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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:
06/08/2023- 07/20/2023
Test Report Issue Date:
08/2/2023
Test Site/Location:
Element Lab., Columbia, MD, USA
Test Report Serial No.:
1M2304260060-12.A3L

FCC ID:	**A3LSMS711U**
APPLICANT:	**Samsung Electronics Co., Ltd.**

Application Type:	Certification
Model:	SM-S711U
Additional Model(s):	SM-S711U1
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.

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

RJ Ortanez
Executive Vice President

ACCREDITED
CERT #2041.01

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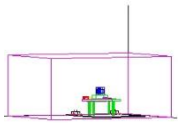
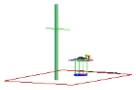


MEASUREMENT REPORT
FCC Part 30



Antenna	Band	Bandwidth [MHz]	Tx Frequency [MHz]	CCs Active	Modulation	Mode	EIRP		Emission Designator
							Max Power [W]	Max Power [dBm]	
Ant-1	NR-n258-R1	50	24275 - 24425	1	QPSK	SISO	0.601	27.79	47M2G7D
					QPSK	2Tx	0.861	29.35	47M2G7D
					π/2 BPSK	2Tx	0.875	29.42	46M2G7D
					16QAM	2Tx	0.558	27.47	46M9W7D
					64QAM	2Tx	0.362	25.59	47M9W7D
		100	24300 - 24400	1	QPSK	SISO	0.605	27.82	95M8G7D
					QPSK	2Tx	0.889	29.49	95M8G7D
					π/2 BPSK	2Tx	0.938	29.72	92M1G7D
					16QAM	2Tx	0.532	27.26	94M6W7D
					64QAM	2Tx	0.351	25.45	95M5W7D
				2	QPSK	2Tx	0.225	23.52	200MG7D
					π/2 BPSK	2Tx	0.222	23.46	193MG7D
					16QAM	2Tx	0.145	21.60	198MW7D
					64QAM	2Tx	0.090	19.54	198MW7D

EUT Overview (Band n258-R1)

Antenna	Band	Bandwidth [MHz]	Tx Frequency [MHz]	CCs Active	Modulation	Mode	EIRP		Emission Designator
							Max Power [W]	Max Power [dBm]	
Ant-1	NR-n258-R2	50	24775 - 25225	1	QPSK	SISO	0.583	27.66	46M5G7D
					QPSK	2Tx	0.906	29.57	46M5G7D
					π/2 BPSK	2Tx	0.916	29.62	46M1G7D
					16QAM	2Tx	0.610	27.85	46M1W7D
					64QAM	2Tx	0.368	25.66	46M1W7D
		100	24800 - 25200	1	QPSK	SISO	0.564	27.51	95M0G7D
					QPSK	2Tx	0.993	29.97	95M0G7D
					π/2 BPSK	2Tx	1.033	30.14	91M7G7D
					16QAM	2Tx	0.619	27.92	94M9W7D
					64QAM	2Tx	0.391	25.92	94M8W7D
				2	QPSK	2Tx	0.238	23.77	195MG7D
					π/2 BPSK	2Tx	0.240	23.80	192MG7D
					16QAM	2Tx	0.153	21.84	194MW7D
					64QAM	2Tx	0.107	20.31	195MW7D
				3	QPSK	2Tx	0.160	22.03	296MG7D
					π/2 BPSK	2Tx	0.245	23.89	294MG7D
					16QAM	2Tx	0.143	21.56	297MW7D
					64QAM	2Tx	0.114	20.55	297MW7D

EUT Overview (Band n258-R2)

Antenna	Band	Bandwidth [MHz]	Tx Frequency [MHz]	CCs Active	Modulation	Mode	EIRP		Emission Designator
							Max Power [W]	Max Power [dBm]	
Ant-1	NR-n261	50	27525 - 28325	1	QPSK	SISO	0.718	28.56	46M3G7D
					QPSK	2Tx	1.479	31.70	46M3G7D
					π/2 BPSK	2Tx	1.476	31.69	46M3G7D
					16QAM	2Tx	0.931	29.69	46M2W7D
					64QAM	2Tx	0.581	27.64	46M1W7D
		100	27550 - 28300	1	QPSK	SISO	0.670	28.26	95M3G7D
					QPSK	2Tx	1.096	30.40	95M3G7D
					π/2 BPSK	2Tx	1.094	30.39	92M0G7D
					16QAM	2Tx	0.679	28.32	95M1W7D
					64QAM	2Tx	0.431	26.34	95M1W7D
				2	QPSK	2Tx	0.244	23.88	198MG7D
					π/2 BPSK	2Tx	0.249	23.97	198MG7D
					16QAM	2Tx	0.161	22.08	198MW7D
					64QAM	2Tx	0.111	20.46	195MW7D
				3	QPSK	2Tx	0.259	24.13	293MG7D
					π/2 BPSK	2Tx	0.263	24.20	292MG7D
					16QAM	2Tx	0.210	23.22	293MW7D
					64QAM	2Tx	0.126	21.02	292MW7D
				4	QPSK	2Tx	0.230	23.62	395MG7D
					π/2 BPSK	2Tx	0.234	23.69	393MG7D
					16QAM	2Tx	0.185	22.68	394MW7D
					64QAM	2Tx	0.137	21.36	396MW7D

EUT Overview (Band n261)

Antenna	Band	Bandwidth [MHz]	Tx Frequency [MHz]	CCs Active	Modulation	Mode	EIRP		Emission Designator
							Max Power [W]	Max Power [dBm]	
Ant-1	NR-n260	50	37025 - 39975	1	QPSK	SISO	0.815	29.11	46M7G7D
					QPSK	2Tx	1.109	30.45	46M7G7D
					π/2 BPSK	2Tx	1.199	30.79	46M0G7D
					16QAM	2Tx	0.745	28.72	46M3W7D
					64QAM	2Tx	0.448	26.51	46M0W7D
		100	37050 - 39950	1	QPSK	2Tx	1.202	30.80	96M0G7D
					π/2 BPSK	2Tx	1.225	30.88	92M3G7D
					16QAM	2Tx	0.685	28.36	95M6W7D
					64QAM	2Tx	0.511	27.08	96M9W7D
				2	QPSK	2Tx	0.261	24.16	197MG7D
					π/2 BPSK	2Tx	0.259	24.14	196MG7D
					16QAM	2Tx	0.177	22.47	194MW7D
					64QAM	2Tx	0.119	20.75	195MW7D
				3	QPSK	2Tx	0.259	24.14	298MG7D
					π/2 BPSK	2Tx	0.259	24.13	297MG7D
					16QAM	2Tx	0.182	22.59	299MW7D
					64QAM	2Tx	0.120	20.79	298MW7D
				4	QPSK	2Tx	0.274	24.37	396MG7D
					π/2 BPSK	2Tx	0.271	24.33	395MG7D
					16QAM	2Tx	0.260	24.15	397MW7D
					64QAM	2Tx	0.188	22.75	397MW7D

EUT Overview (Band n260)

1.0 INTRODUCTION

1.1 Scope

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

1.2 Element Test Location

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

1.3 Test Facility / Accreditations

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

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

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

- Element Washington DC LLC facility is a registered (2451B) test laboratory with the site description on file with ISED.

- Element Washington DC LLC is a Recognized U.S. Certification Assessment Body (CAB # US0110) for ISED Canada as designated by NIST under the U.S. and Canada Mutual Recognition Agreement.

2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **Samsung FCC ID: A3LSMS711U**. The test data contained in this report pertains only to the emissions due to the EUT's 5G mmWave function.

The EUT supports both 50MHz bandwidth and 100MHz bandwidth. The EUT supports 1CC for 50MHz bandwidth and upto 4CC for 100MHz bandwidth. The table below indicates the supported bandwidths and component carriers for the Frequency ranges tested.

# CC's	BW (MHz)	Total CC BW (MHz)	Channel	24.25 - 24.45GHz (n258-R1)	24.75 - 25.25GHz (n258-R2)	27.5 - 28.35GHz (n261)	37 - 40GHz (n260)
1CC	50	50	Low	x	x	x	x
			Mid	x	x	x	x
			High	x	x	x	x
	100	100	Low	x	x	x	x
			Mid	x	x	x	x
			High	x	x	x	x
2CC	50	100	Low	-	-	-	-
			Mid	-	-	-	-
			High	-	-	-	-
	100	200	Low	-	x	x	x
			Mid	x	x	x	x
			High	-	x	x	x
3CC	50	150	Low	-	-	-	-
			Mid	-	-	-	-
			High	-	-	-	-
	100	300	Low	-	x	x	x
			Mid	-	x	x	x
			High	-	x	x	x
4CC	50	200	Low	-	-	-	-
			Mid	-	-	-	-
			High	-	-	-	-
	100	400	Low	-	-	x	x
			Mid	-	-	x	x
			High	-	-	x	x

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. 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.: 0579M, 0600M, 0107M

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

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

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

2.4 Software and Firmware

The test was conducted with firmware version S711USQU0AWG7 installed on the EUT.

2.5 EMI Suppression Device(s)/Modifications

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

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.

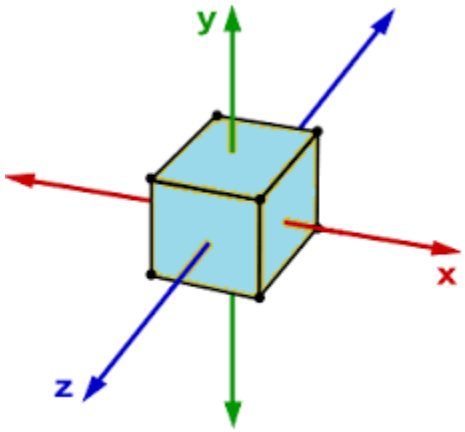


Figure 3-1. Rotation of the EUT Through Three Orthogonal Planes

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

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

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

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

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

Effective Isotropic Radiated Power Sample Calculation

The measured e.i.r.p is converted to E-field in V/m. Then, the distance correction is applied before converting back to calculated e.i.r.p, as explained in KDB 971168 D01.

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.

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

5.0 TEST EQUIPMENT CALIBRATION DATA

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

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	N9030A	50GHz PXA Signal Analyzer	9/9/2022	Annual	9/9/2023	US51350301
Carlisle IT	UTiFlex	FAC mmWave UTiFlex 40GHz	1/12/2023	Annual	1/12/2024	234142-001
Carlisle IT	UTiFlex	FAC mmWave UTiFlex 40GHz	1/12/2023	Annual	1/12/2024	232062-001
EMCO	3115	Horn Antenna (1-18GHz)	8/8/2022	Biennial	8/8/2024	9704-5182
EMCO	3116	Horn Antenna (18-40GHz)	7/20/2021	Biennial	8/30/2023	9203-2178
Fairview Microwave	NC-100	Torque Wrench	12/5/2022	Biennial	12/5/2024	N/A
N/A	AP2-001	EMC Cable and Switch System	1/11/2023	Annual	1/11/2024	AP2-001
N/A	AP2-002	EMC Cable and Switch System	1/11/2023	Annual	1/11/2024	AP2-002
N/A	MD 1M 18-40	EMC Cable and Switch System	1/11/2023	Annual	1/11/2024	MD 1M 18-40
Narda	180-422-KF	Horn (Small)	8/30/2022	Biennial	8/30/2024	U157403-01
OML, Inc.	M05RH	WR-05 Horn Antenna, 24dBi, 140 to 220 GHz	9/27/2022	Biennial	9/27/2024	18073001
OML, Inc.	M08RH	Horn Antenna (90 - 140GHz)	10/6/2021	Biennial	10/6/2023	17111701
OML, Inc.	M12RH	Horn Antenna (60 - 90GHz)	11/16/2021	Biennial	11/16/2023	17111701
OML, Inc.	M19RH	Horn Antenna (40 - 60GHz)	10/12/2021	Biennial	10/12/2023	17111701
Pasternack	NC-100	Torque Wrench	12/5/2022	Biennial	12/5/2024	1240
Rohde & Schwarz	ESW44	EMI Test Receiver 2Hz to 44 GHz	3/1/2023	Annual	3/1/2024	101716
Rohde & Schwarz	FSW67	Signal / Spectrum Analyzer	1/13/2023	Annual	1/13/2024	ID: 1312.8000K67-103200-iQ
Virginia Diodes, Inc.	SAX680	SAX Module (60 - 90GHz)	11/21/2022	Biennial	11/21/2024	SAX680
Virginia Diodes, Inc.	SAX681	SAX Module (90 - 140GHz)	1/5/2023	Biennial	1/5/2025	SAX681
Virginia Diodes, Inc.	SAX682	SAX Module (140 - 220GHz)	3/1/2023	Biennial	3/1/2025	SAX682
Sunol	JB5	Bi-Log Antenna (30M- 5GHz)	8/30/2022	Biennial	8/30/2024	A051107

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.

6.0 SAMPLE CALCULATIONS

Emission Designator

π/2 BPSK/ QPSK Modulation

Emission Designator = 800MG7D

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

QAM Modulation

Emission Designator = 802MW7D

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

7.0 TEST RESULTS

7.1 Summary

Company Name: Samsung Electronics Co., Ltd.

FCC ID: A3LSMS711U

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) 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).
3) Per 2.1057(a)(2), spurious emissions were investigated up to 100GHz for n258-R1, n258-R2 and n261. For n260, spurious emissions were investigated up to 200GHz.
4) The radiated RF output power and all out-of-band emissions in the spurious domain are evaluated to the EIRP limits.
5) “CC” refers to “Component Carriers”.
6) Beam IDs were chosen based on which Beam ID produces the highest EIRP during EIRP simulation.
7) All testing was performed using FTM (Factory Test Mode) software at continuous Tx operation (100% duty cycle).
8) The CP-OFDM and DFT-s-OFDM transmission schemes were investigated fully for each test type and only the worst case data is included.

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

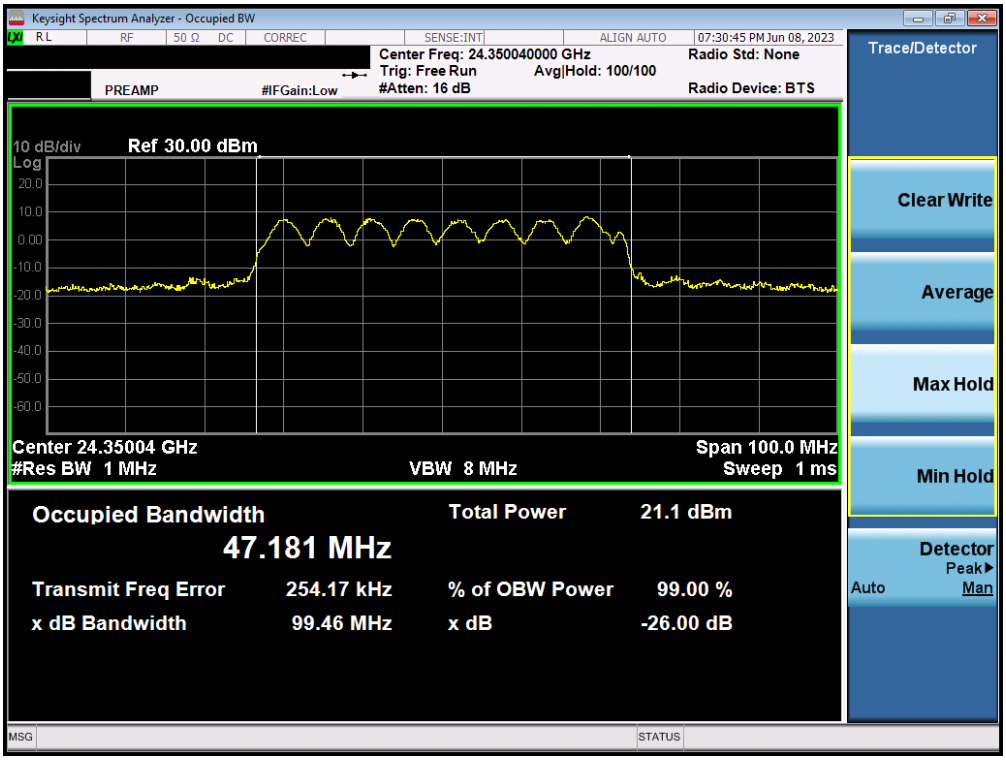
Test Notes

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.

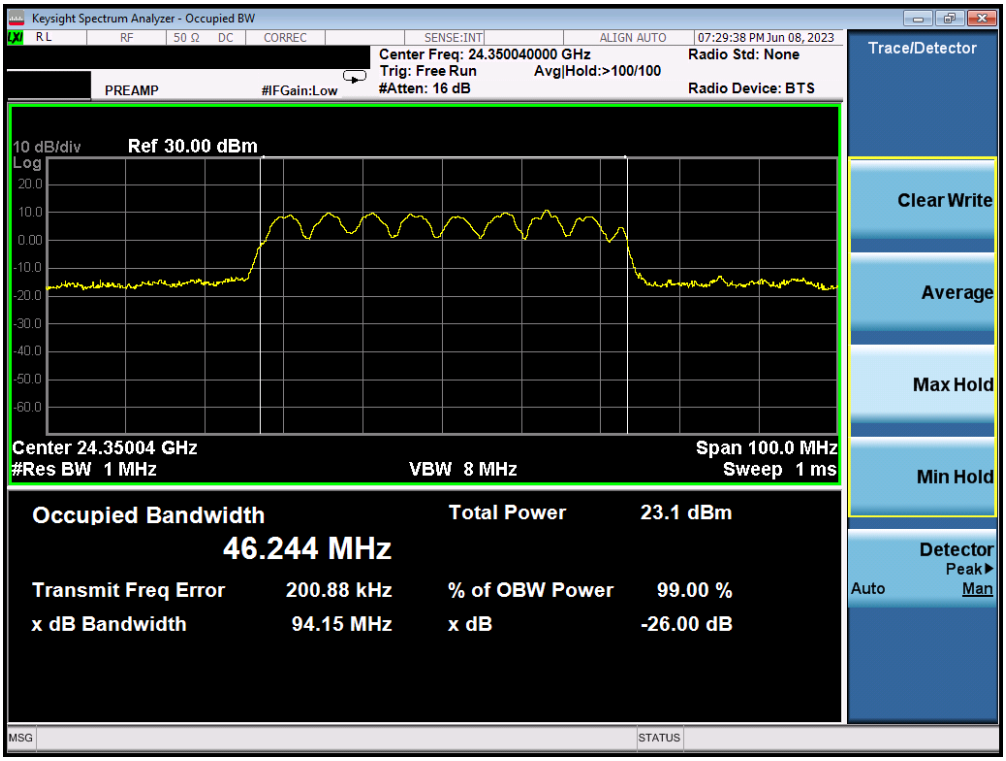
Band n258-R1

Antenna	Bandwidth [MHz]	CCs Active	Transmition Scheme	Modulation	OBW [MHz]
Ant-1	50	1	CP-OFDM	QPSK	47.18
			DFT-s-OFDM	π/2 BPSK	46.24
			CP-OFDM	16QAM	46.92
			CP-OFDM	64QAM	47.85
	100	1	CP-OFDM	QPSK	95.75
			DFT-s-OFDM	π/2 BPSK	92.06
			CP-OFDM	16QAM	94.62
			CP-OFDM	64QAM	95.53
		2	CP-OFDM	QPSK	199.83
			DFT-s-OFDM	π/2 BPSK	192.90
			CP-OFDM	16QAM	198.27
			CP-OFDM	64QAM	197.77

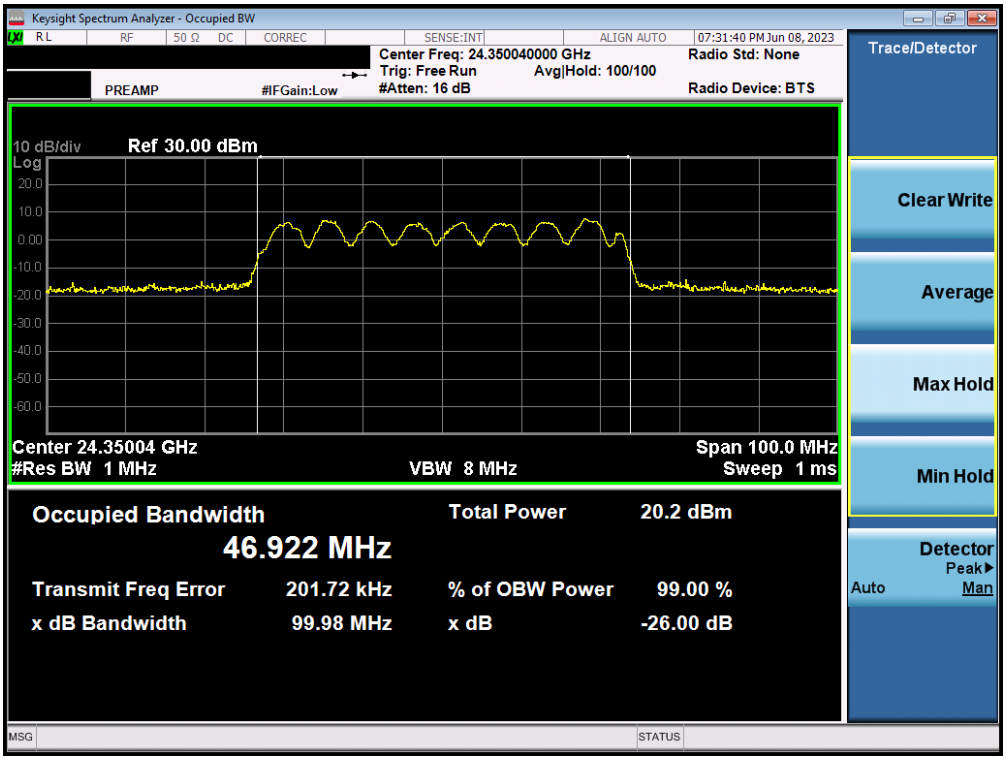
Table 7-2. Summary of Ant-1 Occupied Bandwidths (n258-R1)



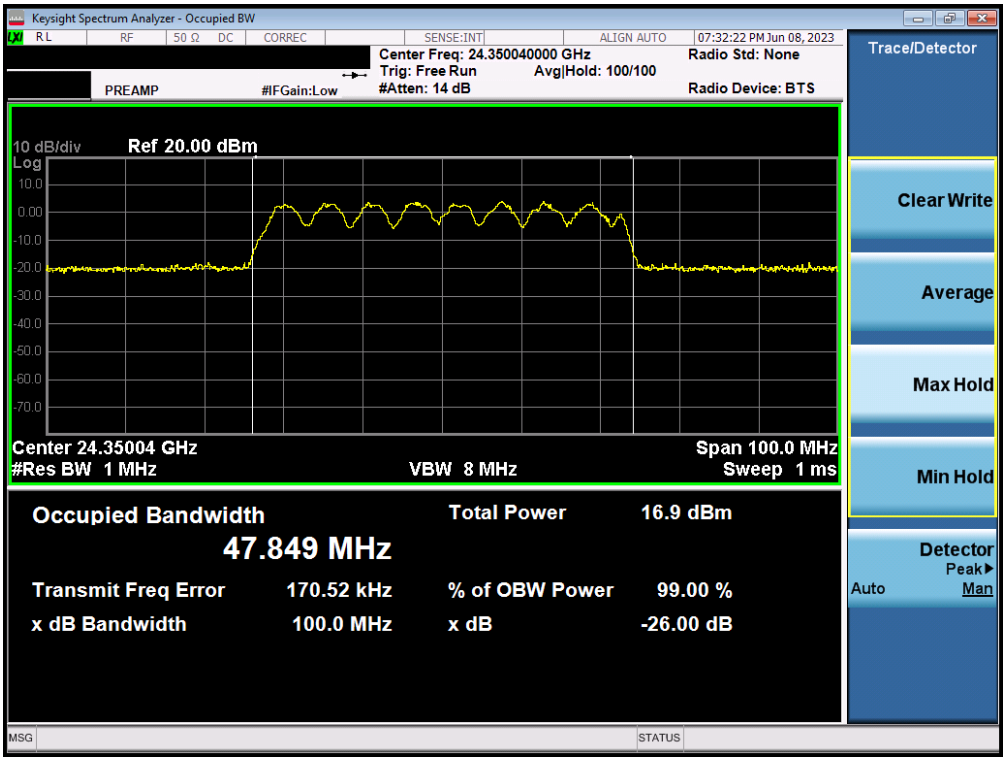
Plot 7-1. Occupied Bandwidth Plot (50MHz-1CC – CP-OFDM QPSK – Mid Channel)



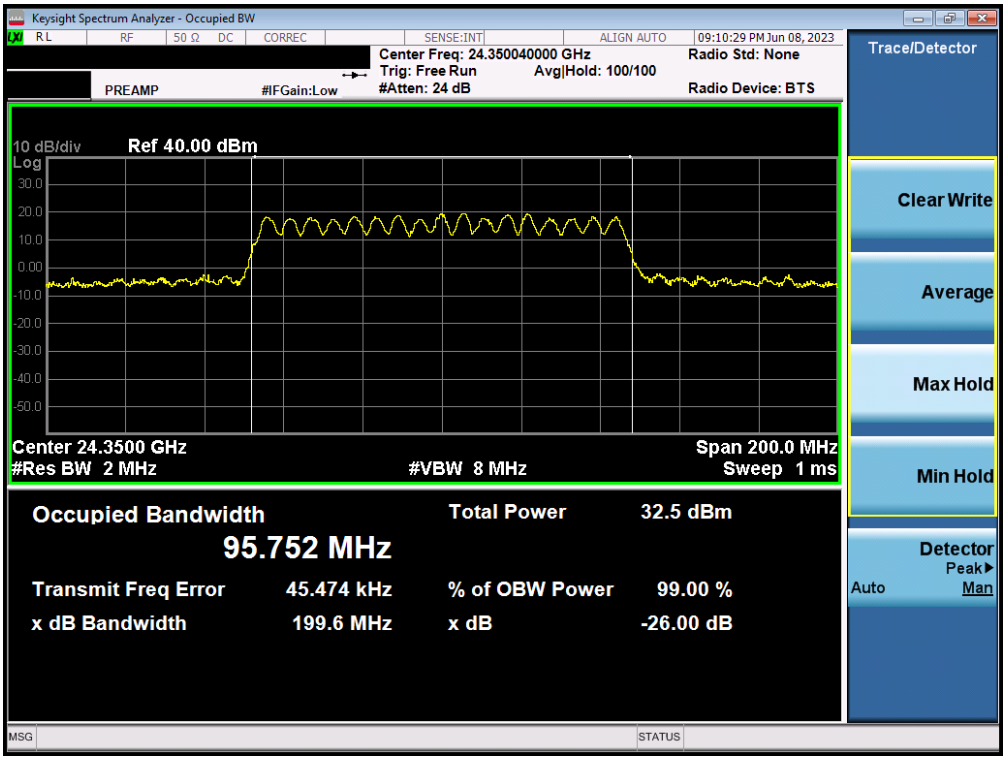
Plot 7-2. Occupied Bandwidth Plot (50MHz-1CC – DFT-s-OFDM π/2 BPSK – Mid Channel)



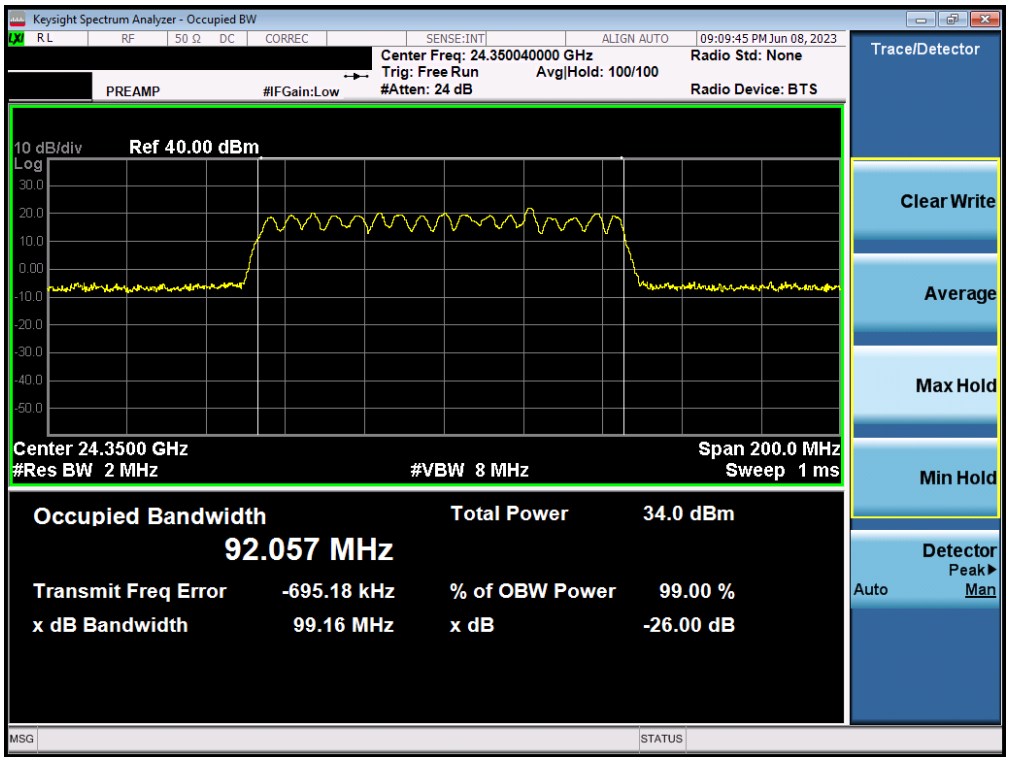
Plot 7-3. Occupied Bandwidth Plot (50MHz-1CC – CP-OFDM 16QAM – Mid Channel)



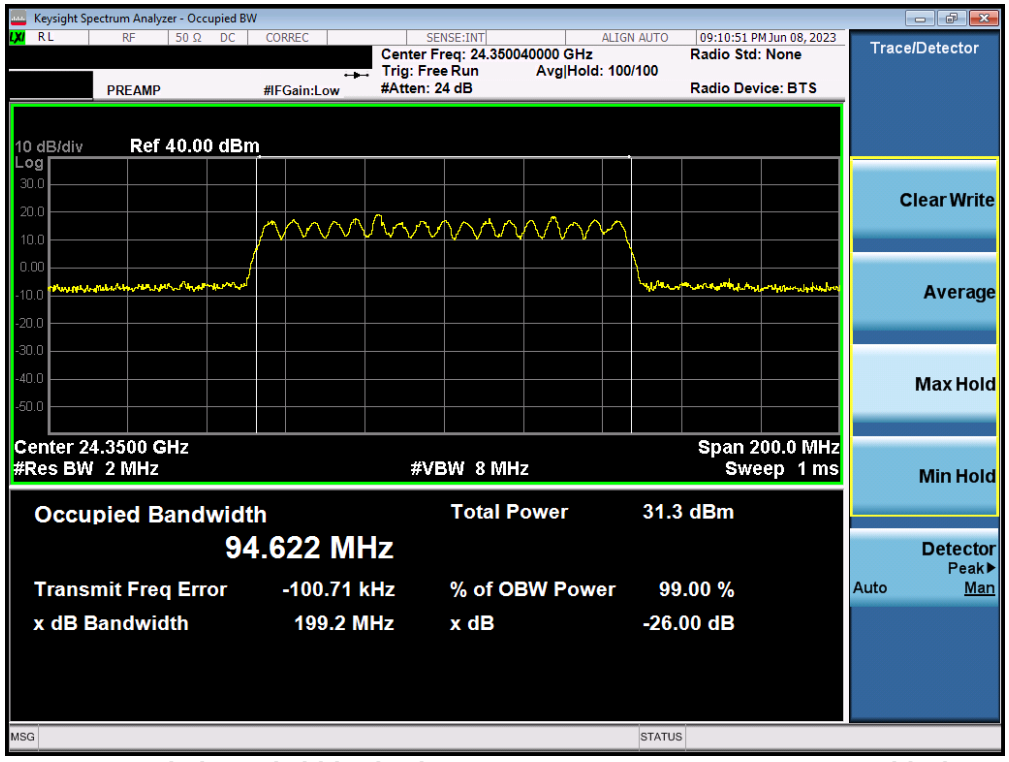
Plot 7-4. Occupied Bandwidth Plot (50MHz-1CC – CP-OFDM 64QAM – Mid Channel)



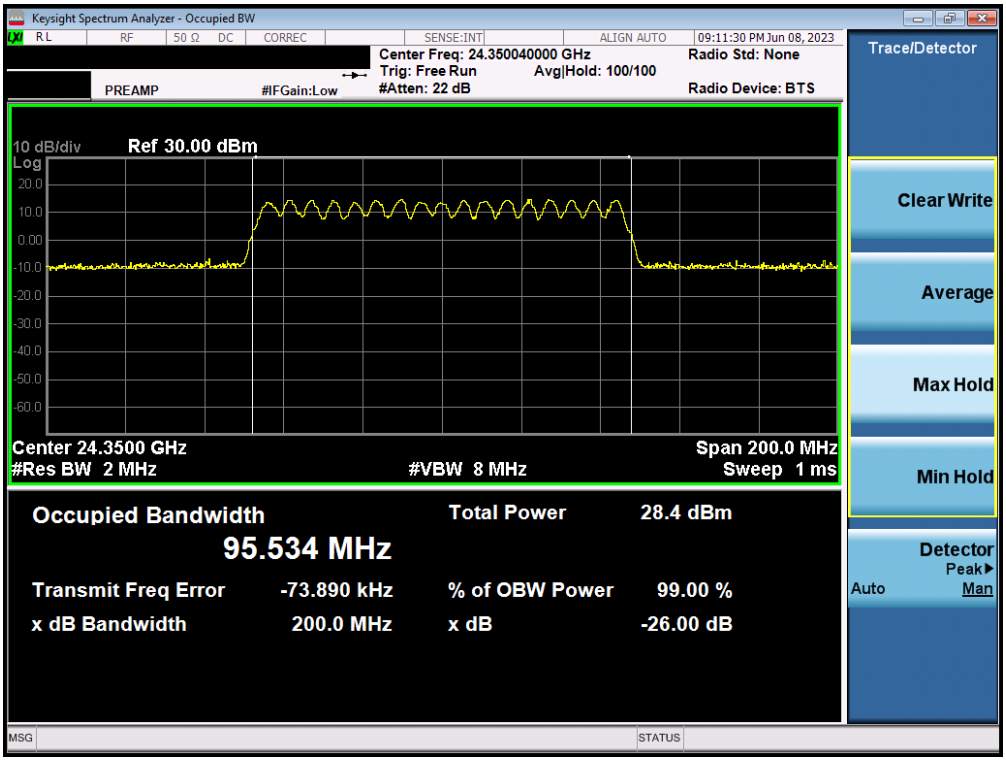
Plot 7-5. Occupied Bandwidth Plot (100MHz-1CC – CP-OFDM QPSK – Mid Channel)



