PCTEST ENGINEERING LABORATORY, INC.
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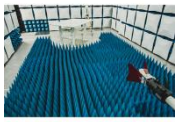


MEASUREMENT REPORT
FCC Part 30 5G mmWave

Applicant Name:
LG Electronics USA, Inc.
1000 Sylvan Avenue
Englewood Cliffs, NJ 07632
United States

Date of Testing:
1/21 – 4/12/2019
Test Site/Location:
PCTEST Lab. Columbia, MD, USA
Test Report Serial No.:
1M1901150005-14-R2.ZNF

FCC ID:	**ZNFV450VM**
APPLICANT:	**LG Electronics USA, Inc.**

Model:	LM-V450VM
Additional Model(s):	LMV450VM, V450VM
Application Type:	Certification
EUT Type:	Portable Handset
FCC Classification:	Part 30 Mobile Transmitter (5GM)
Test Procedure(s):	ANSI C63.26-2015

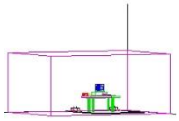
This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in §2.947. Test results reported herein relate only to the item(s) tested.

This revised Test Report (S/N: 1M1901150005-14-R2.ZNF) supersedes and replaces the previously issued test report on the same subject device for the same type of testing as indicated. Please discard or destroy the previously issued test report(s) and dispose of it accordingly.

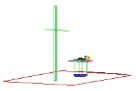
I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking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

Randy Ortanez
President

TABLE OF CONTENTS



MEASUREMENT REPORT
FCC Part 30



Mode	FCC Rule Part	Antenna	Bandwidth (MHz)	CCs Active	Tx Frequency (MHz)	EIRP		Emission Designator	Modulation
						Max. Power (W)	Max. Power (dBm)		
n261	30	QTM0	50	1	27500 - 28350	0.393	25.94	46M9G7D	QPSK
n261	30	QTM0	50	1	27500 - 28350	0.281	24.48	46M5W7D	16QAM
n261	30	QTM0	50	1	27500 - 28350	0.238	23.77	47M2W7D	64QAM
n261	30	QTM0	100	1	27500 - 28350	0.381	25.81	95M0G7D	QPSK
n261	30	QTM0	100	1	27500 - 28350	0.321	25.07	94M7W7D	16QAM
n261	30	QTM0	100	1	27500 - 28350	0.216	23.34	94M8W7D	64QAM
n261	30	QTM0	200	4	27500 - 28350	0.247	23.92	202MG7D	QPSK
n261	30	QTM0	200	4	27500 - 28350	0.171	22.34	199MW7D	16QAM
n261	30	QTM0	200	4	27500 - 28350	0.105	20.20	201MW7D	64QAM
n261	30	QTM0	400	4	27500 - 28350	0.286	24.56	409MG7D	QPSK
n261	30	QTM0	400	4	27500 - 28350	0.206	23.13	399MW7D	16QAM
n261	30	QTM0	400	4	27500 - 28350	0.132	21.20	398MW7D	64QAM
n261	30	QTM1	50	1	27500 - 28350	0.375	25.74	47M0G7D	QPSK
n261	30	QTM1	50	1	27500 - 28350	0.294	24.68	46M5W7D	16QAM
n261	30	QTM1	50	1	27500 - 28350	0.222	23.46	47M3W7D	64QAM
n261	30	QTM1	100	1	27500 - 28350	0.397	25.99	94M8G7D	QPSK
n261	30	QTM1	100	1	27500 - 28350	0.346	25.39	94M7W7D	16QAM
n261	30	QTM1	100	1	27500 - 28350	0.228	23.57	94M9W7D	64QAM
n261	30	QTM1	200	4	27500 - 28350	0.338	25.29	203MG7D	QPSK
n261	30	QTM1	200	4	27500 - 28350	0.252	24.01	199MW7D	16QAM
n261	30	QTM1	200	4	27500 - 28350	0.146	21.63	201MW7D	64QAM
n261	30	QTM1	400	4	27500 - 28350	0.253	24.03	397MG7D	QPSK
n261	30	QTM1	400	4	27500 - 28350	0.191	22.80	397MW7D	16QAM
n261	30	QTM1	400	4	27500 - 28350	0.127	21.03	396MW7D	64QAM
n260	30	QTM0	50	1	37000 - 40000	0.262	24.18	50M9G7D	QPSK
n260	30	QTM0	50	1	37000 - 40000	0.239	23.78	49M8W7D	16QAM
n260	30	QTM0	50	1	37000 - 40000	0.149	21.74	58M6W7D	64QAM
n260	30	QTM0	100	1	37000 - 40000	0.270	24.32	97M6G7D	QPSK
n260	30	QTM0	100	1	37000 - 40000	0.196	22.93	96M7W7D	16QAM
n260	30	QTM0	100	1	37000 - 40000	0.119	20.75	96M8W7D	64QAM
n260	30	QTM0	200	4	37000 - 40000	0.160	22.05	196MG7D	QPSK
n260	30	QTM0	200	4	37000 - 40000	0.135	21.30	196MW7D	16QAM
n260	30	QTM0	200	4	37000 - 40000	0.101	20.03	195MW7D	64QAM
n260	30	QTM0	400	4	37000 - 40000	0.155	21.91	401MG7D	QPSK
n260	30	QTM0	400	4	37000 - 40000	0.139	21.44	398MW7D	16QAM
n260	30	QTM0	400	4	37000 - 40000	0.079	19.00	396MW7D	64QAM
n260	30	QTM1	50	1	37000 - 40000	0.291	24.64	52M8G7D	QPSK
n260	30	QTM1	50	1	37000 - 40000	0.182	22.60	49M4W7D	16QAM
n260	30	QTM1	50	1	37000 - 40000	0.236	23.72	51M2W7D	64QAM
n260	30	QTM1	100	1	37000 - 40000	0.299	24.76	97M7G7D	QPSK
n260	30	QTM1	100	1	37000 - 40000	0.244	23.88	96M8W7D	16QAM
n260	30	QTM1	100	1	37000 - 40000	0.224	23.50	96M6W7D	64QAM
n260	30	QTM1	200	4	37000 - 40000	0.141	21.48	197MG7D	QPSK
n260	30	QTM1	200	4	37000 - 40000	0.098	19.91	196MW7D	16QAM
n260	30	QTM1	200	4	37000 - 40000	0.080	19.03	195MW7D	64QAM
n260	30	QTM1	400	4	37000 - 40000	0.170	22.30	400MG7D	QPSK
n260	30	QTM1	400	4	37000 - 40000	0.150	21.75	396MW7D	16QAM
n260	30	QTM1	400	4	37000 - 40000	0.087	19.38	396MW7D	64QAM

EUT EIRP Overview

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 **LG Portable Handset FCC ID: ZNFV450VM**. The test data contained in this report pertains only to the emissions due to the EUT's 5G mmWave function.

The EUT has 2 dual pole patch arrays. The dual pole patch array each consist of 4 radiating elements . Each of the patch antennas is comprised of two separate antenna feeds - one for horizontal and one for vertical polarization.

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.: 01010, 01028

2.2 Device Capabilities

This device contains the following capabilities:

850/1900 GSM/GPRS/EDGE, 850/1900 WCDMA/HSPA, Multi-band LTE, 802.11b/g/n/ac WLAN, 802.11a/n/ac UNII, Bluetooth (1x, EDR, LE), NFC, 5G NR Bands n261/n260

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.

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 Compiance Testing of Transmitter Used in Licensed Radio Service" (ANSI C63.26-2015) and "Procedures for Compliance Measurement of the Fundamental Emission Power of Licensed Wideband (> 1 MHz) Digital Transmission Systems" (KDB 971168 D01 v03) were used in the measurement of the EUT**.**

3.2 Radiated Power and Radiated Spurious Emissions

§30.202, §30.203, §30.404, §30.405

The radiated test facilities consisted of an indoor 3 meter semi-anechoic chamber used for final measurements and exploratory measurements, when necessary. 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.

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 (mm)	Far Field Distance (m)
18-40	7.49	0.67
40-60	5.00	1.36
60-90	3.33	0.86
90-140	2.14	0.57
140-200	1.50	0.31

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

Radiated power levels are investigated with the receive antenna horizontally and vertically polarized.

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 converted back to calculated e.i.r.p.

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

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

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

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

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

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

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

The e.i.r.p at Antenna A, Antenna B, Antenna C and Antenna D were first measured individually. The measured values were then summed in linear power units then converted back to dBm for the co-polarized antennas.

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

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

= 52.97mW + 43.15mW

=10*log(96.12mW)

= 19.83dBm

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 the National Institute of Standards and Technology (NIST). Measurements antennas used during testing were calibrated in accordance to the requirements of ANSI C63.5-2017.

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	N9030A	PXA Signal Analyzer (44GHz)	5/25/2018	Annual	5/25/2019	MY52350166
Com-Power	AL-130	9kHz - 30MHz Loop Antenna	10/10/2017	Biennial	10/10/2019	121034
Com-Power	PAM-103	Pre-Amplifier (1-1000MHz)	9/17/2018	Annual	9/17/2019	441119
Emco	3115	Horn Antenna (1-18GHz)	3/28/2018	Biennial	3/28/2020	9704-5182
Keysight Technologies	N9030A	3Hz-44GHz PXA Signal Analyzer	3/20/2018	Annual	3/20/2019	MY49430494
Keysight Technologies	N9030A	PXA Signal Analyzer	8/6/2018	Annual	8/6/2019	MY54490576
OML, Inc.	M19RH	Horn Antenna	7/30/2018	Annual	7/30/2019	18073001
OML, Inc.	M12RH	Horn Antenna	7/30/2018	Annual	7/30/2019	18073001
OML, Inc	M08RH	Horn Antenna	7/30/2018	Annual	7/30/2019	18073001
OML, Inc	M05RH	Horn Antenna	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 = 8M62G7D

BW = 8.62 MHz
G = Phase Modulation
7 = Quantized/Digital Info
D = Data transmission, telemetry, telecommand

QAM Modulation

Emission Designator = 8M45W7D

BW = 8.45 MHz
W = Amplitude/Angle Modulated
7 = Quantized/Digital Info
D = Data transmission, telemetry, telecommand

7.0 TEST RESULTS

7.1 Summary

Company Name: LG Electronics USA, Inc.

FCC ID: ZNFV450VM

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	RF Output Power / EIRP	Equivalent Isotropic Radiated Power		PASS	Section 7.3
2.1051, 30.203	Spurious Emissions	-13dBm/Mhz for all out-of-band emissions, -5dBm/MHz from the band edge up to 10% of the channel BW		PASS	Section 7.3, 7.5
2.1055	Frequency Stability	Fundamental emissions stay within authorized frequency block		PASS	Section 0

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), n261 spurious emissions were investigated up to 100GHz, n260 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 chosen based on which Beam ID produces the highest EIRP during EIRP simulation.
7) All testing was performed using FTM (Factory Test Mode) software at continuous Tx operation (100% duty cycle).

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 C63.25-2015 Section 5.4.3

Test Settings

1. The signal analyzer's automatic bandwidth measurement capability was used to perform the 99% occupied bandwidth and the 26dB 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 QTM0 Occupied Bandwidth n261

Channel	Total Bandwidth [MHz]	CCs Active	Modulation	Occupied Bandwidth [MHz]
Mid	50	1	QPSK	46.90
Mid	50	1	16QAM	46.49
Mid	50	1	64QAM	47.16
Mid	200	4	QPSK	202.33
Mid	200	4	16QAM	199.15
Mid	200	4	64QAM	201.03
Mid	100	1	QPSK	94.97
Mid	100	1	16QAM	94.68
Mid	100	1	64QAM	94.83
Mid	400	4	QPSK	409.42
Mid	400	4	16QAM	399.11
Mid	400	4	64QAM	398.23

Table 7-2. QTM0 n261 Occupied Bandwidth Summary Data

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

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

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

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

Plot 7-5. Occupied Bandwidth Plot (4CC-50MHz Bandwidth 16QAM Mid Channel)

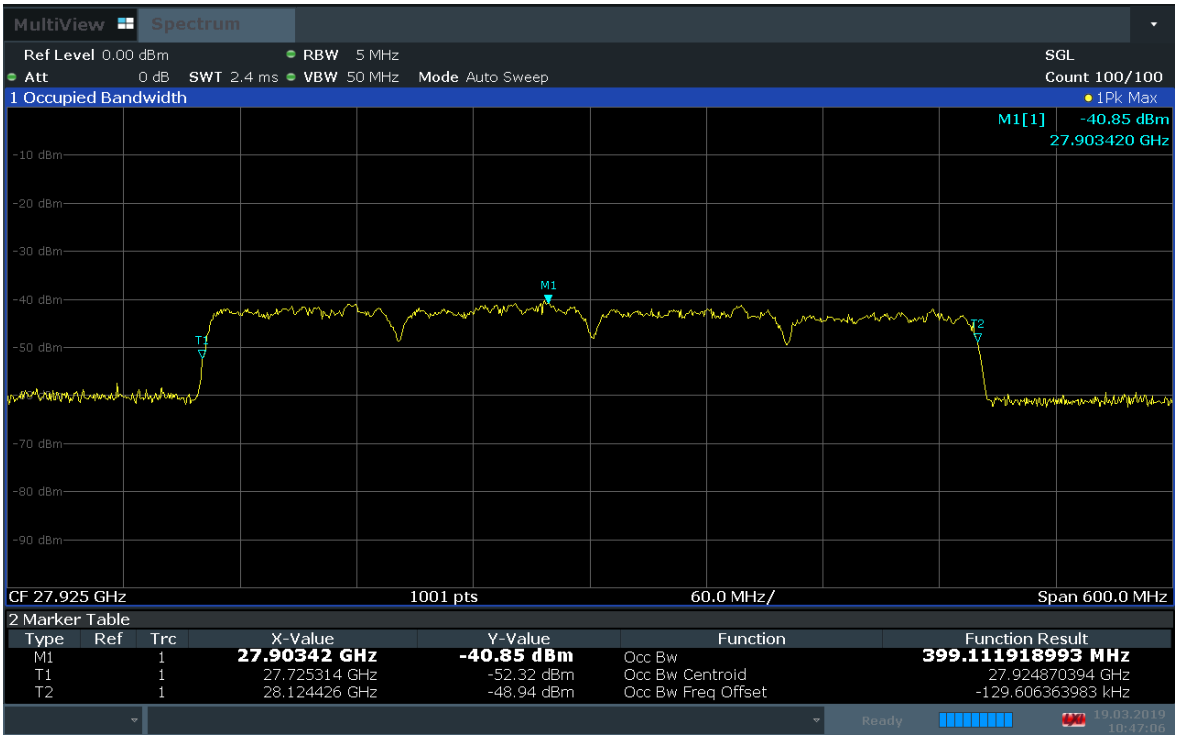
Plot 7-6. Occupied Bandwidth Plot (4CC-50MHz Bandwidth 64QAM Mid Channel)

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

Plot 7-8. Occupied Bandwidth Plot (1CC-100MHz Bandwidth 16QAM Mid Channel)

Plot 7-9. Occupied Bandwidth Plot (1CC-100MHz Bandwidth 64QAM Mid Channel)

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



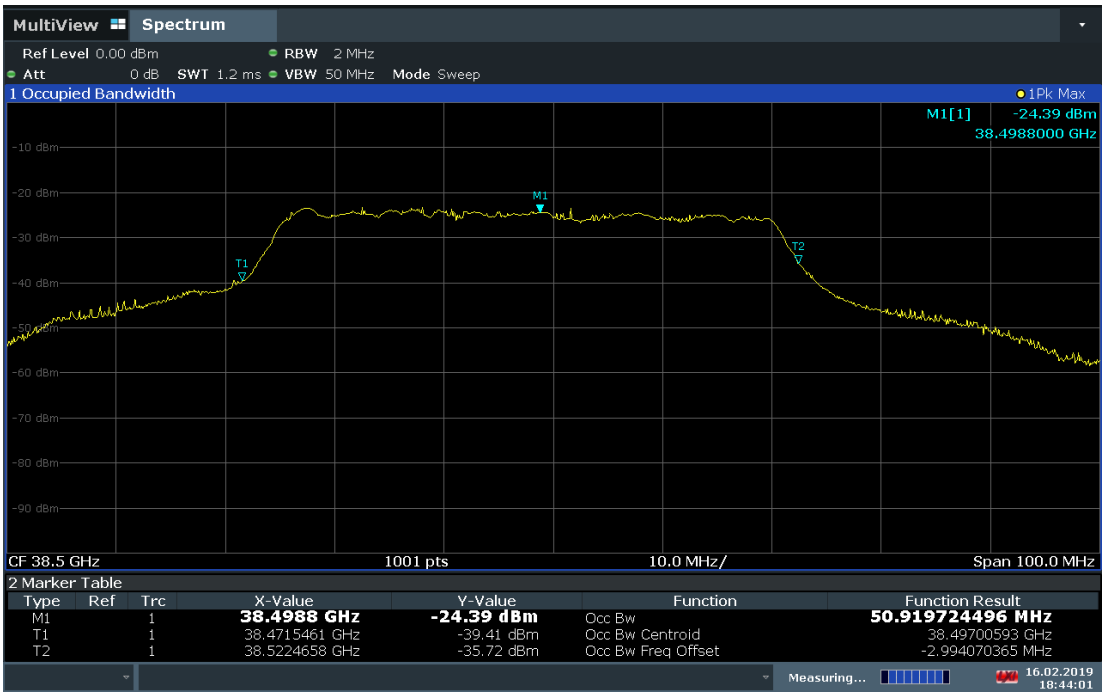
Plot 7-11. Occupied Bandwidth Plot (4CC-100MHz Bandwidth 16QAM Mid Channel)

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

7.2.2 QTM0 Occupied Bandwidth n260

Channel	Total Bandwidth [MHz]	CCs Active	Modulation	Occupied Bandwidth [MHz]
Mid	50	1	QPSK	50.92
Mid	50	1	16QAM	49.81
Mid	50	1	64QAM	58.60
Mid	200	4	QPSK	196.47
Mid	200	4	16QAM	196.07
Mid	200	4	64QAM	195.37
Mid	100	1	QPSK	97.58
Mid	100	1	16QAM	96.68
Mid	100	1	64QAM	96.76
Mid	400	4	QPSK	400.59
Mid	400	4	16QAM	397.56
Mid	400	4	64QAM	395.75

Table 7-3. QTM0 n260 Occupied Bandwidth Summary Data

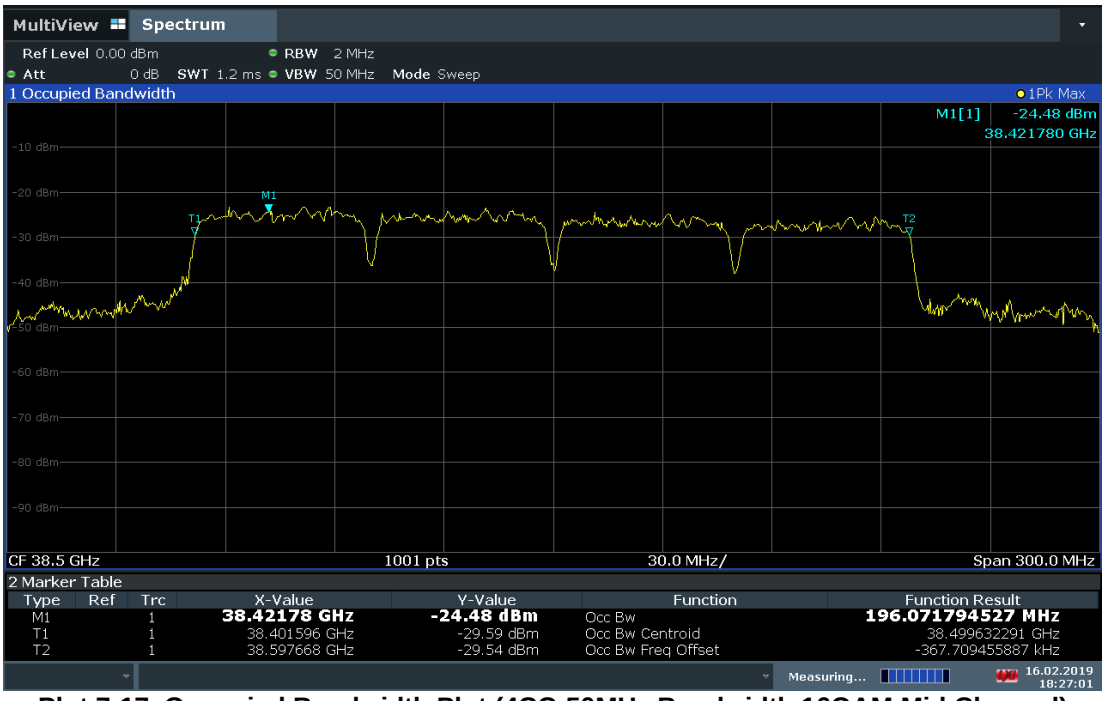


Plot 7-13. Occupied Bandwidth Plot (1CC-50MHz Bandwidth QPSK Mid Channel)

