

**PART 27 MEASUREMENT REPORT**

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

**Date of Testing:**  
 3/15/2022 - 08/10/2022  
**Test Report Issue Date:**  
 08/10/2022  
**Test Site/Location:**  
 Element, Columbia, MD, USA  
**Test Report Serial No.:**  
 1M2204040049-06-R1.C3K

<b>FCC ID:</b>	<b>C3K1997</b>
<b>APPLICANT:</b>	<b>Microsoft Corporation</b>

**Application Type:** Certification  
**Model/HVIN:** 1997  
**EUT Type:** Portable Computing Device  
**FCC Classification:** PCS Licensed Transmitter (PCB)  
**FCC Rule Part:** 27  
**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: 1M2204040049-06-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**



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### FCC Part 27

Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	ERP		EIRP		Emission Designator
				Max. Power [W]	Max. Power [dBm]	Max. Power [W]	Max. Power [dBm]	
LTE Band 71	20 MHz	QPSK	673.0 - 688.0	0.069	18.41	0.114	20.56	17M9G7D
		16QAM	673.0 - 688.0	0.059	17.71	0.097	19.86	17M9W7D
	15 MHz	QPSK	670.5 - 690.5	0.071	18.52	0.117	20.67	13M5G7D
		16QAM	670.5 - 690.5	0.060	17.81	0.099	19.96	13M5W7D
	10 MHz	QPSK	668.0 - 693.0	0.071	18.49	0.116	20.64	9M01G7D
		16QAM	668.0 - 693.0	0.059	17.69	0.096	19.84	9M01W7D
5 MHz	QPSK	665.5 - 695.5	0.072	18.56	0.118	20.71	4M55G7D	
	16QAM	665.5 - 695.5	0.057	17.57	0.094	19.72	4M52W7D	
LTE Band 12	10 MHz	QPSK	704.0 - 711.0	0.065	18.11	0.106	20.26	9M02G7D
		16QAM	704.0 - 711.0	0.058	17.60	0.094	19.75	9M02W7D
	5 MHz	QPSK	701.5 - 713.5	0.066	18.19	0.108	20.34	4M53G7D
		16QAM	701.5 - 713.5	0.058	17.62	0.095	19.77	4M53W7D
	3 MHz	QPSK	700.5 - 714.5	0.063	17.99	0.103	20.14	2M72G7D
		16QAM	700.5 - 714.5	0.059	17.69	0.096	19.84	2M72W7D
1.4 MHz	QPSK	699.7 - 715.3	0.063	17.99	0.103	20.14	1M10G7D	
	16QAM	699.7 - 715.3	0.056	17.48	0.092	19.63	1M11W7D	
LTE Band 13	10 MHz	QPSK	782.0	0.139	21.42	0.228	23.57	9M01G7D
		16QAM	782.0	0.115	20.60	0.189	22.75	9M00W7D
	5 MHz	QPSK	779.5 - 784.5	0.147	21.68	0.242	23.83	4M58G7D
		16QAM	779.5 - 784.5	0.117	20.70	0.193	22.85	4M53W7D
NR Band n71	20 MHz	$\pi/2$ BPSK	673.0 - 688.0	0.064	18.03	0.104	20.18	17M9G7D
		QPSK	673.0 - 688.0	0.068	18.32	0.111	20.47	19M0G7D
		16QAM	673.0 - 688.0	0.054	17.35	0.089	19.50	19M0W7D
	15 MHz	$\pi/2$ BPSK	670.5 - 690.5	0.064	18.08	0.106	20.23	13M4G7D
		QPSK	670.5 - 690.5	0.065	18.16	0.107	20.31	14M1G7D
		16QAM	670.5 - 690.5	0.053	17.28	0.088	19.43	14M2W7D
	10 MHz	$\pi/2$ BPSK	668.0 - 693.0	0.066	18.18	0.108	20.33	9M02G7D
		QPSK	668.0 - 693.0	0.071	18.49	0.116	20.64	9M33G7D
		16QAM	668.0 - 693.0	0.053	17.26	0.087	19.41	9M34W7D
	5 MHz	$\pi/2$ BPSK	665.5 - 695.5	0.068	18.32	0.111	20.47	4M52G7D
		QPSK	665.5 - 695.5	0.073	18.61	0.119	20.76	4M50G7D
		16QAM	665.5 - 695.5	0.055	17.42	0.091	19.57	4M50W7D

**Overview Table (<1GHz Bands)**

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Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	EIRP		Emission Designator
				Max. Power [W]	Max. Power [dBm]	
LTE Band 66/4	20 MHz	QPSK	1720.0 - 1770.0	0.395	25.97	18M0G7D
		16QAM	1720.0 - 1770.0	0.331	25.20	18M0W7D
	15 MHz	QPSK	1717.5 - 1772.5	0.393	25.95	13M5G7D
		16QAM	1717.5 - 1772.5	0.320	25.06	13M5W7D
	10 MHz	QPSK	1715.0 - 1775.0	0.403	26.05	9M01G7D
		16QAM	1715.0 - 1775.0	0.315	24.98	9M00W7D
	5 MHz	QPSK	1712.5 - 1777.5	0.387	25.88	4M55G7D
		16QAM	1712.5 - 1777.5	0.324	25.10	4M52W7D
	3 MHz	QPSK	1711.5 - 1778.5	0.391	25.92	2M72G7D
		16QAM	1711.5 - 1778.5	0.315	24.98	2M73W7D
	1.4 MHz	QPSK	1710.7 - 1779.3	0.392	25.93	1M09G7D
		16QAM	1710.7 - 1779.3	0.312	24.94	1M11W7D
NR Band n66	40 MHz	$\pi/2$ BPSK	1730.0 - 1760.0	0.379	25.78	38M6G7D
		QPSK	1730.0 - 1760.0	0.401	26.03	38M6G7D
		16QAM	1730.0 - 1760.0	0.332	25.21	38M7W7D
	30 MHz	$\pi/2$ BPSK	1725.0 - 1765.0	0.350	25.44	28M6G7D
		QPSK	1725.0 - 1765.0	0.370	25.68	28M6G7D
		16QAM	1725.0 - 1765.0	0.307	24.88	28M7W7D
	20 MHz	$\pi/2$ BPSK	1720.0 - 1770.0	0.337	25.27	18M0G7D
		QPSK	1720.0 - 1770.0	0.349	25.43	18M0G7D
		16QAM	1720.0 - 1770.0	0.296	24.71	18M0W7D
	15 MHz	$\pi/2$ BPSK	1717.5 - 1772.5	0.341	25.33	13M5G7D
		QPSK	1717.5 - 1772.5	0.356	25.52	13M5G7D
		16QAM	1717.5 - 1772.5	0.278	24.43	13M5W7D
	10 MHz	$\pi/2$ BPSK	1715.0 - 1775.0	0.273	24.36	9M00G7D
		QPSK	1715.0 - 1775.0	0.215	23.33	9M00G7D
		16QAM	1715.0 - 1775.0	0.190	22.78	8M98W7D
	5 MHz	$\pi/2$ BPSK	1712.5 - 1777.5	0.335	25.25	4M50G7D
		QPSK	1712.5 - 1777.5	0.363	25.60	4M49G7D
		16QAM	1712.5 - 1777.5	0.303	24.81	4M50W7D

**Overview Table (>1GHz Bands)- Ant1**

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Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	EIRP		Emission Designator
				Max. Power [W]	Max. Power [dBm]	
NR Band n66	40 MHz	$\pi/2$ BPSK	1730.0 - 1760.0	0.256	24.07	38M7G7D
		QPSK	1730.0 - 1760.0	0.269	24.29	38M6G7D
		16QAM	1730.0 - 1760.0	0.210	23.22	38M7W7D
	30 MHz	$\pi/2$ BPSK	1725.0 - 1765.0	0.261	24.17	28M8G7D
		QPSK	1725.0 - 1765.0	0.271	24.34	28M7G7D
		16QAM	1725.0 - 1765.0	0.214	23.30	28M6W7D
	20 MHz	$\pi/2$ BPSK	1720.0 - 1770.0	0.244	23.87	18M1G7D
		QPSK	1720.0 - 1770.0	0.261	24.16	17M9G7D
		16QAM	1720.0 - 1770.0	0.178	22.50	17M9W7D
	15 MHz	$\pi/2$ BPSK	1717.5 - 1772.5	0.241	23.81	13M5G7D
		QPSK	1717.5 - 1772.5	0.252	24.02	13M5G7D
		16QAM	1717.5 - 1772.5	0.181	22.58	13M5W7D
	10 MHz	$\pi/2$ BPSK	1715.0 - 1775.0	0.241	23.82	8M99G7D
		QPSK	1715.0 - 1775.0	0.234	23.70	8M97G7D
		16QAM	1715.0 - 1775.0	0.161	22.06	9M00W7D
	5 MHz	$\pi/2$ BPSK	1712.5 - 1777.5	0.242	23.83	4M50G7D
		QPSK	1712.5 - 1777.5	0.241	23.83	4M51G7D
		16QAM	1712.5 - 1777.5	0.181	22.59	4M50W7D

**Overview Table (>1GHz Bands)- Ant 4**

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## 1.0 INTRODUCTION

### 1.1 Scope

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

### 1.2 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.

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## 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 27.

**Test Device Serial No.:** HP220, K1222, 5S220, 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.

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## 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:

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

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  $P_g [dBm] - \text{cable loss} [dB]$ .

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:

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

And

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

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.

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## 4.0 MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.4-2014. All measurement uncertainty values are shown with a coverage factor of  $k = 2$  to indicate a 95% level of confidence. The measurement uncertainty shown below meets or exceeds the  $U_{\text{CISPR}}$  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

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## 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.

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## 6.0 SAMPLE CALCULATIONS

### Emission Designator

#### 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 – LTE Band

#### **Example: Middle Channel LTE Mode 2<sup>nd</sup> Harmonic (1564 MHz)**

The average 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  $1564$  MHz. So  $6.1$  dB is added to the signal generator reading of  $-30.9$  dBm yielding  $-24.80$  dBm. The fundamental EIRP was  $25.501$  dBm so this harmonic was  $25.501$  dBm  $- (-24.80) = 50.3$  dBc.

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## 7.0 TEST RESULTS

### 7.1 Summary

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

Test Condition	Test Description	FCC Part Section(s)	Test Limit	Test Result	Reference
<b>CONDUCTED</b>	Transmitter Conducted Output Power*	2.1046(a), 2.1046(c)	N/A	<b>PASS</b>	Section 7.2
	Occupied Bandwidth	2.1049(h)	N/A	<b>PASS</b>	Section 7.3
	Conducted Band Edge / Spurious Emissions (LTE Band 13)	2.1051, 27.53(c), 27.53(f)	Undesirable emissions must meet the limits detailed in sections 27.53(c) and 27.53(f)	<b>PASS</b>	Sections 7.4, 7.5
	Conducted Band Edge / Spurious Emissions (LTE Band 12, 17, 71; NR Band n12, n71)	2.1051, 27.53(g)	$\geq 43 + 10 \log (P[\text{Watts}])$ dB of attenuation below transmitter power	<b>PASS</b>	Sections 7.4, 7.5
	Conducted Band Edge / Spurious Emissions (LTE Band 4, 66; NR Band n66)	2.1051, 27.53(h)	$\geq 43 + 10 \log (P[\text{Watts}])$ dB of attenuation below transmitter power	<b>PASS</b>	Sections 7.4, 7.5
	Peak-to-Average Ratio (LTE Band 12, 17, 71; NR Band n12, n71)	27.50(d)(5)	$\leq 13$ dB	<b>PASS</b>	Section 7.6
	Peak-to-Average Ratio (LTE Band 4, 66; NR Band n66)	27.50(d)(5)	$\leq 13$ dB	<b>PASS</b>	Section 7.6
	Frequency Stability	2.1055, 27.54	Fundamental emissions stay within authorized frequency block	<b>PASS</b>	Section 7.9
<b>RADIATED</b>	Effective Radiated Power (LTE Band 13)	27.50(b)(10)	$\leq 3$ Watts max. ERP	<b>PASS</b>	Section 7.7
	Effective Radiated Power (LTE Band 12, 17, 71; NR Band n12, n71)	27.50(c)(10)	$\leq 3$ Watts max. ERP	<b>PASS</b>	Section 7.7
	Equivalent Isotropic Radiated Power (LTE Band 4, 66; NR Band n66)	27.50(d)(4)	$\leq 1$ Watt max. EIRP	<b>PASS</b>	Section 7.7
	Radiated Spurious Emissions (LTE Band 13)	2.1053, 27.53(c), 27.53(f)	Undesirable emissions must meet the limits detailed in sections 27.53(c) and 27.53(f)	<b>PASS</b>	Section 7.8
	Radiated Spurious Emissions (LTE Band 12, 17, 71; NR Band n12, n71)	2.1053, 27.53(g)	$\geq 43 + 10 \log (P[\text{Watts}])$ dB of attenuation below transmitter power	<b>PASS</b>	Section 7.8
	Radiated Spurious Emissions (LTE Band 4, 66; NR Band n66)	2.1053, 27.53(h)(1)	$\geq 43 + 10 \log (P[\text{Watts}])$ dB of attenuation below transmitter power	<b>PASS</b>	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**

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**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 shown in Section 7.0 were 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) For conducted spurious emissions, automated test software was used to measure emissions and capture the corresponding plots necessary to show compliance. The measurement software utilized is EMC Software Tool v1.1.

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## 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

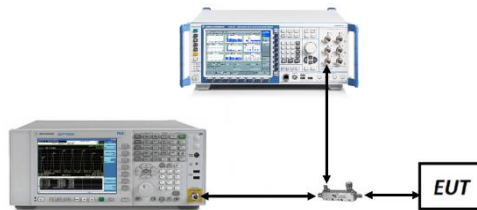
ANSI C63.26-2015 – Section 5.2

### 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. Uplink carrier aggregation is only supported in this EUT while operating in Power Class 3.
2. 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.
3. All other conducted power measurements are contained in the RF exposure report for this filing.

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Power State	Band	Bandwidth (PCC + SCC)	PCC					SCC					ULCA Tx. Power [dBm]
			Modulation	UL Channel	UL Frequency	UL # RB	UL RB Offset	Modulation	UL Channel	UL Frequency	UL # RB	UL RB Offset	
Max	LTE B66	10MHz + 10MHz	QPSK	132022	1715.0	1	49	QPSK	132121	1724.9	1	0	25.36
				132322	1745.0	1	0		132223	1735.1	1	49	25.48
				132622	1775.0	1	0		132523	1765.1	1	49	25.26
			16-QAM	132322	1745.0	100	0	132520	1735.1	100	0	23.5	
				132322	1745	100	0	16-QAM	132223	1735.1	100	0	22.57
				64-QAM	132322	1745	100	0	64-QAM	132223	1735.1	100	0

Table 7-2. Conducted Powers (LTE Band ULCA 66B/C)

NR (SCS 15kHz)						LTE						NR Conducted Power [dBm]	LTE Conducted Power [dBm]	EN-DC Total Tx. Power [dBm]
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			
n66	40	Mid	1745	QPSK	216/0	B14	10	Mid	793	QPSK	50/0	19.55	22.35	24.18
				QPSK	216/0					QPSK	1/25	19.46	23.10	24.66
				QPSK	1/108					QPSK	50/0	19.75	22.25	24.19
				QPSK	1/108					QPSK	1/25	19.81	23.22	24.85
				16Q	1/108					16Q	1/25	19.05	21.55	23.49

Table 7-3. Conducted Max Powers (EN-DC Combo n66- B14)

NR (SCS 15kHz)						LTE						NR Conducted Power [dBm]	LTE Conducted Power [dBm]	EN-DC Total Tx. Power [dBm]
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			
n66	40	Mid	1745	QPSK	216/0	B2	20	Mid	1880	QPSK	100/0	19.47	23.58	25.00
				QPSK	216/0					QPSK	1/50	19.50	23.45	24.92
				QPSK	1/108					QPSK	100/0	19.35	23.60	24.99
				QPSK	1/108					QPSK	1/50	19.11	23.69	24.99
				16Q	216/0					16Q	100/0	18.45	22.50	23.94

Table 7-4. Conducted Max Powers (EN-DC Combo n66- B2)

NR (SCS 15kHz)						LTE						NR Conducted Power [dBm]	LTE Conducted Power [dBm]	EN-DC Total Tx. Power [dBm]
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			
n66	40	Mid	1745	QPSK	216/0	B30	10	Mid	2310	QPSK	50/0	20.84	22.79	24.93
				QPSK	216/0					QPSK	1/25	18.07	23.58	24.66
				QPSK	1/108					QPSK	50/0	20.91	23.91	24.45
				QPSK	1/108					QPSK	1/25	18.25	23.59	24.70
				16Q	216/0					16Q	50/0	19.99	21.80	24.00

Table 7-5. Conducted Max Powers (EN-DC Combo n66- B30)

NR (SCS 15kHz)						LTE						NR Conducted Power [dBm]	LTE Conducted Power [dBm]	EN-DC Total Tx. Power [dBm]
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			
n66	40	Mid	1745	QPSK	216/0	B48	20	Mid	3625	QPSK	100/0	21.26	20.92	24.10
				QPSK	216/0					QPSK	1/50	21.25	20.85	24.06
				QPSK	1/108					QPSK	100/0	21.90	20.82	24.40
				QPSK	1/108					QPSK	1/50	21.88	20.93	24.44
				16Q	1/108					16Q	1/50	20.02	19.98	23.01

Table 7-6. Conducted Max Powers (EN-DC Combo n66- B48)

NR (SCS 15kHz)						LTE						NR Conducted Power [dBm]	LTE Conducted Power [dBm]	EN-DC Total Tx. Power [dBm]
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			
n71	20	Mid	680.5	QPSK	100/0	B66	20	Mid	1745	QPSK	100/0	17.37	23.87	24.75
				QPSK	100/0					QPSK	1/50	17.41	23.80	24.70
				QPSK	1/53					QPSK	100/0	17.26	23.88	24.74
				QPSK	1/53					QPSK	1/50	17.25	23.85	24.71
				16Q	100/0					16Q	100/0	18.71	23.39	24.66

Table 7-7. Conducted Max Powers (EN-DC Combo n71- B66)

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## 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

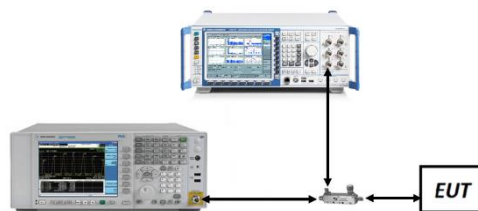
ANSI C63.26-2015 – Section 5.4.4

### 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.

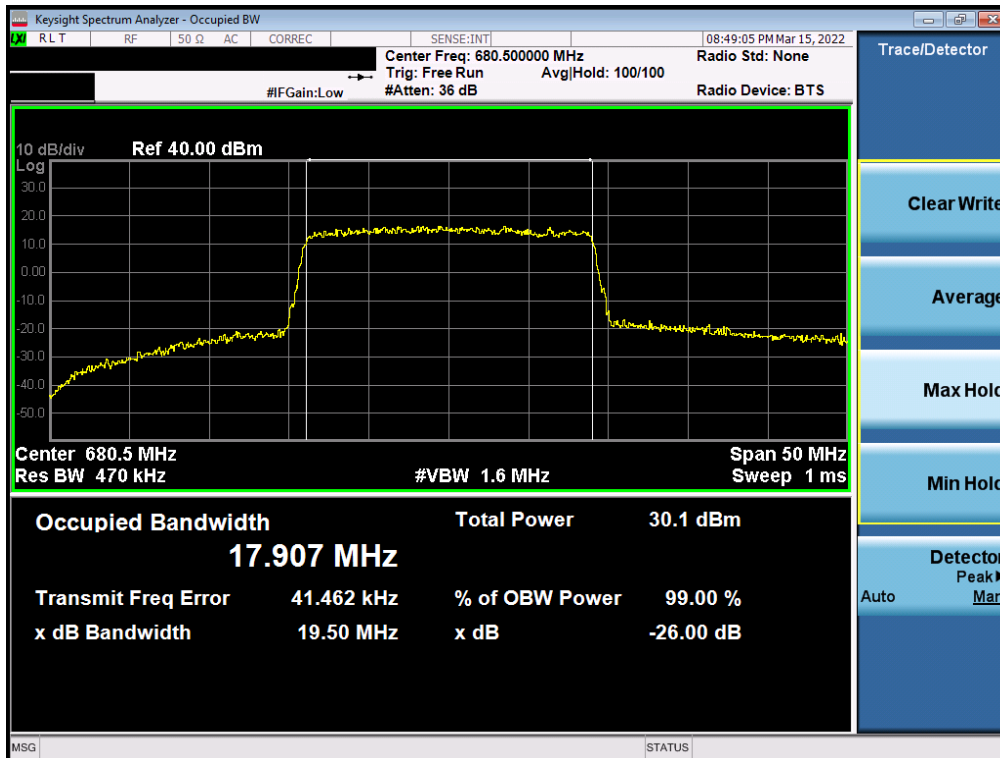
FCC ID: C3K1997	<b>PART 27 MEASUREMENT REPORT</b>		Approved by: Technical Manager
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# LTE Band 71 – Ant1



Plot 7-1. Occupied Bandwidth Plot (LTE Band 71 - 20MHz QPSK - Full RB – Ant1)

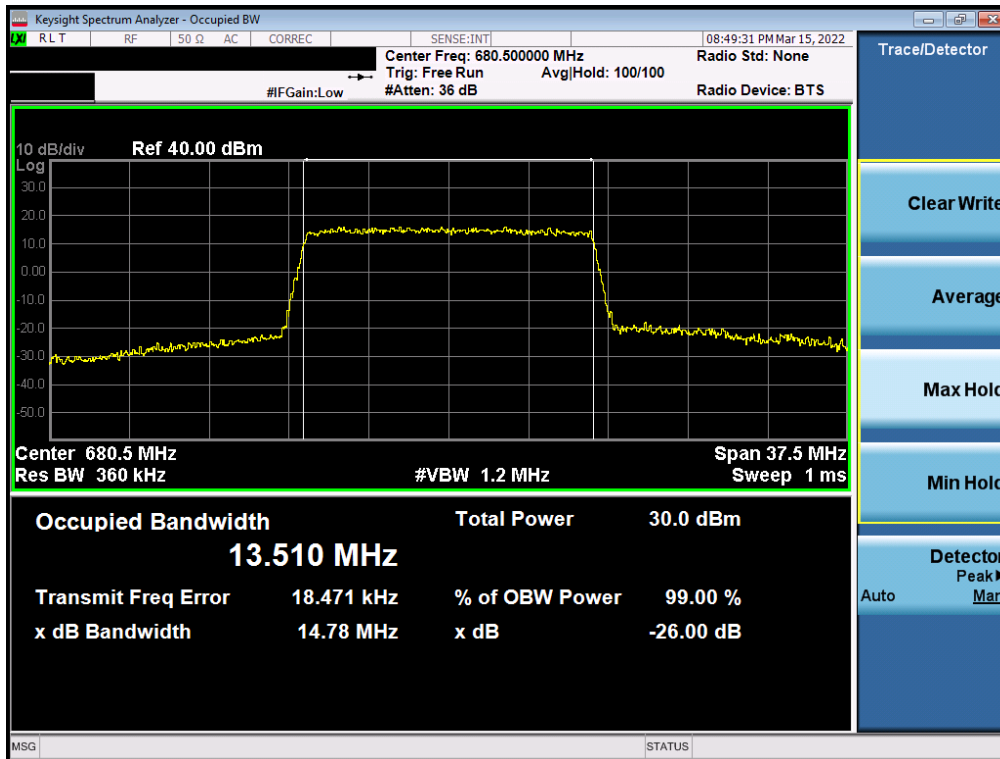


Plot 7-2. Occupied Bandwidth Plot (LTE Band 71 - 20MHz 16-QAM - Full RB – Ant1)

FCC ID: C3K1997	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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Plot 7-3. Occupied Bandwidth Plot (LTE Band 71 - 15MHz QPSK - Full RB – Ant1)

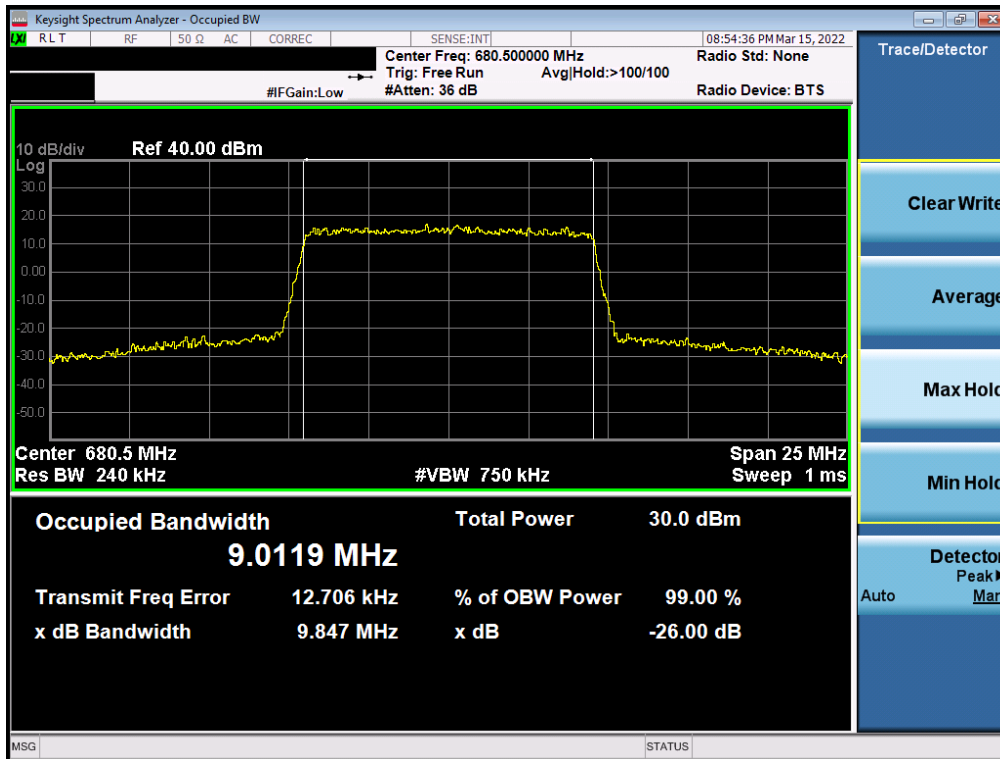


Plot 7-4. Occupied Bandwidth Plot (LTE Band 71 - 15MHz 16-QAM - Full RB – Ant1)

FCC ID: C3K1997	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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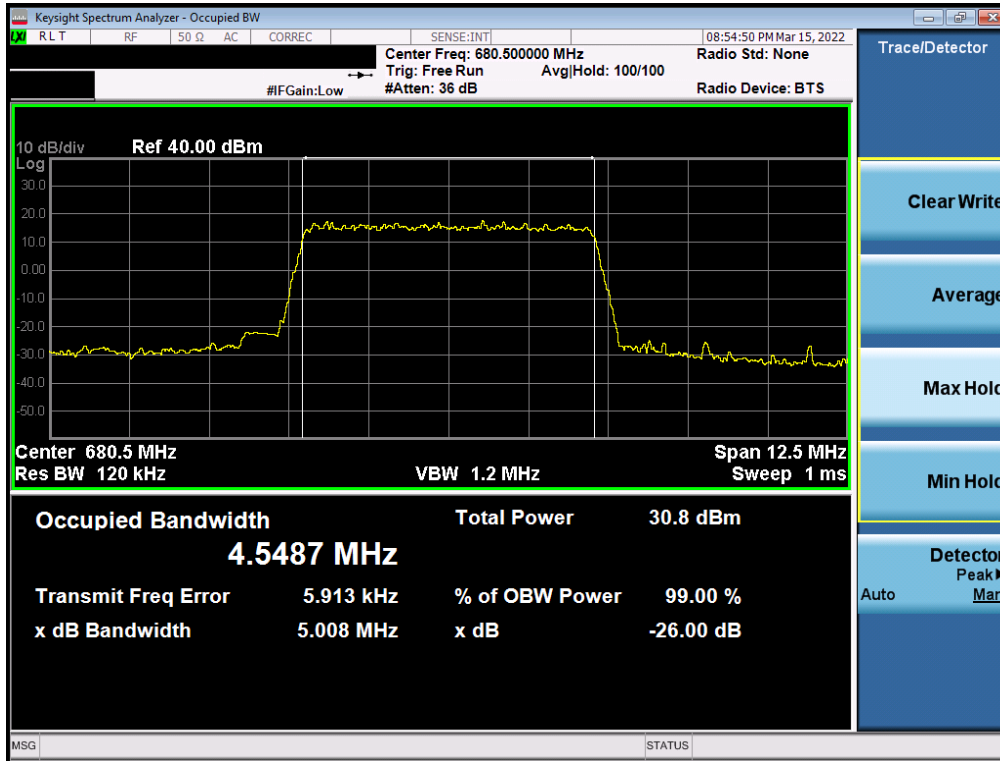


Plot 7-5. Occupied Bandwidth Plot (LTE Band 71 - 10MHz QPSK - Full RB – Ant1)

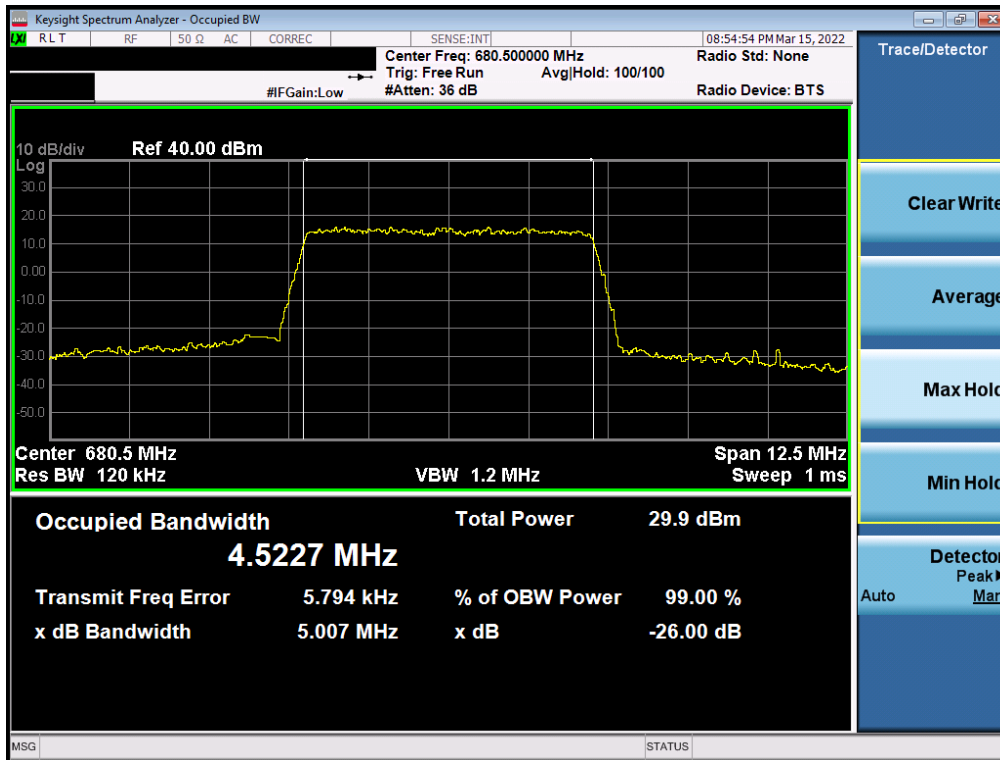


Plot 7-6. Occupied Bandwidth Plot (LTE Band 71 - 10MHz 16-QAM - Full RB – Ant1)

FCC ID: C3K1997	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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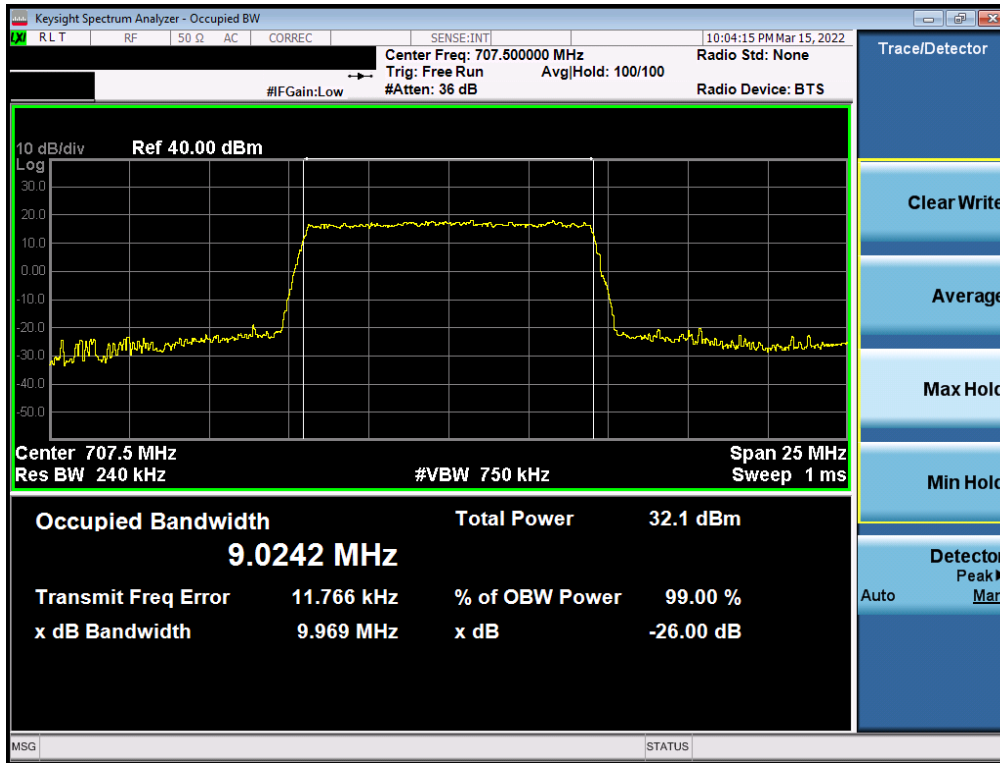
Plot 7-7. Occupied Bandwidth Plot (LTE Band 71 - 5MHz QPSK - Full RB - Ant1)



