



MEASUREMENT REPORT

FCC Part 30 5G mmWave

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

Date of Testing:
3/17 - 5/1/2020
Test Site/Location:
PCTEST Lab. Columbia, MD, USA
Test Report Serial No.:
1M2003090034-07.A3L

FCC ID:	A3LSMG981V
APPLICANT:	Samsung Electronics Co., Ltd.

Application Type: Certification
Model: SM-G981V
EUT Type: Portable Handset
FCC Classification: Part 30 Mobile Transmitter (5GM)
FCC Rule Part(s): 30
Test Procedure(s): ANSI C63.26-2015, KDB 971168 D01 v03r01,
 KDB 842590 D01 v01r01

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

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


 Randy Ortanez
 President

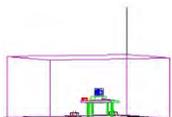


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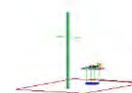
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FCC Part 30



Antenna	Mode	Bandwidth (MHz)	CCs Active	Band	FCC Rule Part	Tx Frequency (MHz)	EIRP		Emission Designator	Modulation
							Max. Power (W)	Max. Power (dBm)		
Ant1	SISO	50	1	n261	30	27500 - 28350	0.222	23.46	45M3G7D	QPSK
Ant1	SISO	50	1	n261	30	27500 - 28350	0.096	19.84	45M4W7D	16QAM
Ant1	SISO	50	1	n261	30	27500 - 28350	0.061	17.88	45M3W7D	64QAM
Ant1	SISO	50	1	n261	30	27500 - 28350	0.210	23.22	45M6G7D	BPSK
Ant1	MIMO	50	1	n261	30	27500 - 28350	0.200	23.01	45M3G7D	QPSK
Ant1	MIMO	50	1	n261	30	27500 - 28350	0.095	19.80	45M4W7D	16QAM
Ant1	MIMO	50	1	n261	30	27500 - 28350	0.074	18.69	45M3W7D	64QAM
Ant1	SISO	50	2	n261	30	27500 - 28350	0.131	21.17	94M8G7D	QPSK
Ant1	SISO	50	2	n261	30	27500 - 28350	0.085	19.30	94M7W7D	16QAM
Ant1	SISO	50	2	n261	30	27500 - 28350	0.061	17.82	94M8W7D	64QAM
Ant1	SISO	50	2	n261	30	27500 - 28350	0.124	20.92	94M8G7D	BPSK
Ant1	MIMO	50	2	n261	30	27500 - 28350	0.084	19.26	94M8G7D	QPSK
Ant1	MIMO	50	2	n261	30	27500 - 28350	0.061	17.85	94M7W7D	16QAM
Ant1	MIMO	50	2	n261	30	27500 - 28350	0.042	16.24	94M8W7D	64QAM
Ant1	SISO	100	1	n261	30	27500 - 28350	0.216	23.34	90M7G7D	QPSK
Ant1	SISO	100	1	n261	30	27500 - 28350	0.112	20.48	90M9W7D	16QAM
Ant1	SISO	100	1	n261	30	27500 - 28350	0.075	18.75	91M2W7D	64QAM
Ant1	SISO	100	1	n261	30	27500 - 28350	0.200	23.00	92M0G7D	BPSK
Ant1	MIMO	100	1	n261	30	27500 - 28350	0.156	21.93	90M7G7D	QPSK
Ant1	MIMO	100	1	n261	30	27500 - 28350	0.100	19.98	90M9W7D	16QAM
Ant1	MIMO	100	1	n261	30	27500 - 28350	0.070	18.46	91M2W7D	64QAM
Ant1	SISO	100	2	n261	30	27500 - 28350	0.161	22.07	189MG7D	QPSK
Ant1	SISO	100	2	n261	30	27500 - 28350	0.105	20.23	190MW7D	16QAM
Ant1	SISO	100	2	n261	30	27500 - 28350	0.074	18.67	191MW7D	64QAM
Ant1	SISO	100	2	n261	30	27500 - 28350	0.154	21.87	189MG7D	BPSK
Ant1	MIMO	100	2	n261	30	27500 - 28350	0.107	20.29	189MG7D	QPSK
Ant1	MIMO	100	2	n261	30	27500 - 28350	0.066	18.22	190MW7D	16QAM
Ant1	MIMO	100	2	n261	30	27500 - 28350	0.059	17.70	191MW7D	64QAM

EUT Overview (L Patch / Ant1 - Band n261)

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Antenna	Mode	Bandwidth (MHz)	CCs Active	Band	FCC Rule Part	Tx Frequency (MHz)	EIRP		Emission Designator	Modulation
							Max. Power (W)	Max. Power (dBm)		
Ant2	SISO	50	1	n261	30	27500 - 28350	0.272	24.35	45M2G7D	QPSK
Ant2	SISO	50	1	n261	30	27500 - 28350	0.187	22.72	45M1W7D	16QAM
Ant2	SISO	50	1	n261	30	27500 - 28350	0.113	20.54	45M1W7D	64QAM
Ant2	SISO	50	1	n261	30	27500 - 28350	0.268	24.28	45M5G7D	BPSK
Ant2	MIMO	50	1	n261	30	27500 - 28350	0.226	23.55	45M2G7D	QPSK
Ant2	MIMO	50	1	n261	30	27500 - 28350	0.146	21.63	45M1W7D	16QAM
Ant2	MIMO	50	1	n261	30	27500 - 28350	0.119	20.77	45M1W7D	64QAM
Ant2	SISO	50	2	n261	30	27500 - 28350	0.168	22.25	94M5G7D	QPSK
Ant2	SISO	50	2	n261	30	27500 - 28350	0.112	20.48	94M7W7D	16QAM
Ant2	SISO	50	2	n261	30	27500 - 28350	0.074	18.67	94M6W7D	64QAM
Ant2	SISO	50	2	n261	30	27500 - 28350	0.152	21.82	94M6G7D	BPSK
Ant2	MIMO	50	2	n261	30	27500 - 28350	0.129	21.10	94M5G7D	QPSK
Ant2	MIMO	50	2	n261	30	27500 - 28350	0.063	18.01	94M7W7D	16QAM
Ant2	MIMO	50	2	n261	30	27500 - 28350	0.098	19.91	94M6W7D	64QAM
Ant2	SISO	100	1	n261	30	27500 - 28350	0.288	24.60	90M6G7D	QPSK
Ant2	SISO	100	1	n261	30	27500 - 28350	0.191	22.82	90M5W7D	16QAM
Ant2	SISO	100	1	n261	30	27500 - 28350	0.123	20.91	90M8W7D	64QAM
Ant2	SISO	100	1	n261	30	27500 - 28350	0.227	23.56	92M0G7D	BPSK
Ant2	MIMO	100	1	n261	30	27500 - 28350	0.243	23.86	90M6G7D	QPSK
Ant2	MIMO	100	1	n261	30	27500 - 28350	0.191	22.80	90M5W7D	16QAM
Ant2	MIMO	100	1	n261	30	27500 - 28350	0.117	20.67	90M8W7D	64QAM
Ant2	SISO	100	2	n261	30	27500 - 28350	0.189	22.77	189MG7D	QPSK
Ant2	SISO	100	2	n261	30	27500 - 28350	0.111	20.46	190MW7D	16QAM
Ant2	SISO	100	2	n261	30	27500 - 28350	0.074	18.70	190MW7D	64QAM
Ant2	SISO	100	2	n261	30	27500 - 28350	0.182	22.59	189MG7D	BPSK
Ant2	MIMO	100	2	n261	30	27500 - 28350	0.181	22.57	189MG7D	QPSK
Ant2	MIMO	100	2	n261	30	27500 - 28350	0.102	20.07	190MW7D	16QAM
Ant2	MIMO	100	2	n261	30	27500 - 28350	0.070	18.47	190MW7D	64QAM

EUT Overview (M Patch / Ant2 - Band n261)

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Antenna	Mode	Bandwidth (MHz)	CCs Active	Band	FCC Rule Part	Tx Frequency (MHz)	EIRP		Emission Designator	Modulation
							Max. Power (W)	Max. Power (dBm)		
Ant1	SISO	50	1	n260	30	37000 - 40000	0.302	24.79	46M9G7D	QPSK
Ant1	SISO	50	1	n260	30	37000 - 40000	0.181	22.10	47M3W7D	16QAM
Ant1	SISO	50	1	n260	30	37000 - 40000	0.123	19.73	47M9W7D	64QAM
Ant1	SISO	50	1	n260	30	37000 - 40000	0.294	18.36	46M0G7D	BPSK
Ant1	MIMO	50	1	n260	30	37000 - 40000	0.287	24.58	46M9G7D	QPSK
Ant1	MIMO	50	1	n260	30	37000 - 40000	0.161	22.08	47M3W7D	16QAM
Ant1	MIMO	50	1	n260	30	37000 - 40000	0.101	20.29	47M9W7D	64QAM
Ant1	SISO	50	2	n260	30	37000 - 40000	0.091	20.89	95M9G7D	QPSK
Ant1	SISO	50	2	n260	30	37000 - 40000	0.060	19.02	96M9W7D	16QAM
Ant1	SISO	50	2	n260	30	37000 - 40000	0.038	17.12	122MW7D	64QAM
Ant1	SISO	50	2	n260	30	37000 - 40000	0.091	19.60	96M0G7D	BPSK
Ant1	MIMO	50	2	n260	30	37000 - 40000	0.074	19.92	95M9G7D	QPSK
Ant1	MIMO	50	2	n260	30	37000 - 40000	0.043	18.59	96M9W7D	16QAM
Ant1	MIMO	50	2	n260	30	37000 - 40000	0.030	16.39	122MW7D	64QAM
Ant1	SISO	100	1	n260	30	37000 - 40000	0.287	24.57	91M3G7D	QPSK
Ant1	SISO	100	1	n260	30	37000 - 40000	0.173	21.69	92M0W7D	16QAM
Ant1	SISO	100	1	n260	30	37000 - 40000	0.128	21.07	93M7W7D	64QAM
Ant1	SISO	100	1	n260	30	37000 - 40000	0.286	24.17	93M4G7D	BPSK
Ant1	MIMO	100	1	n260	30	37000 - 40000	0.281	24.48	91M3G7D	QPSK
Ant1	MIMO	100	1	n260	30	37000 - 40000	0.166	22.20	92M0W7D	16QAM
Ant1	MIMO	100	1	n260	30	37000 - 40000	0.101	20.04	93M7W7D	64QAM
Ant1	SISO	100	2	n260	30	37000 - 40000	0.096	20.92	208MG7D	QPSK
Ant1	SISO	100	2	n260	30	37000 - 40000	0.064	19.06	270MW7D	16QAM
Ant1	SISO	100	2	n260	30	37000 - 40000	0.040	17.56	196MW7D	64QAM
Ant1	SISO	100	2	n260	30	37000 - 40000	0.095	19.80	220MG7D	BPSK
Ant1	MIMO	100	2	n260	30	37000 - 40000	0.076	19.17	208MG7D	QPSK
Ant1	MIMO	100	2	n260	30	37000 - 40000	0.053	17.23	270MW7D	16QAM
Ant1	MIMO	100	2	n260	30	37000 - 40000	0.034	15.34	196MW7D	64QAM

EUT Overview (L Patch / Ant1 - Band n260)

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Antenna	Mode	Bandwidth (MHz)	CCs Active	Band	FCC Rule Part	Tx Frequency (MHz)	EIRP		Emission Designator	Modulation
							Max. Power (W)	Max. Power (dBm)		
Ant2	SISO	50	1	n260	30	37000 - 40000	0.199	22.98	45M6G7D	QPSK
Ant2	SISO	50	1	n260	30	37000 - 40000	0.147	21.67	45M6W7D	16QAM
Ant2	SISO	50	1	n260	30	37000 - 40000	0.070	18.45	45M7W7D	64QAM
Ant2	SISO	50	1	n260	30	37000 - 40000	0.196	22.92	46M6G7D	BPSK
Ant2	MIMO	50	1	n260	30	37000 - 40000	0.294	24.68	45M6G7D	QPSK
Ant2	MIMO	50	1	n260	30	37000 - 40000	0.251	23.99	45M6W7D	16QAM
Ant2	MIMO	50	1	n260	30	37000 - 40000	0.157	21.97	45M7W7D	64QAM
Ant2	SISO	50	2	n260	30	37000 - 40000	0.119	20.74	95M3G7D	QPSK
Ant2	SISO	50	2	n260	30	37000 - 40000	0.100	19.99	95M4W7D	16QAM
Ant2	SISO	50	2	n260	30	37000 - 40000	0.079	18.99	96M9W7D	64QAM
Ant2	SISO	50	2	n260	30	37000 - 40000	0.117	20.70	95M5G7D	BPSK
Ant2	MIMO	50	2	n260	30	37000 - 40000	0.184	20.74	95M3G7D	QPSK
Ant2	MIMO	50	2	n260	30	37000 - 40000	0.142	19.99	95M4W7D	16QAM
Ant2	MIMO	50	2	n260	30	37000 - 40000	0.105	18.99	96M9W7D	64QAM
Ant2	SISO	100	1	n260	30	37000 - 40000	0.220	23.43	94M2G7D	QPSK
Ant2	SISO	100	1	n260	30	37000 - 40000	0.155	21.90	95M1W7D	16QAM
Ant2	SISO	100	1	n260	30	37000 - 40000	0.072	18.47	118MW7D	64QAM
Ant2	SISO	100	1	n260	30	37000 - 40000	0.219	22.89	93M7G7D	BPSK
Ant2	MIMO	100	1	n260	30	37000 - 40000	0.269	24.30	94M2G7D	QPSK
Ant2	MIMO	100	1	n260	30	37000 - 40000	0.192	22.83	95M1W7D	16QAM
Ant2	MIMO	100	1	n260	30	37000 - 40000	0.144	21.58	118MW7D	64QAM
Ant2	SISO	100	2	n260	30	37000 - 40000	0.063	18.94	214MG7D	QPSK
Ant2	SISO	100	2	n260	30	37000 - 40000	0.038	17.07	193MW7D	16QAM
Ant2	SISO	100	2	n260	30	37000 - 40000	0.026	15.75	232MW7D	64QAM
Ant2	SISO	100	2	n260	30	37000 - 40000	0.061	18.55	192MG7D	BPSK
Ant2	MIMO	100	2	n260	30	37000 - 40000	0.093	19.05	214MG7D	QPSK
Ant2	MIMO	100	2	n260	30	37000 - 40000	0.054	17.30	193MW7D	16QAM
Ant2	MIMO	100	2	n260	30	37000 - 40000	0.036	16.13	232MW7D	64QAM

EUT Overview (M Patch / Ant2 - Band n260)

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1.0 INTRODUCTION

1.1 Scope

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

1.2 PCTEST Test Location

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

1.3 Test Facility / Accreditations

Measurements were performed at PCTEST Engineering Lab located in Columbia, MD 21046, U.S.A.

- PCTEST is an ISO 17025-2005 accredited test facility under the American Association for Laboratory Accreditation (A2LA) with Certificate number 2041.01 for Specific Absorption Rate (SAR), Hearing Aid Compatibility (HAC) testing, where applicable, and Electromagnetic Compatibility (EMC) testing for FCC and Innovation, Science, and Economic Development Canada rules.
- PCTEST TCB is a Telecommunication Certification Body (TCB) accredited to ISO/IEC 17065-2012 by A2LA (Certificate number 2041.03) in all scopes of FCC Rules and ISED Standards (RSS).
- PCTEST facility is a registered (2451B) test laboratory with the site description on file with ISED.

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2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **Samsung Portable Handset FCC ID: A3LSMG981V**. The test data contained in this report pertains only to the emissions due to the EUT's 5G mmWave function.

The EUT has a array antenna configuration. Type1: 4 patches, placed on the left and right side (denoted as L Patch and M Patch). Each of the patch 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 8CC for DL, and 2CC for UL. For each CC, the EUT supports both 50MHz bandwidth and 100MHz bandwidth. For modulation, 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.

Antenna	Name
Ant1	L Patch
Ant2	M Patch

Test Device Serial No.: 0118M, 0223M

2.2 Device Capabilities

This device contains the following capabilities:

850/1900 CDMA/EvDO Rev0/A, 1x Advanced (BC0, BC1), 850/1900 GSM/GPRS/EDGE, 850/1900, WCDMA/HSPA, Multi-band LTE, 5G NR (n5, n66, n2, n260, n261), 802.11b/g/n/ax WLAN, 802.11a/n/ac/ax UNII, Bluetooth (1x, EDR, LE), NFC, ANT+, Wireless Power Transfer

2.3 Test Configuration

The EUT was tested per the guidance of KDB 842590 D01 v01r01 and ANSI C63.26-2015. 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 determine the worst case Beam ID for SISO operation and Beam ID pair for MIMO operation. These Beam ID's were used for final measurements.

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 (i.e., a maximum uplink duty cycle of 100%). The FTM software was also used for the EUT operation in the ENDC mode.

2.4 EMI Suppression Device(s)/Modifications

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

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3.0 DESCRIPTION OF TESTS

3.1 Measurement Procedure

The measurement procedures described in the document titled "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 v01r01 were used in the measurement of the EUT.

3.2 Radiated Power and Radiated Spurious Emissions §30.202, §30.203

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.

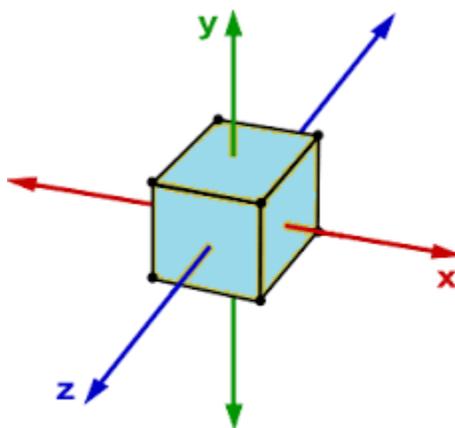


Figure 3-1. Rotation of the EUT Through Three Orthogonal Planes

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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 & Measurement 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 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 KDB 971168 D01.

$$\begin{aligned} \text{Field Strength [dB}\mu\text{V/m]} &= \text{Measured Value [dBm]} + \text{AFCL [dB/m]} + 107 \\ &= -32.74 \text{ dBm} + (40.7\text{dB/m} + 8.78\text{dB}) + 107 = 123.74\text{dB}\mu\text{V/m} \\ &= 10^{(123.74/20)}/1000000 = 1.54 \text{ V/m} \end{aligned}$$

$$\begin{aligned} \text{e.i.r.p. [dBm]} &= 10 * \log((\text{E-Field} * D_m)^2/30) + 30\text{dB} \\ &= 10 * \log((1.54\text{V/m} * 1.00\text{m})^2/30) + 30\text{dB} \\ &= 18.98 \text{ dBm e.i.r.p.} \end{aligned}$$

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4.0 MEASUREMENT UNCERTAINTY

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

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

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5.0 TEST EQUIPMENT CALIBRATION DATA

Test Equipment Calibration is traceable to 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
Agilent	N9030A	PXA Signal Analyzer	6/12/2019	Annual	6/12/2020	MY52350166
Agilent	N9030A	50GHz PXA Signal Analyzer	11/22/2019	Annual	11/22/2020	US51350301
Anritsu	MS46322A	Vector Network Analyzer	8/19/2019	Annual	8/19/2020	1521001
Anritsu	36585K-2F	Precision Autocal 2-Port	7/16/2019	Annual	7/16/2020	1628014
Com-Power	AL-130R	Active Loop Antenna	8/22/2019	Annual	8/22/2020	121085
Espec	ESX-2CA	Environmental Chamber	6/13/2019	Annual	6/13/2020	17620
ETS-Lindgren	3116C	DRG Horn Antenna	3/11/2019	Biennial	3/11/2021	218893
OML Inc.	M05HWA	140 - 220GHz Mixer/Antenna	10/31/2019	Annual	10/31/2020	G00228-2
OML, Inc.	M19HWA	40 - 60GHz Mixer/Antenna	10/31/2019	Annual	10/31/2020	U00228-1
OML, Inc.	M12HWA	60 - 90GHz Mixer/Antenna	10/31/2019	Annual	10/31/2020	E00228-1
OML, Inc.	M08HWA	90 - 140GHz Mixer/Antenna	10/31/2019	Annual	10/31/2020	F00228-1
Rohde & Schwarz	ESU26	EMI Test Receiver (26.5GHz)	6/5/2019	Annual	6/5/2020	100342
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	7/11/2019	Annual	7/11/2020	102134
Rohde & Schwarz	ESW44	EMI Test Receiver 2Hz to 44 GHz	10/16/2019	Annual	10/16/2020	101716
Sunol	DRH-118	Horn Antenna (1-18GHz)	10/3/2019	Biennial	10/3/2021	A050307
Virginia Diodes Inc	SAX253	SAX Module (90 - 140GHz)	9/30/2019	Annual	9/30/2020	SAX253
Virginia Diodes Inc	SAX252	SAX Module (60 - 90GHz)	9/30/2019	Annual	9/30/2020	SAX252
Virginia Diodes Inc	SAX254	SAX Module (140 - 220GHz)	9/30/2019	Annual	9/30/2020	SAX254
Virginia Diodes Inc	SAX411	SAX Module (40 - 60GHz)	10/2/2019	Annual	10/2/2020	SAX411

Table 5-1. Test Equipment

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.

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6.0 SAMPLE CALCULATIONS

Emission Designator

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

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7.0 TEST RESULTS

7.1 Summary

Company Name: Samsung Electronics Co., Ltd.
 FCC ID: A3LSMG981V
 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	RADIATED	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		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 n261 and up to 200GHz for n260.
- 3) All radiated emission measurements at the band edge are converted to an equivalent conductive power by subtracting the known antenna gain from the EIRP measured at each frequency of interest. These emissions are compared to the 30.203 spurious emission limits as conductive power levels.
- 4) The radiated RF output power and all out-of-band emissions in the spurious domain are evaluated to the EIRP limits.
- 5) "CC" refers to "Component Carriers".
- 6) Beam IDs were chosen based on which Beam ID produces the highest EIRP during EIRP simulation.
- 7) All testing was performed using FTM (Factory Test Mode) software at continuous Tx operation (100% duty cycle).
- 8) The CP-OFDM and DFT-s-OFDM transmission schemes were investigated fully for each test type and only the worst case data is included.

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7.2 Occupied Bandwidth

§2.1049

Test Overview

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

Test Procedure Used

ANSI C63.26-2015 Section 5.4.3
KDB 842590 D01 v01r01 Section 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
7. The trace was allowed to stabilize
8. If necessary, steps 2 – 7 were repeated after changing the RBW such that it would be within 1 – 5% of the 99% occupied bandwidth observed in Step 7

Test Notes

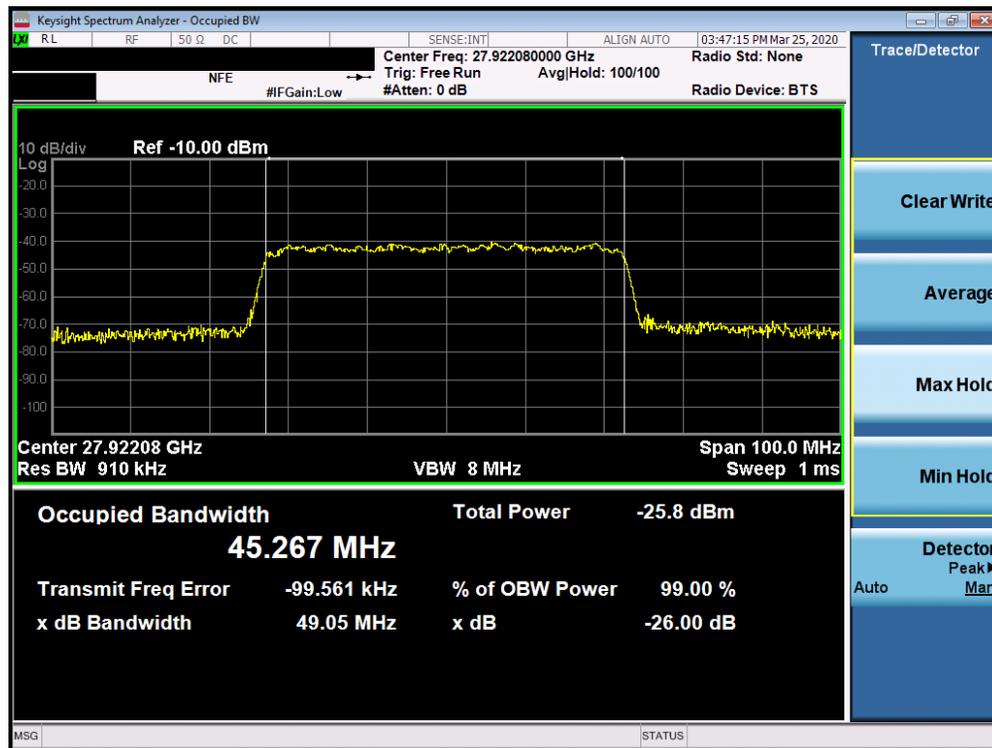
The EUT supports CP (QPSK) and DFT-s (QPSK). Both the types of QPSK modulations were investigated in detail. Data for the worst case has been included in the report.

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Band n261

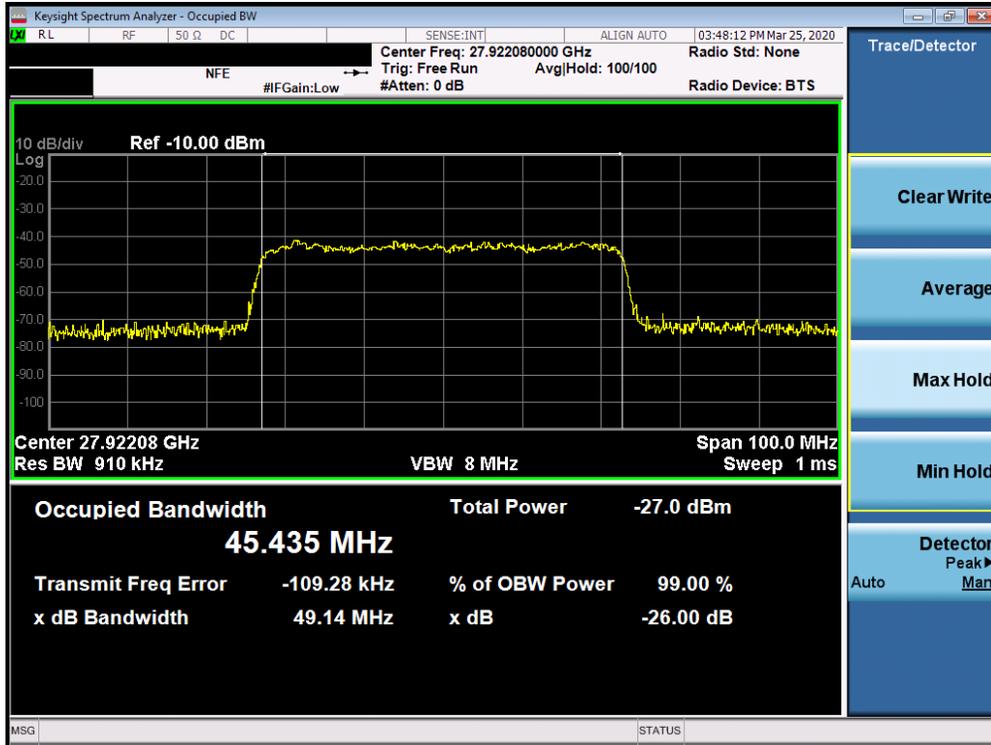
Channel	Bandwidth	CCs Active	Modulation	OBW [MHz]
Mid	50	1	QPSK	45.27
			16QAM	45.44
			64QAM	45.34
			BPSK	45.63
		2	QPSK	94.83
			16QAM	94.70
	100	1	64QAM	94.79
			BPSK	94.82
			QPSK	90.69
			16QAM	90.88
		2	64QAM	91.19
			BPSK	92.00
2	QPSK	189.37		
	16QAM	189.59		
	64QAM	191.45		
	BPSK	189.46		

Table 7-2. Summary of Ant1 Occupied Bandwidths (n261)

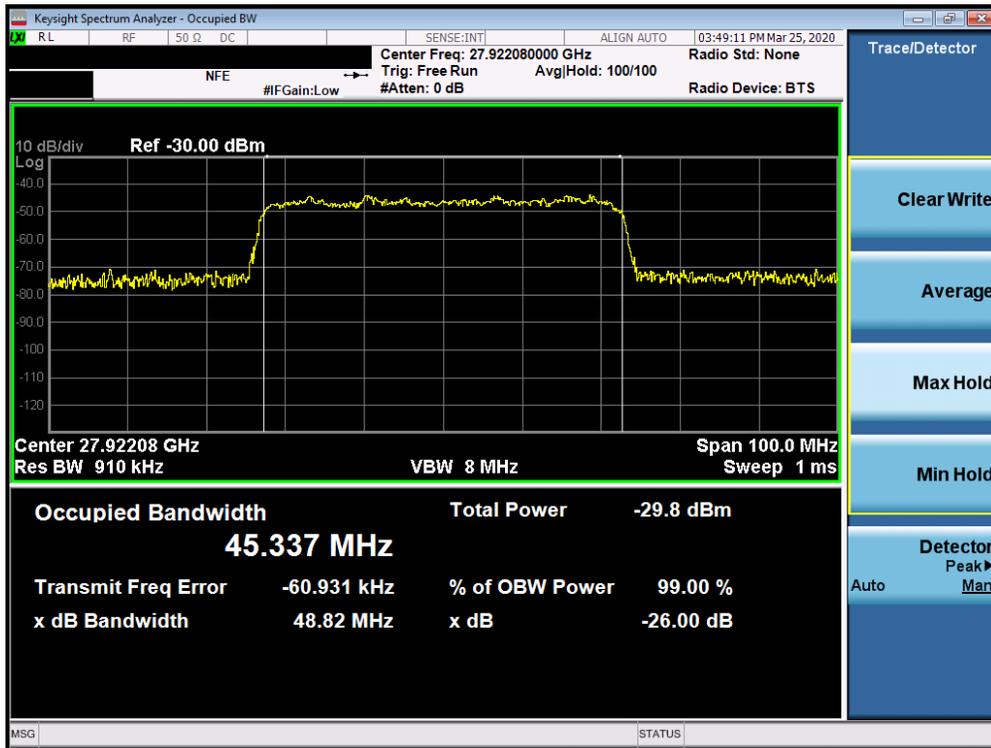


Plot 7-1. Ant1 Occupied Bandwidth Plot (50MHz-1CC – QPSK – Mid Channel)

FCC ID: A3LSMG981V		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Plot 7-2. Ant1 Occupied Bandwidth Plot (50MHz-1CC – 16QAM – Mid Channel)



Plot 7-3. Ant1 Occupied Bandwidth Plot (50MHz-1CC – 64QAM – Mid Channel)

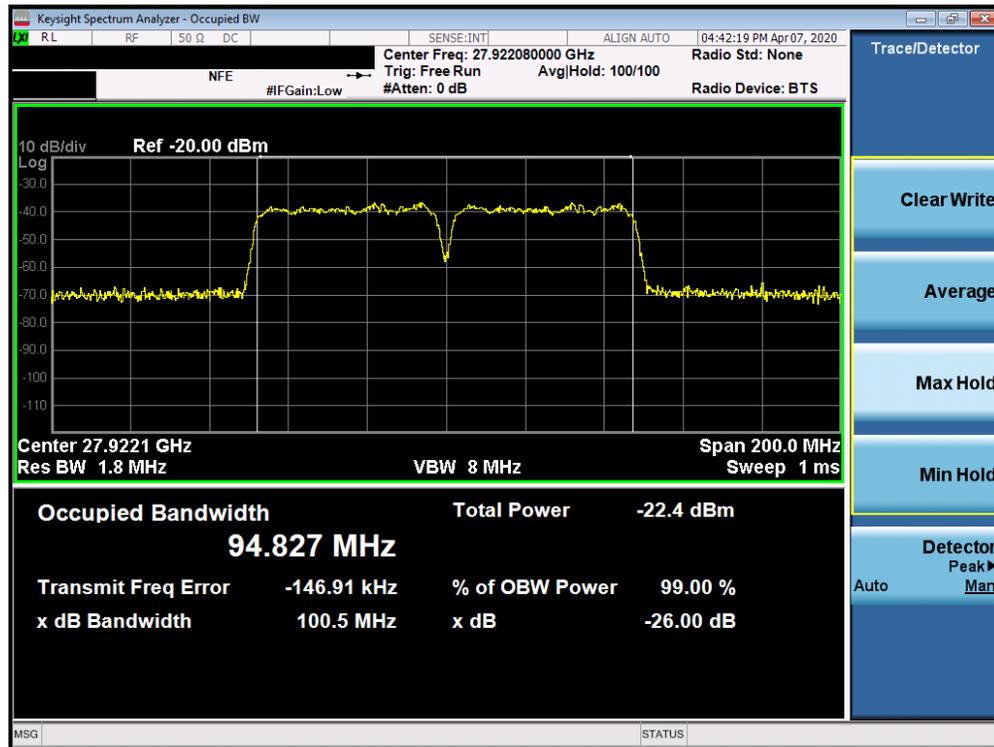
FCC ID: A3LSMG981V		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2003090034-07.A3L	Test Dates: 3/17 - 5/1/2020	EUT Type: Portable Handset		Page 17 of 161

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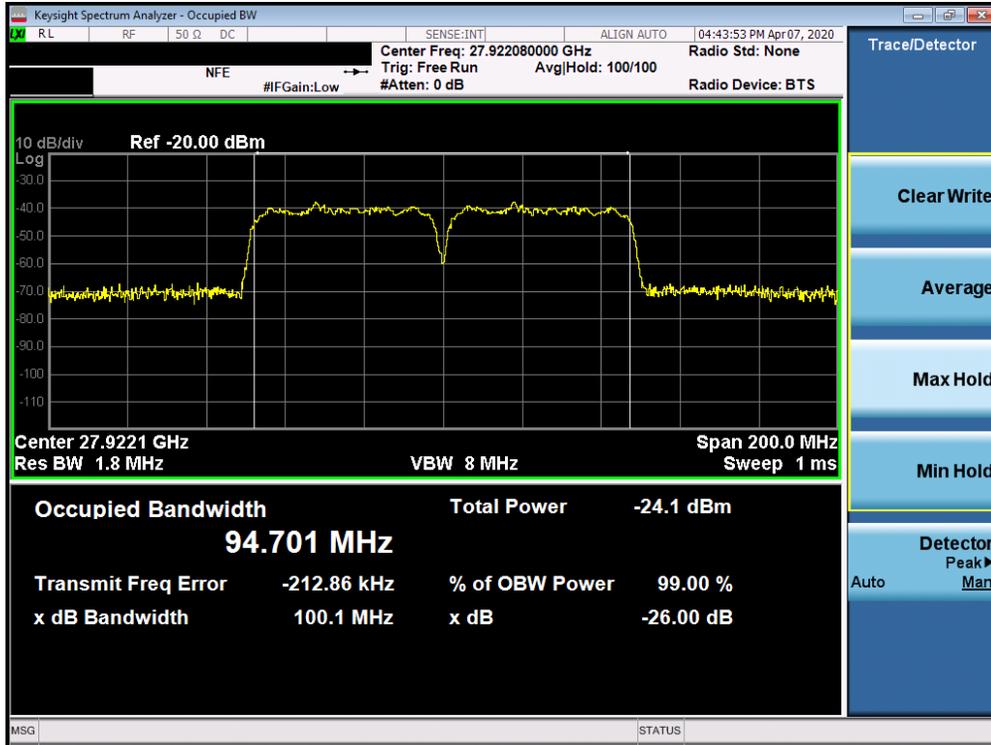
10:08:29 09.05.2020