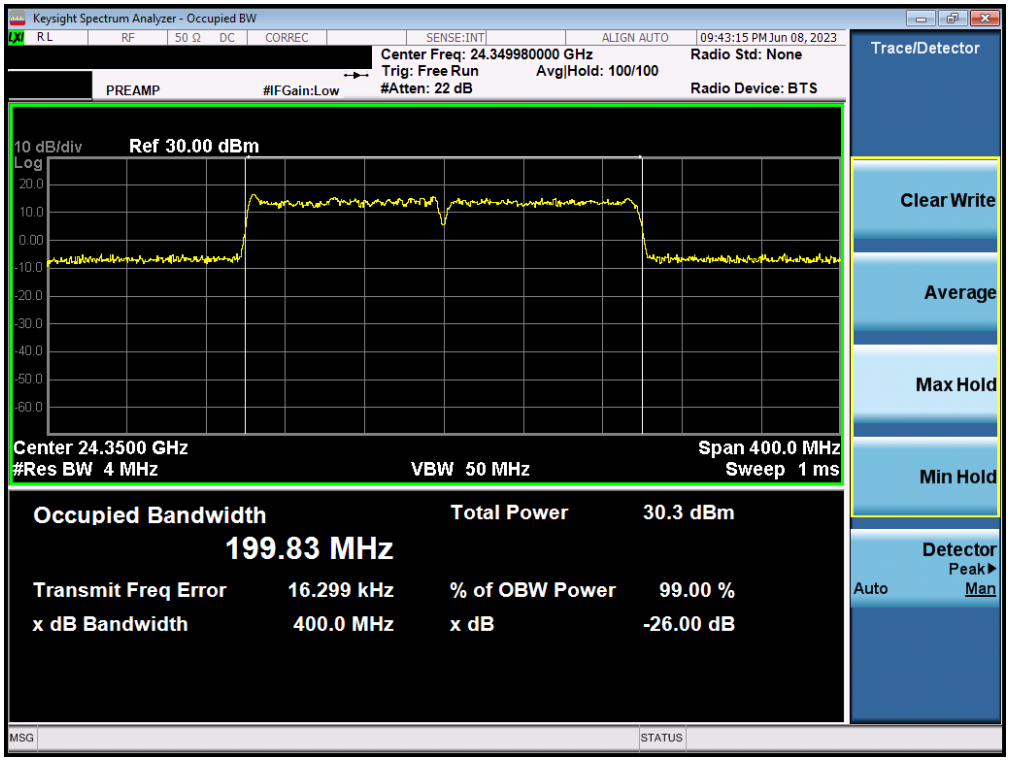
Plot 7-6.Occupied Bandwidth Plot (100MHz-1CC – DFT-s-OFDM π/2 BPSK – Mid Channel)



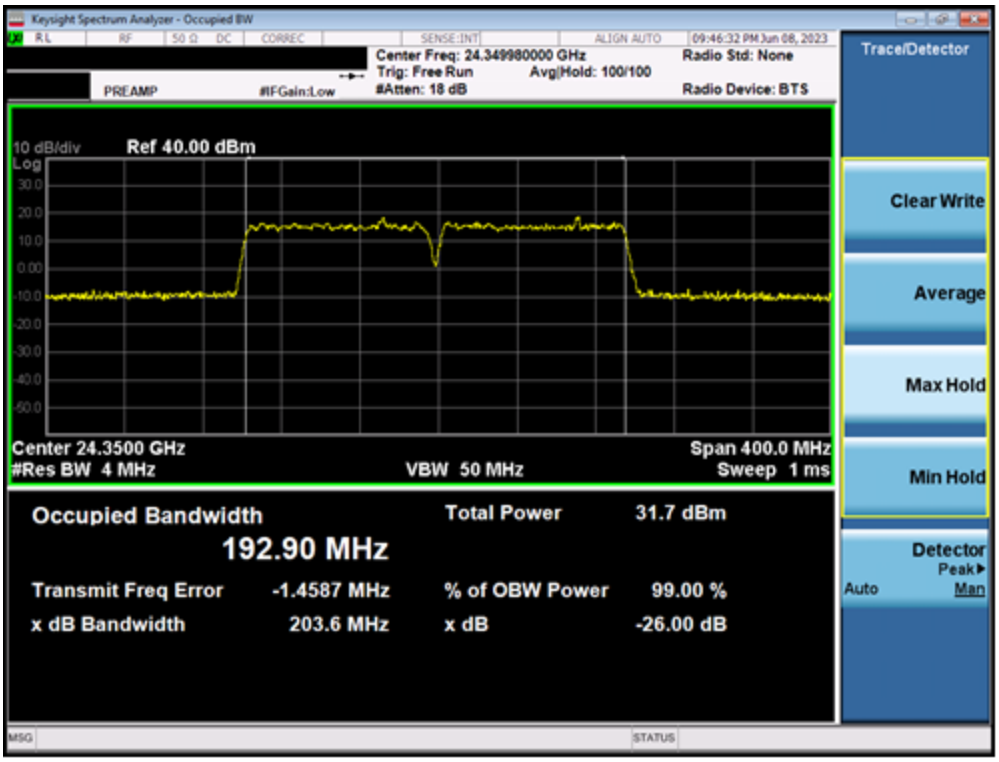
Plot 7-7. Occupied Bandwidth Plot (100MHz-1CC – CP-OFDM 16QAM – Mid Channel)



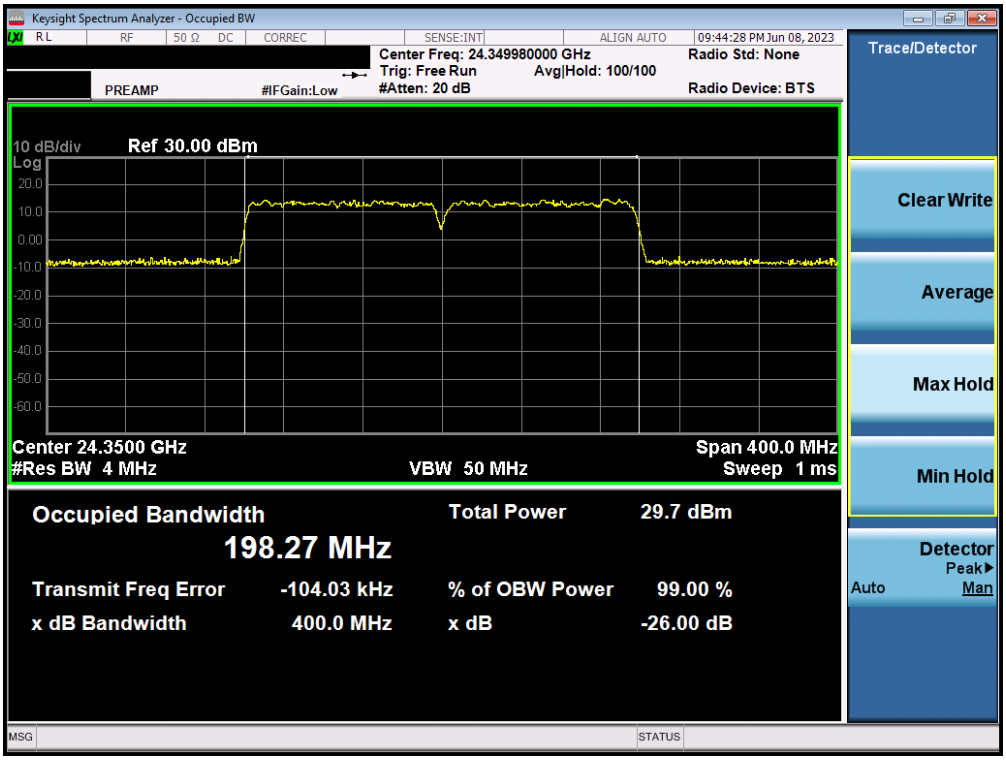
Plot 7-8. Occupied Bandwidth Plot (100MHz-1CC – CP-OFDM 64QAM – Mid Channel)



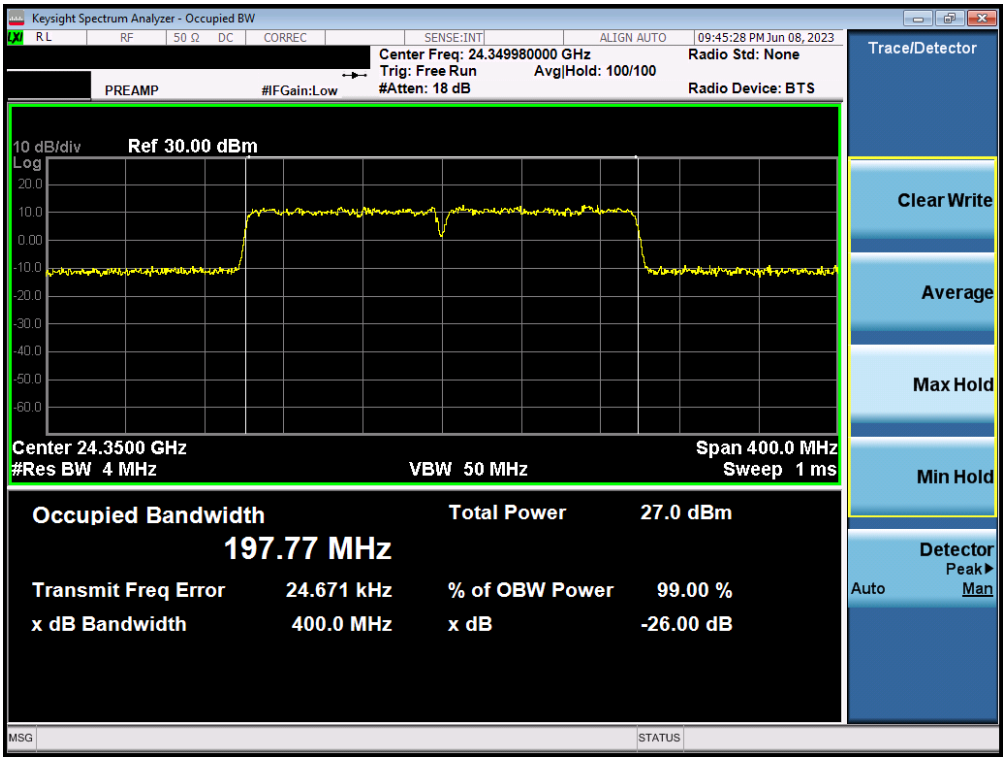
Plot 7-9. Occupied Bandwidth Plot (100MHz-2CC – CP-OFDM QPSK – Mid Channel)



Plot 7-10. Occupied Bandwidth Plot (100MHz-2CC – DFT-s-OFDM π/2 BPSK – Mid Channel)



Plot 7-11. Occupied Bandwidth Plot (100MHz-2CC – CP-OFDM 16QAM – Mid Channel)



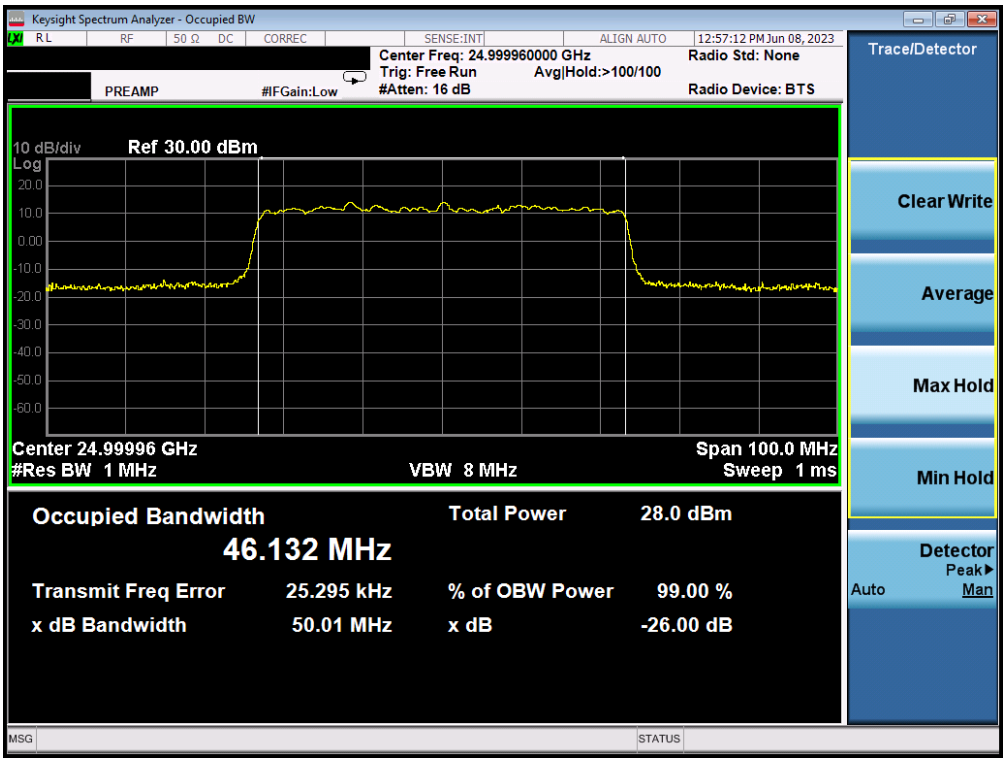
Plot 7-12. Occupied Bandwidth Plot (100MHz-2CC – DFT-s-OFDM 64QAM – Mid Channel)

Band n258-R2

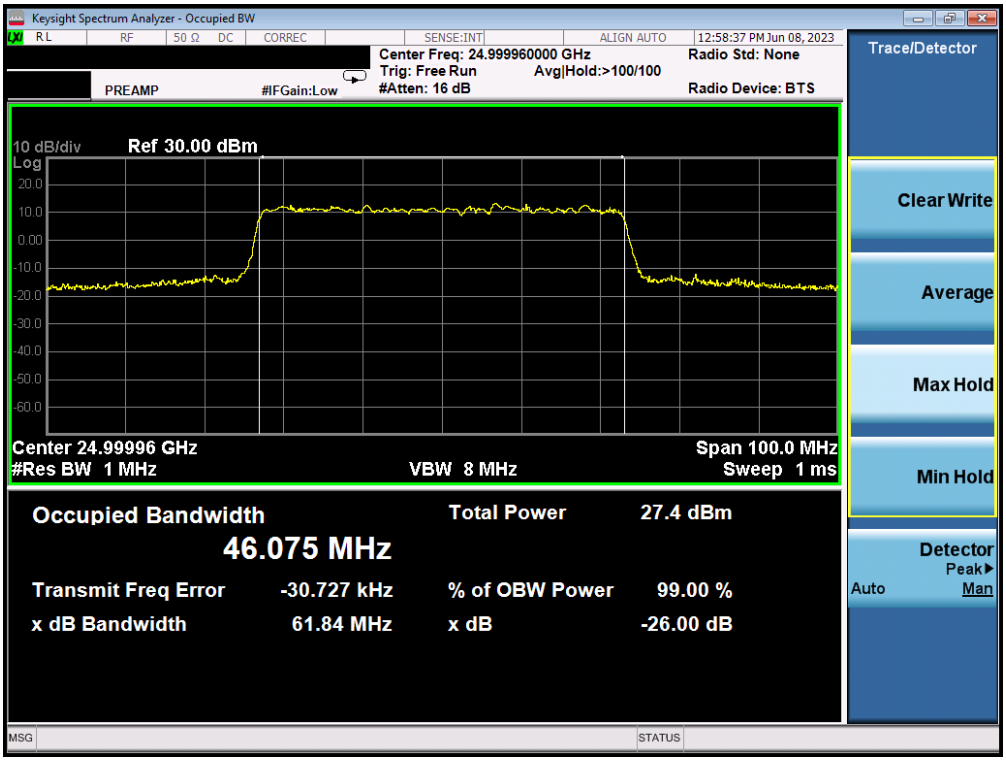
Antenna	Bandwidth [MHz]	CCs Active	Transmition Scheme	Modulation	OBW [MHz]
Ant-1	50	1	CP-OFDM	QPSK	46.50
			DFT-s-OFDM	π/2 BPSK	46.13
			CP-OFDM	16QAM	46.07
			CP-OFDM	64QAM	46.07
	100	1	CP-OFDM	QPSK	94.98
			DFT-s-OFDM	π/2 BPSK	91.68
			CP-OFDM	16QAM	94.88
			CP-OFDM	64QAM	94.75
		2	CP-OFDM	QPSK	194.69
			DFT-s-OFDM	π/2 BPSK	191.52
			CP-OFDM	16QAM	194.43
			CP-OFDM	64QAM	194.61
		3	CP-OFDM	QPSK	296.33
			DFT-s-OFDM	π/2 BPSK	293.70
			CP-OFDM	16QAM	296.61
			CP-OFDM	64QAM	296.94

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

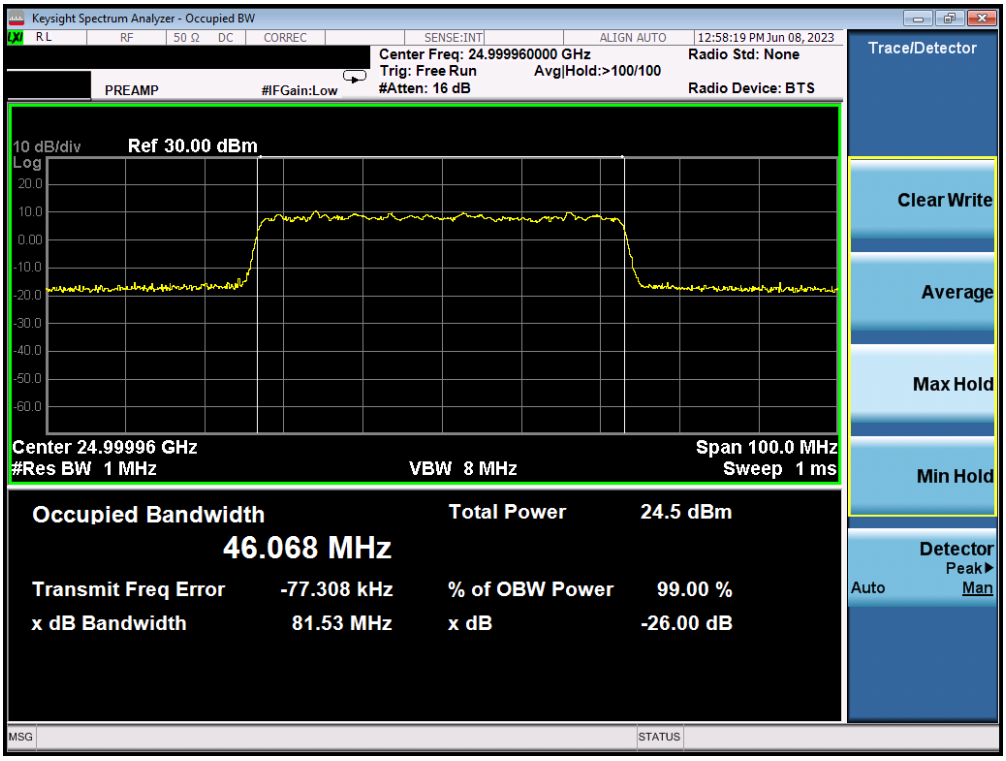
Plot 7-13. Occupied Bandwidth Plot (50MHz-1CC – CP-OFDM QPSK – Mid Channel)



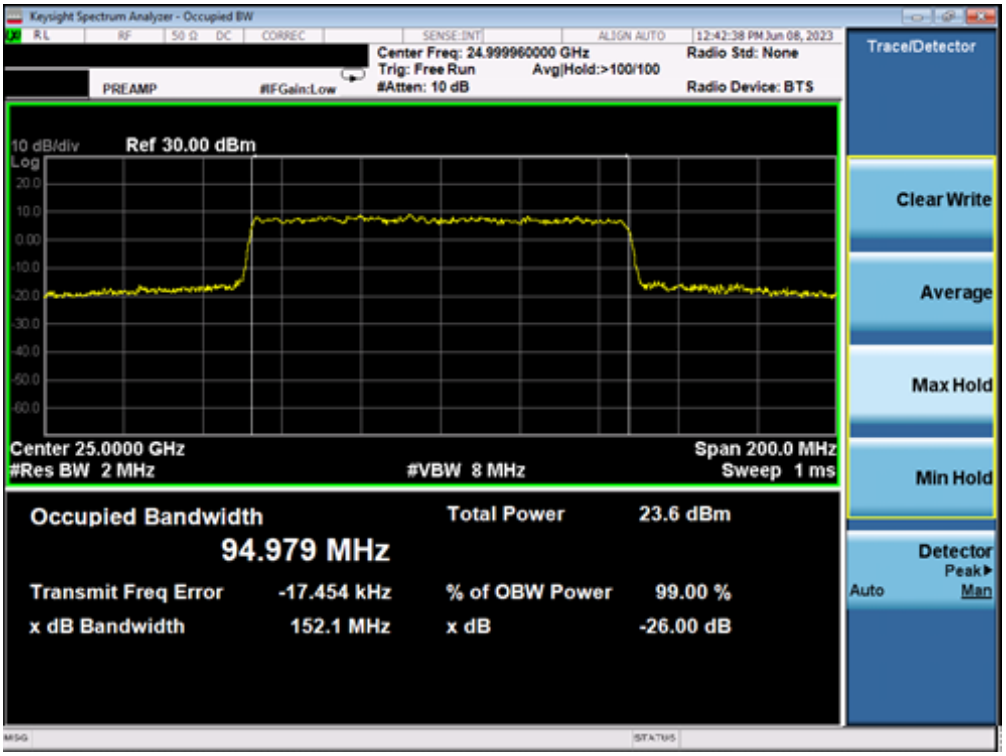
Plot 7-14. Occupied Bandwidth Plot (50MHz-1CC – DFT-s-OFDM π/2 BPSK – Mid Channel)



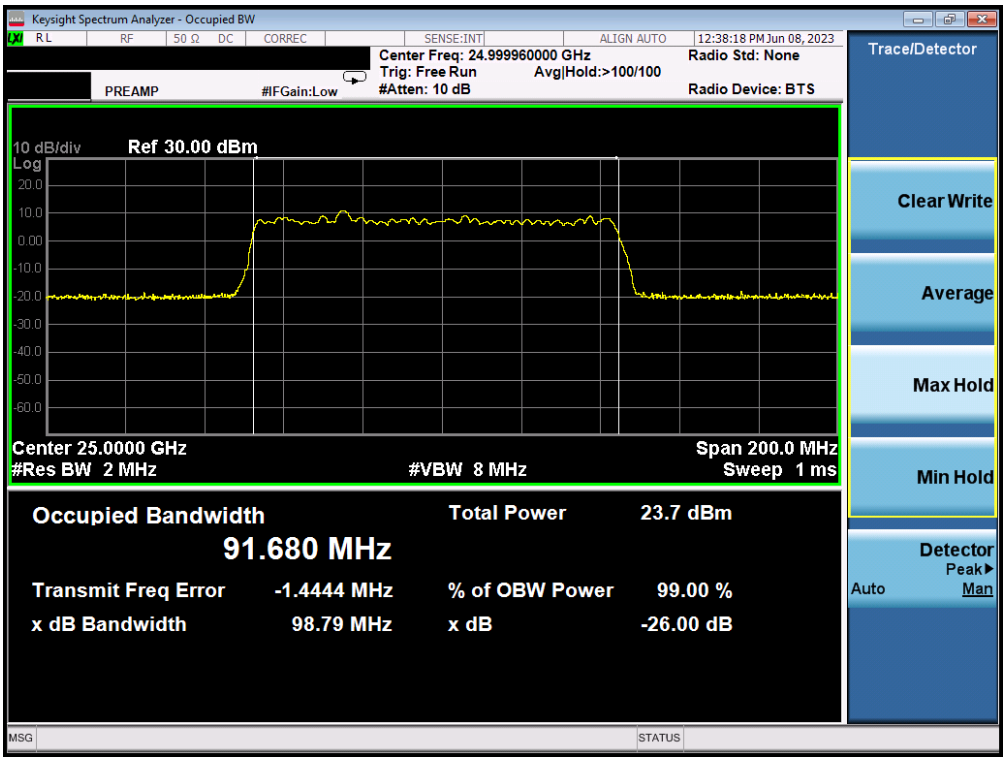
Plot 7-15. Occupied Bandwidth Plot (50MHz-1CC – CP-OFDM 16QAM – Mid Channel)



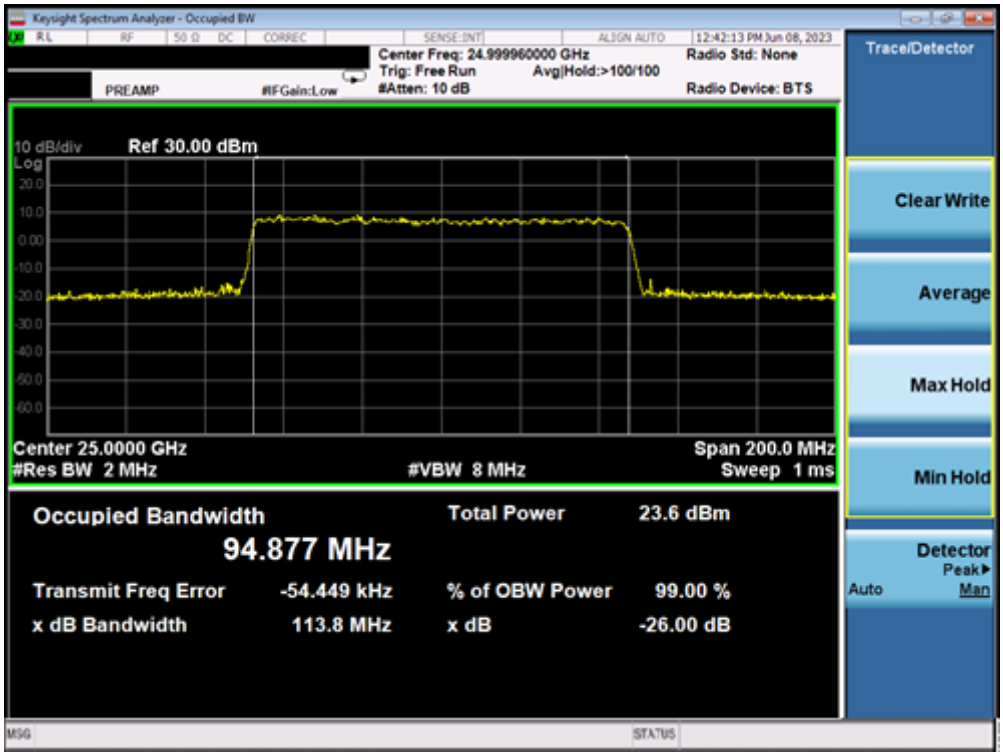
Plot 7-16. Occupied Bandwidth Plot (50MHz-1CC – CP-OFDM 64QAM – Mid Channel)



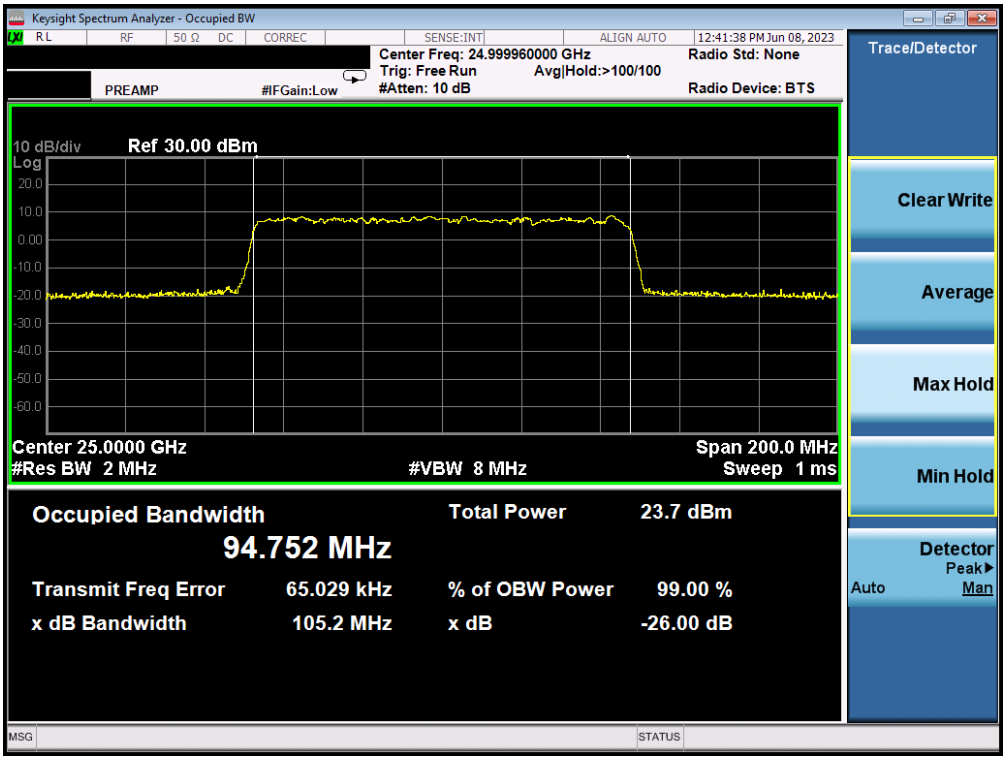
Plot 7-17. Occupied Bandwidth Plot (100MHz-1CC – CP-OFDM QPSK – Mid Channel)



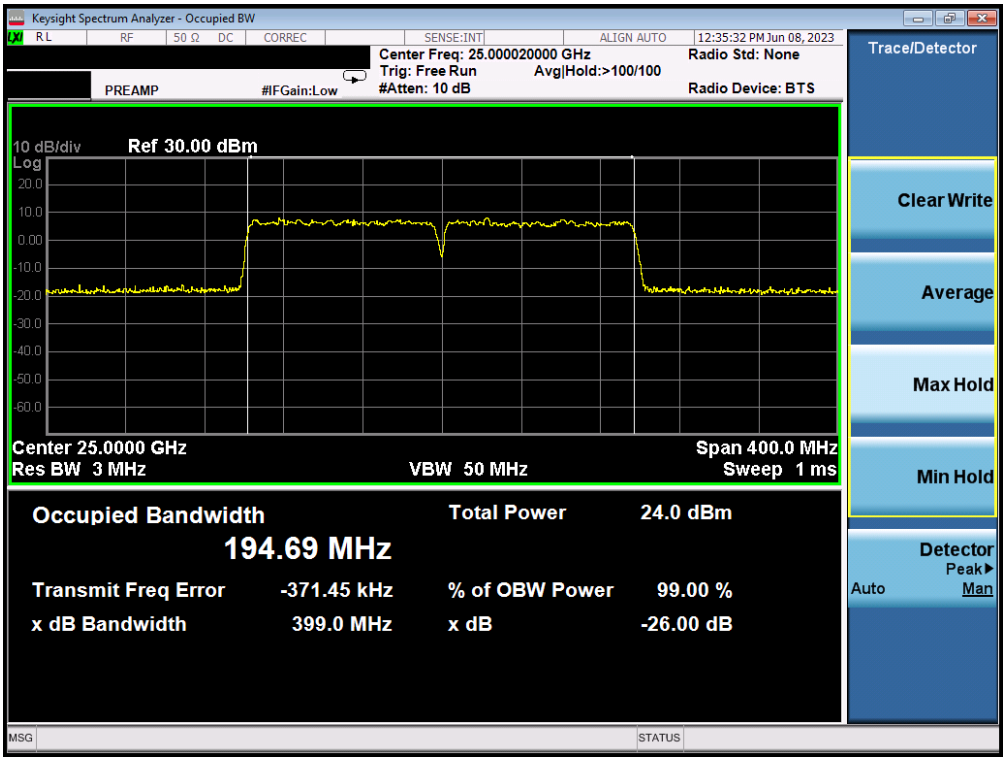
Plot 7-18. Occupied Bandwidth Plot (100MHz-1CC – DFT-s-OFDM π/2 BPSK – Mid Channel)



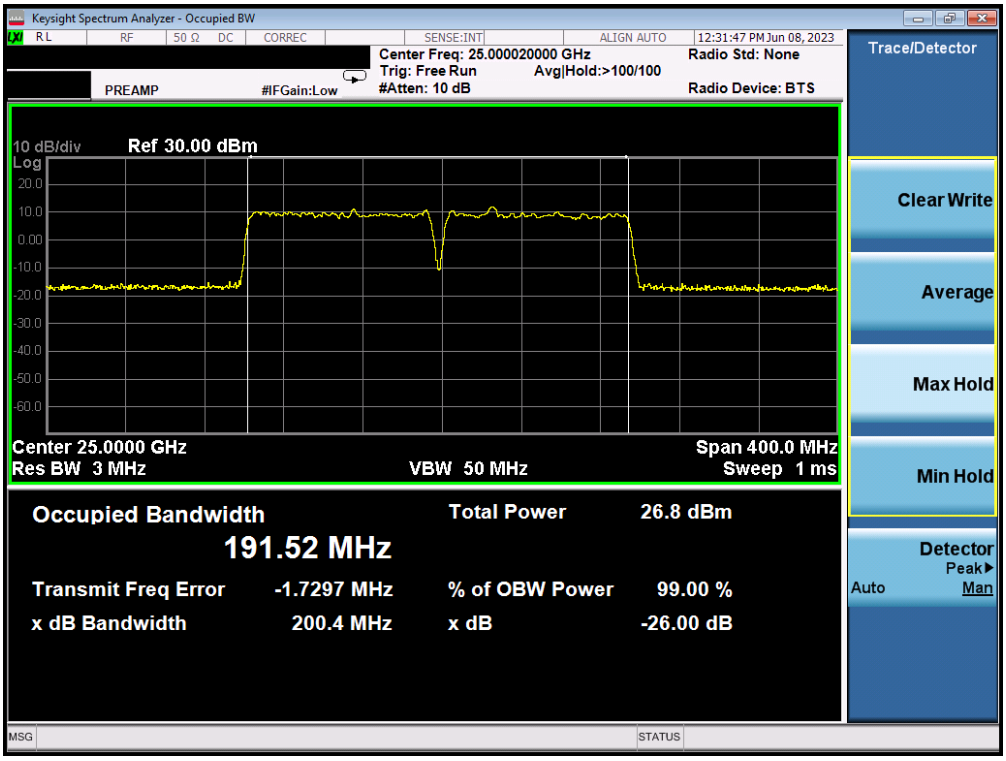
Plot 7-19. Occupied Bandwidth Plot (100MHz-1CC – CP-OFDM 16QAM – Mid Channel)



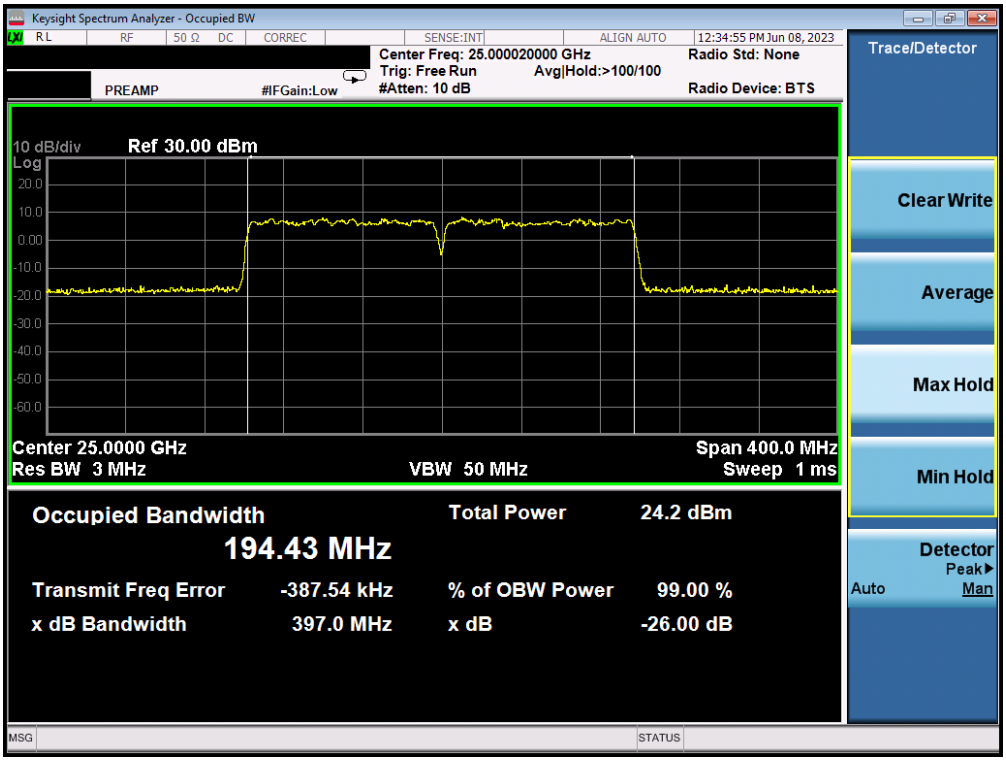
Plot 7-20. Occupied Bandwidth Plot (100MHz-1CC – CP-OFDM 64QAM – Mid Channel)



