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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:
03/19/2018 - 04/09/2019
Test Site/Location:
PCTEST Lab. Columbia, MD, USA
Test Report Serial No.:
1M1904050053-02.A3L

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

Application Type:	Class III Permissive Change
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.

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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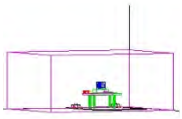
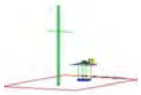


MEASUREMENT REPORT
FCC Part 30



Band	FCC Rule Part	Mode	Antenna	Bandwidth (MHz)	CCs Active	Tx Frequency (MHz)	EIRP		Emission Designator	Modulation
							Max. Power (W)	Max. Power (dBm)		
n260	30	SISO	J Dipole	50	1	37000 - 40000	0.105	20.21	46M9G7D	QPSK
n260	30	SISO	J Dipole	50	1	37000 - 40000	0.092	19.65	46M5W7D	16QAM
n260	30	SISO	J Dipole	50	1	37000 - 40000	0.053	17.23	47M9W7D	64QAM
n260	30	SISO	J Dipole	100	1	37000 - 40000	0.103	20.14	94M8G7D	QPSK
n260	30	SISO	J Dipole	100	1	37000 - 40000	0.091	19.60	94M7W7D	16QAM
n260	30	SISO	J Dipole	100	1	37000 - 40000	0.055	17.37	94M7W7D	64QAM
n260	30	SISO	J Dipole	200	4	37000 - 40000	0.096	19.80	219MG7D	QPSK
n260	30	SISO	J Dipole	200	4	37000 - 40000	0.079	18.99	200MW7D	16QAM
n260	30	SISO	J Dipole	200	4	37000 - 40000	0.044	16.45	205MW7D	64QAM
n260	30	SISO	J Dipole	400	4	37000 - 40000	0.074	18.67	399MG7D	QPSK
n260	30	SISO	J Dipole	400	4	37000 - 40000	0.064	18.06	394MW7D	16QAM
n260	30	SISO	J Dipole	400	4	37000 - 40000	0.034	15.37	394MW7D	64QAM
n260	30	SISO	J Patch	50	1	37000 - 40000	0.121	20.83	47M6G7D	QPSK
n260	30	SISO	J Patch	50	1	37000 - 40000	0.098	19.93	46M6W7D	16QAM
n260	30	SISO	J Patch	50	1	37000 - 40000	0.059	17.69	46M6W7D	64QAM
n260	30	SISO	J Patch	100	1	37000 - 40000	0.121	20.81	94M9G7D	QPSK
n260	30	SISO	J Patch	100	1	37000 - 40000	0.101	20.05	94M6W7D	16QAM
n260	30	SISO	J Patch	100	1	37000 - 40000	0.060	17.77	94M4W7D	64QAM
n260	30	SISO	J Patch	200	4	37000 - 40000	0.030	14.70	229MG7D	QPSK
n260	30	SISO	J Patch	200	4	37000 - 40000	0.026	14.14	216MW7D	16QAM
n260	30	SISO	J Patch	200	4	37000 - 40000	0.018	12.56	197MW7D	64QAM
n260	30	SISO	J Patch	400	4	37000 - 40000	0.031	14.87	396MG7D	QPSK
n260	30	SISO	J Patch	400	4	37000 - 40000	0.028	14.52	395MW7D	16QAM
n260	30	SISO	J Patch	400	4	37000 - 40000	0.019	12.90	392MW7D	64QAM
n260	30	SISO	K Patch	50	1	37000 - 40000	0.120	20.78	48M3G7D	QPSK
n260	30	SISO	K Patch	50	1	37000 - 40000	0.098	19.89	46M8W7D	16QAM
n260	30	SISO	K Patch	50	1	37000 - 40000	0.061	17.85	46M9W7D	64QAM
n260	30	SISO	K Patch	100	1	37000 - 40000	0.125	20.95	95M1G7D	QPSK
n260	30	SISO	K Patch	100	1	37000 - 40000	0.096	19.83	94M8W7D	16QAM
n260	30	SISO	K Patch	100	1	37000 - 40000	0.061	17.83	94M9W7D	64QAM
n260	30	SISO	K Patch	200	4	37000 - 40000	0.091	19.57	253MG7D	QPSK
n260	30	SISO	K Patch	200	4	37000 - 40000	0.075	18.73	232MW7D	16QAM
n260	30	SISO	K Patch	200	4	37000 - 40000	0.046	16.66	201MW7D	64QAM
n260	30	SISO	K Patch	400	4	37000 - 40000	0.070	18.46	397MG7D	QPSK
n260	30	SISO	K Patch	400	4	37000 - 40000	0.063	17.97	396MW7D	16QAM
n260	30	SISO	K Patch	400	4	37000 - 40000	0.038	15.79	393MW7D	64QAM
n260	30	SISO	L Patch	50	1	37000 - 40000	0.071	18.48	47M8G7D	QPSK
n260	30	SISO	L Patch	50	1	37000 - 40000	0.051	17.06	46M6W7D	16QAM
n260	30	SISO	L Patch	50	1	37000 - 40000	0.034	15.36	46M9W7D	64QAM
n260	30	SISO	L Patch	100	1	37000 - 40000	0.071	18.52	94M8G7D	QPSK
n260	30	SISO	L Patch	100	1	37000 - 40000	0.060	17.79	94M6W7D	16QAM
n260	30	SISO	L Patch	100	1	37000 - 40000	0.039	15.87	94M6W7D	64QAM
n260	30	SISO	L Patch	200	4	37000 - 40000	0.045	16.54	206MG7D	QPSK
n260	30	SISO	L Patch	200	4	37000 - 40000	0.040	16.06	215MW7D	16QAM
n260	30	SISO	L Patch	200	4	37000 - 40000	0.025	13.95	201MW7D	64QAM
n260	30	SISO	L Patch	400	4	37000 - 40000	0.045	16.57	397MG7D	QPSK
n260	30	SISO	L Patch	400	4	37000 - 40000	0.041	16.08	396MW7D	16QAM
n260	30	SISO	L Patch	400	4	37000 - 40000	0.025	13.91	393MW7D	64QAM

EUT Overview (SISO)

Band	FCC Rule Part	Mode	Antenna	Bandwidth (MHz)	CCs Active	Tx Frequency (MHz)	EIRP		Emission Designator	Modulation
							Max. Power (W)	Max. Power (dBm)		
n260	30	MIMO	J Dipole	50	1	37000 - 40000	0.148	21.71	46M9G7D	QPSK
n260	30	MIMO	J Dipole	50	1	37000 - 40000	0.132	21.22	46M5W7D	16QAM
n260	30	MIMO	J Dipole	50	1	37000 - 40000	0.078	18.89	47M9W7D	64QAM
n260	30	MIMO	J Dipole	100	1	37000 - 40000	0.150	21.77	94M8G7D	QPSK
n260	30	MIMO	J Dipole	100	1	37000 - 40000	0.116	20.65	94M7W7D	16QAM
n260	30	MIMO	J Dipole	100	1	37000 - 40000	0.073	18.66	94M7W7D	64QAM
n260	30	MIMO	J Patch	50	1	37000 - 40000	0.131	21.16	47M6G7D	QPSK
n260	30	MIMO	J Patch	50	1	37000 - 40000	0.105	20.23	46M6W7D	16QAM
n260	30	MIMO	J Patch	50	1	37000 - 40000	0.066	18.21	46M6W7D	64QAM
n260	30	MIMO	J Patch	100	1	37000 - 40000	0.148	21.71	94M9G7D	QPSK
n260	30	MIMO	J Patch	100	1	37000 - 40000	0.127	21.05	94M6W7D	16QAM
n260	30	MIMO	J Patch	100	1	37000 - 40000	0.101	20.06	94M4W7D	64QAM
n260	30	MIMO	K Patch	50	1	37000 - 40000	0.172	22.35	48M3G7D	QPSK
n260	30	MIMO	K Patch	50	1	37000 - 40000	0.137	21.36	46M8W7D	16QAM
n260	30	MIMO	K Patch	50	1	37000 - 40000	0.085	19.28	46M9W7D	64QAM
n260	30	MIMO	K Patch	100	1	37000 - 40000	0.176	22.46	95M1G7D	QPSK
n260	30	MIMO	K Patch	100	1	37000 - 40000	0.137	21.38	94M8W7D	16QAM
n260	30	MIMO	K Patch	100	1	37000 - 40000	0.083	19.22	94M9W7D	64QAM
n260	30	MIMO	L Patch	50	1	37000 - 40000	0.105	20.21	47M8G7D	QPSK
n260	30	MIMO	L Patch	50	1	37000 - 40000	0.098	19.90	46M6W7D	16QAM
n260	30	MIMO	L Patch	50	1	37000 - 40000	0.060	17.75	46M9W7D	64QAM
n260	30	MIMO	L Patch	100	1	37000 - 40000	0.126	21.00	94M8G7D	QPSK
n260	30	MIMO	L Patch	100	1	37000 - 40000	0.114	20.56	94M6W7D	16QAM
n260	30	MIMO	L Patch	100	1	37000 - 40000	0.075	18.78	94M6W7D	64QAM

EUT Overview (MIMO)

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.

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/n260 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.

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.

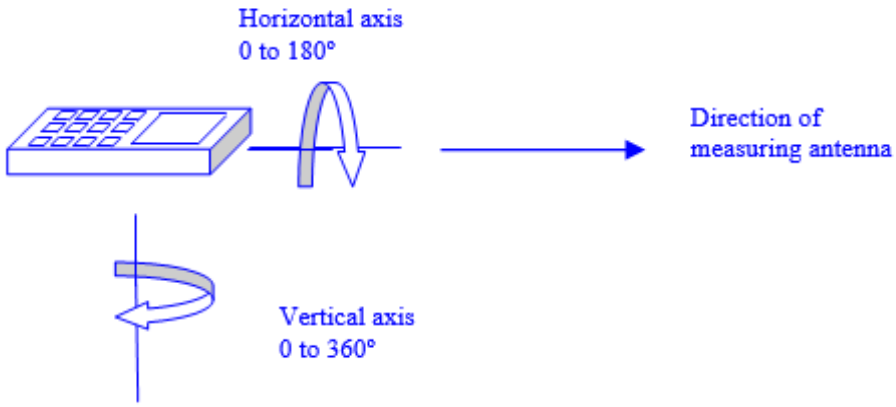


Figure 3-1. Rotation of the EUT through horizontal and vertical axis

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

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

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

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

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

Effective Isotropic Radiated Power Sample Calculation

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

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

= - 35.23 dBm + (41.30dB/m + 10.00dB) + 107 = 123.07dBuV/m

= 10^(123.07/20)/1000000 = 1.42 V/m

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

= 10*log((1.42V/m * 1.00m)^2/30) + 30dB

= **18.27 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^(18.27/10) = 67.14mW

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

= 67.14mW + 37.93mW

=10*log(105.07mW)

= 20.21dBm

4.0 MEASUREMENT UNCERTAINTY

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

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

5.0 TEST EQUIPMENT CALIBRATION DATA

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

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	N9030A	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	4/20/2019	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
OML, Inc.	M05RH	Horn Antenna (140 - 220GHz)	7/30/2018	Annual	7/30/2019	18073001
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
Virginia Diodes Inc	SAX254	SAX Module (140 - 220GHz)	5/22/2018	Annual	5/22/2019	SAX254

Table 5-1. Test Equipment

Notes:

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

6.0 SAMPLE CALCULATIONS

Emission Designator

QPSK Modulation

Emission Designator = 800MG7D

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

QAM Modulation

Emission Designator = 802MW7D

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

7.0 TEST RESULTS

7.1 Summary

Company Name: Samsung Electronics Co., Ltd.

FCC ID: 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 200GHz.
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).

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

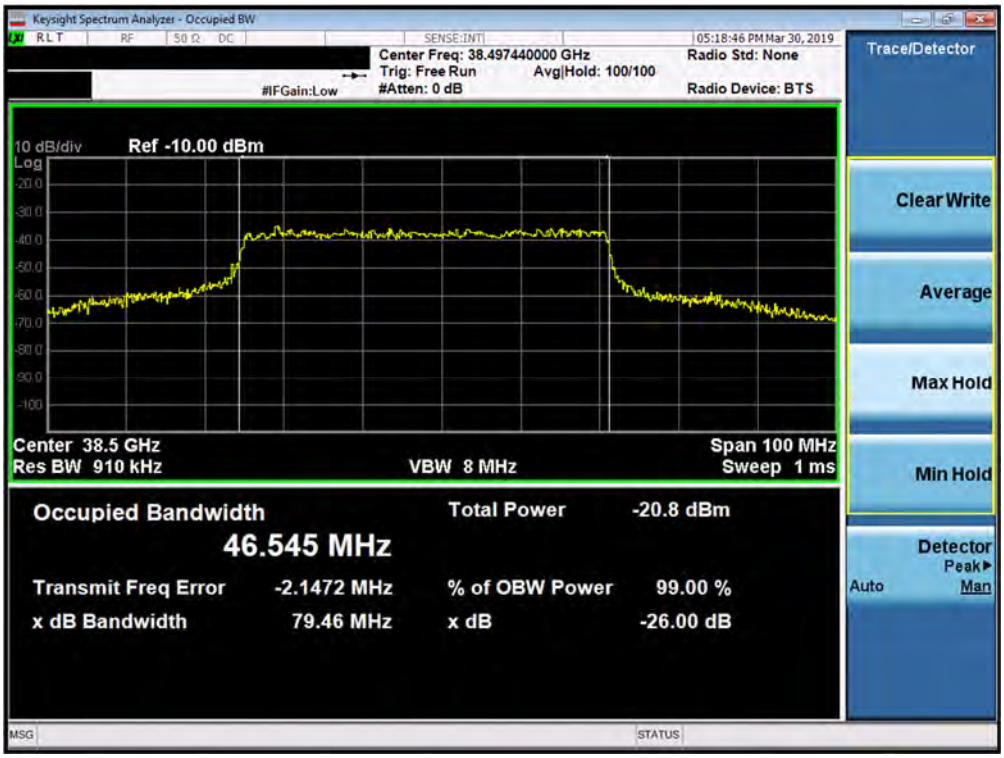
None.

7.2.1 J Dipole Occupied Bandwidth

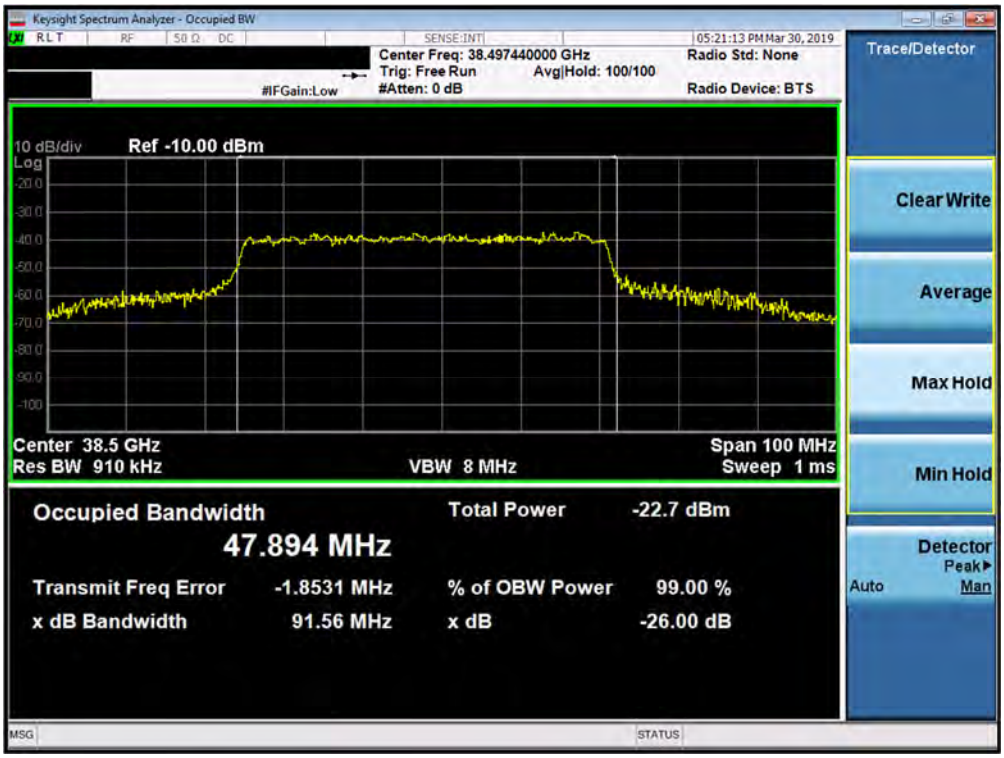
Channel	Bandwidth	CCs Active	Modulation	OBW [MHz]
Mid	50	1	QPSK	46.94
Mid	50	1	16QAM	46.55
Mid	50	1	64QAM	47.89
Mid	100	1	QPSK	94.80
Mid	100	1	16QAM	94.74
Mid	100	1	64QAM	94.74
Mid	200	4	QPSK	219.02
Mid	200	4	16QAM	199.81
Mid	200	4	64QAM	205.09
Mid	400	4	QPSK	399.22
Mid	400	4	16QAM	393.59
Mid	400	4	64QAM	394.39

Table 7-2. Summary of J Dipole Occupied Bandwidths

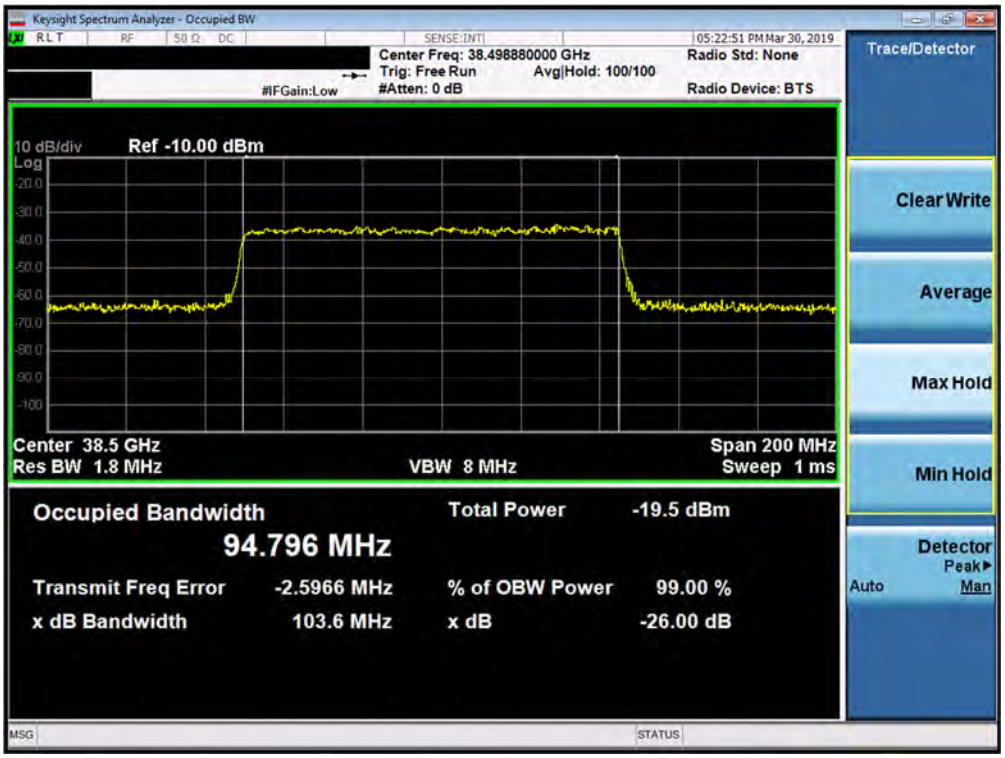
Plot 7-1. Occupied Bandwidth Plot (1CC – 50MHz - QPSK - Mid Channel)



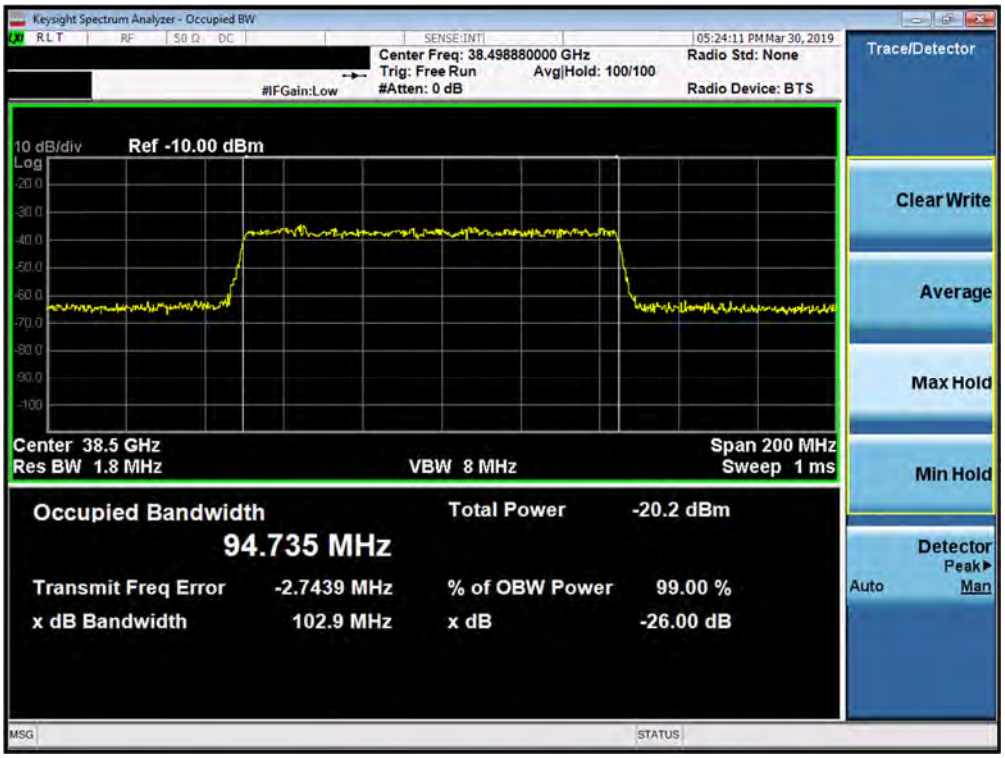
Plot 7-2. Occupied Bandwidth Plot (1CC – 50MHz - 16QAM - Mid Channel)



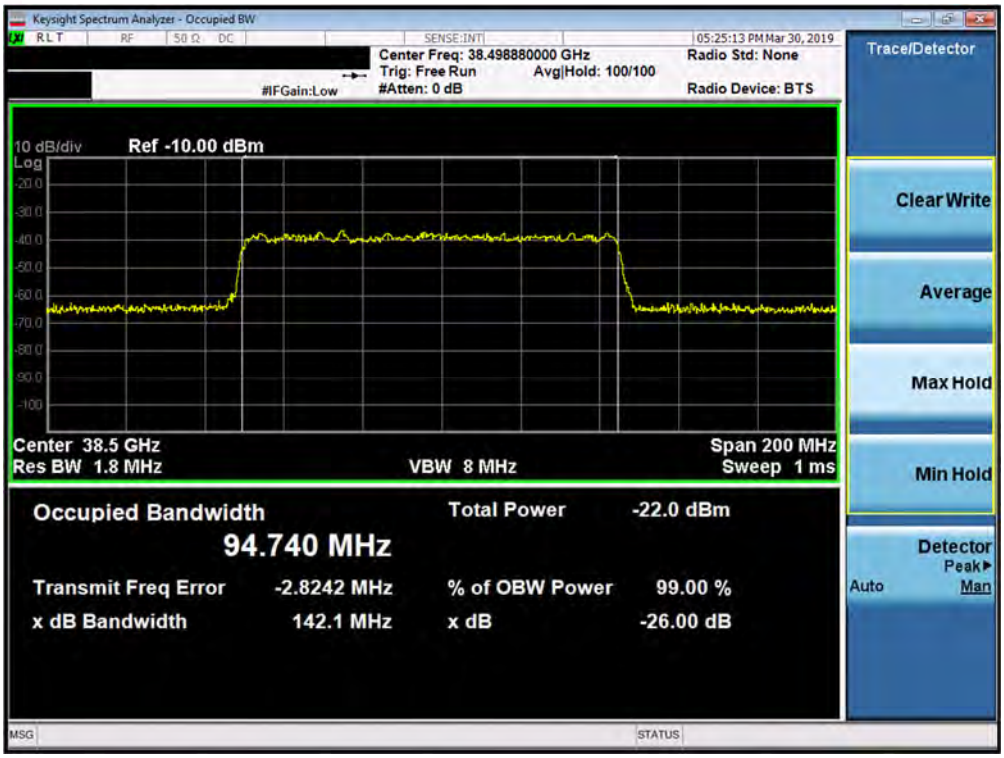
Plot 7-3. Occupied Bandwidth Plot (1CC – 50MHz - 64QAM Mid Channel)



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



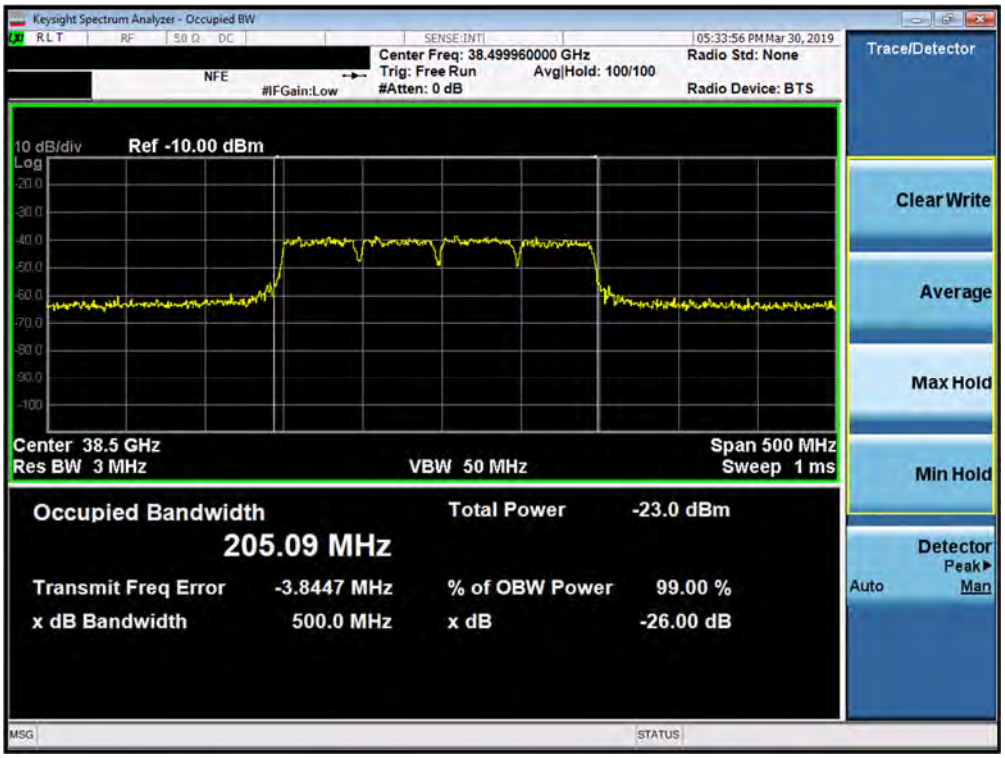
Plot 7-5. Occupied Bandwidth Plot (1CC – 100MHz - 16QAM - Mid Channel)



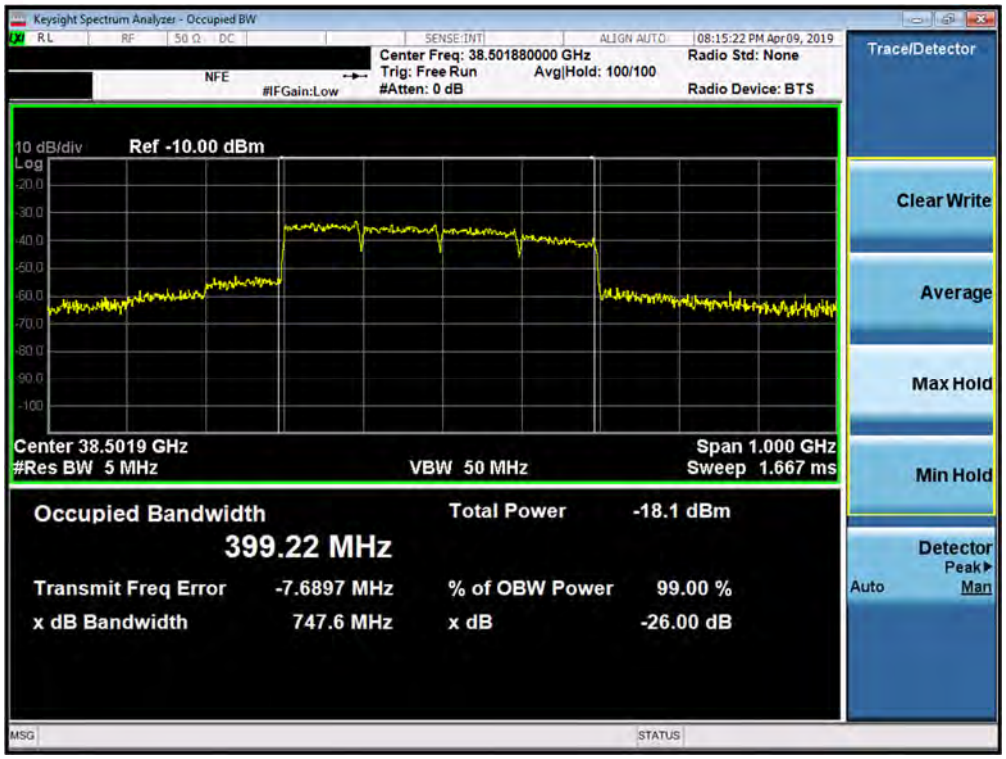
Plot 7-6. Occupied Bandwidth Plot (1CC – 100MHz - 64QAM Mid Channel)

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

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

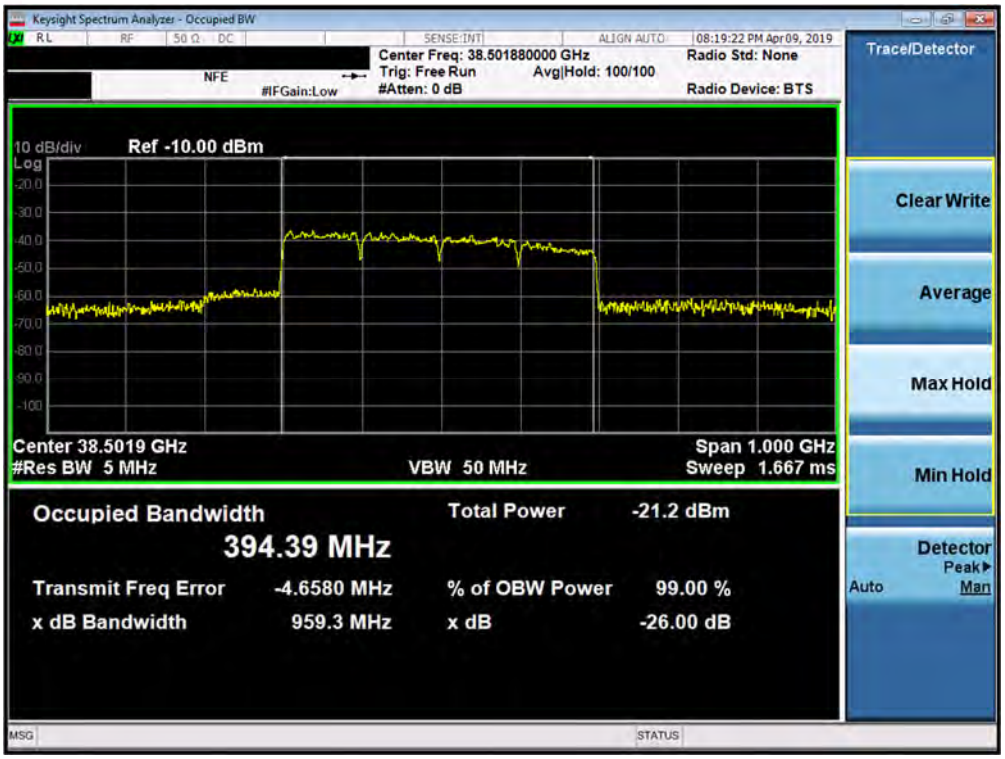


Plot 7-9. Occupied Bandwidth Plot (4CC – 50MHz - 64QAM Mid Channel)



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

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

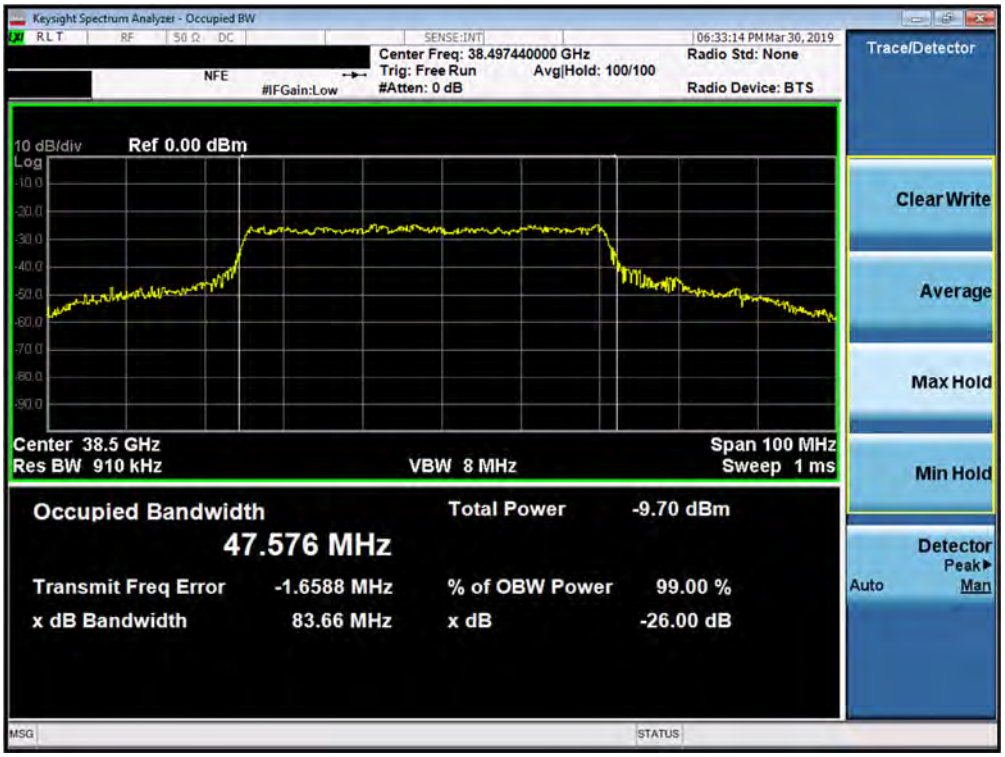


Plot 7-12. Occupied Bandwidth Plot (4CC – 100MHz - 64QAM Mid Channel)

7.2.2 J Patch Occupied Bandwidth

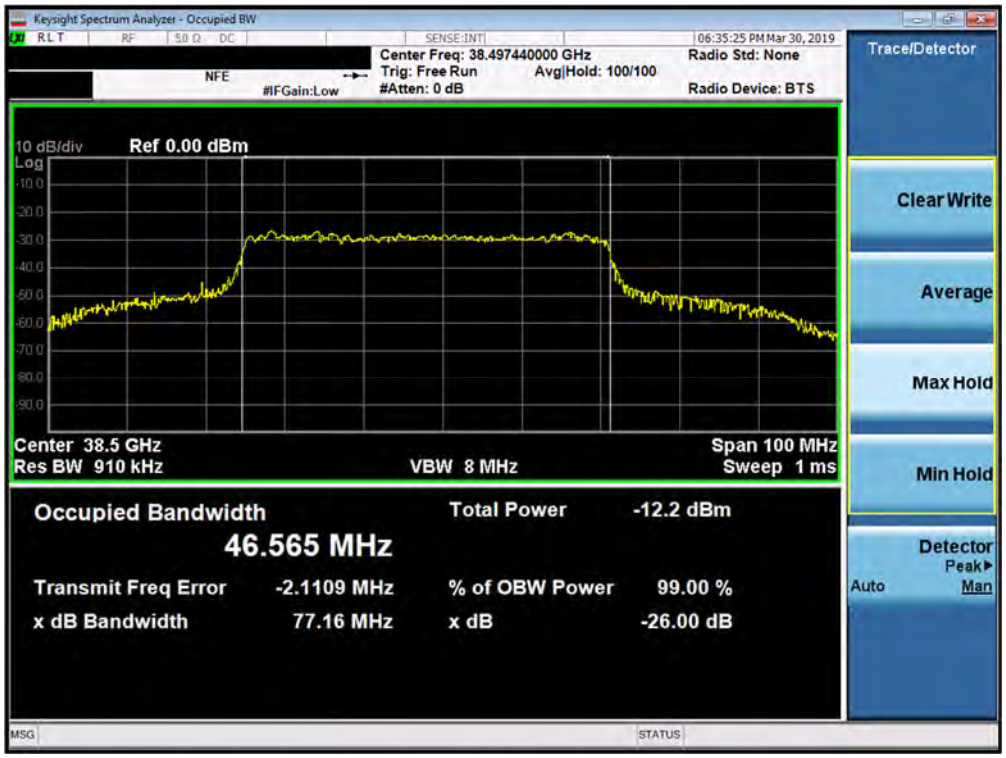
Channel	Bandwidth	CCs Active	Modulation	OBW [MHz]
Mid	50	1	QPSK	47.58
Mid	50	1	16QAM	46.57
Mid	50	1	64QAM	46.57
Mid	100	1	QPSK	94.90
Mid	100	1	16QAM	94.62
Mid	100	1	64QAM	94.43
Mid	200	4	QPSK	228.59
Mid	200	4	16QAM	216.40
Mid	200	4	64QAM	197.46
Mid	400	4	QPSK	396.30
Mid	400	4	16QAM	395.04
Mid	400	4	64QAM	392.19

Table 7-3. Summary of J Patch Occupied Bandwidths

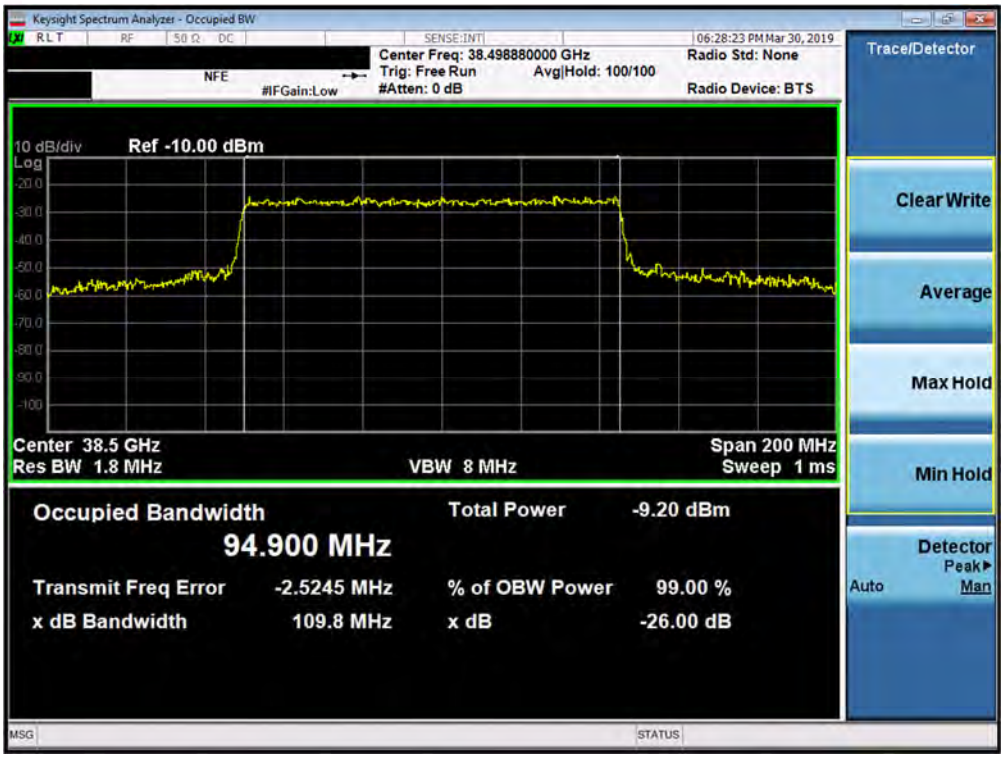


Plot 7-13. Occupied Bandwidth Plot (1CC – 50MHz - QPSK - Mid Channel)

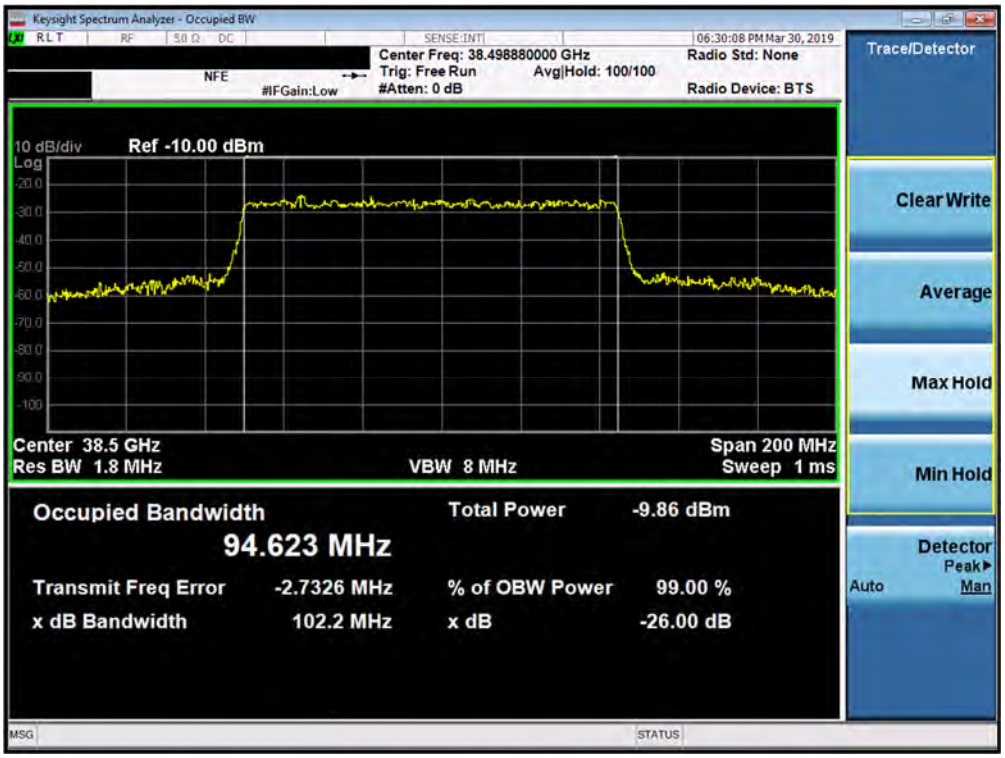
Plot 7-14. Occupied Bandwidth Plot (1CC – 50MHz - 16QAM - Mid Channel)



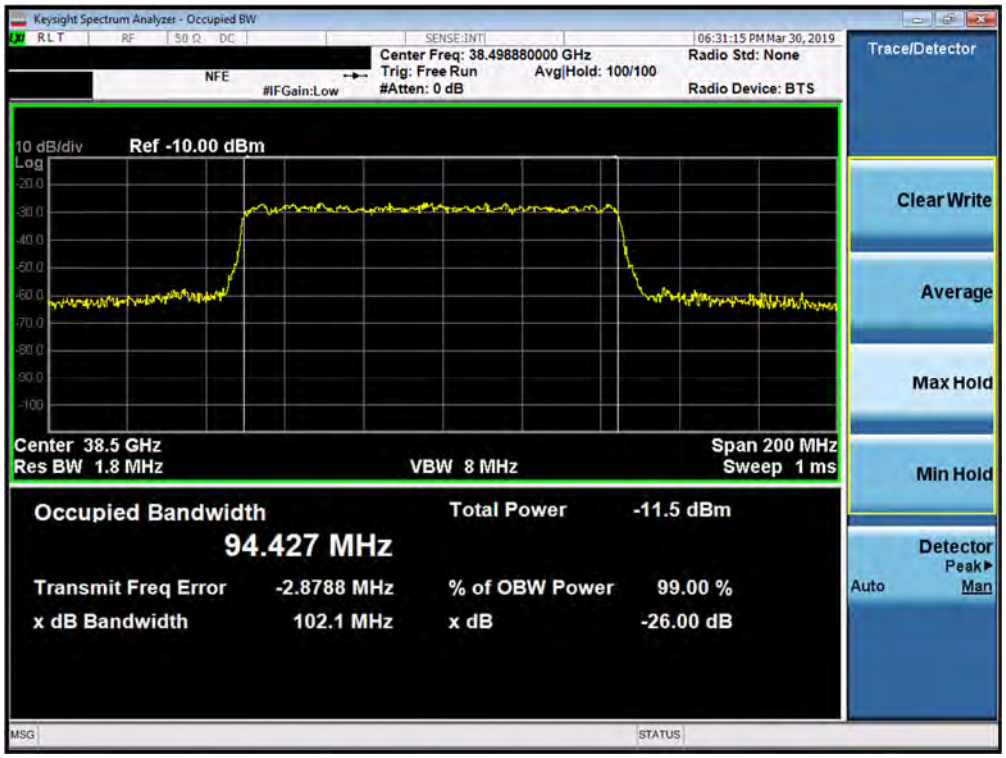
Plot 7-15. Occupied Bandwidth Plot (1CC – 50MHz - 64QAM Mid Channel)



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



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



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

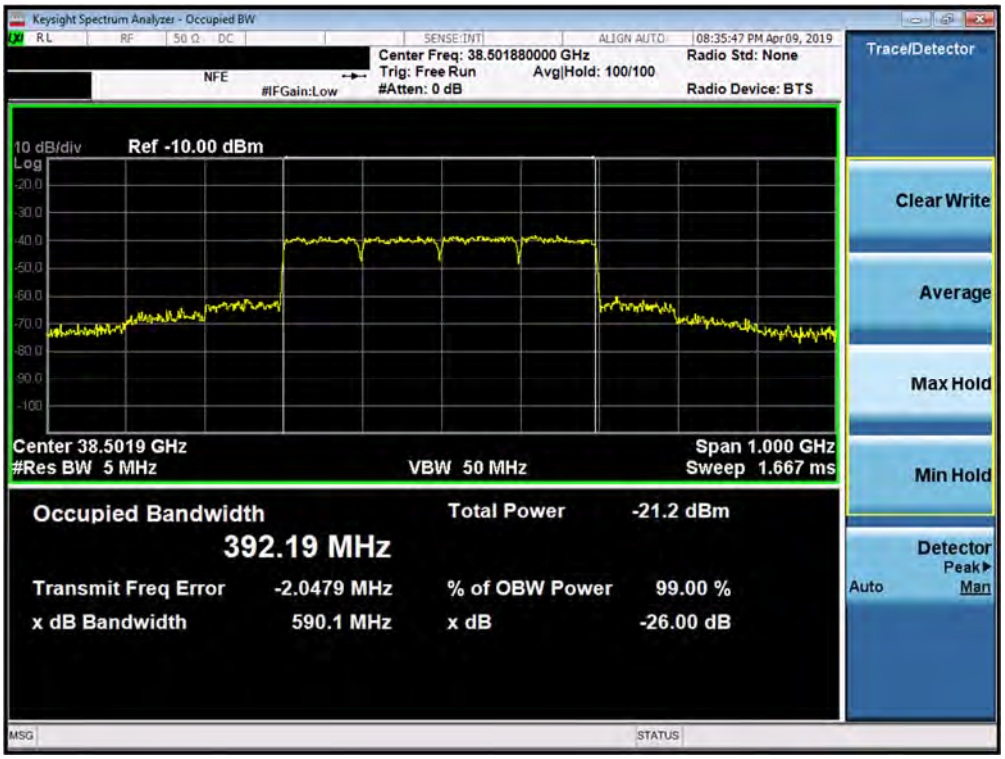
Plot 7-19. Occupied Bandwidth Plot (4CC – 50MHz - QPSK - Mid Channel)