Plot 7-4. Ant1 Occupied Bandwidth Plot (50MHz-1CC – pi/2-BPSK – Mid Channel)

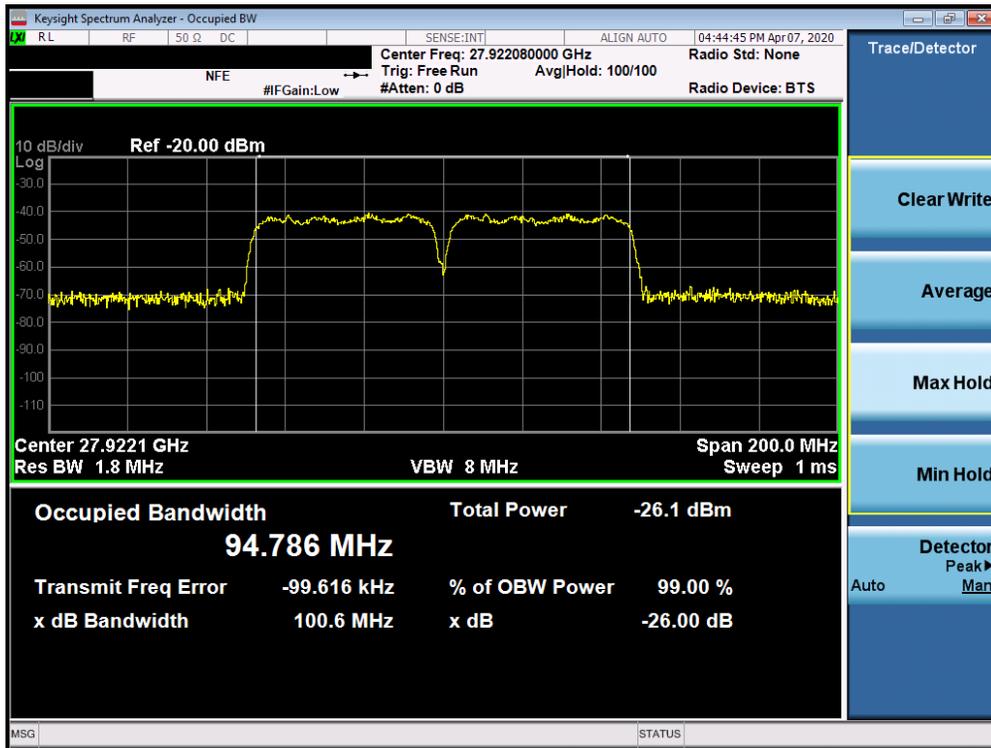


Plot 7-5. Ant1 Occupied Bandwidth Plot (50MHz-2CC – QPSK – Mid Channel)

FCC ID: A3LSMG981V		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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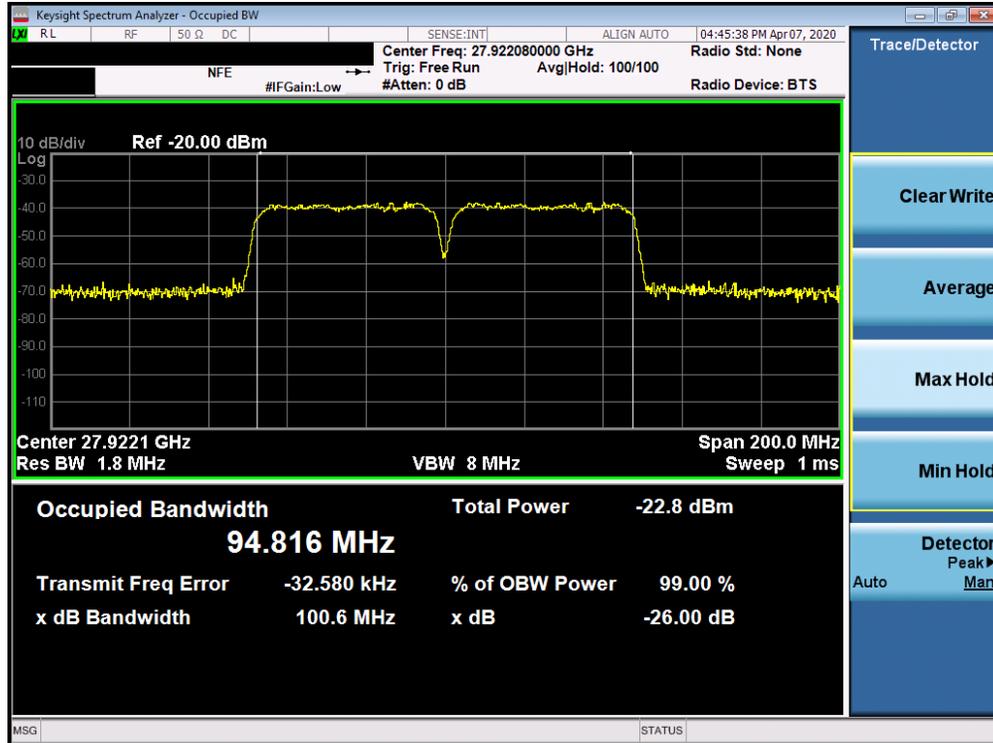


Plot 7-6. Ant1 Occupied Bandwidth Plot (50MHz-2CC – 16QAM – Mid Channel)

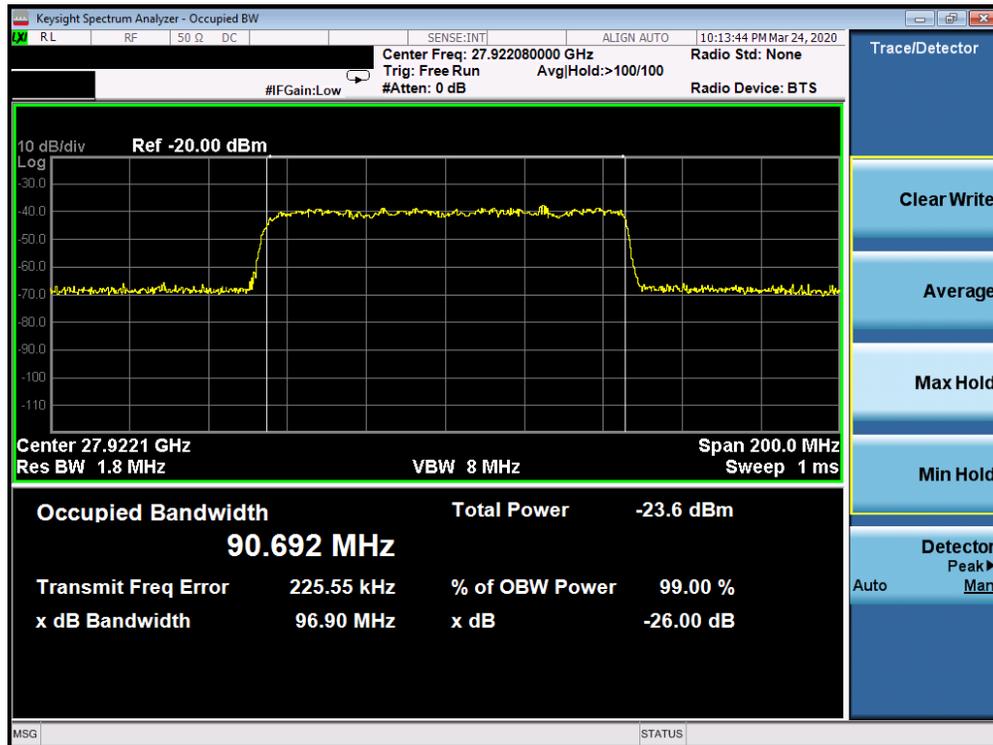


Plot 7-7. Ant1 Occupied Bandwidth Plot (50MHz-2CC – 64QAM – Mid Channel)

FCC ID: A3LSMG981V		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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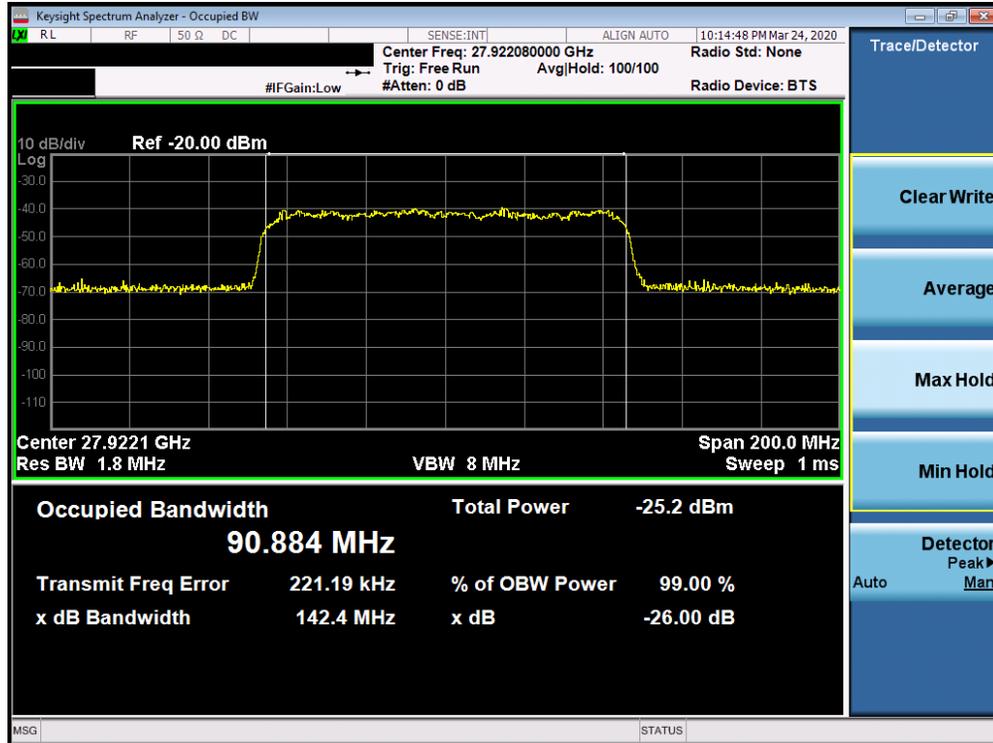


Plot 7-8. Ant1 Occupied Bandwidth Plot (50MHz-2CC – pi/2-BPSK – Mid Channel)

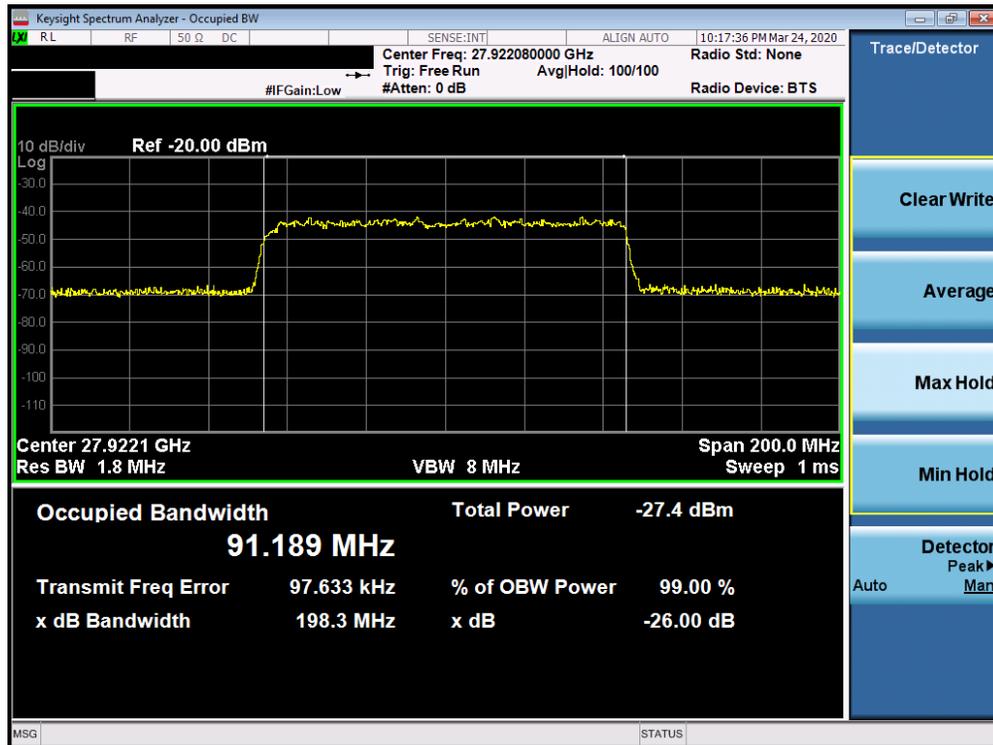


Plot 7-9. Ant1 Occupied Bandwidth Plot (100MHz-1CC – QPSK – Mid Channel)

FCC ID: A3LSMG981V		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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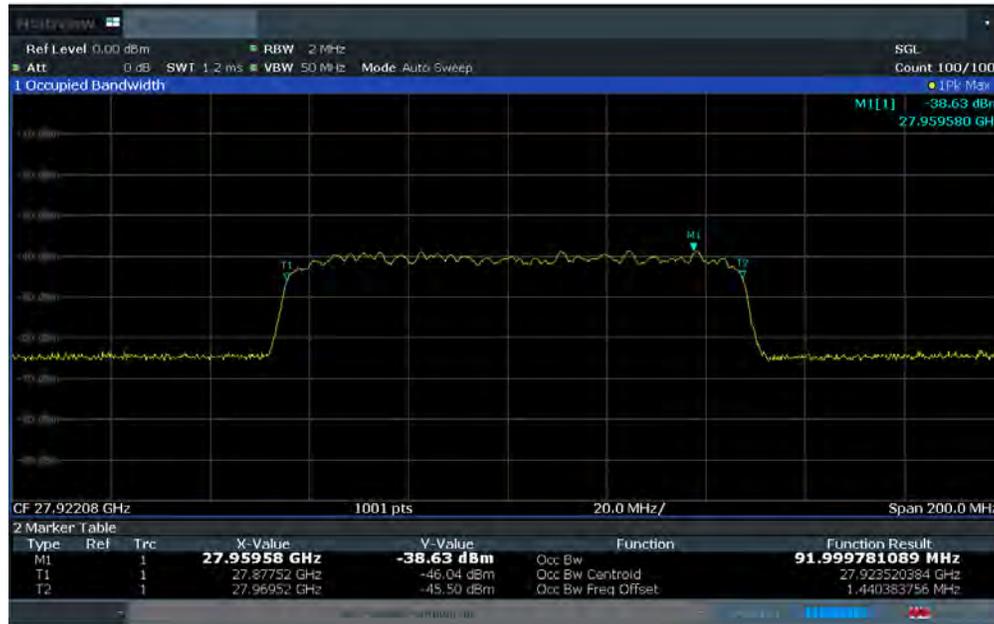
Plot 7-10. Ant1 Occupied Bandwidth Plot (100MHz-1CC – 16QAM – Mid Channel)



Plot 7-11. Ant1 Occupied Bandwidth Plot (100MHz-1CC – 64QAM – Mid Channel)

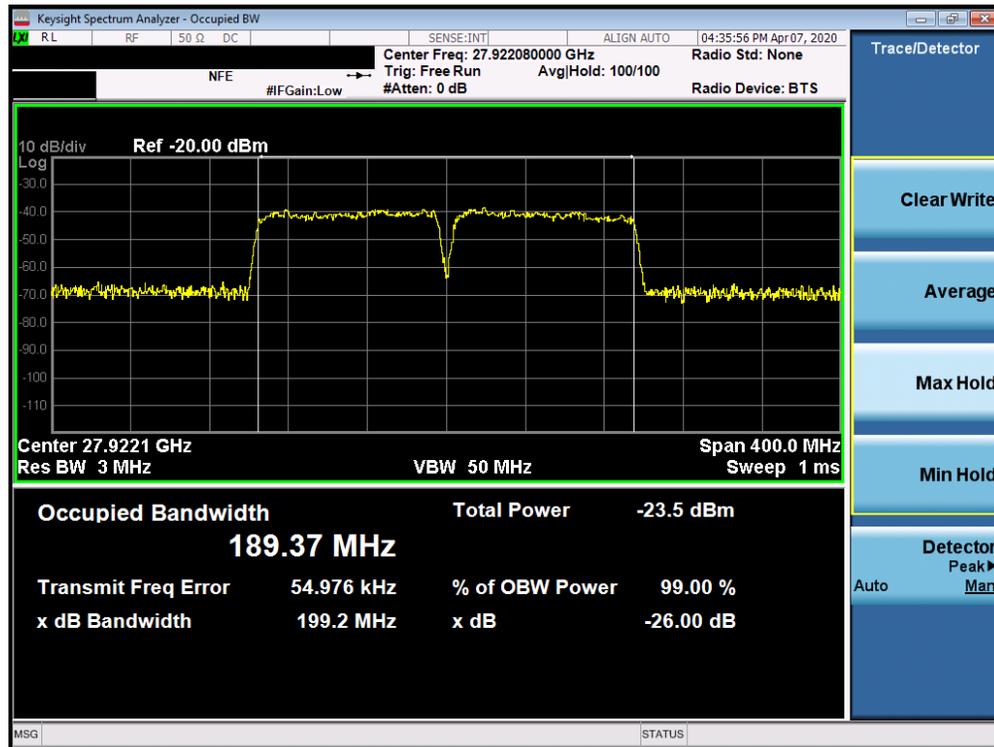
FCC ID: A3LSMG981V		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2003090034-07.A3L	Test Dates: 3/17 - 5/1/2020	EUT Type: Portable Handset		Page 21 of 161

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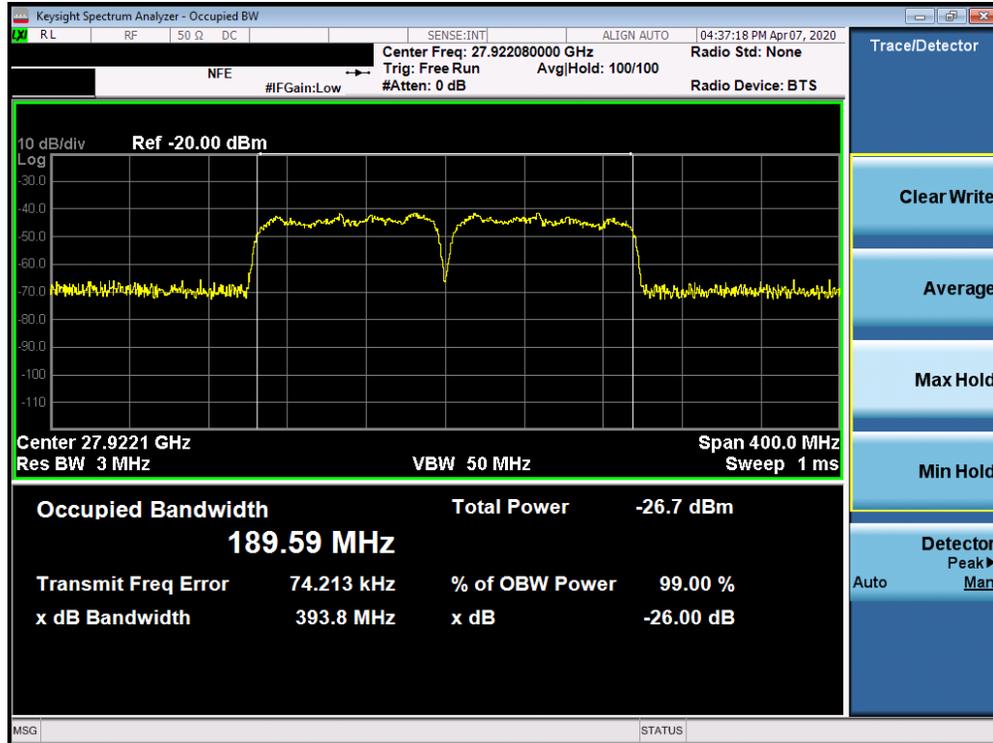
10:07:07 09.05.2020

Plot 7-12. Ant1 Occupied Bandwidth Plot (100MHz-1CC – pi/2-BPSK – Mid Channel)

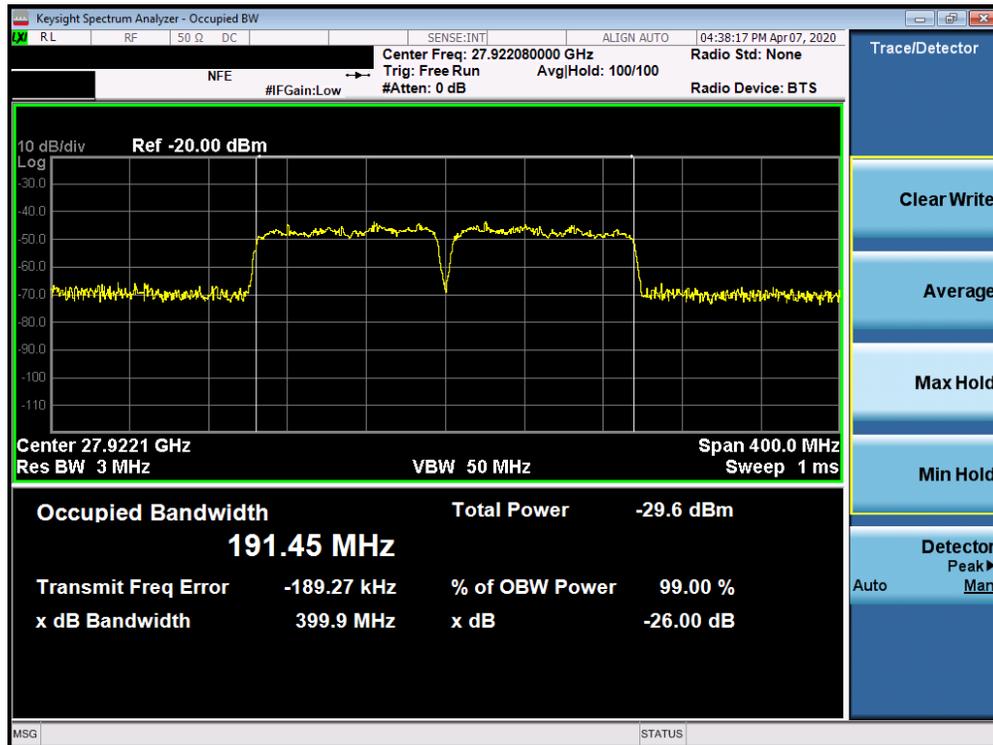


Plot 7-13. Ant1 Occupied Bandwidth Plot (100MHz-2CC – QPSK – Mid Channel)

FCC ID: A3LSMG981V		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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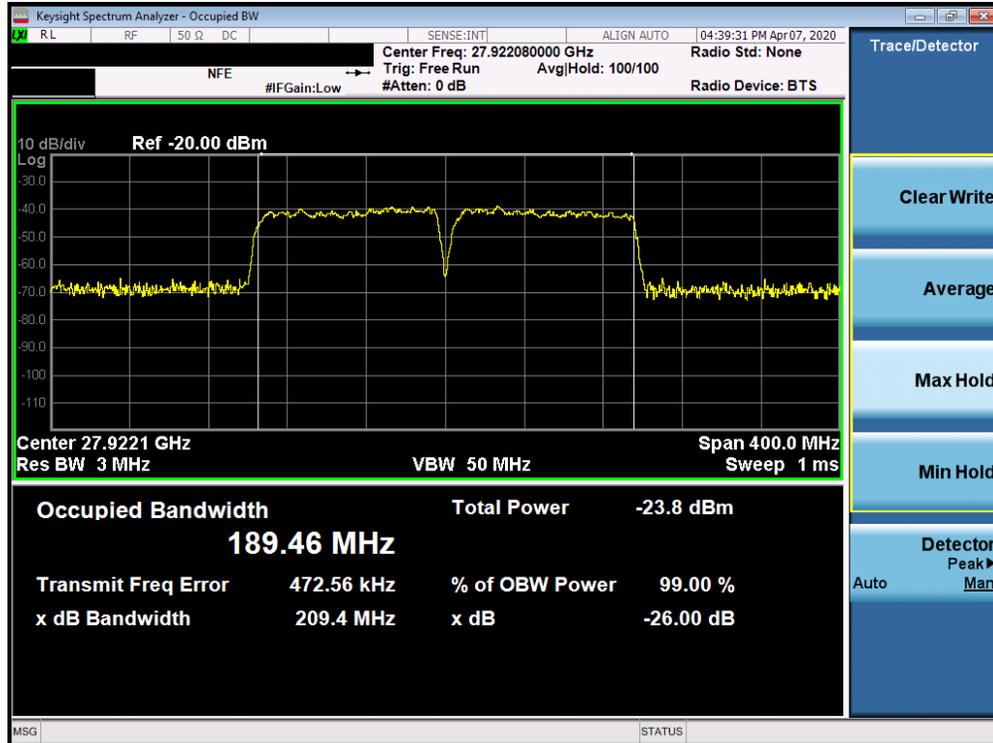


Plot 7-14. Ant1 Occupied Bandwidth Plot (100MHz-2CC – 16QAM – Mid Channel)



Plot 7-15. Ant1 Occupied Bandwidth Plot (100MHz-2CC – 64QAM – Mid Channel)

FCC ID: A3LSMG981V		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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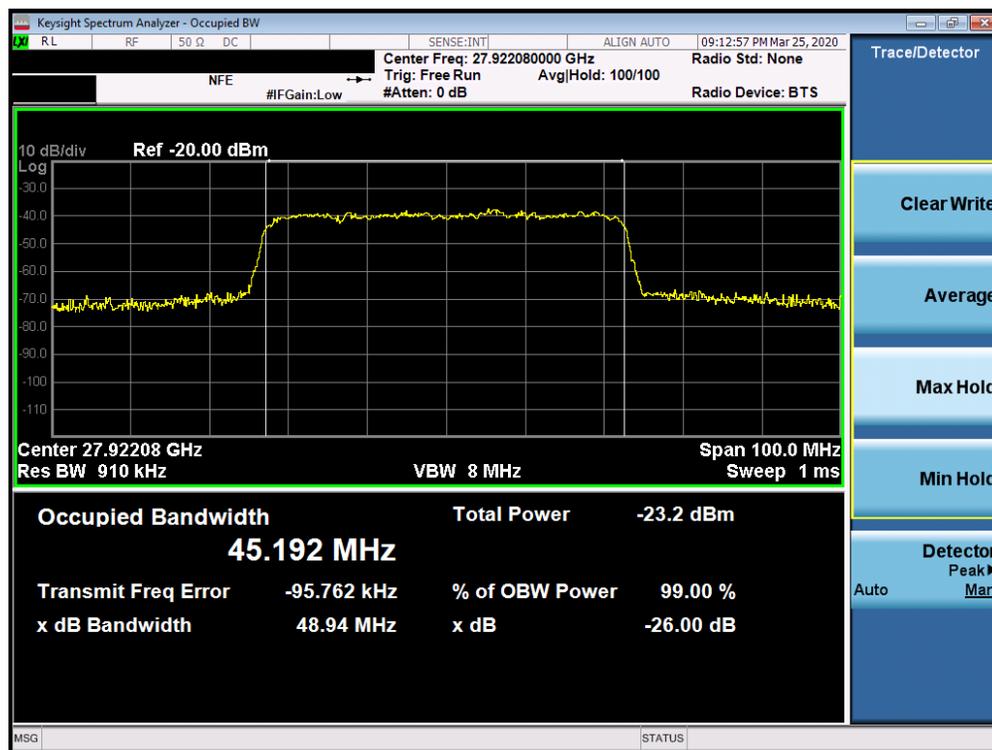


Plot 7-16. Ant1 Occupied Bandwidth Plot (100MHz-2CC – pi/2-BPSK – Mid Channel)

FCC ID: A3LSMG981V		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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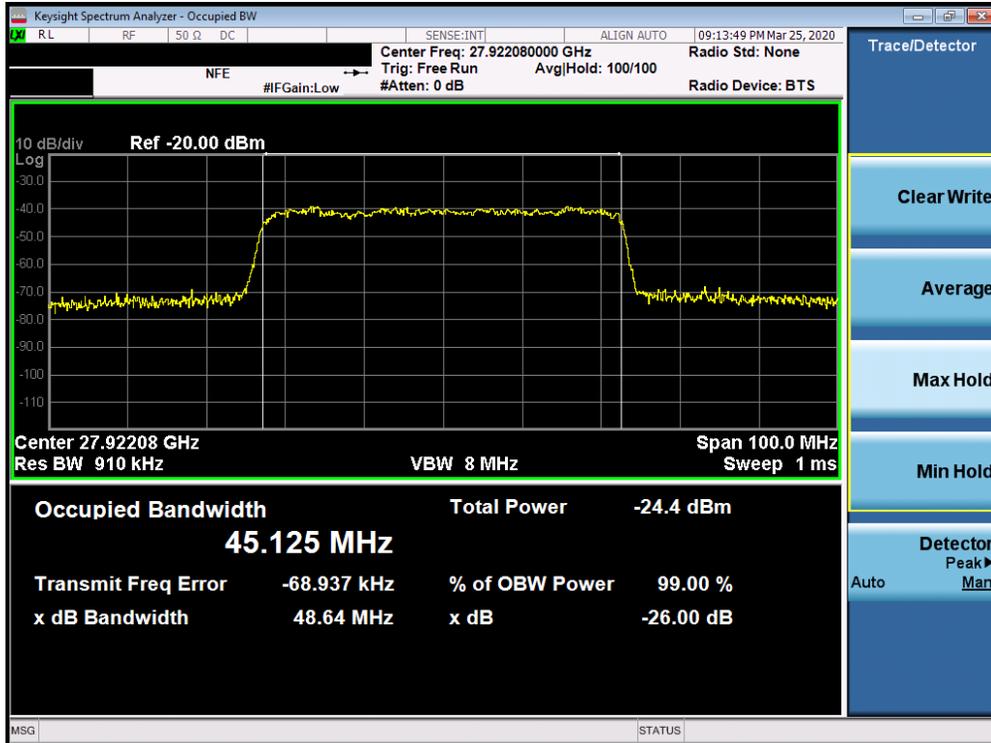
Channel	Bandwidth	CCs Active	Modulation	OBW [MHz]
Mid	50	1	QPSK	45.19
			16QAM	45.13
			64QAM	45.05
			BPSK	45.48
		2	QPSK	94.54
			BPSK	94.62
	100	1	16QAM	94.72
			64QAM	94.61
			BPSK	94.62
			QPSK	90.62
		2	16QAM	90.54
			64QAM	90.82
100	1	BPSK	92.00	
		QPSK	189.09	
	2	16QAM	189.57	
		64QAM	190.00	
			BPSK	189.33

Table 7-3. Summary of Ant2 Occupied Bandwidths (n261)

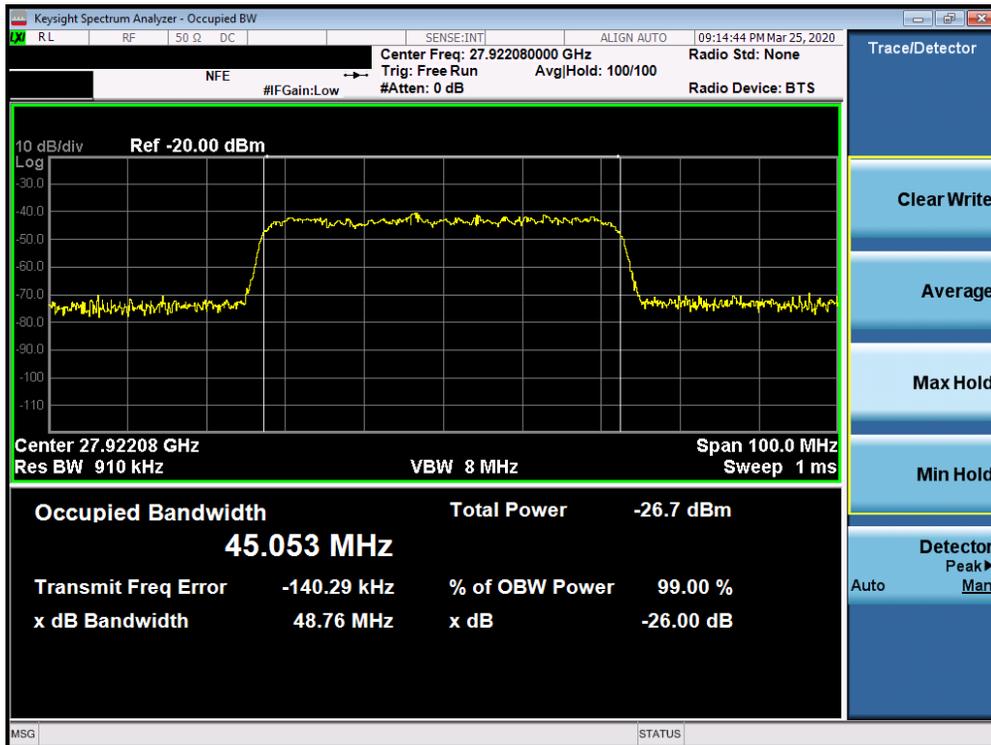


Plot 7-17. Ant2 Occupied Bandwidth Plot (50MHz-1CC – QPSK – Mid Channel)

FCC ID: A3LSMG981V		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Plot 7-18. Ant2 Occupied Bandwidth Plot (50MHz-1CC – 16QAM – Mid Channel)



Plot 7-19. Ant2 Occupied Bandwidth Plot (50MHz-1CC – 64QAM – Mid Channel)

