



ELEMENT WASHINGTON DC LLC

7185 Oakland Mills Road, Columbia, MD 21046 USA
Tel. 410.290.6652 / Fax 410.290.6654
<http://www.element.com>

PART 24 MEASUREMENT REPORT

Applicant Name:
Microsoft Corporation
One Microsoft way
Redmond, WA, 98052
United States

Date of Testing:
03/15/2022- 06/24/2022
Test Report Issue Date:
08/09/2022
Test Site/Location:
Element, Columbia, MD, USA
Test Report Serial No.:
1M2204040049-05-R1.C3K

FCC ID:	C3K1997
Applicant Name:	Microsoft Corporation

Application Type:	Certification
Model:	1997
EUT Type:	Portable Computing Device
FCC Classification:	PCS Licensed Transmitter (PCB)
FCC Rule Part:	24
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.

Note: This revised Test Report (S/N: 1M2204040049-05-R1.C3K) 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.

RJ Ortanez
Executive Vice President



FCC ID: C3K1997	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2204040049-05-R1.C3K	Test Dates: 03/15/2022- 06/24/2022	EUT Type: Portable Computing Device	Page 1 of 181

V3.0 1/5/2022

TABLE OF CONTENTS

1.0	INTRODUCTION	5
1.1	Scope	5
1.2	Element Test Location.....	5
1.3	Test Facility / Accreditations.....	5
2.0	PRODUCT INFORMATION.....	6
2.1	Equipment Description	6
2.2	Device Capabilities.....	6
2.3	Test Configuration	6
2.4	Software and Firmware	6
2.5	EMI Suppression Device(s)/Modifications	6
3.0	DESCRIPTION OF TESTS	7
3.1	Evaluation Procedure	7
3.2	Radiated Power and Radiated Spurious Emissions	7
4.0	MEASUREMENT UNCERTAINTY	8
5.0	TEST EQUIPMENT CALIBRATION DATA	9
6.0	SAMPLE CALCULATIONS	10
7.0	TEST RESULTS	11
7.1	Summary.....	11
7.2	Conducted Output Power Data	12
7.3	Occupied Bandwidth	14
7.4	Spurious and Harmonic Emissions at Antenna Terminal	44
7.5	Band Edge Emissions at Antenna Terminal	65
7.6	Peak-Average Ratio	123
7.7	Radiated Power (EIRP).....	153
7.8	Radiated Spurious Emissions Measurements.....	158
7.9	Frequency Stability / Temperature Variation	177
8.0	CONCLUSION.....	181

FCC ID: C3K1997	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2204040049-05-R1.C3K	Test Dates: 03/15/2022- 06/24/2022	EUT Type: Portable Computing Device	Page 2 of 181

PART 24 MEASUREMENT REPORT

Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	EIRP		Emission Designator	
				Max. Power [W]	Max. Power [dBm]		
WCDMA	N/A	Spread Spectrum	1852.4 - 1907.6	0.336	25.26	4M17F9W	
LTE Band 25/2	20 MHz	QPSK	1860 - 1905	0.254	24.05	18M0G7D	
		16QAM	1860 - 1905	0.223	23.48	18M0W7D	
	15 MHz	QPSK	1857.5 - 1907.5	0.254	24.05	13M5G7D	
		16QAM	1857.5 - 1907.5	0.220	23.42	13M5W7D	
	10 MHz	QPSK	1855 - 1910	0.251	23.99	9M01G7D	
		16QAM	1855 - 1910	0.215	23.33	9M00W7D	
	5 MHz	QPSK	1852.5 - 1912.5	0.255	24.07	4M56G7D	
		16QAM	1852.5 - 1912.5	0.224	23.51	4M53W7D	
	3 MHz	QPSK	1851.5 - 1913.5	0.257	24.11	2M71G7D	
		16QAM	1851.5 - 1913.5	0.226	23.53	2M72W7D	
	1.4 MHz	QPSK	1850.7 - 1914.3	0.254	24.04	1M10G7D	
		16QAM	1850.7 - 1914.3	0.219	23.41	1M09W7D	
	NR Band n25	40 MHz	$\pi/2$ BPSK	1870 - 1895	0.230	23.61	38M7G7D
			QPSK	1870 - 1895	0.189	22.76	38M6G7D
16QAM			1870 - 1895	0.162	22.08	38M8W7D	
30 MHz		$\pi/2$ BPSK	1865 - 1900	0.228	23.57	28M6G7D	
		QPSK	1865 - 1900	0.225	23.53	28M6G7D	
		16QAM	1865 - 1900	0.186	22.69	28M6W7D	
25 MHz		$\pi/2$ BPSK	1862.5 - 1902.5	0.219	23.40	22M9G7D	
		QPSK	1862.5 - 1902.5	0.204	23.10	23M8G7D	
		16QAM	1862.5 - 1902.5	0.164	22.14	23M8W7D	
NR Band n25/2		20 MHz	$\pi/2$ BPSK	1860 - 1905	0.217	23.36	17M9G7D
	QPSK		1860 - 1905	0.187	22.73	19M0G7D	
	16QAM		1860 - 1905	0.155	21.91	19M0W7D	
	15 MHz	$\pi/2$ BPSK	1857.5 - 1907.5	0.212	23.27	13M5G7D	
		QPSK	1857.5 - 1907.5	0.189	22.75	14M2G7D	
		16QAM	1857.5 - 1907.5	0.151	21.78	14M2W7D	
	10 MHz	$\pi/2$ BPSK	1855 - 1910	0.216	23.35	8M99G7D	
		QPSK	1855 - 1910	0.185	22.66	9M31G7D	
		16QAM	1855 - 1910	0.155	21.91	9M30W7D	
	5 MHz	$\pi/2$ BPSK	1852.5 - 1912.5	0.207	23.15	4M52G7D	
		QPSK	1852.5 - 1912.5	0.202	23.05	4M49G7D	
		16QAM	1852.5 - 1912.5	0.162	22.10	4M49W7D	

EUT Overview (Ant 1)

FCC ID: C3K1997	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2204040049-05-R1.C3K	Test Dates: 03/15/2022- 06/24/2022	EUT Type: Portable Computing Device	Page 3 of 181

Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	EIRP		Emission Designator
				Max. Power [W]	Max. Power [dBm]	
NR Band n25	40 MHz	$\pi/2$ BPSK	1870 - 1895	0.127	21.05	38M6G7D
		QPSK	1870 - 1895	0.123	20.89	38M6G7D
		16QAM	1870 - 1895	0.109	20.37	38M6W7D
	30 MHz	$\pi/2$ BPSK	1865 - 1900	0.122	20.85	28M6G7D
		QPSK	1865 - 1900	0.120	20.78	28M7G7D
		16QAM	1865 - 1900	0.105	20.22	28M6W7D
	25 MHz	$\pi/2$ BPSK	1862.5 - 1902.5	0.122	20.85	22M9G7D
		QPSK	1862.5 - 1902.5	0.121	20.82	23M0G7D
		16QAM	1862.5 - 1902.5	0.108	20.33	22M9W7D
NR Band n25/2	20 MHz	$\pi/2$ BPSK	1860 - 1905	0.117	20.68	17M9G7D
		QPSK	1860 - 1905	0.107	20.28	19M0G7D
		16QAM	1860 - 1905	0.091	19.61	19M0W7D
	15 MHz	$\pi/2$ BPSK	1857.5 - 1907.5	0.101	20.05	13M5G7D
		QPSK	1857.5 - 1907.5	0.097	19.87	14M1G7D
		16QAM	1857.5 - 1907.5	0.090	19.54	14M2W7D
	10 MHz	$\pi/2$ BPSK	1855 - 1910	0.099	19.94	8M99G7D
		QPSK	1855 - 1910	0.097	19.86	9M31G7D
		16QAM	1855 - 1910	0.087	19.40	9M31W7D
	5 MHz	$\pi/2$ BPSK	1852.5 - 1912.5	0.100	20.00	4M50G7D
		QPSK	1852.5 - 1912.5	0.097	19.88	4M50G7D
		16QAM	1852.5 - 1912.5	0.094	19.71	4M48W7D

EUT Overview (Ant 4)

FCC ID: C3K1997	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2204040049-05-R1.C3K	Test Dates: 03/15/2022- 06/24/2022	EUT Type: Portable Computing Device	Page 4 of 181

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 Element Test Location

These measurement tests were conducted at the Element laboratory 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 Element lab located in Columbia, MD 21046, U.S.A.

- Element Washington DC LLC is an ISO 17025-2017 accredited test facility under the American Association for Laboratory Accreditation (A2LA) with Certificate number 2041.01 for Specific Absorption Rate (SAR), Hearing Aid Compatibility (HAC) testing, where applicable, and Electromagnetic Compatibility (EMC) testing for FCC and Innovation, Science, and Economic Development Canada rules.
- Element Washington DC LLC 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).
- Element Washington DC LLC facility is a registered (2451B) test laboratory with the site description on file with ISED.
- Element Washington DC LLC is a Recognized U.S. Certification Assessment Body (CAB # US0110) for ISED Canada as designated by NIST under the U.S. and Canada Mutual Recognition Agreement.

FCC ID: C3K1997	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2204040049-05-R1.C3K	Test Dates: 03/15/2022- 06/24/2022	EUT Type: Portable Computing Device	Page 5 of 181

2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **Microsoft Corporation Portable Computing Device FCC ID: C3K1997**. The test data contained in this report pertains only to the emissions due to the EUT's licensed transmitters that operate under the provisions of Part 24.

Test Device Serial No.: HP220, K1222, HS220, HD220, JW220

2.2 Device Capabilities

This device contains the following capabilities:

850/1900 WCDMA/HSPA, Multi-band LTE, 5G NR (FR1 and FR2), 802.11b/g/n/ax WLAN, 802.11a/n/ac/ax UNII (5, 6GHz), Bluetooth (1x, EDR, LE)

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 and antenna port conducted emissions tests.

2.4 Software and Firmware

Testing was performed on device(s) using software/firmware version 1.930.0 installed on the EUT.

2.5 EMI Suppression Device(s)/Modifications

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

FCC ID: C3K1997	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2204040049-05-R1.C3K	Test Dates: 03/15/2022- 06/24/2022	EUT Type: Portable Computing Device	Page 6 of 181

3.0 DESCRIPTION OF TESTS

3.1 Evaluation Procedure

The measurement procedures described in the “American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services” (ANSI C63.26-2015) were used in the measurement of the EUT.

Deviation from Measurement Procedure.....None

3.2 Radiated Power and Radiated Spurious Emissions

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 3 meters from the receive antenna. The receive antenna height is adjusted between 1 and 4 meter height, the turntable is rotated through 360 degrees, and the EUT is manipulated through all orthogonal planes representative of its typical use to achieve the highest reading on the receive spectrum analyzer.

For radiated power measurements, substitution method is used per the guidance of ANSI C63.26-2015. For emissions below 1GHz, a half-wave dipole is substituted in place of the EUT. For emissions above 1GHz, a horn antenna is substituted in place of the EUT. The substitute antenna is driven by a signal generator with the level of the signal generator being adjusted to obtain the same receive spectrum analyzer level previously recorded from the spurious emission from the EUT. The power of the emission is calculated using the following formula:

$$P_d \text{ [dBm]} = P_g \text{ [dBm]} - \text{cable loss [dB]} + \text{antenna gain [dBd/dBi]};$$

where P_d is the dipole equivalent power, P_g is the generator output into the substitution antenna, and the antenna gain is the gain of the substitute antenna used relative to either a half-wave dipole (dBd) or an isotropic source (dBi). The substitute level is equal to $P_g \text{ [dBm]} - \text{cable loss [dB]}$.

For radiated spurious emissions measurements, the field strength conversion method is used per the formulas in Section 5.2.7 of ANSI C63.26-2015. Field Strength (EIRP) is calculated using the following formulas:

$$E_{\text{[dB}\mu\text{V/m]}} = \text{Measured amplitude level}_{\text{[dBm]}} + 107 + \text{Cable Loss}_{\text{[dB]}} + \text{Antenna Factor}_{\text{[dB/m]}}$$

And

$$\text{EIRP}_{\text{[dBm]}} = E_{\text{[dB}\mu\text{V/m]}} + 20\log D - 104.8; \text{ where } D \text{ is the measurement distance in meters.}$$

All radiated measurements are performed in a chamber that meets the site requirements per ANSI C63.4-2014. Additionally, radiated emissions below 30MHz are also validated on an Open Area Test Site to assert correlation with the chamber measurements per the requirements of KDB 414788 D01 v01r01.

Radiated power and radiated spurious emission levels are investigated with the receive antenna horizontally and vertically polarized per ANSI C63.26-2015.

FCC ID: C3K1997	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2204040049-05-R1.C3K	Test Dates: 03/15/2022- 06/24/2022	EUT Type: Portable Computing Device	Page 7 of 181

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 (\pm dB)
Conducted Bench Top Measurements	1.13
Radiated Disturbance (<1GHz)	4.98
Radiated Disturbance (>1GHz)	5.07
Radiated Disturbance (>18GHz)	5.09

FCC ID: C3K1997	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2204040049-05-R1.C3K	Test Dates: 03/15/2022- 06/24/2022	EUT Type: Portable Computing Device	Page 8 of 181

V3.0 1/5/2022

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
-	LTx1	Licensed Transmitter Cable Set	12/9/2021	Annual	12/9/2022	LTx1
-	LTx2	Licensed Transmitter Cable Set	12/19/2021	Annual	12/19/2022	LTx2
-	LTx3	Licensed Transmitter Cable Set	8/18/2021	Annual	8/18/2022	LTx3
-	LTx4	Licensed Transmitter Cable Set	12/19/2021	Annual	12/19/2022	LTx4
-	LTx5	Licensed Transmitter Cable Set	12/19/2021	Annual	12/19/2022	LTx5
Agilent	N9020A	MXA Signal Analyzer	3/4/2022	Annual	3/4/2023	US46470561
Agilent	N9038A	MXE EMI Receiver	1/21/2022	Annual	1/21/2023	MY51210133
Anritsu	MT8820C	Radio Communication Analyzer		N/A		6201300731
Anritsu	MT8821C	Radio Communication Analyzer		N/A		6201381794
Anritsu	MT8821C	Radio Communication Analyzer		N/A		6200901190
Emco	3115	Horn Antenna (1-18GHz)	6/18/2020	Biennial	6/18/2022	9704-5182
Espec	ESX-2CA	Environmental Chamber	5/25/2022	Annual	5/25/2023	17620
Keysight Technologies	N9030A	PXA Signal Analyzer (3Hz-26.5GHz)	2/14/2022	Annual	2/14/2023	MY54490576
Keysight Technologies	N9020A	MXA Signal Analyzer	3/15/2022	Annual	3/15/2023	MY54500644
Mini Circuits	TVA-11-422	RF Power Amp		N/A		QA1317001
Mini-Circuits	SSG-4000HP	Synthesized Signal Generator		N/A		11208010032
Mini-Circuits	SSG-4000HP	Synthesized Signal Generator		N/A		11403100002
Rohde & Schwarz	CMW500	Radio Communication Tester		N/A		100976
Rohde & Schwarz	CMW500	Radio Communication Tester		N/A		112347
Rohde & Schwarz	CMW500	Radio Communication Tester		N/A		102060
Rohde & Schwarz	ESU40	EMI Test Receiver (40GHz)	5/25/2021	Annual	5/25/2022	100348
Rohde & Schwarz	FSW67	Signal / Spectrum Analyzer	8/25/2021	Annual	8/25/2022	103200
Sunol	DRH-118	Horn Antenna (1-18GHz)	2/14/2022	Biennial	2/14/2024	A050307
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	7/27/2020	Biennial	7/27/2022	A051107

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.
2. Equipment with a calibration date of "N/A" shown in this list was not used to make direct calibrated measurements.

FCC ID: C3K1997	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2204040049-05-R1.C3K	Test Dates: 03/15/2022- 06/24/2022	EUT Type: Portable Computing Device	Page 9 of 181

6.0 SAMPLE CALCULATIONS

WCDMA Emission Designator

Emission Designator = 4M16F9W

WCDMA BW = 4.16 MHz
 F = Frequency Modulation
 9 = Composite Digital Info
 W = Combination (Audio/Data)

QPSK Modulation

Emission Designator = 8M62G7D

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

QAM Modulation

Emission Designator = 8M45W7D

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

Spurious Radiated Emission

Example: Spurious emission at 3700.40 MHz

The receive spectrum analyzer reading at 3 meters with the EUT on the turntable was -81.0 dBm. The gain of the substituted antenna is 8.1 dBi. The signal generator connected to the substituted antenna terminals is adjusted to produce a reading of -81.0 dBm on the spectrum analyzer. The loss of the cable between the signal generator and the terminals of the substituted antenna is 2.0 dB at 3700.40 MHz. So 6.1 dB is added to the signal generator reading of -30.9 dBm yielding -24.80 dBm. The fundamental EIRP was 25.50 dBm so this harmonic was 25.50 dBm - (-24.80) = 50.3 dBc.

FCC ID: C3K1997	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2204040049-05-R1.C3K	Test Dates: 03/15/2022- 06/24/2022	EUT Type: Portable Computing Device	Page 10 of 181

7.0 TEST RESULTS

7.1 Summary

Company Name: Microsoft Corporation
 FCC ID: C3K1997
 FCC Classification: PCS Licensed Transmitter (PCB)
 Mode(s): WCDMA/LTE/NR/EN-DC

Test Condition	Test Description	FCC Part Section(s)	Test Limit	Test Result	Reference
CONDUCTED	Transmitter Conducted Output Power*	2.1046(a), 2.1046(c)	N/A	PASS	Section 7.2
	Occupied Bandwidth	2.1049(h)	N/A	PASS	Section 7.3
	Conducted Band Edge / Spurious Emissions	2.1051, 24.238(a)	> 43 + 10log ₁₀ (P[Watts]) at Band Edge and for all out-of-band emissions	PASS	Sections 7.4, 7.5
	Peak-to-Average Ratio	24.232(d)	≤ 13 dB	PASS	Section 7.6
	Frequency Stability	2.1055, 24.235	Fundamental emissions stay within authorized frequency block	PASS	Section 7.9
RADIATED	Equivalent Isotropic Radiated Power	24.232(c)	< 2 Watts max. EIRP	PASS	Section 7.7
	Radiated Spurious Emissions	2.1053, 24.238(a)	≥ 43 + 10 log (P[Watts]) dB of attenuation below transmitter power	PASS	Section 7.8

* The only transmitter output conducted powers included in this report are those where the Pmax value, per the tune-up document, is higher than any of the DSI power levels. For the remaining conducted power measurements, see the **RF Exposure Report**.

Table 7-1. Summary of Test Results

Notes:

- 1) All modes of operation and data rates were investigated. The test results shown in the following sections represent the worst case emissions.
- 2) The analyzer plots were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables, directional couplers, and attenuators used as part of the system to maintain a link between the call box and the EUT at all frequencies of interest.
- 3) All antenna port conducted emissions testing was performed on a test bench with the antenna port of the EUT connected to the spectrum analyzer through calibrated cables, attenuators, and couplers.
- 4) All conducted emissions measurements are performed with automated test software to capture the corresponding plots necessary to show compliance. The measurement software utilized is EMC Software Tool v1.1.

FCC ID: C3K1997	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2204040049-05-R1.C3K	Test Dates: 03/15/2022- 06/24/2022	EUT Type: Portable Computing Device	Page 11 of 181

V3.0 1/5/2022

7.2 Conducted Output Power Data

Test Overview

All emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst-case configuration. All modes of operation were investigated and the worst-case configuration results are reported in this section.

Test Procedure Used

ANSI C63.26-2015 – Section 5.2

Test Settings

1. Detector = RMS
2. Trace mode = trace average for continuous emissions, max hold for pulse emissions
3. Sweep time = auto couple
4. The trace was allowed to stabilize
5. Please see test notes below for RBW and VBW settings

Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.

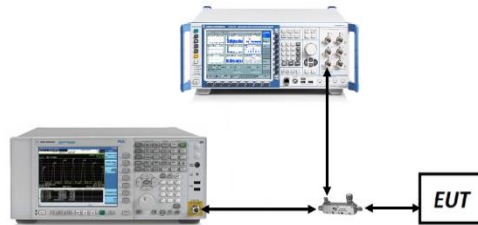


Figure 7-1. Test Instrument & Measurement Setup

Test Notes

1. Conducted power measurements were evaluated using various combinations of RB size, RB offset, modulation, and channel bandwidth. Channel bandwidth data is shown in the tables below based only on the channel bandwidths that were supported in this device.
2. All other conducted power measurements are contained in the RF exposure report for this filing.

FCC ID: C3K1997	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2204040049-05-R1.C3K	Test Dates: 03/15/2022- 06/24/2022	EUT Type: Portable Computing Device	Page 12 of 181

V3.0 1/5/2022

NR (SCS 15kHz)						LTE						NR	LTE	EN-DC
NR Band	NR Bandwidth [MHz]	NR Channel	NR Frequency [MHz]	Mod.	NR RB#/Offset	LTE Band	LTE Bandwidth [MHz]	LTE Channel	LTE Frequency [MHz]	Mod.	LTE RB#/Offset	Conducted Power [dBm]	Conducted Power [dBm]	Total Tx. Power [dBm]
n2	20MHz	Mid	1880	QPSK	100/0	B14	10	Mid	793	QPSK	50/0	19.05	23.55	24.87
				QPSK	100/0					QPSK	1/25	19.23	23.25	24.70
				QPSK	1/53					QPSK	50/0	18.99	23.48	24.80
				QPSK	1/53					QPSK	1/25	19.05	23.18	24.60
				16Q	100/0					16Q	50/0	19.15	23.25	24.68

Table 7-2. Conducted Max Powers (EN-DC Combo n2 – B14)

NR (SCS 15kHz)						LTE						NR	LTE	EN-DC
NR Band	NR Bandwidth [MHz]	NR Channel	NR Frequency [MHz]	Mod.	NR RB#/Offset	LTE Band	LTE Bandwidth [MHz]	LTE Channel	LTE Frequency [MHz]	Mod.	LTE RB#/Offset	Conducted Power [dBm]	Conducted Power [dBm]	Total Tx. Power [dBm]
n2	20	Mid	1880	QPSK	100/0	B66	20	Mid	1745	QPSK	100/0	19.66	23.45	24.97
				QPSK	100/0					QPSK	1/50	19.41	23.50	24.93
				QPSK	1/53					QPSK	100/0	19.55	23.49	24.96
				QPSK	1/53					QPSK	1/50	19.37	23.55	24.95
				16Q	1/53					16Q	100/0	18.55	22.38	23.88

Table 7-3. Conducted Max Powers (EN-DC Combo n2 – B66)

NR (SCS 15kHz)						LTE						NR	LTE	EN-DC
NR Band	NR Bandwidth [MHz]	NR Channel	NR Frequency [MHz]	Mod.	NR RB#/Offset	LTE Band	LTE Bandwidth [MHz]	LTE Channel	LTE Frequency [MHz]	Mod.	LTE RB#/Offset	Conducted Power [dBm]	Conducted Power [dBm]	Total Tx. Power [dBm]
n2	20	Mid	1880	QPSK	100/0	30	10	Mid	2310	QPSK	50/0	18.55	22.55	24.01
				QPSK	100/0					QPSK	1/25	18.32	22.62	23.99
				QPSK	1/53					QPSK	50/0	18.05	22.72	23.99
				QPSK	1/53					QPSK	1/25	18.25	22.68	24.02
				16Q	1/53					16Q	1/25	17.99	21.85	23.35

Table 7-4. Conducted Max Powers (EN-DC Combo n2 – B30)

NR (SCS 15kHz)						LTE						NR	LTE	EN-DC
NR Band	NR Bandwidth [MHz]	NR Channel	NR Frequency [MHz]	Mod.	NR RB#/Offset	LTE Band	LTE Bandwidth [MHz]	LTE Channel	LTE Frequency [MHz]	Mod.	LTE RB#/Offset	Conducted Power [dBm]	Conducted Power [dBm]	Total Tx. Power [dBm]
n25	40	Mid	1882.5	QPSK	216/0	12	10	Mid	707.5	QPSK	50/0	18.99	23.22	24.61
				QPSK	216/0					QPSK	1/25	18.86	23.15	24.52
				QPSK	1/108					QPSK	50/0	19.01	23.18	24.59
				QPSK	1/108					QPSK	1/25	19.05	23.05	24.51
				16Q	216/0					16Q	50/0	18.32	22.78	24.11

Table 7-5. Conducted Max Powers (EN-DC Combo n25 – B12)

NR (SCS 15kHz)						LTE						NR	LTE	EN-DC
NR Band	NR Bandwidth [MHz]	NR Channel	NR Frequency [MHz]	Mod.	NR RB#/Offset	LTE Band	LTE Bandwidth [MHz]	LTE Channel	LTE Frequency [MHz]	Mod.	LTE RB#/Offset	Conducted Power [dBm]	Conducted Power [dBm]	Total Tx. Power [dBm]
n25	40	Mid	1882.5	QPSK	216/0	66	20	Mid	1745	QPSK	100/0	17.88	23.35	24.43
				QPSK	216/0					QPSK	1/50	17.99	23.25	24.38
				QPSK	1/108					QPSK	100/0	18.05	23.49	24.58
				QPSK	1/108					QPSK	1/50	18.11	23.45	24.56
				16Q	1/108					16Q	100/0	17.55	23.11	24.18

Table 7-6. Conducted Max Powers (EN-DC Combo n25 – B66)

FCC ID: C3K1997	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2204040049-05-R1.C3K	Test Dates: 03/15/2022- 06/24/2022	EUT Type: Portable Computing Device	Page 13 of 181

7.3 Occupied Bandwidth

Test Overview

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

Test Procedure Used

ANSI C63.26-2015 – Section 5.4.4

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 \geq 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 Setup

The EUT and measurement equipment were set up as shown in the diagram below.

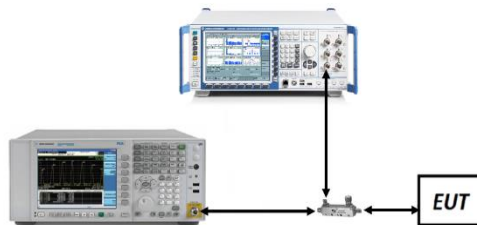


Figure 7-2. Test Instrument & Measurement Setup

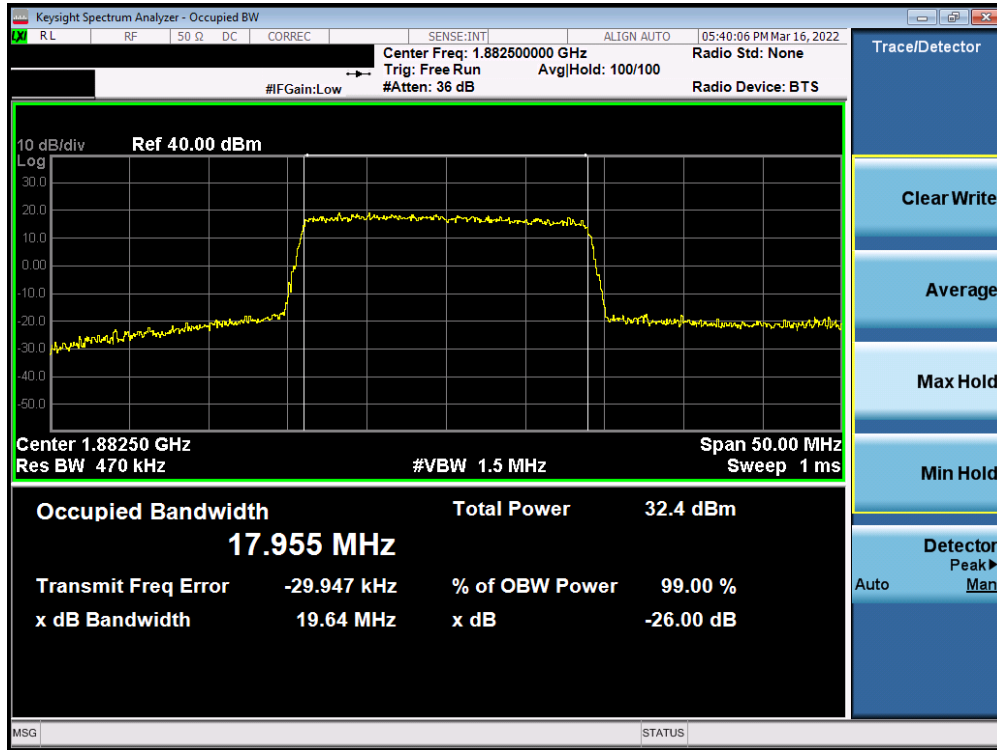
Test Notes

None.

