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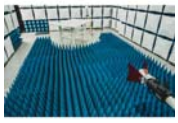

MEASUREMENT REPORT
FCC Part 30 5G mmWave

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

Date of Testing:
01/22/2019 - 03/25/2019
Test Site/Location:
PCTEST Lab. Columbia, MD, USA
Test Report Serial No.:
1M1901100003-06-R1.A3L

FCC ID:	**A3LSMG977U**
APPLICANT:	**Samsung Electronics Co., Ltd.**

Application Type:	Certification
Model:	SM-G977U
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

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.

The revised Test Report (S/N: 1M1901100003-06-R1.A3L) supersedes and replaces the previously issued test report (S/N: 1M1901100003-06.A3L) on the same subject device for the same type of testing as indicated. Please discard or destroy the previously issued test report(s) and dispose of it accordingly.

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

Randy Ortanez
President

ACCREDITED
TESTING CERT#2041.01

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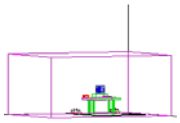
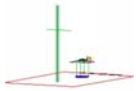


MEASUREMENT REPORT
FCC Part 30



Band	FCC Rule Part	Mode	Antenna	Bandwidth (MHz)	CCs Active	Tx Frequency (MHz)	EIRP		Emission Designator	Modulation
							Max. Power (W)	Max. Power (dBm)		
n261	30	SISO	J Dipole	50	1	27500 - 28350	0.061	17.82	47M0G7D	QPSK
n261	30	SISO	J Dipole	50	1	27500 - 28350	0.070	18.44	46M6W7D	16QAM
n261	30	SISO	J Dipole	50	1	27500 - 28350	0.043	16.30	47M9W7D	64QAM
n261	30	SISO	J Dipole	100	1	27500 - 28350	0.057	17.57	94M9G7D	QPSK
n261	30	SISO	J Dipole	100	1	27500 - 28350	0.069	18.38	94M6W7D	16QAM
n261	30	SISO	J Dipole	100	1	27500 - 28350	0.042	16.21	94M6W7D	64QAM
n261	30	SISO	J Dipole	200	4	27500 - 28350	0.050	16.99	204MG7D	QPSK
n261	30	SISO	J Dipole	200	4	27500 - 28350	0.043	16.37	199MW7D	16QAM
n261	30	SISO	J Dipole	200	4	27500 - 28350	0.024	13.72	198MW7D	64QAM
n261	30	SISO	J Dipole	400	4	27500 - 28350	0.049	16.94	395MG7D	QPSK
n261	30	SISO	J Dipole	400	4	27500 - 28350	0.041	16.11	395MW7D	16QAM
n261	30	SISO	J Dipole	400	4	27500 - 28350	0.020	13.08	398MW7D	64QAM
n261	30	SISO	J Patch	50	1	27500 - 28350	0.091	19.59	47M8G7D	QPSK
n261	30	SISO	J Patch	50	1	27500 - 28350	0.097	19.88	46M8W7D	16QAM
n261	30	SISO	J Patch	50	1	27500 - 28350	0.076	18.83	46M8W7D	64QAM
n261	30	SISO	J Patch	100	1	27500 - 28350	0.093	19.69	94M7G7D	QPSK
n261	30	SISO	J Patch	100	1	27500 - 28350	0.106	20.27	94M6W7D	16QAM
n261	30	SISO	J Patch	100	1	27500 - 28350	0.080	19.05	94M6W7D	64QAM
n261	30	SISO	J Patch	200	4	27500 - 28350	0.077	18.88	203MG7D	QPSK
n261	30	SISO	J Patch	200	4	27500 - 28350	0.062	17.91	198MW7D	16QAM
n261	30	SISO	J Patch	200	4	27500 - 28350	0.036	15.59	198MW7D	64QAM
n261	30	SISO	J Patch	400	4	27500 - 28350	0.070	18.48	394MG7D	QPSK
n261	30	SISO	J Patch	400	4	27500 - 28350	0.054	17.35	394MW7D	16QAM
n261	30	SISO	J Patch	400	4	27500 - 28350	0.028	14.46	393MW7D	64QAM
n261	30	SISO	K Patch	50	1	27500 - 28350	0.130	21.14	47M0G7D	QPSK
n261	30	SISO	K Patch	50	1	27500 - 28350	0.093	19.68	46M4W7D	16QAM
n261	30	SISO	K Patch	50	1	27500 - 28350	0.070	18.48	47M8W7D	64QAM
n261	30	SISO	K Patch	100	1	27500 - 28350	0.143	21.55	94M8G7D	QPSK
n261	30	SISO	K Patch	100	1	27500 - 28350	0.094	19.72	94M7W7D	16QAM
n261	30	SISO	K Patch	100	1	27500 - 28350	0.073	18.66	94M7W7D	64QAM
n261	30	SISO	K Patch	200	4	27500 - 28350	0.101	20.06	201MG7D	QPSK
n261	30	SISO	K Patch	200	4	27500 - 28350	0.076	18.83	197MW7D	16QAM
n261	30	SISO	K Patch	200	4	27500 - 28350	0.048	16.83	198MW7D	64QAM
n261	30	SISO	K Patch	400	4	27500 - 28350	0.077	18.87	394MG7D	QPSK
n261	30	SISO	K Patch	400	4	27500 - 28350	0.059	17.73	393MW7D	16QAM
n261	30	SISO	K Patch	400	4	27500 - 28350	0.035	15.38	393MW7D	64QAM
n261	30	SISO	L Patch	50	1	27500 - 28350	0.124	20.94	49M7G7D	QPSK
n261	30	SISO	L Patch	50	1	27500 - 28350	0.088	19.43	48M7W7D	16QAM
n261	30	SISO	L Patch	50	1	27500 - 28350	0.077	18.84	54M4W7D	64QAM
n261	30	SISO	L Patch	100	1	27500 - 28350	0.136	21.32	95M9G7D	QPSK
n261	30	SISO	L Patch	100	1	27500 - 28350	0.107	20.29	95M8W7D	16QAM
n261	30	SISO	L Patch	100	1	27500 - 28350	0.083	19.21	95M8W7D	64QAM
n261	30	SISO	L Patch	200	4	27500 - 28350	0.091	19.60	208MG7D	QPSK
n261	30	SISO	L Patch	200	4	27500 - 28350	0.064	18.07	201MW7D	16QAM
n261	30	SISO	L Patch	200	4	27500 - 28350	0.039	15.87	208MW7D	64QAM
n261	30	SISO	L Patch	400	4	27500 - 28350	0.100	19.98	393MG7D	QPSK
n261	30	SISO	L Patch	400	4	27500 - 28350	0.083	19.18	393MW7D	16QAM
n261	30	SISO	L Patch	400	4	27500 - 28350	0.042	16.21	392MW7D	64QAM

EUT Overview (SISO)

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Band	FCC Rule Part	Mode	Antenna	Bandwidth (MHz)	CCs Active	Tx Frequency (MHz)	EIRP		Emission Designator	Modulation
							Max. Power (W)	Max. Power (dBm)		
n261	30	MIMO	J Dipole	50	1	27500 - 28350	0.059	17.74	47M0G7D	QPSK
n261	30	MIMO	J Dipole	50	1	27500 - 28350	0.068	18.30	46M6W7D	16QAM
n261	30	MIMO	J Dipole	50	1	27500 - 28350	0.061	17.88	47M9W7D	64QAM
n261	30	MIMO	J Dipole	100	1	27500 - 28350	0.058	17.64	94M9G7D	QPSK
n261	30	MIMO	J Dipole	100	1	27500 - 28350	0.055	17.42	94M6W7D	16QAM
n261	30	MIMO	J Dipole	100	1	27500 - 28350	0.050	17.00	94M6W7D	64QAM
n261	30	MIMO	J Patch	50	1	27500 - 28350	0.103	20.12	47M8G7D	QPSK
n261	30	MIMO	J Patch	50	1	27500 - 28350	0.076	18.82	46M8W7D	16QAM
n261	30	MIMO	J Patch	50	1	27500 - 28350	0.096	19.82	46M8W7D	64QAM
n261	30	MIMO	J Patch	100	1	27500 - 28350	0.100	20.01	94M7G7D	QPSK
n261	30	MIMO	J Patch	100	1	27500 - 28350	0.095	19.80	94M6W7D	16QAM
n261	30	MIMO	J Patch	100	1	27500 - 28350	0.096	19.83	94M6W7D	64QAM
n261	30	MIMO	K Patch	50	1	27500 - 28350	0.145	21.61	47M0G7D	QPSK
n261	30	MIMO	K Patch	50	1	27500 - 28350	0.124	20.95	46M4W7D	16QAM
n261	30	MIMO	K Patch	50	1	27500 - 28350	0.108	20.34	47M8W7D	64QAM
n261	30	MIMO	K Patch	100	1	27500 - 28350	0.155	21.90	94M8G7D	QPSK
n261	30	MIMO	K Patch	100	1	27500 - 28350	0.124	20.95	94M7W7D	16QAM
n261	30	MIMO	K Patch	100	1	27500 - 28350	0.104	20.19	94M7W7D	64QAM
n261	30	MIMO	L Patch	50	1	27500 - 28350	0.136	21.33	49M7G7D	QPSK
n261	30	MIMO	L Patch	50	1	27500 - 28350	0.122	20.87	48M7W7D	16QAM
n261	30	MIMO	L Patch	50	1	27500 - 28350	0.139	21.44	54M4W7D	64QAM
n261	30	MIMO	L Patch	100	1	27500 - 28350	0.151	21.78	95M9G7D	QPSK
n261	30	MIMO	L Patch	100	1	27500 - 28350	0.127	21.05	95M8W7D	16QAM
n261	30	MIMO	L Patch	100	1	27500 - 28350	0.134	21.28	95M8W7D	64QAM

EUT Overview (MIMO)

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1.0 INTRODUCTION

1.1 Scope

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

1.2 PCTEST Test Location

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

1.3 Test Facility / Accreditations

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

- PCTEST is an ISO 17025-2005 accredited test facility under the American Association for Laboratory Accreditation (A2LA) with Certificate number 2041.01 for Specific Absorption Rate (SAR), Hearing Aid Compatibility (HAC) testing, where applicable, and Electromagnetic Compatibility (EMC) testing for FCC and Innovation, Science, and Economic Development Canada rules.

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

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

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2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **Samsung Portable Handset FCC ID: A3LSMG977U**. The test data contained in this report pertains only to the emissions due to the EUT's 5G mmWave function.

The EUT has 2 array antenna configurations. Type1: 4 patches and 4 dipoles, placed on the rear side (denoted as J Patch and J Dipole). Type 2: 4 patches only, placed on the left and right side (denoted as K patch and 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. Dipole antenna does not radiate when patch antenna radiates.

The EUT supports up to 8CC for DL, and 4CC for UL. For each CC, the EUT supports both 50MHz bandwidth and 100MHz bandwidth. For modulation, the EUT supports QPSK, 16QAM and 64QAM. 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.: 1263B, 1266B

2.2 Device Capabilities

This device contains the following capabilities:

850/1900 CDMA/EvDO Rev0/A, 1x Advanced (BC0, BC1), 850/1900 GPRS/EDGE, 850/1700/1900 WCDMA/HSPA, Multi-band LTE, 802.11b/g/n/ax WLAN, 802.11a/n/ac/ax UNII, Bluetooth (1x, EDR, LE), NFC, ANT+, Wireless Power Transfer, n261 5G NR

2.3 Test Configuration

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

EIRP Simulation data for all Beam IDs was used to determine the worst case Beam ID for SISO operation and Beam ID pair for MIMO operation. These Beam ID's was 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 of 3:1 (DL:UL) ratio (i.e., a maximum uplink duty cycle of 25%).

2.4 EMI Suppression Device(s)/Modifications

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

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3.0 DESCRIPTION OF TESTS

3.1 Measurement Procedure

The measurement procedures described in the document titled "American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services" (ANSI C63.26-2015) was 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. 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.

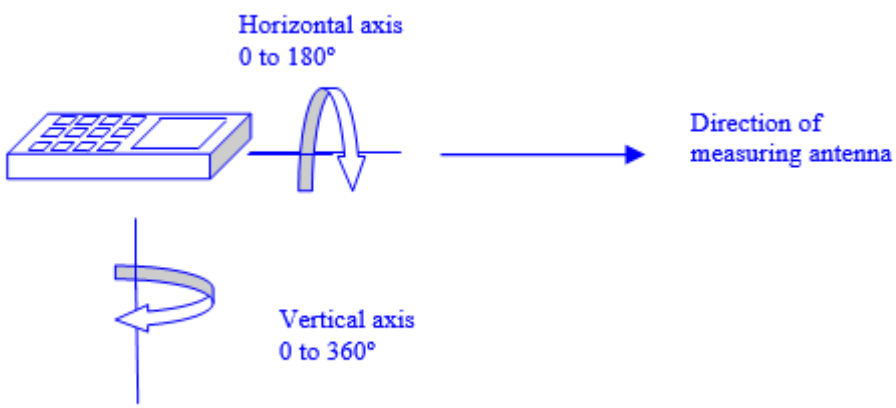

Figure 3-1. Rotation of the EUT through horizontal and vertical axis

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

Frequency Range (GHz)	Wavelength(cm)	Far Field Distance (m)	Measurement Distance (m)
18-40	0.749	0.54	1.00
40-60	0.500	1.39	1.50
60-90	0.333	0.91	1.00
90-100	0.300	0.42	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

= - 34.06 dBm + (40.6dB/m + 8.49dB) + 107 = 122.03dBuV/m

= 10^(122.03/20)/1000000 = 1.26 V/m

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

= 10*log((1.26V/m * 1.00m)^2/30) + 30dB

= **17.24 dBm e.i.r.p.**

Sample MIMO e.i.r.p. Calculation:

The e.i.r.p of the H Beam and V Beam were first measured individually. The measured values were then summed in linear power units then converted back to dBm per the guidance of KDB 662911 D01.

Conversion to linear value = 10^(e.i.r.p/10) = 10^(17.24/10) = 52.97mW

MIMO e.i.r.p. = $e.i.r.p._H$ + $e.i.r.p._V$

= 52.97mW + 43.15mW

=10*log(96.12mW)

= 19.83dBm

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4.0 MEASUREMENT UNCERTAINTY

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

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

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5.0 TEST EQUIPMENT CALIBRATION DATA

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

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	N9030A	PXA Signal Analyzer (44GHz)	5/25/2018	Annual	5/25/2019	MY52350166
Com-Power	AL-130	9kHz - 30MHz Loop Antenna	10/10/2017	Biennial	10/10/2019	121034
Com-Power	PAM-103	Pre-Amplifier (1-1000MHz)	9/17/2018	Annual	9/17/2019	441119
Emco	3115	Horn Antenna (1-18GHz)	3/28/2018	Biennial	3/28/2020	9704-5182
Keysight Technologies	N9030A	3Hz-44GHz PXA Signal Analyzer	3/20/2018	Annual	3/20/2019	MY49430494
Keysight Technologies	N9030A	PXA Signal Analyzer	8/6/2018	Annual	8/6/2019	MY54490576
OML, Inc.	M19RH	Horn Antenna (40 - 60GHz)	7/30/2018	Annual	7/30/2019	17111701
OML, Inc.	M12RH	Horn Antenna (60 - 90GHz)	7/30/2018	Annual	7/30/2019	17111701
OML, Inc	M08RH	Horn Antenna (90 - 140GHz)	7/30/2018	Annual	7/30/2019	17111701
Rohde & Schwarz	FSW67	Signal / Spectrum Analyzer	8/17/2018	Annual	8/17/2019	103200
Rohde & Schwarz	180-442-KF	Horn (Small)	8/21/2018	Annual	8/21/2019	U157403-01
Rohde & Schwarz	ESU26	EMI Test Receiver (26.5GHz)	5/21/2018	Annual	5/21/2019	100342
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	6/18/2018	Annual	6/18/2019	102134
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	4/19/2018	Biennial	4/19/2020	A051107
Virginia Diodes Inc	SAX252	SAX Module (60 - 90GHz)	5/14/2018	Annual	5/14/2019	SAX252
Virginia Diodes Inc	SAX253	SAX Module (90 - 140GHz)	5/8/2018	Annual	5/8/2019	SAX253

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.

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6.0 SAMPLE CALCULATIONS

Emission Designator

QPSK Modulation

Emission Designator = 800MG7D

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

QAM Modulation

Emission Designator = 802MW7D

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

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7.0 TEST RESULTS

7.1 Summary

Company Name: Samsung Electronics Co., Ltd.

FCC ID: A3LSMG977U

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.
3) All radiated emission measurements at the band edge are converted to an equivalent conductive power by subtracting the known antenna gain from the EIRP measured at each frequency of interest. These emissions are compared to the 30.203 spurious emission limits as conductive power levels.
4) The radiated RF output power and all out-of-band emissions in the spurious domain are evaluated to the EIRP limits.
5) “CC” refers to “Component Carriers”.
6) Beam IDs were chosed based on which Beam ID produces the highest EIRP during EIRP simulation.
7) All testing was performed using FTM (Factory Test Mode) software at continuous Tx operation (100% duty cycle).

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7.2 Occupied Bandwidth

§2.1049

Test Overview

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

Test Procedure Used

ANSI C63.26-2015 Section 5.4.3

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

None.

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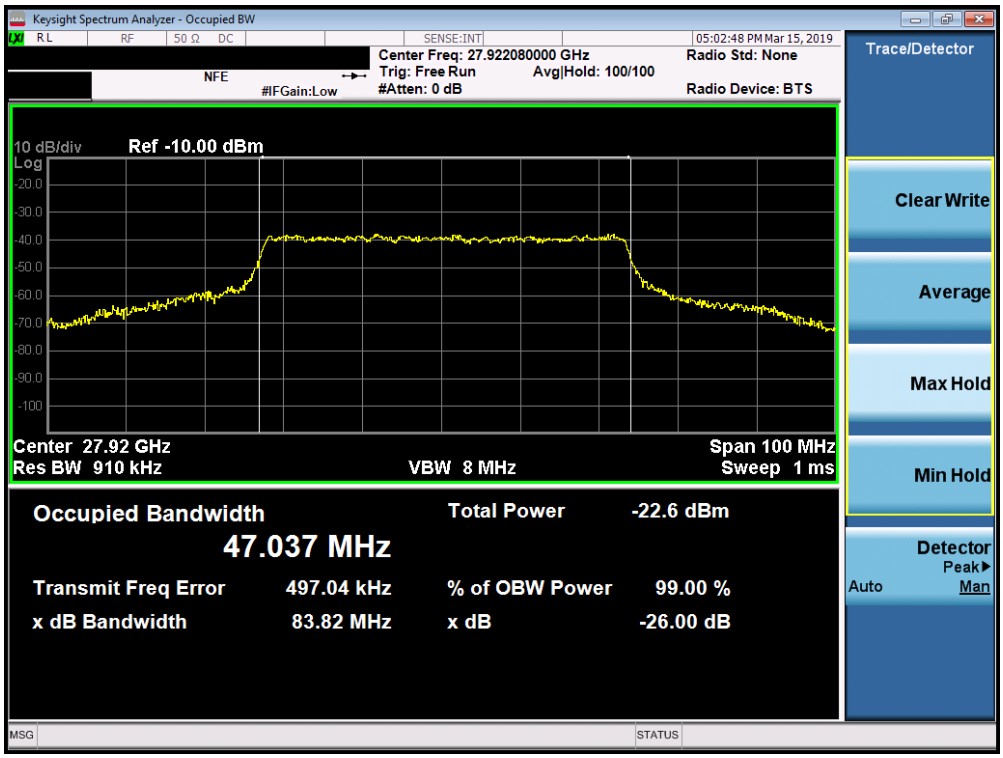
7.2.1 J Dipole Occupied Bandwidth

Channel	Bandwidth	CCs Active	Modulation	OBW [MHz]
Mid	50	1	QPSK	47.04
Mid	50	1	16QAM	46.55
Mid	50	1	64QAM	47.94
Mid	100	1	QPSK	94.88
Mid	100	1	16QAM	94.62
Mid	100	1	64QAM	94.60
Mid	200	4	QPSK	204.34
Mid	200	4	16QAM	199.02
Mid	200	4	64QAM	198.19
Mid	400	4	QPSK	395.17
Mid	400	4	16QAM	395.01
Mid	400	4	64QAM	397.78

Table 7-2. Summary of J Dipole Occupied Bandwidths



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

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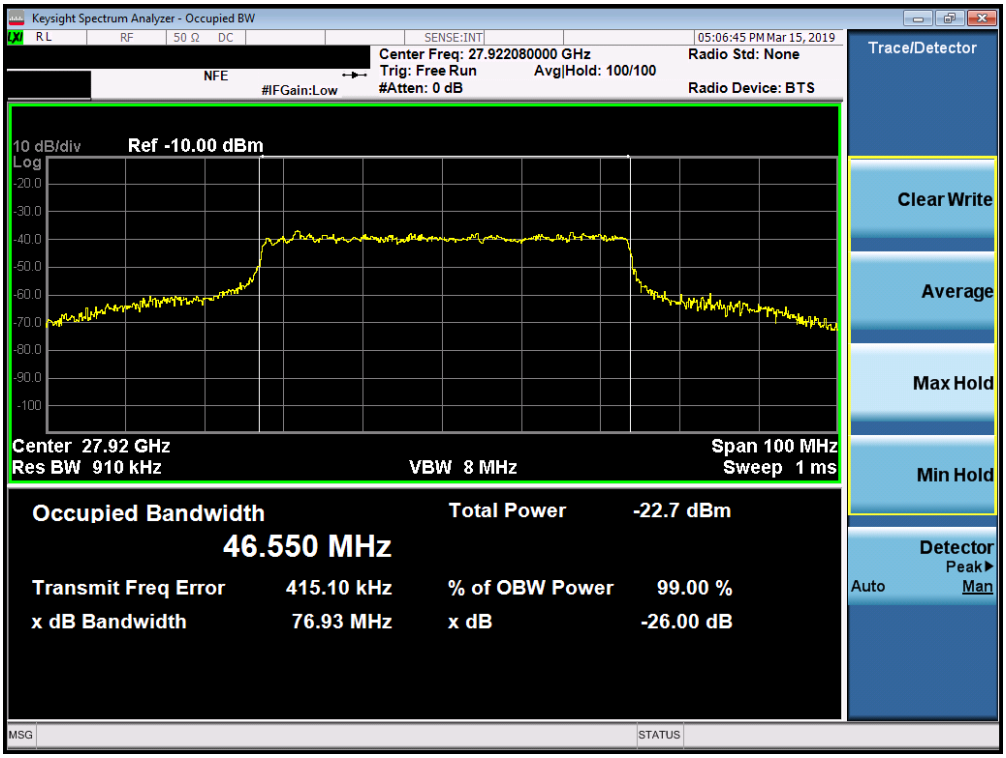
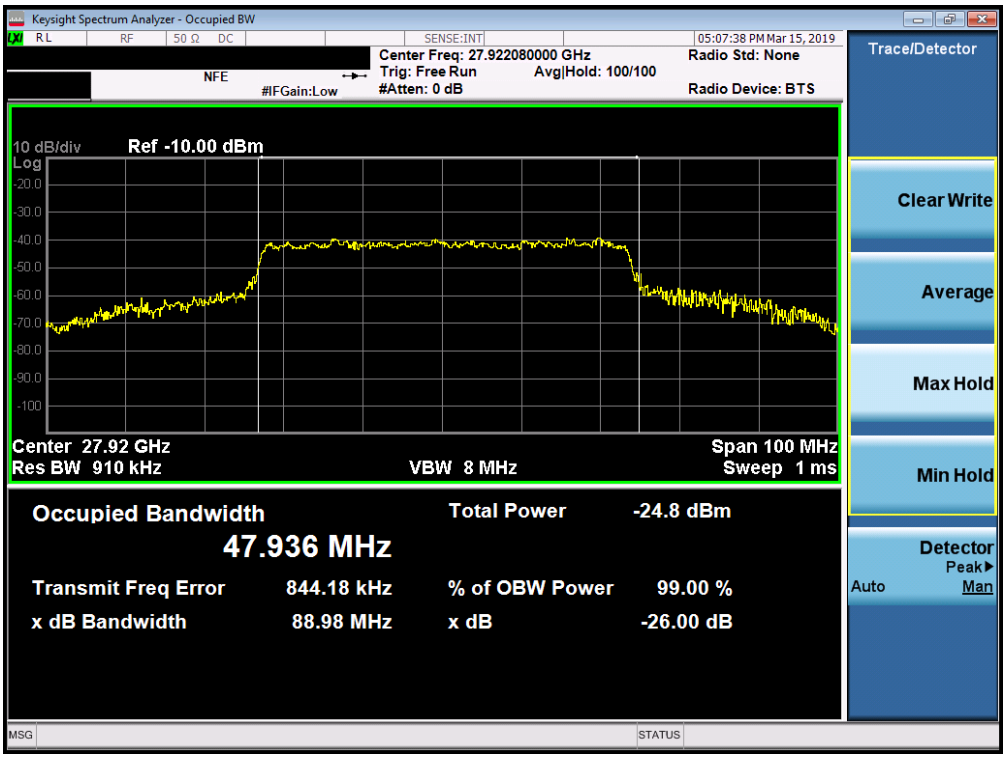


Plot 7-2. Occupied Bandwidth Plot (1CC – 50MHz - 16QAM - Mid Channel)



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

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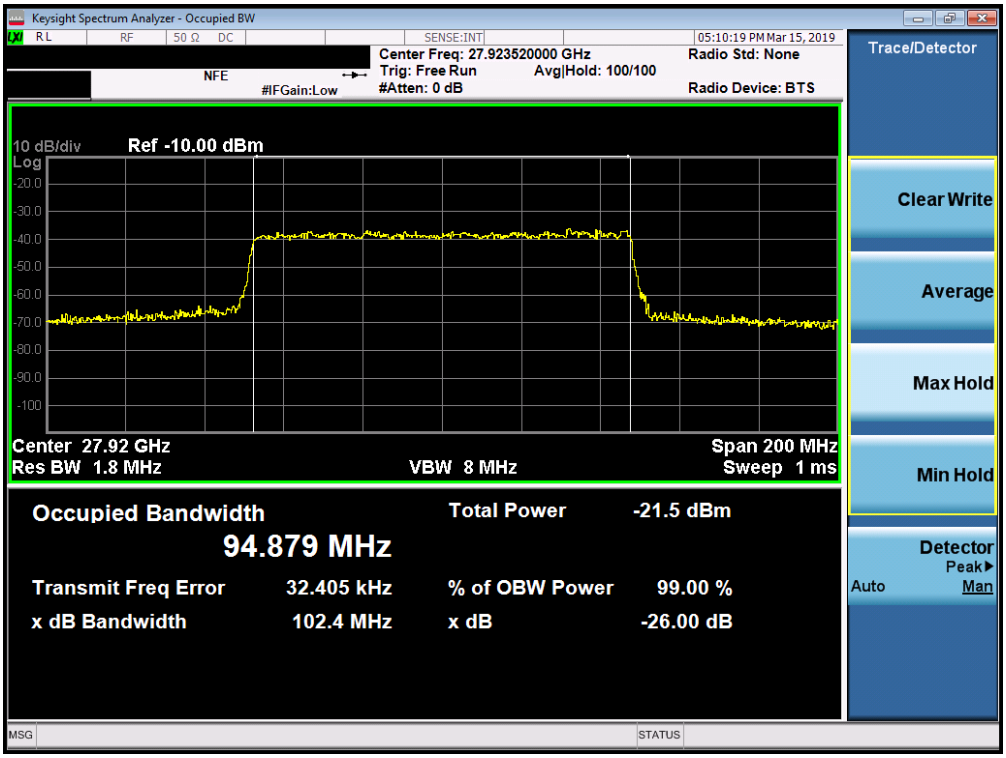
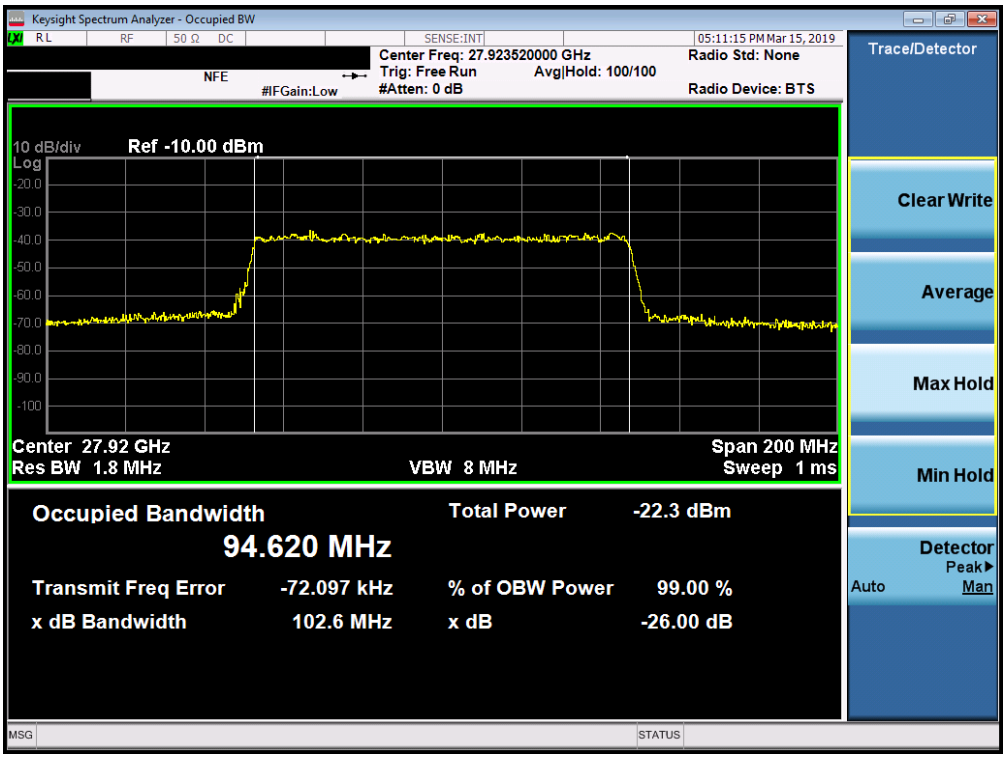


Plot 7-4. Occupied Bandwidth Plot (1CC – 100MHz - QPSK - Mid Channel)



Plot 7-5. Occupied Bandwidth Plot (1CC – 100MHz - 16QAM - Mid Channel)

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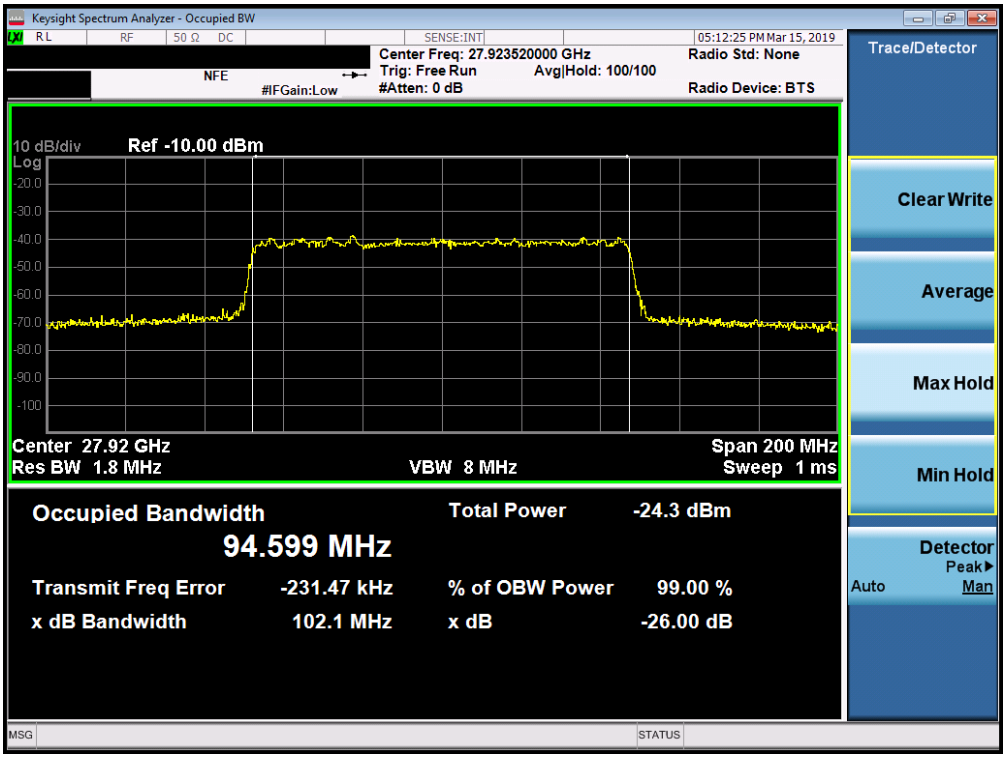
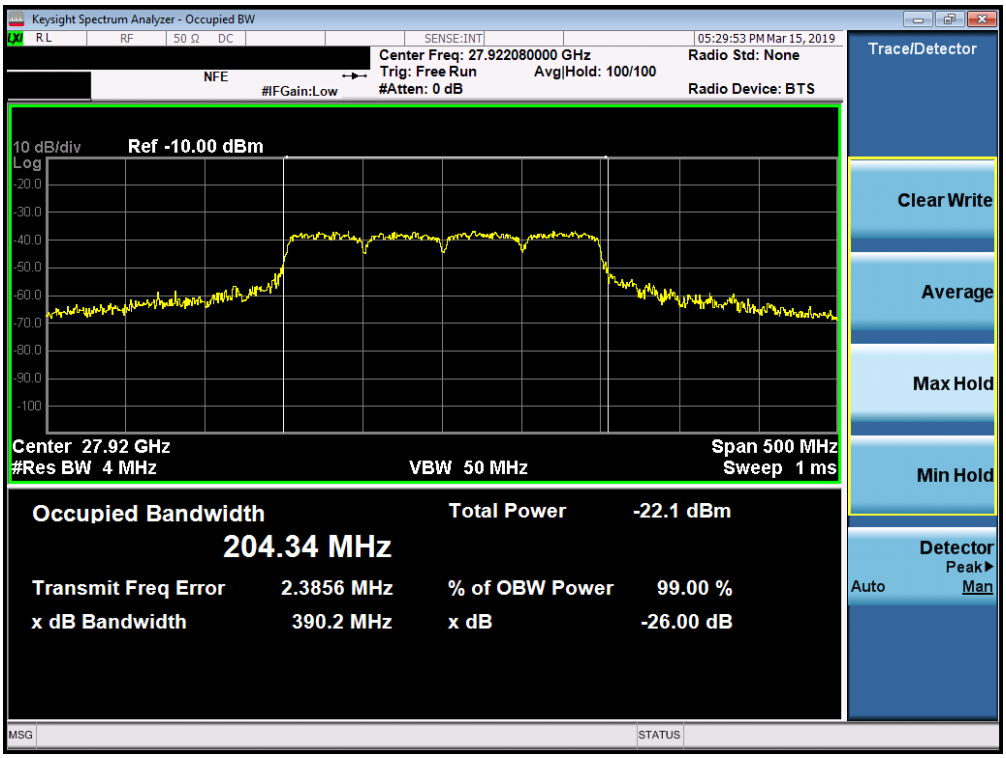


Plot 7-6. Occupied Bandwidth Plot (1CC – 100MHz - 64QAM Mid Channel)



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

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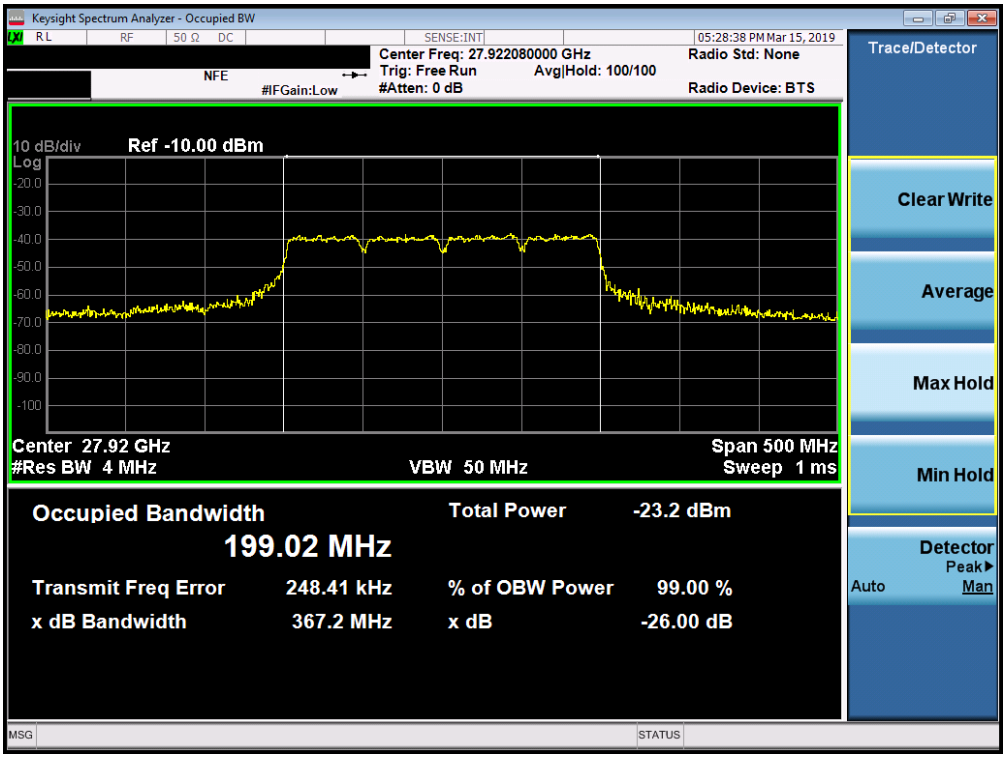
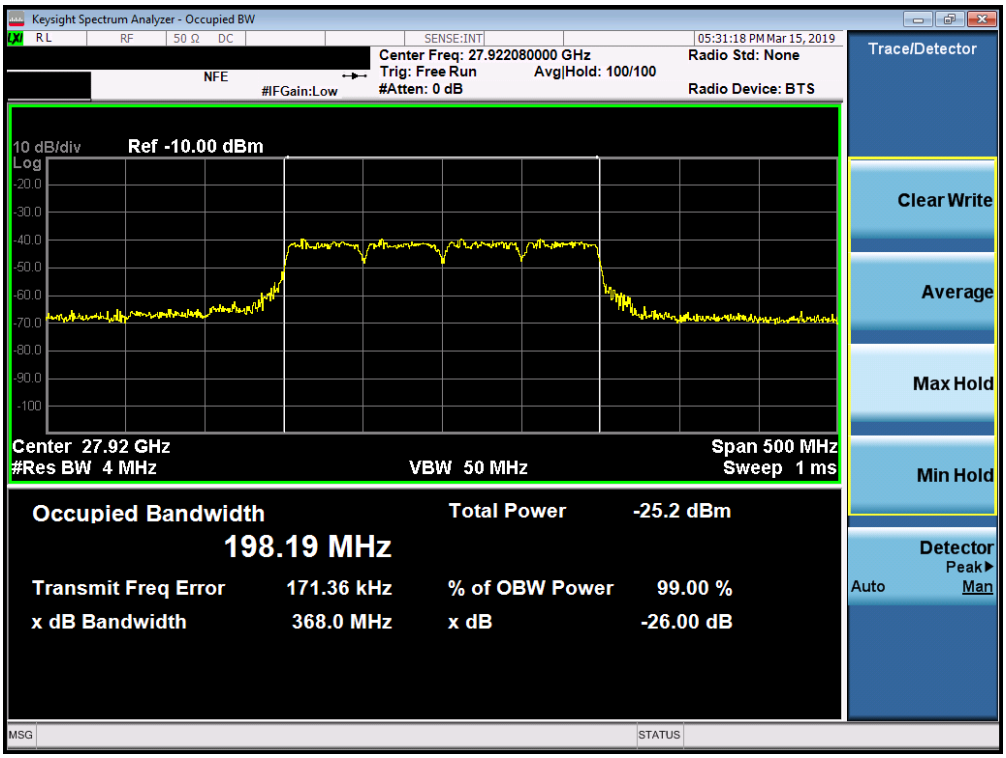


Plot 7-8. Occupied Bandwidth Plot (4CC – 50MHz - 16QAM - Mid Channel)



Plot 7-9. Occupied Bandwidth Plot (4CC – 50MHz - 64QAM Mid Channel)

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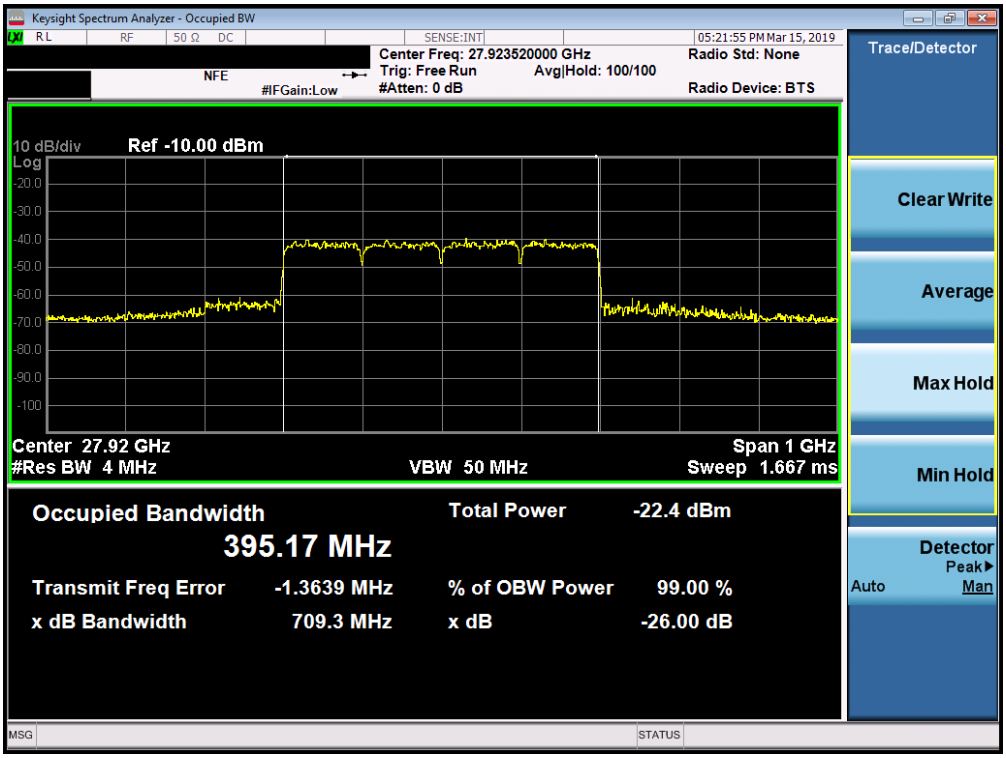
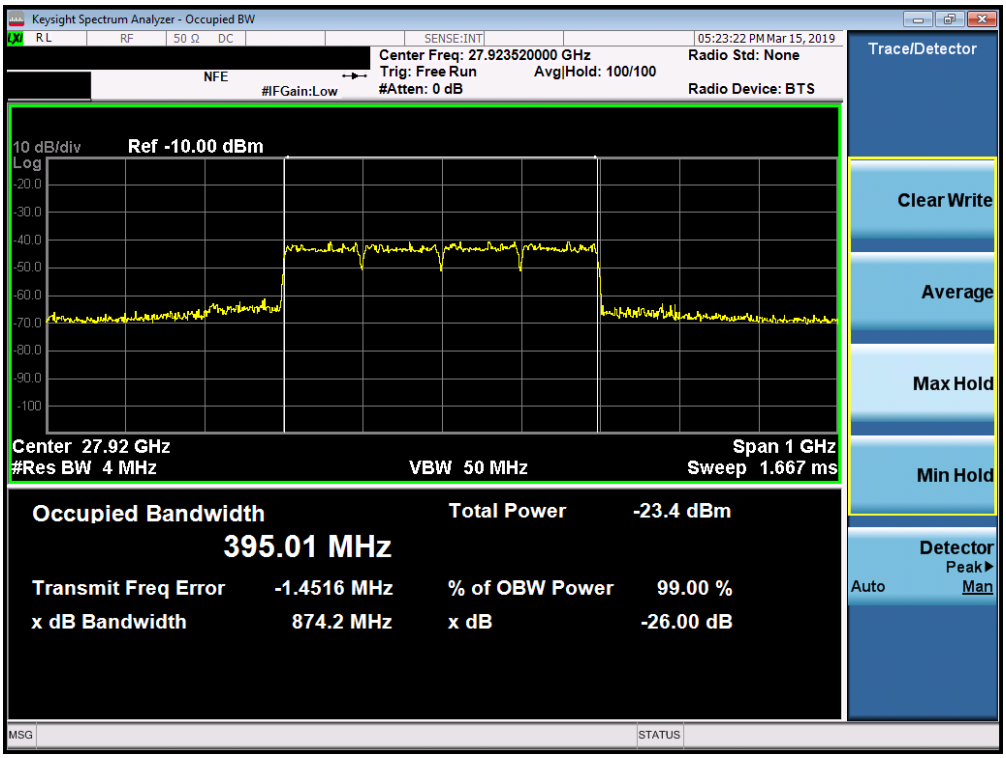


Plot 7-10. Occupied Bandwidth Plot (4CC – 100MHz - QPSK - Mid Channel)



Plot 7-11. Occupied Bandwidth Plot (4CC – 100MHz - 16QAM - Mid Channel)

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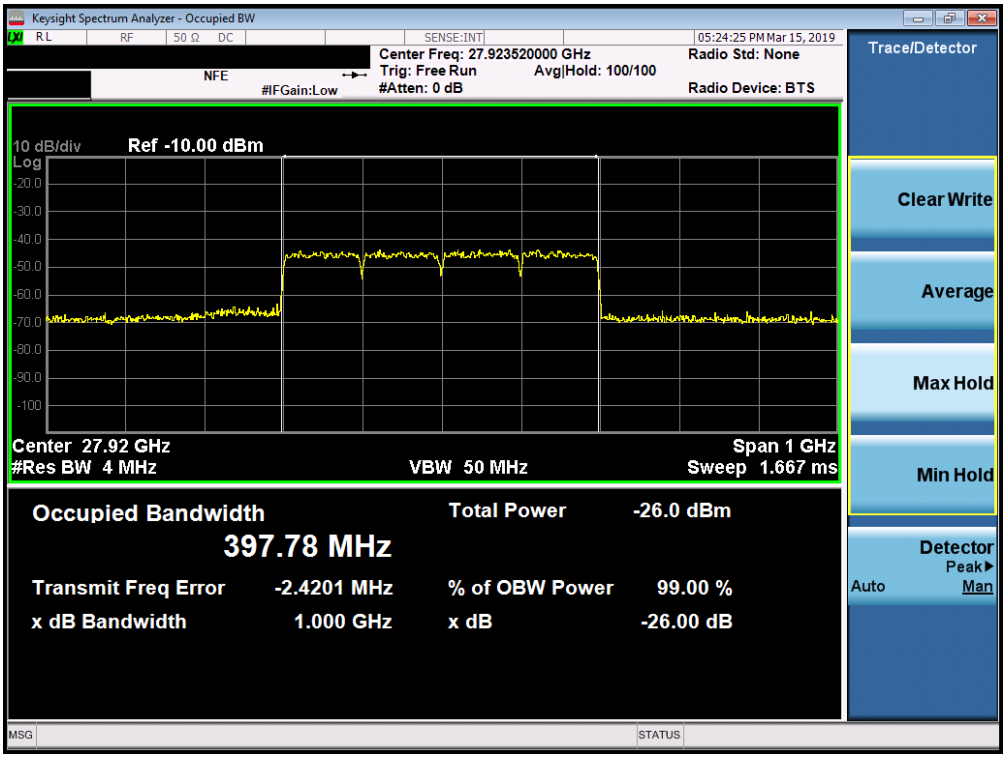

Plot 7-12. Occupied Bandwidth Plot (4CC – 100MHz - 64QAM Mid Channel)

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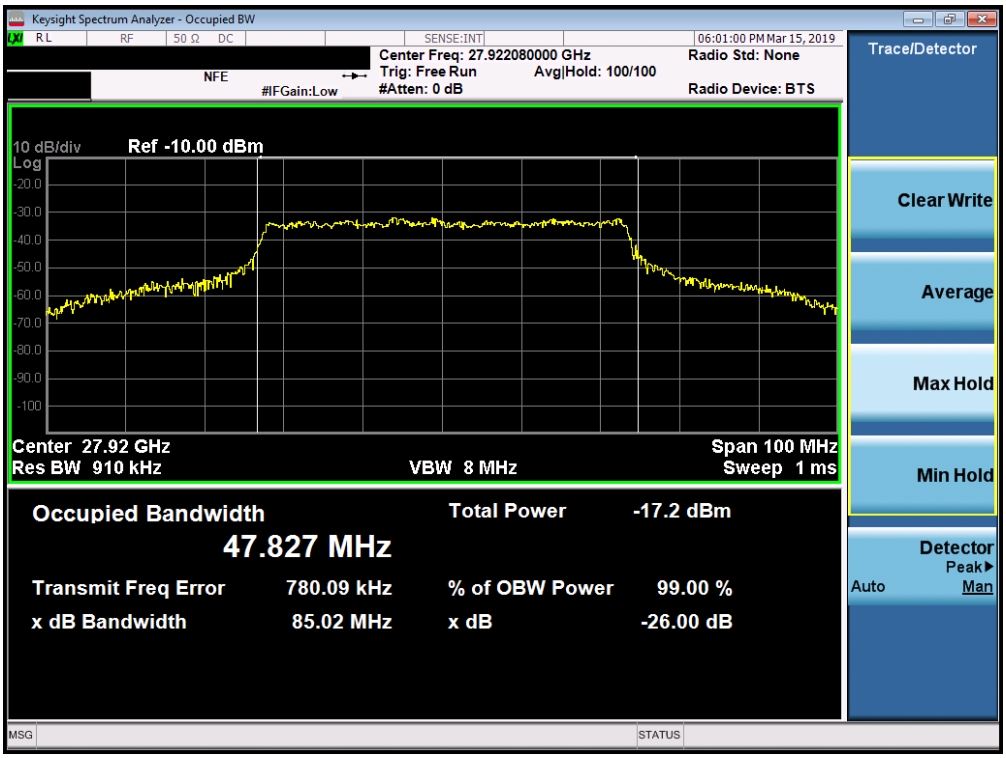
7.2.2 J Patch Occupied Bandwidth

Channel	Bandwidth	CCs Active	Modulation	OBW [MHz]
Mid	50	1	QPSK	47.83
Mid	50	1	16QAM	46.80
Mid	50	1	64QAM	46.84
Mid	100	1	QPSK	94.73
Mid	100	1	16QAM	94.61
Mid	100	1	64QAM	94.58
Mid	200	4	QPSK	203.23
Mid	200	4	16QAM	198.31
Mid	200	4	64QAM	197.53
Mid	400	4	QPSK	394.29
Mid	400	4	16QAM	393.98
Mid	400	4	64QAM	393.23

