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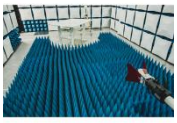

MEASUREMENT REPORT
FCC Part 30 5G mmWave

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

Date of Testing:
09/15/2021-01/06/2022
Test Report Issue Date:
01/06/2022
Test Site/Location:
PCTEST Lab. Columbia, MD, USA
Test Report Serial No.:
1M2109090102-06-R1.A3L

FCC ID:	**A3LSMS908U**
APPLICANT:	**Samsung Electronics Co., Ltd.**

Application Type:	Certification
Model:	SM-S908U
Additional Model(s):	SM-S908U1
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 v01r02

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

This revised Test Report (S/N: 1M2109090102-06-R1.A3L) supersedes and replaces the previously issued test report (S/N: 1M2109090102-06.A3L) on the same subject device for the same type of testing as indicated. Please discard or destroy the previously issued test report(s) and dispose of it accordingly.

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

Randy Ortanez
President

ACCREDITED
CERT #2041.01

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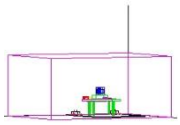
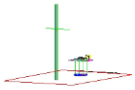


MEASUREMENT REPORT
FCC Part 30



Band	Antenna	Bandwidth [MHz]	Tx Frequency [MHz]	CCs Active	Mode	Modulation	EIRP Max Power [W]	EIRP Max Power [dBm]	Emission Designator
n258 (24.25 - 24.45GHz)	Ant1	100	24300 - 24400	1	SISO	QPSK	0.406	26.08	95M7G7D
					2Tx	QPSK	0.646	28.10	95M7G7D
					2Tx	π/2 BPSK	0.637	28.04	91M9G7D
					2Tx	16QAM	0.532	27.26	95M3W7D
					2Tx	64QAM	0.362	25.59	95M2W7D
				2	2Tx	QPSK	0.208	23.19	194MG7D
					2Tx	π/2 BPSK	0.211	23.25	194MG7D
					2Tx	16QAM	0.103	20.14	194MW7D
					2Tx	64QAM	0.077	18.84	194MW7D
		50	24275 - 24425	1	SISO	QPSK	0.459	26.62	46M2G7D
					2Tx	QPSK	0.851	29.30	46M2G7D
					2Tx	π/2 BPSK	0.828	29.18	45M8G7D
					2Tx	16QAM	0.611	27.86	45M9W7D
					2Tx	64QAM	0.408	26.11	45M9W7D
				2	2Tx	QPSK	0.219	23.41	95M7G7D
					2Tx	π/2 BPSK	0.218	23.38	95M7G7D
					2Tx	16QAM	0.168	22.24	95M5W7D
					2Tx	64QAM	0.087	19.41	95M7W7D

EUT Overview (Ant1/ M patch – Band n258, 24.25 - 24.45GHz)

Band	Antenna	Bandwidth [MHz]	Tx Frequency [MHz]	CCs Active	Mode	Modulation	EIRP Max Power [W]	EIRP Max Power [dBm]	Emission Designator
n258 (24.25 - 24.45GHz)	Ant2	100	24300 - 24400	1	SISO	QPSK	0.345	25.38	-
					2Tx	QPSK	0.360	25.56	-
					2Tx	π/2 BPSK	0.349	25.42	-
					2Tx	16QAM	0.293	24.66	-
					2Tx	64QAM	0.195	22.89	-
				2	2Tx	QPSK	0.215	23.32	-
					2Tx	π/2 BPSK	0.211	23.25	-
					2Tx	16QAM	0.106	20.24	-
					2Tx	64QAM	0.087	19.41	-
		50	24275 - 24425	1	SISO	QPSK	0.327	25.14	-
					2Tx	QPSK	0.397	25.99	-
					2Tx	π/2 BPSK	0.388	25.89	-
					2Tx	16QAM	0.378	25.77	-
					2Tx	64QAM	0.212	23.27	-
				2	2Tx	QPSK	0.251	24.00	-
					2Tx	π/2 BPSK	0.248	23.95	-
					2Tx	16QAM	0.166	22.21	-
					2Tx	64QAM	0.123	20.89	-

EUT Overview (Ant2/ N patch – Band n258, 24.25 - 24.45GHz)

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Band	Antenna	Bandwidth [MHz]	Tx Frequency [MHz]	CCs Active	Mode	Modulation	EIRP		Emission Designator
							Max Power [W]	Max Power [dBm]	
n258 (24.75 - 25.25GHz)	Ant1	100	24800 - 25200	1	SISO	QPSK	0.423	26.27	94M1G7D
					2Tx	QPSK	0.662	28.21	94M1G7D
					2Tx	π/2 BPSK	0.755	28.78	91M0G7D
					2Tx	16QAM	0.439	26.43	93M9W7D
					2Tx	64QAM	0.277	24.42	94M0W7D
				2	2Tx	QPSK	0.213	23.28	194MG7D
					2Tx	π/2 BPSK	0.216	23.34	194MG7D
					2Tx	16QAM	0.139	21.42	194MW7D
					2Tx	64QAM	0.081	19.11	194MW7D
		50	24775 - 25225	1	SISO	QPSK	0.549	27.40	46M0G7D
					2Tx	QPSK	0.738	28.68	46M0G7D
					2Tx	π/2 BPSK	0.757	28.79	45M8G7D
					2Tx	16QAM	0.448	26.51	46M0W7D
					2Tx	64QAM	0.280	24.47	45M9W7D
				2	2Tx	QPSK	0.221	23.45	94M6G7D
					2Tx	π/2 BPSK	0.220	23.43	95M3G7D
					2Tx	16QAM	0.162	22.08	94M7W7D
					2Tx	64QAM	0.083	19.21	94M8W7D

EUT Overview (Ant1/ M patch– Band n258, 24.75 - 25.25GHz)

Band	Antenna	Bandwidth [MHz]	Tx Frequency [MHz]	CCs Active	Mode	Modulation	EIRP		Emission Designator
							Max Power [W]	Max Power [dBm]	
n258 (24.75 - 25.25GHz)	Ant2	100	24800 - 25200	1	SISO	QPSK	0.323	25.10	-
					2Tx	QPSK	0.391	25.92	-
					2Tx	π/2 BPSK	0.372	25.71	-
					2Tx	16QAM	0.382	25.82	-
					2Tx	64QAM	0.180	22.55	-
				2	2Tx	QPSK	0.148	21.70	-
					2Tx	π/2 BPSK	0.143	21.55	-
					2Tx	16QAM	0.088	19.45	-
					2Tx	64QAM	0.054	17.36	-
		50	24775 - 25225	1	SISO	QPSK	0.437	26.41	-
					2Tx	QPSK	0.472	26.74	-
					2Tx	π/2 BPSK	0.421	26.25	-
					2Tx	16QAM	0.252	24.02	-
					2Tx	64QAM	0.166	22.21	-
				2	2Tx	QPSK	0.151	21.80	-
					2Tx	π/2 BPSK	0.146	21.66	-
					2Tx	16QAM	0.088	19.46	-
					2Tx	64QAM	0.057	17.54	-

EUT Overview (Ant2/ N patch – Band n258, 24.75 - 25.25GHz)

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Band	Antenna	Bandwidth [MHz]	Tx Frequency [MHz]	CCs Active	Mode	Modulation	EIRP		Emission Designator
							Max Power [W]	Max Power [dBm]	
n261	Ant1	100	27550 - 28300	1	SISO	QPSK	0.399	26.01	94M2G7D
					2Tx	QPSK	1.305	31.16	94M2G7D
					2Tx	π/2 BPSK	1.270	31.04	91M3G7D
					2Tx	16QAM	0.957	29.81	94M2W7D
					2Tx	64QAM	0.674	28.29	94M8W7D
				2	2Tx	QPSK	0.343	25.36	194MG7D
					2Tx	π/2 BPSK	0.335	25.25	194MG7D
					2Tx	16QAM	0.187	22.73	194MW7D
					2Tx	64QAM	0.109	20.37	195MW7D
		50	27525 - 28325	1	SISO	QPSK	0.366	25.63	46M0G7D
					2Tx	QPSK	1.376	31.39	46M0G7D
					2Tx	π/2 BPSK	1.296	31.13	45M8G7D
					2Tx	16QAM	0.803	29.05	46M1W7D
					2Tx	64QAM	0.619	27.92	46M2W7D
				2	2Tx	QPSK	0.313	24.95	95M8G7D
					2Tx	π/2 BPSK	0.310	24.92	95M6G7D
					2Tx	16QAM	0.191	22.81	96M1W7D
					2Tx	64QAM	0.136	21.35	96M4W7D

EUT Overview (Ant1/ M patch – Band n261)

Band	Antenna	Bandwidth [MHz]	Tx Frequency [MHz]	CCs Active	Mode	Modulation	EIRP		Emission Designator
							Max Power [W]	Max Power [dBm]	
n261	Ant2	100	27550 - 28300	1	SISO	QPSK	0.397	25.98	-
					2Tx	QPSK	0.749	28.74	-
					2Tx	π/2 BPSK	0.403	26.06	-
					2Tx	16QAM	0.256	24.08	-
					2Tx	64QAM	0.168	22.26	-
				2	2Tx	QPSK	0.188	22.74	-
					2Tx	π/2 BPSK	0.188	22.74	-
					2Tx	16QAM	0.118	20.74	-
					2Tx	64QAM	0.084	19.25	-
		50	27525 - 28325	1	SISO	QPSK	0.550	27.41	-
					2Tx	QPSK	0.693	28.41	-
					2Tx	π/2 BPSK	0.509	27.07	-
					2Tx	16QAM	0.318	25.03	-
					2Tx	64QAM	0.219	23.40	-
				2	2Tx	QPSK	0.187	22.72	-
					2Tx	π/2 BPSK	0.185	22.68	-
					2Tx	16QAM	0.119	20.76	-
					2Tx	64QAM	0.078	18.93	-

EUT Overview (Ant2/ N patch– Band n261)

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Band	Antenna	Bandwidth [MHz]	Tx Frequency [MHz]	CCs Active	Mode	Modulation	EIRP		Emission Designator
							Max Power [W]	Max Power [dBm]	
n260	Ant1	100	37050 - 39950	1	SISO	QPSK	0.191	22.81	94M8G7D
					2Tx	QPSK	0.258	24.12	94M8G7D
					2Tx	π/2 BPSK	0.284	24.54	91M9G7D
					2Tx	16QAM	0.208	23.19	94M7W7D
					2Tx	64QAM	0.126	21.02	95M4W7D
				2	2Tx	QPSK	0.150	21.77	195MG7D
					2Tx	π/2 BPSK	0.151	21.80	194MG7D
					2Tx	16QAM	0.105	20.22	195MW7D
					2Tx	64QAM	0.070	18.44	198MW7D
		50	37025 - 39975	1	SISO	QPSK	0.217	23.36	46M3G7D
					2Tx	QPSK	0.662	28.21	46M3G7D
					2Tx	π/2 BPSK	0.650	28.13	46M4G7D
					2Tx	16QAM	0.395	25.97	46M2W7D
					2Tx	64QAM	0.263	24.20	46M2W7D
				2	2Tx	QPSK	0.138	21.40	94M7G7D
					2Tx	π/2 BPSK	0.139	21.43	94M8G7D
					2Tx	16QAM	0.095	19.79	94M9W7D
					2Tx	64QAM	0.062	17.95	95M2W7D

EUT Overview (Ant1/ M patch – Band n260)

Band	Antenna	Bandwidth [MHz]	Tx Frequency [MHz]	CCs Active	Mode	Modulation	EIRP		Emission Designator
							Max Power [W]	Max Power [dBm]	
n260	Ant2	100	37050 - 39950	1	SISO	QPSK	0.264	24.22	-
					2Tx	QPSK	0.321	25.07	-
					2Tx	π/2 BPSK	0.322	25.08	-
					2Tx	16QAM	0.196	22.92	-
					2Tx	64QAM	0.127	21.04	-
				2	2Tx	QPSK	0.149	21.74	-
					2Tx	π/2 BPSK	0.154	21.88	-
					2Tx	16QAM	0.108	20.35	-
					2Tx	64QAM	0.067	18.29	-
		50	37025 - 39975	1	SISO	QPSK	0.289	24.61	-
					2Tx	QPSK	0.375	25.74	-
					2Tx	π/2 BPSK	0.365	25.63	-
					2Tx	16QAM	0.221	23.44	-
					2Tx	64QAM	0.143	21.56	-
				2	2Tx	QPSK	0.126	20.99	-
					2Tx	π/2 BPSK	0.124	20.93	-
					2Tx	16QAM	0.090	19.53	-
					2Tx	64QAM	0.069	18.42	-

EUT Overview (Ant2/ N patch – Band n260)

Note: Due to similar antenna performance from both patch antennas, the Occupied Bandwidth was only measured on one antenna for each band.

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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 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/IEC 17025-2017 accredited test facility under the American Association for Laboratory Accreditation (A2LA) with Certificate number 2041.01 for Specific Absorption Rate (SAR), Hearing Aid Compatibility (HAC) testing, where applicable, and Electromagnetic Compatibility (EMC) testing for FCC and Innovation, Science, and Economic Development Canada rules.

- PCTEST TCB is a Telecommunication Certification Body (TCB) accredited to ISO/IEC 17065-2012 by A2LA (Certificate number 2041.03) in all scopes of FCC Rules and ISED Standards (RSS).

- PCTEST facility is a registered (2451B) test laboratory with the site description on file with ISED.

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2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **Samsung Portable Handset FCC ID: A3LSMS908U.** The test data contained in this report pertains only to the emissions due to the EUT's 5G mmWave function.

The EUT contains two antennas, referred to herein as Ant1 (M Patch) and Ant2 (N 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.

Antenna	Name
Ant1	M patch
Ant2	N patch

The EUT supports up to 2CC for UL. The EUT supports both 50MHz bandwidth and 100MHz bandwidth. The EUT supports a subcarrier spacing (SCS) of 120kHz with two transmission schemes, CP-OFDM and DFT-s-OFDM, with π/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. 2Tx/MIMO operation was achieved by enabling two Beam IDs at the same time: one is from the list of H Beam IDs and other is from the list of V Beam IDs.

Test Device Serial No.: 1146M, 1255M

2.2 Device Capabilities

This device contains the following capabilities:

850/1900 GSM/GPRS/EDGE, 850/1700/1900 WCDMA/HSPA, Multi-band LTE, Multi-band 5G NR (FR1 and FR2), 802.11b/g/n/ax WLAN, 802.11a/n/ac/ax UNII (5GHz and 6GHz), Bluetooth (1x, EDR, LE), NFC, Wireless Power Transfer, Ultra Wideband

2.3 Test Configuration

The EUT was tested per the guidance of KDB 842590 D01 v01r02 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 ID's was used to help determine the worst-case Beam ID for SISO operation and Beam ID pair for 2Tx (DFT-s-OFDM) and MIMO (CP-OFDM) operation. Several additional Beam ID's were also investigated to determine the Beam ID's producing the highest measured EIRP.

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

While operating in the FR2 band, this device supports anchor band operation with either an LTE carrier or an NR FR1 carrier. Both were investigated during FR2 measurements.

2.4 Software and Firmware

The test was conducted with firmware version FAS0_S908UFAU0AUI3 installed on the EUT.

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2.5 EMI Suppression Device(s)/Modifications

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

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3.0 DESCRIPTION OF TESTS

3.1 Measurement Procedure

The measurement procedures described in the document titled "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 v01r02 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.

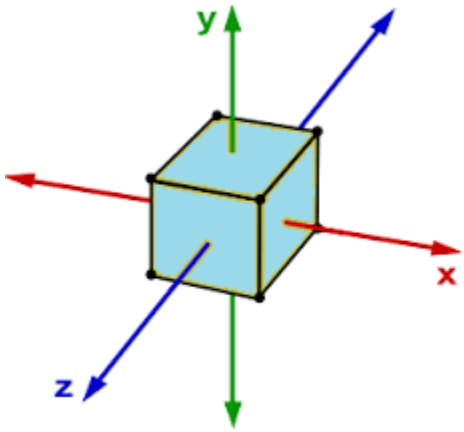

Figure 3-1. Rotation of the EUT Through Three Orthogonal Planes

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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 & Measurment Distance per Frequency Range

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

The maximized power level is recorded using the spectrum analyzer “Channel Power” function with the integration bandwidth set to 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.

Field Strength [dBμV/m] = Measured Value [dBm] + AFCL [dB/m] + 107

= - 32.74 dBm + (40.7dB/m + 8.78dB) + 107 = 123.74dBuV/m

= 10^(123.74/20)/1000000 = 1.54 V/m

e.i.r.p. [dBm] = 10 * log((E-Field*D_m)^2/30) + 30dB

= 10*log((1.54V/m * 1.00m)^2/30) + 30dB

= 18.98 dBm e.i.r.p.

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4.0 MEASUREMENT UNCERTAINTY

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

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

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5.0 TEST EQUIPMENT CALIBRATION DATA

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

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
	AP1	EMC Cable and Switch System	9/10/2021	Annual	9/10/2022	AP1
ETS-Lindgren	3116C	DRG Horn Antenna	5/11/2021	Biennial	5/11/2023	218893
ETS Lindgren	3117	1-18 GHz DRG Horn (Medium)	4/20/2021	Biennial	4/20/2023	125518
Emco	3115	Horn Antenna (1-18GHz)	6/18/2020	Biennial	6/18/2022	9704-5182
Espec	ESX-2CA	Environmental Chamber	8/27/2020	Biennial	8/27/2022	17620
Keysight Technologies	N9030A	3Hz-44GHz PXA Signal Analyzer	7/21/2021	Annual	7/21/2022	MY49430494
Keysight Technologies	N9030A	50GHz PXA Signal Analyzer	1/20/2021	Annual	1/20/2022	US51350301
Megaphase	FAC mmWave	AP FAC mmWave 18ft 40GHz	3/3/2021	Annual	3/3/2022	20033003
Narda	180-442-KF	Wide Band Horn Antenna 18.0 - 40.0 GHz	11/5/2020	Biennial	11/5/2022	U157403-01
OML Inc.	M05RH	WR-05 Horn Antenna, 24dBi, 140 to 220 GHz	10/31/2019	Biennial	1/31/2022	18073001
OML Inc.	M08RH	WR-08 Horn Antenna, 24dBi, 90 to 140 GHz	10/31/2019	Biennial	1/31/2022	18073001
OML Inc.	M12RH	WR-12 Horn Antenna, 24dBi, 60 to 90 GHz	10/31/2019	Biennial	1/31/2022	18073001
OML Inc.	M19RH	WR-19 Horn Antenna, 24dBi, 40 to 60 GHz	10/31/2019	Biennial	1/31/2022	18073001
Rohde & Schwarz	ESU40	EMI Test Receiver (40GHz)	5/25/2021	Annual	5/25/2022	100348
Rohde & Schwarz	FSW26	2Hz-26.5GHz Signal and spectrum analyzer	2/10/2021	Annual	2/10/2022	103187
Rohde & Schwarz	SMW200A	Signal Generator	N/A			190456
Sunol Science	JB5	Bi-Log Antenna (30M - 5GHz)	7/27/2020	Biennial	7/27/2022	A051107
Virginia Diodes Inc	SAX679	SAX Module (40 - 60GHz)	8/28/2020	Biennial	8/28/2022	SAX679
Virginia Diodes Inc	SAX680	SAX Module (60 - 90GHz)	8/14/2020	Biennial	9/14/2022	SAX680
Virginia Diodes Inc	SAX681	SAX Module (90 - 140GHz)	10/22/2020	Biennial	10/22/2022	SAX681
Virginia Diodes Inc	SAX682	SAX Module (140 - 220GHz)	9/24/2020	Biennial	9/24/2022	SAX682
UTiFlex	UTiFlex	FAC mmWave UTiFlex 40GHz	3/3/2021	Annual	3/3/2022	234142-001
UTiFlex	UTiFlex	FAC mmWave UTiFlex 40GHz	3/10/2021	Annual	3/10/2022	232062-001
UTiFlex	UTiFlex	1m UTiFlex 40GHz	9/10/2021	Annual	9/10/2022	232063-001

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

π/2 BPSK Modulation

Emission Designator = 800MG7D

BW = 800 MHz
G = Phase Modulation
7 = Quantized/Digital Info
D = Data transmission, telemetry, telecommand

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: A3LSMS908U

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 n258-R1, n258-R2, n261 and up to 200GHz for n260.
3) The radiated RF output power and all out-of-band emissions in the spurious domain are evaluated to the EIRP limits.
4) “CC” refers to “Component Carriers”.
5) Beam IDs were chosed based on which Beam ID produces the highest EIRP during EIRP simulation.
6) All testing was performed using FTM (Factory Test Mode) software at continuous Tx operation (100% duty cycle).
7) The CP-OFDM and DFT-s-OFDM transmission schemes were investigated fully for each test type and only the worst case data is included.
8) This report contains references to "n258-R1" and "n258-R2". These correspond to n258 Range 1, operating from 24.25 - 24.45GHz, and n258 Range 2, operating from 24.75 - 25.25GHz, respectively, as defined in Part 30.4(a).

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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 v01r02 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 ≥ 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

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

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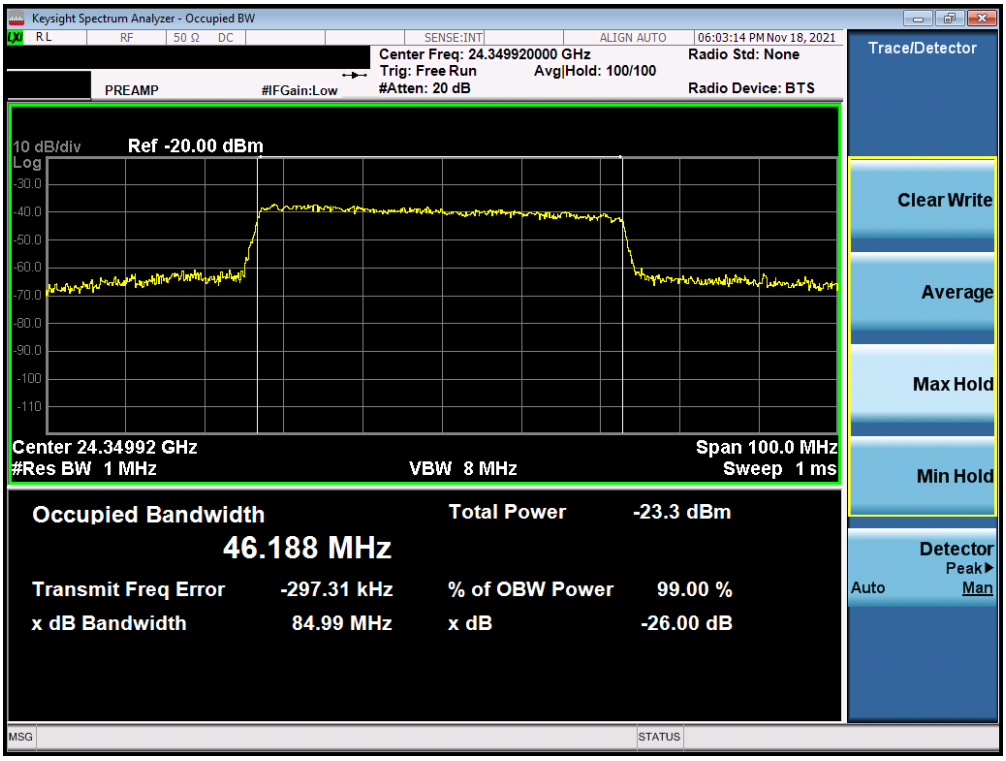
Band n258-R1

Channel	Bandwidth	CCs Active	Transmission Scheme	Modulation	OBW [MHz]
Mid	50	1	CP-OFDM	QPSK	46.19
			DFT-s-OFDM	π/2-BPSK	45.79
			CP-OFDM	16QAM	45.87
			CP-OFDM	64QAM	45.93
		2	DFT-s-OFDM	QPSK	95.68
			DFT-s-OFDM	π/2-BPSK	95.68
			CP-OFDM	16QAM	95.53
			CP-OFDM	64QAM	95.74
	100	1	CP-OFDM	QPSK	95.67
			DFT-s-OFDM	π/2-BPSK	91.86
			CP-OFDM	16QAM	95.28
			CP-OFDM	64QAM	95.15
		2	CP-OFDM	QPSK	194.47
			DFT-s-OFDM	π/2-BPSK	193.92
			CP-OFDM	16QAM	194.01
			DFT-s-OFDM	64QAM	194.20

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



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

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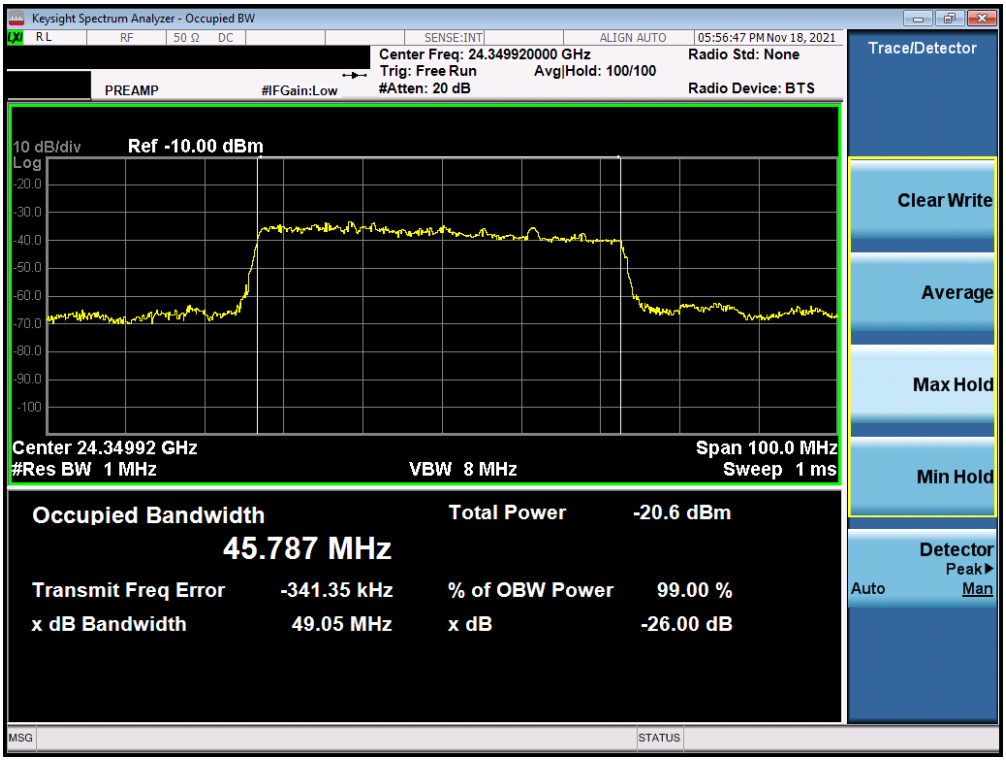
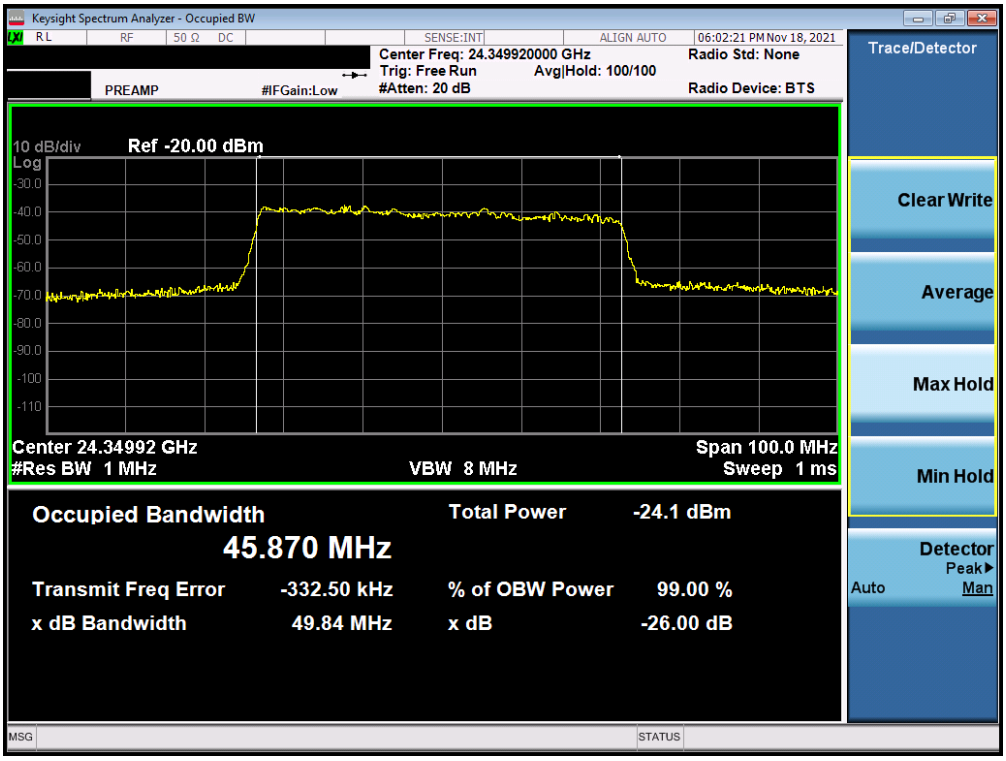


Plot 7-2. Ant1 Occupied Bandwidth Plot (50MHz-1CC – π/2 BPSK – Mid Channel)



Plot 7-3. Ant1 Occupied Bandwidth Plot (50MHz-1CC – 16QAM – Mid Channel)

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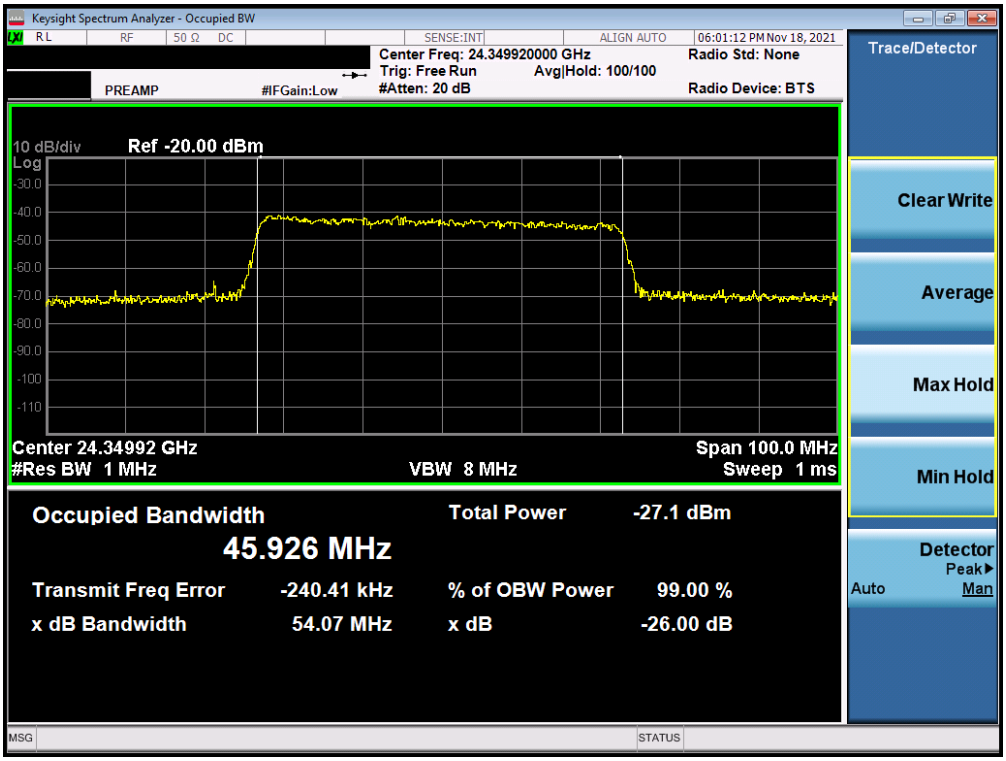
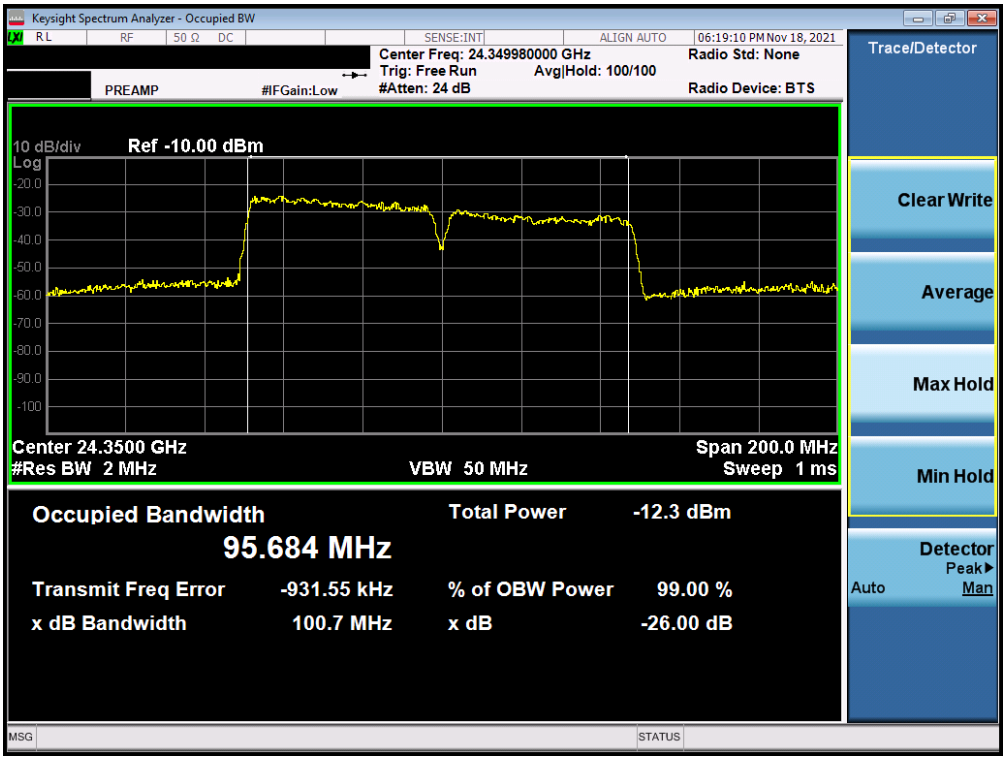


Plot 7-4. Ant1 Occupied Bandwidth Plot (50MHz-1CC – 64QAM – Mid Channel)



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

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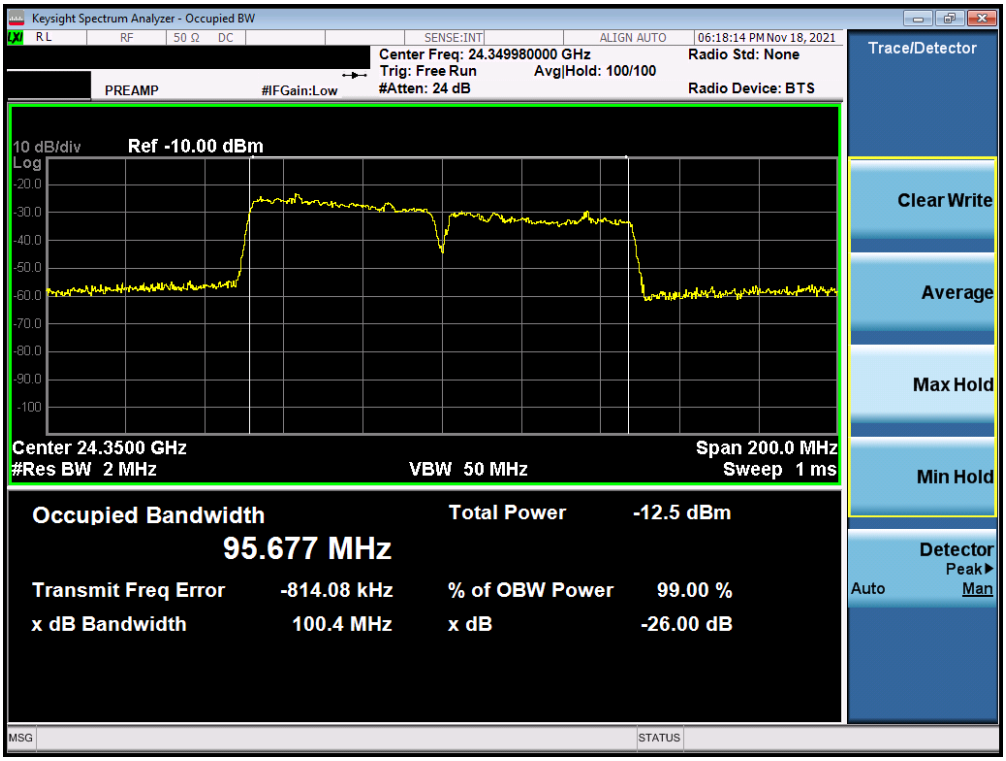
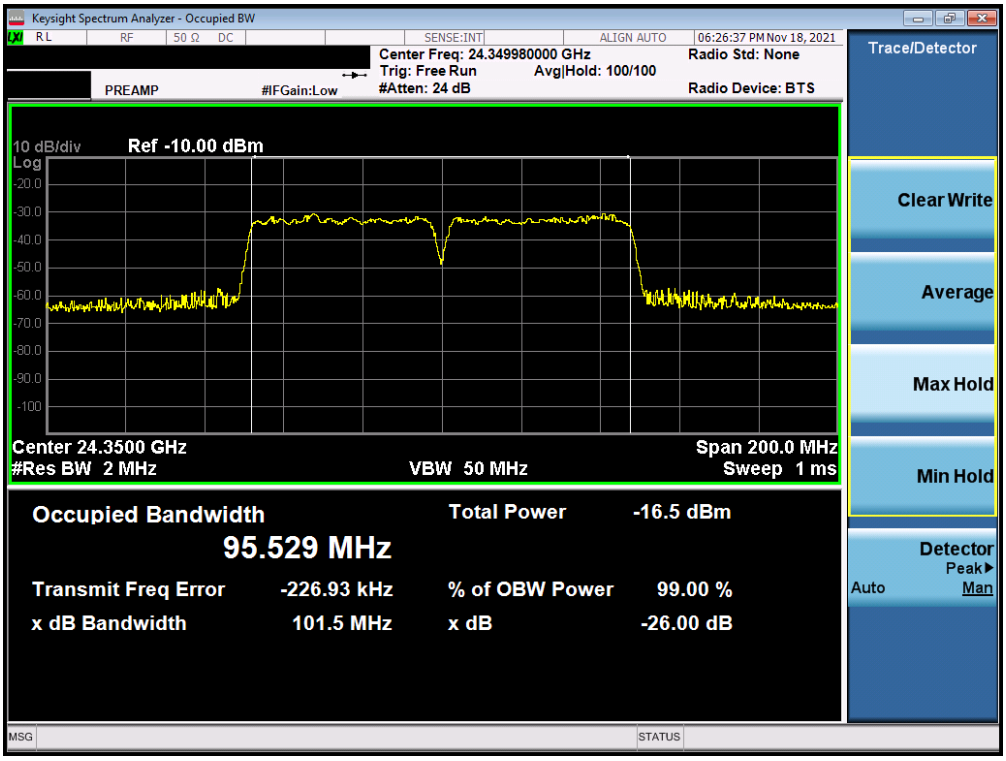