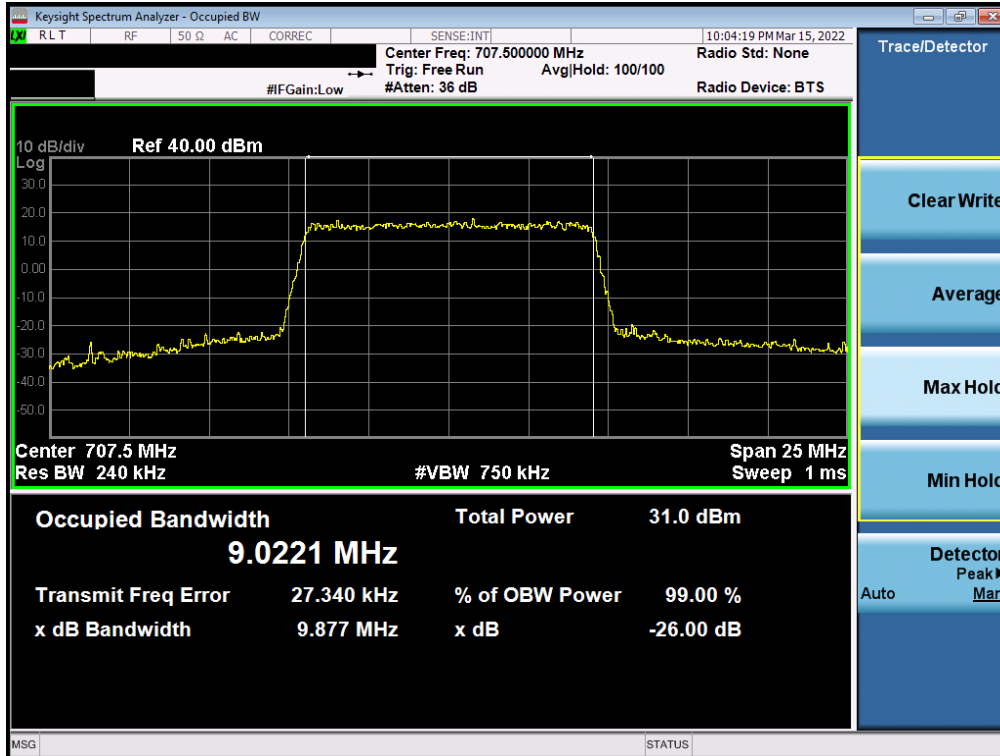
Plot 7-8. Occupied Bandwidth Plot (LTE Band 71 - 5MHz 16-QAM - Full RB - Ant1)

FCC ID: C3K1997	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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### LTE Band 12 – Ant1

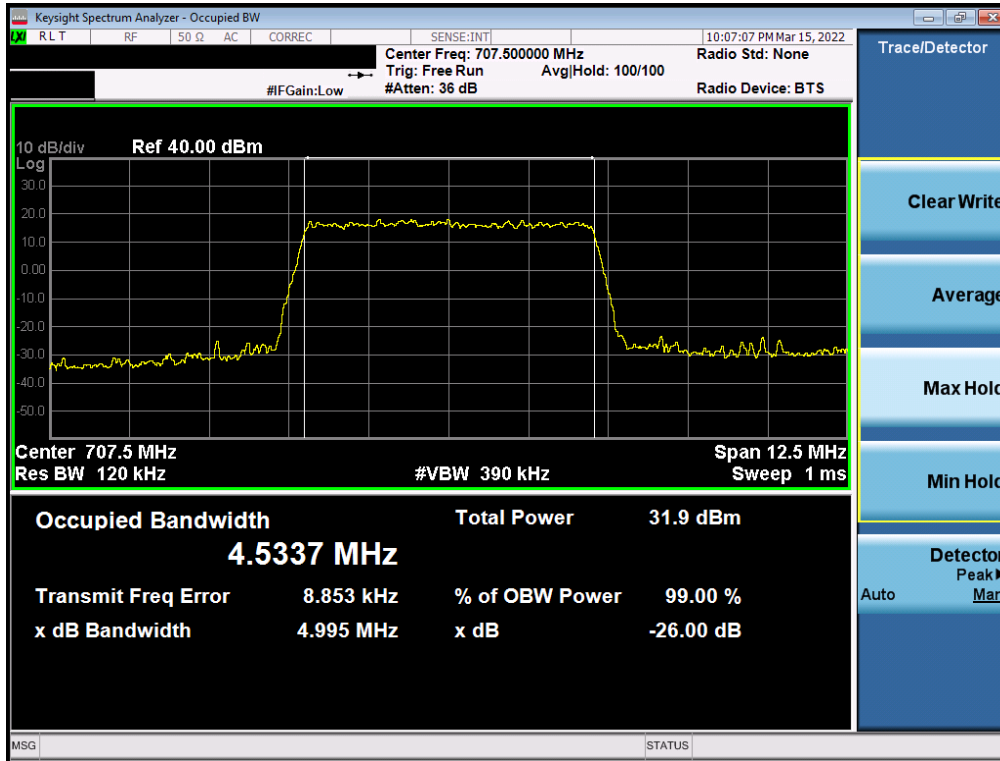


Plot 7-9. Occupied Bandwidth Plot (LTE Band 12 - 10MHz QPSK - Full RB – Ant1)

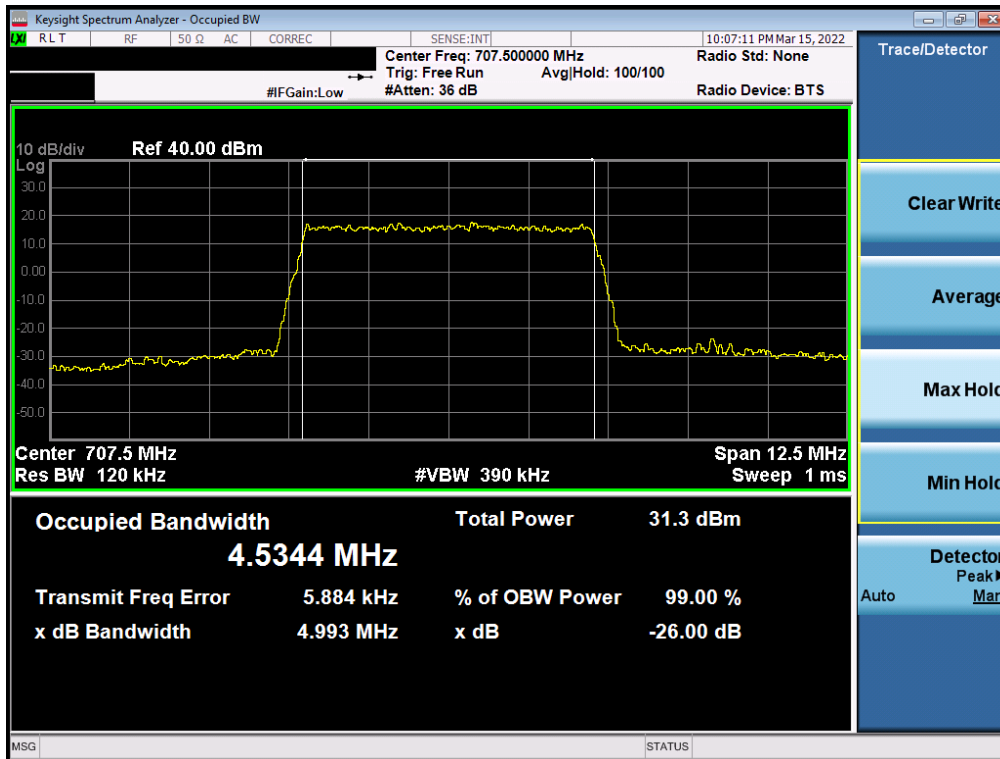


Plot 7-10. Occupied Bandwidth Plot (LTE Band 12 - 10MHz 16-QAM - Full RB – Ant1)

FCC ID: C3K1997	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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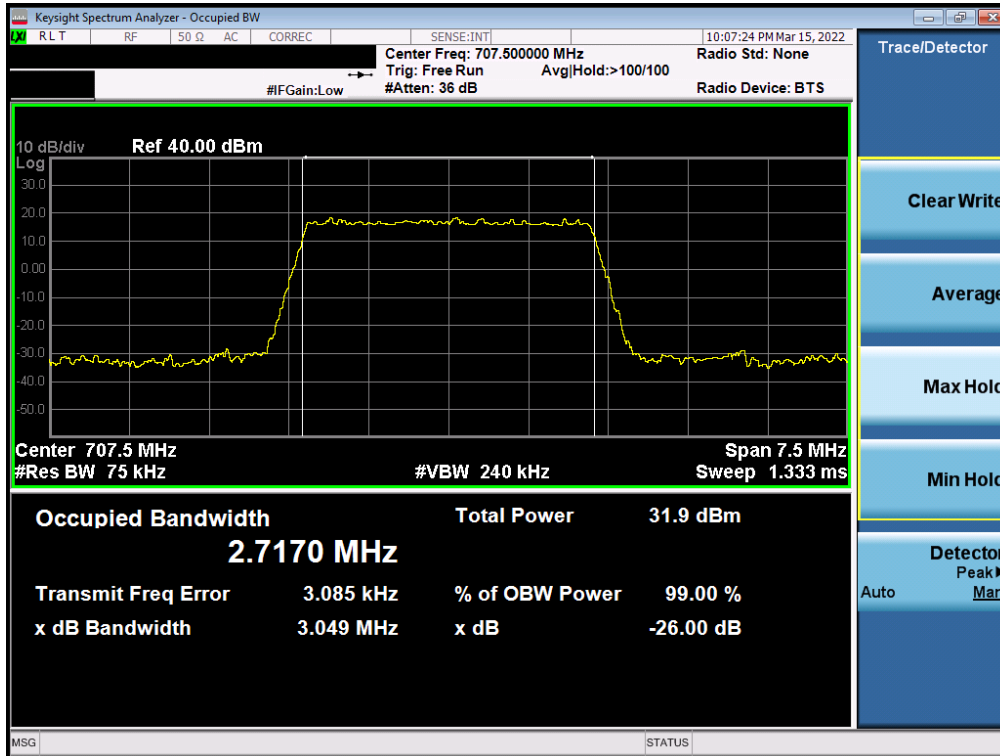


Plot 7-11. Occupied Bandwidth Plot (LTE Band 12 - 5MHz QPSK - Full RB – Ant1)

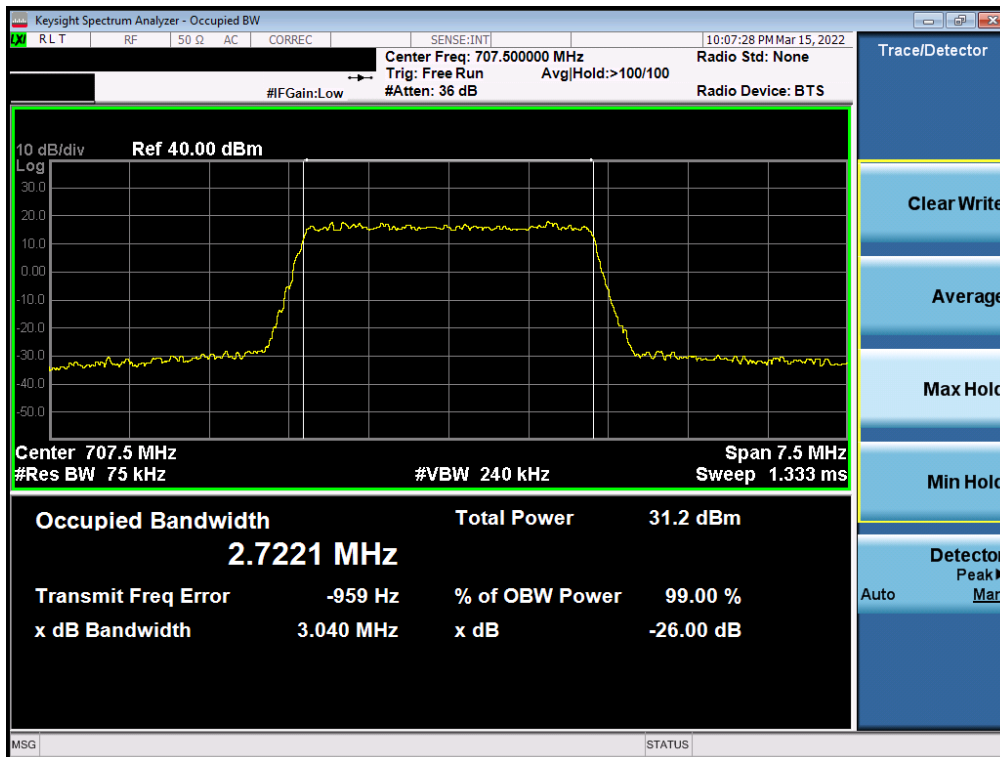


Plot 7-12. Occupied Bandwidth Plot (LTE Band 12 - 5MHz 16-QAM - Full RB – Ant1)

FCC ID: C3K1997	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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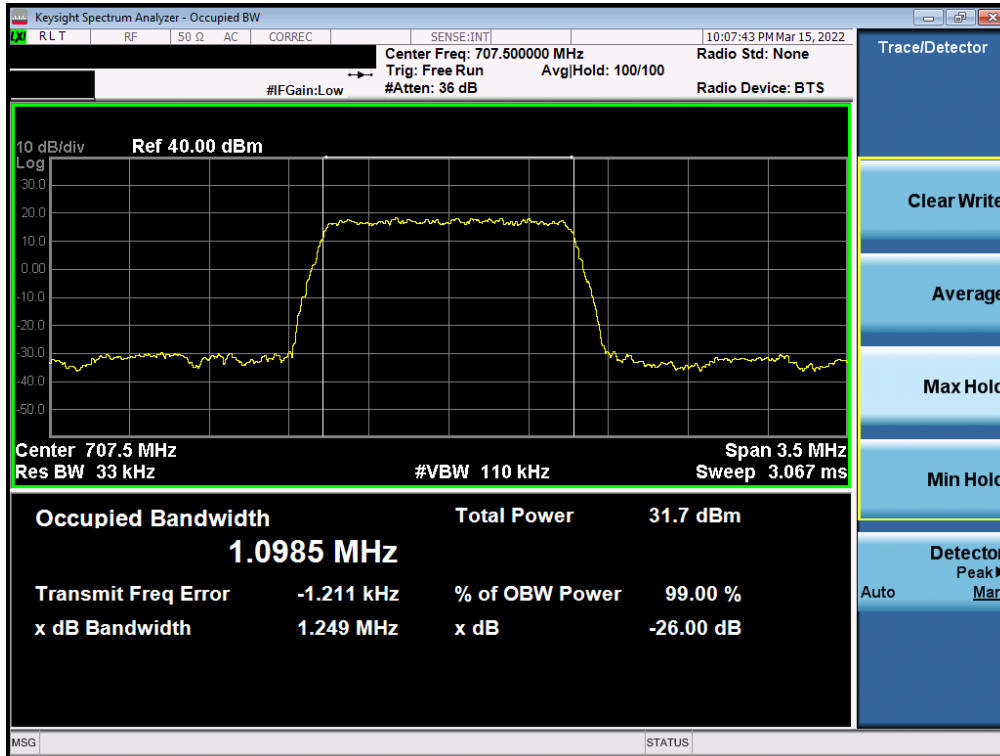


Plot 7-13. Occupied Bandwidth Plot (LTE Band 12 - 3MHz QPSK - Full RB – Ant1)

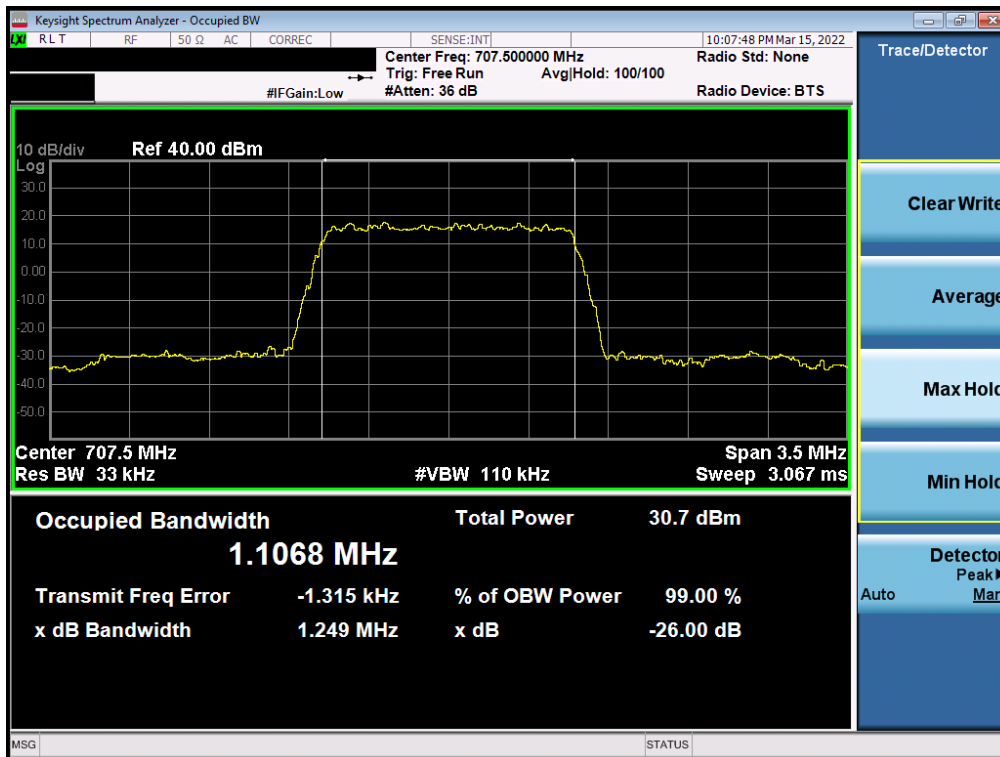


Plot 7-14. Occupied Bandwidth Plot (LTE Band 12 - 3MHz 16-QAM - Full RB – Ant1)

FCC ID: C3K1997	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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Plot 7-15. Occupied Bandwidth Plot (LTE Band 12 – 1.4MHz QPSK - Full RB – Ant1)

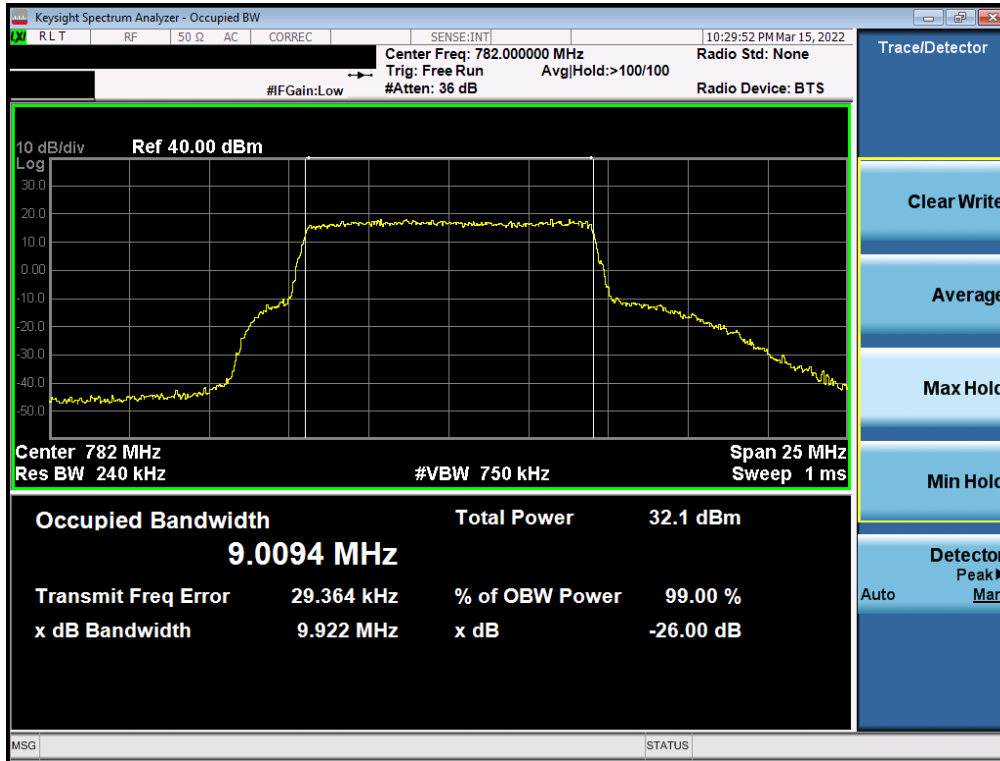


Plot 7-16. Occupied Bandwidth Plot (LTE Band 12 – 1.4MHz 16-QAM - Full RB – Ant1)

FCC ID: C3K1997	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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### LTE Band 13 – Ant1



Plot 7-17. Occupied Bandwidth Plot (LTE Band 13 - 10MHz QPSK - Full RB – Ant1)

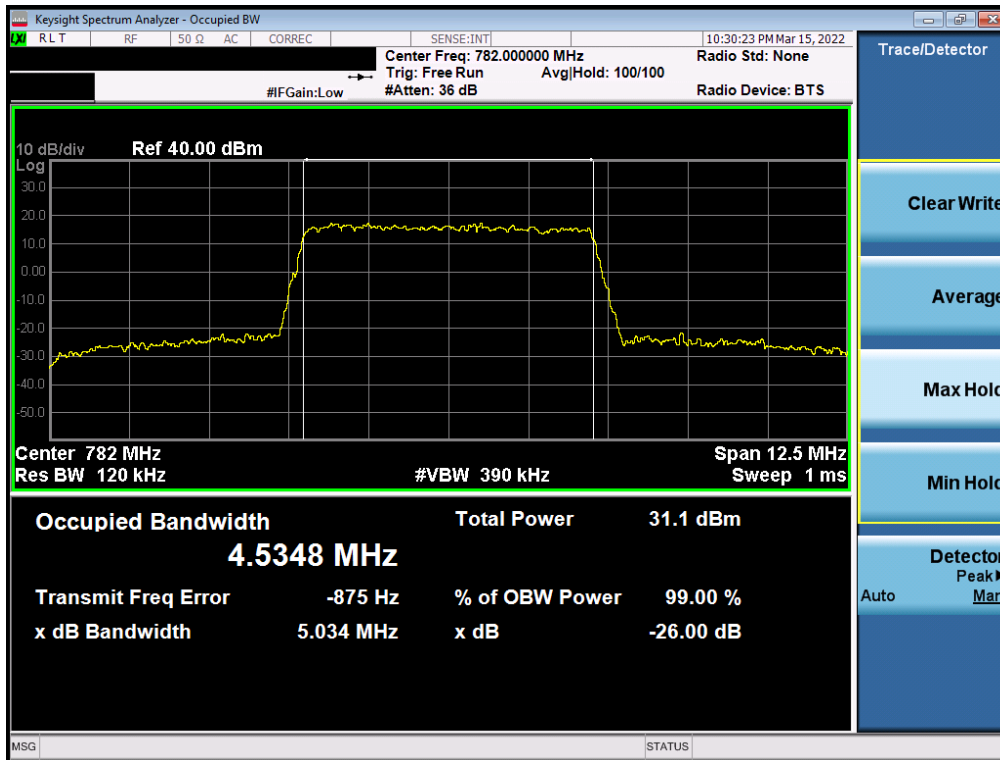


Plot 7-18. Occupied Bandwidth Plot (LTE Band 13 - 10MHz 16-QAM - Full RB – Ant1)

FCC ID: C3K1997	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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Plot 7-19. Occupied Bandwidth Plot (LTE Band 13 - 5MHz QPSK - Full RB – Ant1)



Plot 7-20. Occupied Bandwidth Plot (LTE Band 13 - 5MHz 16-QAM - Full RB – Ant1)

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### NR Band n71 – Ant1

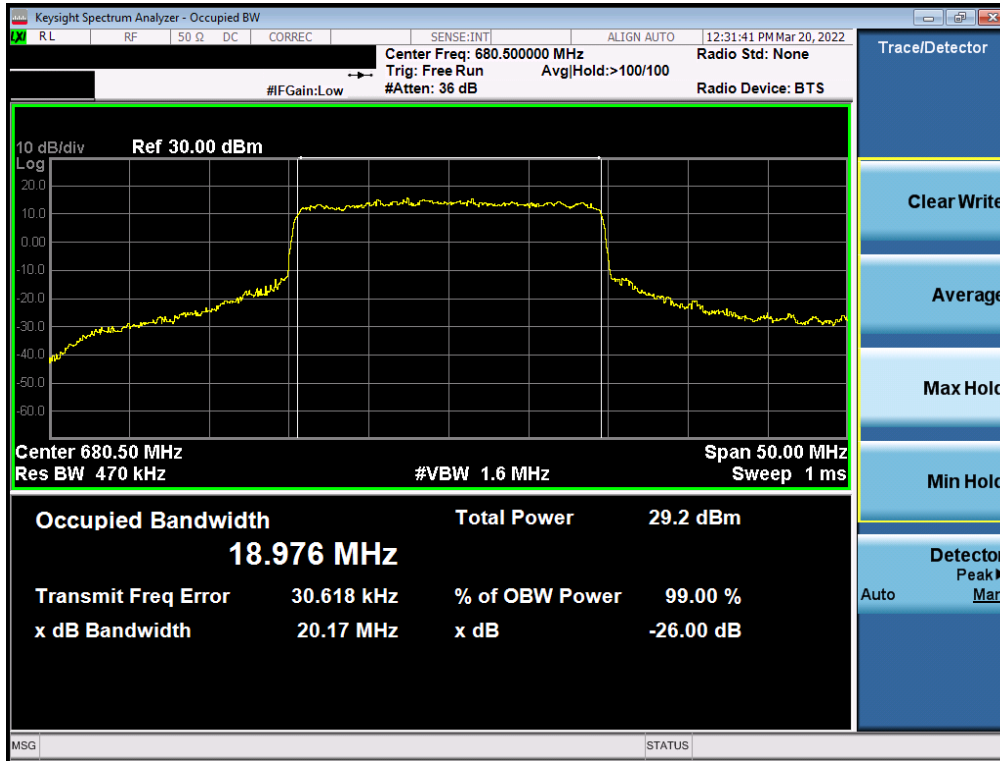


Plot 7-21. Occupied Bandwidth Plot (NR Band n71 - 20MHz DFT-s-OFDM BPSK - Full RB – Ant1)

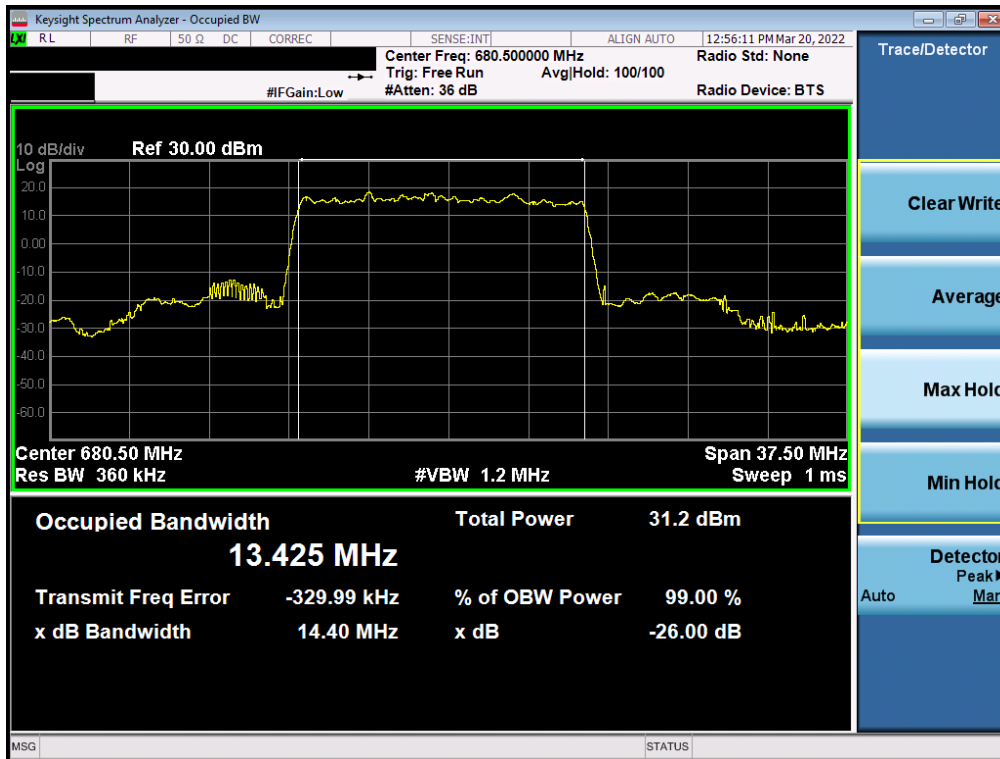


Plot 7-22. Occupied Bandwidth Plot (NR Band n71 - 20MHz CP-OFDM QPSK - Full RB – Ant1)

FCC ID: C3K1997		PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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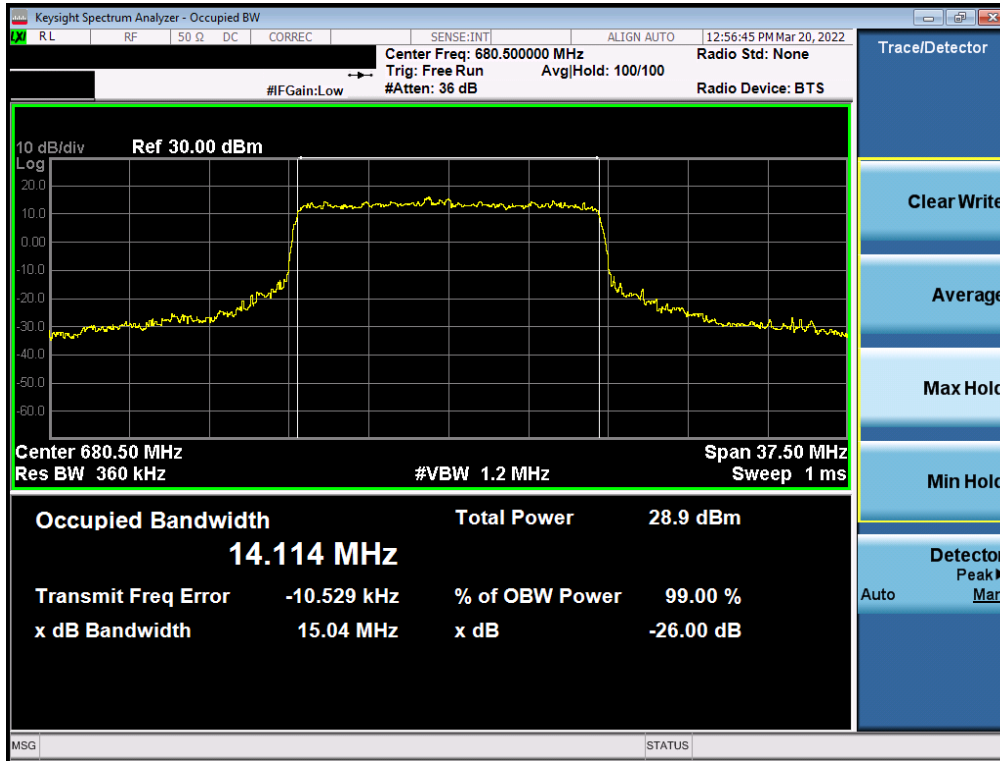


Plot 7-23. Occupied Bandwidth Plot (NR Band n71 - 20MHz CP-OFDM 16-QAM - Full RB - Ant1)

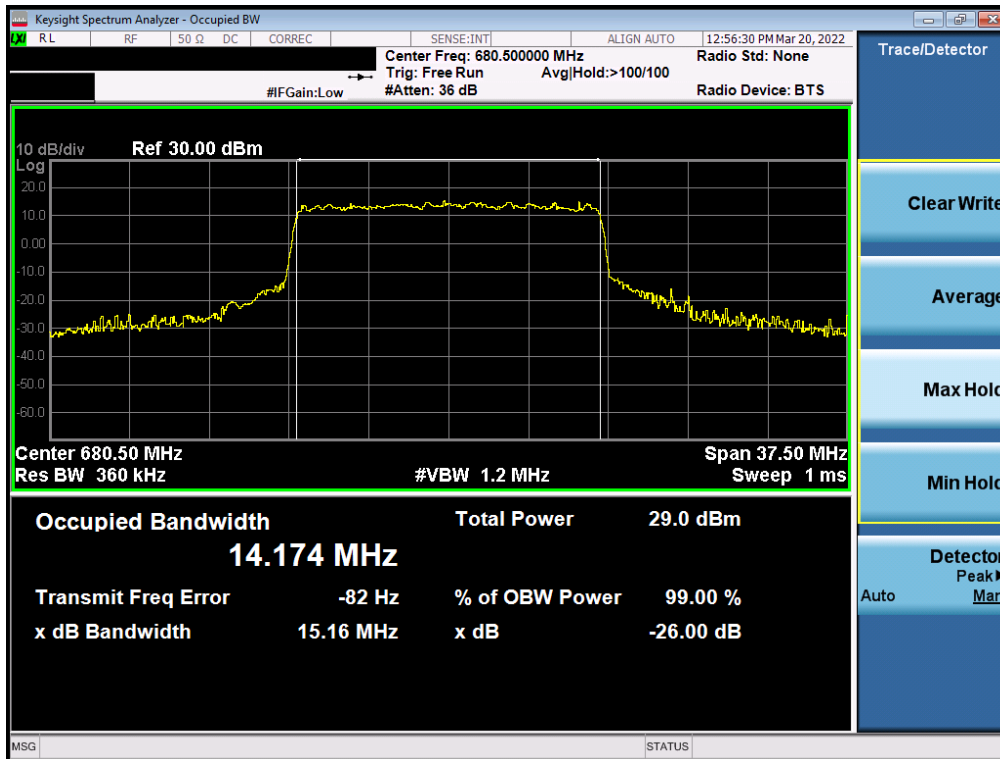


Plot 7-24. Occupied Bandwidth Plot (NR Band n71 - 15MHz DFT-s-OFDM BPSK - Full RB - Ant1)

