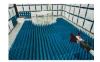


## PCTEST

7185 Oakland Mills Road, Columbia, MD 21046 USA Tel. 410.290.6652 / Fax 410.290.6654 http://www.pctest.com



# PART 96 MEASUREMENT REPORT NR Band n48

#### **Applicant Name:**

Samsung Electronics Co., Ltd. 129, Samsung-ro, Yeongtong-gu, Suwon-si Gyeonggi-do, 16677, Korea

# Date of Testing:

09/20 - 11/18/2021, 05/20/2022, 06/16 - 06/18/2022 **Test Report Issue Date:** 6/20/2022 **Test Site/Location:** PCTEST Lab. Columbia, MD, USA **Test Report Serial No.:** 1M2112090152-05.A3L

FCC ID:	A3LSMS908U				
APPLICANT:	Samsung Electronics Co., Ltd.				
Application Type:	Class II Permissive Change				
Model:	SM-S908U				
Additional Models:	SM-S908U1				
EUT Type:	Portable Handset				
FCC Classification:	Citizens Band End User Devices (CBE)				
FCC Rule Part(s):	96				
Test Procedure(s):	ANSI C63.26-2015, ANSI/TIA-603-E-2016, KDB 971168 D01 v03r01, KDB				
	940660 D01 v03, WINNF-18-IN-00178 v1.0.0.00, KDB 648474 D03 v01r04				
Class II Permissive Change:	Please see FCC Change Document				
Original Grant Date:	12/10/2021				

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.

**Randy Ortanez** President



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# **MEASUREMENT REPORT** FCC Part 96



			T., F.,	Ell	Emission	
Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	Max. Power [W]	Max. Power [dBm]	Emission Designator
		π/2 BPSK	3570.0 - 3680.0	0.118	20.73	35M9G7D
	40 MHz	QPSK	3560.0 - 3690.0	0.112	20.50	38M0G7D
		16QAM	3560.0 - 3690.0	0.083	19.17	37M9W7D
	30 MHz	π/2 BPSK	3565.0 - 3685.0	0.108	20.34	26M9G7D
		QPSK	3565.0 - 3685.0	0.102	20.07	27M9G7D
NR Band n48		16QAM	3565.0 - 3685.0	0.080	19.01	27M9W7D
	20 MHz	π/2 BPSK	3560.0 - 3690.0	0.098	19.93	18M0G7D
		QPSK	3560.0 - 3690.0	0.098	19.92	18M3G7D
		16QAM	3560.0 - 3690.0	0.075	18.75	18M3W7D
		π/2 BPSK	3555.0 - 3695.0	0.122	20.87	8M71G7D
	10MHz	QPSK	3555.0 - 3695.0	0.115	20.62	8M65G7D
		16QAM	3555.0 - 3695.0	0.077	18.84	8M62W7D
			EUT Overview			

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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#### INTRODUCTION 1.0

#### 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.

#### **PCTEST Test Location** 1.2

These measurement tests were conducted at the PCTEST facility 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 PCTEST located in Columbia, MD 21046, U.S.A.

- PCTEST is a OnGo Alliance Approved Test Lab (ATL)
- PCTEST is a WInnForum Approved Test Lab
- PCTEST is an ISO 17025-2017 accredited test facility under the American Association for Laboratory Accreditation (A2LA) with Certificate number 2041.01 for CBRS Alliance Certification Test Plan and WInnForum Conformance and Performance Test Technical Standard.
- PCTEST 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.
- PCTEST 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).
- PCTEST facility is a registered (2451B) test laboratory with the site description on file with ISED.

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#### **PRODUCT INFORMATION** 2.0

#### 2.1 Equipment Description

The Equipment Under Test (EUT) is the Samsung Portable Handset FCC ID:A3LSMS908U. The test data contained in this report pertains only to the emissions due to the EUT's NR Band n48 operation in the CBRS band. Per FCC Part 96, this device is evaluated under Citizens Band End User Devices (CBE).

Test Device Serial No.: 0351M, 1176M, 0335M, 0959M, 0389M, 0584M, 1283M

#### 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 and FR2), 802.11b/g/n/ax WLAN, 802.11a/n/ac/ax UNII (5GHz and 6GHz), Bluetooth (1x, EDR, LE), NFC, Wireless **Power Transfer** 

This device uses a tuner circuit that dynamically updates the antenna impedance parameters to optimize antenna performance for certain bands and modes of operation. The tuner for this device was set to simulate a "free space" condition where the transmit antenna is matched to the medium into which it is transmitting and, thus, the power is at its maximum level.

#### 2.3 **Test Configuration**

The EUT was tested per the guidance of ANSI/TIA-603-E-2016 and KDB 971168 D01 v03r01. 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: EP-N5100 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 FAS0 S908UFAU1AVA5 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 document titled "Land Mobile FM or PM – Communications Equipment – Measurements and Performance Standards" (ANSI/TIA-603-E-2016) and "Procedures for Compliance Measurement of the Fundamental Emission Power of Licensed Wideband (> 1 MHz) Digital Transmission Systems" (KDB 971168 D01 v03r01) were used in the measurement of the EUT.

## 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. Radiated power levels are also investigated with the receive antenna horizontally and vertically polarized. The maximized power level is recorded using the spectrum analyzer "Channel Power" function with the integration band set to the emissions' occupied bandwidth, a RMS detector, RBW = 100kHz, VBW = 300kHz, and a 1 second sweep time over a minimum of 10 sweeps, per the guidelines of KDB 971168 D01 v03r01.

Per the guidance of ANSI/TIA-603-E-2016, a half-wave dipole is then 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:

 $P_{d \, [dBm]} = P_{g \, [dBm]} - cable \ loss \, _{[dB]} + antenna \ gain \, _{[dBd/dBi]}$ 

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].

The calculated  $P_d$  levels are then compared to the absolute spurious emission limit of -40dBm/MHz for End User Devices.

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.

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#### **MEASUREMENT UNCERTAINTY** 4.0

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  $U_{\text{CISPR}}$  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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#### **TEST EQUIPMENT CALIBRATION DATA** 5.0

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		
-	AP2	EMC Cable and Switch System	3/4/2021	Annual	3/4/2022	AP2
-	ETS	EMC Cable and Switch System	3/4/2021	Annual	3/4/2022	ETS
-	LTx5	LIcensed Transmitter Cable Set	3/3/2021	Annual	3/3/2022	LTx5
Agilent	N9030A	50GHz PXA Signal Analyzer	1/20/2021	Annual	1/20/2022	US51350301
Anritsu	MT8821C	Radio Communication Analyzer		N/A		6201525694
Emco	3115	Horn Antenna (1-18GHz) 6/18/2020 Biennial 6/18/2022		9704-5182		
Espec	ESX-2CA	Environmental Chamber 8/27/2020		Annual	8/27/2022	17620
ETS Lindgren	3117	1-18 GHz DRG Horn (Medium)	4/20/2021	Biennial	4/20/2023	00125518
ETS Lindgren	3164-08	Quad Ridge Horn Antenna 3/12/2020 Biennial 3/12/2022		128337		
Mini-Circuits	SSG-4000HP	Synthesized Signal Generator	N/A		11403100002	
Rohde & Schwarz	CMW500	Radio Communication Tester		N/A		100976
Rohde & Schwarz	CMW500	Radio Communication Tester	N/A		112347	
Rohde & Schwarz	ESW44	EMI Test Receiver 2Hz to 44 GHz 1/21/2021 Annual 1/21/2022		101716		
Rohde & Schwarz	FSW26	2Hz-26.5GHz Signal and Spectrum Analyzer 2/10/2021 Annual 2/10/2022		103187		
Sunol	JB6	LB6 Antenna	11/13/2020	Biennial	11/13/2022	A082816

Table 5-1. Test Equipment Table (09/20 – 11/18/2021)

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Keysight Technologies	N9020A	PXA Signal Analyzer	3/4/2022	Annual	3/4/2023	US46470561
			(05/00/0			-

Table 5-2. Test Equipment Table (05/20/2022)

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
-	ETS-002	EMC Cable and Switch System	3/11/2022	Annual	3/11/2023	ETS-002
-	WL40-1	LIcensed Transmitter Cable Set	12/19/2021	Annual	12/19/2022	WL40-1
ETS Lindgren	3116C	DRG Horn Antenna	5/11/2021	Biennial	5/11/2023	218893
ETS Lindgren	3117	1-18 GHz DRG Horn (Medium)	4/20/2021	Biennial	4/20/2023	00125518
Keysight Technologies	N9030B	PXA Signal Analyzer, Multi-touch	1/7/2022	Annual	1/7/2023	MY57141001
Rohde & Schwarz ESU40 EMI Tes		EMI Test Reciever (40GHz)	5/25/2021	Annual	7/25/2022	100348

#### Table 5-3. Test Equipment Table (06/16 - 06/18/2022)

#### 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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#### SAMPLE CALCULATIONS 6.0

## **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).

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# 7.0 TEST RESULTS

## 7.1 Summary

Company Name:	Samsung Electronics Co., Ltd.
FCC ID:	A3LSMS908U
FCC Classification:	Citizens Band End User Devices (CBE)
Mode(s):	NR

Test Condition	n Test Description FCC Part Section(s)		Test Limit	Test Result	Reference
	Conducted Power	2.1046	N/A	PASS	Section 7.2
	Occupied Bandwidth	2.1049	N/A	PASS	Section 7.3
CONDUCTED	Conducted Band Edge / Spurious 2.1051, 96.41(e)(1)(ii), Emissions 96.41(e)(2)		<ul> <li>-13 dBm/MHz at frequencies within 0-B MHz of channel edge (where B is the bandwidth of the assigned channel)</li> <li>-25 dBm/MHz at frequencies greater than B MHz above and below channel edge</li> <li>-40 dBm/MHz at frequencies below 3530 MHz and above 3720 MHz</li> </ul>	PASS	Sections 7.4, 7.5
CON	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 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.	PASS	Section 7.9
RADIATED	Equivalent Isotropic Radiated Power (EIRP)	96.41(b)	23 dBm/10MHz	PASS	Section 7.6
RADI	Radiated Spurious Emissions	2.1053, 96.41(e)(1)(ii), 96.47(e)(2)	-40 dBm/MHz	PASS	Section 7.7

## Notes:

All modes of operation and data rates were investigated. The test results shown in the following sections represent the worst case emissions.

Table 7-1. Summary of Test Results

- 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 PCTEST EMC Software Tool v1.0, Chamber Control v1.3.1.

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# 7.2 Conducted Power Output Data

## **Test Overview**

The EUT is set up to transmit at maximum power for NR. 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.

## Test Procedure Used

KDB 971168 D01 v03r01 - Section 6.0

## **Test Settings**

- 1. Span =  $2 \times OBW$  to  $3 \times OBW$
- 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.

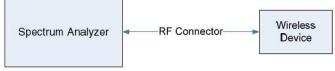


Figure 7-1. Test Instrument & Measurement Setup

#### Test Notes

- 1. Conducted power measurements were evaluated for the two contiguous channels using various combinations of RB size, RB offset, modulation, and channel bandwidth. Channel bandwidth data is shown in the tables below based only on the channel bandwidths that were supported in this device.
- 2. Conducted power measurements are also evaluated for simultaneous transmission of the n48 carrier plus a supported LTE anchor band (EN-DC). The powers were investigated while both bands are operating at their widest supported channel bandwidth.
- 3. All other conducted power measurements are contained in the RF exposure report for this filing.