Plot 7-6. Ant1 Occupied Bandwidth Plot (50MHz-2CC – π/2 BPSK – Mid Channel)



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

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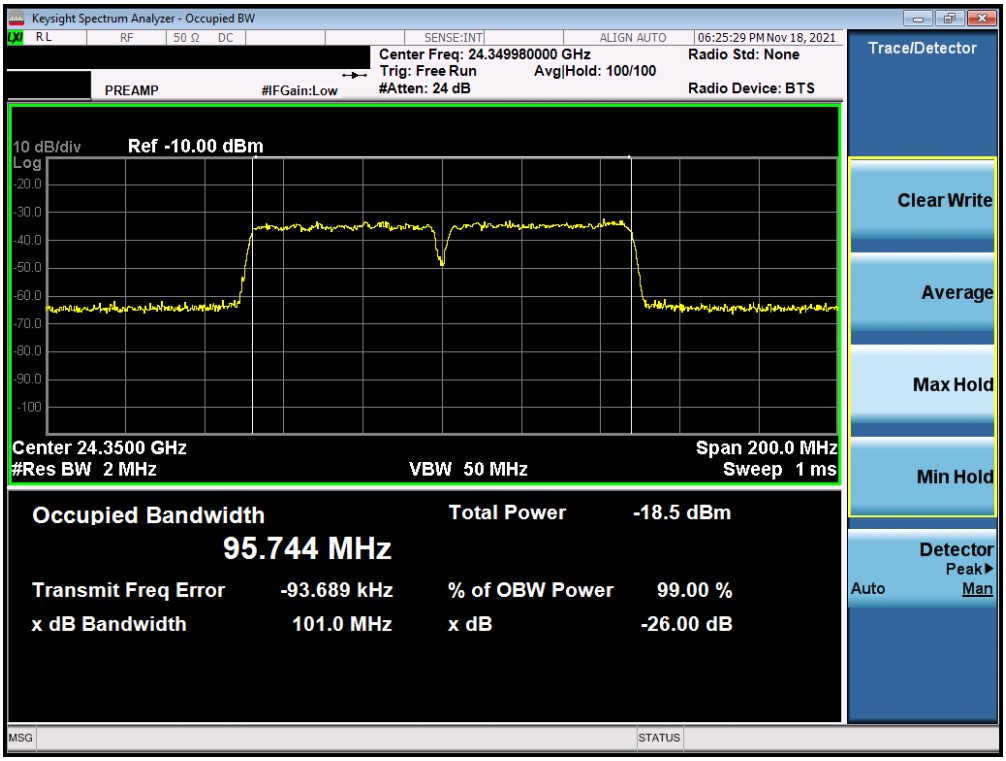
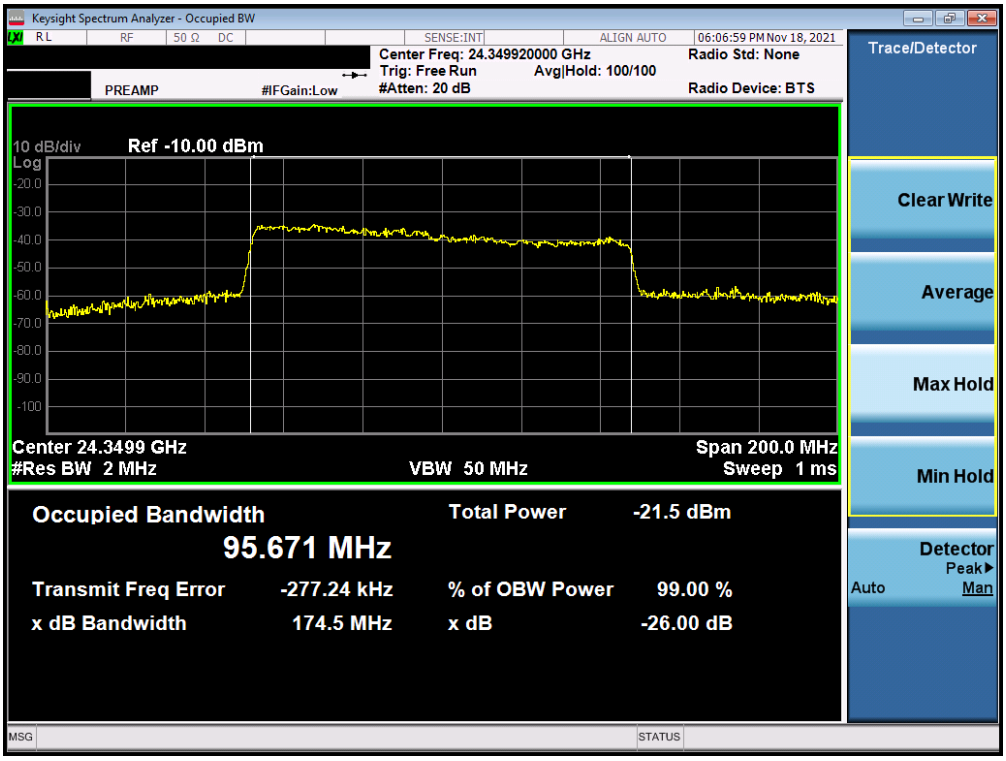


Plot 7-8. Ant1 Occupied Bandwidth Plot (50MHz-2CC – 64QAM – Mid Channel)



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

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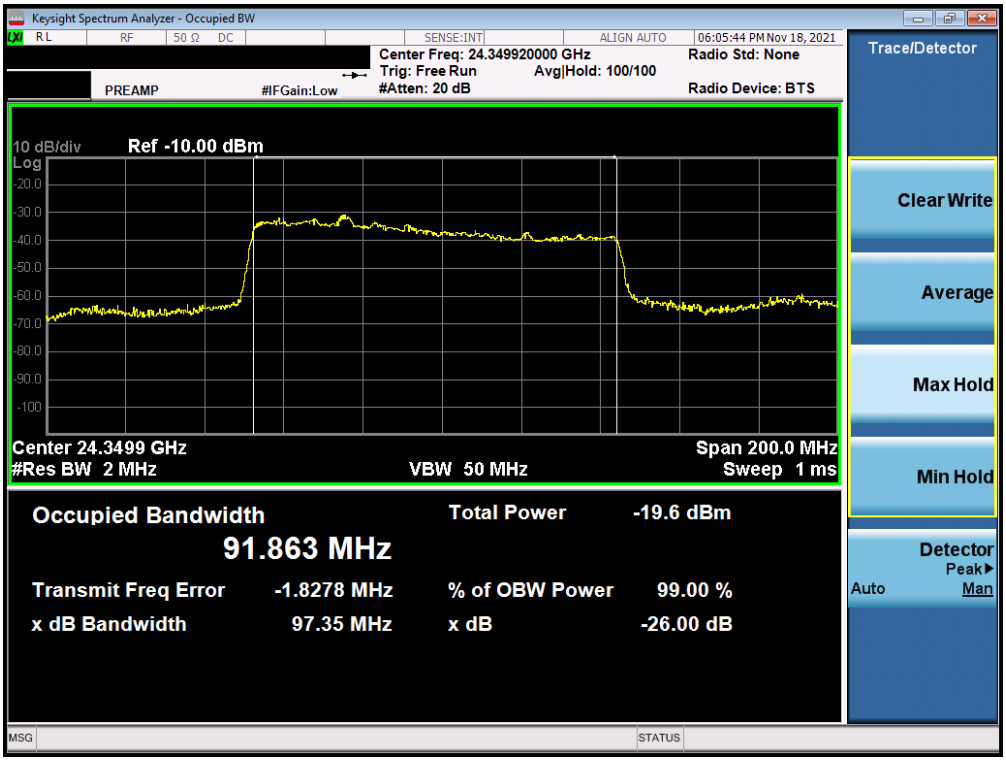
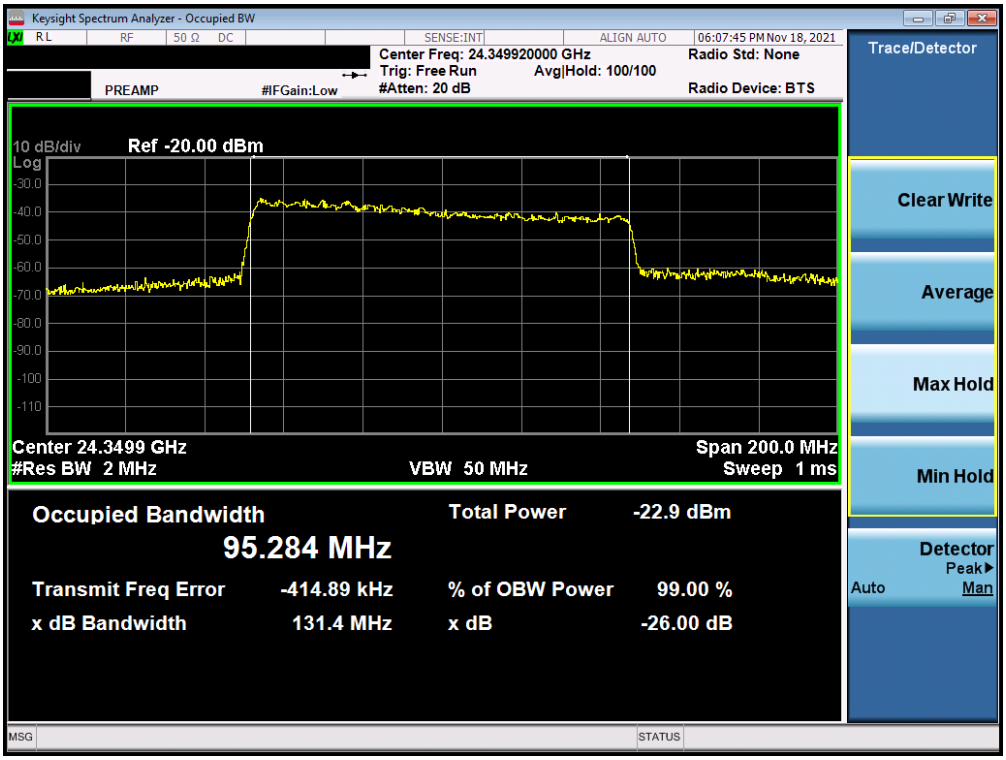


Plot 7-10. Ant1 Occupied Bandwidth Plot (100MHz-1CC – π/2 BPSK – Mid Channel)



Plot 7-11. Ant1 Occupied Bandwidth Plot (100MHz-1CC – 16QAM – Mid Channel)

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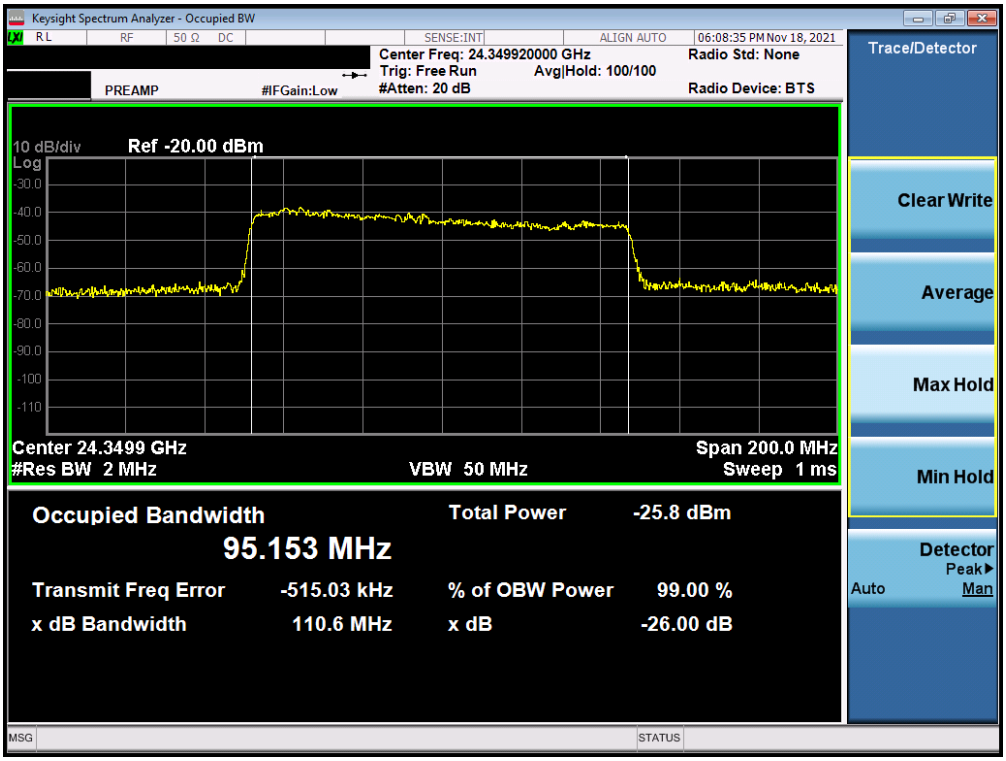
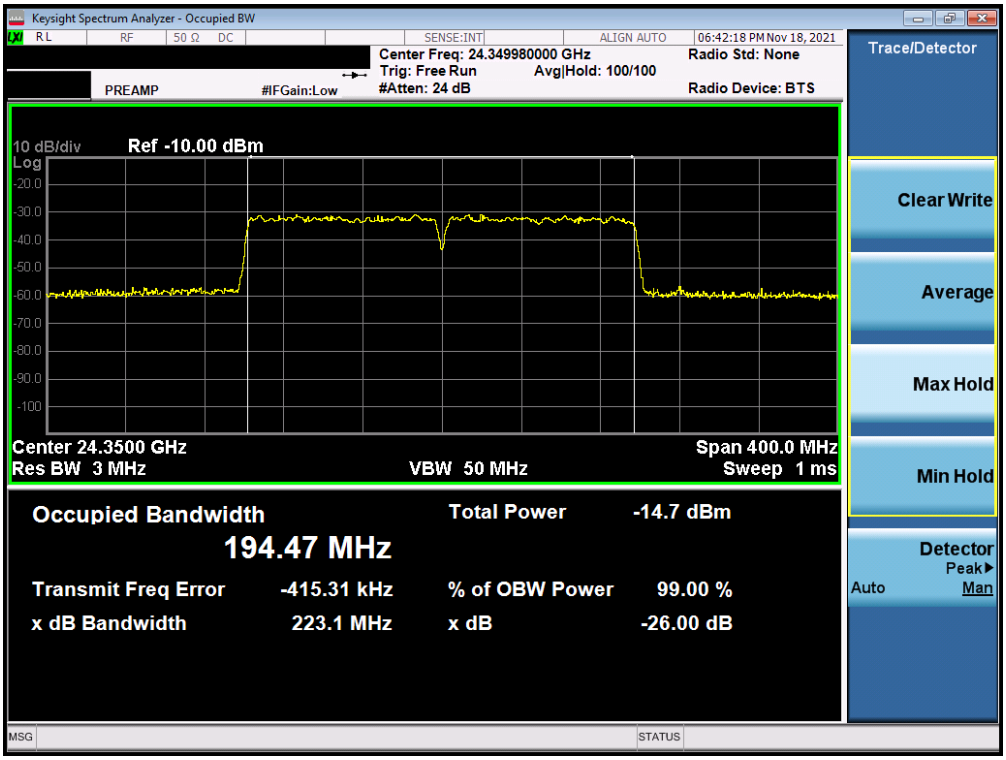


Plot 7-12. Ant1 Occupied Bandwidth Plot (100MHz-1CC – 64QAM – Mid Channel)



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

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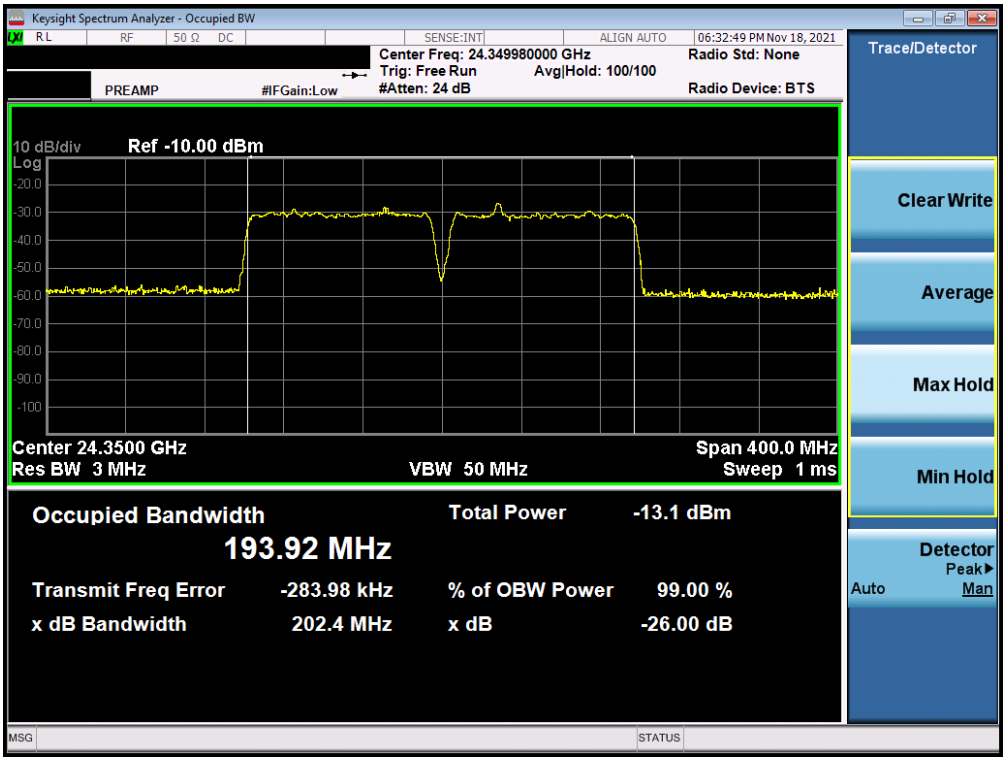
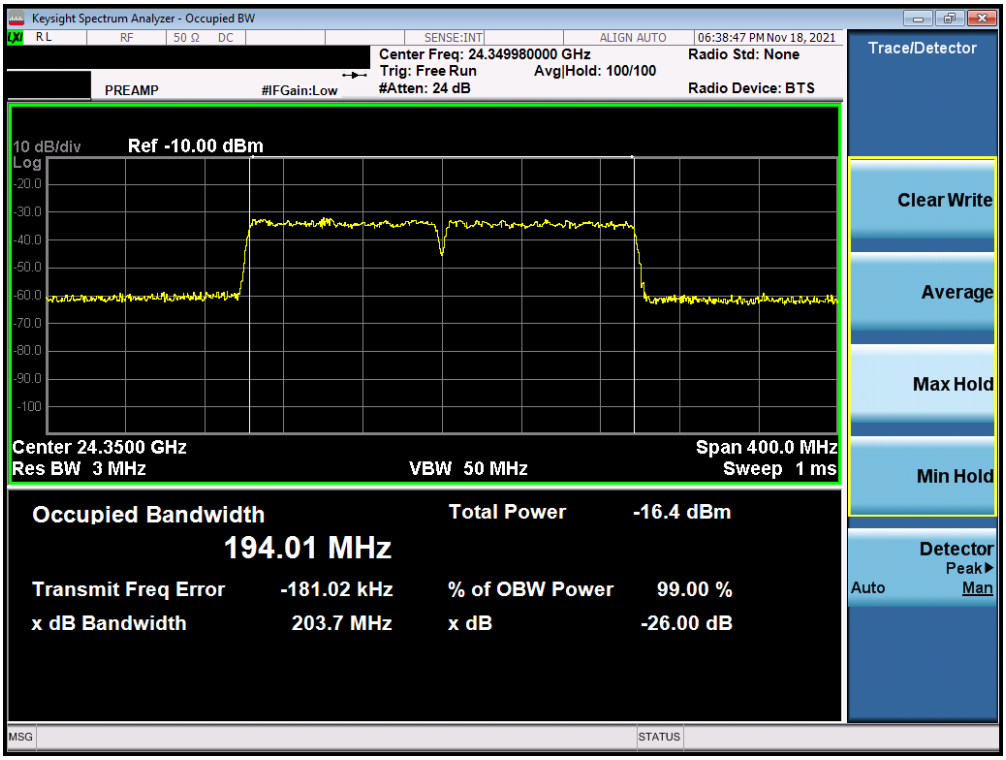


Plot 7-14. Ant1 Occupied Bandwidth Plot (100MHz-2CC – π/2 BPSK – Mid Channel)



Plot 7-15. Ant1 Occupied Bandwidth Plot (100MHz-2CC – 16QAM – Mid Channel)

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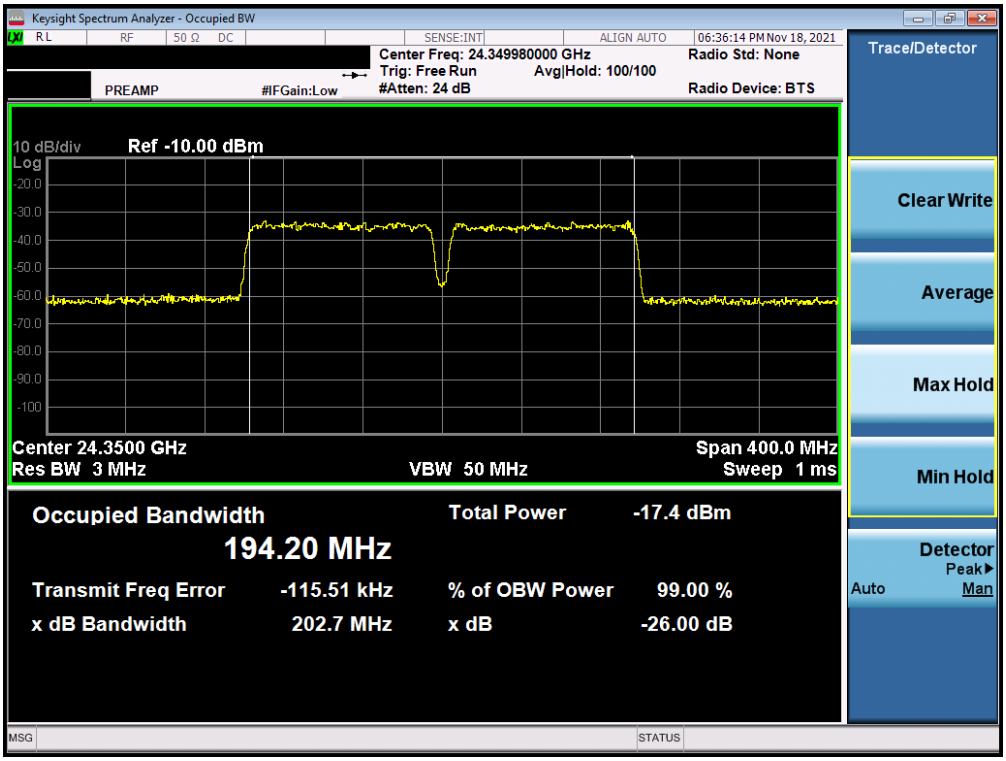

Plot 7-16. Ant1 Occupied Bandwidth Plot (100MHz-2CC – 64QAM – Mid Channel)

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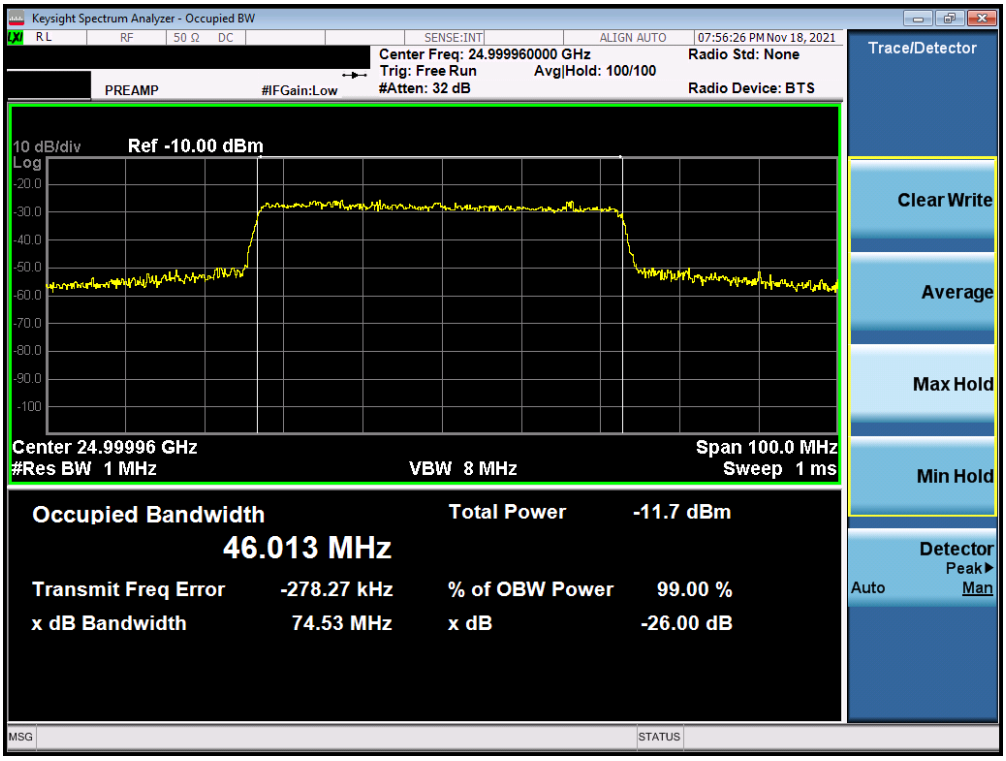
Band n258-R2

Channel	Bandwidth	CCs Active	Transmission Scheme	Modulation	OBW [MHz]
Mid	50	1	CP-OFDM	QPSK	46.01
			DFT-s-OFDM	π/2-BPSK	45.80
			CP-OFDM	16QAM	46.03
			CP-OFDM	64QAM	45.89
		2	CP-OFDM	QPSK	94.61
			DFT-s-OFDM	π/2-BPSK	95.25
			DFT-s-OFDM	16QAM	94.67
			CP-OFDM	64QAM	94.81
	100	1	CP-OFDM	QPSK	94.07
			DFT-s-OFDM	π/2-BPSK	91.03
			CP-OFDM	16QAM	93.90
			CP-OFDM	64QAM	93.95
		2	DFT-s-OFDM	QPSK	193.60
			DFT-s-OFDM	π/2-BPSK	193.53
			DFT-s-OFDM	16QAM	194.31
			DFT-s-OFDM	64QAM	193.86

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



Plot 7-17. Ant1 Occupied Bandwidth Plot (50MHz-1CC – QPSK – Mid Channel)

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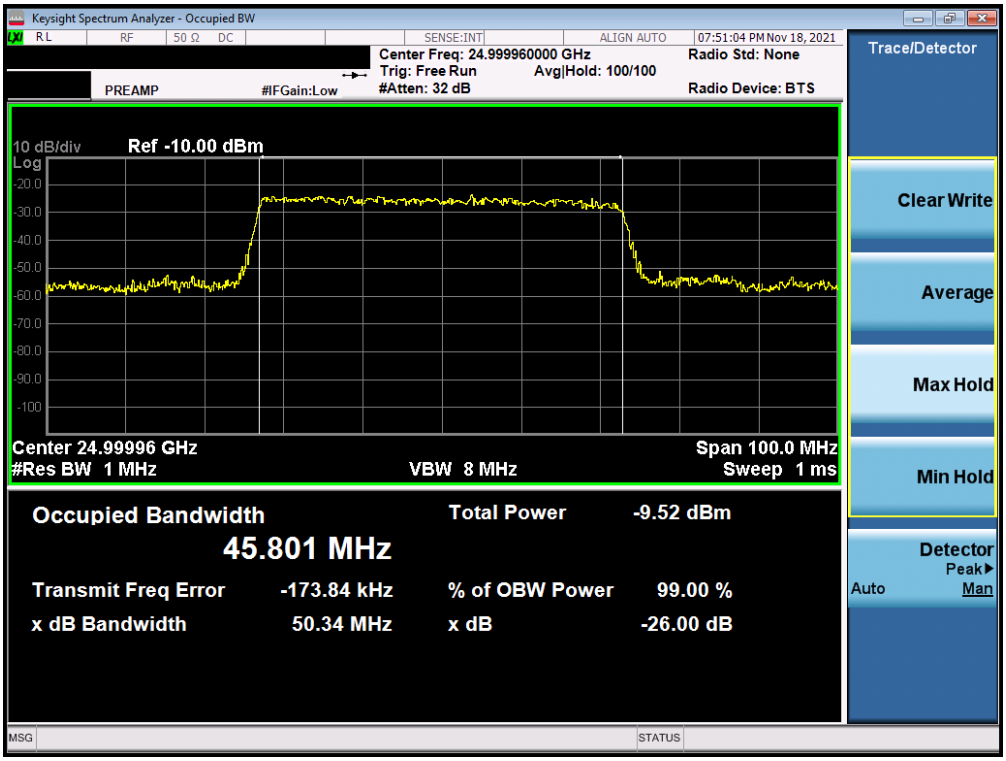
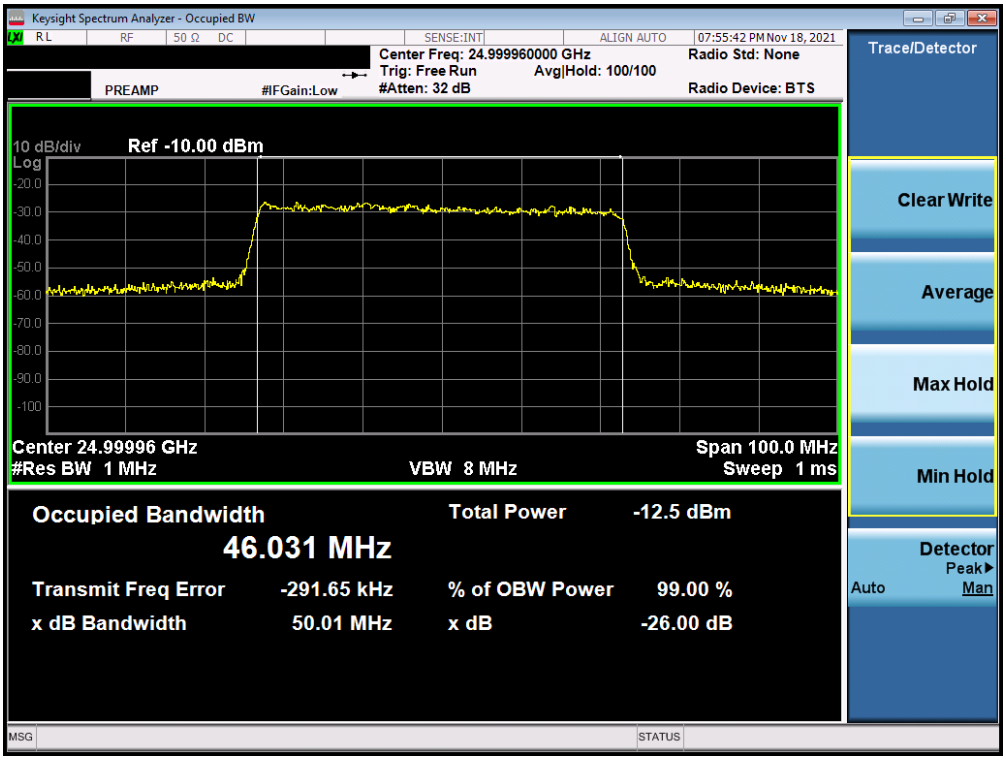


Plot 7-18. Ant1 Occupied Bandwidth Plot (50MHz-1CC – π/2 BPSK – Mid Channel)



Plot 7-19. Ant1 Occupied Bandwidth Plot (50MHz-1CC – 16QAM – Mid Channel)

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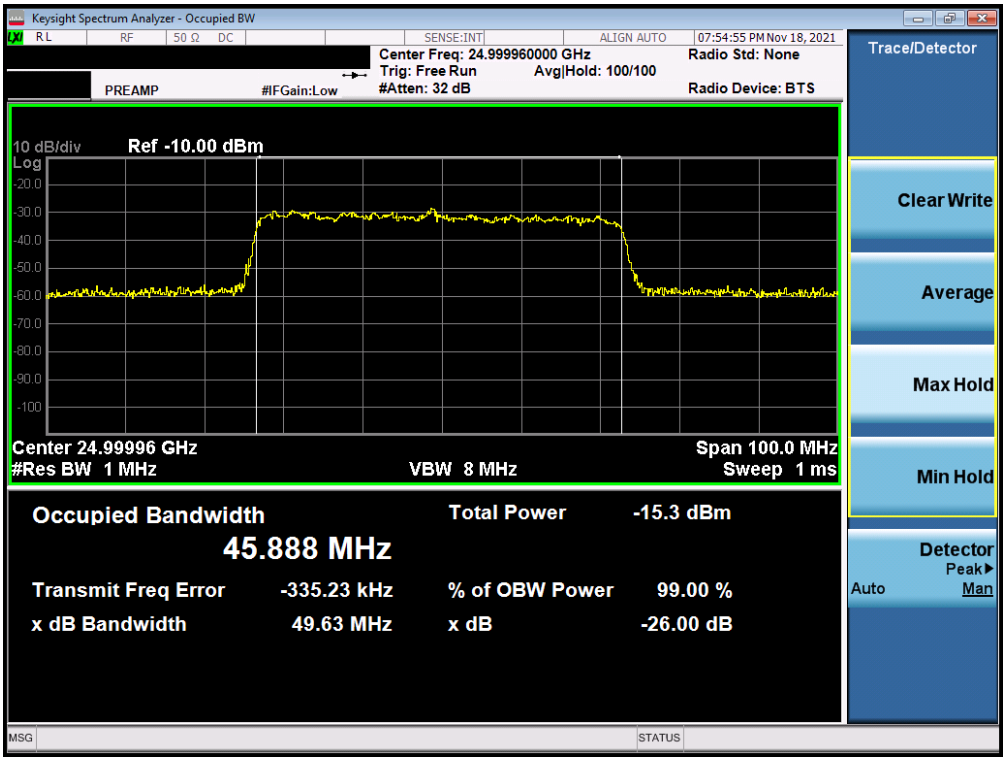
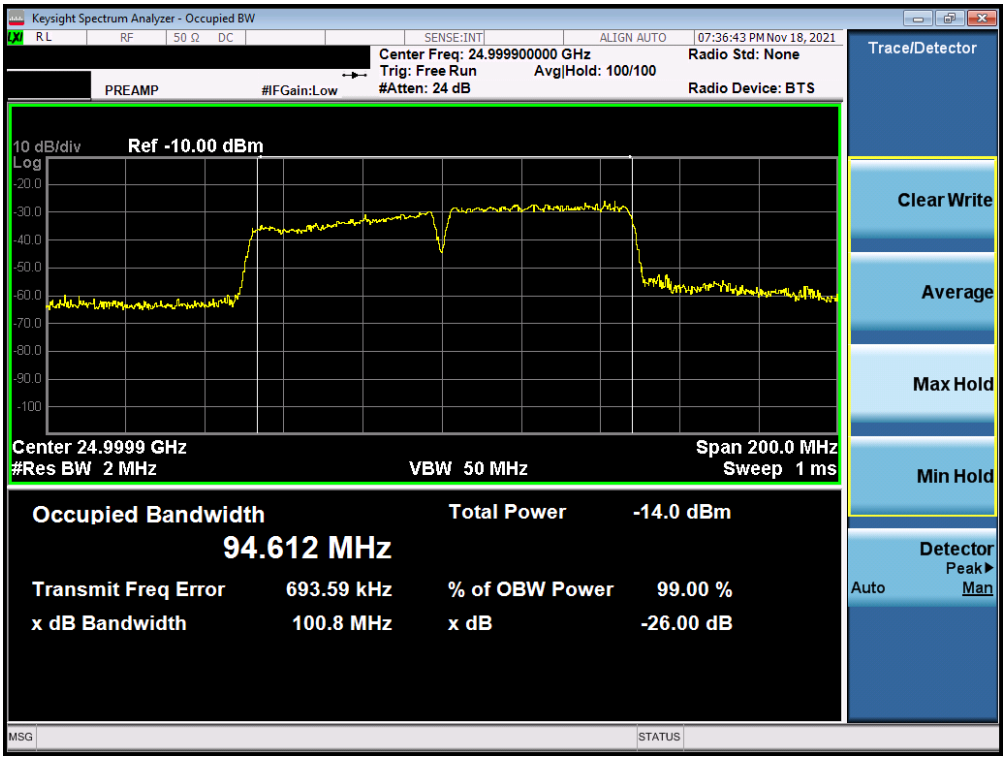


Plot 7-20. Ant1 Occupied Bandwidth Plot (50MHz-1CC – 64QAM – Mid Channel)



Plot 7-21. Ant1 Occupied Bandwidth Plot (50MHz-2CC – QPSK – Mid Channel)