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

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

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

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

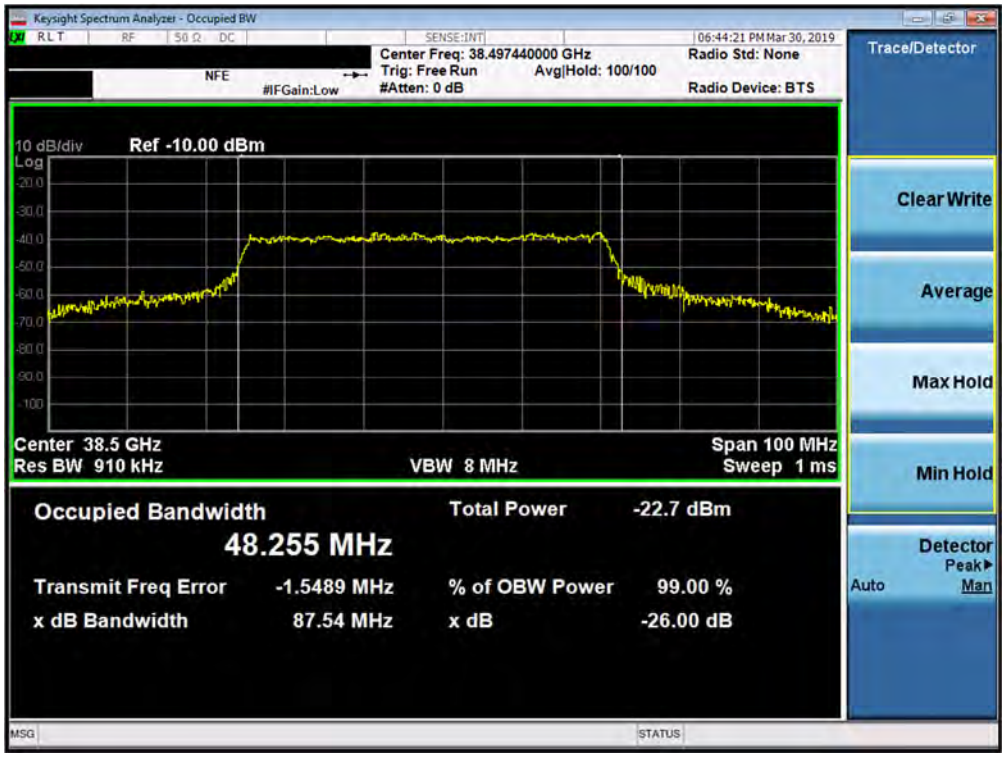


Plot 7-24. Occupied Bandwidth Plot (4CC – 100MHz - 64QAM Mid Channel)

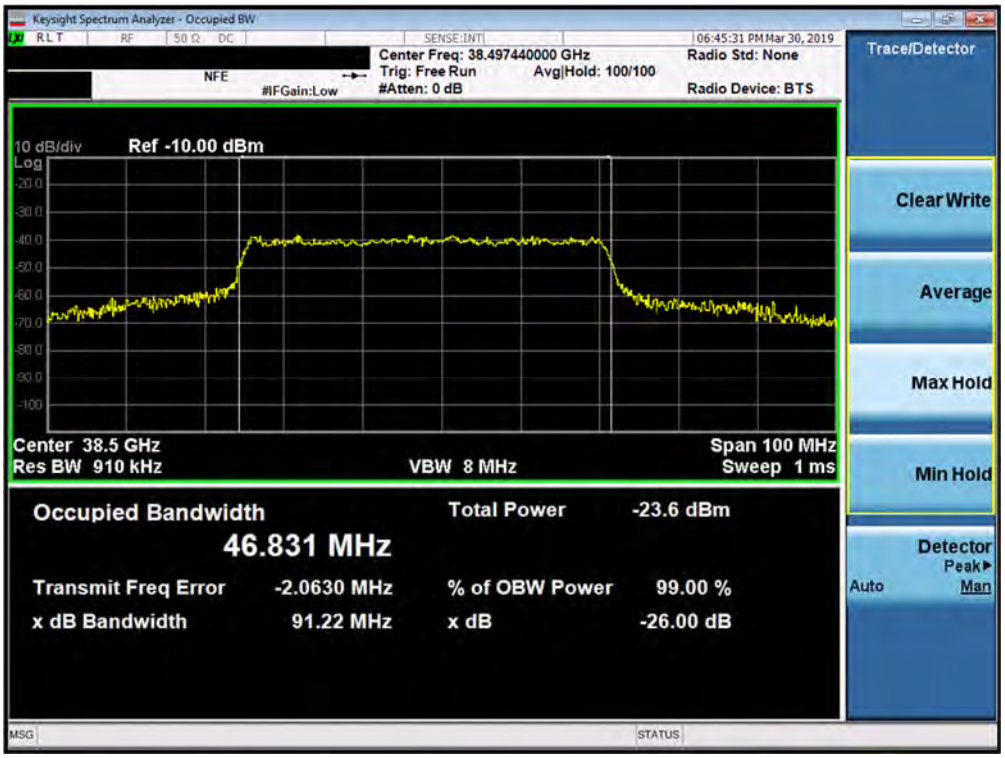
7.2.3 K Patch Occupied Bandwidth

Channel	Bandwidth	CCs Active	Modulation	OBW [MHz]
Mid	50	1	QPSK	48.26
Mid	50	1	16QAM	46.83
Mid	50	1	64QAM	46.87
Mid	100	1	QPSK	95.05
Mid	100	1	16QAM	94.83
Mid	100	1	64QAM	94.87
Mid	200	4	QPSK	253.11
Mid	200	4	16QAM	232.10
Mid	200	4	64QAM	200.72
Mid	400	4	QPSK	397.13
Mid	400	4	16QAM	395.61
Mid	400	4	64QAM	392.61

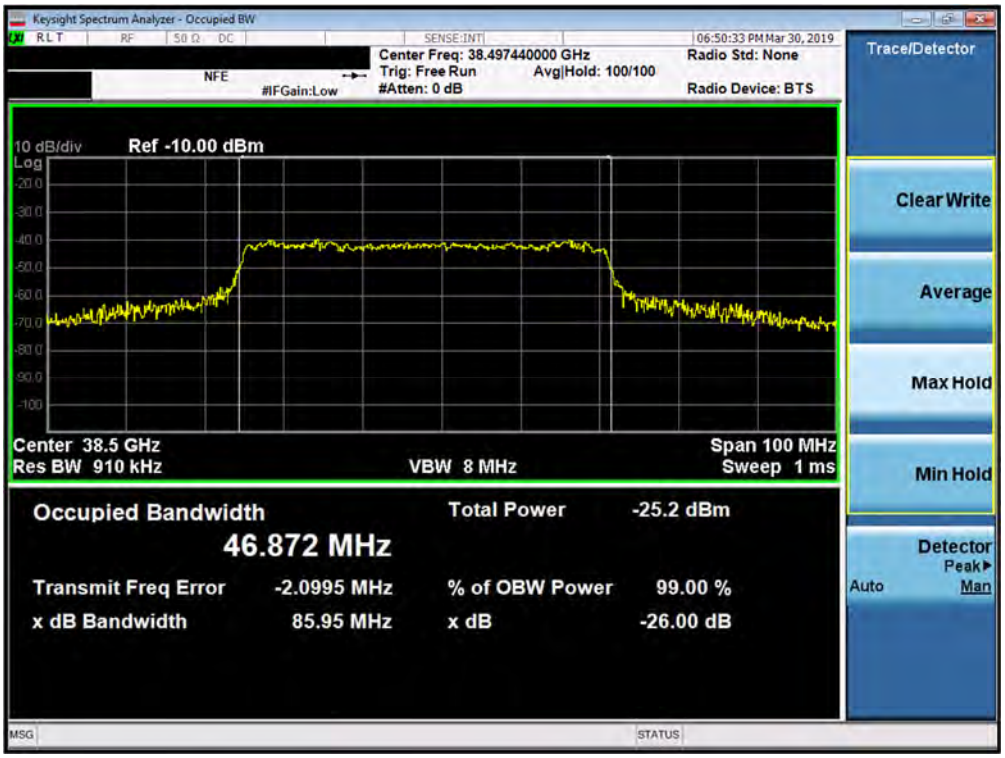
Table 7-4. Summary of K Patch Occupied Bandwidths



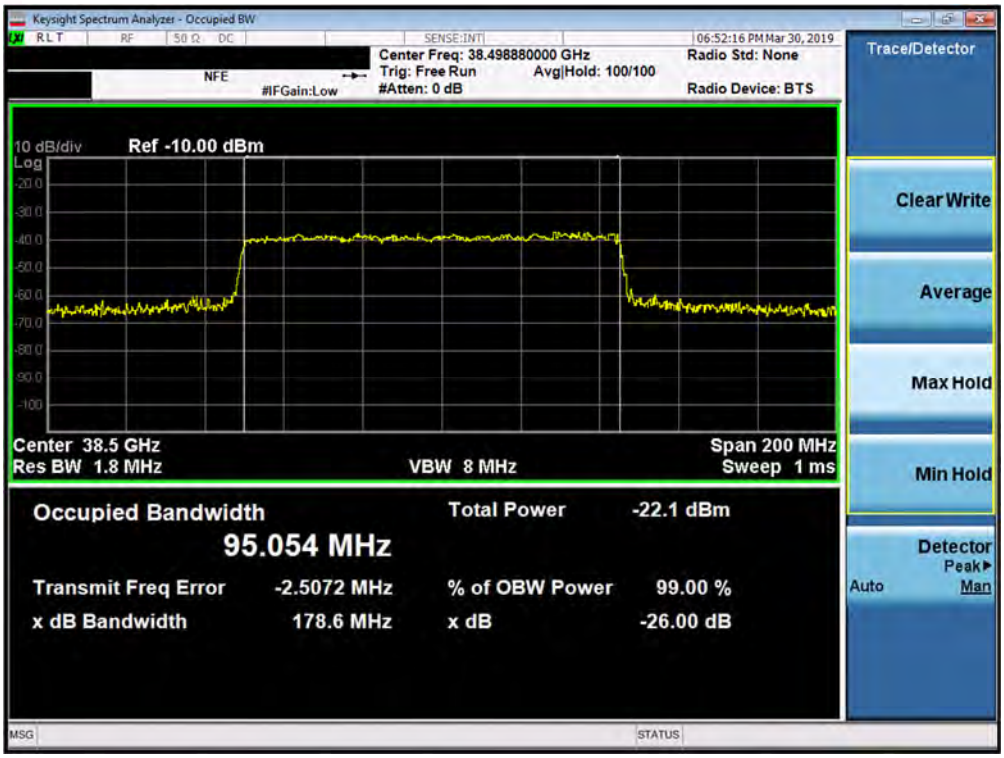
Plot 7-25. Occupied Bandwidth Plot (1CC – 50MHz - QPSK - Mid Channel)



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

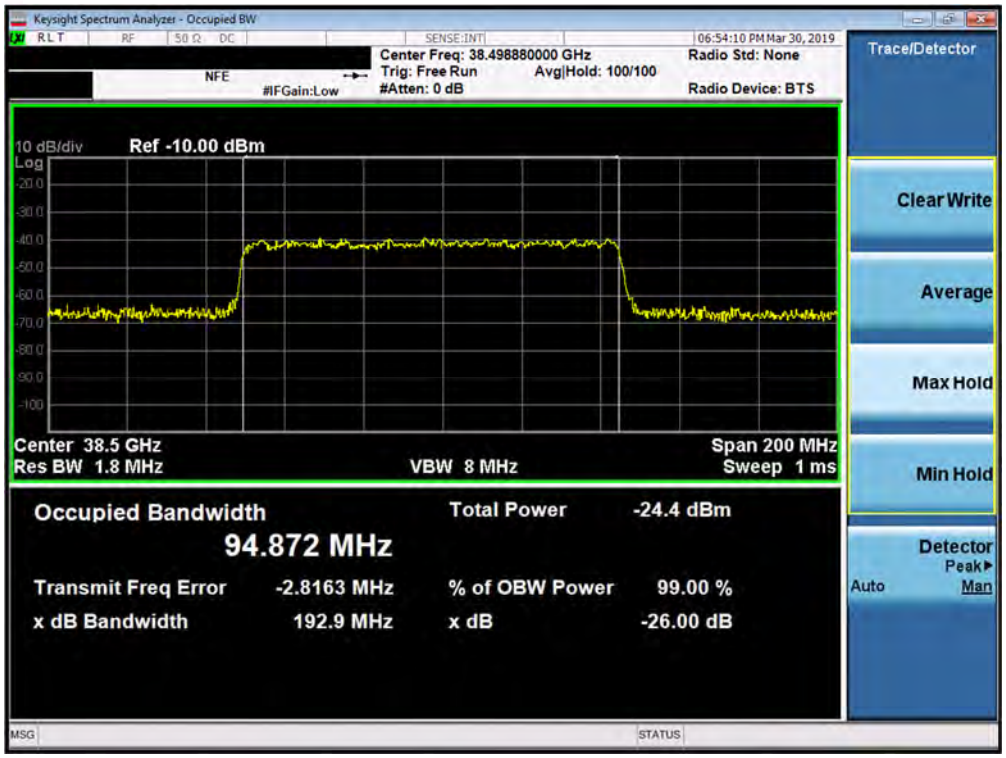


Plot 7-27. Occupied Bandwidth Plot (1CC – 50MHz - 64QAM Mid Channel)



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

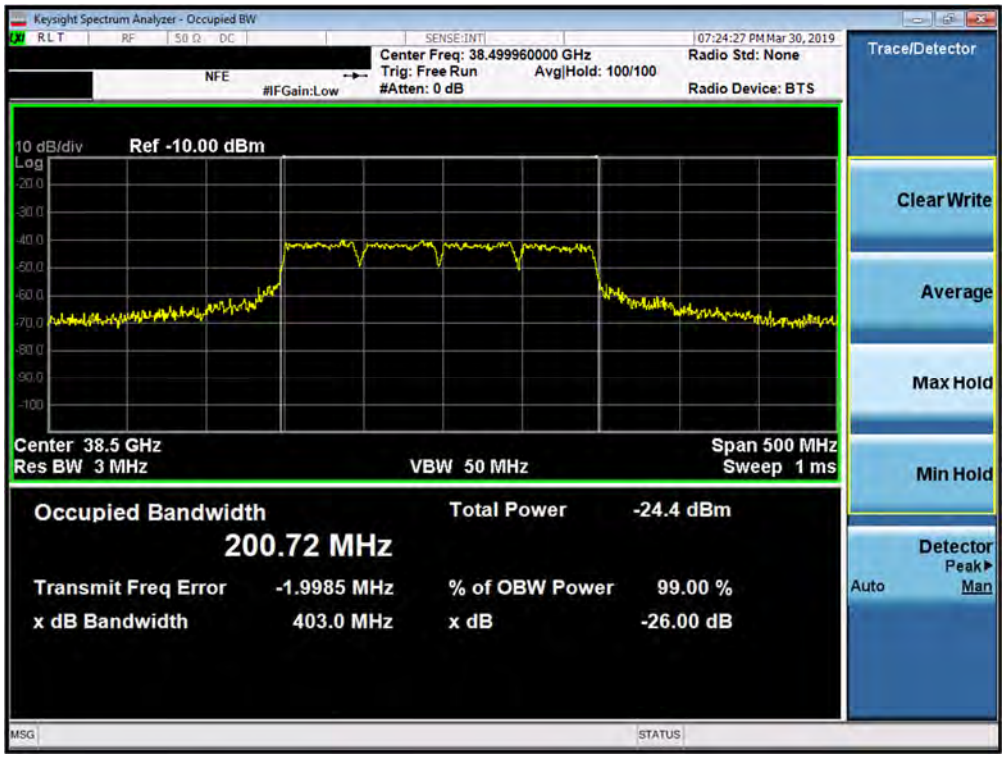
Plot 7-29. Occupied Bandwidth Plot (1CC – 100MHz - 16QAM - Mid Channel)



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

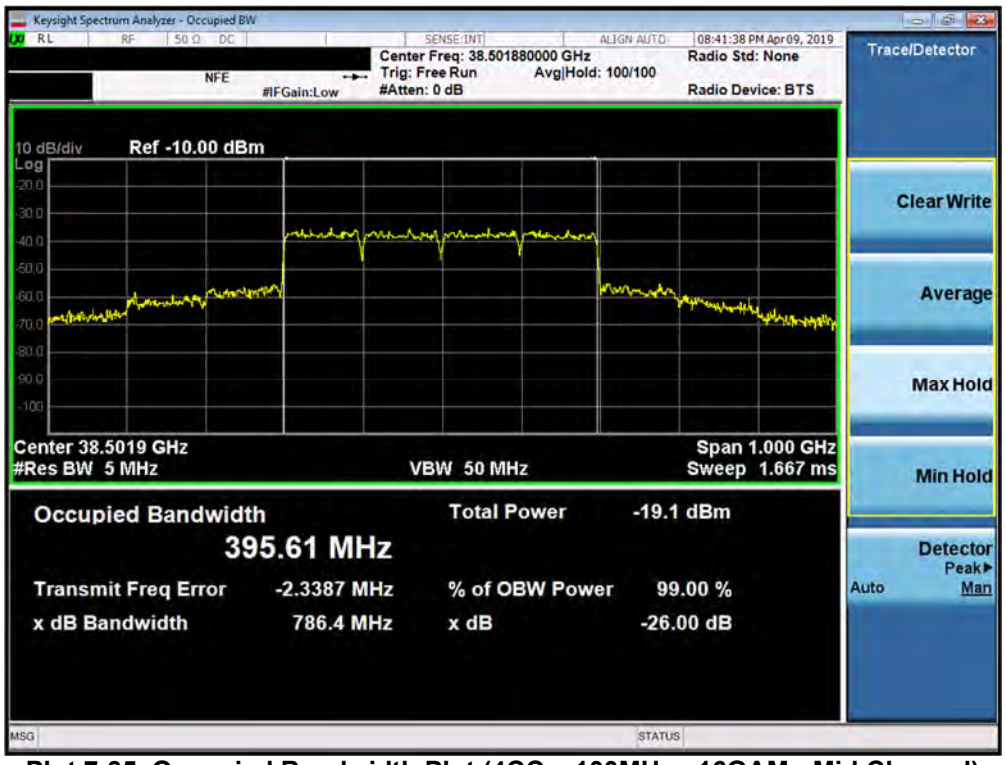
Plot 7-31. Occupied Bandwidth Plot (4CC – 50MHz - QPSK - Mid Channel)

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



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

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



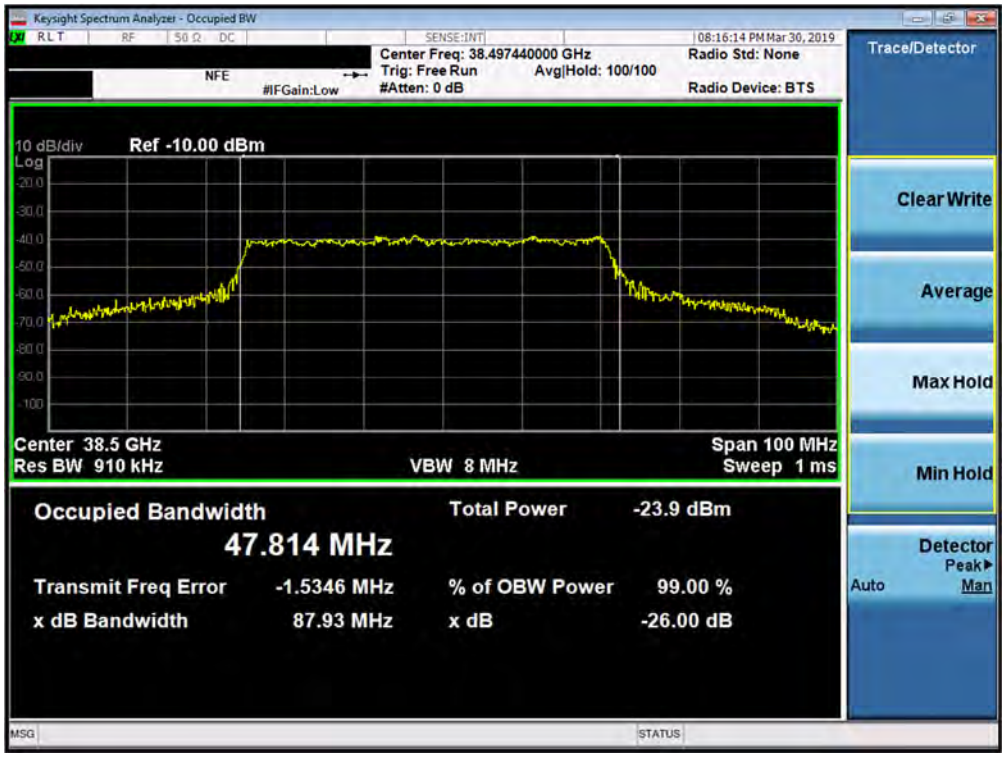
Plot 7-35. Occupied Bandwidth Plot (4CC – 100MHz - 16QAM - Mid Channel)

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

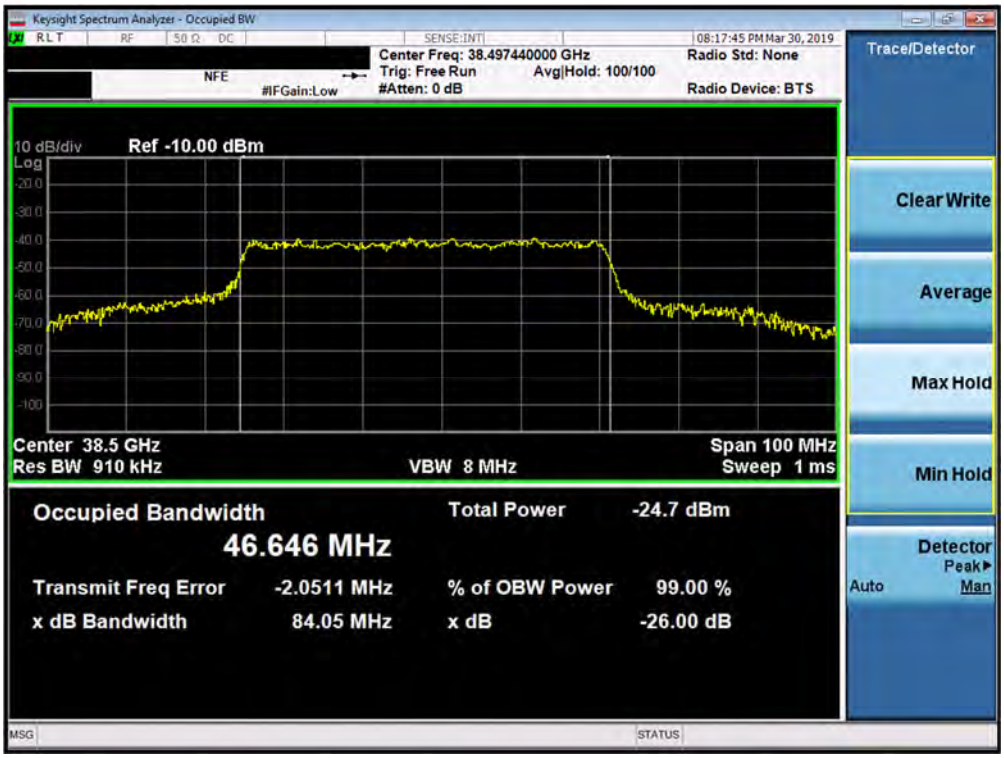
7.2.4 L Patch Occupied Bandwidth

Channel	Bandwidth	CCs Active	Modulation	OBW [MHz]
Mid	50	1	QPSK	47.81
Mid	50	1	16QAM	46.65
Mid	50	1	64QAM	46.95
Mid	100	1	QPSK	94.82
Mid	100	1	16QAM	94.63
Mid	100	1	64QAM	94.65
Mid	200	4	QPSK	205.72
Mid	200	4	16QAM	215.21
Mid	200	4	64QAM	201.47
Mid	400	4	QPSK	396.75
Mid	400	4	16QAM	395.63
Mid	400	4	64QAM	393.40

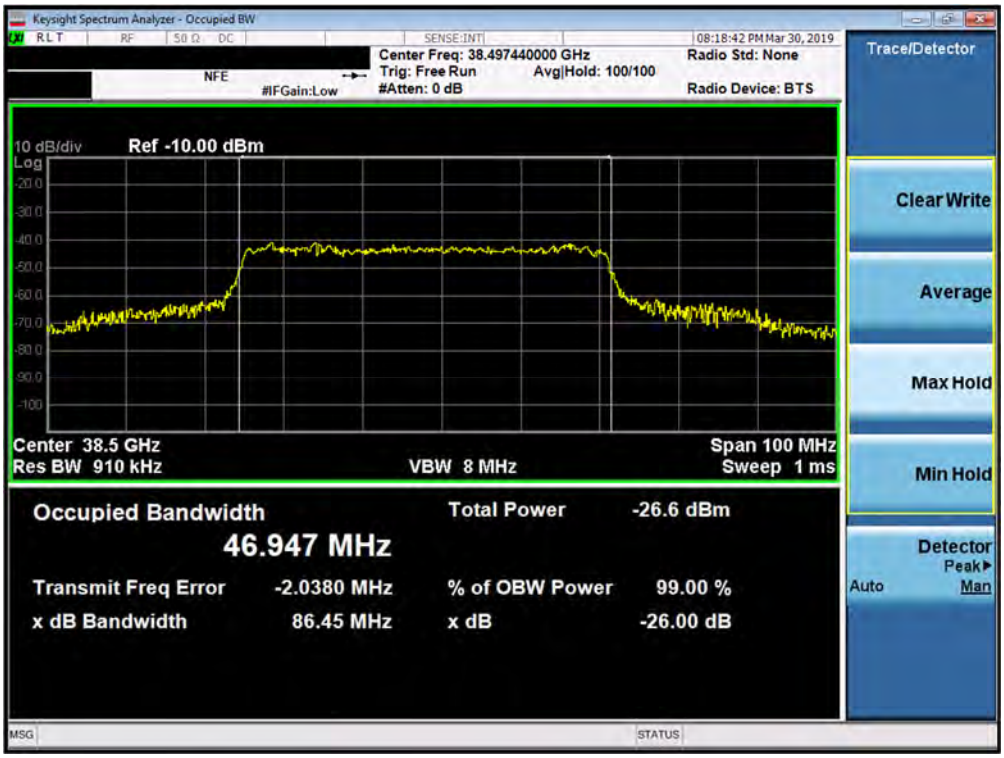
Table 7-5. Summary of L Patch Occupied Bandwidths



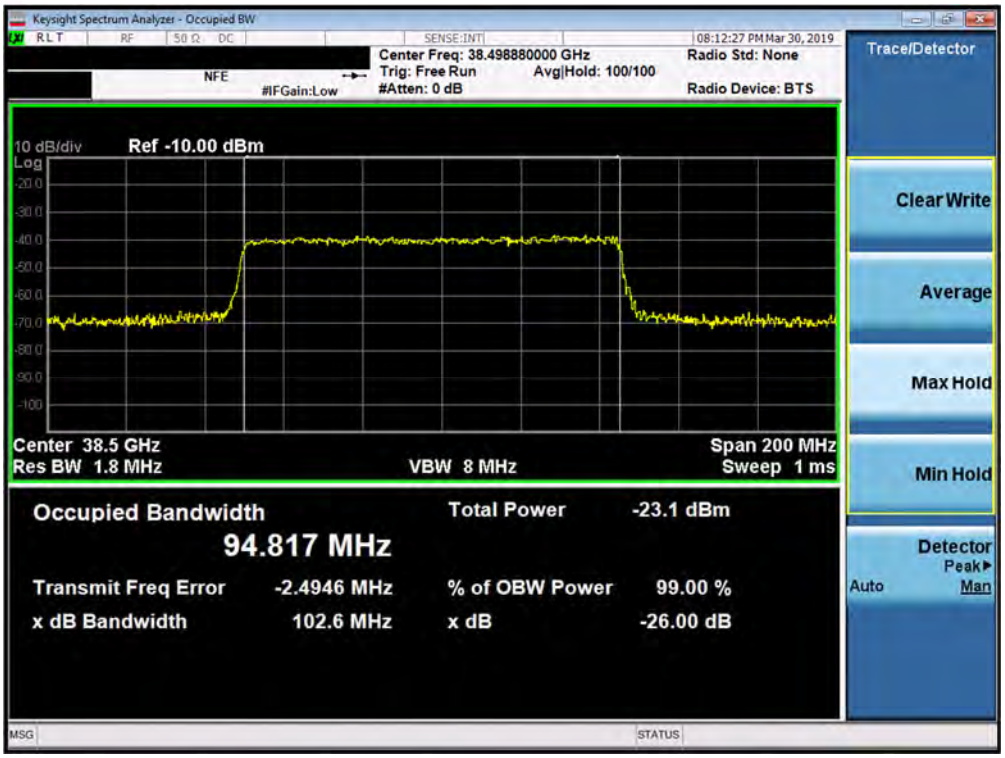
Plot 7-37. Occupied Bandwidth Plot (1CC – 50MHz - QPSK - Mid Channel)



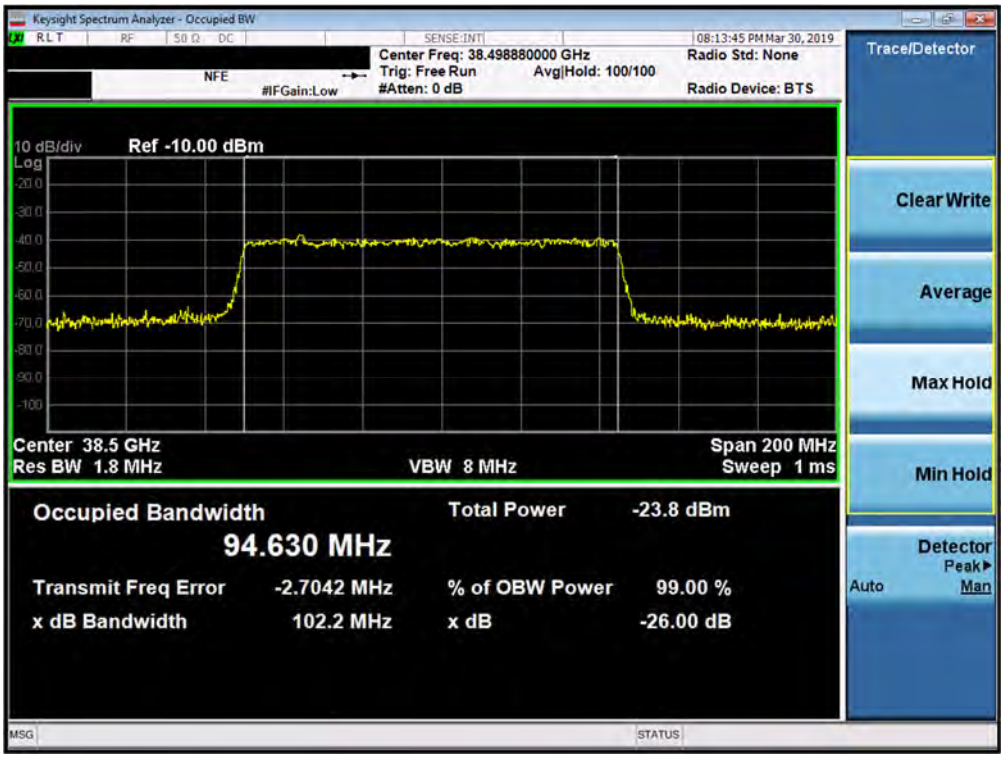
Plot 7-38. Occupied Bandwidth Plot (1CC – 50MHz - 16QAM - Mid Channel)



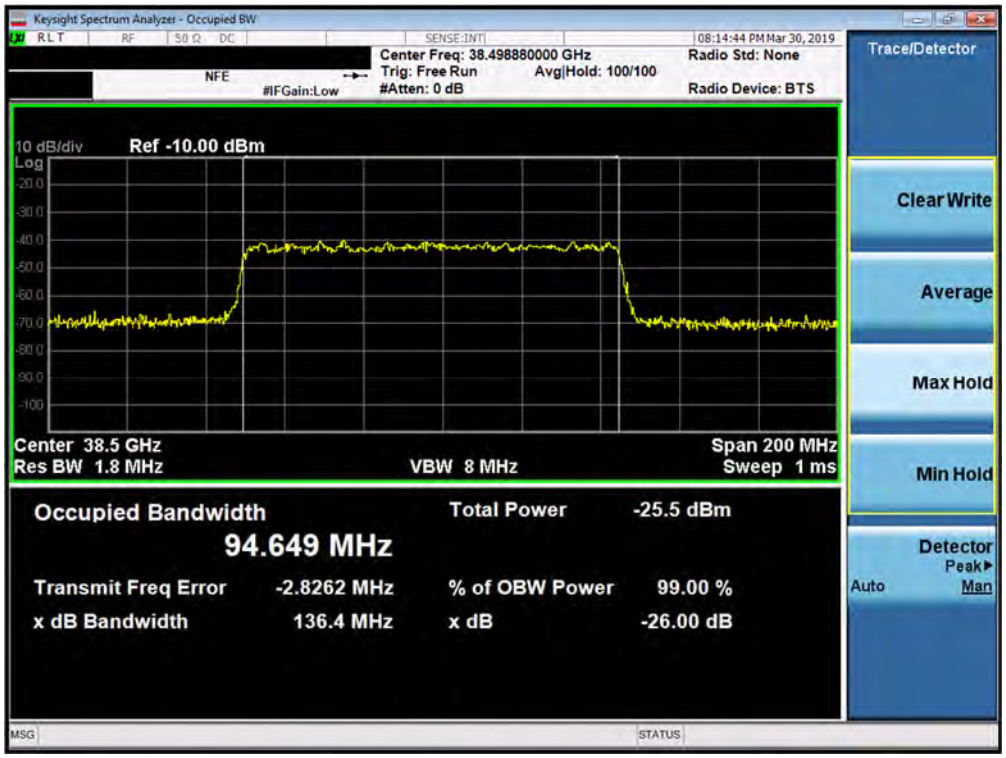
Plot 7-39. Occupied Bandwidth Plot (1CC – 50MHz - 64QAM Mid Channel)



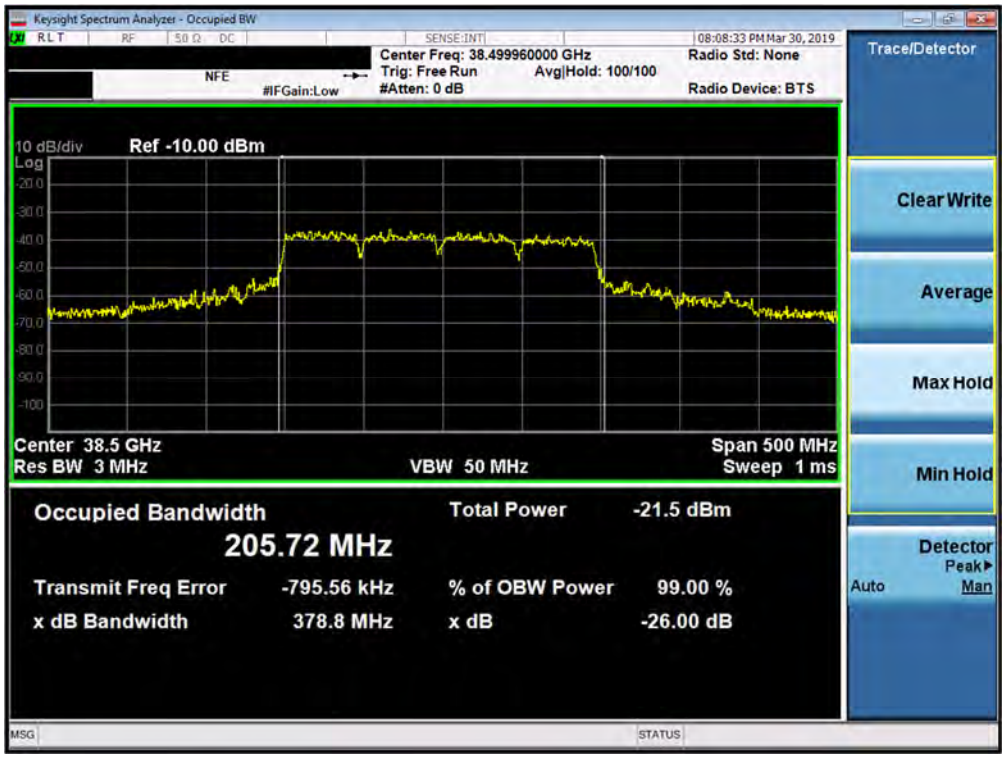
Plot 7-40. Occupied Bandwidth Plot (1CC – 100MHz - QPSK - Mid Channel)



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



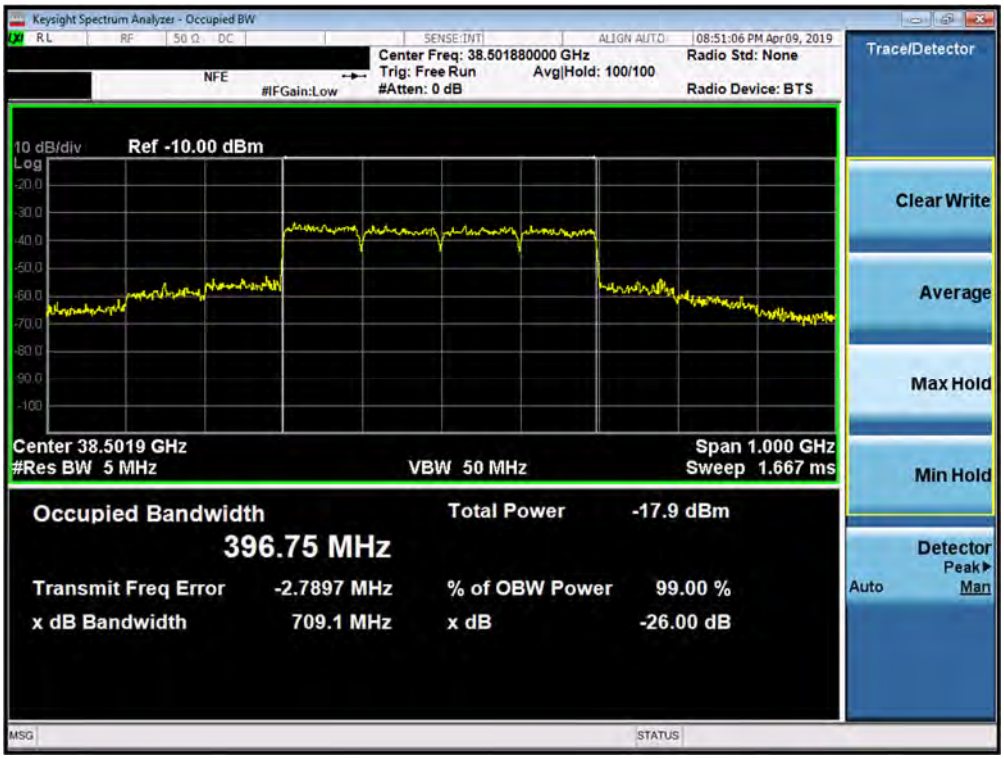
Plot 7-42. Occupied Bandwidth Plot (1CC – 100MHz - 64QAM Mid Channel)



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

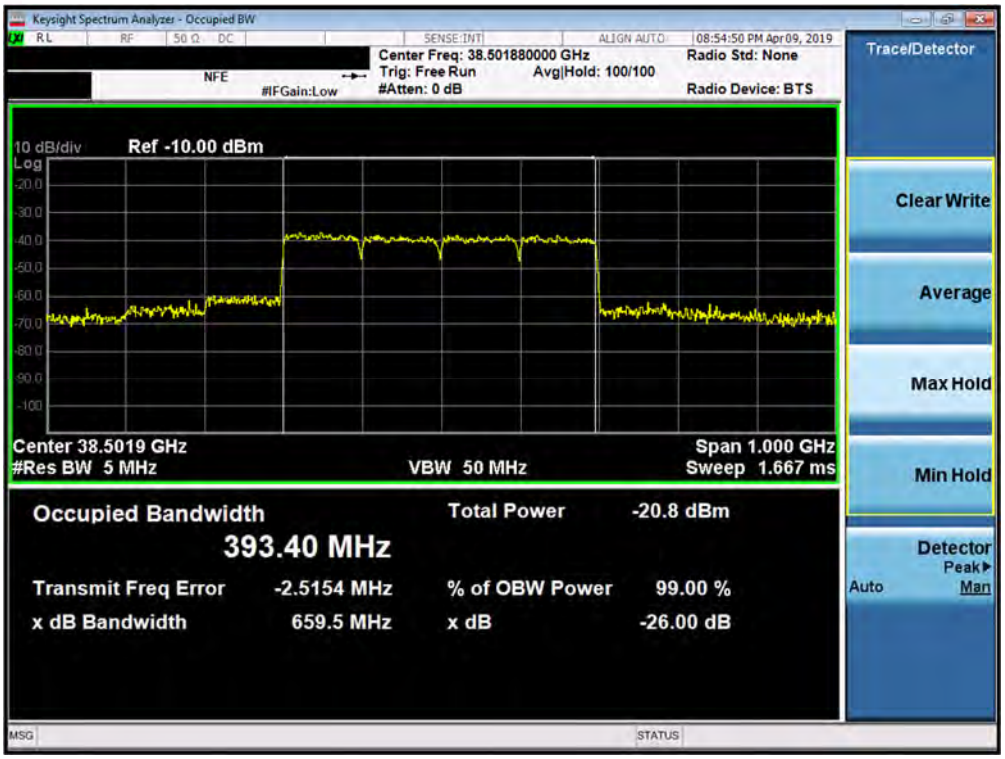
Plot 7-44. Occupied Bandwidth Plot (4CC – 50MHz - 16QAM - Mid Channel)

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



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

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



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

7.3 Equivalent Isotropic Radiated Power

§2.1046, §30.202

Test Overview

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

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

Test Procedures Used

ANSI C63.26-2015 Section 5.2.4.4.1

Test Settings

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

Test Notes

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

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.

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	37027.32	50	V	SISO	4	1	1	16	QPSK	321	279	-35.23	18.27	43.00	-24.73
	Mid	38497.44	50	V	SISO	16	1	1	16	QPSK	322	278	-34.99	18.69	43.00	-24.31
	High	39966.24	50	V	SISO	17	1	1	16	QPSK	335	280	-34.23	**20.21**	43.00	-22.79
	Low	37027.32	50	V	SISO	4	1	1	16	16QAM	321	279	-35.54	17.96	43.00	-25.04
	Mid	38497.44	50	V	SISO	16	1	1	31	16QAM	322	278	-35.38	18.30	43.00	-24.70
	High	39966.24	50	V	SISO	17	1	1	16	16QAM	335	280	-34.79	**19.65**	43.00	-23.35
	Low	37027.32	50	V	SISO	4	1	1	16	64QAM	321	279	-37.71	15.79	43.00	-27.21
	Mid	38497.44	50	V	SISO	16	1	1	16	64QAM	322	278	-37.74	15.94	43.00	-27.06
	High	39966.24	50	V	SISO	17	1	1	16	64QAM	335	280	-37.21	**17.23**	43.00	-25.77
	Low	37027.32	50	V	SISO	133	1	1	16	QPSK	77	103	-37.71	15.79	43.00	-27.21
	Mid	38497.44	50	V	SISO	133	1	1	16	QPSK	63	103	-39.09	14.59	43.00	-28.41
	High	39966.24	50	V	SISO	144	1	1	16	QPSK	25	103	-38.20	16.24	43.00	-26.76
	Low	37027.32	50	V	SISO	133	1	1	16	16QAM	77	103	-37.44	16.06	43.00	-26.94
	Mid	38497.44	50	V	SISO	133	1	1	16	16QAM	63	103	-39.63	14.05	43.00	-28.95
	High	39966.24	50	V	SISO	144	1	1	16	16QAM	25	103	-38.85	15.59	43.00	-27.41
	Low	37027.32	50	V	SISO	133	1	1	16	64QAM	77	103	-39.77	13.73	43.00	-29.27
	Mid	38497.44	50	V	SISO	133	1	1	16	64QAM	63	103	-41.98	11.70	43.00	-31.30
	High	39966.24	50	V	SISO	144	1	1	16	64QAM	25	103	-41.11	13.33	43.00	-29.67
	Low	37051.80	100	V	SISO	4	1	1	0	QPSK	322	280	-34.79	18.71	43.00	-24.29
	Mid	38498.88	100	V	SISO	16	1	1	32	QPSK	322	277	-34.89	18.79	43.00	-24.21
	High	39949.92	100	V	SISO	17	1	1	0	QPSK	335	280	-34.30	**20.14**	43.00	-22.86
	Low	37051.80	100	V	SISO	4	1	1	0	16QAM	322	280	-35.18	18.32	43.00	-24.68
	Mid	38498.88	100	V	SISO	16	1	1	32	16QAM	322	277	-36.07	17.61	43.00	-25.39
	High	39949.92	100	V	SISO	17	1	1	65	16QAM	335	280	-34.84	**19.60**	43.00	-23.40
	Low	37051.80	100	V	SISO	4	1	1	0	64QAM	322	280	-37.14	16.36	43.00	-26.64
	Mid	38498.88	100	V	SISO	16	1	1	0	64QAM	322	277	-38.09	15.59	43.00	-27.41
	High	39949.92	100	V	SISO	17	1	1	65	64QAM	335	280	-37.07	**17.37**	43.00	-25.63
	Low	37051.80	100	V	SISO	133	1	1	0	QPSK	78	103	-37.50	16.00	43.00	-27.00
	Mid	38498.88	100	V	SISO	133	1	1	32	QPSK	64	102	-38.47	15.21	43.00	-27.79
	High	39949.92	100	V	SISO	144	1	1	65	QPSK	25	103	-38.25	16.19	43.00	-26.81
	Low	37051.80	100	V	SISO	133	1	1	0	16QAM	78	103	-37.27	16.23	43.00	-26.77
	Mid	38498.88	100	V	SISO	133	1	1	0	16QAM	64	102	-39.87	13.81	43.00	-29.19
	High	39949.92	100	V	SISO	144	1	1	65	16QAM	25	103	-38.88	15.56	43.00	-27.44
	Low	37051.80	100	V	SISO	133	1	1	0	64QAM	78	103	-39.41	14.09	43.00	-28.91
	Mid	38498.88	100	V	SISO	133	1	1	32	64QAM	64	102	-41.72	11.96	43.00	-31.04
	High	39949.92	100	V	SISO	144	1	1	65	64QAM	25	103	-41.00	13.44	43.00	-29.56
	Mid	38499.96	200	V	SISO	16	4	1	0	QPSK	333	279	-33.88	**19.80**	43.00	-23.20
	Mid	38499.96	200	V	SISO	16	4	1	0	16QAM	333	279	-34.69	**18.99**	43.00	-24.01
	Mid	38499.96	200	V	SISO	16	4	1	0	64QAM	333	279	-37.23	**16.45**	43.00	-26.55
	Mid	38499.96	200	V	SISO	133	4	1	0	QPSK	25	103	-39.31	14.37	43.00	-28.63
	Mid	38499.96	200	V	SISO	133	4	1	0	16QAM	25	103	-39.82	13.86	43.00	-29.14
	Mid	38499.96	200	V	SISO	133	4	1	0	64QAM	25	103	-42.51	11.17	43.00	-31.83
	Mid	38501.88	400	V	SISO	16	4	1	0	QPSK	335	280	-35.01	**18.67**	43.00	-24.33
	Mid	38501.88	400	V	SISO	16	4	1	0	16QAM	335	280	-35.62	**18.06**	43.00	-24.94
	Mid	38501.88	400	V	SISO	16	4	1	0	64QAM	335	280	-38.31	**15.37**	43.00	-27.63
	Mid	38501.88	400	V	SISO	133	4	1	0	QPSK	25	103	-38.90	14.78	43.00	-28.22
	Mid	38501.88	400	V	SISO	133	4	1	0	16QAM	25	103	-39.31	14.37	43.00	-28.63
	Mid	38501.88	400	V	SISO	133	4	1	0	64QAM	25	103	-41.87	11.81	43.00	-31.19

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	38499.96	50	V	MIMO	16	1	1	16	QPSK	322	278	-33.49	20.19	21.71	43.00	-21.29
	Mid	38499.96	50	V	MIMO	144	1	1	16	QPSK	24	103	-37.27	16.41			
	Mid	38499.96	50	V	MIMO	16	1	1	16	16QAM	322	278	-33.88	19.80	21.22	43.00	-21.78
	Mid	38499.96	50	V	MIMO	144	1	1	16	16QAM	24	103	-38.02	15.66			
	Mid	38499.96	50	V	MIMO	16	1	1	16	64QAM	322	278	-36.24	17.44	18.89	43.00	-24.11
	Mid	38499.96	50	V	MIMO	144	1	1	16	64QAM	24	103	-40.25	13.43			
	Mid	38499.96	100	V	MIMO	16	1	1	32	QPSK	322	277	-33.39	20.29	21.77	43.00	-21.23
	Mid	38499.96	100	V	MIMO	144	1	1	32	QPSK	27	102	-37.30	16.38			
	Mid	38499.96	100	V	MIMO	16	1	1	32	16QAM	322	277	-34.57	19.11	20.65	43.00	-22.35
	Mid	38499.96	100	V	MIMO	144	1	1	32	16QAM	27	102	-38.27	15.41			
	Mid	38499.96	100	V	MIMO	16	1	1	32	64QAM	322	277	-36.59	17.09	18.66	43.00	-24.34
	Mid	38499.96	100	V	MIMO	144	1	1	32	64QAM	27	102	-40.22	13.46			

