

**ELEMENT WASHINGTON DC LLC** 

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# PART 30 MEASUREMENT REPORT

#### **Applicant Name:**

Samsung Electronics Co., Ltd. 129, Samsung-ro, Yeongtong-gu, Suwon-si Gyeonggi-do, 16677, Korea Date of Testing: 07/11/2022- 08/17/2022 Test Report Issue Date: 08/25/2022 Test Site/Location: Element Lab., Columbia, MD, USA Test Report Serial No.: 1M2203290039-01.A3L

## FCC ID: APPLICANT:

## A3LSMS901U

Samsung Electronics Co., Ltd.

Application Type:	Class II Permissive Change
Model:	SM-S901U
Additional Model(s):	SM-S901U1
EUT Type:	Portable Handset
FCC Classification:	Part 30 Mobile Transmitter (5GM)
FCC Rule Part(s):	30
Test Procedure(s):	ANSI C63.26-2015, KDB 842590 D01 v01r02
Class II Permissive Change:	Adding 3CC & 4CC capabilities
Original Grant Date:	12/07/2021

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.

RJ Ortanez Executive Vice President



FCC ID:A3LSMS901U		Approved by: Technical Manager	
Test Report S/N:	Test Dates:	EUT Type:	Dogo 1 of 142
1M2203290039-01.A3L	07/11/2022- 08/17/2022	Portable Handset	Page 1 of 142
			V/1.0



# TABLE OF CONTENTS

1.0	INTR	ODUCTION	7
	1.1	Scope	7
	1.2	Element Test Location	7
	1.3	Test Facility / Accreditations	7
2.0	PRO	DUCT INFORMATION	8
	2.1	Equipment Description	8
	2.2	Device Capabilities	8
	2.3	Test Configuration	8
	2.4	Software and Firmware	9
	2.5	EMI Suppression Device(s)/Modifications	9
3.0	DESC	CRIPTION OF TESTS	10
	3.1	Measurement Procedure	10
	3.2	Radiated Power and Radiated Spurious Emissions	10
4.0	MEAS	SUREMENT UNCERTAINTY	12
5.0	TEST	EQUIPMENT CALIBRATION DATA	13
6.0	SAMF	PLE CALCULATIONS	14
7.0	TEST	RESULTS	15
	7.1	Summary	15
	7.2	Occupied Bandwidth	
	7.3	Equivalent Isotropic Radiated Power	49
	7.4	Radiated Spurious and Harmonic Emissions	77
	7.5	Band Edge Emissions	87
	7.6	Frequency Stability / Temperature Variation	117
8.0	CON	CLUSION	124
9.0	APPE	ENDIX A	125
	9.1	VDI Mixer Verification Certificate	125
	9.2	Test Scope Accreditation	129

FCC ID:A3LSMS901U		Approved by: Technical Manager	
Test Report S/N:	Test Dates:	EUT Type:	
1M2203290039-01.A3L	07/11/2022- 08/17/2022	Portable Handset	Page 2 of 142
			V1.0



# **PART 30 MEASUREMENT REPORT**

							Ell	RP	
Antenna	Band	Bandwidth [MHz]	Tx Frequency [MHz]	CCs Active	Modulation	Mode	Max Power [W]	Max Power [dBm]	Emission Designator
					QPSK	2Tx	0.158	21.98	147MG7D
				3	π/2 BPSK	2Tx	0.159	22.01	146MG7D
				3	16QAM	2Tx	0.101	20.06	147MW7D
M-Patch	n258-R1	50			64QAM	2Tx	0.080	19.04	146MW7D
IVI-F AICH	11230-111	50			QPSK	2Tx	0.150	21.76	196MG7D
				4 -	π/2 BPSK	2Tx	0.148	21.71	194MG7D
					16QAM	2Tx	0.096	19.84	196MW7D
			24250 - 24450		64QAM	2Tx	0.069	18.36	197MW7D
			24200 24400		QPSK	2Tx	0.140	21.47	-
					π/2 BPSK	2Tx	0.106	20.25	-
					16QAM	2Tx	0.088	19.45	-
N-Patch	n258-R1	50			64QAM	2Tx	0.064	18.07	-
		50			QPSK	2Tx	0.133	21.24	-
				4	π/2 BPSK	2Tx	0.132	21.20	-
				-	16QAM	2Tx	0.082	19.14	-
					64QAM	2Tx	0.065	18.12	-

EUT Overview (Band n258, 24.25- 24.45GHz)

FCC ID:A3LSMS901U		Approved by: Technical Manager	
Test Report S/N:	Test Dates:	EUT Type:	Dogo 2 of 142
1M2203290039-01.A3L	07/11/2022- 08/17/2022	Portable Handset	Page 3 of 142
			1/4.0



		Bandwidth		CCs			Ell	EIRP	
Antenna	Band		Tx Frequency		Modulation	Mode	Max Power	Max Power	Emission
		[MHz]	[MHz]	Active			[W]	[dBm]	Designator
					QPSK	2Tx	0.240	23.81	150MG7D
				3	π/2 BPSK	2Tx	0.239	23.79	150MG7D
				3	16QAM	2Tx	0.152	21.83	150MW7D
		50	24750 - 25250		64QAM	2Tx	0.103	20.11	149MW7D
		50	24750 - 25250		QPSK	2Tx	0.227	23.57	194MG7D
				4	π/2 BPSK	2Tx	0.223	23.48	194MG7D
				4	16QAM	2Tx	0.150	21.76	194MW7D
M-Patch	n258-R2				64QAM	2Tx	0.104	20.16	194MW7D
IVET AICH	11200-112				QPSK	2Tx	0.256	24.09	292MG7D
				3	π/2 BPSK	2Tx	0.253	24.03	293MG7D
				0	16QAM	2Tx	0.158	22.00	292MW7D
		100	24750 - 25250		64QAM	2Tx	0.102	20.09	294MW7D
		100		4	QPSK	2Tx	0.163	22.11	393MG7D
					π/2 BPSK	2Tx	0.162	22.09	392MG7D
					16QAM	2Tx	0.123	20.91	395MW7D
					64QAM	2Tx	0.079	18.99	396MW7D
		50		3	QPSK	2Tx	0.175	22.44	-
					π/2 BPSK	2Tx	0.175	22.43	-
					16QAM	2Tx	0.103	20.14	-
			24750 - 25250		64QAM	2Tx	0.081	19.09	-
		50	24750 - 25250		QPSK	2Tx	0.171	22.33	-
				4	π/2 BPSK	2Tx	0.170	22.31	-
				-	16QAM	2Tx	0.109	20.36	-
N-Patch	n258-R2				64QAM	2Tx	0.070	18.42	-
IN-F aluit	11230-172				QPSK	2Tx	0.186	22.70	-
				3	π/2 BPSK	2Tx	0.185	22.68	-
				5	16QAM	2Tx	0.117	20.67	-
		100	24750 - 25250		64QAM	2Tx	0.088	19.44	-
		100	24100-20200		QPSK	2Tx	0.123	20.89	-
				4	π/2 BPSK	2Tx	0.122	20.85	-
				4	16QAM	2Tx	0.075	18.77	-
					64QAM	2Tx	0.051	17.04	-

EUT Overview (Band n258, 24.75- 25.25GHz)

FCC ID:A3LSMS901U		Approved by: Technical Manager	
Test Report S/N:	Test Dates:	EUT Type:	
1M2203290039-01.A3L	07/11/2022- 08/17/2022	Portable Handset	Page 4 of 142
			V1 0



		Bandwidth	Tx Frequency	CCs			EIRP		Emission
Antenna	Band	[MHz]	[MHz]	Active	Modulation	Mode	Max Power	Max Power	Designator
		[IMITIZ]	נאורזצן	Active			[W]	[dBm]	Designator
					QPSK	2Tx	0.185	22.67	-
				3	π/2 BPSK	2Tx	0.186	22.70	-
				5	16QAM	2Tx	0.133	21.25	-
		50	27525 - 28325		64QAM	2Tx	0.091	19.60	-
		50	27323 - 20323		QPSK	2Tx	0.134	21.26	-
				4	π/2 BPSK	2Tx	0.153	21.85	-
				4	16QAM	2Tx	0.120	20.80	-
M-Patch	n261				64QAM	2Tx	0.085	19.32	-
IVI-F atch	11201				QPSK	2Tx	0.195	22.90	-
				3	π/2 BPSK	2Tx	0.195	22.91	-
				5	16QAM	2Tx	0.153	21.86	-
		100	27525 - 28325		64QAM	2Tx	0.123	20.91	-
		100		4	QPSK	2Tx	0.167	22.22	-
					π/2 BPSK	2Tx	0.165	22.18	-
					16QAM	2Tx	0.120	20.77	-
					64QAM	2Tx	0.095	19.79	-
		50		3	QPSK	2Tx	0.419	26.22	148MG7D
					π/2 BPSK	2Tx	0.425	26.28	148MG7D
			27525 - 28325	5	16QAM	2Tx	0.264	24.21	148MW7D
					64QAM	2Tx	0.187	22.71	148MW7D
		50	27323 - 20323		QPSK	2Tx	0.235	23.71	195MG7D
				4	π/2 BPSK	2Tx	0.234	23.68	197MG7D
				-	16QAM	2Tx	0.153	21.85	196MW7D
N-Patch	n261				64QAM	2Tx	0.095	19.77	197MW7D
Nº1 atom	11201				QPSK	2Tx	0.492	26.92	293MG7D
				3	π/2 BPSK	2Tx	0.499	26.98	292MG7D
				5	16QAM	2Tx	0.360	25.57	294MW7D
		100	27525 - 28325		64QAM	2Tx	0.281	24.49	293MW7D
		100	21020 - 20020		QPSK	2Tx	0.407	26.09	395MG7D
				4	π/2 BPSK	2Tx	0.402	26.05	395MG7D
				4	16QAM	2Tx	0.255	24.06	395MW7D
					64QAM	2Tx	0.174	22.41	397MW7D

EUT Overview (Band n261)

FCC ID:A3LSMS901U		PART 30 MEASUREMENT REPORT (Class II Permissive Change)			
Test Report S/N:	Test Dates:	EUT Type:	Page 5 of 142		
1M2203290039-01.A3L	07/11/2022- 08/17/2022	Portable Handset	Page 5 01 142		
			V1.0		



		Bandwidth		CCs			EI	EIRP	
Antenna	Band		Tx Frequency	Active	Modulation	Mode	Max Power	Max Power	Emission
		[MHz]	[MHz]	Active			[W]	[dBm]	Designator
					QPSK	2Tx	0.078	18.92	-
				3	π/2 BPSK	2Tx	0.079	18.98	-
				5	16QAM	2Tx	0.077	18.86	-
		50	37050 - 39950		64QAM	2Tx	0.055	17.41	-
		50	57050 - 55550		QPSK	2Tx	0.074	18.67	-
				4	π/2 BPSK	2Tx	0.073	18.62	-
				-	16QAM	2Tx	0.051	17.05	-
M-Patch	n260				64QAM	2Tx	0.036	15.58	-
in r diorr	11200				QPSK	2Tx	0.081	19.11	-
				3	π/2 BPSK	2Tx	0.083	19.17	-
				0	16QAM	2Tx	0.058	17.62	-
		100	37050 - 39950		64QAM	2Tx	0.042	16.22	-
			57565 55565	4	QPSK	2Tx	0.071	18.50	-
					π/2 BPSK	2Tx	0.071	18.52	-
					16QAM	2Tx	0.058	17.65	-
					64QAM	2Tx	0.040	16.03	-
		50		3	QPSK	2Tx	0.131	21.19	149MG7D
					π/2 BPSK	2Tx	0.129	21.10	148MG7D
					16QAM	2Tx	0.091	19.58	149MW7D
			37050 - 39950		64QAM	2Tx	0.071	18.49	149MW7D
		50	57050 - 55550		QPSK	MIMO	0.110	20.41	196MG7D
				4	π/2 BPSK	2Tx	0.105	20.20	198MG7D
				7	16QAM	2Tx	0.108	20.35	196MW7D
N-Patch	n260				64QAM	2Tx	0.078	18.92	198MW7D
	11200				QPSK	2Tx	0.107	20.29	298MG7D
				3	π/2 BPSK	2Tx	0.108	20.32	295MG7D
				0	16QAM	2Tx	0.077	18.88	297MW7D
		100	37050 - 39950		64QAM	2Tx	0.055	17.38	299MW7D
		100	01000 00000		QPSK	2Tx	0.104	20.16	395MG7D
				4	π/2 BPSK	2Tx	0.102	20.08	394MG7D
				Ŧ	16QAM	2Tx	0.100	19.99	394MW7D
					64QAM	2Tx	0.074	18.72	395MW7D

## EUT Overview (Band n260)

**Note:** Due to similar antenna performance from the antennas after thorough investigation, the Occupied Bandwidth was only measured on one antenna for each band.

FCC ID:A3LSMS901U		Approved by: Technical Manager	
Test Report S/N:	Test Dates:	EUT Type:	
1M2203290039-01.A3L	07/11/2022- 08/17/2022	Portable Handset	Page 6 of 142
		-	V1.0



## **1.0 INTRODUCTION**

## 1.1 Scope

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

## 1.2 Element Test Location

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

## 1.3 Test Facility / Accreditations

Measurements were performed at Element laboratory 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.

FCC ID:A3LSMS901U	PART 30 MEASUREMENT REPORT (Class II Permissive Change)		Approved by: Technical Manager	
Test Report S/N:	Test Dates:	EUT Type:	Dage 7 of 142	
1M2203290039-01.A3L	07/11/2022- 08/17/2022	Portable Handset	Page 7 of 142	
			V1.0	



## 2.0 PRODUCT INFORMATION

## 2.1 Equipment Description

The Equipment Under Test (EUT) is the **Samsung Portable Handset FCC ID: A3LSMS901U C2PC**. The test data contained in this report pertains only to the emissions due to the EUT's 5G mmWave function.

The EUT contains two patch antennas, referred to herein as Ant1 and Ant2. Each of the antennas is comprised of two separate antenna feeds - one for horizontal and one for vertical polarization. Only one array antenna can be active at a time.

The EUT supports up to 4CC for UL. Only contiguous carrier operation is supported. For each CC, the EUT supports both 50MHz bandwidth and 100MHz bandwidth. The EUT supports a subcarrier spacing (SCS) of 120kHz with two transmission schemes, CP-OFDM and DFT-s-OFDM, with  $\pi$ /2-BPSK, QPSK, 16-QAM, and 64-QAM modulations. Different Beam IDs are supported, each corresponding to a different position in space for each antenna. During testing, FTM (Factory Test Mode) was used to operate the transmitter. MIMO operation was achieved by enabling two Beam IDs at the same time: one is from the list of H Beam IDs and other is from the list of V Beam IDs.

Test Device Serial No.: 0264M, 0267M, 1517M

## 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

## 2.3 Test Configuration

The EUT was tested per the guidance of ANSI C63.26-2015 and KDB 842590 D01. See Section 7.0 of this test report for a description of the radiated tests.

EIRP Simulation data for all Beam IDs was used to help determine the worst case Beam ID for SISO operation and Beam ID pair for 2Tx (DFT-s-OFDM) and MIMO (CP-OFDM) operation. Several additional Beam ID's were also investigated to determine the Beam ID's producing the highest measured EIRP.

All testing was performed using FTM (Factory Test Mode) software at continuous Tx operation. When implemented out in the field, the EUT will operate with a maximum uplink configuration as allowed by the 5G network/carrier. The FTM software was also used for the EUT operation in the EN-DC mode.

While operating in the FR2 band, this device supports anchor band operation with an LTE carrier. This was investigated during FR2 measurements.

FCC ID:A3LSMS901U	PART 30 MEASUREMENT REPORT (Class II Permissive Change)		Approved by: Technical Manager	
Test Report S/N: Test	st Dates:	EUT Type:	Dogo 9 of 142	
1M2203290039-01.A3L 07/11	11/2022- 08/17/2022	Portable Handset	Page 8 of 142	



The table below indicates the channel Plan for all the Frequency range tested for 3CC/4CC:

# CC's	BW (MHz)	Total CC BW (MHz)	Channel	24.25 - 24.45GHz (n258-R1)	24.75 - 25.25GHz (n258-R2)	27.5 - 28.35GHz (n261)	37 - 40GHz (n260)
			Low	х	х	x	х
	50	150	Mid	-	х	x	х
зсс	cc		High	х	х	x	х
SCC	100		Low	-	х	x	х
		300	Mid	-	-	x	х
			High	-	х	x	х
			Low	-	х	x	х
	50 200	200	Mid	х	х	x	х
100		High	-	х	x	х	
400	4CC		Low	-	х	х	х
	100	400	Mid	-	-	x	х
			High	-	х	х	х

## 2.4 Software and Firmware

The test was conducted with firmware version S901USQU2AVDA 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.

FCC ID:A3LSMS901U		PART 30 MEASUREMENT REPORT (Class II Permissive Change)	
Test Report S/N:	Test Dates:	EUT Type:	Dogo 0 of 142
1M2203290039-01.A3L	3L 07/11/2022- 08/17/2022 Portable Handset		Page 9 of 142
			V1.0



## 3.0 DESCRIPTION OF TESTS

## 3.1 Measurement Procedure

The measurement procedures described in the document titled "American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services" (ANSI C63.26-2015) and the guidance provided in KDB 842590 D01 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 for radiated emissions measurements in the spurious domain. 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 for measurements above 1GHz.

Radiated power (EIRP) measurements were performed in a full anechoic chamber (FAC) conforming to the site validation requirements of CISPR 16-1-4. Radiated spurious emission measurements from 30MHz - 18GHz were performed in a semi anechoic chamber (SAC) conforming to the site validation requirements of CISPR 16-1-4. A positioner was used to manipulate the EUT through several positions in space by rotating about the roll axis as shown in the figure below. The positioner was mounted on top of a turntable bringing the total EUT height to 1.5m.

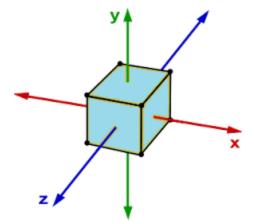


Figure 3-1. Rotation of the EUT Through Three Orthogonal Planes

Test Report S/N: Test Dates: EUT Type:	FCC ID:A3LSMS901U	1U	PART 30 MEASUREMENT REPORT (Class II Permissive Change)	
	Test Report S/N:	Test Dates: E	EUT Type:	Dogo 10 of 142
1M2203290039-01.A3L 07/11/2022- 08/17/2022 Portable Handset Page 10 of 142	1M2203290039-01.A3L	A3L 07/11/2022- 08/17/2022 P	Portable Handset	Fage 10 01 142



The equipment under test was transmitting while connected to its integral antenna and is placed on a turntable. The measurement antenna is in the far field of the EUT per formula  $2D^2/\lambda$  where D is the larger between the dimension of the measurement antenna and the transmitting antenna of the EUT. In this case, "D" is the largest dimension of the measurement antenna. The EUT is manipulated through all orthogonal planes representative of its typical use to achieve the highest reading on the receive spectrum analyzer.

Frequency Range (GHz)	Wavelength(cm)	Far Field Distance (m)	Measurement Distance (m)
18-40	0.749	0.54	1.00
40-60	0.500	1.39	1.50
60-90	0.333	0.91	1.00
90-140	0.214	0.58	1.00
140-200	0.150	0.39	1.00

#### Table 3-1. Far-Field Distance & Measurment Distance per Frequency Range

Radiated power levels are investigated while the receive antenna was rotated through all angles to determine the worst case polarization/positioning. It was determined that H=0 degree and V=90 degree are the worst case positions when the EUT was transmitting horizontally and vertically polarized beams, respectively.

The maximized power level is recorded using the spectrum analyzer "Channel Power" function with the integration bandwidth set to at least the emissions' occupied bandwidth. The EIRP is calculated from the raw power level measured with the spectrum analyzer using the formulas shown below.

## Effective Isotropic Radiated Power Sample Calculation

The measured e.i.r.p is converted to E-field in V/m. Then, the distance correction is applied before converting back to calculated e.i.r.p, as explained in ANSI C63.26-2015.

Field Strength [dB $\mu$ V/m]	= Measured Value [dBm] + AFCL [dB/m] + 107
	= - 32.74 dBm + (40.7dB/m + 8.78dB) + 107 = 123.74dBuV/m
	= 10^(123.74/20)/1000000 = 1.54 V/m
e.i.r.p. [dBm]	= 10 * log((E-Field*D <sub>m</sub> )^2/30) + 30dB
	= 10 * log((1.54V/m * 1.00m)^2/30) + 30dB
	= 18.98 dBm e.i.r.p.

FCC ID:A3LSMS901U	PART 30 MEASUREMENT REPORT (Class II Permissive Change)		Approved by: Technical Manager	
Test Report S/N:	Test Dates:	EUT Type:		
1M2203290039-01.A3L	07/11/2022- 08/17/2022	Portable Handset	Page 11 of 142	
			V1.0	



# 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

FCC ID:A3LSMS901U		PART 30 MEASUREMENT REPORT (Class II Permissive Change)	
Test Report S/N:	Test Dates:	EUT Type:	Dage 12 of 142
1M2203290039-01.A3L	07/11/2022- 08/17/2022	Portable Handset	Page 12 of 142
			1/1.0



## 5.0 TEST EQUIPMENT CALIBRATION DATA

Test Equipment Calibration is traceable to an accredited ISO/IEC 17025 calibration facility. Measurements antennas used during testing were calibrated in accordance to the requirements of ANSI C63.5-2017.