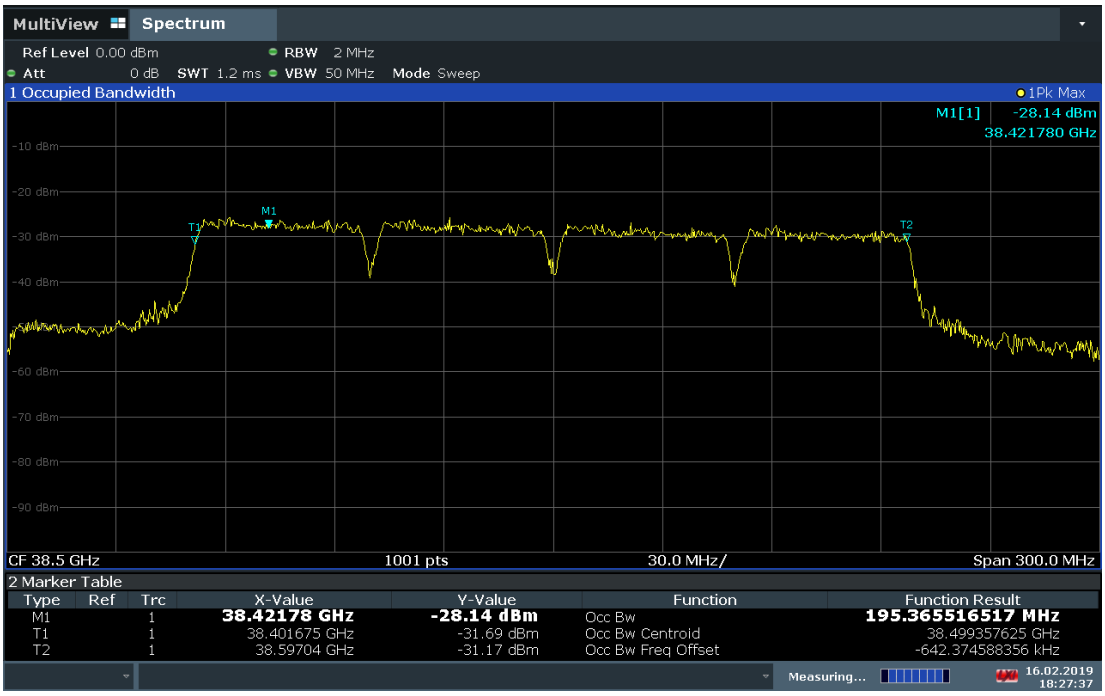
Plot 7-14. Occupied Bandwidth Plot (1CC-50MHz Bandwidth 16QAM Mid Channel)

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

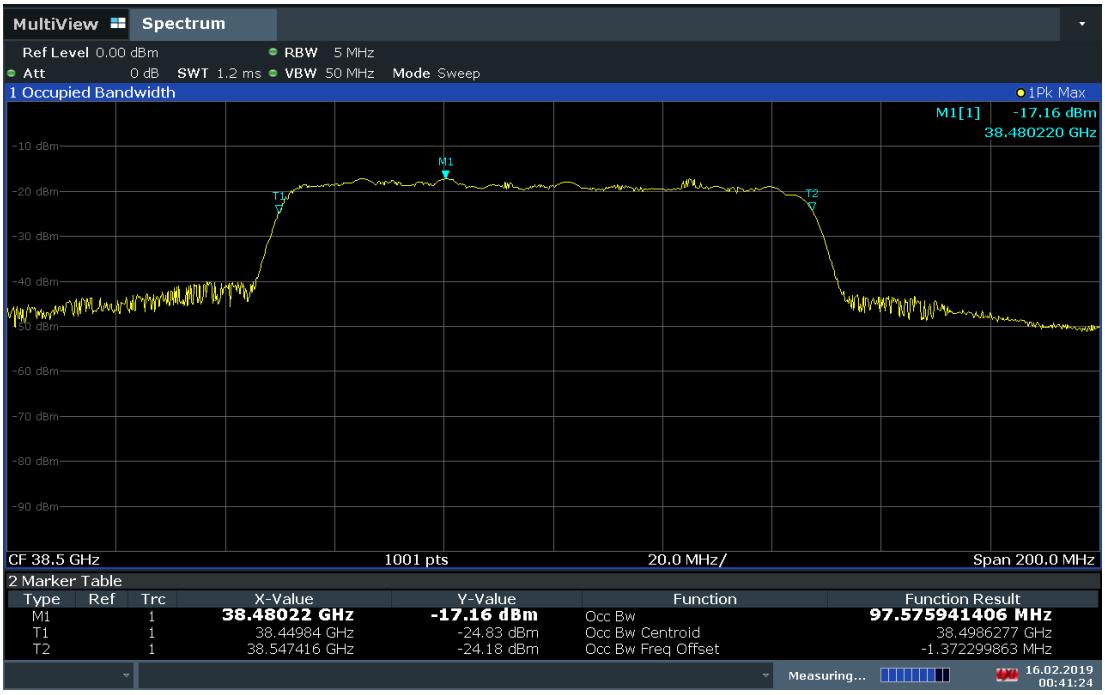
Plot 7-16. Occupied Bandwidth Plot (4CC-50MHz Bandwidth QPSK Mid Channel)



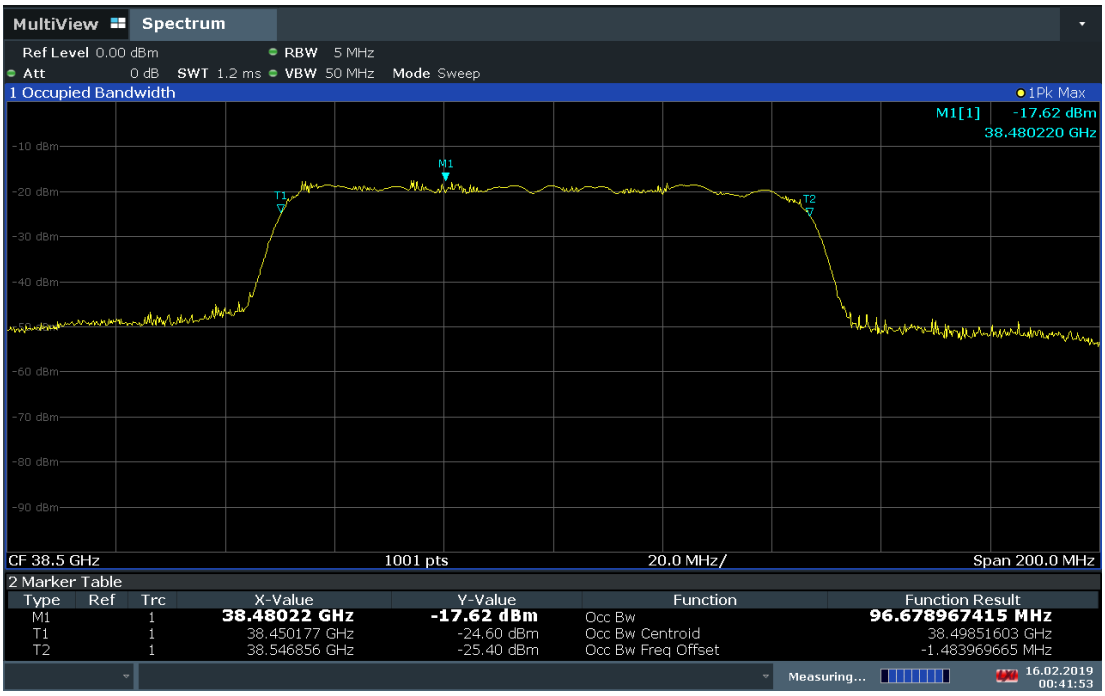
Plot 7-17. Occupied Bandwidth Plot (4CC-50MHz Bandwidth 16QAM Mid Channel)



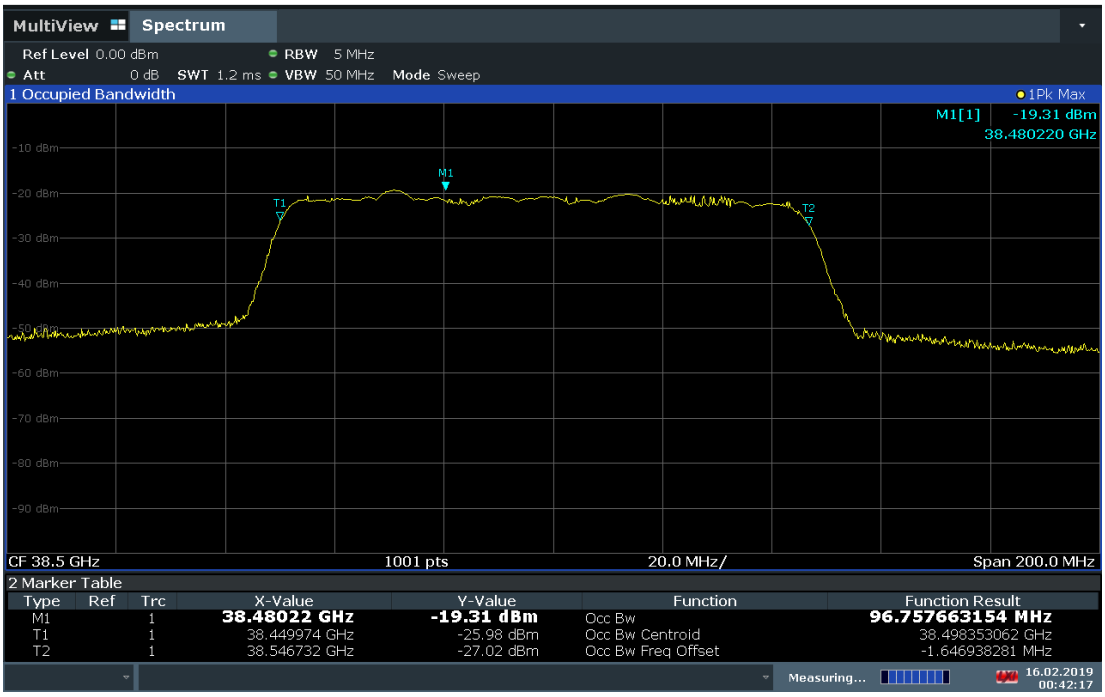
Plot 7-18. Occupied Bandwidth Plot (4CC-50MHz Bandwidth 64QAM Mid Channel)



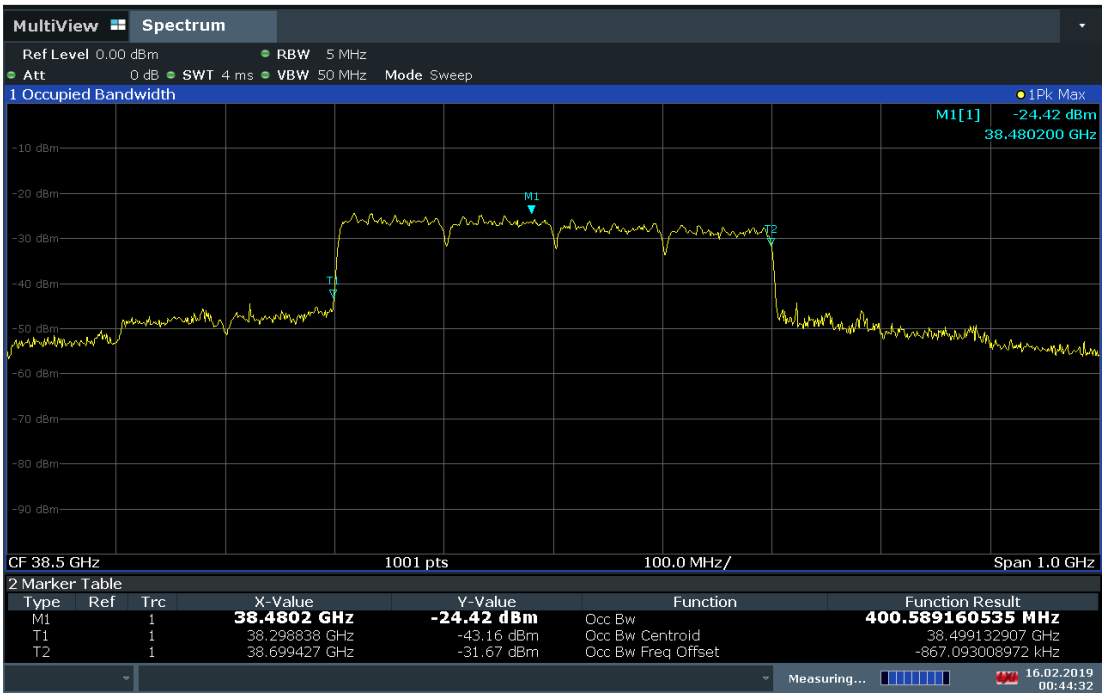
Plot 7-19. Occupied Bandwidth Plot (1CC-100MHz Bandwidth QPSK Mid Channel)



Plot 7-20. Occupied Bandwidth Plot (1CC-100MHz Bandwidth 16QAM Mid Channel)



Plot 7-21. Occupied Bandwidth Plot (1CC-100MHz Bandwidth 64QAM Mid Channel)



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

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

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

7.2.3 QTM1 Occupied Bandwidth n261

Channel	Total Bandwidth [MHz]	CCs Active	Modulation	Occupied Bandwidth [MHz]
Mid	50	1	QPSK	47.00
Mid	50	1	16QAM	46.45
Mid	50	1	64QAM	47.27
Mid	200	4	QPSK	202.75
Mid	200	4	16QAM	198.99
Mid	200	4	64QAM	201.15
Mid	100	1	QPSK	94.76
Mid	100	1	16QAM	94.71
Mid	100	1	64QAM	94.94
Mid	400	4	QPSK	397.02
Mid	400	4	16QAM	396.80
Mid	400	4	64QAM	395.85

Table 7-4. QTM1 n261 Occupied Bandwidth Summary Data

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

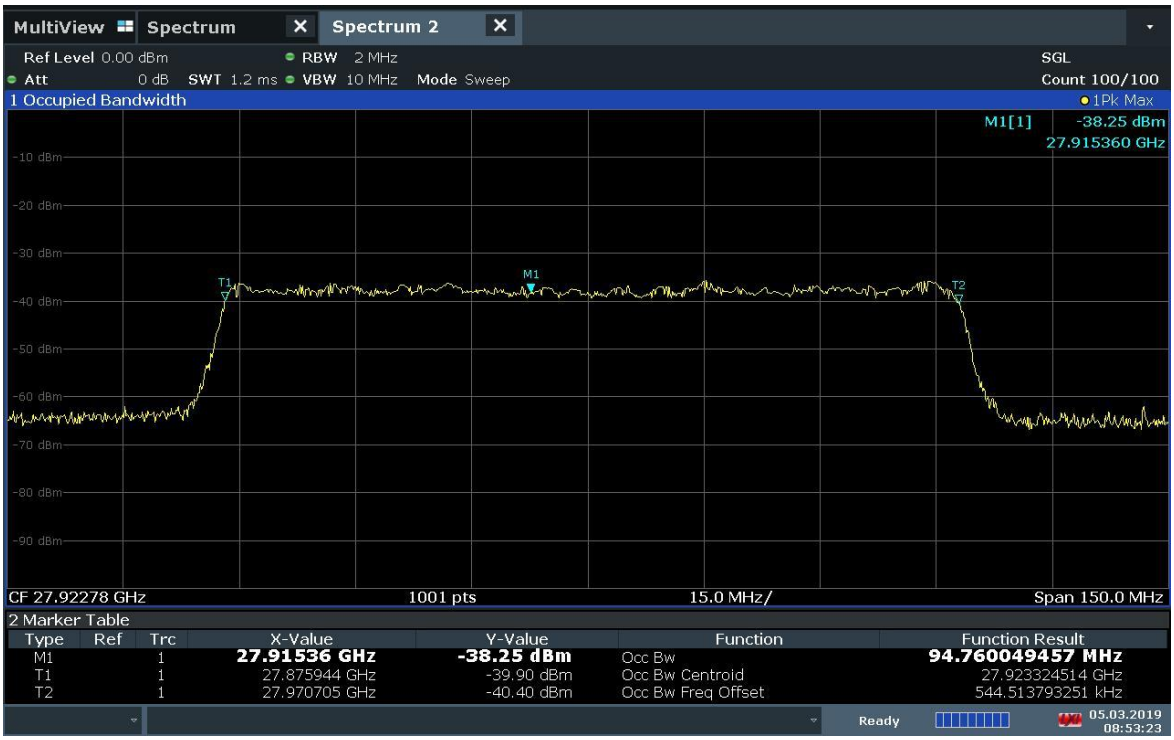
Plot 7-26. Occupied Bandwidth Plot (1CC-50MHz Bandwidth 16QAM Mid Channel)

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

Plot 7-28. Occupied Bandwidth Plot (4CC-50MHz Bandwidth QPSK Mid Channel)

Plot 7-29. Occupied Bandwidth Plot (4CC-50MHz Bandwidth 16QAM Mid Channel)

Plot 7-30. Occupied Bandwidth Plot (4CC-50MHz Bandwidth 64QAM Mid Channel)

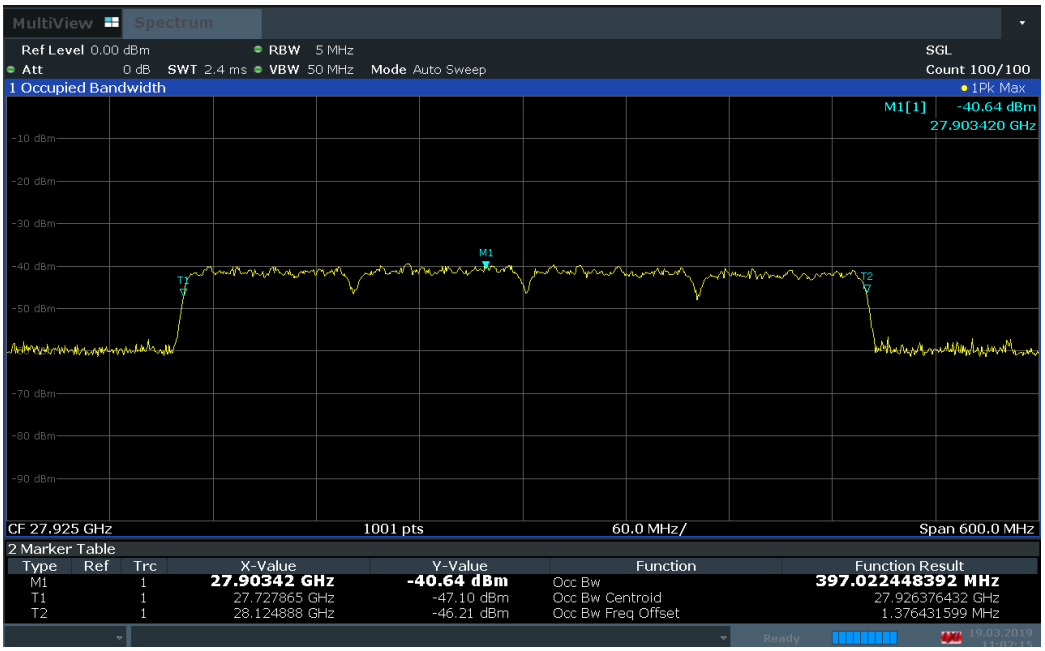


Plot 7-31. Occupied Bandwidth Plot (1CC-100MHz Bandwidth QPSK Mid Channel)

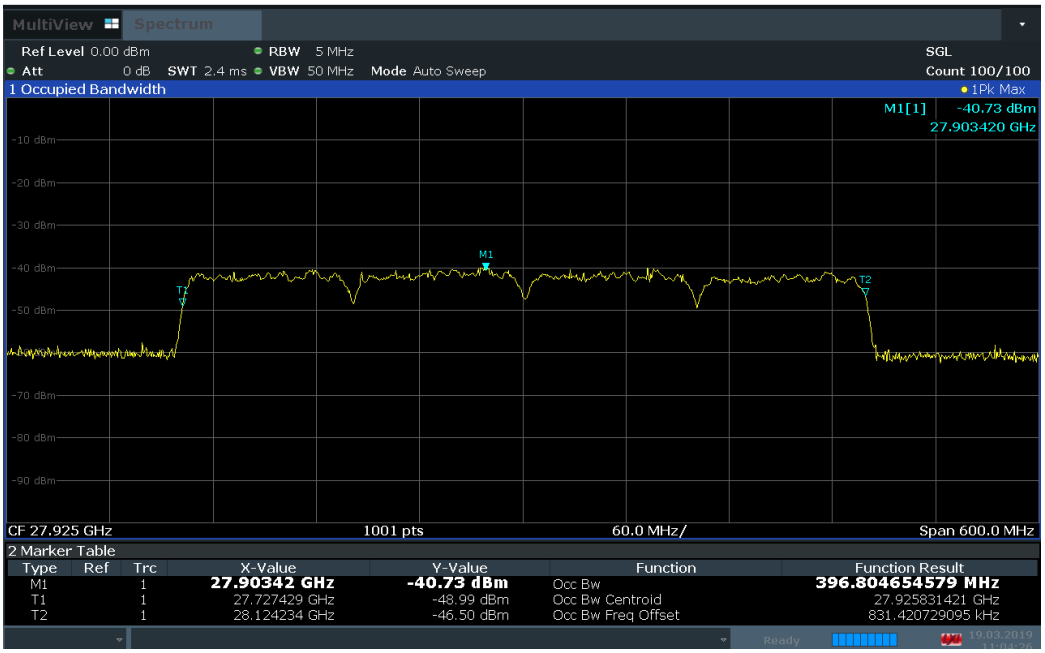
Plot 7-32. Occupied Bandwidth Plot (1CC-100MHz Bandwidth 16QAM Mid Channel)

Plot 7-33. Occupied Bandwidth Plot (1CC-100MHz Bandwidth 64QAM Mid Channel)

.



