

**ELEMENT WASHINGTON DC LLC** 

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# Part 96 MEASUREMENT REPORT

#### **Applicant Name:**

Sony Corporation 1-7-1 Konan Minato-Ku Tokyo, 108-0075 Japan

#### Date of Testing:

02/08/2023 - 03/24/2023 **Test Report Issue Date:** 4/12/2023 **Test Site/Location:** Element lab., Columbia, MD, USA **Test Report Serial No.:** 1M2302060006-17-R1.PY7

# FCC ID: APPLICANT:

### PY7-84558E

Sony Corporation

Application Type:	Certification
EUT Type:	Portable Handset
FCC Classification:	Citizens Band End User Devices (CBE)
FCC Rule Part(s):	96
Test Procedure(s):	ANSI C63.26-2015, KDB 940660 D01 v03,
	WINNF-TS-0122 v1.0.2, KDB 648474 D03 v01r04

Note: This revised Test Report (S/N: 1M2302060006-17-R1.PY7) supersedes and replaces the previously issued test report on the same subject device for the same type of testing as indicated. Please discard or destroy the previously issued test report(s) and dispose of it accordingly.

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in §2.947. Test results reported herein relate only to the item(s) tested.

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

RJ Ortanez Executive Vice President



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# MEASUREMENT REPORT FCC Part 96

				EIRP		Emission
Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	Max. Power [W]	Max. Power [dBm]	Designator
	20 MHz	QPSK	3560.0 - 3690.0	0.123	20.91	17M9G7D
	20 1011 12	16QAM	3560.0 - 3690.0	0.104	20.16	18M0W7D
LTE Band 48 Main ANT	15 MHz	QPSK	3557.5 - 3692.5	0.140	21.46	13M5G7D
		16QAM	3557.5 - 3692.5	0.105	20.20	13M5W7D
	10 MHz	QPSK	3555.0 - 3695.0	0.130	21.15	9M02G7D
		16QAM	3555.0 - 3695.0	0.110	20.42	8M99W7D
	5 MHz	QPSK	3552.5 - 3697.5	0.129	21.12	4M52G7D
		16QAM	3552.5 - 3697.5	0.103	20.11	4M55W7D

	Bandwidth		Tx Frequency	EIRP		Emission
Mode		Modulation	Range [MHz]	Max. Power [W]	Max. Power [dBm]	Designator
	20 MHz	QPSK	3560.0 - 3690.0	0.058	17.64	18M0G7D
LTE Band 48 Sub ANT 10		16QAM	3560.0 - 3690.0	0.049	16.90	18M0W7D
	15 MHz	QPSK	3557.5 - 3692.5	0.059	17.71	13M5G7D
		16QAM	3557.5 - 3692.5	0.046	16.67	13M5W7D
	10 MHz	QPSK	3555.0 - 3695.0	0.063	18.00	8M99G7D
		16QAM	3555.0 - 3695.0	0.051	17.10	9M00W7D
		QPSK	3552.5 - 3697.5	0.063	18.01	4M51G7D
	5 MHz	16QAM	3552.5 - 3697.5	0.048	16.85	4M51W7D

**Note:** EIRP levels shown in the table above are measured over the full channel bandwidth. These values will appear on the Grant of Authorization.

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# **1.0 INTRODUCTION**

### 1.1 Scope

Measurement and determination of electromagnetic emissions (EMC) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission.

### **1.2 Element Test Location**

These measurement tests were conducted at the Element laboratory located at 7185 Oakland Mills Road, Columbia, MD 21046. The measurement facility is compliant with the test site requirements specified in ANSI C63.4-2014.

### 1.3 Test Facility / Accreditations

### Measurements were performed at Element lab located in Columbia, MD 21046, U.S.A.

- Element Washington DC LLC is a OnGo Alliance Approved Test Lab (ATL)
- Element Washington DC LLC is a WInnForum Approved Test Lab
- Element Washington DC LLC is an ISO 17025-2017 accredited test facility under the American Association for Laboratory Accreditation (A2LA) with Certificate number 2041.01 for Specific Absorption Rate (SAR), Hearing Aid Compatibility (HAC) testing, where applicable, and Electromagnetic Compatibility (EMC) testing for FCC and Innovation, Science, and Economic Development Canada rules.
- Element Washington DC LLC TCB is a Telecommunication Certification Body (TCB) accredited to ISO/IEC 17065-2012 by A2LA (Certificate number 2041.03) in all scopes of FCC Rules and ISED Standards (RSS).
- Element Washington DC LLC facility is a registered (2451B) test laboratory with the site description on file with ISED.
- Element Washington DC LLC is a Recognized U.S. Certification Assessment Body (CAB # US0110) for ISED Canada as designated by NIST under the U.S. and Canada Mutual Recognition Agreement.

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# 2.0 PRODUCT INFORMATION

### 2.1 Equipment Description

The Equipment Under Test (EUT) is the **Sony Corporation Portable Handset FCC ID: PY7-84558E**. The test data contained in this report pertains only to the emissions due to the EUT's LTE Band 48 operation in the CBRS band. Per FCC Part 96, this device is evaluated as a Citizens Band End User Devices (CBE).

Test Device Serial No.: 01443, 02904, 02227

### 2.2 Device Capabilities

This device contains the following capabilities:

850/1900 GSM/GPRS/EDGE, 850/1700/1900, WCDMA/HSPA, Multi-band LTE, Multi-band 5G NR FR1, 802.11b/g/n/ax WLAN, 802.11a/n/ac/ax UNII (5 and 6 GHz), Bluetooth (1x, EDR, LE), NFC, Wireless Power Transfer

### 2.3 Test Configuration

The EUT was tested per the guidance of ANSI C63.26-2015. See Section 7.0 of this test report for a description of the radiated and antenna port conducted emissions tests.

This device supports wireless charging capability and, thus, is subject to the test requirements of KDB 648474 D03 v01r04. Additional radiated spurious emission measurements were performed with the EUT lying flat on an authorized wireless charging pad (WCP) Model: Belkin F7U050 while operating under normal conditions in a simulated call or data transmission configuration. The worst case radiated emissions data is shown in this report.

## 2.4 Software and Firmware

Testing was performed on device(s) using software/firmware version 0.621 installed on the EUT.

## 2.5 EMI Suppression Device(s)/Modifications

No EMI suppression device(s) were added and no modifications were made during testing.

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# 3.0 DESCRIPTION OF TESTS

### 3.1 Measurement Procedure

The measurement procedures described in the "American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services" (ANSI C63.26-2015) were used in the measurement of the EUT.

Deviation from Measurement Procedure......None

## 3.2 Radiated Power and Radiated Spurious Emissions

The radiated test facilities consisted of an indoor 3 meter semi-anechoic chamber used for final measurements and exploratory measurements, when necessary. The measurement area is contained within the semi-anechoic chamber which is shielded from any ambient interference. The test site inside the chamber is a 6m x 5.2m elliptical, obstruction-free area in accordance with Figure 5.7 of Clause 5 in ANSI C63.4-2014. Absorbers are arranged on the floor between the turn table and the antenna mast in such a way so as to maximize the reduction of reflections for measurements above 1GHz. For measurements below 1GHz, the absorbers are removed. A raised turntable is used for radiated measurement. The turn table is a continuously rotatable, remote-controlled, metallic turntable and 2 meters (6.56 ft.) in diameter. The turn table is flush with the raised floor of the chamber in order to maintain its function as a ground plane. An 80cm tall test table made of Styrodur is placed on top of the turn table. A Styrodur pedestal is placed on top of the test table to bring the total table height to 1.5m.

The equipment under test was transmitting while connected to its integral antenna and is placed on a turntable 3 meters from the receive antenna. The receive antenna height is adjusted between 1 and 4 meter height, the turntable is rotated through 360 degrees, and the EUT is manipulated through all orthogonal planes representative of its typical use to achieve the highest reading on the receive spectrum analyzer.

For radiated power measurements, substitution method is used per the guidance of ANSI C63.26-2015. For emissions below 1GHz, a half-wave dipole is substituted in place of the EUT. For emissions above 1GHz, a horn antenna is substituted in place of the EUT. The substitute antenna is driven by a signal generator with the level of the signal generator being adjusted to obtain the same receive spectrum analyzer level previously recorded from the spurious emission from the EUT. The power of the emission is calculated using the following formula:

P<sub>d [dBm]</sub> = P<sub>g [dBm]</sub> - cable loss [dB] + antenna gain [dBd/dBi];

where  $P_d$  is the dipole equivalent power,  $P_g$  is the generator output into the substitution antenna, and the antenna gain is the gain of the substitute antenna used relative to either a half-wave dipole (dBd) or an isotropic source (dBi). The substitute level is equal to  $P_{g [dBm]}$  – cable loss [dB].

For radiated spurious emissions measurements, the field strength conversion method is used per the formulas in Section 5.2.7 of ANSI C63.26-2015. Field Strength (EIRP) is calculated using the following formulas:

$$\begin{split} & \mathsf{E}_{[\mathsf{dB}\mu\mathsf{V}/\mathsf{m}]} = \mathsf{Measured} \ \mathsf{amplitude} \ \mathsf{level}_{[\mathsf{dB}\mathsf{m}]} + 107 + \mathsf{Cable} \ \mathsf{Loss}_{[\mathsf{dB}]} + \mathsf{Antenna} \ \mathsf{Factor}_{[\mathsf{dB}/\mathsf{m}]} \\ & \mathsf{And} \\ & \mathsf{EIRP}_{[\mathsf{dB}\mathsf{m}]} = \mathsf{E}_{[\mathsf{dB}\mu\mathsf{V}/\mathsf{m}]} + 20\mathsf{log}\mathsf{D} - 104.8; \ \mathsf{where} \ \mathsf{D} \ \mathsf{is} \ \mathsf{the} \ \mathsf{measurement} \ \mathsf{distance} \ \mathsf{in} \ \mathsf{meters}. \end{split}$$

All radiated measurements are performed in a chamber that meets the site requirements per ANSI C63.4-2014. Additionally, radiated emissions below 30MHz are also validated on an Open Area Test Site to assert correlation with the chamber measurements per the requirements of KDB 414788 D01 v01r01.

Radiated power and radiated spurious emission levels are investigated with the receive antenna horizontally and vertically polarized per ANSI C63.26-2015.

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# 4.0 MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.4-2014. All measurement uncertainty values are shown with a coverage factor of k = 2 to indicate a 95% level of confidence. The measurement uncertainty shown below meets or exceeds the  $U_{CISPR}$  measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

Contribution	Expanded Uncertainty (±dB)
Conducted Bench Top Measurements	1.13
Radiated Disturbance (<1GHz)	4.98
Radiated Disturbance (>1GHz)	5.07
Radiated Disturbance (>18GHz)	5.09

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# 5.0 TEST EQUIPMENT CALIBRATION DATA

Test Equipment Calibration is traceable to the National Institute of Standards and Technology (NIST). Measurements antennas used during testing were calibrated in accordance to the requirements of ANSI C63.5-2017.

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
-	AP1-002	EMC Cable and Switch System	1/11/2023	Annual	1/11/2024	AP1-001
	ETS-001	EMC Cable and Switch System	1/11/2023	Annual	1/11/2024	ETS-001
-	ETS-002	EMC Cable and Switch System	1/11/2023	Annual	1/11/2024	ETS-002
-	LTx1	Licensed Transmitter Cable Set	1/12/2023	Annual	1/12/2024	LTx1
-	LTx2	Licensed Transmitter Cable Set	1/12/2023	Annual	1/12/2024	LTx2
-	LTx3	Licensed Transmitter Cable Set	1/12/2023	Annual	1/12/2024	LTx3
-	LTx4	Licensed Transmitter Cable Set	1/12/2023	Annual	1/12/2024	LTx4
-	LTx5	Licensed Transmitter Cable Set	1/12/2023	Annual	1/12/2024	LTx5
Anritsu	MT8821C	Radio Communication Analyzer		N/A		6201525694
Emco	3115	Horn Antenna (1-18GHz)	8/8/2022	Biennial	8/8/2023	9704-5182
Emco	3116	Horn Antenna (18 - 40GHz)	7/20/2021	Biennial	7/20/2023	9203-2178
Espec	SCP-220	Environmental Chamber	5/25/2022	Annual	5/25/2023	OCPS5H0612K05
ETS Lindgren	3117	1-18 GHz DRG Horn (Medium)	04/20/2021	Biennial	04/20/2023	00125518
ETS Lindgren	3164-10	Quad Ridge Horn 400MHz - 10000MHz	5/10/2021	Biennial	5/10/2023	00166283
Keysight Technologies	N9030A	PXA Signal Analyzer	9/6/2022	Annual	9/6/2023	MY54490576
Keysight Technologies	N9030B	PXA Signal Analyzer, Multi-touch	7/29/2022	Annual	7/29/2023	MY57141001
Rohde & Schwarz	CMW500	Radio Communication Tester		N/A		112347
Rohde & Schwarz	ESU40	EMI Test Receiver (40GHz)	8/25/2022	Annual	8/25/2023	100348
Rohde & Schwarz	FSW26	2Hz-26.5GHz Signal and Spectrum Analyzer	11/6/2022	Annual	11/6/2023	103187
Sunol Sciences	JB5	Bi-Log Antenna (30M - 5GHz)	8/30/2022	Biennial	8/30/2024	A051107

Table 5-1. Test Equipment

### Notes:

- 1. For equipment listed above that has a calibration date or calibration due date that falls within the test date range, care was taken to ensure that this equipment was used after the calibration date and before the calibration due date.
- 2. Equipment with a calibration date of "N/A" shown in this list was not used to make direct calibrated measurements.

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# 6.0 SAMPLE CALCULATIONS

### **Emission Designator**

### **QPSK Modulation**

### Emission Designator = 8M62G7D

LTE BW = 8.62 MHz

G = Phase Modulation

7 = Quantized/Digital Info

D = Data transmission, telemetry, telecommand

### **QAM Modulation**

### Emission Designator = 8M45W7D

LTE BW = 8.45 MHz W = Amplitude/Angle Modulated 7 = Quantized/Digital Info D = Data transmission, telemetry, telecommand

## Spurious Radiated Emission – LTE Band

### Example: Middle Channel LTE Mode 2<sup>nd</sup> Harmonic (7250 MHz)

The average spectrum analyzer reading at 3 meters with the EUT on the turntable was -81.0 dBm. The gain of the substituted antenna is 8.1 dBi. The signal generator connected to the substituted antenna terminals is adjusted to produce a reading of -81.0 dBm on the spectrum analzyer. The loss of the cable between the signal generator and the terminals of the substituted antenna is 2.0 dB at 1564 MHz. So 6.1 dB is added to the signal generator reading of -30.9 dBm yielding -24.80 dBm. The fundamental EIRP was 25.501 dBm so this harmonic was 25.501 dBm - (-24.80) = 50.3 dBc.

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# 7.0 TEST RESULTS

### 7.1 Summary

Company Name:	Sony Corporation
FCC ID:	<u>PY7-84558E</u>
FCC Classification:	Citizens Band End User Devices (CBE)
Mode(s):	<u>LTE</u>

Test Condition	Test Description	FCC Part Section(s)	Test Limit	Test Result	Reference
	Conducted Pow er	2.1046(a), 2.1046(c)	NA	PASS	Section 7.2
	Occupied Bandwidth	2.1049(h)	NA	PASS	Section 7.3
CONDUCTED	Conducted Band Edge / Spurious Emissions (CBSD)	2.1051, 96.41(e)(i)	-13 dBm/MHz at frequencies within 0-10 MHz of above the upper SAS- assigned channel edge and within 0-10 MHz below the low er SAS- assigned channel edge -25 dBm/MHz at frequencies greater than 10 MHz above and below channel edge -emissions below 3530 MHz or above 3720 MHz shall not exceed -40dBm/MHz	PASS	Sections 7.4, 7.5
ŭ	Frequency Stability	2.1055	Fundamental emissions stay within authorized frequency block	PASS	Section 7.8
	End User Device Additional Requirements (CBSD Protocol)	96.47	End User Devices may operate only if they can positively receive and decode an authorization signal transmitted by a CBSD, including the frequencies and pow er limits for their operation. An End User Device must discontinue operations, change frequencies, or change its operational pow er level within 10 seconds of receiving instructions from its associated CBSD.	PASS	Section 7.9
RADIATED	Equivalent Isotropic Radiated Pow er (EIRP) (EUD)	96.41(b)	23 dBm/10MHz	PASS	Section 7.6
RADI	Radiated Spurious Emissions	2.1053, 96.41(e)	-40 dBm/MHz	PASS	Section 7.7

Table 7-1. Summary of Test Results

#### Notes:

- 1) All modes of operation and data rates were investigated. The test results shown in the following sections represent the worst case emissions.
- 2) The analyzer plots were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables, directional couplers, and attenuators used as part of the system to maintain a link between the call box and the EUT at all frequencies of interest.
- 3) All antenna port conducted emissions testing was performed on a test bench with the antenna port of the EUT connected to the spectrum analyzer through calibrated cables, attenuators, and couplers.
- 4) For conducted spurious emissions, automated test software was used to measure emissions and capture the corresponding plots necessary to show compliance. The measurement software utilized is EMC Software Tool v1.1.

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# 7.2 Conducted Output Power Data

### **Test Overview**

The EUT is set up to transmit at maximum power for LTE. All power levels are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst-case configuration. All modes of operation were investigated and the worst-case configuration results are reported in this section.

A-MPR is implemented in this device per the A-MPR specification in 3GPP TS 36.101. The conducted powers are shown herein to cover the different A-MPR levels specified in the standard. Measurement equipment was set up with triggering/gating on the spectrum analyzer such that powers were measured only during the on-time of the signal.

### Test Procedure Used

ANSI C63.26-2015 – Section 5.2

#### **Test Settings**

- 1. Span = 2 x OBW to 3 x OBW
- 2. RBW = 1% to 5% of the OBW
- 3. Number of measurement points in sweep  $\geq$  2 x span / RBW
- 4. Sweep = auto-couple (less than transmission burst duration)
- 5. Detector = RMS (power)
- 6. Trigger was set to enable power measurements only on full power bursts
- 7. Trace was allowed to stabilize
- 8. Spectrum analyzer's "Channel Power" function was used to compute the power by integrating the spectrum across the OBW of the signal

#### Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.



Figure 7-1. Test Instrument & Measurement Setup

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### Test Notes

- 1. A-MPR was verified to comply with the "NS\_27" specification in the 3GPP TS 36.101 standard by setting the MCC to a U.S. code and the MNC to a U.S. carrier supporting LTE B48 operation.
- 2. All other conducted power measurements are contained in the RF exposure report for this filing.