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
	AP1	EMC Cable and Switch System	9/10/2021	Annual	9/10/2022	AP1
	AP2	EMC Cable and Switch System	9/3/2021	Annual	9/3/2022	AP2
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	125518
Megaphase	FAC mmWave	AP FAC mmWave 18ft 40GHz	8/18/2021	Annual	8/18/2022	20033003
Narda	180-442-KF	Wide Band Horn Antenna 18.0 - 40.0 GHz	9/14/2020	Biennial	9/14/2022	2172481
Narda	180-442-KF	Wide Band Horn Antenna 18.0 - 40.0 GHz	11/5/2020	Biennial	11/5/2022	U157403-01
OML Inc.	M12RH	WR-12 Horn Antenna, 24dBi, 60 to 90 GHz	8/12/2020	Triennial	8/12/2023	18073001
Rohde & Schwarz	FSW26	2Hz-26.5GHz Signal and spectrum analyzer	2/2/2022	Annual	2/2/2023	103187
Rohde & Schwarz	FSW67	Signal / Spectrum Analyzer	8/25/2021	Annual	8/25/2022	103200
Rohde & Schwarz	SMW200A	Signal Generator	N/A		190456	
UTiFlex	UTiFlex	FAC mmWave UTiFlex 40GHz	3/9/2022	Annual	3/9/2023	234142-001
UTiFlex	UTiFlex	FAC mmWave UTiFlex 40GHz	3/9/2022	Annual	3/9/2023	232062-001
UTiFlex	UTiFlex	1m UTiFlex 40GHz	9/10/2021	Annual	9/10/2022	232063-001

#### Notes:

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.

FCC ID:A3LSMS901U	PART 30 MEASUREMENT REPORT (Class II Permissive Change)		Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Page 13 of 142
1M2203290039-01.A3L	07/11/2022- 08/17/2022	Portable Handset	Page 13 01 142
			1/1.0



# 6.0 SAMPLE CALCULATIONS

## **Emission Designator**

### **π/2 BPSK/ QPSK Modulation**

### Emission Designator = 800MG7D

BW = 800 MHz

- G = Phase Modulation
- 7 = Quantized/Digital Info
- D = Data transmission, telemetry, telecommand

### **QAM Modulation**

#### Emission Designator = 802MW7D

BW = 802 MHz W = Amplitude/Angle Modulated 7 = Quantized/Digital Info D = Data transmission, telemetry, telecommand

FCC ID:A3LSMS901U		Approved by: Technical Manager	
Test Report S/N:	Test Dates:	EUT Type:	Page 14 of 142
1M2203290039-01.A3L	07/11/2022- 08/17/2022	2022- 08/17/2022 Portable Handset	
			1/4.0



# TEST RESULTS

#### 7.1 Summary

Company Name:	Samsung Electronics Co., Ltd.
FCC ID:	A3LSMS901U
FCC Classification:	Part 30 Mobile Transmitter (5GM)
Mode(s):	TDD

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
2.1049	Occupied Bandwidth	N/A		PASS	Section 7.2
2.1046, 30.202	Equivalent Isotropic Radiated Power	43dBm		PASS	Section 7.3
2.1051, 30.203	Spurious Emissions	-13dBm/MHz for all out-of-band emissions	RADIATED	PASS	Section 7.4
2.1051, 30.203	Out-of-Band Emissions at the Band Edge	-13dBm/MHz for all out-of- band emissions, -5dBm/MHz from the band edge up to 10% of the channel BW		PASS	Section 7.5
2.1055	Frequency Stability	Fundamental emissions stay within authorized frequency block		PASS	Section 7.6

Table 7-1. Summary of Radiated Test Results

## Notes:

- 1) All modes of operation and modulations were investigated. The test results shown in the following sections represent the worst case emissions.
- 2) Per 2.1057(a)(2), spurious emissions were investigated up to 100GHz for n258-R1, n258-R2, n261. Per 2.1057(a)(3), spurious emissions were investigated up to 200GHz for n260.
- The radiated RF output power and all out-of-band emissions in the spurious domain are evaluated to the limits first as EIRP measurements to determine if the "early-exit" condition of KDB 842590 D01 applies. If not, then additional TRP measurements are performed.
- 4) "CC" refers to "Component Carriers".
- 5) Beam IDs were chosen based on which Beam ID produces the highest EIRP during EIRP simulation.
- 6) All testing was performed using FTM (Factory Test Mode) software at continuous Tx operation (100% duty cvcle).
- 7) The CP-OFDM and DFT-s-OFDM transmission schemes were investigated fully for each test type and only the worst case data is included.
- This report contains references to "n258-R1" and "n258-R2". These correspond to n258 Range 1, operating 8) from 24.25 - 24.45GHz, and n258 Range 2, operating from 24.75 - 25.25GHz, respectively, as defined in Part 30.4(a)."

FCC ID:A3LSMS901U		PART 30 MEASUREMENT REPORT (Class II Permissive Change)			
Test Report S/N:	Test Dates:	EUT Type:			
1M2203290039-01.A3L	07/11/2022- 08/17/2022	Portable Handset	Page 15 of 142		
	-		V1.0		



#### **Occupied Bandwidth** 7.2

### **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 5.4.3

#### **Test Settings**

- 1. The signal analyzer's automatic bandwidth measurement capability was used to perform the 99% occupied 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
- 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 Notes**

- 1. The EUT supports CP-OFDM and DFT-s-OFDM. OBW was measured for both waveforms and the worst case has been included in the report.
- 2. Due to similar antenna performance from both patch antennas, the Occupied Bandwidth was only measured on one antenna for each band.

FCC ID:A3LSMS901U		Approved by: Technical Manager		
Test Report S/N:	Test Dates:	EUT Type:	Dogo 16 of 142	
1M2203290039-01.A3L	07/11/2022- 08/17/2022	Portable Handset	Page 16 of 142	
			1/1.0	



## Band n258-R1 (M Patch)

Antenna	Bandwidth [MHz]	CCs Active	Transmission Scheme	Modulation	OBW [MHz]
			DFTs OFDM	QPSK	146.77
	50MHz	3	DFTs OFDM	π/2 BPSK	146.26
			CP OFDM	16QAM	146.85
M-Patch			CP OFDM	64QAM	145.72
IVI-Fatch			CP OFDM	QPSK	195.90
		4	DFTs OFDM	π/2 BPSK	193.90
		4	DFTs OFDM	16QAM	196.19
			CP OFDM	64QAM	197.21

Table 7-2. Summary of Occupied Bandwidths (n258-R1)



Plot 7-1. Occupied Bandwidth Plot (50MHz-3CC – QPSK – Mid Channel)

FCC ID:A3LSMS901U		Approved by: Technical Manager		
Test Report S/N:	Test Dates:	EUT Type:	Page 17 of 142	
1M2203290039-01.A3L	07/11/2022- 08/17/2022	2022- 08/17/2022 Portable Handset		
			V1.0	



Keysight Spectrum Analyzer - Occupied I							
LXIRL RF 50Ω DC	CORREC	SENSE:INT Freg: 24.350040000 GHz		MAug 01, 2022	Trace/Detector		
BDE MID	Trig:		d:>100/100	vice: BTS			
PREAMP	#IFGain:Low #Atte	#IFGain:Low #Atten: 16 dB Radio Device: BTS					
10 dB/div Ref 30.00 dB							
20.0					Clear Wri		
10.0	my man my my	many in march			Clear Wri		
0.00							
-10.0							
-20.0 marganethe and more thank			where the production of the second	and the second	Avera		
-30.0							
-40.0							
-50.0					Max Ho		
-60.0							
Center 24.3500 GHz			Span 4	100.0 MHz			
#Res BW 1 MHz	١	/BW 8 MHz		eep 1 ms	Min Ho		
		Tatal Damas	07.0 JD				
Occupied Bandwid		Total Power	27.0 dBm				
1	46.26 MHz				Detect		
Transmit Freq Error	-141.18 kHz	% of OBW Pow	er 99.00 %		Pea Auto M		
x dB Bandwidth	385.1 MHz	x dB	-26.00 dB				
MSG			STATUS				

Plot 7-2. Occupied Bandwidth Plot (50MHz-3CC –  $\pi/2$ -BPSK – Mid Channel)



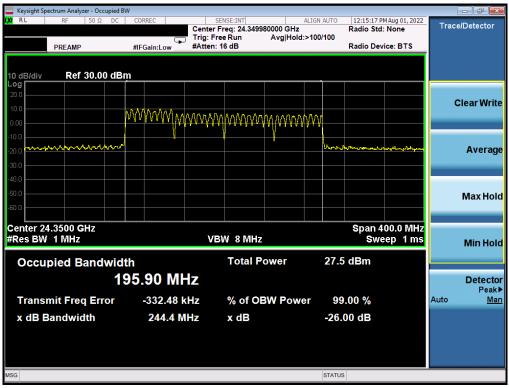
Plot 7-3. Occupied Bandwidth Plot (50MHz-3CC – 16QAM – Mid Channel)

FCC ID:A3LSMS901U		Approved by: Technical Manager	
Test Report S/N:	Test Dates:	EUT Type:	Dage 10 of 140
1M2203290039-01.A3L	07/11/2022- 08/17/2022	Portable Handset	Page 18 of 142
			V1.0



Keysight Spectrum Analyzer - Occupied E					- 7 💌
LXI RL RF 50Ω DC		SENSE:INT /	ALIGN AUTO 12:36:00 F Radio Std	M Aug 01, 2022 : None	Trace/Detector
	· · · · · · · · · · · · · · · · · · ·	ree Run Avg Hold:		DTO	
PREAMP	#IFGain:Low #Atten	: 10 dB	Radio Dev	rice: BTS	
10 dB/div Ref 20.00 dB	m				
10.0					
0.00	mmmym	mon months			Clear Write
-10.0					
-20.0	1 H D 40		warman hand an ale harmal and	ne. Ambreacht and bar	
-30.0			with a second	-Proc/Amploring.com/h-1	Average
-40.0					
-50.0					
-60.0					Max Hold
-70.0					Muxitore
Center 24.3500 GHz #Res BW 1 MHz	v	BW/8 MHz		00.0 MHz ep 1 ms	
TRES BY THINZ	v		000		Min Hold
Occupied Bandwid	th	Total Power	23.2 dBm		
	45.72 MHz				Detector
					Peak▶
Transmit Freq Error	-59.084 kHz	% of OBW Powe	er 99.00 %		Auto <u>Man</u>
x dB Bandwidth	150.2 MHz	x dB	-26.00 dB		
MSG			STATUS		

Plot 7-4. Occupied Bandwidth Plot (50MHz-3CC – 64QAM – Mid Channel)



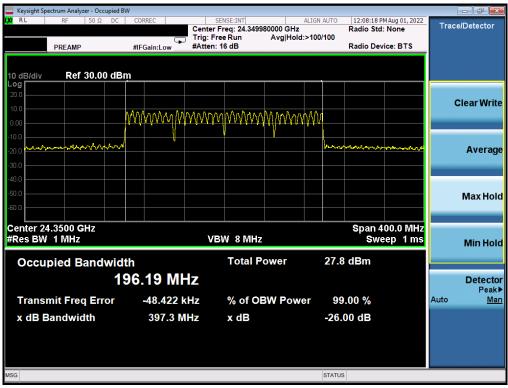
Plot 7-5. Occupied Bandwidth Plot (50MHz-4CC – QPSK – Mid Channel)

FCC ID:A3LSMS901U		Approved by: Technical Manager	
Test Report S/N:	Test Dates:	EUT Type:	Page 19 of 142
1M2203290039-01.A3L	07/11/2022- 08/17/2022	22- 08/17/2022 Portable Handset	
			V1.0



	ectrum Analyzer - Occ	upied BW									
LXI RL	RF 50 Ω	DC CORREC		ISE:INT		ALIGN	AUTO		M Aug 01, 2022	Trac	e/Detector
			Center Free	eq: 24.3499	Avg Hold	·>100	)/100	Radio Std	None	1140	ciberceter
	PREAMP	#IFGain:Low	#Atten: 16		, reginera			Radio Dev	ice: BTS		
10 dB/div Log	Ref 30.00	0 dBm									
20.0											
10.0				Λ.							Clear Write
		MM/W/M	MANNA	MWWWW	$\mathcal{M}\mathcal{M}\mathcal{M}\mathcal{M}$	WW					
0.00											
-10.0	wwwww	see.	<u> </u>		¥			A			
-20.0	wrwww a wrw	V Y Y U					-hAA.	mm	ኊ፟ዀኯኯኯኯኯ		Average
-30.0											
-40.0											
-50.0											Max Hold
-60.0											
								<b>A</b>			
#Res BW	1.3500 GHz		)/D)/	V 8 MHz					00.0 MHz ep 1 ms		
#Res DW			A D A	ν οινιπΖ				SWC	ep mis		Min Hold
Occu	pied Band	width		Total P	ower		30.6	i dBm			
Occu				1 otul 1 s			0010				
		193.90 N	IHZ								Detector
-				0/ -f OF	NA/ D			00.0/		Auto	Peak►
Transi	mit Freq Err	or -278.52	ZKHZ	% of OE	SW Powe	ər	99	.00 %		Auto	<u>Man</u>
x dB E	Bandwidth	243.2	MHz	x dB			-26.	00 dB			
MSG							STATUS	6			

Plot 7-6. Occupied Bandwidth Plot (50MHz-4CC –  $\pi/2$ -BPSK – Mid Channel)



Plot 7-7. Occupied Bandwidth Plot (50MHz-4CC – 16QAM – Mid Channel)

FCC ID:A3LSMS901U		Approved by: Technical Manager	
Test Report S/N:	Test Dates:	EUT Type:	Dage 20 of 142
1M2203290039-01.A3L	07/11/2022- 08/17/2022 Portable Handset		Page 20 of 142
			V1.0



Keysight Spectrum Analyzer - Occupied B					
LX/RL RF 50Ω DC		SENSE:INT Freg: 24.349980000 GHz		2:13:10 PM Aug 01, 2022 dio Std: None	Trace/Detector
PREAMP	#IFGain:Low #Atten:	ree Run Avg Hold: 16 dB		dio Device: BTS	
PREAMP	#IFGain:Low #Atten		Ka	dio Device. B13	
10 dB/div Ref 20.00 dBr	n				
Log					
10.0	1000000				Clear Write
0.00	www.pawaww	ALAMAAAAA WAAAAA	AAN		Cicul Write
-10.0					
-20.0 alignedic synthesis and a first data in the first of the first o			Ashite Survey of parts when	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	
-30.0					Average
-40.0					
-50.0					
-60.0					Max Hold
-70.0					
Center 24.3500 GHz			S	pan 400.0 MHz	
#Res BW 1 MHz	VI	BW 8 MHz		Sweep 1 ms	Min Hold
Occupied Bandwid	th	Total Power	24.7 dE	3m	
	97.21 MHz				Detector
					Detector Peak►
Transmit Freq Error	-203.78 kHz	% of OBW Powe	er 99.00	%	Auto <u>Man</u>
x dB Bandwidth	400.0 MHz	x dB	-26.00	dB	
MSG			STATUS		

Plot 7-8. Occupied Bandwidth Plot (50MHz-4CC – 64QAM – Mid Channel)

FCC ID:A3LSMS901U		Approved by: Technical Manager		
Test Report S/N:	Test Dates:	EUT Type:	Dage 21 of 142	
1M2203290039-01.A3L	07/11/2022- 08/17/2022	Portable Handset	Page 21 of 142	
			V1.0	



## Band n258-R2 (M Patch)

Antenna	Bandwidth [MHz]	CCs Active	Transmission Scheme	Modulation	OBW [MHz]
			CP OFDM	QPSK	149.58
		3	DFTs OFDM	π/2 BPSK	149.55
		5	CP OFDM	16QAM	149.77
	50		CP OFDM	64QAM	149.14
	50		DFTs OFDM	QPSK	193.77
		4	DFTs OFDM	π/2 BPSK	194.42
			CP OFDM	16QAM	193.80
M-Patch			CP OFDM	64QAM	194.14
IVI-Fatcii			CP OFDM	QPSK	292.15
		3	DFTs OFDM	π/2 BPSK	293.40
		3	CP OFDM	16QAM	292.43
	100		CP OFDM	64QAM	293.63
	100		CP OFDM	QPSK	393.18
		4	DFTs OFDM	π/2 BPSK	392.45
		4	CP OFDM	16QAM	394.95
			CP OFDM	64QAM	395.74

Table 7-3. Summary of Occupied Bandwidths (n258-R2)

FCC ID:A3LSMS901U		Approved by: Technical Manager	
Test Report S/N:	Test Dates:	EUT Type:	Daga 22 of 142
1M2203290039-01.A3L	07/11/2022- 08/17/2022	Portable Handset	Page 22 of 142
			V1.0





Plot 7-9. Occupied Bandwidth Plot (50MHz-3CC – QPSK – Mid Channel)



Plot 7-10. Occupied Bandwidth Plot (50MHz-3CC – π/2-BPSK – Mid Channel)

FCC ID:A3LSMS901U		Approved by: Technical Manager		
Test Report S/N:	Test Dates:	EUT Type:	Page 23 of 142	
1M2203290039-01.A3L	07/11/2022- 08/17/2022	Portable Handset	Faye 23 01 142	
			V1.0	



Keysight Spectrum Analyzer - Occupied	3W				
LXIRL RF 50Ω DC	CORREC	SENSE:INT nter Freg: 24.999960000 G	ALIGN AUTO	01:00:02 PM Aug Radio Std: Non	
PREAMP	Trig		Hold:>100/100	Radio Device: E	-
10 dB/div Ref 30.00 dB	<u>m</u>				
20.0		man and the			Clear Write
0.00 -10.0 -20.0 -30.0				รางที่แนการที่สารสารสารสาร	Average
-40.0					Max Hold
Center 25.0000 GHz #Res BW 8 MHz		VBW 50 MHz		Span 300.0 Sweep	
Occupied Bandwid	th 49.77 MHz	Total Power	23.8	3 dBm	Detecto
Transmit Freq Error	597.25 kHz	% of OBW P	ower 99	9.00 %	Auto <u>Mar</u>
x dB Bandwidth	240.7 MHz	x dB	-26.	00 dB	
MSG			STATU	S	

Plot 7-11. Occupied Bandwidth Plot (50MHz-3CC – 16QAM – Mid Channel)



Plot 7-12. Occupied Bandwidth Plot (50MHz-3CC - 64QAM - Mid Channel)

FCC ID:A3LSMS901U		Approved by: Technical Manager	
Test Report S/N:	Test Dates:	EUT Type:	Page 24 of 142
1M2203290039-01.A3L	07/11/2022- 08/17/2022	Portable Handset	Fage 24 01 142
			V1.0



	ectrum Analyzer - Occupied B	W									
LXIRL	RF 50 Ω DC	CORREC		NSE:INT req: 24.9999	60000 CH-	ALIGN	AUTO	01:21:44 P	M Aug 01, 2022	Trac	e/Detector
			Tains Fra		Avg Hold	:>100	/100	Radio Stu	. None		
_	PREAMP	#IFGain:Low	#Atten: 1	0 dB				Radio Dev	ice: BTS		
10 dB/div	Ref 30.00 dBi	m									
Log											
20.0											Clear Write
10.0		MMMMAA	mm	$\Lambda M M \Lambda M$		$\sqrt{1}$					
0.00											
-10.0		Y Y					\				
-20.0 ~~~	wwwwwwwwwww						5	marrie	www.		Average
-30.0											3
-40.0											
-50.0											Max Hold
-60.0											
Contor 2	5.0000 GHz							Enon /	00.0 MHz		
#Res BW			VBI	N 50 MH	7				eep 1 ms		
<b>"</b>	2			A 66 IIII					ask ins		Min Hold
Occu	pied Bandwid	th		Total P	ower		28.0	dBm			
		93.77 MI									Detector
		55.77 WI									Detector Peak▶
Trans	mit Freq Error	236.25	kHz	% of O	<b>BW Pow</b>	er	99	.00 %		Auto	Man
x dB E	Bandwidth	223.6 N	1Hz	x dB			-26.	00 dB			
	Sanatinatin	22010 1		A GE			201				
								,			
MSG							STATUS	5			

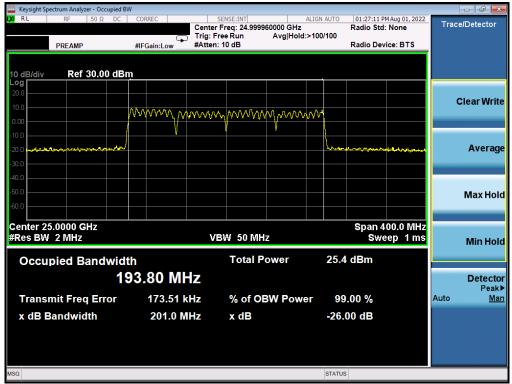
Plot 7-13. Occupied Bandwidth Plot (50MHz-4CC – QPSK – Mid Channel)



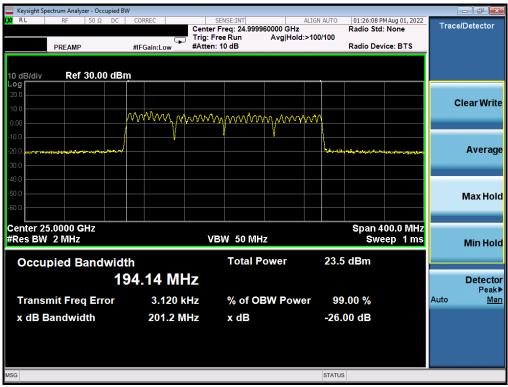
Plot 7-14. Occupied Bandwidth Plot (50MHz-4CC – π/2-BPSK – Mid Channel)

FCC ID:A3LSMS901U		Approved by: Technical Manager	
Test Report S/N:	Test Dates:	EUT Type:	Page 25 of 142
1M2203290039-01.A3L	07/11/2022- 08/17/2022	Portable Handset	Fage 25 01 142
			V1.0





Plot 7-15. Occupied Bandwidth Plot (50MHz-4CC - 16QAM - Mid Channel)



