

### **ELEMENT WASHINGTON DC LLC**

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### PART 27 MEASUREMENT REPORT

#### **Applicant Name:**

SONY Corporation 1-7-1 Konan Minato-ku Tokyo, 108-0075, Japan

#### Date of Testing:

05/05/2022 - 07/12/2022 **Test Report Issue Date:** 07/14/2022 **Test Site/Location:** Element, Columbia, MD, USA **Test Report Serial No.:** 1M2206010068-01-R1.PY7

### FCC ID:

### PY7-57325M

Applicant Name:

### **SONY Corporation**

Application Type: EUT Type: FCC Classification: FCC Rule Part: Test Procedure(s): Class II Permissive Change: Original Grant Date: Class II Permissive Change Portable Handset PCS Licensed Transmitter Held to Ear (PCE) 27 ANSI C63.26-2015, KDB 648474 D03 v01r04 Please see FCC change document 06/17/2022

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.

This revised Test Report (S/N: 1M2206010068-01-R1.PY7) supersedes and replaces the previously issued test report (S/N: 1M2206010068-01.PY7) on the same subject device for the same type of testing as indicated. Please discard or destroy the previously issued test report(s) and dispose of it accordingly.

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

RJ Ortanez Executive Vice President



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				EIRP	
Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	Max. Power [W]	Max. Power [dBm]
	100 MHz	QPSK	2546.0 - 2640.0	0.041	16.09
		16QAM	2546.0 - 2640.0	0.036	15.52
		QPSK	2541.0 - 2645.0	0.041	16.16
	90 MHZ	16QAM	2541.0 - 2645.0	0.035	15.38
	80 MHz	QPSK	2536.0 - 2650.0	0.041	16.13
		16QAM	2536.0 - 2650.0	0.036	15.51
	60 MHz	QPSK	2526.0 - 2660.0	0.042	16.27
UL-MIMO		16QAM	2526.0 - 2660.0	0.036	15.56
NR Band n41 (PC3)	50 MHz	QPSK	2521.0 - 2665.0	0.044	16.40
		16QAM	2521.0 - 2665.0	0.036	15.61
		QPSK	2516.0 - 2670.0	0.044	16.40
		16QAM	2516.0 - 2670.0	0.035	15.45
	20 MU-	QPSK	2511.0 - 2675.0	0.042	16.28
	30 MHZ	16QAM	2511.0 - 2675.0	0.036	15.61
		QPSK	2506.0 - 2680.0	0.039	15.88
	20 MHZ	16QAM	2506.0 - 2680.0	0.034	15.30

**EUT Overview** 

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### 1.0 INTRODUCTION

### 1.1 Scope

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

### **1.2 Element Test Location**

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

#### 1.3 Test Facility / Accreditations

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

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

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### 2.0 PRODUCT INFORMATION

### 2.1 Equipment Description

The Equipment Under Test (EUT) is the **SONY Portable Handset FCC ID: PY7-57325M**. The test data contained in this report pertains only to the emissions due to the EUT's licensed transmitters that operate under the provisions of Part 27.

Test Device Serial No.: 005EAZ, 00QAZ, 00KC5

#### 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 (5 and 6 GHz), Bluetooth (1x, EDR, LE), NFC, UL-MIMO (n41 and n77)

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 C63.26-2015. See Section 7.0 of this test report for a description of the radiated and antenna port conducted emissions tests.

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

#### 2.4 Software and Firmware

Testing was performed on device(s) using software/firmware version 0.1309 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 Evaluation Procedure

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

Deviation from Measurement Procedure......None

### 3.2 Radiated Power and Radiated Spurious Emissions

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

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

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

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

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].

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

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

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

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

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### 4.0 MEASUREMENT UNCERTAINTY

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

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

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### 5.0 TEST EQUIPMENT CALIBRATION DATA

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

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
-	AP2	EMC Cable and Switch System	1/4/2022	Annual	1/4/2023	AP2
-	AP1	EMC Cable and Switch System	12/12/2021	Annual	12/12/2022	AP1
-	ETS	EMC Cable and Switch System	12/9/2021	Annual	12/9/2022	ETS
-	LTx4	Licensed Transmitter Cable Set	12/19/2021	Annual	12/19/2022	LTx4
-	LTx5	Licensed Transmitter Cable Set	12/19/2021	Annual	12/19/2022	LTx5
Anritsu	MT8000A	Radio Communication Test Station	Radio Communication Test Station N/A		6261914237	
Emco	3116	Horn Antenna (18 - 40GHz)	7/20/2021	Biennial	7/20/2023	9203-2178
ETS Lindgren	3117	1-18 GHz DRG Horn (Medium)	4/20/2021	Biennial	4/20/2023	00125518
Keysight Technologies	N9020A	MXA Signal Analyzer	3/15/2022	Annual	3/15/2023	MY54500644
Keysight Technologies	N9030A	PXA Signal Analyzer (44GHz)	7/21/2021	Annual	7/21/2022	MY49430494
Rohde & Schwarz	ESU26	EMI Test Receiver (26.5GHz)	8/3/2021	Annual	8/3/2022	100342
Rohde & Schwarz	ESW44	EMI Test Receiver 2Hz to 44 GHz	3/28/2022	Annual	3/28/2023	101716
Rohde & Schwarz	FSW26	2Hz-26.5GHz Signal and Spectrum Analyzer	4/14/2022	Annual	4/14/2023	103187
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	7/27/2020	Biennial	7/27/2022	A051107

Table 5-1. Test Equipment

#### Notes:

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

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### 6.0 SAMPLE CALCULATIONS

### **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**

#### Example: Spurious emission at 3700.40 MHz

The receive 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 analyzer. The loss of the cable between the signal generator and the terminals of the substituted antenna is 2.0 dB at 3700.40 MHz. So 6.1 dB is added to the signal generator reading of -30.9 dBm yielding -24.80 dBm. The fundamental EIRP was 25.50 dBm so this harmonic was 25.50 dBm -(-24.80) = 50.3 dBc.

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### 7.0 TEST RESULTS

### 7.1 Summary

Company Name:	SONY Corporation
FCC ID:	<u>PY7-57325M</u>
FCC Classification:	PCS Licensed Transmitter Held to Ear (PCE)
Mode(s):	NR

Test Condition	Test Description	FCC Part Section(s)	Test Limit	Test Result	Reference
ED.	Transmitter Conducted Output Power*	2.1046(a), 2.1046(c)	N/A	PASS	Section 7.2
NDUCT	Occupied Bandwidth	2.1049(h)	N/A	PASS	Section 7.3
CO	Conducted Band Edge / Spurious Emissions (NR Band n41)	2.1051, 27.53(m)(4)	Undesirable emissions must meet the limits detailed in 27.53(m)(4)	PASS	Sections 7.4, 7.5
ATED	Equivalent Isotropic Radiated Power (NR Band n41)	27.50(h)(2)	≤ 2 Watts max. EIRP	PASS	Section 7.6
RADI	Radiated Spurious Emissions (NR Band n41)	2.1053, 27.53(m)(4)	Undesirable emissions must meet the limits detailed in 27.53(m)	PASS	Section 7.7

\* The only transmitter output conducted powers included in this report are those where the Pmax value, per the tune-up document, is higher than any of the DSI power levels. For the remaining conducted power measurements, see the **RF Exposure Report**.

#### Notes:

- 1) All modes of operation and data rates were investigated. The test results shown in the following sections represent the worst-case emissions.
- 2) The analyzer plots were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables, directional couplers, and attenuators used as part of the system to maintain a link between the call box and the EUT at all frequencies of interest.
- 3) All antenna port conducted emissions testing was performed on a test bench with the antenna port of the EUT connected to the spectrum analyzer through calibrated cables, attenuators, and couplers.
- All conducted emissions measurements are performed with automated test software to capture the corresponding plots necessary to show compliance. The measurement software utilized is EMC Software Tool v1.0.
- 5) This device supports n41 operation over two antennas simultaneously. The data in this section is marked as "Main" or "Sub"

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### 7.2 Conducted Output Power Data

#### **Test Overview**

All 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.

#### Test Procedure Used

ANSI C63.26-2015 – Section 5.2

#### **Test Settings**

- 1. Span =  $2 \times OBW$  to  $3 \times OBW$
- 2. Detector = RMS
- 3. Trace mode = trace average for continuous emissions, max hold for pulse emissions
- 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 7-1. Test Instrument & Measurement Setup

#### Test Notes

- 1. Conducted power measurements were evaluated 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.
- For 16-QAM and 64-QAM the conducted powers have the same targets, which the reports show only 16-QAM modulation.

