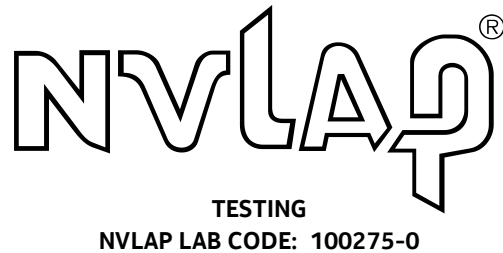


Global Product Compliance Laboratory  
600-700 Mountain Avenue  
Room 5B-108  
Murray Hill, New Jersey 07974-0636 USA



# Title 47 Code of Federal Regulations Test Report

Regulation:

Title 47 CFR FCC Part 96

Client:

NOKIA SOLUTIONS AND NETWORKS, OY

Product Evaluated:

AWHQU AirScale Micro 4T4R n48 40W CBRS 20W

Report Number:

TR-2023-0131-FCC96

Date Issued:

November 7, 2023

This report shall not be reproduced, in whole or in part without the approval of Nokia Global Product Compliance Laboratory.

# Table of Contents

- 1. SYSTEM INFORMATION AND REQUIREMENTS.....4**
  - 1.1 INTRODUCTION ..... 5
  - 1.2 PURPOSE AND SCOPE..... 5
  - 1.3 EUT DETAILS..... 6
  - 1.4 TEST REQUIREMENTS ..... 9
  - 1.5 TEST STANDARDS & MEASUREMENT PROCEDURES ..... 9
  - 1.6 MEASUREMENT UNCERTAINTY ..... 10
  - 1.7 EXECUTIVE SUMMARY ..... 10
  - 1.8 TEST CONFIGURATIONS..... 11
- 2. FCC SECTION 2.1046 - RF POWER OUTPUT AND POWER SPECTRAL DENSITY ..... 12**
  - 2.1 RF POWER OUTPUT ..... 12
  - 2.2 POWER SPECTRAL DENSITY..... 24
  - 2.3 PEAK-TO-AVERAGE POWER RATIO (PAPR)..... 26
- 3. FCC SECTION 2.1047 - MODULATION CHARACTERISTICS ..... 28**
  - 3.1 MODULATION CHARACTERISTICS ..... 28
- 4. FCC SECTION 2.1049 – OCCUPIED BANDWIDTH/EDGE OF BAND EMISSIONS..... 30**
  - 4.1 OCCUPIED BANDWIDTH ..... 30
  - 4.2 EDGE OF BAND EMISSIONS ..... 33
- 5. FCC SECTION 2.1051 - SPURIOUS EMISSIONS AT TRANSMIT ANTENNA PORT ..... 46**
  - 5.1 SECTION 2.1051 SPURIOUS EMISSIONS AT ANTENNA TERMINALS ..... 46
  - 5.2 SPURIOUS EMISSIONS AT ANTENNA TERMINALS RESULTS..... 47
- 6. SECTION 2.1053 - MEASUREMENT REQUIRED: FIELD STRENGTH OF SPURIOUS RADIATION ..... 53**
  - 6.1 SPURIOUS RADIATION AND RADIATED EMISSIONS REQUIREMENTS..... 53
  - 6.2 FIELD STRENGTH OF SPURIOUS RADIATION RESULTS: ..... 53
  - 6.3 TRANSMITTER MEASUREMENTS OF RADIATED SPURIOUS EMISSIONS PLOTS ..... 55
- PHOTOGRAPHS ..... 66**
- 7. NVLAP CERTIFICATE OF ACCREDITATION ..... 71**


**Revisions**

Date	Revision	Section	Change
11/7/2023	0		Initial Release

*Nokia Global Product Compliance Laboratories is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP®) for specific services, listed on the Scope of Accreditation, for: Electromagnetic Compatibility and Telecommunications. This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated January 2009). NVLAP LAB CODE: 100275-0.*

*Nokia Global Product Compliance Laboratory represents to the client that the laboratory’s accreditation or any of its test reports in no way constitutes or implies product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. Government.*

Prepared By:

 11/7/2023  
 Ann Chang  
 Compliance Engineer  
 NVLAP Signatory  
 ann.chang@nokia-bell-labs.com

Reviewed By:

 11/7/2023  
 Steve Gordon  
 EMC Engineer  
 NVLAP Signatory  
 steve.gordon@nokia-bell-labs.com

Approved By:

 11/7/2023  
 Raymond Johnson  
 Technical Manager  
 NVLAP Signatory  
 ray.johnson@nokia-bell-labs.com

## 1. System Information and Requirements

Report copies and other information not contained in this report are held by either the product engineer or in an identified file at the Global Product Compliance Laboratory in Murray-Hill, NJ.

<b>Equipment Under Test (EUT):</b>	AWHQU AirScale Micro 4T4R n48 40W CBRS 20W
<b>Serial Number:</b>	Refer to Section 1.3.3
<b>FCC ID:</b>	2AD8UAWHQU01
<b>Hardware Version:</b>	476212A.101
<b>Software Version:</b>	SBTS23R4
<b>Frequency Range:</b>	3550-3700 MHz
<b>GPCL Project Number:</b>	2023-0131
<b>Manufacturer:</b>	NOKIA SOLUTIONS AND NETWORKS, OY KARAKAARI 7, FI-02610 ESPOO FINLAND
<b>Applicant:</b>	NOKIA SOLUTIONS AND NETWORKS, OY 3201 Olympus Blvd Dallas, Texas 75019 Lee Klindenberg
<b>Test Requirement(s):</b>	Title 47 CFR Part96
<b>Test Standards:</b>	<ul style="list-style-type: none"> <li>• Title 47 CFR Parts 2 and 96</li> <li>• KDB 940660 D01 Certification And Test Procedures For Citizens Broadband Radio Service Devices Authorized Under Part 96, v03, Oct 29, 2020</li> <li>• KDB 971168 D01 Power Measurement License Digital Systems v03r01 April 9, 2018.</li> <li>• KDB 662911 D01 Multiple Transmitter Output v02r01 Oct 2013</li> <li>• ANSI C63.26 (2015)</li> <li>• ANSI C63.4 (2014)</li> </ul>
<b>Measurement Procedure(s):</b>	<ul style="list-style-type: none"> <li>• FCC-IC-OB - GPCL Power Measurement, Occupied Bandwidth &amp; Modulation Test Procedure 6-20-2019</li> <li>• FCC-IC-SE - GPCL Spurious Emissions Test Procedure 6-20-2019</li> </ul>
<b>Test Date(s):</b>	10/12/2023 – 10/30/2023
<b>Test Performed By:</b>	Nokia Global Product Compliance Laboratory 600-700 Mountain Ave. P.O. Box 636 Murray Hill, NJ 07974-0636 Test Site Number: US5302
<b>Product Engineer(s):</b>	Ron Remy
<b>Lead Engineer:</b>	Steve Gordon
<b>Test Engineer (s):</b>	Nilesh Patel, Mike Soli, Norberto Batista
<b>Test Results:</b> The EUT, <i>as tested</i> met the above listed Test Requirements. The decision rule employed is binary (Pass/Fail) based on the measured values without accounting for Measurement Uncertainty or any Guard Band. The measured values obtained during testing were compared to a value given in the referenced regulation or normative standard. Report copies and other information not contained in this report are held by either the product engineer or in an identified file at the Global Product Compliance Laboratory in New Providence, NJ.	

## 1.1 Introduction

This Conformity test report applies to the **AWHQU AirScale Micro 4T4R n48 40W CBRS 20W**, hereinafter referred to as the Equipment Under Test (EUT).

## 1.2 Purpose and Scope

This document is to provide the testing data required for qualifying the EUT in compliance with FCC Part 96 measured in accordance with the procedures set out in Section 2.1033 (c) (14) of the Rules.

The AWHQU is an LTE-TDD (Long Term Evolution-Time Division Duplex) and 5G-NR transceiver which operates in Band 48 Citizens Broadband Radio Service (CBRS) spectrum (3550-3700 MHz).

This Class II permissive change is to demonstrate continued compliance for the **AWHQU AirScale Micro 4T4R n48 40W CBRS 20W** product. For Single carrier operation of 5G-NR 50, 60, 70, and 80 MHz bandwidths and multicarrier 5G NR (up to 3 carriers) and LTE (up to 4 carriers) Concurrent operation with up to 7 total carriers. The following configurations were tested:

Single Carrier: 5G-NR 50, 60, 70, 80 MHz

Multi Carrier: 2CC (5G-NR 70+80), 4CC (5G-NR 50+ LTE 10+10+10), 7CC (5G-NR 10 + 10 + 50 + LTE 10 + 10 + 10 +10) MHz

It supports the external antennas with a minimum gain of 4 dBi and a maximum gain of 18dBi.

The AWHQU was previously certified under FCC ID: 2AD8UAWHQU01.

## 1.3 EUT Details

### 1.3.1 Specifications

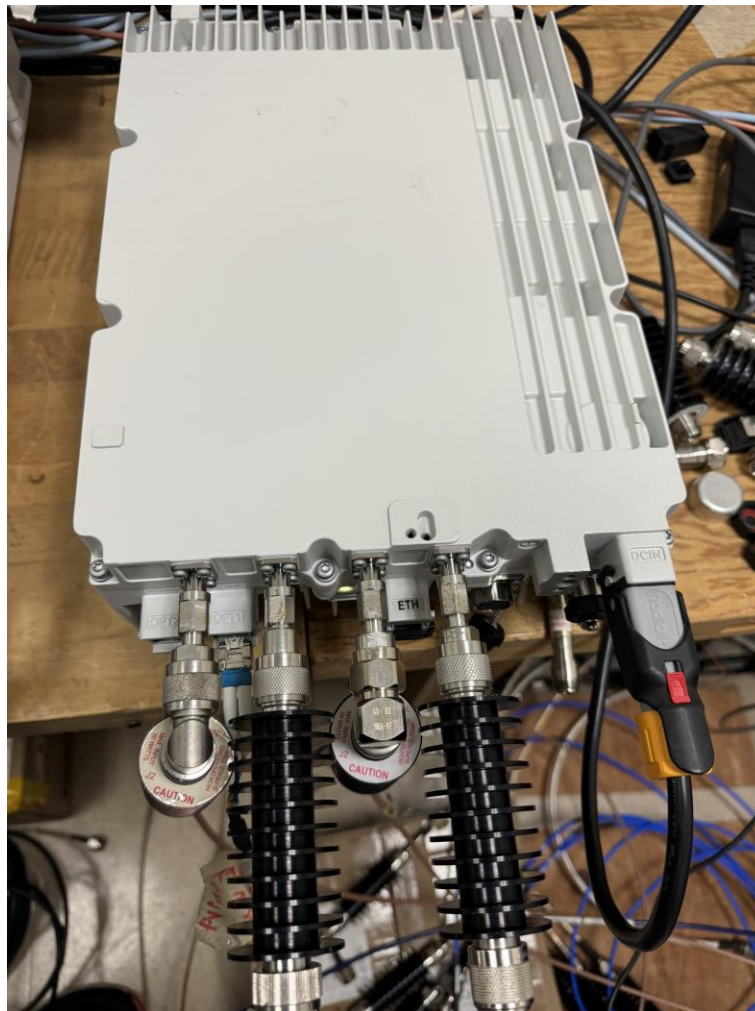
Specification Items	Description
Product Type	AWHQU AirScale Micro 4T4R n48 40W CBRS 20W
Radio Type	Intentional Transceiver
CBSD Category	Category B CBSD Device
Power Type	DC: -48V
Modulation	QPSK, 16QAM, 64QAM and 256QAM
Operating Frequency Range	CBRS (Tx/Rx: 3550-3700 MHz)
Channel Bandwidth	Single Carrier: 5G-NR 50, 60, 70, 80 MHz Multi Carrier: 2CC (5G-NR 70+80), 4CC (5G-NR 50+ LTE 10+10+10), 7CC (5G-NR 10 + 10 + 50 + LTE 10 + 10 + 10 +10) MHz
Max Conducted Power (Rated)	Up to 4x5W (37.0 dBm)
Antenna Gain	Between 4 & 18 dBi Max
Operating Mode	4T4R

### 1.3.2 Supported Antenna

Antenna Vendor	Model	Gain	Minimum Gain evaluated	Conducted Power Adjustment (dBm)
REF Antenna	N/A	4.0	4.0	0
JMA	CX14OMI236-1C	5.0	4.0	-1.0
JMA	CX16OMI236-1C	5.0	4.0	-1.0
JMA	CX16OMI224-1H	6.1	4.0	-2.1
JMA	CX16OMI218-1P	5.3	4.0	-1.3
JMA	DX10FRO260-00 or 06	14.8	4.0	-10.8
JMA	DX12FRO260-20 or 26	15.5	4.0	-11.5
Amphenol	C2U3MT360X06Fxys0	6.6	4.0	-2.6
Amphenol	2C2U3MT360X06Fxys0	5.3	4.0	-1.3
Amphenol	4U4MT360X06Fxys0	5.7	4.0	-1.7
Amphenol	2C4U3MT360X06Fwxys0	5.9	4.0	-1.9
Amphenol	2U3MX065X06Fxys0	11.6	4.0	-7.6
Amphenol	4U4MX065X06Fxys0	11.3	4.0	-7.3
Amphenol	2C4U3MX065X06Fwxys0	8.9	4.0	-4.9
Kathrein	84010555 / 84010556	7.0	4.0	-3.0
Kathrein	84010557 / 84010558	5.8	4.0	-1.8
Kathrein	84010603 / 84010604	6.5	4.0	-2.5
Kathrein	84010564	11.0	4.0	-7.0
CommScope	VVSSP-360S-F	4.9	4.0	-0.9
CommScope	NNVVSSP-360S-FM 5.7	5.7	4.0	-1.7
CommScope	VVSSP-65S-R1BV2 (Panel)	10.4	4.0	-6.4
Alpha Wireless	AW3023-T0-N	18.0	4.0	-14.0
Alpha Wireless	AW3499	6.5	4.0	-2.5
Nokia	AAQA	12.0	4.0	-8.0
Nokia	FA2QD	6.0	4.0	-2.0

### 1.3.3 Photographs

Serial Number





## 1.4 Test Requirements

Each required measurement is listed below:

47 CFR FCC Sections	Description of Tests	Test Required
2.1046, 96.41 (b) 96.41(g)	RF Power Output (b) Power Limits, EIRP, PSD (g) Peak-to-Average Power Ratio	Yes
2.1047, 96.41(a)	Modulation Characteristics	Yes
2.1049, 96.41(e)(2)(3)	(a) Occupied Bandwidth (b) Out-of-Band Emissions	Yes
2.1051, 96.41(e)	Spurious Emissions at Antenna Terminals	Yes
2.1053, 96.41(e)(2)(3)	Field Strength of Spurious Radiation	Yes
2.1055, 96.41(e)(2)(3)	Measurement of Frequency Stability	No*

\*Previously Tested and Passed; Refer to GPCL Project 2023-0004.

## 1.5 Test Standards & Measurement Procedures

### 1.5.1 Test Standards

- Title 47 Code of Federal Regulations, Federal Communications Commission Part 2.
- Title 47 Code of Federal Regulations, Federal Communications Commission Part 96.
- KDB 940660 D01 Certification And Test Procedures For Citizens Broadband Radio Service Devices Authorized Under Part 96, v03, Oct 29, 2020
- KDB 971168 D01 Power Measurement License Digital Systems v03r01 April 9, 2018.
- KDB 662911 D01 Multiple Transmitter Output v02r01 Oct 2013
- ANSI C63.26-2015, American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services
- ANSI C63.4-2014, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz

### 1.5.2 Measurement Procedures

- FCC-IC-OB - GPCL Power Measurement, Occupied Bandwidth & Modulation Test Procedure 6-20-2019
- FCC-IC-SE - GPCL Spurious Emissions Test Procedure 6-20-2019

### 1.6 Measurement Uncertainty

The results of the calculations to estimate uncertainties for the several test methods and standards are shown in the Table below. These are the worst-case values.

**Worst-Case Estimated Measurement Uncertainties**

Standard, Method or Procedure	Condition	Frequency MHz	Expanded Uncertainty (k=2)
a. Classical Emissions, (e.g., ANSI C63.4, CISPR 11, 14, 22, etc., using ESHS 30,	Conducted Emissions	0.009 - 30	±3.5 dB
	Radiated Emissions (AR-6 Semi-Anechoic Chamber)	30 MHz – 200MHz H 30 MHz – 200 MHz V 200 MHz – 1000 MHz H 200 MHz – 1000 MHz V 1 GHz - 18 GHz	±5.1 dB ±5.1 dB ±4.7 dB ±4.7 dB ±3.3 dB

Antenna Port Test	Signal Bandwidth	Frequency Range	Expanded Uncertainty (k=2), Amplitude
Occupied Bandwidth, Edge of Band, Conducted Spurious Emissions	10 Hz	9 kHz to 20 MHz	1.78 dB
	100 Hz	20 MHz to 1 GHz	
	10 kHz to 1 MHz	1 GHz to 10 GHz	
	1MHz	10 GHz to 40 GHz:	
RF Power	10 Hz to 20 MHz	50 MHz to 18 GHz	0.5 dB

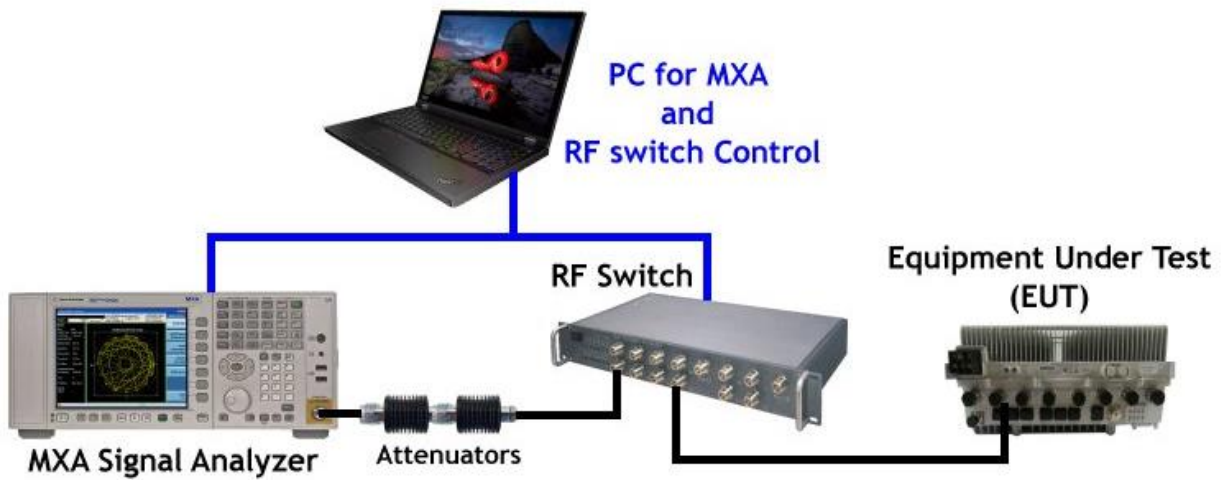
### 1.7 Executive Summary

Requirement 47 CFR FCC Parts 2 and 96	Description of Tests	Result
2.1046, 96.41 (b) 96.41(g)	RF Power Output (b) Power Limits, EIRP, PSD (g) Peak-to-Average Power Ratio	COMPLIES
2.1047, 96.41(a)	Modulation Characteristics	COMPLIES
2.1049, 96.41(e)(2)(3)	(a) Occupied Bandwidth (b) Out-of-Band Emissions	COMPLIES
2.1051, 96.41(e)	Spurious Emissions at Antenna Terminals	COMPLIES
2.1053, 96.41(e)	Field Strength of Spurious Radiation	COMPLIES
2.1055	Measurement of Frequency Stability	COMPLIES

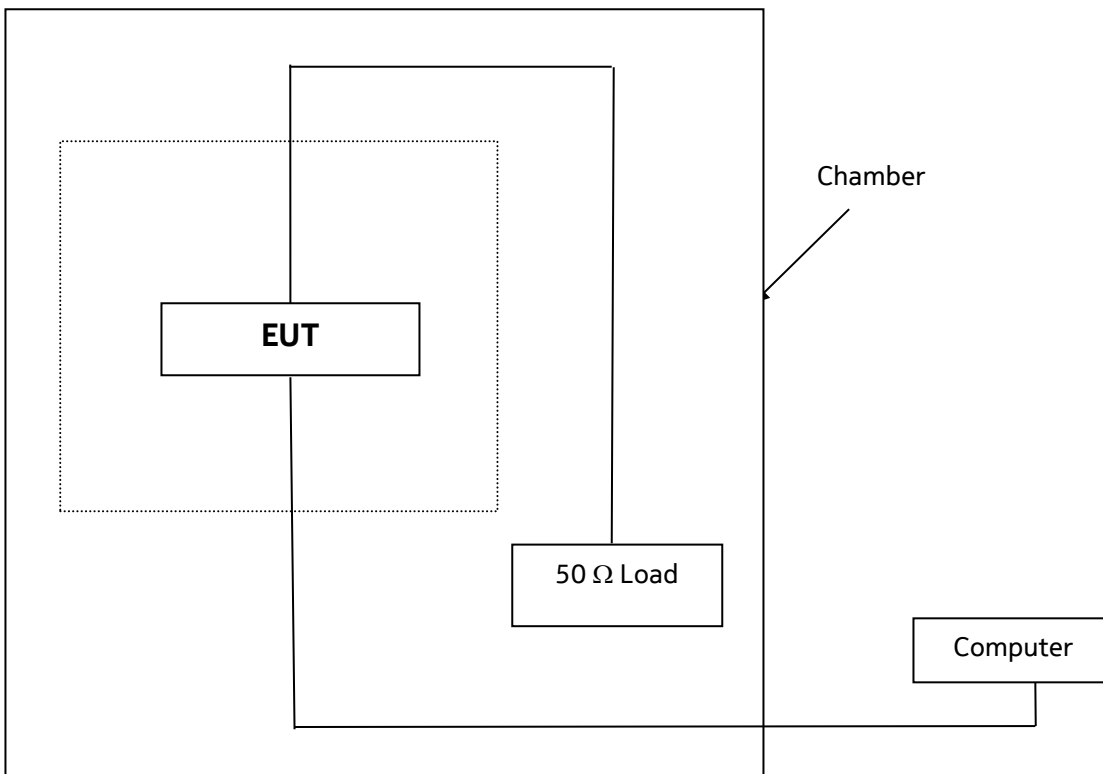
1. **COMPLIES** - Passed all applicable tests.
2. **N/A** – Not Applicable.
3. **NT** – Not Tested.

### 1.8 Test Configurations

Test Setup for all Antenna Port Measurements



Test Setup for Radiated Measurement



## 2. FCC Section 2.1046 - RF Power Output and Power Spectral Density

### 2.1 RF Power Output

#### 2.1.1 Limits

The FCC Part 96.41 requirement for Category B CBSD is that the Output Power of the EUT shall not exceed 47 dBm/10MHz EIRP.

#### 2.1.2 Results

NOTE: Only a sample of the plots are used in this report. The full suite of raw data resides at the MH, New Jersey location.

The maximum RF conducted output power and EIRP for each configuration/operation mode using the minimum and maximum antenna gain are tabulated below and the results are all below FCC Part 96.41 maximum EIRP limit for Category B CBSD. Additional antenna types used with the product require conducted power to be reduced below maximum demonstrated for 4 dBi gain antenna by the difference in gain of that antenna minus 4 dBi. The results have demonstrated the compliance with FCC RF EIRP power output requirement.

**Maximum Effective Isotropic Radiated Power (EIRP) per 10MHz Compliance**

Signal BW (MHz)	Power Level (dBm)	TM	Modulation	Channel Frequency (MHz)	Max Total Power*	Max Total Power Correction	Antenna Gain	Total Product EIRP	47 dBm/10 MHz EIRP Compliance
					(dBm) / BW	(dBm/10MHz)	(dBi)	(dBm/10MHz)	
50	29	3.2	QPSK/16QAM	3624	34.6	27.61	18	45.61	Pass
50	37	3.1	64QAM	3575	43.34	36.35	4	40.35	Pass
60	29	3.1	64QAM	3580	35.43	27.65	18	45.65	Pass
60	37	3.2	QPSK/16QAM	3624	43.25	35.47	4	39.47	Pass
70	29	3.1	64QAM	3585	35.14	26.69	18	44.69	Pass
70	37	3.1	64QAM	3585	42.75	34.30	4	38.30	Pass
80	29	3.1	64QAM	3590	35.14	26.11	18	44.11	Pass
80	37	3.1	64QAM	3590	42.71	33.68	4	37.68	Pass
70+80	37	3.1a	256QAM	3585+3660	42.58	30.82	4	34.82	Pass
50 + 10 +10 +10	37	3.1a	256QAM	3575+3675+3685+3695	43.19	34.16	4	38.16	Pass
10 + 10 + 50 + 10 + 10 + 10 +10	37	3.1a	256QAM	3555+3564+3594+3665+3675+3695+3695	43.25	32.84	4	36.84	Pass

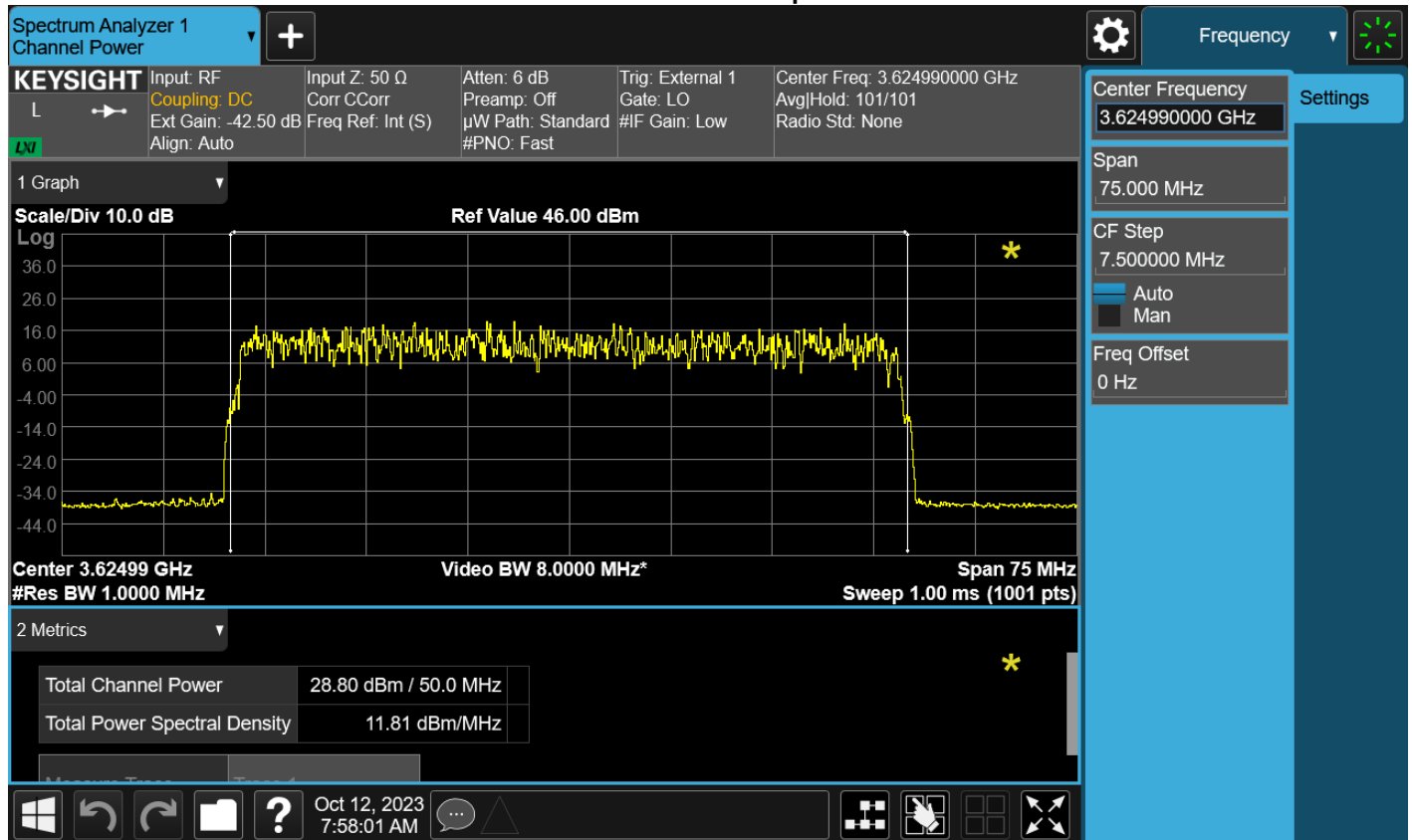
The conducted RF output power results measured for all configurations and operation modes supported are presented in the following sections. \*Value from tables 2.1 – 2.11 after summing of all ports measured.