Bandwidth	Modulation	Channel	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]
z		55340	3560.0	1/50	23.37
20 MHz	QPSK	55990	3625.0	1/0	23.40
0	16-QAM	56640	3690.0	1/50	23.30
2	16-QAM	55340	3560.0	1/50	23.07
N		55315	3557.5	1/37	23.44
MHz	QPSK 16-QAM	55990	3625.0	1/74	23.56
15 1		56665	3692.5	1/37	23.23
-		55315	3557.5	1/37	22.84
N		55290	3555.0	1/49	23.73
10 MHz	QPSK	55990	3625.0	1/49	23.65
0		56690	3695.0	1/0	23.53
-	16-QAM	55290	3555.0	1/49	23.27
N		55265	3552.5	1/12	23.74
MHz	QPSK	55990	3625.0	1/12	23.76
5 N		56715	3697.5	1/24	23.40
	16-QAM	55265	3552.5	1/12	23.02
T-1-1- 7 0	<u> </u>	-			0

Table 7-2. Conducted Power Output Data (LTE Band 48 – Sub Ant)

Test Case	NS	мсс	MNC	Channel BW [MHz]	Channel Frequency [MHz]	RB Size	RB Offset	A-MPR [dB]	Modulation	MPR [dB]	Maximum Target Output Power [dBm]	A-MPR Measured Power [dBm]
1	NS 01	310	01	20	3560	100	0	< 2	QPSK	0	24.00	19.97
I	NS_01	310	01	20	3560	100	0	≤ 3	16-QAM	1	23.00	19.11

Table 7-3. Conducted Power Output Data - With A-MPR (LTE Band 48 - Main Ant)

Test Case	NS	мсс	MNC	Channel BW [MHz]	Channel Frequency [MHz]	RB Size	RB Offset	A-MPR [dB]	Modulation	MPR [dB]	Maximum Target Output Power [dBm]	A-MPR Measured Power [dBm]							
1				20	3560	100	0	≤ 3	QPSK	0	23.00	18.87							
	NS 01	310	310	310	310	310	210	210	210	01	20	3300	100	0	20	16-QAM	1	22.00	17.78
2	NS_01						510 01	20	3690	100	0	≤ 3	QPSK	0	23.00	18.42			
2									20	3090	100	0		16-QAM	1	22.00	17.40		
3				15	0500	75	0	≤ 3	QPSK	0	23.00	18.93							
3	NG 01	210	04	15	3560	75	0		16-QAM	1	22.00	17.85							
4	NS_01	310	01	45	2000	75	0	≤ 3	QPSK	0	23.00	18.99							
4				15	3690	75	0		16-QAM	1	22.00	17.69							

Table 7-4. Conducted Power Output Data – With A-MPR (LTE Band 48 – Sub Ant)

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# 7.3 Occupied Bandwidth

### **Test Overview**

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured. All modes of operation were investigated and the worst case configuration results are reported in this section.

### Test Procedure Used

ANSI C63.26-2015 - Section 5.4.4

#### **Test Settings**

- 1. The signal analyzer's automatic bandwidth measurement capability was used to perform the 99% occupied bandwidth and the 26dB bandwidth. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
- 2. RBW = 1 5% of the expected OBW
- 3. VBW  $\geq$  3 x RBW
- 4. Detector = Peak
- 5. Trace mode = max hold
- 6. Sweep = auto couple
- 7. The trace was allowed to stabilize
- 8. If necessary, steps 2 7 were repeated after changing the RBW such that it would be within
  - 1-5% of the 99% occupied bandwidth observed in Step 7

#### Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.



Figure 7-2. Test Instrument & Measurement Setup

#### Test Notes

None

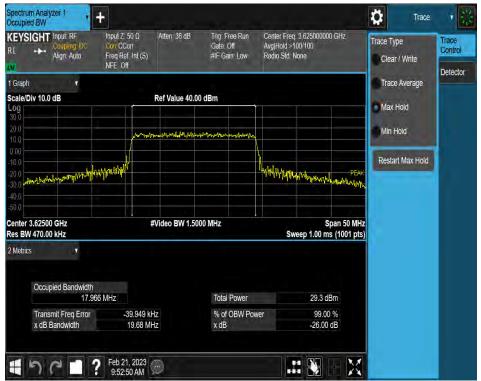
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# LTE Band 48 – Main Ant

HT Input RF Input Z 50 Ω Atten 36 dB Trig. Free Run Center Freq 3 Coupling: DC Corr Gate. Off Avg Hold 100 Align: Auto Freq Ref. Int (S) #IF Gain: Low Radio Std Nor NFE. Off	
Contraction Management	Trace Average
10.0 dB Ref Value 40.00 dBm	Max Hold
	Min Hold
	Restart Max Hold
working was a strategic and a	PEAK PEAK
التناعي المراجعين المعاركين أشكر المتراجعين أأك	
2500 GHz #Video BW 1.5000 MHz	Span 50 MHz
0.00 kHz Swee	ep 1.00 ms (1001 pts)
ccupied Bandwidth	
17.949 MHz Total Power	30.2 dBm
	99.00 %
ansmit Freq Error 4.622 kHz % of OBW Power	

Plot 7-1. Occupied Bandwidth Plot (LTE Band 48 - 20MHz QPSK - Full RB Configuration - Main Ant)



Plot 7-2. Occupied Bandwidth Plot (LTE Band 48 - 20MHz 16-QAM - Full RB Configuration - Main Ant)

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IM         RF         50 Ω         DC         CORREC         SENSE:INT         ALIGN AUTO         11:06:12 PM Feb 20, 2023         Trace/Detec           Center Freq: 3.62500000 GHz         Radio Std: None         Trig: Free Run         Avg Hold: 100/100         Trig: Free Run         Avg Hold: 100/100         Trig: Free Run         Avg Hold: 100/100         Radio Device: BTS         Trig: Free Run         Std: None         Trig: Free Run         Radio Device: BTS         Radio Devic	tor
Trig: Free Run Avg Hold: 100/100	LOI
#FGain:Low #Atten: 36 dB Radio Device: BTS	
10 dB/div Ref 40.00 dBm	
30.0	
200 Clear V	Vrite
100 proving and marked and and and and and and and and and an	
-100 Ave	rage
200 300 There New York Mar Way was a filler	
-40.0	Hold
-50.0	loid
Center 3.62500 GHz Span 37.50 MHz Res BW 360 kHz #VBW 1.1 MHz Sweep 1 ms	
Res BW 360 KHZ #VBW 1.1 MHZ Sweep 1 ms Min	Hold
Occupied Bandwidth Total Power 30.3 dBm	
	ector
	eak►
Transmit Freq Error -50.823 kHz % of OBW Power 99.00 % Auto	<u>Man</u>
x dB Bandwidth 15.09 MHz x dB -26.00 dB	
MSG STATUS	

Plot 7-3. Occupied Bandwidth Plot (LTE Band 48 - 15MHz QPSK - Full RB Configuration - Main Ant)



Plot 7-4. Occupied Bandwidth Plot (LTE Band 48 - 15MHz 16-QAM - Full RB Configuration - Main Ant)

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Keysight Spectrum Analyzer - Occupied	BW				
💢 RL RF 50Ω DC	Cer	SENSE:INT nter Freq: 3.625000000 GHz	R	11:11:29 PM Feb 20, 2023 adio Std: None	Trace/Detector
		g: Free Run Avg Ho tten: 36 dB	ld: 100/100 R	adio Device: BTS	
10 dB/div Ref 40.00 dl	Bm				
Log 30.0					
20.0					Clear Write
10.0	1 math where my	Manhalunan Brancharan Bra			
0.00					
-10.0					Average
-20.0	ntent		Honghan	MARAWARANA	
-30.0				Week and Lot and All Mar	
-40.0					Max Hold
-50.0					
Center 3.62500 GHz				Span 25.00 MHz	
Res BW 240 kHz		#VBW 750 kHz		Sweep 1 ms	Min Hold
Occupied Bandwi	dth	Total Power	29.4 d	Bm	
9	9.0154 MHz				Detector
		% -f 00W 0		0.00	Peak►
Transmit Freq Error	14.647 kHz	% of OBW Pov			Auto <u>Man</u>
x dB Bandwidth	9.749 MHz	x dB	-26.00	dB	
MSG			STATUS		

Plot 7-5. Occupied Bandwidth Plot (LTE Band 48 - 10MHz QPSK - Full RB Configuration - Main Ant)



Plot 7-6. Occupied Bandwidth Plot (LTE Band 48 - 10MHz 16-QAM - Full RB Configuration - Main Ant)

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🔤 Keysight Spectrum Analyzer - Occupied	IBW				
LXI RE S0 Ω DC	Cente	SENSE:INT er Freq: 3.625000000 GHz Free Run Avg Hold		11:16:28 PM Feb 20, 2023 Radio Std: None	Trace/Detector
		n: 36 dB		adio Device: BTS	
10 dB/div <b>Ref 40.00 dl</b> Log	3m				
30.0 20.0	e da se e a affili e se a	1 ( Armand M. M. J.			Clear Write
0.00	N N	Agent And mention of the			
-10.0 -20.0 -30.0 worth house	Arrive		muntre	Mar Mary Marker	Average
-40.0					Max Hold
Center 3.625000 GHz Res BW 120 kHz	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	/BW 1.2 MHz		Span 12.50 MHz Sweep 1 ms	Min Hold
Occupied Bandwi	dth	Total Power	29.4 d	lBm	
	1.5248 MHz				Detector Peak▶
Transmit Freq Error	-4.627 kHz	% of OBW Pow	er 99.0	0 %	Auto <u>Man</u>
x dB Bandwidth	5.101 MHz	x dB	-26.00	) dB	
MSG			STATUS		

Plot 7-7. Occupied Bandwidth Plot (LTE Band 48 - 5MHz QPSK - Full RB Configuration - Main Ant)



Plot 7-8. Occupied Bandwidth Plot (LTE Band 48 - 5MHz 16-QAM - Full RB Configuration - Main Ant)

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# LTE Band 48 – Sub Ant



Plot 7-9. Occupied Bandwidth Plot (LTE Band 48 - 20MHz QPSK - Full RB Configuration - Sub Ant)



Plot 7-10. Occupied Bandwidth Plot (LTE Band 48 - 20MHz 16-QAM - Full RB Configuration - Sub Ant)

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🔤 Keysight Spectrum Analyzer - Occupied	BW						
<b>LX/</b> RL RF 50Ω DC		SENSE:INT Center Freq: 3.6250000 Trig: Free Run	ALIGN AUTO 00 GHz Avg Hold: 100/100	12:17:05 A Radio Std	M Feb 21, 2023 None	Trac	e/Detector
		#Atten: 36 dB	Rvg Hold. 100/100	Radio Dev	ice: BTS		
10 dB/div Ref 40.00 dE	Bm						
Log 30.0							
20.0						(	Clear Write
10.0	montamon	When we are after for the manual of the	with				
0.00							
-10.0			L L				Average
	a Martin		Horas A. at. as				
-20.0 -30.0 mm/million	NAL .		and white	har en phylopy	an war war		
-40.0							Max Hold
-50.0							Max Holu
Center 3.62500 GHz		41/D10/ 4 4 B011-			7.50 MHz		
Res BW 360 kHz		#VBW 1.1 MH;		Swe	ep 1 ms		Min Hold
Occupied Bandwid	dth	Total Pov	ver 29.5	5 dBm			
	3.514 MH	7					Detector
	<b>J.J</b>						Peak
Transmit Freq Error	3.932 kH	Iz % of OBV	V Power 99	.00 %		Auto	<u>Man</u>
x dB Bandwidth	14.69 MH	lz xdB	-26.	00 dB			
MSG			STATUS	6			

Plot 7-11. Occupied Bandwidth Plot (LTE Band 48 - 15MHz QPSK - Full RB Configuration - Sub Ant)



Plot 7-12. Occupied Bandwidth Plot (LTE Band 48 - 15MHz 16-QAM - Full RB Configuration - Sub Ant)

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Keysight Spectrum Analyzer - Occupied BV	V				- 7 ×
02 RL RF 50 Ω DC	+→- Trig: F #IFGain:Low #Atten	SENSE:INT r Freq: 3.625000000 GHz Free Run Avg Hold n: 36 dB	Radio St : 100/100	AM Feb 21, 2023 d: None evice: BTS	Trace/Detector
		mhaterene markathan			Clear Write
000 -100 -200 -300	anod		May May Marken Marken	alsterie Janin .	Average
-30.0				- D. a. 4 (4.0., numbrit	Max Hold
Center 3.62500 GHz Res BW 240 kHz Occupied Bandwidt		VBW 750 kHz Total Power		25.00 MHz eep 1 ms	Min Hold
	9934 MHz				Detector Peak▶
Transmit Freq Error x dB Bandwidth	9.877 kHz 9.854 MHz	% of OBW Powe	er 99.00 % -26.00 dB		Auto <u>Man</u>
MSG			STATUS		

Plot 7-13. Occupied Bandwidth Plot (LTE Band 48 - 10MHz QPSK - Full RB Configuration - Sub Ant)



Plot 7-14. Occupied Bandwidth Plot (LTE Band 48 - 10MHz 16-QAM - Full RB Configuration - Sub Ant)

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🔤 Keysight Spectrum Analyzer - Occupi	ed BW				
L <mark>XI</mark> RL RF 50ΩE		SENSE:INT nter Freq: 3.625000000 GH		46 AM Feb 21, 2023 Std: None	Trace/Detector
	😛 Tri	ig: Free Run Avg H	old: 100/100		
	#IFGain:Low #A	tten: 36 dB	Radio	Device: BTS	
10 dB/div Ref 40.00 c	iBm				
30.0					
20.0					Clear Write
10.0	marnen	ᠬᠬᡃᢛᠰᡟᠯᡘ᠘ᡫᡞ᠕ᠰᢛᠬ᠋ᡟ᠒ᠬᢑ᠆ᠬ	~		
0.00					
-10.0			10		Average
	m MV		Van		J
-20.0 -30.0 Amman Markov	· · · · · · · · · · · · · · · · · · ·		My May May May	man many man	
-40.0					
-50.0					Max Hold
Center 3.625000 GHz				n 12.50 MHz	
Res BW 120 kHz		VBW 1.2 MHz	8	weep 1 ms	Min Hold
Occupied Bandw	idth	Total Power	29.5 dBm		
	4.5132 MHz				Detector Peak▶
Transmit Freq Error	2.265 kHz	% of OBW Po	wer 99.00 %		Auto <u>Man</u>
x dB Bandwidth	5.063 MHz	x dB	-26.00 dB		
	0.000 11112	A GB	20.00 48		
MSG			STATUS		
moo			01/103		

Plot 7-15. Occupied Bandwidth Plot (LTE Band 48 - 5MHz QPSK - Full RB Configuration - Sub Ant)



Plot 7-16. Occupied Bandwidth Plot (LTE Band 48 - 5MHz 16-QAM - Full RB Configuration - Sub Ant)

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## 7.4 Spurious and Harmonic Emissions at Antenna Terminal

### **Test Overview**

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10<sup>th</sup> harmonic. All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst-case configuration. All modes of operation were investigated and the worst-case configuration results are reported in this section.

### The conducted power of any emissions below 3530 MHz or above 3720 MHz shall not exceed -40 dBm/Mhz.

### Test Procedure Used

ANSI C63.26-2015 – Section 5.7.4

### Test Settings

- 1. Start frequency was set to 30MHz and stop frequency was set to at least 10 \* the fundamental frequency (separated into at least two plots per channel)
- 2. Detector = RMS
- 3. Trace mode = Max Hold
- 4. Sweep time = auto couple
- 5. The trace was allowed to stabilize
- 6. Please see test notes below for RBW and VBW settings

### Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.



Figure 7-3. Test Instrument & Measurement Setup

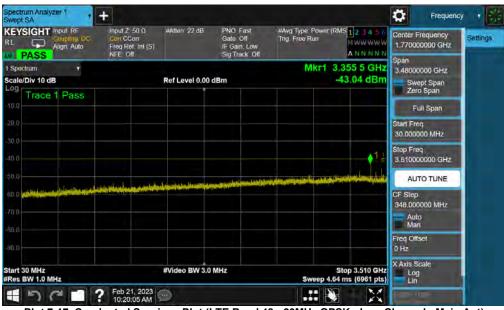
#### Test Notes

- 1. Compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz.
- 2. A notch filter was used to evaluate the frequency range of 3.95GHz to 18GHz. All other frequency ranges were not evaluated with the notch filter.
- 3. Conducted spurious emissions above 24GHz are covered by the radiated spurious emissions measurements.