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Bandwidth	Modulation	Channel	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]
		638000	3570.0	1 / 53	23.20
	π/2 BPSK	641666	3625.0	1 / 26	23.54
		645332	3680.0	1 / 53	23.17
		638000	3570.0	1 / 53	23.32
N	QPSK	641666	3625.0	1 / 26	23.41
		645332	3680.0	1 / 53	23.28
IHz		638000	3570.0	1 / 53	22.56
40 MHz	16-QAM	641666	3625.0	1 / 26	22.48
40		645332	3680.0	1 / 53	22.30
		638000	3570.0	1 / 53	20.37
	64-QAM	641666	3625.0	1/26	20.66
		645332	3680.0	1 / 53	20.68
		638000	3570.0	1 / 53	18.32
	256-QAM	641666	3625.0	1 / 26 1 / 53	18.43 18.17
		645332	3680.0		
		637666	3565.0 3625.0	1 / 39 1 / 19	23.15
	π/2 BPSK	641666 645666	3625.0 3685.0	1 / 19	23.01 23.18
		637666	3565.0	1/39	23.10
	QPSK	641666	3625.0	1 / 19	23.23
		645666	3685.0	1 / 39	23.25
z		637666	3565.0	1 / 39	22.26
₩	16-QAM	641666	3625.0	1/19	21.87
30 MHz		645666	3685.0	1 / 39	22.14
		637666	3565.0	1/39	20.84
	64-QAM	641666	3625.0	1/19	20.74
		645666	3685.0	1 / 39	20.99
	256-QAM	637666	3565.0	1 / 39	18.64
		641666	3625.0	1 / 19	18.27
		645666	3685.0	1 / 39	18.23
		637334	3560.0	1 / 13	22.71
	π/2 BPSK	641666	3625.0	1 / 13	22.74
		646000	3690.0	1 / 37	22.68
		637334	3560.0	1 / 13	22.81
	QPSK	641666	3625.0	1 / 13	22.83
		646000	3690.0	1 / 37	22.64
Hz		637334	3560.0	1 / 13	21.84
20 MHz	16-QAM	641666	3625.0	1 / 13	21.86
20		646000	3690.0	1 / 37	21.87
		637334	3560.0	1 / 13	19.89
	64-QAM	641666	3625.0	1 / 13	19.74
		646000	3690.0	1/37	19.86
		637334	3560.0	1/13	17.84
	256-QAM	641666	3625.0	1/13	18.22
		646000	3690.0	1/37	17.70
	7/0 5501/	637000	3555.0	1/6	23.69
	π/2 BPSK	641666	3625.0	1/6	23.53
		646332	3695.0	1/6	21.72
	QPSK	637000	3555.0	1/6	23.83
		641666 646332	3625.0 3695.0	1/6	23.23
N		646332 637000	3695.0 3555.0	1/6 1/6	22.80 22.34
MH	16-QAM	641666	3625.0	1/6	22.34
10 MHz		646332	3625.0	1/6	21.10
		637000	3555.0	1/6	21.90
	64-QAM	641666	3625.0	1/6	20.24
	C. GOUVI	646332	3695.0	1/6	20.24
		637000	3555.0	1/6	19.34
	256-04M		3625.0	1/6	18.87
	256-QAM	641666	3023.0	1/0	10.07

Table 7-2. Conducted Power Output Data (NR Band n48)

FCC ID: A3LSMS908U	PCTEST Proud to be part of @ element	PART 96 MEASUREMENT REPORT	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	
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		NR LTE												
NR Band	NR (UL) Frequency (MHz)	NR Bandwidth [MHz]	Mod.	NR UL RB#/Offset	LTE Band	LTE (UL) Frequency (MHz)	LTE Bandwidth [MHz]	Mod.	LTE UL RB#/Offset	Power	Conducted Power	Conducted Power		EN-DC Total Tx. Power (dBm)
			π/2 BPSK	1/79				QPSK	1/99	23.83	23.81	26.83		
			QPSK	100/0	B66	1745		QPSK	100/0	22.66	22.89	25.79		
n48	3625	40	QPSK	1/26			20	QPSK	1/0	23.82	23.82	26.83		
1148	3025	40	QPSK	1/53		1745	20	QPSK	1/50	23.59	23.96	26.79		
			QPSK	1/79				QPSK	1/99	23.72	23.93	26.84		
			16Q	1/79				16Q	1/99	23.75	23.05	26.42		

Table 7-3. Conducted Power Output Data (EN-DC, n48 + B66)

		PCC					SCC					
PCC Band	PCC Frequency (MHz)	PCC Bandwidth [MHz]	Mod.	PCC UL RB#/Offset	SCC Band	SCC Frequency (MHz)	SCC Bandwidth [MHz]	Mod.	SCC UL RB#/Offset	Power	SCC Conducted Power [dBm]	Inter-Band ULCA Total Tx. Power (dBm)
			π/2 BPSK	1/26		10 2025		π/2 BPSK	1/26	20.21	21.57	23.95
			QPSK	100/0				QPSK	100/0	20.35	21.00	23.70
n2	1880	20	QPSK	1/26	n48		40	QPSK	1/26	20.22	21.50	23.92
nz	1880	20	QPSK	1/53	1148	3625	5 40	QPSK	1/53	20.19	21.40	23.85
			QPSK	1/79				QPSK	1/79	20.12	21.32	23.77
			16Q	1/26				16Q	1/26	20.52	21.32	23.95

Table 7-4. Conducted Power Output Data (NR CA, n48 + n2)

		PCC					SCC					
PCC Band	PCC Bandwidth [MHz]	PCC Frequency (MHz)	Mod.	PCC UL RB#/Offset	SCC Band	SCC Frequency (MHz)	SCC Bandwidth [MHz]	Mod.	SCC UL RB#/Offset	PCC Conducted Power [dBm]	SCC Conducted Power [dBm]	Inter-Band ULCA Total Tx. Power (dBm)
			π/2 BPSK	1/53				π/2 BPSK	1/53	19.84	20.04	22.95
			QPSK	100/0				QPSK	100/0	19.84	19.54	22.70
n5	20	836.5	QPSK	1/26	n48	3625	40	QPSK	1/26	19.87	19.98	22.94
115	20	830.5	QPSK	1/53	1148	3025	40	QPSK	1/53	19.97	20.11	23.05
			QPSK	1/79				QPSK	1/79	19.53	19.97	22.77
			16Q	1/53				16Q	1/53	19.81	19.42	22.63
						-			A 40	->		

Table 7-5. Conducted Power Output Data (NR CA, n48 + n5)

		PCC					SCC					
PCC Band	PCC Frequency (MHz)	PCC Bandwidth [MHz]	Mod.	PCC UL RB#/Offset	SCC Band	SCC Frequency (MHz)	SCC Bandwidth [MHz]	Mod.	SCC UL RB#/Offset	PCC Conducted Power [dBm]	SCC Conducted Power [dBm]	Inter-Band ULCA Total Tx. Power (dBm)
			π/2 BPSK	1/54				π/2 BPSK	1/26	19.84	20.92	23.42
			QPSK	216/0	]	3625	40	QPSK	100/0	19.98	20.62	23.32
	1745		QPSK	1/54	- 40			QPSK	1/26	19.82	21.05	23.49
n66	1745	40	QPSK	1/108	- n48			QPSK	1/53	19.78	20.93	23.40
			QPSK	1/161				QPSK	1/79	19.80	21.02	23.46
			16Q	1/54				16Q	1/26	20.51	21.14	23.85
		-	Table 7 (	Condu	ata d I		Manut Dat		A n/Q .	m66)		

#### Table 7-6. Conducted Power Output Data (NR CA, n48 + n66)

FCC ID: A3LSMS908U	PCTEST° Proud to be part of @ element	PART 96 MEASUREMENT REPORT CLASS II PERMISSIVE CHANGE	Approved by: Technical Manager
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# 7.3 Occupied Bandwidth §2.1049

## **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

KDB 971168 D01 v03r01 - Section 4.2

## **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

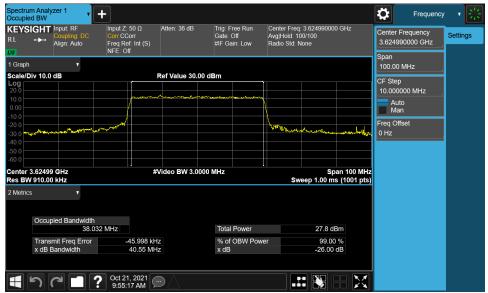
FCC ID: A3LSMS908U	Poud to be part of @ element	PART 96 MEASUREMENT REPORT CLASS II PERMISSIVE CHANGE	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	
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## NR Band n48

EYSIGHT Input: RF Coupling: DC Align: Auto	Input Z: 50 Ω Atten: 36 dE Corr CCorr Freq Ref: Int (S) NFE: Off	Trig: Free Run Center Freq Gate: Off Avg[Hold: 10 #IF Gain: Low Radio Std: N		Settings
Graph 🔹			100.00 MHz	
cale/Div 10.0 dB 0.0 0.0 0.0 0.0	Ref Value 3	0.00 dBm	CF Step 10.000000 MHz Auto Man	
0.0 0.0 0.0 0.0 0.0 0.0 0.0			Freq Offset 0 Hz	
enter 3.62499 GHz	#Video BW 3		Span 100 MHz	
Metrics T Occupied Bandwidth		Sw	veep 1.00 ms (1001 pts)	
	71 MHz	Total Power	30.1 dBm	
Transmit Freq Error x dB Bandwidth	-1.0587 MHz 38.37 MHz	% of OBW Power x dB	99.00 % -26.00 dB	

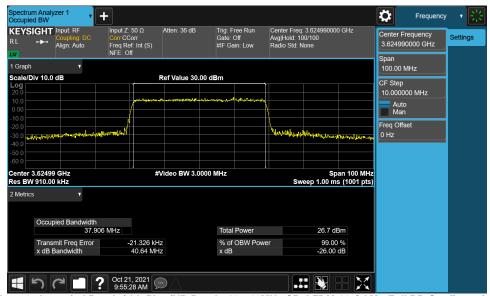
Plot 7-1. Occupied Bandwidth Plot (NR Band n48 - 40MHz DFT-s-OFDM π/2 BPSK - Full RB Configuration)



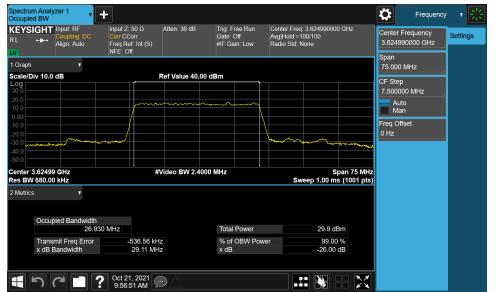
Plot 7-2. Occupied Bandwidth Plot (NR Band n48 - 40MHz CP-OFDM QPSK - Full RB Configuration)

FCC ID: A3LSMS908U	PCTEST* Proud to be part of @ element	PART 96 MEASUREMENT REPORT CLASS II PERMISSIVE CHANGE	SAMSUNG	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		
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Plot 7-3. Occupied Bandwidth Plot (NR Band n48 - 40MHz CP-OFDM 16-QAM - Full RB Configuration)



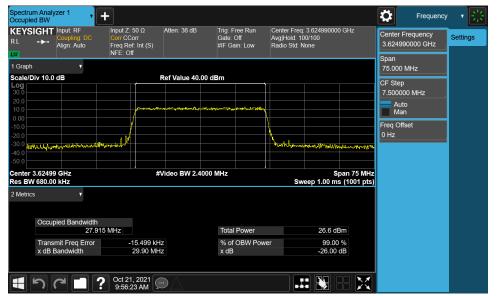
Plot 7-4. Occupied Bandwidth Plot (NR Band n48 - 30MHz DFT-s-OFDM π/2 BPSK - Full RB Configuration)

FCC ID: A3LSMS908U	PCTEST <sup>®</sup> Proud to be part of @ element	PART 96 MEASUREMENT REPORT CLASS II PERMISSIVE CHANGE	SAMSUNG	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		
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L +++ Align: Auto		Atten: 36 dB	Trig: Free Run Gate: Off #IF Gain: Low	Center Freq: 3.6249 Avg Hold: 100/100 Radio Std: None	990000 GHz	Center Frequency 3.624990000 GHz	Settings
Graph v						Span 75.000 MHz	
cale/Div 10.0 dB .og 20.0 10.0		Ref Value 40.00 c	IBm			CF Step 7.500000 MHz Auto Man	
0.00 10.0 20.0 30.0 10.0				Constraint and a second	and the state of t	Freq Offset 0 Hz	
enter 3.62499 GHz es BW 680.00 kHz		Video BW 2.4000	MHz	Sweep 1.	Span 75 MHz 00 ms (1001 pts)		
Metrics •	width						
Transmit Freq E x dB Bandwidth			Total Power % of OBW Pow x dB	er	7.7 dBm 99.00 % 6.00 dB		

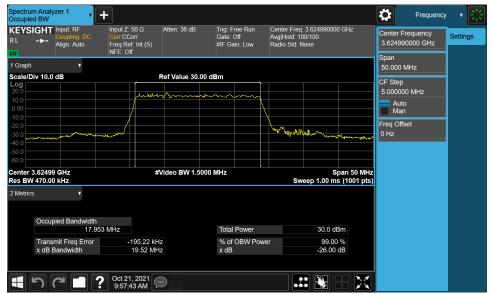
Plot 7-5. Occupied Bandwidth Plot (NR Band n48 - 30MHz CP-OFDM QPSK - Full RB Configuration)



Plot 7-6. Occupied Bandwidth Plot (NR Band n48 - 30MHz CP-OFDM 16-QAM - Full RB Configuration)

FCC ID: A3LSMS908U	PCTEST* Proud to be part of @ element	PART 96 MEASUREMENT REPORT CLASS II PERMISSIVE CHANGE	SAMSUNG	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		
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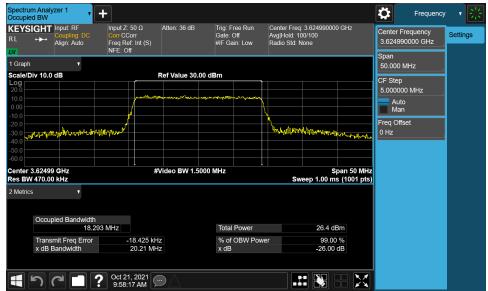
Plot 7-7. Occupied Bandwidth Plot (NR Band n48 - 20MHz DFT-s-OFDM π/2 BPSK - Full RB Configuration)



Plot 7-8. Occupied Bandwidth Plot (NR Band n48 - 20MHz CP-OFDM QPSK - Full RB Configuration)