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



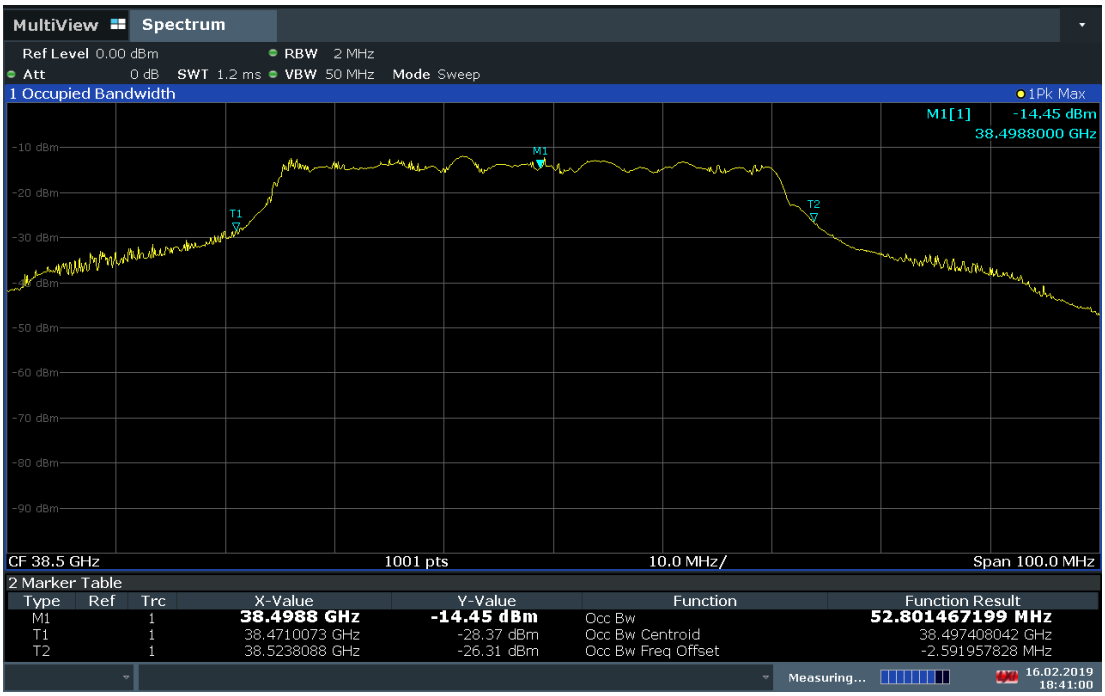
Plot 7-35. Occupied Bandwidth Plot (4CC-100MHz Bandwidth 16QAM Mid Channel)

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

7.2.4 QTM1 Occupied Bandwidth n260

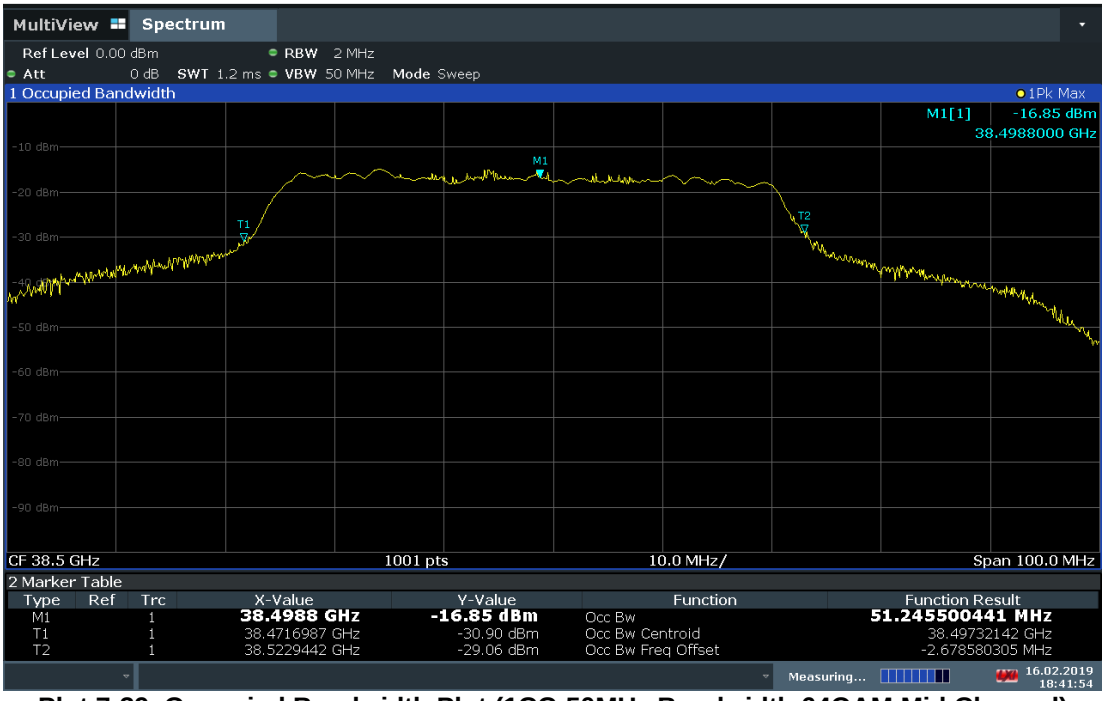
Channel	Total Bandwidth [MHz]	CCs Active	Modulation	Occupied Bandwidth [MHz]
Mid	50	1	QPSK	52.80
Mid	50	1	16QAM	49.40
Mid	50	1	64QAM	51.25
Mid	200	4	QPSK	196.68
Mid	200	4	16QAM	195.66
Mid	200	4	64QAM	195.31
Mid	100	1	QPSK	97.71
Mid	100	1	16QAM	96.78
Mid	100	1	64QAM	96.62
Mid	400	4	QPSK	399.56
Mid	400	4	16QAM	396.32
Mid	400	4	64QAM	395.64

Table 7-5. QTM1 n260 Occupied Bandwidth Summary Data



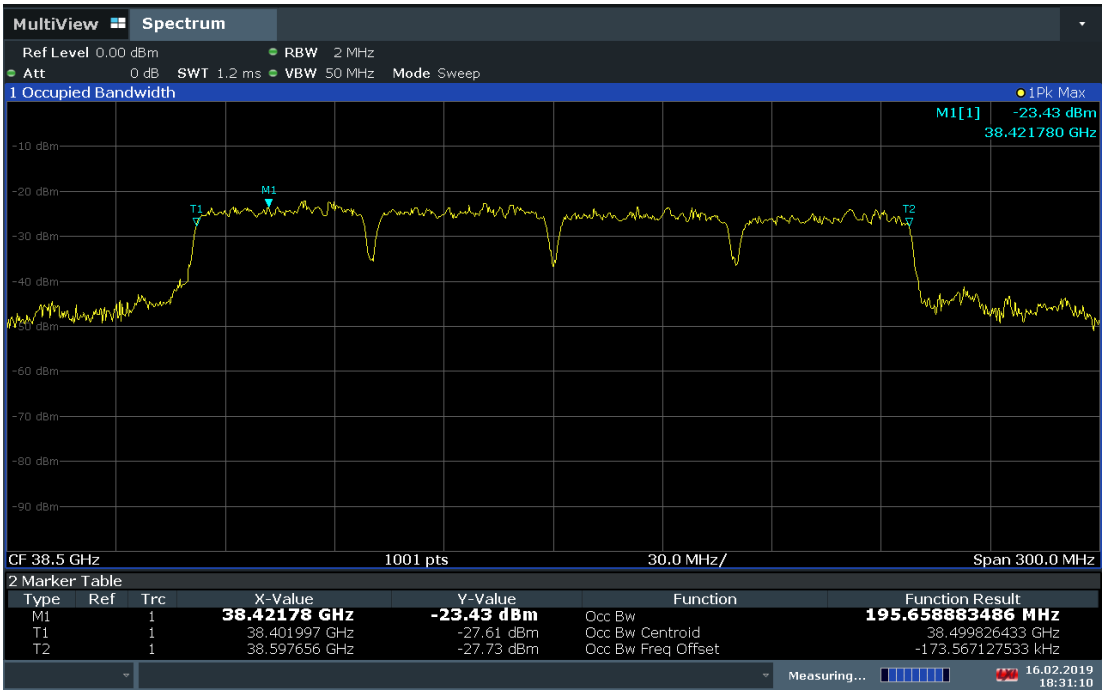
Plot 7-37. Occupied Bandwidth Plot (1CC-50MHz Bandwidth QPSK Mid Channel)

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



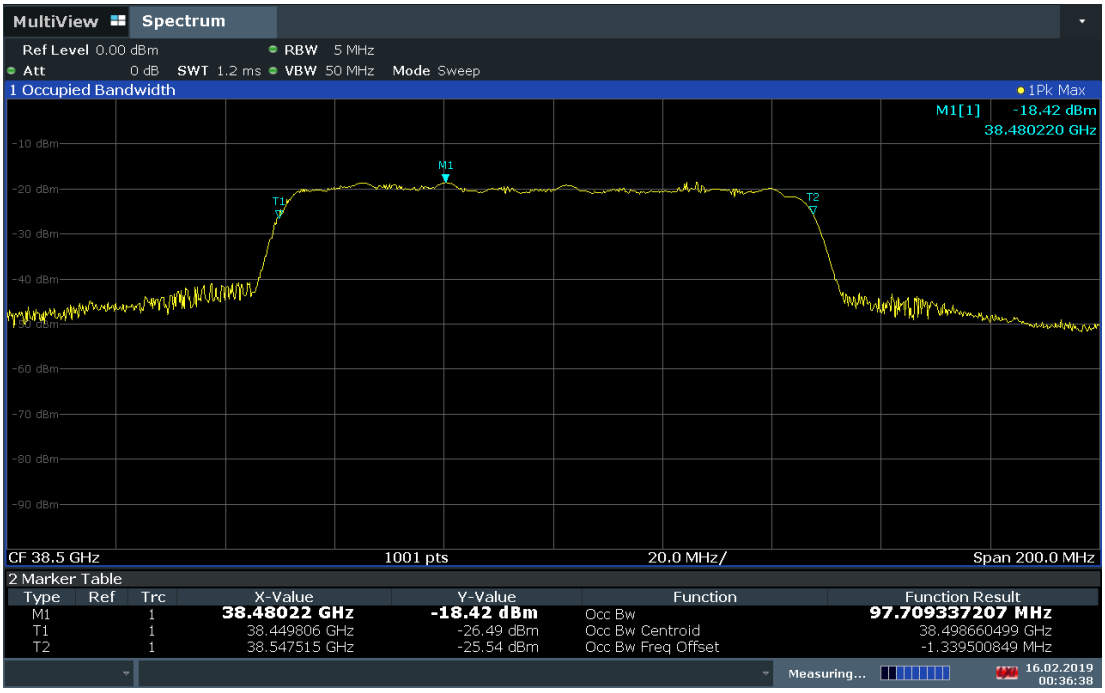
Plot 7-39. Occupied Bandwidth Plot (1CC-50MHz Bandwidth 64QAM Mid Channel)

Plot 7-40. Occupied Bandwidth Plot (4CC-50MHz Bandwidth QPSK Mid Channel)

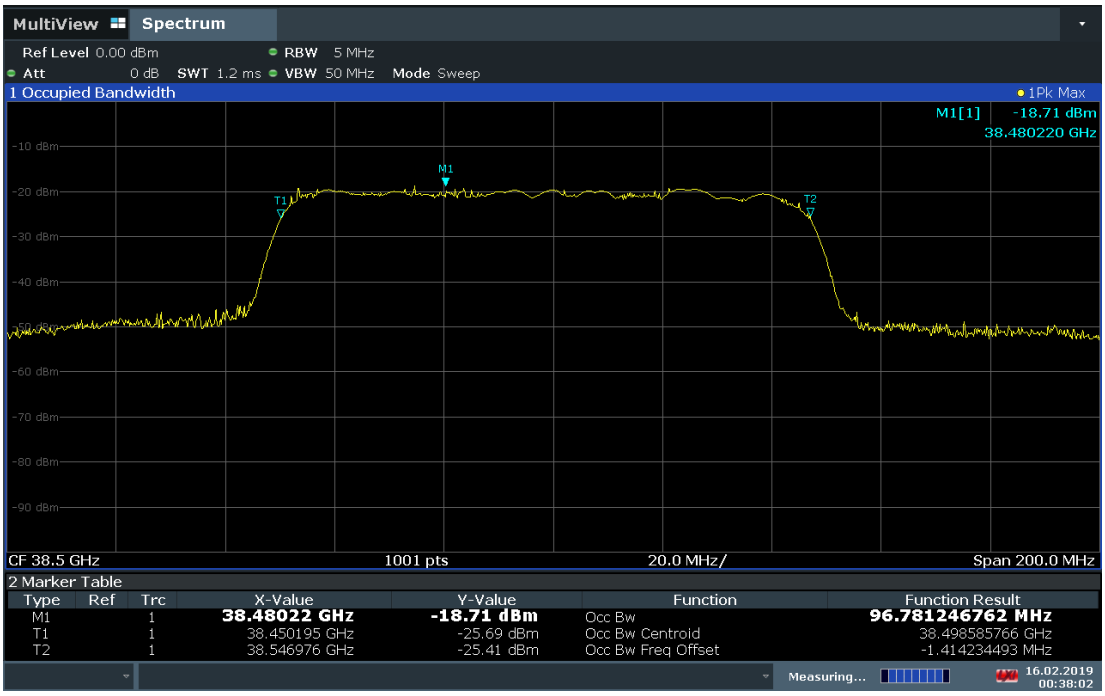


Plot 7-41. Occupied Bandwidth Plot (4CC-50MHz Bandwidth 16QAM Mid Channel)

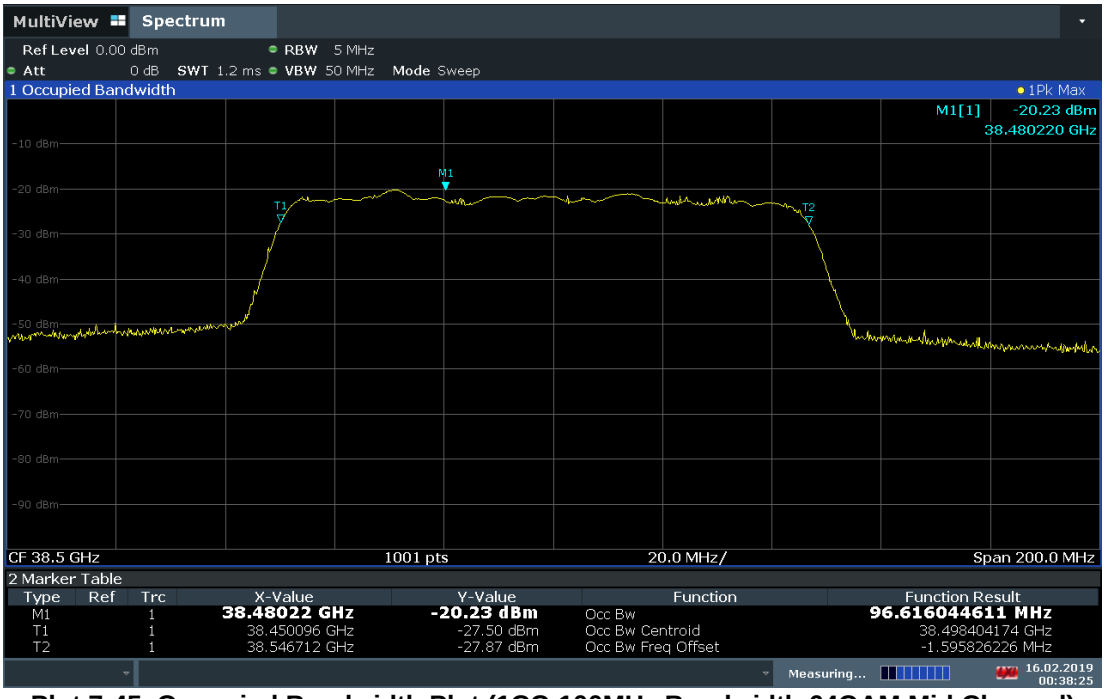
Plot 7-42. Occupied Bandwidth Plot (4CC-50MHz Bandwidth 64QAM Mid Channel)



Plot 7-43. Occupied Bandwidth Plot (1CC-100MHz Bandwidth QPSK Mid Channel)



Plot 7-44. Occupied Bandwidth Plot (1CC-100MHz Bandwidth 16QAM Mid Channel)



Plot 7-45. Occupied Bandwidth Plot (1CC-100MHz Bandwidth 64QAM Mid Channel)

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

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

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

7.3 RF Output 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, which is in the far field of the mmWave signal based on the formula: R $\geq$ 2D^2/wavelength. Where D is the largest dimension of the antenna, D = 0.0445m, wavelength = 0.0107m, so far field threshold = 0.37m.

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 N261 QTM0 EIRP

Antenna	Bandwidth	CCs Active	Chan.	Channel Freq [GHz]	Modulation	RB Size	RB Offset	Beam ID	Ant. Pol. [H/V]	Ant. Height [cm]	Turn Table Azimuth [degree]	SISO EIRP [dBm]	MIMO EIRP [dBm]	Limit [dBm]	Margin [dB]
QTM0	50	1	L	27534.84	QPSK	1	31	18	H	150	195	22.23	25.94	43.00	-17.06
								147	V	150	195	23.53			
			M	27922.08		66	0	18	H	150	198	21.19	25.40	43.00	-17.60
								147	V	150	198	23.34			
			H	28319.52		1	31	18	H	150	201	20.41	25.51	43.00	-17.49
								147	V	150	201	23.91			
			L	27534.84	16QAM	1	31	18	H	150	195	20.78	24.48	43.00	-18.52
								147	V	150	195	22.07			
			M	27922.08		66	0	18	H	150	198	20.16	24.28	43.00	-18.72
								147	V	150	198	22.16			
			H	28319.52		1	31	18	H	150	201	19.55	23.86	43.00	-19.14
								147	V	150	201	21.86			
			L	27534.84	64QAM	1	31	18	H	150	195	20.44	23.77	43.00	-19.23
								147	V	150	195	21.06			
			M	27922.08		66	0	13	H	150	198	18.45	22.53	43.00	-20.47
								141	V	150	198	20.38			
			H	28319.52		1	31	13	H	150	201	16.33	22.07	43.00	-20.93
								141	V	150	201	20.73			
		4	M	27924.96	QPSK	1	16	18	H	150	198	21.14	23.92	43.00	-19.08
								147	V	150	198	20.67			
					16-QAM	1	16	18	H	150	198	19.28	22.34	43.00	-20.66
								147	V	150	198	19.37			
					64-QAM	1	16	18	H	150	198	17.08	20.20	43.00	-22.80
								147	V	150	198	17.30			
	100	1	L	27559.32	QPSK	1	65	18	H	150	196	22.44	25.66	43.00	-17.34
								147	V	150	196	22.86			
			M	27923.52		1	65	18	H	150	198	23.18	25.81	43.00	-17.19
								147	V	150	198	22.39			
			H	28292.16		1	65	18	H	150	200	21.80	25.40	43.00	-17.60
								147	V	150	200	22.92			
			L	27559.32	16QAM	1	32	18	H	150	196	21.99	25.07	43.00	-17.93
								147	V	150	196	22.14			
			M	27923.52		66	0	18	H	150	198	21.52	24.49	43.00	-18.51
								147	V	150	198	21.44			
			H	28292.16		1	0	18	H	150	200	20.09	23.73	43.00	-19.27
								147	V	150	200	21.28			
			L	27559.32	64QAM	1	32	18	H	150	196	20.42	23.34	43.00	-19.66
								147	V	150	196	20.23			
			M	27923.52		1	0	18	H	150	198	19.19	22.44	43.00	-20.56
								147	V	150	198	19.66			
			H	28292.16		1	0	13	H	150	200	18.17	21.69	43.00	-21.31
								141	V	150	200	19.14			
		4	M	27926.52	QPSK	1	32	18	H	150	198	20.27	24.56	43.00	-18.44
								147	V	150	198	22.53			
					16-QAM	1	32	18	H	150	198	18.10	23.13	43.00	-19.87
								147	V	150	198	21.49			
					64-QAM	1	32	18	H	150	198	17.19	21.20	43.00	-21.80
								147	V	150	198	19.00			

