

PART 24 MEASUREMENT REPORT

Applicant Name:
Tecore Networks
7030 Hi Tech Drive
Hanover, MD 21076
United States

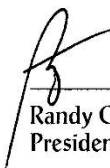
Date of Testing:
02/14/2022 - 03/15/2022
Test Report Issue Date:
03/22/2022
Test Site/Location:
PCTEST Lab. Columbia, MD, USA
Test Report Serial No.:
1M2202140017-01.QLJ

FCC ID:	QLJNIB-002
Applicant Name:	Tecore Networks

Application Type: Certification
Model: iCore NIB-002
EUT Type: Band 2 iCore NIB
FCC Classification: PCS Licensed Transmitter (PCB)
FCC Rule Part: 24
Test Procedure(s): ANSI C63.26-2015, KDB 971168 D01 v03r01

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

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


Randy Ortanez
President

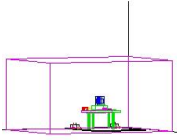


FCC ID: QLJNIB-002	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2202140017-01.QLJ	Test Dates: 02/14/2022 - 03/15/2022	EUT Type: Band 2 iCore NIB	Page 1 of 106

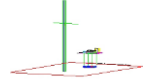
TABLE OF CONTENTS

1.0	INTRODUCTION	4
1.1	Scope	4
1.2	PCTEST Test Location.....	4
1.3	Test Facility / Accreditations.....	4
2.0	PRODUCT INFORMATION.....	5
2.1	Equipment Description	5
2.2	Device Capabilities.....	5
2.3	Test Configuration	5
2.4	EMI Suppression Device(s)/Modifications	5
3.0	DESCRIPTION OF TESTS	6
3.1	Evaluation Procedure	6
3.2	Radiated Power and Radiated Spurious Emissions	6
4.0	MEASUREMENT UNCERTAINTY	7
5.0	TEST EQUIPMENT CALIBRATION DATA	8
6.0	SAMPLE CALCULATIONS	9
7.0	TEST RESULTS	10
7.1	Summary	10
7.2	Transmitter Conducted Output Power / Effective Isotropic Radiated Power	11
7.3	Occupied Bandwidth	13
7.4	Spurious and Harmonic Emissions at Antenna Terminal	38
7.5	Band Edge Emissions at Antenna Terminal.....	49
7.6	Peak-Average Ratio	74
7.7	Radiated Spurious Emissions Measurements.....	99
7.8	Frequency Stability / Temperature Variation	104
8.0	CONCLUSION.....	106

FCC ID: QLJNIB-002	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2202140017-01.QLJ	Test Dates: 02/14/2022 - 03/15/2022	EUT Type: Band 2 iCore NIB	Page 2 of 106



PART 24 MEASUREMENT REPORT



Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	Conducted Power		Emission Designator
				Max. Power [W]	Max. Power [dBm]	
LTE Band 2 (MIMO)	20 MHz	QPSK	1940 - 1980	43.451	46.38	18M0G7D
		16QAM	1940 - 1980	43.451	46.38	18M0W7D
		64QAM	1940 - 1980	43.652	46.40	18M0W7D
		256QAM	1940 - 1980	43.351	46.37	18M0W7D
	15 MHz	QPSK	1937.5 - 1982.5	41.305	46.16	13M5G7D
		16QAM	1937.5 - 1982.5	41.305	46.16	13M5W7D
		64QAM	1937.5 - 1982.5	41.400	46.17	13M5W7D
		256QAM	1937.5 - 1982.5	41.495	46.18	13M5W7D
	10 MHz	QPSK	1935 - 1985	43.752	46.41	8M98G7D
		16QAM	1935 - 1985	43.954	46.43	9M01W7D
		64QAM	1935 - 1985	44.055	46.44	9M04W7D
		256QAM	1935 - 1985	43.752	46.41	9M00W7D
	5 MHz	QPSK	1932.5 - 1987.5	40.272	46.05	4M52G7D
		16QAM	1932.5 - 1987.5	40.365	46.06	4M52W7D
		64QAM	1932.5 - 1987.5	40.272	46.05	4M52W7D
		256QAM	1932.5 - 1987.5	40.738	46.10	4M51W7D
	3 MHz	QPSK	1931.5 - 1988.5	39.719	45.99	2M71G7D
		16QAM	1931.5 - 1988.5	40.087	46.03	2M72W7D
		64QAM	1931.5 - 1988.5	39.994	46.02	2M71W7D
		256QAM	1931.5 - 1988.5	38.994	45.91	2M72W7D
	1.4 MHz	QPSK	1930.7 - 1989.3	38.994	45.91	1M12G7D
		16QAM	1930.7 - 1989.3	38.637	45.87	1M11W7D
		64QAM	1930.7 - 1989.3	39.084	45.92	1M12W7D
		256QAM	1930.7 - 1989.3	38.815	45.89	1M12W7D

EUT Overview

FCC ID: QLJNIB-002	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2202140017-01.QLJ	Test Dates: 02/14/2022 - 03/15/2022	EUT Type: Band 2 iCore NIB	Page 3 of 106

1.0 INTRODUCTION

1.1 Scope

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

1.2 PCTEST Test Location

These measurement tests were conducted at the PCTEST Engineering Laboratory. facility located at 7185 Oakland Mills Road, Columbia, MD 21046. The measurement facility is compliant with the test site requirements specified in ANSI C63.4-2014.

1.3 Test Facility / Accreditations

Measurements were performed at PCTEST Engineering Lab located in Columbia, MD 21046, U.S.A.

- PCTEST is an ISO 17025-2017 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.
- PCTEST TCB is a Telecommunication Certification Body (TCB) accredited to ISO/IEC 17065-2012 by A2LA (Certificate number 2041.03) in all scopes of FCC Rules and ISED Standards (RSS).
- PCTEST facility is a registered (2451B) test laboratory with the site description on file with ISED.

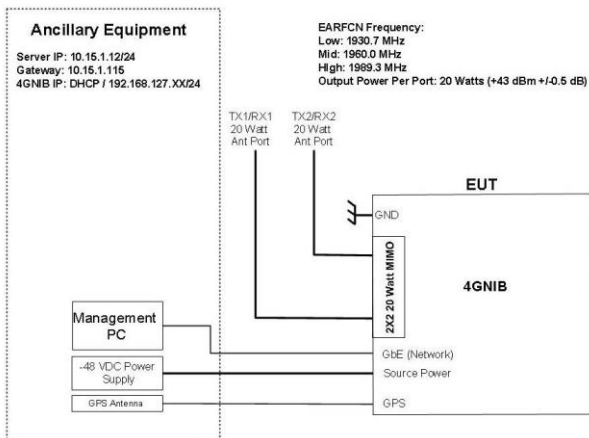
FCC ID: QLJNIB-002	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2202140017-01.QLJ	Test Dates: 02/14/2022 - 03/15/2022	EUT Type: Band 2 iCore NIB	Page 4 of 106

2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **Tecore Networks Band 2 iCore NIB FCC ID: QLJNIB-002**. 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. The EUT generates LTE signal using QPSK, 16-QAM, 64-QAM, and 256-QAM modulations. The EUT can simultaneously transmit an LTE mid band signal with its two antenna ports. The signal output level is set to 20W output per port for a total of 40W output from the two antenna ports and it is fed via a low loss cable to the input of a spectrum analyzer or a 50Ω load, depending on the type of testing performed. EUT was set up to operate as shown below with a -48 VDC power source. Server equipment was used to control the RF functions of the EUT.

Test Device Serial No.: 21400002
BBU Software Version: 8.0
RRH Firmware Version: 015



2.2 Device Capabilities

This device contains the following capabilities:

LTE

2.3 Test Configuration

The EUT was tested per the guidance of ANSI C63.26-2015 and KDB 971168 D01 v03r01. See Sections 3 and 7 of this test report for a description of the radiated and antenna port conducted emissions tests.

2.4 EMI Suppression Device(s)/Modifications

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

FCC ID: QLJNIB-002	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2202140017-01.QLJ	Test Dates: 02/14/2022 - 03/15/2022	EUT Type: Band 2 iCore NIB	Page 5 of 106

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) and “Measurement Guidance for Certification of Licensed Digital Transmitters” (KDB 971168 D01 v03r01) 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 with both of its Tx/Rx RF ports terminated in 50Ω loads 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 to achieve the highest reading on the receive spectrum analyzer.

For radiated spurious emissions measurements and calculations, conversion method is used per the formulas in KDB 971168 Section 5.8.4. 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

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

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.

FCC ID: QLJNIB-002	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2202140017-01.QLJ	Test Dates: 02/14/2022 - 03/15/2022	EUT Type: Band 2 iCore NIB	Page 6 of 106

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: QLJNIB-002	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2202140017-01.QLJ	Test Dates: 02/14/2022 - 03/15/2022	EUT Type: Band 2 iCore NIB	Page 7 of 106

5.0 TEST EQUIPMENT CALIBRATION DATA

Test Equipment Calibration is traceable to the National Institute of Standards and Technology (NIST). Measurement 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
-	AP1	EMC Cable and Switch System	3/9/2021	Annual	3/9/2022	AP1
-	ETS	EMC Cable and Switch System	3/4/2021	Annual	3/4/2022	ETS
Espec	ESX-2CA	Environmental Chamber	8/27/2020	Annual	8/27/2022	17620
ETS Lindgren	3117	1-18 GHz DRG Horn (Medium)	4/20/2021	Biennial	4/20/2023	00125518
Hewlett Packard	6032A	Adjustable DC Power Supply (0-60 V / 0-50 A)	N/A	N/A	N/A	US38322463
Keysight Technologies	N9030A	PXA Signal Analyzer (44GHz)	7/21/2021	Annual	7/17/2022	MY49430494
Keysight Technologies	N9030A	PXA Signal Analyzer	1/6/2022	Annual	1/6/2023	MY55410501
Keysight Technologies	N9038A	MXE EMI Receiver	1/21/2022	Annual	1/21/2023	MY51210133
Rohde & Schwarz	ESU40	EMI Test Receiver (40GHz)	5/25/2021	Annual	5/25/2022	100348
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: QLJNIB-002	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2202140017-01.QLJ	Test Dates: 02/14/2022 - 03/15/2022	EUT Type: Band 2 iCore NIB	Page 8 of 106

6.0 SAMPLE CALCULATIONS

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: QLJNIB-002	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2202140017-01.QLJ	Test Dates: 02/14/2022 - 03/15/2022	EUT Type: Band 2 iCore NIB	Page 9 of 106

7.0 TEST RESULTS

7.1 Summary

Company Name: Tecore Networks
 FCC ID: QLJNIB-002
 FCC Classification: PCS Licensed Transmitter (PCB)
 Mode(s): LTE

Test Condition	Test Description	FCC Part Section(s)	Test Limit	Test Result	Reference
CONDUCTED	Transmitter Conducted Output Power	2.1046	N/A	PASS	Section 7.2
	Occupied Bandwidth	2.1049	N/A	PASS	Section 7.3
	Conducted Band Edge / Spurious Emissions	2.1051, 24.238(a)	> 43 + 10log10(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 7.8
RADIATED	Radiated Spurious Emissions	2.1053, 24.238(a)	≥ 43 + 10 log (P[Watts]) for all out-of-band emissions	PASS	Section 7.7

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 and attenuators used as part of the test setup used to evaluate the EUT at all frequencies of interest.
- 3) All antenna port conducted emissions testing was performed on a test bench with one of the antenna port of the EUT connected to the spectrum analyzer through calibrated cables and attenuators while the other antenna port was terminated in a 50Ω load.
- 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 PCTEST EMC Software Tool v1.1.

FCC ID: QLJNIB-002	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2202140017-01.QLJ	Test Dates: 02/14/2022 - 03/15/2022	EUT Type: Band 2 iCore NIB	Page 10 of 106

7.2 Transmitter Conducted Output Power

Test Overview

The EUT was set to transmit in all four available modulations of LTE mode at the maximum output power of 20W per Tx port (total 40W) for this band or as applicable for the channel through a management server. One of the two output terminals of the EUT was connected through a calibrated cable and 30 dB of external attenuation to a signal analyzer and the other output terminal was terminated with a 50Ω load. This step was repeated with the measurement ports reversed to measure the output power of the second terminal. The powers were then summed to get the total power output from the two antennas transmitting LTE signal simultaneously. The signal analyzers' "Channel Power" function was used to measure the conducted output powers in accordance with the guidance of KDB 971168 D01 v03r01.

Test Procedure Used

KDB 971168 D01 v03r01 – Section 5.2.1

Test Settings

1. Power measurements are performed using the signal analyzer's "channel power" measurement capability for signals with continuous operation.
2. Span = 2 - 3 times the OBW
3. RBW = 1 – 5% of the expected OBW
4. VBW \geq 3 x RBW
5. No. of sweep points \geq 2 x span / RBW
6. Sweep time = auto-couple
7. Detector = RMS
8. Trigger is set to "free run" for signals with continuous operation.
9. The integration bandwidth was roughly set equal to the measured OBW of the signal for signals with continuous operation.
10. Trace mode = trace averaging (RMS) over 100 sweeps
11. The trace was allowed to stabilize

Test Setup

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

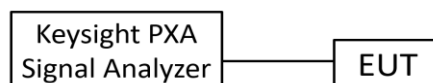


Figure 7-1. Test Instrument & Measurement Setup

Test Notes

None.

FCC ID: QLJNIB-002	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2202140017-01.QLJ	Test Dates: 02/14/2022 - 03/15/2022	EUT Type: Band 2 iCore NIB	Page 11 of 106

LTE Band 2

Bandwidth	Modulation	Channel	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]		
					Ant1	Ant2	MIMO
20 MHz	QPSK	700	1940.0	100 / 0	43.37	43.33	46.36
		900	1960.0	100 / 0	43.11	43.20	46.17
		1100	1980.0	100 / 0	43.28	43.46	46.38
	16-QAM	700	1940.0	100 / 0	43.35	43.34	46.36
		900	1960.0	100 / 0	43.09	43.17	46.14
		1100	1980.0	100 / 0	43.30	43.44	46.38
	64-QAM	700	1940.0	100 / 0	43.34	43.37	46.37
		900	1960.0	100 / 0	43.08	43.19	46.15
		1100	1980.0	100 / 0	43.32	43.46	46.40
	256-QAM	700	1940.0	100 / 0	43.38	43.32	46.36
		900	1960.0	100 / 0	43.12	43.16	46.15
		1100	1980.0	100 / 0	43.28	43.43	46.37
15 MHz	QPSK	675	1937.5	75 / 0	43.16	43.09	46.14
		900	1960.0	75 / 0	42.87	42.95	45.92
		1125	1982.5	75 / 0	43.09	43.21	46.16
	16-QAM	675	1937.5	75 / 0	43.12	43.05	46.10
		900	1960.0	75 / 0	42.80	42.97	45.90
		1125	1982.5	75 / 0	43.06	43.24	46.16
	64-QAM	675	1937.5	75 / 0	43.19	43.04	46.13
		900	1960.0	75 / 0	42.83	42.93	45.89
		1125	1982.5	75 / 0	43.13	43.18	46.17
	256-QAM	675	1937.5	75 / 0	43.25	43.09	46.18
		900	1960.0	75 / 0	42.89	42.87	45.89
		1125	1982.5	75 / 0	43.06	43.16	46.12
10 MHz	QPSK	650	1935.0	50 / 0	43.43	43.37	46.41
		900	1960.0	50 / 0	43.15	43.25	46.21
		1150	1985.0	50 / 0	43.34	43.56	46.46
	16-QAM	650	1935.0	50 / 0	43.48	43.35	46.43
		900	1960.0	50 / 0	43.14	43.22	46.19
		1150	1985.0	50 / 0	43.36	43.55	46.47
	64-QAM	650	1935.0	50 / 0	43.41	43.45	46.44
		900	1960.0	50 / 0	43.21	43.26	46.25
		1150	1985.0	50 / 0	43.42	43.60	46.52
	256-QAM	650	1935.0	50 / 0	43.48	43.31	46.41
		900	1960.0	50 / 0	43.13	43.29	46.22
		1150	1985.0	50 / 0	43.37	43.54	46.47
5 MHz	QPSK	625	1932.5	25 / 0	43.09	42.96	46.04
		900	1960.0	25 / 0	42.84	42.98	45.92
		1175	1987.5	25 / 0	42.99	43.08	46.05
	16-QAM	625	1932.5	25 / 0	43.01	43.00	46.02
		900	1960.0	25 / 0	42.83	42.88	45.87
		1175	1987.5	25 / 0	42.97	43.13	46.06
	64-QAM	625	1932.5	25 / 0	43.07	42.93	46.01
		900	1960.0	25 / 0	42.79	42.84	45.83
		1175	1987.5	25 / 0	42.93	43.14	46.05
	256-QAM	625	1932.5	25 / 0	43.15	43.02	46.10
		900	1960.0	25 / 0	42.82	43.01	45.93
		1175	1987.5	25 / 0	42.91	43.12	46.03
3 MHz	QPSK	615	1931.5	15 / 0	42.97	42.91	45.95
		900	1960.0	15 / 0	42.77	43.01	45.90
		1185	1988.5	15 / 0	42.79	43.16	45.99
	16-QAM	615	1931.5	15 / 0	42.92	42.92	45.93
		900	1960.0	15 / 0	42.82	42.97	45.91
		1185	1988.5	15 / 0	42.81	43.22	46.03
	64-QAM	615	1931.5	15 / 0	43.03	42.90	45.98
		900	1960.0	15 / 0	42.86	42.86	45.87
		1185	1988.5	15 / 0	42.88	43.14	46.02
	256-QAM	615	1931.5	15 / 0	42.82	42.80	45.82
		900	1960.0	15 / 0	42.68	42.68	45.69
		1185	1988.5	15 / 0	42.74	43.06	45.91
1.4 MHz	QPSK	607	1930.7	6 / 0	42.81	42.75	45.79
		900	1960.0	6 / 0	42.73	43.00	45.88
		1193	1989.3	6 / 0	42.76	43.04	45.91
	16-QAM	607	1930.7	6 / 0	42.78	42.71	45.76
		900	1960.0	6 / 0	42.71	42.79	45.76
		1193	1989.3	6 / 0	42.63	43.08	45.87
	64-QAM	607	1930.7	6 / 0	42.82	42.78	45.81
		900	1960.0	6 / 0	42.76	42.82	45.80
		1193	1989.3	6 / 0	42.78	43.04	45.92
	256-QAM	607	1930.7	6 / 0	42.92	42.79	45.87
		900	1960.0	6 / 0	42.70	42.74	45.73
		1193	1989.3	6 / 0	42.73	43.02	45.89

Table 7-2. Transmitter Conducted Output Power (LTE Band 2)

FCC ID: QLNJNB-002	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2202140017-01.QLJ	Test Dates: 02/14/2022 - 03/15/2022	EUT Type: Band 2 iCore NIB	Page 12 of 106

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

KDB 971168 D01 v03r01 – Section 4.2

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.

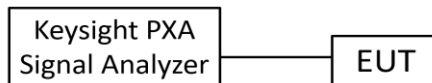


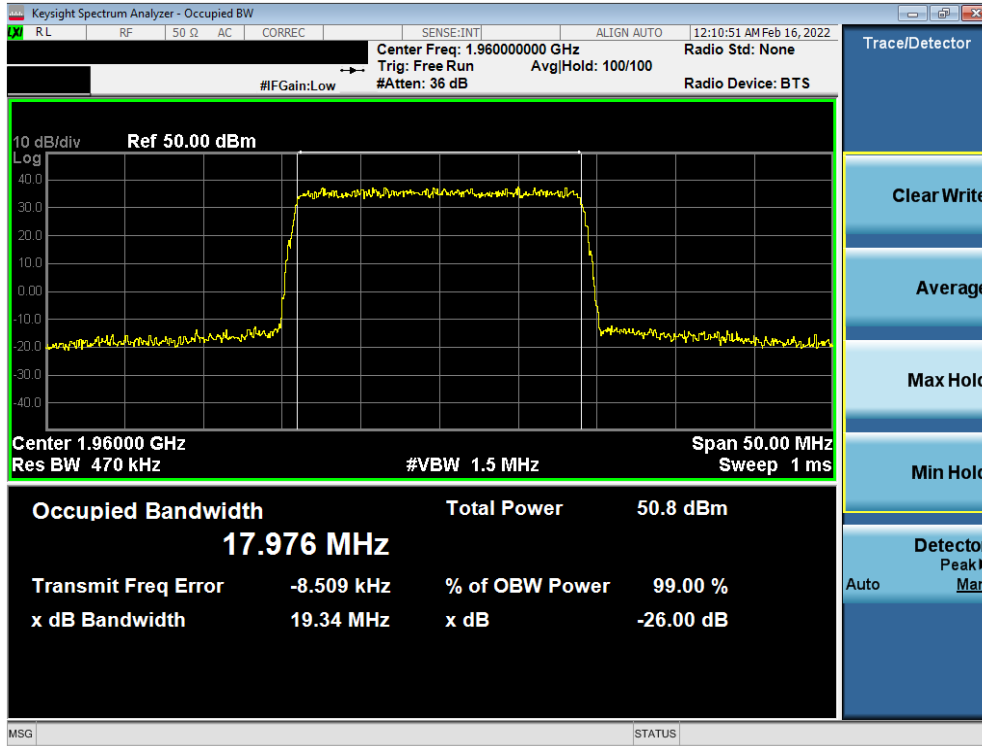
Figure 7-2. Test Instrument & Measurement Setup

Test Notes

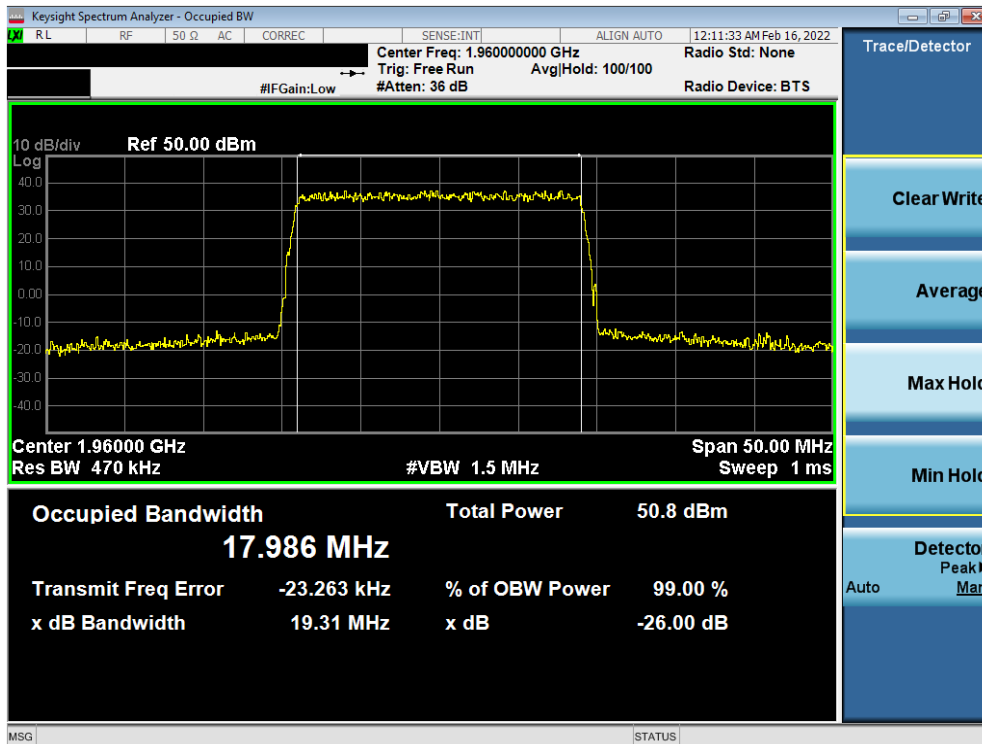
None.