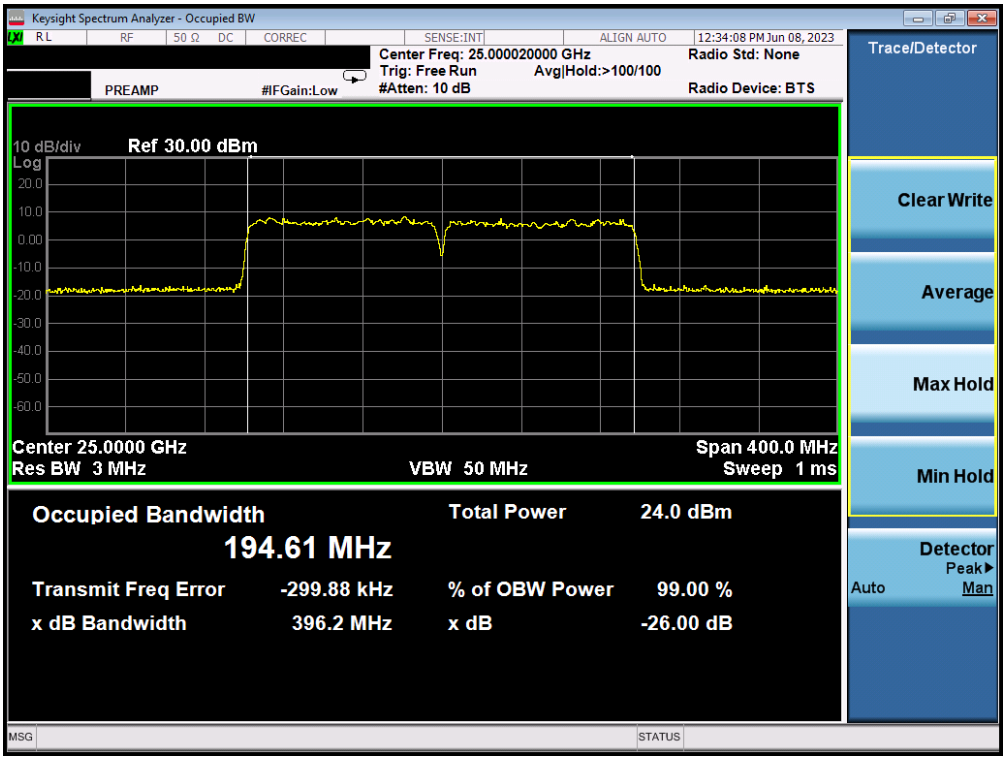
Plot 7-21. Occupied Bandwidth Plot (100MHz-2CC – CP-OFDM QPSK – Mid Channel)



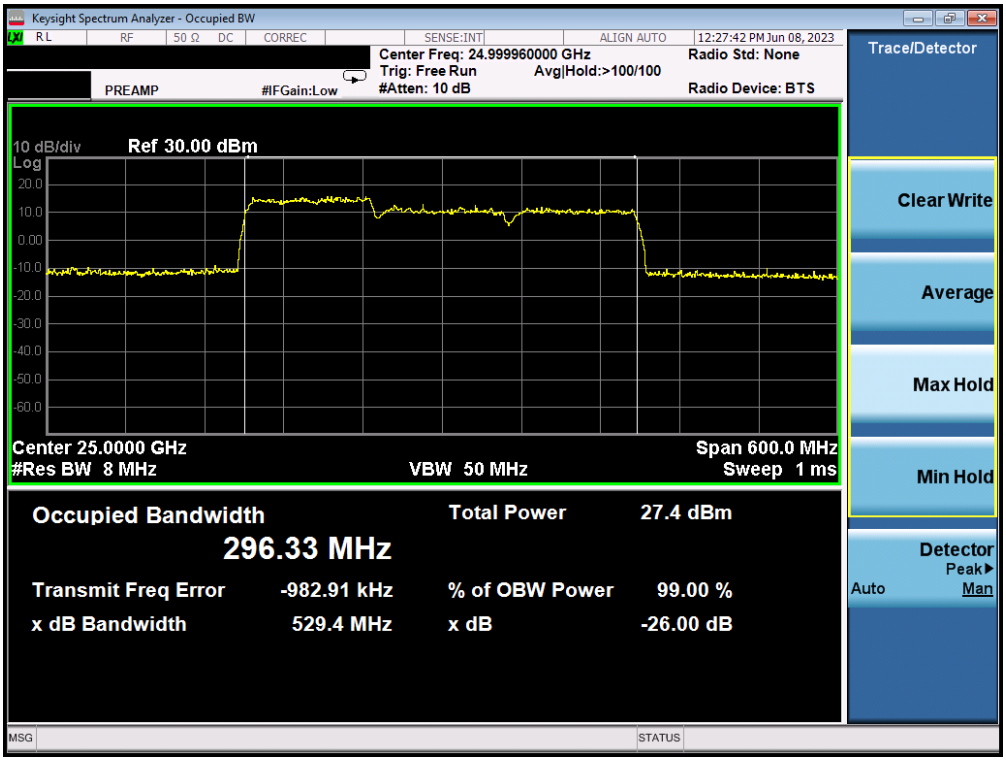
Plot 7-22. Occupied Bandwidth Plot (100MHz-2CC – DFT-s-OFDM π/2 BPSK – Mid Channel)



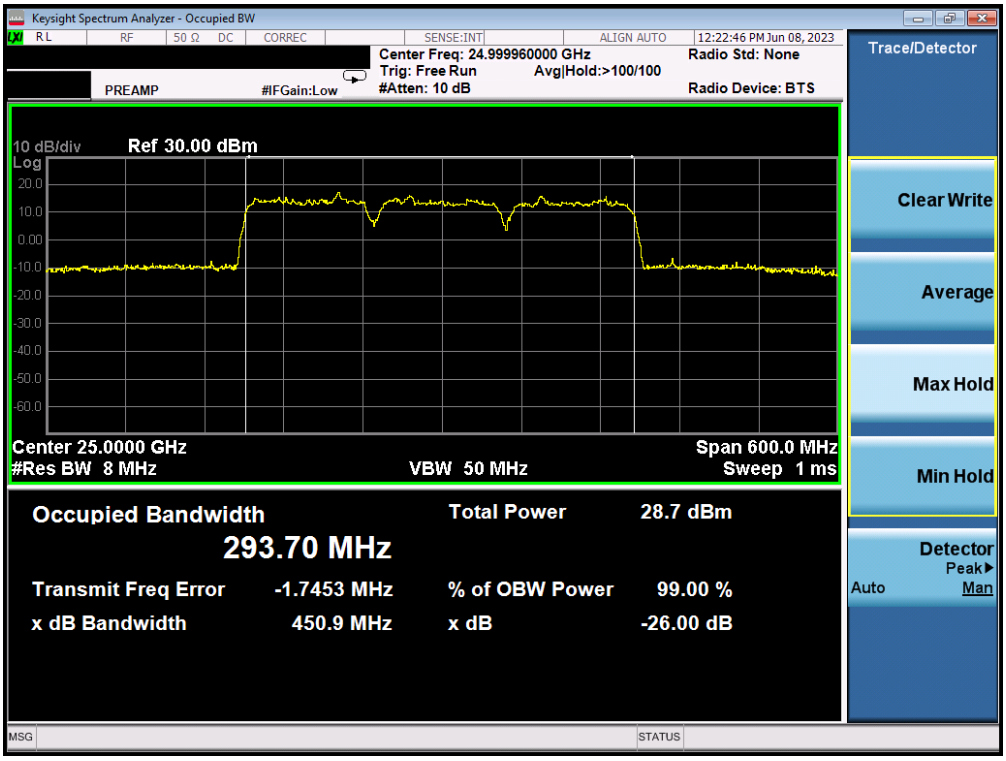
Plot 7-23. Occupied Bandwidth Plot (100MHz-2CC – CP-OFDM 16QAM – Mid Channel)



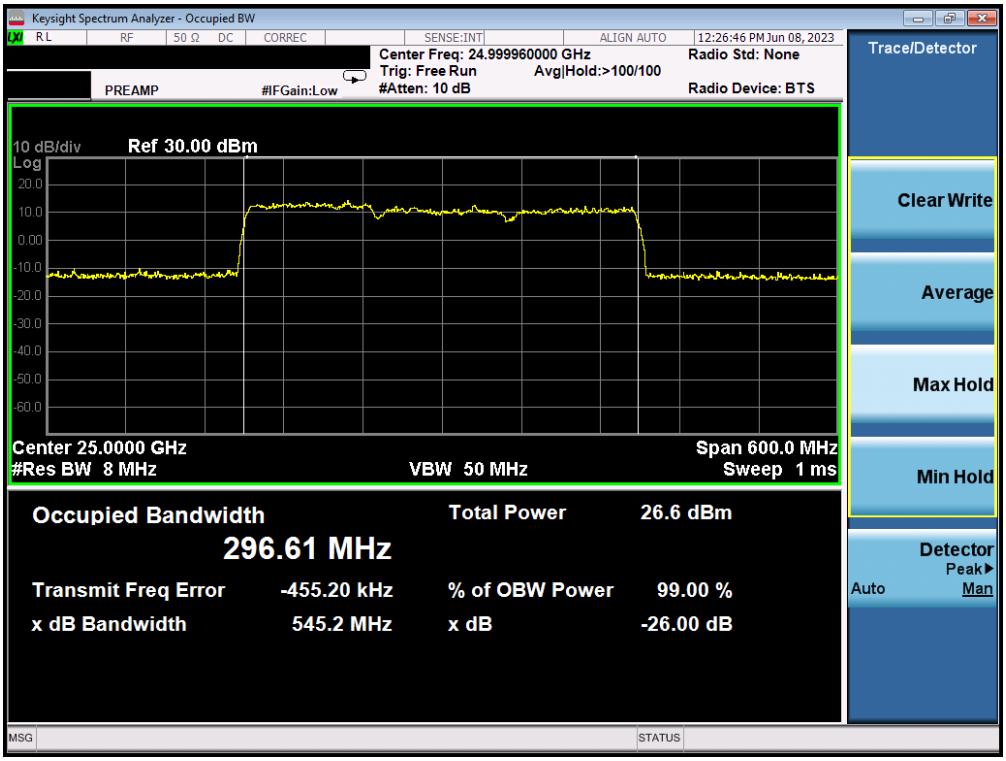
Plot 7-24. Occupied Bandwidth Plot (100MHz-2CC – CP-OFDM 64QAM – Mid Channel)



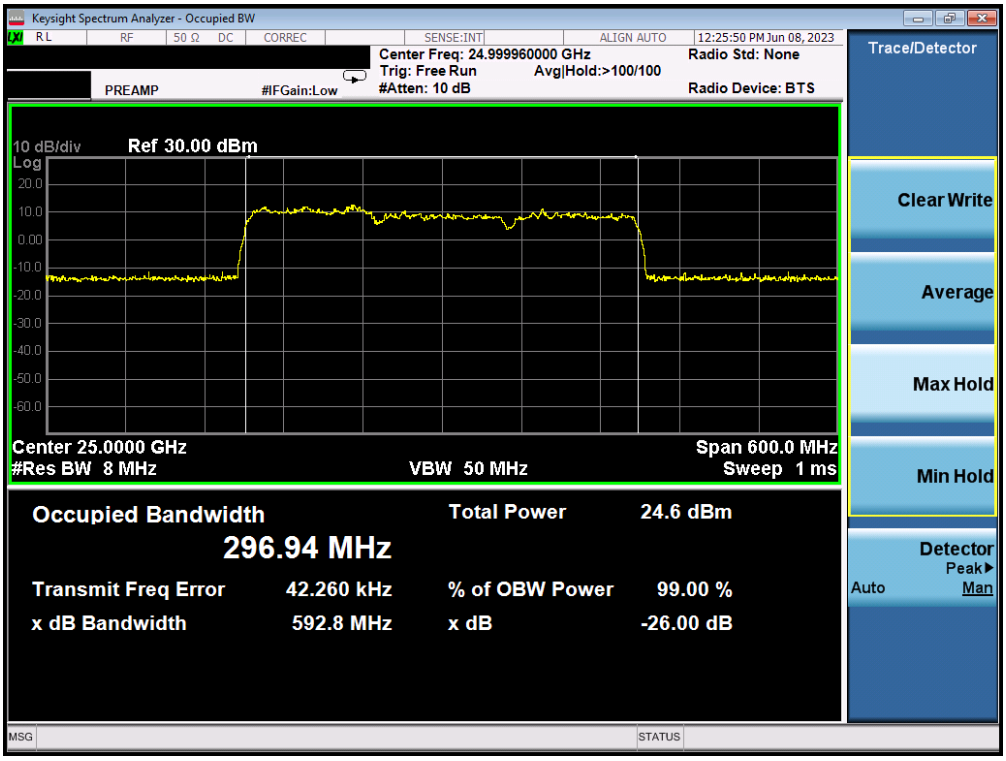
Plot 7-25. Occupied Bandwidth Plot (100MHz-3CC – CP-OFDM QPSK – Mid Channel)



Plot 7-26. Occupied Bandwidth Plot (100MHz-3CC – DFT-s-OFDM π/2 BPSK – Mid Channel)



Plot 7-27. Occupied Bandwidth Plot (100MHz-3CC – CP-OFDM 16QAM – Mid Channel)

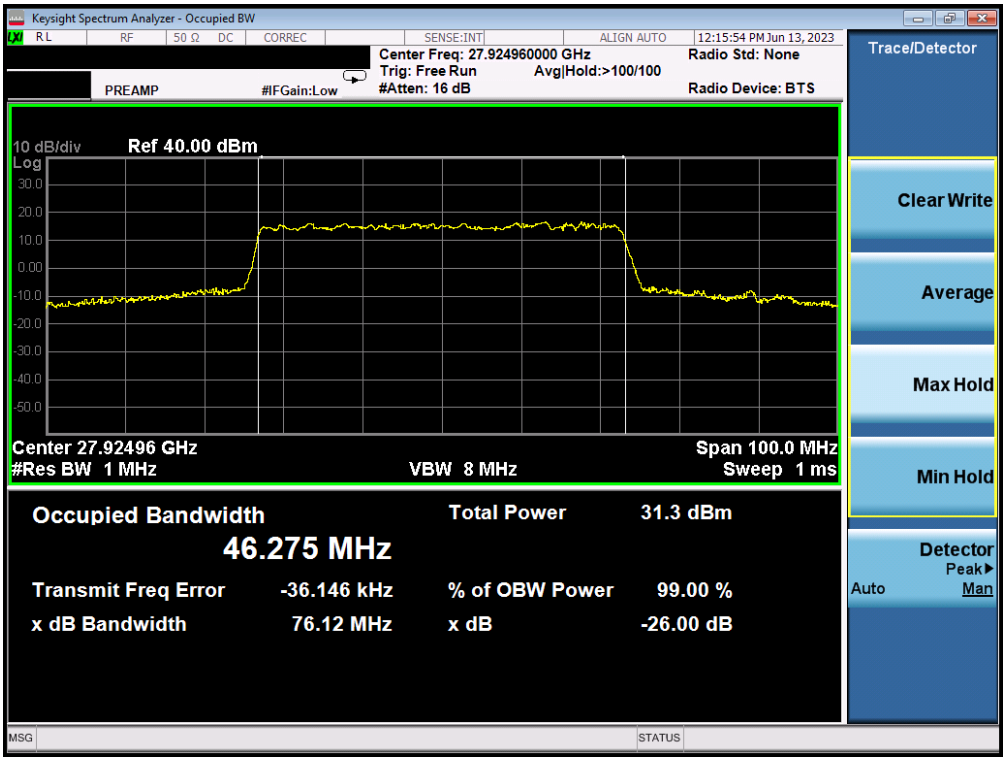


Plot 7-28. Occupied Bandwidth Plot (100MHz-3CC – CP-OFDM 64QAM – Mid Channel)

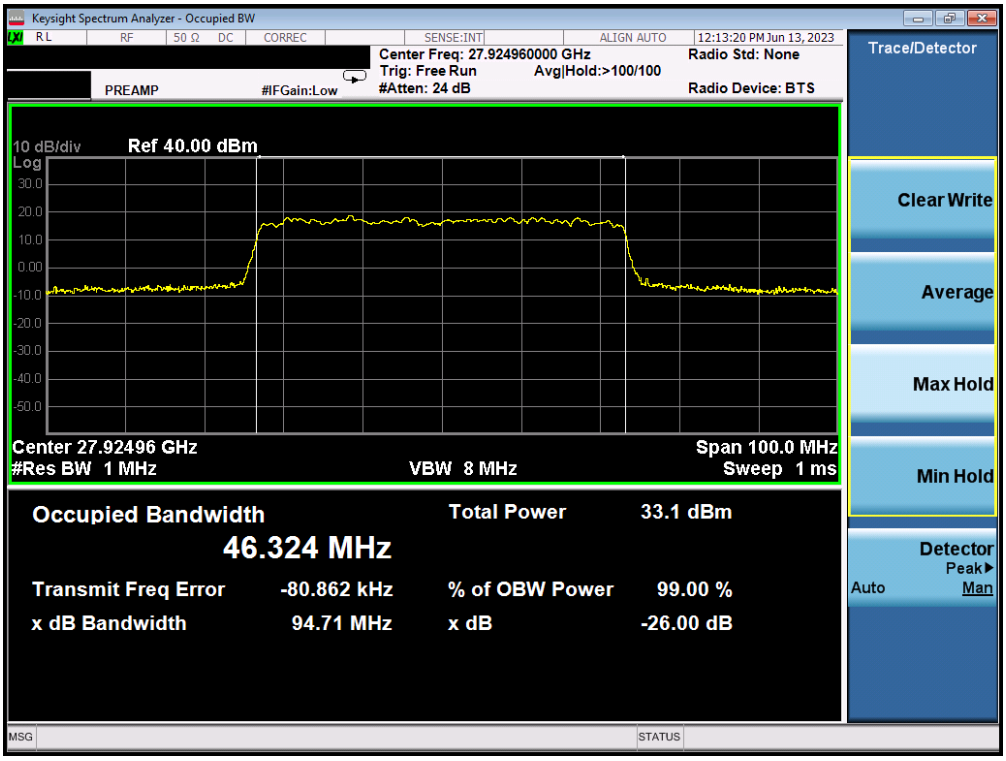
Band n261

Antenna	Bandwidth [MHz]	CCs Active	Transmition Scheme	Modulation	OBW [MHz]
Ant-1	50	1	CP-OFDM	QPSK	46.27
			DFT-s-OFDM	π/2 BPSK	46.32
			CP-OFDM	16QAM	46.17
			CP-OFDM	64QAM	46.12
	100	1	CP-OFDM	QPSK	95.34
			DFT-s-OFDM	π/2 BPSK	91.98
			CP-OFDM	16QAM	95.07
			CP-OFDM	64QAM	95.13
		2	CP-OFDM	QPSK	197.58
			DFT-s-OFDM	π/2 BPSK	197.60
			CP-OFDM	16QAM	197.80
			CP-OFDM	64QAM	194.60
		3	CP-OFDM	QPSK	292.88
			DFT-s-OFDM	π/2 BPSK	292.45
			CP-OFDM	16QAM	293.03
			CP-OFDM	64QAM	292.48
		4	CP-OFDM	QPSK	395.05
			DFT-s-OFDM	π/2 BPSK	393.00
			CP-OFDM	16QAM	394.35
			CP-OFDM	64QAM	395.81

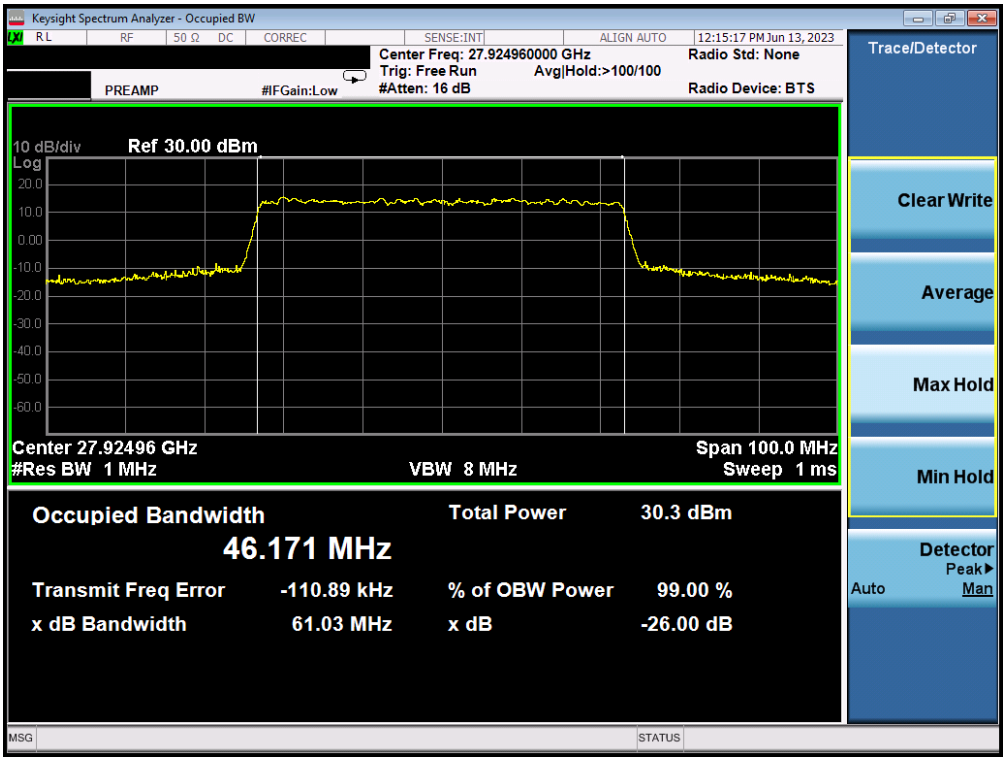
Table 7-4. Summary of Occupied Bandwidths (n261)



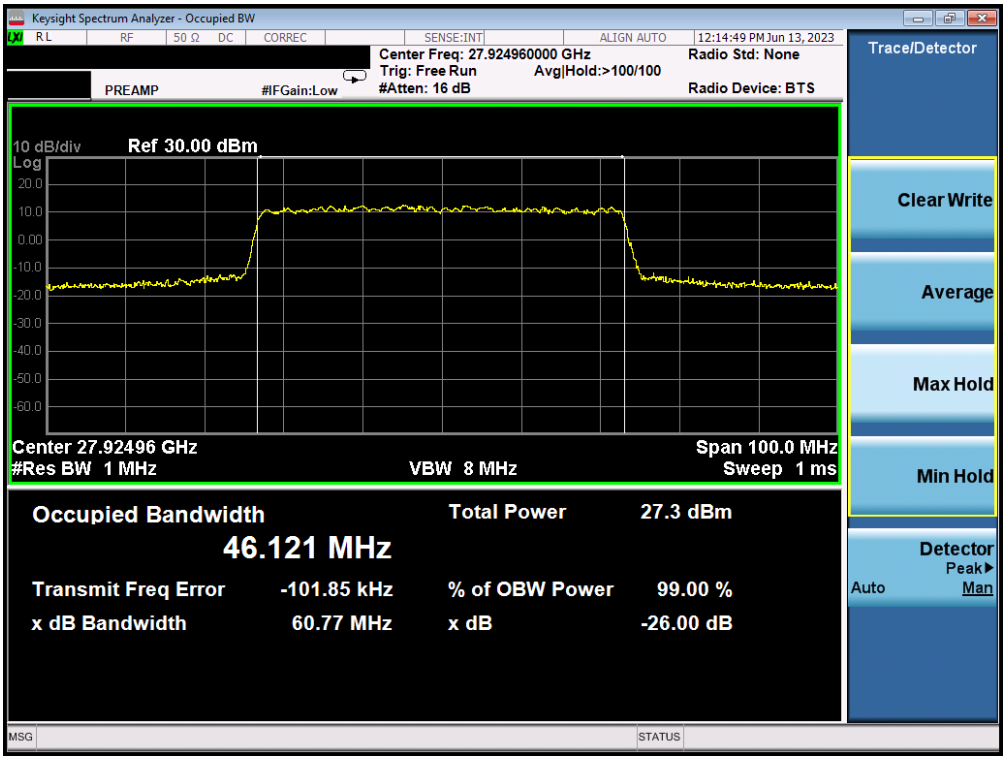
Plot 7-29. Occupied Bandwidth Plot (50MHz-1CC – CP-OFDM QPSK – Mid Channel)



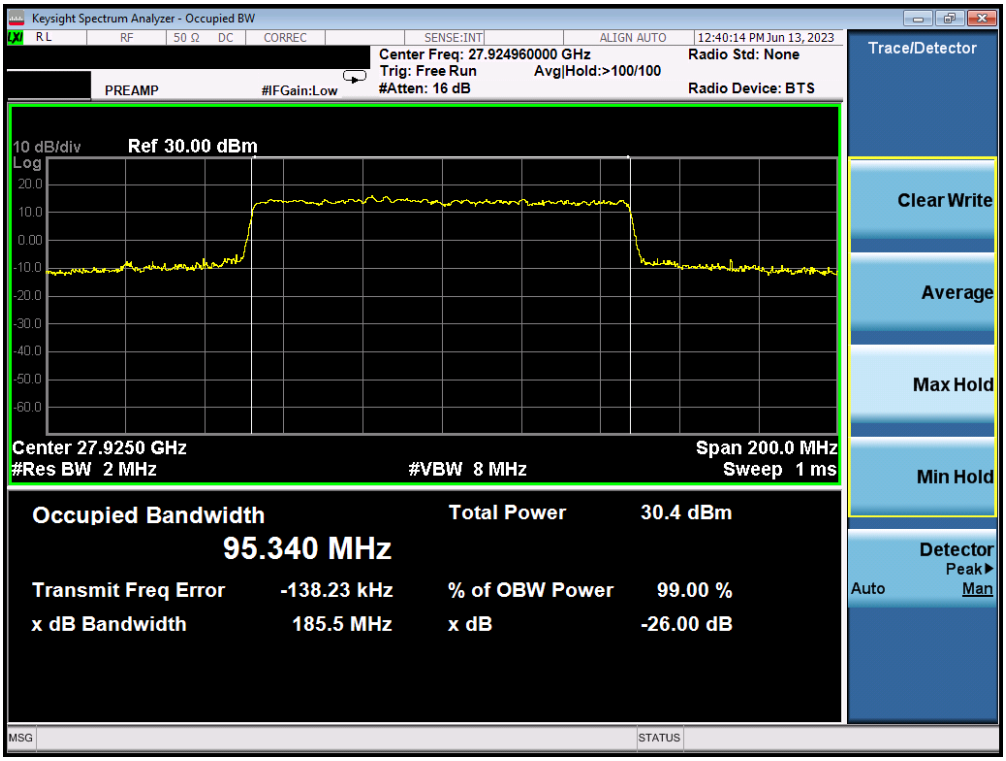
Plot 7-30. Occupied Bandwidth Plot (50MHz-1CC – DFT-s-OFDM π/2 BPSK – Mid Channel)



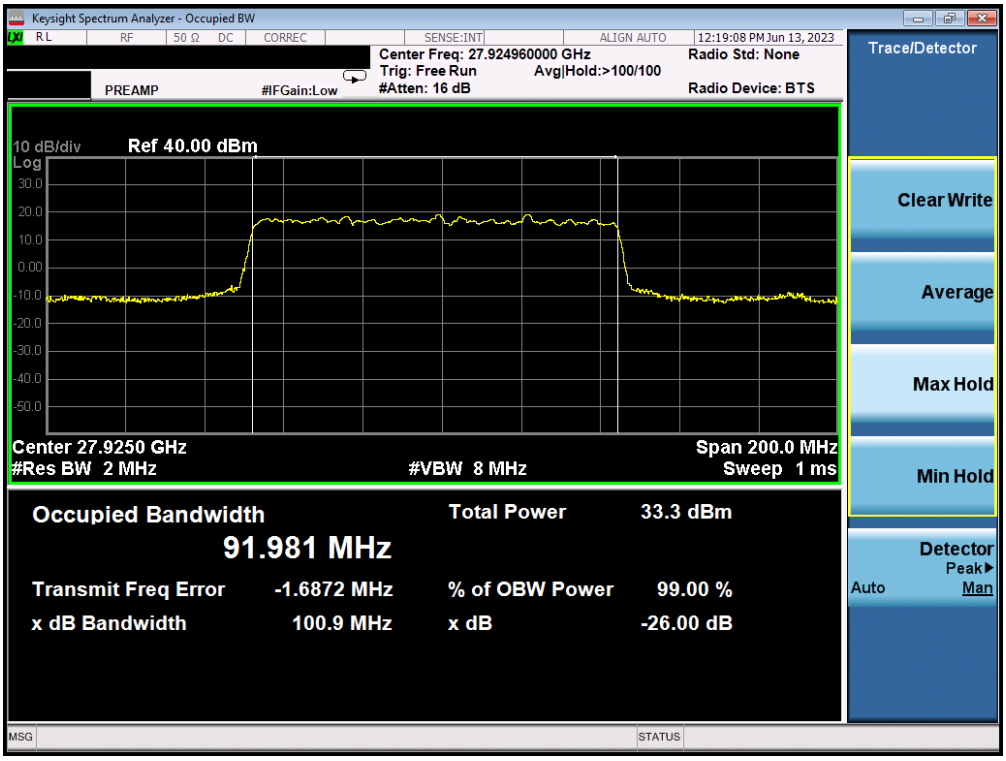
Plot 7-31. Occupied Bandwidth Plot (50MHz-1CC – CP-OFDM 16QAM – Mid Channel)



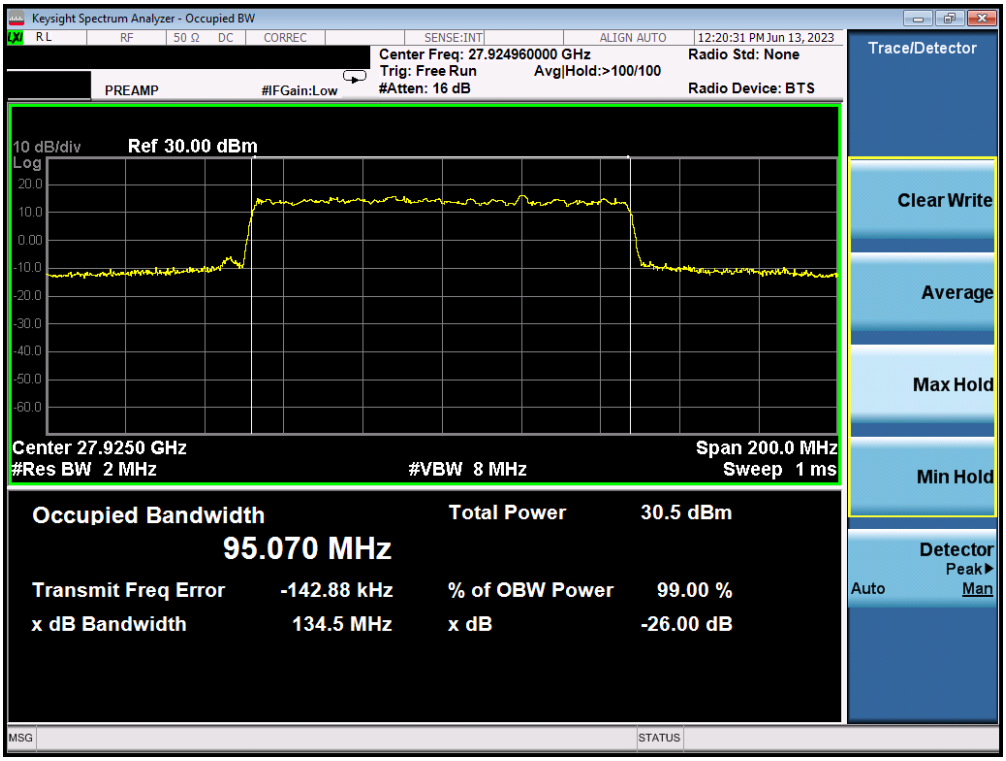
Plot 7-32. Occupied Bandwidth Plot (50MHz-1CC – CP-OFDM 64QAM – Mid Channel)



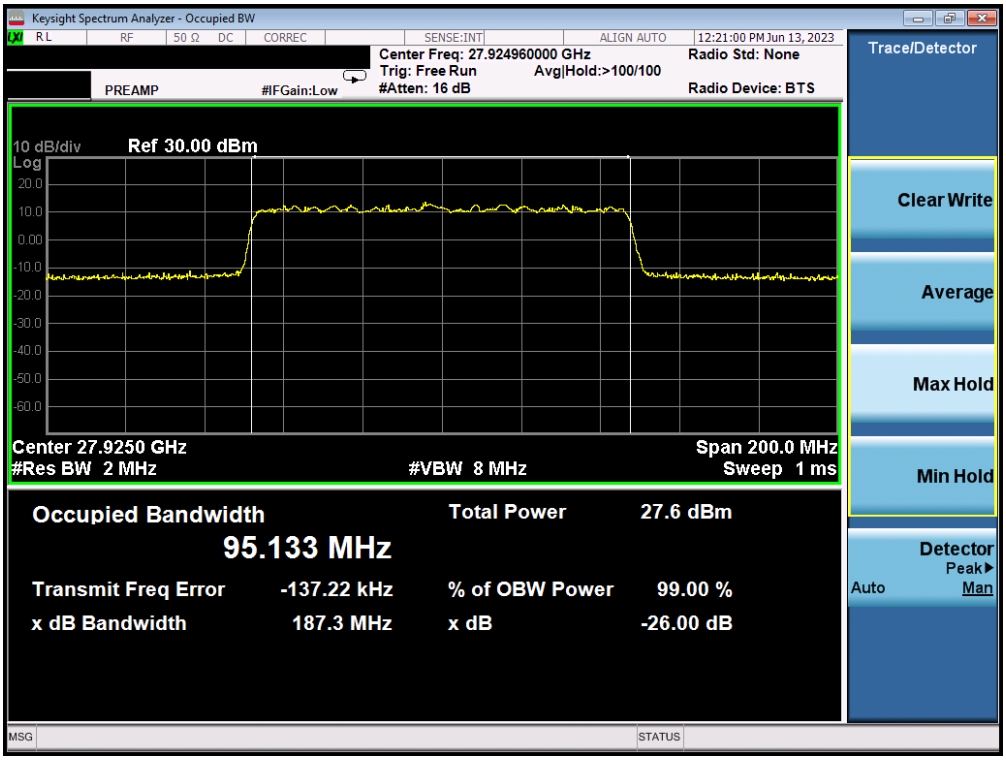
Plot 7-33. Occupied Bandwidth Plot (100MHz-1CC – CP-OFDM QPSK – Mid Channel)