2.1.2.1 5G-NR, 50 MHz

Table 2.1 RF Power Output Results – 29dBm

Channel Power - Signal BW 50MHz					
Test Model 3.1 Modulation 64QAM Channel Frequency 3575MHz		Test Model 3.2 Modulation QPSK/16QAM Channel Frequency 3624MHz		Test Model 3.1a Modulation 256QAM Channel Frequency 3675MHz	
TX Port	(dBm)	TX Port	(dBm)	TX Port	(dBm)
1	27.83	1	28.71	1	27.50
2	27.66	2	28.49	2	27.28
3	27.90	3	<b>28.80</b>	3	27.58
4	27.46	4	28.32	4	27.27
Total Power (dBm)	33.74	Total Power (dBm)	34.60	Total Power (dBm)	33.43
Total Power (W)	2.363	Total Power (W)	2.887	Total Power (W)	2.203

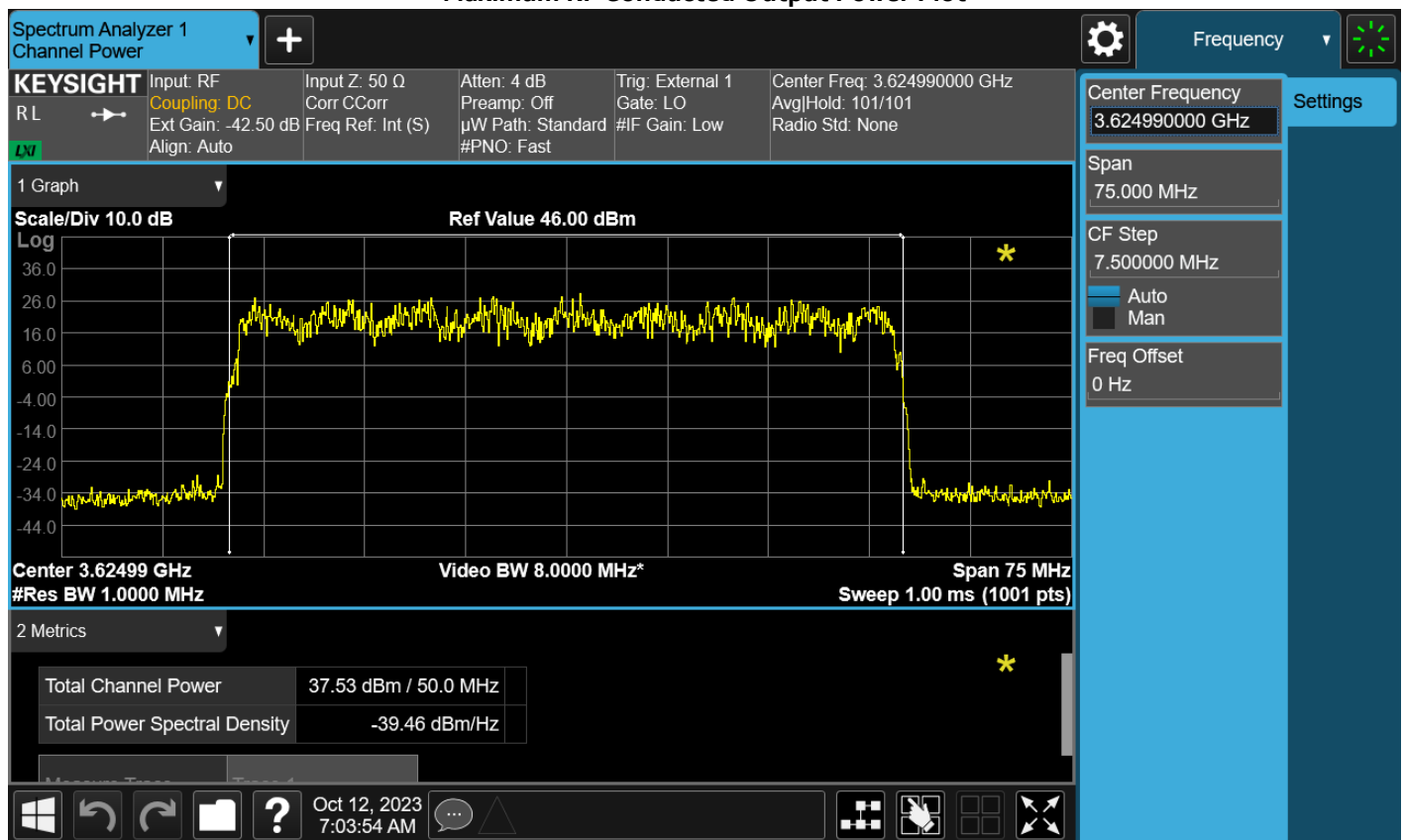
Maximum RF Conducted Output Power Plot



**Table 2.2 RF Power Output Results – 37dBm**

Channel Power - Signal BW 50MHz					
Test Model 3.1 Modulation 64QAM Channel Frequency 3575MHz		Test Model 3.2 Modulation QPSK/16QAM Channel Frequency 3624MHz		Test Model 3.1a Modulation 256QAM Channel Frequency 3675MHz	
TX Port	(dBm)	TX Port	(dBm)	TX Port	(dBm)
1	37.39	1	37.43	1	36.51
2	37.24	2	37.21	2	36.28
3	37.47	3	<b>37.53</b>	3	36.61
4	37.19	4	37.10	4	36.26
Total Power (dBm)	43.34	Total Power (dBm)	43.34	Total Power (dBm)	42.44
Total Power (W)	21.600	Total Power (W)	21.584	Total Power (W)	17.531

**Maximum RF Conducted Output Power Plot**

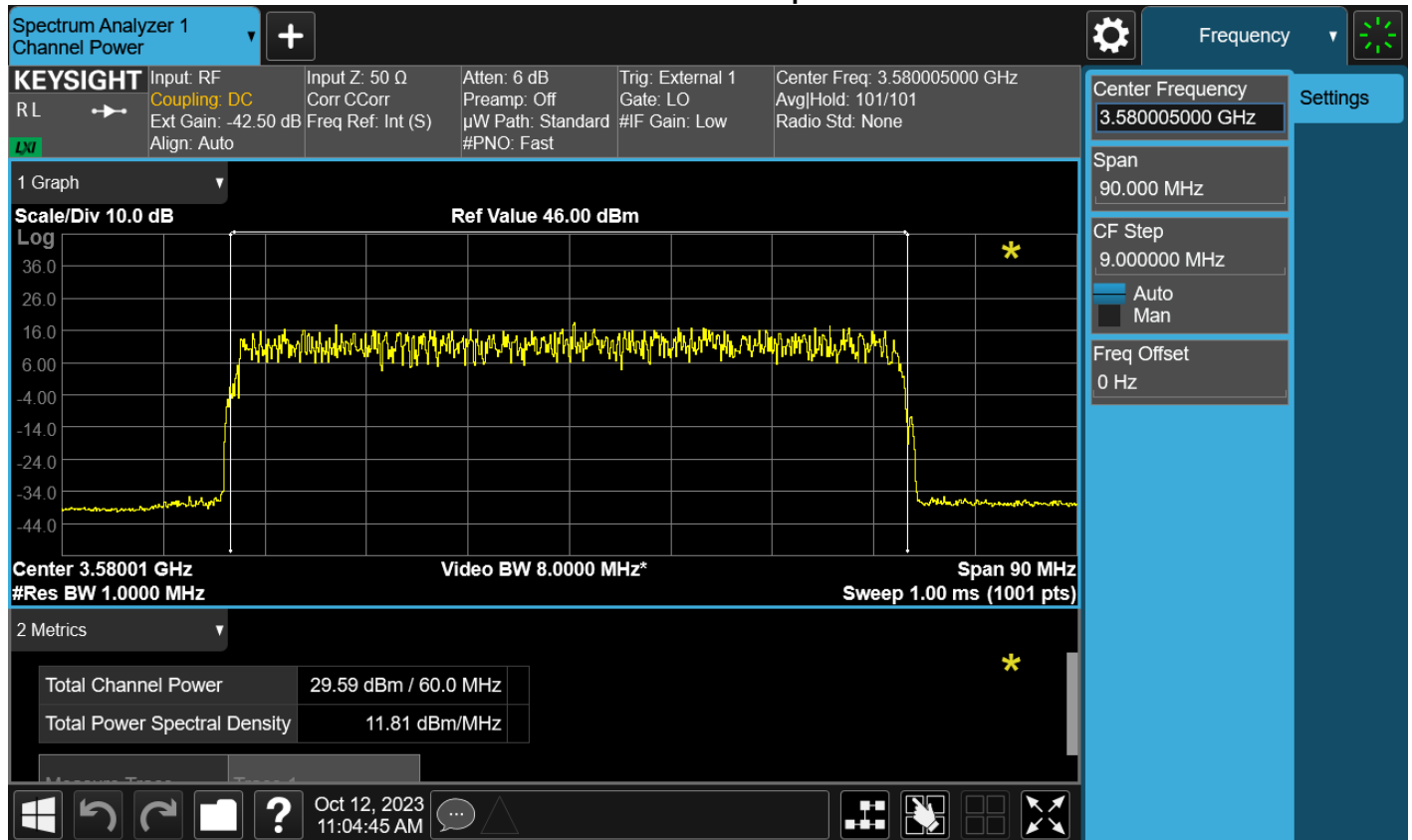


2.1.2.2 5G-NR, 60 MHz

Table 2.3 RF Power Output Results – 29dBm

Channel Power - Signal BW 60MHz					
Test Model 3.1 Modulation 64QAM Channel Frequency 3580MHz		Test Model 3.2 Modulation QPSK/16QAM Channel Frequency 3624MHz		Test Model 3.1a Modulation 256QAM Channel Frequency 3669MHz	
TX Port	(dBm)	TX Port	(dBm)	TX Port	(dBm)
1	29.51	1	28.60	1	28.49
2	29.36	2	28.38	2	28.28
3	<b>29.59</b>	3	28.68	3	28.59
4	29.15	4	28.12	4	28.03
Total Power (dBm)	35.43	Total Power (dBm)	34.47	Total Power (dBm)	34.37
Total Power (W)	3.488	Total Power (W)	2.799	Total Power (W)	2.737

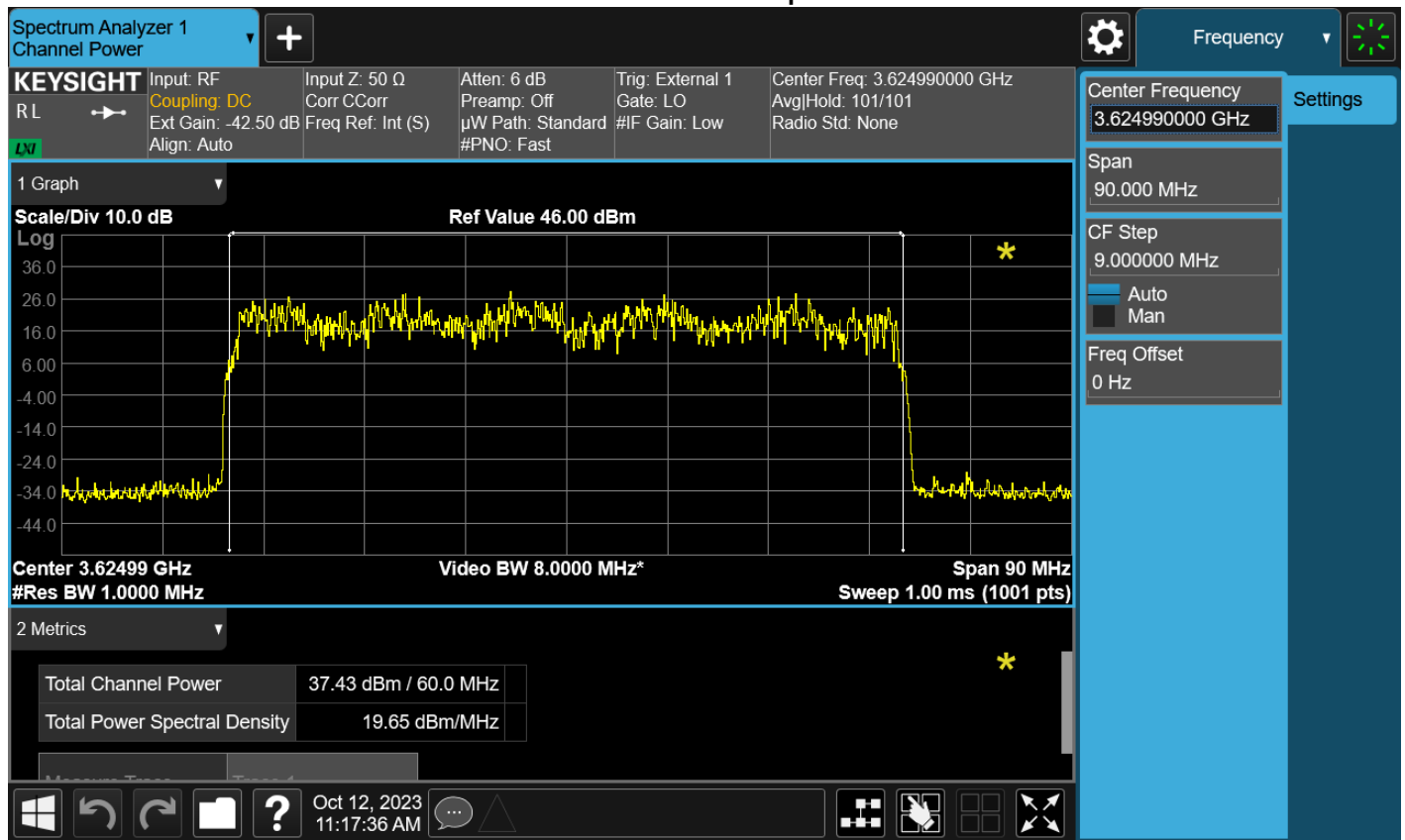
Maximum RF Conducted Output Power Plot



**Table 2.4 RF Power Output Results - 37dBm**

Channel Power - Signal BW 60MHz					
Test Model 3.1 Modulation 64QAM Channel Frequency 3580MHz		Test Model 3.2 Modulation QPSK/16QAM Channel Frequency 3624MHz		Test Model 3.1a Modulation 256QAM Channel Frequency 3669MHz	
TX Port	(dBm)	TX Port	(dBm)	TX Port	(dBm)
1	36.67	1	37.34	1	36.53
2	36.51	2	37.13	2	36.30
3	36.74	3	<b>37.43</b>	3	36.62
4	36.50	4	37.02	4	36.21
Total Power (dBm)	42.63	Total Power (dBm)	43.25	Total Power (dBm)	42.44
Total Power (W)	18.309	Total Power (W)	21.152	Total Power (W)	17.533

**Maximum RF Conducted Output Power Plot**



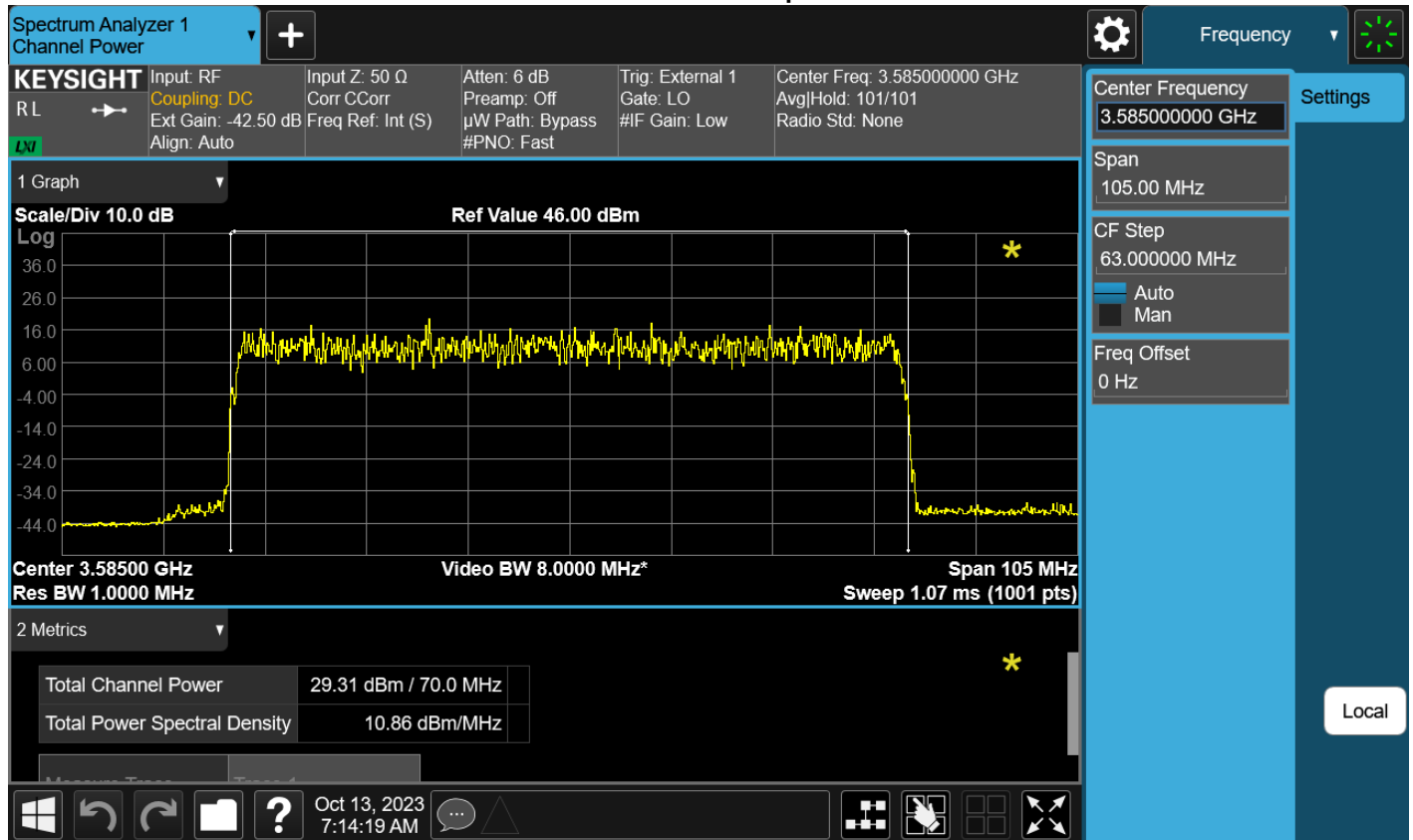


2.1.2.3 5G-NR, 70 MHz

Table 2.5 RF Power Output Results – 29dBm

Channel Power - Signal BW 70MHz					
Test Model 3.1 Modulation 64QAM Channel Frequency 3585MHz		Test Model 3.2 Modulation QPSK/16QAM Channel Frequency 3624MHz		Test Model 3.1a Modulation 256QAM Channel Frequency 3664MHz	
TX Port	(dBm)	TX Port	(dBm)	TX Port	(dBm)
1	29.23	1	29.11	1	29.04
2	29.06	2	28.89	2	28.83
3	<b>29.31</b>	3	29.19	3	29.14
4	28.86	4	28.74	4	28.66
Total Power (dBm)	35.14	Total Power (dBm)	35.01	Total Power (dBm)	34.94
Total Power (W)	3.265	Total Power (W)	3.167	Total Power (W)	3.120

Maximum RF Conducted Output Power Plots



**Table 2.6 RF Power Output Results – 37dBm**

Channel Power - Signal BW 70MHz					
Test Model 3.1 Modulation 64QAM Channel Frequency 3585MHz		Test Model 3.2 Modulation QPSK/16QAM Channel Frequency 3624MHz		Test Model 3.1a Modulation 256QAM Channel Frequency 3664MHz	
TX Port	(dBm)	TX Port	(dBm)	TX Port	(dBm)
1	36.78	1	36.42	1	36.67
2	36.62	2	36.21	2	36.44
3	<b>36.88</b>	3	36.50	3	36.77
4	36.62	4	36.20	4	36.40
Total Power (dBm)	42.75	Total Power (dBm)	42.36	Total Power (dBm)	42.59
Total Power (W)	18.823	Total Power (W)	17.199	Total Power (W)	18.17

**Maximum RF Conducted Output Power Plots**

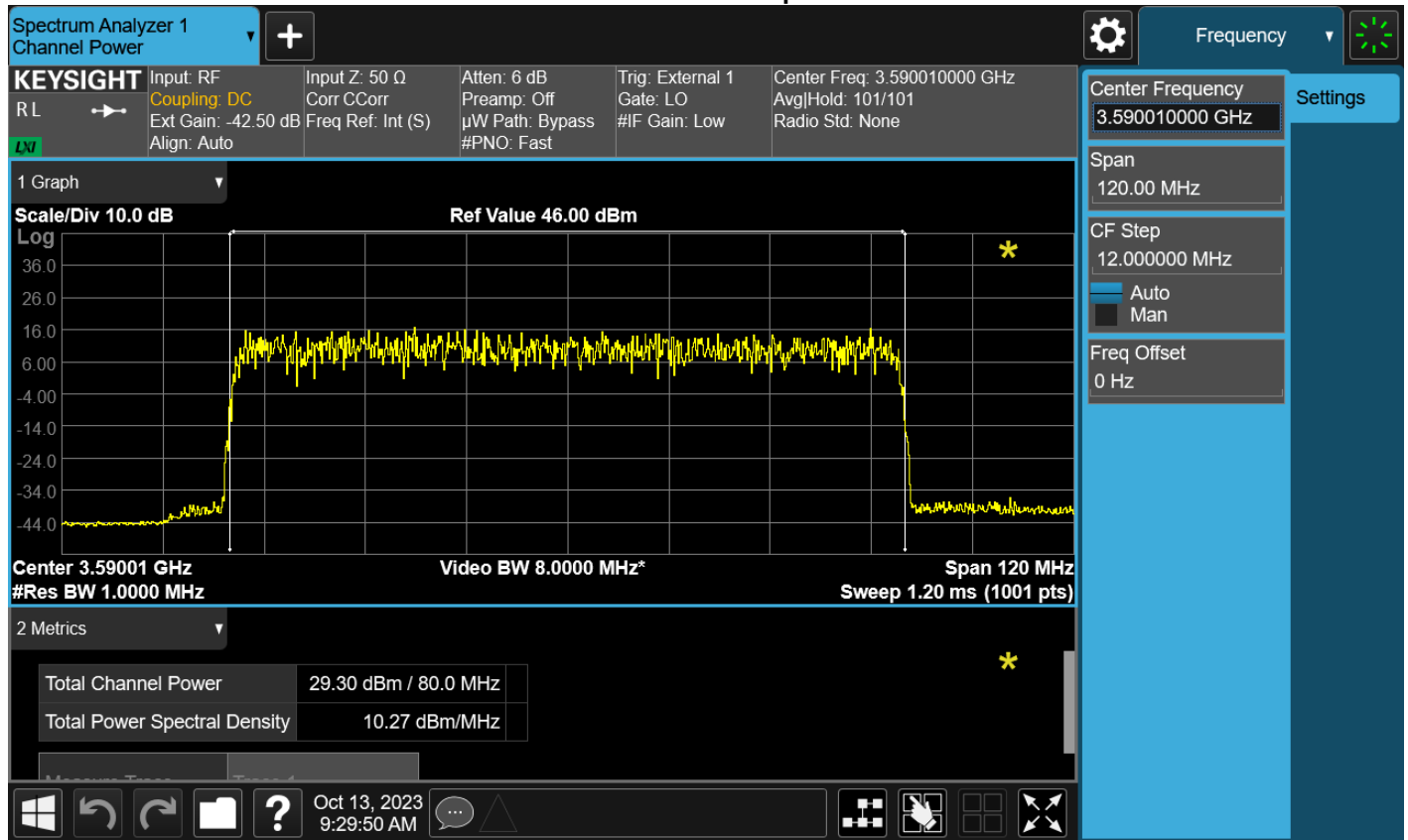


2.1.2.4 5G-NR, 80 MHz

Table 2.7 RF Power Output Results – 29dBm

Channel Power - Signal BW 80MHz					
Test Model 3.1 Modulation 64QAM Channel Frequency 3590MHz		Test Model 3.2 Modulation QPSK/16QAM Channel Frequency 3624MHz		Test Model 3.1a Modulation 256QAM Channel Frequency 3660MHz	
TX Port	(dBm)	TX Port	(dBm)	TX Port	(dBm)
1	29.23	1	29.13	1	29.03
2	29.05	2	28.91	2	28.81
3	<b>29.30</b>	3	29.19	3	29.12
4	28.87	4	28.67	4	28.54
Total Power (dBm)	35.14	Total Power (dBm)	35.00	Total Power (dBm)	34.90
Total Power (W)	3.263	Total Power (W)	3.162	Total Power (W)	3.091

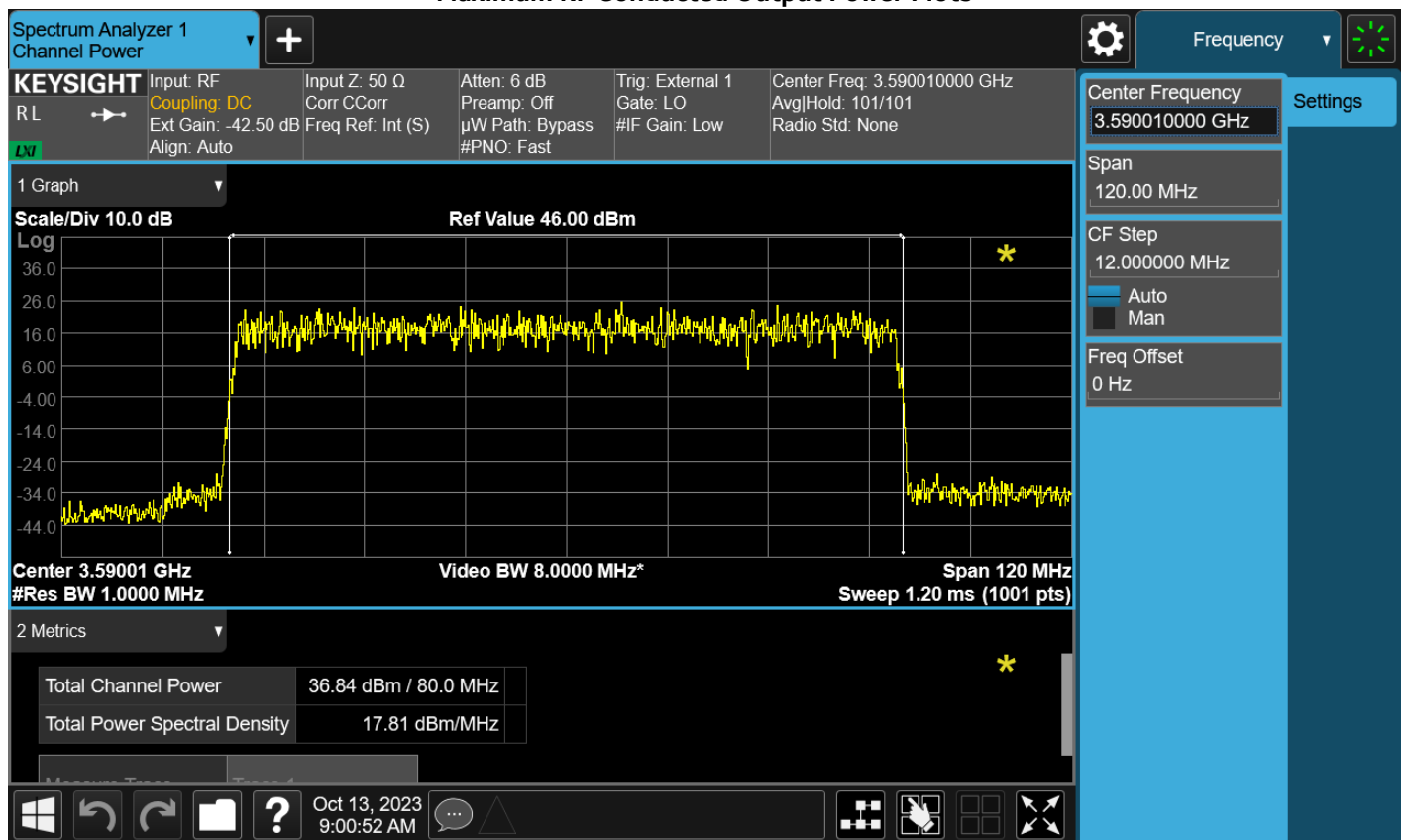
Maximum RF Conducted Output Power Plots



**Table 2.8 RF Power Output Results – 37dBm**

Channel Power - Signal BW 80MHz					
Test Model 3.1 Modulation 64QAM Channel Frequency 3590MHz		Test Model 3.2 Modulation QPSK/16QAM Channel Frequency 3624MHz		Test Model 3.1a Modulation 256QAM Channel Frequency 3660MHz	
TX Port	(dBm)	TX Port	(dBm)	TX Port	(dBm)
1	36.77	1	36.59	1	36.51
2	36.60	2	36.39	2	36.30
3	<b>36.84</b>	3	36.67	3	36.61
4	36.56	4	36.33	4	36.14
Total Power (dBm)	42.71	Total Power (dBm)	42.52	Total Power (dBm)	42.41
Total Power (W)	18.683	Total Power (W)	17.856	Total Power (W)	17.435