FCC ID: QLJNIB-002	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2202140017-01.QLJ	Test Dates: 02/14/2022 - 03/15/2022	EUT Type: Band 2 iCore NIB	Page 13 of 106

LTE Band 2 – Ant1

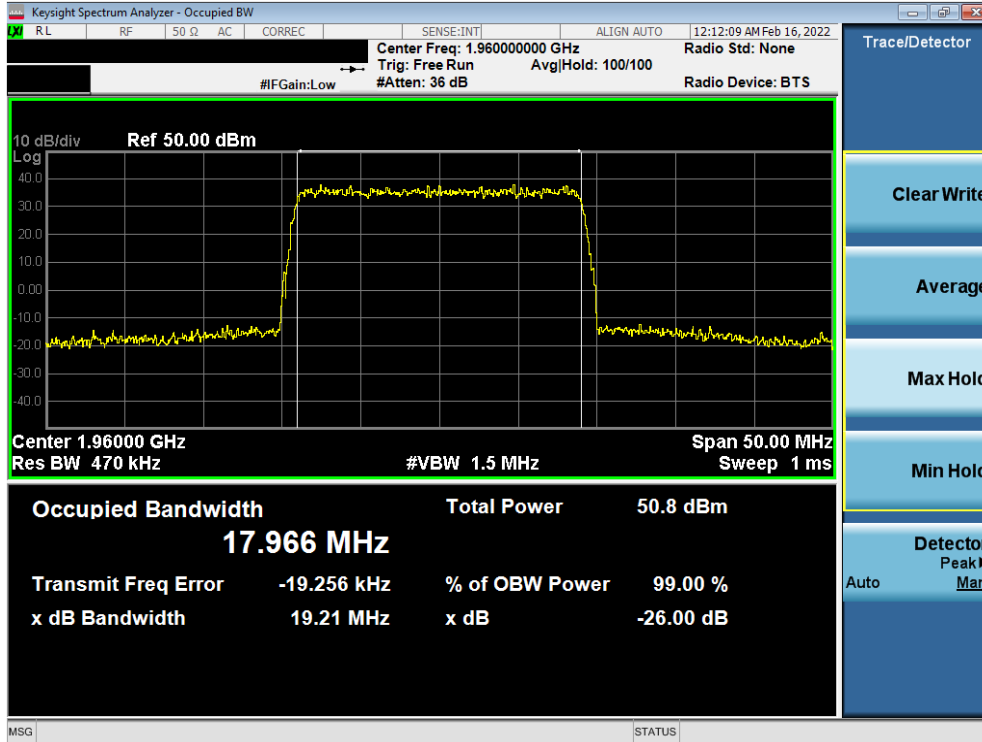


Plot 7-1. Occupied Bandwidth Plot (LTE Band 2 - 20MHz QPSK - Full RB - Ant1)

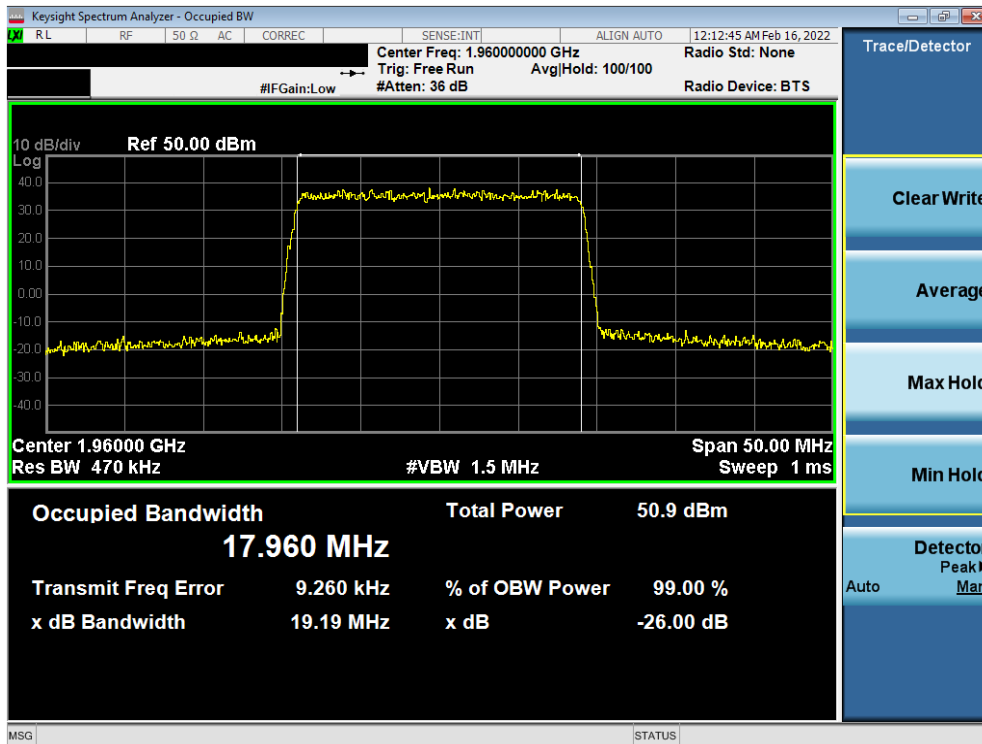


Plot 7-2. Occupied Bandwidth Plot (LTE Band 2 - 20MHz 16-QAM - Full RB - Ant1)

FCC ID: QLJNIB-002	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2202140017-01.QLJ	Test Dates: 02/14/2022 - 03/15/2022	EUT Type: Band 2 iCore NIB	Page 14 of 106

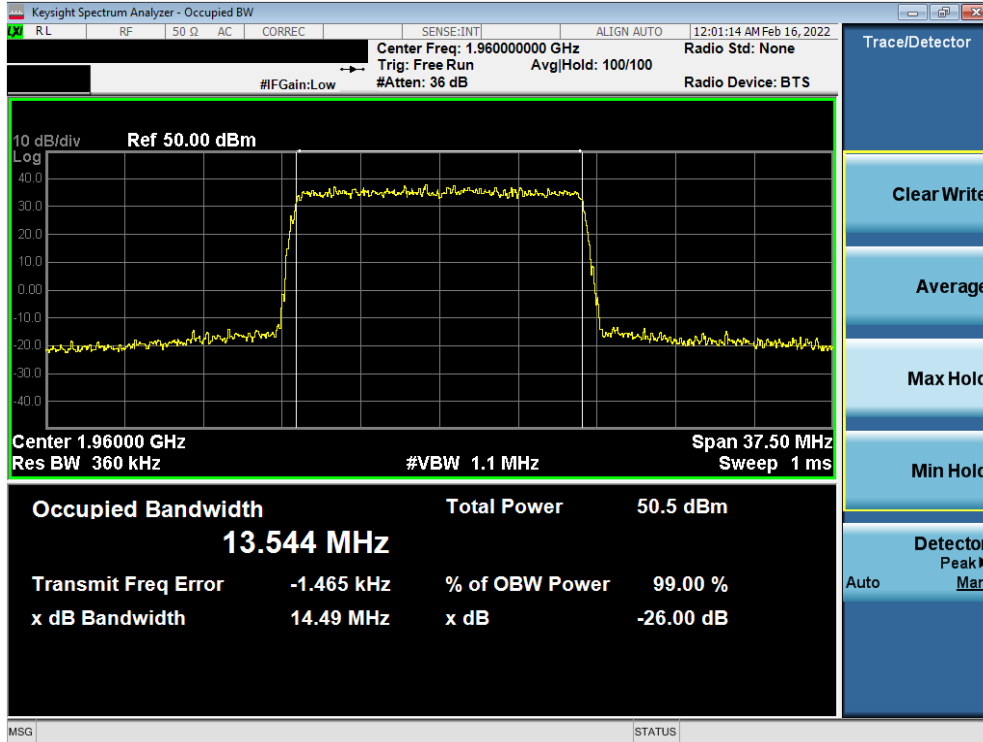


Plot 7-3. Occupied Bandwidth Plot (LTE Band 2 - 20MHz 64-QAM - Full RB - Ant1)



Plot 7-4. Occupied Bandwidth Plot (LTE Band 2 - 20MHz 256-QAM - Full RB - Ant1)

FCC ID: QLJNIB-002	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2202140017-01.QLJ	Test Dates: 02/14/2022 - 03/15/2022	EUT Type: Band 2 iCore NIB	Page 15 of 106

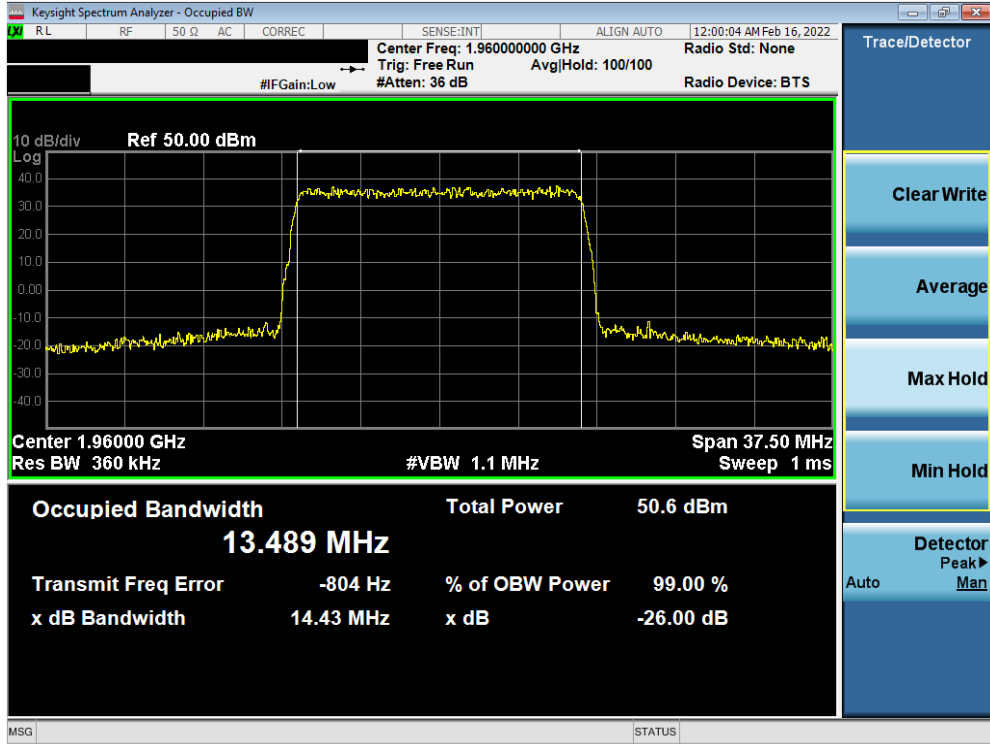


Plot 7-5. Occupied Bandwidth Plot (LTE Band 2 - 15MHz QPSK - Full RB - Ant1)

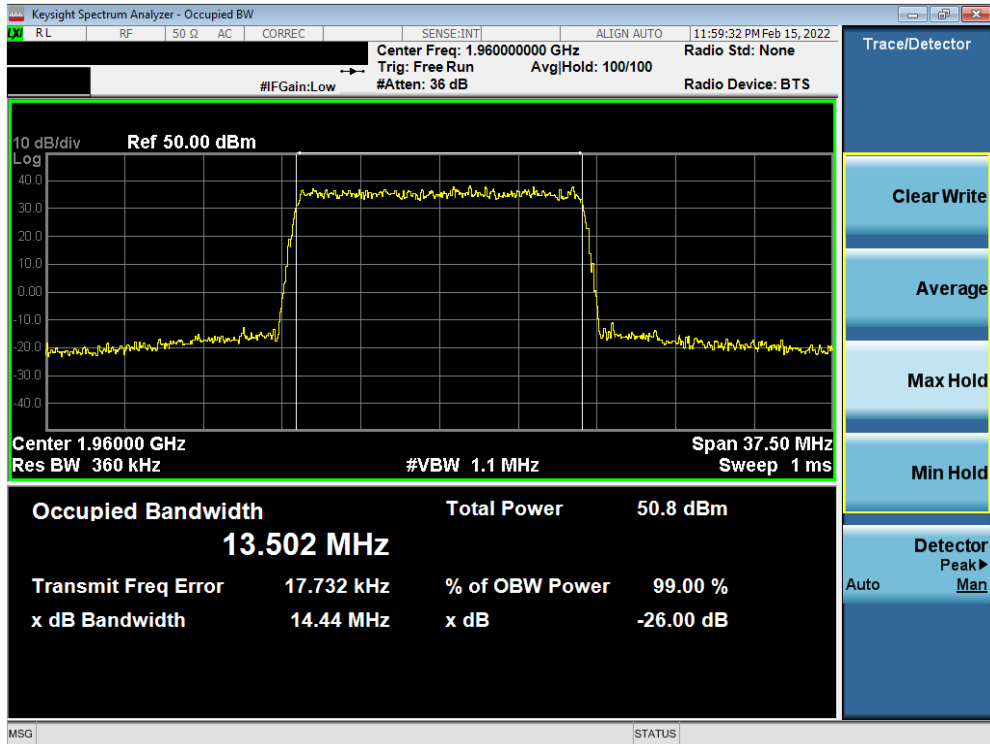


Plot 7-6. Occupied Bandwidth Plot (LTE Band 2 - 15MHz 16-QAM - Full RB - Ant1)

FCC ID: QLJNIB-002	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2202140017-01.QLJ	Test Dates: 02/14/2022 - 03/15/2022	EUT Type: Band 2 iCore NIB	Page 16 of 106

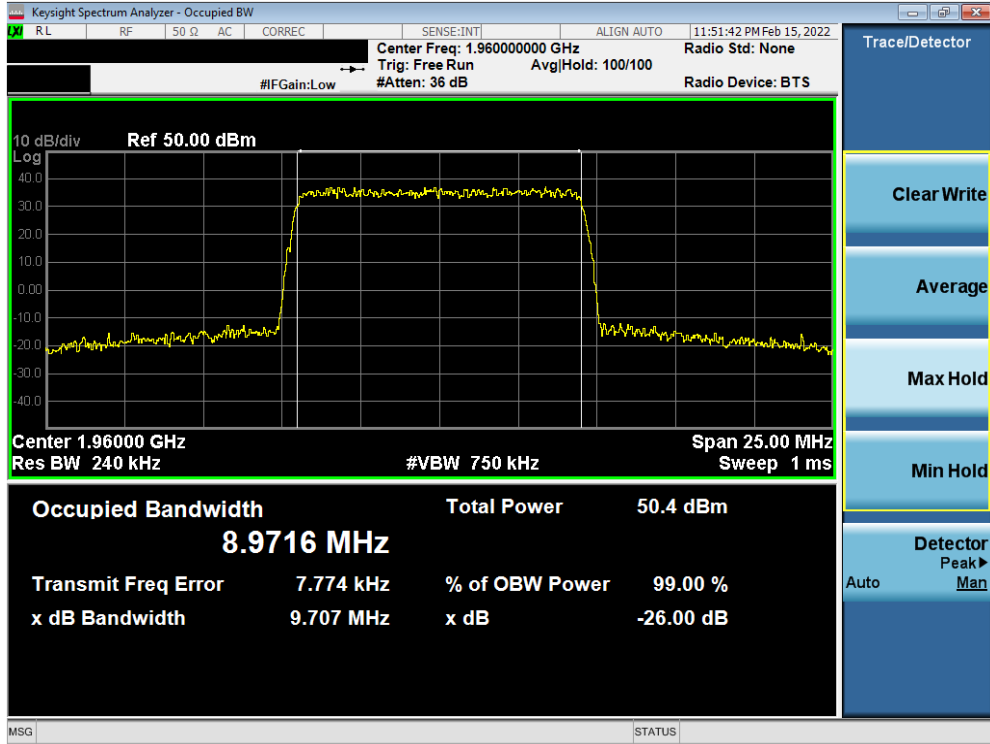


Plot 7-7. Occupied Bandwidth Plot (LTE Band 2 - 15MHz 64-QAM - Full RB - Ant1)

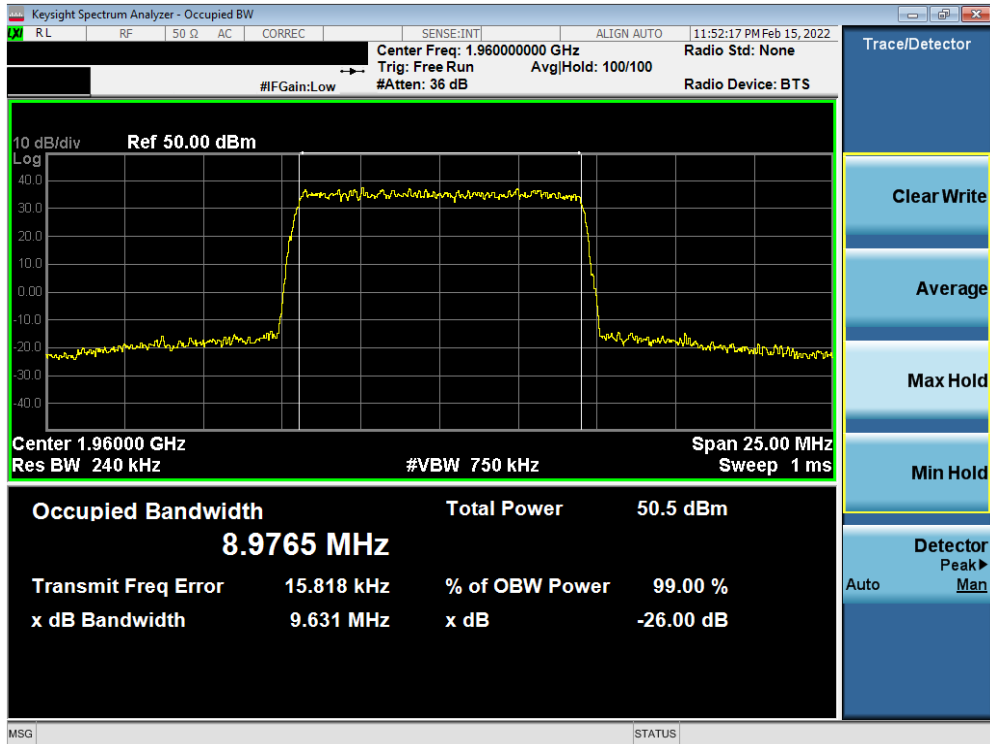


Plot 7-8. Occupied Bandwidth Plot (LTE Band 2 - 15MHz 256-QAM - Full RB - Ant1)

FCC ID: QLJNIB-002	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2202140017-01.QLJ	Test Dates: 02/14/2022 - 03/15/2022	EUT Type: Band 2 iCore NIB	Page 17 of 106

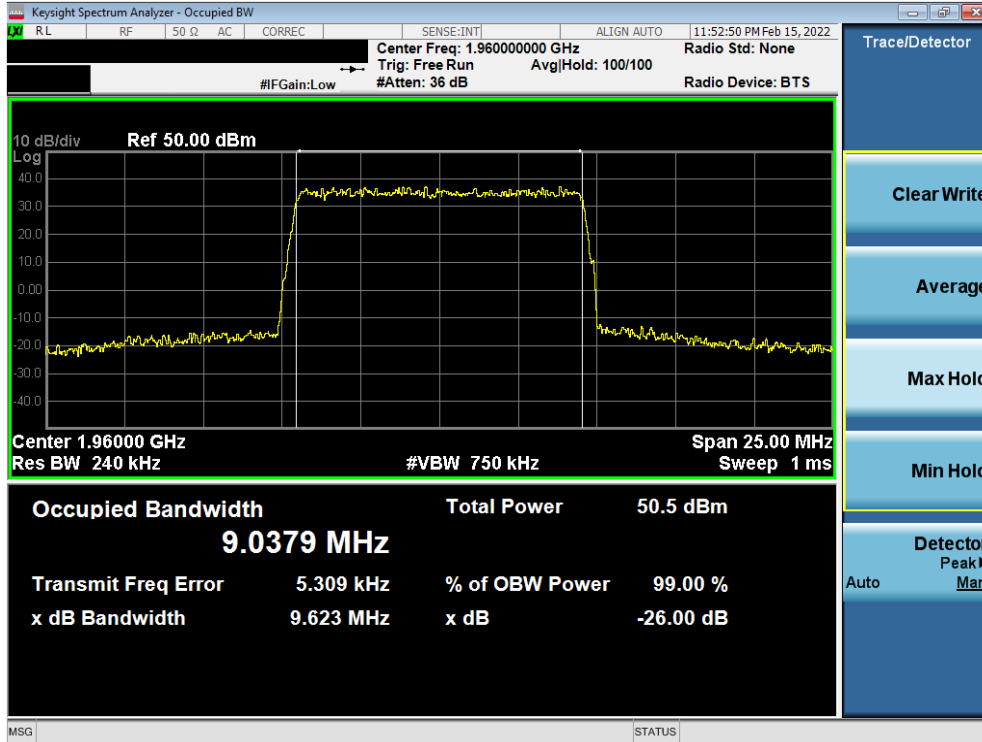


Plot 7-9. Occupied Bandwidth Plot (LTE Band 2 - 10MHz QPSK - Full RB - Ant1)