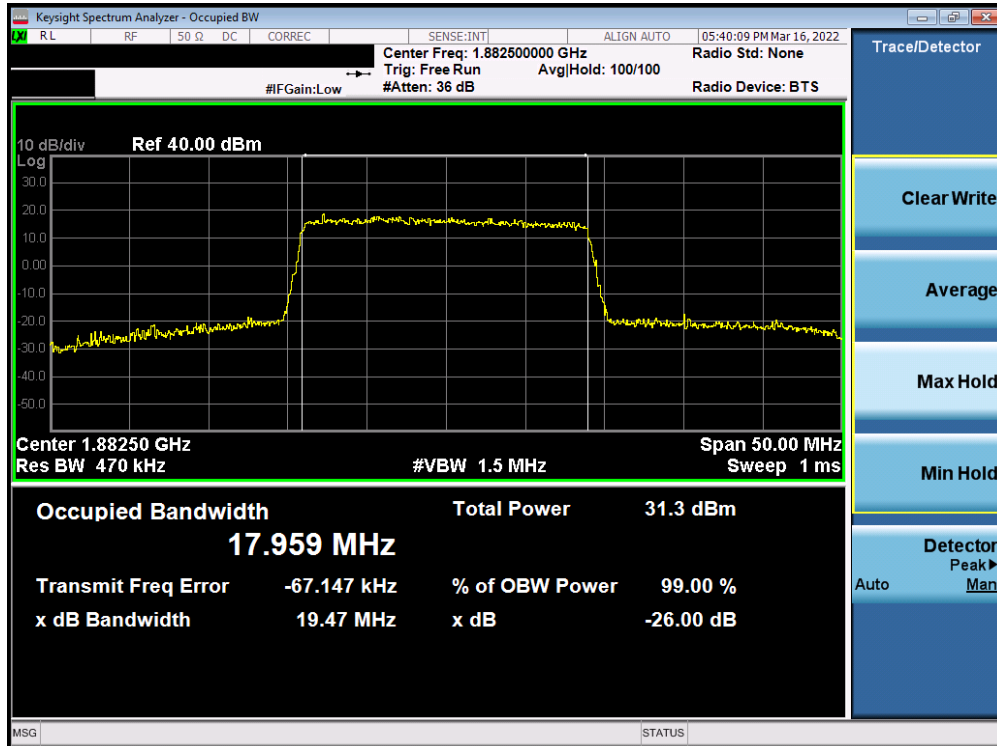
FCC ID: C3K1997	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2204040049-05-R1.C3K	Test Dates: 03/15/2022- 06/24/2022	EUT Type: Portable Computing Device	Page 14 of 181

V3.0 1/5/2022

LTE Band 25/2 – Ant1

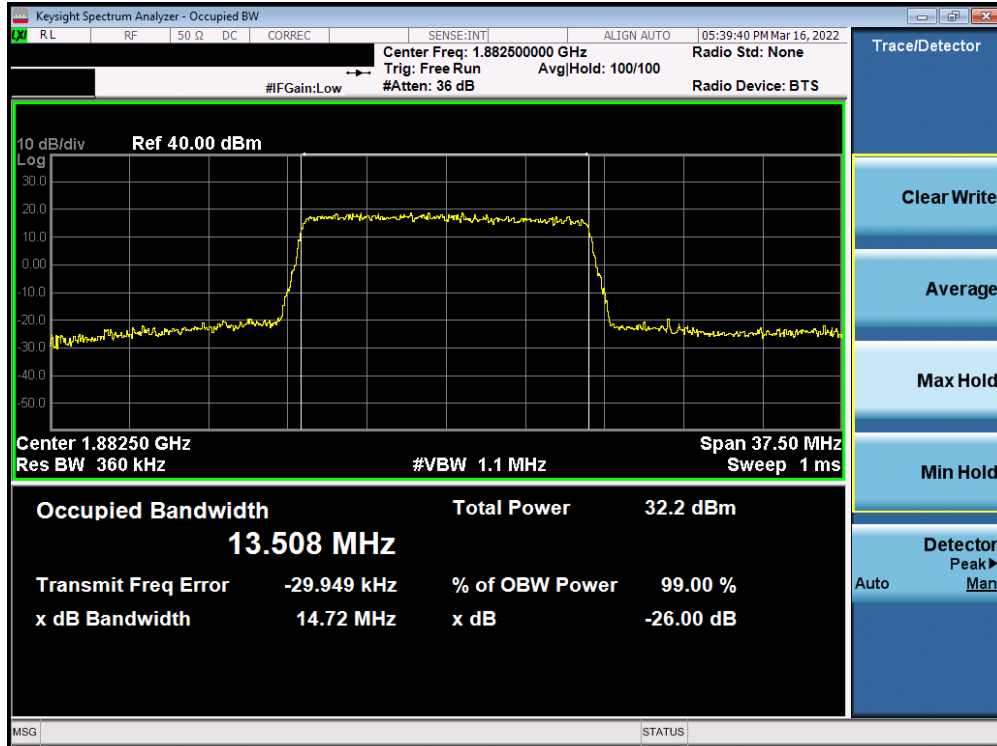


Plot 7-1. Occupied Bandwidth Plot (LTE Band 25/2 - 20MHz QPSK - Full RB - Ant1)

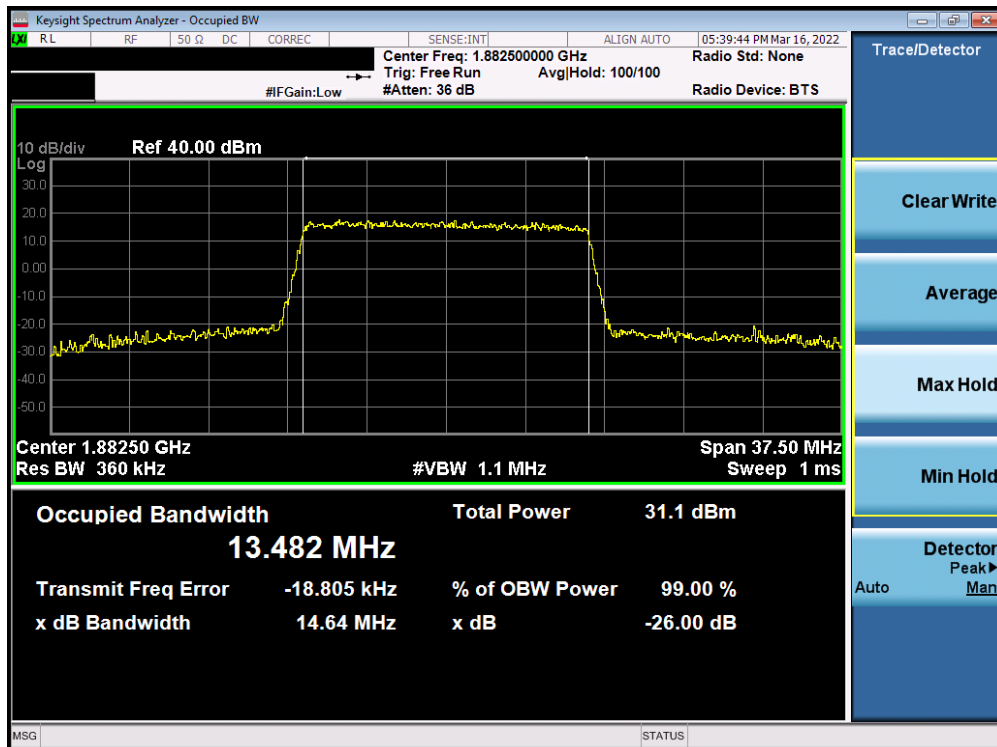


Plot 7-2. Occupied Bandwidth Plot (LTE Band 25/2 - 20MHz 16-QAM - Full RB - Ant1)

FCC ID: C3K1997	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2204040049-05-R1.C3K	Test Dates: 03/15/2022- 06/24/2022	EUT Type: Portable Computing Device	Page 15 of 181

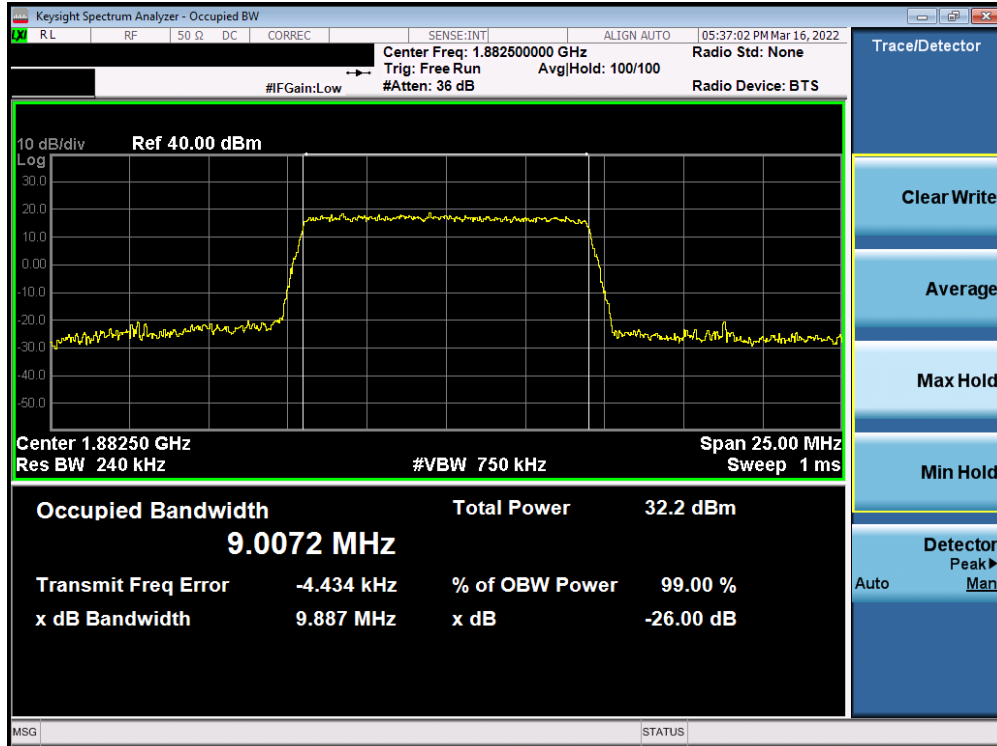


Plot 7-3. Occupied Bandwidth Plot (LTE Band 25/2 - 15MHz QPSK - Full RB - Ant1)

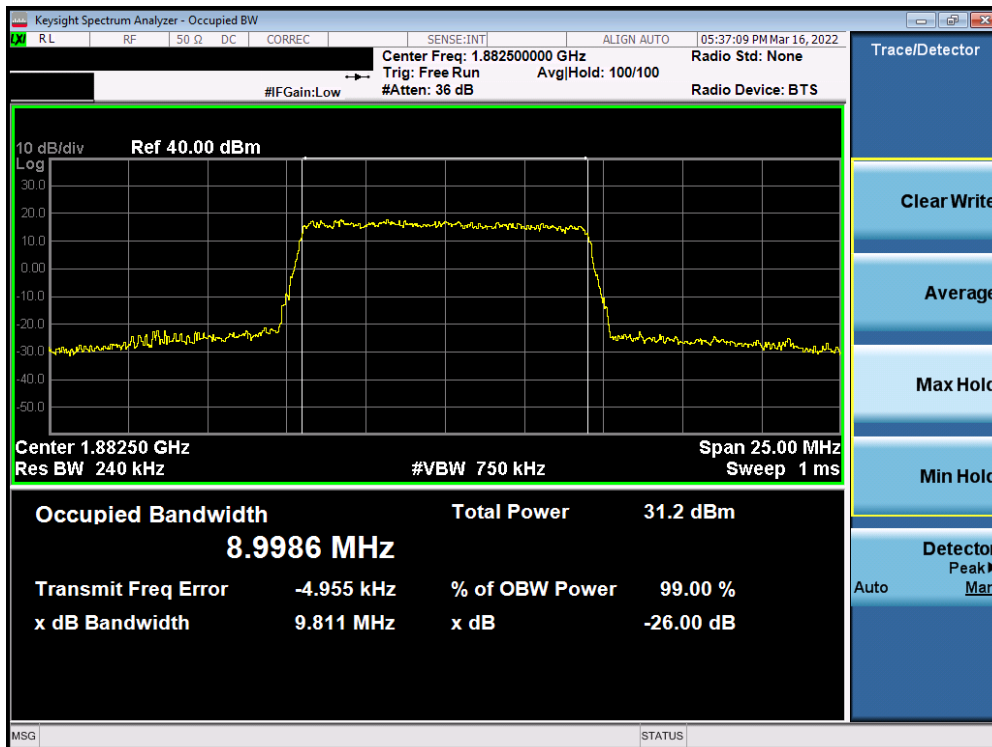


Plot 7-4. Occupied Bandwidth Plot (LTE Band 25/2 - 15MHz 16-QAM - Full RB - Ant1)

FCC ID: C3K1997	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2204040049-05-R1.C3K	Test Dates: 03/15/2022- 06/24/2022	EUT Type: Portable Computing Device	Page 16 of 181

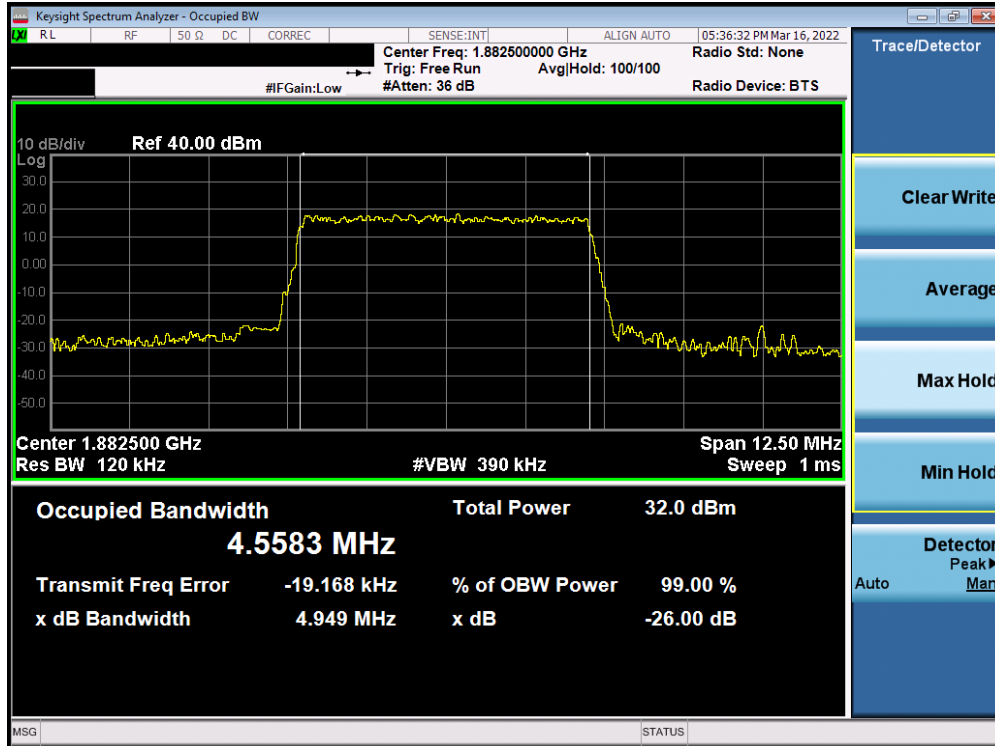


Plot 7-5. Occupied Bandwidth Plot (LTE Band 25/2 - 10MHz QPSK - Full RB - Ant1)

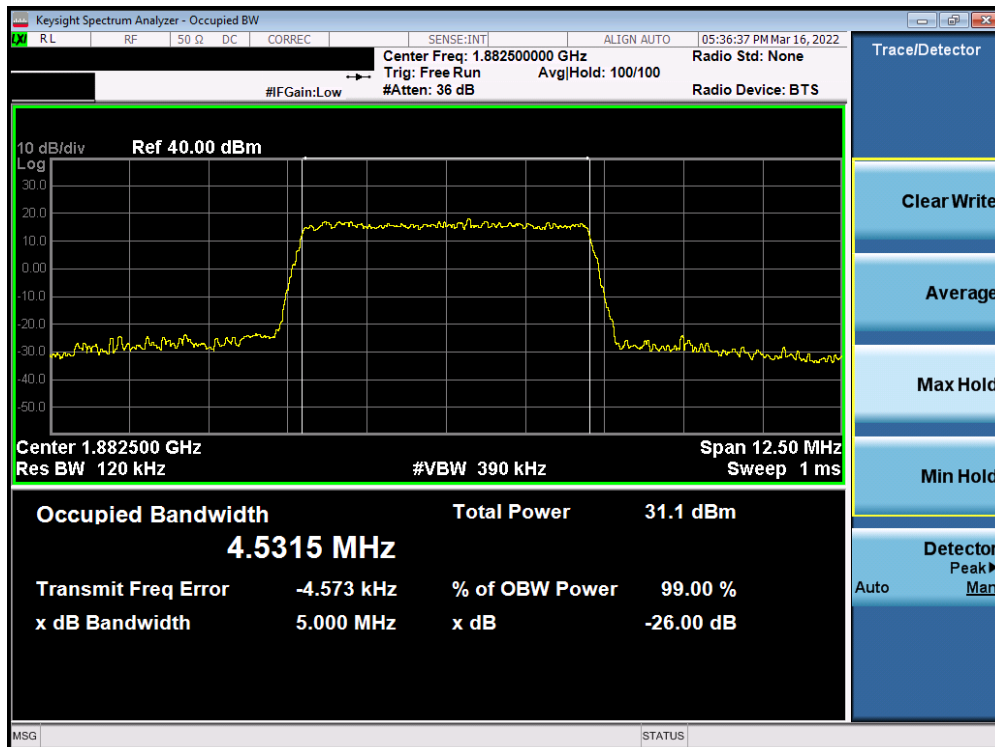


Plot 7-6. Occupied Bandwidth Plot (LTE Band 25/2 - 10MHz 16-QAM - Full RB - Ant1)

FCC ID: C3K1997	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2204040049-05-R1.C3K	Test Dates: 03/15/2022- 06/24/2022	EUT Type: Portable Computing Device	Page 17 of 181

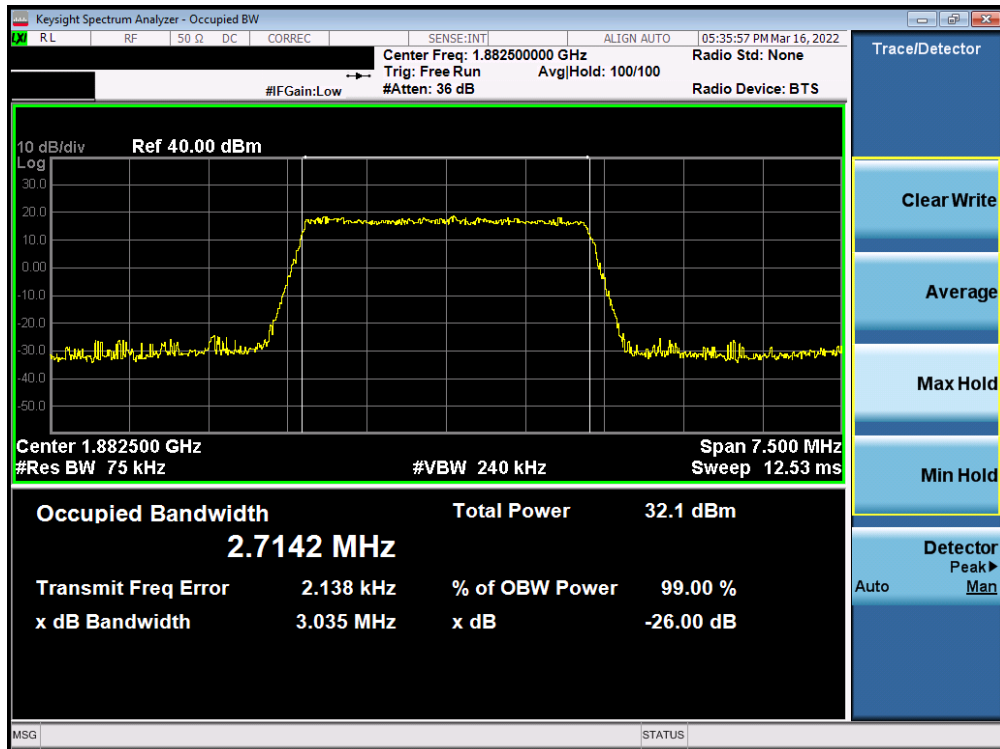


Plot 7-7. Occupied Bandwidth Plot (LTE Band 25/2 - 5MHz QPSK - Full RB - Ant1)

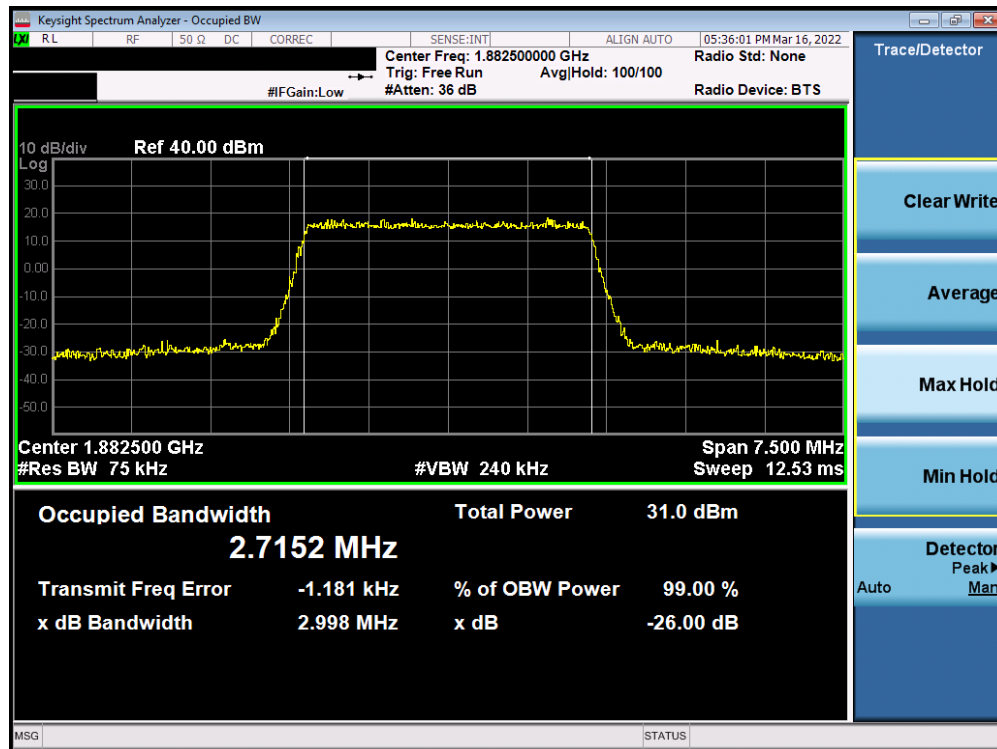


Plot 7-8. Occupied Bandwidth Plot (LTE Band 25/2 - 5MHz 16-QAM - Full RB - Ant1)

FCC ID: C3K1997	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2204040049-05-R1.C3K	Test Dates: 03/15/2022- 06/24/2022	EUT Type: Portable Computing Device	Page 18 of 181

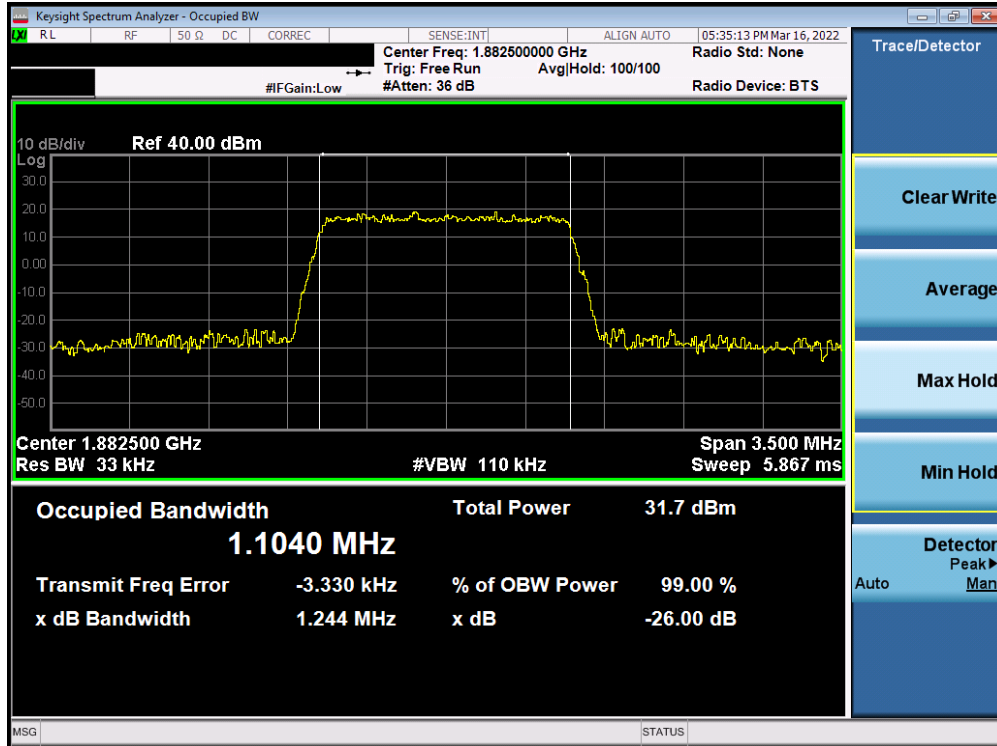


Plot 7-9. Occupied Bandwidth Plot (LTE Band 25/2 - 3MHz QPSK - Full RB - Ant1)