FCC ID: A3LSMS908U	PCTEST <sup>°</sup> Proud to be part of <sup>®</sup> element	PART 96 MEASUREMENT REPORT CLASS II PERMISSIVE CHANGE	ISUNG	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		
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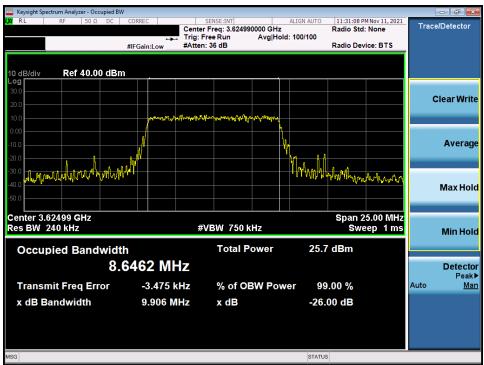
Plot 7-9. Occupied Bandwidth Plot (NR Band n48 - 20MHz CP-OFDM 16-QAM - Full RB Configuration)



Plot 7-10. Occupied Bandwidth Plot (NR Band n48 - 10MHz DFT-s-OFDM π/2 BPSK - Full RB Configuration)

FCC ID: A3LSMS908U	PCTEST° Proud to be part of @ element	PART 96 MEASUREMENT REPORT CLASS II PERMISSIVE CHANGE	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	
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Plot 7-11. Occupied Bandwidth Plot (NR Band n48 - 10MHz CP-OFDM QPSK - Full RB Configuration)



Plot 7-12. Occupied Bandwidth Plot (NR Band n48 - 10MHz CP-OFDM 16-QAM - Full RB Configuration)

FCC ID: A3LSMS908U	PCTEST° Proud to be part of @ element	PART 96 MEASUREMENT REPORT CLASS II PERMISSIVE CHANGE	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	
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#### Spurious and Harmonic Emissions at Antenna Terminal 7.4 §2.1051 §96.41(e)

## **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**

KDB 971168 D01 v03r01 - Section 6.0

## **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
- Trace mode = Max Hold 3.
- 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.

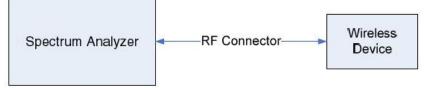


Figure 7-3. Test Instrument & Measurement Setup

#### **Test Notes**

Compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater.

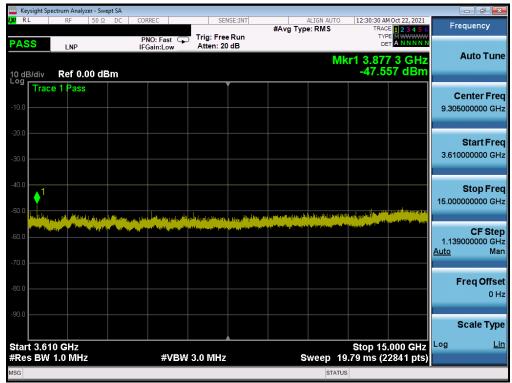
FCC ID: A3LSMS908U	PCTEST° Proud to be part of @ element	PART 96 MEASUREMENT REPORT CLASS II PERMISSIVE CHANGE	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	
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# NR Band n48