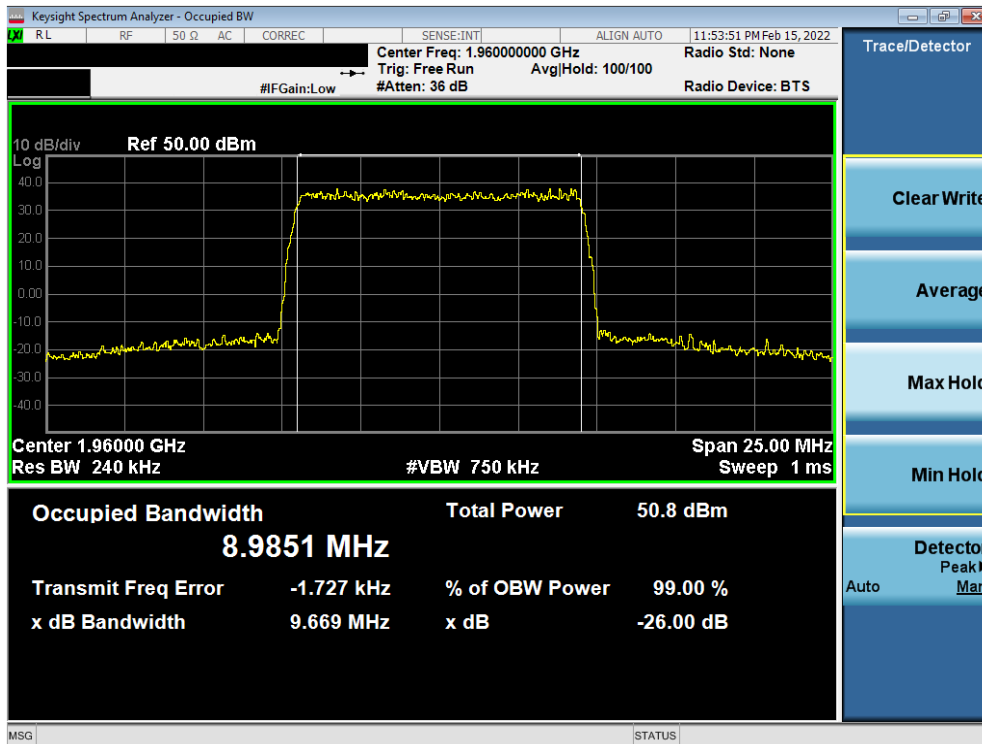


Plot 7-10. Occupied Bandwidth Plot (LTE Band 2 - 10MHz 16-QAM - Full RB - Ant1)

FCC ID: QLJNIB-002	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2202140017-01.QLJ	Test Dates: 02/14/2022 - 03/15/2022	EUT Type: Band 2 iCore NIB	Page 18 of 106

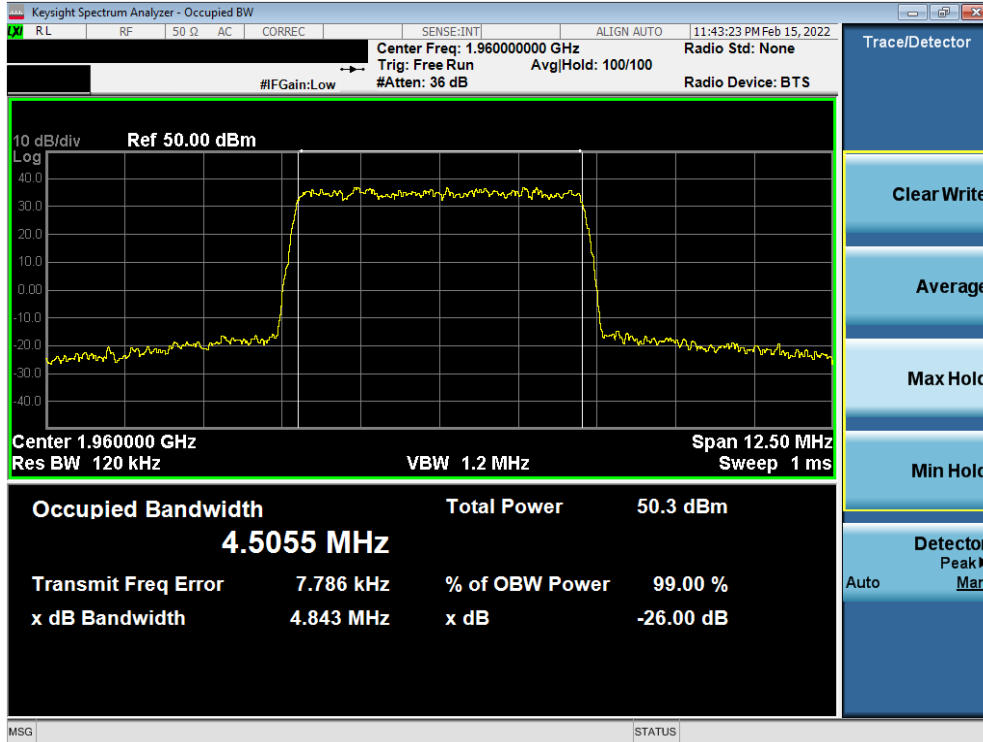


Plot 7-11. Occupied Bandwidth Plot (LTE Band 2 - 10MHz 64-QAM - Full RB - Ant1)

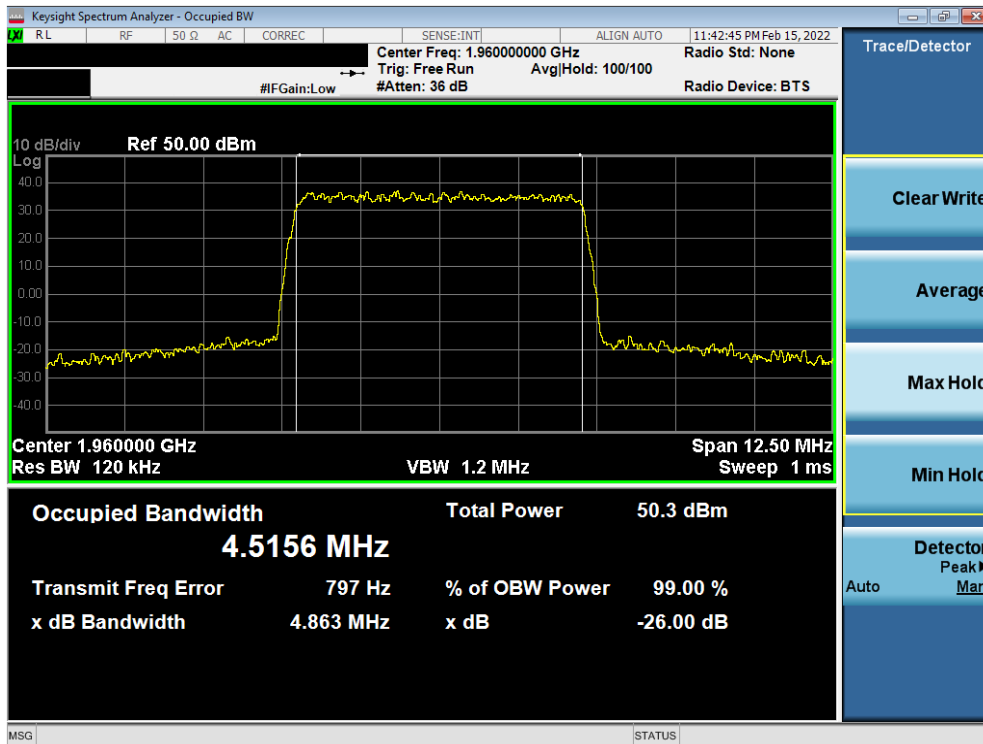


Plot 7-12. Occupied Bandwidth Plot (LTE Band 2 - 10MHz 256-QAM - Full RB - Ant1)

FCC ID: QLJNIB-002	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2202140017-01.QLJ	Test Dates: 02/14/2022 - 03/15/2022	EUT Type: Band 2 iCore NIB	Page 19 of 106

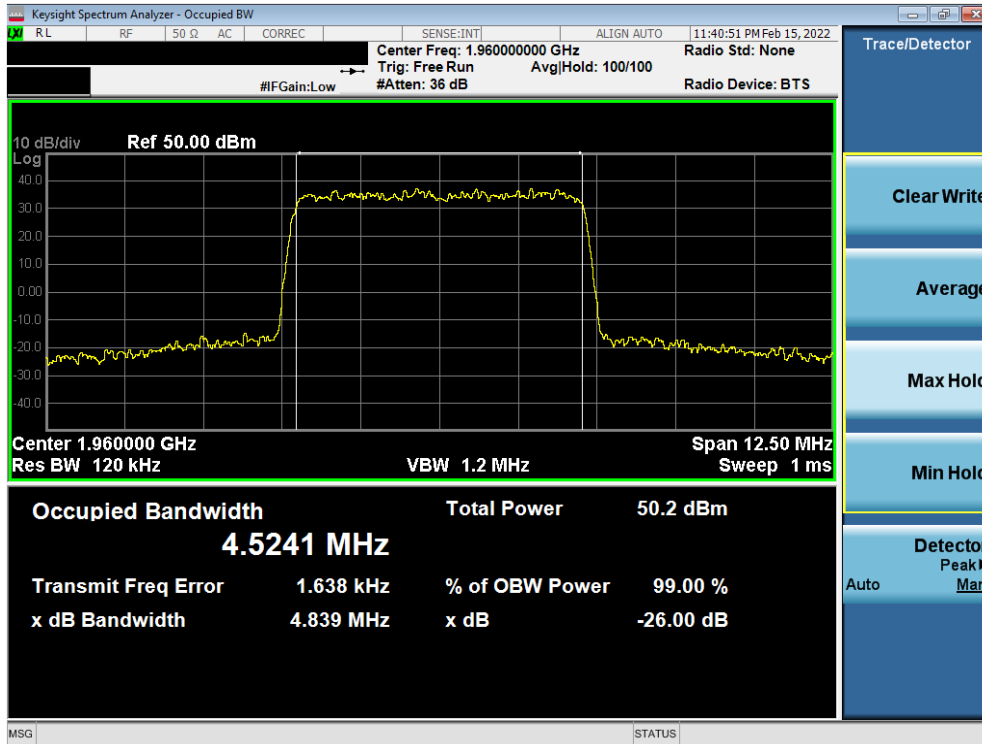


Plot 7-13. Occupied Bandwidth Plot (LTE Band 2 - 5MHz QPSK - Full RB - Ant1)

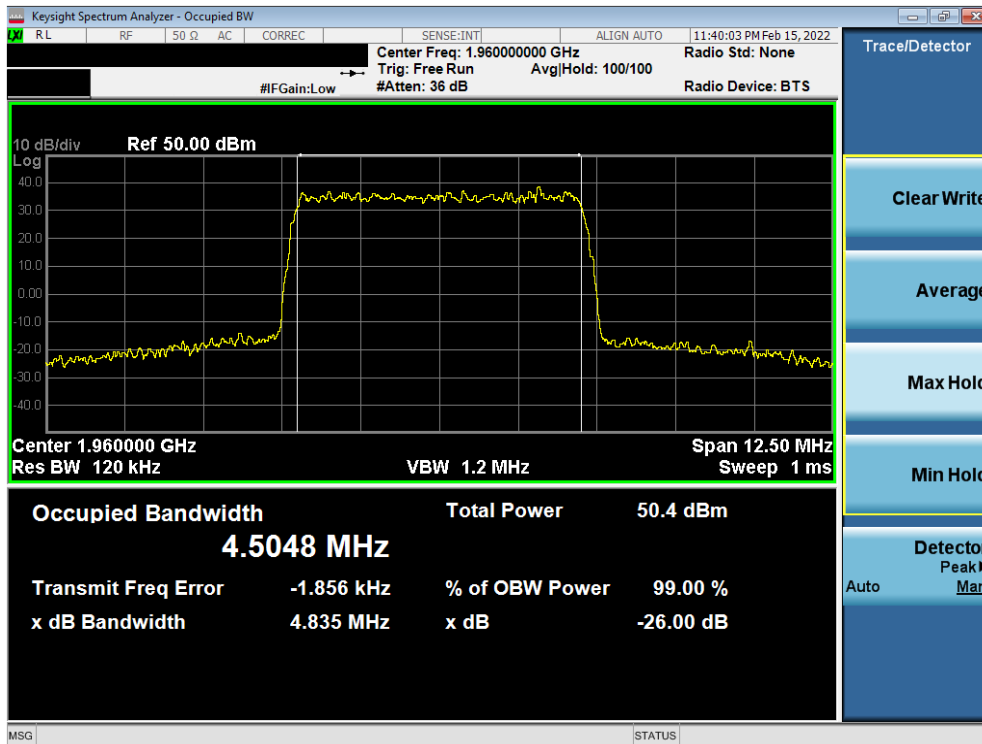


Plot 7-14. Occupied Bandwidth Plot (LTE Band 2 - 5MHz 16-QAM - Full RB - Ant1)

FCC ID: QLJNIB-002	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2202140017-01.QLJ	Test Dates: 02/14/2022 - 03/15/2022	EUT Type: Band 2 iCore NIB	Page 20 of 106

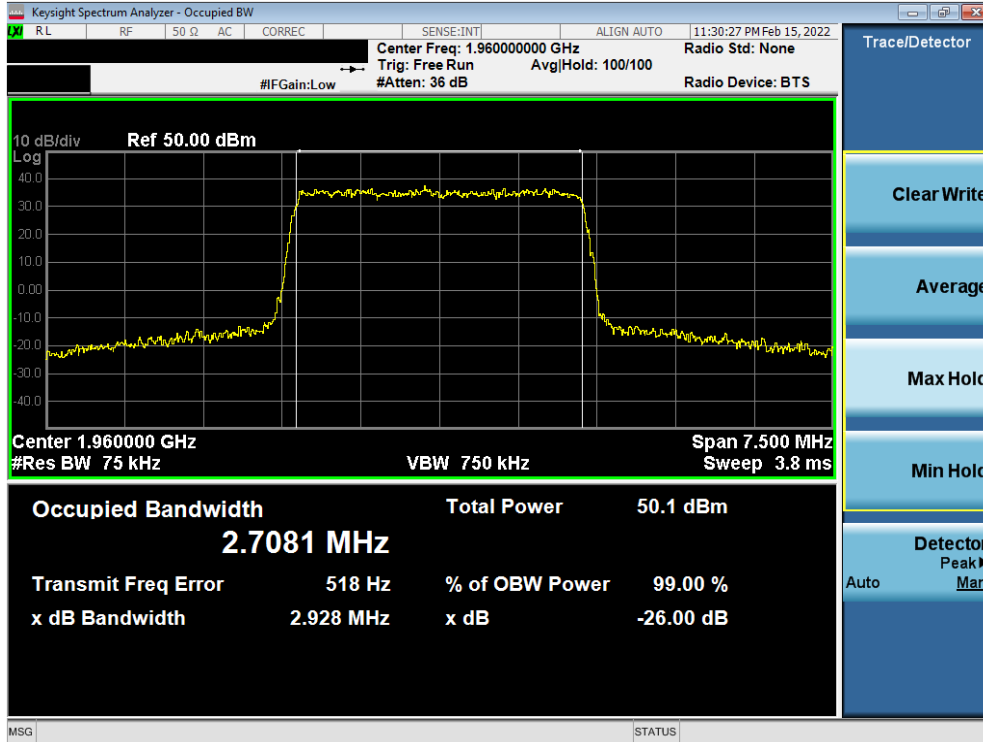


Plot 7-15. Occupied Bandwidth Plot (LTE Band 2 - 5MHz 64-QAM - Full RB - Ant1)

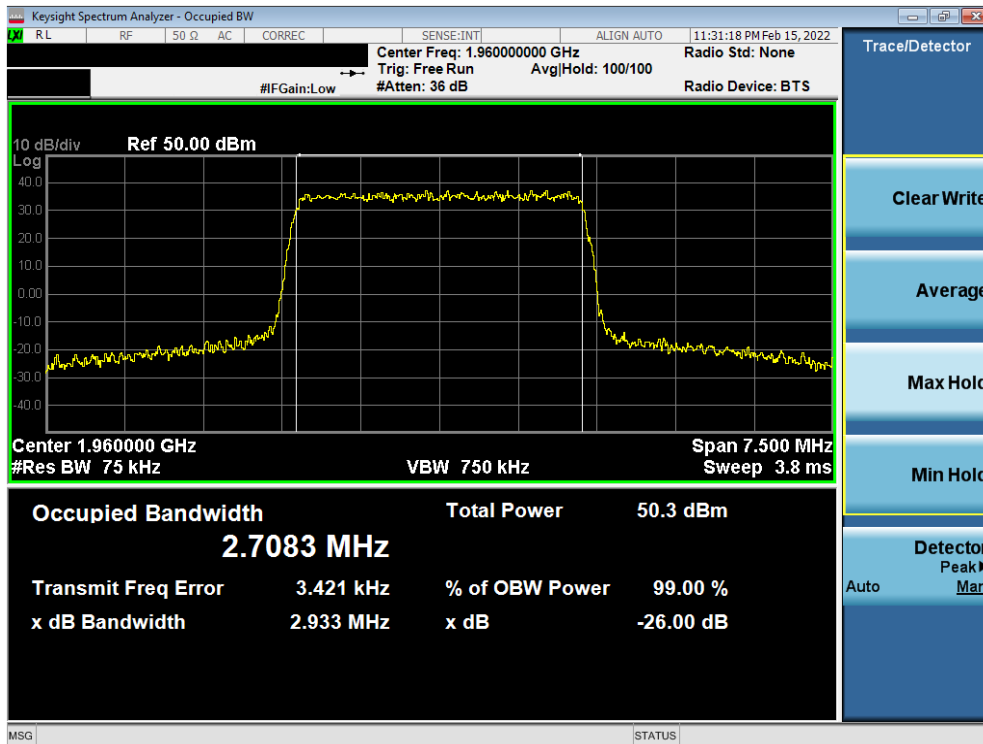


Plot 7-16. Occupied Bandwidth Plot (LTE Band 2 - 5MHz 256-QAM - Full RB - Ant1)

FCC ID: QLJNIB-002	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2202140017-01.QLJ	Test Dates: 02/14/2022 - 03/15/2022	EUT Type: Band 2 iCore NIB	Page 21 of 106

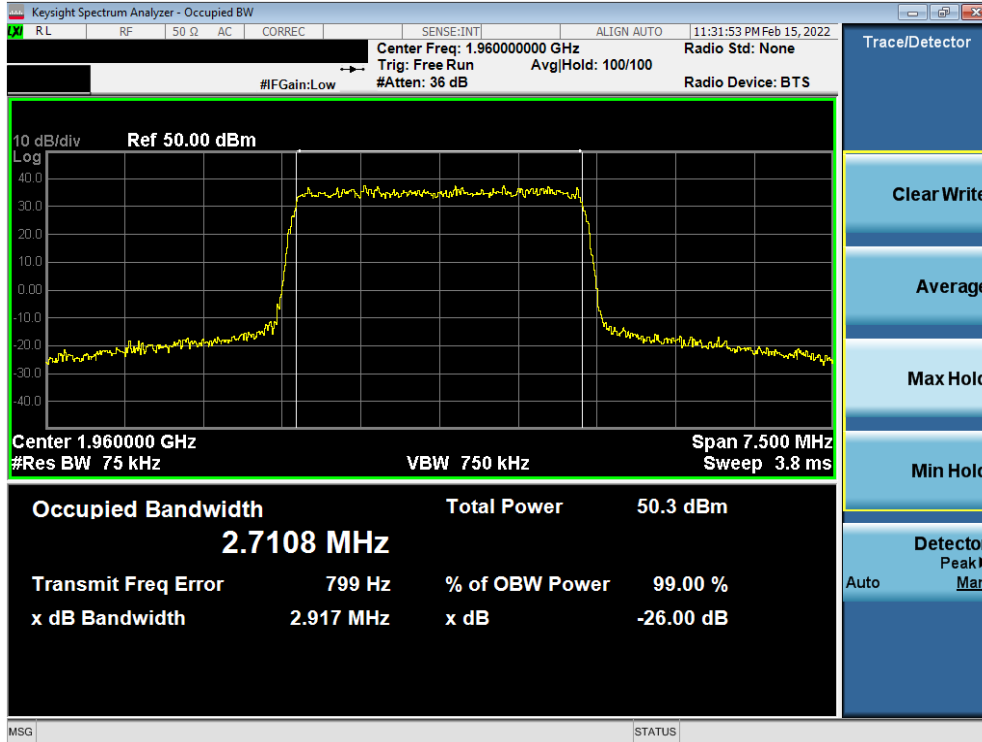


Plot 7-17. Occupied Bandwidth Plot (LTE Band 2 - 3MHz QPSK - Full RB - Ant1)

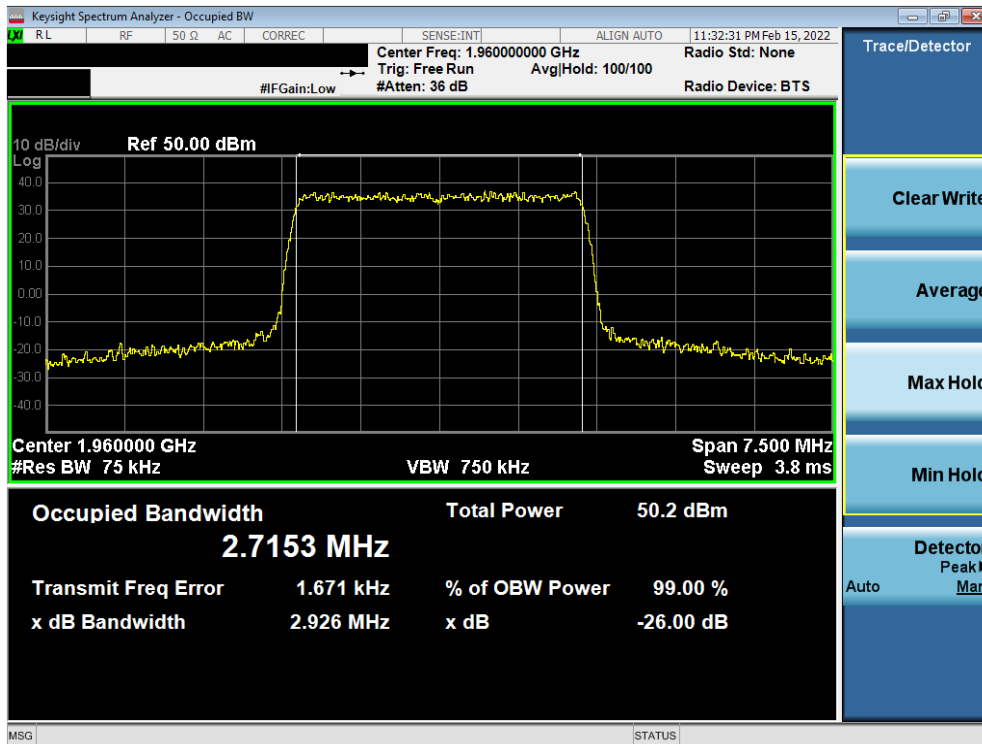


Plot 7-18. Occupied Bandwidth Plot (LTE Band 2 - 3MHz 16-QAM - Full RB - Ant1)

FCC ID: QLJNIB-002	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2202140017-01.QLJ	Test Dates: 02/14/2022 - 03/15/2022	EUT Type: Band 2 iCore NIB	Page 22 of 106