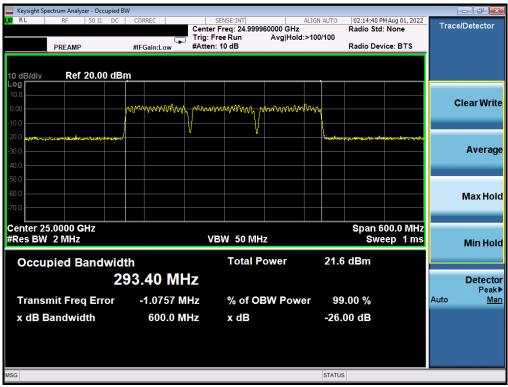
Plot 7-16. Occupied Bandwidth Plot (50MHz-4CC - 64QAM - Mid Channel)

FCC ID:A3LSMS901U		Approved by: Technical Manager		
Test Report S/N:	Test Dates:	EUT Type:	Page 26 of 142	
1M2203290039-01.A3L	07/11/2022- 08/17/2022	11/2022- 08/17/2022 Portable Handset		
			V/1.0	



Keysight Spectrum Analyzer - Occupied B	W						
<b>LX RL RF 50 Ω DC</b>	CORREC	SENSE:INT			M Aug 01, 2022	Trace	Detector
		Center Freq: 24.9999 Trig: Free Run	Avg Hold:>100	Radio Std 0/100	: None		
PREAMP	#IFGain:Low	#Atten: 10 dB		Radio Dev	rice: BTS		
10 dB/div Ref 30.00 dB	m						
Log							
20.0						_	
10.0						C	lear Write
0.00	MAMMMMMMM	1 Manana /	wwwwwwww	h			
-10.0							
-20.0 washarrendaharrhidaharrhidaharr		n A		handstande	a and a sub-		Average
							Average
-30.0							
-40.0							
-50.0							Max Hold
-60.0							
Center 25.0000 GHz			-		00.0 MHz		
#Res BW 2 MHz		VBW 50 MH	z	SWe	eep 1 ms		Min Hold
Occupied Bandwid	<b>th</b>	Total P	ower	25.7 dBm			
				25.1 0.011			
2	92.15 MH	Z					Detector
Transmit From Freeze	400 20 k	U= % of O	BW Power	99.00 %		Auto	Peak▶ Man
Transmit Freq Error	100.30 k	HZ % OF U	BW Power	99.00 %		Auto	Ivian
x dB Bandwidth	576.9 M	Hz xdB		-26.00 dB			
MSG				STATUS			

Plot 7-17. Occupied Bandwidth Plot (100MHz-3CC – QPSK – Mid Channel)



Plot 7-18. Occupied Bandwidth Plot (100MHz-3CC –  $\pi/2$ -BPSK – Mid Channel)

FCC ID:A3LSMS901U	PART 30 MEASUREMENT REPORT (Class II Permissive Change)		Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Dogo 27 of 142
1M2203290039-01.A3L	07/11/2022- 08/17/2022	Portable Handset	Page 27 of 142
			V1.0





Plot 7-19. Occupied Bandwidth Plot (100MHz-3CC - 16QAM - Mid Channel)



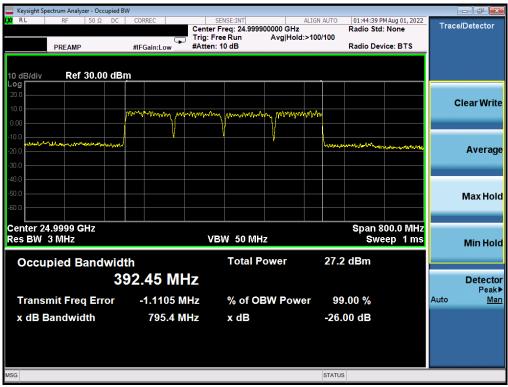
Plot 7-20. Occupied Bandwidth Plot (100MHz-3CC - 64QAM - Mid Channel)

FCC ID:A3LSMS901U	PART 30 MEASUREMENT REPORT (Class II Permissive Change)		Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 20 of 142
1M2203290039-01.A3L	07/11/2022- 08/17/2022	Portable Handset	Page 28 of 142
			V1.0





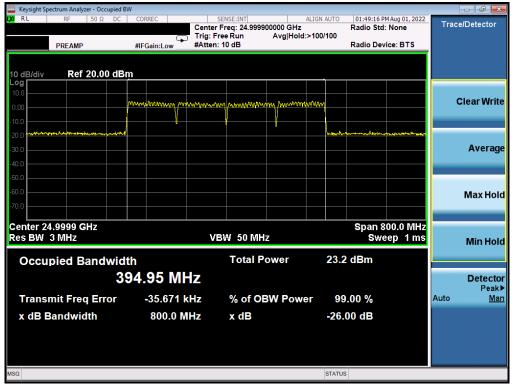
Plot 7-21. Occupied Bandwidth Plot (100MHz-4CC – QPSK – Mid Channel)



Plot 7-22. Occupied Bandwidth Plot (100MHz-4CC –  $\pi/2$ -BPSK – Mid Channel)

FCC ID:A3LSMS901U	PART 30 MEASUREMENT REPORT (Class II Permissive Change)		Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Page 29 of 142
1M2203290039-01.A3L	07/11/2022- 08/17/2022	Portable Handset	Faye 29 01 142
			V1.0





Plot 7-23. Occupied Bandwidth Plot (100MHz-4CC - 16QAM - Mid Channel)



Plot 7-24. Occupied Bandwidth Plot (100MHz-4CC – 64QAM – Mid Channel)

FCC ID:A3LSMS901U	PART 30 MEASUREMENT REPORT (Class II Permissive Change)		Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Dogo 20 of 142
1M2203290039-01.A3L	07/11/2022- 08/17/2022	Portable Handset	Page 30 of 142
			V1.0



# Band n261 (N Patch)

Antenna	Bandwidth [MHz]	CCs Active	Transmission Scheme	Modulation	OBW [MHz]
			CP OFDM	QPSK	147.62
		3	DFTs OFDM	π/2 BPSK	147.68
		5	CP OFDM	16QAM	147.62
	50		CP OFDM	64QAM	148.40
	50	4	DFTs OFDM	QPSK	195.47
			DFTs OFDM	π/2 BPSK	196.50
			CP OFDM	16QAM	195.52
N-Patch			CP OFDM	64QAM	196.60
N-Patch			CP OFDM	QPSK	293.08
		3	DFTs OFDM	π/2 BPSK	291.70
	100	5	CP OFDM	16QAM	293.89
			CP OFDM	64QAM	293.31
	100		CP OFDM	QPSK	394.56
		4	DFTs OFDM	π/2 BPSK	395.04
		4	CP OFDM	16QAM	395.18
			DFTs OFDM	64QAM	396.88

Table 7-4. Summary of Occupied Bandwidths (n261)

FCC ID:A3LSMS901U	PART 30 MEASUREMENT REPORT (Class II Permissive Change)		Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Dogo 21 of 142
1M2203290039-01.A3L	07/11/2022- 08/17/2022	Portable Handset	Page 31 of 142
			V1.0





Plot 7-25. Occupied Bandwidth Plot (50MHz-3CC – QPSK – Mid Channel)



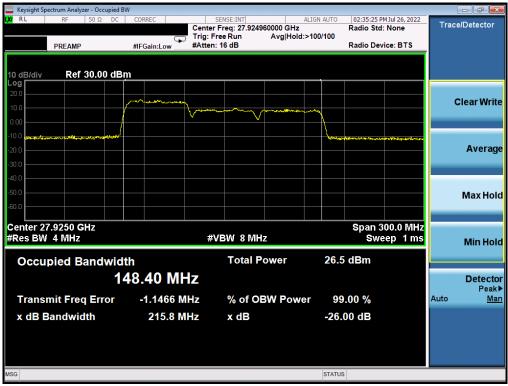
Plot 7-26. Occupied Bandwidth Plot (50MHz-3CC – π/2-BPSK – Mid Channel)

FCC ID:A3LSMS901U	PART 30 MEASUREMENT REPORT (Class II Permissive Change)		Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Page 32 of 142
1M2203290039-01.A3L	07/11/2022- 08/17/2022	Portable Handset	Faye 52 01 142
			V1.0





Plot 7-27. Occupied Bandwidth Plot (50MHz-3CC - 16QAM - Mid Channel)



Plot 7-28. Occupied Bandwidth Plot (50MHz-3CC - 64QAM - Mid Channel)

FCC ID:A3LSMS901U	PART 30 MEASUREMENT REPORT (Class II Permissive Change)		Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Page 33 of 142
1M2203290039-01.A3L	07/11/2022- 08/17/2022	Portable Handset	Fage 55 01 142
			V1.0





Plot 7-29. Occupied Bandwidth Plot (50MHz-4CC – QPSK – Mid Channel)



Plot 7-30. Occupied Bandwidth Plot (50MHz-4CC – π/2-BPSK – Mid Channel)

FCC ID:A3LSMS901U	PART 30 MEASUREMENT REPORT (Class II Permissive Change)		Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 24 of 142
1M2203290039-01.A3L	07/11/2022- 08/17/2022	Portable Handset	Page 34 of 142
			V1.0





Plot 7-31. Occupied Bandwidth Plot (50MHz-4CC – 16QAM – Mid Channel)



Plot 7-32. Occupied Bandwidth Plot (50MHz-4CC - 64QAM - Mid Channel)

FCC ID:A3LSMS901U	PART 30 MEASUREMENT REPORT (Class II Permissive Change)		Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Page 35 of 142
1M2203290039-01.A3L	07/11/2022- 08/17/2022	Portable Handset	Fage 55 01 142
			V1.0





Plot 7-33. Occupied Bandwidth Plot (100MHz-3CC – QPSK – Mid Channel)



Plot 7-34. Occupied Bandwidth Plot (100MHz-3CC – π/2-BPSK – Mid Channel)

FCC ID:A3LSMS901U	PART 30 MEASUREMENT REPORT (Class II Permissive Change)		Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Page 36 of 142
1M2203290039-01.A3L	07/11/2022- 08/17/2022	Portable Handset	Fage 30 01 142
			V1.0





Plot 7-35. Occupied Bandwidth Plot (100MHz-3CC - 16QAM - Mid Channel)



Plot 7-36. Occupied Bandwidth Plot (100MHz-3CC - 64QAM - Mid Channel)

FCC ID:A3LSMS901U		PART 30 MEASUREMENT REPORT (Class II Permissive Change)			
Test Report S/N:	Test Dates:	EUT Type:	Page 37 of 142		
1M2203290039-01.A3L 07/11/2022- 08/17/2022 Portable Handset		Portable Handset	Fage 37 01 142		
			V1.0		



	ectrum Analyze	er - Occu	ipied BW										
L <mark>XI</mark> RL	RF	<u>50 Ω</u>	DC	CORREC			ENSE:INT Freq: 27.9249	900000 GHz	ALIGN AUTO	01:52:06 F	M Jul 26, 2022	Trac	e/Detector
					_ <b>_</b>	Trig: Fr	ee Run		d:>100/100				
	PREAMP			#IFGain:	Low	#Atten:	10 dB			Radio Dev	rice: BTS		
10 dB/div Log	Ref	30.00	dBm						۱ <u> </u>				
20.0													
10.0					handrow	ر. الاست <sup>ار</sup> الاستار مناسب	a water	a to all a A s Correle	0			(	Clear Write
0.00					<b>`</b>	, 	Y	V					
-10.0													
-20.0 July -20.0	medermine	month	est many of the	أممه					amunion	Mundunut	-		Average
-30.0													-
-40.0													
-50.0													Max Hold
-60.0													ινίαχ ποια
Center 2		Hz					NA/ 60 BAL	-			.000 GHz		
#Res BW	8 IVIHZ					VE	3W 50 MH	12		Sweep	1.667 ms		Min Hold
Occu	pied Ba	and	vidth	1			Total F	ower	25.5	dBm			
					5 MI	7							Detector
			00	1.00									Peak
Trans	mit Freq	Erro	or	44	4.08	κHz	% of O	BW Pow	er 99	.00 %		Auto	Man
x dB E	Bandwid	th		40	)8.7 N	Hz	x dB		-26.	00 dB			
MSG									STATUS	3			
		_	_										

Plot 7-37. Occupied Bandwidth Plot (100MHz-4CC – QPSK – Mid Channel)



Plot 7-38. Occupied Bandwidth Plot (100MHz-4CC – π/2-BPSK – Mid Channel)

FCC ID:A3LSMS901U		PART 30 MEASUREMENT REPORT (Class II Permissive Change)			
Test Report S/N:	Test Dates:	EUT Type:	Dega 20 of 142		
1M2203290039-01.A3L	0-01.A3L 07/11/2022- 08/17/2022 Portable Handset		Page 38 of 142		
			V1.0		



	ectrum Analyzer - Occu	upied BW						
LXIRL	RF 50 Ω	DC CORREC	SENSE:INT Center Freq: 27.9249		N AUTO 01:50:01 PM Radio Std:	1 Jul 26, 2022	Trace	Detector
		(	Tains France Dava	Avg Hold:>10		None		
	PREAMP	#IFGain:Low	#Atten: 10 dB		Radio Devi	ice: BTS		
10 dB/div	Ref 30.00	) dBm						
Log								
20.0								lear Write
10.0		manual	month and ponter month	mm				
0.00				Y				
-10.0								
-20.0 manufation	un and Westingerson	mound		n		- And a start of the start of t		Average
-30.0								
-40.0								
-50.0								
								Max Hold
-60.0							_	
Center 2	7.9249 GHz			· · · · · ·	Span 1	.000 GHz		
#Res BW			VBW 50 MH	z		1.667 ms		Min Hold
								Minitiona
Occu	pied Bandy	width	Total P	ower	24.6 dBm			
		395.18 MI	7					Detector
								Peak►
Trans	mit Freq Erro	or 754.98	Hz % of O	BW Power	99.00 %		Auto	<u>Man</u>
x dB F	Bandwidth	589.6 N	Hz x dB		-26.00 dB			
	Janaviati	00010 11			20100 42			
MSG					STATUS			

Plot 7-39. Occupied Bandwidth Plot (100MHz-4CC – 16QAM – Mid Channel)



Plot 7-40. Occupied Bandwidth Plot (100MHz-4CC - 64QAM - Mid Channel)

FCC ID:A3LSMS901U		PART 30 MEASUREMENT REPORT (Class II Permissive Change)			
Test Report S/N:	Test Dates:	EUT Type:	Dage 20 of 142		
1M2203290039-01.A3L	9-01.A3L 07/11/2022- 08/17/2022 Portable Handset		Page 39 of 142		
			V1.0		



# Band n260 (N Patch)

Antenna	Bandwidth [MHz]	CCs Active	Transmission Scheme	Modulation	OBW [MHz]
			DFTs OFDM	QPSK	148.91
		3	DFTs OFDM	π/2 BPSK	148.12
		5	DFTs OFDM	16QAM	148.69
	50		DFTs OFDM	64QAM	149.30
	50		DFTs OFDM	QPSK	195.81
		4	DFTs OFDM	π/2 BPSK	197.99
			DFTs OFDM	16QAM	196.36
N-Patch			CP OFDM	64QAM	197.74
IN-Falcii			CP OFDM	QPSK	297.50
		3	DFTs OFDM	π/2 BPSK	294.71
		5	CP OFDM	16QAM	297.06
	100		CP OFDM	64QAM	298.57
	100		CP OFDM	QPSK	394.88
		4	DFTs OFDM	π/2 BPSK	394.24
		4	CP OFDM	16QAM	394.45
			CP OFDM	64QAM	394.98

Table 7-5. Summary of Ant 1 Occupied Bandwidths (n260)

FCC ID:A3LSMS901U		PART 30 MEASUREMENT REPORT (Class II Permissive Change)			
Test Report S/N:	Test Dates:	EUT Type:	Dage 40 of 142		
1M2203290039-01.A3L	07/11/2022- 08/17/2022	Portable Handset	Page 40 of 142		
			V1.0		



Keysight Spectrum Analyzer - Occupied B					- F	x
<b>LX RL RF 50 Ω DC</b>		SENSE:INT Freq: 38.499900000 GHz	ALIGN AUTO 02:14:42 Radio S	2 PM Jul 21, 2022	Trace/Detector	r
	Trig: Fi	ree Run Avg Hold	:>100/100	evice: BTS		
PREAMP	#IFGain:Low #Atten:	: 6 dB	Radio D	evice: BIS		
10 dB/div Ref 30.00 dBr	n					
20.0					01	
10.0		man mannen			Clear Wr	ite
0.00	¥					
-10.0			\			
-20.0	uniperdent?		and and the second should be and	water water and a	Avera	ige
-30.0						
-40.0						
-50.0					Max Ho	old
-60.0					Maxine	
Center 38.4999 GHz #Res BW 4 MHz	VI	BW 50 MHz		400.0 MHz veep 1 ms		
				reep 11115	Min Ho	bld
Occupied Bandwid	h	Total Power	24.4 dBm			
14	8.91 MHz				Detect	tor
					Pea	akÞ
Transmit Freq Error	398.05 kHz	% of OBW Pow	er 99.00 %		Auto <u>M</u>	lan
x dB Bandwidth	332.6 MHz	x dB	-26.00 dB			
MSG			STATUS			

Plot 7-41. Occupied Bandwidth Plot (50MHz-3CC – QPSK – Mid Channel)



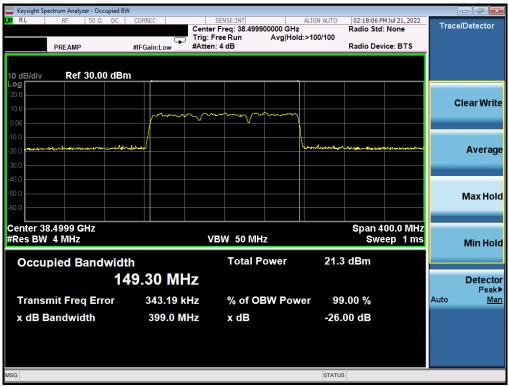
Plot 7-42. Occupied Bandwidth Plot (50MHz-3CC – π/2-BPSK – Mid Channel)

FCC ID:A3LSMS901U		PART 30 MEASUREMENT REPORT (Class II Permissive Change)			
Test Report S/N:	Test Dates:	EUT Type:	Dage 41 of 142		
1M2203290039-01.A3L	3290039-01.A3L 07/11/2022- 08/17/2022 Portable Handset		Page 41 of 142		
			V1.0		



Keysight Spectrum Analyze									
XI RL RF	50 Ω DC	CORREC	SENSE:INT Center Freg: 38.4		ALIGN AUTO	02:17:11 P	M Jul 21, 2022	Trace	Detector
		Ţ.	Trig: Free Run	Avg Hold:	>100/100				
PREAMP		#IFGain:Low	#Atten: 6 dB			Radio Dev	ice: BTS		
10 dB/div Ref Log	30.00 dBn	<u> </u>							
20.0									
10.0				0.0.000.				c	lear Write
0.00									
-10.0		/							
-20.0	whomenowhere			\	and the state of the				Average
-30.0									-
-40.0									
-50.0									Max Hold
-60.0									Μάλ ΠΟΙΟ
Center 38.4999 G	Hz		VDW 501				00.0 MHz		
#Res BW 4 MHz			VBW 50	VIHZ		SWe	ep 1ms		Min Hold
Occupied Ba	andwidt	h	Tota	l Power	23.0	dBm			
		8.69 MI	-						Detector
	19		12						Peak
Transmit Freq	Error	305.66 k	Hz % of	OBW Powe	er 99	.00 %		Auto	Mar
x dB Bandwid	th	396.7 M	Hz x dB		-26.	00 dB			
MSG					STATUS				

Plot 7-43. Occupied Bandwidth Plot (50MHz-3CC - 16QAM - Mid Channel)



Plot 7-44. Occupied Bandwidth Plot (50MHz-3CC - 64QAM - Mid Channel)

FCC ID:A3LSMS901U		PART 30 MEASUREMENT REPORT (Class II Permissive Change)			
Test Report S/N:	Test Dates:	EUT Type:	Dega 42 of 142		
1M2203290039-01.A3L	9-01.A3L 07/11/2022- 08/17/2022 Portable Handset		Page 42 of 142		
			V1.0		





Plot 7-45. Occupied Bandwidth Plot (50MHz-4CC – QPSK – Mid Channel)



Plot 7-46. Occupied Bandwidth Plot (50MHz-4CC – π/2-BPSK – Mid Channel)

FCC ID:A3LSMS901U		PART 30 MEASUREMENT REPORT (Class II Permissive Change)			
Test Report S/N:	Test Dates:	EUT Type:	Dage 42 of 142		
1M2203290039-01.A3L	07/11/2022- 08/17/2022 Portable Handset		Page 43 of 142		
			V1.0		





Plot 7-47. Occupied Bandwidth Plot (50MHz-4CC - 16QAM - Mid Channel)



Plot 7-48. Occupied Bandwidth Plot (50MHz-4CC - 64QAM - Mid Channel)

FCC ID:A3LSMS901U		Approved by: Technical Manager	
Test Report S/N:	Test Dates:	EUT Type:	Page 44 of 142
1M2203290039-01.A3L	07/11/2022- 08/17/2022	Portable Handset	Faye 44 01 142
			V1.0



Keysight Spectrum Analyzer - Occupie					
<mark>IX/RL</mark> RF 50ΩD0		SENSE:INT Center Freg: 38.499900000 GH:		2:10:47 PM Jul 21, 2022 dio Std: None	Trace/Detector
		Trig: Free Run Avg Ho	ld:>100/100		
PREAMP	#IFGain:Low #	fAtten: 0 dB	Ra	dio Device: BTS	
10 dB/div Ref 30.00 d	Bm				
Log 20.0					
10.0					Clear Write
0.00	mane and the	Anger and			
-10.0					
-20.0 metersoul mailing Mostly mildeling and	montering		approximate from stage and		Average
-30.0					
-40.0					
-40.0					
-50.0					Max Hold
-80.0					
Center 38.4999 GHz			S	pan 800.0 MHz	
#Res BW 8 MHz		VBW 50 MHz		Sweep 1 ms	Min Hold
Occupied Bandwi	dth	Total Power	23.4 d	Rm	
			20.4 41	2111	
	297.50 MHz				Detector Peak
Transmit Freq Error	675.11 kHz	z % of OBW Pov	ver 99.00	%	Auto <u>Mar</u>
x dB Bandwidth	383.4 MHz	z xdB	-26.00	dB	
	303.4 WHZ		-20.00		
MSG			STATUS		