Table 7-3. Summary of J Patch Occupied Bandwidths



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

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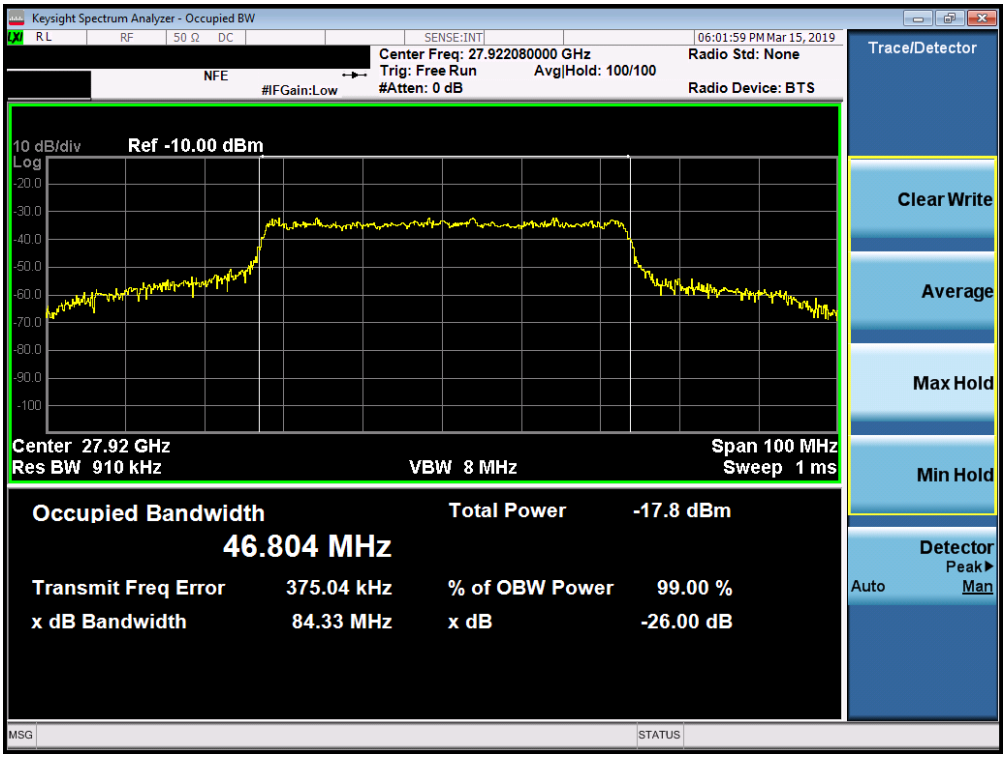
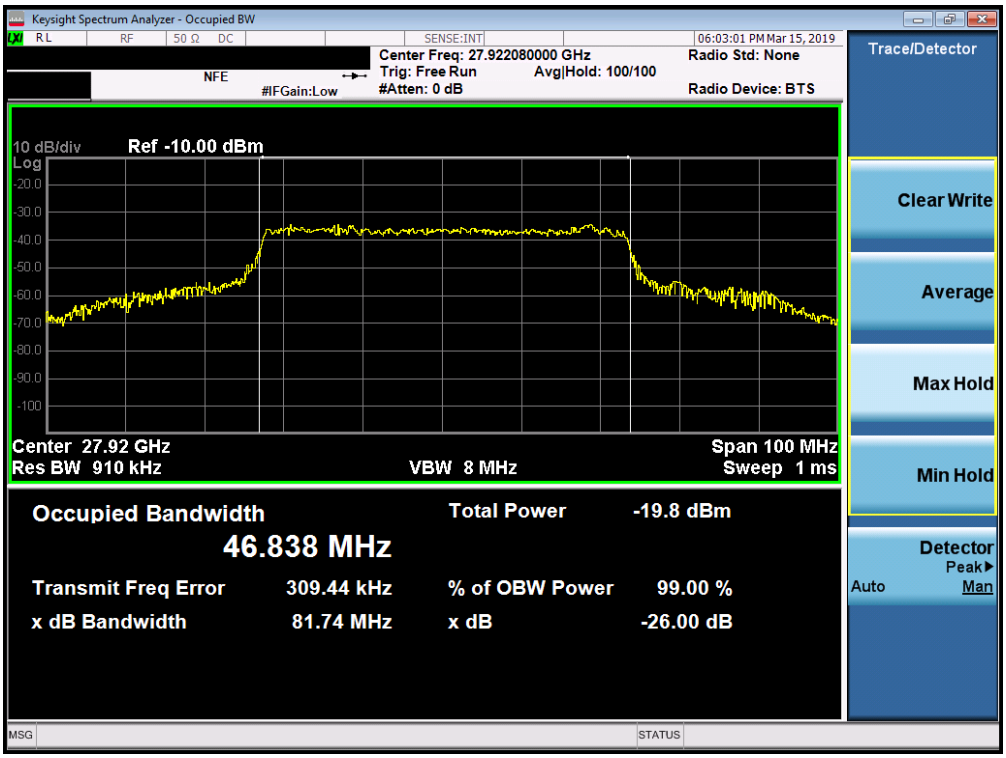


Plot 7-14. Occupied Bandwidth Plot (1CC – 50MHz - 16QAM - Mid Channel)



Plot 7-15. Occupied Bandwidth Plot (1CC – 50MHz - 64QAM Mid Channel)

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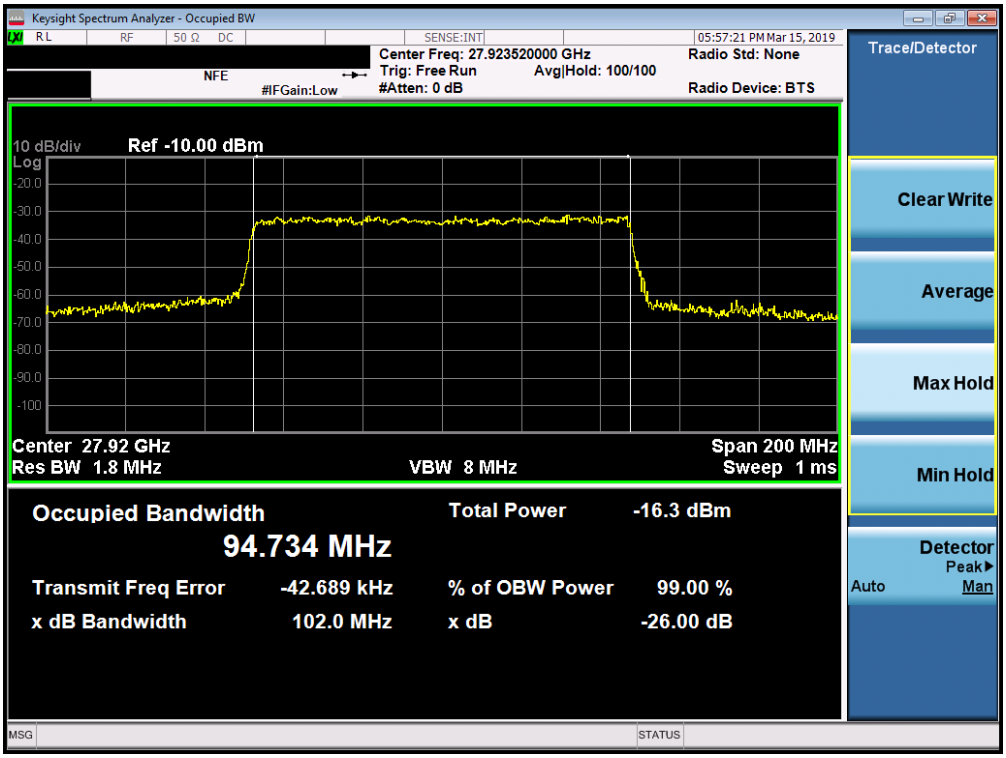
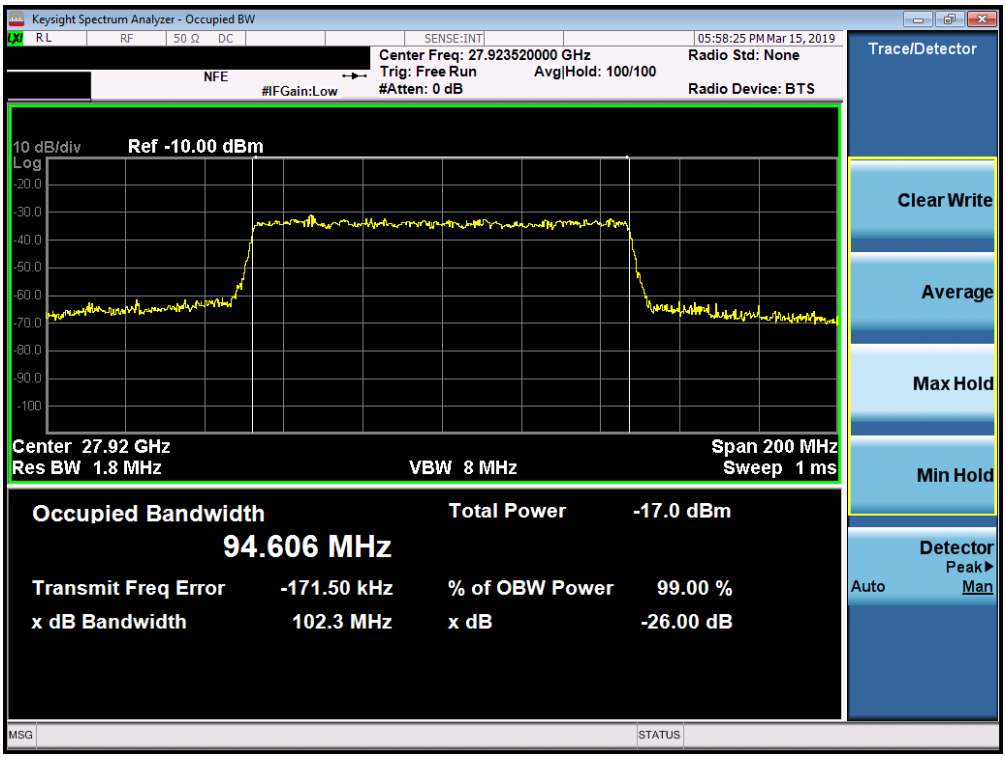


Plot 7-16. Occupied Bandwidth Plot (1CC – 100MHz - QPSK - Mid Channel)



Plot 7-17. Occupied Bandwidth Plot (1CC – 100MHz - 16QAM - Mid Channel)

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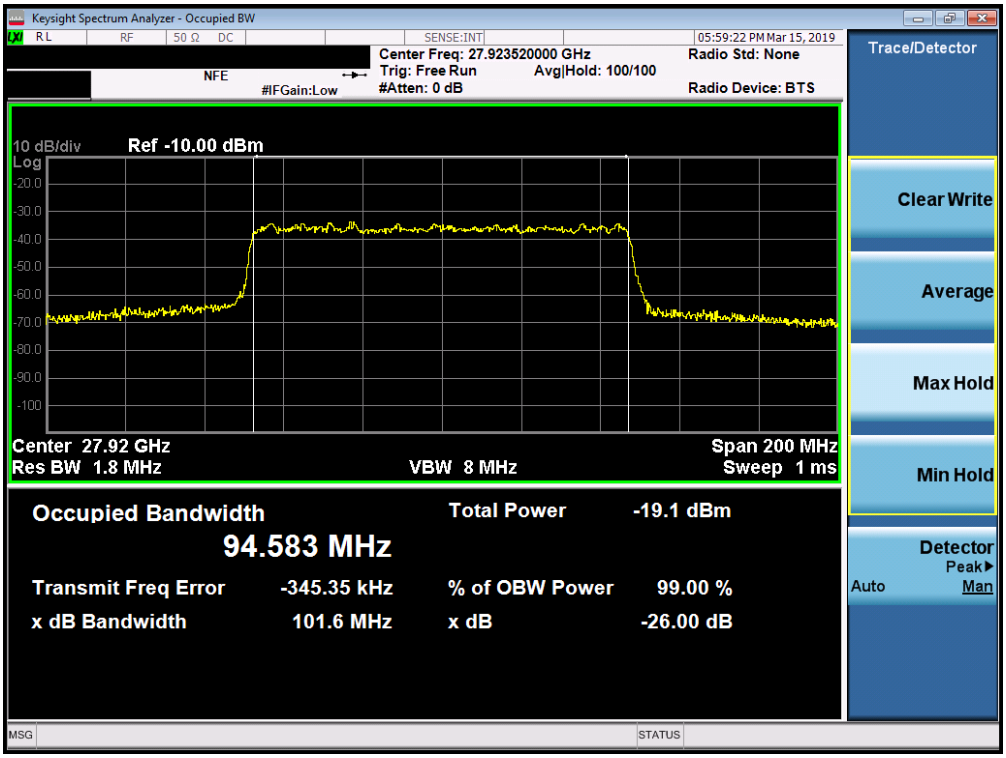
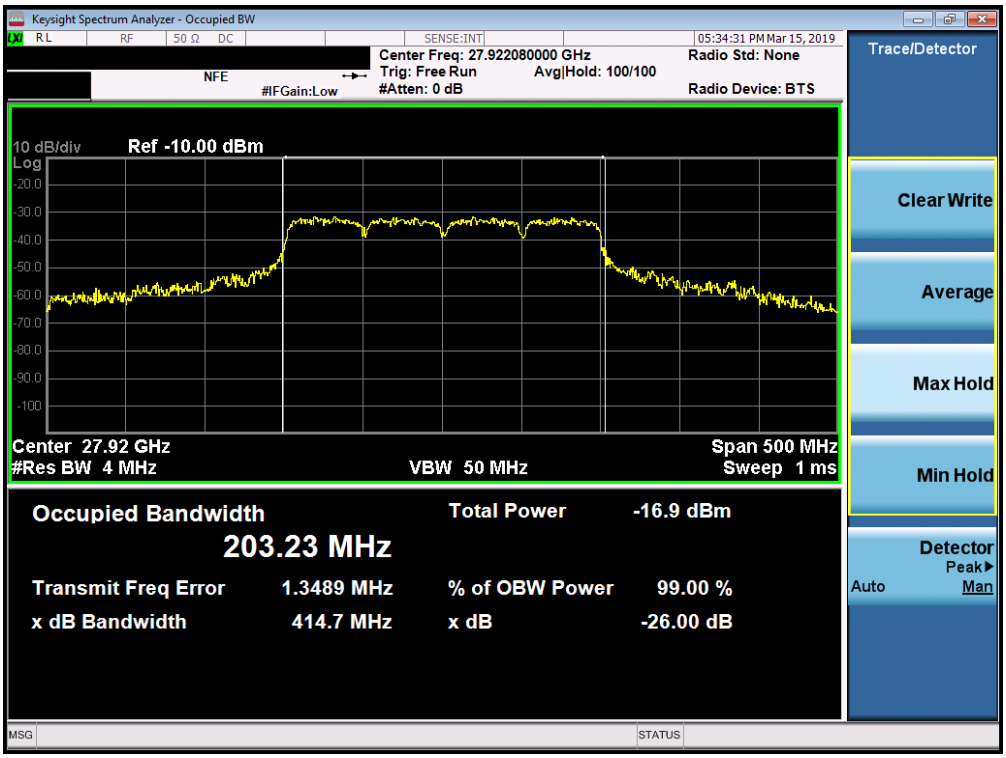


Plot 7-18. Occupied Bandwidth Plot (1CC – 100MHz - 64QAM Mid Channel)



Plot 7-19. Occupied Bandwidth Plot (4CC – 50MHz - QPSK - Mid Channel)

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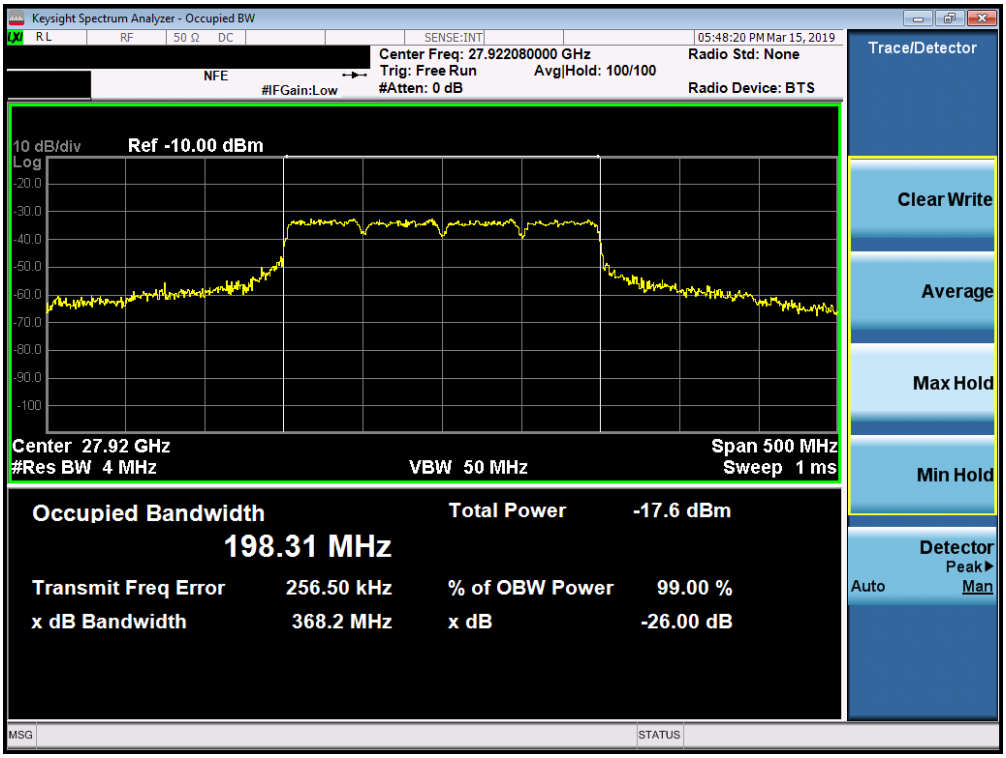
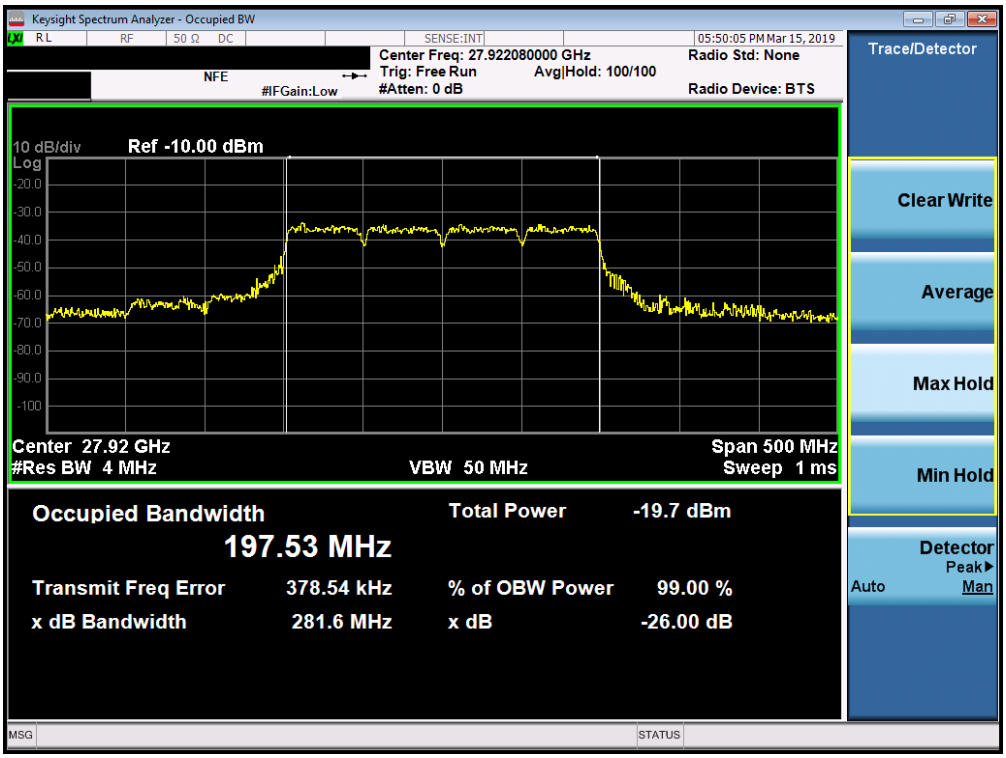


Plot 7-20. Occupied Bandwidth Plot (4CC – 50MHz - 16QAM - Mid Channel)



Plot 7-21. Occupied Bandwidth Plot (4CC – 50MHz - 64QAM Mid Channel)

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Plot 7-22. Occupied Bandwidth Plot (4CC – 100MHz - QPSK - Mid Channel)

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

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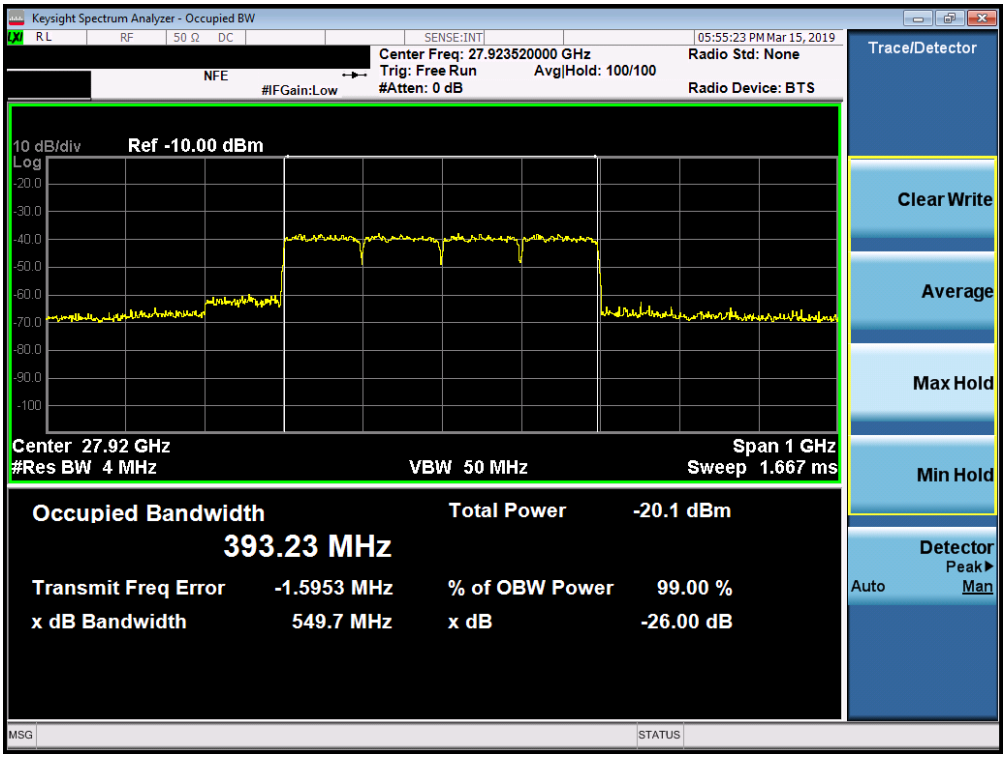

Plot 7-24. Occupied Bandwidth Plot (4CC – 100MHz - 64QAM Mid Channel)

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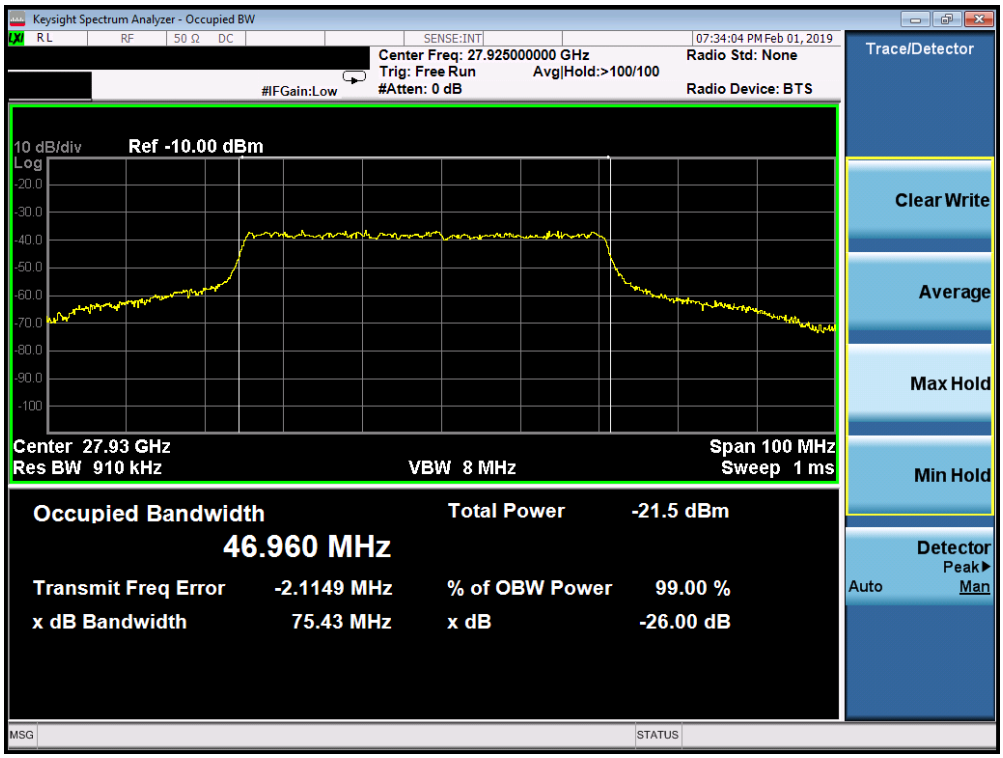
7.2.3 K Patch Occupied Bandwidth

Channel	Bandwidth	CCs Active	Modulation	OBW [MHz]
Mid	50	1	QPSK	46.96
Mid	50	1	16QAM	46.39
Mid	50	1	64QAM	47.81
Mid	100	1	QPSK	94.85
Mid	100	1	16QAM	94.66
Mid	100	1	64QAM	94.74
Mid	200	4	QPSK	201.37
Mid	200	4	16QAM	196.95
Mid	200	4	64QAM	197.78
Mid	400	4	QPSK	393.90
Mid	400	4	16QAM	393.32
Mid	400	4	64QAM	392.57

Table 7-4. Summary of K Patch Occupied Bandwidths



Plot 7-25. Occupied Bandwidth Plot (1CC – 50MHz - QPSK - Mid Channel)

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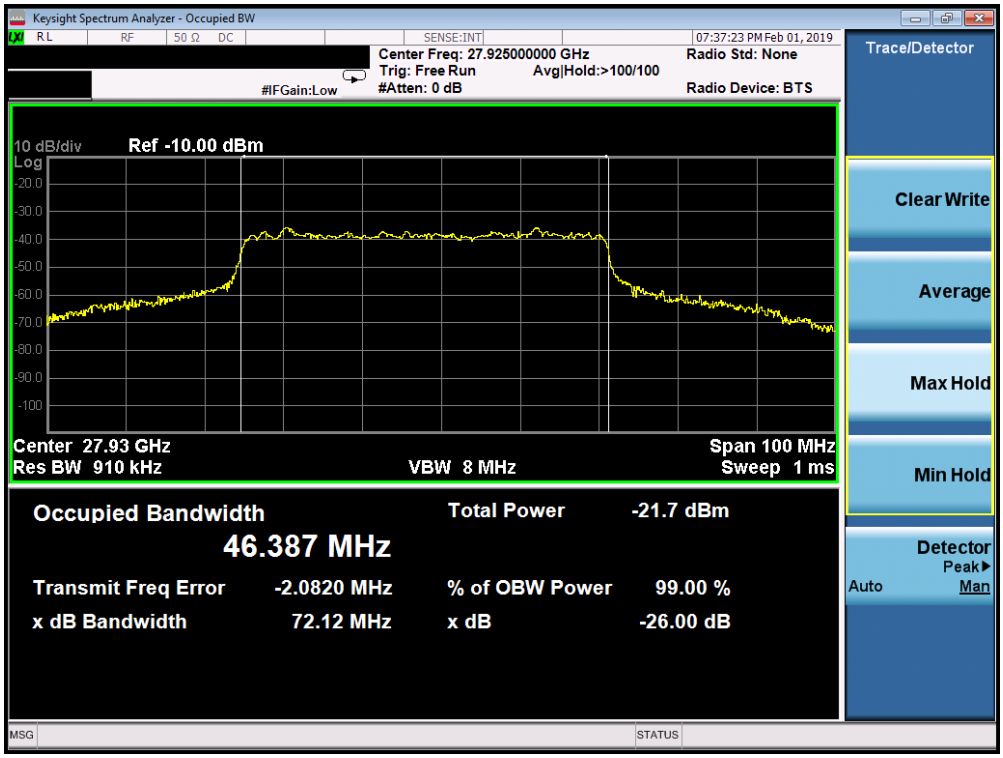
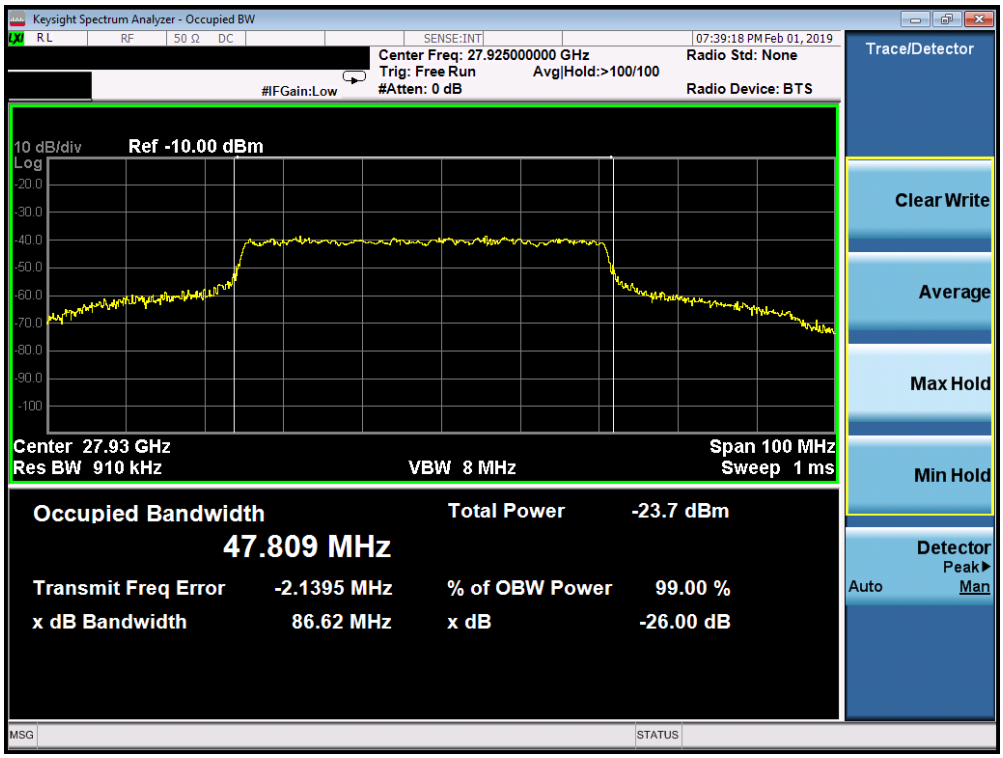


Plot 7-26. Occupied Bandwidth Plot (1CC – 50MHz - 16QAM - Mid Channel)



Plot 7-27. Occupied Bandwidth Plot (1CC – 50MHz - 64QAM Mid Channel)

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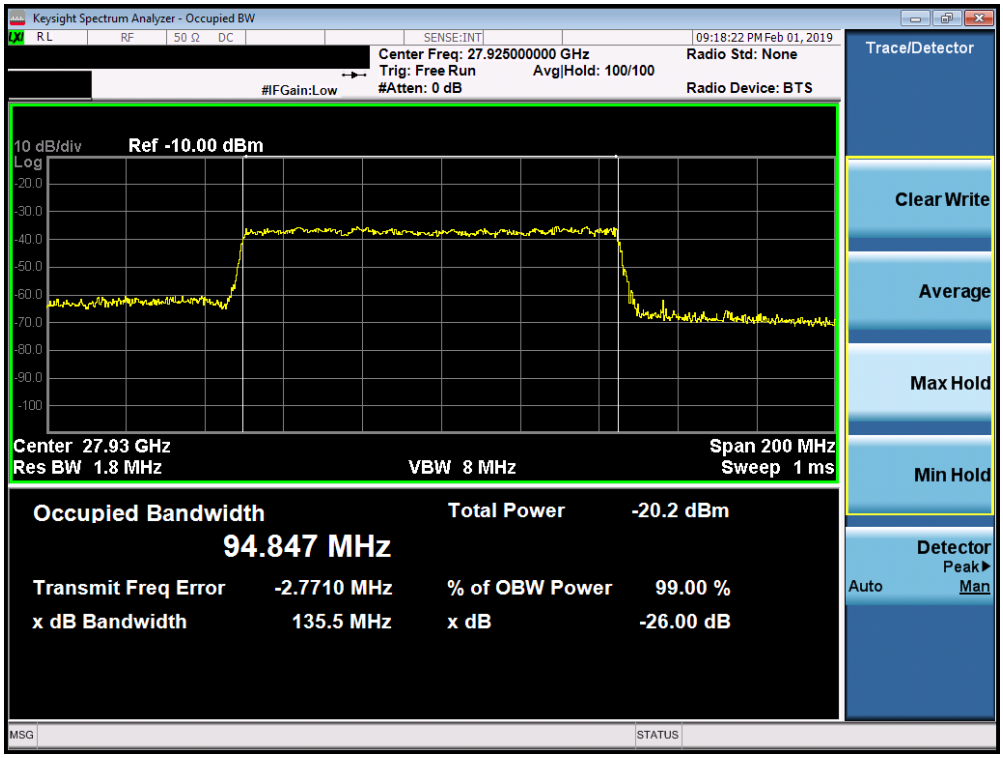
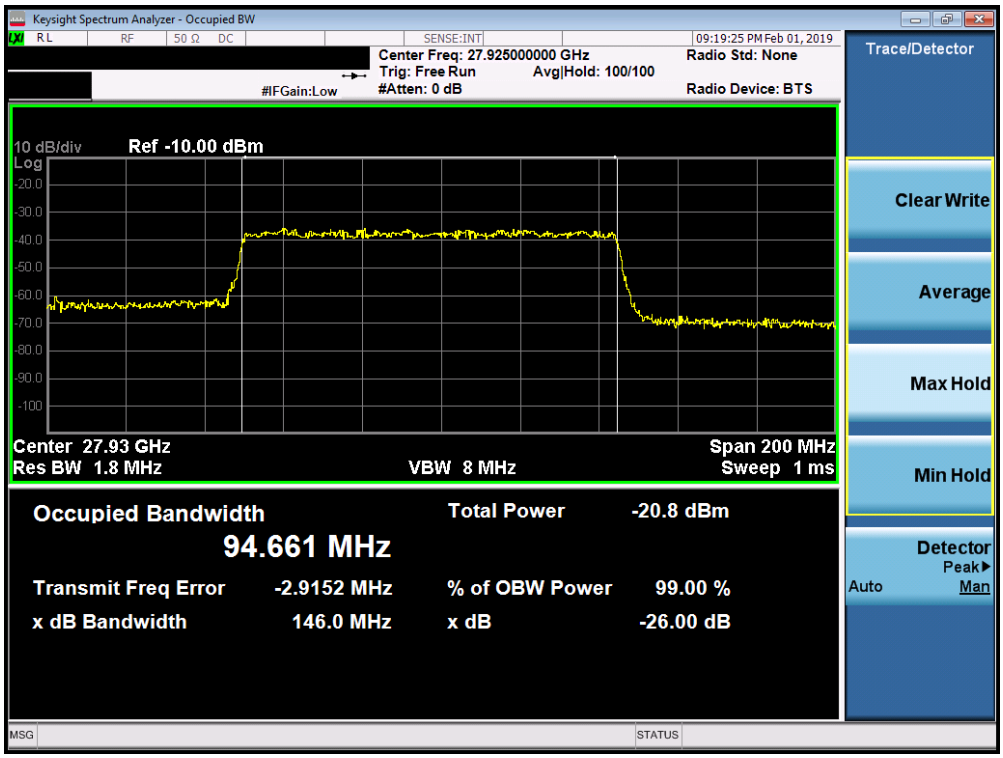


Plot 7-28. Occupied Bandwidth Plot (1CC – 100MHz - QPSK - Mid Channel)



Plot 7-29. Occupied Bandwidth Plot (1CC – 100MHz - 16QAM - Mid Channel)

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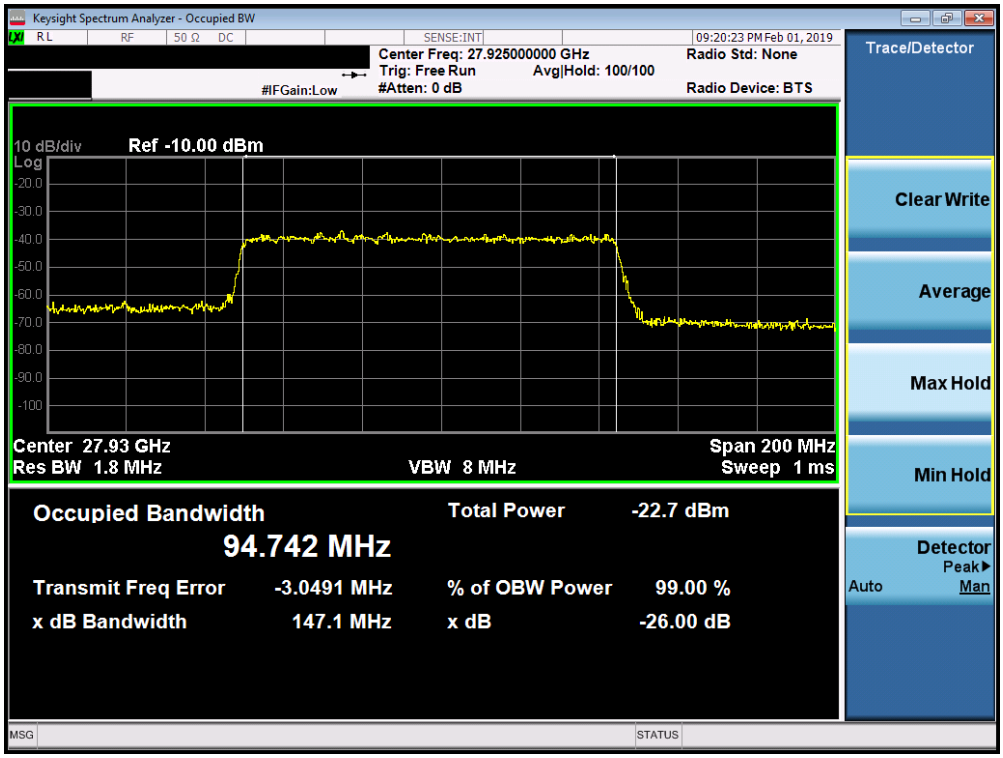
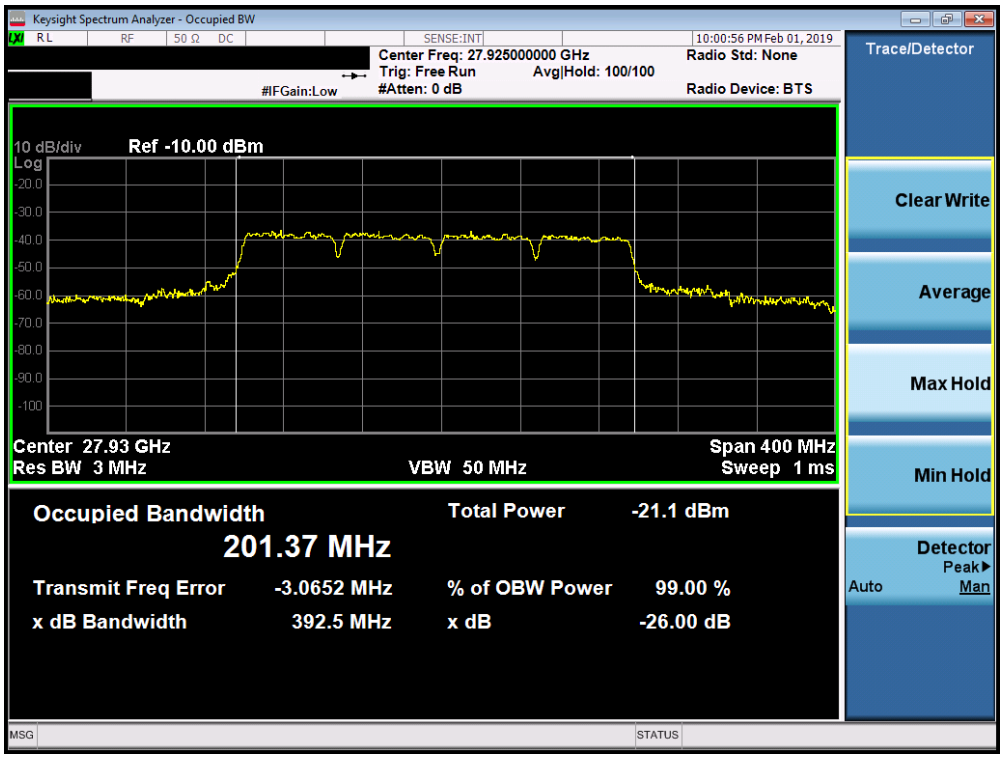


Plot 7-30. Occupied Bandwidth Plot (1CC – 100MHz - 64QAM Mid Channel)



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

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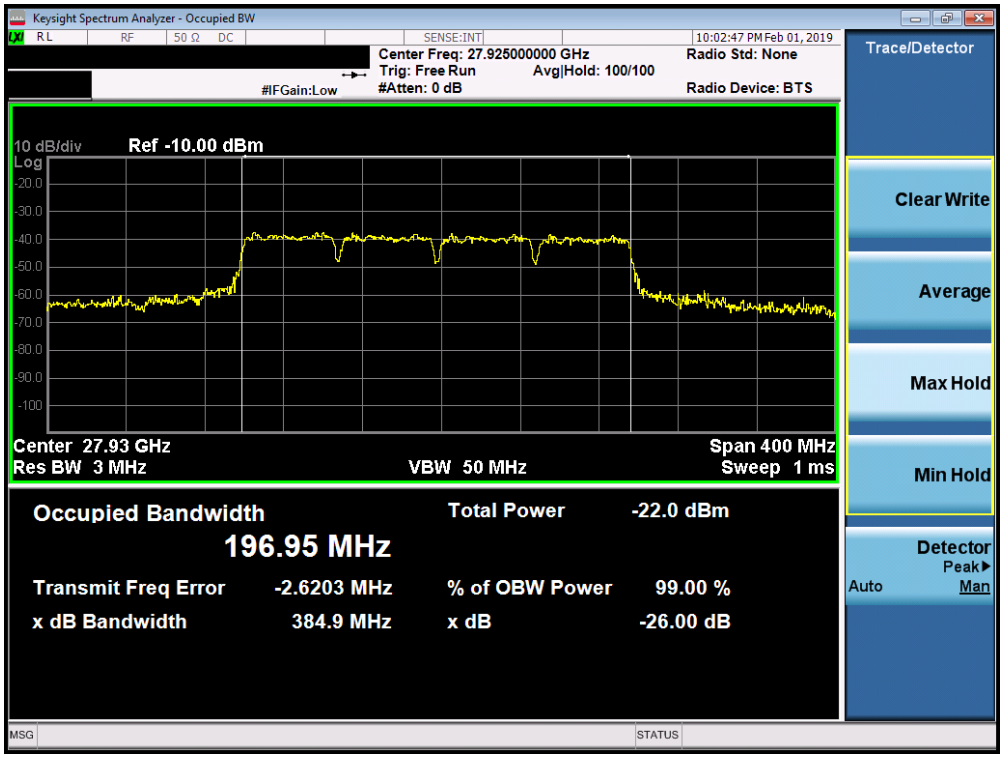
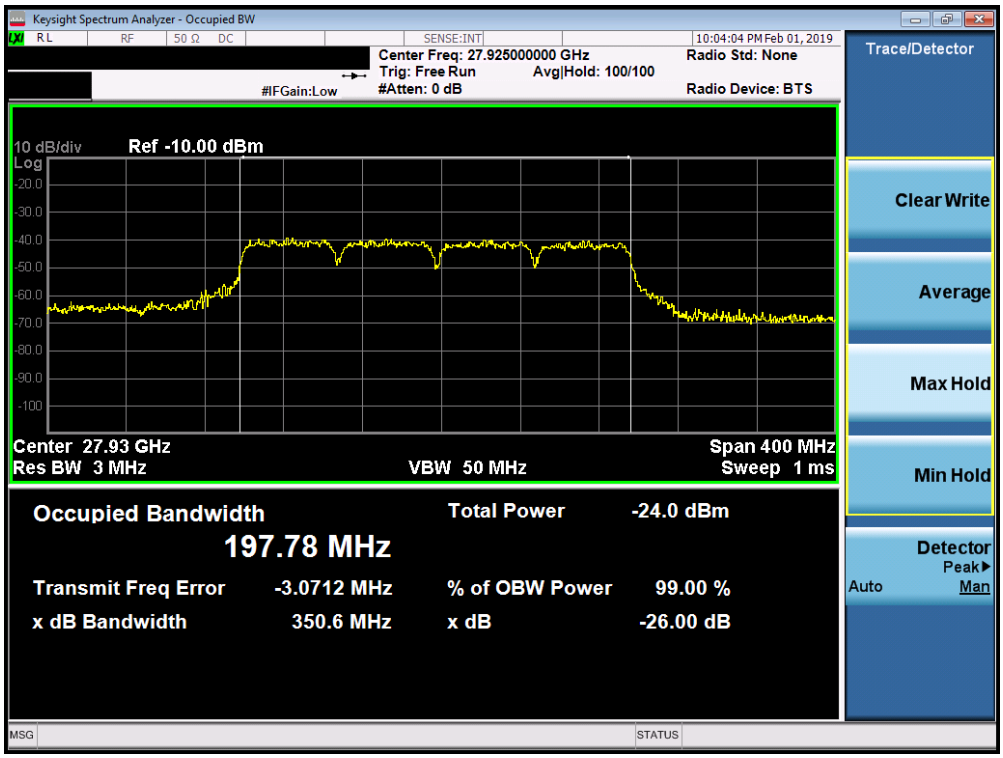


Plot 7-32. Occupied Bandwidth Plot (4CC – 50MHz - 16QAM - Mid Channel)



Plot 7-33. Occupied Bandwidth Plot (4CC – 50MHz - 64QAM Mid Channel)

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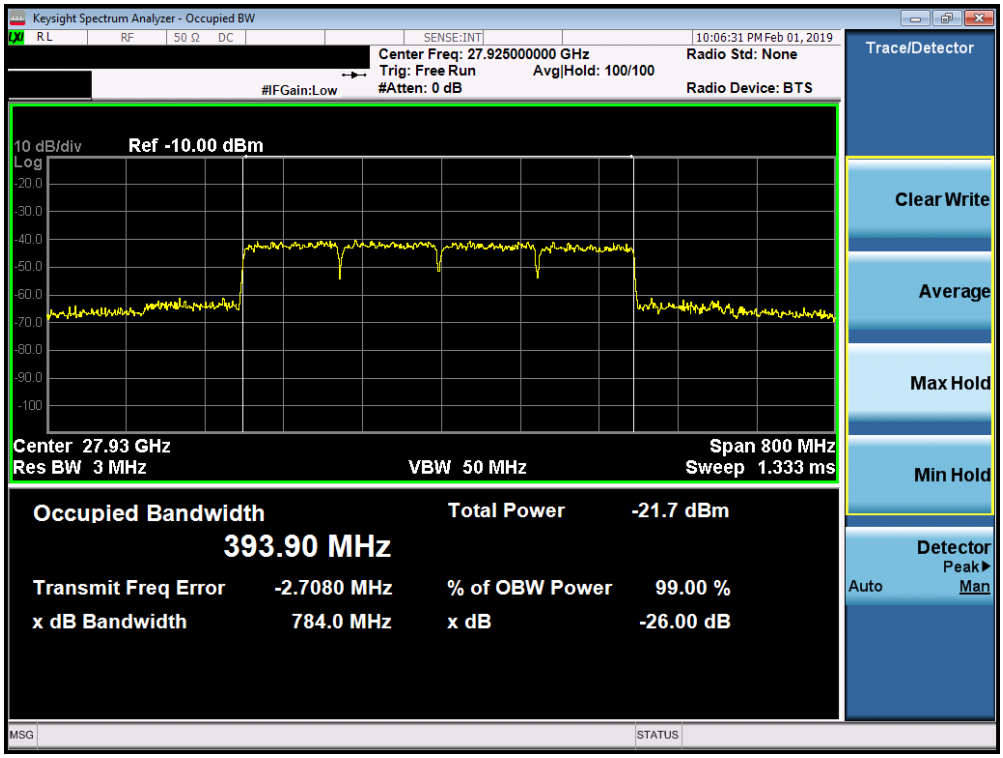
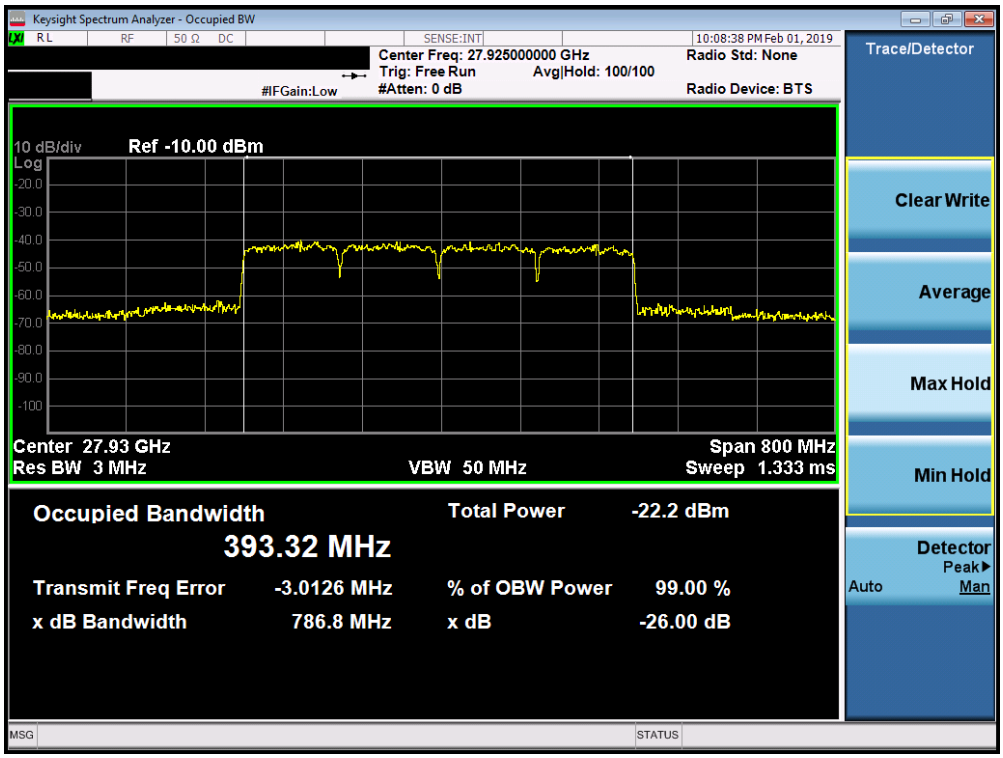