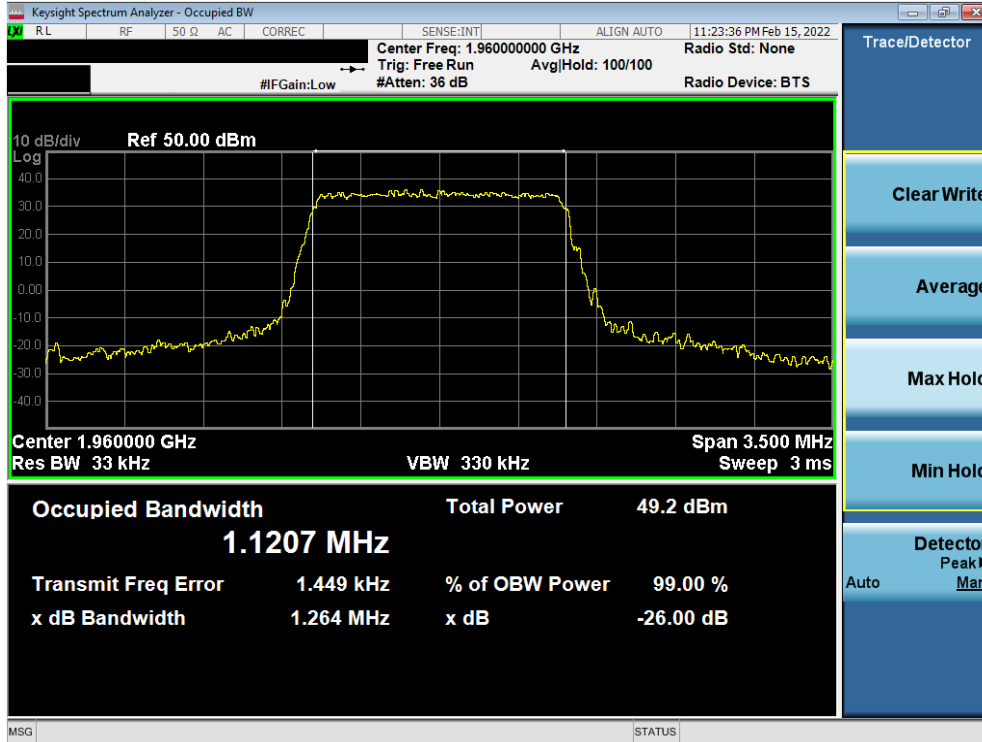


Plot 7-19. Occupied Bandwidth Plot (LTE Band 2 - 3MHz 64-QAM - Full RB - Ant1)

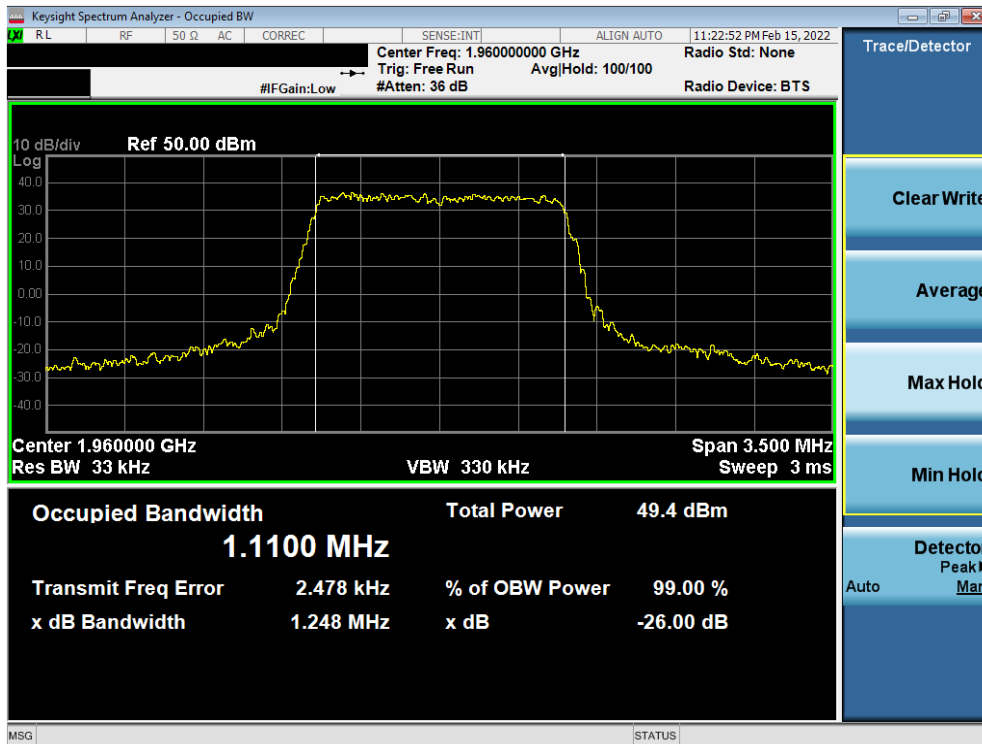


Plot 7-20. Occupied Bandwidth Plot (LTE Band 2 - 3MHz 256-QAM - Full RB - Ant1)

FCC ID: QLJNIB-002	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2202140017-01.QLJ	Test Dates: 02/14/2022 - 03/15/2022	EUT Type: Band 2 iCore NIB	Page 23 of 106

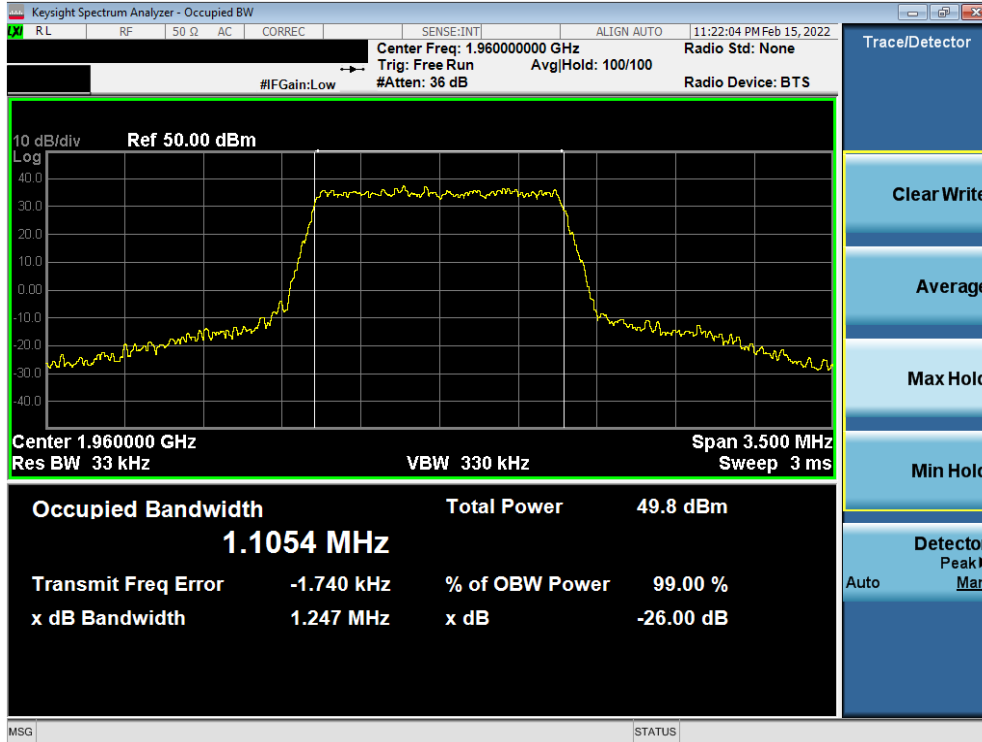


Plot 7-21. Occupied Bandwidth Plot (LTE Band 2 - 1.4MHz QPSK - Full RB - Ant1)

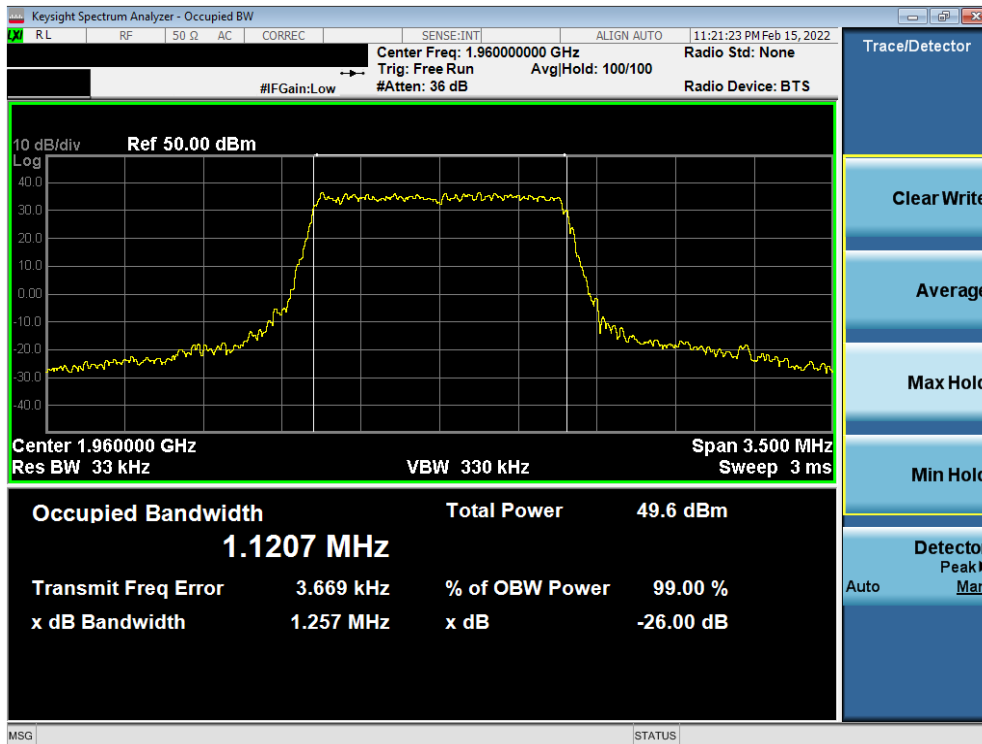


Plot 7-22. Occupied Bandwidth Plot (LTE Band 2 - 1.4MHz 16-QAM - Full RB - Ant1)

FCC ID: QLJNIB-002	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2202140017-01.QLJ	Test Dates: 02/14/2022 - 03/15/2022	EUT Type: Band 2 iCore NIB	Page 24 of 106



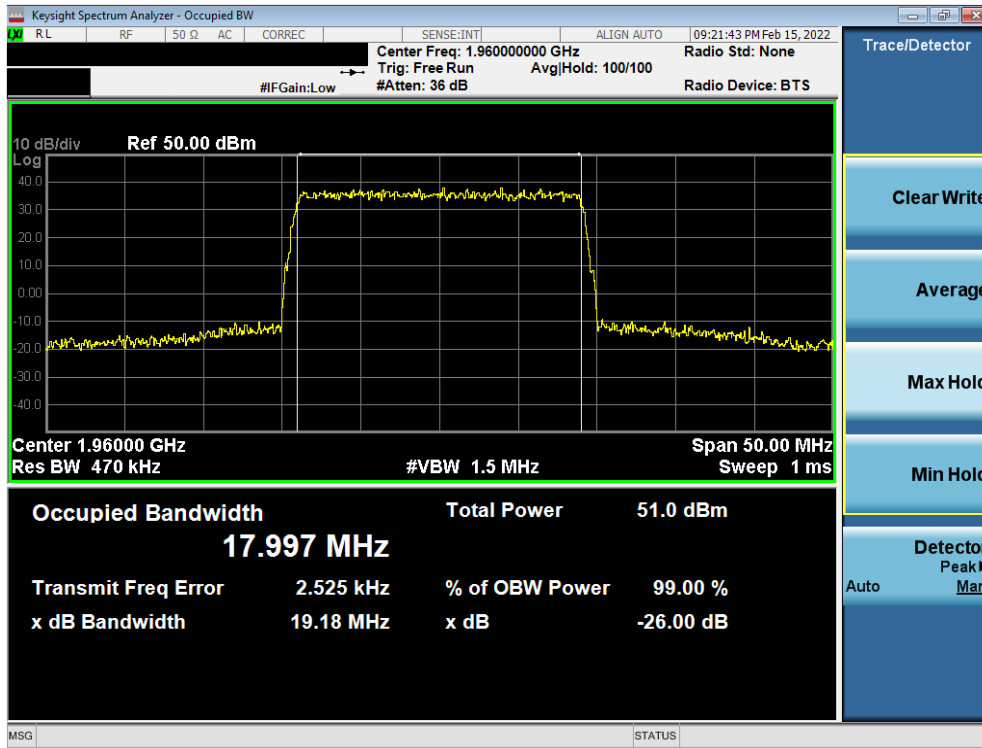
Plot 7-23. Occupied Bandwidth Plot (LTE Band 2 - 1.4MHz 64-QAM - Full RB - Ant1)



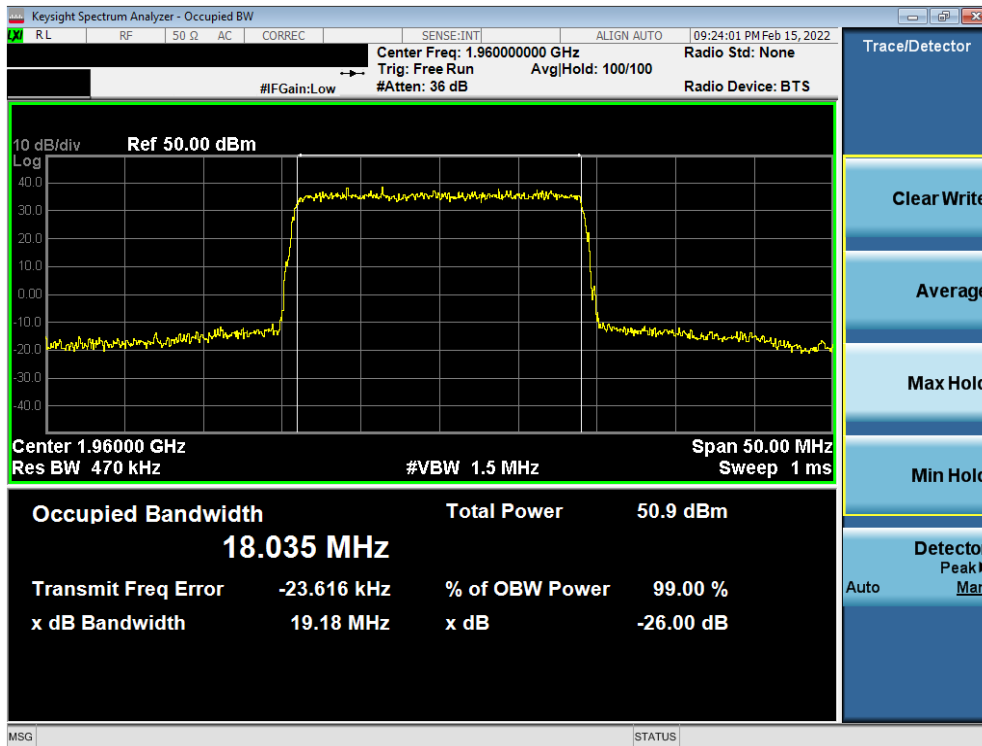
Plot 7-24. Occupied Bandwidth Plot (LTE Band 2 - 1.4MHz 256-QAM - Full RB - Ant1)

FCC ID: QLJNIB-002	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2202140017-01.QLJ	Test Dates: 02/14/2022 - 03/15/2022	EUT Type: Band 2 iCore NIB	Page 25 of 106

LTE Band 2 – Ant2

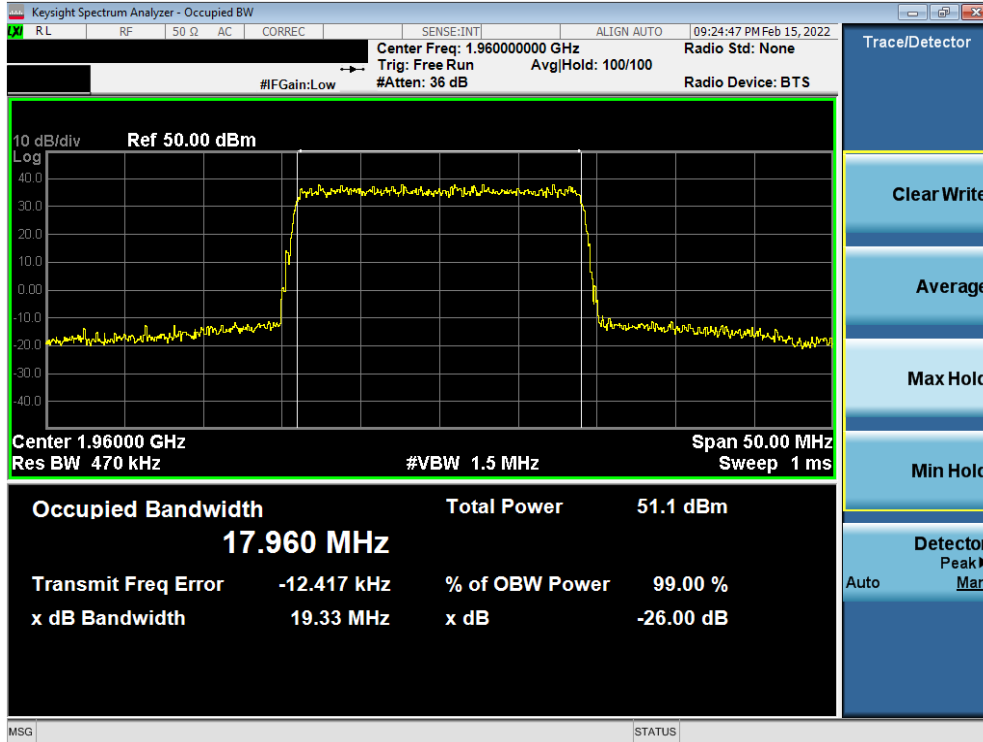


Plot 7-25. Occupied Bandwidth Plot (LTE Band 2 - 20MHz QPSK - Full RB - Ant2)

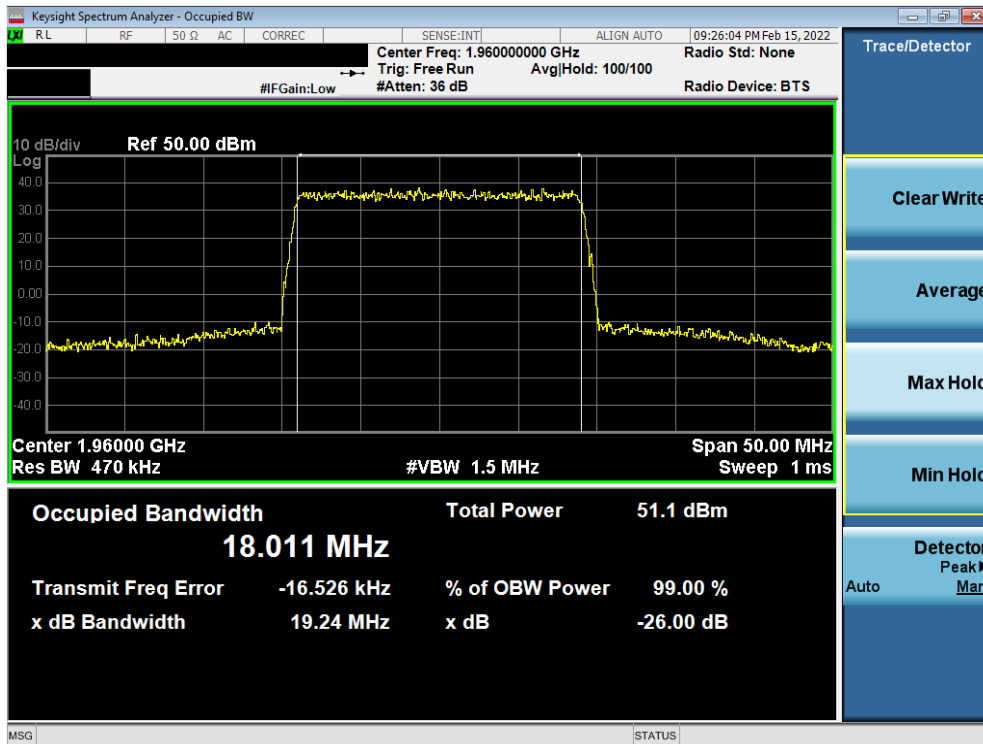


Plot 7-26. Occupied Bandwidth Plot (LTE Band 2 - 20MHz 16-QAM - Full RB - Ant2)

FCC ID: QLJNIB-002	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2202140017-01.QLJ	Test Dates: 02/14/2022 - 03/15/2022	EUT Type: Band 2 iCore NIB	Page 26 of 106

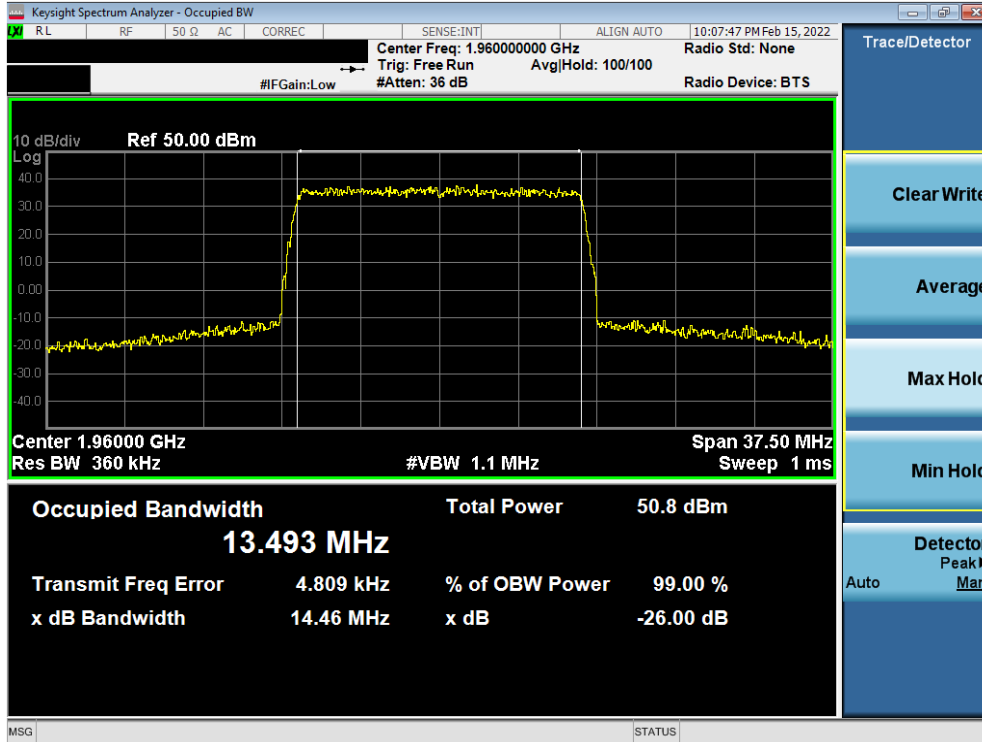


Plot 7-27. Occupied Bandwidth Plot (LTE Band 2 - 20MHz 64-QAM - Full RB - Ant2)