🔤 Key	sight Spectr	um Analy:	zer - Swe	pt SA									-	
<b>l,XI</b> RL	-	RF	50 Ω	DC	CORREC		SEN	NSE:INT	#Avg Typ	ALIGN AUTO		HOct 22, 2021	Fre	quency
PAS	0					ast 🖵	Trig: Free Atten: 20				TYP			
	<u> </u>				IFGain:l	low	Atten: 20	dB						Auto Tune
10 dE	Idiu	Ref 0.0	00 dB	m						IVI	-46.7	2 4 GH <mark>z</mark> 68 dBm		
Log	Trace													
	Hace	1 833												enter Freq
-10.0													1.770	000000 GHz
~~~~														
-20.0														Start Freq
-30.0													30.0	000000 MHz
-40.0												—, <b>,</b> —		Stop Freq
												♦'		000000 GHz
-50.0										n la superior de la s				
	in an	A Postle		n Allera Allera				for the second distance		and the state of the	a has an			CF Step
-60.0	an paint a spaint a	lan se k tel i del del del del											348.0	000000 MHz
70.0													<u>Auto</u>	Man
-70.0														
-80.0													F	req Offset
														0 Hz
-90.0														
													S	cale Type
Stan	t 30 MH	7									Stop 3	.510 GHz	Log	Lin
	SBW 1.		z			#VBW	3.0 MHz			Sweep 4	.667 ms (	7001 pts)		
MSG										STATU				
				_		-			1 40		0.001/			

Plot 7-13. Conducted Spurious Plot (NR Band n48 - 40MHz QPSK - Low Channel)



#### Plot 7-14. Conducted Spurious Plot (NR Band n48 - 40MHz QPSK - Low Channel)

FCC ID: A3LSMS908U	PCTEST° Proud to be part of @ element	PART 96 MEASUREMENT REPORT CLASS II PERMISSIVE CHANGE	Approved by: Technical Manager				
Test Report S/N:	Test Dates:	EUT Type:					
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	ctrum Analyzer - Sv										a X
LXI RL	RF 50 9	Ω DC C	DRREC	SEN	ISE:INT	#Avg Typ	ALIGN AUTO		M Oct 22, 2021	Frequer	псу
PASS	LNP		PNO: Fast 🖵 FGain:Low	Trig: Free #Atten: 14				TYF DE			_
10 dB/div Log	Ref 0.00 d	Bm					Mkı	1 25.98 -50.4	1 0 GH <mark>z</mark> 21 dBm	Auto	Tune
-10.0 Trace	e 1 Pass									Cente 21.0000000	
-20.0										Star 15.0000000	t <b>Frec</b> 00 GH:
-40.0									<b>∲</b> 1	<b>Stoj</b> 27.0000000	p Frec 00 GH:
-60.0	aleman particular sectors and the		A CONTRACTOR OF THE OWNER	n an	ngyildalahaadi wan <sup>aninin</sup> inada	p, Ånstelanstylge ortioeneliseered	an an an Anna a Anna an Anna an A	ul (sector providence de la compañía de la compañía A providencia de la compañía de la co	a sana daakin gigaalay Madaan <sup>di kala</sup> daa di kaa		F Step
-70.0										1.2000000 <u>Auto</u>	00 GH: Mar
-80.0										Freq	Offse 0 Ha
-90.0										Scale	е Туре
Start 15.00 #Res BW			#VBW	3.0 MHz		s	weep 20	Stop 27 ).80 ms (2	.000 GHz 4001 pts)	Log	Lin
MSG							STATU	S			

Plot 7-15. Conducted Spurious Plot (NR Band n48 - 40MHz QPSK - Low Channel)

	ectrum Analyz	ter - Swept S	SA								-	- 0
LXI RL	RF	50 Ω C	C COI	RREC	SEI	ISE:INT	#Avg Typ	ALIGN AUTO		HOct 22, 2021	Fre	quency
PASS	LNP			NO:Fast 🖵 Gain:Low	Trig: Free #Atten: 1		"a.)r		TYF DE			Auto Tune
10 dB/div Log	Ref 0.0							MK	r1 34.55 -51.1	20 dBm		
Trac	e 1 Pass				,						Ce	enter Fred
-10.0											32.0000	000000 GH:
-20.0											:	Start Free
-30.0											27.0000	000000 GH;
-40.0												Stop Free
-50.0								1				000000 GH
ntheter.	data a ballar a sete dari	inter and the	ulla Jahana	, etter folgen and gelge	Mangan and Da	on the hydronese	anternal parally	adding and statements	<sup>1</sup> 12 Constanting of Property Pro-	and an		CF Ster
-60.0	helten fall fall and an	andaj de la carla	ala liya ana da da ana	و بين الفقا في م	i animen al <mark>maint</mark> a		للاددول <u>فرمدا، فر</u> م.	di tulkan alalik			1.0000 <u>Auto</u>	000000 GH Mai
-70.0												
-80.0											F	r <b>eq Offse</b> 0 H:
-90.0												
											S	cale Type
Start 27.0 #Res BW		 ,		#\/R\/	3.0 MHz			ween 1	Stop 37 7.60 ms (2	.000 GHz	Log	<u>Lir</u>
	HO MINZ			#VDVV	5.0 WI12			STATU	_	400 Fpts)		

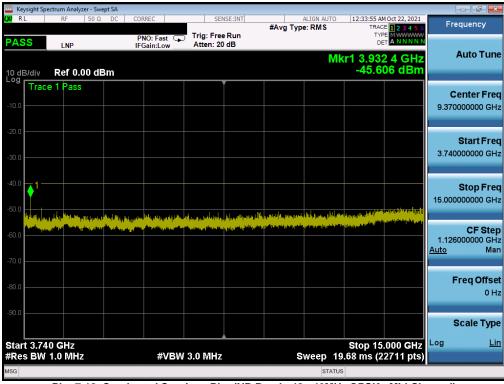
Plot 7-16. Conducted Spurious Plot (NR Band n48 - 40MHz QPSK - Low Channel)

FCC ID: A3LSMS908U	PCTEST° Proud to be part of @ element	PART 96 MEASUREMENT REPORT CLASS II PERMISSIVE CHANGE	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	
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		m Analyzer - Sw										
LXI RL		RF 50 Ω	DC	CORREC	SEN	ISE:INT	#Avg Typ	ALIGN AUTO		Oct 22, 2021	Fre	quency
PASS				PNO: Fast IFGain:Low	Trig: Free Atten: 20				TYP DE			Auto Tune
10 dB/c Log	div R	ef 0.00 dl	Зm					MIK	(r1 3.317 -46.72	7 GHz 27 dBm		
-10.0	Trace 1	Pass										<b>enter Freq</b> 000000 GHz
-20.0												<b>Start Freq</b> 000000 MHz
-40.0				and a second line with	والتعاول التعاوي المحمد الم	* Lussiens aus				1 4444-144		<b>Stop Freq</b> 000000 GHz
-60.0					a ann an Eilean Bhliaidh	المانينية <sub>م</sub> وجوري المانينية من معرا بالمروري					348.0 <u>Auto</u>	<b>CF Step</b> 000000 MHz Man
-80.0 —											F	<b>req Offset</b> 0 Hz
-90.0											s	cale Type
	30 MHz BW 1.0			#VBW	3.0 MHz			Sweep 4	Stop 3. .767 ms (	010 0112	Log	<u>Lin</u>
MSG								STATUS				
_			<u> </u>	<u> </u>		( ()   D   D			0 DOI/			

Plot 7-17. Conducted Spurious Plot (NR Band n48 - 40MHz QPSK - Mid Channel)



Plot 7-18. Conducted Spurious Plot (NR Band n48 - 40MHz QPSK - Mid Channel)

FCC ID: A3LSMS908U	PCTEST° Proud to be part of @ element	PART 96 MEASUREMENT REPORT CLASS II PERMISSIVE CHANGE	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	
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Keysight Sp	ectrum Analyz		t SA										
XI RL	RF	50 Ω	DC	CORREC		SE	NSE:INT	#Δ	ALIGN AUTO		AM Oct 22, 2021	Fre	equency
PASS	LNP			PNO: Fas IFGain:Lo	t 🖵 w	Trig: Fre #Atten: 1		<b>#</b> /11	g type. Kino	T			
10 dB/div Log	Ref 0.0	0 dBr	n						Mk	r1 25.35 -49.9	62 5 GHz 948 dBm		Auto Tune
-10.0	e 1 Pass												enter Freq
-20.0												15.000	Start Freq
-40.0				4.						1	المعادية المعادية المعادية	27.000	Stop Freq
-60.0	Higgard ( entropy ( )) any distance ( ) installation ( )		land Party Party Party International Control of	refit og til <sup>til</sup> ter offer	ر به ای می بادا می در این می بادا ای	a na san sa	- Teleborger generatie - De l'entreger generatie	an a li ferni de la ferni d		Alternational Sector Control	ille Marsacht Aleit Argens Mars	1.200 <u>Auto</u>	CF Step 0000000 GHz Man
-80.0												F	F <b>req Offse</b> 0 Ha
-90.0												:	Scale Type
Start 15.0 #Res BW				#\	/BW :	3.0 MHz			Sweep 2	Stop 2 0.80 ms (	7.000 GHz 24001 pts)	Log	Lin
MSG									STAT	JS			

Plot 7-19. Conducted Spurious Plot (NR Band n48 - 40MHz QPSK - Mid Channel)



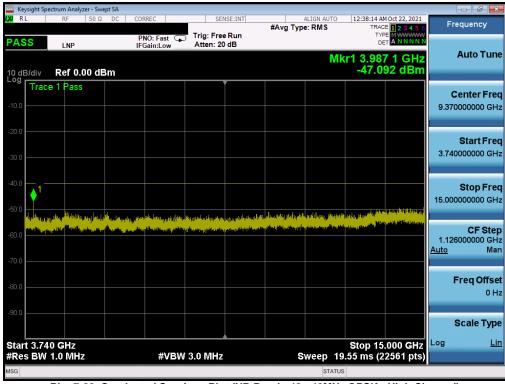
Plot 7-20. Conducted Spurious Plot (NR Band n48 - 40MHz QPSK - Mid Channel)

FCC ID: A3LSMS908U	PCTEST° Proud to be part of @ element	PART 96 MEASUREMENT REPORT CLASS II PERMISSIVE CHANGE	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	
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		n Analyzer - Sw										
LXI RL		RF 50 Ω	DC	CORREC	SE	NSE:INT	#Avg Typ	ALIGN AUTO e: RMS		HOct 22, 2021	Free	quency
PAS	S			PNO: Fast IFGain:Low	Trig: Free Atten: 20				TYF DE		A	uto Tune
10 dB/ Log 🗖		ef 0.00 dl	Зm						-47.1	2 2 GHz 83 dBm		
-10.0 -	Trace 1	Pass										enter Freq
											1.8350	100000 GHz
-20.0 —												Start Freq
-30.0 —											30.0	
-40.0										1		Stop Freq
-50.0 —				da, Balanan any salahan sa	وروي الفرا المراوات	Development		Content of the second of the s	a september og stander Til som sen stander		5.6400	00000 GHZ
-60.0		ing to a part of the second sector of the sector of the second sector of the se			وأذرام الخصار مالا مريا	ومتقلبه فتتاعما ومقدران	and the second					CF Step
-70.0											361.0 <u>Auto</u>	00000 MHz Man
											FI	req Offset
-80.0 —												0 Hz
-90.0 —											S	cale Type
	30 MHz			#)/D14	2.0 MILL-			Duroon 6	Stop 3	.640 GHz	Log	<u>Lin</u>
	BW 1.0	MIRZ		#VBV	/ 3.0 MHz					7281 pts)		
MSG								STATUS				

Plot 7-21. Conducted Spurious Plot (NR Band n48 - 40MHz QPSK - High Channel)



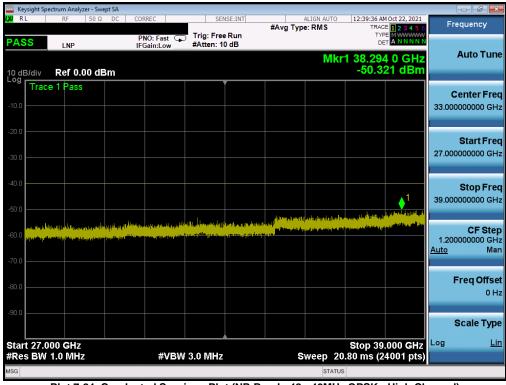
Plot 7-22. Conducted Spurious Plot (NR Band n48 - 40MHz QPSK - High Channel)

FCC ID: A3LSMS908U	PCTEST° Proud to be part of @ element	PART 96 MEASUREMENT REPORT CLASS II PERMISSIVE CHANGE	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	
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	ectrum Analyzer - S										- 0 .
LXI RL	RF 50	Ω DC (	CORREC	SENSE		A Avg Type	LIGN AUTO		1 Oct 22, 2021	Fre	quency
PASS	LNP		PNO: Fast 😱 IFGain:Low	Trig: Free R #Atten: 14 d	un			TYP			
10 dB/div Log	Ref 0.00 c	iBm					Mkr	1 26.188	3 5 GHz 19 dBm		Auto Tune
-10.0	e 1 Pass										<b>enter Freq</b> 000000 GHz
-20.0											<b>Start Freq</b> 000000 GHz
-40.0			n - sine va siloni i La dasakari (J.	a da a su a su a statistical di su a su a	ulista (fis), man (s)e blas	stational fraction is succeeding	and the second second	and <mark>here a</mark> t the little	1 International		<b>Stop Freq</b> 000000 GHz
-60.0 -70.0	a tala ji ya na sa ka na sa ka na sa ka sa sa ka sa	n ( ) of the log of the second of the log of	<ul> <li>Beed on Astronomy build and the set of the</li></ul>				and an and a sound	ik atila selesete petrostelik k	and the first states and	1.200 <u>Auto</u>	<b>CF Step</b> 000000 GHz Man
-80.0										F	req Offset 0 Hz
-90.0										S	cale Type
Start 15.0 #Res BW			#VBW	3.0 MHz		Sv	weep 20	Stop 27 .80 ms (2	.000 GHz 4001 pts)	Log	<u>Lin</u>
MSG							STATUS				

Plot 7-23. Conducted Spurious Plot (NR Band n48 - 40MHz QPSK - High Channel)



Plot 7-24. Conducted Spurious Plot (NR Band n48 - 40MHz QPSK - High Channel)