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

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	37027.32	50	H	SISO	25	1	1	0	QPSK	318	296	-35.13	18.37	43.00	-24.63
	Mid	38497.44	50	H	SISO	28	1	1	31	QPSK	324	296	-37.38	16.30	43.00	-26.70
	High	39966.24	50	H	SISO	24	1	1	31	QPSK	315	296	-38.64	15.80	43.00	-27.20
	Low	37027.32	50	H	SISO	25	1	1	0	16QAM	318	296	-35.61	17.89	43.00	-25.11
	Mid	38497.44	50	H	SISO	28	1	1	31	16QAM	324	296	-38.45	15.23	43.00	-27.77
	High	39966.24	50	H	SISO	24	1	1	31	16QAM	315	296	-39.38	15.06	43.00	-27.94
	Low	37027.32	50	H	SISO	25	1	1	0	64QAM	318	296	-38.21	15.29	43.00	-27.71
	Mid	38497.44	50	H	SISO	28	1	1	31	64QAM	324	296	-40.78	12.90	43.00	-30.10
	High	39966.24	50	H	SISO	24	1	1	31	64QAM	315	296	-41.70	12.74	43.00	-30.26
	Low	37027.32	50	V	SISO	168	1	1	16	QPSK	264	312	-38.68	16.79	43.00	-26.21
	Mid	38497.44	50	V	SISO	169	1	1	16	QPSK	288	312	-36.31	18.81	43.00	-24.19
	High	39966.24	50	V	SISO	153	1	1	0	QPSK	297	312	-35.76	**20.83**	43.00	-22.17
	Low	37027.32	50	V	SISO	168	1	1	16	16QAM	264	312	-39.43	16.04	43.00	-26.96
	Mid	38497.44	50	V	SISO	169	1	1	0	16QAM	288	312	-37.32	17.80	43.00	-25.20
	High	39966.24	50	V	SISO	153	1	1	16	16QAM	297	312	-36.66	**19.93**	43.00	-23.07
	Low	37027.32	50	V	SISO	168	1	1	31	64QAM	264	312	-41.50	13.97	43.00	-29.03
	Mid	38497.44	50	V	SISO	169	1	1	16	64QAM	288	312	-39.27	15.85	43.00	-27.15
	High	39966.24	50	V	SISO	153	1	1	0	64QAM	297	312	-38.90	**17.69**	43.00	-25.31
	Low	37051.80	100	H	SISO	25	1	1	0	QPSK	318	296	-34.41	19.09	43.00	-23.91
	Mid	38498.88	100	H	SISO	28	1	1	32	QPSK	325	296	-37.51	16.17	43.00	-26.83
	High	39949.92	100	H	SISO	24	1	1	65	QPSK	313	296	-38.03	16.41	43.00	-26.59
	Low	37051.80	100	H	SISO	25	1	1	0	16QAM	318	296	-35.39	18.11	43.00	-24.89
	Mid	38498.88	100	H	SISO	28	1	1	0	16QAM	325	296	-38.52	15.16	43.00	-27.84
	High	39949.92	100	H	SISO	24	1	1	65	16QAM	313	296	-39.13	15.31	43.00	-27.69
	Low	37051.80	100	H	SISO	25	1	1	0	64QAM	318	296	-37.86	15.64	43.00	-27.36
	Mid	38498.88	100	H	SISO	28	1	1	65	64QAM	325	296	-41.07	12.61	43.00	-30.39
	High	39949.92	100	H	SISO	24	1	1	65	64QAM	313	296	-41.18	13.26	43.00	-29.74
	Low	37051.80	100	V	SISO	168	1	1	65	QPSK	264	312	-38.95	16.52	43.00	-26.48
	Mid	38498.88	100	V	SISO	169	1	1	0	QPSK	288	312	-36.39	18.73	43.00	-24.27
	High	39949.92	100	V	SISO	153	1	1	0	QPSK	297	312	-35.78	**20.81**	43.00	-22.19
	Low	37051.80	100	V	SISO	168	1	1	32	16QAM	264	312	-39.59	15.88	43.00	-27.12
	Mid	38498.88	100	V	SISO	169	1	1	0	16QAM	288	312	-37.02	18.10	43.00	-24.90
	High	39949.92	100	V	SISO	153	1	1	0	16QAM	297	312	-36.54	**20.05**	43.00	-22.95
	Low	37051.80	100	V	SISO	168	1	1	65	64QAM	264	312	-41.71	13.76	43.00	-29.24
	Mid	38498.88	100	V	SISO	169	1	1	32	64QAM	288	312	-39.05	16.07	43.00	-26.93
	High	39949.92	100	V	SISO	153	1	1	0	64QAM	297	312	-38.82	**17.77**	43.00	-25.23
	Mid	38499.96	200	H	SISO	28	4	1	0	QPSK	324	296	-38.98	**14.70**	43.00	-28.30
	Mid	38499.96	200	H	SISO	28	4	1	0	16QAM	324	296	-39.54	**14.14**	43.00	-28.86
	Mid	38499.96	200	H	SISO	28	4	1	0	64QAM	324	296	-41.84	11.84	43.00	-31.16
	Mid	38499.96	200	V	SISO	169	4	1	0	QPSK	288	312	-40.98	14.11	43.00	-28.89
	Mid	38499.96	200	V	SISO	169	4	1	0	16QAM	288	312	-41.23	13.86	43.00	-29.14
	Mid	38499.96	200	V	SISO	169	4	1	0	64QAM	288	312	-42.53	**12.56**	43.00	-30.44
	Mid	38501.88	400	H	SISO	28	4	1	0	QPSK	326	296	-39.92	13.76	43.00	-29.24
	Mid	38501.88	400	H	SISO	28	4	1	0	16QAM	326	296	-40.49	13.19	43.00	-29.81
	Mid	38501.88	400	H	SISO	28	4	1	0	64QAM	326	296	-42.93	10.75	43.00	-32.25
	Mid	38501.88	400	V	SISO	169	4	1	0	QPSK	288	312	-40.20	**14.87**	43.00	-28.13
	Mid	38501.88	400	V	SISO	169	4	1	0	16QAM	288	312	-40.55	**14.52**	43.00	-28.48
	Mid	38501.88	400	V	SISO	169	4	1	0	64QAM	288	312	-42.17	**12.90**	43.00	-30.10

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	38499.96	50	H	MIMO	26	1	1	16	QPSK	311	295	-36.37	17.31	21.16	43.00	-21.84
	Mid	38499.96	50	V	MIMO	153	1	1	16	QPSK	297	312	-34.83	18.85			
	Mid	38499.96	50	H	MIMO	26	1	1	0	16QAM	311	295	-37.16	16.52	20.23	43.00	-22.77
	Mid	38499.96	50	V	MIMO	153	1	1	0	16QAM	297	312	-35.86	17.82			
	Mid	38499.96	50	H	MIMO	26	1	1	16	64QAM	311	295	-39.27	14.41	18.21	43.00	-24.79
	Mid	38499.96	50	V	MIMO	153	1	1	16	64QAM	297	312	-37.82	15.86			
	Mid	38499.96	100	H	MIMO	26	1	1	0	QPSK	317	296	-36.40	17.28	21.71	43.00	-21.29
	Mid	38499.96	100	V	MIMO	153	1	1	0	QPSK	296	311	-33.92	19.76			
	Mid	38499.96	100	H	MIMO	26	1	1	0	16QAM	317	296	-36.99	16.69	21.05	43.00	-21.95
	Mid	38499.96	100	V	MIMO	153	1	1	0	16QAM	296	311	-34.61	19.07			
	Mid	38499.96	100	H	MIMO	26	1	1	32	64QAM	317	296	-36.71	16.97	20.06	43.00	-22.94
	Mid	38499.96	100	V	MIMO	153	1	1	32	64QAM	296	311	-36.56	17.12			

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

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	37027.32	50	H	SISO	45	1	1	31	QPSK	60	345	-36.43	17.07	43.00	-25.93
	Mid	38497.44	50	H	SISO	45	1	1	31	QPSK	65	348	-36.48	17.20	43.00	-25.80
	High	39966.24	50	H	SISO	45	1	1	31	QPSK	65	345	-37.61	16.83	43.00	-26.17
	Low	37027.32	50	H	SISO	45	1	1	31	16QAM	60	345	-37.34	16.16	43.00	-26.84
	Mid	38497.44	50	H	SISO	45	1	1	16	16QAM	65	348	-37.49	16.19	43.00	-26.81
	High	39966.24	50	H	SISO	45	1	1	31	16QAM	65	345	-38.69	15.75	43.00	-27.25
	Low	37027.32	50	H	SISO	45	1	1	31	64QAM	60	345	-39.52	13.98	43.00	-29.02
	Mid	38497.44	50	H	SISO	45	1	1	31	64QAM	65	348	-39.66	14.02	43.00	-28.98
	High	39966.24	50	H	SISO	45	1	1	31	64QAM	65	345	-40.70	13.74	43.00	-29.26
	Low	37027.32	50	V	SISO	172	1	1	31	QPSK	181	356	-34.10	19.40	43.00	-23.60
	Mid	38497.44	50	V	SISO	172	1	1	31	QPSK	182	355	-32.90	**20.78**	43.00	-22.22
	High	39966.24	50	V	SISO	172	1	1	31	QPSK	182	356	-33.82	20.62	43.00	-22.38
	Low	37027.32	50	V	SISO	172	1	1	31	16QAM	181	356	-35.16	18.34	43.00	-24.66
	Mid	38497.44	50	V	SISO	172	1	1	16	16QAM	182	355	-33.79	**19.89**	43.00	-23.11
	High	39966.24	50	V	SISO	172	1	1	31	16QAM	182	356	-34.59	19.85	43.00	-23.15
	Low	37027.32	50	V	SISO	172	1	1	31	64QAM	181	356	-37.97	15.53	43.00	-27.47
	Mid	38497.44	50	V	SISO	172	1	1	16	64QAM	182	355	-35.84	17.84	43.00	-25.16
	High	39966.24	50	V	SISO	172	1	1	31	64QAM	182	356	-36.59	**17.85**	43.00	-25.15
	Low	37051.80	100	H	SISO	45	1	1	0	QPSK	60	343	-36.39	17.11	43.00	-25.89
	Mid	38498.88	100	H	SISO	45	1	1	32	QPSK	65	348	-36.52	17.16	43.00	-25.84
	High	39949.92	100	H	SISO	45	1	1	65	QPSK	63	346	-38.10	16.34	43.00	-26.66
	Low	37051.80	100	H	SISO	45	1	1	0	16QAM	60	343	-36.91	16.59	43.00	-26.41
	Mid	38498.88	100	H	SISO	45	1	1	0	16QAM	65	348	-37.39	16.29	43.00	-26.71
	High	39949.92	100	H	SISO	45	1	1	0	16QAM	63	346	-38.94	15.50	43.00	-27.50
	Low	37051.80	100	H	SISO	45	1	1	0	64QAM	60	343	-39.38	14.12	43.00	-28.88
	Mid	38498.88	100	H	SISO	45	1	1	32	64QAM	65	348	-39.64	14.04	43.00	-28.96
	High	39949.92	100	H	SISO	45	1	1	65	64QAM	63	346	-41.12	13.32	43.00	-29.68
	Low	37051.80	100	V	SISO	172	1	1	0	QPSK	180	356	-33.96	19.54	43.00	-23.46
	Mid	38498.88	100	V	SISO	172	1	1	65	QPSK	182	354	-32.73	**20.95**	43.00	-22.05
	High	39949.92	100	V	SISO	172	1	1	0	QPSK	182	357	-33.72	20.72	43.00	-22.28
	Low	37051.80	100	V	SISO	172	1	1	0	16QAM	180	356	-34.61	18.89	43.00	-24.11
	Mid	38498.88	100	V	SISO	172	1	1	32	16QAM	182	354	-33.85	**19.83**	43.00	-23.17
	High	39949.92	100	V	SISO	172	1	1	0	16QAM	182	357	-34.83	19.61	43.00	-23.39
	Low	37051.80	100	V	SISO	172	1	1	0	64QAM	180	356	-36.85	16.65	43.00	-26.35
	Mid	38498.88	100	V	SISO	172	1	1	32	64QAM	182	354	-35.85	**17.83**	43.00	-25.17
	High	39949.92	100	V	SISO	172	1	1	0	64QAM	182	357	-37.00	17.44	43.00	-25.56
	Mid	38499.96	200	H	SISO	45	4	1	0	QPSK	65	347	-37.81	15.87	43.00	-27.13
	Mid	38499.96	200	H	SISO	45	4	1	0	16QAM	65	347	-38.43	15.25	43.00	-27.75
	Mid	38499.96	200	H	SISO	45	4	1	0	64QAM	65	347	-40.81	12.87	43.00	-30.13
	Mid	38499.96	200	V	SISO	172	4	1	0	QPSK	183	355	-34.11	**19.57**	43.00	-23.43
	Mid	38499.96	200	V	SISO	172	4	1	0	16QAM	183	355	-34.95	**18.73**	43.00	-24.27
	Mid	38499.96	200	V	SISO	172	4	1	0	64QAM	183	355	-37.02	**16.66**	43.00	-26.34
	Mid	38501.88	400	H	SISO	45	4	1	0	QPSK	65	347	-38.57	15.11	43.00	-27.89
	Mid	38501.88	400	H	SISO	45	4	1	0	16QAM	65	347	-39.03	14.65	43.00	-28.35
	Mid	38501.88	400	H	SISO	45	4	1	0	64QAM	65	347	-41.54	12.14	43.00	-30.86
	Mid	38501.88	400	V	SISO	172	4	1	0	QPSK	65	347	-35.22	**18.46**	43.00	-24.54
	Mid	38501.88	400	V	SISO	172	4	1	0	16QAM	65	347	-35.71	**17.97**	43.00	-25.03
	Mid	38501.88	400	V	SISO	172	4	1	0	64QAM	65	347	-37.89	**15.79**	43.00	-27.21

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	38499.96	50	H	MIMO	44	1	1	31	QPSK	57	342	-36.51	17.17	22.35	43.00	-20.65
	Mid	38499.96	50	V	MIMO	172	1	1	31	QPSK	182	355	-32.90	20.78			
	Mid	38499.96	50	H	MIMO	44	1	1	31	16QAM	57	342	-37.58	16.10	21.36	43.00	-21.64
	Mid	38499.96	50	V	MIMO	172	1	1	31	16QAM	182	355	-33.86	19.82			
	Mid	38499.96	50	H	MIMO	44	1	1	31	64QAM	57	342	-39.67	14.01	19.28	43.00	-23.72
	Mid	38499.96	50	V	MIMO	172	1	1	31	64QAM	182	355	-35.93	17.75			
	Mid	38499.96	100	H	MIMO	44	1	1	65	QPSK	52	344	-36.56	17.12	22.46	43.00	-20.54
	Mid	38499.96	100	V	MIMO	172	1	1	65	QPSK	182	354	-32.73	20.95			
	Mid	38499.96	100	H	MIMO	44	1	1	65	16QAM	52	344	-37.46	16.22	21.38	43.00	-21.62
	Mid	38499.96	100	V	MIMO	172	1	1	65	16QAM	182	354	-33.88	19.80			
	Mid	38499.96	100	H	MIMO	44	1	1	65	64QAM	52	344	-39.85	13.83	19.22	43.00	-23.78
	Mid	38499.96	100	V	MIMO	172	1	1	65	64QAM	182	354	-35.95	17.73			

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

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]	Analyzer Level [dBm]	EIRP [dBm]	Limit [dBm]	Margin [dB]
L Patch	Low	37027.32	50	H	SISO	35	1	1	0	QPSK	118	20	-36.03	17.47	43.00	-25.53
	Mid	38497.44	50	H	SISO	35	1	1	31	QPSK	110	18	-35.82	17.86	43.00	-25.14
	High	39966.24	50	H	SISO	35	1	1	0	QPSK	110	0	-38.32	16.12	43.00	-26.88
	Low	37027.32	50	H	SISO	35	1	1	0	16QAM	118	20	-36.67	16.83	43.00	-26.17
	Mid	38497.44	50	H	SISO	35	1	1	16	16QAM	110	18	-36.67	17.01	43.00	-25.99
	High	39966.24	50	H	SISO	35	1	1	0	16QAM	110	0	-39.41	15.03	43.00	-27.97
	Low	37027.32	50	H	SISO	35	1	1	0	64QAM	118	20	-38.78	14.72	43.00	-28.28
	Mid	38497.44	50	H	SISO	35	1	1	0	64QAM	110	18	-39.15	14.53	43.00	-28.47
	High	39966.24	50	H	SISO	35	1	1	0	64QAM	110	0	-41.07	13.37	43.00	-29.63
	Low	37027.32	50	H	SISO	164	1	1	0	QPSK	205	281	-35.77	17.73	43.00	-25.27
	Mid	38497.44	50	H	SISO	164	1	1	0	QPSK	206	280	-35.20	**18.48**	43.00	-24.52
	High	39966.24	50	H	SISO	176	1	1	0	QPSK	200	264	-36.50	17.94	43.00	-25.06
	Low	37027.32	50	H	SISO	164	1	1	0	16QAM	205	281	-36.75	16.75	43.00	-26.25
	Mid	38497.44	50	H	SISO	164	1	1	0	16QAM	206	280	-36.62	**17.06**	43.00	-25.94
	High	39966.24	50	H	SISO	176	1	1	0	16QAM	200	264	-37.38	17.06	43.00	-25.94
	Low	37027.32	50	H	SISO	164	1	1	0	64QAM	205	281	-38.81	14.69	43.00	-28.31
	Mid	38497.44	50	H	SISO	164	1	1	0	64QAM	206	280	-38.32	**15.36**	43.00	-27.64
	High	39966.24	50	H	SISO	176	1	1	0	64QAM	200	264	-39.56	14.88	43.00	-28.12
	Low	37051.80	100	H	SISO	35	1	1	0	QPSK	115	30	-36.26	17.24	43.00	-25.76
	Mid	38498.88	100	H	SISO	35	1	1	0	QPSK	110	19	-36.30	17.38	43.00	-25.62
	High	39949.92	100	H	SISO	35	1	1	32	QPSK	109	5	-38.66	15.78	43.00	-27.22
	Low	37051.80	100	H	SISO	35	1	1	0	16QAM	115	30	-36.75	16.75	43.00	-26.25
	Mid	38498.88	100	H	SISO	35	1	1	0	16QAM	110	19	-36.33	17.35	43.00	-25.65
	High	39949.92	100	H	SISO	35	1	1	65	16QAM	109	5	-39.26	15.18	43.00	-27.82
	Low	37051.80	100	H	SISO	35	1	1	0	64QAM	115	30	-38.86	14.64	43.00	-28.36
	Mid	38498.88	100	H	SISO	35	1	1	0	64QAM	110	19	-38.01	15.67	43.00	-27.33
	High	39949.92	100	H	SISO	35	1	1	0	64QAM	109	5	-41.16	13.28	43.00	-29.72
	Low	37051.80	100	H	SISO	164	1	1	0	QPSK	205	281	-35.54	17.96	43.00	-25.04
	Mid	38498.88	100	H	SISO	164	1	1	0	QPSK	206	280	-35.16	**18.52**	43.00	-24.48
	High	39949.92	100	H	SISO	176	1	1	65	QPSK	200	264	-36.18	18.26	43.00	-24.74
	Low	37051.80	100	H	SISO	164	1	1	32	16QAM	205	281	-36.44	17.06	43.00	-25.94
	Mid	38498.88	100	H	SISO	164	1	1	0	16QAM	206	280	-35.89	**17.79**	43.00	-25.21
	High	39949.92	100	H	SISO	176	1	1	65	16QAM	200	264	-37.24	17.20	43.00	-25.80
	Low	37051.80	100	H	SISO	164	1	1	32	64QAM	205	281	-38.40	15.10	43.00	-27.90
	Mid	38498.88	100	H	SISO	164	1	1	32	64QAM	206	280	-37.81	**15.87**	43.00	-27.13
	High	39949.92	100	H	SISO	176	1	1	65	64QAM	200	264	-39.35	15.09	43.00	-27.91
	Mid	38499.96	200	H	SISO	35	4	1	0	QPSK	206	280	-37.14	**16.54**	43.00	-26.46
	Mid	38499.96	200	H	SISO	35	4	1	0	16QAM	206	280	-37.62	**16.06**	43.00	-26.94
	Mid	38499.96	200	H	SISO	35	4	1	0	64QAM	206	280	-39.73	**13.95**	43.00	-29.05
	Mid	38499.96	200	H	SISO	164	4	1	0	QPSK	208	281	-37.35	16.33	43.00	-26.67
	Mid	38499.96	200	H	SISO	164	4	1	0	16QAM	208	281	-37.87	15.81	43.00	-27.19
	Mid	38499.96	200	H	SISO	164	4	1	0	64QAM	208	281	-39.79	13.89	43.00	-29.11
	Mid	38501.88	400	H	SISO	35	4	1	0	QPSK	206	280	-37.68	16.00	43.00	-27.00
	Mid	38501.88	400	H	SISO	35	4	1	0	16QAM	206	280	-38.03	15.65	43.00	-27.35
	Mid	38501.88	400	H	SISO	35	4	1	0	64QAM	206	280	-39.94	13.74	43.00	-29.26
	Mid	38501.88	400	H	SISO	164	4	1	0	QPSK	207	281	-37.11	**16.57**	43.00	-26.43
	Mid	38501.88	400	H	SISO	164	4	1	0	16QAM	207	281	-37.60	**16.08**	43.00	-26.92
	Mid	38501.88	400	H	SISO	164	4	1	0	64QAM	207	281	-39.77	**13.91**	43.00	-29.09

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	38499.96	50	H	MIMO	48	1	1	31	QPSK	125	25	-35.81	17.87	20.21	43.00	-22.79
	Mid	38499.96	50	H	MIMO	176	1	1	31	QPSK	199	267	-37.27	16.41			
	Mid	38499.96	50	H	MIMO	48	1	1	31	16QAM	125	25	-36.74	16.94	19.90	43.00	-23.10
	Mid	38499.96	50	H	MIMO	176	1	1	31	16QAM	199	267	-36.84	16.84			
	Mid	38499.96	50	H	MIMO	48	1	1	31	64QAM	125	25	-39.44	14.24	17.75	43.00	-25.25
	Mid	38499.96	50	H	MIMO	176	1	1	31	64QAM	199	267	-38.49	15.19			
	Mid	38499.96	100	H	MIMO	48	1	1	0	QPSK	122	27	-36.33	17.35	21.00	43.00	-22.00
	Mid	38499.96	100	H	MIMO	176	1	1	0	QPSK	201	266	-35.14	18.54			
	Mid	38499.96	100	H	MIMO	48	1	1	0	16QAM	122	27	-36.39	17.29	20.56	43.00	-22.44
	Mid	38499.96	100	H	MIMO	176	1	1	0	16QAM	201	266	-35.88	17.80			
	Mid	38499.96	100	H	MIMO	48	1	1	0	64QAM	122	27	-37.97	15.71	18.78	43.00	-24.22
	Mid	38499.96	100	H	MIMO	176	1	1	0	64QAM	201	266	-37.86	15.82			

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

7.4 Radiated Spurious and Harmonic Emissions

§2.1051, §30.203

Test Overview

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

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

Test Procedure Used

ANSI C63.26-2015 Section 5.7.4

Test Settings

1. Start frequency was set to 30MHz and stop frequency was set to 200 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 1-200GHz show corrected average EIRP levels. Plots below 1GHz are corrected field strength levels. The average EIRP reported below is calculated per section 5.2.7 of ANSI C63.26-2015 which states: EIRP (dBm) = E (dBμV/m) + 20log(D) − 104.8; where D is the measurement distance (in the far field region) in m. The field strength E is calculated E (dBμV/m) = Spectrum Analyzer Level (dBm) + Antenna Factor (dB/m) + Cable Loss (dB) + Harmonic Mixer Conversion Loss (dB) + 107. All appropriate Antenna Factor and Cable Loss have been applied in the spectrum analyzer for each measurement. For measurements > 40GHz, Harmonic Mixer Conversion Loss was also applied to the spectrum analyzer.

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

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

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

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

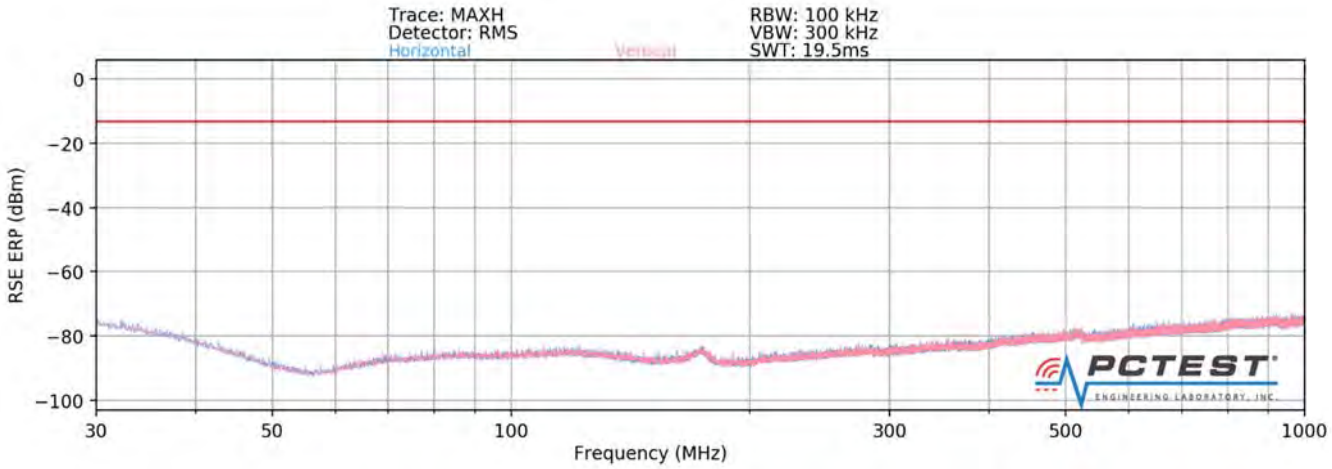
7) All RSE's were measured with 1CC. It was determined that adding more CC's causes the overall amplitude of just 1CC to decrease, therefore, 1CC is the worst case for the purposes of spurious emissions measurements.

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

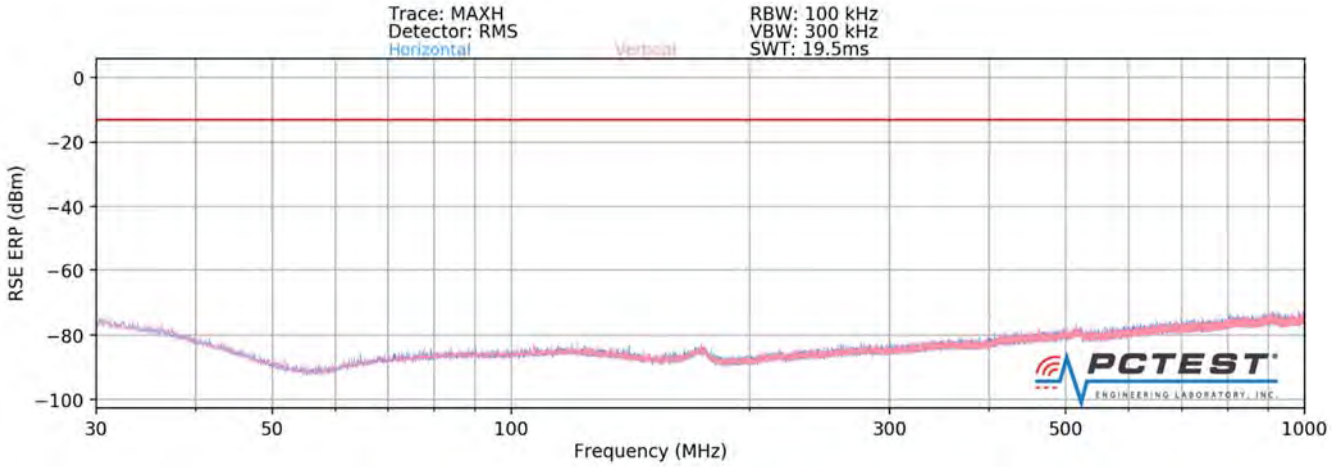
9) All RSE's were investigated in EN-DC mode and with 802.11 chipset active. It was determined that there is no new emission introduced by EN-DC mode, or the 802.11 chipset. For EN-DC mode, the anchor bands are: LTE B12, B13, B5, B4, B66, B2 and B30.

7.4.1 J Dipole Radiated Spurious Emissions

30MHz – 1GHz

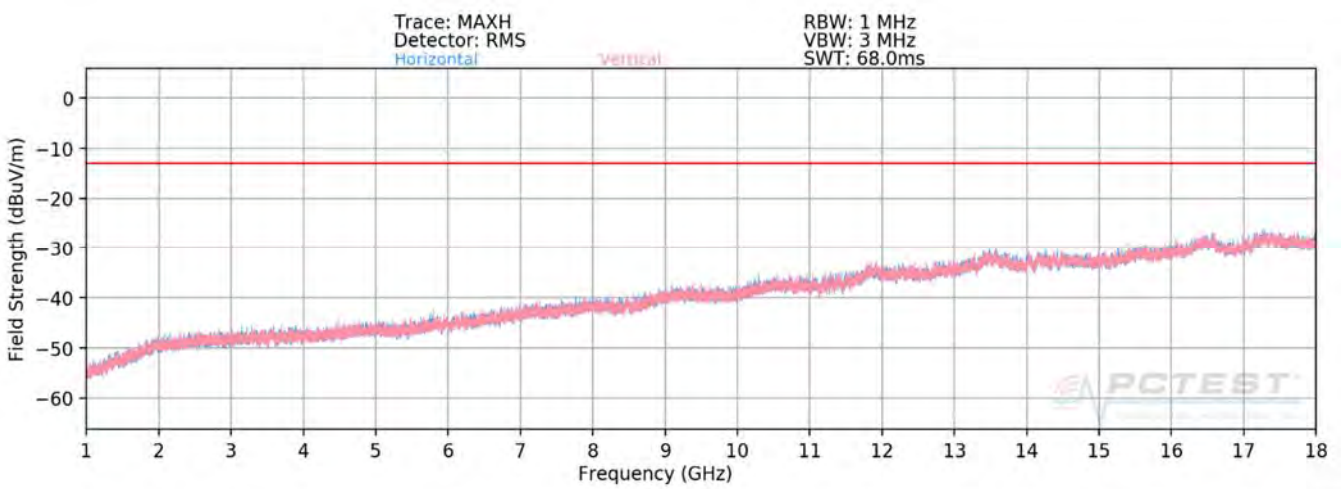


Plot 7-49. J Dipole Radiated Spurious Plot 30 MHz - 1 GHz (1CC QPSK Mid Channel H Beam)

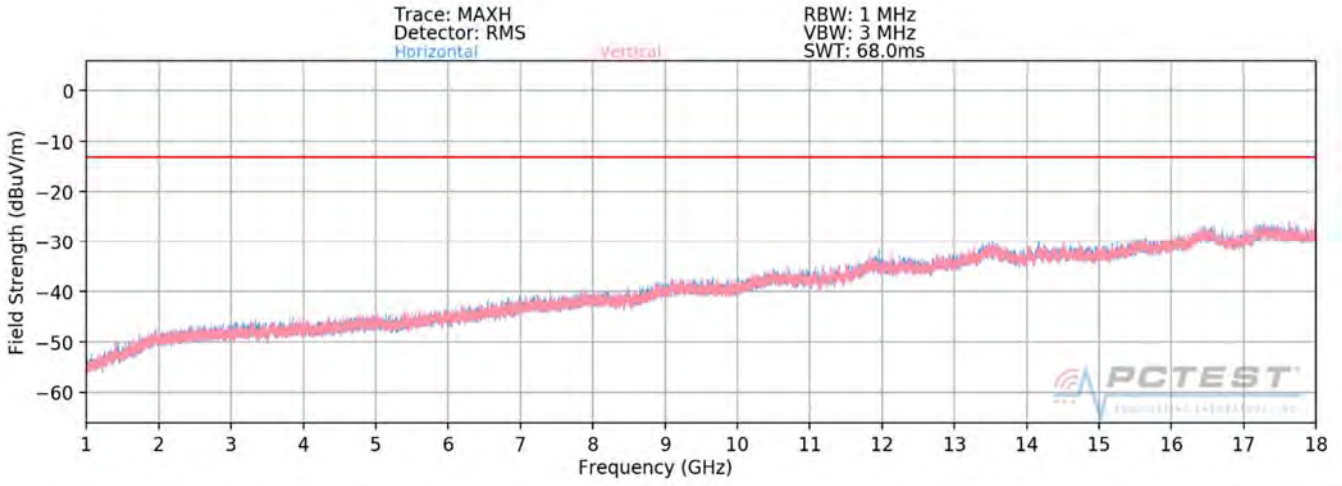


Plot 7-50. J Dipole Radiated Spurious Plot 30 MHz - 1 GHz (1CC QPSK Mid Channel V Beam)

1 – 18GHz

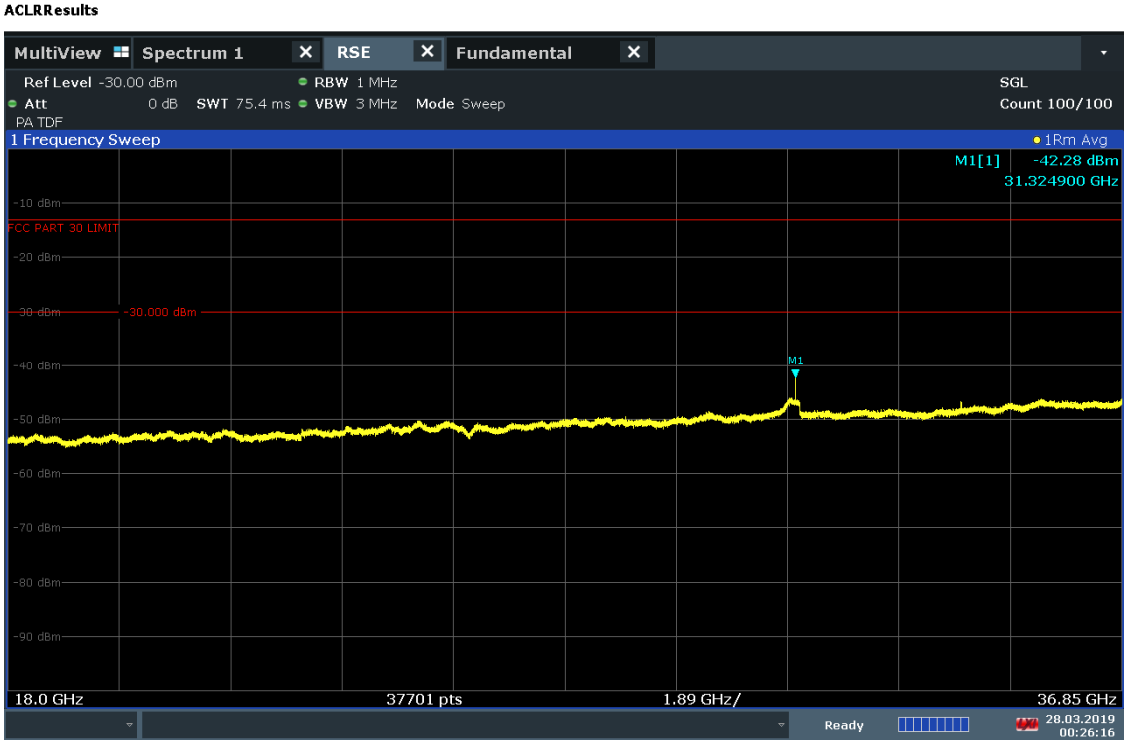


Plot 7-51. J Dipole Radiated Spurious Plot 1-18 GHz (1CC QPSK Mid Channel H Beam)

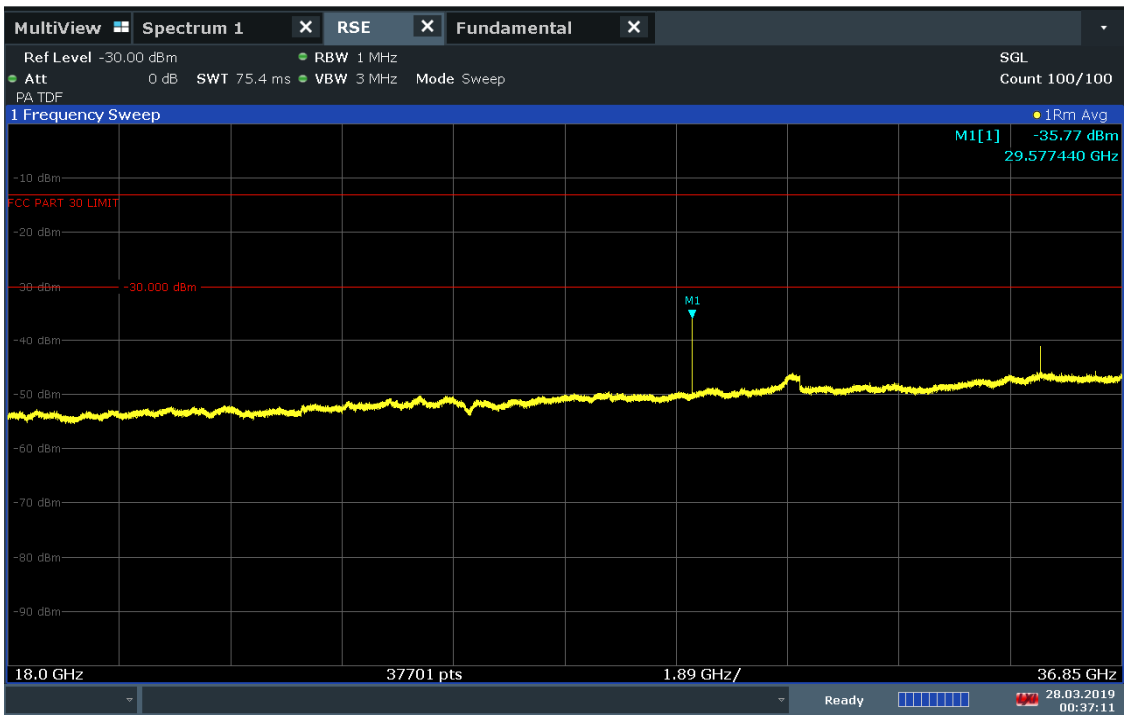


Plot 7-52. J Dipole Radiated Spurious Plot 1-18 GHz (1CC QPSK Mid Channel V Beam)

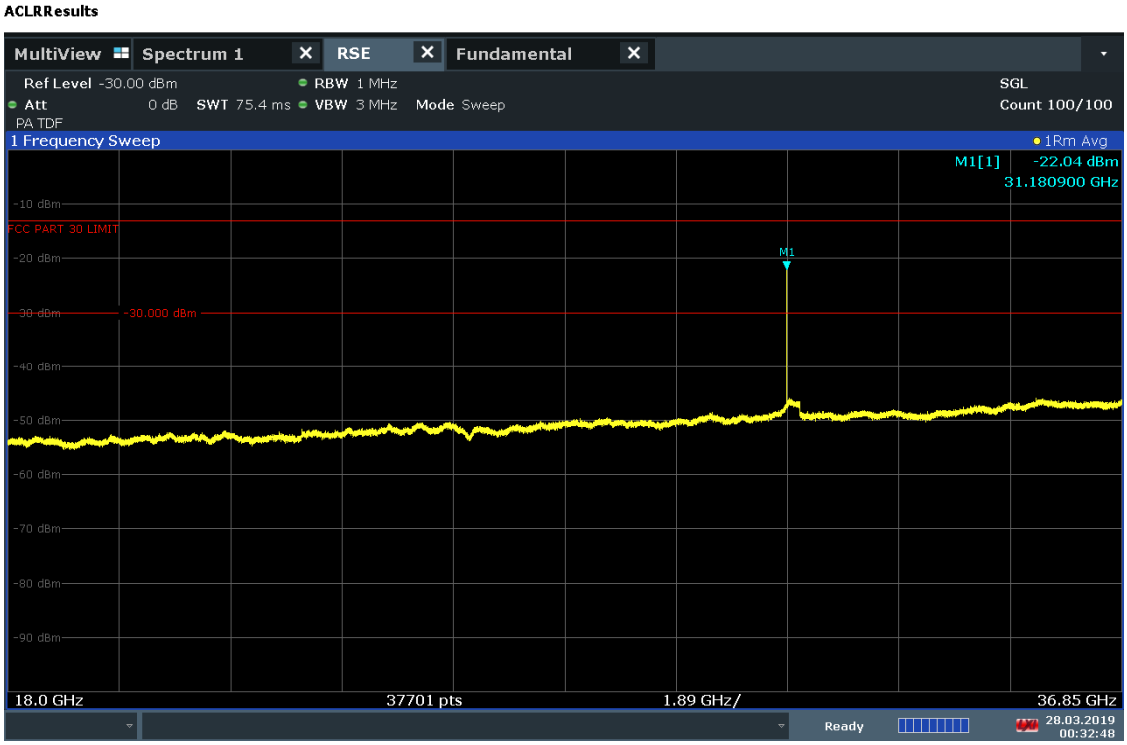
18 – 36.85GHz



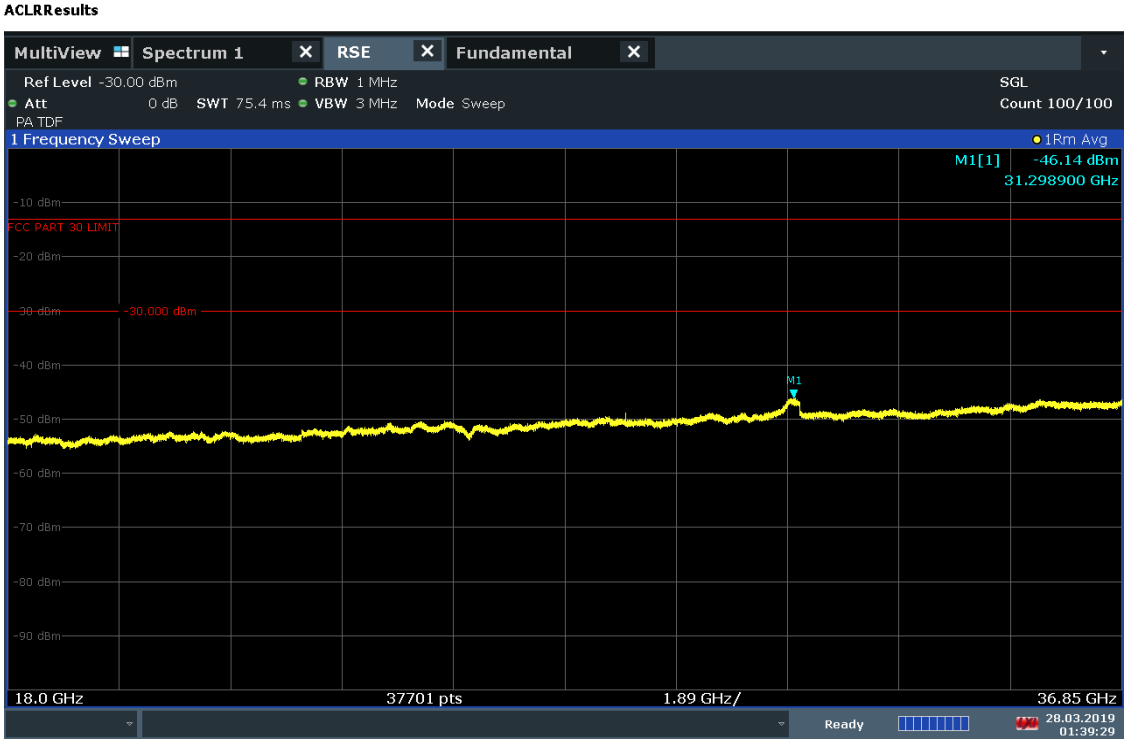
Plot 7-53. J Dipole Radiated Spurious Plot 18-36.85 GHz (1CC QPSK Low Channel H Beam)



Plot 7-54. J Dipole Radiated Spurious Plot 18-36.85 GHz (1CC QPSK Mid Channel H Beam)

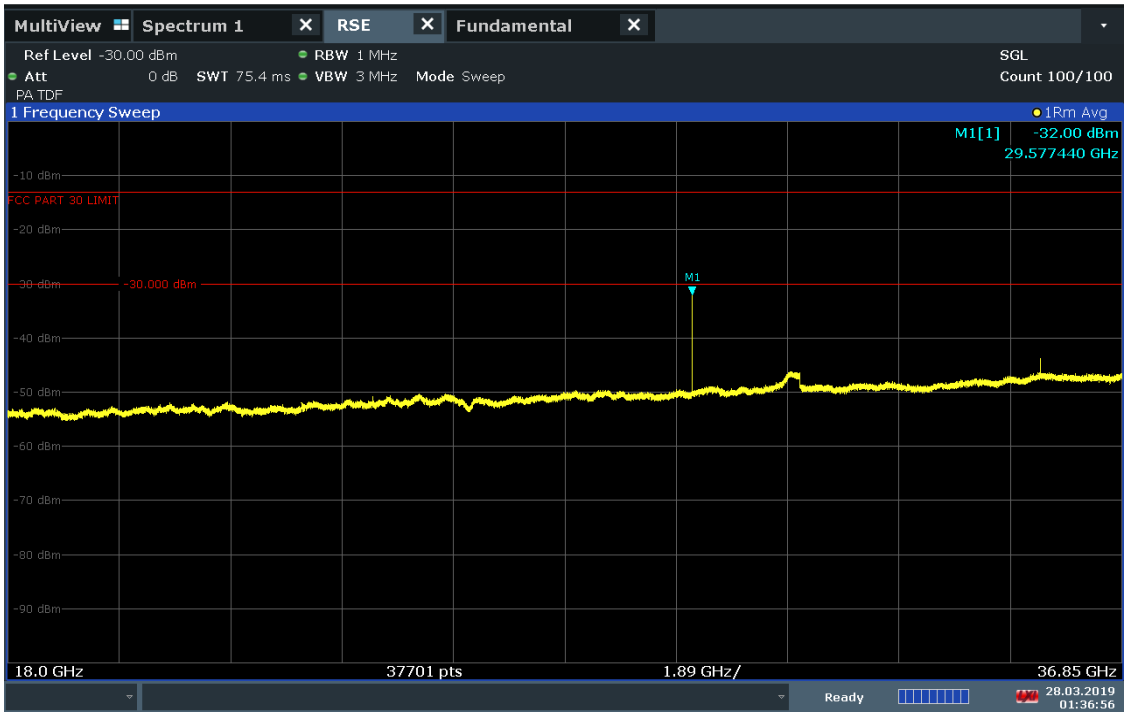


Plot 7-55. J Dipole Radiated Spurious Plot 18-36.85 GHz (1CC QPSK High Channel H Beam)



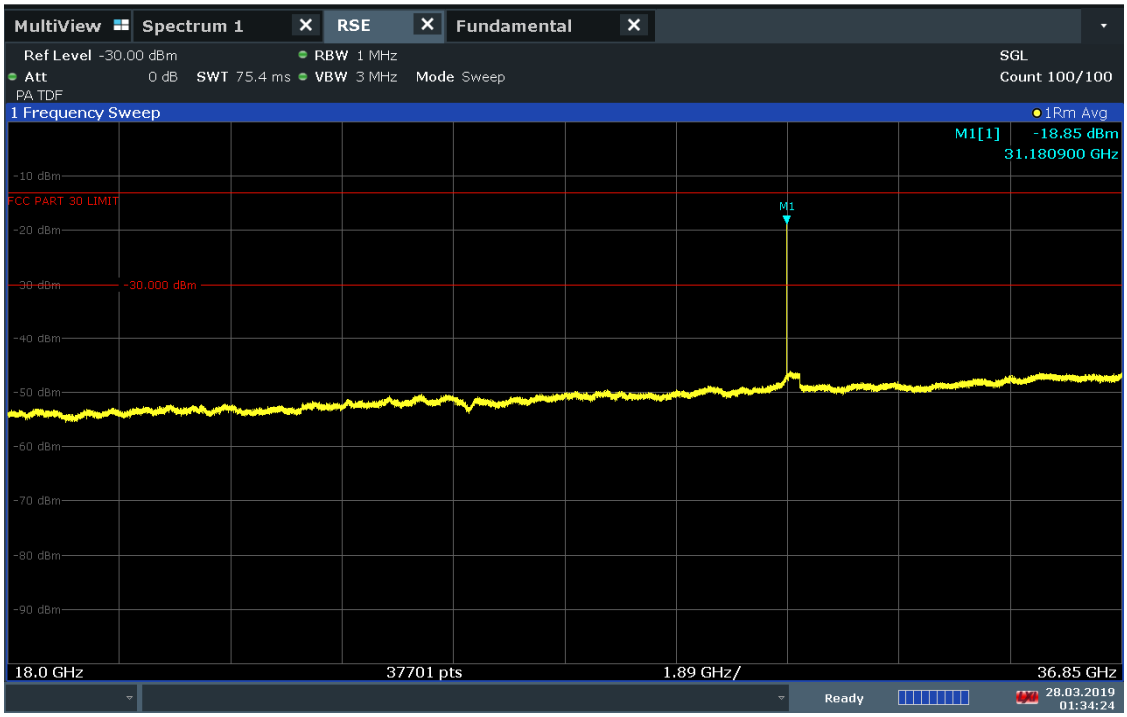
Plot 7-56. J Dipole Radiated Spurious Plot 18-36.85 GHz (1CC QPSK Low Channel V Beam)

ACLRResults



Plot 7-57. J Dipole Radiated Spurious Plot 18-36.85 GHz (1CC QPSK Mid Channel V Beam)

ACLRResults



Plot 7-58. J Dipole Radiated Spurious Plot 18-36.85 GHz (1CC QPSK High Channel V Beam)

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]
31324.90	RMS/Avg	Low	50	QPSK	H	V	150	222	-42.28	-13.00	-29.28
29577.44	RMS/Avg	Mid	50	QPSK	H	V	150	245	-35.77	-13.00	-22.77
31180.90	RMS/Avg	High	50	QPSK	H	V	150	238	-22.04	-13.00	-9.04
31298.90	RMS/Avg	Low	50	QPSK	V	V	150	242	-46.14	-13.00	-33.14
29577.40	RMS/Avg	Mid	50	QPSK	V	V	150	337	-32.00	-13.00	-19.00
31180.90	RMS/Avg	High	50	QPSK	V	V	150	311	-18.85	-13.00	-5.85

Table 7-15. J Dipole Spurious Emissions Table (18-36.85GHz)

Notes

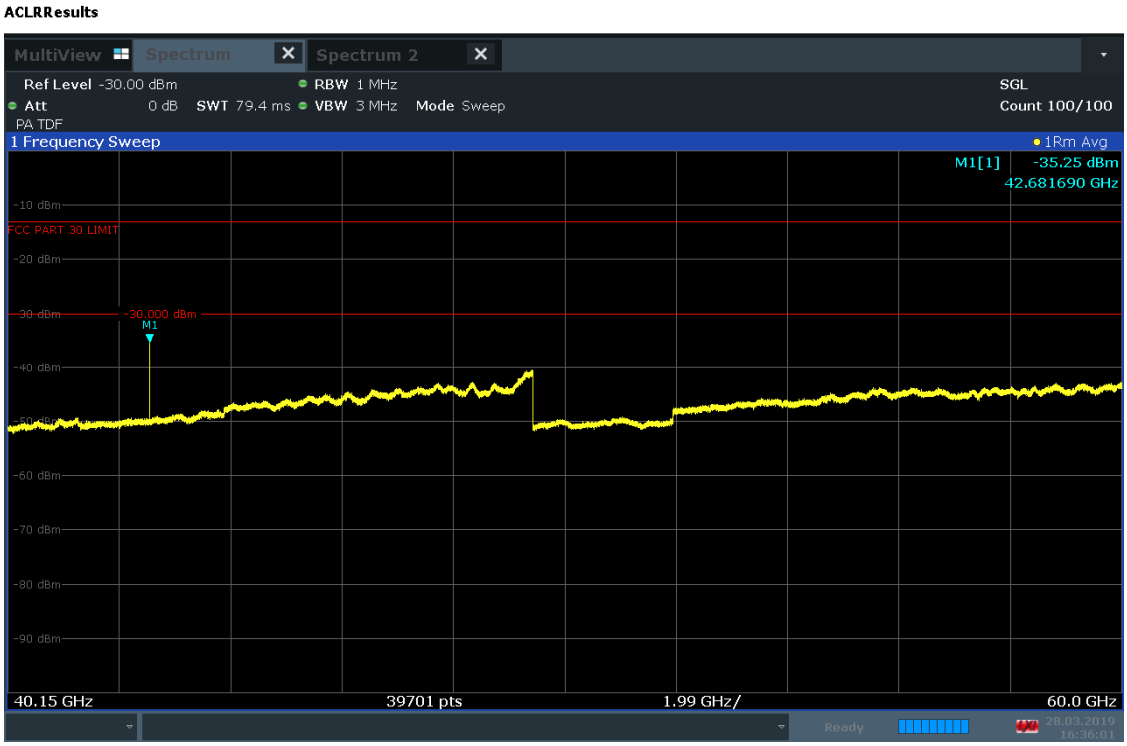
1. The RSE EIRP level is taken directly from the spectrum analyzer which includes the appropriate antenna factors, cable losses, and harmonic mixer conversion losses. Measurements were performed at a distance of 1 meter.