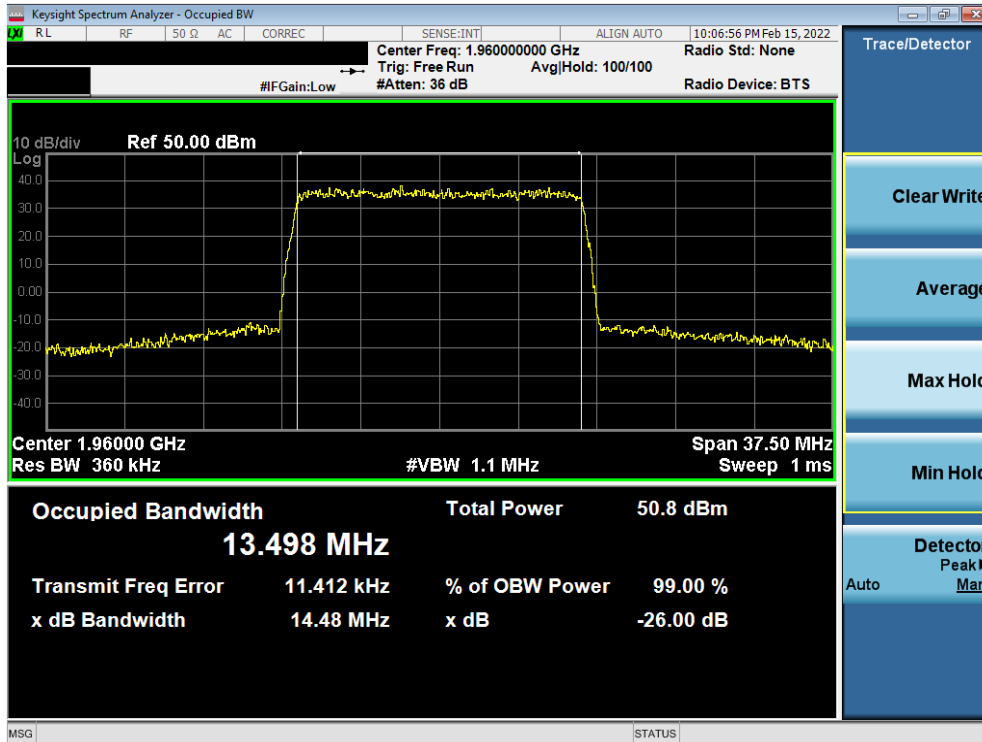


Plot 7-28. Occupied Bandwidth Plot (LTE Band 2 - 20MHz 256-QAM - Full RB - Ant2)

FCC ID: QLJNIB-002	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2202140017-01.QLJ	Test Dates: 02/14/2022 - 03/15/2022	EUT Type: Band 2 iCore NIB	Page 27 of 106

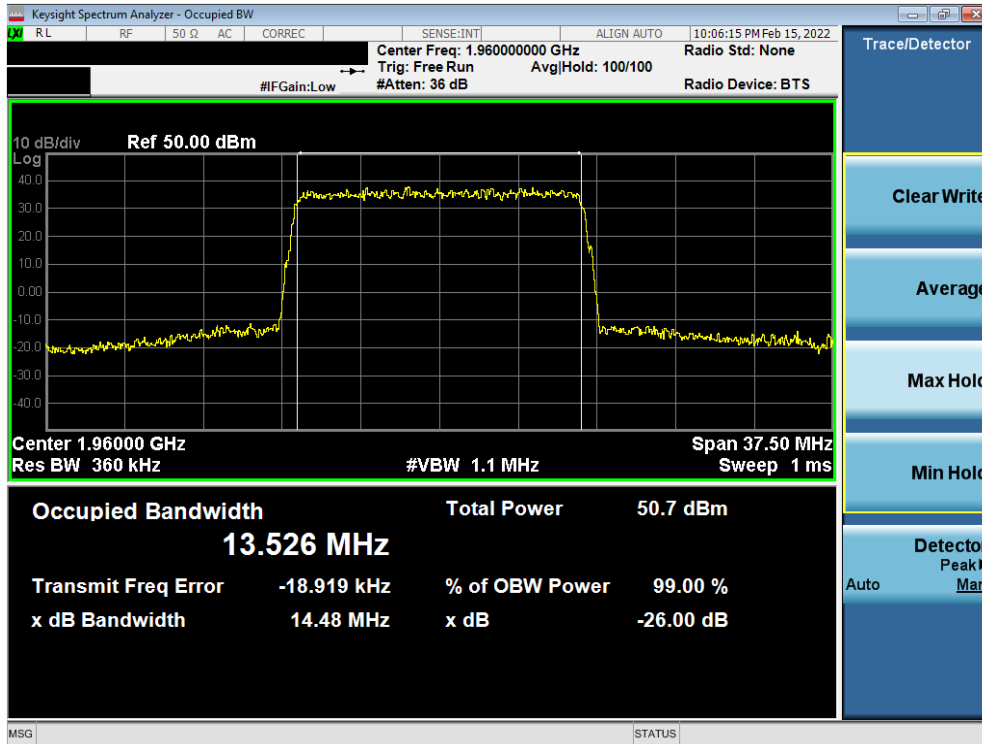


Plot 7-29. Occupied Bandwidth Plot (LTE Band 2 - 15MHz QPSK - Full RB - Ant2)

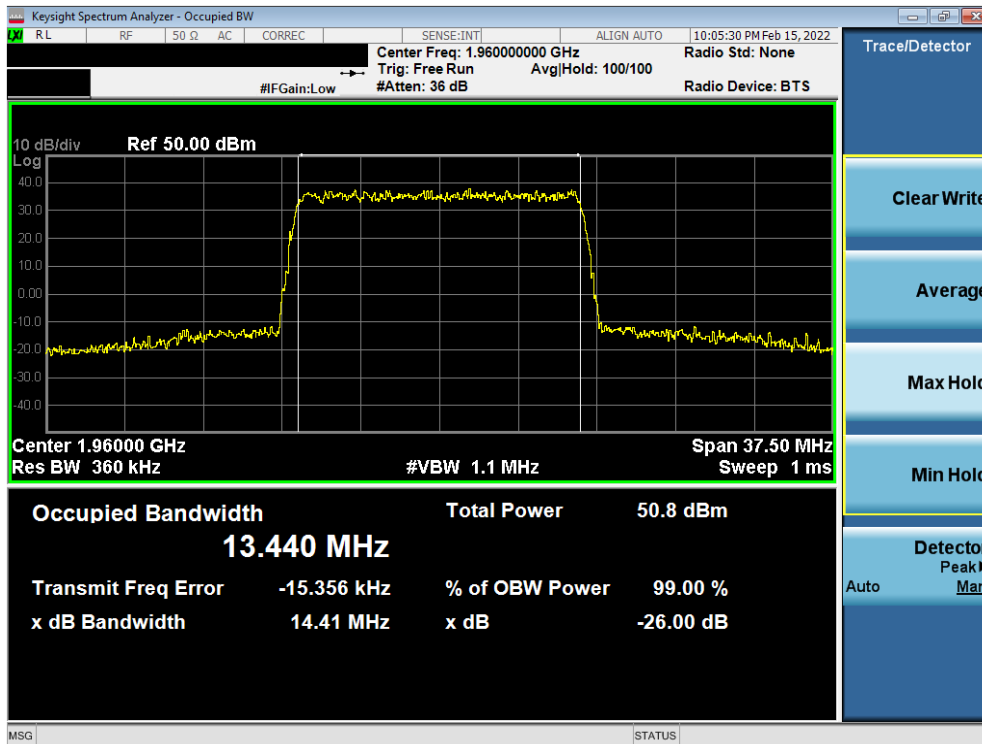


Plot 7-30. Occupied Bandwidth Plot (LTE Band 2 - 15MHz 16-QAM - Full RB - Ant2)

FCC ID: QJNIB-002	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2202140017-01.QLJ	Test Dates: 02/14/2022 - 03/15/2022	EUT Type: Band 2 iCore NIB	Page 28 of 106

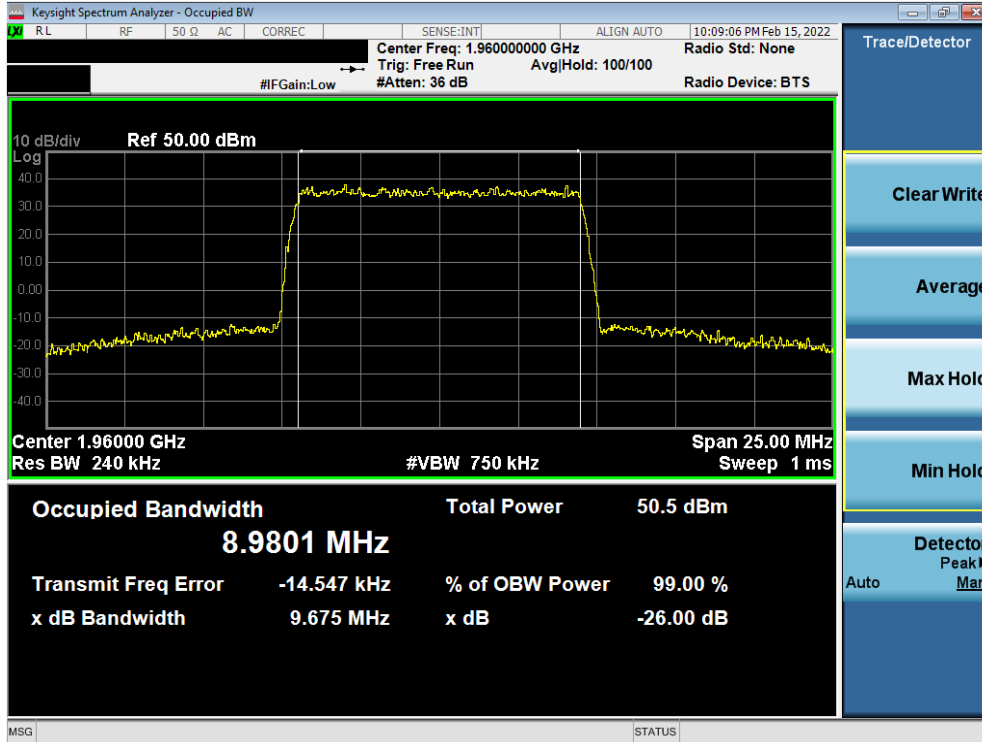


Plot 7-31. Occupied Bandwidth Plot (LTE Band 2 - 15MHz 64-QAM - Full RB - Ant2)

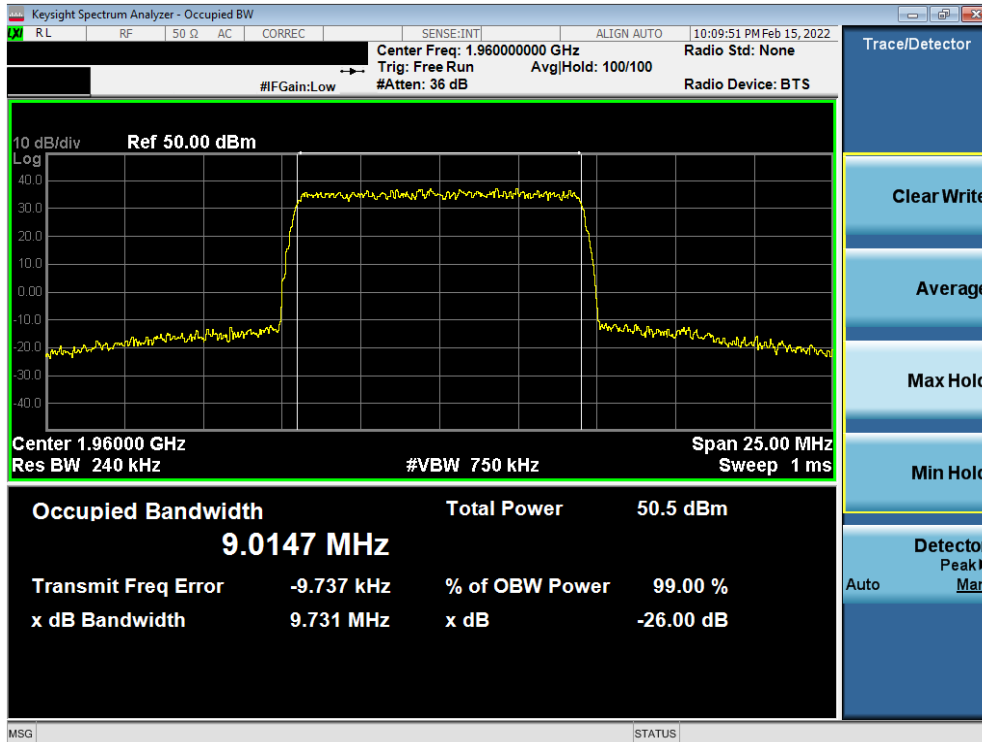


Plot 7-32. Occupied Bandwidth Plot (LTE Band 2 - 15MHz 256-QAM - Full RB - Ant2)

FCC ID: QLJNIB-002	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2202140017-01.QLJ	Test Dates: 02/14/2022 - 03/15/2022	EUT Type: Band 2 iCore NIB	Page 29 of 106

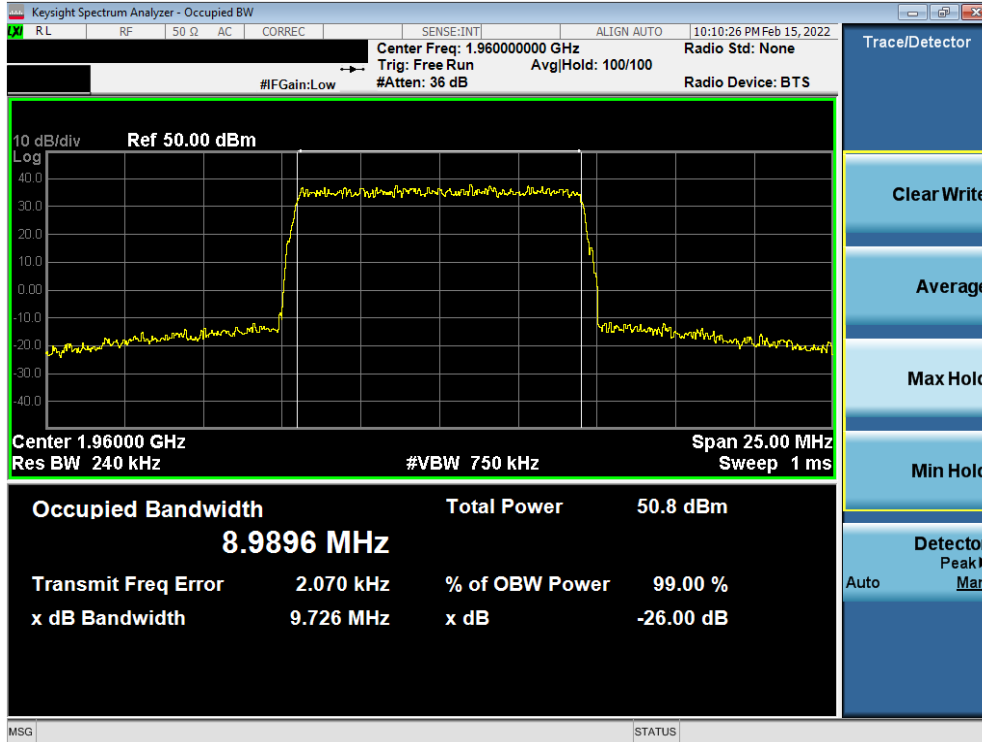


Plot 7-33. Occupied Bandwidth Plot (LTE Band 2 - 10MHz QPSK - Full RB - Ant2)

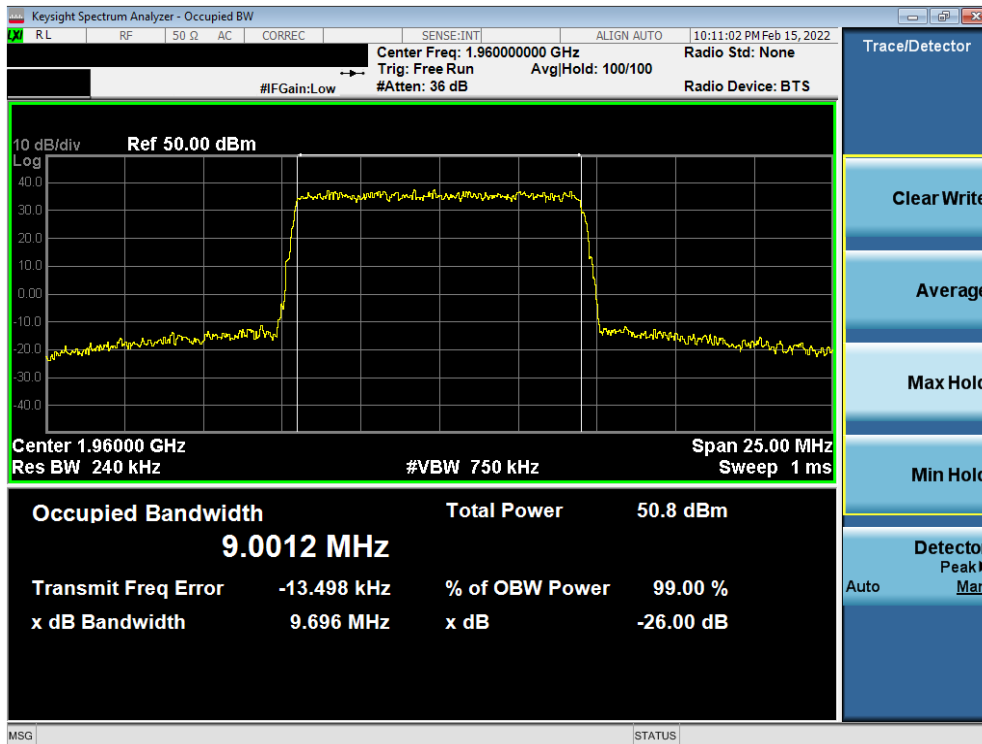


Plot 7-34. Occupied Bandwidth Plot (LTE Band 2 - 10MHz 16-QAM - Full RB - Ant2)

FCC ID: QLNJIB-002	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2202140017-01.QLJ	Test Dates: 02/14/2022 - 03/15/2022	EUT Type: Band 2 iCore NIB	Page 30 of 106

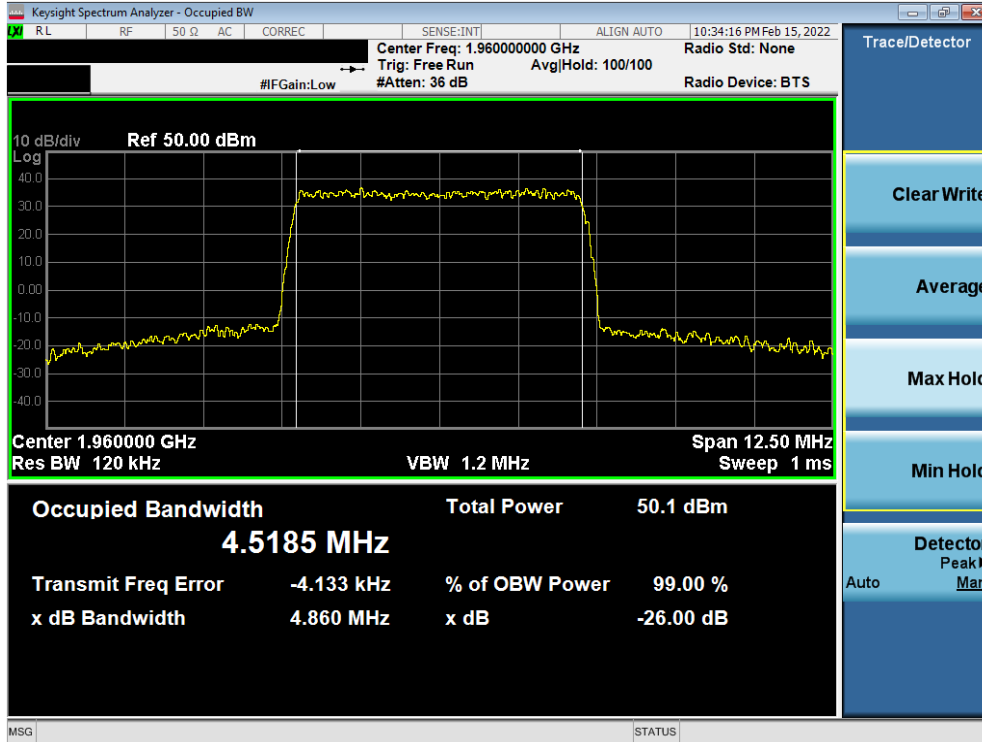


Plot 7-35. Occupied Bandwidth Plot (LTE Band 2 - 10MHz 64-QAM - Full RB - Ant2)

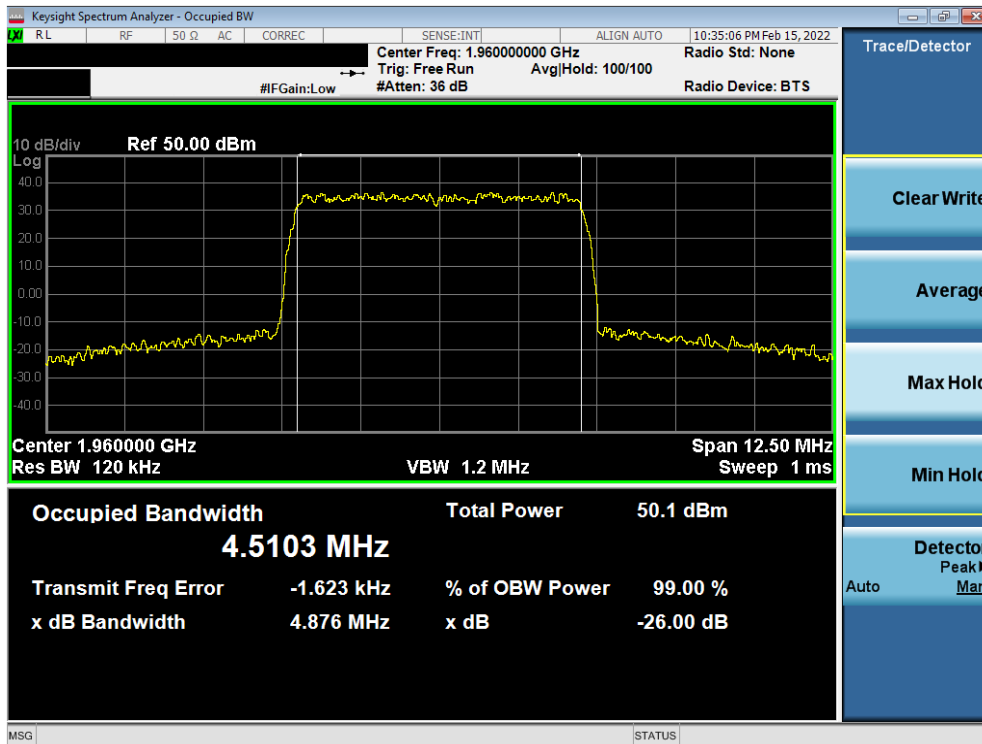


Plot 7-36. Occupied Bandwidth Plot (LTE Band 2 - 10MHz 256-QAM - Full RB - Ant2)

FCC ID: QLJNIB-002	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2202140017-01.QLJ	Test Dates: 02/14/2022 - 03/15/2022	EUT Type: Band 2 iCore NIB	Page 31 of 106