Table 7-6. N261 QTM0 EIRP Summary Data

7.3.2 N261 QTM1 EIRP

Antenna	Bandwidth	CCs Active	Chan.	Channel Freq [GHz]	Modulation	RB Size	RB Offset	Beam ID	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	SISO EIRP [dBm]	MIMO EIRP [dBm]	Limit [dBm]	Margin [dB]
QTM1	50	1	L	27534.84	QPSK	1	31	13	H	150	25	21.71	25.74	43.00	-17.26
								141	V	150	25	23.55			
			M	27922.08		66	0	13	H	150	30	20.98	24.44	43.00	-18.56
								141	V	150	30	21.85			
			H	28319.52		1	31	13	H	150	28	21.56	25.01	43.00	-17.99
								141	V	150	28	22.41			
			L	27534.84	16QAM	1	31	13	H	150	25	21.99	24.58	43.00	-18.42
								141	V	150	25	21.11			
			M	27922.08		66	0	13	H	150	30	19.89	23.35	43.00	-19.65
								141	V	150	30	20.76			
			H	28319.52		1	31	13	H	150	28	21.34	24.68	43.00	-18.32
								141	V	150	28	21.99			
			L	27534.84	64QAM	1	31	13	H	150	25	19.62	23.31	43.00	-19.69
								141	V	150	25	20.89			
			M	27922.08		1	31	13	H	150	30	17.84	21.83	43.00	-21.17
								141	V	150	30	19.63			
			H	28319.52		1	31	13	H	150	28	19.58	23.46	43.00	-19.54
								141	V	150	28	21.18			
		4	M	27924.96	QPSK	1	31	13	H	150	30	21.92	25.29	43.00	-17.71
								141	V	150	30	22.61			
					16-QAM	1	31	13	H	150	30	20.55	24.01	43.00	-18.99
								141	V	150	30	21.41			
					64-QAM	1	31	13	H	150	30	18.20	21.63	43.00	-21.37
								141	V	150	30	19.00			
	100	1	L	27559.32	QPSK	1	0	13	H	150	22	22.03	25.50	43.00	-17.50
								141	V	150	22	22.91			
			M	27923.52		66	0	13	H	150	31	22.73	25.99	43.00	-17.01
								141	V	150	31	23.23			
			H	28292.16		1	32	13	H	150	20	22.53	25.00	43.00	-18.00
								141	V	150	20	21.37			
			L	27559.32	16QAM	1	32	13	H	150	22	22.06	25.39	43.00	-17.61
								141	V	150	22	22.68			
			M	27923.52		1	65	13	H	150	31	21.43	25.05	43.00	-17.95
								141	V	150	31	22.59			
			H	28292.16		1	0	13	H	150	20	20.85	24.22	43.00	-18.78
								141	V	150	20	21.55			
			L	27559.32	64QAM	1	32	13	H	150	22	20.55	23.57	43.00	-19.43
								141	V	150	22	20.58			
			M	27923.52		66	0	13	H	150	31	19.57	23.13	43.00	-19.87
								141	V	150	31	20.62			
			H	28292.16		1	0	13	H	150	20	18.95	21.64	43.00	-21.36
								141	V	150	20	18.29			
		4	M	27926.52	QPSK	1	32	13	H	150	31	21.10	24.03	43.00	-18.97
								141	V	150	31	20.94			
					16-QAM	1	32	13	H	150	31	19.24	22.80	43.00	-20.20
								141	V	150	31	20.27			
					64-QAM	1	32	13	H	150	31	17.63	21.03	43.00	-21.97
								141	V	150	31	18.37			

Table 7-7. N261 QTM1 EIRP Summary Data

7.3.3 N260 QTM0 EIRP

Antenna	Bandwidth	CCs Active	Chan.	Channel Freq [GHz]	Modulation	RB Size	RB Offset	Beam ID	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	SISO EIRP [dBm]	MIMO EIRP [dBm]	Limit [dBm]	Margin [dB]
QTM0	50	1	L	37027.32	QPSK	1	0	19	H	150	186	20.27	24.16	43.00	-18.84
								155	V	150	186	21.88			
			M	38497.44		1	0	19	H	150	192	21.61	24.18	43.00	-18.82
								155	V	150	192	20.69			
			H	39966.24		1	0	19	H	150	190	20.25	24.02	43.00	-18.98
								155	V	150	190	21.65			
			L	37027.32	16QAM	1	0	19	H	150	186	19.79	23.78	43.00	-19.22
								155	V	150	186	21.56			
			M	38497.44		66	0	19	H	150	192	20.47	23.49	43.00	-19.51
								155	V	150	192	20.49			
			H	39966.24		1	0	19	H	150	190	19.20	22.70	43.00	-20.30
								155	V	150	190	20.13			
			L	37027.32	64QAM	1	0	19	H	150	186	17.47	21.43	43.00	-21.57
								155	V	150	186	19.19			
			M	38497.44		1	0	19	H	150	192	18.62	21.74	43.00	-21.26
								155	V	150	192	18.84			
			H	39966.24		1	0	19	H	150	190	16.91	20.46	43.00	-22.54
								155	V	150	190	17.94			
		4	M	38499.96	QPSK	1	0	19	H	150	192	19.83	22.05	43.00	-20.95
								155	V	150	192	18.07			
					16-QAM	1	0	19	H	150	192	18.90	21.30	43.00	-21.70
								155	V	150	192	17.59			
					64-QAM	1	0	19	H	150	192	16.39	20.03	43.00	-22.97
								155	V	150	192	17.57			
	100	1	L	37051.8	QPSK	1	32	19	H	150	190	22.56	24.32	43.00	-18.68
								155	V	150	190	19.54			
			M	38498.88		1	0	19	H	150	194	21.82	24.19	43.00	-18.81
								155	V	150	194	20.44			
			H	39949.92		1	0	19	H	150	195	17.56	19.56	43.00	-23.44
								155	V	150	195	15.23			
			L	37051.8	16QAM	1	32	19	H	150	190	21.78	22.93	43.00	-20.07
								155	V	150	190	16.59			
			M	38498.88		1	0	19	H	150	194	20.12	22.60	43.00	-20.40
								155	V	150	194	18.99			
			H	39949.92		1	0	19	H	150	195	16.37	18.57	43.00	-24.43
								155	V	150	195	14.57			
			L	37051.8	64QAM	1	32	19	H	150	190	19.38	20.75	43.00	-22.25
								155	V	150	190	15.06			
			M	38498.88		1	0	19	H	150	194	17.93	20.67	43.00	-22.33
								155	V	150	194	17.38			
			H	39949.92		1	0	19	H	150	195	14.12	16.44	43.00	-26.56
								155	V	150	195	12.61			
		4	M	38501.88	QPSK	1	0	19	H	150	194	19.88	21.91	43.00	-21.09
								155	V	150	194	17.63			
					16-QAM	1	0	19	H	150	194	19.45	21.44	43.00	-21.56
								155	V	150	194	17.09			
					64-QAM	1	0	19	H	150	194	16.88	19.00	43.00	-24.00
								155	V	150	194	14.86			

Table 7-8. N260 QTM0 EIRP Summary Data

7.3.4 N260 QTM1 EIRP

Antenna	Bandwidth	CCs Active	Chan.	Channel Freq [GHz]	Modulation	RB Size	RB Offset	Beam ID	Ant. Pol. [H/V]	Turntable Azimuth [degrees]	Positioner Azimuth [degrees]	SISO EIRP [dBm]	MIMO EIRP [dBm]	Limit [dBm]	Margin [dB]
QTM1	50	1	L	37027.32	QPSK	1	0	14	H	150	15	21.86	24.64	43.00	-18.36
								151	V	150	15	21.38			
			M	38497.44		1	0	14	H	150	25	19.83	23.21	43.00	-19.79
								151	V	150	25	20.54			
			H	39966.24		1	0	14	H	150	17	19.74	22.96	43.00	-20.04
								151	V	150	17	20.15			
			L	37027.32	16QAM	1	0	14	H	150	15	19.22	22.60	43.00	-20.40
								151	V	150	15	19.94			
			M	38497.44		1	0	14	H	150	25	18.80	22.09	43.00	-20.91
								151	V	150	25	19.34			
			H	39966.24		1	0	14	H	150	17	18.95	22.01	43.00	-20.99
								151	V	150	17	19.05			
			L	37027.32	64QAM	1	0	14	H	150	15	20.91	23.72	43.00	-19.28
								151	V	150	15	20.50			
			M	38497.44		1	0	14	H	150	25	18.23	21.82	43.00	-21.18
								151	V	150	25	19.33			
			H	39966.24		1	0	14	H	150	17	17.92	22.16	43.00	-20.84
								151	V	150	17	20.10			
		4	M	38499.96	QPSK	1	0	14	H	150	25	18.66	21.48	43.00	-21.52
								151	V	150	25	18.28			
					16-QAM	1	0	14	H	150	25	16.87	19.91	43.00	-23.09
								151	V	150	25	16.94			
					64-QAM	1	0	14	H	150	25	15.55	19.03	43.00	-23.97
								151	V	150	25	16.44			
	100	1	L	37051.8	QPSK	1	32	14	H	150	18	22.64	24.76	43.00	-18.24
								151	V	150	18	20.63			
			M	38498.88		1	32	14	H	150	20	21.45	24.66	43.00	-18.34
								151	V	150	20	21.84			
			H	39949.92		1	65	14	H	150	17	20.21	23.81	43.00	-19.19
								151	V	150	17	21.32			
			L	37051.8	16QAM	1	32	14	H	150	18	21.16	23.88	43.00	-19.12
								151	V	150	18	20.56			
			M	38498.88		1	0	14	H	150	20	19.13	22.54	43.00	-20.46
								151	V	150	20	19.90			
			H	39949.92		1	0	14	H	150	17	18.22	22.20	43.00	-20.80
								151	V	150	17	19.98			
			L	37051.8	64QAM	1	0	14	H	150	18	18.81	23.01	43.00	-19.99
								151	V	150	18	20.94			
			M	38498.88		1	0	14	H	150	20	19.76	23.50	43.00	-19.50
								151	V	150	20	21.12			
			H	39949.92		1	0	14	H	150	17	15.90	19.82	43.00	-23.18
								151	V	150	17	17.57			
		4	M	38501.88	QPSK	1	32	14	H	150	20	18.82	22.30	43.00	-20.70
								151	V	150	20	19.71			
					16-QAM	1	32	14	H	150	20	18.27	21.75	43.00	-21.25
								151	V	150	20	19.16			
					64-QAM	1	32	14	H	150	20	15.79	19.38	43.00	-23.62
								151	V	150	20	16.88			

Table 7-9. N260 QTM1 EIRP Summary Data

7.4 Radiated Spurious and Harmonic Emissions

§2.1051 §30.203

Test Overview

Out of band emissions were scanned from 30MHz to 100GHz for n261 and 30MHz to 200GHz for n260, in a radiated test setup with the EUT operating at maximum duty cycle and power. Spurious emission plots were obtained for Low, Mid, and High operating channels. All modulations and applicable CC settings were investigated to determine worst case condition.

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
ANSI C63.26-2015 Section 6.4

Test Settings

1. Start frequency was set to 30MHz and stop frequency was set to 100 GHz for n261 and 200GHz for n260. Several plots are used to show investigations in this entire span.
2. Detector = RMS
3. Trace mode = trace average
4. Sweep time = auto couple
5. Number of sweep points ≥ 2 x Span/RBW
6. The trace was allowed to stabilize
7. RBW = 1MHz, VBW = 3MHz

Test Notes

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

2) All radiated spurious emissions were measured as EIRP to compare with the §30.203 TRP limits.

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

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

5) Emissions below 18GHz were measured at a 3 meter test distance, while emissions above 18GHz were measured at the appropriate far field distance as indicated in Table 7-10. 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 (mm)	Far Field Distance (m)	Measurement Distance (m)
18-40	7.49	0.67	1
40-60	5.00	1.36	1.5
60-90	3.33	0.86	1
90-140	2.14	0.57	1
140-200	1.50	0.31	1

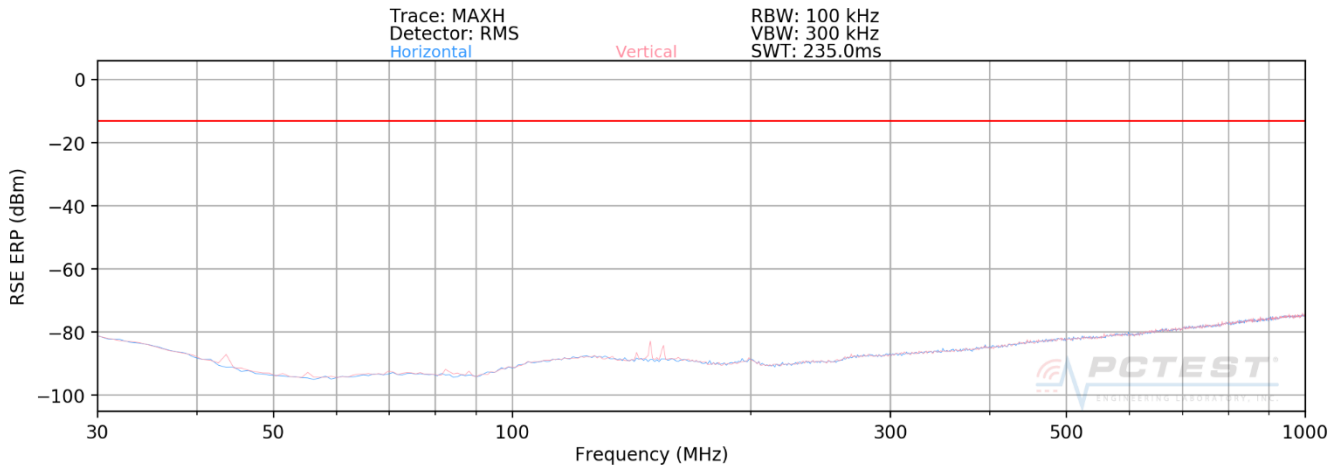
Table 7-10. Far-Field Distance per Frequency Range

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.

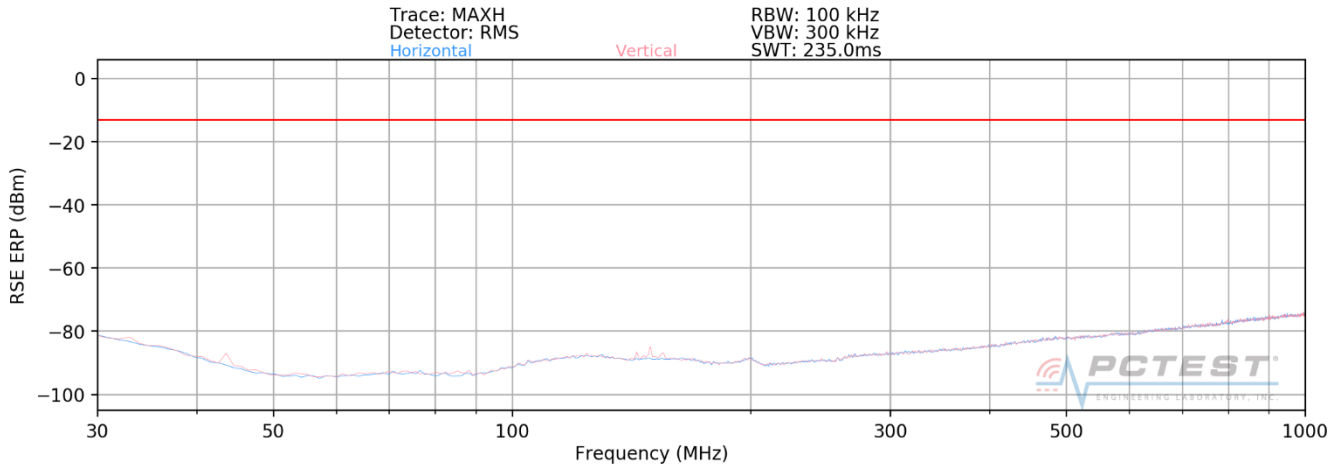
7) All RSE's were measured with 1CC. It was determined that adding more CC's causes the overall amplitude of just 1CC to decrease, therefore, 1CC is the worst case for the purposes of spurious emissions measurements.

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

7.4.1 Radiated Spurious Emissions Plots n261 (30MHz – 1GHz)

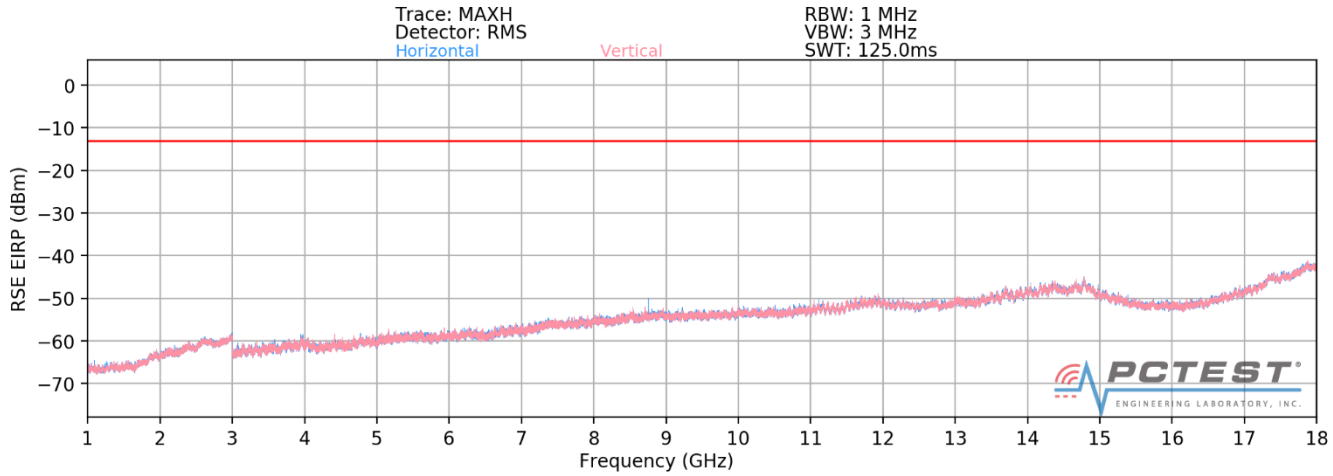


Plot 7-49. Radiated Spurious Plot 30 MHz - 1 GHz (QTM0 1CC-50MHz Bandwidth QPSK Mid Channel)

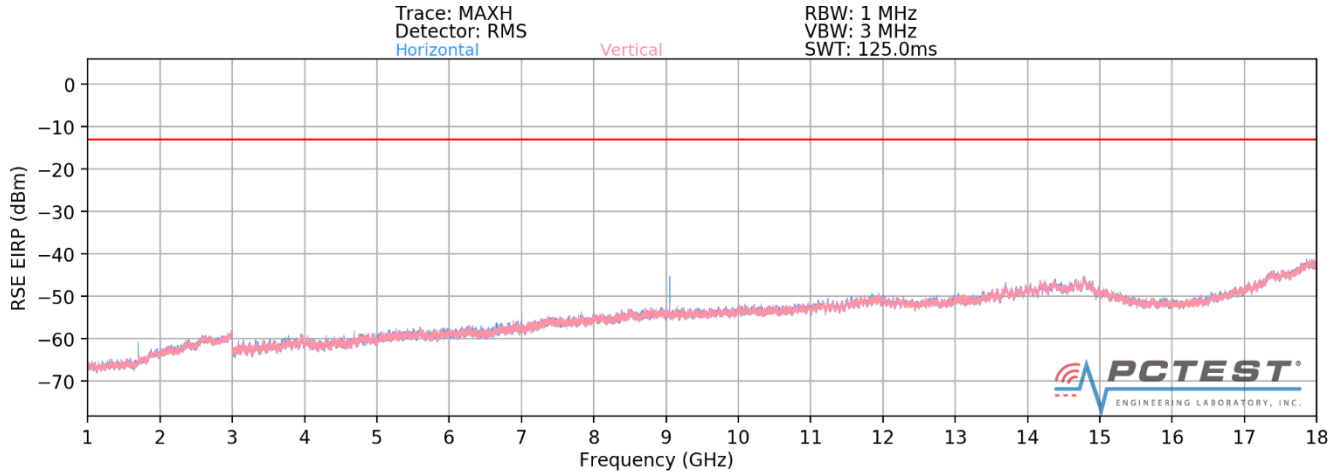


Plot 7-50. Radiated Spurious Plot 30 MHz - 1 GHz (QTM1 1CC100MHz Bandwidth QPSK Mid Channel)