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	Bandwidth	Modulation	Channel	Frequency [MHz]	Main RB Size/Offset	Main Conducted Power [dBm]	Sub RB Size/Offset	Sub Conducted Power [dBm]	UL-MIMO Conducted Power [dBm]
		ODEK	510000	2550.0	1/68	20.16	1/68	19.90	23.04
		QF3N	528000	2593.0	1/68	19.85	1 / 68	19.75	22.91
			510000	2550.0	1 / 68	20.47	1 / 68	20.41	23.45
	IHz	16-QAM	518598 528000	2593.0 2640.0	1/68	20.47	1/68	20.29	23.39
100 N	00 V		510000	2550.0	1 / 68	20.45	1 / 68	20.18	23.33
	64-QAM	518598	2593.0	1/68	20.33	1/68	20.21	23.28	
			510000	2550.0	1 / 68	19.58	1 / 68	19.90	23.05
		256-QAM	518598	2593.0	1 / 68	19.40	1 / 68	19.05	22.24
			528000	2640.0 2545.0	1/68	19.24	1/68	18.85	22.06
	MHz	QPSK	518592	2593.0	1 / 61	19.99	1 / 61	20.04	23.02
			529002	2645.0	1/61	19.88	245 / 0	19.60	22.75
		16-QAM	518592	2593.0	1/61	20.43	1/61	20.06	23.25
			529002	2645.0	1 / 61	20.25	245 / 0	19.64	22.96
	06	64-QAM	509000	2545.0 2593.0	1/61	20.24	1/61	20.05	23.16
			529002	2645.0	1 / 61	20.17	245 / 0	19.59	22.90
		256.OAM	509000	2545.0	1/61	19.30	1/61	18.94	22.14
		200-00-10	529002	2645.0	1 / 61	19.41	245 / 0	18.58	22.01
		0.001/	508000	2540.0	1 / 54	20.26	1 / 54	19.87	23.08
		QPSK	529998	∠593.0 2650.0	1 / 54	20.01 19.77	1 / 54 217 / 0	19.94 19.62	22.99 22.71
			508000	2540.0	1 / 54	20.36	1 / 54	20.32	23.35
	Ŧ	16-QAM	518598	2593.0	1/54	20.33	1/54	20.40	23.38
	W O		508000	2540.0	1 / 54	20.14	1/54	20.11	23.26
	8	64-QAM	518598	2593.0	1 / 54	20.34	1 / 54	20.29	23.33
			529998	2650.0	1 / 54	20.13	217/0	19.67	22.92
		256-QAM	518598	2593.0	1 / 54	19.47	1 / 54	18.81	22.16
			529998 506000	2650.0 2530.0	1/54	19.29	217/0	18.67	22.00
		QPSK	518598	2593.0	1 / 40	20.13	1 / 40	20.11	23.13
			531996	2660.0	1 / 40	20.01	1 / 40	19.81	22.92
		16-QAM	518598	2530.0	1 / 40	20.47 20.38	1 / 40	20.46	23.47 23.43
	MHz		531996	2660.0	1 / 40	20.22	1 / 40	20.42	23.33
	60	64-OAM	506000 518598	2530.0 2593.0	1/40	20.46	1/40	20.38	23.43
			531996	2660.0	1 / 40	20.31	1 / 40	20.12	23.23
		050 0414	506000	2530.0	1 / 40	19.83	1 / 40	19.14	22.51
		200-QAM	531996	2593.0	1 / 40	19.52	1 / 40	18.88	22.35
		QPSK 16-QAM	505000	2525.0	1 / 33	20.28	1 / 33	20.09	23.19
			518598 532998	2593.0 2665.0	1/33	20.35	1/33	20.14	23.26
			505000	2525.0	1/33	20.40	1 / 33	20.45	23.44
	7		518598	2593.0	1/33	20.46	1/33	20.47	23.48
	0 MI		505000	2525.0	1 / 33	20.21	1 / 33	20.33	23.28
	5	64-QAM	518598	2593.0	1/33	20.39	1/33	20.40	23.40
			505000	2005.0	1 / 66	20.26	1 / 66	20.22	23.25
		256-QAM	518598	2593.0	1 / 33	19.39	1 / 33	19.05	22.24
			532998 504000	2665.0 2520.0	1/66	19.44	1/66	19.07	22.27
		QPSK	518598	2593.0	1 / 53	20.29	1 / 26	20.21	23.26
			534000	2670.0	1 / 53	20.00	1/26	19.69	22.86
	N	16-QAM	518598	2520.0	1 / 53	20.49	1 / 26	20.46	23.49 23.26
	μH		534000	2670.0	1 / 53	20.34	1 / 26	20.25	23.31
	40	64-QAM	504000	2520.0 2593.0	1 / 53	20.48 20.41	1 / 26	20.25 20.21	23.38 23.32
			534000	2670.0	1 / 53	20.36	1 / 26	19.87	23.13
		256-QAM	504000 518598	2520.0 2593.0	1 / 53	19.56 19.47	1/26	19.17 19.16	22.38
			534000	2670.0	1 / 53	19.47	1 / 26	18.82	22.17
		OPSK	503000	2515.0	1/19	20.38	1/19	20.26	23.33
		Q: OK	534999	2675.0	1 / 19	20.04	1 / 19	19.91	22.99
		40.000	503000	2515.0	1 / 19	20.49	1 / 19	20.44	23.47
	Ŧ	16-QAM	518598	2593.0 2675.0	1/39	20.47 20.40	1 / 19	20.48 20.07	23.48
	N OK		503000	2515.0	1 / 19	20.37	1 / 19	20.38	23.39
		64-QAM	518598 534999	2593.0 2675.0	1/39	20.35	1/19	20.35	23.36
			503000	2515.0	1 / 19	19.80	1 / 19	19.18	22.51
		256-QAM	518598	2593.0	1/39	19.27	1 / 19	19.05	22.17
E			502000	2075.0	1 / 19	20.21	1 / 19	20.13	22.06
		QPSK	518598	2593.0	1 / 37	19.64	1 / 37	19.82	22.74
			535998 502000	2680.0 2510.0	1/25	19.52	1/25	19.55	22.55
	N	16-QAM	518598	2593.0	1/37	19.96	1/37	20.36	23.17
	HW		535998	2680.0	1/25	19.81	1/25	20.12	22.98
	20	64-QAM	518598	2510.0	1/25	20.18	1/25	20.36	23.28
			535998	2680.0	1 / 25	19.83	1 / 25	20.03	22.94
		256-QAM	502000 518598	2510.0 2593.0	1/25	19.53 19.28	1/25	19.22	22.39
			535998	2680.0	1 / 25	18.96	1 / 25	19.04	22.01
	<b>T</b> - 1-1 - 1			-I D	Dete 1				(000)

Table 7-1. Conducted Power Data (UL-MIMO NR Band n41 (PC3))

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### 7.3 Occupied Bandwidth

#### Test Overview

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

#### Test Procedure Used

ANSI C63.26-2015 - Section 5.4.4

#### **Test Settings**

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

#### Test Setup

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



Figure 7-2. Test Instrument & Measurement Setup

#### Test Notes

For this section, only the sub antenna occupied bandwidths are in this report, the main antenna occupied bandwidth plots are in the original filing report.

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### UL-MIMO NR Band n41 – Sub Antenna

🚾 Keysight Spectrum Analyzer - Occupied BW 🗶 R L 🔋 RF 🛛 50 🔍 DC 
 SENSE:INT
 ALIGN AUTO

 Center Freq: 2.593000000 GHz
 Trig: Free Run
 Avg|Hold: 100/100

 #Atten: 36 dB
 Auton Avg
 Auton Avg
 07:28:36 PM Jul 12, 2022 Radio Std: None Trace/Detector Radio Device: BTS #IFGain:Low Ref 40.00 dBm 10 dB/div .og **Clear Write** Average Max Hold Center 2.5930 GHz Res BW 2.4 MHz Span 250.0 MHz #VBW 8 MHz Sweep 1 ms Min Hold **Total Power** 29.4 dBm Occupied Bandwidth 97.730 MHz Detector Peak▶ <u>Man</u> **Transmit Freg Error** -261.50 kHz % of OBW Power 99.00 % Auto x dB Bandwidth 103.4 MHz x dB -26.00 dB STATUS MSG

Plot 7-2. Occupied Bandwidth Plot (NR Band n41 - 100MHz QPSK - Full RB - Sub ANT)



Plot 7-3. Occupied Bandwidth Plot (NR Band n41 - 100MHz 16-QAM - Full RB - Sub ANT)

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www.commercenter.com Keysight Spectrum Analyzer - Occupied BW	/				- • ×
LXI RE 50Ω DC	CORREC	SENSE:INT	ALIGN AUTO	07:43:41 PM Jul 12, 2022	Trace/Detector
	÷+-	Trig: Free Run	Avg Hold: 100/100		
	#IFGain:Low	#Atten: 36 dB		Radio Device: BTS	
10 dB/div Ref 40.00 dBr	n				
30.0					
20.0					Clear Write
10.0	سواميلوا <sup>ي</sup> - 1 الماليس والي	and an and a second	manderstown		
	/				
-10.0					Average
-20.0	mond		have a		Average
30 0 John march which mar Han and	, 			empson and the to the stand	
40.0					
-40.0					Max Hold
-30.0					
Center 2.5930 GHz				Span 225.0 MHz	
Res BW 2.2 MHz		#VBW 8 MH	Z	Sweep 1 ms	Min Hold
Occurried Rendwidt	11a	Total P	ower 20.1	dBm	MITTOIC
Occupied Balldwid			20.1		
87	7.680 MF	IZ			Detector
Transmit Fred Error	-218 77 k	Hz % of OF	W Power 99	00 %	Peak►
	210.111				Auto <u>Man</u>
x dB Bandwidth	93.06 M	HZ X dB	-26.0	00 dB	
MSG			STATUS	3	

Plot 7-4. Occupied Bandwidth Plot (NR Band n41 - 90MHz QPSK - Full RB - Sub ANT)



Plot 7-5. Occupied Bandwidth Plot (NR Band n41 - 90MHz 16-QAM - Full RB - Sub ANT)

