PCTEST
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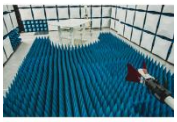

MEASUREMENT REPORT
FCC Part 30 5G mmWave

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

Date of Testing:
04/19/2021-06/04/2021
Test Site/Location:
PCTEST Lab. Columbia, MD, USA
Test Report Serial No.:
1M2104070032-08.A3L

FCC ID:	**A3LSMF711U**
APPLICANT:	**Samsung Electronics Co., Ltd.**

Application Type:	Certification
Model:	SM-F711U
Additional Model(s):	SM-F711U1
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.

Randy Ortanez
President

ACCREDITED
CERT #2041.01

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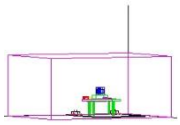
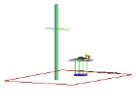


MEASUREMENT REPORT
FCC Part 30



Band	Antenna	Bandwidth [MHz]	Tx Frequency [MHz]	CCs Active	Mode	Modulation	EIRP		Emission Designator
							Max Power [W]	Max Power [dBm]	
n261	Ant1	50	27525 - 28325	1	SISO	QPSK	0.380	25.80	-
					2Tx	QPSK	0.879	29.44	-
					2Tx	π/2 BPSK	0.883	**29.46**	-
					2Tx	16QAM	0.622	27.94	-
					2Tx	64QAM	0.333	25.23	-
					2Tx (Closed)	QPSK	0.581	27.64	-
				2	2Tx	QPSK	0.303	24.82	-
					2Tx	π/2 BPSK	0.301	24.79	-
					2Tx	16QAM	0.216	23.35	-
					2Tx	64QAM	0.127	21.04	-
		100	27550 - 28300	1	SISO	QPSK	0.437	26.40	-
					2Tx	QPSK	0.938	**29.72**	-
					2Tx	π/2 BPSK	0.925	29.66	-
					2Tx	16QAM	0.596	27.75	-
					2Tx	64QAM	0.347	25.40	-
					2Tx (Closed)	QPSK	0.587	27.69	-
				2	2Tx	QPSK	0.289	24.61	-
					2Tx	π/2 BPSK	0.288	24.60	-
					2Tx	16QAM	0.211	23.25	-
					2Tx	64QAM	0.129	21.10	-
n261	Ant2	50	27525 - 28325	1	SISO	QPSK	0.951	29.78	45M5G7D
					2Tx	QPSK	1.009	30.04	45M5G7D
					2Tx	π/2 BPSK	1.067	**30.28**	45M4G7D
					2Tx	16QAM	0.624	27.95	45M2W7D
					2Tx	64QAM	0.375	25.74	45M3W7D
					2Tx (Closed)	QPSK	0.740	28.69	-
				2	2Tx	QPSK	0.480	26.81	94M5G7D
					2Tx	π/2 BPSK	0.473	26.75	95M0G7D
					2Tx	16QAM	0.330	25.19	94M8W7D
					2Tx	64QAM	0.214	23.30	94M7W7D
		100	27550 - 28300	1	SISO	QPSK	0.973	29.88	93M5G7D
					2Tx	QPSK	1.016	30.07	93M5G7D
					2Tx	π/2 BPSK	1.081	**30.34**	90M4G7D
					2Tx	16QAM	0.658	28.18	93M4W7D
					2Tx	64QAM	0.397	25.99	93M0W7D
					2Tx (Closed)	QPSK	0.807	29.07	-
				2	2Tx	QPSK	0.419	26.22	191MG7D
					2Tx	π/2 BPSK	0.414	26.17	192MG7D
					2Tx	16QAM	0.296	24.72	192MW7D
					2Tx	64QAM	0.184	22.65	192MW7D

EUT Overview (Band n261)

Band	Antenna	Bandwidth [MHz]	Tx Frequency [MHz]	CCs Active	Mode	Modulation	EIRP		Emission Designator
							Max Power [W]	Max Power [dBm]	
n260	Ant1	50	37025 - 39975	1	SISO	QPSK	0.525	27.20	45M6G7D
					2Tx	QPSK	0.849	**29.29**	45M6G7D
					2Tx	π/2 BPSK	0.713	28.53	45M0G7D
					2Tx	16QAM	0.436	26.39	45M4W7D
					2Tx	64QAM	0.277	24.43	45M3W7D
					2Tx (Closed)	QPSK	0.681	28.33	-
				2	2Tx	QPSK	0.484	26.85	94M7G7D
					2Tx	π/2 BPSK	0.481	26.82	94M4G7D
					2Tx	16QAM	0.357	25.53	95M2W7D
					2Tx	64QAM	0.219	23.40	94M4W7D
		100	37050 - 39950	1	SISO	QPSK	0.545	27.36	93M2G7D
					2Tx	QPSK	0.787	**28.96**	93M2G7D
					2Tx	π/2 BPSK	0.736	28.67	90M4G7D
					2Tx	16QAM	0.474	26.76	93M0W7D
					2Tx	64QAM	0.286	24.57	92M6W7D
					2Tx (Closed)	QPSK	0.499	26.98	-
				2	2Tx	QPSK	0.414	26.17	191MG7D
					2Tx	π/2 BPSK	0.412	26.15	189MG7D
					2Tx	16QAM	0.293	24.67	191MW7D
					2Tx	64QAM	0.182	22.61	191MW7D
n260	Ant2	50	37025 - 39975	1	SISO	QPSK	0.391	25.92	-
					2Tx	QPSK	0.511	**27.08**	-
					2Tx	π/2 BPSK	0.484	26.85	-
					2Tx	16QAM	0.282	24.50	-
					2Tx	64QAM	0.215	23.32	-
					2Tx (Closed)	QPSK	0.388	25.89	-
				2	2Tx	QPSK	0.254	24.04	-
					2Tx	π/2 BPSK	0.253	24.03	-
					2Tx	16QAM	0.161	22.06	-
					2Tx	64QAM	0.117	20.70	-
		100	37050 - 39950	1	SISO	QPSK	0.429	26.32	-
					2Tx	QPSK	0.550	**27.40**	-
					2Tx	π/2 BPSK	0.522	27.18	-
					2Tx	16QAM	0.305	24.85	-
					2Tx	64QAM	0.237	23.74	-
					2Tx (Closed)	QPSK	0.396	25.98	-
				2	2Tx	QPSK	0.295	24.70	-
					2Tx	π/2 BPSK	0.301	24.79	-
					2Tx	16QAM	0.208	23.18	-
					2Tx	64QAM	0.141	21.50	-

EUT Overview (Band n260)

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

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.

2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **Samsung Portable Handset FCC ID: A3LSMF711U**. 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 (K Patch) and Ant2 (L Patch). Each of the patch antennas is comprised of two separate antenna feeds - one for horizontal and one for vertical polarization. Only one array antenna can be active at a time.

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

Test Device Serial No.: 0842M,0843M

2.2 Device Capabilities

This device contains the following capabilities:

850/1900 CDMA/EvDO Rev0/A, 1x Advanced (BC0, BC1), 850/1900 GSM/GPRS/EDGE, 850/1700/1900 WCDMA/HSPA, Multi-band LTE, 5G NR (n71, n12, n5, n66, n2, n25, n30, n41, n77, n260, n261), 802.11b/g/n/ax WLAN, 802.11a/n/ac/ax UNII (5GHz), Bluetooth (1x, EDR, LE), NFC, Wireless Power Transfer

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 determine the worst case Beam ID for SISO operation and Beam ID pair for 2Tx (DFT-s-OFDM) and MIMO (CP-OFDM) operation. These Beam ID's were used for final measurements.

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

This device supports two configurations: one is with screen open and one is with screen closed. Both configurations are tested, and the worst case radiated emissions data is shown in this report.

2.4 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.

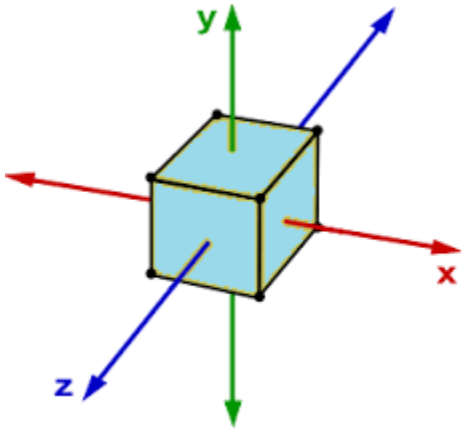


Figure 3-1. Rotation of the EUT Through Three Orthogonal Planes

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 & 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.

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
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
ETS-Lindgren	3116C	DRG Horn Antenna	5/11/2021	Biennial	5/11/2023	218893
Keysight Technologies	N9030A	50GHz PXA Signal Analyzer	1/20/2021	Annual	1/20/2022	US51350301
Megaphase	FAC mmWave	AP FAC mmWave 40GHz	3/3/2021	Annual	3/3/2022	20033003
Narda	180-442-KF	Wide Band Horn Antenna 18.0 - 40.0 GHz	9/14/2020	Annual	9/14/2021	2172481
OML Inc.	M05RH	WR-05 Horn Antenna, 24dBi, 140 to 220 GHz	10/31/2019	Biennial	10/31/2021	18073001
OML Inc.	M08RH	WR-08 Horn Antenna, 24dBi, 90 to 140 GHz	12/30/2018	Biennial	6/30/2021	18073001
OML Inc.	M12RH	WR-12 Horn Antenna, 24dBi, 60 to 90 GHz	12/30/2018	Biennial	6/30/2021	18073001
OML Inc.	M19RH	WR-19 Horn Antenna, 24dBi, 40 to 60 GHz	12/30/2018	Biennial	6/30/2021	18073001
Rohde & Schwarz	ESU40	EMI Test Receiver (40GHz)	5/25/2021	Annual	5/25/2022	100348
Rohde & Schwarz	FSW67	Signal / Spectrum Analyzer	8/10/2020	Annual	8/10/2021	103200
Sunol	DRH-118	Horn Antenna (1-18GHz)	10/3/2019	Biennial	10/3/2021	A050307
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	Annual	8/28/2021	SAX679
Virginia Diodes Inc	SAX680	SAX Module (60 - 90GHz)	8/14/2020	Annual	8/14/2021	SAX680
Virginia Diodes Inc	SAX681	SAX Module (90 - 140GHz)	10/22/2020	Annual	10/22/2021	SAX681
Virginia Diodes Inc	SAX682	SAX Module (140 - 220GHz)	9/24/2020	Annual	9/24/2021	SAX682
UTiFlex	UTiFlex	FAC mmWave UTiFlex 40GHz	3/3/2021	Annual	3/3/2022	234142-001

Table 5-1. Test Equipment

Notes:

1. For equipment listed above that has a calibration date or calibration due date that falls within the test date range, care was taken to ensure that this equipment was used after the calibration date and before the calibration due date.

6.0 SAMPLE CALCULATIONS

Emission Designator

QPSK Modulation

Emission Designator = 800MG7D

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

QAM Modulation

Emission Designator = 802MW7D

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

7.0 TEST RESULTS

7.1 Summary

Company Name: Samsung Electronics Co., Ltd.

FCC ID: A3LSMF711U

FCC Classification: Part 30 Mobile Transmitter (5GM)

Mode(s): TDD

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

Table 7-1. Summary of Radiated Test Results

Notes:

1) All modes of operation and modulations were investigated. The test results shown in the following sections represent the worst case emissions.
2) Per 2.1057(a)(2), spurious emissions were investigated up to 100GHz for n261 and up to 200GHz for n260.
3) 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.

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

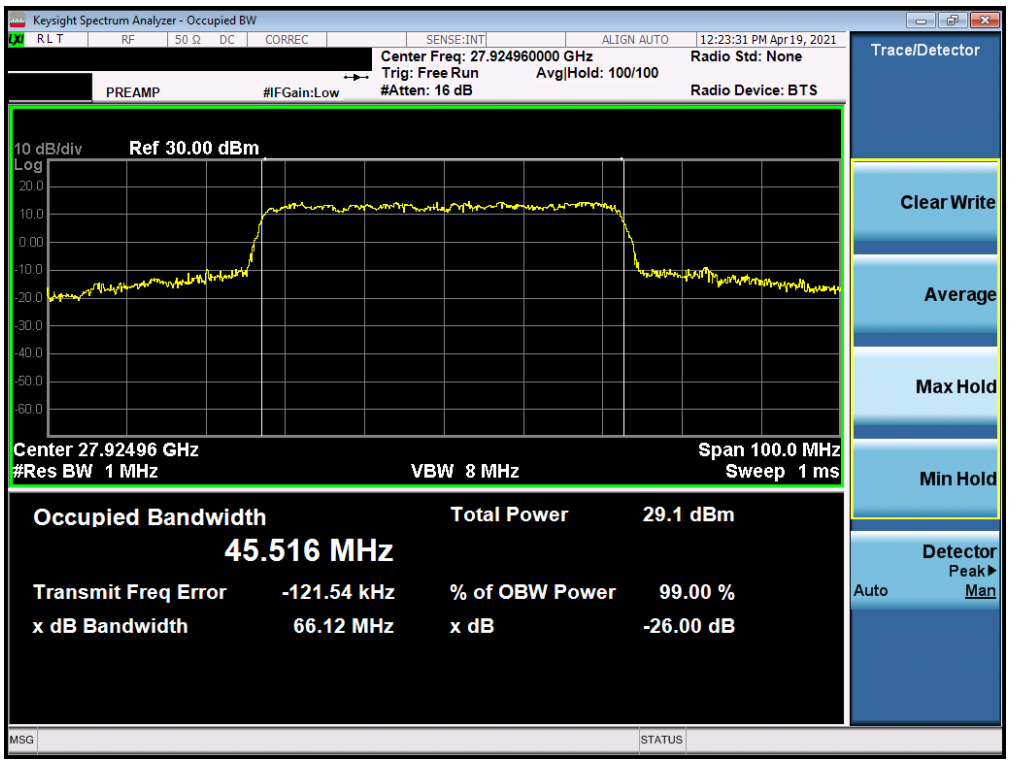
Test Notes

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.

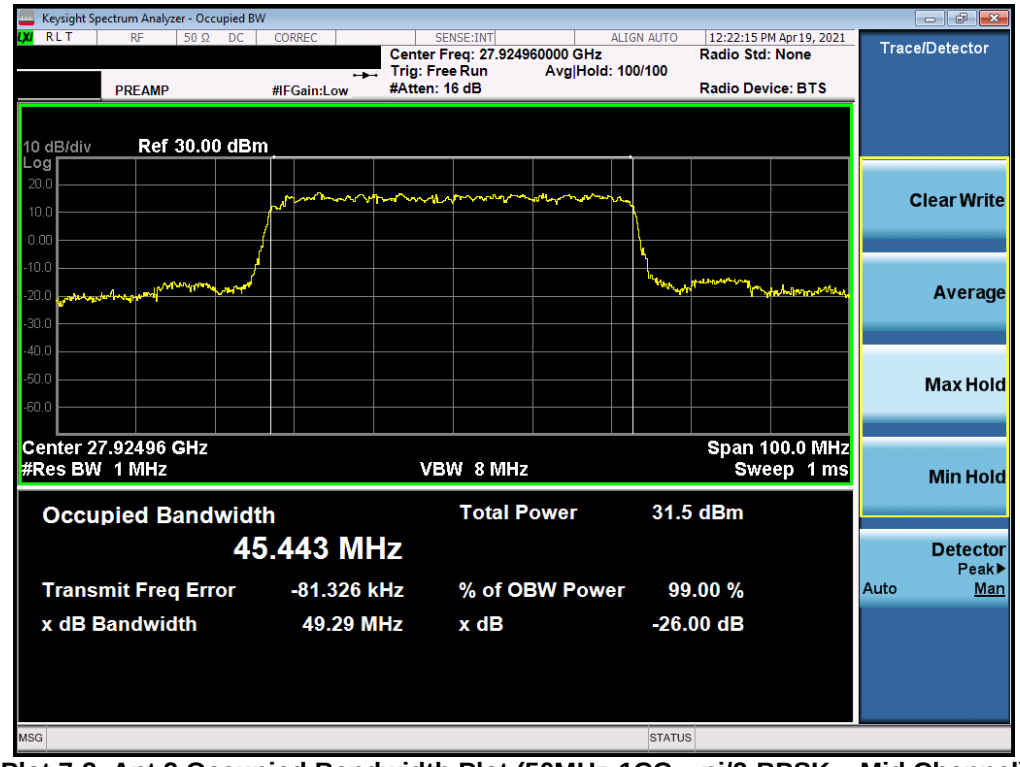
Band n261

Channel	Bandwidth	CCs Active	Transmission Scheme	Modulation	OBW [MHz]
Mid	50	1	CP-OFDM	QPSK	45.52
			DFT-s-OFDM	pi/2-BPSK	45.44
			CP-OFDM	16QAM	45.23
			CP-OFDM	64QAM	45.25
		2	CP-OFDM	QPSK	94.52
			DFT-s-OFDM	pi/2-BPSK	95.00
			CP-OFDM	16QAM	94.83
			CP-OFDM	64QAM	94.68
	100	1	CP-OFDM	QPSK	93.47
			DFT-s-OFDM	pi/2-BPSK	90.39
			CP-OFDM	16QAM	93.44
			CP-OFDM	64QAM	92.95
		2	CP-OFDM	QPSK	191.14
			DFT-s-OFDM	pi/2-BPSK	191.64
			CP-OFDM	16QAM	191.57
			CP-OFDM	64QAM	191.90

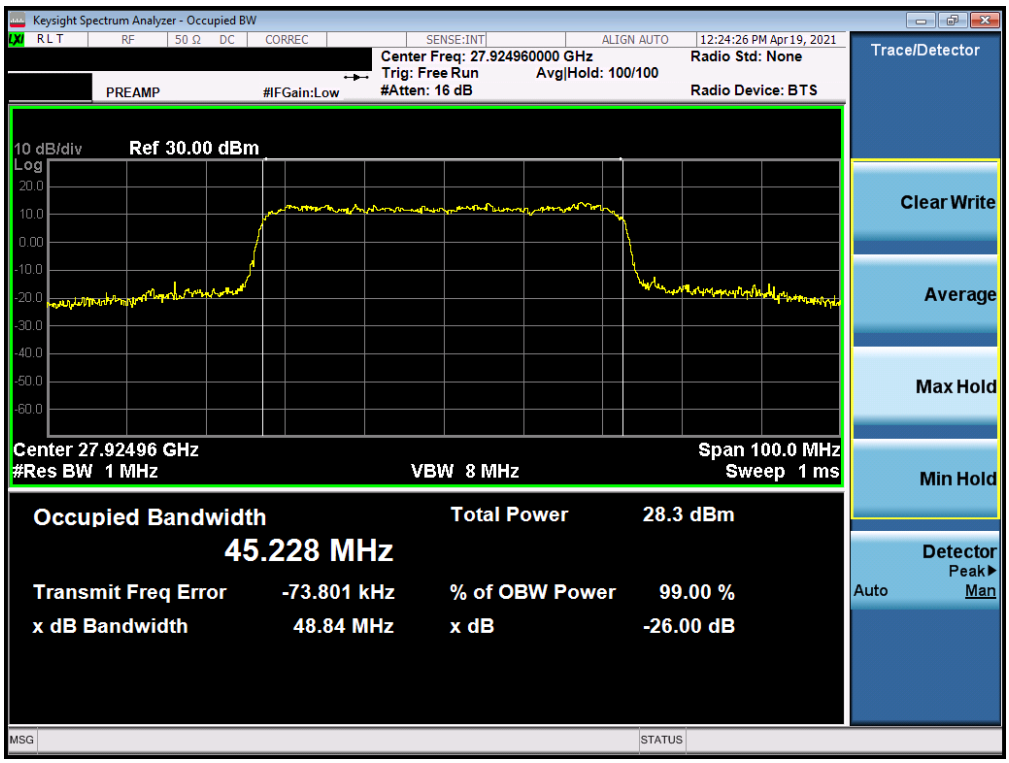
Table 7-2. Summary of Ant 2 Occupied Bandwidths (n261 L Patch)



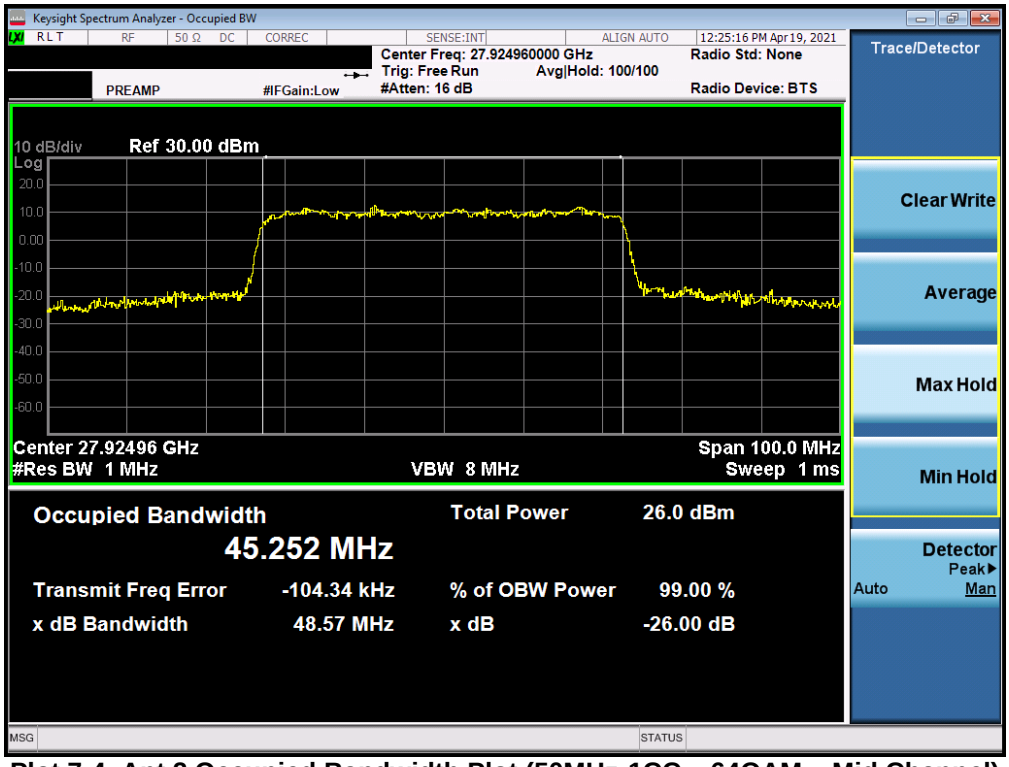
Plot 7-1. Ant 2 Occupied Bandwidth Plot (50MHz-1CC – QPSK – Mid Channel)



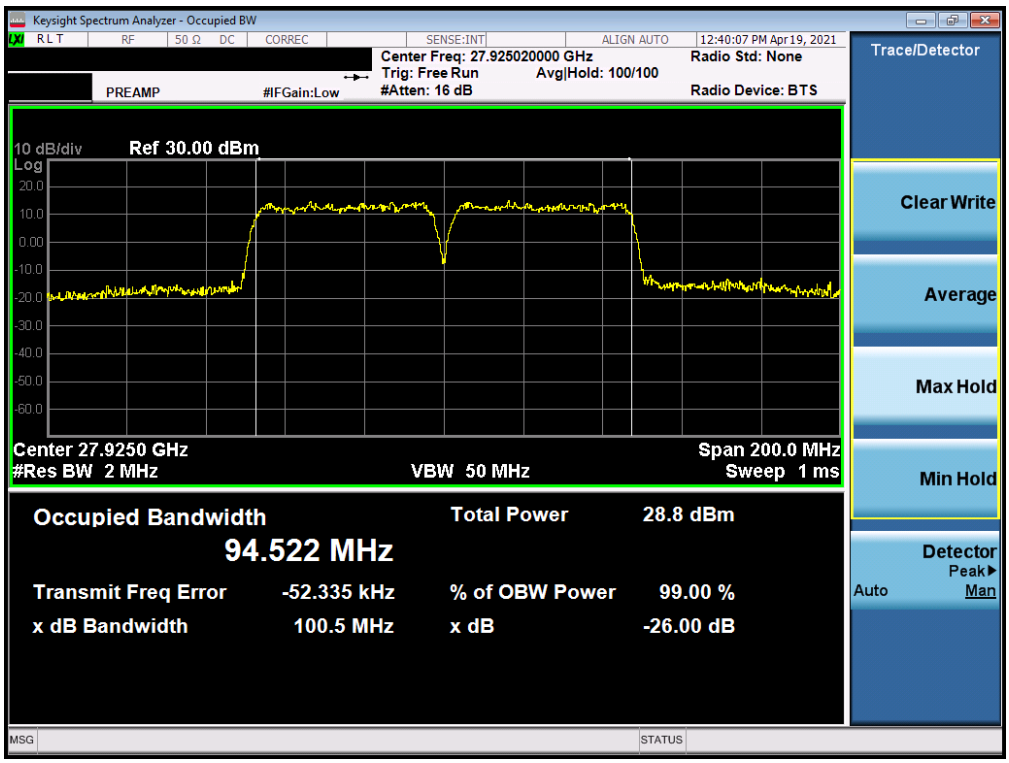
Plot 7-2. Ant 2 Occupied Bandwidth Plot (50MHz-1CC – pi/2-BPSK – Mid Channel)



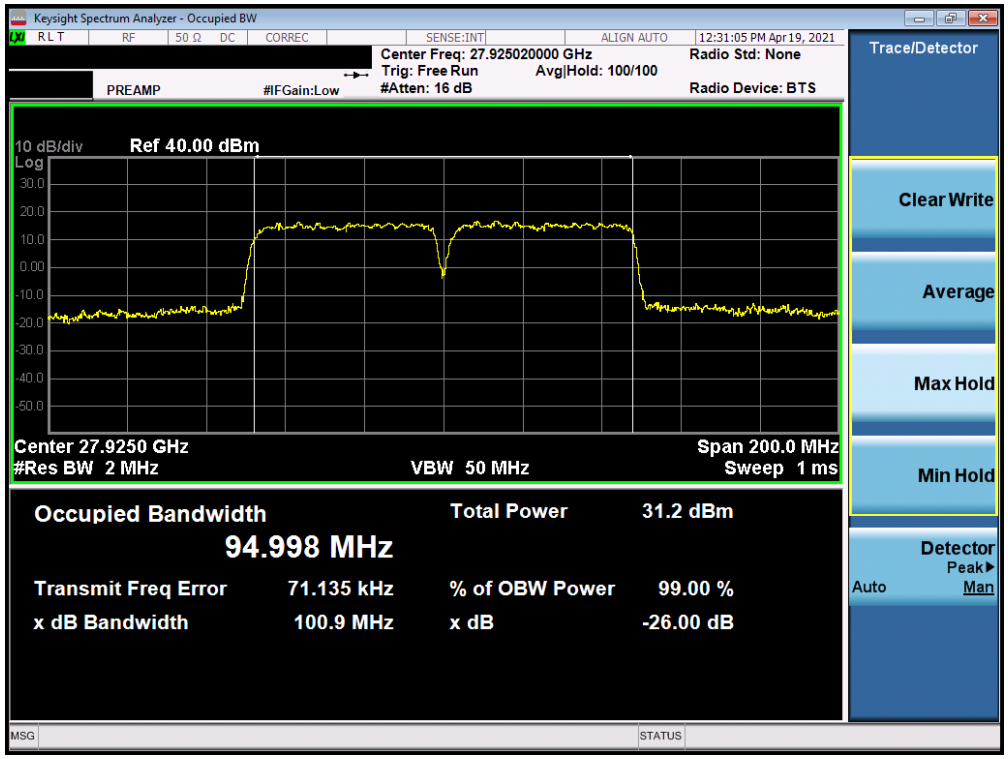
Plot 7-3. Ant 2 Occupied Bandwidth Plot (50MHz-1CC – 16QAM – Mid Channel)