Plot 7-34. Occupied Bandwidth Plot (4CC – 100MHz - QPSK - Mid Channel)



Plot 7-35. Occupied Bandwidth Plot (4CC – 100MHz - 16QAM - Mid Channel)

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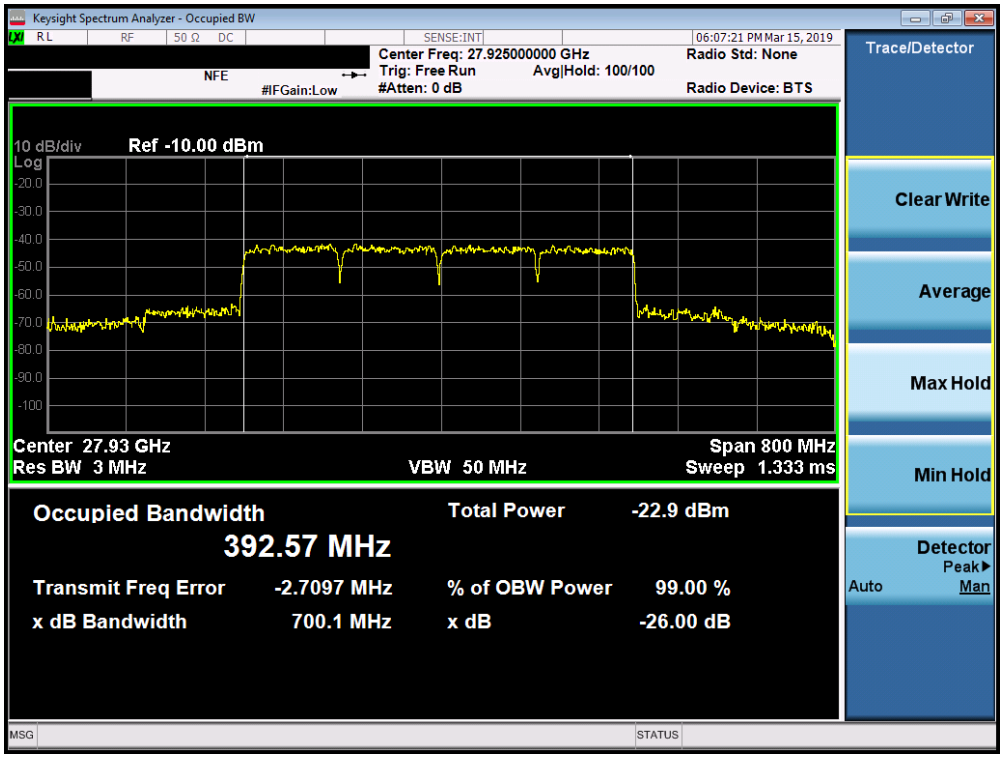

Plot 7-36. Occupied Bandwidth Plot (4CC – 100MHz - 64QAM Mid Channel)

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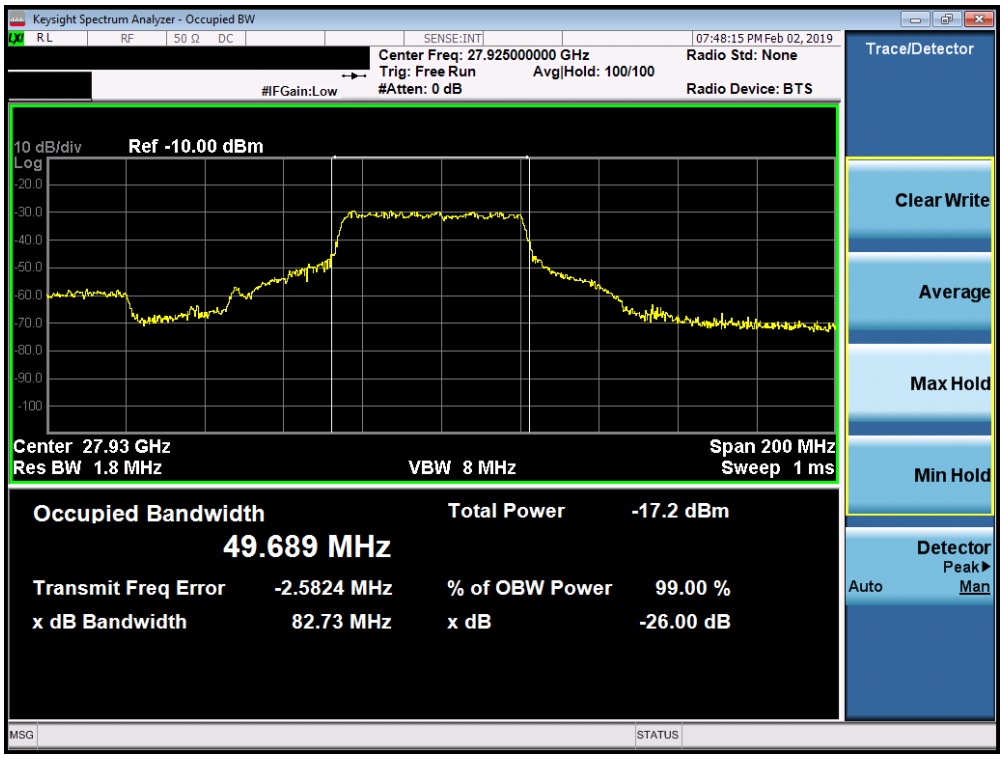
7.2.4 L Patch Occupied Bandwidth

Channel	Bandwidth	CCs Active	Modulation	OBW [MHz]
Mid	50	1	QPSK	49.69
Mid	50	1	16QAM	48.74
Mid	50	1	64QAM	54.44
Mid	100	1	QPSK	95.92
Mid	100	1	16QAM	95.76
Mid	100	1	64QAM	95.80
Mid	200	4	QPSK	207.87
Mid	200	4	16QAM	200.75
Mid	200	4	64QAM	208.03
Mid	400	4	QPSK	393.19
Mid	400	4	16QAM	393.06
Mid	400	4	64QAM	391.82

Table 7-5. Summary of L Patch Occupied Bandwidths



Plot 7-37. Occupied Bandwidth Plot (1CC – 50MHz - QPSK - Mid Channel)

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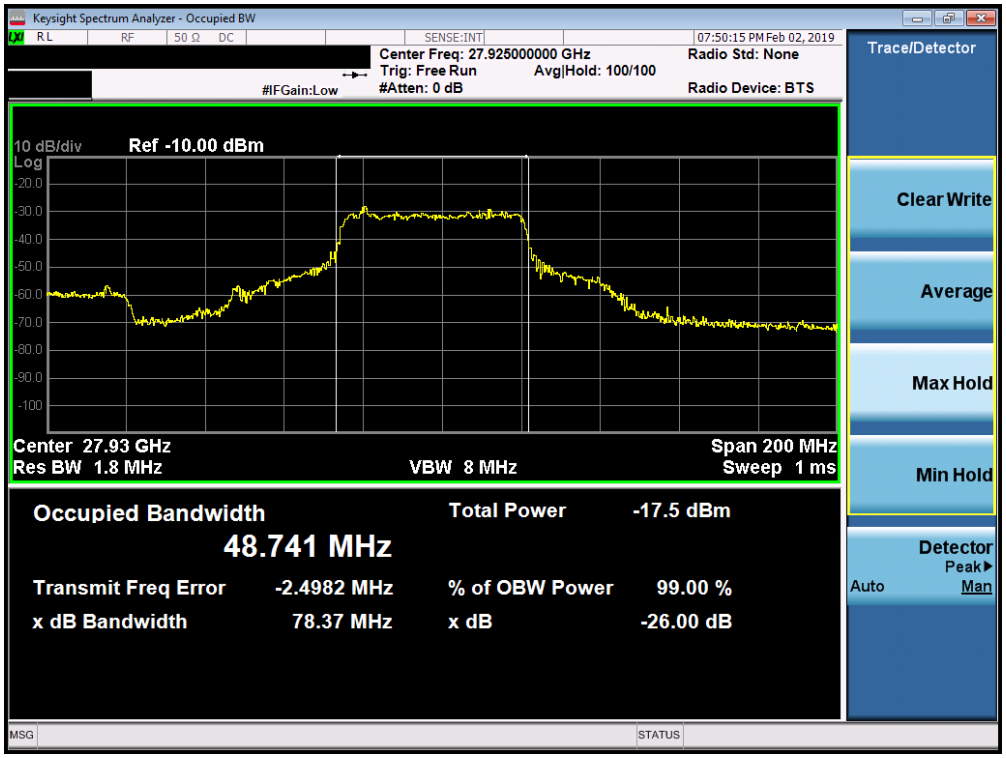

Plot 7-38. Occupied Bandwidth Plot (1CC – 50MHz - 16QAM - Mid Channel)

Plot 7-39. Occupied Bandwidth Plot (1CC – 50MHz - 64QAM Mid Channel)

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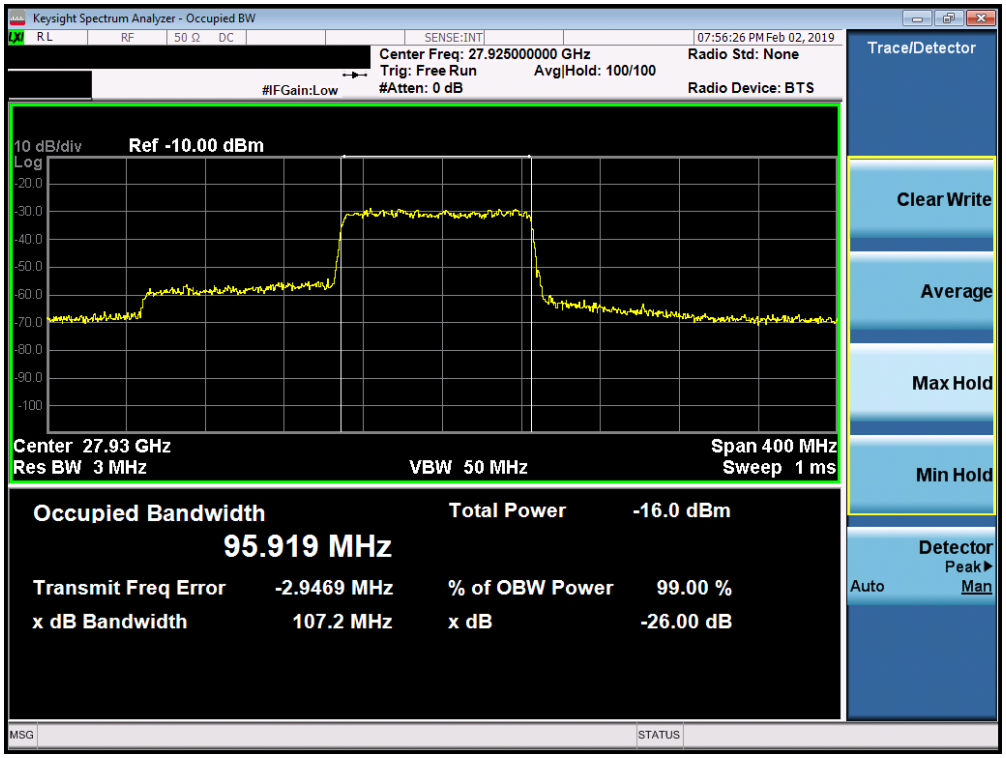
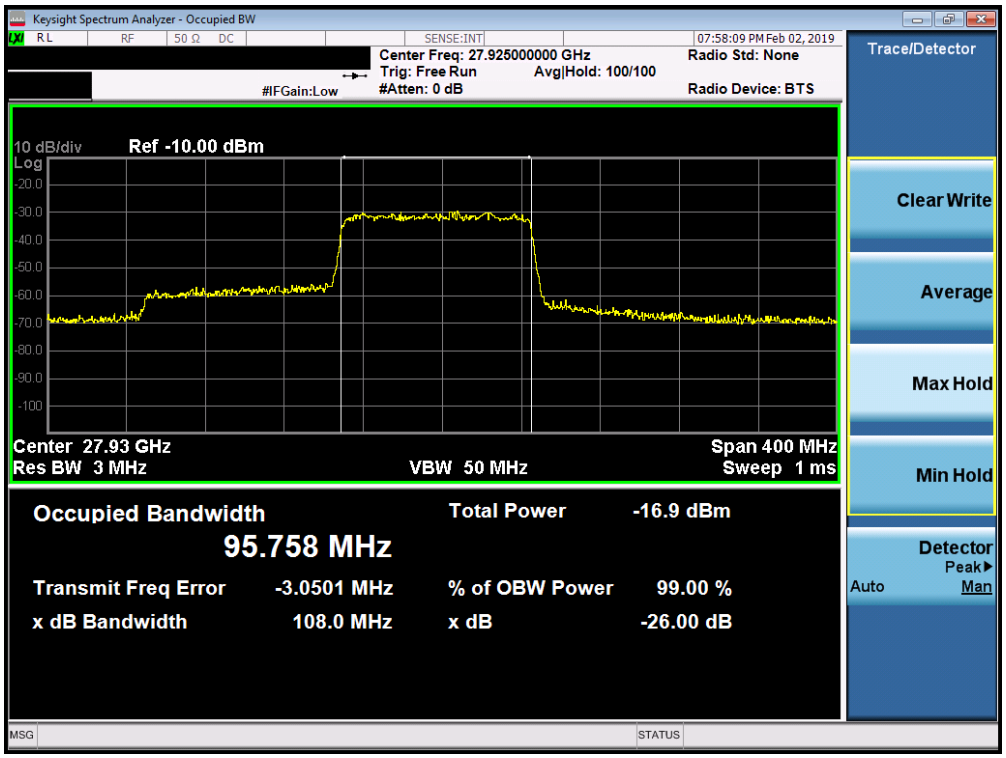


Plot 7-40. Occupied Bandwidth Plot (1CC – 100MHz - QPSK - Mid Channel)



Plot 7-41. Occupied Bandwidth Plot (1CC – 100MHz - 16QAM - Mid Channel)

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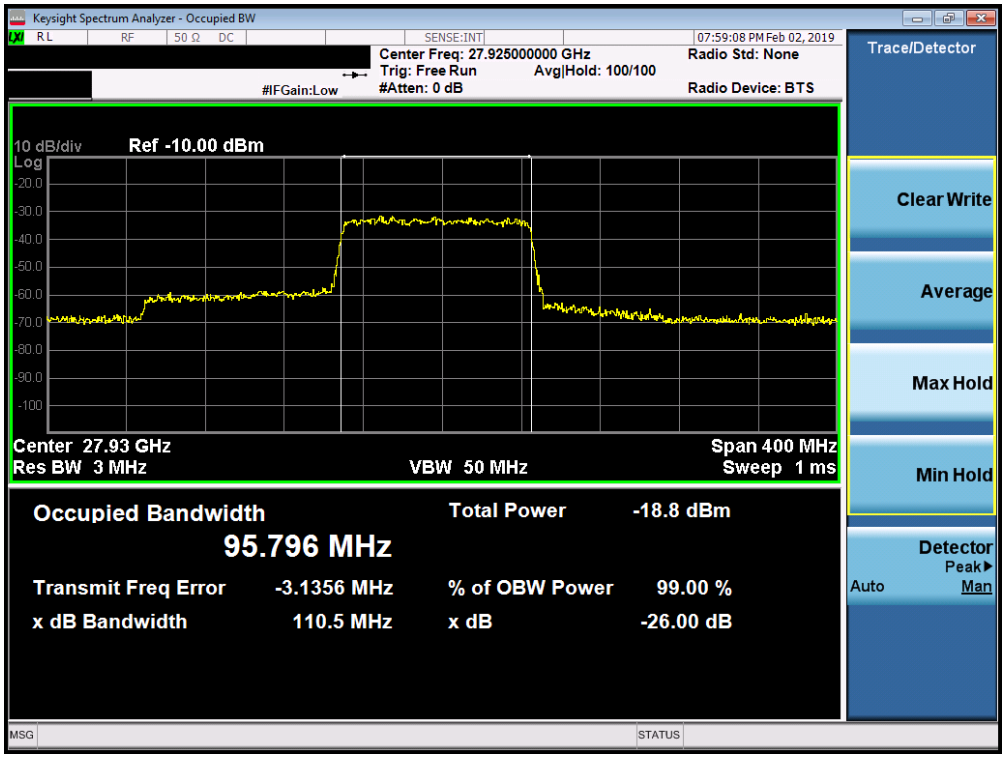

Plot 7-42. Occupied Bandwidth Plot (1CC – 100MHz - 64QAM Mid Channel)

Plot 7-43. Occupied Bandwidth Plot (4CC – 50MHz - QPSK - Mid Channel)

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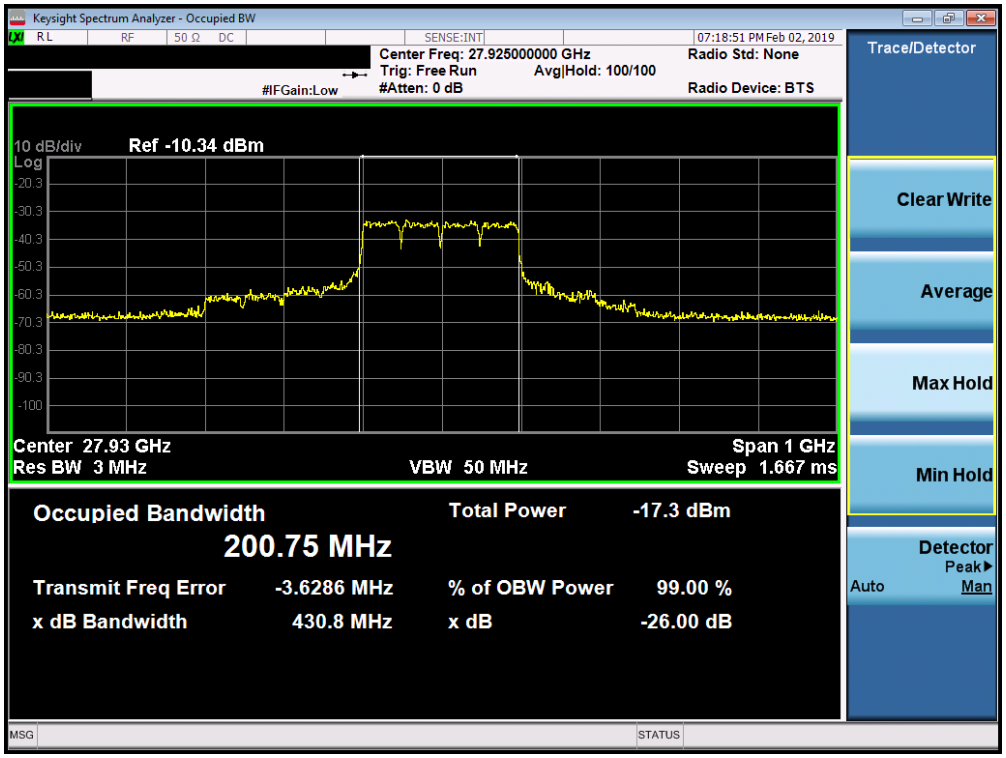
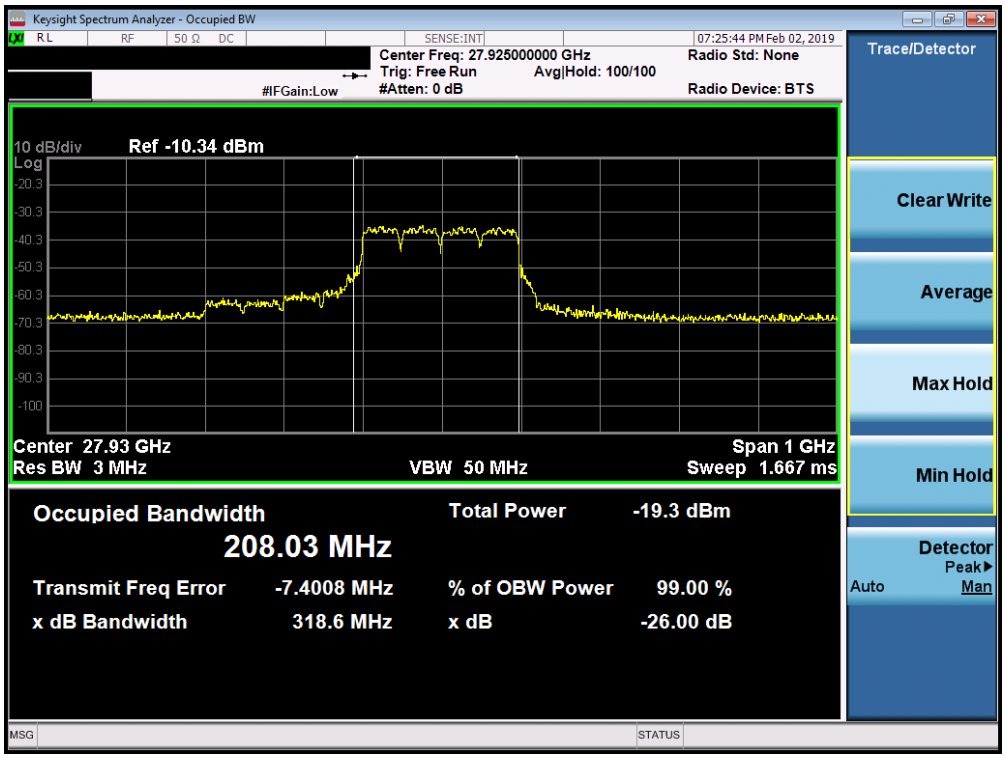


Plot 7-44. Occupied Bandwidth Plot (4CC – 50MHz - 16QAM - Mid Channel)



Plot 7-45. Occupied Bandwidth Plot (4CC – 50MHz - 64QAM Mid Channel)

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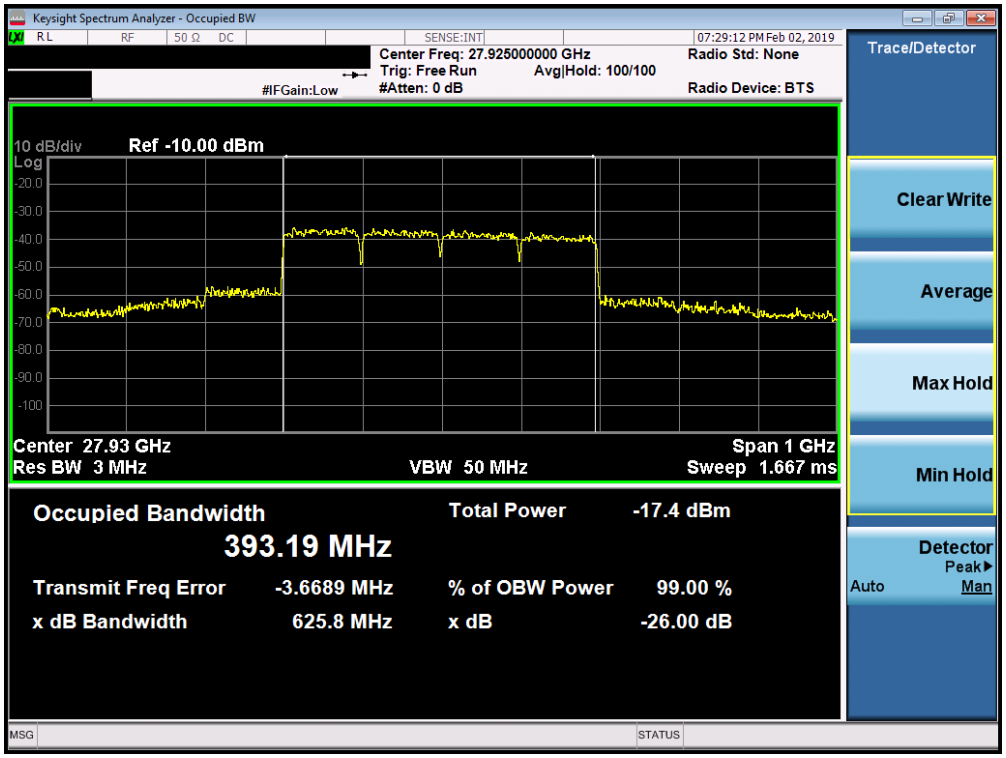

Plot 7-46. Occupied Bandwidth Plot (4CC – 100MHz - QPSK - Mid Channel)

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

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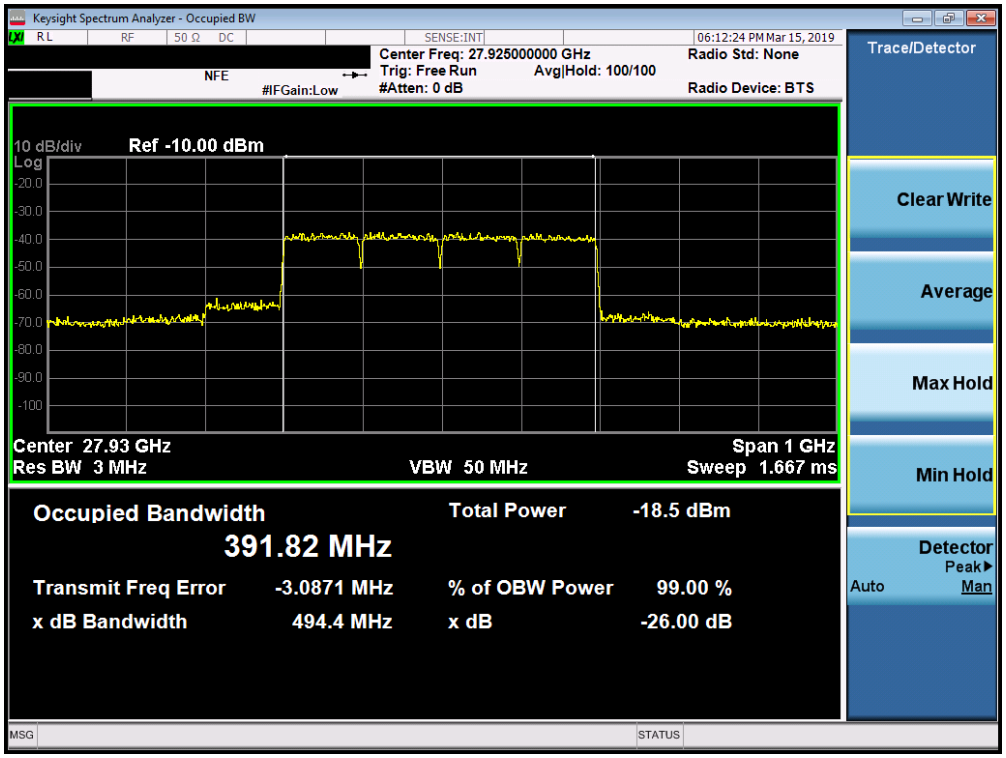

Plot 7-48. Occupied Bandwidth Plot (4CC – 100MHz - 64QAM Mid Channel)

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7.3 Equivalent Isotropic Radiated Power

§2.1046, §30.202

Test Overview

Equivalent Isotropic Radiated Power (EIRP) measurements are performed using broadband horn antennas. All measurements are performed as RMS average measurements while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

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

Test Procedures Used

ANSI C63.26-2015 Section 5.2.4.4.1

Test Settings

1. Radiated power measurements are performed using the signal analyzer's "channel power" measurement capability for signals with continuous operation.
2. RBW = 1 – 5% of the expected OBW, not to exceed 1MHz
3. VBW ≥ 3 x RBW
4. Span = 2x to 3x the OBW
5. No. of sweep points ≥ 2 x span / RBW
6. Detector = RMS
7. The integration bandwidth was roughly set equal to the measured OBW of the signal for signals with continuous operation.
8. Trace mode = trace averaging (RMS) over 100 sweeps
9. The trace was allowed to stabilize

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Test Notes

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

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. 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.

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7.3.1 J Dipole Equivalent Isotropic Radiated Power (EIRP)

Antenna	Chan.	Channel Freq [GHz]	Bandwidth (MHz)	Ant. Pol. [H/V]	Mode	Beam ID	CCs active	RB Size	RB Offset	Modulation	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	Analyzer Level [dBm]	EIRP [dBm]	Limit [dBm]	Margin [dB]
J Dipole	Low	27534.84	50	V	SISO	5	1	1	0	QPSK	317	277	-34.80	16.53	43.00	-26.47
	Mid	27922.08	50	V	SISO	16	1	1	31	QPSK	316	275	-34.00	17.29	43.00	-25.71
	High	28319.52	50	V	SISO	16	1	1	0	QPSK	317	280	-33.60	**17.82**	43.00	-25.18
	Low	27534.84	50	V	SISO	5	1	1	0	16QAM	317	277	-33.55	17.78	43.00	-25.22
	Mid	27922.08	50	V	SISO	16	1	1	31	16QAM	316	275	-33.98	17.31	43.00	-25.69
	High	28319.52	50	V	SISO	16	1	1	0	16QAM	317	280	-32.98	**18.44**	43.00	-24.56
	Low	27534.84	50	V	SISO	5	1	1	0	64QAM	317	277	-35.38	15.95	43.00	-27.05
	Mid	27922.08	50	V	SISO	16	1	1	31	64QAM	316	275	-35.73	15.56	43.00	-27.44
	High	28319.52	50	V	SISO	16	1	1	0	64QAM	317	280	-35.12	**16.30**	43.00	-26.70
	Low	27534.84	50	V	SISO	133	1	1	0	QPSK	320	252	-35.80	15.53	43.00	-27.47
	Mid	27922.08	50	V	SISO	144	1	1	31	QPSK	322	249	-34.85	16.44	43.00	-26.56
	High	28319.52	50	V	SISO	144	1	1	0	QPSK	320	251	-35.81	15.61	43.00	-27.39
	Low	27534.84	50	V	SISO	133	1	1	0	16QAM	320	252	-34.43	16.90	43.00	-26.10
	Mid	27922.08	50	V	SISO	144	1	1	31	16QAM	322	249	-33.64	17.65	43.00	-25.35
	High	28319.52	50	V	SISO	144	1	1	0	16QAM	320	251	-35.19	16.23	43.00	-26.77
	Low	27534.84	50	V	SISO	133	1	1	0	64QAM	320	252	-36.09	15.24	43.00	-27.76
	Mid	27922.08	50	V	SISO	144	1	1	0	64QAM	322	249	-35.87	15.42	43.00	-27.58
	High	28319.52	50	V	SISO	144	1	1	0	64QAM	320	251	-37.31	14.11	43.00	-28.89
	Low	27559.32	100	V	SISO	5	1	1	65	QPSK	315	278	-33.90	17.43	43.00	-25.57
	Mid	27923.52	100	V	SISO	16	1	1	0	QPSK	314	277	-34.06	17.23	43.00	-25.77
	High	28292.16	100	V	SISO	16	1	1	0	QPSK	320	280	-33.85	**17.57**	43.00	-25.43
	Low	27559.32	100	V	SISO	5	1	1	65	16QAM	315	278	-32.95	**18.38**	43.00	-24.62
	Mid	27923.52	100	V	SISO	16	1	1	0	16QAM	314	277	-33.95	17.34	43.00	-25.66
	High	28292.16	100	V	SISO	16	1	1	0	16QAM	320	280	-33.07	18.35	43.00	-24.65
	Low	27559.32	100	V	SISO	5	1	1	65	64QAM	315	278	-35.37	15.96	43.00	-27.04
	Mid	27923.52	100	V	SISO	16	1	1	65	64QAM	314	277	-35.97	15.32	43.00	-27.68
	High	28292.16	100	V	SISO	16	1	1	0	64QAM	320	280	-35.21	**16.21**	43.00	-26.79
	Low	27559.32	100	V	SISO	133	1	1	32	QPSK	322	249	-34.79	16.54	43.00	-26.46
	Mid	27923.52	100	V	SISO	144	1	1	65	QPSK	325	246	-34.94	16.35	43.00	-26.65
	High	28292.16	100	V	SISO	144	1	1	0	QPSK	323	250	-34.84	16.58	43.00	-26.42
	Low	27559.32	100	V	SISO	133	1	1	32	16QAM	322	249	-33.86	17.47	43.00	-25.53
	Mid	27923.52	100	V	SISO	144	1	1	0	16QAM	325	246	-35.46	15.83	43.00	-27.17
	High	28292.16	100	V	SISO	144	1	1	0	16QAM	323	250	-33.88	17.54	43.00	-25.46
	Low	27559.32	100	V	SISO	133	1	1	65	64QAM	322	249	-35.92	15.41	43.00	-27.59
	Mid	27923.52	100	V	SISO	144	1	1	0	64QAM	325	246	-37.47	13.82	43.00	-29.18
	High	28292.16	100	V	SISO	144	1	1	0	64QAM	323	250	-36.24	15.18	43.00	-27.82
	Mid	27922.08	200	V	SISO	16	4	1	0	QPSK	312	277	-34.30	**16.99**	43.00	-26.01
	Mid	27922.08	200	V	SISO	16	4	1	0	16QAM	312	277	-35.25	16.04	43.00	-26.96
	Mid	27922.08	200	V	SISO	16	4	1	0	64QAM	312	277	-37.59	13.70	43.00	-29.30
	Mid	27922.08	200	V	SISO	144	4	1	0	QPSK	322	255	-35.25	16.04	43.00	-26.96
	Mid	27922.08	200	V	SISO	144	4	1	0	16QAM	322	255	-34.92	**16.37**	43.00	-26.63
	Mid	27922.08	200	V	SISO	144	4	1	0	64QAM	322	255	-37.57	**13.72**	43.00	-29.28
	Mid	27923.52	400	V	SISO	16	4	1	0	QPSK	314	272	-34.35	**16.94**	43.00	-26.06
	Mid	27923.52	400	V	SISO	16	4	1	0	16QAM	314	272	-35.18	**16.11**	43.00	-26.89
	Mid	27923.52	400	V	SISO	16	4	1	0	64QAM	314	272	-38.21	**13.08**	43.00	-29.92
	Mid	27923.52	400	V	SISO	144	4	1	0	QPSK	325	254	-35.18	16.11	43.00	-26.89
	Mid	27923.52	400	V	SISO	144	4	1	0	16QAM	325	254	-36.61	14.68	43.00	-28.32
	Mid	27923.52	400	V	SISO	144	4	1	0	64QAM	325	254	-39.19	12.10	43.00	-30.90

Table 7-6. J Dipole EIRP Summary Data (SISO)

Antenna	Chan.	Channel Freq [GHz]	Bandwidth (MHz)	Ant. Pol. [H/V]	Mode	Beam ID	CCs active	RB Size	RB Offset	Modulation	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	Analyzer Level [dBm]	EIRP [dBm]	MIMO EIRP [dBm]	Limit [dBm]	Margin [dB]
J Dipole	Mid	27922.08	50	V	MIMO	4	1	1	0	QPSK	316	275	-36.19	15.10	17.74	43.00	-25.26
	Mid	27922.08	50	V	MIMO	133	1	1	0	QPSK	322	249	-36.96	14.33			
	Mid	27922.08	50	V	MIMO	4	1	1	0	16QAM	316	275	-36.09	15.20	18.30	43.00	-24.70
	Mid	27922.08	50	V	MIMO	133	1	1	0	16QAM	322	249	-35.92	15.37			
	Mid	27922.08	50	V	MIMO	4	1	1	0	64QAM	316	275	-36.35	14.94	17.88	43.00	-25.12
	Mid	27922.08	50	V	MIMO	133	1	1	0	64QAM	322	249	-36.49	14.80			
	Mid	27922.08	100	V	MIMO	4	1	1	0	QPSK	314	277	-36.32	14.97	17.64	43.00	-25.36
	Mid	27922.08	100	V	MIMO	133	1	1	0	QPSK	325	246	-37.03	14.26			
	Mid	27922.08	100	V	MIMO	4	1	1	0	16QAM	314	277	-36.04	15.25	17.42	43.00	-25.58
	Mid	27922.08	100	V	MIMO	133	1	1	0	16QAM	325	246	-37.92	13.37			
	Mid	27922.08	100	V	MIMO	4	1	1	0	64QAM	314	277	-36.64	14.65	17.00	43.00	-26.00
	Mid	27922.08	100	V	MIMO	133	1	1	0	64QAM	325	246	-38.08	13.21			

Table 7-7. J Dipole EIRP Summary Data (MIMO)

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7.3.2 J Patch Equivalent Isotropic Radiated Power (EIRP)

Antenna	Chan.	Channel Freq [GHz]	Bandwidth (MHz)	Ant. Pol. [H/V]	Mode	Beam ID	CCs active	RB Size	RB Offset	Modulation	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	Analyzer Level [dBm]	EIRP [dBm]	Limit [dBm]	Margin [dB]
J Patch	Low	27534.84	50	H	SISO	25	1	1	0	QPSK	175	276	-32.12	19.21	43.00	-23.79
	Mid	27922.08	50	H	SISO	26	1	1	0	QPSK	174	272	-31.70	**19.59**	43.00	-23.41
	High	28319.52	50	H	SISO	40	1	1	0	QPSK	170	280	-32.53	18.89	43.00	-24.11
	Low	27534.84	50	H	SISO	25	1	1	0	16QAM	175	276	-33.54	17.79	43.00	-25.21
	Mid	27922.08	50	H	SISO	26	1	1	0	16QAM	174	272	-31.41	**19.88**	43.00	-23.12
	High	28319.52	50	H	SISO	40	1	1	0	16QAM	170	280	-33.91	17.51	43.00	-25.49
	Low	27534.84	50	H	SISO	25	1	1	0	64QAM	175	276	-34.19	17.14	43.00	-25.86
	Mid	27922.08	50	H	SISO	26	1	1	0	64QAM	174	272	-32.46	**18.83**	43.00	-24.17
	High	28319.52	50	H	SISO	40	1	1	0	64QAM	170	280	-34.56	16.86	43.00	-26.14
	Low	27534.84	50	V	SISO	153	1	1	0	QPSK	190	300	-32.76	18.57	43.00	-24.43
	Mid	27922.08	50	V	SISO	168	1	1	0	QPSK	189	297	-31.71	19.58	43.00	-23.42
	High	28319.52	50	V	SISO	153	1	1	0	QPSK	190	302	-32.91	18.51	43.00	-24.49
	Low	27534.84	50	V	SISO	153	1	1	0	16QAM	190	300	-33.04	18.29	43.00	-24.71
	Mid	27922.08	50	V	SISO	168	1	1	0	16QAM	189	297	-32.16	19.13	43.00	-23.87
	High	28319.52	50	V	SISO	153	1	1	0	16QAM	190	302	-33.45	17.97	43.00	-25.03
	Low	27534.84	50	V	SISO	153	1	1	0	64QAM	190	300	-34.20	17.13	43.00	-25.87
	Mid	27922.08	50	V	SISO	168	1	1	31	64QAM	189	297	-33.43	17.86	43.00	-25.14
	High	28319.52	50	V	SISO	153	1	1	0	64QAM	190	302	-34.10	17.32	43.00	-25.68
	Low	27559.32	100	H	SISO	25	1	1	0	QPSK	177	275	-31.82	19.51	43.00	-23.49
	Mid	27923.52	100	H	SISO	26	1	1	0	QPSK	176	276	-31.60	**19.69**	43.00	-23.31
	High	28292.16	100	H	SISO	40	1	1	0	QPSK	175	271	-31.81	19.61	43.00	-23.39
	Low	27559.32	100	H	SISO	25	1	1	0	16QAM	177	275	-33.63	17.70	43.00	-25.30
	Mid	27923.52	100	H	SISO	26	1	1	0	16QAM	176	276	-31.02	**20.27**	43.00	-22.73
	High	28292.16	100	H	SISO	40	1	1	0	16QAM	175	271	-32.92	18.50	43.00	-24.50
	Low	27559.32	100	H	SISO	25	1	1	0	64QAM	177	275	-34.70	16.63	43.00	-26.37
	Mid	27923.52	100	H	SISO	26	1	1	0	64QAM	176	276	-32.24	**19.05**	43.00	-23.95
	High	28292.16	100	H	SISO	40	1	1	0	64QAM	175	271	-33.81	17.61	43.00	-25.39
	Low	27559.32	100	V	SISO	153	1	1	32	QPSK	192	305	-32.63	18.70	43.00	-24.30
	Mid	27923.52	100	V	SISO	168	1	1	0	QPSK	192	299	-31.72	19.57	43.00	-23.43
	High	28292.16	100	V	SISO	153	1	1	0	QPSK	194	302	-32.44	18.98	43.00	-24.02
	Low	27559.32	100	V	SISO	153	1	1	32	16QAM	192	305	-32.70	18.63	43.00	-24.37
	Mid	27923.52	100	V	SISO	168	1	1	0	16QAM	192	299	-32.44	18.85	43.00	-24.15
	High	28292.16	100	V	SISO	153	1	1	0	16QAM	194	302	-32.63	18.79	43.00	-24.21
	Low	27559.32	100	V	SISO	153	1	1	32	64QAM	192	305	-33.92	17.41	43.00	-25.59
	Mid	27923.52	100	V	SISO	168	1	1	65	64QAM	192	299	-33.25	18.04	43.00	-24.96
	High	28292.16	100	V	SISO	153	1	1	0	64QAM	194	302	-33.79	17.63	43.00	-25.37
	Mid	27922.08	200	H	SISO	26	4	1	0	QPSK	176	270	-32.41	**18.88**	43.00	-24.12
	Mid	27922.08	200	H	SISO	26	4	1	0	16QAM	176	270	-33.38	**17.91**	43.00	-25.09
	Mid	27922.08	200	H	SISO	26	4	1	0	64QAM	176	270	-35.70	**15.59**	43.00	-27.41
	Mid	27922.08	200	V	SISO	168	4	1	0	QPSK	190	307	-32.53	18.76	43.00	-24.24
	Mid	27922.08	200	V	SISO	168	4	1	0	16QAM	190	307	-34.08	17.21	43.00	-25.79
	Mid	27922.08	200	V	SISO	168	4	1	0	64QAM	190	307	-36.81	14.48	43.00	-28.52
	Mid	27923.52	400	H	SISO	26	4	1	0	QPSK	172	276	-33.34	17.95	43.00	-25.05
	Mid	27923.52	400	H	SISO	26	4	1	0	16QAM	172	276	-33.94	**17.35**	43.00	-25.65
	Mid	27923.52	400	H	SISO	26	4	1	0	64QAM	172	276	-36.83	**14.46**	43.00	-28.54
	Mid	27923.52	400	V	SISO	168	4	1	0	QPSK	192	302	-32.81	**18.48**	43.00	-24.52
	Mid	27923.52	400	V	SISO	168	4	1	0	16QAM	192	302	-34.69	16.60	43.00	-26.40
	Mid	27923.52	400	V	SISO	168	4	1	0	64QAM	192	302	-37.64	13.65	43.00	-29.35

Table 7-8. J Patch EIRP Summary Data (SISO)

Antenna	Chan.	Channel Freq [GHz]	Bandwidth (MHz)	Ant. Pol. [H/V]	Mode	Beam ID	CCs active	RB Size	RB Offset	Modulation	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	Analyzer Level [dBm]	EIRP [dBm]	MIMO EIRP [dBm]	Limit [dBm]	Margin [dB]
J Patch	Mid	27922.08	50	H	MIMO	26	1	1	0	QPSK	174	272	-33.52	17.77	20.12	43.00	-22.88
	Mid	27922.08	50	V	MIMO	153	1	1	0	QPSK	189	297	-34.96	16.33			
	Mid	27922.08	50	H	MIMO	26	1	1	0	16QAM	174	272	-35.24	16.05	18.82	43.00	-24.18
	Mid	27922.08	50	V	MIMO	153	1	1	0	16QAM	189	297	-35.73	15.56			
	Mid	27922.08	50	H	MIMO	26	1	1	0	64QAM	174	272	-34.06	17.23	19.82	43.00	-23.18
	Mid	27922.08	50	V	MIMO	153	1	1	0	64QAM	189	297	-34.94	16.35			
	Mid	27922.08	100	H	MIMO	26	1	1	0	QPSK	176	276	-33.77	17.52	20.01	43.00	-22.99
	Mid	27922.08	100	V	MIMO	153	1	1	0	QPSK	192	299	-34.88	16.41			
	Mid	27922.08	100	H	MIMO	26	1	1	0	16QAM	176	276	-33.66	17.63	19.80	43.00	-23.20
	Mid	27922.08	100	V	MIMO	153	1	1	0	16QAM	192	299	-35.55	15.74			
	Mid	27922.08	100	H	MIMO	26	1	1	0	64QAM	176	276	-34.17	17.12	19.83	43.00	-23.17
	Mid	27922.08	100	V	MIMO	153	1	1	0	64QAM	192	299	-34.79	16.50			

Table 7-9. J Patch EIRP Summary Data (MIMO)

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7.3.3 K Patch Equivalent Isotropic Radiated Power (EIRP)

Antenna	Chan.	Channel Freq [GHz]	Bandwidth (MHz)	Ant. Pol. [H/V]	Mode	Beam ID	CCs active	RB Size	RB Offset	Modulation	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	Analyzer Level [dBm]	EIRP [dBm]	Limit [dBm]	Margin [dB]
K Patch	Low	27534.84	50	H	SISO	31	1	1	0	QPSK	335	260	-32.33	19.00	43.00	-24.00
	Mid	27922.08	50	H	SISO	44	1	1	16	QPSK	335	260	-30.15	**21.14**	43.00	-21.86
	High	28319.52	50	H	SISO	45	1	1	0	QPSK	334	263	-31.80	19.62	43.00	-23.38
	Low	27534.84	50	H	SISO	31	1	1	0	16QAM	335	260	-33.34	17.99	43.00	-25.01
	Mid	27922.08	50	H	SISO	44	1	1	31	16QAM	335	260	-31.61	**19.68**	43.00	-23.32
	High	28319.52	50	H	SISO	45	1	1	0	16QAM	334	263	-32.71	18.71	43.00	-24.29
	Low	27534.84	50	H	SISO	31	1	1	0	64QAM	335	260	-34.92	16.41	43.00	-26.59
	Mid	27922.08	50	H	SISO	44	1	1	31	64QAM	335	260	-32.81	**18.48**	43.00	-24.52
	High	28319.52	50	H	SISO	45	1	1	0	64QAM	334	263	-34.26	17.16	43.00	-25.84
	Low	27534.84	50	V	SISO	157	1	1	0	QPSK	201	2	-34.93	16.40	43.00	-26.60
	Mid	27922.08	50	V	SISO	159	1	1	0	QPSK	201	0	-32.30	18.99	43.00	-24.01
	High	28319.52	50	V	SISO	173	1	1	0	QPSK	203	5	-31.66	19.76	43.00	-23.24
	Low	27534.84	50	V	SISO	157	1	1	0	16QAM	201	2	-35.89	15.44	43.00	-27.56
	Mid	27922.08	50	V	SISO	159	1	1	16	16QAM	201	0	-33.86	17.43	43.00	-25.57
	High	28319.52	50	V	SISO	173	1	1	0	16QAM	203	5	-32.79	18.63	43.00	-24.37
	Low	27534.84	50	V	SISO	157	1	1	0	64QAM	201	2	-37.50	13.83	43.00	-29.17
	Mid	27922.08	50	V	SISO	159	1	1	0	64QAM	201	0	-35.23	16.06	43.00	-26.94
	High	28319.52	50	V	SISO	173	1	1	0	64QAM	203	5	-34.19	17.23	43.00	-25.77
	Low	27559.32	100	H	SISO	31	1	1	32	QPSK	335	258	-31.75	19.58	43.00	-23.42
	Mid	27923.52	100	H	SISO	44	1	1	0	QPSK	335	259	-29.74	**21.55**	43.00	-21.45
	High	28292.16	100	H	SISO	45	1	1	0	QPSK	336	258	-31.01	20.41	43.00	-22.59
	Low	27559.32	100	H	SISO	31	1	1	32	16QAM	335	258	-32.63	18.70	43.00	-24.30
	Mid	27923.52	100	H	SISO	44	1	1	32	16QAM	335	259	-31.57	**19.72**	43.00	-23.28
	High	28292.16	100	H	SISO	45	1	1	0	16QAM	336	258	-31.98	19.44	43.00	-23.56
	Low	27559.32	100	H	SISO	31	1	1	32	64QAM	335	258	-34.38	16.95	43.00	-26.05
	Mid	27923.52	100	H	SISO	44	1	1	65	64QAM	335	259	-32.63	**18.66**	43.00	-24.34
	High	28292.16	100	H	SISO	45	1	1	0	64QAM	336	258	-33.81	17.61	43.00	-25.39
	Low	27559.32	100	V	SISO	157	1	1	0	QPSK	201	357	-34.37	16.96	43.00	-26.04
	Mid	27923.52	100	V	SISO	159	1	1	0	QPSK	200	1	-32.51	18.78	43.00	-24.22
	High	28292.16	100	V	SISO	173	1	1	0	QPSK	199	355	-31.24	20.18	43.00	-22.82
	Low	27559.32	100	V	SISO	157	1	1	32	16QAM	201	357	-35.21	16.12	43.00	-26.88
	Mid	27923.52	100	V	SISO	159	1	1	0	16QAM	200	1	-33.86	17.43	43.00	-25.57
	High	28292.16	100	V	SISO	173	1	1	0	16QAM	199	355	-32.43	18.99	43.00	-24.01
	Low	27559.32	100	V	SISO	157	1	1	0	64QAM	201	357	-36.97	14.36	43.00	-28.64
	Mid	27923.52	100	V	SISO	159	1	1	65	64QAM	200	1	-34.69	16.60	43.00	-26.40
	High	28292.16	100	V	SISO	173	1	1	0	64QAM	199	355	-33.64	17.78	43.00	-25.22
	Mid	27922.08	200	H	SISO	44	4	1	0	QPSK	332	260	-31.23	**20.06**	43.00	-22.94
	Mid	27922.08	200	H	SISO	44	4	1	0	16QAM	332	260	-32.46	**18.83**	43.00	-24.17
	Mid	27922.08	200	H	SISO	44	4	1	0	64QAM	332	260	-34.46	**16.83**	43.00	-26.17
	Mid	27922.08	200	V	SISO	159	4	1	0	QPSK	200	358	-33.15	18.14	43.00	-24.86
	Mid	27922.08	200	V	SISO	159	4	1	0	16QAM	200	358	-34.33	16.96	43.00	-26.04
	Mid	27922.08	200	V	SISO	159	4	1	0	64QAM	200	358	-36.86	14.43	43.00	-28.57
	Mid	27923.52	400	H	SISO	44	4	1	0	QPSK	334	262	-32.42	**18.87**	43.00	-24.13
	Mid	27923.52	400	H	SISO	44	4	1	0	16QAM	334	262	-33.56	**17.73**	43.00	-25.27
	Mid	27923.52	400	H	SISO	44	4	1	0	64QAM	334	262	-35.91	**15.38**	43.00	-27.62
	Mid	27923.52	400	V	SISO	159	4	1	0	QPSK	202	4	-33.93	17.36	43.00	-25.64
	Mid	27923.52	400	V	SISO	159	4	1	0	16QAM	202	4	-35.47	15.82	43.00	-27.18
	Mid	27923.52	400	V	SISO	159	4	1	0	64QAM	202	4	-38.00	13.29	43.00	-29.71