Plot 7-49. Occupied Bandwidth Plot (100MHz-3CC – QPSK – Mid Channel)



Plot 7-50. Occupied Bandwidth Plot (100MHz-3CC – π/2-BPSK – Mid Channel)

FCC ID:A3LSMS901U		Approved by: Technical Manager	
Test Report S/N:	Test Dates:	EUT Type:	Page 45 of 142
1M2203290039-01.A3L	07/11/2022- 08/17/2022	Portable Handset	Fage 45 01 142
			V1.0



🔤 Keysight Sp	ectrum Analyzer - Occi	upied BW					E	
L <mark>XI</mark> RL	RF 50 Ω	DC CORREC	SENSE:INT Center Freq: 38.499	ALIGN	AUTO 02:10:06 PM Radio Std:	4 Jul 21, 2022	Trace	Detector
		÷		Avg Hold: 100/1		None		
	PREAMP	#IFGain:Low	#Atten: 0 dB		Radio Devi	ice: BTS		
10 dB/div	Ref 30.00	) dBm						
Log								
20.0							c	lear Write
10.0		مى ئۇساھىسىھاسى	mon man maria	who who who who			Ľ	
0.00			V. V					
-10.0								
-20.0 -20.0		Jammer Marken		Therefore	ميار وسلاور والميدون ومان طلختا	ware they we		Average
-30.0								
-40.0								
-50.0								Max Hold
-60.0								
Comton 20					On an 0			
#Res BW	8.4999 GHz		<b>VBW 50 M</b>	47		00.0 MHz ep 1 ms		
WICS DW	8 1911 12		8 D 8 8 0 0 1 1 1	112	300	ep mis		Min Hold
Occu	pied Band	width	Total	Power	22.9 dBm			
0000								
		297.06 M	ΠZ					Detector Peak►
Trans	mit Freq Erro	or 701.23	kHz % of C	BW Power	99.00 %		Auto	Man
x dB E	Bandwidth	526.8	MHz xdB		-26.00 dB			
		020101						
MSG					STATUS			

Plot 7-51. Occupied Bandwidth Plot (100MHz-3CC - 16QAM - Mid Channel)



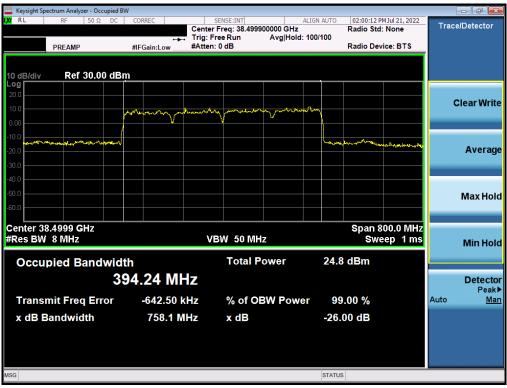
Plot 7-52. Occupied Bandwidth Plot (100MHz-3CC - 64QAM - Mid Channel)

FCC ID:A3LSMS901U		Approved by: Technical Manager	
Test Report S/N:	Test Dates:	EUT Type:	Page 46 of 142
1M2203290039-01.A3L	07/11/2022- 08/17/2022	Portable Handset	Fage 40 01 142
			V1.0



Keysight Spectrum Analyzer - Occup					- đ 론
LXI RL RF 50 Ω	DC CORREC Cent	SENSE:INT ter Freg: 38,499900000 GHz	ALIGN AUTO 01:57:37 Radio St	PM Jul 21, 2022	Trace/Detector
	++- Trig	: Free Run Avg Hold	: 100/100		
PREAMP	#IFGain:Low #Att	en: 0 dB	Radio De	evice: BTS	
10 dB/div Ref 30.00	dBm				
20.0					
10.0	manen my marker	my and man	annaling		Clear Write
0.00					
-10.0					
-20.0 -20.0			here with whether	hale grade with the state of th	Average
-30.0					
-40.0					
-50.0					Max Hold
-60.0					maxitor
Center 38.4999 GHz #Res BW 8 MHz		VBW 50 MHz		800.0 MHz veep 1 ms	
					Min Hold
Occupied Bandw	vidth	Total Power	24.0 dBm		
	394.88 MHz				Detecto
					Peak
Transmit Freq Erro	r 634.12 kHz	% of OBW Powe	er 99.00 %		Auto <u>Mar</u>
x dB Bandwidth	692.8 MHz	x dB	-26.00 dB		
MSG			STATUS		

Plot 7-53. Occupied Bandwidth Plot (100MHz-4CC – QPSK – Mid Channel)



Plot 7-54. Occupied Bandwidth Plot (100MHz-4CC – π/2-BPSK – Mid Channel)

FCC ID:A3LSMS901U		Approved by: Technical Manager	
Test Report S/N:	Test Dates:	EUT Type:	Dogo 47 of 142
1M2203290039-01.A3L	07/11/2022- 08/17/2022	Portable Handset	Page 47 of 142
			V1.0



	pectrum Analyz			N										
L <mark>XI</mark> RL	RF	50 Ω	DC	CORRE	C	Cente	SENSE:INT r Freq: 38.499	900000 GHz	ALIGN	AUTO	01:55:48 P Radio Std	M Jul 21, 2022	Trac	e/Detector
						🗖 Trig: I	ree Run	Avg Hol		100				
	PREAMP			#IFGa	in:Low	#Atter	n: 0 dB				Radio Dev	rice: BTS		
10 dB/div Log	Ref	30.00	dBr	n										
20.0														
10.0						ward and the state of the state	me manyarde		And the state of the				(	Clear Write
0.00				marin	www	al and a second of a				\				
-10.0														
-20.0	and a state of the second state of the	موادرهما	and							ha	meren and an			Average
-30.0														Ŭ
-40.0														
-50.0														Max Hold
-60.0														Max Hold
	8.4999 G	Hz										00.0 MHz		
#Res BW	8 MHz					V	BW 50 M	HZ			SWe	eep 1 ms		Min Hold
Occu	pied Ba	andv	vidt	h			Total	Power		24.0	) dBm			
		anten			5 M	LI								<b>D</b> - 4 4
			3	74.4	5 M	ПΖ								Detector Peak▶
Trans	mit Freq	Erro	or	9	18.89	kHz	% of C	BW Pow	/er	99	.00 %		Auto	Man
x dB F	Bandwid	lth		e	<b>591.3</b>	MHz	x dB			-26.	00 dB			
MSG										STATUS				
Mag										STATUS				

Plot 7-55. Occupied Bandwidth Plot (100MHz-4CC - 16QAM - Mid Channel)



Plot 7-56. Occupied Bandwidth Plot (100MHz-4CC - 64QAM - Mid Channel)

FCC ID:A3LSMS901U		Approved by: Technical Manager		
Test Report S/N:	Test Dates:	EUT Type:	Dage 49 of 142	
1M2203290039-01.A3L	07/11/2022- 08/17/2022	Portable Handset	Page 48 of 142	
			V1.0	



## 7.3 Equivalent Isotropic Radiated Power

### **Test Overview**

Equivalent Isotropic Radiated Power (EIRP) measurements are performed using 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.

### The average power of the sum of all antenna elements is limited to a maximum EIRP of +43 dBm.

#### **Test Procedures Used**

ANSI C63.26-2015 – Section 5.2.4.4.1 KDB 842590 D01 – Section 4.2

#### **Test Settings**

- 1. Radiated power measurements are performed using the signal analyzer's "channel power" measurement capability for signals with continuous operation.
- 2. RBW = 1 5% of the expected OBW
- 3. VBW  $\geq$  3 x RBW
- 4. Span = 2x to 3x the OBW
- 5. No. of sweep points  $\geq 2 \times \text{span} / \text{RBW}$
- 6. Sweep time = Auto
- 7. Detector = RMS
- 8. The integration bandwidth was roughly set equal to the measured OBW of the signal for signals with continuous operation.
- 9. Trace mode = trace averaging (RMS) over 100 sweeps
- 10. The trace was allowed to stabilize

FCC ID:A3LSMS901U		Approved by: Technical Manager	
Test Report S/N:	Test Dates:	EUT Type:	Page 49 of 142
1M2203290039-01.A3L	07/11/2022- 08/17/2022	Portable Handset	Fage 49 01 142
			V1.0



### Test Notes

- 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. Both H-Beam and V-Beam were investigated and the worst-case measurements were reported below.
- 2) Elements within the same antenna array are correlated to produce beamforming array gain. Antenna arrays cannot be correlated with another antenna array. During testing, only one antenna array was active.
- 3) EIRP measurements for all bands were taken at 1m test distance as was required for far-field conditions (see Table 3-1).
- 4) The average EIRP reported below is calculated per section 5.2.7 of ANSI C63.26-2015 which states: EIRP (dBm) = E (dBμV/m) + 20log(D) 104.8; where D is the measurement distance (in the far field region) in m. The field strength at the antenna terminals E is calculated as: E (dBμV/m) = Spectrum Analyzer Channel Power Level (dBm) + Antenna Factor (dB/m) + Cable Loss (dB) + 107.
- 5) All EIRP measurements were made with the appropriate offset levels loaded into the spectrum analyzer as determined from the measurement distance, antenna factor, cable loss, and the equations in Note 4 above.
- 6) Radiated power levels are investigated while the receive antenna was rotated through all angles to determine the worst case polarization/positioning.
- 7) This device supports transmission of H-polarized and V-polarized beams from the antenna array in both CP-OFDM and DFT-s-OFDM transmission schemes. SISO and MIMO operation is also supported for some configurations. As part of the testing, all modes are investigated fully on the channel showing the highest simulated EIRP using QPSK modulation. The configuration that shows the highest measured EIRP was then used to determine the EIRP for the low and high channels and for the additional modulations.
- 8) Several BeamID's are investigated based on the provided simulated data to determine the worst-case BeamID.
- 9) For each band and antenna array configuration tested, worst case EIRP plots are displayed for all total bandwidths tested (50MHz, 100MHz, 200MHz).

#### Sample Calculation

The offset level loaded into the spectrum analyzer allows for a direct conversion of the raw channel power level measured by the analyzer into an EIRP. This offset level is frequency dependent and is calculated as follows:

Offset Level [dB] = Antenna Factor [dB/m] + Cable Loss [dB] + 20 Log(Distance [m]) + 107 - 104.8.

For example, to measure an EIRP at a frequency of 24400MHz with an antenna factor of 40.40dB/m, a cable loss of 7.68dB, and a measurement distance of 1 meter, an offset level of:

#### Offset Level = 40.40dB/m + 7.68dB + 20 Log(1 meter) + 107 - 104.8 = 50.28 dB

shall be loaded into the spectrum analyzer.

FCC ID:A3LSMS901U		Approved by: Technical Manager	
Test Report S/N:	Test Dates:	EUT Type:	Page 50 of 142
1M2203290039-01.A3L	07/11/2022- 08/17/2022	Portable Handset	Fage 50 01 142
			V1.0



# Band n258-R1 Beam ID Configurations

Channel	Beam Polarization	Beam ID	Beam ID Pair
Low	2Tx/MIMO	154	26
Mid	2Tx/MIMO	154	26
High	2Tx/MIMO	154	26
	Low Mid	Low 2Tx/MIMO Mid 2Tx/MIMO	Low         2Tx/MIMO         154           Mid         2Tx/MIMO         154

 Table 7-6. Ant1 Worst Case Beam ID

Mode	Channel	Beam Polarization	Beam ID	Beam ID Pair
	Low	2Tx/MIMO	168	40
MIMO	Mid	2Tx/MIMO	168	40
	High	2Tx/MIMO	159	31

Table 7-7. Ant2 Worst Case Beam ID

FCC ID:A3LSMS901U		PART 30 MEASUREMENT REPORT (Class II Permissive Change)	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Dogo E1 of 140
1M2203290039-01.A3L	07/11/2022- 08/17/2022	Portable Handset	Page 51 of 142
			V1.0



## Band n258-R1

Bandwidth [MHz]	CCs Active	Channel	Frequency [MHz]	Transmission Scheme	Modulation	Beam ID	Beam Pol.	Ant. Div.	Ant. Pol. [H/V]	Positioner Azimuth [degrees]	Turntable Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
		Low	24324.96	DFT-s-OFDM	QPSK	26 + 154	H+V	2Tx	V	270.0	266.7	32 / 0	21.98
		Low	24324.96	CP-OFDM	QPSK	26 + 154	H + V	MIMO	V	270.0	266.7	32 / 0	19.91
		Low	24324.96	DFT-s-OFDM	π/2 BPSK	26 + 154	H+V	2Tx	V	270.0	266.7	32 / 0	22.01
50+50+50	3	Low	24324.96	DFT-s-OFDM	16QAM	26 + 154	H+V	2Tx	V	270.0	266.7	1 / 16	20.06
		Low	24324.96	DFT-s-OFDM	64QAM	26 + 154	H+V	2Tx	V	270.0	266.7	1 / 16	19.04
		Mid	24350.04	DFT-s-OFDM	π/2 BPSK	28 + 156	H+V	2Tx	V	16.0	30.9	32 / 0	17.13
		High	24375.00	DFT-s-OFDM	π/2 BPSK	26 + 154	H+V	2Tx	V	270.0	265.0	32 / 0	19.17

Table 7-8. Ant1 EIRP Data (Band n258-R1 - 50MHz-3CC)

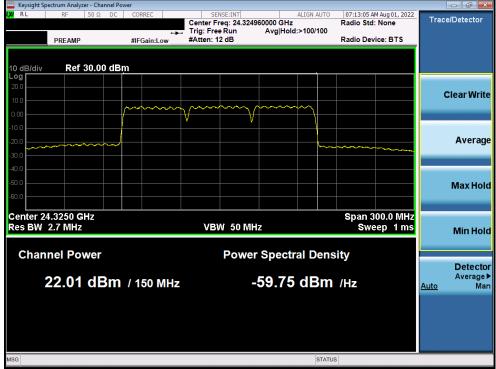
Bandwidth [MHz]	CCs Active	Channel	Frequency [MHz]	Transmission Scheme	Modulation	Beam ID	Beam Pol.	Ant. Div.	Ant. Pol. [H/V]	Positioner Azimuth [degrees]	Turntable Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
		Mid	24349.98	DFT-s-OFDM	QPSK	28 + 156	H + V	2Tx	V	322.0	292.2	32 / 0	21.76
		Mid	24349.98	CP-OFDM	QPSK	28 + 156	H + V	MIMO	V	322.0	292.2	32 / 0	19.75
50+50+50+50	4	Mid	24349.98	DFT-s-OFDM	π/2 BPSK	28 + 156	H+V	2Tx	V	322.0	292.2	32 / 0	21.71
		Mid	24349.98	DFT-s-OFDM	16QAM	28 + 156	H+V	2Tx	V	322.0	292.2	1 / 19	19.84
		Mid	24349.98	DFT-s-OFDM	64QAM	28 + 156	H + V	2Tx	V	322.0	292.2	1 / 19	18.36

Table 7-9. Ant1 EIRP Data (Band n258-R1 – 50MHz-4CC)

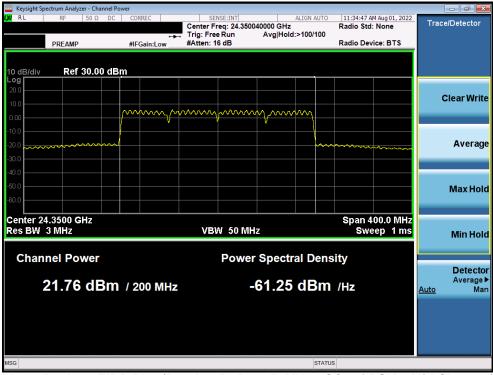
FCC ID:A3LSMS901U		PART 30 MEASUREMENT REPORT (Class II Permissive Change)			
Test Report S/N:	Test Dates:	EUT Type:	Dogo 52 of 142		
1M2203290039-01.A3L	07/11/2022- 08/17/2022	Portable Handset	Page 52 of 142		
			V1.0		



## Worst-Case EIRP Plots (n258-R1)



Plot 7-57. Ant1 EIRP Plot (Band n258-R1 - 50MHz-3CC - π/2-BPSK - Low Channel)



Plot 7-58. Ant1 EIRP Plot (Band n258-R1 - 50MHz-4CC - QPSK - Mid Channel)

FCC ID:A3LSMS901U		PART 30 MEASUREMENT REPORT (Class II Permissive Change)			
Test Report S/N:	Test Dates:	EUT Type:	Dogo 52 of 142		
1M2203290039-01.A3L	07/11/2022- 08/17/2022	Portable Handset	Page 53 of 142		
			V1.0		



Bandwidth [MHz]	CCs Active	Channel	Frequency [MHz]	Transmission Scheme	Modulation	Beam ID	Beam Pol.	Ant. Div.	Ant. Pol. [H/V]	Positioner Azimuth [degrees]	Turntable Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
		Low	24324.96	DFT-s-OFDM	QPSK	40 + 168	H+V	2Tx	V	362.0	89.9	32 / 0	21.37
		Mid	24350.04	DFT-s-OFDM	QPSK	40 + 168	H+V	2Tx	V	359.0	89.0	32 / 0	21.32
		High	24375.00	DFT-s-OFDM	QPSK	31 + 159	H+V	2Tx	V	15.0	101.0	32 / 0	21.47
50+50+50	3	High	24375.00	CP-OFDM	QPSK	31 + 159	H+V	MIMO	V	15.0	101.0	32 / 0	19.30
		High	24375.00	DFT-s-OFDM	π/2 BPSK	31 + 159	H+V	2Tx	V	15.0	101.0	32 / 0	20.25
		High	24375.00	DFT-s-OFDM	16QAM	31 + 159	H+V	2Tx	V	15.0	101.0	1 / 16	19.45
		High	24375.00	DFT-s-OFDM	64QAM	31 + 159	H+V	2Tx	V	15.0	101.0	1 / 16	18.07

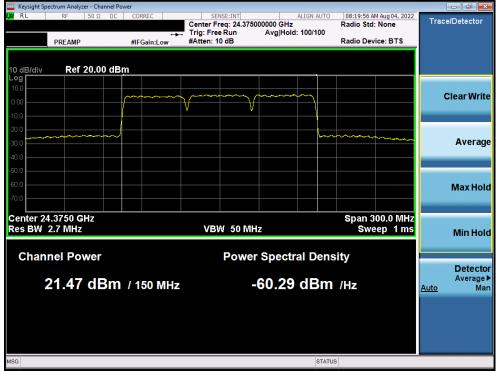
Table 7-10. Ant2 EIRP Data (Band n258-R1 - 50MHz-3CC)

Bandwidth [MHz]	CCs Active	Channel	Frequency [MHz]	Transmission Scheme	Modulation	Beam ID	Beam Pol.	Ant. Div.	Ant. Pol. [H/V]	Positioner Azimuth [degrees]	Turntable Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
		Mid	24349.98	DFT-s-OFDM	QPSK	40 + 168	H+V	2Tx	V	356.0	91.0	32 / 0	21.24
		Mid	24349.98	CP-OFDM	QPSK	40 + 168	H+V	MIMO	V	356.0	91.0	32 / 0	18.41
50+50+50+50	4	Mid	24349.98	DFT-s-OFDM	π/2 BPSK	40 + 168	H+V	2Tx	V	356.0	91.0	32 / 0	21.20
		Mid	24349.98	DFT-s-OFDM	16QAM	40 + 168	H+V	2Tx	V	356.0	91.0	32 / 0	19.14
		Mid	24349.98	DFT-s-OFDM	64QAM	40 + 168	H+V	2Tx	V	356.0	91.0	1 / 16	18.12

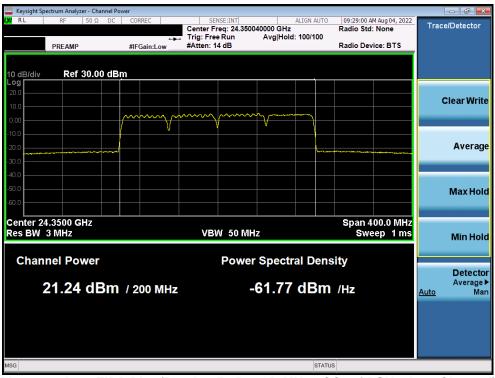
Table 7-11. Ant2 EIRP Data (Band n258-R1 - 50MHz-4CC)

FCC ID:A3LSMS901U		PART 30 MEASUREMENT REPORT (Class II Permissive Change)			
Test Report S/N:	Test Dates:	EUT Type:	Dege E4 of 140		
1M2203290039-01.A3L	07/11/2022- 08/17/2022	Portable Handset	Page 54 of 142		
			V1.0		





Plot 7-59. Ant2 EIRP Plot (Band n258-R1 - 50MHz-3CC - π/2-BPSK - Low Channel)



Plot 7-60. Ant2 EIRP Plot (Band n258-R1 - 50MHz-4CC - QPSK - Low Channel)

FCC ID:A3LSMS901U		PART 30 MEASUREMENT REPORT (Class II Permissive Change)			
Test Report S/N:	Test Dates:	EUT Type:	Dogo EE of 142		
1M2203290039-01.A3L	07/11/2022- 08/17/2022	Portable Handset	Page 55 of 142		
		·	V1.0		



# Band n258-R2 Beam ID Configurations

Mode	Channel	Beam Polarization	Beam ID	Beam ID Pair
	Low	2Tx/MIMO	154	26
MIMO	Mid	2Tx/MIMO	154	26
	High	2Tx/MIMO	154	26

Table 7-12. Ant1 Worst Case Beam ID

Mode	Channel	Beam Polarization	Beam ID	Beam ID Pair
	Low	2Tx/MIMO	168	40
MIMO	Mid	2Tx/MIMO	168	40
	High	2Tx/MIMO	168	40