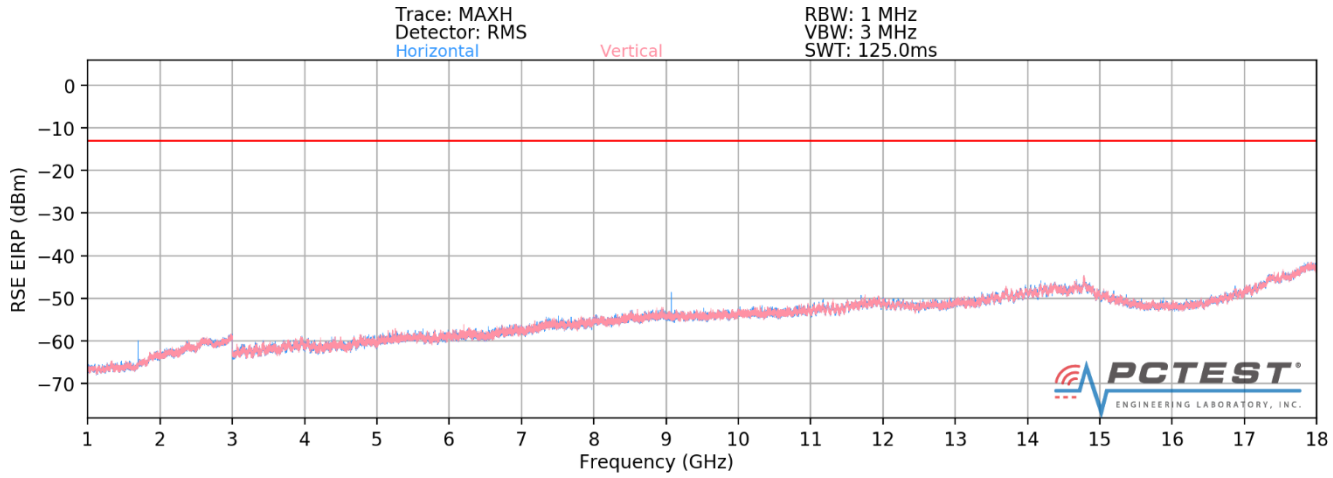
7.4.2 Radiated Spurious Emissions Plots n261 (1 – 18GHz)



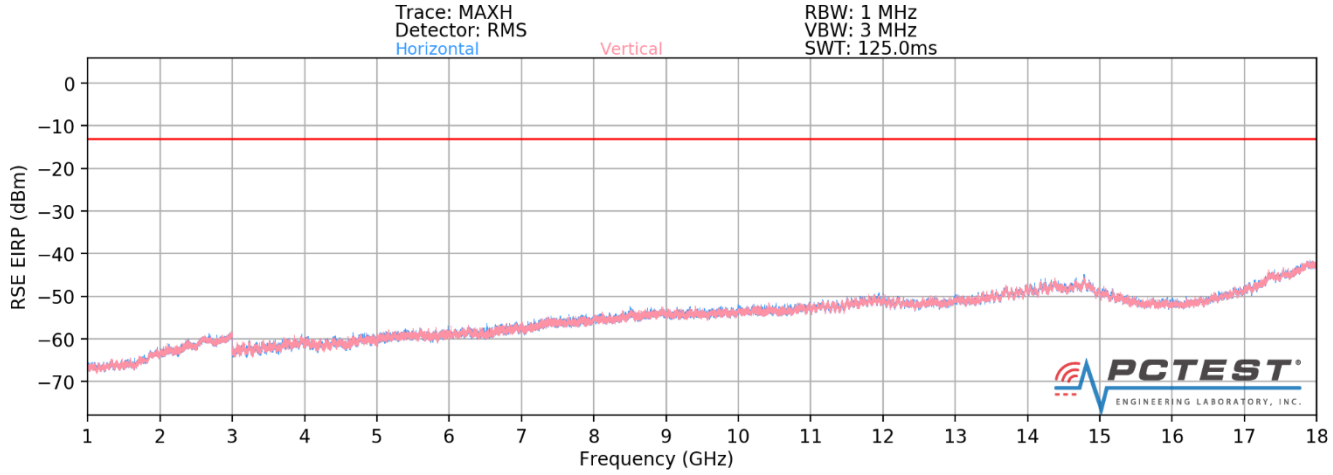
Plot 7-51. Radiated Spurious Plot 1-18 GHz (QTM0 1CC-50MHz Bandwidth QPSK Low Channel)



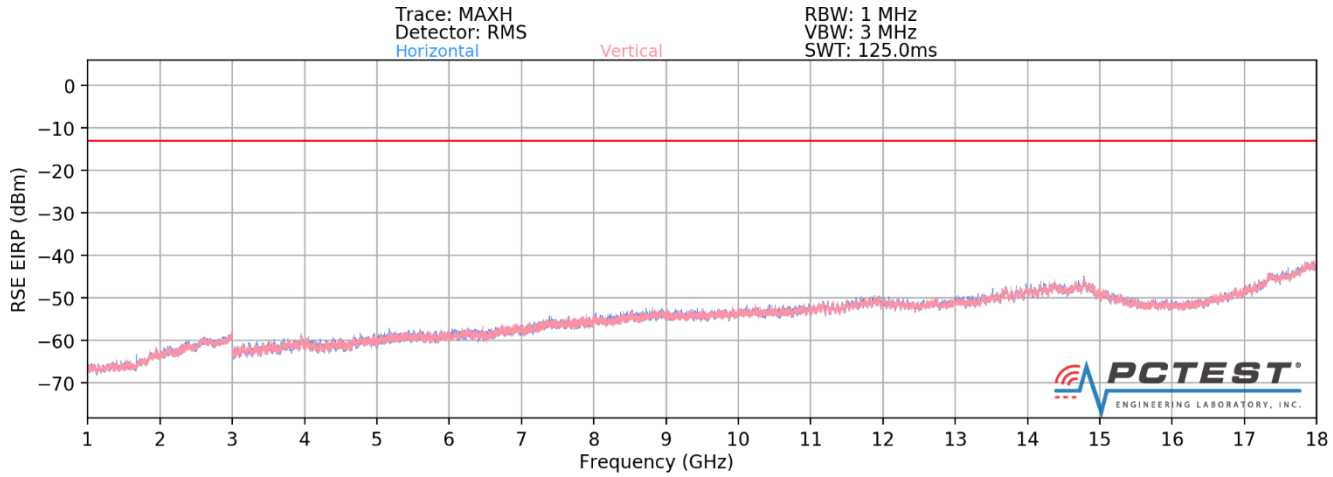
Plot 7-52. Radiated Spurious Plot 1-18 GHz (QTM0 1CC-50MHz Bandwidth QPSK Mid Channel)



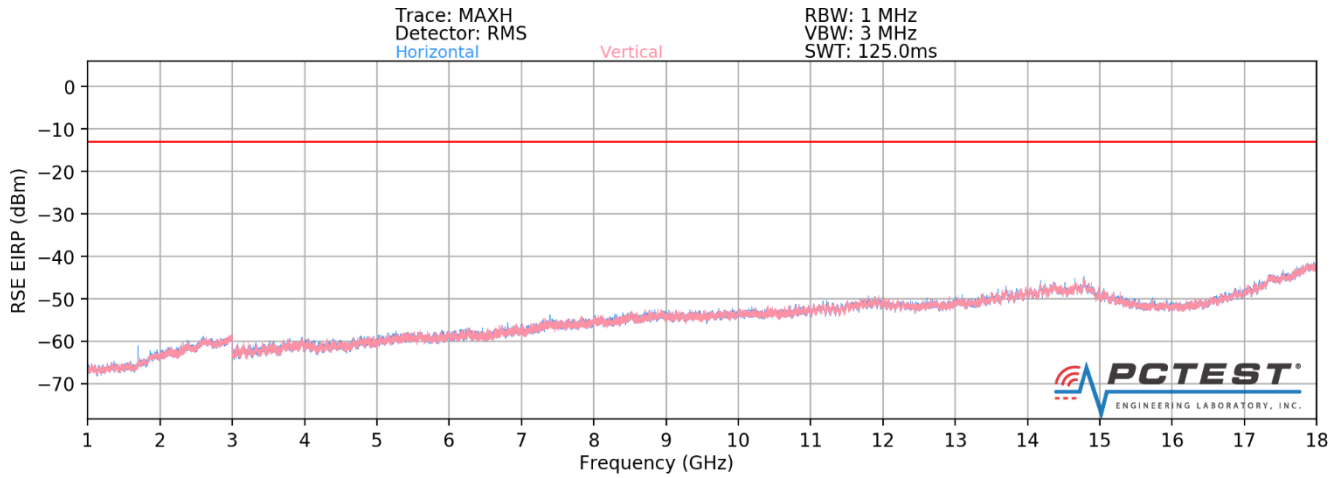
Plot 7-53. Radiated Spurious Plot 1-18 GHz (QTM0 1CC-50MHz Bandwidth QPSK High Channel)



Plot 7-54. Radiated Spurious Plot 1-18 GHz (QTM1 1CC-100MHz Bandwidth QPSK Low Channel)

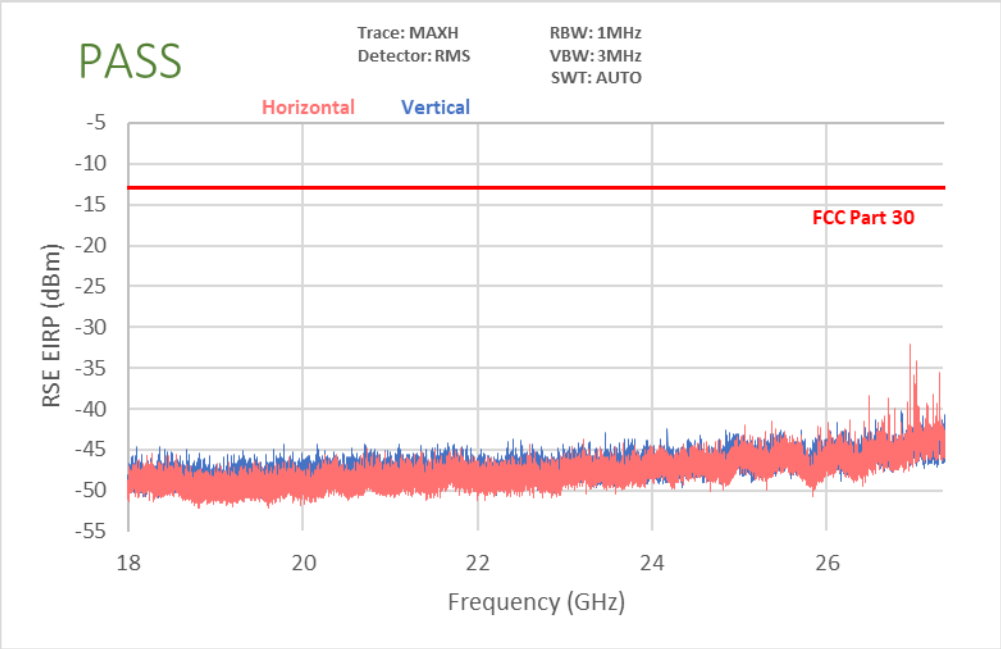


Plot 7-55. Radiated Spurious Plot 1-18 GHz (QTM1 1CC-100MHz Bandwidth QPSK Mid Channel)

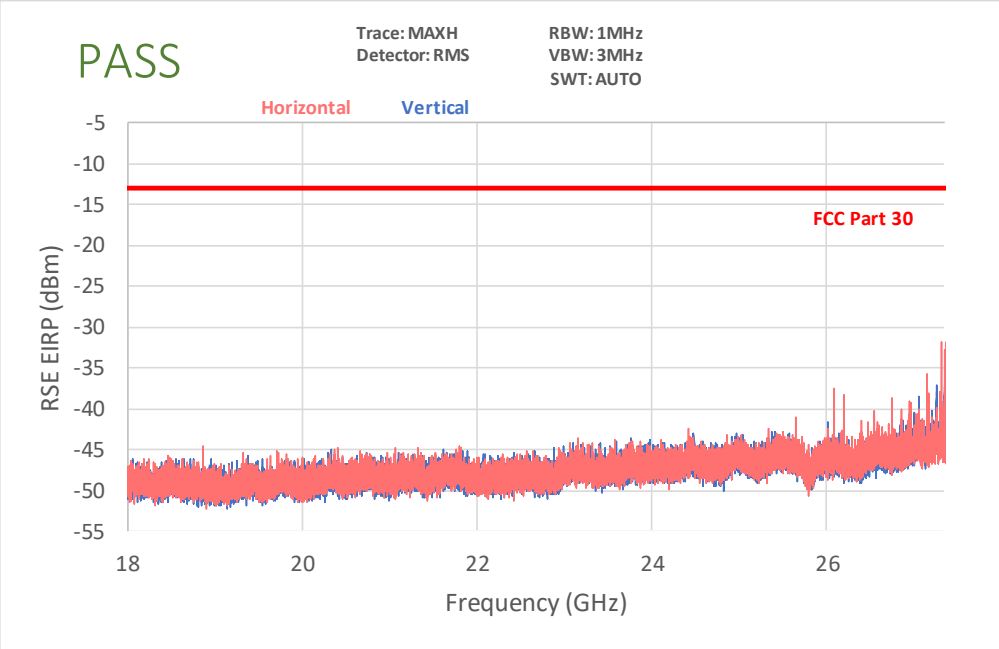


Plot 7-56. Radiated Spurious Plot 1-18 GHz (QTM1 1CC-100MHz Bandwidth QPSK High Channel)

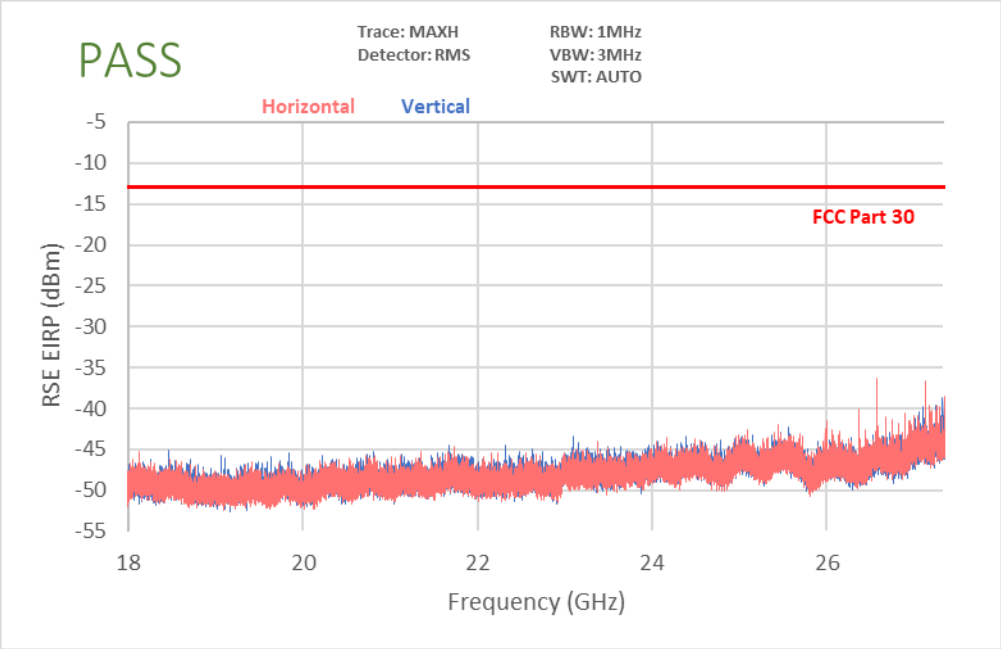
7.4.3 Radiated Spurious Emissions Plots n261 (18 – 27.5GHz)



Plot 7-57. Radiated Spurious Plot 18-27.5 GHz (QTM0 1CC-50MHz Bandwidth QPSK Low Channel)



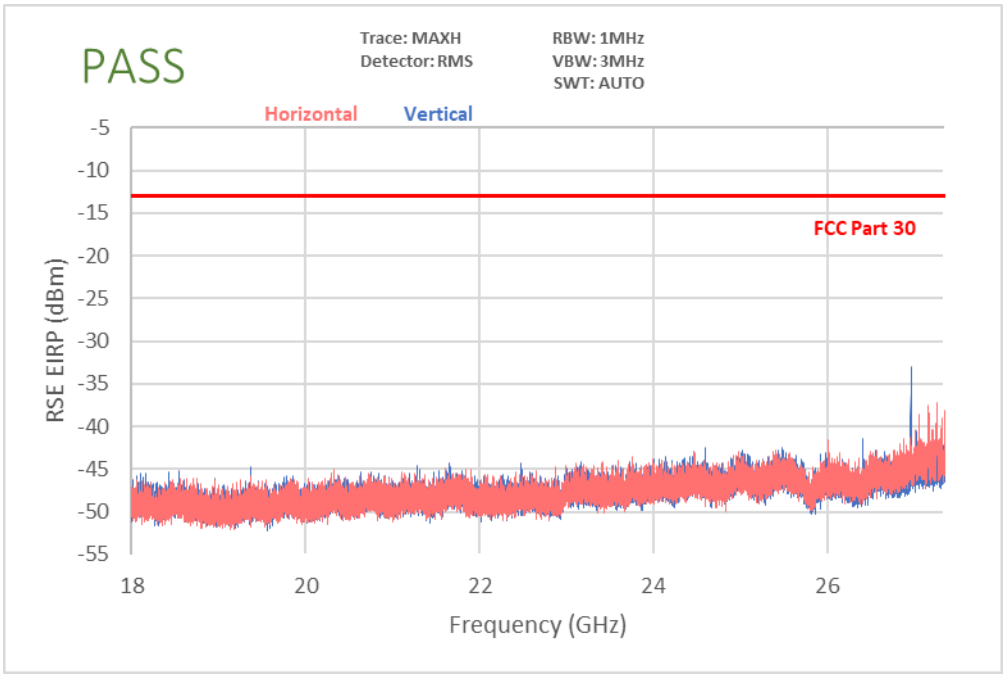
Plot 7-58. Radiated Spurious Plot 18-27.5 GHz (QTM0 1CC-50MHz Bandwidth QPSK Mid Channel)



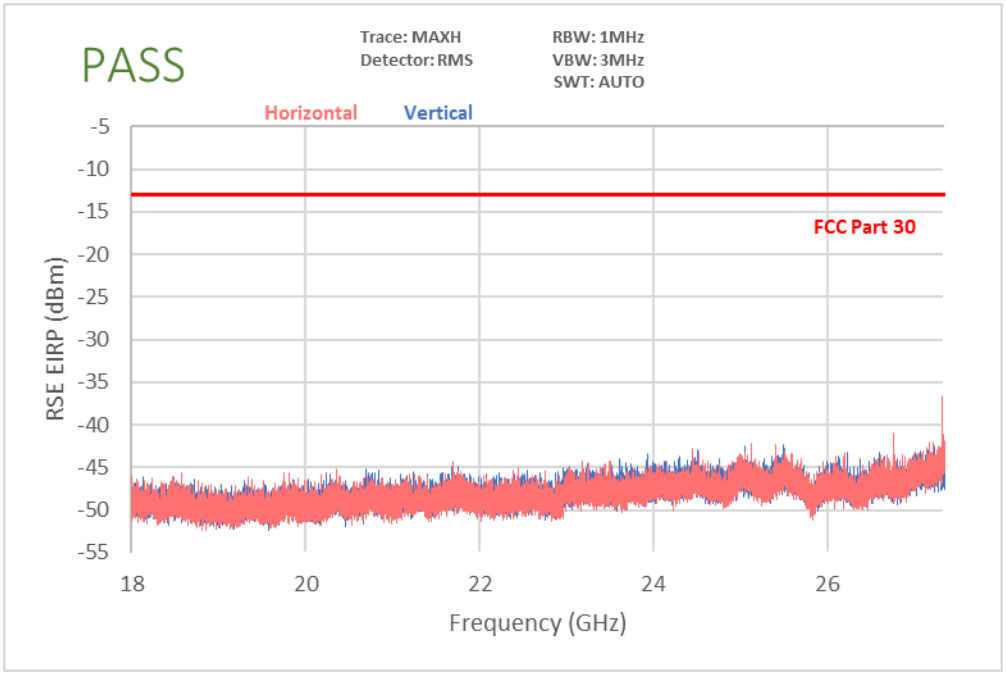
Plot 7-59. Radiated Spurious Plot 18-27.5 GHz (QTM0 1CC-50MHz Bandwidth QPSK High Channel)

Frequency [MHz]	Detector /Trace	Chan.	Bandwidth (MHz)	Mod.	Beam Polarization	Ant. Pos [H/V]	Ant. Height [cm]	Turn Table Azimuth [degree]	RSE EIRP [dBm]	Limit [dBm]	Margin [dB]
27012.54	Maxh/RMS	Low	50	QPSK	H + V	H	150	195	-32.68	-13.00	-19.68
27328.58	Maxh/RMS	Mid	50	QPSK	H + V	H	150	194	-33.28	-13.00	-20.28
27287.20	Maxh/RMS	High	50	QPSK	H + V	H	150	191	-38.21	-13.00	-25.21
27035.27	Maxh/RMS	Low	50	QPSK	H + V	V	150	185	-38.20	-13.00	-25.20
27319.72	Maxh/RMS	Mid	50	QPSK	H + V	V	150	180	-37.84	-13.00	-24.84
27317.28	Maxh/RMS	High	50	QPSK	H + V	V	150	192	-39.89	-13.00	-26.89