FCC ID: PY7-57325M	PART 27 MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Technical Manager	
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🤤 Keysight Spectrum Analyzer - Occupied	BW					-	. • <b>x</b>
LXI RL RF 50Ω DC	CORREC	SENSE:INT	ALIGN AUTO	07:51:35 Pl	M Jul 12, 2022	Trace/[	Detector
		Trig: Free Run	Avg Hold: 100/100	Radio Stu.	None		
	#IFGain:Low	#Atten: 36 dB		Radio Dev	ice: BTS		
10 dB/div Ref 40.00 dl	3m						
Log							
30.0						Cl	ear Write
20.0		- mon - month	man				
0.00							
-10.0							Average
-20.0	And		he when the set of the	mannahly	manun	_	
-30.0							
-40.0							Max Hold
-50.0							nux noru
Contor 2 5020 CHz				Enon 2			
Res BW 1.8 MHz		#VBW_6_MH;	7	Span z Swe	ep 1 ms		
							Min Hold
Occupied Bandwig	dth	Total Po	ower 29.5	dBm			
	7 606 ML	7					
	1.000 1011	12					Detector
Transmit Freq Error	-184.40 k	Hz % of OE	W Power 99	.00 %		Auto	Peak ► Man
x dB Bandwidth	82 42 M	Hz xdB	-26 (	00 dB			mari
A dB Banawidth	02.42 M		Loit				
150			074710				
mou			STATUS				

Plot 7-6. Occupied Bandwidth Plot (NR Band n41 - 80MHz QPSK - Full RB - Sub ANT)



Plot 7-7. Occupied Bandwidth Plot (NR Band n41 - 80MHz 16-QAM - Full RB - Sub ANT)

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🧰 Keysight Spectrum Analyzer - Occupied BW								- • •
LX RL RF 50Ω DC	CORREC	SENSE:INT Center Freg: 2.5930	20000 GHz	ALIGN AUTO	07:58:30 P Radio Std	MJul 12, 2022	Trac	e/Detector
	- <b>-</b>	Trig: Free Run	Avg Hold	l: 100/100				
,	#IFGain:Low	#Atten: 36 dB			Radio Dev	ice: BTS		
10 dB/div Ref 40.00 dBm	<u> </u>					1		
30.0								
20.0								Clear Write
10.0	monthing	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	<b>৵৻৻৽৽৾ঀ৽ঀ৽৻</b> ৽					
0.00				\				
-10.0				<b>\</b>				Average
-20.0								Ŭ
-30.0 promotion and and market water	Jun			Lidomanus	- Aller and house	undunation		
-40.0								
-50.0								Max Hold
Center 2.59302 GHz		#\/R\// 5 M	7		Span 1	50.0 MHZ		
Res DW 1.5 WITZ		#4D44 3 141	12		0110	sep mis		Min Hold
Occupied Bandwidt	h	Total	Power	29.0	dBm			
59	186 ML	7						
		12						Detector
Transmit Freq Error	-240.81 k	Hz % of O	BW Powe	er 99	.00 %		Auto	Man
x dB Bandwidth	61.62 M	Hz xdB		-26.0	)0 dB			
MSG				STATUS				

Plot 7-8. Occupied Bandwidth Plot (NR Band n41 - 60MHz QPSK - Full RB - Sub ANT)



Plot 7-9. Occupied Bandwidth Plot (NR Band n41 - 60MHz 16-QAM - Full RB - Sub ANT)

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🤤 Keysight Spectrum Analyzer - Occupied BW								
XX RL RF 50 Ω DC CO	RREC	SENSE:INT	ALI	IGN AUTO	08:05:34 P	M Jul 12, 2022	Trac	e/Detector
	Trig: F	Free Run	Avg Hold:>1	100/100	Radio Stu	None		
#IF	Gain:Low #Atter	n: 36 dB			Radio Dev	ice: BTS		
10 dB/div Ref 40.00 dBm								
20.0							(	Clear Write
10.0	- mark more	uhen all march	mm					
0.00			N					
49.0	/							•
-10.0								Average
20.0 Linesh in hadenst warmen			<u>۱</u>	Whenter	المرجب والله ساما	a mort reconcilled		
-40.0								Max Hold
-50.0								
Center 2.59302 GHz					Span 1	25.0 MHz		
Res BW 1.2 MHz	#	VBW 4 MHz			Swe	ep 1ms		
				00.0				Min Hold
Occupied Bandwidth		Total Po	wer	29.2	dBm			
47.7	'01 MHz							Detector
Tana and the Farmer	407 50 1.11-	% -f 00	N D	00	00.0/			Peak▶
I ransmit Freq Error	-137.58 KHZ	% of OB	w Power	99.	00 %		Auto	<u>Man</u>
x dB Bandwidth	50.80 MHz	x dB		-26.0	0 dB			
MSG				STATUS				

Plot 7-10. Occupied Bandwidth Plot (NR Band n41 - 50MHz QPSK - Full RB - Sub ANT)



Plot 7-11. Occupied Bandwidth Plot (NR Band n41 - 50MHz 16-QAM - Full RB - Sub ANT)

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Plot 7-12. Occupied Bandwidth Plot (NR Band n41 - 40MHz QPSK - Full RB - Sub ANT)



Plot 7-13. Occupied Bandwidth Plot (NR Band n41 - 40MHz 16-QAM - Full RB - Sub ANT)

FCC ID: PY7-57325M		Approved by: Technical Manager	
Test Report S/N:	Test Dates:	EUT Type:	Dogo 10 of 52
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		· · · · · · · · · · · · · · · · · · ·	V3.0 1/6/2022





Plot 7-14. Occupied Bandwidth Plot (NR Band n41 - 30MHz QPSK - Full RB - Sub ANT)



Plot 7-15. Occupied Bandwidth Plot (NR Band n41 - 30MHz 16-QAM - Full RB - Sub ANT)

FCC ID: PY7-57325M		Approved by: Technical Manager	
Test Report S/N:	Test Dates:	EUT Type:	Dage 20 of 52
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Plot 7-16. Occupied Bandwidth Plot (NR Band n41 - 20MHz QPSK - Full RB - Sub ANT)



Plot 7-17. Occupied Bandwidth Plot (NR Band n41 - 20MHz 16-QAM - Full RB - Sub ANT)

FCC ID: PY7-57325M		Approved by: Technical Manager	
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### 7.4 Spurious and Harmonic Emissions at Antenna Terminal

#### Test Overview

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

#### For Band 41, the minimum permissible attenuation level of any spurious emission is 55 + 10log<sub>10</sub>(P<sub>[Watts]</sub>).

#### Test Procedure Used

ANSI C63.26-2015 - Section 5.7.4

#### **Test Settings**

- 1. Start frequency was set to 30MHz and stop frequency was set to 10GHz (separated into at least two plots per channel)
- 2. Detector = RMS
- 3. Trace mode = trace average for continuous emissions, max hold for pulse emissions
- 4. Sweep time = auto couple
- 5. The trace was allowed to stabilize
- 6. Please see test notes below for RBW and VBW settings

#### Test Setup

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



Figure 7-3. Test Instrument & Measurement Setup

#### Test Notes

- 1. Per Part 27, compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz.
- 2. For NR operation, all subcarrier spacings (SCS) and transmission schemes (e.g. CP-OFDM and DFT-s-OFDM) 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.
- 3. In this section, the UL-MIMO NR band n41 (main and sub antennas) plots has a 3dB correction applied to the individual plots to address the MIMO requirements in ANSI C63.26.

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### UL-MIMO NR Band n41 – Main Antenna



Plot 7-18. Conducted Spurious Plot (NR Band n41 - 100MHz QPSK - RB Size 1, RB Offset 0 - Low Channel – Main ANT)



Plot 7-19. Conducted Spurious Plot (NR Band n41 - 100MHz QPSK - RB Size 1, RB Offset 0 - Low Channel - Main ANT)

FCC ID: PY7-57325M		Approved by: Technical Manager	
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🔤 Keysig	ght Spect	rum Analyzer - S	Swept SA											
L <mark>XI</mark> RL		RF 50	Ω DC	CORREC		SENS	E:INT	#Avg Ty	ALIGN AUT	0 11:0	3:41 PM TRACE	Jul 12, 2022 1 2 3 4 5 6	F	requency
10 dB/	S /div	Ref 0.00	dBm	PNO: Fas IFGain:Lo	st 🖵 II w A	itten: 12	dB		M	lkr1 26 -4	0ET	5 GHz 1 dBm		Auto Tune
-10.0 -	Trace	1 Pass											<b>(</b> 21.00	<b>Center Freq</b> 0000000 GHz
-20.0 -													15.00	Start Freq 0000000 GHz
-40.0 -50.0				al bit of an in the base	Alerton (Alerton) Alerton (Alerton)	ling hyperosise	an a t <sup>a in ta</sup> nanyi a ja	and a second	an a la contraction 		ng sa ta ta		27.00	Stop Freq 0000000 GHz
-60.0 -	fines I e fee fe												1.20 <u>Auto</u>	<b>CF Step</b> 0000000 GHz Man
-80.0														Freq Offset 0 Hz
Start	15.00	0 GHz							_	Sto	op 27.	000 GHz	Log	Scale Type
#IRCES	BW 1	.u MHz		#	VBW 3.0	JWIHZ			Sweep	ATUS	ns (24	roor prsj		

Plot 7-20. Conducted Spurious Plot (NR Band n41 - 100MHz QPSK - RB Size 1, RB Offset 0 - Low Channel - Main ANT)



Plot 7-21. Conducted Spurious Plot (NR Band n41 - 100MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel – Main ANT)