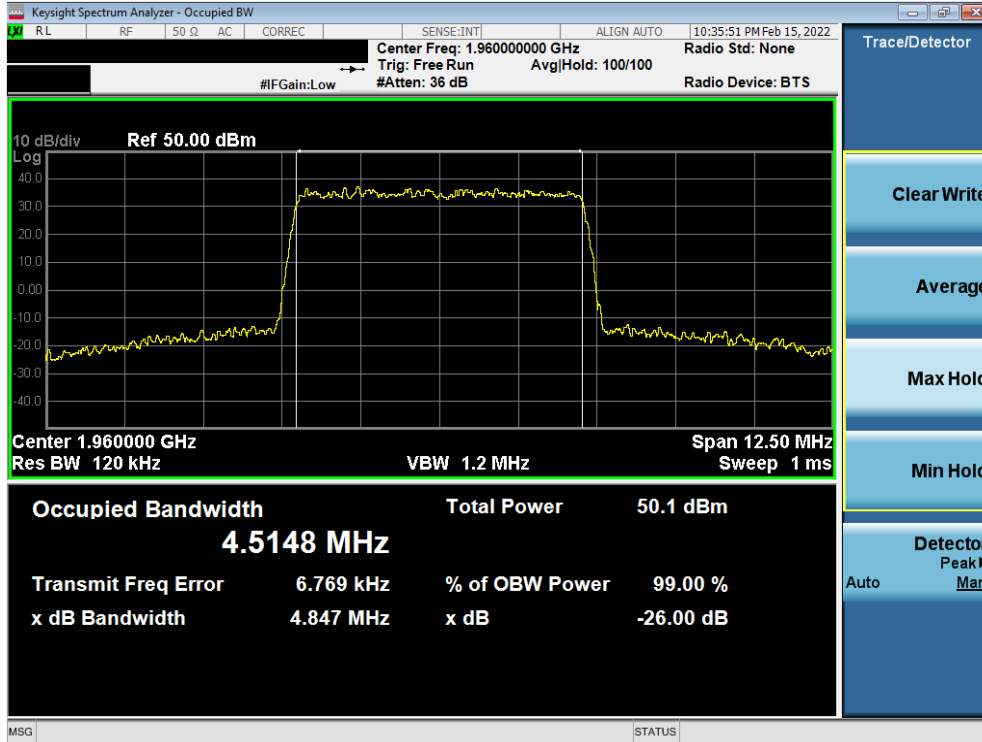


Plot 7-37. Occupied Bandwidth Plot (LTE Band 2 - 5MHz QPSK - Full RB - Ant2)

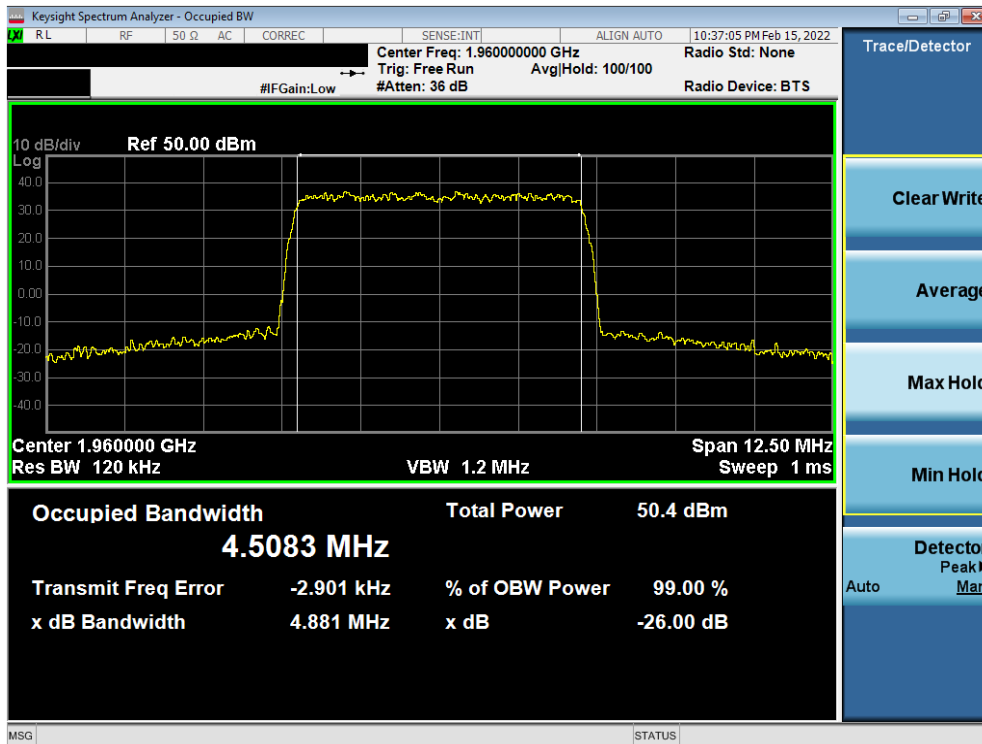


Plot 7-38. Occupied Bandwidth Plot (LTE Band 2 - 5MHz 16-QAM - Full RB - Ant2)

FCC ID: QLJNIB-002	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2202140017-01.QLJ	Test Dates: 02/14/2022 - 03/15/2022	EUT Type: Band 2 iCore NIB	Page 32 of 106

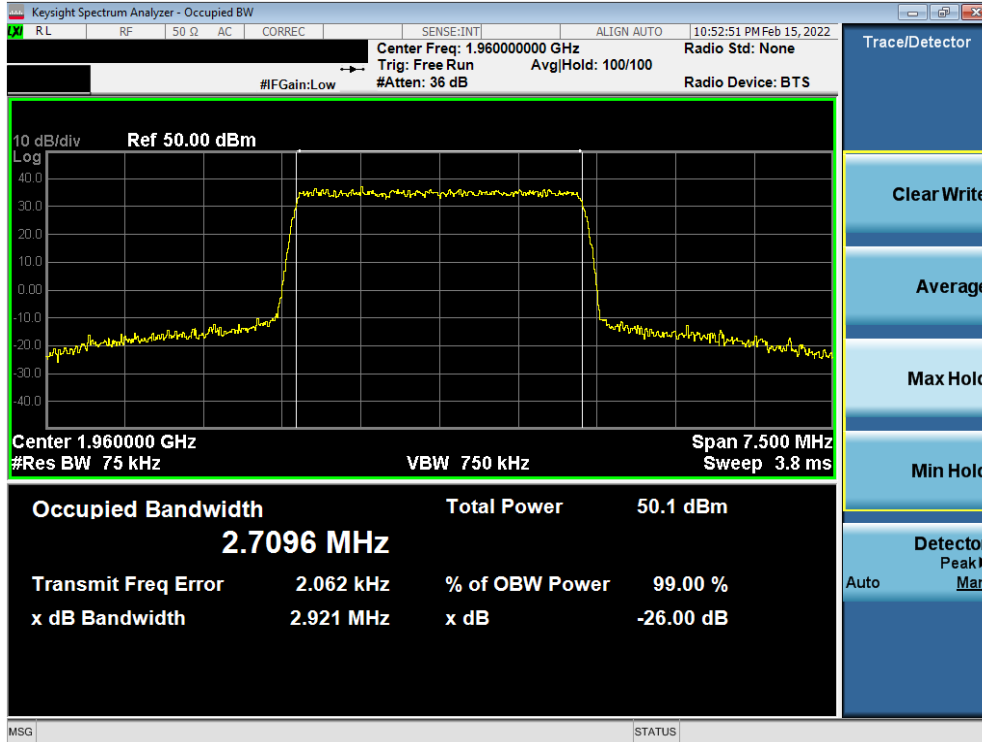


Plot 7-39. Occupied Bandwidth Plot (LTE Band 2 - 5MHz 64-QAM - Full RB - Ant2)

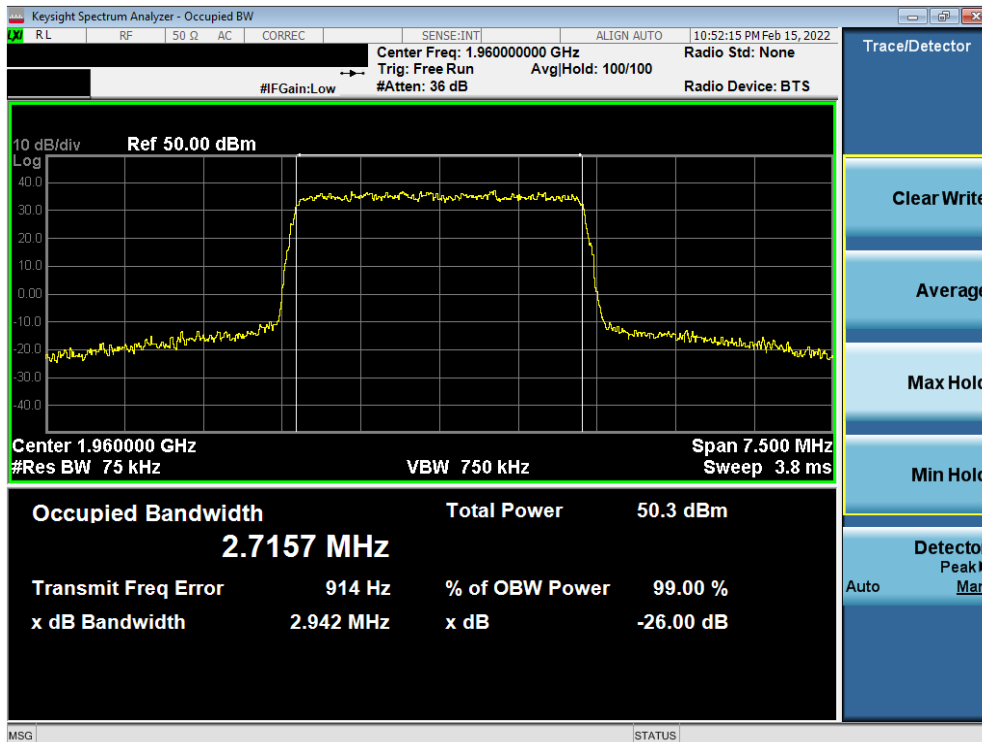


Plot 7-40. Occupied Bandwidth Plot (LTE Band 2 - 5MHz 256-QAM - Full RB - Ant2)

FCC ID: QLNJIB-002	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2202140017-01.QLJ	Test Dates: 02/14/2022 - 03/15/2022	EUT Type: Band 2 iCore NIB	Page 33 of 106

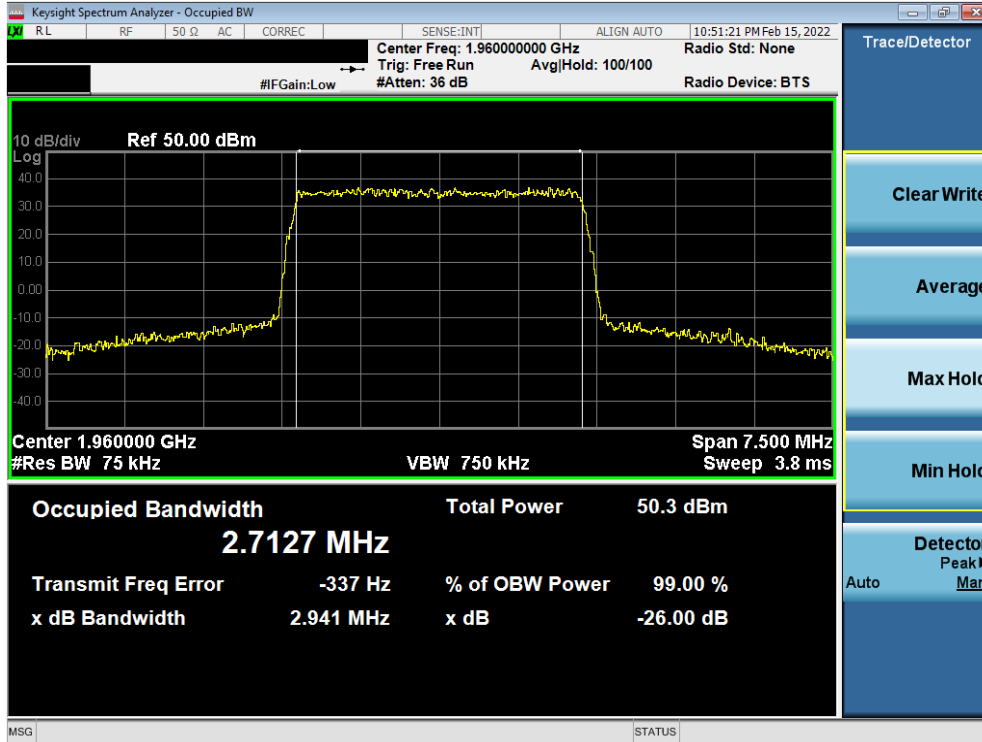


Plot 7-41. Occupied Bandwidth Plot (LTE Band 2 - 3MHz QPSK - Full RB - Ant2)

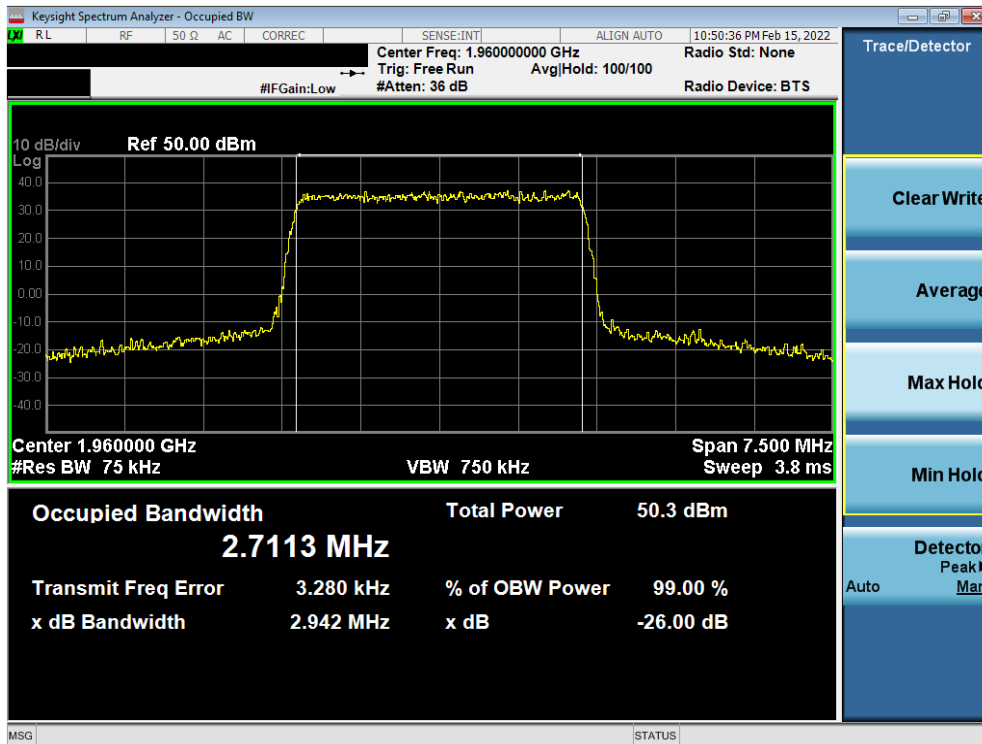


Plot 7-42. Occupied Bandwidth Plot (LTE Band 2 - 3MHz 16-QAM - Full RB - Ant2)

FCC ID: QLJNIB-002	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2202140017-01.QLJ	Test Dates: 02/14/2022 - 03/15/2022	EUT Type: Band 2 iCore NIB	Page 34 of 106

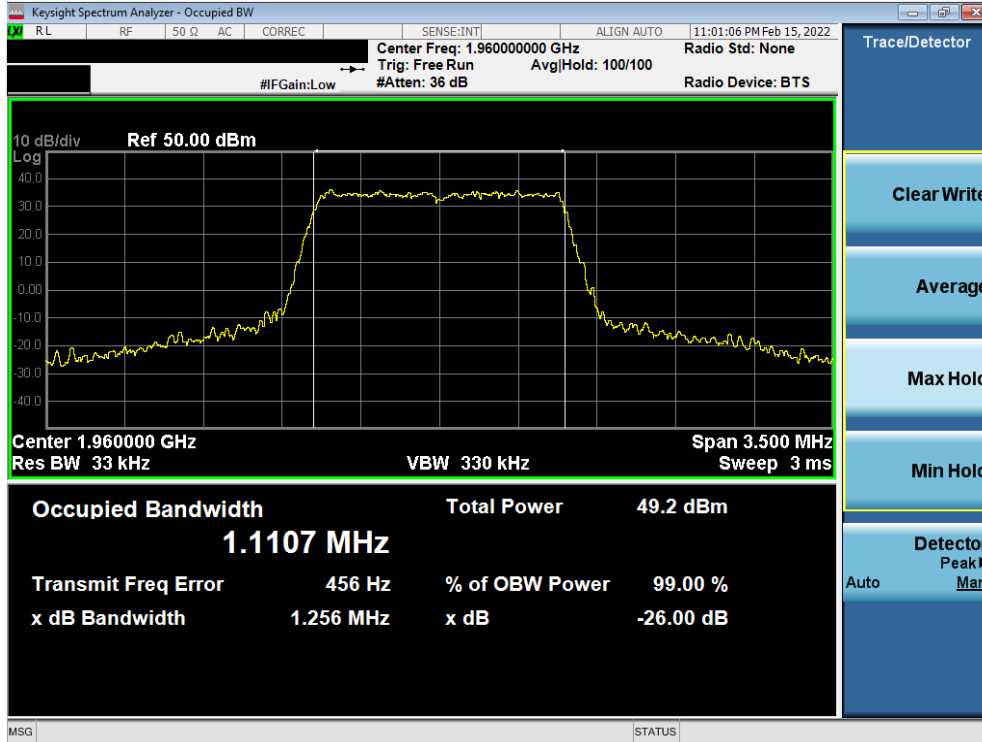


Plot 7-43. Occupied Bandwidth Plot (LTE Band 2 - 3MHz 64-QAM - Full RB - Ant2)

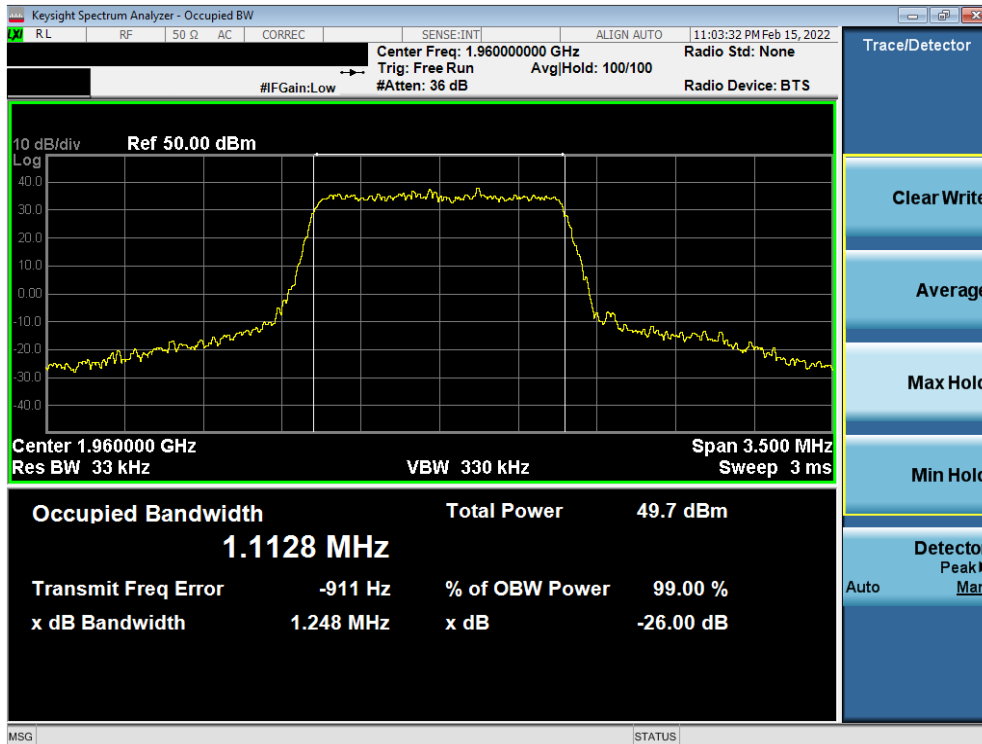


Plot 7-44. Occupied Bandwidth Plot (LTE Band 2 - 3MHz 256-QAM - Full RB - Ant2)

FCC ID: QLJNIB-002	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2202140017-01.QLJ	Test Dates: 02/14/2022 - 03/15/2022	EUT Type: Band 2 iCore NIB	Page 35 of 106

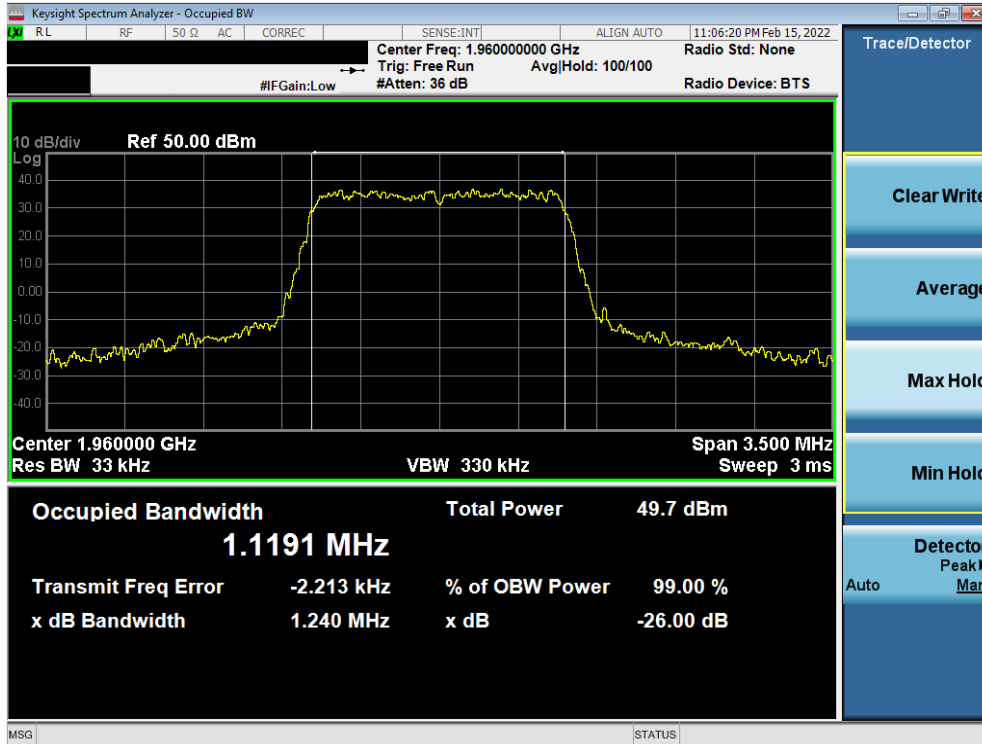


Plot 7-45. Occupied Bandwidth Plot (LTE Band 2 - 1.4MHz QPSK - Full RB - Ant2)

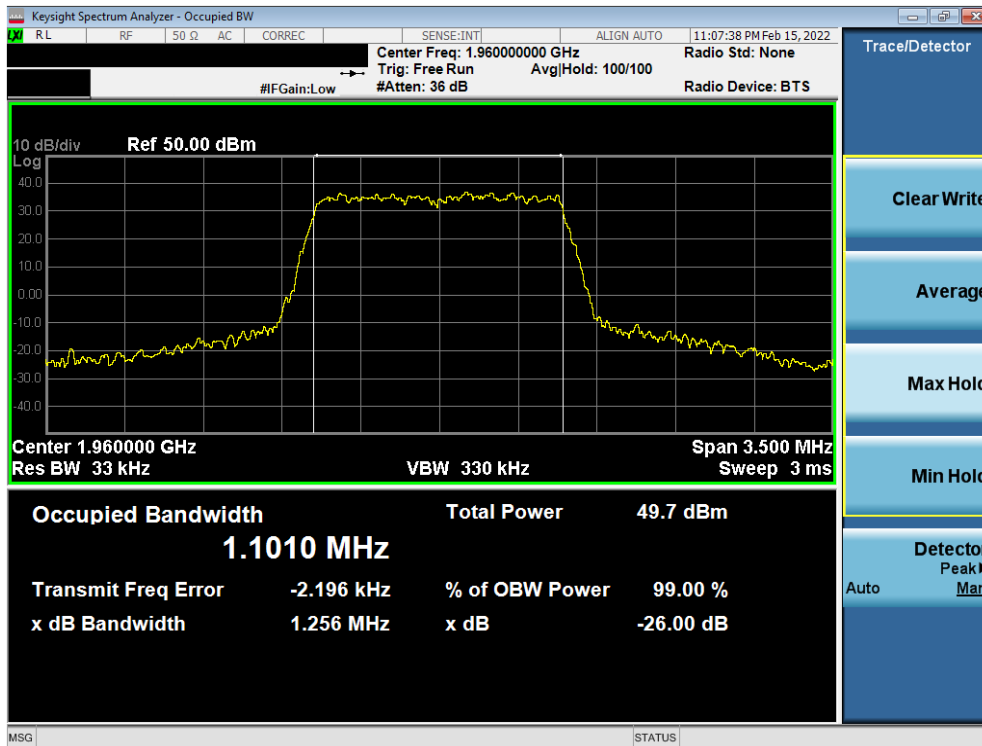


Plot 7-46. Occupied Bandwidth Plot (LTE Band 2 - 1.4MHz 16-QAM - Full RB - Ant2)

FCC ID: QLJNIB-002	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2202140017-01.QLJ	Test Dates: 02/14/2022 - 03/15/2022	EUT Type: Band 2 iCore NIB	Page 36 of 106



Plot 7-47. Occupied Bandwidth Plot (LTE Band 2 - 1.4MHz 64-QAM - Full RB - Ant2)



Plot 7-48. Occupied Bandwidth Plot (LTE Band 2 - 1.4MHz 256-QAM - Full RB - Ant2)

FCC ID: QLJNIB-002	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2202140017-01.QLJ	Test Dates: 02/14/2022 - 03/15/2022	EUT Type: Band 2 iCore NIB	Page 37 of 106

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

KDB 971168 D01 v03r01 – Section 6.0

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.