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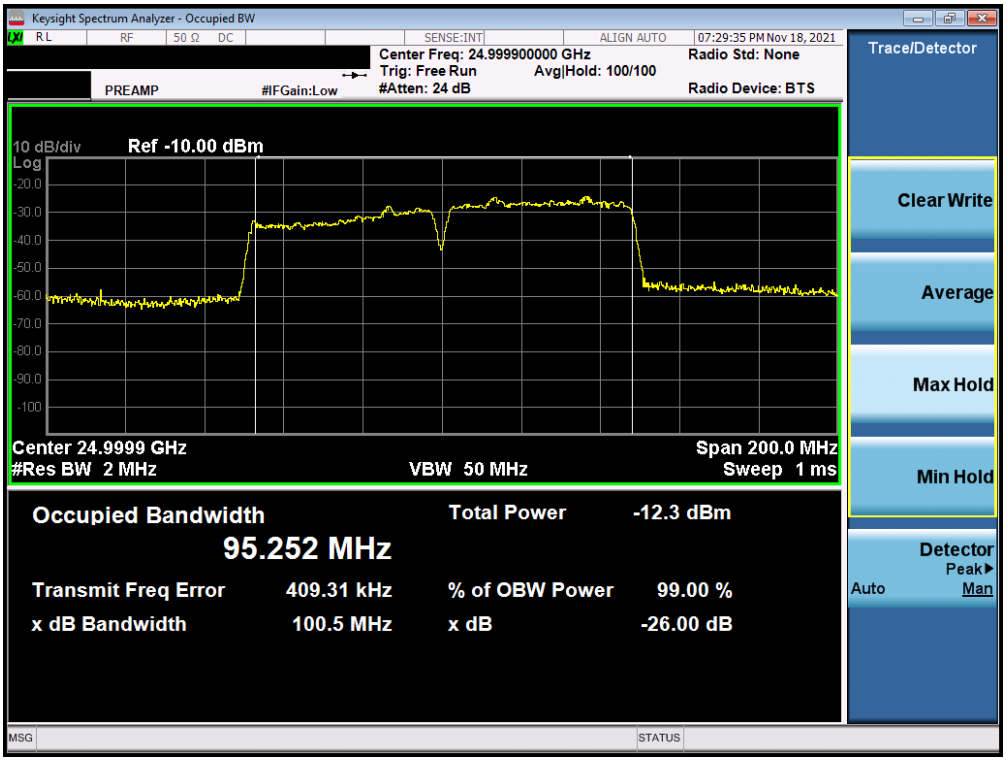
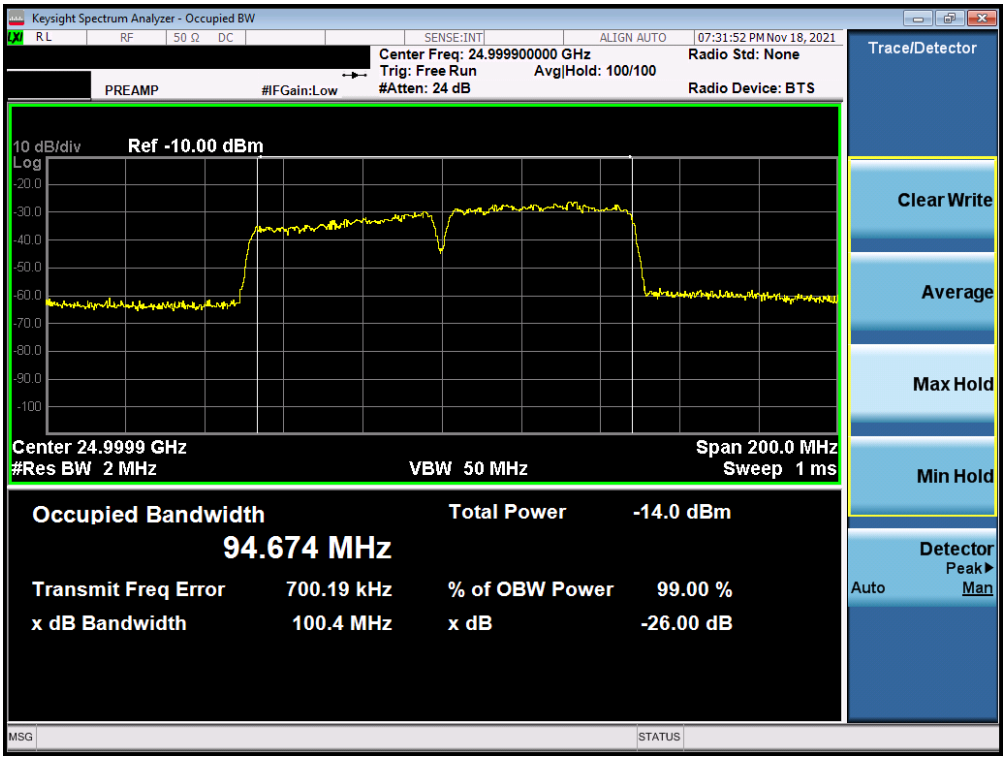


Plot 7-22. Ant1 Occupied Bandwidth Plot (50MHz-2CC – π/2 BPSK – Mid Channel)



Plot 7-23. Ant1 Occupied Bandwidth Plot (50MHz-2CC – 16QAM – Mid Channel)

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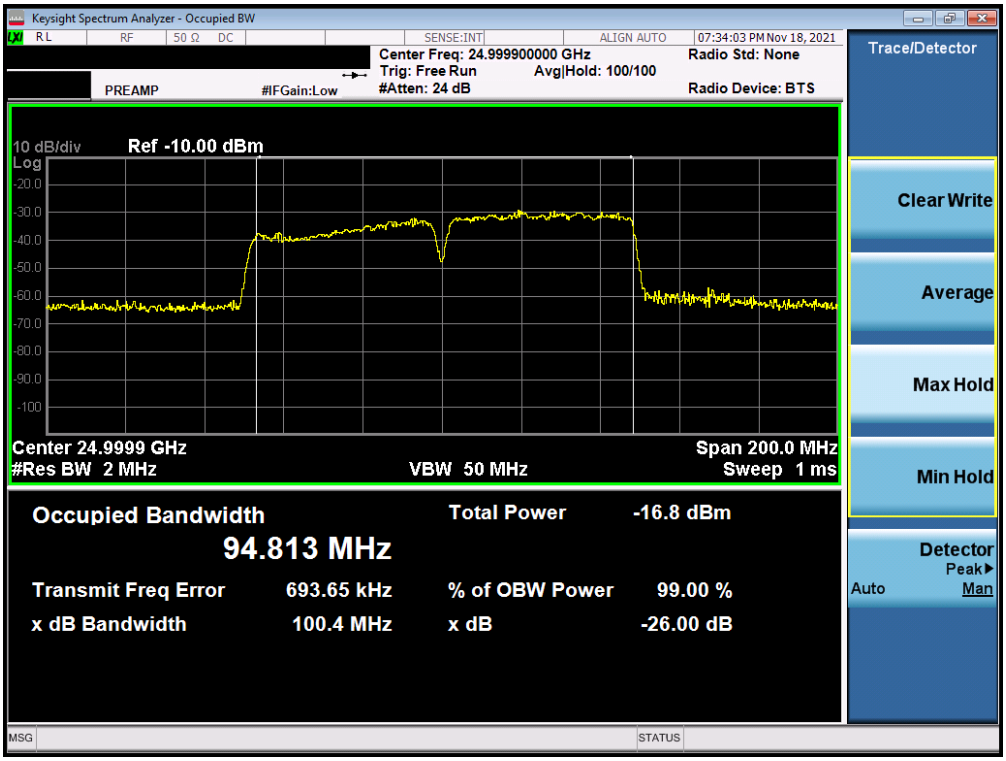
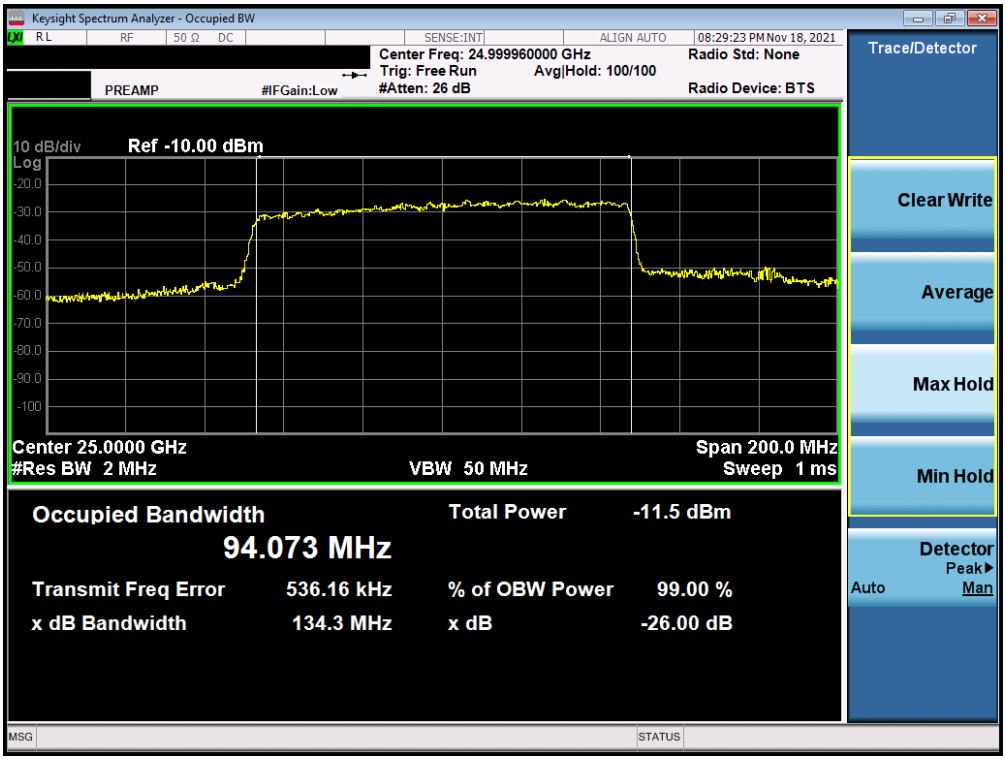


Plot 7-24. Ant1 Occupied Bandwidth Plot (50MHz-2CC – 64QAM – Mid Channel)



Plot 7-25. Ant1 Occupied Bandwidth Plot (100MHz-1CC – QPSK – Mid Channel)

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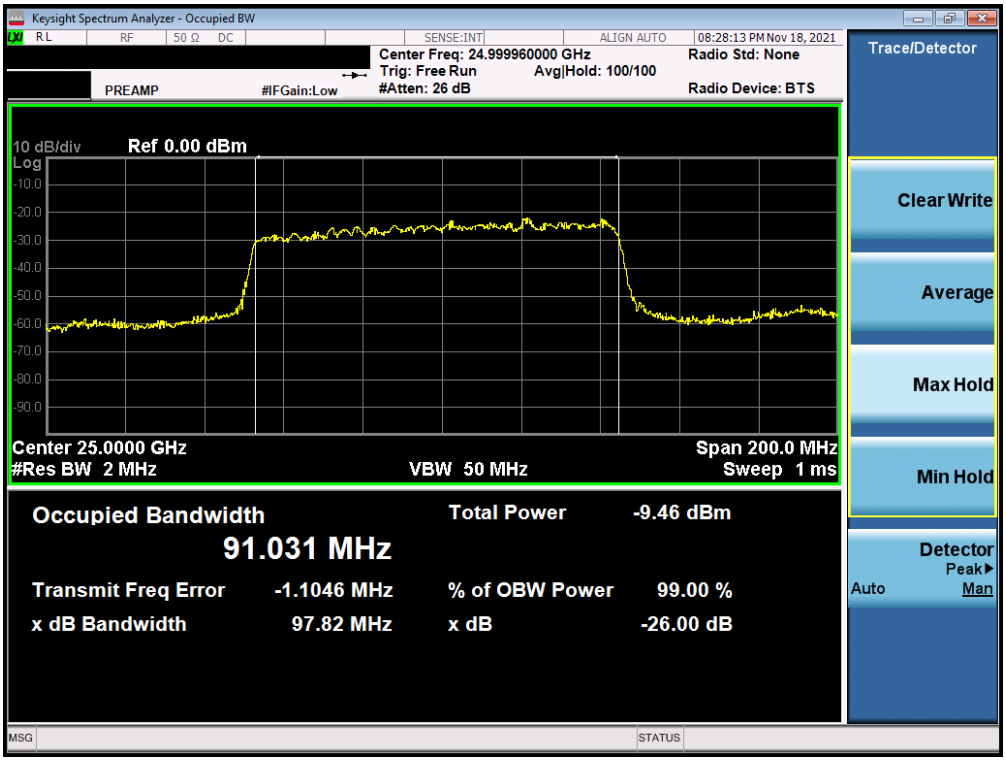
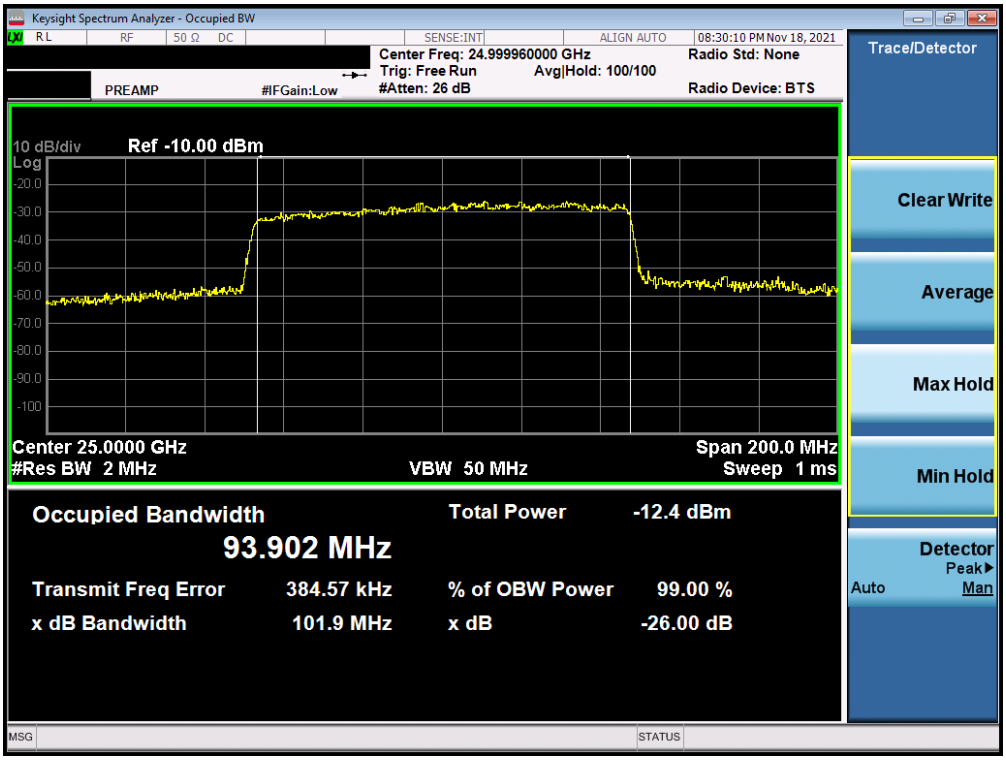


Plot 7-26. Ant1 Occupied Bandwidth Plot (100MHz-1CC – π/2 BPSK – Mid Channel)



Plot 7-27. Ant1 Occupied Bandwidth Plot (100MHz-1CC – 16QAM – Mid Channel)

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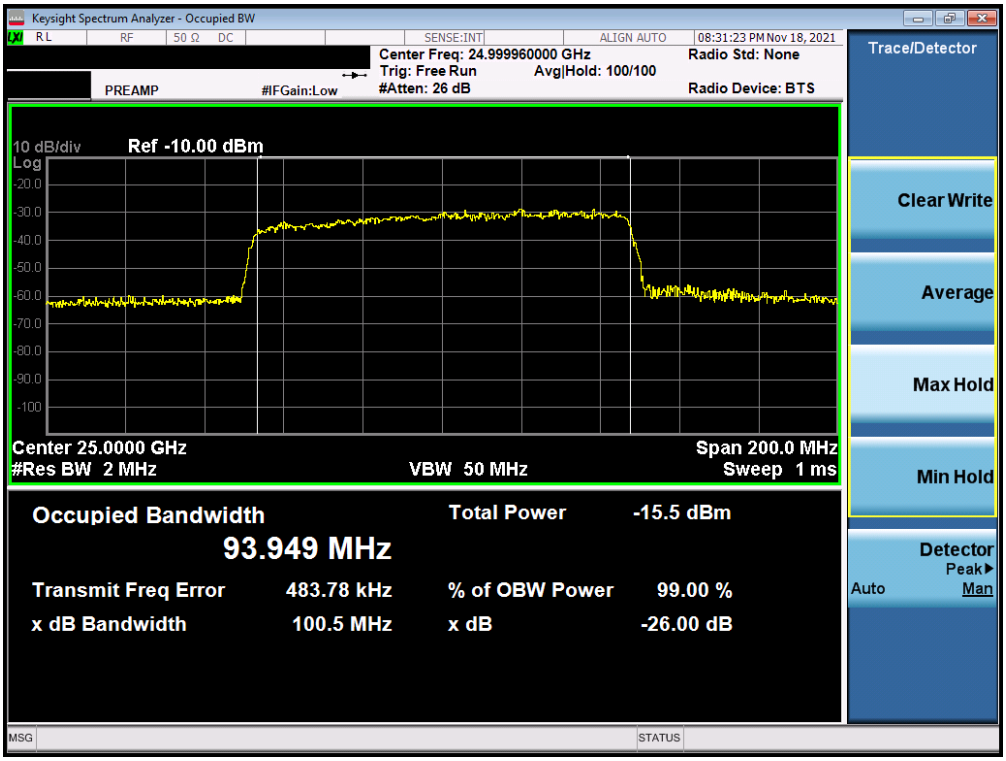
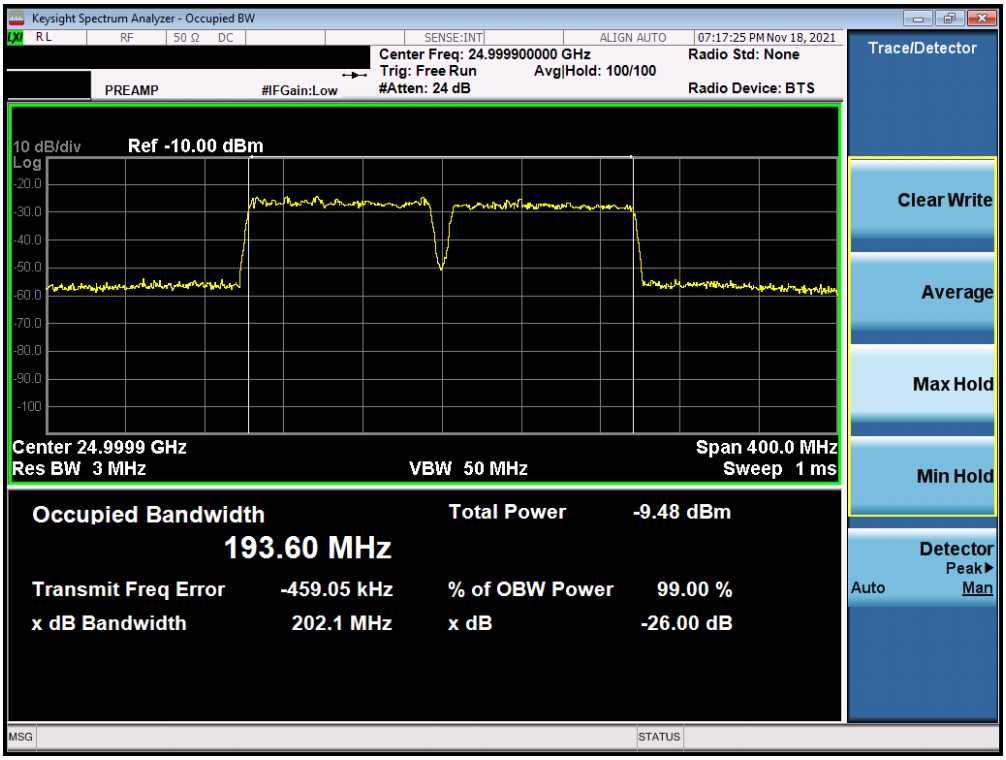


Plot 7-28. Ant1 Occupied Bandwidth Plot (100MHz-1CC – 64QAM – Mid Channel)



Plot 7-29. Ant1 Occupied Bandwidth Plot (100MHz-2CC – QPSK – Mid Channel)

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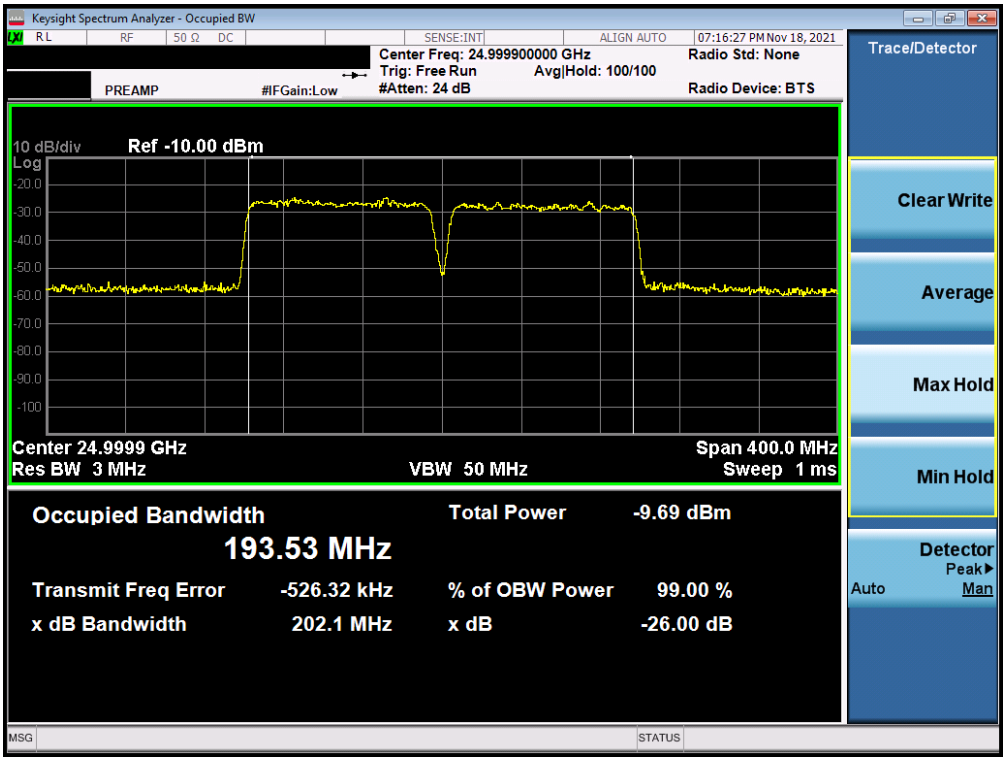
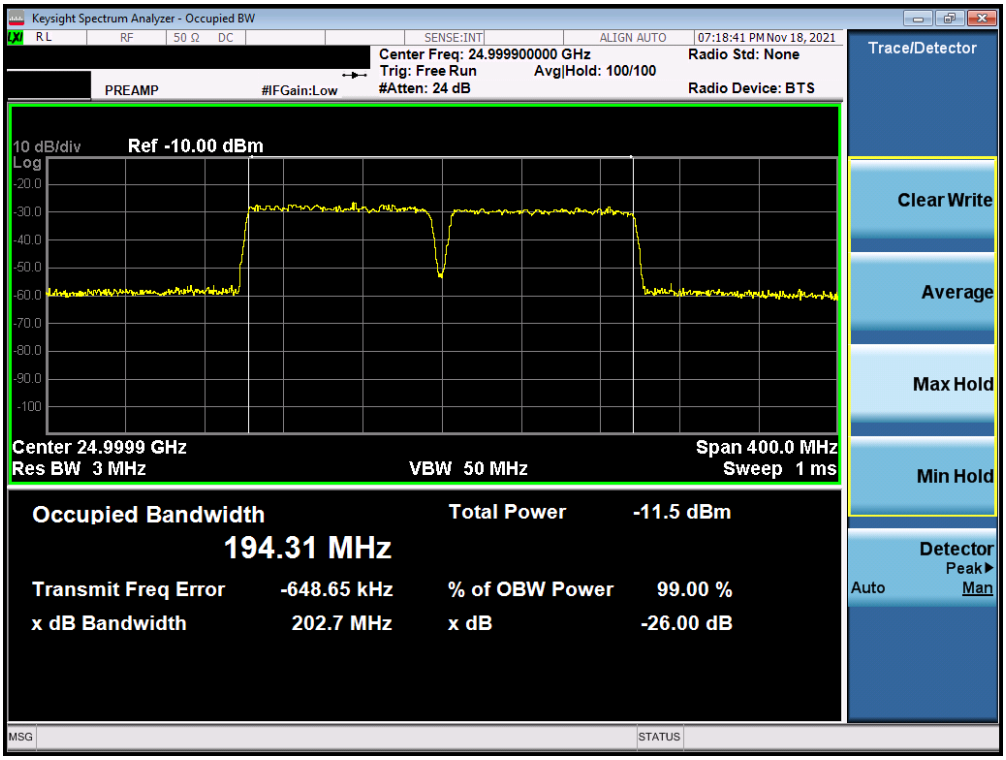


Plot 7-30. Ant1 Occupied Bandwidth Plot (100MHz-2CC – π/2 BPSK – Mid Channel)



Plot 7-31. Ant1 Occupied Bandwidth Plot (100MHz-2CC – 16QAM – Mid Channel)

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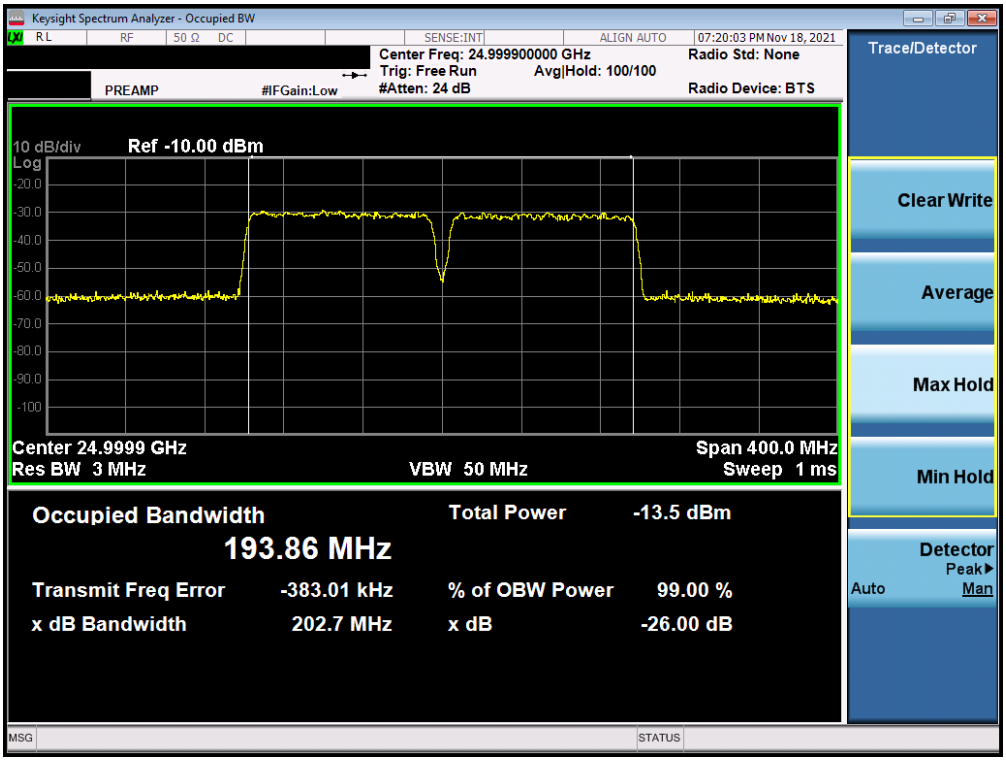

Plot 7-32. Ant1 Occupied Bandwidth Plot (100MHz-2CC – 64QAM – Mid Channel)

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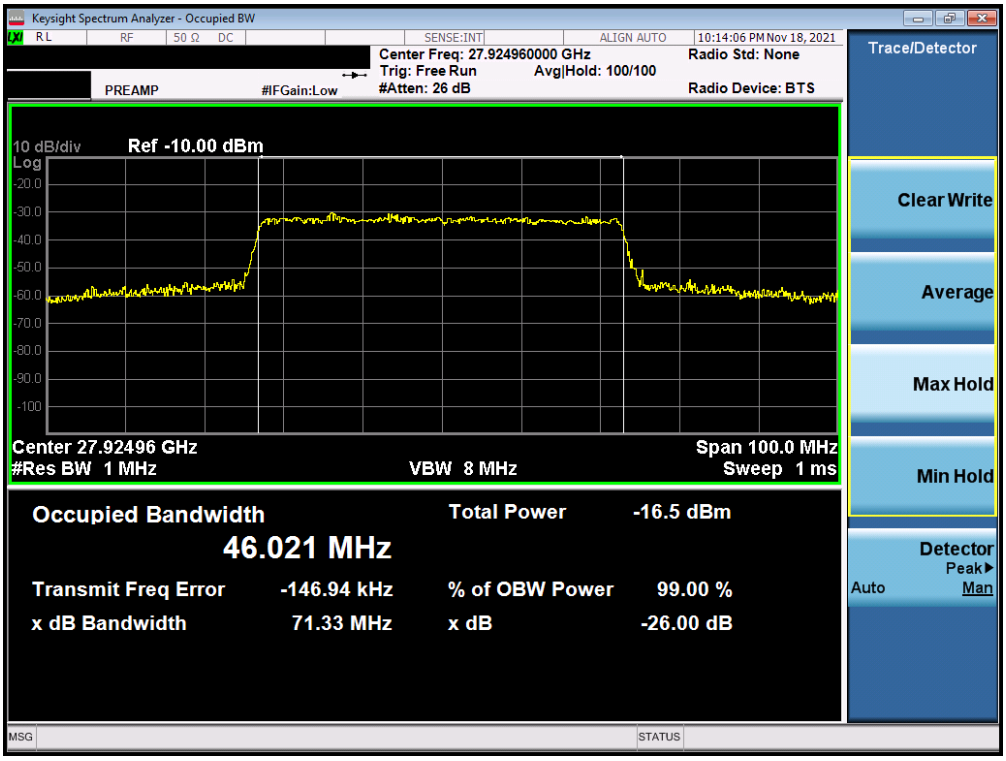
Band n261

Channel	Bandwidth	CCs Active	Transmission Scheme	Modulation	OBW [MHz]
Mid	50	1	CP-OFDM	QPSK	46.02
			DFT-s-OFDM	π/2-BPSK	45.78
			CP-OFDM	16QAM	46.06
			CP-OFDM	64QAM	46.20
		2	CP-OFDM	QPSK	95.77
			DFT-s-OFDM	π/2-BPSK	95.58
			CP-OFDM	16QAM	96.06
			CP-OFDM	64QAM	96.43
	100	1	CP-OFDM	QPSK	94.18
			DFT-s-OFDM	π/2-BPSK	91.35
			CP-OFDM	16QAM	94.21
			CP-OFDM	64QAM	94.82
		2	CP-OFDM	QPSK	194.48
			DFT-s-OFDM	π/2-BPSK	193.90
			CP-OFDM	16QAM	194.43
			DFT-s-OFDM	64QAM	194.76

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



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

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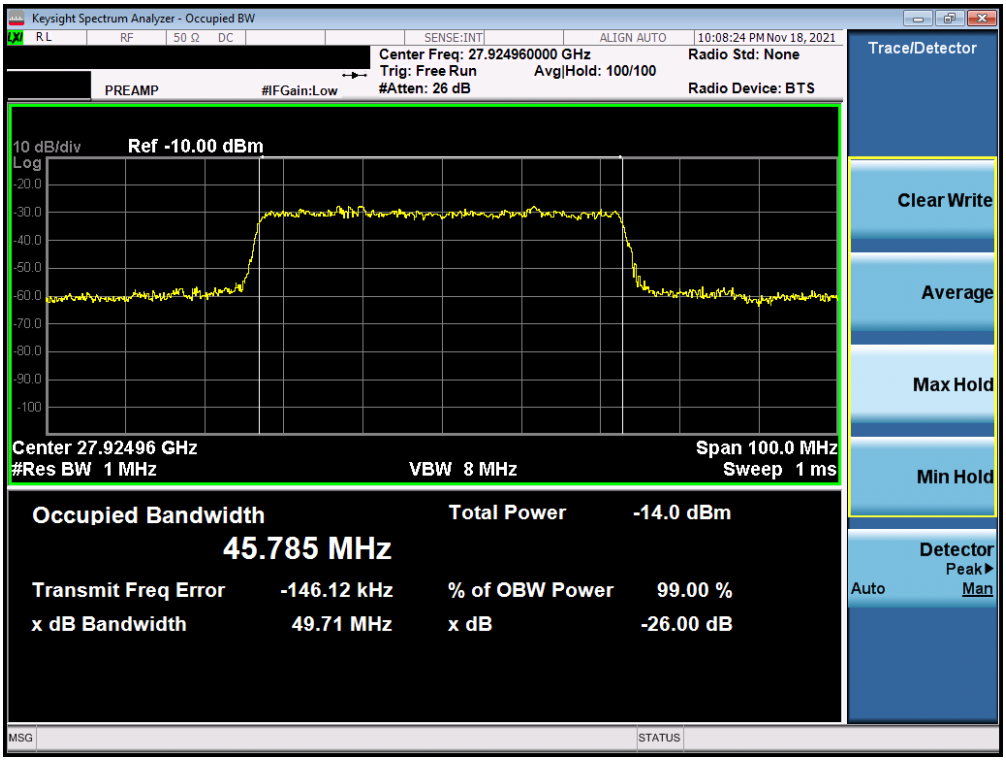
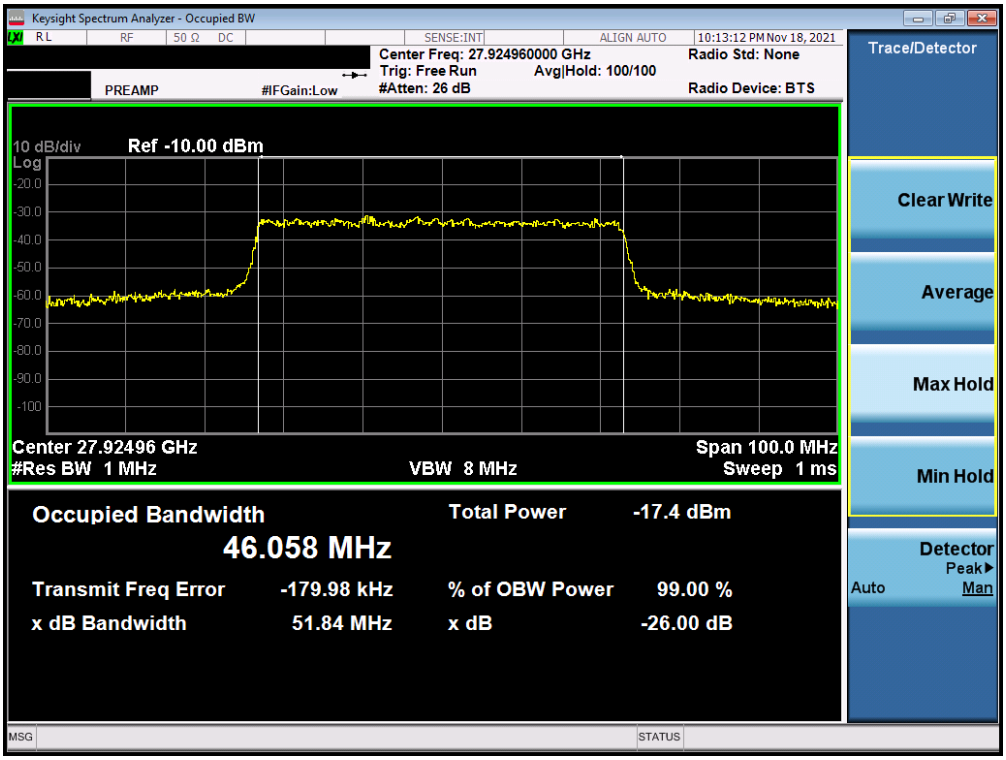


Plot 7-34. Ant1 Occupied Bandwidth Plot (50MHz-1CC – π/2 BPSK – Mid Channel)



Plot 7-35. Ant1 Occupied Bandwidth Plot (50MHz-1CC – 16QAM – Mid Channel)

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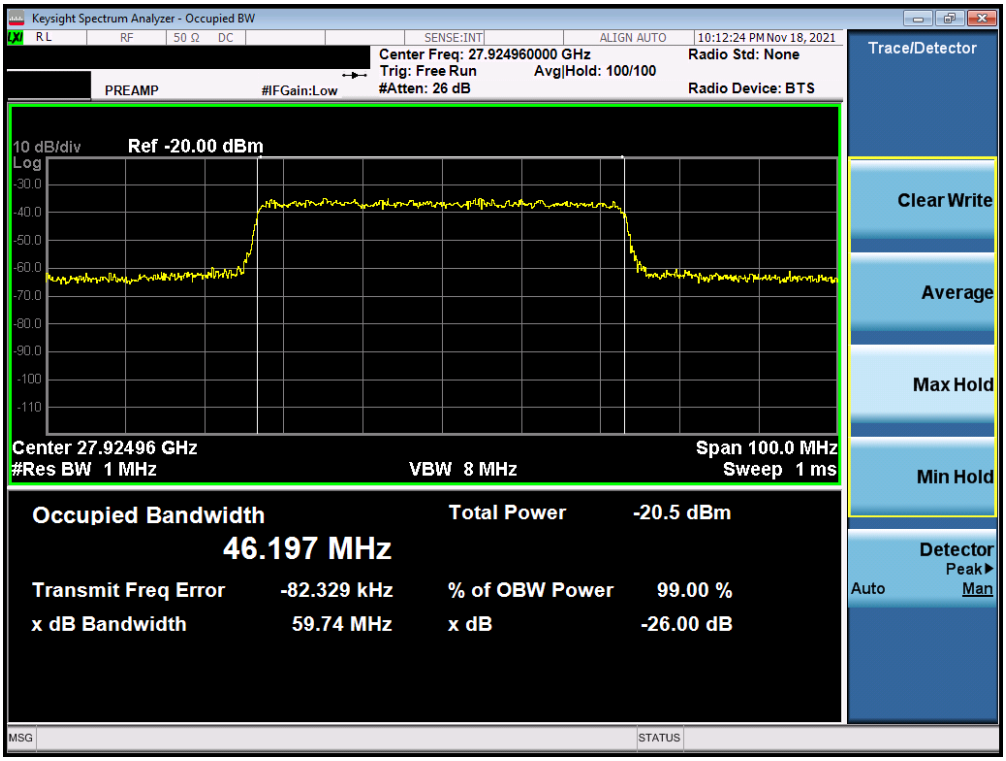
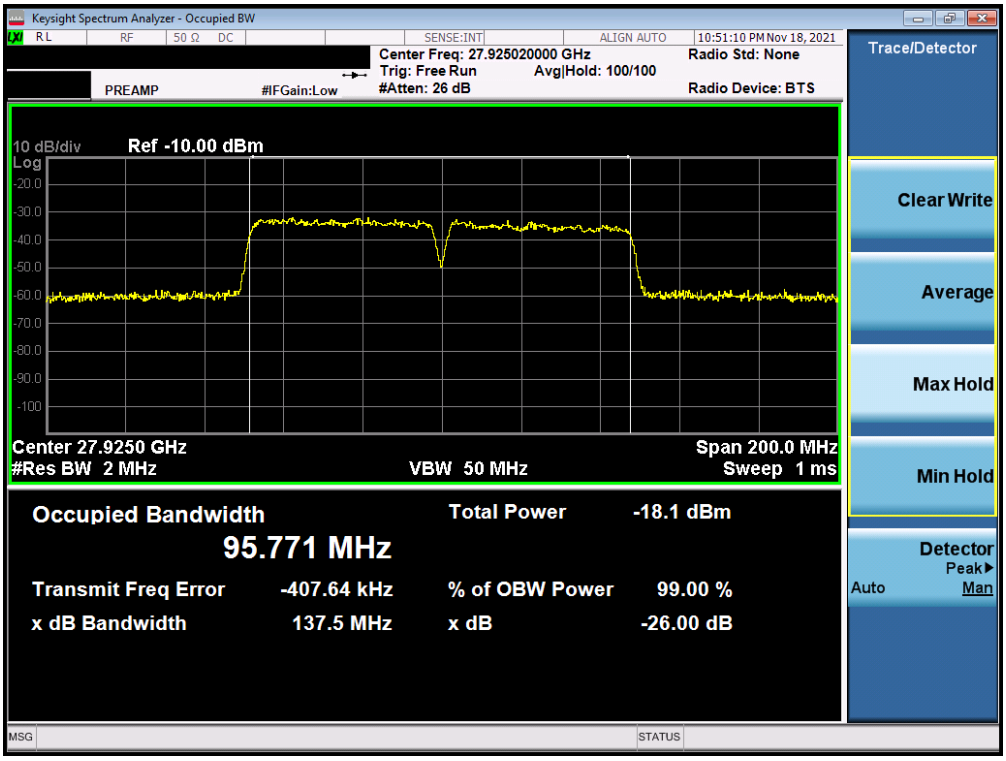