Table 7-13. Ant2 Worst Case Beam ID

FCC ID:A3LSMS901U		PART 30 MEASUREMENT REPORT (Class II Permissive Change)	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage F6 of 142
1M2203290039-01.A3L	07/11/2022- 08/17/2022	Portable Handset	Page 56 of 142
			V1.0



## Band n258-R2

Bandwidth [MHz]	CCs Active	Channel	Frequency [MHz]	Transmission Scheme	Modulation	Beam ID	Beam Pol.	Ant. Div.	Ant. Pol. [H/V]	Positioner Azimuth [degrees]	Turntable Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
		Low	24825.00	DFT-s-OFDM	QPSK	26 + 154	H+V	2Tx	V	246.0	264.0	32 / 0	23.81
		Low	24825.00	CP-OFDM	QPSK	26 + 154	H+V	MIMO	V	246.0	264.0	32 / 0	21.75
		Low	24825.00	DFT-s-OFDM	π/2 BPSK	26 + 154	H+V	2Tx	V	246.0	264.0	32 / 0	23.79
50+50+50	3	Low	24825.00	DFT-s-OFDM	16QAM	26 + 154	H+V	2Tx	V	246.0	264.0	32 / 0	21.83
		Low	24825.00	DFT-s-OFDM	64QAM	26 + 154	H+V	2Tx	V	246.0	264.0	1 / 16	20.11
		Mid	24999.96	DFT-s-OFDM	π/2 BPSK	26 + 154	H+V	2Tx	V	256.0	270.0	32 / 0	17.54
		High	25175.04	DFT-s-OFDM	π/2 BPSK	26 + 154	H+V	2Tx	V	256.0	270.0	32 / 0	23.54

Table 7-14. Ant1 EIRP Data (Band n258-R2 - 50MHz-3CC)

Bandwidth [MHz]	CCs Active	Channel	Frequency [MHz]	Transmission Scheme	Modulation	Beam ID	Beam Pol.	Ant. Div.	Ant. Pol. [H/V]	Positioner Azimuth [degrees]	Turntable Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
		Low	24849.96	DFT-s-OFDM	QPSK	26 + 154	H + V	2Tx	V	267.0	262.6	32 / 0	23.57
		Low	24849.00	CP-OFDM	QPSK	26 + 154	H + V	MIMO	V	267.0	262.6	32 / 0	21.49
		Low	24849.96	DFT-s-OFDM	π/2 BPSK	26 + 154	H+V	2Tx	V	267.0	262.6	32 / 0	23.48
50+50+50+50	4	Low	24849.96	DFT-s-OFDM	16QAM	26 + 154	H+V	2Tx	V	267.0	262.6	1 / 16	21.76
		Low	24849.96	DFT-s-OFDM	64QAM	26 + 154	H+V	2Tx	V	267.0	262.6	1 / 16	20.16
		Mid	24999.96	DFT-s-OFDM	QPSK	26 + 154	H + V	2Tx	V	256.0	266.4	32 / 0	22.78
		High	25150.08	DFT-s-OFDM	QPSK	26 + 154	H+V	2Tx	V	253.0	262.1	32 / 0	22.19

Table 7-15. Ant1 EIRP Data (Band n258-R2 - 50MHz-4CC)

Bandwidth [MHz]	CCs Active	Channel	Frequency [MHz]	Transmission Scheme	Modulation	Beam ID	Beam Pol.	Ant. Div.	Ant. Pol. [H/V]	Positioner Azimuth [degrees]	Turntable Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
		Low	24900.00	DFT-s-OFDM	QPSK	26 + 154	H+V	2Tx	V	256.0	270.2	32 / 0	24.09
		Low	24900.00	CP-OFDM	QPSK	26 + 154	H+V	MIMO	V	256.0	270.2	32 / 0	22.01
		Low	24900.00	DFT-s-OFDM	π/2 BPSK	26 + 154	H+V	2Tx	V	256.0	270.2	32 / 0	24.03
100+100+100	3	Low	24900.00	DFT-s-OFDM	16QAM	26 + 154	H+V	2Tx	V	256.0	270.2	32 / 0	22.00
		Low	24900.00	DFT-s-OFDM	64QAM	26 + 154	H+V	2Tx	V	256.0	270.2	32 / 0	20.09
		Mid	24999.96	DFT-s-OFDM	QPSK	26 + 154	H+V	2Tx	V	255.0	270.9	32 / 0	23.96
		High	25100.04	DFT-s-OFDM	QPSK	26 + 154	H+V	2Tx	V	254.0	269.1	32 / 0	23.98
			Table 7			(D		0 00	40004	1- 200			

Table 7-16. Ant1 EIRP Data (Band n258-R2 – 100MHz-3CC)

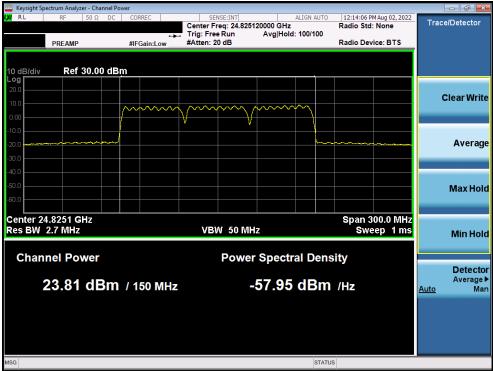
Bandwidth [MHz]	CCs Active	Channel	Frequency [MHz]	Transmission Scheme	Modulation	Beam ID	Beam Pol.	Ant. Div.	Ant. Pol. [H/V]	Positioner Azimuth [degrees]	Turntable Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
		Low	24949.98	DFT-s-OFDM	QPSK	26 + 154	H+V	2Tx	V	255.0	269.2	32 / 0	22.11
		Low	24949.98	CP-OFDM	QPSK	26 + 154	H+V	MIMO	V	255.0	269.2	32 / 0	20.62
		Low	24949.98	DFT-s-OFDM	π/2 BPSK	26 + 154	H+V	2Tx	V	255.0	269.2	32 / 0	22.09
100+100+100+100	4	Low	24949.98	DFT-s-OFDM	16QAM	26 + 154	H+V	2Tx	V	255.0	269.2	1 / 16	20.91
		Low	24949.98	DFT-s-OFDM	64QAM	26 + 154	H+V	2Tx	V	255.0	269.2	1 / 16	18.99
		Mid	25000.02	DFT-s-OFDM	QPSK	26 + 154	H+V	2Tx	V	254.0	268.8	32 / 0	21.26
		High	25050.06	DFT-s-OFDM	QPSK	26 + 154	H+V	2Tx	V	253.0	268.5	32 / 0	21.23

Table 7-17. Ant1 EIRP Data (Band n258-R2 - 100MHz-4CC)

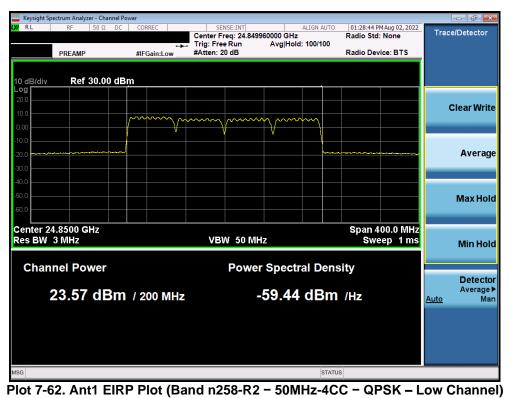
FCC ID:A3LSMS901U		PART 30 MEASUREMENT REPORT (Class II Permissive Change)	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 57 of 142
1M2203290039-01.A3L	07/11/2022- 08/17/2022	Portable Handset	Page 57 of 142
			V1.0



## Worst-Case EIRP Plots (n258-R2)

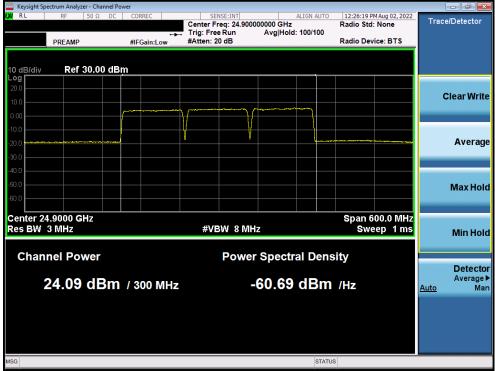


Plot 7-61. Ant1 EIRP Plot (Band n258-R2 - 50MHz-3CC - QPSK - Low Channel)



FCC ID:A3LSMS901U		PART 30 MEASUREMENT REPORT (Class II Permissive Change)	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Daga 50 of 140
1M2203290039-01.A3L	07/11/2022- 08/17/2022	Portable Handset	Page 58 of 142
	•		V1.0





Plot 7-63. Ant1 EIRP Plot (Band n258-R2 - 100MHz-3CC - QPSK - Low Channel)



Plot 7-64. Ant1 EIRP Plot (Band n258-R2 - 100MHz-4CC - QPSK - Low Channel)

FCC ID:A3LSMS901U		PART 30 MEASUREMENT REPORT (Class II Permissive Change)	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 50 of 142
1M2203290039-01.A3L	07/11/2022- 08/17/2022	Portable Handset	Page 59 of 142
			V1.0



Bandwidth [MHz]	CCs Active	Channel	Frequency [MHz]	Transmission Scheme	Modulation	Beam ID	Beam Pol.	Ant. Div.	Ant. Pol. [H/V]	Positioner Azimuth [degrees]	Turntable Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
		Low	24825.00	DFT-s-OFDM	QPSK	40 + 168	H+V	2Tx	V	4.0	89.6	32 / 0	22.37
		Mid	24999.96	DFT-s-OFDM	QPSK	40 + 168	H+V	2Tx	V	5.0	95.2	32 / 0	22.09
		High	25175.04	DFT-s-OFDM	QPSK	40 + 168	H+V	2Tx	V	8.0	97.7	32 / 0	22.44
50+50+50	3	High	25175.04	CP-OFDM	QPSK	40 + 168	H+V	MIMO	V	8.0	97.7	32 / 0	20.32
		High	25175.04	DFT-s-OFDM	π/2 BPSK	40 + 168	H+V	2Tx	V	8.0	97.7	32 / 0	22.43
		High	25175.04	DFT-s-OFDM	16QAM	40 + 168	H+V	2Tx	V	8.0	97.7	1 / 16	20.14
		High	25175.04	DFT-s-OFDM	64QAM	40 + 168	H+V	2Tx	V	8.0	97.7	1 / 16	19.09

### Table 7-18. Ant2 EIRP Data (Band n258-R2 - 50MHz-3CC)

Bandwidth [MHz]	CCs Active	Channel	Frequency [MHz]	Transmission Scheme	Modulation	Beam ID	Beam Pol.	Ant. Div.	Ant. Pol. [H/V]	Positioner Azimuth [degrees]	Turntable Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
		Low	24849.96	DFT-s-OFDM	QPSK	40 + 168	H + V	2Tx	V	7.0	101.4	32 / 0	20.17
		Mid	24999.96	DFT-s-OFDM	QPSK	40 + 168	H+V	2Tx	V	9.0	105.0	32 / 0	20.54
		High	25150.08	DFT-s-OFDM	QPSK	40 + 168	H + V	2Tx	V	7.0	98.9	32 / 0	22.33
50+50+50+50	4	High	25150.08	CP-OFDM	QPSK	40 + 168	H+V	MIMO	V	7.0	98.9	32 / 0	20.17
		High	25150.08	DFT-s-OFDM	π/2 BPSK	40 + 168	H+V	2Tx	V	7.0	98.9	32 / 0	22.31
		High	25150.08	DFT-s-OFDM	16QAM	40 + 168	H+V	2Tx	V	7.0	98.9	32 / 0	20.36
		High	25150.08	DFT-s-OFDM	64QAM	40 + 168	H+V	2Tx	V	7.0	98.9	1 / 16	18.42

### Table 7-19. Ant2 EIRP Data (Band n258-R2 - 50MHz-4CC)

Bandwidth [MHz]	CCs Active	Channel	Frequency [MHz]	Transmission Scheme	Modulation	Beam ID	Beam Pol.	Ant. Div.	Ant. Pol. [H/V]	Positioner Azimuth [degrees]	Turntable Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
		Low	24900.00	DFT-s-OFDM	QPSK	40 + 168	H+V	2Tx	V	4.0	264.0	32 / 0	22.38
		Mid	24999.96	DFT-s-OFDM	QPSK	40 + 168	H + V	2Tx	V	350.0	255.0	32 / 0	22.54
		High	25175.04	DFT-s-OFDM	QPSK	40 + 168	H+V	2Tx	V	358.0	254.9	32 / 0	22.70
100+100+100	3	High	25175.04	CP-OFDM	QPSK	40 + 168	H + V	MIMO	V	358.0	254.9	32 / 0	20.67
		High	25175.04	DFT-s-OFDM	π/2 BPSK	40 + 168	H+V	2Tx	V	358.0	254.9	32 / 0	22.68
		High	25175.04	DFT-s-OFDM	16QAM	40 + 168	H+V	2Tx	V	358.0	254.9	32 / 0	20.67
		High	25175.04	DFT-s-OFDM	64QAM	40 + 168	H+V	2Tx	V	358.0	254.9	1 / 19	19.44

### Table 7-20. Ant2 EIRP Data (Band n258-R2 - 100MHz-3CC)

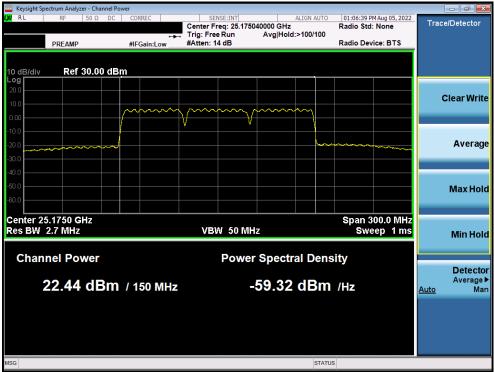
Bandwidth [MHz]	CCs Active	Channel	Frequency [MHz]	Transmission Scheme	Modulation	Beam ID	Beam Pol.	Ant. Div.	Ant. Pol. [H/V]	Positioner Azimuth [degrees]	Turntable Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
		Low	24949.98	DFT-s-OFDM	QPSK	40 + 168	H+V	2Tx	V	354.0	261.0	32 / 0	20.54
		Mid	25000.02	DFT-s-OFDM	QPSK	40 + 168	H + V	2Tx	V	3.0	268.8	32 / 0	20.62
		High	25050.06	DFT-s-OFDM	QPSK	40 + 168	H+V	2Tx	V	359.0	232.0	32 / 0	20.89
100+100+100+100	4	High	25050.06	CP-OFDM	QPSK	40 + 168	H + V	MIMO	V	359.0	232.0	32 / 0	19.11
		High	25050.06	DFT-s-OFDM	π/2 BPSK	40 + 168	H+V	2Tx	V	359.0	232.0	32 / 0	20.85
		High	25050.06	DFT-s-OFDM	16QAM	40 + 168	H + V	2Tx	V	359.0	232.0	32 / 0	18.77
		High	25050.06	DFT-s-OFDM	64QAM	40 + 168	H+V	2Tx	V	359.0	232.0	1 / 16	17.04

Table 7-21. Ant2 EIRP Data (Band n258-R2 - 100MHz-4CC)

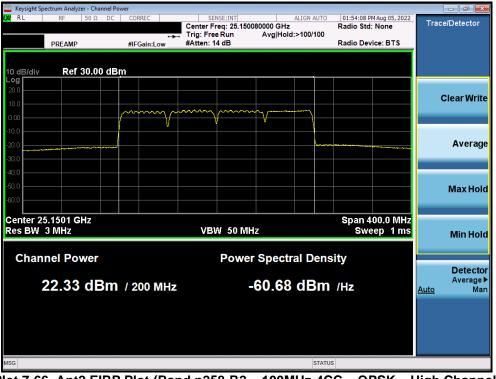
FCC ID:A3LSMS901U		Approved by: Technical Manager		
Test Report S/N:	Test Dates:	EUT Type:	Dere CO of 140	
1M2203290039-01.A3L	07/11/2022- 08/17/2022 Portable Handset		Page 60 of 142	
			V1.0	



## Worst-Case EIRP Plots (n258-R2)



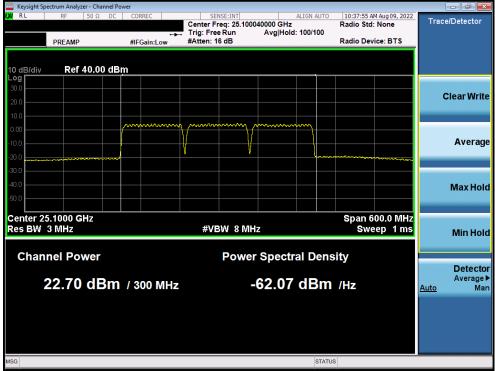
Plot 7-65. Ant2 EIRP Plot (Band n258-R2 - 50MHz-3CC - QPSK - High Channel)



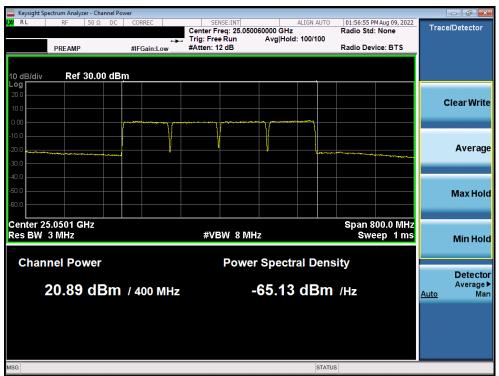
Plot 7-66. Ant2 EIRP Plot (Band n258-R2 - 100MHz-4CC - QPSK - High Channel)

FCC ID:A3LSMS901U		PART 30 MEASUREMENT REPORT (Class II Permissive Change)	Approved by: Technical Manager		
Test Report S/N:	Test Dates:	EUT Type:	Page 61 of 142		
1M2203290039-01.A3L	07/11/2022- 08/17/2022	Portable Handset	Fage 01 01 142		
			V1.0		





Plot 7-67. Ant2 EIRP Plot (Band n258-R2 - 100MHz-3CC - QPSK - High Channel)



Plot 7-68. Ant2 EIRP Plot (Band n258-R2 - 100MHz-4CC - QPSK - High Channel)

FCC ID:A3LSMS901U		PART 30 MEASUREMENT REPORT (Class II Permissive Change)			
Test Report S/N:	Test Dates:	EUT Type:	Page 62 of 142		
1M2203290039-01.A3L	07/11/2022- 08/17/2022	Portable Handset	raye 02 01 142		
		·	V1.0		



# Band n261 Beam ID Configurations

Mode	Channel	Beam Polarization	Beam ID	Beam ID Pair
	Low	2Tx/MIMO	155	27
MIMO	Mid	2Tx/MIMO	164	36
	High	2Tx/MIMO	165	37

Table 7-22. Ant1 Worst Case Beam ID

Mode	Channel	Beam Polarization	Beam ID	Beam ID Pair
	Low	2Tx/MIMO	159	31
MIMO	Mid	2Tx/MIMO	159	31
	High	2Tx/MIMO	159	31

Table 7-23. Ant2 Worst Case Beam ID

FCC ID:A3LSMS901U		PART 30 MEASUREMENT REPORT (Class II Permissive Change)	Approved by: Technical Manager	
Test Report S/N:	Test Dates:	EUT Type:	Page 63 of 142	
1M2203290039-01.A3L	07/11/2022- 08/17/2022	Portable Handset	Page 63 01 142	
			V1.0	



## Band n261

Bandwidth [MHz]	CCs Active	Channel	Frequency [MHz]	Transmission Scheme	Modulation	Beam ID	Beam Pol.	Ant. Div.	Ant. Pol. [H/V]	Positioner Azimuth [degrees]	Turntable Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
		Low	27574.92	DFT-s-OFDM	QPSK	27 + 155	H+V	2Tx	V	115.0	120.2	32 / 0	22.67
		Low	27574.92	CP-OFDM	QPSK	27 + 155	H + V	MIMO	V	115.0	120.2	32 / 0	20.77
		Low	27574.92	DFT-s-OFDM	π/2 BPSK	27 + 155	H+V	2Tx	V	115.0	120.2	32 / 0	22.70
50+50+50	3	Low	27574.92	DFT-s-OFDM	16QAM	27 + 155	H+V	2Tx	V	115.0	120.2	1 / 16	21.25
		Low	27574.92	DFT-s-OFDM	64QAM	27 + 155	H+V	2Tx	V	115.0	120.2	1 / 16	19.60
		Mid	27924.96	DFT-s-OFDM	π/2 BPSK	36 + 164	H+V	2Tx	V	121.0	120.0	32 / 0	22.39
		High	28275.00	DFT-s-OFDM	π/2 BPSK	37 + 165	H+V	2Tx	V	110.0	120.6	32 / 0	19.59

Table 7-24. Ant1 EIRP Data (Band n261 - 50MHz-3CC)

Bandwidth [MHz]	CCs Active	Channel	Frequency [MHz]	Transmission Scheme	Modulation	Beam ID	Beam Pol.	Ant. Div.	Ant. Pol. [H/V]	Positioner Azimuth [degrees]	Turntable Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
		Low	27599.88	DFT-s-OFDM	π/2 BPSK	27 + 155	H+V	2Tx	Н	125.0	271.0	32 / 0	21.05
		Mid	27924.96	DFT-s-OFDM	QPSK	36 + 164	H+V	2Tx	н	118.0	272.3	32 / 0	21.26
		Mid	27924.96	CP-OFDM	QPSK	36 + 164	H+V	MIMO	Н	118.0	272.3	32 / 0	20.39
50+50+50+50	4	Mid	27924.96	DFT-s-OFDM	π/2 BPSK	36 + 164	H+V	2Tx	н	118.0	272.3	32 / 0	21.85
		Mid	27924.96	DFT-s-OFDM	16QAM	36 + 164	H+V	2Tx	н	118.0	272.3	1 / 16	20.80
		Mid	27924.96	DFT-s-OFDM	64QAM	36 + 164	H+V	2Tx	Н	118.0	272.3	1 / 16	19.32
		High	28250.04	DFT-s-OFDM	π/2 BPSK	37 + 165	H+V	2Tx	н	259.0	57.0	32 / 0	21.80