**Maximum RF Conducted Output Power Plots**

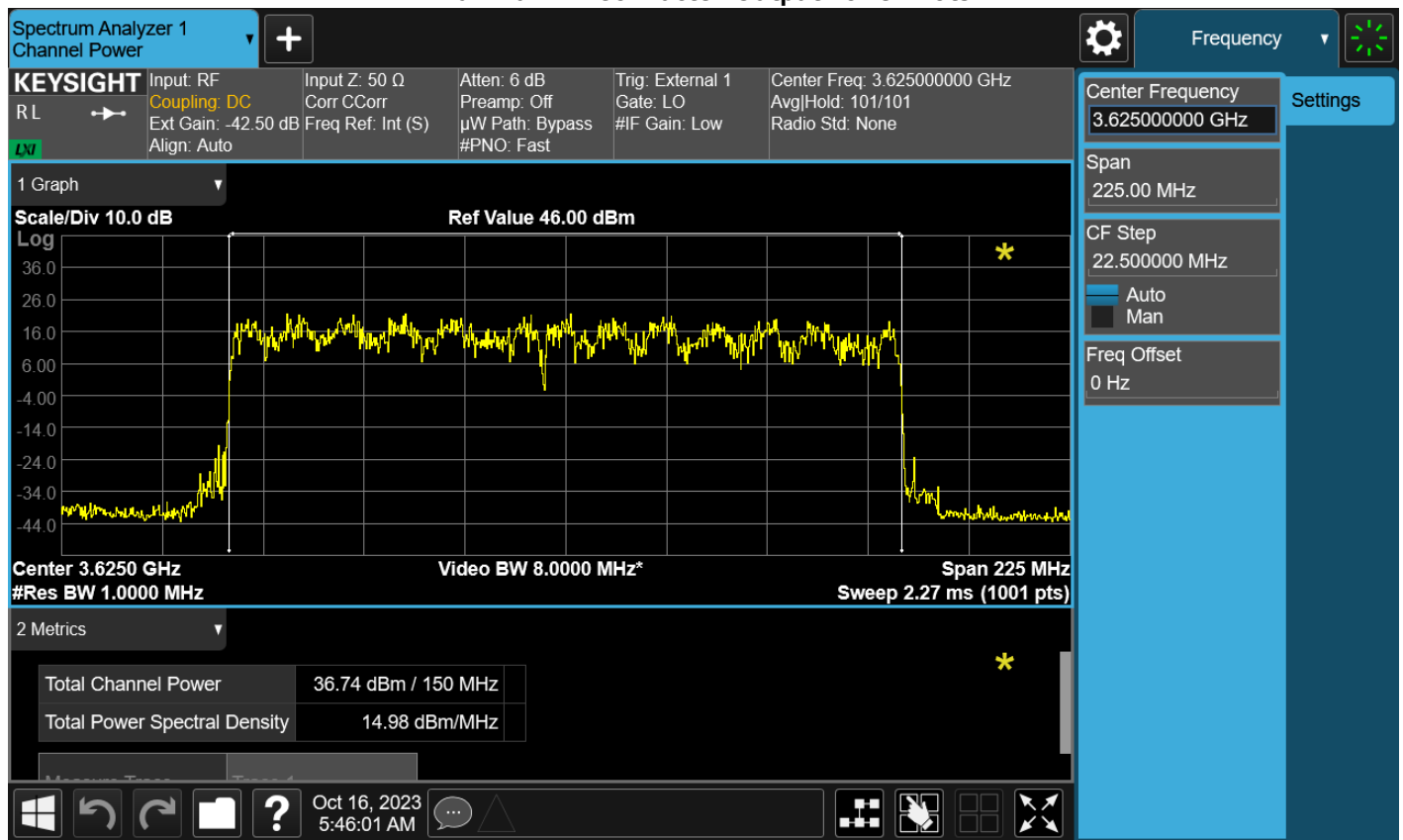


2.1.2.5 5G-NR, 2CC, 70+ 80 MHz

Table 2.9 RF Power Output Results – 37dBm

Test Model 3.1a Modulation 256QAM Channel Frequency 3585 + 3660 MHz BW 70 +80 MHz	
TX	Channel Power (dBm/BW)
1	36.63
2	36.46
3	<b>36.74</b>
4	36.39
Total Power (dBm)	42.58
Total Power (W)	18.104

Maximum RF Conducted Output Power Plots

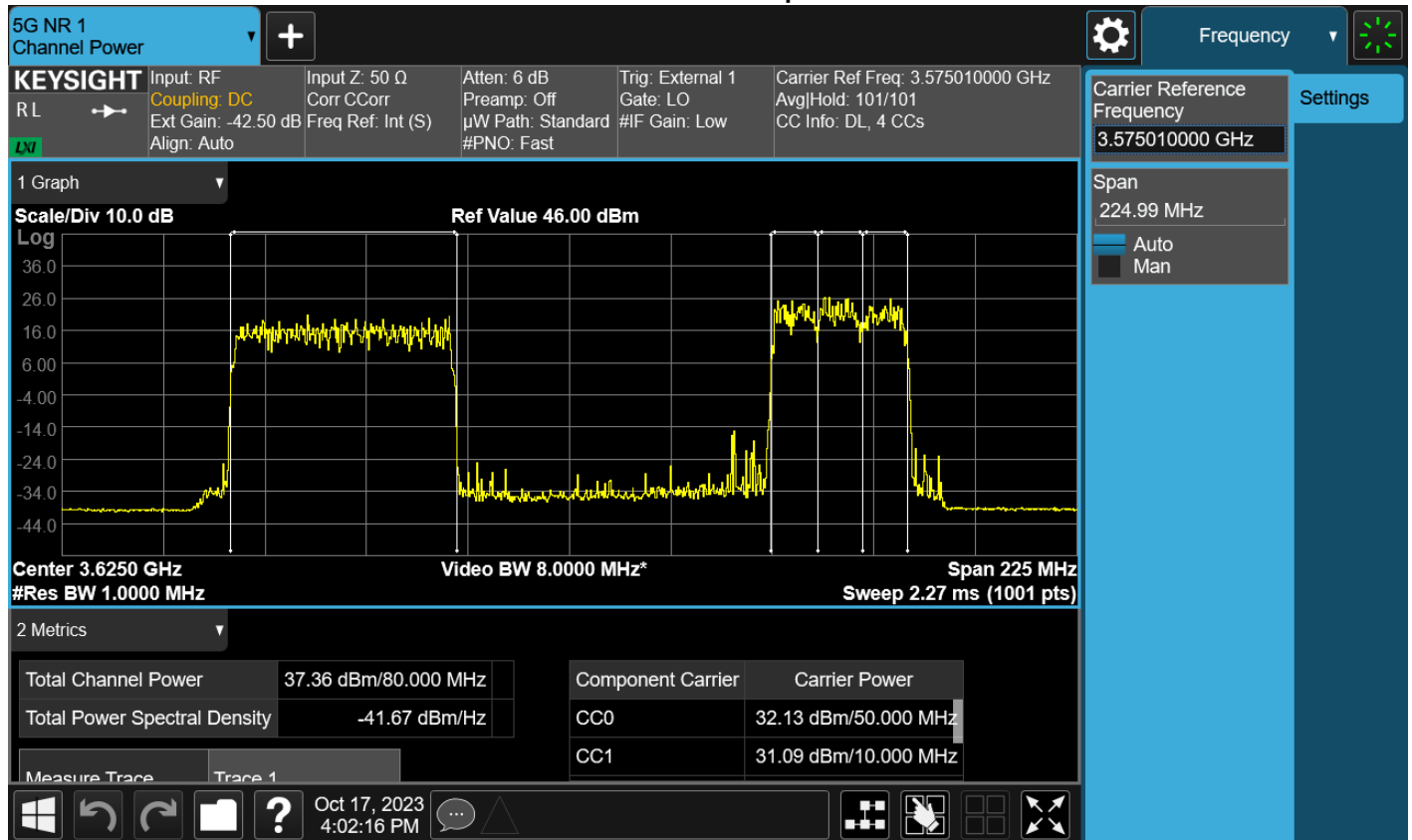


2.1.2.6 5G-NR/LTE Concurrent, 4CC, 50+ 10 + 10 + 10 MHz

Table 2.10 RF Power Output Results – 37dBm

Test Model 3.1a Modulation 256QAM Channel Frequency 3575+3675+3685+3695 MHz BW 50 + 10 +10 +10 MHz	
TX	Channel Power (dBm/BW)
1	37.25
2	37.05
3	37.36
4	37.00
Total Power (dBm)	43.19
Total Power (W)	20.835

Maximum RF Conducted Output Power Plots

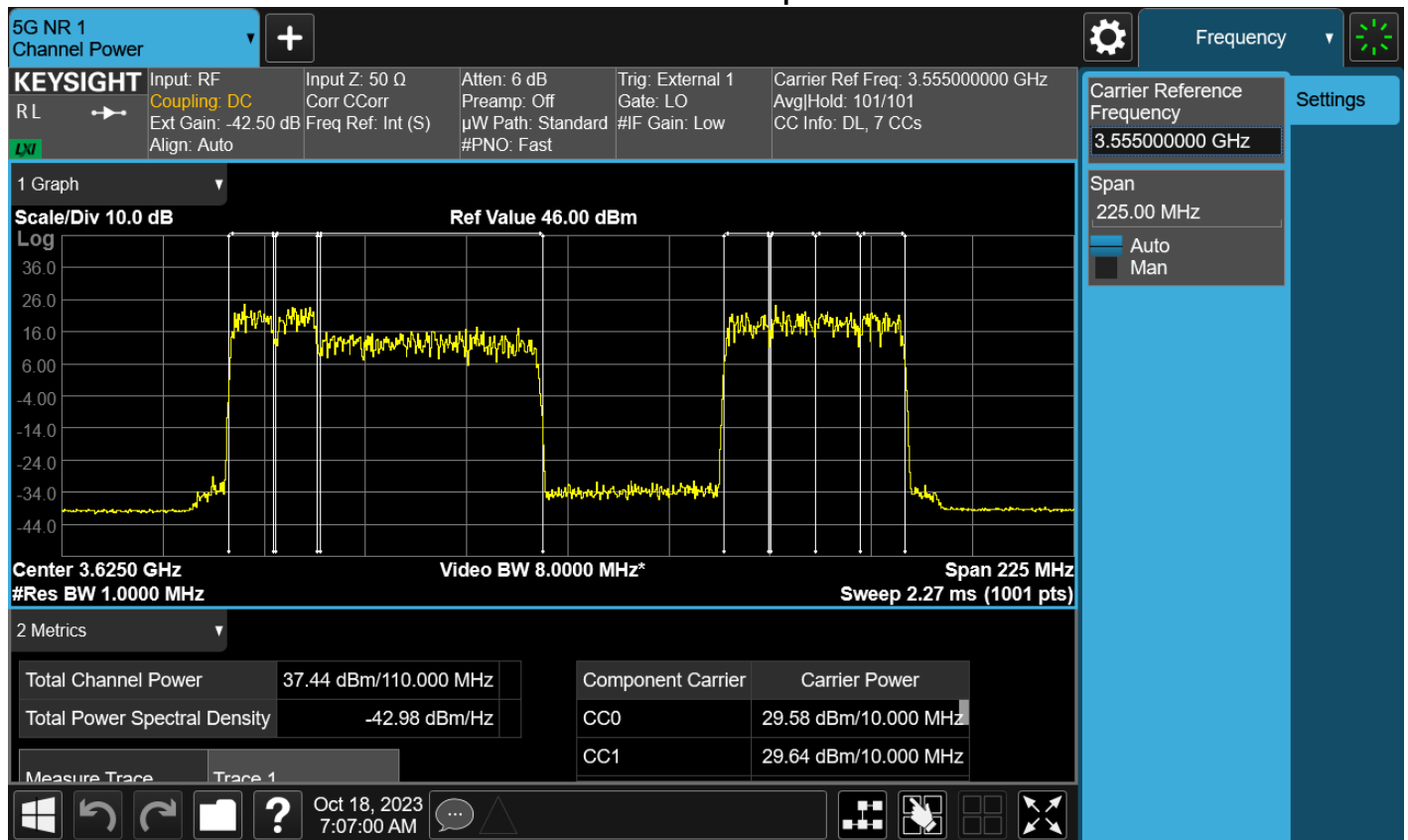


2.1.2.7 5G-NR/LTE Concurrent, 7CC, 10 + 10 + 50+ 10 + 10 + 10 +10 MHz

Table 2.11 RF Power Output Results – 37dBm

Test Model 3.1 Modulation 64QAM Channel Frequency 3555+3564+3594+3665+3675+3695+3695 MHz BW 10 + 10 + 50 + 10 + 10 + 10 +10MHz	
TX	Channel Power (dBm/BW)
1	37.31
2	37.14
3	<b>37.44</b>
4	37.02
Total Power (dBm)	43.25
Total Power (W)	21.140

Maximum RF Conducted Output Power Plots



## 2.2 Power Spectral Density

### 2.2.1 Limits

The FCC Part 96.41 requirement for Category B CBSD is that the Power Spectral Density (PSD) of the EUT shall not exceed 37 dBm/MHz.

### 2.2.2 Results

The peak average PSD of the EUT was measured per ANSI C63.26 methods and procedures and with the PSD Measurement feature of the MXA Analyzer. The PSD was measured when the product was set to each power setting for the bandwidths being measured at the antenna transmitting terminals. The signal bandwidths, modulations and transmit channels identified in Table below were evaluated. The measured power spectral density level was documented in the table below.

The Maximum Average PSD Values are bolded in each Table.

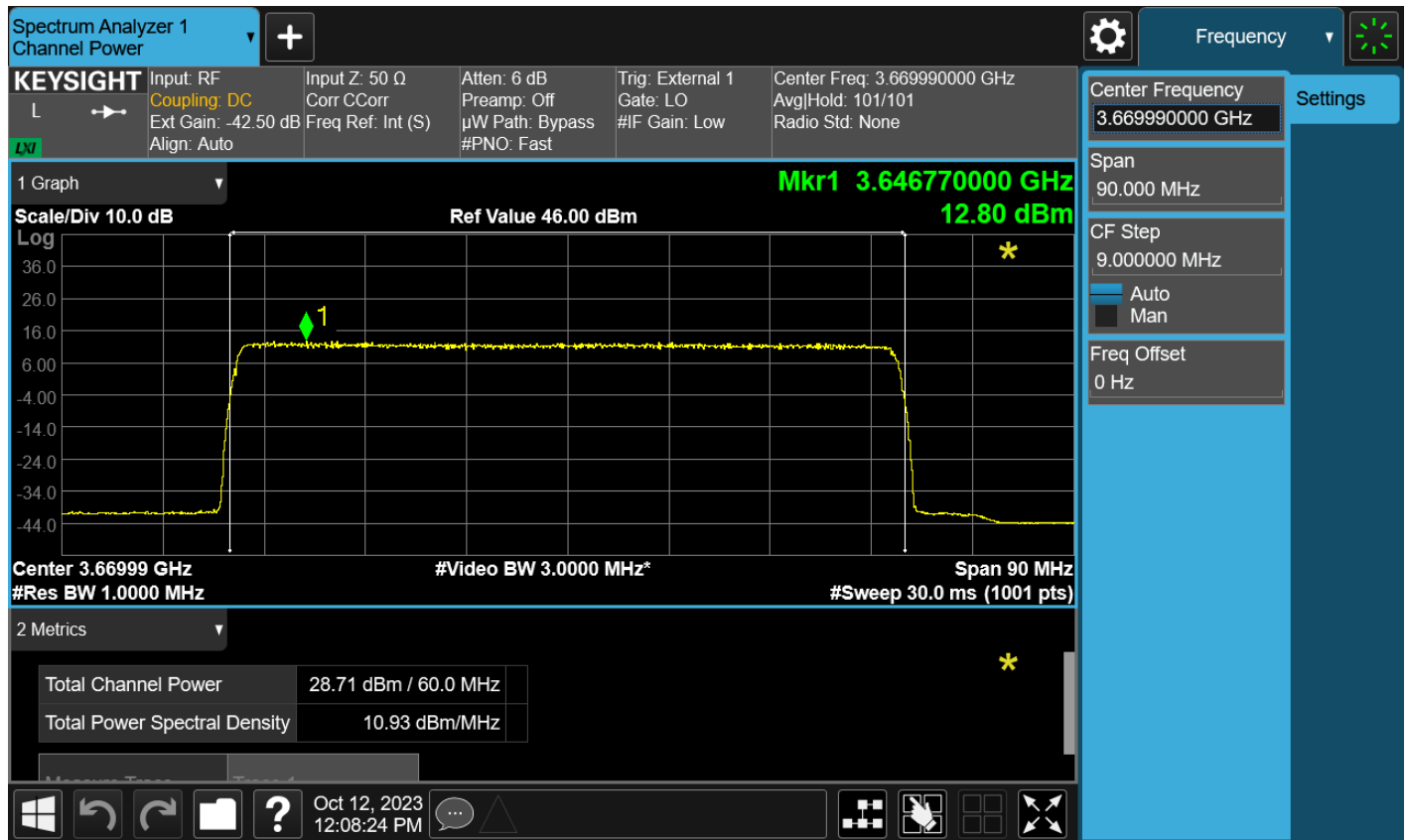
**Table 2.12 Power Spectral Density Results**

Signal BW (MHz)	Power Level (dBm)	TM	Modulation	Channel Frequency (MHz)	TX	Peak PSD (1Port) dBm/1MHz	Peak PSD (4Port) dBm/1MHz	Antenna Gain	Total PSD dBm/1MHz	37 dBm/MHz PSD Compliance
50	29	1.1	QPSK	3575	3	12.57	18.59	18	36.59	Pass
50	29	1.1	QPSK	3624	3	12.29	18.31	18	36.31	Pass
50	29	1.1	QPSK	3675	3	12.33	18.35	18	36.35	Pass
50	37	1.1	QPSK	3575	3	21.46	27.48	4	31.48	Pass
50	37	1.1	QPSK	3624	3	21.17	27.19	4	31.19	Pass
50	37	1.1	QPSK	3675	3	21.15	27.17	4	31.17	Pass
60	29	1.1	QPSK	3580	3	12.53	18.55	18	36.55	Pass
60	29	1.1	QPSK	3624	3	12.63	18.65	18	36.65	Pass
60	29	1.1	QPSK	3669	3	12.80	18.82	18	<b>36.82</b>	Pass
60	37	1.1	QPSK	3580	3	20.44	26.46	4	30.46	Pass
60	37	1.1	QPSK	3624	3	20.52	26.54	4	30.54	Pass
60	37	1.1	QPSK	3669	3	20.65	26.67	4	30.67	Pass
70	29	1.1	QPSK	3585	3	12.45	18.47	18	36.47	Pass
70	29	1.1	QPSK	3624	3	12.52	18.54	18	36.54	Pass
70	29	1.1	QPSK	3664	3	12.47	18.49	18	36.49	Pass
70	37	1.1	QPSK	3585	3	19.82	25.84	4	29.84	Pass
70	37	1.1	QPSK	3624	3	19.91	25.93	4	29.93	Pass
70	37	1.1	QPSK	3664	3	19.73	25.75	4	29.75	Pass
80	29	1.1	QPSK	3590	3	12.23	18.25	18	36.25	Pass
80	29	1.1	QPSK	3624	3	12.09	18.11	18	36.11	Pass
80	29	1.1	QPSK	3660	3	11.98	18.00	18	36.00	Pass
80	37	1.1	QPSK	3590	3	19.61	25.63	4	29.63	Pass
80	37	1.1	QPSK	3624	3	19.46	25.48	4	29.48	Pass
80	37	1.1	QPSK	3660	3	19.61	25.63	4	29.63	Pass
70+80	37	1.1	QPSK	3585+3660	3	9.98	16.00	4	20.00	Pass



### 2.2.3 Maximum Conducted PSD Plots

NOTE: Only a sample of the plots are used in this report. The full suite of raw data resides at the MH, New Jersey location.



### 2.3 Peak-to-Average Power Ratio (PAPR)

The Peak-to-Average Power Ratio (PAPR) of the EUT was measured per KDB 971168 D01 using the Power Complementary Cumulative Distribution Function (CCDF) feature of the MXA Analyzer. The PAPR measurements are tabulated in Table 2.16.

The FCC requirement for PAPR is that the transmitter’s peak-to-average power ratio (PAPR) shall not exceed 13 dB for more than 0.1% of the time using a signal corresponding to the highest PAPR during periods of continuous transmission. The maximum PAPR value for each measured configuration is given in Table 2.16.

#### 2.3.1 Peak-to-Average Power Ratio Result

The maximum Peak-to-Average Power Ratio (PAPR) of the EUT measured at its antenna transmitting terminals was measured to be 8.69 dB maximum, which is in full compliance with the requirement to not exceed 13 dB as specified by the FCC. The representative data sets exact values are listed in Table 2.16 below.

**Table 2.13 Peak to Average Power Ratio**

Signal BW (MHz)	Power Level (dBm)	TM	Modulation	Channel Frequency (MHz)	TX	PAR at 0.1% Limit - 13 dB
50	37	3.1	64QAM	3575	3	8.52
50	37	3.2	QPSK/16QAM	3624	3	5.38
50	37	3.1a	256QAM	3675	3	8.43
60	37	3.1	64QAM	3580	3	8.53
60	37	3.2	QPSK/16QAM	3624	3	8.54
60	37	3.1a	256QAM	3669	3	8.55
70	37	3.1	64QAM	3585	3	8.55
70	37	3.2	QPSK/16QAM	3624	3	8.56
70	37	3.1a	256QAM	3664	3	8.60
80	37	3.1	64QAM	3590	3	8.53
80	37	3.2	QPSK/16QAM	3624	3	8.50
80	37	3.1a	256QAM	3660	3	<b>8.69</b>
70+80	37	3.2	QPSK/16QAM	3585+3660	3	8.62
50 + 10 +10 +10	37	3.1a	256QAM	3575+3675+3685+3695	3	8.47+7.99
10 + 10 + 50 + 10 + 10 + 10 +10	37	3.1a	256QAM	3555+3564+3594+3665+3675+3695+3695	3	8.26+8.12

### 2.3.2 Peak-to-Average Power Ratio Plot

NOTE: Only the worst-case plot is used in this report. The full suite of raw data resides at the MH, New Jersey location.



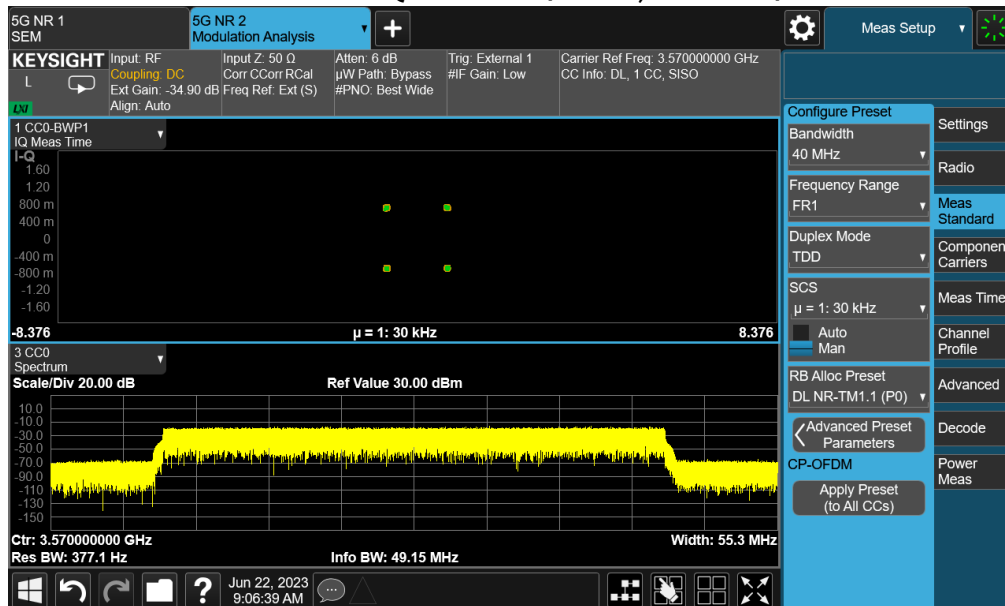
### 3. FCC Section 2.1047 - Modulation Characteristics

#### 3.1 Modulation Characteristics

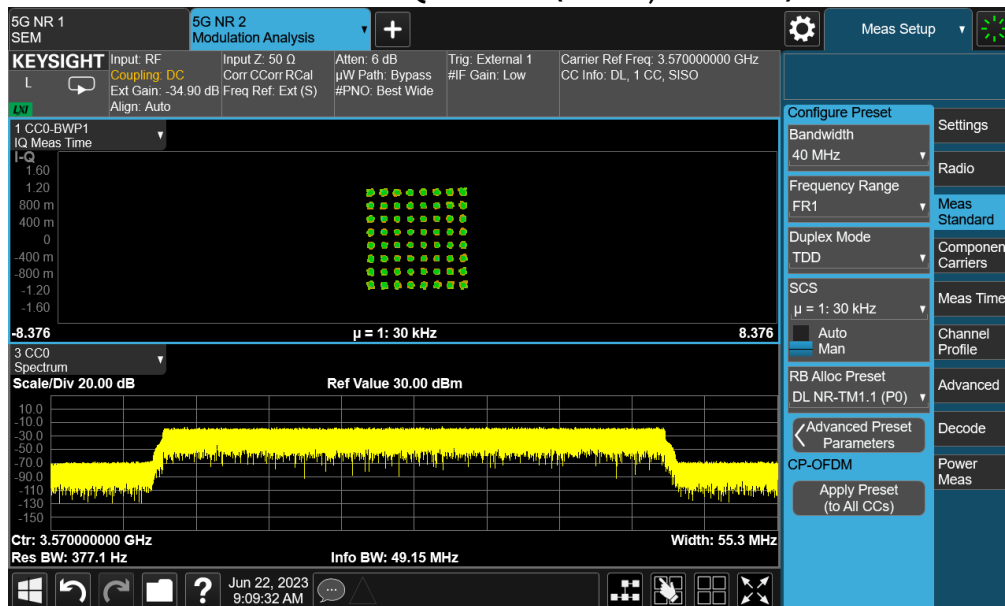
The RF signal at the antenna port was demodulated and verified for correctness of the modulation signal used before each test was performed.

##### 3.1.1 Modulation Characteristics – Plots

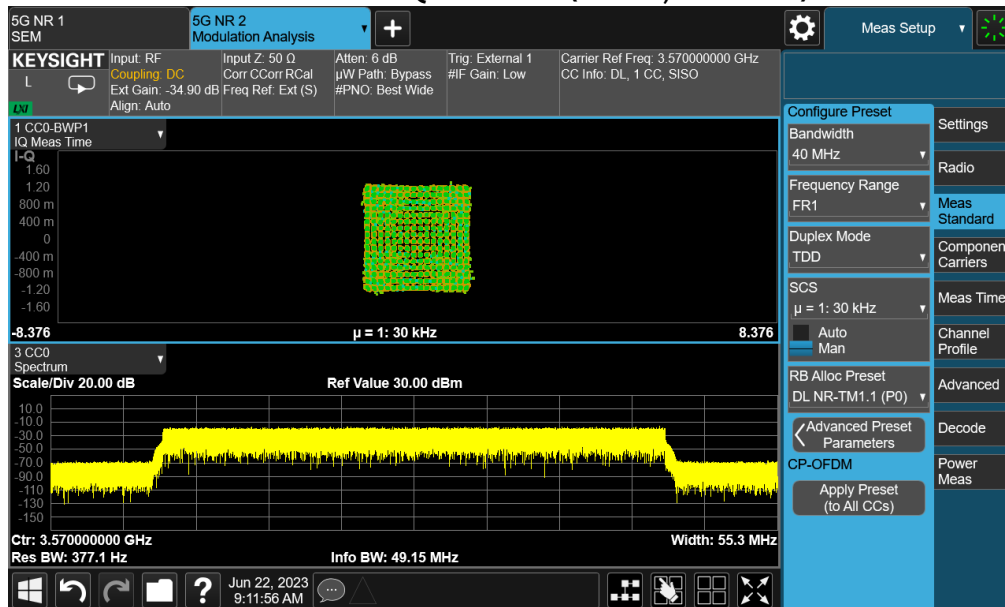
Modulation QPSK TM1.1 (40MHz, 3570 MHz)



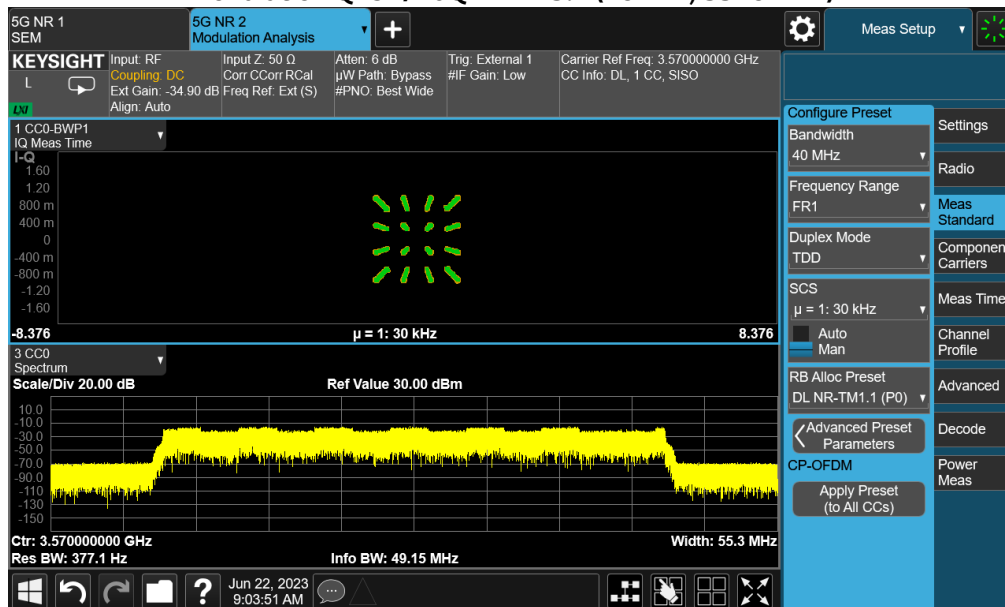
Modulation 64QAM TM3.1 (40MHz, 3570 MHz)



### Modulation 256QAM TM3.1a (40MHz, 3570 MHz)



### Modulation QPSK/16QAM TM3.2 (40MHz, 3570 MHz)



## 4. FCC Section 2.1049 – Occupied Bandwidth/Edge of Band Emissions

### 4.1 Occupied Bandwidth

In 47CFR 2.1049 the FCC requires:

“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 under the following conditions as applicable.”