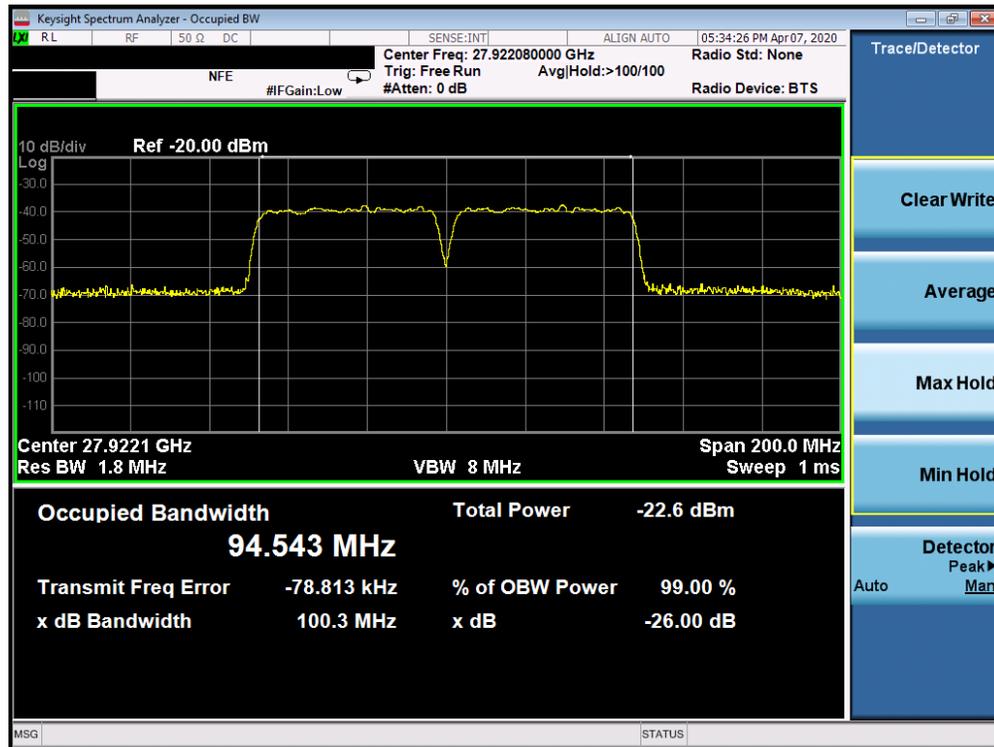
FCC ID: A3LSMG981V		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2003090034-07.A3L	Test Dates: 3/17 - 5/1/2020	EUT Type: Portable Handset		Page 26 of 161

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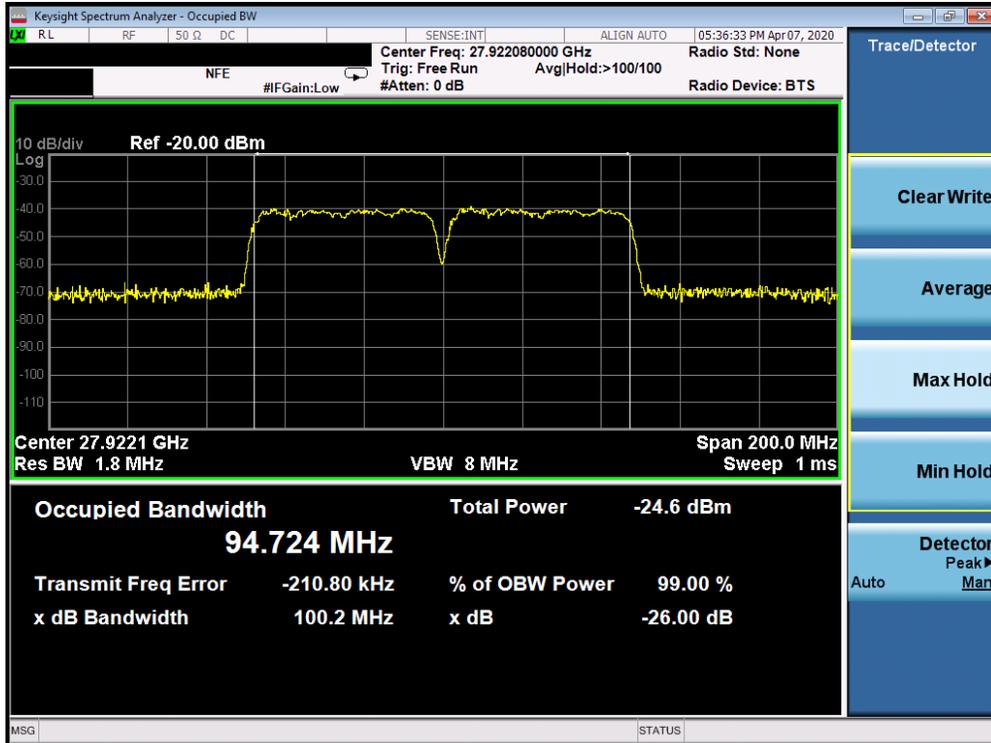
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Plot 7-20. Ant2 Occupied Bandwidth Plot (50MHz-1CC – pi/2-BPSK – Mid Channel)

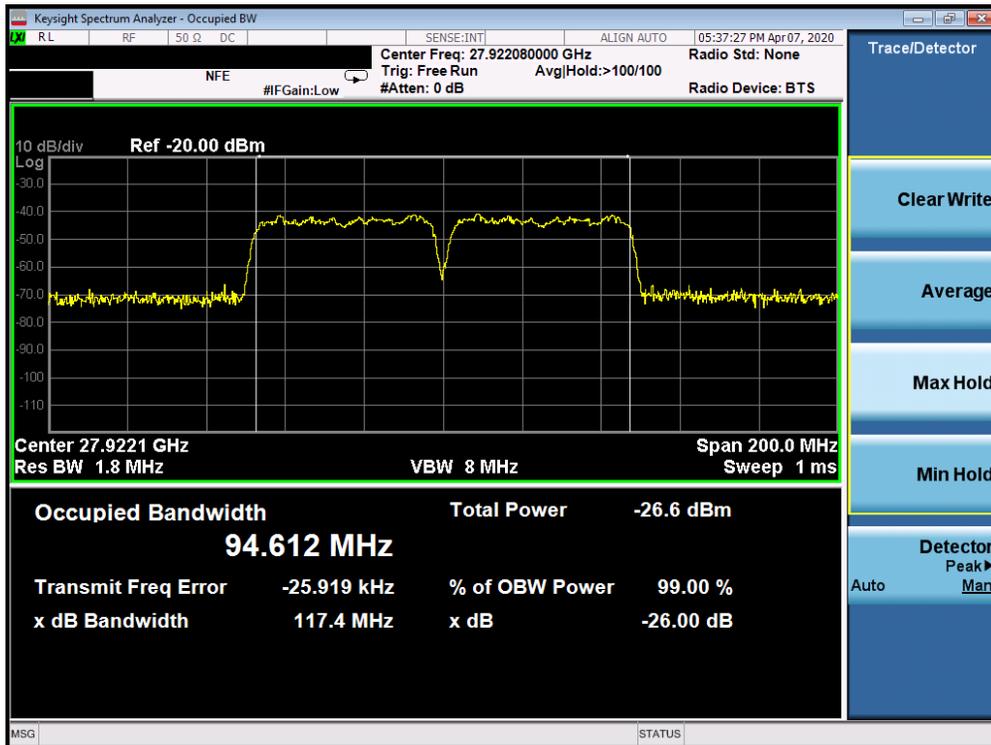


Plot 7-21. Ant2 Occupied Bandwidth Plot (50MHz-2CC – QPSK – Mid Channel)

FCC ID: A3LSMG981V		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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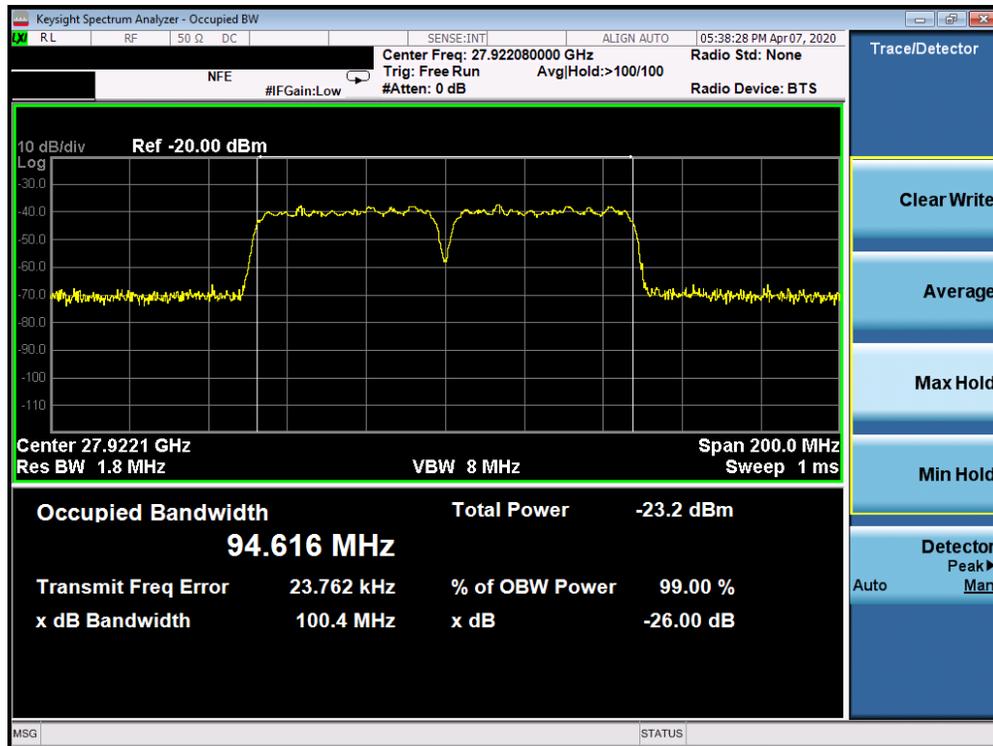


Plot 7-22. Ant2 Occupied Bandwidth Plot (50MHz-2CC – 16QAM – Mid Channel)

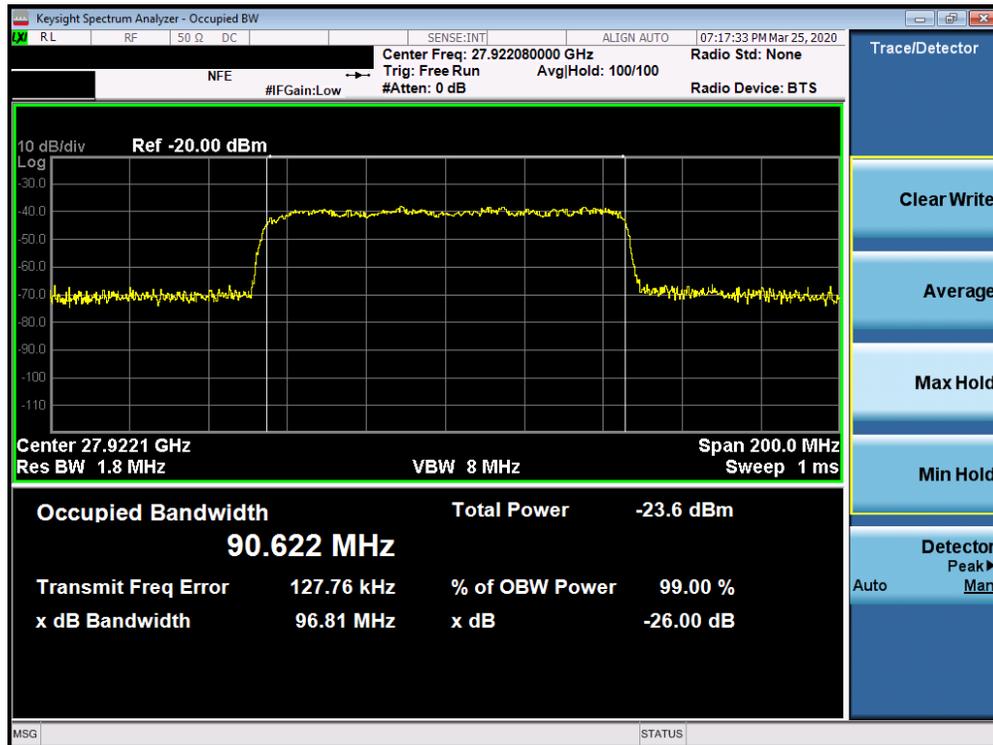


Plot 7-23. Ant2 Occupied Bandwidth Plot (50MHz-2CC – 64QAM – Mid Channel)

FCC ID: A3LSMG981V		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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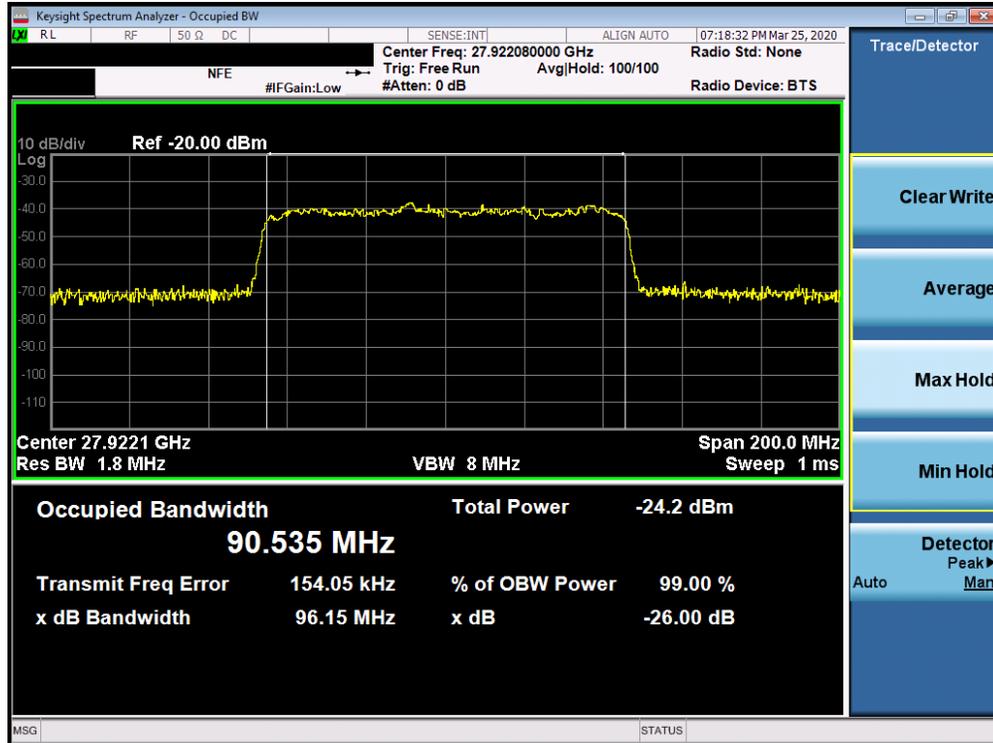


Plot 7-24. Ant2 Occupied Bandwidth Plot (50MHz-2CC – pi/2-BPSK – Mid Channel)

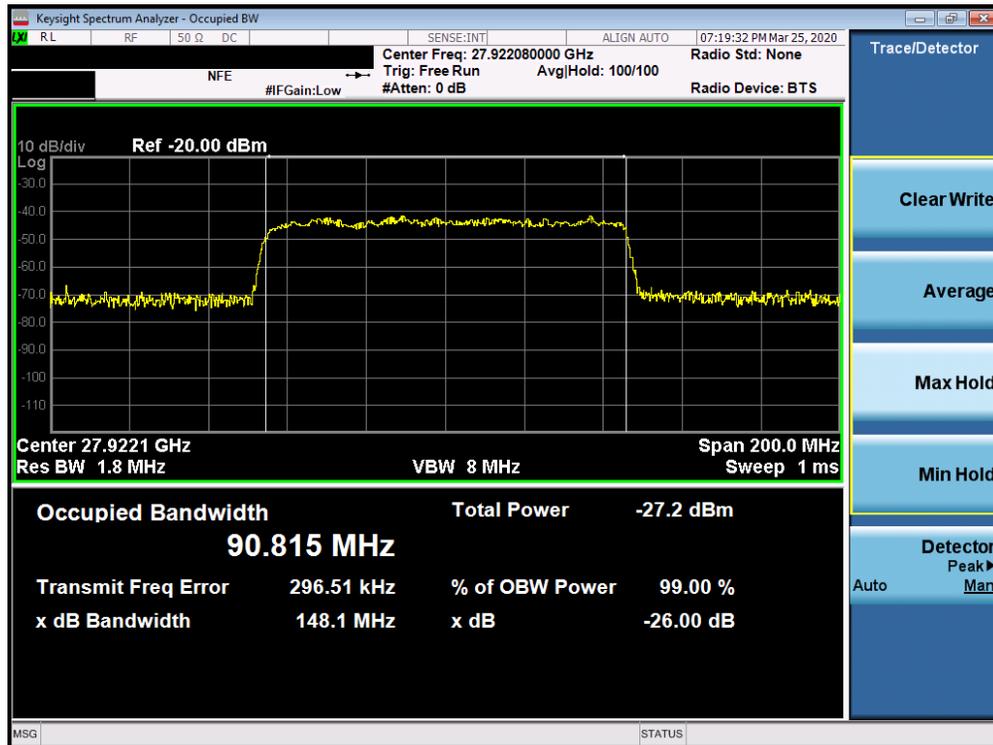


Plot 7-25. Ant2 Occupied Bandwidth Plot (100MHz-1CC – QPSK – Mid Channel)

FCC ID: A3LSMG981V		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Plot 7-26. Ant2 Occupied Bandwidth Plot (100MHz-1CC – 16QAM – Mid Channel)



Plot 7-27. Ant2 Occupied Bandwidth Plot (100MHz-1CC – 64QAM – Mid Channel)

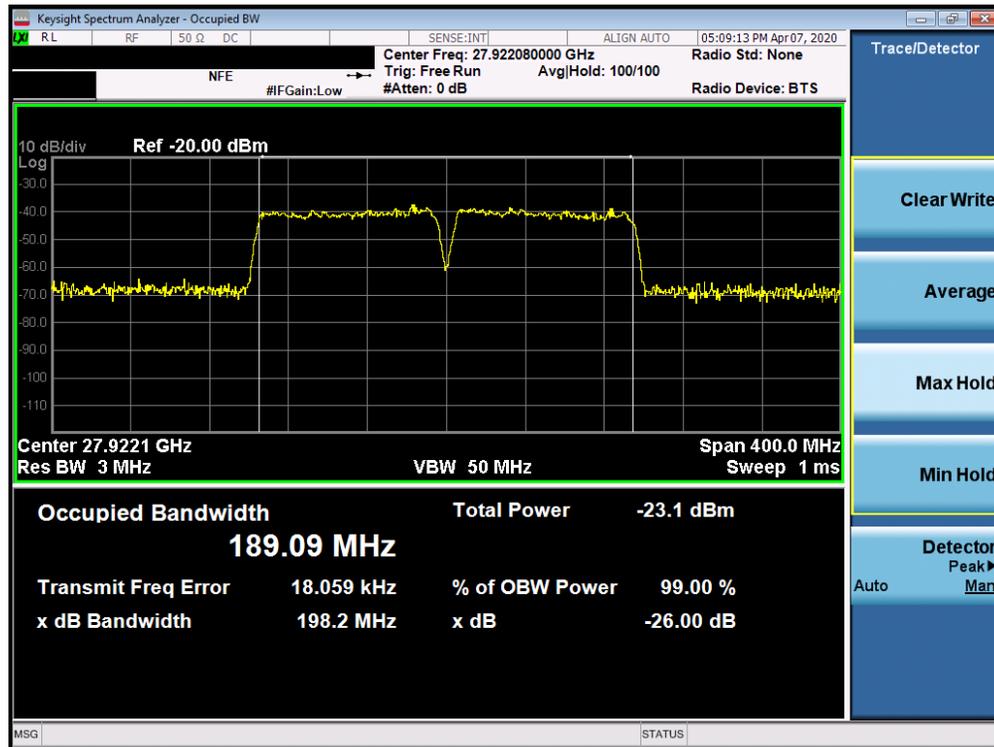
FCC ID: A3LSMG981V		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2003090034-07.A3L	Test Dates: 3/17 - 5/1/2020	EUT Type: Portable Handset		Page 30 of 161

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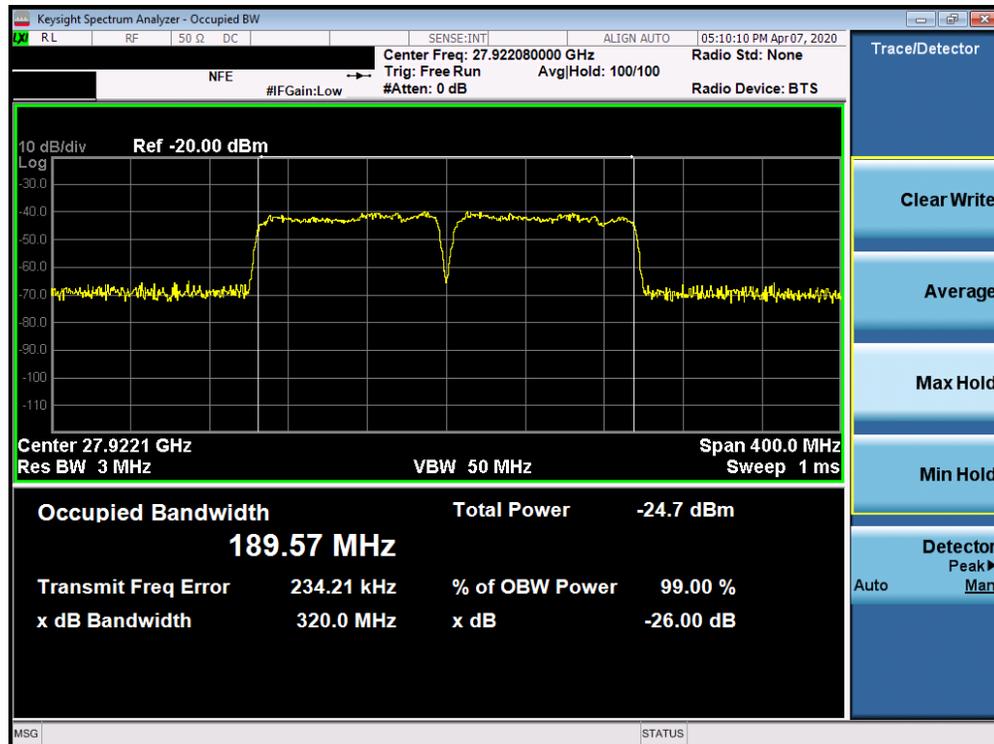
10:07:07 09.05.2020

Plot 7-28. Ant2 Occupied Bandwidth Plot (100MHz-1CC – pi/2-BPSK – Mid Channel)

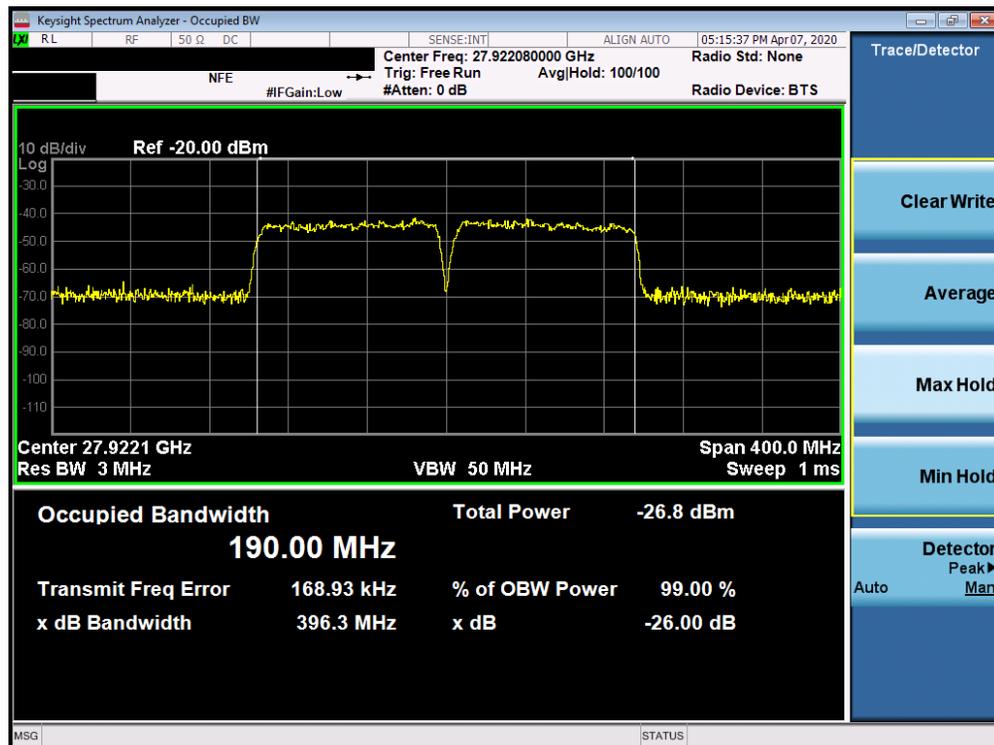


Plot 7-29. Ant2 Occupied Bandwidth Plot (100MHz-2CC – QPSK – Mid Channel)

FCC ID: A3LSMG981V		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2003090034-07.A3L	Test Dates: 3/17 - 5/1/2020	EUT Type: Portable Handset		Page 31 of 161

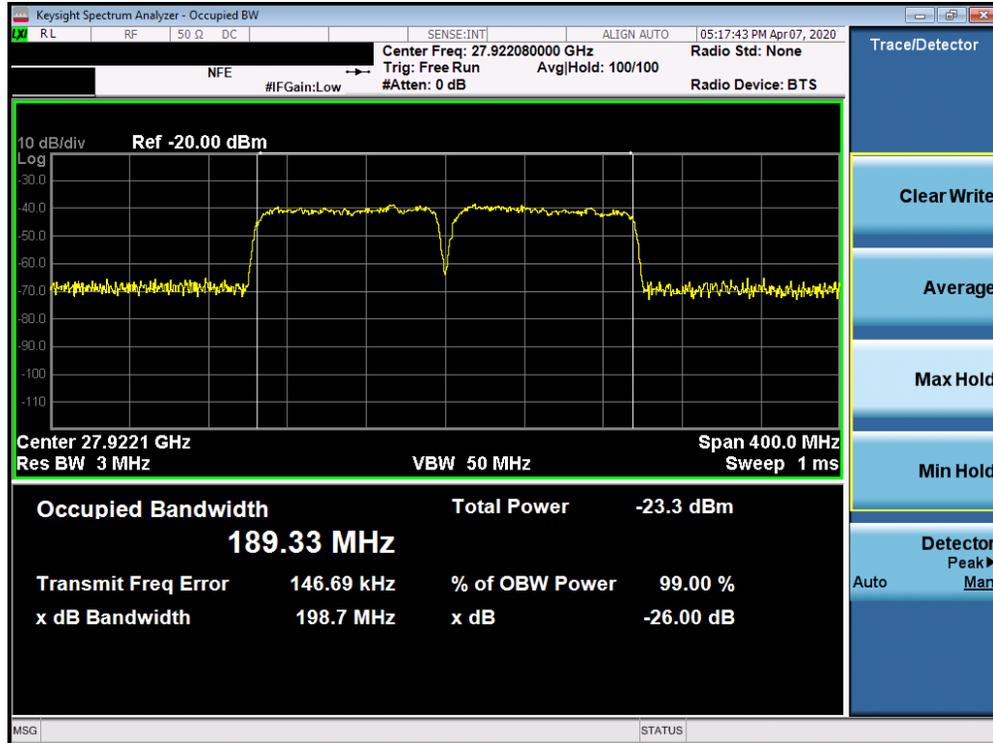


Plot 7-30. Ant2 Occupied Bandwidth Plot (100MHz-2CC – 16QAM – Mid Channel)



Plot 7-31. Ant2 Occupied Bandwidth Plot (100MHz-2CC – 64QAM – Mid Channel)

FCC ID: A3LSMG981V		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2003090034-07.A3L	Test Dates: 3/17 - 5/1/2020	EUT Type: Portable Handset		Page 32 of 161



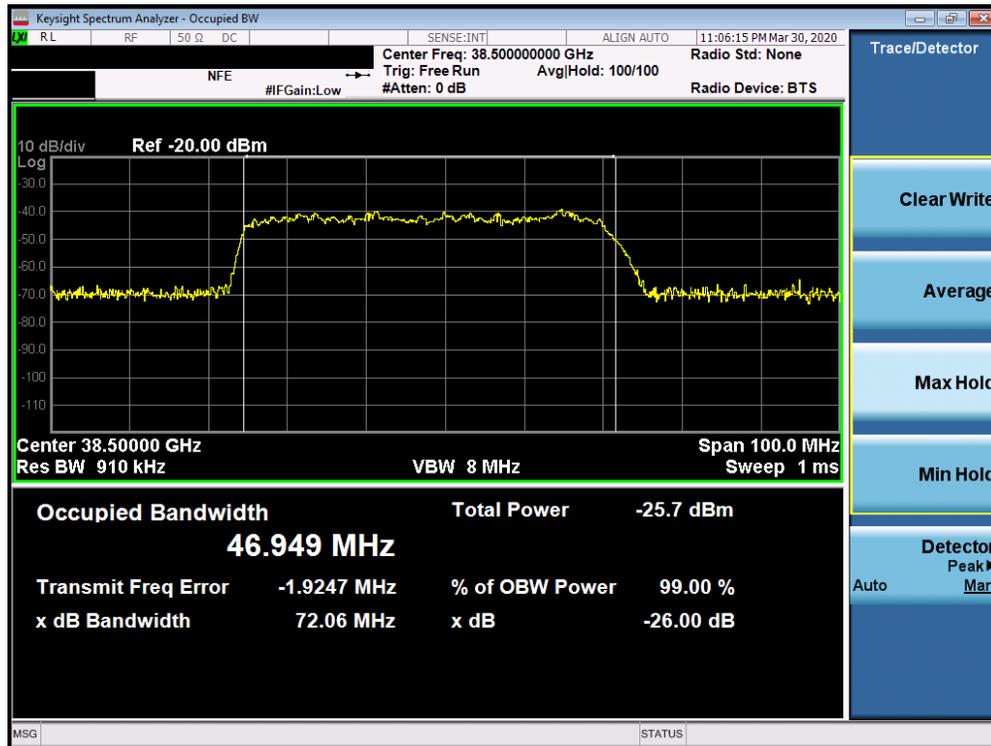
Plot 7-32. Ant2 Occupied Bandwidth Plot (100MHz-2CC – pi/2-BPSK – Mid Channel)

FCC ID: A3LSMG981V		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2003090034-07.A3L	Test Dates: 3/17 - 5/1/2020	EUT Type: Portable Handset		Page 33 of 161

Band n260

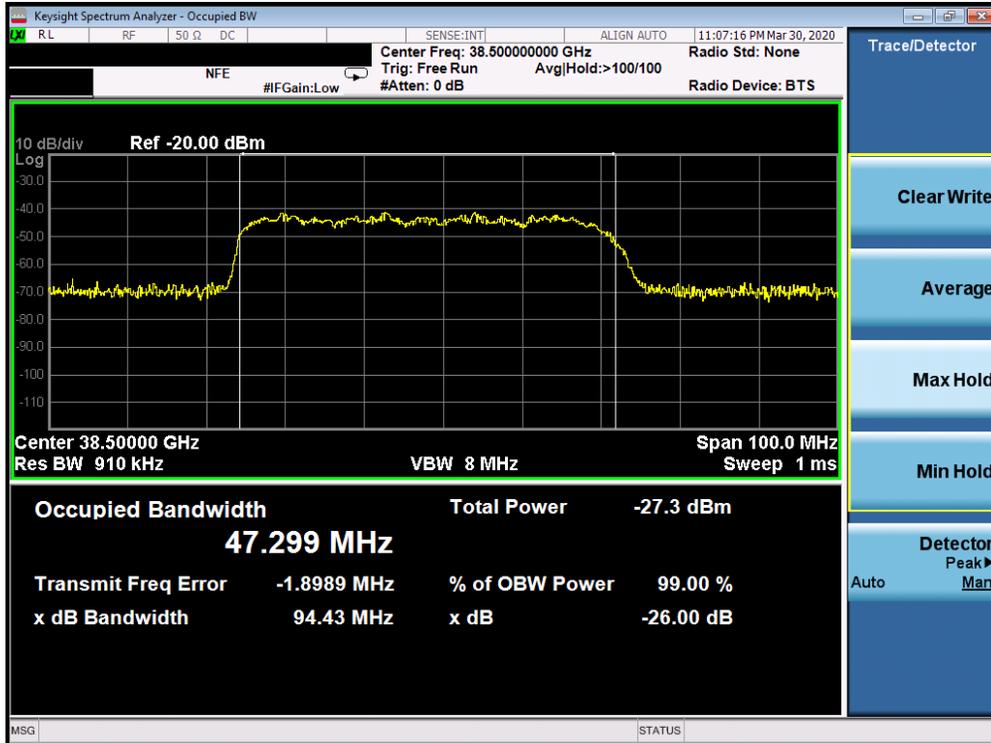
Channel	Bandwidth	CCs Active	Modulation	OBW [MHz]
Mid	50	1	QPSK	46.95
			16QAM	47.30
			64QAM	47.90
			BPSK	46.08
		2	QPSK	95.87
			16QAM	96.88
	100	1	64QAM	122.24
			BPSK	96.04
			QPSK	91.32
			16QAM	91.99
		2	64QAM	93.73
			BPSK	93.40
2	QPSK	207.53		
	16QAM	269.84		
	64QAM	195.77		
	BPSK	220.01		

Table 7-4. Summary of Ant1 Occupied Bandwidths (n260)