FCC ID: C3K1997	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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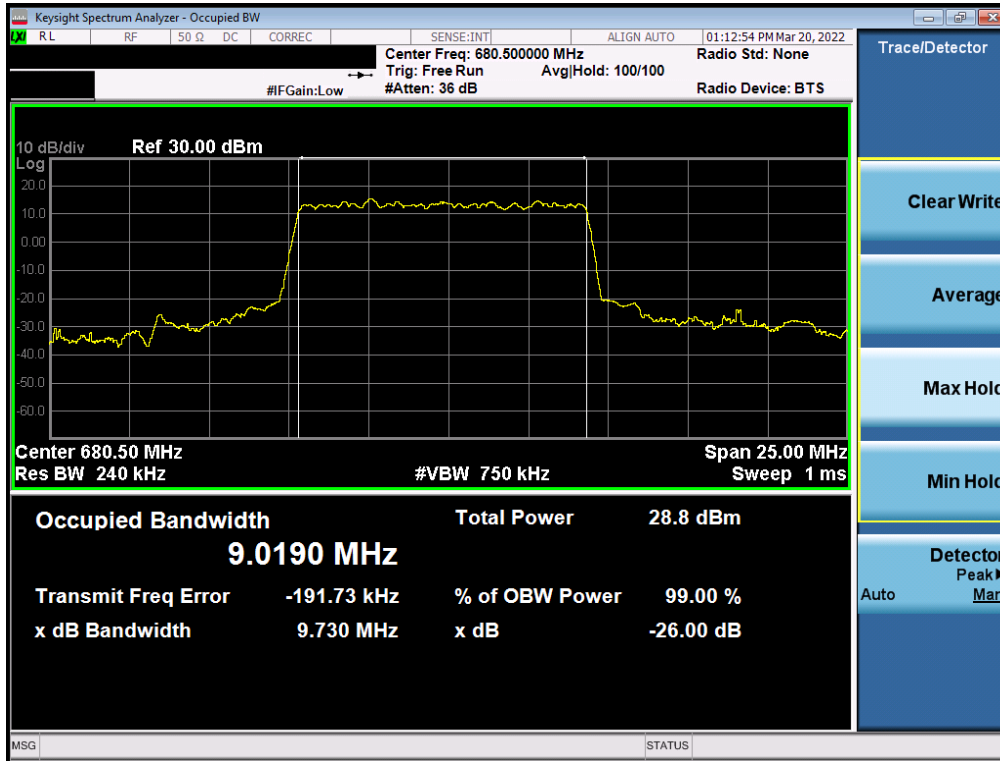


Plot 7-25. Occupied Bandwidth Plot (NR Band n71 - 15MHz QPSK - Full RB - Ant1)

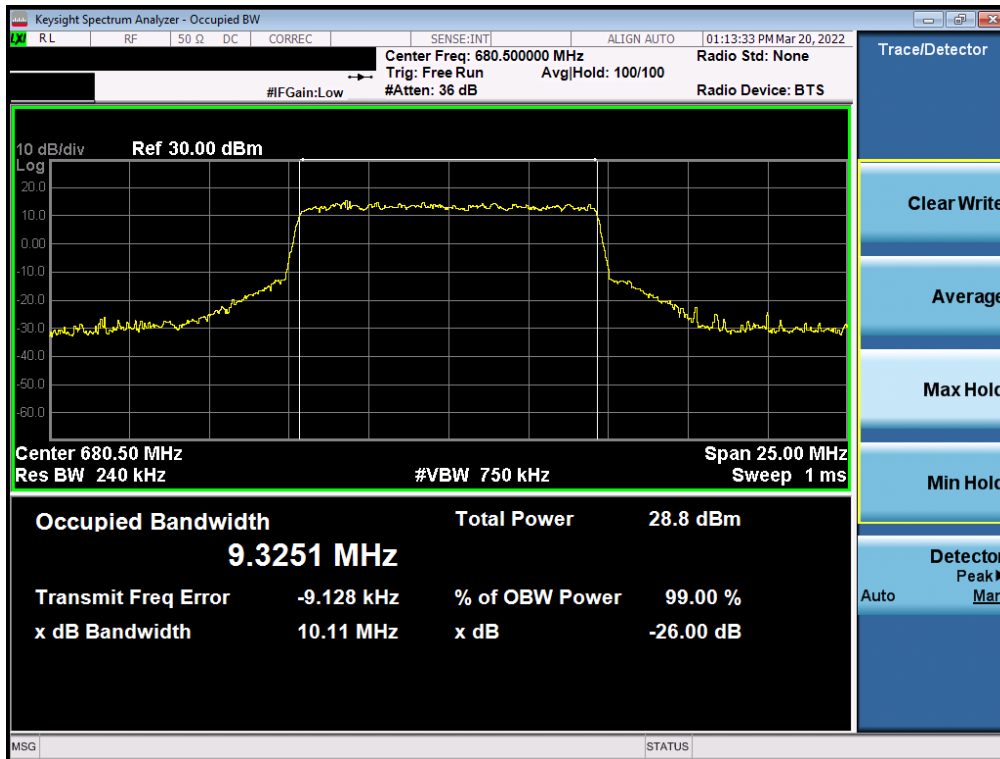


Plot 7-26. Occupied Bandwidth Plot (NR Band n71 - 15MHz CP-OFDM 16-QAM - Full RB - Ant1)

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Plot 7-27. Occupied Bandwidth Plot (NR Band n71 - 10MHz DFT-s-OFDM BPSK - Full RB - Ant1)

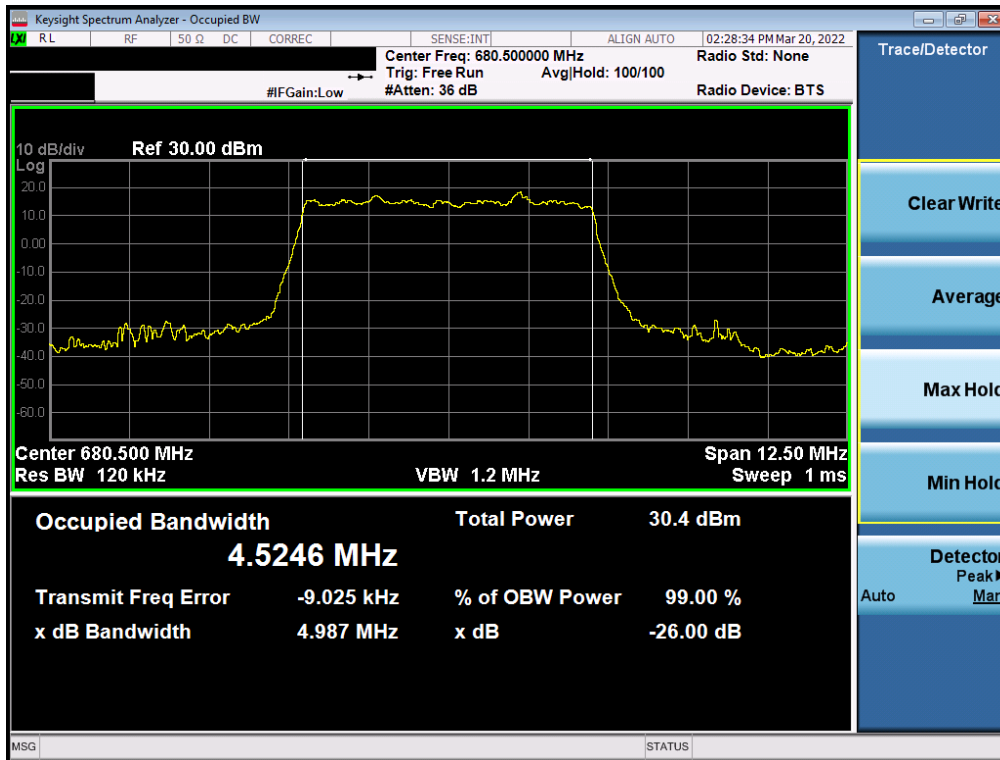


Plot 7-28. Occupied Bandwidth Plot (NR Band n71 - 10MHz CP-OFDM QPSK - Full RB - Ant1)

FCC ID: C3K1997	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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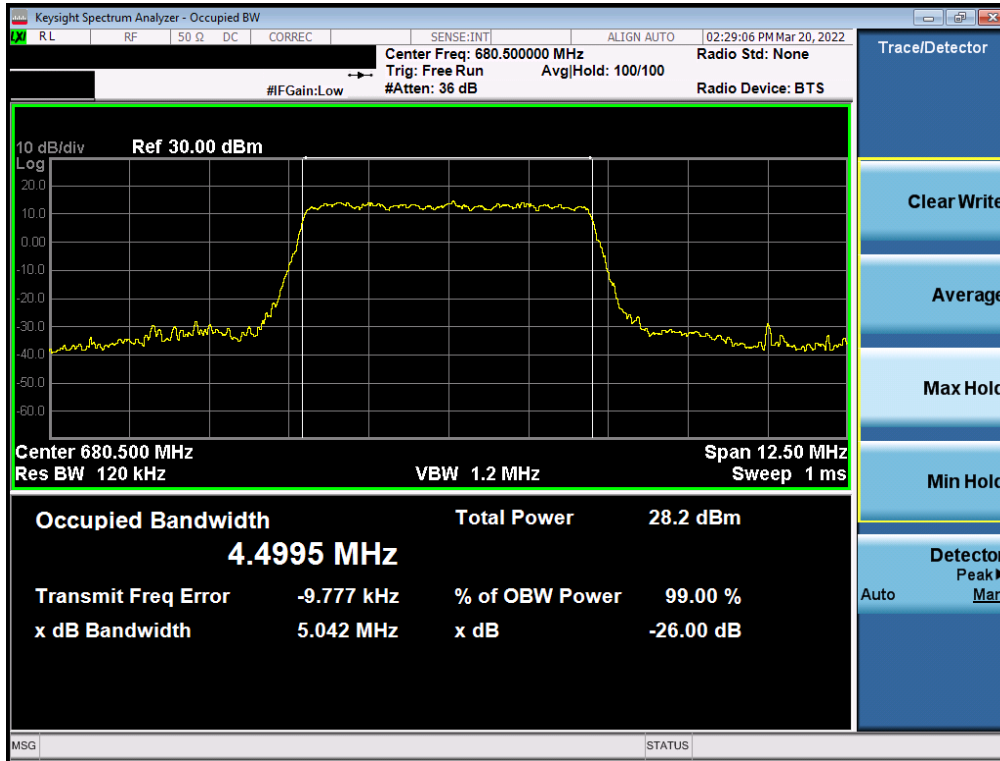


Plot 7-29. Occupied Bandwidth Plot (NR Band n71 - 10MHz CP-OFDM 16-QAM - Full RB - Ant1)

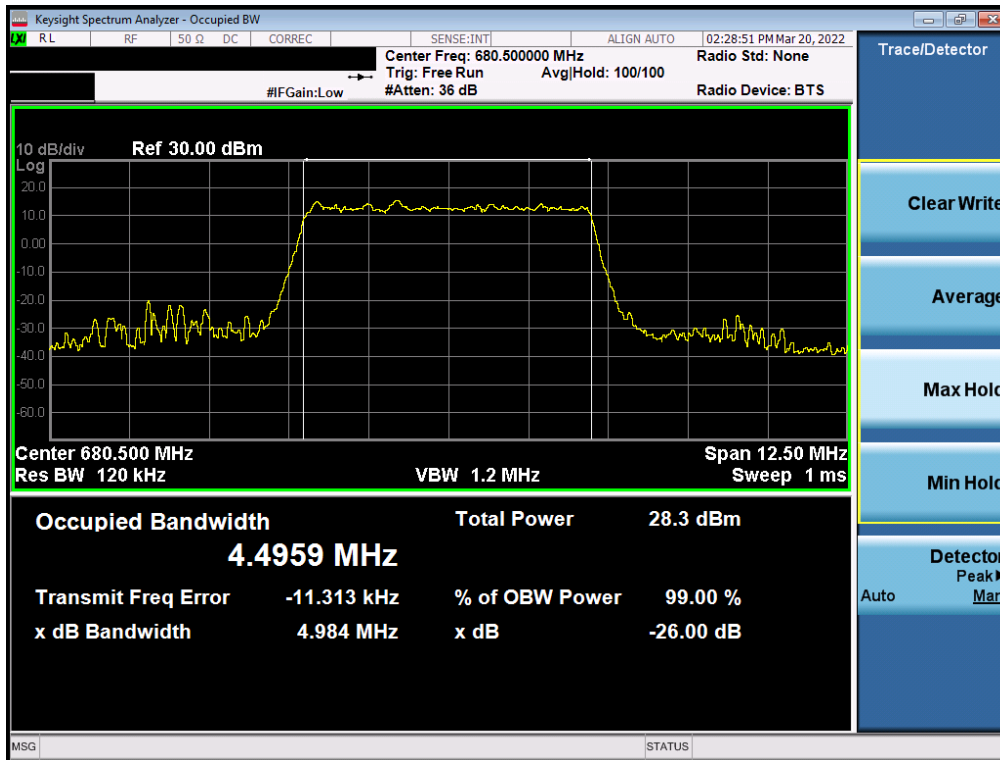


Plot 7-30. Occupied Bandwidth Plot (NR Band n71 - 5MHz DFT-s-OFDM BPSK - Full RB - Ant1)

FCC ID: C3K1997	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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Plot 7-31. Occupied Bandwidth Plot (NR Band n71 - 5MHz CP-OFDM QPSK - Full RB - Ant1)

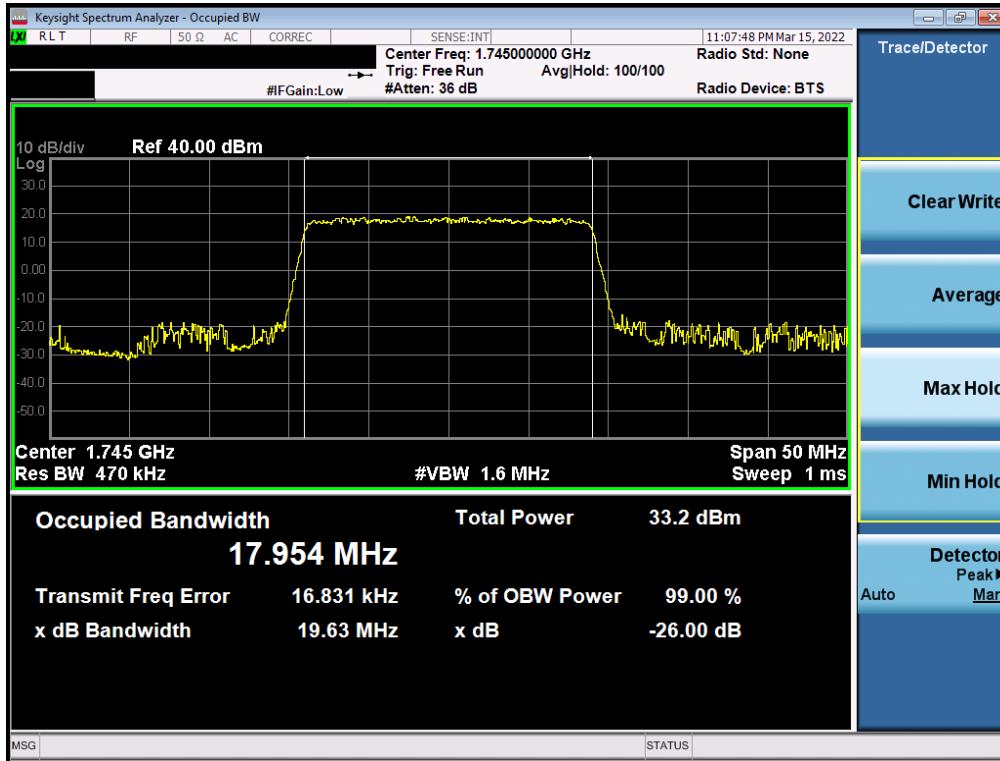


Plot 7-32. Occupied Bandwidth Plot (NR Band n71 - 5MHz CP-OFDM 16-QAM - Full RB - Ant1)

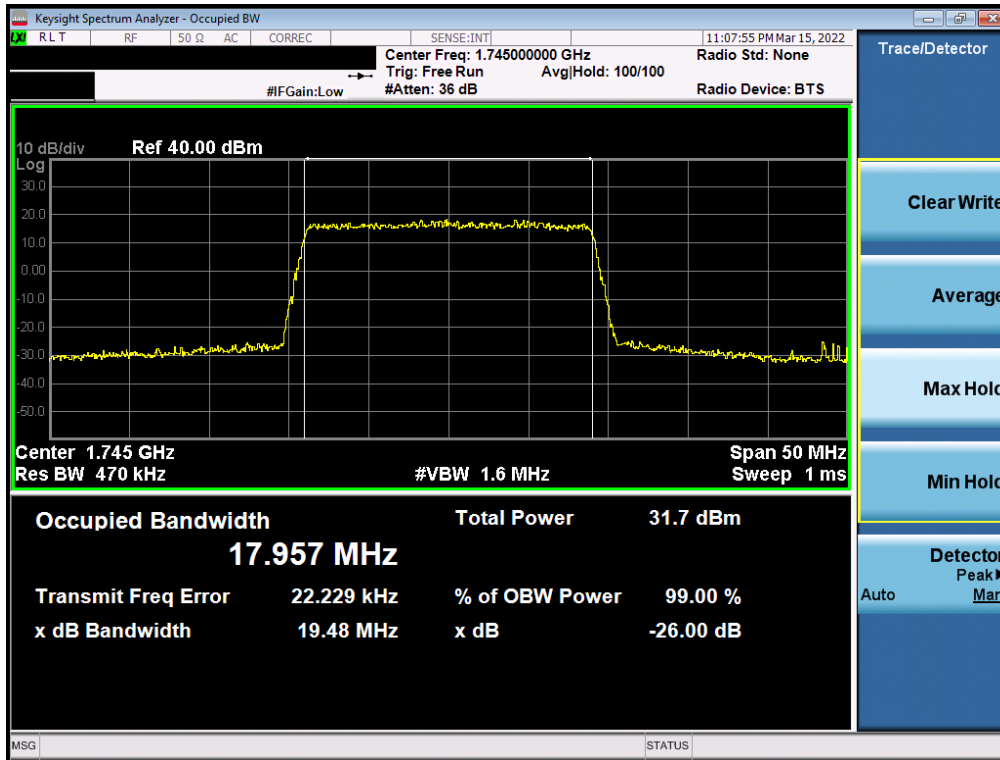
FCC ID: C3K1997	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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### LTE Band 66/4 - Ant1

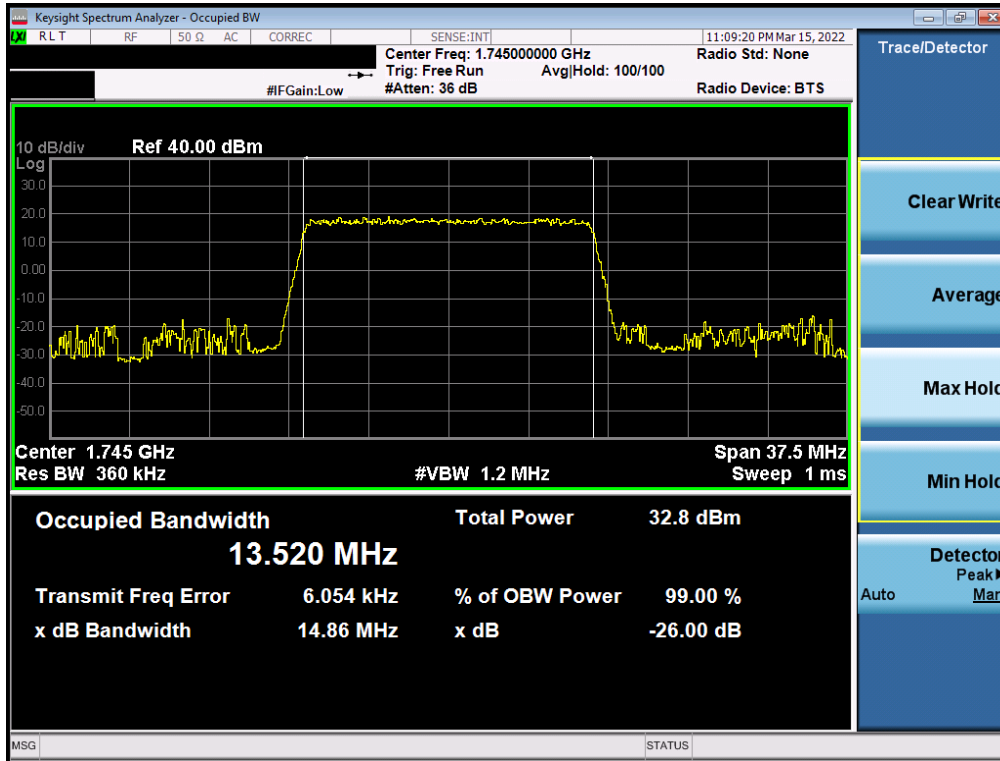


Plot 7-33. Occupied Bandwidth Plot (LTE Band 66/4 - 20MHz QPSK - Full RB - Ant1)

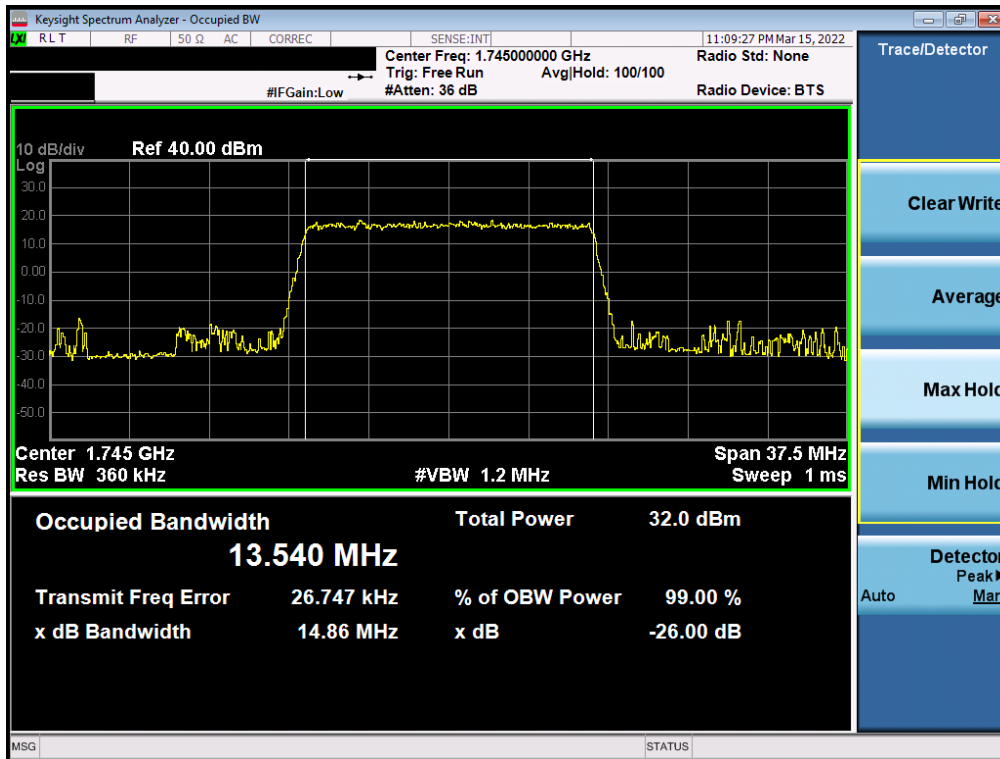


Plot 7-34. Occupied Bandwidth Plot (LTE Band 66/4 - 20MHz 16-QAM - Full RB - Ant1)

FCC ID: C3K1997	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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Plot 7-35. Occupied Bandwidth Plot (LTE Band 66/4 - 15MHz QPSK - Full RB - Ant1)

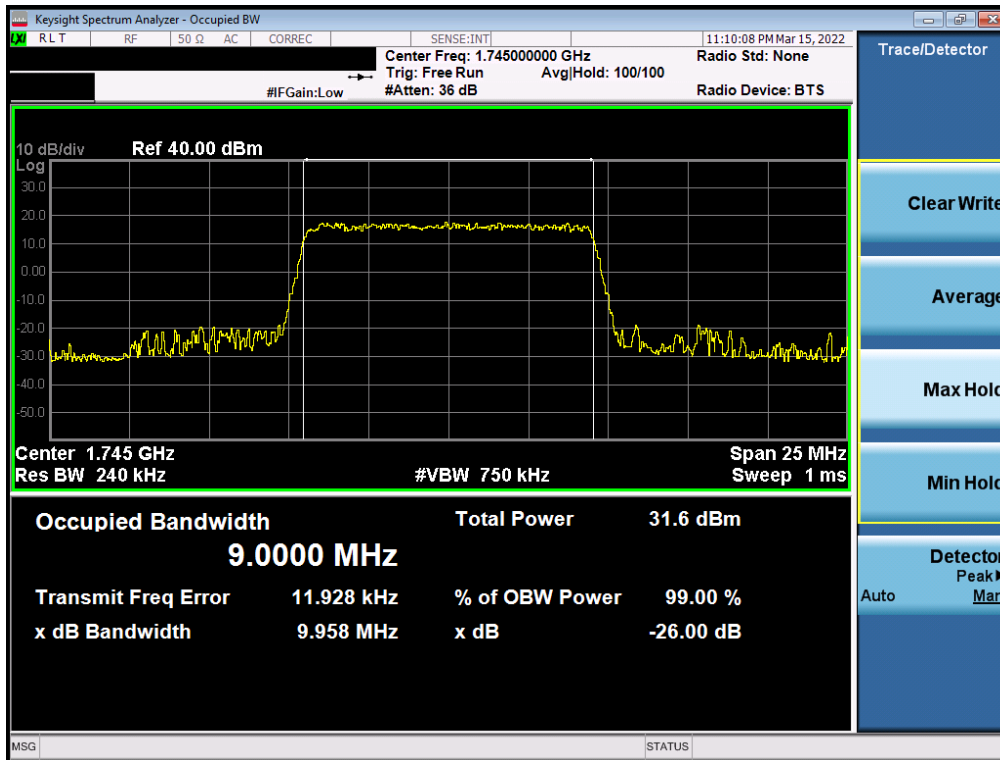


Plot 7-36. Occupied Bandwidth Plot (LTE Band 66/4 - 15MHz 16-QAM - Full RB - Ant1)

FCC ID: C3K1997	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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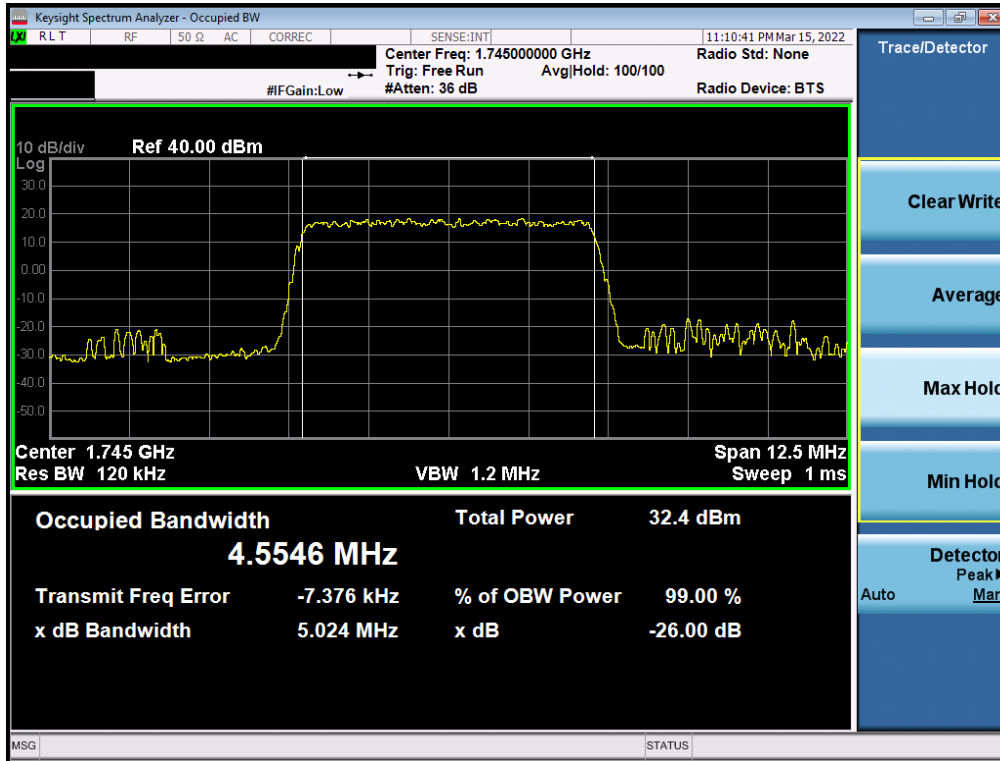


Plot 7-37. Occupied Bandwidth Plot (LTE Band 66/4 - 10MHz QPSK - Full RB - Ant1)

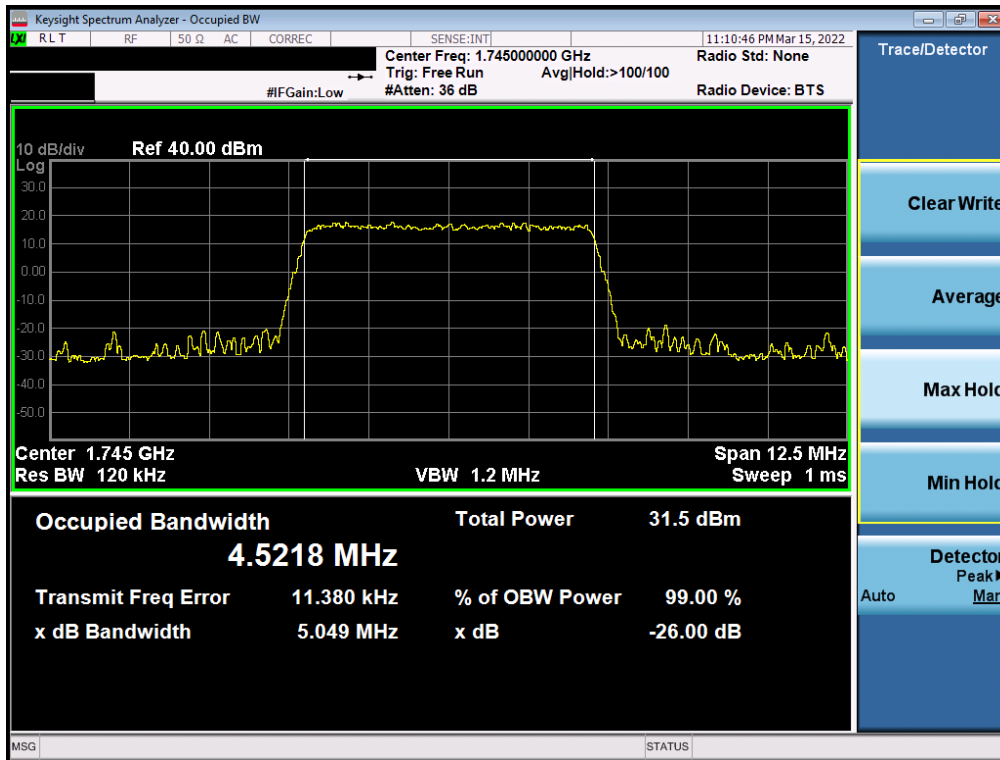


Plot 7-38. Occupied Bandwidth Plot (LTE Band 66/4 - 10MHz 16-QAM - Full RB - Ant1)