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🔤 Key	sight Spe	trum A	Analyzer - Si	wept SA										- • •
<b>lxi</b> R		RF	50	Ω DC	CORREC		SEN	ISE:INT	#Avg Typ	ALIGN AUTO e: RMS	) 11:00:05 TR/	PM Jul 12, 2022 ACE 1 2 3 4 5 6	Fr	equency
<b>PAS</b>	S 3/div	Rei	f 20.00	dBm	PNO: F IFGain:L	ast 😱 .ow	Trig: Free Atten: 32	e Run dB		М	kr1 14.83 -31.0	39 0 GHz 006 dBm		Auto Tune
Log 10.0	Trace	e 1 P	'ass										<b>(</b> 8.84	<b>Center Freq</b> 5000000 GHz
0.00 -10.0													2.69	Start Freq 0000000 GHz
-20.0 -30.0							n catholice to	culana kinin		). N. I. Jaffalizza	állithatar tara ar araith	And the second s	15.00	Stop Freq 0000000 GHz
-40.0 -50.0				nt y dae haarpo det taarikka wa		rever squarely	ىرى خانىلىكى	the ball, and a second poly	من مان بر برای می اور اور بر برای می اور اور بر برای می اور	1 de	alian a star a surger a star a st		1.23 <u>Auto</u>	<b>CF Step</b> 1000000 GHz Man
-60.0														Freq Offset 0 Hz
														Scale Type
Star #Re:	t 2.69 s BW	0 GH 1.0 I	lz VIHz			#VBW	3.0 MHz		ę	weep	Stop 1 16.41 ms (	5.000 GHz 24621 pts)	Log	Lin
MSG										STA	rus			

Plot 7-22. Conducted Spurious Plot (NR Band n41 - 100MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel - Main ANT)



Plot 7-23. Conducted Spurious Plot (NR Band n41 - 100MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel – Main ANT)

FCC ID: PY7-57325M		Approved by: Technical Manager		
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🔤 Key	sight Spec	trum A	nalyzer - Swe	pt SA											
<b>l,XI</b> R	L	RF	50 Ω	DC	CORREC	Tri	SEN:	SE:INT	#Avg	ALIGN AU Type: RMS	JTO	11:06:14 P TRA	MJul 12, 2022	F	requency
10 dl	S B/div	Ref	20.00 c	dBm	PNO: Fast IFGain:Lov	, At	ten: 32	dB			Mk	r1 2.32 -34.7	1 0 GHz 23 dBm		Auto Tune
10.0	Trace	9 1 P	ass											1.20	<b>Center Freq</b> 53000000 GHz
0.00 -10.0														3	Start Freq 0.000000 MHz
-20.0 -30.0													1	2.49	<b>Stop Freq</b> 96000000 GHz
-40.0 -50.0		kangi di. Kangi di		allyn <sup>l</sup> lografydyn Talwy allan da	units halo provid		i i i i i i i i i i i i i i i i i i i				e ( i li l			24 <u>Auto</u>	<b>CF Step</b> 6.600000 MHz Man
-60.0															Freq Offset 0 Hz
Star #Re	t 0.030 s BW 1	0 GH 1.0 N	z 1Hz		#V	'BW 3.0	MHz			Swee	р3.	Stop 2 288 ms	2.496 GHz (4933 pts)	Log	Scale Type
MSG										ST	TATUS				

Plot 7-24. Conducted Spurious Plot (NR Band n41 - 100MHz QPSK - RB Size 1, RB Offset 0 - High Channel – Main ANT)



Plot 7-25. Conducted Spurious Plot (NR Band n41 - 100MHz QPSK - RB Size 1, RB Offset 0 - High Channel – Main ANT)

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Plot 7-26. Conducted Spurious Plot (NR Band n41 - 100MHz QPSK - RB Size 1, RB Offset 0 - High Channel – Main ANT)

FCC ID: PY7-57325M		Approved by: Technical Manager		
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### UL-MIMO NR Band n41 – Sub Antenna



Plot 7-27. Conducted Spurious Plot (NR Band n41 - 100MHz QPSK - RB Size 1, RB Offset 0 - Low Channel - Sub ANT)



Plot 7-28. Conducted Spurious Plot (NR Band n41 - 100MHz QPSK - RB Size 1, RB Offset 0 - Low Channel - Sub ANT)

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🔤 Key	sight Spec	trum A	nalyzer - Swe	pt SA										
L <mark>XI</mark> R	L	RF	50 Ω	DC	CORREC		SEN	SE:INT	#Ave Tvr	ALIGN AUT	0 07:39:0	2 PM Jul 12, 2022	Fr	equency
PAS	S				PNO: Fas IFGain:Lo	st 🖵 🛛	Frig: Free Atten: 12	Run dB	#Avg Typ	Je. KWIS				
10 dE Log	3/div	Ref	0.00 di	3m						M	lkr1 26.8 -42	25 0 GHz .326 dBm		Auto Tune
-10.0	Trace	e 1 P	ass										<b>(</b> 21.00	<b>Center Freq</b> 0000000 GHz
-20.0 -30.0													15.00	Start Freq 0000000 GHz
-40.0 -50.0	स्तर वर्ष मुख्य वर्ष	nate of the second	in the state of the			nt keyen alle f	Mangalan Mangalan Mangalan Mangalan Mangalan Mangalan Mangalan Mangalan Mangalan Mangalan Mangalan Mangalan Mangalan Mangalan Mangalan Mangalan Mang	ورون الافتران ومع مرود الافتراني ورون	an an ann an	n la parte de la composition La composition de la composition La composition de la	andysel dyspation of the state	a se	27.00	Stop Freq 0000000 GHz
-60.0 -70.0													1.20 <u>Auto</u>	<b>CF Step</b> 0000000 GHz Man
-80.0														Freq Offset 0 Hz
														Scale Type
Star #Re	t 15.0 s BW	00 G 1.0 N	Hz 1Hz		#	VBW 3.	0 MHz		\$	Sweep	Stop 16.00 ms	27.000 GHz (24001 pts)	Log	Lin
MSG										ST/	ATUS			

Plot 7-29. Conducted Spurious Plot (NR Band n41 - 100MHz QPSK - RB Size 1, RB Offset 0 - Low Channel - Sub ANT)



Plot 7-30. Conducted Spurious Plot (NR Band n41 - 100MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel – Sub ANT)

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🔤 Key	sight Spec	trum:	Analyzer - Swe	ept SA									
L <mark>XI</mark> R	L	R	= 50 Ω	DC	CORREC		SENSE:INT		ALIGN AUT	0 07:33:12	PM Jul 12, 2022	Fr	equency
					BN0 5	Tria: E	Free Run	#Avg Typ	e:RMS	T	ACE 1 2 3 4 5 6		oquonoy
PAS	S				IFGain:Low	Atten	: 32 dB				DET A NNNNN		
									M	kr1 13 7	4 5 GHz		Auto Tune
40 di	1 data	Do	F 20 00 /	d D m						-30	866 dBm		
Log	5/017	Re	1 20.00 (										
	Trace	9 T F	'ass									0	Center Freg
10.0												8.84	5000000 GHz
												0.04	000000000112
0.00													
2122													Start Freq
10.0												2 69	0000000 GHz
-10.0												2.00	
-20.0													Stop Freq
												15.00	0000000 GHz
-30.0											العار المحمد والمحمد والمحال		
	, particular	ور ال	والمحمد الديو بسادته	والدارير وولياور	hyper a log at the local data		allerge stand built after	(1999), and a state of a second	anna a' faraise	eellen liegelaagdelie	ALL ALL AND DESCRIPTION OF		
-40.0	Part and the second	1	Standard Addition	in all a state of the		A STREET STOLEN ST	ستحداد تعديظ كالا وداريم ور	I KATGE TOU AND AND AND A DESCRIPTION	li talah katalah kata ta	كالالعان بسيابتكا اطفالت		4.00	CF Step
												1.23 Auto	1000000 GHZ
-50.0												Auto	Iviaii
-60.0												1	Freq Offset
													0 Hz
-70.0													
													scale Type
Star	t 2.69	0 GI	IZ							Stop 1	5.000 GHz	Log	Lin
#Re	s BW	1.0	WHZ		#VE	BW 3.0 MI	HZ	\$	weep	16.41 ms (	24621 pts)		
MSG									STA	TUS			

Plot 7-31. Conducted Spurious Plot (NR Band n41 - 100MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel - Sub ANT)



Plot 7-32. Conducted Spurious Plot (NR Band n41 - 100MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel – Sub ANT)

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🔤 Key	sight Spec	trum Analy	/zer - Swep	ot SA										
L <b>XI</b> R	L	RF	50 Ω	DC	CORREC	_	SEN	SE:INT	#Avg	ALIGN AUTO	0 07:40:38 TR. T	PM Jul 12, 2022 ACE 1 2 3 4 5 6	F	requency
10 dl	S B/div	Ref 2	0.00 d	Bm	PNO: Fas IFGain:Lov	t 🗭 w	Atten: 32	dB		I	Mkr1 2.3 -35.	56 0 GHz 120 dBm		Auto Tune
10.0	Trace	1 Pas	S										1.26	<b>Center Freq</b> 53000000 GHz
-10.0													3	Start Freq 0.000000 MHz
-20.0 -30.0												1	2.49	Stop Freq 66000000 GHz
-40.0 -50.0	dujansida. Ngadara	d analy in the field of (include the second second (include second		a la constanta da la constanta	ny manga katalapan ny manganan Na katalapan katalapan ny manganan katalapan ny manganan katalapan ny manganan katalapan ny mangana katalapan n Na katalapan ng manganan ng					lan din Jahrintan.			24 <u>Auto</u>	<b>CF Step</b> 6.600000 MHz Man
-60.0														Freq Offset 0 Hz
Star	t 0.03	) GHz									Stop	2.496 GHz	Log	Scale Type
#Re MSG	s BW	1.0 MH	z		#\	/BW 3.	0 MHz			Sweep	<b>3.288 ms</b> лов	(4933 pts)	209	

Plot 7-33. Conducted Spurious Plot (NR Band n41 - 100MHz QPSK - RB Size 1, RB Offset 0 - High Channel - Sub ANT)



Plot 7-34. Conducted Spurious Plot (NR Band n41 - 100MHz QPSK - RB Size 1, RB Offset 0 - High Channel – Sub ANT)

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Plot 7-35. Conducted Spurious Plot (NR Band n41 - 100MHz QPSK - RB Size 1, RB Offset 0 - High Channel – Sub ANT)

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### 7.5 Band Edge Emissions at Antenna Terminal

#### **Test Overview**

All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at 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 minimum permissible attenuation level for Band 41 is as noted in the Test Notes on the following page.