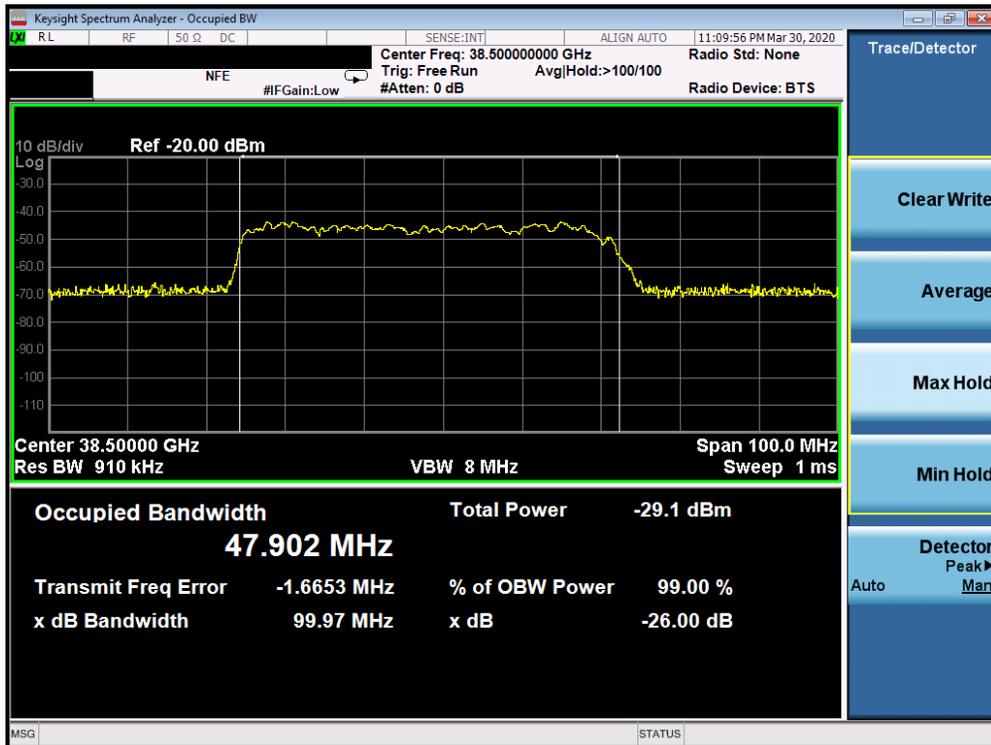


Plot 7-33. Ant1 Occupied Bandwidth Plot (50MHz-1CC – QPSK – Mid Channel)

FCC ID: A3LSMG981V		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Plot 7-34. Ant1 Occupied Bandwidth Plot (50MHz-1CC – 16QAM – Mid Channel)



Plot 7-35. Ant1 Occupied Bandwidth Plot (50MHz-1CC – 64QAM – Mid Channel)

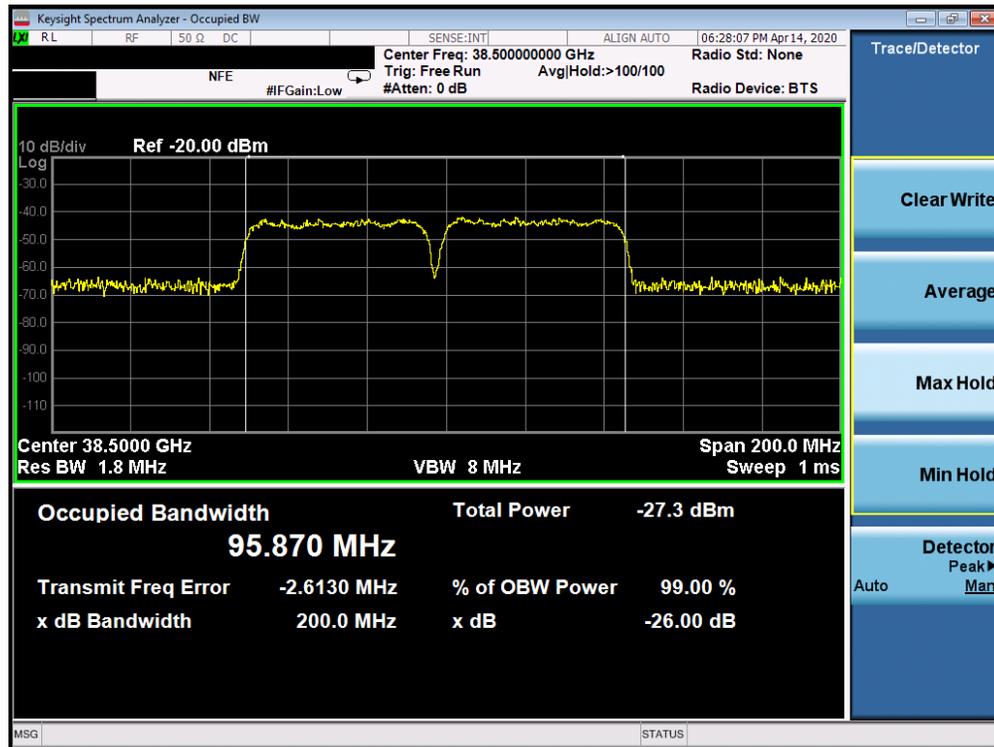
FCC ID: A3LSMG981V		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2003090034-07.A3L	Test Dates: 3/17 - 5/1/2020	EUT Type: Portable Handset		Page 35 of 161

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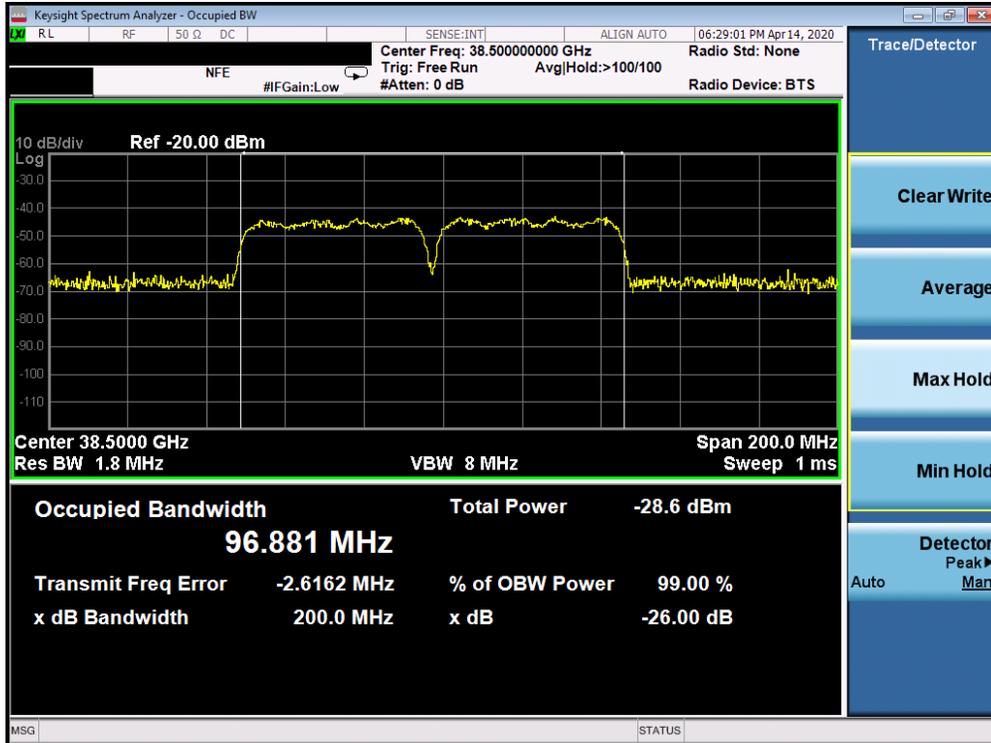
10:45:29 09.05.2020

Plot 7-36. Ant1 Occupied Bandwidth Plot (50MHz-1CC – pi/2 BPSK – Mid Channel)

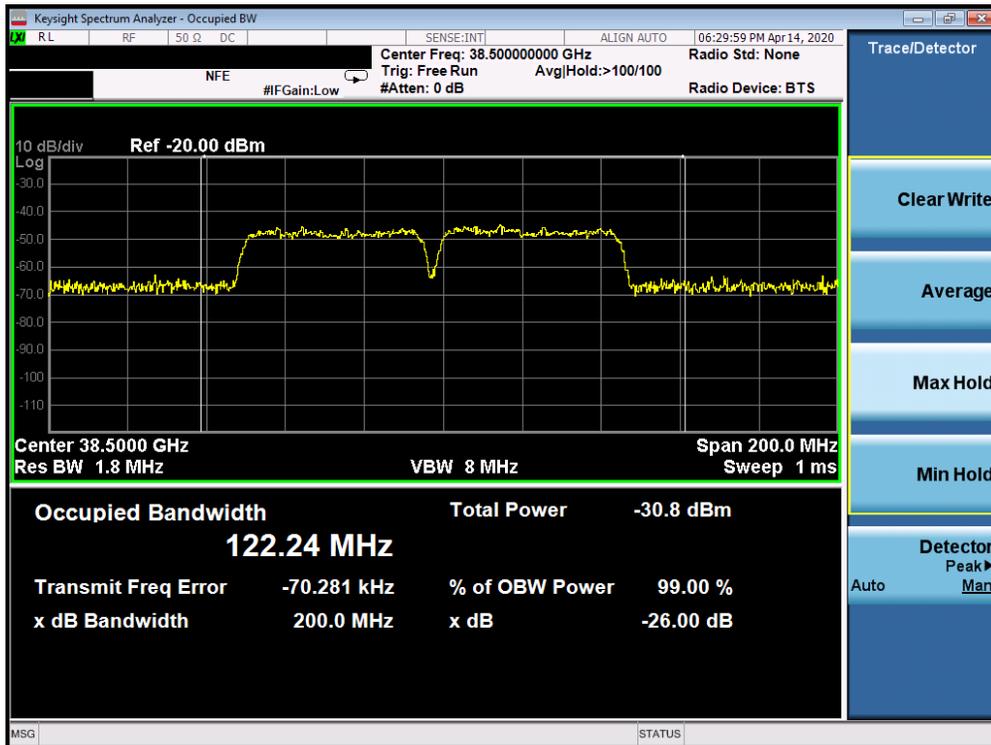


Plot 7-37. Ant1 Occupied Bandwidth Plot (50MHz-2CC – QPSK – Mid Channel)

FCC ID: A3LSMG981V		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2003090034-07.A3L	Test Dates: 3/17 - 5/1/2020	EUT Type: Portable Handset		Page 36 of 161

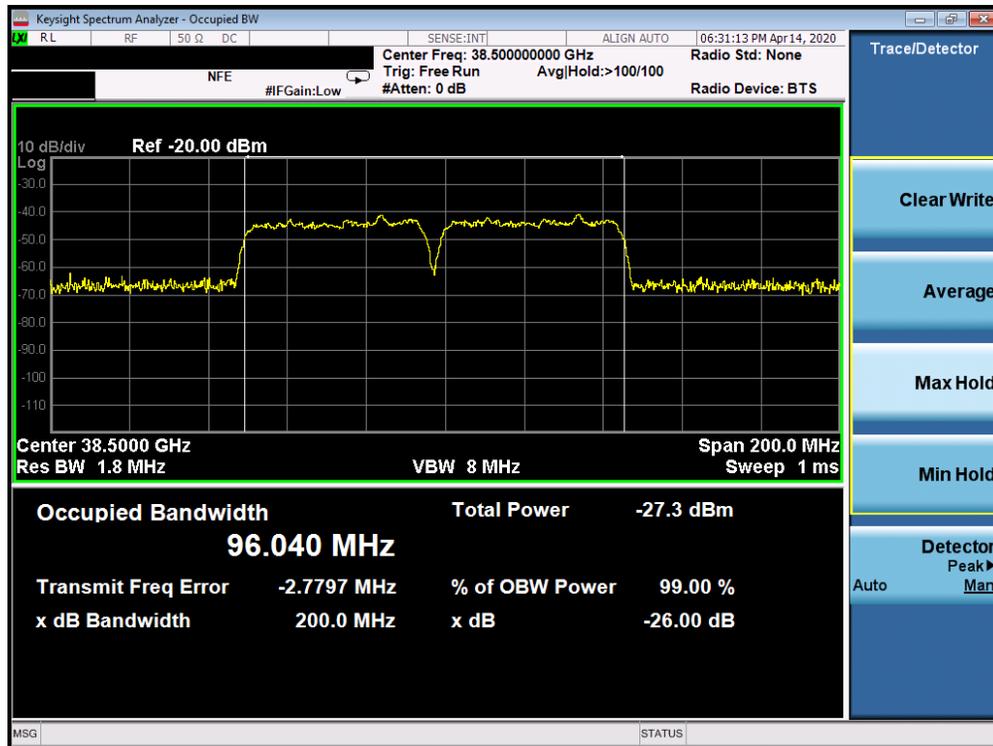


Plot 7-38. Ant1 Occupied Bandwidth Plot (50MHz-2CC – 16QAM – Mid Channel)

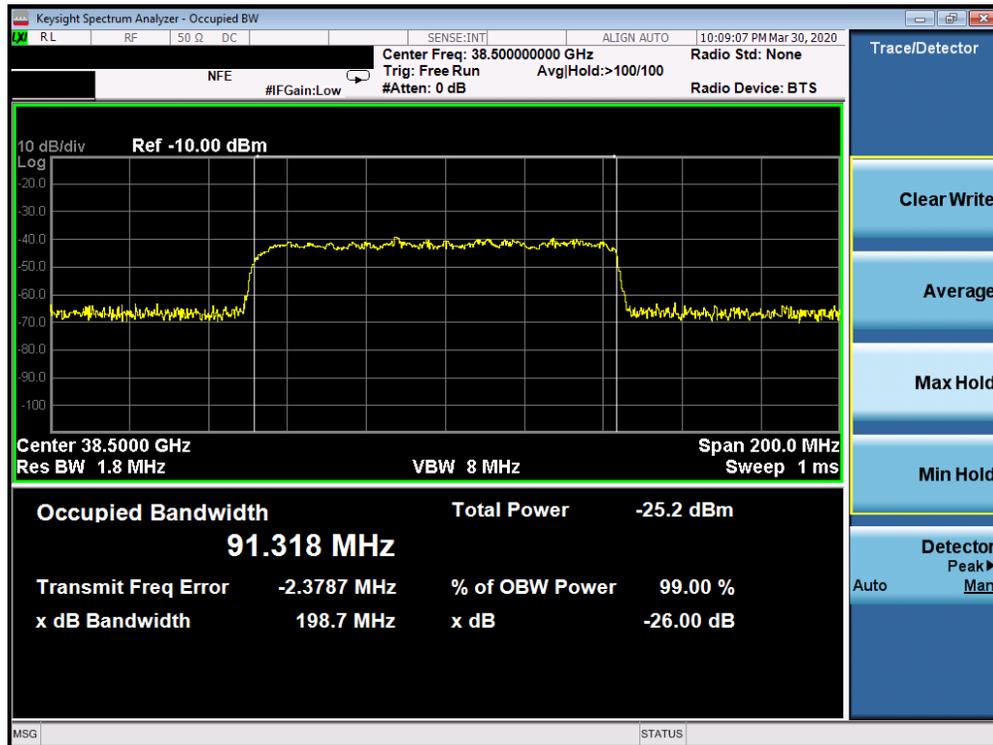


Plot 7-39. Ant1 Occupied Bandwidth Plot (50MHz-2CC – 64QAM – Mid Channel)

FCC ID: A3LSMG981V		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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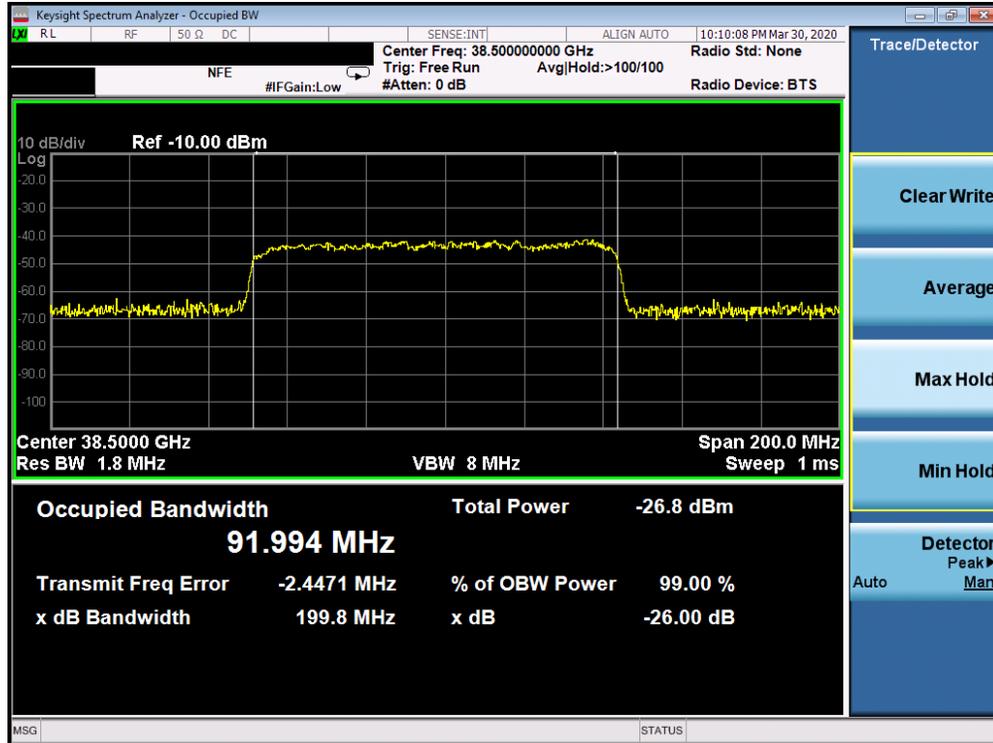


Plot 7-40. Ant1 Occupied Bandwidth Plot (50MHz-2CC – pi/2 BPSK – Mid Channel)

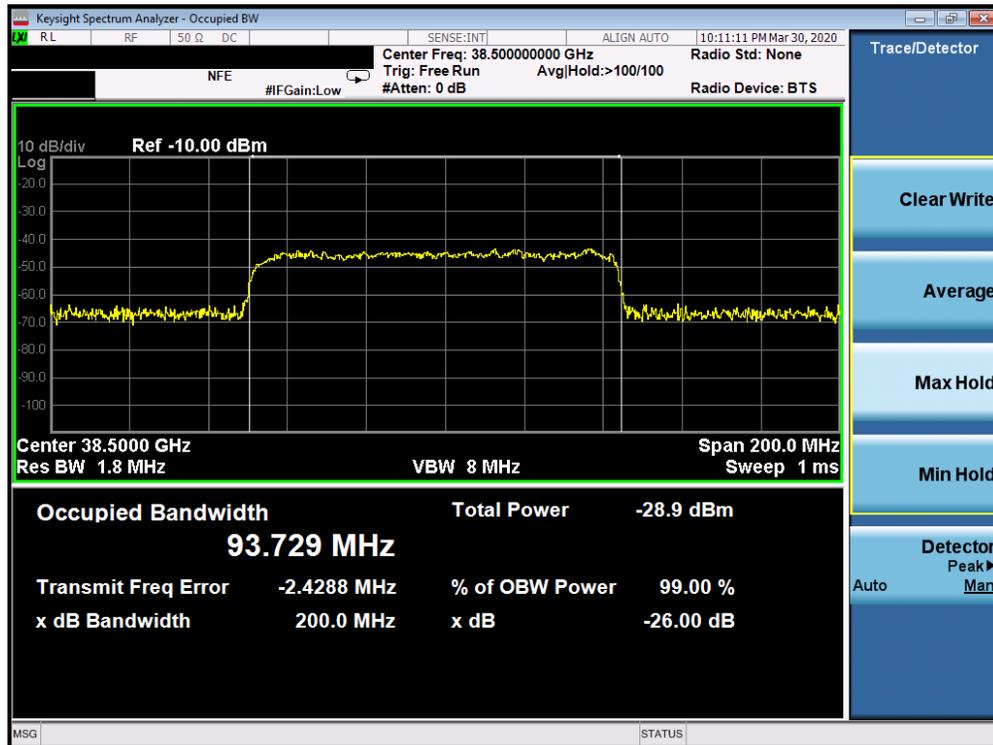


Plot 7-41. Ant1 Occupied Bandwidth Plot (100MHz-1CC – QPSK – Mid Channel)

FCC ID: A3LSMG981V		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Plot 7-42. Ant1 Occupied Bandwidth Plot (100MHz-1CC – 16QAM – Mid Channel)



Plot 7-43. Ant1 Occupied Bandwidth Plot (100MHz-1CC – 64QAM – Mid Channel)

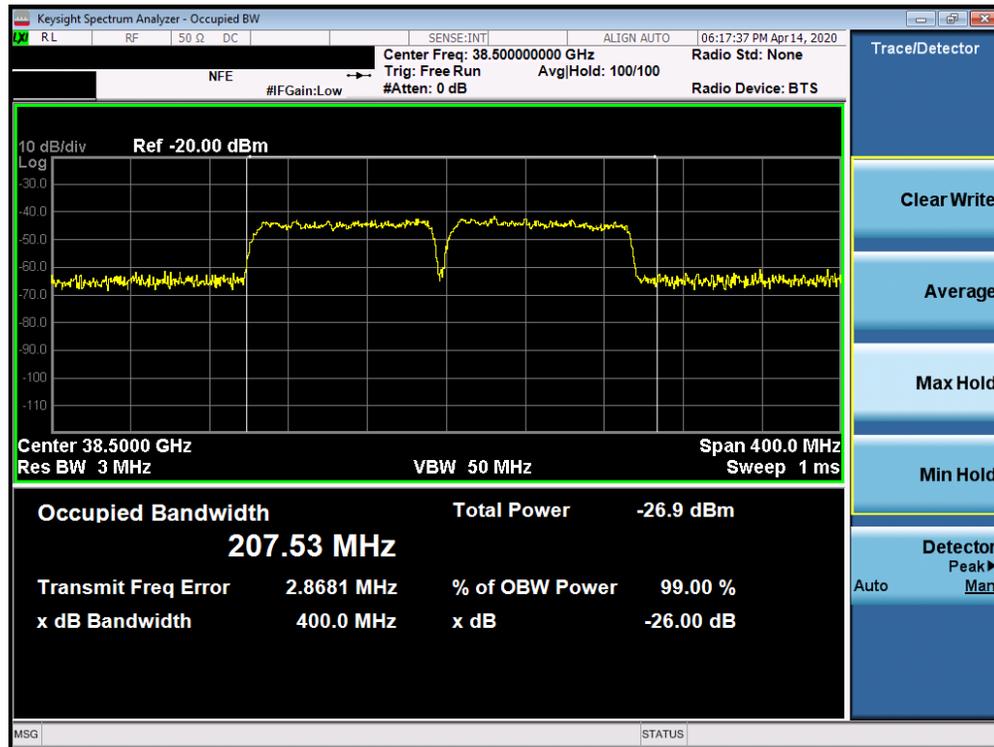
FCC ID: A3LSMG981V		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2003090034-07.A3L	Test Dates: 3/17 - 5/1/2020	EUT Type: Portable Handset		Page 39 of 161

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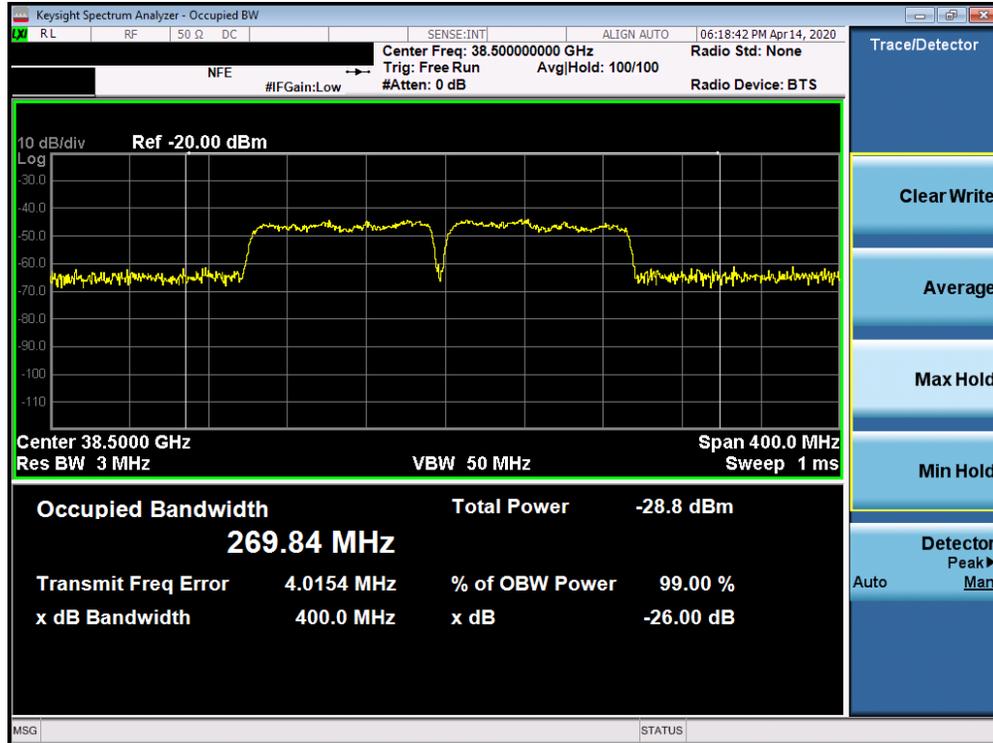
10:44:25 09.05.2020

Plot 7-44. Ant1 Occupied Bandwidth Plot (100MHz-1CC – pi/2-BPSK – Mid Channel)



Plot 7-45. Ant1 Occupied Bandwidth Plot (100MHz-2CC – QPSK – Mid Channel)

FCC ID: A3LSMG981V		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2003090034-07.A3L	Test Dates: 3/17 - 5/1/2020	EUT Type: Portable Handset		Page 40 of 161



Plot 7-46. Ant1 Occupied Bandwidth Plot (100MHz-2CC – 16QAM – Mid Channel)

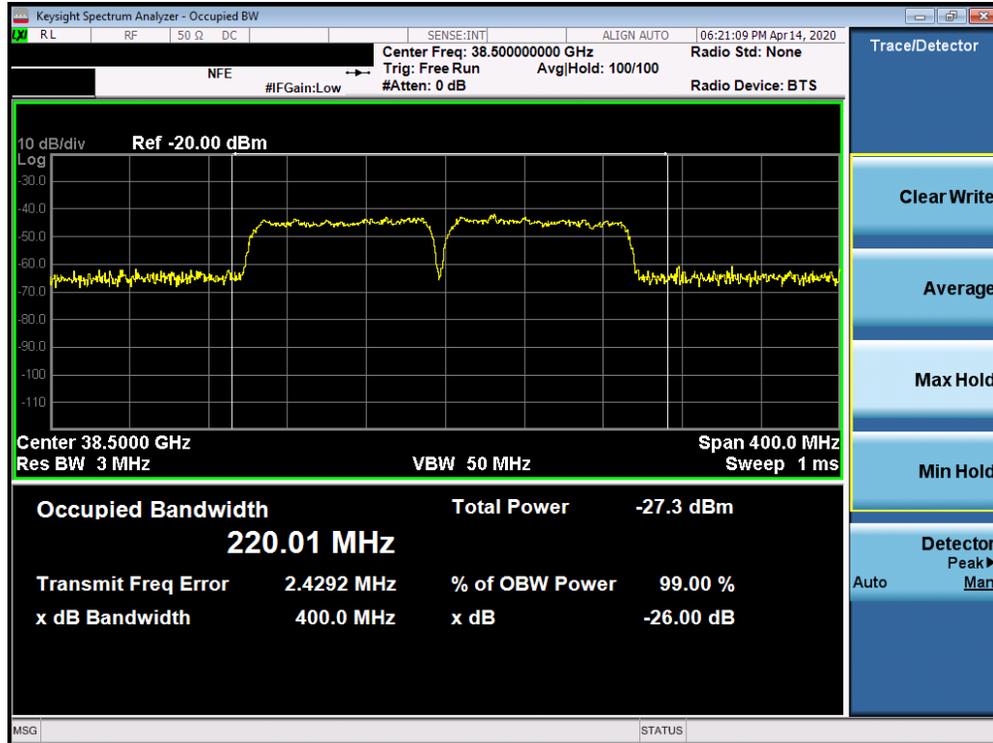
ACLRRResults



12:34:47 09.05.2020

Plot 7-47. Ant1 Occupied Bandwidth Plot (100MHz-2CC – 64QAM – Mid Channel)

FCC ID: A3LSMG981V		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2003090034-07.A3L	Test Dates: 3/17 - 5/1/2020	EUT Type: Portable Handset		Page 41 of 161

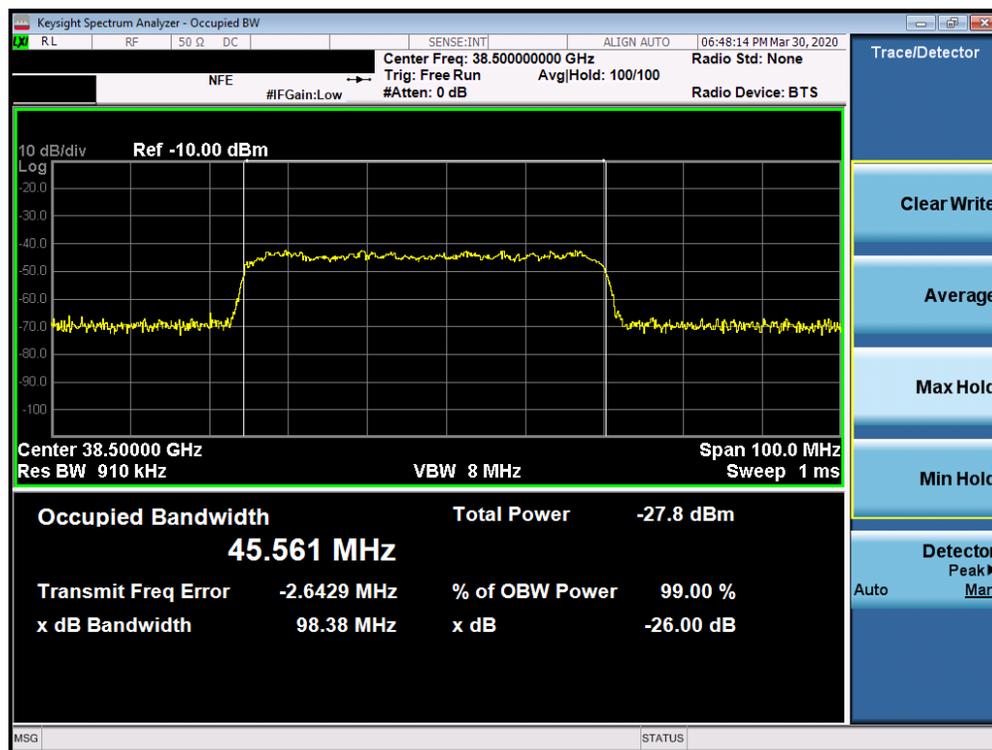


Plot 7-48. Ant1 Occupied Bandwidth Plot (100MHz-2CC – pi/2-BPSK – Mid Channel)

FCC ID: A3LSMG981V		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2003090034-07.A3L	Test Dates: 3/17 - 5/1/2020	EUT Type: Portable Handset		Page 42 of 161

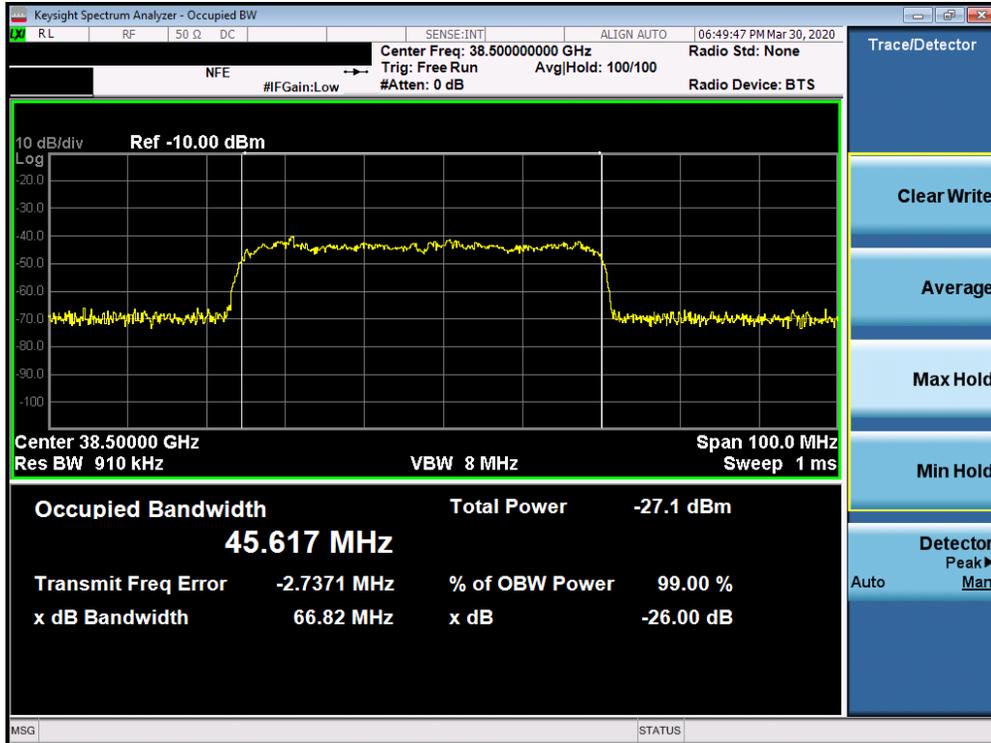
Channel	Bandwidth	CCs Active	Modulation	OBW [MHz]
Mid	50	1	QPSK	45.56
			16QAM	45.62
			64QAM	45.69
			BPSK	46.63
		2	QPSK	95.30
			BPSK	95.49
	100	1	QPSK	94.21
			16QAM	95.09
			64QAM	118.19
			BPSK	93.70
		2	QPSK	213.56
			BPSK	192.12

Table 7-5. Summary of Ant2 Occupied Bandwidths (n260)

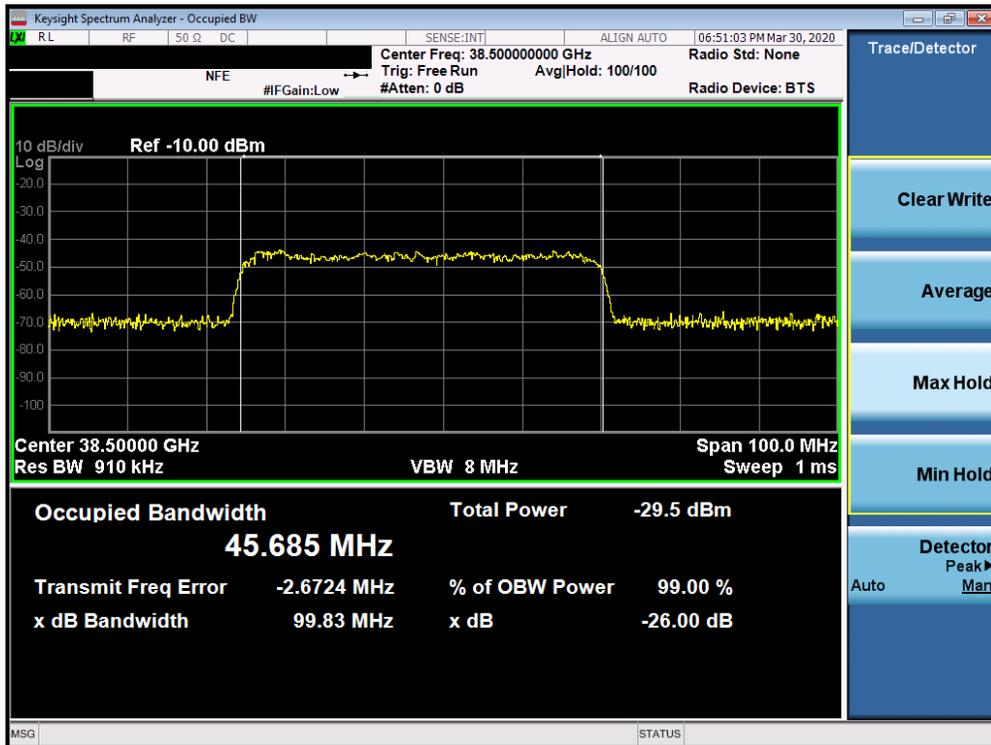


Plot 7-49. Ant2 Occupied Bandwidth Plot (50MHz-1CC – QPSK – Mid Channel)