FCC ID: C3K1997	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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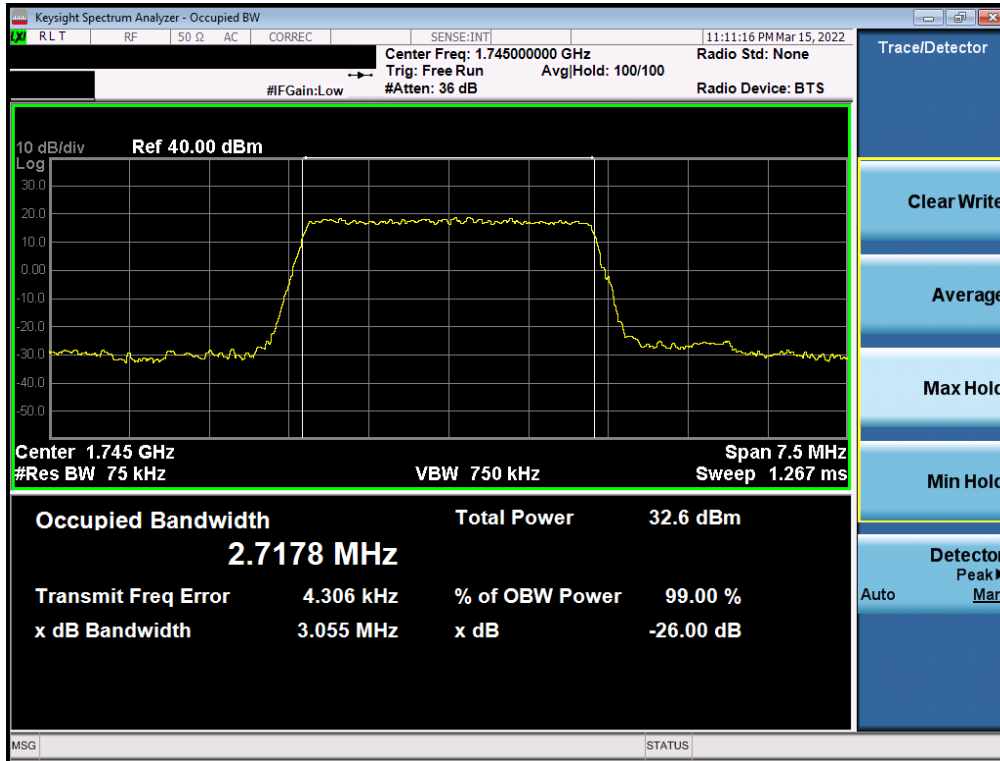


Plot 7-39. Occupied Bandwidth Plot (LTE Band 66/4 - 5MHz QPSK - Full RB - Ant1)

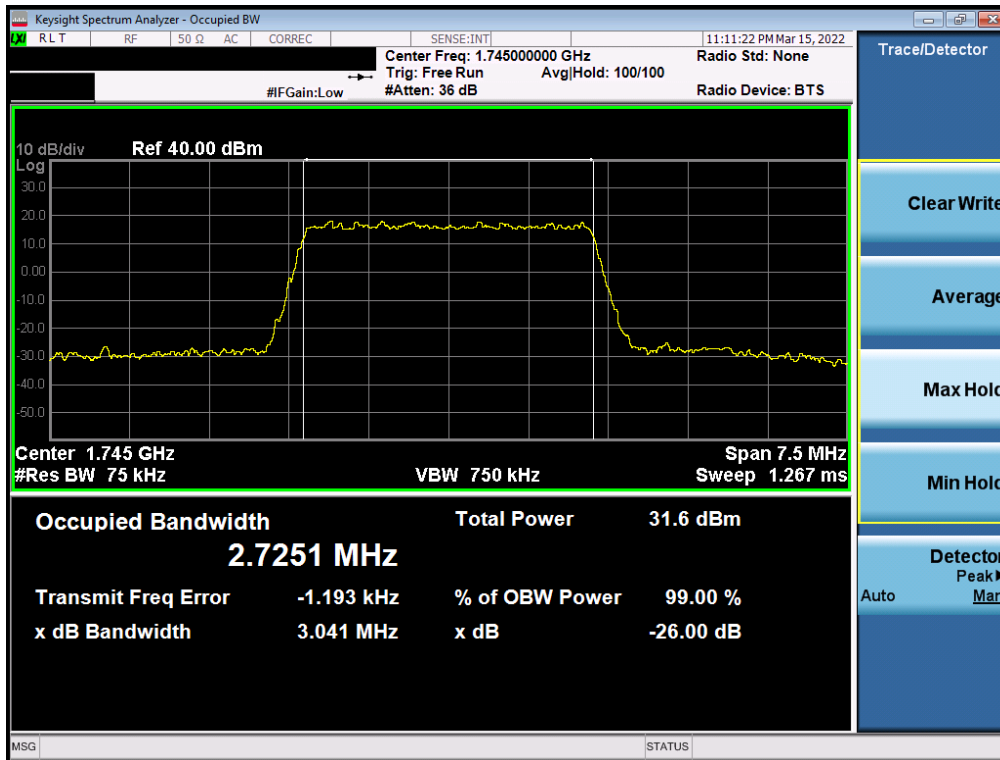


Plot 7-40. Occupied Bandwidth Plot (LTE Band 66/4 - 5MHz 16-QAM - Full RB - Ant1)

FCC ID: C3K1997	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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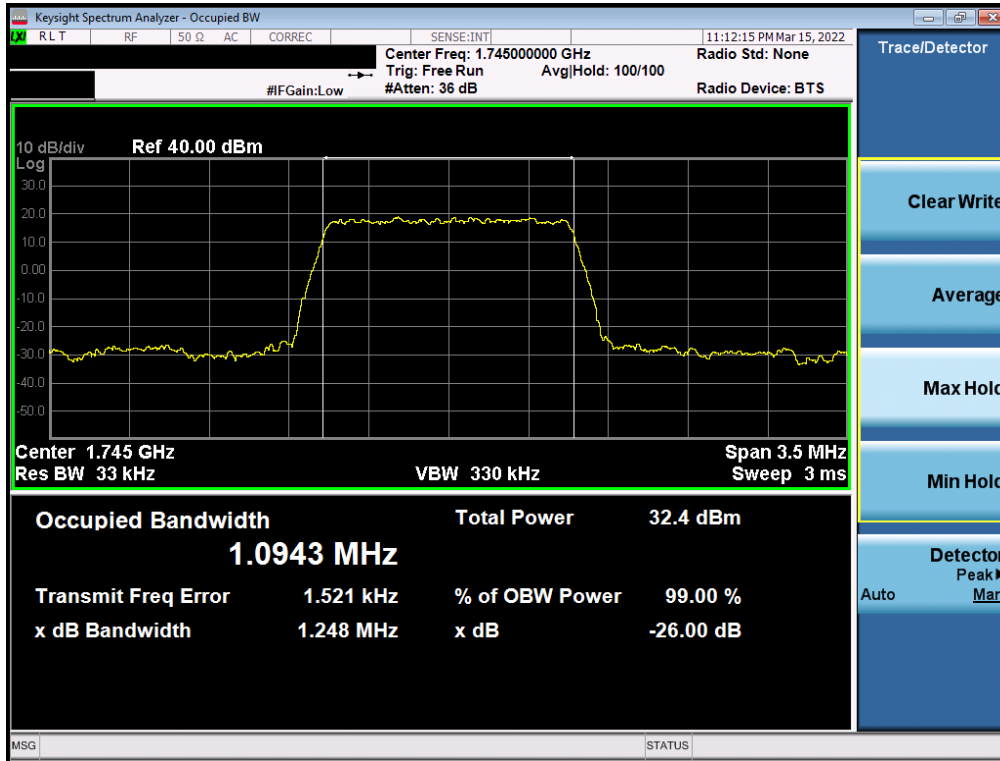


Plot 7-41. Occupied Bandwidth Plot (LTE Band 66/4 - 3MHz QPSK - Full RB - Ant1)

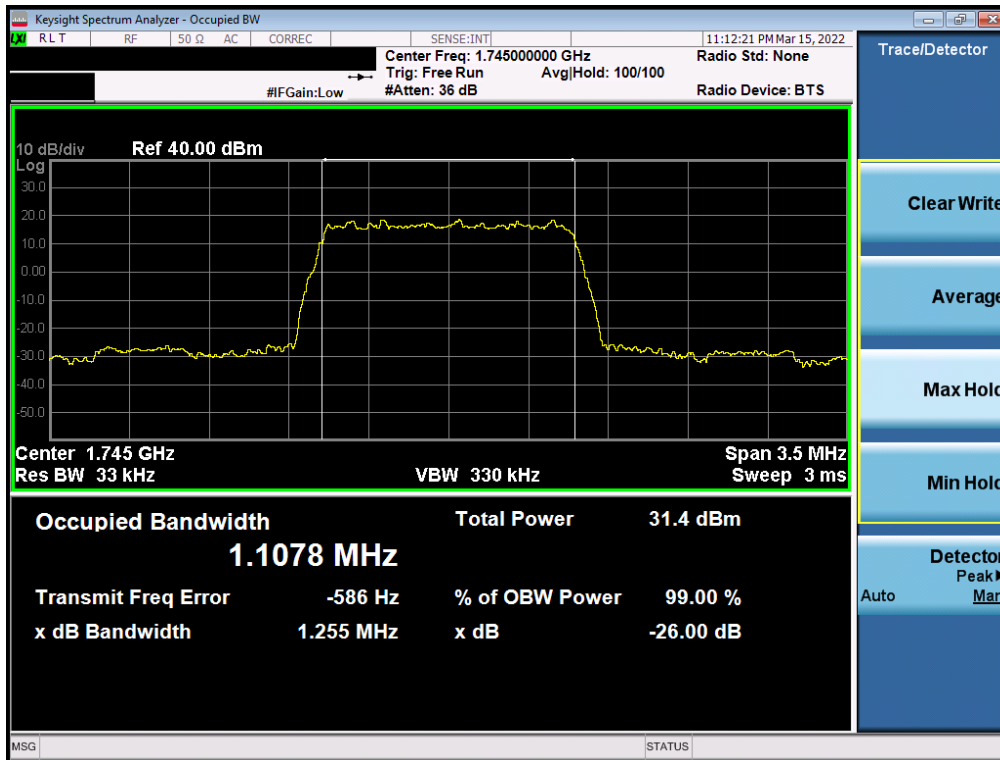


Plot 7-42. Occupied Bandwidth Plot (LTE Band 66/4 - 3MHz 16-QAM - Full RB - Ant1)

FCC ID: C3K1997	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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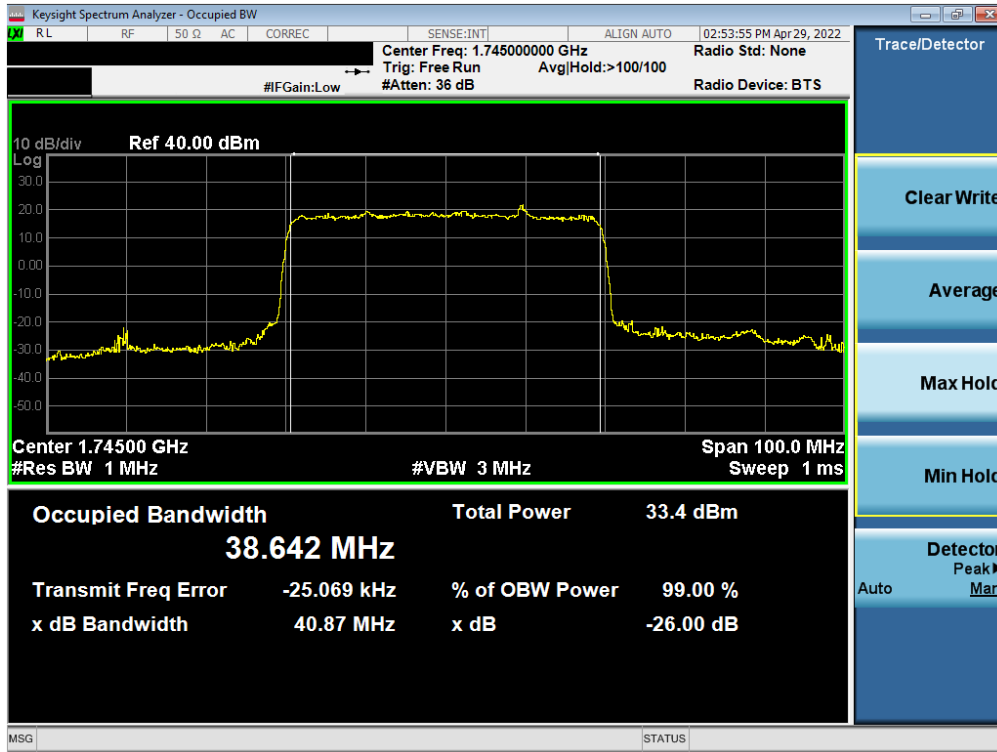
Plot 7-43. Occupied Bandwidth Plot (LTE Band 66/4 - 1.4MHz QPSK - Full RB - Ant1)



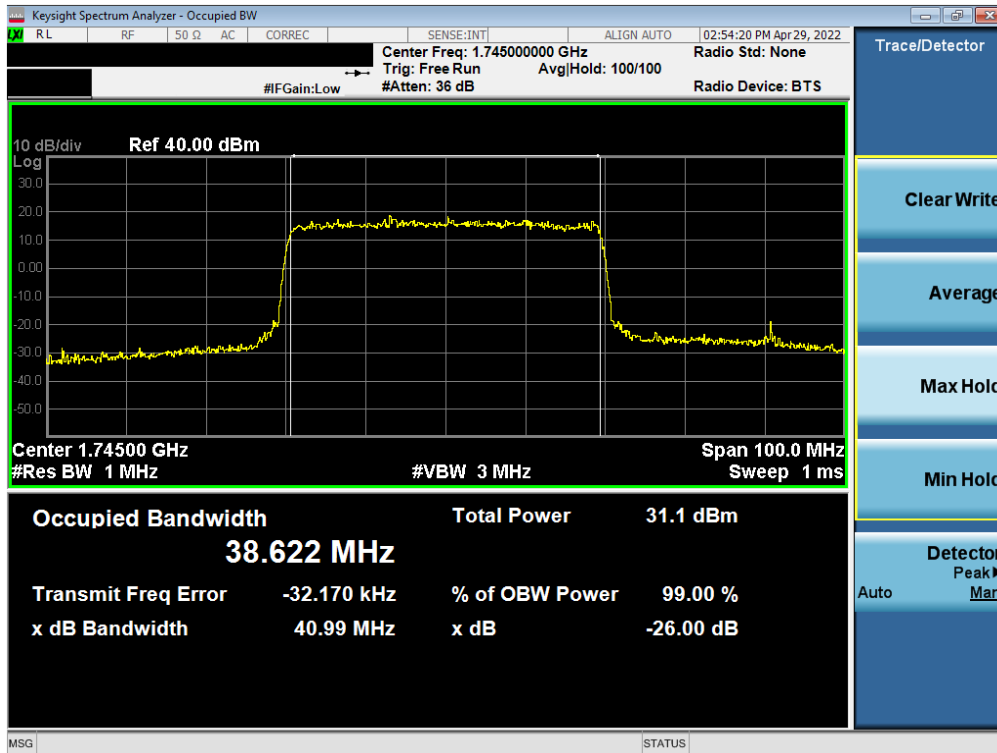
Plot 7-44. Occupied Bandwidth Plot (LTE Band 66/4 - 1.4MHz 16-QAM - Full RB - Ant1)

FCC ID: C3K1997	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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# NR Band n66 – Ant1

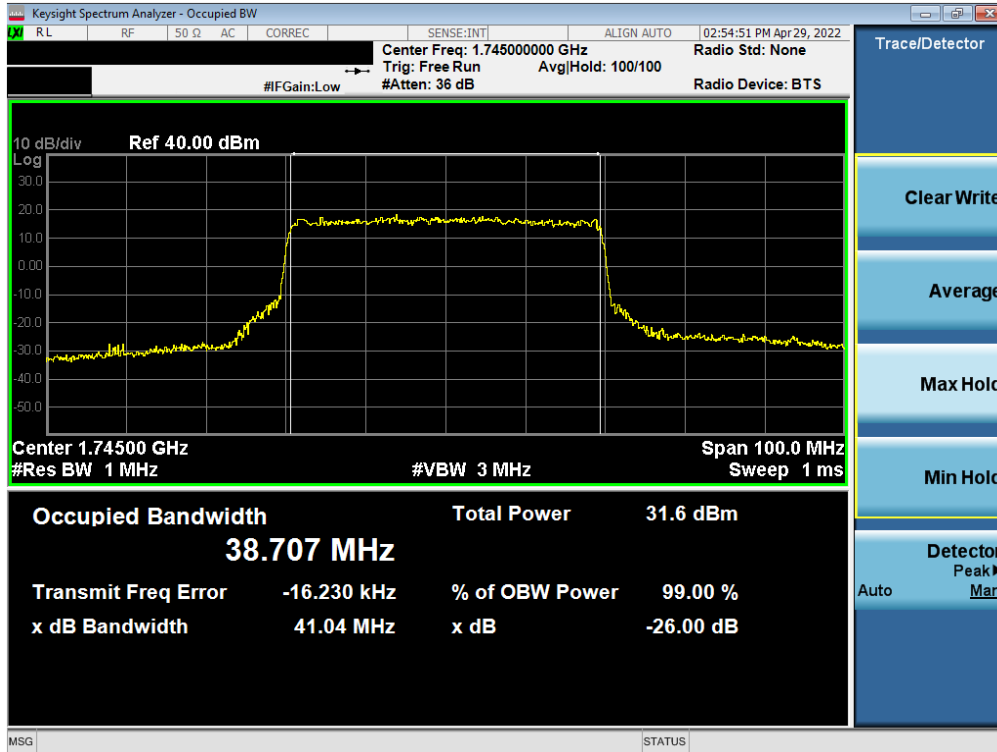


Plot 7-45. Occupied Bandwidth Plot (NR Band n66 - 40.0MHz DFT-s-OFDM BPSK - Full RB – Ant1)

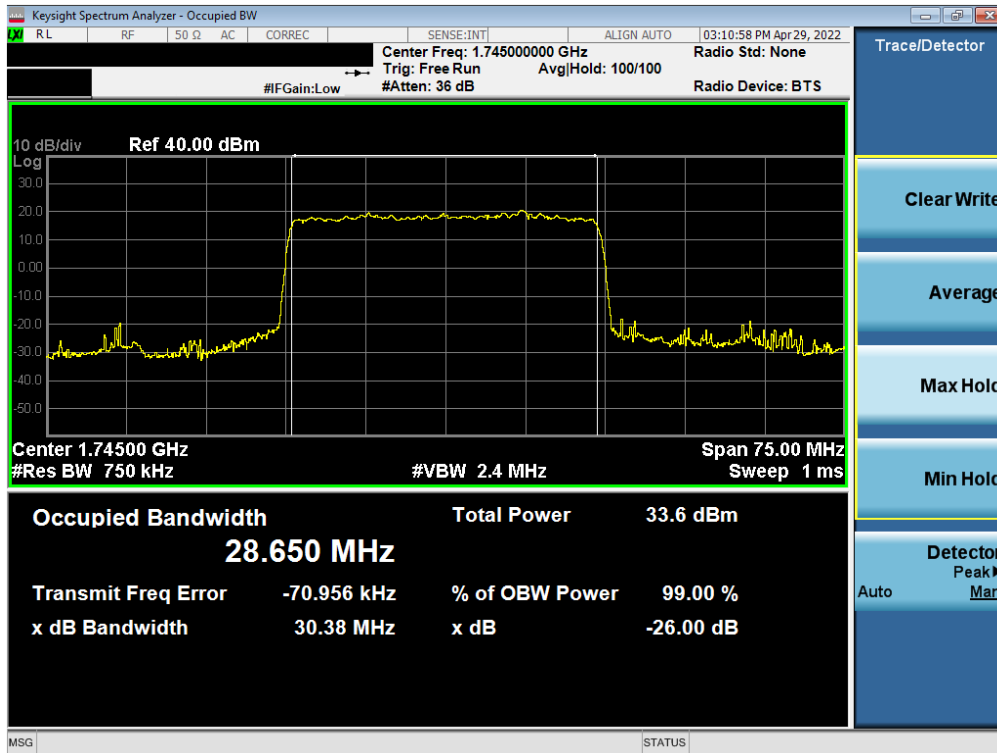


Plot 7-46. Occupied Bandwidth Plot (NR Band n66 - 40.0MHz CP-OFDM QPSK - Full RB – Ant1)

FCC ID: C3K1997	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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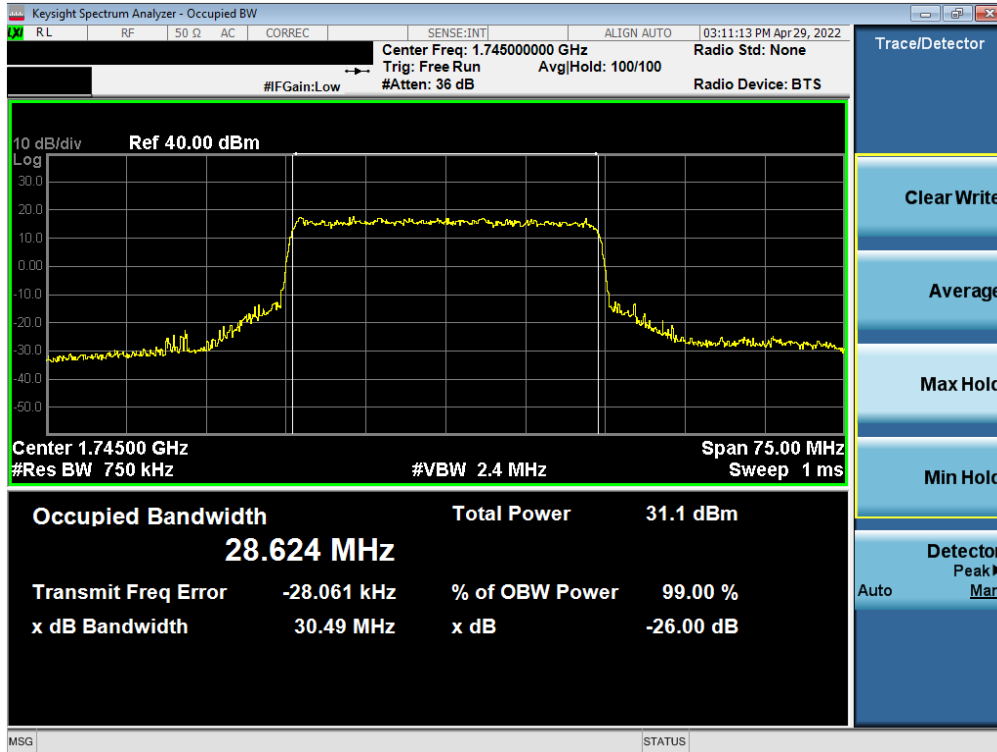
Plot 7-47. Occupied Bandwidth Plot (NR Band n66 - 40.0MHz CP-OFDM 16QAM - Full RB - Ant1)



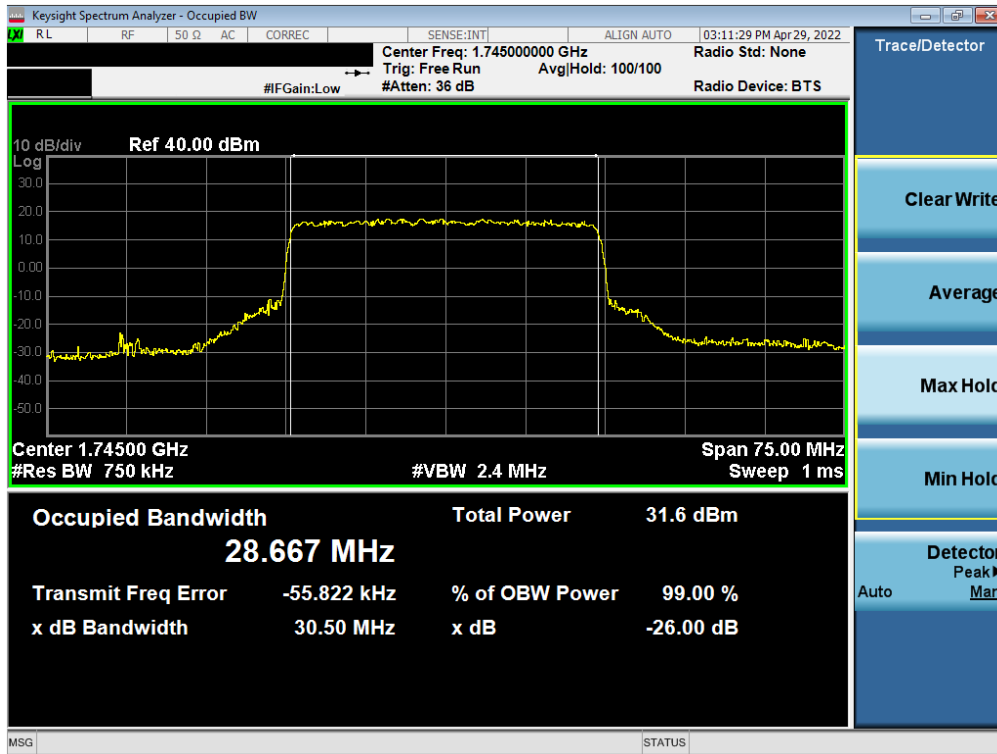
Plot 7-48. Occupied Bandwidth Plot (NR Band n66 - 30.0MHz DFT-s-OFDM BPSK - Full RB - Ant1)

FCC ID: C3K1997	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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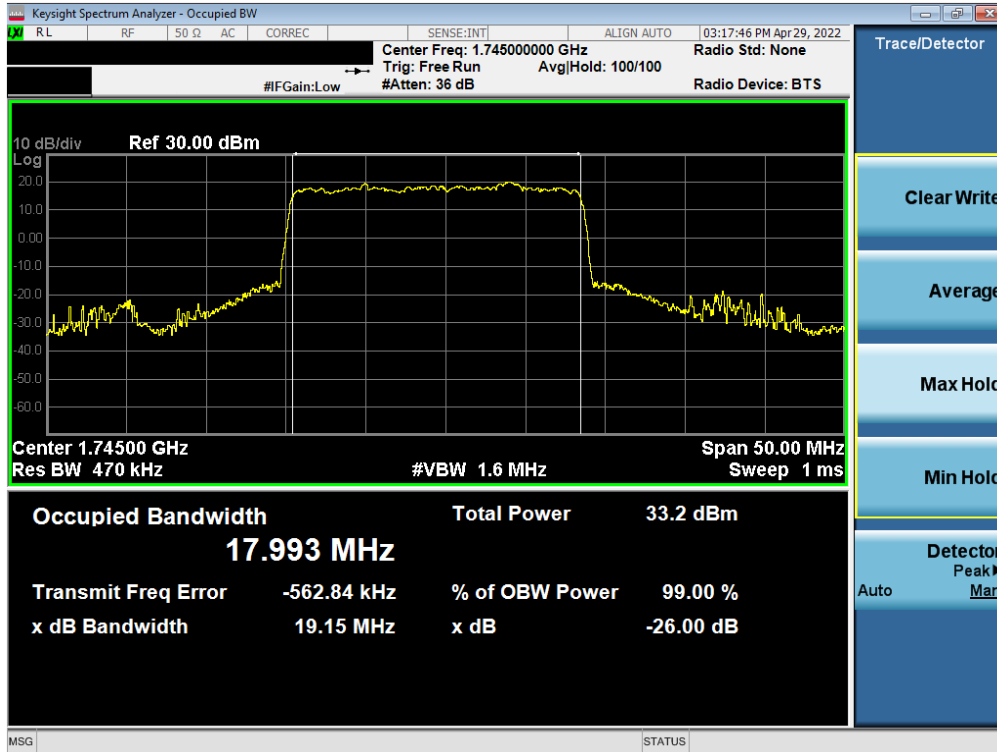


Plot 7-49. Occupied Bandwidth Plot (NR Band n66 - 30.0MHz CP-OFDM QPSK - Full RB - Ant1)

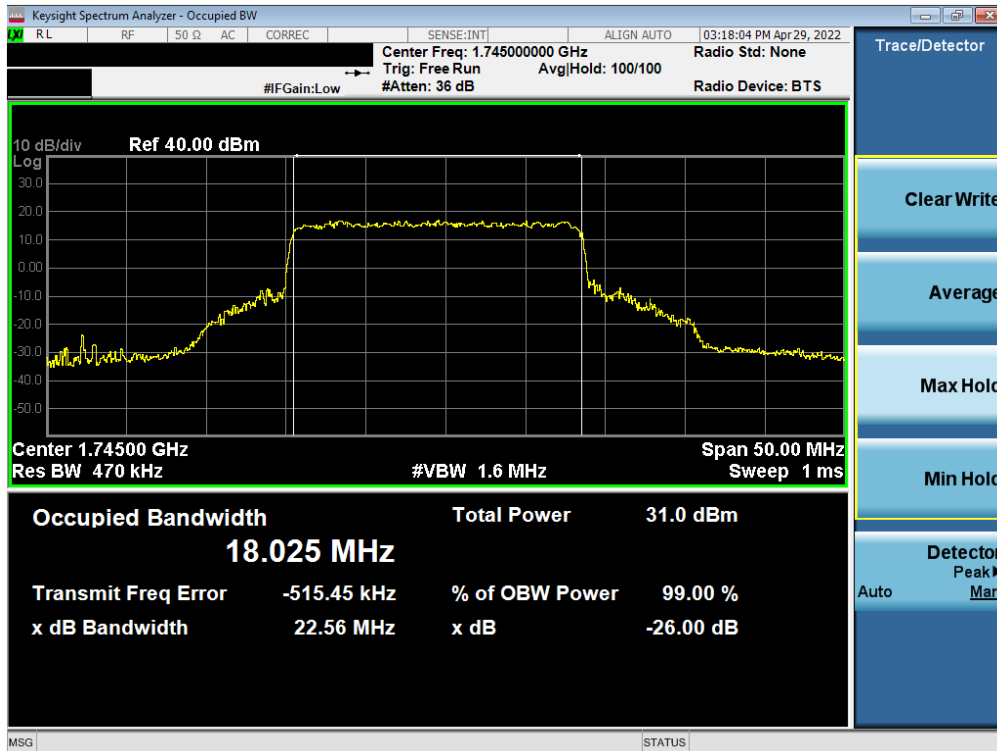


Plot 7-50. Occupied Bandwidth Plot (NR Band n66 - 30.0MHz CP-OFDM 16QAM - Full RB - Ant1)

FCC ID: C3K1997	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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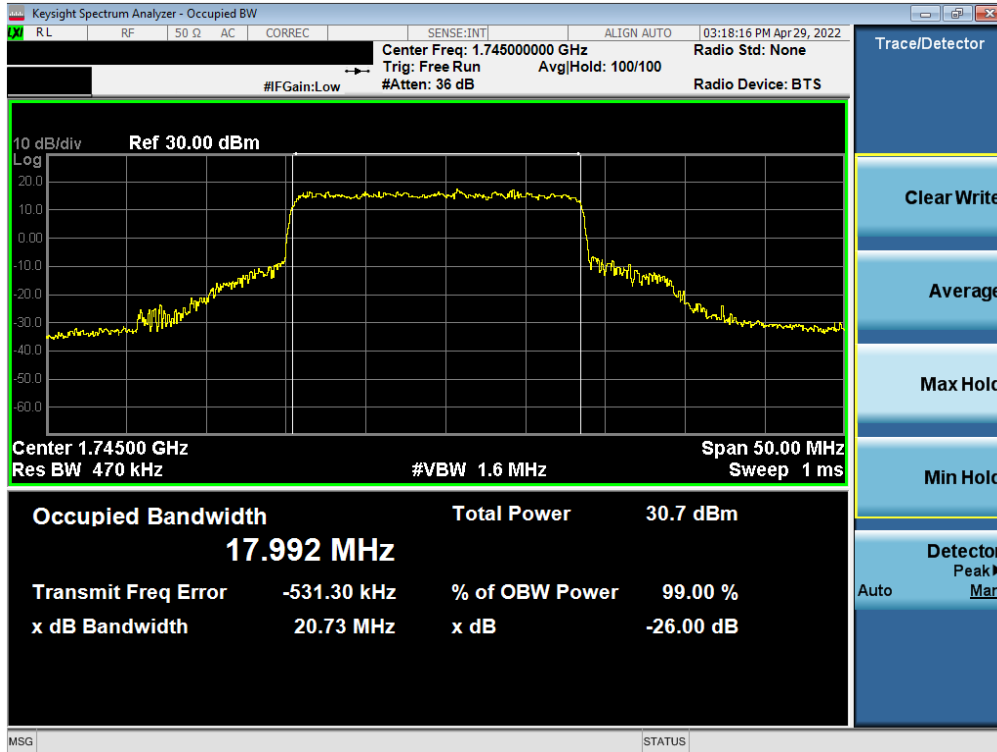


Plot 7-51. Occupied Bandwidth Plot (NR Band n66 - 20.0MHz DFT-s-OFDM BPSK - Full RB – Ant1)

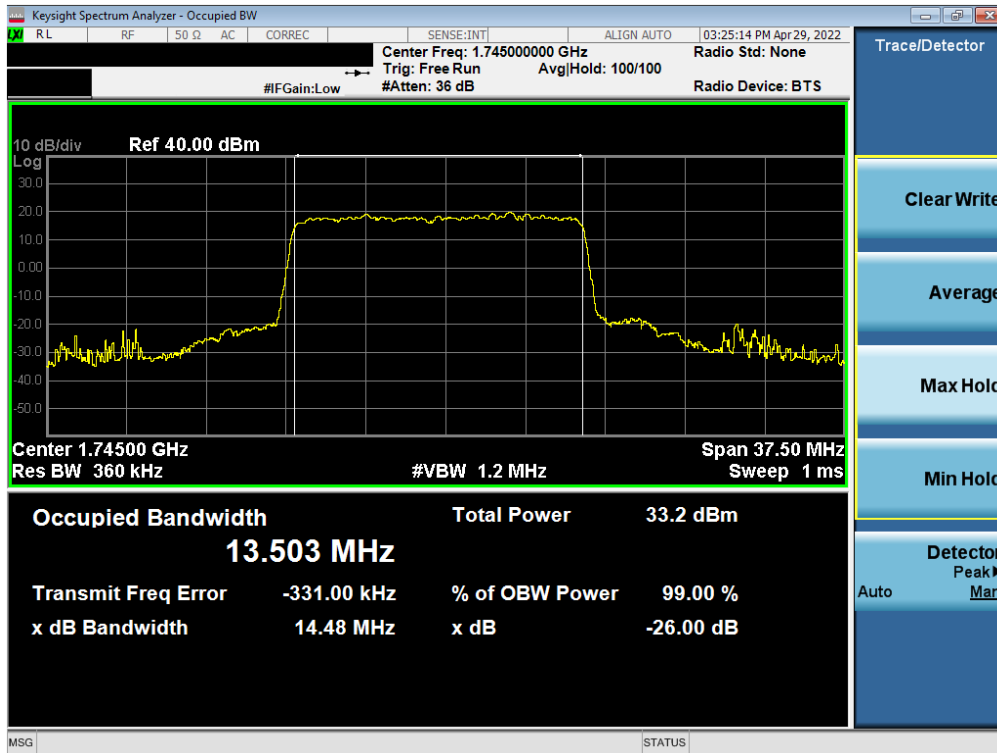


Plot 7-52. Occupied Bandwidth Plot (NR Band n66 - 20.0MHz CP-OFDM QPSK - Full RB – Ant1)