Table 7-25. Ant1 EIRP Data (Band n261 – 50MHz-4CC)

Bandwidth [MHz]	CCs Active	Channel	Frequency [MHz]	Transmission Scheme	Modulation	Beam ID	Beam Pol.	Ant. Div.	Ant. Pol. [H/V]	Positioner Azimuth [degrees]	Turntable Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
		Low	27650.04	DFT-s-OFDM	QPSK	27 + 155	H + V	2Tx	н	100.0	98.5	32 / 0	22.90
		Low	27650.04	CP-OFDM	QPSK	27 + 155	H + V	MIMO	н	100.0	98.5	32 / 0	20.96
		Low	27650.04	DFT-s-OFDM	π/2 BPSK	27 + 155	H+V	2Tx	Н	100.0	98.5	32 / 0	22.91
100+100+100	3	Low	27650.04	DFT-s-OFDM	16QAM	27 + 155	H+V	2Tx	н	100.0	98.5	1 / 16	21.86
		Low	27650.04	DFT-s-OFDM	64QAM	27 + 155	H+V	2Tx	Н	100.0	98.5	1 / 16	20.91
		Mid	27924.96	DFT-s-OFDM	π/2 BPSK	36 + 164	H+V	2Tx	Н	102.0	95.0	32 / 0	21.04
		High	28200.00	DFT-s-OFDM	π/2 BPSK	37 + 165	H+V	2Tx	н	108.0	121.0	32 / 0	22.27

### Table 7-26. Ant1 EIRP Data (Band n261 - 100MHz-3CC)

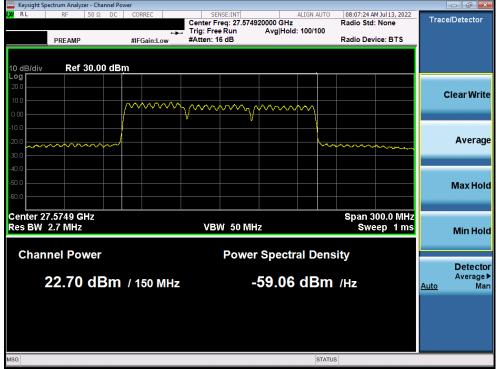
Bandwidth [MHz]	CCs Active	Channel	Frequency [MHz]	Transmission Scheme	Modulation	Beam ID	Beam Pol.	Ant. Div.	Ant. Pol. [H/V]	Positioner Azimuth [degrees]	Turntable Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
		Low	27700.02	DFT-s-OFDM	QPSK	27 + 155	H + V	2Tx	Н	233.0	74.2	32 / 0	21.28
		Mid	27925.02	DFT-s-OFDM	QPSK	36 + 164	H+V	2Tx	Н	252.0	97.7	32 / 0	22.22
		Mid	27925.02	CP-OFDM	QPSK	36 + 164	H + V	MIMO	Н	252.0	97.7	32 / 0	20.73
100+100+100+100	4	Mid	27925.02	DFT-s-OFDM	π/2 BPSK	36 + 164	H+V	2Tx	н	252.0	97.7	32 / 0	22.18
		Mid	27925.02	DFT-s-OFDM	16QAM	36 + 164	H+V	2Tx	Н	252.0	97.7	1 / 12	20.77
		Mid	27925.02	DFT-s-OFDM	64QAM	36 + 164	H+V	2Tx	н	252.0	97.7	1 / 12	19.79
		High	28150.02	DFT-s-OFDM	QPSK	37 + 165	H+V	2Tx	н	239.0	87.8	32 / 0	21.41

Table 7-27. Ant1 EIRP Data (Band n261 - 100MHz-4CC)

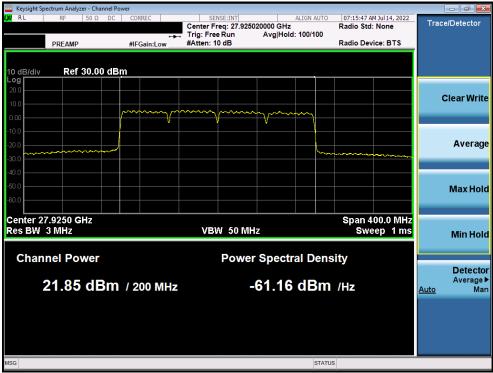
FCC ID:A3LSMS901U		PART 30 MEASUREMENT REPORT (Class II Permissive Change)			
Test Report S/N:	Test Dates:	EUT Type:	Dogo 64 of 142		
1M2203290039-01.A3L	07/11/2022- 08/17/2022	Portable Handset	Page 64 of 142		
			V1.0		



## Worst-Case EIRP Plots (n261)



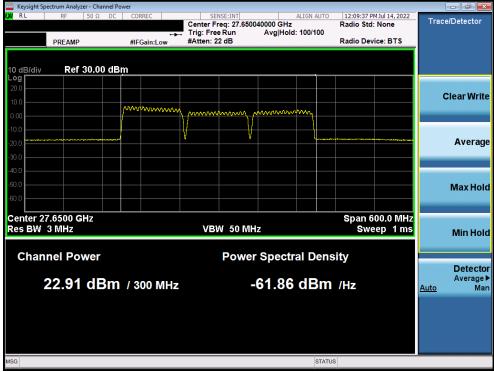
Plot 7-69. Ant1 EIRP Plot (Band n261 - 50MHz-3CC - π/2 BPSK - Low Channel)



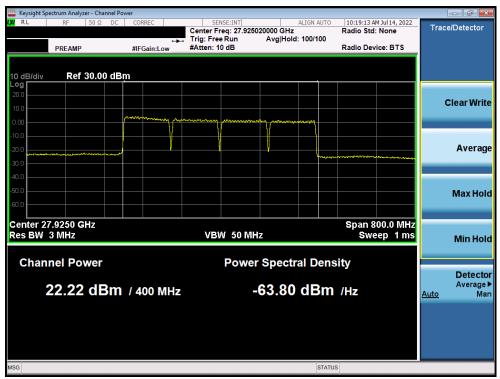
Plot 7-70. Ant1 EIRP Plot (Band n261 - 50MHz-4CC - QPSK - Mid Channel)

FCC ID:A3LSMS901U		Approved by: Technical Manager	
Test Report S/N:	Test Dates: EUT Type:		Dogo 65 of 142
1M2203290039-01.A3L	07/11/2022- 08/17/2022	Portable Handset	Page 65 of 142
			V1.0





Plot 7-71. Ant1 EIRP Plot (Band n261 - 100MHz-3CC - QPSK - Low Channel)



Plot 7-72. Ant1 EIRP Plot (Band n261 – 100MHz-4CC – π/2-BPSK – Mid Channel)

FCC ID:A3LSMS901U	Test Dates: EUT T	PART 30 MEASUREMENT REPORT (Class II Permissive Change)	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Dogo 66 of 142
1M2203290039-01.A3L	07/11/2022- 08/17/2022	Portable Handset	Page 66 of 142
		·	V1.0



Bandwidth [MHz]	CCs Active	Channel	Frequency [MHz]	Transmission Scheme	Modulation	Beam ID	Beam Pol.	Ant. Div.	Ant. Pol. [H/V]	Positioner Azimuth [degrees]	Turntable Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
		Low	27574.92	DFT-s-OFDM	π/2 BPSK	31 + 159	H+V	2Tx	V	250.0	325.0	32 / 0	23.79
		Mid	27924.96	DFT-s-OFDM	QPSK	31 + 159	H+V	2Tx	V	262.0	332.9	32 / 0	26.22
		Mid	27924.96	CP-OFDM	QPSK	31 + 159	H+V	MIMO	V	262.0	332.9	32 / 0	24.21
50+50+50	3	Mid	27924.96	DFT-s-OFDM	π/2 BPSK	31 + 159	H+V	2Tx	V	262.0	332.9	32 / 0	26.28
		Mid	27924.96	DFT-s-OFDM	16QAM	31 + 159	H+V	2Tx	V	262.0	332.9	32 / 0	24.21
		Mid	27924.96	DFT-s-OFDM	64QAM	31 + 159	H+V	2Tx	V	262.0	332.9	1 / 16	22.71
		High	28275.00	DFT-s-OFDM	π/2 BPSK	31 + 159	H+V	2Tx	V	43.0	175.2	32 / 0	21.32

### Table 7-28. Ant2 EIRP Data (Band n261 - 50MHz-3CC)

Bandwidth [MHz]	CCs Active	Channel	Frequency [MHz]	Transmission Scheme	Modulation	Beam ID	Beam Pol.	Ant. Div.	Ant. Pol. [H/V]	Positioner Azimuth [degrees]	Turntable Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
		Low	27599.88	DFT-s-OFDM	QPSK	31 + 159	H + V	2Tx	н	311.0	177.9	32 / 0	22.05
		Mid	27924.96	DFT-s-OFDM	QPSK	31 + 159	H + V	2Tx	V	111.0	344.8	32 / 0	23.71
		Mid	27924.96	CP-OFDM	QPSK	31 + 159	H+V	MIMO	V	111.0	344.8	32 / 0	21.64
50+50+50+50	4	Mid	27924.96	DFT-s-OFDM	π/2 BPSK	31 + 159	H+V	2Tx	V	111.0	344.8	32 / 0	23.68
		Mid	27924.96	DFT-s-OFDM	16QAM	31 + 159	H+V	2Tx	V	111.0	344.8	1 / 12	21.85
		Mid	27924.96	DFT-s-OFDM	64QAM	31 + 159	H+V	2Tx	V	111.0	344.8	32 / 0	19.77
		High	28250.04	DFT-s-OFDM	QPSK	31 + 159	H+V	2Tx	н	308.0	178.9	32 / 0	21.88

### Table 7-29. Ant2 EIRP Data (Band n261 - 50MHz-4CC)

Bandwidth [MHz]	CCs Active	Channel	Frequency [MHz]	Transmission Scheme	Modulation	Beam ID	Beam Pol.	Ant. Div.	Ant. Pol. [H/V]	Positioner Azimuth [degrees]	Turntable Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
		Low	27650.04	DFT-s-OFDM	π/2 BPSK	31 + 159	H+V	2Tx	V	72.0	16.7	32 / 0	23.74
		Mid	27924.96	DFT-s-OFDM	QPSK	31 + 159	H + V	2Tx	V	79.0	26.7	32 / 0	26.92
		Mid	27924.96	CP-OFDM	QPSK	31 + 159	H + V	MIMO	V	79.0	26.7	32 / 0	24.94
100+100+100	3	Mid	27924.96	DFT-s-OFDM	π/2 BPSK	31 + 159	H+V	2Tx	V	79.0	26.7	32 / 0	26.98
		Mid	27924.96	DFT-s-OFDM	16QAM	31 + 159	H+V	2Tx	V	79.0	26.7	1 / 19	25.57
		Mid	27924.96	DFT-s-OFDM	64QAM	31 + 159	H+V	2Tx	V	79.0	26.7	1 / 19	24.49
		High	28200.00	DFT-s-OFDM	π/2 BPSK	31 + 159	H+V	2Tx	V	74.0	16.0	32 / 0	23.95

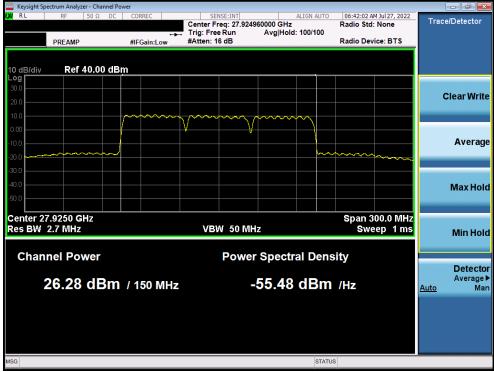
### Table 7-30. Ant2 EIRP Data (Band n261 - 100MHz-3CC)

Bandwidth [MHz]	CCs Active	Channel	Frequency [MHz]	Transmission Scheme	Modulation	Beam ID	Beam Pol.	Ant. Div.	Ant. Pol. [H/V]	Positioner Azimuth [degrees]	Turntable Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
		Low	27700.02	DFT-s-OFDM	QPSK	31 + 159	H+V	2Tx	V	43.0	348.2	32 / 0	22.75
		Mid	27925.02	DFT-s-OFDM	QPSK	31 + 159	H+V	2Tx	н	71.0	27.1	32 / 0	26.09
		Mid	27925.02	CP-OFDM	QPSK	31 + 159	H+V	MIMO	н	71.0	27.1	32 / 0	23.47
100+100+100+100	4	Mid	27925.02	DFT-s-OFDM	π/2 BPSK	31 + 159	H+V	2Tx	н	71.0	27.1	32 / 0	26.05
		Mid	27925.02	DFT-s-OFDM	16QAM	31 + 159	H+V	2Tx	н	71.0	27.1	1 / 12	24.06
		Mid	27925.02	DFT-s-OFDM	64QAM	31 + 159	H+V	2Tx	Н	71.0	27.1	1 / 12	22.41
		High	28150.02	DFT-s-OFDM	QPSK	31 + 159	H+V	2Tx	Н	53.0	347.8	32 / 0	23.02

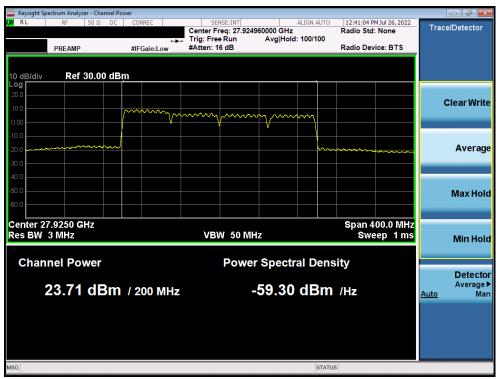
Table 7-31. Ant2 EIRP Data (Band n261 - 100MHz-4CC)

FCC ID:A3LSMS901U		PART 30 MEASUREMENT REPORT (Class II Permissive Change)	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 67 of 140
1M2203290039-01.A3L	07/11/2022- 08/17/2022	Portable Handset	Page 67 of 142
		·	V1.0





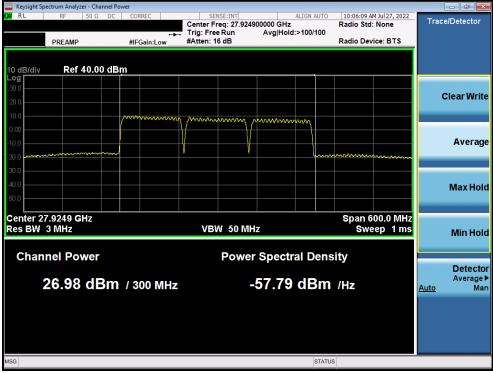
Plot 7-73. Ant2 EIRP Plot (Band n261 - 50MHz-3CC - QPSK - Mid Channel)



Plot 7-74. Ant2 EIRP Plot (Band n261 - 50MHz-4CC - QPSK - Mid Channel)

FCC ID:A3LSMS901U	t S/N: Test Dates: EUT Ty	PART 30 MEASUREMENT REPORT (Class II Permissive Change)	Approved by: Technical Manager	
Test Report S/N:	Test Dates:	EUT Type:	Dogo 69 of 142	
1M2203290039-01.A3L	07/11/2022- 08/17/2022	Portable Handset	Page 68 of 142	
		·	V1.0	





Plot 7-75. Ant2 EIRP Plot (Band n261 - 100MHz-3CC - QPSK - Mid Channel)



Plot 7-76. Ant2 EIRP Plot (Band n261 – 100MHz-4CC – π/2-BPSK – Mid Channel)

FCC ID:A3LSMS901U	rt S/N: Test Dates: EUT T	PART 30 MEASUREMENT REPORT (Class II Permissive Change)	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Dogo 60 of 142
1M2203290039-01.A3L	07/11/2022- 08/17/2022	Portable Handset	Page 69 of 142
		·	V1.0



# Band n260 Beam ID Configurations

de	Channel	Beam Polarization	Beam ID	Beam ID Pair
	Low	2Tx/MIMO	163	35
MIMO	Mid	2Tx/MIMO	163	35
	High	2Tx/MIMO	162	34

Table 7-32. Ant1 Worst Case Beam ID

de	Channel	Beam Polarization	Beam ID	Beam ID Pair
	Low	2Tx/MIMO	167	39
MIMO	Mid	2Tx/MIMO	167	39
	High	2Tx/MIMO	158	30

Table 7-33. Ant2 Worst Case Beam ID

FCC ID:A3LSMS901U		PART 30 MEASUREMENT REPORT (Class II Permissive Change)	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Dogo 70 of 140
1M2203290039-01.A3L	07/11/2022- 08/17/2022	Portable Handset	Page 70 of 142
			V1.0



## Band n260

Bandwidth [MHz]	CCs Active	Channel	Frequency [MHz]	Transmission Scheme	Modulation	Beam ID	Beam Pol.	Ant. Div.	Ant. Pol. [H/V]	Positioner Azimuth [degrees]	Turntable Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
		Low	37074.96	DFT-s-OFDM	π/2 BPSK	35 + 163	H+V	2Tx	V	234.0	260.7	32 / 0	16.51
		Mid	38499.96	DFT-s-OFDM	QPSK	35 + 163	H + V	2Tx	V	232.0	261.4	32 / 0	18.92
		Mid	38499.96	CP-OFDM	QPSK	35 + 163	H + V	MIMO	V	232.0	261.4	32 / 0	17.44
50+50+50	3	Mid	38499.96	DFT-s-OFDM	π/2 BPSK	35 + 163	H+V	2Tx	V	232.0	261.4	32 / 0	18.98
		Mid	38499.96	DFT-s-OFDM	16QAM	35 + 163	H+V	2Tx	V	232.0	261.4	1 / 19	18.86
		Mid	38499.96	DFT-s-OFDM	64QAM	35 + 163	H+V	2Tx	V	232.0	261.4	1 / 19	17.41
		High	39925.08	DFT-s-OFDM	π/2 BPSK	34 + 162	H+V	2Tx	V	240.0	266.4	32 / 0	17.36

Table 7-34. Ant1 EIRP Data (Band n260 – 50MHz-3CC)

Bandwidth [MHz]	CCs Active	Channel	Frequency [MHz]	Transmission Scheme	Modulation	Beam ID	Beam Pol.	Ant. Div.	Ant. Pol. [H/V]	Positioner Azimuth [degrees]	Turntable Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
	4	Low	37099.92	DFT-s-OFDM	QPSK	35 + 163	H + V	2Tx	V	133.0	82.2	32 / 0	16.98
		Mid	38499.96	DFT-s-OFDM	QPSK	35 + 163	H+V	2Tx	V	132.0	86.0	32 / 0	18.67
		Mid	38499.96	CP-OFDM	QPSK	35 + 163	H + V	MIMO	V	132.0	86.0	32 / 0	17.21
50+50+50+50		Mid	38499.96	DFT-s-OFDM	π/2 BPSK	35 + 163	H+V	2Tx	V	132.0	86.0	32 / 0	18.62
		Mid	38499.96	DFT-s-OFDM	16QAM	35 + 163	H + V	2Tx	V	132.0	86.0	32 / 0	17.05
		Mid	38499.96	DFT-s-OFDM	64QAM	35 + 163	H+V	2Tx	V	132.0	86.0	1 / 19	15.58
		High	39900.12	DFT-s-OFDM	QPSK	34 + 162	H+V	2Tx	V	132.0	83.8	32 / 0	18.38

Table 7-35. Ant1 EIRP Data (Band n260 - 50MHz-4CC)

Bandwidth [MHz]	CCs Active	Channel	Frequency [MHz]	Transmission Scheme	Modulation	Beam ID	Beam Pol.	Ant. Div.	Ant. Pol. [H/V]	Positioner Azimuth [degrees]	Turntable Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
	3	Low	37149.96	DFT-s-OFDM	π/2 BPSK	35 + 163	H+V	2Tx	V	231.0	260.5	32 / 0	17.04
		Mid	38499.96	DFT-s-OFDM	QPSK	35 + 163	H + V	2Tx	V	231.0	260.5	32 / 0	19.11
		Mid	38499.96	CP-OFDM	QPSK	35 + 163	H+V	MIMO	V	231.0	260.5	32 / 0	17.58
100+100+100		Mid	38499.96	DFT-s-OFDM	π/2 BPSK	35 + 163	H+V	2Tx	V	231.0	260.5	32 / 0	19.17
		Mid	38499.96	DFT-s-OFDM	16QAM	35 + 163	H+V	2Tx	V	231.0	260.5	32 / 0	17.62
		Mid	38499.96	DFT-s-OFDM	64QAM	35 + 163	H+V	2Tx	V	231.0	260.5	1 / 19	16.22
		High	39849.96	DFT-s-OFDM	π/2 BPSK	34 + 162	H+V	2Tx	V	229.0	261.1	32 / 0	17.47

Table 7-36. Ant1 EIRP Data (Band n260 - 100MHz-3CC)