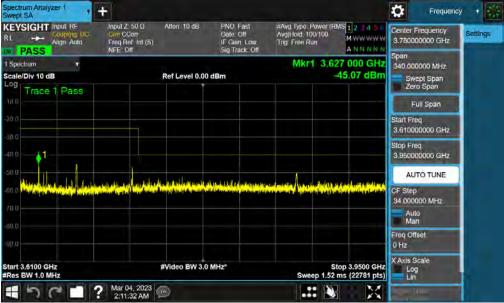
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# LTE Band 48 – Main Ant



Plot 7-17. Conducted Spurious Plot (LTE Band 48 - 20MHz QPSK - Low Channel - Main Ant)



Plot 7-18. Conducted Spurious Plot (LTE Band 48 - 20MHz QPSK - Low Channel - Main Ant)

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Plot 7-19. Conducted Spurious Plot (LTE Band 48 - 20MHz QPSK - Low Channel - Main Ant)

EYSIGHT Input RF Coupling, DC Align Auto	Input Z 50 0 #Atten 10 Con CCorr Freq Ref Int (S) NFE: Off	dB PNO Fast Gate: Off IF Gain: Low Sig Track: Off	#Avg Type: Power (RA Avg Hold >100/100 Trig: Free Run	MS 1 2 3 4 5 6 MWWWWW A N N N N N	Center Frequency 21.000000000 GHz Span	Setting
Spectrum v cale/Div 10 dB	Ref Level	0.00 dBm		62 00 GHz 44.22 dBm	6,00000000 GHz Swept Span Zero Span	
Trace 1 Pass					Full Span	
20.0					Start Freq 18.00000000 GHz	
40.0				1	Stop Freq 24.000000000 GHz	
0.0		and the second second second			AUTO TUNE	
50.0					CF Step 600,000000 MHz	
					Auto Man	
					Freq Offset 0 Hz	
tart 18.000 GHz Res BW 1.0 MHz	#Video BV	/ 3.0 MHz*		op 24.000 GHz ms (24001 pts)	X Axis Scale Log	

Plot 7-20. Conducted Spurious Plot (LTE Band 48 - 20MHz QPSK - Low Channel - Main Ant)

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Plot 7-21. Conducted Spurious Plot (LTE Band 48 - 20MHz QPSK - Mid Channel - Main Ant)

EYSIGHT Input R Coupling Align: Align: Align	g DC Gorr Con	Atten: 10 dB	PNO Fast Gate Off IF Gain Low Sig Track Off	#Avg Type: Po Avg Hold: 100 Trig: Free Run	100 N	2 3 4 5 6 WW WW W N N N N N	Center Frequency 3.812500000 GHz	Setting
Spectrum cale/Div 10 dB		Ref Level 0.00	dBm	Mkr1		644 GHz 87 dBm	Span 275.000000 MHz Swept Span Zero Span	
Trace 1 Pas	SS					_	Full Span	
							Start Freq 3.675000000 GHz	
0.0							Stop Freq 3.950000000 GHz	
0.0	ويعرب فيالبان مرور وجعول واللادل		at the			1	AUTO TUNE	
0.0 million provident		"Werklan Richard				ing the state	CF Step 27.500000 MHz	
10.0 10.0							Auto Man	
80.0							Freq Offset 0 Hz	1
tart 3.6750 GHz Res BW 1.0 MHz		#Video BW 3.0	MHz*	Sweet		3.9500 GHz (22651 pts)	X Axis Scale Log Lin	
150	Mar 04, 2023 2:09:46 AM	0		Swee				-

Plot 7-22. Conducted Spurious Plot (LTE Band 48 - 20MHz QPSK - Mid Channel - Main Ant)

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EYSIGHT Input RF Coupling, DC Align: Auto	Input Z: 50 0 Gen CCorr Freq Ref: Int (S) NFE: Off	Atten: 10 dB	PNO: Fast Gate: Off IF Gain: Low Sig Track- Off	#Avg Type: Power ( Avg) fold >100/100 Trig: Free Run	RMS 1 2 3 4 5 6 M WWWWW A N N N N N	Center Frequency 10.975000000 GHz Span	Setting
Spectrum v cale/Div 10 dB		Ref Level 0.00	dBm	Mkr1 1	7.578 2 GHz -51.70 dBm	14.0500000 GHz Swept Span Zero Span	
Trace 1 Pass						Full Span	
						Start Freq 3.950000000 GHz	
30.0 40.0						Stop Freq 18.000000000 GH2	
50.0		و الم	ten di la Vina ina	a margalite weather	1	AUTO TUNE	
so.o					Contraction of the local division of the loc	CF Step 1.405000000 GHz	
						Auto Man	
90.0						Freq Offset 0 Hz	
tart 3.950 GHz Res BW 1.0 MHz		#Video BW 3.0	MHz		Stop 18.000 GHz 3 ms (22651 pts)	X Axis Scale Log	

Plot 7-23. Conducted Spurious Plot (LTE Band 48 - 20MHz QPSK - Mid Channel - Main Ant)

EYSIGHT Input RF Coupling DC Align: Auto	Input Z: 50 0 # Gen CCon Freq Ref. Int (S) NFE: Off	Atten 10 dB	PNO: Fast Gate: Off IF Gain: Low Sig Track: Off	#Avg Type: Power (F Avg Hold > 100/100 Trig: Free Run	MS123456 MWWWWW ANNNN	Center Frequency 21.000000000 GHz Span	Setting
Spectrum v cale/Div 10 dB	R	ef Levei 0.00 d	Bm		679 25 GHz -43.77 dBm	6.00000000 GHz Swept Span Zero Span	
Trace 1 Pass						Full Span	
						Start Freq 18.00000000 GHz	
10.0					<b>(1</b>	Stop Freq 24.000000000 GHz	
0.0	electric confidential and		a fan stille son de state		An el angle ang	AUTO TUNE	
50 n						CF Step 600,000000 MHz	
w o						Auto Man	
						Freq Offset 0 Hz	
tart 18,000 GHz Res BW 1.0 MHz	#\	/ideo BW 3.0 N	IHz*		top 24,000 GHz ms (24001 pts)	X Axis Scale Log	

Plot 7-24. Conducted Spurious Plot (LTE Band 48 - 20MHz QPSK - Mid Channel - Main Ant)

FCC ID: PY7-84558E		PART 96 MEASUREMENT REPORT			
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EYSIGHT Input: RF Coupling: DC Align: Auto	Input Z 50 0 Corr CCorr Freq Ref. Int (5) NFE Off	#Atten: 22 dB	PNO Fast Gato Off IF Gain: Low Sig Track Off	#Avg Type Po Tng, Free Run	Wer(RMS123456 MWWWWW ANNNNN	Center Fréquency 1.835000000 GHz Span	Setting
Spectrum v cale/Div 10 dB		Ref Level 0.00	dBm	Mk	r1 3.383 0 GHz -44.74 dBm	3,61000000 GHz Swept Span Zero Span	
Trace 1 Pass						Full Span	
20.0					Lond 1	Start Freq 30.000000 MHz	
00					1	Stop Freq 3,640000000 GHz	
		in an and the second of the	- Artifician and Artificial	والإليام والمالية والواجاة		AUTO TUNE	
						CF Step 361.000000 MHz Auto Man	
90.0						Freq Offset 0 Hz	
tart 30 MHz Res BW 1.0 MHz		#Video BW 3.0	MHz	Swee	Stop 3.640 GHz p ~7.18 ms (7221 pts)	X Axis Scale Log Lin	

Plot 7-25. Conducted Spurious Plot (LTE Band 48 - 20MHz QPSK - High Channel - Main Ant)

CEYSIGHT Input RF Coupling DC Align: Auto	Input Z 50 Ω Atten: 10 dB Con CCon Freq Ref: Int (S) NFE: Off	Gate: Off	Ing: Free Run	2 3 4 5 6 WWWWW NNNNN	Center Frequency 3.845000000 GHz	Setting
Spectrum v cale/Div 10 dB	Ref Level 0.00	dBm	Mkr1 3.894 3 -45.	76 GHz 02 dBm	Span 210.000000 MHz Swept Span Zero Span	
Trace 1 Pass					Full Span	1
					Start Freq 3.740000000 GHz	
10.0					Stop Freq 3.950000000 GHz	
0.0	with distance of the set of second second	a second at			AUTO TUNE	
O.O. MALES WAS INTERNED IN COMPANY		in the international states of the	hlad Ministry And Ministry of	And Although	CF Step 21.000000 MHz	
50.0					Auto Man	
0.0					Freq Offset 0 Hz	
tart 3.7400 GHz Res BW 1.0 MHz	#Video BW 3.0	MHz*	Stop 3 Sweep 1.50 ms (	.9500 GHz 22521 pts)	X Axis Scale Log Lin	

Plot 7-26. Conducted Spurious Plot (LTE Band 48 - 20MHz QPSK - High Channel - Main Ant)

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REVENIENT Input RF Coupling DC Align Auto	Input Z 50 0 Con CCon Freq Ref Int (S) NFE: Off	Atten: 10 dB	PNO:Fast Gate:Off IF Gam Low Skg Track-Off	#Avg Type: F Avg Hold > 1 Trig: Free Ru		Center Frequency 10.975000000 GHz Span	Setting
Spectrum v cale/Div 10 dB		Ref Level 0.00	dBm	М	kr1 3.997 1 GHz -48.25 dBm	14.0500000 GHz Swept Span Zero Span	
Trace 1 Pass						Full Span	
						Start Freq 3.950000000 GHz	
0.0						Stop Freq 18.000000000 GHz	
00			-	المار المراجعة وماليه المراجع	-	AUTO TUNE	
0.0						CF Step 1 405000000 GHz	
0.0						Auto Man	
						Freq Offset 0 Hz	
art 3,950 GHz tes BW 1.0 MHz		#Video BW 3.0	MHz*	Swee	Stop 18.000 GHz -26.2 ms (22521 pts)	X Axis Scale Log	
1701	Mar 04, 2023 12:46:24 AM	9				Signal Track (Span Zoom)	

Plot 7-27. Conducted Spurious Plot (LTE Band 48 - 20MHz QPSK - High Channel - Main Ant)

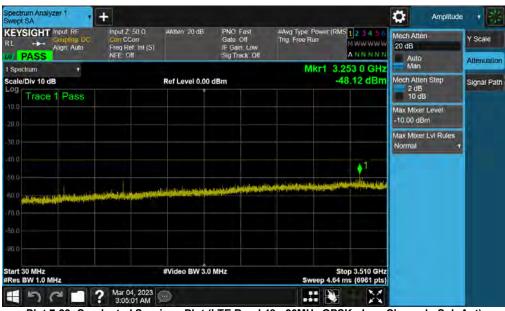
Spectrum + sale/Div 10 dB <sup>09</sup> Trace 1 Pass	Ref Level 0.00	dBm	Mkr1 23	3.843 75 GHz -43.41 dBm	Span 6.00000000 GHz	
					Swept Span Zero Span	
					Full Span	
					Start Freq 18.00000000 GHz	
0.0					Stop Freq 24.000000000 GHz	
0.0					AUTO TUNE	
an					CF Step 600,000000 MHz	
0.0					Auto Man	
					Freq Offset 0 Hz	
art 18.000 GHz Res BW 1.0 MHz	#Video BW 3.0	MHz*	Sweep 11	Stop 24.000 GHz .2 ms (24001 pts)	X Axis Scale Log	

Plot 7-28. Conducted Spurious Plot (LTE Band 48 - 20MHz QPSK - High Channel - Main Ant)

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# LTE Band 48 – Sub Ant



Plot 7-29. Conducted Spurious Plot (LTE Band 48 - 20MHz QPSK - Low Channel - Sub Ant)

CEYSIGHT Input RF Coupling DC Align: Auto	Input Z 50 0 Gen CCorr Freq Ref. Int (S) NFE: Off	#Atten 18 dB	PNO: Fast Gate: Off IF Gain: Low Sig Track: Off	#Avg Type: Pov Avg Hold: 100/1 Trig: Free Run	VOT (RMS 1 2 3 4 5 6 100 M WWWWW A N N N N N	Center Frequency 3.780000000 GHz Span	Setting
Spectrum v cale/Div 10 dB		Ref Level 0.00 o	dBm	Mkrt	3.610 313 GHz -45.48 dBm	340.000000 MHz Swept Span Zero Span	
Trace 1 Pass						Full Span	
0.0						Start Freq 3.610000000 GHz	
40.0 1						Stop Freq 3.950000000 GHz	
50.0	ana maina an di dila ina ina	an in the shake of the		illerterand heinikane	and the statistic statistics	AUTO TUNE	
00.0						CF Step 34.000000 MHz	
						Auto Man	
						Freq Offset 0 Hz	
tart 3.6100 GHz Res BW 1.0 MHz		#Video BW 3.0 P	MHz*	Sweep	Stop 3.9500 GHz 1.52 ms (22781 pts)	X Axis Scale Log	

Plot 7-30. Conducted Spurious Plot (LTE Band 48 - 20MHz QPSK - Low Channel - Sub Ant)

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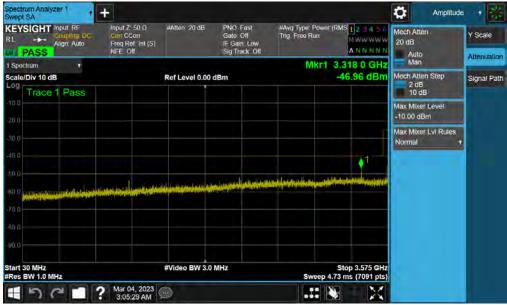
Plot 7-31. Conducted Spurious Plot (LTE Band 48 - 20MHz QPSK - Low Channel - Sub Ant)

Gouping DC Con	Z 50 Ω Atten: 10 dB CCorr Ref. int (S) Off	PNO: Fast Gate: Off IF Gain Low Sig Track: Off	#Avg Type: Powe Avg Hold: 100/10 Trig: Free Run	A N N N N N	Center Frequency 22.500000000 GHz Span	Setting
Spectrum v cale/Div 10 dB	Ref Level 0.00	dBm	Mkr1 26	-45.77 dBm	9.00000000 GHz Swept Span Zero Span	
Trace 1 Pass					Full Span	
					Start Freq 18.00000000 GHz	
10.0				1	Stop Freq 27.000000000 GHz	
0.0	Landers and a standard street of the state		the state of the state		AUTO TUNE	
0.0					CF Step 900,000000 MHz	
					Auto Man	
40.0					Freq Offset 0 Hz	
tart 18.000 GHz Res BW 1.0 MHz	#Video BW 3.0	MHz*	Sween ~1	Stop 27.000 GHz 17.6 ms (24001 pts)	X Axis Scale Log	

Plot 7-32. Conducted Spurious Plot (LTE Band 48 - 20MHz QPSK - Low Channel - Sub Ant)

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Plot 7-33. Conducted Spurious Plot (LTE Band 48 - 20MHz QPSK - Mid Channel - Sub Ant)

	aping DC gn: Auto	Input Z 50 0 Gorr CCorr Freq Ref. Int (S) NFE: Off	#Atten: 20 dB	PNO: Fast Gate: Off IF Gain: Low Sig Track: Off	#Avg Type: Pov Avg Hold: 100/ Trig: Free Run	100 M	2 3 4 5 6 WWWWW NNNNN	Mech Atten 20 dB Auto	Y Scale
Spectrum cale/Div 10 dB	-		Ref Level 0.00	dBm	Mkr1		54 GHz 99 dBm	Man Mech Atten Step	Signal Pati
00.	Pass							2 dB 10 dB	
								Max Mixer Level -10.00 dBm	
								Max Mixer Lvl Rules Normal v	
	1		Perioda to A the set of					-	
0.0	in all the second second			n ball tank a tanimata	the later of the second second		ener attailiseete		
tart 3,6750 GHz			#Video BW 3.0	MHz*		Stop 3	.9500 GHz		

Plot 7-34. Conducted Spurious Plot (LTE Band 48 - 20MHz QPSK - Mid Channel - Sub Ant)

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Plot 7-35. Conducted Spurious Plot (LTE Band 48 - 20MHz QPSK - Mid Channel - Sub Ant)

EYSIGHT Input RF L Align Auto	Input Z 50 0 Atten: 10 dB Gon CCorr Freq Ref. Int (S) NFE: Off	PNO: Fast Gate: Off IF Gam Low Sig Track: Off	#Avg Type Power ( Avg Hold>100/100 Trig Free Run	RMS 1 2 J 4 5 6 M WW WW W A N N N N N	Center Frequency 22.500000000 GHz Span	Settings
Spectrum r cale/Div 10 dB	Ref Level 0.0	00 dBm	Mkr1 26.9	39 250 GHz -45.84 dBm	9.00000000 GHz Swept Span Zero Span	
an and a second					Full Span	
					Start Freq 18.00000000 GHz	
				1	Stop Freq 27.000000000 GHz	
0.0	weller land the property of the property of the pro-			an share the second second	AUTO TUNE	
0.0	the second in the second in the second in the				CF Step 900.000000 MHz	
0.0					Auto Man	
					Freq Offset 0 Hz	
tart 18.000 GHz Res BW 1.0 MHz	#Video BW 3	0 MHz*		Stop 27.000 GHz 5 ms (24001 pts)	X Axis Scale Log	

Plot 7-36. Conducted Spurious Plot (LTE Band 48 - 20MHz QPSK - Mid Channel - Sub Ant)

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EYSIGHT Input: RF Coupling: DC Align: Auto	Input Z 50 Q Con CCorr Freq Ref. Int (5) NFE Off	#Atten: 20 dB	PNO Fast Gate Off IF Gain: Low Sig Track Off	#Avg Type: Power (RMS Trig, Free Run	123456 MWWWWW ANNNNN	Mech Atten 20 dB Auto	Y Scale
Spectrum v cale/Div 10 dB		Ref Level 0.00	18m		83 0 GHz 6.62 dBm	Man Mech Atten Step	
Trace 1 Pass		Rei Level 0.001			02 0011	2 dB 10 dB	Signal Pat
						Max Mixer Level -10.00 dBm	
					F	Max Mixer Lvl Rules Normal •	1
					tot 1	-	
0 0	معتمد معالية معتقد	and the second second	وحديقا والمتلوغ الإسط الانتجابية		in the second second		
70.0							
α α							
tart 30 MHz Res BW 1.0 MHz		#Video BW 3.0	MHz	Sto Sweep ~7.18 m	op 3.640 GHz		

Plot 7-37. Conducted Spurious Plot (LTE Band 48 - 20MHz QPSK - High Channel - Sub Ant)

CEYSIGHT Input RF Coupling DC Align: Auto	Input Z' 50 Ω Atten: 10 dB Gen CCorr Freq Ref. Int (S) NFE: Off	Gate: Off	Ing Free Run	1456 /ww.ww INNNN	Center Frequency 3.845000000 GHz Span	Setting
Spectrum v cale/Div 10 dB	Ref Levei 0.00	dBm	Mkr1 3,741 47 -46.8	3 GHz 3 dBm	210.000000 MHz Swept Span Zero Span	
Trace 1 Pass					Full Span	
0.0					Start Freq 3.740000000 GHz	
10.0					Stop Freq 3.950000000 GHz	
	Anterior descriptions, southing				AUTO TUNE	
	North Constraints in the second of the	din seleti ne in sine i	alter winners and a state	Assistant (Marine) Association (Marine)	CF Step 21.000000 MHz	
					Auto Man	
					Freq Offset 0 Hz	
tart 3.7400 GHz Res BW 1.0 MHz	#Video BW 3.0	MHz*	Stop 3.9 Sweep 1.50 ms (2)	500 GHz	X Axis Scale Log	

Plot 7-38. Conducted Spurious Plot (LTE Band 48 - 20MHz QPSK - High Channel - Sub Ant)

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EYSIGHT Input RF coupling bic Align Auto	Input Z 50 0 Atten 10 Gen CCorr Freq Ref. Int (S) NFE: Off	dB PNO: Fast Gate: Off IF Gain Low Sig Track: Off	#Avg Type: Power (RMS 1 2 3 4 Avg Hold >100/100 Trig: Free Run A N N N	WW 10.975000000 GHz
Spectrum v cale/Div 10 dB	Ref Leve	el 0.00 dBm	Mkr1 3.997 4 G -49.81 dl	HZ 14.0500000 GHz
Inace   Pass				Full Span
				Start Freq 3.950000000 GHz
40.0				Stop Freq 18.00000000 GHz
50 0				AUTO TUNE
so o Nucember and a	teresisten indication of the	a belegilen be itter datte sol		CF Step 1.405000000 GHz
				Auto Man
				Freq Offset 0 Hz
tart 3.950 GHz Res BW 1.0 MHz	#Video E	W 3.0 MHz	Stop 18.000 Sweep ~26.2 ms (22521	

Plot 7-39. Conducted Spurious Plot (LTE Band 48 - 20MHz QPSK - High Channel - Sub Ant)

EYSIGHT Input RF Coupling DC Align: Auto	Input Z: 50 0 Atten: 10 dB Gen CCorr Freq Ref. Int (S) NFE: Off	PNO: Fast Gate: Off IF Gam Low Sig Track: Off	#Avg Type: Power Avg Hold: 100/100 Trig: Free Run	(RMS 1 2 3 4 5 6 MWWWWW A NNNNN	Center Frequency 22.500000000 GHz Span	Settings
Spectrum v cale/Div 10 dB	Ref Level 0.00	) dBm	Mkr1 25.7	773 750 GHz -45.20 dBm	9,00000000 GHz Swept Span Zero Span	
Trace 1 Pass					Full Span	
				اكت	Start Freq 18.000000000 GHz	
				1	Stop Freq 27.000000000 GHz	
	and the second state of th			An a start land	AUTO TUNE	
0.0					CF Step 900.000000 MHz	
0.0 0.0					Auto Man	
					Freq Offset 0 Hz	
art 18.000 GHz Res BW 1.0 MHz	#Video BW 3.0	0 MHz*	Sween ~17	Stop 27.000 GHz .6 ms (24001 pts)	X Axis Scale Log	

Plot 7-40. Conducted Spurious Plot (LTE Band 48 - 20MHz QPSK - High Channel - Sub Ant)

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# 7.5 Band Edge Emissions at Antenna Terminal

### **Test Overview**

All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst-case configuration. All modes of operation were investigated and the worst-case configuration results are reported in this section.