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:

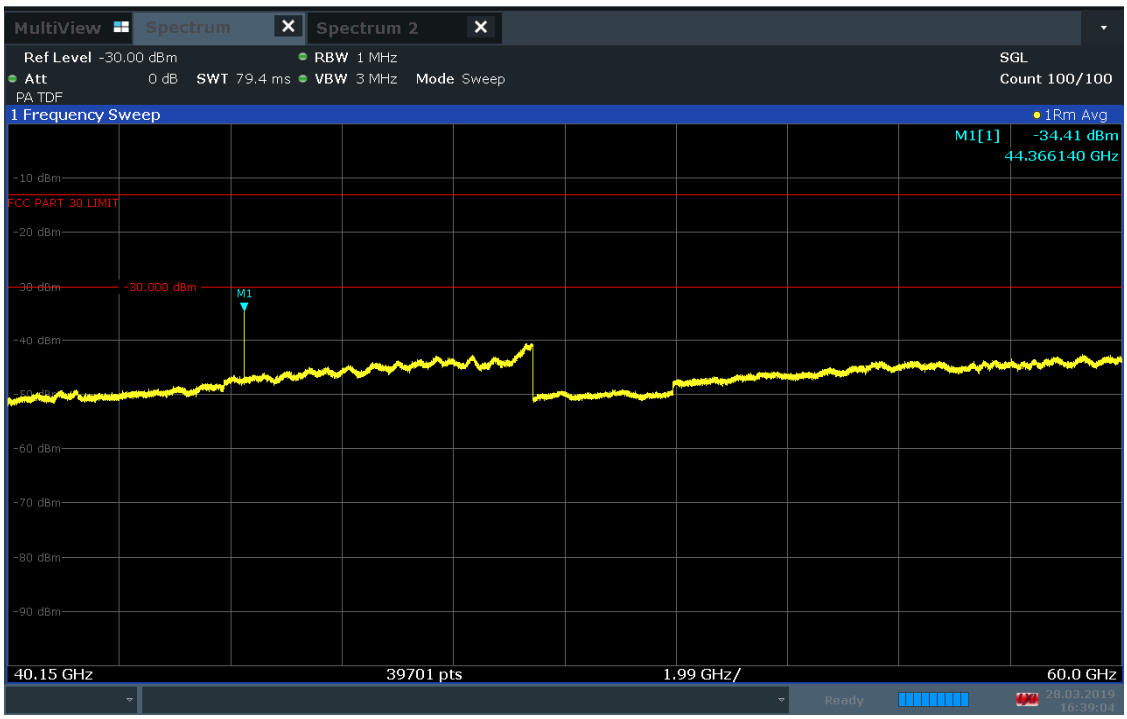
EIRP(H Beam) + EIRP(V Beam) = EIRP(MIMO)

(-22.04 dBm + -18.85 dBm) = (6.25 µW + 13.03 µW) = (19.28 µW) = -17.15 dBm

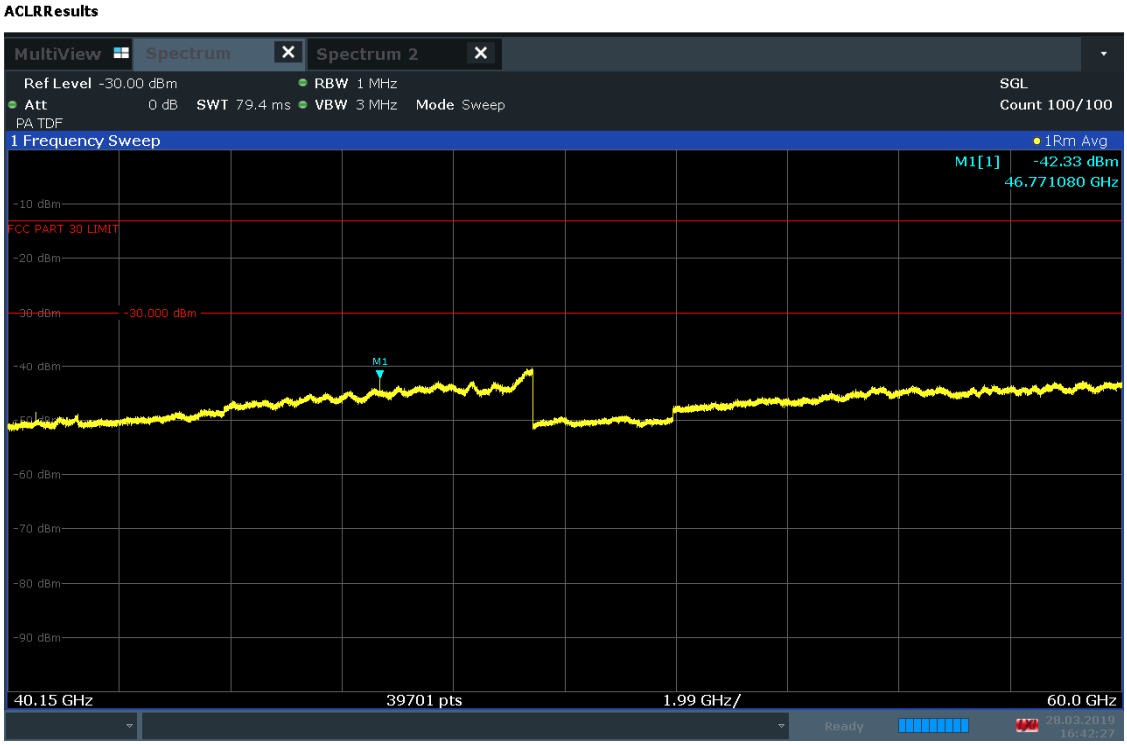
40.15 – 60GHz



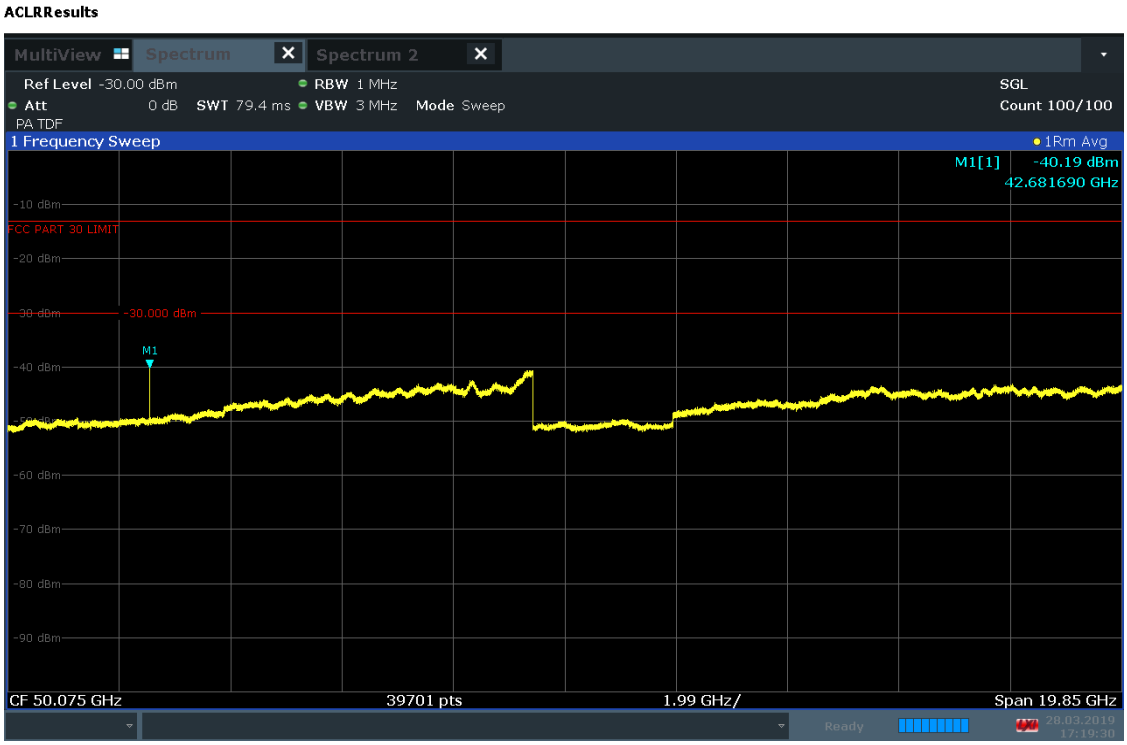
Plot 7-59. J Dipole Radiated Spurious Plot 40.15-60 GHz (1CC QPSK Low Channel H Beam)



Plot 7-60. J Dipole Radiated Spurious Plot 40.15-60 GHz (1CC QPSK Mid Channel H Beam)

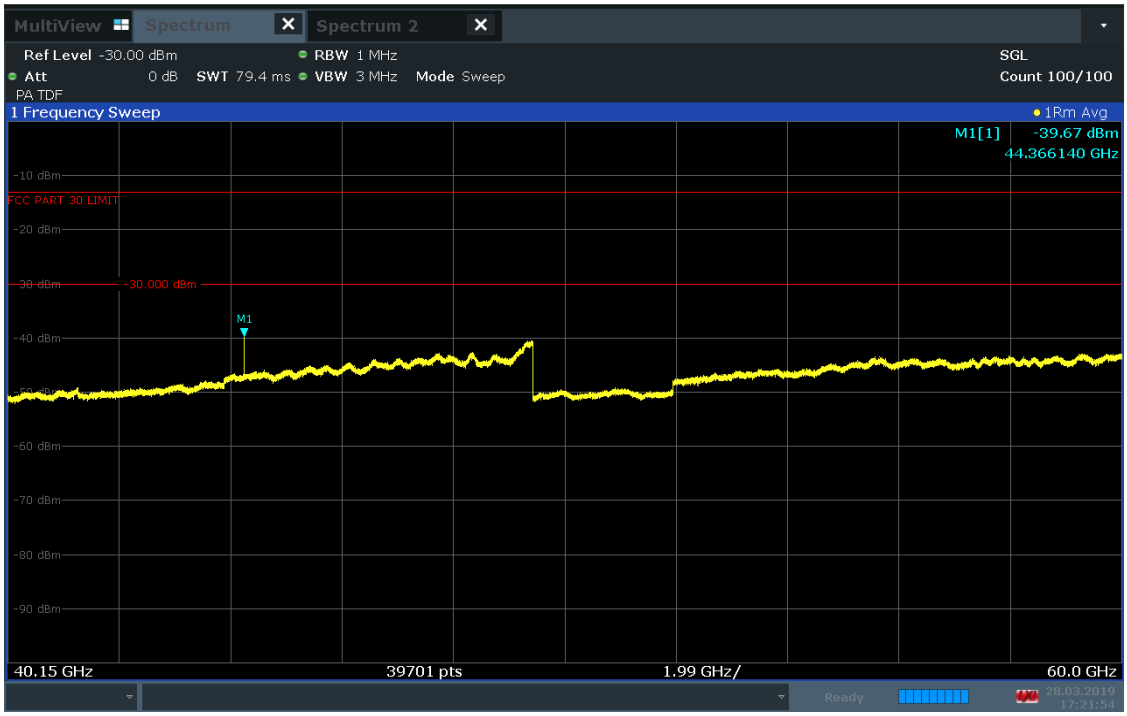


Plot 7-61. J Dipole Radiated Spurious Plot 40.15-60 GHz (1CC QPSK High Channel H Beam)



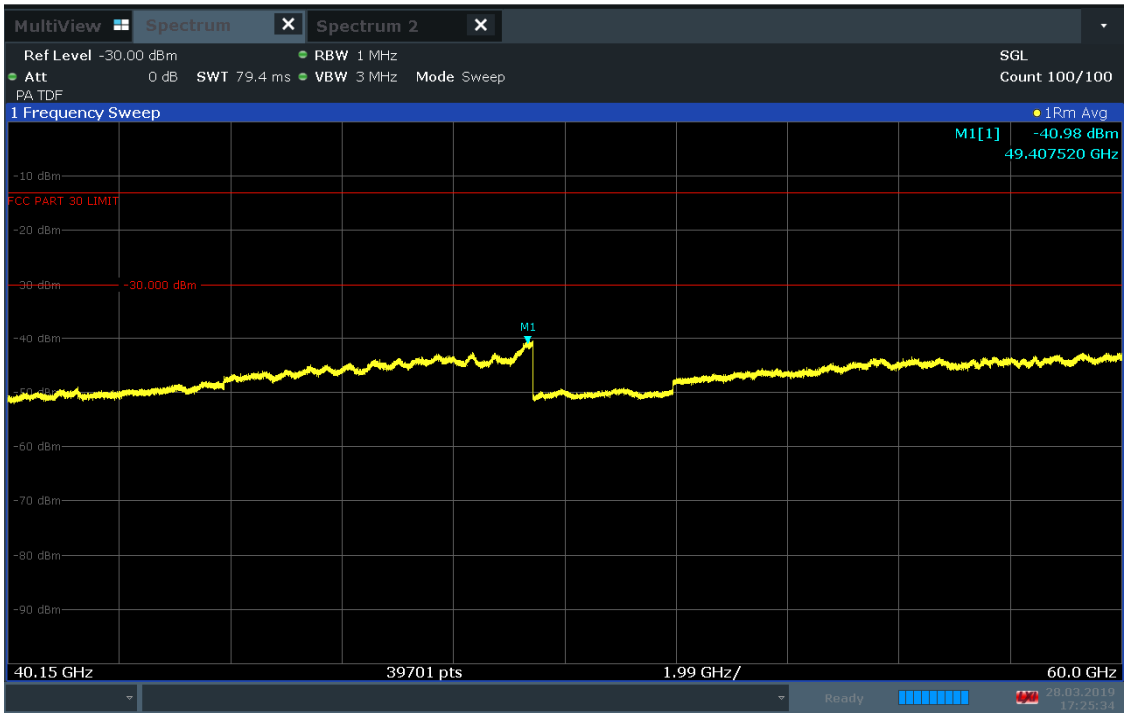
Plot 7-62. J Dipole Radiated Spurious Plot 40.15-60 GHz (1CC QPSK Low Channel V Beam)

ACLRResults



Plot 7-63. J Dipole Radiated Spurious Plot 40.15-60 GHz (1CC QPSK Mid Channel V Beam)

ACLRResults



Plot 7-64. J Dipole Radiated Spurious Plot 40.15-60 GHz (1CC QPSK High Channel V Beam)

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]
42681.69	RMS/Avg	Low	50	QPSK	H	V	150	246	-35.25	-13.00	-22.25
44366.14	RMS/Avg	Mid	50	QPSK	H	V	150	250	-34.41	-13.00	-21.41
46771.08	RMS/Avg	High	50	QPSK	H	V	150	233	-42.33	-13.00	-29.33
42681.69	RMS/Avg	Low	50	QPSK	V	V	150	251	-40.19	-13.00	-27.19
44366.14	RMS/Avg	Mid	50	QPSK	V	V	150	322	-39.67	-13.00	-26.67
49407.52	RMS/Avg	High	50	QPSK	V	V	150	313	-40.98	-13.00	-27.98

Table 7-16. J Dipole Spurious Emissions Table (40.15-60 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 1.5 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)

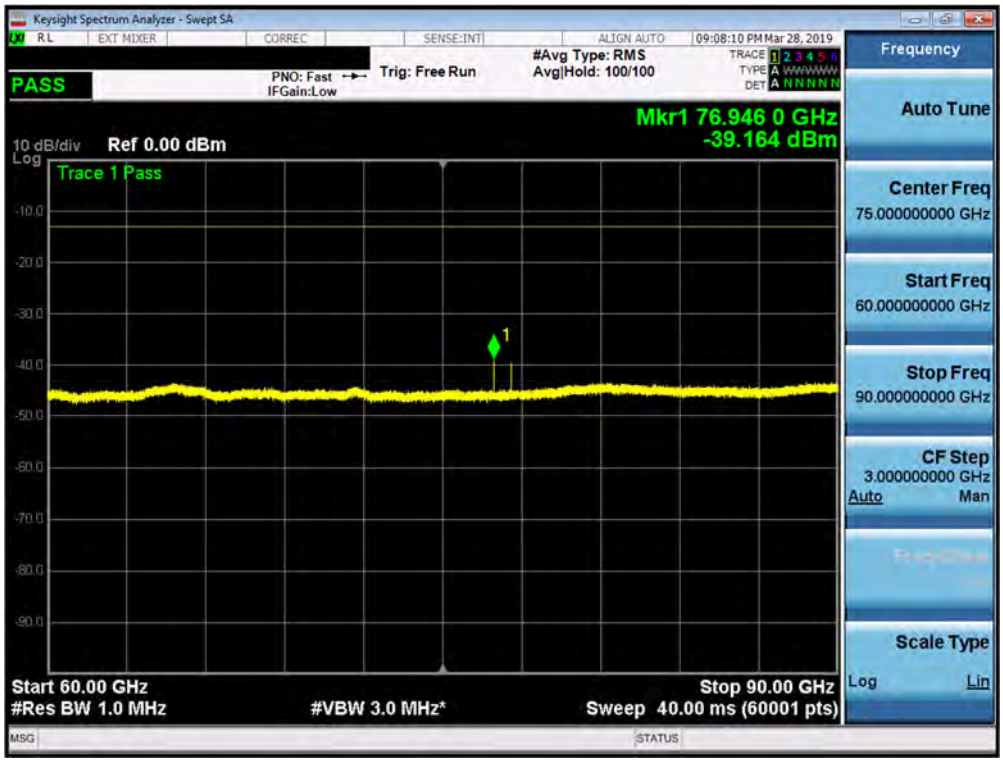
(-34.41 dBm + -39.67 dBm) = (362.24 nW + 107.89 nW) = (470.13 nW) = -33.28 dBm

Plot 7-65. J Dipole Radiated Spurious Plot 60-90 GHz (1CC QPSK Low Channel H Beam)

Plot 7-66. J Dipole Radiated Spurious Plot 60-90 GHz (1CC QPSK Mid Channel H Beam)

Plot 7-67. J Dipole Radiated Spurious Plot 60-90 GHz (1CC QPSK High Channel H Beam)

Plot 7-68. J Dipole Radiated Spurious Plot 60-90 GHz (1CC QPSK Low Channel V Beam)



Plot 7-69. J Dipole Radiated Spurious Plot 60-90 GHz (1CC QPSK Mid Channel V Beam)

Plot 7-70. J Dipole Radiated Spurious Plot 60-90 GHz (1CC QPSK High Channel V Beam)

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]
74006.00	RMS/Avg	Low	50	QPSK	H	H	150	259	-39.38	-13.00	-26.38
76946.00	RMS/Avg	Mid	50	QPSK	H	H	150	260	-41.77	-13.00	-28.77
79844.00	RMS/Avg	High	50	QPSK	H	H	150	220	-40.14	-13.00	-27.14
74006.50	RMS/Avg	Low	50	QPSK	V	H	150	233	-43.10	-13.00	-30.10
76946.00	RMS/Avg	Mid	50	QPSK	V	H	150	252	-39.16	-13.00	-26.16
79884.50	RMS/Avg	High	50	QPSK	V	H	150	311	-43.13	-13.00	-30.13

Table 7-17. J Dipole Spurious Emissions Table (60-90GHz)

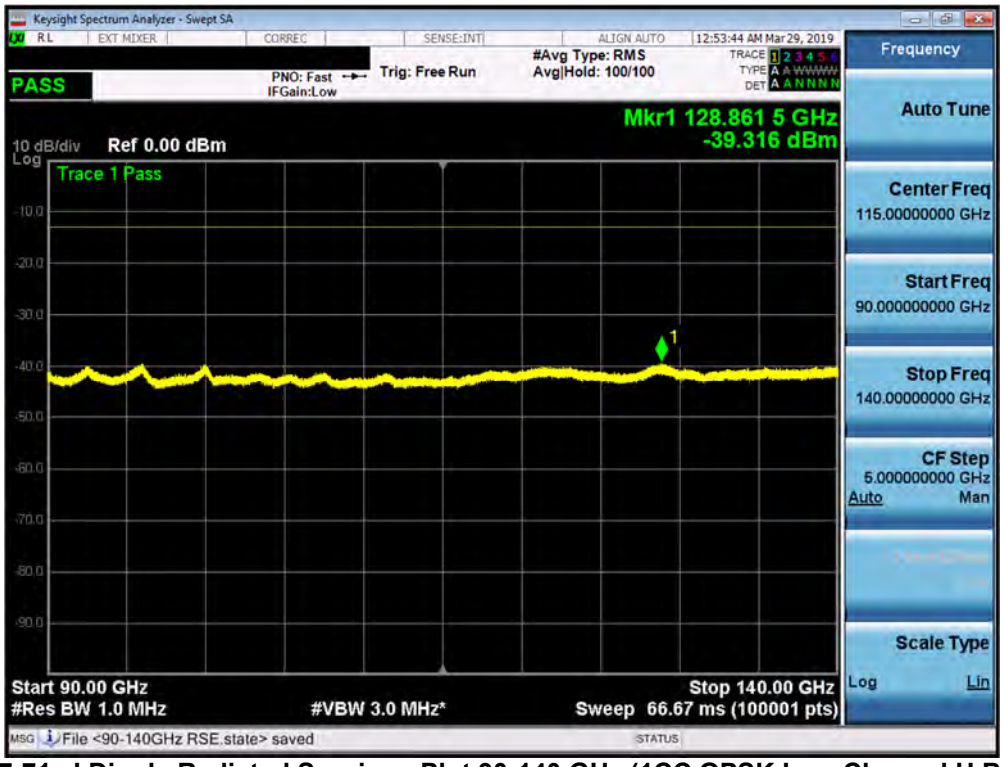
Notes

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.

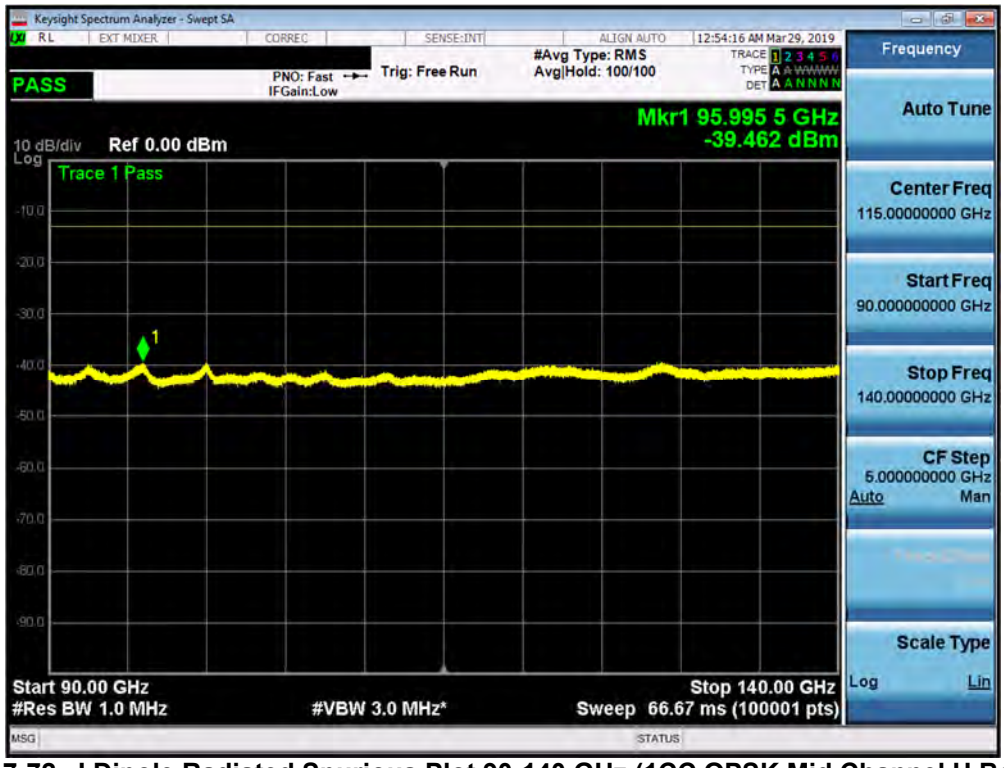
2. To address compliance of MIMO RSE per KDB 662911 D01, the MIMO RSE EIRP is calculated by summing the worst case H Beam EIRP and V Beam EIRP in linear powers units then converted back to dBm:

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

(-41.77 dBm + -39.16 dBm) = (66.53 nW + 121.33 nW) = (187.87 nW) = -37.26 dBm

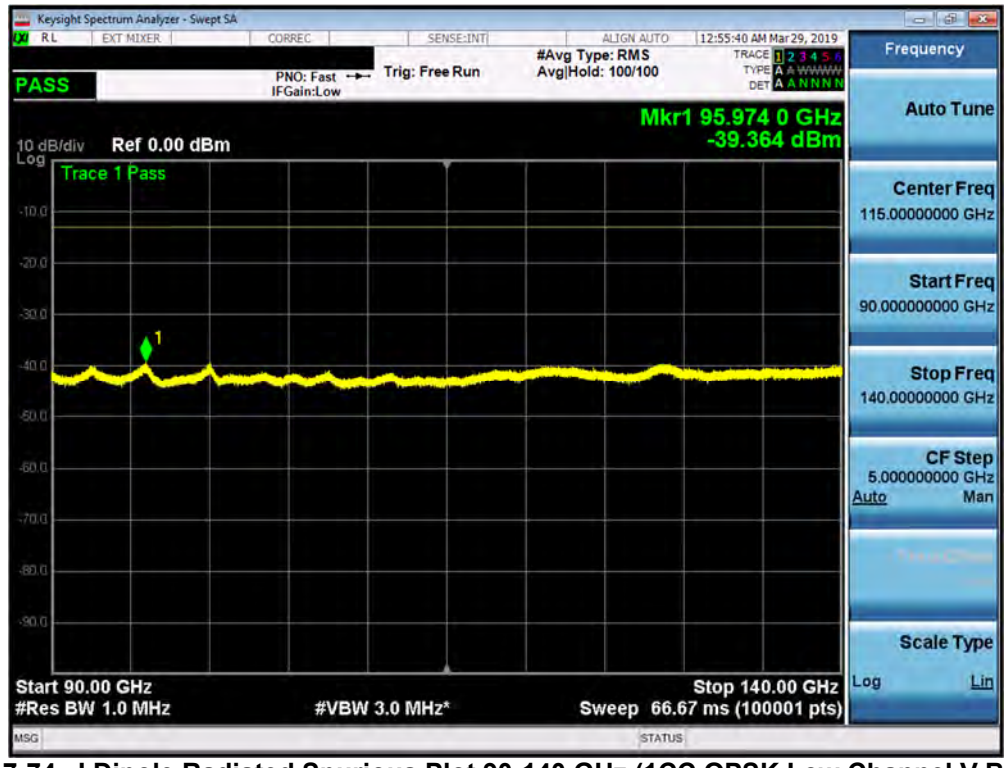


Plot 7-71. J Dipole Radiated Spurious Plot 90-140 GHz (1CC QPSK Low Channel H Beam)

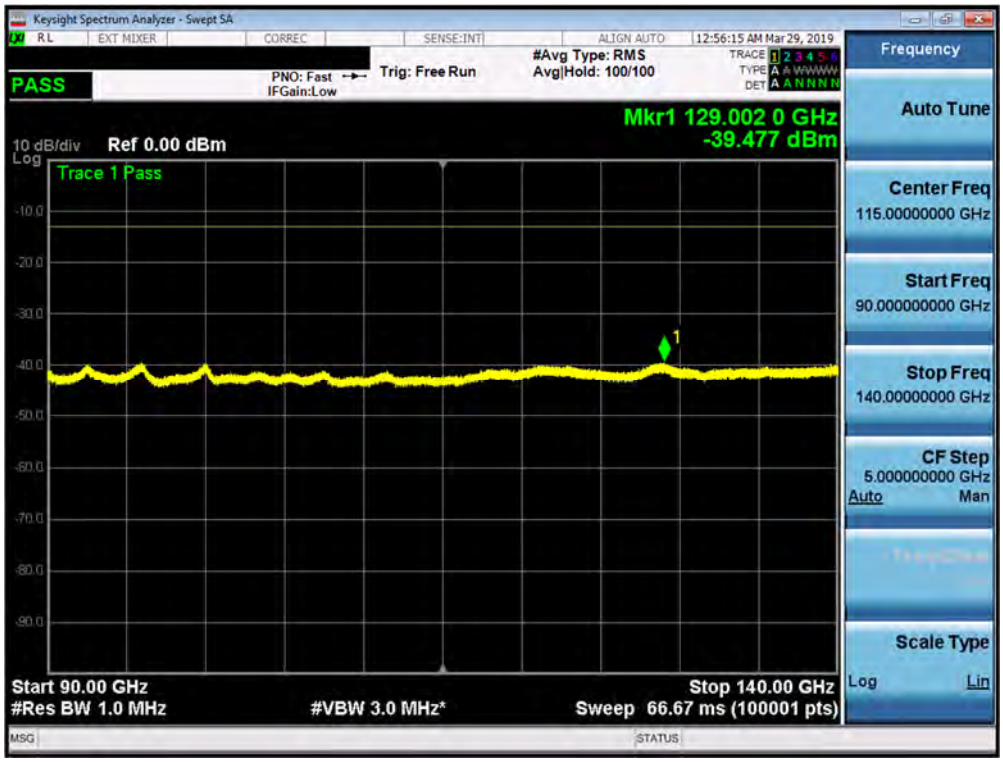


Plot 7-72. J Dipole Radiated Spurious Plot 90-140 GHz (1CC QPSK Mid Channel H Beam)

Plot 7-73. J Dipole Radiated Spurious Plot 90-140 GHz (1CC QPSK High Channel H Beam)



Plot 7-74. J Dipole Radiated Spurious Plot 90-140 GHz (1CC QPSK Low Channel V Beam)



Plot 7-75. J Dipole Radiated Spurious Plot 90-140 GHz (1CC QPSK Mid Channel V Beam)

Plot 7-76. J Dipole Radiated Spurious Plot 90-140 GHz (1CC QPSK High Channel V Beam)

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]
128861.50	RMS/Avg	Low	50	QPSK	H	H	-	-	-39.32	-13.00	-26.32
95995.50	RMS/Avg	Mid	50	QPSK	H	H	-	-	-39.46	-13.00	-26.46
128472.00	RMS/Avg	High	50	QPSK	H	H	-	-	-39.38	-13.00	-26.38
95974.00	RMS/Avg	Low	50	QPSK	V	H	-	-	-39.36	-13.00	-26.36
129002.00	RMS/Avg	Mid	50	QPSK	V	H	-	-	-39.48	-13.00	-26.48
95988.00	RMS/Avg	High	50	QPSK	V	H	-	-	-39.24	-13.00	-26.24

Table 7-18. J Dipole Spurious Emissions Table (90-140GHz)

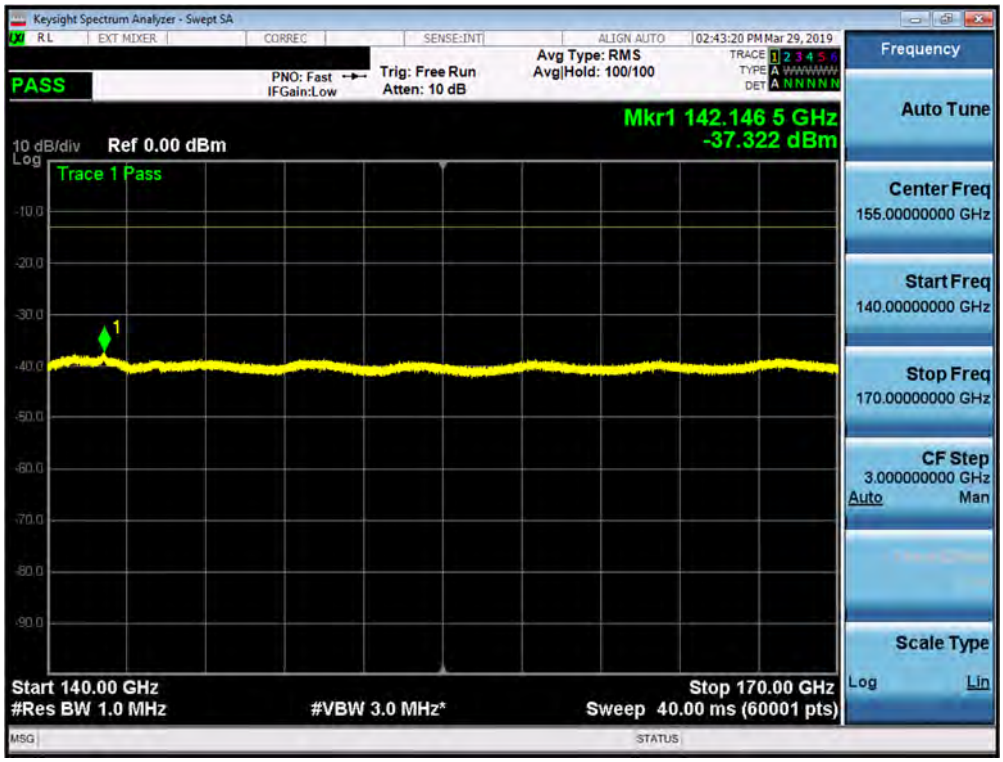
Notes

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.

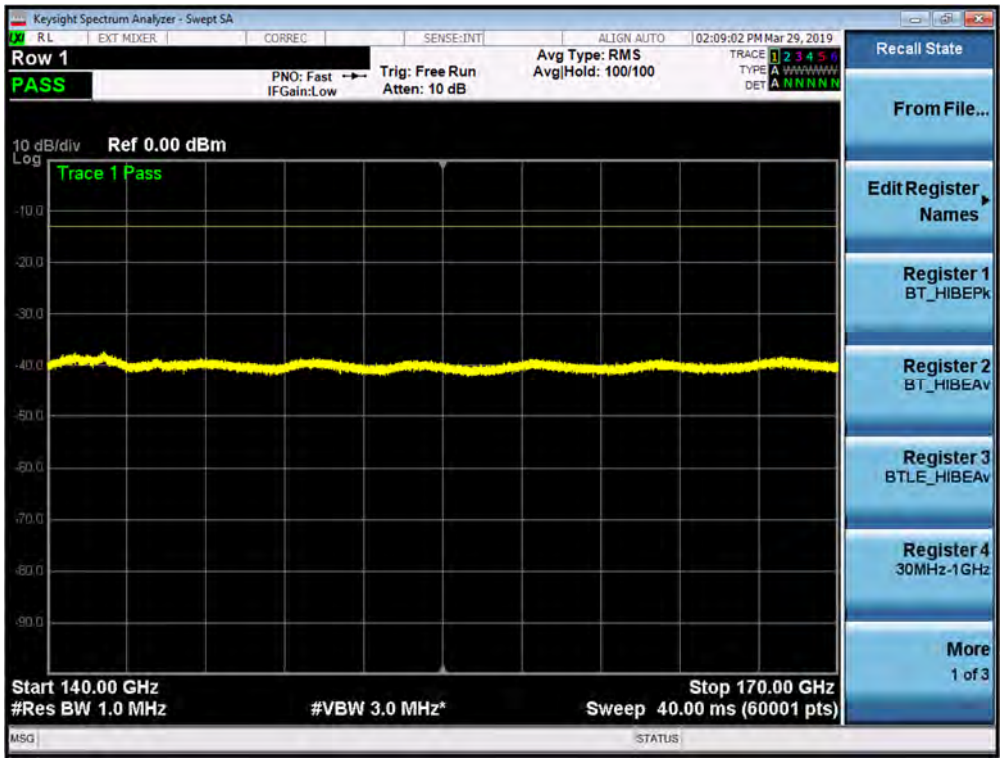
2. To address compliance of MIMO RSE per KDB 662911 D01, the MIMO RSE EIRP is calculated by summing the worst case H Beam EIRP and V Beam EIRP in linear powers units then converted back to dBm:

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

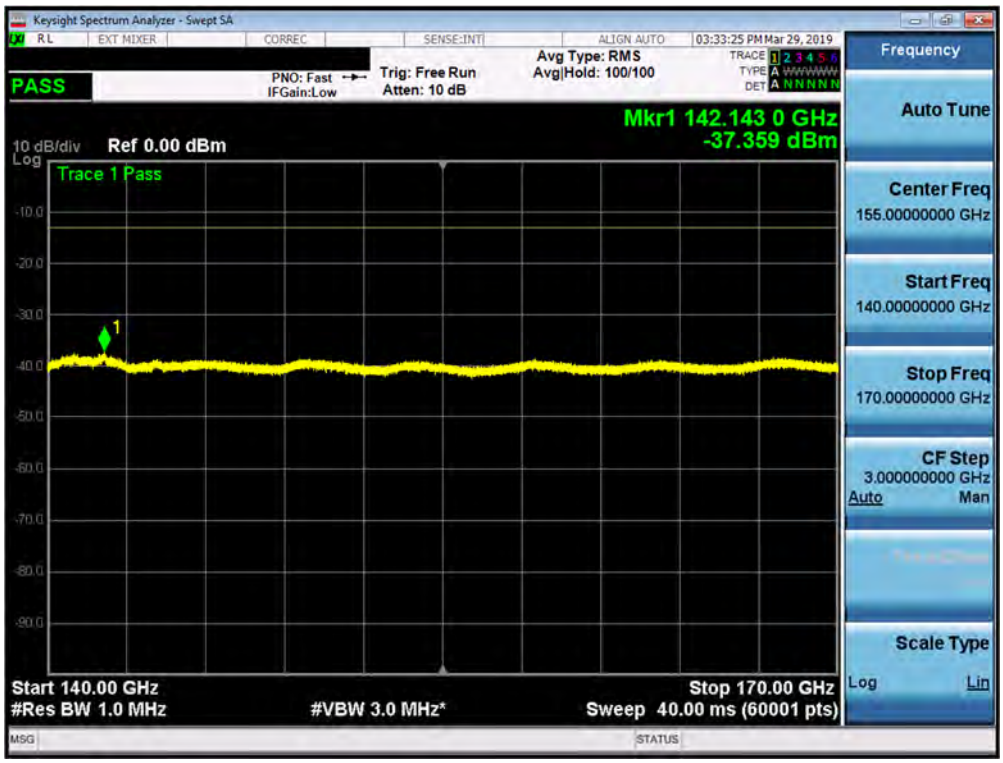
(-39.38 dBm + -39.24 dBm) = (115.35 nW + 119.12 nW) = (234.47 nW) = -36.30 dBm



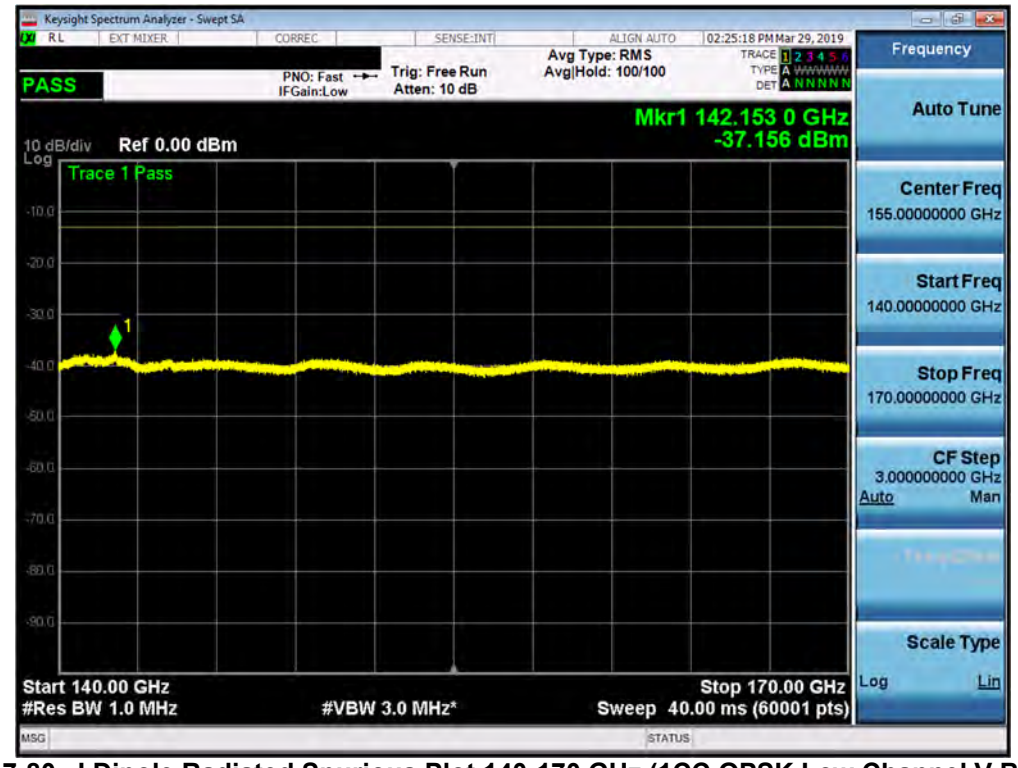
Plot 7-77. J Dipole Radiated Spurious Plot 140-170 GHz (1CC QPSK Low Channel H Beam)



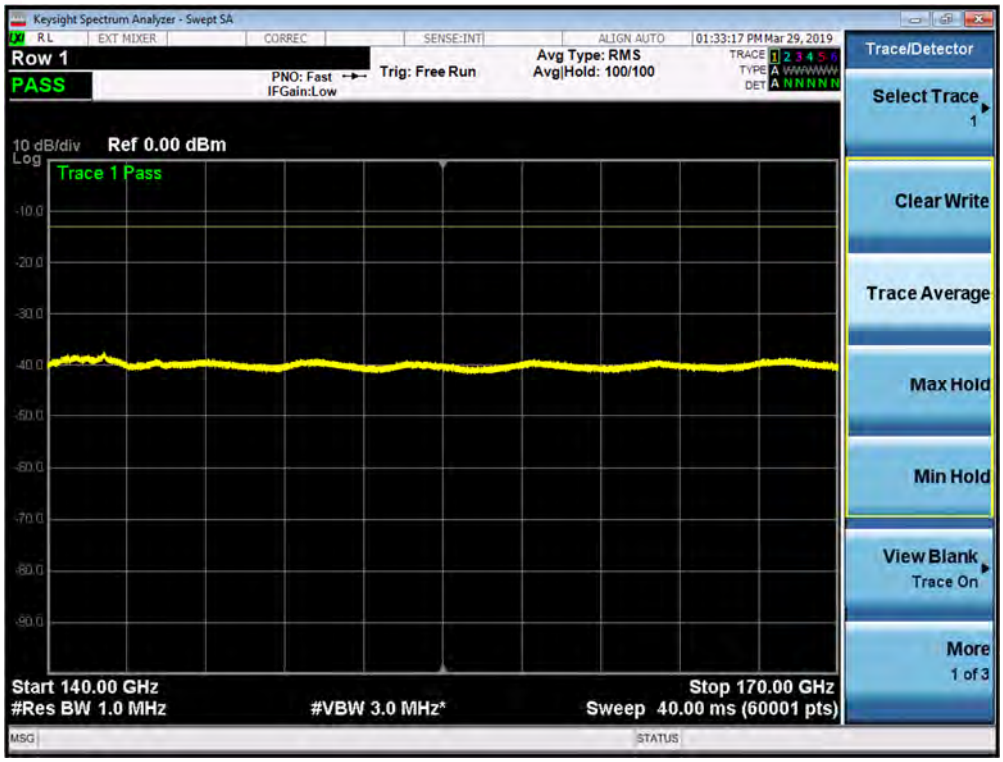
Plot 7-78. J Dipole Radiated Spurious Plot 140-170 GHz (1CC QPSK Mid Channel H Beam)



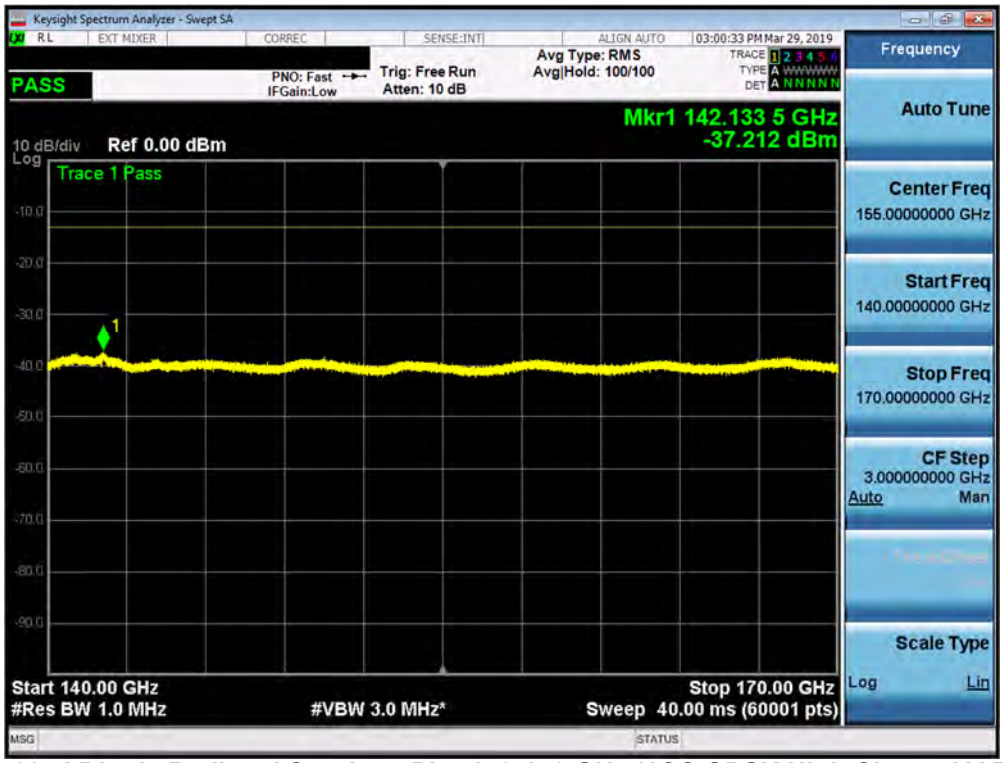
Plot 7-79. J Dipole Radiated Spurious Plot 140-170 GHz (1CC QPSK High Channel H Beam)



Plot 7-80. J Dipole Radiated Spurious Plot 140-170 GHz (1CC QPSK Low Channel V Beam)



Plot 7-81. J Dipole Radiated Spurious Plot 140-170 GHz (1CC QPSK Mid Channel V Beam)



Plot 7-82. J Dipole Radiated Spurious Plot 140-170 GHz (1CC QPSK High Channel V Beam)

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]
142146.50	RMS/Avg	Low	50	QPSK	H	H	-	-	-37.32	-13.00	-24.32
142126.00	RMS/Avg	Mid	50	QPSK	H	H	-	-	-37.38	-13.00	-24.38
142143.00	RMS/Avg	High	50	QPSK	H	H	-	-	-37.36	-13.00	-24.36
142153.00	RMS/Avg	Low	50	QPSK	V	H	-	-	-37.16	-13.00	-24.16
142139.50	RMS/Avg	Mid	50	QPSK	V	H	-	-	-37.39	-13.00	-24.39
142133.50	RMS/Avg	High	50	QPSK	V	H	-	-	-37.21	-13.00	-24.21

Table 7-19. J Dipole Spurious Emissions Table (140-170GHz)

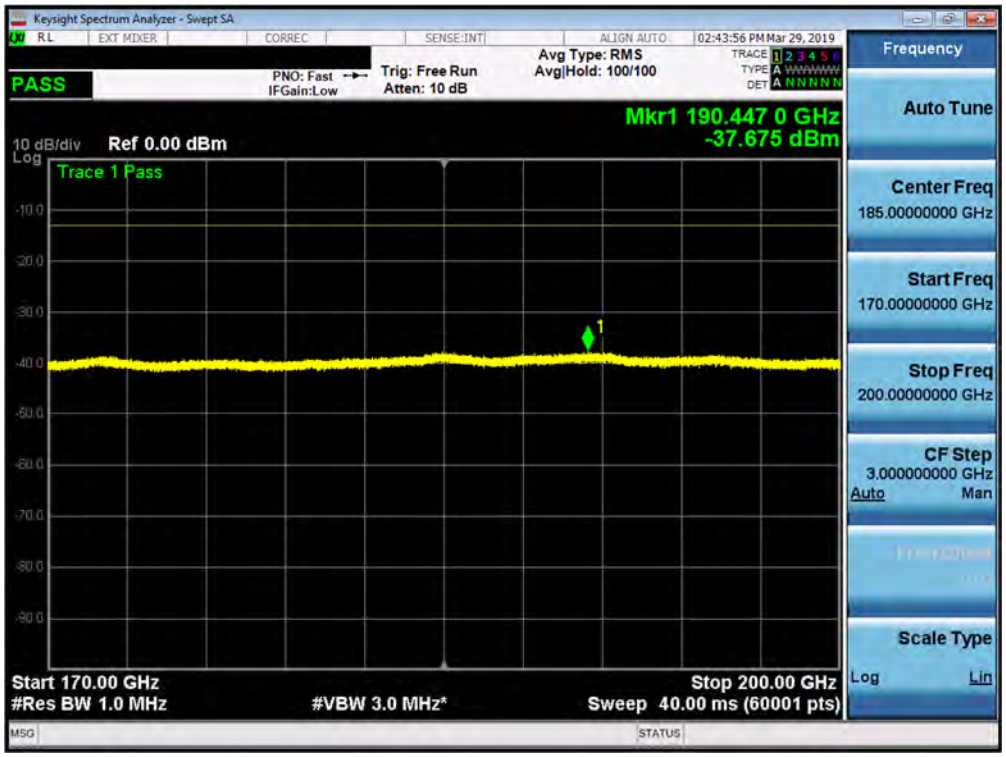
Notes

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.