Table 7-10. K Patch EIRP Summary Data (SISO)

Antenna	Chan.	Channel Freq [GHz]	Bandwidth (MHz)	Ant. Pol. [H/V]	Mode	Beam ID	CCs active	RB Size	RB Offset	Modulation	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	Analyzer Level [dBm]	EIRP [dBm]	MIMO EIRP [dBm]	Limit [dBm]	Margin [dB]
K Patch	Mid	27922.08	50	H	MIMO	32	1	1	0	QPSK	335	260	-31.49	19.80	21.61	43.00	-21.39
	Mid	27922.08	50	V	MIMO	159	1	1	0	QPSK	201	0	-34.36	16.93			
	Mid	27922.08	50	H	MIMO	32	1	1	0	16QAM	335	260	-32.14	19.15	20.95	43.00	-22.05
	Mid	27922.08	50	V	MIMO	159	1	1	0	16QAM	201	0	-35.03	16.26			
	Mid	27922.08	50	H	MIMO	32	1	1	0	64QAM	335	260	-33.23	18.06	20.34	43.00	-22.66
	Mid	27922.08	50	V	MIMO	159	1	1	0	64QAM	201	0	-34.85	16.44			
	Mid	27922.08	100	H	MIMO	32	1	1	0	QPSK	335	259	-31.23	20.06	21.90	43.00	-21.10
	Mid	27922.08	100	V	MIMO	159	1	1	0	QPSK	200	1	-34.02	17.27			
	Mid	27922.08	100	H	MIMO	32	1	1	0	16QAM	335	259	-32.30	18.99	20.95	43.00	-22.05
	Mid	27922.08	100	V	MIMO	159	1	1	0	16QAM	200	1	-34.73	16.56			
	Mid	27922.08	100	H	MIMO	32	1	1	0	64QAM	335	259	-33.53	17.76	20.19	43.00	-22.81
	Mid	27922.08	100	V	MIMO	159	1	1	0	64QAM	200	1	-34.78	16.51			

Table 7-11. K Patch EIRP Summary Data (MIMO)

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7.3.4 L Patch Equivalent Isotropic Radiated Power (EIRP)

Antenna	Chan.	Channel Freq [GHz]	Bandwidth (MHz)	Ant. Pol. [H/V]	Mode	Beam ID	CCs active	RB Size	RB Offset	Modulation	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	EIRP [dBm]	Limit [dBm]	Margin [dB]
L Patch	Low	27534.84	50	H	SISO	48	1	1	0	QPSK	25	111	19.60	43.00	-23.40
	Mid	27922.08	50	H	SISO	48	1	1	31	QPSK	25	113	**20.94**	43.00	-22.06
	High	28319.52	50	H	SISO	48	1	1	0	QPSK	25	107	20.49	43.00	-22.51
	Low	27534.84	50	H	SISO	48	1	1	0	16QAM	25	111	18.96	43.00	-24.04
	Mid	27922.08	50	H	SISO	48	1	1	31	16QAM	25	113	19.39	43.00	-23.61
	High	28319.52	50	H	SISO	48	1	1	0	16QAM	25	107	**19.43**	43.00	-23.57
	Low	27534.84	50	H	SISO	48	1	1	0	64QAM	25	111	17.32	43.00	-25.68
	Mid	27922.08	50	H	SISO	48	1	1	31	64QAM	25	113	**18.84**	43.00	-24.16
	High	28319.52	50	H	SISO	48	1	1	0	64QAM	25	107	18.13	43.00	-24.87
	Low	27534.84	50	V	SISO	164	1	1	0	QPSK	205	246	19.21	43.00	-23.79
	Mid	27922.08	50	V	SISO	176	1	1	0	QPSK	202	222	19.91	43.00	-23.09
	High	28319.52	50	V	SISO	177	1	1	31	QPSK	205	267	18.35	43.00	-24.65
	Low	27534.84	50	V	SISO	164	1	1	0	16QAM	205	246	18.21	43.00	-24.79
	Mid	27922.08	50	V	SISO	176	1	1	0	16QAM	202	222	18.43	43.00	-24.57
	High	28319.52	50	V	SISO	177	1	1	31	16QAM	205	267	17.99	43.00	-25.01
	Low	27534.84	50	V	SISO	164	1	1	0	64QAM	205	246	16.43	43.00	-26.57
	Mid	27922.08	50	V	SISO	176	1	1	31	64QAM	202	222	17.58	43.00	-25.42
	High	28319.52	50	V	SISO	177	1	1	31	64QAM	205	267	17.13	43.00	-25.87
	Low	27559.32	100	H	SISO	48	1	1	0	QPSK	25	110	**21.32**	43.00	-21.68
	Mid	27923.52	100	H	SISO	48	1	1	0	QPSK	27	104	21.22	43.00	-21.78
	High	28292.16	100	H	SISO	48	1	1	0	QPSK	21	111	21.15	43.00	-21.85
	Low	27559.32	100	H	SISO	48	1	1	0	16QAM	25	110	18.49	43.00	-24.51
	Mid	27923.52	100	H	SISO	48	1	1	65	16QAM	27	104	19.74	43.00	-23.26
	High	28292.16	100	H	SISO	48	1	1	0	16QAM	21	111	**20.29**	43.00	-22.71
	Low	27559.32	100	H	SISO	48	1	1	32	64QAM	25	110	17.31	43.00	-25.69
	Mid	27923.52	100	H	SISO	48	1	1	65	64QAM	27	104	18.31	43.00	-24.69
	High	28292.16	100	H	SISO	48	1	1	0	64QAM	21	111	**19.21**	43.00	-23.79
	Low	27559.32	100	V	SISO	164	1	1	32	QPSK	205	244	19.11	43.00	-23.89
	Mid	27923.52	100	V	SISO	176	1	1	0	QPSK	205	221	20.17	43.00	-22.83
	High	28292.16	100	V	SISO	177	1	1	0	QPSK	200	266	20.10	43.00	-22.90
	Low	27559.32	100	V	SISO	164	1	1	65	16QAM	205	244	18.36	43.00	-24.64
	Mid	27923.52	100	V	SISO	176	1	1	65	16QAM	205	221	18.56	43.00	-24.44
	High	28292.16	100	V	SISO	177	1	1	0	16QAM	200	266	18.57	43.00	-24.43
	Low	27559.32	100	V	SISO	164	1	1	65	64QAM	205	244	16.59	43.00	-26.41
	Mid	27923.52	100	V	SISO	176	1	1	0	64QAM	205	221	17.32	43.00	-25.68
	High	28292.16	100	V	SISO	177	1	1	0	64QAM	200	266	17.45	43.00	-25.55
	Mid	27922.08	200	H	SISO	48	4	1	0	QPSK	22	103	**19.60**	43.00	-23.40
	Mid	27922.08	200	H	SISO	48	4	1	0	16QAM	22	103	17.38	43.00	-25.62
	Mid	27922.08	200	H	SISO	48	4	1	0	64QAM	22	103	15.00	43.00	-28.00
	Mid	27922.08	200	V	SISO	176	4	1	0	QPSK	205	211	19.26	43.00	-23.74
	Mid	27922.08	200	V	SISO	176	4	1	0	16QAM	205	211	**18.07**	43.00	-24.93
	Mid	27922.08	200	V	SISO	176	4	1	0	64QAM	205	211	**15.87**	43.00	-27.13
	Mid	27923.52	400	H	SISO	48	4	1	0	QPSK	21	107	**19.98**	43.00	-23.02
	Mid	27923.52	400	H	SISO	48	4	1	0	16QAM	21	107	**19.18**	43.00	-23.82
	Mid	27923.52	400	H	SISO	48	4	1	0	64QAM	21	107	**16.21**	43.00	-26.79
	Mid	27923.52	400	V	SISO	176	4	1	0	QPSK	204	210	18.59	43.00	-24.41
	Mid	27923.52	400	V	SISO	176	4	1	0	16QAM	204	210	16.96	43.00	-26.04
	Mid	27923.52	400	V	SISO	176	4	1	0	64QAM	204	210	14.33	43.00	-28.67

Table 7-12. L Patch EIRP Summary Data (SISO)

Antenna	Chan.	Channel Freq [GHz]	Bandwidth (MHz)	Ant. Pol. [H/V]	Mode	Beam ID	CCs active	RB Size	RB Offset	Modulation	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	Analyzer Level [dBm]	EIRP [dBm]	MIMO EIRP [dBm]	Limit [dBm]	Margin [dB]
L Patch	Mid	27922.08	50	H	MIMO	49	1	1	31	QPSK	25	113	-32.18	19.11	21.33	43.00	-21.67
	Mid	27922.08	50	V	MIMO	176	1	1	0	QPSK	202	222	-33.93	17.36			
	Mid	27922.08	50	H	MIMO	49	1	1	16	16QAM	25	113	-33.02	18.27	20.87	43.00	-22.13
	Mid	27922.08	50	V	MIMO	176	1	1	0	16QAM	202	222	-33.89	17.40			
	Mid	27922.08	50	H	MIMO	49	1	1	31	64QAM	25	113	-32.19	19.10	21.44	43.00	-21.56
	Mid	27922.08	50	V	MIMO	176	1	1	0	64QAM	202	222	-33.66	17.63			
	Mid	27922.08	100	H	MIMO	49	1	1	65	QPSK	27	104	-32.11	19.18	21.78	43.00	-21.22
	Mid	27922.08	100	V	MIMO	176	1	1	0	QPSK	205	221	-32.98	18.31			
	Mid	27922.08	100	H	MIMO	49	1	1	0	16QAM	27	104	-32.65	18.64	21.05	43.00	-21.95
	Mid	27922.08	100	V	MIMO	176	1	1	0	16QAM	205	221	-33.95	17.34			
	Mid	27922.08	100	H	MIMO	49	1	1	65	64QAM	27	104	-32.15	19.14	21.28	43.00	-21.72
	Mid	27922.08	100	V	MIMO	176	1	1	65	64QAM	205	221	-34.11	17.18			

Table 7-13. L Patch EIRP Summary Data (MIMO)

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7.4 Radiated Spurious and Harmonic Emissions

§2.1051, §30.203

Test Overview

The spectrum is scanned from 30MHz to 100GHz. 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

Test Settings

1. Start frequency was set to 30MHz and stop frequency was set to 100 GHz. 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) Elements within the same antenna array are correlated to produce beamforming array gain. Antenna arrays cannot be correlated with another antenna array. During testing, only one antenna array was active.

4) The plots from 1-100GHz show corrected average EIRP levels. Plots below 1GHz are corrected field strength levels. The average EIRP reported below is calculated per section 5.2.7 of ANSI C63.26-2015 which states: EIRP (dBm) = E (dBμV/m) + 20log(D) − 104.8; where D is the measurement distance (in the far field region) in m. The field strength E is calculated E (dBμV/m) = Spectrum Analyzer Level (dBm) + Antenna Factor (dB/m) + Cable Loss (dB) + Harmonic Mixer Conversion Loss (dB) + 107. All appropriate Antenna Factor and Cable Loss have been applied in the spectrum analyzer for each measurement. For measurements > 40GHz, Harmonic Mixer Conversion Loss was also applied to the spectrum analyzer.

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

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Frequency Range (GHz)	Wavelength(cm)	Far Field Distance (m)	Measurement Distance (m)
18-40	0.749	0.54	1.00
40-60	0.500	1.39	1.50
60-90	0.333	0.91	1.00
90-100	0.300	0.42	1.00

Table 7-14. Far-Field Distance & Measurement Distance per Frequency Range

6) All emissions from 30MHz - 60GHz were measured using a spectrum analyzer with an internal preamplifier. Emissions >60GHz were measured using a harmonic mixer with the spectrum analyzer.

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

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

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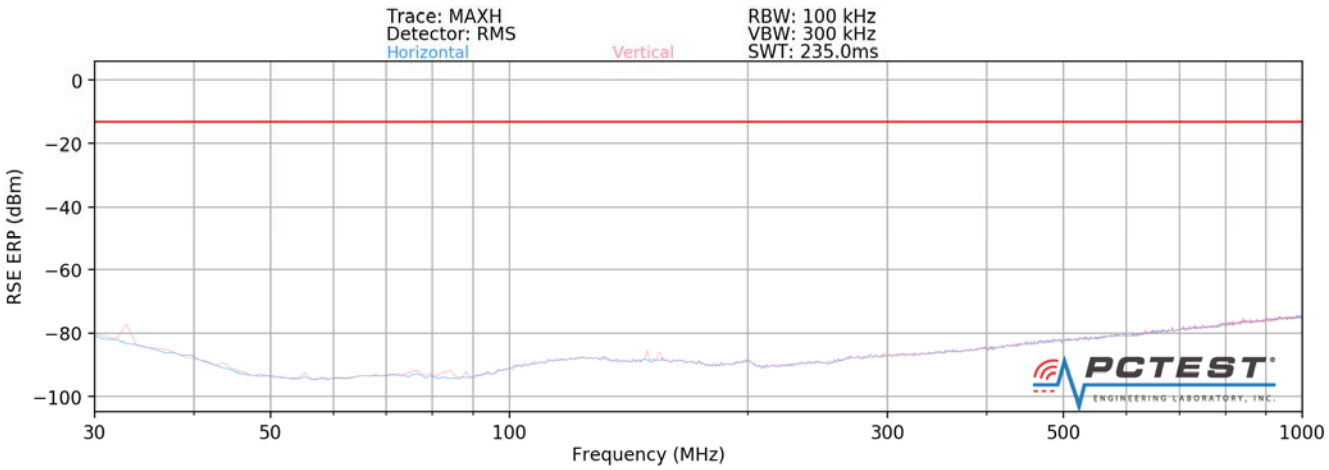
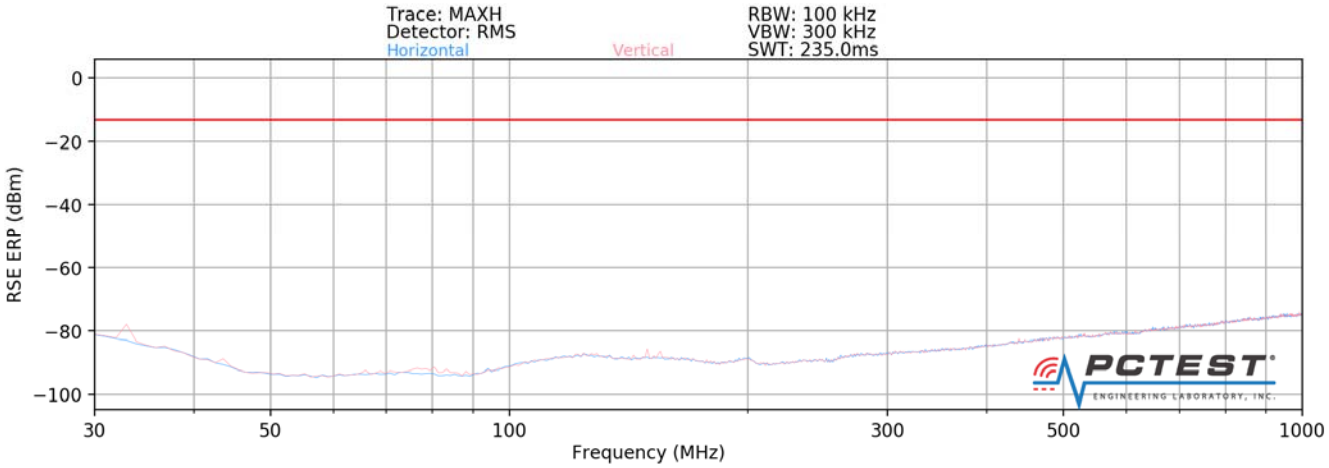
7.4.1 J Dipole Radiated Spurious Emissions

30MHz – 1GHz



Plot 7-49. J Dipole Radiated Spurious Plot 30 MHz - 1 GHz (1CC 16QAM Mid Channel H Beam)



Plot 7-50. J Dipole Radiated Spurious Plot 30 MHz - 1 GHz (1CC 16QAM Mid Channel V Beam)

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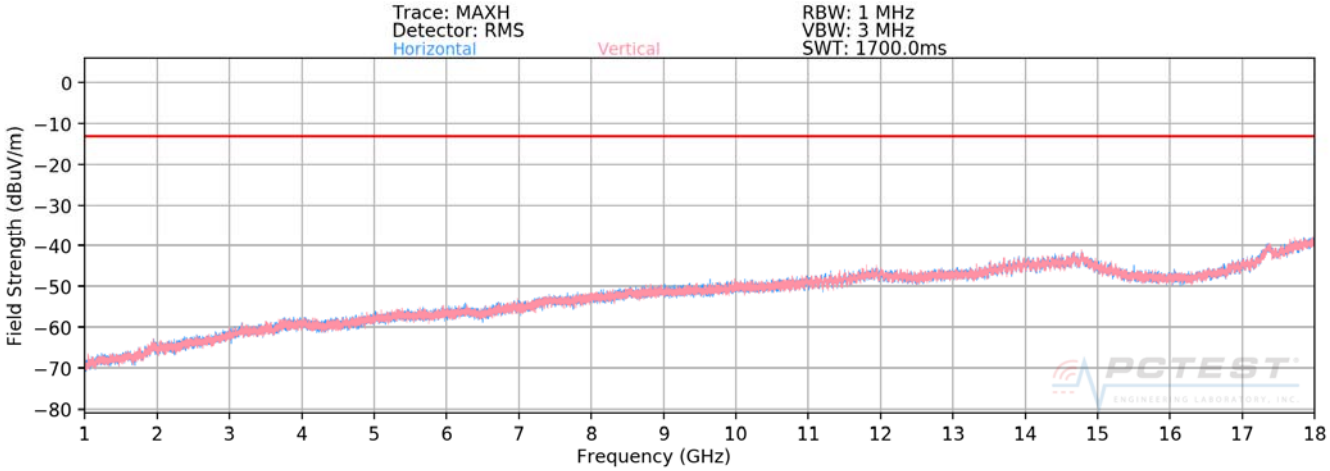
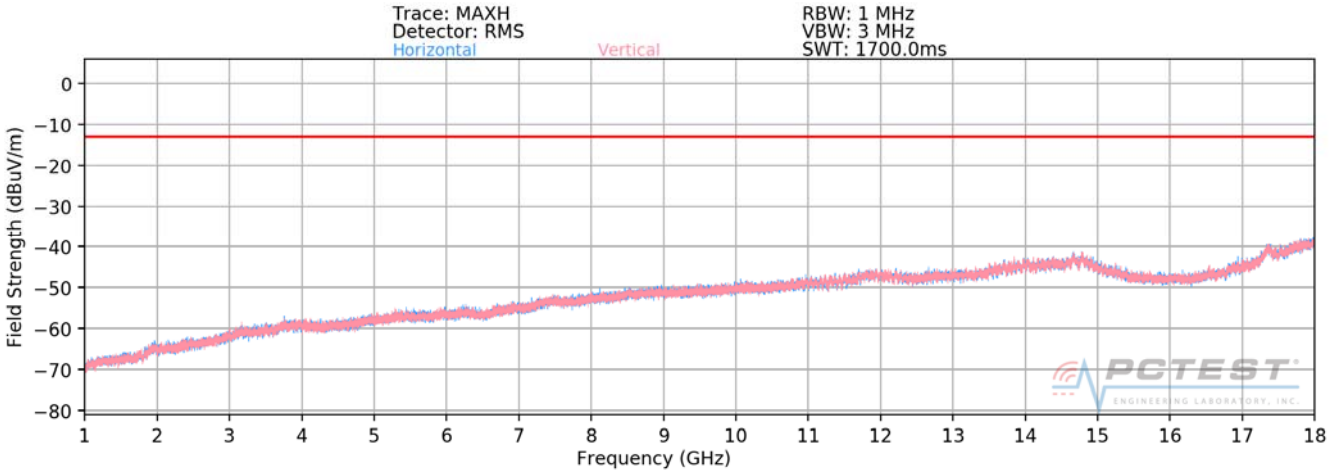
1 – 18GHz



Plot 7-51. J Dipole Radiated Spurious Plot 1-18 GHz (1CC 16QAM Mid Channel H Beam)



Plot 7-52. J Dipole Radiated Spurious Plot 1-18 GHz (1CC 16QAM Mid Channel V Beam)

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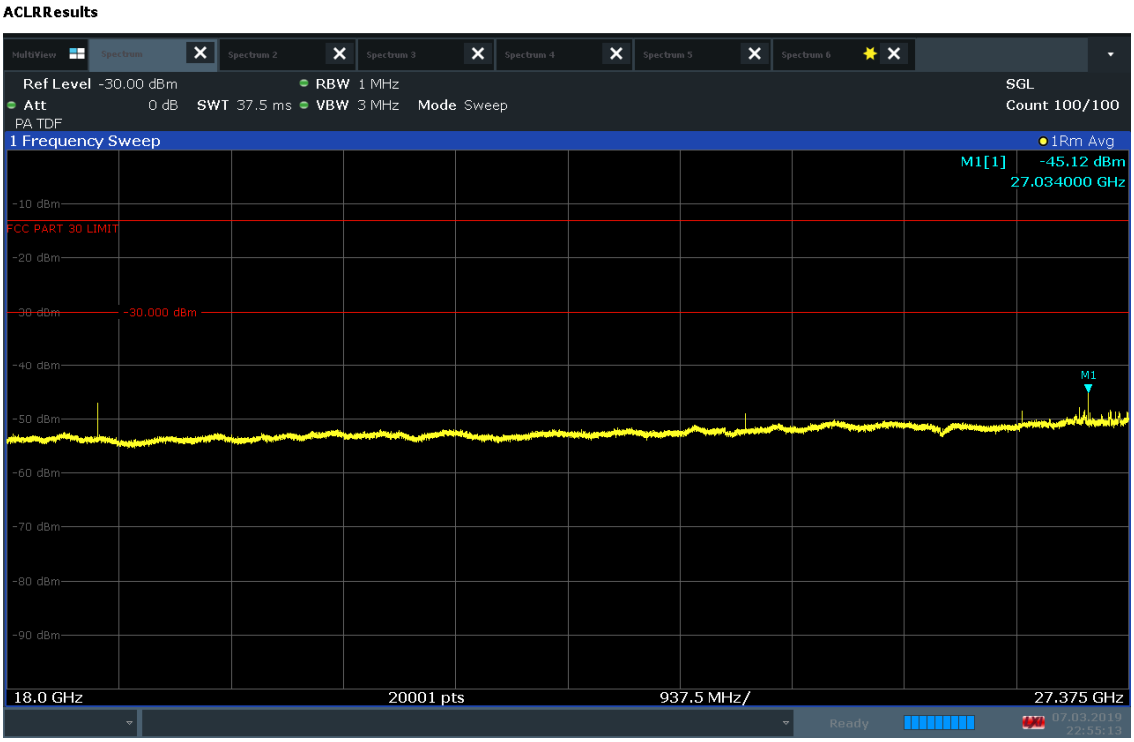
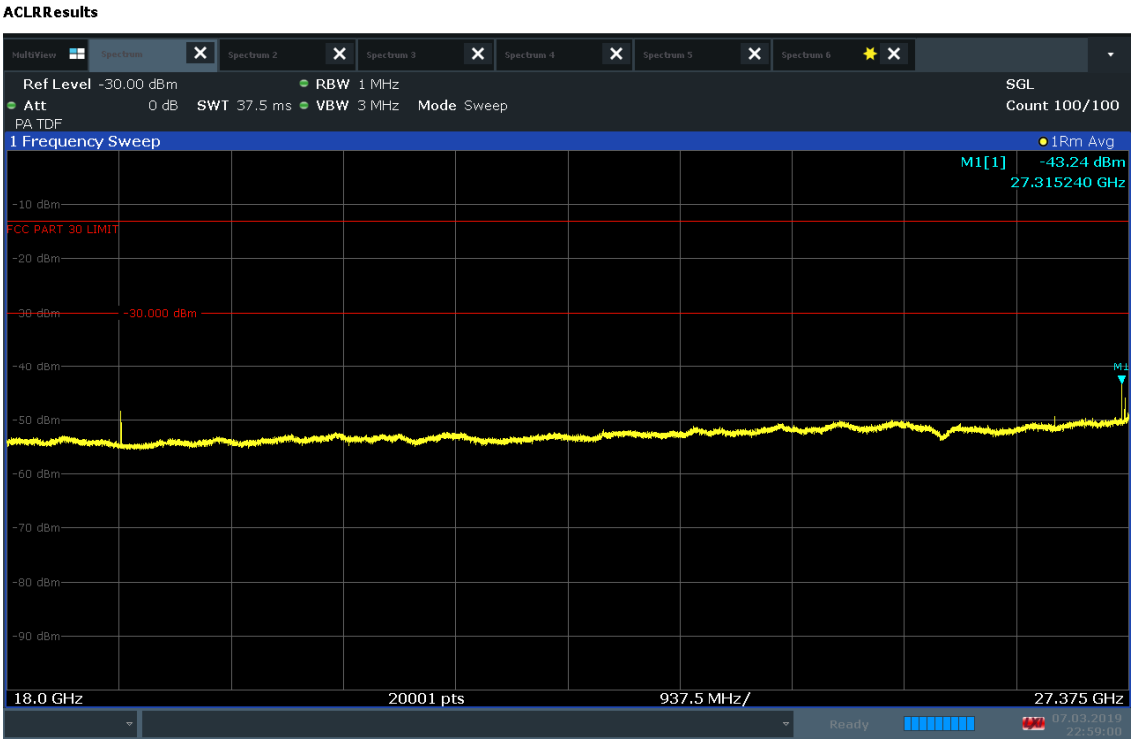
18 – 27.375GHz



Plot 7-53. J Dipole Radiated Spurious Plot 18-27.375 GHz (1CC 16QAM Low Channel H Beam)



Plot 7-54. J Dipole Radiated Spurious Plot 18-27.375 GHz (1CC 16QAM Mid Channel H Beam)

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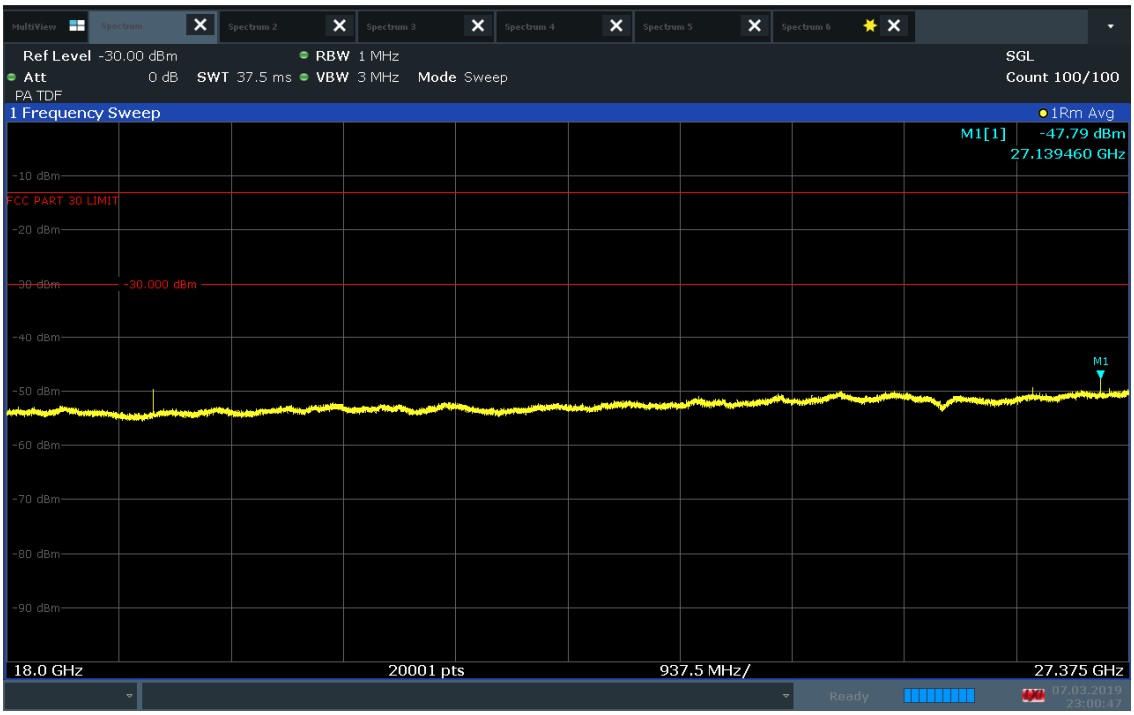
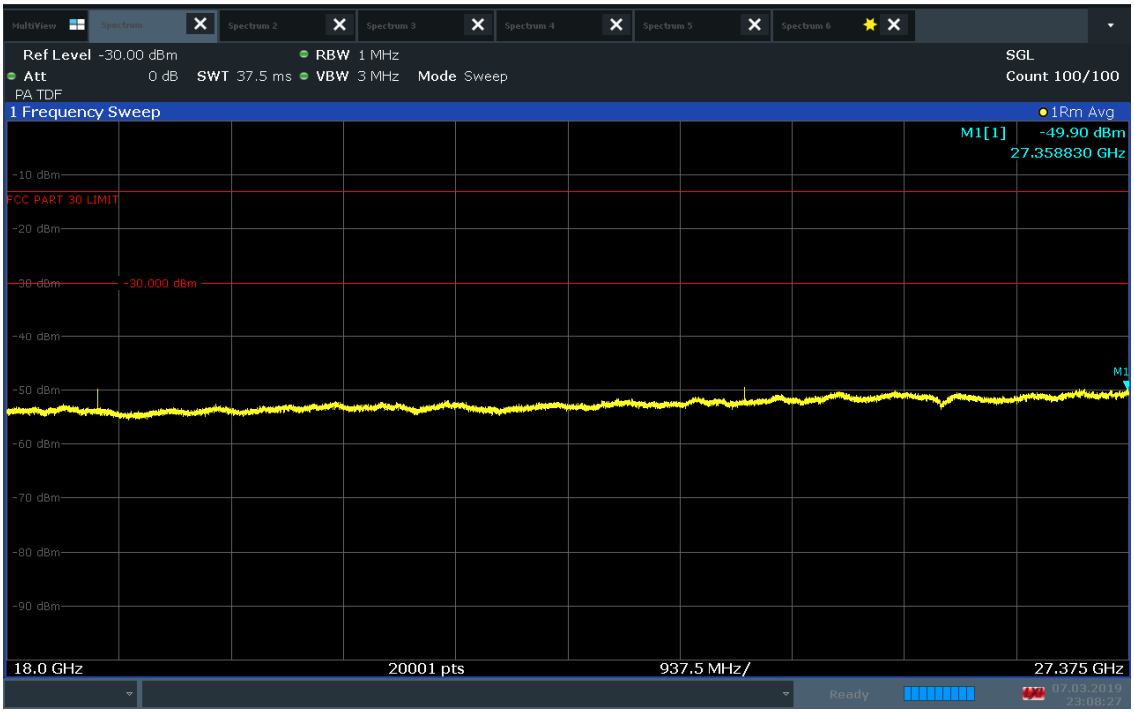


Plot 7-55. J Dipole Radiated Spurious Plot 18-27.375 GHz (1CC 16QAM High Channel H Beam)

ACLRResults



Plot 7-56. J Dipole Radiated Spurious Plot 18-27.375 GHz (1CC 16QAM Low Channel V Beam)

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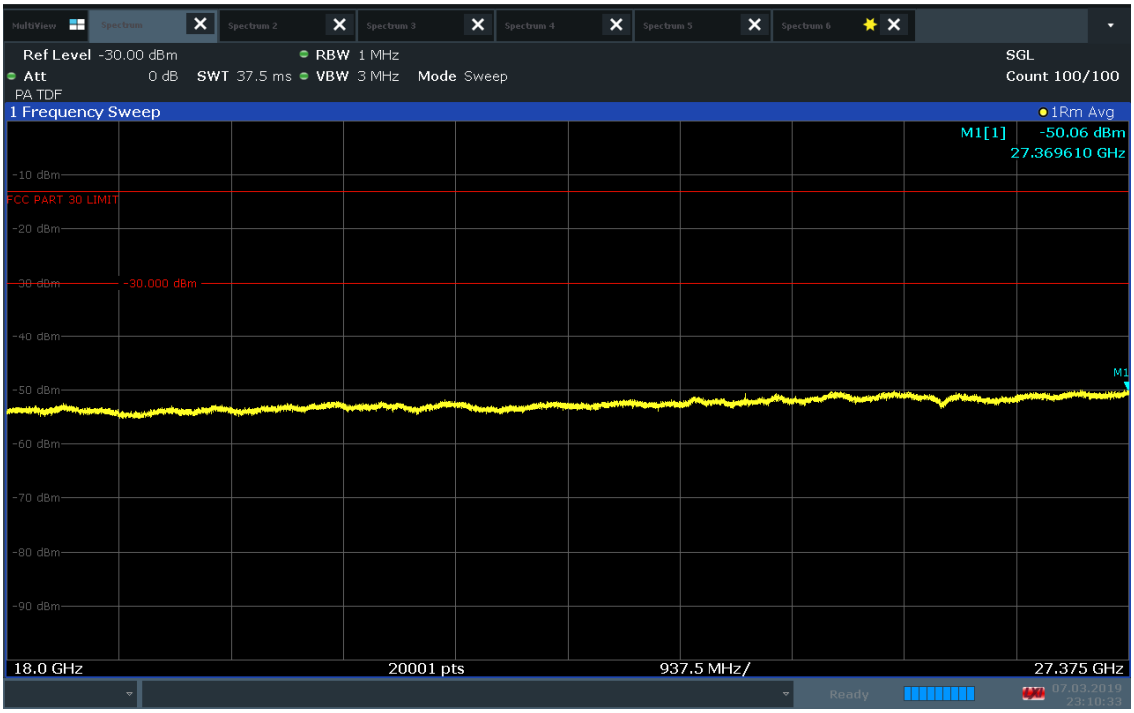
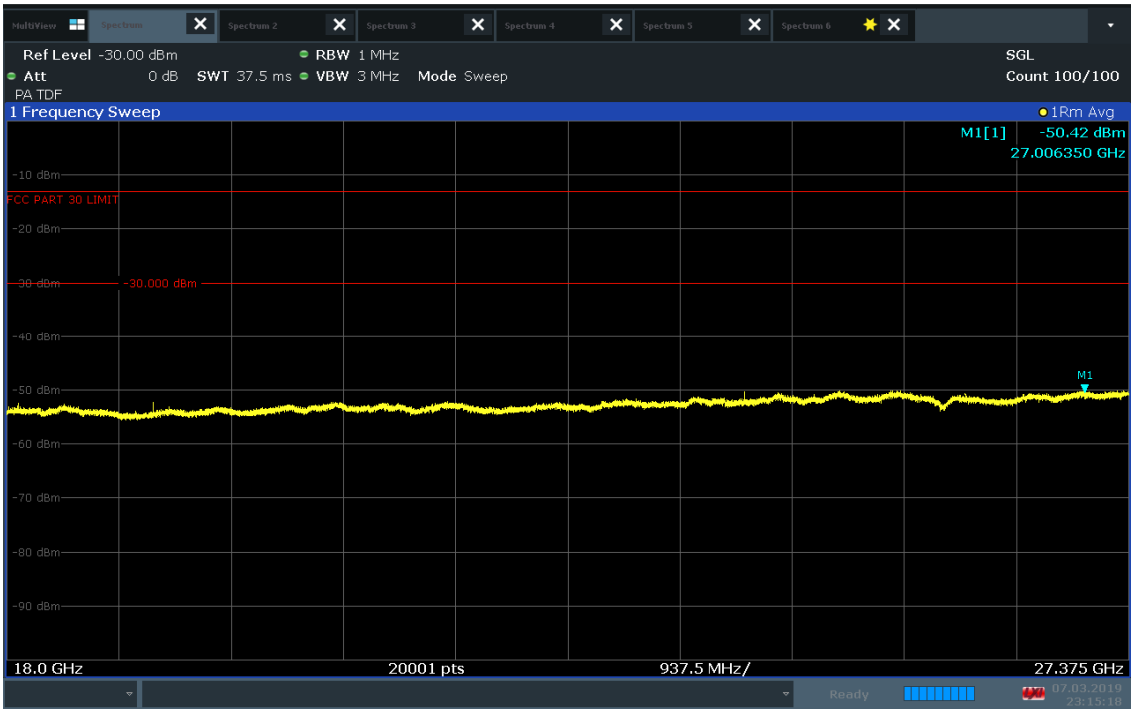


Plot 7-57. J Dipole Radiated Spurious Plot 18-27.375 GHz (1CC 16QAM Mid Channel V Beam)

ACLRResults



Plot 7-58. J Dipole Radiated Spurious Plot 18-27.375 GHz (1CC 16QAM High Channel V Beam)

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Spurious Emissions EIRP Sample Calculation

The raw radiated spurious level is converted to field strength in dBµV/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]	Detector/ Trace	Chan.	Bandwidth (MHz)	Mod.	EUT Beam Polarization	Ant. Pos [H/V]	Ant. Height [cm]	Turn Table Azimuth [degree]	RSE EIRP [dBm]	Limit [dBm]	Margin [dB]
27034.00	RMS/Avg	Low	50	16QAM	H	V	150	2	-45.12	-13.00	-32.12
27315.40	RMS/Avg	Mid	50	16QAM	H	V	150	355	-43.24	-13.00	-30.24
27139.40	RMS/Avg	High	50	16QAM	H	V	150	5	-47.79	-13.00	-34.79
27358.83	RMS/Avg	Low	50	16QAM	V	V	150	347	-49.90	-13.00	-36.90
27369.61	RMS/Avg	Mid	50	16QAM	V	V	150	358	-50.06	-13.00	-37.06
27006.35	RMS/Avg	High	50	16QAM	V	V	150	355	-50.42	-13.00	-37.42

Table 7-15. J Dipole Spurious Emissions Table (18-27.375GHz)

Notes

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

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

EIRP(H Beam) + EIRP(V Beam) = EIRP(MIMO)

(-43.24 dBm + -50.06 dBm) = (47.42 nW + 9.86 nW) = (57.28 nW) = -42.42 dBm

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28.475 – 40GHz

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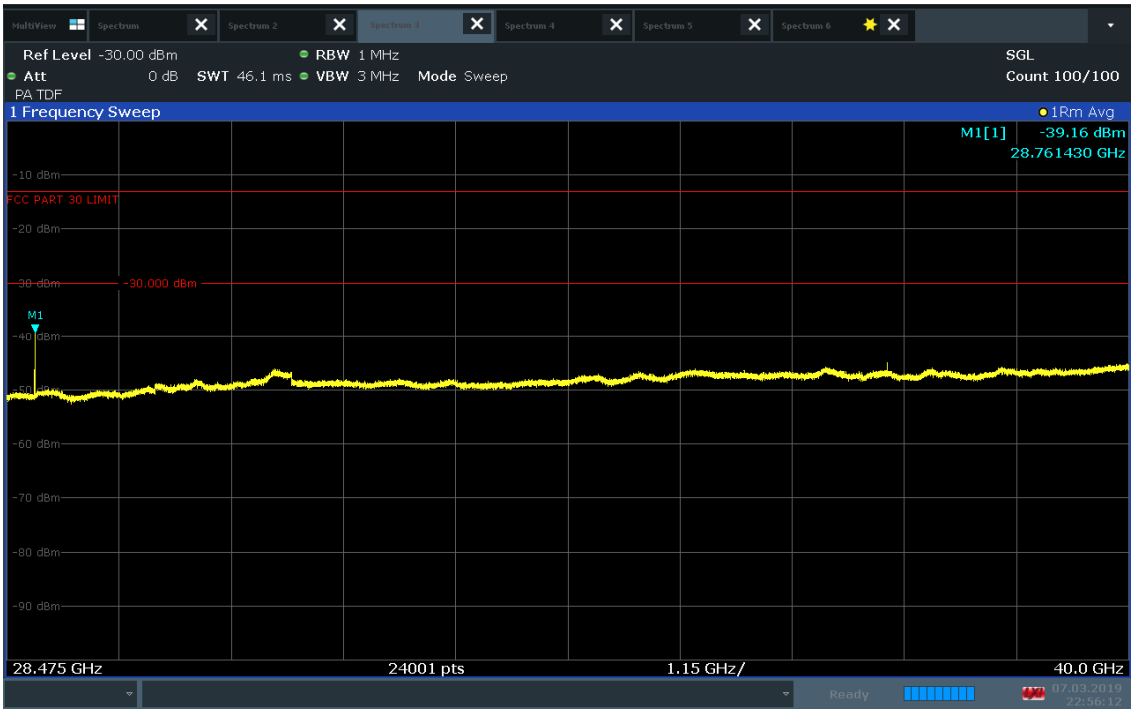
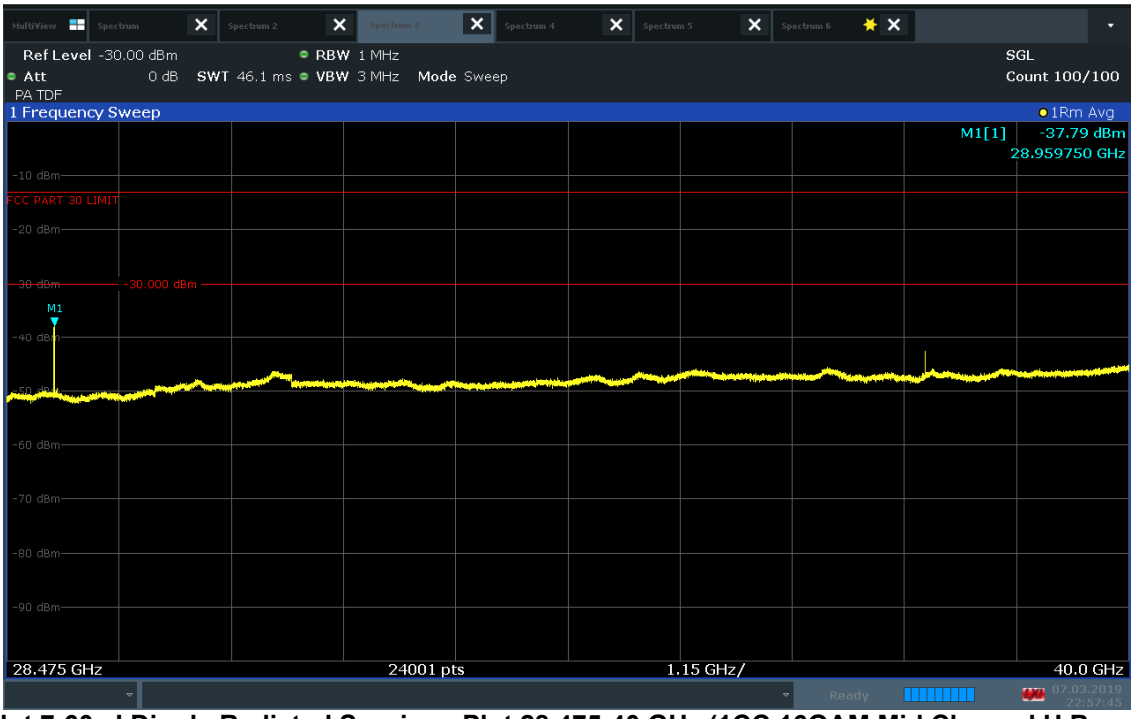


Plot 7-59. J Dipole Radiated Spurious Plot 28.475-40 GHz (1CC 16QAM Low Channel H Beam)

ACLRResults



Plot 7-60. J Dipole Radiated Spurious Plot 28.475-40 GHz (1CC 16QAM Mid Channel H Beam)

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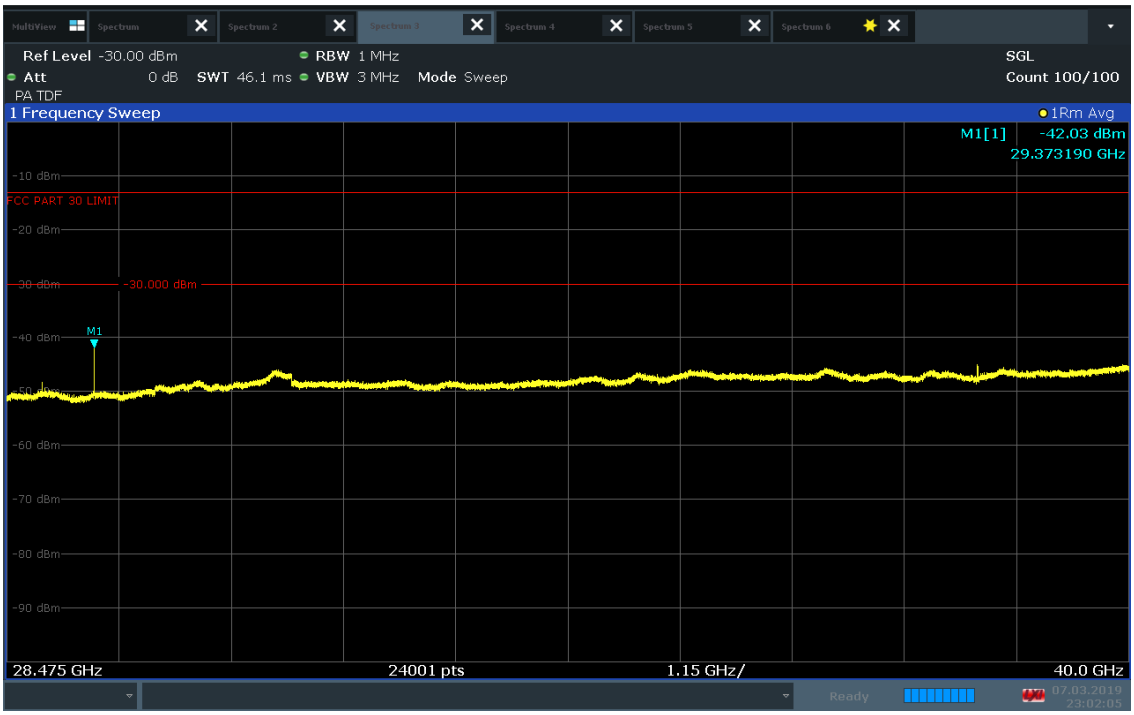
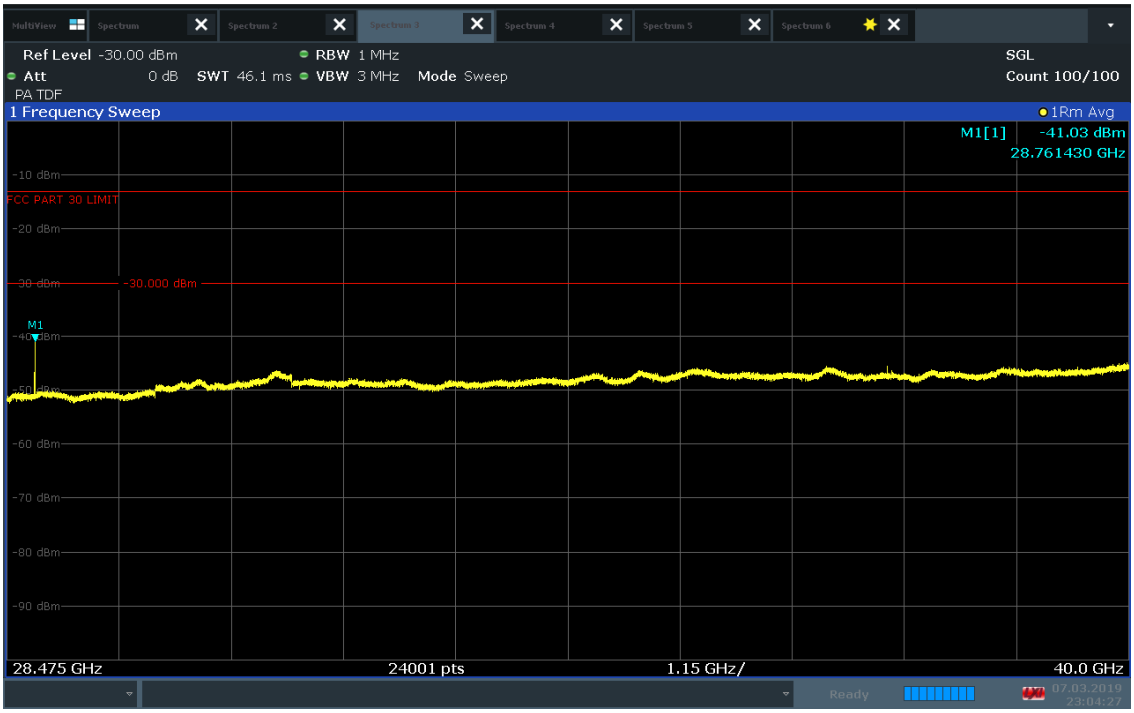


Plot 7-61. J Dipole Radiated Spurious Plot 28.475-40 GHz (1CC 16QAM High Channel H Beam)

ACLRResults



Plot 7-62. J Dipole Radiated Spurious Plot 28.475-40 GHz (1CC 16QAM Low Channel V Beam)