For an End User Device, the conducted power of any emission outside the fundamental emission (whether in or outside of the authorized band) shall not exceed -13 dBm/MHz within 0 to B MHz (where B is the bandwidth in MHz 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 MHz below the lower CBSD-assigned channel edge. At all frequencies greater than B MHz above the upper CBSD assigned channel edge and less than B MHz below the lower CBSD-assigned channel edge, the conducted power of any end user device emission shall not exceed -25 dBm/MHz. The conducted power of emissions below 3530 MHz or above 3720 MHz shall not exceed -40dBm/MHz.

#### Test Procedure Used

ANSI C63.26-2015 – Section 5.7.3

### **Test Settings**

- 1. Start and stop frequency were set such that the band edge would be placed in the center of the plot
- 2. Span was set large enough so as to capture all out of band emissions near the band edge
- 3. RBW > 1% of the emission bandwidth
- 4. VBW ≥ 3 x RBW
- 5. Detector = RMS
- 6. Number of sweep points  $\geq 2 \times \text{Span/RBW}$
- 7. Trace mode = trace average
- 8. Sweep time = auto couple
- 9. The trace was allowed to stabilize

#### Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.



Figure 7-4. Test Instrument & Measurement Setup

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### Test Notes

- 1. Per 96.41(e)(3)(i), compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 megahertz bands immediately outside and adjacent to the licensee's authorized frequency channel, a resolution bandwidth of no less than one percent of the fundamental emission bandwidth may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full reference bandwidth (i.e., 1 MHz or 1 percent of emission bandwidth, as specified). The fundamental emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.
- 2. A-MPR is applied for conducted band edge measurements.

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## LTE Band 48 – Main Ant



Plot 7-41. Channel - Main Ant Edge Plot (LTE Band 48 - 20MHz QPSK - Low Channel - Main Ant)



Plot 7-42. Channel - Main Ant Edge Plot (LTE Band 48 - 20MHz QPSK - Mid Channel - Main Ant)

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	put RF oupling DC ligh: Aulo	Input 2, 50 0 Gan CCorr Freq Ref. Int (5) NEE: Off	Atten 26.dB	Thig Fre Gate LC IF Gain	>	Conter Fred Radio Std. 1	9 3 69000000 (3 None	ιz		Frequency 00000 GHz	Settings
ul Range Graph ale/Div 10.0 dB	7		Ref Value 40.	00 dBm					CF Step 21.0000 Auto Mar	000 MHz. o	
									Freq Off 0 Hz		
					The state of the s	Market and and an					
rt 3.640 GHz							Stop 3.	740 GHz			
U Ranna Tehle									1		
ul Range Table	•				ure Trace Type		Trace Average	Trace 1 (Active)			
		Freq Stop Fre		Trace Frequen	e Type cy A	mplitude					
Spur Ra	ange Start 1 3,640	00 GHz 3.6700 G	Hz 1.000 MHz	Trace Frequen 3.66965000	e Type cy A 0 GHz -3	8.83 dBm	Trace Average ALIMIT -13.83 dE	(Active)			
Spur Ra	ange Start 1 3.640 2 3.670	00 GHz 3.6700 G 00 GHz 3.6790 G	Hz 1.000 MHz Hz 1.000 MHz	Trace Frequen 3.66965000 3.67871500	Type cy A 0 GHz -3 0 GHz -3	8.83 dBm 4.67 dBm	Trace Average ALIMIT -13.83 dE -21.67 dE	(Active)			
Spur Ra	ange Start 1 3,640 2 3,670 3 3,679	00 GHz 3.6700 G 00 GHz 3.6790 G 00 GHz 3.6800 G	Hz 1.000 MHz Hz 1.000 MHz Hz 390.0 kHz	Trace Frequent 3.66965000 3.67871500 3.67996500	e Type cy A 0 GHz -3 0 GHz -3 0 GHz -3	8.83 dBm 4.67 dBm 5.03 dBm	Trace Average ALIMIT -13.83 dE -21.67 dE -22.03 dE	(Active)			
Spur R:	ange Start 1 3.640 2 3.670 3 3.679 4 3.680	00 GHz 3.6700 G 00 GHz 3.6790 G 00 GHz 3.6800 G 00 GHz 3.7000 G	Hz 1.000 MHz Hz 1.000 MHz Hz 390.0 kHz Hz 390.0 kHz	Trace Frequen 3.66965000 3.67871500 3.67996500 3.69256666	e Type cy A 0 GHz -3 0 GHz -3 0 GHz -3 7 GHz 3	8.83 dBm 4.67 dBm 5.03 dBm .769 dBm	Trace Average ALImit -13.83 dE -21.67 dE -22.03 dE -21.23 dE	(Active)			
Spur R 1 2 3 4 5	ange Stan 1 3.640 2 3.670 3 3.679 4 3.680 5 3.700	00 GHz 3.6700 G 00 GHz 3.6790 G 00 GHz 3.6800 G 00 GHz 3.7000 G 00 GHz 3.7000 G	Hz 1.000 MHz Hz 1.000 MHz Hz 390.0 kHz Hz 390.0 kHz Hz 390.0 kHz Hz 390.0 kHz	Trace Frequen 3.66965000 3.67871500 3.67996500 3.69256666 3.70003333	Type cy A 0 GHz -3 0 GHz -3 0 GHz -3 7 GHz -3 3 GHz -3 3 GHz -3	8.83 dBm 4.67 dBm 5.03 dBm .769 dBm 4.42 dBm	Trace Average <u>ALIMit</u> -13.83 dE -21.67 dE -22.03 dE -21.23 dE -21.42 dE	(Active)			
1 2 3 4 5 6	ange Stan 1 3.640 2 3.670 3 3.675 4 3.680 5 3.700 6 3.701	00 GHz 3.6700 G 00 GHz 3.6790 G 00 GHz 3.6800 G 00 GHz 3.7000 G 00 GHz 3.7010 G 10 GHz 3.7100 G	Hz         1.000 MHz           Hz         1.000 MHz           Hz         390.0 kHz           Hz         390.0 kHz           Hz         390.0 kHz           Hz         390.0 kHz           Hz         1.000 MHz	Trace Frequent 3.66965000 3.67871500 3.67996500 3.69256666 3.70003333 3.70104500	Type cy A 0 GHz -3 0 GHz -3 0 GHz -3 7 GHz -3 3 GHz -3 0 GHz -3 0 GHz -3	8.83 dBm 4.67 dBm 5.03 dBm .769 dBm 4.42 dBm 4.19 dBm	Trace Average <u>ALIMI</u> -13.83 dE -21.67 dE -21.23 dE -21.23 dE -21.42 dE -21.19 dE	(Active)			
Spur R 1 2 3 4 5	ange Start 1 3,640 2 3,670 3 3,675 4 3,680 5 3,700 6 3,701 7 3,710	00 GHz 3.6700 G 00 GHz 3.6790 G 00 GHz 3.6800 G 00 GHz 3.7000 G 00 GHz 3.7000 G	Hz         1.000 MHz           Hz         1.000 MHz           Hz         390.0 kHz           Hz         390.0 kHz           Hz         390.0 kHz           Hz         390.0 kHz           Hz         1.000 MHz           Hz         390.0 kHz           Hz         1.000 MHz           Hz         1.000 MHz	Trace Frequen 3.66965000 3.67871500 3.67996500 3.69256666 3.70003333	type cy A 0 GHz -3 0 GHz -3 0 GHz -3 7 GHz -3 3 GHz -3 0 GHz -3 3 GHz -4	8.83 dBm 4.67 dBm 5.03 dBm .769 dBm 4.42 dBm	Trace Average <u>ALIMit</u> -13.83 dE -21.67 dE -22.03 dE -21.23 dE -21.42 dE	(Active)			

Plot 7-43. Channel - Main Ant Edge Plot (LTE Band 48 - 20MHz QPSK - High Channel - Main Ant)

		n Analyzer - Spuri									
LXI RL	F	KF 50 Ω	DC CORREC	Cen	SENSE:INT ter Freg: 3.55	7500000		LIGN AUTO	11:08:35 PI Radio Std:	M Feb 20, 2023	Frequency
DAO	Gat	te: LO		Trig	: Free Run		OTTE				
PAS	<u> </u>		IFGain:L	.ow #Att	ten: 26 dB				Radio Dev	ice: BTS	
10 dB	/div	Ref 30.00	dBm								
Log											
20.0											Center Fred
10.0											3.557500000 GH;
0.00					en la						
-10.0											
-20.0											
-30.0 –				a the set it the		Const.	lbre e .				
-40.0		and the second second	deadle of	الرواللغبط أفد		l <mark>i kanala</mark>			n an		
-50.0	an the state of the		-Purving					an Hitu		Winerestation and the	
-60.0	and the second										
Start	3.51 G	Hz							Stop 3	.605 GHz	CF Step
											5.000000 MHz
Spur	Range	Start Freq	Stop Freq	RBW	Frequenc	v	Amplit	ude	∆ Limit		<u>Auto</u> Mar
1	1	3.5100 GHz		1.000 MH	z 3.5299000	00 GHz	-42.46	dBm	-2.461 dB		
2	2	3.5300 GHz	3.5400 GHz	1.000 MH	z 3.5399333	33 GHz	-34.29	dBm	-9.290 dB		Freq Offse
3	3	3.5400 GHz	3.5490 GHz	1.000 MH	z 3.5435550	00 GHz	-30.51 (	dBm	-17.51 dB		
4	4	3.5490 GHz	3.5500 GHz	300.0 kHz	z 3.5498183	33 GHz	-31.47 (	dBm	-18.47 dB		0 H:
5	5	3.5500 GHz			z 3.5594750				-18.77 dB		
6	6	3.5650 GHz			z 3.5652400				-19.39 dB		
7	7	3.5660 GHz			z 3.5679833				-19.29 dB		
8	8	3.5800 GHz	3.6050 GHz	1.000 MH	z 3.5871666	67 GHz	-41.07 (	dBm	-16.07 dB		
MSG						_		STAT	211		
mag						_		STAT			

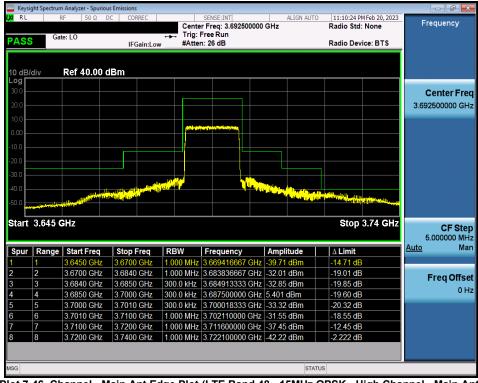
Plot 7-44. Channel - Main Ant Edge Plot (LTE Band 48 - 15MHz QPSK - Low Channel - Main Ant)

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RL		n Analyzer - Spu F 50 Ω		CORREC		SENSE:INT Freq: 3.625000	000 GHz	ALIGN AUTO	11:08:08 PM Radio Std:	1 Feb 20, 2023 None	Frequency
PASS	Gat	e: LO		IFGain:Lo		Free Run n: 26 dB			Radio Devi	ice: BTS	
I0 dB/ ₋og <b>Г</b>	div	Ref 30.0	0 dBm								
20.0 -											Center Fre 3.625000000 GH
0.00						a for the state of					
10.0 20.0											
30.0 40.0							l. Ili				
50.0		and the second	nni (majiki)					<b>Minan Hi</b> lington		had the state of the second	
60.0											
Start	3.578 0	SHZ							Stop 3.	.673 GHz	CF Ste 5.00000 MH
Spur	Range	Start Free	Sto	p Freq	RBW	Frequency	Ampl	itude	∆ Limit		<u>Auto</u> Ma
1	1	3.5775 GH	z 3.60	)25 GHz	1.000 MHz	3.601916667 G	GHz -39.75	dBm	-14.75 dB		
	2	3.6025 GH	z 3.61	165 GHz	1.000 MHz	3.611856667 G	Hz -32.28	dBm	-19.28 dB		Freq Offs
2	3	3.6165 GH	_	175 GHz	300.0 kHz	3.617393333 G	GHz -32.51	dBm	-19.51 dB		01
	-		7 3.65	325 GHz	300.0 kHz	3.626400000 G	Hz 5.881	dBm	-19.12 dB		01
}	4	3.6175 GH				0.000700007.0	Hz -33 41	dBm	-20.41 dB		
}	4	3.6175 GH 3.6325 GH		335 GHz	300.0 kHz	3.632736667 G	11L 00.11	abiii			
2 3 4 5	4 5		z 3.63	335 GHz 175 GHz		3.632736667 G			-19.94 dB		
3 4 5	4 5	3.6325 GH	z 3.63 z 3.64		1.000 MHz		GHz -32.94	dBm	-19.94 dB -15.13 dB		
3 	4 5 6	3.6325 GH 3.6335 GH	z 3.63 z 3.64	175 GHz	1.000 MHz	3.634970000 G	GHz -32.94	dBm			

Plot 7-45. Channel - Main Ant Edge Plot (LTE Band 48 - 15MHz QPSK - Mid Channel - Main Ant)



Plot 7-46. Channel - Main Ant Edge Plot (LTE Band 48 - 15MHz QPSK - High Channel - Main Ant)

FCC ID: PY7-84558E		PART 96 MEASUREMENT REPORT			
Test Report S/N:	Test Dates:	EUT Type:	Page 39 of 66		
1M2302060006-17-R1.PY7	02/08/2023 - 03/24/2023	Portable Handset	Fage 39 01 00		
© 2023 ELEMENT		· · · · · · · · · · · · · · · · · · ·	V11.0 9/14/2022		



PASS	C.t	F 50Ω [ e:LO	DC CORREC	+++ Trig:	SENSE:INT r Freq: 3.5550 Free Run h: 26 dB	000000 GI	ALIGN AUTO	0 11:14:52 F Radio Sto Radio De		Frequency
10 dB		Ref 30.00 (		y <del>w</del> ritten	. 10 08					
20.0 - 10.0 -										Center Fre 3.555000000 GH
0.00 10.0										
-20.0 -30.0										
-40.0 -50.0				<mark>_/</mark>			Contraction of the second second	Mark International		
	a si sa	the state of the s						and the second s	V Constant of the second second	
	3 51 G							Sto	n 3.6 GHz	
	3.51 G								p 3.6 GHz	CF Ste 15.000000 MH Auto Mi
Start	Range	Start Freq	Stop Freq	RBW	Frequency		Amplitude	∆ Limit		15.000000 MI
Start Spur	Range	Start Freq 3.5100 GHz	3.5300 GHz	1.000 MHz	3.52956666	7 GHz -4	19.93 dBm	∆ Limit -9.927 df	В	15.000000 MI
Start	Range	<b>Start Freq</b> 3.5100 GHz 3.5300 GHz	3.5300 GHz 3.5400 GHz	1.000 MHz 1.000 MHz	3.52956666 3.53760000	7 GHz -4 0 GHz -3	19.93 dBm 39.36 dBm	∆ Limit -9.927 dt -14.36 dt	B B B	15.000000 M <u>Auto</u> M
Start	<b>Range</b> 1 2 3	<b>Start Freq</b> 3.5100 GHz 3.5300 GHz 3.5400 GHz	3.5300 GHz 3.5400 GHz 3.5490 GHz	1.000 MHz 1.000 MHz 1.000 MHz	3.52956666 3.53760000 3.54441000	7 GHz -4 0 GHz -3 0 GHz -2	19.93 dBm 39.36 dBm 29.91 dBm	Δ Limit -9.927 df -14.36 df -16.91 df	B B B B	15.000000 Mi <u>Auto</u> Mi Freq Offs
Start	Range 1 2 3 4	Start Freq           3.5100 GHz           3.5300 GHz           3.5400 GHz           3.5400 GHz           3.5490 GHz	3.5300 GHz 3.5400 GHz 3.5490 GHz 3.5500 GHz	1.000 MHz 1.000 MHz 1.000 MHz 200.0 kHz	3.52956666 3.53760000 3.54441000 3.54990333	7 GHz -4 0 GHz -3 0 GHz -2 3 GHz -3	19.93 dBm 39.36 dBm 29.91 dBm 31.31 dBm	∆ Limit -9.927 df -14.36 df -16.91 df -18.31 df	<b>B</b> B B B B B	15.000000 Mi <u>Auto</u> M Freq Offs
Start	Range 1 2 3 4 5	<b>Start Freq</b> 3.5100 GHz 3.5300 GHz 3.5400 GHz 3.5490 GHz 3.5500 GHz	3.5300 GHz 3.5400 GHz 3.5490 GHz 3.5500 GHz 3.5600 GHz	1.000 MHz           1.000 MHz           1.000 MHz           200.0 KHz           200.0 KHz	3.52956666 3.53760000 3.54441000 3.54990333 3.55195000	7 GHz -4 0 GHz -3 0 GHz -2 3 GHz -3 0 GHz 6.	19.93 dBm 39.36 dBm 29.91 dBm 31.31 dBm 575 dBm	∆ Limit -9.927 df -14.36 df -16.91 df -18.31 df -18.31 df -18.42 df	<b>B</b> B B B B B B B	15.000000 Mi <u>Auto</u> M Freq Offs
	Range 1 2 3 4 5 6	<b>Start Freq</b> 3.5100 GHz 3.5300 GHz 3.5400 GHz 3.5490 GHz 3.5500 GHz 3.5600 GHz	3.5300 GHz 3.5400 GHz 3.5490 GHz 3.5500 GHz 3.5600 GHz 3.5610 GHz	1.000 MHz           1.000 MHz           1.000 MHz           1.000 MHz           200.0 KHz           200.0 kHz           200.0 kHz	3.52956666 3.53760000 3.54441000 3.54990333 3.55195000 3.56017666	7 GHz -4 0 GHz -3 0 GHz -2 3 GHz -3 0 GHz 6. 7 GHz -3	19.93 dBm 19.36 dBm 29.91 dBm 31.31 dBm 575 dBm 31.07 dBm	Δ Limit -9.927 df -14.36 df -16.91 df -18.31 df -18.42 df -18.42 df -18.07 df	B B B B B B B B B B B B B B B B B B B	15.000000 MI
Start	Range           1           2           3           4           5           6           7	<b>Start Freq</b> 3.5100 GHz 3.5300 GHz 3.5400 GHz 3.5490 GHz 3.5500 GHz	3.5300 GHz 3.5400 GHz 3.5490 GHz 3.5500 GHz 3.5600 GHz	1.000 MHz           1.000 MHz           1.000 MHz           200.0 KHz           200.0 kHz           200.0 kHz           1.000 MHz	3.52956666 3.53760000 3.54441000 3.54990333 3.55195000	7 GHz         -4           0 GHz         -3           0 GHz         -2           3 GHz         -3           0 GHz         6.           7 GHz         -3           0 GHz         -2	9.93 dBm 9.36 dBm 29.91 dBm 31.31 dBm 575 dBm 31.07 dBm 28.35 dBm	∆ Limit -9.927 df -14.36 df -16.91 df -18.31 df -18.31 df -18.42 df	<b>3</b> 3 3 3 3 3 3 3 3 3 3 3 3	15.000000 M <u>Auto</u> M Freq Offs