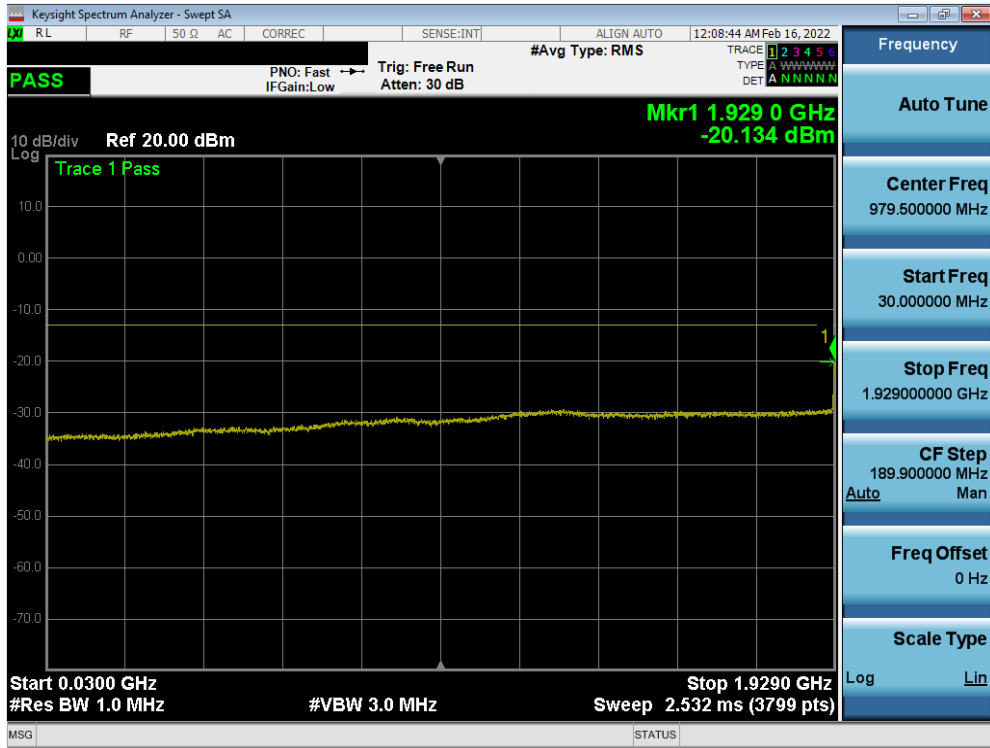
Figure 7-3. Test Instrument & Measurement Setup

Test Note

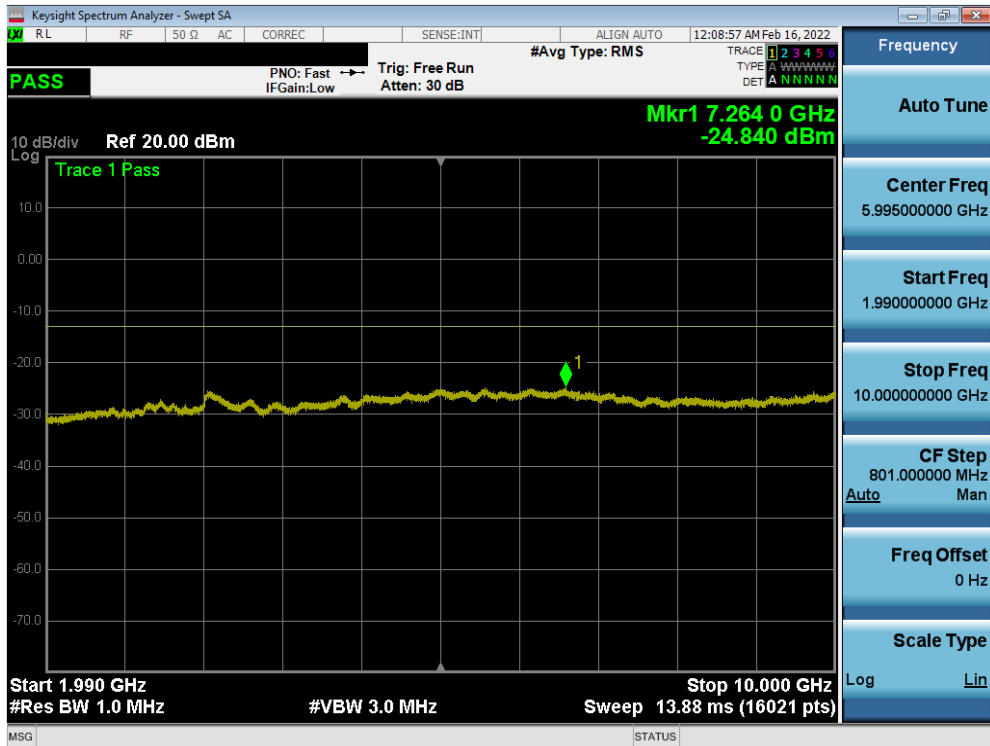
Per Part 24, compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth 1 MHz or greater.

FCC ID: QLJNIB-002	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2202140017-01.QLJ	Test Dates: 02/14/2022 - 03/15/2022	EUT Type: Band 2 iCore NIB	Page 38 of 106

LTE Band 2 – Ant1

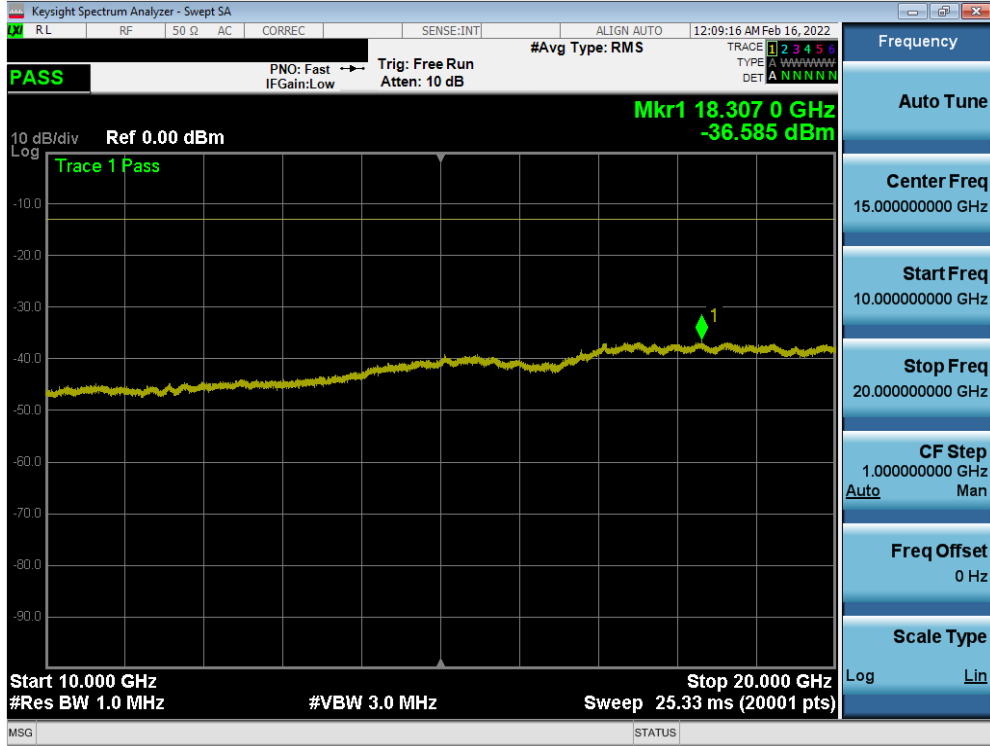


Plot 7-49. Conducted Spurious Plot (LTE Band 2 - 20MHz QPSK - Full RB - Low Channel - Ant1)

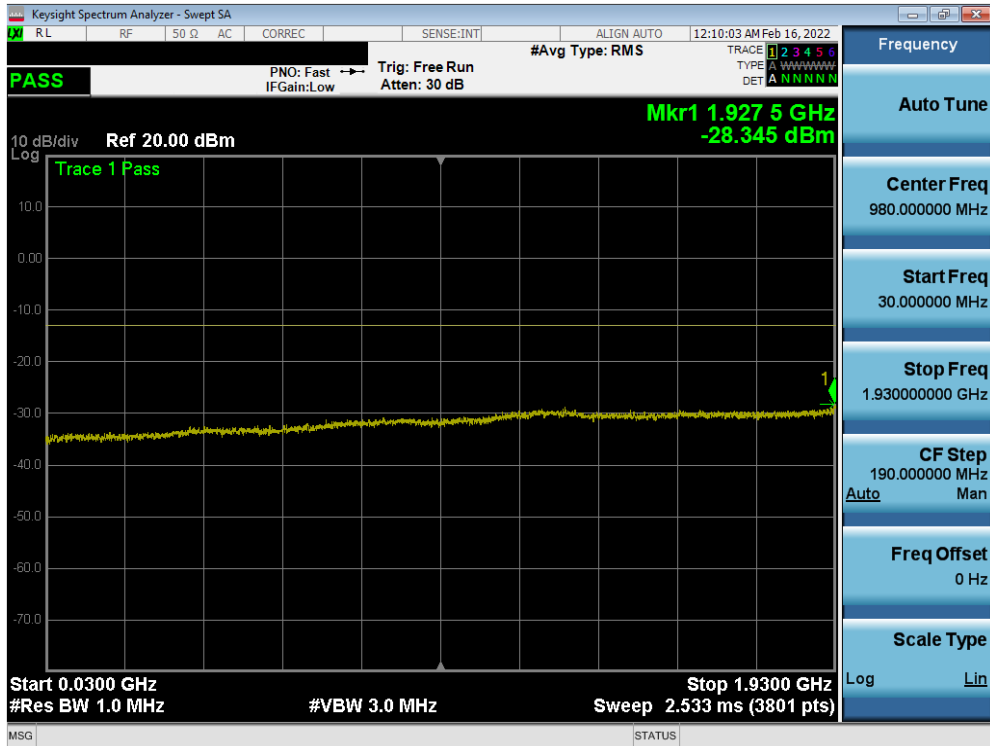


Plot 7-50. Conducted Spurious Plot (LTE Band 2 - 20MHz QPSK - Full RB - Low Channel - Ant1)

FCC ID: QLJNIB-002	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2202140017-01.QLJ	Test Dates: 02/14/2022 - 03/15/2022	EUT Type: Band 2 iCore NIB	Page 39 of 106

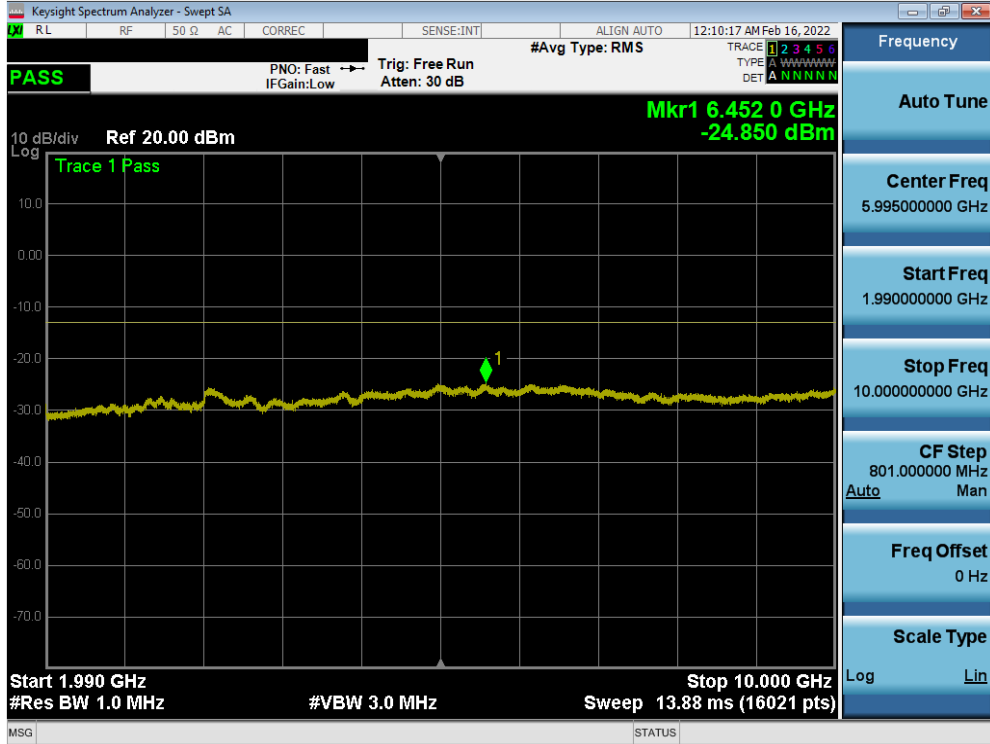


Plot 7-51. Conducted Spurious Plot (LTE Band 2 - 20MHz QPSK - Full RB - Low Channel - Ant1)

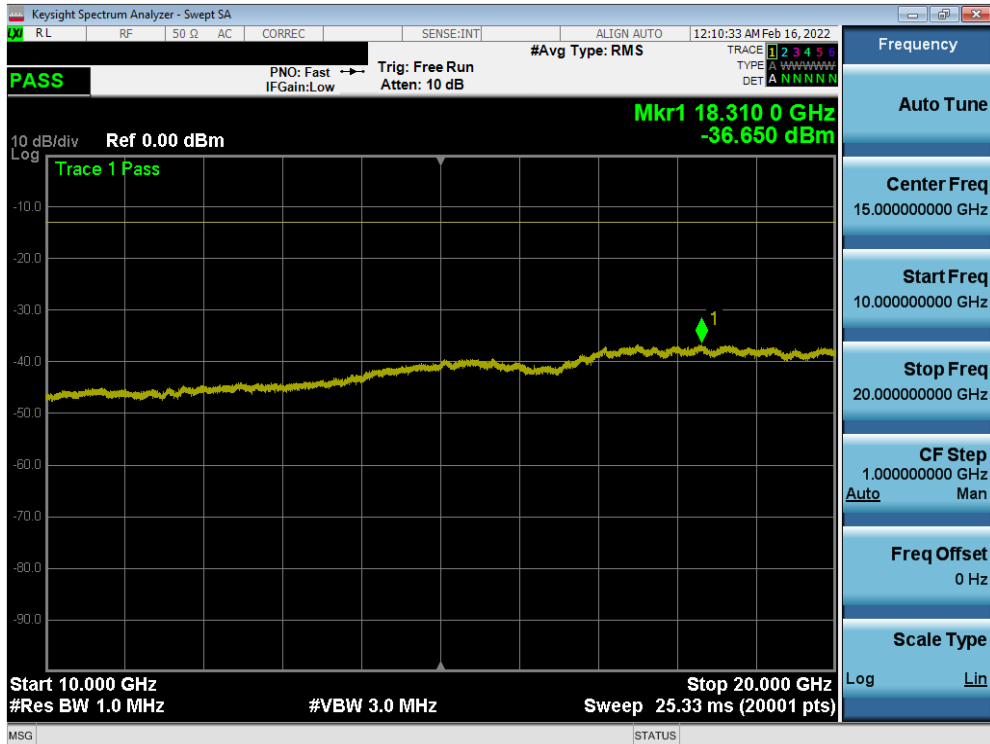


Plot 7-52. Conducted Spurious Plot (LTE Band 2 - 20MHz QPSK - Full RB - Mid Channel - Ant1)

FCC ID: QLJNIB-002	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2202140017-01.QLJ	Test Dates: 02/14/2022 - 03/15/2022	EUT Type: Band 2 iCore NIB	Page 40 of 106

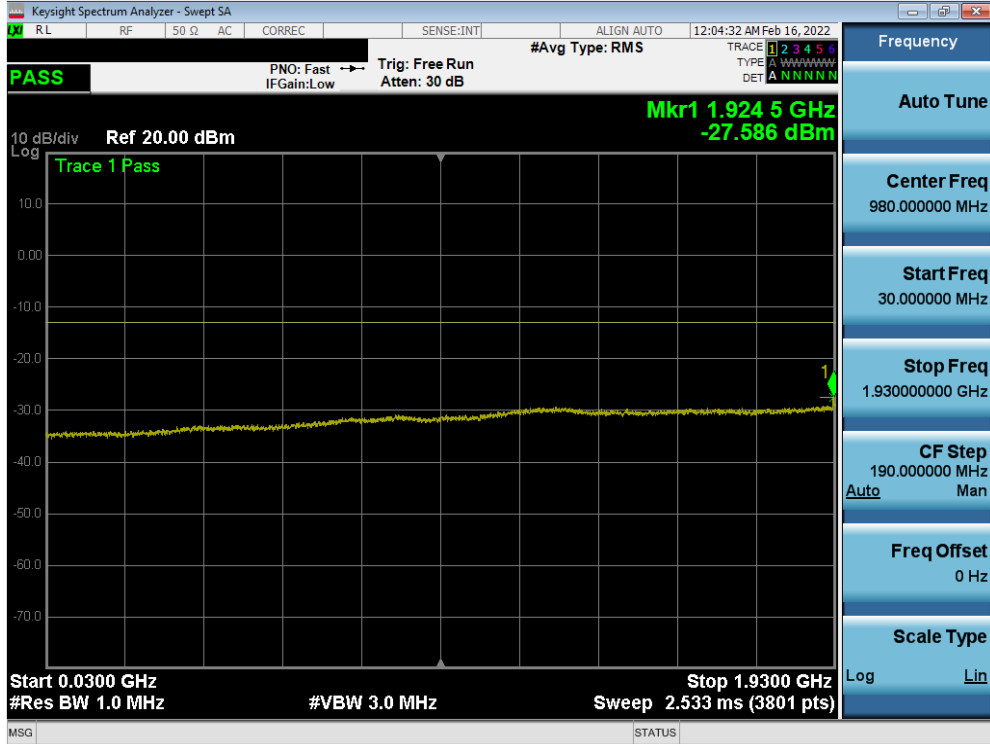


Plot 7-53. Conducted Spurious Plot (LTE Band 2 - 20MHz QPSK - Full RB - Mid Channel - Ant1)

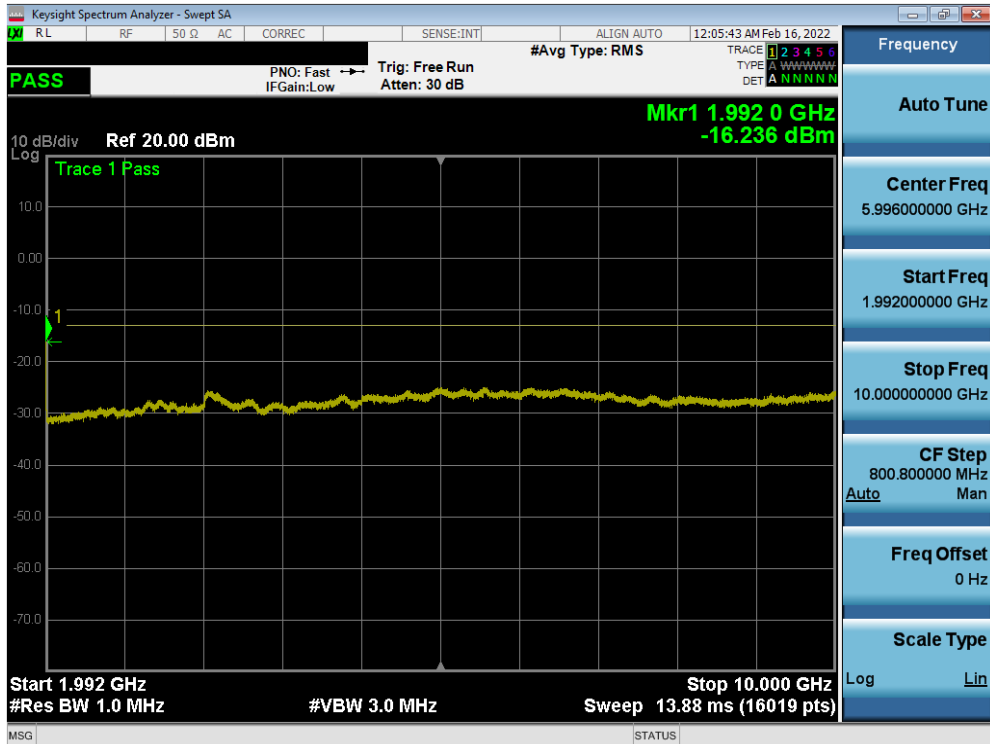


Plot 7-54. Conducted Spurious Plot (LTE Band 2 - 20MHz QPSK - Full RB - Mid Channel - Ant1)