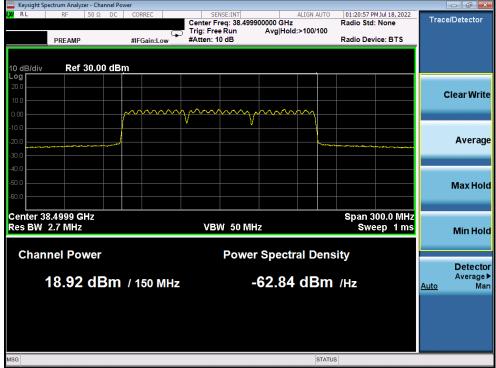
Bandwidth [MHz]	CCs Active	Channel	Frequency [MHz]	Transmission Scheme	Modulation	Beam ID	Beam Pol.	Ant. Div.	Ant. Pol. [H/V]	Positioner Azimuth [degrees]	Turntable Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
	4	Low	37199.94	DFT-s-OFDM	π/2 BPSK	35 + 163	H+V	2Tx	V	251.0	261.1	32 / 0	16.96
		Mid	38500.02	DFT-s-OFDM	QPSK	35 + 163	H + V	2Tx	V	105.0	84.1	32 / 0	18.50
		Mid	38500.02	CP-OFDM	QPSK	35 + 163	H+V	MIMO	V	105.0	84.1	32 / 0	17.73
100+100+100+100		Mid	38500.02	DFT-s-OFDM	π/2 BPSK	35 + 163	H+V	2Tx	V	105.0	84.1	32 / 0	18.52
		Mid	38500.02	DFT-s-OFDM	16QAM	35 + 163	H+V	2Tx	V	105.0	84.1	1 / 16	17.65
		Mid	38500.02	DFT-s-OFDM	64QAM	35 + 163	H+V	2Tx	V	105.0	84.1	1 / 16	16.03
		High	39799.98	DFT-s-OFDM	π/2 BPSK	34 + 162	H+V	2Tx	V	249.0	262.5	32 / 0	17.40

Table 7-37. Ant1 EIRP Data (Band n260 - 100MHz-4CC)

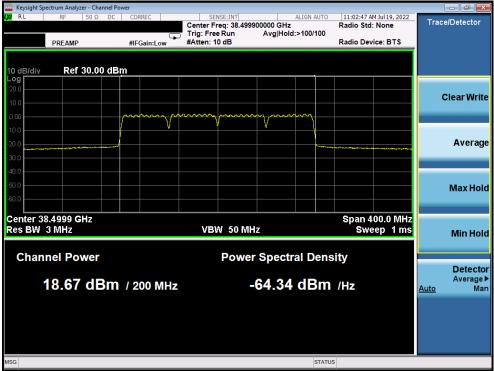
FCC ID:A3LSMS901U		PART 30 MEASUREMENT REPORT (Class II Permissive Change)	Approved by: Technical Manager		
Test Report S/N:	Test Dates:	EUT Type:	Page 71 of 142		
1M2203290039-01.A3L	07/11/2022- 08/17/2022	Portable Handset	Fage / 1 01 142		
			V1.0		



## Worst-Case EIRP Plots (n260)



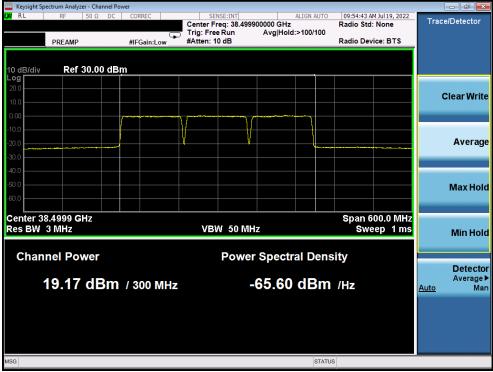
Plot 7-77. Ant1 EIRP Plot (Band n260 - 50MHz-3CC - QPSK - Mid Channel)



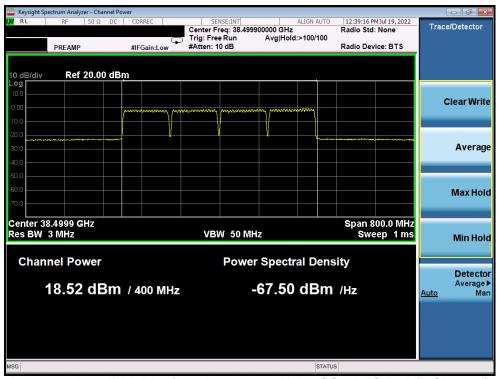
Plot 7-78. Ant1 EIRP Plot (Band n260 - 50MHz-4CC - QPSK - Mid Channel)

FCC ID:A3LSMS901U		Approved by: Technical Manager		
Test Report S/N:	Test Dates:	EUT Type:	Dogo 72 of 142	
1M2203290039-01.A3L	07/11/2022- 08/17/2022	Portable Handset	Page 72 of 142	
			V1.0	





Plot 7-79. Ant1 EIRP Plot (Band n260 - 100MHz-3CC - QPSK - Mid Channel)



Plot 7-80. Ant1 EIRP Plot (Band n260 - 100MHz-4CC - BPSK - Mid Channel)

FCC ID:A3LSMS901U		PART 30 MEASUREMENT REPORT (Class II Permissive Change)	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Daga 72 of 142
1M2203290039-01.A3L	07/11/2022- 08/17/2022	Portable Handset	Page 73 of 142
		-	V1.0



## Band n260

Bandwidth [MHz]	CCs Active	Channel	Frequency [MHz]	Transmission Scheme	Modulation	Beam ID	Beam Pol.	Ant. Div.	Ant. Pol. [H/V]	Positioner Azimuth [degrees]	Turntable Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
		Low	37074.96	DFT-s-OFDM	QPSK	39 + 167	H + V	2Tx	Н	36.0	189.7	32 / 0	21.19
		Low	37074.96	CP-OFDM	QPSK	39 + 167	H + V	MIMO	Н	36.0	189.7	32 / 0	19.54
		Low	37074.96	DFT-s-OFDM	π/2 BPSK	39 + 167	H+V	2Tx	Н	36.0	189.7	32 / 0	21.10
50+50+50	3	Low	37074.96	DFT-s-OFDM	16QAM	39 + 167	H+V	2Tx	Н	36.0	189.7	1 / 19	19.58
		Low	37074.96	DFT-s-OFDM	64QAM	39 + 167	H+V	2Tx	Н	36.0	189.7	1 / 19	18.49
		Mid	38499.96	DFT-s-OFDM	QPSK	39 + 167	H+V	2Tx	Н	25.0	153.0	32 / 0	19.29
		High	39925.08	DFT-s-OFDM	QPSK	30 + 158	H+V	2Tx	Н	32.0	199.6	32 / 0	19.09

Table 7-38. Ant2 EIRP Data (Band n260 - 50MHz-3CC)

-s-OFDM QPSK					[degrees]	[degrees]		
	39 + 167	H+V	2Tx	н	295.0	26.1	32 / 0	20.16
-OFDM QPSK	39 + 167	H+V	MIMO	Н	295.0	26.1	32 / 0	20.41
-s-OFDM π/2 BPSK	39 + 167	H+V	2Tx	Н	295.0	26.1	32 / 0	20.20
-s-OFDM 16QAM	39 + 167	H+V	2Tx	Н	295.0	26.1	1 / 19	20.35
-s-OFDM 64QAM	39 + 167	H+V	2Tx	Н	295.0	26.1	1 / 19	18.92
-s-OFDM π/2 BPSK	39 + 167	H+V	2Tx	н	300.0	27.0	32 / 0	20.05
-s-OFDM π/2 BPSK	30 + 158	H+V	2Tx	Н	230.0	35.0	32 / 0	17.86
	-s-OFDM 16QAM -s-OFDM 64QAM -s-OFDM π/2 BPSK	s-OFDM         16QAM         39 + 167           s-OFDM         64QAM         39 + 167           s-OFDM         π/2 BPSK         39 + 167	s-OFDM         16QAM         39 + 167         H + V           s-OFDM         64QAM         39 + 167         H + V           s-OFDM         π/2 BPSK         39 + 167         H + V	s-OFDM         16QAM         39 + 167         H + V         2Tx           s-OFDM         64QAM         39 + 167         H + V         2Tx           s-OFDM         π/2 BPSK         39 + 167         H + V         2Tx	s-OFDM         16QAM         39 + 167         H + V         2Tx         H           s-OFDM         64QAM         39 + 167         H + V         2Tx         H           s-OFDM         7/2 BPSK         39 + 167         H + V         2Tx         H	s-OFDM         16QAM         39 + 167         H + V         2Tx         H         295.0           s-OFDM         64QAM         39 + 167         H + V         2Tx         H         295.0           s-OFDM         64QAM         39 + 167         H + V         2Tx         H         295.0           s-OFDM         π/2 BPSK         39 + 167         H + V         2Tx         H         300.0	s-OFDM         16QAM         39 + 167         H + V         2Tx         H         295.0         26.1           s-OFDM         64QAM         39 + 167         H + V         2Tx         H         295.0         26.1           s-OFDM         64QAM         39 + 167         H + V         2Tx         H         295.0         26.1           s-OFDM         π/2 BPSK         39 + 167         H + V         2Tx         H         300.0         27.0	s-OFDM         16QAM         39 + 167         H + V         2Tx         H         295.0         26.1         1 / 19           s-OFDM         64QAM         39 + 167         H + V         2Tx         H         295.0         26.1         1 / 19           s-OFDM         64QAM         39 + 167         H + V         2Tx         H         295.0         26.1         1 / 19           s-OFDM         π/2 BPSK         39 + 167         H + V         2Tx         H         300.0         27.0         32 / 0

Table 7-39. Ant2 EIRP Data (Band n260 – 50MHz-4CC)

Bandwidth [MHz]	CCs Active	Channel	Frequency [MHz]	Transmission Scheme	Modulation	Beam ID	Beam Pol.	Ant. Div.	Ant. Pol. [H/V]	Positioner Azimuth [degrees]	Turntable Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
		Low	37149.96	DFT-s-OFDM	QPSK	39 + 167	H + V	2Tx	н	29.0	195.2	1 / 12	20.29
		Low	37149.96	CP-OFDM	QPSK	39 + 167	H+V	MIMO	н	29.0	195.2	32 / 0	19.95
		Low	37149.96	DFT-s-OFDM	π/2 BPSK	39 + 167	H+V	2Tx	н	29.0	195.2	1 / 12	20.32
100+100+100	3	Low	37149.96	DFT-s-OFDM	16QAM	39 + 167	H+V	2Tx	н	28.0	192.0	32 / 0	18.88
		Low	37149.96	DFT-s-OFDM	64QAM	39 + 167	H+V	2Tx	н	29.0	195.2	1 / 16	17.38
		Mid	38499.96	DFT-s-OFDM	π/2 BPSK	39 + 167	H+V	2Tx	н	361.0	255.0	32 / 0	14.74
		High	39849.96	DFT-s-OFDM	π/2 BPSK	30 + 158	H+V	2Tx	н	360.0	248.0	32 / 0	14.95

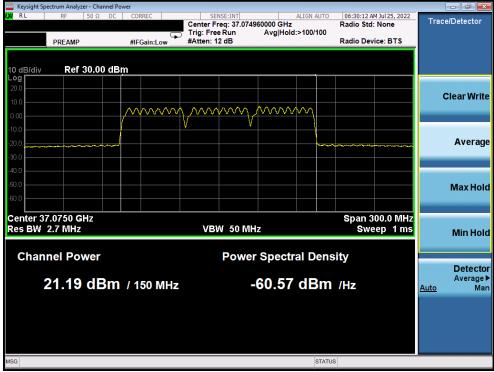
Table 7-40. Ant2 EIRP Data (Band n260 – 100MHz-3CC)

Bandwidth [MHz]	CCs Active	Channel	Frequency [MHz]	Transmission Scheme	Modulation	Beam ID	Beam Pol.	Ant. Div.	Ant. Pol. [H/V]	Positioner Azimuth [degrees]	Turntable Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
		Low	37199.94	DFT-s-OFDM	QPSK	39 + 167	H+V	2Tx	н	36.0	191.5	32 / 0	20.16
		Low	37199.94	CP-OFDM	QPSK	39 + 167	H + V	MIMO	н	36.0	191.5	32 / 0	19.56
		Low	37199.94	DFT-s-OFDM	π/2 BPSK	39 + 167	H+V	2Tx	н	36.0	191.5	32 / 0	20.08
100+100+100+100	4	Low	37199.94	DFT-s-OFDM	16QAM	39 + 167	H+V	2Tx	Н	36.0	191.5	1 / 12	19.99
		Low	37199.94	DFT-s-OFDM	64QAM	39 + 167	H+V	2Tx	н	36.0	191.5	1 / 12	18.72
		Mid	38500.02	DFT-s-OFDM	π/2 BPSK	39 + 167	H+V	2Tx	н	40.0	187.5	32 / 0	19.89
		High	39799.98	DFT-s-OFDM	π/2 BPSK	30 + 158	H+V	2Tx	н	36.0	191.5	32 / 0	20.02

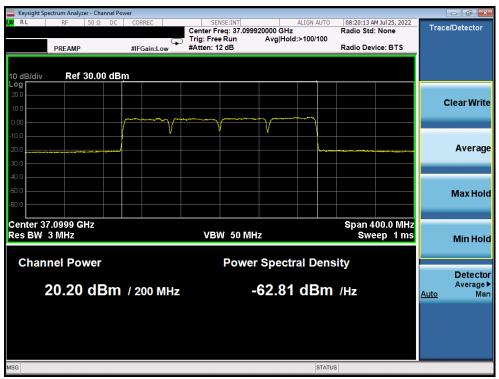
Table 7-41. Ant2 EIRP Data (Band n260 - 100MHz-4CC)

FCC ID:A3LSMS901U		PART 30 MEASUREMENT REPORT (Class II Permissive Change)	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Dogo 74 of 142
1M2203290039-01.A3L	07/11/2022- 08/17/2022	Portable Handset	Page 74 of 142
			V1.0





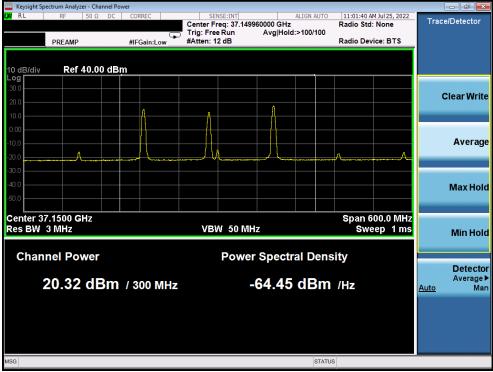
Plot 7-81. Ant2 EIRP Plot (Band n260 - 50MHz-3CC - QPSK - Low Channel)



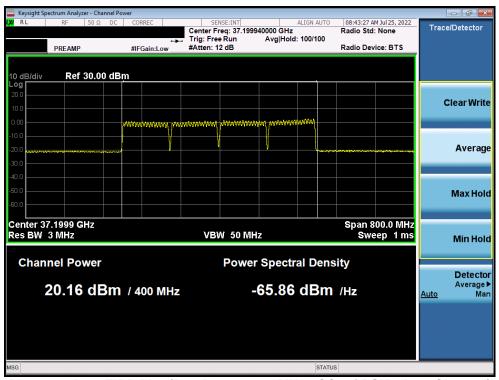
Plot 7-82. Ant2 EIRP Plot (Band n260 - 50MHz-4CC - QPSK - Low Channel)

FCC ID:A3LSMS901U		PART 30 MEASUREMENT REPORT (Class II Permissive Change)	Approved by: Technical Manager	
Test Report S/N:	Test Dates:	EUT Type:	Dogo 75 of 142	
1M2203290039-01.A3L	07/11/2022- 08/17/2022	Portable Handset	Page 75 of 142	
		·	V1.0	





Plot 7-83. Ant2 EIRP Plot (Band n260 - 100MHz-3CC - QPSK - Low Channel)



Plot 7-84. Ant2 EIRP Plot (Band n260 - 100MHz-4CC - QPSK - Low Channel)

FCC ID:A3LSMS901U		PART 30 MEASUREMENT REPORT (Class II Permissive Change)	Approved by: Technical Manager	
Test Report S/N:	Test Dates:	EUT Type:	Dogo 76 of 142	
1M2203290039-01.A3L	07/11/2022- 08/17/2022	Portable Handset	Page 76 of 142	
		·	V1.0	



### 7.4 Radiated Spurious and Harmonic Emissions

#### **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.

# The conductive power or total radiated power of any emissions outside a licensee's frequency block shall be -13dBm/1MHz.

#### Test Procedure Used

ANSI C63.26-2015 – Section 5.5.4 KDB 842590 D01 – Section 4.4.3

#### Test Settings

- 1. Start frequency was set to 30MHz and stop frequency was set to 100 GHz for n261 and 200GHz for n260. Several plots are used to show investigations in this entire span.
- 2. Detector = RMS
- 3. Trace mode = trace average
- 4. Sweep time = auto couple
- 5. Number of sweep points  $\geq 2 \times \text{Span/RBW}$
- 6. The trace was allowed to stabilize
- 7. RBW = 1MHz, VBW = 3MHz

#### 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.
- All radiated spurious emissions were measured as EIRP to compare with the §30.203 TRP limits. Emissions that were found to be non-compliant using the EIRP method were re-measured using the Spherical Grid TRP Method per KDB 842590 D01 Section 4.4.3.3.4.
- 3) The plots in this section were taken with the analyzer set to max hold. All final measurements shown in the tables that accompany the plots were taken with trace averaging performed over 100 sweeps while the analyzer was triggering on a specific emission of interest.
- 4) Elements within the same antenna array are correlated to produce beamforming array gain. Antenna arrays cannot be correlated with another antenna array. During testing, only one antenna array was active.

FCC ID:A3LSMS901U		PART 30 MEASUREMENT REPORT (Class II Permissive Change)	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Dogo 77 of 142
1M2203290039-01.A3L	07/11/2022- 08/17/2022	Portable Handset	Page 77 of 142
			\/1.0



- 5) The plots from 1 200GHz show corrected average EIRP levels. The average EIRP reported below is calculated per section 5.2.7 of ANSI C63.26-2015 which states: EIRP (dBm) = E (dBµV/m) + 20log(D) 104.8; where D is the measurement distance (in the far field region) in m. The field strength E is calculated E (dBµV/m) = Spectrum Analyzer Level (dBm) + Antenna Factor (dB/m) + Cable Loss (dB) + Harmonic Mixer Conversion Loss (dB) + 107. All appropriate Antenna Factors and Cable Losses have been applied in the spectrum analyzer for each measurement. For measurements > 40GHz, a Harmonic Mixer Conversion Loss was also applied to the spectrum analyzer.
- 6) Emissions below 18GHz were measured at a 3 meter test distance, while emissions above 18GHz were measured at the appropriate far field distance. The far field of the mmWave signal is based on formula: R > 2D^2/wavelength, where D is the larger between the dimension of the measurement antenna and the transmitting antenna of the EUT. In this case, D is the largest dimension of the measurement antenna.

Frequency Range (GHz)	Wavelength(cm)	Far Field Distance (m)	Measurement Distance (m)
18-40	0.749	0.54	1.00
40-60	0.500	1.39	1.50
60-90	0.333	0.91	1.00
90-140	0.214	0.58	1.00
140-200	0.150	0.39	1.00

Table 7-42. Far-Field Distance & Measurement Distance per Frequency Range

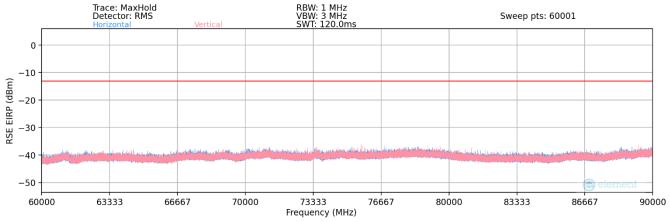
- 7) All emissions from 18MHz 40GHz were measured using a spectrum analyzer with an internal preamplifier. Emissions >40GHz were measured using a harmonic mixer with the spectrum analyzer.
- 8) RSE's were measured with 3CC (60-90GHz) for all bands. It was determined that adding more CC's causes the overall amplitude of just 3CC to decrease, therefore, 1CC is the worst case for the purposes of spurious emissions measurements.
- 9) The "-" shown in the following RSE tables are used to denote a noise floor measurement.
- 10) All RSE's were investigated in EN-DC mode and with 802.11 chipset active. It was determined that there is no new emission introduced by EN-DC mode, or the 802.11 chipset. For EN-DC mode, n261 uses LTE B2, B5, B12, B13, B48 and B66, n260 uses LTE B2, B5, B12, B13, B14,B30, B48 and B66 and n258 uses LTE B2, B5, B12, B14, B30, and B66.
- 11) Additionally, this device supports anchor bands operating in FR1 spectrum. The n261 band uses NR Bands n2, n5, n66, and n77 as anchor bands. The n260 band uses NR Bands n2, n5, n12, n14, n30, n66, and n77 as anchor bands. The n258 band uses NR Bands n2, n5, n12, n14, n30, and n66 as anchor bands.
- 12) There was no discernible difference in the spurious emission levels when using different LTE anchor bands. Thus, LTE Band 2 was used as a representative anchor band for EN-DC investigations.

FCC ID:A3LSMS901U		PART 30 MEASUREMENT REPORT (Class II Permissive Change)	Approved by: Technical Manager	
Test Report S/N:	Test Dates:	EUT Type:	Page 78 of 142	
1M2203290039-01.A3L	07/11/2022- 08/17/2022	Portable Handset	Faye 70 01 142	
			V1.0	



# Band n258-R1 (M Patch)

### 60GHz - 90GHz



Plot 7-85. Ant 1-n258-R1 Radiated Spurious Plot (3CC QPSK Mid Channel 2Tx)

### Spurious Emissions EIRP Sample Calculation (n258-R1)

The raw radiated spurious level is converted to field strength in dBuV/m. Then, the RSE EIRP level is calculated by applying the additional factors shown below for a test distance of 1 meter.