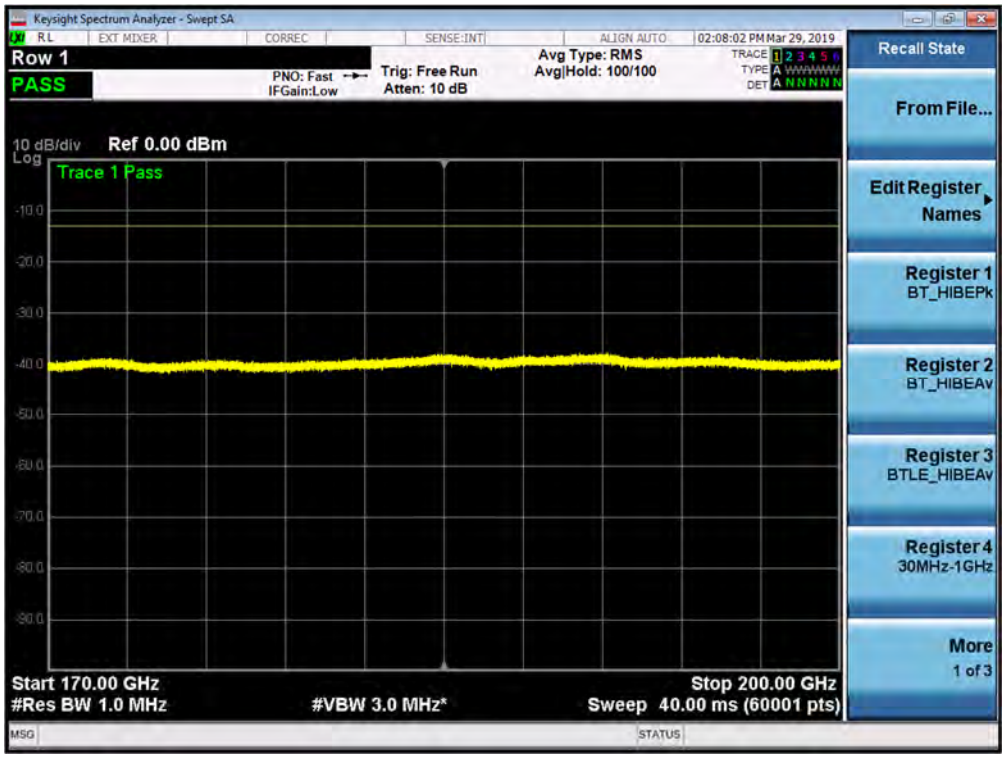
2. To address compliance of MIMO RSE per KDB 662911 D01, the MIMO RSE EIRP is calculated by summing the worst case H Beam EIRP and V Beam EIRP in linear powers units then converted back to dBm:

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

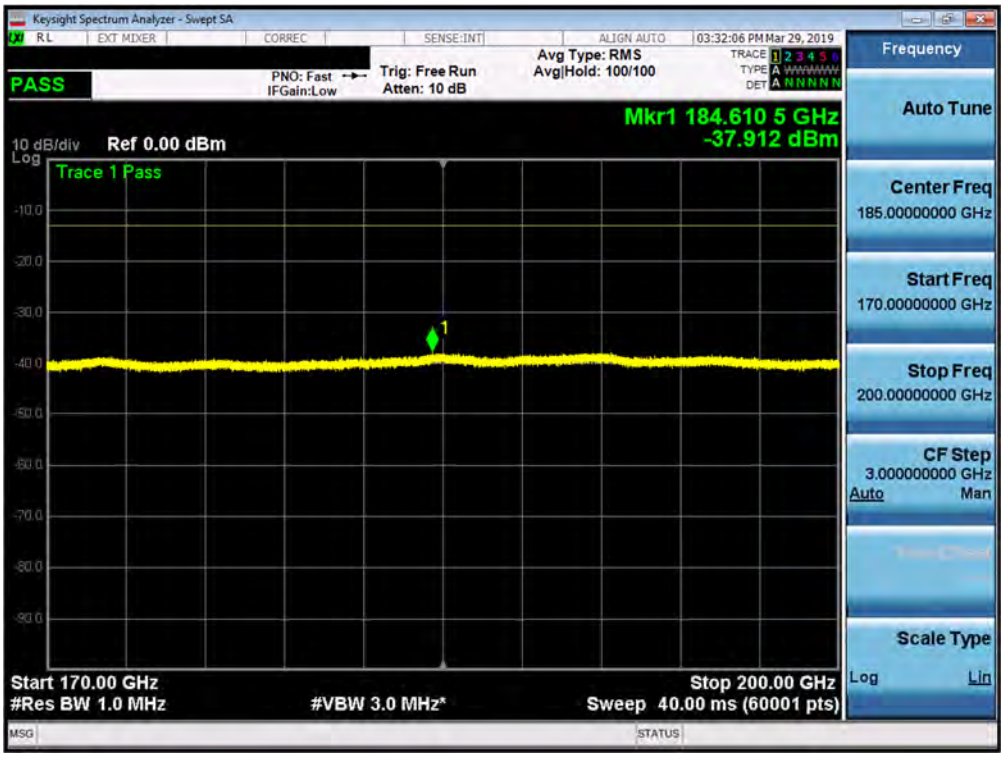
(-37.32 dBm + -37.16 dBm) = (185.35 nW + 192.31 nW) = (377.66 nW) = -34.22 dBm



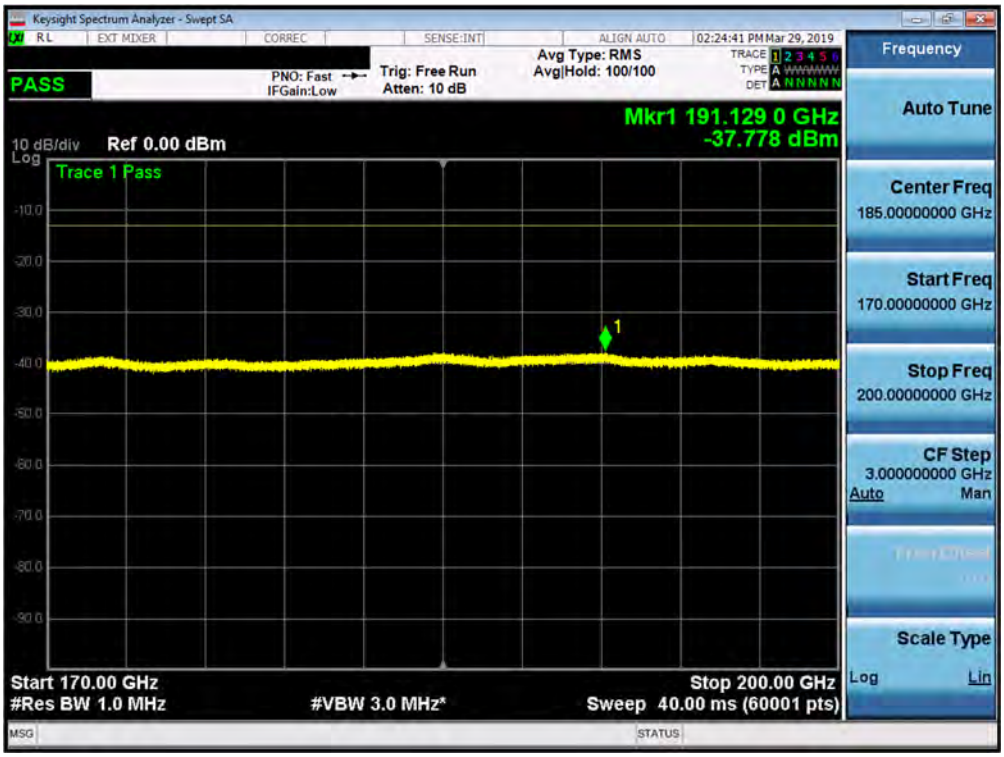
Plot 7-83. J Dipole Radiated Spurious Plot 170-200 GHz (1CC QPSK Low Channel H Beam)



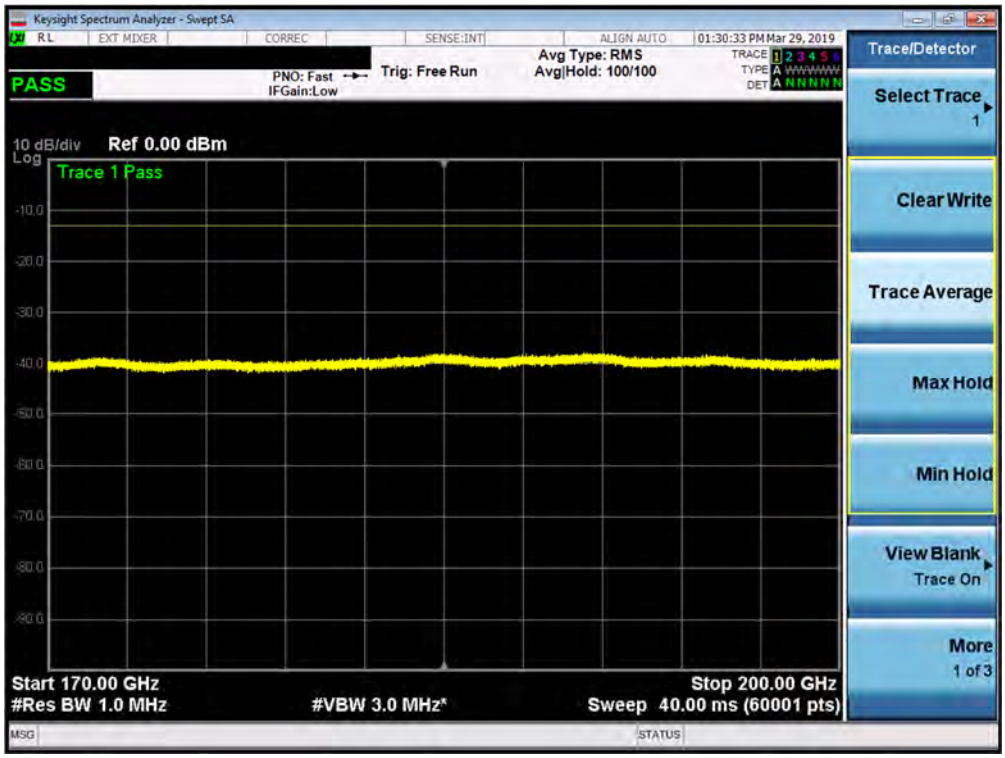
Plot 7-84. J Dipole Radiated Spurious Plot 170-200 GHz (1CC QPSK Mid Channel H Beam)



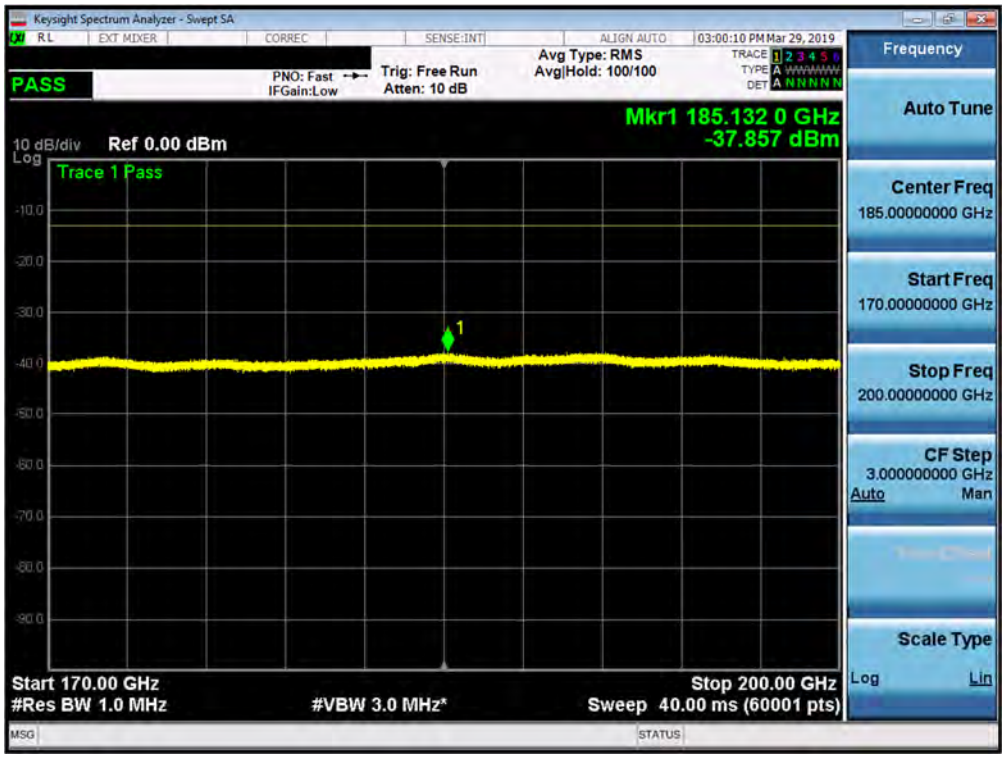
Plot 7-85. J Dipole Radiated Spurious Plot 170-200 GHz (1CC QPSK High Channel H Beam)



Plot 7-86. J Dipole Radiated Spurious Plot 170-200 GHz (1CC QPSK Low Channel V Beam)



Plot 7-87. J Dipole Radiated Spurious Plot 170-200 GHz (1CC QPSK Mid Channel V Beam)



Plot 7-88. J Dipole Radiated Spurious Plot 170-200 GHz (1CC QPSK High Channel V Beam)

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]
190447.00	RMS/Avg	Low	50	QPSK	H	H	-	-	-37.68	-13.00	-24.68
191176.50	RMS/Avg	Mid	50	QPSK	H	H	-	-	-37.76	-13.00	-24.76
184610.50	RMS/Avg	High	50	QPSK	H	H	-	-	-37.91	-13.00	-24.91
191129.00	RMS/Avg	Low	50	QPSK	V	H	-	-	-37.78	-13.00	-24.78
190319.50	RMS/Avg	Mid	50	QPSK	V	H	-	-	-37.77	-13.00	-24.77
185132.00	RMS/Avg	High	50	QPSK	V	H	-	-	-37.86	-13.00	-24.86

Table 7-20. J Dipole Spurious Emissions Table (170-200GHz)

Notes

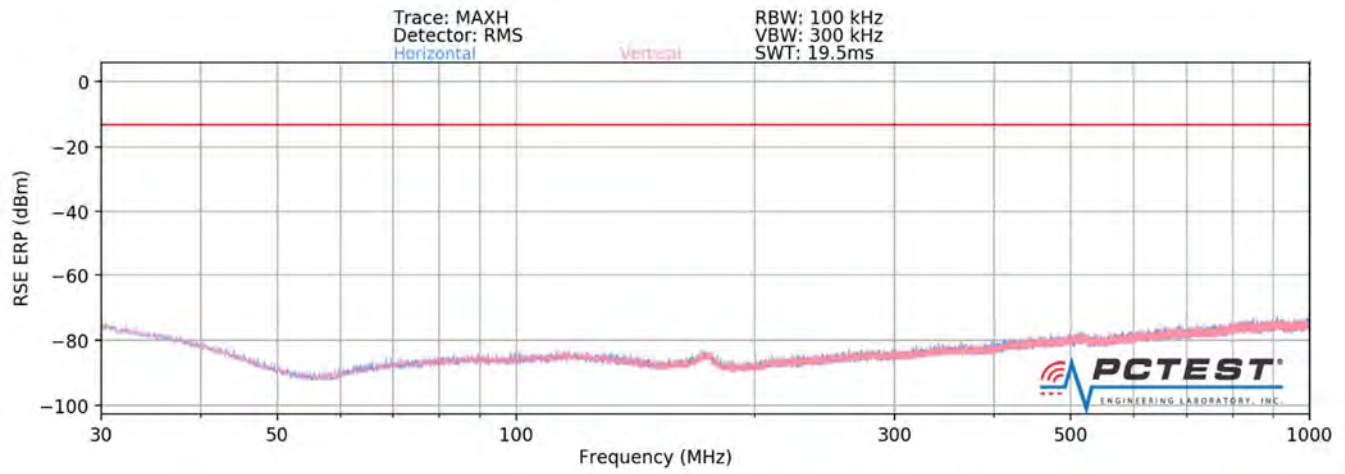
1. The RSE EIRP level is taken directly from the spectrum analyzer which includes the appropriate antenna factors, cable losses, and harmonic mixer conversion losses. Measurements were performed at a distance of 1 meter.

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:

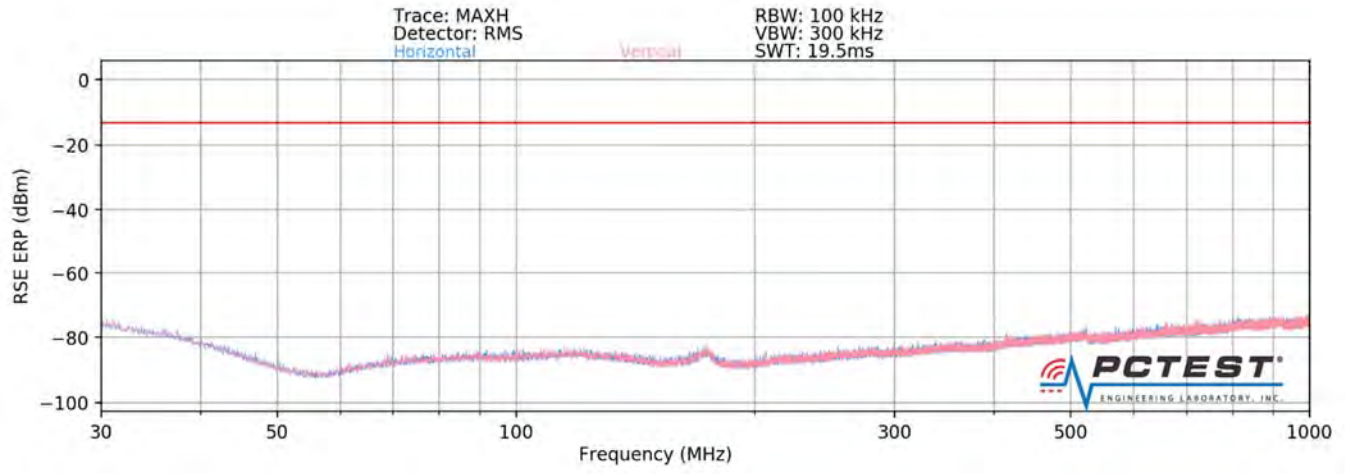
EIRP(H Beam) + EIRP(V Beam) = EIRP(MIMO)

(-37.68 dBm + -37.78 dBm) = (170.61 nW + 166.72 nW) = (337.33 nW) = -34.72 dBm

7.4.2 J Patch Radiated Spurious Emissions 30MHz – 1GHz

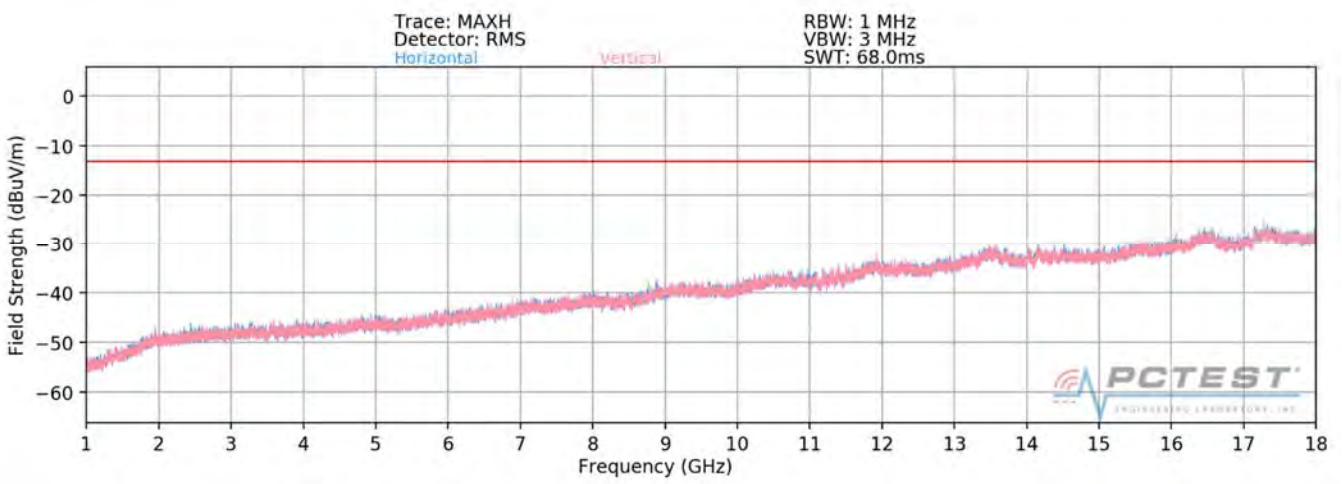


Plot 7-89. J Patch Radiated Spurious Plot 30 MHz - 1 GHz (1CC QPSK Mid Channel H Beam)

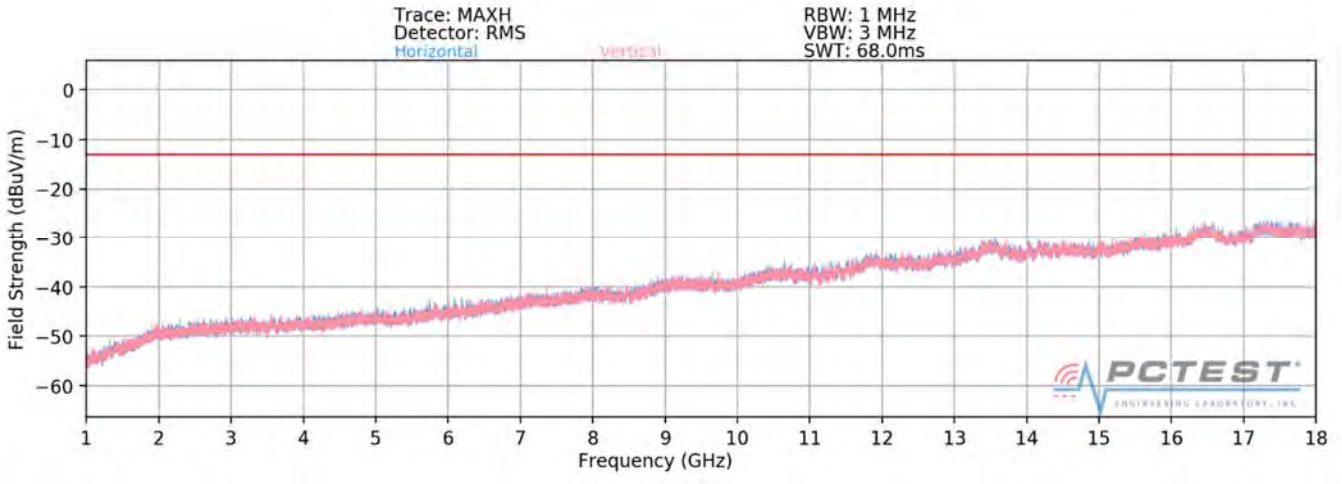


Plot 7-90. J Patch Radiated Spurious Plot 30 MHz - 1 GHz (1CC QPSK Mid Channel V Beam)

1 – 18GHz



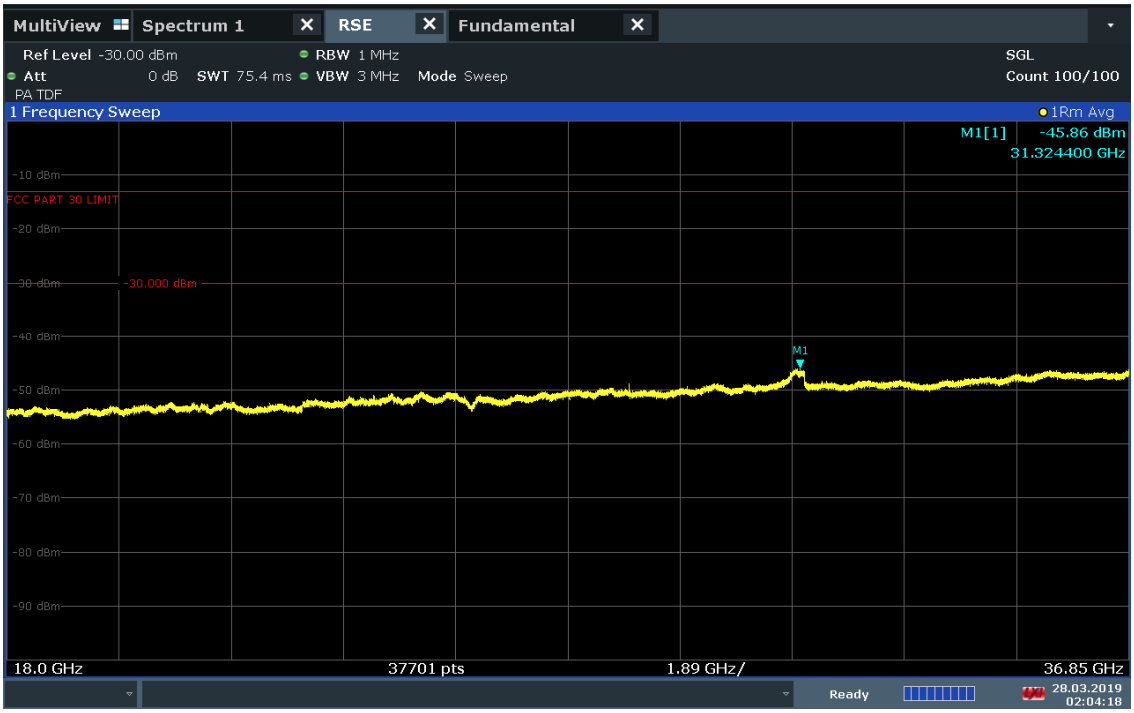
Plot 7-91. J Patch Radiated Spurious Plot 1-18 GHz (1CC QPSK Mid Channel H Beam)



Plot 7-92. J Patch Radiated Spurious Plot 1-18 GHz (1CC QPSK Mid Channel V Beam)

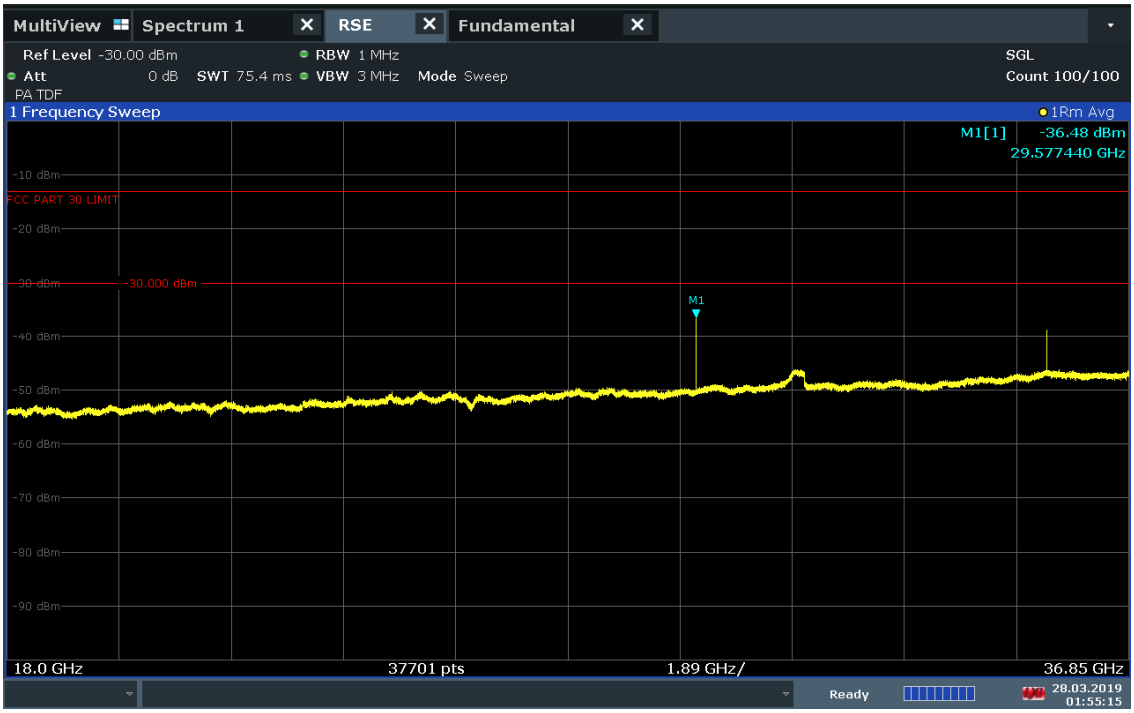
18 – 36.85GHz

ACLRResults



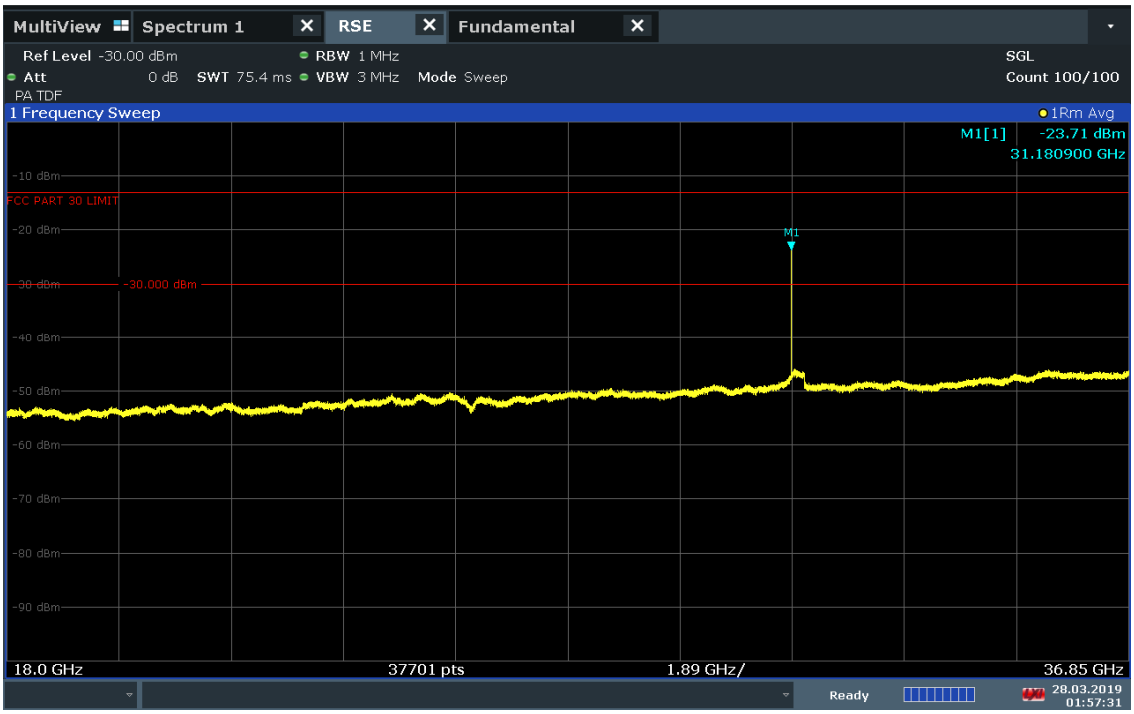
Plot 7-93. J Patch Radiated Spurious Plot 18-36.85 GHz (1CC QPSK Low Channel H Beam)

ACLRResults



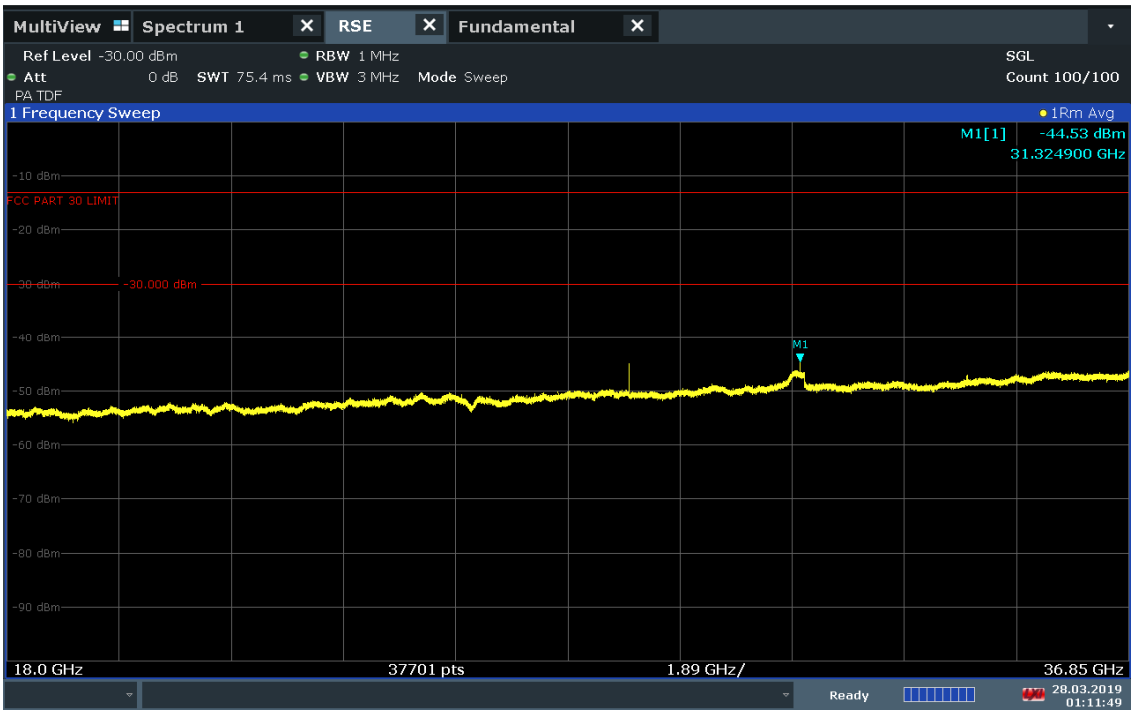
Plot 7-94. J Patch Radiated Spurious Plot 18-36.85 GHz (1CC QPSK Mid Channel H Beam)

ACLRResults



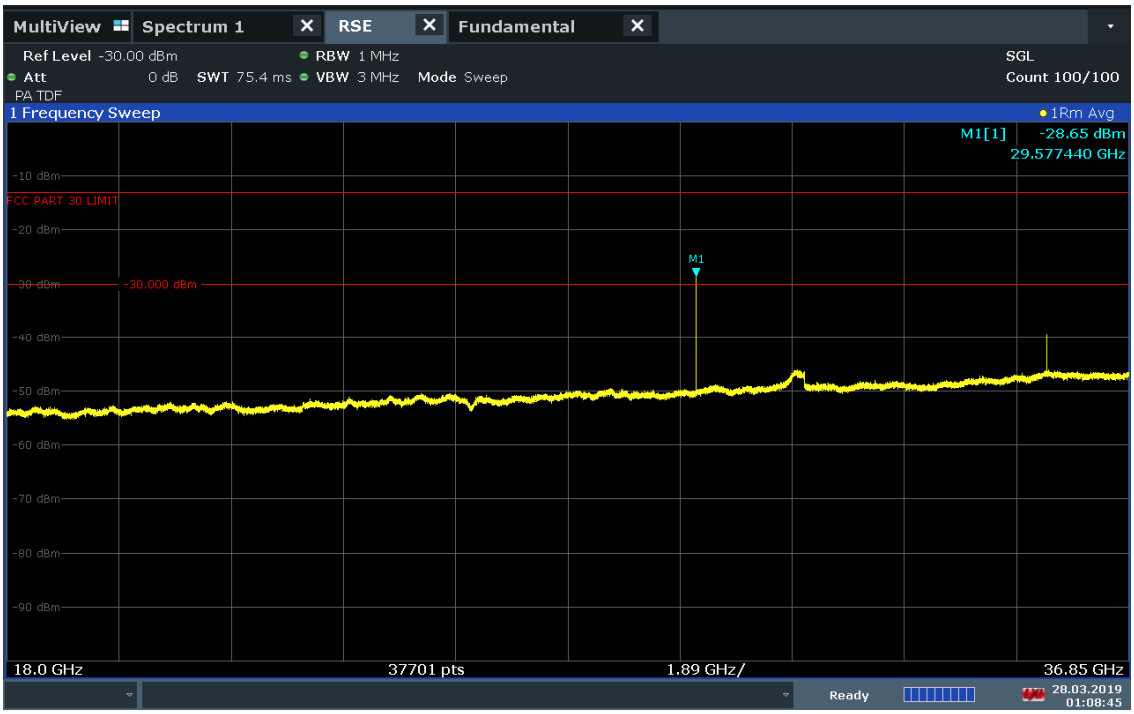
Plot 7-95. J Patch Radiated Spurious Plot 18-36.85 GHz (1CC QPSK High Channel H Beam)

ACLRResults



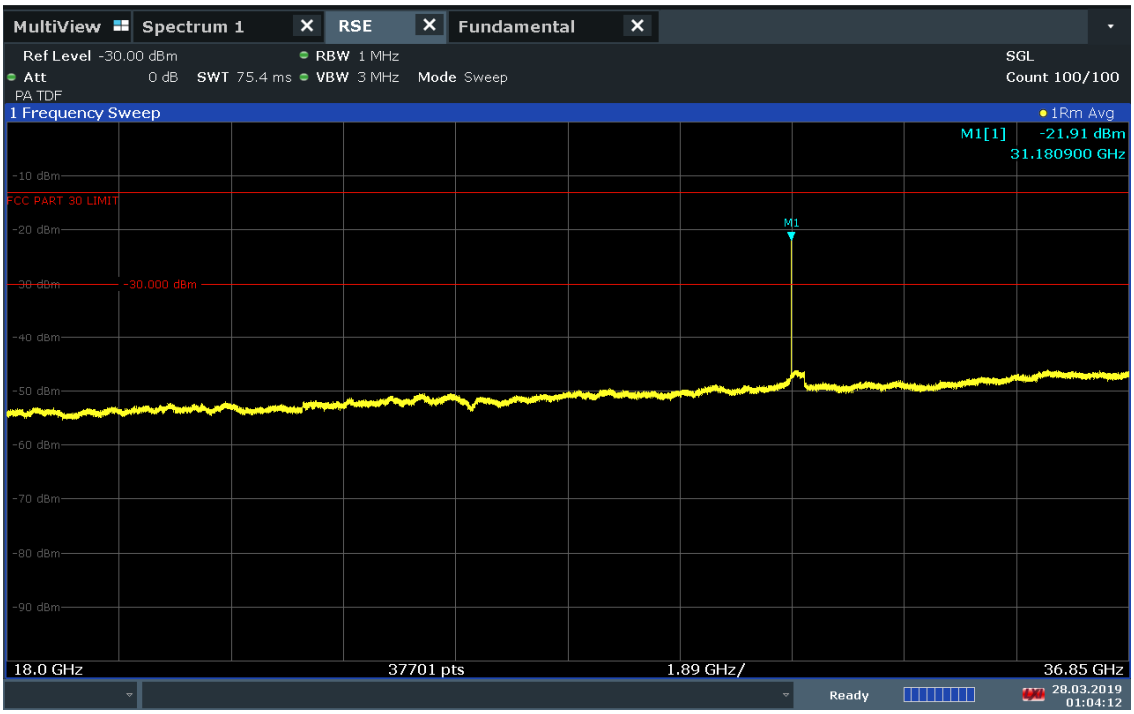
Plot 7-96. J Patch Radiated Spurious Plot 18-36.85 GHz (1CC QPSK Low Channel V Beam)

ACLRResults



Plot 7-97. J Patch Radiated Spurious Plot 18-36.85 GHz (1CC QPSK Mid Channel V Beam)

ACLRResults



Plot 7-98. J Patch Radiated Spurious Plot 18-36.85 GHz (1CC QPSK High Channel V Beam)

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]
31324.40	RMS/Avg	Low	50	QPSK	H	V	150	289	-45.86	-13.00	-32.86
29577.40	RMS/Avg	Mid	50	QPSK	H	V	150	296	-36.48	-13.00	-23.48
31180.90	RMS/Avg	High	50	QPSK	H	V	150	232	-23.71	-13.00	-10.71
31324.90	RMS/Avg	Low	50	QPSK	V	H	150	211	-44.53	-13.00	-31.53
29577.44	RMS/Avg	Mid	50	QPSK	V	H	150	288	-28.65	-13.00	-15.65
31180.90	RMS/Avg	High	50	QPSK	V	H	150	198	-21.91	-13.00	-8.91

Table 7-21. J Patch Spurious Emissions Table (18-36.85GHz)

Notes

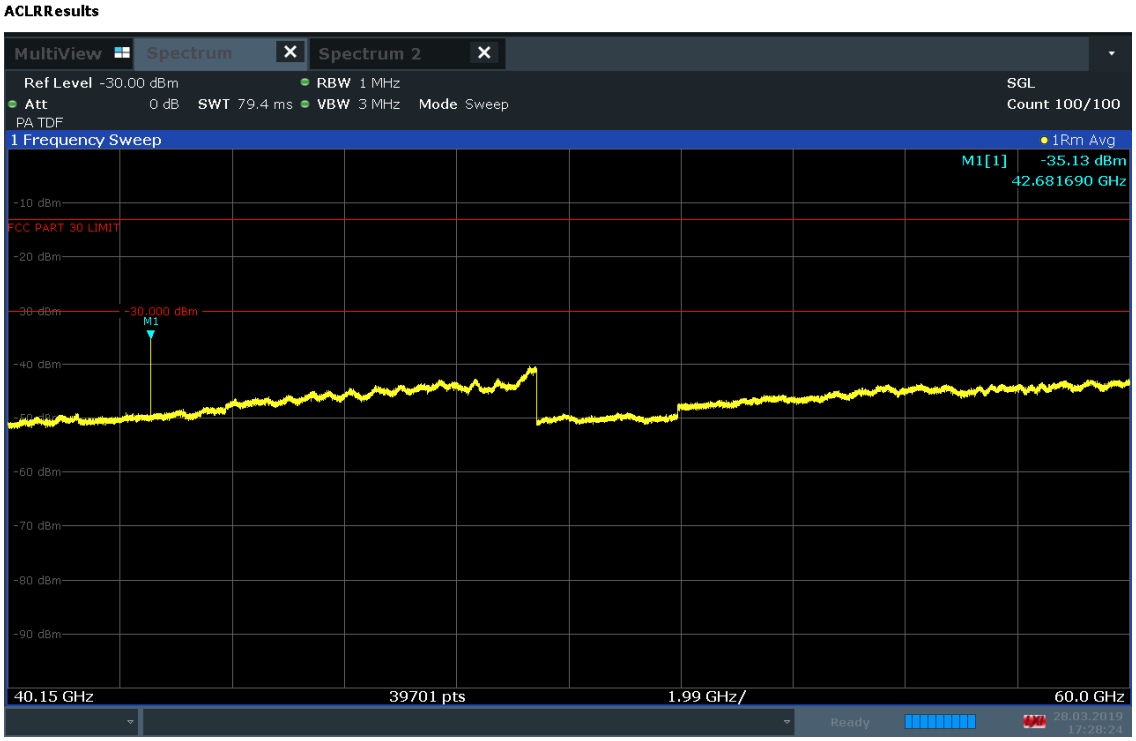
1. The RSE EIRP level is taken directly from the spectrum analyzer which includes the appropriate antenna factors, cable losses, and harmonic mixer conversion losses. Measurements were performed at a distance of 1 meter.