FCC ID: A3LSMS908U	PCTEST° Proud to be part of @ element	PART 96 MEASUREMENT REPORT CLASS II PERMISSIVE CHANGE	Approved by: Technical Manager
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# 7.5 Band Edge Emissions at Antenna Terminal §2.1051 §96.41(e)(iii)

## 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.

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 -40 dBm/MHz.

#### Test Procedure Used

KDB 971168 D01 v03r01 - Section 6.0

#### **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  $\geq$  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.

Spectrum Analyzer	RF Connector	Wireless Device	
	l l		

Figure 7-4. Test Instrument & Measurement Setup

#### Test Notes

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.

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# NR Band n48

		Analyzer - Sp																-   •   ×
XI RL	F	RF 50 :	Ω AC	CO	RREC				SE:INT			ALIGN AU	TO	10:14:19 P			Fre	quency
		1.0							q: 3.56001	0000	GHZ			Radio Sto	: None			quonoy
PASS	Gat	e: LO		IFO	Gain:Lo		#Atten							Radio De	vice: B	тѕ		
10 dB/	div	Ref 30.	00 dl	Зm														
20.0																		
																		enter Free
10.0																	3.560	010000 GH
0.00								~~										
-10.0																		
-20.0																		
-30.0			J															
-40.0			and the second	4				-,	agile interesting									
-50.0 🕶														wang tracks and the second		and a state of		
-60.0																		
Start	3.51 G	Hz												Stop	3.67	GHz		
																		CF Step
Cours	Danga	Start Fre		Stop	Erog	RE	30/		equency		Ampl	ituda		∆ Limit				000000 MH
Spur	Range	3.5100 G		Stop					26633333				-	-4.504 d	D		<u>Auto</u>	Mar
2	2	3.5300 G		3.5400					200333333 366666667				+	-4.504 d				
2 3	2	3.5400 G		3.5400					44440000				+	-17.84 0 -28.01 d			F	req Offse
3 4	3	3.5400 G		3.5490					44440000 49881667				+	-28.010				•
4 5	4 5	3.5490 G		3.5900					49881667 74933333				+	-23.62 d				0 H
5 6	5 6	3.5900 G		3.590					74955555 90298333					-23.62 0				
7	7	3.5900 G		3.630					90298333 91195000				+	-29.44 0				
<u>/</u> 8	8	3.6300 G		3.670					31866667				+	-23.22 0				
0	0	0.0000 0	112	0.0700	JOIL	1.00		0.0	51000007	OTIZ				-23.220				
								_					_					

Plot 7-25. Channel Edge Plot (NR Band n48 - 40MHz QPSK - Low Channel)



Plot 7-26. Channel Edge Plot (NR Band n48 - 40MHz QPSK - Mid Channel)

FCC ID: A3LSMS908U	PCTEST° Proud to be part of @ element	PART 96 MEASUREMENT REPORT CLASS II PERMISSIVE CHANGE	Approved by: Technical Manager
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			ous Emissi											_	
RL	C.	kF 50 Ω	AC	CORREC			SENSE:INT r Freq: 3.69 RF Burst	0000000	GHz	ALIGN AU		Radio Sto	PM Oct 14, 2021 d: None	- Fr	equency
ASS		e. LU		IFGain:L		#Atter	n: 26 dB					Radio De	vice: BTS	_	
0 dB/	div	Ref 40.00	) dBm												
- <b>°g</b> 30.0															
															enter Fre
20.0														3.690	0000000 GH
10.0															
0.00									~~						
10.0															
20.0 -									_						
30.0															
40.0															
					مسمعهم	-mu				and the second second	~~~		-		
50.0					<u></u>	_JW			<b>Wee</b>	and the second	~~~	40 <sup>4</sup> 04	****		
50.0	3.58 GI	Hz			n-11200-4						~~~	Stop	3.76 GHz		
50.0	3.58 GI	Hz										Stop	3.76 GHz		CF Ste
50.0 Start			Sto				Erequen		Amo	litude	~~~~			361	.000000 MH
50.0 Start		Start Freq		op Freq	RB	W	Frequent			litude		∆ Limit			
50.0			z 3.62	<b>op Freq</b> 200 GHz	RE	W 00 MHz	Frequent 3.6192660 3.6570500	667 GHz	-48.2	1 dBm			t dB	361	.000000 MH
50.0 Start Spur	Range	Start Freq 3.5800 GHz	z 3.62 z 3.65	200 GHz	RE 1.00 2 1.00	W DO MHz DO MHz	3.619266	5 <mark>67 GHz</mark> 000 GHz	-48.2 -41.9	1 <mark>dBm</mark> 8 dBm		∆ Limit -23.21 c	t 1 <mark>B</mark> 1B	361 <u>Auto</u>	.000000 MH Ma
Start	Range	Start Freq 3.5800 GHz 3.6200 GHz	z 3.62 z 3.65 z 3.66	200 GHz 590 GHz	RE 2 1.00 2 1.00 2 750	W DO MHz DO MHz .0 kHz	3.6192660 3.6570500	667 GHz 000 GHz 333 GHz	- <mark>48.2</mark> -41.9 -40.3	1 <mark>dBm</mark> 8 dBm 5 dBm		∆ Limit -23.21 c -28.98 c	1 <mark>8</mark> 18 18	361 <u>Auto</u>	.000000 M⊢ Ma Freq Offse
Spur	<b>Range</b> 1 2 3	<b>Start Freq</b> 3.5800 GHz 3.6200 GHz 3.6590 GHz	z 3.62 z 3.65 z 3.66 z 3.70	200 GHz 590 GHz 500 GHz	RE 2 1.00 2 750 2 750 2 750	W 00 MHz 00 MHz .0 kHz .0 kHz	3.6192660 3.6570500 3.6599333	667 GHz 000 GHz 333 GHz 000 GHz	-48.2 -41.9 -40.3 0.895	1 dBm 8 dBm 5 dBm 6 dBm		Δ Limit -23.21 c -28.98 c -27.35 c	3 <mark>B</mark> 3B 3B 3B 3B	361 <u>Auto</u>	.000000 M⊢ Ma Freq Offse
50.0 Start Spur	Range 1 2 3 4	<b>Start Freq</b> 3.5800 GHz 3.6200 GHz 3.6590 GHz 3.6600 GHz 3.7000 GHz 3.7010 GHz	3.62           3.65           3.66           3.66           3.70           3.70           3.70           3.71	200 GHz 590 GHz 500 GHz 500 GHz 500 GHz 500 GHz 100 GHz	RE 2 1.00 2 750 2 750 2 750 2 750 2 750 2 750 2 750 2 750	W 00 MHz 00 MHz 00 KHz 00 KHz 00 KHz 00 KHz	3.6192660 3.6570500 3.6599333 3.6936000 3.7000883 3.7012550	667 GHz 000 GHz 333 GHz 000 GHz 333 GHz 000 GHz	-48.2 -41.98 -40.3 0.895 -40.12 -40.10	1 dBm 8 dBm 5 dBm 6 dBm 2 dBm 0 dBm		Δ Limit -23.21 c -28.98 c -27.35 c -24.10 c	18 18 18 18 18 18	361 <u>Auto</u>	.000000 MH
Start	Range           1           2           3           4           5           6           7	<b>Start Freq</b> 3.5800 GHz 3.6200 GHz 3.6590 GHz 3.6600 GHz 3.7000 GHz 3.7010 GHz 3.7100 GHz	3.62           3.65           3.66           3.66           3.66           3.70           3.70           3.71           3.72	200 GHz 590 GHz 500 GHz 500 GHz 000 GHz 100 GHz 200 GHz	RE 1.00 1.00 750 750 750 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00	W 00 MHz 00 MHz 00 KHz 00 KHz 00 KHz 00 MHz 00 MHz	3.6192660 3.6570500 3.6599333 3.6936000 3.7000883 3.7012550 3.7102000	667 GHz 000 GHz 333 GHz 000 GHz 333 GHz 000 GHz 000 GHz	-48.2 -41.9 -40.3 0.895 -40.1 -40.1	1 dBm 3 dBm 5 dBm 6 dBm 2 dBm 0 dBm 7 dBm		Δ Limit -23.21 c -28.98 c -27.35 c -24.10 c -27.12 c -27.12 c -27.10 c -17.47 c	: 18 18 18 18 18 18 18 18	361 <u>Auto</u>	.000000 MH Ma Freq Offse
itart	Range 1 2 3 4 5	<b>Start Freq</b> 3.5800 GHz 3.6200 GHz 3.6590 GHz 3.6600 GHz 3.7000 GHz 3.7010 GHz	3.62           3.65           3.66           3.66           3.66           3.70           3.70           3.71           3.72	200 GHz 590 GHz 500 GHz 500 GHz 500 GHz 500 GHz 100 GHz	RE 1.00 1.00 750 750 750 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00	W 00 MHz 00 MHz 00 KHz 00 KHz 00 KHz 00 MHz 00 MHz	3.6192660 3.6570500 3.6599333 3.6936000 3.7000883 3.7012550	667 GHz 000 GHz 333 GHz 000 GHz 333 GHz 000 GHz 000 GHz	-48.2 -41.9 -40.3 0.895 -40.1 -40.1	1 dBm 3 dBm 5 dBm 6 dBm 2 dBm 0 dBm 7 dBm		Δ Limit -23.21 c -28.98 c -27.35 c -24.10 c -27.12 c -27.10 c	: 18 18 18 18 18 18 18 18	361 <u>Auto</u>	.000000 MH Ma Freq Offso
o.o tart	Range           1           2           3           4           5           6           7	<b>Start Freq</b> 3.5800 GHz 3.6200 GHz 3.6590 GHz 3.6600 GHz 3.7000 GHz 3.7010 GHz 3.7100 GHz	3.62           3.65           3.66           3.66           3.66           3.70           3.70           3.71           3.72	200 GHz 590 GHz 500 GHz 500 GHz 000 GHz 100 GHz 200 GHz	RE 1.00 1.00 750 750 750 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00	W 00 MHz 00 MHz 00 KHz 00 KHz 00 KHz 00 MHz 00 MHz	3.6192660 3.6570500 3.6599333 3.6936000 3.7000883 3.7012550 3.7102000	667 GHz 000 GHz 333 GHz 000 GHz 333 GHz 000 GHz 000 GHz	-48.2 -41.9 -40.3 0.895 -40.1 -40.1	1 dBm 3 dBm 5 dBm 6 dBm 2 dBm 0 dBm 7 dBm		Δ Limit -23.21 c -28.98 c -27.35 c -24.10 c -27.12 c -27.12 c -27.10 c -17.47 c	: 18 18 18 18 18 18 18 18	361 <u>Auto</u>	.000000 MH Ma Freq Offs





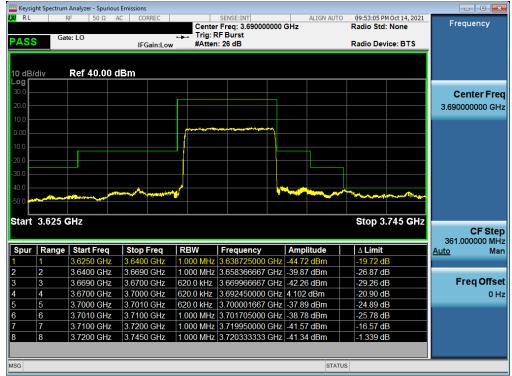
Plot 7-28. Channel Edge Plot (NR Band n48 - 30MHz QPSK - Low Channel)

FCC ID: A3LSMS908U	PCTEST Proud to be part of @ element	PART 96 MEASUREMENT REPORT CLASS II PERMISSIVE CHANGE	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	
1M2112090152-05.A3L	09/20 - 11/18/2021, 06/16 - 06/18/2022	Portable Handset	Page 30 of 51
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		Analyzer - Spuri	ous Emissions									
ASS		RF 50 Ω	AC CORREC				00 GHz	ALIGN AUTO	10:00:20 P Radio Std Radio Dev		Frequ	lency
0 dB/e	div	Ref 30.00	dBm									
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0.00												
20.0												
50.0 50.0				~~~ <b>/</b>			Y.					
⊥ tart	3.565 G	GHz							Stop 3	.685 GHz		
			Stop Fre	q RBW	/ Fr	equency	Amp	litude	Stop 3	.685 GHz	361.00	0000 MH
		GHz Start Freq 3.5650 GHz	<b>Stop Fre</b> 3.5800 G			equency 78050000 GI		litude				0000 MH
Spur		Start Freq	3.5800 GH	lz 1.000	MHz 3.5		Hz -45.07	7 dBm	∆ Limit	B	361.00 <u>Auto</u>	0000 M⊢ Ma
Spur	Range	Start Freq 3.5650 GHz	3.5800 GH 3.6090 GH	lz 1.000 lz 1.000	MHz 3.5 MHz 3.6	78050000 GI	Hz -45.07 Hz -40.27	7 dBm 7 dBm	∆ Limit -20.07 d	<mark>B</mark> B	361.00 <u>Auto</u>	0000 M⊢ Ma
Spur	Range 1 2	<b>Start Freq</b> 3.5650 GHz 3.5800 GHz	3.5800 GH 3.6090 GH 3.6100 GH	lz 1.000 lz 1.000 lz 620.0	MHz 3.5 MHz 3.6 kHz 3.6	7 <mark>8050000 G</mark> 02571667 G	Hz -45.07 Hz -40.27 Hz -39.78	7 dBm 7 dBm 8 dBm	∆ Limit -20.07 d -27.27 d	B B B B	361.00 <u>Auto</u>	0000 M⊢ Ma eq Offso
Spur	Range 1 2 3 4 5	<b>Start Freq</b> 3.5650 GHz 3.5800 GHz 3.6090 GHz	3.5800 GH 3.6090 GH 3.6100 GH 3.6400 GH	Iz         1.000           Iz         1.000           Iz         620.0           Iz         620.0	MHz         3.5           MHz         3.6           kHz         3.6           kHz         3.6	78050000 GI 02571667 GI 09696667 GI	Hz -45.07 Hz -40.27 Hz -39.78 Hz 8.306	7 dBm 7 dBm 3 dBm dBm	∆ Limit -20.07 d -27.27 d -26.78 d	<mark>В</mark> В В В В	361.00 <u>Auto</u>	0000 M⊦ Ma eq Offso