Plot 7-36. Ant1 Occupied Bandwidth Plot (50MHz-1CC – 64QAM – Mid Channel)



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

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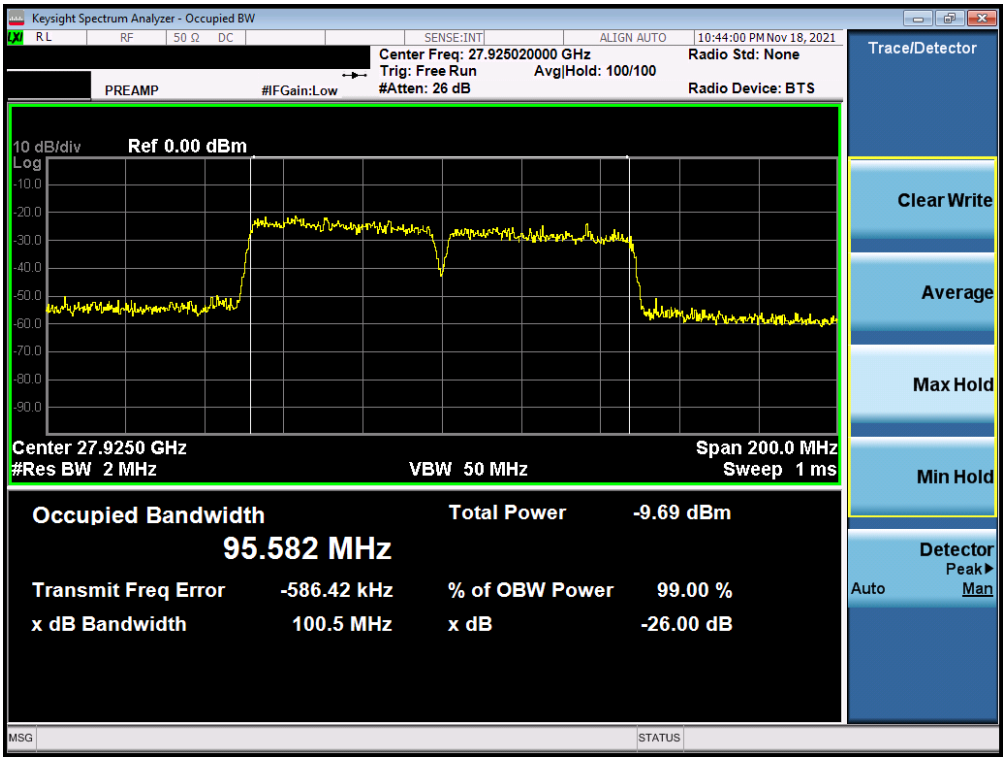
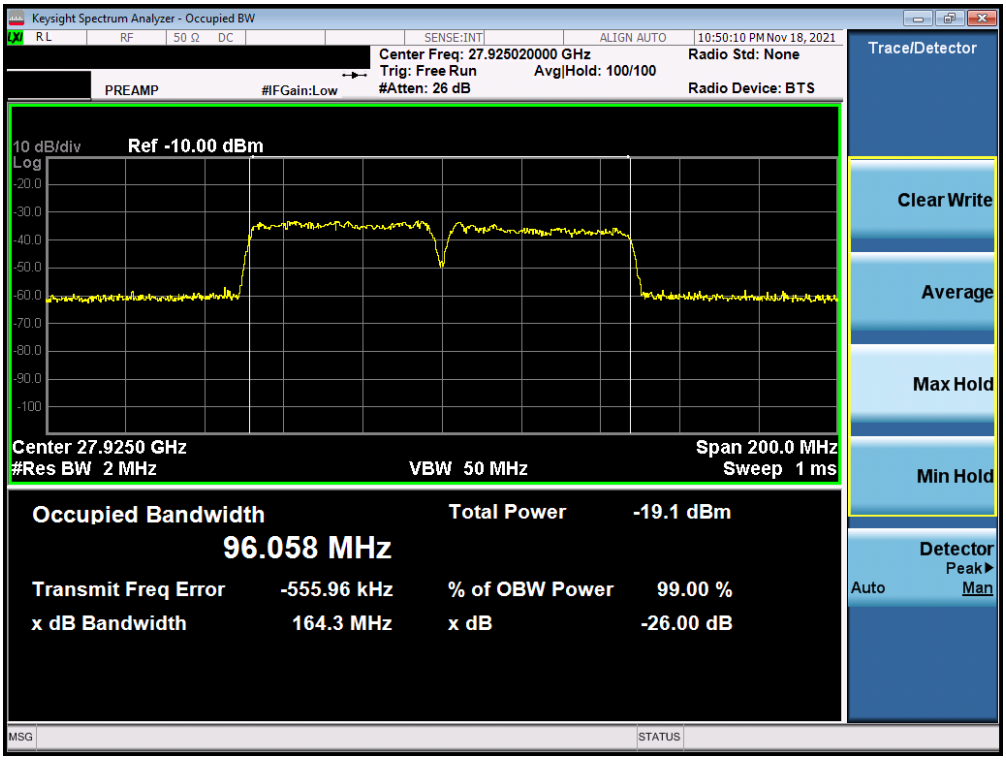


Plot 7-38. Ant1 Occupied Bandwidth Plot (50MHz-2CC – π/2 BPSK – Mid Channel)



Plot 7-39. Ant1 Occupied Bandwidth Plot (50MHz-2CC – 16QAM – Mid Channel)

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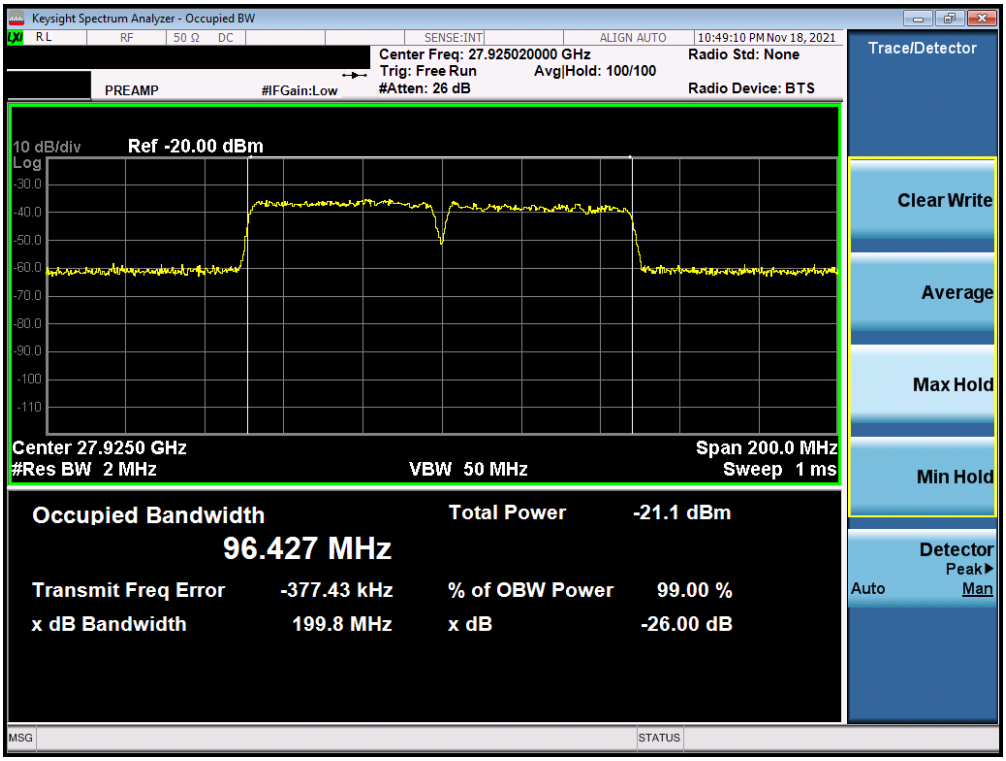
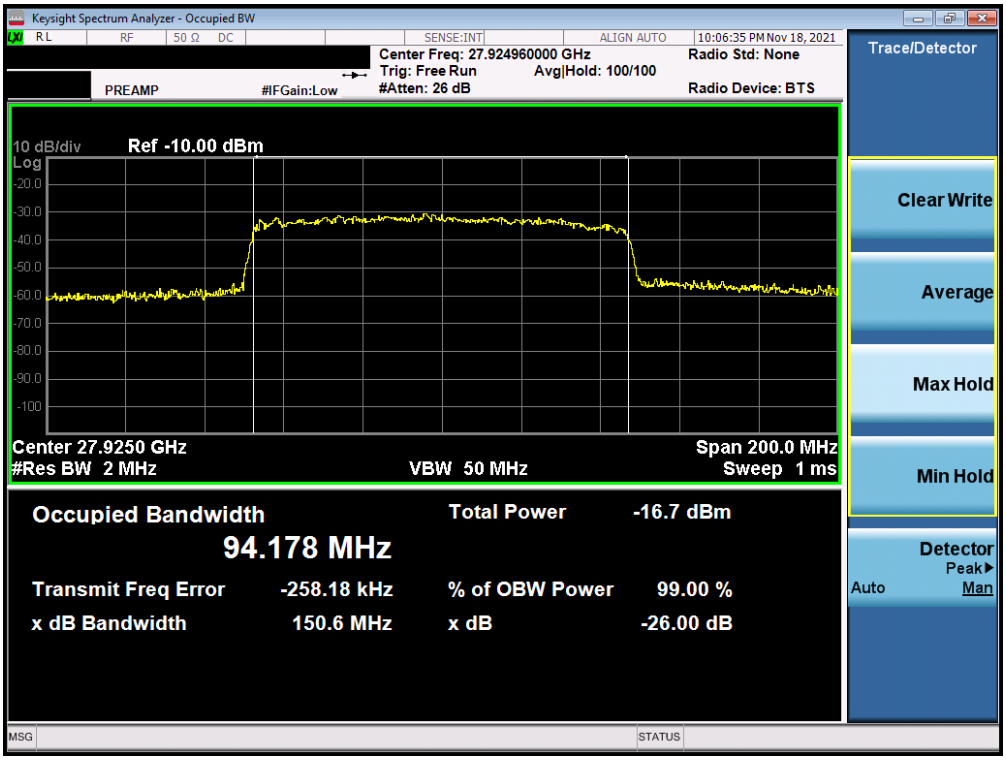


Plot 7-40. Ant1 Occupied Bandwidth Plot (50MHz-2CC – 64QAM – Mid Channel)



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

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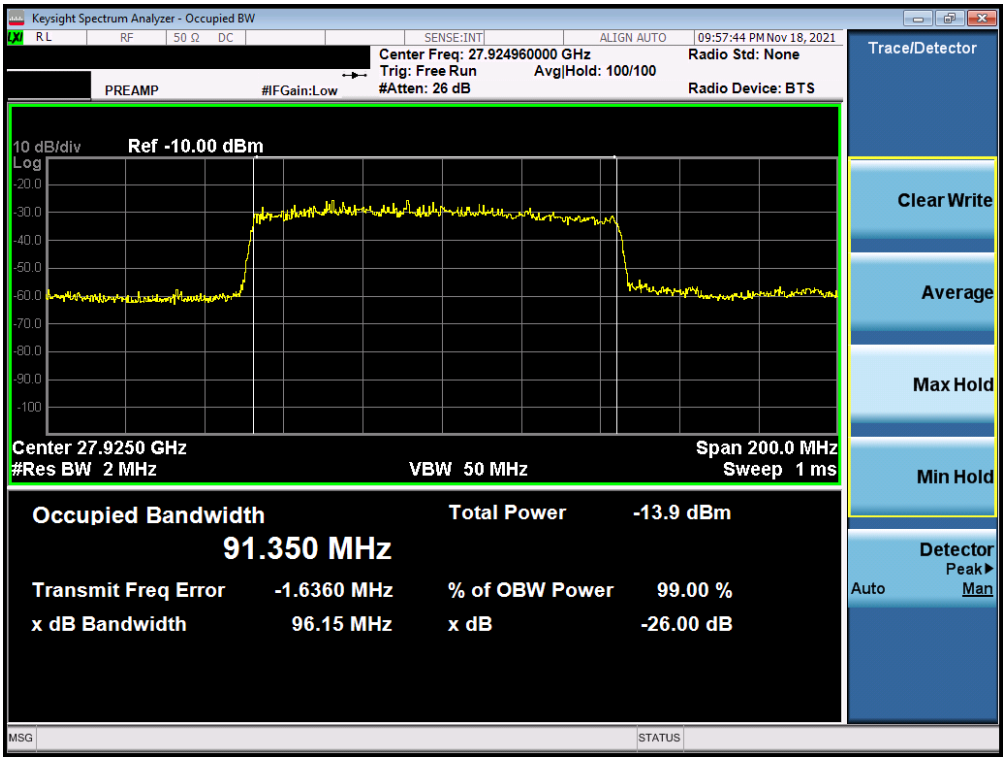
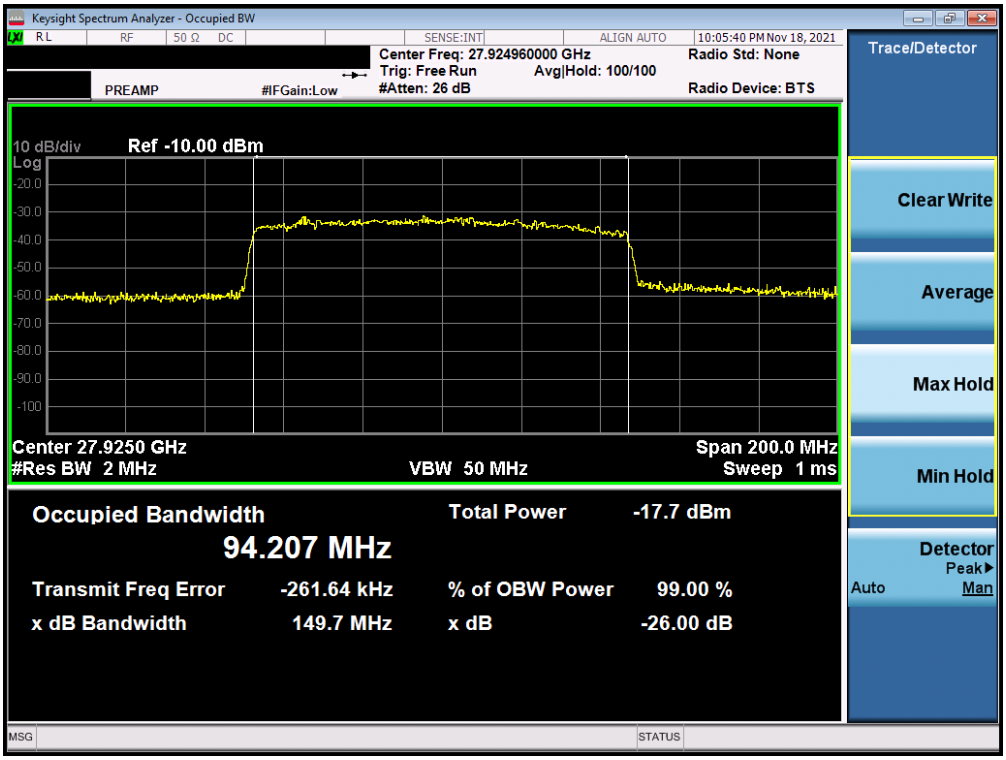


Plot 7-42. Ant1 Occupied Bandwidth Plot (100MHz-1CC – π/2 BPSK – Mid Channel)



Plot 7-43. Ant1 Occupied Bandwidth Plot (100MHz-1CC – 16QAM – Mid Channel)

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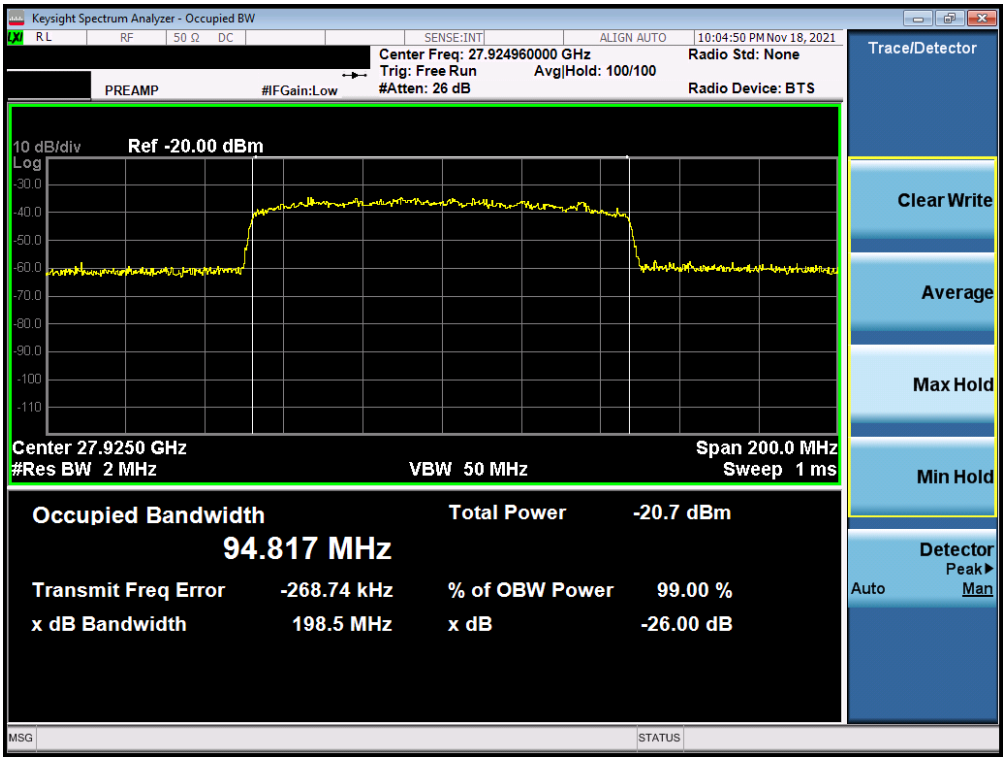
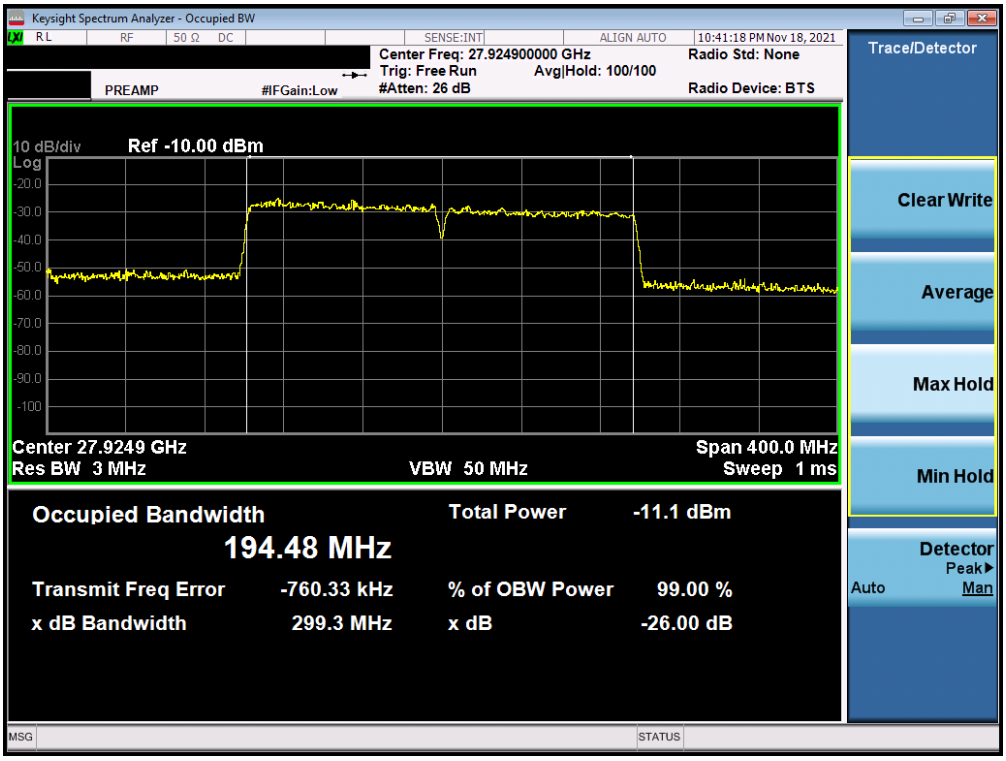


Plot 7-44. Ant1 Occupied Bandwidth Plot (100MHz-1CC – 64QAM – Mid Channel)



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

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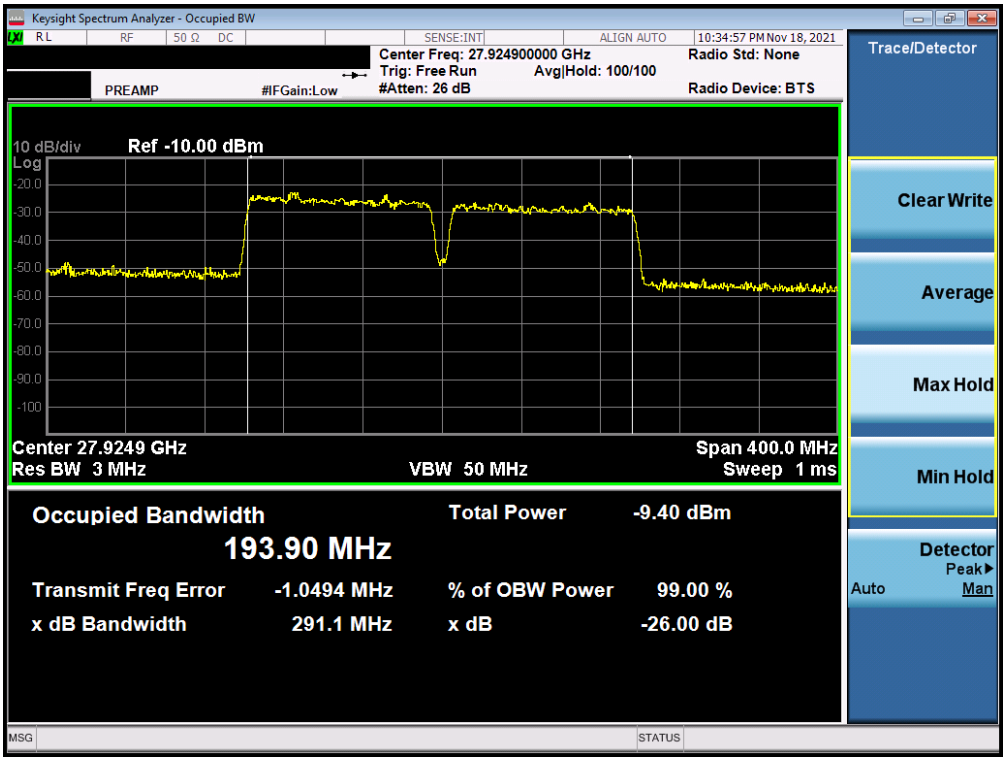
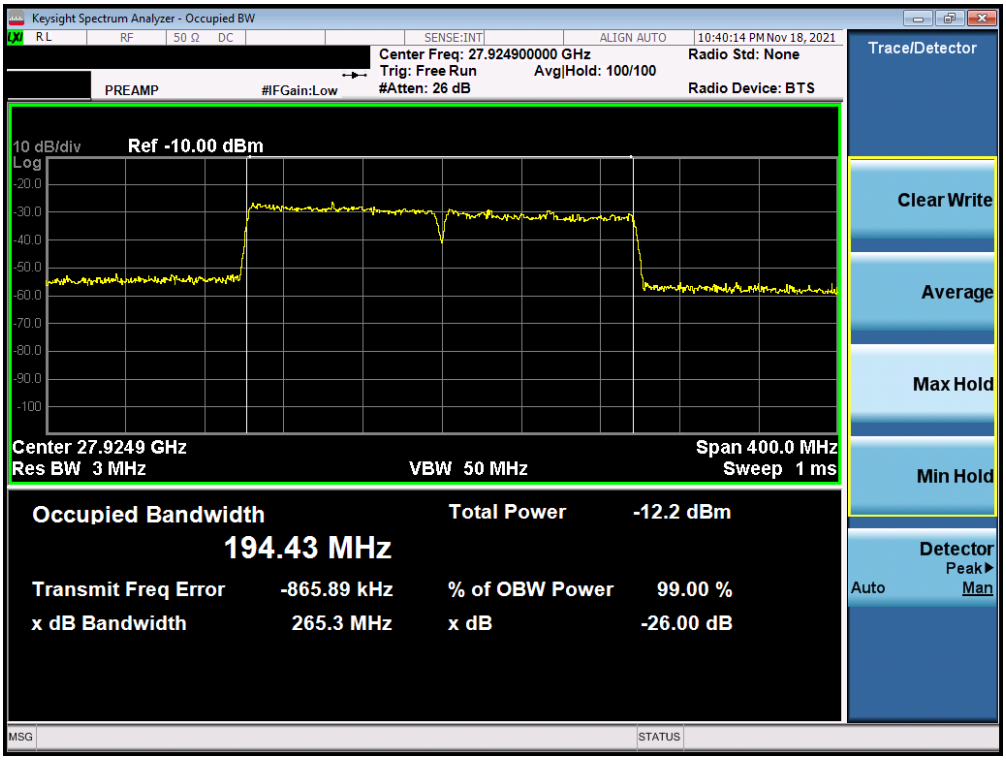


Plot 7-46. Ant1 Occupied Bandwidth Plot (100MHz-2CC – π/2 BPSK – Mid Channel)



Plot 7-47. Ant1 Occupied Bandwidth Plot (100MHz-2CC – 16QAM – Mid Channel)

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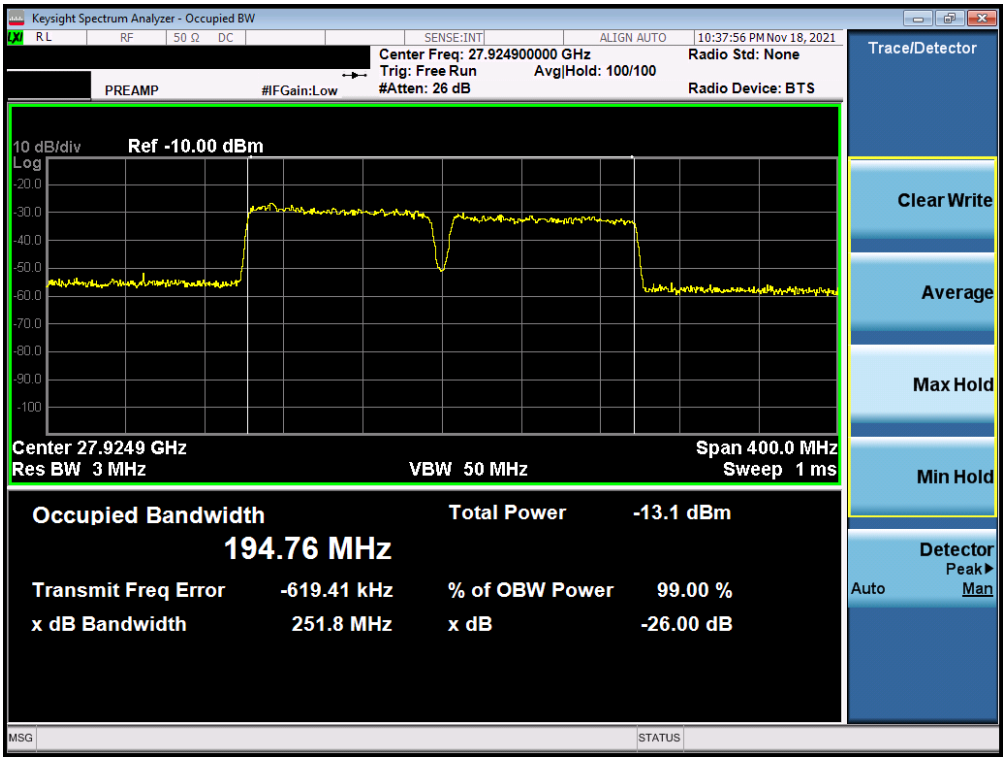

Plot 7-48. Ant1 Occupied Bandwidth Plot (100MHz-2CC – 64QAM – Mid Channel)

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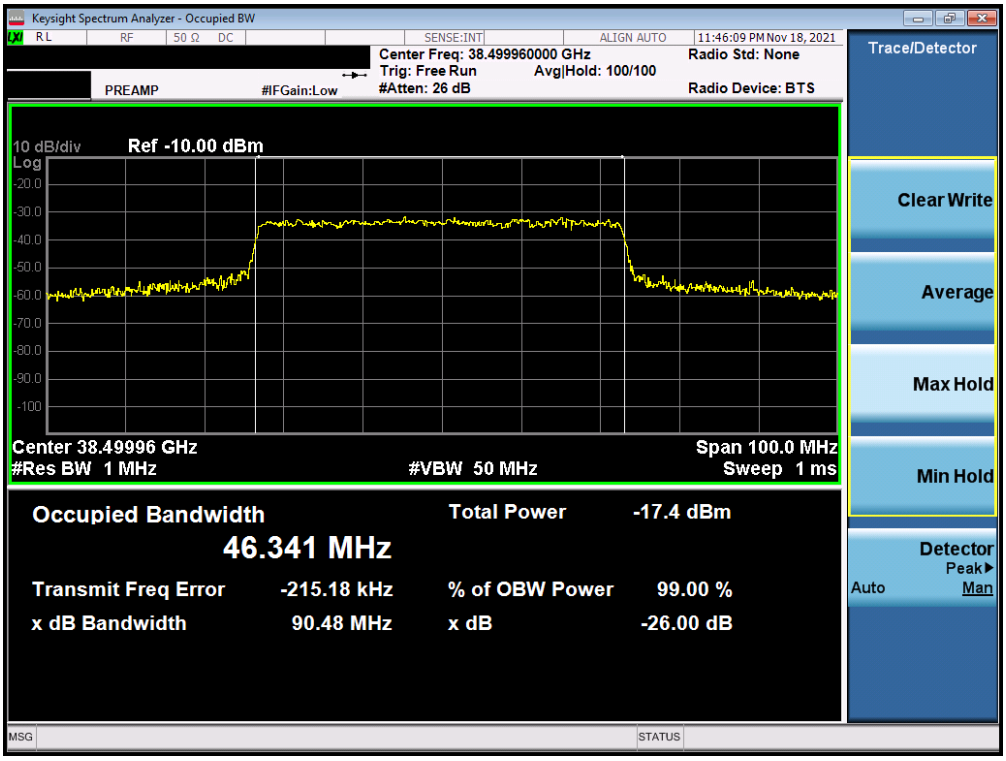
Band n260

Channel	Bandwidth	CCs Active	Transmission Scheme	Modulation	OBW [MHz]
Mid	50	1	CP-OFDM	QPSK	46.34
			DFT-s-OFDM	π/2-BPSK	46.39
			CP-OFDM	16QAM	46.22
			CP-OFDM	64QAM	46.24
		2	DFT-s-OFDM	QPSK	94.73
			DFT-s-OFDM	π/2-BPSK	94.78
			DFT-s-OFDM	16QAM	94.92
			CP-OFDM	64QAM	95.15
	100	1	CP-OFDM	QPSK	94.77
			DFT-s-OFDM	π/2-BPSK	91.90
			CP-OFDM	16QAM	94.72
			CP-OFDM	64QAM	95.37
		2	CP-OFDM	QPSK	194.70
			DFT-s-OFDM	π/2-BPSK	193.99
			CP-OFDM	16QAM	195.03
			CP-OFDM	64QAM	197.73

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



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

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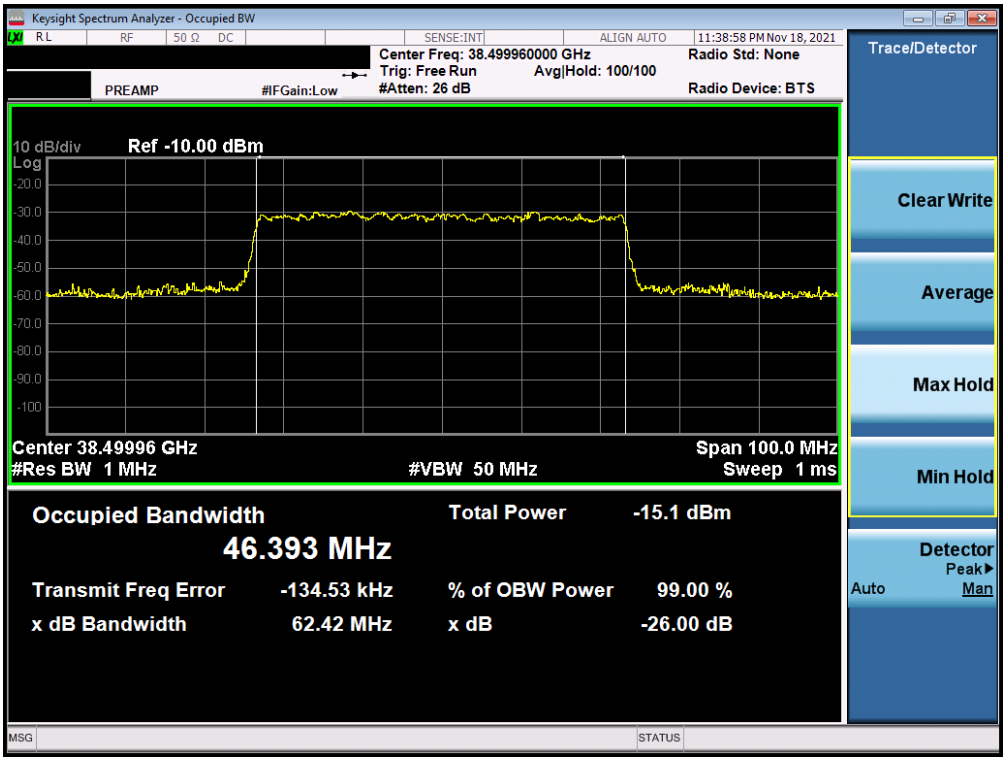
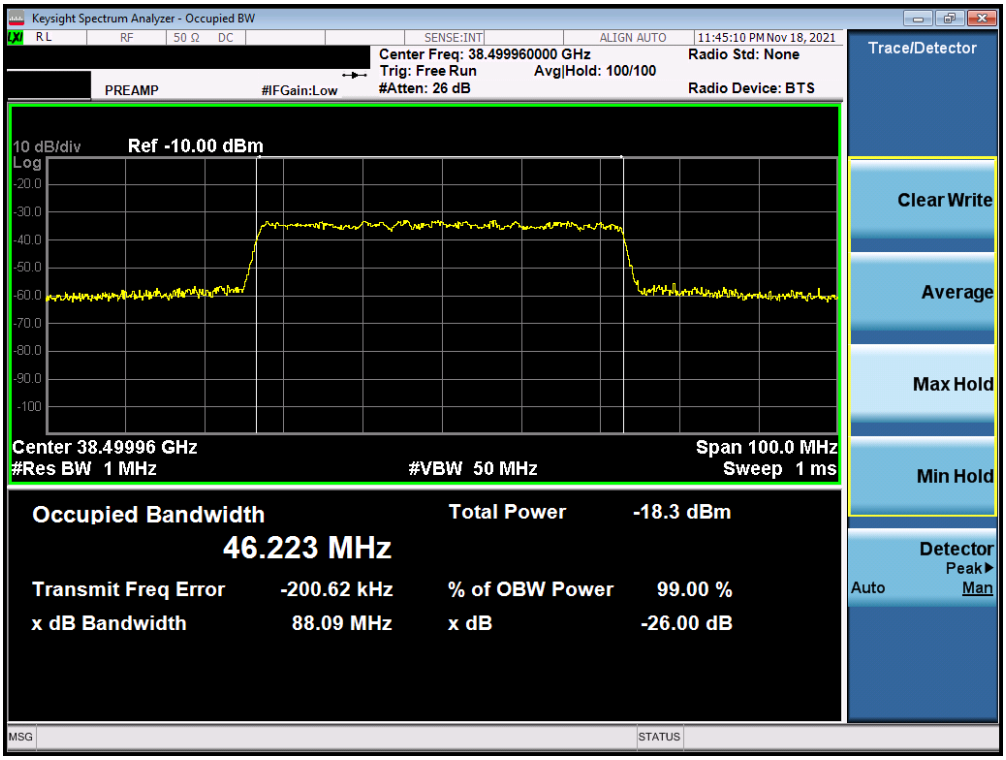


Plot 7-50. Occupied Bandwidth Plot (50MHz-1CC – π/2 BPSK – Mid Channel)



Plot 7-51. Occupied Bandwidth Plot (50MHz-1CC – 16QAM – Mid Channel)