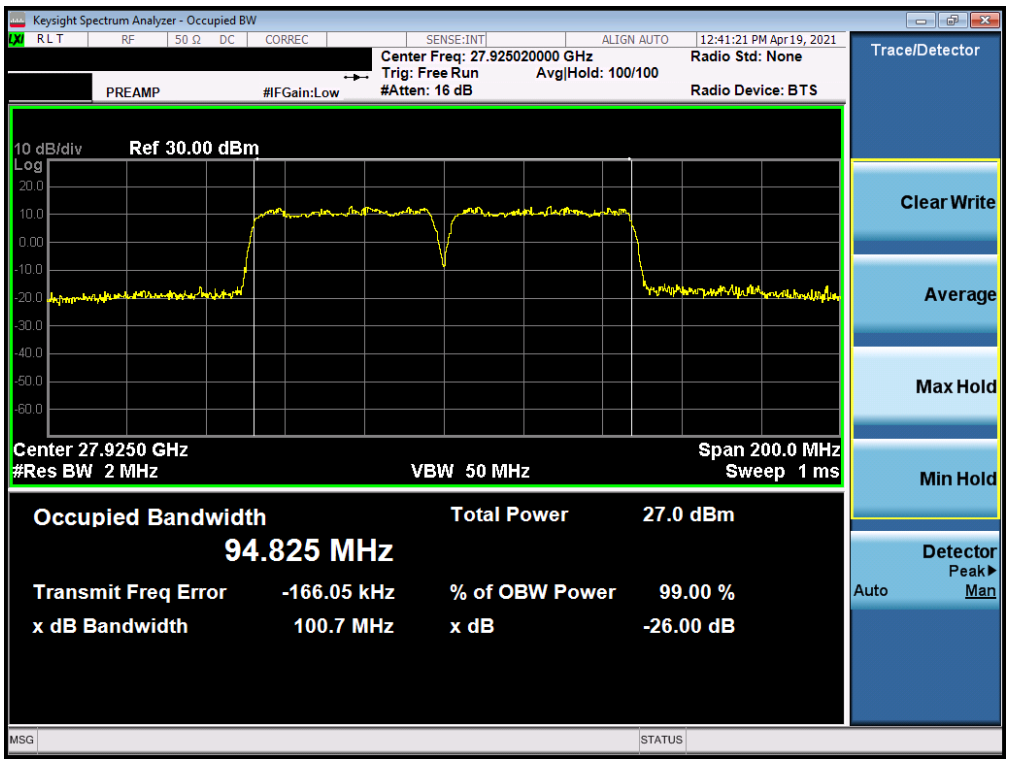
Plot 7-4. Ant 2 Occupied Bandwidth Plot (50MHz-1CC – 64QAM – Mid Channel)



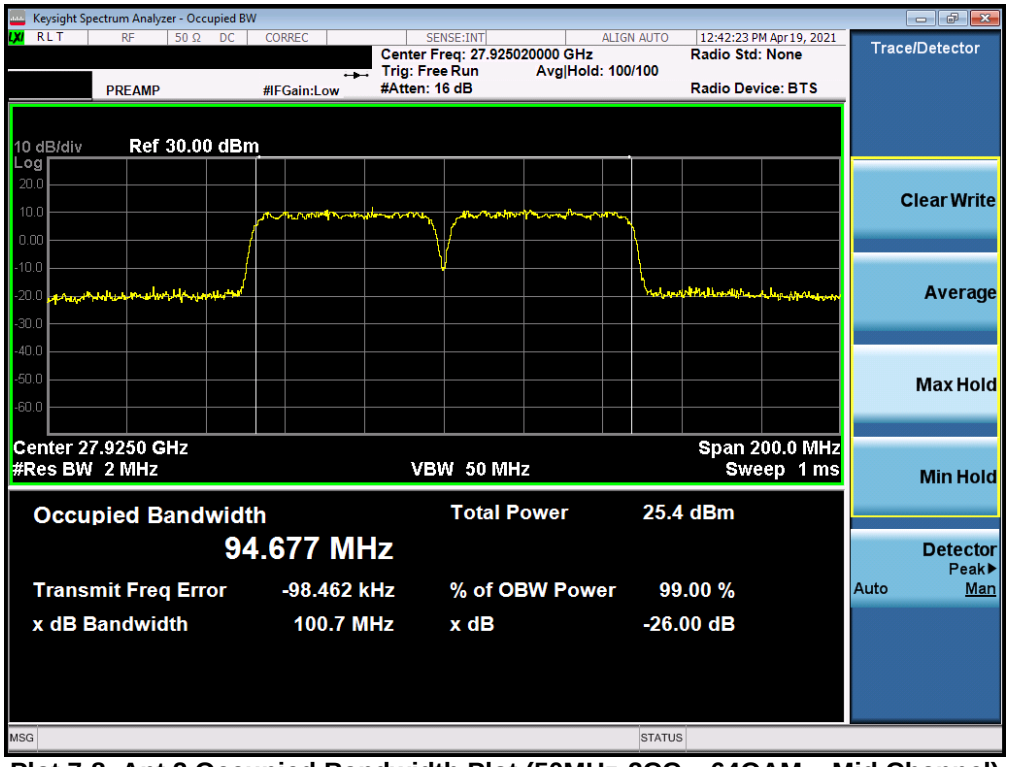
Plot 7-5. Ant 2 Occupied Bandwidth Plot (50MHz-2CC – QPSK – Mid Channel)



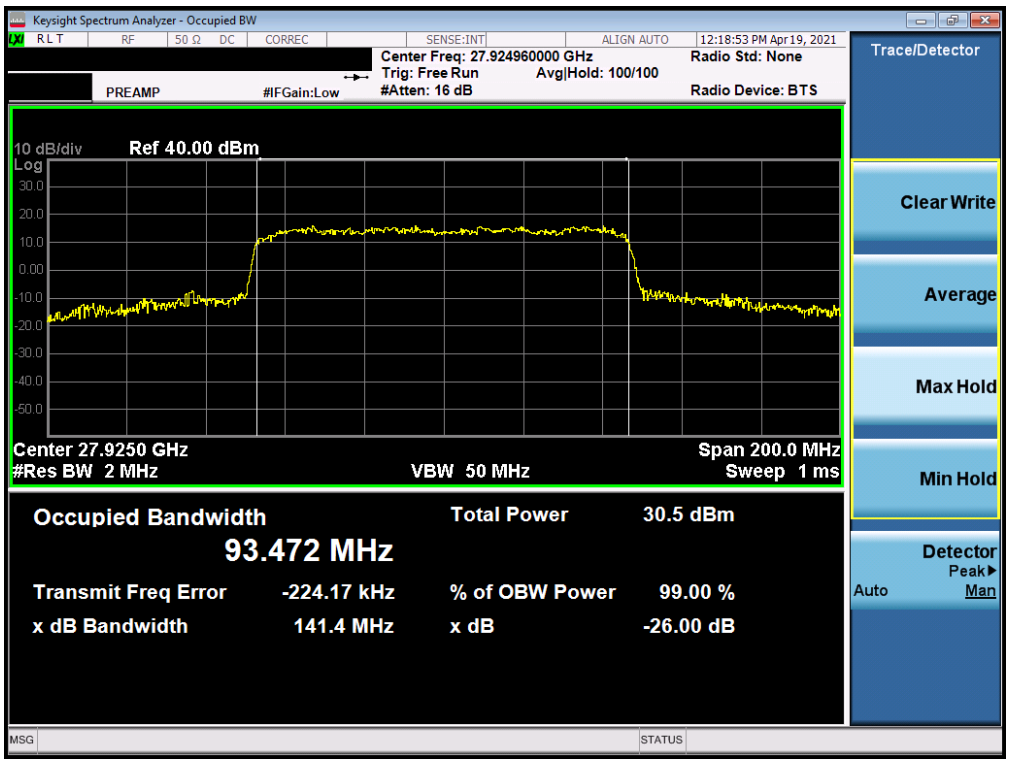
Plot 7-6. Ant 2 Occupied Bandwidth Plot (50MHz-2CC – pi/2-BPSK – Mid Channel)



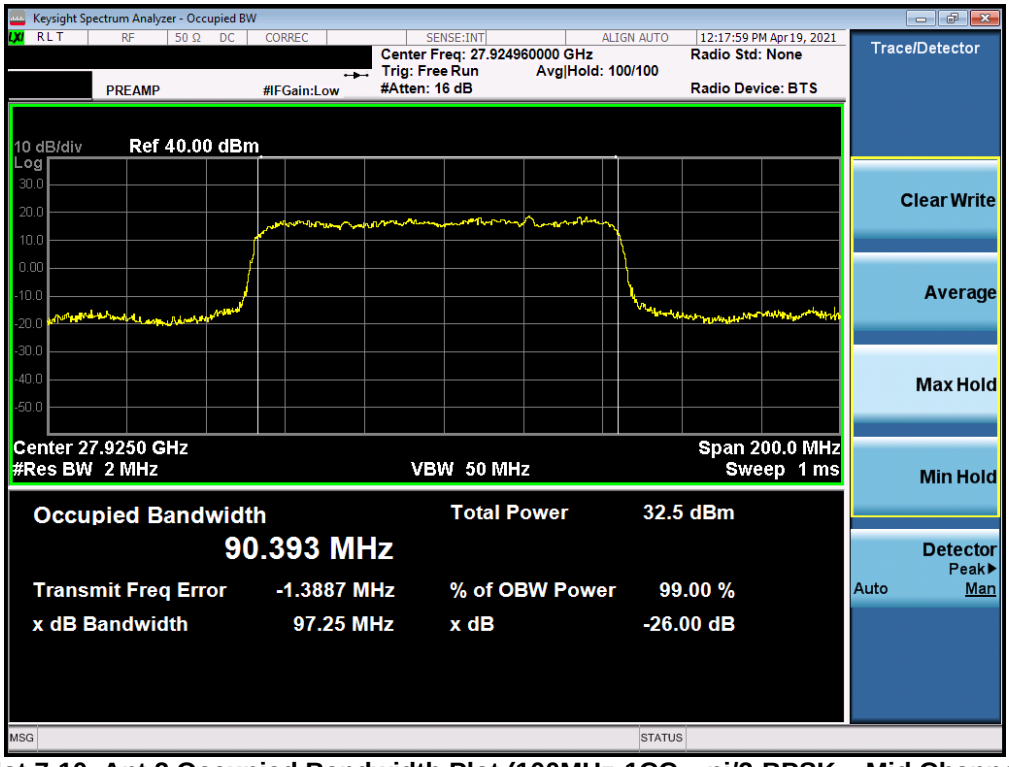
Plot 7-7. Ant 2 Occupied Bandwidth Plot (50MHz-2CC – 16QAM – Mid Channel)



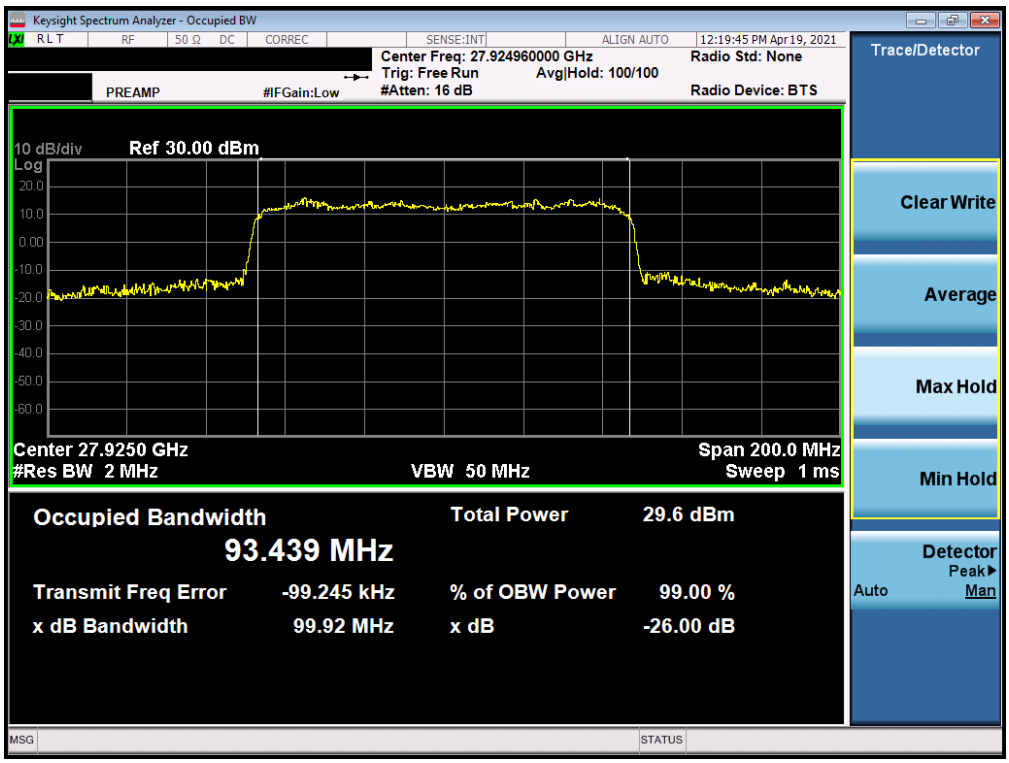
Plot 7-8. Ant 2 Occupied Bandwidth Plot (50MHz-2CC – 64QAM – Mid Channel)



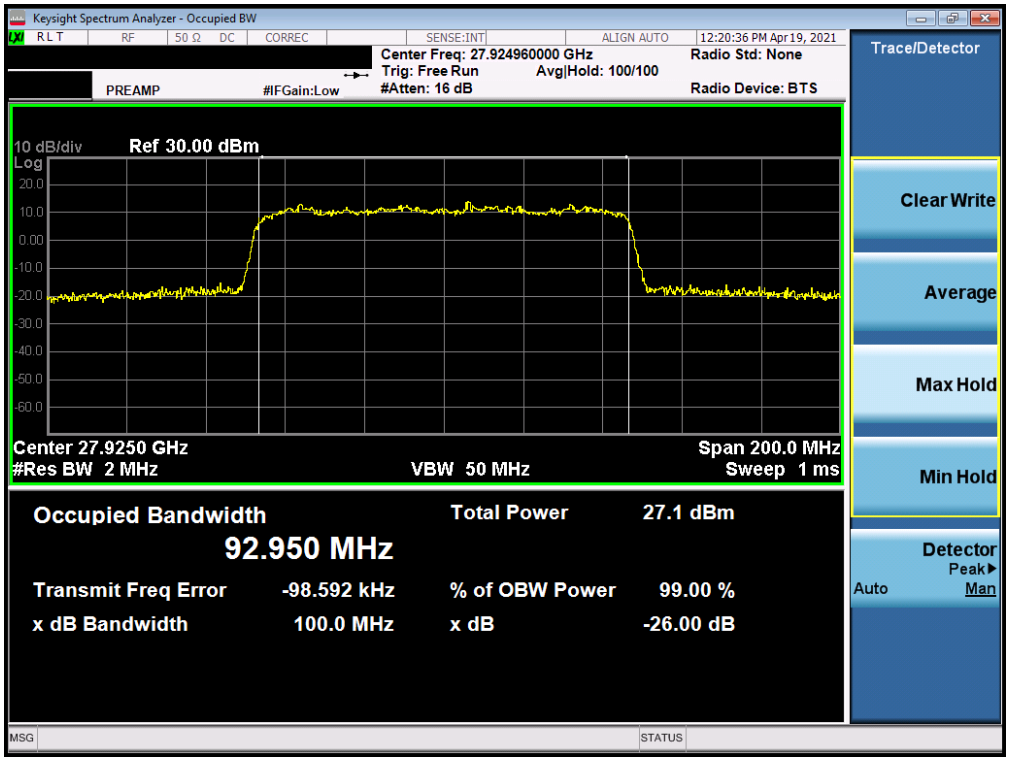
Plot 7-9. Ant 2 Occupied Bandwidth Plot (100MHz-1CC – QPSK – Mid Channel)



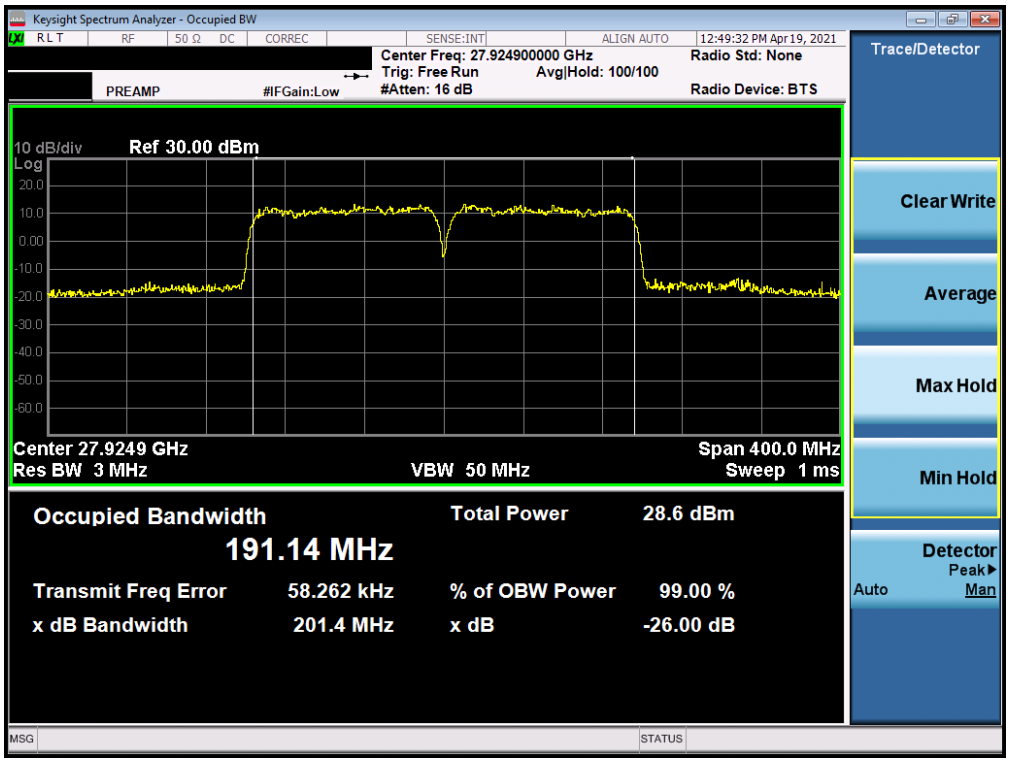
Plot 7-10. Ant 2 Occupied Bandwidth Plot (100MHz-1CC – pi/2-BPSK – Mid Channel)



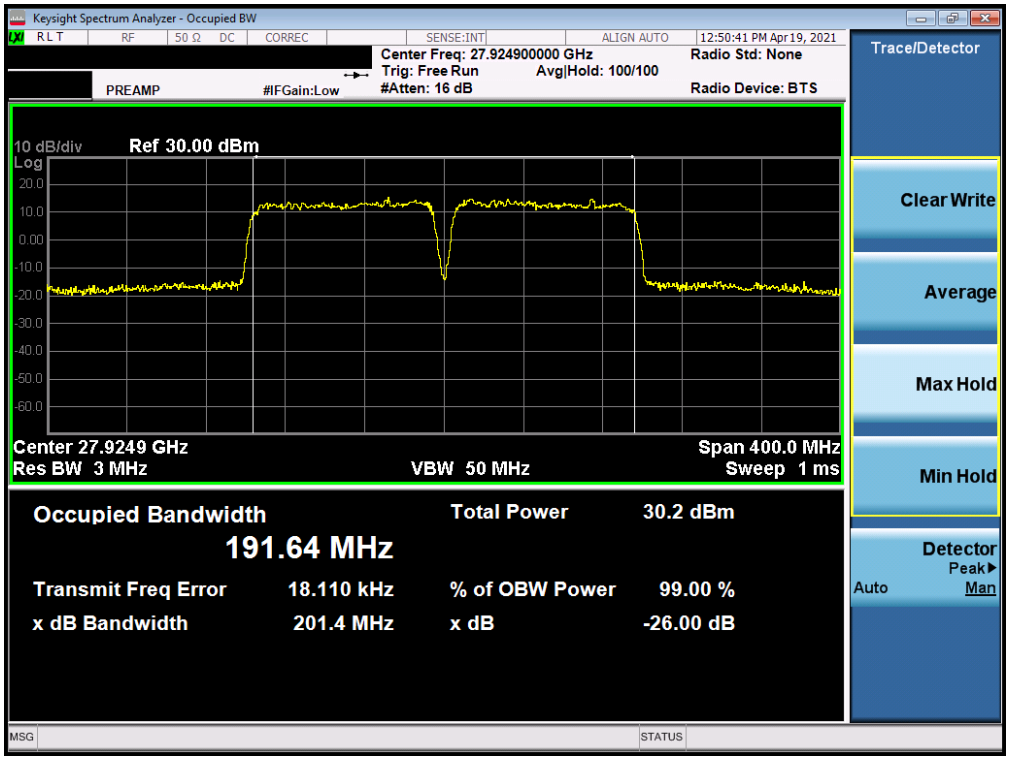
Plot 7-11. Ant 2 Occupied Bandwidth Plot (100MHz-1CC – 16QAM – Mid Channel)



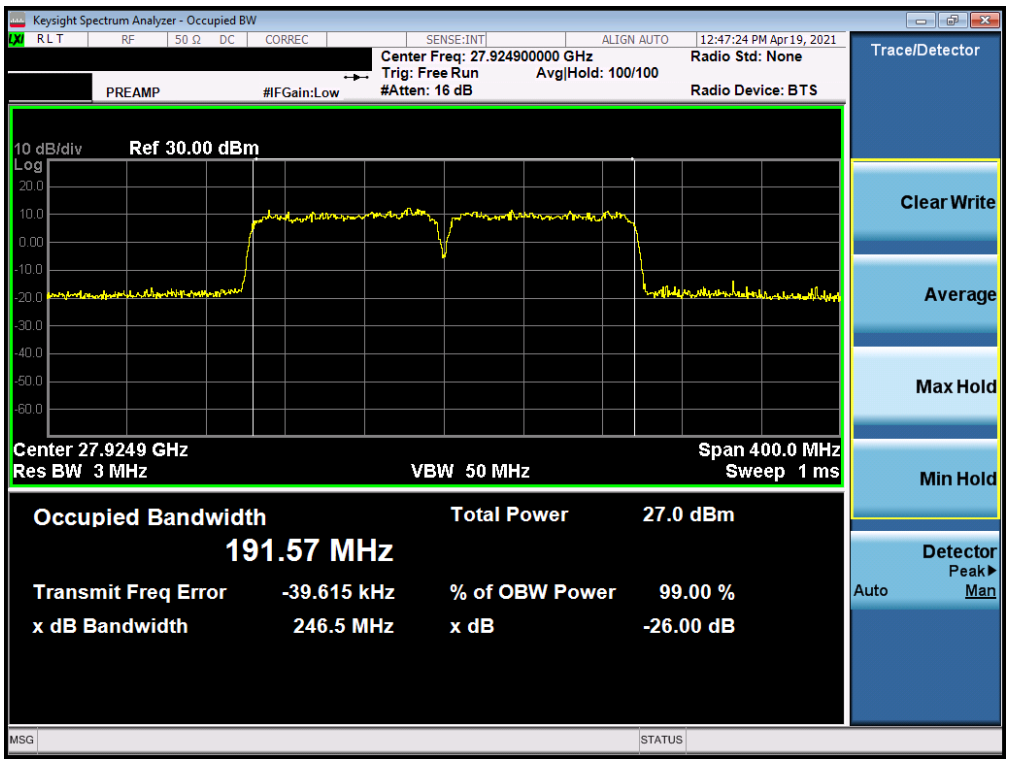
Plot 7-12. Ant 2 Occupied Bandwidth Plot (100MHz-1CC – 64QAM – Mid Channel)



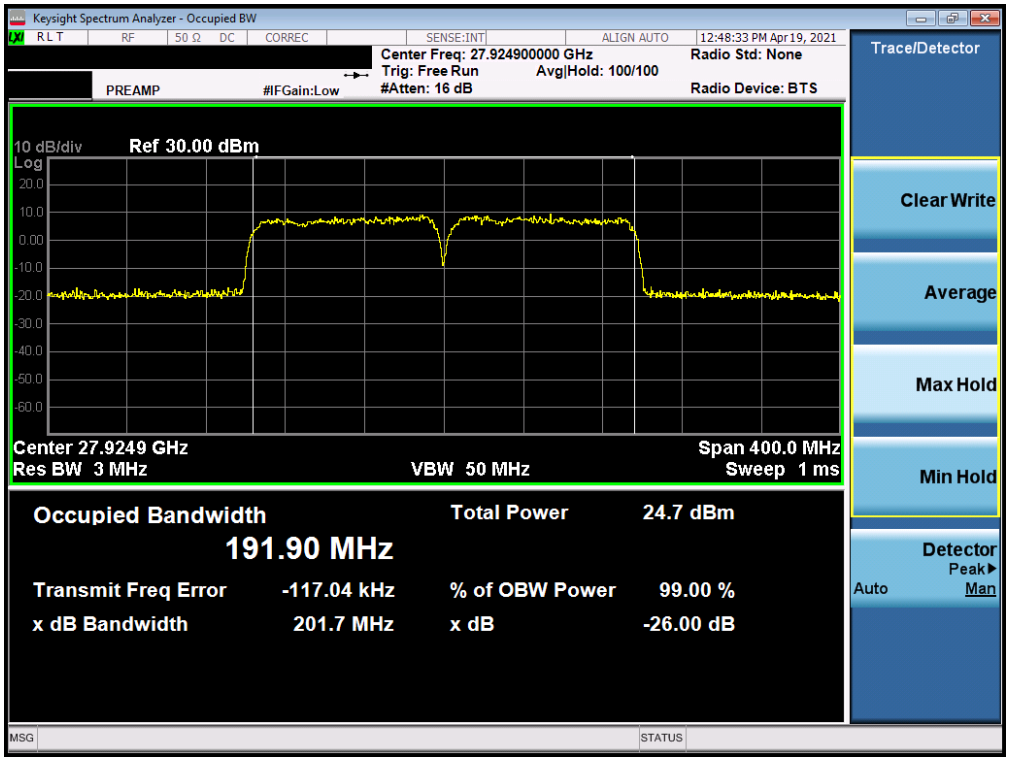
Plot 7-13. Ant 2 Occupied Bandwidth Plot (100MHz-2CC – QPSK – Mid Channel)



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



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

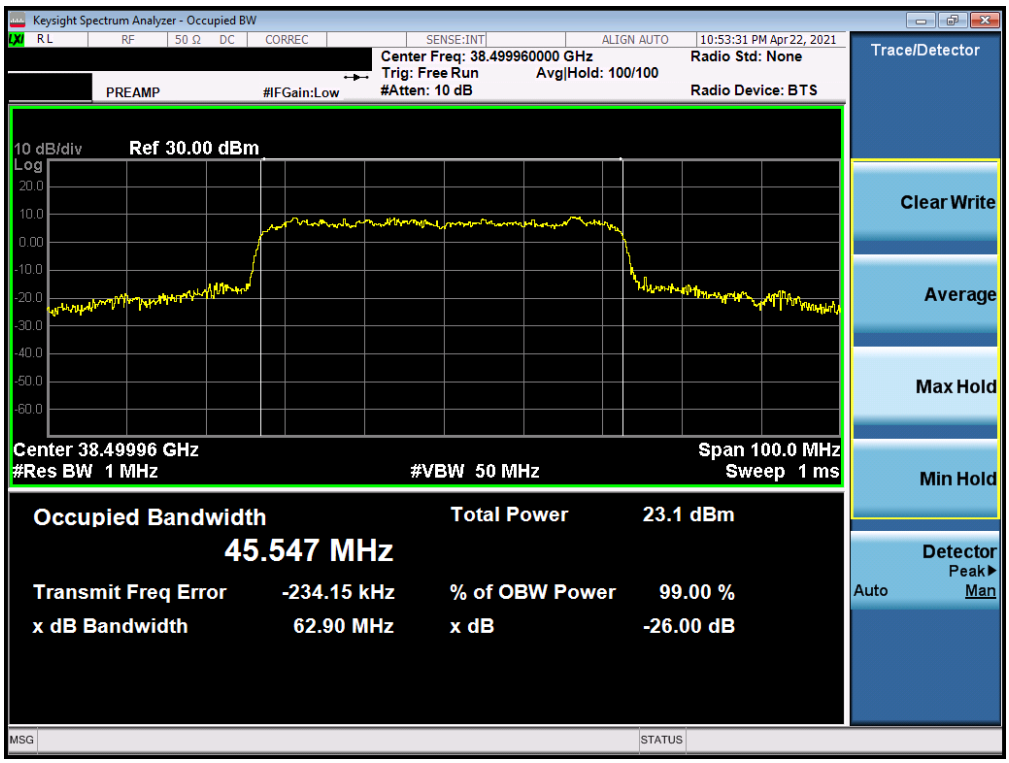


Plot 7-16. Ant 2 Occupied Bandwidth Plot (100MHz-2CC – 64QAM – Mid Channel)

