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Page Number

Report No.: FG9N2021-03B



FCC RADIO TEST REPORT

FCC ID : 2ABZ2-EE103 Equipment : Smart Phone Brand Name : ONEPLUS

Model Name : IN2015

Applicant : OnePlus Technology (Shenzhen) Co., Ltd

18C02, 18C03, 18C04 and 18C05, Shum Yip Terra Building, Binhe Avenue North, Futian

District, Shenzhen

Manufacturer : OnePlus Technology (Shenzhen) Co., Ltd

18C02, 18C03, 18C04 and 18C05, Shum Yip Terra Building, Binhe Avenue North, Futian

District, Shenzhen

Standard : 47 CFR Part 2, 96

The product was received on Nov. 20, 2019 and testing was started from Jan. 29, 2020 and completed on Feb. 05, 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.

Approved by: Louis Wu

TEL: 886-3-327-3456

Lunis Win

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory

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

FAX: 886-3-328-4978 Issued Date : Mar. 24, 2020

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Report Version : 01

History of this test report

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Version	Description	Issued Date
01	Initial issue of report	Mar. 24, 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	Conducted Output Power	Reporting only	-
3.3	§96.41	Peak-to-Average Ratio	Pass	
3.4	§96.41	Effective Isotropic Radiated Power	Pass	-
3.5	§2.1049 §96.41	Occupied Bandwidth	Reporting only	-
3.6	§2.1051 §96.41	Conducted Band Edge Measurement	Pass	-
3.7	§2.1051 §96.41	Conducted Spurious Emission	Pass	-
3.8	§2.1055	Frequency Stability for Temperature & Voltage	Pass	-
4.4	§2.1051 §96.41	Radiated Spurious Emission	Pass	Under limit 6.10 dB at 21751.000 MHz

Note: The FG9N2021-03B report reuses test data from the FG9N2021-02B report.

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 Product Feature of Equipment Under Test

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

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Product Specification subjective to this standard								
	WWAN: PIFA Antenna							
	WLAN:							
	<ant. 1=""> PIFA Antenna</ant.>							
Antenna Type	<ant. 2=""> PIFA Antenna</ant.>							
	Bluetooth: PIFA Antenna							
	GPS / Glonass / BDS / Galileo / SBAS: IFA Antenna							
	NFC: Loop Antenna							

1.2 Modification of EUT

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

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1.3 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.						
rest site No.	03CH12-HY						
Test Engineer	Lance Chiang and Wei Chuan Chu						
Temperature	22~26 ℃						
Relative Humidity	58~62%						

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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- + ANSI C63.26-2015
- ANSI / TIA-603-E
- 47 CFR Part 2, 96
- FCC KDB 971168 D01 Power Meas. License Digital Systems v03r01
- FCC KDB 414788 D01 Radiated Test Site v01r01.
- FCC KDB 940660 D01 Part 96 CBRS Eqpt v02
- FCC KDB 412172 D01 Determining ERP and EIRP v01r01

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. The worst cases (Y plane) were recorded in this report.

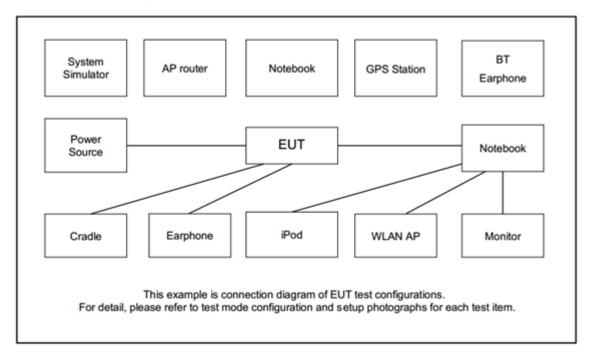
			В	andwid	lth (MF	łz)		ı	/lodulatio	n		RB#		Tes	t Char	nel
Test Items	Band	1.4	3	5	10	15	20	QPSK	16QAM	64QAM	1	Half	Full	L	М	Н
Max. Output Power	48	•	•	v	v	v	v	v	v	v	v	v	v	٧	v	v
26dB and 99% Bandwidth	48	•	•	v	v	v	v	v	v	v			v	٧	v	v
Conducted Band Edge	48	•	•	v	v	v	v	v	v	v	v		v	٧	v	v
Peak-to-Aver age Ratio	48	•	•				v	v	v	v	v		v	٧	v	v
Conducted Spurious Emission	48			v	v	v	v	v	v	v	v		v	v	v	v
E.R.P / E.I.R.P	48	-	-	v	v	v	v	v	v	v	v			v	v	v
Frequency Stability	48	•	•		v			v			v				v	
Radiated Spurious Emission	48	48 Worst Case v v v							v							
Remark	 The mark "v" means that this configuration is chosen for testing The mark "-" means that this bandwidth is not supported. The device is investigated from 30MHz to 10 times of fundamental signal for radiated sourious emission test under 															

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Test Items	Band	Bandwidth (MHz)					Modulation			RB#			Test Channel				
rest items	Buna	20+20	20+15	15+20	20+10	10+20	20+5	5+20	QPSK	16QAM	64QAM	1	Half	Full	L	М	Н
Max. Output Power	48C_CA	v	v	v	v	v	v	v	٧	v	v	٧	v	v	v	٧	v
26dB and 99% Bandwidth	48C_CA	v	v	٧	٧	v	٧	v	٧	v	v			v	v	>	٧
Conducted Band Edge	48C_CA	v	v	٧	٧	v	v	v	٧	v	v	٧		v	v	٧	v
Conducted Spurious Emission	48C_CA	v	v	v	٧	v	v	v	٧	v	v	٧		v	v	٧	v
E.I.R.P.	48C_CA	v	v	v	v	v	v	v	v	v	v	v			v	v	v
Radiated Spurious Emission	48C_CA						V	Vorst C	ase						v	٧	v
Remark	 The ma The de differer reporter 	The mark "-" means that this bandwidth is not supported.						ler									

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2.2 Connection Diagram of Test System



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2.3 Support Unit used in test configuration

Iten	Equipment	Trade Name	Model No.	FCC ID	Data Cable	Power Cord
1.	System Simulator	Anritsu	MT8821C	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)

2.5 Frequency List of Low/Middle/High Channels

	LTE Band 48 Channel and Frequency List									
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest						
20	Channel	55340	55990	56640						
20	Frequency	3560.0	3625.0	3690.0						
15	Channel	55315	55990	56665						
15	Frequency	3557.5	3625.0	3692.5						
10	Channel	55290	55990	56690						
10	Frequency	3555.0	3625.0	3695.0						
E	Channel	55265	55990	56715						
5	Frequency	3552.5	3625.0	3697.5						

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LTE Band 48C Channel and Frequency List_CA										
BW [MHz]	Channe	/Frequency(MHz)	Lowest	Middle	Highest					
	DOG	Channel	55273	55898	56523					
504 . 0004	PCC	Frequency	3553.3	3615.8	3678.3					
5M + 20M	000	Channel	55390	56015	56640					
	SCC	Frequency	3565	3627.5	3690					
	DCC	Channel	55340	55965	56590					
2014 - 514	PCC	Frequency	3560	3622.5	3685					
20M + 5M	500	Channel	55457	56082	56707					
	SCC	Frequency	3571.7	3634.2	3696.7					
	DCC	Channel	55295	55896	56496					
10M + 20M	PCC	Frequency	3555.5	3615.6	3675.6					
10W + 20W	SCC	Channel	55439	56040	56640					
		Frequency	3569.9	3630	3690					
	PCC	Channel	55340	55941	56541					
20M + 10M	PCC	Frequency	3560	3620.1	3680.1					
20IVI + 10IVI	SCC	Channel	55484	56085	56685					
	500	Frequency	3574.4	3634.5	3694.5					
	PCC	Channel	55318	55893	56469					
15M + 20M	PCC	Frequency	3557.8	3615.3	3672.9					
15IVI + 20IVI	SCC	Channel	55489	56064	56640					
	500	Frequency	3574.9	3632.4	3690					
	PCC	Channel	55340	55916	56491					
2014 . 4514	PCC	Frequency	3560	3617.6	3675.1					
20M + 15M	SCC	Channel	55511	56087	56662					
	300	Frequency	3577.1	3634.7	3692.2					
	PCC	Channel	55340	55891	56442					
20M + 20M	F00	Frequency	3560	3615.1	3670.2					
ZUIVI + ZUIVI	SCC	Channel	55538	56089	56640					
	300	Frequency	3579.8	3634.9	3690					

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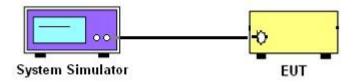
3 Conducted Test Items

3.1 Measuring Instruments

See list of measuring instruments of this test report.

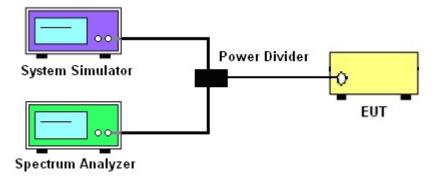
3.1.1 Test Setup

3.1.2 Conducted Output Power

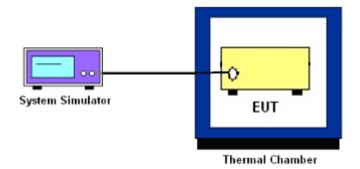


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3.1.3 Peak-to-Average Ratio, Occupied Bandwidth, Conducted Band-Edge and Conducted Spurious Emission



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

3.2.1 Description of the Conducted Output Power 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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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

- 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 EIRP

3.4.1 Description of the EIRP Measurement

The EIRP of mobile transmitters must not exceed 23 dBm /10 megahertz for LTE Band 48.

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The testing follows ANSI C63.26-2015 Section 5.2.5.5

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_C = signal attenuation in the connecting cable between the transmitter and antenna in dB

EIRP for CBRS equipment as below tabel:

Device	Maximum EIRP (dBm/10 MHz)
End User Device	23
Category A CBSD	30
Category B CBSD	47

3.4.1 Test Procedures

The testing follows procedure in Section 5.2 of ANSI C63.26-2015 and KDB 940660 D01 Part 96 Eqpt v02 Section 3.2(b)(2)

Determine the EIRP by adding the effective antenna gain to the measured average conducted power level.

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3.5 Occupied Bandwidth

3.5.1 Description of Occupied Bandwidth Measurement

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

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total mean transmitted power.

