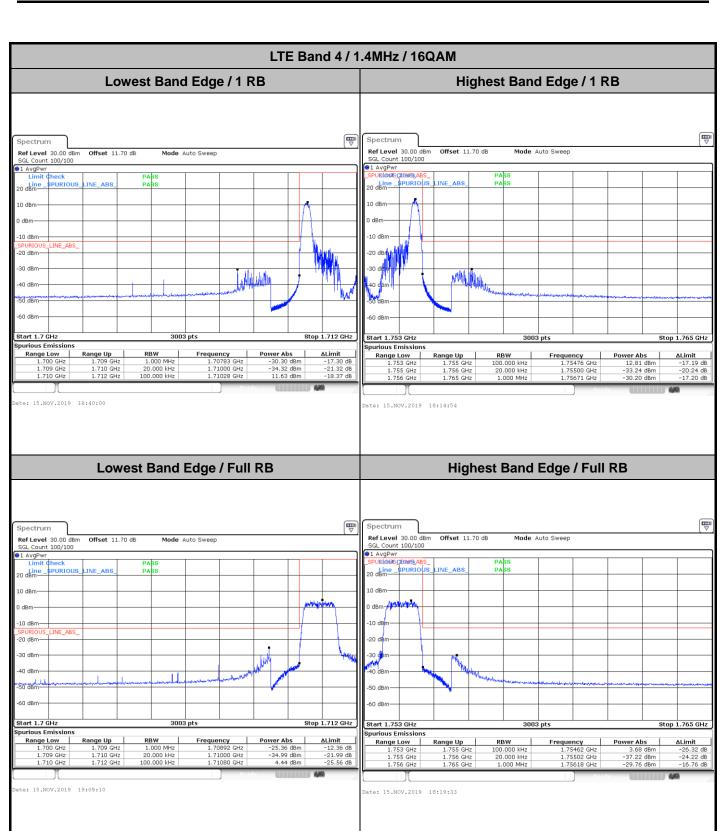
1.518481518 MHz

## **Conducted Band Edge**



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LTE Band 4 / 3MHz / QPSK Lowest Band Edge / 1RB Highest Band Edge / 1 RB Spectrum Ref Level 30.00 dBm Offset 11.70 dB Mode Auto Sweep Ref Level 30.00 dBm Offset 11.70 dB Mode Auto Sween Count 100/100 SGL Count 100/100 20 dBm -30 dBm -30 dBm-PHARLINA. Start 1.7 GHz Spurious Emissions 3003 pts Stop 1.713 GHz urious Emissions -31.10 ds Range Up 1,709 GH 1.75500 GHz 1.75608 GHz ate: 15.NOV.2019 19:22:00 Lowest Band Edge / Full RB **Highest Band Edge / Full RB** Spectrum Mode Auto Sweep Ref Level 30.00 dBm Offset 11.70 dB Ref Level 30.00 dBm Offset 11.70 dB SGL Count 100/100 Mode Auto Sweep SGL Count 100/100 ∍1 AvgPw PASS PASS 10 dBm 10 dBm INE\_ABS\_ 20 dBm 30 dBn -30 dBm -60 dBm-Start 1.752 GHz ourious Emissions Frequency 1.70900 GHz 1.70992 GHz 1.71060 GHz -31.48 dBm -35.54 dBm 5.20 dBm 1.752 GHz 1.755 GHz 1.756 GHz Range Up 1.709 GHz ∆Limit te: 15.NOV.2019 19:26:41 Date: 15.NOV.2019 19:43:33

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LTE Band 4 / 3MHz / 16QAM Lowest Band Edge / 1 RB Highest Band Edge /1 RB Spectrum Ref Level 30.00 dBm Offset 11.70 dB Mode Auto Sweep Ref Level 30.00 dBm Offset 11.70 dB Mode Auto Sween Count 100/100 SGL Count 100/100 20 dBm--30 dBm -30 dBm MANA Start 1.7 GHz Spurious Emission 3003 pts Stop 1.713 GHz urious Emissions Frequency 1.70887 GHz Range Up 1,709 GH 1.75500 GHz 1.75654 GHz ate: 15.NOV.2019 19:24:19 Lowest Band Edge / Full RB **Highest Band Edge / Full RB** Spectrum Mode Auto Sweep Ref Level 30.00 dBm Offset 11.70 dB Ref Level 30.00 dBm Offset 11.70 dB SGL Count 100/100 Mode Auto Sweep SGL Count 100/100 ∍1 AvgPw 10 dBm 10 dBm 20 dBm -30 dBm 30 dBn -60 dBm-Start 1.752 GHz purious Emissions Frequency 1.70900 GHz 1.70990 GHz 1.71095 GHz △Limit -18.52 dB -21.72 dB -24.75 dB 1.752 GHz 1.755 GHz 1.756 GHz Range Up 1.709 GHz te: 15.NOV.2019 19:28:32 Date: 15.NOV.2019 19:45:23

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