FCC ID: C3K1997	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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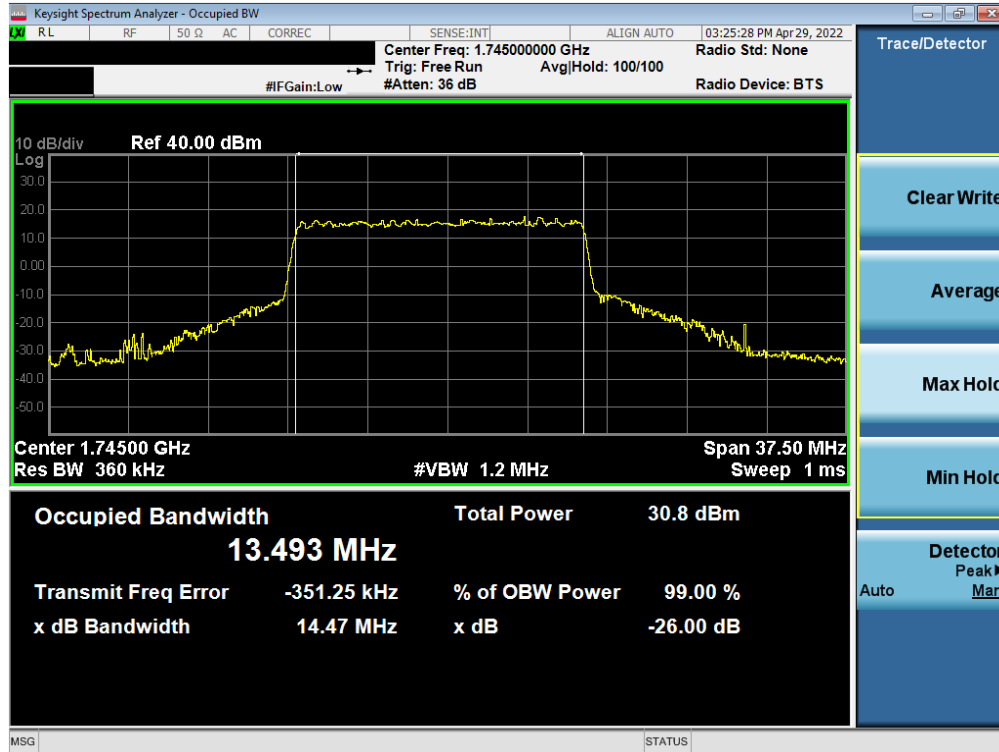


Plot 7-53. Occupied Bandwidth Plot (NR Band n66 - 20.0MHz CP-OFDM 16QAM - Full RB - Ant1)

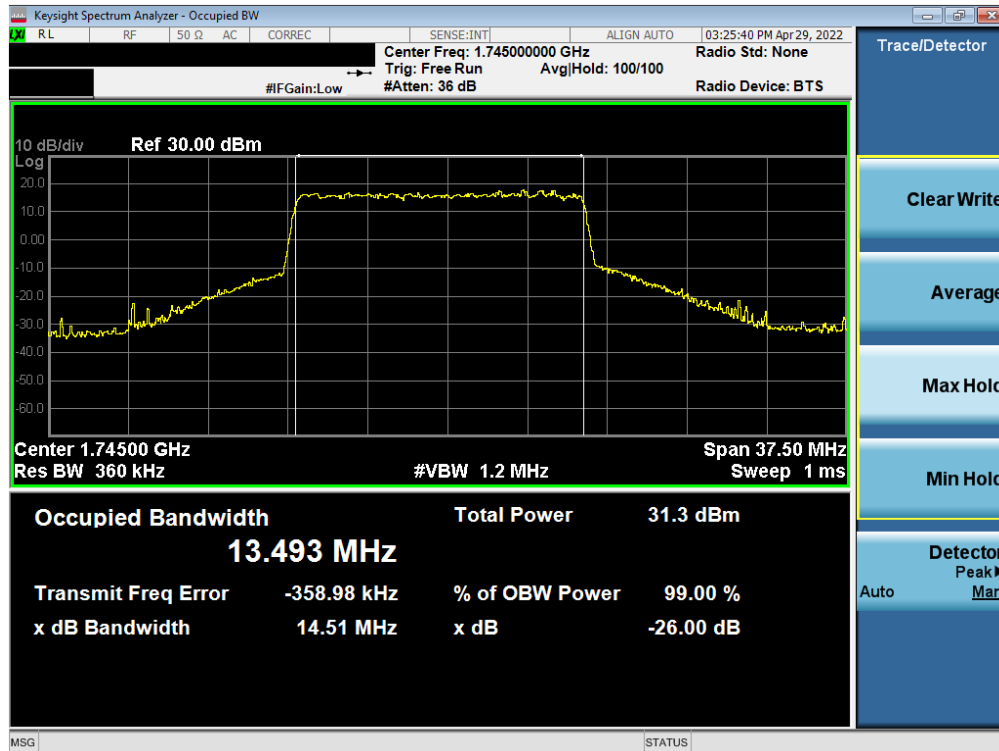


Plot 7-54. Occupied Bandwidth Plot (NR Band n66 - 15.0MHz DFT-s-OFDM BPSK - Full RB - Ant1)

FCC ID: C3K1997	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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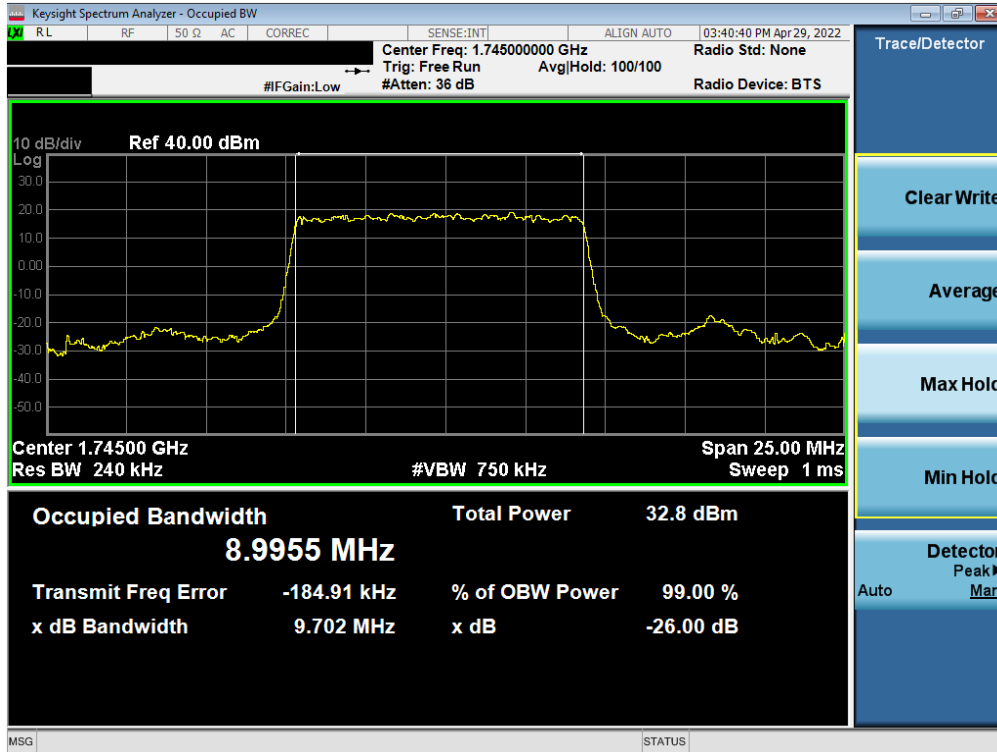


Plot 7-55. Occupied Bandwidth Plot (NR Band n66 - 15.0MHz CP-OFDM QPSK - Full RB - Ant1)

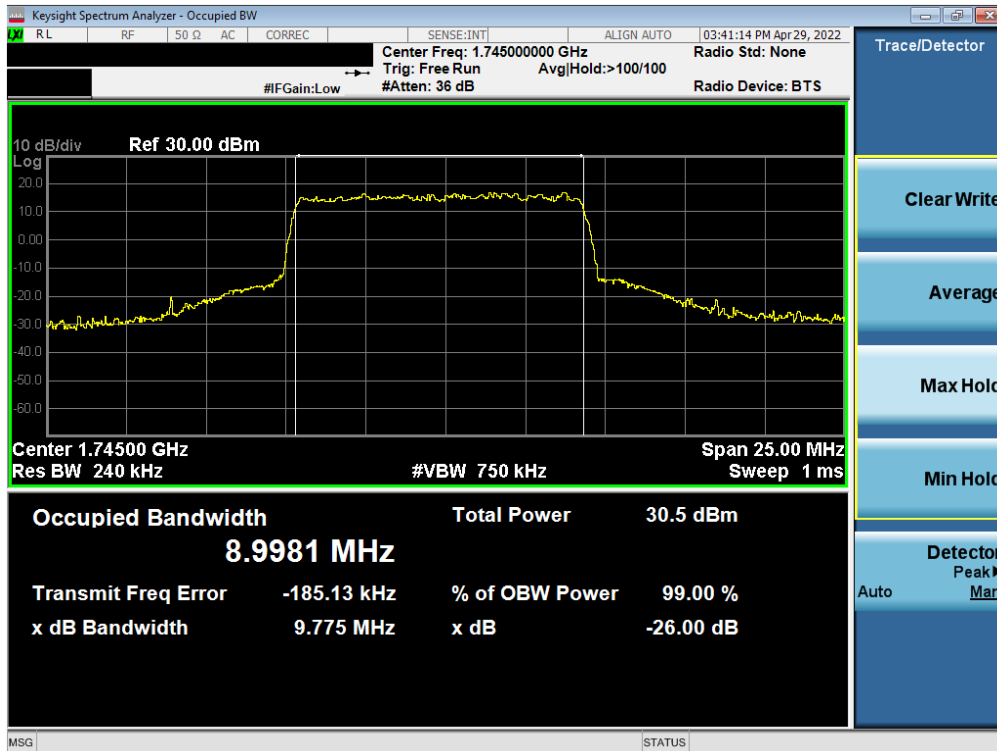


Plot 7-56. Occupied Bandwidth Plot (NR Band n66 - 15.0MHz CP-OFDM 16QAM - Full RB - Ant1)

FCC ID: C3K1997	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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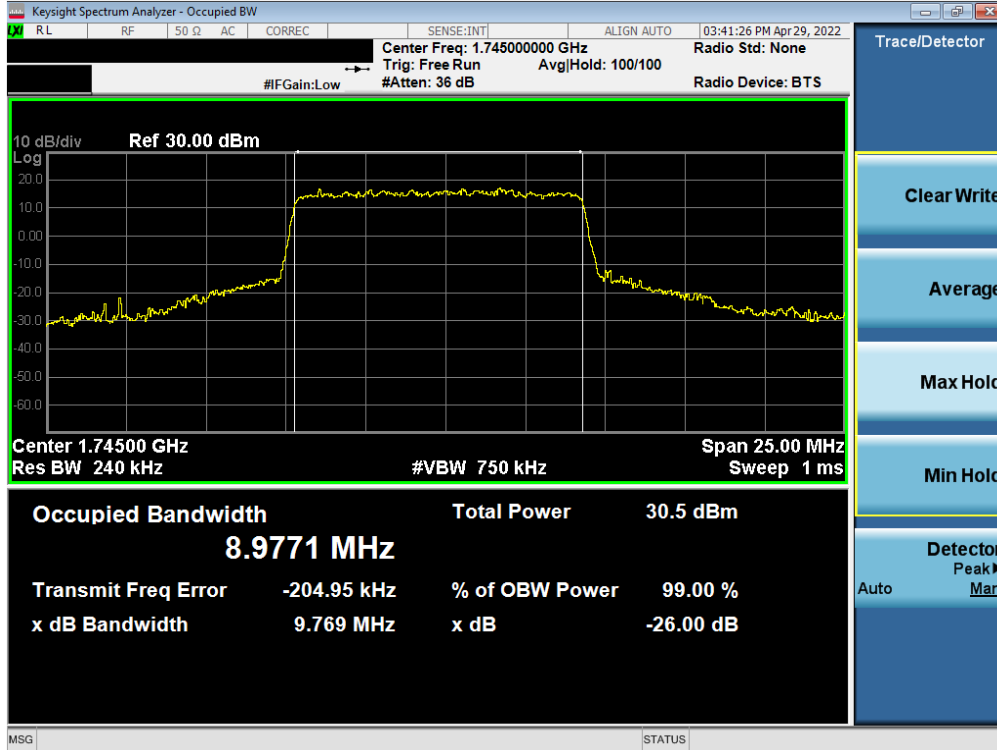


Plot 7-57. Occupied Bandwidth Plot (NR Band n66 - 10.0MHz DFT-s-OFDM BPSK - Full RB – Ant1)

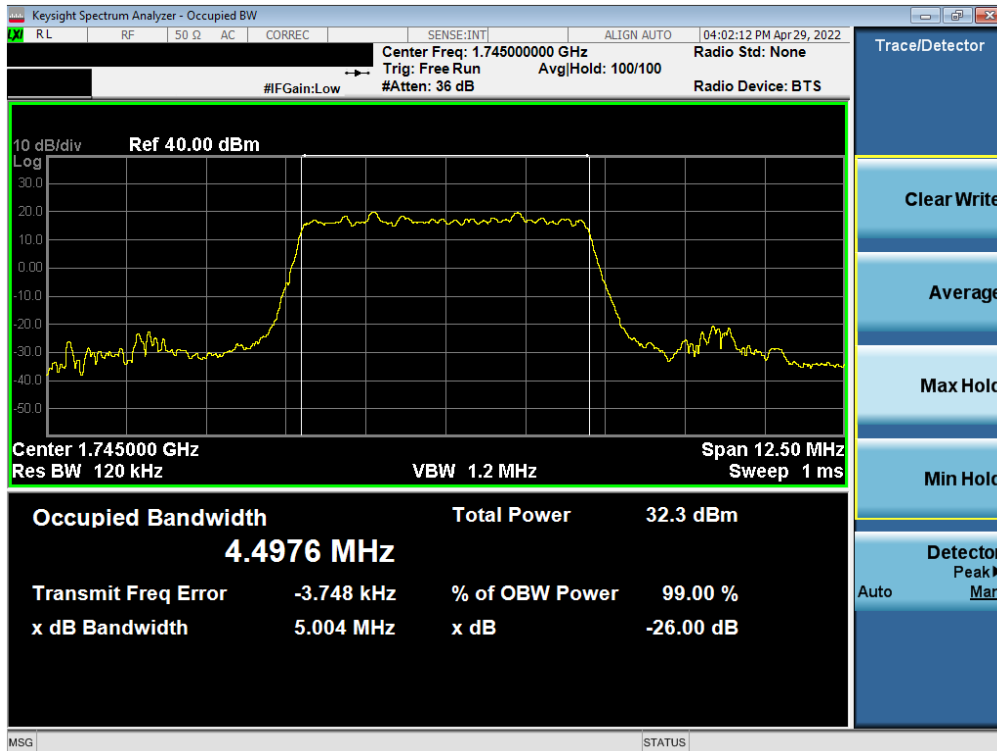


Plot 7-58. Occupied Bandwidth Plot (NR Band n66 - 10.0MHz CP-OFDM QPSK - Full RB – Ant1)

FCC ID: C3K1997	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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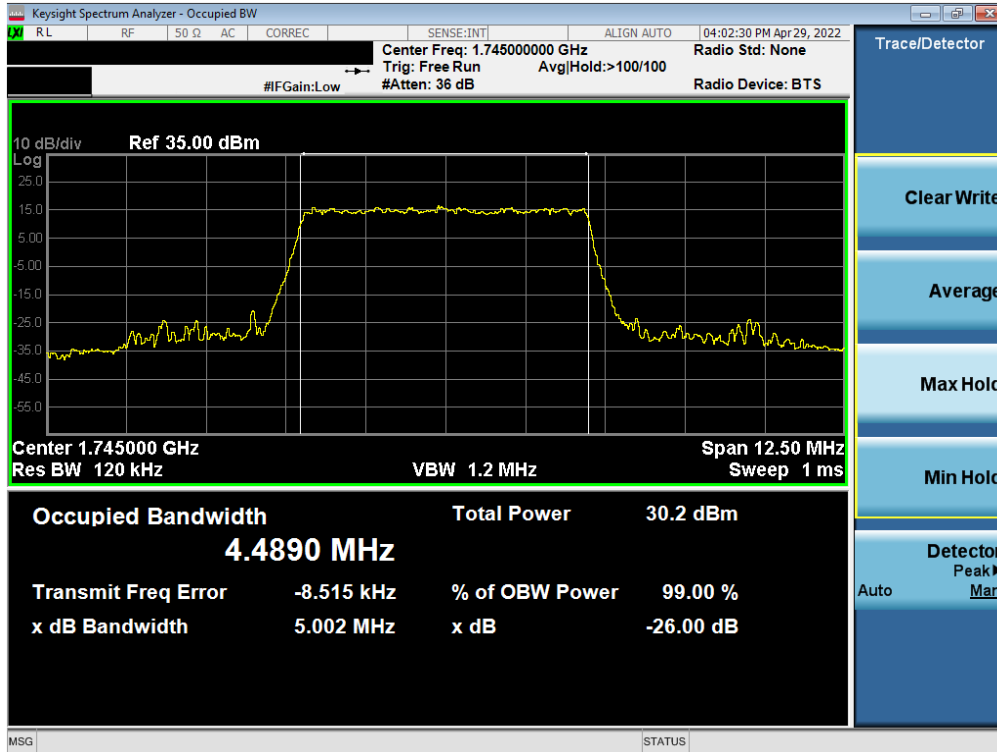


Plot 7-59. Occupied Bandwidth Plot (NR Band n66 - 10.0MHz CP-OFDM 16QAM - Full RB – Ant1)

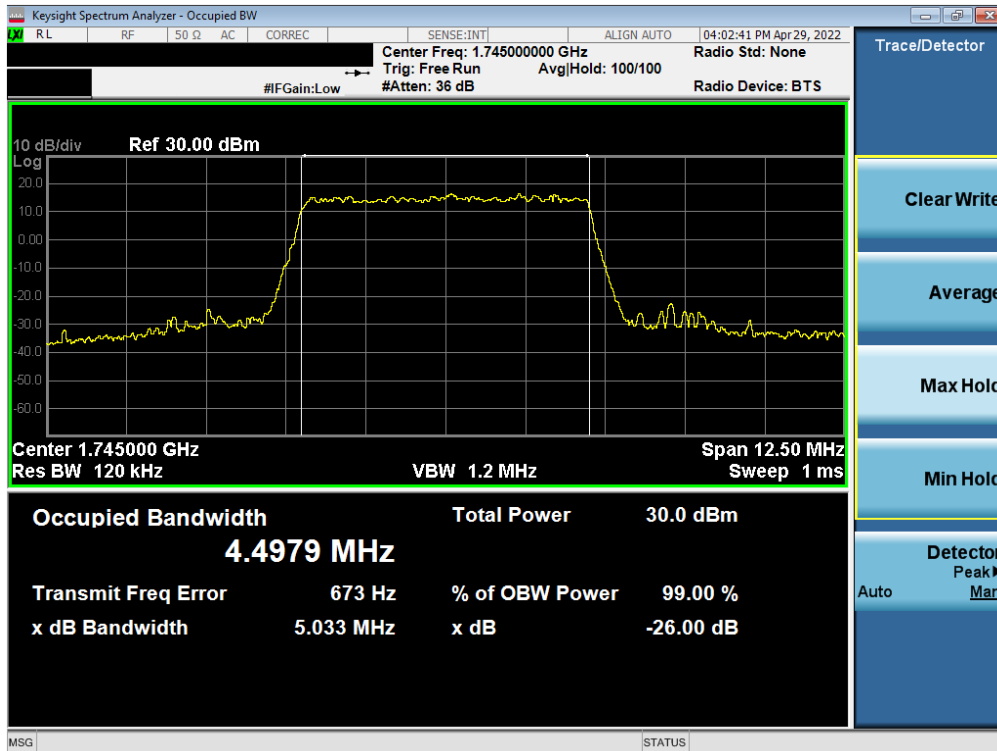


Plot 7-60. Occupied Bandwidth Plot (NR Band n66 - 5.0MHz DFT-s-OFDM BPSK - Full RB – Ant1)

FCC ID: C3K1997	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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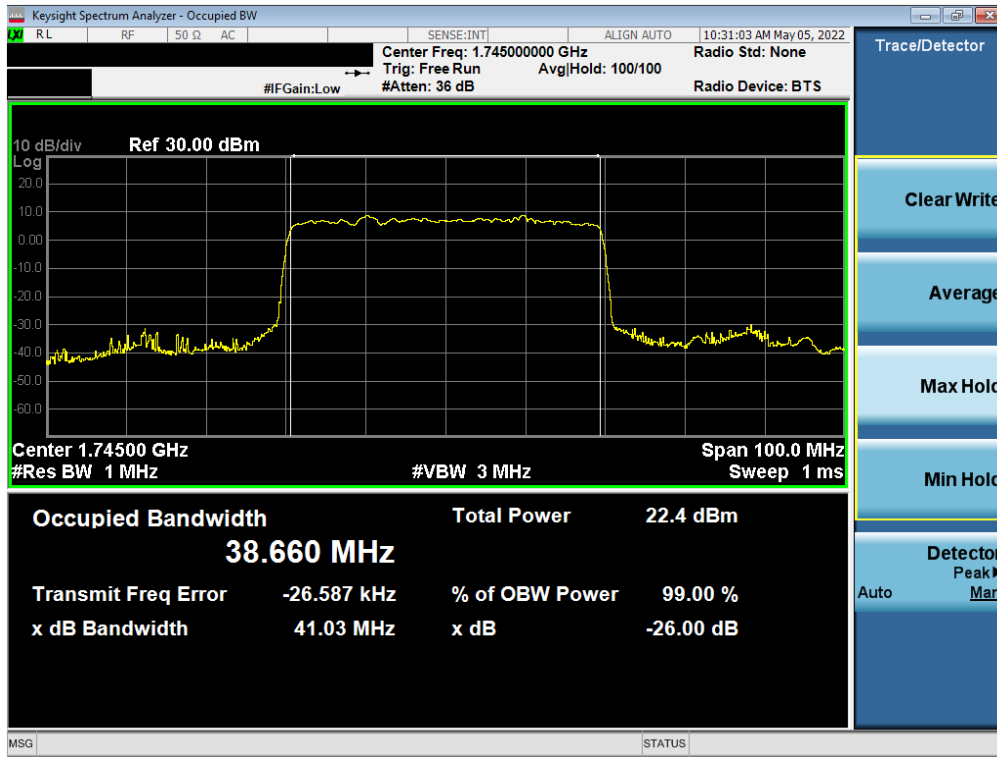
Plot 7-61. Occupied Bandwidth Plot (NR Band n66 - 5.0MHz CP-OFDM QPSK - Full RB - Ant1)



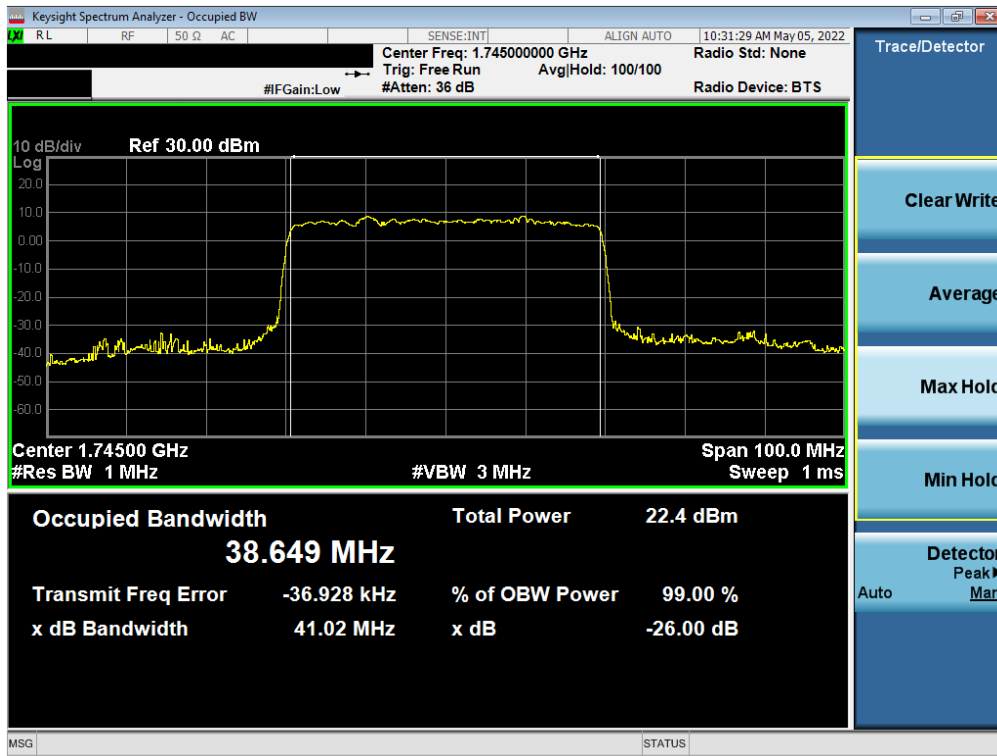
Plot 7-62. Occupied Bandwidth Plot (NR Band n66 - 5.0MHz CP-OFDM 16QAM - Full RB - Ant1)

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### NR Band n66 – Ant4



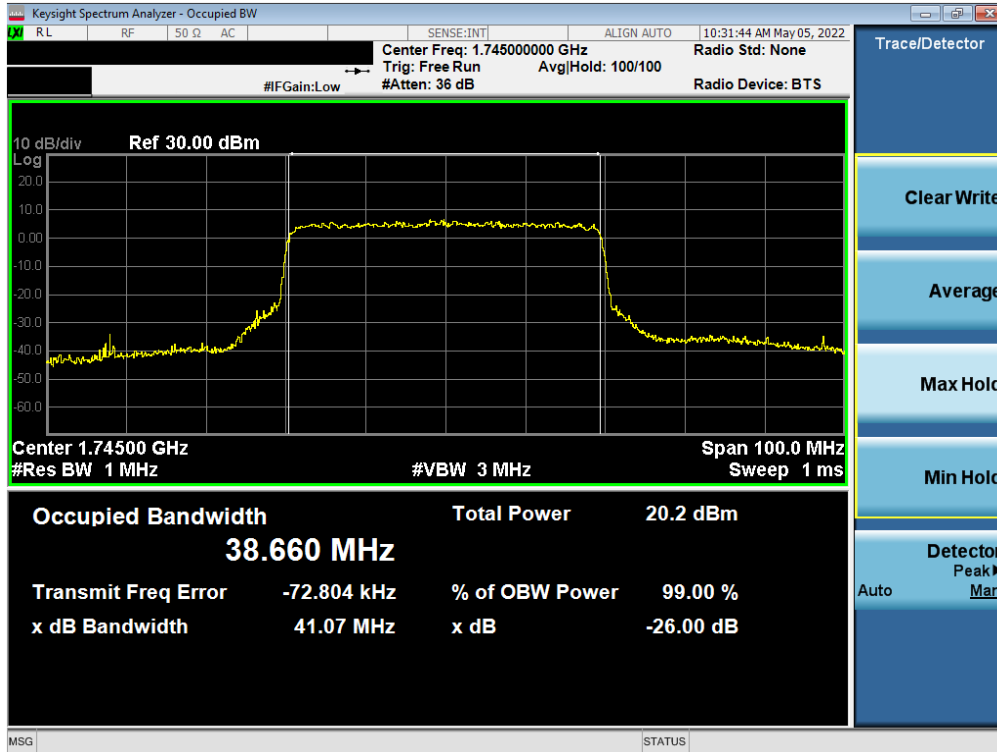
Plot 7-63. Occupied Bandwidth Plot (NR Band n66 - 40.0MHz DFT-s-OFDM BPSK - Full RB – Ant4)



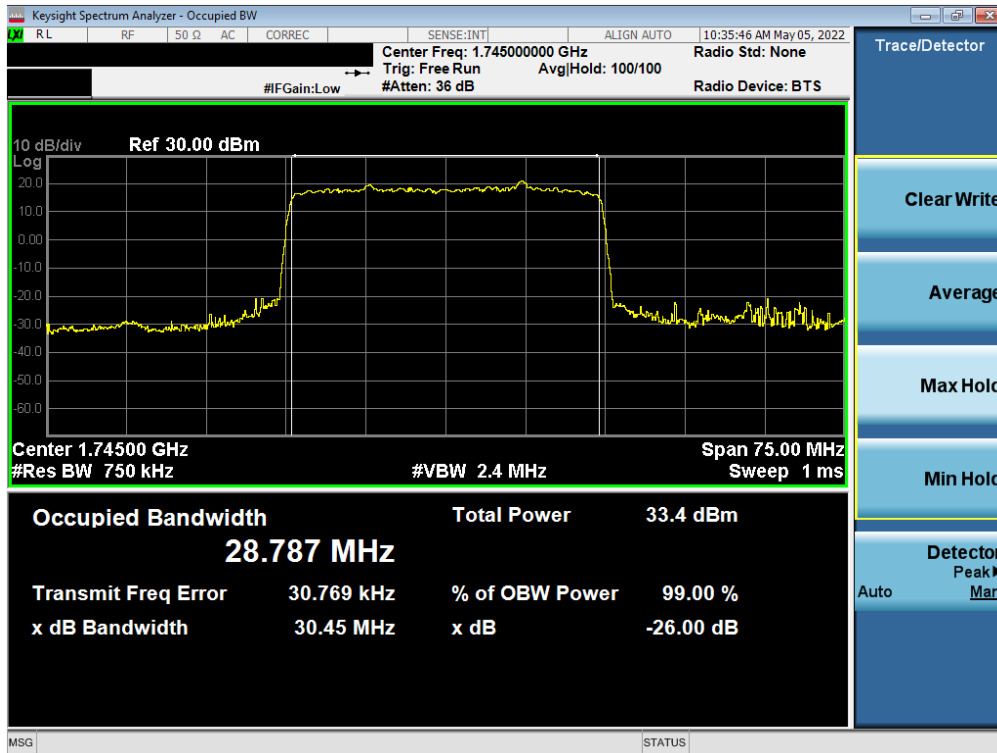
Plot 7-64. Occupied Bandwidth Plot (NR Band n66 - 40.0MHz CP-OFDM QPSK - Full RB – Ant4)

FCC ID: C3K1997	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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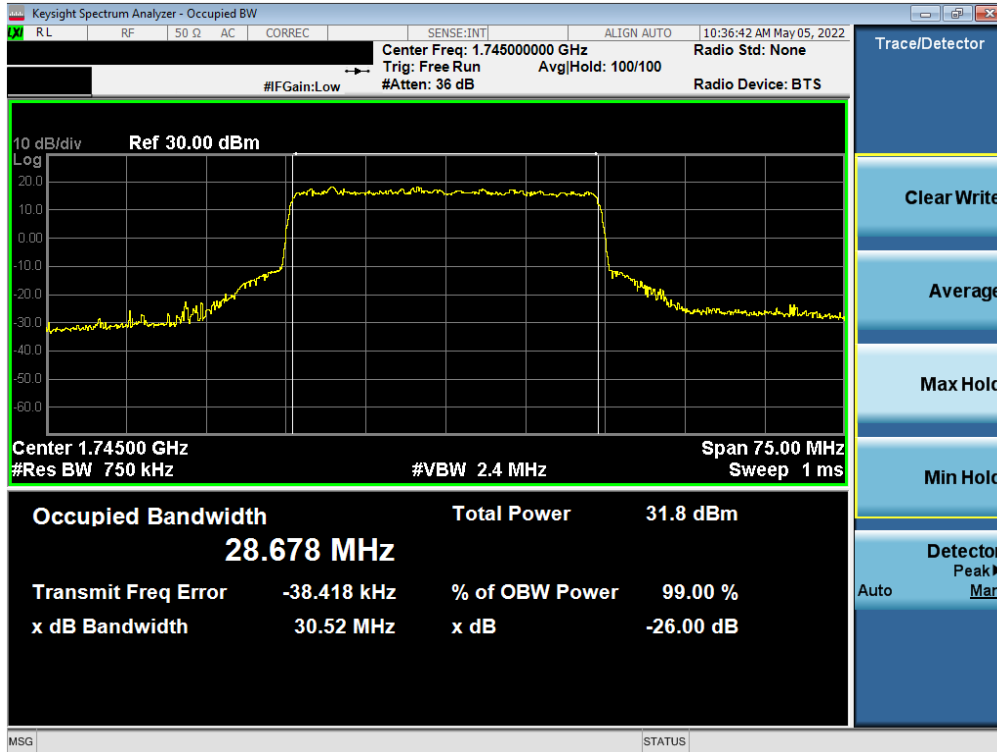