The 26 dB emission bandwidth is defined as the frequency range between two points, one above and

one below the carrier frequency, at which the spectral density of the emission is attenuated 26 dB

below the maximum in-band spectral density of the modulated signal. Spectral density (power per unit

bandwidth) is to be measured with a detector of resolution bandwidth equal to approximately 1.0% of

the emission bandwidth.

3.5.2 Test Procedures

The testing follows ANSI C63.26-2015 Section 5.4.3 (26dB) and Section 5.4.4 (99OB)

1. The EUT was connected to spectrum analyzer and system simulator via a power divider.

2. 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.

5. Determine the reference value: Set the EUT to transmit a modulated signal. Allow the trace to

stabilize. Set the spectrum analyzer marker to the highest level of the displayed trace.

(this is the reference value)

6. Determine the "-26 dB down amplitude" as equal to (Reference Value - X).

7. Place two markers, one at the lowest and the other at the highest frequency of the envelope of

the spectral display such that each marker is at or slightly below the "-X dB down amplitude"

determined in step 6. If a marker is below this "-X dB down amplitude" value it shall be placed as close as possible to this value. The OBW is the positive frequency difference between the

two markers.

8. Use the 99 % power bandwidth function of the spectrum analyzer and report the measured

bandwidth.

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3.6 Conducted Band Edge

3.6.1 Description of Conducted Band Edge Measurement

The conducted power of any End User Device emission outside the fundamental emission (whether in or outside of the authorized band) shall not exceed -13 dBm/MHz within 0 to B megahertz (where B is the bandwidth in megahertz of the assigned channel or multiple contiguous channels of the End User Device) above the upper CBSD-assigned channel edge and within 0 to B megahertz below the lower CBSD-assigned channel edge. At all frequencies greater than B megahertz above the upper CBSD assigned channel edge and less than B megahertz below the lower CBSD-assigned channel edge, the conducted power of any End User Device emission shall not exceed -25 dBm/MHz. Notwithstanding the emission limits in this paragraph, the Adjacent Channel Leakage Ratio for End User Devices shall be at least 30 dB.

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3.6.2 Test Procedures

The testing follows FCC KDB 971168 D01 v03r01 Section 6.1.

- 1. The EUT was connected to spectrum analyzer and system simulator via a power divider.
- 2. The band edges of low and high channels for the highest RF powers were measured.
- 3. Set RBW >= 1% EBW in the 1MHz band immediately outside and adjacent to the band edge.
- 4. Beyond the 1 MHz band from the band edge, RBW=1MHz was used
- 5. Set spectrum analyzer with RMS detector.
- The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

For Adjacent Channel Leakage Ratio (ACLR) measurement,

- The Adjacent Channel Leakage Ratio (ACLR) is the ratio of the average power in the assigned aggregated channel bandwidth to the average power over the equivalent adjacent channel bandwidth.
- 2. The option ACLR of spectrum analyzer is used and measures the ACLR ratio by setting equivalent channel bandwidth.
- 3. The measured ACLR ratio shall be at least 30 dB.

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3.7 Conducted Spurious Emission

3.7.1 Description of Conducted Spurious Emission Measurement

Emission and interference limits: the device satisfies the emission limits specified in Section FCC Part 96.41 e) 1) ii) & e) 2) at the lowest and highest edges of the band, and in the middle of the band.

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3.7.2 Test Procedures

The testing follows FCC KDB 971168 D01 v03r01 Section 6.1.

- 1. The EUT was connected to spectrum analyzer and system simulator via a power divider.
- 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 -40dBm/MHz.

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3.8 Frequency Stability

3.8.1 Description of Frequency Stability Measurement

The frequency stability shall be measured by variation of ambient temperature and variation of primary supply voltage to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within ±0.00025% (±2.5ppm) of the center frequency

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3.8.2 Test Procedures for Temperature Variation

The testing follows FCC KDB 971168 D01 v03r01 Section 9.0.

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

3.8.3 Test Procedures for Voltage Variation

The testing follows FCC KDB 971168 D01 v03r01 Section 9.0.

- 1. The EUT was placed in a temperature chamber at 25±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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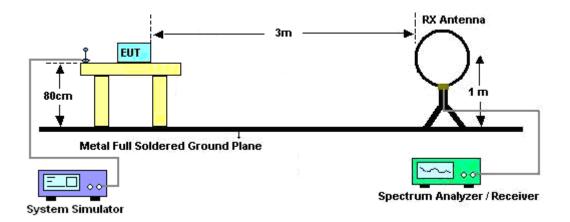
4 Radiated Test Items

4.1 Measuring Instruments

See list of measuring instruments of this test report.

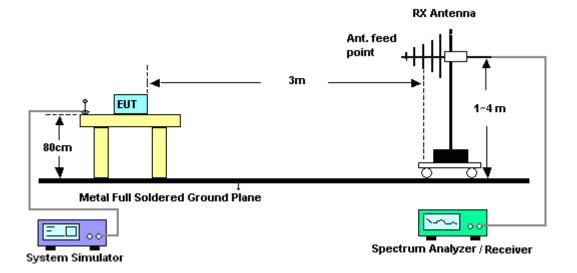
4.2 Test Setup

For radiated emissions below 30MHz



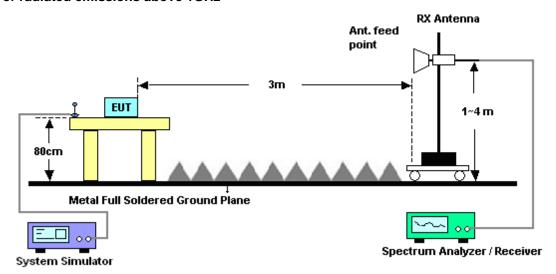
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For radiated emissions from 30MHz to 1GHz



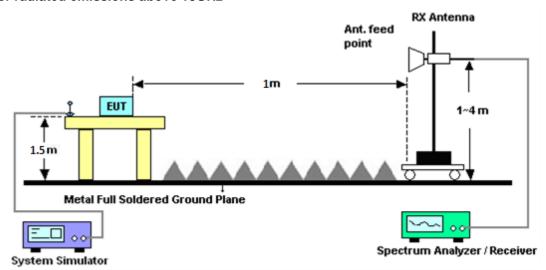
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For radiated emissions above 1GHz



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For radiated emissions above 18GHz



4.3 Test Result of Radiated Test

Please refer to Appendix B.

Note:

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported.

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

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4.4 Radiated Spurious Emission

4.4.1 Description of Radiated Spurious Emission Measurement

The radiated spurious emission was measured by substitution method according to ANSI / TIA-603-E.

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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 -40dBm / MHz.

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

4.4.2 Test Procedures

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

- 1. The EUT was placed on a turntable with 0.8 meter height for frequency below 1GHz and 1.5 meter height for frequency above 1GHz respectively above ground.
- 2. The EUT was set 3 meters from the receiving antenna mounted on the antenna tower.
- 3. The table was rotated 360 degrees to determine the position of the highest spurious emission.
- 4. The height of the receiving antenna is varied between 1m to 4m to search the maximum spurious emission for both horizontal and vertical polarizations.
- 5. During the measurement, the system simulator parameters were set to force the EUT transmitting at maximum output power.
- 6. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
- A horn antenna was substituted in place of the EUT and was driven by a signal generator.
 Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.

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

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

The limit line is -40dBm/MHz

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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	100315	9 kHz~30 MHz	Dec. 26, 2019	Feb. 03, 2020~ Feb. 05, 2020	Dec. 25, 2020	Radiation (03CH12-HY)
Bilog Antenna	TESEQ	CBL 6111D & 00800N1D01 N-06	37059 & 01	30MHz~1GHz	Oct. 12, 2019	Feb. 03, 2020~ Feb. 05, 2020	Oct. 11, 2020	Radiation (03CH12-HY)
Horn Antenna	SCHWARZBE CK	BBHA 9120D	9120D-132 8	1GHz ~ 18GHz	Nov. 14, 2019	Feb. 03, 2020~ Feb. 05, 2020	Nov. 13, 2020	Radiation (03CH12-HY)
Horn Antenna	SCHWARZBE CK	BBHA 9120D	9120D-152 2	1GHz ~ 18GHz	Sep. 19, 2019	Feb. 03, 2020~ Feb. 05, 2020	Sep. 18, 2020	Radiation (03CH12-HY)
SHF-EHF Horn Antenna	SCHWARZBE CK	BBHA 9170	BBHA9170 584	18GHz ~ 40GHz	Dec. 10, 2019	Feb. 03, 2020~ Feb. 05, 2020	Dec. 09, 2020	Radiation (03CH12-HY)
Preamplifier	COM-POWER	PA-103	161075	10MHz~1GHz	Mar. 25, 2019	Feb. 03, 2020~ Feb. 05, 2020	Mar. 24, 2020	Radiation (03CH12-HY)
Preamplifier	Jet-Power	JPA00101800 -30-10P	160118000 2	1GHz~18GHz	Aug. 01, 2019	Feb. 03, 2020~ Feb. 05, 2020	Jul. 01, 2020	Radiation (03CH12-HY)
Preamplifier	EMEC	EM18G40G	060715	18GHz ~ 40GHz	Dec. 13, 2019	Feb. 03, 2020~ Feb. 05, 2020	Dec. 12, 2020	Radiation (03CH12-HY)
Preamplifier	Agilent	8449B	3008A023 75	1GHz~26.5GHz	May 27, 2019	Feb. 03, 2020~ Feb. 05, 2020	May 26, 2020	Radiation (03CH12-HY)
Spectrum Analyzer	Keysight	N9010A	MY553705 26	10Hz~44GHz	Mar. 19, 2019	Feb. 03, 2020~ Feb. 05, 2020	Mar. 18, 2020	Radiation (03CH12-HY)
Signal Generator	Rohde & Schwarz	SMB100A	175727	100kHz~40GHz	Dec. 23, 2018	Feb. 03, 2020~ Feb. 05, 2020	Dec. 23, 2019	Radiation (03CH12-HY)
Hygrometer	TECPEL	DTM-303B	TP161243	N/A	May 11, 2019	Feb. 03, 2020~ Feb. 05, 2020	May 10, 2020	Radiation (03CH12-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 126E	0058/126E	30M-18G	Mar. 13, 2019	Feb. 03, 2020~ Feb. 05, 2020	Mar. 12, 2020	Radiation (03CH12-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	505134/2	30M~40GHz	Feb. 26, 2019	Feb. 03, 2020~ Feb. 05, 2020	Feb. 25, 2020	Radiation (03CH12-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	800740/2	30M~40GHz	Feb. 26, 2019	Feb. 03, 2020~ Feb. 05, 2020	Feb. 25, 2020	Radiation (03CH12-HY)
Base Station	Anritsu	MT8821C	620143281 6	GSM / GPRS /WCDMA / LTE FDD/TDD with 44) /LTE-3CC DLCA,2CC ULCA	May 05, 2019	Feb. 03, 2020~ Feb. 05, 2020	May 04, 2020	Radiation (03CH12-HY)
Controller	EMEC	EM1000	N/A	Control Turn table & Ant Mast	N/A	Feb. 03, 2020~ Feb. 05, 2020	N/A	Radiation (03CH12-HY)
Antenna Mast	EMEC	AM-BS-4500- B	N/A	1m~4m	N/A	Feb. 03, 2020~ Feb. 05, 2020	N/A	Radiation (03CH12-HY)
Turn Table	EMEC	TT2000	N/A	0~360 Degree	N/A	Feb. 03, 2020~ Feb. 05, 2020	N/A	Radiation (03CH12-HY)
Software	Audix	E3 6.2009-8-24	RK-00098 9	N/A	N/A	Feb. 03, 2020~ Feb. 05, 2020	N/A	Radiation (03CH12-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	Jan. 29, 2020~ Feb. 02, 2020	Mar. 02, 2020	Conducted (TH05-HY)
Spectrum Analyzer	Rohde & Schwarz	FSV40	101397	10Hz~40GHz	Nov. 15, 2019	Jan. 29, 2020~ Feb. 02, 2020	Nov. 14, 2020	Conducted (TH05-HY)
Temperature Chamber	ESPEC	SH-641	92013720	-40°C ~90°C	Sep. 02, 2019	Jan. 29, 2020~ Feb. 02, 2020	Sep. 01, 2020	Conducted (TH05-HY)
Programmable Power Supply	GW Instek	PSS-2005	EL890089	1V~20V 0.5A~5A	Feb. 21, 2019	Jan. 29, 2020~ Feb. 02, 2020	Feb. 20, 2020	Conducted (TH05-HY)
Coupler	Warison	20dB 25W SMA Directional Coupler	#A	1-18GHz	Jan. 13, 2020	Jan. 29, 2020~ Feb. 02, 2020	Jan. 12, 2021	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	3.24
Confidence of 95% (U = 2Uc(y))	3.24