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:

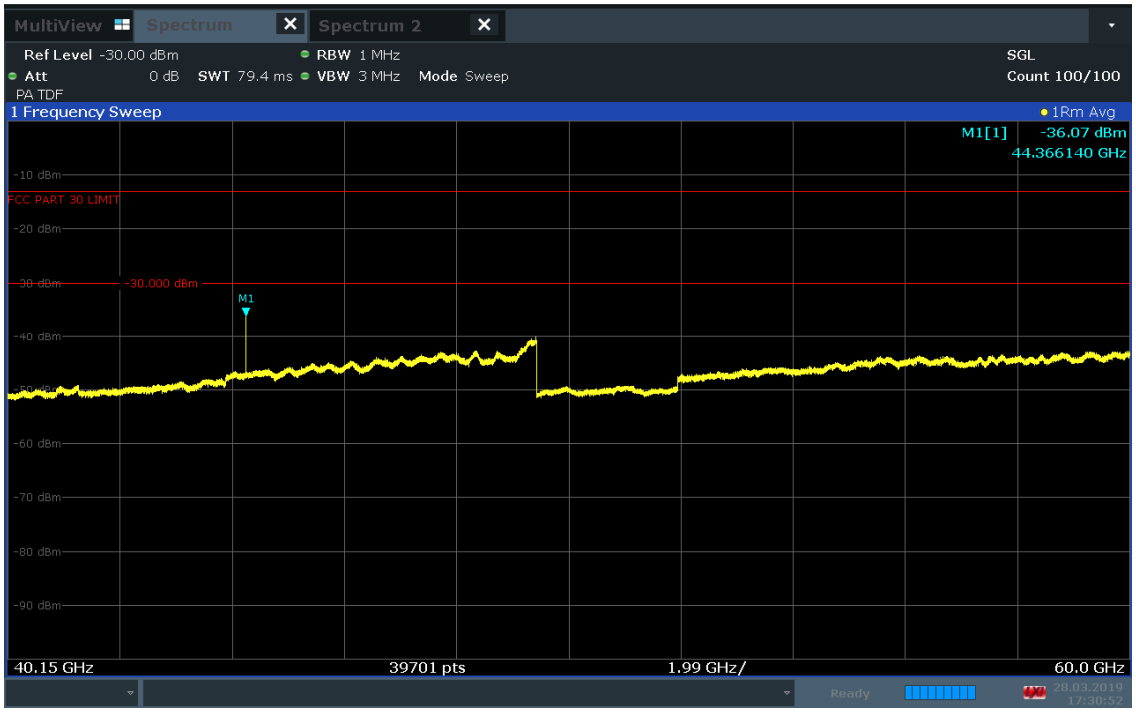
EIRP(H Beam) + EIRP(V Beam) = EIRP(MIMO)

(-23.71 dBm + -21.91 dBm) = (4.26 µW + 6.44 µW) = (10.70 µW) = -19.71 dBm

40.15 – 60GHz

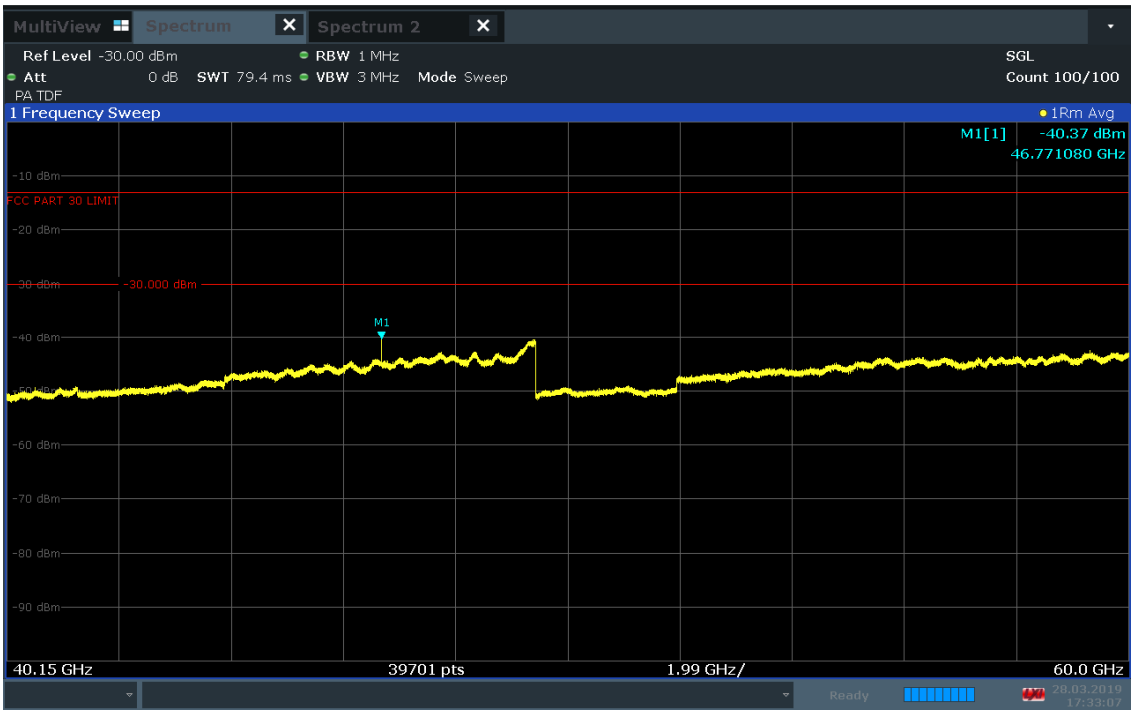


Plot 7-99. J Patch Radiated Spurious Plot 40.15-60 GHz (1CC QPSK Low Channel H Beam)



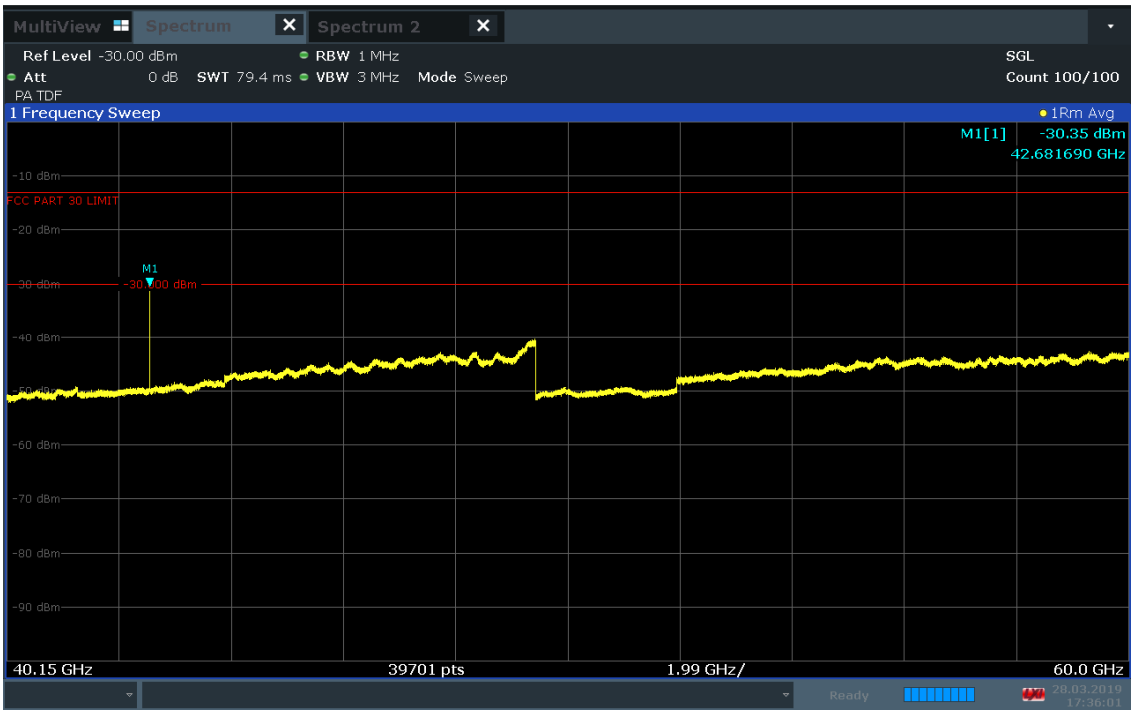
Plot 7-100. J Patch Radiated Spurious Plot 40.15-60 GHz (1CC QPSK Mid Channel H Beam)

ACLRResults



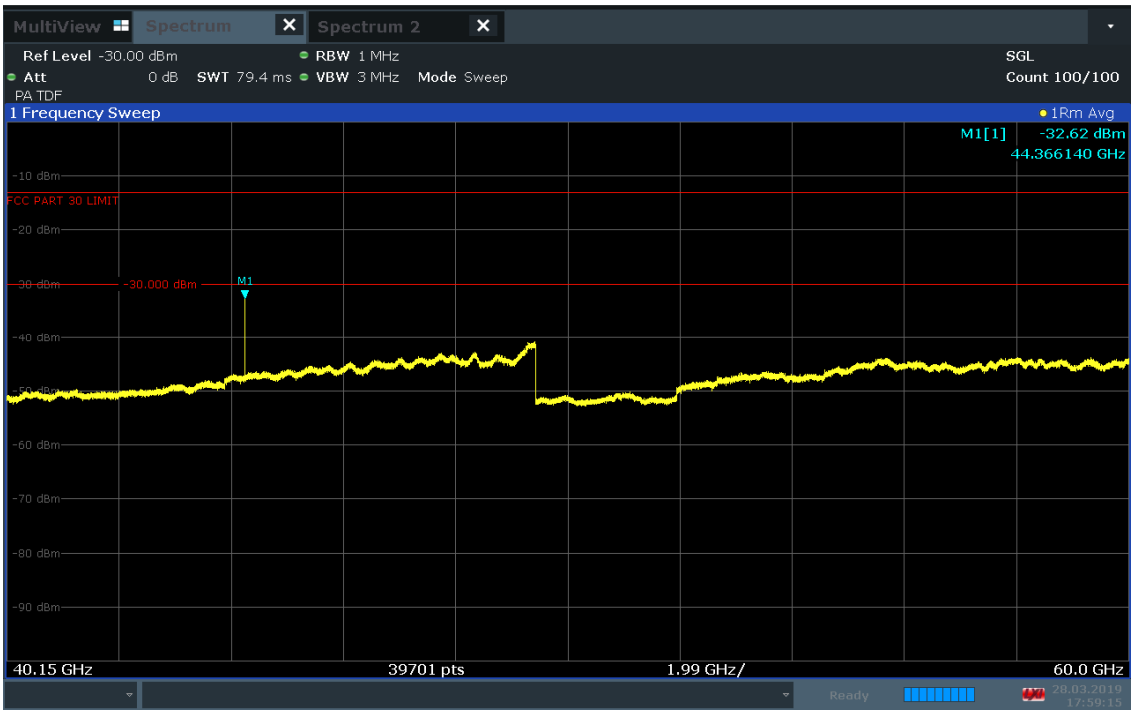
Plot 7-101. J Patch Radiated Spurious Plot 40.15-60 GHz (1CC QPSK High Channel H Beam)

ACLRResults



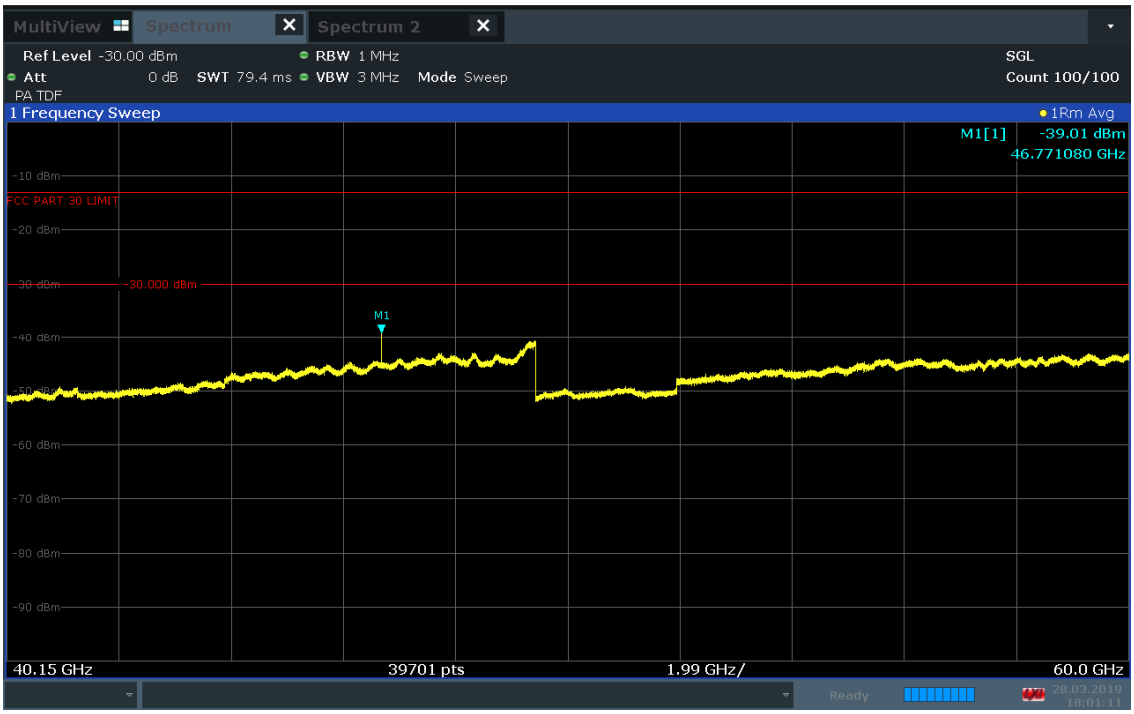
Plot 7-102. J Patch Radiated Spurious Plot 40.15-60 GHz (1CC QPSK Low Channel V Beam)

ACLRResults



Plot 7-103. J Patch Radiated Spurious Plot 40.15-60 GHz (1CC QPSK Mid Channel V Beam)

ACLRResults



Plot 7-104. J Patch Radiated Spurious Plot 40.15-60 GHz (1CC QPSK High Channel V Beam)

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] + 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]
42681.69	RMS/Avg	Low	50	QPSK	H	V	150	292	-35.13	-13.00	-22.13
44366.14	RMS/Avg	Mid	50	QPSK	H	V	150	290	-36.07	-13.00	-23.07
46771.08	RMS/Avg	High	50	QPSK	H	V	150	231	-40.37	-13.00	-27.37
42681.69	RMS/Avg	Low	50	QPSK	V	H	150	215	-30.35	-13.00	-17.35
44366.14	RMS/Avg	Mid	50	QPSK	V	H	150	276	-32.62	-13.00	-19.62
46771.08	RMS/Avg	High	50	QPSK	V	H	150	212	-39.01	-13.00	-26.01

Table 7-22. J Patch Spurious Emissions Table (40.15-60 GHz)

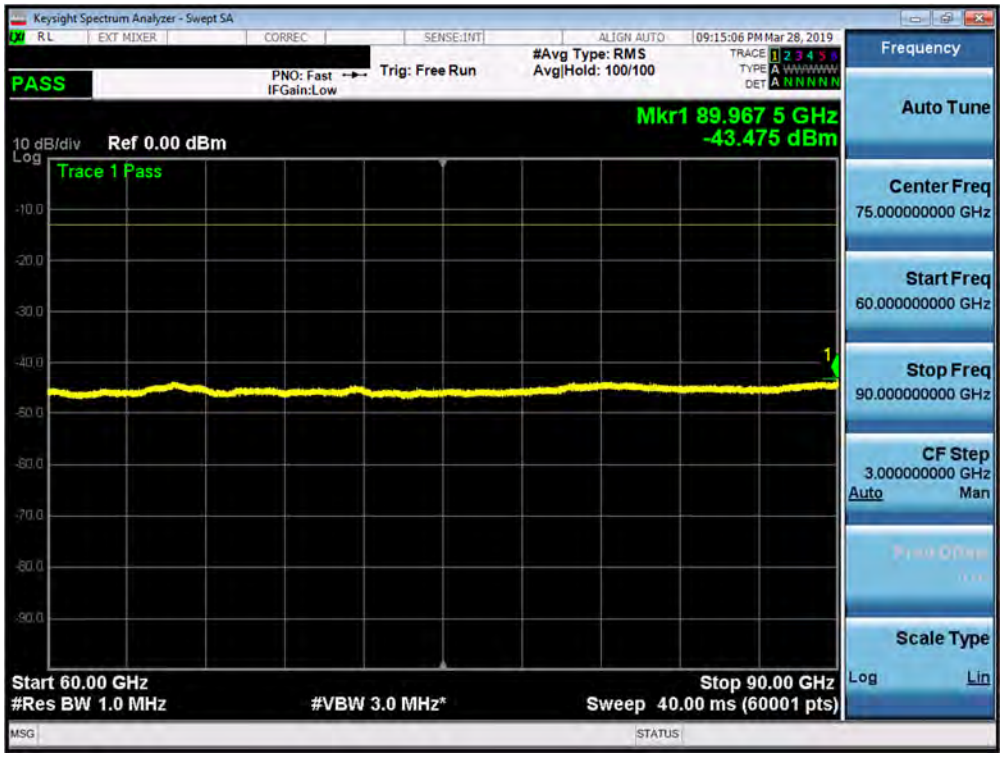
Notes

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 1.5 meter.

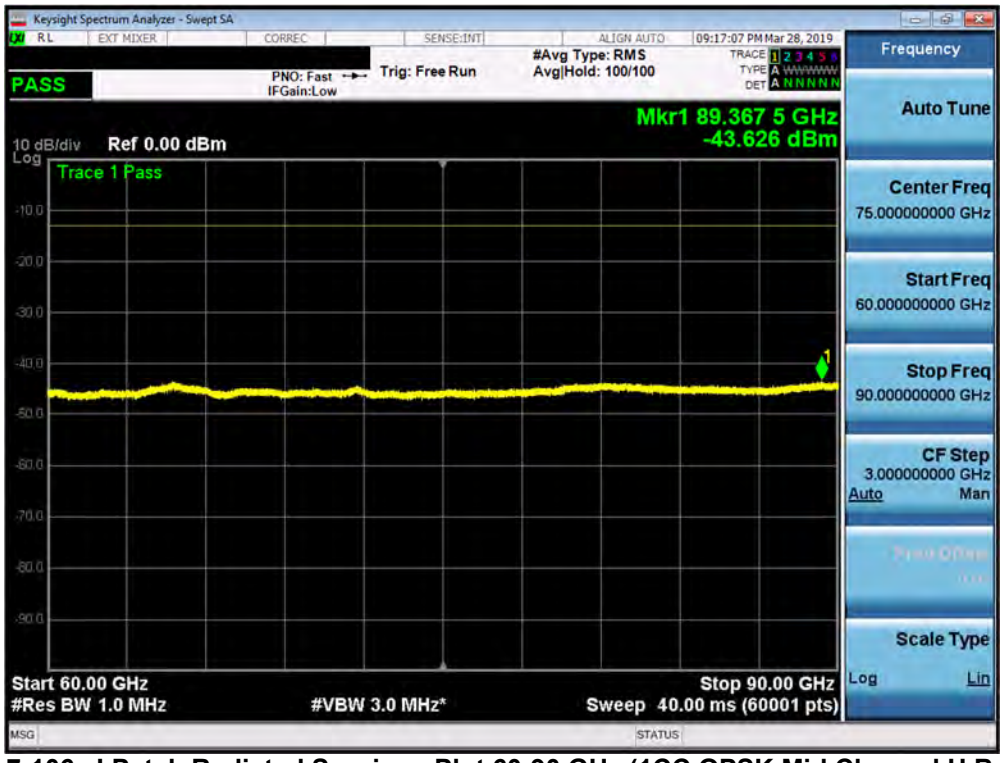
2. To address compliance of MIMO RSE per KDB 662911 D01, the MIMO RSE EIRP is calculated by summing the worst case H Beam EIRP and V Beam EIRP in linear powers units then converted back to dBm:

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

(-35.13 dBm + -30.35 dBm) = (306.90 nW + 922.58 nW) = (1229.48 nW) = -29.10 dBm

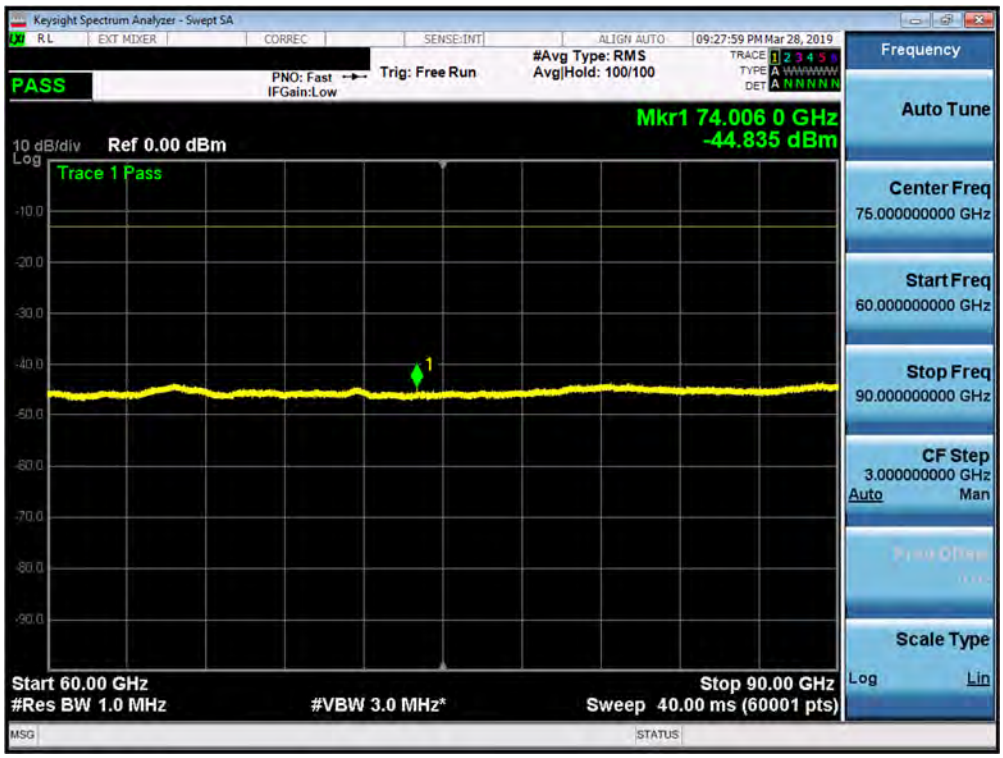


Plot 7-105. J Patch Radiated Spurious Plot 60-90 GHz (1CC QPSK Low Channel H Beam)

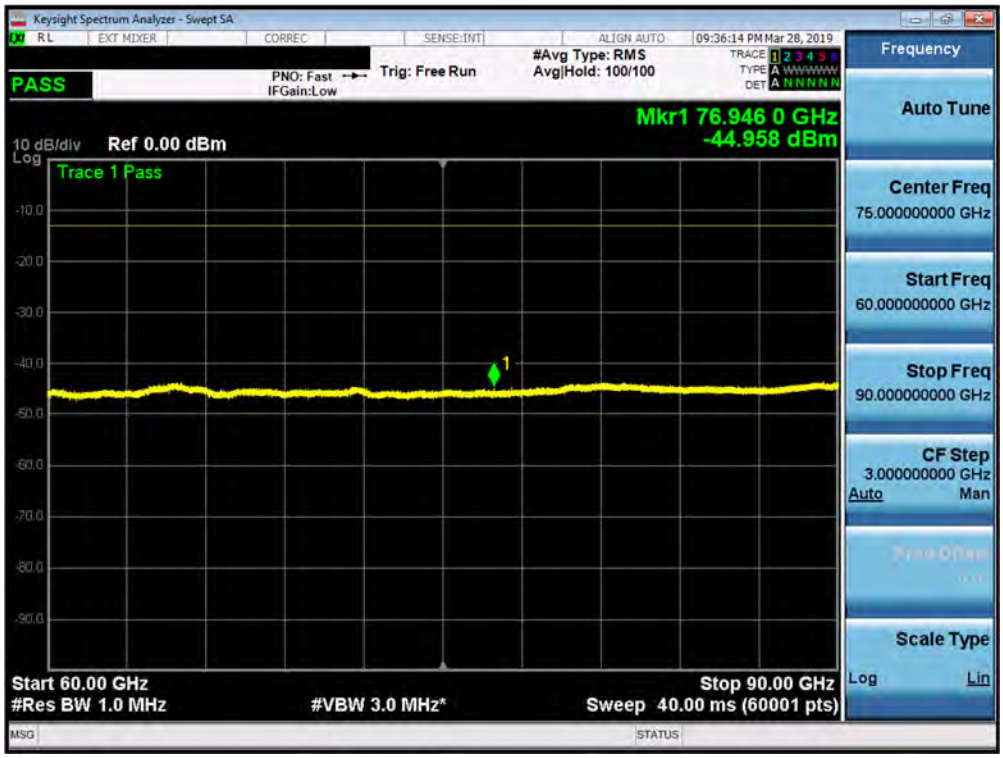


Plot 7-106. J Patch Radiated Spurious Plot 60-90 GHz (1CC QPSK Mid Channel H Beam)

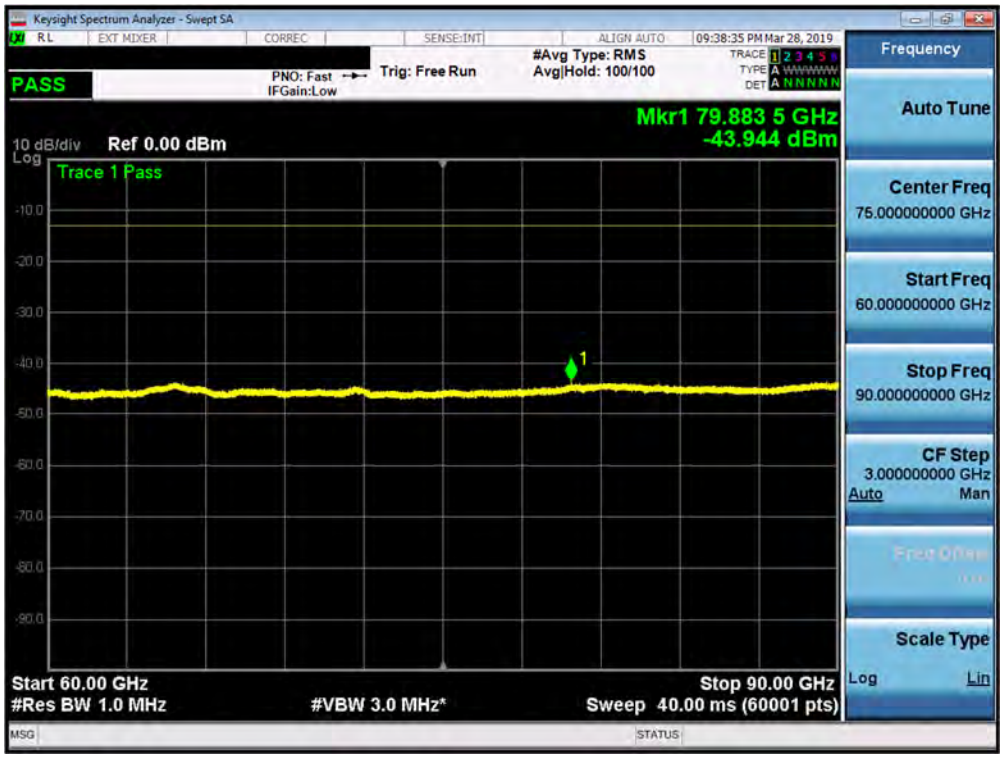
Plot 7-107. J Patch Radiated Spurious Plot 60-90 GHz (1CC QPSK High Channel H Beam)



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



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



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

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]
89967.50	RMS/Avg	Low	50	QPSK	H	H	-	-	-43.48	-13.00	-30.48
89367.50	RMS/Avg	Mid	50	QPSK	H	H	-	-	-43.63	-13.00	-30.63
81230.50	RMS/Avg	High	50	QPSK	H	H	150	195	-43.76	-13.00	-30.76
74006.00	RMS/Avg	Low	50	QPSK	V	V	150	216	-44.84	-13.00	-31.84
76946.00	RMS/Avg	Mid	50	QPSK	V	V	150	210	-44.96	-13.00	-31.96
79883.50	RMS/Avg	High	50	QPSK	V	V	150	328	-43.94	-13.00	-30.94

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

Notes

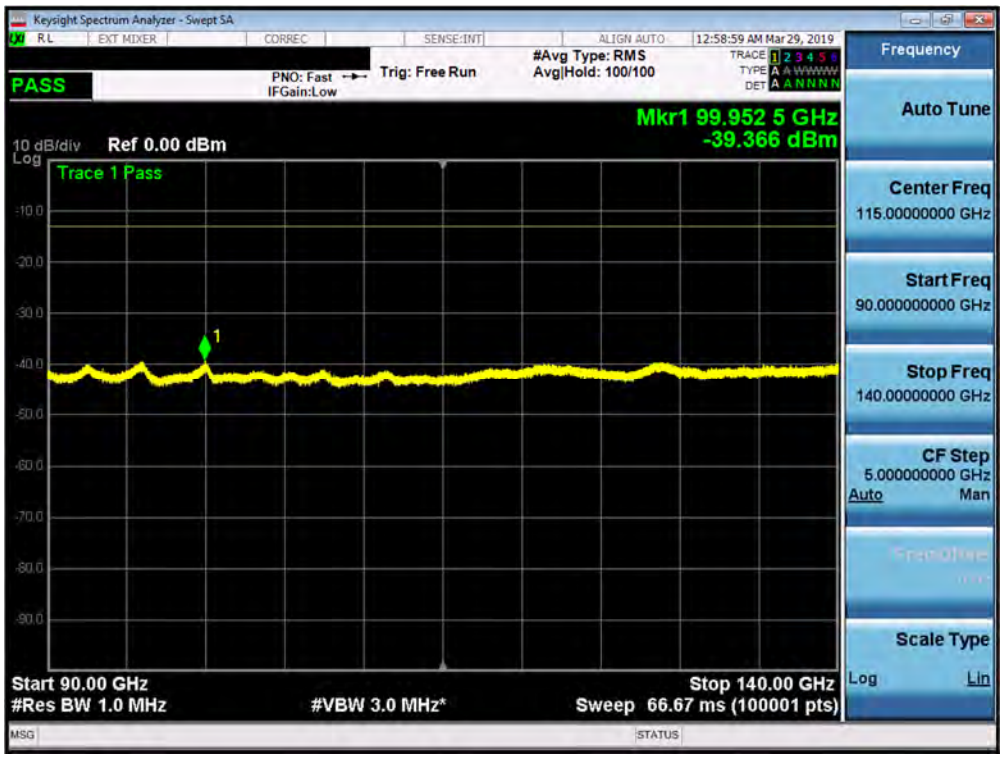
1. The RSE EIRP level is taken directly from the spectrum analyzer which includes the appropriate antenna factors, cable losses, and harmonic mixer conversion losses. Measurements were performed at a distance of 1 meter.

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:

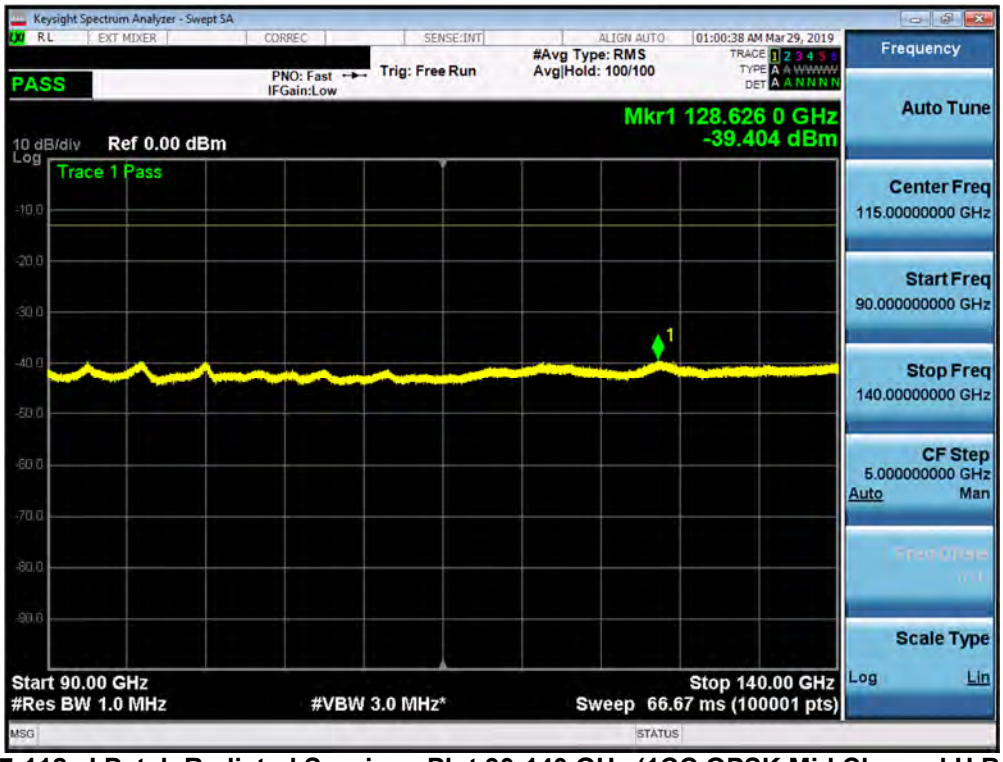
EIRP(H Beam) + EIRP(V Beam) = EIRP(MIMO)

(-43.76 dBm + -43.94 dBm) = (42.07 nW + 40.36 nW) = (82.43 nW) = -40.84 dBm

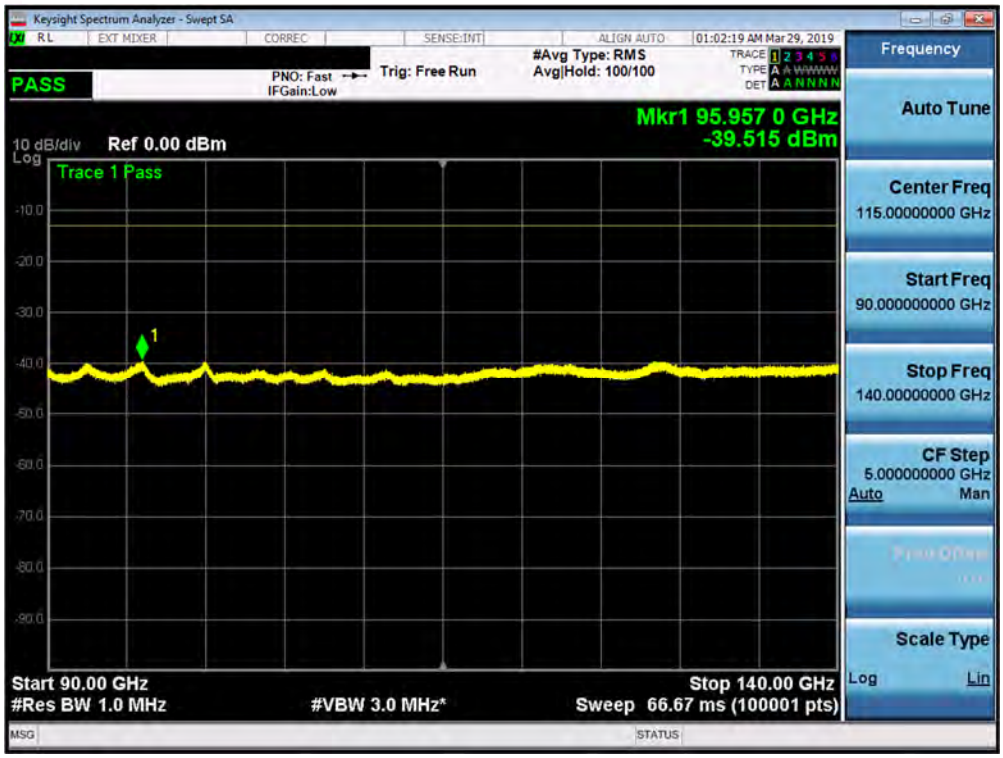
90 – 140GHz



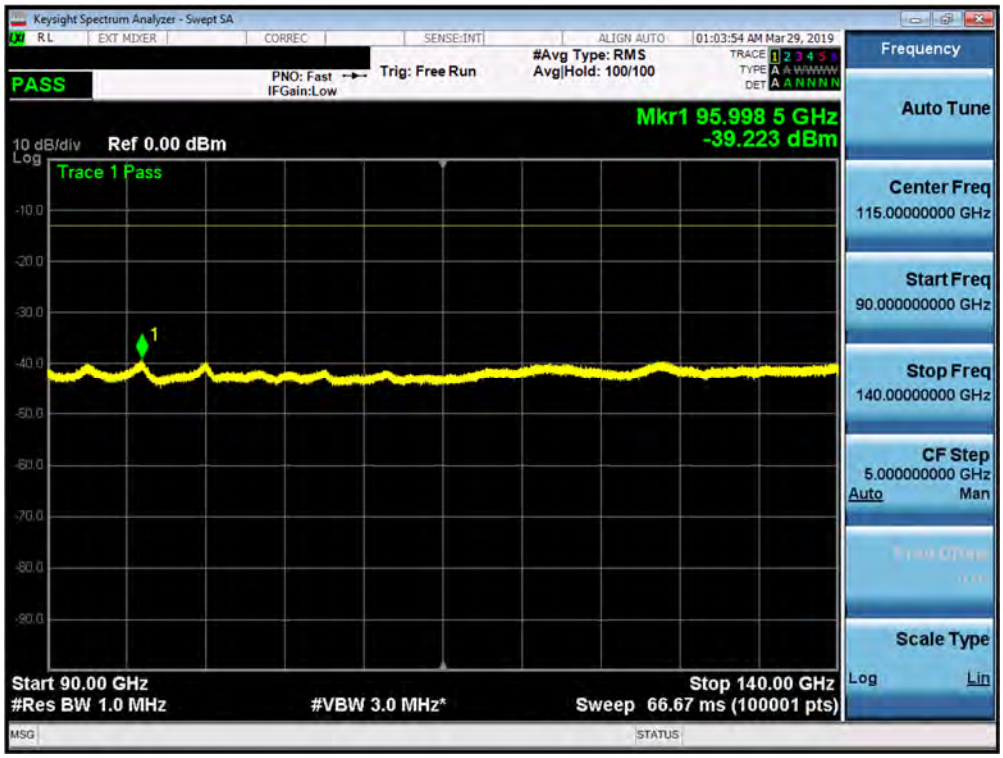
Plot 7-111. J Patch Radiated Spurious Plot 90-140 GHz (1CC QPSK Low Channel H Beam)



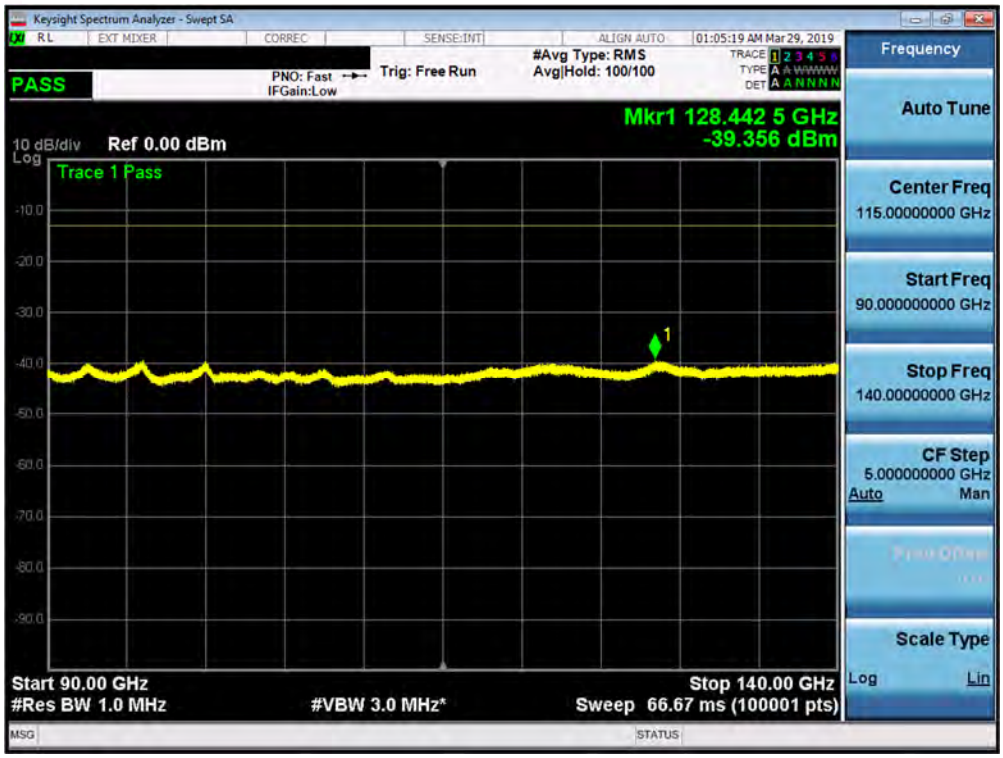
Plot 7-112. J Patch Radiated Spurious Plot 90-140 GHz (1CC QPSK Mid Channel H Beam)



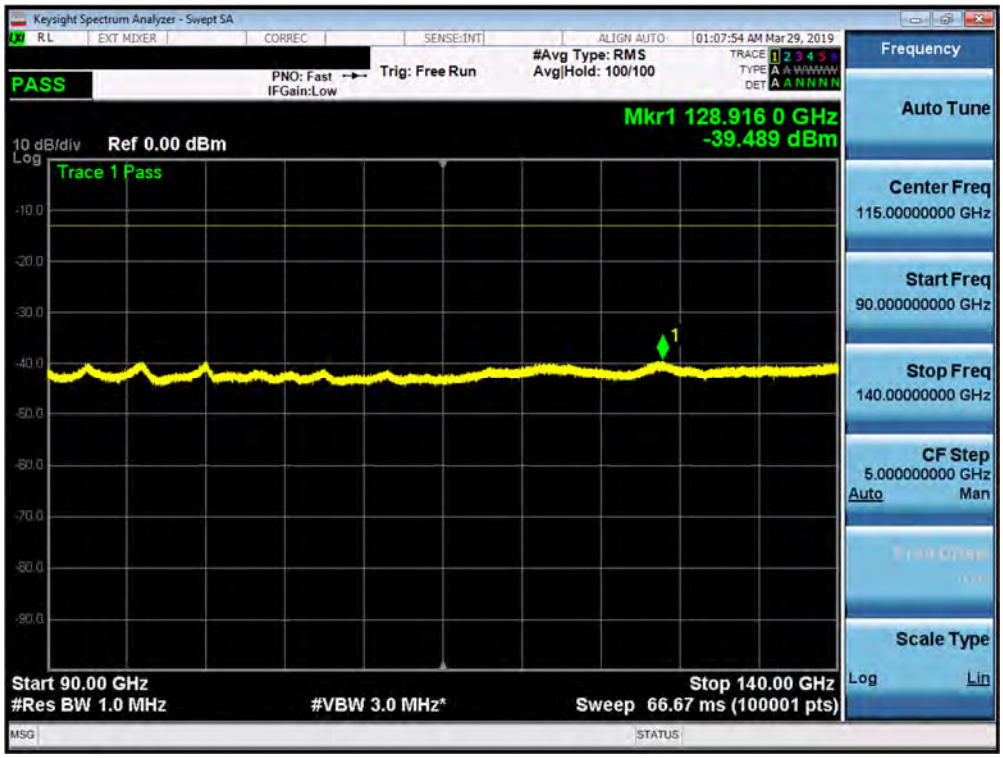
Plot 7-113. J Patch Radiated Spurious Plot 90-140 GHz (1CC QPSK High Channel H Beam)



Plot 7-114. J Patch Radiated Spurious Plot 90-140 GHz (1CC QPSK Low Channel V Beam)



Plot 7-115. J Patch Radiated Spurious Plot 90-140 GHz (1CC QPSK Mid Channel V Beam)



Plot 7-116. J Patch Radiated Spurious Plot 90-140 GHz (1CC QPSK High Channel V Beam)

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]
99952.50	RMS/Avg	Low	50	QPSK	H	H	-	-	-39.37	-13.00	-26.37
128626.00	RMS/Avg	Mid	50	QPSK	H	H	-	-	-39.40	-13.00	-26.40
95957.00	RMS/Avg	High	50	QPSK	H	H	-	-	-39.52	-13.00	-26.52
95998.50	RMS/Avg	Low	50	QPSK	V	V	-	-	-39.22	-13.00	-26.22
128442.50	RMS/Avg	Mid	50	QPSK	V	V	-	-	-39.36	-13.00	-26.36
128916.00	RMS/Avg	High	50	QPSK	V	V	-	-	-39.49	-13.00	-26.49

Table 7-24. J Patch Spurious Emissions Table (90-140GHz)

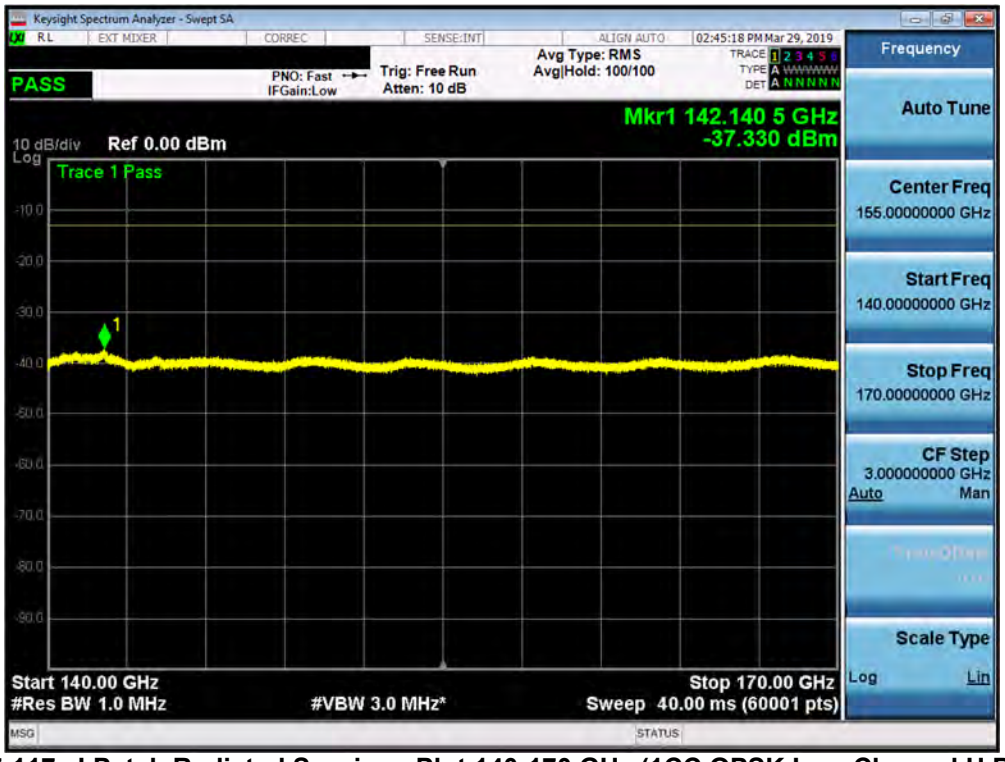
Notes

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.