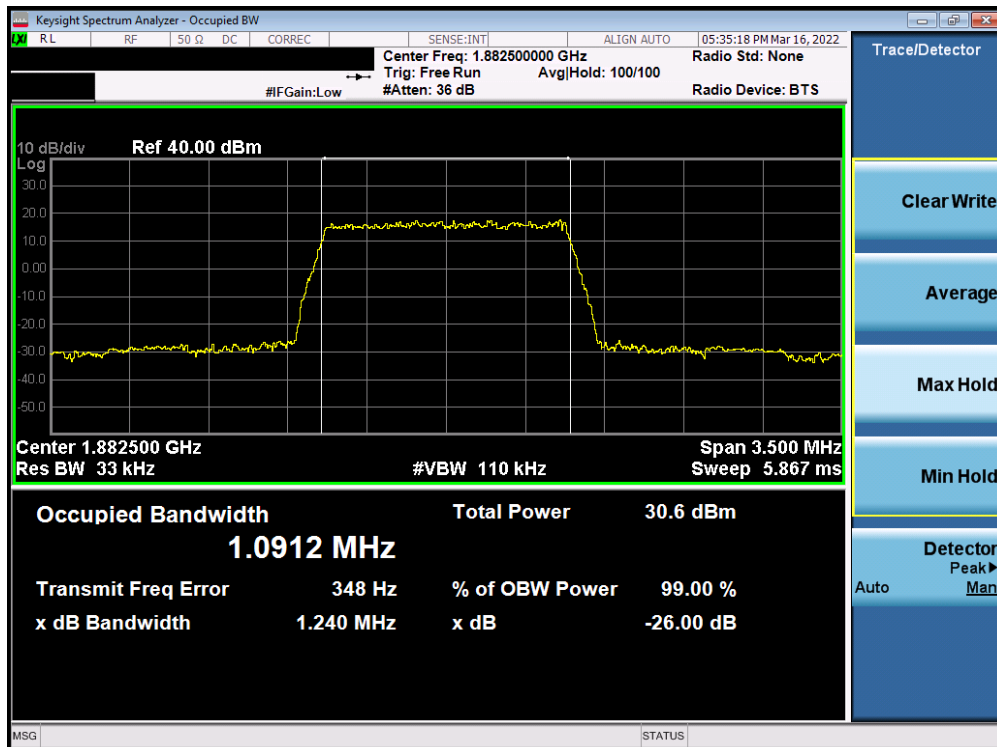


Plot 7-10. Occupied Bandwidth Plot (LTE Band 25/2 - 3MHz 16-QAM - Full RB - Ant1)

FCC ID: C3K1997	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2204040049-05-R1.C3K	Test Dates: 03/15/2022- 06/24/2022	EUT Type: Portable Computing Device	Page 19 of 181



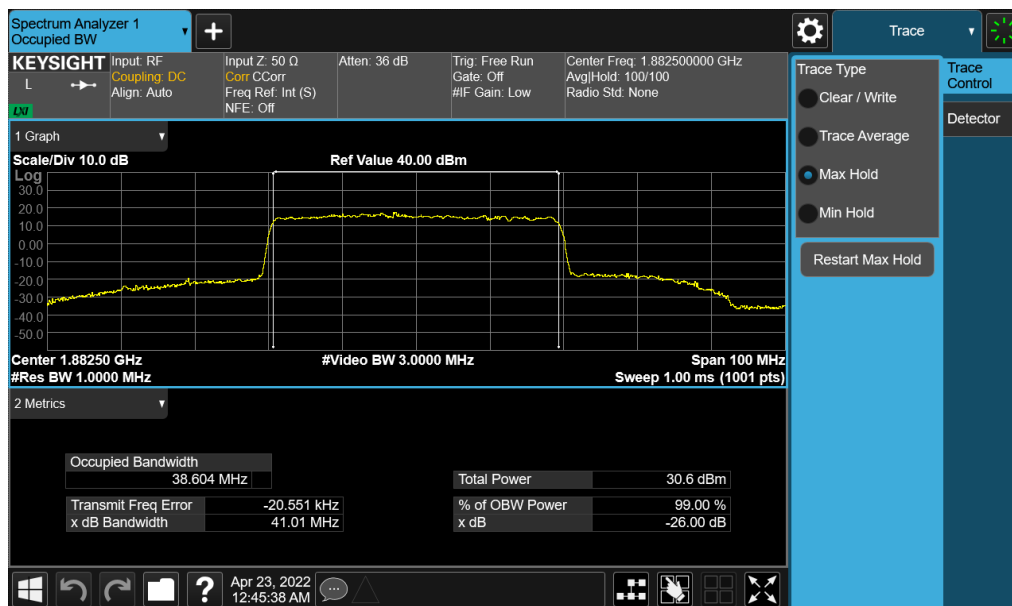
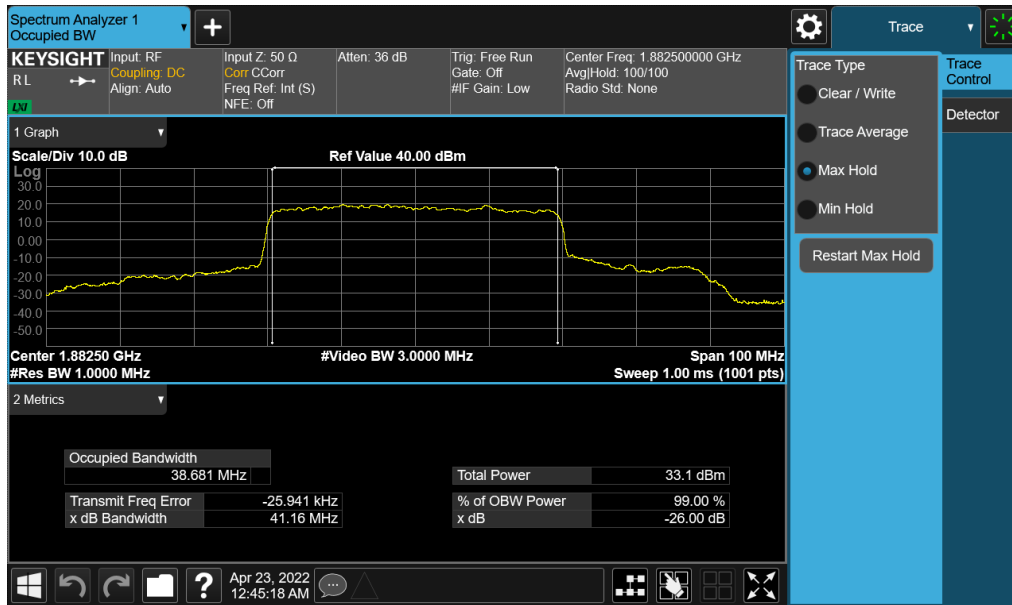
Plot 7-11. Occupied Bandwidth Plot (LTE Band 25/2 - 1.4MHz QPSK - Full RB - Ant1)



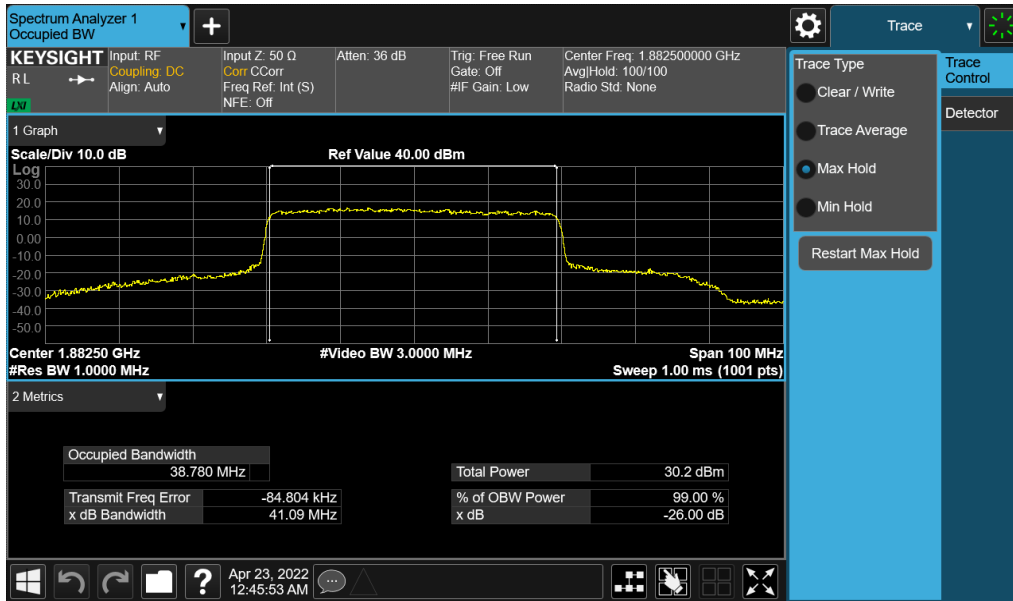
Plot 7-12. Occupied Bandwidth Plot (LTE Band 25/2 - 1.4MHz 16-QAM - Full RB - Ant1)

FCC ID: C3K1997	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2204040049-05-R1.C3K	Test Dates: 03/15/2022- 06/24/2022	EUT Type: Portable Computing Device	Page 20 of 181

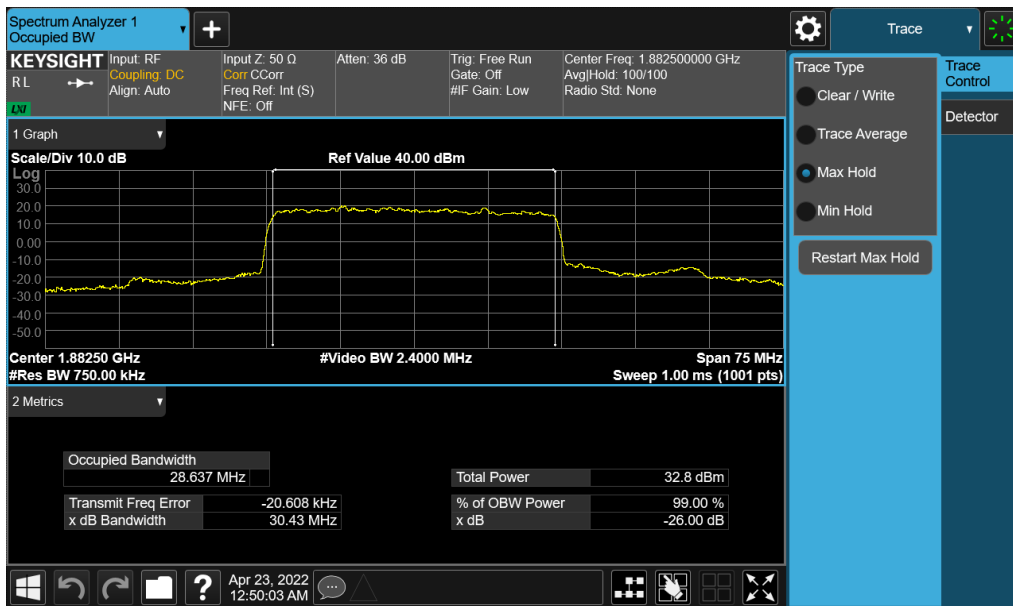
NR Band n25/2 – Ant1



FCC ID: C3K1997	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2204040049-05-R1.C3K	Test Dates: 03/15/2022- 06/24/2022	EUT Type: Portable Computing Device	Page 21 of 181

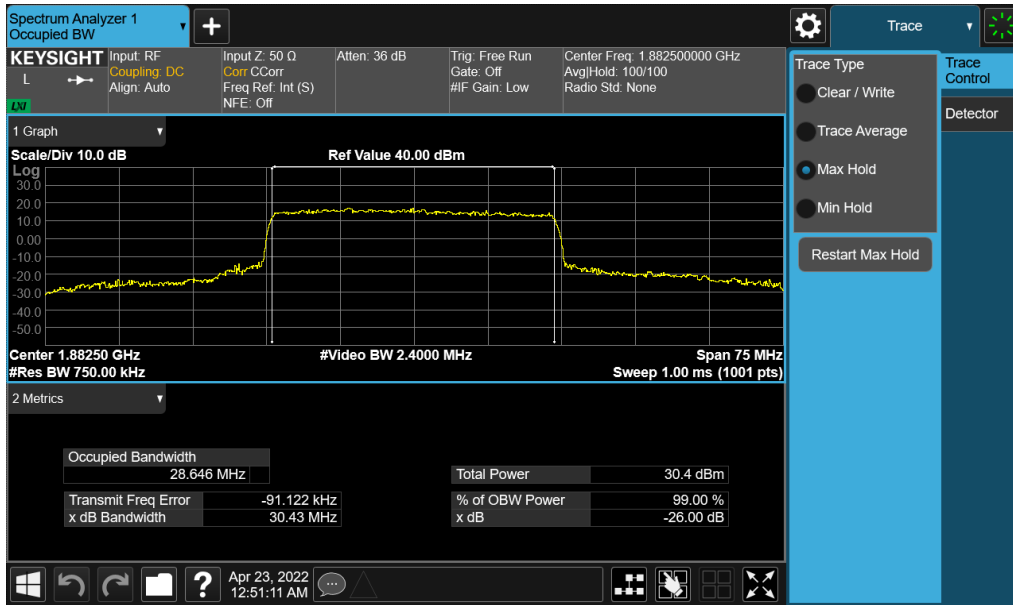


Plot 7-15. Occupied Bandwidth Plot (NR Band n25 - 40.0MHz CP-OFDM 16QAM - Full RB - ANT1)

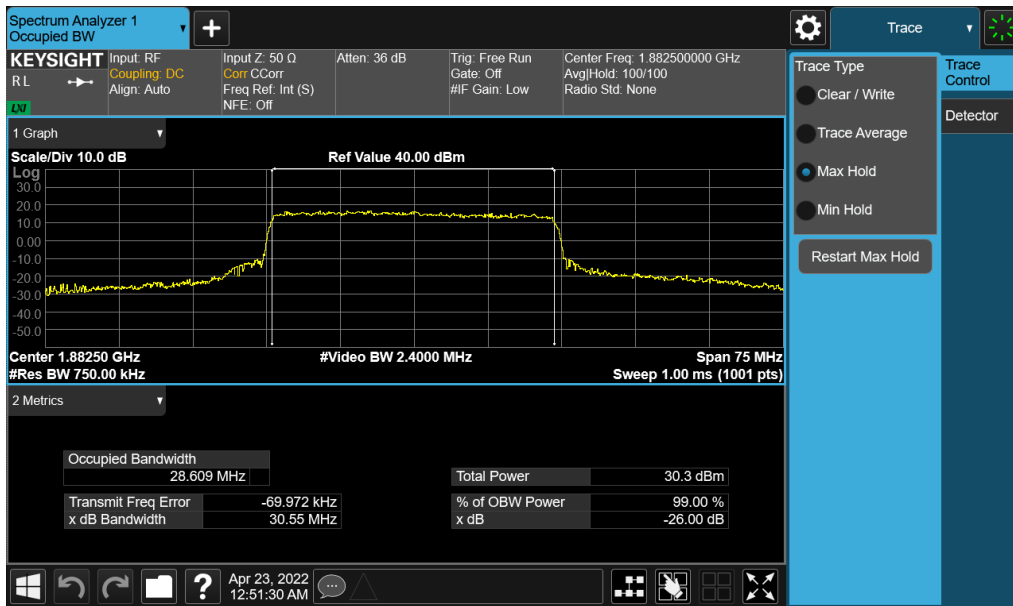


Plot 7-16. Occupied Bandwidth Plot (NR Band n25 - 30.0MHz DFT-s-OFDM BPSK - Full RB - ANT1)

FCC ID: C3K1997	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2204040049-05-R1.C3K	Test Dates: 03/15/2022- 06/24/2022	EUT Type: Portable Computing Device	Page 22 of 181

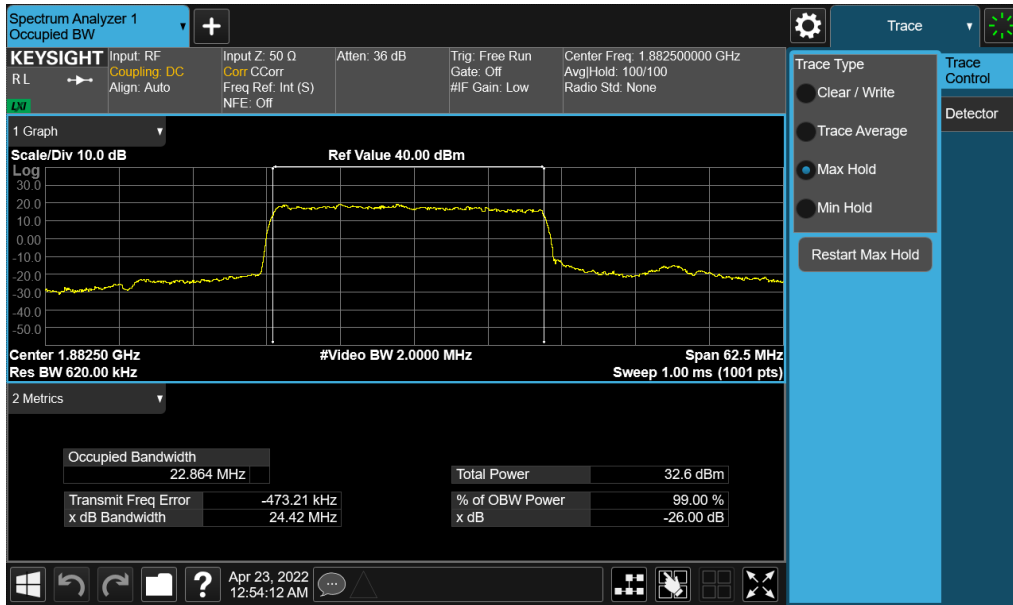


Plot 7-17. Occupied Bandwidth Plot (NR Band n25 - 30.0MHz CP-OFDM QPSK - Full RB - ANT1)

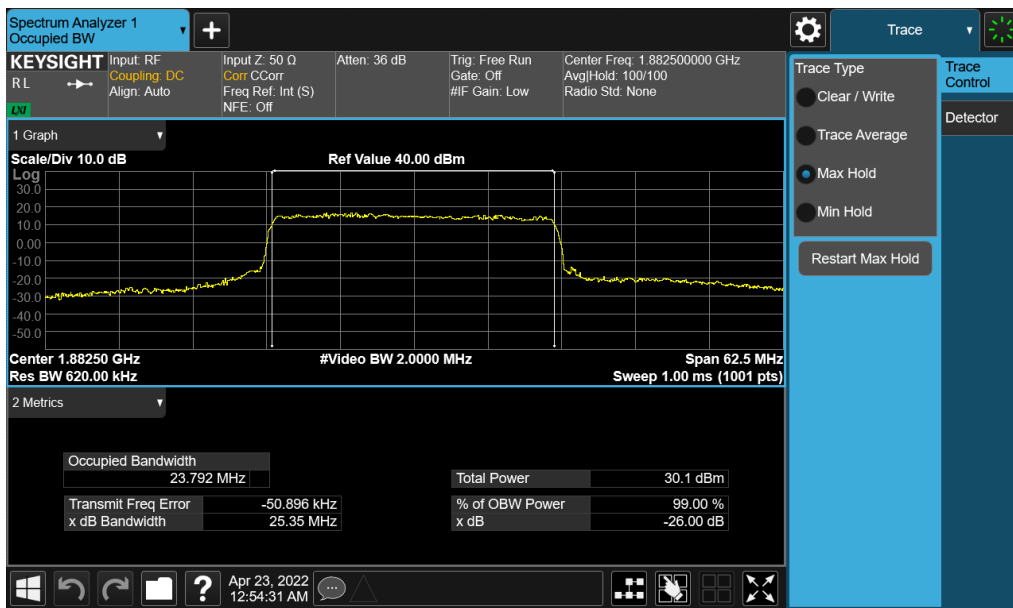


Plot 7-18. Occupied Bandwidth Plot (NR Band n25 - 30.0MHz CP-OFDM 16QAM - Full RB - ANT1)

FCC ID: C3K1997	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2204040049-05-R1.C3K	Test Dates: 03/15/2022- 06/24/2022	EUT Type: Portable Computing Device	Page 23 of 181

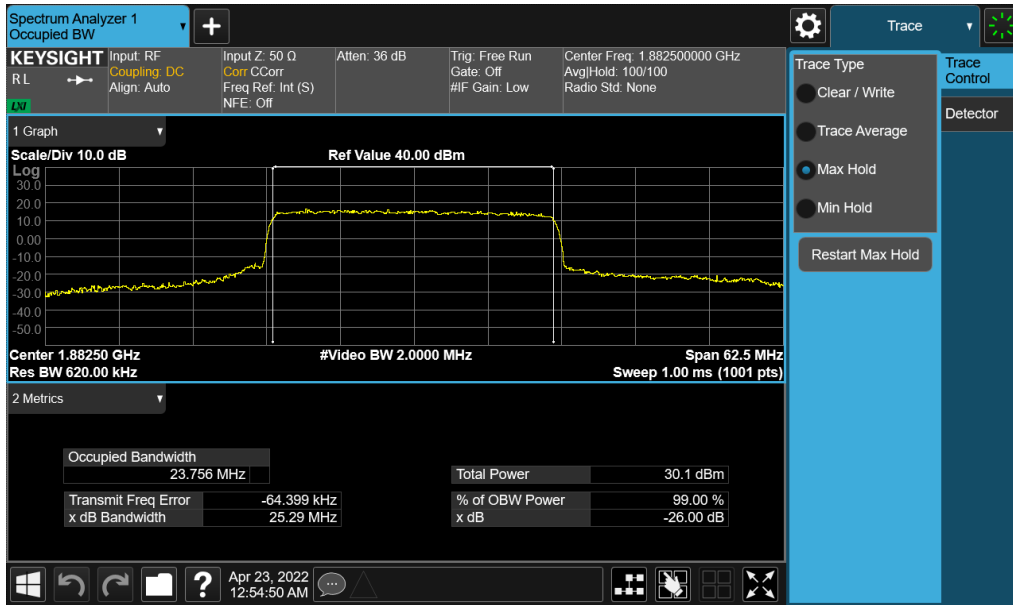


Plot 7-19. Occupied Bandwidth Plot (NR Band n25 - 25.0MHz DFT-s-OFDM BPSK - Full RB - ANT1)

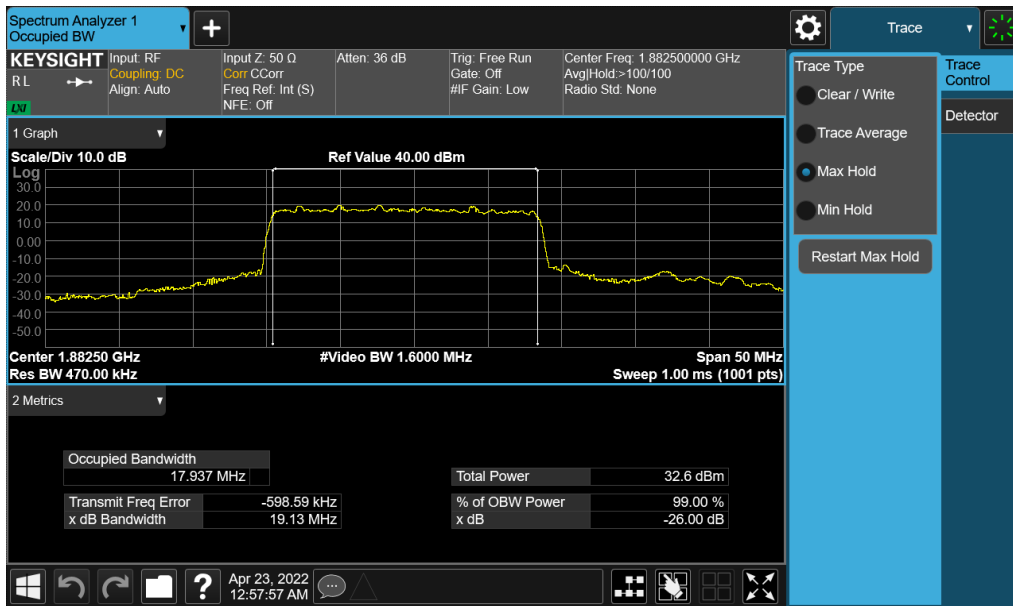


Plot 7-20. Occupied Bandwidth Plot (NR Band n25 - 25.0MHz CP-OFDM QPSK - Full RB - ANT1)

FCC ID: C3K1997	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2204040049-05-R1.C3K	Test Dates: 03/15/2022- 06/24/2022	EUT Type: Portable Computing Device	Page 24 of 181

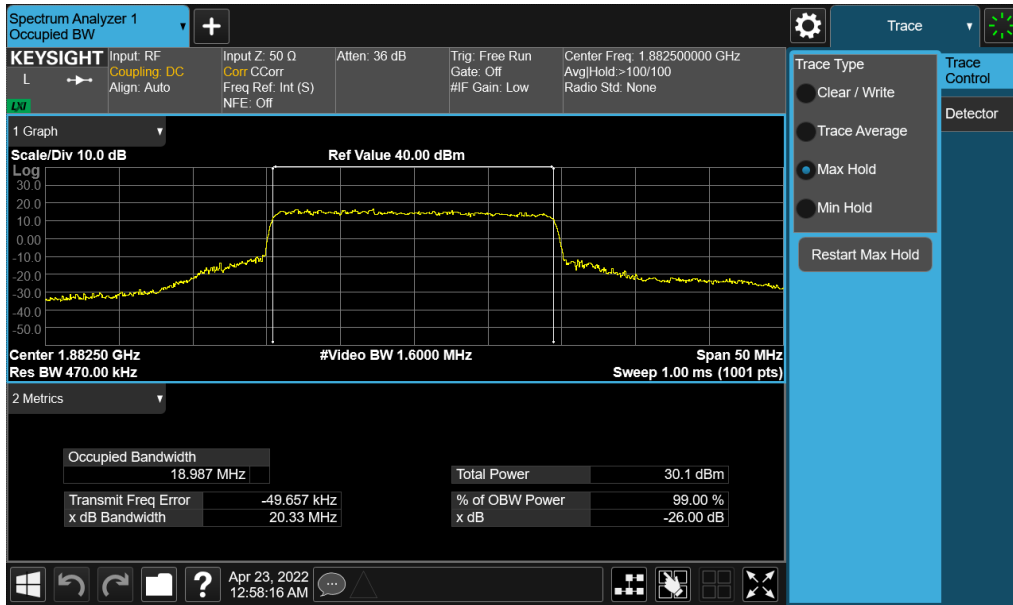


Plot 7-21. Occupied Bandwidth Plot (NR Band n25 - 25.0MHz CP-OFDM 16QAM - Full RB - ANT1)

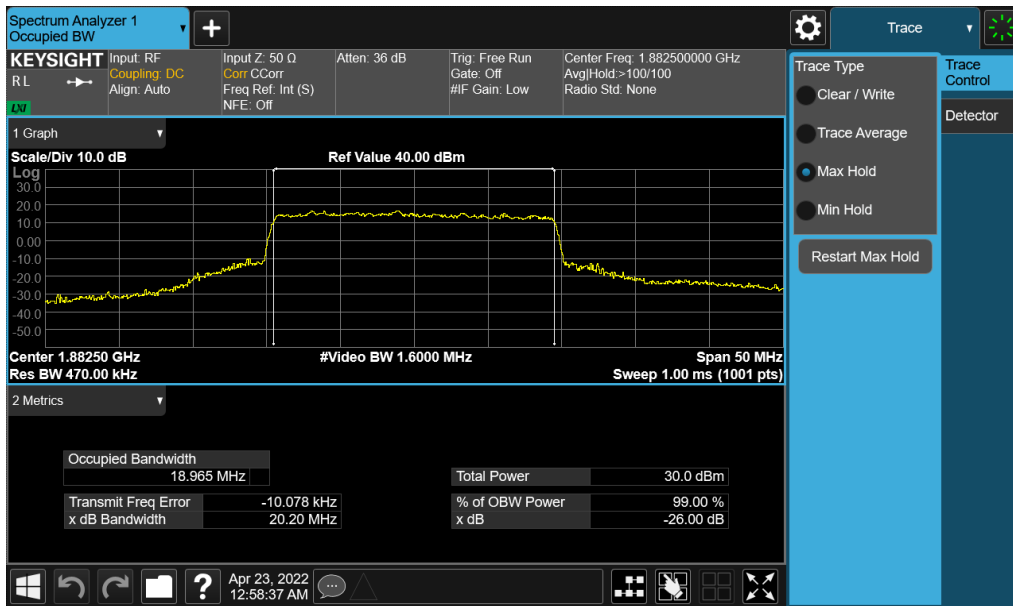


Plot 7-22. Occupied Bandwidth Plot (NR Band n25/2 - 20.0MHz DFT-s-OFDM BPSK - Full RB - ANT1)

FCC ID: C3K1997	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2204040049-05-R1.C3K	Test Dates: 03/15/2022- 06/24/2022	EUT Type: Portable Computing Device	Page 25 of 181