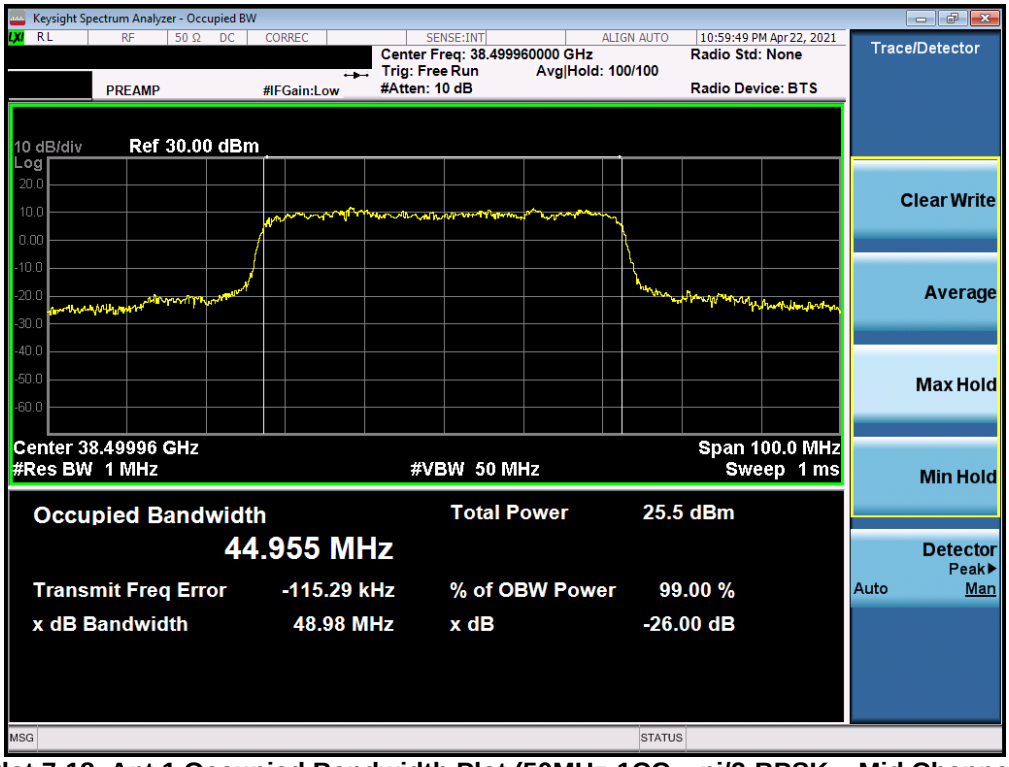
Band n260

Channel	Bandwidth	CCs Active	Transmission Scheme	Modulation	OBW [MHz]
Mid	50	1	CP-OFDM	QPSK	45.55
			DFT-s-OFDM	pi/2-BPSK	44.96
			CP-OFDM	16QAM	45.38
			CP-OFDM	64QAM	45.33
		2	CP-OFDM	QPSK	94.68
			DFT-s-OFDM	pi/2-BPSK	94.44
			CP-OFDM	16QAM	95.21
			CP-OFDM	64QAM	94.44
	100	1	CP-OFDM	QPSK	93.16
			DFT-s-OFDM	pi/2-BPSK	90.38
			CP-OFDM	16QAM	92.96
			CP-OFDM	64QAM	92.59
		2	CP-OFDM	QPSK	191.39
			DFT-s-OFDM	pi/2-BPSK	189.21
			CP-OFDM	16QAM	191.40
			CP-OFDM	64QAM	190.58

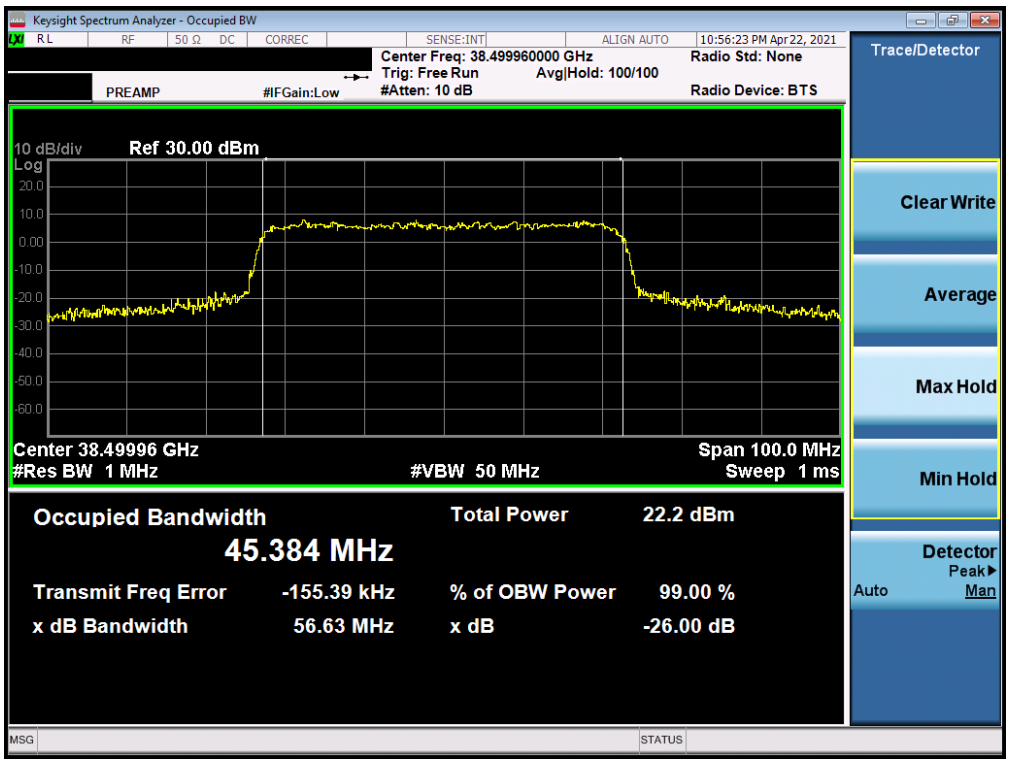
Table 7-3. Summary of Ant 1 Occupied Bandwidths (n260 K Patch)



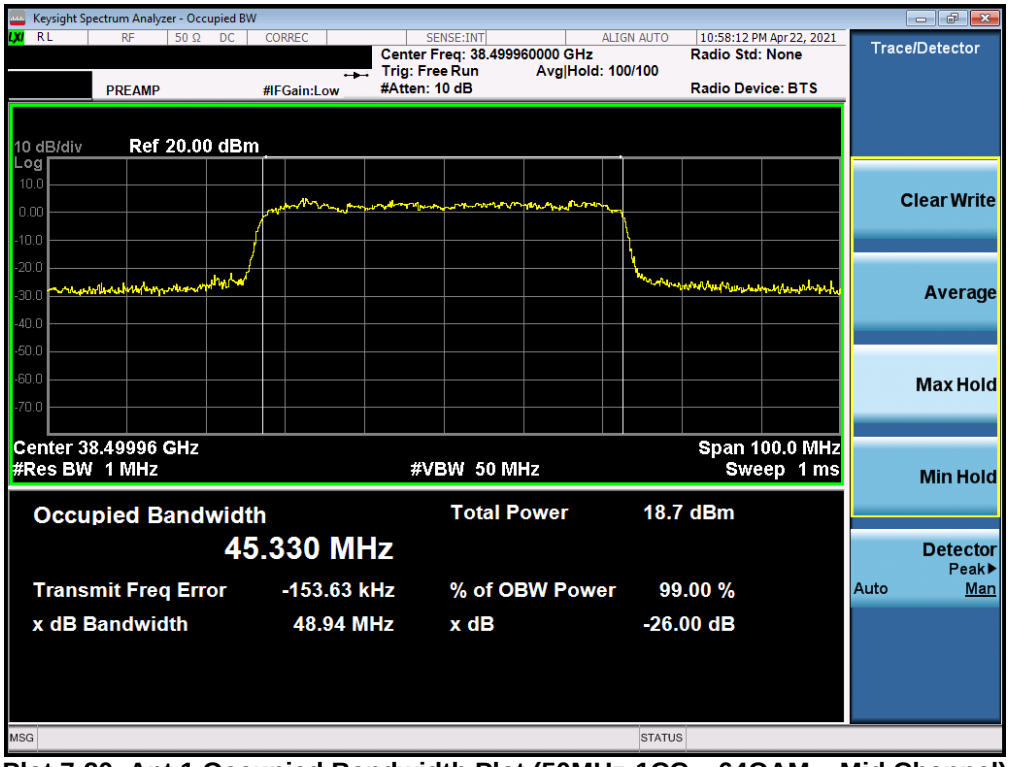
Plot 7-17. Ant 1 Occupied Bandwidth Plot (50MHz-1CC – QPSK – Mid Channel)



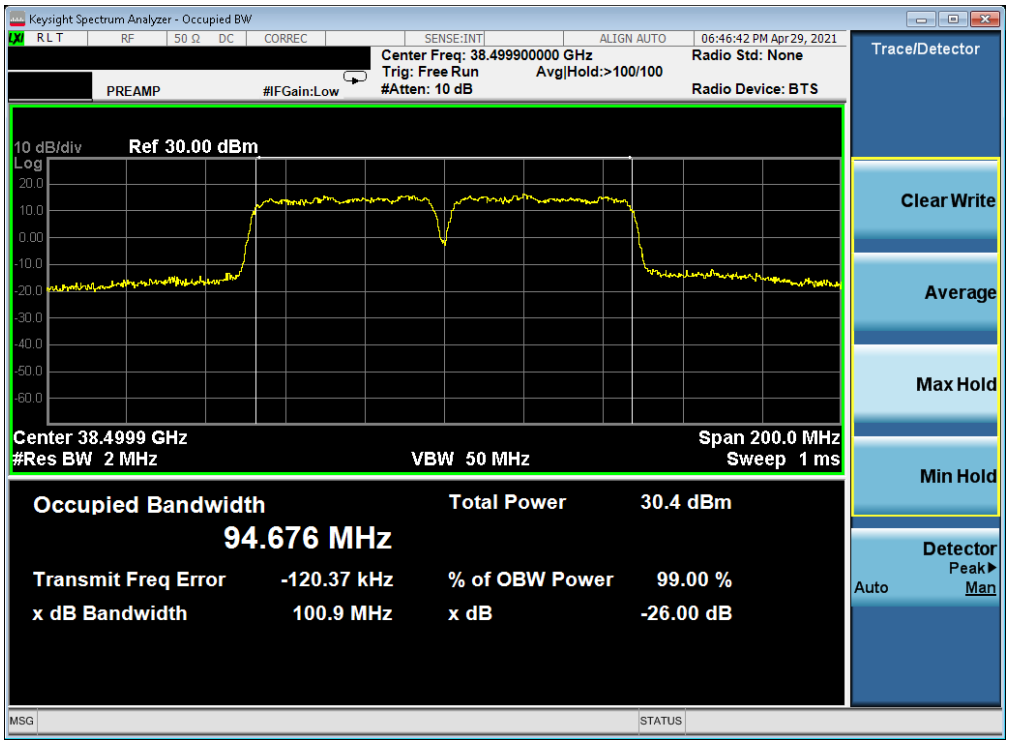
Plot 7-18. Ant 1 Occupied Bandwidth Plot (50MHz-1CC – pi/2-BPSK – Mid Channel)



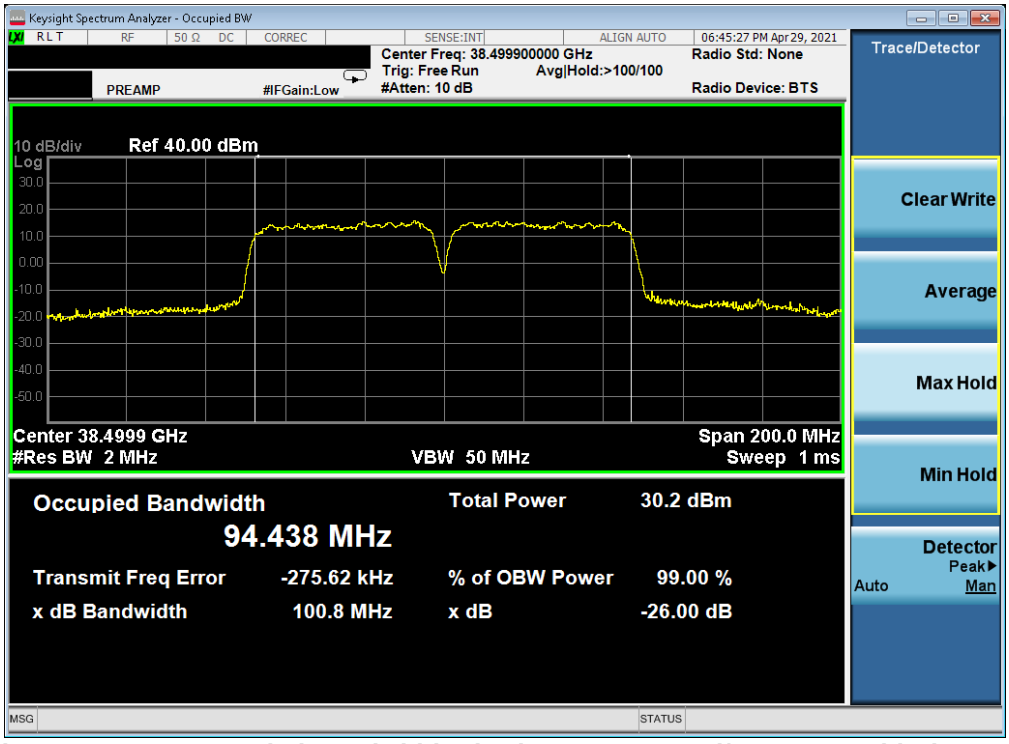
Plot 7-19. Ant 1 Occupied Bandwidth Plot (50MHz-1CC – 16QAM – Mid Channel)



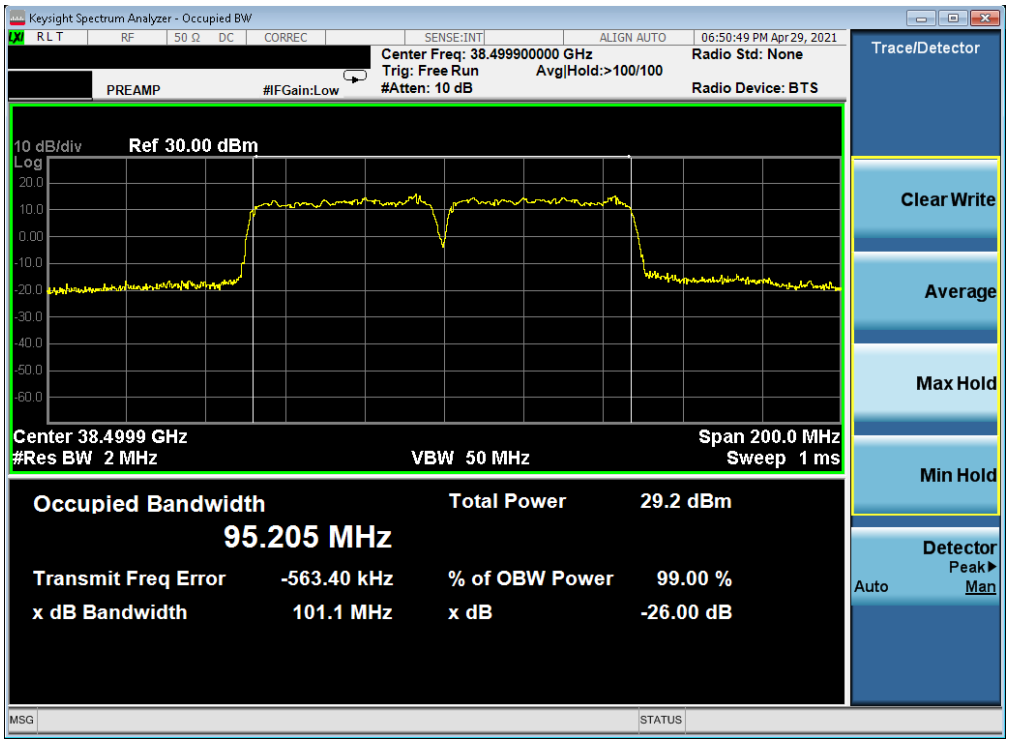
Plot 7-20. Ant 1 Occupied Bandwidth Plot (50MHz-1CC – 64QAM – Mid Channel)



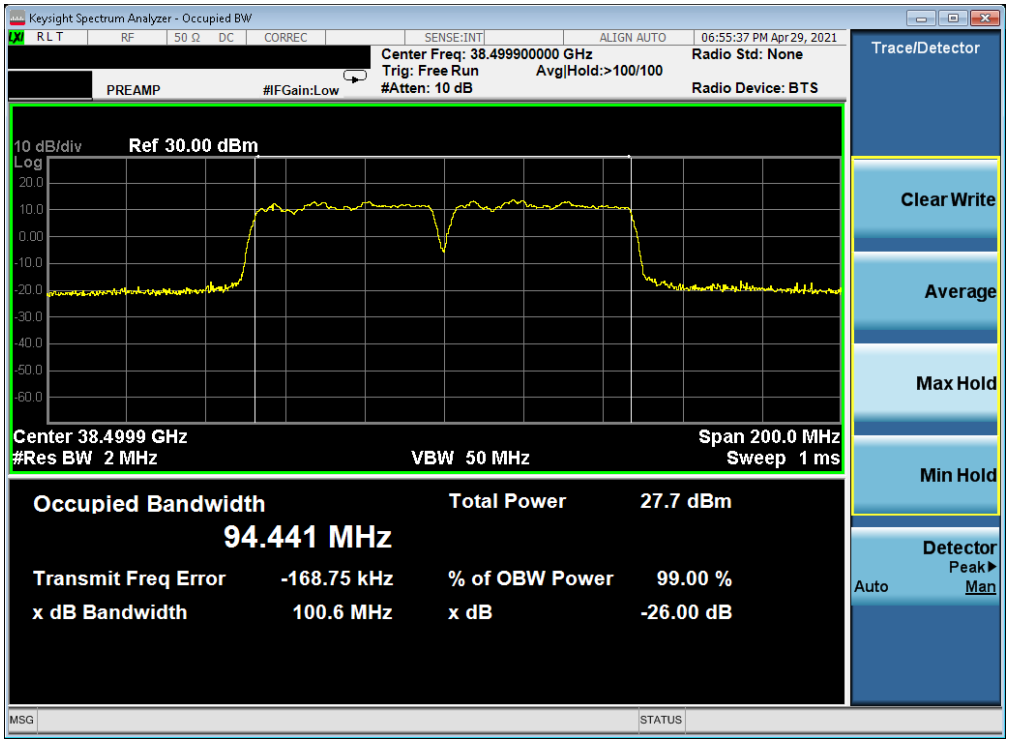
Plot 7-21. Ant 1 Occupied Bandwidth Plot (50MHz-2CC – QPSK – Mid Channel)



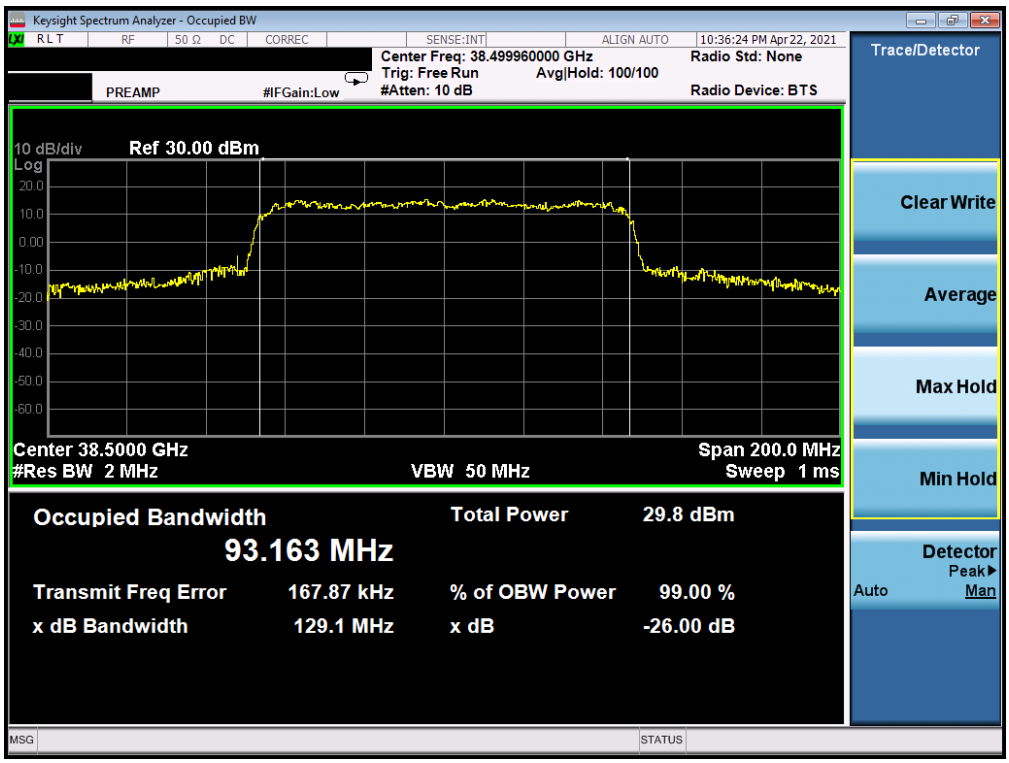
Plot 7-22. Ant 1 Occupied Bandwidth Plot (50MHz-2CC – pi/2-BPSK – Mid Channel)



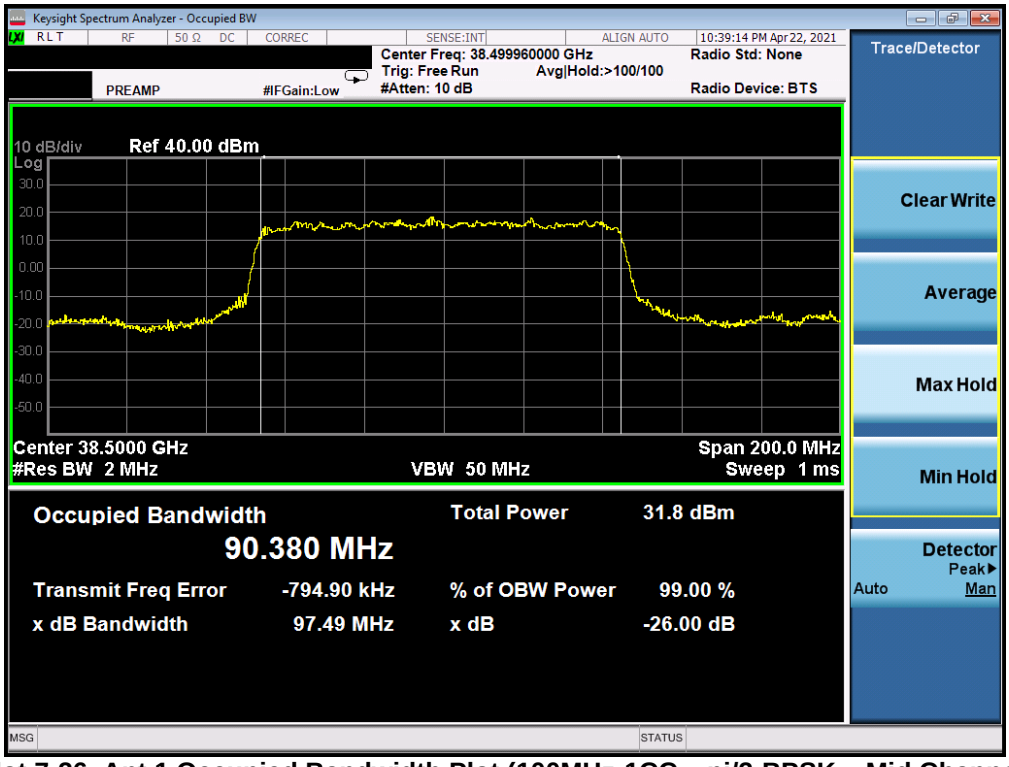
Plot 7-23. Ant 1 Occupied Bandwidth Plot (50MHz-2CC – 16QAM – Mid Channel)



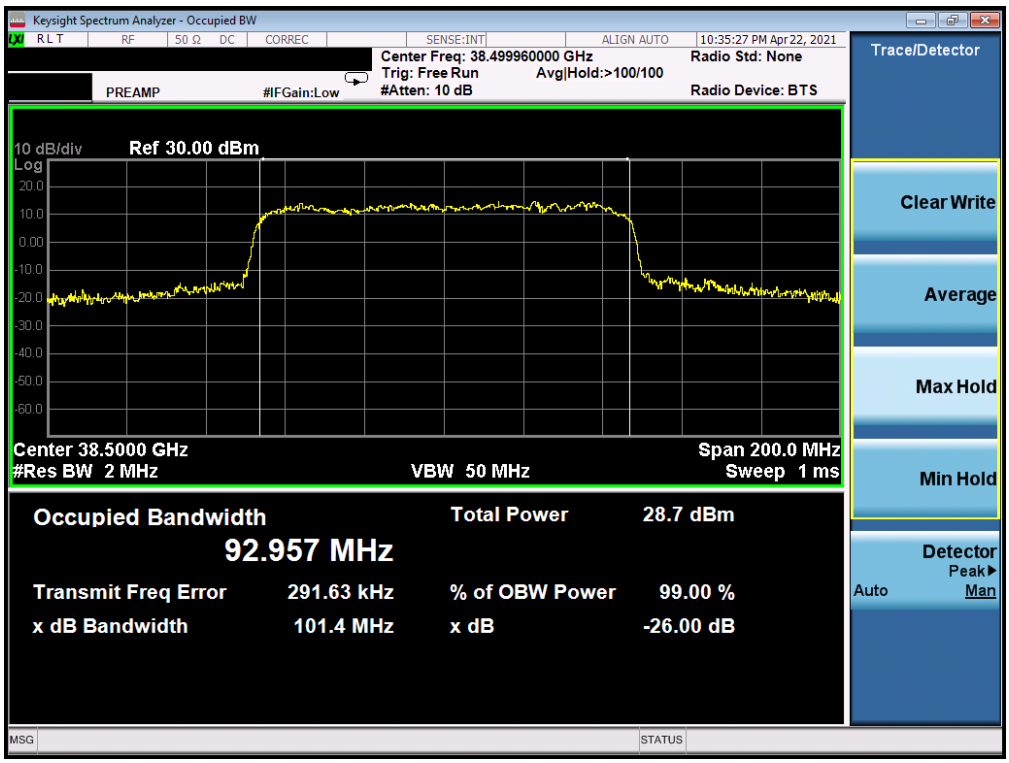
Plot 7-24. Ant 1 Occupied Bandwidth Plot (50MHz-2CC – 64QAM – Mid Channel)