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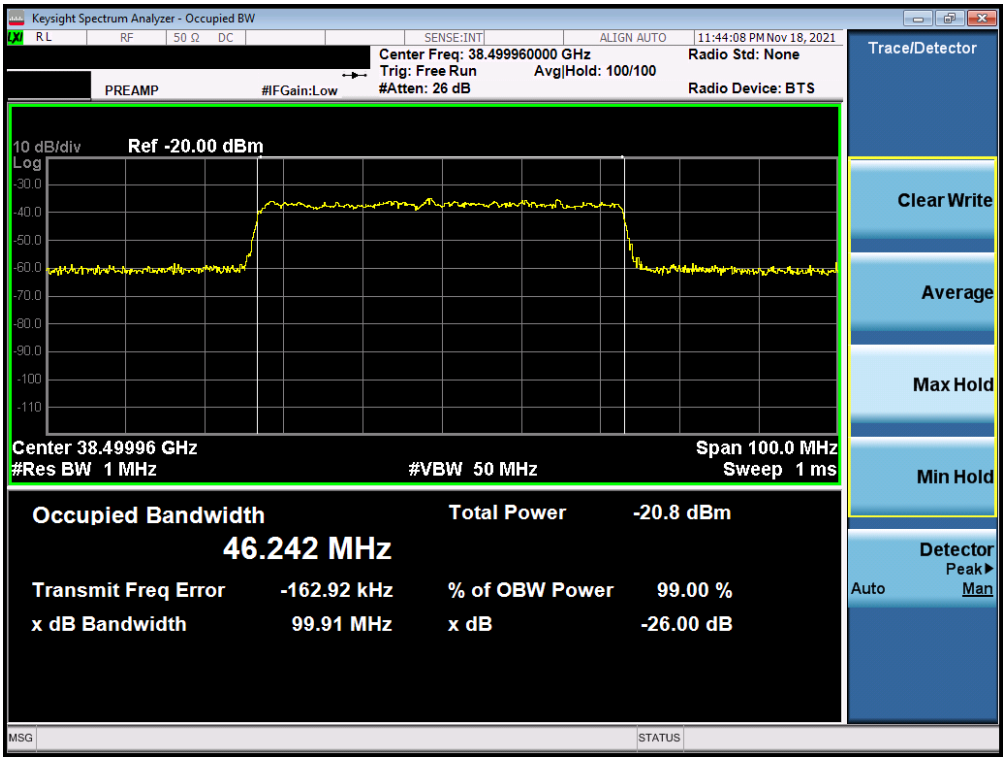
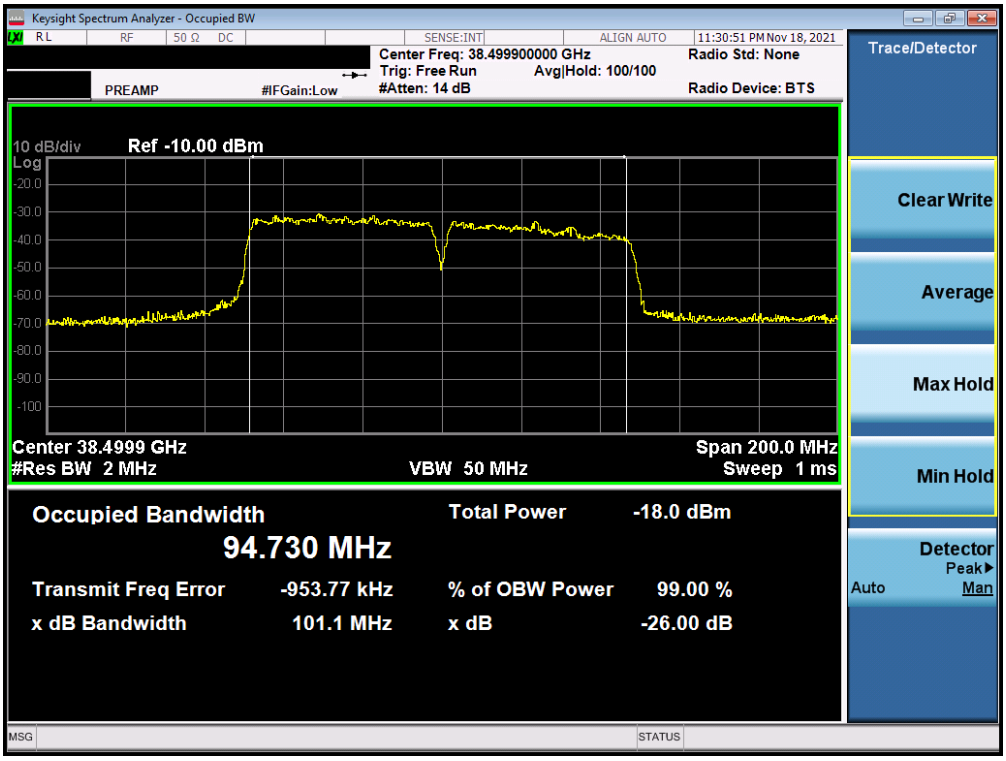


Plot 7-52. Occupied Bandwidth Plot (50MHz-1CC – 64QAM – Mid Channel)



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

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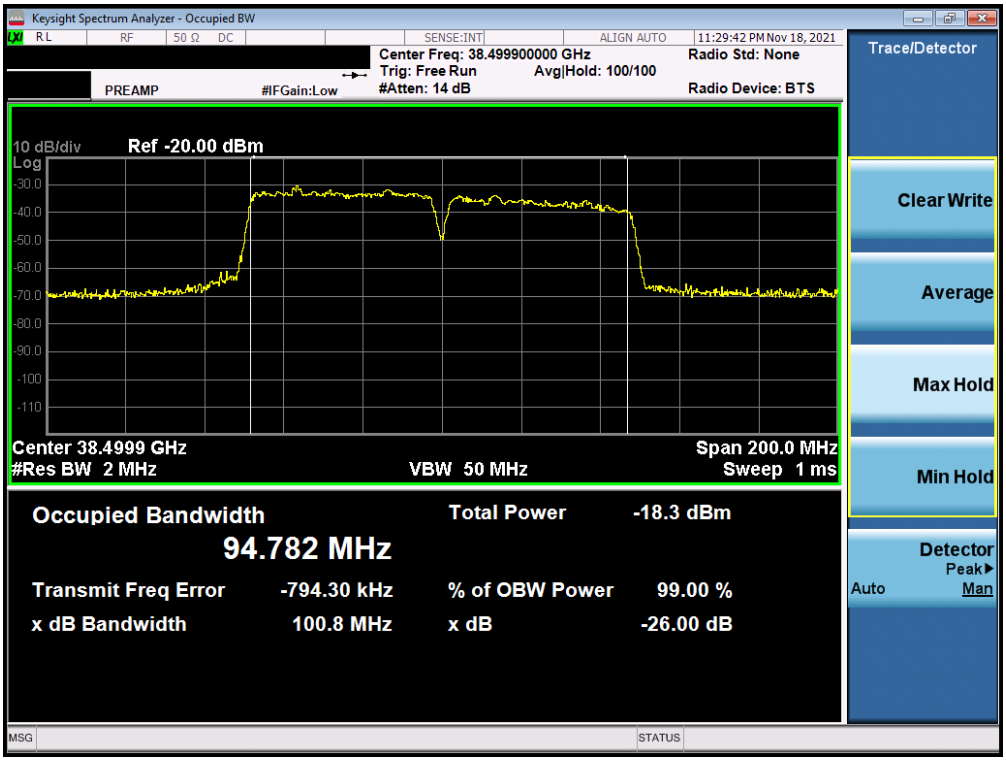
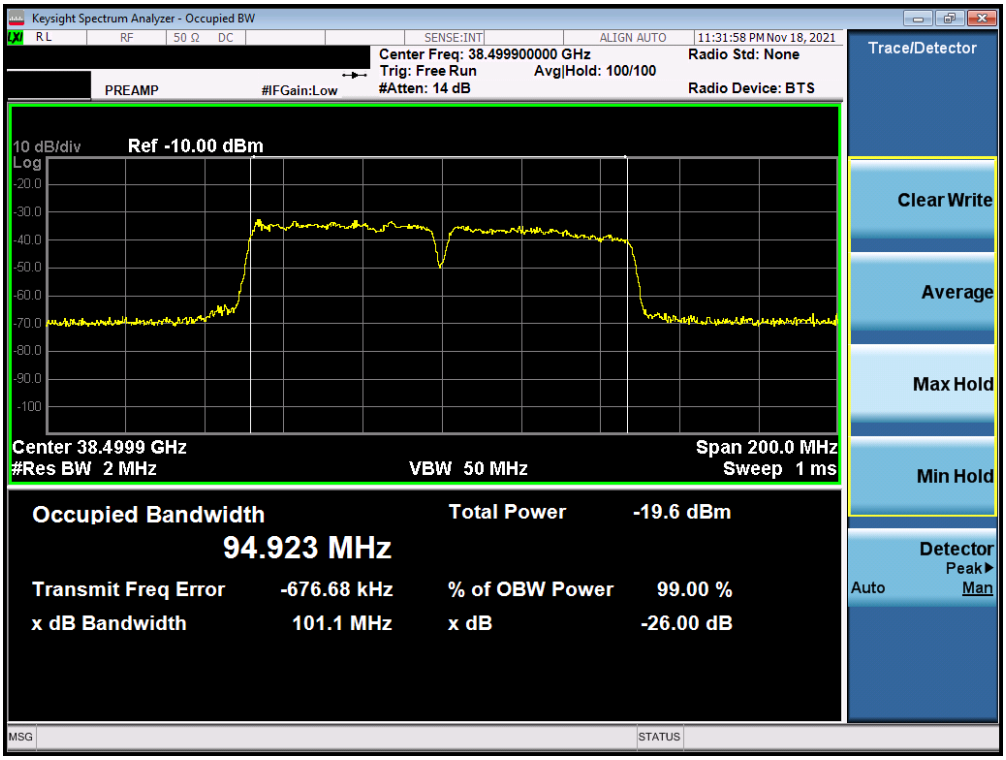


Plot 7-54. Occupied Bandwidth Plot (50MHz-2CC – π/2 BPSK – Mid Channel)



Plot 7-55. Ant1 Occupied Bandwidth Plot (50MHz-2CC – 16QAM – Mid Channel)

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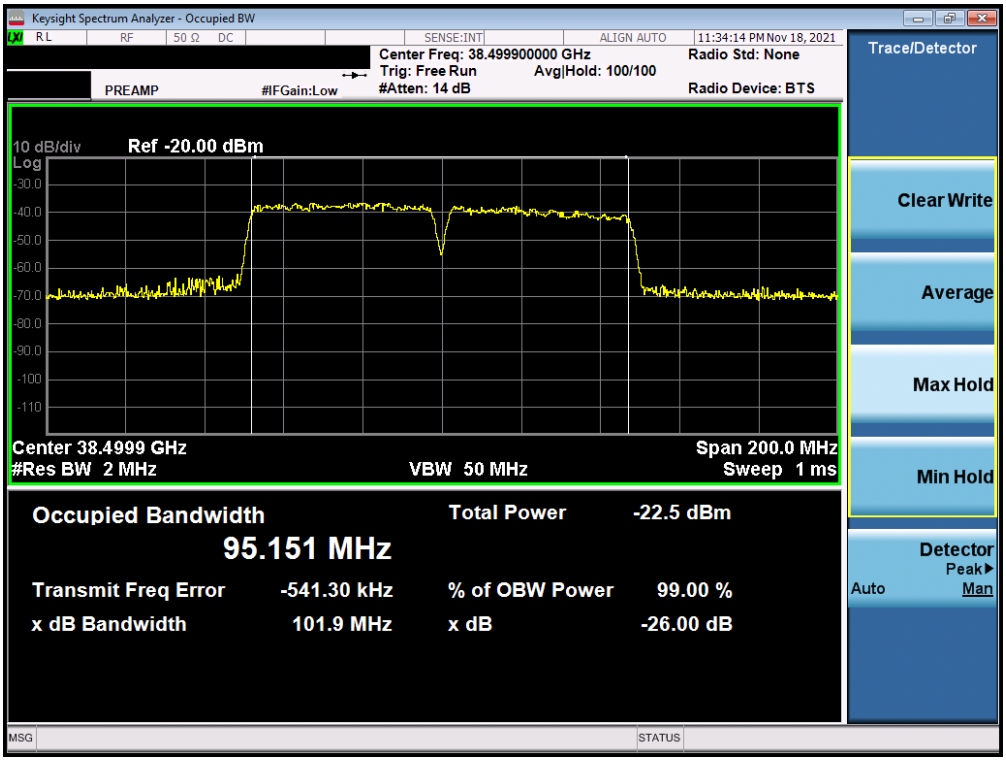
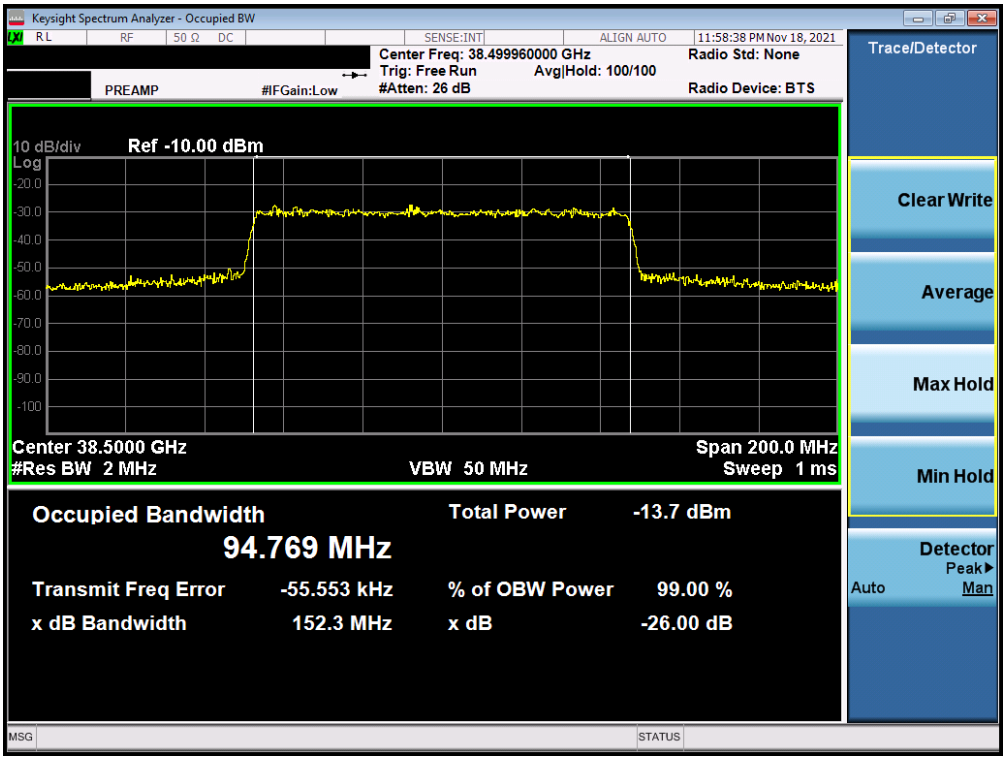


Plot 7-56. Occupied Bandwidth Plot (50MHz-2CC – 64QAM – Mid Channel)



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

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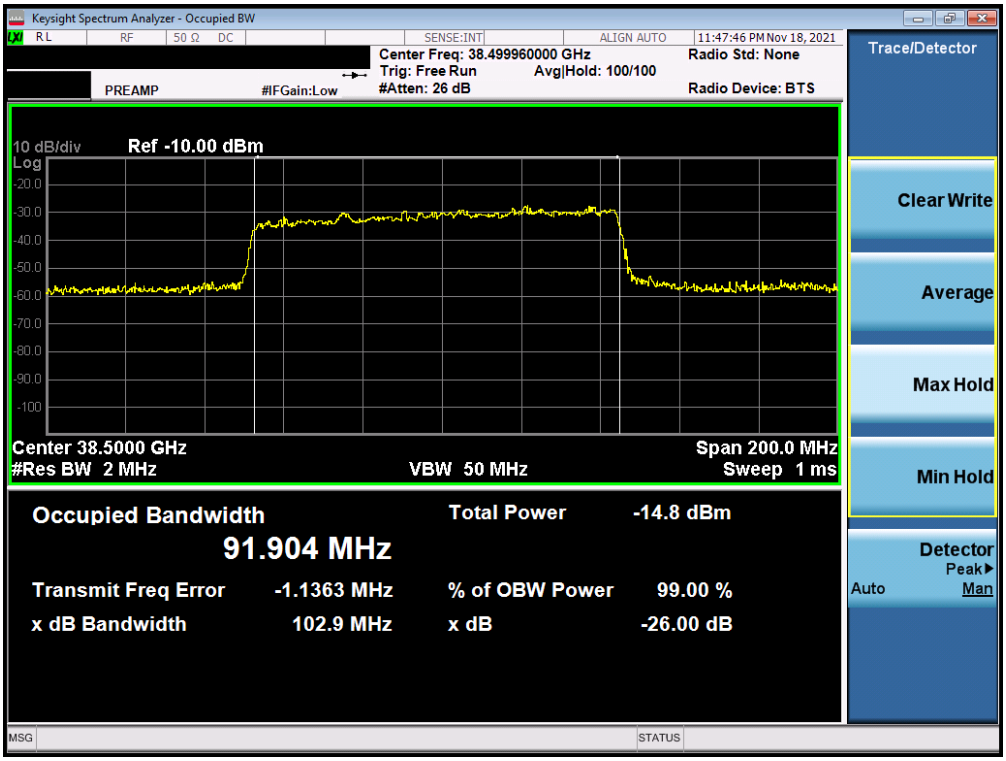
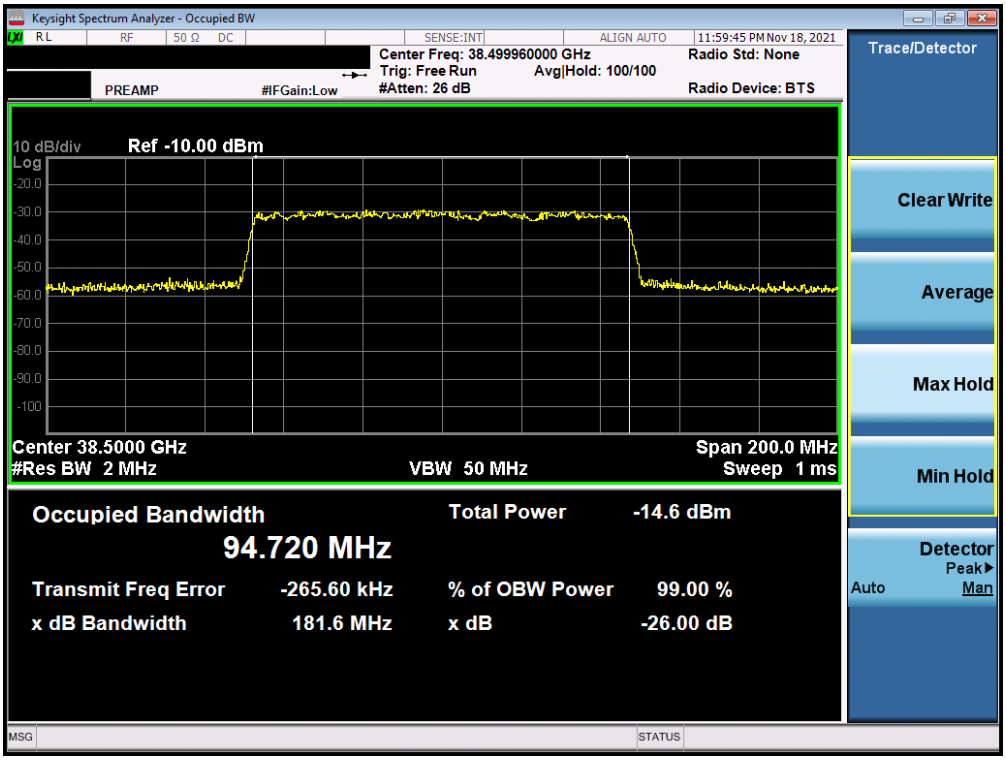


Plot 7-58. Occupied Bandwidth Plot (100MHz-1CC – π/2 BPSK – Mid Channel)



Plot 7-59. Occupied Bandwidth Plot (100MHz-1CC – 16QAM – Mid Channel)

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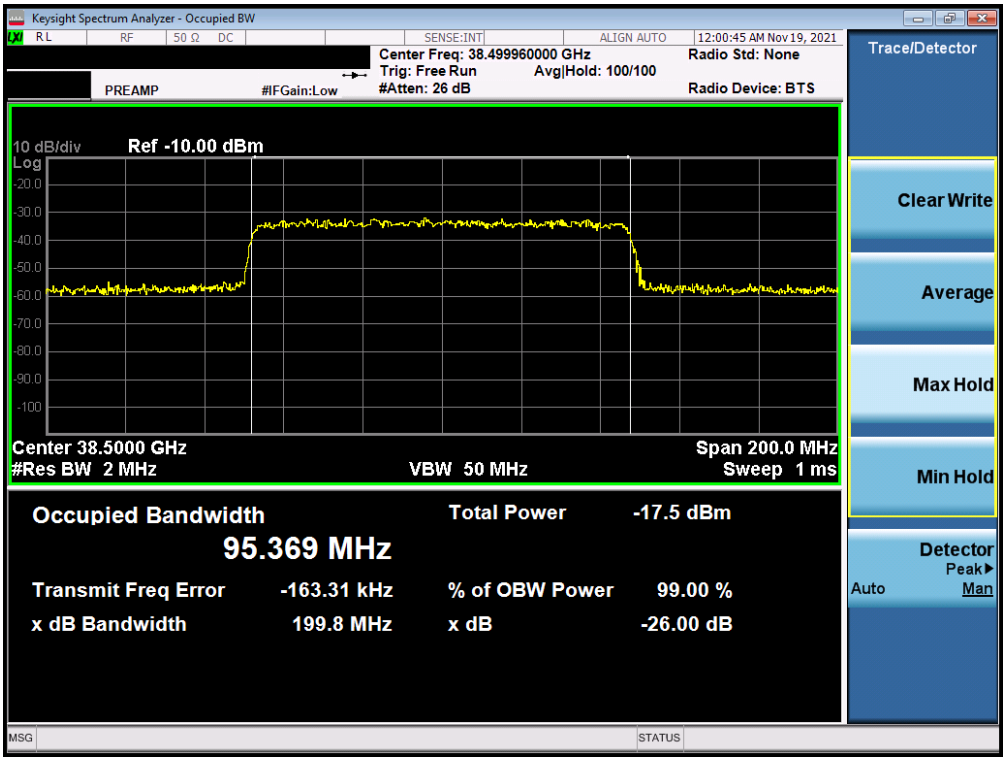
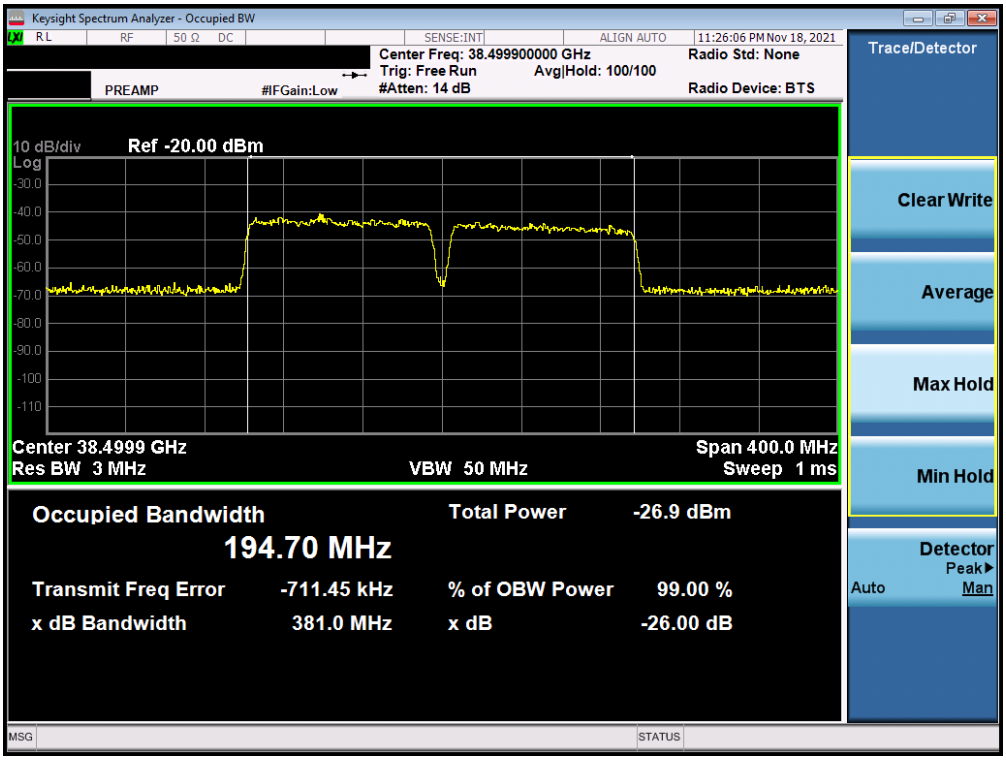


Plot 7-60. Occupied Bandwidth Plot (100MHz-1CC – 64QAM – Mid Channel)



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

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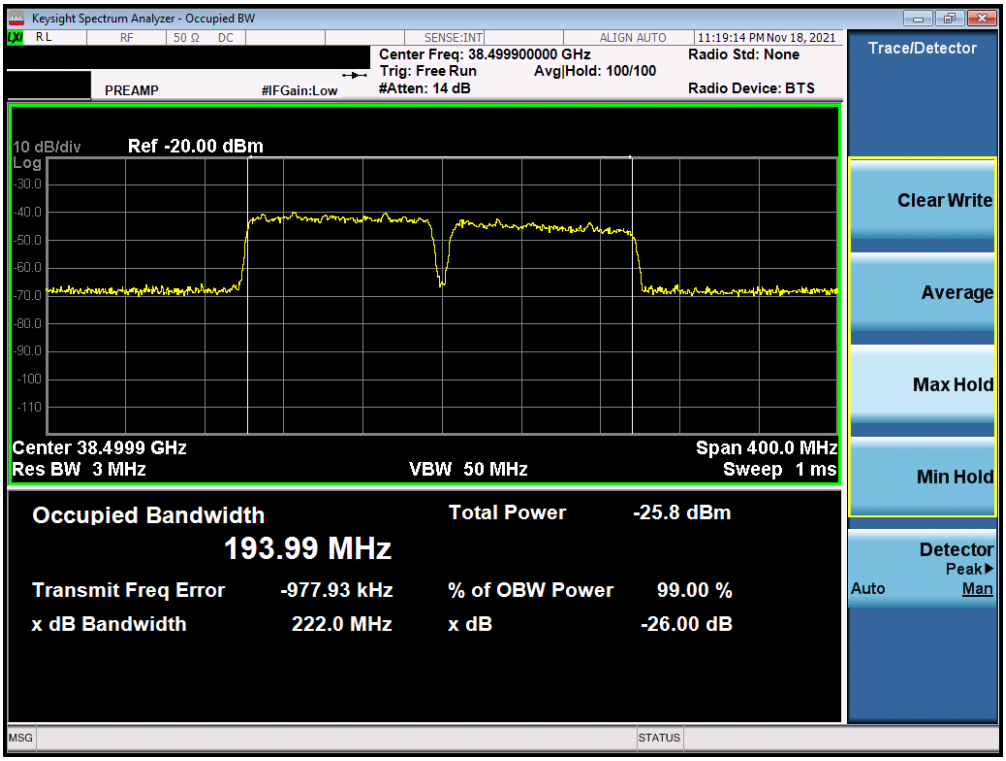
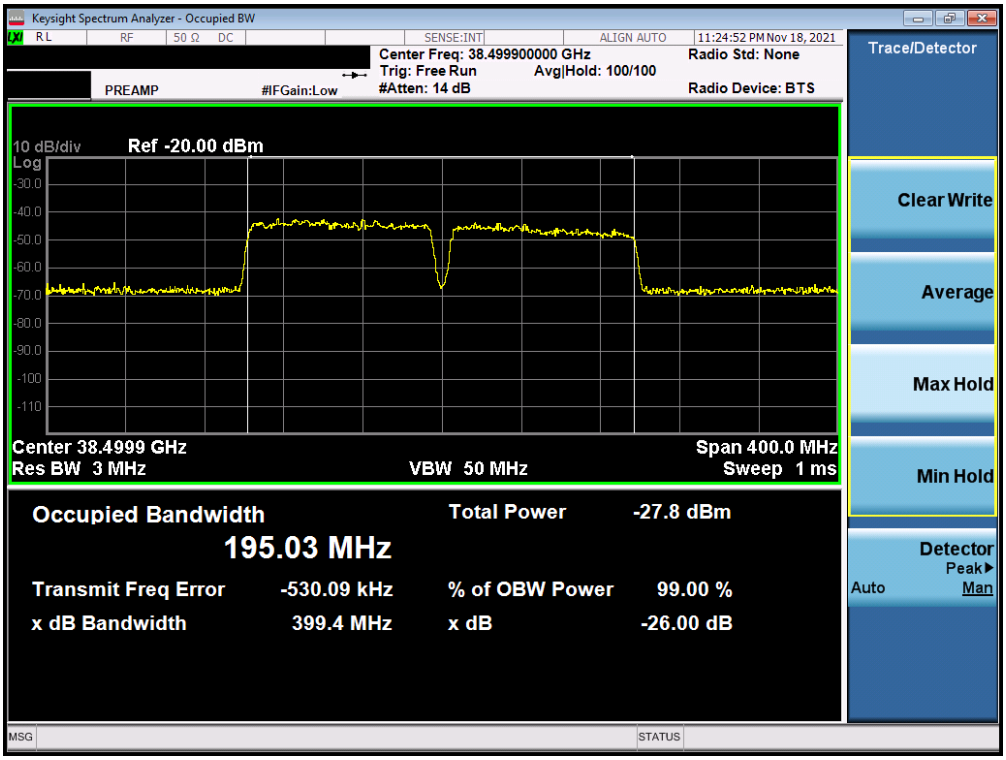


Plot 7-62. Occupied Bandwidth Plot (100MHz-2CC – π/2 BPSK – Mid Channel)



Plot 7-63. Occupied Bandwidth Plot (100MHz-2CC – 16QAM – Mid Channel)

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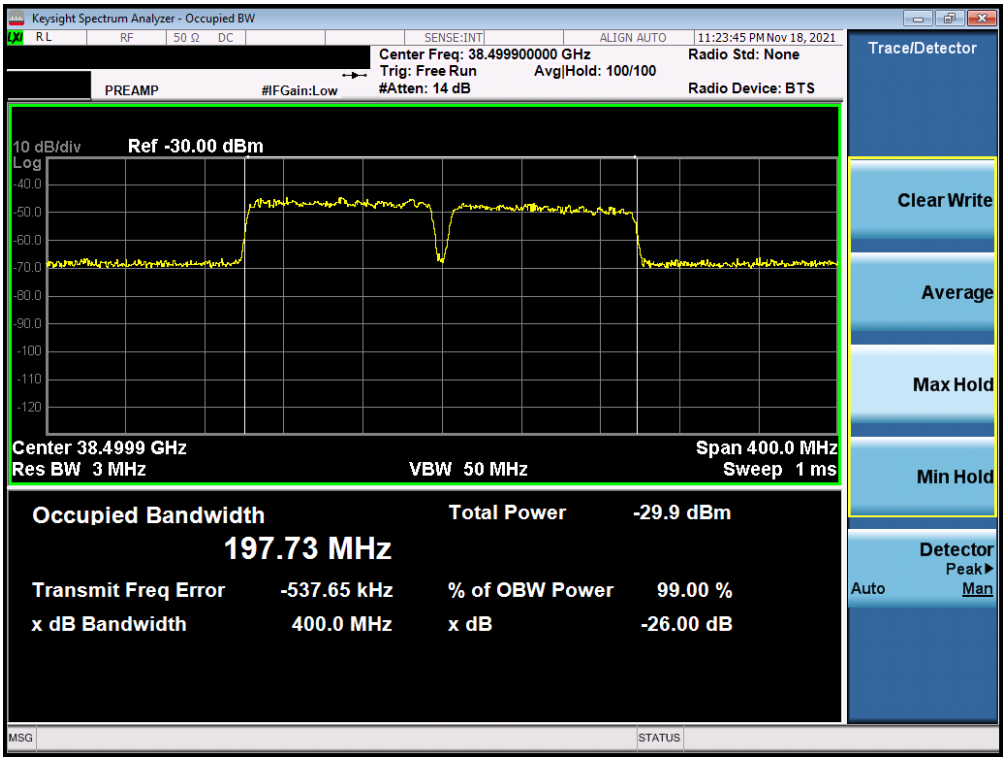

Plot 7-64. Occupied Bandwidth Plot (100MHz-2CC – 64QAM – Mid Channel)

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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 v01r02 Section 4.2

Test Settings

1. Radiated power measurements are performed using the signal analyzer's "channel power" measurement capability for signals with continuous operation.
2. RBW = 1 – 5% of the expected OBW
3. VBW ≥ 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 for all bands were taken at 1m test distance as was required for far-field conditions.

4) The average EIRP reported below is calculated per section 5.2.7 of ANSI C63.26-2015 which states: EIRP (dBm) = E (dBµV/m) + 20log(D) − 104.8; where D is the measurement distance (in the far field region) in m. The field strength at the antenna terminals E is calculated E (dBµV/m) = Spectrum Analyzer Channel Power Level (dBm) + Antenna Factor (dB/m) + Cable Loss (dB) + 107.

5) All EIRP measurements were made with the appropriate offset levels loaded into the spectrum analyzer as determined from the measurement distance, antenna factor, cable loss, and the equations in Note 4 above.

6) Radiated power levels are investigated while the receive antenna was rotated through all angles to determine the worst case polarization/positioning.

7) This device supports transmission of H-polarized and V-polarized beams from the antenna array in both CP-OFDM and DFT-s-OFDM transmission schemes. SISO and MIMO operation is also supported for some configurations. As part of the testing, all modes are investigated fully on the channel showing the highest simulated EIRP using QPSK modulation. The configuration that shows the highest measured EIRP was then used to determine the EIRP for the low and high channels and for the additional modulations.

8) Several BeamID's are investigated based on the provided simulated data to determine the worst-case BeamID.

9) For each band and antenna array configuration investigated, worst case EIRP plots are displayed for all total bandwidths tested (50MHz, 100MHz, 200MHz). Since these EIRP plots were measured separately from the data in the EIRP tables, results displayed in the plots may marginally differ from the corresponding results displayed in EIRP data tables. However, any differences are negligible and well within the stated measurement uncertainty.

Sample Calculation

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

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

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

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

shall be loaded into the spectrum analyzer.