This required measurement is the 99% Occupied Bandwidth, also called the designated signal bandwidth and needs to be within the parameters of the products specified emissions designator. During these measurements it is customary to evaluate the Edge of Band emissions at block/band edges.

Part 96.41e(3) specified that the fundamental emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

The transmitted signal occupied bandwidth was measured using a Keysight MXA Signal Analyzer. All emissions were within the parameters as required.

#### 4.1.1 Occupied Bandwidth – Result

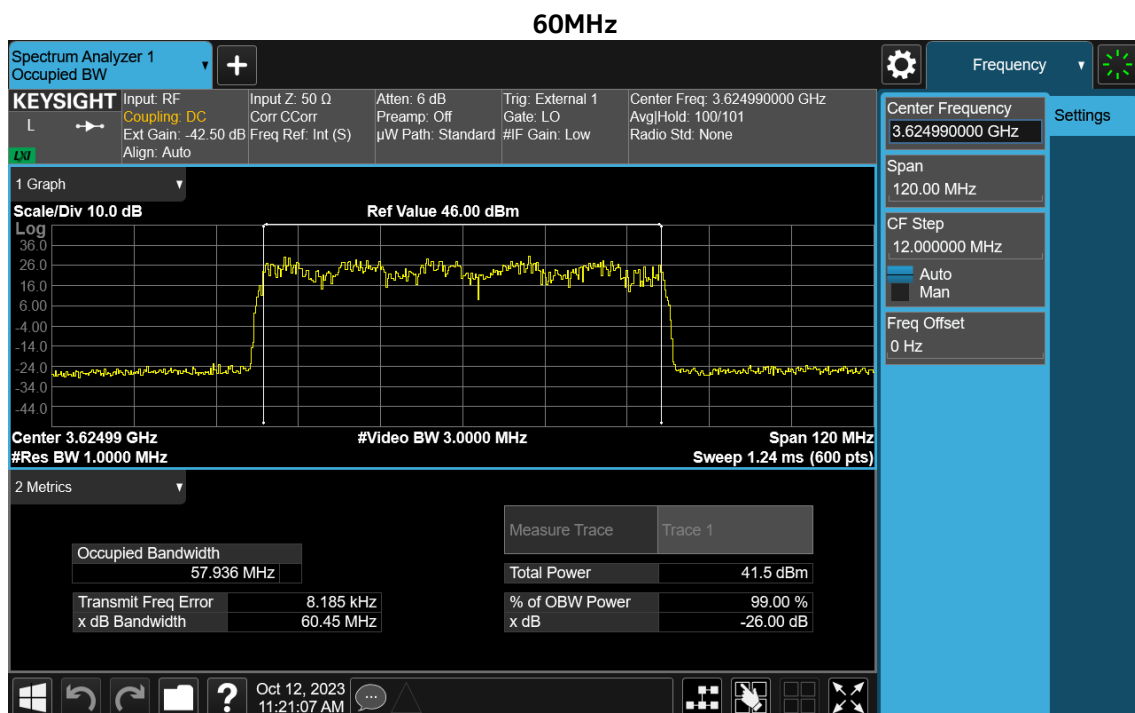
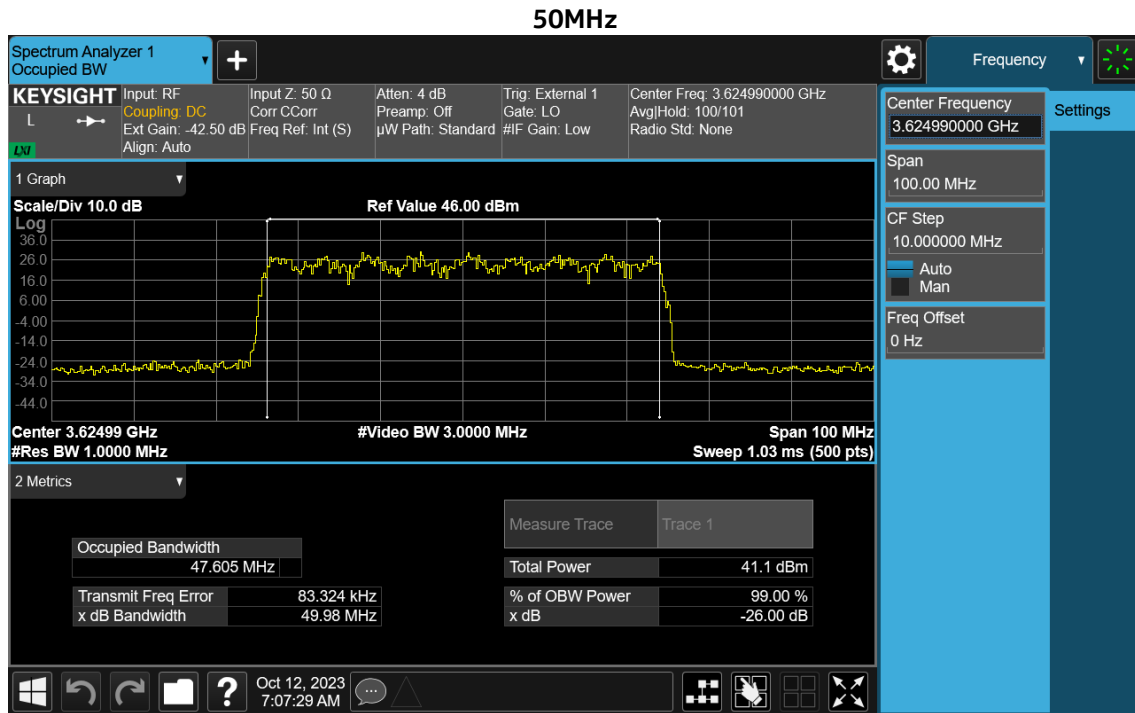
##### 4.1.1.1 99% Occupied Bandwidth Result

99% Occupied Bandwidth

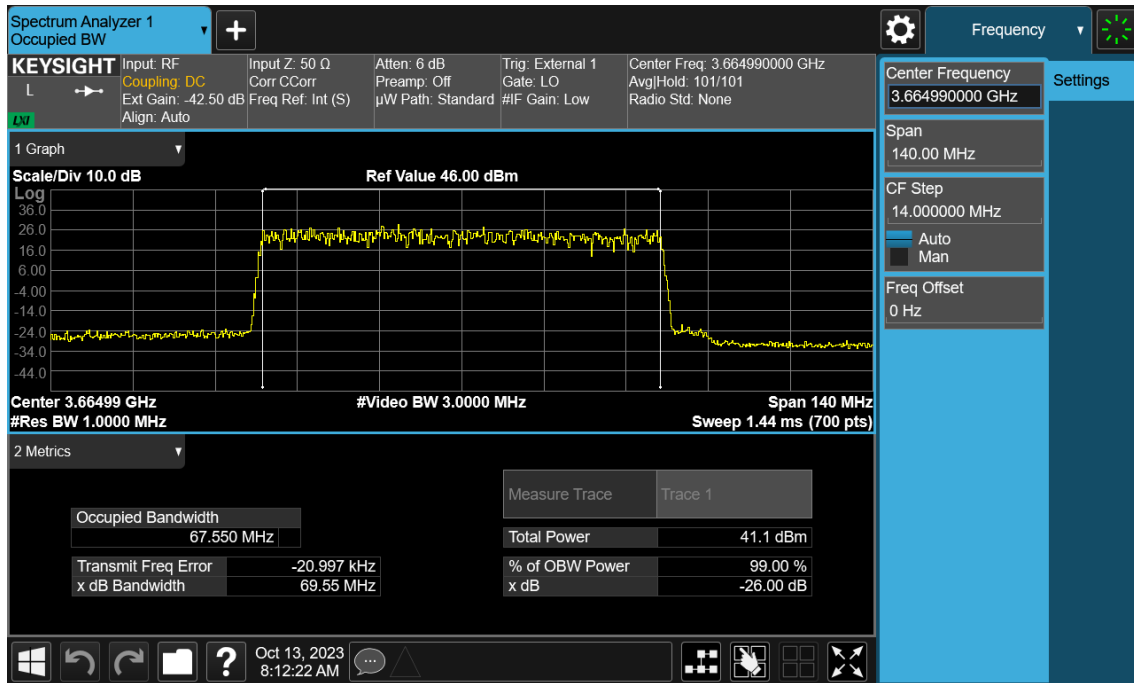
Signal BW (MHz)	Power Level (dBm)	TM	Modulation	Channel Frequency (MHz)	TX	99% Occupied BW (MHz)
50	37	3.1	64QAM	3575	3	47.278
50	37	3.2	QPSK/16QAM	3624	3	<b>47.605</b>
50	37	3.1a	256QAM	3675	3	47.528
60	37	3.1	64QAM	3580	3	57.276
60	37	3.2	QPSK/16QAM	3624	3	<b>57.936</b>
60	37	3.1a	256QAM	3669	3	57.871
70	37	3.1	64QAM	3585	3	67.545
70	37	3.2	QPSK/16QAM	3624	3	67.309
70	37	3.1a	256QAM	3664	3	<b>67.550</b>
80	37	3.1	64QAM	3590	3	77.186
80	37	3.2	QPSK/16QAM	3624	3	77.249
80	37	3.1a	256QAM	3660	3	<b>77.346</b>
70+80	37	3.2	QPSK/16QAM	3585+3660	3	146.91
50 + 10 +10 +10	37	3.1a	256QAM	3575+3675+3685+3695	3	47.682+28.732
10 + 10 + 50 + 10 + 10 + 10 +10	37	3.1a	256QAM	3555+3564+3594+3665+3675+3695+3695	3	66.373+38.572

### 4.1.1.2 99% Occupied Bandwidth Plots

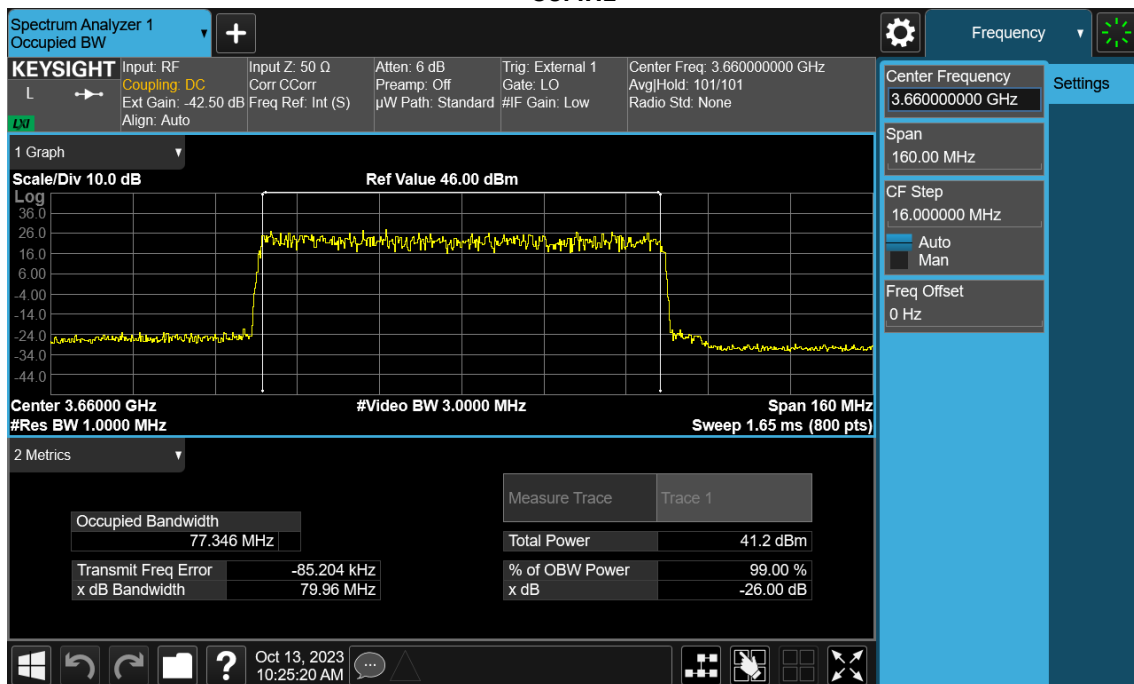
NOTE: Only the plots which give the widest bandwidth for each configuration evaluated are used in this report. The full suite of raw data resides at the MH, New Jersey location.



70MHz



80MHz





## 4.2 Edge of band Emissions

47CFR 96.41 (e)(1) (i) (2) and KDB 940660 D01 Section 3.2 (b)(6) specified that the limits for the emissions outside the fundamental are as follows.

- within 0 MHz to 10 MHz above and below the assigned channel  $\leq -13$  dBm/MHz,
- greater than 10 MHz above and below the assigned channel  $\leq -25$  dBm/MHz,
- any emission below 3530 MHz and above 3720 MHz  $\leq -40$  dBm/MHz.

47CFR 96.41 (e)(3) and KDB 940660 D01 Section 3.2 (b)(6) specified stated that (i) Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 megahertz bands immediately outside and adjacent to the licensee's authorized frequency channel, a resolution bandwidth of no less than one percent of the fundamental emission bandwidth may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full reference bandwidth (*i.e.*, 1 MHz or 1 percent of emission bandwidth, as specified). The fundamental emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power. (ii) When measuring unwanted emissions to demonstrate compliance with the limits, the CBSD and End User Device nominal carrier frequency/channel shall be adjusted as close to the licensee's authorized frequency block edges, both upper and lower, as the design permits. (iii) Compliance with emission limits shall be demonstrated using either average (RMS)-detected or peak-detected power measurement techniques.

KDB 940660 D01 Section 3.2 (b)(6) specified that measurements must be performed for low, mid, and high channels. It is acceptable to apply the procedures in Section 5.7 of ANSI C63.26-2015. When antenna-port conducted measurements are performed to demonstrate compliance to the applicable unwanted emission limits (Section 2.1051), a separate radiated measurement is required to detect spurious emissions that may be radiated directly from the cabinet, control circuits, power leads, or intermediate circuit elements under normal conditions of installation and operation (Section 2.1053). The Section 96.41(e) limits generally also apply to radiated unwanted emissions.

The Edge of Band emissions of the EUT at the external antenna connector (EAC) were measured using a Keysight MXA Signal Analyzer. The RF output from the EAC port to signal analyzer was reduced (to an amplitude usable by the signal analyzer) by using a calibrated attenuator and test coupler. The path attenuation was offset on the display and the signal for the carrier was adjusted to the corrected RF power level for the resolution bandwidth used for the transmit signal.

Oobe mask limit was created using the following sample calculation:

Limits:

Within 0-1MHz: -13dBm/1%EBW

Within 1-10MHz: -13dBm/MHz

Within >10: -25dBm/MHz

For 10MHz Carriers with 4 ports, the limits at one port:

Within 0-1MHz: -13dBm/1%EBW=> -19dBm/100kHz

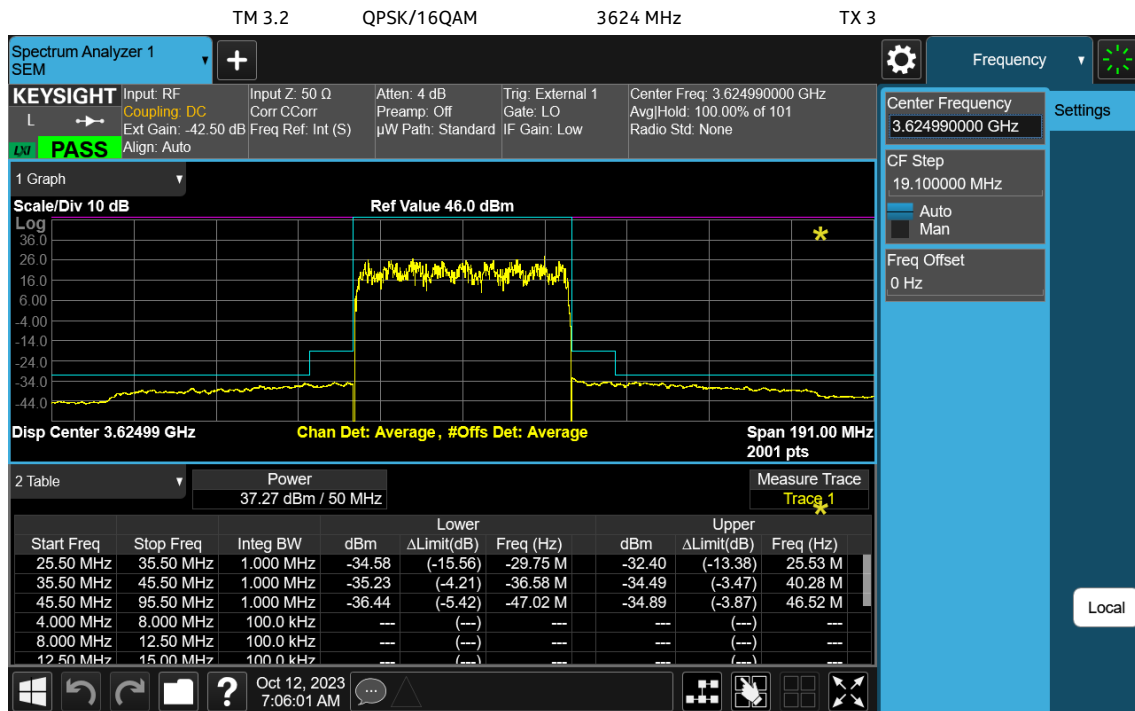
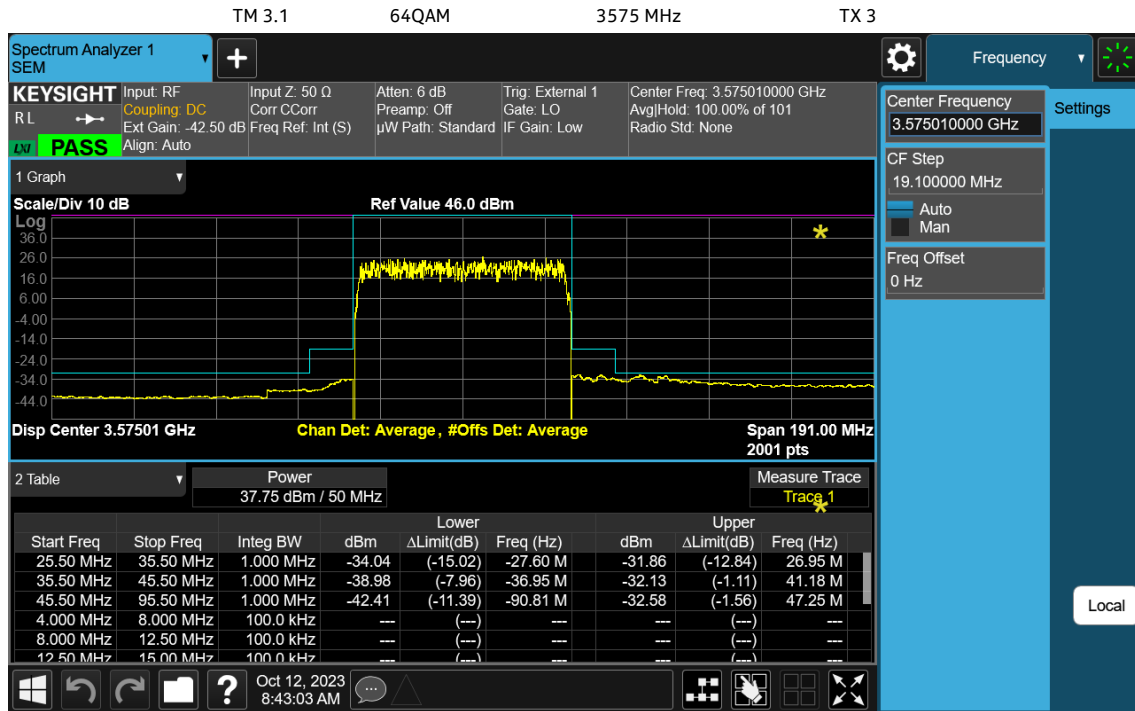
Within 1-10MHz: -13dBm/MHz => -19dBm/1MHz

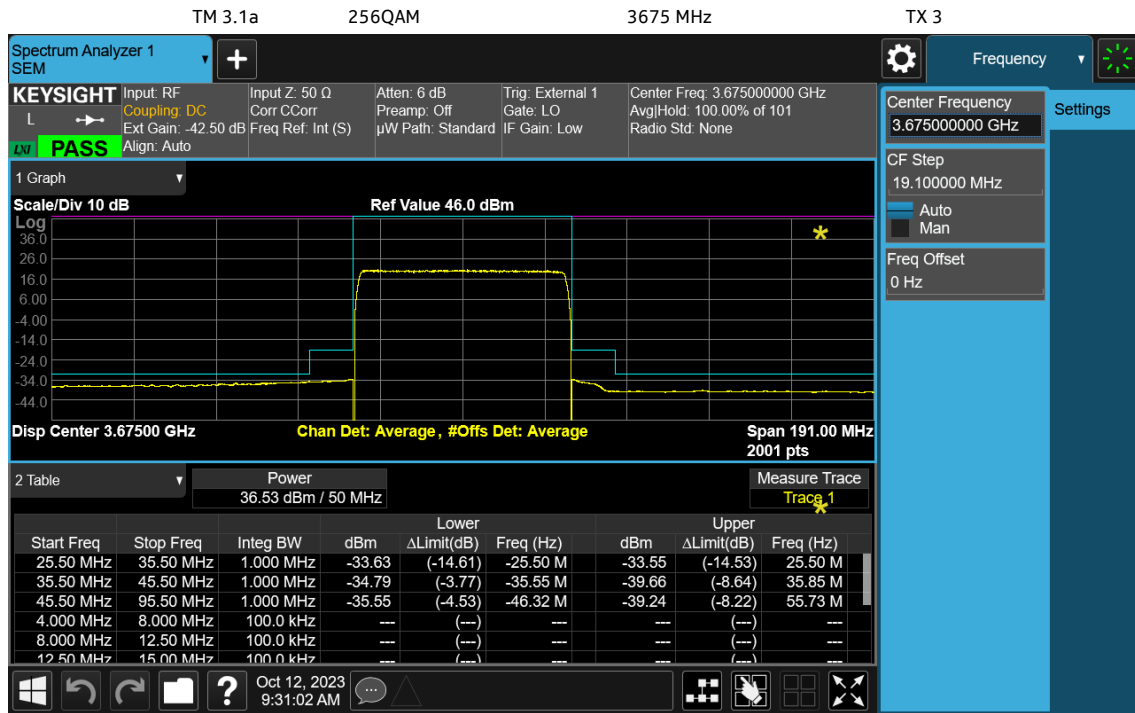
Within >10: -25dBm/MHz => -31dBm/1MHz

### 4.2.1 Edge of Band Emissions - Plots.

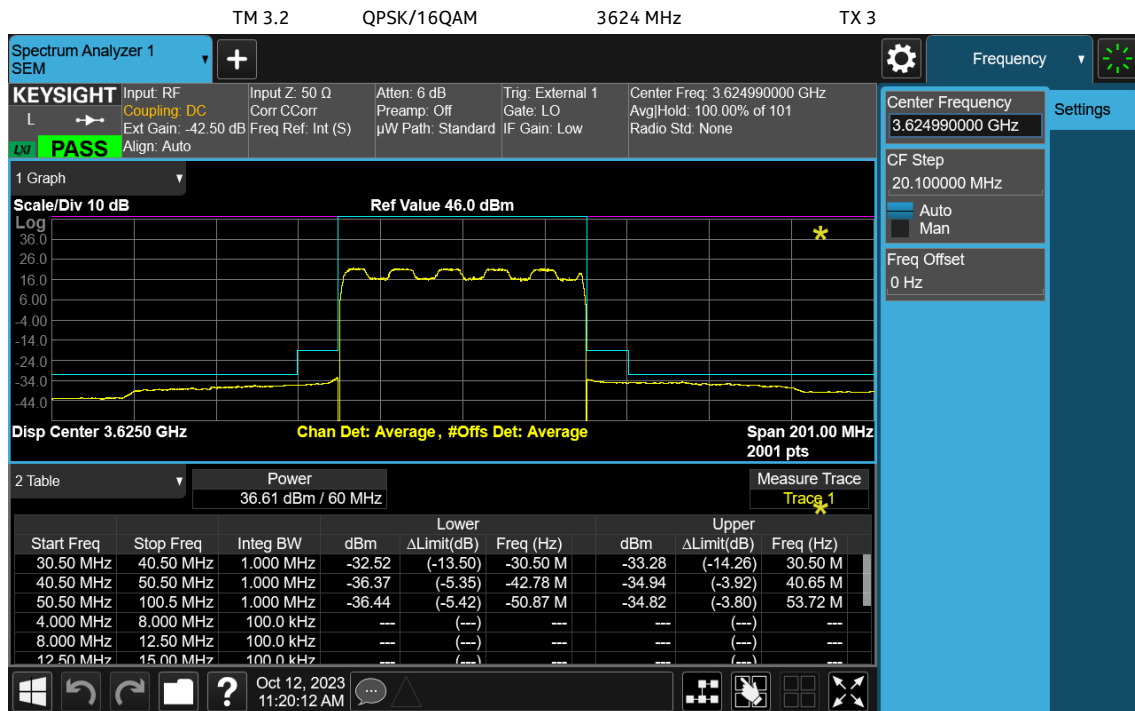
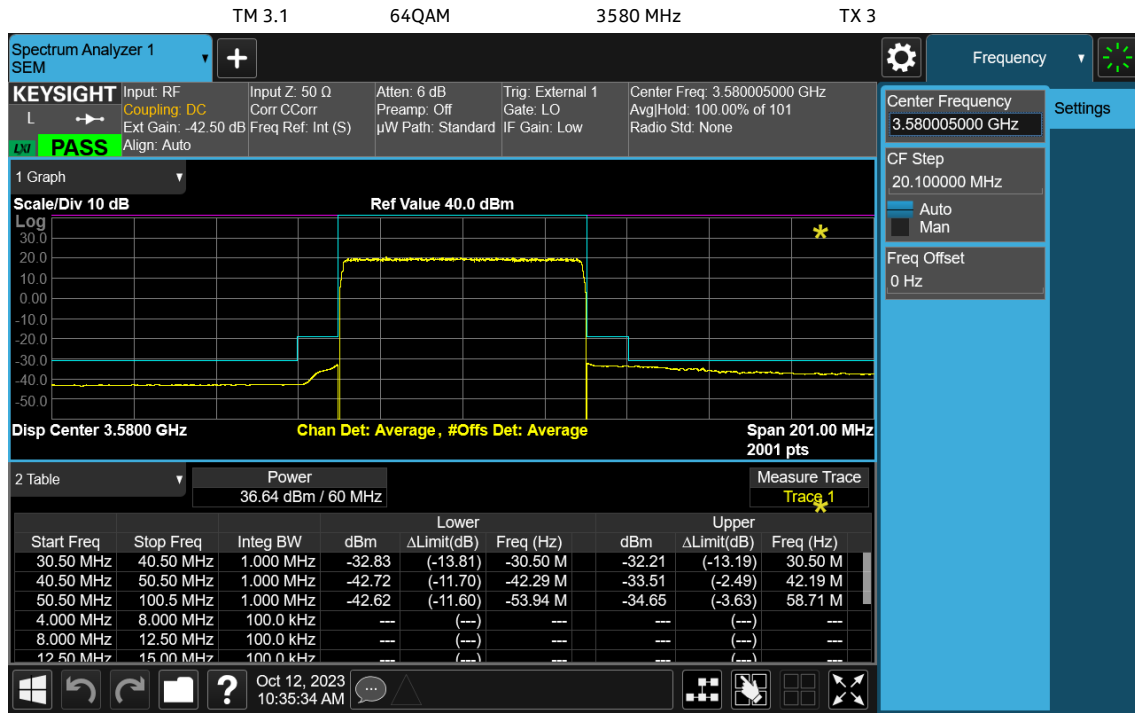
All of the measurements met the requirements of Part 96.41(e)(1) and KDB 940660 D01 Section 3.2 (b)(6) when measured per Part 2.1049.