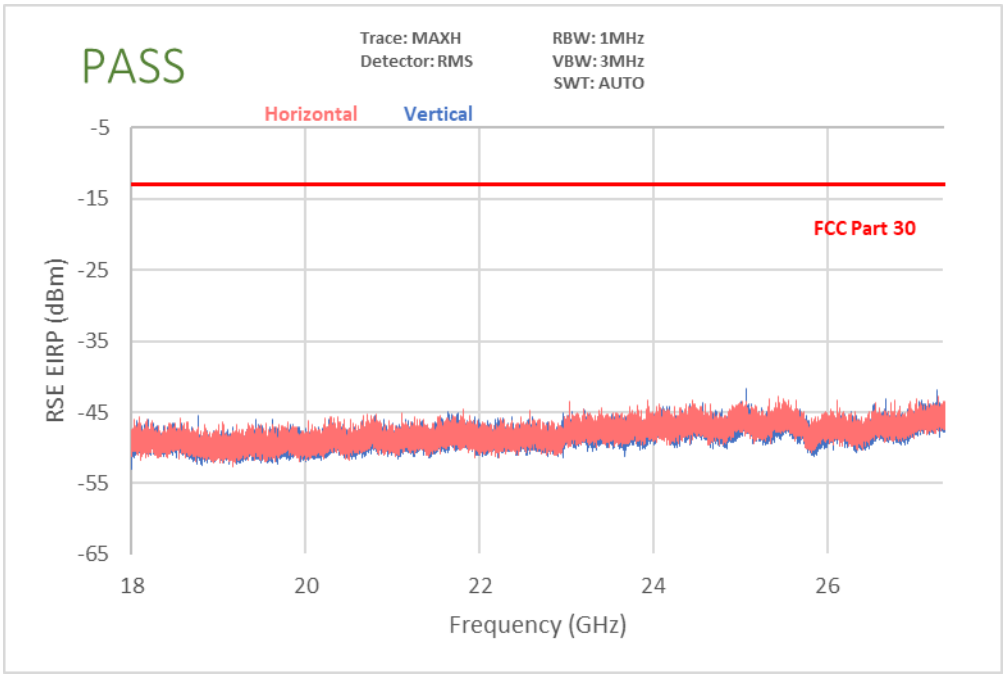
Table 7-11. Spurious Emissions QTM0 (18 – 27.5GHz)



Plot 7-60. Radiated Spurious Plot 18-27.5 GHz (QTM1 1CC-100MHz Bandwidth QPSK Low Channel)



Plot 7-61. Radiated Spurious Plot 18-27.5 GHz (QTM1 1CC-100MHz Bandwidth QPSK Mid Channel)



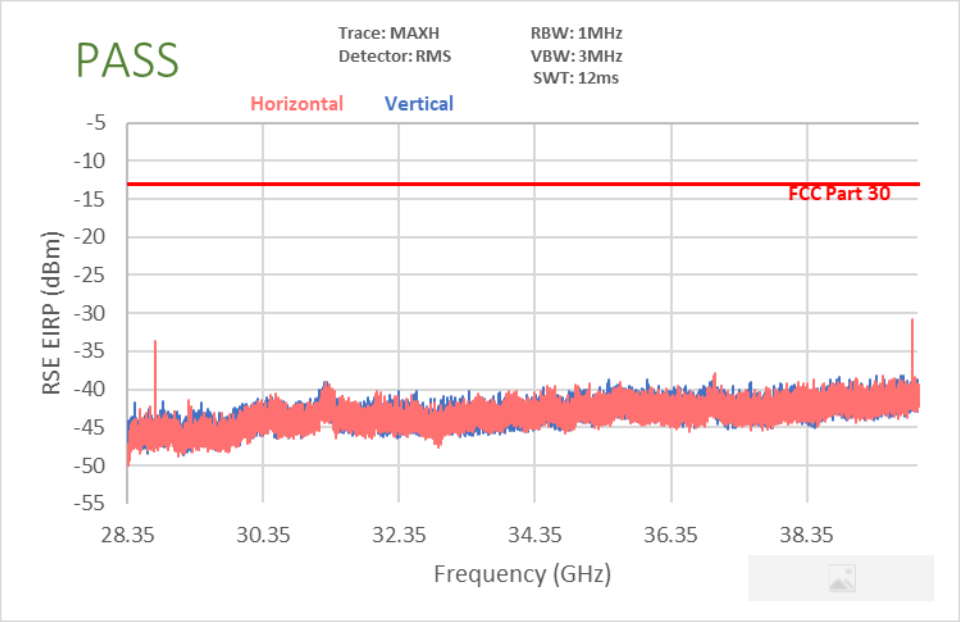
Plot 7-62. Radiated Spurious Plot 18-27.5 GHz (QTM1 1CC-100MHz Bandwidth QPSK High Channel)

Frequency [MHz]	Detector /Trace	Chan.	Bandwidth (MHz)	Mod.	Beam Polarization	Ant. Pos [H/V]	Ant. Height [cm]	Turn Table Azimuth [degree]	RSE EIRP [dBm]	Limit [dBm]	Margin [dB]
27328.61	Maxh/RMS	Low	100	QPSK	H + V	H	150	26	-36.95	-13.00	-23.95
27361.57	Maxh/RMS	Mid	100	QPSK	H + V	H	150	27	-37.51	-13.00	-24.51
25673.58	Maxh/RMS	High	100	QPSK	H + V	H	150	30	-40.38	-13.00	-27.38
27154.28	Maxh/RMS	Low	100	QPSK	H + V	V	150	32	-32.57	-13.00	-19.57
27156.67	Maxh/RMS	Mid	100	QPSK	H + V	V	150	27	-43.38	-13.00	-30.38
25637.49	Maxh/RMS	High	100	QPSK	H + V	V	150	25	-41.34	-13.00	-28.34

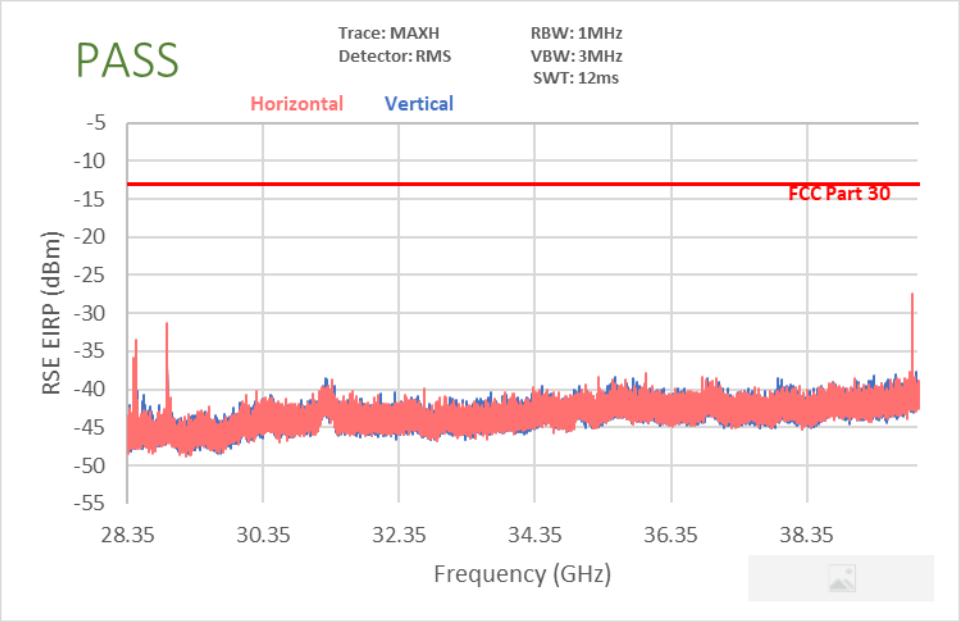
Table 7-12. Spurious Emissions QTM1 (18 – 27.5GHz)

7.4.4 Radiated Spurious Emissions Plots n261 (28.5 – 40GHz)

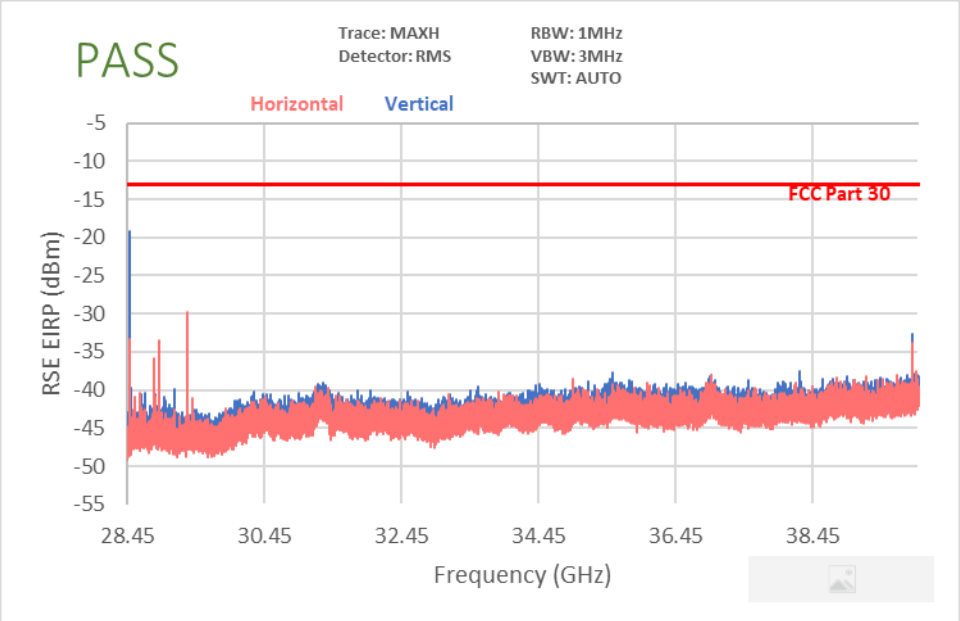
Note: The spurious emissions scans started at 29GHz as shown in the plots of this section so as to only focus on the spurious emissions and not the fundamental emission.



Plot 7-63. Radiated Spurious Plot 28.5-40 GHz (QTM0 1CC-50MHz Bandwidth QPSK Low Channel)



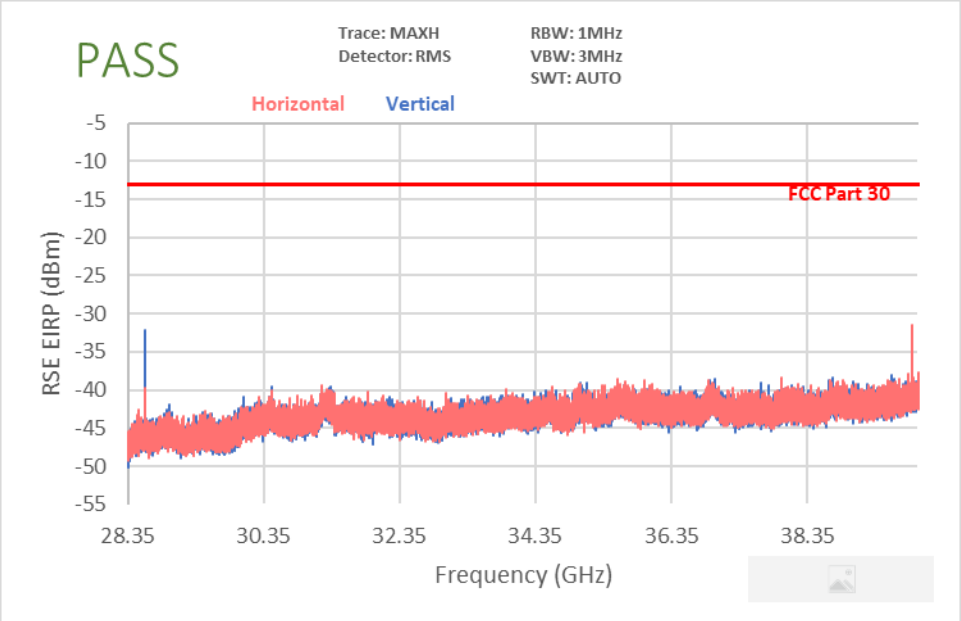
Plot 7-64. Radiated Spurious Plot 28.5-40 GHz (QTM0 1CC-50MHz Bandwidth QPSK Mid Channel)



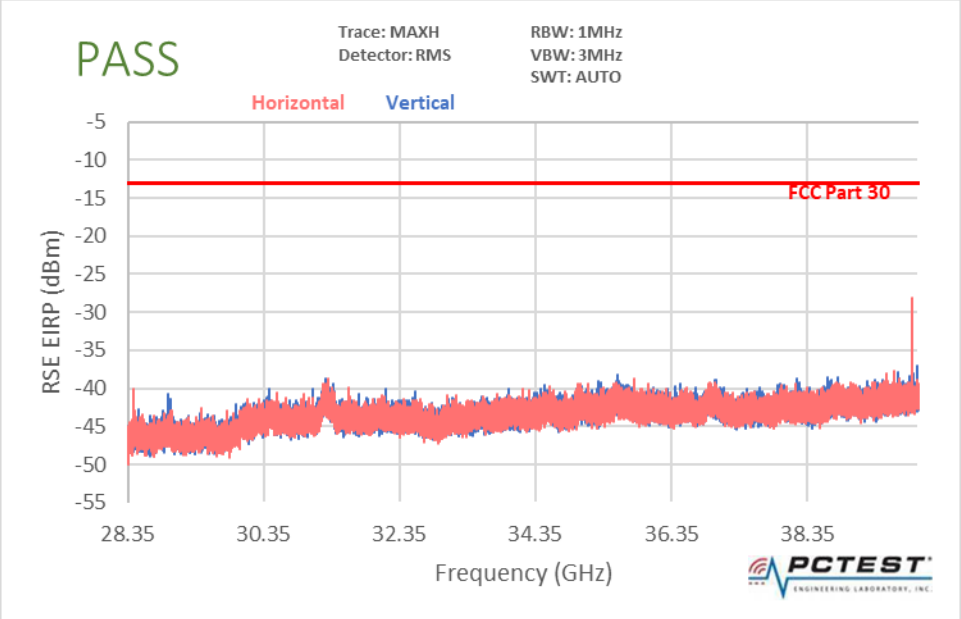
Plot 7-65. Radiated Spurious Plot 28.5-40 GHz (QTM0 1CC-50MHz Bandwidth QPSK High Channel)

Frequency [MHz]	Detector /Trace	Chan.	Bandwidth (MHz)	Mod.	Beam Polarization	Ant. Pos [H/V]	Ant. Height [cm]	Turntable Azimuth [degree]	RSE EIRP [dBm]	Limit [dBm]	Margin [dB]
39876.28	Maxh/RMS	Low	50	QPSK	H + V	H	150	189	-31.20	-13.00	-18.20
39855.20	Maxh/RMS	Mid	50	QPSK	H + V	H	150	187	-26.27	-13.00	-13.27
28461.69	Maxh/RMS	High	50	QPSK	H + V	H	150	190	-30.68	-13.00	-17.68
39876.28	Maxh/RMS	Low	50	QPSK	H + V	V	150	191	-42.33	-13.00	-29.33
39855.20	Maxh/RMS	Mid	50	QPSK	H + V	V	150	186	-38.67	-13.00	-25.67
28461.69	Maxh/RMS	High	50	QPSK	H + V	V	150	190	-19.30	-13.00	-6.30

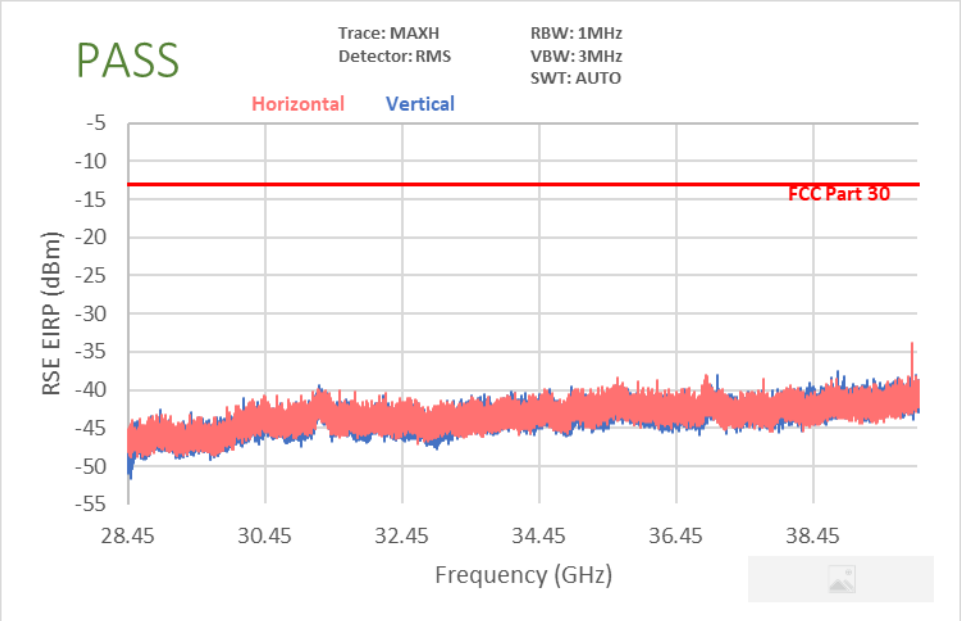
Table 7-13. Spurious Emissions QTM0 (28.5 – 40GHz)



Plot 7-66. Radiated Spurious Plot 28.5-40 GHz (QTM1 1CC-100MHz Bandwidth QPSK Low Channel)



Plot 7-67. Radiated Spurious Plot 28.5-40 GHz (QTM1 1CC-100MHz Bandwidth QPSK Mid Channel)

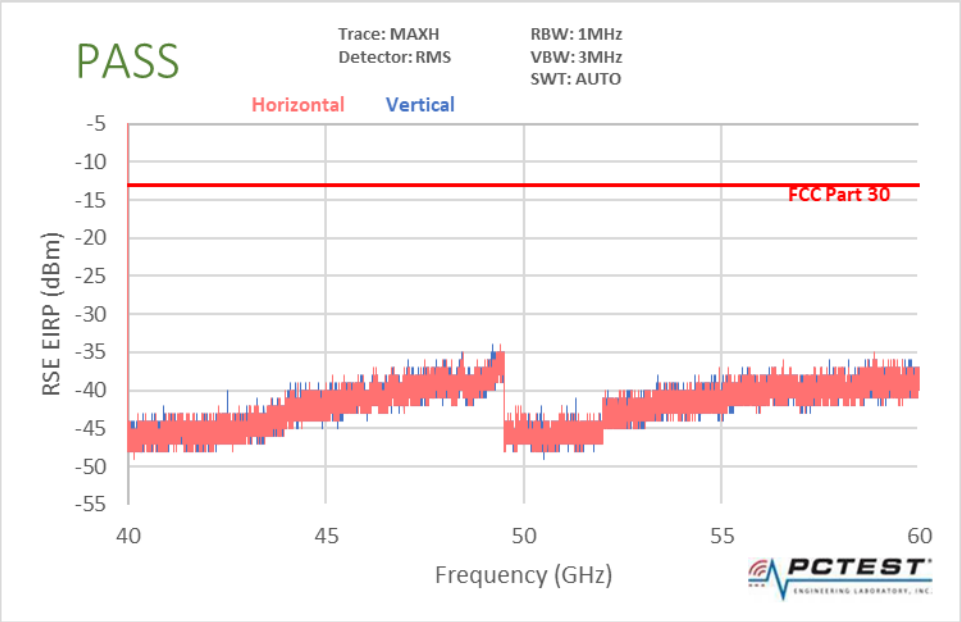


Plot 7-68. Radiated Spurious Plot 28.5-40 GHz (QTM1 1CC-100MHz Bandwidth QPSK High Channel)

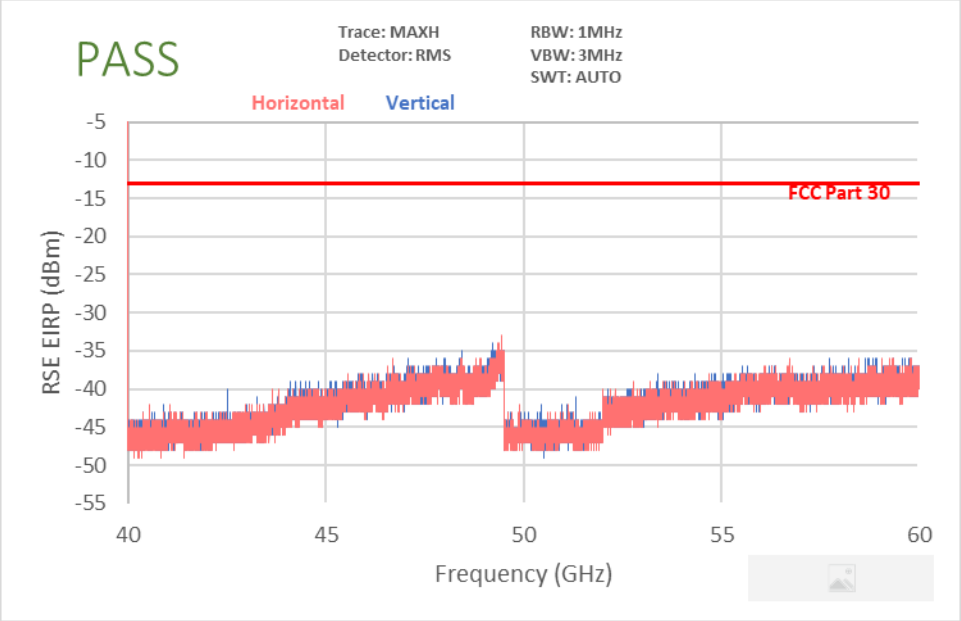
Frequency [MHz]	Detector /Trace	Chan.	Bandwidth (MHz)	Mod.	Beam Polarization	Ant. Pos [H/V]	Ant. Height [cm]	Turntable Azimuth [degree]	RSE EIRP [dBm]	Limit [dBm]	Margin [dB]
28512.28	Maxh/RMS	Low	100	QPSK	H + V	H	150	18	-38.34	-13.00	-25.34
39876.24	Maxh/RMS	Mid	100	QPSK	H + V	H	150	22	-28.08	-13.00	-15.08
39756.31	Maxh/RMS	High	100	QPSK	H + V	H	150	27	-33.61	-13.00	-20.61
28512.28	Maxh/RMS	Low	100	QPSK	H + V	V	150	26	-32.28	-13.00	-19.28
39876.24	Maxh/RMS	Mid	100	QPSK	H + V	V	150	28	-38.62	-13.00	-25.62
39756.31	Maxh/RMS	High	100	QPSK	H + V	V	150	21	-37.50	-13.00	-24.50