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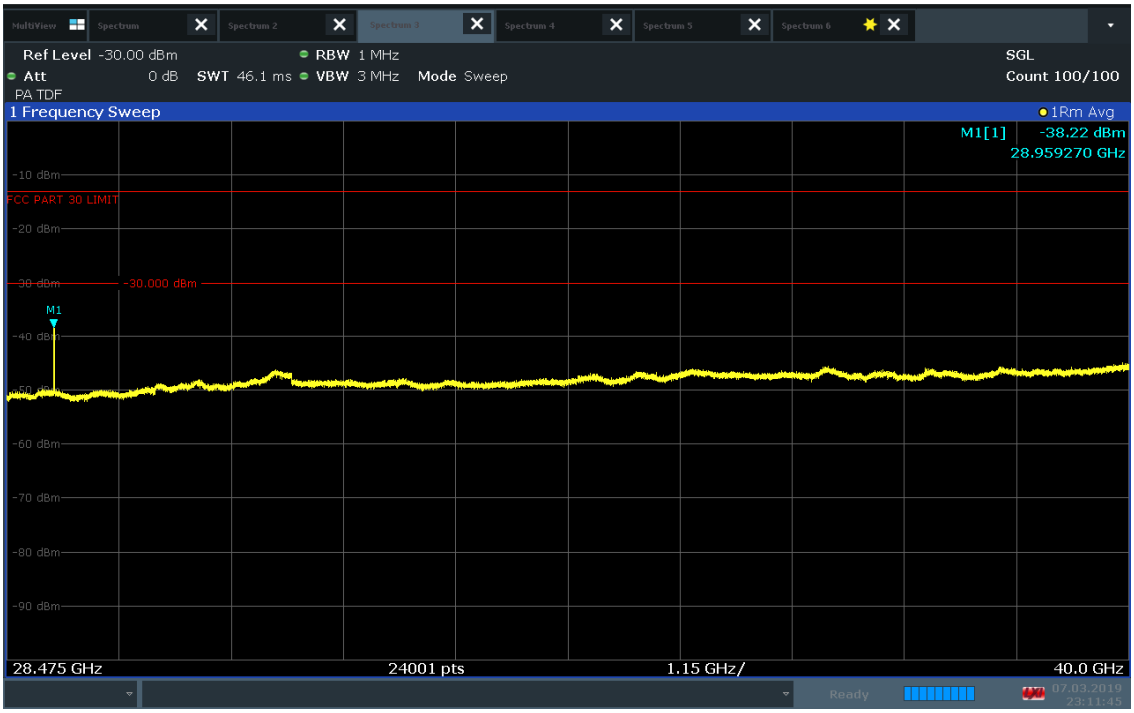
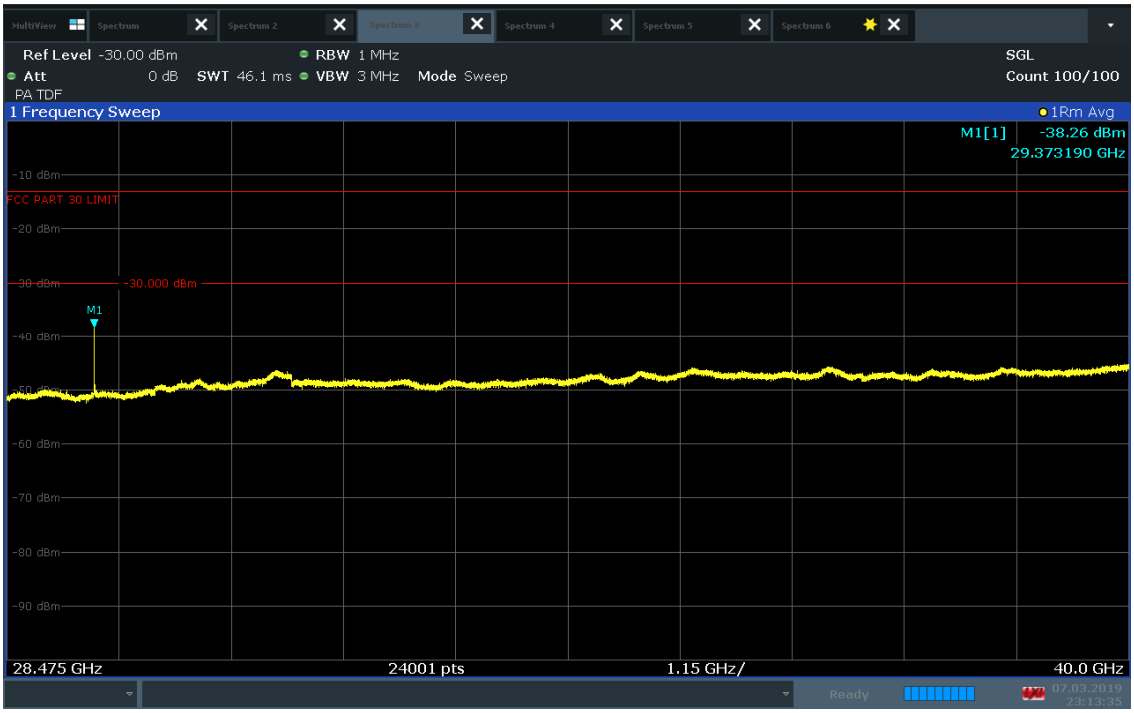
ACLRResults



Plot 7-63. J Dipole Radiated Spurious Plot 28.475-40 GHz (1CC 16QAM Mid Channel V Beam)

ACLRResults



Plot 7-64. J Dipole Radiated Spurious Plot 28.475-40 GHz (1CC 16QAM High Channel V Beam)

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Spurious Emissions EIRP Sample Calculation

The raw radiated spurious level is converted to field strength in dBµV/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]	Detector/ Trace	Chan.	Bandwidth (MHz)	Mod.	EUT Beam Polarization	Ant. Pos [H/V]	Ant. Height [cm]	Turntable Azimuth [degree]	RSE EIRP [dBm]	Limit [dBm]	Margin [dB]
28761.14	RMS/Avg	Low	50	16QAM	H	H	150	297	-39.16	-13.00	-26.16
28959.75	RMS/Avg	Mid	50	16QAM	H	H	150	302	-37.79	-13.00	-24.79
29373.19	RMS/Avg	High	50	16QAM	H	H	150	322	-42.03	-13.00	-29.03
28761.43	RMS/Avg	Low	50	16QAM	V	V	150	340	-41.03	-13.00	-28.03
28959.27	RMS/Avg	Mid	50	16QAM	V	V	150	17	-38.22	-13.00	-25.22
29373.19	RMS/Avg	High	50	16QAM	V	V	150	22	-38.26	-13.00	-25.26

Table 7-16. J Dipole Spurious Emissions Table (28.475-40 GHz)

Notes

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

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

EIRP(H Beam) + EIRP(V Beam) = EIRP(MIMO)

(-37.79 dBm + -38.22 dBm) = (166.34 nW + 150.66 nW) = (317.00 nW) = -34.99 dBm

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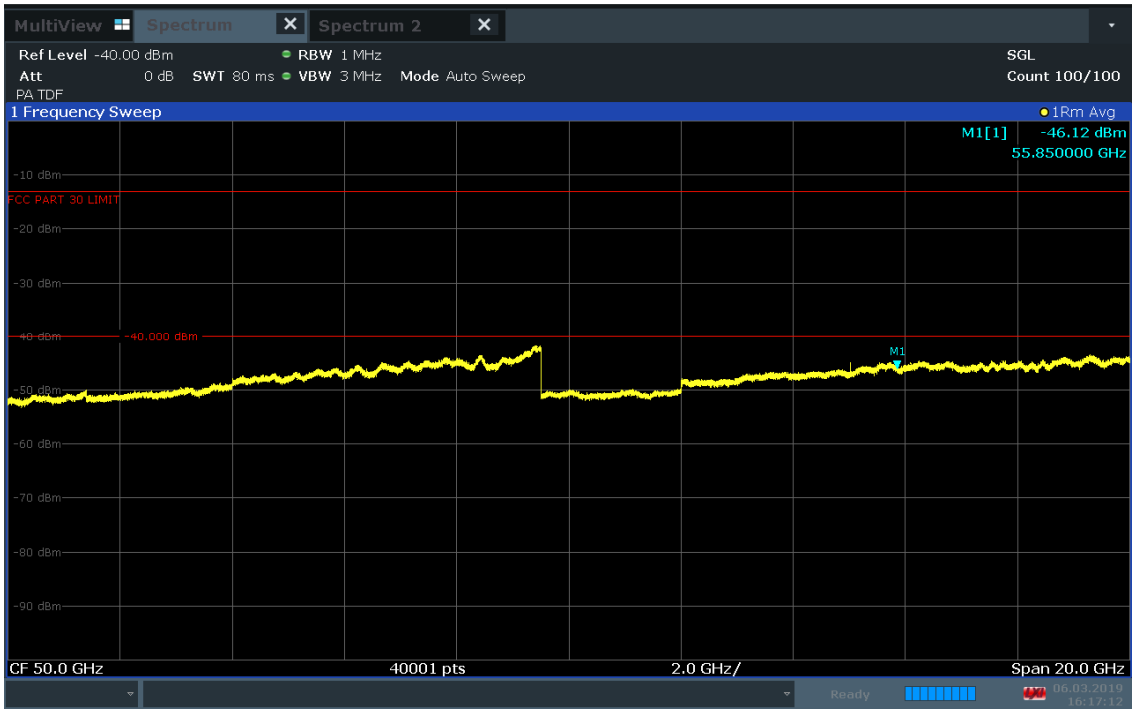
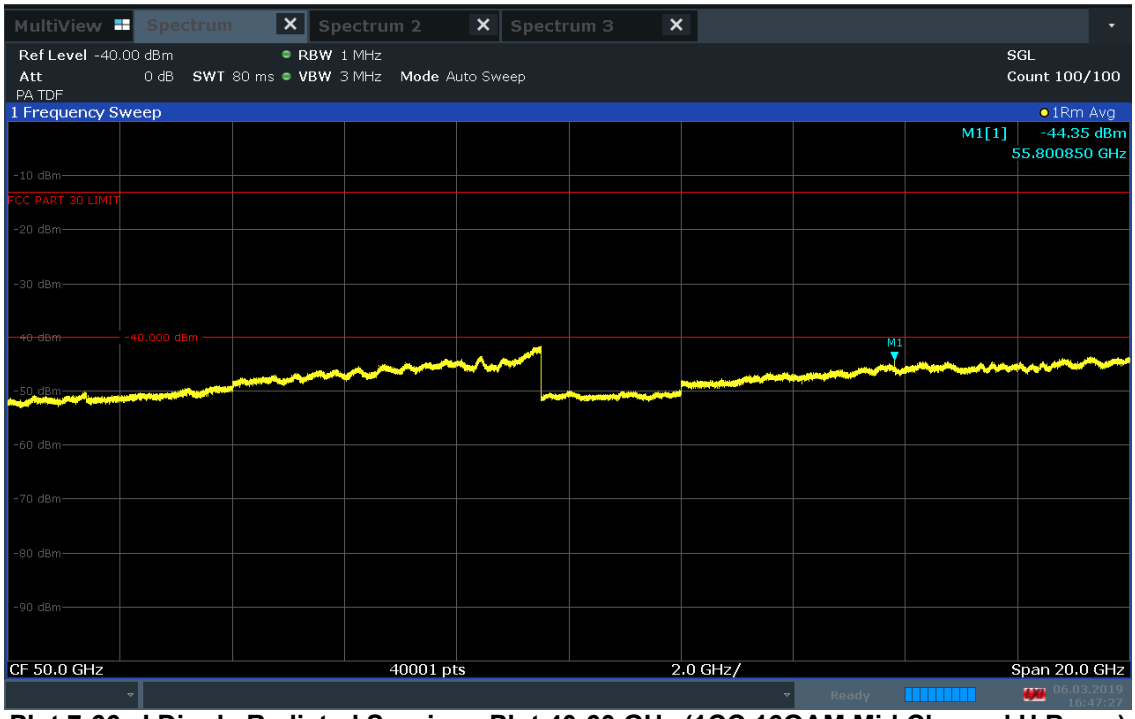
40 – 60GHz

ACLRResults



Plot 7-65. J Dipole Radiated Spurious Plot 40-60 GHz (1CC 16QAM Low Channel H Beam)

ACLRResults



Plot 7-66. J Dipole Radiated Spurious Plot 40-60 GHz (1CC 16QAM Mid Channel H Beam)

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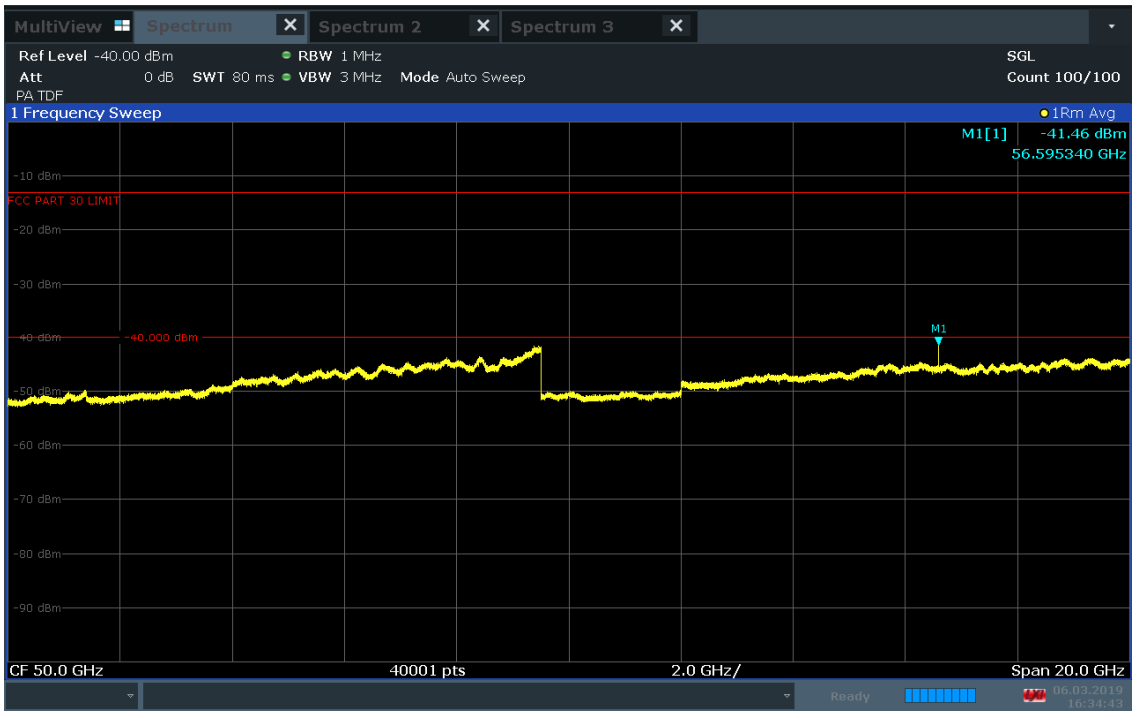
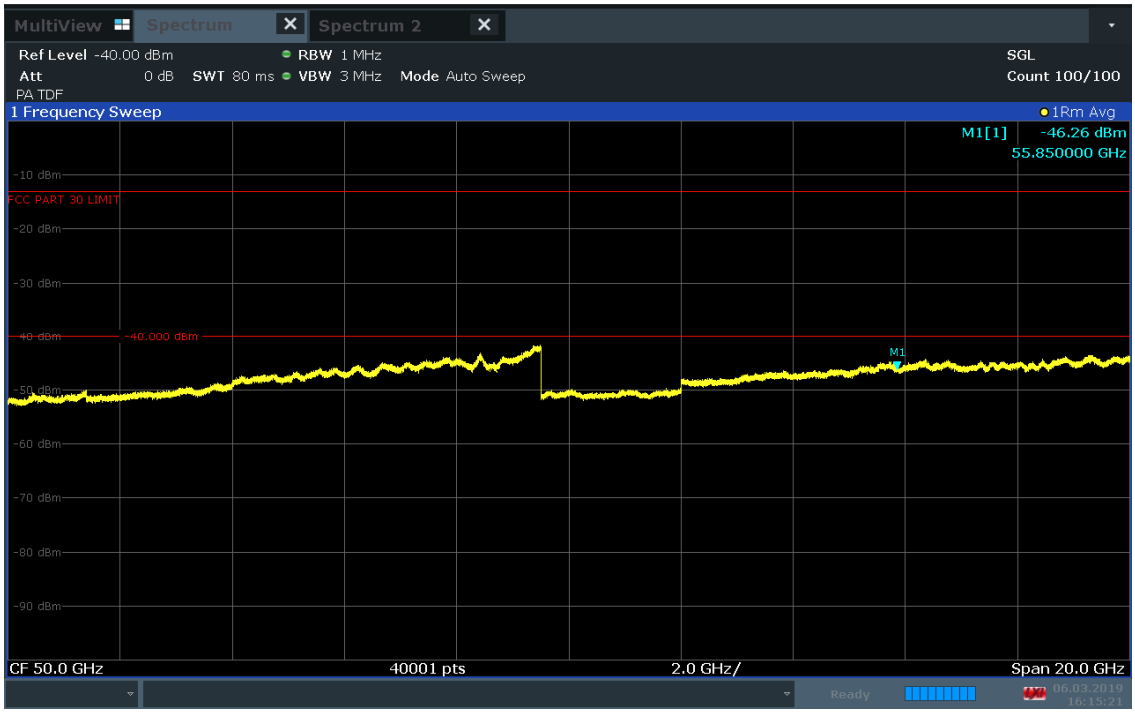


Plot 7-67. J Dipole Radiated Spurious Plot 40-60 GHz (1CC 16QAM High Channel H Beam)

ACLRResults



Plot 7-68. J Dipole Radiated Spurious Plot 40-60 GHz (1CC 16QAM Low Channel V Beam)

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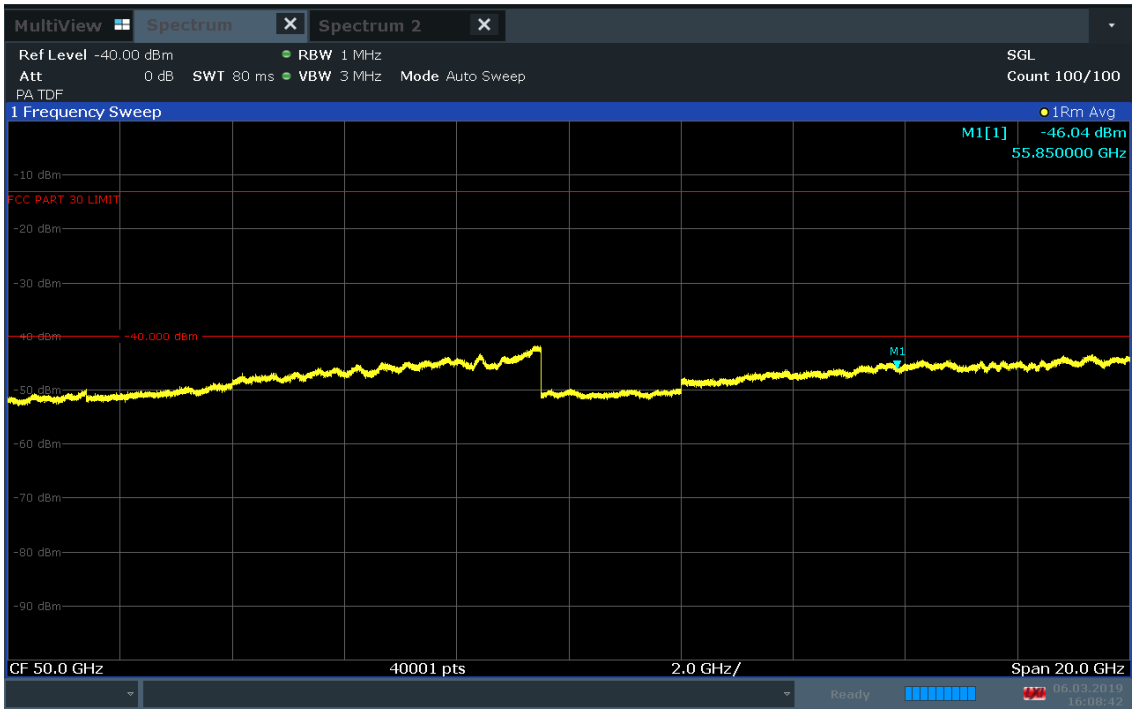
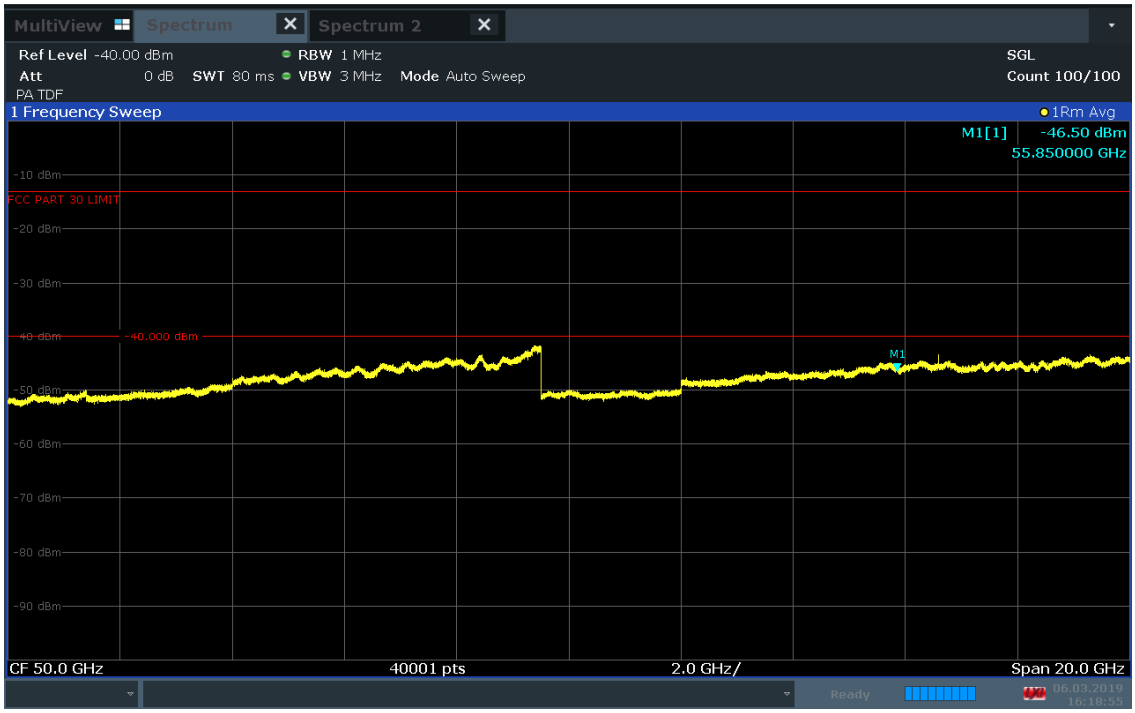
ACLRResults



Plot 7-69. J Dipole Radiated Spurious Plot 40-60 GHz (1CC 16QAM Mid Channel V Beam)

ACLRResults



Plot 7-70. J Dipole Radiated Spurious Plot 40-60 GHz (1CC 16QAM High Channel V Beam)

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Spurious Emissions EIRP Sample Calculation

The raw radiated spurious level is converted to field strength in dBµV/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]	Detector/ Trace	Chan.	Bandwidth (MHz)	Mod.	EUT Beam Polarization	Ant. Pos [H/V]	Ant. Height [cm]	Turn Table Azimuth [degree]	RSE EIRP [dBm]	Limit [dBm]	Margin [dB]
55850.00	RMS/Avg	Low	50	16QAM	H	H	150	11	-46.12	-13.00	-33.12
55800.85	RMS/Avg	Mid	50	16QAM	H	H	150	295	-44.35	-13.00	-31.35
56595.34	RMS/Avg	High	50	16QAM	H	H	150	325	-41.46	-13.00	-28.46
55850.00	RMS/Avg	Low	50	16QAM	V	V	150	299	-46.26	-13.00	-33.26
55850.00	RMS/Avg	Mid	50	16QAM	V	V	150	24	-46.04	-13.00	-33.04
56595.00	RMS/Avg	High	50	16QAM	V	V	150	18	-46.50	-13.00	-33.50

Table 7-17. J Dipole Spurious Emissions Table (40 - 60GHz)

Notes

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

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

EIRP(H Beam) + EIRP(V Beam) = EIRP(MIMO)

(-41.46 dBm + -46.50 dBm) = (71.45 nW + 22.39 nW) = (93.84 nW) = -40.28 dBm

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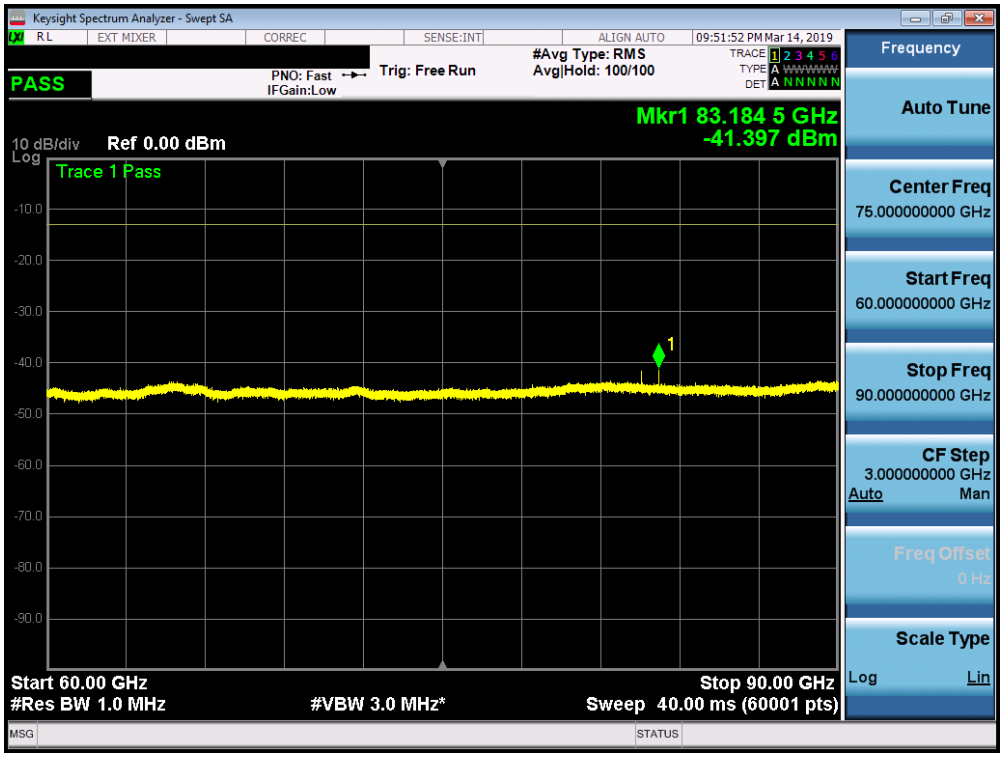
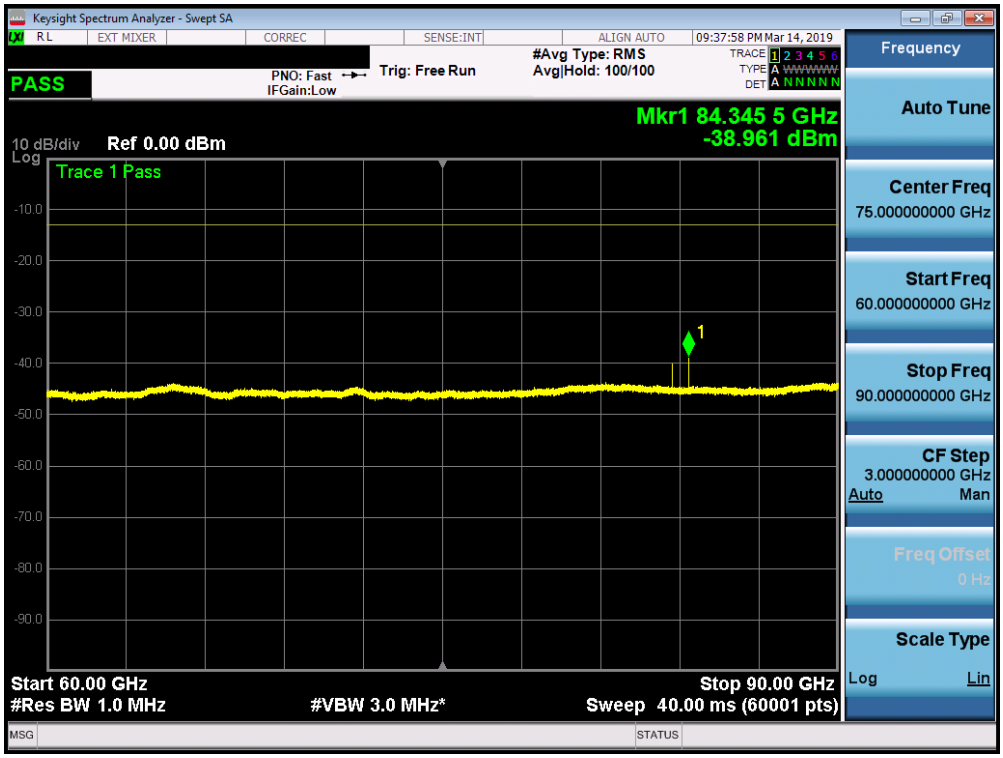


Plot 7-71. J Dipole Radiated Spurious Plot 60-90 GHz (1CC 16QAM Low Channel H Beam)



Plot 7-72. J Dipole Radiated Spurious Plot 60-90 GHz (1CC 16QAM Mid Channel H Beam)

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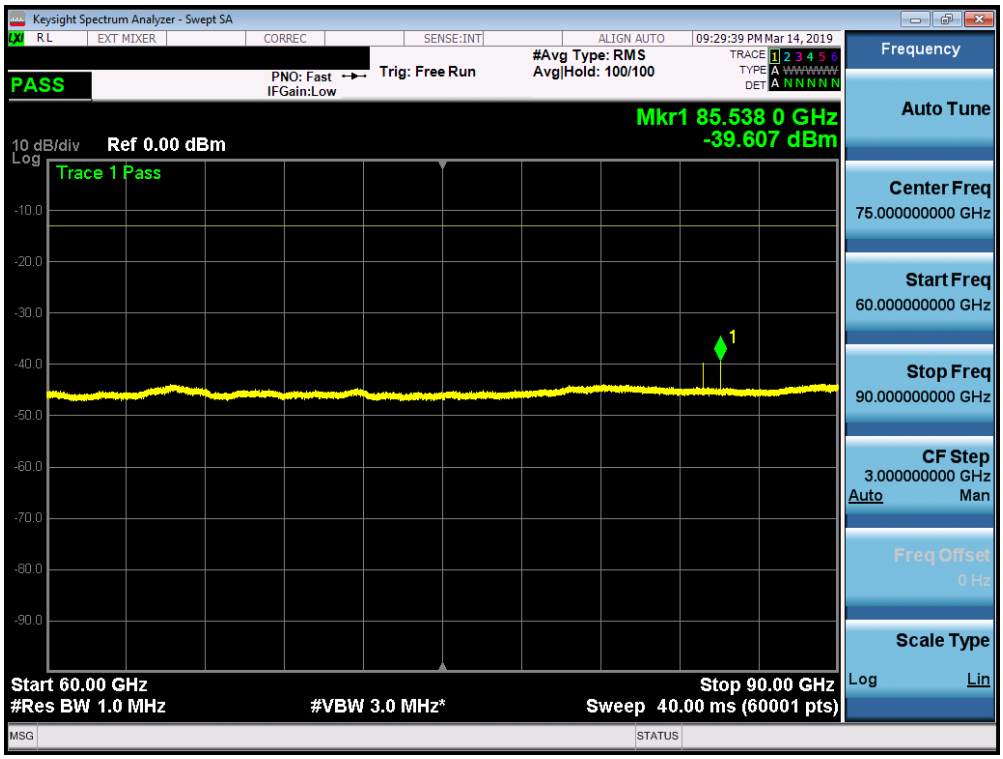
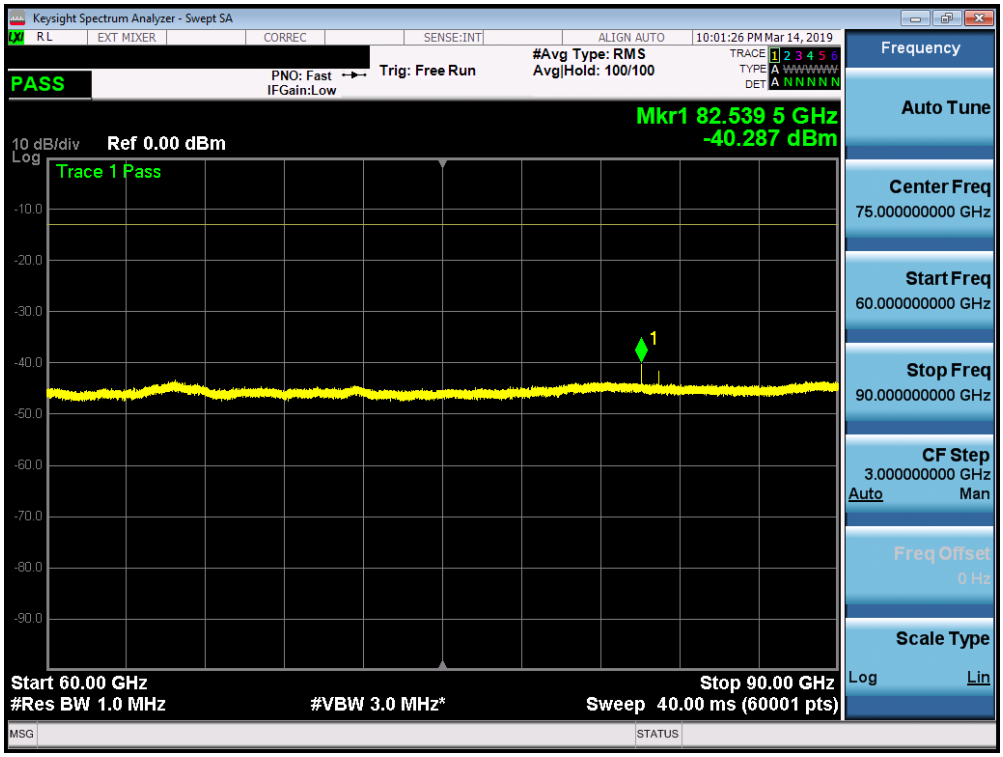


Plot 7-73. J Dipole Radiated Spurious Plot 60-90 GHz (1CC 16QAM High Channel H Beam)



Plot 7-74. J Dipole Radiated Spurious Plot 60-90 GHz (1CC 16QAM Low Channel V Beam)

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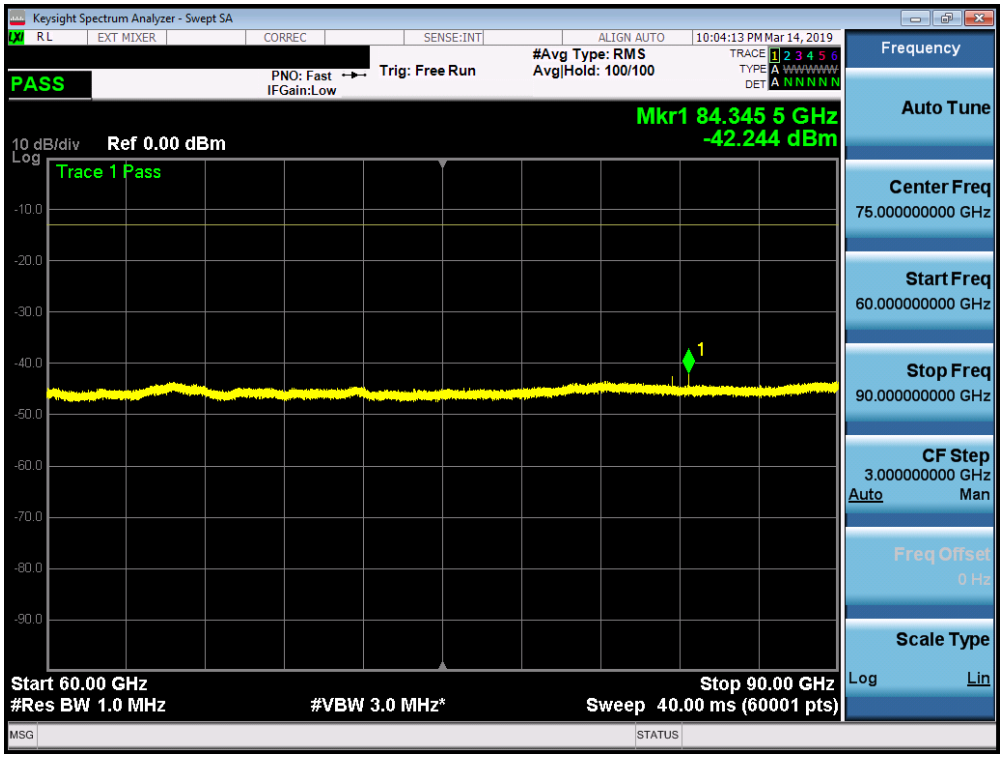
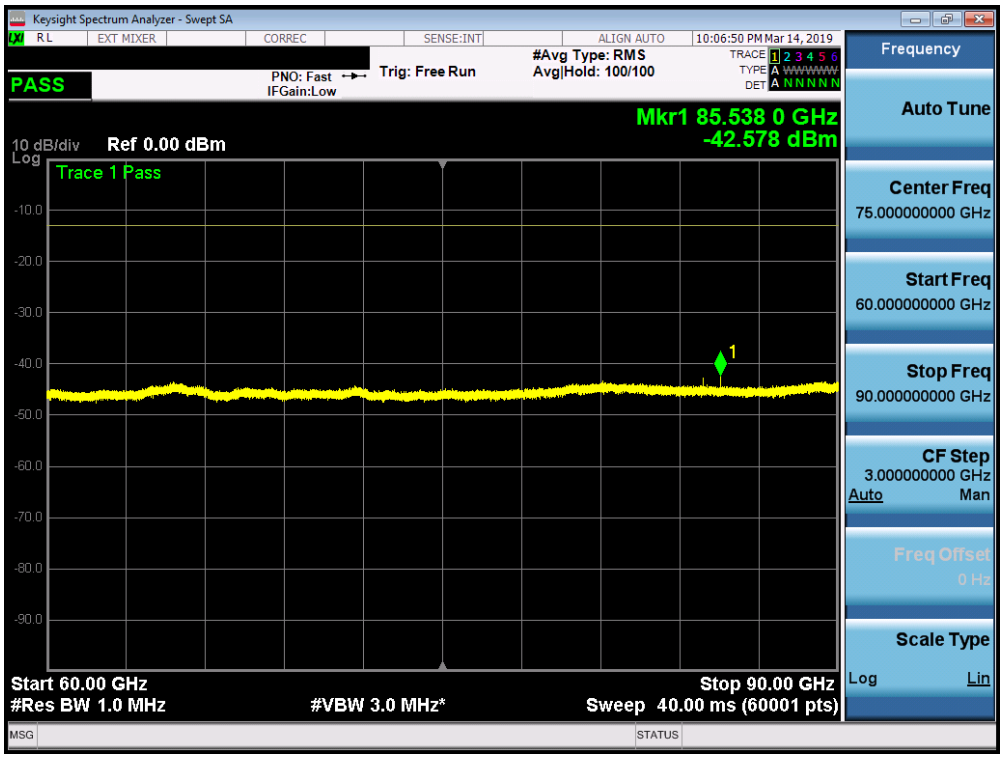


Plot 7-75. J Dipole Radiated Spurious Plot 60-90 GHz (1CC 16QAM Mid Channel V Beam)



Plot 7-76. J Dipole Radiated Spurious Plot 60-90 GHz (1CC 16QAM High Channel V Beam)

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Spurious Emissions EIRP Sample Calculation

The raw radiated spurious level is converted to field strength in dBµV/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) + Harmonic Mixer Loss (dB) – 104.8

Frequency [MHz]	Detector/ Trace	Chan.	Bandwidth (MHz)	Mod.	EUT Beam Polarization	Ant. Pos [H/V]	Ant. Height [cm]	Turn Table Azimuth [degree]	RSE EIRP [dBm]	Limit [dBm]	Margin [dB]
83184.50	RMS/Avg	Low	50	16QAM	H	H	150	293	-41.40	-13.00	-28.40
84345.50	RMS/Avg	Mid	50	16QAM	H	H	150	299	-38.96	-13.00	-25.96
85538.00	RMS/Avg	High	50	16QAM	H	H	150	322	-39.61	-13.00	-26.61
82539.50	RMS/Avg	Low	50	16QAM	V	V	150	346	-40.29	-13.00	-27.29
84345.50	RMS/Avg	Mid	50	16QAM	V	V	150	12	-42.24	-13.00	-29.24
85538.00	RMS/Avg	High	50	16QAM	V	V	150	24	-42.58	-13.00	-29.58

Table 7-18. J Dipole Spurious Emissions Table (60-90GHz)

Notes

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

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

EIRP(H Beam) + EIRP(V Beam) = EIRP(MIMO)

(-38.96 dBm + -42.24 dBm) = (127.06 nW + 59.70 nW) = (186.76 nW) = -37.29 dBm

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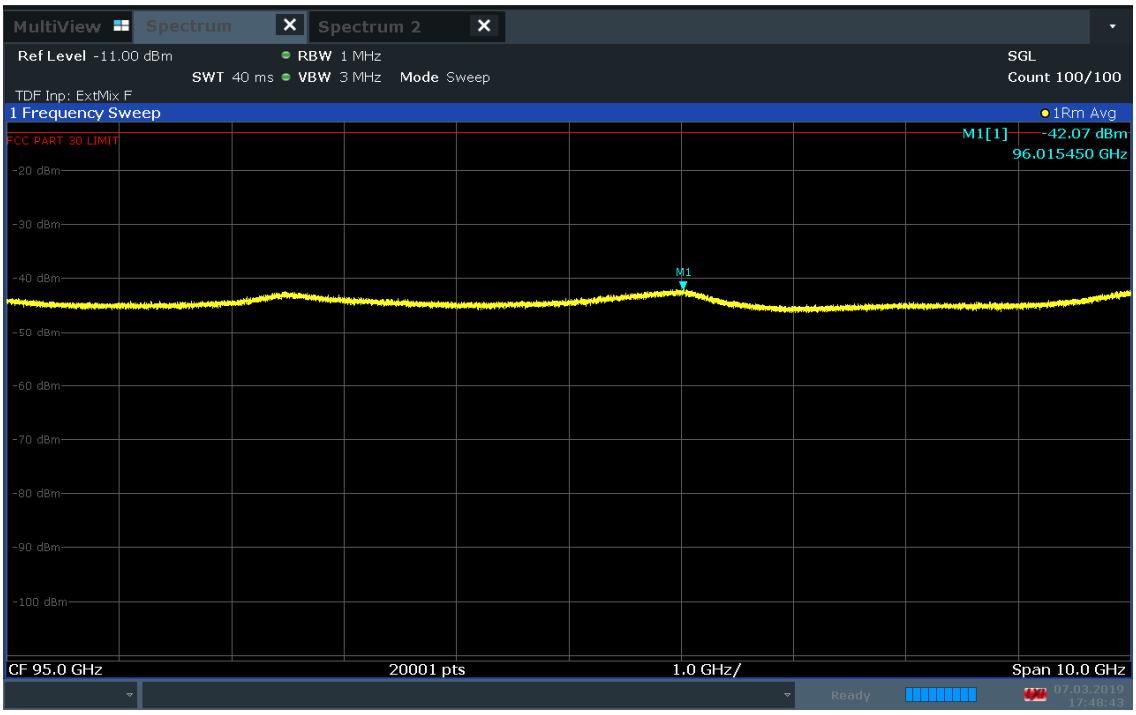
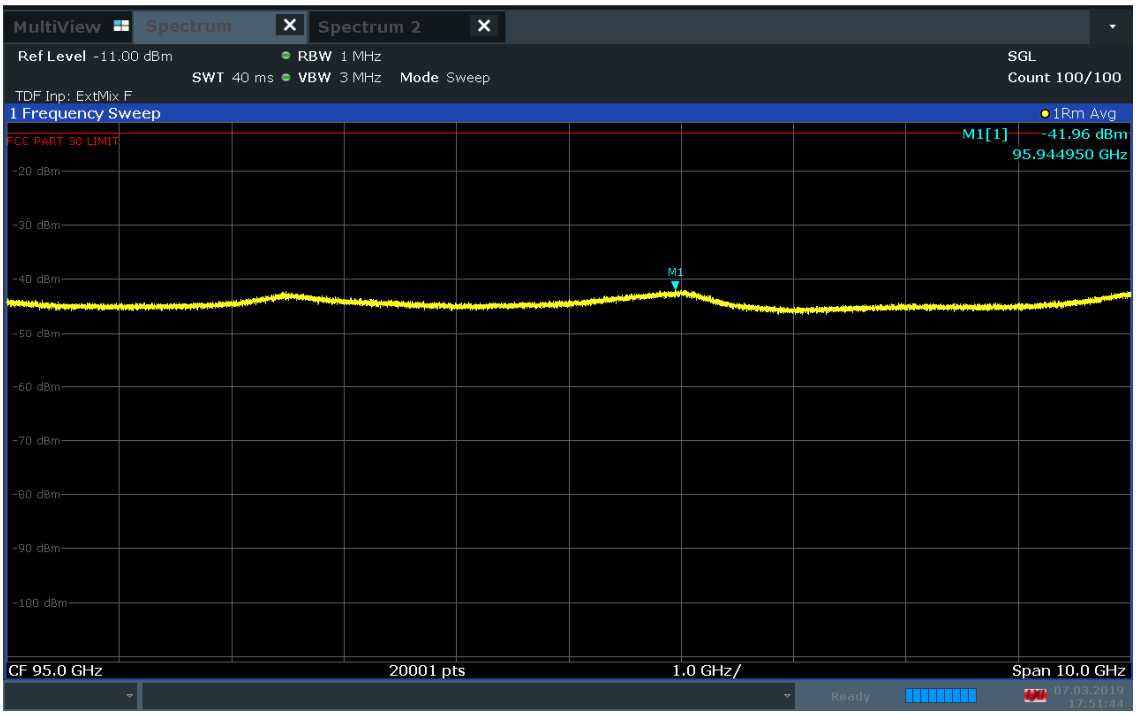
90 – 100GHz

ACLRResults



Plot 7-77. J Dipole Radiated Spurious Plot 90-100 GHz (1CC 16QAM Low Channel H Beam)

ACLRResults



Plot 7-78. J Dipole Radiated Spurious Plot 90-100 GHz (1CC 16QAM Mid Channel H Beam)

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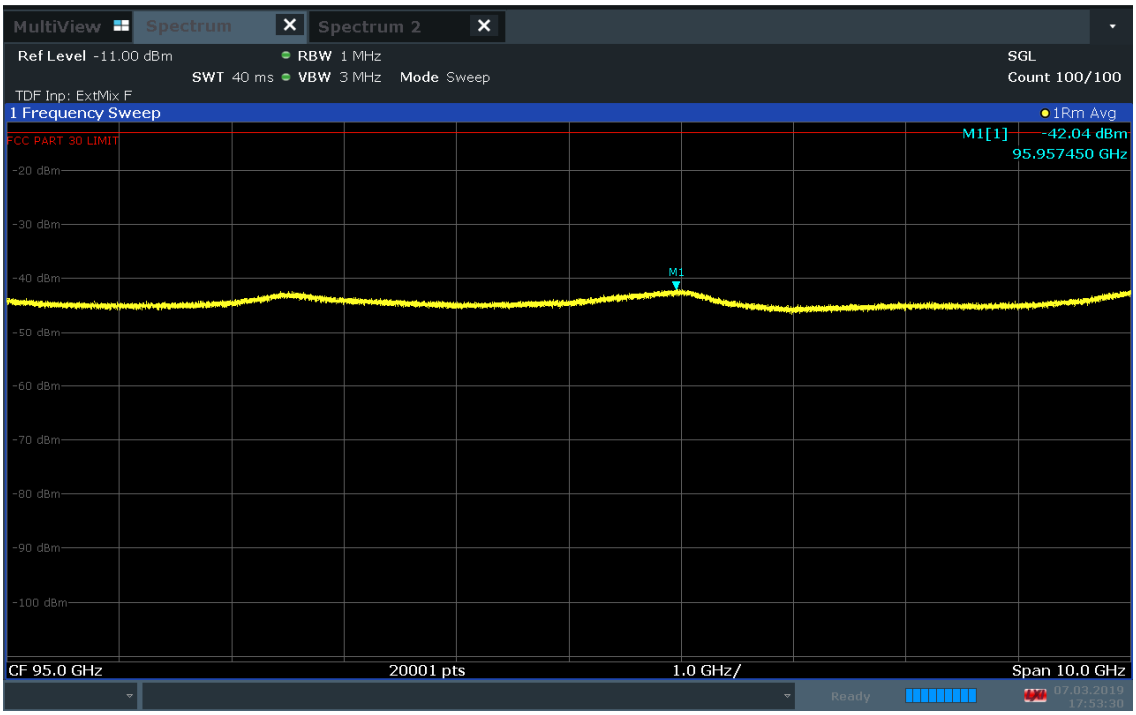
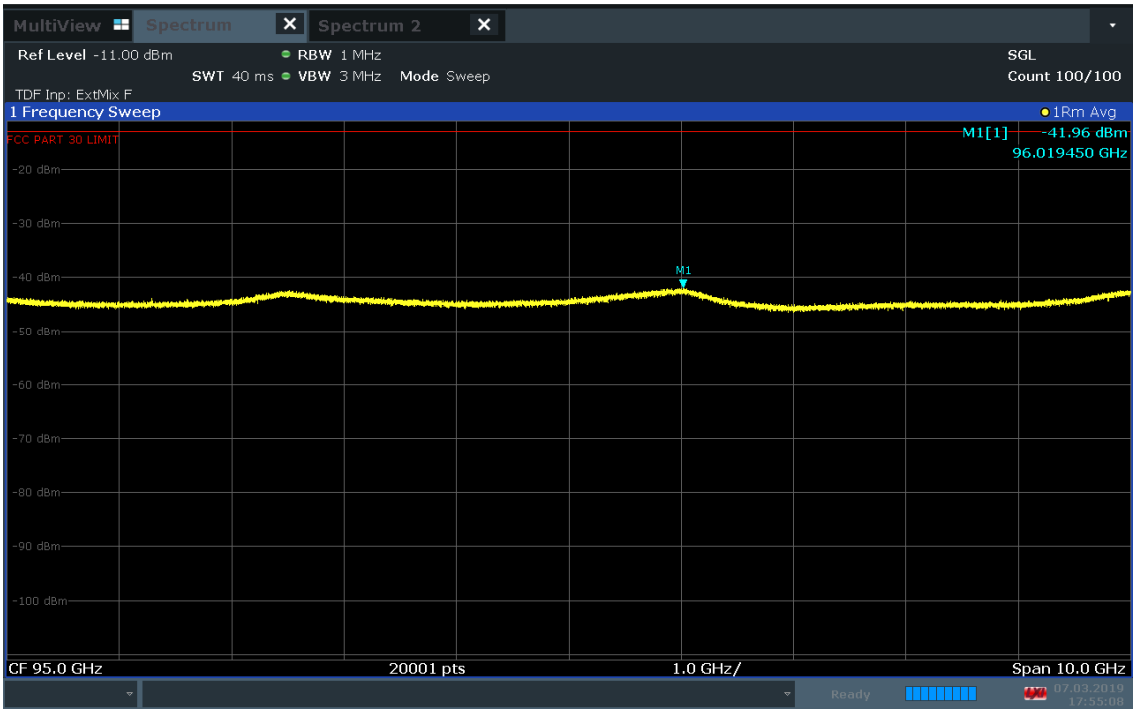
ACLRResults



Plot 7-79. J Dipole Radiated Spurious Plot 90-100 GHz (1CC 16QAM High Channel H Beam)

ACLRResults



Plot 7-80. J Dipole Radiated Spurious Plot 90-100 GHz (1CC 16QAM Low Channel V Beam)