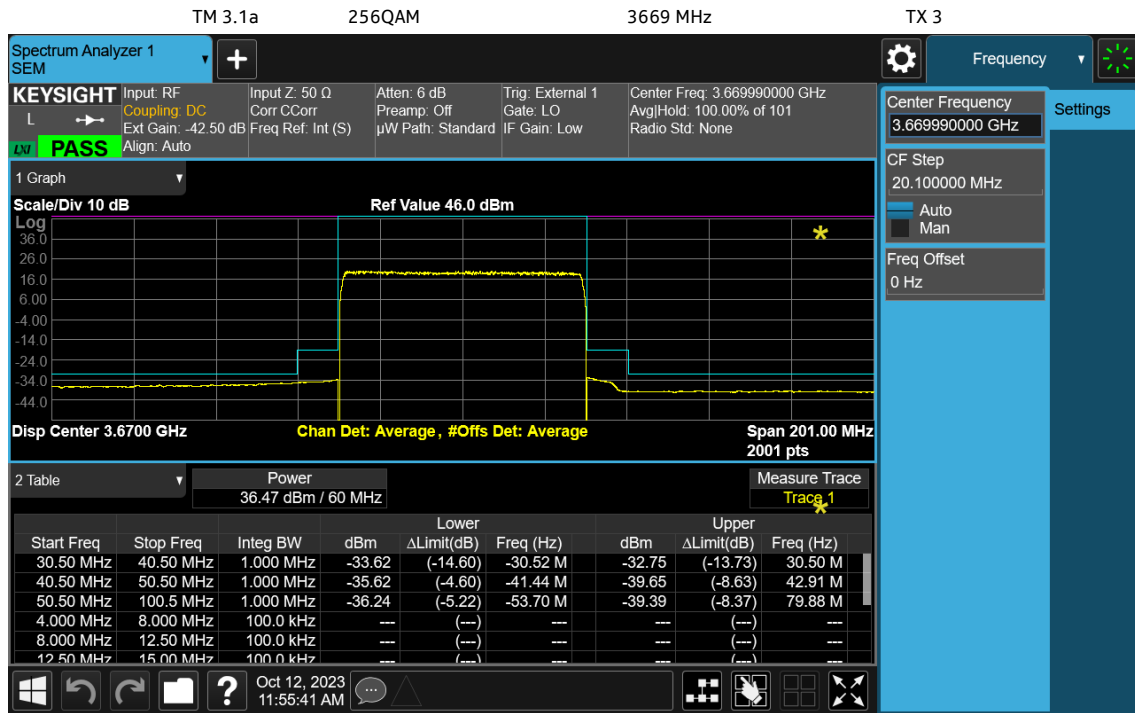
#### 4.2.1.1 50MHz, 37dBm



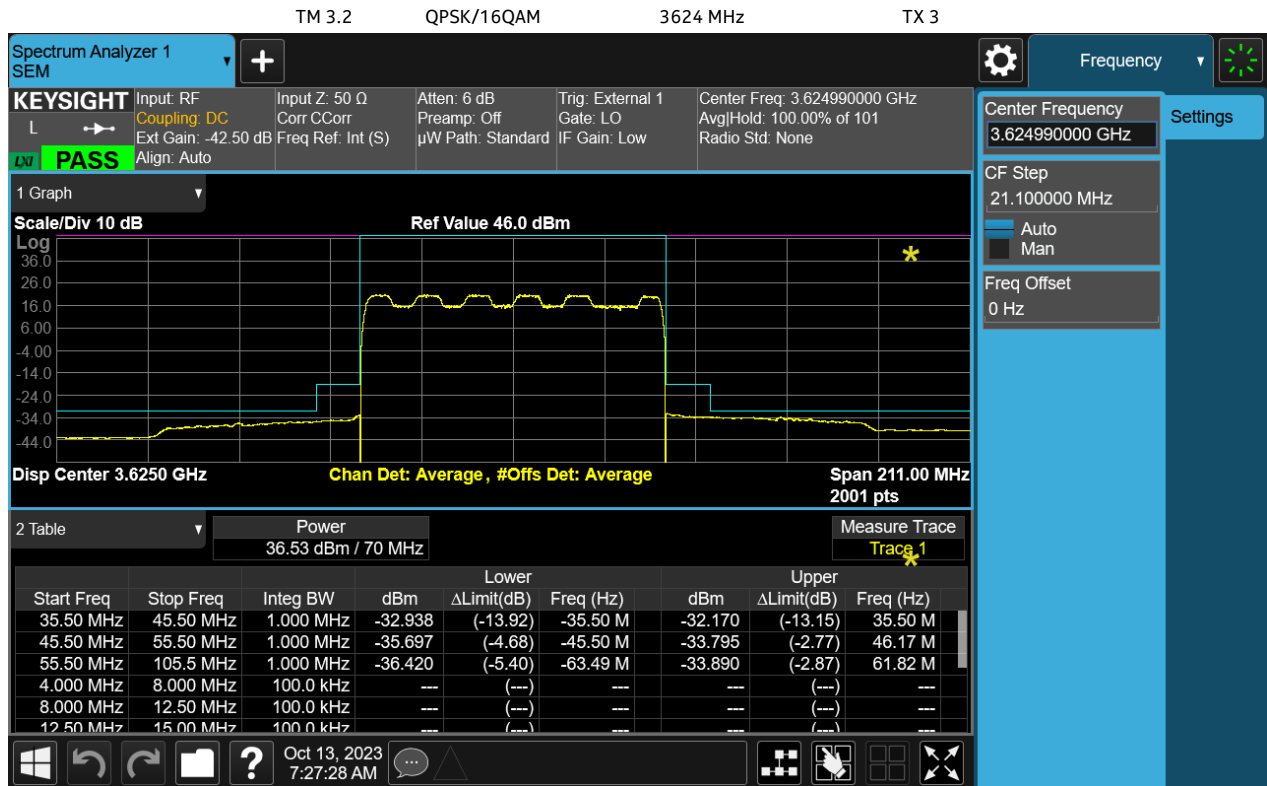
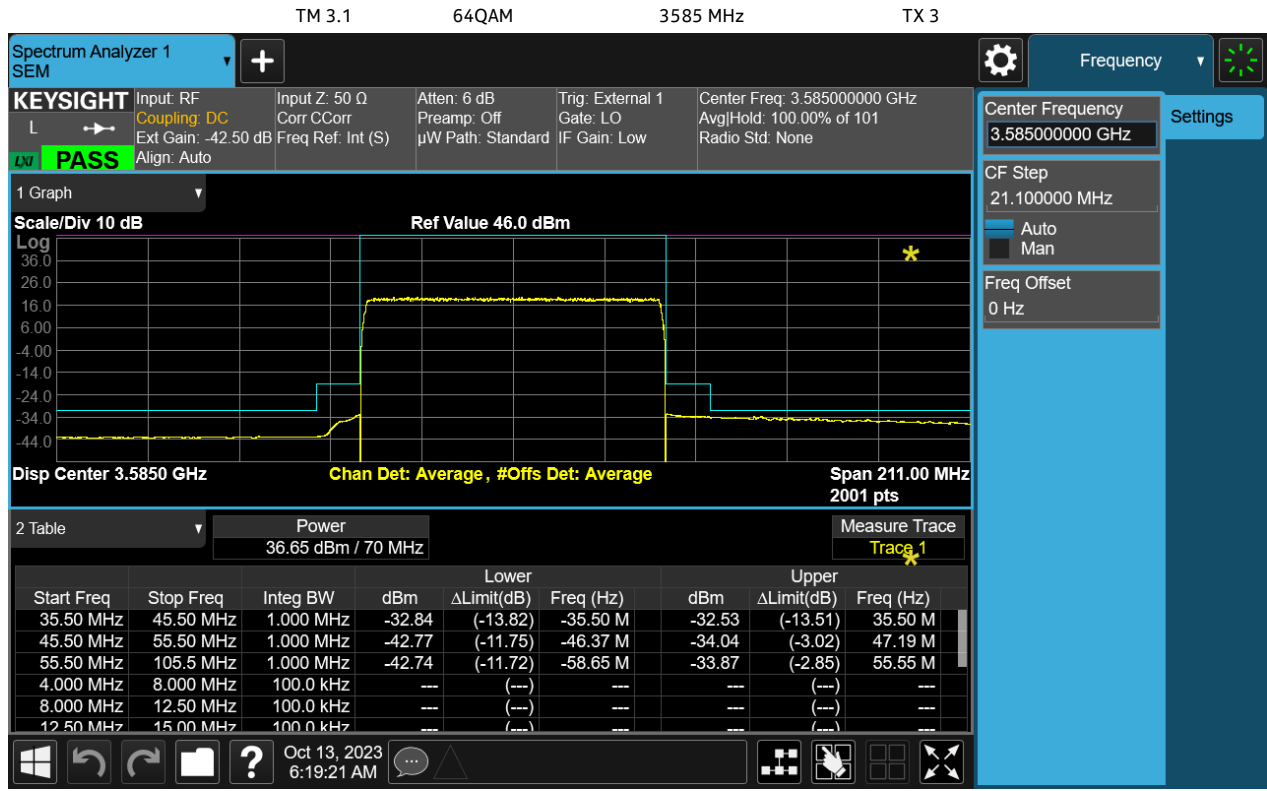


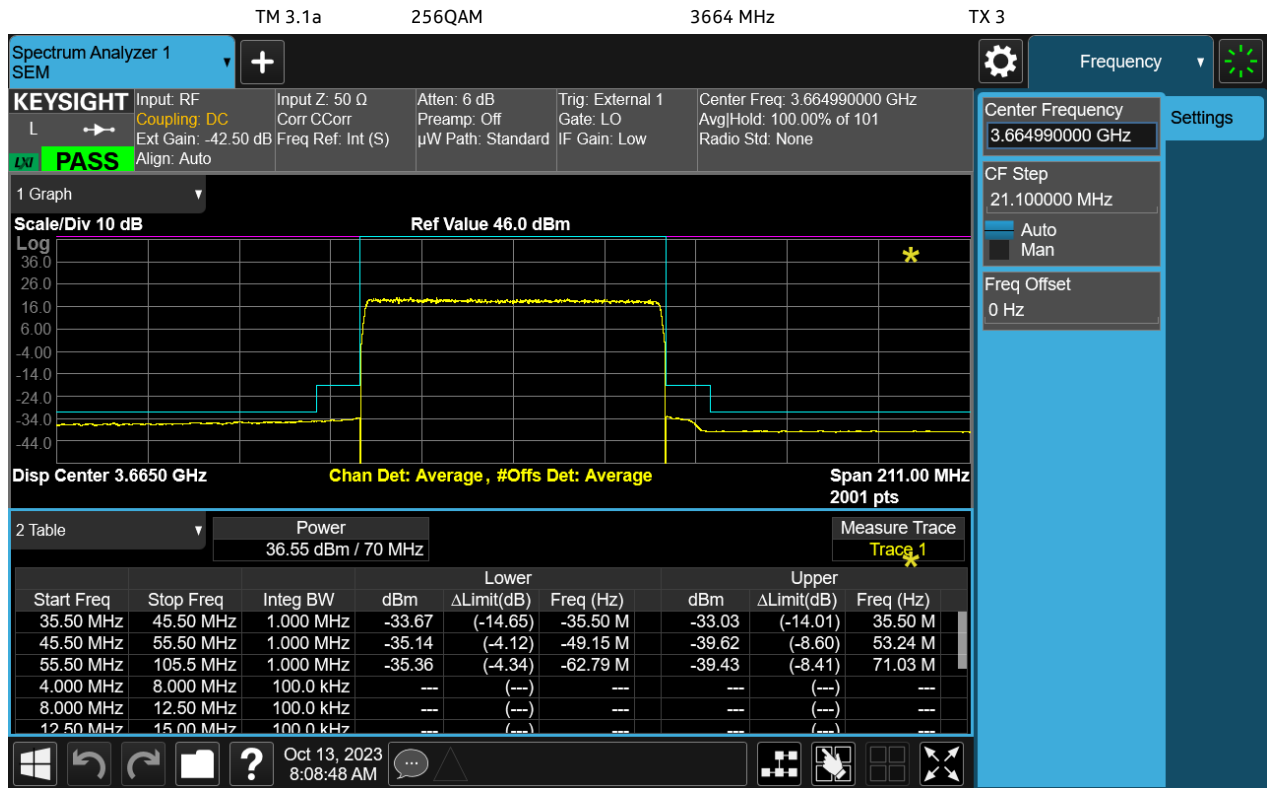
4.2.1.2 60MHz, 37dBm



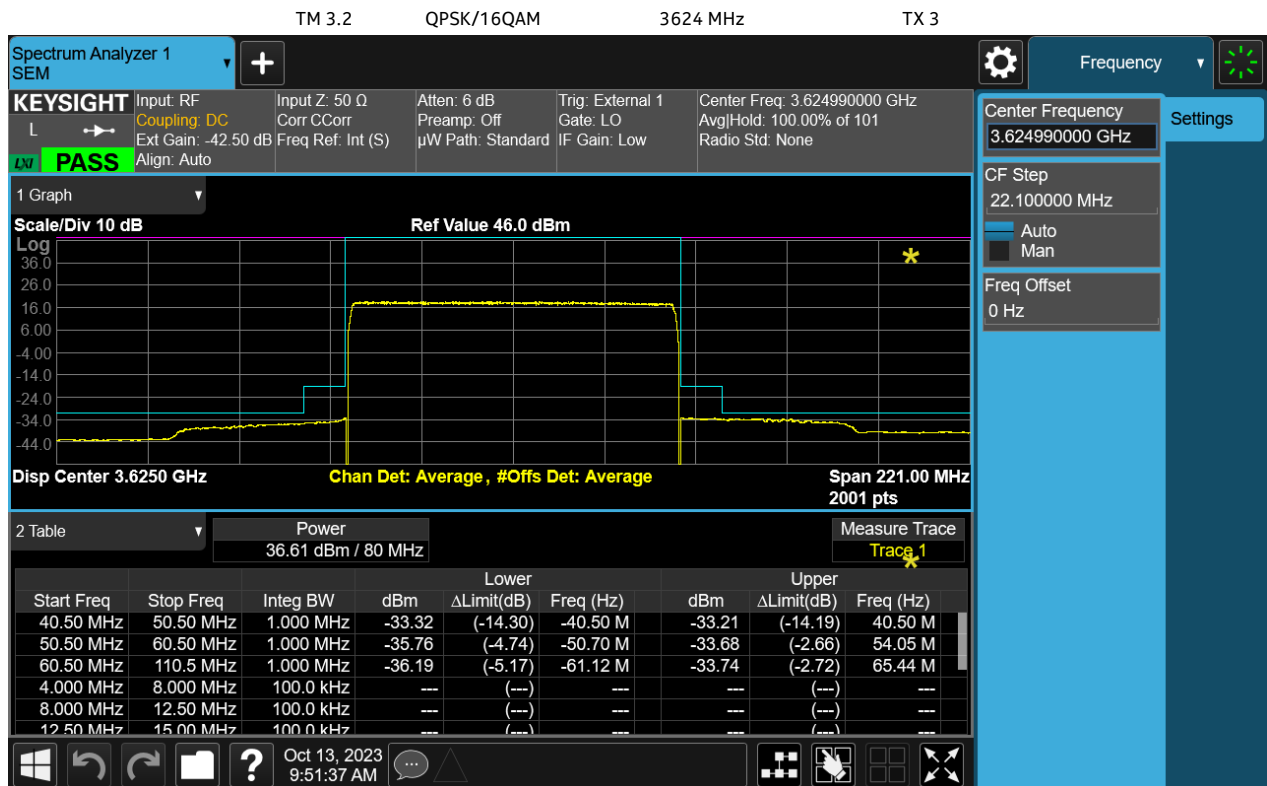
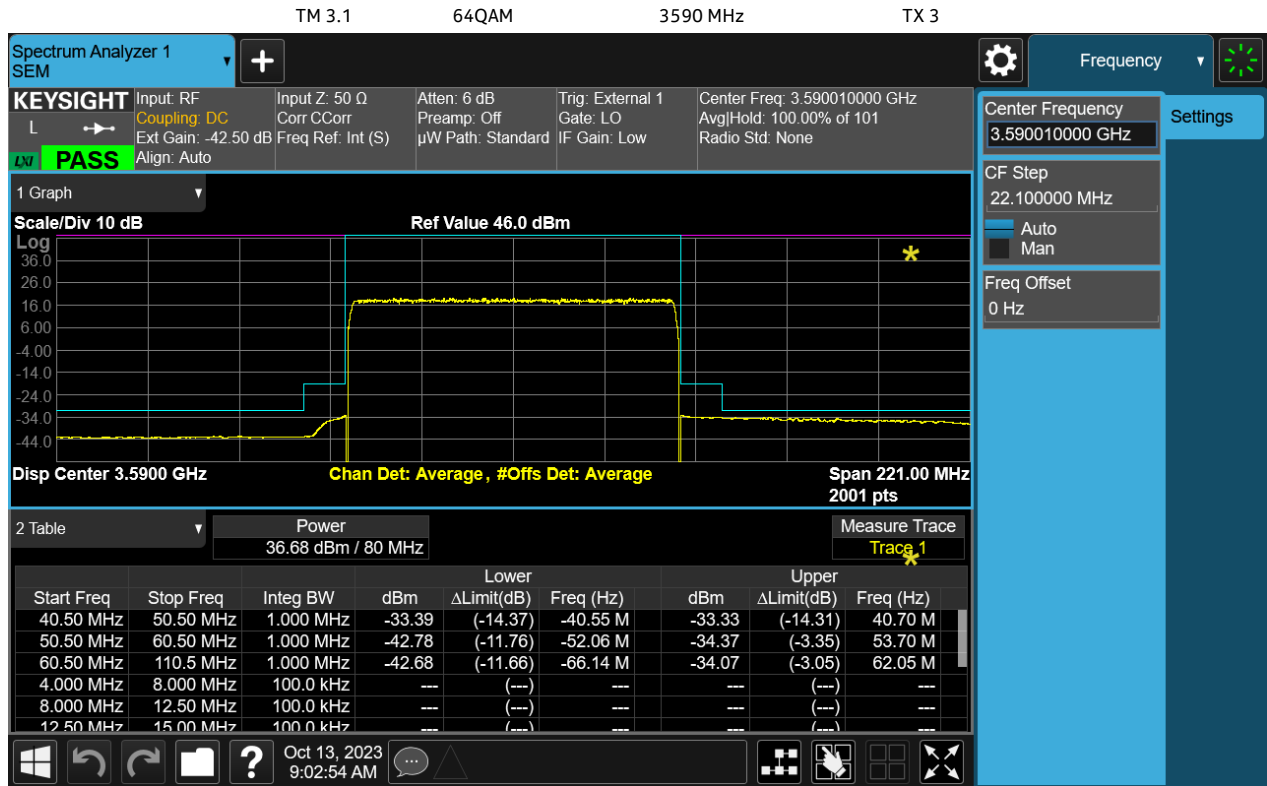