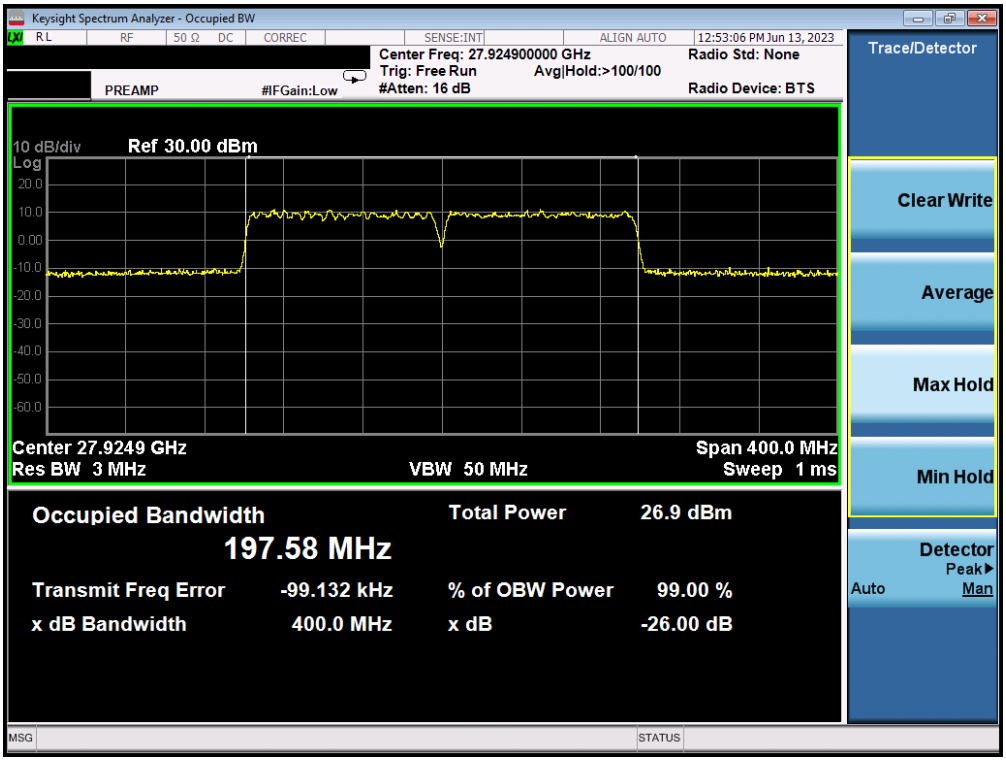
Plot 7-34. Occupied Bandwidth Plot (100MHz-1CC – DFT-s-OFDM π/2 BPSK – Mid Channel)



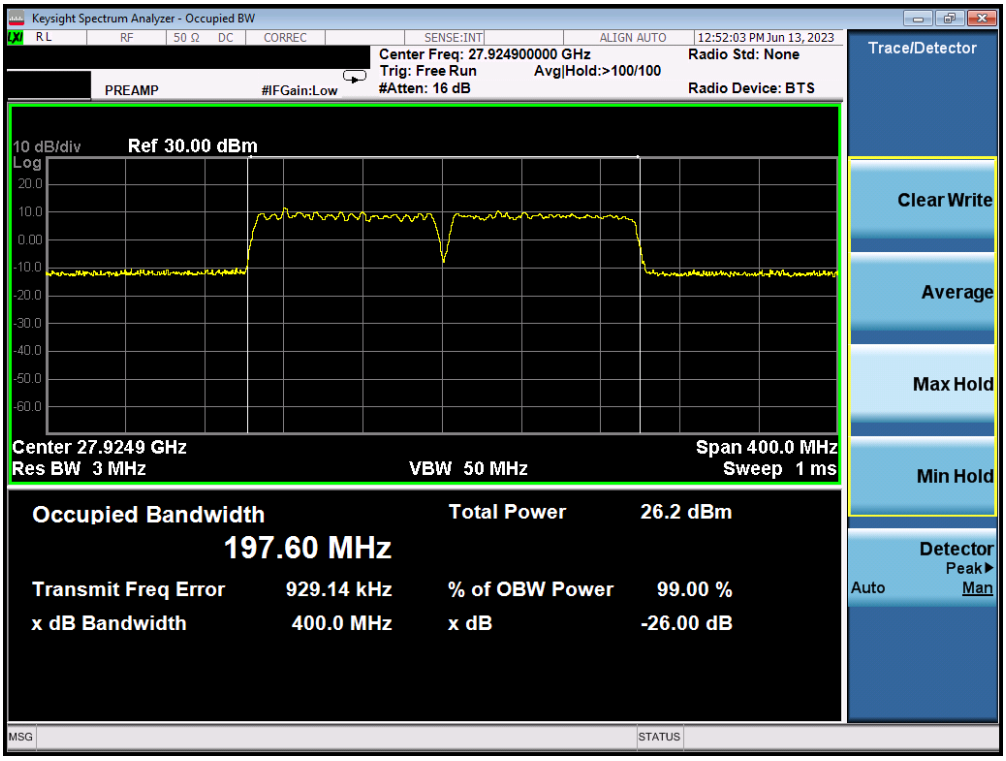
Plot 7-35. Occupied Bandwidth Plot (100MHz-1CC – CP-OFDM 16QAM – Mid Channel)



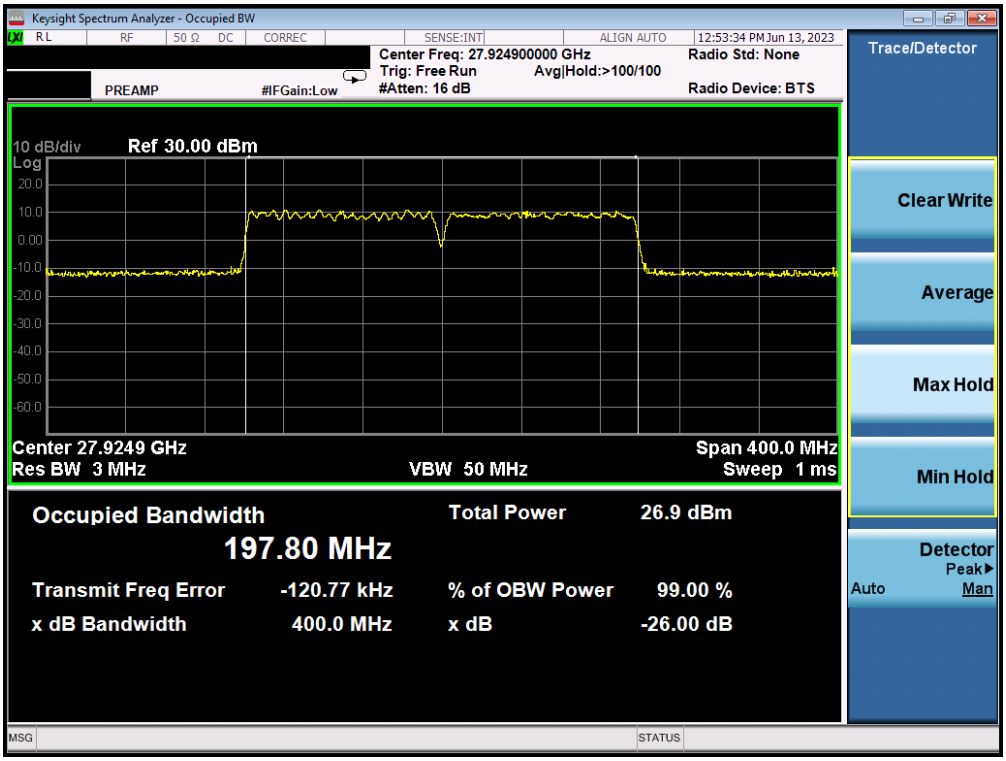
Plot 7-36. Occupied Bandwidth Plot (100MHz-1CC – CP-OFDM 64QAM – Mid Channel)



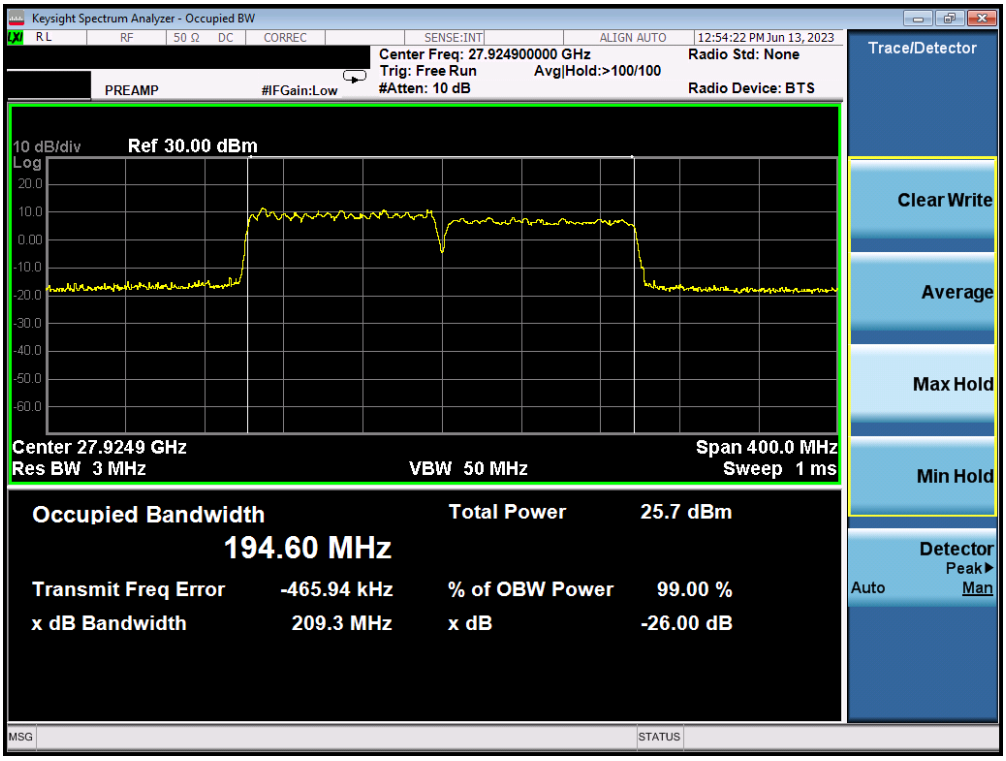
Plot 7-37. Occupied Bandwidth Plot (100MHz-2CC – CP-OFDM QPSK – Mid Channel)



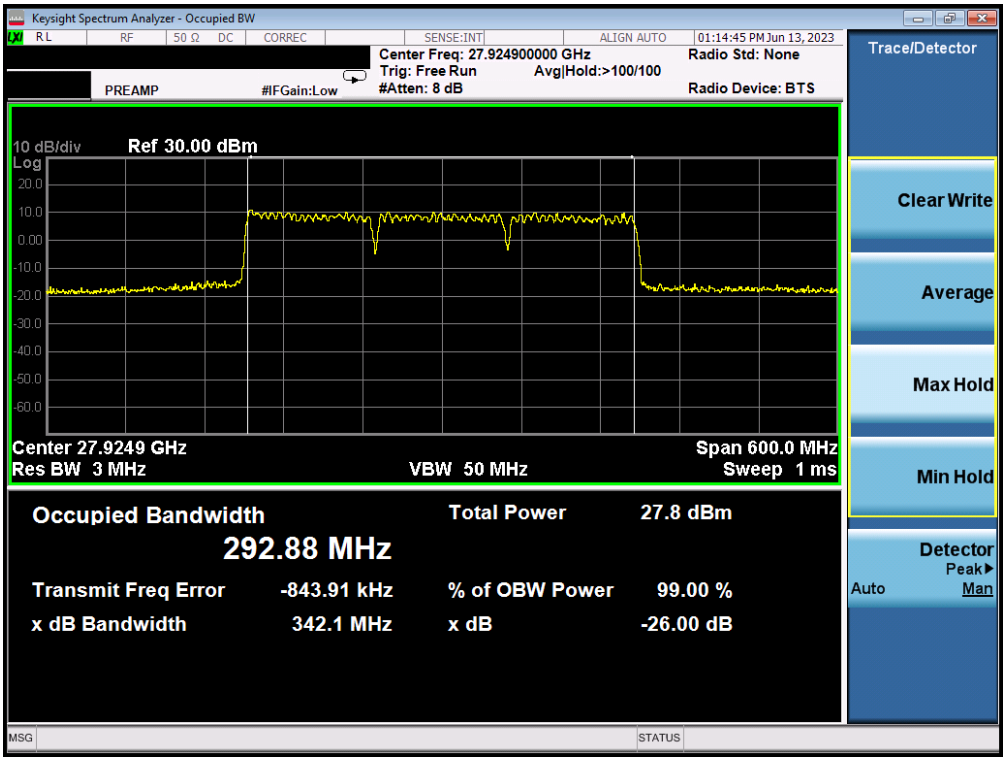
Plot 7-38. Occupied Bandwidth Plot (100MHz-2CC – DFT-s-OFDM π/2 BPSK – Mid Channel)



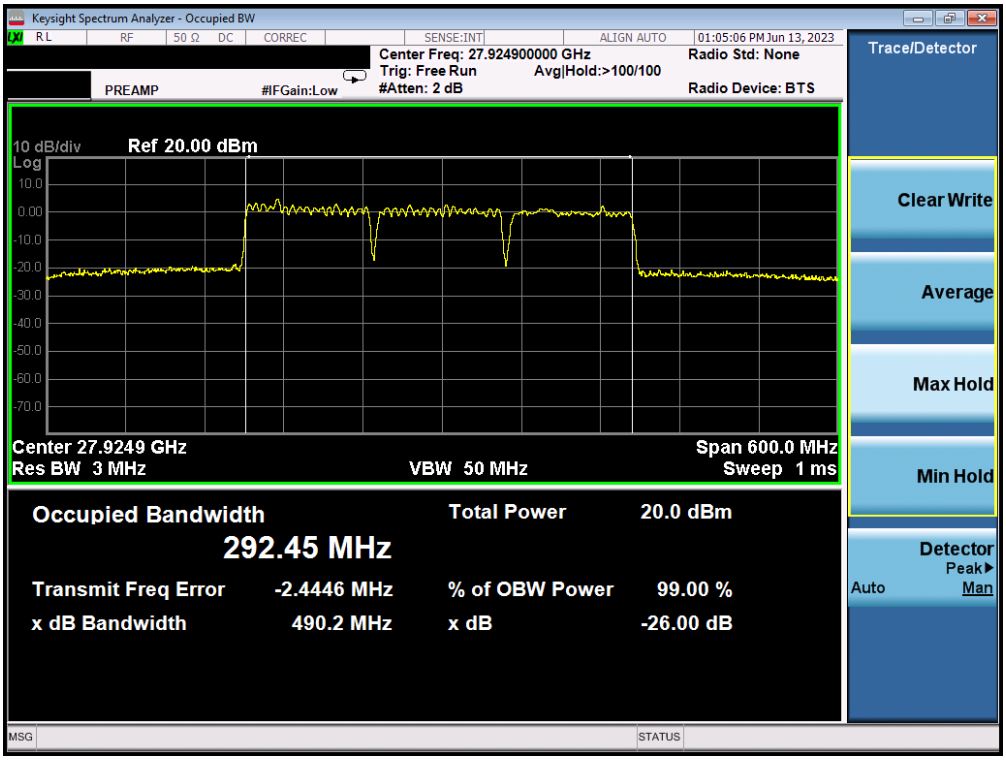
Plot 7-39. Occupied Bandwidth Plot (100MHz-2CC – CP-OFDM 16QAM – Mid Channel)



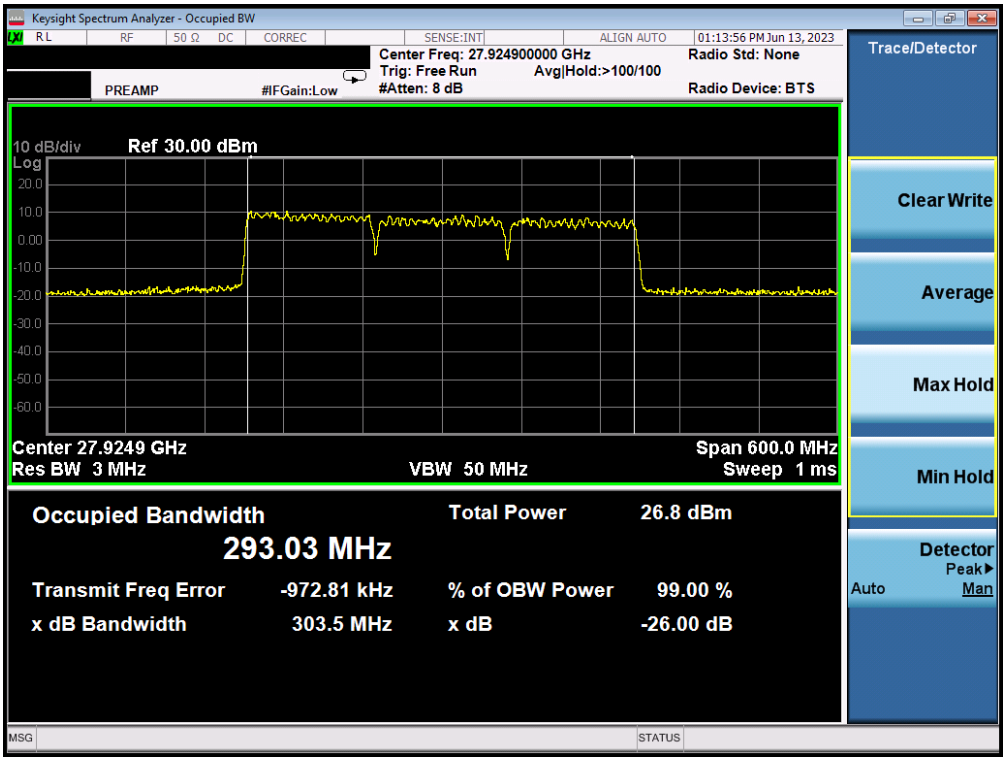
Plot 7-40. Occupied Bandwidth Plot (100MHz-2CC – CP-OFDM 64QAM – Mid Channel)



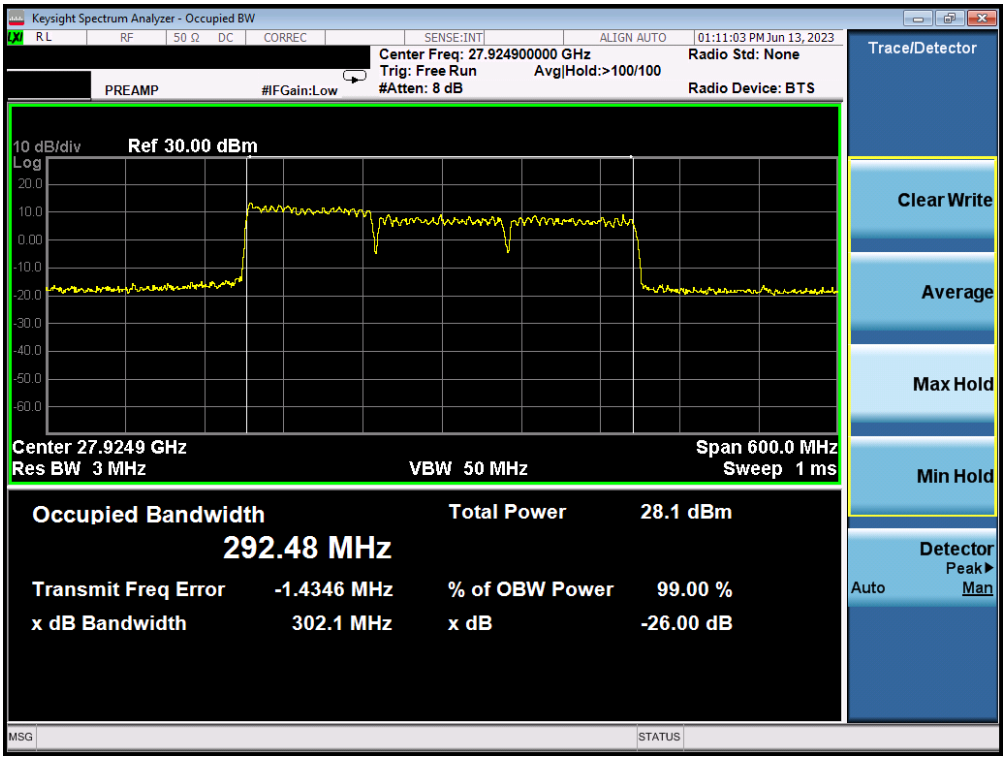
Plot 7-41. Occupied Bandwidth Plot (100MHz-3CC – CP-OFDM QPSK – Mid Channel)



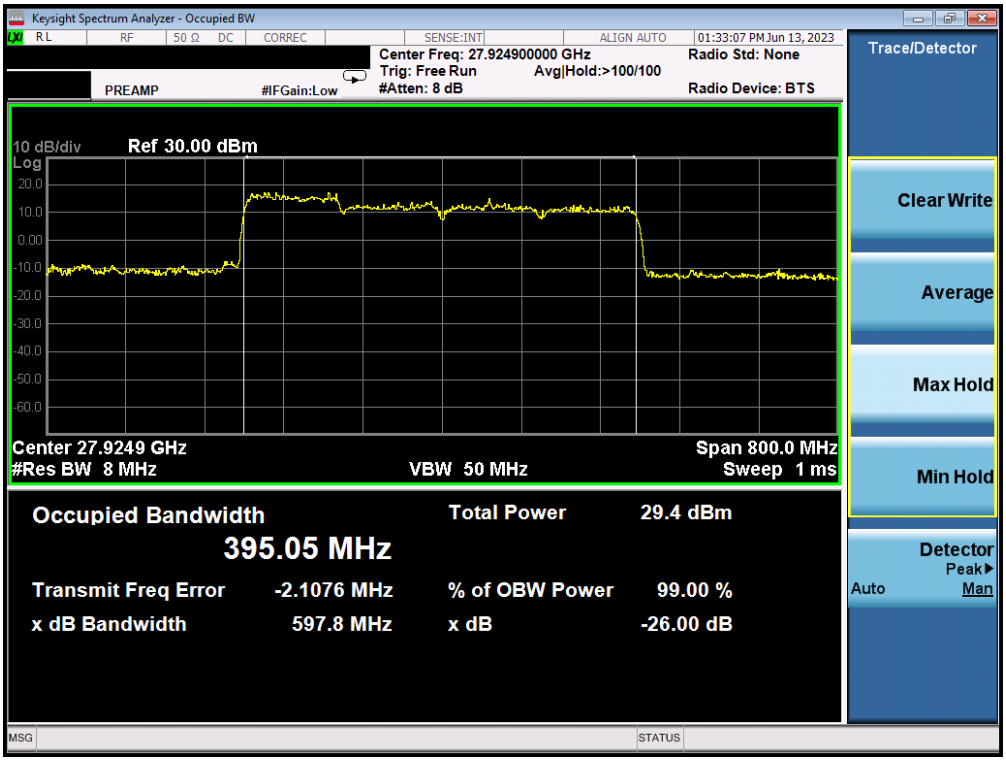
Plot 7-42. Occupied Bandwidth Plot (100MHz-3CC – DFT-s-OFDM π/2 BPSK – Mid Channel)



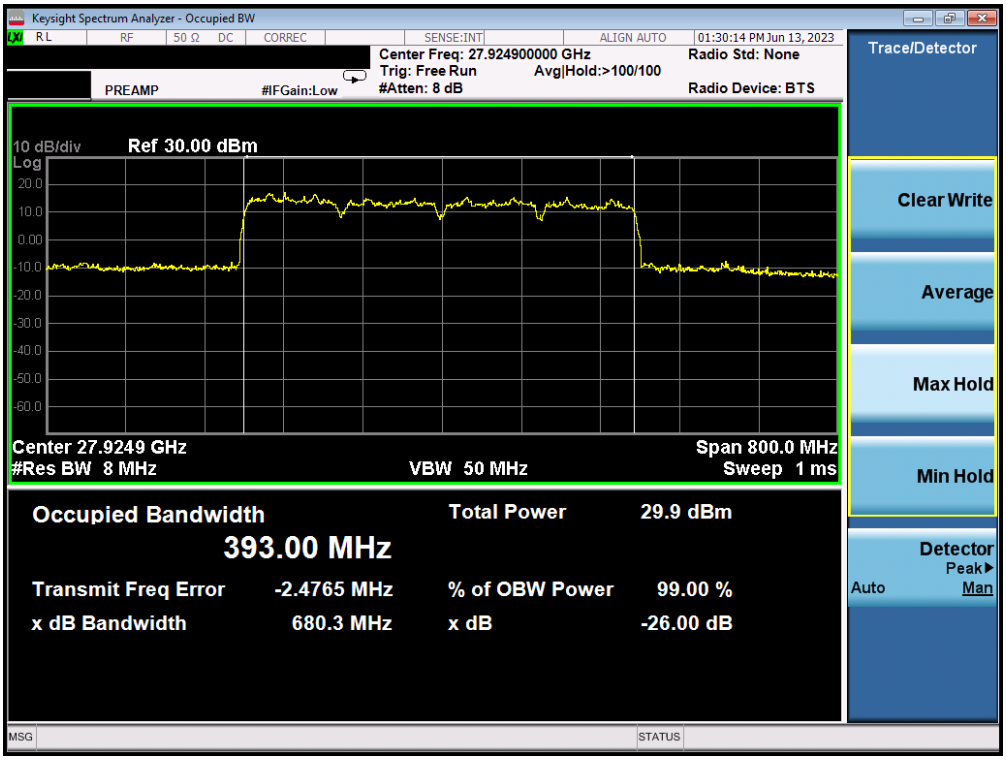
Plot 7-43. Occupied Bandwidth Plot (100MHz-3CC – CP-OFDM 16QAM – Mid Channel)



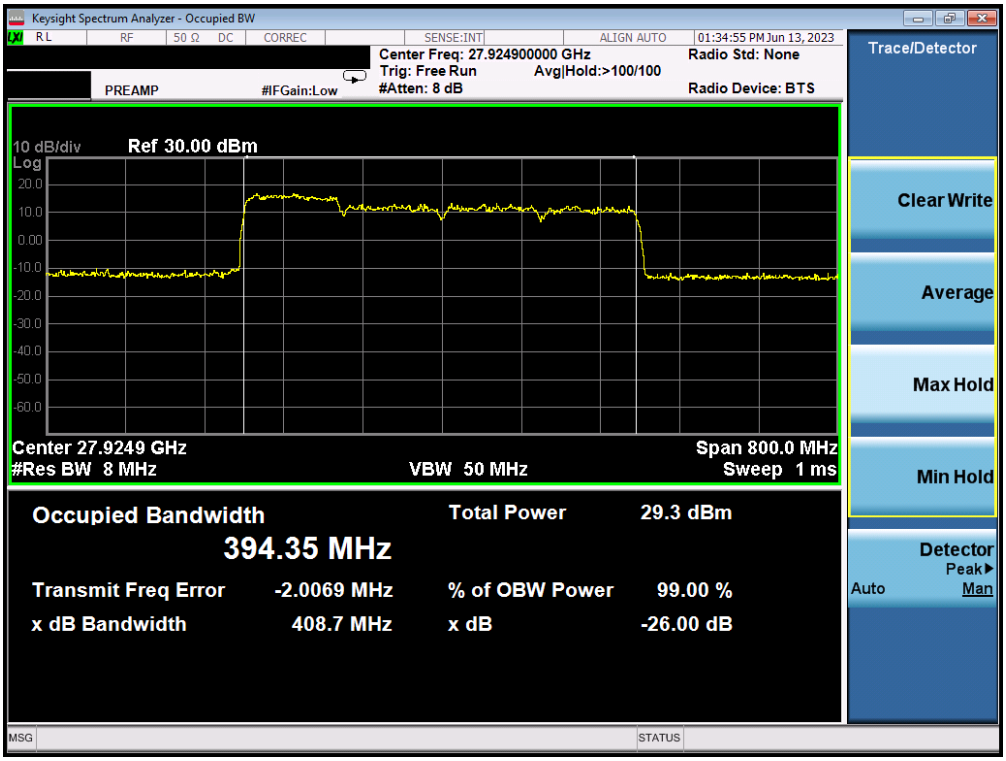
Plot 7-44. Occupied Bandwidth Plot (100MHz-3CC – CP-OFDM 64QAM – Mid Channel)



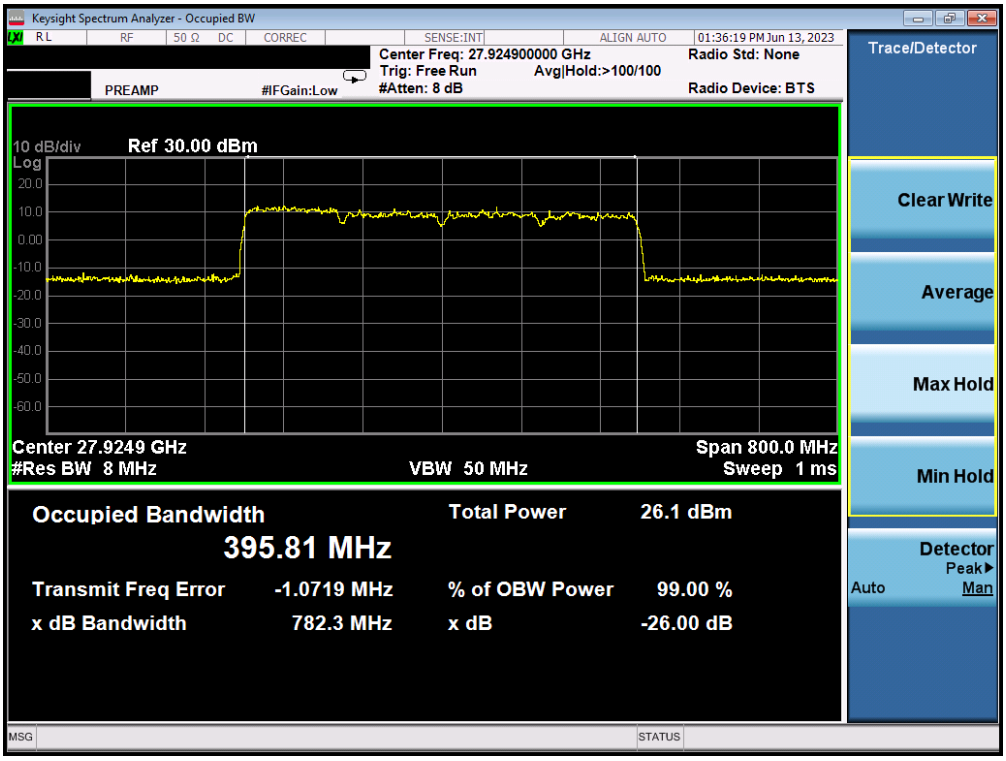
Plot 7-45. Occupied Bandwidth Plot (100MHz-4CC – CP-OFDM QPSK – Mid Channel)



Plot 7-46. Occupied Bandwidth Plot (100MHz-4CC – DFT-s-OFDM π/2 BPSK – Mid Channel)



Plot 7-47. Occupied Bandwidth Plot (100MHz-4CC – CP-OFDM 16QAM – Mid Channel)

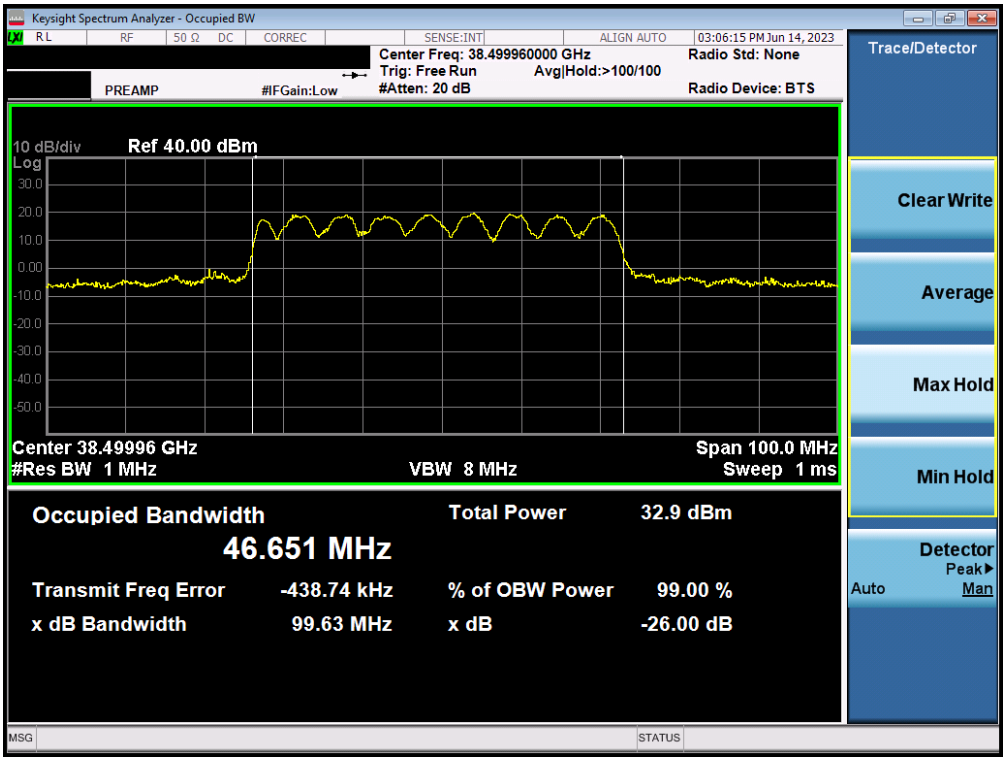


Plot 7-48. Occupied Bandwidth Plot (100MHz-4CC – CP-OFDM 64QAM – Mid Channel)