Plot 7-47. Channel - Main Ant Edge Plot (LTE Band 48 - 10MHz QPSK - Low Channel - Main Ant)



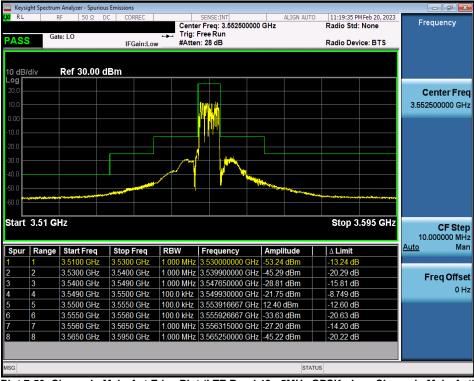
Plot 7-48. Channel - Main Ant Edge Plot (LTE Band 48 - 10MHz QPSK - Mid Channel - Main Ant)

FCC ID: PY7-84558E		PART 96 MEASUREMENT REPORT			
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© 2023 ELEMENT			V11.0 9/14/2022		



ASS		RF 50 Ω te: LO	DC CORREC	🛶 Trig: F	SENSE:INT r Freq: 3.695000 Free Run h: 26 dB		IGN AUTO	11:15:41 Pl Radio Std: Radio Dev		Frequency
10 dB/		Ref 40.00	IFGain:Lov	w #Atter	1. 20 00			Radio Dev		
30.0 - 20.0 -										Center Fre 3.695000000 GF
0.00										
20.0 - 30.0 -										
40.0			ANT AND		<b>/%</b>		North Street of the Owner of the			
50.0	3.65 GI	Hz	And and and a state of the stat				And the second second	Stop	3.74 GHz	15.000000 M
50.0		Start Freq	Stop Freq	RBW	Frequency	Amplitu		∆ Limit		15.000000 M
itart	Range	Start Freq 3.6500 GHz	3.6800 GHz	1.000 MHz	Frequency 3.678700000 0	Amplitu GHz -40.85 d	Bm	Δ Limit -15.85 dB		15.000000 M
0.0 tart	Range	<b>Start Freq</b> 3.6500 GHz 3.6800 GHz	3.6800 GHz 3.6890 GHz	1.000 MHz 1.000 MHz	Frequency 3.678700000 ( 3.689000000 (	Amplitu 3Hz -40.85 d 3Hz -31.92 d	Bm Bm	Δ Limit -15.85 dB -18.92 dB		15.000000 M <u>Auto</u> M
50.0 start	<b>Range</b> 1 2 3	<b>Start Freq</b> 3.6500 GHz 3.6800 GHz 3.6890 GHz	3.6800 GHz 3.6890 GHz 3.6900 GHz	1.000 MHz 1.000 MHz 200.0 kHz	Frequency 3.678700000 ( 3.689000000 ( 3.689956667 (	Amplitu GHz -40.85 d GHz -31.92 d GHz -31.24 d	Bm Bm Bm	∆ Limit -15.85 dB -18.92 dB -18.24 dB		15.000000 M <u>Auto</u> M Freq Offs
so.o	Range 1 2 3 4	<b>Start Freq</b> 3.6500 GHz 3.6800 GHz 3.6890 GHz 3.6900 GHz	3.6800 GHz 3.6890 GHz 3.6900 GHz 3.7000 GHz	1.000 MHz 1.000 MHz 200.0 kHz 200.0 kHz	Frequency 3.678700000 ( 3.689000000 ( 3.689956667 ( 3.696016667 (	Amplitu 3Hz 40.85 d 3Hz 31.92 d 3Hz 31.92 d 3Hz 31.24 d 3Hz 6.430 dE	Bm Bm Bm Bm	Δ Limit -15.85 dB -18.92 dB -18.24 dB -18.57 dB		15.000000 M <u>Auto</u> M Freq Offs
50.0 start	Range 1 2 3 4 5	<b>Start Freq</b> 3.6500 GHz 3.6800 GHz 3.6890 GHz 3.6900 GHz 3.7000 GHz	3.6800 GHz 3.6890 GHz 3.6900 GHz 3.7000 GHz 3.7010 GHz	1.000 MHz           1.000 MHz           200.0 kHz           200.0 kHz           200.0 kHz	Frequency 3678700000 ( 3.68900000 ( 3.689956667 ( 3.69956667 ( 3.700046667 (	Amplitu GHz -40.85 d GHz -31.92 d GHz -31.24 d GHz -32.03 d	Bm Bm Bm Bm Bm Bm	Δ Limit -15.85 dB -18.92 dB -18.24 dB -18.57 dB -19.03 dB		15.000000 M <u>Auto</u> M Freq Offs
start	Range 1 2 3 4 5 6	<b>Start Freq</b> 3.6500 GHz 3.6800 GHz 3.6890 GHz 3.6900 GHz	3.6800 GHz 3.6890 GHz 3.6900 GHz 3.7000 GHz 3.7010 GHz 3.7100 GHz	1.000 MHz           1.000 MHz           200.0 kHz           200.0 kHz           200.0 kHz           1.000 MHz           1.000 MHz	Frequency 3678700000 0 3689000000 0 368995667 0 3.698016667 0 3.700046667 0 3.701795000 0	Amplitu SHz 40.85 d SHz 31.92 d SHz 6.430 dE SHz 6.430 dE SHz 6.430 d SHz 6.29.45 d	Bm B	Δ Limit -15.85 dB -18.92 dB -18.24 dB -18.57 dB -19.03 dB -16.45 dB		15.000000 M <u>Auto</u> M Freq Offs
0.0 tart	Range 1 2 3 4 5 6	<b>Start Freq</b> 3.6500 GHz 3.6800 GHz 3.6890 GHz 3.6900 GHz 3.7000 GHz 3.7010 GHz	3.6800 GHz 3.6890 GHz 3.6900 GHz 3.7000 GHz 3.7010 GHz 3.7100 GHz 3.7200 GHz	1.000 MHz           1.000 MHz           200.0 KHz           200.0 KHz           200.0 KHz           1.000 MHz           1.000 MHz	Frequency 3678700000 ( 3.68900000 ( 3.689956667 ( 3.69956667 ( 3.700046667 (	Amplitu 3Hz -40.85 d 3Hz -31.92 d 3Hz -31.92 d 3Hz -31.24 d 3Hz 6.430 dE 3Hz -22.03 d 3Hz -22.03 d 3Hz -22.945 d 3Hz -241.51 d	Bm B	Δ Limit -15.85 dB -18.92 dB -18.24 dB -18.57 dB -19.03 dB		CF Sto 15.00000 M Auto M Freq Offs 0

Plot 7-49. Channel - Main Ant Edge Plot (LTE Band 48 - 10MHz QPSK - High Channel - Main Ant)



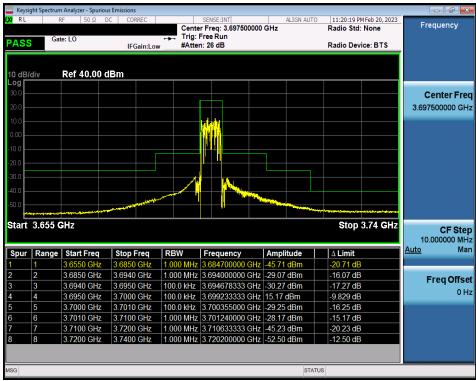
Plot 7-50. Channel - Main Ant Edge Plot (LTE Band 48 - 5MHz QPSK - Low Channel - Main Ant)

FCC ID: PY7-84558E		PART 96 MEASUREMENT REPORT			
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RL	F	F 50 Ω	DC (	CORREC		SENSE:INT	ALIGN AL	TO 11:18:30 Pt Radio Std:	MFeb 20, 2023 None	Frequency
ASS	Gat	e: LO		IFGain:Lo		Free Run n: 26 dB		Radio Dev	ice: BTS	
0 dB/	/div	Ref 30.0	0 dBm							
og - 20.0 - 10.0 -										Center Fre 3.625000000 GH
0.0										
i0.0	h, frat syn er strangfer	riyadingtadi atir yang digi		and the second second	NAT STOLEN AND AND AND AND AND AND AND AND AND AN	₩ <b>^</b> \	and the second sec	and the matter and the state of	*****	
	3.583 C	SHz						Stop 3	.668 GHz	CF Ste 10.000000 Mi
Spur	Range	Start Free	sto	p Freq	RBW	Frequency	Amplitude	∆ Limit		<u>Auto</u> M
	1	3.5825 GH	lz 3.61	75 GHz	1.000 MHz	3.614583333 G	Hz -40.47 dBm	-15.47 dB		
	2	3.6175 GH	z 3.62	15 GHz	1.000 MHz	3.620873333 G	Hz -28.07 dBm	-15.07 dB		Freq Offs
	3	3.6215 GH	lz 3.62	25 GHz	100.0 kHz	3.622323333 G	Hz -28.39 dBm	-15.39 dB		
	4	3.6225 GH	z 3.62	75 GHz	100.0 kHz	3.625650000 G	Hz 12.31 dBm	-12.69 dB		0
	5	3.6275 GH	lz 3.62	85 GHz	100.0 kHz	3.627988333 G	Hz -34.46 dBm	-21.46 dB		
	6	3.6285 GH	z 3.63	25 GHz	1.000 MHz	3.629113333 G	Hz -28.36 dBm	-15.36 dB		
	7	3.6325 GH	lz 3.66	75 GHz	1.000 MHz	3.632850000 G	Hz -35.92 dBm	-10.92 dB		

Plot 7-51. Channel - Main Ant Edge Plot (LTE Band 48 - 5MHz QPSK - Mid Channel - Main Ant)



Plot 7-52. Channel - Main Ant Edge Plot (LTE Band 48 - 5MHz QPSK - High Channel - Main Ant)

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# LTE Band 48 – Sub Ant



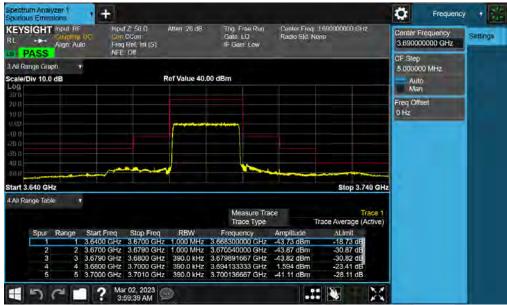
Plot 7-53. Channel - Sub Ant Edge Plot (LTE Band 48 - 20MHz QPSK - Low Channel - Sub Ant)



Plot 7-54. Channel - Sub Ant Edge Plot (LTE Band 48 - 20MHz QPSK - Mid Channel - Sub Ant)

FCC ID: PY7-84558E		PART 96 MEASUREMENT REPORT	
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© 2023 ELEMENT	•		V11.0 9/14/2022





Plot 7-55. Channel - Sub Ant Edge Plot (LTE Band 48 - 20MHz QPSK - High Channel - Sub Ant)

Settings	Centor Frequency 3.557500000 GHz	3 55750000 GHZ None	Contar Froq Radio Std: N	Thn, Free Run Gate, LO IF Gain, Low	Allen 26 dB	CCorr Rel. Int (5)	DC Gen	Align: Auto	PASS
	CF Step	_					-	×0 ×	Ni Range Gra
	5.800000 MHz			0 dBm	ef Value 30.0				le/Div 10.0
	Auto Man				(e) value solo				
	Freq Offset 0 Hz								
	0112								
				Law a					0
							_		
		Stop 3 605 GHz						-	
		Stop 3.605 GHz							art 3.510 GH
				. Constanting			i		
		Trace 1		Measure Tra			Į.		art 3.510 GH
		Trace 1 Trace Average (Active)		Trace Type	DRW	Sion Fred		e v	art 3.510 GH VI Range Tab
		Trace 1			RBW	Stop Freq	Start Freq	a <b>r</b> Range	art 3.510 GH
		Trace 1 Trace Average (Active) ALImit	Amplitude	Trace Type Frequency		3.5300 GHz	Start Freq	n r Range	art 3.510 GH Ni Range Tab
		Trace 1 Trace Average (Active) <u>ALImit</u> -8.023 dB -17.92 dB -24.67 dB	Amplitude -48.02 dBm -42.92 dBm -37.67 dBm	Trace Type Frequency 3.528300000 GHz	1.000 MHz	3.5300 GHz 3.5400 GHz 3.5490 GHz	Start Freq 3.5100 GHz	e f Range 1 2	art 3.510 GH VI Range Tab Spur 1
		Trace 1 Trace Average (Active) AUmit -8.023 dB -17.92 dB -24.67 dB -25.42 dB	Amplitude -48.02 dBm -42.92 dBm -37.67 dBm -38.42 dBm	Trace Type Frequency 3.528300000 GHz 3.5398666667 GHz 3.543975000 GHz 3.5439966667 GHz	1.000 MHz 1.000 MHz 1.000 MHz 300.0 KHz	3.5300 GHz 3.5400 GHz 3.5490 GHz 3.5500 GHz	Start Freq 3.5100 GHz 3.5300 GHz 3.5400 GHz 3.5490 GHz	Range	Art 3.510 GH
		Trace 1 Trace Average (Active) AUmit -8.023 dB -17.92 dB -24.67 dB -24.67 dB -25.42 dB -21.68 dB	Amplitude -48.02 dBm -42.92 dBm -37.67 dBm -38.42 dBm 3.113 dBm	Trace Type Frequency 3.528300000 GHz 3.539866667 GHz 3.543975000 GHz	1.000 MHz 1.000 MHz 1.000 MHz	3.5300 GHz 3.5400 GHz 3.5490 GHz	Start Freq 3.5100 GHz 3.5300 GHz 3.5400 GHz	Range	Art 3.510 GH
		Trace 1 Trace Average (Active) ALlimit 8.023 dB -17.92 dB -24 67 dB -26 47 dB -25.42 dB -21.69 dB -28.03 dB	Amplitude 48.02 dBm 42.92 dBm -37.67 dBm -38.42 dBm 3.113 dBm -41.03 dBm	Trace Type Frequency 3.528300000 GHz 3.539866667 GHz 3.543975000 GHz 3.5549996667 GHz 3.5553000000 GHz 3.555000000 GHz 3.5655013333 GHz	1.000 MHz 1.000 MHz 1.000 MHz 300.0 kHz 300.0 kHz 300.0 kHz 300.0 kHz	3.5300 GHz 3.5400 GHz 3.5490 GHz 3.5500 GHz 3.5650 GHz 3.5660 GHz	Start Freq 3.5100 GHz 3.5300 GHz 3.5400 GHz 3.5490 GHz 3.5500 GHz 3.5650 GHz	Range	Art 3.510 GH
		Trace 1 Trace Average (Active) AUmit -8.023 dB -17.92 dB -24.67 dB -24.67 dB -25.42 dB -21.68 dB	Amplitude -48.02 dBm -42.92 dBm -37.67 dBm -38.42 dBm 3.113 dBm	Trace Type Frequency 3.528300000 GH2 3.539866667 GH2 3.543975000 GH2 3.5439996667 GH2 3.56300000 GH2 3.566513333 GH2 3.566120000 GH2	1.000 MHz 1.000 MHz 1.000 MHz 300,0 kHz 300,0 kHz 300,0 kHz 300,0 kHz 1.000 MHz	3.5300 GHz 3.5400 GHz 3.5490 GHz 3.5500 GHz 3.5650 GHz 3.5660 GHz 3.5750 GHz	Start Freq 3.5100 GHz 3.5300 GHz 3.5490 GHz 3.5500 GHz 3.5660 GHz 3.5660 GHz	Range 1 2 3 4 5 6 7	Ant 3.510 GH

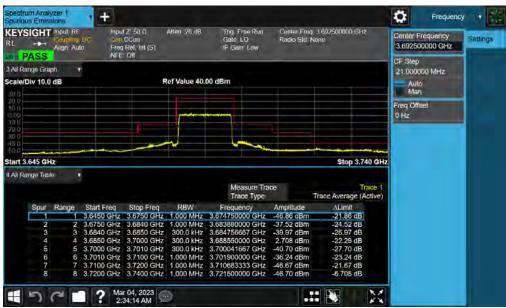
Plot 7-56. Channel - Sub Ant Edge Plot (LTE Band 48 - 15MHz QPSK - Low Channel - Sub Ant)