Plot 7-65. Occupied Bandwidth Plot (NR Band n66 - 40.0MHz CP-OFDM 16QAM - Full RB - Ant4)

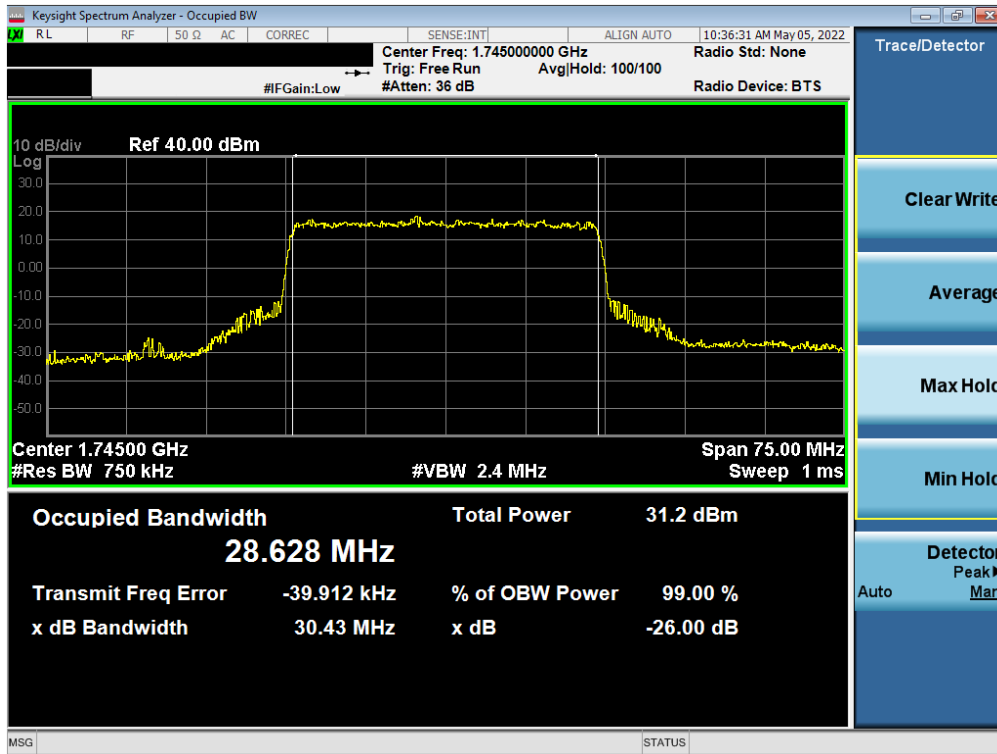


Plot 7-66. Occupied Bandwidth Plot (NR Band n66 - 30.0MHz DFT-s-OFDM BPSK - Full RB - Ant4)

FCC ID: C3K1997	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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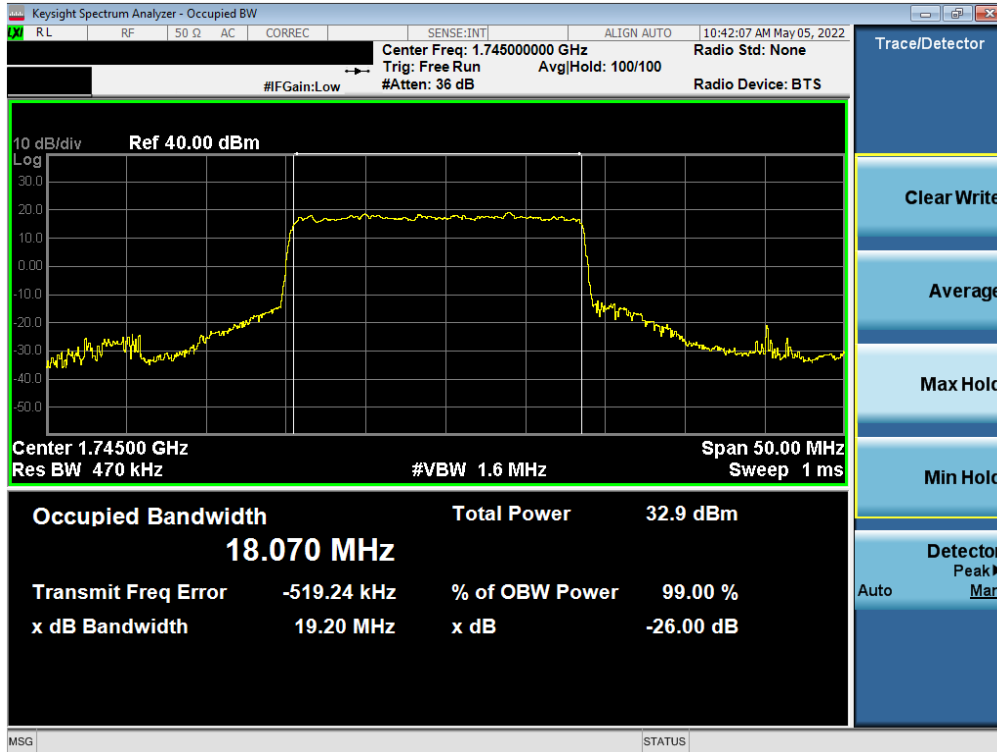


Plot 7-67. Occupied Bandwidth Plot (NR Band n66 - 30.0MHz CP-OFDM QPSK - Full RB - Ant4)

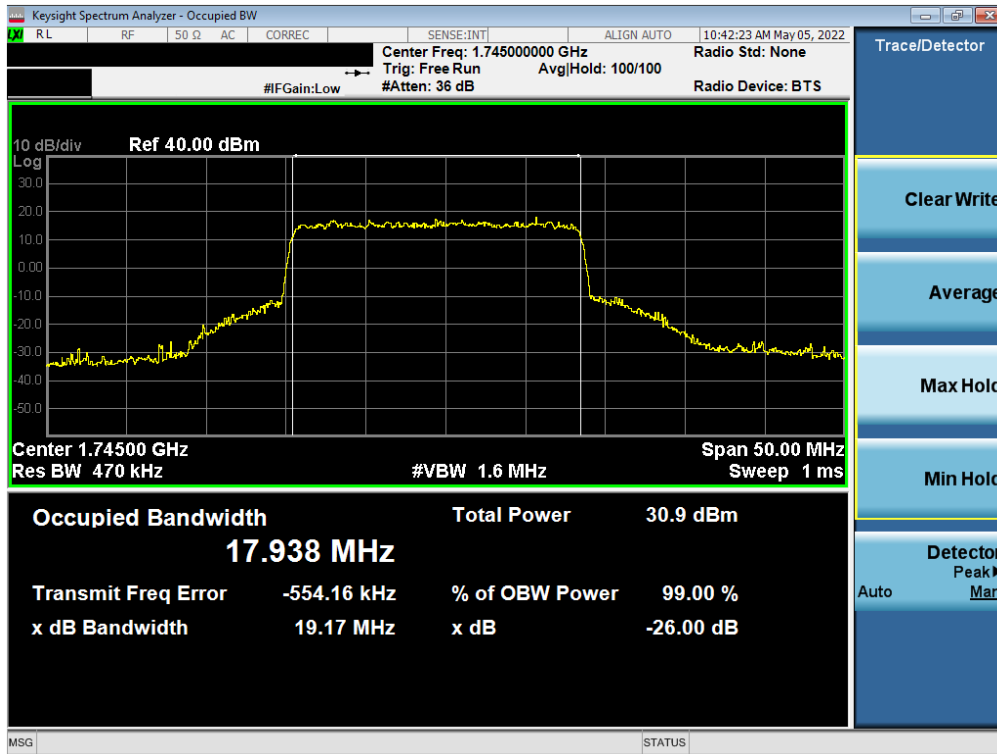


Plot 7-68. Occupied Bandwidth Plot (NR Band n66 - 30.0MHz CP-OFDM 16QAM - Full RB - Ant4)

FCC ID: C3K1997	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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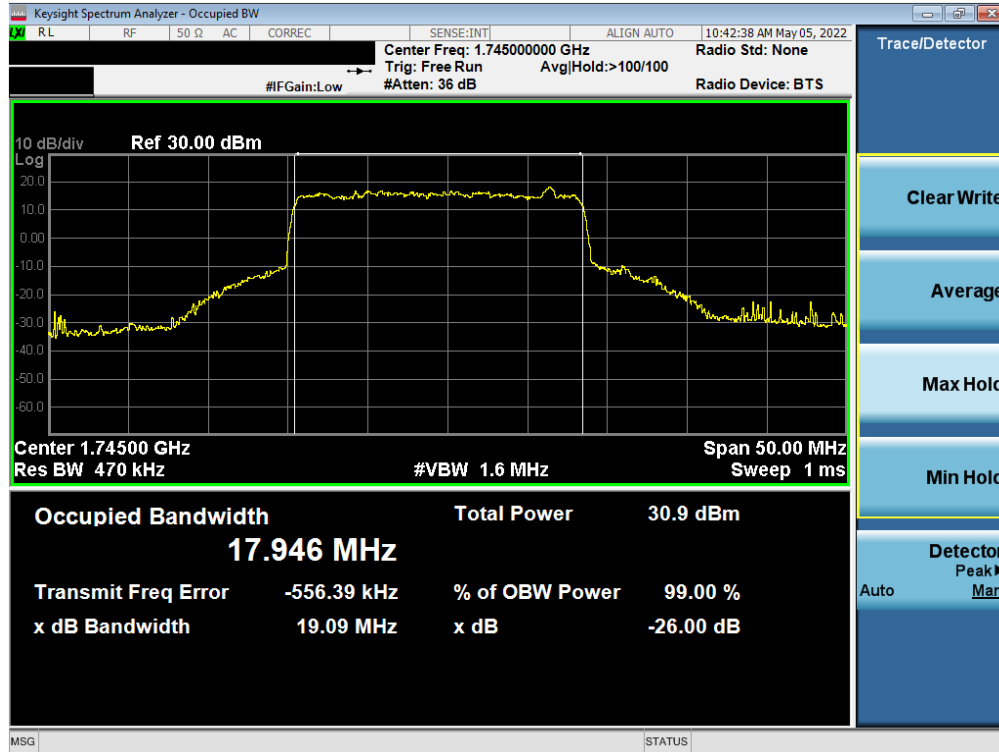


Plot 7-69. Occupied Bandwidth Plot (NR Band n66 - 20.0MHz DFT-s-OFDM BPSK - Full RB – Ant4)

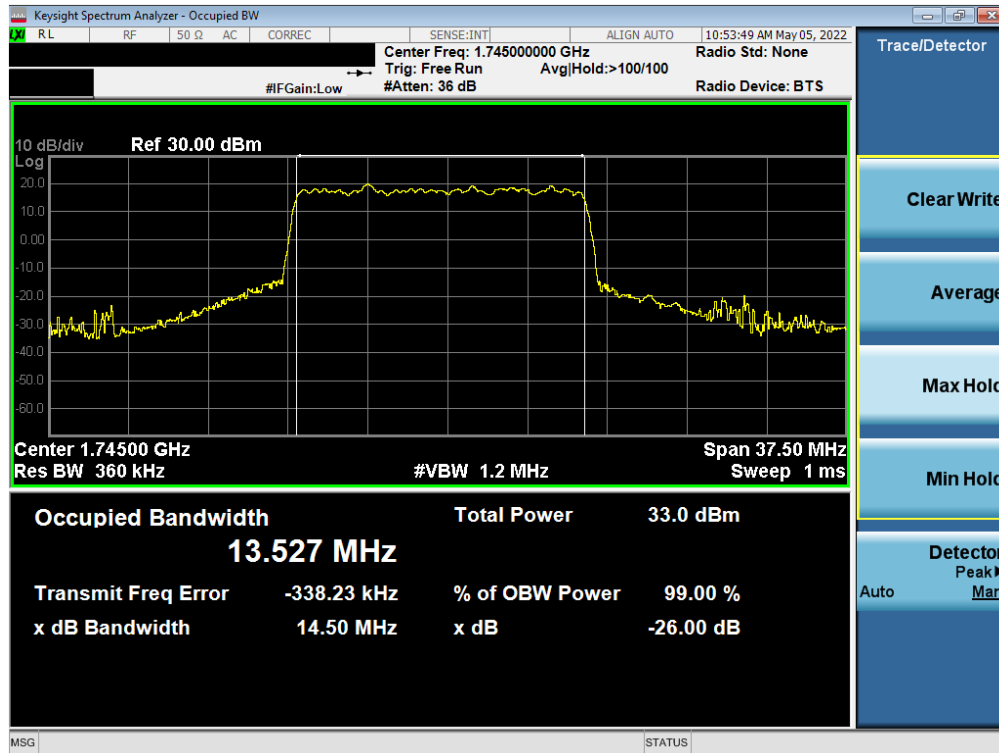


Plot 7-70. Occupied Bandwidth Plot (NR Band n66 - 20.0MHz CP-OFDM QPSK - Full RB – Ant4)

FCC ID: C3K1997	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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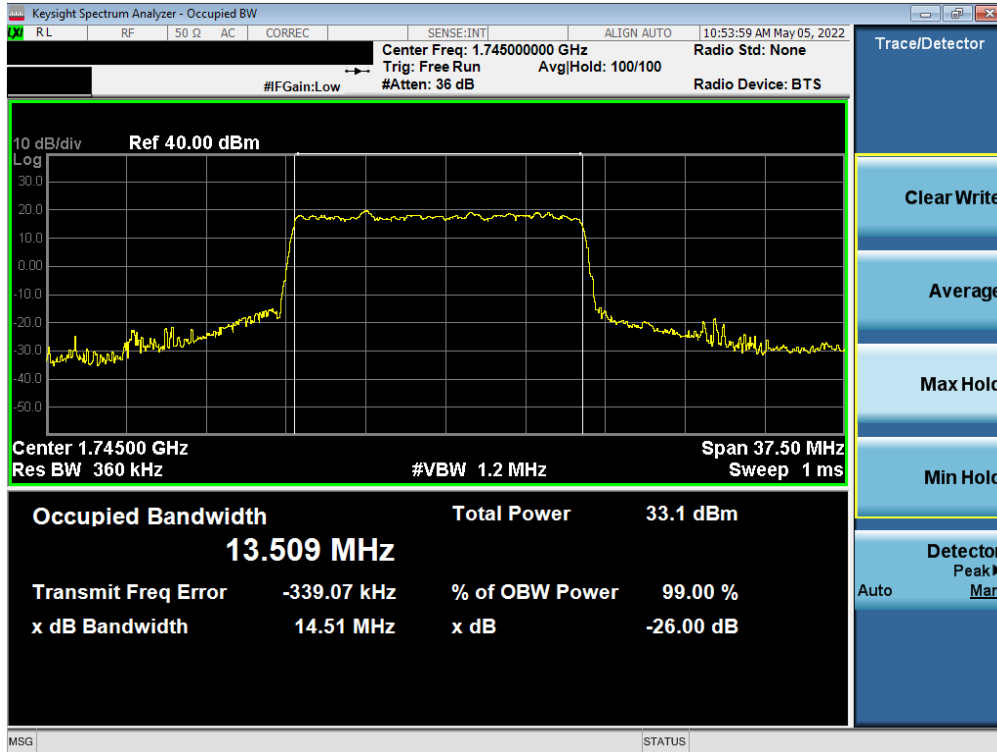


Plot 7-71. Occupied Bandwidth Plot (NR Band n66 - 20.0MHz CP-OFDM 16QAM - Full RB – Ant4)

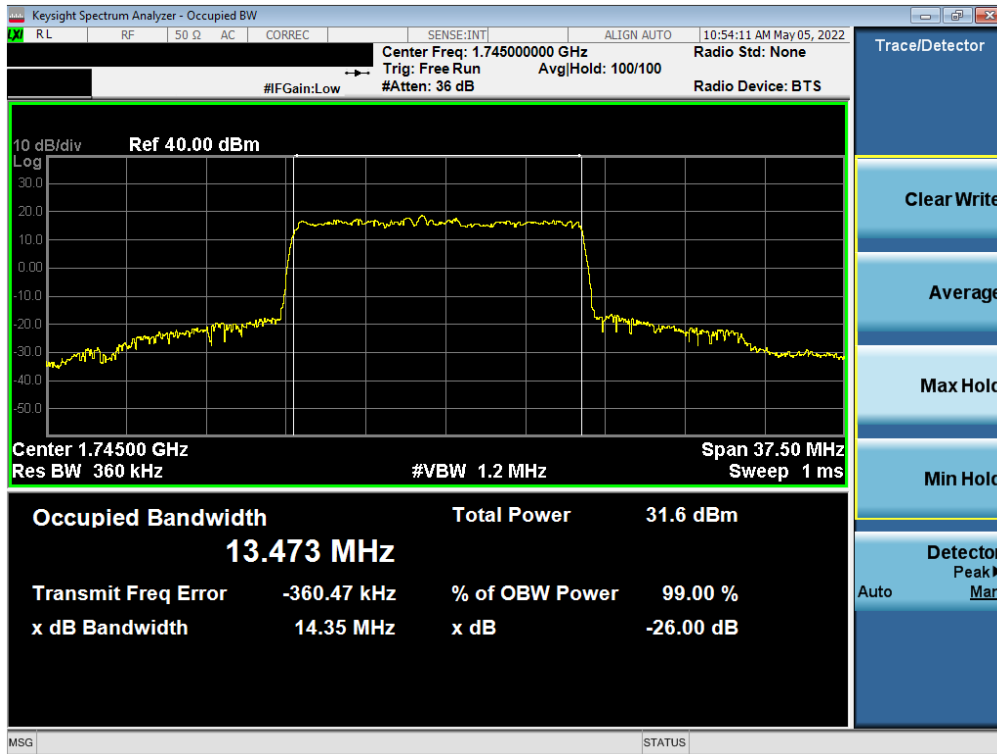


Plot 7-72. Occupied Bandwidth Plot (NR Band n66 - 15.0MHz DFT-s-OFDM BPSK - Full RB – Ant4)

FCC ID: C3K1997	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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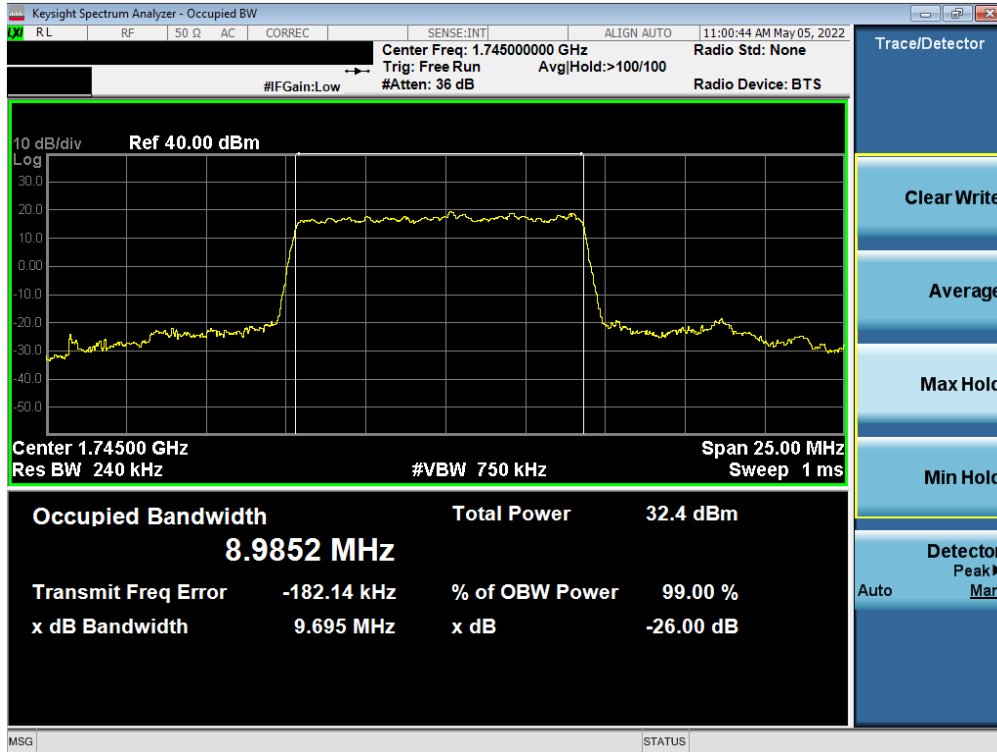


Plot 7-73. Occupied Bandwidth Plot (NR Band n66 - 15.0MHz CP-OFDM QPSK - Full RB - Ant4)

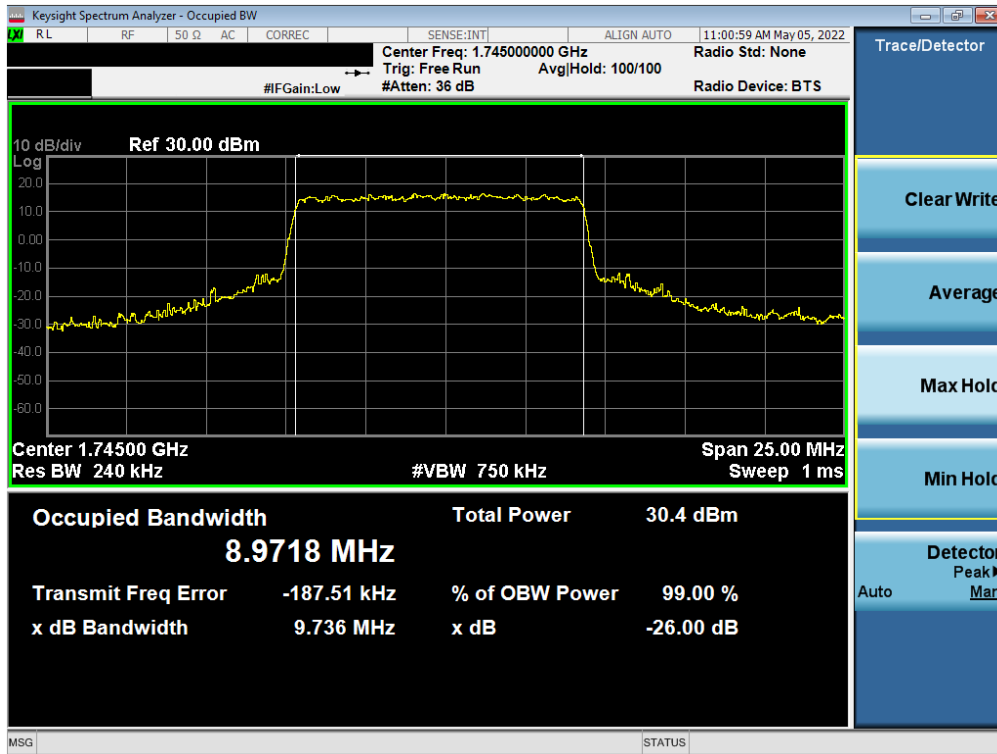


Plot 7-74. Occupied Bandwidth Plot (NR Band n66 - 15.0MHz CP-OFDM 16QAM - Full RB - Ant4)

FCC ID: C3K1997	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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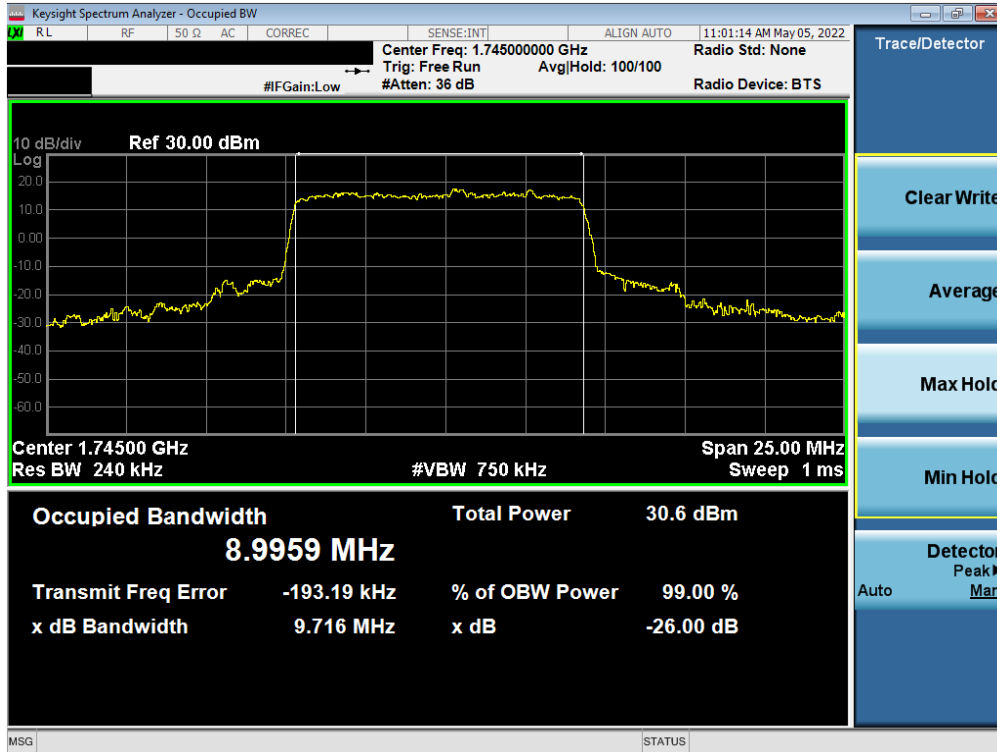


Plot 7-75. Occupied Bandwidth Plot (NR Band n66 - 10.0MHz DFT-s-OFDM BPSK - Full RB – Ant4)

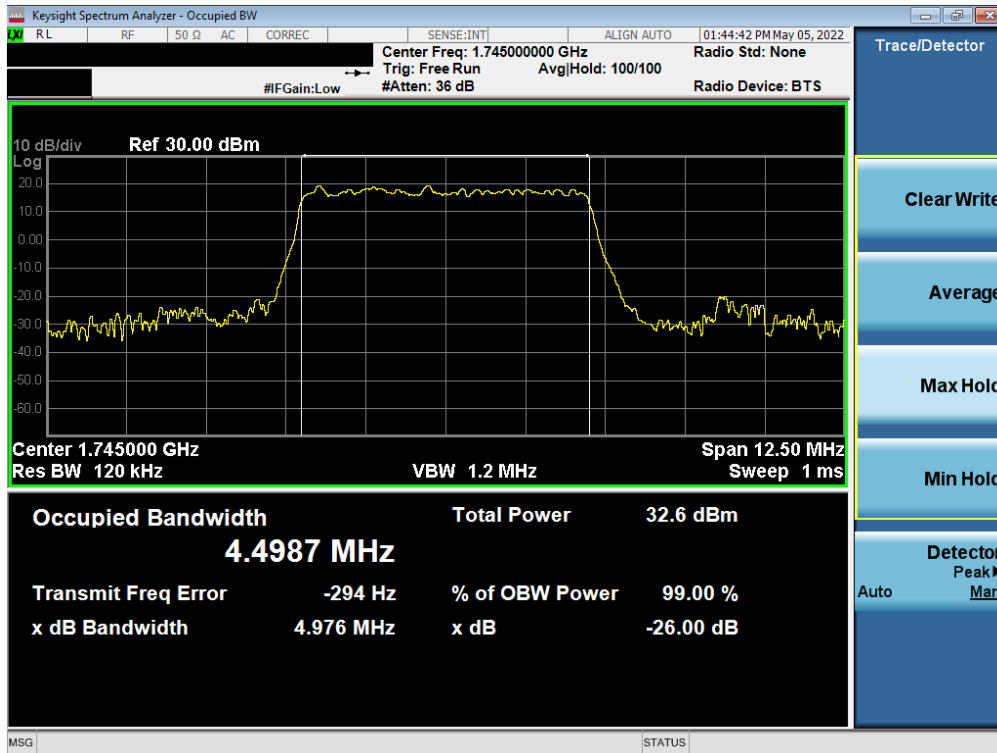


Plot 7-76. Occupied Bandwidth Plot (NR Band n66 - 10.0MHz CP-OFDM QPSK - Full RB – Ant4)

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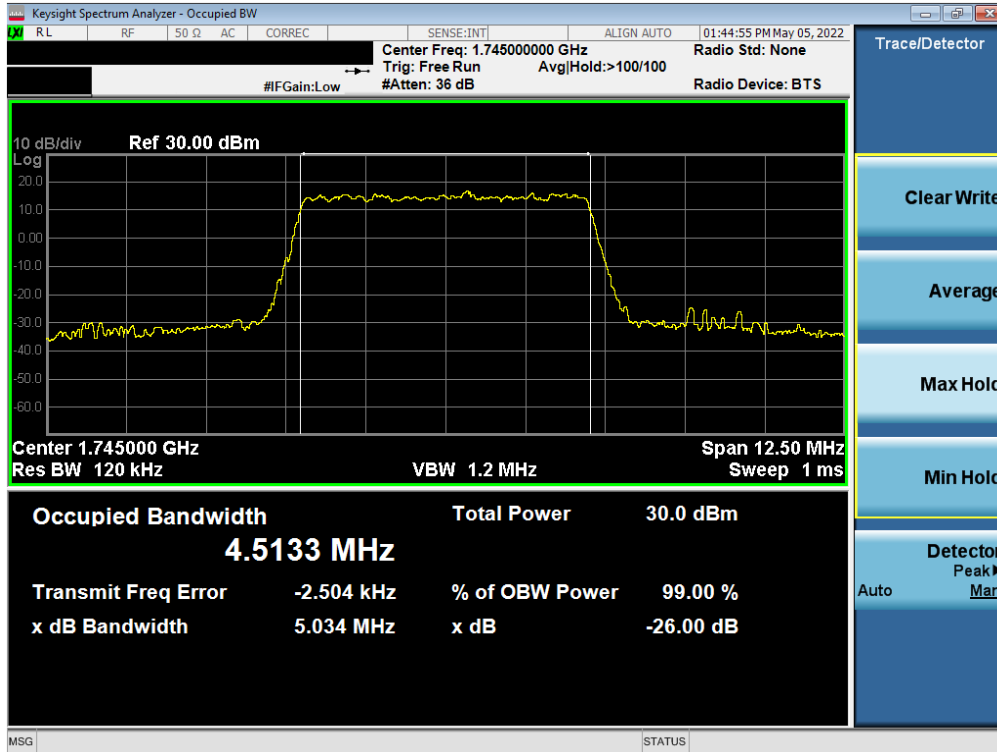


Plot 7-77. Occupied Bandwidth Plot (NR Band n66 - 10.0MHz CP-OFDM 16QAM - Full RB – Ant4)

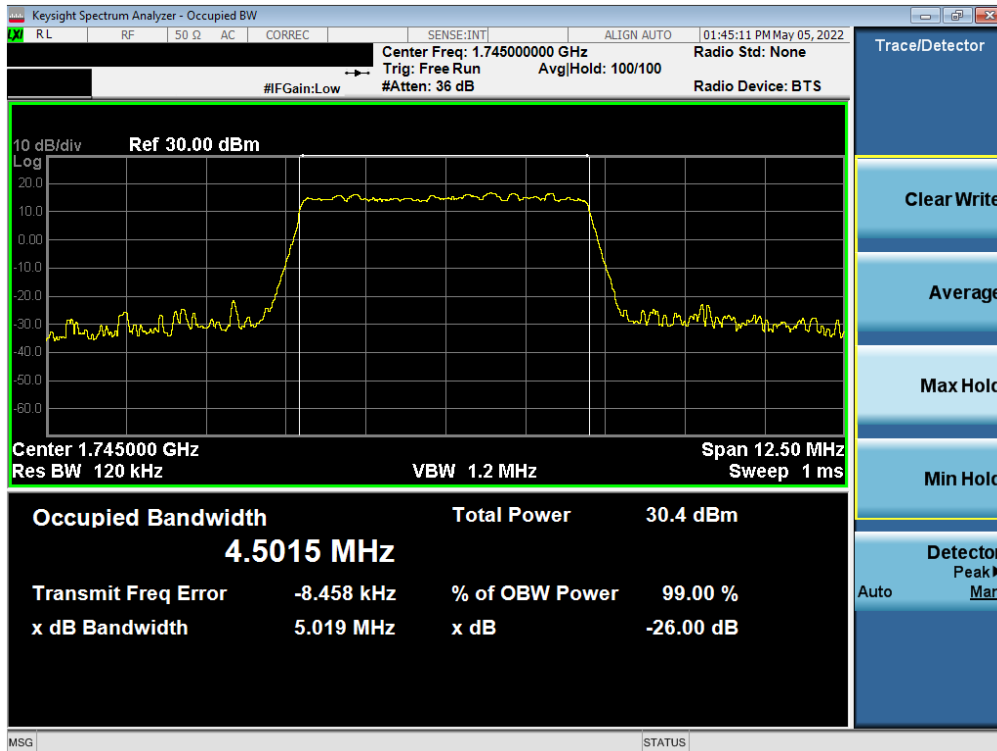


Plot 7-78. Occupied Bandwidth Plot (NR Band n66 - 5.0MHz DFT-s-OFDM BPSK - Full RB – Ant4)

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Plot 7-79. Occupied Bandwidth Plot (NR Band n66 - 5.0MHz CP-OFDM QPSK - Full RB - Ant4)



Plot 7-80. Occupied Bandwidth Plot (NR Band n66 - 5.0MHz CP-OFDM 16QAM - Full RB - Ant4)

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## 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 10<sup>th</sup> 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