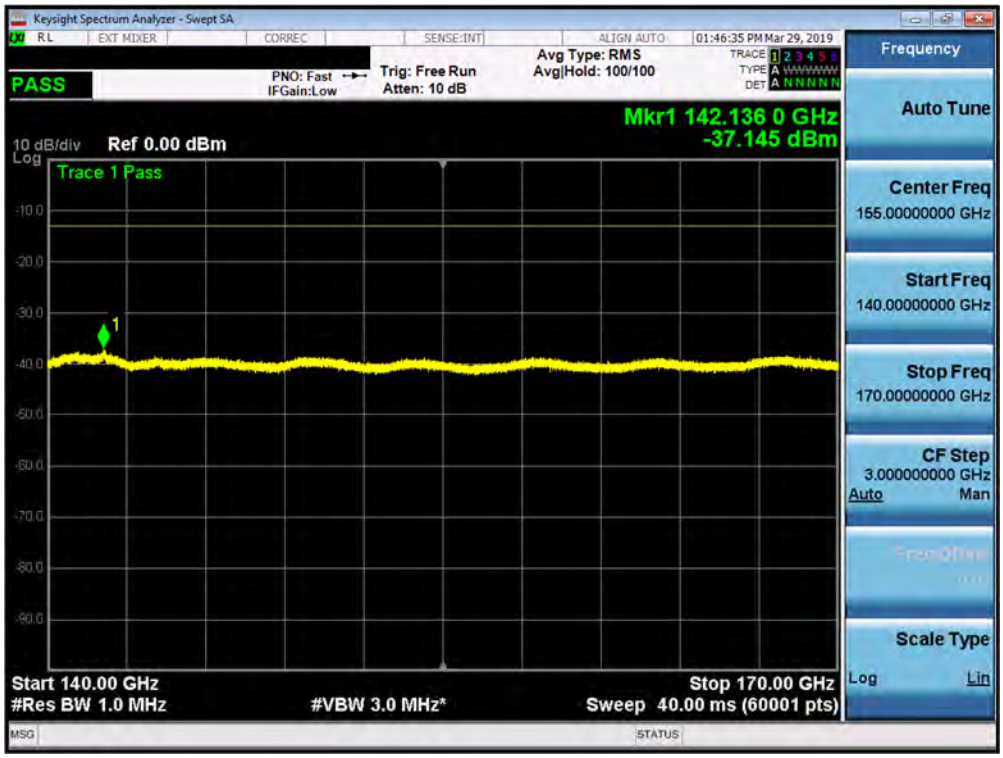
2. To address compliance of MIMO RSE per KDB 662911 D01, the MIMO RSE EIRP is calculated by summing the worst case H Beam EIRP and V Beam EIRP in linear powers units then converted back to dBm:

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

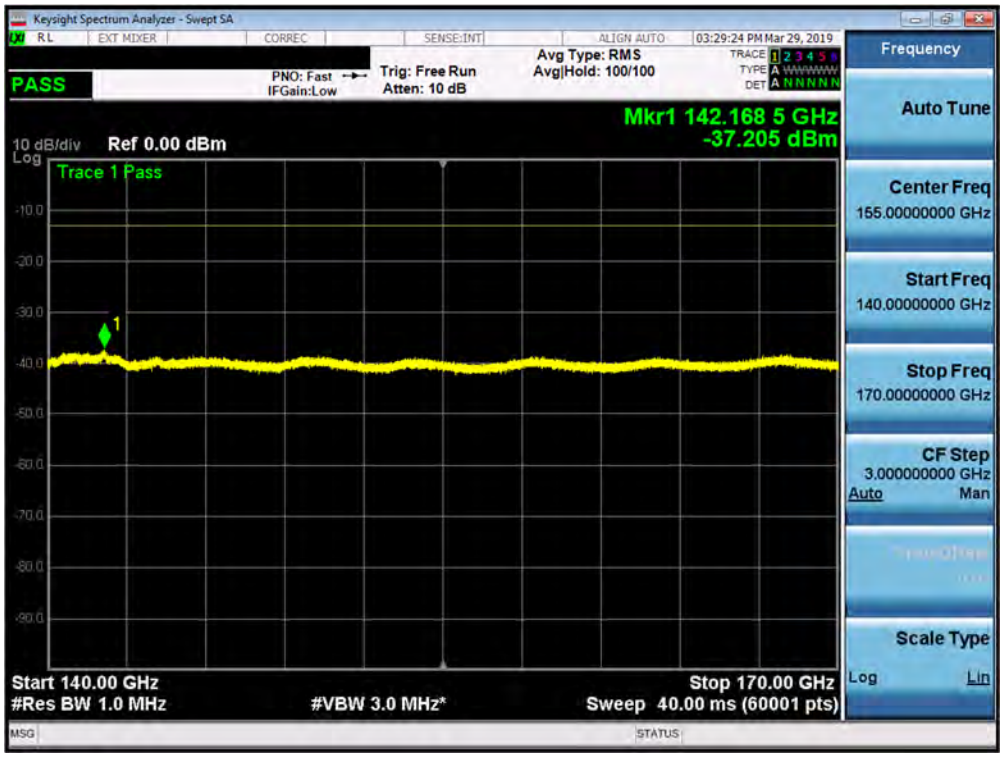
(-39.37 dBm + -39.22 dBm) = (115.61 nW + 119.67 nW) = (235.28 nW) = -36.28 dBm



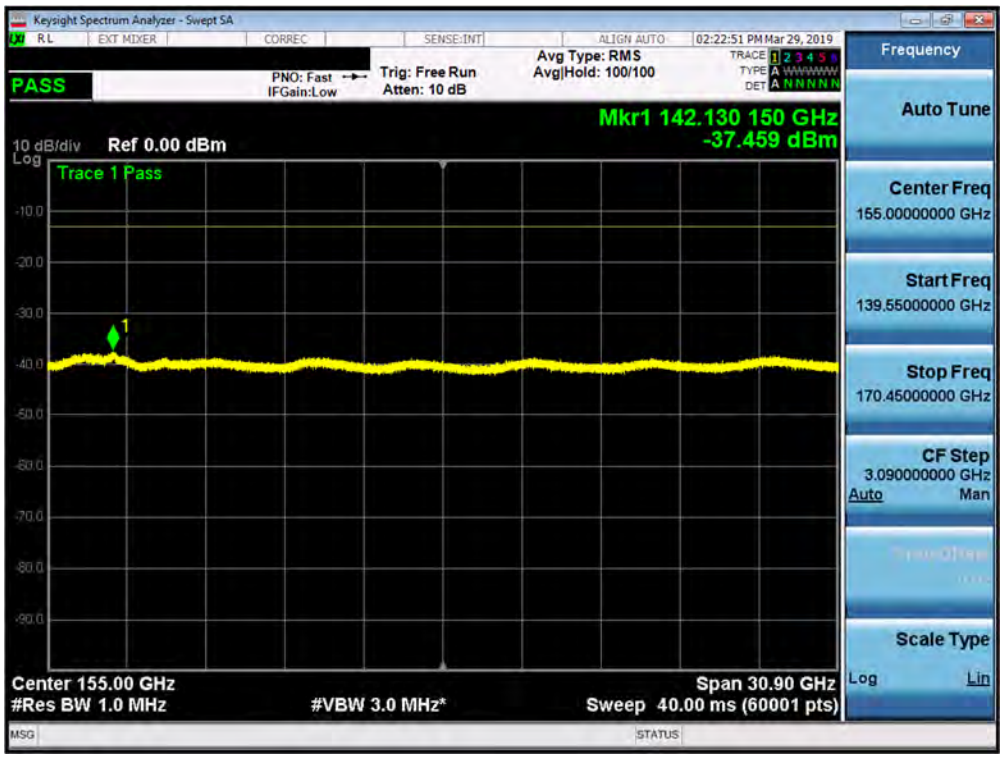
Plot 7-117. J Patch Radiated Spurious Plot 140-170 GHz (1CC QPSK Low Channel H Beam)



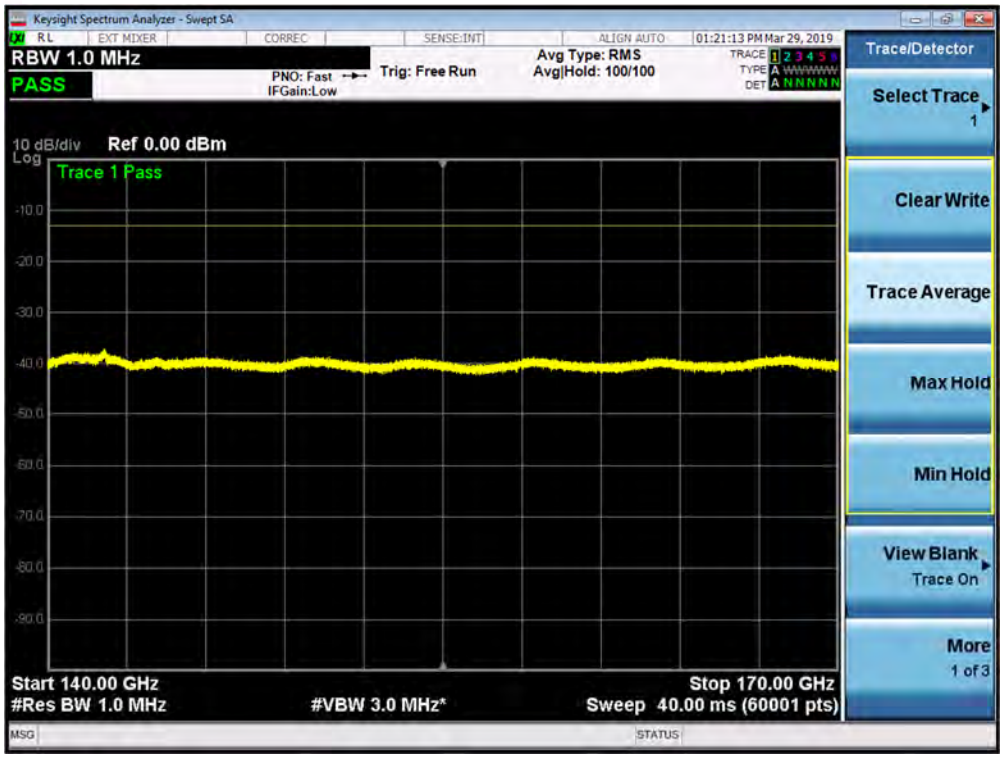
Plot 7-118. J Patch Radiated Spurious Plot 140-170 GHz (1CC QPSK Mid Channel H Beam)



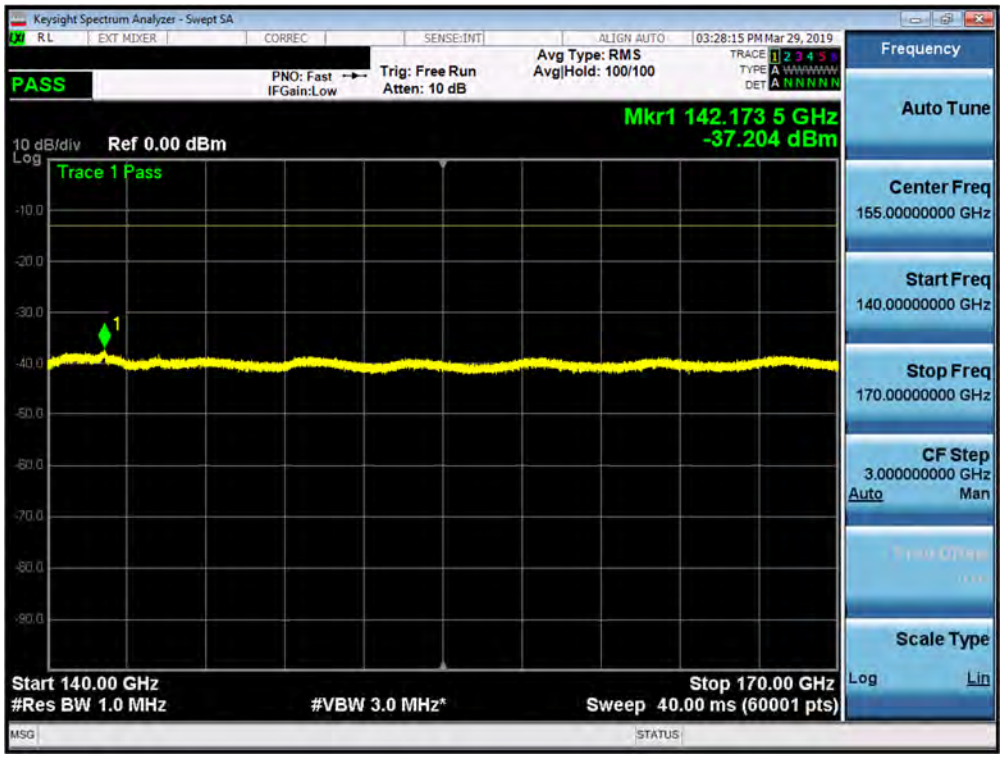
Plot 7-119. J Patch Radiated Spurious Plot 140-170 GHz (1CC QPSK High Channel H Beam)



Plot 7-120. J Patch Radiated Spurious Plot 140-170 GHz (1CC QPSK Low Channel V Beam)



Plot 7-121. J Patch Radiated Spurious Plot 140-170 GHz (1CC QPSK Mid Channel V Beam)



Plot 7-122. J Patch Radiated Spurious Plot 140-170 GHz (1CC QPSK High Channel V Beam)

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]
142140.50	RMS/Avg	Low	50	QPSK	H	H	-	-	-37.33	-13.00	-24.33
142136.00	RMS/Avg	Mid	50	QPSK	H	H	-	-	-37.15	-13.00	-24.15
142168.50	RMS/Avg	High	50	QPSK	H	H	-	-	-37.21	-13.00	-24.21
142130.15	RMS/Avg	Low	50	QPSK	V	V	-	-	-37.46	-13.00	-24.46
142158.00	RMS/Avg	Mid	50	QPSK	V	V	-	-	-37.16	-13.00	-24.16
142173.50	RMS/Avg	High	50	QPSK	V	V	-	-	-37.20	-13.00	-24.20

Table 7-25. J Patch Spurious Emissions Table (140-170GHz)

Notes

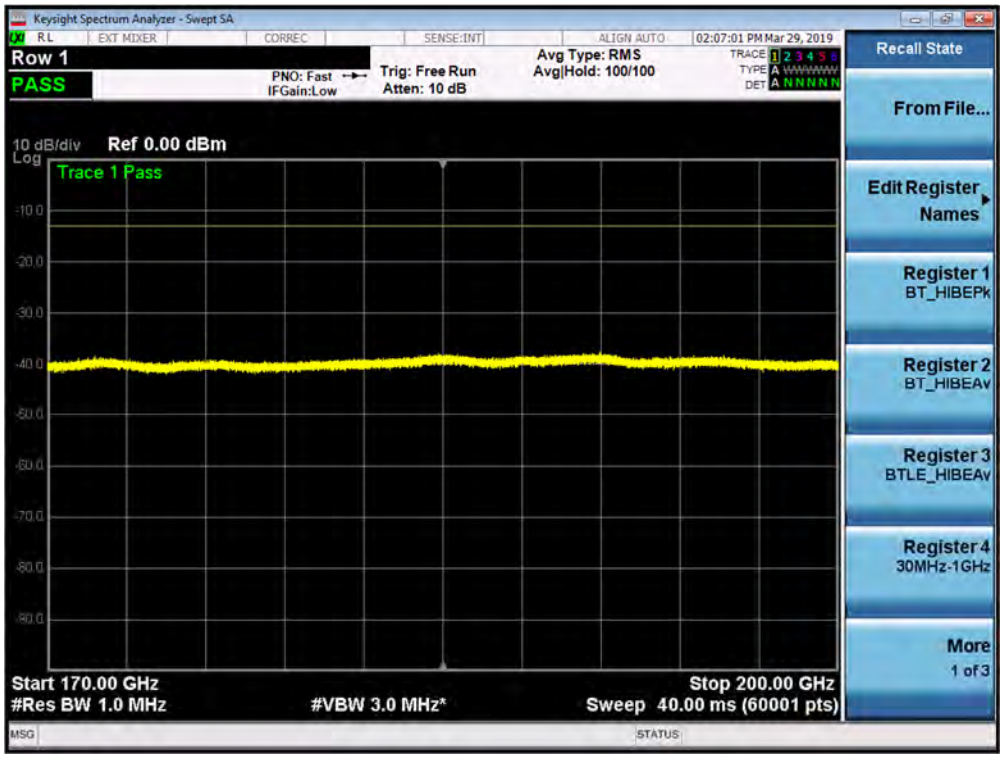
1. The RSE EIRP level is taken directly from the spectrum analyzer which includes the appropriate antenna factors, cable losses, and harmonic mixer conversion losses. Measurements were performed at a distance of 1 meter.

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:

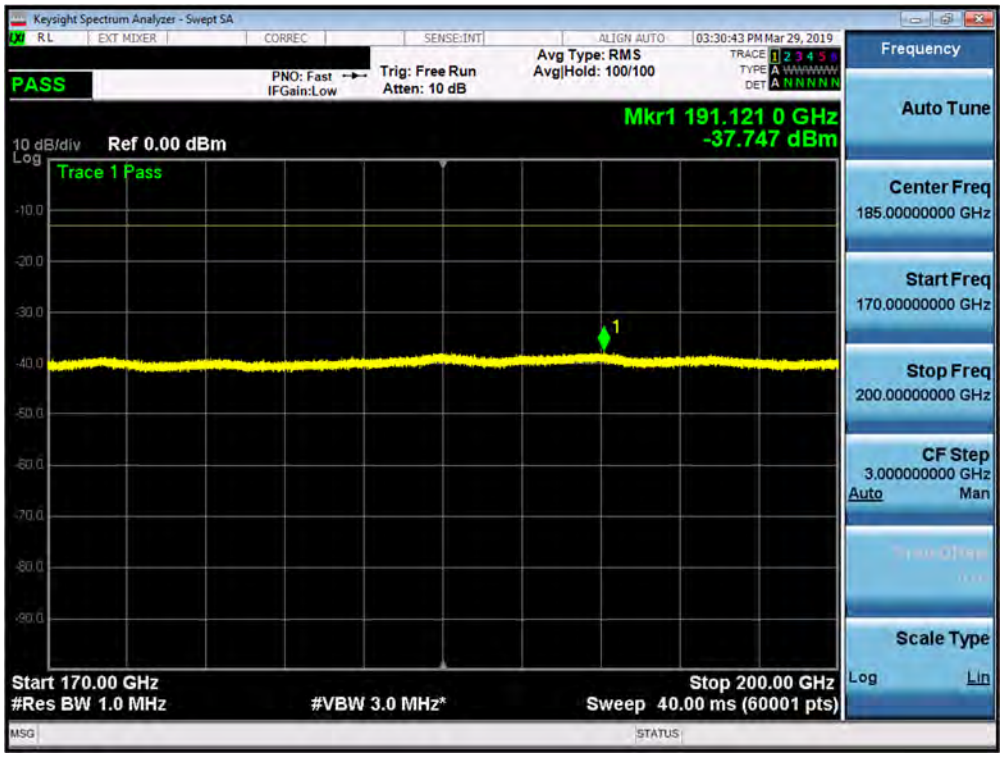
EIRP(H Beam) + EIRP(V Beam) = EIRP(MIMO)

(-37.15 dBm + -37.16 dBm) = (192.75 nW + 192.31 nW) = (385.06 nW) = -34.14 dBm

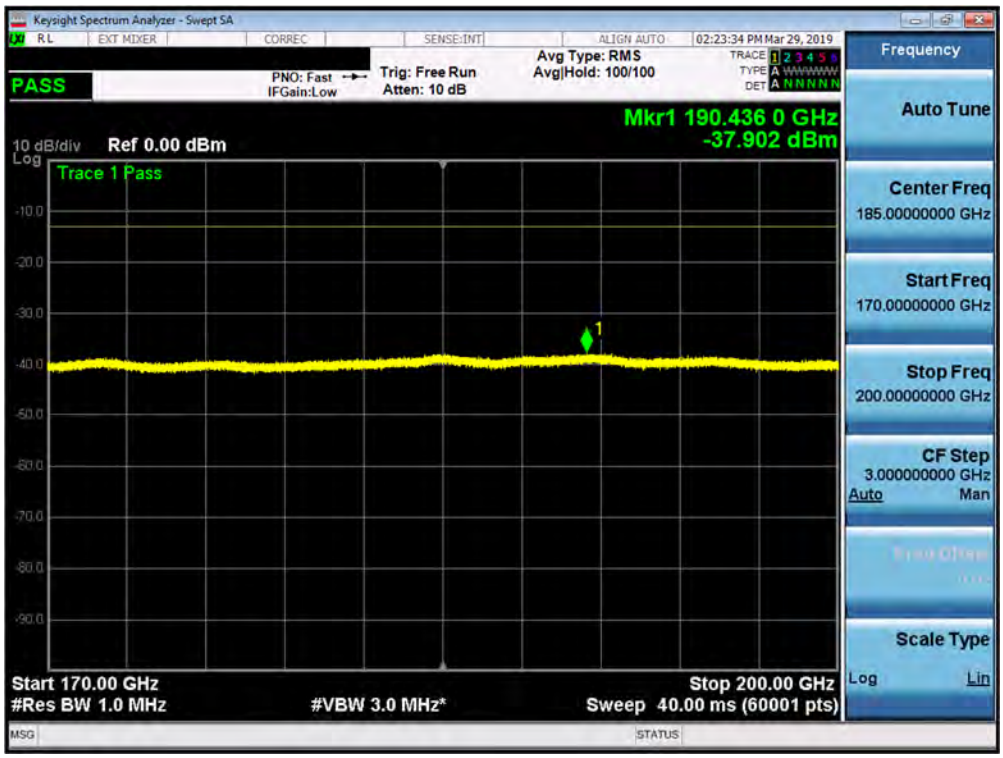
Plot 7-123. J Patch Radiated Spurious Plot 170-200 GHz (1CC QPSK Low Channel H Beam)



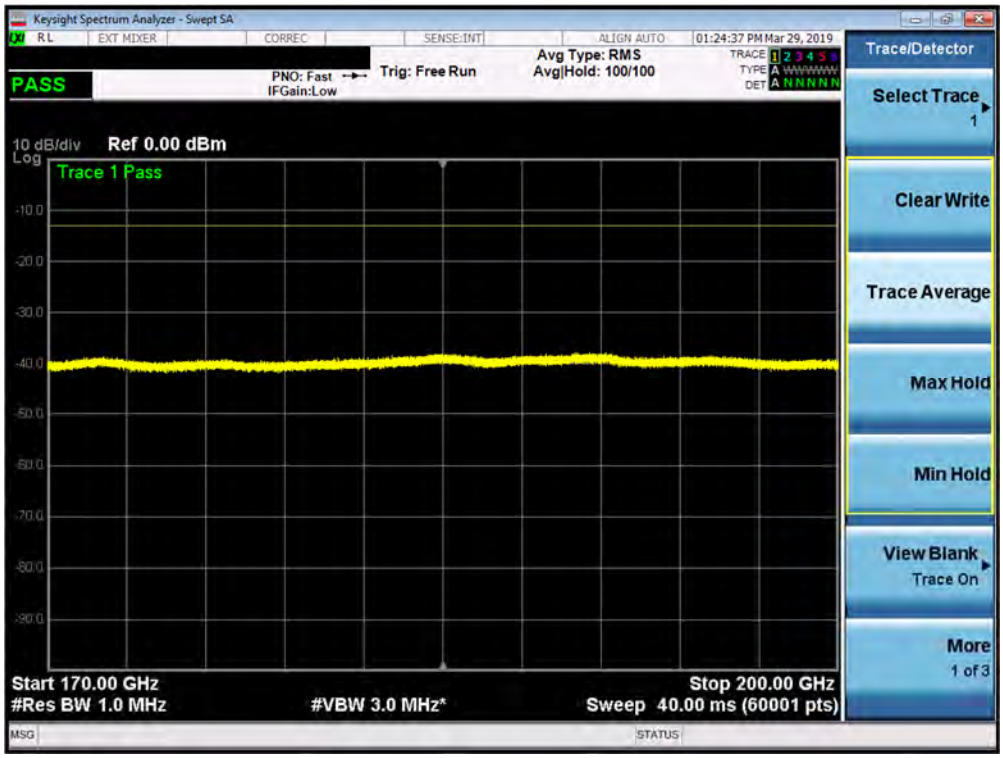
Plot 7-124. J Patch Radiated Spurious Plot 170-200 GHz (1CC QPSK Mid Channel H Beam)



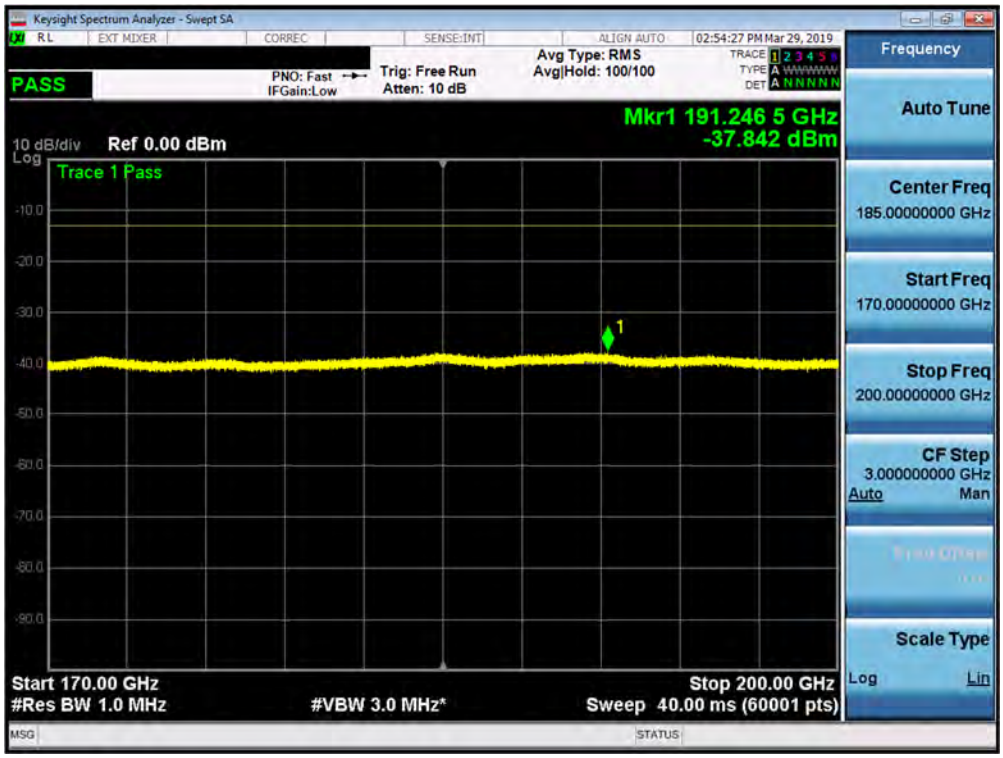
Plot 7-125. J Patch Radiated Spurious Plot 170-200 GHz (1CC QPSK High Channel H Beam)



Plot 7-126. J Patch Radiated Spurious Plot 170-200 GHz (1CC QPSK Low Channel V Beam)



Plot 7-127. J Patch Radiated Spurious Plot 170-200 GHz (1CC QPSK Mid Channel V Beam)



Plot 7-128. J Patch Radiated Spurious Plot 170-200 GHz (1CC QPSK High Channel V Beam)

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) + 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]
191031.50	RMS/Avg	Low	50	QPSK	H	H	-	-	-37.88	-13.00	-24.88
190977.00	RMS/Avg	Mid	50	QPSK	H	H	-	-	-37.51	-13.00	-24.51
191121.00	RMS/Avg	High	50	QPSK	H	H	-	-	-37.75	-13.00	-24.75
190436.00	RMS/Avg	Low	50	QPSK	V	V	-	-	-37.90	-13.00	-24.90
190092.50	RMS/Avg	Mid	50	QPSK	V	V	-	-	-37.80	-13.00	-24.80
191246.50	RMS/Avg	High	50	QPSK	V	V	-	-	-37.84	-13.00	-24.84

Table 7-26. J Patch Spurious Emissions Table (170-200GHz)

Notes

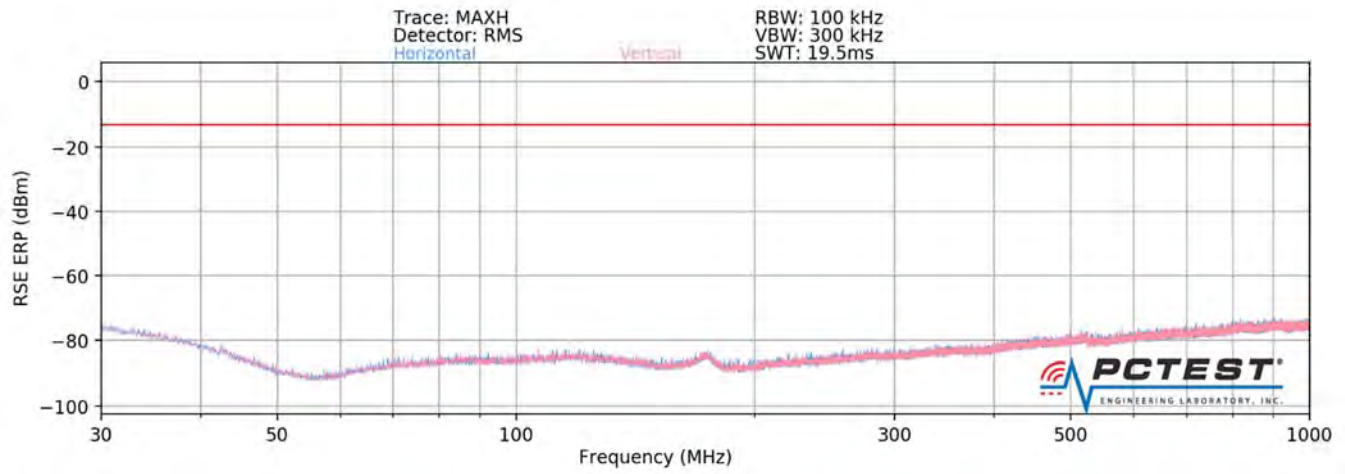
1. The RSE EIRP level is taken directly from the spectrum analyzer which includes the appropriate antenna factors, cable losses, and harmonic mixer conversion losses. Measurements were performed at a distance of 1.5 meter.

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:

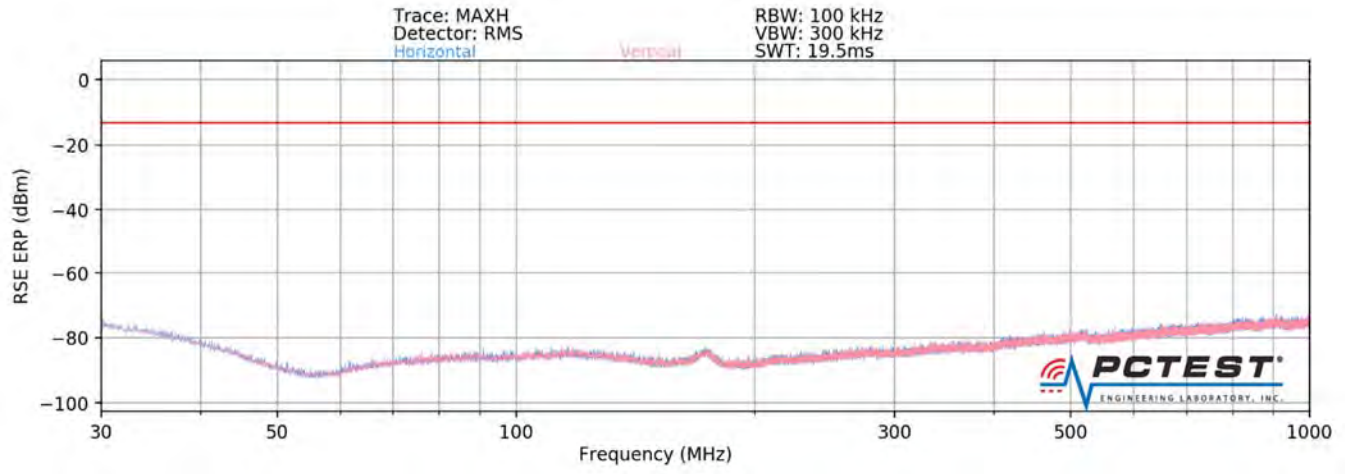
EIRP(H Beam) + EIRP(V Beam) = EIRP(MIMO)

(-37.51 dBm + -37.80 dBm) = (177.42 nW + 165.96 nW) = (343.38 nW) = -34.64 dBm

7.4.3 K Patch Radiated Spurious Emissions 30MHz – 1GHz

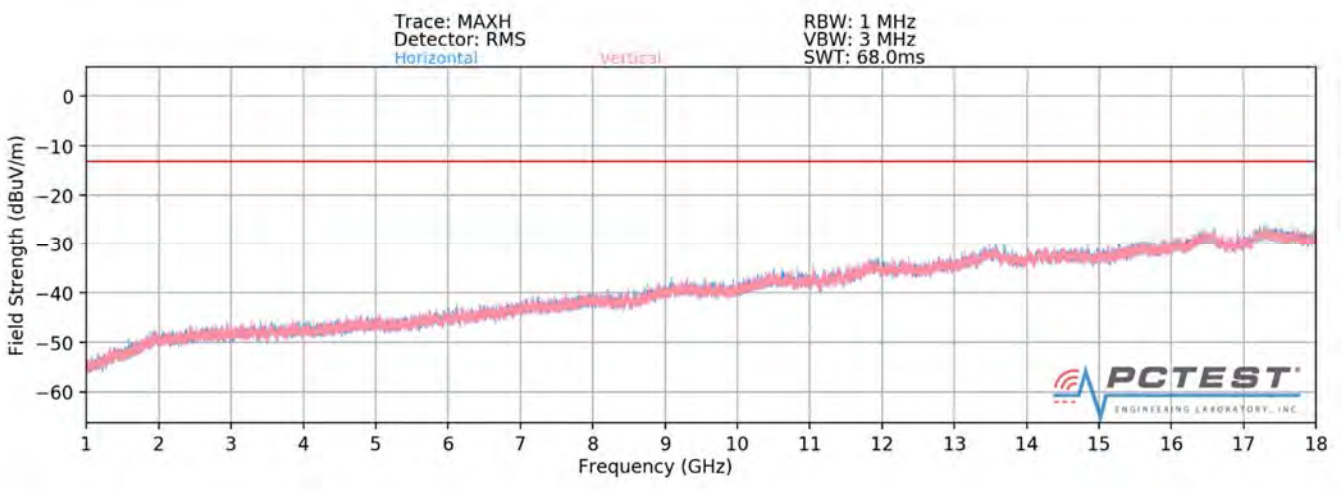


Plot 7-129. K Patch Radiated Spurious Plot 30 MHz - 1 GHz (1CC QPSK Mid Channel H Beam)

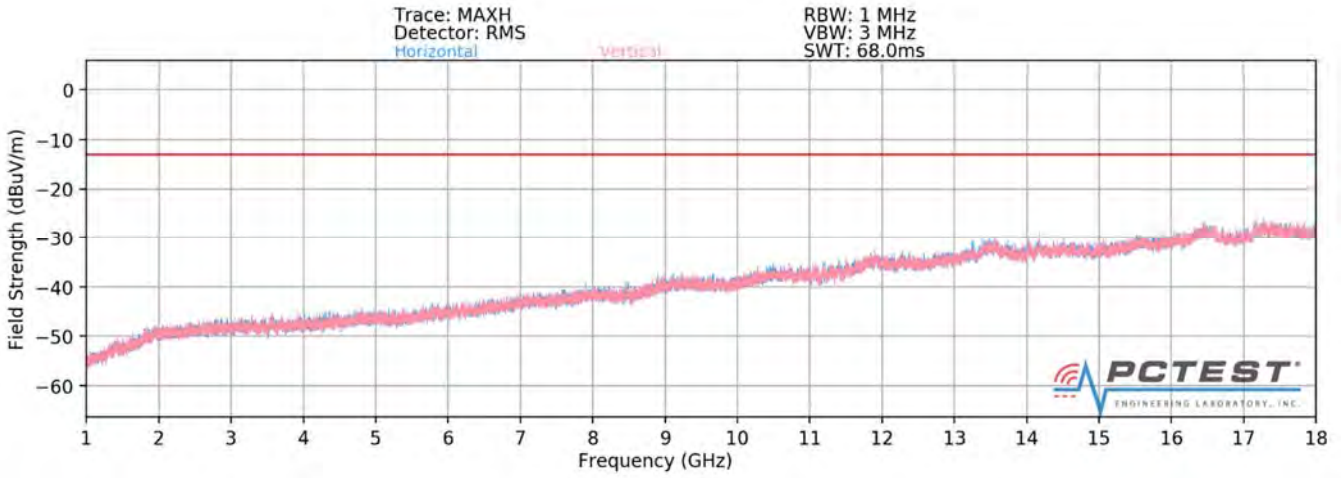


Plot 7-130. K Patch Radiated Spurious Plot 30 MHz - 1 GHz (1CC QPSK Mid Channel V Beam)

1 – 18GHz

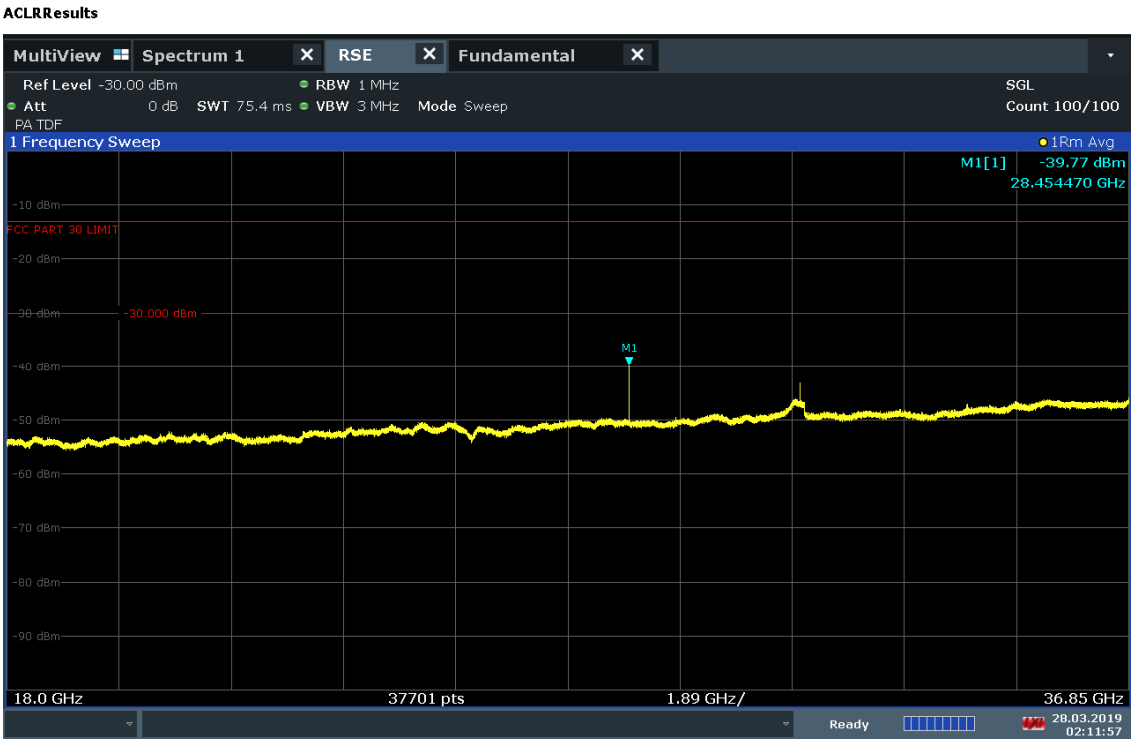


Plot 7-131. K Patch Radiated Spurious Plot 1-18 GHz (1CC QPSK Mid Channel H Beam)

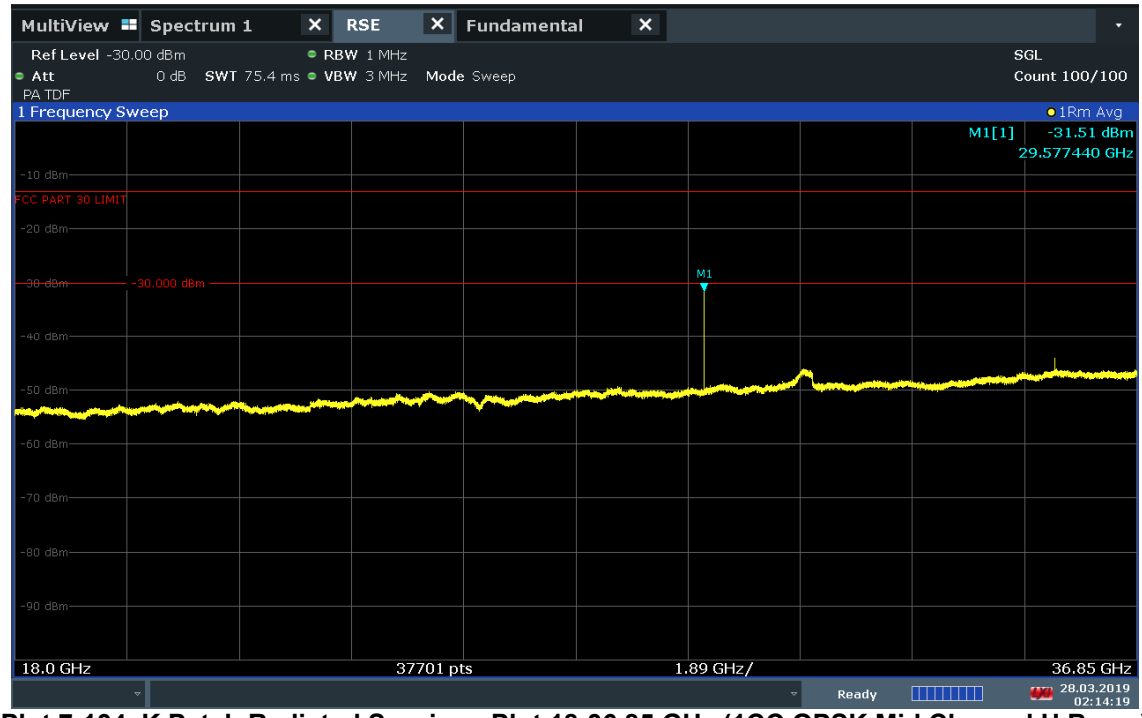


Plot 7-132. K Patch Radiated Spurious Plot 1-18 GHz (1CC QPSK Mid Channel V Beam)

18 – 36.85GHz

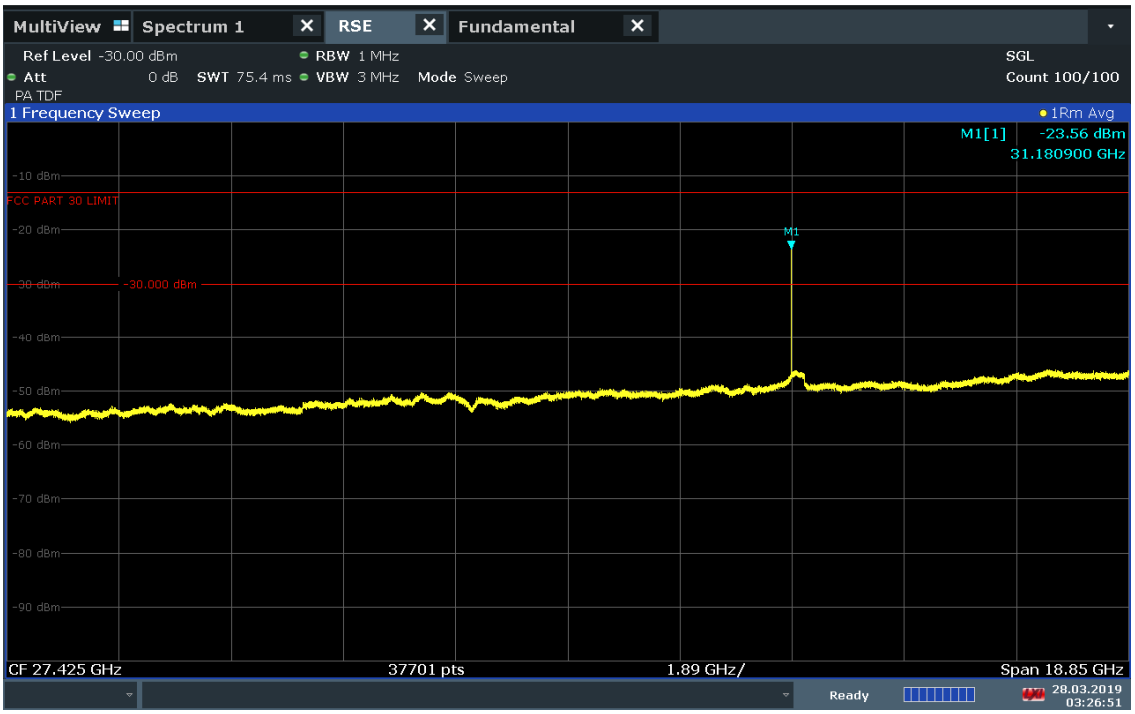


Plot 7-133. K Patch Radiated Spurious Plot 18-36.85 GHz (1CC QPSK Low Channel H Beam)



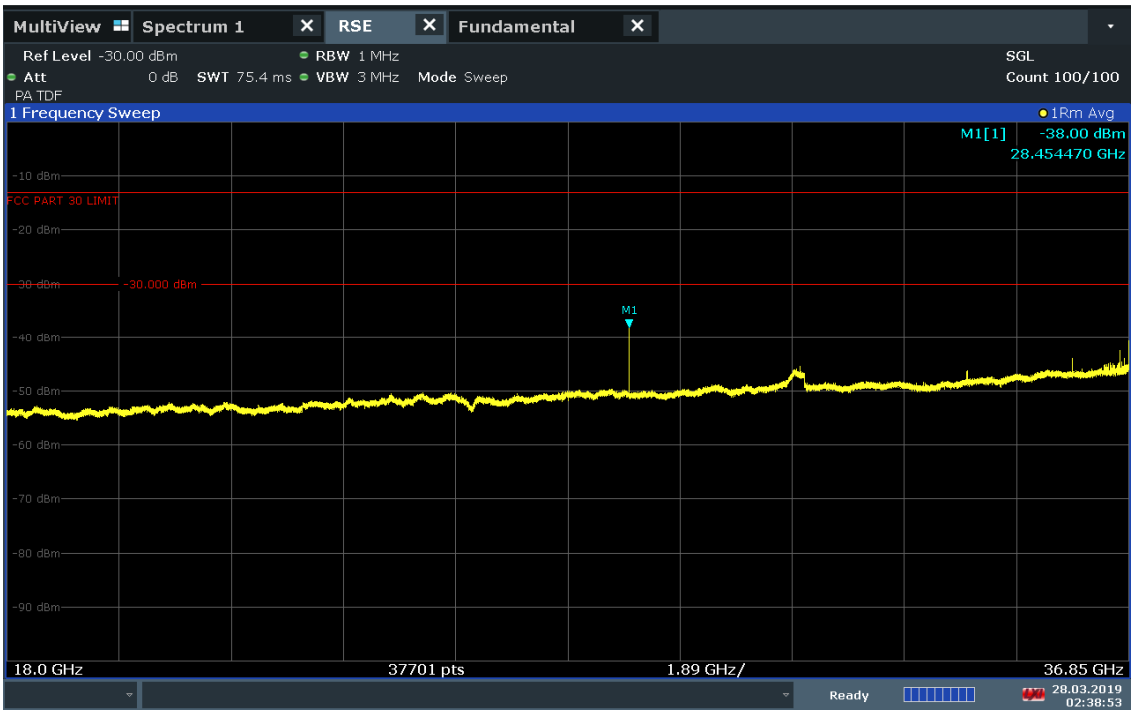
Plot 7-134. K Patch Radiated Spurious Plot 18-36.85 GHz (1CC QPSK Mid Channel H Beam)

ACLRResults



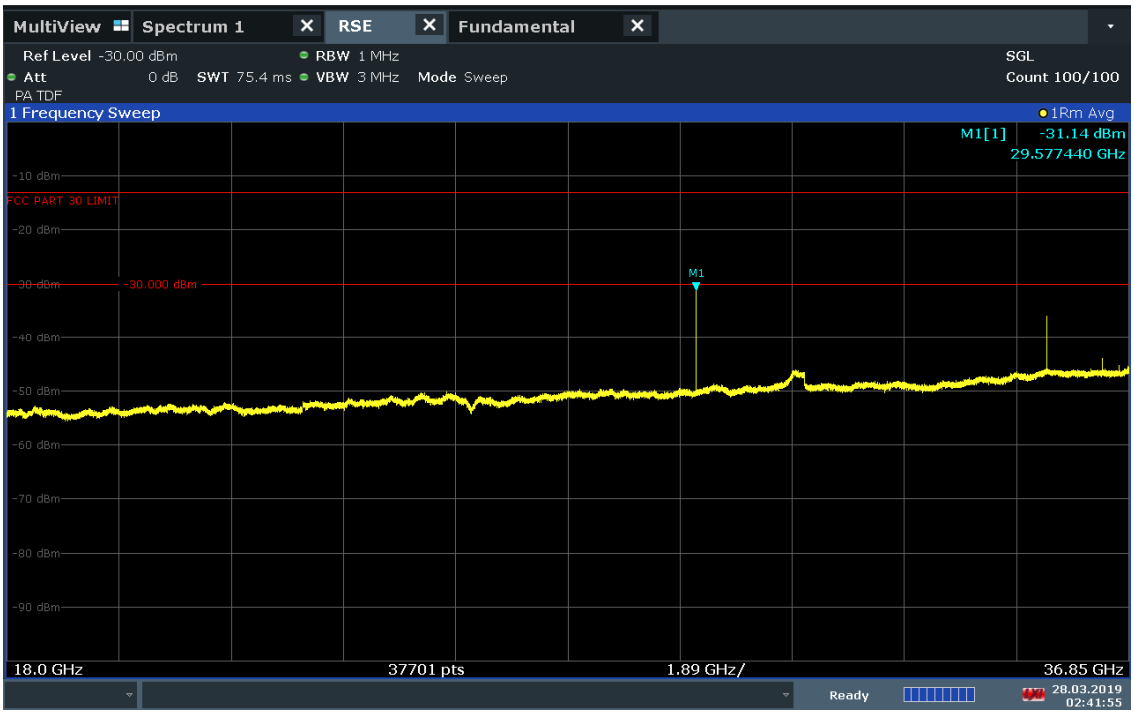
Plot 7-135. K Patch Radiated Spurious Plot 18-36.85 GHz (1CC QPSK High Channel H Beam)

ACLRResults



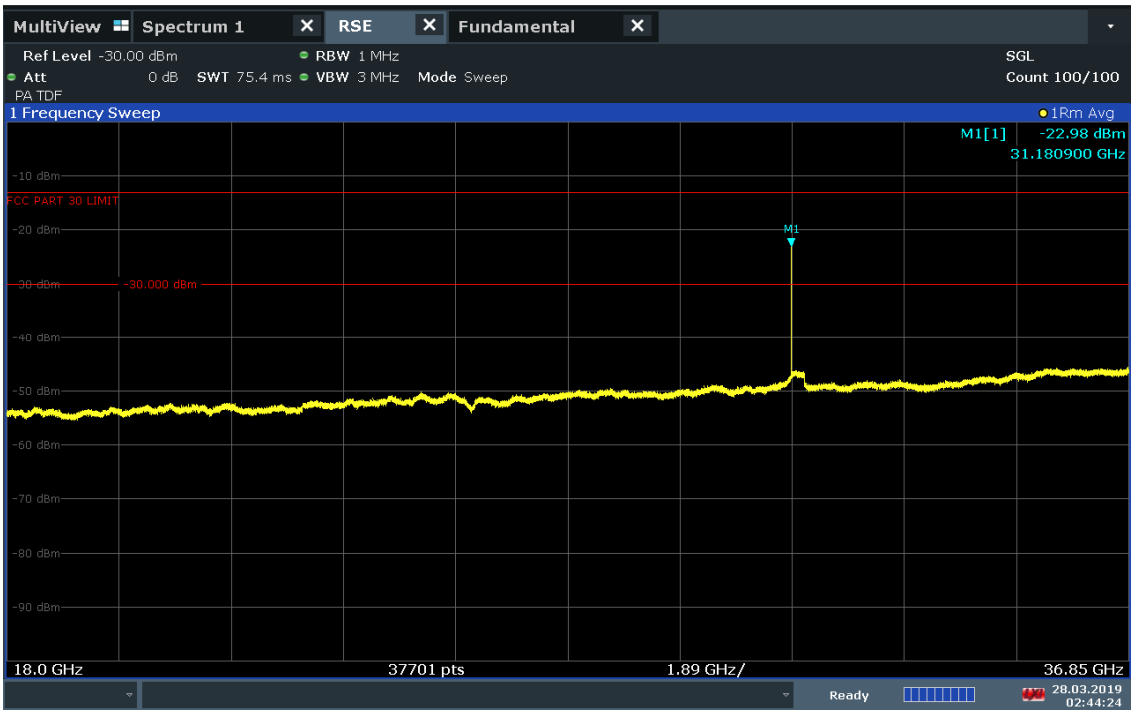
Plot 7-136. K Patch Radiated Spurious Plot 18-36.85 GHz (1CC QPSK Low Channel V Beam)

ACLRResults



Plot 7-137. K Patch Radiated Spurious Plot 18-36.85 GHz (1CC QPSK Mid Channel V Beam)

ACLRResults



Plot 7-138. K Patch Radiated Spurious Plot 18-36.85 GHz (1CC QPSK High Channel V Beam)

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]
28454.47	RMS/Avg	Low	50	QPSK	H	V	150	180	-39.77	-13.00	-26.77
29577.44	RMS/Avg	Mid	50	QPSK	H	V	150	303	-31.51	-13.00	-18.51
31180.90	RMS/Avg	High	50	QPSK	H	V	150	288	-23.56	-13.00	-10.56
28454.47	RMS/Avg	Low	50	QPSK	V	H	150	302	-38.00	-13.00	-25.00
29577.44	RMS/Avg	Mid	50	QPSK	V	H	150	272	-31.14	-13.00	-18.14
31180.90	RMS/Avg	High	50	QPSK	V	H	150	251	-22.98	-13.00	-9.98

Table 7-27. K Patch Spurious Emissions Table (18-36.85GHz)

Notes

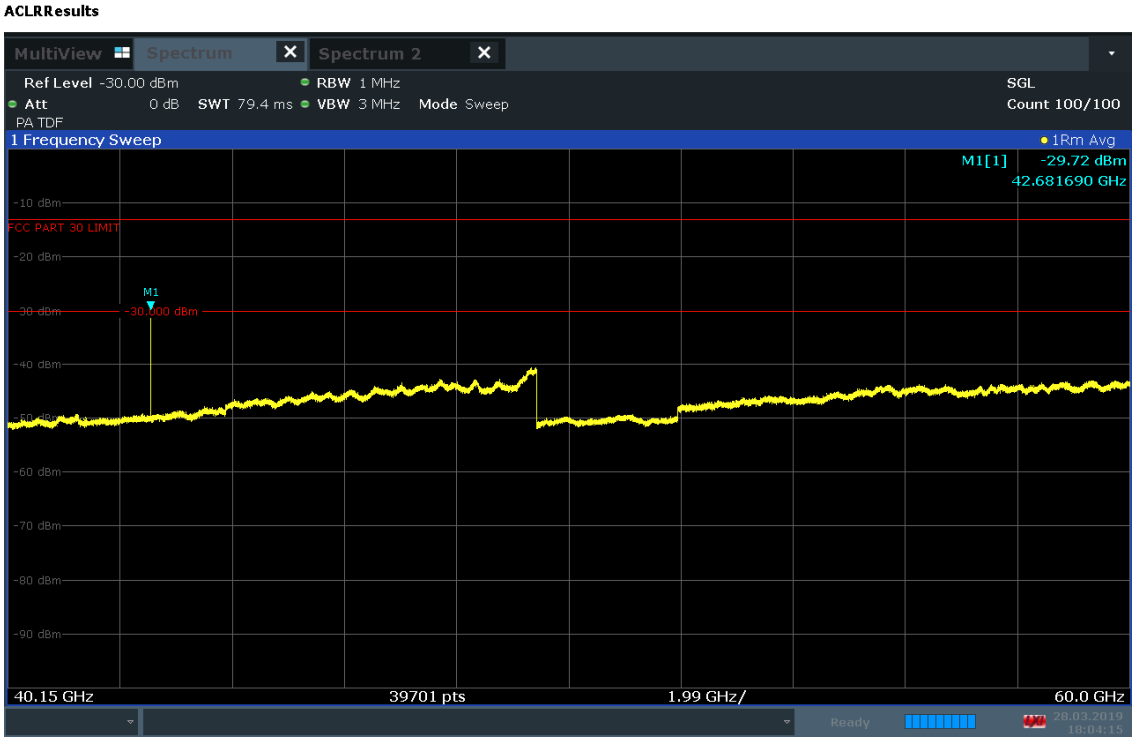
1. The RSE EIRP level is taken directly from the spectrum analyzer which includes the appropriate antenna factors, cable losses, and harmonic mixer conversion losses. Measurements were performed at a distance of 1 meter.