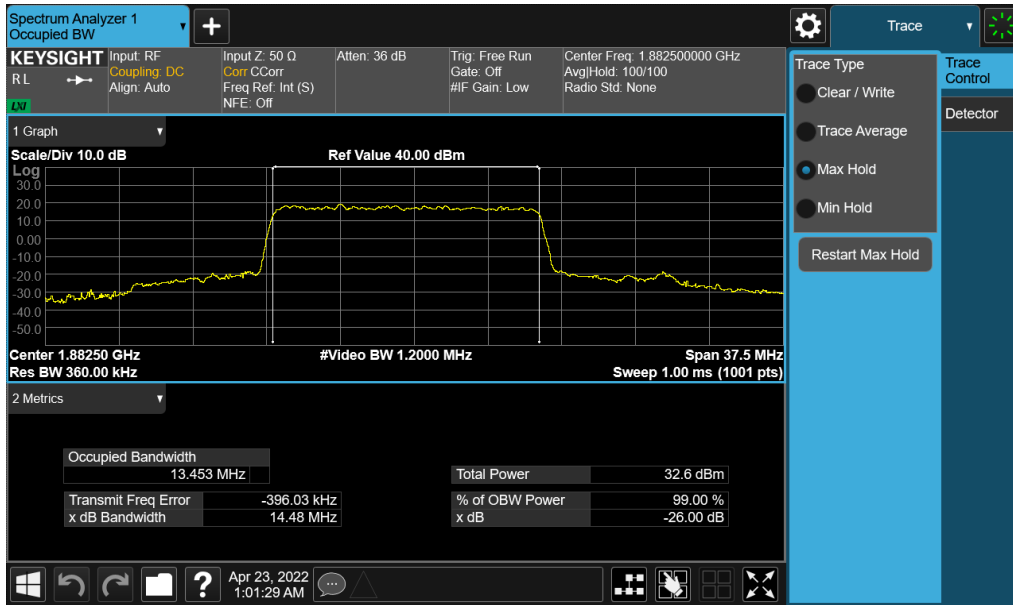


Plot 7-23. Occupied Bandwidth Plot (NR Band n25/2 - 20.0MHz CP-OFDM QPSK - Full RB - ANT1)

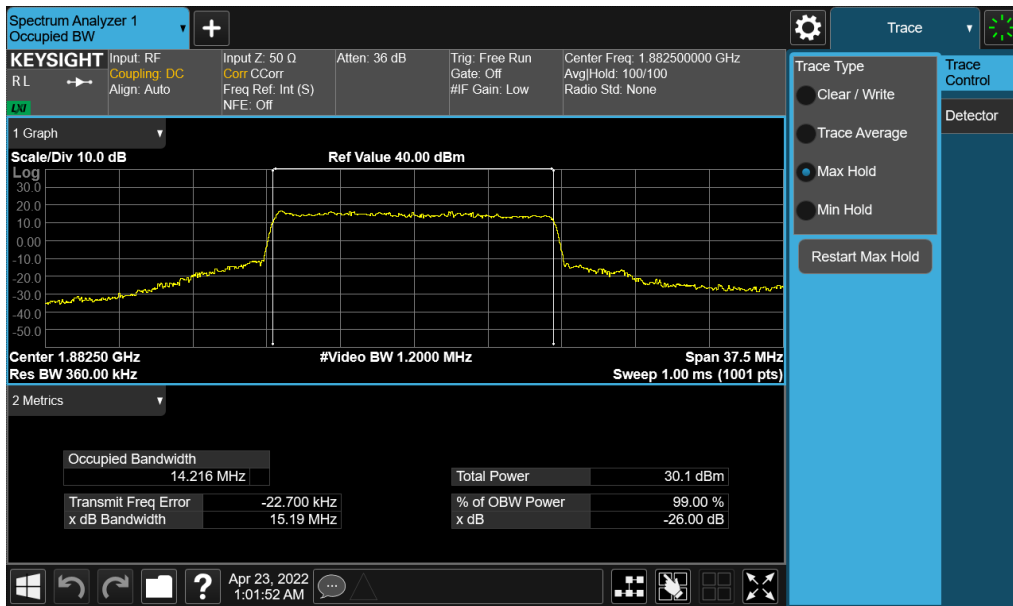


Plot 7-24. Occupied Bandwidth Plot (NR Band n25/2 - 20.0MHz CP-OFDM 16QAM - Full RB - ANT1)

FCC ID: C3K1997	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2204040049-05-R1.C3K	Test Dates: 03/15/2022- 06/24/2022	EUT Type: Portable Computing Device	Page 26 of 181

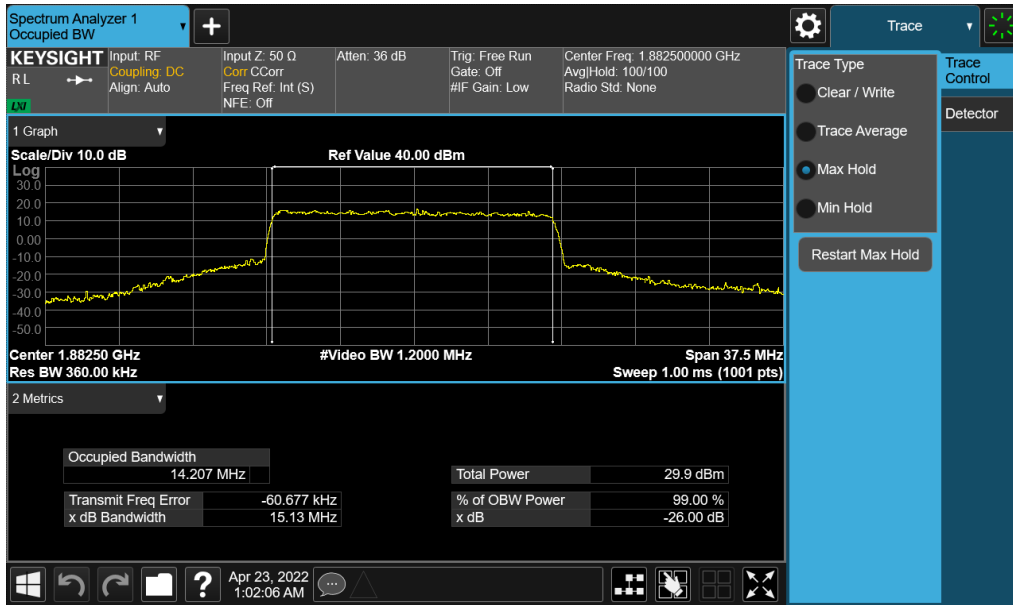


Plot 7-25. Occupied Bandwidth Plot (NR Band n25/2 - 15.0MHz DFT-s-OFDM BPSK - Full RB - ANT1)

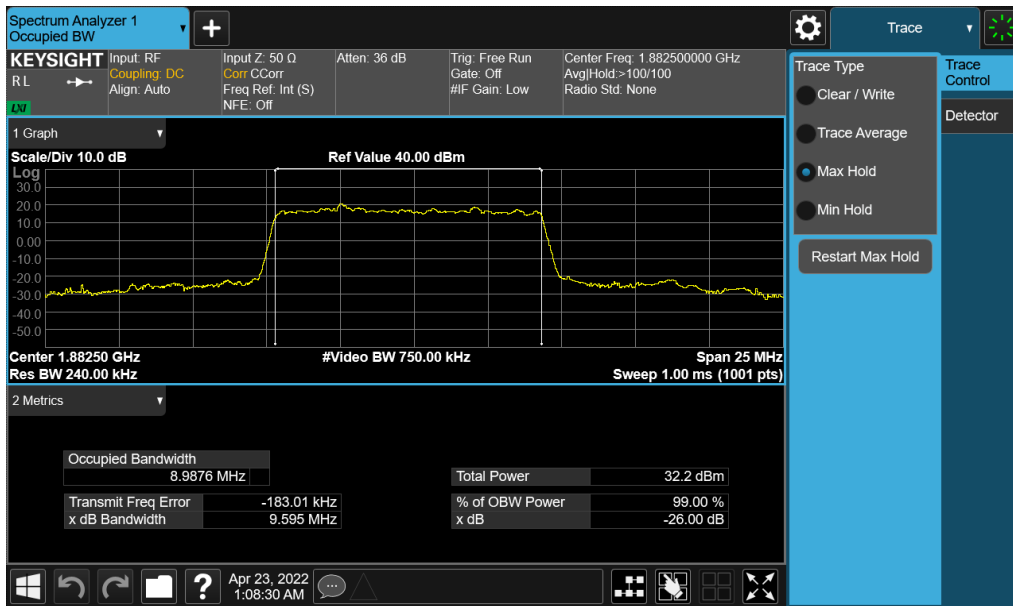


Plot 7-26. Occupied Bandwidth Plot (NR Band n25/2 - 15.0MHz CP-OFDM QPSK - Full RB - ANT1)

FCC ID: C3K1997	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2204040049-05-R1.C3K	Test Dates: 03/15/2022- 06/24/2022	EUT Type: Portable Computing Device	Page 27 of 181

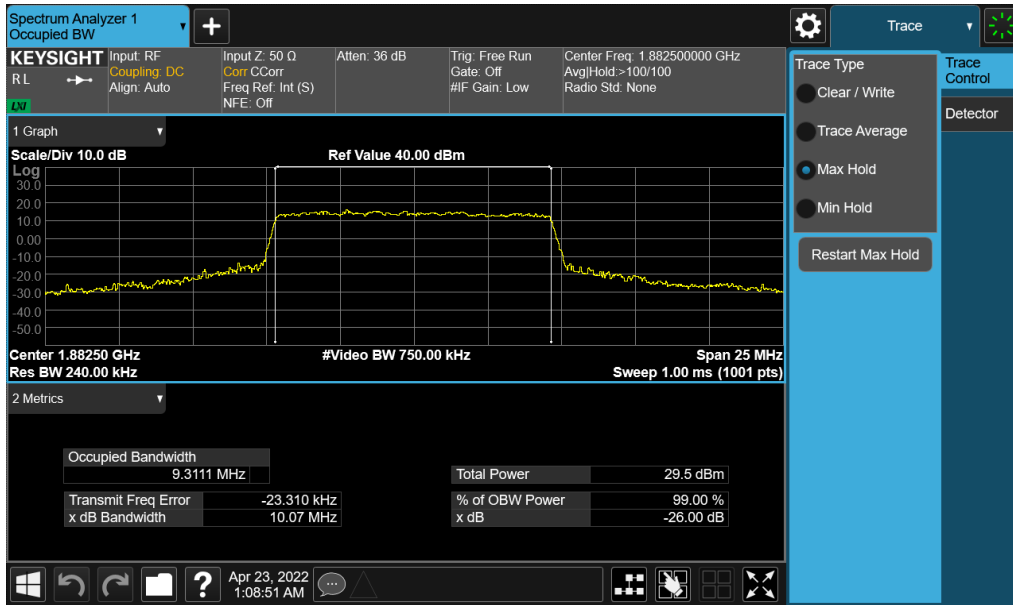


Plot 7-27. Occupied Bandwidth Plot (NR Band n25/2 - 15.0MHz CP-OFDM 16QAM - Full RB - ANT1)

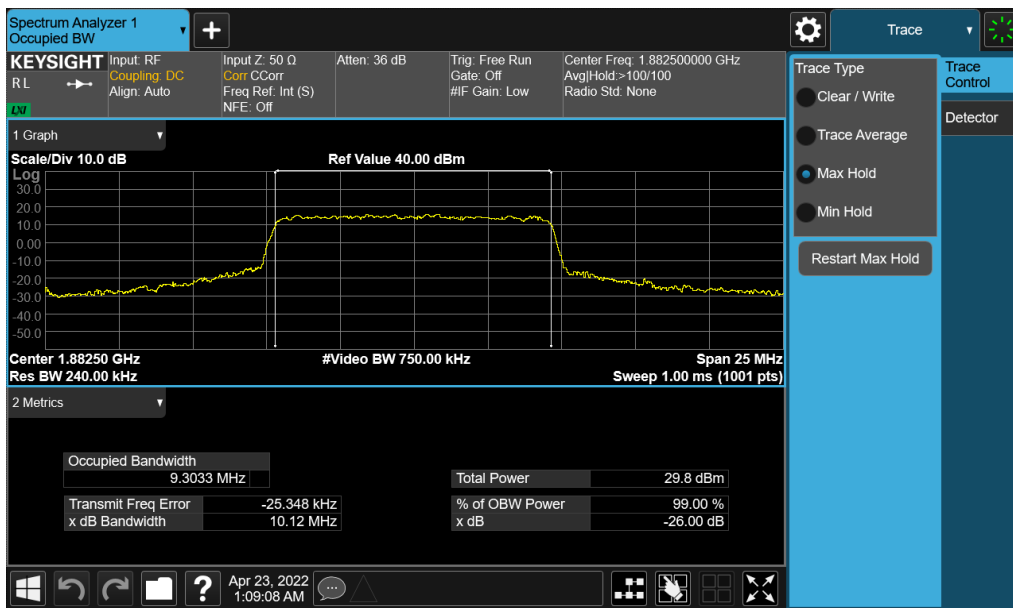


Plot 7-28. Occupied Bandwidth Plot (NR Band n25/2 - 10.0MHz DFT-s-OFDM BPSK - Full RB - ANT1)

FCC ID: C3K1997	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2204040049-05-R1.C3K	Test Dates: 03/15/2022- 06/24/2022	EUT Type: Portable Computing Device	Page 28 of 181

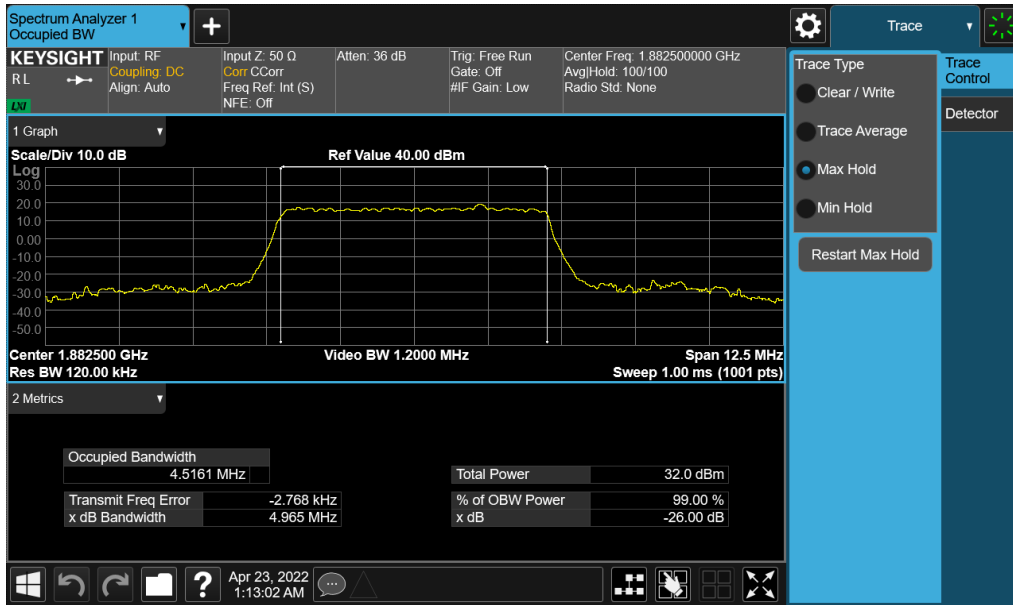


Plot 7-29. Occupied Bandwidth Plot (NR Band n25/2 - 10.0MHz CP-OFDM QPSK - Full RB - ANT1)

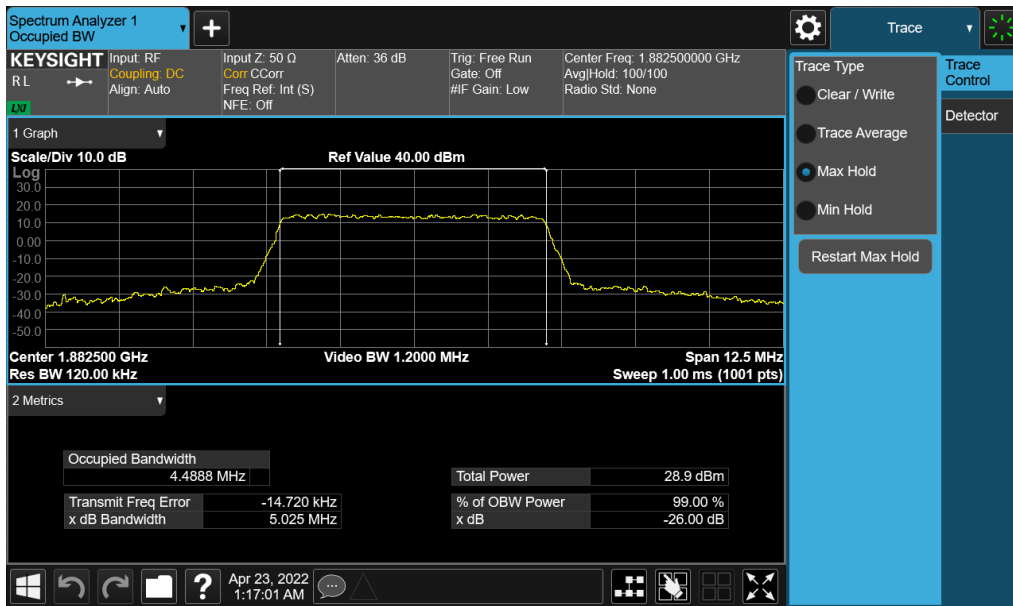


Plot 7-30. Occupied Bandwidth Plot (NR Band n25/2 - 10.0MHz CP-OFDM 16QAM - Full RB - ANT1)

FCC ID: C3K1997	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2204040049-05-R1.C3K	Test Dates: 03/15/2022- 06/24/2022	EUT Type: Portable Computing Device	Page 29 of 181

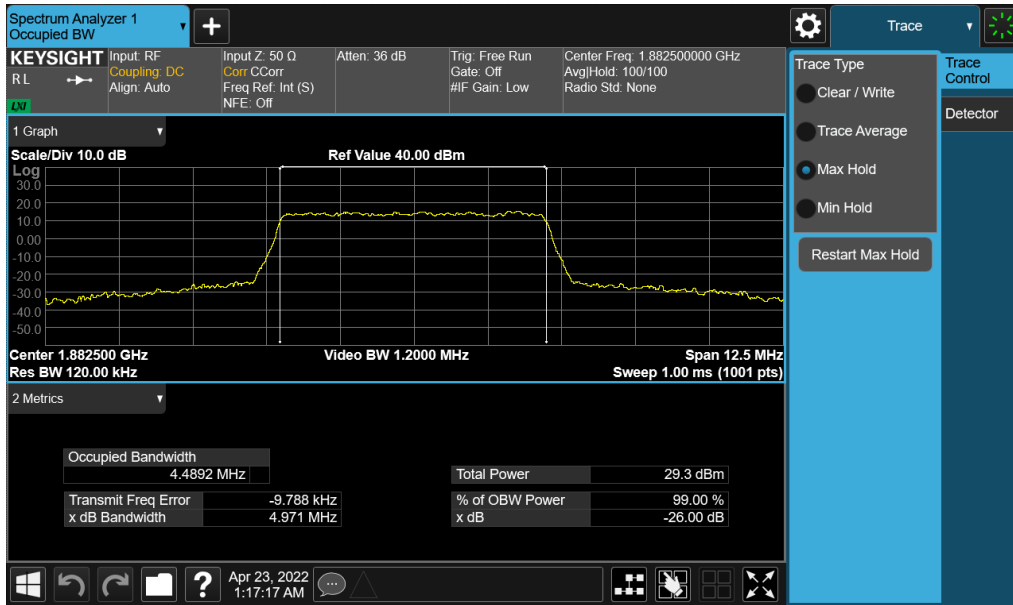


Plot 7-31. Occupied Bandwidth Plot (NR Band n25/2 - 5.0MHz DFT-s-OFDM BPSK - Full RB - ANT1)



Plot 7-32. Occupied Bandwidth Plot (NR Band n25/2 - 5.0MHz CP-OFDM QPSK - Full RB - ANT1)

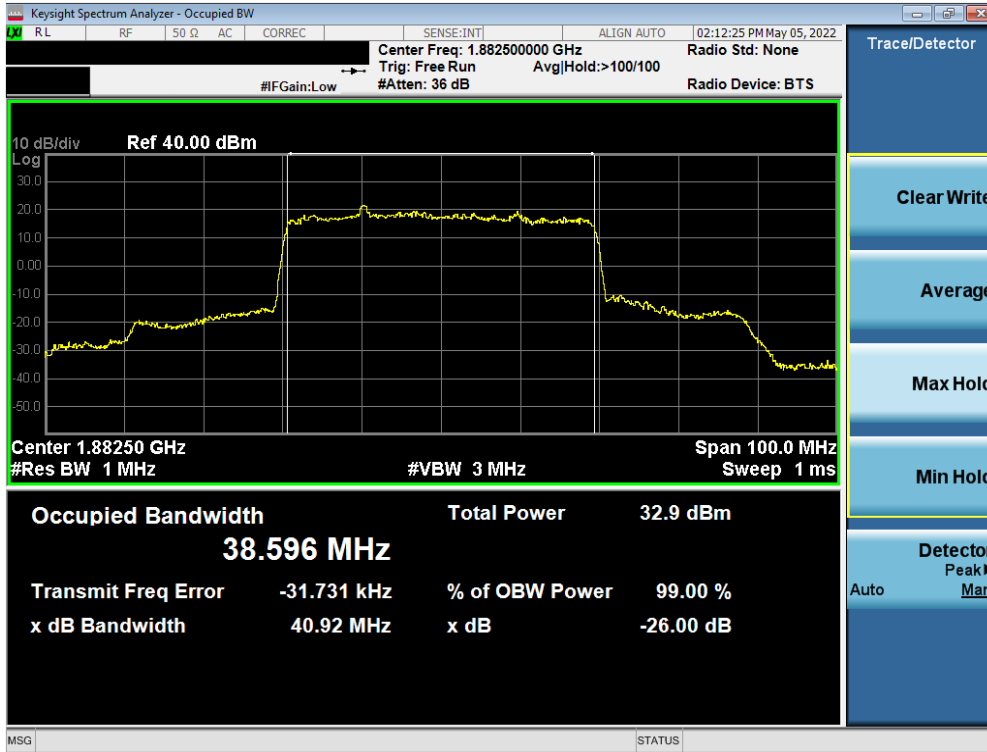
FCC ID: C3K1997	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2204040049-05-R1.C3K	Test Dates: 03/15/2022- 06/24/2022	EUT Type: Portable Computing Device	Page 30 of 181



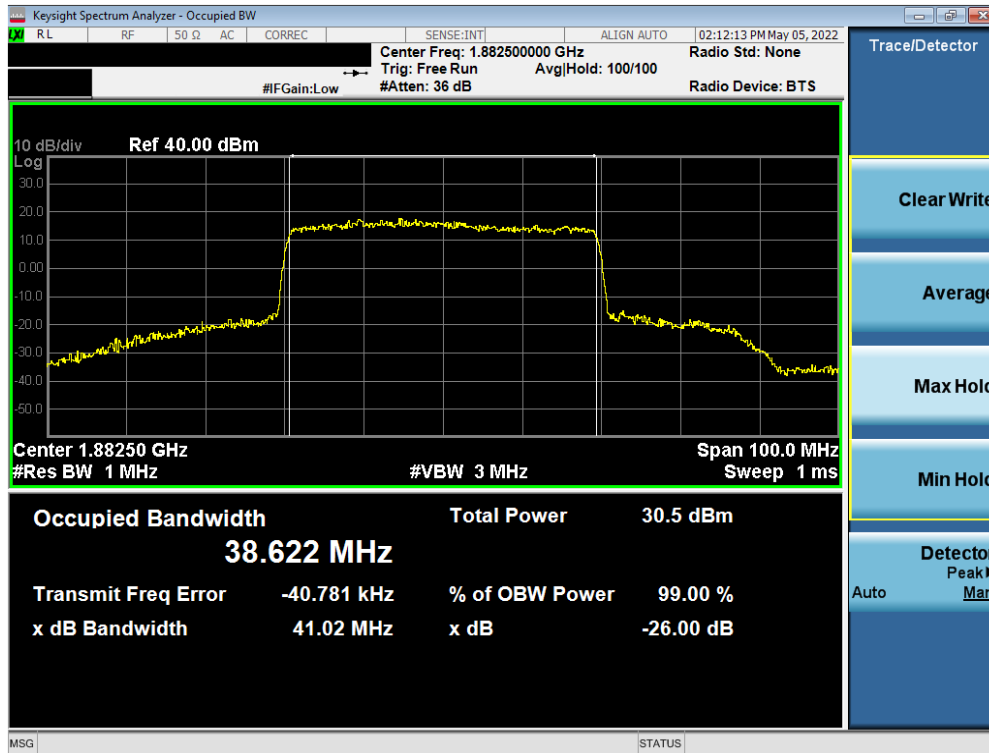
Plot 7-33. Occupied Bandwidth Plot (NR Band n25/2 - 5.0MHz CP-OFDM 16QAM - Full RB - ANT1)

FCC ID: C3K1997	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2204040049-05-R1.C3K	Test Dates: 03/15/2022- 06/24/2022	EUT Type: Portable Computing Device	Page 31 of 181

NR Band n25/2 – Ant4



Plot 7-34. Occupied Bandwidth Plot (NR Band n25 - 40.0MHz DFT-s-OFDM BPSK - Full RB - ANT4)



Plot 7-35. Occupied Bandwidth Plot (NR Band n25 - 40.0MHz CP-OFDM QPSK - Full RB - ANT4)

FCC ID: C3K1997	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2204040049-05-R1.C3K	Test Dates: 03/15/2022- 06/24/2022	EUT Type: Portable Computing Device	Page 32 of 181



Plot 7-36. Occupied Bandwidth Plot (NR Band n25 - 40.0MHz CP-OFDM 16QAM - Full RB - ANT4)

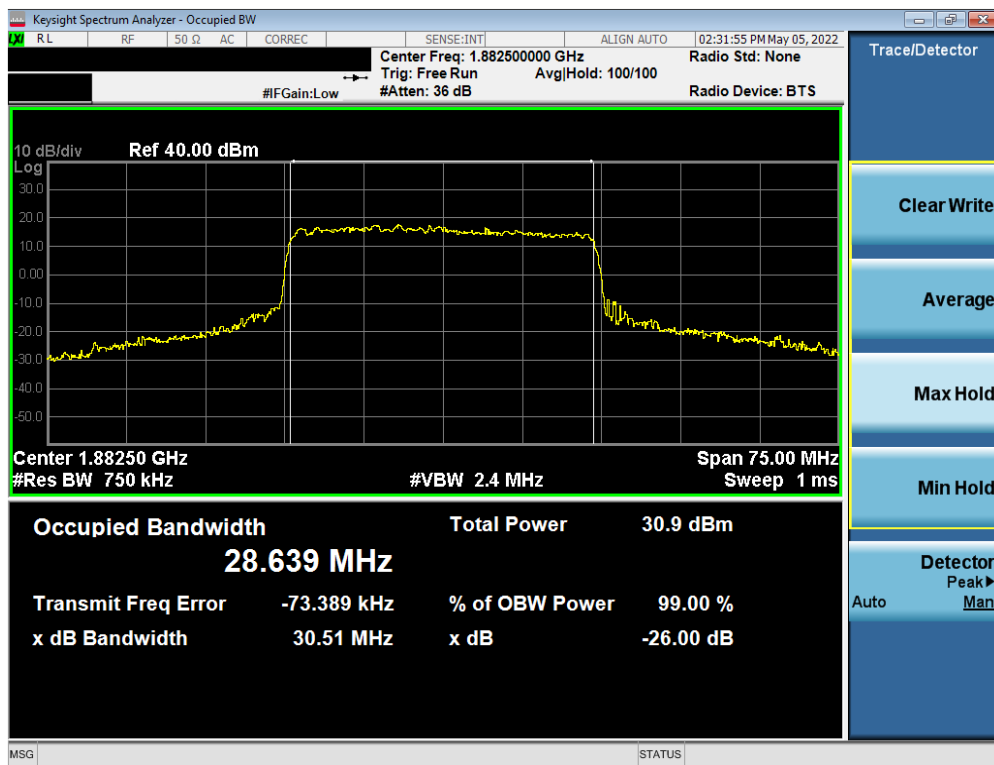


Plot 7-37. Occupied Bandwidth Plot (NR Band n25 - 30.0MHz DFT-s-OFDM BPSK - Full RB - ANT4)