#### **Test Procedure Used**

ANSI C63.26-2015 - Section 5.7.3

#### Test Settings

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

#### Test Setup

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



Figure 7-4. Test Instrument & Measurement Setup

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#### Test Notes

- Per 27.53(m) for operations in the BRS/EBS bands, the attenuation factor shall be not less than 40 + 10 log (P) dB on all frequencies between the channel edge and 5 megahertz from the channel edge, 43 + 10 log (P) dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth. In addition, the attenuation factor shall not be less that 43 + 10 log (P) dB on all frequencies between 2490.5 MHz and 2496 MHz and 55 + 10 log (P) dB at or below 2490.5 MHz.
- 2. For NR operation, all subcarrier spacings (SCS) and transmission schemes (e.g. CP-OFDM and DFT-s-OFDM) 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.
- 3. For this section, only the sub antenna band edge emissions are in this report, the main antenna band edge emissions are in the original filing report.
- 4. In this section, the UL-MIMO NR band n41 (main and sub antennas) plots has a 3dB correction applied to the individual plots to address the MIMO requirements in ANSI C63.26.

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### UL-MIMO NR Band n41 – Main Antenna

🔤 Keysi	ight Spectrum	Analyzer - Spu	rious Emission	15									- 0 💌
LXI RL	F	RF 50 Ω	DC C	ORREC	Cente	SENSE:INT	1600000		LIGN AUTO	11:05:16 P Radio Std	M Jul 12, 2022	Fre	equency
DAC	•				Trig:	Free Run							
PAS.	<u> </u>			FGain:Lo	w #Atte	n: 32 dB				Radio Dev	rice: BTS		
10 dB	div	Ref 30.0	0 dBm										
20.0												- C	ontor From
10.0												2 5 4 6	
												2.540	000000 GHZ
10.00						ļ –							
-10.0													
-20.0													
-30.0 -						لمىر					mme		
-4U.U  -					- A A A A A A A A A A A A A A A A A A A								
-50.0													
-60.0													
Start	2.371 (	GHz								Stop 2	.621 GHz		
										- 400P			CF Step
Cour	Banga	Stort Erec	t Stop	Eroa	DDW	Ereguery		Amplit	uda	≜ Linsit		25.	000000 MHz
1 1	1 Kange	2 3710 GH	7 2490	15 GHz	1 000 MHz	2 4899978	99 GH7	-35.99 c	IBm	-10.99 dB		Auto	Ivian
2	2	2.4905 GH	z 2.495	50 GHz	1.000 MHz	2.4950000	)00 GHz	-34.29 (	:Bm	-21.29 dB			
3	3	2.4950 GH	z 2.496	60 GHz	1.000 MHz	2.4960000	)00 GHz	-26.64 c	:Bm	-13.64 dB		F	req Offset
4	4	2.4960 GH	z 2.621	0 GHz	1.000 MHz	2.5371646	659 GHz	: 1.229 d	Bm	-23.77 dB			0 Hz
MSG				_			_	_	STAT	115			
mod									STAT				

Plot 7-36. Lower ACP Plot (NR Band n41 - 100MHz CP-OFDM-QPSK - Full RB - Main ANT)

Keysi	ight Spectrum	Analyzer - Spuric	us Emissions							• 💌
LXI RL	F	F   50 Ω	DC CORREC	Cente	SENSE:INT	1000 GHz	AUTO   11:05:54 Radio St	PM Jul 12, 2022	Freque	ncy
PAS	S		IEGain:L	Trig:	Free Run n: 32 dB		Radio De	evice: BTS		
			II Guine							
10 dB	div	Ref 30.00	dBm							
20.0									Cente	r Freq
10.0									2.6400000	00 GHz
0.00										
-10.0										
-20.0										
-30.0										
-40.0										
-50.0								~~~~~~		
-60.0										
Start	2 565 (	2H7					Ston	2 815 GHz		
otait	. 2.303 (	9112					Gtop	2.013 0112	С	F Step
Course	Denne	Ctout From	Cton From			0 mm litter of a			25.0000	00 MHz
1 1	1 Kange	2 5650 GHz	2 6900 GHz		2 642309237 G	Hz 1 187 dBm	-23.81 d	R	Auto	Man
2	2	2.6900 GHz	2.6910 GHz	1.000 MHz	2.690000000 G	Hz -28.62 dBm	-18.62 d	B		
3	3	2.6910 GHz	2.6950 GHz	1.000 MHz	2.691040000 G	Hz -34.96 dBm	-24.96 d	В	Freq	Offset
4	4	2.6950 GHz	2.7900 GHz	1.000 MHz	2.695502646 G	Hz -35.48 dBm	-22.48 d	В		0 Hz
5	5	2.7900 GHz	2.8150 GHz	1.000 MHz	2.791750000 G	Hz -48.01 dBm	-23.01 d	В		
MSG							STATUS			

Plot 7-37. Upper ACP Plot (NR Band n41 - 100MHz CP-OFDM-QPSK – Full RB – Main ANT)

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### UL-MIMO NR Band n41 – Sub Antenna

🔤 Keysi	ight Spectrum	Analyzer - Spurio	ous Emissions						-	
LXI RL	F	RF 50 Ω	DC CORREC	Cente	SENSE:INT	ALIGN AU	TO 07:39:29 PI Radio Std	MJul 12, 2022	Freque	ncy
DAC	•			Trig:	Free Run					
PAS	<u> </u>		IFGain:Lo	ow #Atte	n: 32 dB		Radio Dev	ice: BTS		
10 dB	//div	Ref 30.00	dBm							
Log 20.0L										
10.0									Cent	er Freq
10.0									2.546000	JOO GHZ
0.00					1					
-10.0										
-20.0										
-30.0										
-40.0										
-50.0				~~~						
-60.0										
	0.074									
start	2.371 0	SHZ					Stop 2	.621 GHZ		•E Sten
									525.200	DOO MHZ
Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	∆ Limit		<u>Auto</u>	Man
1	1	2.3710 GHz	2.4905 GHz	1.000 MHz	2.490500000	GHz -36.54 dBm	-11.54 dB			
2	2	2.4905 GHz	2.4950 GHz	1.000 MHz	2.495000000	GHZ - 34.86 dBm	-21.86 dB		Free	Offect
3	3	2.4950 GHZ	2.4960 GHZ	1.000 MHz	2.4960000000	3Hz   -20.39 dBm	- 13.39 dB		TIEC	
-		12.4000 OH 2	2.0210 0112	11.000 10112	2.301322000					0112
MSG						ST	ATUS			

Plot 7-38. Lower ACP Plot (NR Band n41 - 100MHz CP-OFDM-QPSK - Full RB - Sub ANT)



Plot 7-39. Upper ACP Plot (NR Band n41 - 100MHz CP-OFDM-QPSK - Full RB - Sub ANT)

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🔤 Keys	ight Spectrum	Analyzer - Spurio	us Emissions							- ×
LXI RL	.	RF 50 Ω	DC CORREC		SENSE:INT	ALIGN AUT	0 07:48:04 PI	M Jul 12, 2022	Frequen	cv
				Cente	er Freq: 2.5410000 Free Run	JOU GHZ	Radio Std:	None	riequeri	~ <b>,</b>
PAS	S		IFGain:Lo	w #Atte	n: 32 dB		Radio Dev	ice: BTS		
10 dE	3/div	Ref 30.00	dBm							
20.0										-
20.0									Cente	r Freq
10.0									2.54100000	0 GHz
0.00								·		
-10.0										
-20.0										
20.0					J			6		
-30.0								la harrier		
-4U.U										
-50.0										
-60.0										
Star	t 2.396 (	GHz					Stop 2.	.596 GHz		
									CF	Step
Spur	Range	Start Fred	Stop Freg	RBW	Frequency	Amplitude	∆ Limit		22.50000	Man
1	1	2.3960 GHz	2.4905 GHz	1.000 MHz	2.490500000 GH		-9.571 dB		<u>- (uto</u>	man
2	2	2.4905 GHz	2.4950 GHz	1.000 MHz	2.494640000 GH	Hz -32.46 dBm	-19.46 dB			
3	3	2.4950 GHz	2.4960 GHz	910.0 kHz	2.496000000 GH	Hz -27.74 dBm	-14.74 dB		Freq	Offset
4	4	2.4960 GHz	2.5960 GHz	1.000 MHz	2.50655276 <u>4</u> GH	Hz 1.765 dBm	-23.23 dB			0 Hz
MSG						ST	ATUS		L	
						517				

Plot 7-40. Lower ACP Plot (NR Band n41 - 90MHz CP-OFDM-QPSK - Full RB - Sub ANT)