Spur	Range 1 2 3 4	<b>Start Freq</b> <b>3.5650 GHz</b> 3.5800 GHz 3.6090 GHz 3.6100 GHz	3.5800 GH           3.6090 GH           3.6100 GH           3.6400 GH           3.6410 GH	Iz         1.000           Iz         1.000           Iz         620.0           Iz         620.0           Iz         620.0	MHz         3.5           MHz         3.6           kHz         3.6           kHz         3.6           kHz         3.6           kHz         3.6	78050000 GI 02571667 GI 09696667 GI 23200000 GI	Hz -45.07 Hz -40.27 Hz -39.78 Hz 8.306 Hz -40.56	/ dBm / dBm 3 dBm dBm 3 dBm	∆ Limit -20.07 d -27.27 d -26.78 d -16.69 d	<mark>B</mark> B B B B B	361.00 <u>Auto</u>	0000 M⊢ Ma eq Offso
<b>Start</b> <b>Spur</b> 1 2 3 4 5 5 7	Range 1 2 3 4 5	<b>Start Freq</b> <b>3.5650 GHz</b> <b>3.5800 GHz</b> <b>3.6090 GHz</b> <b>3.6100 GHz</b> <b>3.6400 GHz</b>	3.5800 GH 3.6090 GH 3.6100 GH 3.6400 GH 3.6410 GH 3.6410 GH 3.6700 GH	Iz         1.000           Iz         1.000           Iz         620.0           Iz         620.0           Iz         620.0           Iz         620.0           Iz         620.0	MHz         3.5           MHz         3.6           kHz         3.6           kHz         3.6           kHz         3.6           kHz         3.6           kHz         3.6           kHz         3.6	78050000 GI 02571667 GI 09696667 GI 23200000 GI 40735000 GI	Hz -45.07 Hz -40.27 Hz -39.78 Hz 8.306 Hz -40.56 Hz -41.00	7 dBm 7 dBm 3 dBm dBm 3 dBm 3 dBm	Δ Limit -20.07 d -27.27 d -26.78 d -16.69 d -27.56 d	B B B B B B B B	361.00 <u>Auto</u>	CF Ste 0000 MH Ma eq Offse 0 H
Spur	Range 1 2 3 4 5	<b>Start Freq</b> 3.5650 GHz 3.5800 GHz 3.6090 GHz 3.6100 GHz 3.6400 GHz 3.6410 GHz	3.5800 GH 3.6090 GH 3.6100 GH 3.6400 GH 3.6410 GH 3.6410 GH 3.6700 GH	Iz         1.000           Iz         1.000           Iz         620.0           Iz         620.0           Iz         620.0           Iz         620.0           Iz         620.0	MHz         3.5           MHz         3.6           kHz         3.6           kHz         3.6           kHz         3.6           kHz         3.6           kHz         3.6           kHz         3.6	78050000 GI 02571667 GI 09696667 GI 23200000 GI 40735000 GI 43706667 GI	Hz -45.07 Hz -40.27 Hz -39.78 Hz 8.306 Hz -40.56 Hz -41.00	7 dBm 7 dBm 3 dBm dBm 3 dBm 3 dBm	Δ Limit -20.07 d -27.27 d -26.78 d -16.69 d -27.56 d -28.00 d	B B B B B B B B	361.00 <u>Auto</u>	0000 M⊢ Ma eq Offse

Plot 7-29. Channel Edge Plot (NR Band n48 - 30MHz QPSK - Mid Channel)



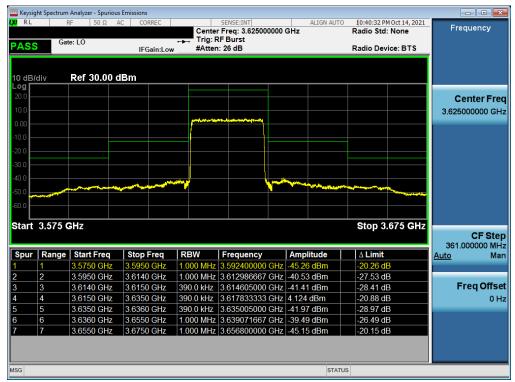
Plot 7-30. Channel Edge Plot (NR Band n48 - 30MHz QPSK - High Channel)

FCC ID: A3LSMS908U	Proud to be part of element	PART 96 MEASUREMENT REPORT CLASS II PERMISSIVE CHANGE	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	
1M2112090152-05.A3L	09/20 - 11/18/2021, 06/16 - 06/18/2022	Portable Handset	Page 31 of 51
© 2022 PCTEST	-		V2.0 4/8/2021



RL		Analyzer - Spurie F 50 Ω		ORREC			SENSE:IN	.56001	0000 G		ALIGN AUTO			M Oct 14, : : <b>None</b>	2021	Fre	equency	×
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0.0 tart	Range 1 2 3 4	<b>Start Freq</b> 3.5100 GHz 3.5300 GHz 3.5400 GHz 3.5490 GHz	2 3.530 2 3.540 2 3.549 2 3.550	00 GHz 00 GHz 00 GHz 00 GHz 00 GHz	2 1.0 2 1.0 2 1.0 2 39	000 MHz 000 MHz 000 MHz 0.0 kHz	3.5272 3.5373 3.5475 3.5499	33333 83333 45000 53333	GHz GHz GHz GHz	45.50 44.32 -38.67 -41.02	dBm dBm dBm dBm dBm	Δ -€ -1 -2 -2	Limit 5.501 d 9.32 d 25.67 d 28.02 d	B B B B	GHz	<u>Auto</u>	.000000 N N Freq Off	VI Via S
0.0 tart	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	2 3.530 2 3.540 2 3.549 2 3.550 2 3.570	00 GHz 00 GHz 00 GHz 00 GHz 00 GHz	2 1.0 2 1.0 2 1.0 2 39 2 39	000 MHz 000 MHz 000 MHz 0.0 kHz 0.0 kHz	3.5272 3.5373 3.5475 3.5499 3.5640	33333 83333 45000 53333 66667	GHz - GHz - GHz - GHz - GHz 8	45.50 44.32 -38.67 -41.02 8.778	dBm dBm dBm dBm dBm	Δ -1 -2 -2 -2 -1	<b>Limit</b> 5.501 d 9.32 d 5.67 d 8.02 d 6.22 d	B B B B B	Hz	<u>Auto</u>	.000000 N N Freq Off	MH Ma
0.0 tart	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 3.5700 GHz	2 3.530 2 3.540 2 3.549 2 3.550 2 3.570 2 3.571	00 GHz 00 GHz 00 GHz 00 GHz 00 GHz	2 1.0 2 1.0 2 1.0 2 39 2 39 2 39 2 39	000 MHz 000 MHz 000 MHz 0.0 kHz 0.0 kHz 0.0 kHz	3.52723 3.53734 3.5475 3.5499 3.56406 3.5700	33333 83333 45000 53333 66667 11667	GHz - GHz - GHz - GHz - GHz - GHz -	45.50 44.32 -38.67 -41.02 8.778 -41.36	dBm dBm dBm dBm dBm dBm	Δ -1 -2 -2 -1 -1 -2 -2 -1	Limit 5.501 d 9.32 d 25.67 d 28.02 d	B B B B B B B	GHz	<u>Auto</u>	.000000 N N Freq Off	Mi Mi
0.0 tart	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 3.5700 GHz 3.5710 GHz	3.530           3.540           3.542           3.542           3.550           3.550           3.570           3.571           3.590	00 GHz 00 GHz 00 GHz 00 GHz 00 GHz 10 GHz 00 GHz	2 1.0 2 1.0 2 39 2 39 2 39 2 39 2 39 2 39 2 1.0	000 MHz 000 MHz 000 MHz 0.0 kHz 0.0 kHz 0.0 kHz 0.0 kHz	3.52723 3.53733 3.5475 3.5499 3.56400 3.5700 3.5795	33333 83333 45000 53333 66667 11667 18333	GHz - GHz - GHz - GHz - GHz 4 GHz - GHz -	45.50 44.32 -38.67 -41.02 8.778 -41.36 -40.25	dBm dBm dBm dBm dBm dBm dBm	Δ -1 -2 -2 -1 -2 -2 -2 -2 -2 -2	Limit 5.501 d 9.32 d 5.67 d 8.02 d 6.22 d 8.36 d 7.25 d	B B B B B B B B B B	i Hz	<u>Auto</u>	.000000 N N Freq Off	Mi Mi
tart	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 3.5700 GHz	3.530           3.540           3.542           3.542           3.550           3.550           3.570           3.571           3.590	00 GHz 00 GHz 00 GHz 00 GHz 00 GHz 10 GHz	2 1.0 2 1.0 2 39 2 39 2 39 2 39 2 39 2 39 2 1.0	000 MHz 000 MHz 000 MHz 0.0 kHz 0.0 kHz 0.0 kHz 0.0 kHz	3.52723 3.53734 3.5475 3.5499 3.56406 3.5700	33333 83333 45000 53333 66667 11667 18333	GHz - GHz - GHz - GHz - GHz 4 GHz - GHz -	45.50 44.32 -38.67 -41.02 8.778 -41.36 -40.25	dBm dBm dBm dBm dBm dBm dBm	Δ -1 -2 -2 -1 -2 -2 -2 -2 -2 -2	<b>Limit</b> 5.501 d 9.32 d 25.67 d 8.02 d 6.22 d 8.36 d	B B B B B B B B B B		<u>Auto</u>	.000000 N N Freq Off	Mi Mi





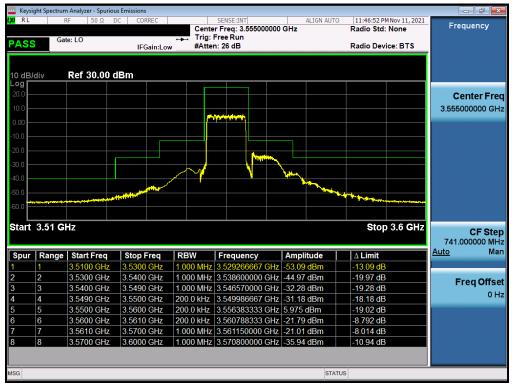
Plot 7-32. Channel Edge Plot (NR Band n48 - 20MHz QPSK - Mid Channel)

FCC ID: A3LSMS908U	PCTEST Proud to be part of @ element	PART 96 MEASUREMENT REPORT CLASS II PERMISSIVE CHANGE	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	
1M2112090152-05.A3L	09/20 - 11/18/2021, 06/16 - 06/18/2022	Portable Handset	Page 32 of 51
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Keysig RL		RF 50 Ω	AC	CORREC			SE	ENSE:INT			ALIGN AUTO	10:26:49	PM Oct 1	4,2021		
ASS	Gat	e: LO		IFGain:		🔉 Trig		req: 3.6900 Burst 26 dB	000000	GHz		Radio S Radio D			Fre	equency
0 dB/	ldiv	Ref 40.0	0 dBn	h												
<b>.og</b> 30.0																enter Fre 0000000 G⊦
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30.0 –									_							
io.o					and the second	7			<b>N 1 1 1</b>		****					
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0.0	3.64 GH			top Fred	7	RBW	F	requency	/	Ampl	itude	Sto Δ Lim		GHz	361. <u>Auto</u>	CF Ste .000000 MH Ma
0.0	Range			top Frec		RBW 1.000 MI		requency 65350000					it	GHz		000000 MI
0.0	Range 1 2	Start Fre 3.6400 GH 3.6600 GH	<mark>lz 3.0</mark> lz 3.0	5 <mark>600 GH</mark> 5790 GH	IZ 1 IZ 1	1.000 MI 1.000 MI	Hz 3. Hz 3.	65350000	0 <mark>0 GHz</mark> 67 GHz	-44.45 -40.29	odBm dBm	∆ Lim	it dB	GHz	<u>Auto</u>	.000000 MI M
0.0	Range           1           2           3	<b>Start Fre</b> <b>3.6400 GH</b> 3.6600 GH 3.6790 GH	iz 3.0 iz 3.0 iz 3.0	5 <mark>600 GH</mark> 5790 GH 5800 GH	IZ 1 IZ 1 IZ 3	1.000 MI 1.000 MI 390.0 kH	Hz 3. Hz 3. Iz 3.	65350000 67589666 67999833	0 <mark>0 GHz</mark> 67 GHz 63 GHz	-44.45 -40.29 -41.59	dBm dBm dBm	Δ Lim -19.45 -27.29 -28.59	it dB dB dB	GHz	<u>Auto</u>	.000000 MI M
1.0 1.0 tart	Range           1           2           3           4	<b>Start Fre</b> <b>3.6400 GF</b> 3.6600 GF 3.6790 GF 3.6800 GF	iz 3.0 iz 3.0 iz 3.0 iz 3.0	600 GH 790 GH 800 GH 7000 GH	iz 1 Iz 1 Iz 3 Iz 3	1.000 Mi 1.000 Mi 390.0 kH 390.0 kH	Hz 3.0 Hz 3.0 Iz 3.0 Iz 3.0	65350000 67589666 67999833 69356666	0 GHz 7 GHz 3 GHz 7 GHz	-44.45 -40.29 -41.59 4.352	dBm dBm dBm dBm dBm	Δ Lim -19.45 -27.29 -28.59 -20.65	it dB dB dB dB	GHz	<u>Auto</u>	.000000 Mi M Freq Offs
1.0	Range           1           2           3           4	<b>Start Fre</b> <b>3.6400 GH</b> 3.6600 GH 3.6790 GH	iz 3.0 iz 3.0 iz 3.0 iz 3.0	5 <mark>600 GH</mark> 5790 GH 5800 GH	iz 1 Iz 1 Iz 3 Iz 3	1.000 Mi 1.000 Mi 390.0 kH 390.0 kH	Hz 3.0 Hz 3.0 Iz 3.0 Iz 3.0	65350000 67589666 67999833	0 GHz 7 GHz 3 GHz 7 GHz	-44.45 -40.29 -41.59 4.352	dBm dBm dBm dBm dBm	Δ Lim -19.45 -27.29 -28.59	it dB dB dB dB	GHz	<u>Auto</u>	.000000 MI M Freq Offs
0.0	Range 1 2 3 4 5	<b>Start Fre</b> <b>3.6400 GF</b> 3.6600 GF 3.6790 GF 3.6800 GF	Iz         3.0	600 GH 790 GH 800 GH 7000 GH	z 1  z 1  z 3  z 3  z 3	1.000 Mi 1.000 Mi 390.0 kH 390.0 kH 390.0 kH 1.000 Mi	Hz 3.0 Hz 3.0 Hz 3.0 Hz 3.0 Hz 3.0 Hz 3.0	65350000 67589666 67999833 69356666 70000500 70467500	0 GHz 7 GHz 3 GHz 7 GHz 0 GHz 0 GHz	-44.45 -40.29 -41.59 4.352 -40.62 -38.62	dBm dBm dBm dBm dBm dBm dBm dBm	Δ Lim -19.45 -27.29 -28.59 -20.65 -27.62 -25.62	it dB dB dB dB dB dB dB	GHz	<u>Auto</u>	.000000 MI M Freq Offs