FCC ID: C3K1997	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2204040049-05-R1.C3K	Test Dates: 03/15/2022- 06/24/2022	EUT Type: Portable Computing Device	Page 33 of 181



Plot 7-38. Occupied Bandwidth Plot (NR Band n25 - 30.0MHz CP-OFDM QPSK - Full RB - ANT4)



Plot 7-39. Occupied Bandwidth Plot (NR Band n25 - 30.0MHz CP-OFDM 16QAM - Full RB - ANT4)

FCC ID: C3K1997	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2204040049-05-R1.C3K	Test Dates: 03/15/2022- 06/24/2022	EUT Type: Portable Computing Device	Page 34 of 181

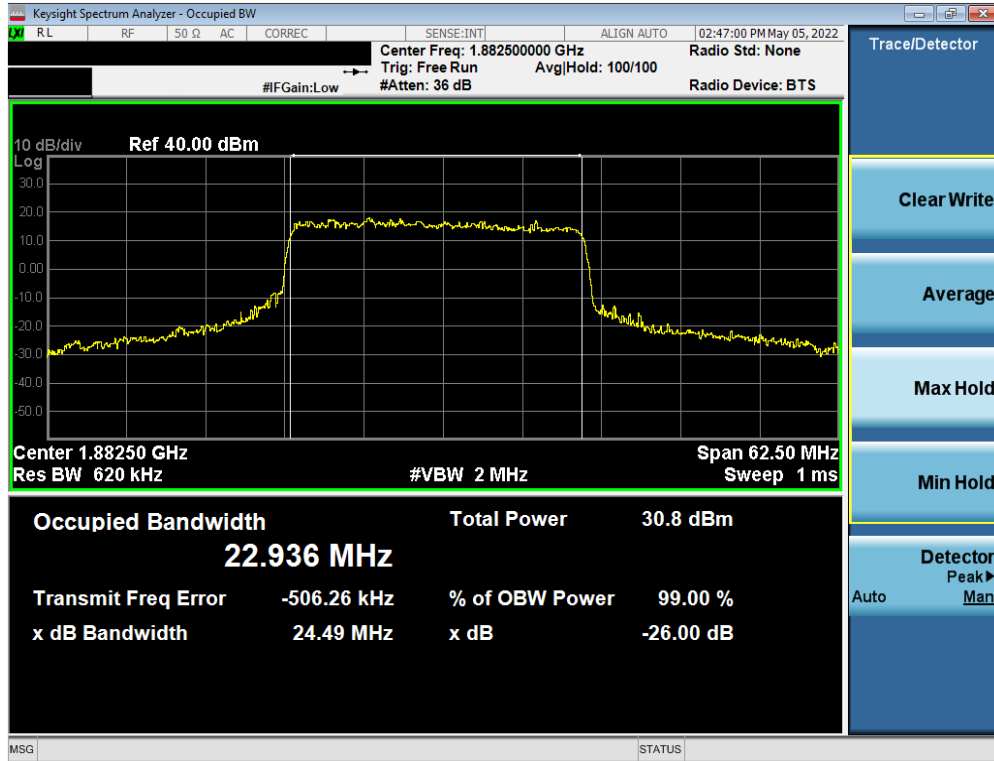


Plot 7-40. Occupied Bandwidth Plot (NR Band n25 - 25.0MHz DFT-s-OFDM BPSK - Full RB - ANT4)

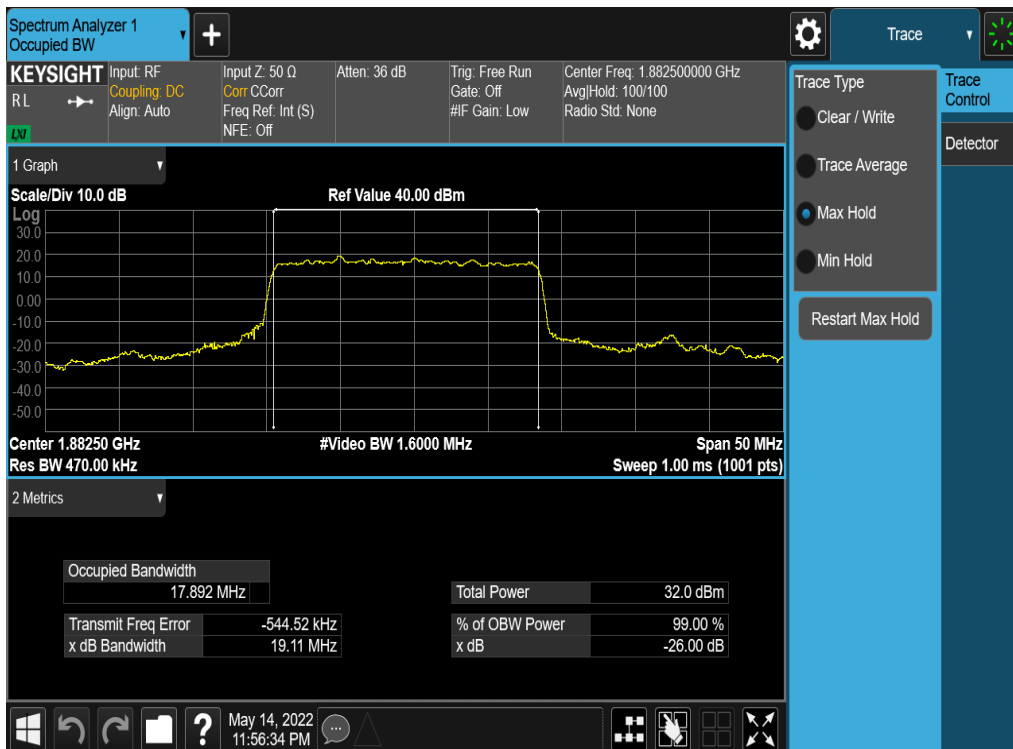


Plot 7-41. Occupied Bandwidth Plot (NR Band n25 - 25.0MHz CP-OFDM QPSK - Full RB - ANT4)

FCC ID: C3K1997	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2204040049-05-R1.C3K	Test Dates: 03/15/2022- 06/24/2022	EUT Type: Portable Computing Device	Page 35 of 181

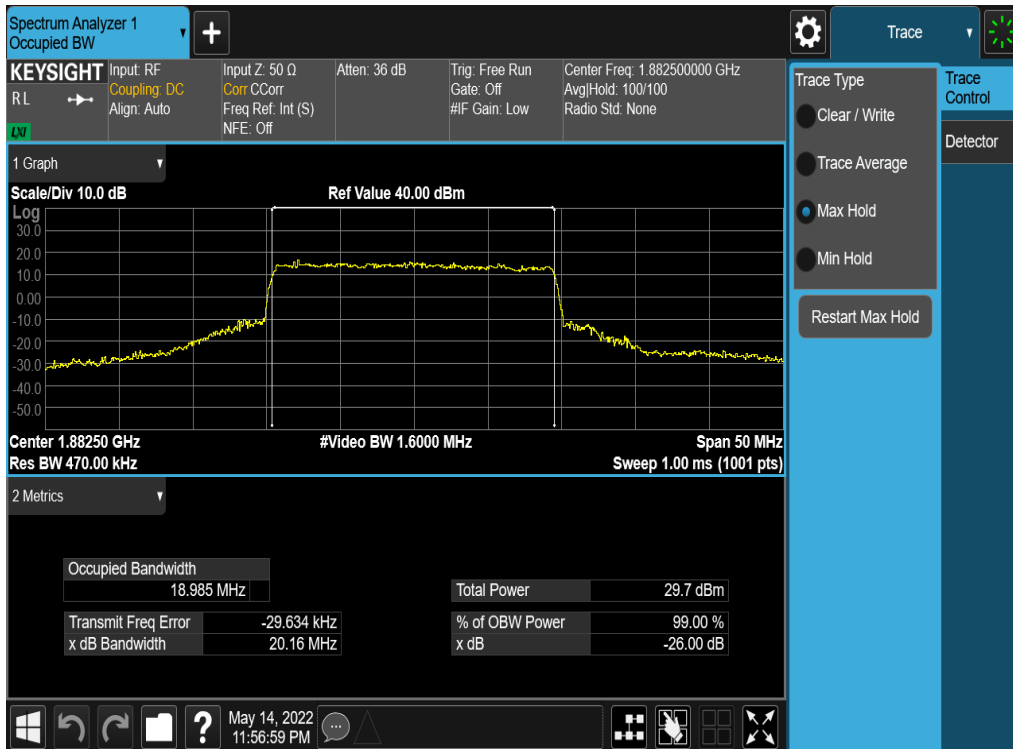


Plot 7-42. Occupied Bandwidth Plot (NR Band n25 - 25.0MHz CP-OFDM 16QAM - Full RB - ANT4)

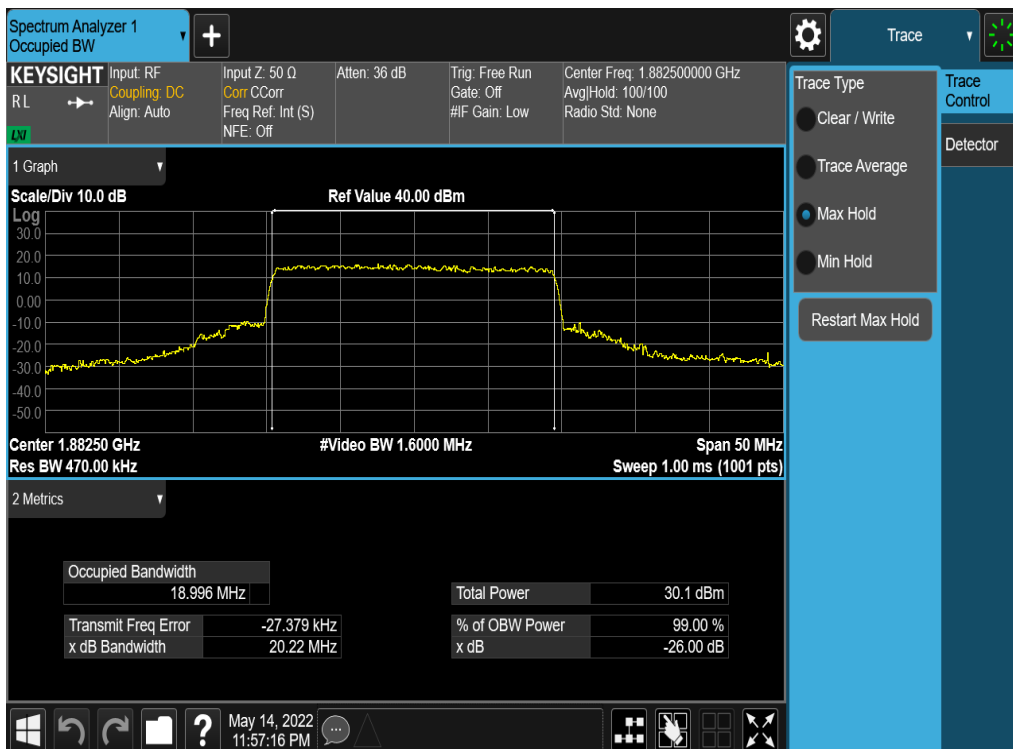


Plot 7-43. Occupied Bandwidth Plot (NR Band n25/2 - 20.0MHz DFT-s-OFDM BPSK - Full RB - ANT4)

FCC ID: C3K1997	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2204040049-05-R1.C3K	Test Dates: 03/15/2022 - 06/24/2022	EUT Type: Portable Computing Device	Page 36 of 181

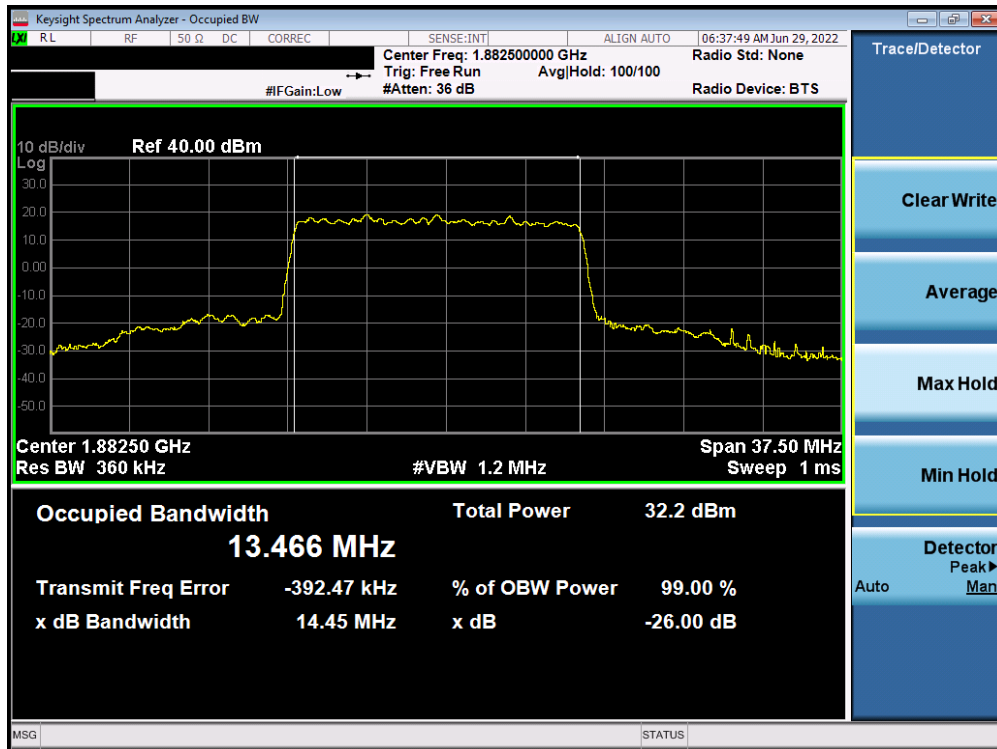


Plot 7-44. Occupied Bandwidth Plot (NR Band n25/2 - 20.0MHz CP-OFDM QPSK - Full RB - ANT4)

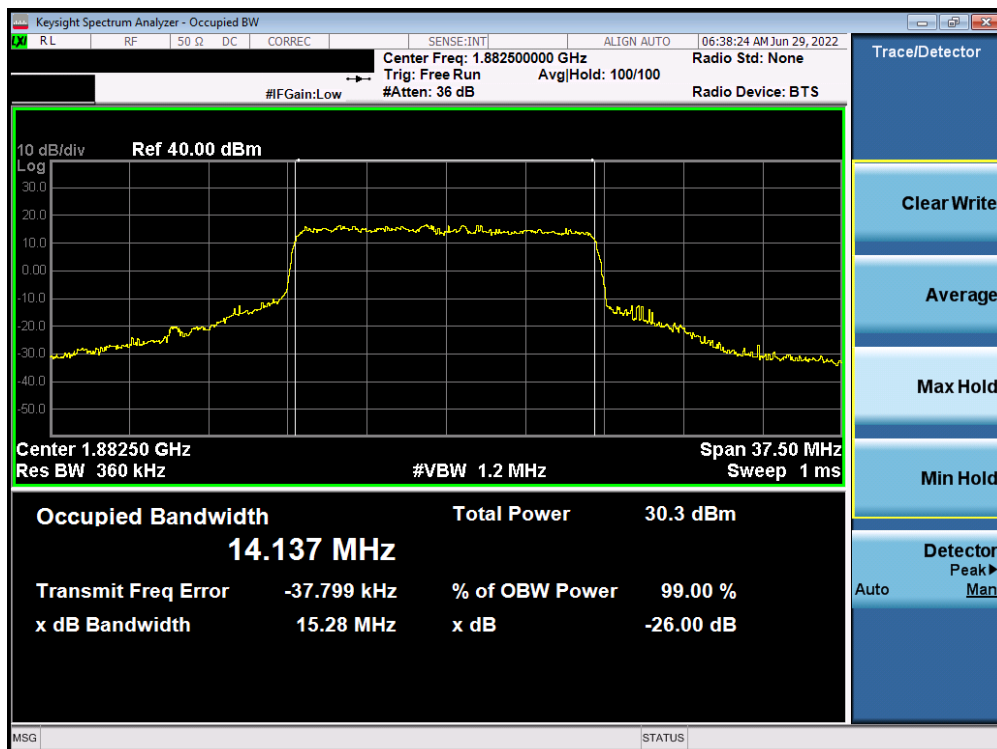


Plot 7-45. Occupied Bandwidth Plot (NR Band n25/2 - 20.0MHz CP-OFDM 16QAM - Full RB - ANT4)

FCC ID: C3K1997	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2204040049-05-R1.C3K	Test Dates: 03/15/2022- 06/24/2022	EUT Type: Portable Computing Device	Page 37 of 181

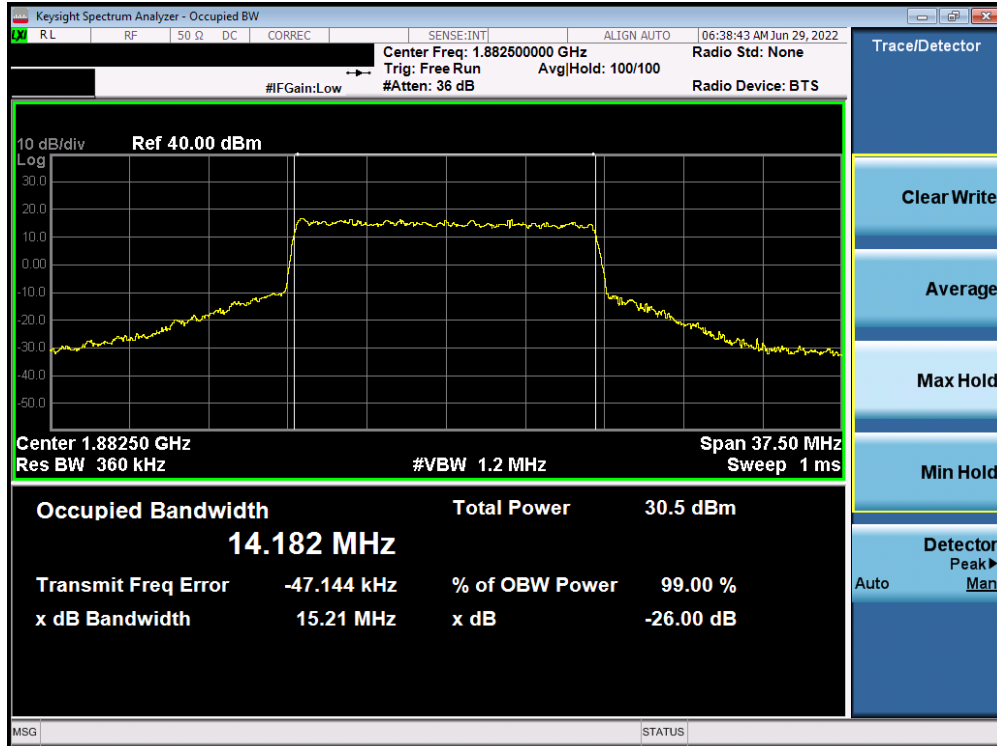


Plot 7-46. Occupied Bandwidth Plot (NR Band n25/2 - 15.0MHz DFT-s-OFDM BPSK - Full RB - ANT4)

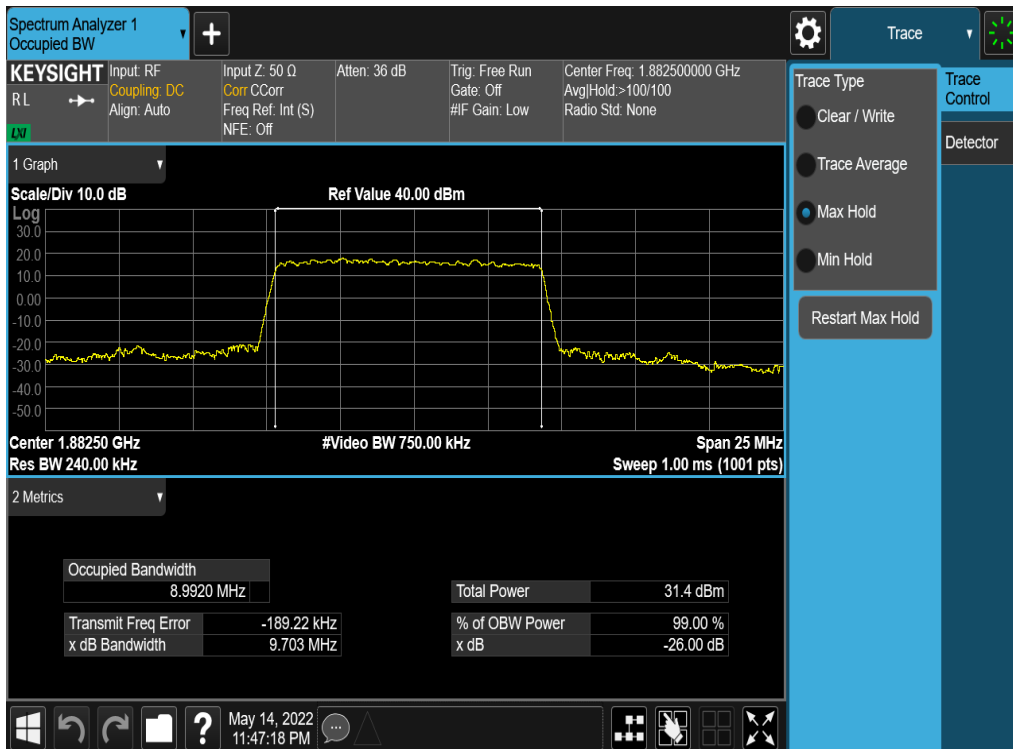


Plot 7-47. Occupied Bandwidth Plot (NR Band n25/2 - 15.0MHz CP-OFDM QPSK - Full RB - ANT4)

FCC ID: C3K1997	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2204040049-05-R1.C3K	Test Dates: 03/15/2022- 06/24/2022	EUT Type: Portable Computing Device	Page 38 of 181

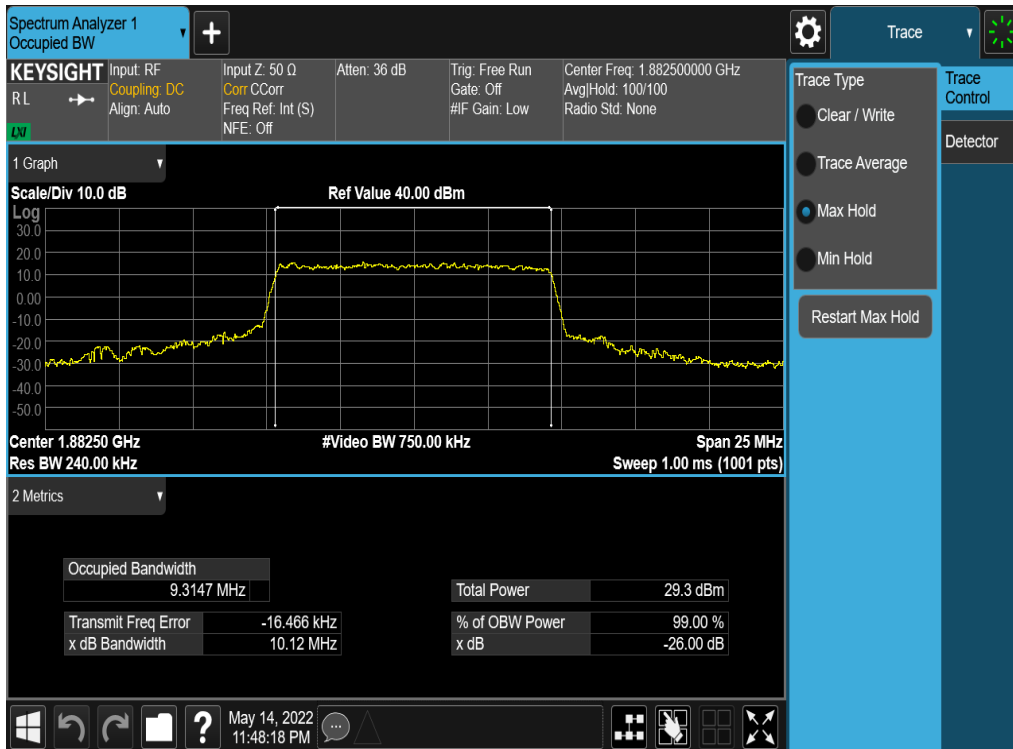


Plot 7-48. Occupied Bandwidth Plot (NR Band n25/2 - 15.0MHz CP-OFDM 16QAM - Full RB - ANT4)

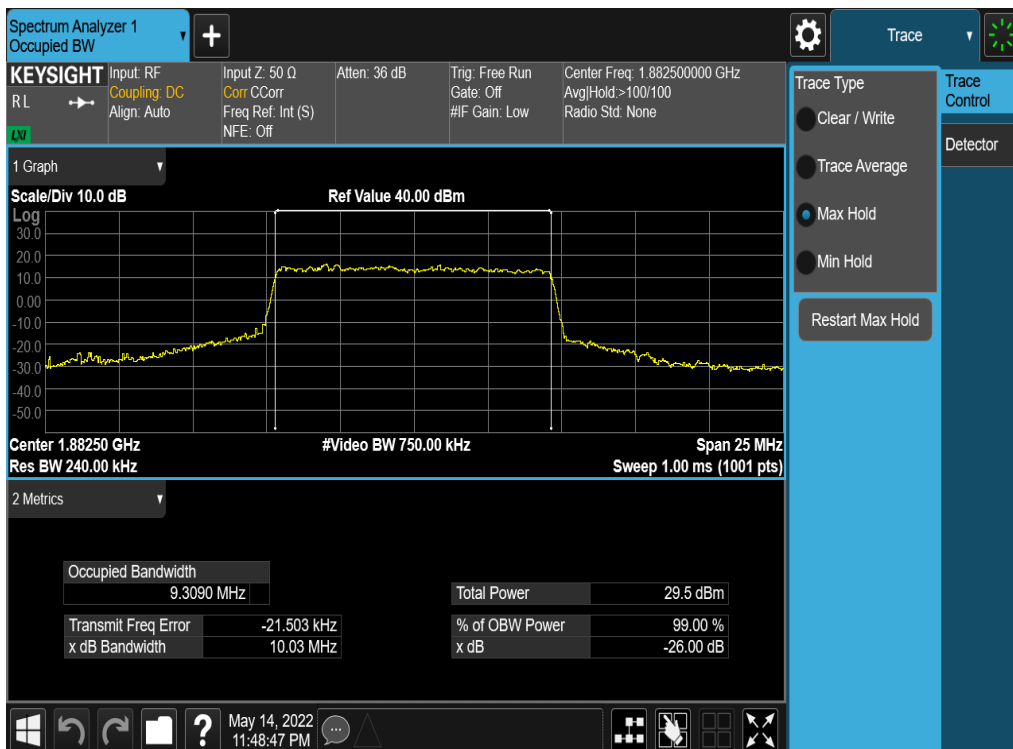


Plot 7-49. Occupied Bandwidth Plot (NR Band n25/2 - 10.0MHz DFT-s-OFDM BPSK - Full RB - ANT4)