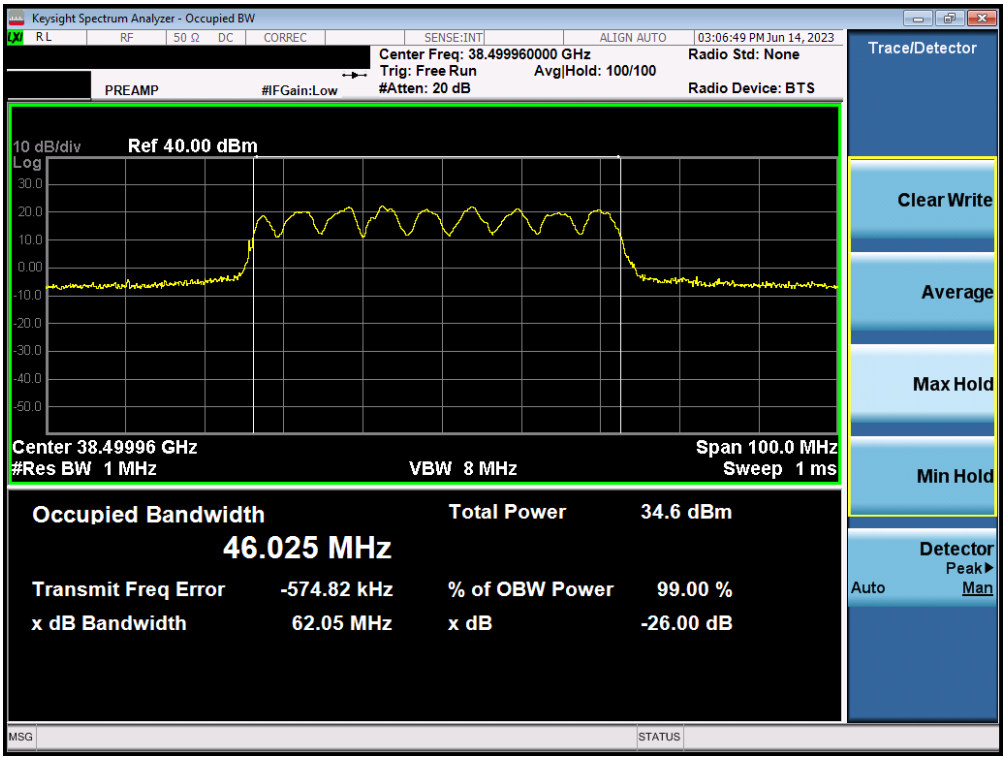
Band n260

Antenna	Bandwidth [MHz]	CCs Active	Transmition Scheme	Modulation	OBW [MHz]
Ant-1	50	1	CP-OFDM	QPSK	46.65
			DFT-s-OFDM	π/2 BPSK	46.03
			CP-OFDM	16QAM	46.29
			CP-OFDM	64QAM	46.01
	100	1	CP-OFDM	QPSK	95.98
			DFT-s-OFDM	π/2 BPSK	92.33
			CP-OFDM	16QAM	95.59
			CP-OFDM	64QAM	96.94
		2	CP-OFDM	QPSK	197.21
			DFT-s-OFDM	π/2 BPSK	195.80
			CP-OFDM	16QAM	194.49
			CP-OFDM	64QAM	195.24
		3	CP-OFDM	QPSK	298.10
			DFT-s-OFDM	π/2 BPSK	297.44
			CP-OFDM	16QAM	299.16
			CP-OFDM	64QAM	297.73
		4	CP-OFDM	QPSK	396.16
			DFT-s-OFDM	π/2 BPSK	395.33
			CP-OFDM	16QAM	396.58
			CP-OFDM	64QAM	396.64

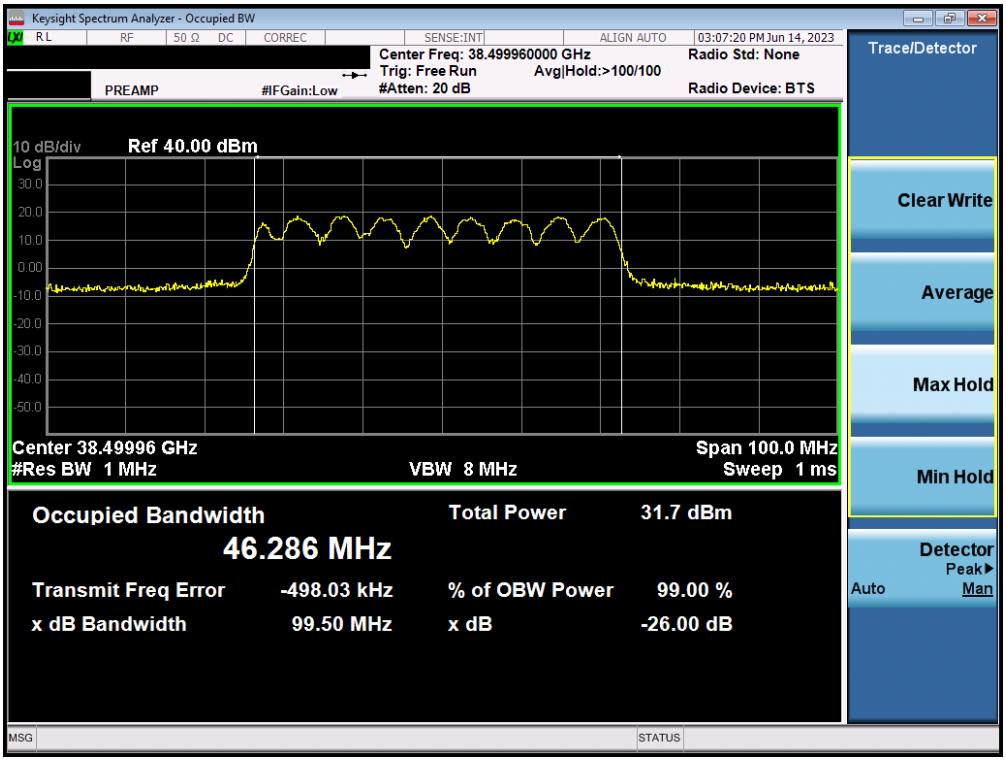
Table 7-5. Summary of Occupied Bandwidths (n260)



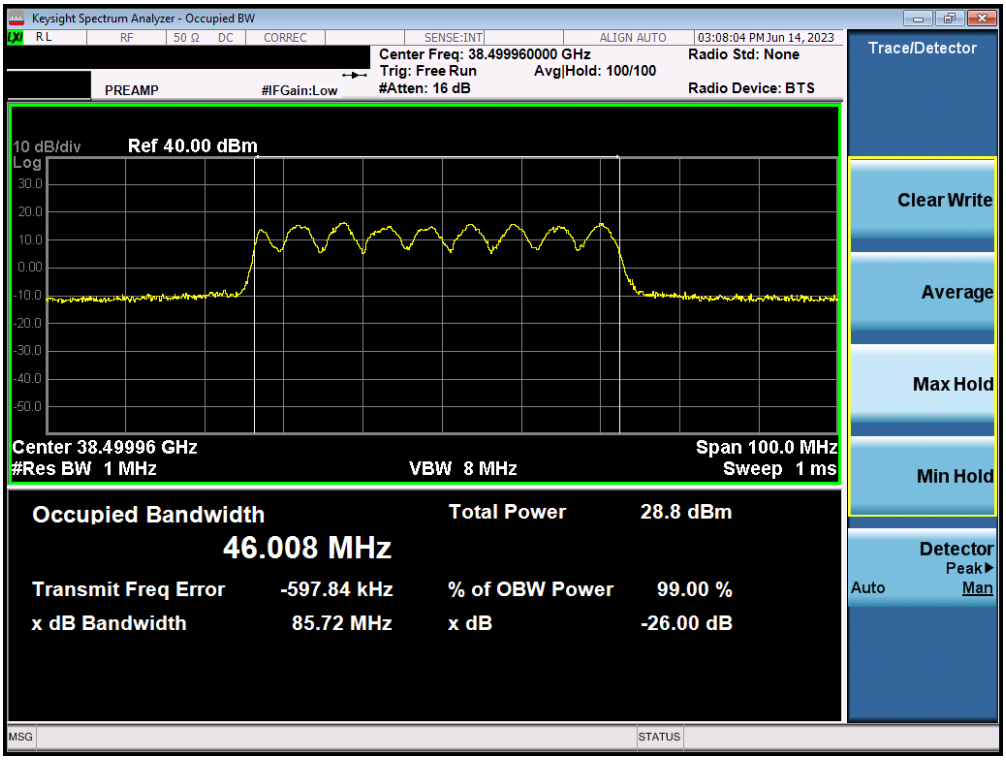
Plot 7-49. Occupied Bandwidth Plot (50MHz-1CC – CP-OFDM QPSK – Mid Channel)



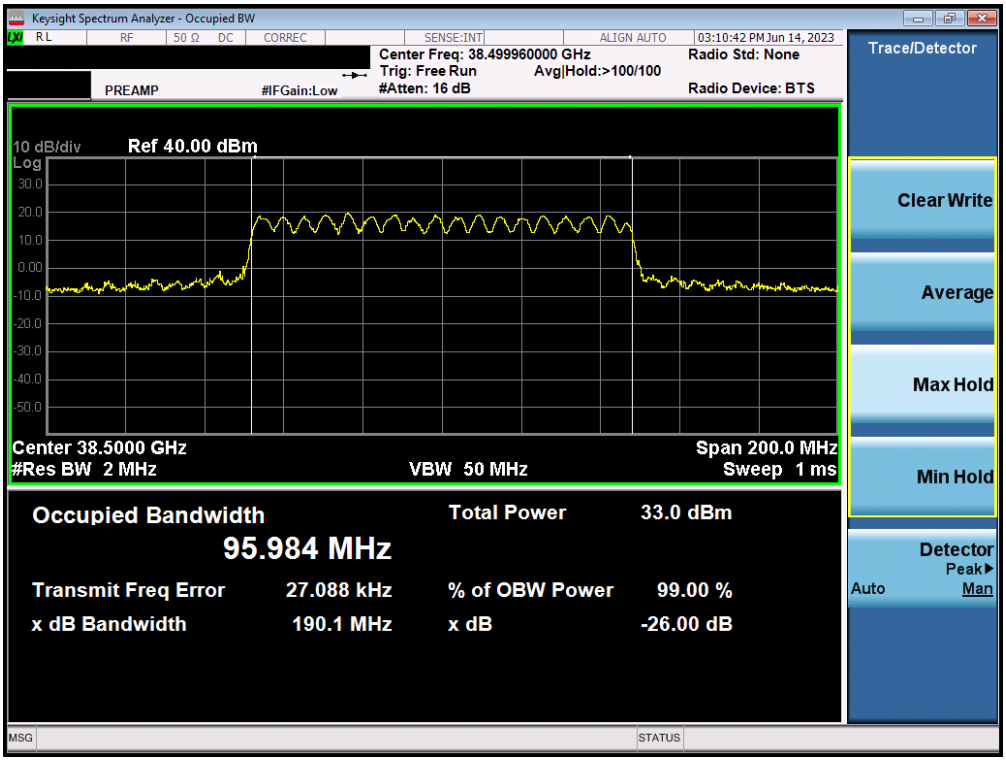
Plot 7-50. Occupied Bandwidth Plot (50MHz-1CC – DFT-s-OFDM π/2 BPSK – Mid Channel)



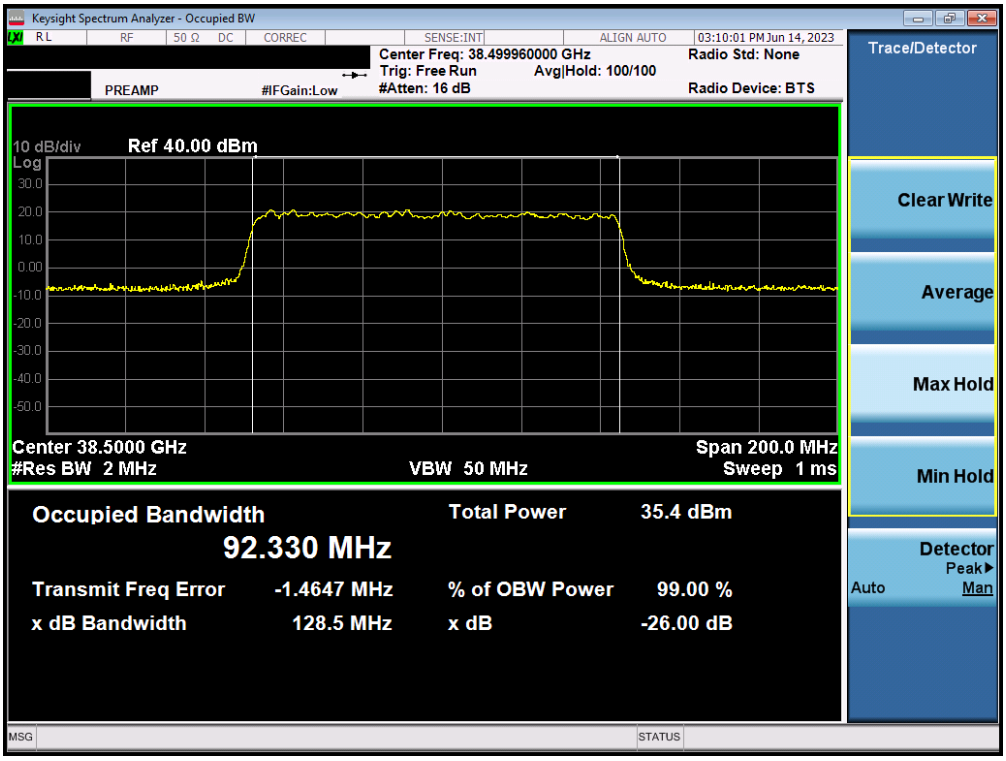
Plot 7-51. Occupied Bandwidth Plot (50MHz-1CC – CP-OFDM 16QAM – Mid Channel)



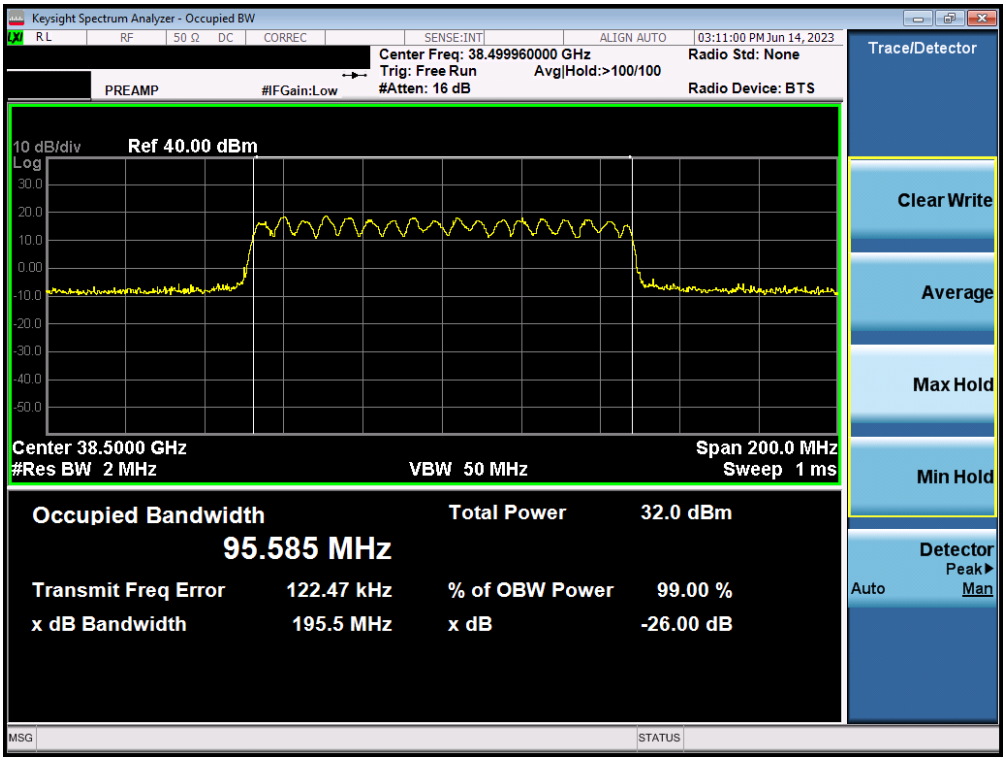
Plot 7-52. Occupied Bandwidth Plot (50MHz-1CC – CP-OFDM 64QAM – Mid Channel)



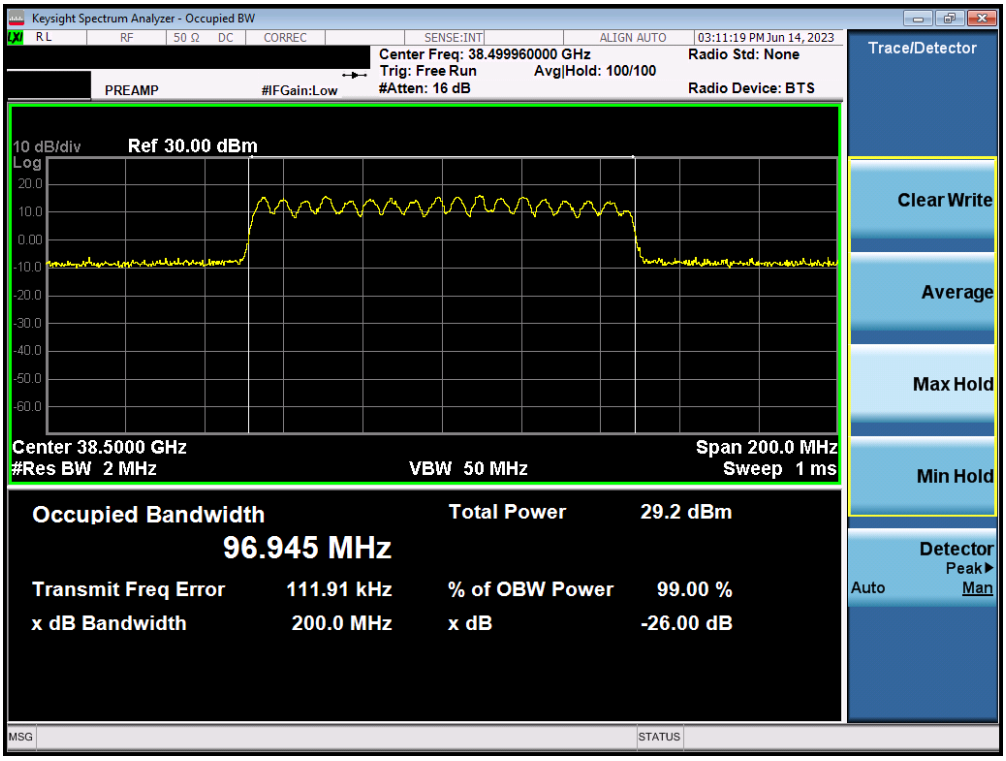
Plot 7-53. Occupied Bandwidth Plot (100MHz-1CC – CP-OFDM QPSK – Mid Channel)



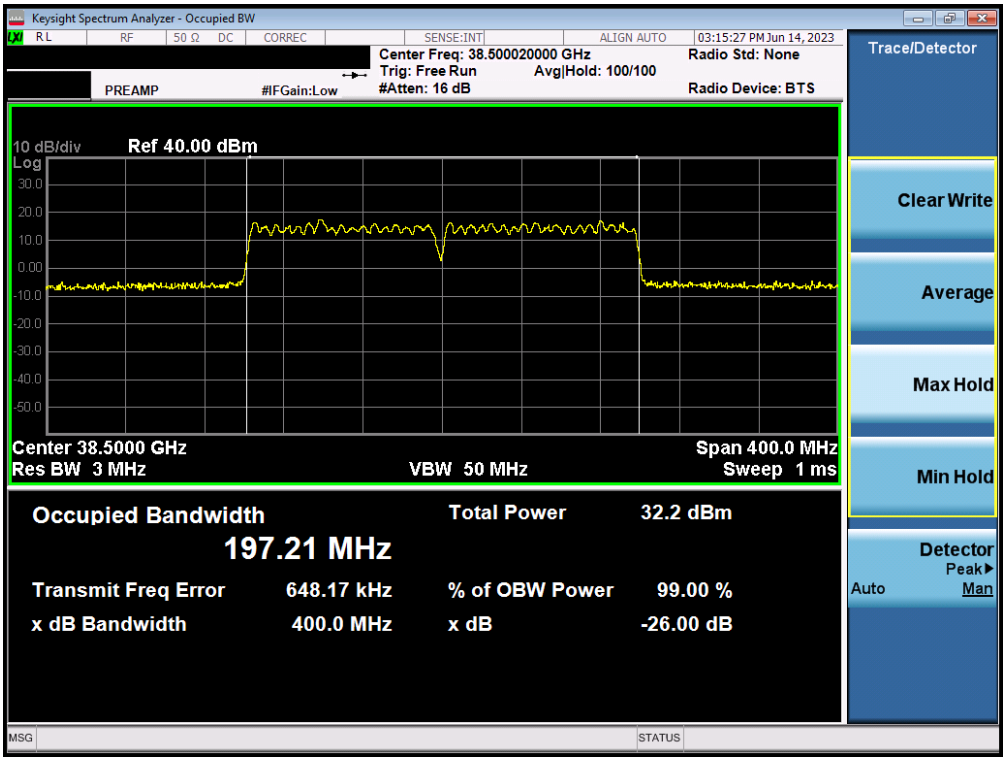
Plot 7-54. Occupied Bandwidth Plot (100MHz-1CC – DFT-s-OFDM π/2 BPSK – Mid Channel)



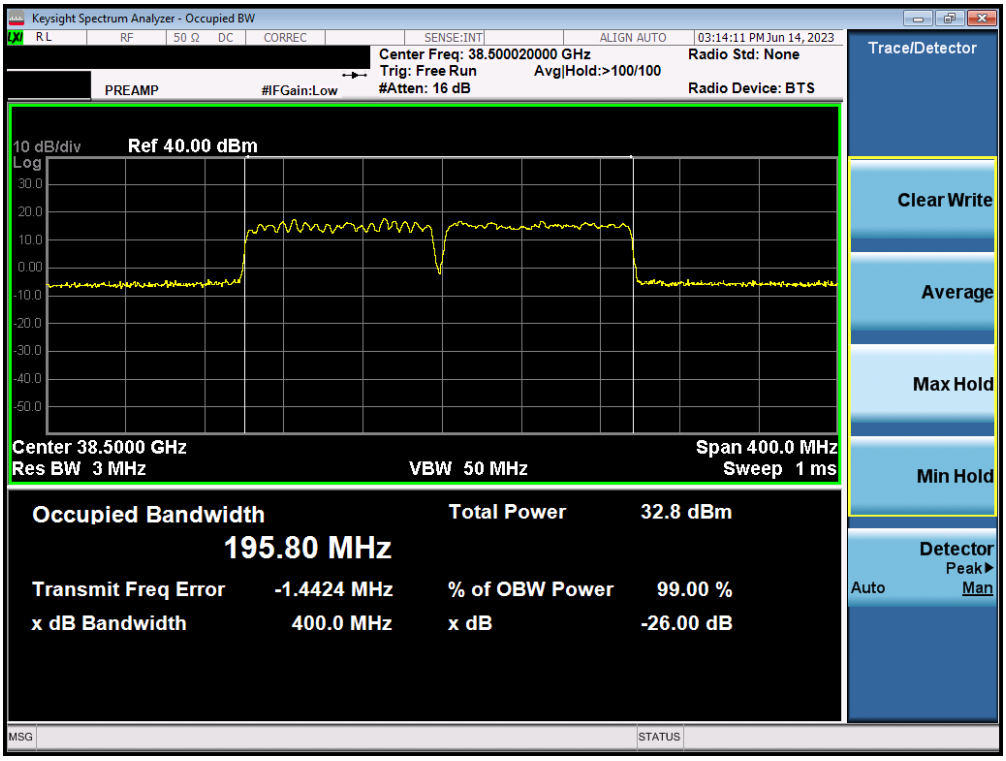
Plot 7-55. Occupied Bandwidth Plot (100MHz-1CC – CP-OFDM 16QAM – Mid Channel)



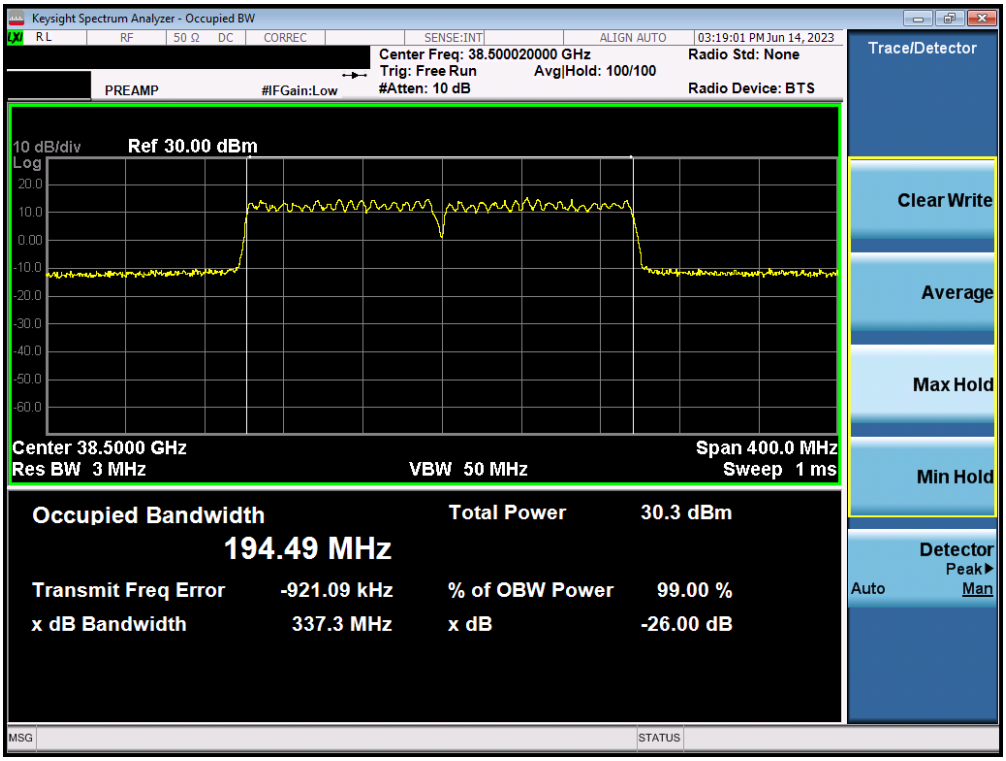
Plot 7-56. Occupied Bandwidth Plot (100MHz-1CC – CP-OFDM 64QAM – Mid Channel)



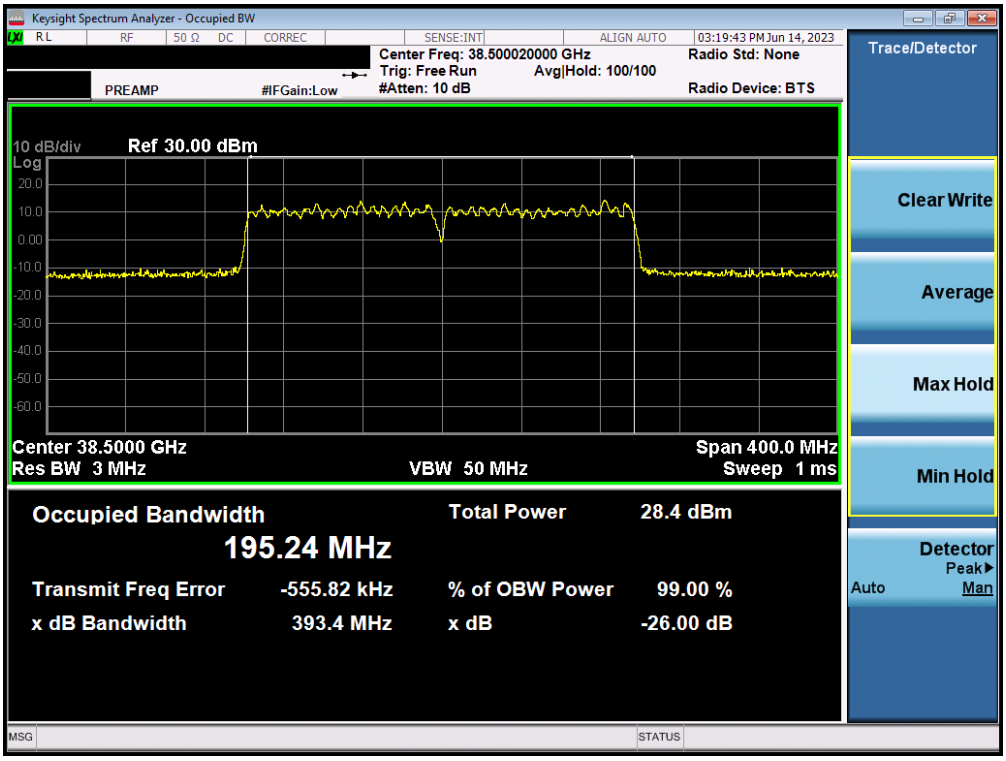
Plot 7-57. Occupied Bandwidth Plot (100MHz-2CC – CP-OFDM QPSK – Mid Channel)



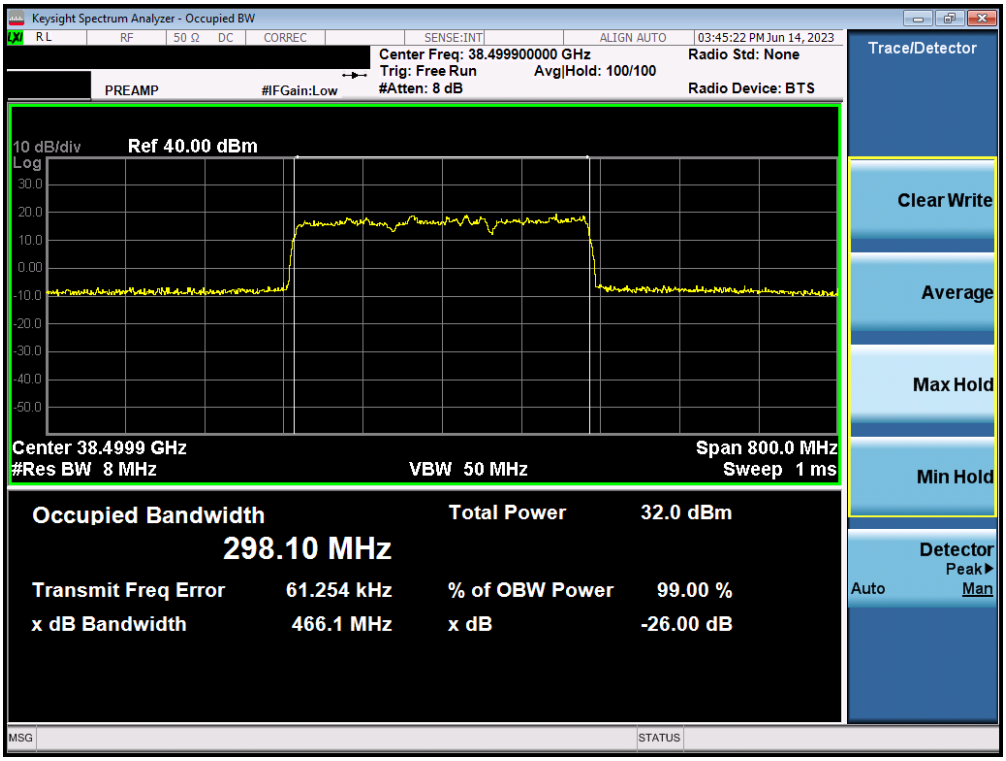
Plot 7-58. Occupied Bandwidth Plot (100MHz-2CC – DFT-s-OFDM π/2 BPSK – Mid Channel)



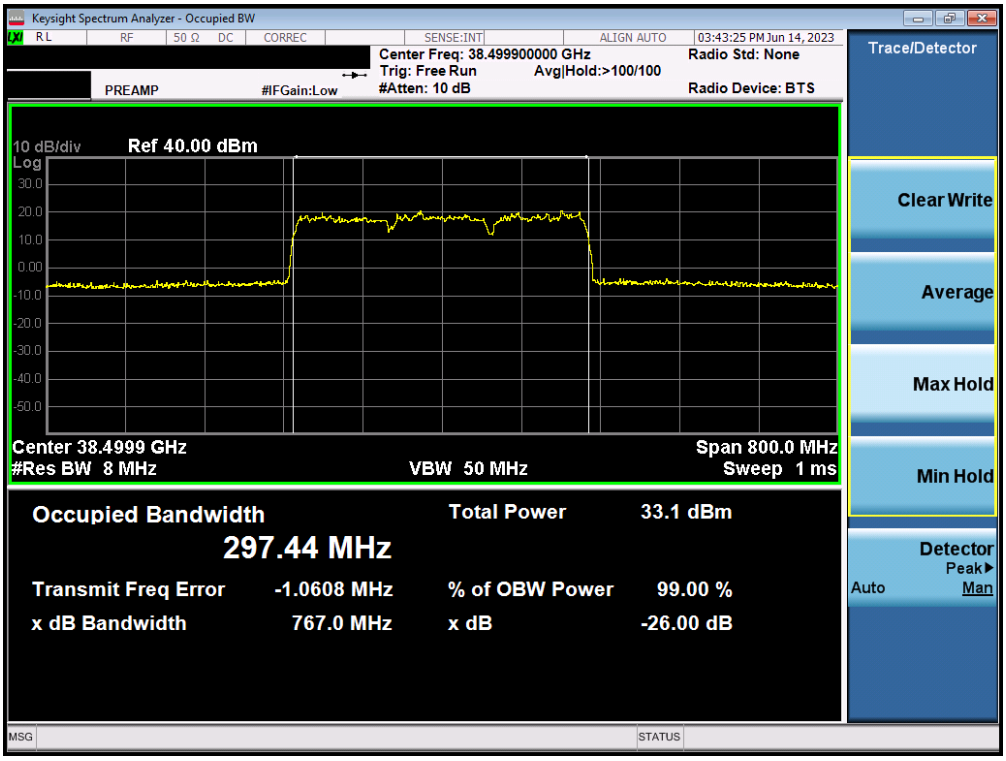
Plot 7-59. Occupied Bandwidth Plot (100MHz-2CC – CP-OFDM 16QAM – Mid Channel)



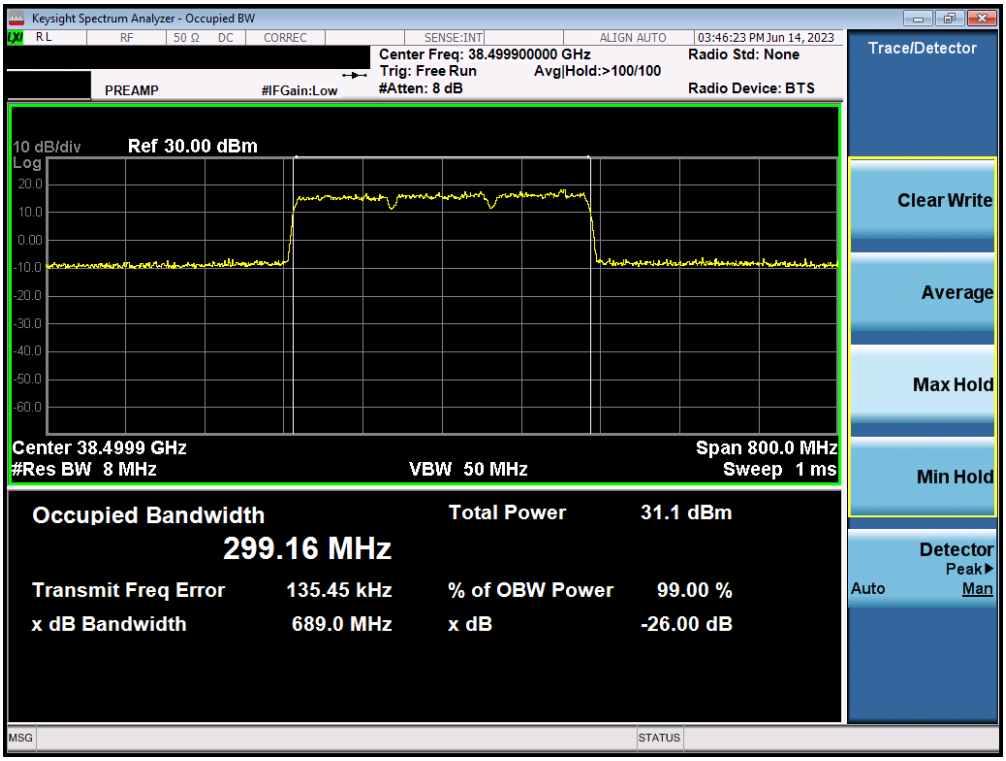
Plot 7-60. Occupied Bandwidth Plot (100MHz-2CC – CP-OFDM 64QAM – Mid Channel)