FCC ID: A3LSMG981V		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2003090034-07.A3L	Test Dates: 3/17 - 5/1/2020	EUT Type: Portable Handset		Page 43 of 161



Plot 7-50. Ant2 Occupied Bandwidth Plot (50MHz-1CC – 16QAM – Mid Channel)



Plot 7-51. Ant2 Occupied Bandwidth Plot (50MHz-1CC – 64QAM – Mid Channel)

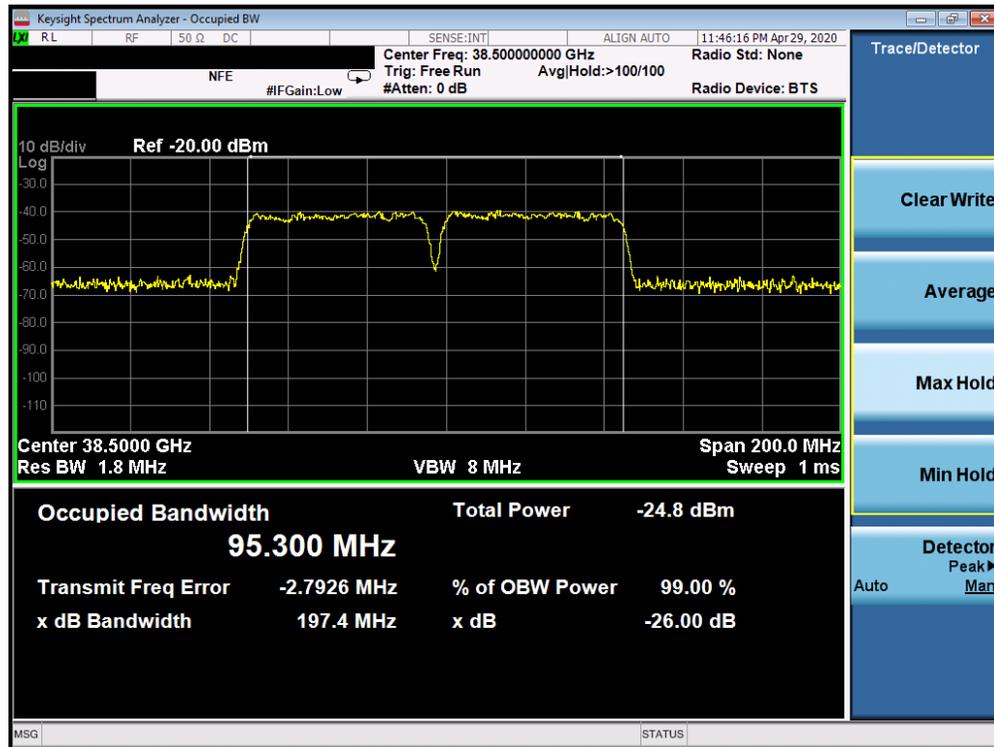
FCC ID: A3LSMG981V		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2003090034-07.A3L	Test Dates: 3/17 - 5/1/2020	EUT Type: Portable Handset		Page 44 of 161

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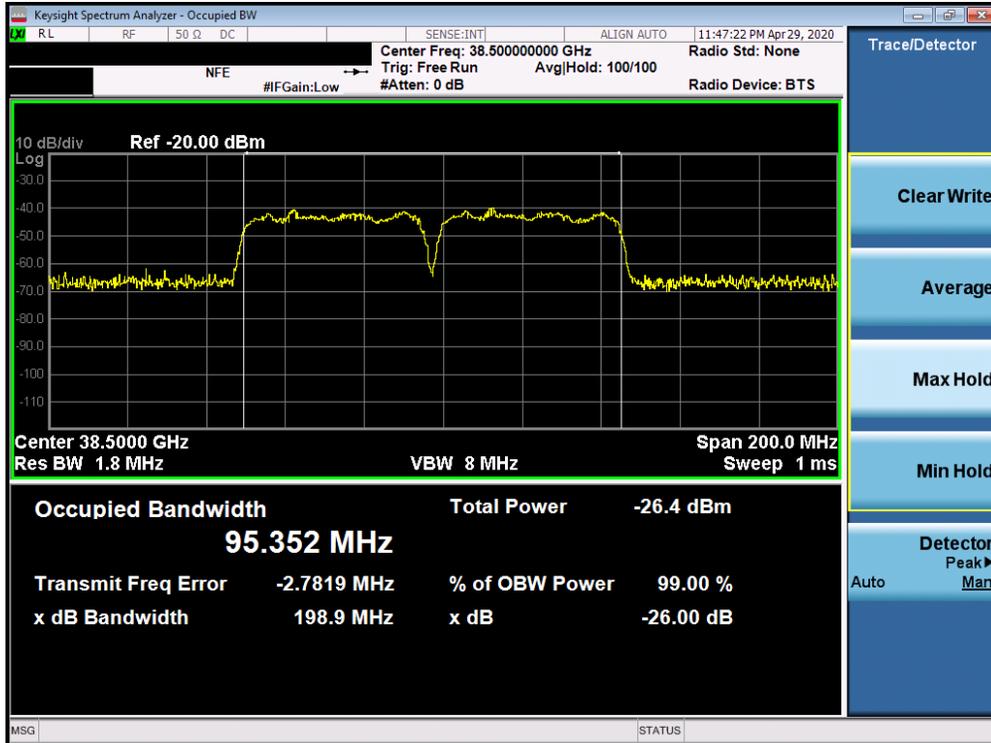
12:46:34 09.05.2020

Plot 7-52. Ant2 Occupied Bandwidth Plot (50MHz-1CC – pi/2-BPSK – Mid Channel)

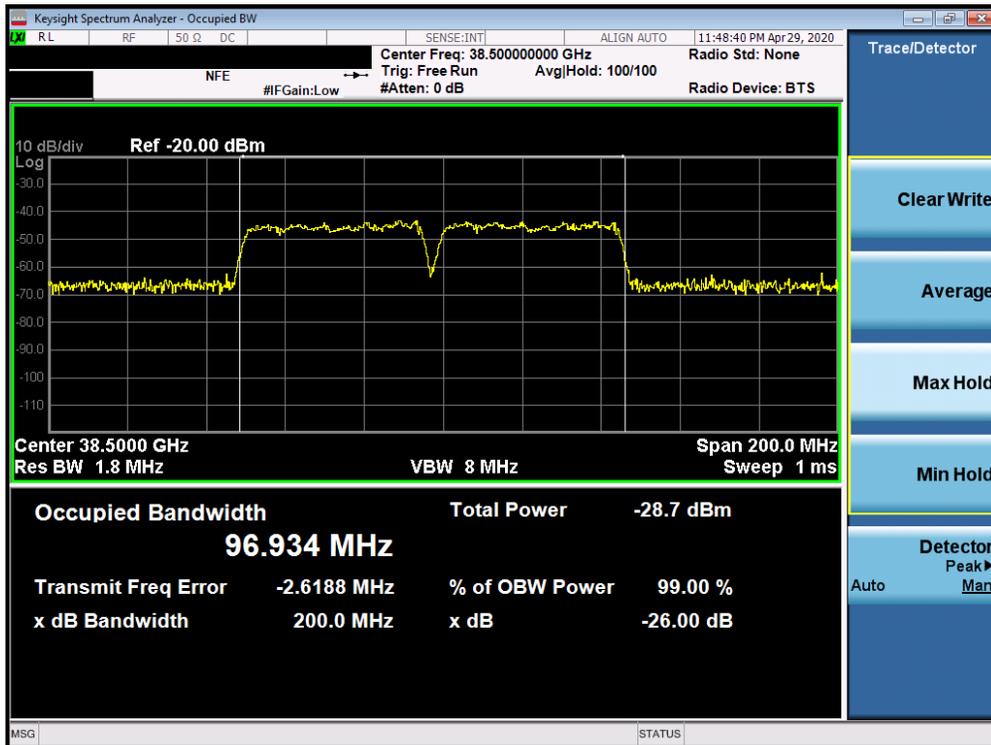


Plot 7-53. Ant2 Occupied Bandwidth Plot (50MHz-2CC – QPSK – Mid Channel)

FCC ID: A3LSMG981V		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2003090034-07.A3L	Test Dates: 3/17 - 5/1/2020	EUT Type: Portable Handset		Page 45 of 161



Plot 7-54. Ant2 Occupied Bandwidth Plot (50MHz-2CC – 16QAM – Mid Channel)



Plot 7-55. Ant2 Occupied Bandwidth Plot (50MHz-2CC – 64QAM – Mid Channel)

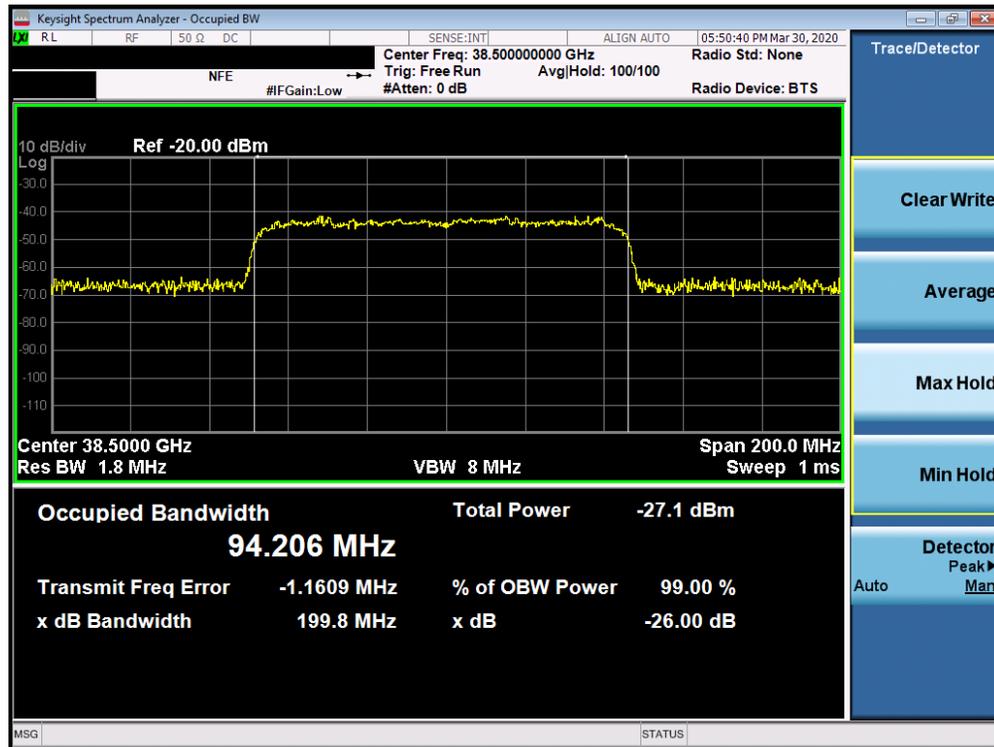
FCC ID: A3LSMG981V		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2003090034-07.A3L	Test Dates: 3/17 - 5/1/2020	EUT Type: Portable Handset		Page 46 of 161

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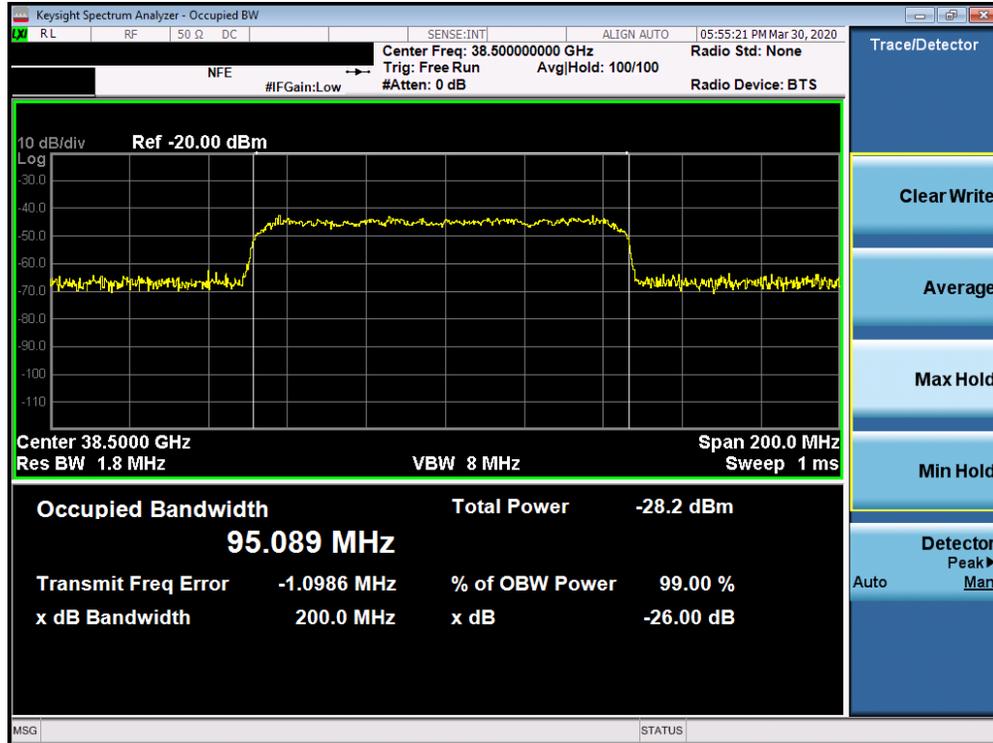
15:00:48 09.05.2020

Plot 7-56. Ant2 Occupied Bandwidth Plot (50MHz-2CC – pi/2-BPSK – Mid Channel)

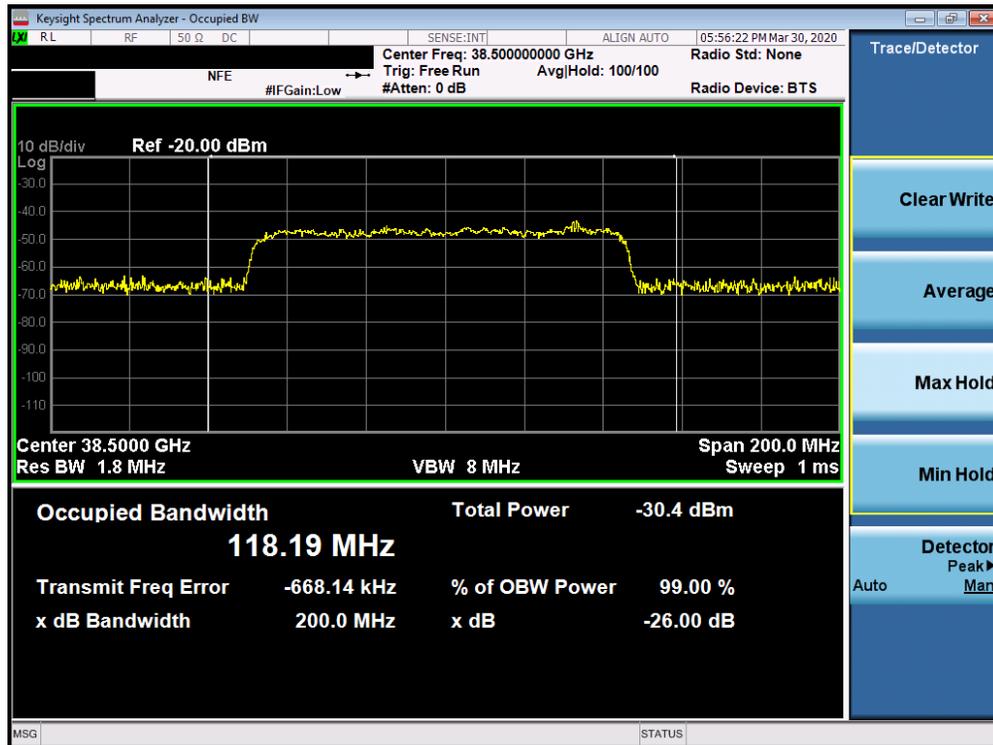


Plot 7-57. Ant2 Occupied Bandwidth Plot (100MHz-1CC – QPSK – Mid Channel)

FCC ID: A3LSMG981V		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2003090034-07.A3L	Test Dates: 3/17 - 5/1/2020	EUT Type: Portable Handset		Page 47 of 161



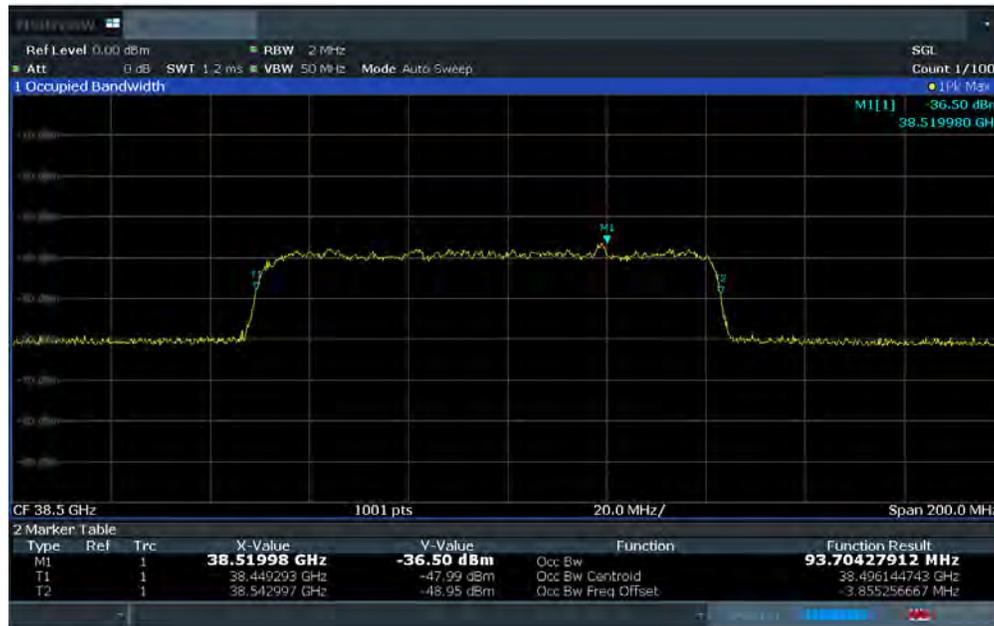
Plot 7-58. Ant2 Occupied Bandwidth Plot (100MHz-1CC – 16QAM – Mid Channel)



Plot 7-59. Ant2 Occupied Bandwidth Plot (100MHz-1CC – 64QAM – Mid Channel)

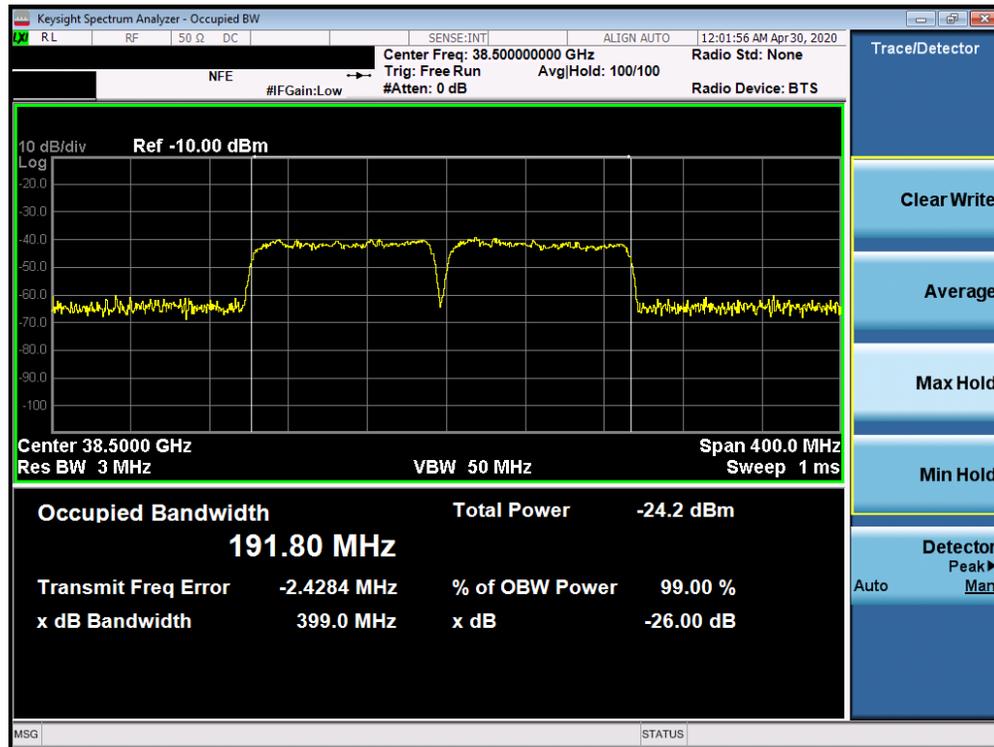
FCC ID: A3LSMG981V		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2003090034-07.A3L	Test Dates: 3/17 - 5/1/2020	EUT Type: Portable Handset		Page 48 of 161

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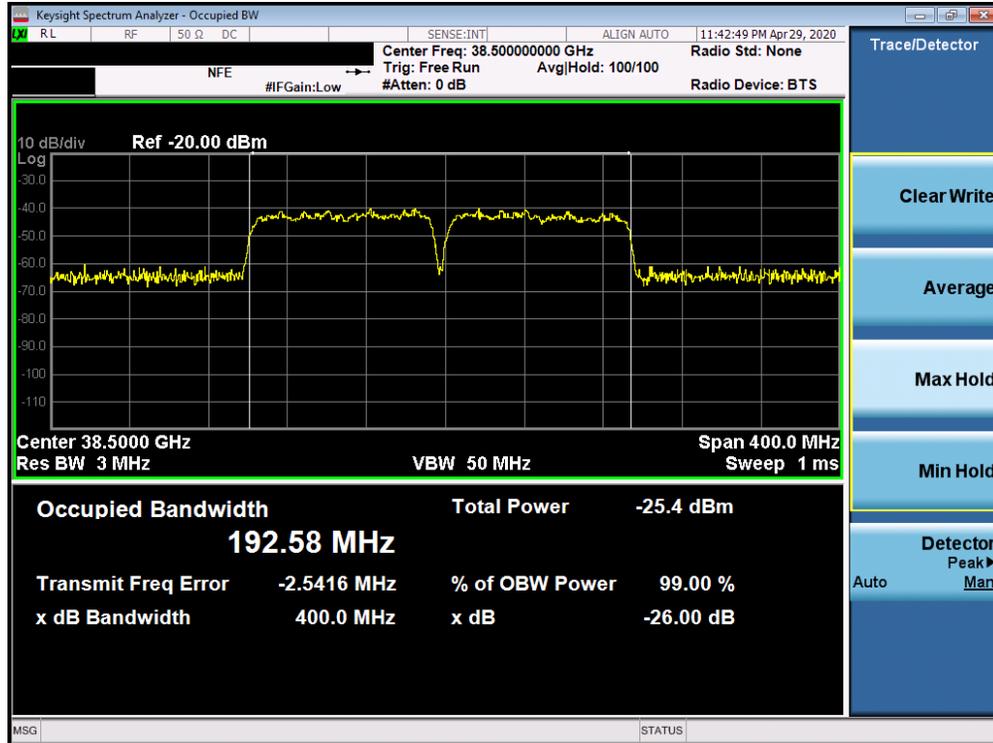
14:48:46 09.05.2020

Plot 7-60. Ant2 Occupied Bandwidth Plot (100MHz-1CC – pi/2-BPSK – Mid Channel)

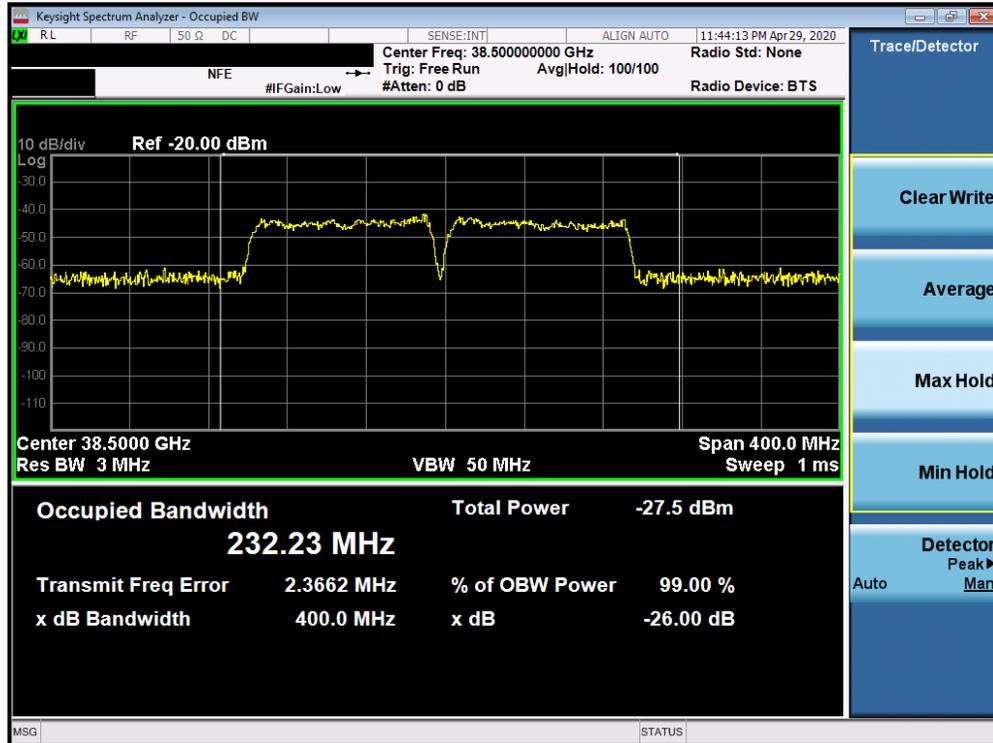


Plot 7-61. Ant2 Occupied Bandwidth Plot (100MHz-2CC – QPSK – Mid Channel)

FCC ID: A3LSMG981V		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Plot 7-62. Ant2 Occupied Bandwidth Plot (100MHz-2CC – 16QAM – Mid Channel)



Plot 7-63. Ant2 Occupied Bandwidth Plot (100MHz-2CC – 64QAM – Mid Channel)

FCC ID: A3LSMG981V		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2003090034-07.A3L	Test Dates: 3/17 - 5/1/2020	EUT Type: Portable Handset		Page 50 of 161

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14:59:07 09.05.2020

Plot 7-64. Ant2 Occupied Bandwidth Plot (100MHz-2CC – pi/2-BPSK – Mid Channel)

FCC ID: A3LSMG981V		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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7.3 Equivalent Isotropic Radiated Power §2.1046, §30.202

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 v01r01 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, not to exceed 1MHz
3. VBW ≥ 3 x RBW
4. Span = 2x to 3x the OBW
5. No. of sweep points ≥ 2 x span / RBW
6. Detector = RMS
7. The integration bandwidth was roughly set equal to the measured OBW of the signal for signals with continuous operation.
8. Trace mode = trace averaging (RMS) over 100 sweeps
9. The trace was allowed to stabilize

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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. 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 were taken at 1m test distance.
- 4) The average EIRP reported below is calculated per section 5.2.7 of ANSI C63.26-2015 which states: $EIRP (dBm) = E (dB\mu V/m) + 20\log(D) - 104.8$; where D is the measurement distance (in the far field region) in m. The field strength E is calculated $E (dB\mu V/m) = \text{Spectrum Analyzer Channel Power Level (dBm)} + \text{Antenna Factor (dB/m)} + \text{Cable Loss (dB)} + 107$.
- 5) 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.

FCC ID: A3LSMG981V		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Band n261 Beam ID Configurations

Mode	Beam Polarization	Beam ID_01	Beam ID_02
SISO	H	154	-
		154	-
		154	-
	V	19	-
		26	-
		26	-
MIMO		25	154
		25	154
		25	154

Table 7-6. Ant1 Worst Case Beam ID

Mode	Beam Polarization	Beam ID_01	Beam ID_02
SISO	H	140	-
		150	-
		149	-
	V	22	-
		22	-
		23	-
MIMO		21	150
		21	150
		21	150

Table 7-7. Ant2 Worst Case Beam ID

FCC ID: A3LSMG981V		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Band n261

CCs active	Mode	Frequency [MHz]	Channel	Beam Pol	Modulation	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
1	SISO	27534.84	Low	H	QPSK	H	222	27	1/16	23.46
		27922.08	Mid	H	QPSK	H	231	53	1/16	23.06
		28319.52	High	H	QPSK	H	218	33	1/16	22.11
		27534.84	Low	H	16QAM	H	222	27	1/16	19.84
		27534.84	Low	H	64QAM	H	222	27	1/16	17.88
		27534.84	Low	H	BPSK	H	222	27	1/16	23.22
	MIMO	27534.84	Low	MIMO	QPSK	H	260	89	1/16	23.01
		27534.84	Low	MIMO	16QAM	H	260	89	1/16	19.80
		27534.84	Low	MIMO	64QAM	H	260	89	1/16	18.69

Table 7-8. Ant1 EIRP Data (Band n261 - 50MHz-1CC)

CCs active	Mode	Frequency [MHz]	Channel	Beam Pol	Modulation	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
2	SISO	27922.08	Mid	H	QPSK	H	206	55	32/0	21.17
		27922.08	Mid	H	16QAM	H	206	55	32/0	19.30
		27922.08	Mid	H	64QAM	H	206	55	32/0	17.82
		27922.08	Mid	H	BPSK	H	206	55	32/0	20.92
	MIMO	28319.52	Mid	MIMO	QPSK	H	207	55	32/0	19.26
		28319.52	Mid	MIMO	16QAM	H	207	55	32/0	17.85
		28319.52	Mid	MIMO	64QAM	H	207	55	32/0	16.24

Table 7-9. Ant1 EIRP Data (Band n261 - 50MHz-2CC)

CCs active	Mode	Frequency [MHz]	Channel	Beam Pol	Modulation	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
1	SISO	27534.84	Low	H	QPSK	H	231	28	1/32	23.34
		27922.08	Mid	H	QPSK	H	230	31	1/32	23.28
		28319.52	High	H	QPSK	H	224	43	1/32	22.69
		27534.84	Low	H	16QAM	H	231	28	1/32	20.48
		27534.84	Low	H	64QAM	H	231	28	1/32	18.75
		27534.84	Low	H	BPSK	H	231	28	1/32	23.00
	MIMO	27534.84	Low	MIMO	QPSK	H	259	103	1/16	21.93
		27534.84	Low	MIMO	16QAM	H	259	103	1/16	19.98
		27534.84	Low	MIMO	64QAM	H	259	103	1/16	18.46

Table 7-10. Ant1 EIRP Data (Band n261 - 100MHz-1CC)

FCC ID: A3LSMG981V		MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
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CCs active	Mode	Frequency [MHz]	Channel	Beam Pol	Modulation	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
2	SISO	27922.08	Mid	H	QPSK	H	203	53	66/0	22.07
		27922.08	Mid	H	16QAM	H	203	53	66/0	20.23
		27922.08	Mid	H	64QAM	H	203	53	66/0	18.67
		27922.08	Mid	H	BPSK	H	203	53	66/0	21.87
	MIMO	28319.52	Mid	H	QPSK	H	198	51	32/0	20.29
		28319.52	Mid	H	16QAM	H	198	51	32/0	18.22
		28319.52	Mid	H	64QAM	H	198	51	32/0	17.70

Table 7-11. Ant1 EIRP Data (Band n261 - 100MHz-2CC)

CCs active	Mode	Frequency [MHz]	Channel	Beam Pol	Modulation	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
1	SISO	27534.84	Low	H	QPSK	H	213	36	1/16	24.35
		27922.08	Mid	H	QPSK	H	217	41	1/16	23.84
		28319.52	High	H	QPSK	H	210	42	1/16	22.84
		27534.84	Low	H	16QAM	H	213	36	1/16	22.72
		27534.84	Low	H	64QAM	H	213	36	1/16	20.54
		27534.84	Low	H	BPSK	H	213	36	1/16	24.28
	MIMO	27534.84	Low	MIMO	QPSK	H	149	72	1/16	23.55
		27534.84	Low	MIMO	16QAM	H	149	72	1/16	21.63
		27534.84	Low	MIMO	64QAM	H	149	72	1/16	20.77

Table 7-12. Ant2 EIRP Data (Band n261 - 50MHz-1CC)

CCs active	Mode	Frequency [MHz]	Channel	Beam Pol	Modulation	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
2	SISO	27922.08	Mid	H	QPSK	H	37	318	32/0	22.25
		27922.08	Mid	H	16QAM	H	37	318	32/0	20.48
		27922.08	Mid	H	64QAM	H	37	318	32/0	18.67
		27922.08	Mid	H	BPSK	H	37	318	32/0	21.82
	MIMO	28319.52	Mid	MIMO	QPSK	V	169	99	32/0	21.10
		28319.52	Mid	MIMO	16QAM	V	169	99	32/0	18.01
		28319.52	Mid	MIMO	64QAM	V	169	99	32/0	19.91

Table 7-13. Ant2 EIRP Data (Band n261 - 50MHz-2CC)

CCs active	Mode	Frequency [MHz]	Channel	Beam Pol	Modulation	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
1	SISO	27534.84	Low	H	QPSK	H	225	46	1/16	24.60
		27922.08	Mid	H	QPSK	H	214	44	1/16	24.04
		28319.52	High	H	QPSK	H	231	53	1/16	24.41
		27534.84	Low	H	16QAM	H	225	46	1/16	22.82
		27534.84	Low	H	64QAM	H	225	46	1/16	20.91
		27534.84	Low	H	BPSK	H	225	46	1/16	23.56
	MIMO	27534.84	Low	MIMO	QPSK	V	150	78	1/16	23.86
		27534.84	Low	MIMO	16QAM	V	150	78	1/16	22.80
		27534.84	Low	MIMO	64QAM	V	150	78	1/16	20.67