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© 2023 ELEMENT		·	V11.0 9/14/2022	



RL	rum Analyzer - Spurio RF 50 Ω			SENSE:INT r Freq: 3.62500000 Free Run	ALIGN AUTO D GHz	12:18:48 AM Feb 21, 2023 Radio Std: None	Frequency
ASS	Gate: LO	IFGain:Lov		n: 26 dB		Radio Device: BTS	
0 dB/div	Ref 30.00	dBm					
.og	Rel JU.00	авт					
20.0							Center Fre
10.0							3.625000000 G
100							
0.0							
0.0							
30.0		ال خونين	h and here		after, ser		
10.0	الم المعالمين الم		ali da segunda		Martin Martin and Andrew Martin	Wester.	
io.o	The second se	lt. effluers				and the second s	
A CONTRACTOR OF THE OWNER	Scott Hilling .						
50.0							
tart 3.578	GHZ					Stop 3.673 GHz	
	<u> </u>						CF Ste 20.000000 M
Dur Dang	Start Ered	Stop Fred	DBW	Frequency	Amplitude	A Limit	Auto M
Spur Rang		Stop Freq	RBW	Frequency	Amplitude	Δ Limit	Auto M
1	3.5775 GHz	3.6025 GHz	1.000 MHz	3.598291667 GHz	2 -35.76 dBm	-10.76 dB	
1			1.000 MHz 1.000 MHz		2 -35.76 dBm 2 -29.58 dBm		Freq Offs
1 2 3	3.5775 GHz 3.6025 GHz	3.6025 GHz 3.6165 GHz	1.000 MHz 1.000 MHz 300.0 kHz	3.598291667 GH 3.615403333 GH	<ul> <li>-35.76 dBm</li> <li>-29.58 dBm</li> <li>-30.68 dBm</li> </ul>	-10.76 dB -16.58 dB	Freq Offs
1 2 3 4	3.5775 GHz 3.6025 GHz 3.6165 GHz	3.6025 GHz 3.6165 GHz 3.6175 GHz	1.000 MHz 1.000 MHz 300.0 kHz 300.0 kHz	3.598291667 GH 3.615403333 GH 3.617491667 GH	<ul> <li>-35.76 dBm</li> <li>-29.58 dBm</li> <li>-30.68 dBm</li> <li>5.825 dBm</li> </ul>	-10.76 dB -16.58 dB -17.68 dB	Freq Offs
1 2 3 4	3.5775 GHz 3.6025 GHz 3.6165 GHz 3.6175 GHz	3.6025 GHz 3.6165 GHz 3.6175 GHz 3.6325 GHz	1.000 MHz           1.000 MHz           300.0 kHz           300.0 kHz           300.0 kHz	3.598291667 GHz 3.615403333 GHz 3.617491667 GHz 3.621550000 GHz	<ul> <li>-35.76 dBm</li> <li>-29.58 dBm</li> <li>-30.68 dBm</li> <li>5.825 dBm</li> <li>-32.90 dBm</li> </ul>	-10.76 dB -16.58 dB -17.68 dB -19.18 dB	Auto M Freq Offs 01
1 2 3 4 5	3.5775 GHz 3.6025 GHz 3.6165 GHz 3.6175 GHz 3.6325 GHz	3.6025 GHz 3.6165 GHz 3.6175 GHz 3.6325 GHz 3.6335 GHz	1.000 MHz           1.000 MHz           300.0 KHz           300.0 kHz           300.0 kHz           1.000 MHz	3.598291667 GH; 3.615403333 GH; 3.617491667 GH; 3.621550000 GH; 3.632506667 GH;	<ul> <li>-35.76 dBm</li> <li>-29.58 dBm</li> <li>-30.68 dBm</li> <li>5.825 dBm</li> <li>-32.90 dBm</li> <li>-31.68 dBm</li> </ul>	-10.76 dB -16.58 dB -17.68 dB -19.18 dB -19.90 dB	Freq Offs
1 2 3 4 5 6	3.5775 GHz 3.6025 GHz 3.6165 GHz 3.6175 GHz 3.6325 GHz 3.6335 GHz	3.6025 GHz 3.6165 GHz 3.6175 GHz 3.6325 GHz 3.6335 GHz 3.6475 GHz	1.000 MHz           1.000 MHz           300.0 KHz           300.0 kHz           300.0 kHz           1.000 MHz	3.598291667 GH; 3.615403333 GH; 3.617491667 GH; 3.621550000 GH; 3.632506667 GH; 3.634970000 GH;	<ul> <li>-35.76 dBm</li> <li>-29.58 dBm</li> <li>-30.68 dBm</li> <li>5.825 dBm</li> <li>-32.90 dBm</li> <li>-31.68 dBm</li> </ul>	-10.76 dB -16.58 dB -17.68 dB -19.18 dB -19.90 dB -18.68 dB	Freq Offs
1 2 3 4 5 6	3.5775 GHz 3.6025 GHz 3.6165 GHz 3.6175 GHz 3.6325 GHz 3.6335 GHz	3.6025 GHz 3.6165 GHz 3.6175 GHz 3.6325 GHz 3.6335 GHz 3.6475 GHz	1.000 MHz           1.000 MHz           300.0 KHz           300.0 kHz           300.0 kHz           1.000 MHz	3.598291667 GH; 3.615403333 GH; 3.617491667 GH; 3.621550000 GH; 3.632506667 GH; 3.634970000 GH;	<ul> <li>-35.76 dBm</li> <li>-29.58 dBm</li> <li>-30.68 dBm</li> <li>5.825 dBm</li> <li>-32.90 dBm</li> <li>-31.68 dBm</li> </ul>	-10.76 dB -16.58 dB -17.68 dB -19.18 dB -19.90 dB -18.68 dB	Freq Offs

Plot 7-57. Channel - Sub Ant Edge Plot (LTE Band 48 - 15MHz QPSK - Mid Channel - Sub Ant)



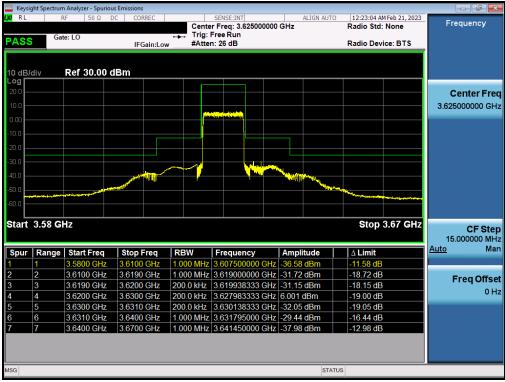
Plot 7-58. Channel - Sub Ant Edge Plot (LTE Band 48 - 15MHz QPSK - High Channel - Sub Ant)

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ASS		F 50 Ω e: LO	DC CORREC	+++ Trig:	SENSE:INT r Freq: 3.555000000 Free Run n: 26 dB	ALIGN AUTO I <b>GHz</b>	12:23:38 AM Feb 21, 2023 Radio Std: None Radio Device: BTS	Frequency
0 dBi .og <b>F</b>	/div	Ref 30.00	dBm					
20.0								Center Fre 3.555000000 GH
0.00 - 10.0 -								
20.0								
			1 Januar			New York of the local data		
40.0						And International Party of the International Par		
40.0 50.0 - 50.0 -						Autility and a starting the start	Non and the second	
50.0 50.0	3.51 G	ingeneration 1z					Stop 3.6 GHz	
50.0 50.0		1z Start Freq	Stop Freq	RBW	Frequency	Amplitude	Stop 3.6 GHz	<b>CF St</b> e 15.000000 MH <u>Auto</u> Ma
50.0 50.0 Start			<b>Stop Freq</b> 3.5300 GHz		7 Frequency 3.529666667 GHz			15.00000 Mi
50.0 50.0 Start	Range	Start Freq		1.000 MHz		-48.65 dBm	∆ Limit	15.000000 MI <u>Auto</u> Mi
50.0 50.0 Start	Range	Start Freq 3.5100 GHz	3.5300 GHz	1.000 MHz 1.000 MHz	3.529666667 GHz	-48.65 dBm -36.20 dBm	Δ Limit -8.648 dB	15.000000 Mi <u>Auto</u> Mi Freq Offs
50.0 50.0 Start	Range 1 2 3	<b>Start Freq</b> 3.5100 GHz 3.5300 GHz	3.5300 GHz 3.5400 GHz	1.000 MHz 1.000 MHz 1.000 MHz	3.529666667 GHz 3.537533333 GHz	-48.65 dBm -36.20 dBm -30.13 dBm	Δ Limit -8.648 dB -11.20 dB	15.000000 MI <u>Auto</u> M Freq Offs
50.0 50.0 5tart Spur	Range           1           2           3           4	<b>Start Freq</b> 3.5100 GHz 3.5300 GHz 3.5400 GHz	3.5300 GHz 3.5400 GHz 3.5490 GHz	1.000 MHz 1.000 MHz 1.000 MHz 200.0 kHz	3.529666667 GHz 3.537533333 GHz 3.549000000 GHz	-48.65 dBm -36.20 dBm -30.13 dBm -30.58 dBm	Δ Limit -8.648 dB -11.20 dB -17.13 dB	15.000000 MI <u>Auto</u> M Freq Offs
50.0 50.0 Start Spur	Range 1 2 3 4 5	<b>Start Freq</b> 3.5100 GHz 3.5300 GHz 3.5400 GHz 3.5490 GHz	3.5300 GHz 3.5400 GHz 3.5490 GHz 3.5500 GHz	1.000 MHz           1.000 MHz           1.000 MHz           200.0 KHz           200.0 KHz	3.529666667 GHz 3.537533333 GHz 3.549000000 GHz 3.549916667 GHz	-48.65 dBm -36.20 dBm -30.13 dBm -30.58 dBm 6.446 dBm	Δ Limit -8.648 dB -11.20 dB -17.13 dB -17.58 dB	15.000000 Mi <u>Auto</u> Mi Freq Offs
50.0 <b>-</b> 50.0 <b>-</b> 5tart Spur	Range           1           2           3           4           5           6	<b>Start Freq</b> 3.5100 GHz 3.5300 GHz 3.5400 GHz 3.5490 GHz 3.5500 GHz	3.5300 GHz           3.5400 GHz           3.5490 GHz           3.5500 GHz           3.5500 GHz           3.5600 GHz	1.000 MHz           1.000 MHz           1.000 MHz           2.000 MHz           200.0 kHz           200.0 kHz           200.0 kHz	3.529666667 GHz 3.537533333 GHz 3.549000000 GHz 3.549916667 GHz 3.551300000 GHz	-48.65 dBm -36.20 dBm -30.13 dBm -30.58 dBm 6.446 dBm -30.40 dBm	Δ Limit -8.648 dB -11.20 dB -17.13 dB -17.58 dB -18.55 dB	15.000000 MI <u>Auto</u> M Freq Offs
50.0 <b>-</b> 50.0 <b>-</b> 5tart Spur	Range           1           2           3           4           5           6	<b>Start Freq</b> 3.5100 GHz 3.5300 GHz 3.5400 GHz 3.5490 GHz 3.5500 GHz 3.5600 GHz	3.5300 GHz           3.5400 GHz           3.5490 GHz           3.5500 GHz           3.5600 GHz           3.5600 GHz           3.5610 GHz	1.000 MHz           1.000 MHz           1.000 MHz           200.0 KHz           200.0 kHz           200.0 kHz           1.000 MHz	3.529666667 GHz 3.537533333 GHz 3.549000000 GHz 3.549916667 GHz 3.551300000 GHz 3.560115000 GHz	-48.65 dBm           -36.20 dBm           -30.13 dBm           -30.58 dBm           6.446 dBm           -30.40 dBm	Δ Limit -8.648 dB -11.20 dB -17.13 dB -17.58 dB -18.55 dB -17.40 dB	15.000000 MI <u>Auto</u> Mi

Plot 7-59. Channel - Sub Ant Edge Plot (LTE Band 48 - 10MHz QPSK - Low Channel - Sub Ant)



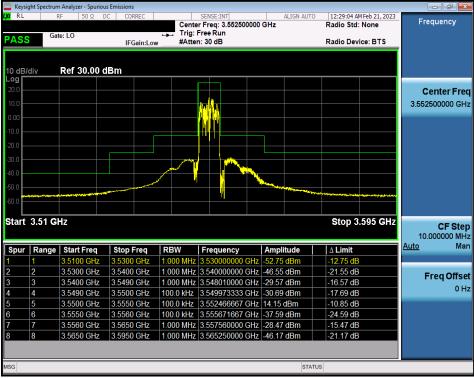
Plot 7-60. Channel - Sub Ant Edge Plot (LTE Band 48 - 10MHz QPSK - Mid Channel - Sub Ant)

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			us Emissions						
X/RL	R	¥F 50 Ω	DC CORREC	Cente	SENSE:INT r Freq: 3.69500000	ALIGN AUTO	12:25:03 AM Fe Radio Std: No		Frequency
	Gat	te: LO		+++ Trig:	Free Run				
PAS	s		IFGain:Lov	v #Atter	n: 26 dB		Radio Device	BTS	
10 dB	/div	Ref 40.00	dBm						
Log									
30.0									Center Fre
20.0									3.695000000 GH
10.0									
0.00				<u>,</u>					
-10.0									
-20.0									
-30.0									
-30.0				All more and all		<u>.</u>			
-40.0			Mark Mark	~~ <u>"</u>					
-40.0			Sala and a state of the state o				Mining		
	والارتباعية والارتباع						March		
-40.0 -50.0	3.65 GI	HZ					Stop 3.	74 GHz	05.010
-40.0 -50.0	3.65 GI	han a state of the					Stop 3.7	74 GHz	
-40.0 - -50.0 - Start			Stop Freg	RBW	Frequency	Amplitude		74 GHz	15.000000 MH
-40.0 -50.0	Range	Start Freq	<b>Stop Freq</b> 3 6800 GHz	<b>RBW</b>   1 000 MHz	Frequency 3 678300000 GHz	Amplitude	∆ Limit	74 GHz	15.000000 MH
-40.0 - -50.0 - Start Spur 1	Range		<b>Stop Freq</b> 3.6800 GHz 3.6890 GHz	1.000 MHz	Frequency 3.678300000 GHz 3.683600000 GHz	-36.22 dBm		74 GHz	
-40.0 - -50.0 - Start Spur 1 2	Range 1 2	Start Freq 3.6500 GHz	3.6800 GHz	1.000 MHz 1.000 MHz	3.678300000 GHz	-36.22 dBm -31.47 dBm	Δ Limit -11.22 dB	74 GHz	15.000000 MH <u>Auto</u> Ma <b>Freq Offse</b>
-40.0 - -50.0 - Start Spur 1 2 3	Range           1           2           3	<b>Start Freq</b> 3.6500 GHz 3.6800 GHz	3.6800 GHz 3.6890 GHz	1.000 MHz 1.000 MHz 200.0 kHz	3.678300000 GHz 3.683600000 GHz	-36.22 dBm -31.47 dBm -32.25 dBm	Δ Limit -11.22 dB -18.47 dB	74 GHz	15.000000 MH <u>Auto</u> Ma <b>Freq Offs</b> e
-40.0 - -50.0 - Start Start 1 2 3 4	Range 1 2 3 4	<b>Start Freq</b> 3.6500 GHz 3.6800 GHz 3.6890 GHz	3.6800 GHz 3.6890 GHz 3.6900 GHz	1.000 MHz 1.000 MHz 200.0 kHz 200.0 kHz	3.678300000 GHz 3.683600000 GHz 3.689873333 GHz	-36.22 dBm -31.47 dBm -32.25 dBm 5.741 dBm	Δ Limit -11.22 dB -18.47 dB -19.25 dB	74 GHz	15.000000 MH <u>Auto</u> Ma <b>Freq Offse</b>
-40.0 - -50.0 - Start	Range 1 2 3 4 5	Start Freq           3.6500 GHz           3.6800 GHz           3.6890 GHz           3.6900 GHz	3.6800 GHz 3.6890 GHz 3.6900 GHz 3.7000 GHz	1.000 MHz           1.000 MHz           200.0 kHz           200.0 kHz           200.0 kHz	3.678300000 GHz 3.683600000 GHz 3.689873333 GHz 3.697666667 GHz	-36.22 dBm -31.47 dBm -32.25 dBm 5.741 dBm -31.17 dBm	Δ Limit -11.22 dB -18.47 dB -19.25 dB -19.26 dB	74 GHz	15.000000 MH <u>Auto</u> Ma <b>Freq Offs</b> e
-40.0 -50.0 Start Start 2 3 4 5 6 7	Range           1           2           3           4           5           6           7	<b>Start Freq</b> 3.6500 GHz 3.6800 GHz 3.6890 GHz 3.6900 GHz 3.7000 GHz 3.7010 GHz 3.7100 GHz	3.6800 GHz 3.6890 GHz 3.6900 GHz 3.7000 GHz 3.7010 GHz 3.7100 GHz 3.7200 GHz	1.000 MHz           1.000 MHz           200.0 kHz           200.0 kHz           200.0 kHz           1.000 MHz           1.000 MHz           1.000 MHz	3.678300000 GHz 3.683600000 GHz 3.689873333 GHz 3.697666667 GHz 3.700036667 GHz 3.701315000 GHz 3.711633333 GHz	-36.22 dBm -31.47 dBm -32.25 dBm 5.741 dBm -31.17 dBm -28.88 dBm -35.83 dBm	Δ Limit -11.22 dB -19.25 dB -19.26 dB -19.26 dB -18.17 dB -15.88 dB -10.83 dB	74 GHz	15.000000 MH <u>Auto</u> Ma <b>Freq Offse</b>
-40.0 - -50.0 - Start Start 2 3 4 5	Range           1           2           3           4           5           6           7	<b>Start Freq</b> 3.6500 GHz 3.6800 GHz 3.6890 GHz 3.6900 GHz 3.7000 GHz 3.7010 GHz	3.6800 GHz           3.6890 GHz           3.6900 GHz           3.7000 GHz           3.7010 GHz           3.7100 GHz	1.000 MHz           1.000 MHz           200.0 kHz           200.0 kHz           200.0 kHz           1.000 MHz           1.000 MHz           1.000 MHz	3.678300000 GHz 3.683600000 GHz 3.689873333 GHz 3.697666667 GHz 3.700036667 GHz 3.701315000 GHz	-36.22 dBm -31.47 dBm -32.25 dBm 5.741 dBm -31.17 dBm -28.88 dBm -35.83 dBm	△ Limit -11.22 dB -18.47 dB -19.25 dB -19.26 dB -18.17 dB -15.88 dB	74 GHz	15.000000 MH
-40.0 -50.0 Start Start 1 2 3 4 5 6 7	Range           1           2           3           4           5           6           7	<b>Start Freq</b> 3.6500 GHz 3.6800 GHz 3.6890 GHz 3.6900 GHz 3.7000 GHz 3.7010 GHz 3.7100 GHz	3.6800 GHz 3.6890 GHz 3.6900 GHz 3.7000 GHz 3.7010 GHz 3.7100 GHz 3.7200 GHz	1.000 MHz           1.000 MHz           200.0 kHz           200.0 kHz           200.0 kHz           1.000 MHz           1.000 MHz           1.000 MHz	3.678300000 GHz 3.683600000 GHz 3.689873333 GHz 3.697666667 GHz 3.700036667 GHz 3.701315000 GHz 3.711633333 GHz	-36.22 dBm -31.47 dBm -32.25 dBm 5.741 dBm -31.17 dBm -28.88 dBm -35.83 dBm	Δ Limit -11.22 dB -19.25 dB -19.26 dB -19.26 dB -18.17 dB -15.88 dB -10.83 dB	74 GHz	15.000000 MH <u>Auto</u> Ma <b>Freq Offs</b> e
-40.0 -50.0 Start Start 1 2 3 4 5 6 7	Range           1           2           3           4           5           6           7	<b>Start Freq</b> 3.6500 GHz 3.6800 GHz 3.6890 GHz 3.6900 GHz 3.7000 GHz 3.7010 GHz 3.7100 GHz	3.6800 GHz 3.6890 GHz 3.6900 GHz 3.7000 GHz 3.7010 GHz 3.7100 GHz 3.7200 GHz	1.000 MHz           1.000 MHz           200.0 kHz           200.0 kHz           200.0 kHz           1.000 MHz           1.000 MHz           1.000 MHz	3.678300000 GHz 3.683600000 GHz 3.689873333 GHz 3.697666667 GHz 3.700036667 GHz 3.701315000 GHz 3.711633333 GHz	-36.22 dBm -31.47 dBm -32.25 dBm 5.741 dBm -31.17 dBm -28.88 dBm -35.83 dBm	Δ Limit -11.22 dB -18.47 dB -19.25 dB -19.26 dB -18.17 dB -15.88 dB -10.83 dB -5.277 dB	74 GHz	15.000000 M⊦ <u>Auto</u> Ma <b>Freq Offs</b> e