🔤 Keysi	ght Spectrum	Analyzer - Spuriou	is Emissions							_	
LXI RL	1	RF 50 Ω	DC CORREC	Contr	SENSE:INT	ALIG	N AUTO	07:48:40 Pl	M Jul 12, 2022	Frequ	ency
				Trig:	Free Run	JOU GHZ		taulo stu.	None	· ·	
PAS	S		IFGain:Lov	v #Atte	n: 32 dB		F	Radio Dev	ice: BTS		
10 dB	/div	Ref 30.00	dBm								
Log											
20.0										Cen	ter Freq
10.0										2.645010	000 GHz
0.00		·									_
-10.0		í									
00.0											
-20.0											
-30.0					- man-						
-40.0											
-50.0							<u> </u>				
-60.0											
000.0											
Start	2.578 (	GHz						Stop 2	.803 GHz		
											CF Step
Sour	Pange	Start Fred	Stop Fred	PRW	Frequency	Amplitud		à Limit		22.500	000 MHz
1 1	1 Interinge	2 5775 GHz	2 6900 GHz	1 000 MHz	2 603616071 CI			22.12.dR		Auto	wan
2	2	2.6900 GHz	2.6910 GHz	1.000 MHz	2.690000000	Hz - 28 46 dBr	m _	18 46 dB			
3	3	2.6910 GHz	2.6950 GHz	1.000 MHz	2 691120000 GF	Hz -31 29 dBr	m -	21 29 dB		Fre	a Offset
4	4	2 6950 GHz	2 7800 GHz	1.000 MHz	2 695000000 GI	Hz -32 72 dBr	m -	19.72 dB			0 Hz
5	5	2.7800 GHz	2.8025 GHz	1.000 MHz	2.785850000 GI	Hz -47.76 dBr	m -	22.76 dB			0112
MSG							STATUS				
MSG							STATUS				

Plot 7-41. Upper ACP Plot (NR Band n41 - 90MHz CP-OFDM-QPSK - Full RB - Sub ANT)

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🔤 Keys	ight Spectrum	Analyzer - Spurio	ous Emissions										[	- • •
LXI RL	F	RF 50 Ω	DC COR	REC	Canto	SENSE:	INT	000	AI	LIGN AUTO	07:55:39	PM Jul 12, 2022	Fre	auencv
					Trig:	Free R	: 2.030990 un	000	GHZ		Radio St	a: None		
PAS	S		IFG	Gain:Low	#Atter	n: 32 d	в				Radio De	evice: BTS		
40 -15	2	Dof 20.00	dBm											
Loa	siaiv	Rel 30.00	UDIII											
20.0													c	enter Freg
10.0													2 5 3 5	
0.00								~~					2.000	990000 GH2
0.00														
-10.0						F								
-20.0														
-30.0														
-40.0														
-50.0	·····				~~~									
00.0														
-6U.U														
Star	2.396 (	GH7									Ston	2 596 GHz		
	. 21000 4										erop			CF Step
								_					20.	000000 мн <sup>і</sup> г
Spu	Range	Start Freq	Stop F	req	RBW	Freq	uency		Amplit	ude	∆Limit		<u>Auto</u>	Man
1	1	2.3960 GHz	2.4905	GHz	1.000 MHz	2.490	500000 G	Hz	-36.47 c	Bm	-11.47 d	8		
2	2	2.4905 GHz	2.4950	GHZ	1.000 MHz	2.494	775000 G	HZ	- <u>33.84 c</u>	IBm	-20.84 d	<u>B</u>	-	
3	3	2.4950 GHz	2.4960	GHZ	820.0 KHZ	2.495	980000 G	HZ	-33.830	IBM	-20.83 d	8		requise
4	4	2.4960 GHZ	2.5960	GHZ	T.000 MHZ	2.508	562814 G	HZ	2.274 a	BIN	-22.73 d	8		0 HZ
MSG										STAT	rus			

Plot 7-42. Lower ACP Plot (NR Band n41 - 80MHz CP-OFDM-QPSK - Full RB - Sub ANT)

🔤 Keysi	ght Spectrum	Analyzer - Spuriou	us Emissions								
LXI RL	F	RF 50 Ω	DC CORREC	Cont	SENSE:INT	ALIGN /	AUTO	07:56:19 P	M Jul 12, 2022	Freque	ncv
				Tria:	Free Run	UU GHZ		Radio Sta	None		
PAS	S		IFGain:Lov	v #Atte	n: 32 dB			Radio Dev	rice: BTS		
		Dof 20.00	dBm								
	laiv	Rel 30.00	ивш								
20.0										Cente	er Fred
10.0										2 6500200	
0.00										2.6500200	UU GHZ
0.00		ſ									
-10.0											
-20.0		J									
-30.0											
-40 0											
70.0						and the second s	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~			
-30.0											
-60.0											
Start	2.50.0	L						Cton	2 70 CHz		
Start	2.39 G	Π2						ອເບມ	2.79 GHZ	C	F Sten
										20.0000	00 MHz
Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude		∆ Limit		Auto	Man
1	1	2.5900 GHz	2.6900 GHz	1.000 MHz	2.611608040 GF	lz 2.127 dBm		-22.87 dB			
2	2	2.6900 GHz	2.6910 GHz	1.000 MHz	2.690000000 GH	lz -30.04 dBm		-20.04 dB			
3	3	2.6910 GHz	2.6950 GHz	1.000 MHz	2.691720000 GH	iz -32.88 dBm		-22.88 dB		Freq	Offset
4	4	2.6950 GHz	2.7700 GHz	1.000 MHz	2.695000000 GH	lz -34.55 dBm		-21.55 dB			0 Hz
5	5	2.7700 GHz	2.7900 GHz	1.000 MHz	2.774800000 GH	lz -47.87 dBm		-22.87 dB			
MSG							STATUS				

Plot 7-43. Upper ACP Plot (NR Band n41 - 80MHz CP-OFDM-QPSK – Full RB – Sub ANT)

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🔤 Keys	ight Spectrum	Analyzer - Spurio	ous Emissions										- • •
LXI RL	.	RF 50 Ω	DC COR	REC	Canta	SENSE:INT	0000	A	LIGN AUTO	08:02:37 P	M Jul 12, 2022	Fre	auencv
					Tria:	Free Run	0000	GHZ		Radio Sta	: None		1
PAS	S		IFG	Gain:Low	#Atter	n: 32 dB				Radio Dev	rice: BTS		
10 45	1246	Dof 20.00	dBm										
Log	salv	Kel JU.UU	ubili										
20.0												C	enter Freg
10.0												2 5 2 6	
0.00								-				2.0200	00000 0112
10.00						i i							
-10.0						_							
-20.0													
-30.0													
-40.0					1 marine								
-50.0				varia and									
co.o													
-60.0													
Star	t 2.421 (	GHz					_			Stop 2	.571 GHz		
													CF Step
												15.0	000000 MHz
Spu	Range	Start Freq	Stop F	req	RBW	Frequency		Amplit	ude	∆ Limit		<u>Auto</u>	Man
1	1	2.4210 GHz	2.4905	GHZ	1.000 MHz	2.490384167	GHZ	-33.69 0	1Bm	-8.689 dB			
2	2	2.4905 GHZ	2.4950	GHZ	1.000 MHZ	2.492877500	GHZ	32.54 0	aBm	-19.54 dB		F	
3	3	2.4950 GHZ	2.4960			2.495995555		-34.310 2.041 d	Jonn Rm	-21.31 dB		•	ieq onset
4	4	2.4900 GHZ	2.5710	Griz	1.000 Mil 12	2.499075000	Grizp	5.94 T U		-21.00 ub			0 H2
	_		_	_	_		_	_					
MSG									STAT	US			

Plot 7-44. Lower ACP Plot (NR Band n41 - 60MHz CP-OFDM-QPSK - Full RB - Sub ANT)

🔤 Keysi	ght Spectrum	Analyzer - Spuriou	is Emissions						
LXI RL		RF 50 Ω	DC CORREC	Contr	SENSE:INT	ALIGN A	UTO 08:03:13 P	M Jul 12, 2022	Frequency
				Trig:	Free Run	000 G112	Radio Stu	. None	
PAS	s		IFGain:Lov	v #Atte	n: 32 dB		Radio Dev	rice: BTS	
10 dB	/div	Ref 30.00	dBm						
Log									
20.0									Center Freq
10.0									2.660010000 GHz
0.00					<u> </u>				
-10.0		<b> </b>							
-20.0									
-30.0									
40.0									
-40.0									
-50.0 -									
-60.0									
Stort	2 615 /	 ∼⊔					Stop 2	765 CH2	
Start	2.013	302					Stop 2	.703 GHZ	CF Step
									15.000000 MHz
Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	∆ Limit		<u>Auto</u> Man
1	1	2.6150 GHz	2.6900 GHz	1.000 MHz	2.633750000 GI	Hz 3.433 dBm	-21.57 dB		
2	2	2.6900 GHz	2.6910 GHz	1.000 MHz	2.690006667 GI	Hz -25.89 dBm	-15.89 dB		Ener Offerst
3	3	2.6910 GHz	2.6950 GHz	1.000 MHz	2.694946667 G	Hz -35.68 dBm	-25.68 dB		FreqOnset
4	4	2.6950 GHz	2.7500 GHz	1.000 MHz	2.695000000 GI	Hz -36.33 dBm	-23.33 dB		0 Hz
<u> </u>	S	2.7500 GHZ	2.7650 GHZ	T.UUU MHZ	[2.760575000 GI	HZ  -47.09 dBm	-22.09 dB		
	_						· ·		
MSG						S	STATUS		

Plot 7-45. Upper ACP Plot (NR Band n41 - 60MHz CP-OFDM-QPSK - Full RB - Sub ANT)