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

Measuring Uncertainty for a Level of	3.62
Confidence of 95% (U = 2Uc(y))	

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

Measuring Uncertainty for a Level of	4.06
Confidence of 95% (U = 2Uc(y))	4.06

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Appendix A. Test Results of Conducted Test

Conducted Output Power(Average power)

LTE Band 48 Maximum Average Power [dBm]									
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest			
20	1	0		22.76	22.56	22.22			
20	1	49		23.04	22.81	22.46			
20	1	99		22.85	22.67	22.30			
20	50	0	QPSK	22.09	21.86	21.51			
20	50	24		22.12	21.93	21.59			
20	50	50		22.07	21.82	21.44			
20	100	0		22.11	21.81	21.52			
20	1	0		21.91	21.65	21.32			
20	1	49		22.14	21.91	21.59			
20	1	99		22.06	21.76	21.35			
20	50	0	16-QAM	21.14	20.85	20.52			
20	50	24		21.24	20.97	20.62			
20	50	50		21.10	20.84	20.45			
20	100	0		21.17	20.83	20.52			
20	1	0		20.32	20.62	20.25			
20	1	49		20.50	20.98	20.00			
20	1	99	64-QAM	20.52	20.66	20.05			
20	50	0		19.64	19.57	19.23			
20	50	24		19.78	19.63	19.30			
20	50	50		19.73	19.66	19.36			
20	100	0		19.65	19.57	19.17			
15	1	0		22.65	22.60	22.22			
15	1	37		22.74	22.78	22.42			
15	1	74		22.88	22.77	22.34			
15	36	0	QPSK	21.86	21.92	21.46			
15	36	20		21.90	21.83	21.53			
15	36	39		21.93	21.86	21.40			
15	75	0		21.86	21.74	21.43			
15	1	0		22.02	21.82	21.48			
15	1	37		21.96	21.93	21.56			
15	1	74		22.19	21.90	21.52			
15	36	0	16-QAM	21.02	20.81	20.49			
15	36	20		21.06	20.77	20.59			
15	36	39		21.04	20.83	20.46			
15	75	0		21.10	20.86	20.56			
15	1	0		20.59	20.34	20.35			
15	1	37		20.51	20.32	20.48			
15	1	74		20.76	20.45	20.34			
15	36	0	64-QAM	19.74	19.48	19.15			
15	36	20		19.78	19.42	19.18			
15	36	39		19.85	19.49	19.20			
15	75	0		19.77	19.45	19.16			



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	LTE Band 48 Maximum Average Power [dBm]									
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest				
10	1	0		22.60	22.40	22.02				
10	1	25		22.91	22.71	22.35				
10	1	49		22.77	22.54	22.25				
10	25	0	QPSK	21.84	21.62	21.26				
10	25	12		22.03	21.81	21.44				
10	25	25		21.92	21.65	21.31				
10	50	0		21.90	21.61	21.34				
10	1	0		21.73	21.50	21.10				
10	1	25		22.08	21.83	21.49				
10	1	49		21.95	21.77	21.39				
10	25	0	16-QAM	20.84	20.66	20.22				
10	25	12		21.02	20.80	20.43				
10	25	25		20.88	20.62	20.32				
10	50	0		20.96	20.67	20.37				
10	1	0		20.59	20.50	19.98				
10	1	25		20.88	20.57	20.31				
10	1	49	64-QAM	20.72	20.71	20.06				
10	25	0		19.63	19.57	19.21				
10	25	12		19.73	19.68	19.19				
10	25	25		19.68	19.63	19.23				
10	50	0		19.62	19.58	19.18				
5	1	0	QPSK	22.78	22.57	22.24				
5	1	12		22.96	22.73	22.37				
5	1	24		22.89	22.63	22.36				
5	12	0		21.96	21.68	21.34				
5	12	7		21.95	21.72	21.45				
5	12	13		21.96	21.68	21.40				
5	25	0		21.90	21.74	21.39				
5	1	0		21.87	21.64	21.29				
5	1	12		21.93	21.74	21.37				
5	1	24		21.90	21.68	21.40				
5	12	0	16-QAM	20.89	20.61	20.23				
5	12	7		20.88	20.72	20.37				
5	12	13		20.95	20.66	20.33				
5	25	0		20.98	20.80	20.46				
5	1	0		20.42	20.29	20.16				
5	1	12		20.47	20.32	20.21				
5	1	24	64-QAM	20.49	20.31	20.28				
5	12	0		19.54	19.35	19.05				
5	12	7		19.59	19.40	19.11				
5	12	13		19.57	19.41	19.10				
5	25	0		19.58	19.53	19.24				

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LTE Band 48C_CA Maximum Average Power [dBm]									
	P	CC		CC			_		
BW [MHz]	RB Size	RB Offset	RB Size	RB Offset	Mod	Lowest	Middle	Highest	
20+20	100	0	100	0		20.34	20.23	20.83	
20+20	1	0	1	99	QPSK	13.41	13.61	13.98	
20+20	1	99	1	0		22.31	22.22	22.85	
20+20	100	0	100	0		19.39	19.30	19.85	
20+20	1	0	1	99	16-QAM	13.88	14.15	14.01	
20+20	1	99	1	0		21.83	21.62	21.86	
20+20	100	0	100	0		19.21	19.30	19.76	
20+20	1	0	1	99	64-QAM	13.57	13.88	14.29	
20+20	1	99	1	0		19.89	20.10	20.77	
20+15	100	0	75	0	QPSK	20.84	20.77	21.79	
20+15	1	0	1	74		13.62	13.58	13.77	
20+15	1	99	1	0		22.21	22.23	22.81	
20+15	100	0	75	0		18.88	19.02	20.15	
20+15	1	0	1	74	16-QAM	13.72	13.79	14.02	
20+15	1	99	1	0		21.34	21.27	22.10	
20+15	100	0	75	0		18.90	18.96	19.90	
20+15	1	0	1	74	64-QAM	13.75	13.81	14.01	
20+15	1	99	1	0		18.85	19.23	20.05	
15+20	75	0	100	0		20.39	20.40	20.92	
15+20	1	0	1	99	QPSK	13.65	13.81	14.17	
15+20	1	74	1	0		21.97	22.11	22.71	
15+20	75	0	100	0		18.95	19.07	19.98	
15+20	1	0	1	99	16-QAM	13.70	13.88	14.24	
15+20	1	74	1	0		21.09	21.33	22.03	
15+20	75	0	100	0		18.64	18.97	19.95	
15+20	1	0	1	99	64-QAM	13.74	13.86	14.12	
15+20	1	74	1	0		18.63	19.22	20.25	

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LTE Band 48C_CA Maximum Average Power [dBm] **PCC** SCC BW [MHz] Mod Middle Highest Lowest RB Size **RB Offset RB Size RB Offset** 20+10 100 0 50 0 20.33 20.41 20.93 20+10 49 QPSK 13.80 13.72 14.37 1 0 1 20+10 1 99 1 21.78 22.31 22.78 20+10 100 0 50 0 19.12 19.46 19.97 20+10 0 1 49 16-QAM 13.78 13.75 1 14.37 20+10 1 99 1 0 20.94 21.34 21.97 20+10 100 0 50 0 18.37 18.98 20.09 20+10 1 0 1 49 64-QAM 13.68 13.90 14.37 20+10 99 1 0 18.29 19.20 19.98 1 10+20 50 0 100 0 20.19 20.33 20.95 1 QPSK 10+20 1 0 99 13.75 13.81 14.33 1 21.95 10+20 49 0 22.04 22.72 1 10+20 50 0 100 0 18.68 19.44 19.97 10+20 1 0 1 99 16-QAM 13.85 14.43 13.86 10+20 49 1 20.94 21.19 21.97 1 0 10+20 50 0 100 0 18.55 19.47 20.00 10+20 1 1 99 64-QAM 13.87 14.02 0 14.39 10+20 1 49 1 0 18.65 19.23 20.12 100 25 20+5 0 0 20.15 20.49 21.05 QPSK 20+5 1 0 1 24 14.05 13.92 14.28 1 1 20+5 99 0 21.63 22.14 22.78 100 25 18.74 20+5 0 0 19.41 19.98 20+5 1 0 1 24 16-QAM 14.01 13.97 14.55 1 20+5 1 99 0 20.66 21.17 21.92 100 25 20+5 0 0 18.66 19.16 19.87 20+5 1 0 1 24 64-QAM 13.95 13.91 14.32 1 1 20+5 99 0 18.75 19.07 19.45 5+20 25 0 100 0 19.90 20.34 20.88 5+20 QPSK 0 1 99 13.87 13.80 14.44 1 1 1 5+20 24 0 21.37 22.00 22.75 5+20 25 0 100 0 18.58 19.41 19.96 5+20 0 1 99 16-QAM 14.08 14.00 14.55 1 1 5+20 1 24 0 20.45 20.99 21.85 5+20 25 0 100 0 18.22 18.85 19.96 5+20 0 1 99 64-QAM 13.95 13.91 14.45 1 1 5+20 1 24 0 18.25 18.83 20.12