Plot 7-61. Channel - Sub Ant Edge Plot (LTE Band 48 - 10MHz QPSK - High Channel - Sub Ant)



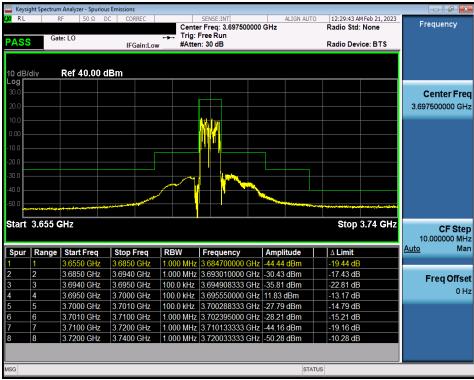
Plot 7-62. Channel - Sub Ant Edge Plot (LTE Band 48 - 5MHz QPSK - Low Channel - Sub Ant)

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RL		n Analyzer - Spurio RF 50 Ω		Cente	SENSE:INT	ALIGN AUTO	12:27:42 AM Feb 21, 2023 Radio Std: None	Frequency
PASS	Gat	te: LO	IFGain:Lov	Trig:	Free Run 1: 28 dB	G112	Radio Device: BTS	
I0 dB/	div	Ref 30.00	dBm					
- <b>og</b> 20.0								<b>Center Fre</b> 3.625000000 GH
0.00								
30.0				A CONTRACTOR OF THE OWNER				
50.0 60.0			and a second			The state of the s	······	
Start	3.583 G	GHz					Stop 3.668 GHz	CF Ste 10.000000 MH
					1			
Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	∆ Limit	<u>Auto</u> Ma
Spur		Start Freq 3.5825 GHz	Stop Freq 3.6175 GHz		Frequency 3.617150000 GHz		∆ Limit -9.678 dB	Auto Ma
	1			1.000 MHz		-34.68 dBm		
2	1 2	3.5825 GHz	3.6175 GHz	1.000 MHz 1.000 MHz	3.617150000 GHz	-34.68 dBm -26.18 dBm	-9.678 dB	Freq Offs
	1 2 3	3.5825 GHz 3.6175 GHz	3.6175 GHz 3.6215 GHz	1.000 MHz 1.000 MHz 100.0 kHz	3.617150000 GHz 3.621340000 GHz	-34.68 dBm -26.18 dBm -27.16 dBm	-9.678 dB -13.18 dB	Freq Offs
• • • •	1 2 3 4	3.5825 GHz 3.6175 GHz 3.6215 GHz	3.6175 GHz 3.6215 GHz 3.6225 GHz	1.000 MHz 1.000 MHz 100.0 kHz 100.0 kHz	3.617150000 GHz 3.621340000 GHz 3.622086667 GHz	-34.68 dBm -26.18 dBm -27.16 dBm 12.99 dBm	-9.678 dB -13.18 dB -14.16 dB	Freq Offs
• • • •	1 2 3 4 5	3.5825 GHz 3.6175 GHz 3.6215 GHz 3.6225 GHz	3.6175 GHz 3.6215 GHz 3.6225 GHz 3.6275 GHz	1.000 MHz           1.000 MHz           100.0 kHz           100.0 kHz           100.0 kHz	3.617150000 GHz 3.621340000 GHz 3.622086667 GHz 3.625608333 GHz	-34.68 dBm -26.18 dBm -27.16 dBm 12.99 dBm -30.17 dBm	-9.678 dB -13.18 dB -14.16 dB -12.01 dB	Freq Offs
<b>Spur</b> 2 3 4 5 5 7	1 2 3 4 5 6	3.5825 GHz 3.6175 GHz 3.6215 GHz 3.6225 GHz 3.6275 GHz	3.6175 GHz 3.6215 GHz 3.6225 GHz 3.6275 GHz 3.6285 GHz	1.000 MHz           1.000 MHz           100.0 KHz           100.0 kHz           100.0 kHz           100.0 kHz           100.0 kHz	3.617150000 GHz 3.621340000 GHz 3.622086667 GHz 3.625608333 GHz 3.627980000 GHz	-34.68 dBm -26.18 dBm -27.16 dBm 12.99 dBm -30.17 dBm -27.21 dBm	-9.678 dB -13.18 dB -14.16 dB -12.01 dB -17.17 dB	Freq Offs
2 3 1	1 2 3 4 5 6	3.5825 GHz 3.6175 GHz 3.6215 GHz 3.6225 GHz 3.6275 GHz 3.6285 GHz	3.6175 GHz 3.6215 GHz 3.6225 GHz 3.6275 GHz 3.6285 GHz 3.6325 GHz	1.000 MHz           1.000 MHz           100.0 KHz           100.0 kHz           100.0 kHz           100.0 kHz           100.0 kHz	3.617150000 GHz 3.621340000 GHz 3.622086667 GHz 3.625608333 GHz 3.627980000 GHz 3.629186667 GHz	-34.68 dBm -26.18 dBm -27.16 dBm 12.99 dBm -30.17 dBm -27.21 dBm	-9.678 dB           -13.18 dB           -14.16 dB           -12.01 dB           -17.17 dB           -14.21 dB	Auto Mi Freq Offs 0 ł

Plot 7-63. Channel - Sub Ant Edge Plot (LTE Band 48 - 5MHz QPSK - Mid Channel - Sub Ant)



Plot 7-64. Channel - Sub Ant Edge Plot (LTE Band 48 - 5MHz QPSK - High Channel - Sub Ant)

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# 7.6 Radiated Power (EIRP)

### **Test Overview**

Equivalent Isotropic Radiated Power (EIRP) measurements are performed using the substitution method described in ANSI C63.26-2015 with the EUT transmitting into an integral antenna. Measurements are performed using vertically and horizontally polarized broadband horn antennas. All measurements are performed as RMS average measurements while the EUT is operating at maximum power, and at the appropriate frequencies.

### Test Procedures Used

ANSI C63.26-2015 - Section 5.2.4.4

### Test Settings

- 1. Radiated power measurements are performed using the signal analyzer's "channel power" measurement capability for signals with continuous operation.
- 2. RBW = 1 5% of the expected OBW
- 3. VBW  $\geq$  3 x RBW
- 4. Span = 1.5 times the OBW
- 5. No. of sweep points  $\geq$  2 x span / RBW
- 6. Detector = RMS
- 7. Trigger is set to "free run" for signals with continuous operation with the sweep times set to "auto". Trigger is set to enable triggering only on full power bursts with the sweep time set less than or equal to the transmission burst duration.
- 8. The integration bandwidth was set equal to 10MHz. For signals with burst transmission, the "gating" function was enabled to ensure that measurements are performed during times in which the transmitter is operating at its maximum power.
- 9. Trace mode = trace averaging (RMS) over 100 sweeps
- 10. The trace was allowed to stabilize.

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### Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.

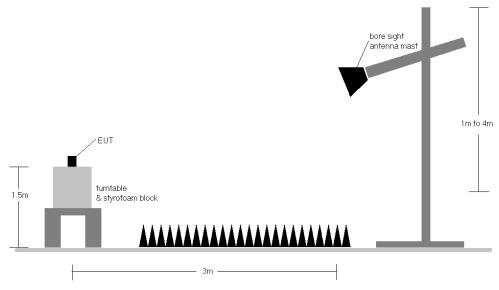


Figure 7-5. Radiated Test Setup >1GHz

### Test Notes

- 1) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the tables below.
- 2) This unit was tested with its standard battery.
- 3) The worst case EIRP shown in this section is found with LTE operating only using 1RB. As such, the EIRP/10MHz and full channel EIRP values will be identical since 1RB is fully contained within all available channel bandwidths for LTE Band 48 (i.e. 5, 10, 15, 20MHz).

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Bandwidth	Mod.	Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Ant. Gain [dBi]	RB Size/Offset	Substitute Level [dBm]	EIRP [dBm/10MHz]	EIRP [Watts/10MHz]	EIRP Limit [dBm/10MHz]	Margin [dB]
	QPSK	3560.00	н	102	25	7.37	1 / 99	12.67	20.04	0.101	23.00	-2.96
N	QPSK	3625.00	Н	103	18	6.77	1 / 99	14.14	20.91	0.123	23.00	-2.09
MHz	QPSK	3690.00	Н	103	26	6.15	1/0	13.92	20.07	0.102	23.00	-2.93
20 1	16-QAM	3560.00	Н	102	25	7.37	1 / 50	12.07	19.44	0.088	23.00	-3.56
2	16-QAM	3625.00	Н	103	18	6.77	1 / 99	13.39	20.16	0.104	23.00	-2.84
	16-QAM	3690.00	Н	103	26	6.15	1/0	13.31	19.46	0.088	23.00	-3.54
	QPSK	3557.50	Н	102	25	7.40	1/9	12.59	19.99	0.100	23.00	-3.01
N	QPSK	3625.00	Н	103	18	6.77	1/9	14.69	21.46	0.140	23.00	-1.54
H	QPSK	3692.50	Н	103	26	6.12	1 / 28	13.99	20.11	0.102	23.00	-2.89
15 MHz	16-QAM	3557.50	Н	102	25	7.40	1/9	11.60	19.00	0.080	23.00	-4.00
-	16-QAM	3625.00	Н	103	18	6.77	1 / 28	13.43	20.20	0.105	23.00	-2.80
	16-QAM	3692.50	Н	103	26	6.12	1 / 28	12.59	18.71	0.074	23.00	-4.29
	QPSK	3555.00	Н	102	25	7.43	1 / 12	12.52	19.94	0.099	23.00	-3.06
N	QPSK	3625.00	Н	103	18	6.77	1 / 17	14.38	21.15	0.130	23.00	-1.85
H	QPSK	3695.00	Н	103	26	6.09	1 / 17	13.75	19.85	0.096	23.00	-3.15
10 MHz	16-QAM	3555.00	Н	102	25	7.43	1 / 12	11.67	19.09	0.081	23.00	-3.91
<u> </u>	16-QAM	3625.00	Н	103	18	6.77	1 / 17	13.65	20.42	0.110	23.00	-2.58
	16-QAM	3695.00	Н	103	26	6.09	1 / 17	12.65	18.75	0.075	23.00	-4.25
	QPSK	3552.50	Н	102	25	7.45	1/5	12.55	20.00	0.100	23.00	-3.00
N	QPSK	3625.00	Н	103	18	6.77	1/5	14.35	21.12	0.129	23.00	-1.88
Ë	QPSK	3697.50	Н	103	26	6.06	1/3	13.73	19.80	0.095	23.00	-3.20
5 MHz	16-QAM	3552.50	Н	102	25	7.45	1/5	11.88	19.33	0.086	23.00	-3.67
	16-QAM	3625.00	Н	103	18	6.77	1/5	13.34	20.11	0.103	23.00	-2.89
	16-QAM	3697.50	Н	103	26	6.06	1/3	12.98	19.05	0.080	23.00	-3.95
20 MHz	QPSK (WCP)	3625.00	Н	102	343	6.77	1 / 99	9.38	16.15	0.041	23.00	-6.85

Table 7-5. EIRP Data (LTE Band 48 – Main Ant)

Bandwidth	Mod.	Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Ant. Gain [dBi]	RB Size/Offset	Substitute Level [dBm]	EIRP [dBm/10MHz]	EIRP [Watts/10MHz]	EIRP Limit [dBm/10MHz]	Margin [dB]
	QPSK	3560.00	Н	218	15	7.37	1/0	10.27	17.64	0.058	23.00	-5.36
N	QPSK	3625.00	Н	169	360	6.77	1/0	10.08	16.85	0.048	23.00	-6.15
Ē	QPSK	3690.00	Н	159	353	6.15	1 / 50	10.70	16.85	0.048	23.00	-6.15
20 MHz	16-QAM	3560.00	Н	218	15	7.37	1 / 50	9.53	16.90	0.049	23.00	-6.10
3	16-QAM	3625.00	Н	169	360	6.77	1 / 50	9.40	16.17	0.041	23.00	-6.83
	16-QAM	3690.00	Н	159	353	6.15	1 / 50	10.09	16.24	0.042	23.00	-6.76
	QPSK	3557.50	Н	218	15	7.40	1/37	10.31	17.71	0.059	23.00	-5.29
N	QPSK	3625.00	Н	169	360	6.77	1/74	10.24	17.01	0.050	23.00	-5.99
Ē	QPSK	3692.50	Н	159	353	6.12	1/37	10.66	16.78	0.048	23.00	-6.22
15 MHz	16-QAM	3557.50	Н	218	15	7.40	1/37	9.27	16.67	0.046	23.00	-6.33
~	16-QAM	3625.00	Н	169	360	6.77	1/74	9.14	15.91	0.039	23.00	-7.09
	16-QAM	3692.50	Н	159	353	6.12	1/37	10.43	16.55	0.045	23.00	-6.45
	QPSK	3555.00	Н	218	15	7.43	1/49	10.58	18.00	0.063	23.00	-5.00
N	QPSK	3625.00	Н	169	360	6.77	1/49	10.33	17.10	0.051	23.00	-5.90
10 MHz	QPSK	3695.00	Н	159	353	6.09	1/0	10.98	17.08	0.051	23.00	-5.92
0	16-QAM	3555.00	Н	218	15	7.43	1/49	9.68	17.10	0.051	23.00	-5.90
~	16-QAM	3625.00	Н	169	360	6.77	1/49	9.47	16.24	0.042	23.00	-6.76
	16-QAM	3695.00	Н	159	353	6.09	1/0	10.81	16.91	0.049	23.00	-6.09
	QPSK	3552.50	Н	218	15	7.45	1/12	10.56	18.01	0.063	23.00	-4.99
N	QPSK	3625.00	Н	169	360	6.77	1/12	10.44	17.21	0.053	23.00	-5.79
5 MHz	QPSK	3697.50	Н	159	353	6.06	1/24	10.88	16.95	0.049	23.00	-6.05
2	16-QAM	3552.50	Н	218	15	7.45	1/12	9.40	16.85	0.048	23.00	-6.15
	16-QAM	3625.00	Н	169	360	6.77	1/12	9.43	16.20	0.042	23.00	-6.80
	16-QAM	3697.50	Н	159	353	6.06	1/24	10.57	16.64	0.046	23.00	-6.36
20 MHz	QPSK (WCP)	3560.00	Н	198	314	7.37	1/0	6.08	13.45	0.022	23.00	-9.55

Table 7-6. EIRP Data (LTE Band 48 – Sub Ant)

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# 7.7 Radiated Spurious Emissions Measurements

### **Test Overview**

Radiated spurious emissions measurements are performed using the field strength conversion method described in ANSI C63.26-2015 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using hybrid (biconical/log) antennas. Measurements on signals operating above 1GHz are performed using vertically and horizontally polarized broadband horn antennas. All measurements are performed as RMS measurements while the EUT is operating at maximum power, and at the appropriate frequencies.

### **Test Procedures Used**

ANSI C63.26-2015 - Section 5.5.4

### Test Settings

- 1. RBW = 100kHz for emissions below 1GHz and 1MHz for emissions above 1GHz
- 2. VBW  $\geq$  3 x RBW
- 3. Span = 1.5 times the OBW
- 4. No. of sweep points  $\geq$  2 x span / RBW
- 5. Detector = RMS
- Trace mode = Max Hold (In cases where the level is within 2dB of the limit, the final measurement is taken using triggering/gating and trace averaging.)
- 7. The trace was allowed to stabilize

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The EUT and measurement equipment were set up as shown in the diagram below.