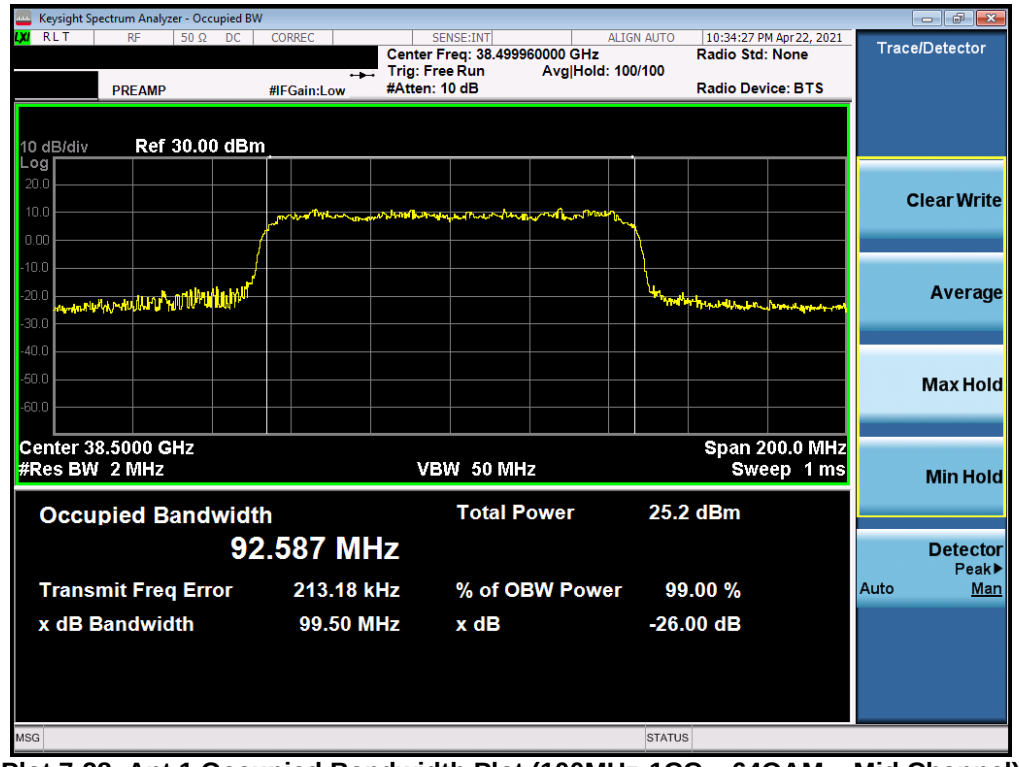
Plot 7-25. Ant 1 Occupied Bandwidth Plot (100MHz-1CC – QPSK – Mid Channel)



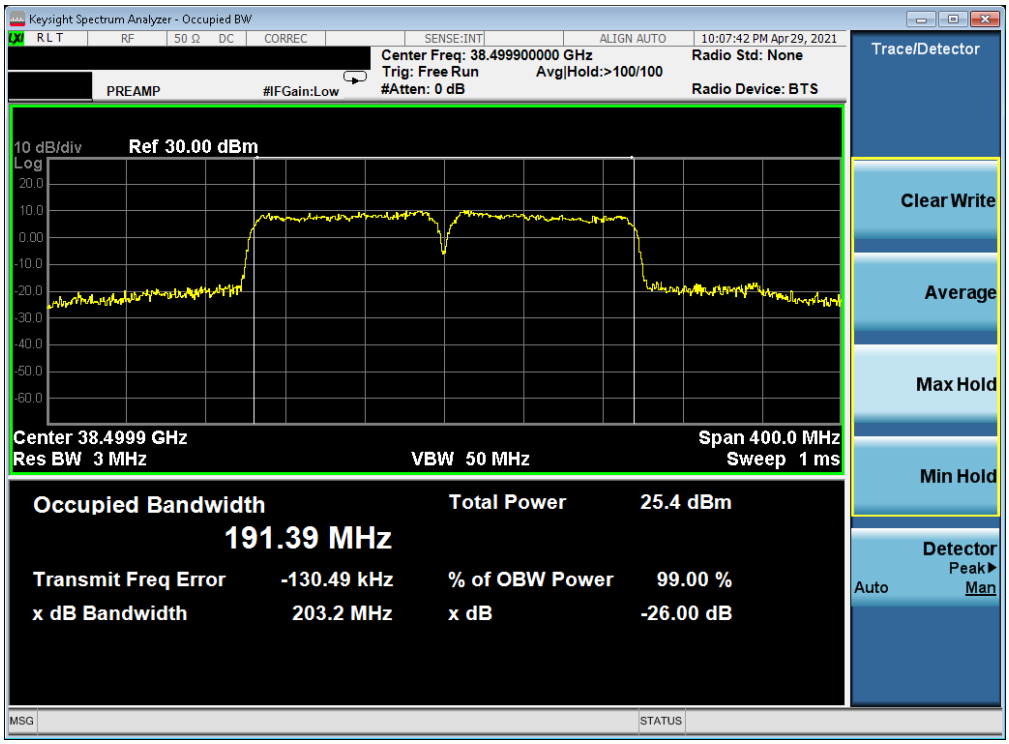
Plot 7-26. Ant 1 Occupied Bandwidth Plot (100MHz-1CC – pi/2-BPSK – Mid Channel)



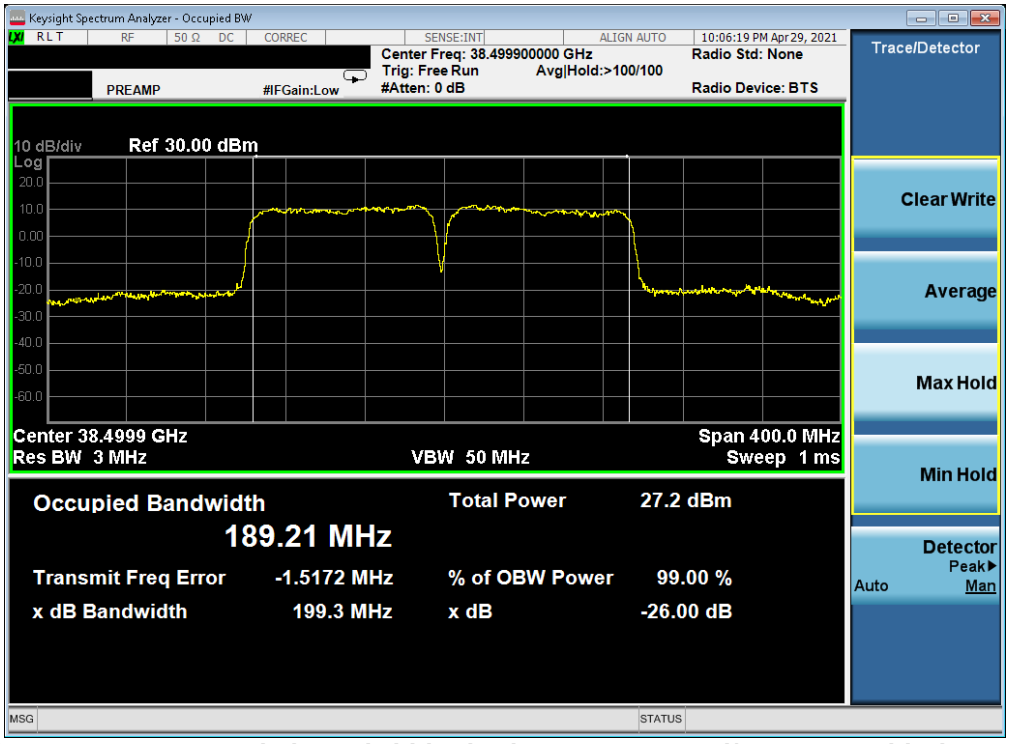
Plot 7-27. Ant 1 Occupied Bandwidth Plot (100MHz-1CC – 16QAM – Mid Channel)



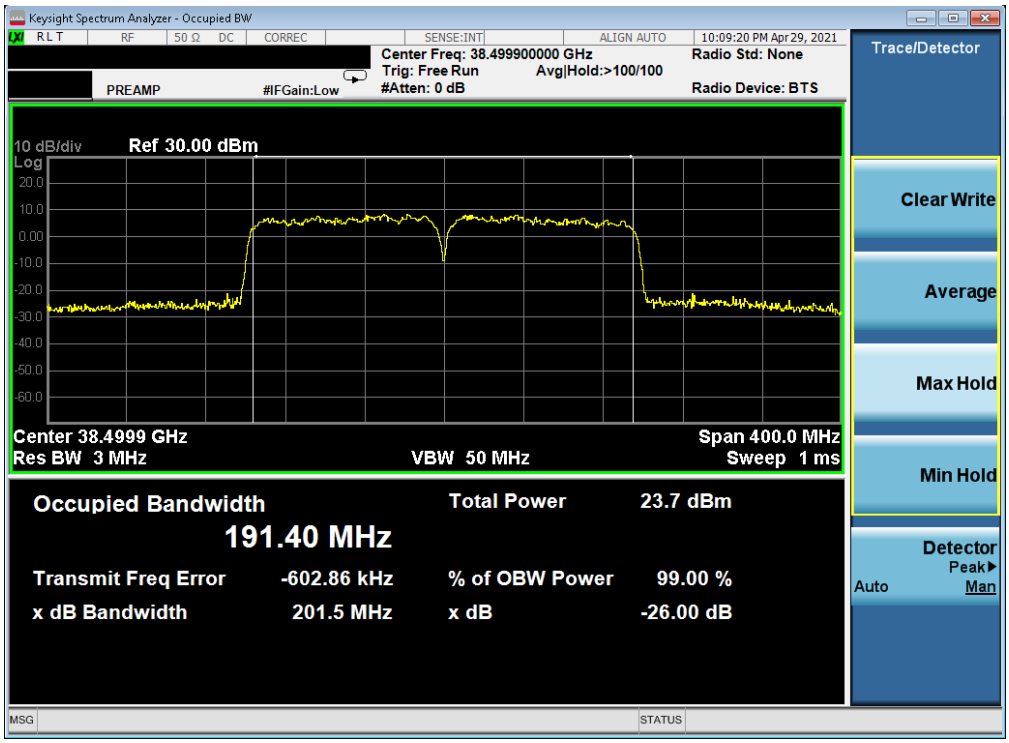
Plot 7-28. Ant 1 Occupied Bandwidth Plot (100MHz-1CC – 64QAM – Mid Channel)



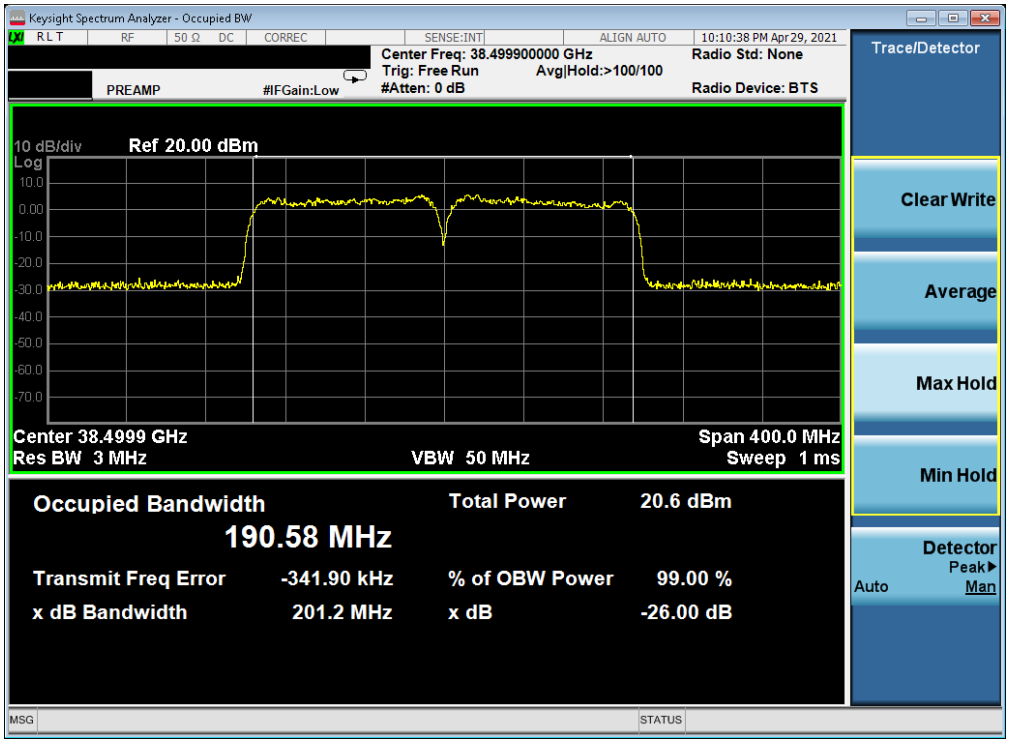
Plot 7-29. Ant 1 Occupied Bandwidth Plot (100MHz-2CC – QPSK – Mid Channel)



Plot 7-30. Ant 1 Occupied Bandwidth Plot (100MHz-2CC – pi/2-BPSK – Mid Channel)



Plot 7-31. Ant 1 Occupied Bandwidth Plot (100MHz-2CC – 16QAM – Mid Channel)



Plot 7-32. Ant 1 Occupied Bandwidth Plot (100MHz-2CC – 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

Test Notes

1) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the tables below. Both H-Beam and V-Beam were investigated and the worst-case measurements were reported below.

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

3) EIRP measurements were taken at 1m test distance.

4) The average EIRP reported below is calculated per section 5.2.7 of ANSI C63.26-2015 which states: EIRP (dBm) = E (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 Channel Power Level (dBm) + Antenna Factor (dB/m) + Cable Loss (dB) + 107.

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

6) 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.

7) The folder open configuration was the worst case, so the full "open" test results are shown in this section.

Band n261 Beam ID Configurations

Mode	Channel	Beam Polarization	Beam ID	Beam ID Pair
SISO	Low	H	149	-
		V	30	-
	Mid	H	149	-
		V	30	-
	High	H	159	-
		V	30	-
MIMO	Low	2Tx/MIMO	158	30
	Mid	2Tx/MIMO	149	21
	High	2Tx/MIMO	149	21
SISO (Closed)	Low	H	157	-
		V	21	-
	Mid	H	157	-
		V	21	-
	High	H	157	-
		V	21	-
MIMO (Closed)	Low	2Tx/MIMO	159	31
	Mid	2Tx/MIMO	159	31
	High	2Tx/MIMO	159	31

Table 7-4. Ant 1 (K Patch) Worst Case Beam ID

Mode	Channel	Beam Polarization	Beam ID	Beam ID Pair
SISO	Low	H	153	-
		V	36	-
	Mid	H	155	-
		V	36	-
	High	H	155	-
		V	36	-
MIMO	Low	2Tx/MIMO	153	25
	Mid	2Tx/MIMO	155	27
	High	2Tx/MIMO	155	27
SISO (Closed)	Low	H	163	-
		V	36	-
	Mid	H	154	-
		V	35	-
	High	H	154	-
		V	34	-
MIMO (Closed)	Low	2Tx/MIMO	161	33
	Mid	2Tx/MIMO	161	33
	High	2Tx/MIMO	154	26

Table 7-5. Ant 2 (L Patch) Worst Case Beam ID

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]
Low	27525.00	DFT-s-OFDM	QPSK	149	H	SISO	V	13	345	1 / 19	25.80
Low	27525.00	DFT-s-OFDM	QPSK	30	V	SISO	V	14	258	1 / 19	25.60
Low	27525.00	DFT-s-OFDM	QPSK	158+30	H + V	2Tx	H	332	277	1 / 19	29.44
Low	27525.00	CP-OFDM	QPSK	149	H	SISO	V	13	345	1 / 19	23.31
Low	27525.00	CP-OFDM	QPSK	30	V	SISO	V	14	258	1 / 12	23.06
Low	27525.00	CP-OFDM	QPSK	158+30	H + V	MIMO	H	332	277	1 / 19	26.03
Mid	27924.96	DFT-s-OFDM	QPSK	149+21	H + V	2Tx	H	15	308	1 / 16	28.35
High	28324.92	DFT-s-OFDM	QPSK	149+21	H + V	2Tx	H	16	303	1 / 19	28.29
Low	27525.00	DFT-s-OFDM	π/2 BPSK	158+30	H + V	2Tx	H	332	277	1 / 19	**29.46**
Low	27525.00	DFT-s-OFDM	16QAM	158+30	H + V	2Tx	H	332	277	1 / 19	27.94
Low	27525.00	DFT-s-OFDM	64QAM	158+30	H + V	2Tx	H	332	277	1 / 19	25.23
Low	27525.00	DFT-s-OFDM (Closed)	QPSK	159+31	H + V	2Tx	V	290	53	1 / 19	27.64

Table 7-6. Ant 1 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]
Low	27525.00	DFT-s-OFDM	QPSK	158+30	H + V	2Tx	H	332	276	32 / 0	24.82
Low	27525.00	DFT-s-OFDM	π/2 BPSK	158+30	H + V	2Tx	H	332	276	32 / 0	24.79
Low	27525.00	DFT-s-OFDM	16QAM	158+30	H + V	2Tx	H	332	276	32 / 0	23.35
Low	27525.00	DFT-s-OFDM	64QAM	158+30	H + V	2Tx	H	332	276	32 / 0	21.04

Table 7-7. Ant 1 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]
Low	27550.08	DFT-s-OFDM	QPSK	149	H	SISO	V	13	343	1 / 23	26.40
Low	27550.08	DFT-s-OFDM	QPSK	30	V	SISO	V	14	259	1 / 23	25.51
Low	27550.08	DFT-s-OFDM	QPSK	158+30	H + V	2Tx	H	332	276	1 / 33	**29.72**
Low	27550.08	CP-OFDM	QPSK	149	H	SISO	V	13	343	1 / 33	23.86
Low	27550.08	CP-OFDM	QPSK	30	V	SISO	V	14	259	1 / 23	23.11
Low	27550.08	CP-OFDM	QPSK	158+30	H + V	MIMO	H	332	276	1 / 33	26.78
Mid	27924.96	DFT-s-OFDM	QPSK	149+21	H + V	2Tx	H	16	304	1 / 42	29.12
High	28299.96	DFT-s-OFDM	QPSK	149+21	H + V	2Tx	H	16	305	1 / 33	28.83
Low	27550.08	DFT-s-OFDM	π/2 BPSK	158+30	H + V	2Tx	H	332	276	1 / 33	29.66
Low	27550.08	DFT-s-OFDM	16QAM	158+30	H + V	2Tx	H	332	276	1 / 33	27.75
Low	27550.08	DFT-s-OFDM	64QAM	158+30	H + V	2Tx	H	332	276	1 / 33	25.40
Low	27550.08	DFT-s-OFDM (Closed)	QPSK	159+31	H + V	2Tx	V	292	52	1 / 23	27.69

Table 7-8. Ant 1 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]
Low	27550.08	DFT-s-OFDM	QPSK	158+30	H + V	2Tx	H	333	275	64 / 0	24.61
Low	27550.08	DFT-s-OFDM	π/2 BPSK	158+30	H + V	2Tx	H	333	275	64 / 0	24.60
Low	27550.08	DFT-s-OFDM	16QAM	158+30	H + V	2Tx	H	333	275	64 / 0	23.25
Low	27550.08	DFT-s-OFDM	64QAM	158+30	H + V	2Tx	H	333	275	64 / 0	21.10

Table 7-9. Ant 1 EIRP Data (Band n261 - 100MHz-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]
Low	27525.00	DFT-s-OFDM	QPSK	153	H	SISO	H	41	293	1 / 19	29.28
Low	27525.00	DFT-s-OFDM	QPSK	36	V	SISO	H	54	95	1 / 16	29.78
Low	27525.00	DFT-s-OFDM	QPSK	153+25	H + V	2Tx	H	44	297	1 / 16	30.04
Low	27525.00	CP-OFDM	QPSK	153	H	SISO	H	41	293	1 / 19	25.82
Low	27525.00	CP-OFDM	QPSK	36	V	SISO	H	54	95	1 / 19	26.33
Low	27525.00	CP-OFDM	QPSK	153+25	H + V	MIMO	H	44	297	1 / 16	26.85
Mid	27924.96	DFT-s-OFDM	QPSK	155+27	H + V	2Tx	H	69	63	1 / 19	29.43
High	28324.92	DFT-s-OFDM	QPSK	155+27	H + V	2Tx	H	68	66	1 / 12	27.63
Low	27525.00	DFT-s-OFDM	π/2 BPSK	153+25	H + V	2Tx	H	44	297	1 / 16	**30.28**
Low	27525.00	DFT-s-OFDM	16QAM	153+25	H + V	2Tx	H	44	297	1 / 16	27.95
Low	27525.00	DFT-s-OFDM	64QAM	153+25	H + V	2Tx	H	44	297	1 / 16	25.74
Low	27525.00	DFT-s-OFDM (Closed)	QPSK	161+33	H + V	2Tx	H	108	54	1 / 16	28.69

Table 7-10. Ant 2 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]
Low	27525.00	DFT-s-OFDM	QPSK	153+25	H + V	2Tx	H	55	292	32 / 0	26.81
Low	27525.00	DFT-s-OFDM	π/2 BPSK	153+25	H + V	2Tx	H	55	292	32 / 0	26.75
Low	27525.00	DFT-s-OFDM	16QAM	153+25	H + V	2Tx	H	55	292	32 / 0	25.19
Low	27525.00	DFT-s-OFDM	64QAM	153+25	H + V	2Tx	H	55	292	32 / 0	23.30

Table 7-11. Ant 2 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]
Low	27550.08	DFT-s-OFDM	QPSK	153	H	SISO	H	41	293	1 / 23	29.70
Low	27550.08	DFT-s-OFDM	QPSK	36	V	SISO	H	66	94	1 / 23	29.88
Low	27550.08	DFT-s-OFDM	QPSK	153+25	H + V	2Tx	H	45	294	1 / 23	30.07
Low	27550.08	CP-OFDM	QPSK	153	H	SISO	H	41	293	1 / 23	26.37
Low	27550.08	CP-OFDM	QPSK	36	V	SISO	H	66	94	1 / 23	26.51
Low	27550.08	CP-OFDM	QPSK	153+25	H + V	MIMO	H	45	294	1 / 23	27.23
Mid	27924.96	DFT-s-OFDM	QPSK	155+27	H + V	2Tx	H	70	64	1 / 23	30.05
High	28299.96	DFT-s-OFDM	QPSK	155+27	H + V	2Tx	H	67	66	1 / 23	28.53
Low	27550.08	DFT-s-OFDM	π/2 BPSK	153+25	H + V	2Tx	H	45	294	1 / 23	**30.34**
Low	27550.08	DFT-s-OFDM	16QAM	153+25	H + V	2Tx	H	45	294	1 / 23	28.18
Low	27550.08	DFT-s-OFDM	64QAM	153+25	H + V	2Tx	H	45	294	1 / 23	25.99
Low	27550.08	DFT-s-OFDM (Closed)	QPSK	161+33	H + V	2Tx	H	107	57	1 / 23	29.07

Table 7-12. Ant 2 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]
Low	27550.08	DFT-s-OFDM	QPSK	153+25	H + V	2Tx	H	54	291	64 / 0	26.22
Low	27550.08	DFT-s-OFDM	π/2 BPSK	153+25	H + V	2Tx	H	54	291	64 / 0	26.17
Low	27550.08	DFT-s-OFDM	16QAM	153+25	H + V	2Tx	H	54	291	64 / 0	24.72
Low	27550.08	DFT-s-OFDM	64QAM	153+25	H + V	2Tx	H	54	291	64 / 0	22.65

Table 7-13. Ant 2 EIRP Data (Band n261 - 100MHz-2CC)

Band n260 Beam ID Configurations

Mode	Channel	Beam Polarization	Beam ID	Beam ID Pair
SISO	Low	H	152	-
		V	24	-
	Mid	H	152	-
		V	34	-
	High	H	152	-
		V	34	-
MIMO	Low	2Tx/MIMO	152	24
	Mid	2Tx/MIMO	152	24
	High	2Tx/MIMO	152	24
SISO (Closed)	Low	H	161	-
		V	34	-
	Mid	H	161	-
		V	24	-
	High	H	152	-
		V	33	-
MIMO (Closed)	Low	2Tx/MIMO	162	34
	Mid	2Tx/MIMO	152	24
	High	2Tx/MIMO	152	24

Table 7-14. Ant 1 (K Patch) Worst Case Beam ID

Notes:

1. For SISO V beam, both beam ID 34 and 25 were investigated, the worst case was included in this report.

Mode	Channel	Beam Polarization	Beam ID	Beam ID Pair
SISO	Low	H	166	-
		V	39	-
	Mid	H	157	-
		V	39	-
	High	H	167	-
		V	39	-
MIMO	Low	2Tx/MIMO	157	29
	Mid	2Tx/MIMO	166	38
	High	2Tx/MIMO	167	39
SISO (Closed)	Low	H	155	-
		V	38	-
	Mid	H	157	-
		V	38	-
	High	H	157	-
		V	30	-
MIMO (Closed)	Low	2Tx/MIMO	165	37
	Mid	2Tx/MIMO	156	28
	High	2Tx/MIMO	156	28

Table 7-15. Ant 2 (L Patch) Worst Case Beam ID

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	152	H	SISO	H	96	352	1 / 19	26.93
High	39975.00	DFT-s-OFDM	QPSK	34	V	SISO	H	334	280	1 / 19	27.20
High	39975.00	DFT-s-OFDM	QPSK	152+24	H + V	2Tx	V	16	69	1 / 19	**29.29**
High	39975.00	CP-OFDM	QPSK	152	H	SISO	H	96	352	1 / 16	24.54
High	39975.00	CP-OFDM	QPSK	34	V	SISO	H	334	280	1 / 16	24.67
High	39975.00	CP-OFDM	QPSK	152+24	H + V	MIMO	V	16	69	1 / 16	26.36
Low	37025.04	DFT-s-OFDM	QPSK	152+24	H + V	2Tx	V	8	258	1 / 19	28.09
Mid	38499.96	DFT-s-OFDM	QPSK	152+24	H + V	2Tx	V	15	71	1 / 19	26.43
High	39975.00	DFT-s-OFDM	π/2 BPSK	152+24	H + V	2Tx	V	16	69	1 / 16	28.53
High	39975.00	DFT-s-OFDM	16QAM	152+24	H + V	2Tx	V	16	69	1 / 19	26.39
High	39975.00	DFT-s-OFDM	64QAM	152+24	H + V	2Tx	V	16	69	1 / 19	24.43
High	39975.00	DFT-s-OFDM (Closed)	QPSK	152+24	H + V	2Tx	V	17	98	1 / 19	28.33

Table 7-16. Ant 1 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	152+24	H + V	2Tx	V	13	308	32 / 0	26.85
High	39975.00	DFT-s-OFDM	π/2 BPSK	152+24	H + V	2Tx	V	13	308	32 / 0	26.82
High	39975.00	DFT-s-OFDM	16QAM	152+24	H + V	2Tx	V	13	308	32 / 0	25.53
High	39975.00	DFT-s-OFDM	64QAM	152+24	H + V	2Tx	V	13	308	32 / 0	23.40