FCC ID: C3K1997	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2204040049-05-R1.C3K	Test Dates: 03/15/2022- 06/24/2022	EUT Type: Portable Computing Device	Page 39 of 181

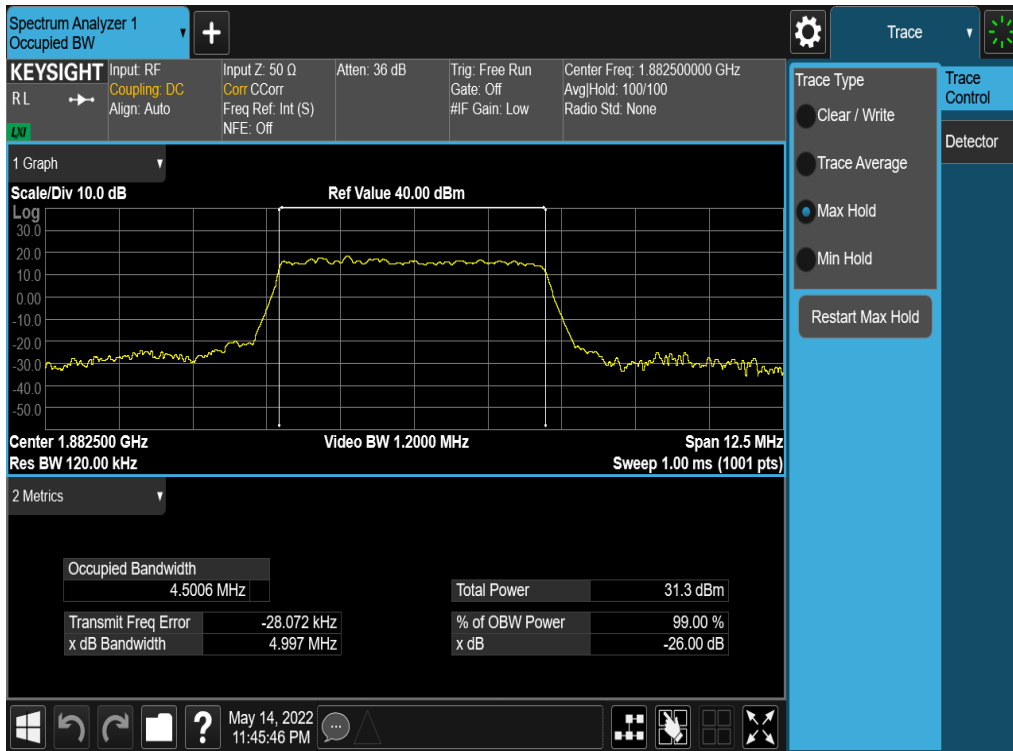


Plot 7-50. Occupied Bandwidth Plot (NR Band n25/2 - 10.0MHz CP-OFDM QPSK - Full RB - ANT4)

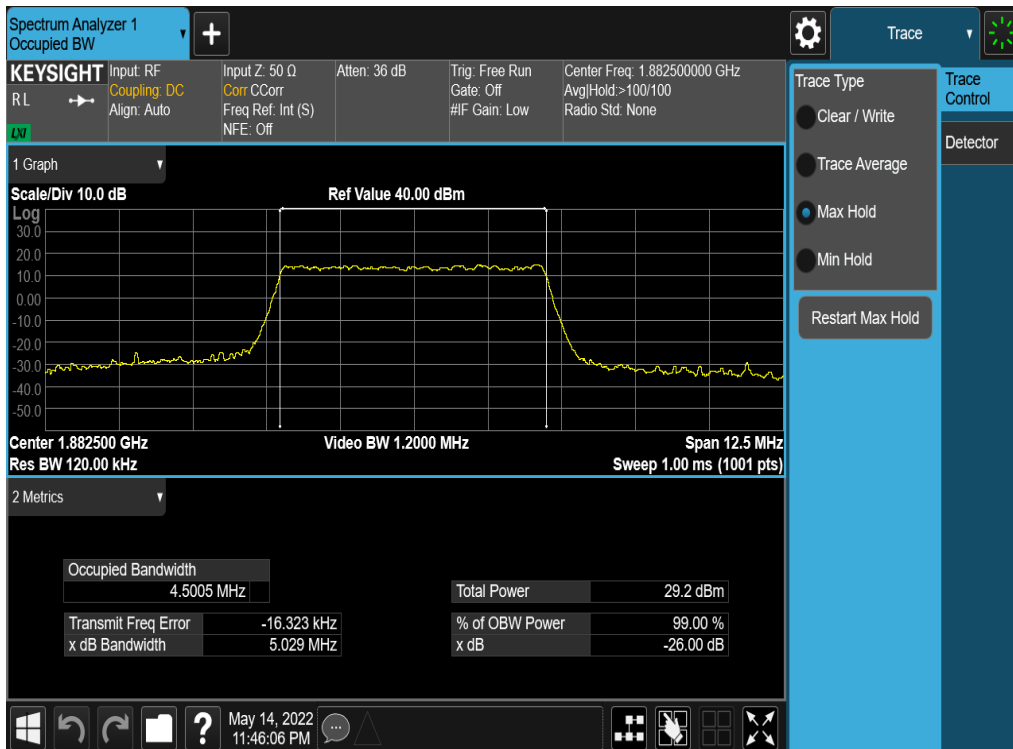


Plot 7-51. Occupied Bandwidth Plot (NR Band n25/2 - 10.0MHz CP-OFDM 16QAM - Full RB - ANT4)

FCC ID: C3K1997	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2204040049-05-R1.C3K	Test Dates: 03/15/2022- 06/24/2022	EUT Type: Portable Computing Device	Page 40 of 181

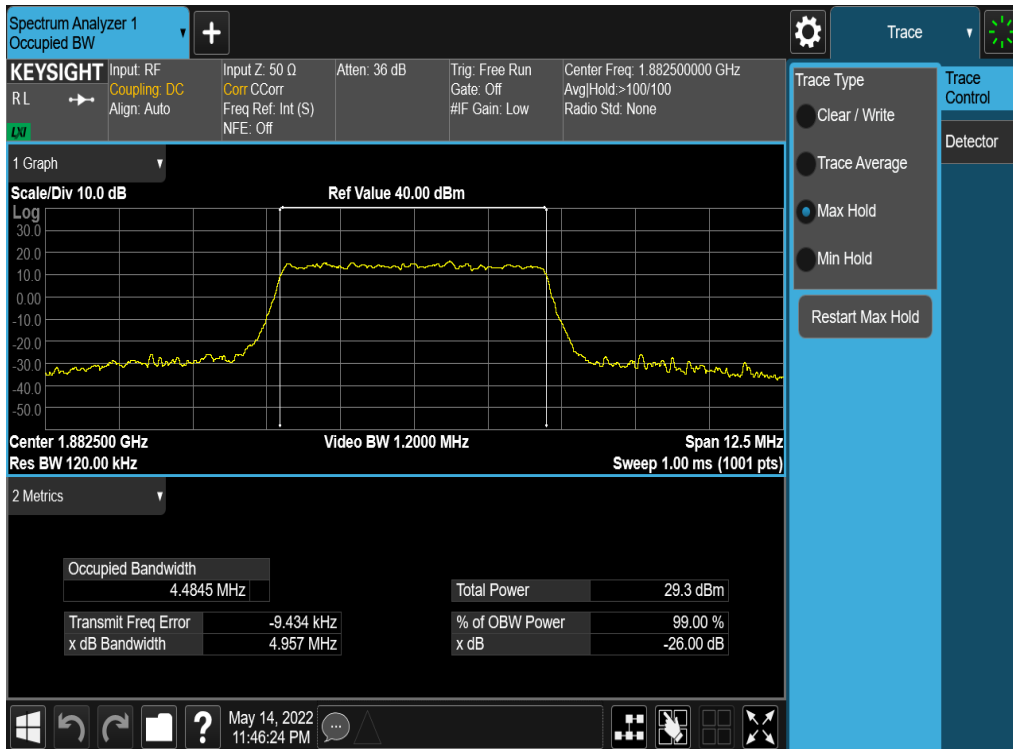


Plot 7-52. Occupied Bandwidth Plot (NR Band n25/2 - 5.0MHz DFT-s-OFDM BPSK - Full RB - ANT4)



Plot 7-53. Occupied Bandwidth Plot (NR Band n25/2 - 5.0MHz CP-OFDM QPSK - Full RB - ANT4)

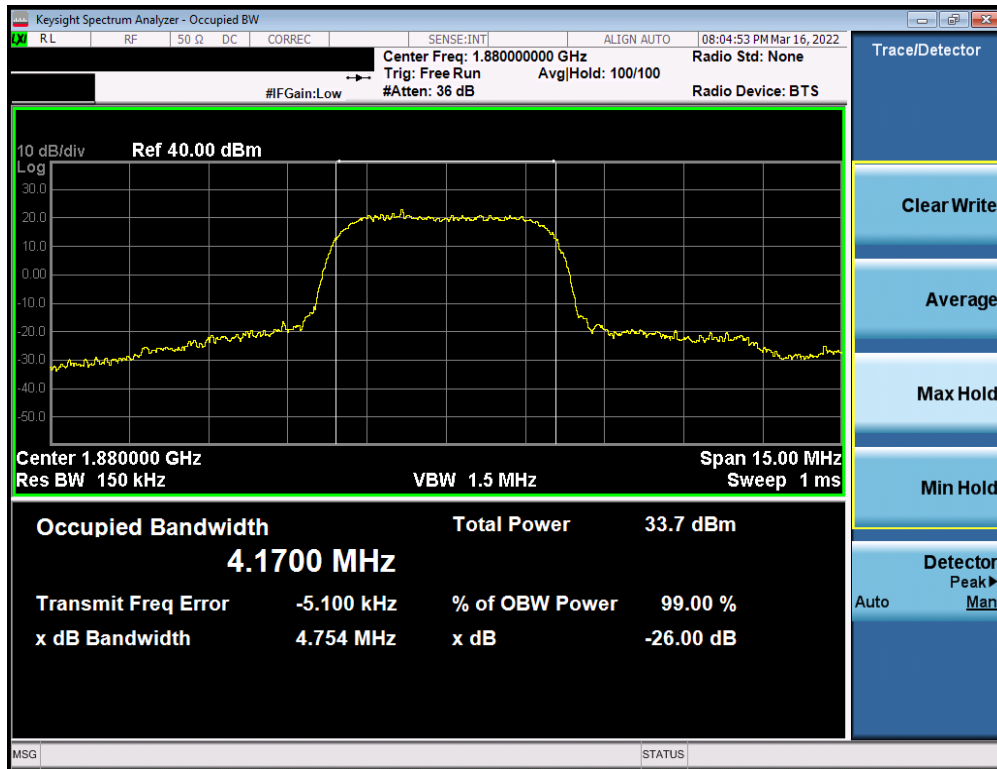
FCC ID: C3K1997	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2204040049-05-R1.C3K	Test Dates: 03/15/2022- 06/24/2022	EUT Type: Portable Computing Device	Page 41 of 181



Plot 7-54. Occupied Bandwidth Plot (NR Band n25/2 - 5.0MHz CP-OFDM 16QAM - Full RB - ANT4)

FCC ID: C3K1997	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2204040049-05-R1.C3K	Test Dates: 03/15/2022- 06/24/2022	EUT Type: Portable Computing Device	Page 42 of 181

WCDMA PCS – Ant1



Plot 7-55. Occupied Bandwidth Plot (WCDMA, Ch. 9400 - Ant1)

FCC ID: C3K1997	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2204040049-05-R1.C3K	Test Dates: 03/15/2022- 06/24/2022	EUT Type: Portable Computing Device	Page 43 of 181

7.4 Spurious and Harmonic Emissions at Antenna Terminal

Test Overview

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10th harmonic. All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst-case configuration. All modes of operation were investigated and the worst-case configuration results are reported in this section.

The minimum permissible attenuation level of any spurious emission is $43 + 10 \log_{10}(P_{[Watts]})$, where P is the transmitter power in Watts.

Test Procedure Used

ANSI C63.26-2015 – Section 5.7.4

Test Settings

1. Start frequency was set to 30MHz and stop frequency was set to 20GHz (separated into at least two plots per channel)
2. Detector = RMS
3. Trace mode = trace average for continuous emissions, max hold for pulse emissions
4. Sweep time = auto couple
5. The trace was allowed to stabilize
6. Please see test notes below for RBW and VBW settings

Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.

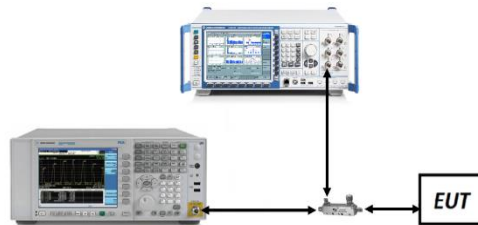


Figure 7-3. Test Instrument & Measurement Setup

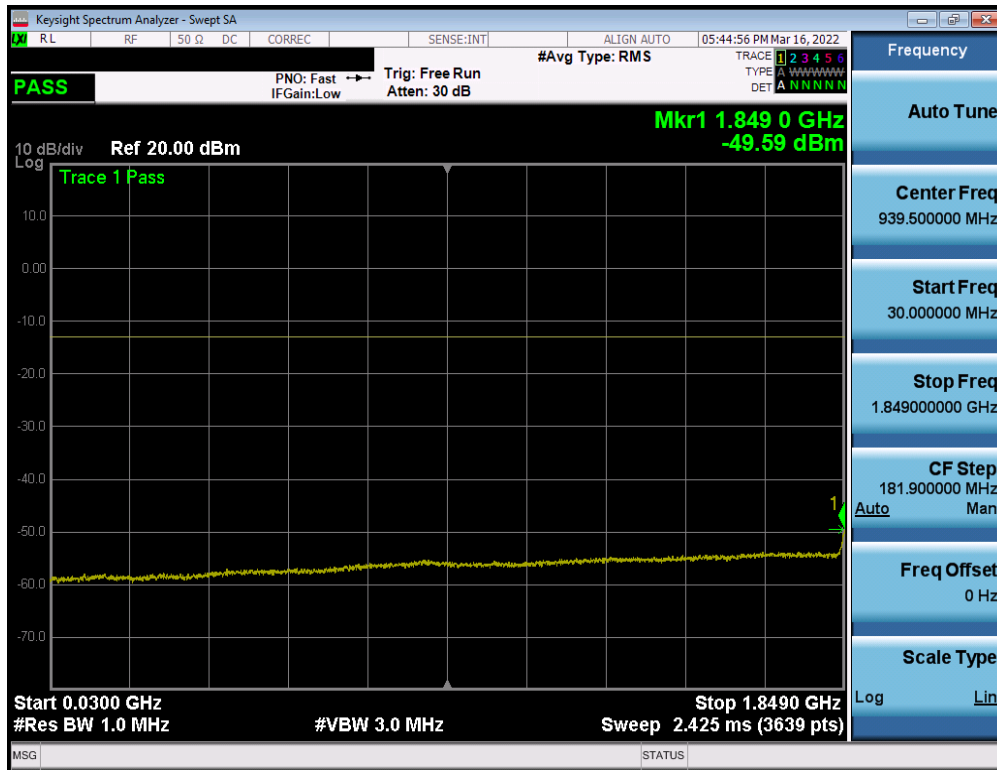
Test Notes

1. Per Part 24, compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz.
2. For NR operation, all subcarrier spacings (SCS) and transmission schemes (e.g. CP-OFDM and DFT-s-OFDM) were investigated to determine the worst case configuration. All modes of operation were investigated and the worst-case configuration results are reported in this section.

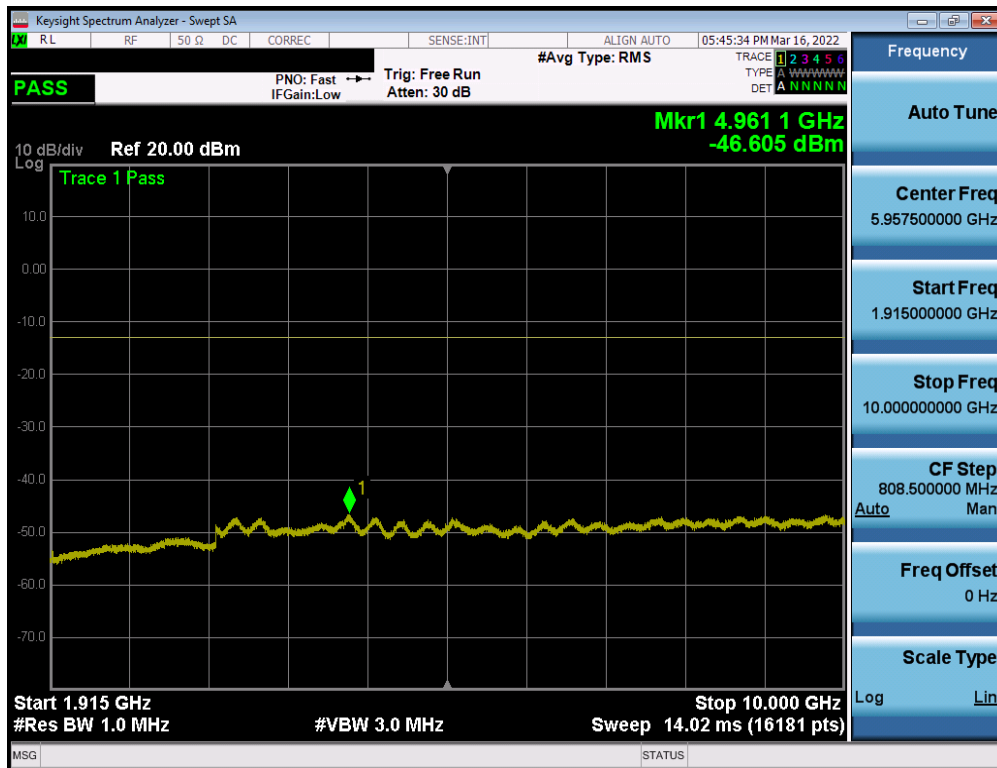
FCC ID: C3K1997	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2204040049-05-R1.C3K	Test Dates: 03/15/2022- 06/24/2022	EUT Type: Portable Computing Device	Page 44 of 181

V3.0 1/5/2022

LTE Band 25/2 – Ant1

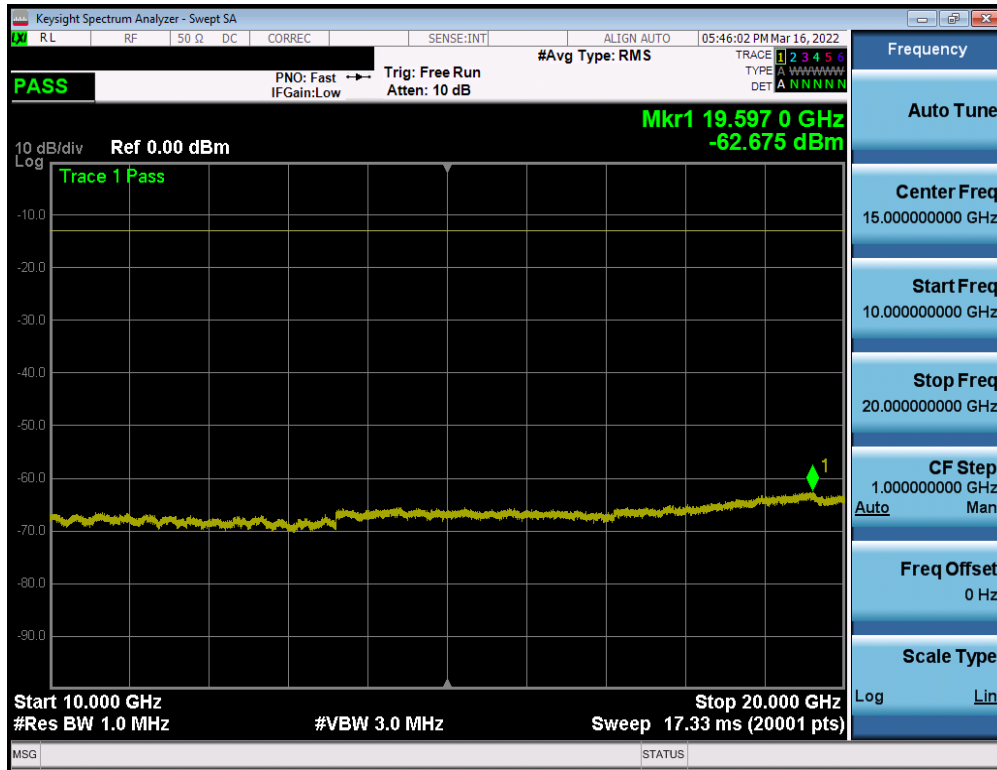


Plot 7-56. Conducted Spurious Plot (LTE Band 25/2 - 20MHz QPSK - 1RB - Low Channel - Ant1)



Plot 7-57. Conducted Spurious Plot (LTE Band 25/2 - 20MHz QPSK - 1RB - Low Channel - Ant1)

FCC ID: C3K1997	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2204040049-05-R1.C3K	Test Dates: 03/15/2022- 06/24/2022	EUT Type: Portable Computing Device	Page 45 of 181

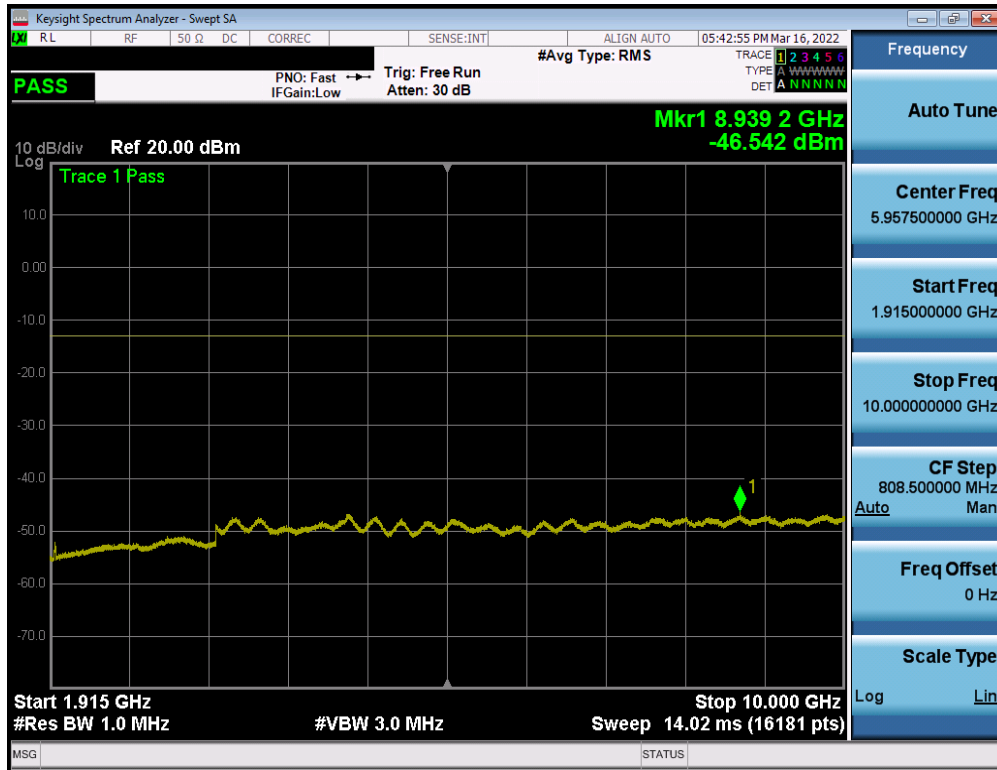


Plot 7-58. Conducted Spurious Plot (LTE Band 25/2 - 20MHz QPSK - 1RB - Low Channel - Ant1)

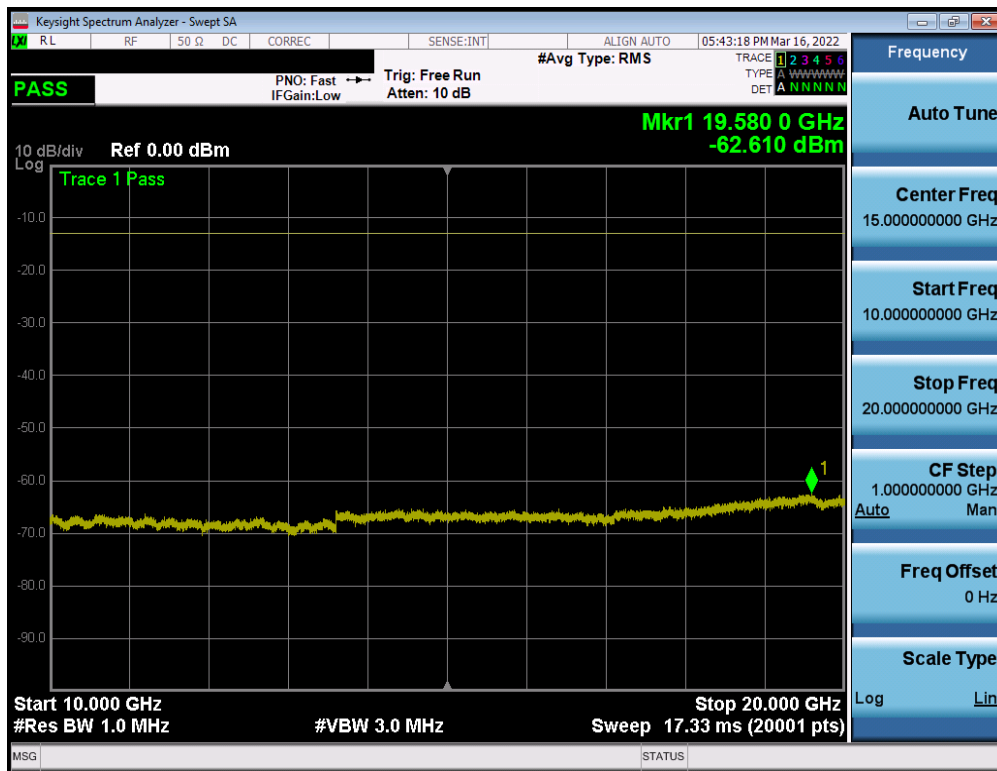


Plot 7-59. Conducted Spurious Plot (LTE Band 25/2 - 20MHz QPSK - 1RB - Mid Channel - Ant1)

FCC ID: C3K1997	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2204040049-05-R1.C3K	Test Dates: 03/15/2022- 06/24/2022	EUT Type: Portable Computing Device	Page 46 of 181