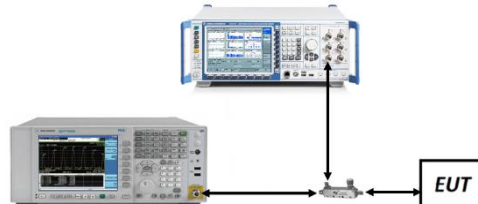
ANSI C63.26-2015 – Section 5.7.4

### Test Settings

1. Start frequency was set to 30MHz and stop frequency was set to 18GHz (separated into at least two plots per channel)
2. RBW  $\geq$  100kHz
3. VBW  $\geq$  3 x RBW
4. Detector = RMS
5. Trace mode = max hold
6. Sweep time = auto couple
7. The trace was allowed to stabilize

### Test Setup

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



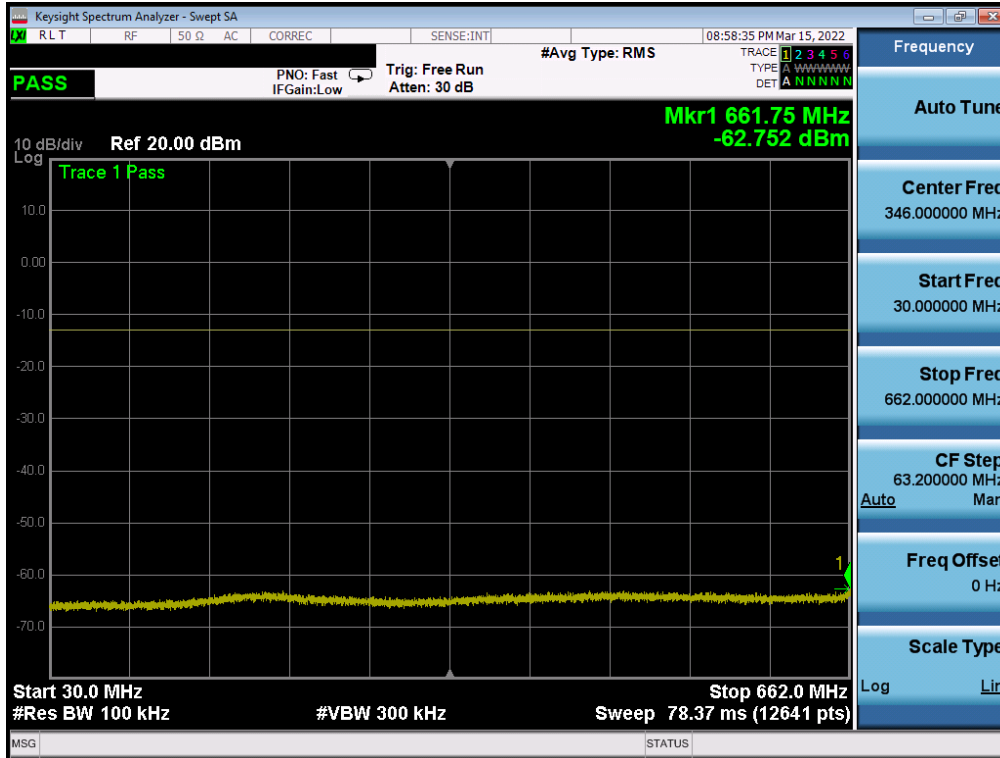
**Figure 7-3. Test Instrument & Measurement Setup**

### Test Notes

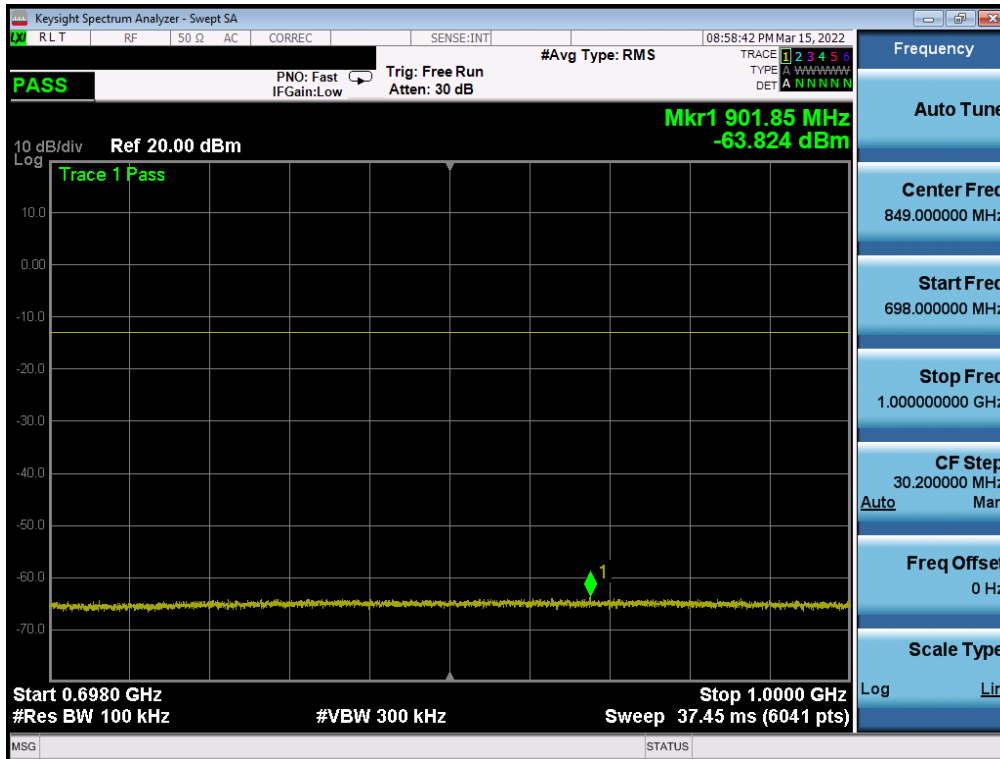
1. Per Part 27, compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth 100 kHz or greater for measurements below 1GHz.
2. For NR operation, all subcarrier spacings (SCS) and transmission schemes (e.g. CP-OFDM and DFT-s-OFDM) were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

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# LTE Band 71 – Ant1

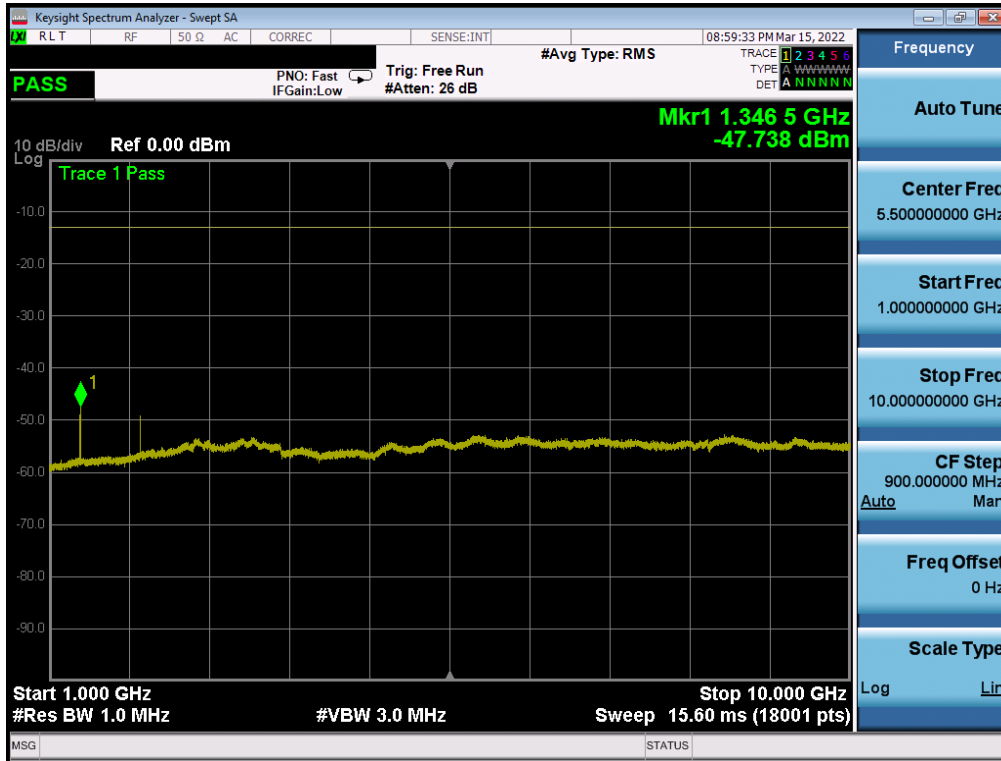


Plot 7-81. Conducted Spurious Plot (LTE Band 71 - 20MHz QPSK - 1 RB - Low Channel - Ant1)



Plot 7-82. Conducted Spurious Plot (LTE Band 71 - 20MHz QPSK - 1 RB - Low Channel - Ant1)

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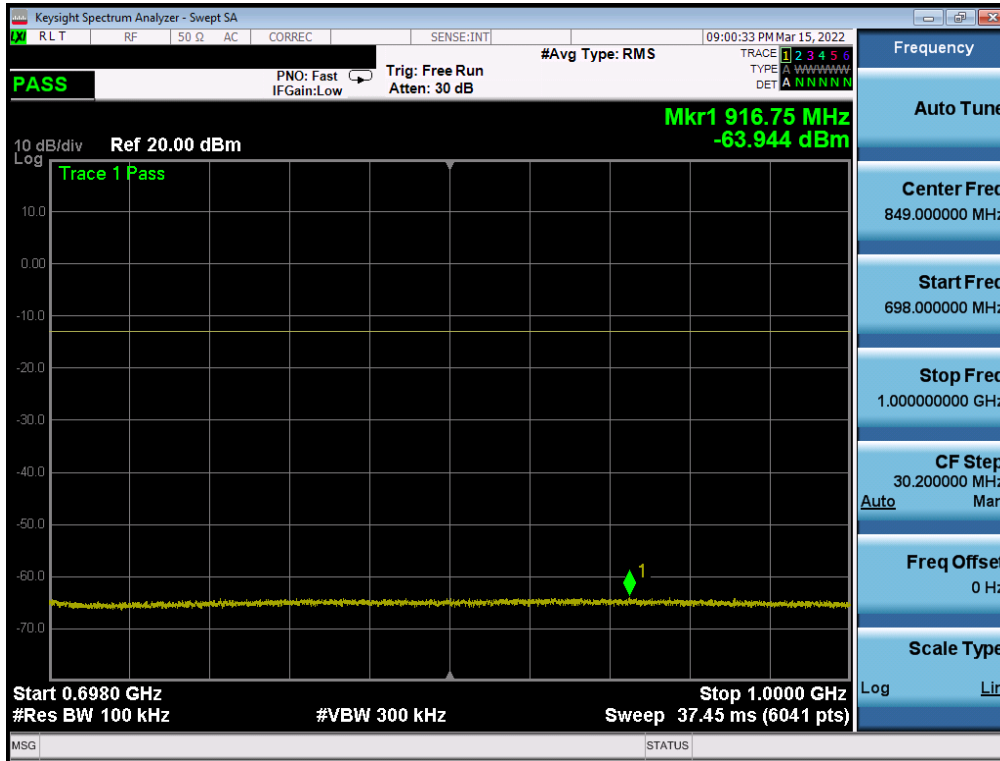


Plot 7-83. Conducted Spurious Plot (LTE Band 71 - 20MHz QPSK - 1 RB - Low Channel - Ant1)



Plot 7-84. Conducted Spurious Plot (LTE Band 71 - 20MHz QPSK - 1 RB - Mid Channel - Ant1)

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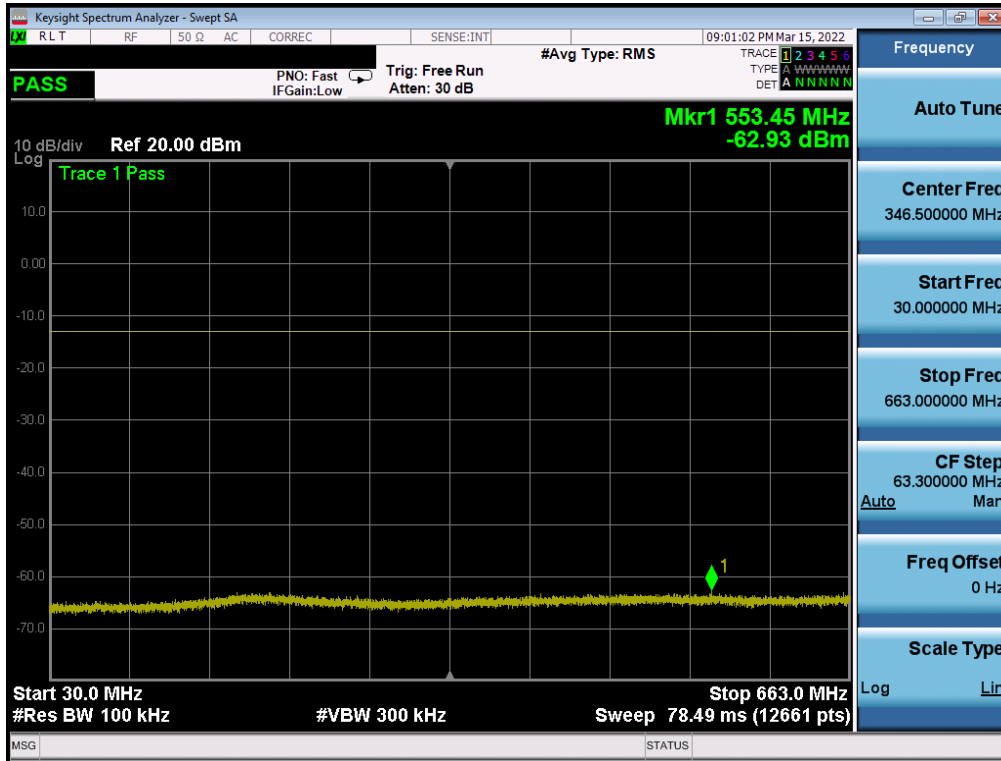


Plot 7-85. Conducted Spurious Plot (LTE Band 71 - 20MHz QPSK - 1 RB - Mid Channel - Ant1)

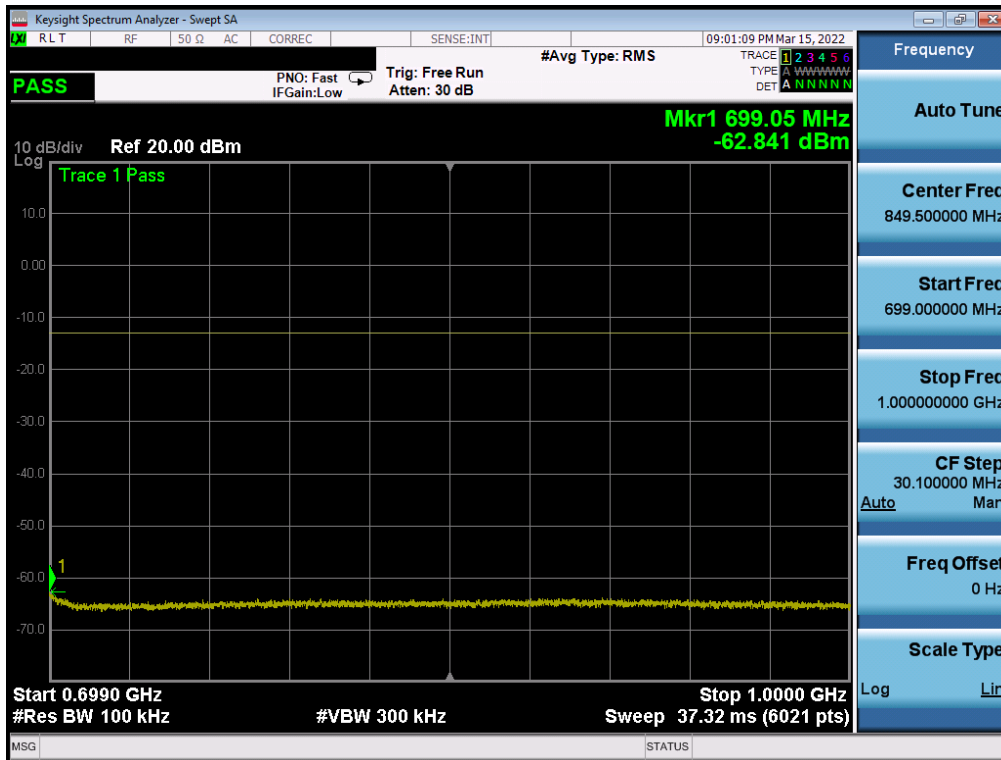


Plot 7-86. Conducted Spurious Plot (LTE Band 71 - 20MHz QPSK - 1 RB - Mid Channel - Ant1)

FCC ID: C3K1997	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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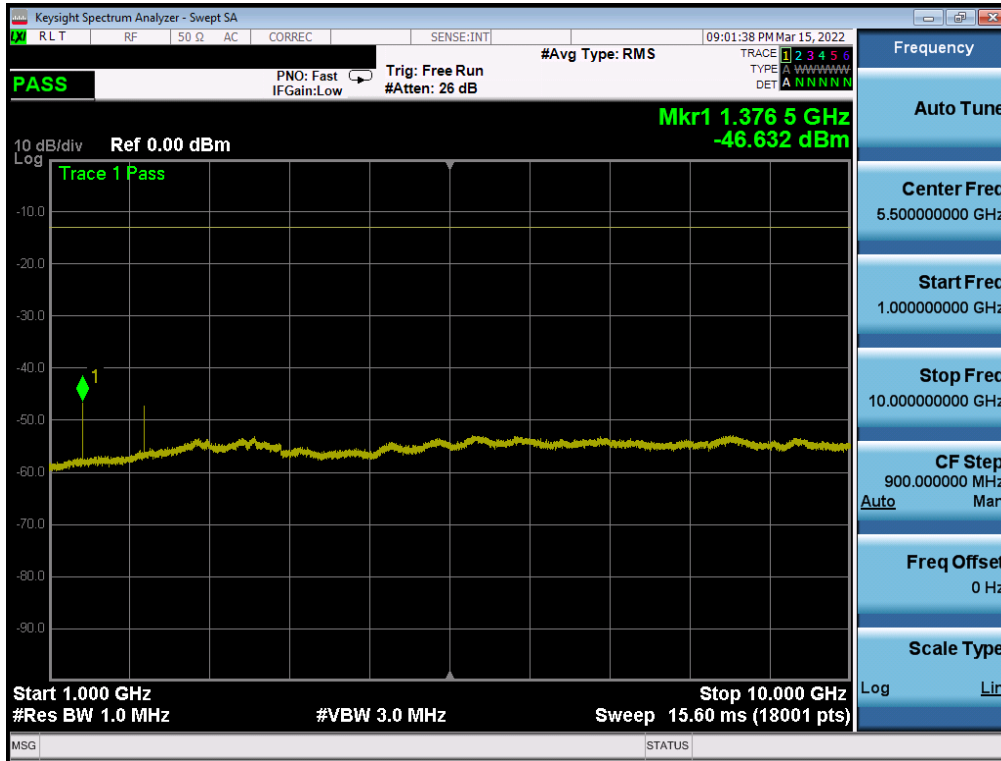


Plot 7-87. Conducted Spurious Plot (LTE Band 71 - 20MHz QPSK - 1 RB - High Channel - Ant1)



Plot 7-88. Conducted Spurious Plot (LTE Band 71 - 20MHz QPSK - 1 RB - High Channel - Ant1)

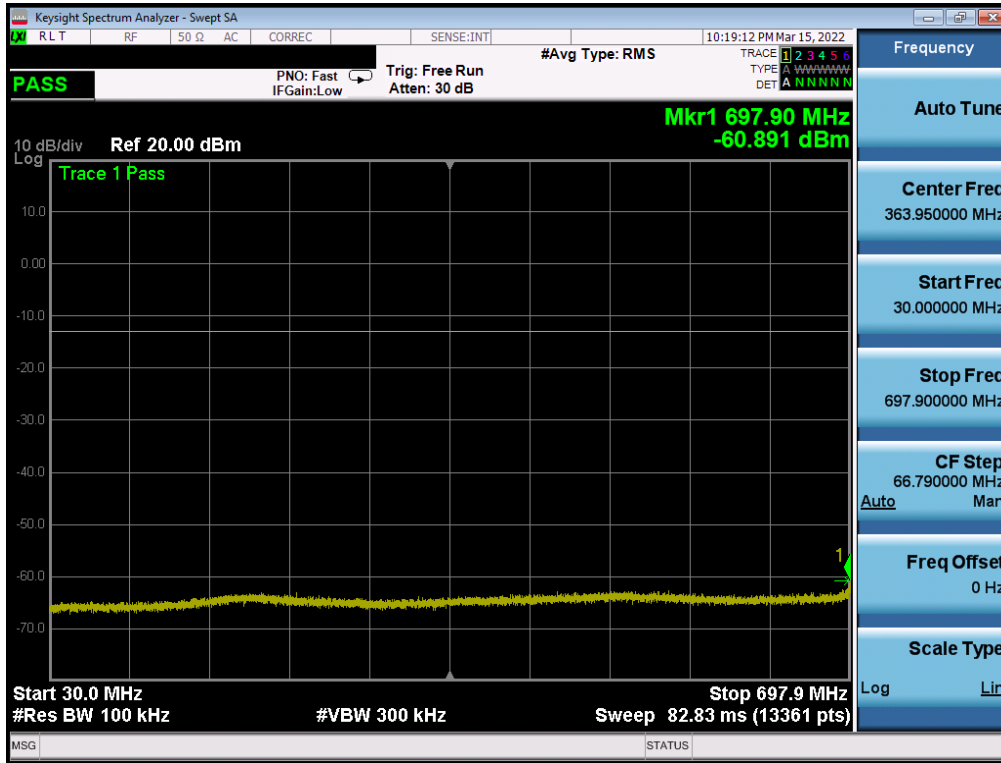
FCC ID: C3K1997	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2204040049-06-R1.C3K	Test Dates: 3/15/2022 - 08/10/2022	EUT Type: Portable Computing Device	Page 61 of 222



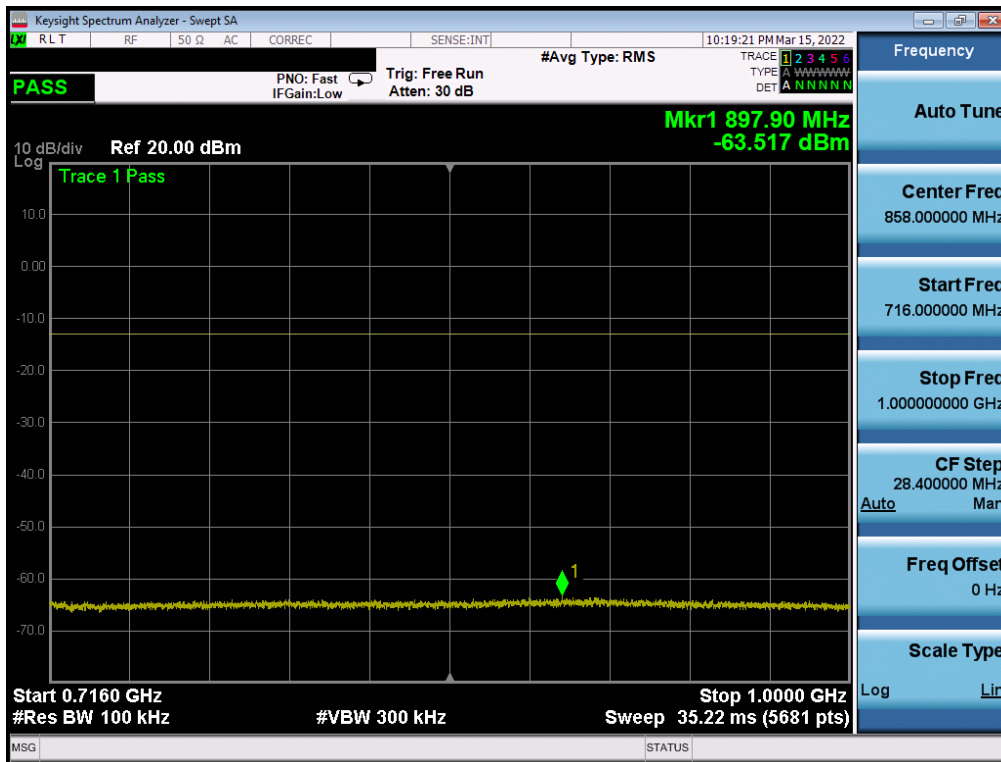
Plot 7-89. Conducted Spurious Plot (LTE Band 71 - 20MHz QPSK - 1 RB - High Channel - Ant1)

FCC ID: C3K1997	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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### LTE Band 12 – Ant1



Plot 7-90. Conducted Spurious Plot (LTE Band 12 - 10MHz QPSK - 1 RB - Low Channel - Ant1)

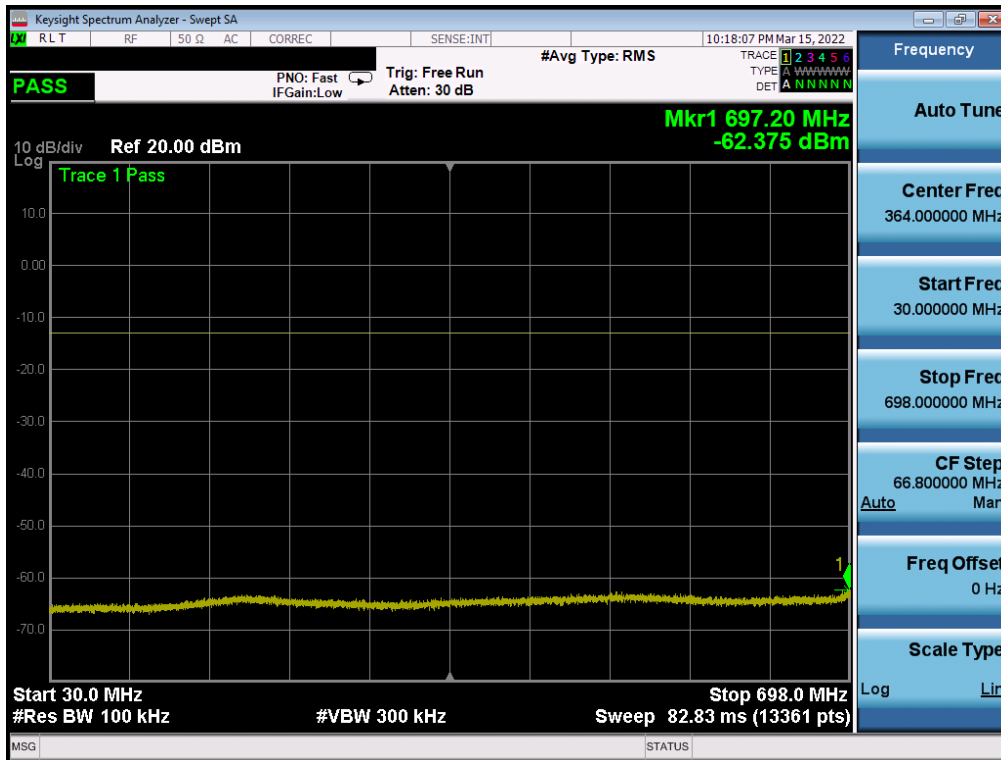


Plot 7-91. Conducted Spurious Plot (LTE Band 12 - 10MHz QPSK - 1 RB - Low Channel - Ant1)

FCC ID: C3K1997	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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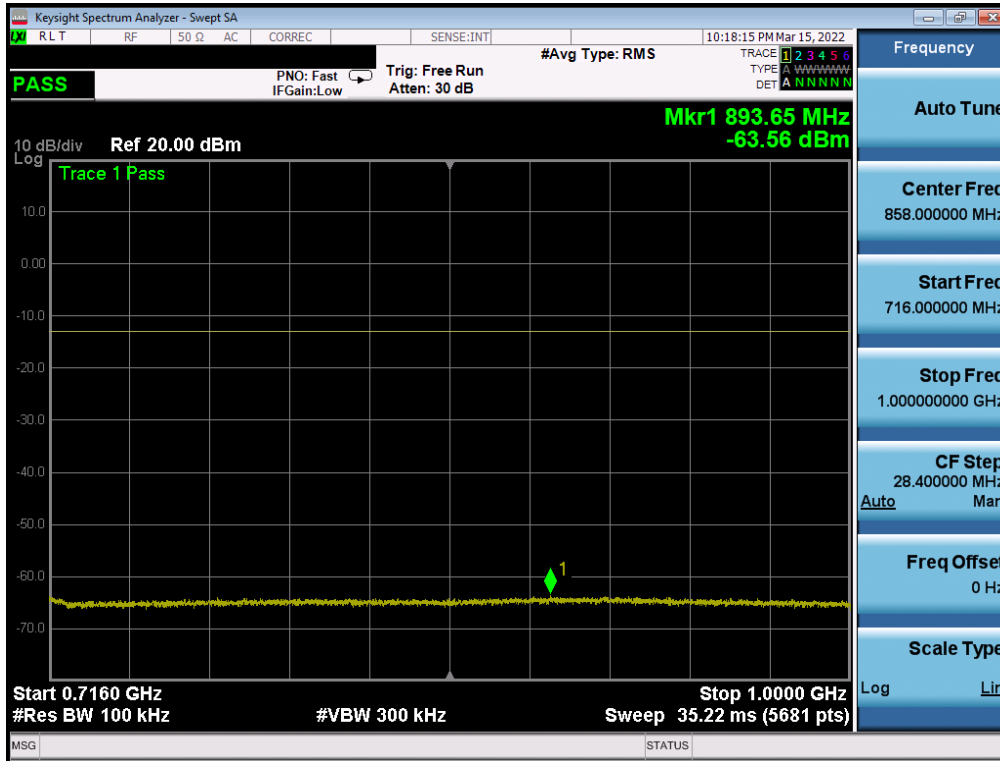
Plot 7-92. Conducted Spurious Plot (LTE Band 12 - 10MHz QPSK - 1 RB - Low Channel - Ant1)



Plot 7-93. Conducted Spurious Plot (LTE Band 12 - 10MHz QPSK - 1 RB - Mid Channel - Ant1)

FCC ID: C3K1997	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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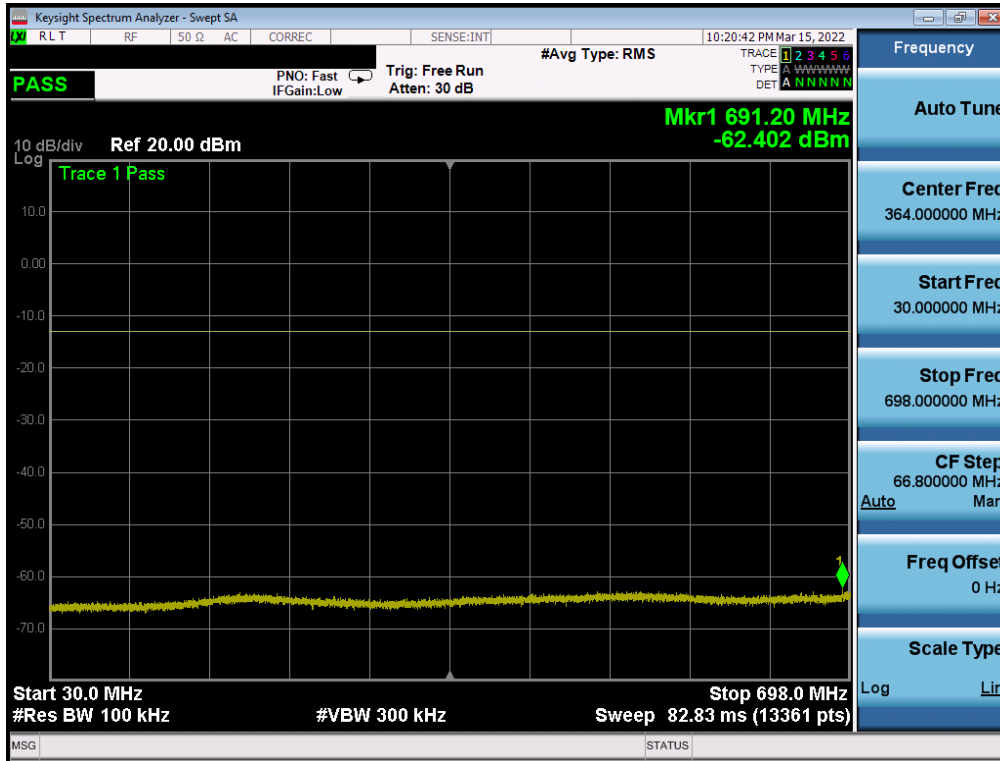


Plot 7-94. Conducted Spurious Plot (LTE Band 12 - 10MHz QPSK - 1 RB - Mid Channel - Ant1)