Table 7-17. Ant 1 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	152	H	SISO	H	95	354	1 / 33	27.36
High	39949.92	DFT-s-OFDM	QPSK	34	V	SISO	H	125	69	1 / 42	23.77
High	39949.92	DFT-s-OFDM	QPSK	152+24	H + V	2Tx	V	16	67	1 / 42	**28.96**
High	39949.92	CP-OFDM	QPSK	152	H	SISO	H	95	354	1 / 23	23.41
High	39949.92	CP-OFDM	QPSK	34	V	SISO	H	125	69	1 / 33	20.51
High	39949.92	CP-OFDM	QPSK	152+24	H + V	MIMO	V	16	67	1 / 33	25.29
Low	37050.00	DFT-s-OFDM	QPSK	152+24	H + V	2Tx	V	9	257	1 / 23	28.29
Mid	38499.96	DFT-s-OFDM	QPSK	152+24	H + V	2Tx	V	177	309	1 / 42	26.87
High	39949.92	DFT-s-OFDM	π/2 BPSK	152+24	H + V	2Tx	V	16	67	1 / 33	28.67
High	39949.92	DFT-s-OFDM	16QAM	152+24	H + V	2Tx	V	16	67	1 / 42	26.76
High	39949.92	DFT-s-OFDM	64QAM	152+24	H + V	2Tx	V	16	67	1 / 33	24.57
High	39949.92	DFT-s-OFDM (Closed)	QPSK	152+24	H + V	2Tx	V	179	131	1 / 42	26.98

Table 7-18. Ant 1 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	152+24	H + V	2Tx	V	15	64	64 / 0	26.17
High	39949.92	DFT-s-OFDM	π/2 BPSK	152+24	H + V	2Tx	V	15	64	64 / 0	26.15
High	39949.92	DFT-s-OFDM	16QAM	152+24	H + V	2Tx	V	15	64	64 / 0	24.67
High	39949.92	DFT-s-OFDM	64QAM	152+24	H + V	2Tx	V	15	64	64 / 0	22.61

Table 7-19. Ant 1 EIRP Data (Band n260 - 100MHz-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]
Low	37025.04	DFT-s-OFDM	QPSK	157	H	SISO	V	64	93	1 / 19	25.92
Low	37025.04	DFT-s-OFDM	QPSK	39	V	SISO	H	262	124	1 / 19	23.48
Low	37025.04	DFT-s-OFDM	QPSK	157+29	H + V	2Tx	V	69	92	1 / 19	**27.08**
Low	37025.04	CP-OFDM	QPSK	157	H	SISO	V	64	93	1 / 19	23.36
Low	37025.04	CP-OFDM	QPSK	39	V	SISO	H	262	124	1 / 12	20.24
Low	37025.04	CP-OFDM	QPSK	157+29	H + V	MIMO	V	69	92	1 / 19	23.55
Mid	38499.96	DFT-s-OFDM	QPSK	166+38	H + V	2Tx	H	36	309	1 / 12	25.24
High	39975.00	DFT-s-OFDM	QPSK	167+39	H + V	2Tx	H	268	116	1 / 19	26.08
Low	37025.04	DFT-s-OFDM	π/2 BPSK	157+29	H + V	2Tx	V	69	92	1 / 19	26.85
Low	37025.04	DFT-s-OFDM	16QAM	157+29	H + V	2Tx	V	69	92	1 / 19	24.50
Low	37025.04	DFT-s-OFDM	64QAM	157+29	H + V	2Tx	V	69	92	1 / 19	23.32
High	39975.00	DFT-s-OFDM (Closed)	QPSK	28+156	H + V	2Tx	V	59	92	1 / 19	25.89

Table 7-20. Ant 2 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]
Low	37025.04	DFT-s-OFDM	QPSK	157+29	H + V	2Tx	V	68	92	32 / 0	24.04
Low	37025.04	DFT-s-OFDM	π/2 BPSK	157+29	H + V	2Tx	V	68	92	32 / 0	24.03
Low	37025.04	DFT-s-OFDM	16QAM	157+29	H + V	2Tx	V	68	92	32 / 0	22.06
Low	37025.04	DFT-s-OFDM	64QAM	157+29	H + V	2Tx	V	68	92	1 / 19	20.70

Table 7-21. Ant 2 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]
Low	37050.00	DFT-s-OFDM	QPSK	157	H	SISO	V	64	93	1 / 42	26.32
Low	37050.00	DFT-s-OFDM	QPSK	39	V	SISO	H	262	122	1 / 23	23.49
Low	37050.00	DFT-s-OFDM	QPSK	157+29	H + V	2Tx	V	69	93	1 / 23	**27.40**
Low	37050.00	CP-OFDM	QPSK	157	H	SISO	V	64	93	1 / 42	23.84
Low	37050.00	CP-OFDM	QPSK	39	V	SISO	H	262	122	1 / 23	21.03
Low	37050.00	CP-OFDM	QPSK	157+29	H + V	MIMO	V	69	93	1 / 23	23.87
Mid	38499.96	DFT-s-OFDM	QPSK	166+38	H + V	2Tx	H	37	307	1 / 42	25.84
High	39949.92	DFT-s-OFDM	QPSK	167+39	H + V	2Tx	H	275	119	1 / 42	25.56
Low	37050.00	DFT-s-OFDM	π/2 BPSK	157+29	H + V	2Tx	V	69	93	1 / 23	27.18
Low	37050.00	DFT-s-OFDM	16QAM	157+29	H + V	2Tx	V	69	93	1 / 23	24.85
Low	37050.00	DFT-s-OFDM	64QAM	157+29	H + V	2Tx	V	69	93	1 / 23	23.74
High	39949.92	DFT-s-OFDM (Closed)	QPSK	156+28	H + V	2Tx	V	62	94	1 / 42	25.98

Table 7-22. Ant 2 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]
Low	37050.00	DFT-s-OFDM	QPSK	157+29	H + V	2Tx	V	68	91	64 / 0	24.70
Low	37050.00	DFT-s-OFDM	π/2 BPSK	157+29	H + V	2Tx	V	68	91	64 / 0	24.79
Low	37050.00	DFT-s-OFDM	16QAM	157+29	H + V	2Tx	V	68	91	64 / 0	23.18
Low	37050.00	DFT-s-OFDM	64QAM	157+29	H + V	2Tx	V	68	91	1 / 42	21.50

Table 7-23. Ant 2 EIRP Data (Band n260 - 100MHz-2CC)

7.4 Radiated Spurious and Harmonic Emissions

§2.1051, §30.203

Test Overview

The spectrum is scanned from 30MHz to 100GHz for n261 and from 30MHz to 200GHz for n260. All out of band emissions are measured in a radiated test setup while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All modulations were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

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

Test Procedure Used

ANSI C63.26-2015 Section 5.7.4
KDB 842590 D01 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 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.

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) The folder open configuration was the worst case so the full "open" test results are shown in this section.

5) 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.

6) 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.

7) 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 7-24. Far-Field Distance & Measurement Distance per Frequency Range

8) 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.

9) 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.

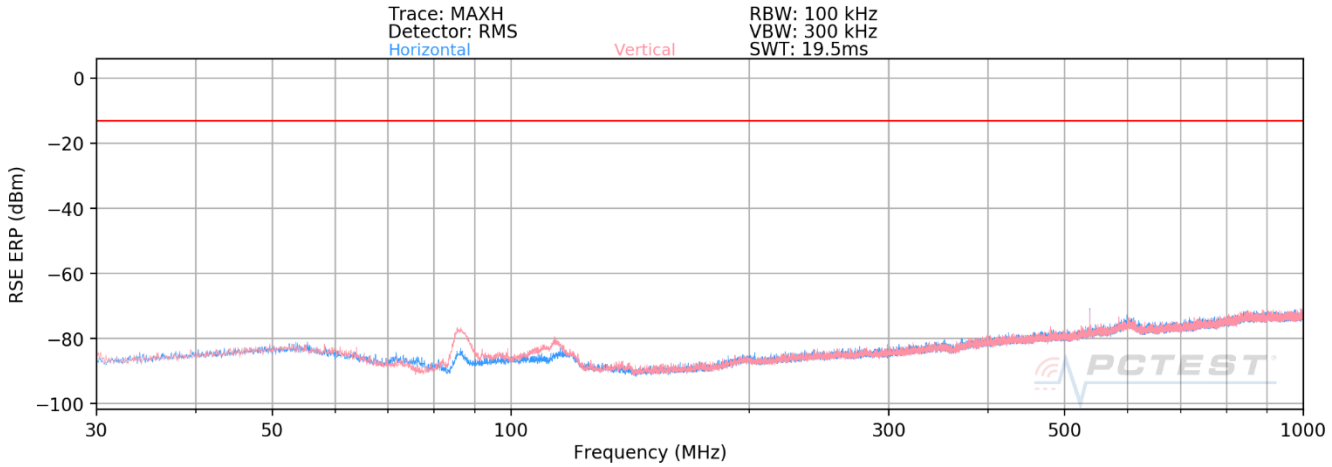
10) The "-" shown in the following RSE tables are used to denote a noise floor measurement.

11) 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, and n260 uses LTE B2, B5, B12, B13, B14,B30, B48 and B66.

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

Band n261 – Ant 1 – Open

30MHz - 1GHz



Plot 7-33. Ant 1- n261 Radiated Spurious Plot (1CC QPSK Mid Channel 2Tx – EN-DC Anchor Band 2)

Spurious Emissions ERP Sample Calculation (n261)

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)

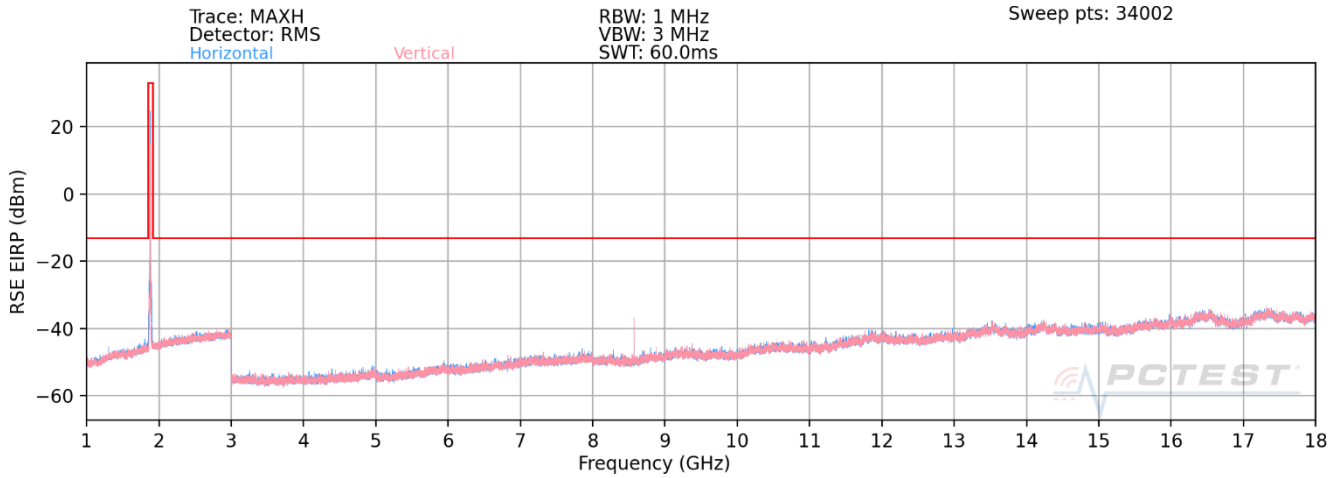
Frequency [MHz]	Channnel	Bandwidth (MHz)	EUT Beam Pol.	Modulation	Antenna Polarization [H/V]	Turntable Azimuth [degrees]	Antenna Height [cm]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
56.02	Mid	100	2Tx	QPSK	V	356	134	-88.82	-13.00	-75.82
86.44	Mid	100	2Tx	QPSK	V	306	116	-93.23	-13.00	-80.23
112.50	Mid	100	2Tx	QPSK	V	179	170	-93.87	-13.00	-80.87
203.63	Mid	100	2Tx	QPSK	V	211	388	-93.60	-13.00	-80.60
537.60	Mid	100	2Tx	QPSK	H	69	153	-59.62	-13.00	-46.62
854.20	Mid	100	2Tx	QPSK	H	172	376	-82.12	-13.00	-69.12

Table 7-25. Ant 1 – 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.

1GHz - 18GHz



Plot 7-34. Ant 1-n261 Radiated Spurious Plot (1CC QPSK Mid Channel 2Tx – EN-DC Anchor Band 2)

Spurious Emissions EIRP Sample Calculation (n261)

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

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

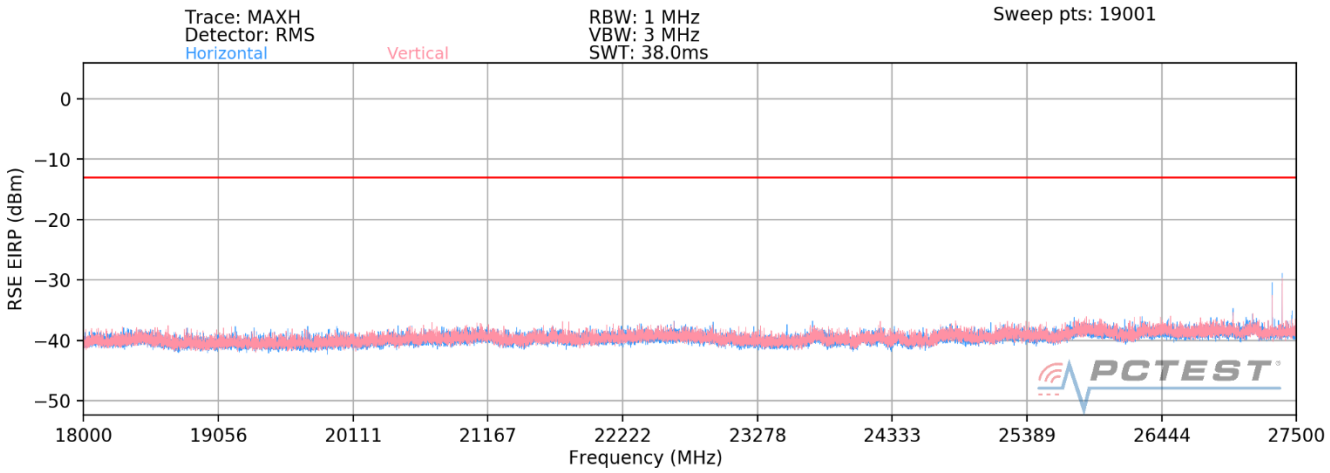
Frequency [MHz]	Channnel	Bandwidth (MHz)	EUT Beam Pol.	Modulation	Antenna Polarization [H/V]	Turntable Azimuth [degrees]	Antenna Height [cm]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
8812.15	Low	50	2Tx	QPSK	V	10	112	-40.06	-13.00	-27.06
8572.01	Mid	50	2Tx	QPSK	V	183	112	-42.21	-13.00	-29.21
8971.82	High	50	2Tx	QPSK	V	16	111	-41.22	-13.00	-28.22

Table 7-26. Ant 1 - 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.

18GHz - 27.5GHz



Plot 7-35. Ant 1-n261 Radiated Spurious Plot (1CC QPSK Mid Channel 2Tx – EN-DC Anchor B2)

Spurious Emissions EIRP Sample Calculation (n261)

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

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

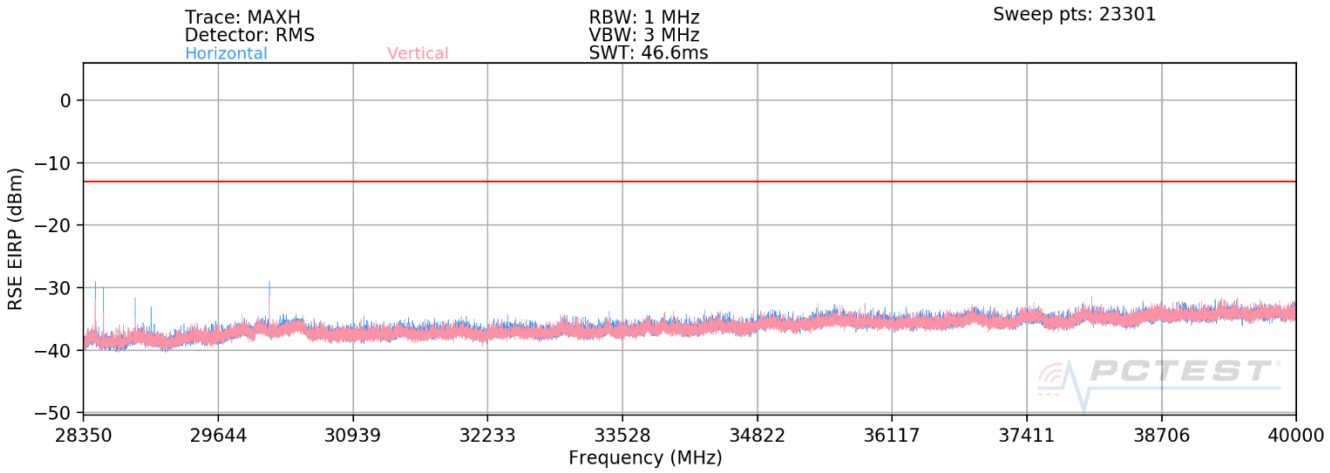
Frequency [MHz]	Channnel	Bandwidth (MHz)	EUT Beam Pol.	Modulation	Antenna Polarization [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
27218.40	Low	50	2Tx	QPSK	H	15	254	-29.47	-13.00	-16.47
27400.85	Low	50	2Tx	QPSK	H	15	255	-29.60	-13.00	-16.60
27003.60	Mid	50	2Tx	QPSK	H	48	282	-33.91	-13.00	-20.91
27311.35	Mid	50	2Tx	QPSK	H	48	281	-30.79	-13.00	-17.79
27387.90	Mid	50	2Tx	QPSK	H	36	290	-30.59	-13.00	-17.59
27327.10	High	50	2Tx	QPSK	H	25	292	-34.15	-13.00	-21.15
27403.70	High	50	2Tx	QPSK	H	19	295	-29.14	-13.00	-16.14

Table 7-27. Ant 1 - 2Tx - Spurious Emissions Table (18GHz - 27.5GHz)

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.

28.35GHz - 40GHz



Plot 7-36. Ant 1-n261 Radiated Spurious Plot (1CC QPSK Mid Channel 2Tx – EN-DC Anchor B2)

Spurious Emissions EIRP Sample Calculation (n261)

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

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

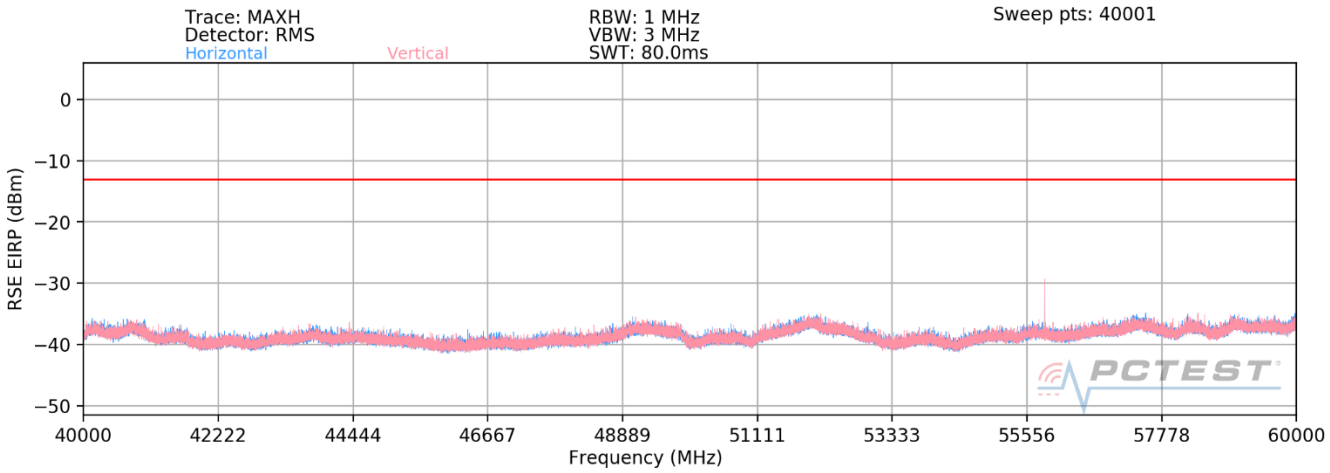
Frequency [MHz]	Channnel	Bandwidth (MHz)	EUT Beam Pol.	Modulation	Antenna Polarization [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
28447.20	Low	50	2Tx	QPSK	H	14	256	-31.80	-13.00	-18.80
28614.80	Low	50	2Tx	QPSK	H	15	249	-30.19	-13.00	-17.19
28463.05	Mid	50	2Tx	QPSK	H	32	292	-30.22	-13.00	-17.22
28539.75	Mid	50	2Tx	QPSK	H	42	288	-30.93	-13.00	-17.93
28847.30	Mid	50	2Tx	QPSK	H	27	292	-33.87	-13.00	-20.87
30134.95	Mid	50	2Tx	QPSK	H	44	288	-31.76	-13.00	-18.76
28632.75	High	50	2Tx	QPSK	H	27	292	-26.49	-13.00	-13.49
28863.05	High	50	2Tx	QPSK	H	32	291	-31.24	-13.00	-18.24

Table 7-28. Ant 1 - 2Tx - Spurious Emissions Table (28.35GHz - 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.

40GHz - 60GHz



Plot 7-37. Ant 1-n261 Radiated Spurious Plot (1CC QPSK Mid Channel 2Tx – EN-DC Anchor B2)

Spurious Emissions EIRP Sample Calculation (n261)

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

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

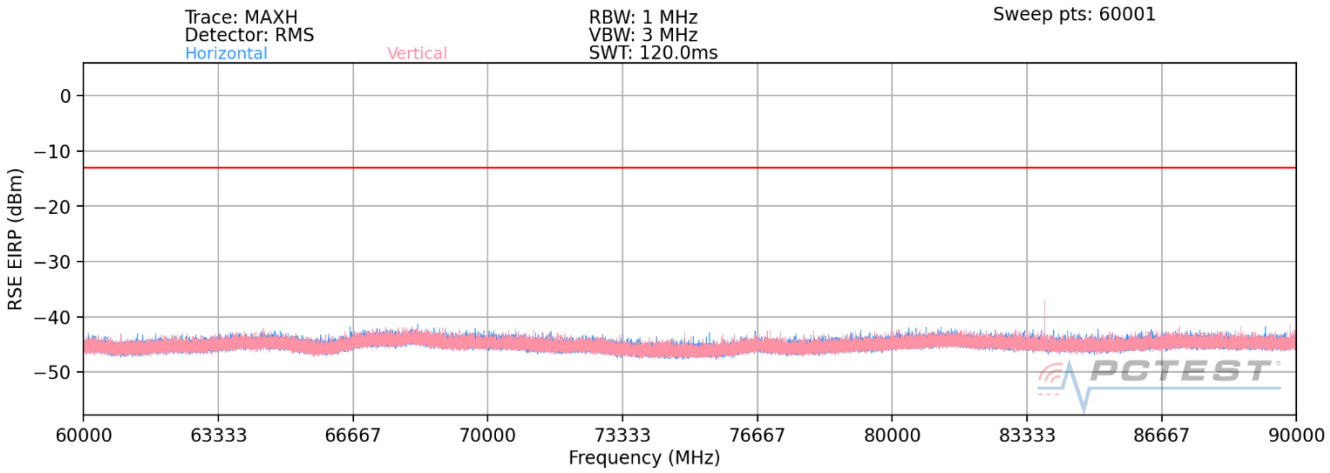
Frequency [MHz]	Channnel	Bandwidth (MHz)	EUT Beam Pol.	Modulation	Antenna Polarization [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
55051.38	Low	50	2Tx	QPSK	V	202	284	-33.83	-13.00	-20.83
55815.24	Mid	50	2Tx	QPSK	V	331	352	-31.18	-13.00	-18.18
56651.22	High	50	2Tx	QPSK	V	329	9	-30.61	-13.00	-17.61

Table 7-29. Ant 1 - 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.