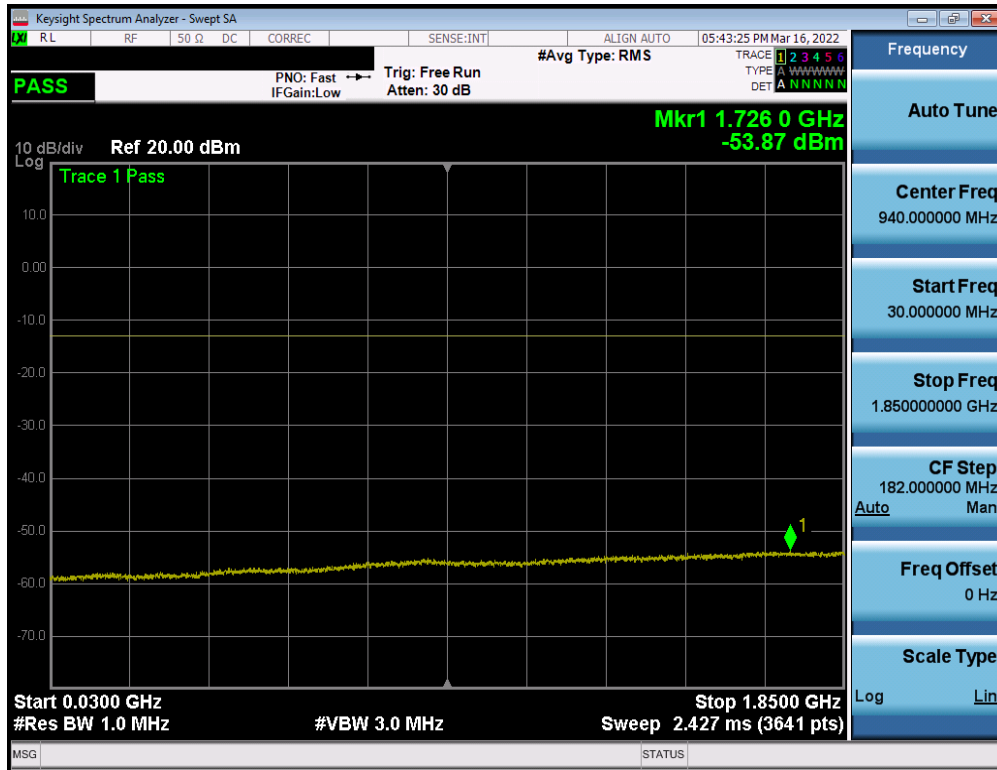


Plot 7-60. Conducted Spurious Plot (LTE Band 25/2 - 20MHz QPSK - 1RB - Mid Channel - Ant1)

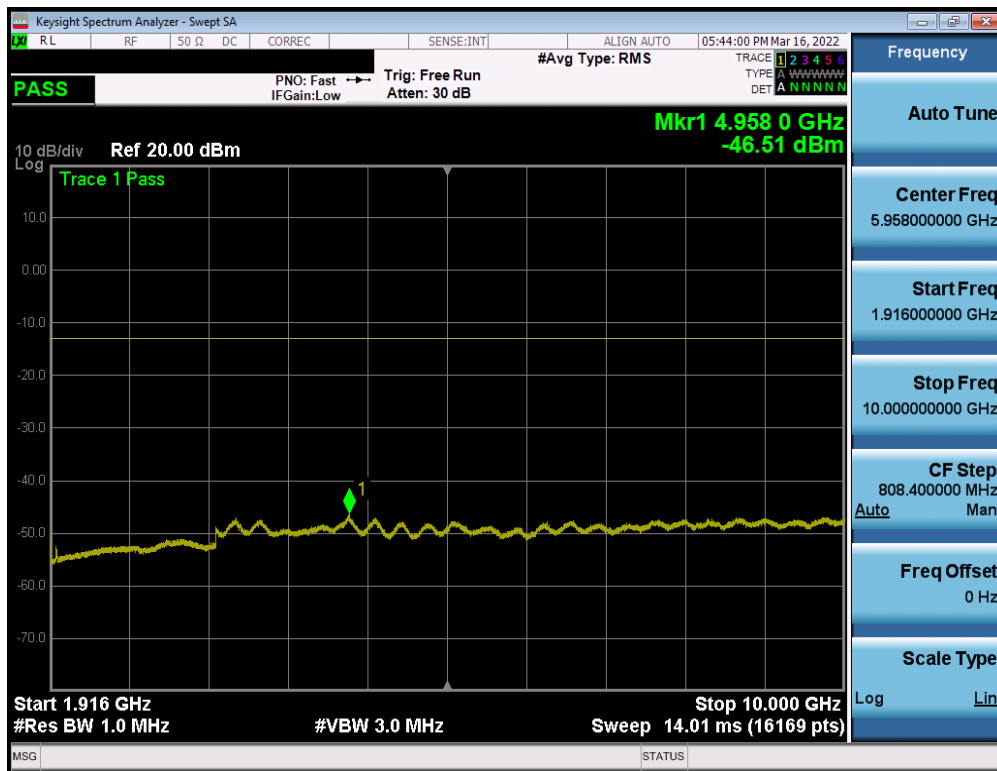


Plot 7-61. Conducted Spurious Plot (LTE Band 25/2 - 20MHz QPSK - 1RB - Mid Channel - Ant1)

FCC ID: C3K1997	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2204040049-05-R1.C3K	Test Dates: 03/15/2022- 06/24/2022	EUT Type: Portable Computing Device	Page 47 of 181

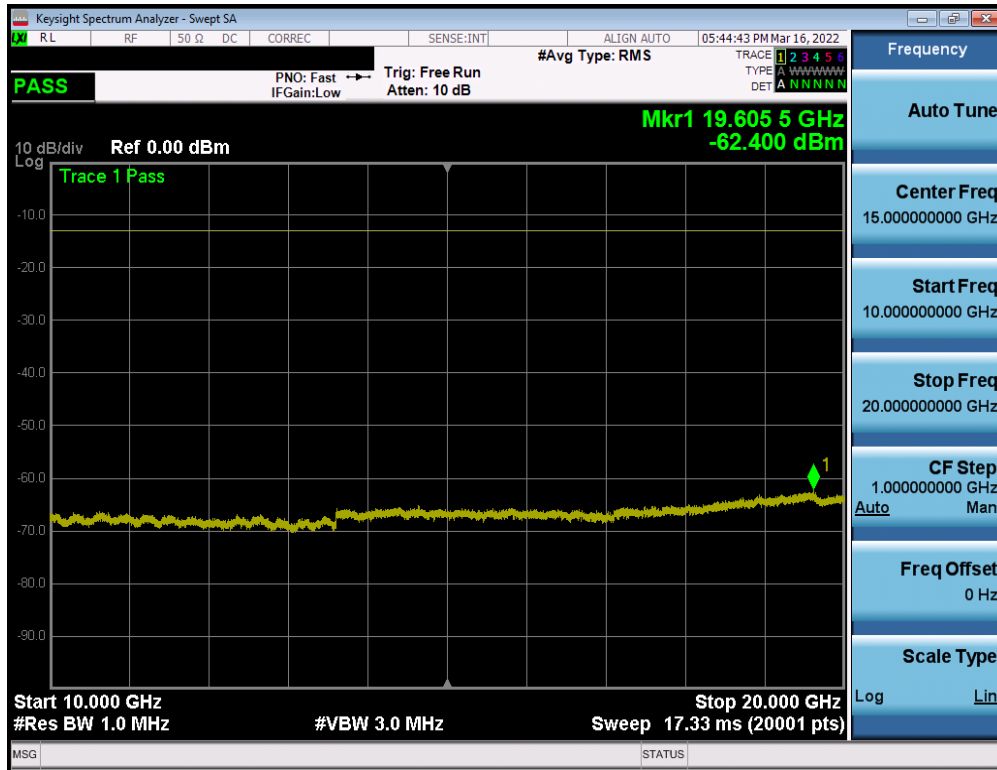


Plot 7-62. Conducted Spurious Plot (LTE Band 25/2 - 20MHz QPSK - 1RB - High Channel - Ant1)



Plot 7-63. Conducted Spurious Plot (LTE Band 25/2 - 20MHz QPSK - 1RB - High Channel - Ant1)

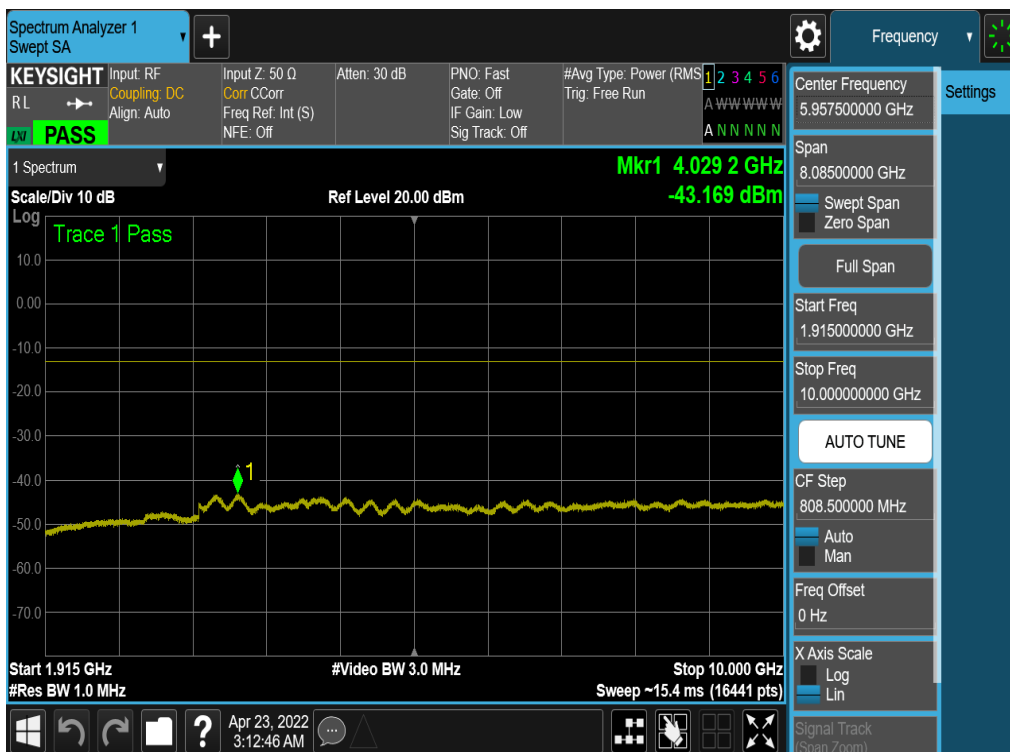
FCC ID: C3K1997	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2204040049-05-R1.C3K	Test Dates: 03/15/2022- 06/24/2022	EUT Type: Portable Computing Device	Page 48 of 181



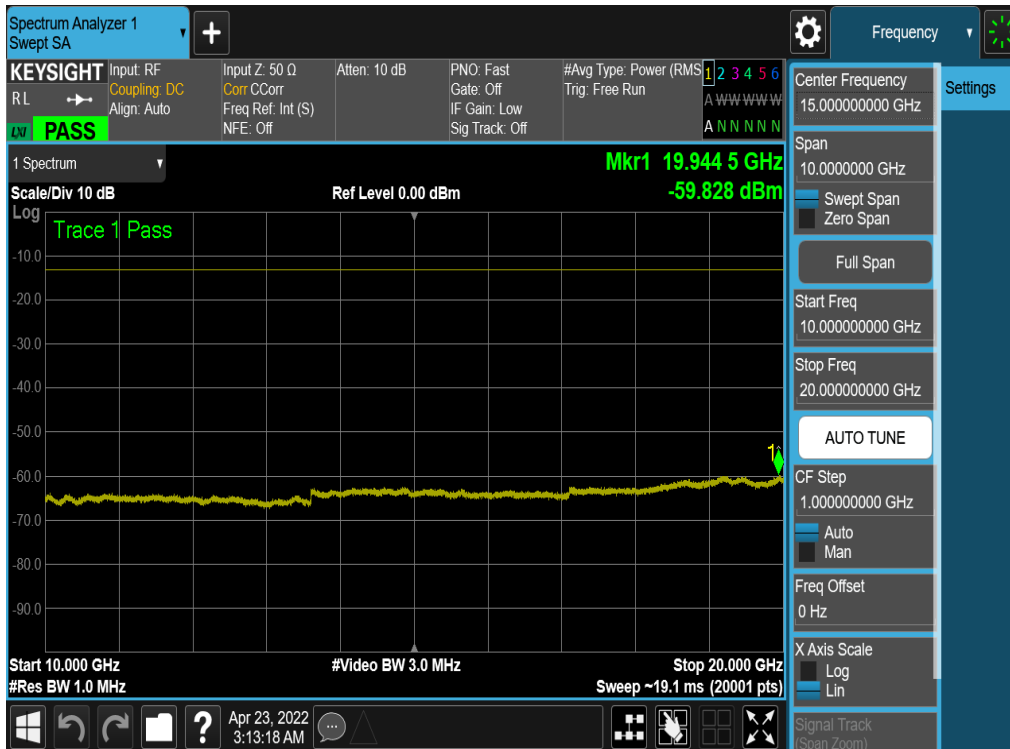
Plot 7-64. Conducted Spurious Plot (LTE Band 25/2 - 20MHz QPSK - 1RB - High Channel - Ant1)

FCC ID: C3K1997	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2204040049-05-R1.C3K	Test Dates: 03/15/2022- 06/24/2022	EUT Type: Portable Computing Device	Page 49 of 181

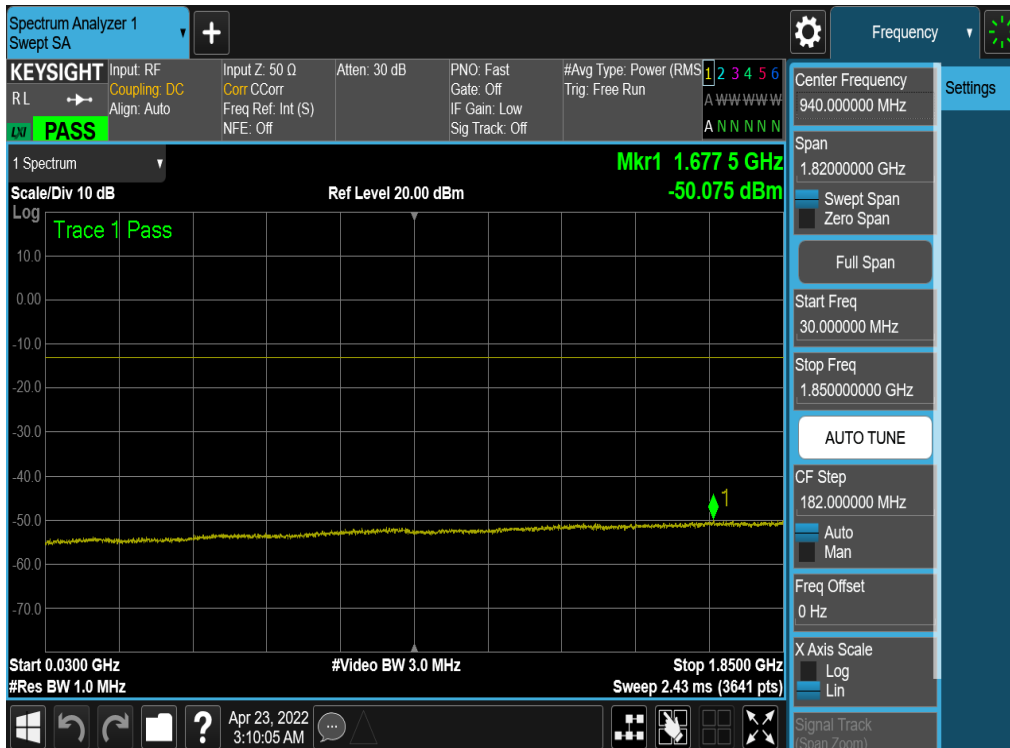
NR Band n25/2 – Ant1



FCC ID: C3K1997	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2204040049-05-R1.C3K	Test Dates: 03/15/2022- 06/24/2022	EUT Type: Portable Computing Device	Page 50 of 181

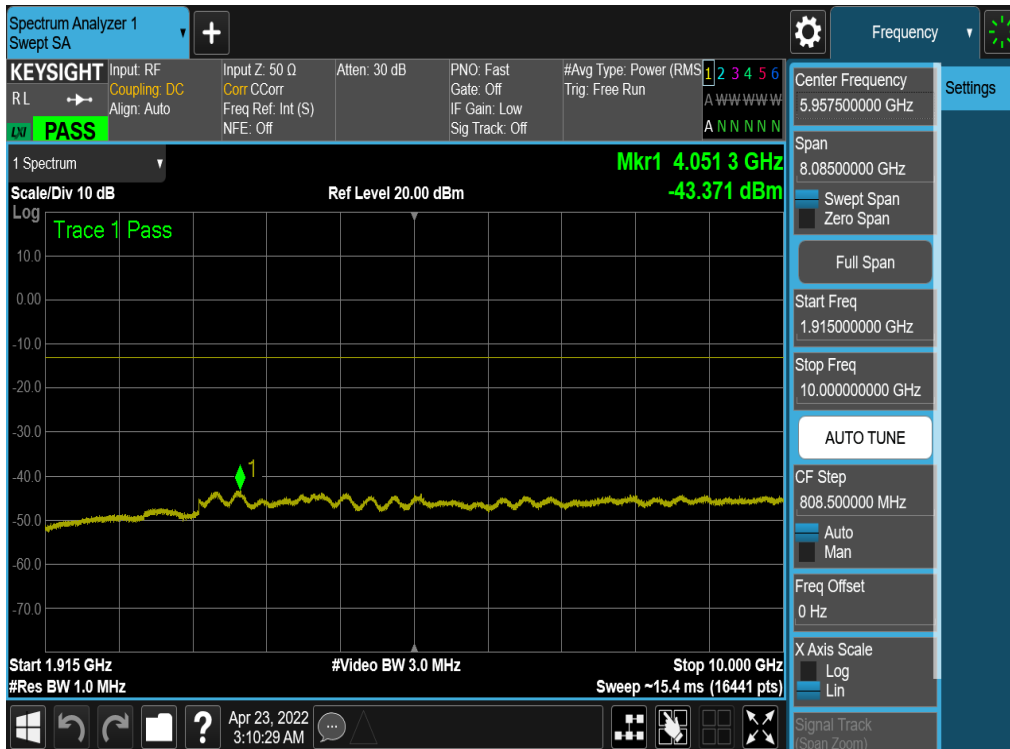


Plot 7-67. Conducted Spurious Plot (NR Band n25 - 40.0MHz - 1RB - Low Channel - Ant1)

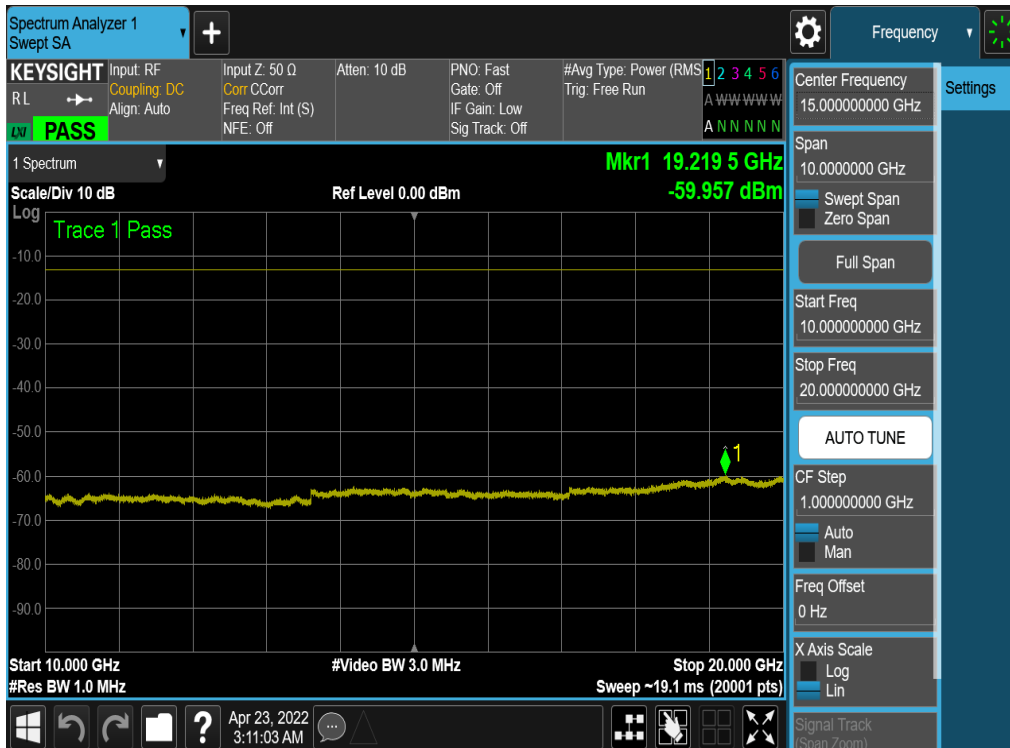


Plot 7-68. Conducted Spurious Plot (NR Band n25 - 40.0MHz - 1RB - Mid Channel - Ant1)

FCC ID: C3K1997	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2204040049-05-R1.C3K	Test Dates: 03/15/2022- 06/24/2022	EUT Type: Portable Computing Device	Page 51 of 181



Plot 7-69. Conducted Spurious Plot (NR Band n25 - 40.0MHz - 1RB - Mid Channel - Ant1)

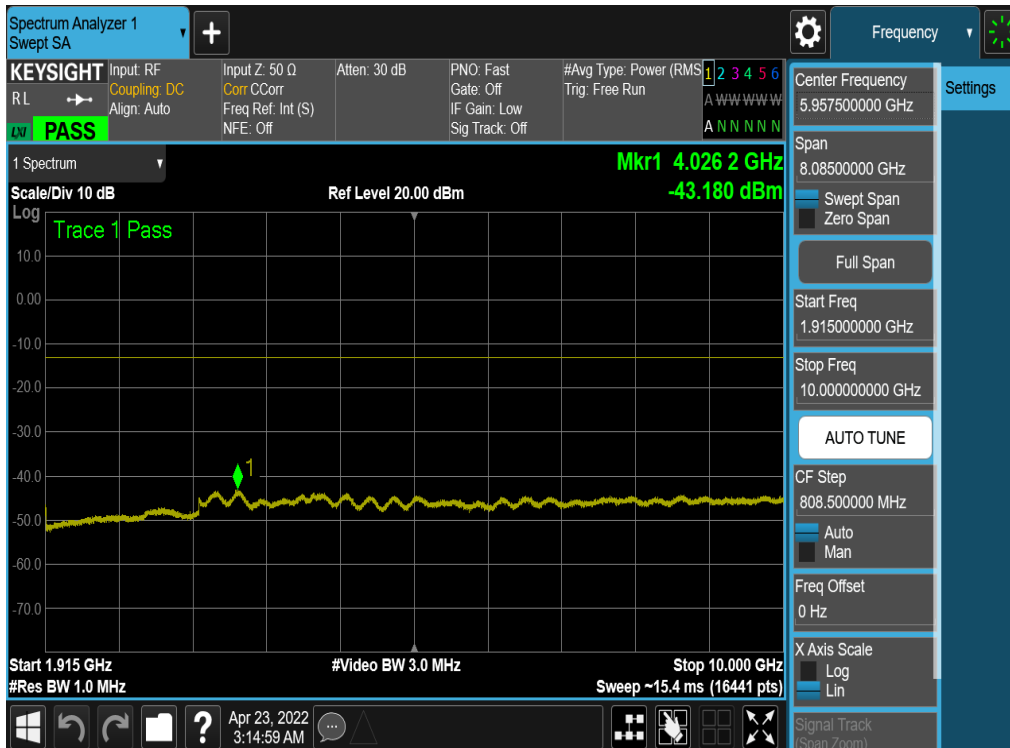


Plot 7-70. Conducted Spurious Plot (NR Band n25 - 40.0MHz - 1RB - Mid Channel - Ant1)

FCC ID: C3K1997	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2204040049-05-R1.C3K	Test Dates: 03/15/2022- 06/24/2022	EUT Type: Portable Computing Device	Page 52 of 181

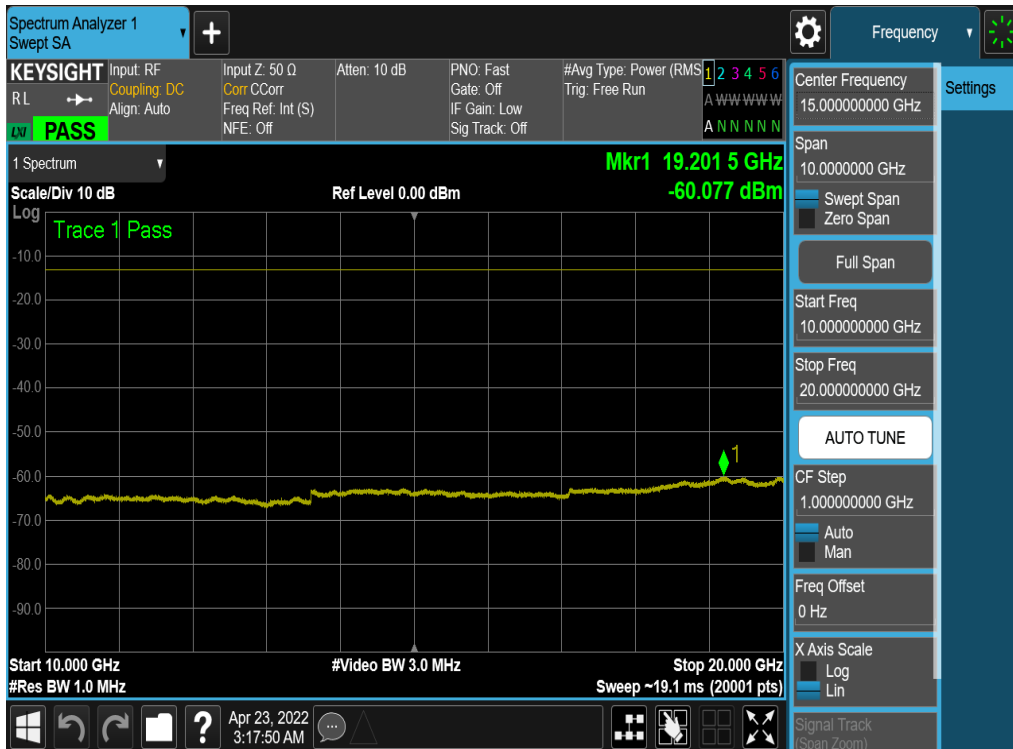


Plot 7-71. Conducted Spurious Plot (NR Band n25 - 40.0MHz - 1RB - High Channel - Ant1)



Plot 7-72. Conducted Spurious Plot (NR Band n25 - 40.0MHz - 1RB - High Channel - Ant1)

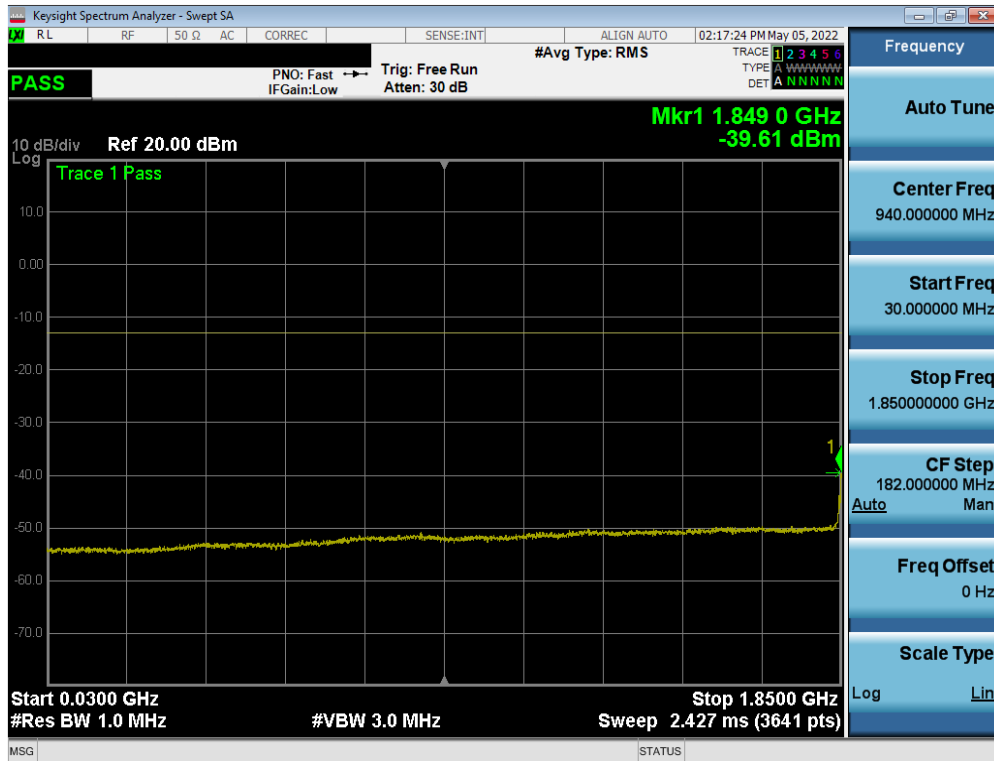
FCC ID: C3K1997	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2204040049-05-R1.C3K	Test Dates: 03/15/2022- 06/24/2022	EUT Type: Portable Computing Device	Page 53 of 181