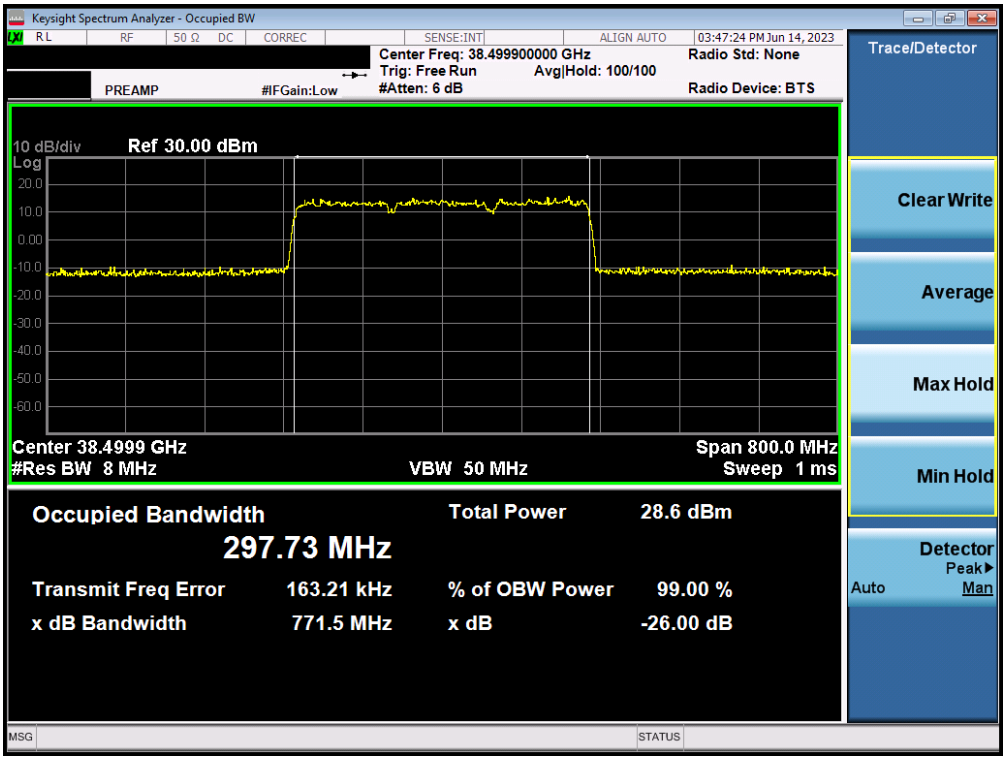
Plot 7-61. Occupied Bandwidth Plot (100MHz-3CC – CP-OFDM QPSK – Mid Channel)



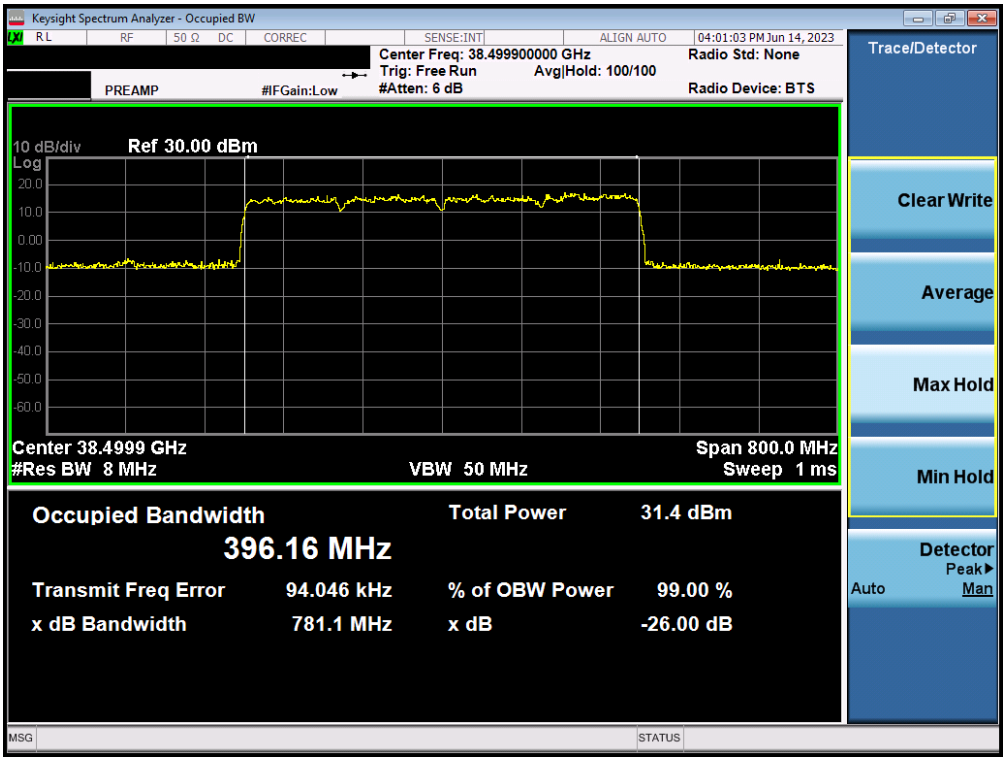
Plot 7-62. Occupied Bandwidth Plot (100MHz-3CC – DFT-s-OFDM π/2 BPSK – Mid Channel)



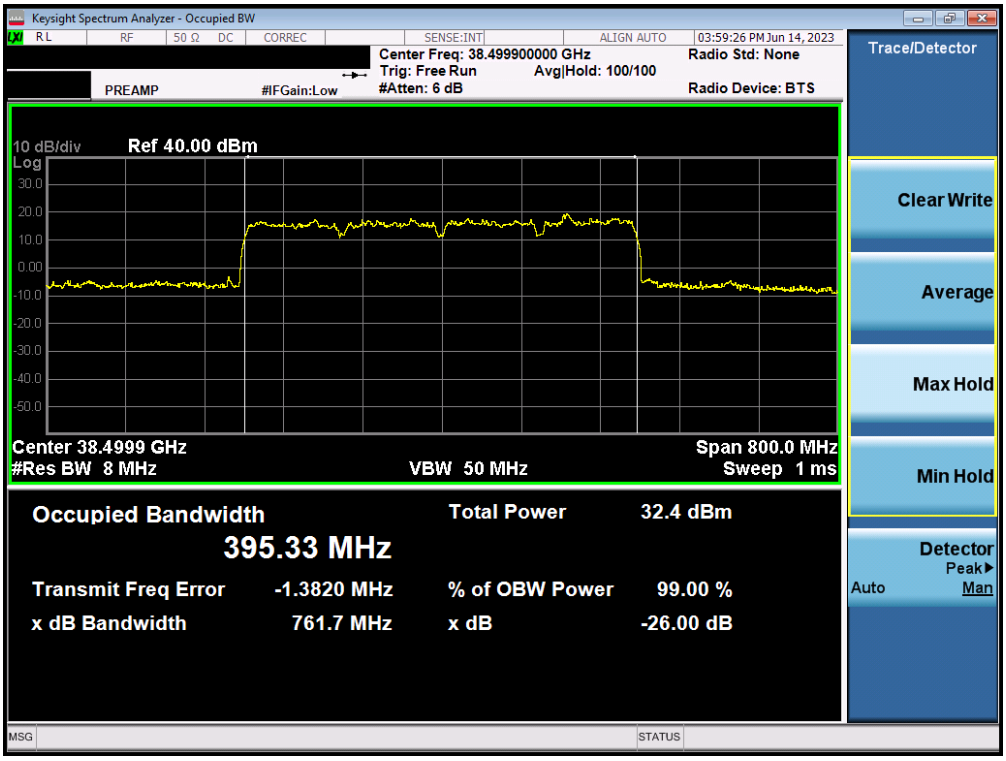
Plot 7-63. Occupied Bandwidth Plot (100MHz-3CC – CP-OFDM 16QAM – Mid Channel)



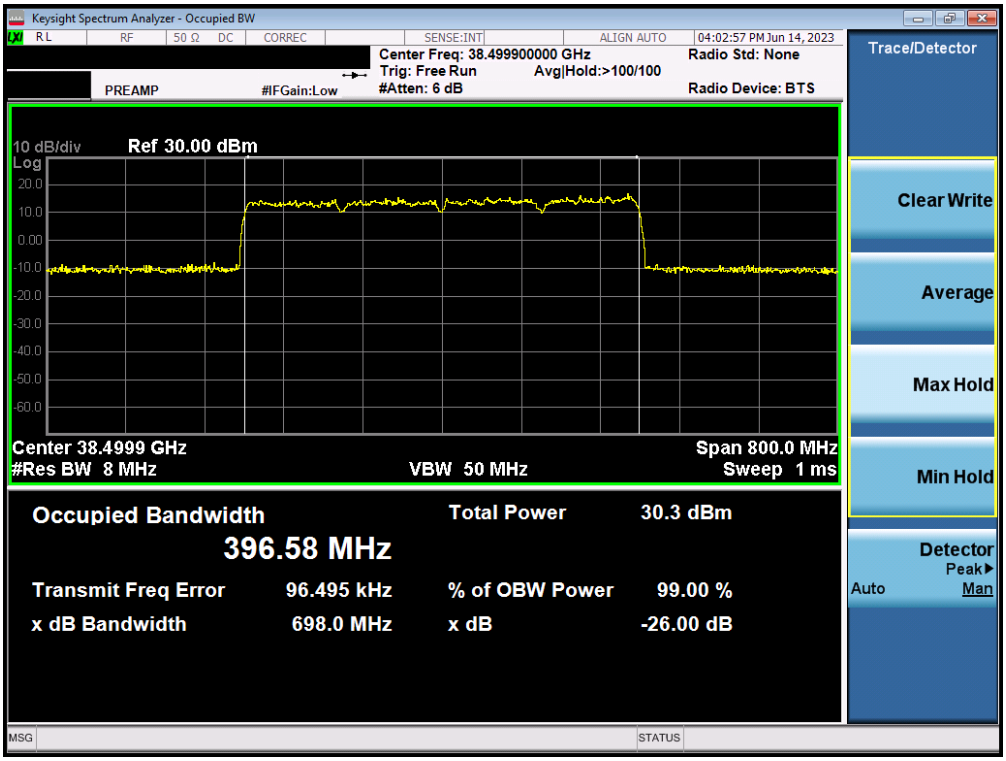
Plot 7-64. Occupied Bandwidth Plot (100MHz-3CC – CP-OFDM 64QAM – Mid Channel)



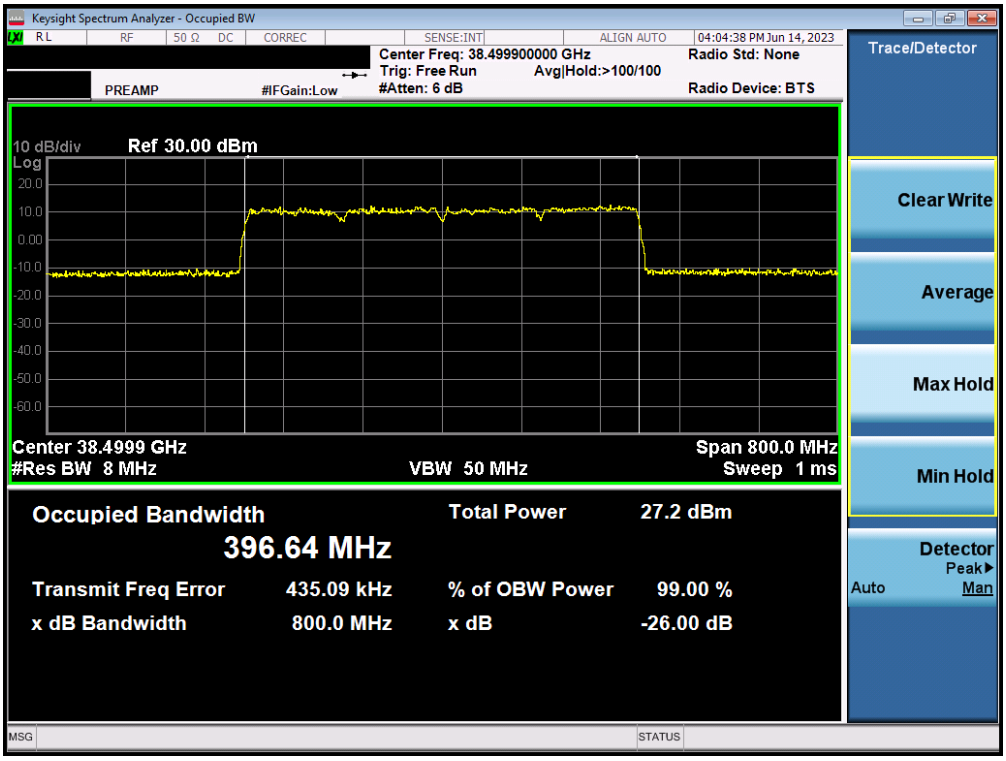
Plot 7-65. Occupied Bandwidth Plot (100MHz-4CC – CP-OFDM QPSK – Mid Channel)



Plot 7-66. Occupied Bandwidth Plot (100MHz-4CC – DFT-s-OFDM π/2 BPSK – Mid Channel)



Plot 7-67. Occupied Bandwidth Plot (100MHz-4CC – CP-OFDM 16QAM – Mid Channel)



Plot 7-68. Occupied Bandwidth Plot (100MHz-4CC – CP-OFDM 64QAM – Mid Channel)

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

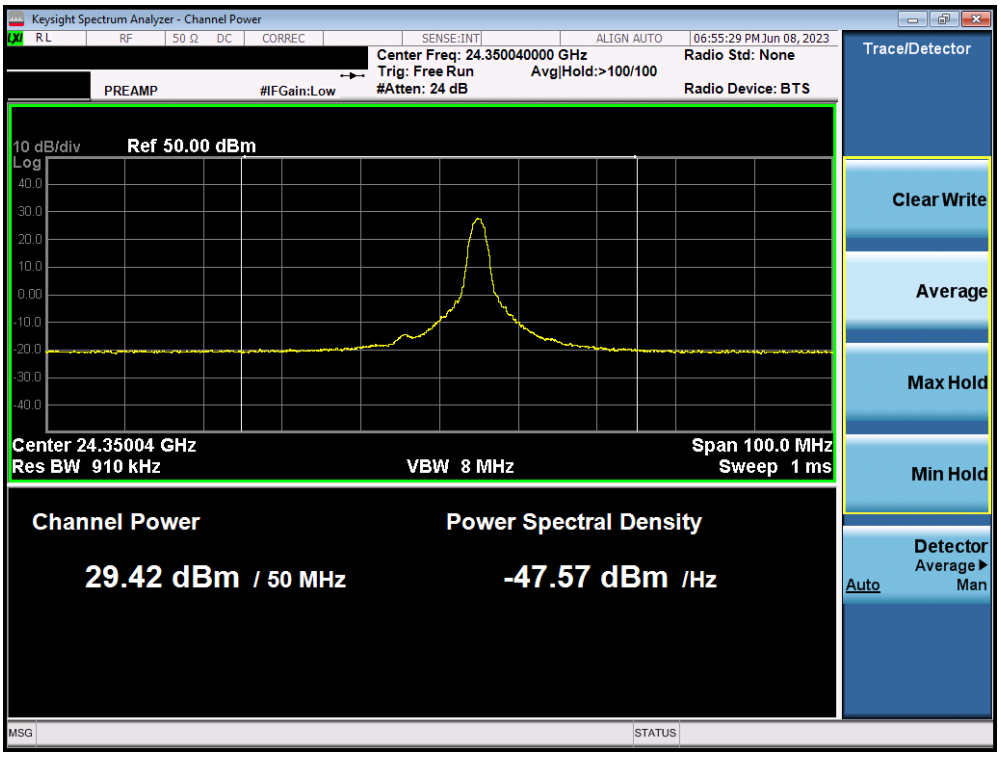
ANSI C63.26-2015 Section 5.2.4.4.1
KDB 842590 D01 v01r02 Section 4.2

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

Bandwidth [MHz]	CCs Active	Channel	Frequency [MHz]	Transmission Scheme	Modulation	Beam ID	Beam Pol.	Ant. Div.	Ant. Pol. [H/V]	Positioner Roll [degrees]	Turntable Azimuth [degrees]	RB Size/Offsets	EIRP [dBm]
50	1	Low	24275.04	DFT-s-OFDM	QPSK	17+145	H + V	2Tx	H	320	64.2	1 / 19	**29.02**
				DFT-s-OFDM	π/2 BPSK	17+145	H + V	2Tx	H	320	64.2	1 / 19	**29.04**
		Mid	24350.04	DFT-s-OFDM	QPSK	17+145	H + V	2Tx	H	320	62.1	1 / 19	29.35
				CP-OFDM	QPSK	17+145	H + V	MIMO	H	320	62.1	1 / 19	26.25
				DFT-s-OFDM	π/2 BPSK	17+145	H + V	2Tx	H	320	62.1	1 / 19	**29.42**
				DFT-s-OFDM	16QAM	17+145	H + V	2Tx	H	320	62.1	1 / 19	27.47
				DFT-s-OFDM	64QAM	17+145	H + V	2Tx	H	320	62.1	1 / 19	25.59
		High	24424.92	DFT-s-OFDM	QPSK	16+144	H + V	2Tx	H	334	253.0	1 / 16	28.71
				DFT-s-OFDM	QPSK	148	H	SISO	H	305	312.0	1 / 19	25.26
				DFT-s-OFDM	QPSK	18	V	SISO	V	333	248.9	1 / 16	27.79
				CP-OFDM	QPSK	148	H	SISO	H	305	312.0	1 / 19	21.43
				CP-OFDM	QPSK	18	V	SISO	V	333	248.9	1 / 19	24.72
				DFT-s-OFDM	π/2 BPSK	16+144	H + V	2Tx	H	334	253.0	1 / 16	**28.80**

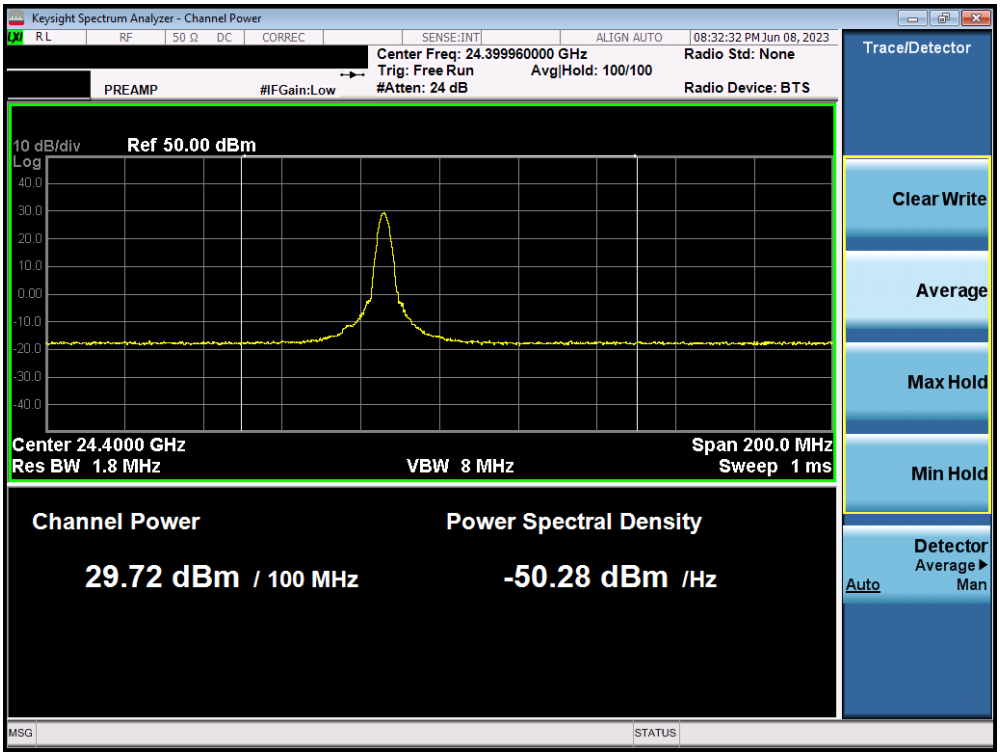
Table 7-6. EIRP Data (Band n258-R1 - 50MHz)



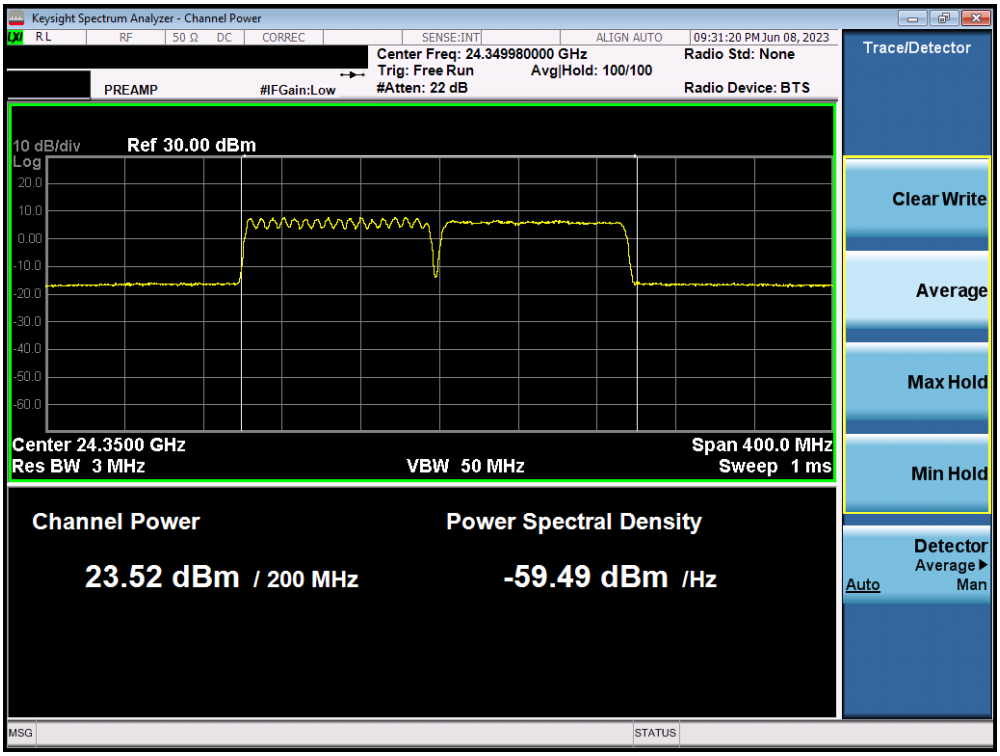
Plot 7-69. EIRP Plot (Band n258-R1 − 50MHz-1CC Mid Channel DFT-s-OFDM π/2 BPSK)

Bandwidth [MHz]	CCs Active	Channel	Frequency [MHz]	Transmission Scheme	Modulation	Beam ID	Beam Pol.	Ant. Div.	Ant. Pol. [H/V]	Positioner Roll [degrees]	Turntable Azimuth [degrees]	RB Size/Offsets	EIRP [dBm]
100	1	Low	24300.00	DFT-s-OFDM	QPSK	17+145	H + V	2Tx	H	317	63.8	1 / 23	**28.68**
				DFT-s-OFDM	π/2 BPSK	17+145	H + V	2Tx	H	317	63.8	1 / 23	**28.63**
		Mid	24350.04	DFT-s-OFDM	QPSK	17+145	H + V	2Tx	H	318	63.9	1 / 33	28.76
				DFT-s-OFDM	π/2 BPSK	17+145	H + V	2Tx	H	318	63.9	1 / 33	**28.78**
		High	24399.96	DFT-s-OFDM	QPSK	16+144	H + V	2Tx	H	327	256.4	1 / 23	29.49
				DFT-s-OFDM	QPSK	148	H	SISO	H	305	311.2	1 / 33	24.87
				DFT-s-OFDM	QPSK	18	V	SISO	V	335	246.9	1 / 42	27.82
				CP-OFDM	QPSK	16+144	H + V	MIMO	H	327	256.4	1 / 23	26.68
				CP-OFDM	QPSK	148	H	SISO	H	305	311.2	1 / 33	21.80
				CP-OFDM	QPSK	18	V	SISO	V	335	246.9	1 / 23	24.87
				DFT-s-OFDM	π/2 BPSK	16+144	H + V	2Tx	H	327	256.4	1 / 23	**29.72**
				DFT-s-OFDM	16QAM	16+144	H + V	2Tx	H	327	256.4	1 / 23	27.26
				DFT-s-OFDM	64QAM	16+144	H + V	2Tx	H	327	256.4	1 / 23	25.45
100+100	2	Mid	24349.98	DFT-s-OFDM	QPSK	17+145	H + V	2Tx	H	320	63.7	64 / 0	**23.52**
				CP-OFDM	QPSK	17+145	H + V	MIMO	H	320	63.7	66 / 0	21.58
				DFT-s-OFDM	π/2 BPSK	17+145	H + V	2Tx	H	320	63.7	64 / 0	23.46
				DFT-s-OFDM	16QAM	17+145	H + V	2Tx	H	320	63.7	64 / 0	21.60
				DFT-s-OFDM	64QAM	17+145	H + V	2Tx	H	320	63.7	64 / 0	19.54

Table 7-7. EIRP Data (Band n258-R1 - 100MHz)



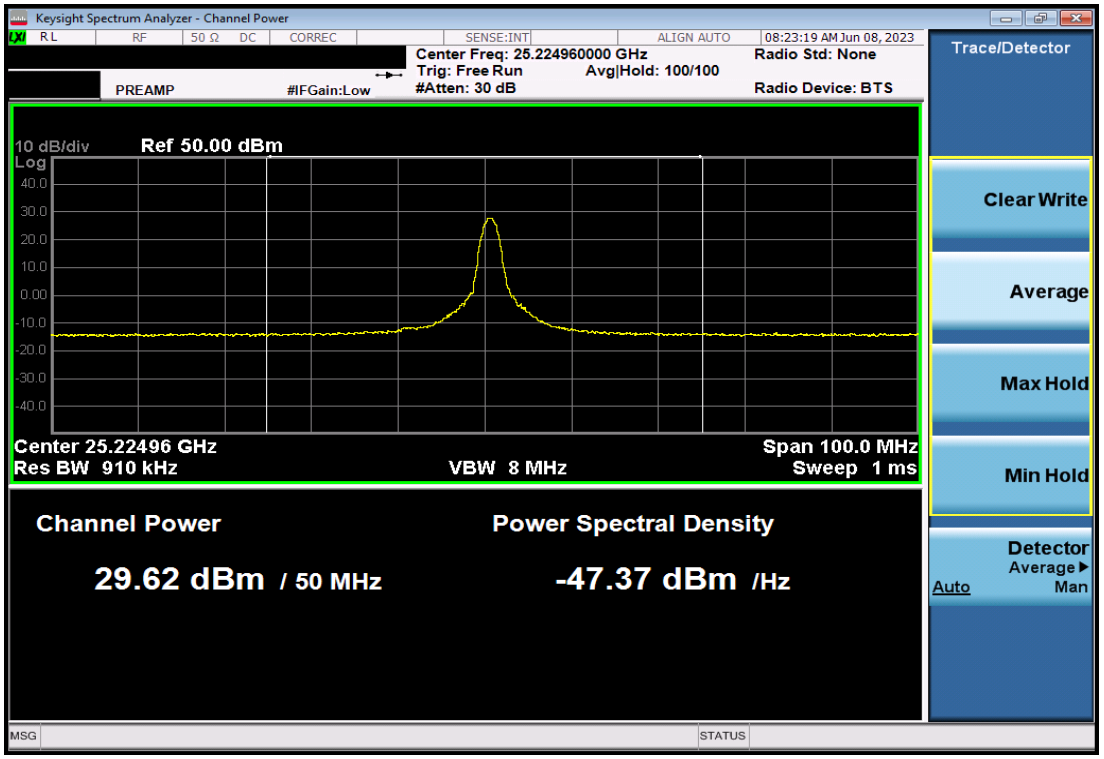
Plot 7-70. EIRP Plot (Band n258-R1 − 100MHz-1CC High Channel DFT-s-OFDM π/2 BPSK)



Plot 7-71. EIRP Plot (Band n258-R1 − 100MHz-2CC Mid Channel DFT-s-OFDM π/2 BPSK)

Bandwidth [MHz]	CCs Active	Channel	Frequency [MHz]	Transmission Scheme	Modulation	Beam ID	Beam Pol.	Ant. Div.	Ant. Pol. [H/V]	Positioner Roll [degrees]	Turntable Azimuth [degrees]	RB Size/Offsets	EIRP [dBm]
50	1	Low	24775.08	DFT-s-OFDM	QPSK	18	V	SISO	V	330	115	1 / 12	27.66
				DFT-s-OFDM	QPSK	148	H	SISO	V	252	310	1 / 16	25.96
				CP-OFDM	QPSK	18	V	SISO	V	330	115	1 / 12	24.53
				CP-OFDM	QPSK	148	H	SISO	V	252	310	1 / 16	22.85
				DFT-s-OFDM	π/2 BPSK	16+145	H+V	2Tx	H	335	250	1 / 16	**28.82**
		Mid	24999.96	DFT-s-OFDM	π/2 BPSK	18+146	H+V	2Tx	H	336	248	1 / 16	**29.27**
		High	25224.96	DFT-s-OFDM	QPSK	18+146	H+V	2Tx	H	335	250	1 / 16	29.57
				CP-OFDM	QPSK	18+146	H+V	MIMO	H	335	250	1 / 16	26.64
				DFT-s-OFDM	π/2 BPSK	18+146	H+V	2Tx	H	335	250	1 / 16	**29.62**
				DFT-s-OFDM	16QAM	18+146	H+V	2Tx	H	335	250	1 / 16	27.85
				DFT-s-OFDM	64QAM	18+146	H+V	2Tx	H	335	250	1 / 16	25.66

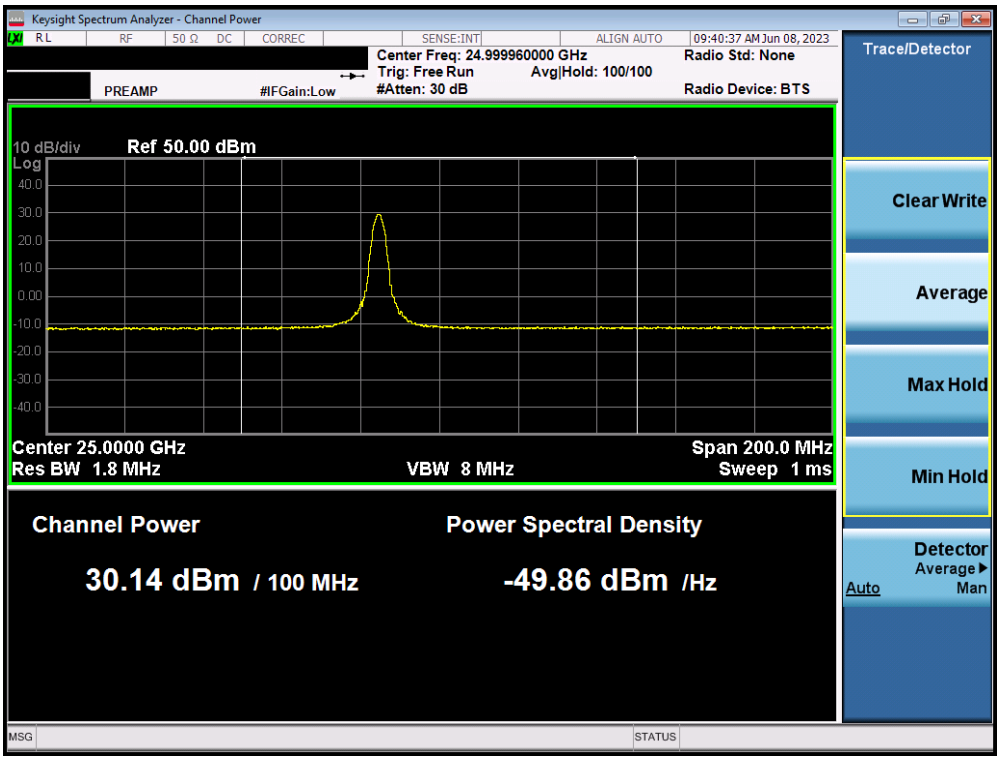
Table 7-8. EIRP Data (Band n258-R2 - 50MHz)



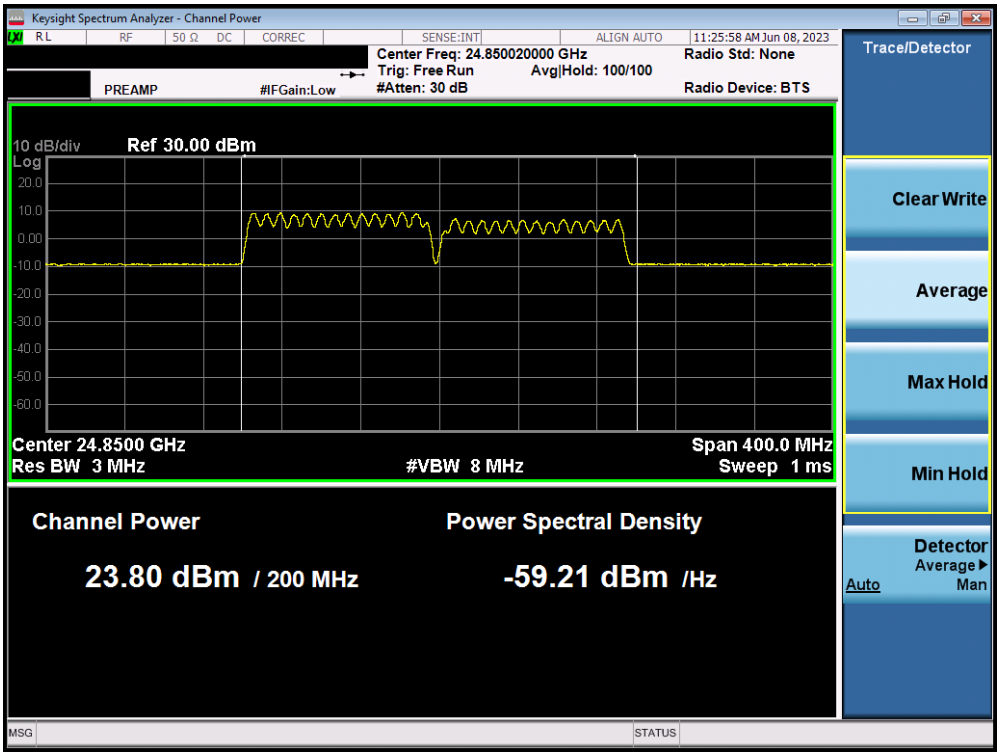
Plot 7-72. EIRP Plot (Band n258-R2 − 50MHz-1CC Mid Channel DFT-s-OFDM π/2 BPSK)