4.2.1.3 70MHz, 37dBm

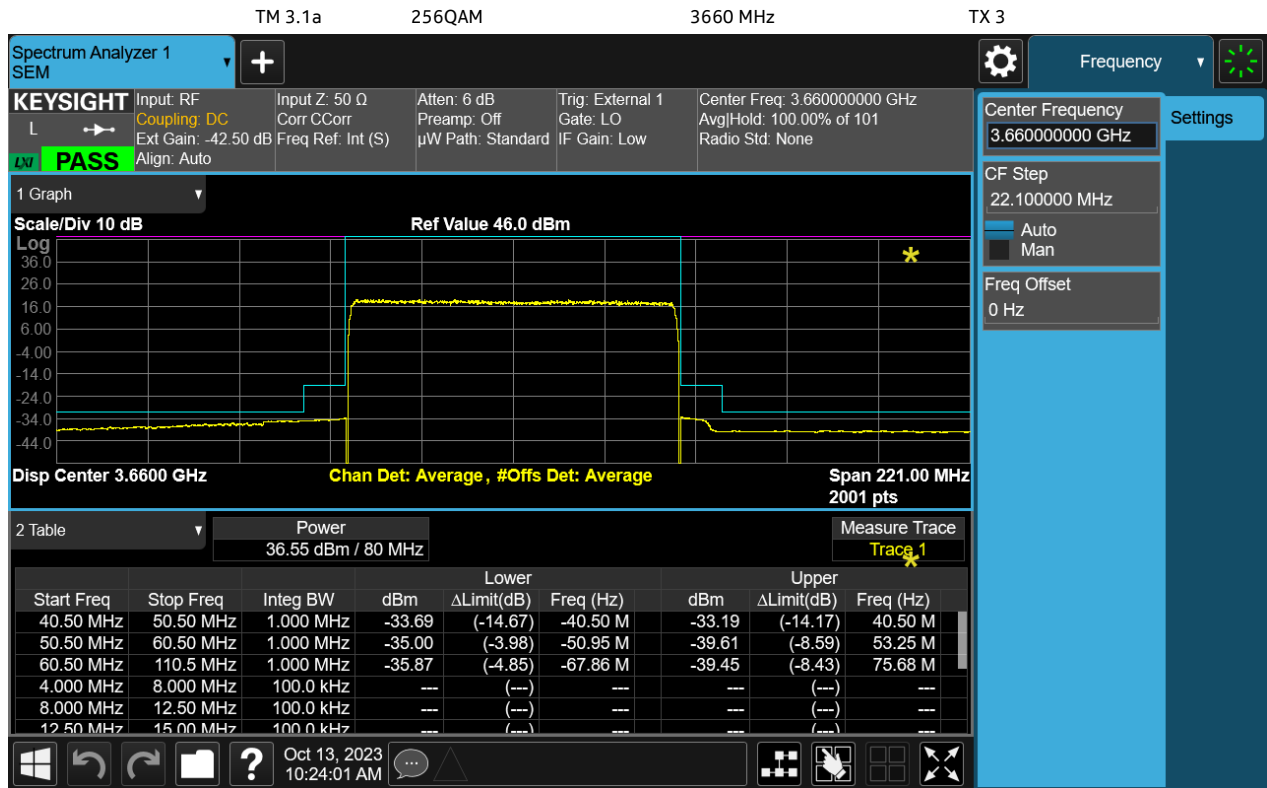




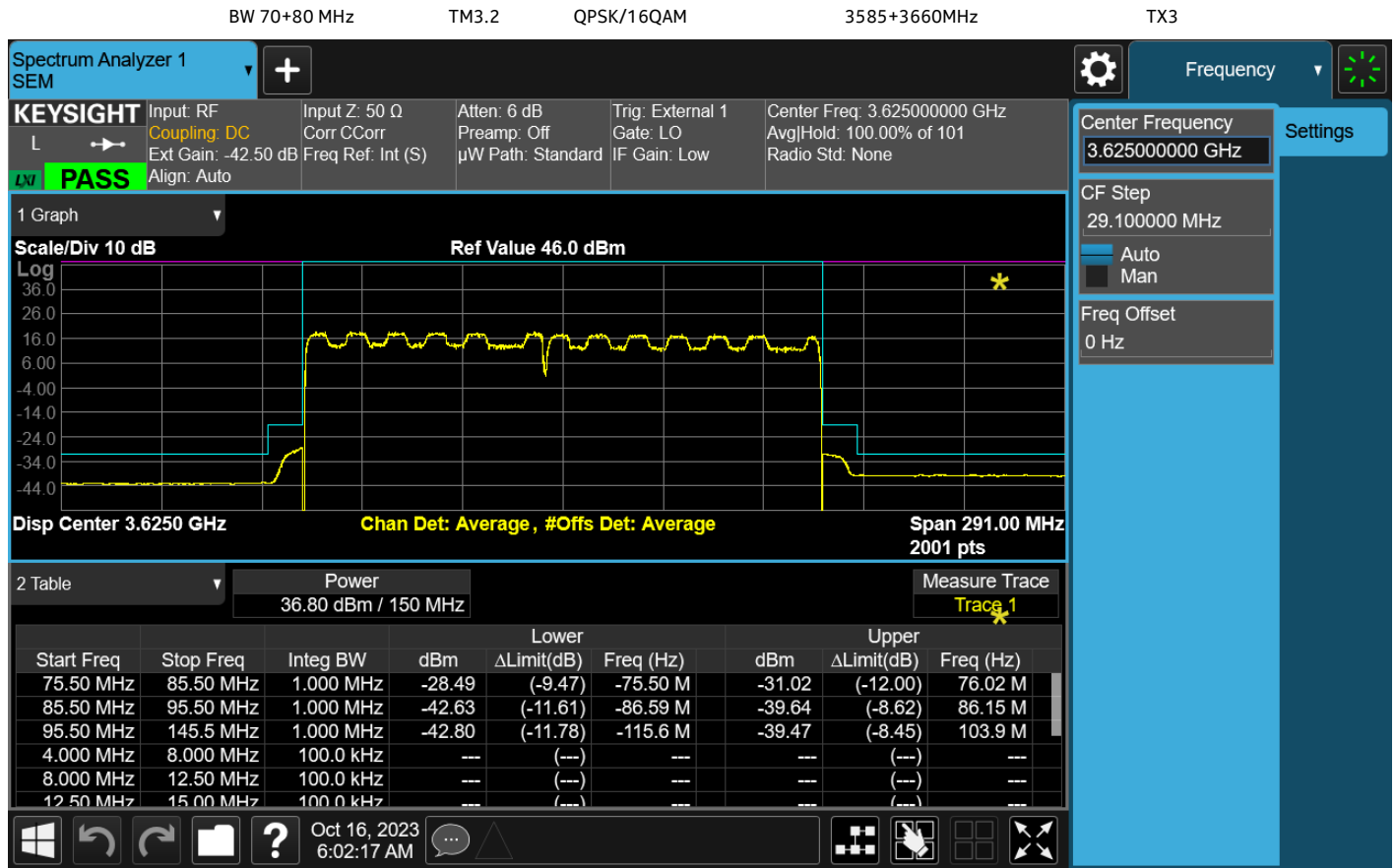
4.2.1.4 80MHz, 37dBm



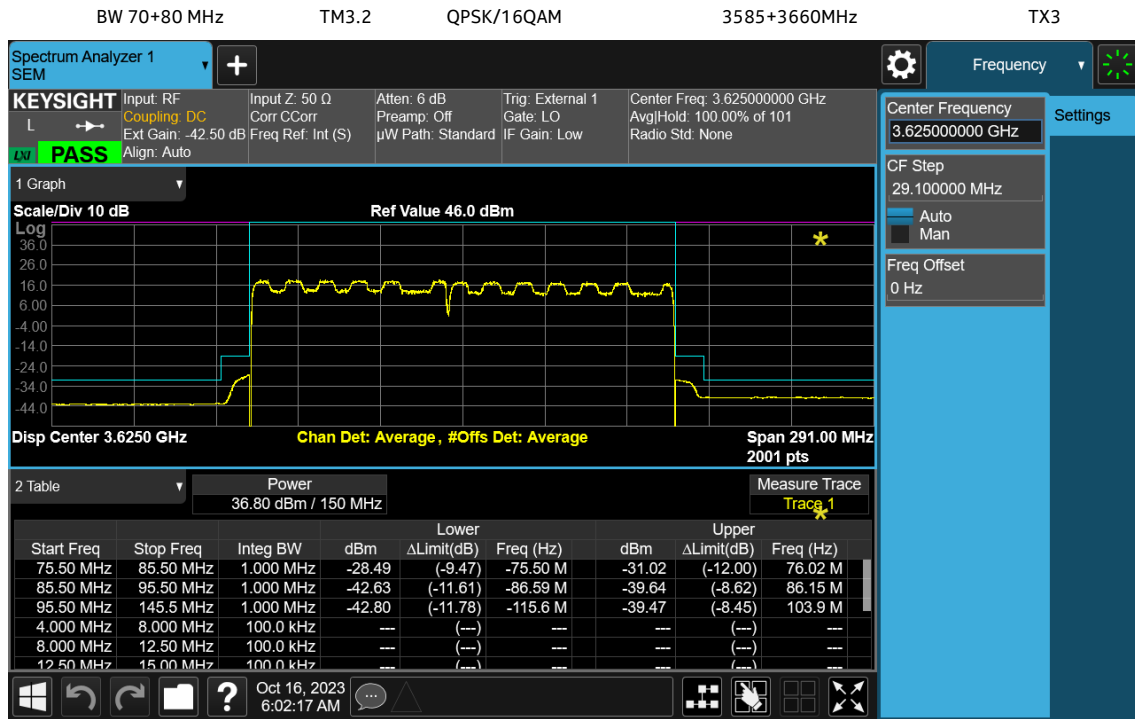




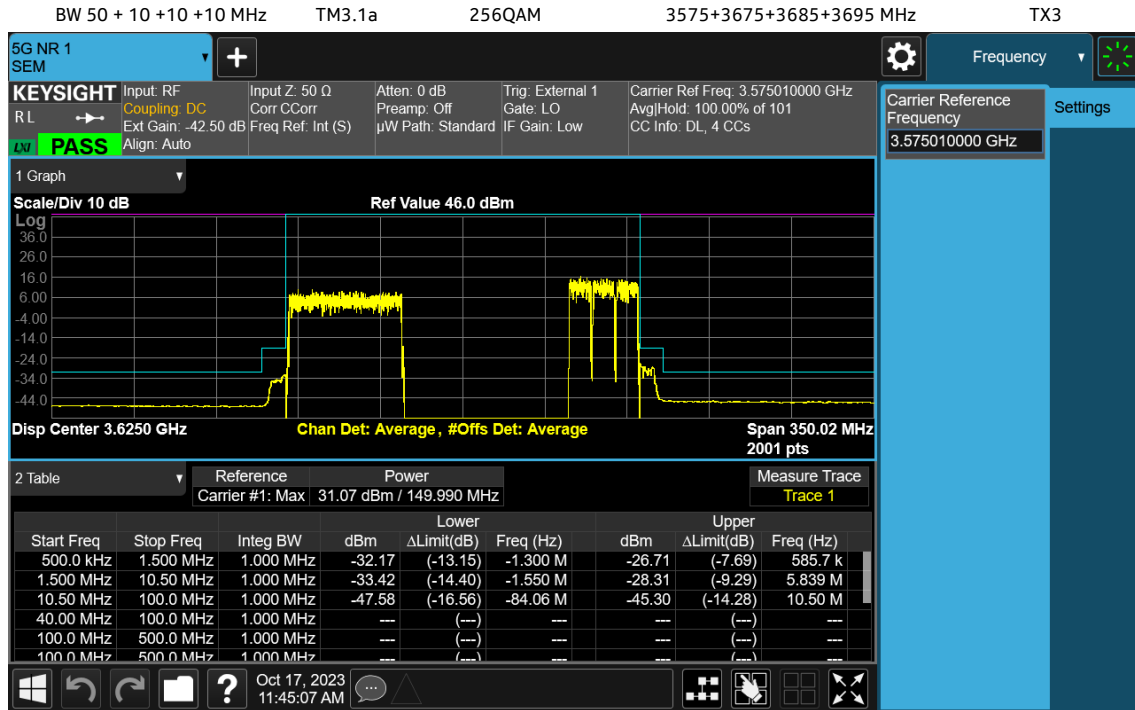
4.2.1.5 2CC, 37dBm



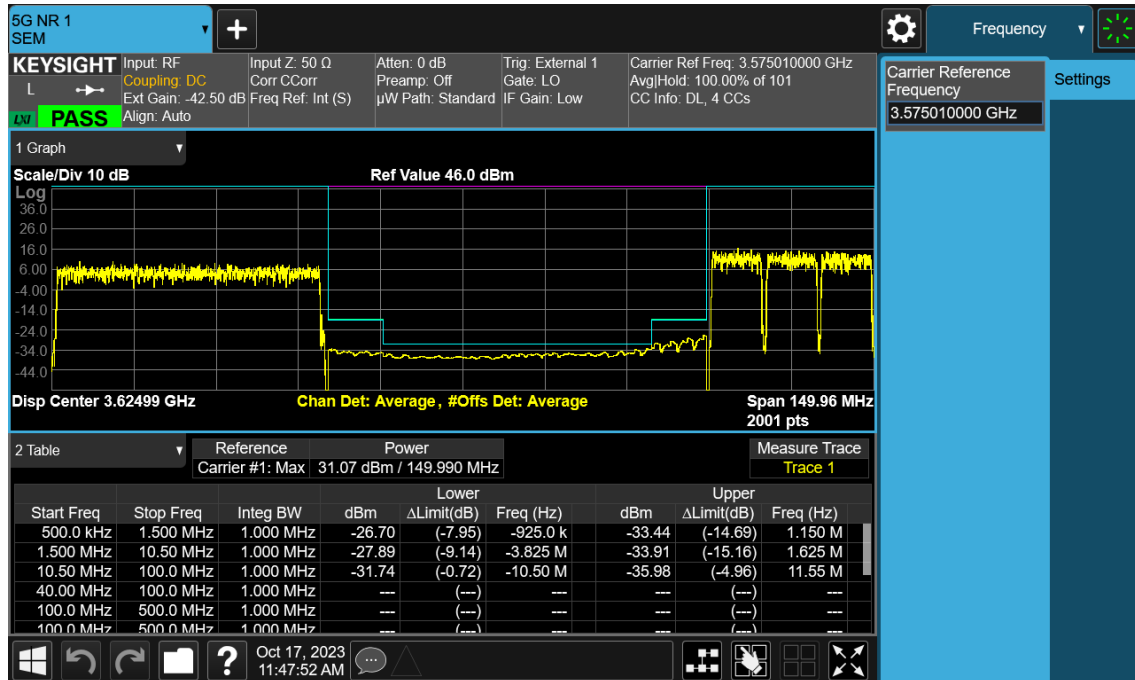
4.2.1.6 2CC, 37dBm



4.2.1.8 4CC, 37dBm

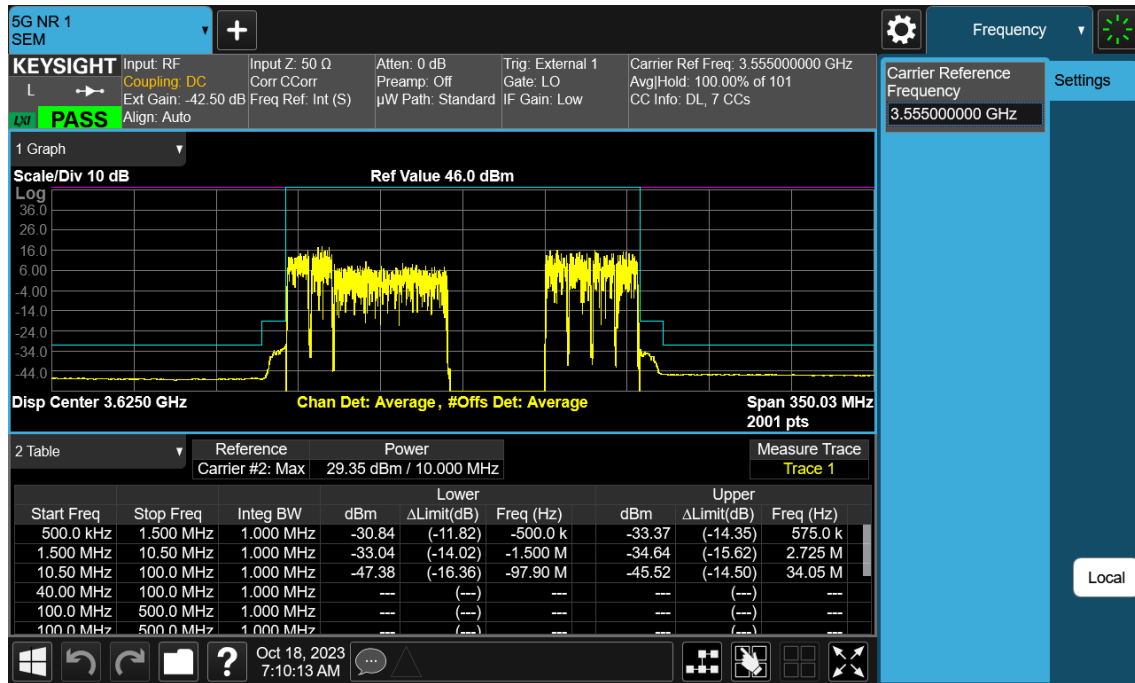


Inner

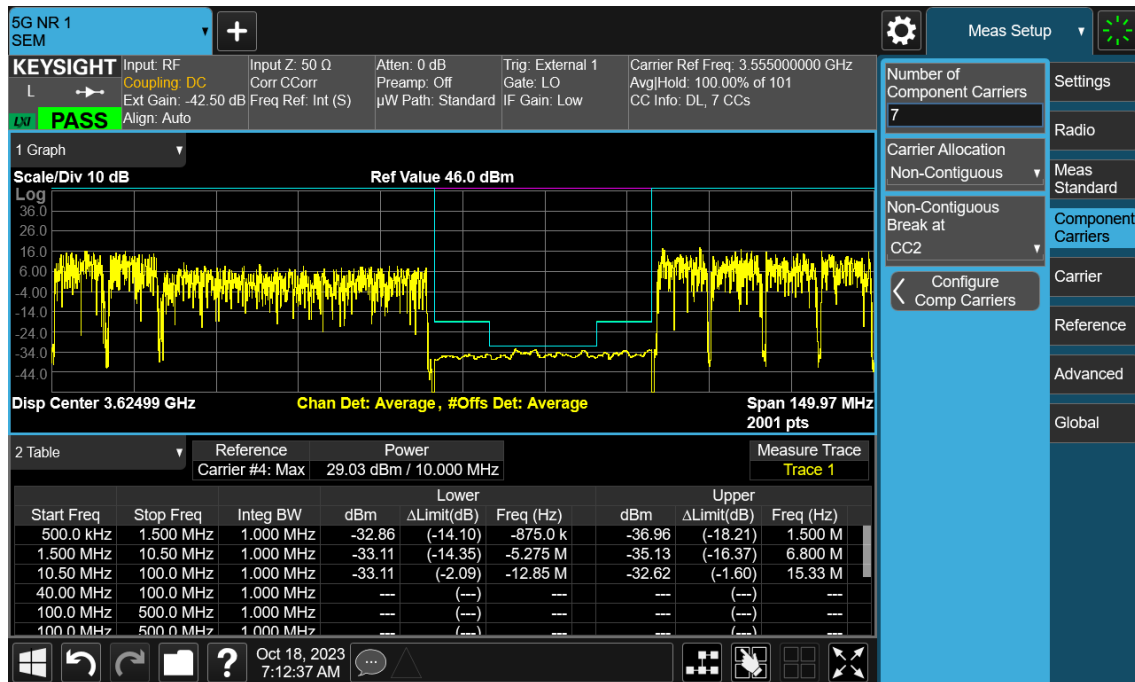


4.2.1.9 7CC, 37dBm

BW 10 + 10 + 50 + 10 + 10 + 10 + 10MHz TM3.1a 256QAM 3555+3564+3594+3665+3675+3695+3695 MHz TX3



Inner



## 5. FCC Section 2.1051 - Spurious Emissions at Transmit Antenna Port

This test measures the emissions of spurious signals which may come from harmonic, parasitic, intermodulation and frequency conversion products and are outside the necessary bandwidth but excludes Edge-of-Band emissions.

### 5.1 Section 2.1051 Spurious Emissions at Antenna Terminals

Spurious Emissions at the antenna terminals were investigated per 47CFR Section 2.1057(a)(1) over the frequency range of 9 kHz to 37 GHz which is beyond the 10th harmonic of the carrier frequency. A test coupler and/or attenuator which incorporates a low intermod broadband RF attenuator was used to reduce the transceiver's amplitude to a level usable by the spectrum analyzer.

The spurious measurements were made using a PC based automated test system which controls either a MXA Signal Analyzer or a Rohde & Schwarz ESU-40 Test Receiver/ Spectrum Analyzer. These measurements are performed in compliance with ANSI C63.26 and our ISO17025 process. The measurement meets the ANSI C63.26 requirements in paragraphs 5.2.4.4.1 and 5.7 which requires that the number of points in the sweep be  $> 2 \times \text{Span}/\text{RBW}$ .

The required emission limitation specified in **47CFR 96.41 (e)** was applied to these tests. Based upon the criterion given in Section 96 of the Code, the required emission limit for emissions outside a licensee's frequency block is:

47CFR 96.41 (e)(2) Additional protection levels. Notwithstanding paragraph (d)(1) of this section, the conducted power of any emissions below 3530 MHz or above 3720 MHz shall not exceed  $-40\text{dBm}/\text{MHz}$ . In order to account for the spectral adding of identical signals from the primary and diversity ports, per KDB 662911 D01 Multiple Transmitter Output v01r01, the level needs be adjusted by  $10\text{LOG}(n)$  where  $n$ = number of outputs.

The adjustment for  $n=4 \rightarrow 10\text{LOG}(4) = 6.02 \text{ dB}$

Therefore, the limit for emissions  $>20 \text{ MHz}$  outside a licensee's frequency block when measured with a RBW of 1 MHz is:

$-40 \text{ dBm} - 6.02 \text{ dB} = -46.02 \text{ dBm}$  for 4x MIMO

## 5.2 Spurious Emissions at Antenna Terminals Results

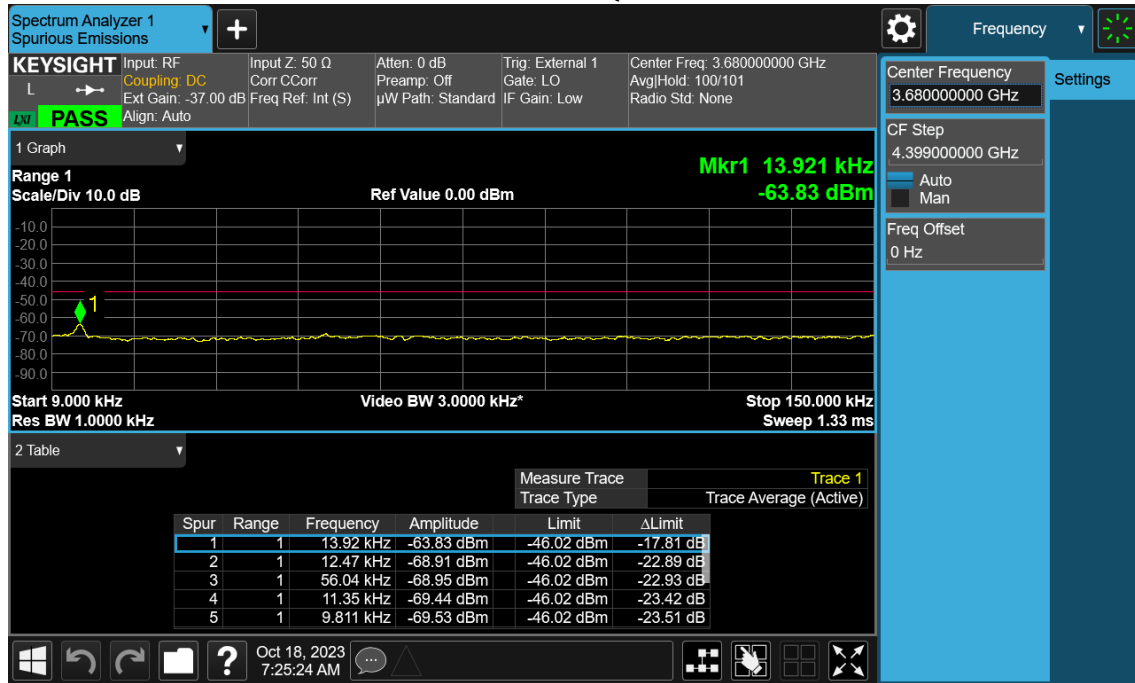
NOTE: Only plots with lowest margin in each frequency range are used in this report. The full suite of raw data resides at the MH, New Jersey location.

**Tabular Data – Spurious Emissions at Antenna Terminals**

Signal BW (MHz)	Power Level (dBm)	TM	Modulation	Channel Frequency (MHz)	TX	Conducted Spurious Emissions Results
50	37	3.1	64QAM	3575	3	Pass
50	37	3.2	QPSK/16QAM	3624	3	Pass
50	37	3.1a	256QAM	3675	3	Pass
60	37	3.1	64QAM	3580	3	Pass
60	37	3.2	QPSK/16QAM	3624	3	Pass
60	37	3.1a	256QAM	3669	3	Pass
70	37	3.1	64QAM	3585	3	Pass
70	37	3.2	QPSK/16QAM	3624	3	Pass
70	37	3.1a	256QAM	3664	3	Pass
80	37	3.1	64QAM	3590	3	Pass
80	37	3.2	QPSK/16QAM	3624	3	Pass
80	37	3.1a	256QAM	3660	3	Pass
70+80	37	3.2	QPSK/16QAM	3585+3660	3	Pass
50 + 10 +10 +10	37	3.1a	256QAM	3575+3675+3685+3695	3	Pass
10 + 10 + 50 + 10 + 10 + 10 +10	37	3.1a	256QAM	3555+3564+3594+3665+3675+3695+3695	3	Pass

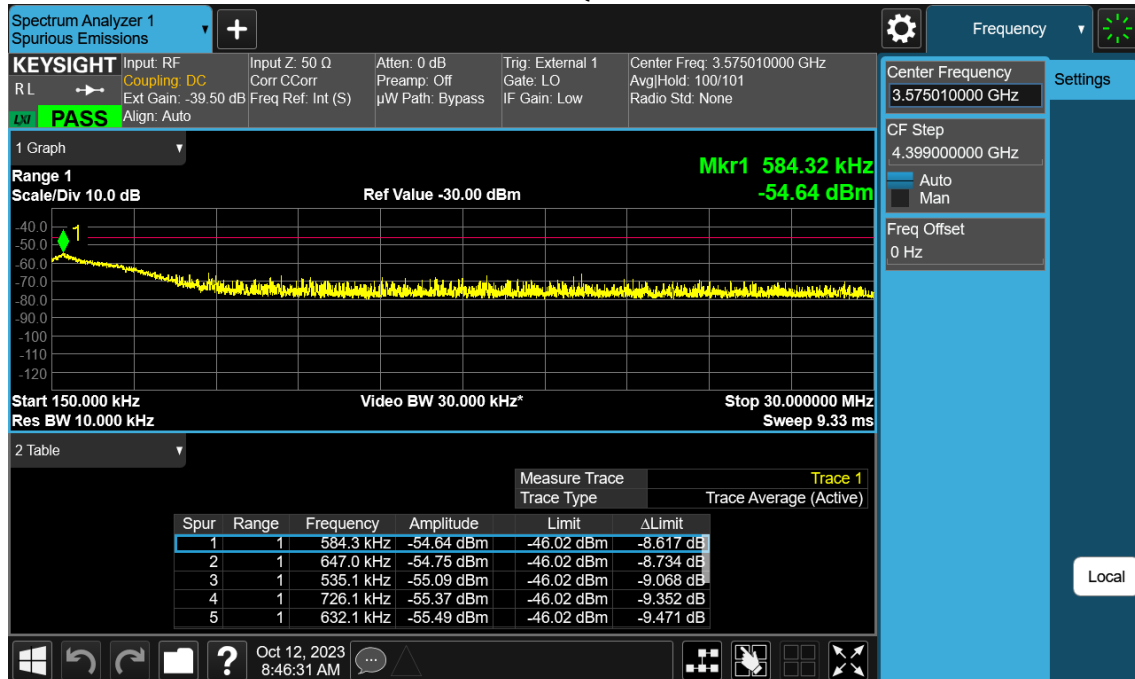
9KHz – 150kHz

Signal BW (MHz) Power Level (dBm) TM Modulation Channel Frequency (MHz) TX  
 10 + 10 + 50 + 10 + 10 + 10 + 10 37 3.1a 256QAM 3555+3564+3594+3665+3675+3695+3695 3



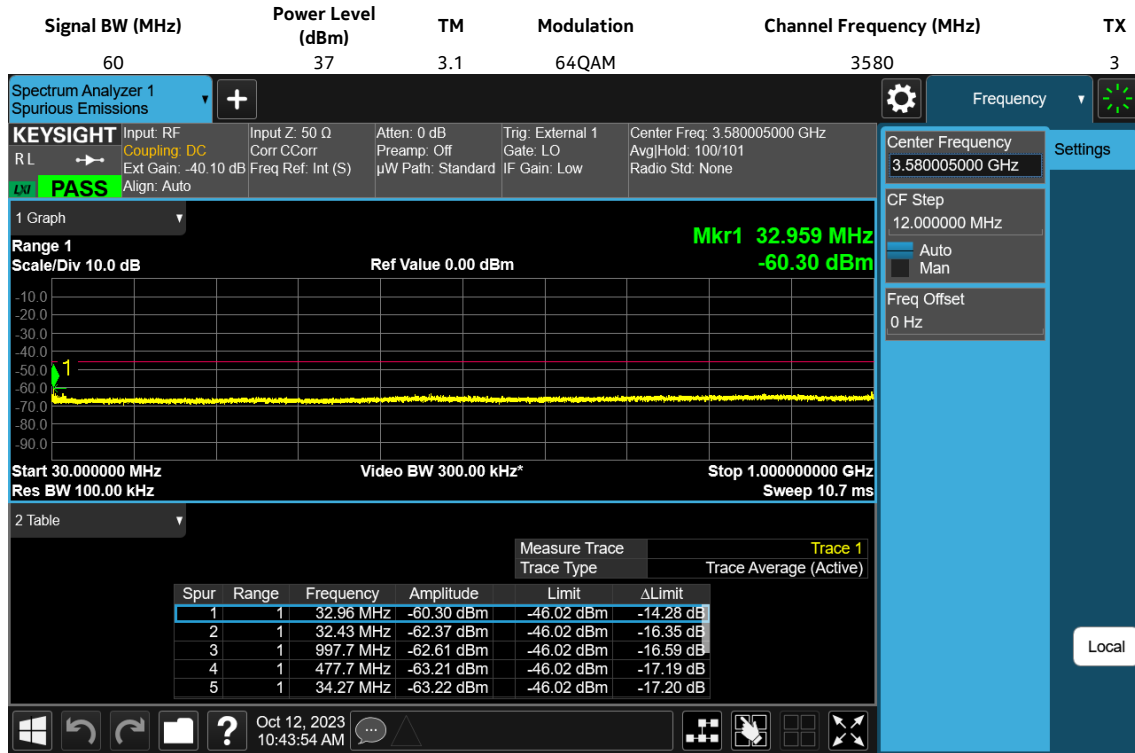
150kHz – 30MHz

Signal BW (MHz) Power Level (dBm) TM Modulation Channel Frequency (MHz) TX  
 50 37 3.1 64QAM 3575 3