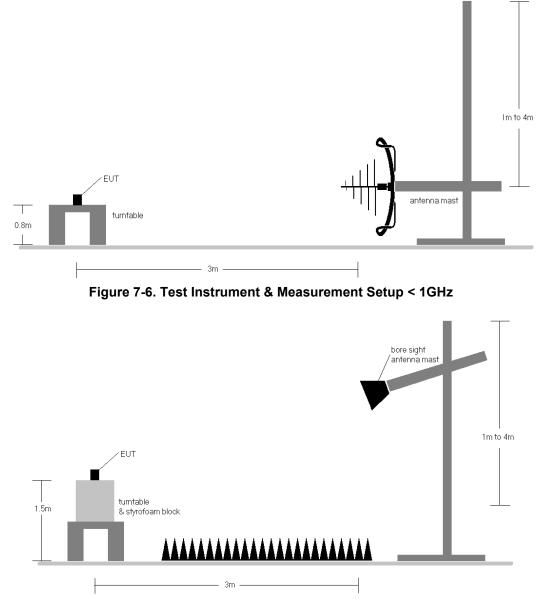


Figure 7-7. Test Instrument & Measurement Setup >1 GHz

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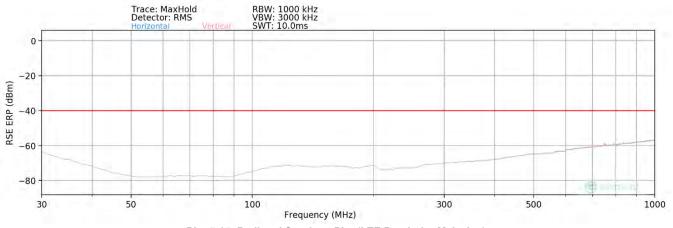
### Test Notes

- 1) Field strengths are calculated using the Measurement quantity conversions in ANSI C63.26-2015 Section 5.2.7:
  - a)  $E(dB\mu V/m) = Measured amplitude level (dBm) + 107 + Cable Loss (dB) + Antenna Factor (dB/m) b) EIRP (dBm) = E(dB\mu V/m) + 20logD 104.8; where D is the measurement distance in meters.$
- 2) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the tables below.
- 3) This unit was tested with its standard battery.
- 4) The spectrum is measured from 9kHz to the 10th harmonic of the fundamental frequency of the transmitter. The worst-case emissions are reported.
- 5) Emissions below 18GHz were measured at a 3-meter test distance while emissions above 18GHz were measured at a 1 meter test distance with the application of a distance correction factor.
- 6) The "-" shown in the following RSE tables are used to denote a noise floor measurement.

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# LTE Band 48 – Main Ant



### Plot 7-65. Radiated Spurious Plot (LTE Band 48 - Main Ant)

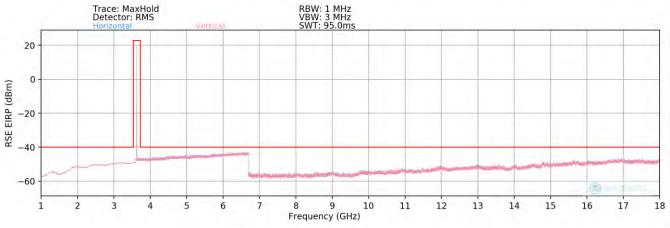
Bandwidth (MHz):	20
Frequency (MHz):	3690.0
Modulation Signal:	QPSK
RB Config (Size / Offset):	1 / 50

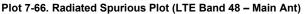
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	ERP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
225.00	V	-	-	-103.94	18.14	21.20	-76.21	-40.00	-36.21
750.00	V	-	-	-102.93	29.40	33.47	-63.94	-40.00	-23.94

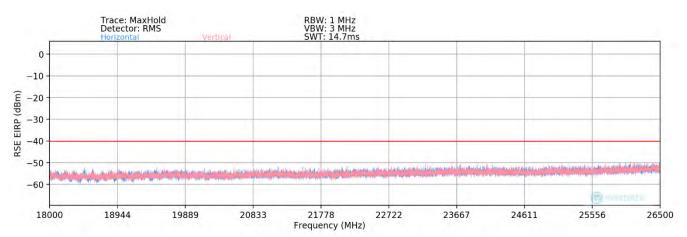
Table 7-7. Radiated Spurious Data (LTE Band 48 – High Channel - Main Ant)

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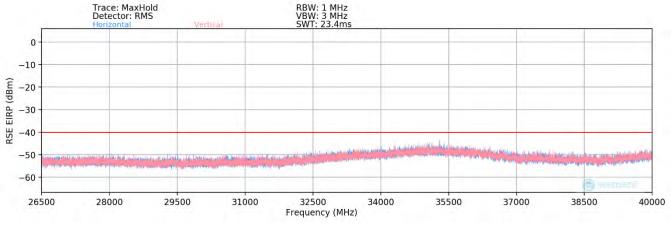














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Bandwidth (MHz):	20
Frequency (MHz):	3560.0
Modulation Signal:	QPSK
RB Config (Size / Offset):	1 / 50

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
7120.00	Н	-	-	-77.37	7.76	37.39	-57.86	-40.00	-17.86
10680.00	Н	283	190	-77.43	11.35	40.92	-54.34	-40.00	-14.34
14240.00	Н	-	-	-80.28	14.66	41.38	-53.88	-40.00	-13.88
17800.00	Н	-	-	-79.88	17.52	44.64	-50.61	-40.00	-10.61

Table 7-8. Radiated Spurious Data (LTE Band 48 – Low Channel - Main Ant)

Bandwidth (MHz):	20
Frequency (MHz):	3625.0
Modulation Signal:	QPSK
RB Config (Size / Offset):	1 / 50

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
7250.00	Н	-	-	-77.62	7.23	36.61	-58.65	-40.00	-18.65
10875.00	Н	-	-	-78.30	11.17	39.87	-55.39	-40.00	-15.39
14500.00	Н	-	-	-79.96	15.13	42.17	-53.09	-40.00	-13.09

Table 7-9. Radiated Spurious Data (LTE Band 48 – Mid Channel - Main Ant)

Bandwidth (MHz):	20
Frequency (MHz):	3690.0
Modulation Signal:	QPSK
RB Config (Size / Offset):	1 / 50

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
7380.00	Н	-	-	-77.77	7.92	37.15	-58.11	-40.00	-18.11
11070.00	Н	127	190	-74.64	11.47	43.83	-51.43	-40.00	-11.43
14760.00	Н	-	-	-80.07	15.88	42.81	-52.45	-40.00	-12.45

Table 7-10. Radiated Spurious Data (LTE Band 48 – High Channel - Main Ant)

Case:	w/ Wireless Charging Pad
Bandwidth (MHz):	20
Frequency (MHz):	3690.0
Modulation Signal:	QPSK
RB Config (Size / Offset):	1 / 50

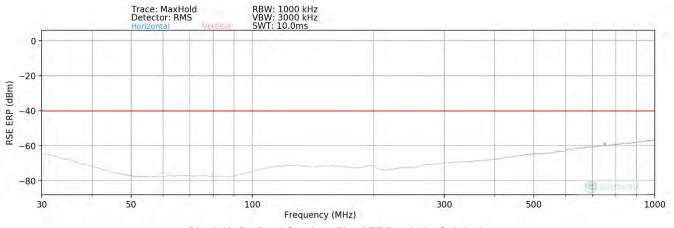
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
7380.00	Н	-	-	-77.61	7.92	37.31	-57.95	-40.00	-17.95
11070.00	Н	-	-	-78.85	11.47	39.62	-55.64	-40.00	-15.64
14760.00	H	-	-	-80.25	15.88	42.63	-52.63	-40.00	-12.63

Table 7-11. Radiated Spurious Data with WCP (LTE Band 48 – Main Ant)

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# LTE Band 48 – Sub Ant



#### Plot 7-69. Radiated Spurious Plot (LTE Band 48 - Sub Ant)

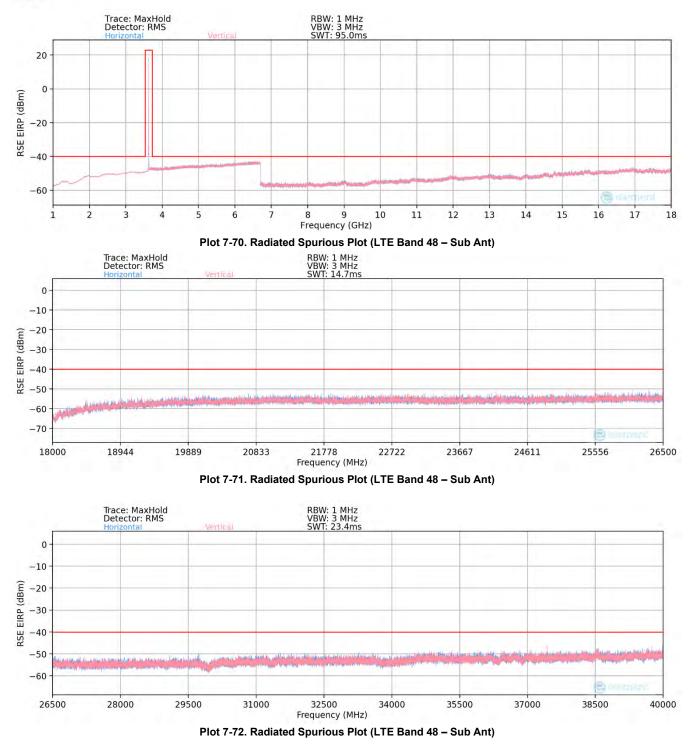
Bandwidth (MHz):	20
Frequency (MHz):	3690.0
Modulation Signal:	QPSK
RB Config (Size / Offset):	1 / 50

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	ERP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
62.00	V	142	150	-97.62	14.75	24.13	-73.28	-40.00	-33.28
80.00	V	-	-	-99.86	14.57	21.71	-75.70	-40.00	-35.70
747.80	V	-	-	-94.16	29.19	42.03	-55.38	-40.00	-15.38

Table 7-12. Radiated Spurious Data (LTE Band 48 – High Channel - Sub Ant)

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Bandwidth (MHz):	20
Frequency (MHz):	3560.0
Modulation Signal:	QPSK
RB Config (Size / Offset):	1 / 50

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
7120.00	V	-	-	-77.07	7.76	37.69	-57.56	-40.00	-17.56
10680.00	V	-	-	-79.39	11.35	38.96	-56.30	-40.00	-16.30
14240.00	V	-	-	-79.48	14.66	42.18	-53.08	-40.00	-13.08

Table 7-13. Radiated Spurious Data (LTE Band 48 – Low Channel - Sub Ant)

Bandwidth (MHz):	20
Frequency (MHz):	3625.0
Modulation Signal:	QPSK
RB Config (Size / Offset):	1 / 50

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
7250.00	V	-	-	-77.64	7.23	36.59	-58.67	-40.00	-18.67
10875.00	V	256	25	-76.75	11.17	41.42	-53.84	-40.00	-13.84
14500.00	V	-	-	-80.58	15.13	41.55	-53.71	-40.00	-13.71

Table 7-14. Radiated Spurious Data (LTE Band 48 - Mid Channel - Sub Ant)

Bandwidth (MHz):	20
Frequency (MHz):	3690.0
Modulation Signal:	QPSK
RB Config (Size / Offset):	1 / 50

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
7380.00	V	-	-	-77.63	7.92	37.29	-57.97	-40.00	-17.97
11070.00	V	259	26	-74.74	11.47	43.73	-51.53	-40.00	-11.53
14760.00	V	-	-	-80.17	15.88	42.71	-52.55	-40.00	-12.55

Table 7-15. Radiated Spurious Data (LTE Band 48 – High Channel - Sub Ant)

20
3690.0
QPSK
1 / 50

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
7380.00	V	-	-	-77.73	7.92	37.19	-58.07	-40.00	-18.07
11070.00	V	243	185	-75.32	11.47	43.15	-52.11	-40.00	-12.11
14760.00	V	-	-	-80.34	15.88	42.54	-52.72	-40.00	-12.72

Table 7-16. Radiated Spurious Data (LTE Band 48 – High Channel - Sub Ant) – With WCP

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# 7.8 Frequency Stability / Temperature Variation

### **Test Overview and Limit**

Frequency stability testing is performed in accordance with the guidelines of ANSI C63.26-2015. The frequency stability of the transmitter is measured by:

- a.) **Temperature:** The temperature is varied from -30°C to +50°C in 10°C increments using an environmental chamber.
- b.) **Primary Supply Voltage:** The primary supply voltage is varied from 85% to 115% of the nominal value for non hand-carried battery and AC powered equipment. For hand-carried, battery-powered equipment, primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacturer.

# For Part 96, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

### Test Procedure Used

ANSI C63.26-2015 – Section 5.6

### Test Settings

- 1. The carrier frequency of the transmitter is measured at room temperature (20°C to provide a reference).
- 2. The equipment is turned on in a "standby" condition for fifteen minutes before applying power to the transmitter. Measurement of the carrier frequency of the transmitter is made within one minute after applying power to the transmitter.
- 3. Frequency measurements are made at 10°C intervals ranging from -30°C to +50°C. A period of at least one half-hour is provided to allow stabilization of the equipment at each temperature level.

### Test Setup

The EUT was connected via an RF cable to a spectrum analyzer with the EUT placed inside an environmental chamber.

### <u>Test Notes</u>

None

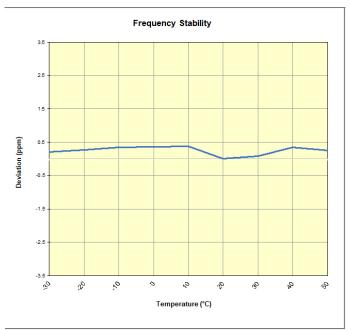
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# Frequency Stability / Temperature Variation

LTE Band 48									
	Operating Fre	quency (Hz):	3,625,00	00,000					
	Ref. Vo	ltage (VDC):	4.2	8					
Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)				
		- 30	3,625,000,840	761	0.0000210				
		- 20	3,625,001,047	968	0.0000267				
				- 10	3,625,001,335	1,256	0.0000347		
		0	3,625,001,405	1,326	0.0000366				
100 %	4.28	+ 10	3,625,001,455	1,375	0.0000379				
		+ 20 (Ref)	3,625,000,079	0	0.0000000				
		+ 30	3,625,000,386	306	0.000085				
	+ 40	3,625,001,354	1,275	0.0000352					
			3,625,001,025	946	0.0000261				
Battery Endpoint	3.69	+ 20	3,625,000,071	-9	-0.0000002				

Table 7-17. LTE Band 48 Frequency Stability Data



Plot 7-73. LTE Band 48 Frequency Stability Chart

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## 7.9 End User Device Additional Requirement (CBSD Protocol)

### Test Overview and Limit

End user device additional requirements (CBSD Protocol) are tested per the test procedures listed below. During testing, the EUT is connected to a certified CBSD (Ruckus FCC ID: S9GQ910US00) as a companion device to show compliance with Part 96.47.

End User Devices may operate only if they can positively receive and decode an authorization signal transmitted by a CBSD, including the frequencies and power limits for their operation.

An End User Device must discontinue operations, change frequencies, or change its operational power level within 10 seconds of receiving instructions from its associated CBSD.

### Test Procedure Used

KDB 940660 D01 v03, WINNF-TS-0122 V1.0.2

### Test Setup/Method

The EUT was connected via an RF cable to a certified CBSD and spectrum analyzer. The following procedure is performed by applying WINNF-TS-0122 CBRS CBSD Test Specification.

- 1. Run#1:
  - a. Setup WINNF.PT.C.HBT.1 with 3615MHz 3635MHz.
  - b. Enable AP service from Ruckus Cloud management.
  - c. Check EUT Tx frequency.
  - d. Disable AP service from Ruckus Cloud management and check EUT stop transmission within 10s.
- 2. Run#2:
  - a. Setup WINNF.PT.C.HBT.1 with 3660MHz 3680MHz.
  - b. Enable AP service from Ruckus Cloud management.
  - c. Check EUT Tx frequency.
  - d. Disable AP service from Ruckus Cloud management and check EUT stop transmission within 10s.

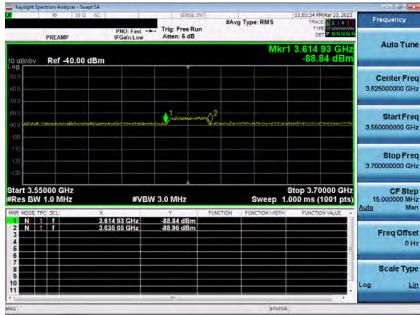
### Test Notes

The EUT is an End User Device.

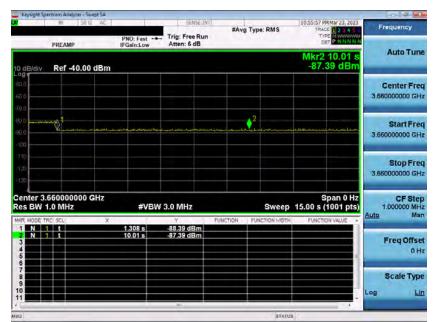
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## Run#1:



Plot 7-74. Run#1 End User Device Frequency of Operations



Plot 7-75. Run#1 End User Device Discontinues Operations within 10s

## Note:

Marker 1: CBSD sends instructions to discontinue LTE operations.

Marker 2: EUT discontinues operation.

Marker 3: 10 seconds elapsed time from CBSD sending instructions to EUT.

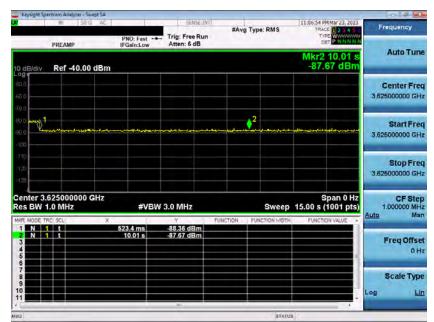
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# Run#2:

	PREAMP		AC	PNO: Fast		SENSE:	#Av	д Тур	e: RMS	TRU	PM Mar 23, 2023 CE 1 2 3 4 5 (PE 2 NNNNN)	Frequency
0 dB/div		10.00 d		( Gall. Low					Mkr		93 GHz 35 dBm	Auto Tu
og 31.0 50.0												Center Fr 3.625000000 G
<b>U</b> /0	lattoria	राजन्म-भूमेल्	utana	operation of the second	way by th	-145 months	ntreasures	And And	uluwym	2 Helensfran	artulorantipeta	Start Fr 3,55000000 G
110												Stop Fr 3.700000000 G
tart 3.55 Res BW	1.0 MH		x	#VB	W 3.0	MHz	FUNCTION	_	Sweep 1	.000 ms	0000 GHz (1001 pts)	CF Sto 15.000000 M Auto M
3 4 5	f			93 GHz 03 GHz		835 dBm 094 dBm						Freq Offs 0
6 7 8 9												Scale Typ
		_				AIII			STATU			

Plot 7-76. Run#2 End User Device Frequency of Operations



Plot 7-77. Run#2 End User Device Discontinues Operations within 10s

### Note:

Marker 1: CBSD sends instructions to discontinue LTE operations.

Marker 2: EUT discontinues operation.

Marker 3: 10 seconds elapsed time from CBSD sending instructions to EUT.

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# 8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **Sony Portable Handset FCC ID: PY7-84558E** complies with all of the End User Device requirements of Part 96 of the FCC Rules for LTE operation only.

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