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LTE Band 48

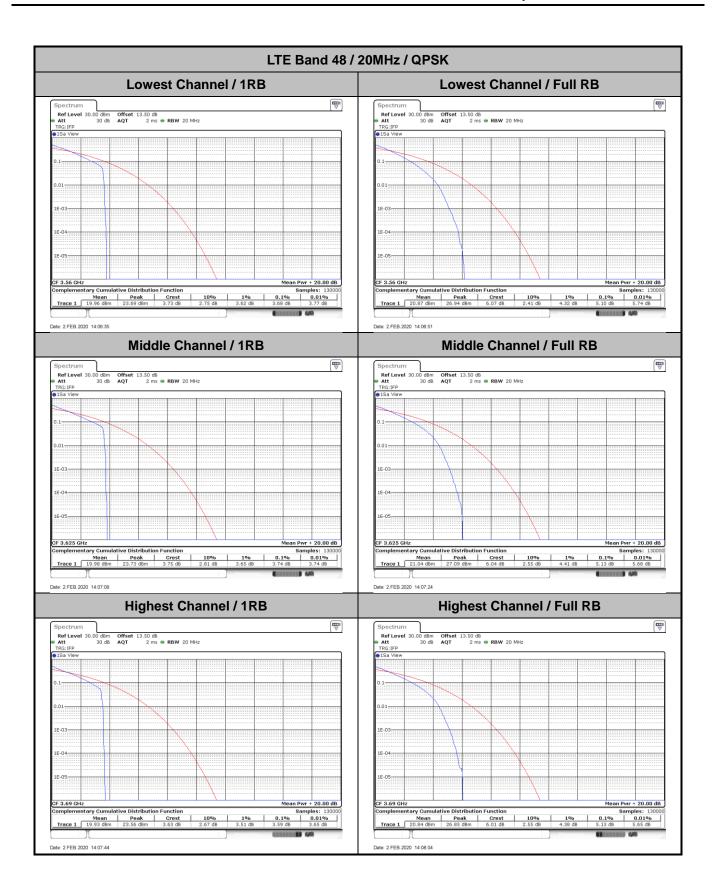
Peak-to-Average Ratio

Mode									
Mod.	QP	SK	160	Limit: 13dB					
RB Size	1RB	1RB Full RB		Full RB	Result				
Lowest CH	3.68	5.10	5.65	6.00					
Middle CH	3.74	5.13	5.42	6.03	PASS				
Highest CH	3.59	5.13	5.62	6.00					
Mode		LTE Band 48 / 20MHz							
Mod.	64Q	AM			Limit: 13dB				
RB Size	1RB	Full RB			Result				
Lowest CH	6.55	6.49	-	-					
Middle CH	6.70	6.52	-	-	PASS				
Highest CH	6.67	6.52	-	-					

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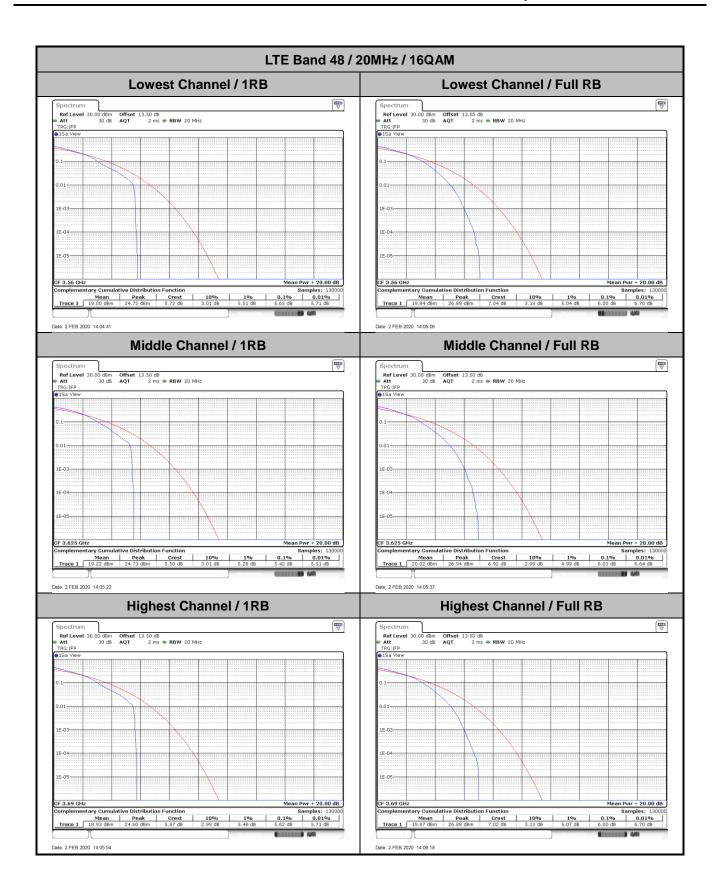
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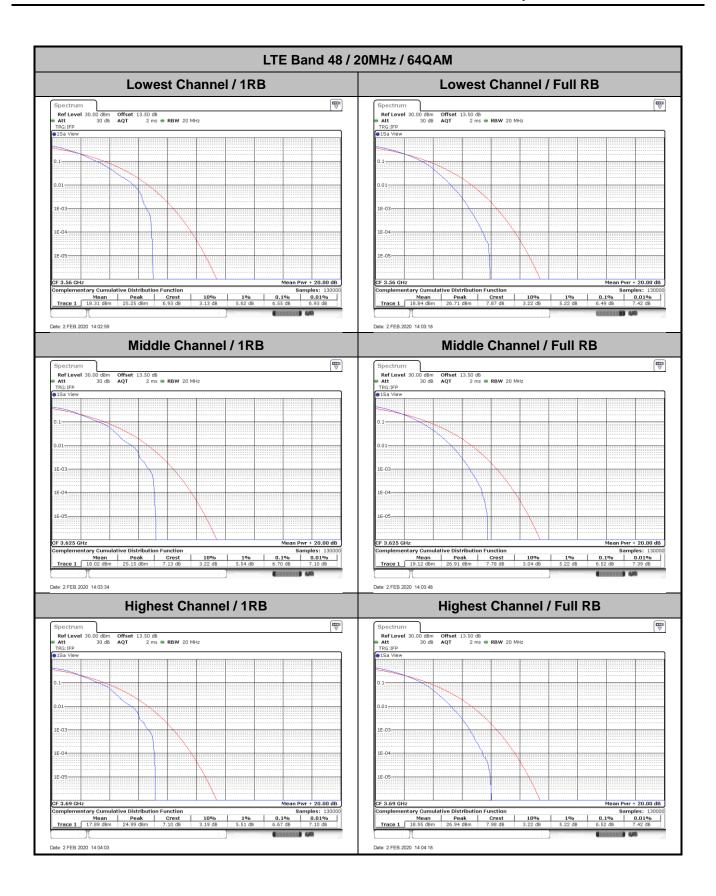
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26dB Bandwidth

Mode		LTE Band 48 : 26dB BW(MHz)										
BW	1.4MHz 3MHz			5N	5MHz		10MHz		ИHz	20MHz		
Mod.	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Lowest CH	-	-	-	-	4.85	4.89	9.75	9.71	14.30	14.63	19.10	18.66
Middle CH	-	-	-	-	4.94	4.91	9.69	9.65	14.57	14.51	19.30	18.78
Highest CH	-	-	-	-	4.90	4.86	9.63	9.69	14.27	14.27	18.74	18.62
Mode					LTE Ba	and 48 :	26dB BV	V(MHz)				
BW	1.4	ЛHz	3MHz		5MHz		10MHz		15MHz		20MHz	
Mod.	64QAM		64QAM		64QAM		64QAM		64QAM		64QAM	
Lowest CH	-	-	-	-	4.86	-	9.71	-	14.15	-	18.62	-
Middle CH	-	-	-	-	4.95	-	9.65	-	14.36	-	18.66	-
Highest CH	-	-	-	-	4.87	-	9.77	-	14.36	-	19.06	-

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Att 30 dB

SGL Count 100/100

1Pk Max 14.22 dB 3.55097200 GF 26.00 d 4.845000000 MF 726 -10 dBm -20 dBm Mar M MA 40 (B) A) A Span 10.0 MHz CF 3.5525 GHz Span 10.0 MHz X-value 3.550972 GHz 3.550992 GHz 3.554938 GHz Type Ref Trc Type Ref Trc -11.98 dBm -12.15 dBm Middle Channel / 5MHz / QPSK Middle Channel / 5MHz / 16QAM 13.50 dB • RBW 100 kHz 19 µs • VBW 300 kHz Mode Auto FFT Offset 13.50 dB ● RBW 100 kHz SWT 19 µs ● VBW 300 kHz Mode Auto FFT 14.03 dBn 3.625460nn 14.13 dBi 3.62494000 26.00 d 40-d8n 40 dBm -50 dBm-Function Result 4,935 MHz 26.00 dB 734.5 Function Result 4.905 MHz 26.00 dB 739.1
 X-value
 Y-value