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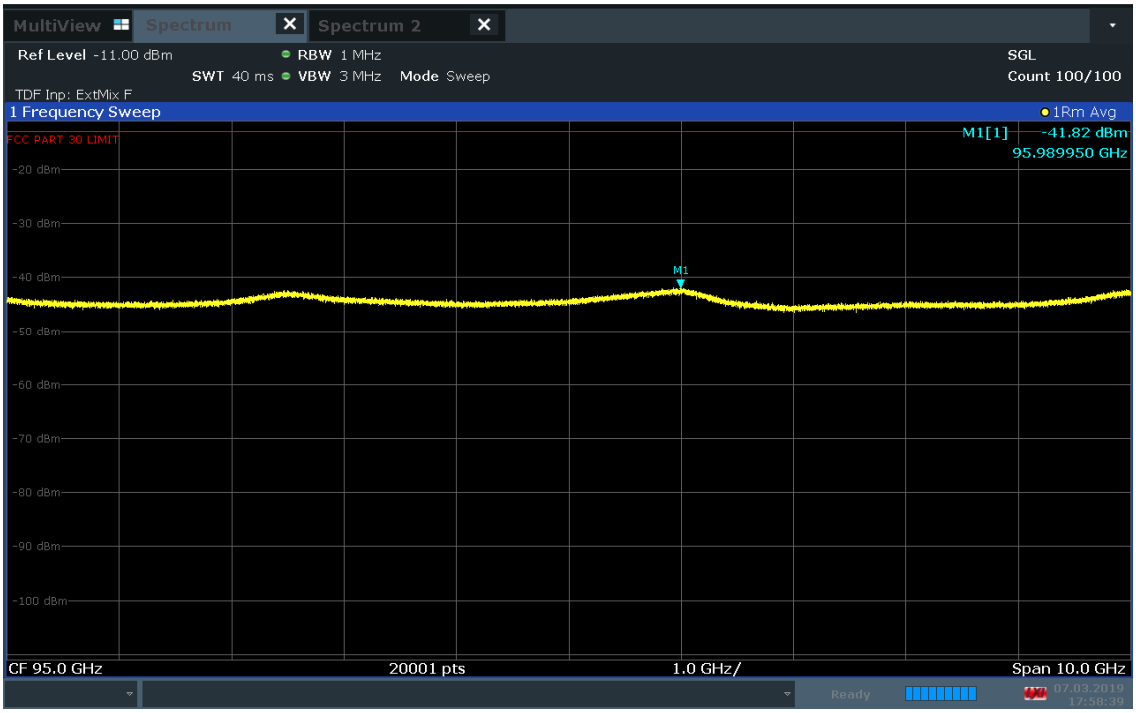
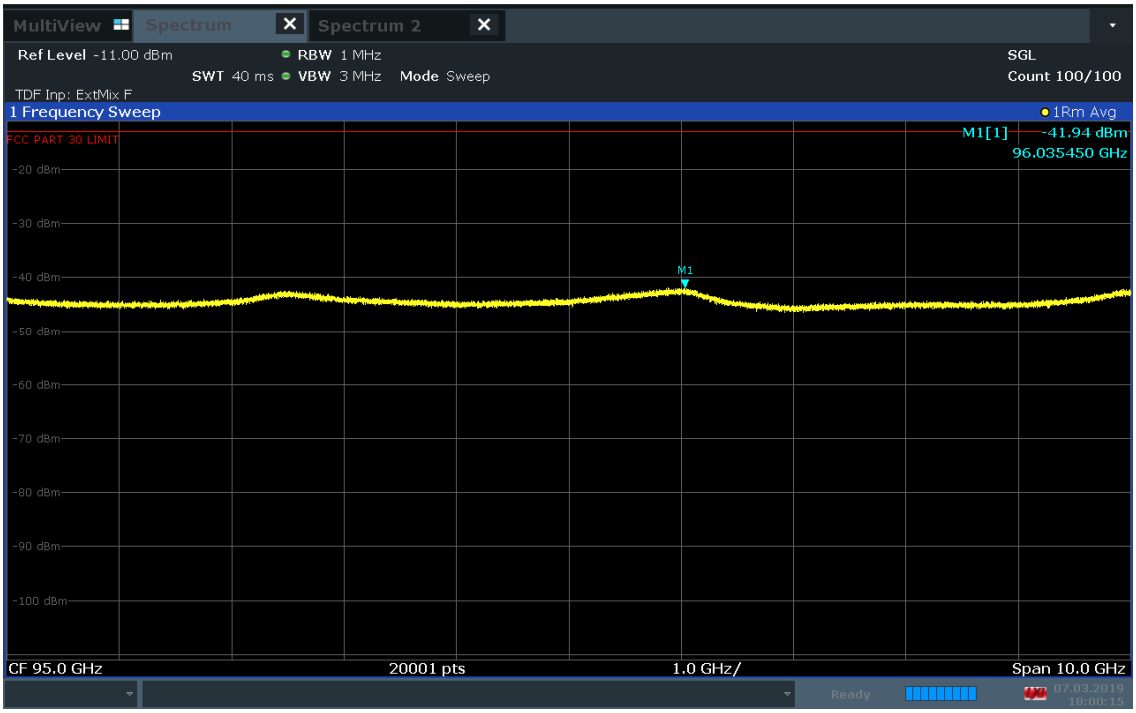


Plot 7-81. J Dipole Radiated Spurious Plot 90-100 GHz (1CC 16QAM Mid Channel V Beam)

ACLRResults



Plot 7-82. J Dipole Radiated Spurious Plot 90-100 GHz (1CC 16QAM High Channel V Beam)

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Spurious Emissions EIRP Sample Calculation

The raw radiated spurious level is converted to field strength in dBµV/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) + Harmonic Mixer Loss (dB) – 104.8

Frequency [MHz]	Detector/ Trace	Chan.	Bandwidth (MHz)	Mod.	Beam Polarization	Ant. Pos [H/V]	Ant. Height [cm]	Turn Table Azimuth [degree]	RSE EIRP [dBm]	Limit [dBm]	Margin [dB]
96015.45	RMS/Avg	Low	50	16QAM	H	H	-	-	-42.07	-13.00	-29.07
95944.95	RMS/Avg	Mid	50	16QAM	H	H	-	-	-41.96	-13.00	-28.96
95957.45	RMS/Avg	High	50	16QAM	H	H	-	-	-42.04	-13.00	-29.04
96019.45	RMS/Avg	Low	50	16QAM	V	V	-	-	-41.96	-13.00	-28.96
95989.95	RMS/Avg	Mid	50	16QAM	V	V	-	-	-41.82	-13.00	-28.82
96035.45	RMS/Avg	High	50	16QAM	V	V	-	-	-41.94	-13.00	-28.94

Table 7-19. J Dipole Spurious Emissions Table (90-100GHz)

Notes

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

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

EIRP(H Beam) + EIRP(V Beam) = EIRP(MIMO)

(-41.96 dBm + -41.82 dBm) = (63.68 nW + 65.77 nW) = (129.45 nW) = -38.88 dBm

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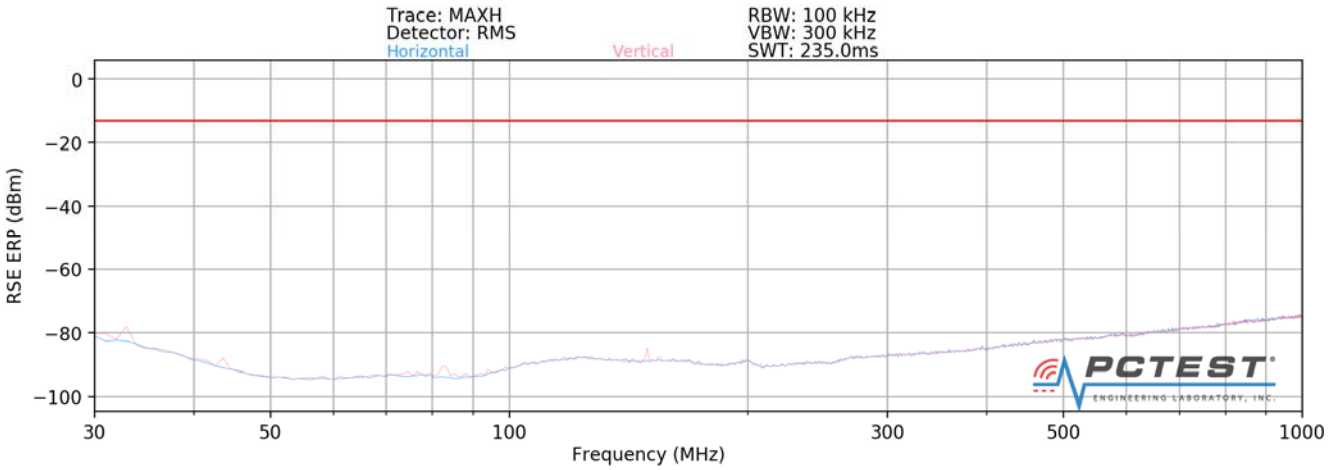
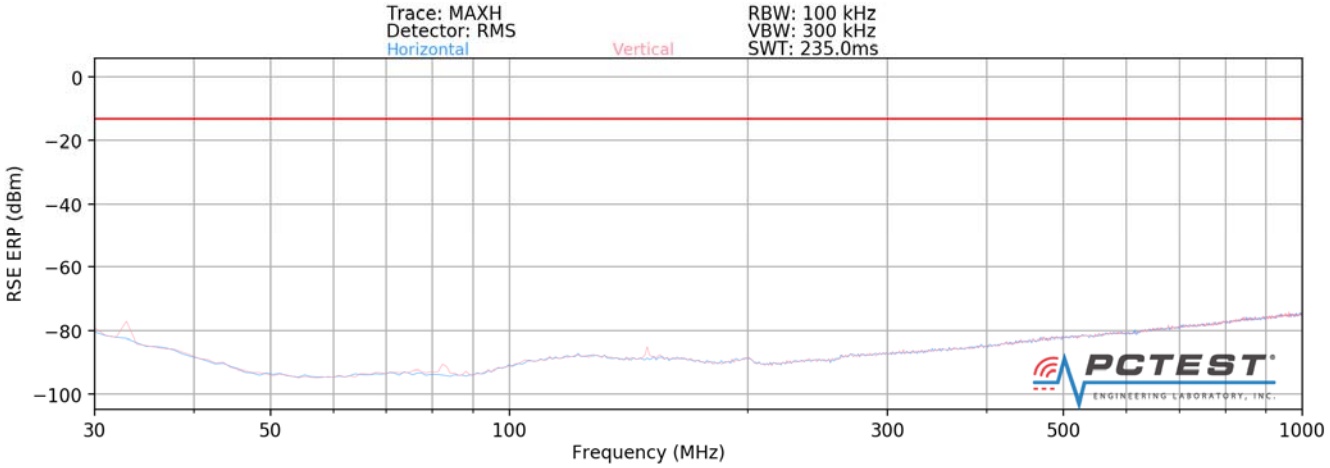
7.4.2 J Patch Radiated Spurious Emissions 30MHz – 1GHz



Plot 7-83. J Patch Radiated Spurious Plot 30 MHz - 1 GHz (1CC 16QAM Mid Channel H Beam)



Plot 7-84. J Patch Radiated Spurious Plot 30 MHz - 1 GHz (1CC 16QAM Mid Channel V Beam)

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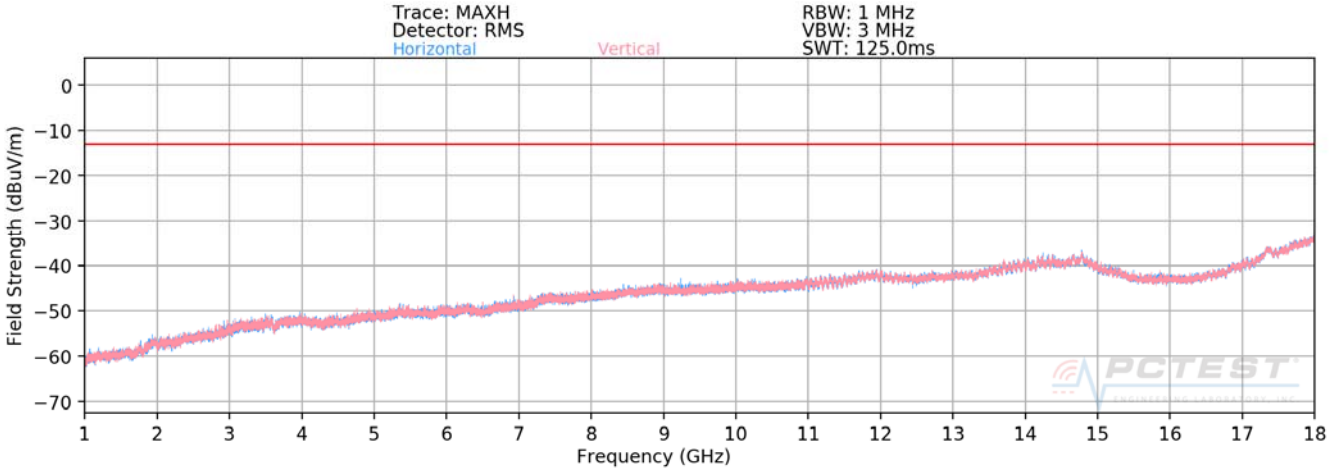
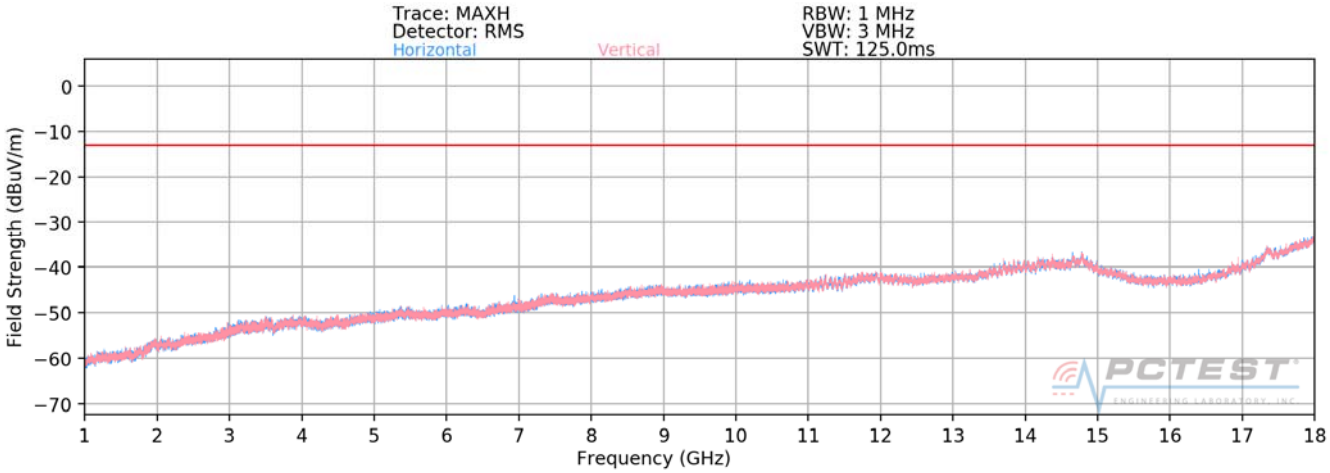
1 – 18GHz



Plot 7-85. J Patch Radiated Spurious Plot 1-18 GHz (1CC 16QAM Mid Channel H Beam)



Plot 7-86. J Patch Radiated Spurious Plot 1-18 GHz (1CC 16QAM Mid Channel V Beam)

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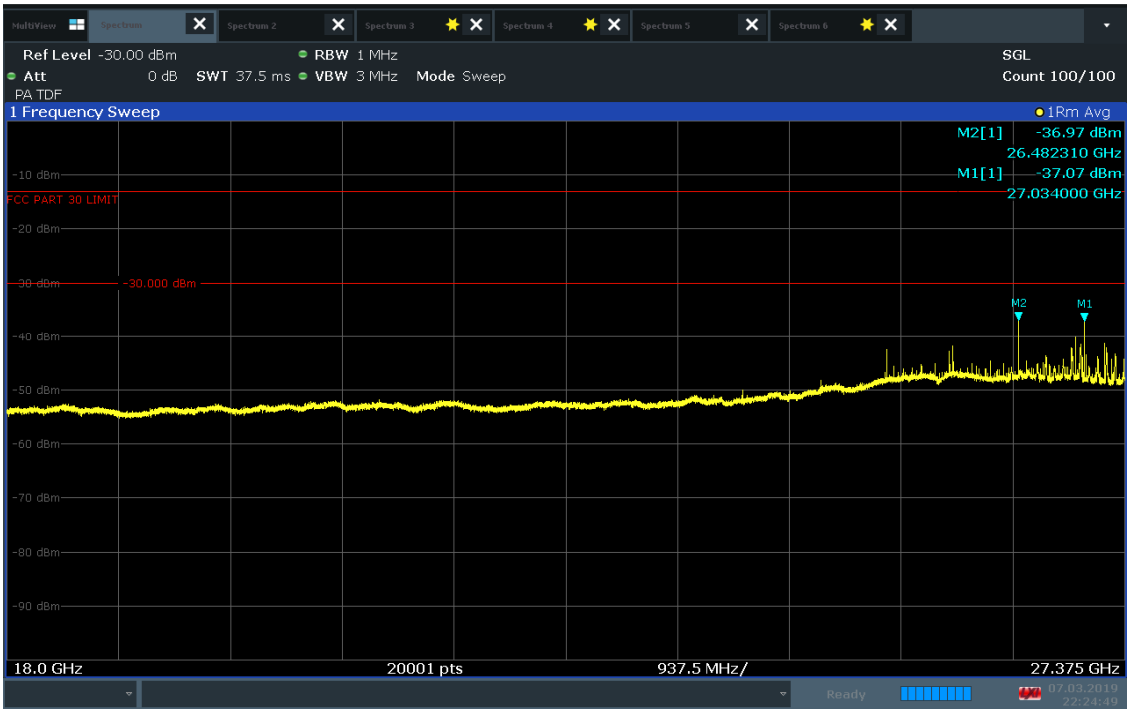
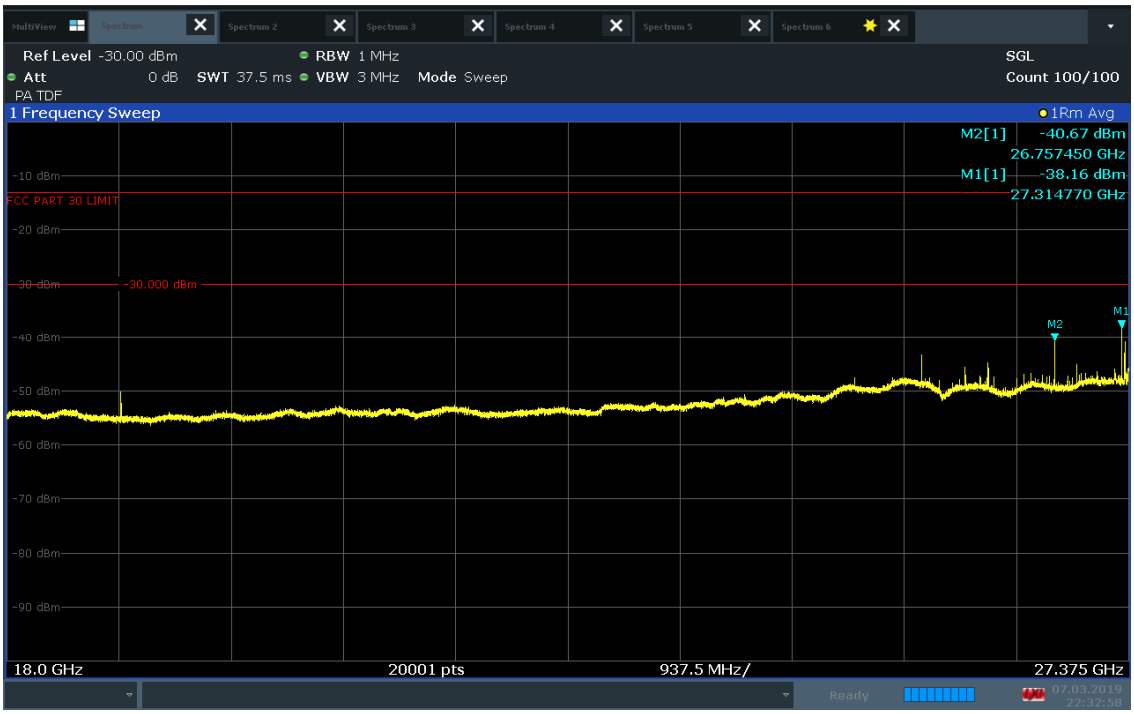
18 – 27.375GHz

ACLRResults



Plot 7-87. J Patch Radiated Spurious Plot 18-27.375 GHz (1CC 16QAM Low Channel H Beam)

ACLRResults



Plot 7-88. J Patch Radiated Spurious Plot 18-27.375 GHz (1CC 16QAM Mid Channel H Beam)

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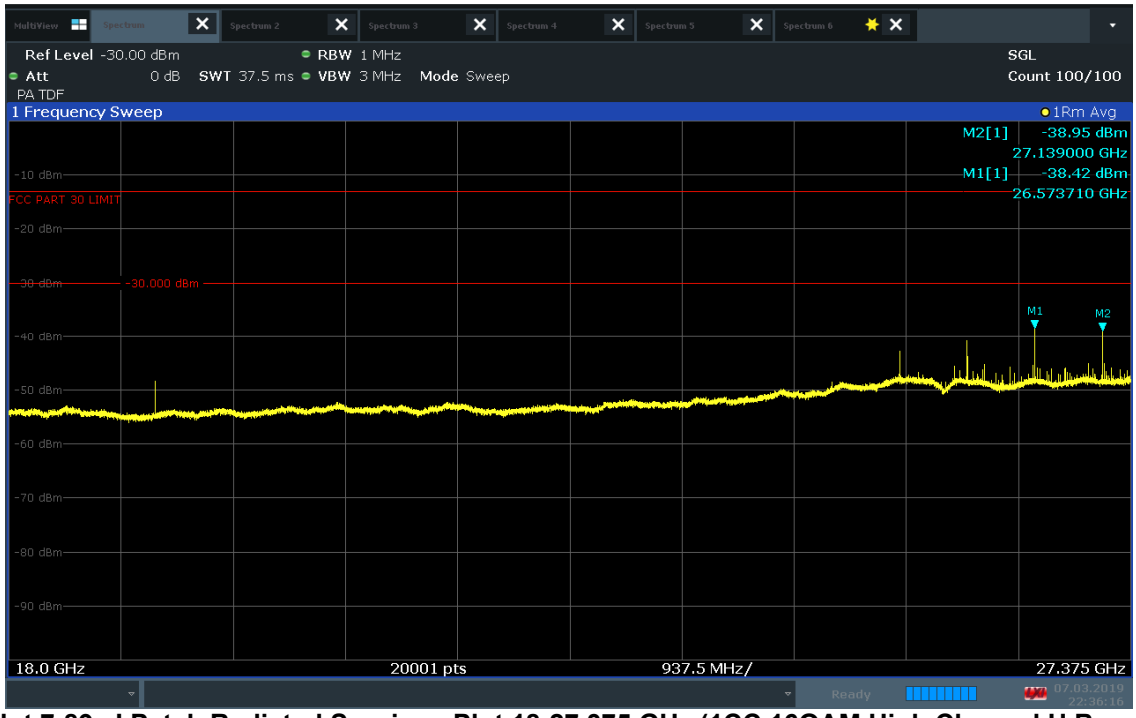
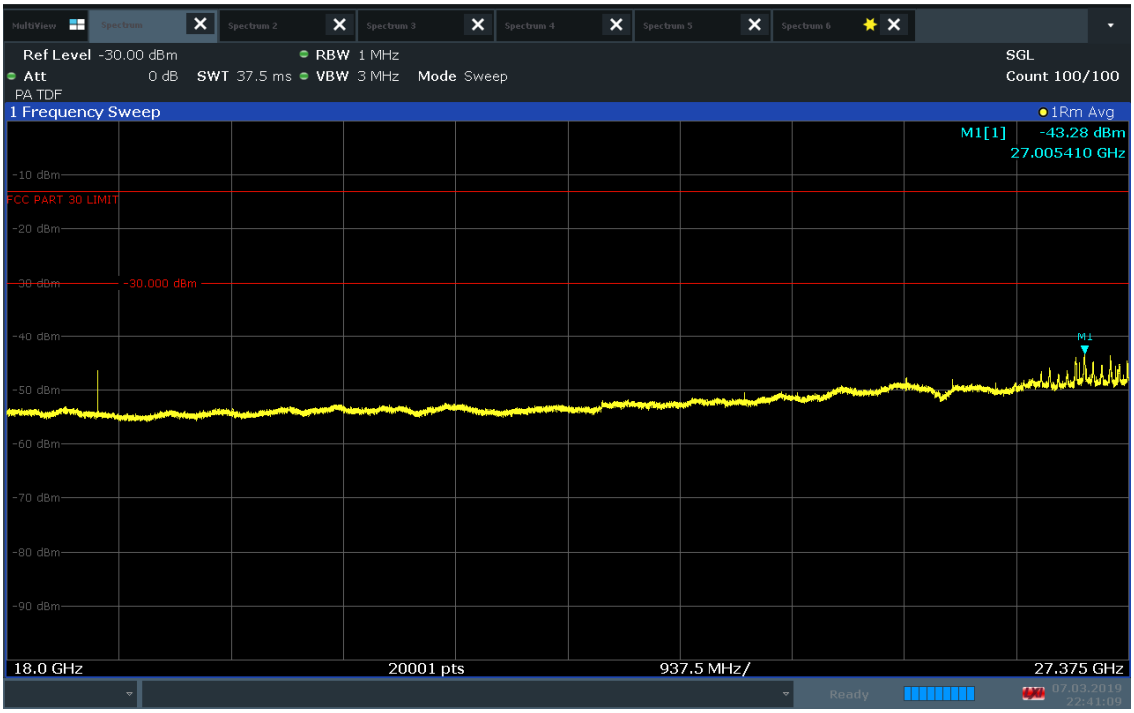
ACLRResults



Plot 7-89. J Patch Radiated Spurious Plot 18-27.375 GHz (1CC 16QAM High Channel H Beam)

ACLRResults



Plot 7-90. J Patch Radiated Spurious Plot 18-27.375 GHz (1CC 16QAM Low Channel V Beam)

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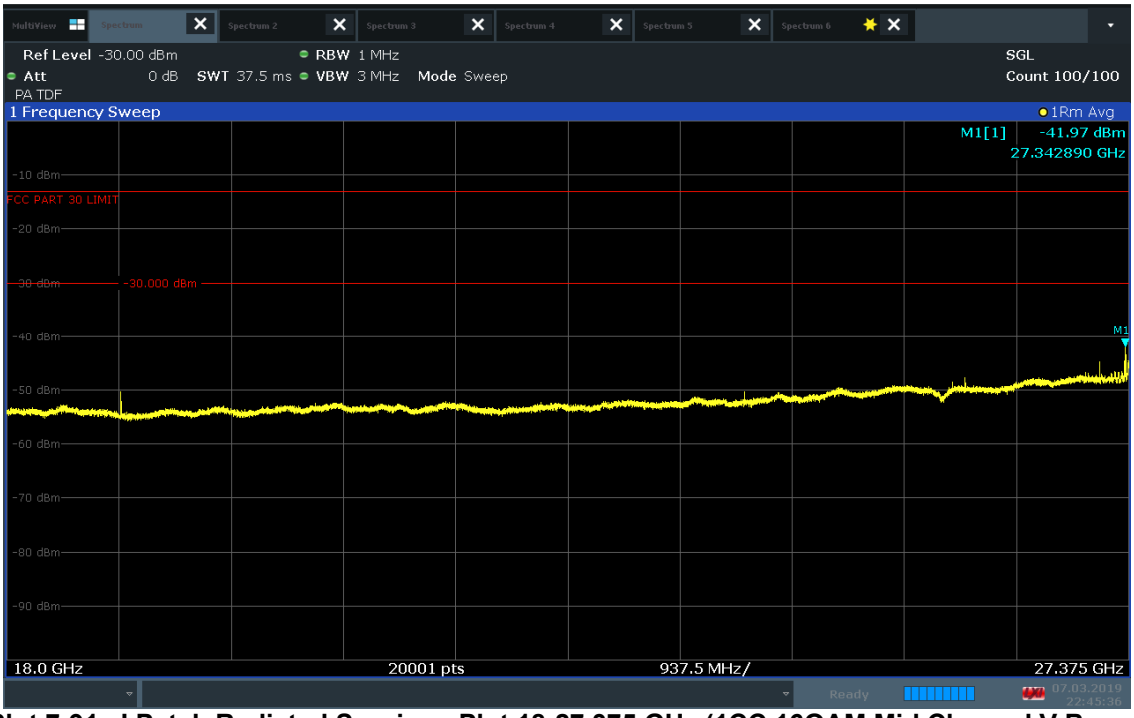
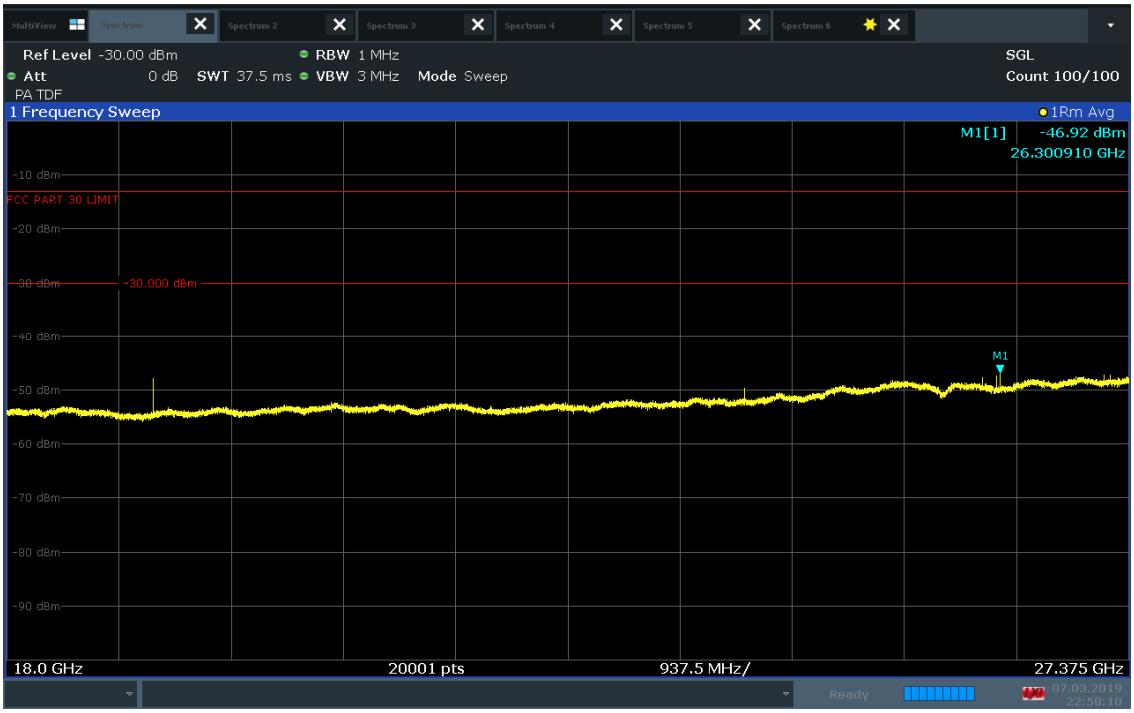
ACLRResults



Plot 7-91. J Patch Radiated Spurious Plot 18-27.375 GHz (1CC 16QAM Mid Channel V Beam)

ACLRResults



Plot 7-92. J Patch Radiated Spurious Plot 18-27.375 GHz (1CC 16QAM High Channel V Beam)

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Spurious Emissions EIRP Sample Calculation

The raw radiated spurious level is converted to field strength in dBµV/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]	Detector/ Trace	Chan.	Bandwidth (MHz)	Mod.	EUT Beam Polarization	Ant. Pos [H/V]	Ant. Height [cm]	Turn Table Azimuth [degree]	RSE EIRP [dBm]	Limit [dBm]	Margin [dB]
26482.31	RMS/Avg	Low	50	16QAM	H	H	150	322	-36.97	-13.00	-23.97
27314.77	RMS/Avg	Mid	50	16QAM	H	H	150	287	-38.16	-13.00	-25.16
26573.71	RMS/Avg	High	50	16QAM	H	H	150	321	-38.42	-13.00	-25.42
27005.41	RMS/Avg	Low	50	16QAM	V	V	150	248	-43.28	-13.00	-30.28
27342.89	RMS/Avg	Mid	50	16QAM	V	V	150	288	-41.97	-13.00	-28.97
26300.91	RMS/Avg	High	50	16QAM	V	V	150	272	-46.92	-13.00	-33.92

Table 7-20. J Patch Spurious Emissions Table (18-27.375GHz)

Notes

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

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

EIRP(H Beam) + EIRP(V Beam) = EIRP(MIMO)

(-36.97 dBm + -43.28 dBm) = (200.91 nW + 46.99 nW) = (247.90 nW) = -36.06 dBm

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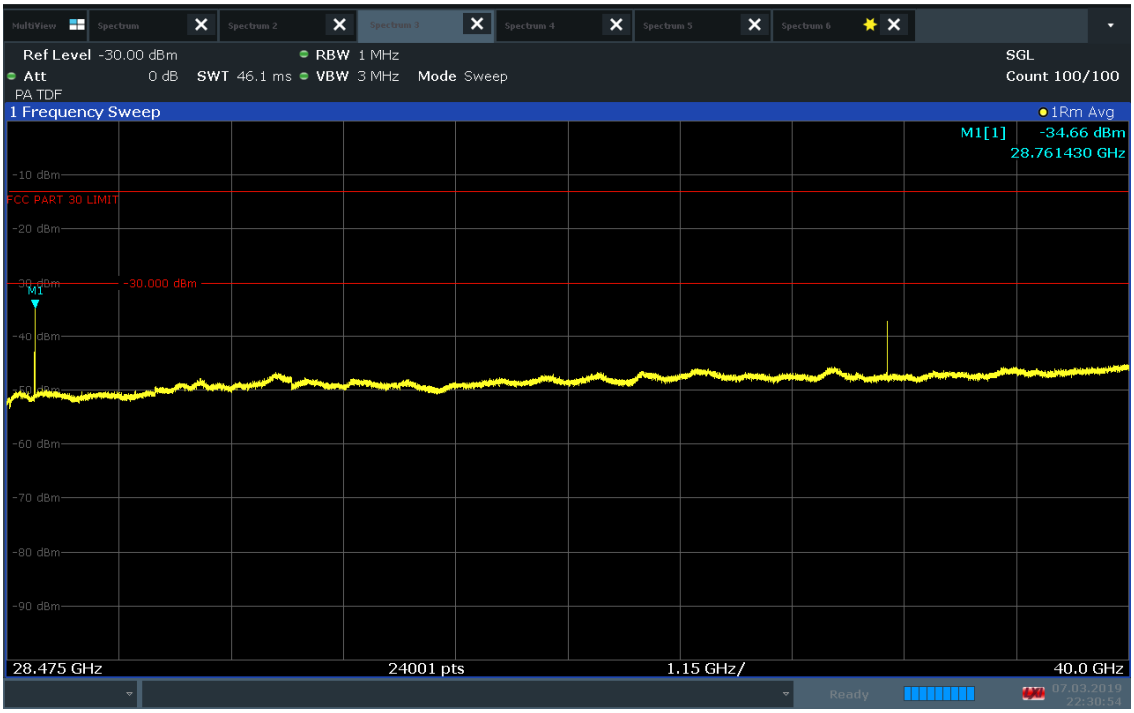
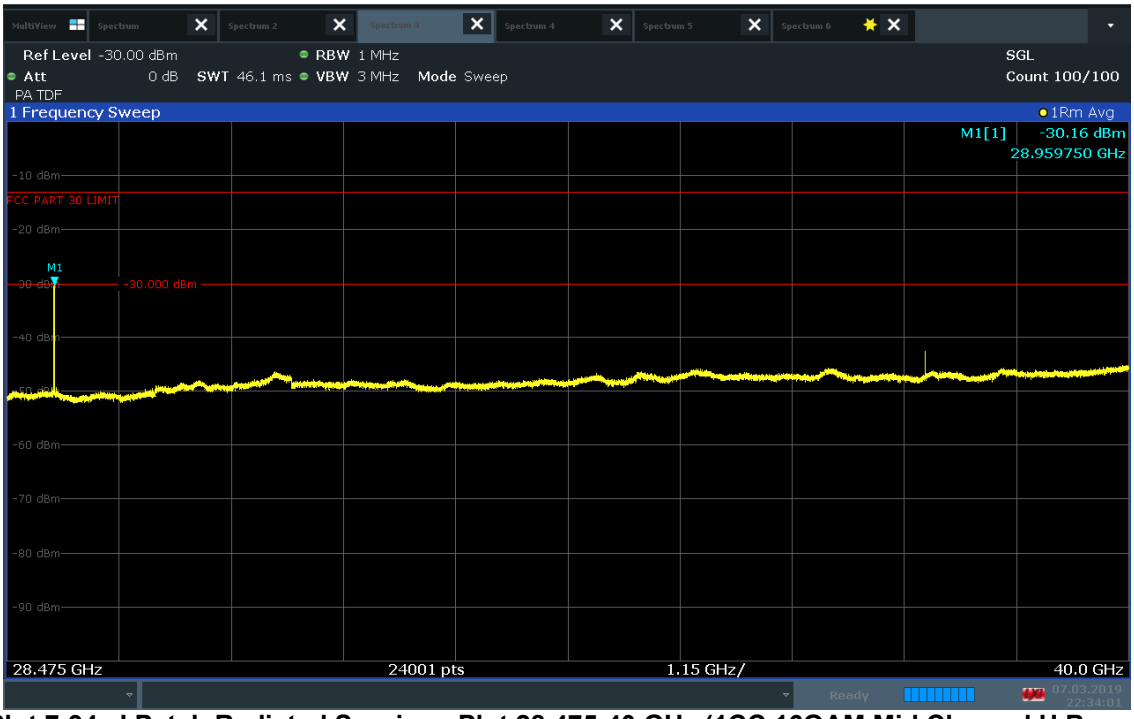
28.475 – 40GHz

ACLRResults



Plot 7-93. J Patch Radiated Spurious Plot 28.475-40 GHz (1CC 16QAM Low Channel H Beam)

ACLRResults



Plot 7-94. J Patch Radiated Spurious Plot 28.475-40 GHz (1CC 16QAM Mid Channel H Beam)

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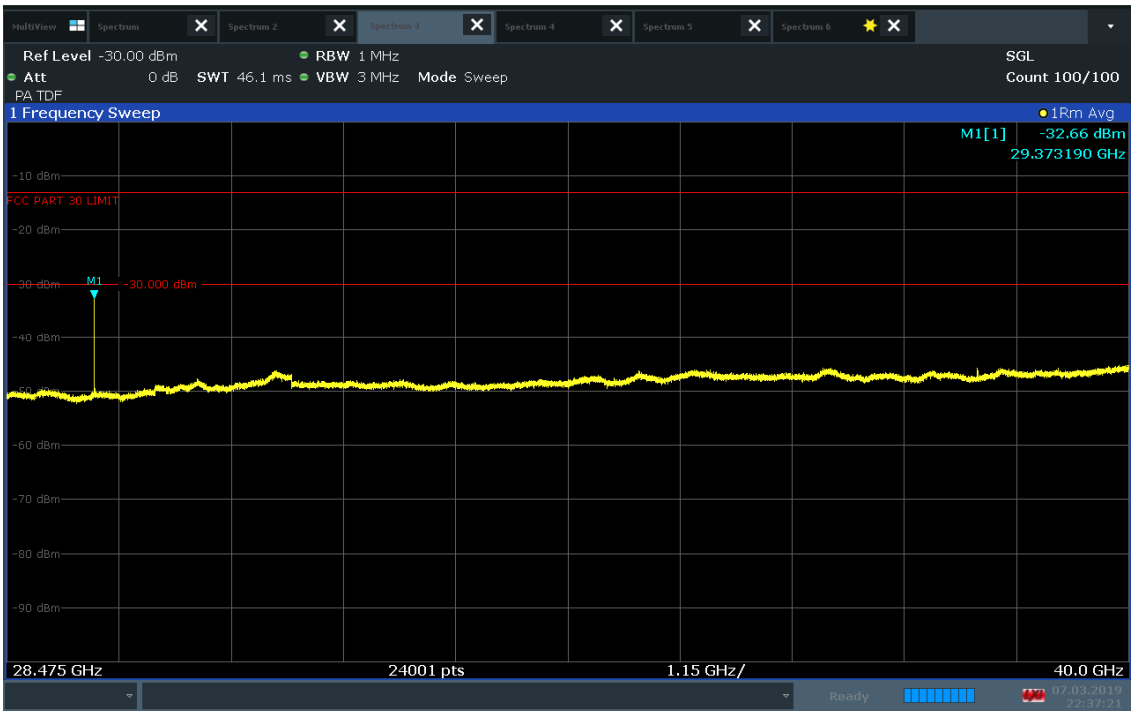
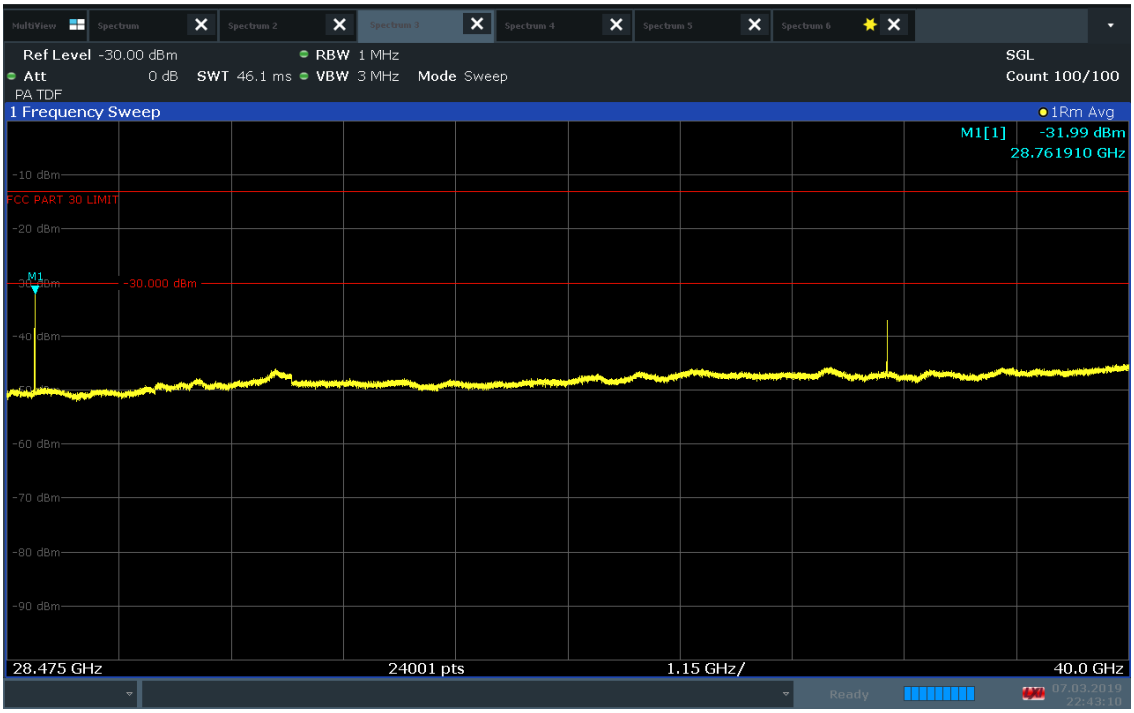
ACLRResults



Plot 7-95. J Patch Radiated Spurious Plot 28.475-40 GHz (1CC 16QAM High Channel H Beam)

ACLRResults



Plot 7-96. J Patch Radiated Spurious Plot 28.475-40 GHz (1CC 16QAM Low Channel V Beam)

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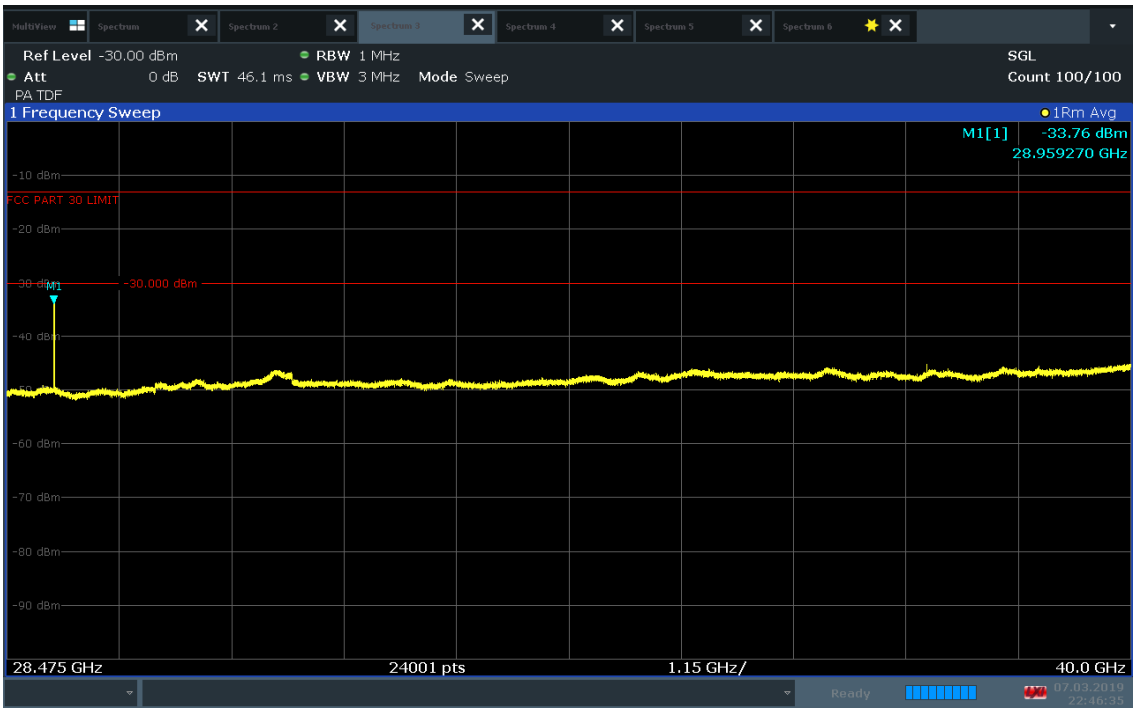
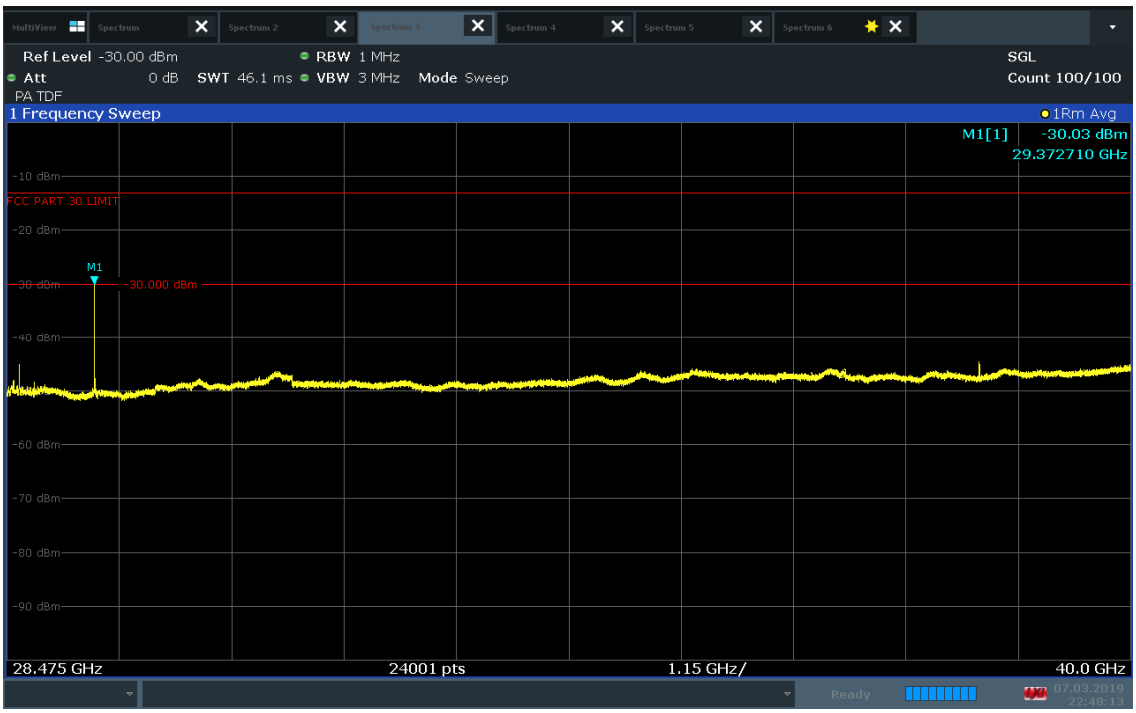
ACLRResults



Plot 7-97. J Patch Radiated Spurious Plot 28.475-40 GHz (1CC 16QAM Mid Channel V Beam)

ACLRResults



Plot 7-98. J Patch Radiated Spurious Plot 28.475-40 GHz (1CC 16QAM High Channel V Beam)

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Spurious Emissions EIRP Sample Calculation

The raw radiated spurious level is converted to field strength in dBµV/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] + AFCL [dB/m] + 20Log(Dm) – 104.8

Frequency [MHz]	Detector/ Trace	Chan.	Bandwidth (MHz)	Mod.	EUT Beam Polarization	Ant. Pos [H/V]	Ant. Height [cm]	Turntable Azimuth [degree]	RSE EIRP [dBm]	Limit [dBm]	Margin [dB]
28761.43	RMS/Avg	Low	50	16QAM	H	H	150	324	-34.66	-13.00	-21.66
28959.75	RMS/Avg	Mid	50	16QAM	H	H	150	285	-30.16	-13.00	-17.16
29373.19	RMS/Avg	High	50	16QAM	H	H	150	321	-32.66	-13.00	-19.66
28761.91	RMS/Avg	Low	50	16QAM	V	V	150	256	-31.99	-13.00	-18.99
28959.27	RMS/Avg	Mid	50	16QAM	V	V	150	279	-33.76	-13.00	-20.76
29372.71	RMS/Avg	High	50	16QAM	V	V	150	276	-30.03	-13.00	-17.03

Table 7-21. J Patch Spurious Emissions Table (28.475-40 GHz)

Notes

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

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

EIRP(H Beam) + EIRP(V Beam) = EIRP(MIMO)

(-32.66 dBm + -30.03 dBm) = (542.001 nW + 993.116 nW) = (1535.12 nW) = -28.14 dBm