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Band n258-R1 Beam ID Configurations

Mode	Channel	Polarization	Beam ID	Beam ID Pair
SISO	Low	H	36	
		V	164	
	Mid	H	36	
		V	164	
	High	H	36	
		V	164	
MIMO	Low	2Tx/MIMO	156	28
	Mid	2Tx/MIMO	156	28
	High	2Tx/MIMO	156	28

Table 7-6. Ant1 Worst Case Beam ID

Mode	Channel	Polarization	Beam ID	Beam ID Pair
SISO	Low	H	159	
		V	32	
	Mid	H	159	
		V	32	
	High	H	159	
		V	32	
MIMO	Low	2Tx/MIMO	168	40
	Mid	2Tx/MIMO	168	40
	High	2Tx/MIMO	168	40

Table 7-7. Ant2 Worst Case Beam ID

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Band n258-R1

Channel	Frequency [MHz]	Transmission Scheme	Modulation	BeamID	Beam Pol.	Ant. Div.	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
Mid	24349.92	DFT-s-OFDM	QPSK	164	H	SISO	H	75	269	1 / 19	25.73
Mid	24349.92	DFT-s-OFDM	QPSK	36	V	SISO	V	272	259	1 / 19	26.62
Mid	24349.92	DFT-s-OFDM	QPSK	156 + 28	H + V	2Tx	H	298	109	1 / 12	**29.30**
Mid	24349.92	CP-OFDM	QPSK	164	H	SISO	H	75	269	1 / 19	22.39
Mid	24349.92	CP-OFDM	QPSK	36	V	SISO	V	272	259	1 / 19	23.56
Mid	24349.92	CP-OFDM	QPSK	156 + 28	H + V	MIMO	H	298	109	1 / 12	26.59
Low	24275.04	DFT-s-OFDM	QPSK	156 + 28	H + V	2Tx	H	306	252	1 / 12	28.29
High	24424.92	DFT-s-OFDM	QPSK	156 + 28	H + V	2Tx	H	311	66	1 / 12	28.58
Mid	24349.92	DFT-s-OFDM	π/2 BPSK	156 + 28	H + V	2Tx	H	298	109	1 / 12	29.18
Mid	24349.92	DFT-s-OFDM	16QAM	156 + 28	H + V	2Tx	H	298	109	1 / 12	27.86
Mid	24349.92	DFT-s-OFDM	64QAM	156 + 28	H + V	2Tx	H	298	109	1 / 12	26.11

Table 7-8. Ant1 EIRP Data (Band n258-R1 - 50MHz-1CC)

Channel	Frequency [MHz]	Transmission Scheme	Modulation	BeamID	Beam Pol.	Ant. Div.	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
Mid	24349.92	DFT-s-OFDM	QPSK	156 + 28	H + V	2Tx	H	255	300	32 / 0	23.41
Mid	24349.92	DFT-s-OFDM	π/2 BPSK	156 + 28	H + V	2Tx	H	255	300	32 / 0	23.38
Mid	24349.92	DFT-s-OFDM	16QAM	156 + 28	H + V	2Tx	H	255	300	32 / 0	22.24
Mid	24349.92	DFT-s-OFDM	64QAM	156 + 28	H + V	2Tx	H	255	300	32 / 0	19.41

Table 7-9. Ant1 EIRP Data (Band n258-R1 - 50MHz-2CC)

Channel	Frequency [MHz]	Transmission Scheme	Modulation	BeamID	Beam Pol.	Ant. Div.	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
Mid	24349.92	DFT-s-OFDM	QPSK	164	H	SISO	H	75	269	1 / 42	26.08
Mid	24349.92	DFT-s-OFDM	QPSK	36	V	SISO	V	264	257	1 / 33	26.07
Mid	24349.92	DFT-s-OFDM	QPSK	156 + 28	H + V	2Tx	H	304	46	1 / 33	**28.10**
Mid	24349.92	CP-OFDM	QPSK	164	H	SISO	H	75	269	1 / 42	23.05
Mid	24349.92	CP-OFDM	QPSK	36	V	SISO	V	264	257	1 / 33	22.96
Mid	24349.92	CP-OFDM	QPSK	156 + 28	H + V	MIMO	H	304	46	1 / 33	25.47
Low	24300.00	DFT-s-OFDM	QPSK	156 + 28	H + V	2Tx	H	301	52	1 / 33	27.21
High	24399.96	DFT-s-OFDM	QPSK	156 + 28	H + V	2Tx	H	311	66	1 / 33	26.58
Mid	24349.92	DFT-s-OFDM	π/2 BPSK	156 + 28	H + V	2Tx	H	304	46	1 / 33	28.04
Mid	24349.92	DFT-s-OFDM	16QAM	156 + 28	H + V	2Tx	H	304	46	1 / 33	27.26
Mid	24349.92	DFT-s-OFDM	64QAM	156 + 28	H + V	2Tx	H	304	46	1 / 33	25.59

Table 7-10. Ant1 EIRP Data (Band n258-R1 - 100MHz-1CC)

Channel	Frequency [MHz]	Transmission Scheme	Modulation	BeamID	Beam Pol.	Ant. Div.	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
Mid	24349.92	DFT-s-OFDM	QPSK	156 + 28	H + V	2Tx	H	255	300	64 / 0	23.19
Mid	24349.92	DFT-s-OFDM	π/2 BPSK	156 + 28	H + V	2Tx	H	255	300	64 / 0	23.25
Mid	24349.92	DFT-s-OFDM	16QAM	156 + 28	H + V	2Tx	H	255	300	64 / 0	20.14
Mid	24349.92	DFT-s-OFDM	64QAM	156 + 28	H + V	2Tx	H	255	300	64 / 0	18.84

Table 7-11. Ant1 EIRP Data (Band n258-R1 - 100MHz-2CC)

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Channel	Frequency [MHz]	Transmission Scheme	Modulation	BeamID	Beam Pol.	Ant. Div.	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
Mid	24349.92	DFT-s-OFDM	QPSK	159	H	SISO	H	181	44	1 / 19	24.16
Mid	24349.92	DFT-s-OFDM	QPSK	32	V	SISO	H	120	105	1 / 19	25.14
Mid	24349.92	DFT-s-OFDM	QPSK	168 + 40	H + V	2Tx	H	322	261	1 / 19	**25.99**
Mid	24349.92	CP-OFDM	QPSK	159	H	SISO	H	181	44	1 / 19	20.91
Mid	24349.92	CP-OFDM	QPSK	32	V	SISO	H	120	105	1 / 19	21.97
Mid	24349.92	CP-OFDM	QPSK	168 + 40	H + V	MIMO	H	322	261	1 / 19	22.73
Low	24275.04	DFT-s-OFDM	QPSK	168 + 40	H + V	2Tx	H	313	238	1 / 19	25.11
High	24424.92	DFT-s-OFDM	QPSK	168 + 40	H + V	2Tx	H	303	233	1 / 19	25.67
Mid	24349.92	DFT-s-OFDM	π/2 BPSK	168 + 40	H + V	2Tx	H	322	261	1 / 19	25.89
Mid	24349.92	DFT-s-OFDM	16QAM	168 + 40	H + V	2Tx	H	322	261	1 / 19	25.77
Mid	24349.92	DFT-s-OFDM	64QAM	168 + 40	H + V	2Tx	H	322	261	1 / 19	23.27

Table 7-12. Ant2 EIRP Data (Band n258-R1 - 50MHz-1CC)

Channel	Frequency [MHz]	Transmission Scheme	Modulation	BeamID	Beam Pol.	Ant. Div.	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
Mid	24349.92	DFT-s-OFDM	QPSK	168 + 40	H + V	2Tx	H	311	244	32 / 0	24.00
Mid	24349.92	DFT-s-OFDM	π/2 BPSK	168 + 40	H + V	2Tx	H	311	244	32 / 0	23.95
Mid	24349.92	DFT-s-OFDM	16QAM	168 + 40	H + V	2Tx	H	311	244	32 / 0	22.21
Mid	24349.92	DFT-s-OFDM	64QAM	168 + 40	H + V	2Tx	H	311	244	32 / 0	20.89

Table 7-13. Ant2 EIRP Data (Band n258-R1 - 50MHz-2CC)

Channel	Frequency [MHz]	Transmission Scheme	Modulation	BeamID	Beam Pol.	Ant. Div.	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
Mid	24349.92	DFT-s-OFDM	QPSK	159	H	SISO	H	181	44	1 / 42	24.34
Mid	24349.92	DFT-s-OFDM	QPSK	32	V	SISO	H	120	105	1 / 42	25.38
Mid	24349.92	DFT-s-OFDM	QPSK	168 + 40	H + V	2Tx	H	311	236	1 / 42	**25.56**
Mid	24349.92	CP-OFDM	QPSK	159	H	SISO	H	181	44	1 / 42	21.77
Mid	24349.92	CP-OFDM	QPSK	32	V	SISO	H	120	105	1 / 42	22.33
Mid	24349.92	CP-OFDM	QPSK	168 + 40	H + V	MIMO	H	311	236	1 / 42	22.58
Low	24300.00	DFT-s-OFDM	QPSK	168 + 40	H + V	2Tx	H	313	238	1 / 42	24.36
High	24399.96	DFT-s-OFDM	QPSK	168 + 40	H + V	2Tx	H	303	233	1 / 33	25.12
Mid	24349.92	DFT-s-OFDM	π/2 BPSK	168 + 40	H + V	2Tx	H	311	236	1 / 42	25.42
Mid	24349.92	DFT-s-OFDM	16QAM	168 + 40	H + V	2Tx	H	311	236	1 / 42	24.66
Mid	24349.92	DFT-s-OFDM	64QAM	168 + 40	H + V	2Tx	H	311	236	1 / 42	22.89

Table 7-14. Ant2 EIRP Data (Band n258-R1 - 100MHz-1CC)

Channel	Frequency [MHz]	Transmission Scheme	Modulation	BeamID	Beam Pol.	Ant. Div.	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
Mid	24349.92	DFT-s-OFDM	QPSK	168 + 40	H + V	2Tx	H	120	105	64 / 0	23.32
Mid	24349.92	DFT-s-OFDM	π/2 BPSK	168 + 40	H + V	2Tx	H	120	105	64 / 0	23.25
Mid	24349.92	DFT-s-OFDM	16QAM	168 + 40	H + V	2Tx	H	120	105	64 / 0	20.24
Mid	24349.92	DFT-s-OFDM	64QAM	168 + 40	H + V	2Tx	H	120	105	64 / 0	19.41

Table 7-15. Ant2 EIRP Data (Band n258-R1 - 100MHz-2CC)

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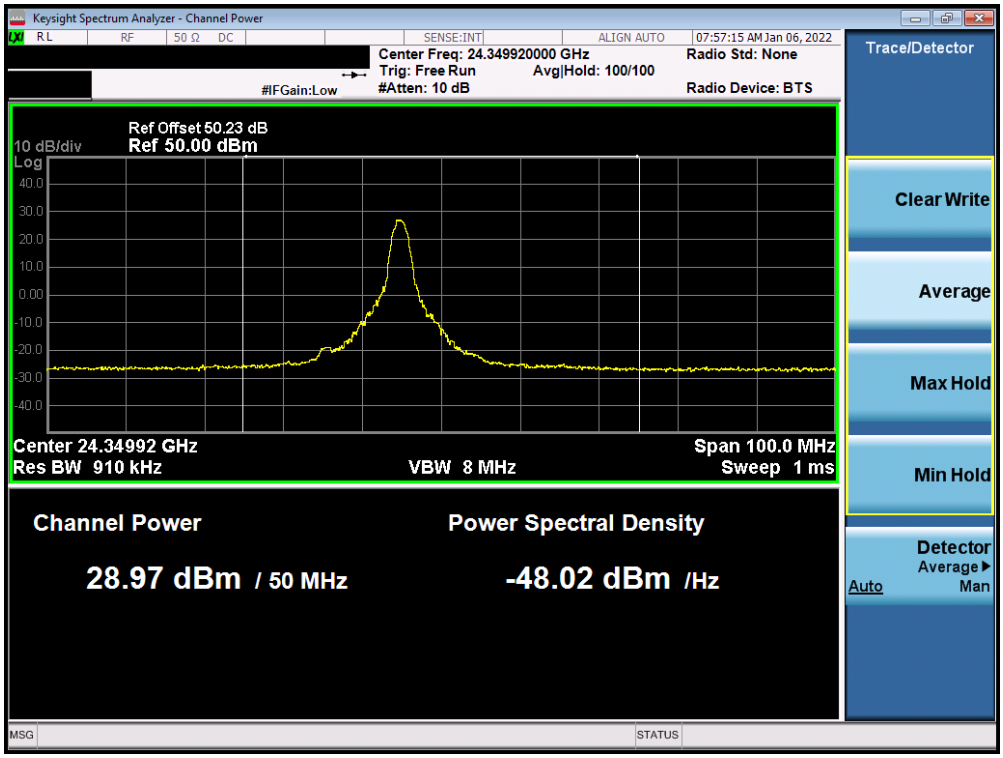
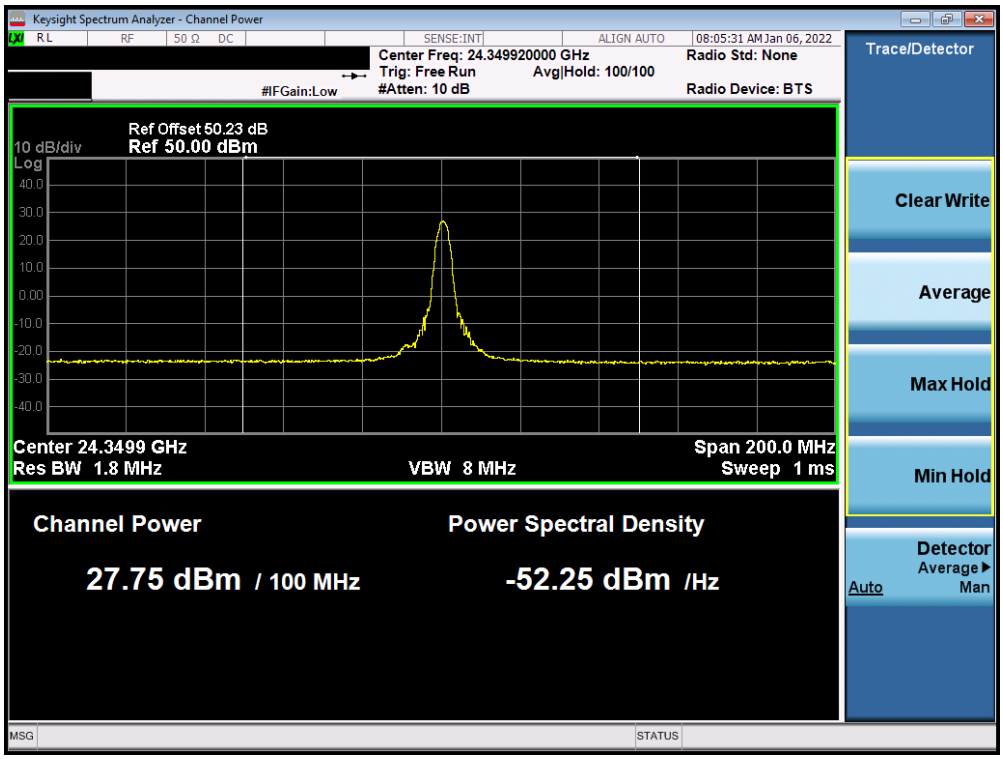


Plot 7-65. Ant 1 EIRP Plot (Band n258-R1 − 50MHz-1CC − QPSK – Mid Channel)



Plot 7-66. Ant 1 EIRP Plot (Band n258-R1 − 100MHz-1CC − QPSK – Mid Channel)

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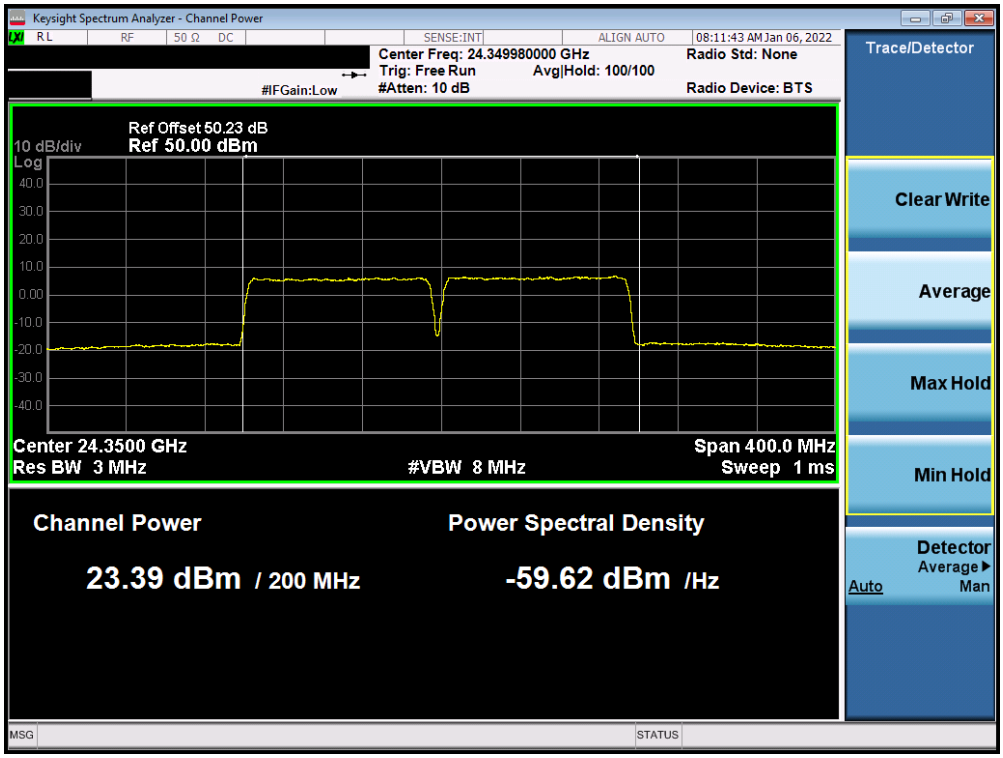
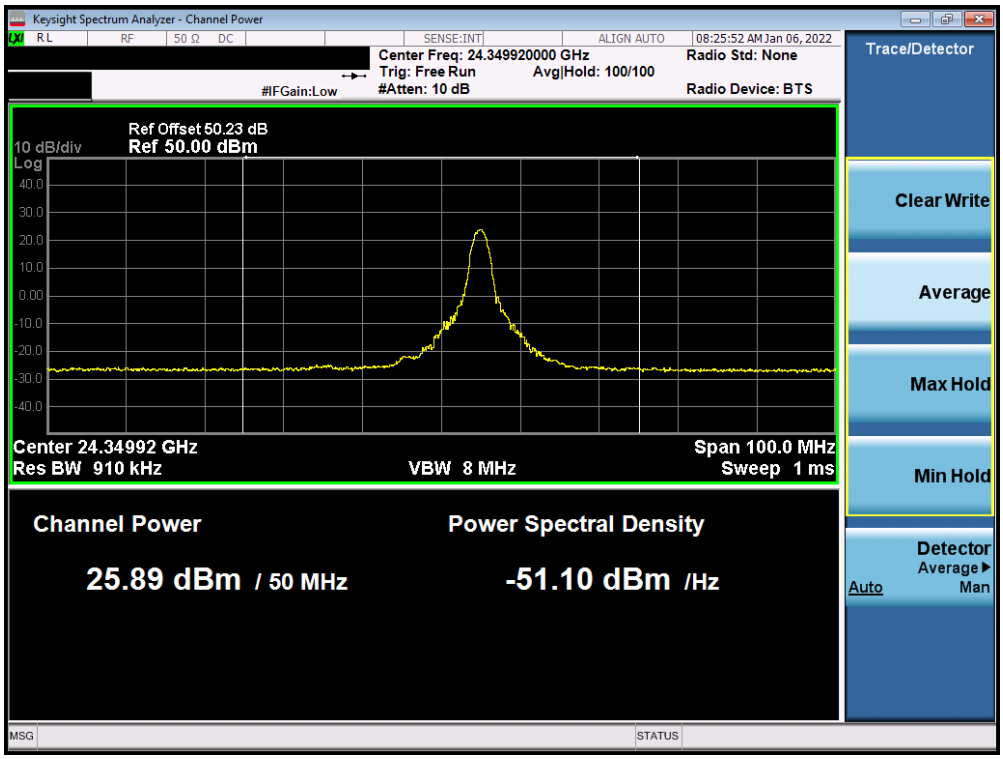


Plot 7-67. Ant 1 EIRP Plot (Band n258-R1 – 100MHz-2CC – pi/2-BPSK – Mid Channel)



Plot 7-68. Ant 2 EIRP Plot (Band n258-R1 – 50MHz-1CC – QPSK – Mid Channel)

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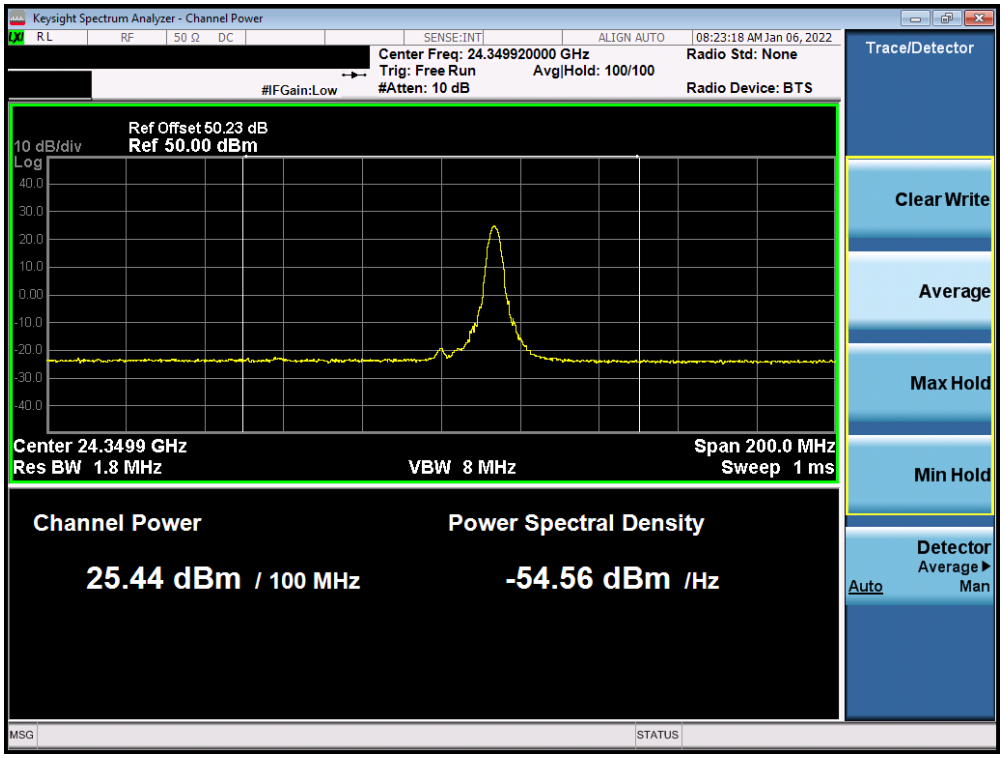
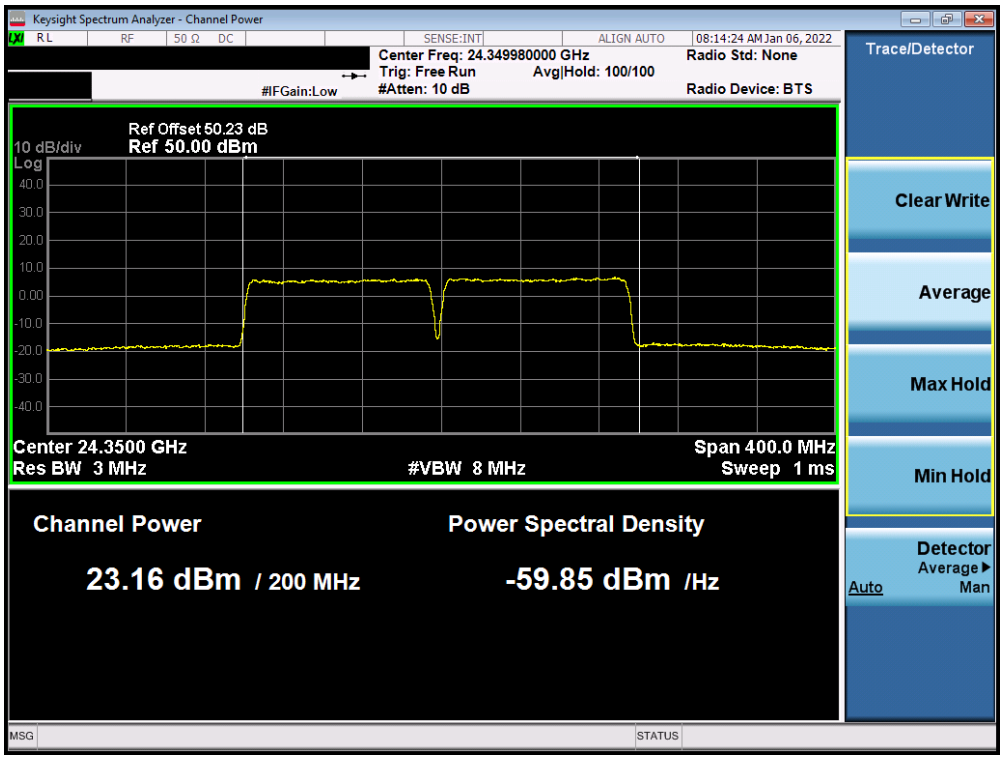


Plot 7-69. Ant 2 EIRP Plot (Band n258-R1 − 100MHz-1CC − QPSK – Mid Channel)



Plot 7-70. Ant 2 EIRP Plot (Band n258-R1 − 100MHz-2CC − QPSK – Mid Channel)

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Band n258-R2 Beam ID Configurations

Mode	Channel	Polarization	Beam ID	Beam ID Pair
SISO	Low	H	164	
		V	36	
	Mid	H	164	
		V	36	
	High	H	164	
		V	36	
MIMO	Low	2Tx/MIMO	163	35
	Mid	2Tx/MIMO	163	35
	High	2Tx/MIMO	163	35

Table 7-16. Ant1 (M Patch) Worst Case Beam ID

Mode	Channel	Polarization	Beam ID	Beam ID Pair
SISO	Low	H	166	
		V	32	
	Mid	H	166	
		V	32	
	High	H	166	
		V	32	
MIMO	Low	2Tx/MIMO	168	40
	Mid	2Tx/MIMO	168	40
	High	2Tx/MIMO	168	40

Table 7-17. Ant2 (N Patch) Worst Case Beam ID

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Band n258-R2

Channel	Frequency [MHz]	Transmission Scheme	Modulation	BeamID	Beam Pol.	Ant. Div.	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
Mid	24999.96	DFT-s-OFDM	QPSK	164	H	SISO	H	81	264	1 / 19	26.64
Mid	24999.96	DFT-s-OFDM	QPSK	36	V	SISO	V	86	261	1 / 19	27.40
Mid	24999.96	DFT-s-OFDM	QPSK	163 + 35	H + V	2Tx	V	253	298	1 / 16	28.23
Mid	24999.96	CP-OFDM	QPSK	164	H	SISO	H	81	264	1 / 19	23.56
Mid	24999.96	CP-OFDM	QPSK	36	V	SISO	V	86	261	1 / 19	24.32
Mid	24999.96	CP-OFDM	QPSK	163 + 35	H + V	MIMO	V	253	298	1 / 16	24.01
Low	24775.08	DFT-s-OFDM	QPSK	163 + 35	H + V	2Tx	V	254	259	1 / 19	28.19
High	25224.96	DFT-s-OFDM	QPSK	163 + 35	H + V	2Tx	V	252	294	1 / 19	28.68
High	25224.96	DFT-s-OFDM	π/2 BPSK	163 + 35	H + V	2Tx	V	252	294	1 / 19	**28.79**
High	25224.96	DFT-s-OFDM	16QAM	163 + 35	H + V	2Tx	V	252	294	1 / 19	26.51
High	25224.96	DFT-s-OFDM	64QAM	163 + 35	H + V	2Tx	V	252	294	1 / 19	24.47

Table 7-18. Ant1 EIRP Data (Band n258-R2 - 50MHz-1CC)

Channel	Frequency [MHz]	Transmission Scheme	Modulation	BeamID	Beam Pol.	Ant. Div.	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
High	25199.94	DFT-s-OFDM	QPSK	163 + 35	H + V	2Tx	V	249	296	32 / 0	23.45
High	25199.94	DFT-s-OFDM	π/2 BPSK	163 + 35	H + V	2Tx	V	249	296	32 / 0	23.43
High	25199.94	DFT-s-OFDM	16QAM	163 + 35	H + V	2Tx	V	249	296	32 / 0	22.08
High	25199.94	DFT-s-OFDM	64QAM	163 + 35	H + V	2Tx	V	249	296	32 / 0	19.21

Table 7-19. Ant1 EIRP Data (Band n258-R2 - 50MHz-2CC)

Channel	Frequency [MHz]	Transmission Scheme	Modulation	BeamID	Beam Pol.	Ant. Div.	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
Mid	24999.96	DFT-s-OFDM	QPSK	164	H	SISO	H	81	264	1 / 23	26.14
Mid	24999.96	DFT-s-OFDM	QPSK	36	V	SISO	V	86	261	1 / 23	26.27
Mid	24999.96	DFT-s-OFDM	QPSK	163 + 35	H + V	2Tx	V	253	298	1 / 42	28.21
Mid	24999.96	CP-OFDM	QPSK	164	H	SISO	H	81	264	1 / 23	23.41
Mid	24999.96	CP-OFDM	QPSK	36	V	SISO	V	86	261	1 / 23	23.25
Mid	24999.96	CP-OFDM	QPSK	163 + 35	H + V	MIMO	V	253	298	1 / 42	24.21
Low	24800.04	DFT-s-OFDM	QPSK	163 + 35	H + V	2Tx	V	254	259	1 / 33	28.17
High	25200.00	DFT-s-OFDM	QPSK	163 + 35	H + V	2Tx	V	252	294	1 / 42	**28.83**
High	25200.00	DFT-s-OFDM	π/2 BPSK	163 + 35	H + V	2Tx	V	252	294	1 / 42	28.78
High	25200.00	DFT-s-OFDM	16QAM	163 + 35	H + V	2Tx	V	252	294	1 / 42	26.43
High	25200.00	DFT-s-OFDM	64QAM	163 + 35	H + V	2Tx	V	252	294	1 / 42	24.42

Table 7-20. Ant1 EIRP Data (Band n258-R2 - 100MHz-1CC)

Channel	Frequency [MHz]	Transmission Scheme	Modulation	BeamID	Beam Pol.	Ant. Div.	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
High	25150.02	DFT-s-OFDM	QPSK	163 + 35	H + V	2Tx	V	249	296	64 / 0	23.28
High	25150.02	DFT-s-OFDM	π/2 BPSK	163 + 35	H + V	2Tx	V	249	296	64 / 0	23.34
High	25150.02	DFT-s-OFDM	16QAM	163 + 35	H + V	2Tx	V	249	296	64 / 0	21.42
High	25150.02	DFT-s-OFDM	64QAM	163 + 35	H + V	2Tx	V	249	296	64 / 0	19.11

Table 7-21. Ant1 EIRP Data (Band n258-R2 - 100MHz-2CC)

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Channel	Frequency [MHz]	Transmission Scheme	Modulation	BeamID	Beam Pol.	Ant. Div.	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
Mid	24999.96	DFT-s-OFDM	QPSK	166	H	SISO	H	106	117	1 / 19	25.07
Mid	24999.96	DFT-s-OFDM	QPSK	32	V	SISO	V	93	31	1 / 19	26.41
Mid	24999.96	DFT-s-OFDM	QPSK	168 + 40	H + V	2Tx	H	318	257	1 / 19	**26.74**
Mid	24999.96	CP-OFDM	QPSK	166	H	SISO	H	106	117	1 / 19	21.98
Mid	24999.96	CP-OFDM	QPSK	32	V	SISO	V	93	31	1 / 19	23.32
Mid	24999.96	CP-OFDM	QPSK	168 + 40	H + V	MIMO	H	318	257	1 / 19	23.62
Low	24775.08	DFT-s-OFDM	QPSK	168 + 40	H + V	2Tx	H	91	30	1 / 19	26.08
High	25224.96	DFT-s-OFDM	QPSK	168 + 40	H + V	2Tx	H	100	20	1 / 19	25.43
Mid	24999.96	DFT-s-OFDM	π/2 BPSK	168 + 40	H + V	2Tx	H	318	257	1 / 19	26.25
Mid	24999.96	DFT-s-OFDM	16QAM	168 + 40	H + V	2Tx	H	318	257	1 / 19	24.02
Mid	24999.96	DFT-s-OFDM	64QAM	168 + 40	H + V	2Tx	H	318	257	1 / 19	22.21

Table 7-22. Ant2 EIRP Data (Band n258-R2 - 50MHz-1CC)

Channel	Frequency [MHz]	Transmission Scheme	Modulation	BeamID	Beam Pol.	Ant. Div.	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
Mid	24999.96	DFT-s-OFDM	QPSK	168 + 40	H + V	2Tx	V	316	266	32 / 0	21.80
Mid	24999.96	DFT-s-OFDM	π/2 BPSK	168 + 40	H + V	2Tx	H	316	266	32 / 0	21.66
Mid	24999.96	DFT-s-OFDM	16QAM	168 + 40	H + V	2Tx	H	316	266	32 / 0	19.46
Mid	24999.96	DFT-s-OFDM	64QAM	168 + 40	H + V	2Tx	H	316	266	32 / 0	17.54

Table 7-23. Ant2 EIRP Data (Band n258-R2 - 50MHz-2CC)

Channel	Frequency [MHz]	Transmission Scheme	Modulation	BeamID	Beam Pol.	Ant. Div.	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
Mid	24999.96	DFT-s-OFDM	QPSK	166	H	SISO	H	106	117	1 / 42	24.81
Mid	24999.96	DFT-s-OFDM	QPSK	32	V	SISO	V	93	31	1 / 42	25.10
Mid	24999.96	DFT-s-OFDM	QPSK	168 + 40	H + V	2Tx	V	116	129	1 / 42	25.36
Mid	24999.96	CP-OFDM	QPSK	166	H	SISO	H	106	117	1 / 42	22.03
Mid	24999.96	CP-OFDM	QPSK	32	V	SISO	V	93	31	1 / 42	23.45
Mid	24999.96	CP-OFDM	QPSK	168 + 40	H + V	MIMO	V	116	129	1 / 42	23.60
Low	24800.04	DFT-s-OFDM	QPSK	168 + 40	H + V	2Tx	V	116	129	1 / 42	25.13
High	25200.00	DFT-s-OFDM	QPSK	168 + 40	H + V	2Tx	V	127	117	1 / 42	**25.92**
High	25200.00	DFT-s-OFDM	π/2 BPSK	168 + 40	H + V	2Tx	V	127	117	1 / 42	25.71
High	25200.00	DFT-s-OFDM	16QAM	168 + 40	H + V	2Tx	V	127	117	1 / 42	25.82
High	25200.00	DFT-s-OFDM	64QAM	168 + 40	H + V	2Tx	V	127	117	1 / 42	22.55

Table 7-24. Ant2 EIRP Data (Band n258-R2 - 100MHz-1CC)

Channel	Frequency [MHz]	Transmission Scheme	Modulation	BeamID	Beam Pol.	Ant. Div.	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
High	25150.02	DFT-s-OFDM	QPSK	168 + 40	H + V	2Tx	V	316	266	64 / 0	21.70
High	25150.02	DFT-s-OFDM	π/2 BPSK	168 + 40	H + V	2Tx	V	316	266	64 / 0	21.55
High	25150.02	DFT-s-OFDM	16QAM	168 + 40	H + V	2Tx	V	316	266	64 / 0	19.45
High	25150.02	DFT-s-OFDM	64QAM	168 + 40	H + V	2Tx	V	316	266	64 / 0	17.36

Table 7-25. Ant2 EIRP Data (Band n258-R2 - 100MHz-2CC)

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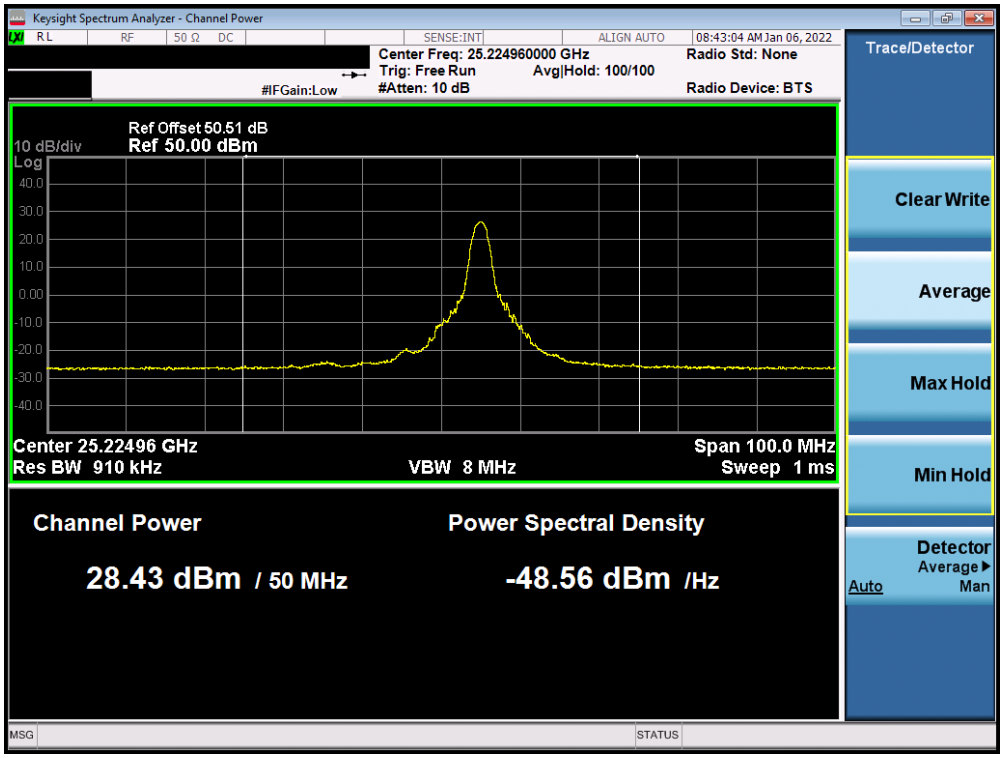
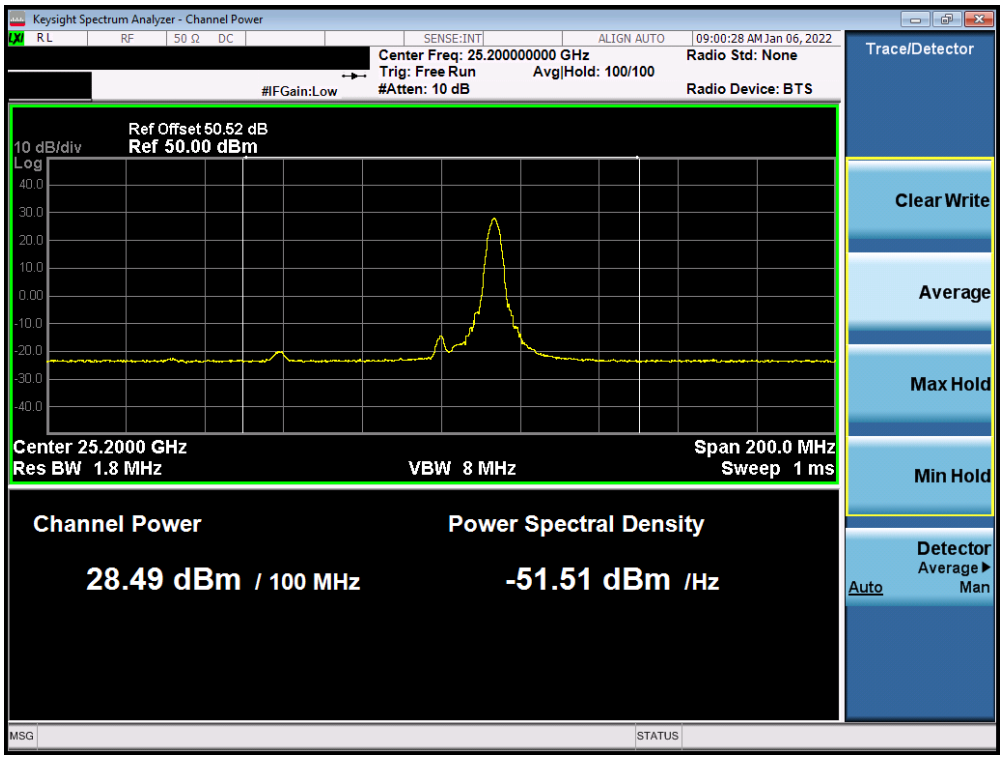


Plot 7-71. Ant 1 EIRP Plot (Band n258-R2 − 50MHz-1CC – pi/2-BPSK – High Channel)



Plot 7-72. Ant 1 EIRP Plot (Band n258-R2 − 100MHz-1CC − QPSK – High Channel)