Table 7-14. Ant2 EIRP Data (Band n261 - 100MHz-1CC)

FCC ID: A3LSMG981V	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
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Bandwidth (MHz)	CCs active	Mode	Frequency [MHz]	Channel	Beam Pol	Modulation	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
100	2	SISO	27922.08	Mid	H	QPSK	H	35	316	32/0	22.77
			27922.08	Mid	H	16QAM	H	35	316	32/0	20.46
			27922.08	Mid	H	64QAM	H	35	316	32/0	18.70
			27922.08	Mid	H	BPSK	H	35	316	32/0	22.59
		MIMO	28319.52	Mid	MIMO	QPSK	H	199	309	32/0	22.57
			28319.52	Mid	MIMO	16QAM	H	199	309	32/0	20.07
			28319.52	Mid	MIMO	64QAM	H	199	309	32/0	18.47

Table 7-15. Ant2 EIRP Data (Band n261 - 100MHz-2CC)

FCC ID: A3LSMG981V		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Band n260 Beam ID Configurations

Mode	Beam Polarization	Beam ID_01	Beam ID_02
SISO	H	155	-
		147	-
		155	-
	V	28	-
		19	-
		19	-
MIMO		18	147
		27	155
		28	154

Table 7-16. Ant1 Worst Case Beam ID

Mode	Beam Polarization	Beam ID_01	Beam ID_02
SISO	H	151	-
		141	-
		151	-
	V	24	-
		15	-
		14	-
MIMO		14	141
		14	141
		23	151

Table 7-17. Ant2 Worst Case Beam ID

FCC ID: A3LSMG981V		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Band n260

CCs active	Mode	Frequency [MHz]	Channel	Beam Pol	Modulation	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
1	SISO	37027.32	Low	V	QPSK	V	203	42	1/16	24.79
		38497.44	Mid	V	QPSK	V	202	39	1/16	22.46
		39966.24	High	V	QPSK	V	198	46	1/16	22.14
		37027.32	Low	V	16QAM	V	203	42	1/16	22.10
		37027.32	Low	V	64QAM	V	203	42	1/16	19.73
	37027.32	Low	V	BPSK	V	203	42	1/16	18.36	
	MIMO	37027.32	Low	MIMO	QPSK	H	101	332	1/16	24.58
		37027.32	Low	MIMO	16QAM	H	101	332	1/16	22.08
		37027.32	Low	MIMO	64QAM	H	101	332	1/16	20.29

Table 7-18. Ant1 EIRP Data (Band n260 - 50MHz-1CC)

CCs active	Mode	Frequency [MHz]	Channel	Beam Pol	Modulation	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
2	SISO	38497.44	Mid	V	QPSK	V	207	34	32/0	20.89
		38497.44	Mid	V	16QAM	V	207	34	32/0	19.02
		38497.44	Mid	V	64QAM	V	207	34	32/0	17.12
		38497.44	Mid	V	BPSK	V	207	34	32/0	19.60
	MIMO	39966.24	Mid	MIMO	QPSK	V	170	329	32/0	19.92
		39966.24	Mid	MIMO	QPSK	V	170	329	32/0	18.59
		39966.24	Mid	MIMO	QPSK	V	170	329	32/0	16.39

Table 7-19. Ant1 EIRP Data (Band n260 - 50MHz-2CC)

CCs active	Mode	Frequency [MHz]	Channel	Beam Pol	Modulation	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
1	SISO	37027.32	Low	H	QPSK	H	185	24	1/32	24.57
		38497.44	Mid	H	QPSK	H	191	34	1/32	23.18
		39966.24	High	H	QPSK	H	192	38	1/32	23.34
		37027.32	Low	H	16QAM	H	185	24	1/32	21.69
		37027.32	Low	H	64QAM	H	185	24	1/32	21.07
		37027.32	Low	H	BPSK	H	185	24	1/32	24.17
	MIMO	37027.32	Low	MIMO	QPSK	H	101	331	1/32	24.48
		37027.32	Low	MIMO	16QAM	H	101	331	1/32	22.20
		37027.32	Low	MIMO	64QAM	H	101	331	1/32	20.04

Table 7-20. Ant1 EIRP Data (Band n260 - 100MHz-1CC)

FCC ID: A3LSMG981V		MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
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CCs active	Mode	Frequency [MHz]	Channel	Beam Pol	Modulation	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
2	SISO	38497.44	Mid	V	QPSK	H	205	32	66/0	20.92
		38497.44	Mid	V	16QAM	H	205	32	66/0	19.06
		38497.44	Mid	V	64QAM	H	205	32	66/0	17.56
		38497.44	Mid	V	BPSK	H	205	32	66/0	19.80
	MIMO	39966.24	Mid	MIMO	QPSK	V	170	329	66/0	19.17
		39966.24	Mid	MIMO	16QAM	V	170	329	66/0	17.23
		39966.24	Mid	MIMO	64QAM	V	170	329	66/0	15.34

Table 7-21. Ant1 EIRP Data (Band n260 - 100MHz-2CC)

CCs active	Mode	Frequency [MHz]	Channel	Beam Pol	Modulation	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
1	SISO	37027.32	Low	H	QPSK	H	91	30	1/16	22.98
		38497.44	Mid	H	QPSK	H	91	25	1/16	22.24
		39966.24	High	H	QPSK	H	92	18	1/16	21.76
		37027.32	Low	H	16QAM	H	91	30	1/16	21.67
		37027.32	Low	H	64QAM	H	91	30	1/16	18.27
		37027.32	Low	H	BPSK	H	91	30	1/16	22.90
	MIMO	37027.32	Low	MIMO	QPSK	V	153	66	1/16	24.68
		37027.32	Low	MIMO	16QAM	V	153	66	1/16	23.99
		37027.32	Low	MIMO	64QAM	V	153	66	1/16	21.97

Table 7-22. Ant2 EIRP Data (Band n260 - 50MHz-1CC)

CCs active	Mode	Frequency [MHz]	Channel	Beam Pol	Modulation	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
2	SISO	38497.44	Mid	V	QPSK	H	74	29	32/0	20.74
		38497.44	Mid	V	16QAM	H	74	29	32/0	19.99
		38497.44	Mid	V	64QAM	H	74	29	32/0	18.99
		38497.44	Mid	V	BPSK	H	74	29	32/0	20.70
	MIMO	39966.24	Mid	MIMO	QPSK	H	94	30	32/0	20.74
		39966.24	Mid	MIMO	16QAM	H	92	24	32/0	19.99
		39966.24	Mid	MIMO	64QAM	H	92	24	32/0	18.99

Table 7-23. Ant2 EIRP Data (Band n260 - 50MHz-2CC)

CCs active	Mode	Frequency [MHz]	Channel	Beam Pol	Modulation	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
1	SISO	37027.32	Low	V	QPSK	H	71	31	1/32	23.43
		38497.44	Mid	V	QPSK	H	73	30	1/32	22.15
		39966.24	High	V	QPSK	H	75	17	1/32	21.46
		37027.32	Low	V	16QAM	H	71	31	1/32	21.90
		37027.32	Low	H	64QAM	H	90	28	1/32	18.47
		37027.32	Low	H	BPSK	H	90	28	1/32	22.89
	MIMO	37027.32	Low	MIMO	QPSK	V	154	67	1/0	24.30
		37027.32	Low	MIMO	16QAM	V	154	67	1/0	22.83
		37027.32	Low	MIMO	64QAM	V	154	67	1/0	21.58

Table 7-24. Ant2 EIRP Data (Band n260 - 100MHz-1CC)

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CCs active	Mode	Frequency [MHz]	Channel	Beam Pol	Modulation	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
2	SISO	38497.44	Mid	H	QPSK	H	92	19	66/0	18.94
		38497.44	Mid	H	16QAM	H	92	19	66/0	17.07
		38497.44	Mid	H	64QAM	H	92	19	66/0	15.75
		38497.44	Mid	H	BPSK	H	92	19	66/0	18.55
	MIMO	39966.24	Mid	MIMO	QPSK	H	66	146	66/0	19.05
		39966.24	Mid	MIMO	16QAM	H	66	146	66/0	17.30
		39966.24	Mid	MIMO	64QAM	H	66	146	66/0	16.13

Table 7-25. Ant2 EIRP Data (Band n260 - 100MHz-2CC)

FCC ID: A3LSMG981V		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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7.4 Radiated Spurious and Harmonic Emissions

§2.1051, §30.203

Test Overview

The spectrum is scanned from 30MHz to 100GHz for n261 and from 30MHz to 200GHz for n260. All out of band emissions are measured in a radiated test 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 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 5.7.4
KDB 842590 D01 v01r01 Section 4.4.2 and 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.
- 2) All radiated spurious emissions were measured as EIRP to compare with the §30.203 TRP limits.
- 3) 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.
- 4) The plots from 1-200GHz show corrected average EIRP levels. Plots below 1GHz are corrected field strength levels. The average EIRP reported below is calculated per section 5.2.7 of ANSI C63.26-2015 which states: $\text{EIRP (dBm)} = E \text{ (dB}\mu\text{V/m)} + 20\log(D) - 104.8$; where D is the measurement distance (in the far field region) in m. The field strength E is calculated $E \text{ (dB}\mu\text{V/m)} = \text{Spectrum Analyzer Level (dBm)} + \text{Antenna Factor (dB/m)} + \text{Cable Loss (dB)} + \text{Harmonic Mixer Conversion Loss (dB)} + 107$. All appropriate Antenna Factor and Cable Loss have been applied in the spectrum analyzer for each measurement. For measurements $> 40\text{GHz}$, Harmonic Mixer Conversion Loss was also applied to the spectrum analyzer.
- 5) 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: $R > 2D^2/\text{wavelength}$, 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.

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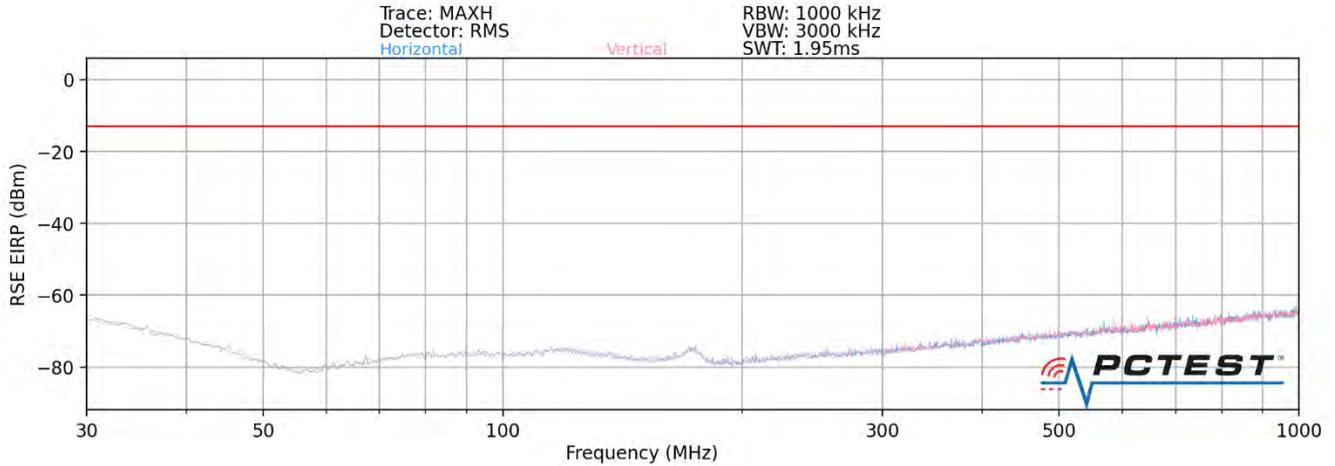
Frequency Range (GHz)	Wavelength(cm)	Far Field Distance (m)	Measurement Distance (m)
18-40	0.749	0.54	1.00
40-60	0.500	1.39	1.50
60-90	0.333	0.91	1.00
90-140	0.214	0.58	1.00
140-200	0.150	0.39	1.00

Table 7-26. Far-Field Distance & Measurement Distance per Frequency Range

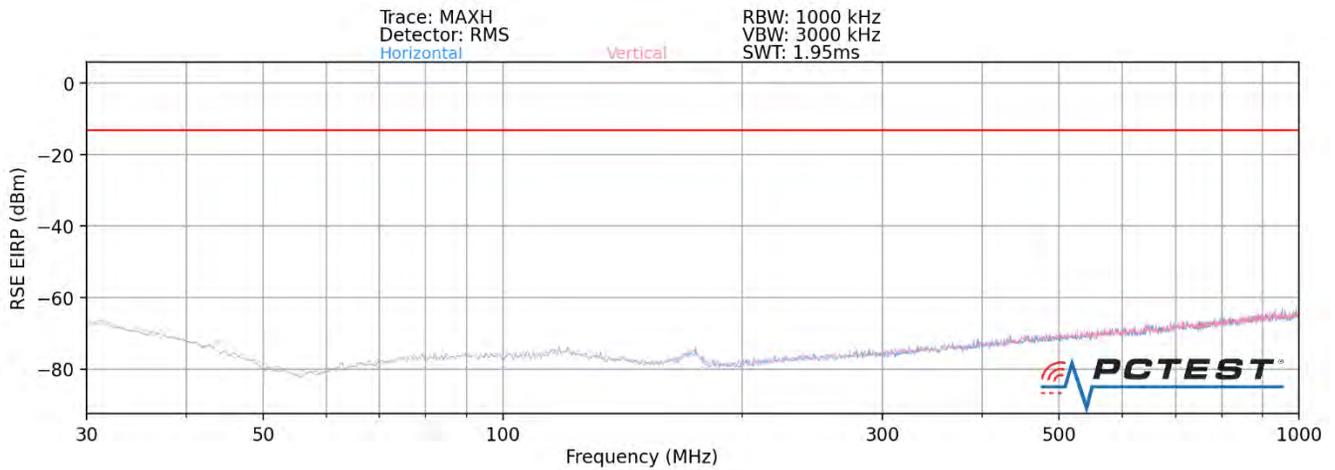
- 6) All emissions from 30MHz - 60GHz were measured using a spectrum analyzer with an internal preamplifier. Emissions >60GHz were measured using a harmonic mixer with the spectrum analyzer.
- 7) All RSE's were measured with 1CC. It was determined that adding more CC's causes the overall amplitude of just 1CC to decrease, therefore, 1CC is the worst case for the purposes of spurious emissions measurements.
- 8) The "-" shown in the following RSE tables are used to denote a noise floor measurement.
- 9) 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 B13, B5, B4, B66 and B2, and n260 uses LTE B12, B13, B5, B4, B66, B2 and B30.
- 10) 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.
- 11) For the n261 band spurious emission measurements, the spectrum directly below the fundamental frequency is investigated from 18 - 27.5GHz and the spectrum directly above the fundamental frequency is investigated from 28.475 - 40GHz. The portion of spectrum from 27.5 – 27.5GHz and 28.35 - 28.475GHz is shown Section 7.5 which covers band edge emissions.
- 12) For the n260 band spurious emission measurements, the spectrum directly below the fundamental frequency is investigated from 18 - 37.00GHz and the spectrum directly above the fundamental frequency is investigated from 40.15 - 60GHz. The portion of spectrum from 37.00 - 40GHz and 40 - 40.15GHz is shown Section 7.5 which covers band edge emissions.

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**Band n261 – Ant1
30MHz - 1GHz**



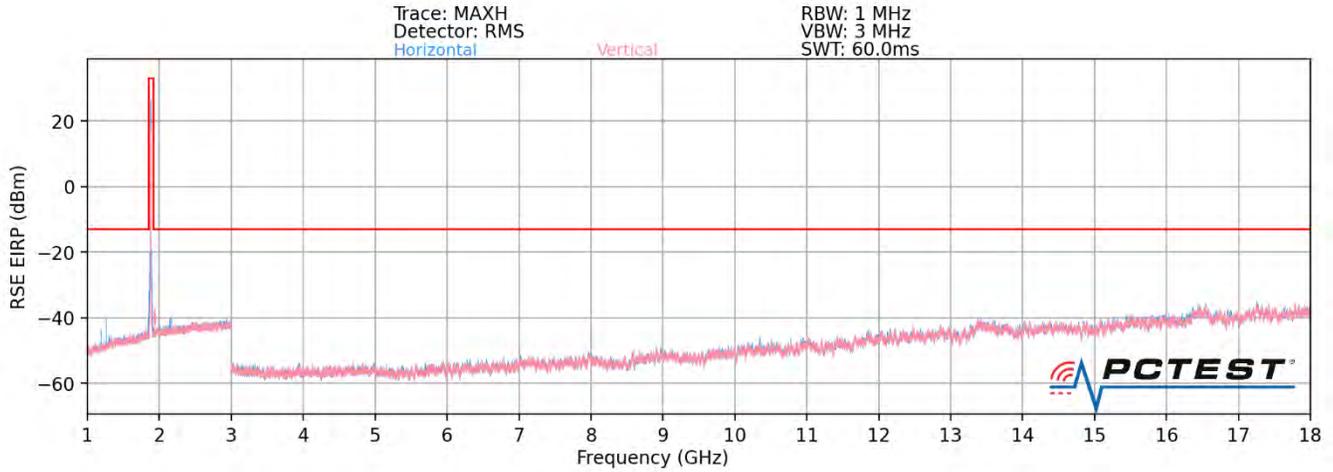
Plot 7-65. Ant1-n261 Radiated Spurious Plot (1CC QPSK Mid Channel H Beam)



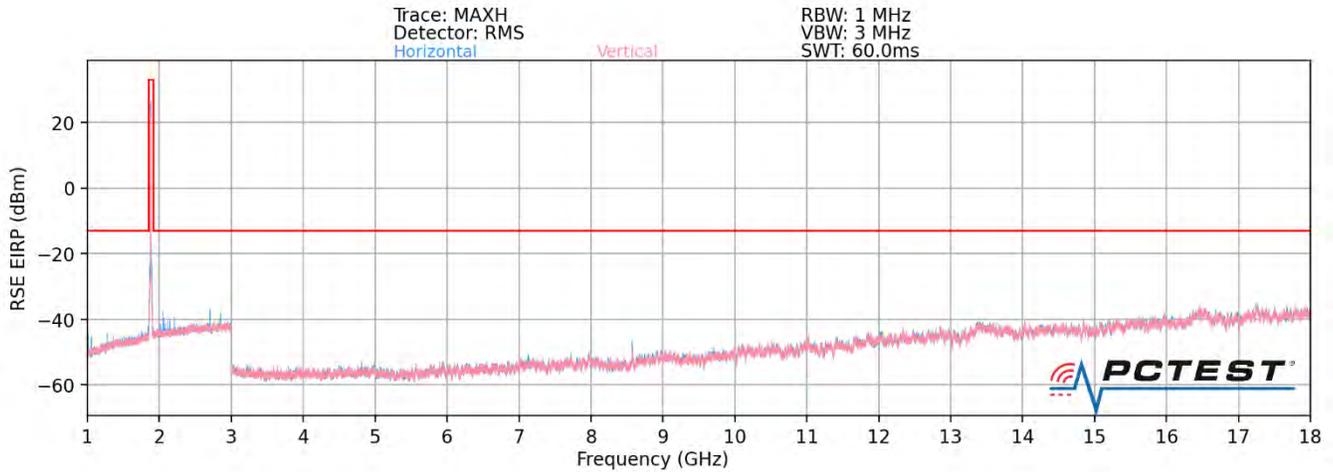
Plot 7-66. Ant1-n261 Radiated Spurious Plot (1CC QPSK Mid Channel V Beam)

FCC ID: A3LSMG981V		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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1GHz - 18GHz



Plot 7-67. Ant1-n261 Radiated Spurious Plot 1GHz - 18GHz (1CC QPSK Mid Channel H Beam – ENDC Anchor Band 2)



Plot 7-68. Ant1-n261 Radiated Spurious Plot 1GHz - 18GHz (1CC QPSK Mid Channel V Beam – ENDC Anchor Band 2)

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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.

$$\text{RSE EIRP (dBm)} = \text{Analyzer Level (dBm)} + 107 + \text{AFCL (dB/m)} + 20\text{Log(Dm)} - 104.8$$

Frequency [MHz]	Channel	Bandwidth (MHz)	EUT Beam Pol.	Modulation	Antenna Polarization [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
8821.85	Low	50	H	QPSK	V	121	84	-41.32	-13.00	-28.32
8821.85	Low	50	V	QPSK	V	155	331	-40.78	-13.00	-27.78
8569.22	Mid	50	H	QPSK	V	112	74	-43.68	-13.00	-30.68
8569.22	Mid	50	V	QPSK	V	161	336	-41.57	-13.00	-28.57
8966.78	High	50	H	QPSK	V	102	62	-41.26	-13.00	-28.26
8966.78	High	50	V	QPSK	V	147	322	-40.60	-13.00	-27.60

Table 7-27. Ant1 - SISO -Spurious Emissions Table (1GHz - 18GHz)

Channel	Bandwidth (MHz)	Modulation	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
Low	50	QPSK	-38.03	-13.00	-25.03
Mid	50	QPSK	-38.40	-13.00	-25.40
High	50	QPSK	-37.91	-13.00	-24.91

Table 7-28. Ant1 - MIMO -Spurious Emissions Table (1GHz - 18GHz)

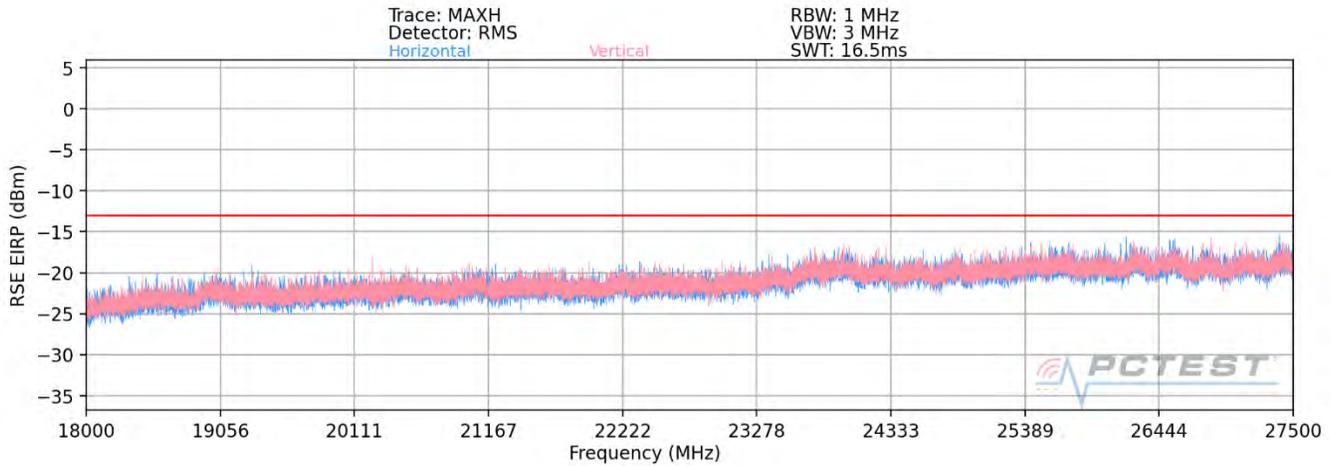
Notes

1. 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.
2. To address compliance of MIMO RSE per KDB 662911 D01, the MIMO RSE EIRP is calculated by summing the worst case H Beam EIRP and V Beam EIRP in linear powers units then converted back to dBm:

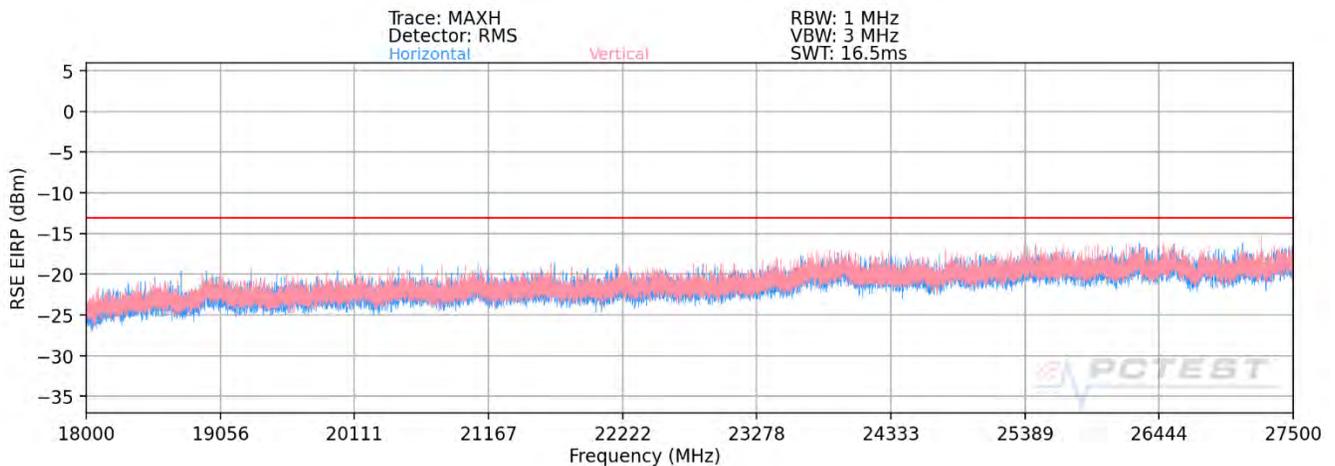
$$\text{EIRP(H Beam)} + \text{EIRP(V Beam)} = \text{EIRP(MIMO)}$$

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18GHz - 27.5GHz



Plot 7-69. Ant1-n261 Radiated Spurious Plot (1CC QPSK Mid Channel H Beam – ENDC Anchor B2)



Plot 7-70. Ant1-n261 Radiated Spurious Plot (1CC QPSK Mid Channel V Beam – ENDC Anchor B2)

FCC ID: A3LSMG981V		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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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.

$$\text{RSE EIRP (dBm)} = \text{Analyzer Level (dBm)} + 107 + \text{AFCL (dB/m)} + 20\text{Log(Dm)} - 104.8$$

Frequency [MHz]	Channel	Bandwidth (MHz)	EUT Beam Pol.	Modulation	Antenna Polarization [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
27251.30	Low	50	H	QPSK	V	39	351	-21.48	-13.00	-8.48
27283.40	Low	50	V	QPSK	H	323	286	-25.88	-13.00	-12.88
27385.02	Mid	50	H	QPSK	V	328	331	-35.44	-13.00	-22.44
27385.02	Mid	50	V	QPSK	H	352	317	-24.84	-13.00	-11.84
27398.61	High	50	H	QPSK	V	282	286	-23.95	-13.00	-10.95
26199.75	High	50	V	QPSK	H	-	-	-32.31	-13.00	-19.31

Table 7-29. Ant1 - SISO -Spurious Emissions Table (18GHz - 27.5GHz)

Channel	Bandwidth (MHz)	Modulation	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
Low	50	QPSK	-20.13	-13.00	-7.13
Mid	50	QPSK	-21.36	-13.00	-8.36
High	50	QPSK	-23.36	-13.00	-10.36

Table 7-30. Ant1 - MIMO -Spurious Emissions Table (18GHz - 27.5GHz)

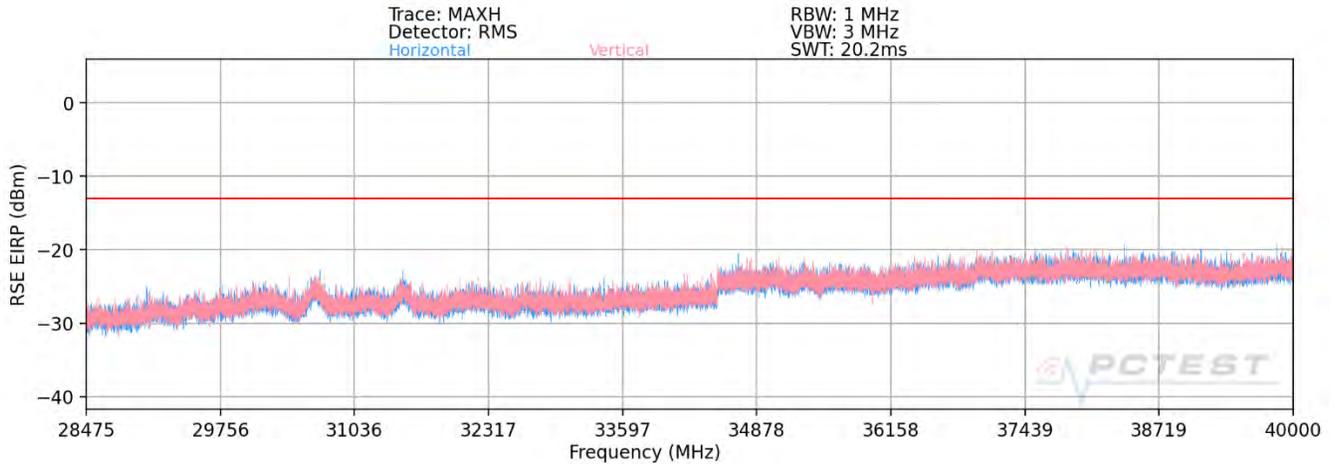
Notes

1. 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.
2. To address compliance of MIMO RSE per KDB 662911 D01, the MIMO RSE EIRP is calculated by summing the worst case H Beam EIRP and V Beam EIRP in linear powers units then converted back to dBm:

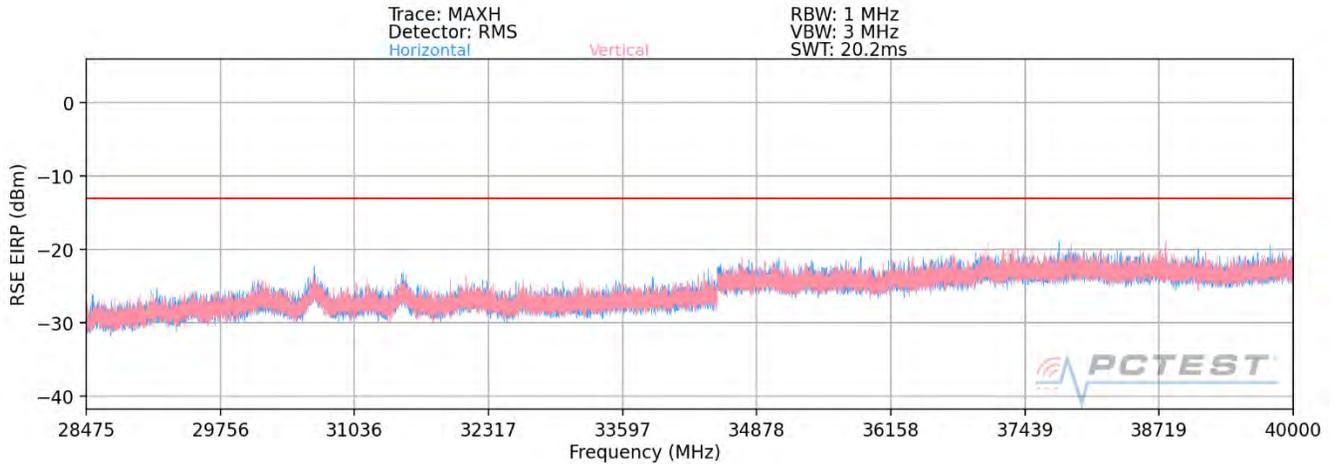
$$\text{EIRP(H Beam)} + \text{EIRP(V Beam)} = \text{EIRP(MIMO)}$$

FCC ID: A3LSMG981V		MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
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28.35GHz - 40GHz



Plot 7-71. Ant1-n261 Radiated Spurious Plot (1CC QPSK Mid Channel H Beam – ENDC Anchor B2)



Plot 7-72. Ant1-n261 Radiated Spurious Plot (1CC QPSK Mid Channel V Beam – ENDC Anchor B2)

FCC ID: A3LSMG981V		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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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.

$$\text{RSE EIRP (dBm)} = \text{Analyzer Level (dBm)} + 107 + \text{AFCL (dB/m)} + 20\text{Log(Dm)} - 104.8$$

Frequency [MHz]	Channel	Bandwidth (MHz)	EUT Beam Pol.	Modulation	Antenna Polarization [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
28582.31	Low	50	H	QPSK	V	36	22	-20.99	-13.00	-7.99
28582.20	Low	50	V	QPSK	H	345	216	-22.99	-13.00	-9.99
30136.70	Mid	50	H	QPSK	V	30	21	-21.40	-13.00	-8.40
30137.82	Mid	50	V	QPSK	H	336	291	-22.59	-13.00	-9.59
29769.89	High	50	H	QPSK	V	31	19	-20.36	-13.00	-7.36
29740.66	High	50	V	QPSK	H	-	-	-26.91	-13.00	-13.91

Table 7-31. Ant1 - SISO -Spurious Emissions Table (28.35GHz - 40GHz)

Channel	Bandwidth (MHz)	Modulation	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
Low	50	QPSK	-18.86	-13.00	-5.86
Mid	50	QPSK	-18.33	-13.00	-5.33
High	50	QPSK	-19.49	-13.00	-6.49

Table 7-32. Ant1 - MIMO -Spurious Emissions Table (28.35GHz - 40GHz)

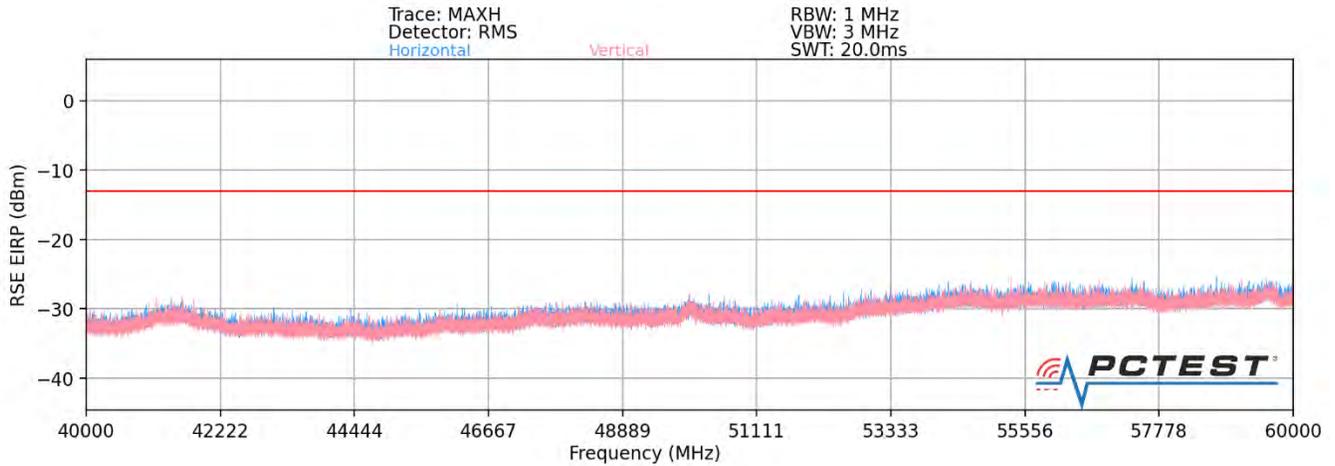
Notes

1. 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.
2. To address compliance of MIMO RSE per KDB 662911 D01, the MIMO RSE EIRP is calculated by summing the worst case H Beam EIRP and V Beam EIRP in linear powers units then converted back to dBm:

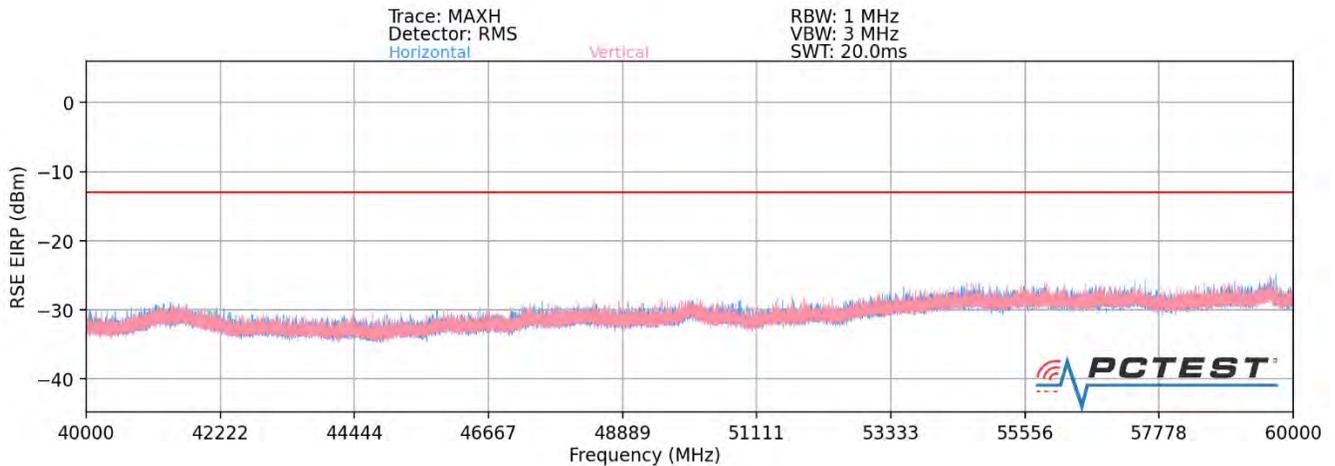
$$\text{EIRP(H Beam)} + \text{EIRP(V Beam)} = \text{EIRP(MIMO)}$$

FCC ID: A3LSMG981V		MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
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40GHz - 60GHz



Plot 7-73. Ant1-n261 Radiated Spurious Plot (1CC QPSK Mid Channel H Beam – ENDC Anchor B2)



Plot 7-74. Ant1-n261 Radiated Spurious Plot (1CC QPSK Mid Channel V Beam – ENDC Anchor B2)

FCC ID: A3LSMG981V	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
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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 1.5 meter.