60GHz - 90GHz



Plot 7-38. Ant 1-n261 Radiated Spurious Plot (1CC QPSK Mid Channel 2Tx – EN-DC Anchor B2)

Spurious Emissions EIRP Sample Calculation (n261)

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

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

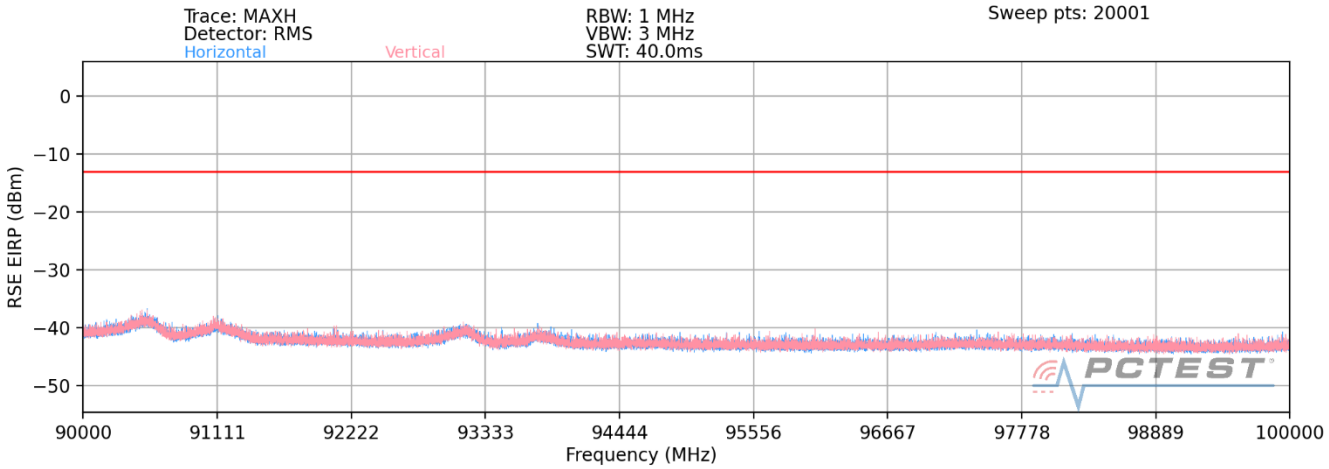
Frequency [MHz]	Channnel	Bandwidth (MHz)	EUT Beam Pol.	Modulation	Antenna Polarization [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
82576.79	Low	50	2Tx	QPSK	V	299	326	-38.78	-13.00	-25.78
83776.60	Mid	50	2Tx	QPSK	V	323	7	-39.39	-13.00	-26.39
84976.40	High	50	2Tx	QPSK	V	233	1	-39.65	-13.00	-26.65

Table 7-30. Ant 1 - 2Tx - Spurious Emissions Table (60GHz - 90GHz)

Notes

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

90GHz - 100GHz



Plot 7-39. Ant 1-n261 Radiated Spurious Plot (1CC QPSK Mid Channel 2Tx – EN-DC Anchor B2)

Spurious Emissions EIRP Sample Calculation (n261)

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

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

Frequency [MHz]	Channnel	Bandwidth (MHz)	EUT Beam Pol.	Modulation	Antenna Polarization [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
91043.03	Low	50	2Tx	QPSK	V	-	-	-42.79	-13.00	-29.79
91062.41	Mid	50	2Tx	QPSK	V	-	-	-42.50	-13.00	-29.50
91065.51	High	50	2Tx	QPSK	V	-	-	-42.66	-13.00	-29.66

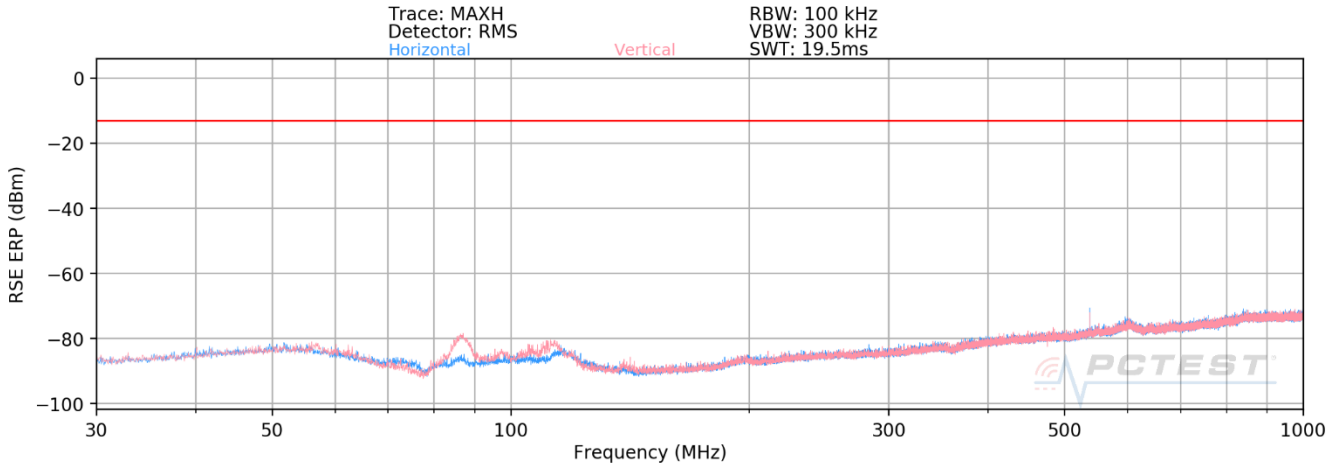
Table 7-31. Ant 1 - 2Tx - Spurious Emissions Table (90GHz - 100GHz)

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 n261 – Ant 2 – Open

30MHz - 1GHz



Plot 7-40. Ant 2-n261 Radiated Spurious Plot (1CC QPSK Mid Channel 2Tx – EN-DC Anchor Band 2)

Spurious Emissions ERP Sample Calculation (n261)

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)

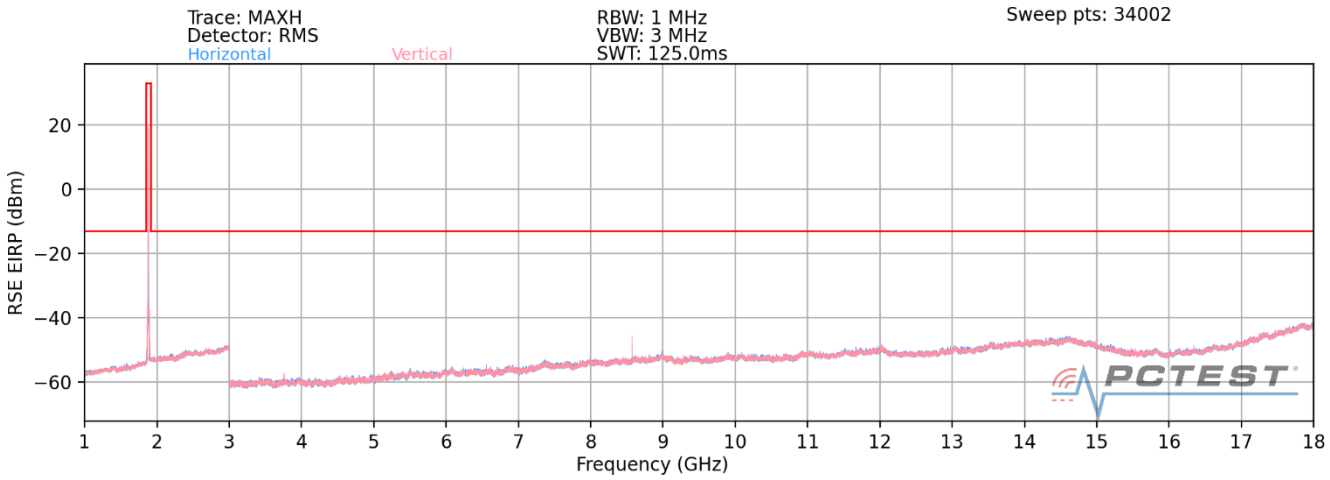
Frequency [MHz]	Channnel	Bandwidth (MHz)	EUT Beam Pol.	Modulation	Antenna Polarization [H/V]	Turntable Azimuth [degrees]	Antenna Height [cm]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
56.41	Mid	100	2Tx	QPSK	V	324	394	-88.22	-13.00	-75.22
85.89	Mid	100	2Tx	QPSK	V	268	141	-89.49	-13.00	-76.49
109.87	Mid	100	2Tx	QPSK	V	58	120	-86.90	-13.00	-73.90
206.59	Mid	100	2Tx	QPSK	V	342	120	-91.75	-13.00	-78.75
537.60	Mid	100	2Tx	QPSK	H	155	166	-62.25	-13.00	-49.25
588.16	Mid	100	2Tx	QPSK	V	205	207	-79.75	-13.00	-66.75

Table 7-32. Ant 2 - 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.

1GHz - 18GHz



Plot 7-41. Ant 2-n261 Radiated Spurious Plot (1CC QPSK Mid Channel 2Tx – EN-DC Anchor Band 2)

Spurious Emissions EIRP Sample Calculation (n261)

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

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

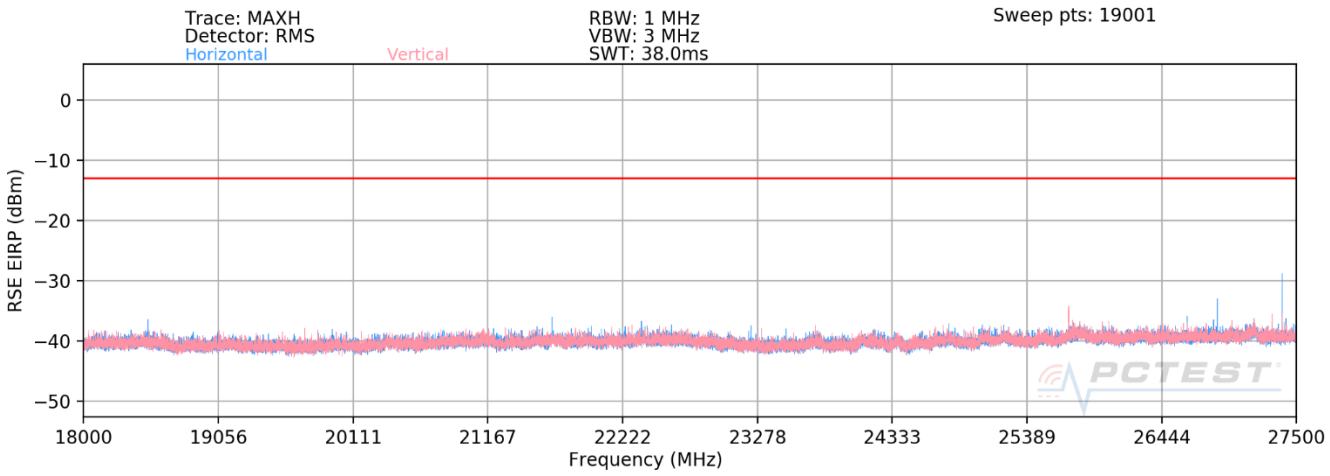
Frequency [MHz]	Channnel	Bandwidth (MHz)	EUT Beam Pol.	Modulation	Antenna Polarization [H/V]	Turntable Azimuth [degrees]	Antenna Height [cm]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
8811.95	Low	50	2Tx	QPSK	V	336	116	-39.73	-13.00	-26.73
8571.91	Mid	50	2Tx	QPSK	V	344	138	-42.59	-13.00	-29.59
8971.82	High	50	2Tx	QPSK	V	8	346	-38.62	-13.00	-25.62

Table 7-33. Ant 2 - 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.

18GHz - 27.5GHz



Plot 7-42. Ant 2-n261 Radiated Spurious Plot (1CC QPSK Mid Channel 2Tx – EN-DC Anchor B2)

Spurious Emissions EIRP Sample Calculation (n261)

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

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

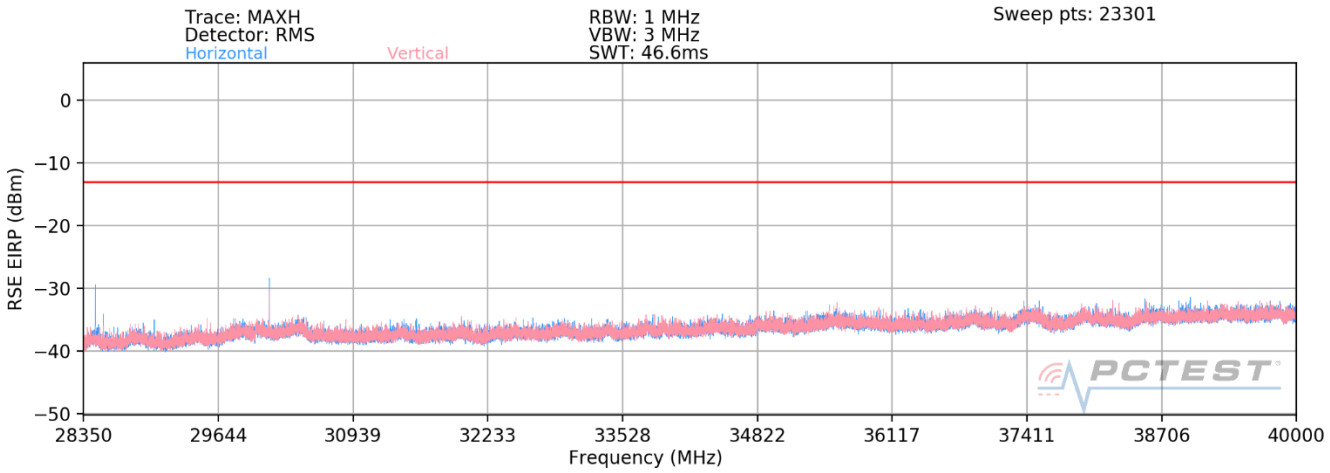
Frequency [MHz]	Channnel	Bandwidth (MHz)	EUT Beam Pol.	Modulation	Antenna Polarization [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
26911.25	Low	50	2Tx	QPSK	H	287	275	-30.31	-13.00	-17.31
26975.25	Low	50	2Tx	QPSK	H	286	276	-30.26	-13.00	-17.26
26879.75	Mid	50	2Tx	QPSK	H	143	48	-37.52	-13.00	-24.52
27387.95	Mid	50	2Tx	QPSK	H	138	47	-32.22	-13.00	-19.22
27326.85	High	50	2Tx	QPSK	H	145	56	-38.37	-13.00	-25.37
27403.90	High	50	2Tx	QPSK	H	149	63	-39.98	-13.00	-26.98

Table 7-34. Ant 2 - 2Tx - Spurious Emissions Table (18GHz - 27.5GHz)

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.

28.35GHz - 40GHz



Plot 7-43. Ant 2-n261 Radiated Spurious Plot (1CC QPSK Mid Channel 2Tx – EN-DC Anchor B2)

Spurious Emissions EIRP Sample Calculation (n261)

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

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

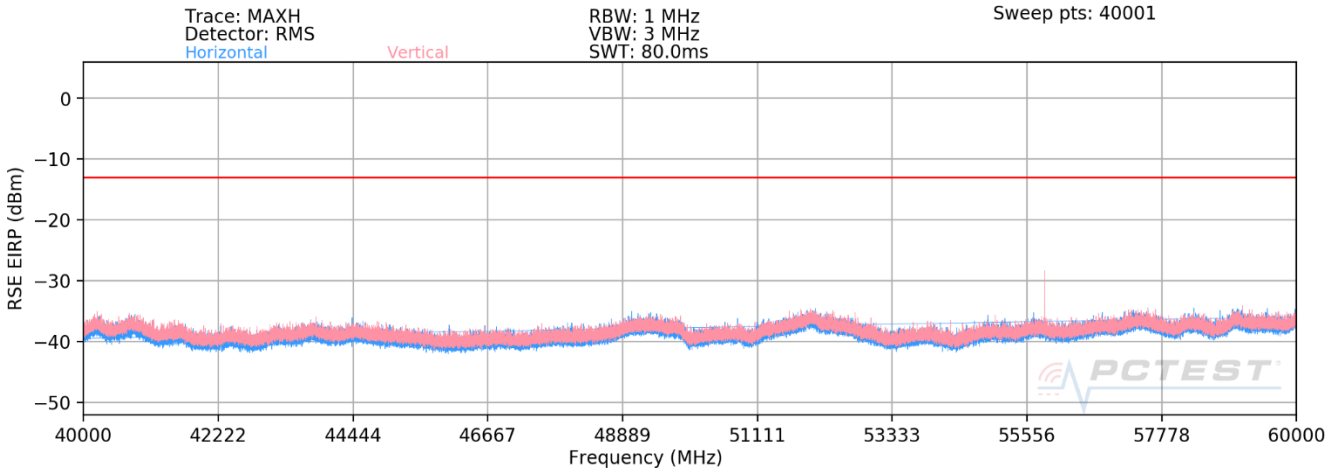
Frequency [MHz]	Channnel	Bandwidth (MHz)	EUT Beam Pol.	Modulation	Antenna Polarization [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
28446.90	Low	50	2Tx	QPSK	H	291	275	-30.83	-13.00	-17.83
28614.95	Low	50	2Tx	QPSK	H	290	269	-30.78	-13.00	-17.78
28463.15	Mid	50	2Tx	QPSK	H	149	54	-34.20	-13.00	-21.20
30135.10	Mid	50	2Tx	QPSK	H	153	65	-32.05	-13.00	-19.05
28862.90	High	50	2Tx	QPSK	H	150	69	-34.06	-13.00	-21.06
29735.15	High	50	2Tx	QPSK	H	149	80	-31.27	-13.00	-18.27

Table 7-35. Ant 2 - 2Tx - Spurious Emissions Table (28.35GHz - 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.

40GHz - 60GHz



Plot 7-44. Ant 2-n261 Radiated Spurious Plot (1CC QPSK Mid Channel 2Tx – EN-DC Anchor B2)

Spurious Emissions EIRP Sample Calculation (n261)

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

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

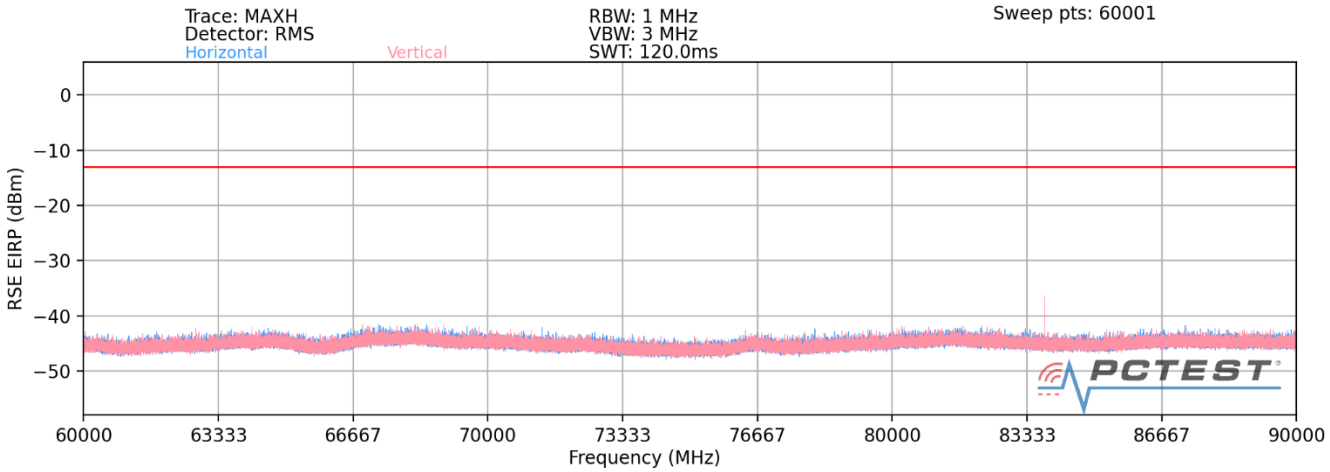
Frequency [MHz]	Channnel	Bandwidth (MHz)	EUT Beam Pol.	Modulation	Antenna Polarization [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
55051.20	Low	50	2Tx	QPSK	H	323	328	-30.61	-13.00	-17.61
55850.82	Mid	50	2Tx	QPSK	V	68	100	-28.64	-13.00	-15.64
56650.70	High	50	2Tx	QPSK	V	69	101	-27.70	-13.00	-14.70

Table 7-36. Ant 2 - 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.

60GHz - 90GHz



Plot 7-45. Ant 2-n261 Radiated Spurious Plot (1CC QPSK Mid Channel 2Tx – EN-DC Anchor B2)

Spurious Emissions EIRP Sample Calculation (n261)

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

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

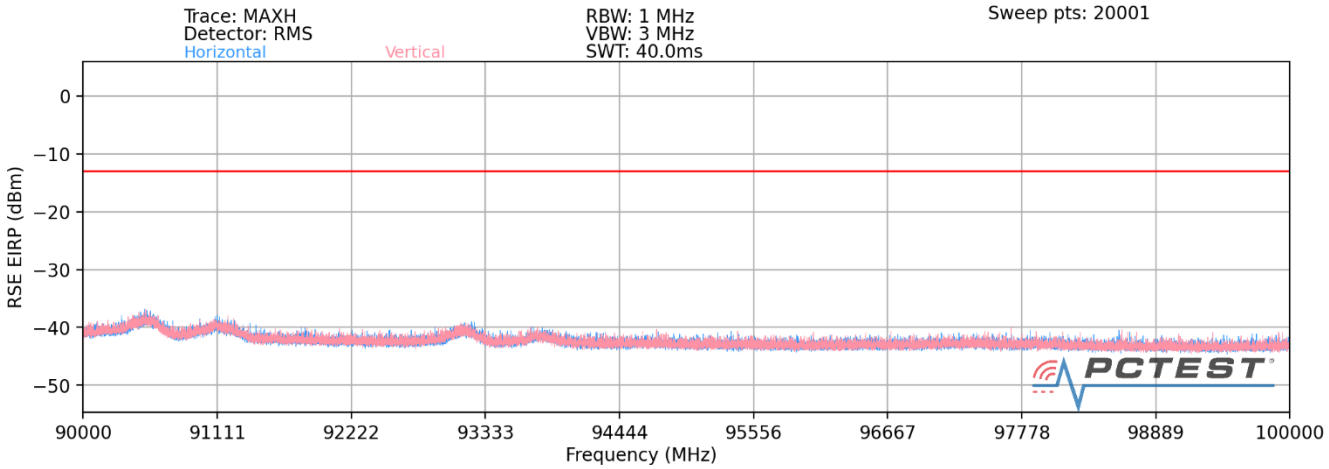
Frequency [MHz]	Channnel	Bandwidth (MHz)	EUT Beam Pol.	Modulation	Antenna Polarization [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
82576.61	Low	50	2Tx	QPSK	V	193	248	-42.36	-13.00	-29.36
83776.82	Mid	50	2Tx	QPSK	V	148	70	-39.32	-13.00	-26.32
84976.56	High	50	2Tx	QPSK	V	151	76	-38.86	-13.00	-25.86

Table 7-37. Ant 2 - 2Tx - Spurious Emissions Table (60GHz - 90GHz)

Notes

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

90GHz - 100GHz



Plot 7-46. Ant 2-n261 Radiated Spurious Plot (1CC QPSK Mid Channel 2Tx – EN-DC Anchor B2)

Spurious Emissions EIRP Sample Calculation (n261)

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

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

Frequency [MHz]	Channnel	Bandwidth (MHz)	EUT Beam Pol.	Modulation	Antenna Polarization [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
91032.44	Low	50	2Tx	QPSK	V	-	-	-43.19	-13.00	-30.19
91031.54	Mid	50	2Tx	QPSK	V	-	-	-42.80	-13.00	-29.80
91040.03	High	50	2Tx	QPSK	V	-	-	-42.61	-13.00	-29.61

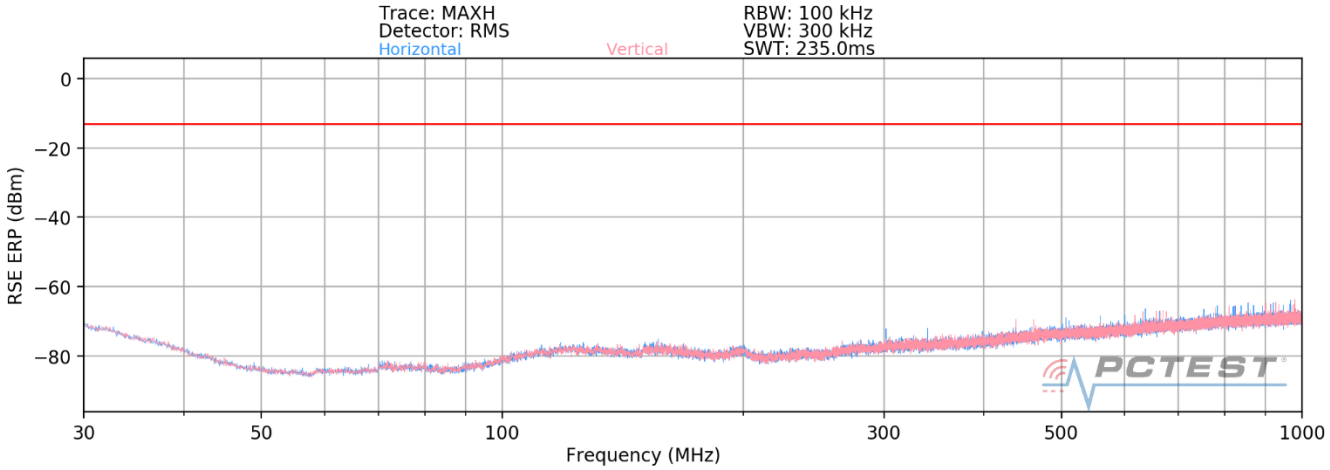
Table 7-38. Ant 2 - 2Tx - Spurious Emissions Table (90GHz - 100GHz)

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 n260- Ant 1 – Open

30MHz - 1GHz



Plot 7-47. Ant 1-n260 Radiated Spurious Plot (1CC QPSK Mid Channel 2Tx – EN-DC Anchor Band 2)

Spurious Emissions ERP Sample Calculation (n260)

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)

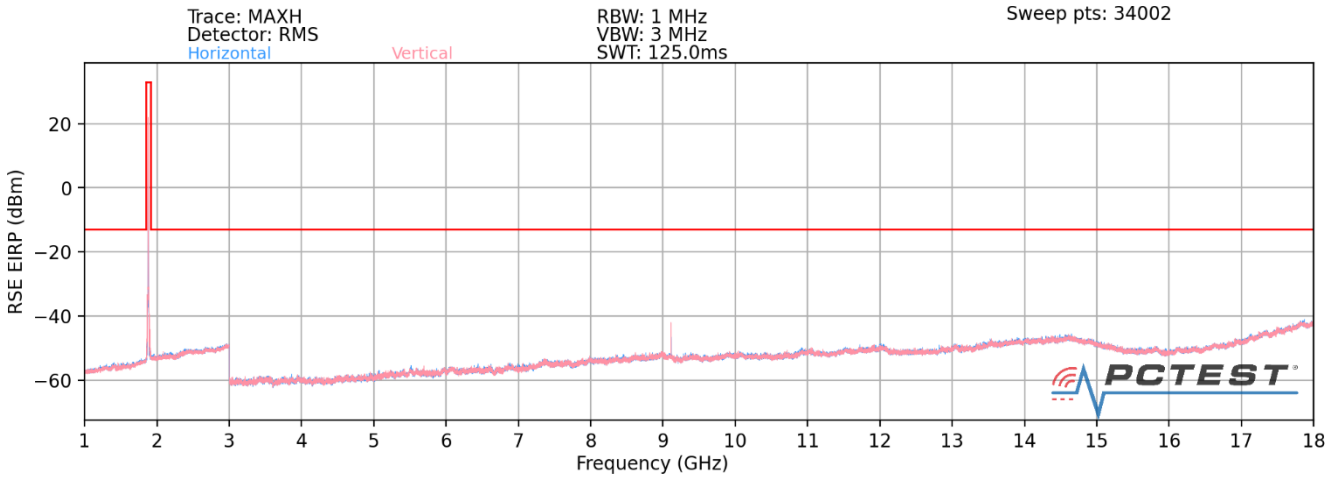
Frequency [MHz]	Channnel	Bandwidth (MHz)	EUT Beam Pol.	Modulation	Antenna Polarization [H/V]	Turntable Azimuth [degrees]	Antenna Height [cm]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
299.52	Mid	50	2Tx	QPSK	H	315	146	-79.40	-13.00	-66.40
347.66	Mid	50	2Tx	QPSK	H	352	389	-78.46	-13.00	-65.46
446.25	Mid	50	2Tx	QPSK	V	346	273	-76.45	-13.00	-63.45
495.48	Mid	50	2Tx	QPSK	H	314	184	-75.23	-13.00	-62.23
649.35	Mid	50	2Tx	QPSK	H	65	236	-73.45	-13.00	-60.45
897.80	Mid	50	2Tx	QPSK	V	261	212	-71.52	-13.00	-58.52

Table 7-39. Ant 1 - 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.

1GHz - 18GHz



Plot 7-48. Ant 1-n260 Radiated Spurious Plot (1CC QPSK Mid Channel 2Tx – EN-DC Anchor Band 2)

Spurious Emissions EIRP Sample Calculation (n260)

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

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

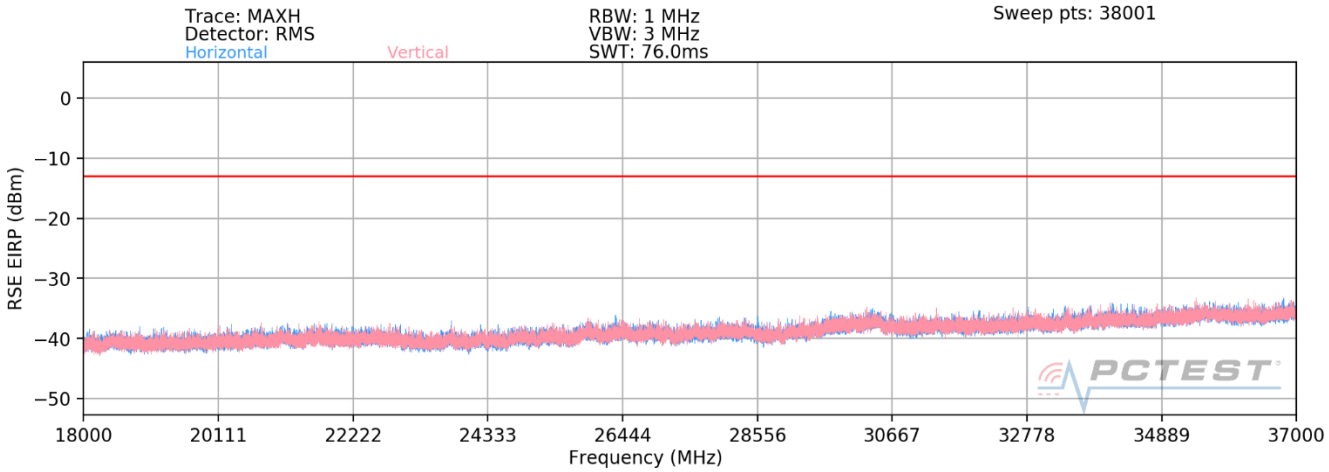
Frequency [MHz]	Channnel	Bandwidth (MHz)	EUT Beam Pol.	Modulation	Antenna Polarization [H/V]	Turntable Azimuth [degrees]	Antenna Height [cm]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
8404.16	Low	50	2Tx	QPSK	V	349	361	-44.42	-13.00	-31.42
9111.85	Mid	50	2Tx	QPSK	V	349	325	-44.98	-13.00	-31.98
9153.30	High	50	2Tx	QPSK	V	21	226	-44.27	-13.00	-31.27

Table 7-40. Ant 1 - 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.