**RSE EIRP (dBm)** = Analyzer Level (dBm) + 107 + AFCL (dB/m) + 20Log(Dm) – 104.8 + Harmonic Mixer Conversion Loss [dB]

Frequency [MHz]	Channnel	Bandwidth (MHz)	EUT Beam Pol.	Modulation	Antenna Polarization [H/V]	Positioner Azimuth [degrees]	Turntable Azimuth [degrees]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
71105.90	Low	50	2Tx	QPSK	V	258	146	-41.26	-13.00	-28.26
73051.31	Mid	50	2Tx	QPSK	V	258	146	-39.20	-13.00	-26.20
75686.00	High	50	2Tx	QPSK	V	258	146	-37.54	-13.00	-24.54

Table 7-51. Ant 1 - 2Tx - Spurious Emissions Table (60GHz - 90GHz)

#### **Notes**

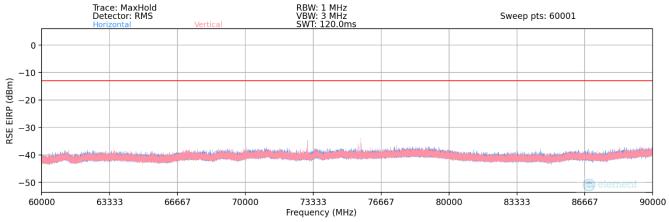
The RSE EIRP level is taken directly from the spectrum analyzer which includes the appropriate antenna factors, cable losses, and harmonic mixer conversion losses. Measurements were performed at a distance of 1 meter.

FCC ID:A3LSMS901U		PART 30 MEASUREMENT REPORT (Class II Permissive Change)			
Test Report S/N:	Test Dates:	EUT Type:	Dogo 70 of 142		
1M2203290039-01.A3L	07/11/2022- 08/17/2022 Portable Handset		Page 79 of 142		
			V/1.0		



# Band n258-R1 (N Patch)

### 60GHz - 90GHz



Plot 7-86. Ant 2-n258-R1 Radiated Spurious Plot (3CC QPSK Mid Channel 2Tx)

### Spurious Emissions EIRP Sample Calculation (n258-R1)

The raw radiated spurious level is converted to field strength in dBuV/m. Then, the RSE EIRP level is calculated by applying the additional factors shown below for a test distance of 1 meter.

**RSE EIRP (dBm)** = Analyzer Level (dBm) + 107 + AFCL (dB/m) + 20Log(Dm) – 104.8 + Harmonic Mixer Conversion Loss [dB]

Frequency [MHz]	Channnel	Bandwidth (MHz)	EUT Beam Pol.	Modulation	Antenna Polarization [H/V]	Positioner Azimuth [degrees]	Turntable Azimuth [degrees]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
72826.32	Low	50	2Tx	QPSK	V	91	84	-41.54	-13.00	-28.54
73051.00	Mid	50	2Tx	QPSK	V	89	80	-37.16	-13.00	-24.16
75686.00	High	50	2Tx	QPSK	V	89	80	-36.23	-13.00	-23.23
75675.00	High	50	2Tx	QPSK	V	89	80	-39.01	-13.00	-26.01

Table 7-57. Ant 2 - 2Tx - Spurious Emissions Table (60GHz - 90GHz)

### <u>Notes</u>

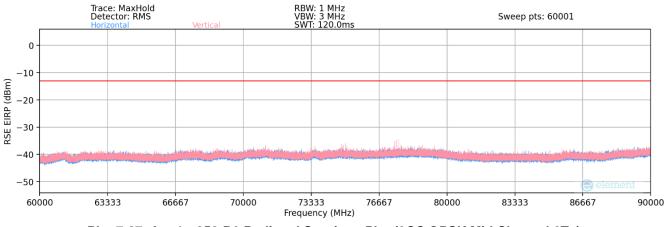
The RSE EIRP level is taken directly from the spectrum analyzer which includes the appropriate antenna factors, cable losses, and harmonic mixer conversion losses. Measurements were performed at a distance of 1 meter.

FCC ID:A3LSMS901U		PART 30 MEASUREMENT REPORT (Class II Permissive Change)			
Test Report S/N:	Test Dates:	EUT Type:	Page 80 of 142		
1M2203290039-01.A3L	07/11/2022- 08/17/2022	Portable Handset	Fage 60 01 142		
			V/1.0		



# Band n258-R2 (M Patch)

### 60GHz - 90GHz



Plot 7-87. Ant 1-n258-R2 Radiated Spurious Plot (3CC QPSK Mid Channel 2Tx)

### Spurious Emissions EIRP Sample Calculation (n258-R2)

The raw radiated spurious level is converted to field strength in dBuV/m. Then, the RSE EIRP level is calculated by applying the additional factors shown below for a test distance of 1 meter.

**RSE EIRP (dBm)** = Analyzer Level (dBm) + 107 + AFCL (dB/m) + 20Log(Dm) – 104.8 + Harmonic Mixer Conversion Loss [dB]

Frequency [MHz]	Channnel	Bandwidth (MHz)	EUT Beam Pol.	Modulation	Antenna Polarization [H/V]	Positioner Azimuth [degrees]	Turntable Azimuth [degrees]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
74320.00	Low	100	2Tx	QPSK	V	85	193	-41.01	-13.00	-28.01
74997.50	Low	100	2Tx	QPSK	V	85	193	-40.82	-13.00	-27.82
75001.18	Mid	100	2Tx	QPSK	V	85	191	-41.34	-13.00	-28.34
75032.50	Mid	100	2Tx	QPSK	V	85	191	-40.56	-13.00	-27.56
75906.00	High	100	2Tx	QPSK	V	85	191	-38.42	-13.00	-25.42
75911.00	High	100	2Tx	QPSK	V	85	191	-39.53	-13.00	-26.53
75920.00	High	100	2Tx	QPSK	V	85	191	-38.99	-13.00	-25.99

Table 7-63. Ant 1 - 2Tx - Spurious Emissions Table (60GHz - 90GHz)

#### **Notes**

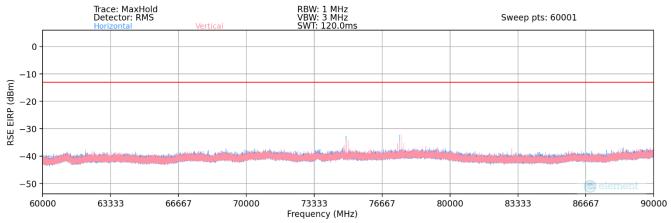
The RSE EIRP level is taken directly from the spectrum analyzer which includes the appropriate antenna factors, cable losses, and harmonic mixer conversion losses. Measurements were performed at a distance of 1 meter.

FCC ID:A3LSMS901U		PART 30 MEASUREMENT REPORT (Class II Permissive Change)				
Test Report S/N:	Test Dates:	EUT Type:	Dogo 91 of 142			
1M2203290039-01.A3L	07/11/2022- 08/17/2022	Portable Handset	Page 81 of 142			
			\/1.0			



# Band n258-R2 (N Patch)

### 60GHz - 90GHz



Plot 7-88. Ant 2-n258-R2 Radiated Spurious Plot (3CC QPSK Mid Channel 2Tx)

### Spurious Emissions EIRP Sample Calculation (n258-R2)

The raw radiated spurious level is converted to field strength in dBuV/m. Then, the RSE EIRP level is calculated by applying the additional factors shown below for a test distance of 1 meter.

**RSE EIRP (dBm)** = Analyzer Level (dBm) + 107 + AFCL (dB/m) + 20Log(Dm) – 104.8 + Harmonic Mixer Conversion Loss [dB]

Frequency [MHz]	Channnel	Bandwidth (MHz)	EUT Beam Pol.	Modulation	Antenna Polarization [H/V]	Positioner Azimuth [degrees]	Turntable Azimuth [degrees]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
74997.00	Mid	100	2Tx	QPSK	н	75	223	-36.21	-13.00	-23.21
75017.00	Mid	100	2Tx	QPSK	н	75	223	-38.42	-13.00	-25.42
77610.00	High	100	2Tx	QPSK	н	79	220	-39.64	-13.00	-26.64
77631.00	High	100	2Tx	QPSK	Н	79	220	-35.22	-13.00	-22.22
77620.00	High	100	2Tx	QPSK	V	79	220	-35.88	-13.00	-22.88
77639.00	High	50	2Tx	QPSK	Н	79	220	-38.41	-13.00	-25.41

Table 7-69. Ant 2 - 2Tx - Spurious Emissions Table (60GHz - 90GHz)

### <u>Notes</u>

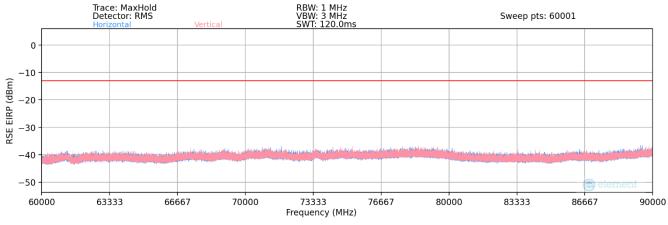
The RSE EIRP level is taken directly from the spectrum analyzer which includes the appropriate antenna factors, cable losses, and harmonic mixer conversion losses. Measurements were performed at a distance of 1 meter.

FCC ID:A3LSMS901U		PART 30 MEASUREMENT REPORT (Class II Permissive Change)			
Test Report S/N:	Test Dates:	EUT Type:	Page 82 of 142		
1M2203290039-01.A3L	07/11/2022- 08/17/2022	1/2022- 08/17/2022 Portable Handset			
			\/1.0		



# Band n261 (M Patch)

### 60GHz - 90GHz



Plot 7-89. Ant 1-n261 Radiated Spurious Plot (3CC QPSK Mid Channel 2Tx)

### Spurious Emissions EIRP Sample Calculation (n261)

The raw radiated spurious level is converted to field strength in dBuV/m. Then, the RSE EIRP level is calculated by applying the additional factors shown below for a test distance of 1 meter.

**RSE EIRP (dBm)** = Analyzer Level (dBm) + 107 + AFCL (dB/m) + 20Log(Dm) – 104.8 + Harmonic Mixer Conversion Loss [dB]

Frequency [MHz]	Channnel	Bandwidth (MHz)	EUT Beam Pol.	Modulation	Antenna Polarization [H/V]	Positioner Azimuth [degrees]	Turntable Azimuth [degrees]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
83561.00	Low	100	2Tx	QPSK	V	315.00	51.00	-41.66	-13.00	-28.66
83776.03	Mid	100	2Tx	QPSK	V	315.00	51.00	-39.06	-13.00	-26.06
83912.78	High	100	2Tx	QPSK	V	315.00	51.00	-40.75	-13.00	-27.75

Table 7-76. Ant 1 - 2Tx - Spurious Emissions Table (60GHz - 90GHz)

#### Notes

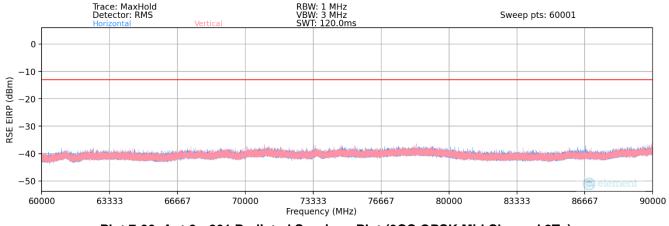
The RSE EIRP level is taken directly from the spectrum analyzer which includes the appropriate antenna factors, cable losses, and harmonic mixer conversion losses. Measurements were performed at a distance of 1 meter.

FCC ID:A3LSMS901U		Approved by: Technical Manager	
Test Report S/N: Te	est Dates:	EUT Type:	Dage 02 of 142
1M2203290039-01.A3L 07/*	7/11/2022- 08/17/2022	Portable Handset	Page 83 of 142



# Band n261 (N Patch)

### 60GHz - 90GHz



Plot 7-90. Ant 2-n261 Radiated Spurious Plot (3CC QPSK Mid Channel 2Tx)

### Spurious Emissions EIRP Sample Calculation (n261)

The raw radiated spurious level is converted to field strength in dBuV/m. Then, the RSE EIRP level is calculated by applying the additional factors shown below for a test distance of 1 meter.

**RSE EIRP (dBm)** = Analyzer Level (dBm) + 107 + AFCL (dB/m) + 20Log(Dm) – 104.8 + Harmonic Mixer Conversion Loss [dB]

Frequency [MHz]	Channnel	Bandwidth (MHz)	EUT Beam Pol.	Modulation	Antenna Polarization [H/V]	Positioner Azimuth [degrees]	Turntable Azimuth [degrees]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
83600.00	Low	100	2Tx	QPSK	Н	251.00	234.00	-41.26	-13.00	-28.26
83776.00	Mid	100	2Tx	QPSK	Н	251.00	234.00	-38.41	-13.00	-25.41
83912.00	High	100	2Tx	QPSK	н	251.00	234.00	-39.20	-13.00	-26.20

Table 7-83. Ant 2 - 2Tx - Spurious Emissions Table (60GHz - 90GHz)

#### **Notes**

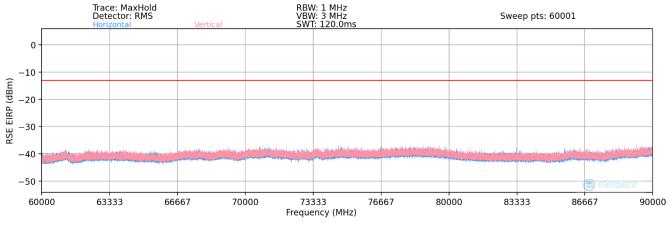
The RSE EIRP level is taken directly from the spectrum analyzer which includes the appropriate antenna factors, cable losses, and harmonic mixer conversion losses. Measurements were performed at a distance of 1 meter.

FCC ID:A3LSMS901U		PART 30 MEASUREMENT REPORT (Class II Permissive Change)				
Test Report S/N:	Test Dates:	EUT Type:	Page 84 of 142			
1M2203290039-01.A3L	07/11/2022- 08/17/2022	022- 08/17/2022 Portable Handset				



# Band n260 (M Patch)

### 60GHz - 90GHz



Plot 7-91. Ant 1-n260 Radiated Spurious Plot (3CC QPSK Mid Channel 2Tx)

### **Spurious Emissions EIRP Sample Calculation (n260)**

The raw radiated spurious level is converted to field strength in dBuV/m. Then, the RSE EIRP level is calculated by applying the additional factors shown below for a test distance of 1 meter.

**RSE EIRP (dBm)** = Analyzer Level (dBm) + 107 + AFCL (dB/m) + 20Log(Dm) – 104.8 + Harmonic Mixer Conversion Loss [dB]

Frequency [MHz]	Channnel	Bandwidth (MHz)	EUT Beam Pol.	Modulation	Antenna Polarization [H/V]	Positioner Azimuth [degrees]	Turntable Azimuth [degrees]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
76685.00	Low	100	2Tx	QPSK	н	-	-	-42.34	-13.00	-29.34
79950.80	Mid	100	2Tx	QPSK	Н	-	-	-42.56	-13.00	-29.56
83100.50	High	100	2Tx	QPSK	н	-	-	-42.98	-13.00	-29.98

Table 7-89. Ant 1 - 2Tx - Spurious Emissions Table (60GHz - 90GHz)

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

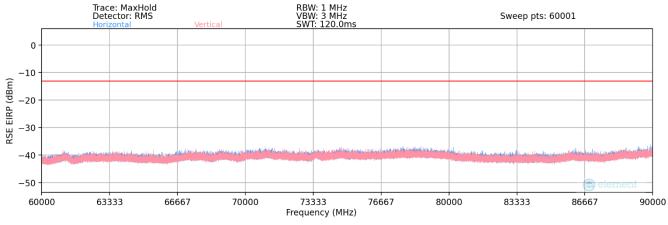
The RSE EIRP level is taken directly from the spectrum analyzer which includes the appropriate antenna factors, cable losses, and harmonic mixer conversion losses. Measurements were performed at a distance of 1 meter.

FCC ID:A3LSMS901U		Approved by: Technical Manager	
Test Report S/N:	Test Dates:	EUT Type:	Dega 95 of 140
1M2203290039-01.A3L	07/11/2022- 08/17/2022	Portable Handset	Page 85 of 142
		•	\/1.0



# Band n260 (N Patch)

### 60GHz - 90GHz





### Spurious Emissions EIRP Sample Calculation (n260)

The raw radiated spurious level is converted to field strength in dBuV/m. Then, the RSE EIRP level is calculated by applying the additional factors shown below for a test distance of 1 meter.

**RSE EIRP (dBm)** = Analyzer Level (dBm) + 107 + AFCL (dB/m) + 20Log(Dm) – 104.8 + Harmonic Mixer Conversion Loss [dB]

Frequency [MHz]	Channnel	Bandwidth (MHz)	EUT Beam Pol.	Modulation	Antenna Polarization [H/V]	Positioner Azimuth [degrees]	Turntable Azimuth [degrees]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
77000.01	Low	100	2Tx	QPSK	н	-	-	-44.13	-13.00	-31.13
86998.88	Mid	100	2Tx	QPSK	н	-	-	-43.21	-13.00	-30.21
88250.00	High	100	2Tx	QPSK	н	-	-	-44.56	-13.00	-31.56

Table 7-96. Ant 2 - 2Tx -Spurious Emissions Table (60GHz - 90GHz)

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

The RSE EIRP level is taken directly from the spectrum analyzer which includes the appropriate antenna factors, cable losses, and harmonic mixer conversion losses. Measurements were performed at a distance of 1 meter.

FCC ID:A3LSMS901U		Approved by: Technical Manager	
Test Report S/N:	Test Dates:	EUT Type:	Dega 96 of 140
1M2203290039-01.A3L	07/11/2022- 08/17/2022	Portable Handset	Page 86 of 142
			\/1.0



### 7.5 Band Edge Emissions

#### **Test Overview**

All out of band emissions are measured in a radiated setup while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All modulations 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 of any spurious emission is -13dBm/1MHz. However, in the bands immediately outside and adjacent to the licensee's frequency block, having a bandwidth equal to 10 percent of the channel bandwidth, the conductive power or the total radiated power of any emission shall be -5 dBm/MHz or lower.

#### Test Procedure Used

ANSI C63.26-2015 Section 5 and ANSI C63.26-2015 Section 6.4 KDB 842590 D01 – Section 4.4.2.4

#### Test Settings

- 1. Start and stop frequency were set such that both upper and lower band edges are measured.
- 2. Span was set large enough so as to capture all out of band emissions near the band edge
- 3. RBW = 1MHz
- 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 Notes

- 1) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning.
- 2) Band Edge emissions were measured at a 1 meter distance.
- The spectrum analyzer for each measurement shows an offset value that was determined using the measurement antenna factor, cable loss, far field measurement distance. A sample calculation is shown on the following page.
- 4) This device supports transmission of H-polarized and V-polarized beams from the antenna array in both CP-OFDM and DFT-s-OFDM transmission schemes. SISO and MIMO operation is also supported for some configurations. As part of the testing, all modes were fully investigated and only the worst case has been included in this report.

FCC ID:A3LSMS901U	PART 30 MEASUREMENT REPORT (Class II Permissive Change)		Approved by: Technical Manager	
Test Report S/N:	Test Dates:	EUT Type:	Dogo 97 of 142	
1M2203290039-01.A3L	07/11/2022- 08/17/2022	Portable Handset	Page 87 of 142	
			V1.0	



- 5) All combinations of 3CC and 4CC were fully investigated, and only the worst case has been included in this report.
- 6) All 4CC cases were investigated with PCC prioritization feature, which has the higher power PCC at the band edge for the worst case.
- 7) Unless otherwise specified, the radiated band edge plots in this section display the worst case EIRP measurements for the indicated bandwidth-component carrier configuration.
- 8) The plots in this section that display Total Radiated Power (TRP) were obtained from measurements that were performed in accordance with the guidance of Section 4.4.2.4 of KDB 842590 D01 for the Spherical Method.

#### Sample Analyzer Offset Calculation (at 27.5GHz)

Measurement Antenna Factor = 40.70dB/m

Cable Loss = 8.82dB

Analyzer Offset (dB) = AF (dB/m) + CL (dB) + 107 +  $20\log_{10}(D) - 104.8dB$ , where D = 1m

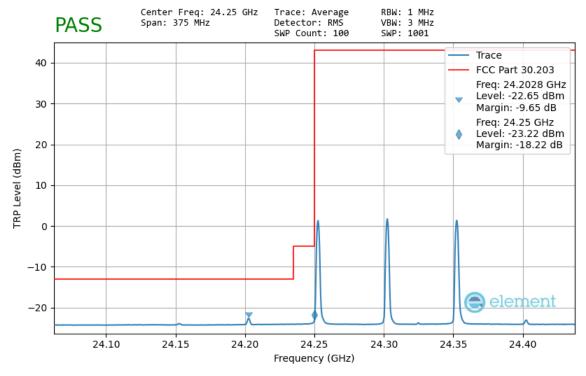
= 40.70dB/m + 8.82dB + 107 + 20log<sub>10</sub>(1m) - 104.8dB

= 51.72dB

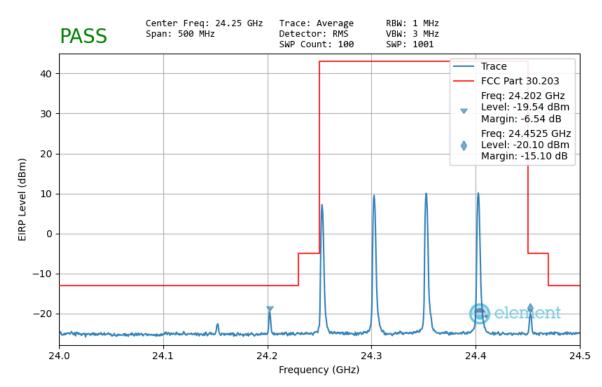
FCC ID:A3LSMS901U		Approved by: Technical Manager		
Test Report S/N:	Test Dates:	EUT Type:	Dage 80 of 142	
1M2203290039-01.A3L	07/11/2022- 08/17/2022	Portable Handset	Page 88 of 142	
			V1.0	



### Band n258-R1 – Worst Case







#### Plot 7-94. Ant 1 Lower Band Edge (50MHz-4CC - pi/2-BPSK 1 RB)

FCC ID:A3LSMS901U		Approved by: Technical Manager	
Test Report S/N:	Test Dates:	EUT Type:	Dogo 80 of 142
1M2203290039-01.A3L	07/11/2022- 08/17/2022	Portable Handset	Page 89 of 142
			V1.0