Table 7-14. Spurious Emissions QTM1 (28.5 – 40GHz)

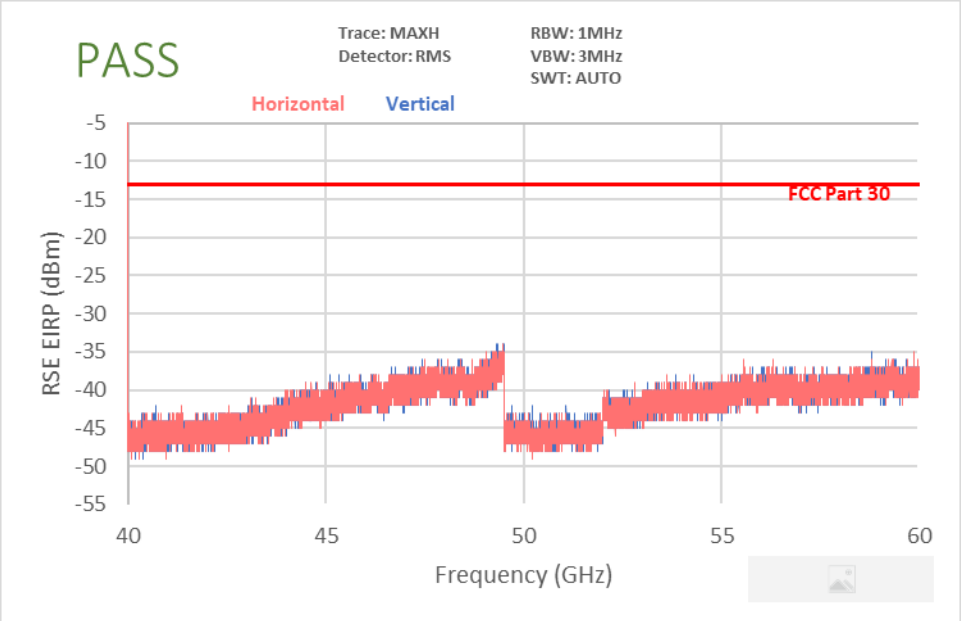
7.4.5 Radiated Spurious Emissions Plots n261 (40 – 60GHz)



Plot 7-69. Radiated Spurious Plot 40-60 GHz (QTM0 1CC-50MHz Bandwidth QPSK Low Channel)



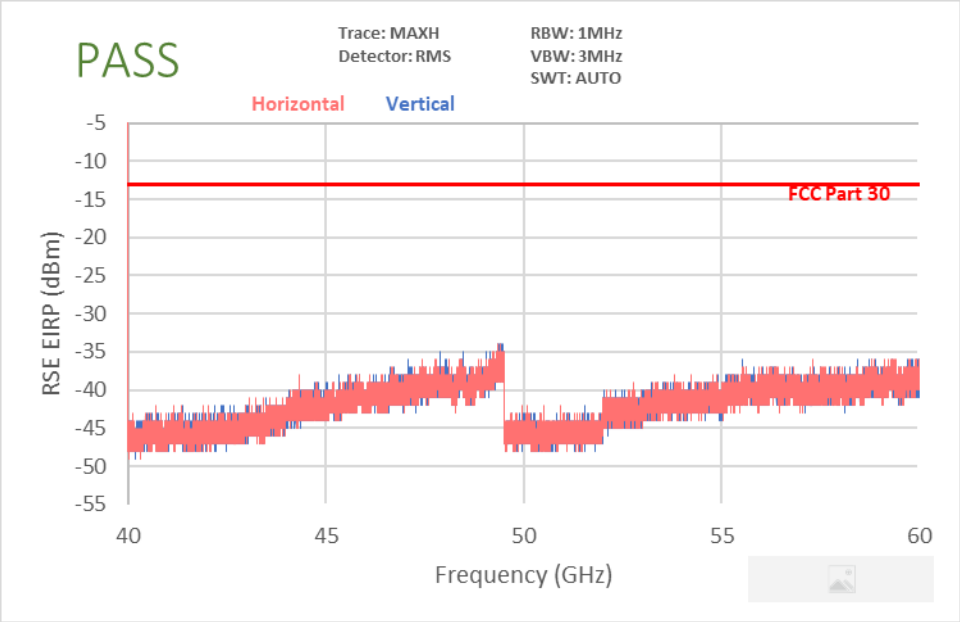
Plot 7-70. Radiated Spurious Plot 40-60 GHz (QTM0 1CC-50MHz Bandwidth QPSK Mid Channel)



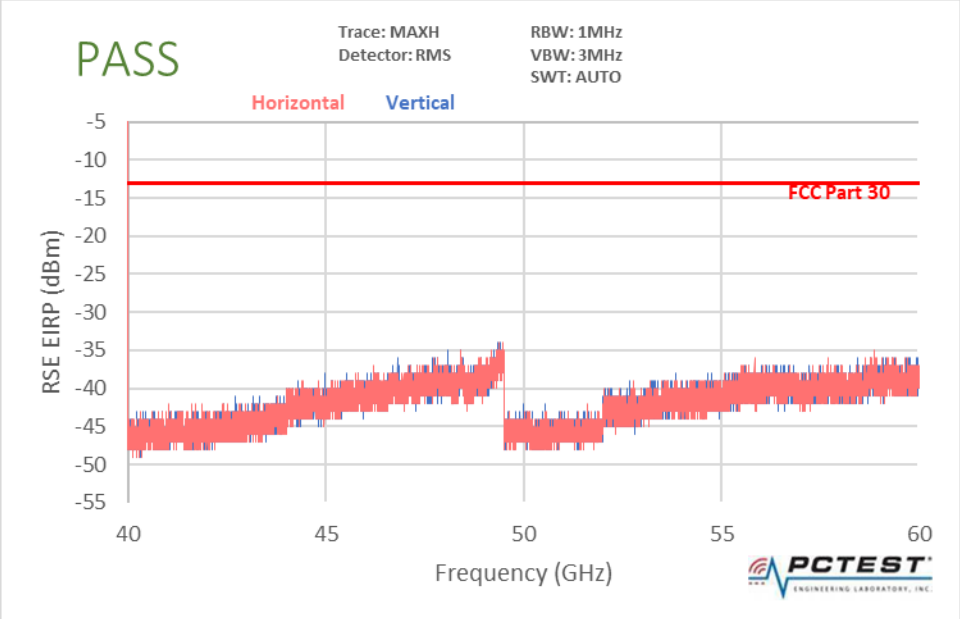
Plot 7-71. Radiated Spurious Plot 40-60 GHz (QTM0 1CC-50MHz Bandwidth QPSK High Channel)

Frequency [MHz]	Detector /Trace	Chan.	Bandwidth (MHz)	Mod.	Beam Polarization	Ant. Pos [H/V]	Ant. Height [cm]	Turn Table Azimuth [degree]	RSE EIRP [dBm]	Limit [dBm]	Margin [dB]
55118.64	Maxh/RMS	Low	50	QPSK	H + V	H	-	-	-38.49	-13.00	-25.49
55847.04	Maxh/RMS	Mid	50	QPSK	H + V	H	-	-	-38.01	-13.00	-25.01
56584.32	Maxh/RMS	High	50	QPSK	H + V	H	-	-	-39.07	-13.00	-26.07
55118.64	Maxh/RMS	Low	50	QPSK	H + V	V	-	-	-40.24	-13.00	-27.24
55847.04	Maxh/RMS	Mid	50	QPSK	H + V	V	-	-	-38.08	-13.00	-25.08
56584.32	Maxh/RMS	High	50	QPSK	H + V	V	-	-	-39.84	-13.00	-26.84

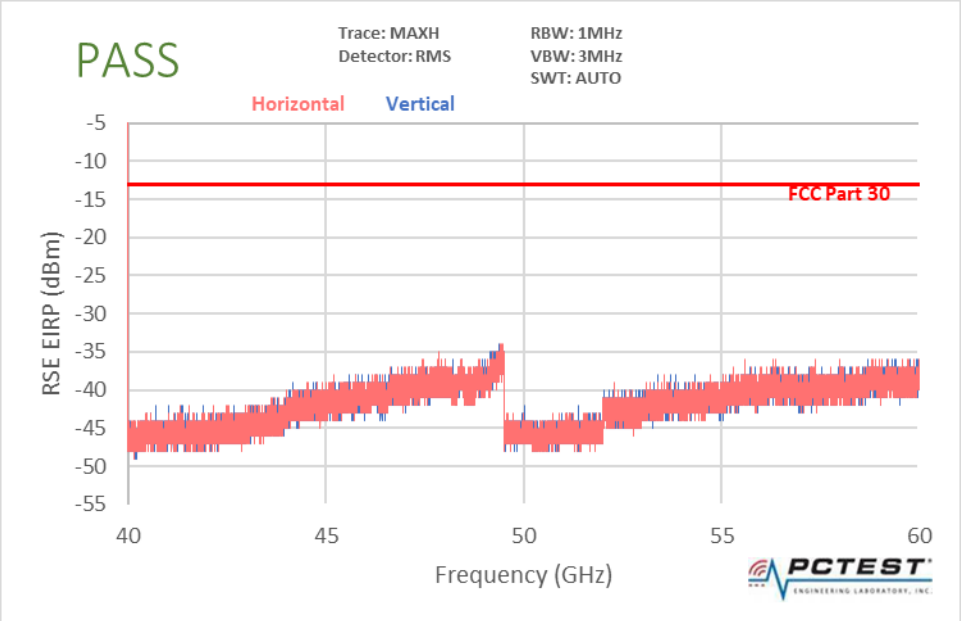
Table 7-15. Spurious Emissions QTM0 (40 – 60GHz)



Plot 7-72. Radiated Spurious Plot 40-60 GHz (QTM1 1CC-100MHz Bandwidth QPSK Low Channel)



Plot 7-73. Radiated Spurious Plot 40-60 GHz (QTM1 1CC-100MHz Bandwidth QPSK Mid Channel)

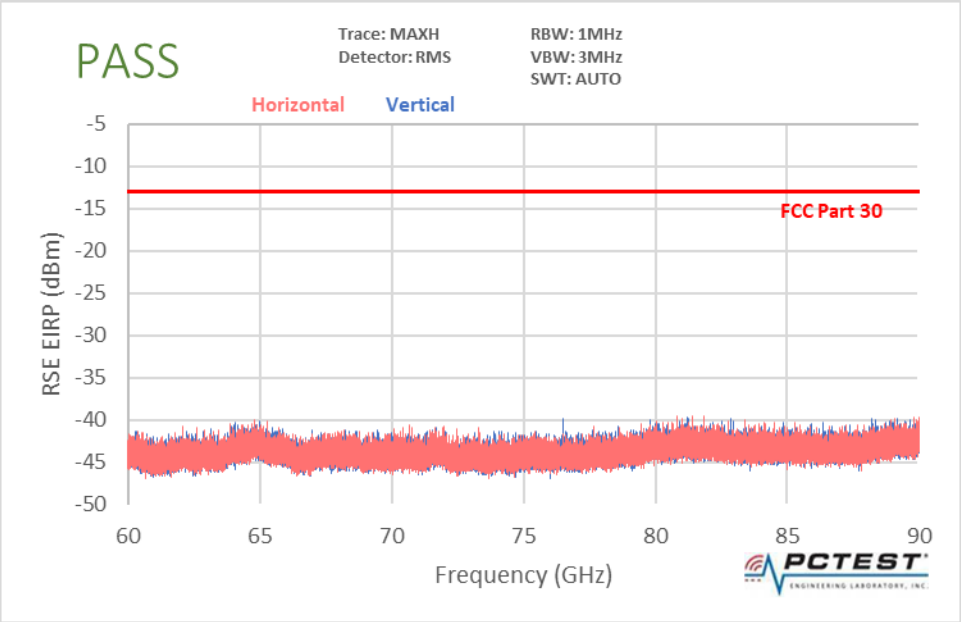


Plot 7-74. Radiated Spurious Plot 40-60 GHz (QTM1 1CC-100MHz Bandwidth QPSK High Channel)

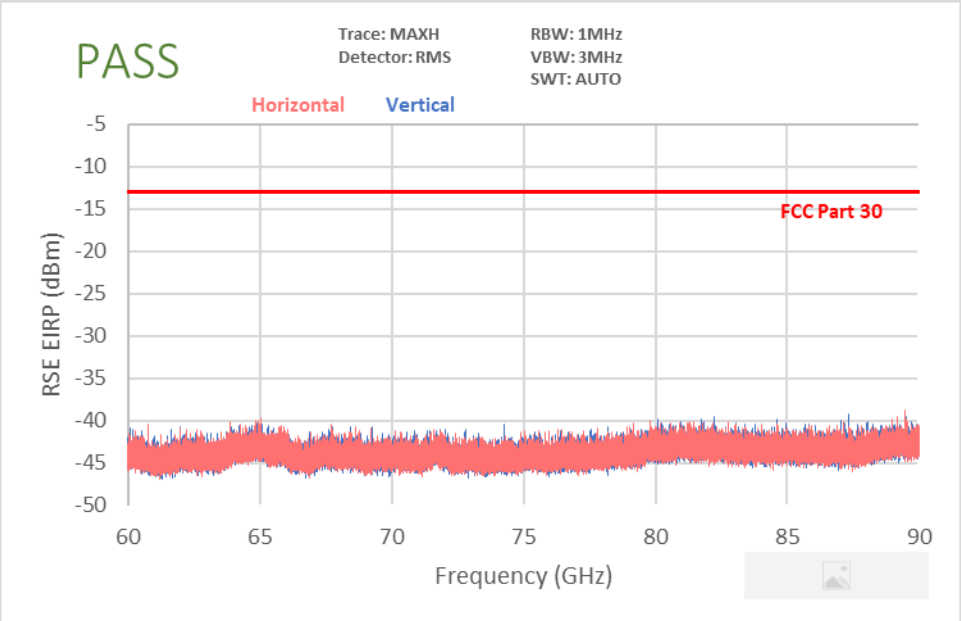
Frequency [MHz]	Detector /Trace	Chan.	Bandwidth (MHz)	Mod.	Beam Polarization	Ant. Pos [H/V]	Ant. Height [cm]	Turn Table Azimuth [degree]	RSE EIRP [dBm]	Limit [dBm]	Margin [dB]
55118.64	Maxh/RMS	Low	100	QPSK	H + V	H	-	-	-37.97	-13.00	-24.97
55847.04	Maxh/RMS	Mid	100	QPSK	H + V	H	-	-	-38.05	-13.00	-25.05
56584.32	Maxh/RMS	High	100	QPSK	H + V	H	-	-	-39.57	-13.00	-26.57
55118.64	Maxh/RMS	Low	100	QPSK	H + V	V	-	-	-40.28	-13.00	-27.28
55847.04	Maxh/RMS	Mid	100	QPSK	H + V	V	-	-	-39.87	-13.00	-26.87
56584.32	Maxh/RMS	High	100	QPSK	H + V	V	-	-	-40.31	-13.00	-27.31

Table 7-16. Spurious Emissions QTM1 (40 – 60GHz)

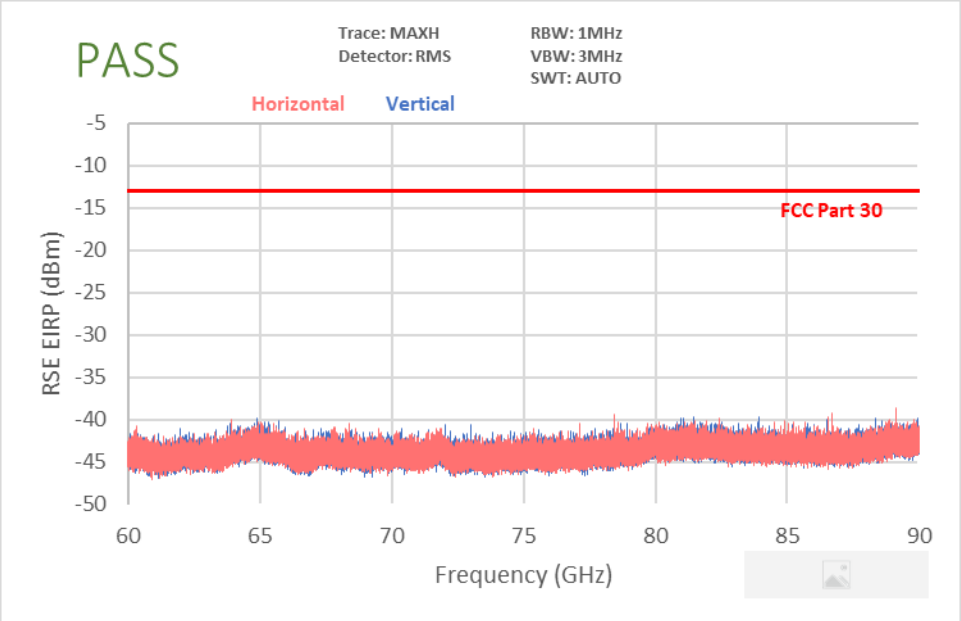
7.4.6 Radiated Spurious Emissions Plots n261 (60 – 90GHz)



Plot 7-75. Radiated Spurious Plot 60-90 GHz (QTM0 1CC-50MHz Bandwidth QPSK Low Channel)



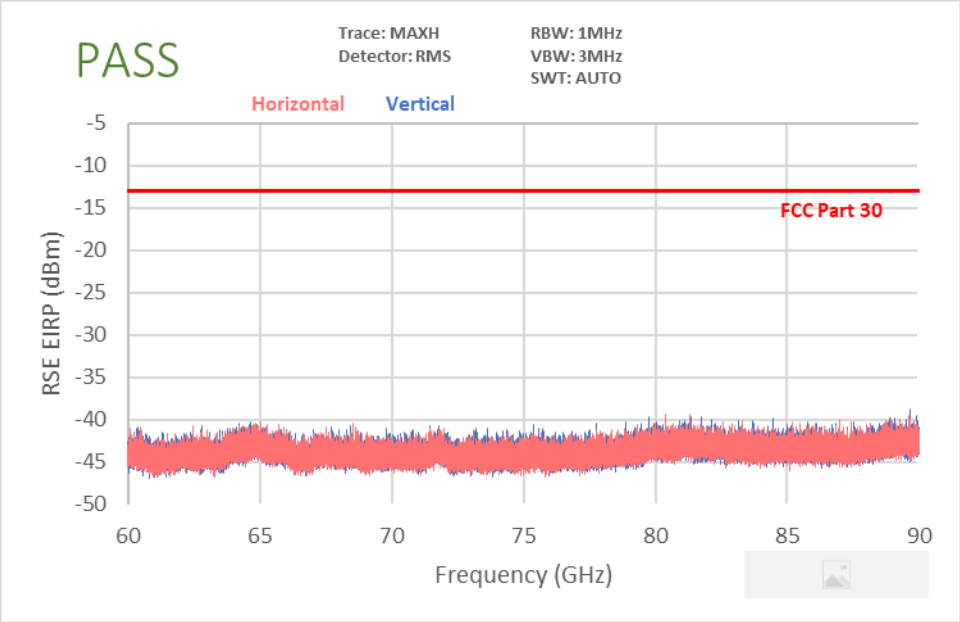
Plot 7-76. Radiated Spurious Plot 60-90 GHz (QTM0 1CC-50MHz Bandwidth QPSK Mid Channel)