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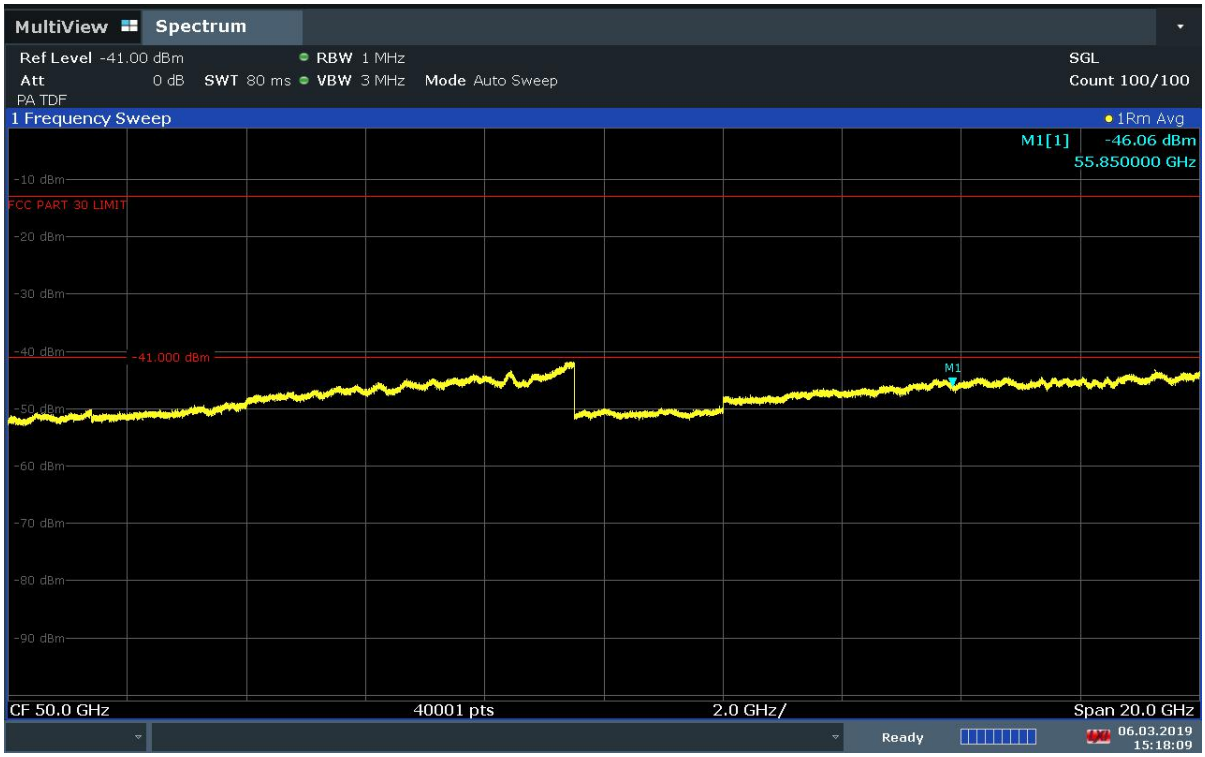
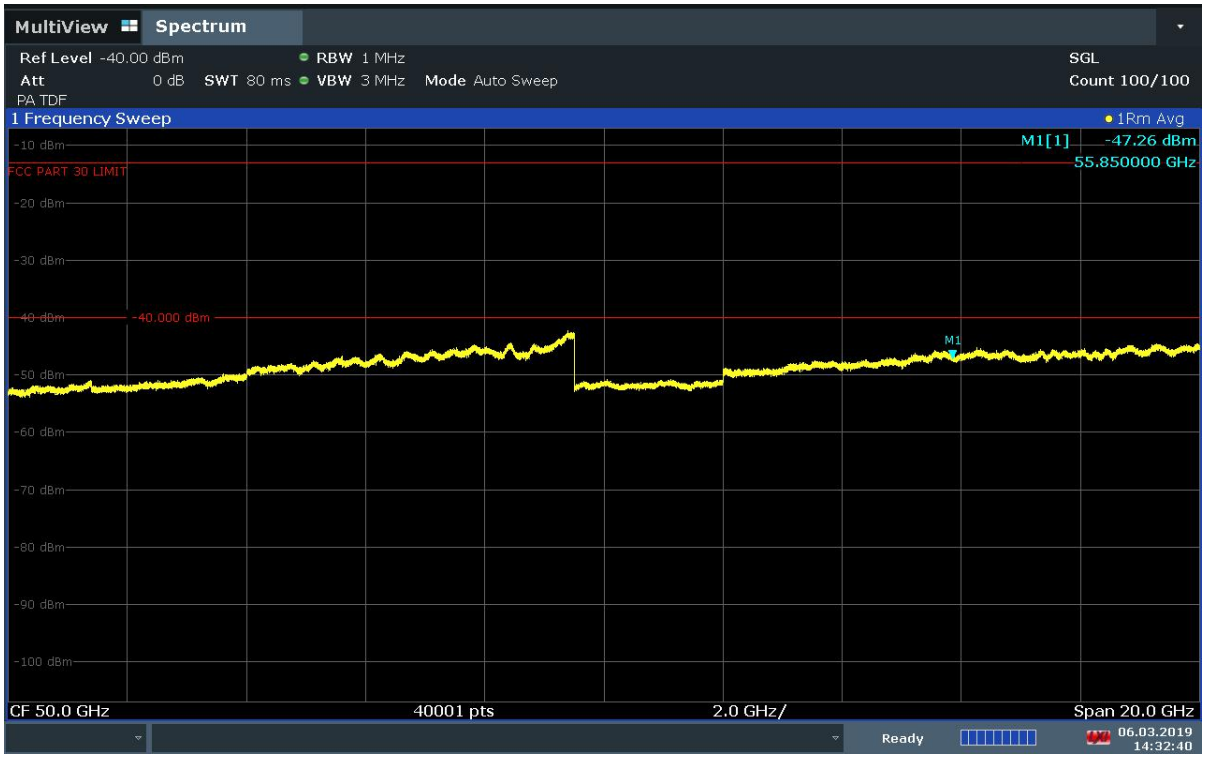
40 – 60GHz



Plot 7-99. J Patch Radiated Spurious Plot 40-60 GHz (1CC 16QAM Low Channel H Beam)



Plot 7-100. J Patch Radiated Spurious Plot 40-60 GHz (1CC 16QAM Mid Channel H Beam)

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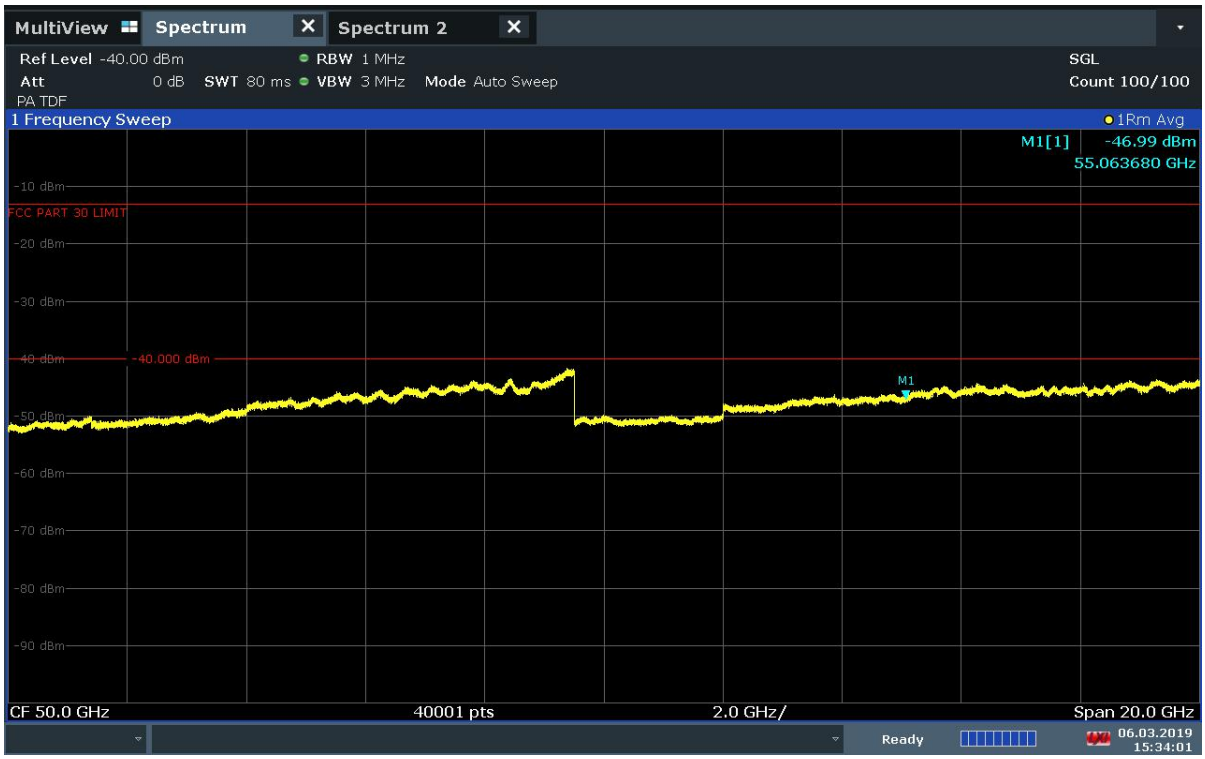
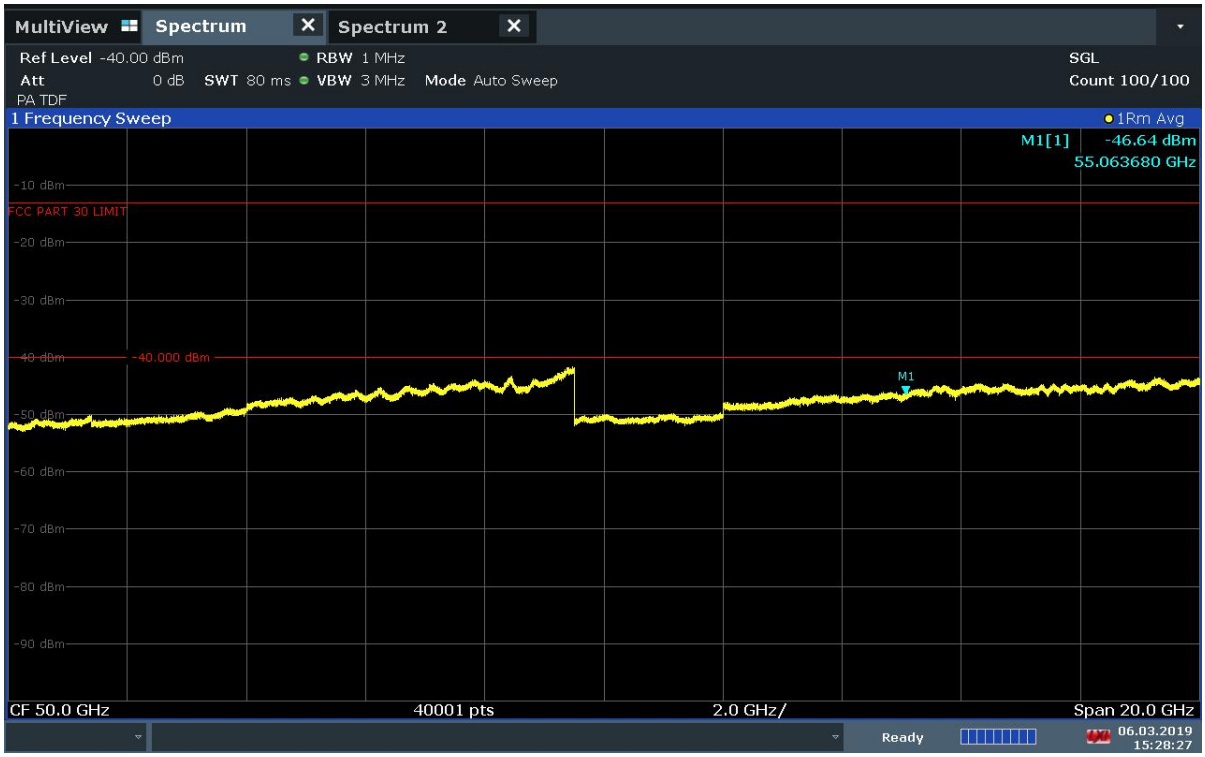


Plot 7-101. J Patch Radiated Spurious Plot 40-60 GHz (1CC 16QAM High Channel H Beam)



Plot 7-102. J Patch Radiated Spurious Plot 40-60 GHz (1CC 16QAM Low Channel V Beam)

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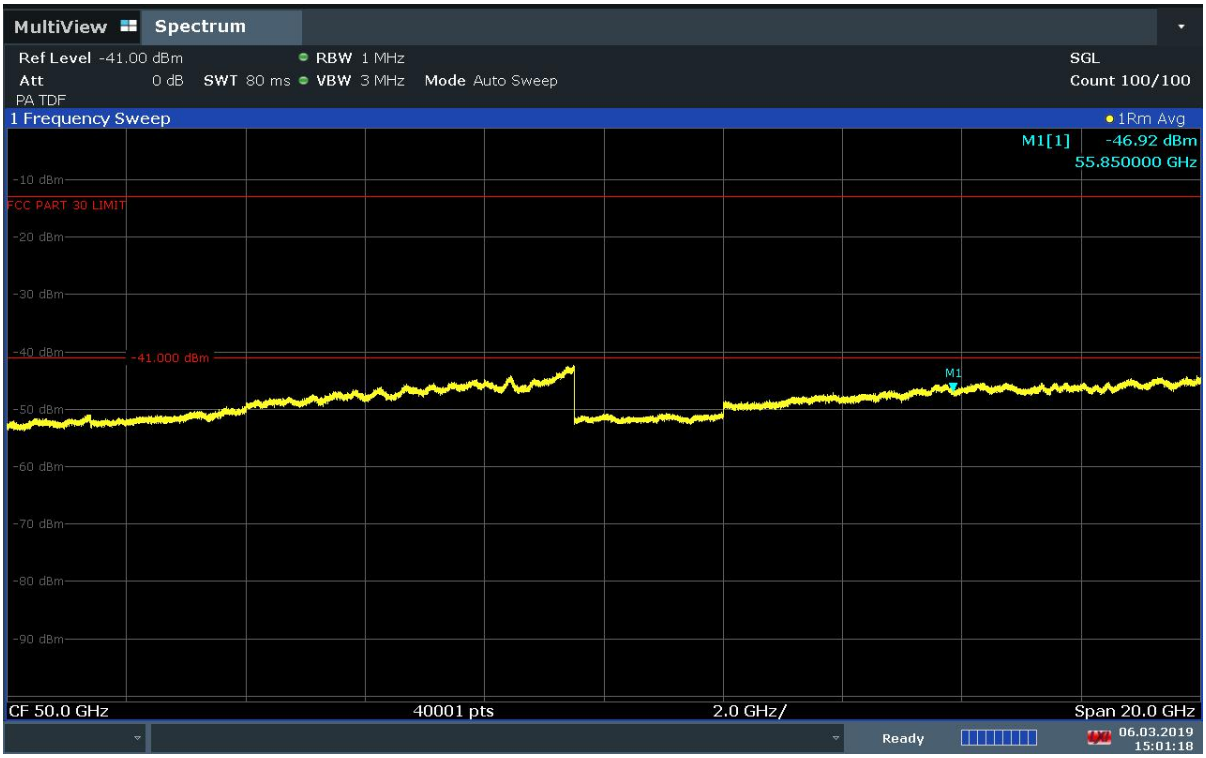
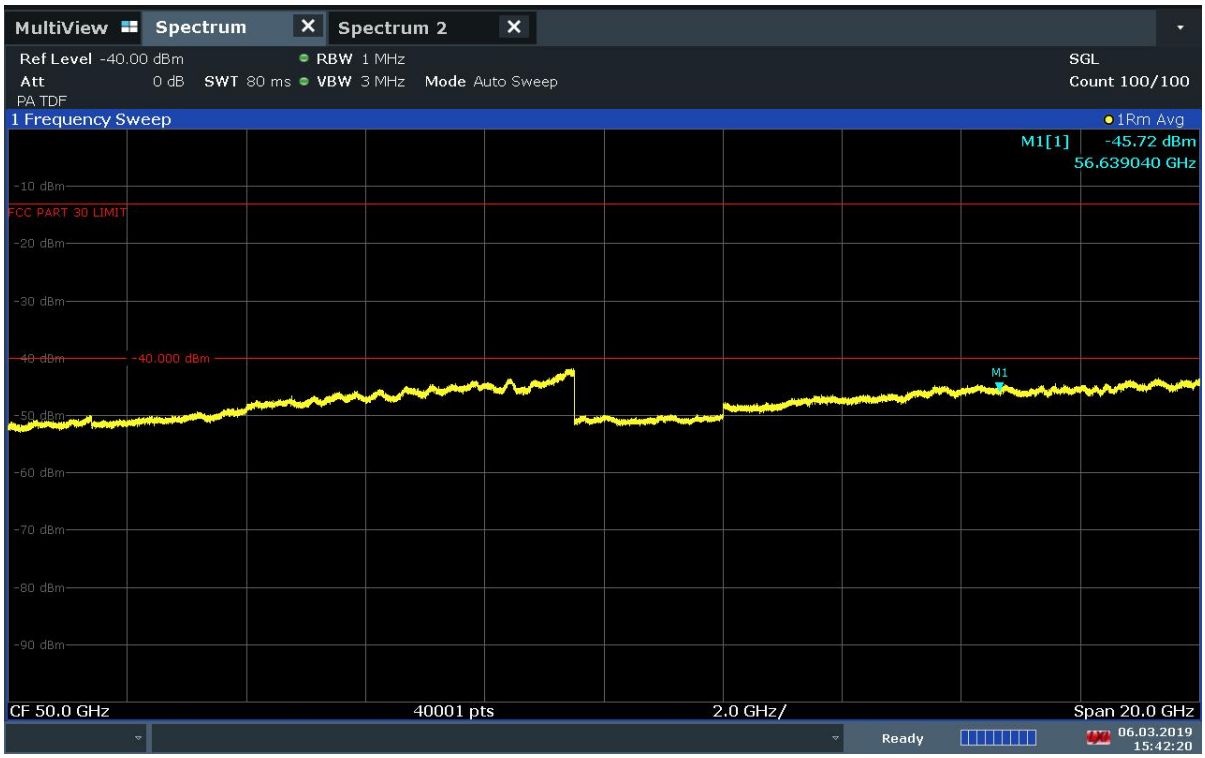


Plot 7-103. J Patch Radiated Spurious Plot 40-60 GHz (1CC 16QAM Mid Channel V Beam)



Plot 7-104. J Patch Radiated Spurious Plot 40-60 GHz (1CC 16QAM High Channel V Beam)

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Spurious Emissions EIRP Sample Calculation

The raw radiated spurious level is converted to field strength in dBµV/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]	Detector/ Trace	Chan.	Bandwidth (MHz)	Mod.	EUT Beam Polarization	Ant. Pos [H/V]	Ant. Height [cm]	Turn Table Azimuth [degree]	RSE EIRP [dBm]	Limit [dBm]	Margin [dB]
55850.00	RMS/Avg	Low	50	16QAM	H	H	150	276	-46.06	-13.00	-33.06
55850.00	RMS/Avg	Mid	50	16QAM	H	H	150	299	-47.26	-13.00	-34.26
55063.68	RMS/Avg	High	50	16QAM	H	H	150	301	-46.99	-13.00	-33.99
55063.68	RMS/Avg	Low	50	16QAM	V	V	150	299	-46.64	-13.00	-33.64
55850.00	RMS/Avg	Mid	50	16QAM	V	V	150	302	-46.92	-13.00	-33.92
56639.04	RMS/Avg	High	50	16QAM	V	V	150	295	-45.72	-13.00	-32.72

Table 7-22. J Patch Spurious Emissions Table (40 - 60GHz)

Notes

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

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

EIRP(H Beam) + EIRP(V Beam) = EIRP(MIMO)

(-46.99 dBm + -45.72 dBm) = (20.00 nW + 26.79 nW) = (46.79 nW) = -43.30 dBm

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60 – 90GHz

Plot 7-105. J Patch Radiated Spurious Plot 60-90 GHz (1CC 16QAM Low Channel H Beam)

Plot 7-106. J Patch Radiated Spurious Plot 60-90 GHz (1CC 16QAM Mid Channel H Beam)

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Plot 7-107. J Patch Radiated Spurious Plot 60-90 GHz (1CC 16QAM High Channel H Beam)

Plot 7-108. J Patch Radiated Spurious Plot 60-90 GHz (1CC 16QAM Low Channel V Beam)

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Plot 7-109. J Patch Radiated Spurious Plot 60-90 GHz (1CC 16QAM Mid Channel V Beam)

Plot 7-110. J Patch Radiated Spurious Plot 60-90 GHz (1CC 16QAM High Channel V Beam)

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Spurious Emissions EIRP Sample Calculation

The raw radiated spurious level is converted to field strength in dBµV/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) + Harmonic Mixer Loss (dB) – 104.8

Frequency [MHz]	Detector/ Trace	Chan.	Bandwidth (MHz)	Mod.	EUT Beam Polarization	Ant. Pos [H/V]	Ant. Height [cm]	Turn Table Azimuth [degree]	RSE EIRP [dBm]	Limit [dBm]	Margin [dB]
88776.50	RMS/Avg	Low	50	16QAM	H	H	150	327	-43.43	-13.00	-30.43
81179.00	RMS/Avg	Mid	50	16QAM	H	H	150	300	-43.81	-13.00	-30.81
84893.00	RMS/Avg	High	50	16QAM	H	H	150	322	-43.16	-13.00	-30.16
89359.50	RMS/Avg	Low	50	16QAM	V	V	150	243	-43.36	-13.00	-30.36
89070.50	RMS/Avg	Mid	50	16QAM	V	V	150	245	-43.45	-13.00	-30.45
88956.50	RMS/Avg	High	50	16QAM	V	V	150	262	-43.26	-13.00	-30.26

Table 7-23. J Patch Spurious Emissions Table (60-90GHz)

Notes

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

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

EIRP(H Beam) + EIRP(V Beam) = EIRP(MIMO)

(-43.16 dBm + -43.26 dBm) = (48.31 nW + 47.21 nW) = (95.51 nW) = -40.2 dBm

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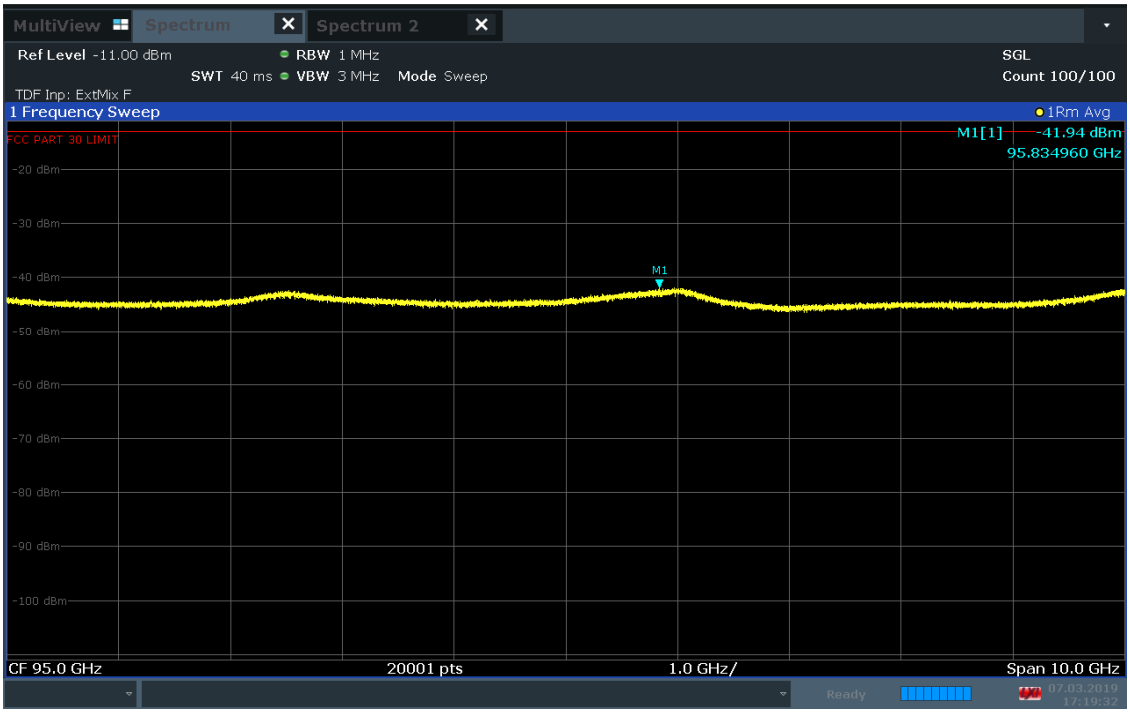
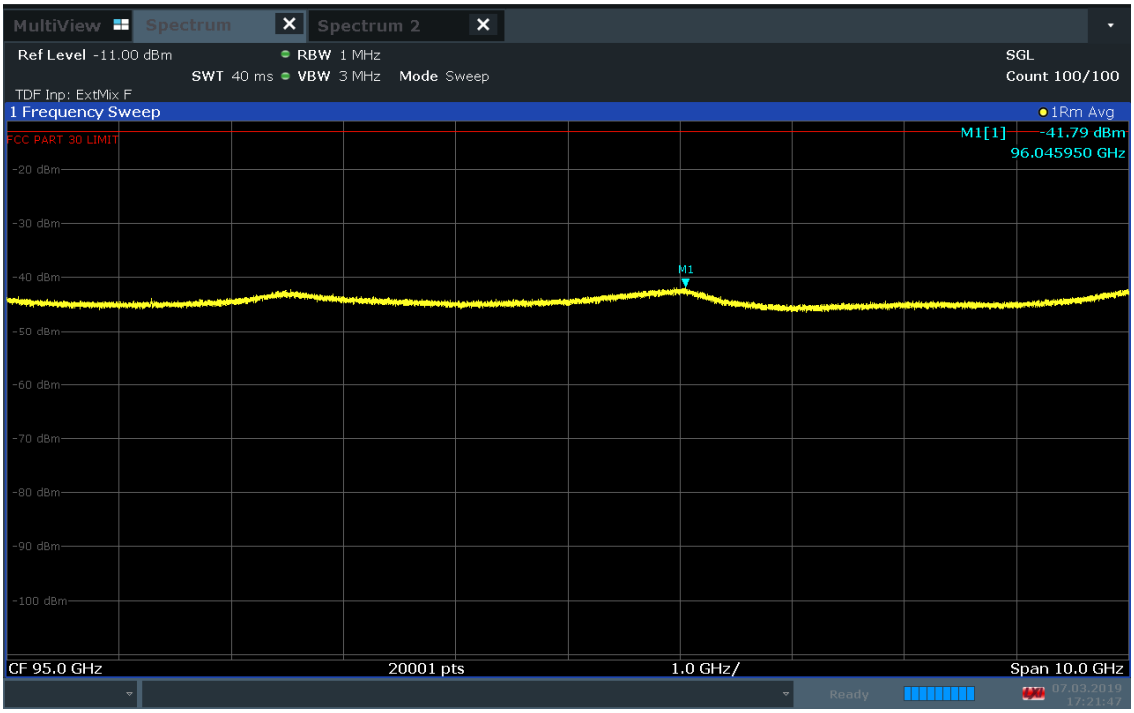
90 – 100GHz

ACLRResults



Plot 7-111. J Patch Radiated Spurious Plot 90-100 GHz (1CC 16QAM Low Channel H Beam)

ACLRResults



Plot 7-112. J Patch Radiated Spurious Plot 90-100 GHz (1CC 16QAM Mid Channel H Beam)

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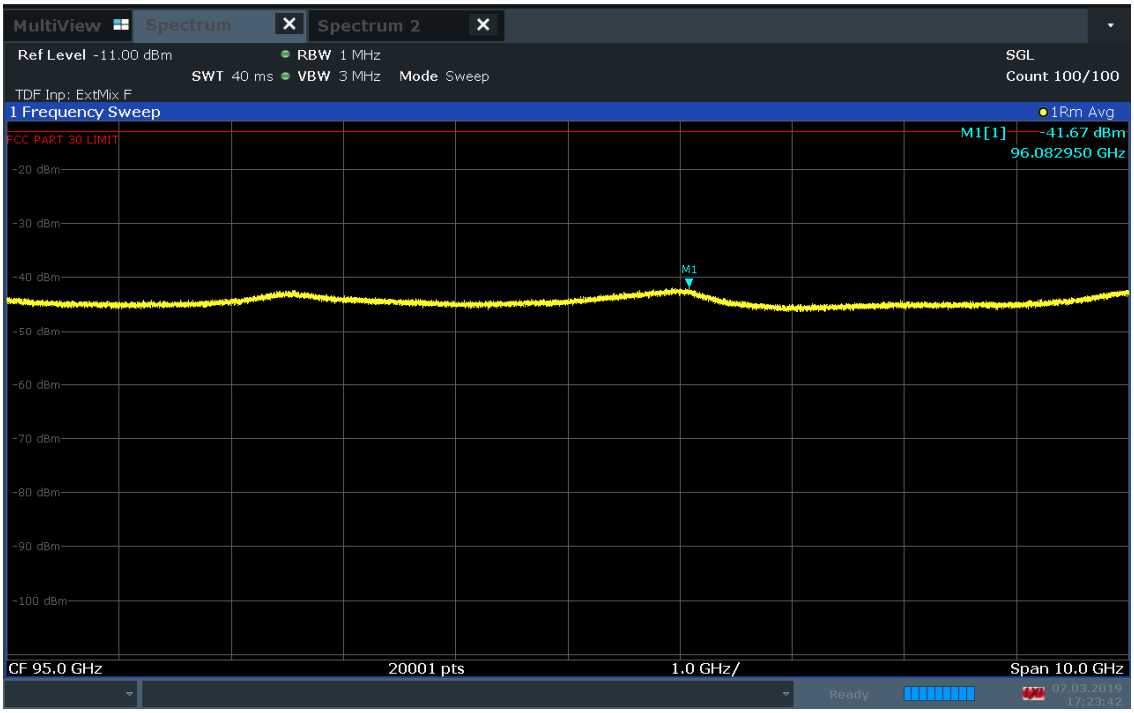
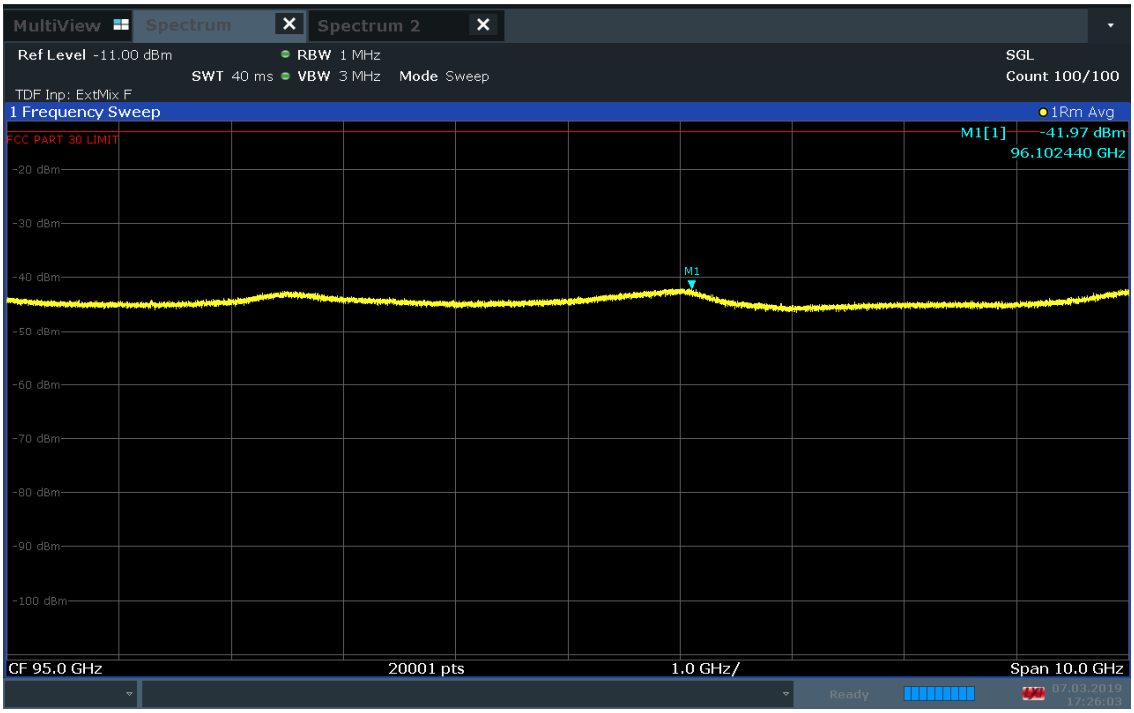
ACLRResults



Plot 7-113. J Patch Radiated Spurious Plot 90-100 GHz (1CC 16QAM High Channel H Beam)

ACLRResults



Plot 7-114. J Patch Radiated Spurious Plot 90-100 GHz (1CC 16QAM Low Channel V Beam)

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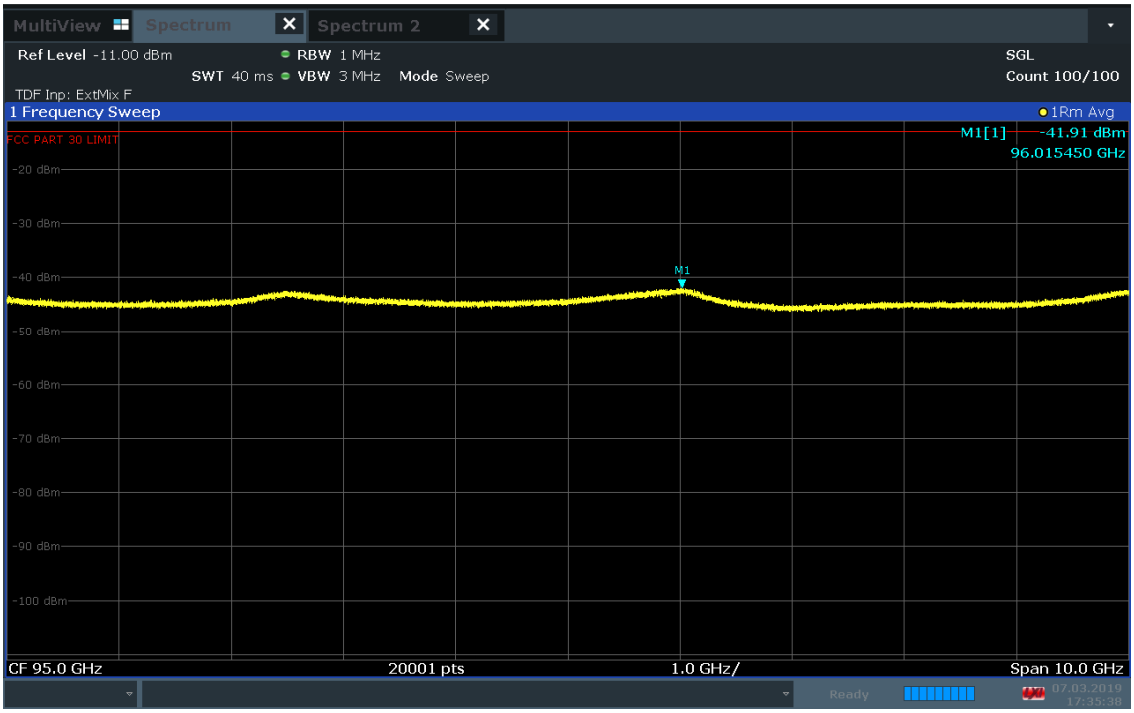
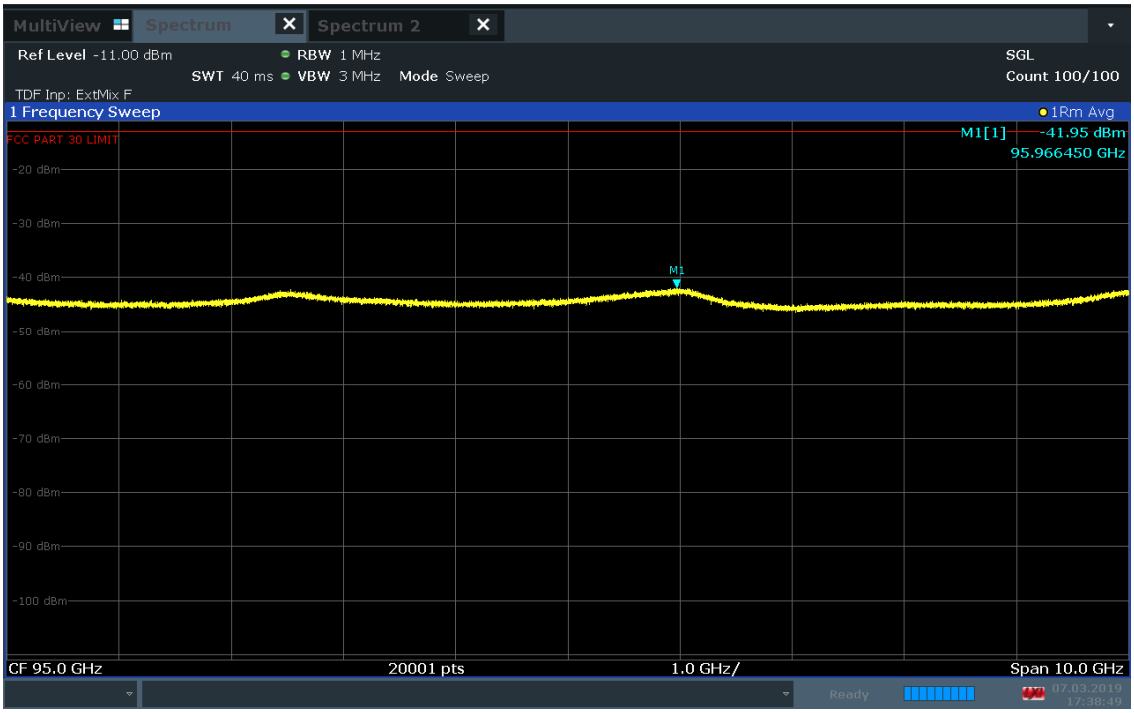
ACLRResults



Plot 7-115. J Patch Radiated Spurious Plot 90-100 GHz (1CC 16QAM Mid Channel V Beam)

ACLRResults



Plot 7-116. J Patch Radiated Spurious Plot 90-100 GHz (1CC 16QAM High Channel V Beam)

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Spurious Emissions EIRP Sample Calculation

The raw radiated spurious level is converted to field strength in dBµV/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) + Harmonic Mixer Loss (dB) – 104.8

Frequency [MHz]	Detector/ Trace	Chan.	Bandwidth (MHz)	Mod.	Beam Polarization	Ant. Pos [H/V]	Ant. Height [cm]	Turn Table Azimuth [degree]	RSE EIRP [dBm]	Limit [dBm]	Margin [dB]
95834.96	RMS/Avg	Low	50	16QAM	H	H	-	-	-41.94	-13.00	-28.94
96045.95	RMS/Avg	Mid	50	16QAM	H	H	-	-	-41.79	-13.00	-28.79
96082.95	RMS/Avg	High	50	16QAM	H	H	-	-	-41.67	-13.00	-28.67
96102.44	RMS/Avg	Low	50	16QAM	V	V	-	-	-41.97	-13.00	-28.97
96015.45	RMS/Avg	Mid	50	16QAM	V	V	-	-	-41.91	-13.00	-28.91
95966.45	RMS/Avg	High	50	16QAM	V	V	-	-	-41.95	-13.00	-28.95

Table 7-24. J Patch Spurious Emissions Table (90-100GHz)

Notes

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

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

EIRP(H Beam) + EIRP(V Beam) = EIRP(MIMO)

(-41.67 dBm + -41.95 dBm) = (68.08 nW + 63.83 nW) = (131.90 nW) = -38.80 dBm

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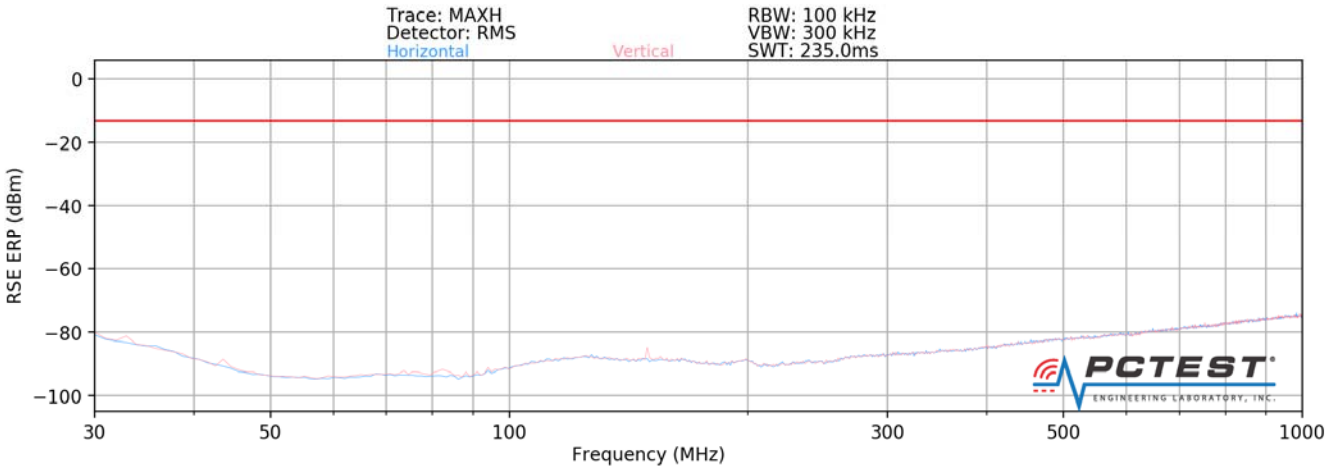
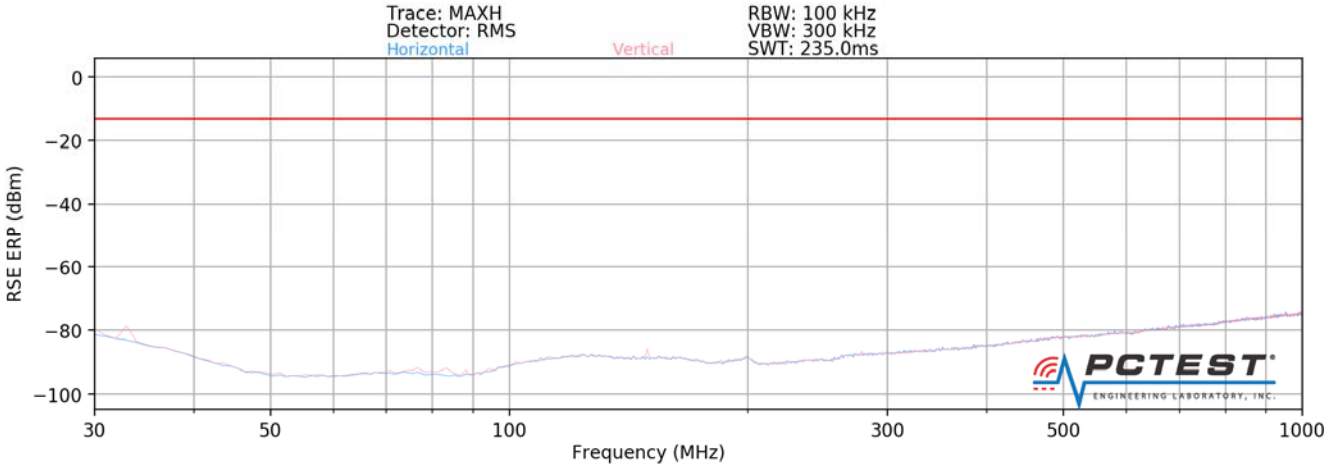
7.4.3 K Patch Radiated Spurious Emissions 30MHz – 1GHz



Plot 7-117. K Patch Radiated Spurious Plot 30 MHz - 1 GHz (1CC QPSK Mid Channel H Beam)



Plot 7-118. K Patch Radiated Spurious Plot 30 MHz - 1 GHz (1CC QPSK Mid Channel V Beam)

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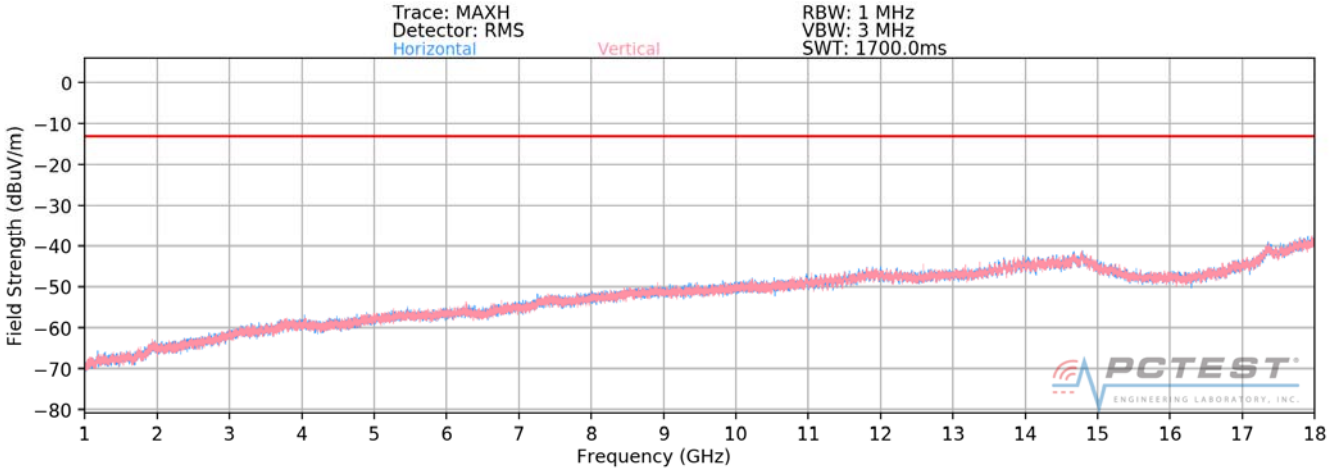
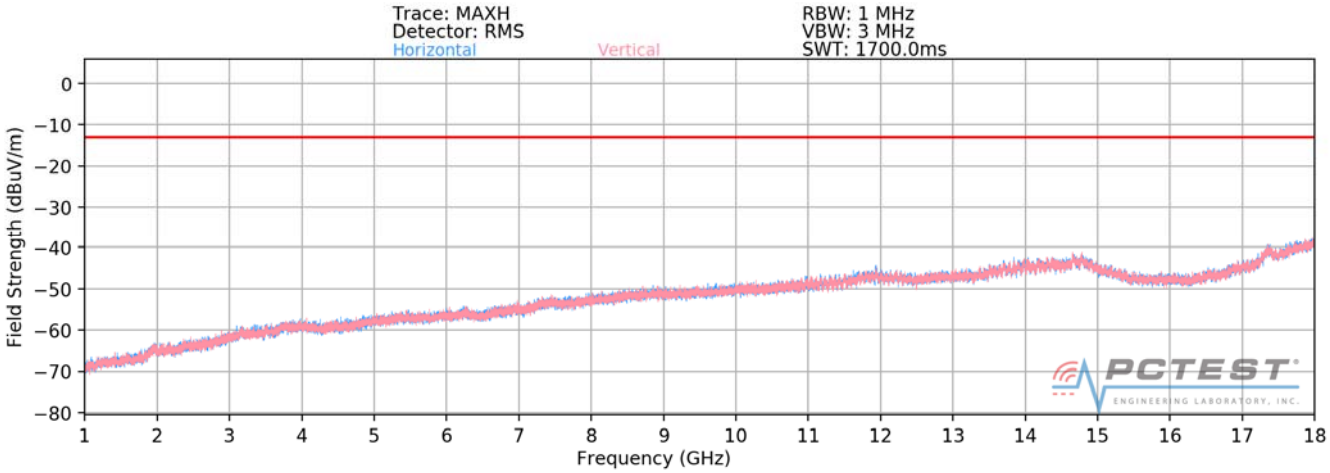
1 – 18GHz



Plot 7-119. K Patch Radiated Spurious Plot 1-18 GHz (1CC QPSK Mid Channel H Beam)



Plot 7-120. K Patch Radiated Spurious Plot 1-18 GHz (1CC QPSK Mid Channel V Beam)

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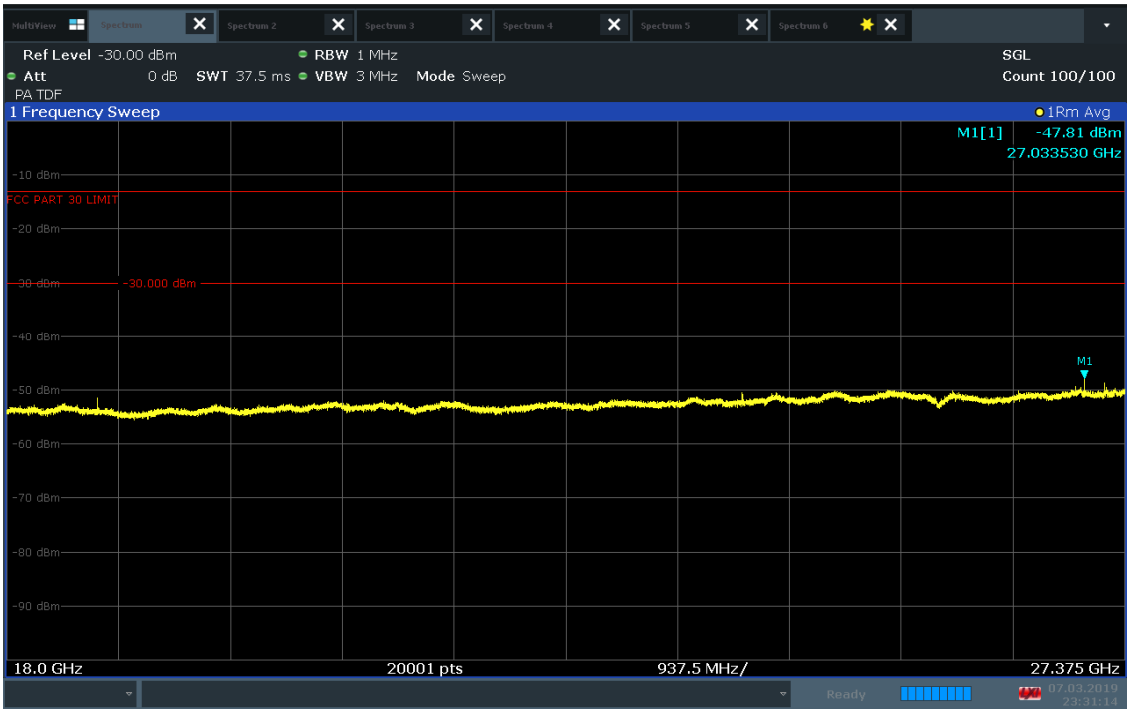
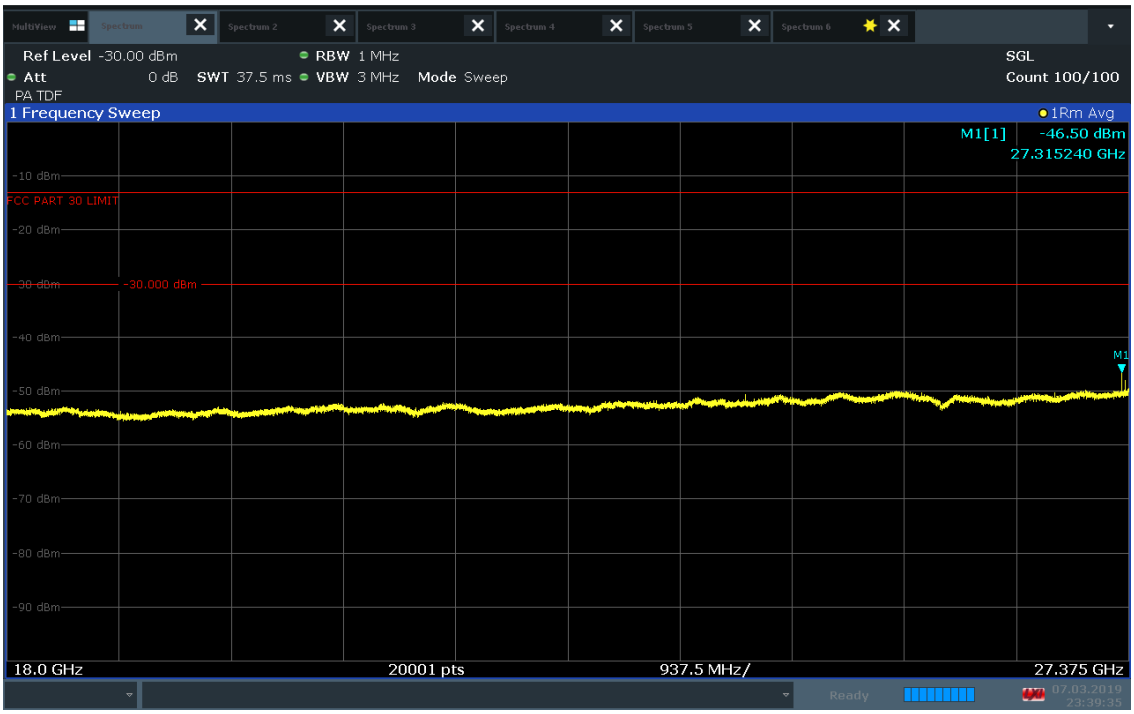
18 – 27.375GHz