18GHz – 37GHz



Plot 7-49. Ant 1-n260 Radiated Spurious Plot (1CC QPSK Mid Channel 2Tx – EN-DC Anchor Band 2)

Spurious Emissions EIRP Sample Calculation (n260)

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

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

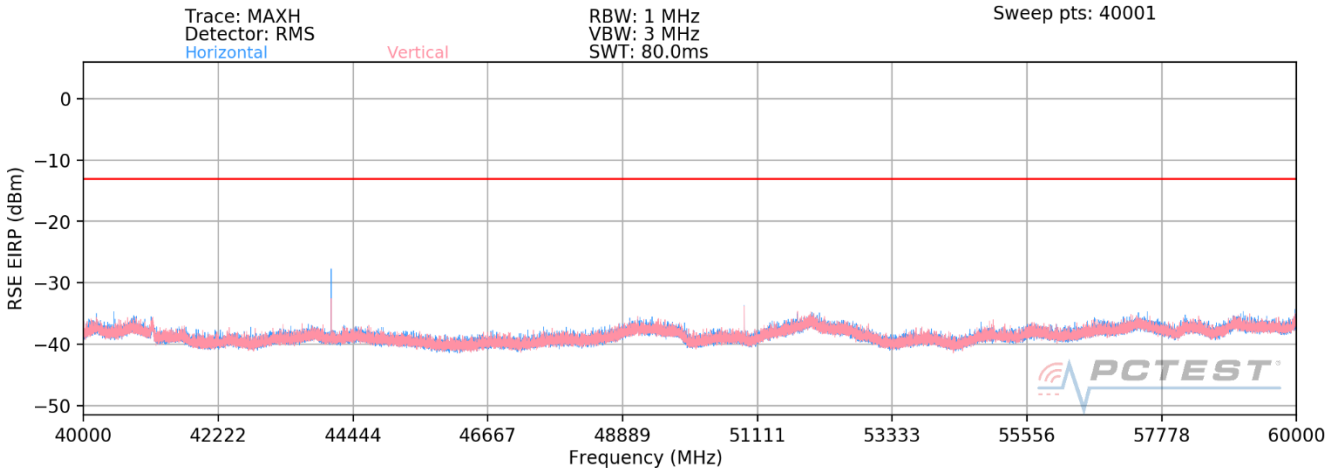
Frequency [MHz]	Channnel	Bandwidth (MHz)	EUT Beam Pol.	Modulation	Antenna Polarization [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
36718.35	Low	50	2Tx	QPSK	H	272	348	-25.64	-13.00	-12.64
36900.80	Low	50	2Tx	QPSK	H	269	345	-24.58	-13.00	-11.58
36922.80	Mid	50	2Tx	QPSK	H	-	-	-37.43	-13.00	-24.43
36928.52	High	50	2Tx	QPSK	H	-	-	-37.53	-13.00	-24.53

Table 7-41. Ant 1 - 2Tx - Spurious Emissions Table (18GHz – 37GHz)

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.

40GHz - 60GHz



Plot 7-50. Ant 1-n260 Radiated Spurious Plot (1CC QPSK Mid Channel 2Tx – EN-DC Anchor Band 2)

Spurious Emissions EIRP Sample Calculation (n260)

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

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

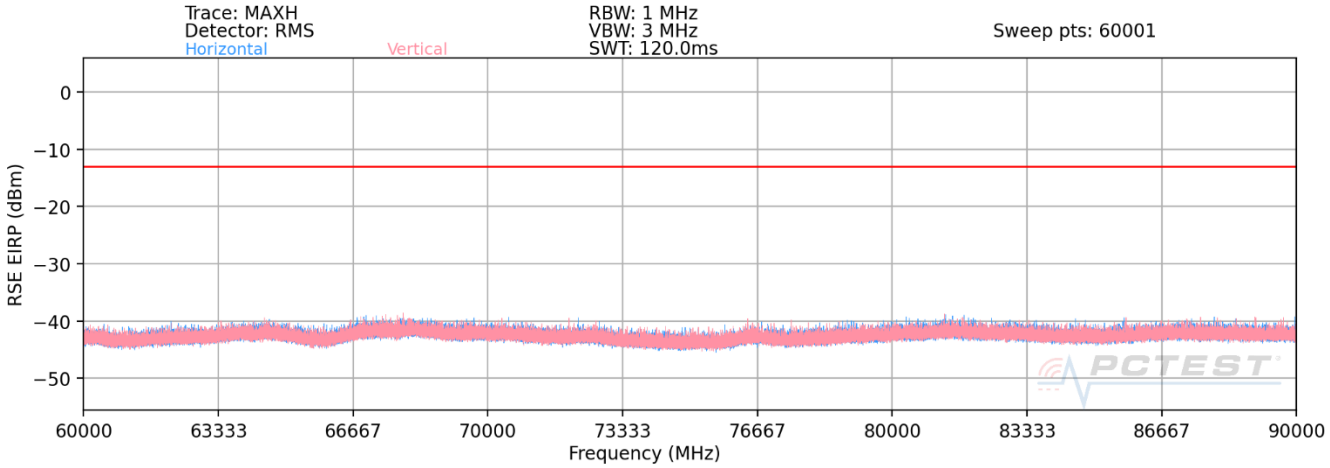
Frequency [MHz]	Channnel	Bandwidth (MHz)	EUT Beam Pol.	Modulation	Antenna Polarization [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
42930.99	Low	50	2Tx	QPSK	H	285	354	-28.73	-13.00	-15.73
49806.40	Low	50	2Tx	QPSK	H	278	355	-34.51	-13.00	-21.51
44083.06	Mid	50	2Tx	QPSK	H	272	319	-28.65	-13.00	-15.65
50894.79	Mid	50	2Tx	QPSK	H	275	2	-36.79	-13.00	-23.79
46233.36	High	50	2Tx	QPSK	H	282	327	-33.50	-13.00	-20.50
52861.51	High	50	2Tx	QPSK	H	270	357	-41.91	-13.00	-28.91

Table 7-42. Ant 1 - 2Tx - Spurious Emissions Table (40GHz - 60GHz)

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 1.5 meter.

60GHz - 90GHz



Plot 7-51. Ant 1-n260 Radiated Spurious Plot (1CC QPSK Mid Channel 2Tx – EN-DC Anchor Band 2)

Spurious Emissions EIRP Sample Calculation (n260)

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

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

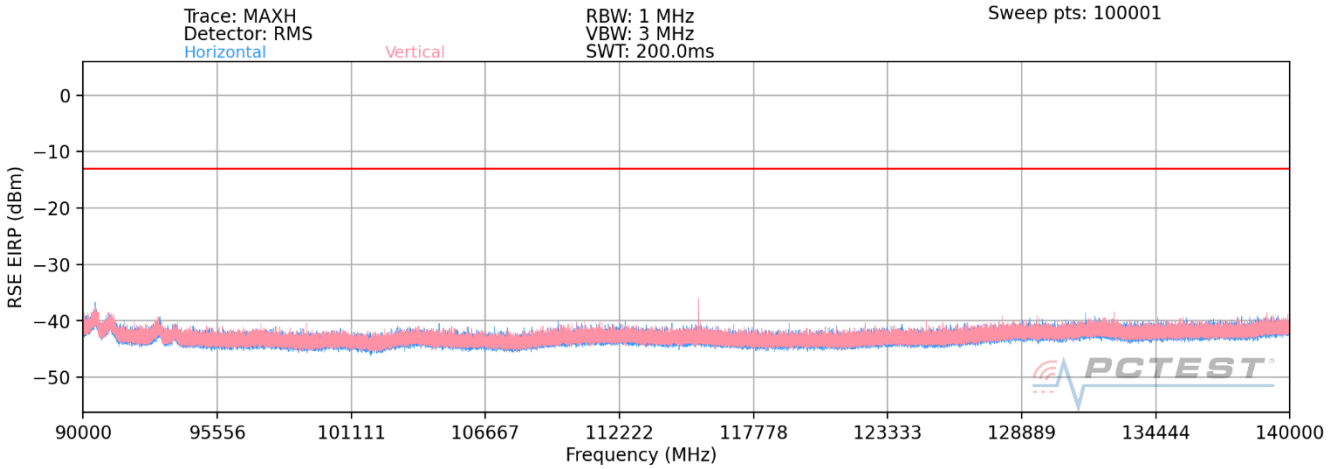
Frequency [MHz]	Channnel	Bandwidth (MHz)	EUT Beam Pol.	Modulation	Antenna Polarization [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
74050.74	Low	50	2Tx	QPSK	H	243	358	-45.16	-13.00	-32.16
77000.97	Mid	50	2Tx	QPSK	H	269	53	-44.05	-13.00	-31.05
79951.77	High	50	2Tx	QPSK	H	292	1	-46.22	-13.00	-33.22

Table 7-43. Ant 1 - 2Tx - Spurious Emissions Table (60GHz - 90GHz)

Notes

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

90GHz - 140GHz



Plot 7-52. Ant 1-n260 Radiated Spurious Plot (1CC QPSK Mid Channel 2Tx – EN-DC Anchor Band 2)

Spurious Emissions EIRP Sample Calculation (n260)

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

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

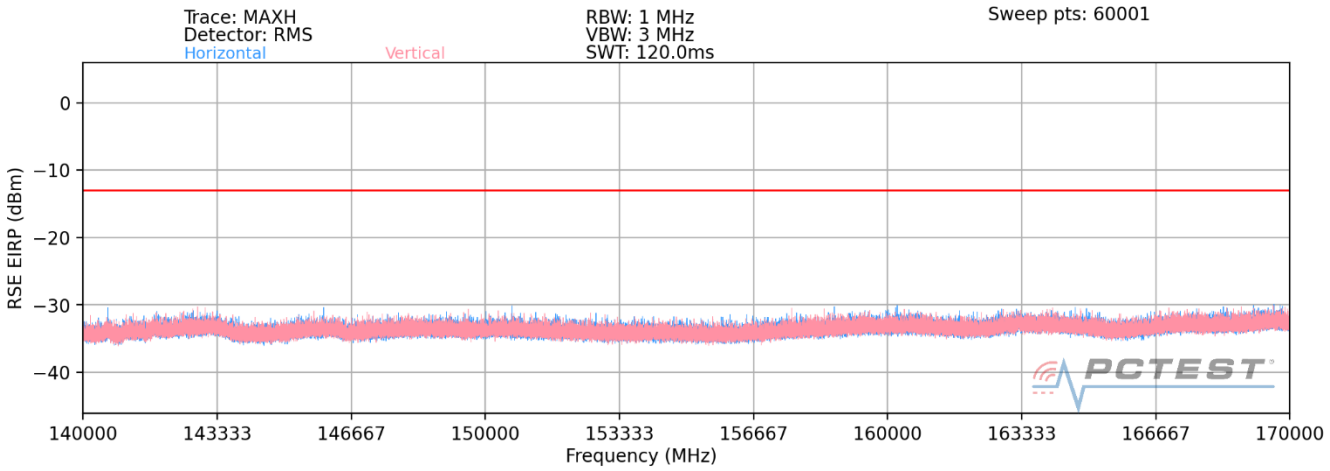
Frequency [MHz]	Channnel	Bandwidth (MHz)	EUT Beam Pol.	Modulation	Antenna Polarization [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
111076.29	Low	50	2Tx	QPSK	V	323	341	-32.88	-13.00	-19.88
115501.12	Mid	50	2Tx	QPSK	V	332	26	-32.50	-13.00	-19.50
119926.65	High	50	2Tx	QPSK	V	21	17	-32.72	-13.00	-19.72

Table 7-44. Ant 1 - 2Tx - Spurious Emissions Table (90GHz - 140GHz)

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.

140GHz - 170GHz



Plot 7-53. Ant 1-n260 Radiated Spurious Plot (1CC QPSK Mid Channel 2Tx – EN-DC Anchor Band 2)

Spurious Emissions EIRP Sample Calculation (n260)

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

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

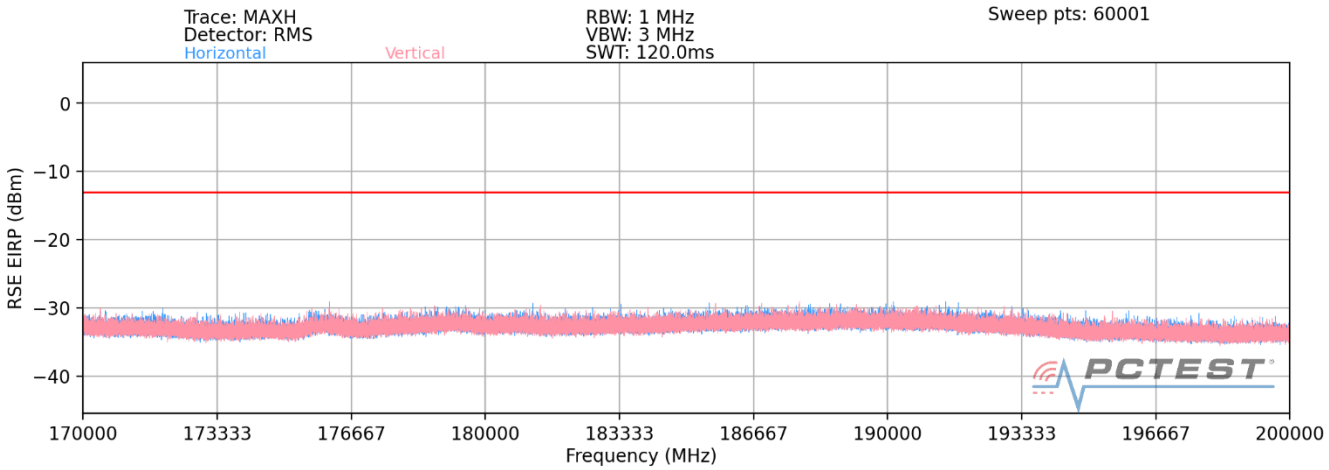
Frequency [MHz]	Channnel	Bandwidth (MHz)	EUT Beam Pol.	Modulation	Antenna Polarization [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
148100.16	Low	50	2Tx	QPSK	H	-	-	-38.62	-13.00	-25.62
154014.53	Mid	50	2Tx	QPSK	H	-	-	-39.15	-13.00	-26.15
159893.11	High	50	2Tx	QPSK	H	-	-	-37.94	-13.00	-24.94

Table 7-45. Ant 1 - 2Tx - Spurious Emissions Table (140GHz - 170GHz)

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.

170GHz - 200GHz



Plot 7-54. Ant 1-n260 Radiated Spurious Plot (1CC QPSK Mid Channel 2Tx – EN-DC Anchor Band 2)

Spurious Emissions EIRP Sample Calculation (n260)

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

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

Frequency [MHz]	Channnel	Bandwidth (MHz)	EUT Beam Pol.	Modulation	Antenna Polarization [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
185139.02	Low	50	2Tx	QPSK	H	-	-	-37.32	-13.00	-24.32
192515.25	Mid	50	2Tx	QPSK	H	-	-	-37.51	-13.00	-24.51
199879.68	High	50	2Tx	QPSK	H	-	-	-38.50	-13.00	-25.50

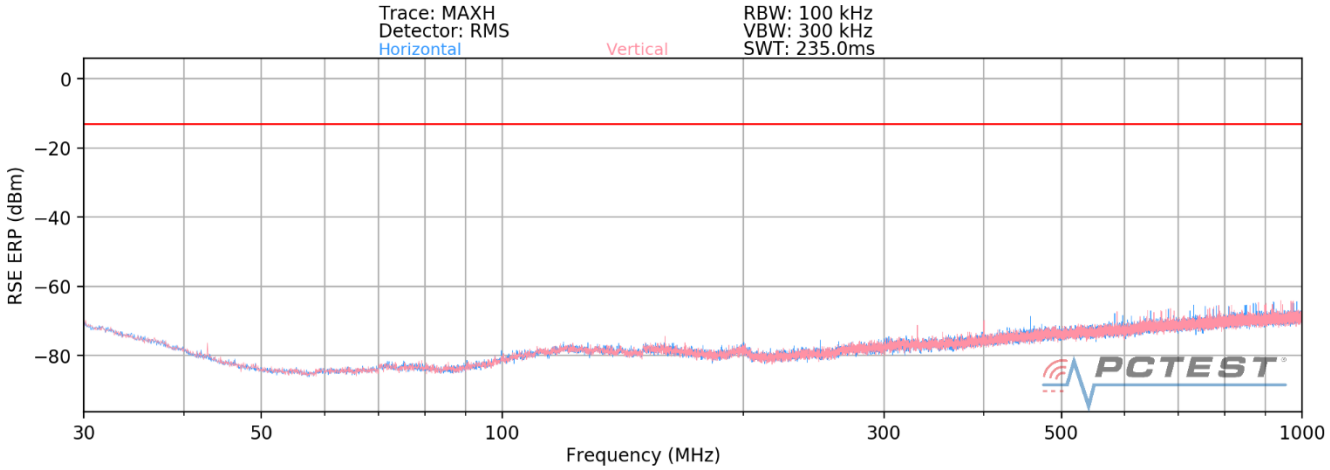
Table 7-46. Ant 1 - 2Tx - Spurious Emissions Table (170GHz - 200GHz)

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 n260- Ant 2 – Open

30MHz - 1GHz



Plot 7-55. Ant 2-n260 Radiated Spurious Plot (1CC QPSK Mid Channel 2Tx – EN-DC Anchor Band 2)

Spurious Emissions ERP Sample Calculation (n260)

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)

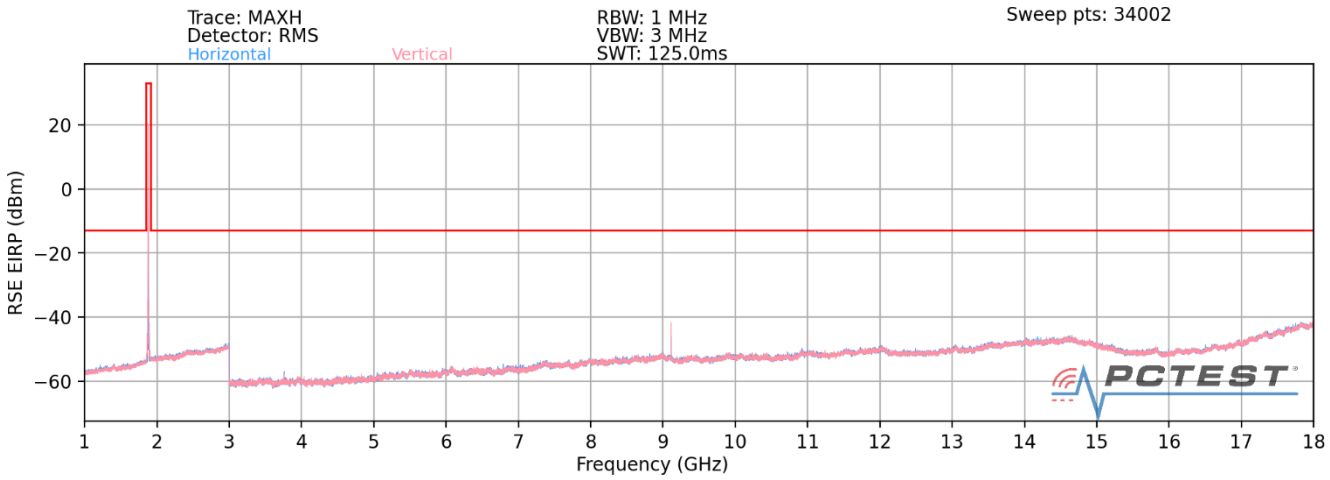
Frequency [MHz]	Channnel	Bandwidth (MHz)	EUT Beam Pol.	Modulation	Antenna Polarization [H/V]	Turntable Azimuth [degrees]	Antenna Height [cm]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
41.65	Mid	50	2Tx	QPSK	V	207	159	-79.32	-13.00	-66.32
329.17	Mid	50	2Tx	QPSK	V	209	212	-79.06	-13.00	-66.06
403.46	Mid	50	2Tx	QPSK	V	326	391	-77.68	-13.00	-64.68
446.51	Mid	50	2Tx	QPSK	H	142	198	-76.44	-13.00	-63.44
703.81	Mid	50	2Tx	QPSK	H	98	289	-73.28	-13.00	-60.28
804.34	Mid	50	2Tx	QPSK	V	61	321	-72.07	-13.00	-59.07

Table 7-47. Ant 2 - 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.

1GHz - 18GHz



Plot 7-56. Ant 2-n260 Radiated Spurious Plot (1CC QPSK Mid Channel 2Tx – EN-DC Anchor Band 2)

Spurious Emissions EIRP Sample Calculation (n260)

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

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

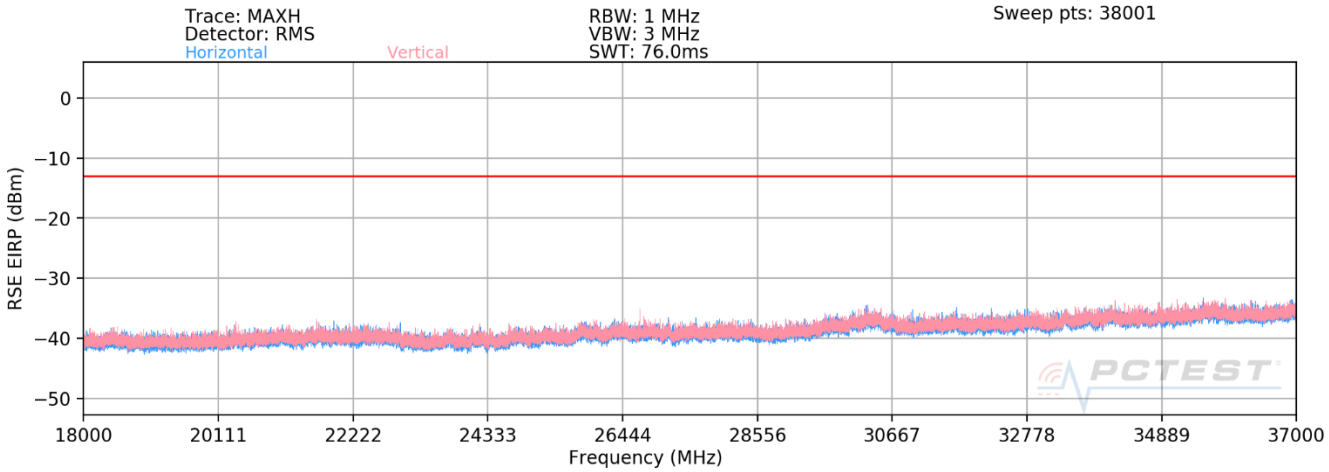
Frequency [MHz]	Channnel	Bandwidth (MHz)	EUT Beam Pol.	Modulation	Antenna Polarization [H/V]	Turntable Azimuth [degrees]	Antenna Height [cm]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
8404.90	Low	50	2Tx	QPSK	V	343	155	-41.83	-13.00	-28.83
9111.65	Mid	50	2Tx	QPSK	V	357	342	-38.68	-13.00	-25.68
9153.35	High	50	2Tx	QPSK	V	343	391	-36.83	-13.00	-23.83

Table 7-48. Ant 2 - 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.

18GHz – 37GHz



Plot 7-57. Ant 2-n260 Radiated Spurious Plot (1CC QPSK Mid Channel 2Tx– EN-DC Anchor Band 2)

Spurious Emissions EIRP Sample Calculation (n260)

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

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

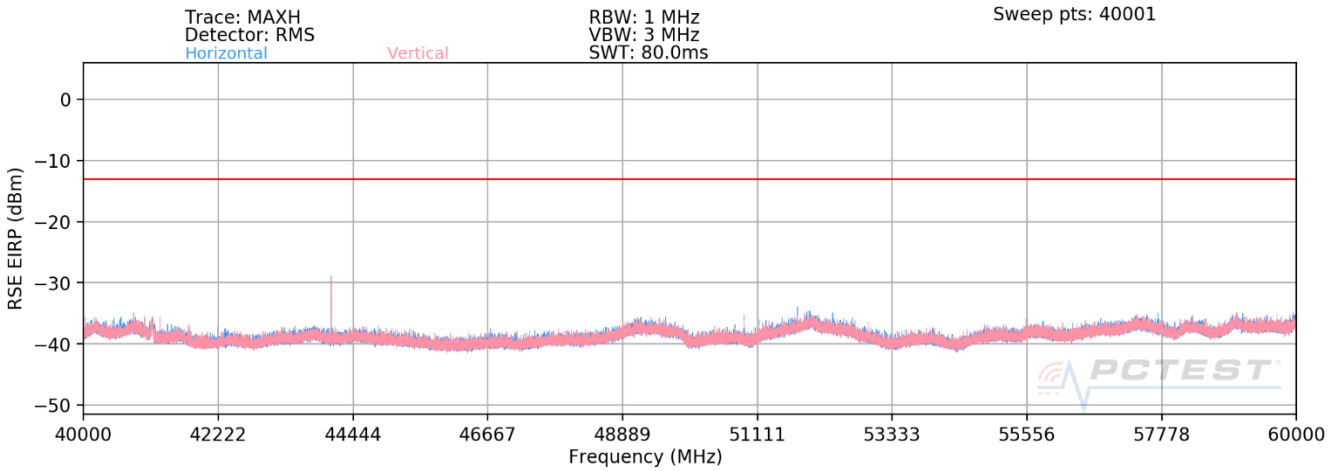
Frequency [MHz]	Channnel	Bandwidth (MHz)	EUT Beam Pol.	Modulation	Antenna Polarization [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
36475.05	Low	50	2Tx	QPSK	H	126	98	-33.62	-13.00	-20.62
36909.37	Mid	50	2Tx	QPSK	H	-	-	-37.62	-13.00	-24.62
36929.07	High	50	2Tx	QPSK	H	-	-	-37.22	-13.00	-24.22

Table 7-49. Ant 2 - 2Tx - Spurious Emissions Table (18GHz – 37GHz)

Notes

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

40GHz - 60GHz



Plot 7-58. Ant 2-n260 Radiated Spurious Plot (1CC QPSK Mid Channel 2Tx – EN-DC Anchor Band 2)

Spurious Emissions EIRP Sample Calculation (n260)

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

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

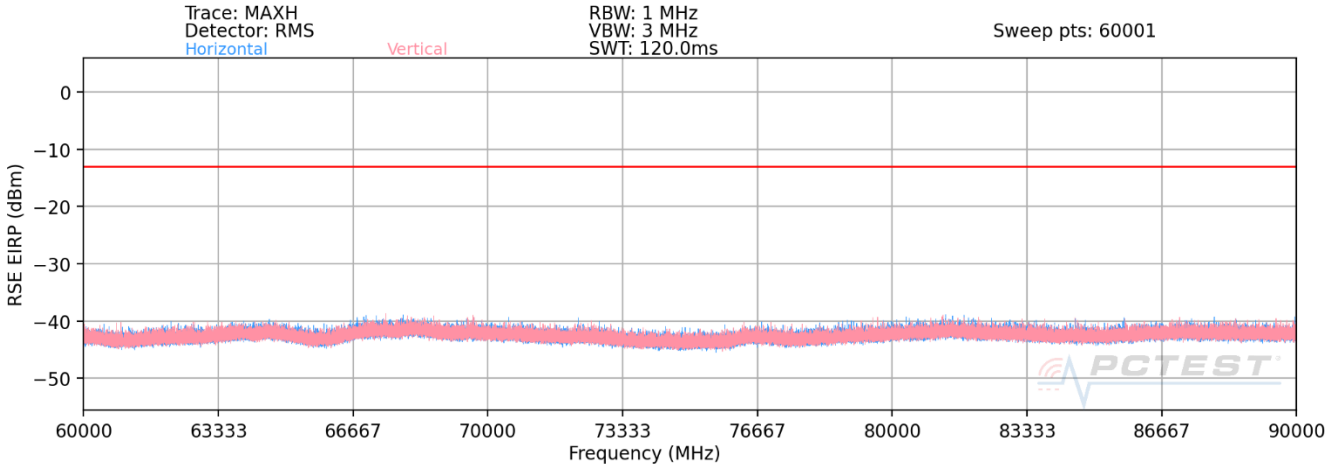
Frequency [MHz]	Channnel	Bandwidth (MHz)	EUT Beam Pol.	Modulation	Antenna Polarization [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
42931.02	Low	50	2Tx	QPSK	H	291	274	-26.31	-13.00	-13.31
49806.48	Low	50	2Tx	QPSK	H	204	261	-36.44	-13.00	-23.44
44082.91	Mid	50	2Tx	QPSK	H	274	268	-29.30	-13.00	-16.30
50894.90	Mid	50	2Tx	QPSK	H	209	279	-41.55	-13.00	-28.55
46233.45	High	50	2Tx	QPSK	H	269	270	-32.80	-13.00	-19.80
52861.22	High	50	2Tx	QPSK	H	-	-	-43.06	-13.00	-30.06

Table 7-50. Ant 2 - 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. Measurements were performed at a distance of 1.5 meter.