 3.62546 GHz
 14.03 dBm

 3.62542 GHz
 -12.10 dBm

 3.627448 GHz
 -11.74 dBm

 X-value
 Y-value
 Function

 3.62494 GHz
 14.13 dBm
 ndB down

 3.622532 GHz
 -11.84 dBm
 ndB

 3.627468 GHz
 -11.69 dBm
 Q factor
 Type Ref Trc Type Ref Trc Function n ndB down Date: 2.FEB.2020 14:10:00 Date: 2.FEB.2020 14:10:12 Highest Channel / 5MHz / QPSK Highest Channel / 5MHz / 16QAM Offset 13.50 dB ● RBW 100 kHz SWT 19 µs ● VBW 300 kHz Mode Auto FFT Att 30 dB
 SGL Count 100/100
 1Pk Max 14.55 dB 3.69869900 GF 12.42 dB 3.69595200 GF -30 dBm-40 dBm -50 dBm-

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Type Ref Trc

 X-value
 Y-value
 Function

 3.695952 GHz
 12.42 dBm
 ndB down

3.695122 GHz 3.699978 GHz

Function Result 4.895 MHz

Type | Ref | Trc |

 X-value
 Y-value
 Function

 3.698699 GHz
 14.55 dBm
 ndB down

3.694993 GHz -11.65 dBm 3.699888 GHz -11.98 dBm

 X-value
 Y-value
 Function

 3.697358 GHz
 15.92 dBm
 ndB down

Type | Ref | Trc |

Report No.: FG9N2021-03B LTE Band 48 Lowest Channel / 10MHz / QPSK Lowest Channel / 10MHz / 16QAM Ref Level 30.00 dBm

Att 30 dB

SGL Count 100/100

1Pk Max 16.31 dE 3.5565180 G 26.0 9.750000000 -10 dBm -20 dBm 40 dBm= Span 20.0 MHz Span 20.0 MHz Type Ref Trc Middle Channel / 10MHz / QPSK Middle Channel / 10MHz / 16QAM Offset 13.50 dB ● RBW 300 kHz SWT 12.6 µs ● VBW 1 MHz Mode Auto FFT 16.28 dBr 3.6275570 GH 26.00 d .690000000 MH 374. -50 dBm
 X-value
 Y-value
 Function

 3.627557 GHz
 16.28 dBm
 ndB down

 3.620165 GHz
 -9.78 dBm
 ndB

 3.629855 GHz
 -9.41 dBm
 Q factor
 Type Ref Trc Type Ref Trc Function n ndB down **Function Result Function Result** Date: 2.FEB.2020 13:50:12 Date: 2.FEB.2020 13:50:24 Highest Channel / 10MHz / QPSK Highest Channel / 10MHz / 16QAM Offset 13.50 dB ● RBW 300 kHz SWT 12.6 µs ● VBW 1 MHz Mode Auto FFT Att 30 dB
 SGL Count 100/100
 1Pk Max 15.24 dBr 3.6968380 GH 15.92 dB 3.6973580 GF

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Function Result

Type Ref Trc

 X-value
 Y-value
 Function

 3.696838 GHz
 15.24 dBm
 ndB down

3.690145 GHz 3.699835 GHz

Report No.: FG9N2021-03B LTE Band 48 Lowest Channel / 15MHz / QPSK Lowest Channel / 15MHz / 16QAM Ref Level 30.00 dBm

Att 30 dB

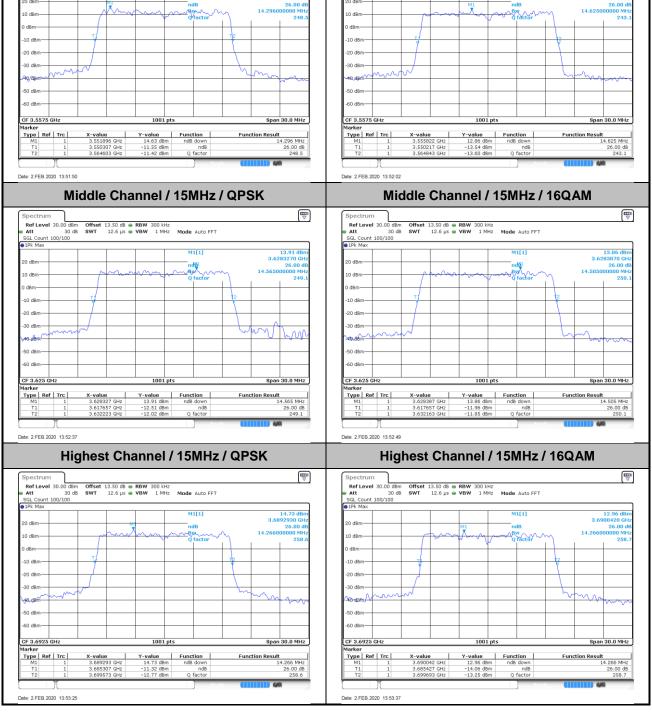
SGL Count 100/100

1Pk Max 14.63 dBi 3.5518960 GF 26.00 d 14.296000000 MF 243. -10 dBm Span 30.0 MHz CF 3.5575 GHz Span 30.0 MHz Type Ref Trc Middle Channel / 15MHz / QPSK Middle Channel / 15MHz / 16QAM **□**□□ Offset 13.50 dB ● RBW 300 kHz SWT 12.6 µs ● VBW 1 MHz Mode Auto FFT 13.91 dB 13.86 dBi 3.6283870 CH My hom -50 dBm Function Result 14.565 MHz 26.00 dB 249.1 Function Result 14.505 MHz 26.00 dB 250.1
 X-value
 Y-value
 Function

 3.628327 GHz
 13.91 dBm
 ndB down

 3.617657 GHz
 -12.51 dBm
 ndB

 3.632223 GHz
 -12.02 dBm
 Q factor
 Type Ref Trc Type Ref Trc Date: 2.FEB.2020 13:52:37 Date: 2.FEB.2020 13:52:49 Highest Channel / 15MHz / QPSK Highest Channel / 15MHz / 16QAM Offset 13.50 dB ● RBW 300 kHz SWT 12.6 µs ● VBW 1 MHz Mode Auto FFT Att 30 dB
 SGL Count 100/100
 1Pk Max 14.73 dB 3.6892930 GF 12.96 dBr 3.6900420 GH

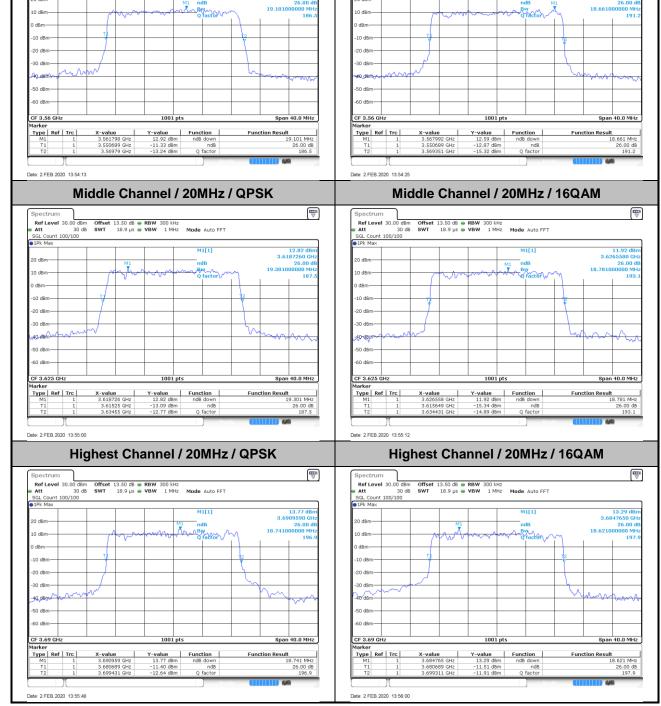


Report No.: FG9N2021-03B LTE Band 48 Lowest Channel / 20MHz / QPSK Lowest Channel / 20MHz / 16QAM Ref Level 30.00 dBm

Att 30 dB

SGL Count 100/100

1Pk Max 12.92 dBi 3.5617980 GF 26.00 d 19.101000000 MF 186 191. -10 dBm -20 dBm 40.0 MHz CF 3.56 GF Span 40.0 MHz Y-value 12.92 dBm -11.33 dBm -13.24 dBm Type Ref Trc -12.87 dBm -15.32 dBm Middle Channel / 20MHz / QPSK Middle Channel / 20MHz / 16QAM **□**□□ ▽ Offset 13.50 dB ● RBW 300 kHz SWT 18.9 µs ● VBW 1 MHz Mode Auto FFT 11.92 dBn 3.6265580 12.82 dBr 3.6187260 GF 26.00 d



Report No.: FG9N2021-03B LTE Band 48 Lowest Channel / 5MHz / 64QAM Lowest Channel / 10MHz / 64QAM Ref Level 30.00 dBm

Att 30 dB

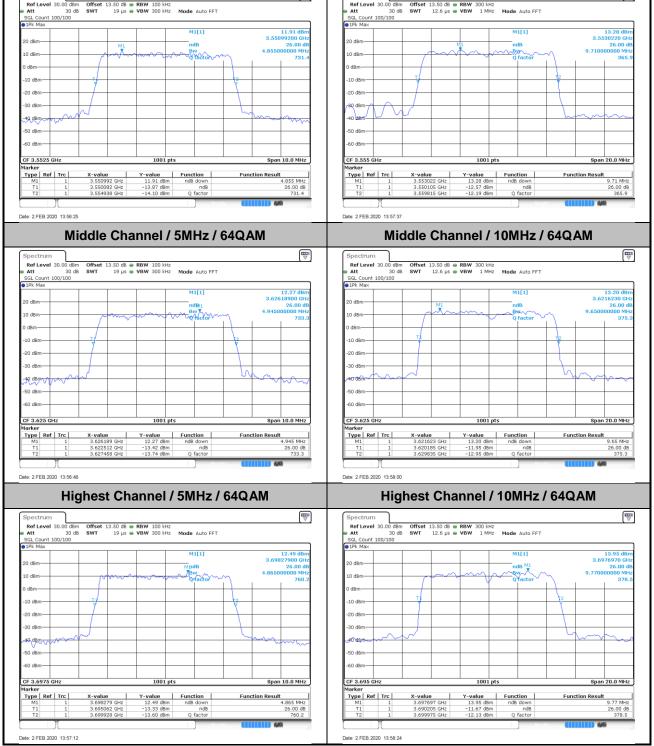
SGL Count 100/100

1Pk Max 11.91 dE 3.55099200 G 26.00 4.855000000 M 731 -10 dBm -20 dBm Span 10.0 MHz Span 20.0 MHz X-value 3.550992 GHz 3.550082 GHz 3.554938 GHz Type Ref Trc Middle Channel / 5MHz / 64QAM Middle Channel / 10MHz / 64QAM **□**□□ 13.50 dB • RBW 100 kHz 19 µs • VBW 300 kHz Mode Auto FFT 13.50 dB • RBW 300 kHz 12.6 µs • VBW 1 MHz Mode Auto FFT 13.20 dBr 3.6216230 GL 12.27 dB: 3.62618900 GF -40 dBm -50 dBm Function Result 4,945 MHz 26.00 dB 733.3
 X-value
 Y-value
 Function