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			1/0 0 1/0/0000		



E Keys	ight Spectrum	Analyzer - Spurio	ous Emissions										- • •
LXI RL	. F	¥F 50 Ω	DC COF	RREC	Canto	SENSE:INT	20000	ALI	GN AUTO	08:09:58 P	M Jul 12, 2022	Fred	uencv
					Trig:	Free Run	20000	GHZ		Radio Sta	None		
PAS	S		IFO	Gain:Low	, #Atte	n: 32 dB				Radio Dev	rice: BTS		
40.15		D-6 20.00	dDae										
10 dE	s/div	Ref 30.00	aBm	1									
20.0												Co	nter Fred
10.0												0.5040	
0.00												2.5210.	20000 GHZ
U.UU													
-10.0						f							
-20.0													
-30.0													
-40.0											my		
50.0													
-50.0													
-60.0													
Otor	2 4 24 /	ـــــــــــــــــــــــــــــــــــــ								Stop 7	550 CH2		
Star	. 2.434 \	9112								Stop 2	.555 GHZ		CE Step
												12.50	00000 MHz
Spu	Range	Start Freq	Stop	req	RBW	Frequency		Amplitu	de	∆ Limit		<u>Auto</u>	Man
1	1	2.4335 GHz	2.4905	GHz	1.000 MHz	2.490500000	GHz	-39.50 dE	3m	-14.50 dB			
2	2	2.4905 GHz	2.4950	GHz	1.000 MHz	2.494865000	GHz	-34.36 dE	3m	-21.36 dB		_	
3	3	2.4950 GHz	2.4960	GHz	560.0 kHz	2.496000000	GHz	-34.05 dE	3m	-21.05 dB		Fr	eq Offset
4	4	2.4960 GHz	2.5585	GHz	560.0 kHz	2.498533784	GHz	1.922 dB	m	-23.08 dB			0 Hz
MSG									STAT	US			

Plot 7-46. Lower ACP Plot (NR Band n41 - 50MHz CP-OFDM-QPSK - Full RB - Sub ANT)



Plot 7-47. Upper ACP Plot (NR Band n41 - 50MHz CP-OFDM-QPSK - Full RB - Sub ANT)

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		· · · · · · · · · · · · · · · · · · ·	V3.0 1/6/2022	



🔤 Keys	ight Spectrum	Analyzer - Spurio	us Emissions						
LX/ RL		RF 50 Ω	DC CORREC		SENSE:INT	ALIGN AUT	08:16:47 P	M Jul 12, 2022	Frequency
				Cente	er Freq: 2.5160100 Free Run	00 GHz	Radio Std	None	rioquonoy
PAS	S		IFGain:Lo	w #Atte	n: 32 dB		Radio Dev	ice: BTS	
		B-5 00 00	-ID						
10 dE	s(div	Ref 30.00	aBm						
20.0									Contor From
10.0									Center Freq
10.0									2.516010000 GHZ
0.00							,		
-10.0					<del> </del> +				
-20.0									
-30.0									
40.0									
-40.0								and the second se	
-50.0									
-60.0									
Otor	0 4 4 6 4	<u> </u>					Oton 2	546 011-	
Stan	Z.440 (	JHZ					Stop 2	.940 GHZ	CE Sten
									10.000000 MHz
Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	💧 🛆 Limit		Auto Man
1	1	2.4460 GHz	2.4905 GHz	1.000 MHz	2.489165000 GH	lz -36.43 dBm	-11.43 dB		
2	2	2.4905 GHz	2.4950 GHz	1.000 MHz	2.495000000 GH	lz -35.34 dBm	-22.34 dB		
3	3	2.4950 GHz	2.4960 GHz	430.0 kHz	2.496000000 GH	lz -36.75 dBm	-23.75 dB		Freq Offset
4	4	2.4960 GHz	2.5460 GHz	430.0 kHz	2.501411255 GH	lz 2.035 dBm	-22.96 dB		0 Hz
MSG						ST	ATUS		

Plot 7-48. Lower ACP Plot (NR Band n41 - 40MHz CP-OFDM-QPSK - Full RB - Sub ANT)

🔤 Keysi	ght Spectrum	Analyzer - Spuriou	is Emissions						
LXI RL		RF 50 Ω	DC CORREC	Contr	SENSE:INT	ALIGN A	UTO 08:17:22	M Jul 12, 2022	Frequency
				Trig:	Free Run	00 912	Radio Ste	. None	
PAS	S		IFGain:Lov	w #Atte	n: 32 dB		Radio De	vice: BTS	
10 40	(diu	Pof 30.00	dBm						
		Ker 30.00							
20.0									Center Freq
10.0									2 67000000 CH7
0.00									2.070000000 8112
0.00									
-10.0									
-20.0		f – – –							
-30.0									
-40.0		Į			hormon				
50.0									
-30.0									
-6U.U									
Start	264 C	H7					Ston	2 74 GHz	
otait	2.04 0	112					otop	2.74 GHZ	CF Step
									10.000000 MHz
Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	∆ Limit		<u>Auto</u> Man
1	1	2.6400 GHz	2.6900 GHz	430.0 kHz	2.654718615 GH	lz 1.749 dBm	-23.25 dE	3	
2	2	2.6900 GHz	2.6910 GHz	820.0 kHz	2.690000000 GH	lz -36.11 dBm	-26.11 dE		
3	3	2.6910 GHz	2.6950 GHz	1.000 MHz	2.691000000 GH	lz -35.66 dBm	-25.66 dE	3	FreqOffset
4	4	2.6950 GHz	2.7300 GHz	1.000 MHz	2.695350000 GH	lz -37.10 dBm	-24.10 dE	3	0 Hz
5	5	2.7300 GHz	2.7400 GHz	1.000 MHz	2.730000000 GH	lz  -44.17 dBm	-19.17 dE	3	
MSG						s	STATUS		

Plot 7-49. Upper ACP Plot (NR Band n41 - 40MHz CP-OFDM-QPSK – Full RB – Sub ANT)

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			1/0 0 1/0/0000



🛄 Keys	ight Spectrum	Analyzer - Spurio	ous Emissions								[	- • ×
LXI RL	. 1	RF 50 Ω	DC CORR	EC		SENSE:INT		ALIGN AUTO	08:23:44 P	M Jul 12, 2022	Fre	quency
					Trig: F	req: 2.511000	JUUU GHZ		Radio Std	None		
PAS	S		IFGa	in:Low	#Atten	: 32 dB			Radio Dev	ice: BTS		
10 dE	1/41	Dof 20.00	dBm									
	SULA	Kel JU.UU	UBIII									
20.0											с	enter Freg
10.0											2 5 1 1	000000 GHz
0.00							······································	······			2.011	
10.0												
-10.0												
-20.0												
-30.0									+			
-40.0						אר"			\ 			
-50.0	·											
-60.0												
Star	t 2.459 (	GHz							Stop 2	.534 GHz		
											-	CF Step
Spu	Range	Start Fred	Stop Fr	ea R	BW	Frequency	Ampl	itude	∆ Limit		Auto 7.	Man
1	1	2.4585 GHz	2.4905 0	Hz 1.0	000 MHz 2	2.490500000 (	Hz -37.97	dBm	-12.97 dB		Auto	man
2	2	2.4905 GHz	2.4950 G	Hz 1.0	000 MHz 🕯	2.494775000 (	Hz -36.69	dBm	-23.69 dB			
3	3	2.4950 GHz	2.4960 G	Hz 33	0.0 kHz 🛛	2.495740000 (	Hz -38.68	dBm	-25.68 dB		F	req Offset
4	4	2.4960 GHz	2.5335 G	Hz 33	60.0 kHz 🛛	2.505789823 (	Hz 2.285	dBm	-22.71 dB			0 Hz
MSG								STATU	S			

Plot 7-50. Lower ACP Plot (NR Band n41 - 30MHz CP-OFDM-QPSK - Full RB - Sub ANT)



Plot 7-51. Upper ACP Plot (NR Band n41 - 30MHz CP-OFDM-QPSK - Full RB - Sub ANT)

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🔤 Keys	ight Spectrum	Analyzer - Spurio	us Emissions							×
LXI RL	.	RF 50 Ω	DC CORREC	Canto	SENSE:INT	ALIGN AU	TO 08:31:21 P	M Jul 12, 2022	Frequency	
				Tria:	Free Run	UU GHZ	Radio Std	None	, , , , , , , , , , , , , , , , , , , ,	
PAS	S		IFGain:Lov	w #Atte	n: 32 dB		Radio Dev	rice: BTS		
10 45	1246	Dof 20.00	dBm							
	salv	Kel JU.00	ивш							
20.0									Center Fre	a
10.0									2 505990000 GH	-17
0.00					~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		2.0000000000	12
10.00					1					
-10.0										
-20.0										
-30.0										
-40.0					~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		<u> </u>	a martine		
-50.0										
60.0										
-00.0										
Star	t 2.471 (	GHz					Stop 2	.521 GHz		
									CF Ste	p
				Loow		ا بند ا	1 1		5.000000 MH	١z
Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude			<u>Auto</u> Ma	an
		2.47 TO GHZ	2.4905 GHZ		2.490500000 GF	12 - 37 .77 dBm	-12.77 dB			
2	2	2.4900 GHZ	2.4950 GHZ	240.01/14	2.4949 10000 GF	12 - 34.7 TUDIII	-21.71 uB		Freq Offs	et
4	4	2.4950 GHZ	2.4900 GHz	240.0 KHz	2.493940000 Gr	12 - 38.07 dBm	-23.07 dB		0	17
		12.4000 0112	2.0210 0112	240.0 Ki 12	2.001404700 01	12   2.701 dBitt	-22.50 dB		01	12
MEG	_	_					ATUS			
MSG						SI	ATUS			

Plot 7-52. Lower ACP Plot (NR Band n41 - 20MHz CP-OFDM-QPSK - Full RB - Sub ANT)



Plot 7-53. Upper ACP Plot (NR Band n41 - 20MHz CP-OFDM-QPSK - Full RB - Sub ANT)

FCC ID: PY7-57325M		PART 27 MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	Approved by: Technical Manager	
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### 7.6 Radiated Power (EIRP)

#### **Test Overview**

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

#### Test Procedures Used

ANSI C63.26-2015 - Section 5.2.4.4

#### **Test Settings**

- Radiated power measurements are performed using the signal analyzer's "channel power" measurement capability for signals with continuous operation. For signals with burst transmission, the signal analyzer's "time domain power" measurement capability is used
- 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  $\geq$  2 x span / RBW
- 6. Detector = RMS
- 7. Trigger is set to "free run" for signals with continuous operation with the sweep times set to "auto". Trigger is set to enable triggering only on full power bursts with the sweep time set less than or equal to the transmission burst duration.
- 8. The integration bandwidth was roughly set equal to the measured OBW of the signal for signals with continuous operation. For signals with burst transmission, the "gating" function was enabled to ensure that measurements are performed during times in which the transmitter is operating at its maximum power.
- 9. Trace mode = trace averaging (RMS) over 100 sweeps
- 10. The trace was allowed to stabilize.