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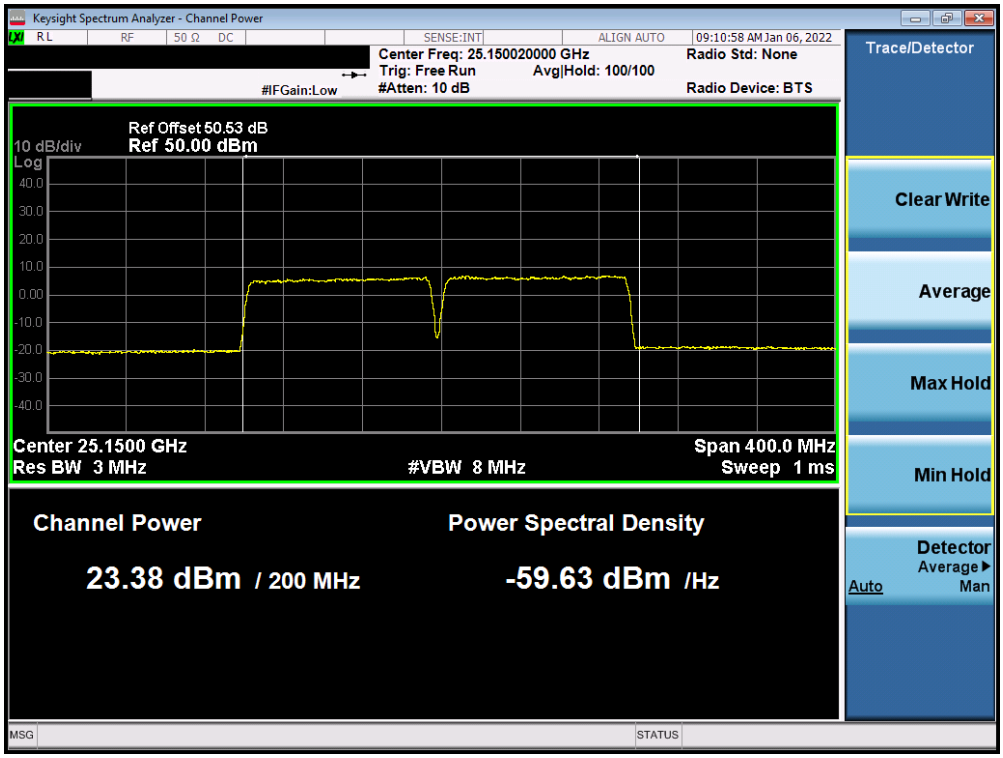
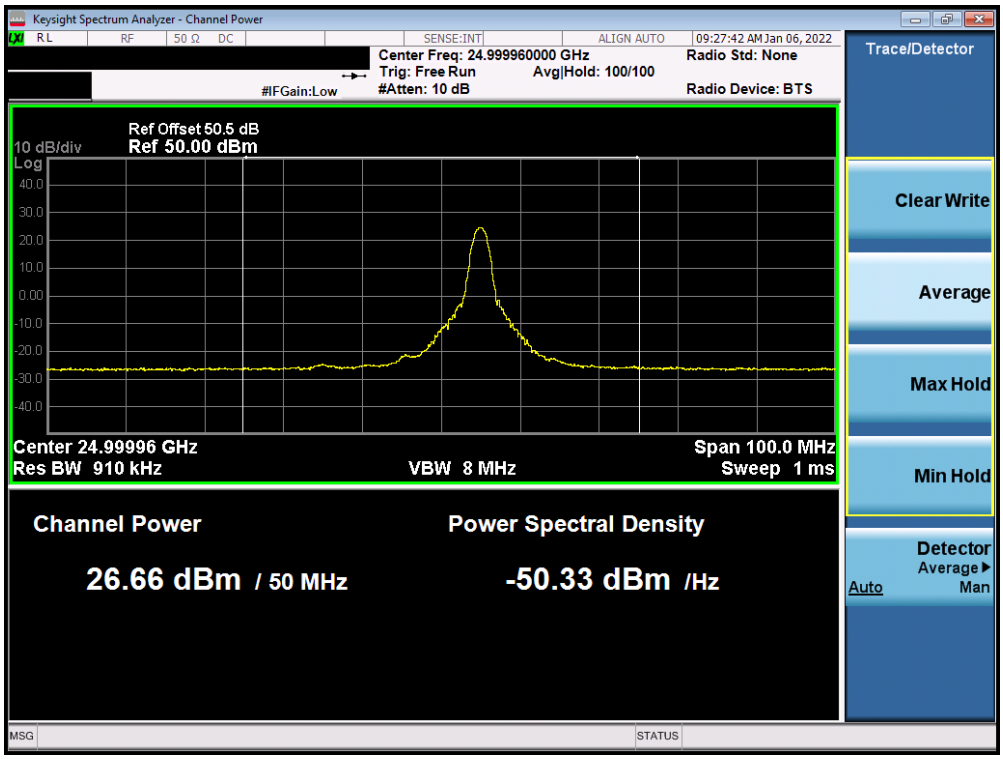


Plot 7-73. Ant 1 EIRP Plot (Band n258-R2 − 100MHz-2CC − pi/2-BPSK – High Channel)



Plot 7-74. Ant 2 EIRP Plot (Band n258-R2 − 50MHz-1CC − QPSK – Mid Channel)

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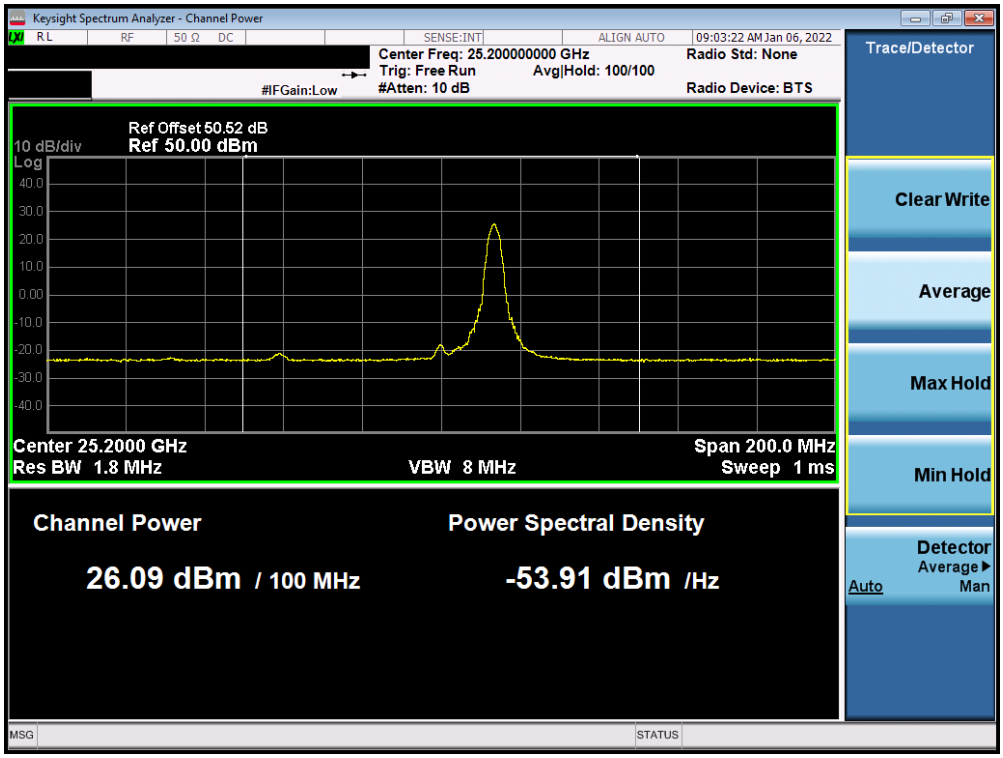
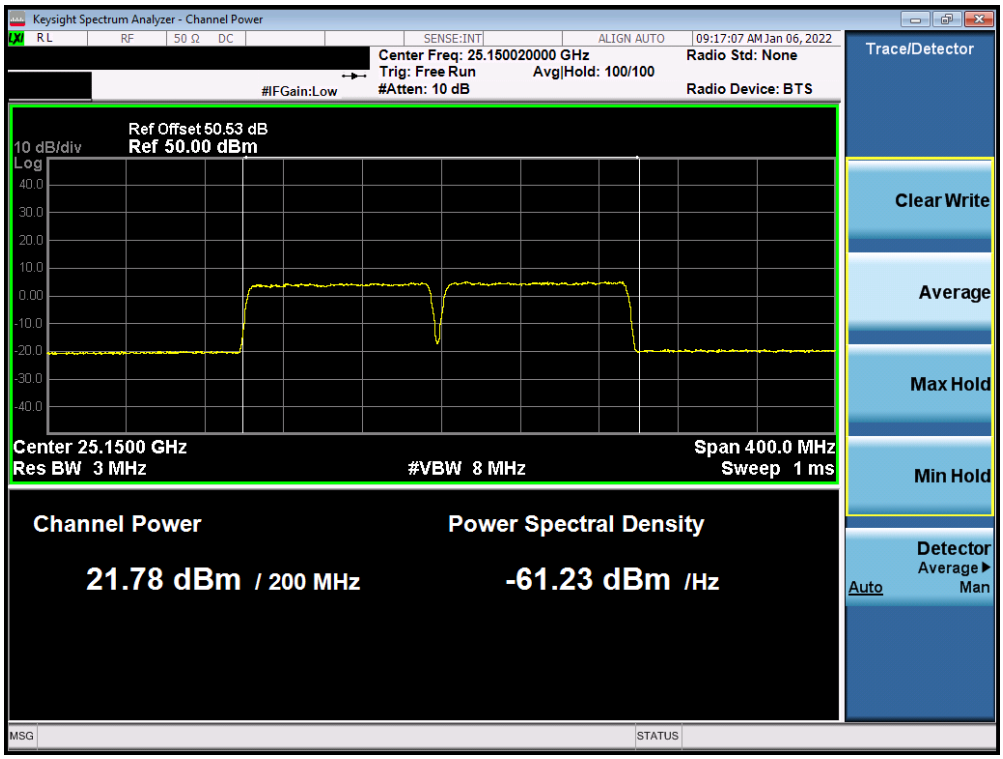


Plot 7-75. Ant 2 EIRP Plot (Band n258-R2 − 100MHz-1CC − QPSK – High Channel)



Plot 7-76. Ant 2 EIRP Plot (Band n258-R2 − 100MHz-2CC – QPSK – High Channel)

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Band n261 Beam ID Configurations

Mode	Channel	Polarization	Beam ID	Beam ID Pair
SISO	Low	H	27	
		V	155	
	Mid	H	27	
		V	155	
	High	H	27	
		V	155	
MIMO	Low	2Tx/MIMO	164	36
	Mid	2Tx/MIMO	155	27
	High	2Tx/MIMO	155	27

Table 7-26. Ant1 Worst Case Beam ID

Mode	Channel	Polarization	Beam ID	Beam ID Pair
SISO	Low	H	32	
		V	160	
	Mid	H	31	
		V	161	
	High	H	30	
		V	169	
MIMO	Low	2Tx/MIMO	158	30
	Mid	2Tx/MIMO	158	30
	High	2Tx/MIMO	158	30

Table 7-27. Ant2 Worst Case Beam ID

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Band n261

Channel	Frequency [MHz]	Transmission Scheme	Modulation	BeamID	Beam Pol.	Ant. Div.	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
High	28324.92	DFT-s-OFDM	QPSK	155	H	SISO	H	288	288	1 / 12	25.63
High	28324.92	DFT-s-OFDM	QPSK	27	V	SISO	V	81	270	1 / 12	25.44
High	28324.92	DFT-s-OFDM	QPSK	155 + 27	H + V	2Tx	H	292	303	1 / 12	29.78
High	28324.92	CP-OFDM	QPSK	155	H	SISO	H	288	288	1 / 12	22.71
High	28324.92	CP-OFDM	QPSK	27	V	SISO	V	81	270	1 / 12	23.38
High	28324.92	CP-OFDM	QPSK	155 + 27	H + V	MIMO	H	292	303	1 / 12	23.78
Low	27525.00	DFT-s-OFDM	QPSK	164 + 36	H + V	2Tx	H	108	110	1 / 12	29.54
Mid	27924.96	DFT-s-OFDM	QPSK	155 + 27	H + V	2Tx	H	109	112	1 / 12	**31.39**
Mid	27924.96	DFT-s-OFDM	π/2 BPSK	155 + 27	H + V	2Tx	H	109	112	1 / 12	31.13
Mid	27924.96	DFT-s-OFDM	16QAM	155 + 27	H + V	2Tx	H	109	112	1 / 12	29.05
Mid	27924.96	DFT-s-OFDM	64QAM	155 + 27	H + V	2Tx	H	109	112	1 / 12	27.92

Table 7-28. Ant1 EIRP Data (Band n261 - 50MHz-1CC)

Channel	Frequency [MHz]	Transmission Scheme	Modulation	BeamID	Beam Pol.	Ant. Div.	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
Mid	27924.96	DFT-s-OFDM	QPSK	155 + 27	H + V	2Tx	H	286	301	32 / 0	24.95
Mid	27924.96	DFT-s-OFDM	π/2 BPSK	155 + 27	H + V	2Tx	H	286	301	32 / 0	24.92
Mid	27924.96	DFT-s-OFDM	16QAM	155 + 27	H + V	2Tx	H	286	301	32 / 0	22.81
Mid	27924.96	DFT-s-OFDM	64QAM	155 + 27	H + V	2Tx	H	286	301	32 / 0	21.35

Table 7-29. Ant1 EIRP Data (Band n261 - 50MHz-2CC)

Channel	Frequency [MHz]	Transmission Scheme	Modulation	BeamID	Beam Pol.	Ant. Div.	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
High	28299.96	DFT-s-OFDM	QPSK	155	H	SISO	H	287	301	1 / 42	25.85
High	28299.96	DFT-s-OFDM	QPSK	27	V	SISO	V	81	270	1 / 23	26.01
High	28299.96	DFT-s-OFDM	QPSK	155 + 27	H + V	2Tx	H	305	267	1 / 33	30.11
High	28299.96	CP-OFDM	QPSK	155	H	SISO	H	287	301	1 / 23	23.77
High	28299.96	CP-OFDM	QPSK	27	V	SISO	V	81	270	1 / 42	22.95
High	28299.96	CP-OFDM	QPSK	155 + 27	H + V	MIMO	H	305	267	1 / 33	27.16
Low	27550.08	DFT-s-OFDM	QPSK	164 + 36	H + V	2Tx	H	108	110	1 / 33	30.40
Mid	27924.96	DFT-s-OFDM	QPSK	155 + 27	H + V	2Tx	H	109	112	1 / 33	**31.16**
Mid	27924.96	DFT-s-OFDM	π/2 BPSK	155 + 27	H + V	2Tx	H	109	112	1 / 33	31.04
Mid	27924.96	DFT-s-OFDM	16QAM	155 + 27	H + V	2Tx	H	109	112	1 / 33	29.81
Mid	27924.96	DFT-s-OFDM	64QAM	155 + 27	H + V	2Tx	H	109	112	1 / 33	28.29

Table 7-30. Ant1 EIRP Data (Band n261 - 100MHz-1CC)

Channel	Frequency [MHz]	Transmission Scheme	Modulation	BeamID	Beam Pol.	Ant. Div.	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
Mid	27924.96	DFT-s-OFDM	QPSK	155 + 27	H + V	2Tx	H	387	308	64 / 0	25.36
Mid	27924.96	DFT-s-OFDM	π/2 BPSK	155 + 27	H + V	2Tx	H	387	308	64 / 0	25.25
Mid	27924.96	DFT-s-OFDM	16QAM	155 + 27	H + V	2Tx	H	387	308	64 / 0	22.73
Mid	27924.96	DFT-s-OFDM	64QAM	155 + 27	H + V	2Tx	H	387	308	64 / 0	20.37

Table 7-31. Ant1 EIRP Data (Band n261 - 100MHz-2CC)

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Channel	Frequency [MHz]	Transmission Scheme	Modulation	BeamID	Beam Pol.	Ant. Div.	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
High	28324.92	DFT-s-OFDM	QPSK	169	H	SISO	H	239	51	1 / 19	22.03
High	28324.92	DFT-s-OFDM	QPSK	30	V	SISO	V	291	20	1 / 16	27.41
High	28324.92	DFT-s-OFDM	QPSK	158 + 30	H + V	2Tx	V	62	30	1 / 19	**28.41**
High	28324.92	CP-OFDM	QPSK	169	H	SISO	H	239	51	1 / 19	18.91
High	28324.92	CP-OFDM	QPSK	30	V	SISO	V	291	20	1 / 16	27.36
High	28324.92	CP-OFDM	QPSK	158 + 30	H + V	MIMO	V	62	30	1 / 19	25.46
Low	27525.00	DFT-s-OFDM	QPSK	158 + 30	H + V	2Tx	V	61	36	1 / 16	27.49
Mid	27924.96	DFT-s-OFDM	QPSK	158 + 30	H + V	2Tx	V	64	27	1 / 12	27.98
High	28324.92	DFT-s-OFDM	π/2 BPSK	158 + 30	H + V	2Tx	V	62	30	1 / 19	27.07
High	28324.92	DFT-s-OFDM	16QAM	158 + 30	H + V	2Tx	V	62	30	1 / 19	25.03
High	28324.92	DFT-s-OFDM	64QAM	158 + 30	H + V	2Tx	V	62	30	1 / 16	23.40

Table 7-32. Ant2 EIRP Data (Band n261 - 50MHz-1CC)

Channel	Frequency [MHz]	Transmission Scheme	Modulation	BeamID	Beam Pol.	Ant. Div.	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
High	28324.92	DFT-s-OFDM	QPSK	158 + 30	H + V	2Tx	V	66	32	32 / 0	22.72
High	28324.92	DFT-s-OFDM	π/2 BPSK	158 + 30	H + V	2Tx	V	66	32	32 / 0	22.68
High	28324.92	DFT-s-OFDM	16QAM	158 + 30	H + V	2Tx	V	66	32	32 / 0	20.76
High	28324.92	DFT-s-OFDM	64QAM	158 + 30	H + V	2Tx	V	66	32	32 / 0	18.93

Table 7-33. Ant2 EIRP Data (Band n261 - 50MHz-2CC)

Channel	Frequency [MHz]	Transmission Scheme	Modulation	BeamID	Beam Pol.	Ant. Div.	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
High	28299.96	DFT-s-OFDM	QPSK	169	H	SISO	H	239	51	1 / 42	22.98
High	28299.96	DFT-s-OFDM	QPSK	30	V	SISO	V	291	20	1 / 23	25.98
High	28299.96	DFT-s-OFDM	QPSK	158 + 30	H + V	2Tx	V	62	30	1 / 23	**28.74**
High	28299.96	CP-OFDM	QPSK	169	H	SISO	H	239	51	1 / 42	20.03
High	28299.96	CP-OFDM	QPSK	30	V	SISO	V	291	20	1 / 23	23.03
High	28299.96	CP-OFDM	QPSK	158 + 30	H + V	MIMO	V	62	30	1 / 23	25.71
Low	27550.08	DFT-s-OFDM	QPSK	158 + 30	H + V	2Tx	V	63	42	1 / 42	28.45
Mid	27924.96	DFT-s-OFDM	QPSK	158 + 30	H + V	2Tx	V	74	45	1 / 23	27.52
High	28324.92	DFT-s-OFDM	π/2 BPSK	158 + 30	H + V	2Tx	V	62	30	1 / 33	26.06
High	28324.92	DFT-s-OFDM	16QAM	158 + 30	H + V	2Tx	V	62	30	1 / 42	24.08
High	28324.92	DFT-s-OFDM	64QAM	158 + 30	H + V	2Tx	V	62	30	1 / 42	22.26

Table 7-34. Ant2 EIRP Data (Band n261 - 100MHz-1CC)

Channel	Frequency [MHz]	Transmission Scheme	Modulation	BeamID	Beam Pol.	Ant. Div.	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
High	28324.92	DFT-s-OFDM	QPSK	158 + 30	H + V	2Tx	V	63	41	64 / 0	22.74
High	28324.92	DFT-s-OFDM	π/2 BPSK	158 + 30	H + V	2Tx	V	63	41	64 / 0	22.74
High	28324.92	DFT-s-OFDM	16QAM	158 + 30	H + V	2Tx	V	63	41	64 / 0	20.74
High	28324.92	DFT-s-OFDM	64QAM	158 + 30	H + V	2Tx	V	63	41	1 / 23	19.25

Table 7-35. Ant2 EIRP Data (Band n261 - 100MHz-2CC)

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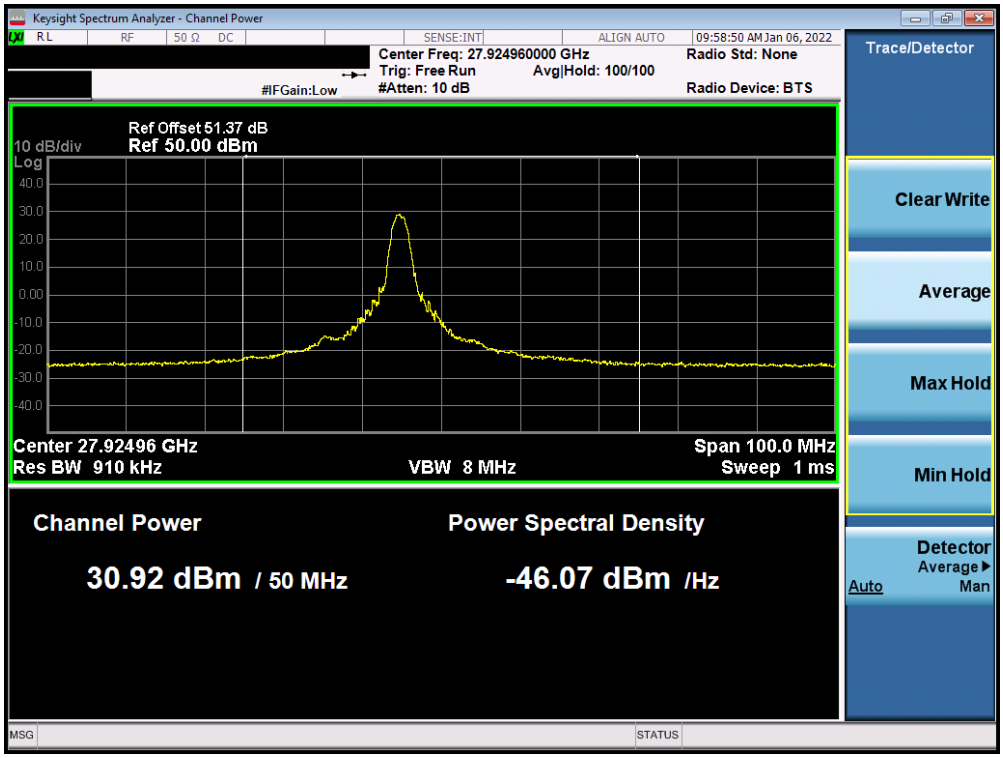
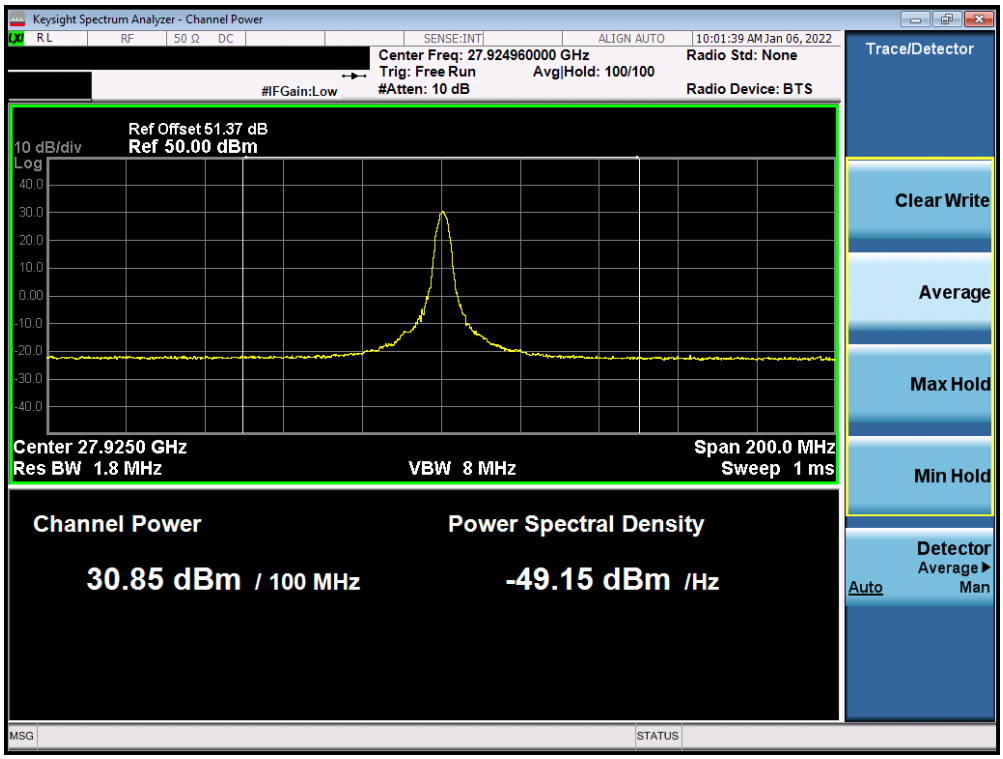


Plot 7-77. Ant 1 EIRP Plot (Band n261 – 50MHz-1CC – QPSK – Mid Channel)



Plot 7-78. Ant 1 EIRP Plot (Band n261 – 100MHz-1CC – QPSK – Mid Channel)

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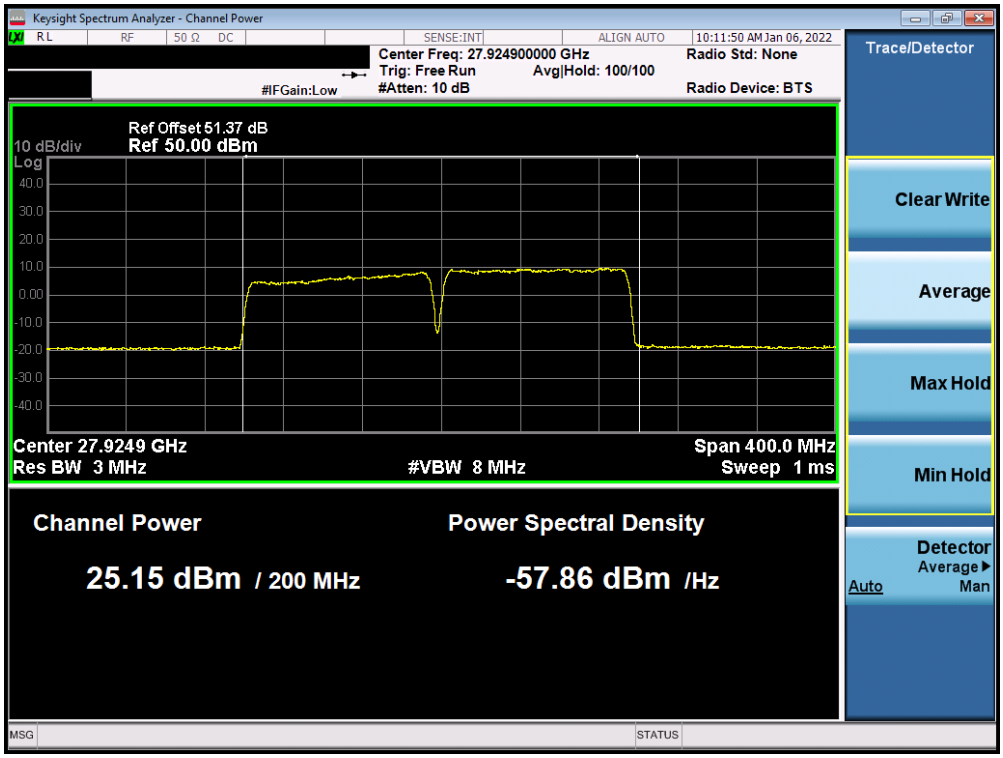
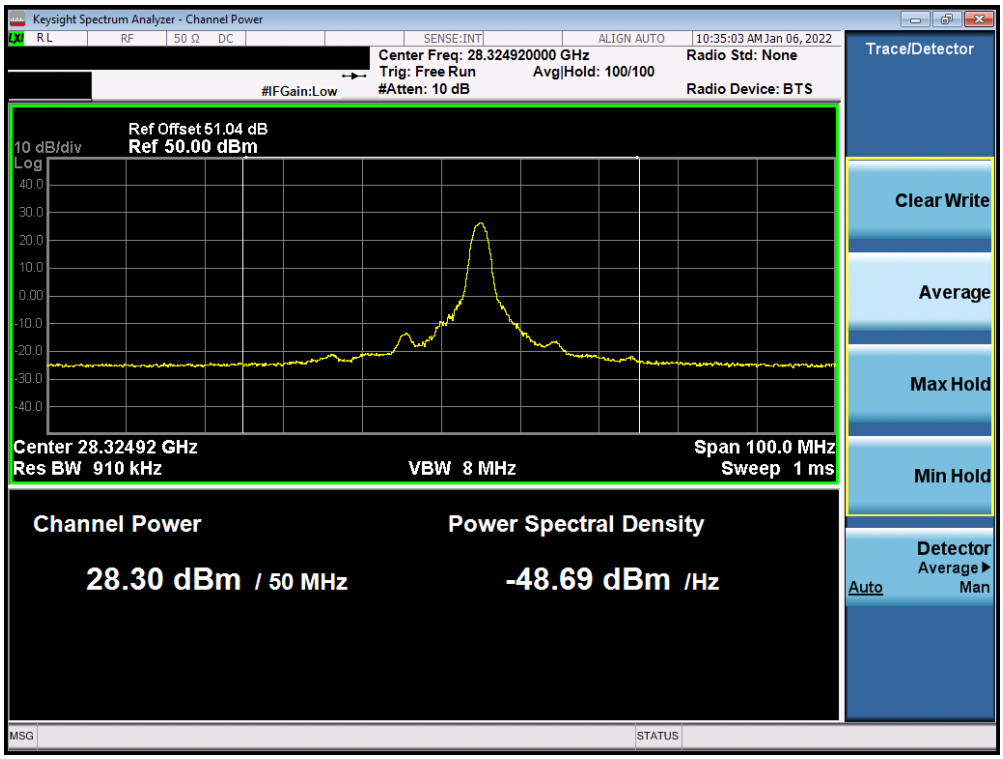


Plot 7-79. Ant 1 EIRP Plot (Band n261 − 100MHz-2CC – QPSK – Mid Channel)



Plot 7-80. Ant 2 EIRP Plot (Band n261 − 50MHz-1CC − QPSK – High Channel)

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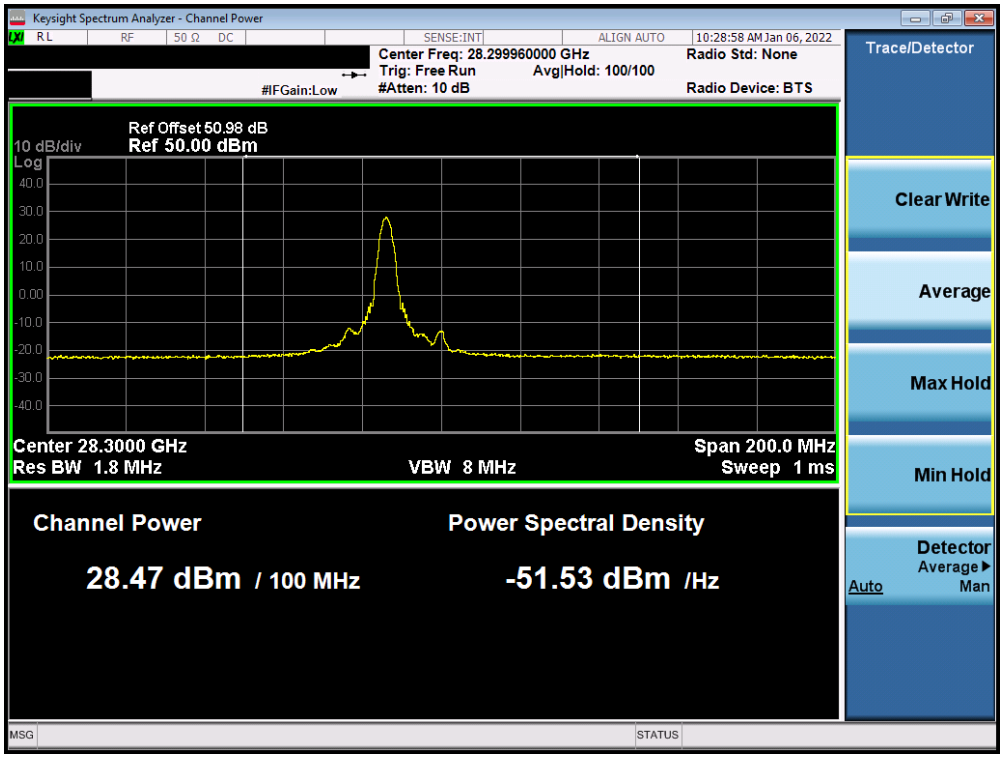
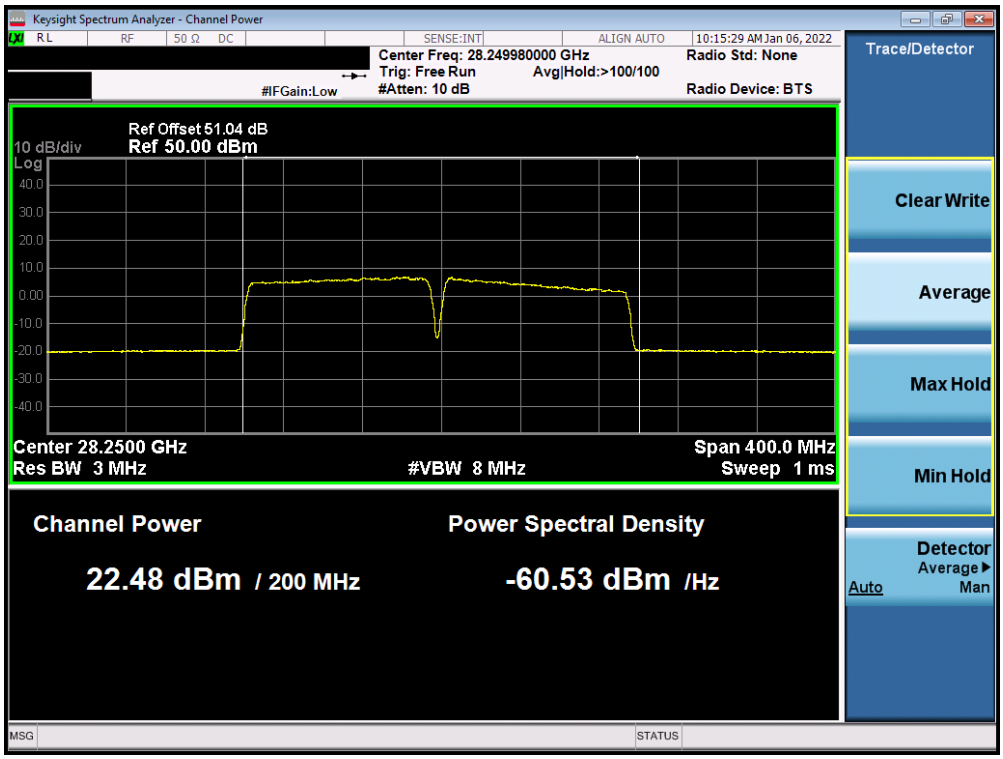


Plot 7-81. Ant 2 EIRP Plot (Band n261 − 100MHz-1CC − QPSK – High Channel)



Plot 7-82. Ant 2 EIRP Plot (Band n261 − 100MHz-2CC – QPSK – High Channel)

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Band n260 Beam ID Configurations

Mode	Channel	Polarization	Beam ID	Beam ID Pair
SISO	Low	H	25	
		V	154	
	Mid	H	34	
		V	163	
	High	H	27	
		V	163	
MIMO	Low	2Tx/MIMO	153	25
	Mid	2Tx/MIMO	153	25
	High	2Tx/MIMO	155	27

Table 7-36. Ant1 Worst Case Beam ID

Mode	Channel	Polarization	Beam ID	Beam ID Pair
SISO	Low	H	40	
		V	158	
	Mid	H	40	
		V	158	
	High	H	32	
		V	158	
MIMO	Low	2Tx/MIMO	158	30
	Mid	2Tx/MIMO	168	40
	High	2Tx/MIMO	168	40

Table 7-37. Ant2 Worst Case Beam ID

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Band n260

Channel	Frequency [MHz]	Transmission Scheme	Modulation	BeamID	Beam Pol.	Ant. Div.	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
High	39975.00	DFT-s-OFDM	QPSK	163	H	SISO	V	282	311	1 / 12	23.36
High	39975.00	DFT-s-OFDM	QPSK	27	V	SISO	H	63	266	1 / 16	23.30
High	39975.00	DFT-s-OFDM	QPSK	155 + 27	H + V	2Tx	H	116	335	1 / 19	**28.21**
High	39975.00	CP-OFDM	QPSK	163	H	SISO	V	282	311	1 / 12	20.24
High	39975.00	CP-OFDM	QPSK	27	V	SISO	H	63	266	1 / 16	20.10
High	39975.00	CP-OFDM	QPSK	155 + 27	H + V	MIMO	H	116	335	1 / 19	24.76
Low	37025.04	DFT-s-OFDM	QPSK	155 + 27	H + V	2Tx	H	112	248	1 / 12	23.65
Mid	38499.96	DFT-s-OFDM	QPSK	155 + 27	H + V	2Tx	H	296	252	1 / 12	24.70
High	39975.00	DFT-s-OFDM	π/2 BPSK	155 + 27	H + V	2Tx	H	116	335	1 / 19	28.13
High	39975.00	DFT-s-OFDM	16QAM	155 + 27	H + V	2Tx	H	116	335	1 / 19	25.97
High	39975.00	DFT-s-OFDM	64QAM	155 + 27	H + V	2Tx	H	116	335	1 / 19	24.20

Table 7-38. Ant1 EIRP Data (Band n260 - 50MHz-1CC)

Channel	Frequency [MHz]	Transmission Scheme	Modulation	BeamID	Beam Pol.	Ant. Div.	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
High	39975.00	DFT-s-OFDM	QPSK	155+27	H + V	2Tx	H	246	321	32 / 0	21.40
High	39975.00	DFT-s-OFDM	π/2 BPSK	155 + 27	H + V	2Tx	H	246	321	32 / 0	21.43
High	39975.00	DFT-s-OFDM	16QAM	155 + 27	H + V	2Tx	H	246	321	32 / 0	19.79
High	39975.00	DFT-s-OFDM	64QAM	155 + 27	H + V	2Tx	H	246	321	32 / 0	17.95

Table 7-39. Ant1 EIRP Data (Band n260 - 50MHz-2CC)

Channel	Frequency [MHz]	Transmission Scheme	Modulation	BeamID	Beam Pol.	Ant. Div.	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
Mid	38499.96	DFT-s-OFDM	QPSK	163	H	SISO	V	266	231	1 / 33	22.81
Mid	38499.96	DFT-s-OFDM	QPSK	34	V	SISO	H	237	246	1 / 33	22.19
Mid	38499.96	DFT-s-OFDM	QPSK	153 + 25	H + V	2Tx	V	110	332	1 / 33	24.12
Mid	38499.96	CP-OFDM	QPSK	163	H	SISO	V	266	231	1 / 33	19.89
Mid	38499.96	CP-OFDM	QPSK	34	V	SISO	H	237	246	1 / 33	19.17
Mid	38499.96	CP-OFDM	QPSK	153 + 25	H + V	MIMO	V	110	332	1 / 23	21.84
Low	37050.00	DFT-s-OFDM	QPSK	153 + 25	H + V	2Tx	V	108	350	1 / 42	23.61
High	39949.92	DFT-s-OFDM	QPSK	153 + 25	H + V	2Tx	V	302	251	1 / 42	22.92
Mid	38499.96	DFT-s-OFDM	π/2 BPSK	153 + 25	H + V	2Tx	V	110	332	1 / 23	**24.54**
Mid	38499.96	DFT-s-OFDM	16QAM	153 + 25	H + V	2Tx	V	110	332	1 / 23	23.19
Mid	38499.96	DFT-s-OFDM	64QAM	153 + 25	H + V	2Tx	V	110	332	1 / 23	21.02

Table 7-40. Ant1 EIRP Data (Band n260 - 100MHz-1CC)