 3.626189 GHz
 12.27 dBm
 ndB down

 3.622512 GHz
 -13.42 dBm
 ndB

 3.627458 GHz
 -13.74 dBm
 Q factor
 Type Ref Trc Type Ref Trc **Function Result** Date: 2.FEB.2020 13:56:48 Date: 2.FEB.2020 13:58:00 Highest Channel / 5MHz / 64QAM Highest Channel / 10MHz / 64QAM Offset 13.50 dB ● RBW 300 kHz SWT 12.6 µs ● VBW 1 MHz Mode Auto FFT Att 30 dB
 SGL Count 100/100
 1Pk Max 12.49 dB 3.69827900 GF 13.95 dBr 3.6976970 GH



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Report No.: FG9N2021-03B LTE Band 48 Lowest Channel / 15MHz / 64QAM Lowest Channel / 20MHz / 64QAM Ref Level 30.00 dBm

Att 30 dB

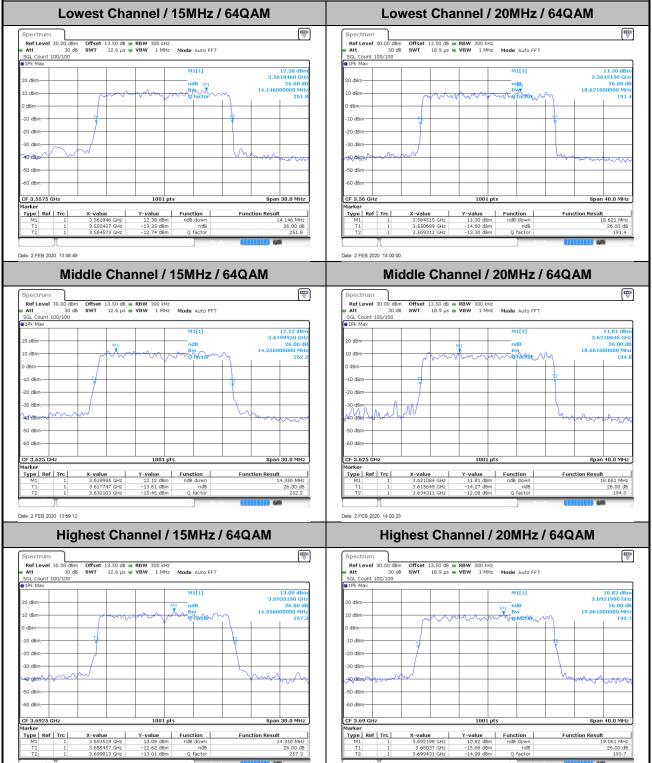
SGL Count 100/100

1Pk Max 12.38 dBi 3.5618460 GH 26.00 d 14.146000000 MH 251 191. -10 dBm -20 dBm 40 dBm Span 30.0 MHz Span 40.0 MHz Y-value 12.38 dBm -13.35 dBm -12.74 dBm X-value 3.561846 GHz 3.550427 GHz 3.564573 GHz Type Ref Trc -14.60 dBm -13.30 dBm Middle Channel / 15MHz / 64QAM Middle Channel / 20MHz / 64QAM **□**□□ 13.50 dB • RBW 300 kHz 12.6 µs • VBW 1 MHz Mode Auto FFT 13.50 dB • RBW 300 kHz 18.9 µs • VBW 1 MHz Mode Auto FFT 11.81 dBr 3.6210840 GH 12.12 dBr 3.6199950 GF 26.00 di -50 dBm-Function Result 14.356 MHz 26.00 dB 252.2 Function Result 18.661 MHz 26.00 dB 194.0
 X-value
 Y-value
 Function

 3.619995 GHz
 12.12 dBm
 ndB down

 3.61747 GHz
 -13.61 dBm
 ndB

 3.632103 GHz
 -15.45 dBm
 Q factor
 Type Ref Trc Type Ref Trc Date: 2.FEB.2020 13:59:12 Date: 2.FEB.2020 14:00:23 Highest Channel / 20MHz / 64QAM Highest Channel / 15MHz / 64QAM Offset 13.50 dB ● RBW 300 kHz SWT 18.9 µs ● VBW 1 MHz Mode Auto FFT Att 30 dB
 SGL Count 100/100
 1Pk Max 13.08 dB 3.6935190 GF 10.82 dBr 3.6921980 GH



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Occupied Bandwidth

Mode	LTE Band 48 : 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	-	-	-	-	4.49	4.48	9.05	8.99	13.49	13.46	17.86	17.90
Middle CH	-	-	-	-	4.49	4.50	9.05	9.05	13.49	13.37	17.94	17.90
Highest CH	-	-	-	-	4.49	4.50	9.09	9.03	13.43	13.46	17.90	17.86
Mode	LTE Band 48 : 99%OBW(MHz)											
BW	1.4MHz		3MHz		5MHz		10MHz		15MHz		20MHz	
Mod.	64QAM		64QAM		64QAM		64QAM		64QAM		64QAM	
Lowest CH	-	-	-	-	4.48	-	9.07	-	13.40	-	17.82	-
Middle CH	-	-	-	-	4.48	-	8.99	-	13.40	-	17.86	-
Highest CH	-	-	-	-	4.51	-	9.05	-	13.46	-	17.90	-

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Report No.: FG9N2021-03B LTE Band 48 Lowest Channel / 5MHz / QPSK Lowest Channel / 5MHz / 16QAM Ref Level 30.00 dBm

Att 30 dB

SGL Count 100/100

Pk Max 14.32 dB 3.55040200 GF 4.485514486 MF -10 dBm -10 dBr -20 dBm-30 dBm 201 PCV 1001 pts Span 10.0 MHz CF 3.5525 GHz Y-value 14.32 dBm 9.20 dBm 8.33 dBm X-value 3.55239 GHz 3.5502622 GHz 3.5547378 GHz Y-value 13.06 dBm 7.33 dBm 8.49 dBm X-value 3.550402 GHz 3.5502622 GHz 3.5547478 GHz Type Ref Trc Function Type Ref Trc Middle Channel / 5MHz / QPSK Middle Channel / 5MHz / 16QAM SGL Count 100/100 • 1Pk Max 14.16 dBi 3.62395100 GF 4.485514486 MF dBm-40 d8pr -40.dBhn -50 dBm-CF 3.625 GH Type Ref Trc
 X-value
 Y-value
 Function

 3.623951 GHz
 14.16 dBm
 3.6227622 GHz

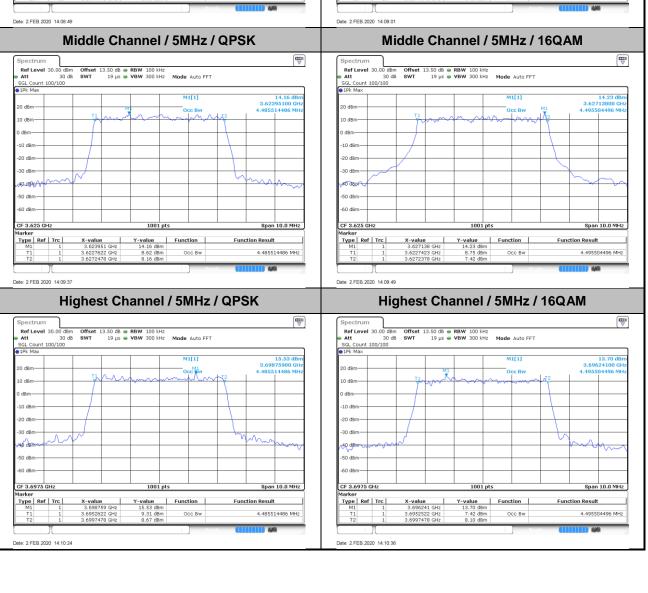
 3.6227622 GHz
 8.62 dBm
 Occ Bw

 3.6272478 GHz
 8.16 dBm
 Type Ref Trc
 X-value
 Y-value
 Function

 3.627138 GHz
 14.23 dBm
 3.6227423 GHz

 3.6227423 GHz
 8.75 dBm
 Occ Bw

 3.6272378 GHz
 7.42 dBm
 Function Result **Function Result** 4.485514486 MHz 4.495504496 MHz Date: 2.FEB.2020 14:09:37 Date: 2.FEB.2020 14:09:49 Highest Channel / 5MHz / QPSK Highest Channel / 5MHz / 16QAM Ref Level 30.00 dBm Offset 13.50 dB ● RBW 100 kHz ■ Att 30 db SWT 19 µs ● VBW 300 kHz Mode Auto FFT SGL Count 100/100
■ 1Pk Max Ref Level 30.0 Att 15.53 dB 3.69875900 GF 4.485514486 MF 20 dBm dBm--10 dBm -30 dBm-



X-value Y-value Function
3.696698 GHz 16.18 dBm
3.6904945 GHz 8.69 dBm Occ Bw
3.6998784 GHz 9.05 dBm

Type | Ref | Trc |

FAX: 886-3-328-4978

Report No.: FG9N2021-03B LTE Band 48 Lowest Channel / 10MHz / QPSK Lowest Channel / 10MHz / 16QAM Ref Level 30.00 dBm