Bandwidth [MHz]	CCs Active	Channel	Frequency [MHz]	Transmission Scheme	Modulation	Beam ID	Beam Pol.	Ant. Div.	Ant. Pol. [H/V]	Positioner Roll [degrees]	Turntable Azimuth [degrees]	RB Size/Offsets	EIRP [dBm]
100	1	Low	24800.04	DFT-s-OFDM	QPSK	18	V	SISO	V	328	114	1 / 42	27.51
				DFT-s-OFDM	QPSK	148	H	SISO	H	252	310	1 / 33	26.01
				CP-OFDM	QPSK	18	V	SISO	V	328	114	1 / 42	24.42
				CP-OFDM	QPSK	148	H	SISO	H	252	310	1 / 33	23.56
				DFT-s-OFDM	π/2 BPSK	16+144	H+V	2Tx	H	335	249	1 / 23	**28.77**
		Mid	24999.96	DFT-s-OFDM	QPSK	18+146	H+V	2Tx	H	334	250	1 / 23	29.97
				CP-OFDM	QPSK	18+146	H+V	MIMO	H	334	250	1 / 23	27.04
				DFT-s-OFDM	π/2 BPSK	18+146	H+V	2Tx	H	334	250	1 / 23	**30.14**
				DFT-s-OFDM	16QAM	18+146	H+V	2Tx	H	334	250	1 / 23	27.92
				DFT-s-OFDM	64QAM	18+146	H+V	2Tx	H	334	250	1 / 23	25.92
		High	25200.00	DFT-s-OFDM	π/2 BPSK	18+146	H+V	2Tx	H	335	250	1 / 23	**27.88**
100+100	2	Low	24850.02	DFT-s-OFDM	π/2 BPSK	16+144	H+V	2Tx	H	335	249	64 / 0	**23.54**
		Mid	25000.02	CP-OFDM	QPSK	16+144	H+V	MIMO	H	335	249	66 / 0	20.79
				DFT-s-OFDM	π/2 BPSK	18+146	H+V	2Tx	H	335	249	64 / 0	**23.60**
		High	25150.02	DFT-s-OFDM	QPSK	18+146	H+V	2Tx	H	336	246	64 / 0	23.77
				CP-OFDM	QPSK	18+146	H+V	MIMO	H	336	246	66 / 0	21.65
				DFT-s-OFDM	π/2 BPSK	18+146	H+V	2Tx	H	336	246	64 / 0	**23.80**
				DFT-s-OFDM	16QAM	18+146	H+V	2Tx	H	336	246	64 / 0	21.84
				DFT-s-OFDM	64QAM	18+146	H+V	2Tx	H	336	246	1 / 33	20.31
100+100+100	3	Low	24900.00	DFT-s-OFDM	π/2 BPSK	16+144	H+V	2Tx	H	337	263	64 / 0	**23.82**
		High	25100.04	DFT-s-OFDM	QPSK	18+146	H+V	2Tx	H	332	257	64 / 0	22.03
				CP-OFDM	QPSK	18+146	H+V	MIMO	H	332	257	66 / 0	20.56
				DFT-s-OFDM	π/2 BPSK	18+146	H+V	2Tx	H	332	257	64 / 0	**23.89**
				DFT-s-OFDM	16QAM	18+146	H+V	2Tx	H	332	257	1 / 23	21.56
				DFT-s-OFDM	64QAM	18+146	H+V	2Tx	H	332	257	1 / 23	20.55

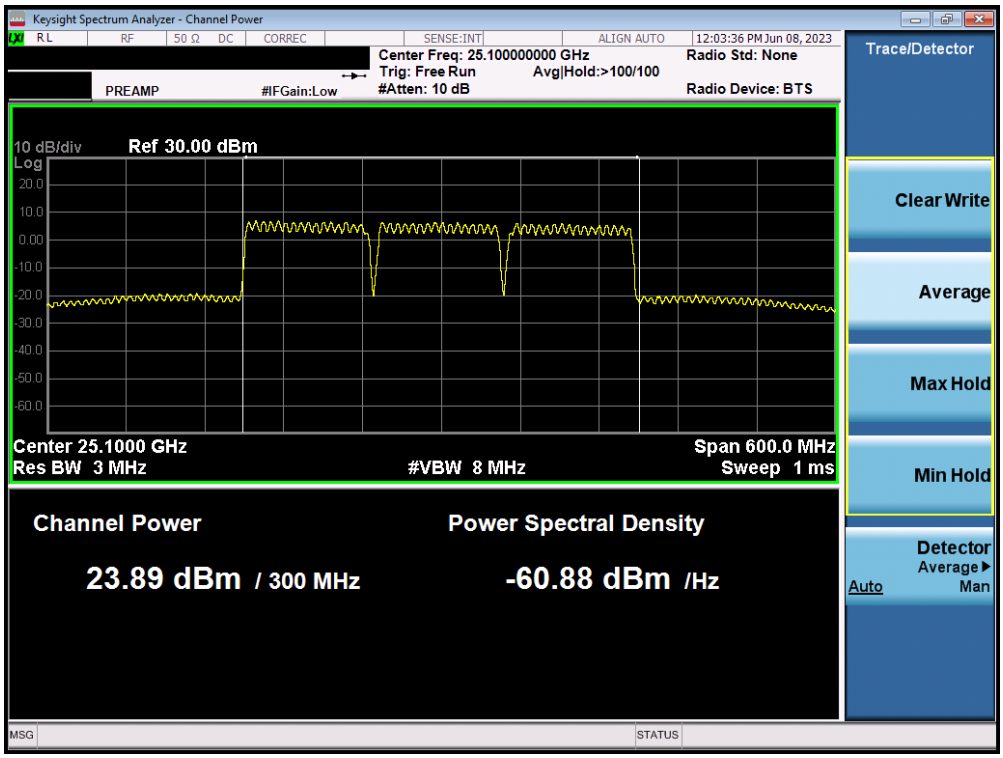
Table 7-9. Ant-1 EIRP Data (Band n258-R2 - 100MHz)



Plot 7-73.EIRP Plot (Band n258-R2 − 100MHz-1CC Mid Channel DFT-s-OFDM BPSK)



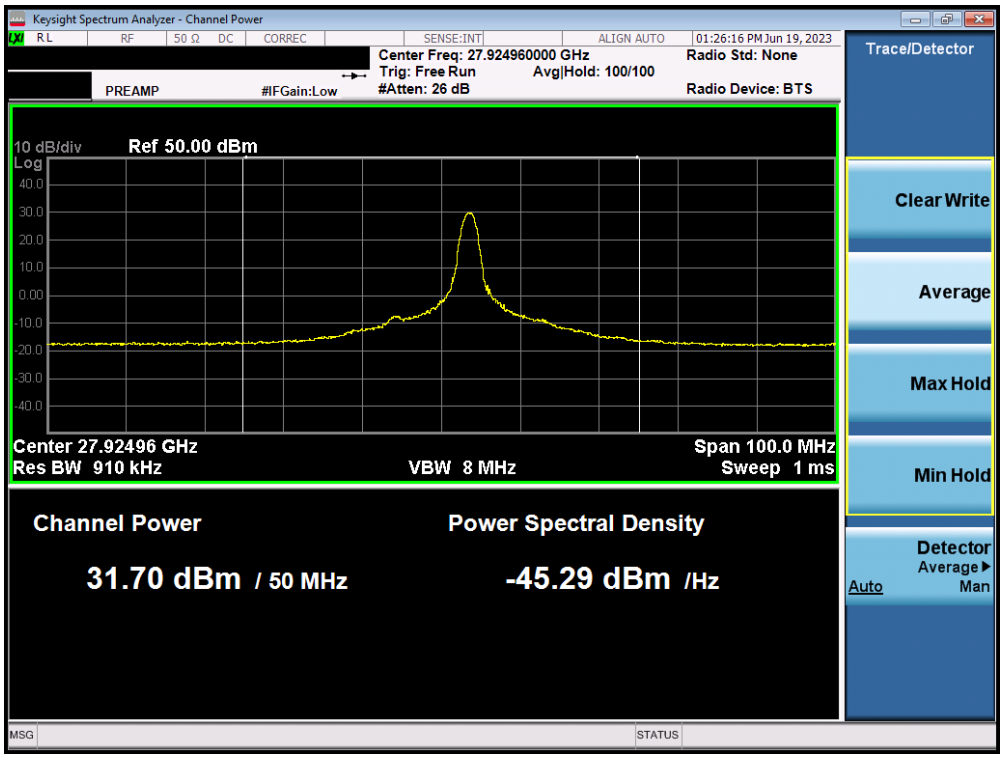
Plot 7-74.EIRP Plot (Band n258-R2 − 100MHz-2CC High Channel DFT-s-OFDM BPSK)



Plot 7-75.EIRP Plot (Band n258-R2 − 100MHz-3CC High Channel DFT-s-OFDM BPSK)

Bandwidth [MHz]	CCs Active	Channel	Frequency [MHz]	Transmission Scheme	Modulation	Beam ID	Beam Pol.	Ant. Div.	Ant. Pol. [H/V]	Positioner Roll [degrees]	Turntable Azimuth [degrees]	RB Size/Offsets	EIRP [dBm]
50	1	Low	27525.00	DFT-s-OFDM	QPSK	18+146	H+V	2Tx	H	45	16	1 / 16	**29.25**
		Mid	27924.96	DFT-s-OFDM	QPSK	19+147	H+V	2Tx	H	242	19	1 / 19	**31.70**
				DFT-s-OFDM	QPSK	15	V	SISO	V	264	42	1 / 12	28.56
				DFT-s-OFDM	QPSK	142	H	SISO	H	216	55	1 / 12	25.26
				CP-OFDM	QPSK	19+147	H+V	MIMO	H	242	19	1 / 19	28.68
				CP-OFDM	QPSK	15	V	SISO	V	264	42	1 / 12	25.26
				CP-OFDM	QPSK	142	H	SISO	H	216	55	1 / 12	22.94
				DFT-s-OFDM	π/2 BPSK	19+147	H+V	2Tx	H	242	19	1 / 19	31.69
				DFT-s-OFDM	16QAM	19+147	H+V	2Tx	H	242	19	1 / 19	29.69
				DFT-s-OFDM	64QAM	19+147	H+V	2Tx	H	242	19	1 / 19	27.64
		High	28324.92	DFT-s-OFDM	π/2 BPSK	19+147	H+V	2Tx	V	50	17	1 / 12	**29.56**

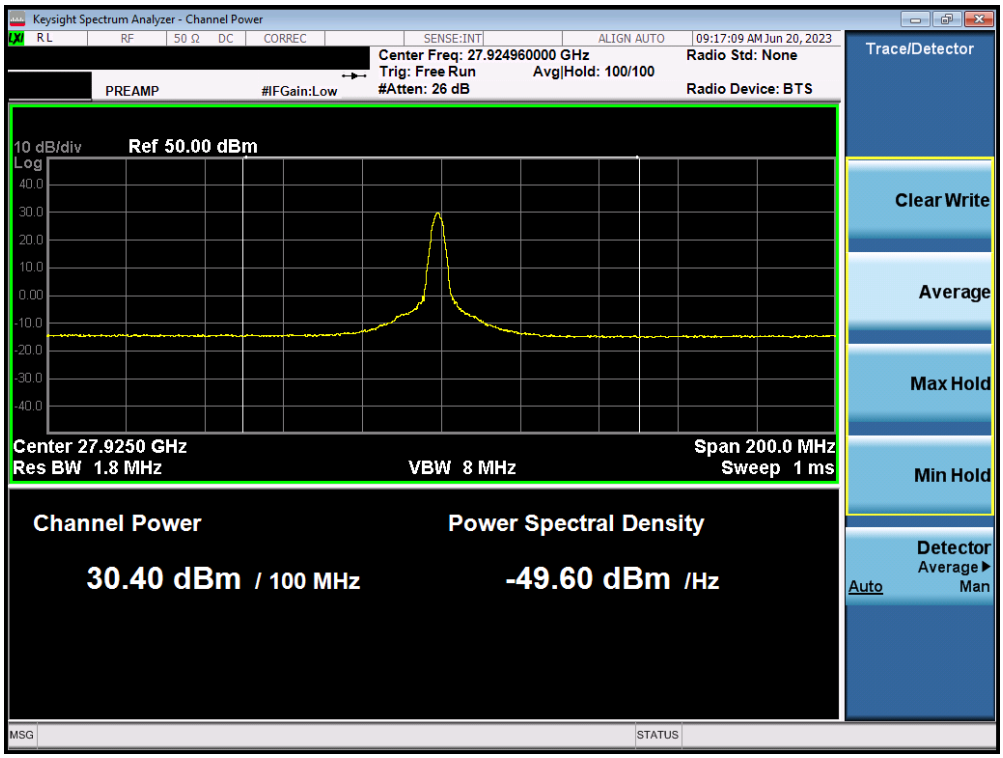
Table 7-10. Ant-1 EIRP Data (Band n261 - 50MHz)



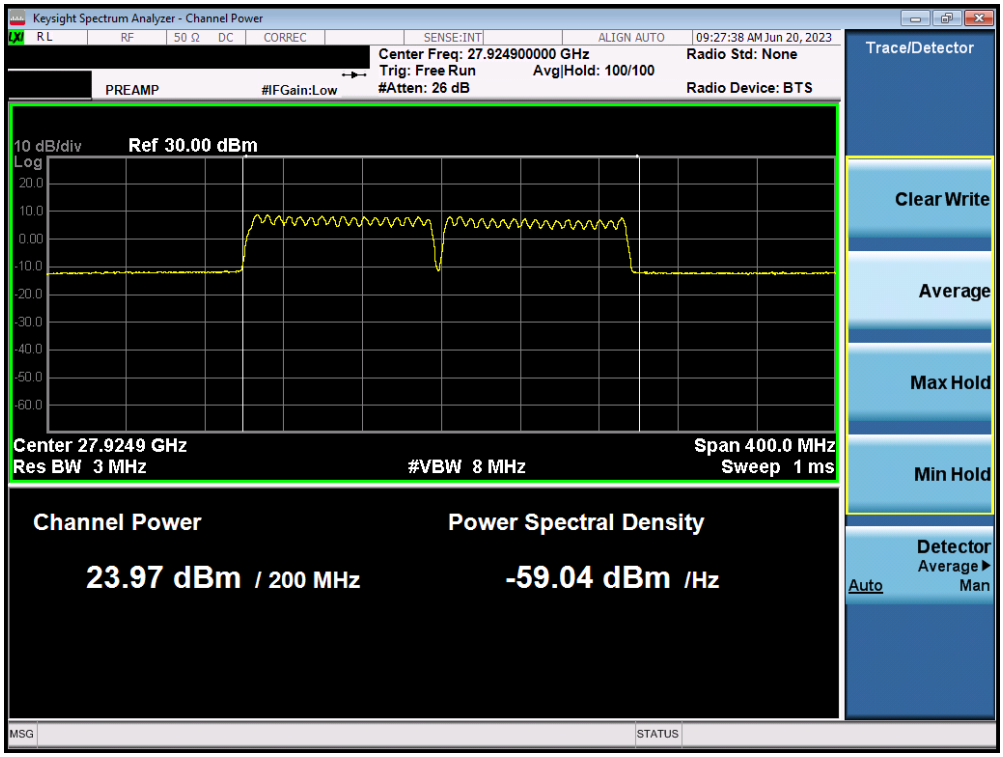
Plot 7-76.EIRP Plot (Band n261 − 50MHz-1CC Mid Channel DFT-s-OFDM QPSK)

Bandwidth [MHz]	CCs Active	Channel	Frequency [MHz]	Transmission Scheme	Modulation	Beam ID	Beam Pol.	Ant. Div.	Ant. Pol. [H/V]	Positioner Roll [degrees]	Turntable Azimuth [degrees]	RB Size/Offsets	EIRP [dBm]
100	1	Low	27550.08	DFT-s-OFDM	QPSK	18+146	H+V	2Tx	V	45	16	1 / 33	**28.54**
		Mid	27924.96	DFT-s-OFDM	QPSK	19+147	H+V	2Tx	V	59	19	1 / 33	**30.40**
				DFT-s-OFDM	QPSK	15	V	SISO	V	240	52	1 / 33	28.26
				DFT-s-OFDM	QPSK	142	H	SISO	H	251	56	1 / 24	25.22
				CP-OFDM	QPSK	19+147	H+V	MIMO	V	59	19	1 / 33	27.37
				CP-OFDM	QPSK	15	V	SISO	V	240	52	1 / 33	25.13
				CP-OFDM	QPSK	142	H	SISO	H	251	56	1 / 24	22.21
				DFT-s-OFDM	π/2 BPSK	19+147	H+V	2Tx	V	59	19	1 / 33	30.39
				DFT-s-OFDM	16QAM	19+147	H+V	2Tx	V	59	19	1 / 33	28.32
				DFT-s-OFDM	64QAM	19+147	H+V	2Tx	V	59	19	1 / 33	26.34
		High	28299.96	DFT-s-OFDM	π/2 BPSK	19+147	H+V	2Tx	V	50	17	1 / 33	**29.56**
100+100	2	Low	27600.06	DFT-s-OFDM	π/2 BPSK	18+146	H+V	2Tx	V	46	17	64 / 0	**22.98**
		Mid	27925.02	DFT-s-OFDM	QPSK	19+147	H+V	2Tx	V	59	19	64 / 0	23.88
				CP-OFDM	QPSK	19+147	H+V	MIMO	V	59	19	66 / 0	22.04
				DFT-s-OFDM	π/2 BPSK	19+147	H+V	2Tx	V	59	19	64 / 0	**23.97**
				DFT-s-OFDM	16QAM	19+147	H+V	2Tx	V	59	19	64 / 0	22.08
				DFT-s-OFDM	64QAM	19+147	H+V	2Tx	V	59	19	1 / 33	20.46
		High	28249.98	DFT-s-OFDM	π/2 BPSK	19+147	H+V	2Tx	V	50	17	64 / 0	**23.69**
100+100+100	3	Low	27650.04	DFT-s-OFDM	π/2 BPSK	18+146	H+V	2Tx	V	46	17	64 / 0	**22.98**
		Mid	27924.96	DFT-s-OFDM	QPSK	19+147	H+V	2Tx	V	59	19	64 / 0	24.13
				CP-OFDM	QPSK	19+147	H+V	MIMO	V	59	19	66 / 0	22.24
				DFT-s-OFDM	π/2 BPSK	19+147	H+V	2Tx	V	59	19	64 / 0	**24.20**
				DFT-s-OFDM	16QAM	19+147	H+V	2Tx	V	59	19	1 / 33	23.22
				DFT-s-OFDM	64QAM	19+147	H+V	2Tx	V	59	19	1 / 33	21.02
		High	28200.00	DFT-s-OFDM	π/2 BPSK	19+147	H+V	2Tx	V	50	17	64 / 0	**23.55**
100+100+100+100	4	Low	27700.02	DFT-s-OFDM	π/2 BPSK	18+146	H+V	2Tx	V	46	17	64 / 0	**22.98**
		Mid	27925.02	DFT-s-OFDM	QPSK	19+147	H+V	2Tx	V	59	19	64 / 0	23.62
				CP-OFDM	QPSK	19+147	H+V	MIMO	V	59	19	66 / 0	21.54
				DFT-s-OFDM	π/2 BPSK	19+147	H+V	2Tx	V	59	19	64 / 0	**23.69**
				DFT-s-OFDM	16QAM	19+147	H+V	2Tx	V	59	19	1 / 33	22.68
				DFT-s-OFDM	64QAM	19+147	H+V	2Tx	V	59	19	1 / 24	21.36
		High	28150.02	DFT-s-OFDM	π/2 BPSK	19+147	H+V	2Tx	V	50	17	64 / 0	**23.38**

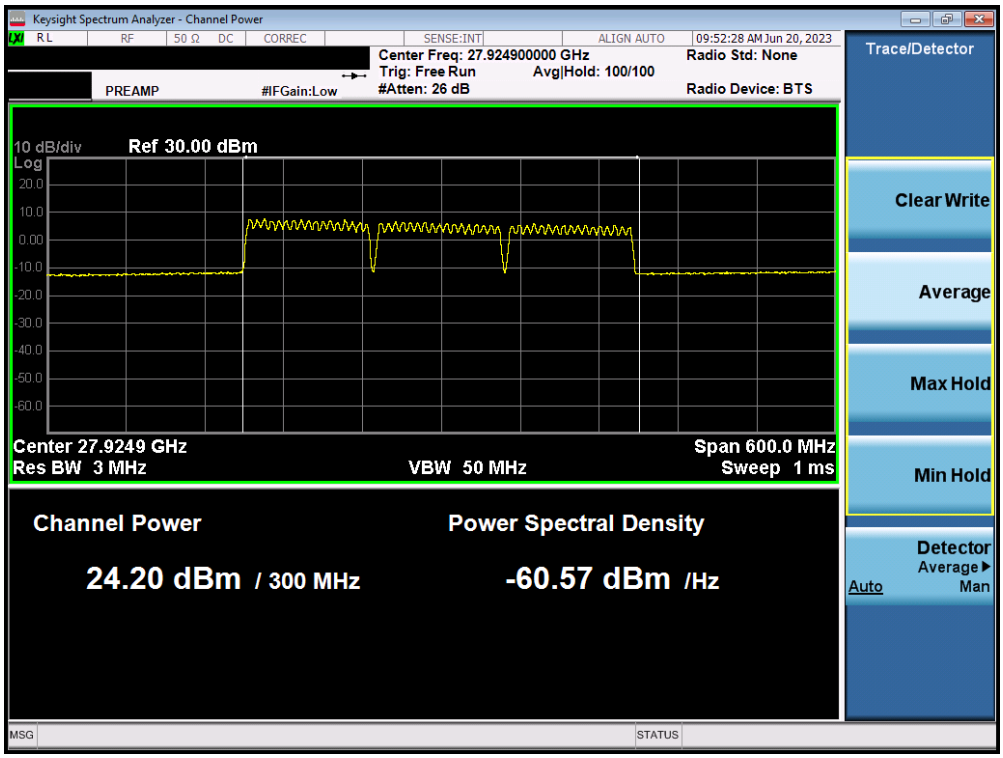
Table 7-11.EIRP Data (Band n261 - 100MHz)



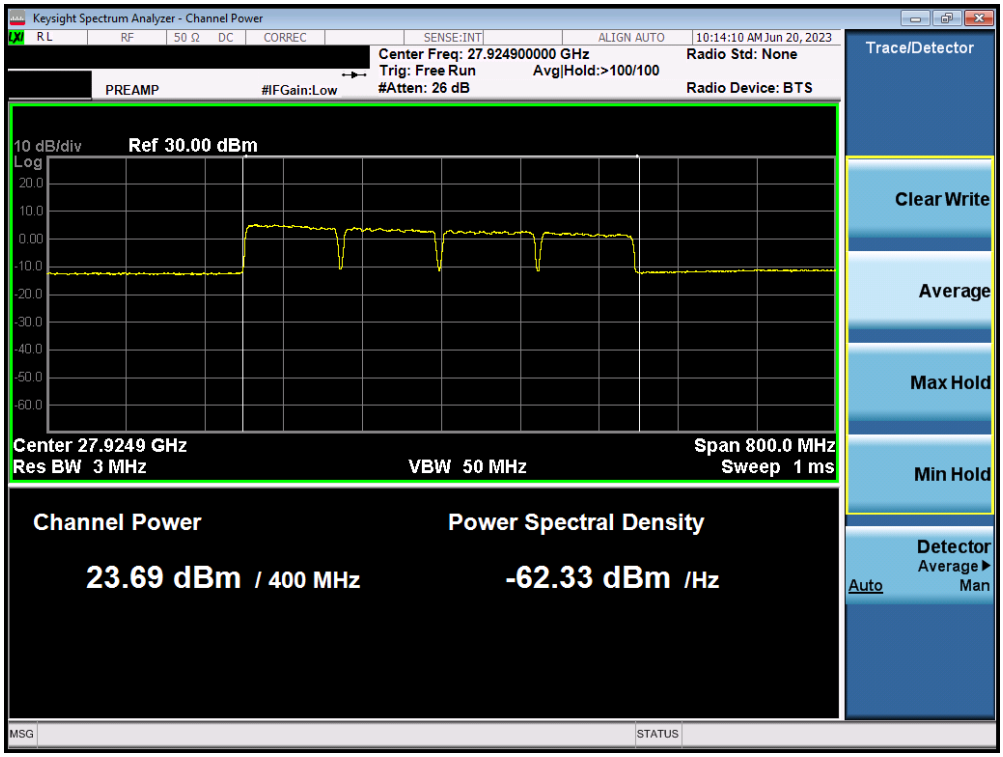
Plot 7-77.EIRP Plot (Band n261 − 100MHz-1CC Mid Channel DFT-s-OFDM QPSK)



Plot 7-78.EIRP Plot (Band n261 − 100MHz-2CC Mid Channel DFT-s-OFDM π/2 BPSK)



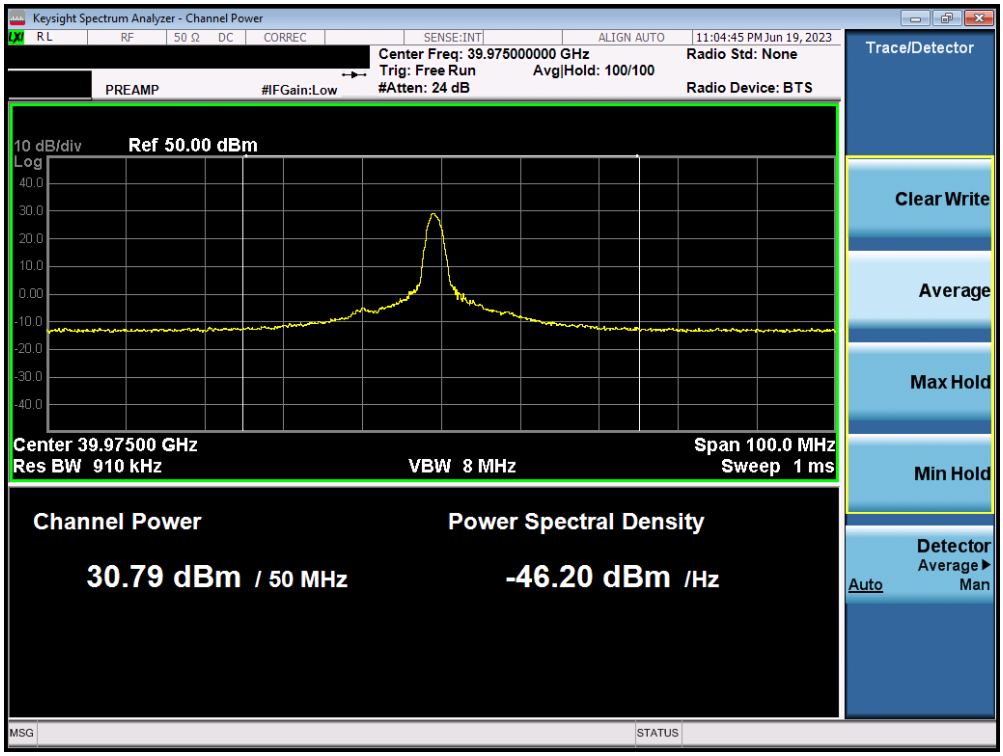
Plot 7-79. EIRP Plot (Band n261 − 100MHz-3CC Mid Channel DFT-s-OFDM π/2 BPSK)



Plot 7-80.EIRP Plot (Band n261 − 100MHz-4CC Mid Channel DFT-s-OFDM π/2 BPSK)

Bandwidth [MHz]	CCs Active	Channel	Frequency [MHz]	Transmission Scheme	Modulation	Beam ID	Beam Pol.	Ant. Div.	Ant. Pol. [H/V]	Positioner Roll [degrees]	Turntable Azimuth [degrees]	RB Size/Offsets	EIRP [dBm]
50	1	Low	37025.04	DFT-s-OFDM	QPSK	18+146	H + V	2Tx	H	333	16.9	1 / 19	**28.04**
				DFT-s-OFDM	π/2 BPSK	18+146	H + V	2Tx	H	333	16.9	1 / 19	**27.88**
		Mid	38499.96	DFT-s-OFDM	QPSK	18+146	H + V	2Tx	H	326	17.1	1 / 12	**29.41**
				DFT-s-OFDM	QPSK	142	H	SISO	H	99	28.6	1 / 19	28.70
				DFT-s-OFDM	QPSK	14	V	SISO	V	283	337.6	1 / 19	29.11
				CP-OFDM	QPSK	18+146	H + V	MIMO	H	326	17.1	1 / 12	28.33
				CP-OFDM	QPSK	142	H	SISO	H	99	28.6	1 / 19	25.64
				CP-OFDM	QPSK	14	V	SISO	V	283	337.6	1 / 19	25.92
				DFT-s-OFDM	π/2 BPSK	18+146	H + V	2Tx	H	326	17.1	1 / 16	29.22
		High	39975.00	DFT-s-OFDM	QPSK	18+146	H + V	2Tx	H	327	16.2	1 / 16	30.45
				DFT-s-OFDM	QPSK	147	H	SISO	H	99	31.2	1 / 12	28.07
				CP-OFDM	QPSK	18+146	H + V	MIMO	H	327	16.2	1 / 16	27.46
				DFT-s-OFDM	π/2 BPSK	18+146	H + V	2Tx	H	327	16.2	1 / 16	**30.79**
				DFT-s-OFDM	16QAM	18+146	H + V	2Tx	H	327	16.2	1 / 16	28.72
				DFT-s-OFDM	64QAM	18+146	H + V	2Tx	H	327	16.2	1 / 16	26.51

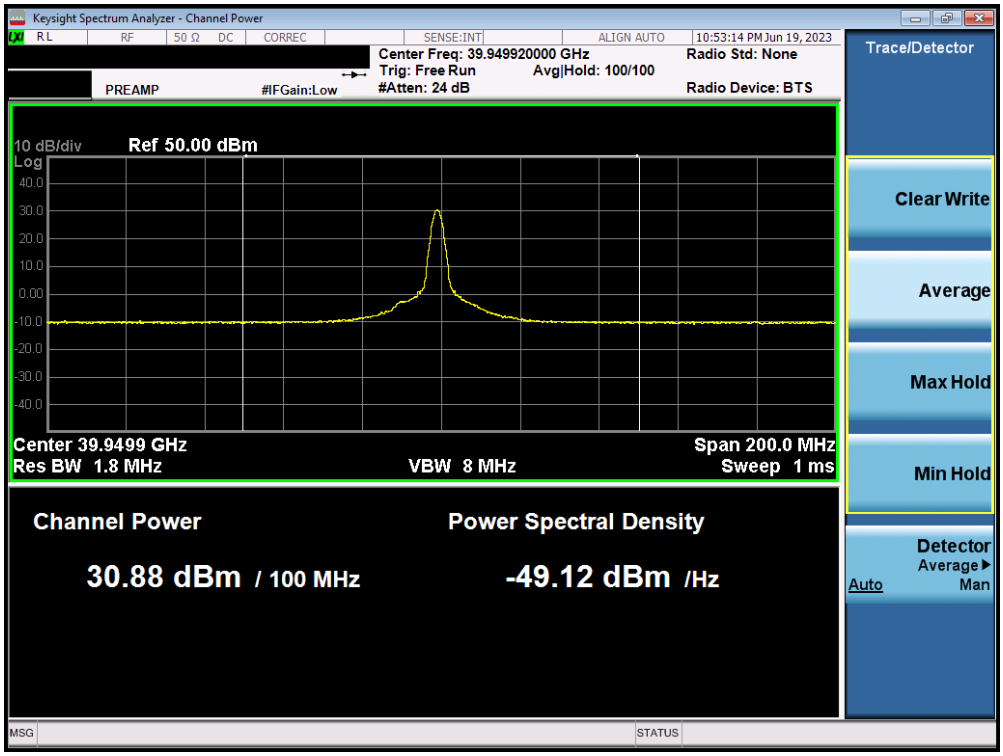
Table 7-12. EIRP Data (Band n260 - 50MHz)



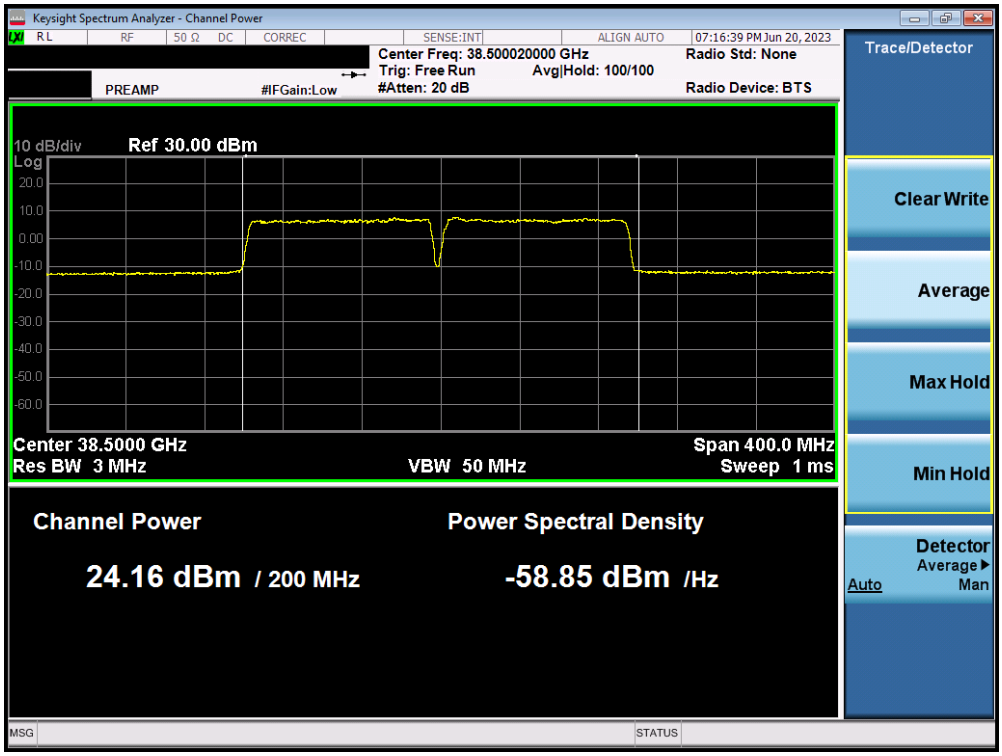
Plot 7-81.EIRP Plot (Band n260 − 50MHz-1CC High Channel DFT-s-OFDM π/2 BPSK)