ACLRResults



Plot 7-121. K Patch Radiated Spurious Plot 18-27.375 GHz (1CC QPSK Low Channel H Beam)

ACLRResults



Plot 7-122. K Patch Radiated Spurious Plot 18-27.375 GHz (1CC QPSK Mid Channel H Beam)

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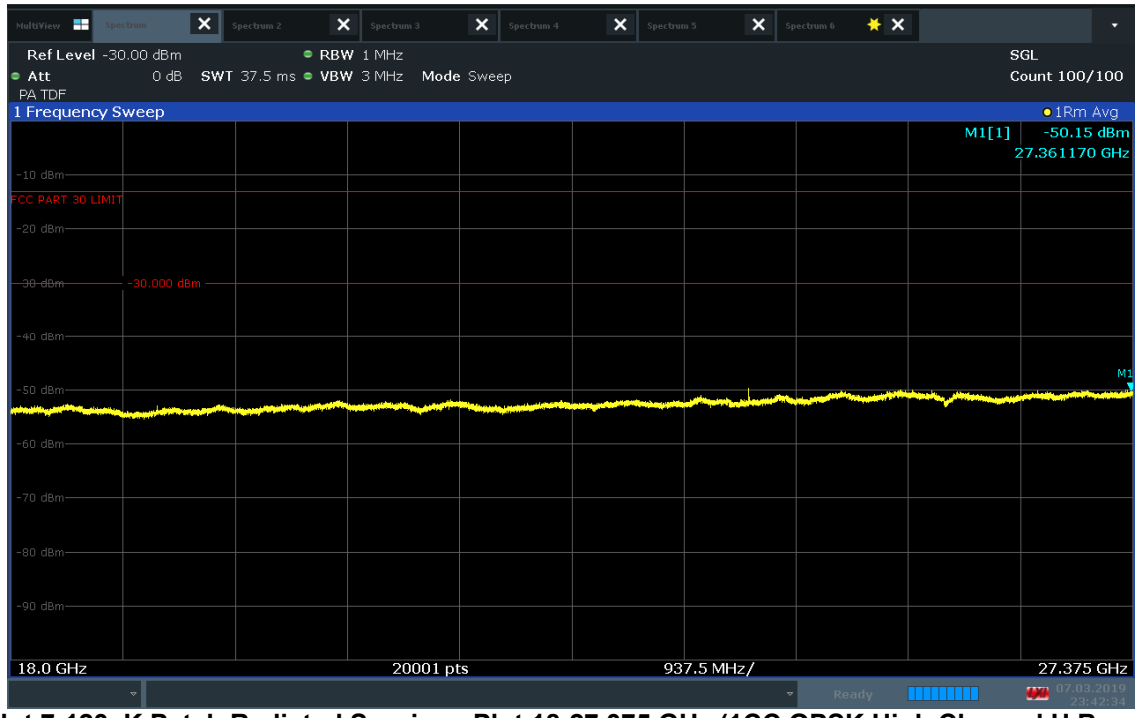
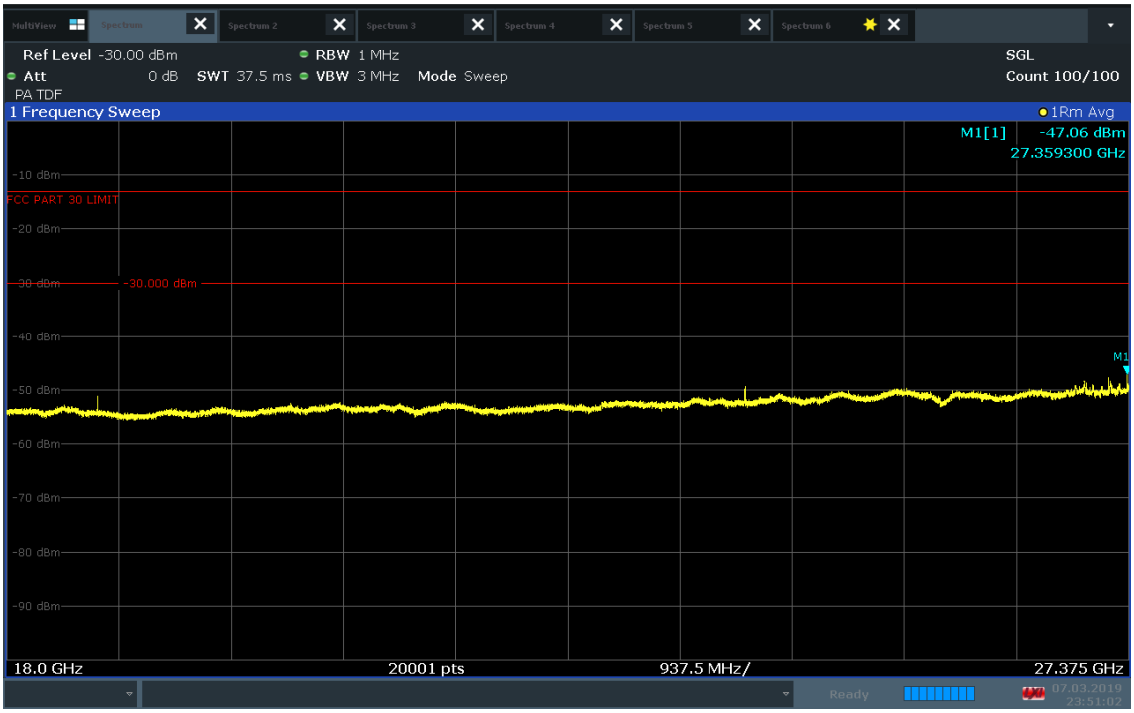
ACLRResults



Plot 7-123. K Patch Radiated Spurious Plot 18-27.375 GHz (1CC QPSK High Channel H Beam)

ACLRResults



Plot 7-124. K Patch Radiated Spurious Plot 18-27.375 GHz (1CC QPSK Low Channel V Beam)

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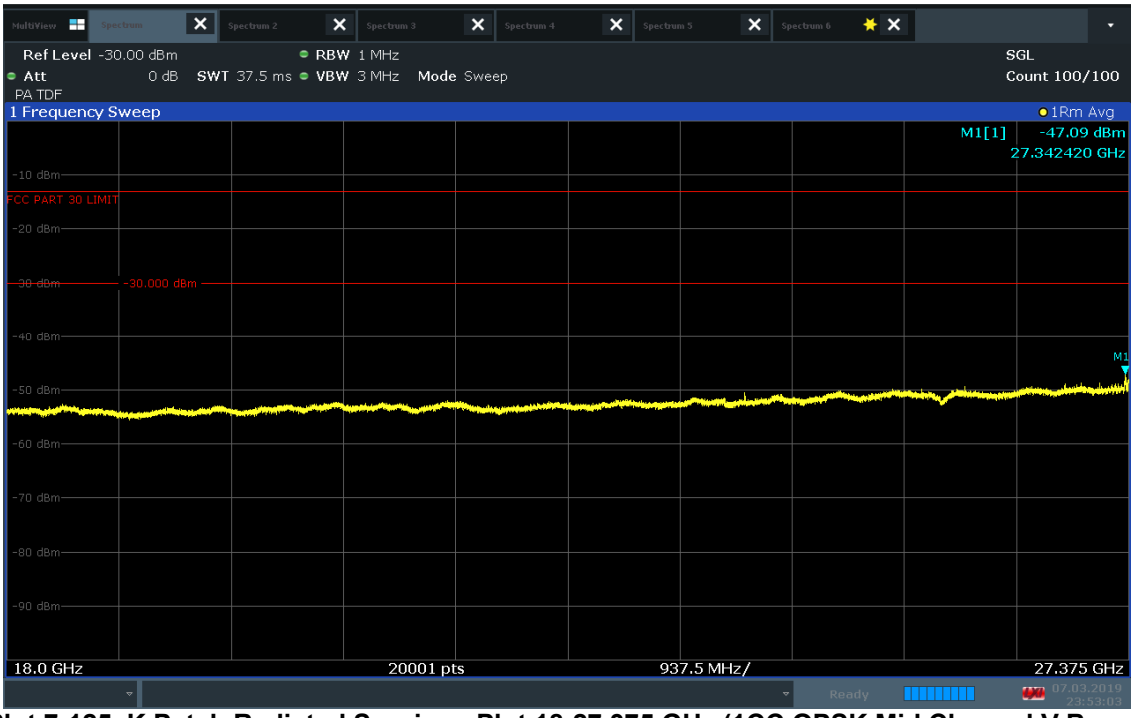
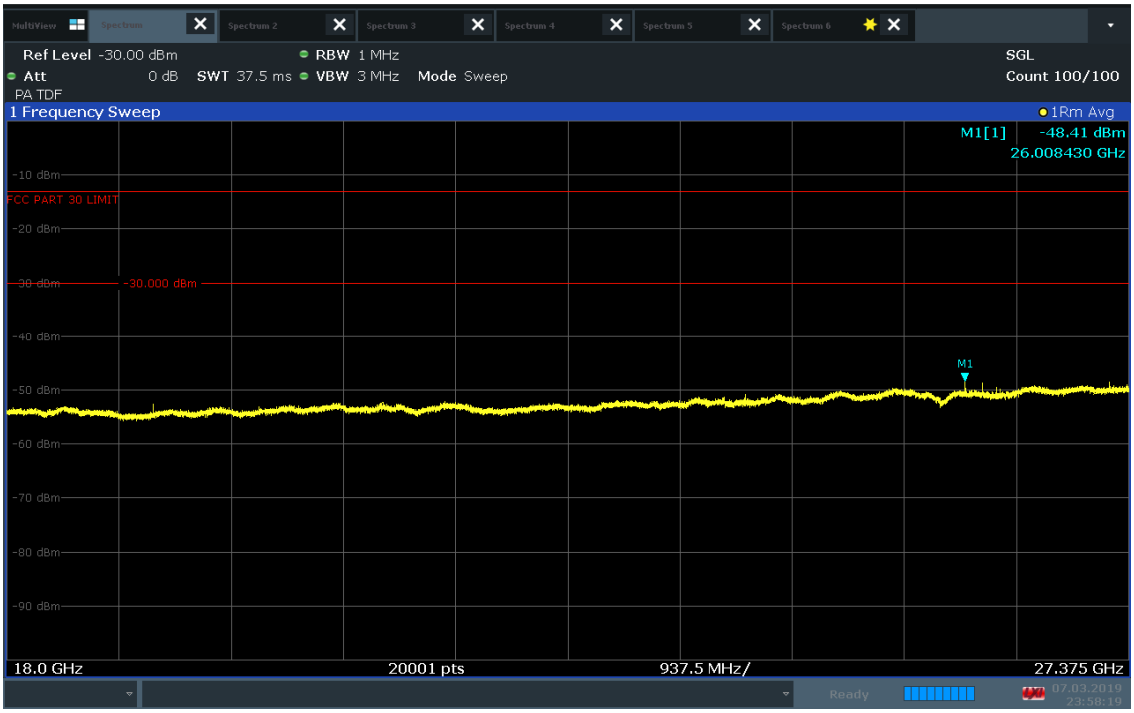
ACLRResults



Plot 7-125. K Patch Radiated Spurious Plot 18-27.375 GHz (1CC QPSK Mid Channel V Beam)

ACLRResults



Plot 7-126. K Patch Radiated Spurious Plot 18-27.375 GHz (1CC QPSK High Channel V Beam)

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Spurious Emissions EIRP Sample Calculation

The raw radiated spurious level is converted to field strength in dBµV/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]	Detector/ Trace	Chan.	Bandwidth (MHz)	Mod.	EUT Beam Polarization	Ant. Pos [H/V]	Ant. Height [cm]	Turn Table Azimuth [degree]	RSE EIRP [dBm]	Limit [dBm]	Margin [dB]
27033.53	RMS/Avg	Low	50	QPSK	H	V	150	312	-47.81	-13.00	-34.81
27315.24	RMS/Avg	Mid	50	QPSK	H	V	150	7	-46.50	-13.00	-33.50
27361.17	RMS/Avg	High	50	QPSK	H	V	150	302	-50.15	-13.00	-37.15
27359.30	RMS/Avg	Low	50	QPSK	V	H	150	344	-47.06	-13.00	-34.06
27342.42	RMS/Avg	Mid	50	QPSK	V	H	150	326	-47.09	-13.00	-34.09
26008.43	RMS/Avg	High	50	QPSK	V	H	150	342	-48.41	-13.00	-35.41

Table 7-25. K Patch Spurious Emissions Table (18-27.375GHz)

Notes

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

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

EIRP(H Beam) + EIRP(V Beam) = EIRP(MIMO)

(-46.50 dBm + -47.09 dBm) = (22.39 nW + 19.54 nW) = (41.93 nW) = -43.77 dBm

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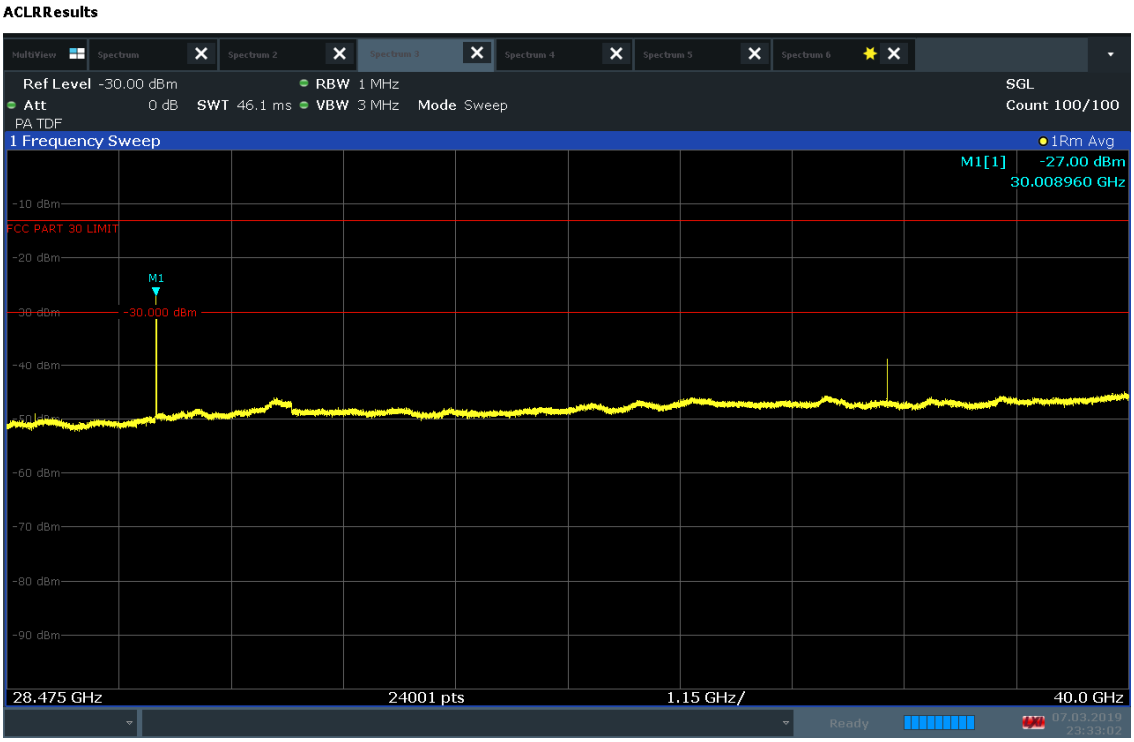
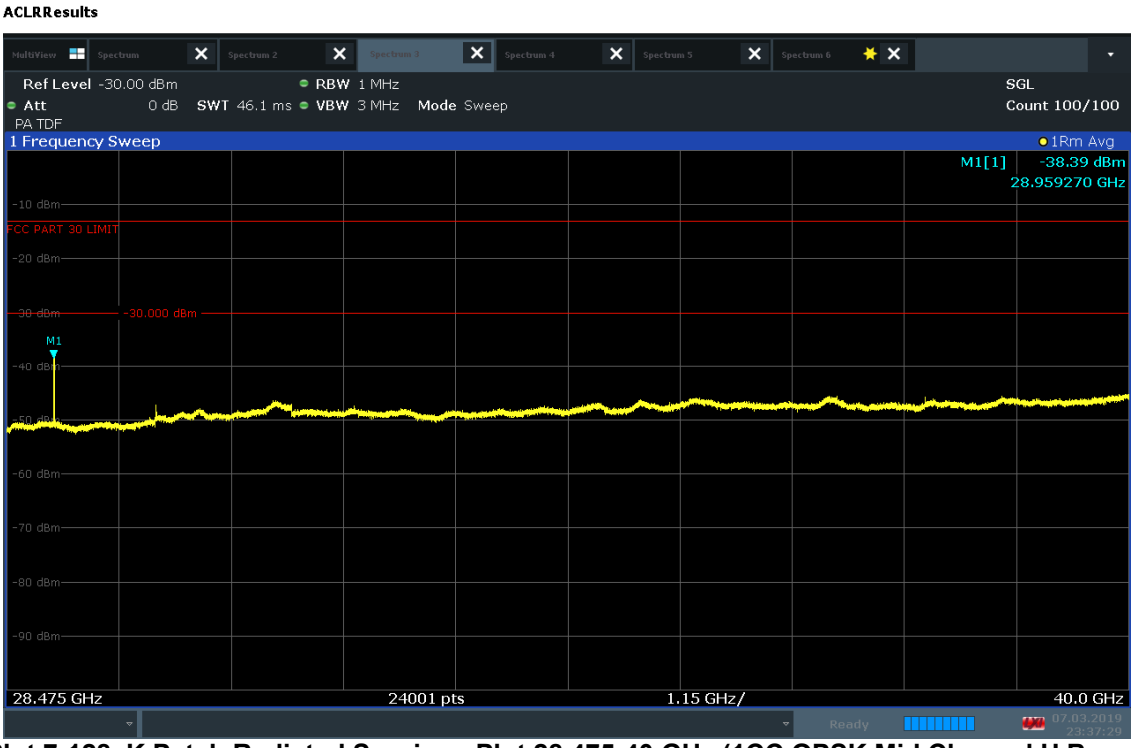
28.475 – 40GHz



Plot 7-127. K Patch Radiated Spurious Plot 28.475-40 GHz (1CC QPSK Low Channel H Beam)



Plot 7-128. K Patch Radiated Spurious Plot 28.475-40 GHz (1CC QPSK Mid Channel H Beam)

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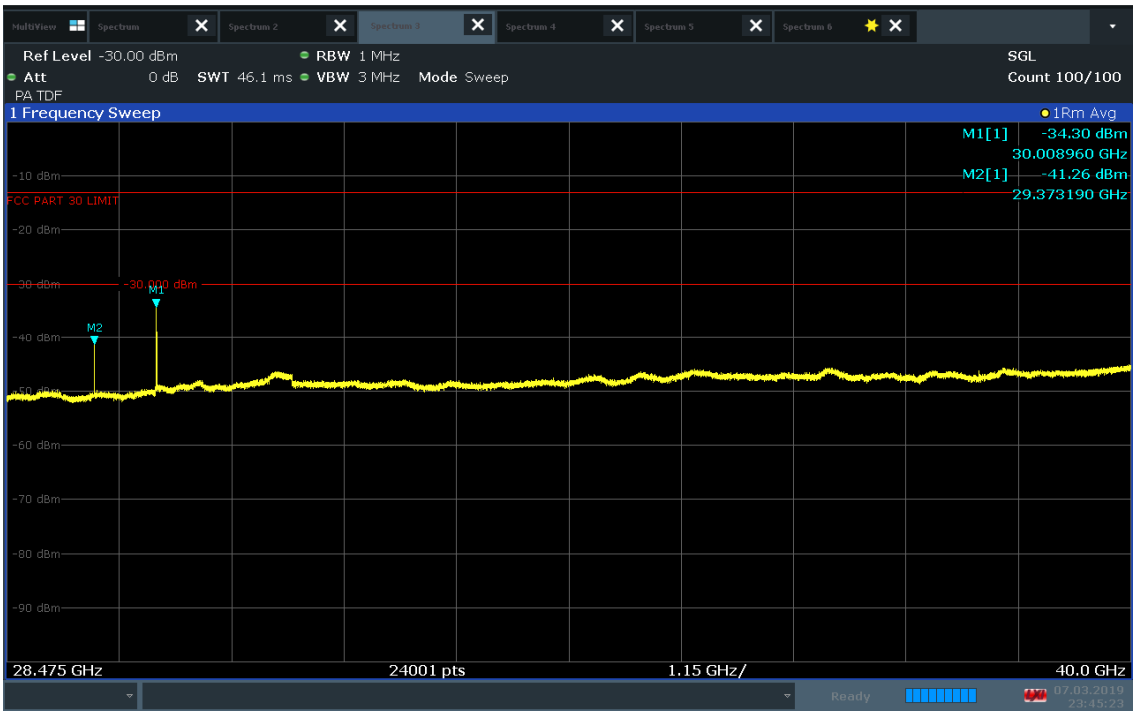
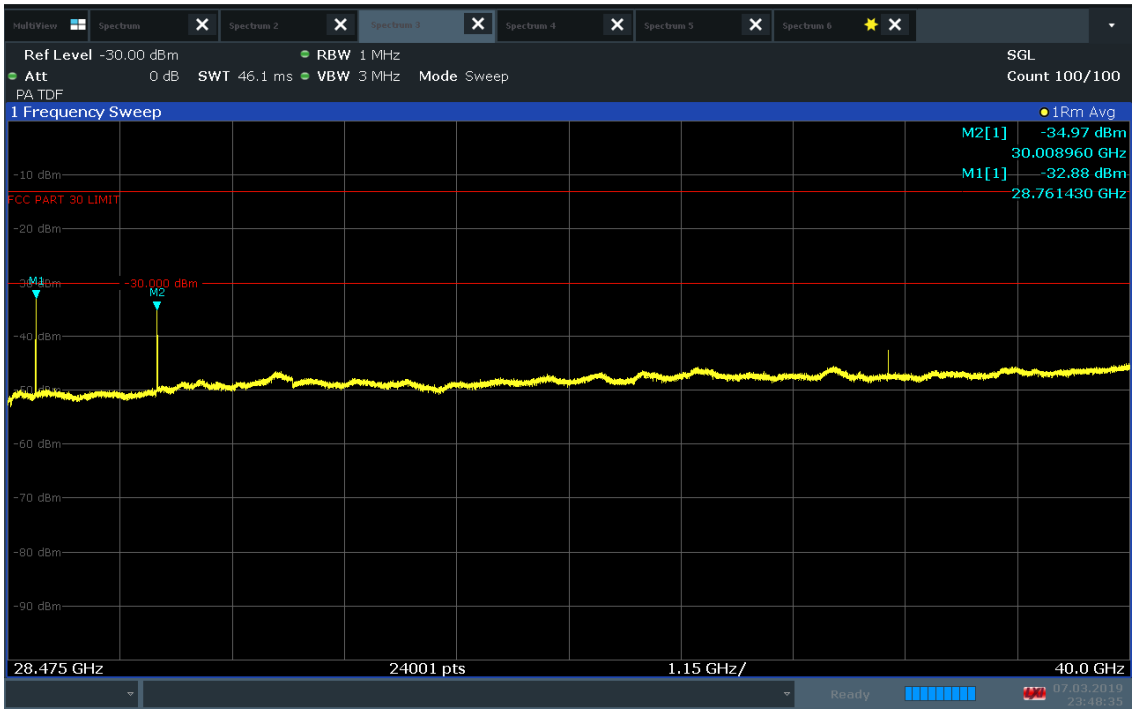
ACLRResults



Plot 7-129. K Patch Radiated Spurious Plot 28.475-40 GHz (1CC QPSK High Channel H Beam)

ACLRResults



Plot 7-130. K Patch Radiated Spurious Plot 28.475-40 GHz (1CC QPSK Low Channel V Beam)

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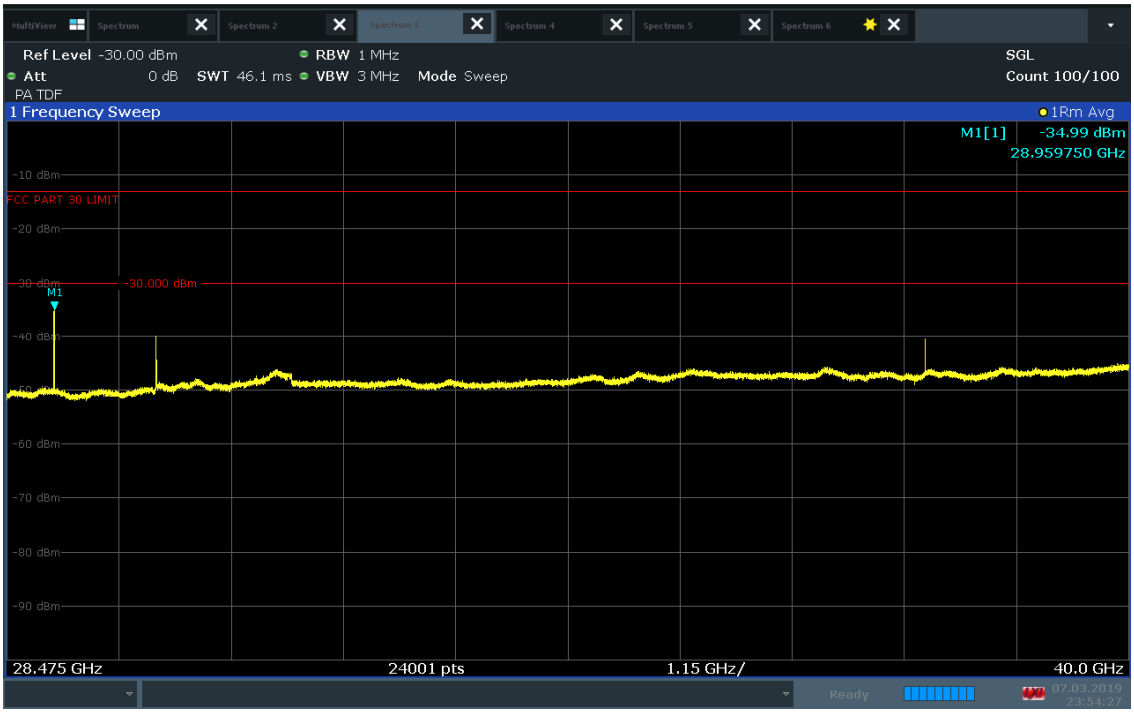
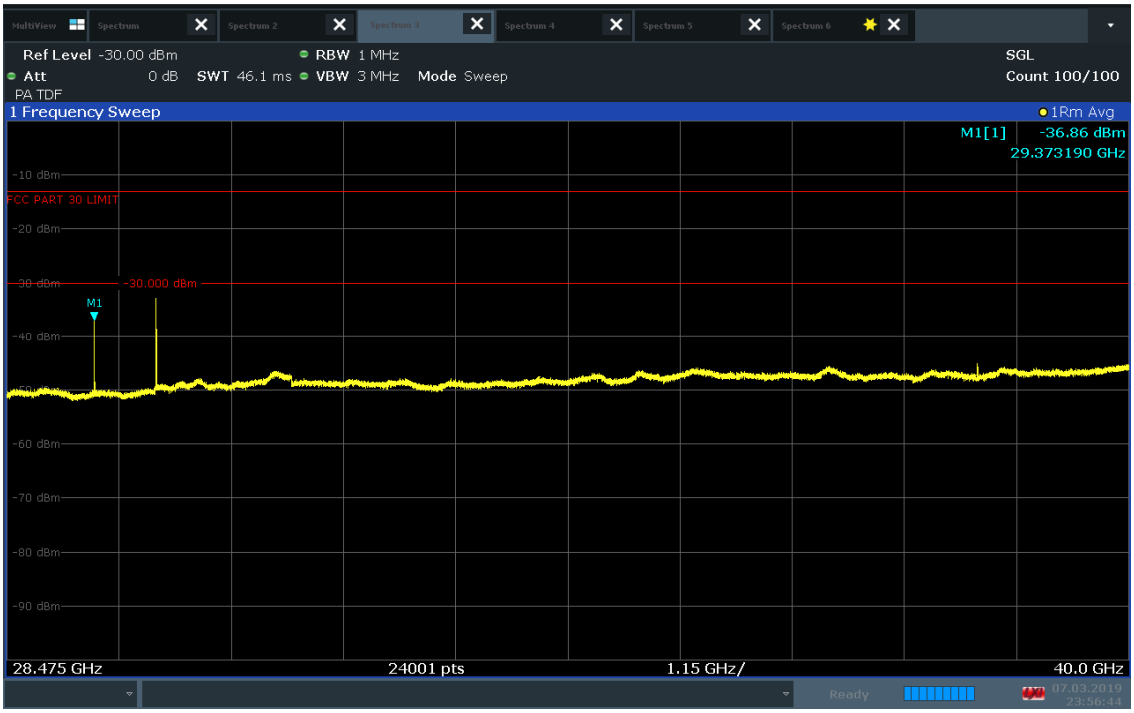
ACLRResults



Plot 7-131. K Patch Radiated Spurious Plot 28.475-40 GHz (1CC QPSK Mid Channel V Beam)

ACLRResults



Plot 7-132. K Patch Radiated Spurious Plot 28.475-40 GHz (1CC QPSK High Channel V Beam)

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Spurious Emissions EIRP Sample Calculation

The raw radiated spurious level is converted to field strength in dBµV/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] + AFCL [dB/m] + 20Log(Dm) – 104.8

Frequency [MHz]	Detector/ Trace	Chan.	Bandwidth (MHz)	Mod.	EUT Beam Polarization	Ant. Pos [H/V]	Ant. Height [cm]	Turntable Azimuth [degree]	RSE EIRP [dBm]	Limit [dBm]	Margin [dB]
30008.96	RMS/Avg	Low	50	QPSK	H	V	150	317	-27.00	-13.00	-14.00
28959.27	RMS/Avg	Mid	50	QPSK	H	V	150	5	-38.39	-13.00	-25.39
30008.96	RMS/Avg	High	50	QPSK	H	V	150	322	-34.30	-13.00	-21.30
28761.43	RMS/Avg	Low	50	QPSK	V	H	150	343	-32.88	-13.00	-19.88
28959.75	RMS/Avg	Mid	50	QPSK	V	H	150	332	-34.99	-13.00	-21.99
29373.19	RMS/Avg	High	50	QPSK	V	H	150	11	-36.86	-13.00	-23.86

Table 7-26. K Patch Spurious Emissions Table (28.475-40 GHz)

Notes

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

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

EIRP(H Beam) + EIRP(V Beam) = EIRP(MIMO)

(-27.00 dBm + -32.88 dBm) = (1995.26 nW + 515.23 nW) = (2510.49 nW) = -26.00 dBm

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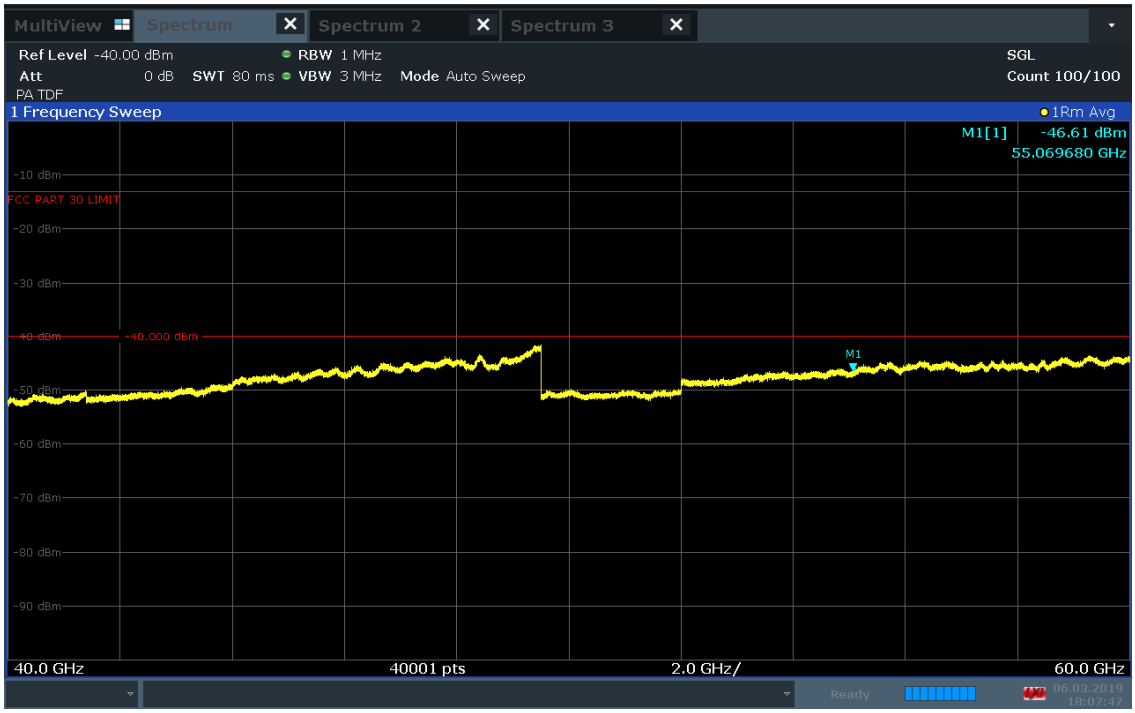
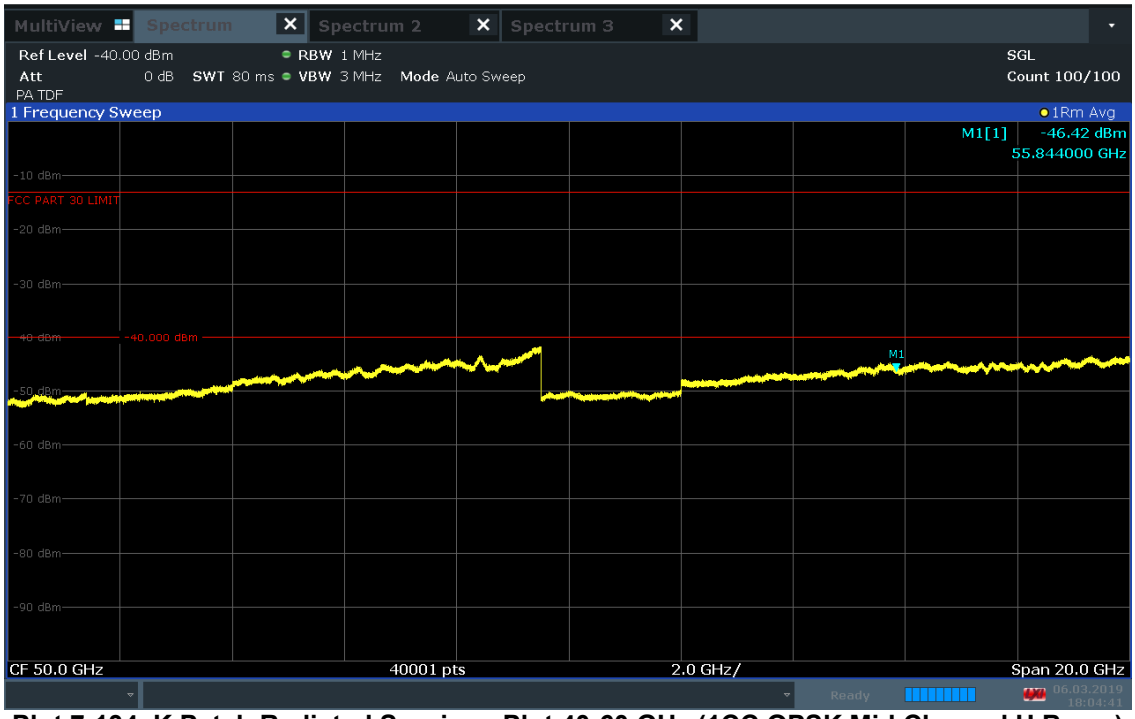
40 – 60GHz

ACLRResults



Plot 7-133. K Patch Radiated Spurious Plot 40-60 GHz (1CC QPSK Low Channel H Beam)

ACLRResults



Plot 7-134. K Patch Radiated Spurious Plot 40-60 GHz (1CC QPSK Mid Channel H Beam)

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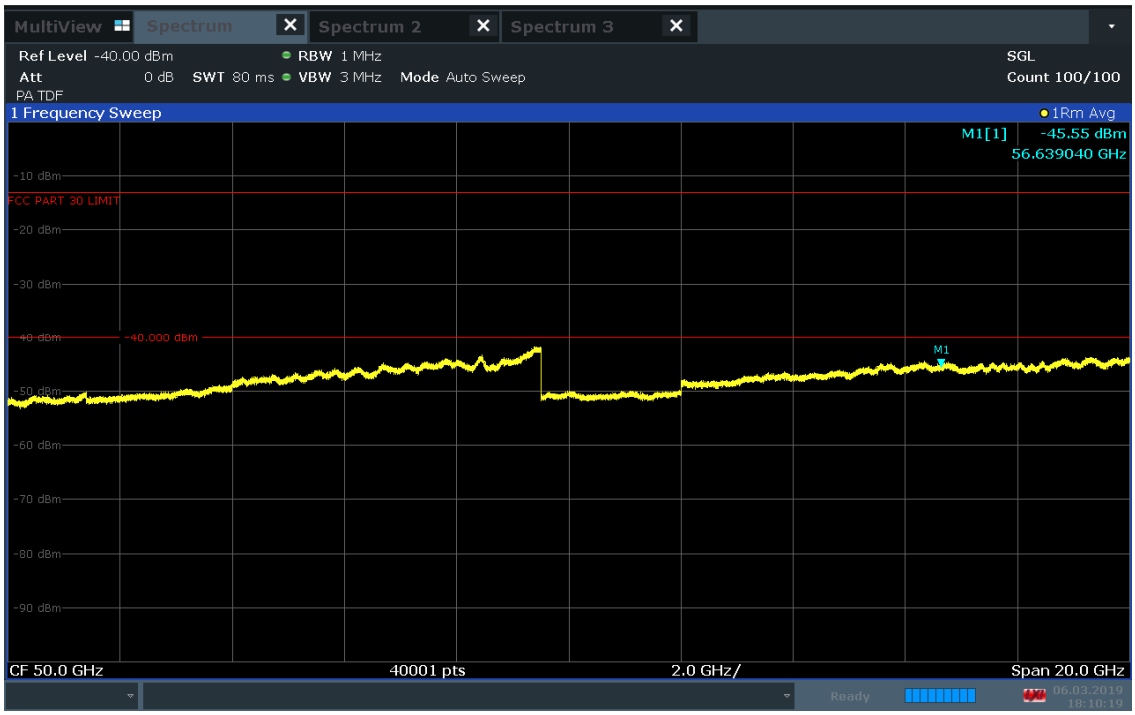
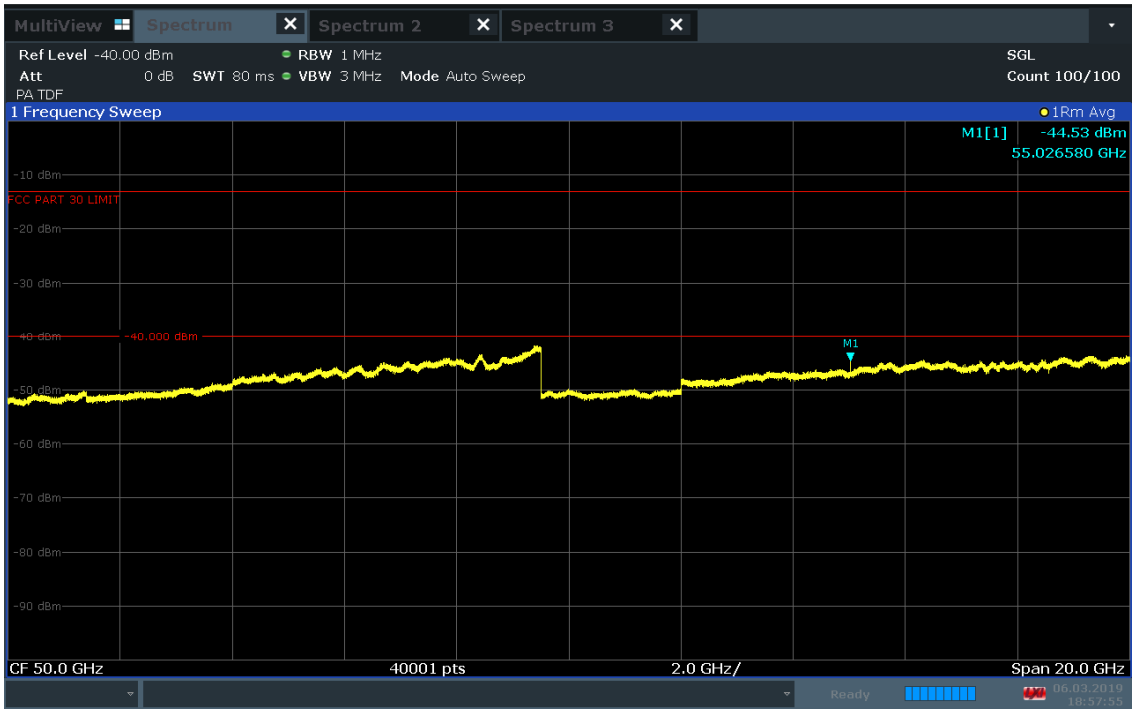
ACLRResults



Plot 7-135. K Patch Radiated Spurious Plot 40-60 GHz (1CC QPSK High Channel H Beam)

ACLRResults



Plot 7-136. K Patch Radiated Spurious Plot 40-60 GHz (1CC QPSK Low Channel V Beam)

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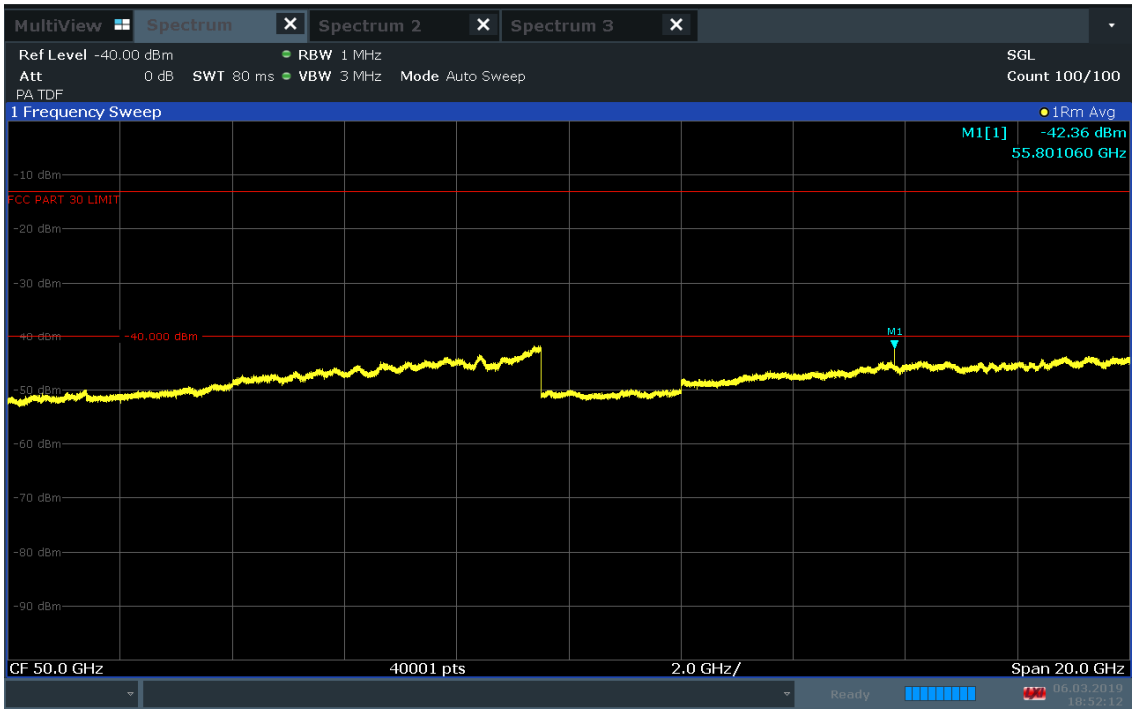
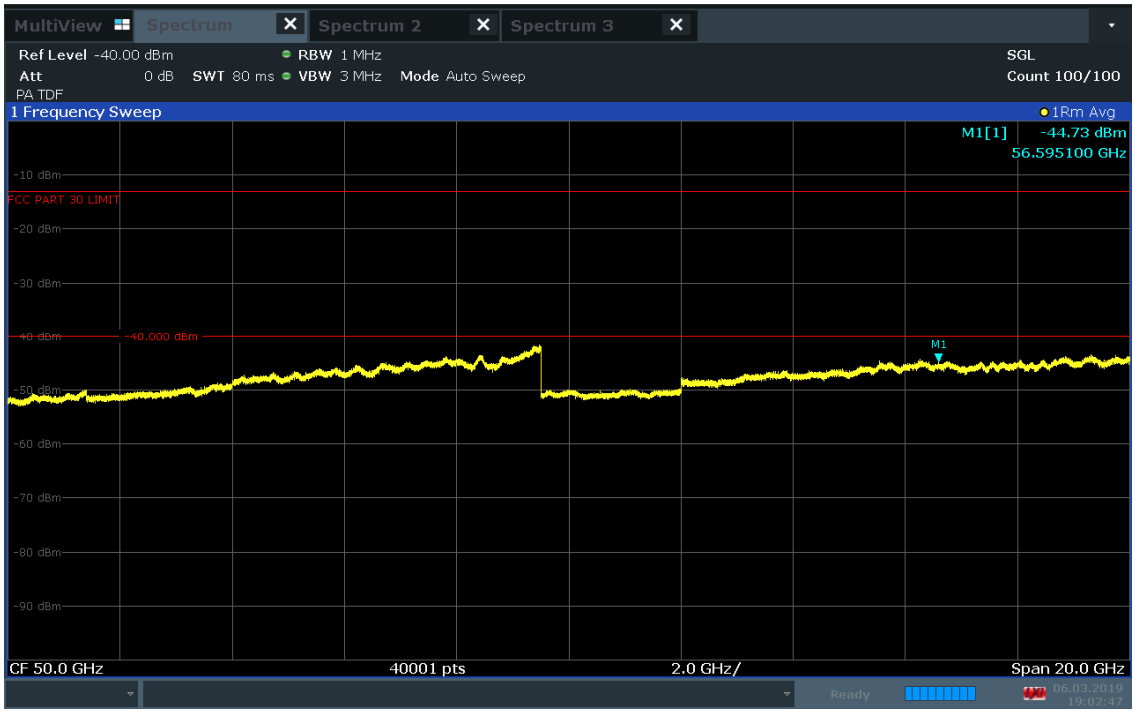
ACLRResults



Plot 7-137. K Patch Radiated Spurious Plot 40-60 GHz (1CC QPSK Mid Channel V Beam)

ACLRResults



Plot 7-138. K Patch Radiated Spurious Plot 40-60 GHz (1CC QPSK High Channel V Beam)

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Spurious Emissions EIRP Sample Calculation

The raw radiated spurious level is converted to field strength in dBµV/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]	Detector/ Trace	Chan.	Bandwidth (MHz)	Mod.	EUT Beam Polarization	Ant. Pos [H/V]	Ant. Height [cm]	Turn Table Azimuth [degree]	RSE EIRP [dBm]	Limit [dBm]	Margin [dB]
55069.08	RMS/Avg	Low	50	QPSK	H	V	150	310	-46.61	-13.00	-33.61
55844.00	RMS/Avg	Mid	50	QPSK	H	V	150	352	-46.42	-13.00	-33.42
56639.04	RMS/Avg	High	50	QPSK	H	V	150	354	-45.55	-13.00	-32.55
55026.50	RMS/Avg	Low	50	QPSK	V	H	150	322	-44.53	-13.00	-31.53
55801.06	RMS/Avg	Mid	50	QPSK	V	H	150	360	-42.36	-13.00	-29.36
56595.10	RMS/Avg	High	50	QPSK	V	H	150	2	-44.73	-13.00	-31.73

Table 7-27. K Patch Spurious Emissions Table (40 - 60GHz)

Notes

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

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

EIRP(H Beam) + EIRP(V Beam) = EIRP(MIMO)

(-46.42 dBm + -42.36 dBm) = (22.80 nW + 58.08 nW) = (80.88 nW) = -40.92 dBm

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60 – 90GHz

Plot 7-139. K Patch Radiated Spurious Plot 60-90 GHz (1CC QPSK Low Channel H Beam)

Plot 7-140. K Patch Radiated Spurious Plot 60-90 GHz (1CC QPSK Mid Channel H Beam)

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