Att 30 dB

SGL Count 100/100

Pk Max 15.65 dB 3.5556590 G 9.050949051 M 14.59 dBr 3.5528620 GH 8.991008991 MH -10 dBm -10 dBn -20 dBm-40 dBm 1001 pts CF 3.555 GHz CF 3.555 GHz Y-value 15.65 dBm 10.36 dBm 8.80 dBm X-value 3.552862 GHz 3.5504845 GHz 3.5594755 GHz X-value 3.555659 GHz 3.5504645 GHz 3.5595155 GHz Y-value 14.59 dBm 7.42 dBm 7.18 dBm Type Ref Trc Function Type Ref Trc Middle Channel / 10MHz / QPSK Middle Channel / 10MHz / 16QAM ♥ Spectrum

| Ref Level 30.00 dBm | Offset 13.50 dB | RBW 300 kHz |
| Att | 30 dB | SWT | 12.6 μs | VBW | 1 MHz | Mode Auto FFT 15.11 dBn 3.6242210 GH 9.050949051 MH 15.36 dBi 3.6274580 GF 9.050949051 MF dBm--20 dBm--30 dBm--40 dBm-46 dBh 50 dBm -50 dBm-CF 3.625 GH
 X-value
 Y-value
 Function

 3.627458 GHz
 15.36 dBm

 3.6204845 GHz
 9.26 dBm
 Occ Bw

 3.6295355 GHz
 10.04 dBm

 X-value
 Y-value
 Function

 3.624221 GHz
 15.11 dBm

 3.6204645 GHz
 9.45 dBm
 Occ Bw

 3.6295155 GHz
 9.09 dBm
 Type Ref Trc Type Ref Trc Function Result **Function Result** 9.050949051 MHz 9.050949051 MHz Date: 2.FEB.2020 13:49:49 Date: 2.FEB.2020 13:50:01 Highest Channel / 10MHz / QPSK Highest Channel / 10MHz / 16QAM Ref Level 30.00 dBm Offset 13.50 dB ● RBW 300 kHz ■ Att 30 db SWT 12.6 μs ● VBW 1 MHz Mode Auto FFT SGL Count 100/100 ■ 1Pk Max 16.18 dBi 3.6966980 GH 9.0909090 15.26 dBn 3.6976170 GH 9.030969031 MH 20 dBm dBm--10 dBm -30 dBm -50 dBm-

9.090909091 MHz

 Type
 Ref
 Trc
 X-value
 Y-value
 Function

 M1
 1
 3,697617 GHz
 15,26 dBm

Occ Bw

9.030969031 MHz

Report No.: FG9N2021-03B LTE Band 48 Lowest Channel / 15MHz / QPSK Lowest Channel / 15MHz / 16QAM Ref Level 30.00 dBm

Att 30 dB

SGL Count 100/100

1Pk Max 14.63 dB 3.5539940 GH 13.486513487 MH 10 dBm -10 dBm -10 dBn -20 dBmmon -40.dBm 40. dB/A -60 dBn -60 dBm 1001 pts CF 3.5575 GHz 1001 pts CF 3.5575 GHz Y-value 15.50 dBm 8.86 dBm 8.12 dBm X-value 3.553994 GHz 3.5507268 GHz 3.5642133 GHz Type Ref Trc Type Ref Trc Middle Channel / 15MHz / QPSK Middle Channel / 15MHz / 16QAM ♥ Spectrum

| Ref Level 30.00 dBm | Offset 13.50 dB | RBW 300 kHz |
| Att | 30 dB | SWT | 12.6 μs | VBW | 1 MHz | Mode Auto FFT SGL Count 100/100 13.72 dBn 3.6225420 GH 13.366633367 MH 14.63 dBi 3.6290460 GF 13.486513487 MF dBmwww. verdêm[™] 40 dsm--50 dBm -50 dBm-CF 3.625 GH Span 30.0 MHz
 X-value
 Y-value
 Function

 3.629046 GHz
 14.63 dBm

 3.6182268 GHz
 10.06 dBm
 Occ Bw

 3.6317133 GHz
 9.71 dBm
 Type Ref Trc Type Ref Trc
 X-value
 Y-value
 Function

 3.622542 GHz
 13.72 dBm
 3.6183167 GHz
 7.14 dBm
 Occ Bw

 3.63316833 GHz
 7.93 dBm
 Occ Bw
 Function Result **Function Result** 13.486513487 MHz 13.366633367 MHz Date: 2.FEB.2020 13:52:14 Date: 2.FEB.2020 13:52:25 Highest Channel / 15MHz / QPSK Highest Channel / 15MHz / 16QAM Ref Level 30.00 dBm Offset 13.50 dB ● RBW 300 kHz ■ Att 30 db SWT 12.6 μs ● VBW 1 MHz Mode Auto FFT SGL Count 100/100 ■ 1Pk Max 15.00 dB 3.6963660 GH 13.426573427 MH 13.70 dBi 3.6878850 GH 13.456543457 MH 20 dBm dBm--10 dBm -30 dBm-LMM -50 dBm--50 dBm

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Function Result

13.426573427 MHz

440

 Type
 Ref
 Trc
 X-value
 Y-value
 Function

 M1
 1
 3,687885 GHz
 13,70 dBm

Function Result

13.456543457 MHz

Occ Bw

FAX: 886-3-328-4978

Type | Ref | Trc |

9.65 dBm Occ Bw 8.84 dBm

X-value Y-value Function
3.689441 GHz 13.29 dBm
3.6810899 GHz 7.14 dBm Occ Bw
3.699991 GHz 9.58 dBm

Type | Ref | Trc |

FAX: 886-3-328-4978

Report No.: FG9N2021-03B LTE Band 48 Lowest Channel / 20MHz / QPSK Lowest Channel / 20MHz / 16QAM Ref Level 30.00 dBm

Att 30 dB

SGL Count 100/100

1Pk Max 10 dBm -10 dBm -10 dBr -20 dBm-40 rdBm -60 dBm Span 40.0 MHz CF 3.56 GH 1001 pts Y-value 13.02 dBm 8.57 dBm 7.69 dBm Type Ref Trc Function Type Ref Trc Middle Channel / 20MHz / QPSK Middle Channel / 20MHz / 16QAM ♥ 14.39 dBi 3.6246400 GF 17.942057942 MF dBm--50 dBm-CF 3.625 GH
 X-value
 Y-value
 Function

 3.62464 GHz
 14.39 dBm

 3.616009 GHz
 8.97 dBm
 Occ Bw

 3.633951 GHz
 9.48 dBm
 Type Ref Trc
 X-value
 Y-value
 Function

 3.629795 GHz
 12.53 dBm
 3.616049 GHz
 7.80 dBm
 Occ Bw

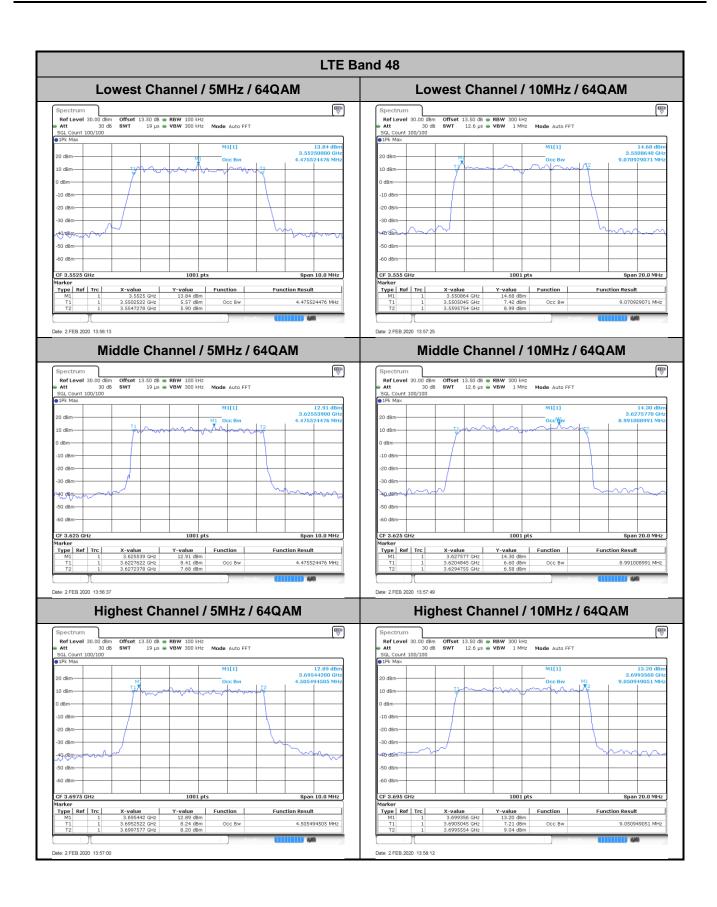
 3.633951 GHz
 7.82 dBm
 Occ Bw
 Type Ref Trc Function Result **Function Result** 17.942057942 MHz 17.902097902 MHz Date: 2.FEB.2020 13:54:37 Date: 2.FEB.2020 13:54:49 Highest Channel / 20MHz / 16QAM Highest Channel / 20MHz / QPSK Ref Level 30.00 dBm Offset 13.50 dB ● RBW 300 kHz ■ Att 30 db SWT 18.9 µs ● VBW 1 MHz Mode Auto FFT SGL Count 100/100 ■ 1Pk Max 13.29 dBi 3.6894410 GF 17.902097902 MF 20 dBm dBm -10 dBm -30 dBm--50 dBm-

17.902097902 MHz

Type Ref Trc

Occ Bw

17.862137862 MHz



Type | Ref | Trc |

FAX: 886-3-328-4978

7.53 dBm Occ Bw 8.58 dBm

Report No.: FG9N2021-03B LTE Band 48 Lowest Channel / 15MHz / 64QAM Lowest Channel / 20MHz / 64QAM Ref Level 30.00 dBm

Att 30 dB

SGL Count 100/100

1Pk Max 12.51 dB 3.5521950 GH 13.396603397 MH 10 dBm -10 dBm -10 dBn -20 dBm--40°d8m³-48.68m -60 dBm 1001 pts CF 3.5575 GHz CF 3.56 GH Span 40.0 MHz Type Ref Trc Function Type Ref Trc 5.38 dBm 6.02 dBm Middle Channel / 15MHz / 64QAM Middle Channel / 20MHz / 64QAM ♥ SGL Count 100/100 12.01 dBi 3.6188860 GF 13.396603397 MF 11.72 dBn 3.6224430 GH 17.862137862 MH dBm--20 dBm-M 40 dbm ✓ -50 dBm-CF 3.625 GH
 X-value
 Y-value
 Function