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

Frequency [MHz]	Channel	Bandwidth (MHz)	EUT Beam Pol.	Modulation	Antenna Polarization [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
55071.24	Low	50	H	QPSK	V	294	313	-44.51	-13.00	-31.51
55070.97	Low	50	V	QPSK	V	325	333	-42.17	-13.00	-29.17
55845.27	Mid	50	H	QPSK	V	297	313	-41.54	-13.00	-28.54
55845.33	Mid	50	V	QPSK	V	24	3	-41.87	-13.00	-28.87
56640.12	High	50	H	QPSK	V	296	311	-41.17	-13.00	-28.17
56640.36	High	50	V	QPSK	V	316	331	-43.20	-13.00	-30.20

Table 7-33. Ant1 - SISO -Spurious Emissions Table (40GHz - 60GHz)

Channel	Bandwidth (MHz)	Modulation	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
Low	50	QPSK	-40.17	-13.00	-27.17
Mid	50	QPSK	-38.49	-13.00	-25.49
High	50	QPSK	-39.05	-13.00	-26.05

Table 7-34. Ant1 - MIMO -Spurious Emissions Table (40GHz - 60GHz)

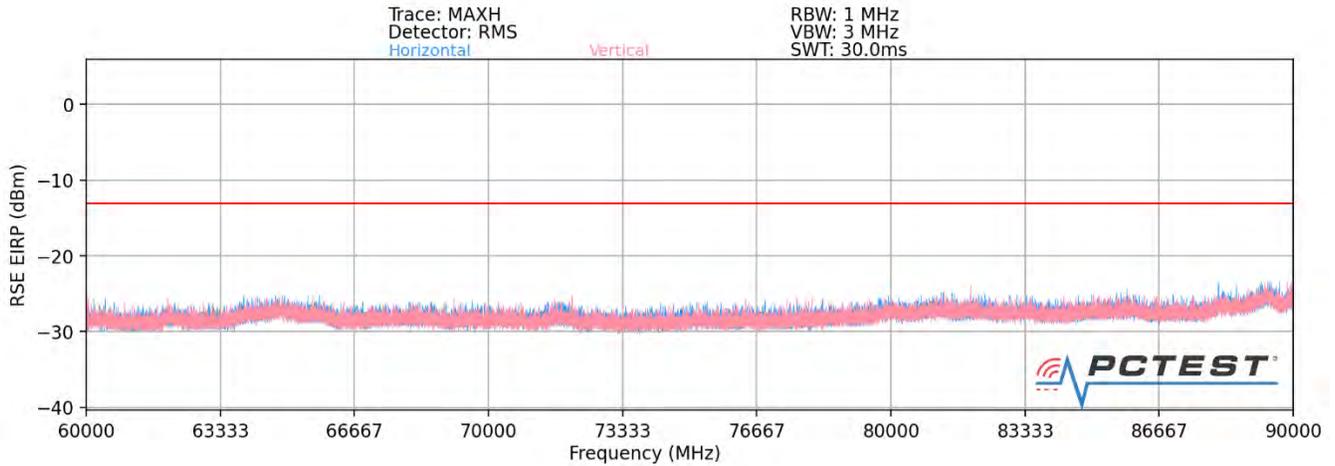
Notes

1. 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.
2. To address compliance of MIMO RSE per KDB 662911 D01, the MIMO RSE EIRP is calculated by summing the worst case H Beam EIRP and V Beam EIRP in linear powers units then converted back to dBm:

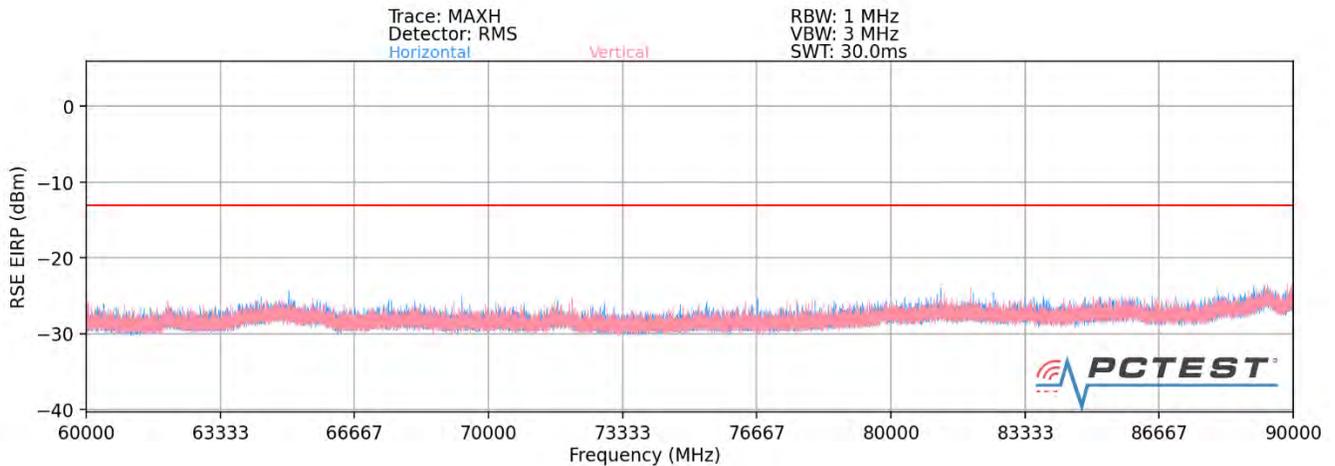
$$\text{EIRP(H Beam)} + \text{EIRP(V Beam)} = \text{EIRP(MIMO)}$$

FCC ID: A3LSMG981V		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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60GHz - 90GHz



Plot 7-75. Ant1-n261 Radiated Spurious Plot (1CC QPSK Mid Channel H Beam – ENDC Anchor B2)



Plot 7-76. Ant1-n261 Radiated Spurious Plot (1CC QPSK Mid Channel V Beam – ENDC Anchor B2)

FCC ID: A3LSMG981V	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
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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]	Channel	Bandwidth (MHz)	EUT Beam Pol.	Modulation	Antenna Polarization [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
82602.15	Low	50	H	QPSK	H	-	-	-43.08	-13.00	-30.08
82604.45	Low	50	V	QPSK	V	-	-	-43.24	-13.00	-30.24
83767.48	Mid	50	H	QPSK	H	-	-	-43.63	-13.00	-30.63
83767.44	Mid	50	V	QPSK	V	-	-	-43.54	-13.00	-30.54
84961.57	High	50	H	QPSK	H	-	-	-43.32	-13.00	-30.32
84962.75	High	50	V	QPSK	V	-	-	-43.79	-13.00	-30.79

Table 7-35. Ant1 - SISO -Spurious Emissions Table (60GHz - 90GHz)

Channel	Bandwidth (MHz)	Modulation	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
Low	50	QPSK	-40.14	-13.00	-27.14
Mid	50	QPSK	-40.42	-13.00	-27.42
High	50	QPSK	-40.54	-13.00	-27.54

Table 7-36. Ant1 - MIMO -Spurious Emissions Table (60GHz - 90GHz)

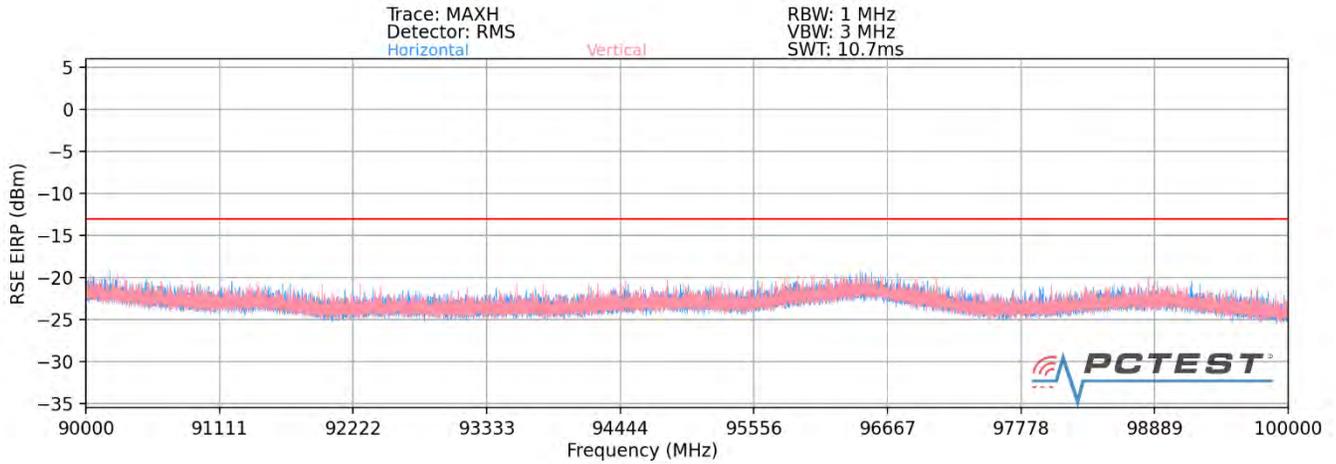
Notes

1. 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.
2. To address compliance of MIMO RSE per KDB 662911 D01, the MIMO RSE EIRP is calculated by summing the worst case H Beam EIRP and V Beam EIRP in linear powers units then converted back to dBm:

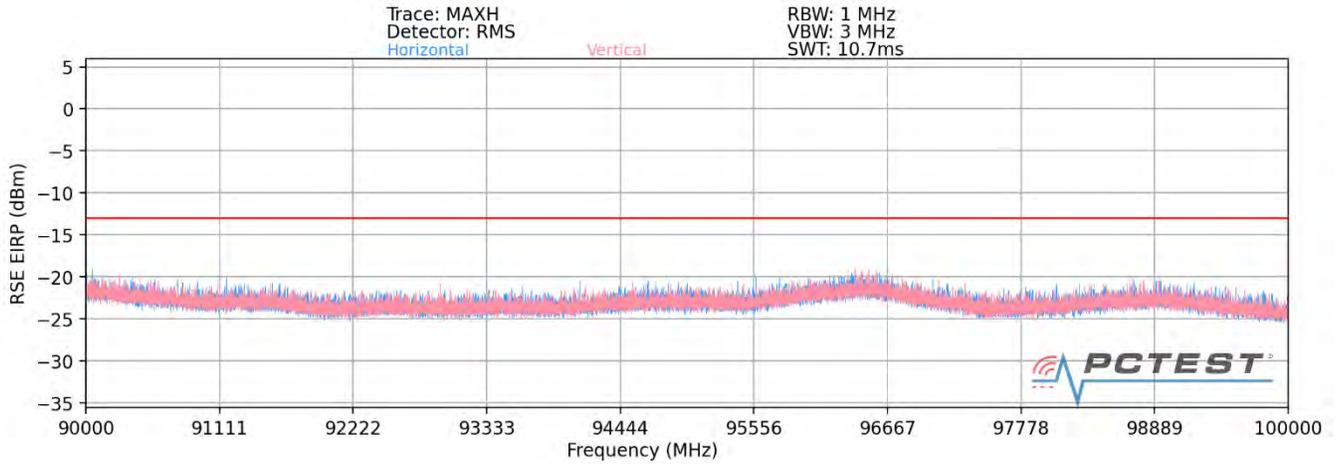
$$\text{EIRP(H Beam)} + \text{EIRP(V Beam)} = \text{EIRP(MIMO)}$$

FCC ID: A3LSMG981V		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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90GHz - 100GHz



Plot 7-77. Ant1-n261 Radiated Spurious Plot (1CC QPSK Mid Channel H Beam – ENDC Anchor B2)



Plot 7-78. Ant1-n261 Radiated Spurious Plot (1CC QPSK Mid Channel V Beam – ENDC Anchor B2)

FCC ID: A3LSMG981V		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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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]	Channel	Bandwidth (MHz)	EUT Beam Pol.	Modulation	Antenna Polarization [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
96552.11	Low	50	H	QPSK	V	-	-	-51.60	-13.00	-38.60
96455.29	Low	50	V	QPSK	V	-	-	-51.29	-13.00	-38.29
96471.22	Mid	50	H	QPSK	V	-	-	-51.28	-13.00	-38.28
96485.00	Mid	50	V	QPSK	V	-	-	-51.33	-13.00	-38.33
96491.40	High	50	H	QPSK	V	-	-	-51.45	-13.00	-38.45
96493.25	High	50	V	QPSK	V	-	-	-51.19	-13.00	-38.19

Table 7-37. Ant1 - SISO -Spurious Emissions Table (90GHz - 100GHz)

Channel	Bandwidth (MHz)	Modulation	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
Low	50	QPSK	-48.43	-13.00	-35.43
Mid	50	QPSK	-48.38	-13.00	-35.38
High	50	QPSK	-48.31	-13.00	-35.31

Table 7-38. Ant1 - MIMO -Spurious Emissions Table (90GHz - 100GHz)

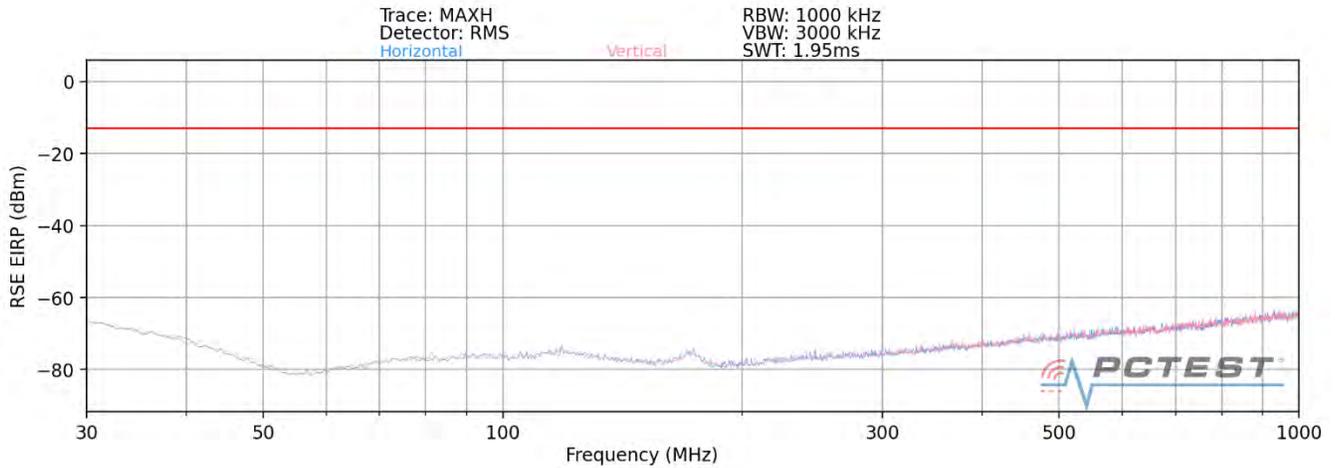
Notes

1. 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.
2. To address compliance of MIMO RSE per KDB 662911 D01, the MIMO RSE EIRP is calculated by summing the worst case H Beam EIRP and V Beam EIRP in linear powers units then converted back to dBm:

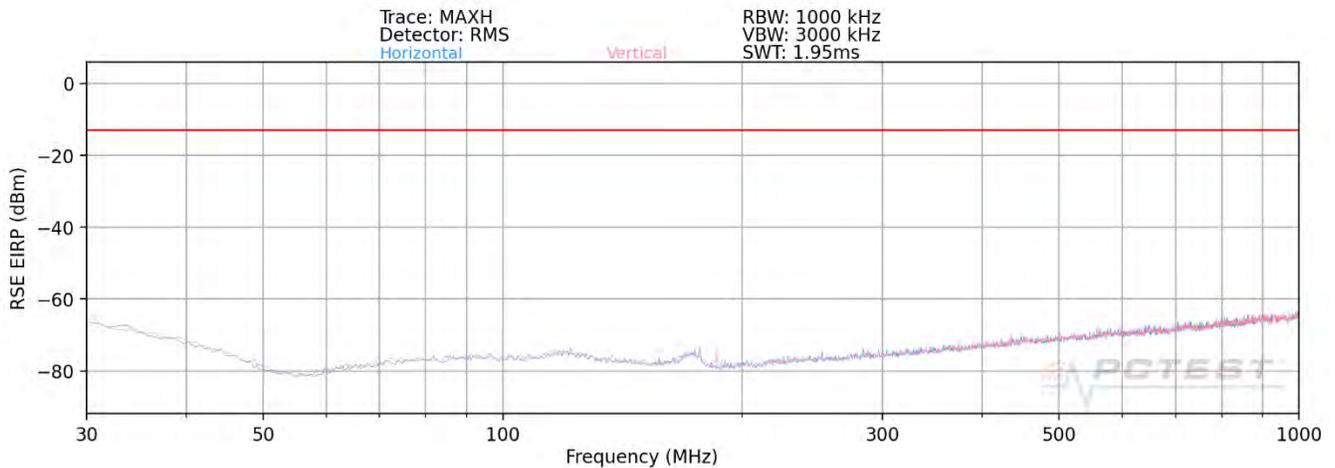
$$\text{EIRP(H Beam)} + \text{EIRP(V Beam)} = \text{EIRP(MIMO)}$$

FCC ID: A3LSMG981V		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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**Band n261 – Ant2
30MHz - 1GHz**



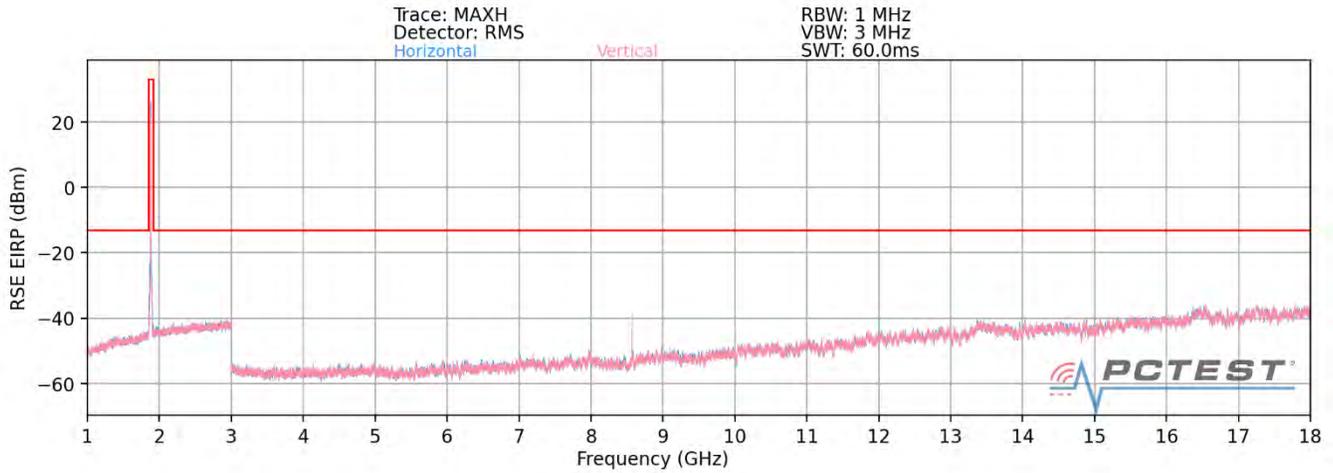
Plot 7-79. Ant2-n261 Radiated Spurious Plot (1CC QPSK Mid Channel H Beam)



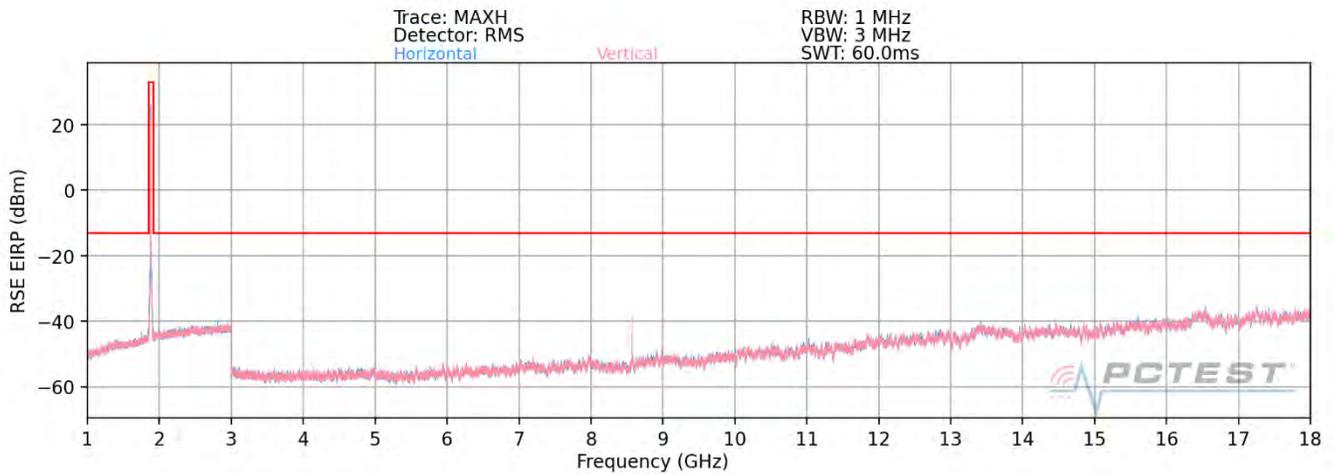
Plot 7-80. Ant2-n261 Radiated Spurious Plot (1CC QPSK Mid Channel V Beam)

FCC ID: A3LSMG981V		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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1GHz - 18GHz



Plot 7-81. Ant2-n261 Radiated Spurious Plot 1GHz - 18GHz (1CC QPSK Mid Channel H Beam – ENDC Anchor Band 2)



Plot 7-82. Ant2-n261 Radiated Spurious Plot 1GHz - 18GHz (1CC QPSK Mid Channel V Beam – ENDC Anchor Band 2)

FCC ID: A3LSMG981V		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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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.

$$\text{RSE EIRP (dBm)} = \text{Analyzer Level (dBm)} + 107 + \text{AFCL (dB/m)} + 20\text{Log(Dm)} - 104.8$$

Frequency [MHz]	Channel	Bandwidth (MHz)	EUT Beam Pol.	Modulation	Antenna Polarization [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
8821.94	Low	50	H	QPSK	V	105	10	-37.07	-13.00	-24.07
8821.94	Low	50	V	QPSK	V	347	7	-39.31	-13.00	-26.31
8569.05	Mid	50	H	QPSK	V	112	23	-36.69	-13.00	-23.69
8569.05	Mid	50	V	QPSK	V	350	6	-37.69	-13.00	-24.69
8966.61	High	50	H	QPSK	V	131	17	-36.78	-13.00	-23.78
8966.61	High	50	V	QPSK	V	349	9	-39.25	-13.00	-26.25

Table 7-39. Ant2 - SISO -Spurious Emissions Table (1GHz - 18GHz)

Channel	Bandwidth (MHz)	Modulation	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
Low	50	QPSK	-35.04	-13.00	-22.04
Mid	50	QPSK	-34.20	-13.00	-21.20
High	50	QPSK	-34.83	-13.00	-21.83

Table 7-40. Ant2 - MIMO -Spurious Emissions Table (1GHz - 18GHz)

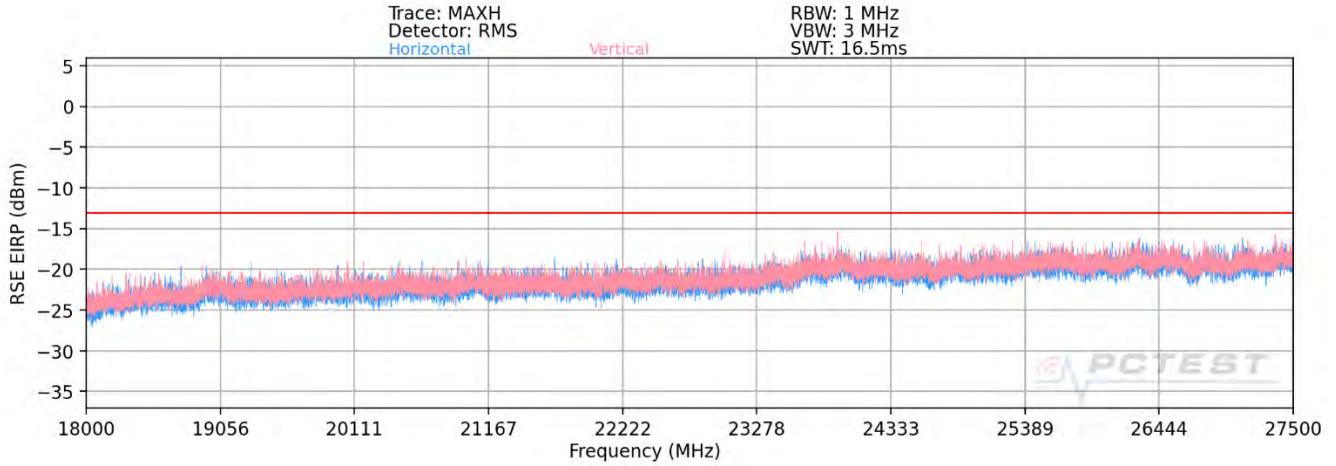
Notes

1. 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.
2. To address compliance of MIMO RSE per KDB 662911 D01, the MIMO RSE EIRP is calculated by summing the worst case H Beam EIRP and V Beam EIRP in linear powers units then converted back to dBm:

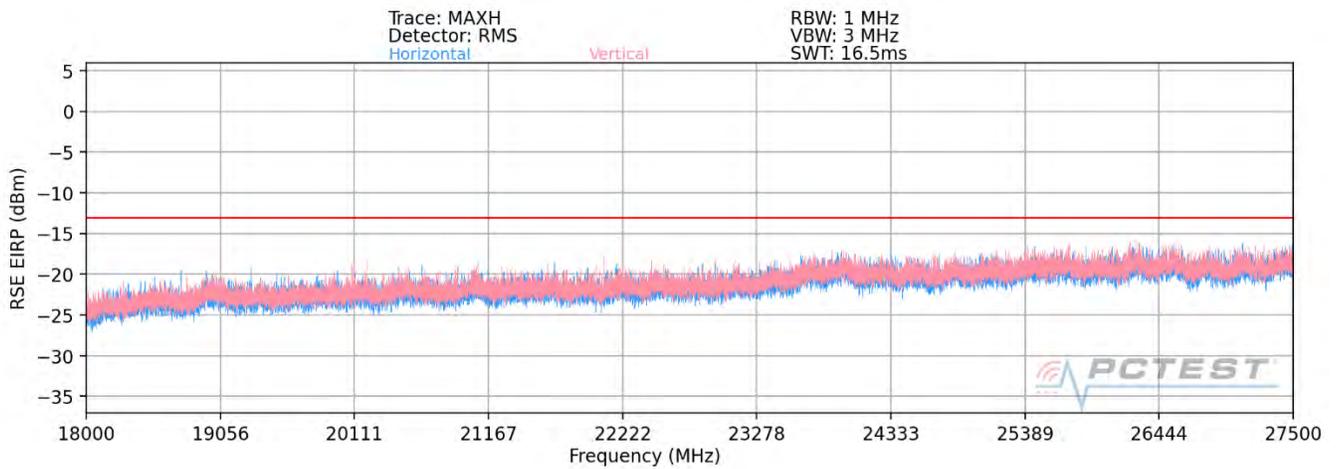
$$\text{EIRP(H Beam)} + \text{EIRP(V Beam)} = \text{EIRP(MIMO)}$$

FCC ID: A3LSMG981V		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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18GHz - 27.5GHz



Plot 7-83. Ant2-n261 Radiated Spurious Plot (1CC QPSK Mid Channel H Beam – ENDC Anchor B2)



Plot 7-84. Ant2-n261 Radiated Spurious Plot (1CC QPSK Mid Channel V Beam – ENDC Anchor B2)

FCC ID: A3LSMG981V	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
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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.

$$\text{RSE EIRP (dBm)} = \text{Analyzer Level (dBm)} + 107 + \text{AFCL (dB/m)} + 20\text{Log(Dm)} - 104.8$$

Frequency [MHz]	Channel	Bandwidth (MHz)	EUT Beam Pol.	Modulation	Antenna Polarization [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
27404.64	Low	50	H	QPSK	H	27	334	-21.34	-13.00	-8.34
27405.35	Low	50	V	QPSK	V	336	90	-23.61	-13.00	-10.61
27385.01	Mid	50	H	QPSK	H	26	337	-23.65	-13.00	-10.65
27389.35	Mid	50	V	QPSK	V	349	85	-23.87	-13.00	-10.87
27230.00	High	50	H	QPSK	H	-	-	-26.01	-13.00	-13.01
27230.00	High	50	V	QPSK	V	-	-	-25.49	-13.00	-12.49

Table 7-41. Ant2 - SISO -Spurious Emissions Table (18GHz - 27.5GHz)

Channel	Bandwidth (MHz)	Modulation	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
Low	50	QPSK	-19.32	-13.00	-6.32
Mid	50	QPSK	-21.80	-13.00	-8.80
High	50	QPSK	-22.73	-13.00	-9.73

Table 7-42. Ant2 - MIMO -Spurious Emissions Table (18GHz - 27.5GHz)

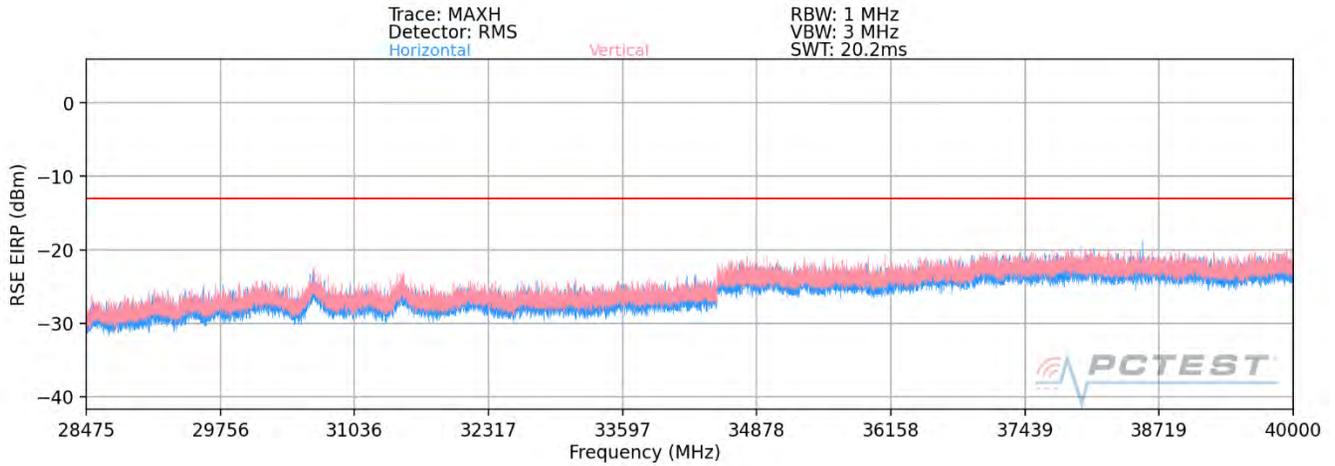
Notes

1. 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.
2. To address compliance of MIMO RSE per KDB 662911 D01, the MIMO RSE EIRP is calculated by summing the worst case H Beam EIRP and V Beam EIRP in linear powers units then converted back to dBm:

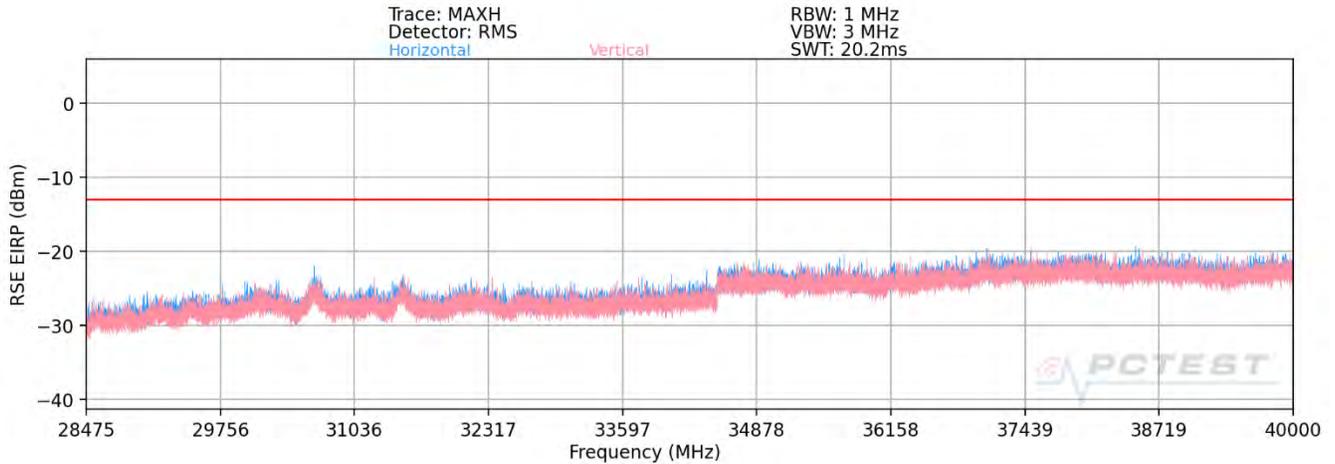
$$\text{EIRP(H Beam)} + \text{EIRP(V Beam)} = \text{EIRP(MIMO)}$$

FCC ID: A3LSMG981V		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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28.35GHz - 40GHz



Plot 7-85. Ant2-n261 Radiated Spurious Plot (1CC QPSK Mid Channel H Beam – ENDC Anchor B2)



Plot 7-86. Ant2-n261 Radiated Spurious Plot (1CC QPSK Mid Channel V Beam – ENDC Anchor B2)

FCC ID: A3LSMG981V		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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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.

$$\text{RSE EIRP (dBm)} = \text{Analyzer Level (dBm)} + 107 + \text{AFCL (dB/m)} + 20\text{Log(Dm)} - 104.8$$

Frequency [MHz]	Channel	Bandwidth (MHz)	EUT Beam Pol.	Modulation	Antenna Polarization [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
28582.20	Low	50	H	QPSK	H	25	317	-21.50	-13.00	-8.50
28582.14	Low	50	V	QPSK	V	20	328	-19.36	-13.00	-6.36
30138.28	Mid	50	H	QPSK	H	26	303	-20.47	-13.00	-7.47
30138.36	Mid	50	V	QPSK	V	19	331	-21.30	-13.00	-8.30
29769.40	High	50	H	QPSK	H	26	300	-20.70	-13.00	-7.70
29769.06	High	50	V	QPSK	V	19	325	-22.20	-13.00	-9.20

Table 7-43. Ant2 - SISO -Spurious Emissions Table (28.35GHz - 40GHz)

Channel	Bandwidth (MHz)	Modulation	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
Low	50	QPSK	-17.29	-13.00	-4.29
Mid	50	QPSK	-17.98	-13.00	-4.98
High	50	QPSK	-18.38	-13.00	-5.38

Table 7-44. Ant2 - MIMO -Spurious Emissions Table (28.35GHz - 40GHz)

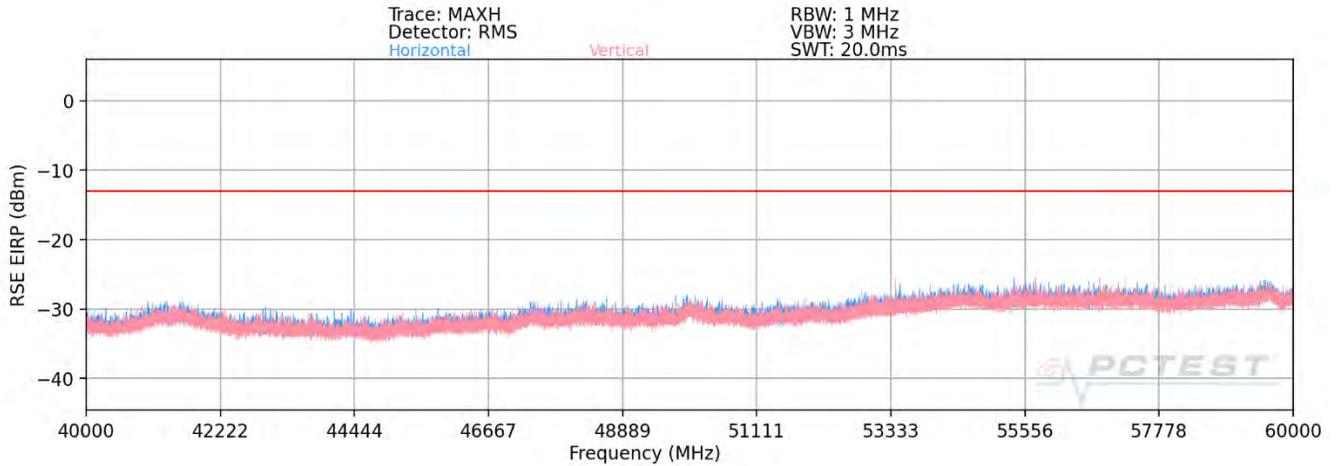
Notes

1. 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.
2. To address compliance of MIMO RSE per KDB 662911 D01, the MIMO RSE EIRP is calculated by summing the worst case H Beam EIRP and V Beam EIRP in linear powers units then converted back to dBm:

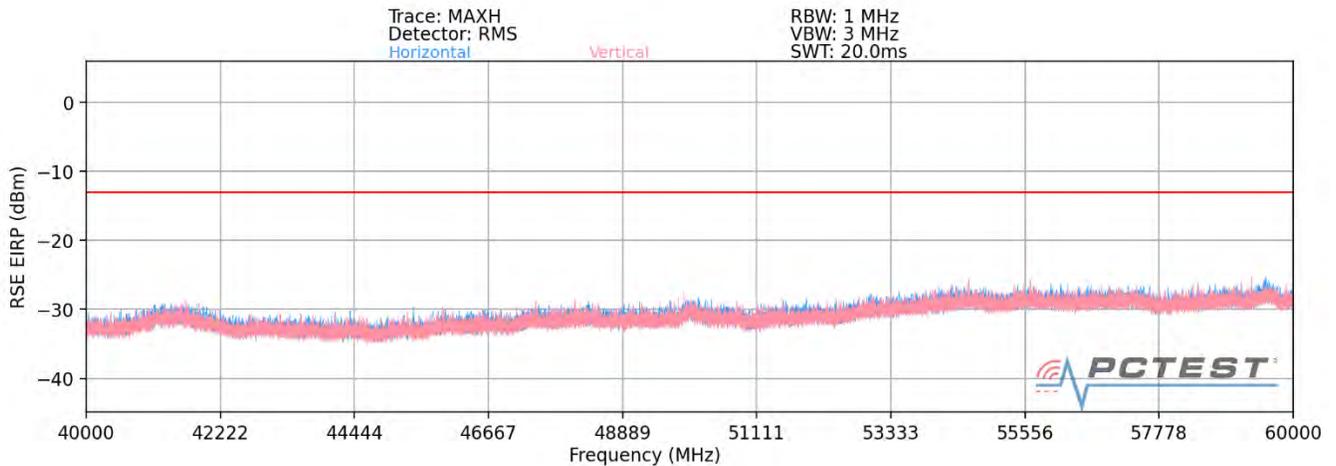
$$\text{EIRP(H Beam)} + \text{EIRP(V Beam)} = \text{EIRP(MIMO)}$$

FCC ID: A3LSMG981V		MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
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40GHz - 60GHz



Plot 7-87. Ant2-n261 Radiated Spurious Plot (1CC QPSK Mid Channel H Beam – ENDC Anchor B2)



Plot 7-88. Ant2-n261 Radiated Spurious Plot (1CC QPSK Mid Channel V Beam – ENDC Anchor B2)

FCC ID: A3LSMG981V		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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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 1.5 meter.

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

Frequency [MHz]	Channel	Bandwidth (MHz)	EUT Beam Pol.	Modulation	Antenna Polarization [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
55071.24	Low	50	H	QPSK	V	120	47	-44.53	-13.00	-31.53
55071.30	Low	50	V	QPSK	V	142	51	-40.93	-13.00	-27.93
55845.03	Mid	50	H	QPSK	V	117	49	-42.83	-13.00	-29.83
55845.39	Mid	50	V	QPSK	V	143	53	-41.39	-13.00	-28.39
56640.21	High	50	H	QPSK	V	115	45	-41.96	-13.00	-28.96
56640.69	High	50	V	QPSK	V	138	50	-42.80	-13.00	-29.80

Table 7-45. Ant2 - SISO -Spurious Emissions Table (40GHz - 60GHz)

Channel	Bandwidth (MHz)	Modulation	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
Low	50	QPSK	-39.36	-13.00	-26.36
Mid	50	QPSK	-38.66	-13.00	-25.66
High	50	QPSK	-39.35	-13.00	-26.35

Table 7-46. Ant2 - MIMO -Spurious Emissions Table (40GHz - 60GHz)

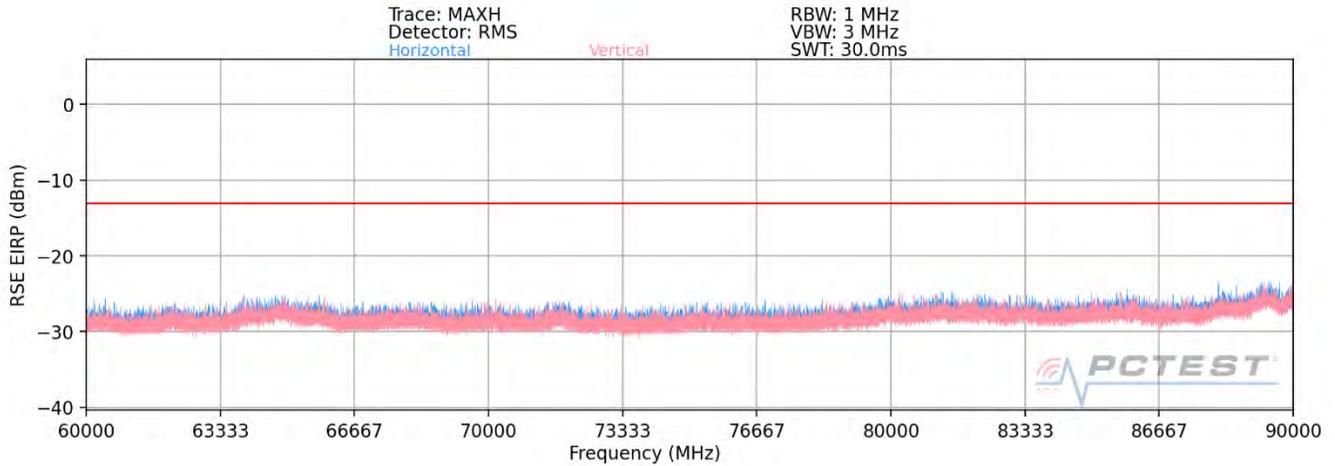
Notes

1. 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.
2. To address compliance of MIMO RSE per KDB 662911 D01, the MIMO RSE EIRP is calculated by summing the worst case H Beam EIRP and V Beam EIRP in linear powers units then converted back to dBm:

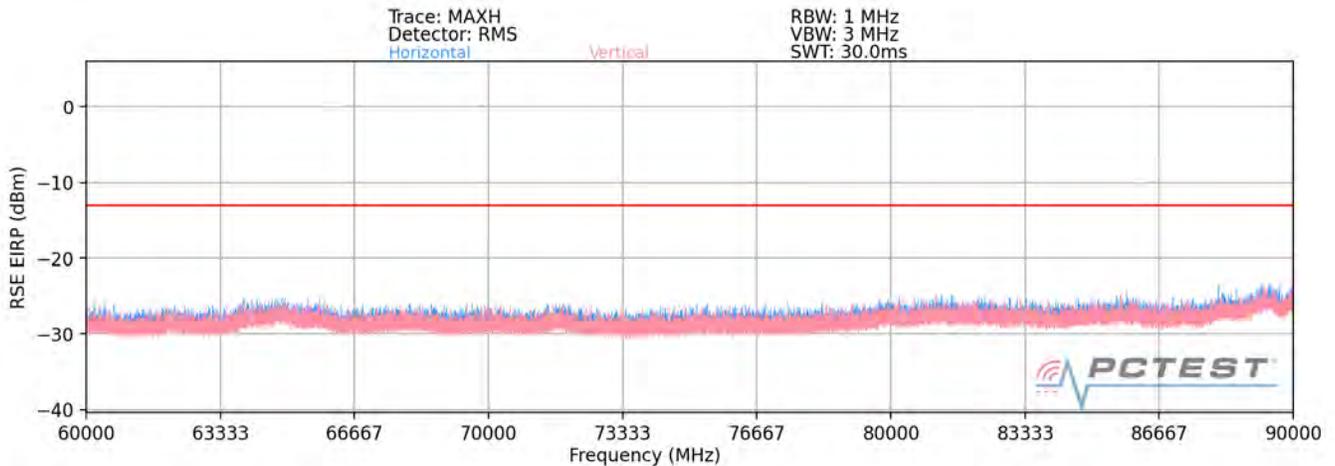
$$\text{EIRP(H Beam)} + \text{EIRP(V Beam)} = \text{EIRP(MIMO)}$$

FCC ID: A3LSMG981V		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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60GHz - 90GHz



Plot 7-89. Ant2-n261 Radiated Spurious Plot (1CC QPSK Mid Channel H Beam – ENDC Anchor B2)

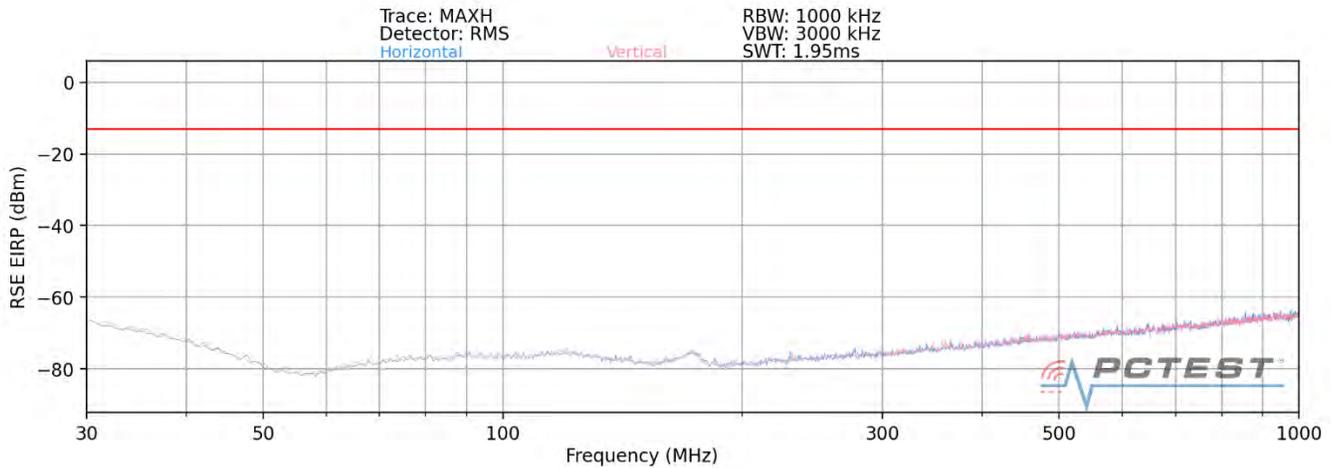


Plot 7-90. Ant2-n261 Radiated Spurious Plot (1CC QPSK Mid Channel V Beam – ENDC Anchor B2)

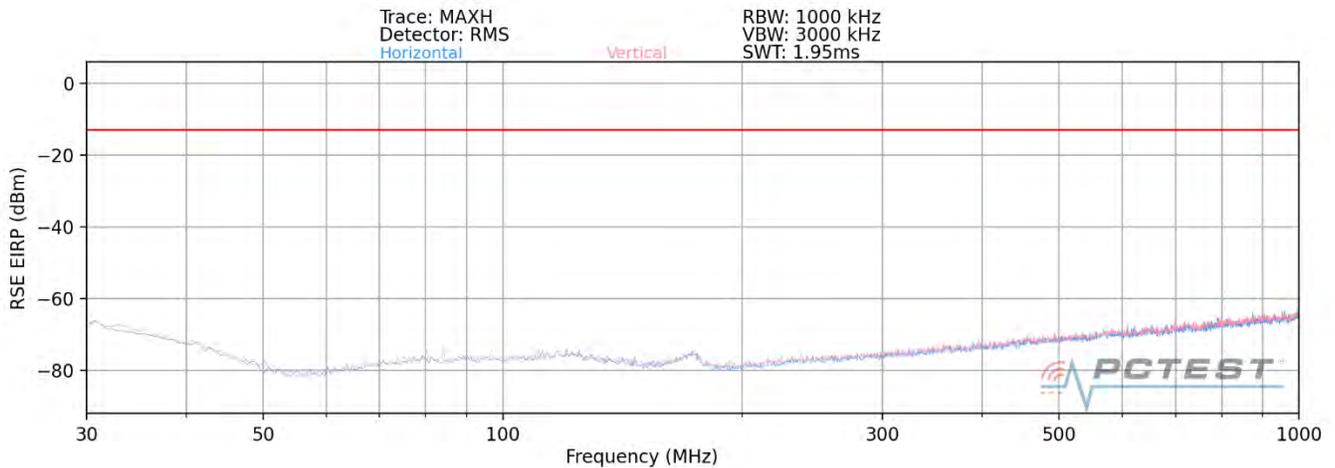
FCC ID: A3LSMG981V	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
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Band n260- Ant1

30MHz - 1GHz



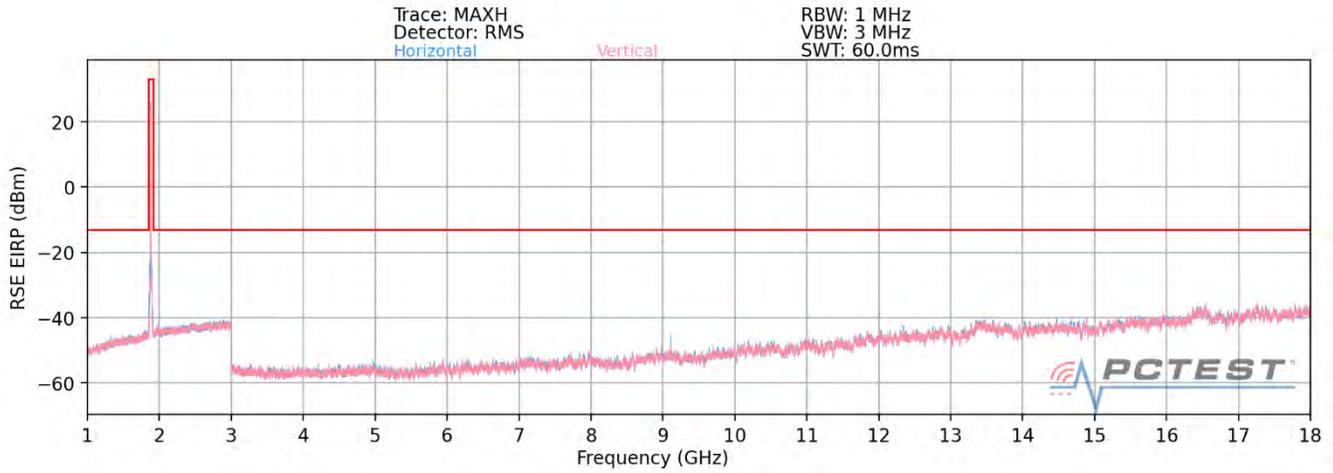
Plot 7-91. Ant1-n260 Radiated Spurious Plot (1CC QPSK Mid Channel H Beam)



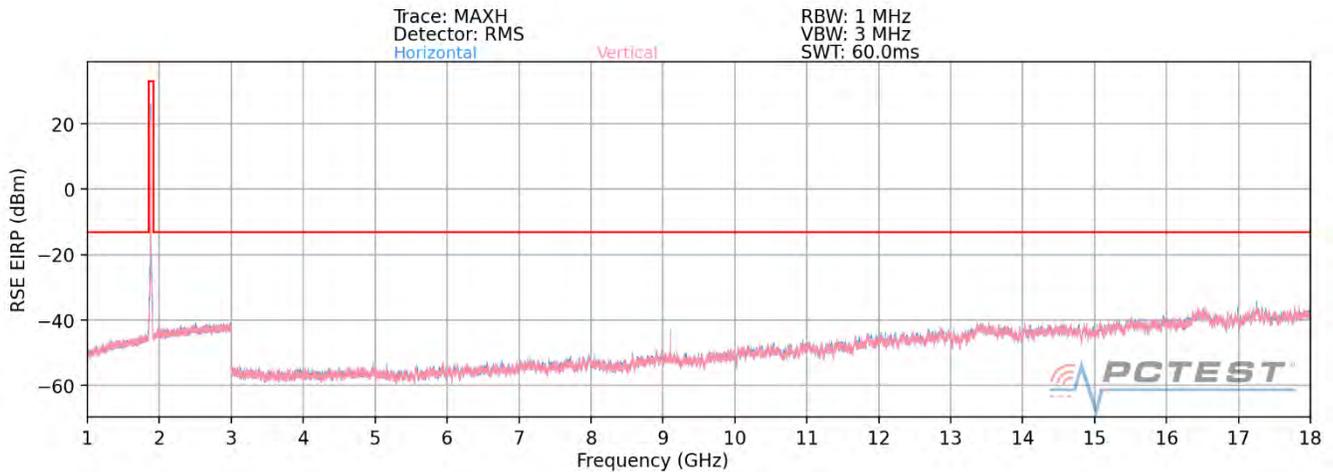
Plot 7-92. Ant1-n260 Radiated Spurious Plot (1CC QPSK Mid Channel V Beam)

FCC ID: A3LSMG981V		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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1GHz - 18GHz



Plot 7-93. Ant1-n260 Radiated Spurious Plot 1GHz - 18GHz (1CC QPSK Mid Channel H Beam – ENDC Anchor Band 2)



Plot 7-94. Ant1-n260 Radiated Spurious Plot 1GHz - 18GHz (1CC QPSK Mid Channel V Beam – ENDC Anchor Band 2)

FCC ID: A3LSMG981V		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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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.

$$\text{RSE EIRP (dBm)} = \text{Analyzer Level (dBm)} + 107 + \text{AFCL (dB/m)} + 20\text{Log(Dm)} - 104.8$$

Frequency [MHz]	Channel	Bandwidth (MHz)	EUT Beam Pol.	Modulation	Antenna Polarization [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
8406.71	Low	50	H	QPSK	H	174	62	-40.67	-13.00	-27.67
8406.71	Low	50	V	QPSK	V	158	15	-35.14	-13.00	-22.14
9109.01	Mid	50	H	QPSK	H	155	79	-39.16	-13.00	-26.16
9109.01	Mid	50	V	QPSK	V	153	25	-35.43	-13.00	-22.43
9144.84	High	50	H	QPSK	H	260	72	-39.58	-13.00	-26.58
9144.84	High	50	V	QPSK	V	160	19	-34.22	-13.00	-21.22

Table 7-47. Ant1 - SISO -Spurious Emissions Table (1GHz - 18GHz)

Channel	Bandwidth (MHz)	Modulation	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
Low	50	QPSK	-34.07	-13.00	-21.07
Mid	50	QPSK	-34.02	-13.00	-21.02
High	50	QPSK	-33.11	-13.00	-20.11

Table 7-48. Ant1 - MIMO -Spurious Emissions Table (1GHz - 18GHz)

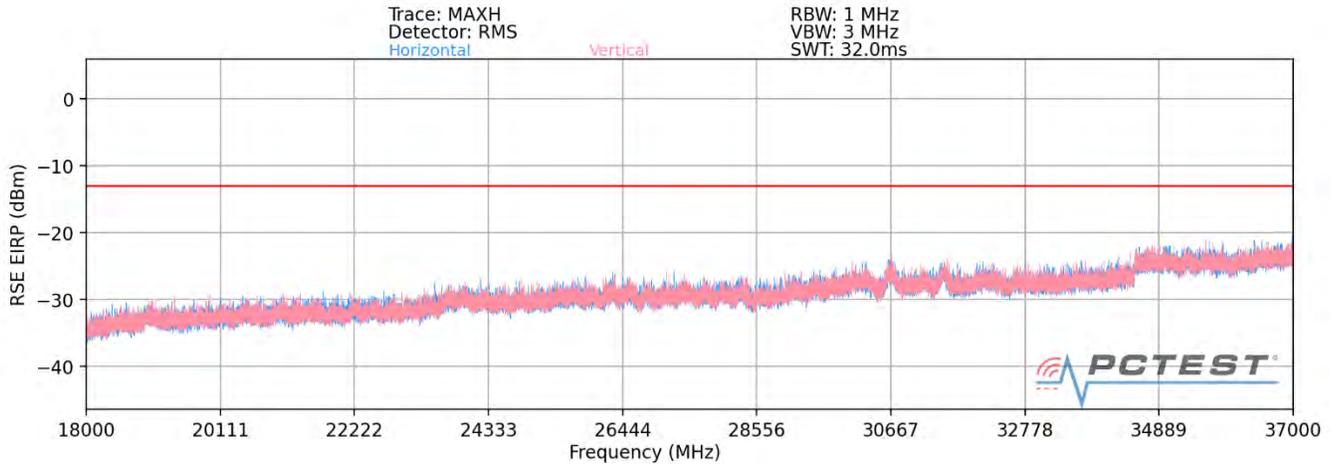
Notes

1. 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.
2. To address compliance of MIMO RSE per KDB 662911 D01, the MIMO RSE EIRP is calculated by summing the worst case H Beam EIRP and V Beam EIRP in linear powers units then converted back to dBm:

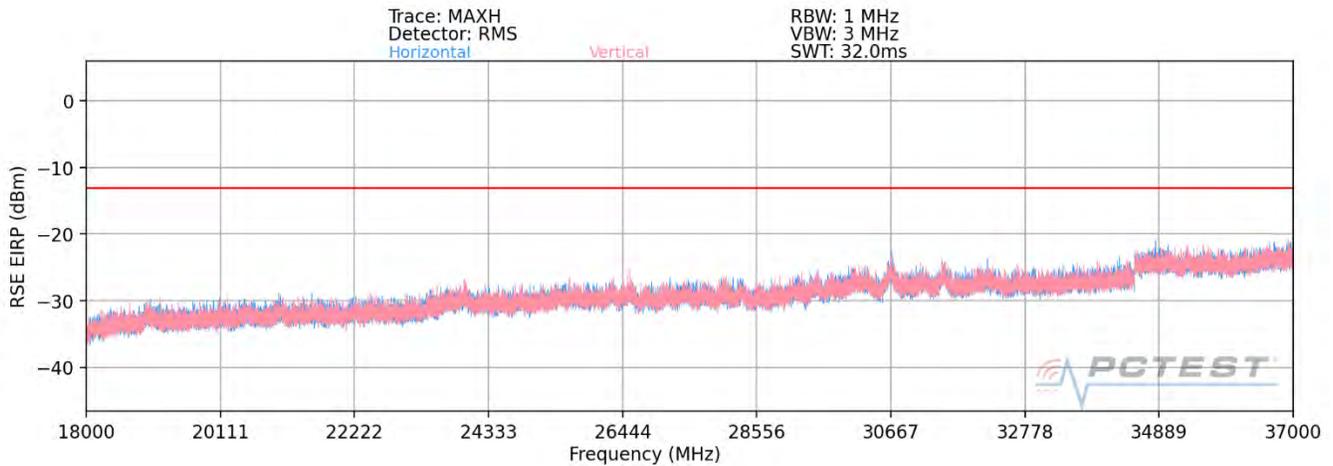
$$\text{EIRP(H Beam)} + \text{EIRP(V Beam)} = \text{EIRP(MIMO)}$$

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18GHz – 36.85GHz



Plot 7-95. Ant1-n260 Radiated Spurious Plot (1CC QPSK Mid Channel H Beam – ENDC)



Plot 7-96. Ant1-n260 Radiated Spurious Plot (1CC QPSK Mid Channel V Beam – ENDC)

FCC ID: A3LSMG981V	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
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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.

$$\text{RSE EIRP (dBm)} = \text{Analyzer Level (dBm)} + 107 + \text{AFCL (dB/m)} + 20\text{Log(Dm)} - 104.8$$

Frequency [MHz]	Channel	Bandwidth (MHz)	EUT Beam Pol.	Modulation	Antenna Polarization [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
37669.77	Low	50	H	QPSK	H	-	-	-25.01	-13.00	-12.01
37669.80	Low	50	V	QPSK	V	-	-	-24.33	-13.00	-11.33
36541.20	Mid	50	H	QPSK	H	-	-	-24.64	-13.00	-11.64
36540.16	Mid	50	V	QPSK	V	-	-	-25.01	-13.00	-12.01
36746.21	High	50	H	QPSK	H	-	-	-25.41	-13.00	-12.41
36746.60	High	50	V	QPSK	V	-	-	-25.11	-13.00	-12.11

Table 7-49. Ant1 - SISO -Spurious Emissions Table (18GHz – 36.85GHz)

Channel	Bandwidth (MHz)	Modulation	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
Low	50	QPSK	-21.65	-13.00	-8.65
Mid	50	QPSK	-22.20	-13.00	-9.20
High	50	QPSK	-22.25	-13.00	-9.25

Table 7-50. Ant1 - MIMO -Spurious Emissions Table (18GHz – 37.0GHz)

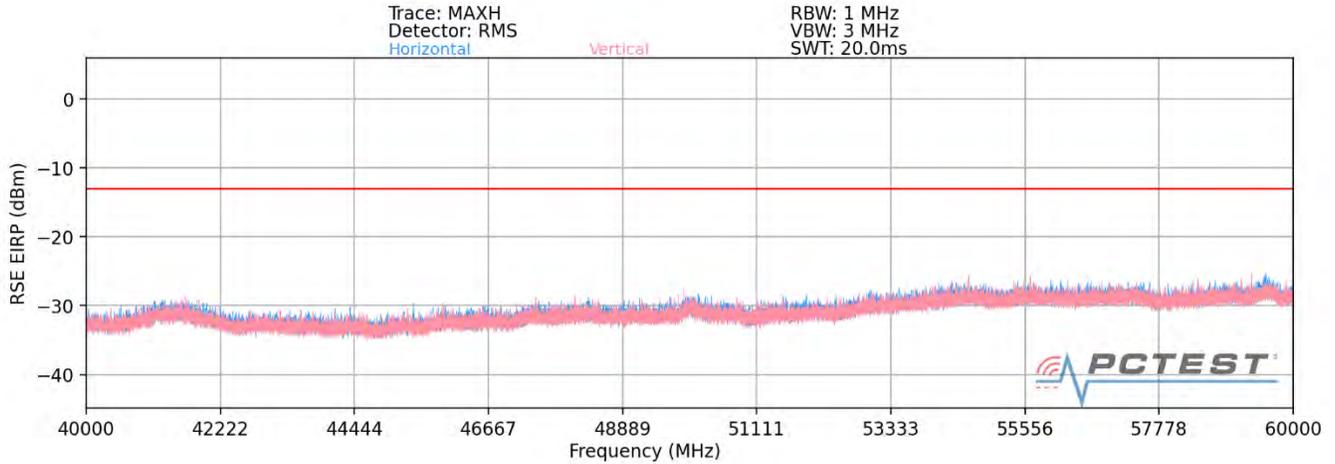
Notes

1. 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.
2. To address compliance of MIMO RSE per KDB 662911 D01, the MIMO RSE EIRP is calculated by summing the worst case H Beam EIRP and V Beam EIRP in linear powers units then converted back to dBm:

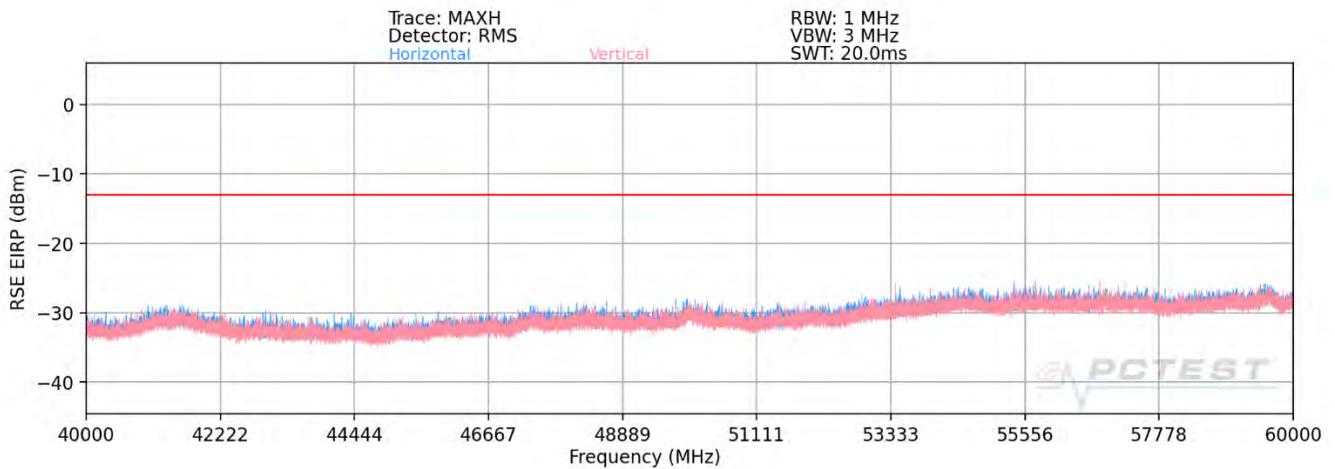
$$\text{EIRP(H Beam)} + \text{EIRP(V Beam)} = \text{EIRP(MIMO)}$$

FCC ID: A3LSMG981V		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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40.0GHz - 60GHz



Plot 7-97. Ant1-n260 Radiated Spurious Plot (1CC QPSK Mid Channel H Beam – ENDC)



Plot 7-98. Ant1-n260 Radiated Spurious Plot (1CC QPSK Mid Channel V Beam – ENDC)

FCC ID: A3LSMG981V	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
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