60GHz - 90GHz



Plot 7-59. Ant 2-n260 Radiated Spurious Plot (1CC QPSK Mid Channel 2Tx – EN-DC Anchor Band 2)

Spurious Emissions EIRP Sample Calculation (n260)

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

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

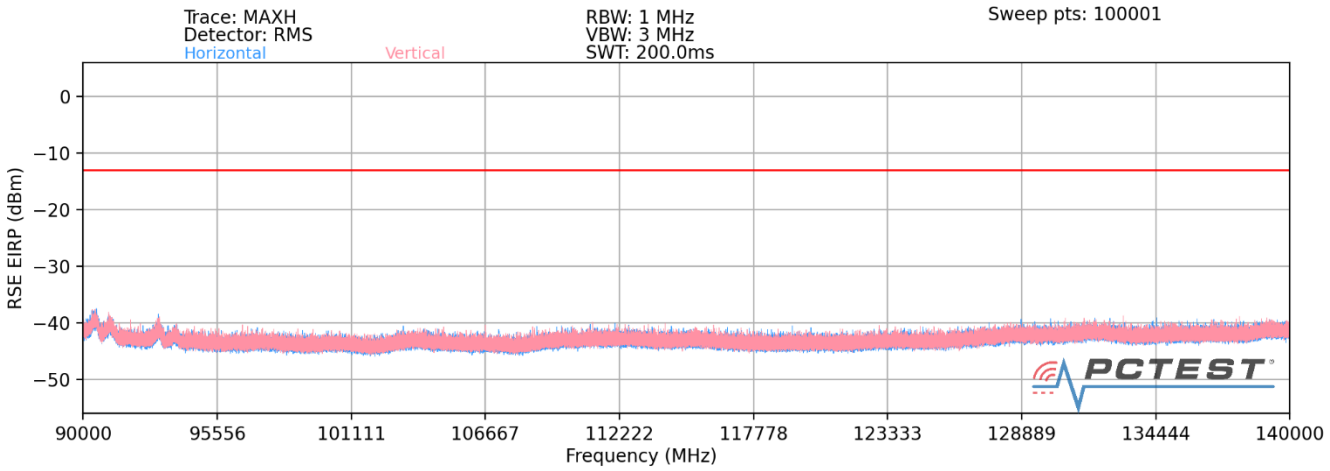
Frequency [MHz]	Channnel	Bandwidth (MHz)	EUT Beam Pol.	Modulation	Antenna Polarization [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
74050.97	Low	50	2Tx	QPSK	H	298	347	-41.67	-13.00	-28.67
77000.88	Mid	50	2Tx	QPSK	H	299	239	-42.16	-13.00	-29.16
79951.15	High	50	2Tx	QPSK	H	334	343	-43.08	-13.00	-30.08

Table 7-51. Ant 2 - 2Tx -S purious 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 - 140GHz



Plot 7-60. Ant 2-n260 Radiated Spurious Plot (1CC QPSK Mid Channel 2Tx – EN-DC Anchor Band 2)

Spurious Emissions EIRP Sample Calculation (n260)

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

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

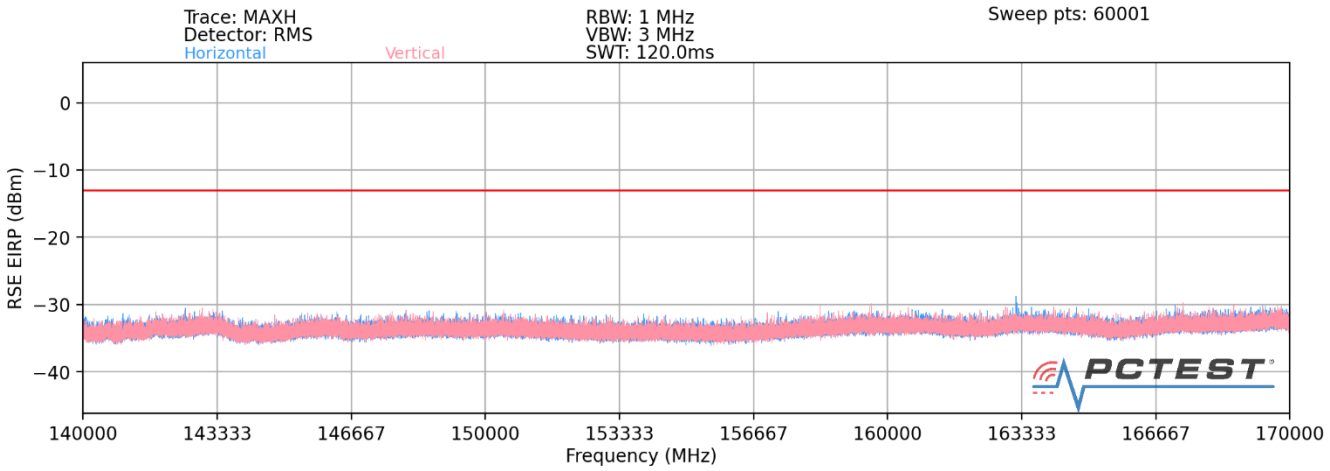
Frequency [MHz]	Channnel	Bandwidth (MHz)	EUT Beam Pol.	Modulation	Antenna Polarization [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
111147.06	Low	50	2Tx	QPSK	V	251	274	-30.54	-13.00	-17.54
115497.12	Mid	50	2Tx	QPSK	V	335	351	-37.26	-13.00	-24.26
119851.14	High	50	2Tx	QPSK	V	57	52	-38.36	-13.00	-25.36

Table 7-52. Ant2 -2Tx - Spurious Emissions Table (90GHz - 140GHz)

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.

140GHz - 170GHz



Plot 7-61. Ant 2-n260 Radiated Spurious Plot (1CC QPSK Mid Channel 2Tx – EN-DC Anchor Band 2)

Spurious Emissions EIRP Sample Calculation (n260)

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

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

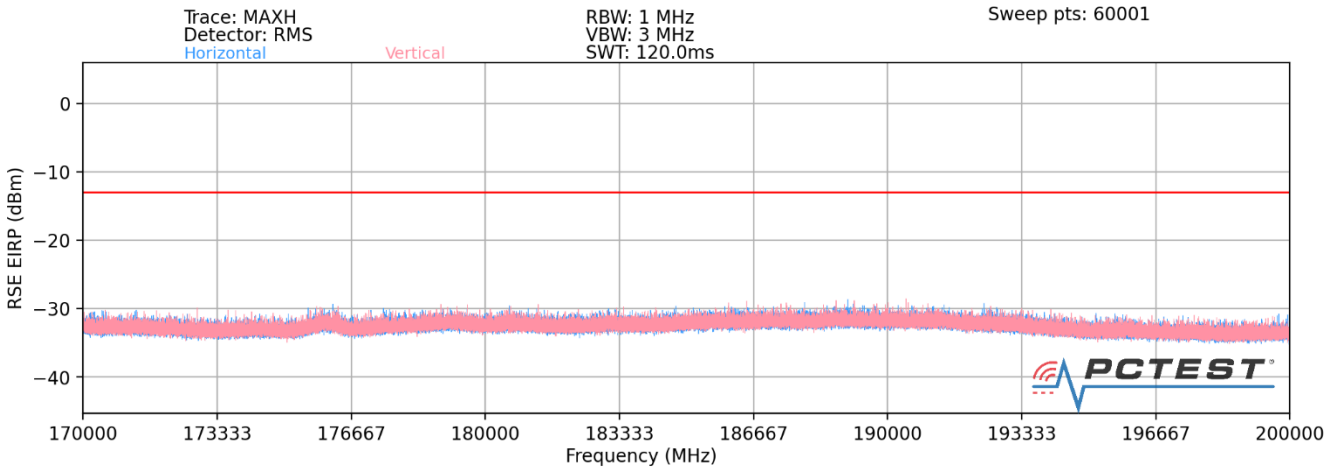
Frequency [MHz]	Channnel	Bandwidth (MHz)	EUT Beam Pol.	Modulation	Antenna Polarization [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
148099.20	Low	50	2Tx	QPSK	H	-	-	-38.60	-13.00	-25.60
154003.74	Mid	50	2Tx	QPSK	H	-	-	-38.63	-13.00	-25.63
159911.30	Low	50	2Tx	QPSK	H	-	-	-38.08	-13.00	-25.08

Table 7-53. Ant 2 - 2Tx - Spurious Emissions Table (140GHz - 170GHz)

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.

170GHz - 200GHz



Plot 7-62. Ant 2-n260 Radiated Spurious Plot (1CC QPSK Mid Channel 2Tx – EN-DC Anchor Band 2)

Spurious Emissions EIRP Sample Calculation (n260)

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

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

Frequency [MHz]	Channnel	Bandwidth (MHz)	EUT Beam Pol.	Modulation	Antenna Polarization [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
185129.73	Low	50	2Tx	QPSK	H	-	-	-37.39	-13.00	-24.39
192495.94	Mid	50	2Tx	QPSK	H	-	-	-37.38	-13.00	-24.38
199878.75	High	50	2Tx	QPSK	H	-	-	-38.53	-13.00	-25.53

Table 7-54. Ant 2 - 2Tx - Spurious Emissions Table (170GHz - 200GHz)

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.

7.5 Band Edge Emissions

§2.1051, §30.203

Test Overview

All out of band emissions are measured in a radiated setup while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All modulations were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

The minimum permissible attenuation level of any spurious emission is -13dBm/1MHz. However, in the bands immediately outside and adjacent to the licensee's frequency block, having a bandwidth equal to 10 percent of the channel bandwidth, the conductive power or the total radiated power of any emission shall be −5 dBm/MHz or lower.

Test Procedure Used

ANSI C63.26-2015 Section 5 and ANSI C63.26-2015 Section 6.4
KDB 842590 D01 v01r02 Section 4.4.2.4

Test Settings

1. Start and stop frequency were set such that both upper and lower band edges are measured.
2. Span was set large enough so as to capture all out of band emissions near the band edge
3. RBW = 1MHz
4. VBW ≥ 3 x RBW
5. Detector = RMS
6. Number of sweep points ≥ 2 x Span/RBW
7. Trace mode = trace average
8. Sweep time = auto couple
9. The trace was allowed to stabilize

Test Notes

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

5) All combinations of 1CC and 2CC were fully investigated, and only the worst case has been included in this report.

6) All 2CC cases were investigated with PCC prioritization feature, which was the higher PCC at the band edge for the worst case.

7) The Total Radiated Power measurements shown in this section were performed in accordance with the guidance of Section 4.4.2.4 of KDB 842590 D01 for the Spherical Method.

Sample Analyzer Offset Calculation (at 27.5GHz)

Measurement Antenna Factor = 40.70dB/m

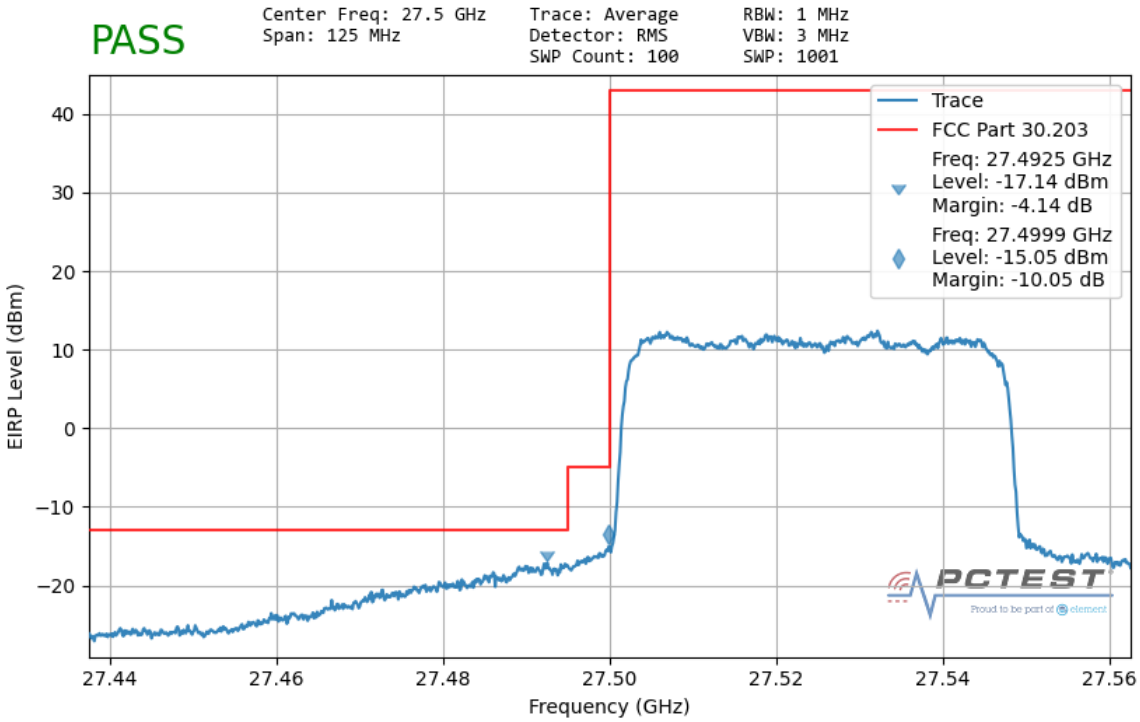
Cable Loss = 8.82dB

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

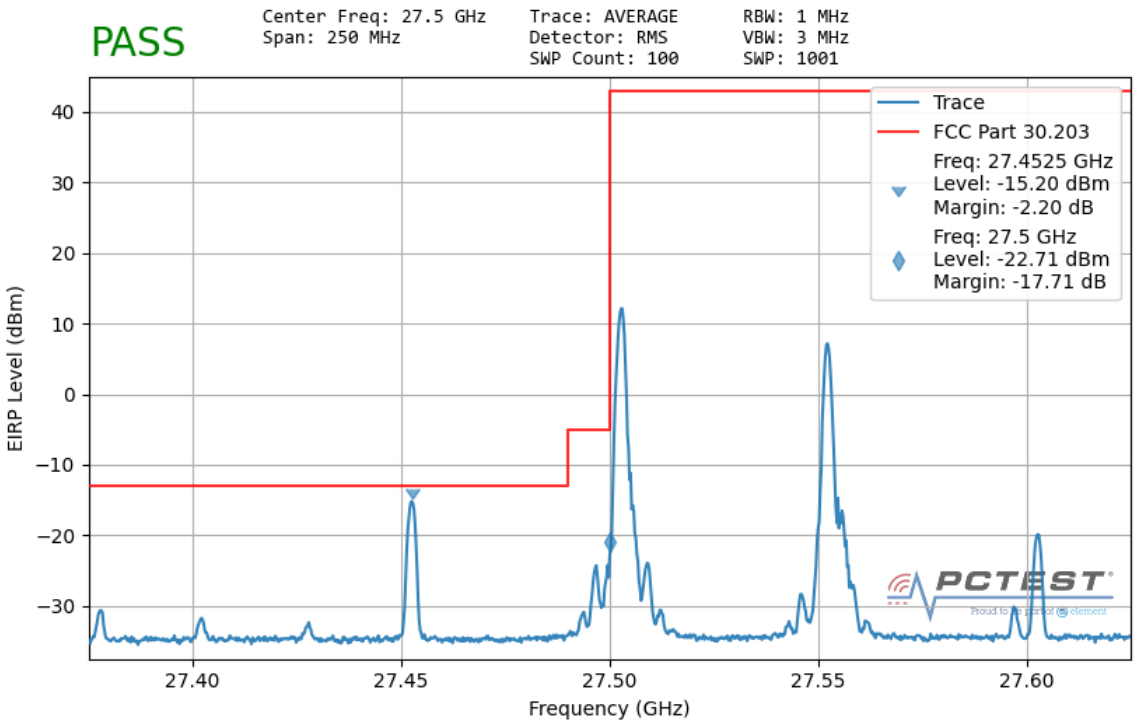
= 40.70dB/m + 8.82dB + 107 + $20\log_{10}(1m)$ – 104.8dB

= 51.72dB

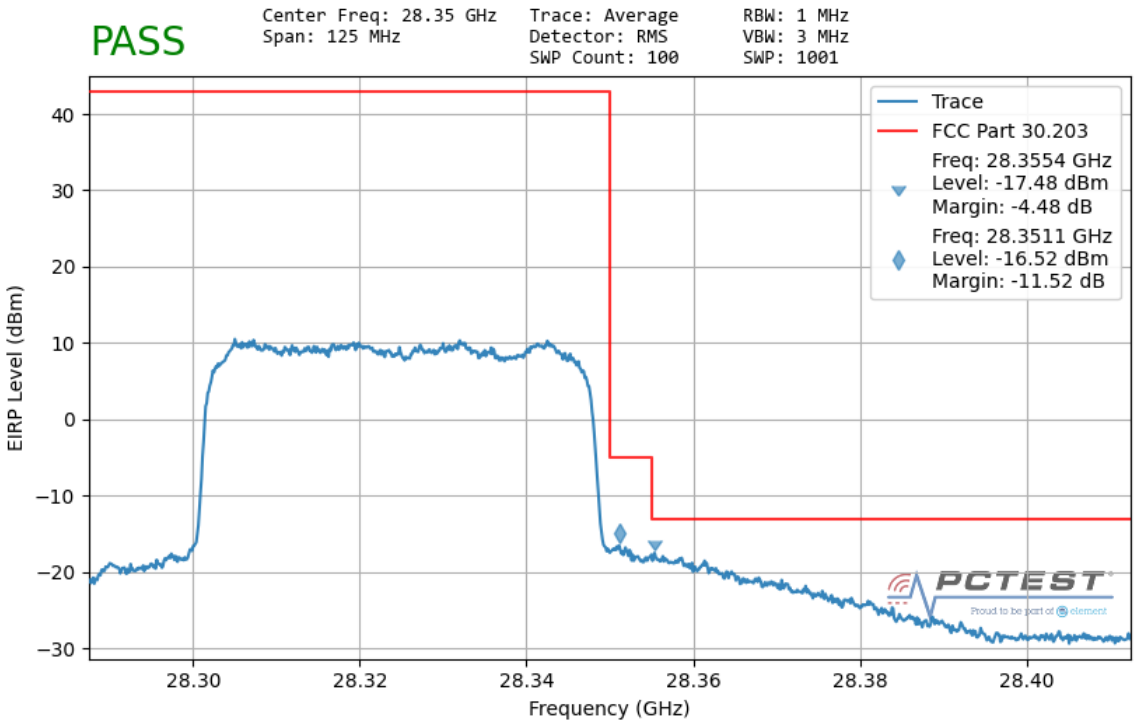
Band n261 – Worst-Case – Open



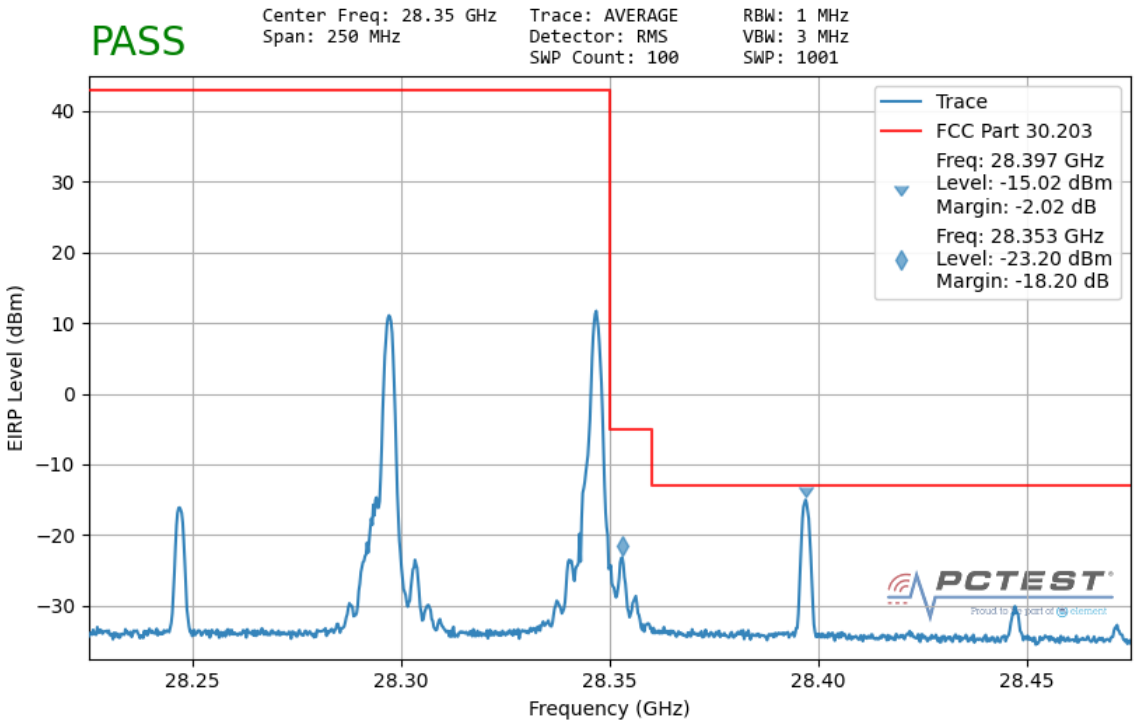
Plot 7-63. Ant 1 Lower Band Edge (50MHz-1CC – QPSK Full RB)



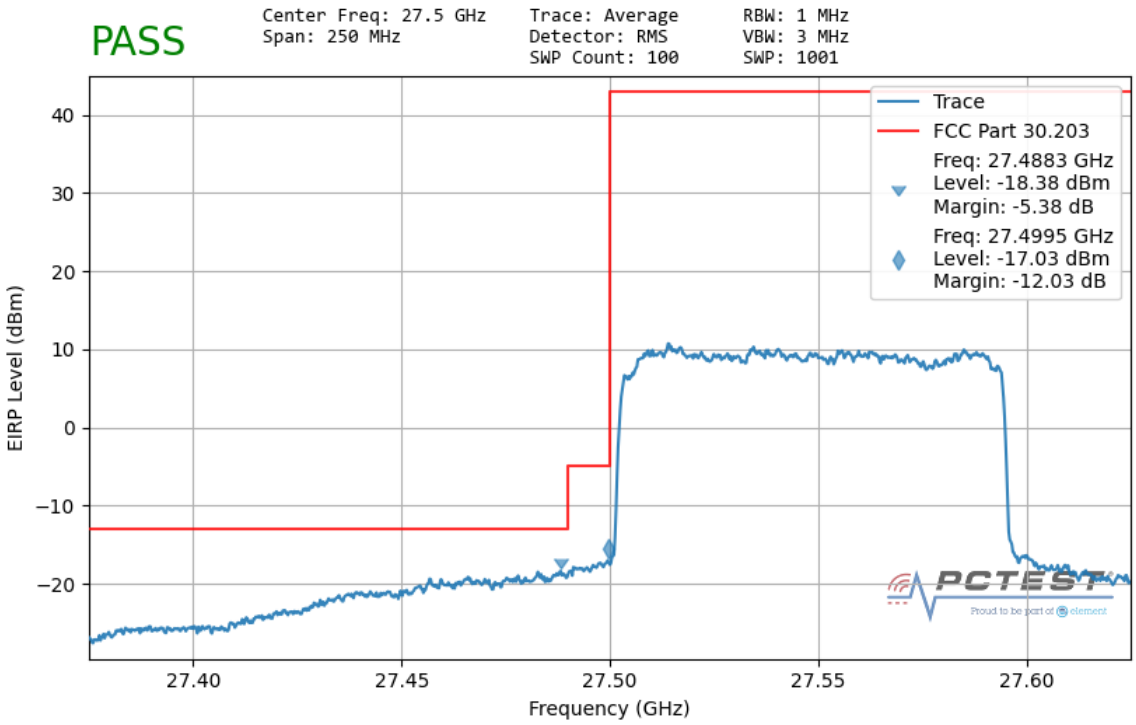
Plot 7-64. Ant 1 Lower Band Edge – (50MHz-2CC – QPSK 1 RB)



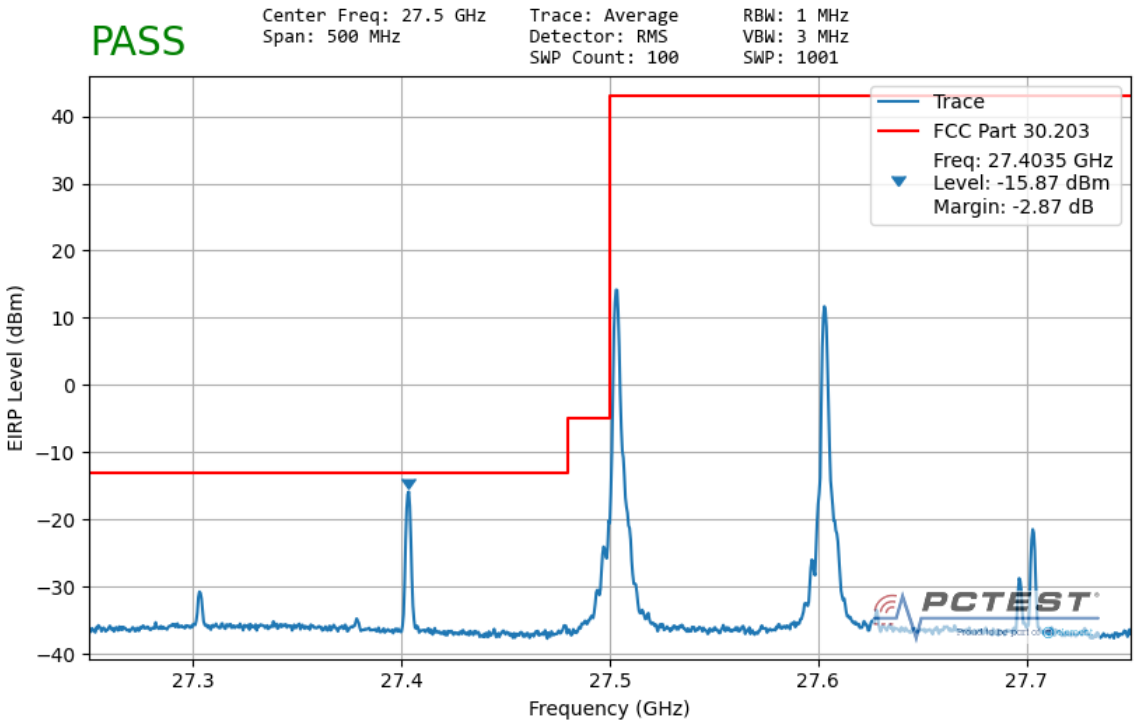
Plot 7-65. Ant 1 Upper Band Edge (50MHz-1CC – QPSK Full RB)



Plot 7-66. Ant 1 Upper Band Edge (50MHz-2CC – QPSK 1 RB)



Plot 7-67. Ant 1 Lower Band Edge (100MHz-1CC – QPSK Full RB)



Plot 7-68. Ant 1 Lower Band Edge (100MHz-2CC – QPSK 1 RB)