 3.618886 GHz
 12.01 dBm

 3.6182867 GHz
 7.98 dBm
 Occ Bw

 3.636838 GHz
 8.06 dBm

 Marker
 Trc
 X-value
 Y-value
 Function

 M1
 1
 3.622443 GHz
 11.72 dBm
 11.72 dBm

 T1
 1
 3.6160899 GHz
 6.34 dBm
 Occ Bw

 T2
 1
 3.633951 GHz
 7.56 dBm
 Occ Bw
 Type Ref Trc Function Result **Function Result** 13.396603397 MHz 17.862137862 MHz Date: 2.FEB.2020 13:59:00 Date: 2.FEB.2020 14:00:12 Highest Channel / 20MHz / 64QAM Highest Channel / 15MHz / 64QAM Ref Level 30.00 dBm Offset 13.50 dB ● RBW 300 kHz ■ Att 30 db SWT 18.9 µs ● VBW 1 MHz Mode Auto FFT SGL Count 100/100 ■ 1Pk Max M1[1] M1[1] 20 dBm dBm--10 dBm -30 dBm-49. dBm/r -50 dBm-

13.456543457 MHz

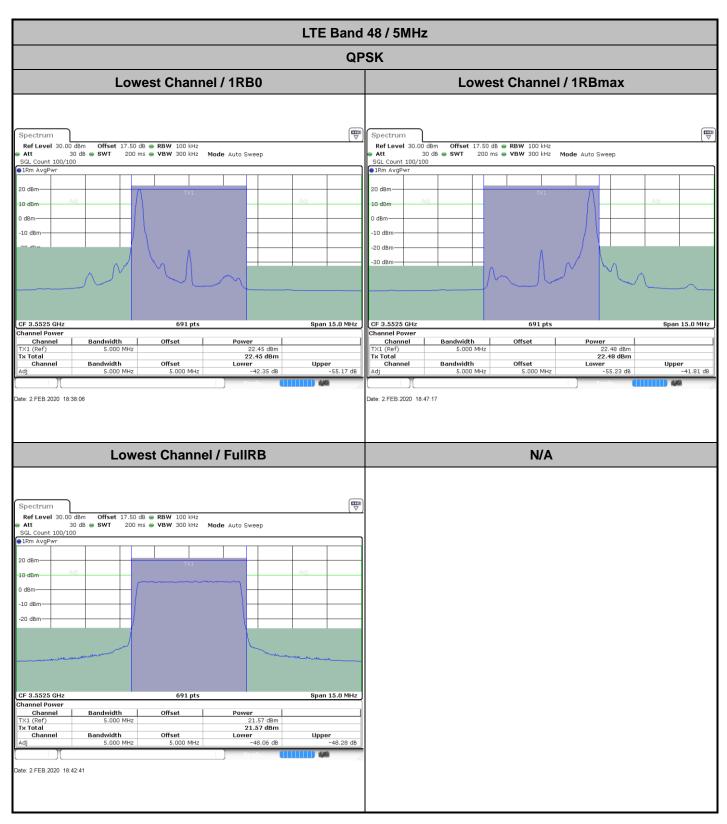
 Type
 Ref
 Trc
 X-value
 Y-value
 Function

 M1
 1
 3,687123 GHz
 12,06 dBm

6.52 dBm Occ Bw 5.64 dBm

17.902097902 MHz

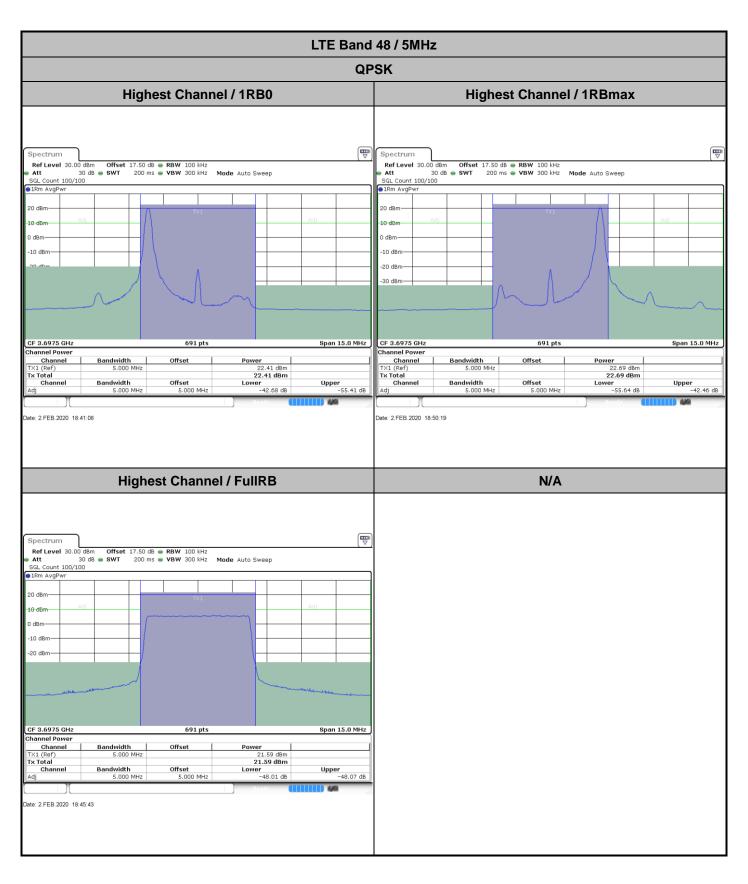




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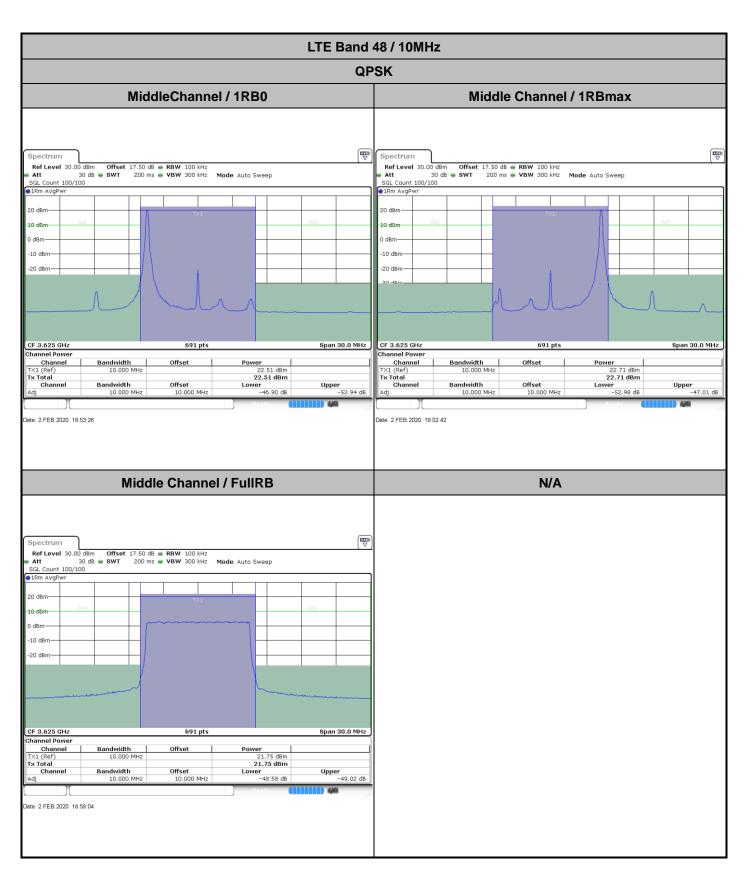
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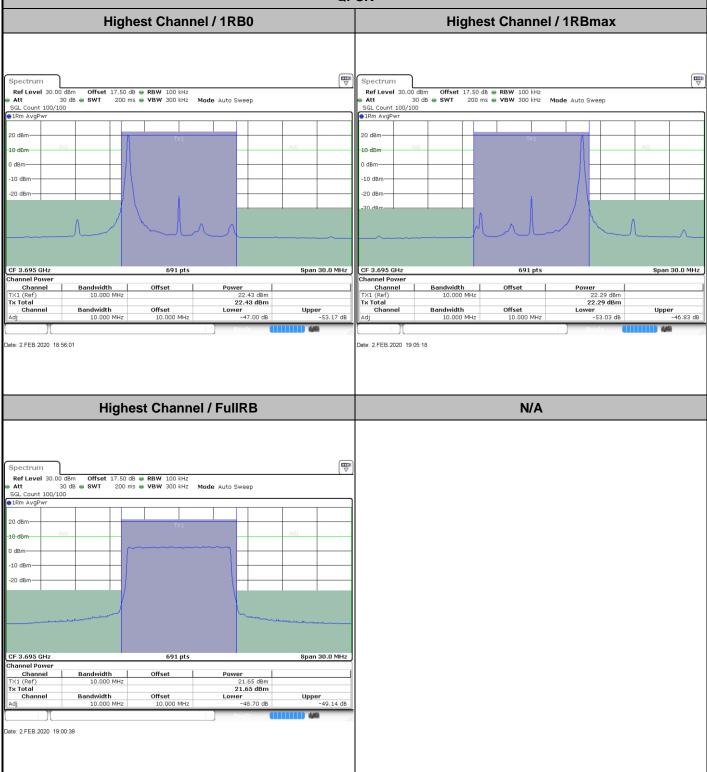


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Report No.: FG9N2021-03B LTE Band 48 / 10MHz **QPSK Highest Channel / 1RB0 Highest Channel / 1RBmax** Spectrum Mode Auto Sweep Mode Auto Sweep CF 3.695 GHz Span 30.0 MHz CF 3.695 GHz 691 pts Span 30.0 MHz 691 pts Channel Power
Channel
TX1 (Ref)
Tx Total
Channel Channel Power
Channel
TX1 (Ref)
Tx Total
Channel 22.43 dBm 22.43 dBm Lower -47.00 dB 22.29 dBm 22.29 dBm 22.29 dBm Lower -53.03 dB Bandwidth 10.000 MHz Offset Offset Upper -46.83 dB Upper -53.17 dB Bandwidth 10.000 MHz Bandwidth 10.000 MHz ate: 2.FEB.2020 18:56:01 Date: 2.FEB.2020 19:05:18 **Highest Channel / FullRB** N/A **W** Spectrum Ref Level 30.00 dBm Offset Att 30 dB SWT SGL Count 100/100 17.50 dB • RBW 100 kHz 200 ms • VBW 300 kHz Mode Auto Sweep 20 dBm dBm -10 dBm



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