0.0	Range           1           2           3           4           5           6	<b>Start Free</b> <b>3.6400 GF</b> <b>3.6600 GF</b> <b>3.6790 GF</b> <b>3.6800 GF</b> <b>3.7000 GF</b>	Iz         3.0	5600 GH 5790 GH 5800 GH 7000 GH 7010 GH	z 1  z 1  z 3  z 3  z 3	1.000 Mi 1.000 Mi 390.0 kH 390.0 kH 390.0 kH 1.000 Mi	Hz 3.0 Hz 3.0 Hz 3.0 Hz 3.0 Hz 3.0 Hz 3.0	65350000 67589666 67999833 69356666 70000500	0 GHz 7 GHz 3 GHz 7 GHz 0 GHz 0 GHz	-44.45 -40.29 -41.59 4.352 -40.62 -38.62	dBm dBm dBm dBm dBm dBm dBm dBm	Δ Lim -19.45 -27.29 -28.59 -20.65 -27.62	it dB dB dB dB dB dB dB	GHZ	<u>Auto</u>	.000000 Mł Mi Freq Offs
0.0	Range           1           2           3           4           5           6           7	<b>Start Fre</b> <b>3.6400 GF</b> <b>3.6600 GF</b> <b>3.6790 GF</b> <b>3.6800 GF</b> <b>3.7000 GF</b> <b>3.7010 GF</b>	iz         3.0           iz         3.0	5600 GH 5790 GH 5800 GH 7000 GH 7010 GH 7100 GH	IZ 1 IZ 1 IZ 3 IZ 3 IZ 3 IZ 1 IZ 1	1.000 Mi 1.000 Mi 390.0 kH 390.0 kH 390.0 kH 1.000 Mi 1.000 Mi	Hz         3.0           Hz         3.0	65350000 67589666 67999833 69356666 70000500 70467500	00 GHz 7 GHz 3 GHz 7 GHz 00 GHz 00 GHz 3 GHz	-44.45 -40.29 -41.59 4.352 -40.62 -38.62 -43.52	dBm dBm dBm dBm dBm dBm dBm dBm dBm	Δ Lim -19.45 -27.29 -28.59 -20.65 -27.62 -25.62	it dB dB dB dB dB dB dB dB dB	GHz	<u>Auto</u>	IM 000000





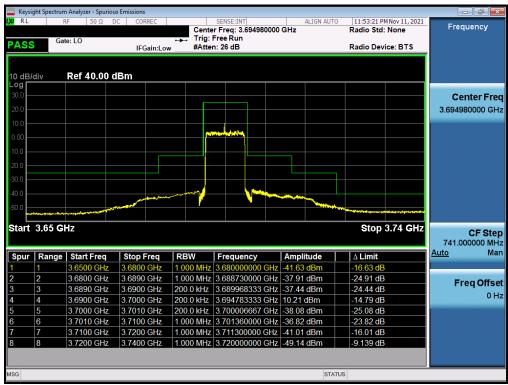
Plot 7-34. Channel Edge Plot (NR Band n48 - 10MHz QPSK - Low Channel)

FCC ID: A3LSMS908U	PCTEST° Proud to be part of @ element	PART 96 MEASUREMENT REPORT CLASS II PERMISSIVE CHANGE	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	
1M2112090152-05.A3L	09/20 - 11/18/2021, 06/16 - 06/18/2022	Portable Handset	Page 33 of 51
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RL		KF 50 Ω	DC C	ORREC			SE:INT eq: 3.6250	00000	GHz	ALIGN AUTO		td: None	Frequei	ncy
ASS	Gat	te: LO	1	FGain:Lo		tten: 26					Radio D	evice: BTS		
0 dB	(diu	Ref 30.00	dBm											
og F		Kel JU.UU	ubiii											
20.0													Cente	er Fre
10.0													3.6250000	
100						profession	-							
0.0														
20.0														
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10.0 L														
50.0					1	8	N -			and the second second				
- r		a the design of the state of the										anna an ago (19 y y y y an 1999 y y		
50.0														
⊥ tart	3.58 G	47									Sto	p 3.67 GHz		
	0.00 0	12									010	0.01 0112	741.0000	
Spur	Range	Start Freq	Stop	Freq	RBW	Fr	equency		Ampl	itude	∆ Limit	:	<u>Auto</u>	Ma
	1	3.5800 GHz	3.610	00 GHz	1.000 M	Hz 3.6	08350000	) GHz	-42.58	3 dBm	-17.58 (	dB		
	2	3.6100 GHz		90 GHz			18910000				-25.46 (		Freq	Offs
	3	3.6190 GHz		00 GHz			19990000				-26.42 (		incq	01
	4	3.6200 GHz		00 GHz			22533333				-19.61 (			UF
	5	3.6300 GHz		10 GHz			30060000				-27.56			
,	6	3.6310 GHz		00 GHz			31060000				-25.02			
			3 670	0 GHz	1.000 M	Hz   3.6	40050000	GHz	-42.62	2 dBm	-17.62	dB		
,	7	3.6400 GHz	13.07											
,		3.6400 GHz	5.07											
		3.6400 GHZ	3.010											

Plot 7-35. Channel Edge Plot (NR Band n48 - 10MHz QPSK - Mid Channel)



Plot 7-36. Channel Edge Plot (NR Band n48 - 10MHz QPSK - High Channel)

FCC ID: A3LSMS908U	PCTEST° Proud to be part of @ element	PART 96 MEASUREMENT REPORT CLASS II PERMISSIVE CHANGE	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	
1M2112090152-05.A3L	09/20 - 11/18/2021, 06/16 - 06/18/2022	Portable Handset	Page 34 of 51
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#### **Radiated Power (EIRP)** 7.6 §96.41(b)

## **Test Overview**

Equivalent Isotropic Radiated Power (EIRP) measurements are performed using the substitution method described in ANSI/TIA-603-E-2016 with the EUT transmitting into an integral antenna. Measurements on signals operating above 1GHz are performed using vertically and horizontally polarized broadband horn antennas. All measurements are performed as RMS average measurements while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

## **Test Procedures Used**

KDB 971168 D01 v03r01 - Section 5.2.1

ANSI/TIA-603-E-2016 - Section 2.2.17

## **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, not to exceed 1MHz
- 3. VBW  $\geq$  3 x RBW
- 4. Span = 1.5 times the OBW
- 5. No. of sweep points > 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".
- The integration bandwidth was set equal to 10MHz. 8.
- 9. Trace mode = trace averaging (RMS) over 100 sweeps
- 10. The trace was allowed to stabilize

FCC ID: A3LSMS908U	PCTEST Proud to be part of @ element	PART 96 MEASUREMENT REPORT CLASS II PERMISSIVE CHANGE	SAMSUNG	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		
1M2112090152-05.A3L	09/20 - 11/18/2021, 06/16 - 06/18/2022	Portable Handset		Page 35 of 51
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## **Test Setup**

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

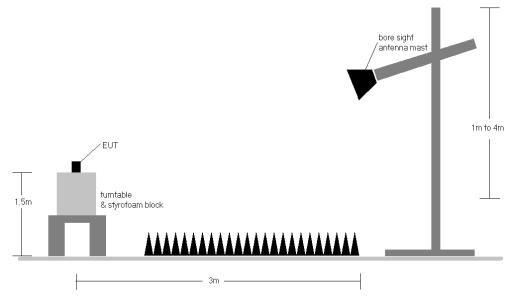


Figure 7-5. Radiated Test Setup >1GHz

## **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.
- The worst case EIRP shown in this section is found with NR operating only using 1RB. As such, the 3) EIRP/10MHz and full channel EIRP values will be identical since 1RB is fully contained within all available channel bandwidths for NR Band 48 (i.e. 10, 20, 30, 40MHz).

FCC ID: A3LSMS908U	PCTEST° Proud to be part of @ element	PART 96 MEASUREMENT REPORT CLASS II PERMISSIVE CHANGE	SAMSUNG	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:		
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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]
	π/2 BPSK	3570.0	V	113	264	7.15	1 / 26	13.23	20.38	0.109	23.00	-2.62
	π/2 BPSK	3625.0	V	106	272	6.91	1 / 79	13.82	20.73	0.118	23.00	-2.27
Ŧ	π/2 BPSK	3680.0	V	115	267	6.60	1 / 53	13.57	20.17	0.104	23.00	-2.83
40 MHz	QPSK	3570.0	V	113	264	7.15	1 / 26	12.96	20.11	0.103	23.00	-2.89
40	QPSK	3625.0	V	106	272	6.91	1 / 79	13.59	20.50	0.112	23.00	-2.50
	QPSK	3680.0	V	115	267	6.60	1 / 53	13.44	20.04	0.101	23.00	-2.96
	16-QAM	3680.0	V	115	267	6.60	1 / 53	12.57	19.17	0.083	23.00	-3.83
	π/2 BPSK	3565.0	V	125	266	7.15	1 / 39	13.18	20.34	0.108	23.00	-2.66
	π/2 BPSK	3625.0	V	102	267	6.91	1 / 19	13.29	20.20	0.105	23.00	-2.80
MHz	π/2 BPSK	3685.0	V	100	276	6.60	1 / 39	13.58	20.18	0.104	23.00	-2.82
×	QPSK	3565.0	V	125	266	7.15	1 / 39	12.89	20.04	0.101	23.00	-2.96
30	QPSK	3625.0	V	102	267	6.91	1 / 19	13.16	20.07	0.102	23.00	-2.93
	QPSK	3685.0	V	100	276	6.60	1 / 39	13.41	20.01	0.100	23.00	-2.99
	16-QAM	3685.0	V	100	276	6.60	1 / 39	12.41	19.01	0.080	23.00	-3.99
	π/2 BPSK	3560.0	V	125	266	7.15	1 / 13	12.73	19.89	0.097	23.00	-3.11
	π/2 BPSK	3625.0	V	102	267	6.91	1 / 13	13.02	19.93	0.098	23.00	-3.07
20 MHz	π/2 BPSK	3690.0	V	100	276	6.59	1 / 37	13.08	19.68	0.093	23.00	-3.32
N N	QPSK	3560.0	V	125	266	7.15	1 / 13	12.44	19.59	0.091	23.00	-3.41
20	QPSK	3625.0	V	102	267	6.91	1 / 13	13.01	19.92	0.098	23.00	-3.08
	QPSK	3690.0	V	100	276	6.59	1 / 37	12.81	19.40	0.087	23.00	-3.60
	16-QAM	3690.0	V	100	276	6.59	1 / 37	12.16	18.75	0.075	23.00	-4.25
	π/2 BPSK	3552.5	V	125	266	7.16	1/6	13.72	20.87	0.122	23.00	-2.13
	π/2 BPSK	3625.0	V	102	267	6.91	1/6	13.81	20.72	0.118	23.00	-2.28
MHz	π/2 BPSK	3697.5	V	100	276	6.59	1/6	12.14	18.72	0.075	23.00	-4.28
Σ	QPSK	3552.5	V	125	266	7.16	1/6	13.47	20.62	0.115	23.00	-2.38
10	QPSK	3625.0	V	102	267	6.91	1/6	13.41	20.32	0.108	23.00	-2.68
	QPSK	3697.5	V	100	276	6.59	1/6	12.97	19.56	0.090	23.00	-3.44
	16-QAM	3552.5	V	125	266	7.16	1/6	11.68	18.84	0.077	23.00	-4.16
	QPSK (CP-OFDM)	3570.0	V	113	259	7.15	1 / 79	10.04	17.19	0.052	23.00	-5.81
40 MHz	QPSK (Opposite Pol.)	3570.0	Н	101	306	7.37	1 / 26	9.60	16.97	0.050	23.00	-6.03
	QPSK (WCP)	3570.0	V	177	22	7.15	1 / 26	4.79	11.94	0.016	23.00	-11.06

Table 7-7. EIRP Data (NR Band n48)

FCC ID: A3LSMS908U	PCTEST <sup>®</sup> Proud to be part of @ element	PART 96 MEASUREMENT REPORT CLASS II PERMISSIVE CHANGE	SAMSUNG	Approved by: Technical Manager			
Test Report S/N:	Test Dates:	EUT Type:					
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#### **Radiated Spurious Emissions Measurements** 7.7 §2.1053 §96.41(e)(1)(ii) §96.41(e)(2)

## **Test Overview**

Radiated spurious emissions measurements are performed using the field strength conversion method described in KDB 971168 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using horizontally and vertically polarized tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically and horizontally polarized broadband horn antennas.

#### **Test Procedures Used**

KDB 971168 D01 v03r01 - Section 5.8

ANSI/TIA-603-E-2016 - Section 2.2.12

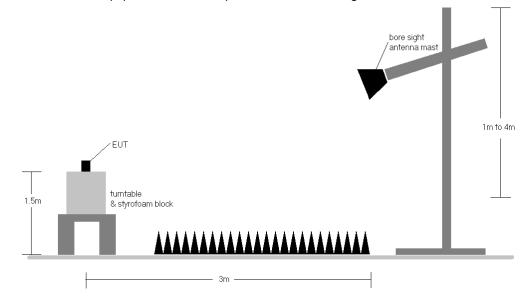
#### **Test Settings**

- 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 > 2 x span / RBW
- 5. Detector = RMS
- 6. 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

FCC ID: A3LSMS908U	PCTEST* Proud to be part of @ element	PART 96 MEASUREMENT REPORT CLASS II PERMISSIVE CHANGE	SAMSUNG	Approved by: Technical Manager			
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## **Test Setup**



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

Figure 7-6. Test Instrument & Measurement Setup

## **Test Notes**

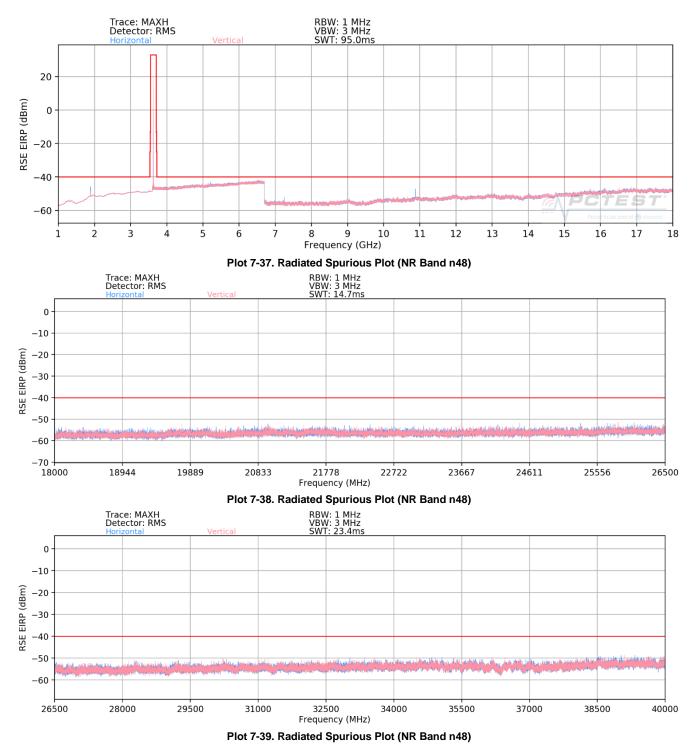
- 1) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the tables below.
- 2) This unit was tested with its standard battery.
- 3) The spectrum is measured from 9kHz to the 10th harmonic of the fundamental frequency of the transmitter. The worst-case emissions are reported.
- 4) 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.