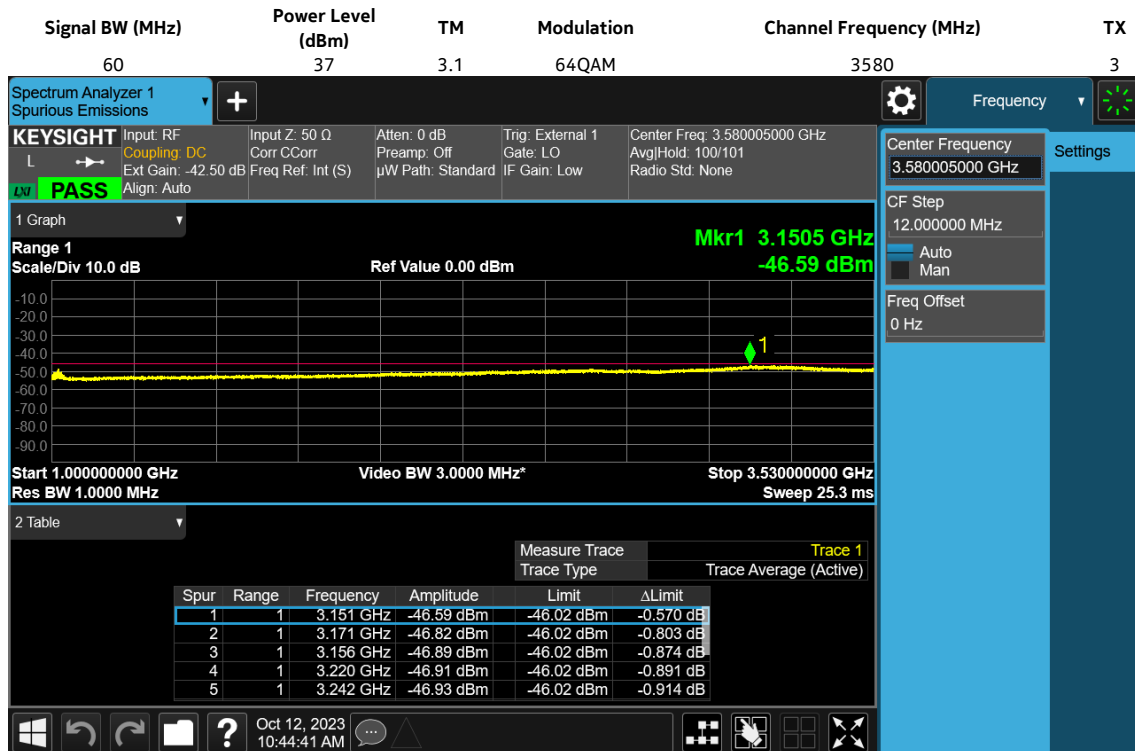




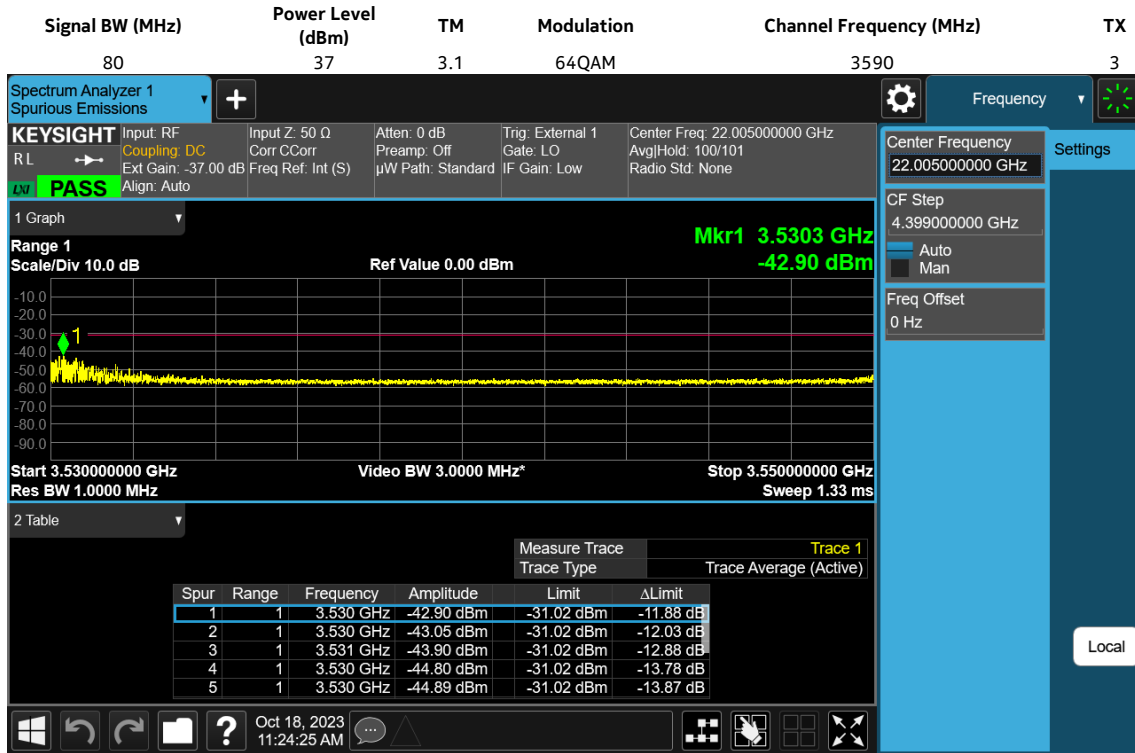
### 30MHz – 1GHz



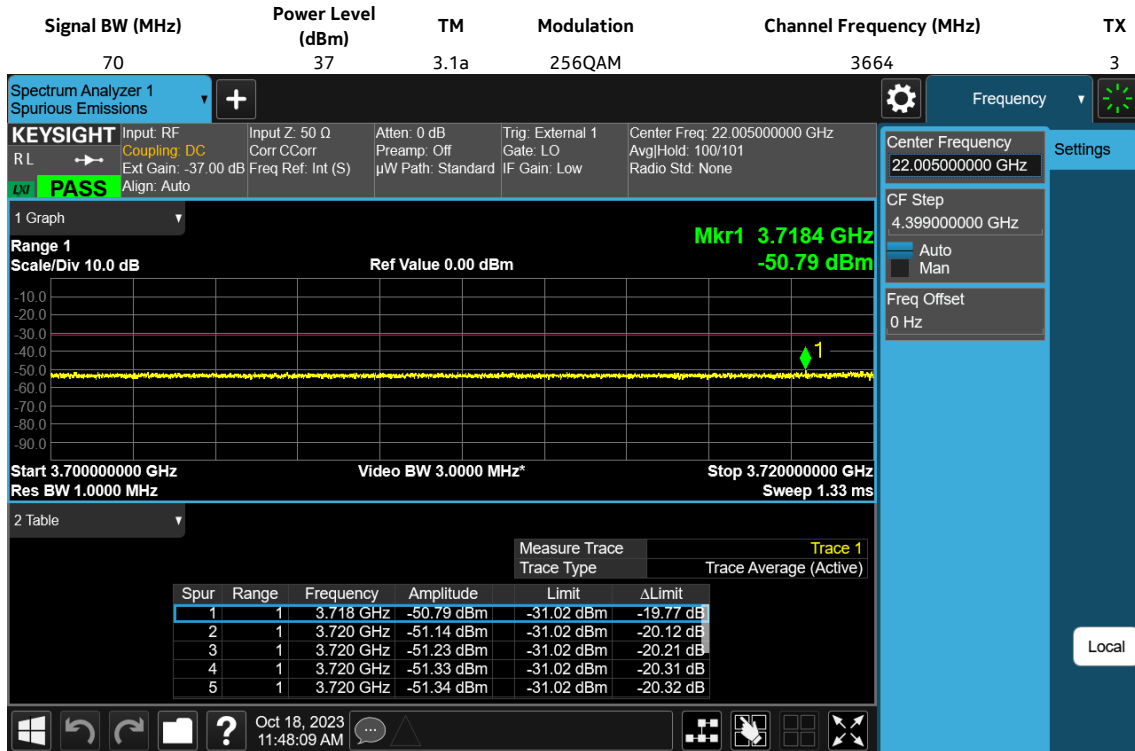
### 1GHz – 3.53GHz



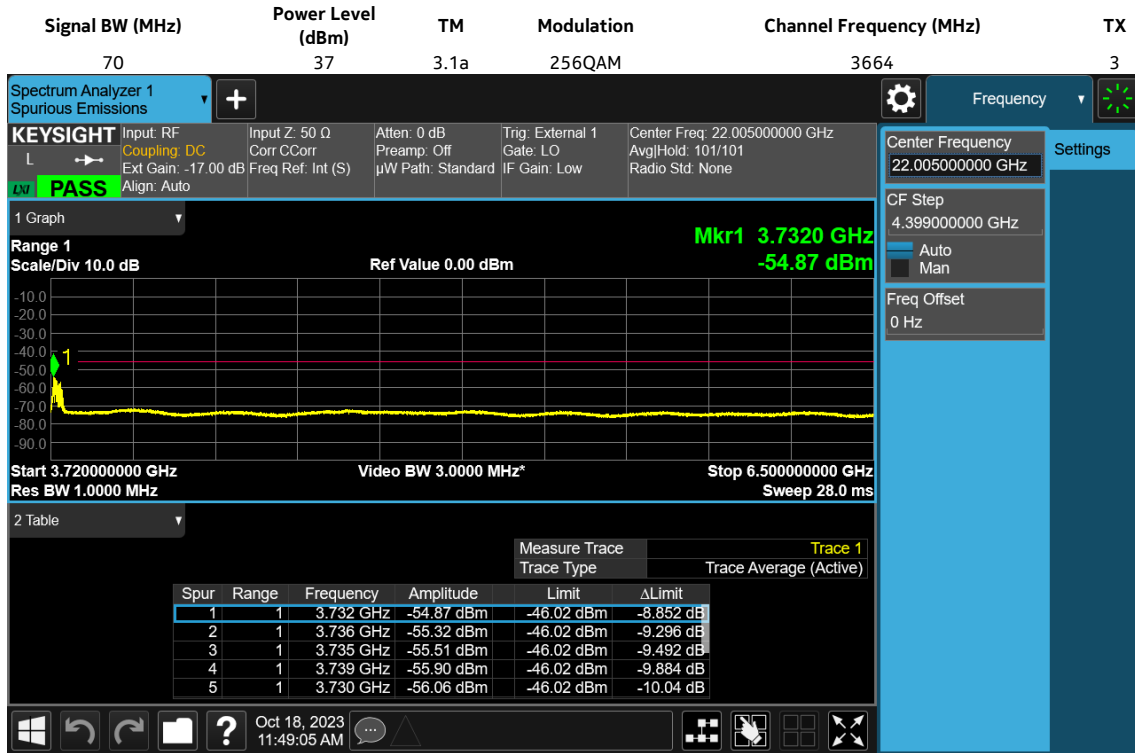
### 3.53GHz – 3.55GHz



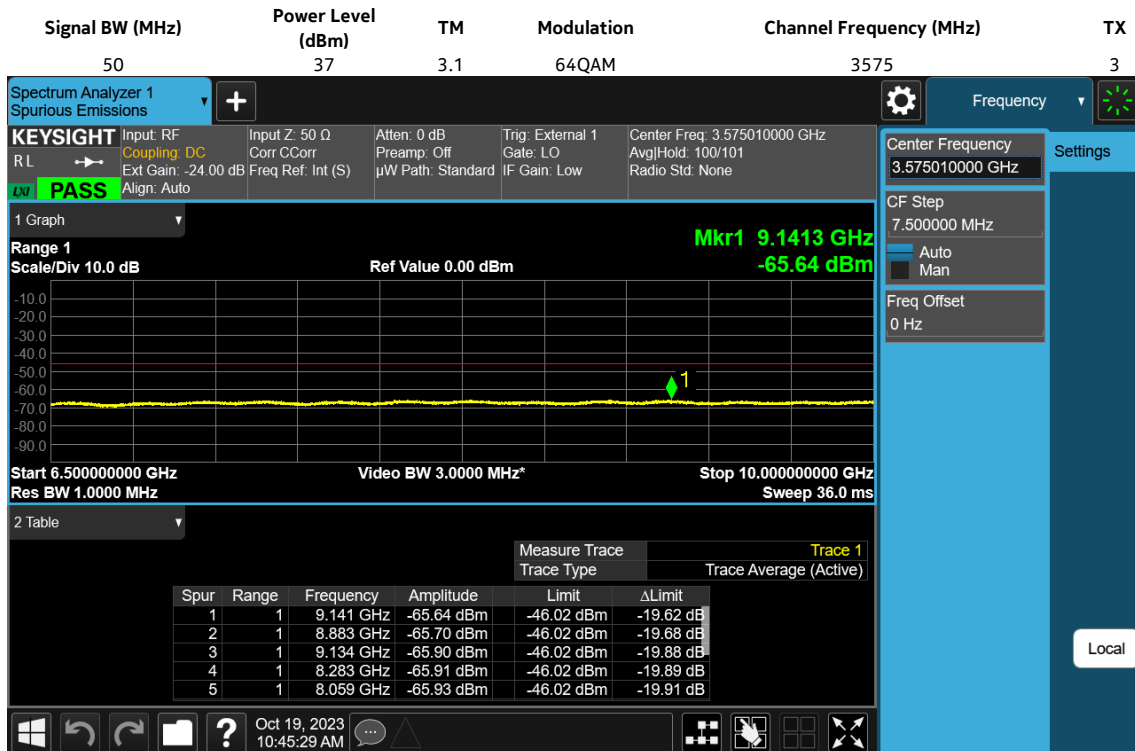
### 3.70GHz – 3.72GHz



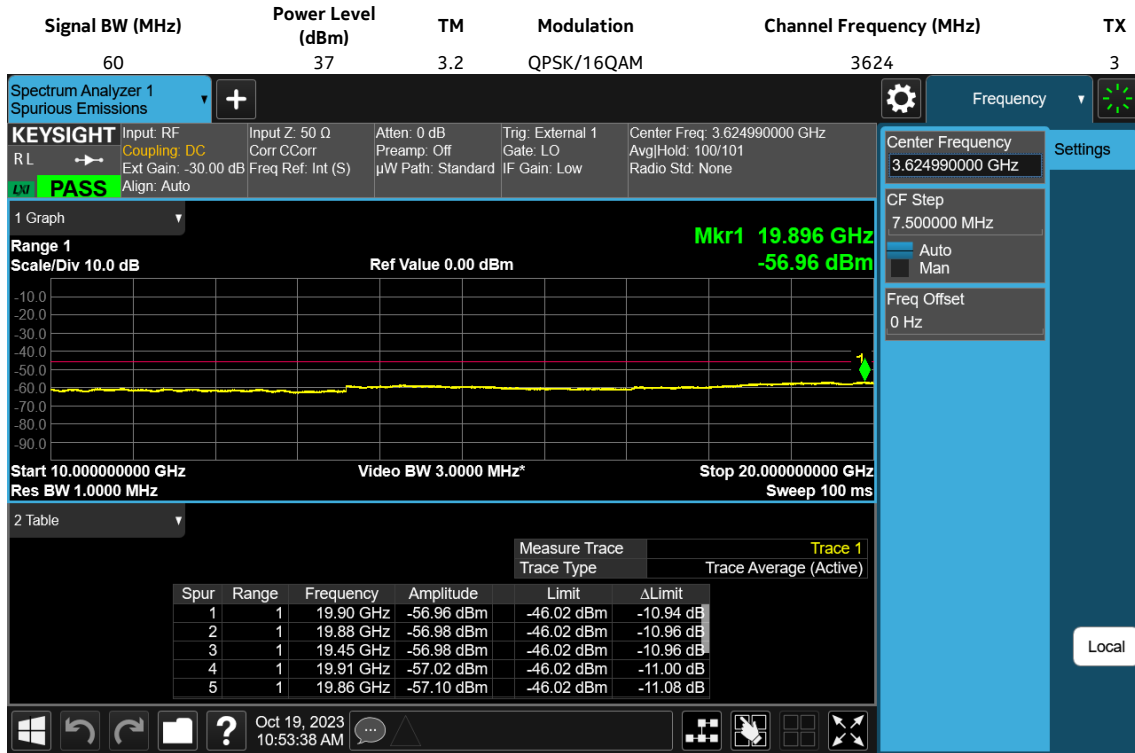
### 3.72GHz – 6.5GHz



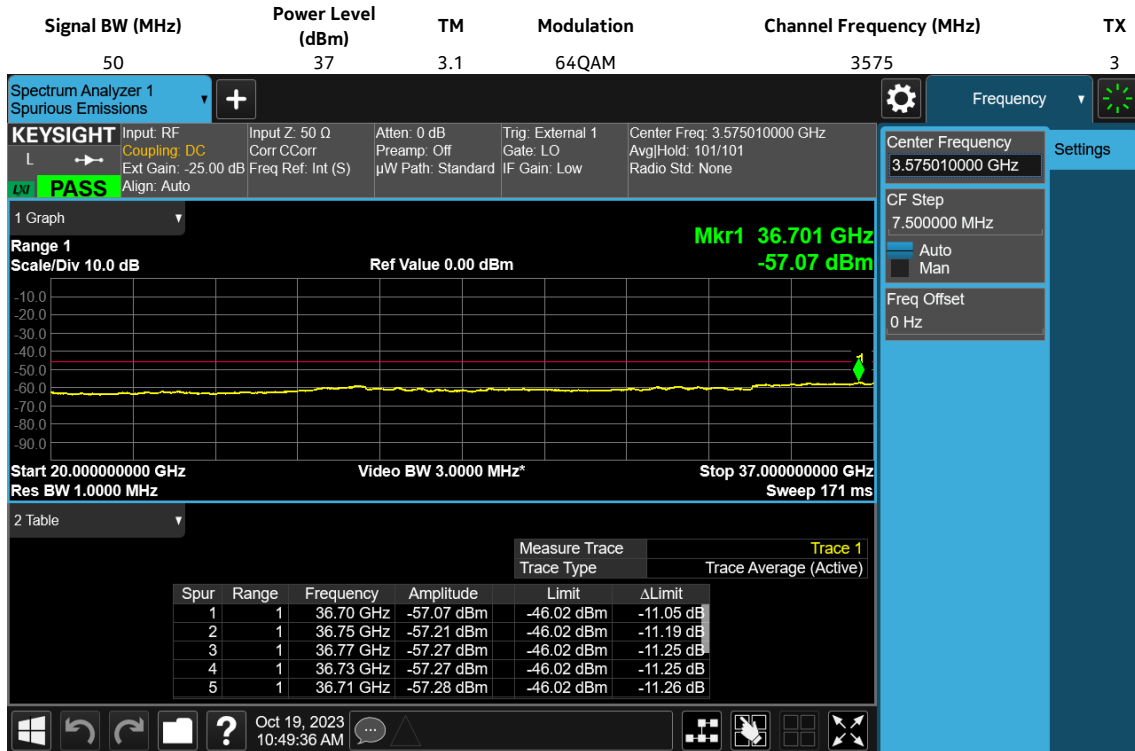
### 6.5GHz – 10GHz



### 10GHz – 20GHz

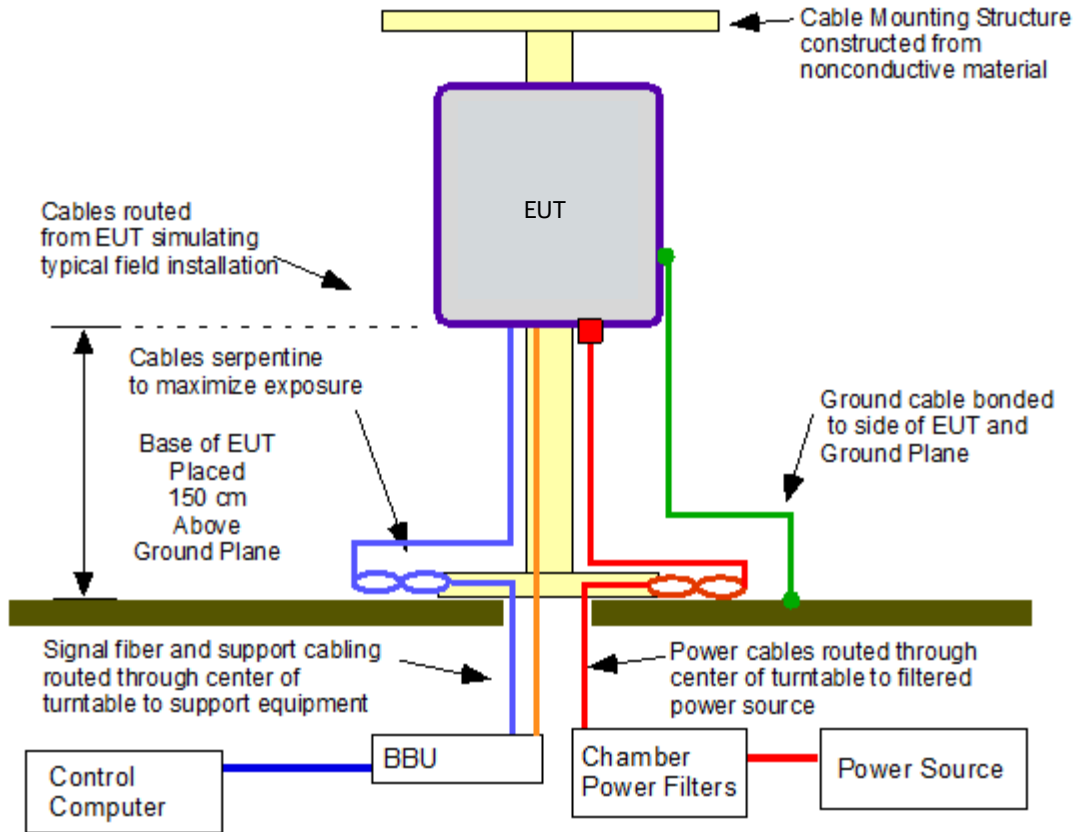


### 20GHz – 37GHz





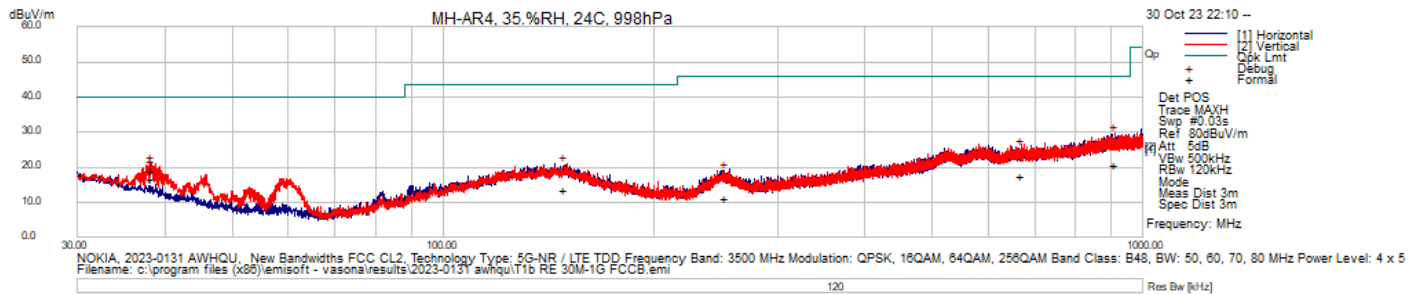
### Radiated Emission Setup



AirScale 28 GHz Radio Unit  
AEUA RE Setup  
W.S. Majkowski 10-2-2018

### 6.3 Transmitter Measurements of Radiated Spurious Emissions Plots

#### RE 30MHz – 1GHz



#### Test Information

<b>Results Title</b>	Radiated E 3m 30MHz-1GHz
<b>File Name</b>	T1b RE 30M-1G FCCB.emi
<b>Test Laboratory</b>	MH-AR4, 35. %RH, 24C, 998hPa
<b>Test Engineer</b>	BB/MJS
<b>Test Software</b>	Vasona by EMISoft, version 6.061
<b>Equipment</b>	NOKIA
<b>EUT Details</b>	2023-0131 AWHQU, New Bandwidths FCC CL2, Technology Type: 5G-NR / LTE TDD Frequency Band: 3500 MHz Modulation: QPSK, 16QAM, 64QAM, 256QAM Band Class: B48, BW: 50, 60, 70, 80 MHz Power Level: 4 x 5 W, MIMO, 2023-0131 - AWHQU New Bandwidths FCC CL2, NR50 3624.99MHz 3.1 37dBm SN EB2313R0212, PN: 746212A.101
<b>Configuration</b>	2023-0131 - AWHQU New Bandwidths FCC CL2, RE 30MHz-1GHz FCCB, 3 Meter distance, Offset bore, Antenna E758, PreAmp E813, Instrument ESW E1511, LPF E792, AR4 cable set
<b>Date</b>	2023-10-30 22:10:31

#### Formal Data

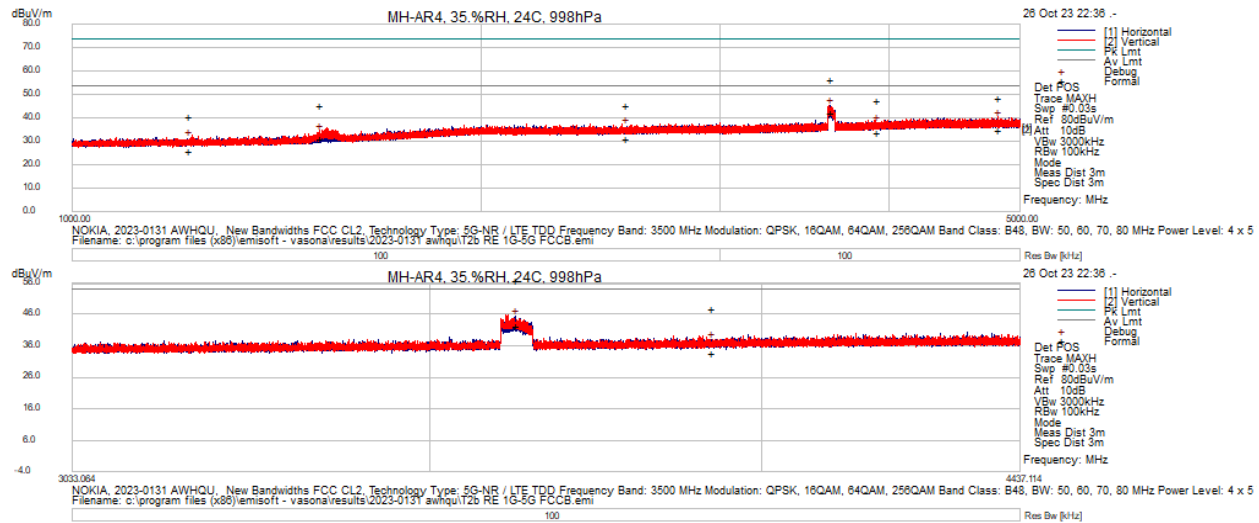
Frequency MHz	Raw dBuV	Cable Loss	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
38.304	32.08	0.57	-13.67	18.97	QuasiMax	V	105	171	40.00	-21.03	Pass	
38.305	29.85	0.57	-13.67	16.75	QuasiMax	V	104	298	40.00	-23.25	Pass	
911.283	20.93	3.41	-3.77	20.57	QuasiMax	H	125	54	46.00	-25.43	Pass	
669.050	21.19	2.66	-6.25	17.61	QuasiMax	H	257	345	46.00	-28.39	Pass	
148.618	21.22	1.20	-8.84	13.57	QuasiMax	H	188	39	43.50	-29.93	Pass	
252.424	20.74	1.49	-10.90	11.34	QuasiMax	H	272	19	46.00	-34.66	Pass	

#### Preview Data

Frequency MHz	Raw dBuV	Cable Loss	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
38.305	34.32	0.57	-13.67	21.21	NoTune	V	102	90	40.00	-18.79	Fail	
38.304	33.21	0.57	-13.67	20.10	NoTune	V	102	90	40.00	-19.90	Fail	
148.618	28.74	1.20	-8.84	21.10	NoTune	H	102	353	43.50	-22.40	Fail	
252.424	28.44	1.49	-10.90	19.04	NoTune	H	102	353	46.00	-26.96	Fail	
669.050	29.44	2.66	-6.25	25.86	NoTune	H	102	353	46.00	-20.14	Fail	
911.283	30.10	3.41	-3.77	29.74	NoTune	H	102	353	46.00	-16.26	Fail	

Note: Preview data was measured using a peak detector to identify frequencies of interest for formal measurement. Formal data consist of all frequencies in the preview list within 6 dB of specification limit or the top six frequencies. Failure in preview data does not necessarily constitute failure in formal data.

RE 1GHz – 5GHz



Test Information

<b>Results Title</b>	Radiated E 3m 1-18GHz
<b>File Name</b>	T2b RE 1G-5G FCCB.emi
<b>Test Laboratory</b>	MH-AR4, 35. %RH, 24C, 998hPa
<b>Test Engineer</b>	BB/MJS
<b>Test Software</b>	Vasona by EMISoft, version 6.061
<b>Equipment</b>	NOKIA
<b>EUT Details</b>	2023-0131 AWHQU, New Bandwidths FCC CL2, Technology Type: 5G-NR / LTE TDD Frequency Band: 3500 MHz Modulation: QPSK, 16QAM, 64QAM, 256QAM Band Class: B48, BW: 50, 60, 70, 80 MHz Power Level: 4 x 5 W, MIMO, 2023-0131 - AWHQU New Bandwidths FCC CL2, NR50 3624.99MHz 3.1 37dBm SN EB2313R0212, PN: 746212A.101
<b>Configuration</b>	2023-0131 - AWHQU New Bandwidths FCC CL2, RE 1G-5G FCCB, 3 Meter distance straight bore, Antenna E1073, PreAmp E1602, Instrument ESW E1511, 6dBPad E889, AR4 cable set
<b>Date</b>	2023-10-26 22:36:17

Formal Data

Frequency MHz	Raw dBuV	Cable Loss	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
3625.068	42.48	8.73	-9.02	42.19	AvgMax	V	153	69	54.00	-11.81	Pass	
3625.068	56.87	8.73	-9.02	56.58	PeakMax	V	153	69	74.00	-17.42	Pass	
4824.674	33.81	9.28	-8.34	34.76	AvgMax	V	277	180	54.00	-19.24	Pass	
3921.812	33.23	8.86	-8.50	33.59	AvgMax	H	153	196	54.00	-20.41	Pass	
1524.164	37.31	7.76	-13.64	31.43	AvgMax	V	105	291	54.00	-22.57	Pass	
2562.404	33.07	8.25	-9.92	31.40	AvgMax	H	147	5	54.00	-22.60	Pass	
4824.674	47.84	9.28	-8.34	48.78	PeakMax	V	277	180	74.00	-25.22	Pass	
3921.812	47.17	8.86	-8.50	47.52	PeakMax	H	153	196	74.00	-26.48	Pass	
1219.350	33.07	7.54	-14.47	26.14	AvgMax	H	127	155	54.00	-27.86	Pass	
2562.404	47.02	8.25	-9.92	45.35	PeakMax	H	147	5	74.00	-28.65	Pass	
1524.164	51.15	7.76	-13.64	45.27	PeakMax	V	105	291	74.00	-28.73	Pass	
1219.350	47.56	7.54	-14.47	40.63	PeakMax	H	127	155	74.00	-33.37	Pass	

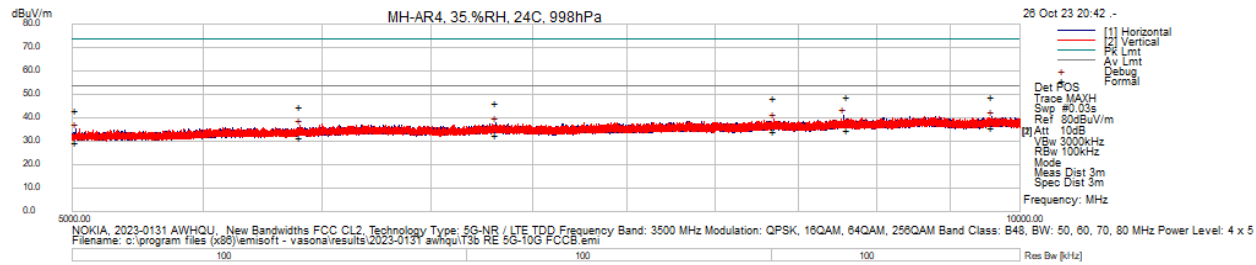


**Preview Data**

Frequency MHz	Raw dBuV	Cable Loss	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
3625.068	45.86	8.73	-9.02	45.57	NoTune	V	152	242	54.00	-8.43	Pass	
4824.674	39.55	9.28	-8.34	40.50	NoTune	V	102	352	54.00	-13.50	Pass	
1524.164	40.31	7.76	-13.64	34.43	NoTune	V	100	353	54.00	-19.57	Pass	
2562.404	38.97	8.25	-9.92	37.30	NoTune	H	100	353	54.00	-16.70	Pass	
1219.350	38.88	7.54	-14.47	31.95	NoTune	H	100	353	54.00	-22.05	Pass	
3921.812	37.86	8.86	-8.50	38.22	NoTune	H	100	353	54.00	-15.78	Pass	

Note: Preview data was measured using a peak detector to identify frequencies of interest for formal measurement. Formal data consist of all frequencies in the preview list within 6 dB of specification limit or the top six frequencies. Failure in preview data does not necessarily constitute failure in formal data.

RE 5GHz – 10GHz



Test Information

<b>Results Title</b>	Radiated E 3m 1-18GHz
<b>File Name</b>	T3b RE 5G-10G FCCB.emi
<b>Test Laboratory</b>	MH-AR4, 35. %RH, 24C, 998hPa
<b>Test Engineer</b>	BB/MJS
<b>Test Software</b>	Vasona by EMISoft, version 6.061
<b>Equipment</b>	NOKIA
<b>EUT Details</b>	2023-0131 AWHQU, New Bandwidths FCC CL2, Technology Type: 5G-NR / LTE TDD Frequency Band: 3500 MHz Modulation: QPSK, 16QAM, 64QAM, 256QAM Band Class: B48, BW: 50, 60, 70, 80 MHz Power Level: 4 x 5 W, MIMO, 2023-0131 - AWHQU New Bandwidths FCC CL2, NR50 3624.99MHz 3.1 37dBm SN EB2313R0212, PN: 746212A.101
<b>Configuration</b>	2023-0131 - AWHQU New Bandwidths FCC CL2, RE 5G-10G FCCB, 3 Meter distance straight bore, Antenna E1073, PreAmp E1602, Instrument ESW E1511, HPF E1480, AR4 cable set
<b>Date</b>	2023-10-26 20:42:31

Formal Data

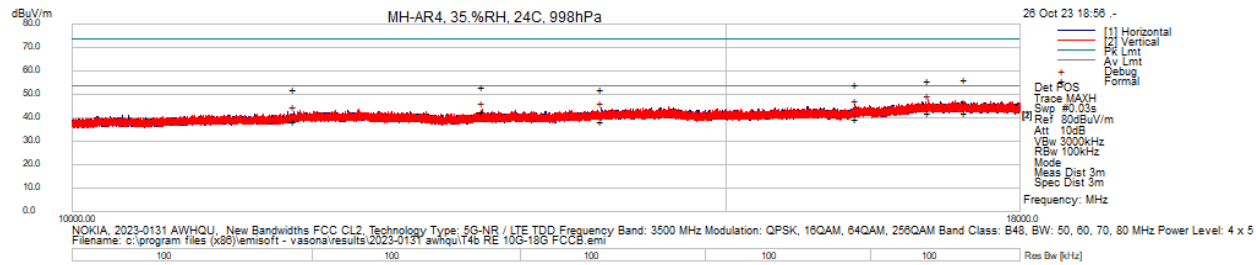
Frequency MHz	Raw dBuV	Cable Loss	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
9788.434	32.76	5.58	-2.57	35.76	AvgMax	V	103	5	54.00	-18.24	Pass	
8807.090	33.17	5.31	-3.73	34.75	AvgMax	H	266	57	54.00	-19.25	Pass	
8351.897	33.80	4.87	-4.24	34.43	AvgMax	V	181	163	54.00	-19.57	Pass	
6814.275	33.79	4.80	-5.79	32.79	AvgMax	V	211	46	54.00	-21.21	Pass	
5905.713	33.70	4.61	-6.84	31.47	AvgMax	V	204	82	54.00	-22.53	Pass	
5013.784	34.10	3.88	-8.25	29.73	AvgMax	V	241	245	54.00	-24.27	Pass	
9788.434	46.24	5.58	-2.57	49.24	PeakMax	V	103	5	74.00	-24.76	Pass	
8807.090	47.34	5.31	-3.73	48.92	PeakMax	H	266	57	74.00	-25.08	Pass	
8351.897	48.17	4.87	-4.24	48.80	PeakMax	V	181	163	74.00	-25.20	Pass	
6814.275	47.33	4.80	-5.79	46.33	PeakMax	V	211	46	74.00	-27.67	Pass	
5905.713	47.23	4.61	-6.84	45.00	PeakMax	V	204	82	74.00	-29.00	Pass	
5013.784	47.66	3.88	-8.25	43.29	PeakMax	V	241	245	74.00	-30.71	Pass	

Preview Data

Frequency MHz	Raw dBuV	Cable Loss	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
8786.777535	39.64	5.29	-3.76	41.17	Debug	H	302	88	54.00	-12.83	Pass	
5013.784	39.28	3.88	-8.25	34.91	Debug	V	101	353	54.00	-19.09	Pass	
5905.713	39.08	4.61	-6.84	36.85	Debug	V	101	353	54.00	-17.15	Pass	
8351.897	38.70	4.87	-4.24	39.32	Debug	V	101	353	54.00	-14.68	Pass	
6814.275	38.82	4.80	-5.79	37.83	Debug	V	101	353	54.00	-16.17	Pass	
9788.434	37.47	5.58	-2.57	40.47	Debug	V	101	353	54.00	-13.53	Pass	

Note: Preview data was measured using a peak detector to identify frequencies of interest for formal measurement. Formal data consist of all frequencies in the preview list within 6 dB of specification limit or the top six frequencies. Failure in preview data does not necessarily constitute failure in formal data.