Channel	Frequency [MHz]	Transmission Scheme	Modulation	BeamID	Beam Pol.	Ant. Div.	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
Mid	38499.96	DFT-s-OFDM	QPSK	153 + 25	H + V	2Tx	V	243	325	64 / 0	21.77
Mid	38499.96	DFT-s-OFDM	π/2 BPSK	153 + 25	H + V	2Tx	V	243	325	64 / 0	21.80
Mid	38499.96	DFT-s-OFDM	16QAM	153 + 25	H + V	2Tx	V	243	325	64 / 0	20.22
Mid	38499.96	DFT-s-OFDM	64QAM	153 + 25	H + V	2Tx	V	243	325	64 / 0	18.44

Table 7-41. Ant1 EIRP Data (Band n260 - 100MHz-2CC)

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Channel	Frequency [MHz]	Transmission Scheme	Modulation	BeamID	Beam Pol.	Ant. Div.	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
High	39975.00	DFT-s-OFDM	QPSK	158	H	SISO	H	207	58	1 / 19	20.76
High	39975.00	DFT-s-OFDM	QPSK	32	V	SISO	H	279	9	1 / 12	24.61
High	39975.00	DFT-s-OFDM	QPSK	168 + 40	H + V	2Tx	H	82	5	1 / 19	**25.74**
High	39975.00	CP-OFDM	QPSK	158	H	SISO	H	207	58	1 / 12	17.78
High	39975.00	CP-OFDM	QPSK	32	V	SISO	H	279	9	1 / 12	21.58
High	39975.00	CP-OFDM	QPSK	168 + 40	H + V	MIMO	H	82	5	1 / 12	22.77
Low	37025.04	DFT-s-OFDM	QPSK	158 + 30	H + V	2Tx	H	270	327	1 / 16	23.54
Mid	38499.96	DFT-s-OFDM	QPSK	168 + 40	H + V	2Tx	H	164	33	1 / 16	25.44
High	39975.00	DFT-s-OFDM	π/2 BPSK	168 + 40	H + V	2Tx	H	82	5	1 / 19	25.63
High	39975.00	DFT-s-OFDM	16QAM	168 + 40	H + V	2Tx	H	82	5	1 / 19	23.44
High	39975.00	DFT-s-OFDM	64QAM	168 + 40	H + V	2Tx	H	82	5	1 / 19	21.56

Table 7-42. Ant2 EIRP Data (Band n260 - 50MHz-1CC)

Channel	Frequency [MHz]	Transmission Scheme	Modulation	BeamID	Beam Pol.	Ant. Div.	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
High	39975.00	DFT-s-OFDM	QPSK	168 + 40	H + V	2Tx	H	72	4	32 / 0	20.99
High	39975.00	DFT-s-OFDM	π/2 BPSK	168 + 40	H + V	2Tx	H	72	4	32 / 0	20.93
High	39975.00	DFT-s-OFDM	16QAM	168 + 40	H + V	2Tx	H	72	4	32 / 0	19.53
High	39975.00	DFT-s-OFDM	64QAM	168 + 40	H + V	2Tx	H	72	4	32 / 0	18.42

Table 7-43. Ant2 EIRP Data (Band n260 - 50MHz-2CC)

Channel	Frequency [MHz]	Transmission Scheme	Modulation	BeamID	Beam Pol.	Ant. Div.	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
High	39949.92	DFT-s-OFDM	QPSK	158	H	SISO	V	328	102	1 / 33	24.22
High	39949.92	DFT-s-OFDM	QPSK	32	V	SISO	H	12	280	1 / 42	23.83
High	39949.92	DFT-s-OFDM	QPSK	168 + 40	H + V	2Tx	H	83	6	1 / 23	25.07
High	39949.92	CP-OFDM	QPSK	158	H	SISO	V	328	102	1 / 42	21.03
High	39949.92	CP-OFDM	QPSK	32	V	SISO	H	12	280	1 / 33	20.75
High	39949.92	CP-OFDM	QPSK	168 + 40	H + V	MIMO	H	83	6	1 / 23	22.23
Low	37050.00	DFT-s-OFDM	QPSK	30 + 158	H + V	2Tx	H	108	113	1 / 42	23.96
Mid	38499.96	DFT-s-OFDM	QPSK	40 + 168	H + V	2Tx	H	169	44	1 / 33	24.81
High	39949.92	DFT-s-OFDM	π/2 BPSK	168 + 40	H + V	2Tx	H	83	6	1 / 23	**25.08**
High	39949.92	DFT-s-OFDM	16QAM	168 + 40	H + V	2Tx	H	83	6	1 / 23	22.92
High	39949.92	DFT-s-OFDM	64QAM	168 + 40	H + V	2Tx	H	83	6	1 / 23	21.04

Table 7-44. Ant2 EIRP Data (Band n260 - 100MHz-1CC)

Channel	Frequency [MHz]	Transmission Scheme	Modulation	BeamID	Beam Pol.	Ant. Div.	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	RB Size/Offset	EIRP [dBm]
High	39949.92	DFT-s-OFDM	QPSK	40 + 168	H + V	2Tx	H	74	18	64 / 0	21.74
High	39949.92	DFT-s-OFDM	π/2 BPSK	168 + 40	H + V	2Tx	H	74	18	64 / 0	21.88
High	39949.92	DFT-s-OFDM	16QAM	168 + 40	H + V	2Tx	H	74	18	64 / 0	20.35
High	39949.92	DFT-s-OFDM	64QAM	168 + 40	H + V	2Tx	H	74	18	64 / 0	18.29

Table 7-45. Ant2 EIRP Data (Band n260 - 100MHz-2CC)

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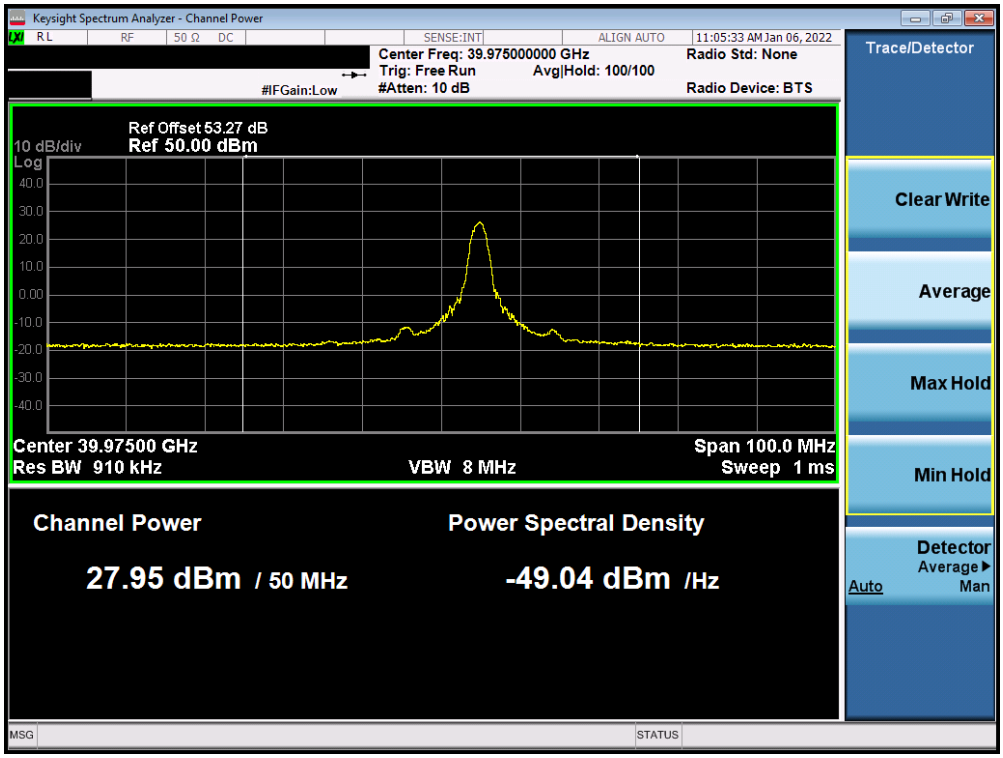
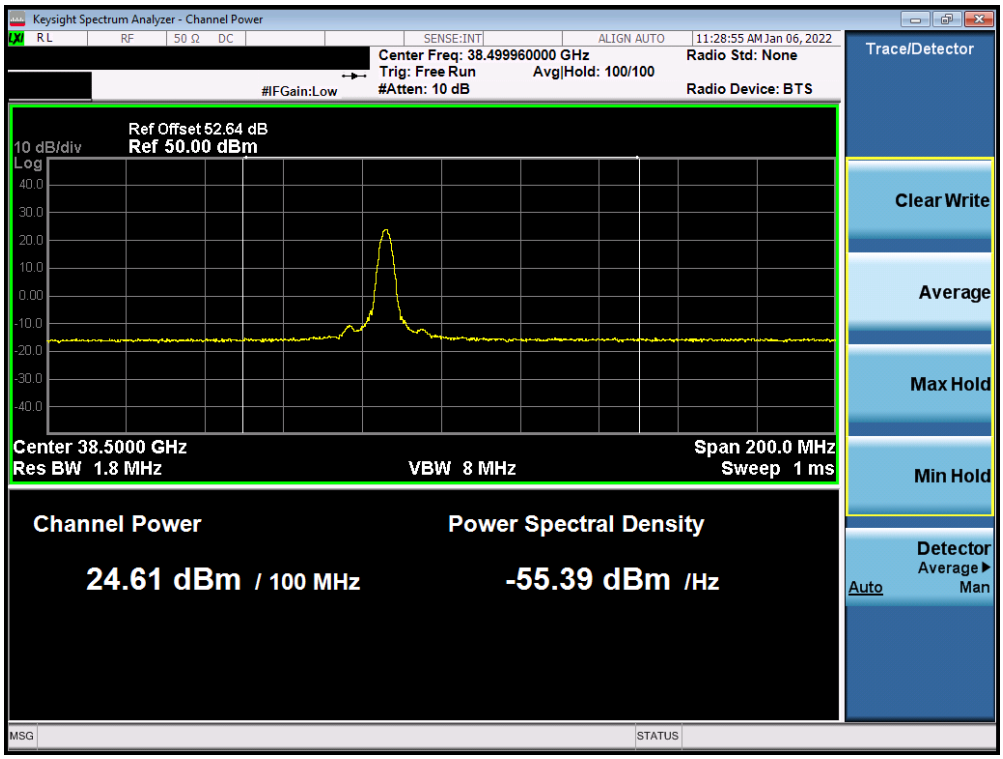


Plot 7-83. Ant 1 EIRP Plot (Band n260 – 50MHz-1CC – QPSK – High Channel)



Plot 7-84. Ant 1 EIRP Plot (Band n260 – 100MHz-1CC – pi/2-BPSK – Mid Channel)

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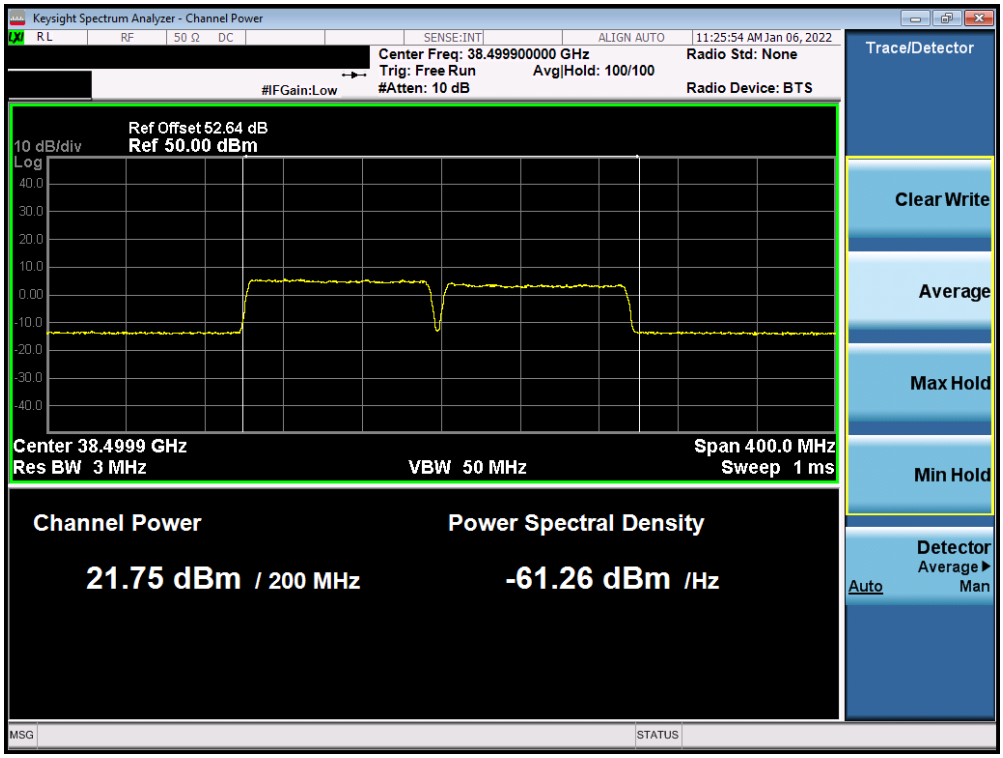
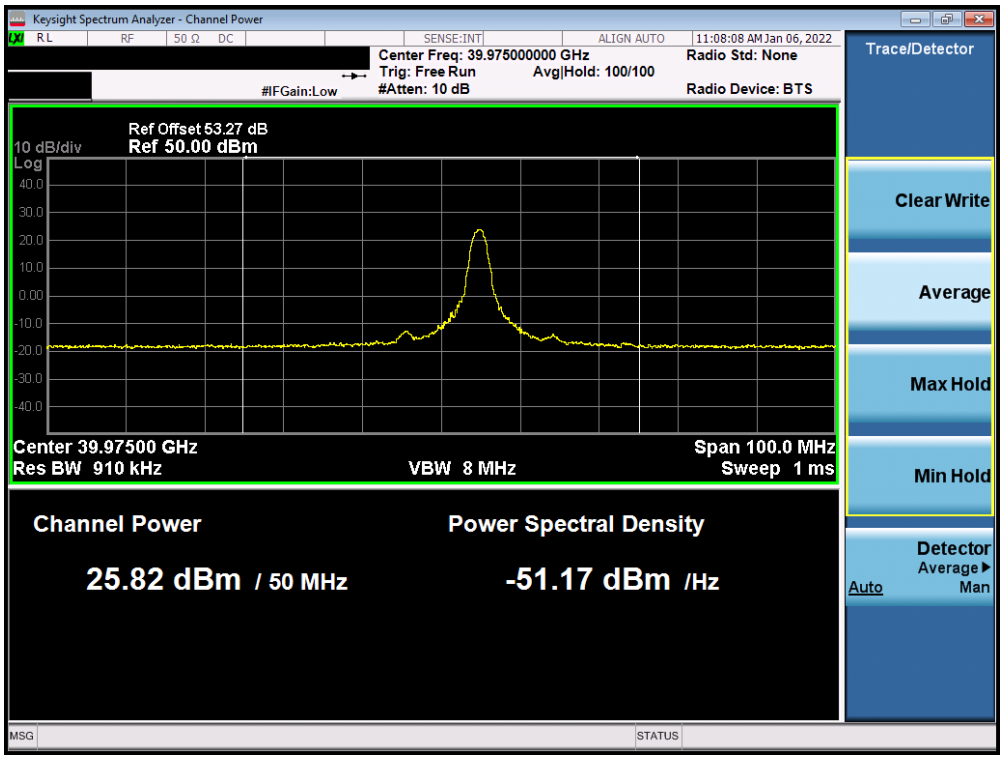


Plot 7-85. Ant 1 EIRP Plot (Band n260 – 100MHz-2CC – pi/2-BPSK – Mid Channel)



Plot 7-86. Ant 2 EIRP Plot (Band n260 – 50MHz-1CC – QPSK – High Channel)

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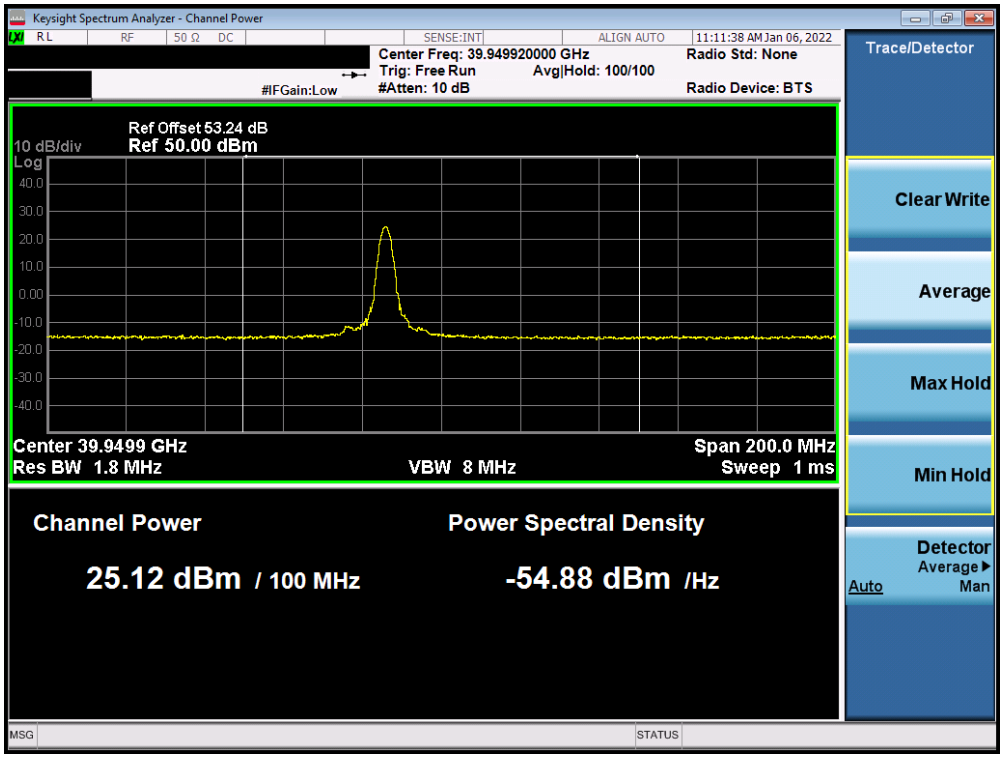
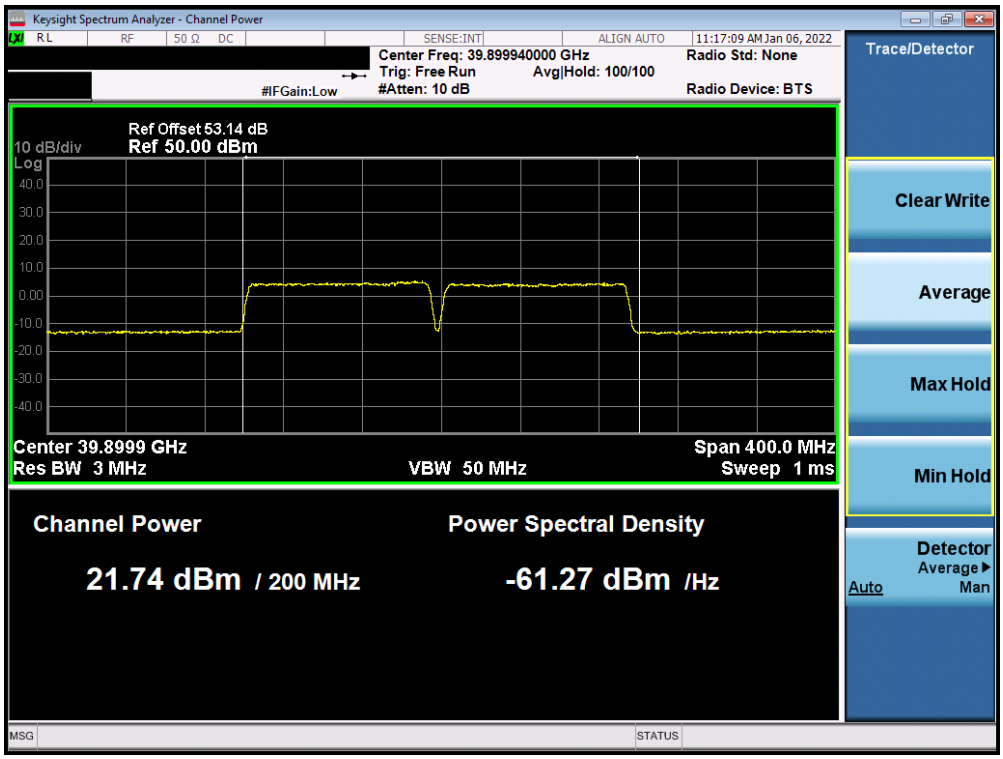


Plot 7-87. Ant 2 EIRP Plot (Band n260 − 100MHz-1CC − pi/2-BPSK – High Channel)



Plot 7-88. Ant 2 EIRP Plot (Band n260 − 100MHz-2CC – pi/2-BPSK – High Channel)

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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 n258 bands and from 30MHz to 200GHz for n260 band. 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 v01r02 Section 4.4.3

Test Settings

1. Start frequency was set to 30MHz and stop frequency was set to 100 GHz for n261 and n258 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 ≥ 2 x 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. Emissions that were found to be non-compliant using the EIRP method were re-measured using the Spherical Grid TRP Method per KDB 842590.

3) The plots in this section were taken with the analyzer set to max hold. All final measurements shown in the tables that accompany the plots were taken with trace averaging performed over 100 sweeps while the analyzer was triggering on a specific emission of interest.

4) Elements within the same antenna array are correlated to produce beamforming array gain. Antenna arrays cannot be correlated with another antenna array. During testing, only one antenna array was active.

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5) The plots from 1-200GHz show corrected average EIRP levels. The average EIRP reported below is calculated per section 5.2.7 of ANSI C63.26-2015 which states: EIRP (dBm) = E (dBµV/m) + 20log(D) − 104.8; where D is the measurement distance (in the far field region) in m. The field strength E is calculated E (dBµV/m) = Spectrum Analyzer Level (dBm) + Antenna Factor (dB/m) + Cable Loss (dB) + Harmonic Mixer Conversion Loss (dB) + 107. All appropriate Antenna Factor and Cable Loss have been applied in the spectrum analyzer for each measurement. For measurements > 40GHz, Harmonic Mixer Conversion Loss was also applied to the spectrum analyzer.

6) Emissions below 18GHz were measured at a 3 meter test distance, while emissions above 18GHz were measured at the appropriate far field distance. The far field of the mmWave signal is based on formula: R > 2D^2/wavelength, where D is the larger between the dimension of the measurement antenna and the transmitting antenna of the EUT. In this case, D is the largest dimension of the measurement antenna.

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

Table 7-46. Far-Field Distance & Measurement Distance per Frequency Range

7) All emissions from 30MHz - 40GHz were measured using a spectrum analyzer with an internal preamplifier. Emissions >40GHz were measured using a harmonic mixer with the spectrum analyzer.

8) 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.

9) The "-" shown in the following RSE tables are used to denote a noise floor measurement.

10) All RSE's were investigated in EN-DC mode and with 802.11 chipset active. It was determined that there is no new emission introduced by EN-DC mode, or the 802.11 chipset. For EN-DC mode, n261 uses LTE B2, B5, B12, B13, B48 and B66, n260 uses LTE B2, B5, B12, B13, B14,B30, B48 and B66 and n258 uses LTE B2, B5, B12, B14, B30, and B66.

11) Additionally, this device supports anchor bands operating in FR1 spectrum. The n261 band uses NR Bands n2, n5, n66, and n77 as anchor bands. The n260 band uses NR Bands n2, n5, n12, n14, n30, n66, and n77 as anchor bands. The n258 band uses NR Bands n2, n5, n12, n14, n30, and n66 as anchor bands.

12) There was no discernible difference in the spurious emission levels when using different LTE and NR FR1 anchor bands. Thus, LTE Band 2 was used as a representative anchor band for EN-DC investigations.

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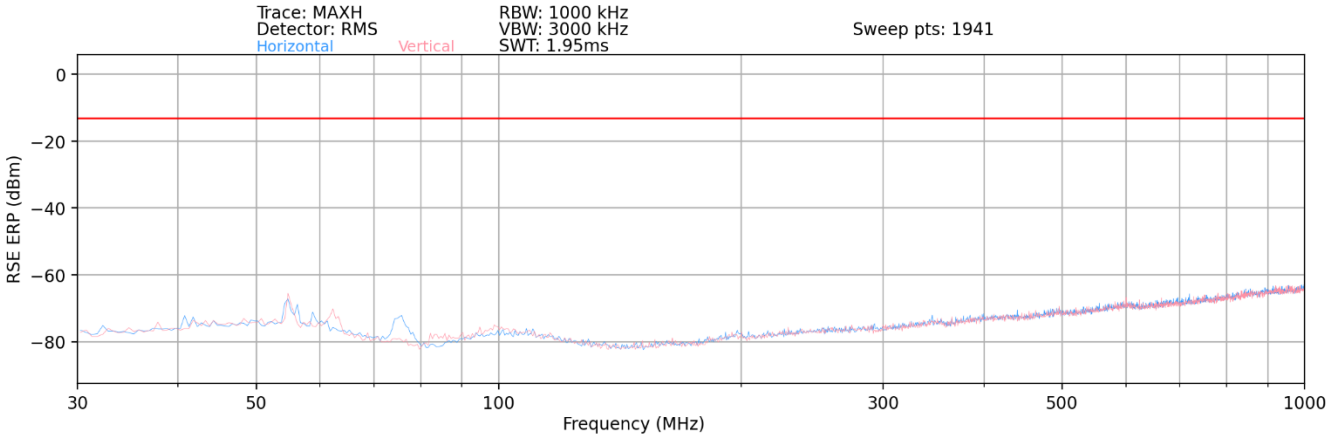
Ant1 Band n258-R1

30MHz - 1GHz



Plot 7-89. Ant1- n258-R1 Radiated Spurious Plot (1CC QPSK Mid Channel 2Tx – EN-DC Anchor Band 2)

Spurious Emissions ERP Sample Calculation (n258-R1)

The raw radiated spurious level is converted to field strength in dBuV/m. Then, the RSE ERP level is calculated by applying the additional factors shown below for a test distance of 3 meter.

RSE ERP (dBm) = Analyzer Level (dBm) + 107 + AFCL (dB/m) + 20Log(Dm) – 104.8 – 2.15 (dB)

Frequency [MHz]	Channnel	Bandwidth (MHz)	EUT Beam Pol.	Modulation	Antenna Polarization [H/V]	Turntable Azimuth [degrees]	Antenna Height [cm]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
66.11	Mid	50	2Tx	QPSK	H	-	-	-77.66	-13.00	-64.66
87.44	Mid	50	2Tx	QPSK	H	-	-	-79.87	-13.00	-66.87
96.17	Mid	50	2Tx	QPSK	H	-	-	-77.38	-13.00	-64.38
110.23	Mid	50	2Tx	QPSK	H	-	-	-78.33	-13.00	-65.33
117.98	Mid	50	2Tx	QPSK	H	-	-	-78.68	-13.00	-65.68
303.65	Mid	50	2Tx	QPSK	H	-	-	-74.76	-13.00	-61.76

Table 7-47. Ant1 – 2Tx - Spurious Emissions Table (30MHz - 1GHz)

Notes

The RSE ERP level is taken directly from the spectrum analyzer which includes the appropriate antenna factors, and cable losses. Measurements were performed at a distance of 3 meter.

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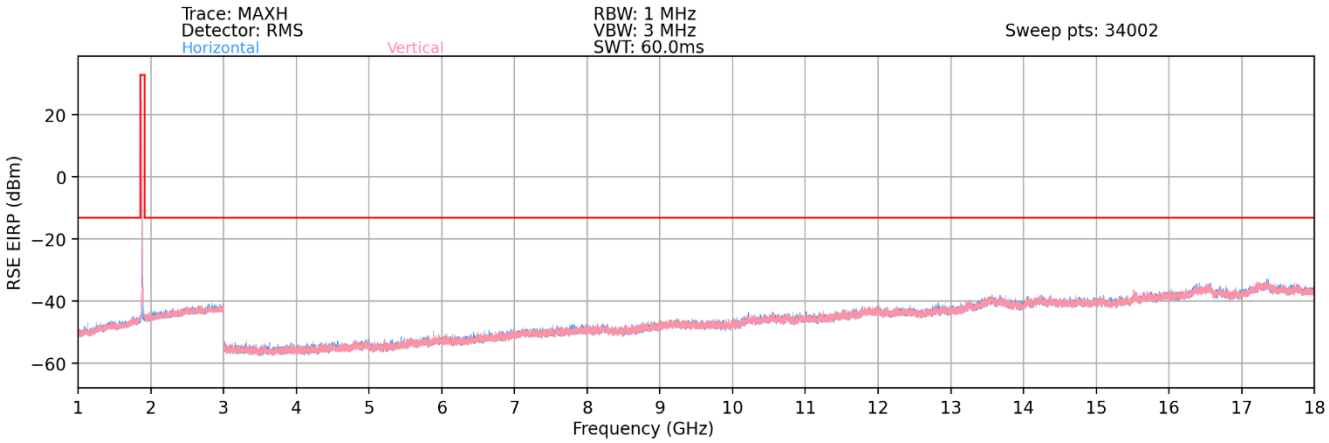
1GHz - 18GHz



Plot 7-90. Ant1-n258-R1 Radiated Spurious Plot (1CC QPSK Mid Channel 2Tx – EN-DC Anchor Band 2)

Spurious Emissions EIRP Sample Calculation (n258-R1)

The raw radiated spurious level is converted to field strength in dBuV/m. Then, the RSE EIRP level is calculated by applying the additional factors shown below for a test distance of 3 meter.

RSE EIRP (dBm) = Analyzer Level (dBm) + 107 + AFCL (dB/m) + 20Log(Dm) – 104.8

Frequency [MHz]	Channnel	Bandwidth (MHz)	EUT Beam Pol.	Modulation	Antenna Polarization [H/V]	Turntable Azimuth [degrees]	Antenna Height [cm]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
5000.68	Mid	50	2Tx	QPSK	H	-	-	-53.50	-13.00	-40.50
9500.03	Mid	50	2Tx	QPSK	H	-	-	-47.76	-13.00	-34.76
11302.47	Mid	50	2Tx	QPSK	H	-	-	-45.79	-13.00	-32.79

Table 7-49. Ant1 - 2Tx - Spurious Emissions Table (1GHz - 18GHz)

Notes

The RSE EIRP level is taken directly from the spectrum analyzer which includes the appropriate antenna factors, and cable losses. Measurements were performed at a distance of 3 meter.

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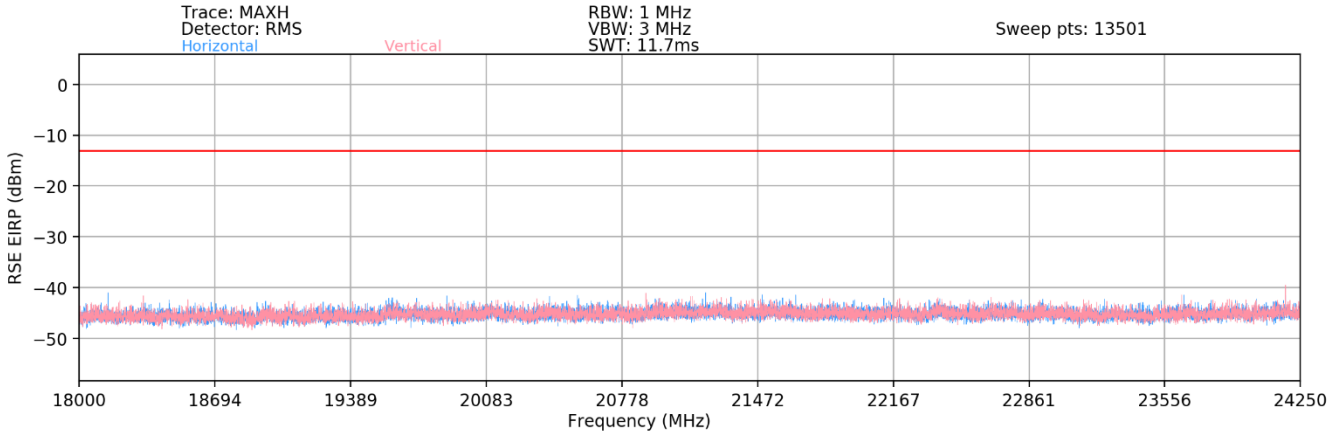
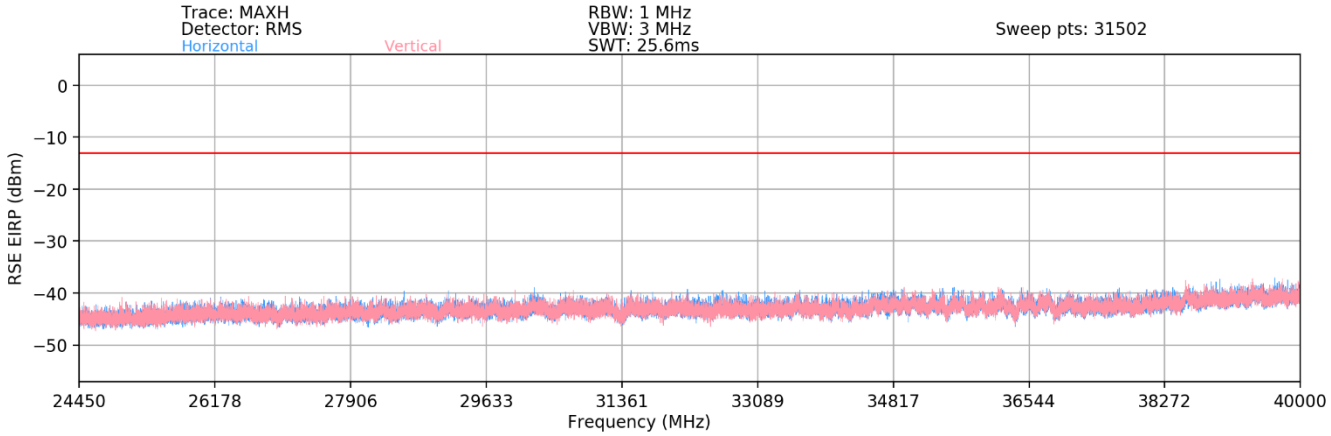
18GHz - 24.25GHz



Plot 7-91. Ant1-n258-R1 Radiated Spurious Plot (1CC QPSK Mid Channel 2Tx – EN-DC Anchor B2)

24.45GHz - 40GHz



Plot 7-92. Ant1-n258-R1 Radiated Spurious Plot (1CC QPSK Mid Channel 2Tx – EN-DC Anchor B2)

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Spurious Emissions EIRP Sample Calculation (n258-R1)

The raw radiated spurious level is converted to field strength in dBuV/m. Then, the RSE EIRP level is calculated by applying the additional factors shown below for a test distance of 1 meter.
RSE EIRP (dBm) = Analyzer Level (dBm) + 107 + AFCL (dB/m) + 20Log(Dm) – 104.8

Frequency [MHz]	Channnel	Bandwidth (MHz)	EUT Beam Pol.	Modulation	Antenna Polarization [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
21107.50	Mid	50	2Tx	QPSK	H	-	-	-45.42	-13.00	-32.42
24570.00	Mid	50	2Tx	QPSK	H	-	-	-45.42	-13.00	-32.42
27339.50	Mid	50	2Tx	QPSK	H	-	-	-43.77	-13.00	-30.77

Table 7-50. Ant1 - 2Tx - Spurious Emissions Table (18GHz - 40GHz)

Notes

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

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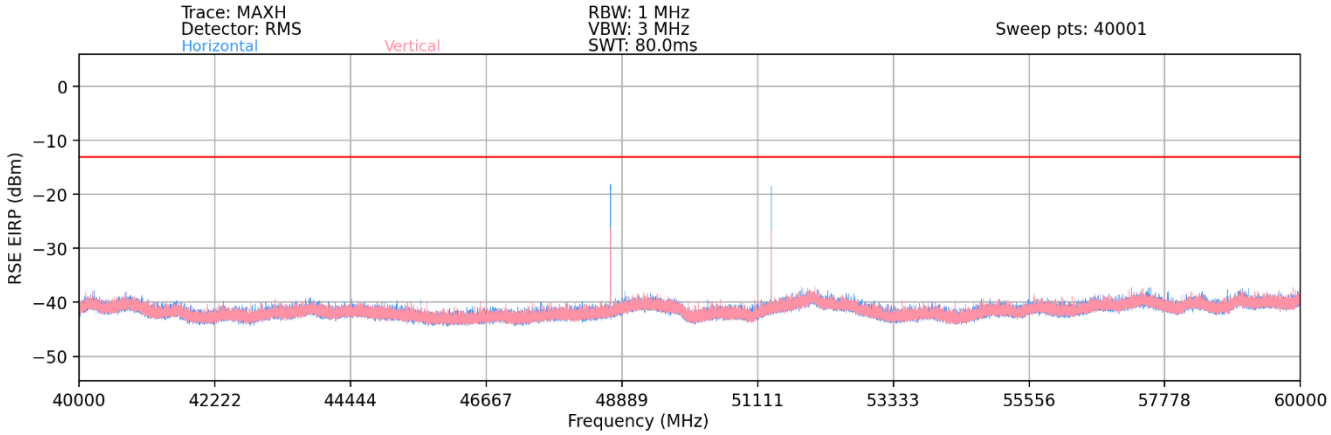
40GHz - 60GHz



Plot 7-93. Ant1-n258-R1 Radiated Spurious Plot (1CC QPSK Mid Channel 2Tx – EN-DC Anchor B2)

Spurious Emissions EIRP Sample Calculation (n258-R1)

The raw radiated spurious level is converted to field strength in dBuV/m. Then, the RSE EIRP level is calculated by applying the additional factors shown below for a test distance of 1.5 meter.

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

Frequency [MHz]	Channnel	Bandwidth (MHz)	EUT Beam Pol.	Modulation	Antenna Polarization [H/V]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
48551.22	Low	50	2Tx	QPSK	H	-21.91	-13.00	-8.91
51845.46	Low	50	2Tx	QPSK	H	-46.39	-13.00	-33.39
48700.70	Mid	50	2Tx	QPSK	H	-21.17	-13.00	-8.17
51336.79	Mid	50	2Tx	QPSK	H	-43.44	-13.00	-30.44
48850.95	High	50	2Tx	QPSK	H	-20.86	-13.00	-7.86
51476.34	High	50	2Tx	QPSK	H	-44.32	-13.00	-31.32

Table 7-51. Ant1 - 2Tx - Spurious Emissions Table (40GHz - 60GHz)

Notes

The RSE EIRP level is taken directly from the spectrum analyzer which includes the appropriate antenna factors, cable losses, and harmonic mixer conversion losses. Measurements were performed at a distance of 1.5 meter.

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