- 5) The "-" shown in the following RSE tables are used to denote a noise floor measurement.
- 6) Per KDB 971168, Field Strength Level (dBµV/m) is converted to EIRP Spurious Emission Level (dBm) using the formula in Section 5.8.4 (d):

EIRP (dBm) = E (dB $\mu$ V/m) + 20 log D - 104.8; where D is the measurement distance in meters

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# NR Band n48



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40
3570.0
QPSK
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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]
7140.00	Н	163	32	-75.04	15.40	47.36	-47.90	-40.00	-7.90
10710.00	Н	152	46	-78.86	20.62	48.76	-46.50	-40.00	-6.50
14280.00	Н	-	-	-84.72	27.90	50.18	-45.08	-40.00	-5.08
17850.00	Н	-	-	-85.43	32.31	53.88	-41.38	-40.00	-1.38

Table 7-8. Radiated Spurious Data (NR Band n48 - Low Channel)

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	159	52	-77.73	16.06	45.33	-49.93	-40.00	-9.93
10875.00	Н	173	57	-80.74	21.10	47.36	-47.90	-40.00	-7.90
14500.00	Н	-	-	-84.78	28.27	50.49	-44.77	-40.00	-4.77

Table 7-9. Radiated Spurious Data (NR Band n48 - Mid Channel)

Frequency (MHz): 3680.0	
Modulation Signal: QPSK	
RB Config (Size / Offset): 1 / 53	

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]
7360.00	Н	161	67	-78.12	15.83	44.71	-50.54	-40.00	-10.54
11070.00	Н	153	54	-82.30	22.15	46.85	-48.41	-40.00	-8.41
14760.00	Н	-	-	-85.11	27.85	49.74	-45.52	-40.00	-5.52

Table 7-10. Radiated Spurious Data (NR Band n48 - High Channel)

Bandwidth (MHz):	40
Frequency (MHz):	3570.0
Modulation Signal:	QPSK
RB Config (Size / Offset):	1 / 53

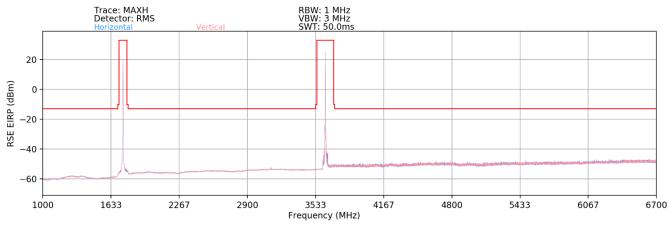
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
7140.00	Н	120	77	-77.42	15.40	44.98	-50.28	-40.00	-10.28
10710.00	Н	128	79	-81.30	20.62	46.32	-48.94	-40.00	-8.94
14280.00	Н	-	-	-84.72	27.90	50.18	-45.08	-40.00	-5.08
17850.00	Н	-	-	-85.48	32.31	53.83	-41.43	-40.00	-1.43

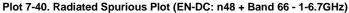
Table 7-11. Radiated Spurious Data with WCP (NR Band n48)

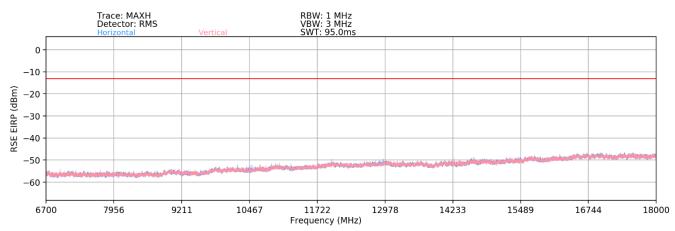
FCC ID: A3LSMS908U	PCTEST Proud to be part of @ element	PART 96 MEASUREMENT REPORT CLASS II PERMISSIVE CHANGE	Approved by: Technical Manager		
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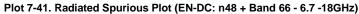


# EN-DC: NR Band n48 + Band 66









Bandwidth (MHz):	40MHz / 20MHz
Frequency (MHz):	3625MHz / 1745MHz
Modulation Signal:	QPSK
RB Config (Size / Offset):	1 / 53 & 1 / 50

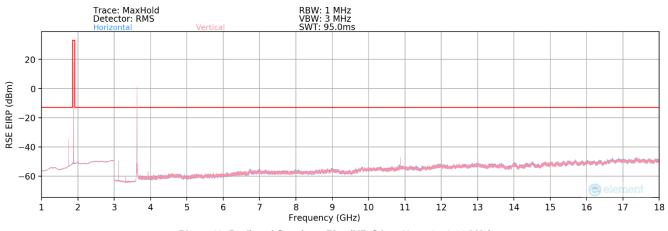
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1310.00	V	-	-	-76.27	6.12	36.85	-58.41	-13.00	-45.41
1610.00	V	-	-	-76.55	5.67	36.12	-59.14	-13.00	-46.14
1880.00	V	-	-	-76.61	9.34	39.73	-55.53	-13.00	-42.53
3760.00	V	-	-	-78.08	12.63	41.55	-53.71	-13.00	-40.71
5370.00	V	-	-	-78.37	14.96	43.59	-51.67	-13.00	-38.67
5505.00	V	-	-	-77.87	14.57	43.70	-51.56	-13.00	-38.56

Table 7-12. Radiated Spurious Data (EN-DC: n48 + Band 66)

FCC ID: A3LSMS908U	PCTEST° Proud to be part of @ element	PART 96 MEASUREMENT REPORT CLASS II PERMISSIVE CHANGE	Approved by: Technical Manager
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# NR CA: NR Band n48 + NR Band n2



Plot 7-42. Radiated Spurious Plot (NR CA: n48 + n2 - 1-18GHz)

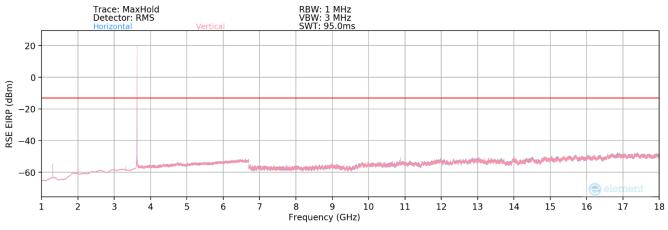
Bandwidth (MHz):	40MHz / 20MHz		
Frequency (MHz):	3625MHz / 1880MHz		
Modulation Signal:	QPSK		
RB Config (Size / Offset):	1 / 53 & 1 / 53		

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]
1745.00	V	-	-	-76.65	-1.70	28.65	-66.60	-13.00	-53.60
3123.50	V	140	272	-71.41	3.18	38.77	-56.49	-13.00	-43.49
3350.00	V	-	-	-77.59	2.68	32.09	-63.17	-13.00	-50.17
3895.00	V	-	-	-77.76	3.22	32.46	-62.80	-13.00	-49.80
5505.00	V	-	-	-77.91	5.18	34.27	-60.99	-13.00	-47.99

Table 7-13. Radiated Spurious Data (NR CA: n48 + n2)

FCC ID: A3LSMS908U	PCTEST° Proud to be part of @ element	PART 96 MEASUREMENT REPORT CLASS II PERMISSIVE CHANGE		Approved by: Technical Manager	
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# NR CA: NR Band n48 + NR Band n5

Plot 7-43. Radiated Spurious Plot (NR CA: n48 + n5 - 1-18GHz)

Bandwidth (MHz):	40MHz / 20MHz
Frequency (MHz):	3625MHz / 836.5MHz
Modulation Signal:	QPSK
RB Config (Size / Offset):	1 / 53 & 1 / 53

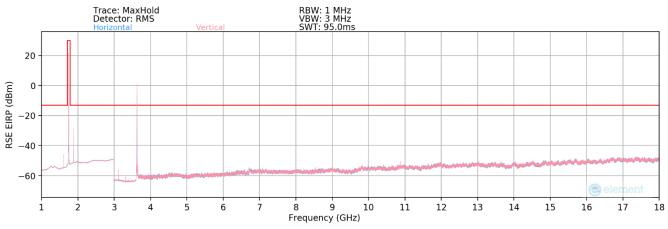
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1311.00	Н	-	-	-78.49	-3.03	25.48	-69.78	-13.00	-56.78
1394.50	Н	-	-	-78.24	-3.37	25.39	-69.87	-13.00	-56.87
1952.00	Н	-	-	-77.14	-0.47	29.39	-65.87	-13.00	-52.87
2788.50	Н	-	-	-77.12	0.70	30.58	-64.68	-13.00	-51.68
4461.50	Н	393	5	-77.38	3.60	33.22	-62.03	-13.00	-49.03
5298.00	н	-	-	-78.41	4.99	33.58	-61.68	-13.00	-48.68

Table 7-14. Radiated Spurious Data (NR CA: n48 + n5)

FCC ID: A3LSMS908U	PCTEST° Proud to be part of @ element	PART 96 MEASUREMENT REPORT CLASS II PERMISSIVE CHANGE	Approved by: Technical Manager
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# NR CA: NR Band n48 + NR Band n66



Plot 7-44. Radiated Spurious Plot (NR CA: n48 + n66 - 1-18GHz)

Bandwidth (MHz):	40MHz / 40MHz
Frequency (MHz):	3625MHz / 1745MHz
Modulation Signal:	QPSK
RB Config (Size / Offset):	1 / 53 & 1 / 108

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]
1610.00	V	151	280	-75.08	-3.77	28.15	-67.10	-13.00	-54.10
1880.00	V	137	262	-68.87	0.70	38.83	-56.43	-13.00	-43.43
3320.00	V	-	-	-77.84	2.46	31.62	-63.64	-13.00	-50.64
3225.00	V	182	257	-76.20	2.48	33.28	-61.98	-13.00	-48.98
3355.00	V	-	-	-77.16	2.70	32.54	-62.71	-13.00	-49.71
5370.00	V	-	-	-78.43	5.20	33.77	-61.49	-13.00	-48.49
8590.00	V	-	-	-79.15	8.34	36.19	-59.07	-13.00	-46.07

Table 7-15. Radiated Spurious Data (NR CA: n48 + n66)

FCC ID: A3LSMS908U	PCTEST° Proud to be part of @ element	PART 96 MEASUREMENT REPORT CLASS II PERMISSIVE CHANGE	Approved by: Technical Manager
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#### Frequency Stability / Temperature Variation 7.8

# §2.1055

## **Test Overview and Limit**

Frequency stability testing is performed in accordance with the guidelines of ANSI/TIA-603-E-2016. The frequency stability of the transmitter is measured by:

- Temperature: The temperature is varied from -30°C to +50°C in 10°C increments using an environmental a.) 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/TIA-603-E-2016

#### **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.

#### **Test Notes**

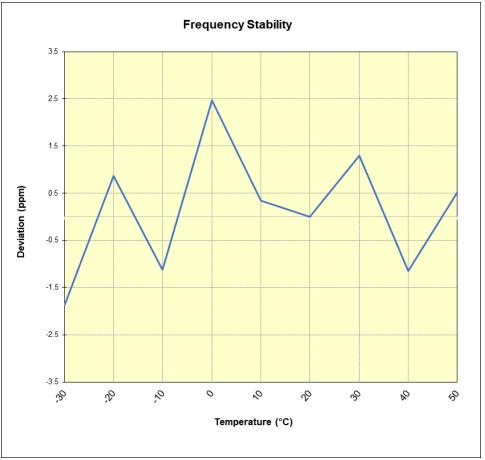
None

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<b>NR Band</b>	n48				
	Operating Fre	quency (Hz):	3,625,000,000		
	Ref. Voltage (VDC):		4.38	}	
Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
		- 30	3,625,156,712	-6,759	-0.0001864
		- 20	3,625,166,631	3,160	0.0000872
		- 10	3,625,159,427	-4,044	-0.0001116
		0	3,625,172,429	8,958	0.0002471
100 %	4.38	+ 10	3,625,164,718	1,247	0.0000344
		+ 20 (Ref)	3,625,163,471	0	0.0000000
		+ 30	3,625,168,188	4,717	0.0001301
		+ 40	3,625,159,336	-4,135	-0.0001141
		+ 50	3,625,165,348	1,877	0.0000518
Battery Endpoint	4.38	+ 20	3,625,161,641	-1,830	-0.0000505

Table 7-16. NR Band n48 Frequency Stability Data





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#### End User Device Additional Requirement (CBSD Protocol) 7.9 §96.47

## **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 5G NR CBSD 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-18-IN-00178 v1.0.0.00

#### **Test Setup/Method**

The EUT was connected via an RF cable to a certified 5G CBSD and spectrum analyzer. The following procedure is performed by applying WINNF-18-IN-00178 v1.0.0.00 CBRS End User Device as UUT Test Guidelines

- 1. Run#1:
  - a. Setup WINNF.PT.C.HBT.1 with 3615MHz 3635MHz.
  - b. Enable 5G AP service from CBSD.
  - c. Check EUT Tx frequency.
  - d. Disable AP service and check EUT stop transmission within 10s.
- 2. Run#2:
  - a. Setup WINNF.PT.C.HBT.1 with 3660MHz 3680MHz.
  - b. Enable 5G AP service from CBSD.
  - c. Check EUT Tx frequency.
  - d. Disable AP service and check EUT stop transmission within 10s.

#### Test Notes

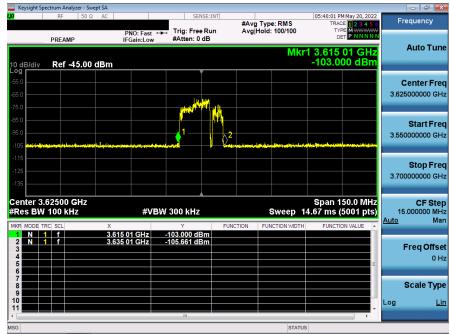
The EUT is an End User Device.

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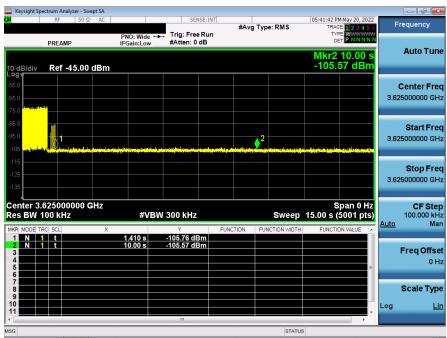
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# Run#1:



Plot 7-46. Run#1 End User Device Frequency of Operations



Plot 7-47. Run#1 End User Device Discontinues Operations within 10s

# Note:

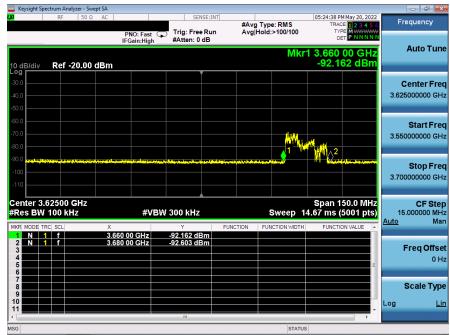
CBSD sends instructions to discontinue NR operations (beginning of plot at time = 0 seconds) Marker 1: EUT discontinues operation.

Marker 2: 10 seconds elapsed time from CBSD sending instructions to EUT.

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# Run#2:



Plot 7-48. Run#2 End User Device Frequency of Operations



Plot 7-49. Run#2 End User Device Discontinues Operations within 10s

# Note:

CBSD sends instructions to discontinue NR operations (beginning of plot at time = 0 seconds) Marker 1: EUT discontinues operation.

Marker 2: 10 seconds elapsed time from CBSD sending instructions to EUT.

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#### CONCLUSION 8.0

The data collected relate only to the item(s) tested and show that the Samsung Portable Handset FCC ID: A3LSMS908U complies with all of the End User Device requirements of Part 96 of the FCC Rules for NR operation.

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