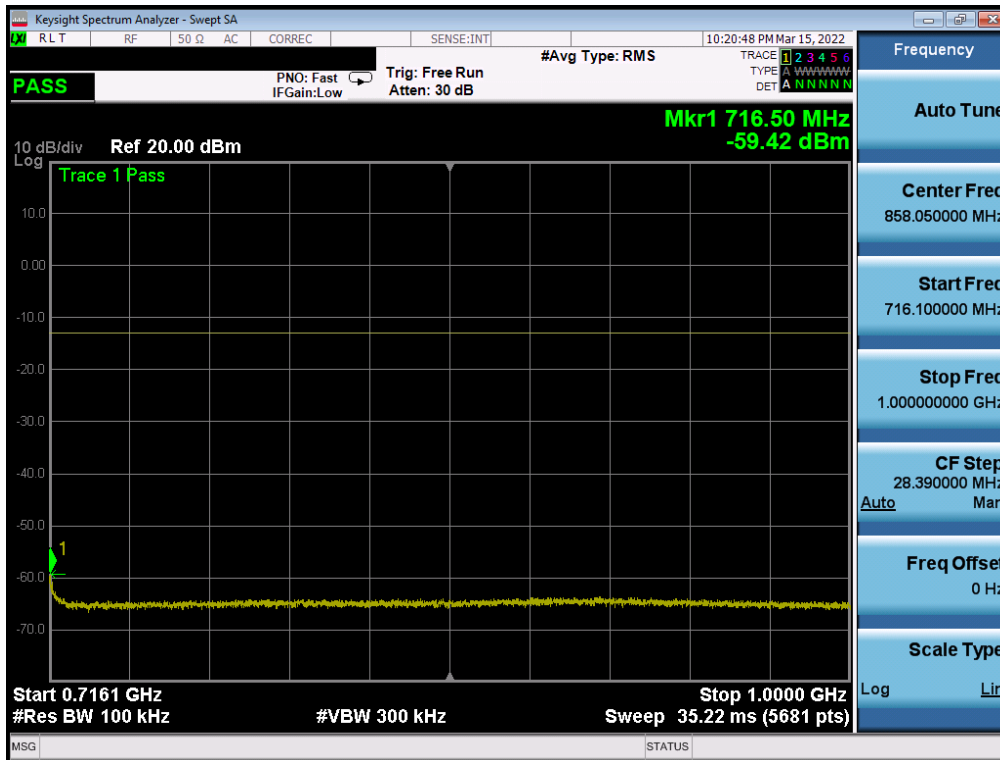


Plot 7-95. Conducted Spurious Plot (LTE Band 12 - 10MHz QPSK - 1 RB - Mid Channel - Ant1)

FCC ID: C3K1997	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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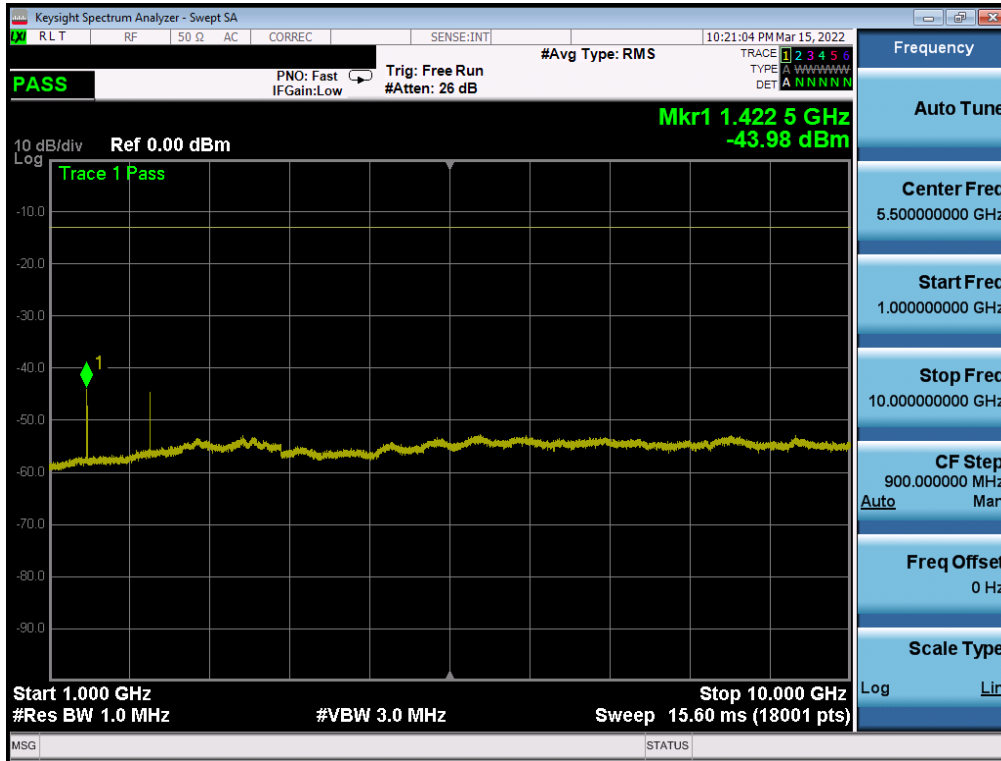


Plot 7-96. Conducted Spurious Plot (LTE Band 12 - 10MHz QPSK - 1 RB - High Channel - Ant1)



Plot 7-97. Conducted Spurious Plot (LTE Band 12 - 10MHz QPSK - 1 RB - High Channel - Ant1)

FCC ID: C3K1997	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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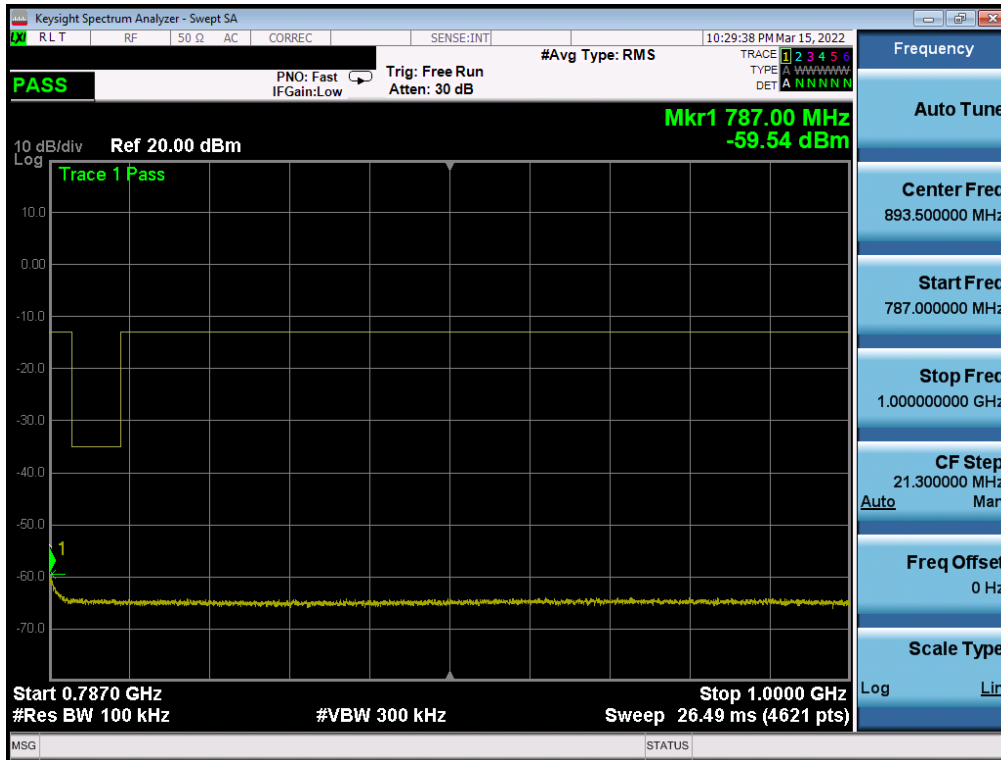
Plot 7-98. Conducted Spurious Plot (LTE Band 12 - 10MHz QPSK - 1 RB - High Channel - Ant1)

FCC ID: C3K1997	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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### LTE Band 13 – Ant1

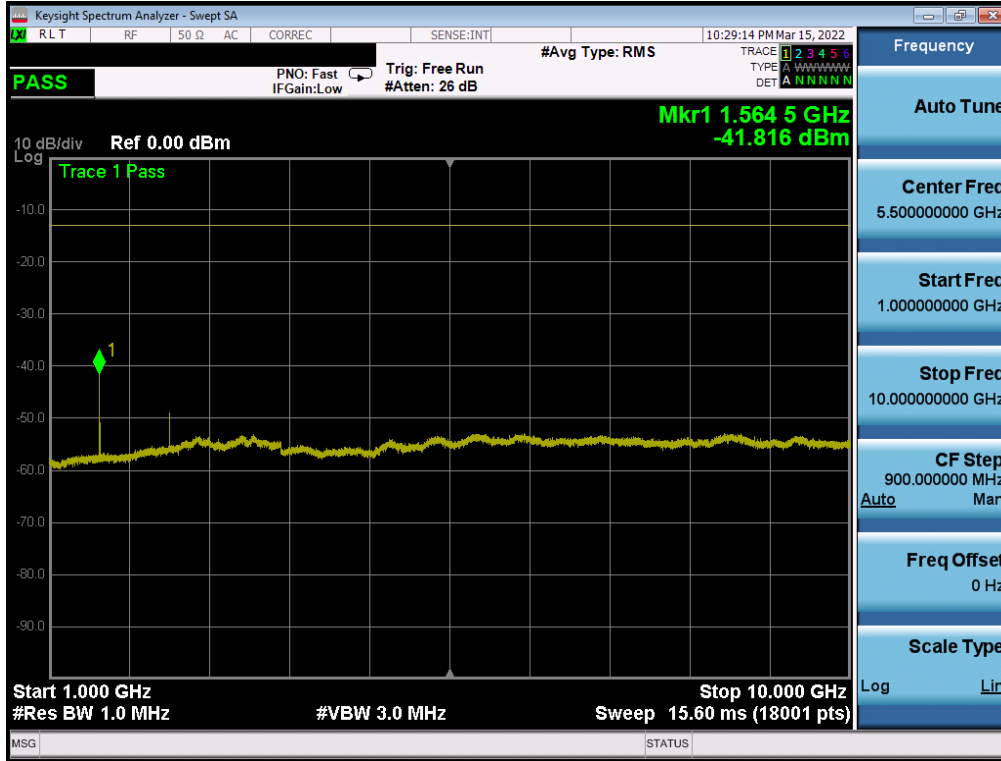


Plot 7-99. Conducted Spurious Plot (LTE Band 13 - 10MHz QPSK - 1 RB)



Plot 7-100. Conducted Spurious Plot (LTE Band 13 - 10MHz QPSK - 1 RB)

FCC ID: C3K1997	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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Plot 7-101. Conducted Spurious Plot (LTE Band 13 - 10MHz QPSK - 1 RB)

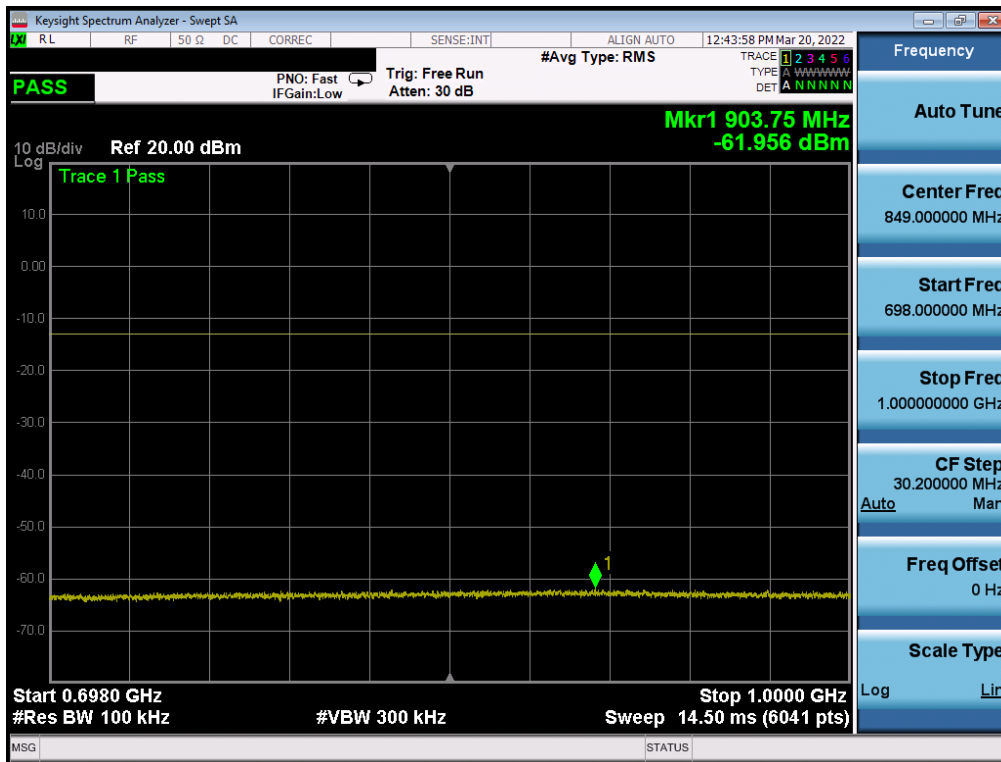
FCC ID: C3K1997	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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# NR Band n71 – Ant1



Plot 7-102. Conducted Spurious Plot (NR Band n71 -20.0MHz - 1 RB - Low Channel - Ant1)



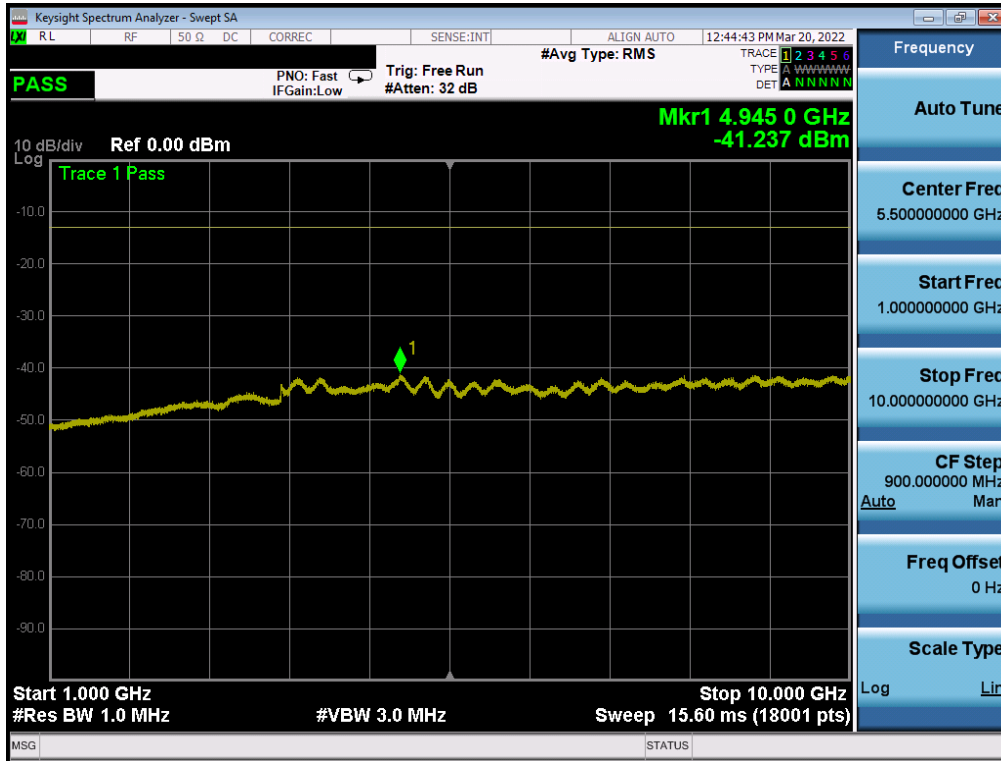
Plot 7-103. Conducted Spurious Plot (NR Band n71 - 20.0MHz - 1 RB - Low Channel - Ant1)

FCC ID: C3K1997	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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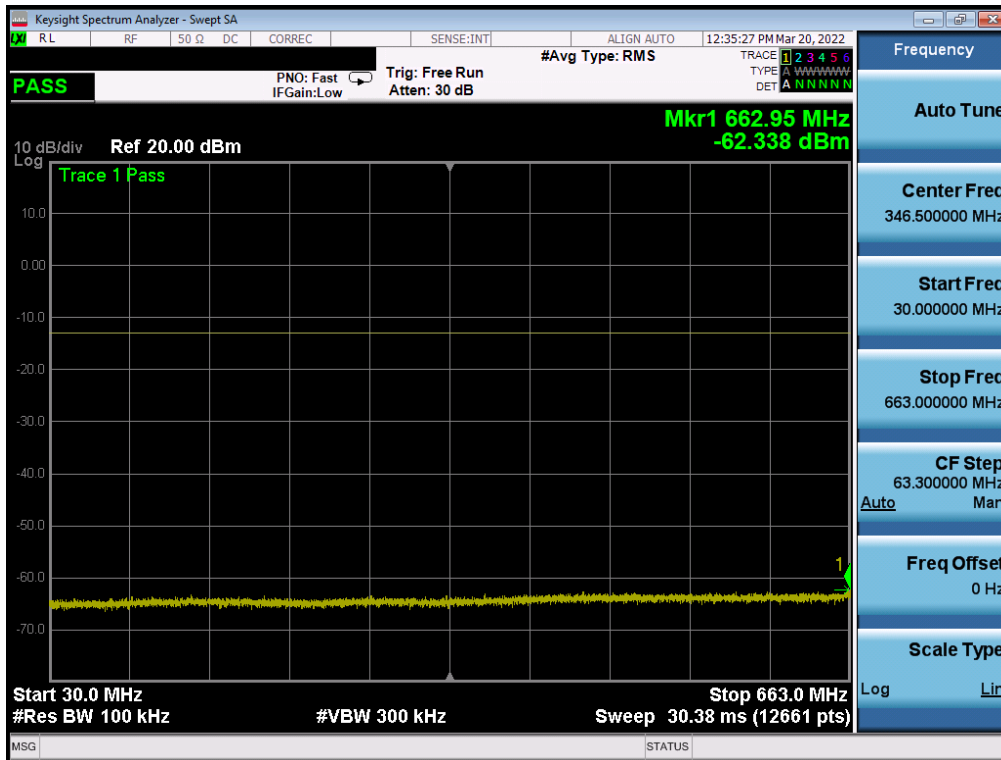
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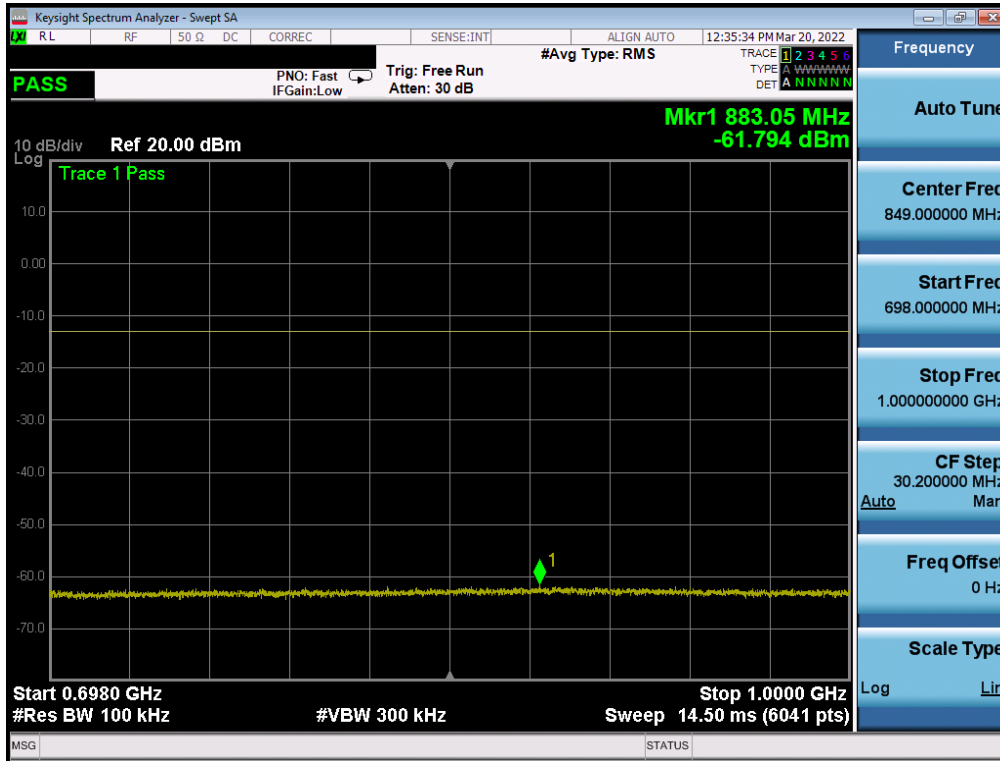


Plot 7-104. Conducted Spurious Plot (NR Band n71 - 20.0MHz - 1 RB - Low Channel - Ant1)

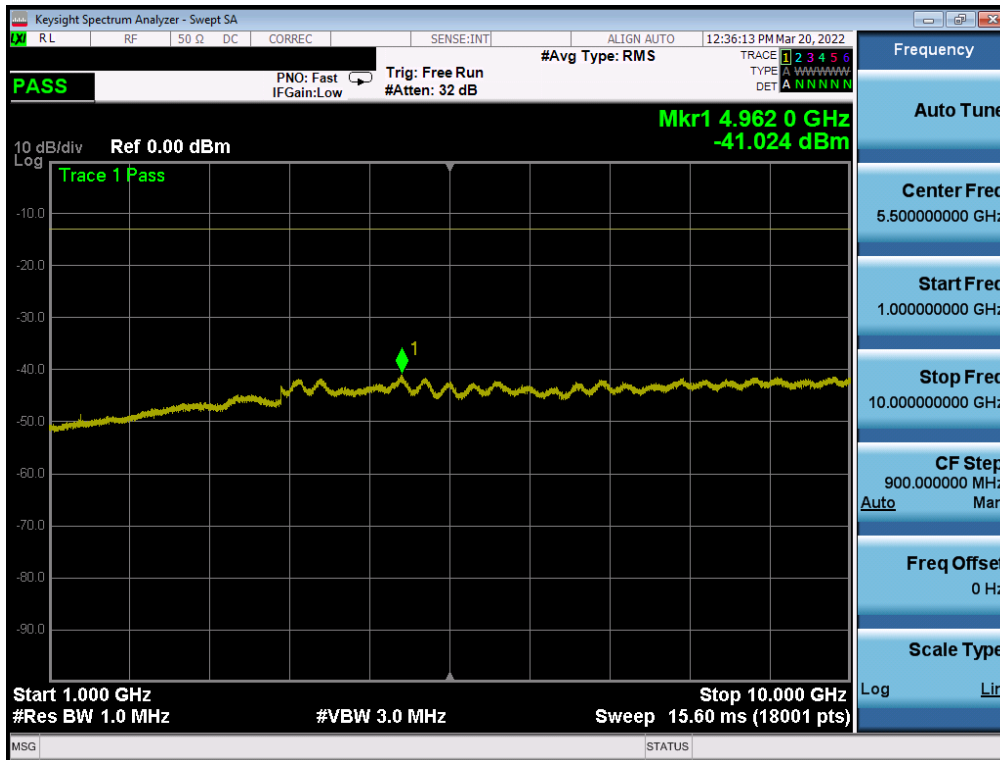


Plot 7-105. Conducted Spurious Plot (NR Band n71 - 20.0MHz - 1 RB - Mid Channel - Ant1)

FCC ID: C3K1997	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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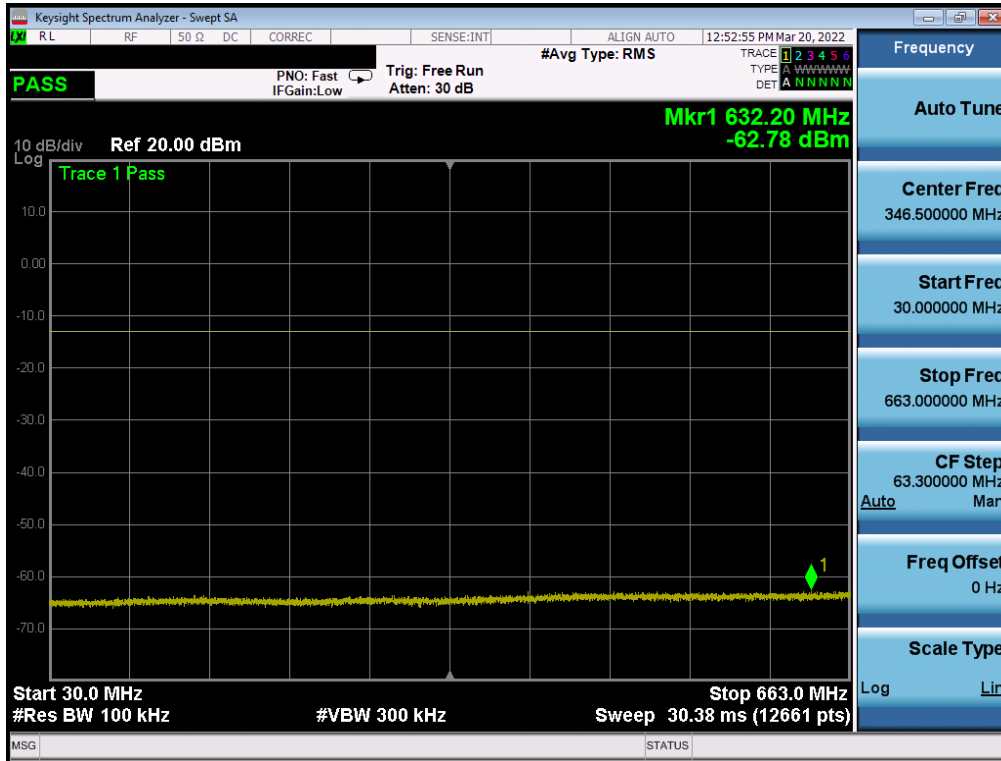
Plot 7-106. Conducted Spurious Plot (NR Band n71 - 20.0MHz - 1 RB - Mid Channel - Ant1)



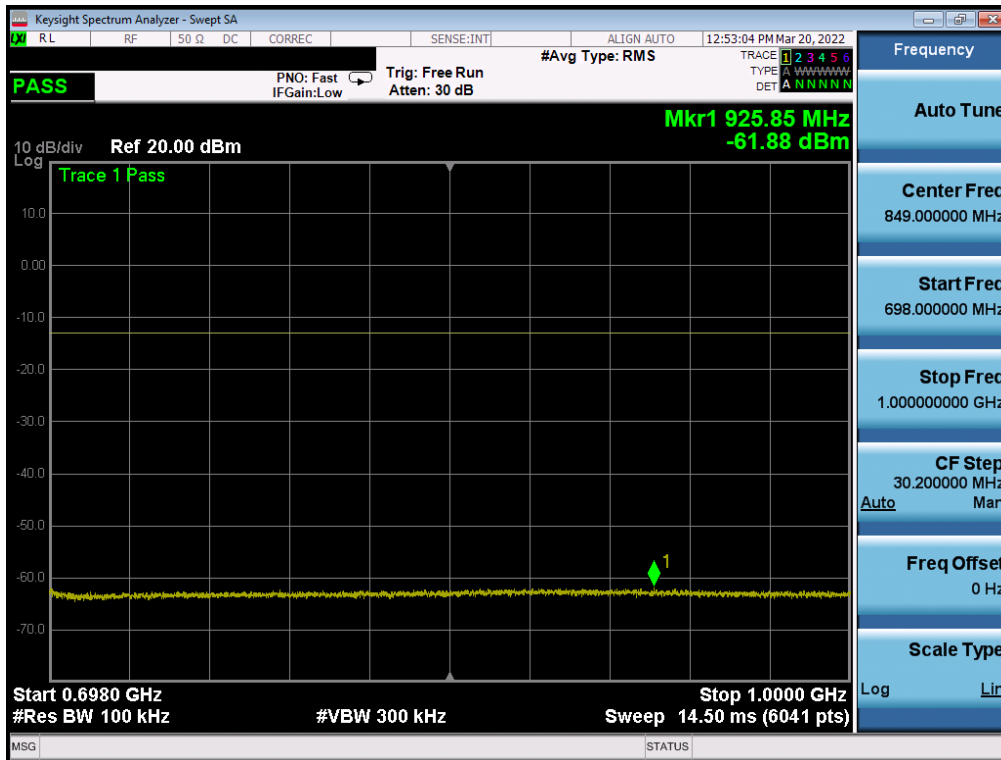
Plot 7-107. Conducted Spurious Plot (NR Band n71 - 20.0MHz - 1 RB - Mid Channel - Ant1)

FCC ID: C3K1997	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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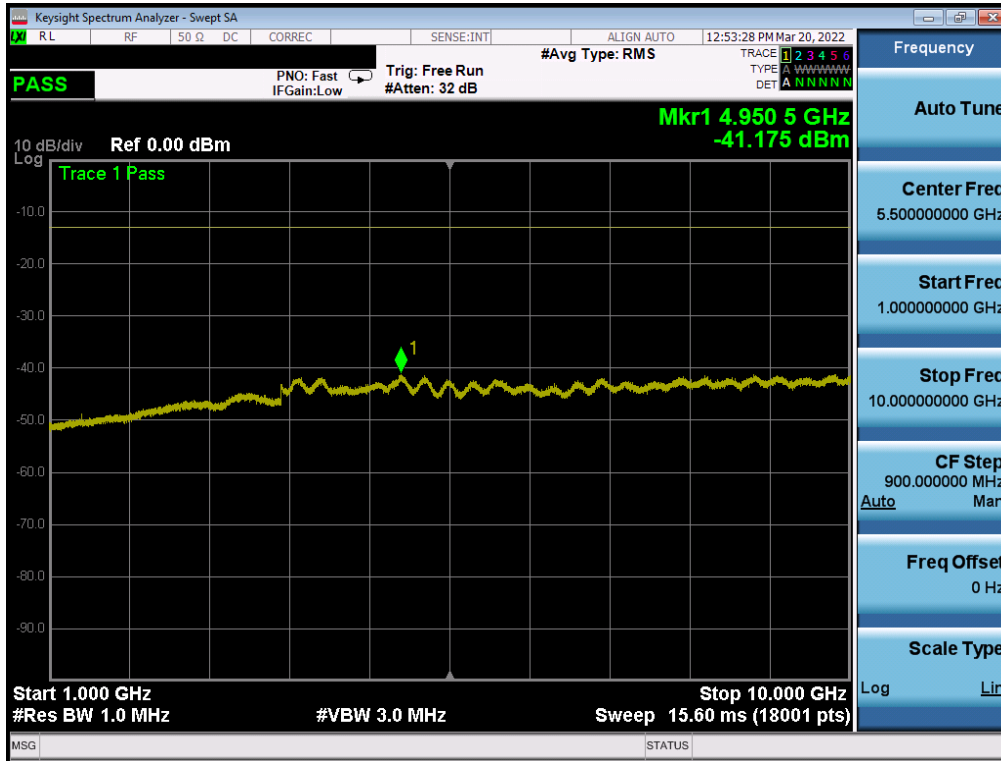


Plot 7-108. Conducted Spurious Plot (NR Band n71 - 20.0MHz - 1 RB - High Channel - Ant1)



Plot 7-109. Conducted Spurious Plot (NR Band n71 - 20.0MHz - 1 RB - High Channel - Ant1)

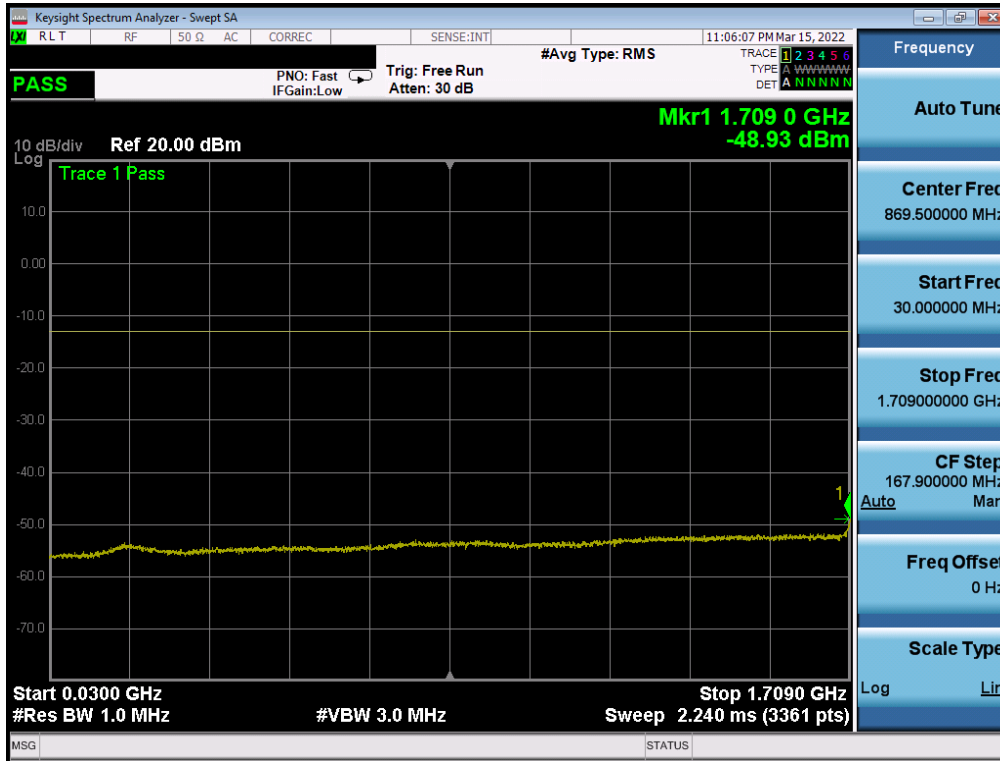
FCC ID: C3K1997	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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Plot 7-110. Conducted Spurious Plot (NR Band n71 - 20.0MHz - 1 RB - High Channel - Ant1)

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### LTE Band 66/4 – Ant1



Plot 7-111. Conducted Spurious Plot (LTE Band 66/4 - 20MHz QPSK - 1 RB - Low Channel – Ant1)



Plot 7-112. Conducted Spurious Plot (LTE Band 66/4 - 20MHz QPSK - 1 RB - Low Channel – Ant1)

FCC ID: C3K1997	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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