Bandwidth [MHz]	CCs Active	Channel	Frequency [MHz]	Transmission Scheme	Modulation	Beam ID	Beam Pol.	Ant. Div.	Ant. Pol. [H/V]	Positioner Roll [degrees]	Turntable Azimuth [degrees]	RB Size/Offsets	EIRP [dBm]
100	1	Low	37050.00	DFT-s-OFDM	π/2 BPSK	18+146	H + V	2Tx	H	332	17.2	1 / 33	**28.21**
		Mid	38499.96	DFT-s-OFDM	QPSK	142	H	SISO	V	97	28.6	1 / 33	28.48
				DFT-s-OFDM	QPSK	14	V	SISO	H	283	338.2	1 / 33	28.92
				CP-OFDM	QPSK	142	H	SISO	V	97	28.6	1 / 33	25.28
				CP-OFDM	QPSK	14	V	SISO	H	283	338.2	1 / 33	25.79
				DFT-s-OFDM	π/2 BPSK	18+146	H + V	2Tx	H	333	17.1	1 / 23	**29.26**
		High	39949.92	DFT-s-OFDM	QPSK	18+146	H + V	2Tx	H	327	16.7	1 / 33	30.80
				CP-OFDM	QPSK	18+146	H + V	MIMO	H	327	16.7	1 / 42	27.73
				DFT-s-OFDM	π/2 BPSK	18+146	H + V	2Tx	H	327	16.7	1 / 33	**30.88**
				DFT-s-OFDM	16QAM	18+146	H + V	2Tx	H	327	16.7	1 / 42	28.36
				DFT-s-OFDM	64QAM	18+146	H + V	2Tx	H	327	16.7	1 / 42	27.08
100+100	2	Low	37099.98	DFT-s-OFDM	QPSK	18+146	H + V	2Tx	H	333	17.8	64 / 0	**21.60**
		Mid	38500.02	DFT-s-OFDM	QPSK	18+146	H + V	2Tx	H	335	17.7	64 / 0	**24.16**
				CP-OFDM	QPSK	18+146	H + V	MIMO	H	335	17.7	66 / 0	22.52
				DFT-s-OFDM	π/2 BPSK	18+146	H + V	2Tx	H	335	17.7	64 / 0	24.14
				DFT-s-OFDM	16QAM	18+146	H + V	2Tx	H	335	17.7	64 / 0	22.47
				DFT-s-OFDM	64QAM	18+146	H + V	2Tx	H	335	17.7	64 / 0	20.75
		High	39899.94	DFT-s-OFDM	QPSK	18+146	H + V	2Tx	H	329	17.1	64 / 0	**24.03**
100+100+100	3	Low	37149.96	DFT-s-OFDM	QPSK	18+146	H + V	2Tx	H	334	16.9	1 / 33	**21.65**
		Mid	38499.96	DFT-s-OFDM	QPSK	18+146	H + V	2Tx	H	335	17.0	64 / 0	**24.14**
				CP-OFDM	QPSK	18+146	H + V	MIMO	H	335	17.0	66 / 0	22.56
				DFT-s-OFDM	π/2 BPSK	18+146	H + V	2Tx	H	335	17.0	64 / 0	24.13
				DFT-s-OFDM	16QAM	18+146	H + V	2Tx	H	335	17.0	64 / 0	22.59
				DFT-s-OFDM	64QAM	18+146	H + V	2Tx	H	335	17.0	64 / 0	20.79
		High	39849.96	DFT-s-OFDM	QPSK	18+146	H + V	2Tx	H	335	16.6	64 / 0	**24.02**
100+100+100+100	4	Low	37199.94	DFT-s-OFDM	QPSK	18+146	H + V	2Tx	H	328	17.5	64 / 0	**21.34**
		Mid	38500.02	DFT-s-OFDM	QPSK	18+146	H + V	2Tx	H	333	17.3	1 / 23	**24.37**
				CP-OFDM	QPSK	18+146	H + V	MIMO	H	333	17.3	1 / 23	24.24
				DFT-s-OFDM	π/2 BPSK	18+146	H + V	2Tx	H	333	17.3	1 / 23	24.33
				DFT-s-OFDM	16QAM	18+146	H + V	2Tx	H	333	17.3	1 / 23	24.15
				DFT-s-OFDM	64QAM	18+146	H + V	2Tx	H	333	17.3	1 / 23	22.75
		High	39799.98	DFT-s-OFDM	QPSK	18+146	H + V	2Tx	H	331	17.0	64 / 0	**23.90**

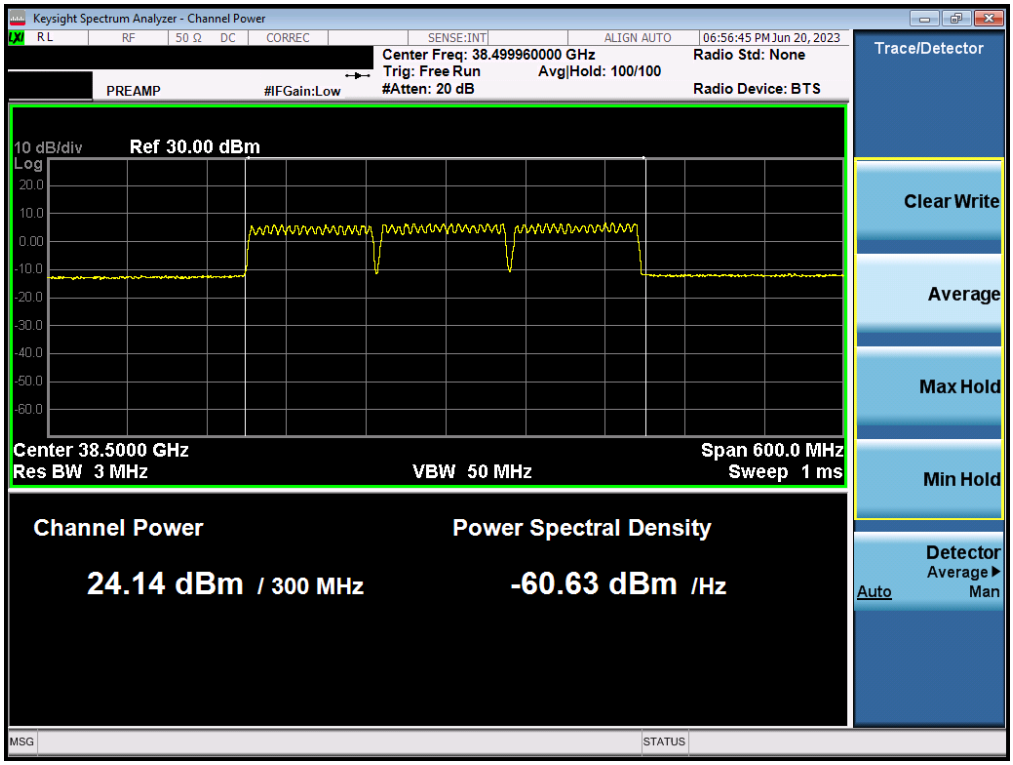
Table 7-13.EIRP Data (Band n260 - 100MHz)



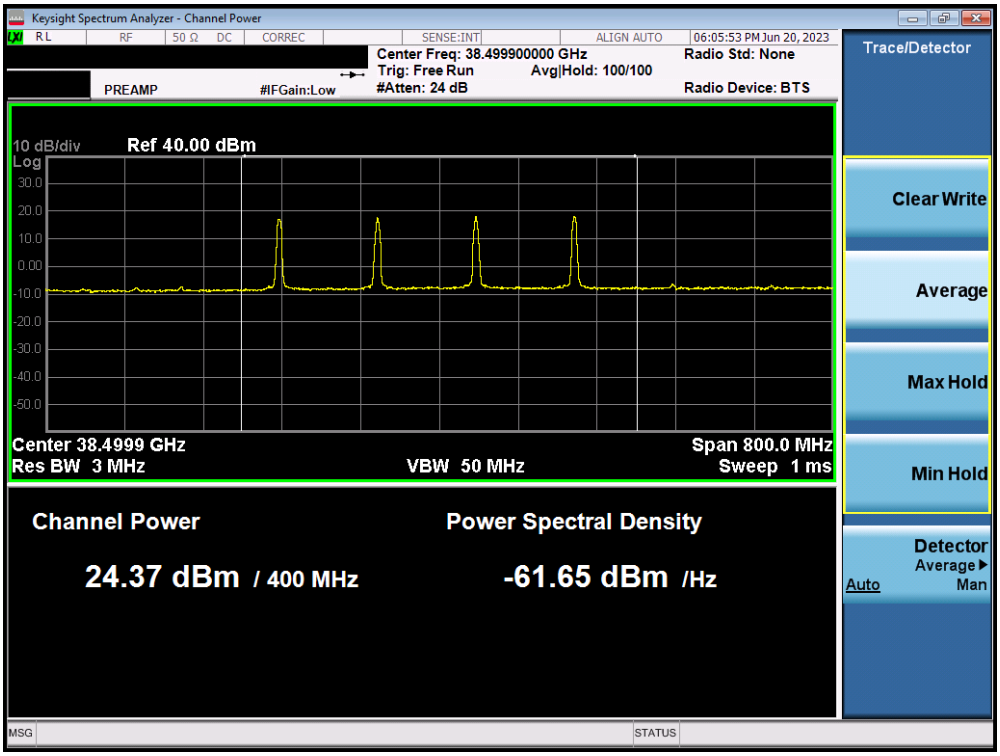
Plot 7-82.EIRP Plot (Band n260 − 100MHz-1CC High Channel DFT-s-OFDM π/2 BPSK)



Plot 7-83.EIRP Plot (Band n260 − 100MHz-2CC Mid Channel DFT-s-OFDM QPSK)



Plot 7-84.EIRP Plot (Band n260 − 100MHz-3CC Mid Channel DFT-s-OFDM QPSK)



Plot 7-85.EIRP Plot (Band n260 − 100MHz-4CC Mid Channel DFT-s-OFDM QPSK)

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 (see Table 3-1).

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

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

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

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

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

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 45.49dB/m, a cable loss of 8.53dB, and a measurement distance of 1 meter, an offset level of:

Offset Level = 45.49dB/m + 8.53dB + 20 Log(1 meter) + 107 - 104.8 = 56.22 dB

shall be loaded into the spectrum analyzer.

7.4 Radiated Spurious and Harmonic Emissions

§2.1051, §30.203

Test Overview

The spectrum is scanned from 30MHz to 100GHz for n258-R1, n258-R2, and n261. For n260, the spectrum is scanned from 30MHz to 200GHz. 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 n258/n261 and 200GHz for n260. Several plots are used to show investigations in this entire span.
2. Detector = RMS
3. Trace mode = trace average
4. Sweep time = auto couple
5. Number of sweep points ≥ 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) 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.

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

4) The plots from 1-200GHz show corrected average EIRP levels. 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.

5) Emissions below 18GHz were measured at a 3 meter test distance, while emissions above 18GHz were measured at the appropriate far field distance. The far field of the mmWave signal is based on formula: R > 2D^2/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 7-14. Far-Field Distance & Measurement Distance per Frequency Range

6) 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.

7) All RSE's were measured with 1CC. It was determined that adding more CC's causes the overall amplitude of just 1CC to decrease, therefore, 1CC is the worst case for the purposes of spurious emissions measurements.

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

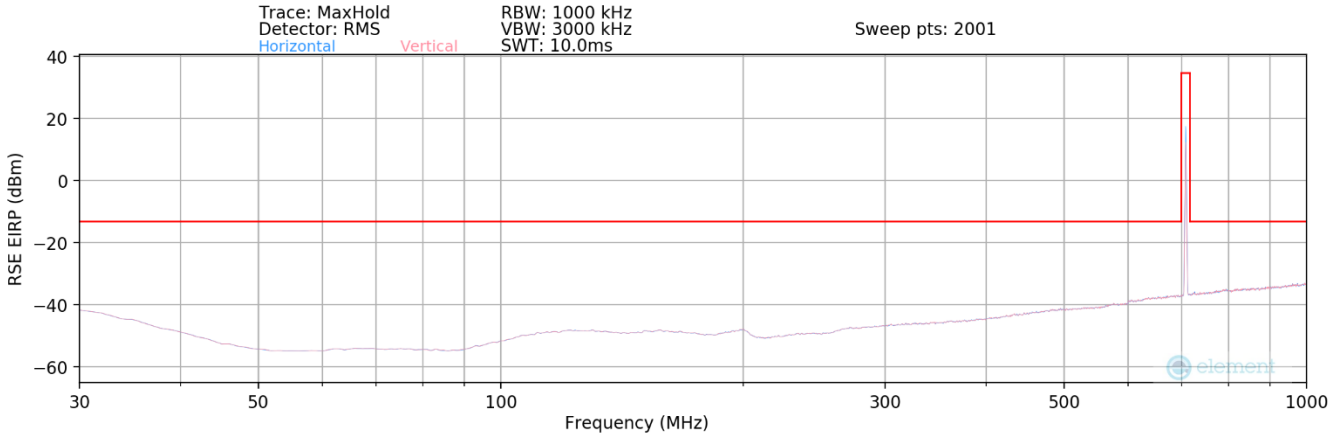
9) All RSE’s were investigated in EN-DC mode and with 802.11 chipset active. It was determined that there is no new emission introduced by EN-DC mode, or the 802.11 chipset. For EN-DC mode, n261 uses LTE B2, B4, B5, B12, B13, B48 and B66, n260 uses LTE B2, B14, B5, B12, B13, B30, B48 and B66 and n258 uses LTE B2, B5, B12, B14, B30, and B66.

10) Additionally, this device supports anchor bands operating in FR1 spectrum. The n261 band uses NR Bands n2, n5, n25, n41, n48, n66 and n77. The n260 band uses NR Bands n2, n5, n12, n25, n30, n41, n48, n66 and n77. The n258 band uses NR Bands NR n2, n5, n12, n25, n30, n41, n66 and n77 as anchor bands.

11) LTE and FR1 anchor bands supports default configuration and Tx hopping configuration. Both configurations were investigated. There was no discernible difference in the spurious emission levels when using different LTE and NR FR1 anchor bands. Thus, LTE Band 12 was used as a representative anchor band for EN-DC and NR-DC investigations.

Band n258-R1

30MHz - 1GHz



Plot 7-86.n258-R1 Radiated Spurious Plot – EN-DC Anchor LTE Band 12

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)

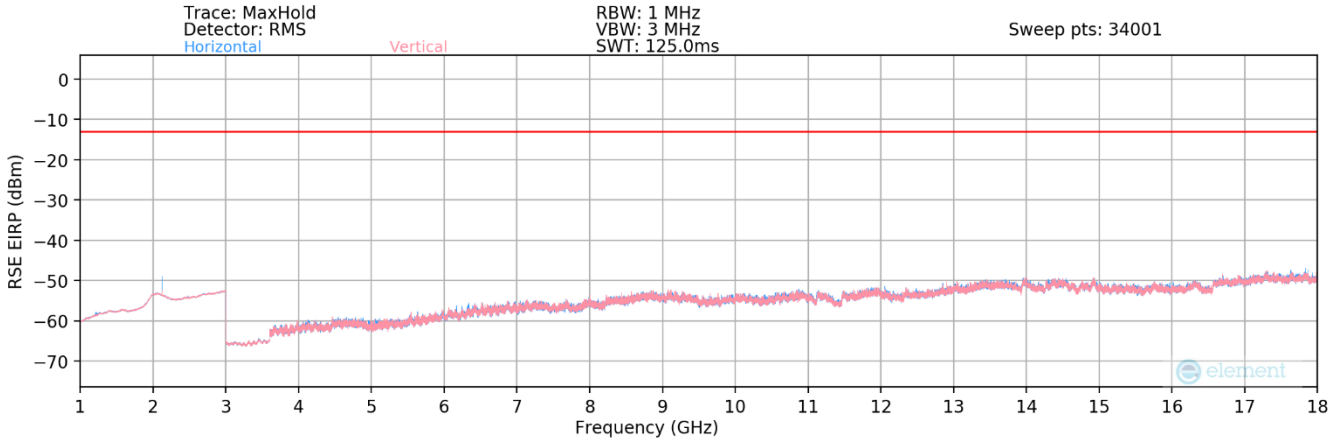
Frequency [MHz]	Channnel	Bandwidth (MHz)	EUT Beam Pol.	Modulation	Antenna Polarization [H/V]	Antenna Height [cm]	Turntable Azimuth [degrees]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
484.70	Low	50	2Tx	QPSK	H	-	-	-51.81	-13.00	-38.81
554.00	Mid	50	2Tx	QPSK	H	-	-	-51.65	-13.00	-38.65
591.60	High	50	2Tx	QPSK	H	-	-	-50.50	-13.00	-37.50

Table 7-15.n258-R1 Radiated 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.

1GHz - 18GHz



Plot 7-87.n258-R1 Radiated Spurious Plot – EN-DC Anchor LTE Band 12

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

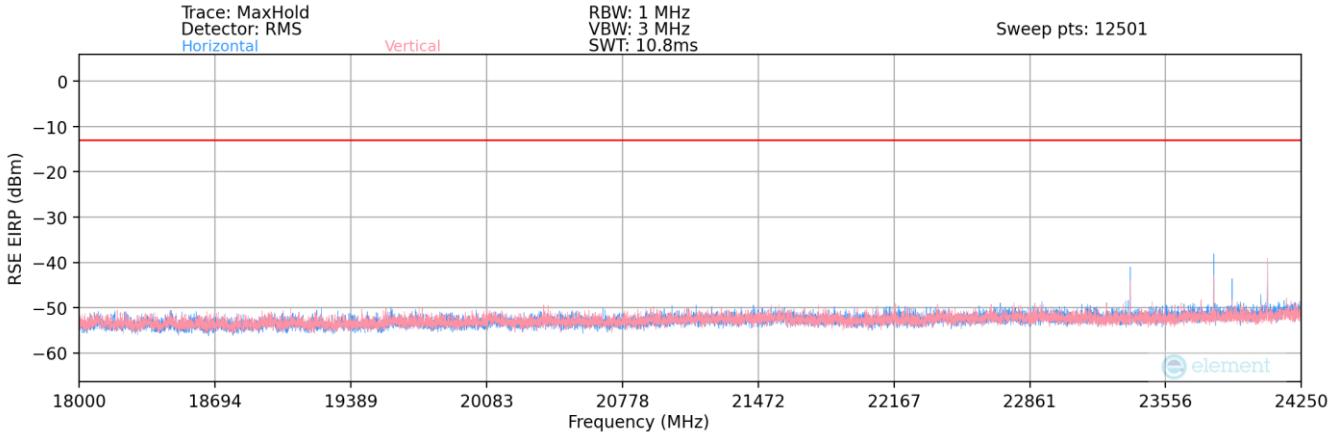
Frequency [MHz]	Channnel	Bandwidth (MHz)	EUT Beam Pol.	Modulation	Antenna Polarization [H/V]	Antenna Height [cm]	Turntable Azimuth [degrees]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
17907.54	Low	50	2Tx	QPSK	H	-	-	-53.05	-13.00	-40.05
2122.50	Mid	50	2Tx	QPSK	H	138	181	-48.89	-13.00	-35.89
17982.54	Mid	50	2Tx	QPSK	H	-	-	-52.59	-13.00	-39.59
17990.00	High	50	2Tx	QPSK	H	-	-	-52.49	-13.00	-39.49

Table 7-16.n258-R1 Radiated Spurious Emissions Table (1GHz - 18GHz)

Notes

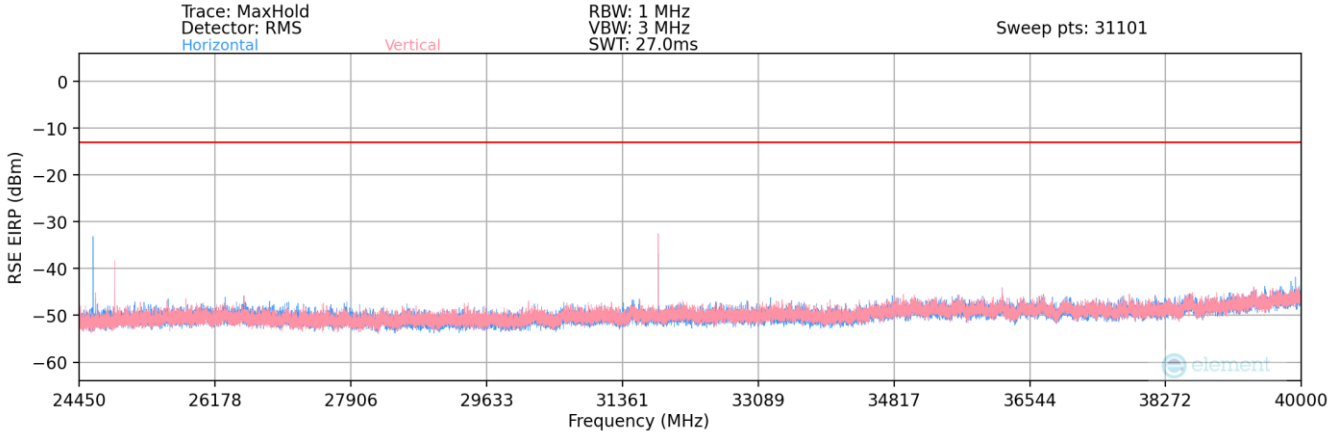
The RSE EIRP level is taken directly from the spectrum analyzer which includes the appropriate antenna factors, and cable losses. Measurements were performed at a test distance of 3 meter.

18GHz-24.25GHz



Plot 7-88. n258-R1 Radiated Spurious Plot

24.45GHz-40GHz



Plot 7-89.n258-R1 Radiated Spurious Plot

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

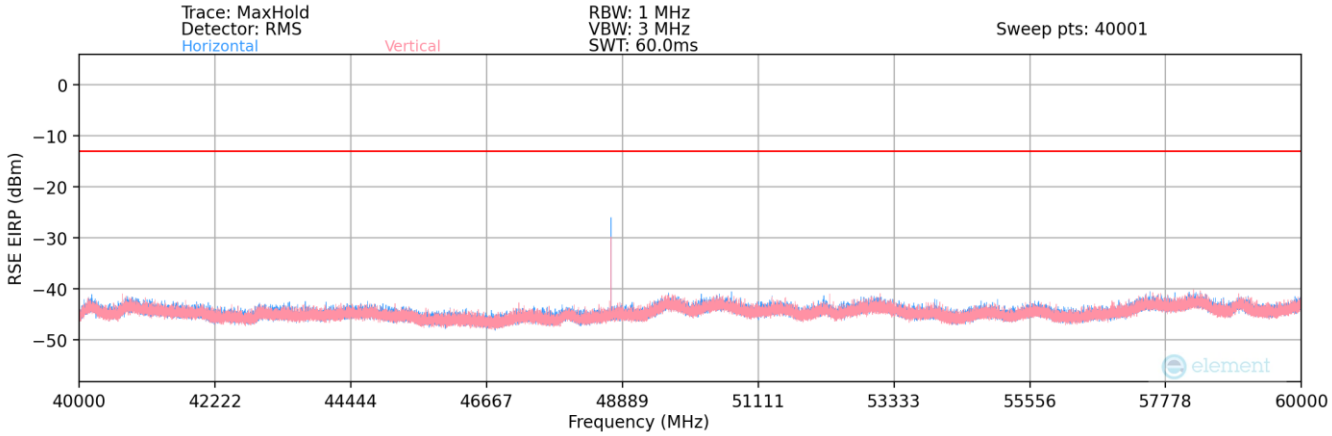
Frequency [MHz]	Channnel	Bandwidth (MHz)	EUT Beam Pol.	Modulation	Antenna Polarization [H/V]	Antenna Height [cm]	Turntable Azimuth [degrees]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
23450.00	Low	50	2Tx	QPSK	V	150	285	-43.10	-13.00	-30.10
24550.40	Low	50	2Tx	QPSK	V	150	282	-39.10	-13.00	-26.10
24824.00	Low	50	2Tx	QPSK	V	150	312	-40.19	-13.00	-27.19
23802.00	Mid	50	2Tx	QPSK	H	150	353	-42.83	-13.00	-29.83
24657.67	Mid	50	2Tx	QPSK	H	150	12	-43.11	-13.00	-30.11
24899.50	Mid	50	2Tx	QPSK	V	150	308	-39.68	-13.00	-26.68
31817.00	Mid	50	2Tx	QPSK	V	150	91	-33.42	-13.00	-20.42
24151.50	High	50	2Tx	QPSK	H	150	10	-36.22	-13.00	-23.22
24700.50	High	50	2Tx	QPSK	H	150	36	-32.73	-13.00	-19.73
24974.50	High	50	2Tx	QPSK	H	150	332	-33.46	-13.00	-20.46

Table 7-17.n258-R1 Radiated 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 test distance of 1 meter.

40GHz - 60GHz



Plot 7-90.n258-R1 Radiated Spurious Plot

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]

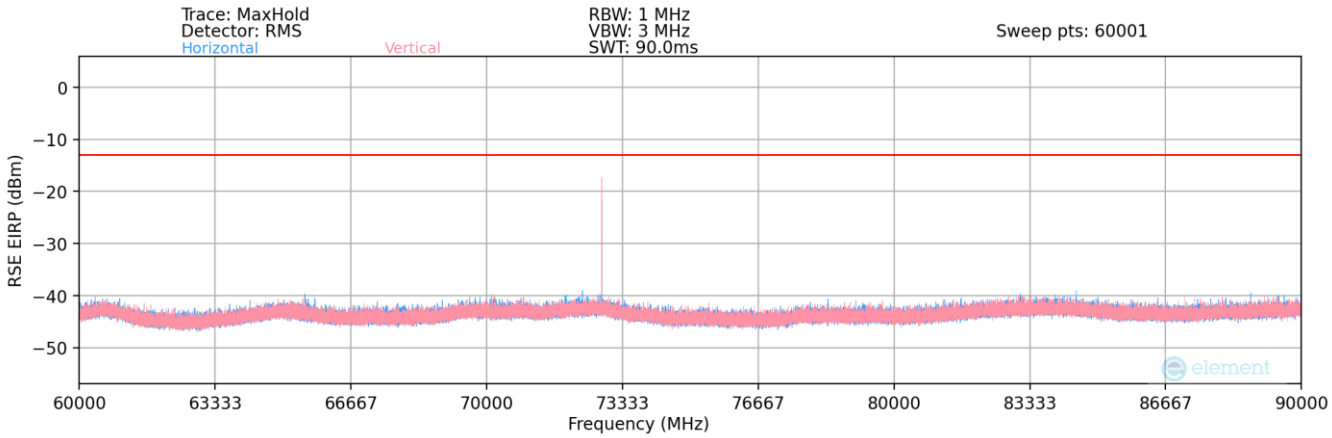
Frequency [MHz]	Channnel	Bandwidth (MHz)	EUT Beam Pol.	Modulation	Antenna Polarization [H/V]	Antenna Height [cm]	Turntable Azimuth [degrees]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
48550.94	Low	50	2Tx	QPSK	H	244	209	-26.93	-13.00	-13.93
48701.53	Mid	50	2Tx	QPSK	H	341	211	-26.62	-13.00	-13.62
48850.64	High	50	2Tx	QPSK	V	24	33	-27.44	-13.00	-14.44

Table 7-18.n258-R1 Radiated 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.

60GHz - 90GHz



Plot 7-91.n258-R1 Radiated Spurious Plot

Spurious Emissions EIRP Sample Calculation (n258-R1)

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

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

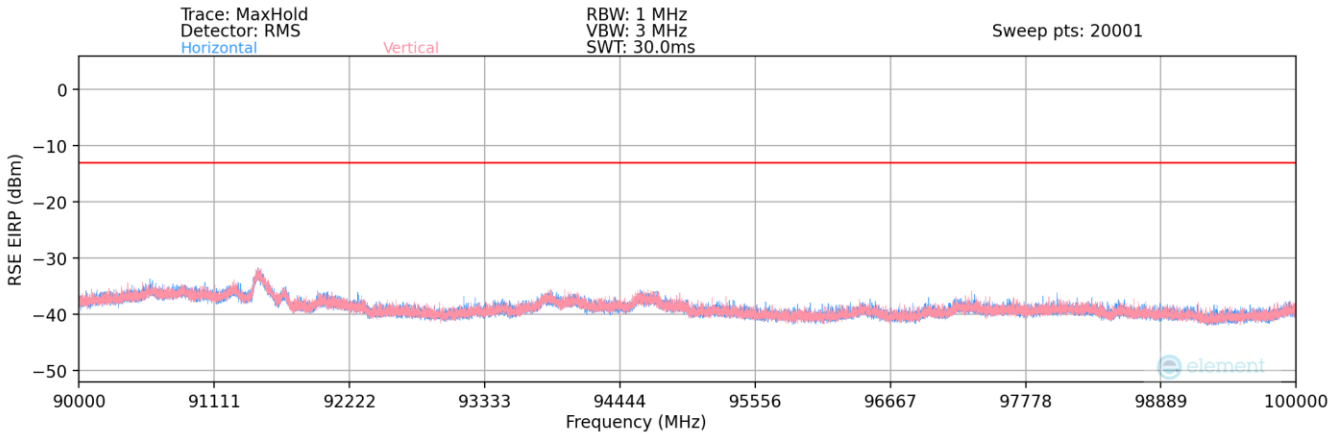
Frequency [MHz]	Channnel	Bandwidth (MHz)	EUT Beam Pol.	Modulation	Antenna Polarization [H/V]	Positioner Roll [degrees]	Turntable Azimuth [degrees]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
72827.96	Low	50	2Tx	QPSK	V	9	177	-17.06	-13.00	-4.06
73051.03	Mid	50	2Tx	QPSK	V	19	179	-16.99	-13.00	-3.99
73276.76	High	50	2Tx	QPSK	V	0	179	-21.83	-13.00	-8.83

Table 7-19. Ant-1n258-R1 Radiated Spurious Emissions Table (60GHz - 90GHz)

Notes

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

90GHz - 100GHz



Plot 7-92.n258-R1 Radiated Spurious Plot

Spurious Emissions EIRP Sample Calculation (n258-R1)

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

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

Frequency [MHz]	Channnel	Bandwidth (MHz)	EUT Beam Pol.	Modulation	Antenna Polarization [H/V]	Positioner Roll [degrees]	Turntable Azimuth [degrees]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
95999.00	Low	50	2Tx	QPSK	V	-	-	-45.80	-13.00	-32.80
96495.00	Mid	50	2Tx	QPSK	V	-	-	-42.71	-13.00	-29.71
97265.00	High	50	2Tx	QPSK	V	-	-	-44.03	-13.00	-31.03

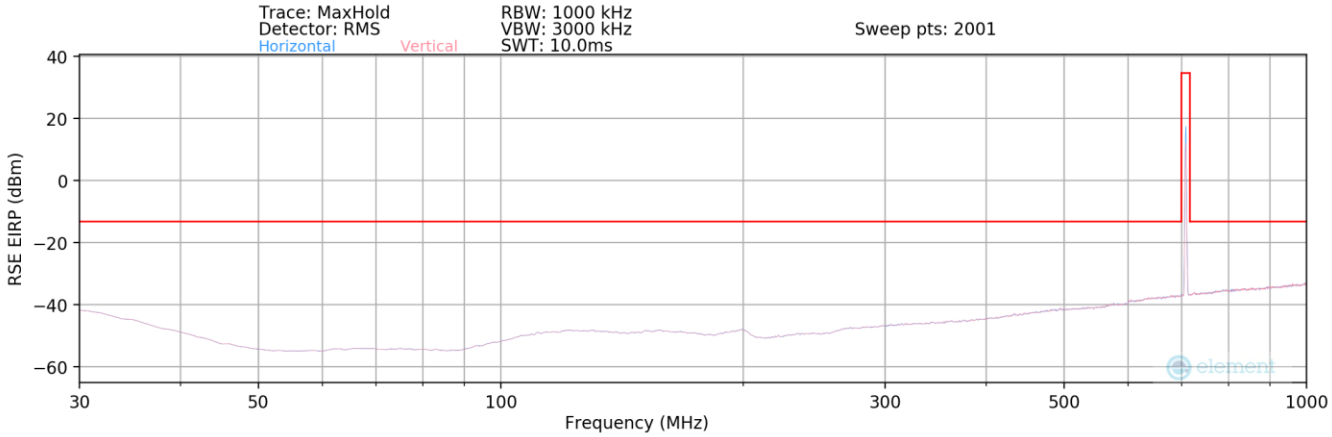
Table 7-20.n258-R1 Radiated Spurious Emissions table (90GHz-100GHz)

Notes

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

Band n258-R2

30MHz - 1GHz



Plot 7-93.n258-R2 Radiated Spurious Plot – EN-DC Anchor LTE Band 12

Spurious Emissions ERP Sample Calculation (n258-R2)

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)

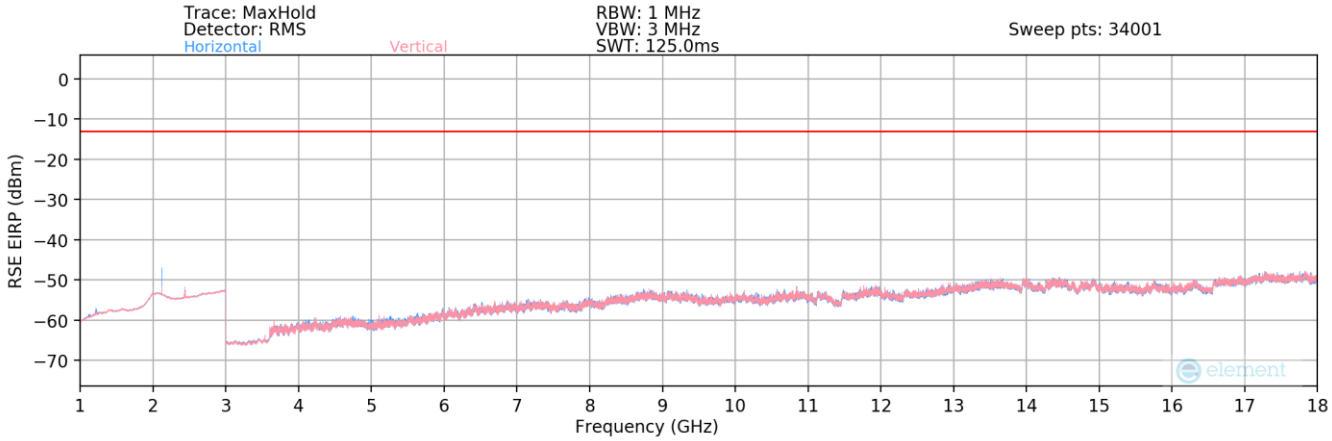
Frequency [MHz]	Channnel	Bandwidth (MHz)	EUT Beam Pol.	Modulation	Antenna Polarization [H/V]	Antenna Height [cm]	Turntable Azimuth [degrees]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
272.00	Low	50	2Tx	QPSK	H	-	-	-57.18	-13.00	-44.18
281.00	Mid	50	2Tx	QPSK	H	-	-	-57.27	-13.00	-44.27
330.00	High	50	2Tx	QPSK	H	-	-	-56.32	-13.00	-43.32

Table 7-21.n258-R2 Radiated 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.

1GHz - 18GHz



Plot 7-94.n258-R2 Radiated Spurious Plot – EN-DC Anchor LTE Band 12

Spurious Emissions EIRP Sample Calculation (n258-R2)

The raw radiated spurious level is converted to field strength in dBuV/m. Then, the RSE EIRP level is calculated by applying the additional factors shown below for a test distance of 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]	Antenna Height [cm]	Turntable Azimuth [degrees]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
10868.70	Low	50	2Tx	QPSK	H	-	-	-56.99	-13.00	-43.99
2123.00	Mid	50	2Tx	QPSK	H	151	187	-46.90	-13.00	-33.90
10983.00	Mid	50	2Tx	QPSK	H	-	-	-56.89	-13.00	-43.89
11047.12	High	50	2Tx	QPSK	H	-	-	-56.45	-13.00	-43.45

Table 7-22.n258-R2 Radiated 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.