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#### Test Setup

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



Figure 7-5. Radiated Test Setup >1GHz

#### Test Notes

- 1) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst-case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the tables below.
- 2) This unit was tested with its standard battery.
- 3) For NR operation, all subcarrier spacings (SCS) and transmission schemes (e.g. CP-OFDM and DFT-s-OFDM) 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.
- 4) For radiated power (EIRP), UL-MIMO test case have both the main and sub antenna transmitting simultaneously.

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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]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
łz	QPSK	2546.0	Н	129	212	9.38	1 / 68	5.93	15.31	0.034	33.01	-17.70
MF	QPSK	2593.0	Н	127	212	9.49	1 / 136	6.56	16.05	0.040	33.01	-16.96
00	QPSK	2640.0	Н	137	208	9.89	1 / 68	6.20	16.09	0.041	33.01	-16.92
÷	16-QAM	2593.0	Н	127	212	9.49	1 / 136	6.03	15.52	0.036	33.01	-17.49
N	QPSK	2541.0	Н	129	212	9.39	1 / 61	5.86	15.25	0.033	33.01	-17.76
НИ	QPSK	2593.0	Н	127	212	9.49	1 / 61	6.67	16.16	0.041	33.01	-16.85
	QPSK	2645.0	Н	137	208	9.91	1 / 61	6.16	16.07	0.040	33.01	-16.94
0,	16-QAM	2593.0	Н	127	212	9.49	1 / 61	5.89	15.38	0.035	33.01	-17.63
N	QPSK	2536.0	Н	129	212	9.40	1 / 54	5.95	15.35	0.034	33.01	-17.66
НИ	QPSK	2593.0	Н	127	212	9.49	1 / 54	6.64	16.13	0.041	33.01	-16.88
	QPSK	2650.0	Н	137	208	9.93	1 / 54	6.10	16.03	0.040	33.01	-16.98
8	16-QAM	2593.0	Н	127	212	9.49	1 / 54	6.02	15.51	0.036	33.01	-17.50
N	QPSK	2526.0	Н	129	212	9.43	1 / 40	5.92	15.35	0.034	33.01	-17.66
НИ	QPSK	2593.0	Н	127	212	9.49	1 / 40	6.78	16.27	0.042	33.01	-16.74
1 0	QPSK	2660.0	Н	137	208	9.85	1 / 40	6.39	16.24	0.042	33.01	-16.77
9	16-QAM	2593.0	Н	127	212	9.49	1 / 40	6.07	15.56	0.036	33.01	-17.45
N	QPSK	2521.0	Н	129	212	9.45	1 / 33	6.01	15.46	0.035	33.01	-17.55
НИ	QPSK	2593.0	Н	127	212	9.49	1 / 33	6.91	16.40	0.044	33.01	-16.61
1 03	QPSK	2665.0	Н	137	208	9.84	1 / 66	6.30	16.13	0.041	33.01	-16.88
42	16-QAM	2593.0	Н	127	212	9.49	1 / 33	6.12	15.61	0.036	33.01	-17.40
N	QPSK	2516.0	Н	129	212	9.48	1 / 53	5.95	15.43	0.035	33.01	-17.58
НИ	QPSK	2593.0	Н	127	212	9.49	1 / 53	6.91	16.40	0.044	33.01	-16.61
9	QPSK	2670.0	Н	137	208	9.82	1 / 53	6.36	16.18	0.042	33.01	-16.83
ষ	16-QAM	2670.0	Н	137	208	9.82	1 / 53	5.63	15.45	0.035	33.01	-17.56
N	QPSK	2511.0	Н	129	212	9.50	1 / 19	6.09	15.60	0.036	33.01	-17.41
НИ	QPSK	2593.0	Н	127	212	9.49	1 / 39	6.64	16.13	0.041	33.01	-16.88
0	QPSK	2675.0	Н	137	208	9.85	1 / 19	6.44	16.28	0.042	33.01	-16.73
с С	16-QAM	2593.0	Н	127	212	9.49	1 / 39	6.12	15.61	0.036	33.01	-17.40
N	QPSK	2506.0	Н	129	212	9.50	1 / 25	5.95	15.45	0.035	33.01	-17.56
НИ	QPSK	2593.0	Н	127	212	9.49	1 / 37	6.39	15.88	0.039	33.01	-17.13
0	QPSK	2680.0	Н	137	208	9.87	1 / 25	6.00	15.87	0.039	33.01	-17.14
>	16-QAM	2593.0	Н	127	212	9.49	1 / 37	5.81	15.30	0.034	33.01	-17.71
100 MH-	QPSK (Opposite Pol.)	2640.0	V	125	337	9.50	1/68	5.22	14.72	0.030	33.01	-18.29
	QPSK (WCP)	2640.0	Н	137	208	9.89	1/68	5.58	15.47	0.035	33.01	-17.54

Table 7-1. EIRP Data UL-MIMO NR Band n41 (PC3))

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### 7.7 Radiated Spurious Emissions Measurements

#### **Test Overview**

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

#### **Test Procedures Used**

ANSI C63.26-2015 - Section 5.5.4

#### **Test Settings**

- 1. RBW = 100kHz for emissions below 1GHz and 1MHz for emissions above 1GHz
- 2. VBW  $\ge$  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 = Average (Max Hold for pulsed emissions)
- 7. The trace was allowed to stabilize

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#### Test Setup

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



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

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#### Test Notes

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

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### UL-MIMO NR Band n41 (PC3)





Bandwidth (MHz): 100									
Frequency (MHz): 2593.0									
<b>RB / Offset:</b> 1 / 136									
Mode:	UL-MIMO								
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]
109.40	Н	-	-	-70.14	-16.77	20.09	-75.17	-25.00	-50.17
	Table 7.2 Redicted Spurious Date (III, MIMO NR Rend p41)								

Table 7-2. Radiated Spurious Data (UL-MIMO NR Band n41)

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Bandwidth (MHz):	100
Frequency (MHz):	2546.0
RB / Offset:	1 / 136
Mode:	UL-MIMO

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]
5092.00	н	-	-	-72.71	9.98	44.27	-50.99	-25.00	-25.99
7638.00	н	-	-	-75.49	16.47	47.98	-47.27	-25.00	-22.27
10184.00	Н	-	-	-76.46	20.95	51.49	-43.77	-25.00	-18.77

Table 7-3. Radiated Spurious Data (UL-MIMO NR Band n41- Low Channel)

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Bandwidth (MHz):	100
Frequency (MHz):	2593.0
RB / Offset:	1 / 136
Mode:	UL-MIMO
Mode:	UL-MIMO

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]
5186.00	н	-	-	-73.31	10.50	44.19	-51.07	-25.00	-26.07
7779.00	н	-	-	-74.31	16.31	49.00	-46.26	-25.00	-21.26
10372.00	Н	-	-	-74.98	20.12	52.14	-43.12	-25.00	-18.12

Table 7-4. Radiated Spurious Data (UL-MIMO NR Band n41- Mid Channel)

Bandwidth (MHz):	100
Frequency (MHz):	2640.0
RB / Offset:	1 / 136
Mode:	UL-MIMO

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]
5280.00	Н	-	-	-73.72	10.48	43.76	-51.49	-25.00	-26.49
7920.00	Н	-	-	-74.40	16.35	48.95	-46.31	-25.00	-21.31
10560.00	Н	-	-	-75.19	20.50	52.31	-42.95	-25.00	-17.95

Table 7-5. Radiated Spurious Data (UL-MIMO NR Band n41- High Channel)

Case:	w/ Wireless Charging Pad
Bandwidth (MHz):	100
Frequency (MHz):	2593.0
RB / Offset:	1 / 136
Mode:	UL-MIMO

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]
5186.00	Н	-	-	-73.42	10.50	44.08	-51.18	-25.00	-26.18
7779.00	Н	-	-	-74.46	16.31	48.85	-46.41	-25.00	-21.41
10372.00	Н	-	-	-75.64	20.12	51.48	-43.78	-25.00	-18.78

Table 7-6. Radiated Spurious Data with WCP (UL-MIMO NR Band n41)

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### 8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **SONY Portable Handset FCC ID: PY7-57325M** complies with all the requirements of Part 27 of the FCC rules.

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