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:

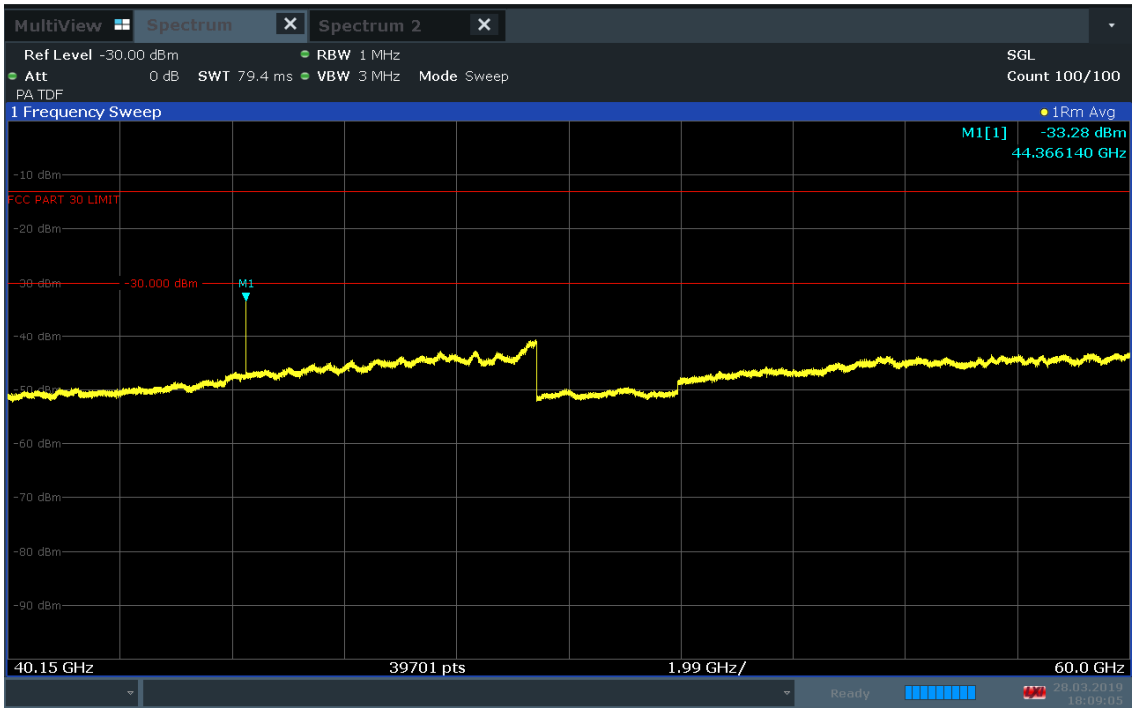
EIRP(H Beam) + EIRP(V Beam) = EIRP(MIMO)

(-23.56 dBm + -22.98 dBm) = (4.41 µW + 5.04 µW) = (9.45 µW) = -20.25 dBm

40.15 – 60GHz

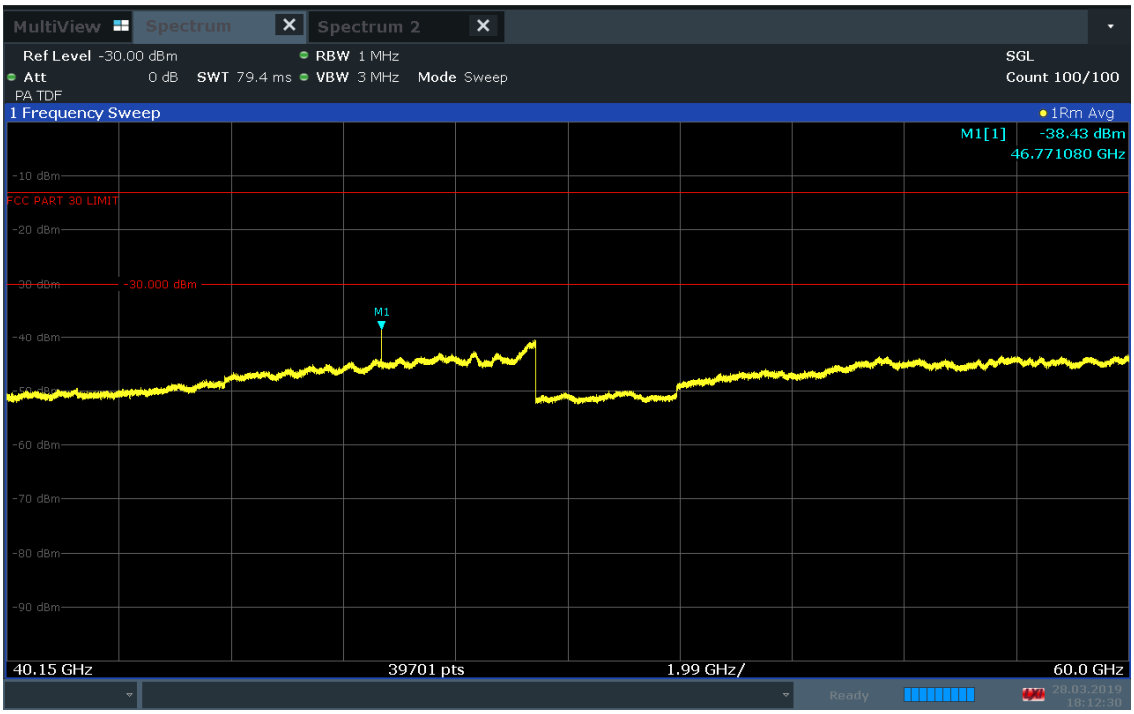


Plot 7-139. K Patch Radiated Spurious Plot 40.15-60 GHz (1CC QPSK Low Channel H Beam)



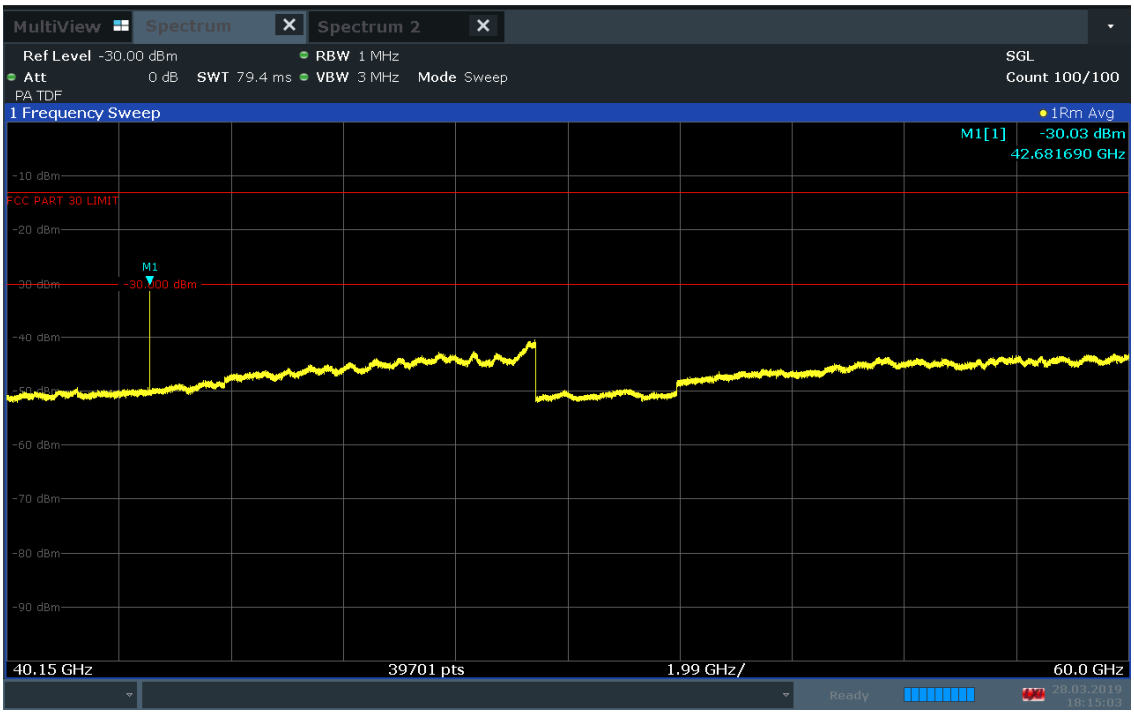
Plot 7-140. K Patch Radiated Spurious Plot 40.15-60 GHz (1CC QPSK Mid Channel H Beam)

ACLRResults



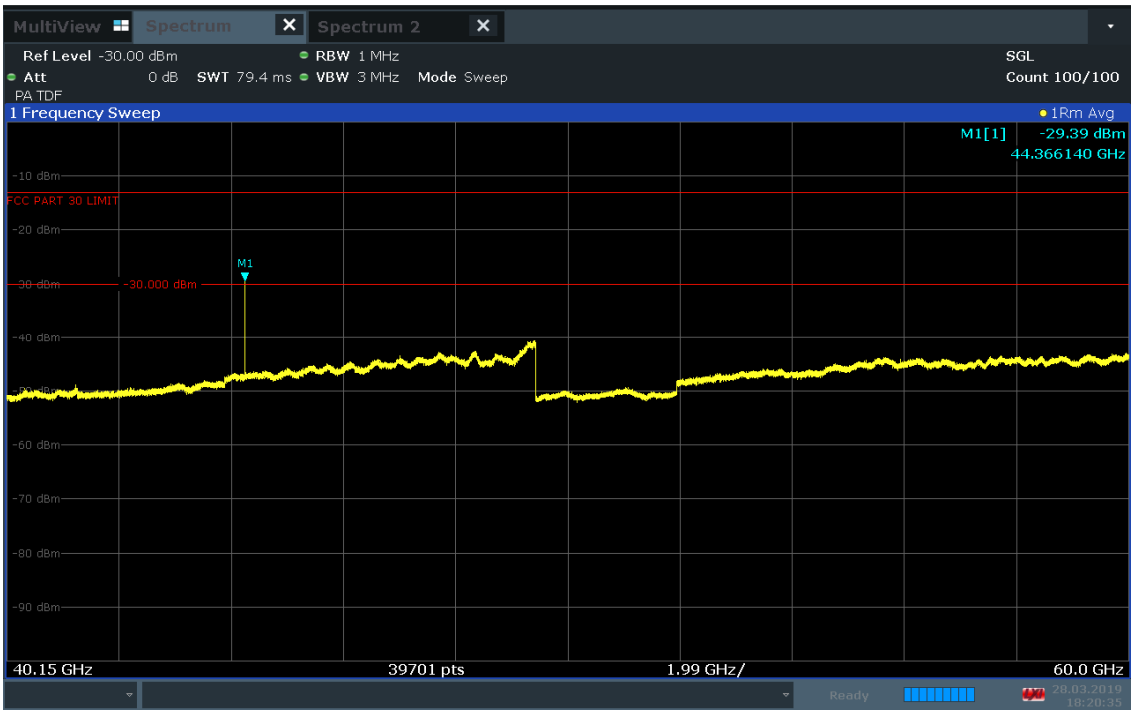
Plot 7-141. K Patch Radiated Spurious Plot 40.15-60 GHz (1CC QPSK High Channel H Beam)

ACLRResults



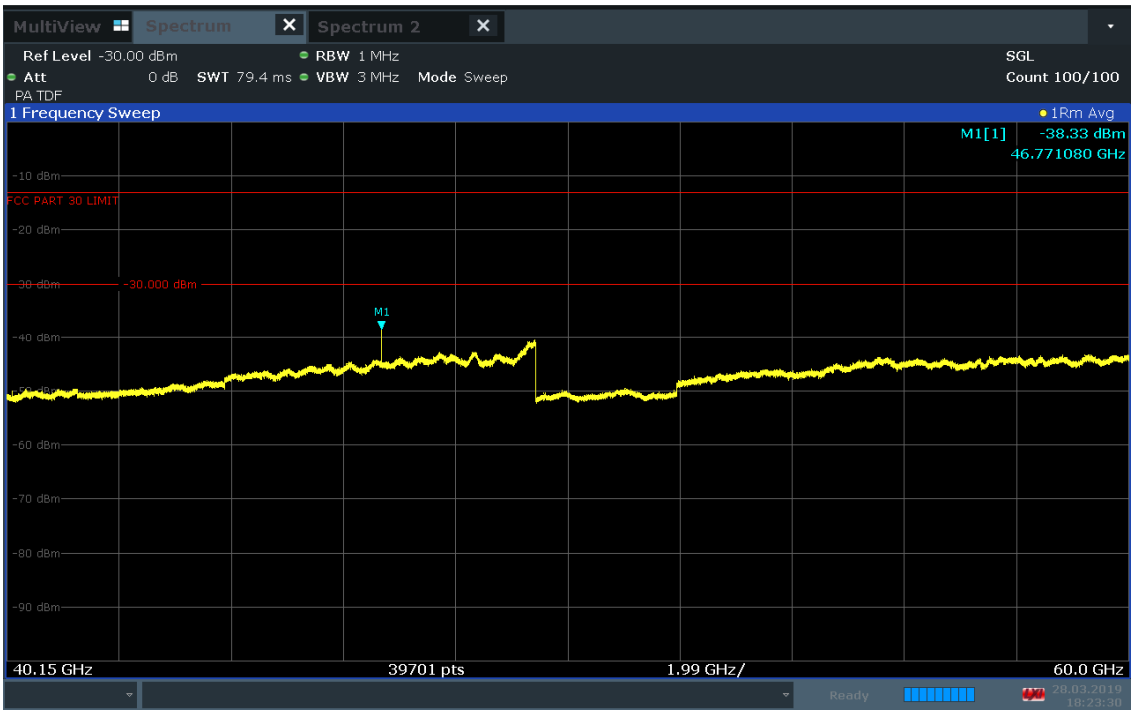
Plot 7-142. K Patch Radiated Spurious Plot 40.15-60 GHz (1CC QPSK Low Channel V Beam)

ACLRResults



Plot 7-143. K Patch Radiated Spurious Plot 40.15-60 GHz (1CC QPSK Mid Channel V Beam)

ACLRResults



Plot 7-144. K Patch Radiated Spurious Plot 40.15-60 GHz (1CC QPSK High Channel V Beam)

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] + 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]
42681.69	RMS/Avg	Low	50	QPSK	H	H	150	184	-29.72	-13.00	-16.72
44366.14	RMS/Avg	Mid	50	QPSK	H	H	150	306	-33.28	-13.00	-20.28
46771.08	RMS/Avg	High	50	QPSK	H	H	150	295	-38.43	-13.00	-25.43
42681.69	RMS/Avg	Low	50	QPSK	V	H	150	298	-30.03	-13.00	-17.03
44366.14	RMS/Avg	Mid	50	QPSK	V	H	150	270	-29.39	-13.00	-16.39
46771.08	RMS/Avg	High	50	QPSK	V	H	150	229	-38.33	-13.00	-25.33

Table 7-28. K Patch Spurious Emissions Table (40.15-60 GHz)

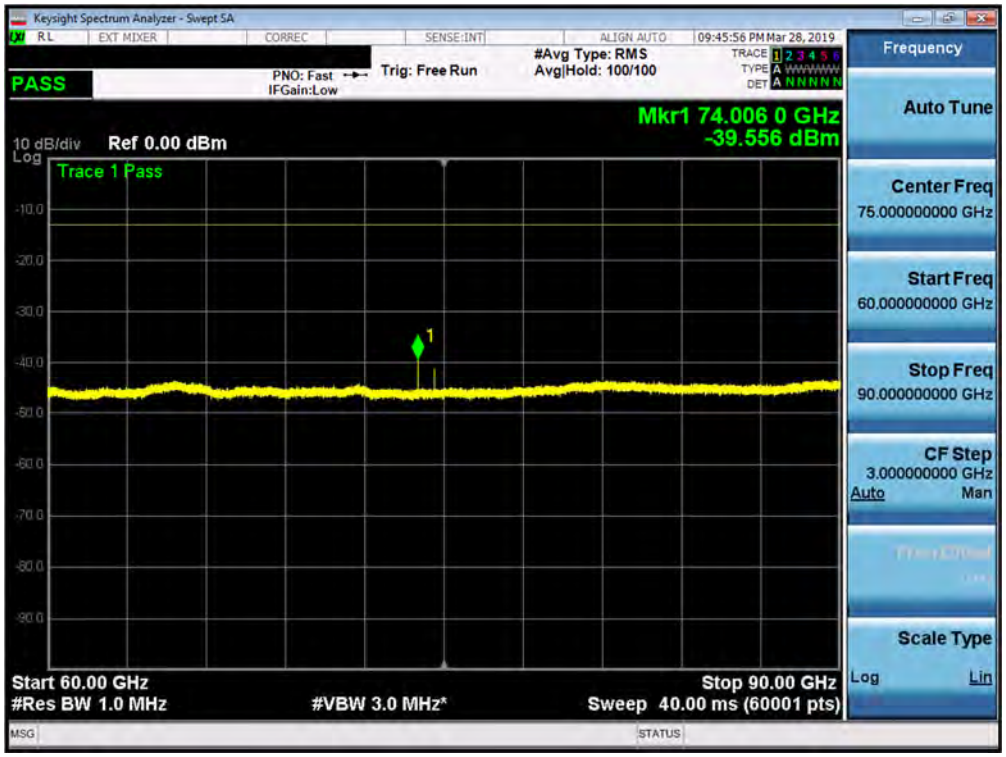
Notes

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 1.5 meter.

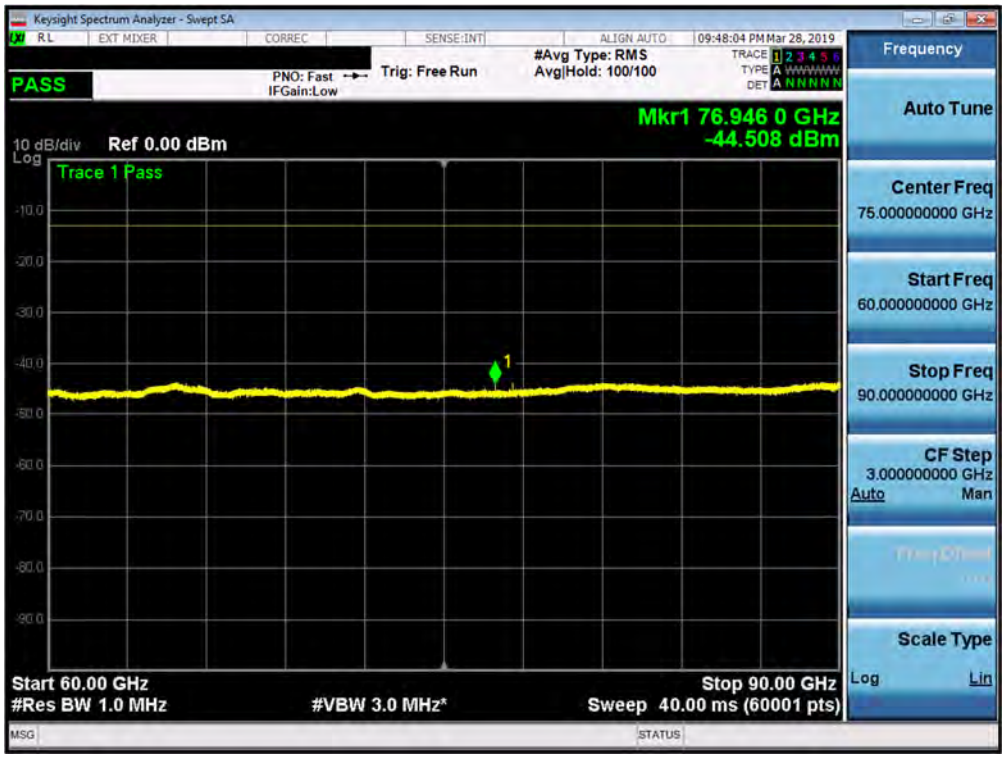
2. To address compliance of MIMO RSE per KDB 662911 D01, the MIMO RSE EIRP is calculated by summing the worst case H Beam EIRP and V Beam EIRP in linear powers units then converted back to dBm:

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

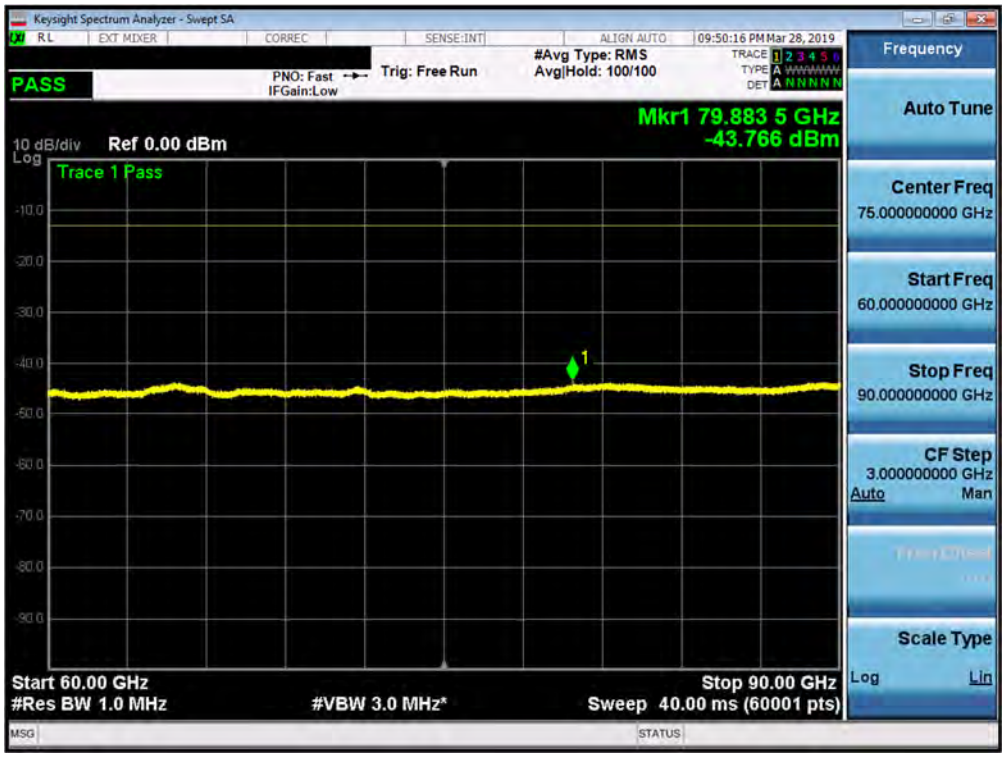
(-29.72 dBm + -30.03 dBm) = (1066.60 nW + 993.12 nW) = (2059.72 nW) = -26.86 dBm



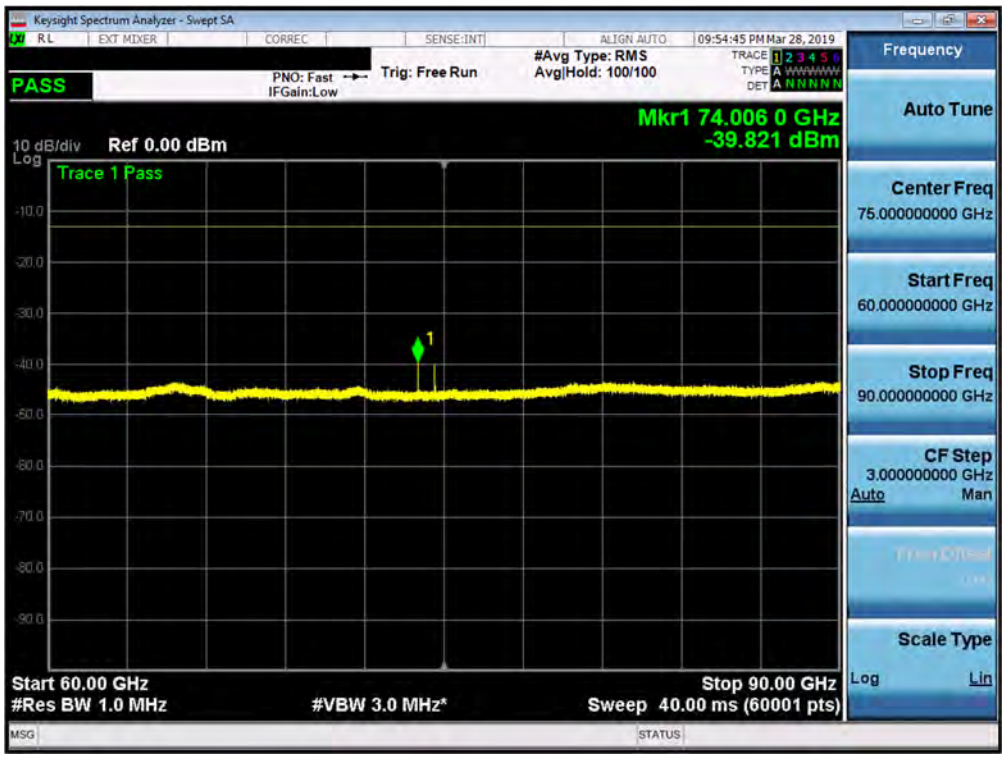
Plot 7-145. K Patch Radiated Spurious Plot 60-90 GHz (1CC QPSK Low Channel H Beam)



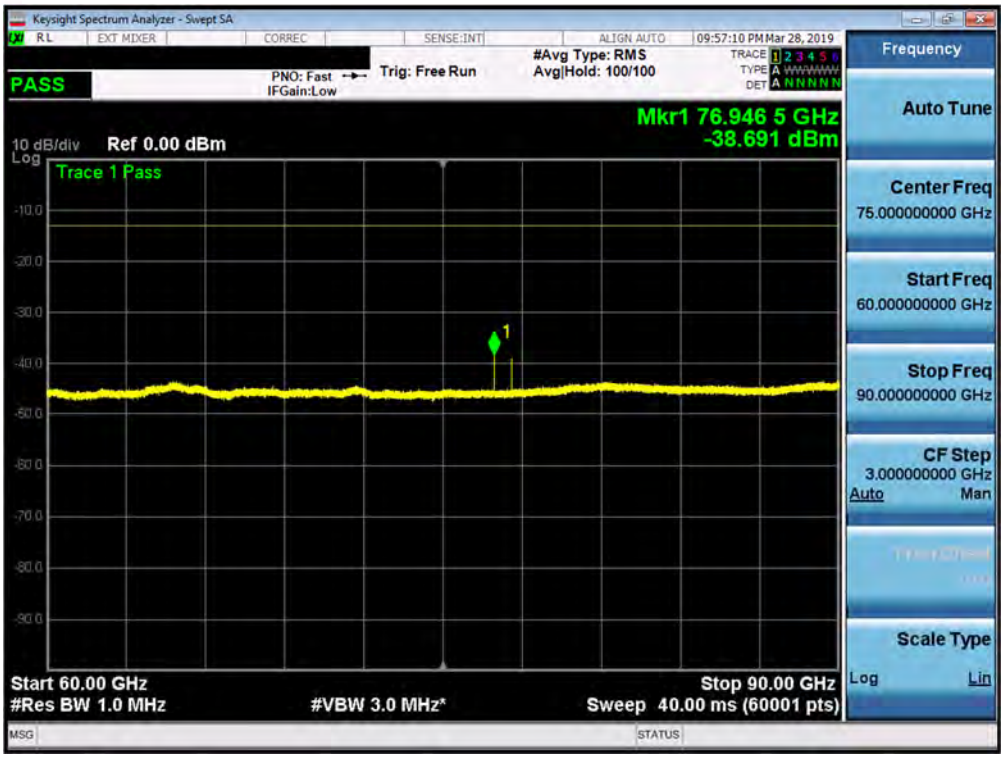
Plot 7-146. K Patch Radiated Spurious Plot 60-90 GHz (1CC QPSK Mid Channel H Beam)



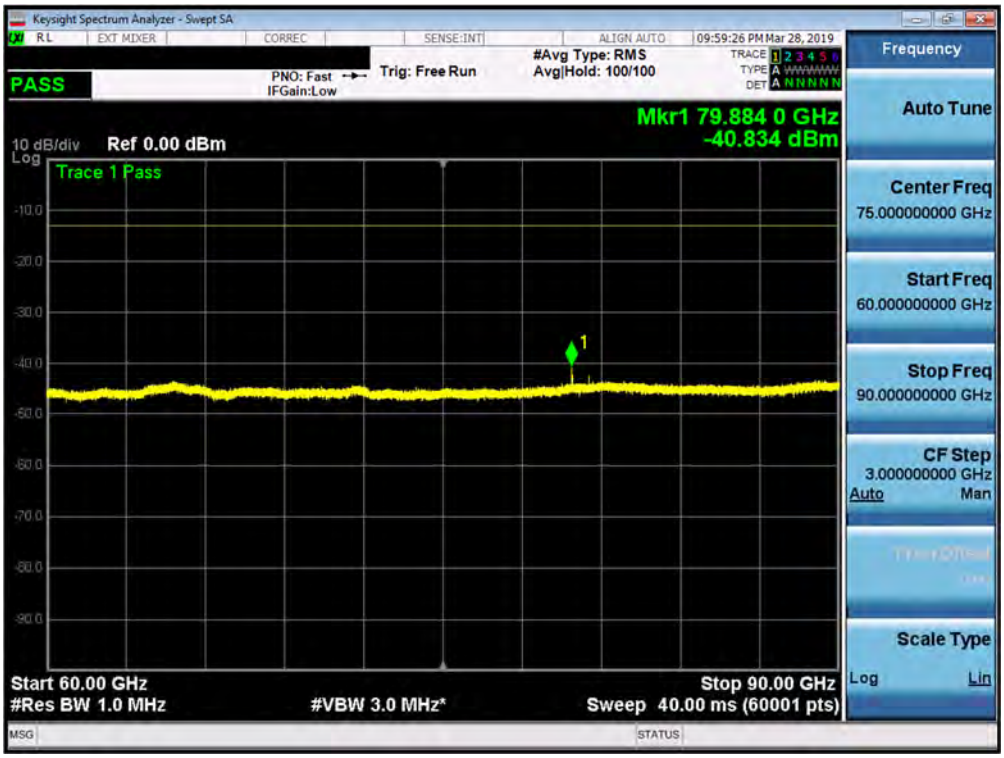
Plot 7-147. K Patch Radiated Spurious Plot 60-90 GHz (1CC QPSK High Channel H Beam)



Plot 7-148. K Patch Radiated Spurious Plot 60-90 GHz (1CC QPSK Low Channel V Beam)



Plot 7-149. K Patch Radiated Spurious Plot 60-90 GHz (1CC QPSK Mid Channel V Beam)



Plot 7-150. K Patch Radiated Spurious Plot 60-90 GHz (1CC QPSK High Channel V Beam)

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]
74006.00	RMS/Avg	Low	50	QPSK	H	V	150	233	-39.56	-13.00	-26.56
76946.00	RMS/Avg	Mid	50	QPSK	H	V	150	234	-44.51	-13.00	-31.51
79883.50	RMS/Avg	High	50	QPSK	H	V	150	200	-43.77	-13.00	-30.77
74006.00	RMS/Avg	Low	50	QPSK	V	H	150	225	-39.82	-13.00	-26.82
76946.50	RMS/Avg	Mid	50	QPSK	V	H	150	201	-38.69	-13.00	-25.69
79884.00	RMS/Avg	High	50	QPSK	V	H	150	266	-40.83	-13.00	-27.83

Table 7-29. K Patch Spurious Emissions Table (60-90GHz)

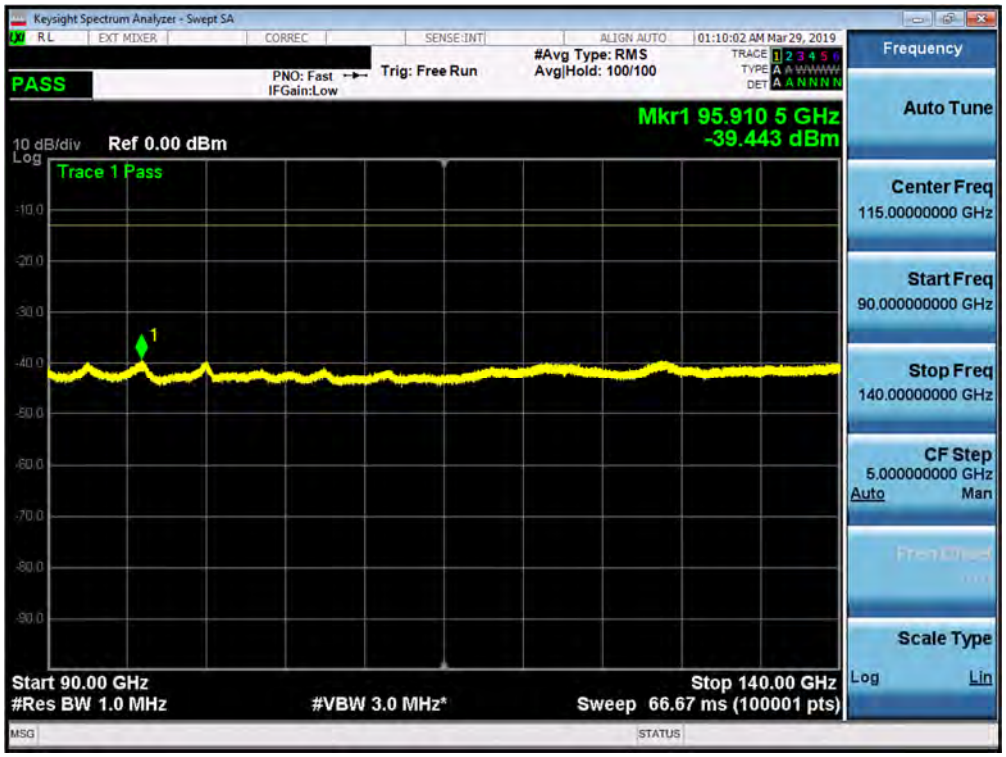
Notes

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.

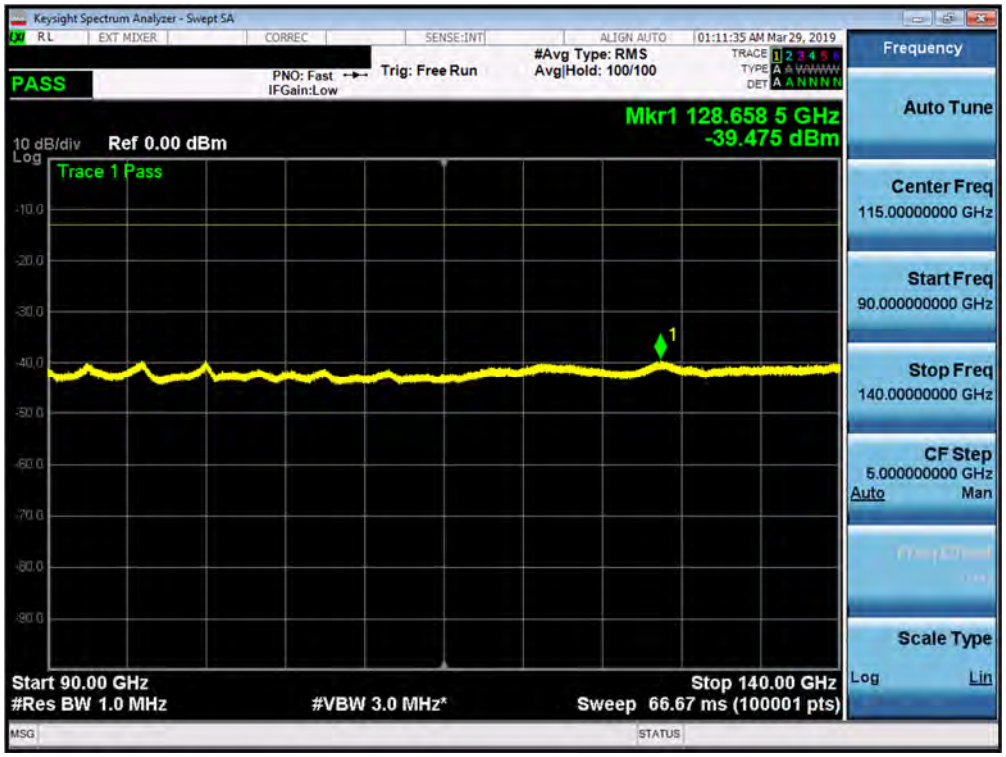
2. To address compliance of MIMO RSE per KDB 662911 D01, the MIMO RSE EIRP is calculated by summing the worst case H Beam EIRP and V Beam EIRP in linear powers units then converted back to dBm:

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

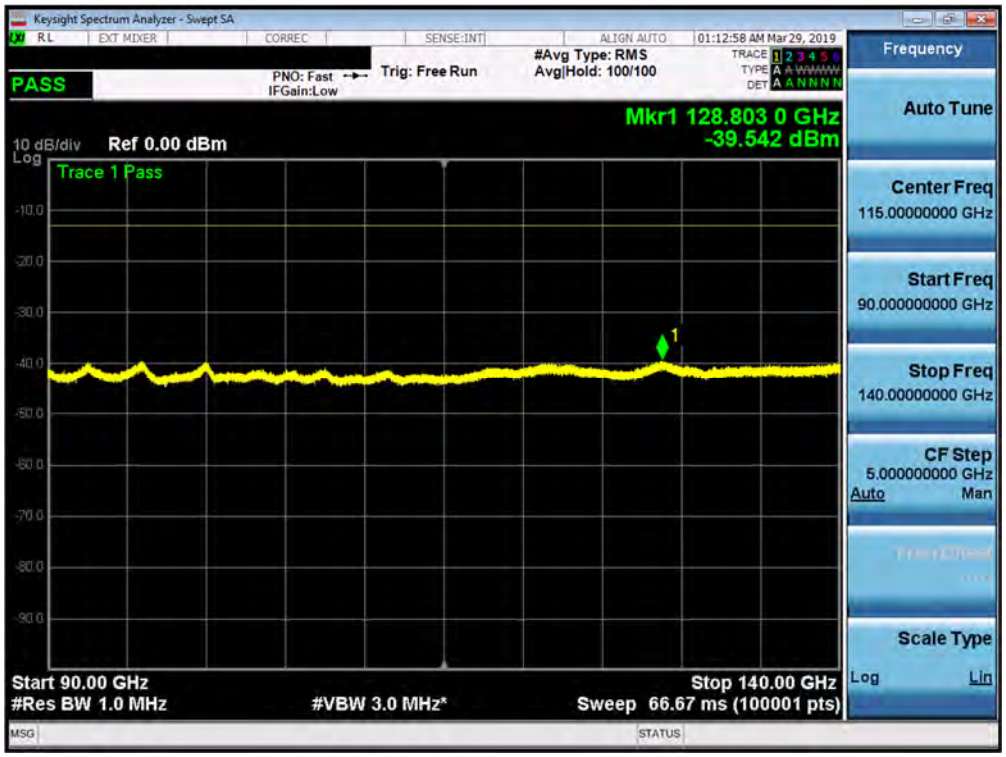
(-39.56 dBm + -39.82 dBm) = (110.66 nW + 104.23 nW) = (214.89 nW) = -36.68 dBm



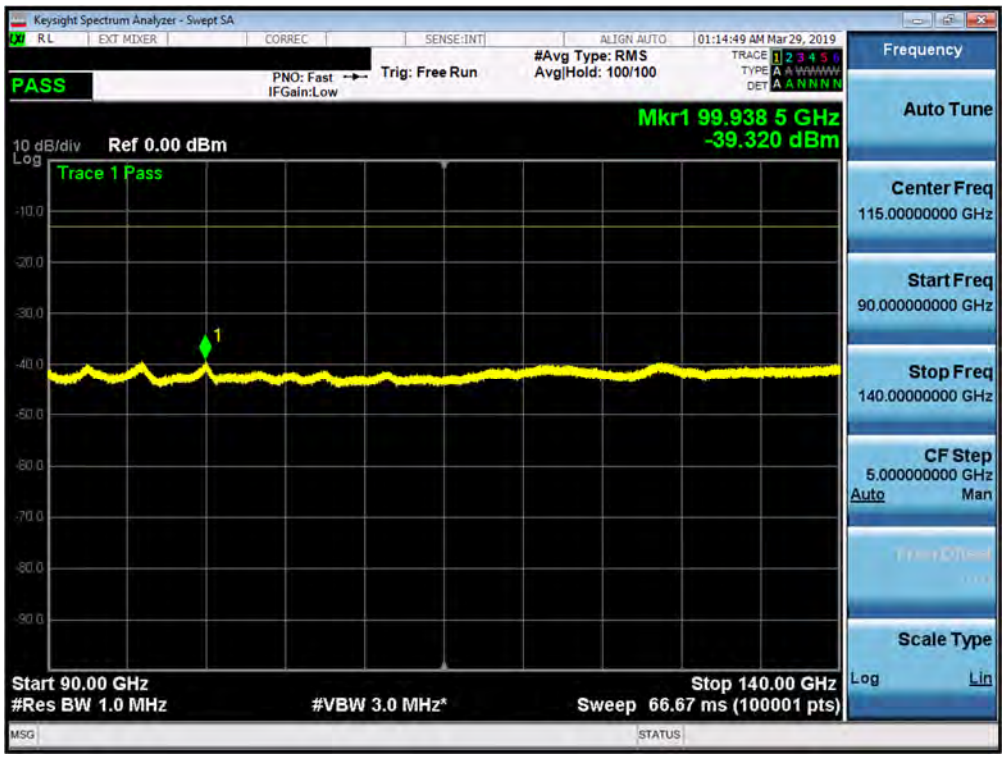
Plot 7-151. K Patch Radiated Spurious Plot 90-140 GHz (1CC QPSK Low Channel H Beam)



Plot 7-152. K Patch Radiated Spurious Plot 90-140 GHz (1CC QPSK Mid Channel H Beam)



Plot 7-153. K Patch Radiated Spurious Plot 90-140 GHz (1CC QPSK High Channel H Beam)



Plot 7-154. K Patch Radiated Spurious Plot 90-140 GHz (1CC QPSK Low Channel V Beam)