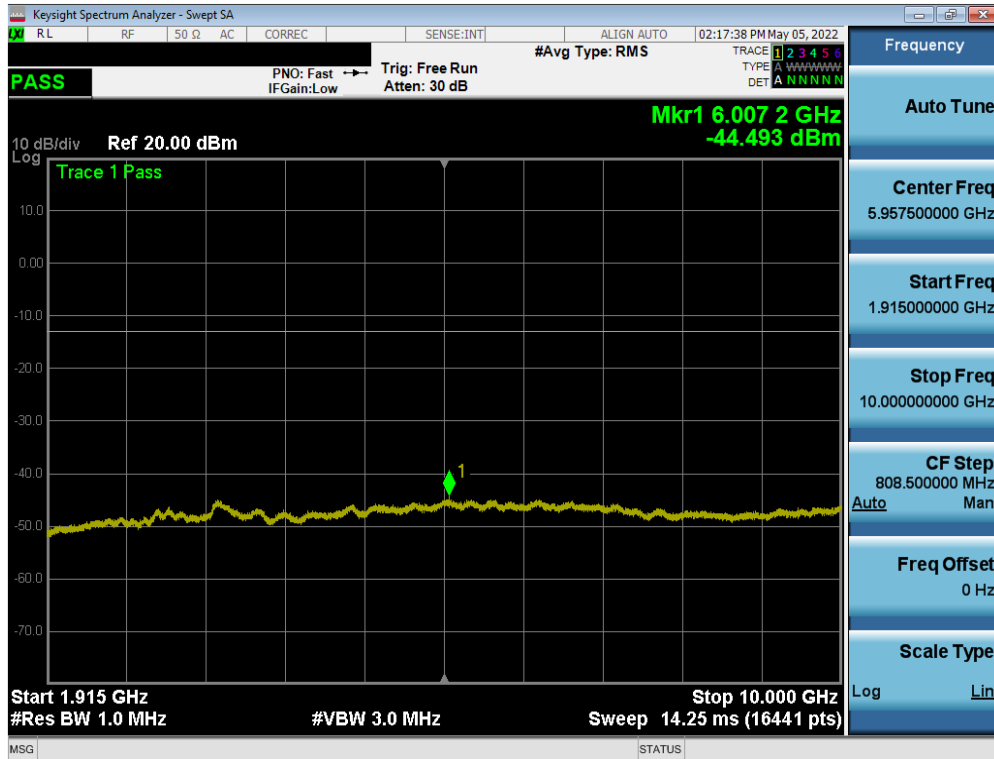
Plot 7-73. Conducted Spurious Plot (NR Band n25 - 40.0MHz - 1RB - High Channel - Ant1)

FCC ID: C3K1997	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2204040049-05-R1.C3K	Test Dates: 03/15/2022- 06/24/2022	EUT Type: Portable Computing Device	Page 54 of 181

NR Band n25/2 – Ant4

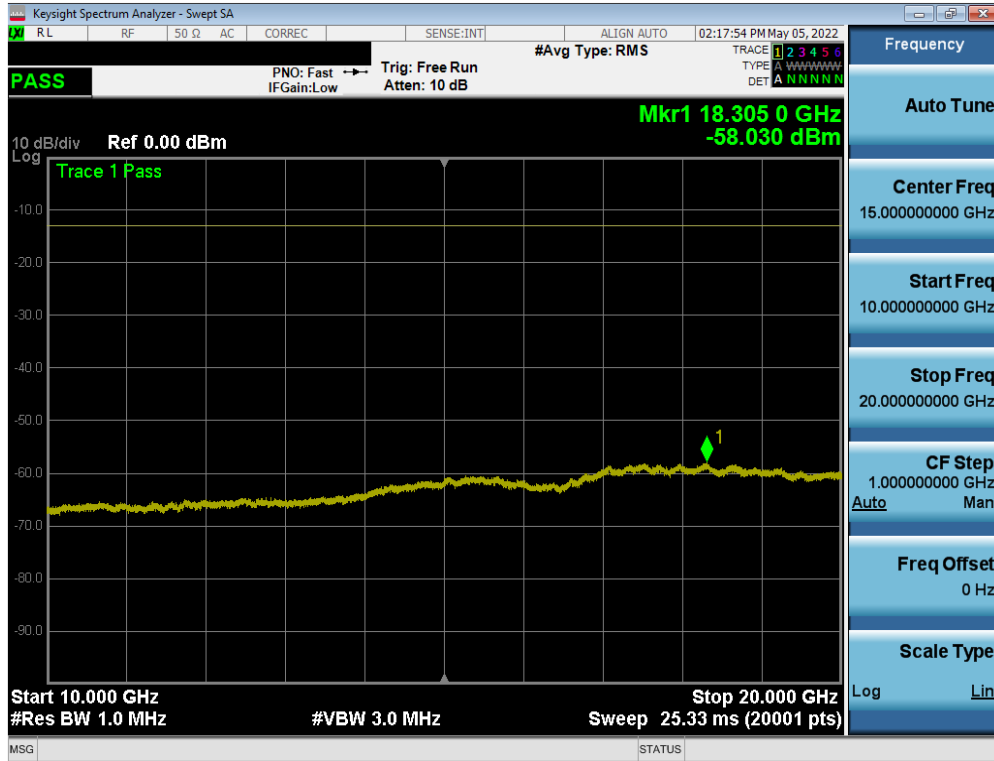


Plot 7-74. Conducted Spurious Plot (NR Band n25 -40.0MHz - 1RB - Low Channel - Ant4)

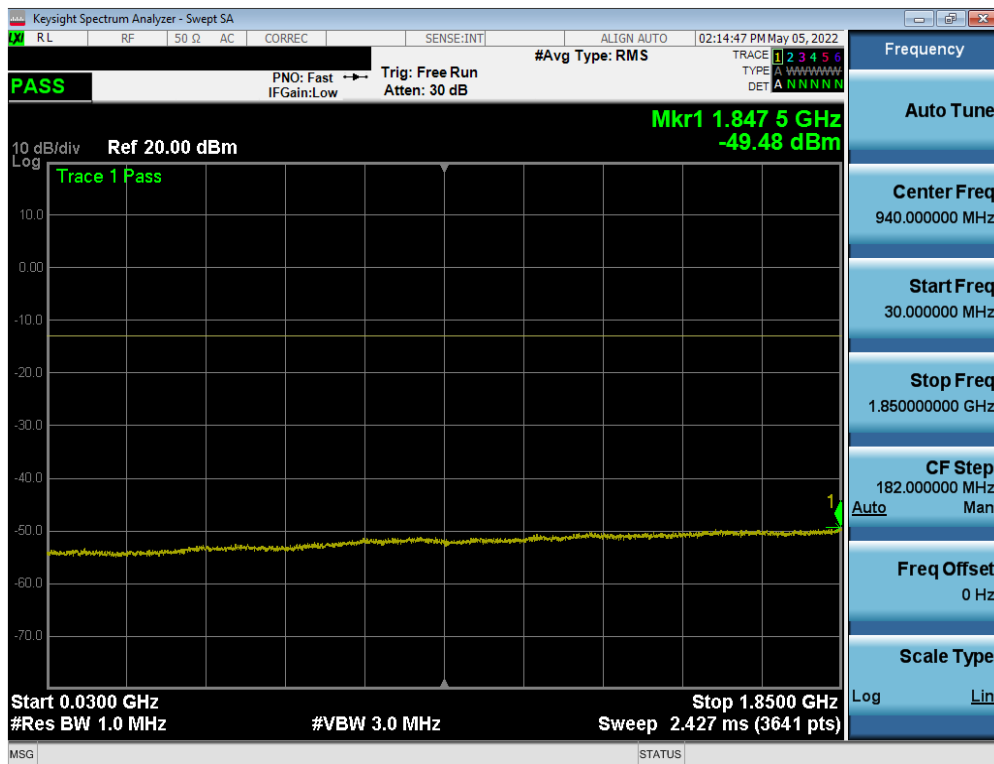


Plot 7-75. Conducted Spurious Plot (NR Band n25 - 40.0MHz - 1RB - Low Channel - Ant4)

FCC ID: C3K1997	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2204040049-05-R1.C3K	Test Dates: 03/15/2022- 06/24/2022	EUT Type: Portable Computing Device	Page 55 of 181

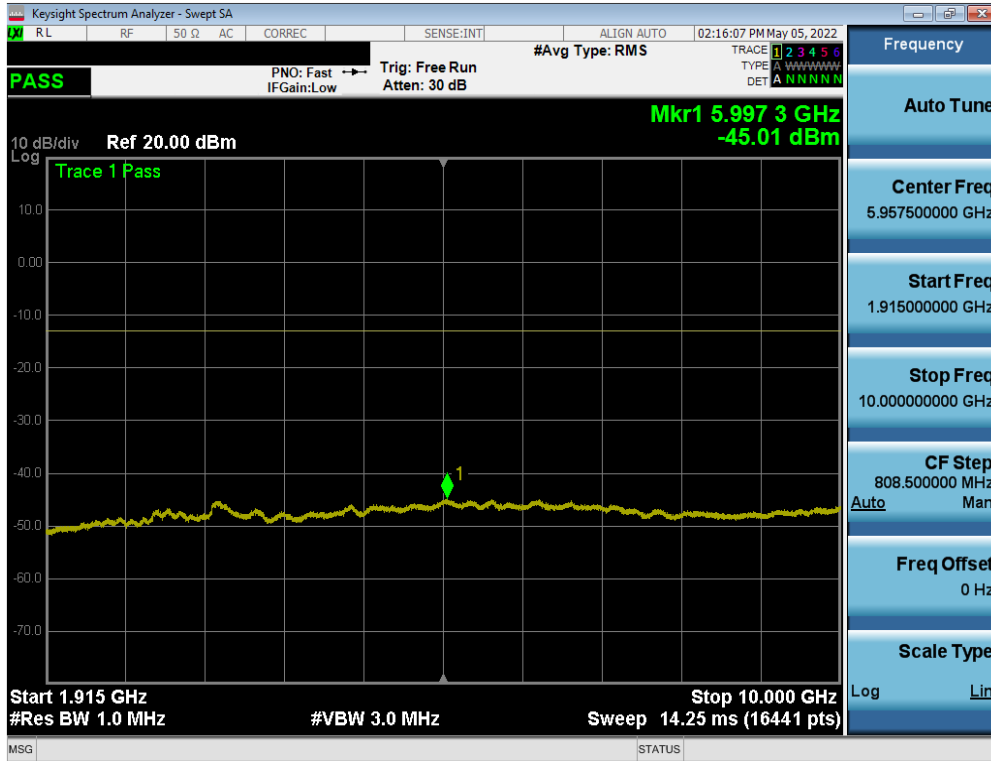


Plot 7-76. Conducted Spurious Plot (NR Band n25 - 40.0MHz - 1RB - Low Channel - Ant4)

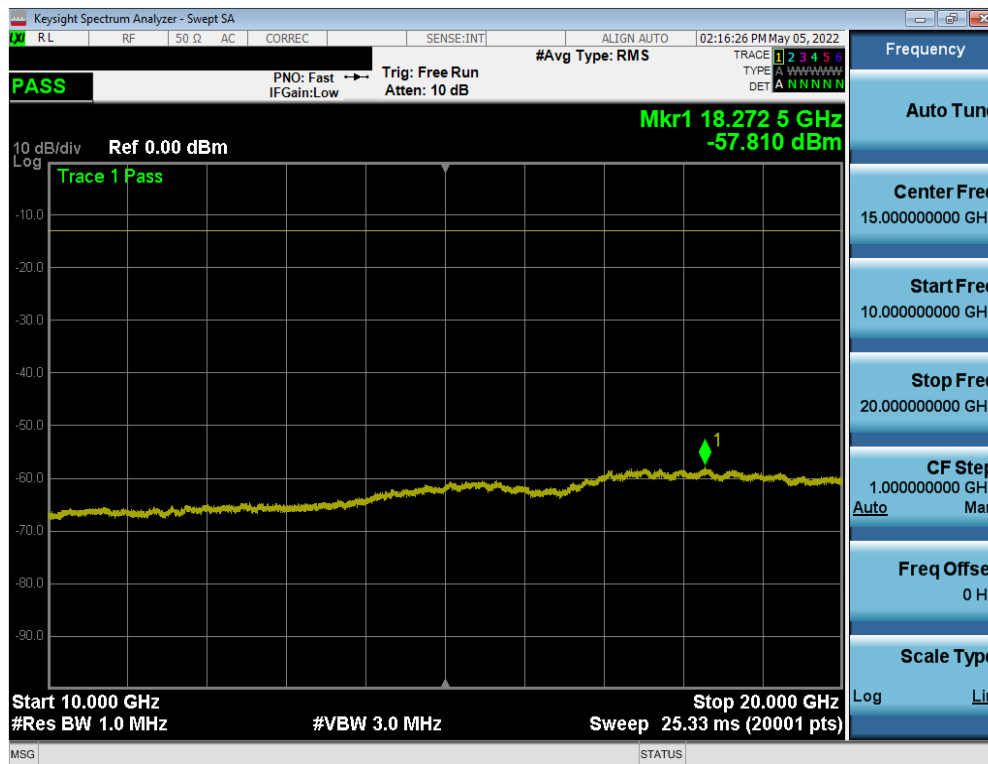


Plot 7-77. Conducted Spurious Plot (NR Band n25 - 40.0MHz - 1RB - Mid Channel - Ant4)

FCC ID: C3K1997	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2204040049-05-R1.C3K	Test Dates: 03/15/2022- 06/24/2022	EUT Type: Portable Computing Device	Page 56 of 181

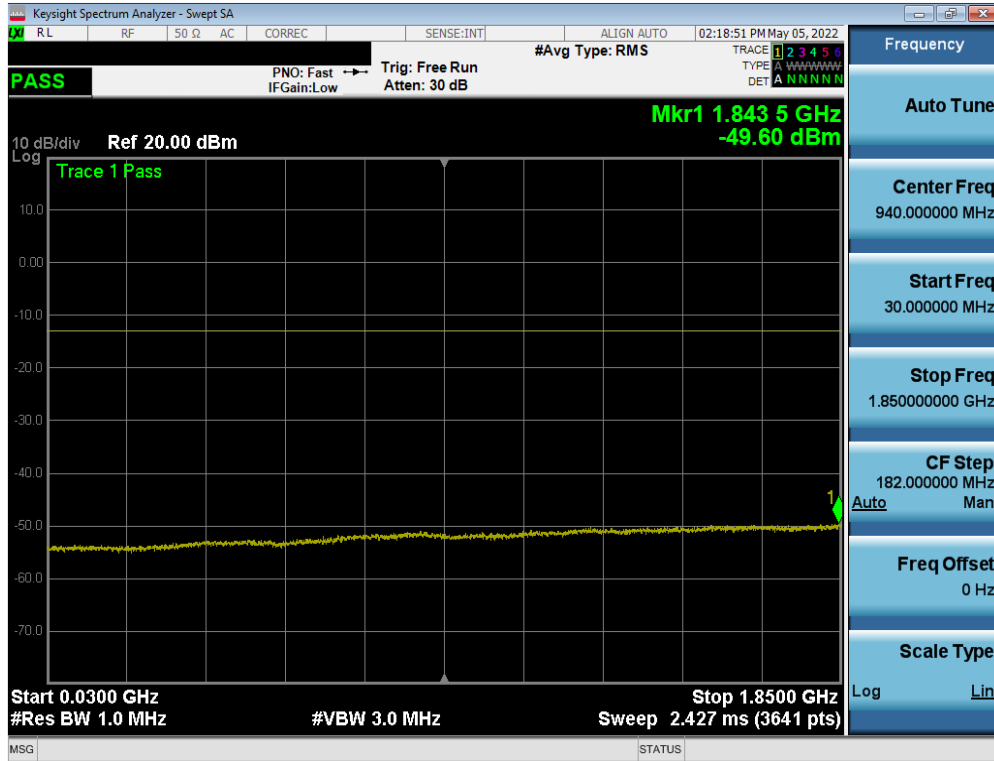


Plot 7-78. Conducted Spurious Plot (NR Band n25 - 40.0MHz - 1RB - Mid Channel - Ant4)

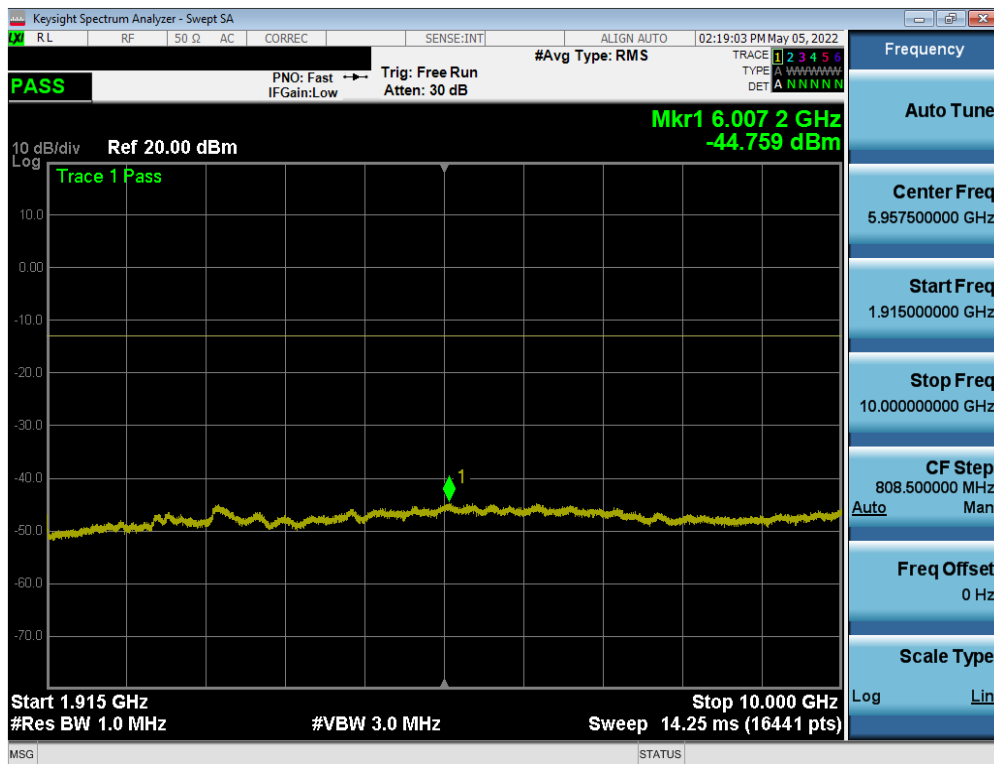


Plot 7-79. Conducted Spurious Plot (NR Band n25 - 40.0MHz - 1RB - Mid Channel - Ant4)

FCC ID: C3K1997	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2204040049-05-R1.C3K	Test Dates: 03/15/2022- 06/24/2022	EUT Type: Portable Computing Device	Page 57 of 181

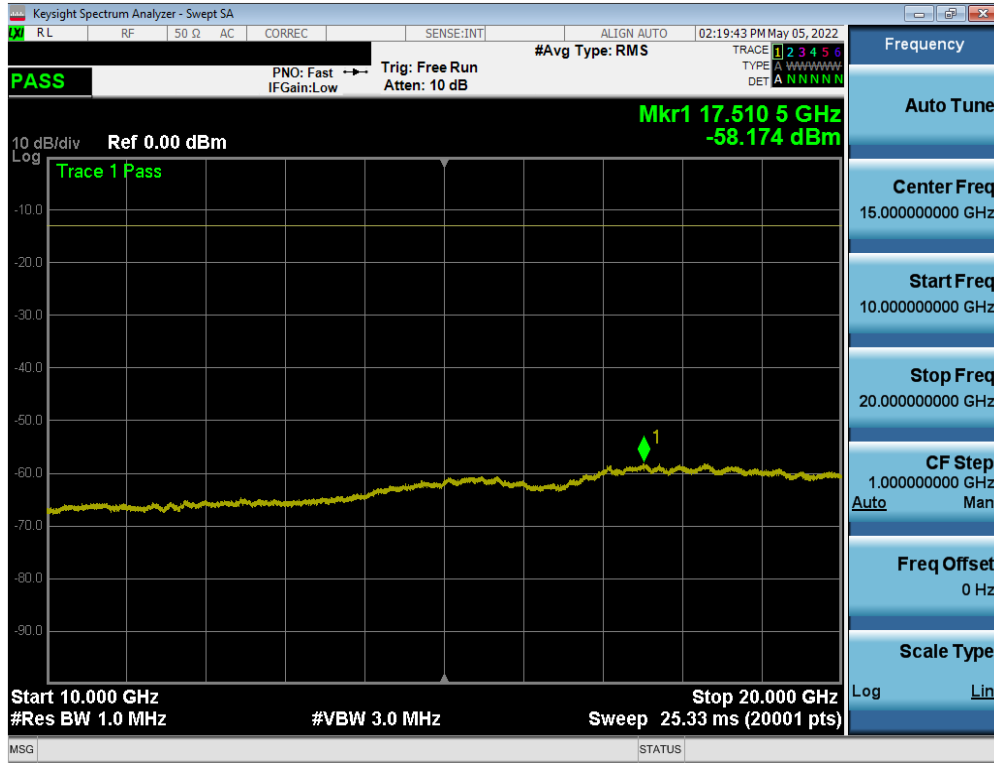


Plot 7-80. Conducted Spurious Plot (NR Band n25 - 40.0MHz - 1RB - High Channel - Ant4)



Plot 7-81. Conducted Spurious Plot (NR Band n25 - 40.0MHz - 1RB - High Channel - Ant4)

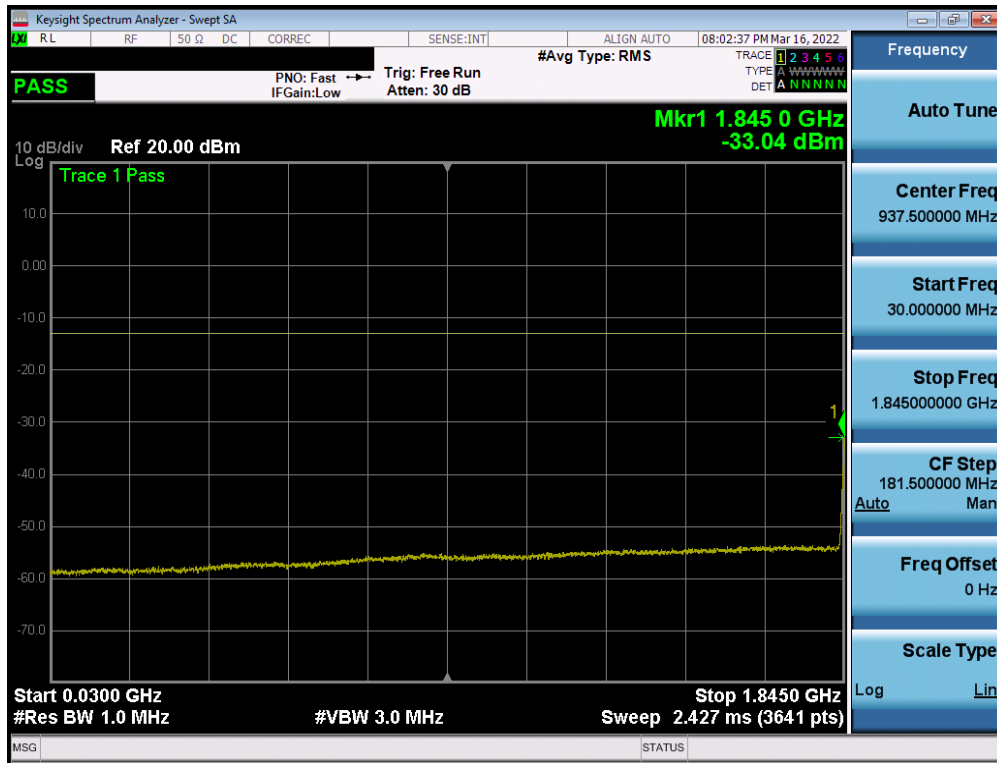
FCC ID: C3K1997	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2204040049-05-R1.C3K	Test Dates: 03/15/2022- 06/24/2022	EUT Type: Portable Computing Device	Page 58 of 181



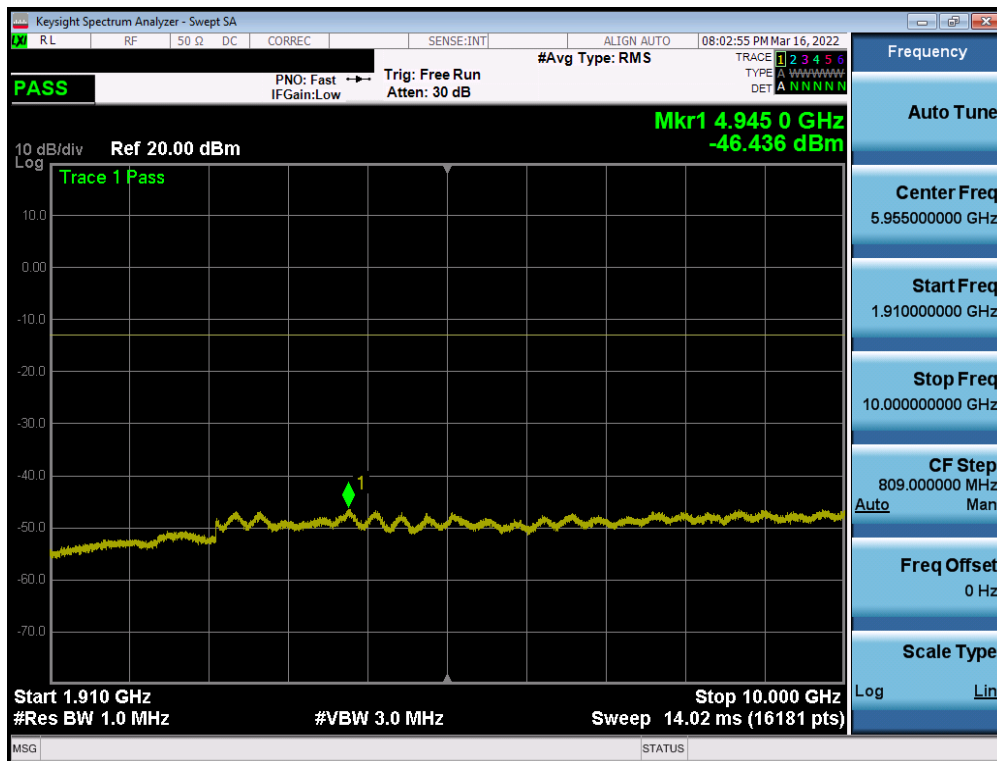
Plot 7-82. Conducted Spurious Plot (NR Band n25 - 40.0MHz - 1RB - High Channel - Ant4)

FCC ID: C3K1997	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2204040049-05-R1.C3K	Test Dates: 03/15/2022- 06/24/2022	EUT Type: Portable Computing Device	Page 59 of 181

WCDMA PCS – Ant1



Plot 7-83. Conducted Spurious Plot (WCDMA Ch. 9262 - Ant1)



Plot 7-84. Conducted Spurious Plot (WCDMA Ch. 9262 - Ant1)

FCC ID: C3K1997	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2204040049-05-R1.C3K	Test Dates: 03/15/2022- 06/24/2022	EUT Type: Portable Computing Device	Page 60 of 181