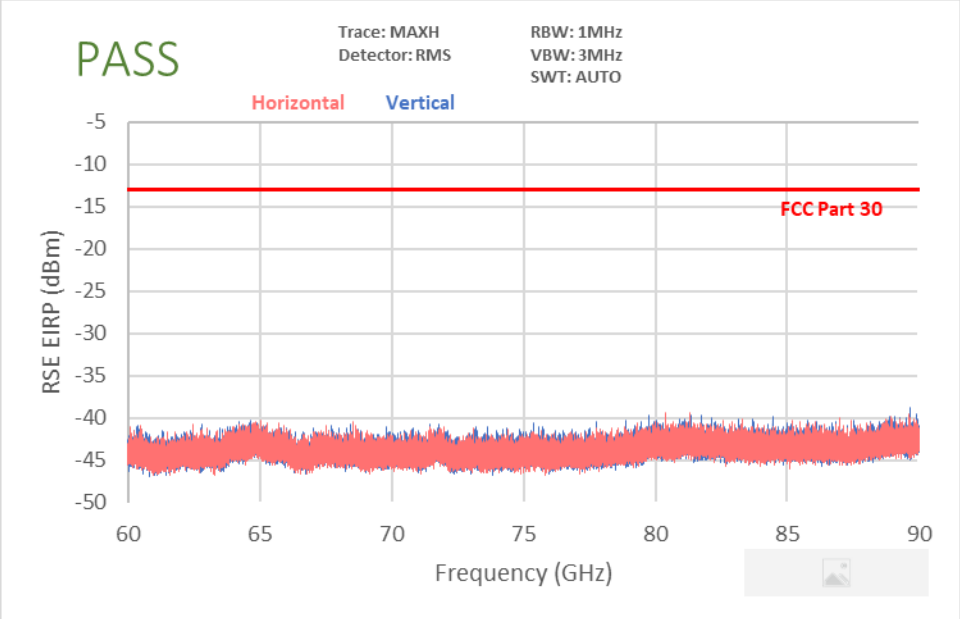
Plot 7-77. Radiated Spurious Plot 60-90 GHz (QTM0 1CC-50MHz Bandwidth QPSK High Channel)

Frequency [MHz]	Detector /Trace	Chan.	Bandwidth (MHz)	Mod.	Beam Polarization	Ant. Pos [H/V]	Ant. Height [cm]	Turn Table Azimuth [degree]	RSE EIRP [dBm]	Limit [dBm]	Margin [dB]
82677.96	Maxh/RMS	Low	50	QPSK	H + V	H	-	-	-42.67	-13.00	-29.67
83770.56	Maxh/RMS	Mid	50	QPSK	H + V	H	-	-	-41.08	-13.00	-28.08
84876.48	Maxh/RMS	High	50	QPSK	H + V	H	-	-	-43.61	-13.00	-30.61
82677.96	Maxh/RMS	Low	50	QPSK	H + V	V	-	-	-40.28	-13.00	-27.28
83770.56	Maxh/RMS	Mid	50	QPSK	H + V	V	-	-	-42.57	-13.00	-29.57
84876.48	Maxh/RMS	High	50	QPSK	H + V	V	-	-	-40.25	-13.00	-27.25

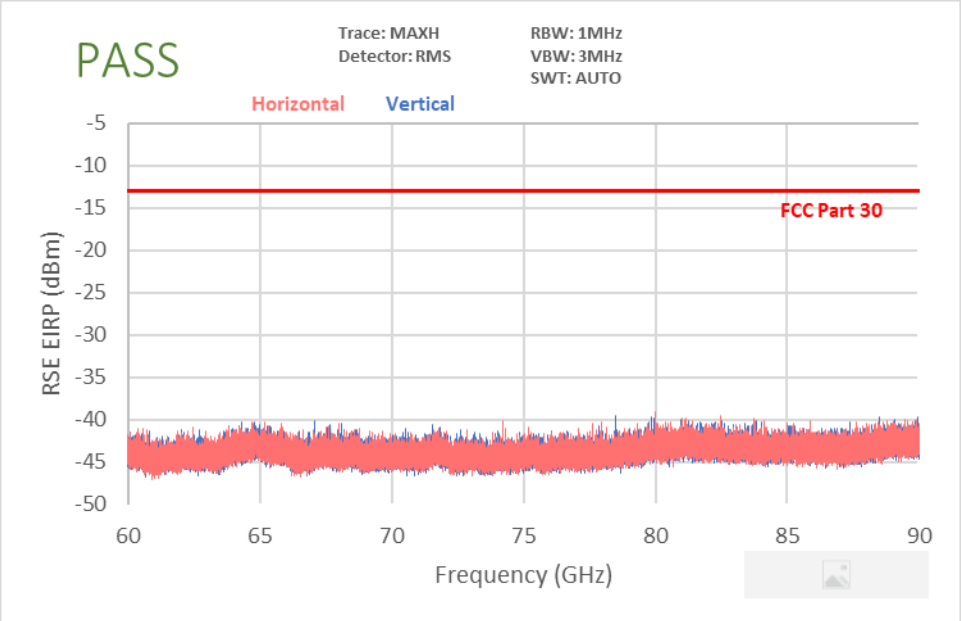
Table 7-17. Spurious Emissions QTM0 (60 – 90GHz)



Plot 7-78. Radiated Spurious Plot 60-90 GHz (QTM1 1CC-100MHz Bandwidth QPSK Low Channel)



Plot 7-79. Radiated Spurious Plot 60-90 GHz (QTM1 1CC-100MHz Bandwidth QPSK Mid Channel)

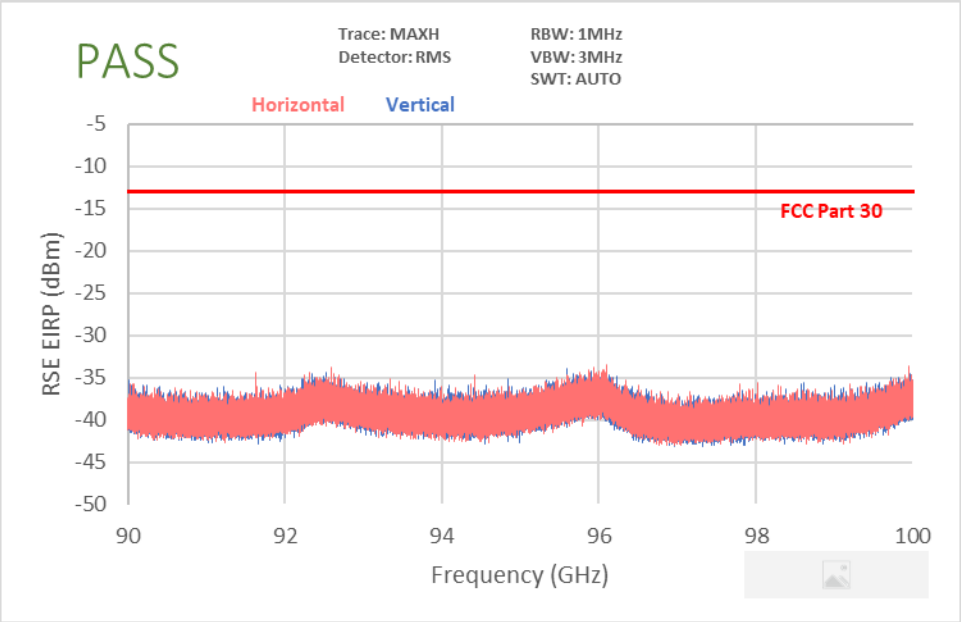


Plot 7-80. Radiated Spurious Plot 60-90 GHz (QTM1 1CC-100MHz Bandwidth QPSK High Channel)

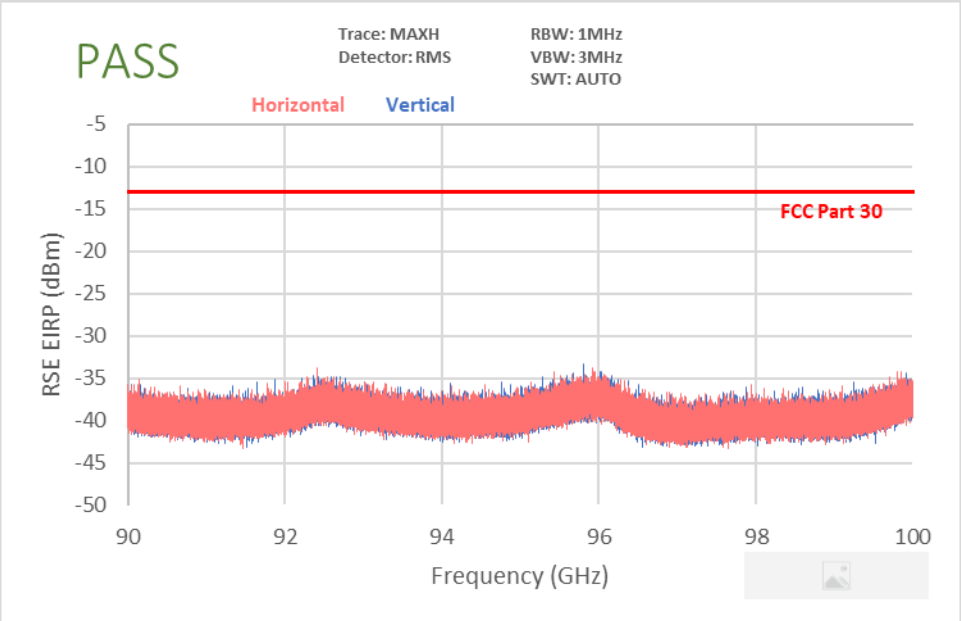
Frequency [MHz]	Detector /Trace	Chan.	Bandwidth (MHz)	Mod.	Beam Polarization	Ant. Pos [H/V]	Ant. Height [cm]	Turn Table Azimuth [degree]	RSE EIRP [dBm]	Limit [dBm]	Margin [dB]
82677.96	Maxh/RMS	Low	100	QPSK	H + V	H	-	-	-41.68	-13.00	-28.68
83770.56	Maxh/RMS	Mid	100	QPSK	H + V	H	-	-	-43.14	-13.00	-30.14
84876.48	Maxh/RMS	High	100	QPSK	H + V	H	-	-	-41.54	-13.00	-28.54
82677.96	Maxh/RMS	Low	100	QPSK	H + V	V	-	-	-40.99	-13.00	-27.99
83770.56	Maxh/RMS	Mid	100	QPSK	H + V	V	-	-	-42.18	-13.00	-29.18
84876.48	Maxh/RMS	High	100	QPSK	H + V	V	-	-	-40.57	-13.00	-27.57

Table 7-18. Spurious Emissions QTM1 (60 – 90GHz)

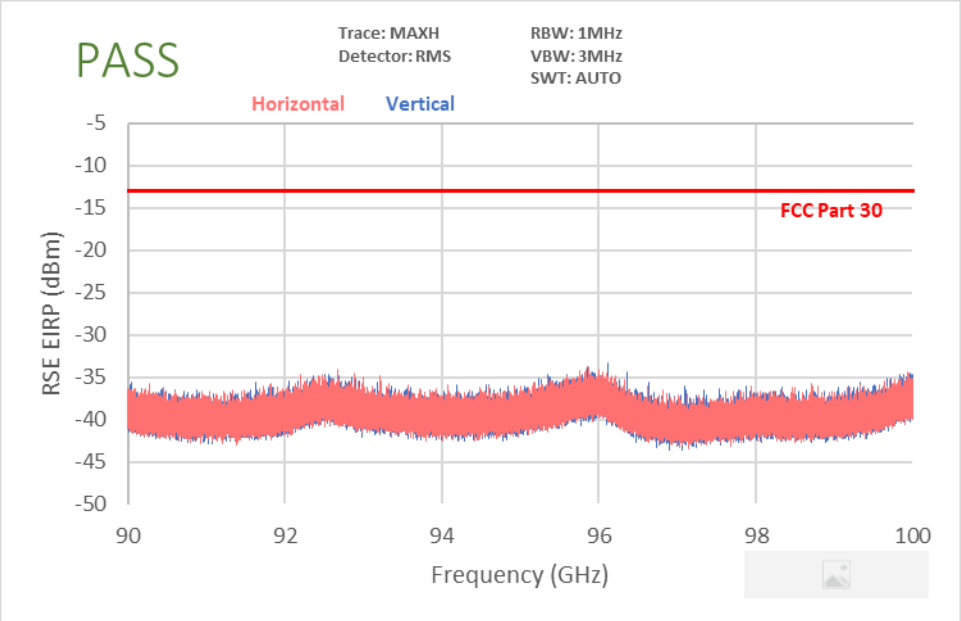
7.4.7 Radiated Spurious Emissions Plots n261 (90 – 100GHz)



Plot 7-81. Radiated Spurious Plot 90-100 GHz (QTM0 1CC-50MHz Bandwidth QPSK Low Channel)



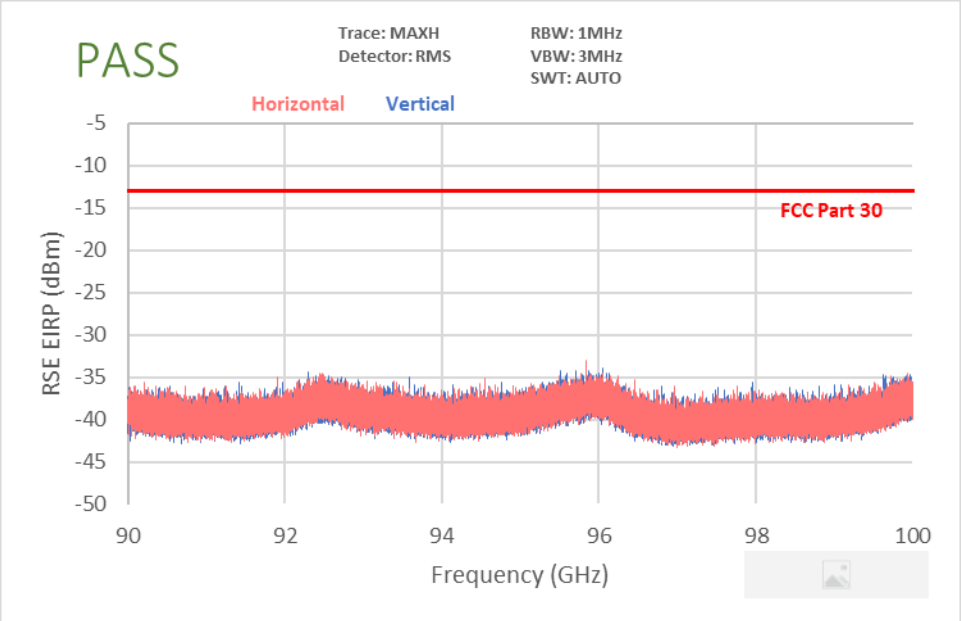
Plot 7-82. Radiated Spurious Plot 90-100 GHz (QTM0 1CC-50MHz Bandwidth QPSK Mid Channel)



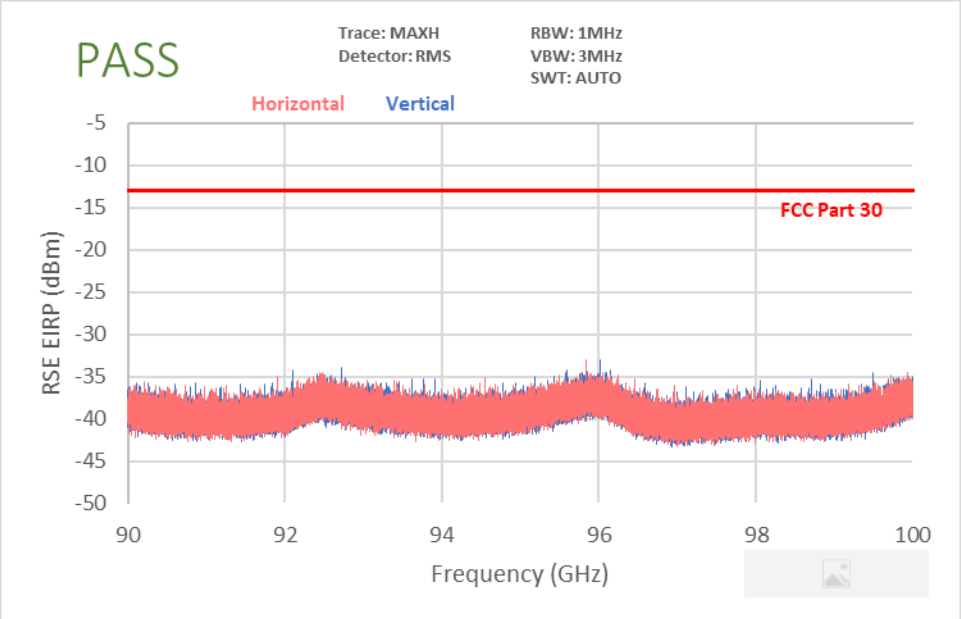
Plot 7-83. Radiated Spurious Plot 90-100 GHz (QTM0 1CC-50MHz Bandwidth QPSK High Channel)

Frequency [MHz]	Detector/Trace	Chan.	Bandwidth (MHz)	Mod.	Beam Polarization	Ant. Pos [H/V]	Ant. Height [cm]	Turn Table Azimuth [degree]	RSE EIRP [dBm]	Limit [dBm]	Margin [dB]
95267.26	Maxh/RMS	Low	50	QPSK	H + V	H	-	-	-33.27	-13.00	-20.27
95392.37	Maxh/RMS	Mid	50	QPSK	H + V	H	-	-	-34.67	-13.00	-21.67
95647.85	Maxh/RMS	High	50	QPSK	H + V	H	-	-	-33.50	-13.00	-20.50
95267.26	Maxh/RMS	Low	50	QPSK	H + V	V	-	-	-34.21	-13.00	-21.21
95392.37	Maxh/RMS	Mid	50	QPSK	H + V	V	-	-	-34.09	-13.00	-21.09
95647.85	Maxh/RMS	High	50	QPSK	H + V	V	-	-	-33.62	-13.00	-20.62

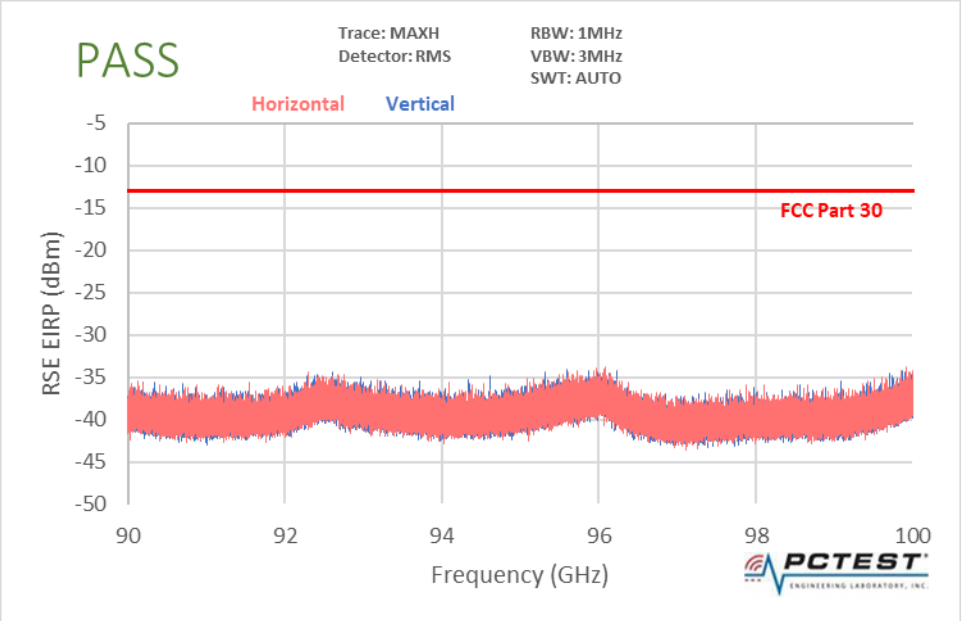
Table 7-19. Spurious Emissions QTM0 (90-100 GHz)



Plot 7-84. Radiated Spurious Plot 90-100 GHz (QTM1 1CC-100MHz Bandwidth QPSK Low Channel)



Plot 7-85. Radiated Spurious Plot 90-100 GHz (QTM1 1CC-100MHz Bandwidth QPSK Mid Channel)



Plot 7-86. Radiated Spurious Plot 90-100 GHz (QTM1 1CC-100MHz Bandwidth QPSK High Channel)

Frequency [MHz]	Detector/Trace	Chan.	Bandwidth (MHz)	Mod.	Beam Polarization	Ant. Pos [H/V]	Ant. Height [cm]	Turn Table Azimuth [degree]	RSE EIRP [dBm]	Limit [dBm]	Margin [dB]
95318.68	Maxh/RMS	Low	100	QPSK	H + V	H	-	-	-34.37	-13.00	-21.37
95647.20	Maxh/RMS	Mid	100	QPSK	H + V	H	-	-	-33.08	-13.00	-20.08
95463.29	Maxh/RMS	High	100	QPSK	H + V	H	-	-	-34.31	-13.00	-21.31
95318.68	Maxh/RMS	Low	100	QPSK	H + V	V	-	-	-33.97	-13.00	-20.97
95647.20	Maxh/RMS	Mid	100	QPSK	H + V	V	-	-	-34.27	-13.00	-21.27
95463.29	Maxh/RMS	High	100	QPSK	H + V	V	-	-	-33.57	-13.00	-20.57

Table 7-20. Spurious Emissions QTM1 (90-100 GHz)

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 3 meters.

Spurious Level [dBµV/m] = Analyzer Level [dBm] + AFCL [dB/m] + 107

= - 56.01 dBm - 22.64 dB/m + 107

= 28.35dBµV/m

RSE EIRP [dBm] = Field Strength + 20Log(D_m) – 104.8

= 28.35dBµV/m + 20Log(3) – 104.8

= -95.06dBm