RE 10GHz – 18GHz



Test Information

<b>Results Title</b>	Radiated E 3m 1-18GHz
<b>File Name</b>	T4b RE 10G-18G FCCB.emi
<b>Test Laboratory</b>	MH-AR4, 35. %RH, 24C, 998hPa
<b>Test Engineer</b>	BB/MJS
<b>Test Software</b>	Vasona by EMISoft, version 6.061
<b>Equipment</b>	NOKIA
<b>EUT Details</b>	2023-0131 AWHQU, New Bandwidths FCC CL2, Technology Type: 5G-NR / LTE TDD Frequency Band: 3500 MHz Modulation: QPSK, 16QAM, 64QAM, 256QAM Band Class: B48, BW: 50, 60, 70, 80 MHz Power Level: 4 x 5 W, MIMO, 2023-0131 - AWHQU New Bandwidths FCC CL2, NR50 3624.99MHz 3.1 37dBm SN EB2313R0212, PN: 746212A.101
<b>Configuration</b>	2023-0131 - AWHQU New Bandwidths FCC CL2, RE10G-18G FCCB, 3 Meter distance straight bore, Antenna E1073, PreAmp E1602, Instrument ESW E1511, HPF E1480, AR4 cable set
<b>Date</b>	2023-10-26 18:56:49

Formal Data

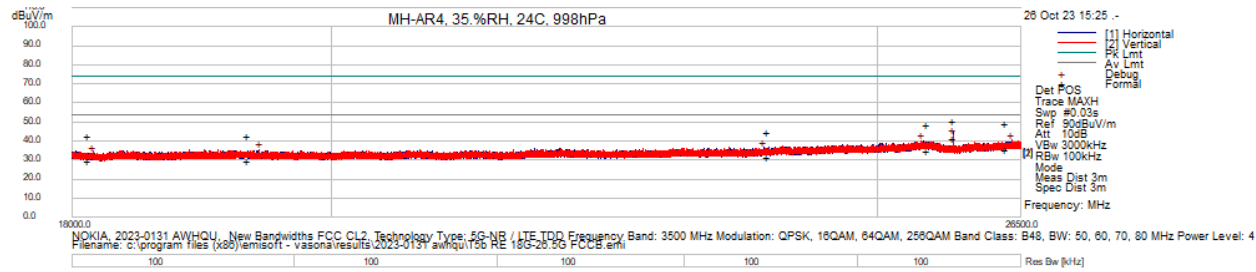
Frequency MHz	Raw dBuV	Cable Loss	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
12890.664	36.24	5.84	0.72	42.80	AvgMax	V	104	338	54.00	-11.20	Pass	
17391.581	32.90	7.10	2.42	42.42	AvgMax	V	292	351	54.00	-11.58	Pass	
16992.453	32.70	6.98	2.56	42.25	AvgMax	V	265	276	54.00	-11.75	Pass	
16246.831	32.73	6.47	0.67	39.86	AvgMax	V	233	193	54.00	-14.14	Pass	
13877.096	31.71	6.26	0.61	38.58	AvgMax	V	103	321	54.00	-15.42	Pass	
11467.221	32.49	5.93	0.05	38.46	AvgMax	V	102	230	54.00	-15.54	Pass	
17391.581	46.86	7.10	2.42	56.39	PeakMax	V	292	351	74.00	-17.61	Pass	
16992.453	46.20	6.98	2.56	55.74	PeakMax	V	265	276	74.00	-18.26	Pass	
16246.831	47.02	6.47	0.67	54.15	PeakMax	V	233	193	74.00	-19.85	Pass	
12890.664	46.76	5.84	0.72	53.32	PeakMax	V	104	338	74.00	-20.68	Pass	
11467.221	46.34	5.93	0.05	52.32	PeakMax	V	102	230	74.00	-21.68	Pass	
13877.096	45.41	6.26	0.61	52.28	PeakMax	V	103	321	74.00	-21.72	Pass	

Preview Data

Frequency MHz	Raw dBuV	Cable Loss	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
11467.221	36.72	5.93	0.05	42.70	Debug	V	102	353	54.00	-11.30	Pass	
12890.664	37.41	5.84	0.72	43.97	Debug	V	102	353	54.00	-10.03	Pass	
16246.831	37.89	6.47	0.67	45.03	Debug	V	102	353	54.00	-8.97	Pass	
16992.453	37.81	6.98	2.56	47.35	Debug	V	102	353	54.00	-6.65	Pass	
13877.096	37.22	6.26	0.61	44.09	Debug	V	102	353	54.00	-9.91	Pass	
17391.581	35.11	7.10	2.42	44.63	Debug	V	102	353	54.00	-9.37	Pass	

Note: Preview data was measured using a peak detector to identify frequencies of interest for formal measurement. Formal data consist of all frequencies in the preview list within 6 dB of specification limit or the top six frequencies. Failure in preview data does not necessarily constitute failure in formal data.

RE 18GHz – 26.5GHz



Test Information

<b>Results Title</b>	Radiated E 3M 18-26.5GHz
<b>File Name</b>	T5b RE 18G-26.5G FCCB.emi
<b>Test Laboratory</b>	MH-AR4, 35. %RH, 24C, 998hPa
<b>Test Engineer</b>	BB/MJS
<b>Test Software</b>	Vasona by EMISoft, version 6.061
<b>Equipment</b>	NOKIA
<b>EUT Details</b>	2023-0131 AWHQU, New Bandwidths FCC CL2, Technology Type: 5G-NR / LTE TDD Frequency Band: 3500 MHz Modulation: QPSK, 16QAM, 64QAM, 256QAM Band Class: B48, BW: 50, 60, 70, 80 MHz Power Level: 4 x 5 W, MIMO, 2023-0131 - AWHQU New Bandwidths FCC CL2, NR50 3624.99MHz 3.1 37dBm SN EB2313R0212, PN: 746212A.101
<b>Configuration</b>	2023-0131 - AWHQU New Bandwidths FCC CL2, RE18G-26.5G FCCB, 3 Meter distance straight bore, Antenna E1451, PreAmp E1600, Instrument ESW E1511, HPF E1211, E1528+E1529 cable set
<b>Date</b>	2023-10-26 15:25:50

Formal Data

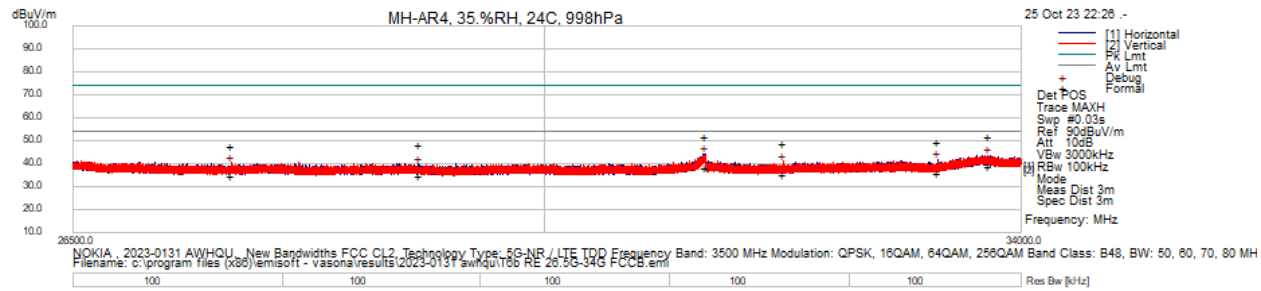
Frequency MHz	Raw dBuV	Cable Loss	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
25781.256	41.21	13.39	-13.46	41.14	AvgMax	H	104	285	54.00	-12.86	Pass	
26343.193	35.90	13.41	-13.88	35.44	AvgMax	H	279	269	54.00	-18.56	Pass	
25508.364	34.73	13.32	-13.01	35.04	AvgMax	H	102	27	54.00	-18.96	Pass	
23901.861	32.85	12.91	-14.15	31.60	AvgMax	V	122	46	54.00	-22.40	Pass	
25781.256	50.36	13.39	-13.46	50.29	PeakMax	H	104	285	74.00	-23.71	Pass	
19336.472	36.78	11.58	-18.66	29.69	AvgMax	V	242	305	54.00	-24.31	Pass	
18114.946	36.79	11.59	-19.03	29.35	AvgMax	V	248	340	54.00	-24.65	Pass	
26343.193	49.72	13.41	-13.88	49.26	PeakMax	H	279	269	74.00	-24.74	Pass	
25508.364	48.10	13.32	-13.01	48.41	PeakMax	H	102	27	74.00	-25.59	Pass	
23901.861	45.87	12.91	-14.15	44.62	PeakMax	V	122	46	74.00	-29.38	Pass	
19336.472	49.99	11.58	-18.66	42.90	PeakMax	V	242	305	74.00	-31.10	Pass	
18114.946	50.29	11.59	-19.03	42.85	PeakMax	V	248	340	74.00	-31.15	Pass	

Preview Data

Frequency MHz	Raw dBuV	Cable Loss	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
18154.178	41.28	11.57	-19.07	33.77	Debug	V	102	353	54.00	-20.23	Pass	
19427.919	42.80	11.60	-18.60	35.74	Debug	V	102	353	54.00	-18.30	Pass	
23863.487	37.66	12.91	-14.19	36.38	Debug	V	0	353	54.00	-17.62	Pass	
25450.133	39.81	13.29	-13.11	39.99	Debug	H	102	69	54.00	-14.01	Pass	
25781.279	43.00	13.39	-13.46	42.93	Debug	H	102	0	54.00	-11.07	Pass	
26410.316	40.70	13.40	-13.89	40.22	Debug	H	102	0	54.00	-13.78	Pass	

Note: Preview data was measured using a peak detector to identify frequencies of interest for formal measurement. Formal data consist of all frequencies in the preview list within 6 dB of specification limit or the top six frequencies. Failure in preview data does not necessarily constitute failure in formal data.

RE 26.5 GHz – 34 GHz



Test Information

<b>Results Title</b>	Radiated E 3M 26.5-40GHz
<b>File Name</b>	T6b RE 26.5G-34G FCCB.emi
<b>Test Laboratory</b>	MH-AR4, 35. %RH, 24C, 998hPa
<b>Test Engineer</b>	BB/MJS
<b>Test Software</b>	Vasona by EMISoft, version 6.061
<b>Equipment</b>	NOKIA
<b>EUT Details</b>	2023-0131 AWHQU, New Bandwidths FCC CL2, Technology Type: 5G-NR / LTE TDD Frequency Band: 3500 MHz Modulation: QPSK, 16QAM, 64QAM, 256QAM Band Class: B48, BW: 50, 60, 70, 80 MHz Power Level: 4 x 5 W, MIMO, 2023-0131 - AWHQU New Bandwidths FCC CL2, NR50 3624.99MHz 3.1 37dBm SN EB2313R0212, PN: 746212A.101
<b>Configuration</b>	2023-0131 - AWHQU New Bandwidths FCC CL2, RE 26.5G-34G FCCB, 3 Meter distance straight bore, Antenna E1373, PreAmp E1600, Instrument ESW E1511, HPF E1211, E1528+E1529 cable set
<b>Date</b>	2023-10-25 19:12:44

Formal Data

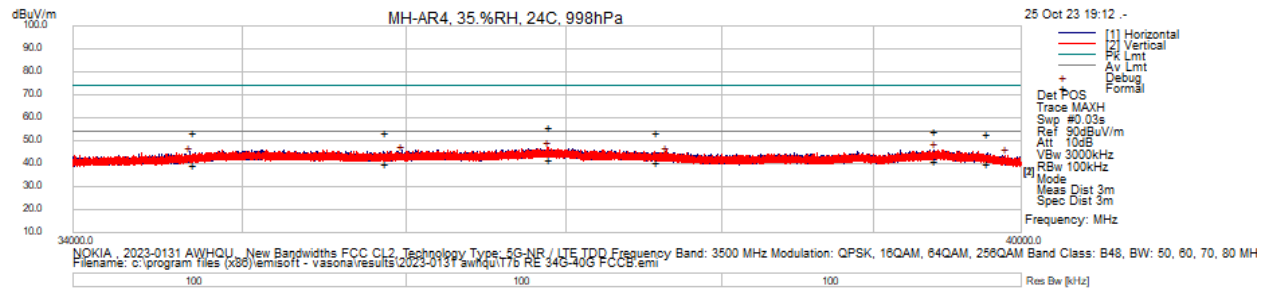
Frequency MHz	Raw dBuV	Cable Loss	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
36897.158	37.23	15.63	-10.80	42.06	AvgMax	V	125	121	54.00	-11.94	Pass	
39411.875	35.84	16.30	-11.08	41.07	AvgMax	H	129	2	54.00	-12.93	Pass	
37576.981	35.74	15.69	-10.90	40.53	AvgMax	H	191	219	54.00	-13.47	Pass	
35870.560	35.55	15.21	-10.48	40.28	AvgMax	V	283	3	54.00	-13.72	Pass	
39772.904	35.02	16.33	-11.46	39.90	AvgMax	V	296	236	54.00	-14.10	Pass	
34708.892	35.18	14.92	-10.40	39.70	AvgMax	V	186	351	54.00	-14.30	Pass	
36897.158	51.26	15.63	-10.80	56.09	PeakMax	V	125	121	74.00	-17.91	Pass	
39411.875	49.23	16.30	-11.08	54.46	PeakMax	H	129	2	74.00	-19.54	Pass	
37576.981	49.03	15.69	-10.90	53.82	PeakMax	H	191	219	74.00	-20.18	Pass	
34708.892	49.29	14.92	-10.40	53.81	PeakMax	V	186	351	74.00	-20.19	Pass	
35870.560	48.85	15.21	-10.48	53.59	PeakMax	V	283	3	74.00	-20.41	Pass	
39772.904	48.16	16.33	-11.46	53.04	PeakMax	V	296	236	74.00	-20.96	Pass	

Preview Data

Frequency MHz	Raw dBuV	Cable Loss	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
36884.200	42.10	15.62	-10.77	46.95	Debug	V	202	44	54.00	-7.05	Pass	
39411.867	40.97	16.30	-11.08	46.20	Debug	H	252	330	54.00	-7.80	Pass	
39896.200	39.09	16.34	-11.69	43.74	Debug	V	152	66	54.00	-10.26	Pass	
34690.701	40.03	14.91	-10.43	44.52	Debug	V	100	350	54.00	-9.48	Pass	
35972.657	40.58	15.25	-10.58	45.25	Debug	V	100	350	54.00	-8.75	Pass	
37643.787	39.80	15.72	-10.93	44.60	Debug	H	100	350	54.00	-9.40	Pass	

Note: Preview data was measured using a peak detector to identify frequencies of interest for formal measurement. Formal data consist of all frequencies in the preview list within 6 dB of specification limit or the top six frequencies. Failure in preview data does not necessarily constitute failure in formal data.

RE 34 GHz – 40 GHz



Test Information

<b>Results Title</b>	Radiated E 3M 26.5-40GHz
<b>File Name</b>	T7b RE 34G-40G FCCB.emi
<b>Test Laboratory</b>	MH-AR4, 35. %RH, 24C, 998hPa
<b>Test Engineer</b>	BB/MJS
<b>Test Software</b>	Vasona by EMISoft, version 6.061
<b>Equipment</b>	NOKIA
<b>EUT Details</b>	2023-0131 AWHQU, New Bandwidths FCC CL2, Technology Type: 5G-NR / LTE TDD Frequency Band: 3500 MHz Modulation: QPSK, 16QAM, 64QAM, 256QAM Band Class: B48, BW: 50, 60, 70, 80 MHz Power Level: 4 x 5 W, MIMO, 2023-0131 - AWHQU New Bandwidths FCC CL2, NR50 3624.99MHz 3.1 37dBm SN EB2313R0212, PN: 746212A.101
<b>Configuration</b>	2023-0131 - AWHQU New Bandwidths FCC CL2, RE 34G-40G FCCB, 3 Meter distance 3m straight bore, Antenna E1373, PreAmp E1600, Instrument ESW E1511, HPF E1211, E1528+E1529 cable set
<b>Date</b>	2023-10-25 19:12:44

Formal Data

Frequency MHz	Raw dBuV	Cable Loss	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
36897.158	37.23	15.63	-10.80	42.06	AvgMax	V	125	121	54.00	-11.94	Pass	
39411.875	35.84	16.30	-11.08	41.07	AvgMax	H	129	2	54.00	-12.93	Pass	
37576.981	35.74	15.69	-10.90	40.53	AvgMax	H	191	219	54.00	-13.47	Pass	
35870.560	35.55	15.21	-10.48	40.28	AvgMax	V	283	3	54.00	-13.72	Pass	
39772.904	35.02	16.33	-11.46	39.90	AvgMax	V	296	236	54.00	-14.10	Pass	
34708.892	35.18	14.92	-10.40	39.70	AvgMax	V	186	351	54.00	-14.30	Pass	
36897.158	51.26	15.63	-10.80	56.09	PeakMax	V	125	121	74.00	-17.91	Pass	
39411.875	49.23	16.30	-11.08	54.46	PeakMax	H	129	2	74.00	-19.54	Pass	
37576.981	49.03	15.69	-10.90	53.82	PeakMax	H	191	219	74.00	-20.18	Pass	
34708.892	49.29	14.92	-10.40	53.81	PeakMax	V	186	351	74.00	-20.19	Pass	
35870.560	48.85	15.21	-10.48	53.59	PeakMax	V	283	3	74.00	-20.41	Pass	
39772.904	48.16	16.33	-11.46	53.04	PeakMax	V	296	236	74.00	-20.96	Pass	

Preview Data

Frequency MHz	Raw dBuV	Cable Loss	AF dB/m	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
36884.200	42.10	15.62	-10.77	46.95	Debug	V	202	44	54.00	-7.05	Pass	
39411.867	40.97	16.30	-11.08	46.20	Debug	H	252	330	54.00	-7.80	Pass	
39896.200	39.09	16.34	-11.69	43.74	Debug	V	152	66	54.00	-10.26	Pass	
34690.701	40.03	14.91	-10.43	44.52	Debug	V	100	350	54.00	-9.48	Pass	
35972.657	40.58	15.25	-10.58	45.25	Debug	V	100	350	54.00	-8.75	Pass	
37643.787	39.80	15.72	-10.93	44.60	Debug	H	100	350	54.00	-9.40	Pass	



Note: Preview data was measured using a peak detector to identify frequencies of interest for formal measurement. Formal data consist of all frequencies in the preview list within 6 dB of specification limit or the top six frequencies. Failure in preview data does not necessarily constitute failure in formal data.

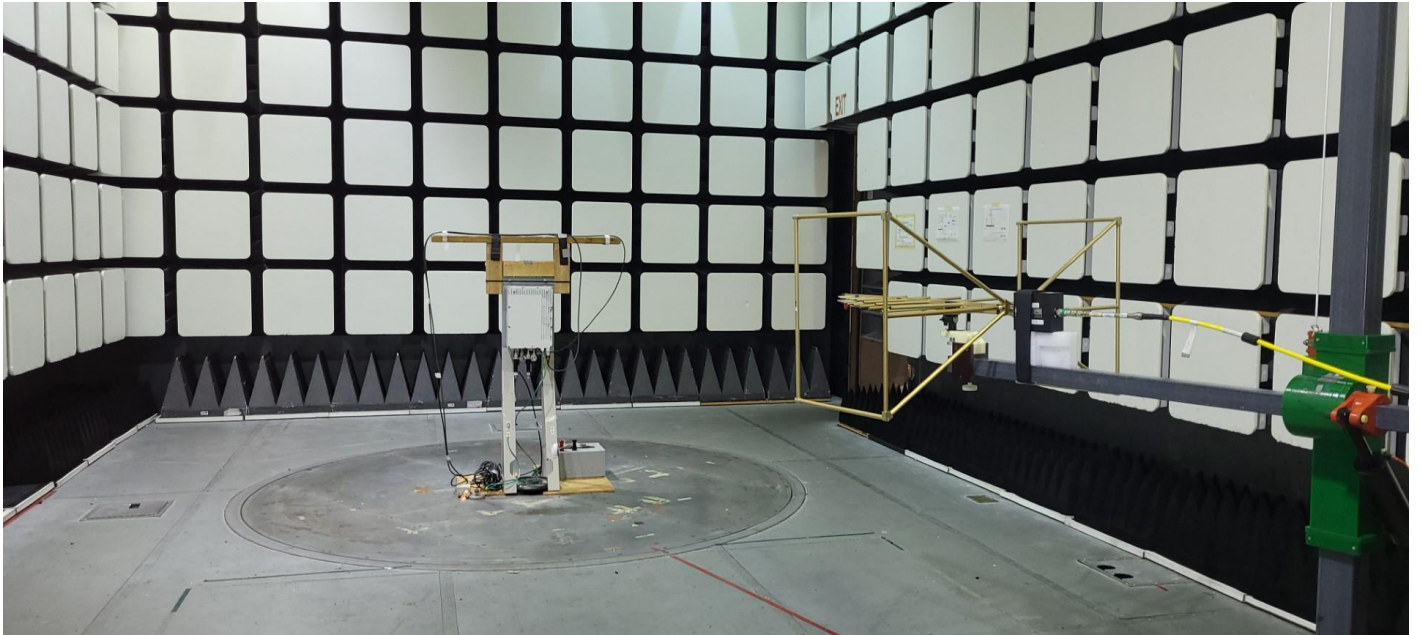
## Photographs

### Radio Test

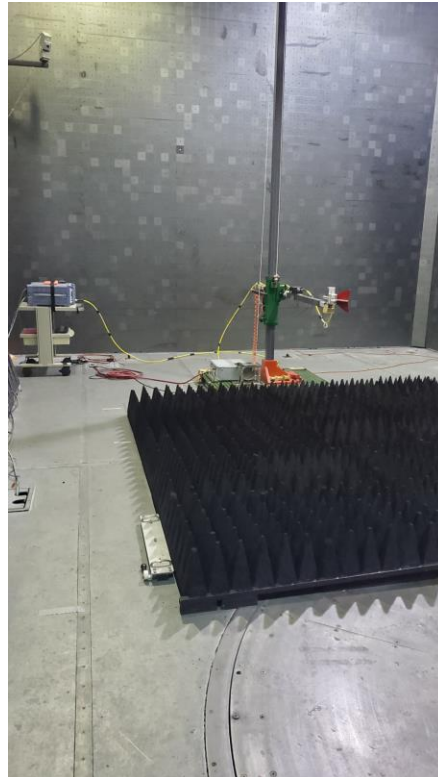


## Radiated Emission Test

### 30MHz – 1GHz



### 1GHz – 18GHz

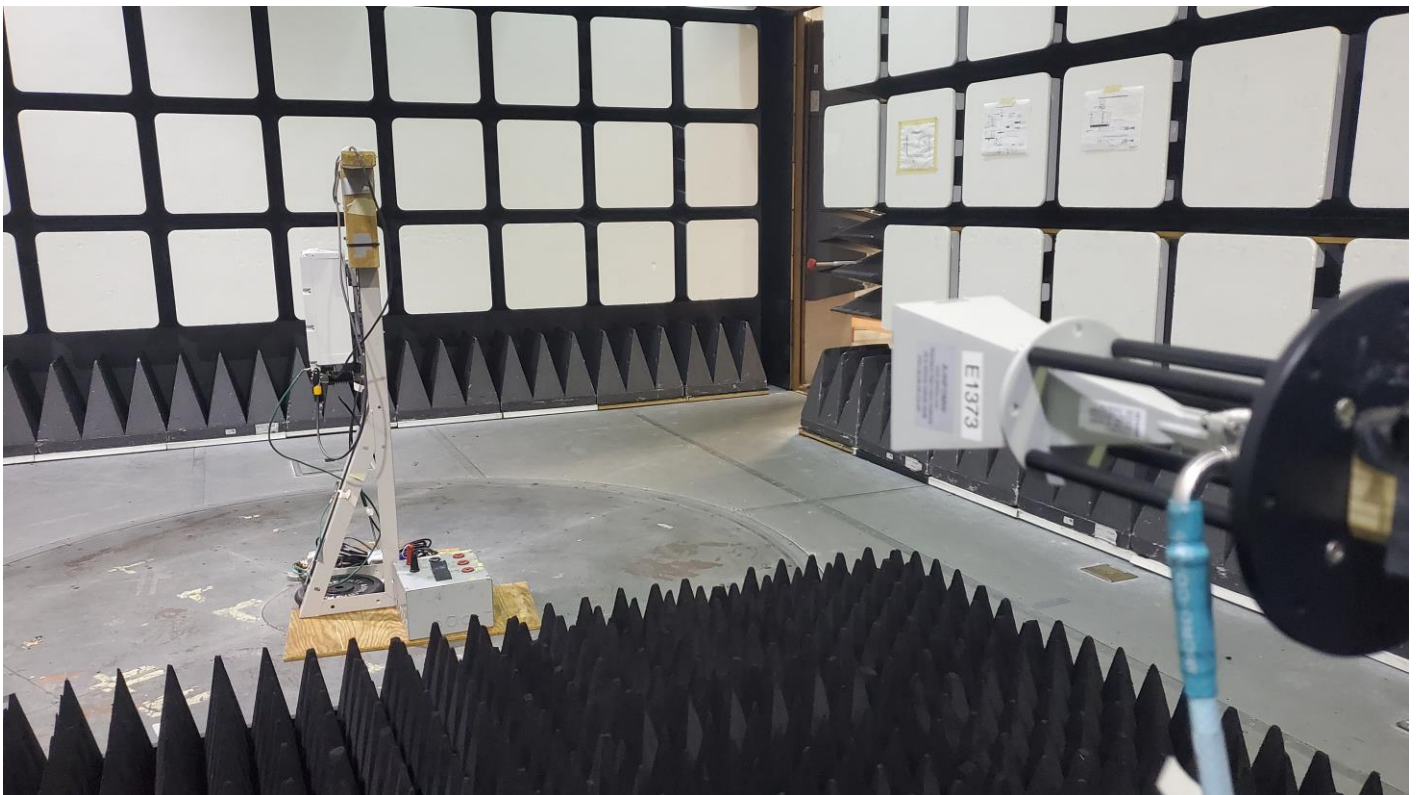




18GHz – 26.5GHz



26.5GHz – 40GHz



## Test Equipment

### Radio Test Equipment

Asset ID	Manufacturer	Type	Description	Model	Serial	Calibration Date	Calibration Due
E1338	KeySight Technologies	MXA Signal Analyzer	20 Hz-44 GHz (Analysis Bandwidth 125 MHz)	N9020B	MY57430927	2023-05-06	2025-05-06
E896	Agilent Technologies	Network Analyzer	10 MHz - 40 GHz	N5230C	MY49000897	2023-02-08	2025-02-08
1609	Traceable	Data Logger	Barometric Humidity Temp Data Logger	6453,98767-15	221743404	2022-08-25	2024-08-25

### Customer Provided Equipment

Manufacturer	Type	Description	Model	Serial	Calibration Type
Agilent	Attenuator	Attenuator Interconnect Kit, Type-N	11716A	MY42140029	CNR-V
Weinschel	Attenuator	20dB/50W DC-8.5GHz	24-20-34	CG3785	CNR-V
Weinschel	Attenuator	20dB/50W DC-8.5GHz	24-20-34	CG3744	CNR-V
Weinschel	Attenuator	20dB 50W DC – 8.5GHz	24-20-34	CG3752	CNR-V
Weinschel	Attenuator	20dB 50W DC – 8.5GHz	24-20-34	CG3766	CNR-V
Weinschel	Attenuator	20dB 50W DC – 8.5GHz	24-20-12	CE5787	CNR-V
Weinschel	Attenuator	20dB/50W DC-8.5GHz	24-20-34-LIM	CG3892	CNR-V
Weinschel	Attenuator	20dB/50W DC-8.5GHz	24-20-34	CD9980	CNR-V
Weinschel	Attenuator	20dB/50W DC-8.5GHz	24-20-34	CD9981	CNR-V
E1155	Weinschel	Attenuator	10dB 25Watt 0.05GHz - 26GHz	74-10-12	CNR-V
E1587	RLC Electronics Inc	Filter, High Pass 6-24GHz	11HS-6G/24G-K11	20-02	CNR-V
Creo wave Filters, OY	Filter	Filter, Notch	CW-BSF-3300-3700-E9-M2	2142001	CNR-V

CNR-V: Calibration Not Required, Must Be Verified

Test Date: 10/12/23 – 10/20/23

**Radiated Emission Test Equipment**

Asset ID	Manufacturer	Type	Description	Model	Serial	Calibration Date	Calibration Due
E1451	A-Info	Horn Antenna	18 to 26.5 GHz WR42 25 dB	LB-42-25-C2-KF	J202066360	2023-01-10	2025-01-10
E1373	A-Info	Horn Antenna	26.5-40GHz WR28 25 dB	LB-28-25-C2-KF	J202062735	2022-07-08	2025-07-08
E758	A.H. Systems Inc.	Biological Antenna	25 - 2000 MHz	SAS-521-2	458	2022-03-01	2024-03-01
E1600	A.H. Systems Inc.	Pre-Amplifier	18 - 42 GHz	PAM-1842	101	2023-01-10	2025-01-10
E1602	A.H. Systems Inc.	Pre-Amplifier	20 MHz - 18 GHz, 1 Watt Input limiter	PAM-0118P	620	2023-03-06	2025-03-06
E1073	ETS Lindgren	Horn Antenna	Double-Ridged Waveguide Horn 1- 18 GHz	3117	00135198	2023-06-06	2025-06-06
E1211	RLC Electronics Inc	Filter, High Pass	10 - 30 GHz, 2W, 5dB	F-19414	1444003	CNR-V	CNR-V
E1480	Reactel, Inc.	Filter, High Pass	DC - 4.3 GHz	11HS-X4.3GS11	SN20-02	CNR-V	CNR-V
E1511	Rohde & Schwarz	Test Receiver	EMI Test Receiver 2 Hz - 44 GHz	ESW44	101965	2023-07-31	2025-07-31
E813	Sonoma Instrument Co.	Amplifier	9kHz-1GHz	310N	186750	2022-11-28	2024-11-28
E792	Trilithic	Filter, Low Pass	900-2000 MHz, 50W	H10LC2000-1-AA	200817067	CNR	CNR

CNR-V: Calibration Not Required; Must be Verified

CNR: Calibration Not Required

Test Date: 10/25/23 - 10/30/23

## 7. NVLAP Certificate of Accreditation

<p>United States Department of Commerce National Institute of Standards and Technology</p>  	
<hr/> <b>Certificate of Accreditation to ISO/IEC 17025:2017</b> <hr/>	
<p>NVLAP LAB CODE: 100275-0</p>	
<p><b>Nokia, Global Product Compliance Lab</b> Murray Hill, NJ</p>	
<p><i>is accredited by the National Voluntary Laboratory Accreditation Program for specific services, listed on the Scope of Accreditation, for:</i></p>	
<p><b>Electromagnetic Compatibility &amp; Telecommunications</b></p>	
<p><i>This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communique dated January 2009).</i></p>	
<hr/> <p>2023-09-07 through 2024-09-30 Effective Dates</p>	 <hr/>  For the National Voluntary Laboratory Accreditation Program