FCC ID: QLJNIB-002	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2202140017-01.QLJ	Test Dates: 02/14/2022 - 03/15/2022	EUT Type: Band 2 iCore NIB	Page 41 of 106

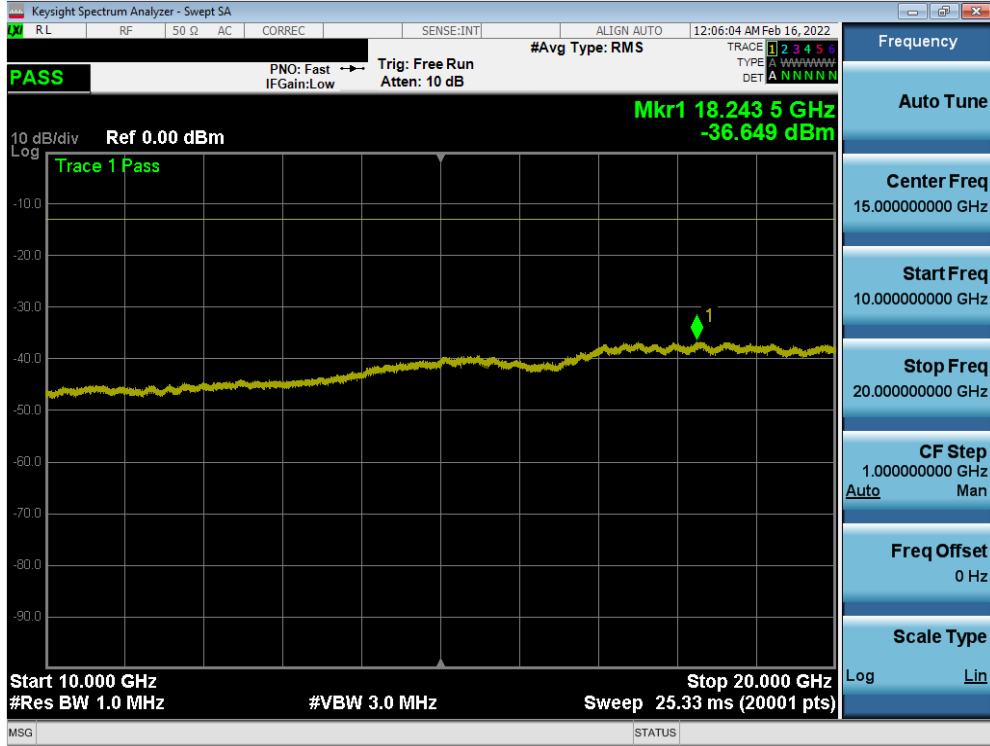


Plot 7-55. Conducted Spurious Plot (LTE Band 2 - 20MHz QPSK - Full RB - High Channel - Ant1)



Plot 7-56. Conducted Spurious Plot (LTE Band 2 - 20MHz QPSK - Full RB - High Channel - Ant1)

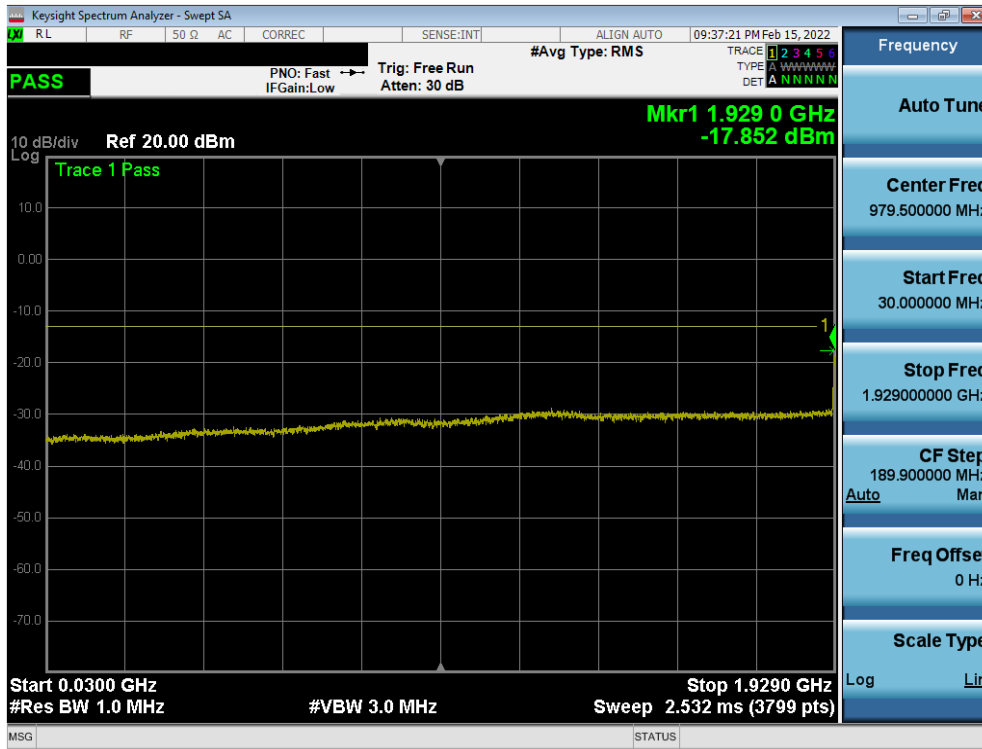
FCC ID: QLJNIB-002	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2202140017-01.QLJ	Test Dates: 02/14/2022 - 03/15/2022	EUT Type: Band 2 iCore NIB	Page 42 of 106



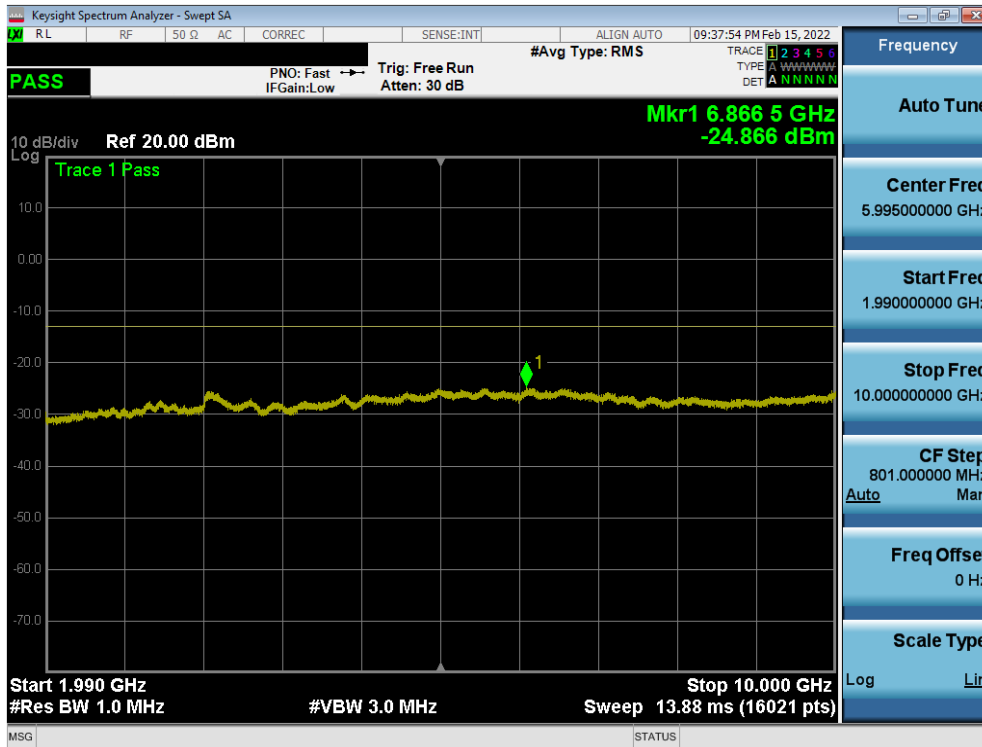
Plot 7-57. Conducted Spurious Plot (LTE Band 2 - 20MHz QPSK - Full RB - High Channel - Ant1)

FCC ID: QLJNIB-002	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2202140017-01.QLJ	Test Dates: 02/14/2022 - 03/15/2022	EUT Type: Band 2 iCore NIB	Page 43 of 106

LTE Band 2 – Ant2

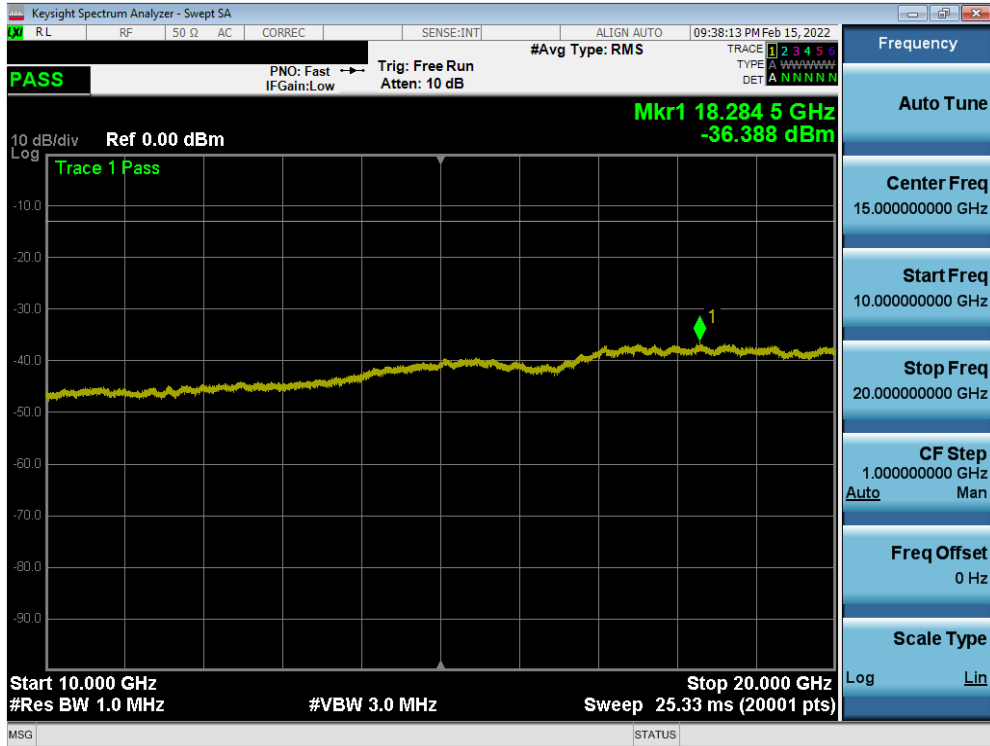


Plot 7-58. Conducted Spurious Plot (LTE Band 2 - 20MHz QPSK - Full RB - Low Channel - Ant2)

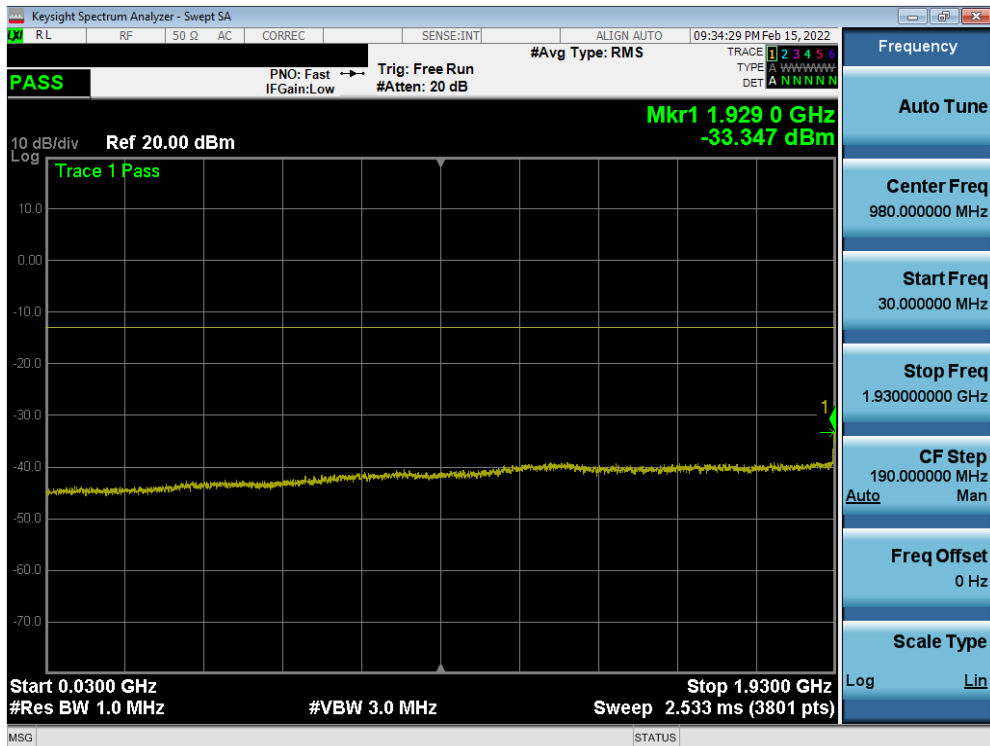


Plot 7-59. Conducted Spurious Plot (LTE Band 2 - 20MHz QPSK - Full RB - Low Channel - Ant2)

FCC ID: QLJNIB-002	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2202140017-01.QLJ	Test Dates: 02/14/2022 - 03/15/2022	EUT Type: Band 2 iCore NIB	Page 44 of 106

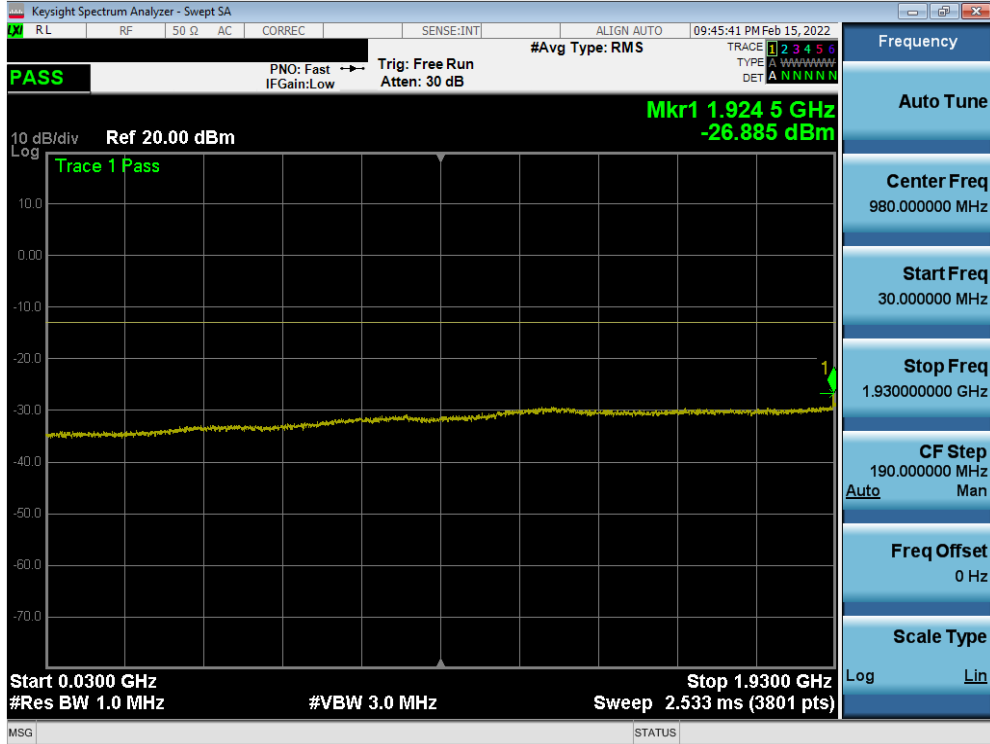


Plot 7-60. Conducted Spurious Plot (LTE Band 2 - 20MHz QPSK - Full RB - Low Channel - Ant2)

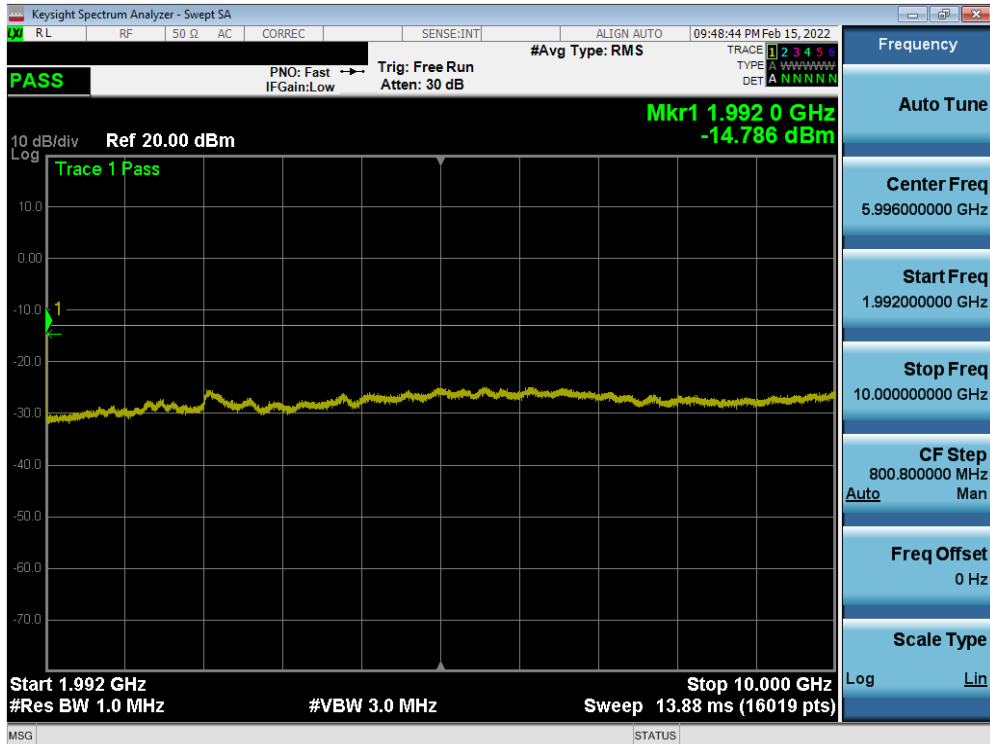


Plot 7-61. Conducted Spurious Plot (LTE Band 2 - 20MHz QPSK - Full RB - Mid Channel - Ant2)

FCC ID: QLJNIB-002	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2202140017-01.QLJ	Test Dates: 02/14/2022 - 03/15/2022	EUT Type: Band 2 iCore NIB	Page 45 of 106

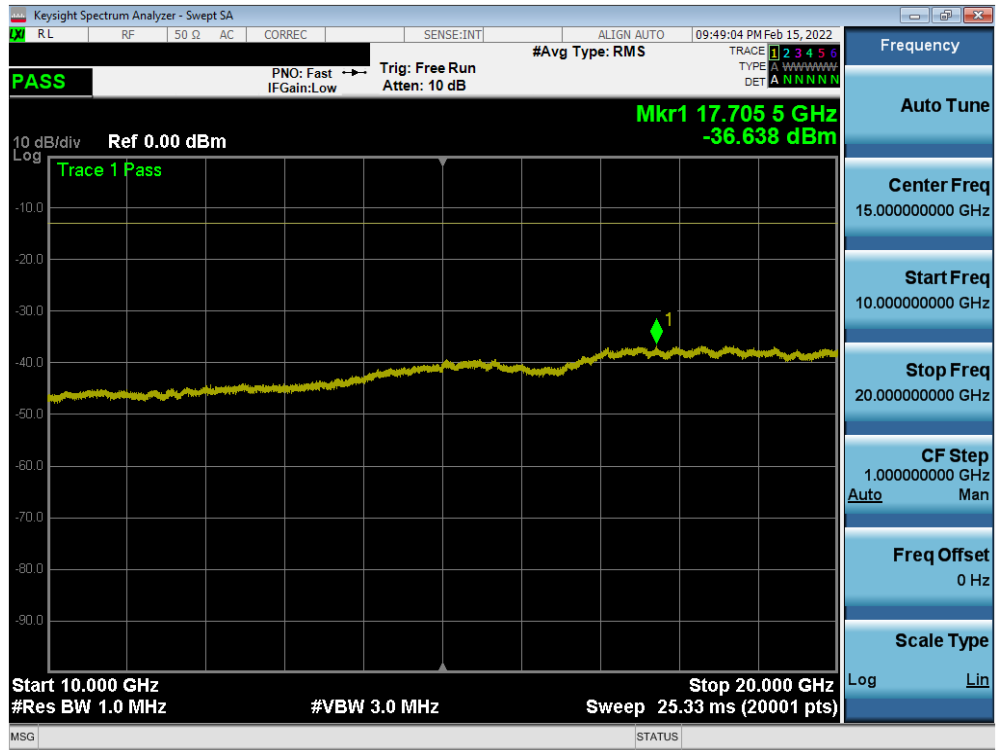


Plot 7-64. Conducted Spurious Plot (LTE Band 2 - 20MHz QPSK - Full RB - High Channel - Ant2)



Plot 7-65. Conducted Spurious Plot (LTE Band 2 - 20MHz QPSK - Full RB - High Channel - Ant2)

FCC ID: QLJNIB-002	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2202140017-01.QLJ	Test Dates: 02/14/2022 - 03/15/2022	EUT Type: Band 2 iCore NIB	Page 47 of 106



Plot 7-66. Conducted Spurious Plot (LTE Band 2 - 20MHz QPSK - Full RB - High Channel - Ant2)

FCC ID: QLJNIB-002	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2202140017-01.QLJ	Test Dates: 02/14/2022 - 03/15/2022	EUT Type: Band 2 iCore NIB	Page 48 of 106

7.5 Band Edge Emissions at Antenna Terminal

Test Overview

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

KDB 971168 D01 v03r01 – Section 6.0

Test Settings

1. Start and stop frequency were set such that the band edge would be placed in the center of the plot
2. Span was set large enough so as to capture all out of band emissions near the band edge
3. RBW \geq 1% of the emission bandwidth
4. VBW \geq 3 x RBW
5. Detector = RMS
6. Number of sweep points \geq 2 x Span/RBW
7. Trace mode = trace average for continuous emissions, max hold for pulse emissions
8. Sweep time = auto couple
9. The trace was allowed to stabilize

Test Setup

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

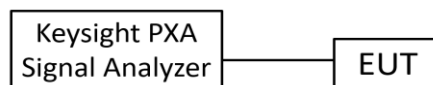


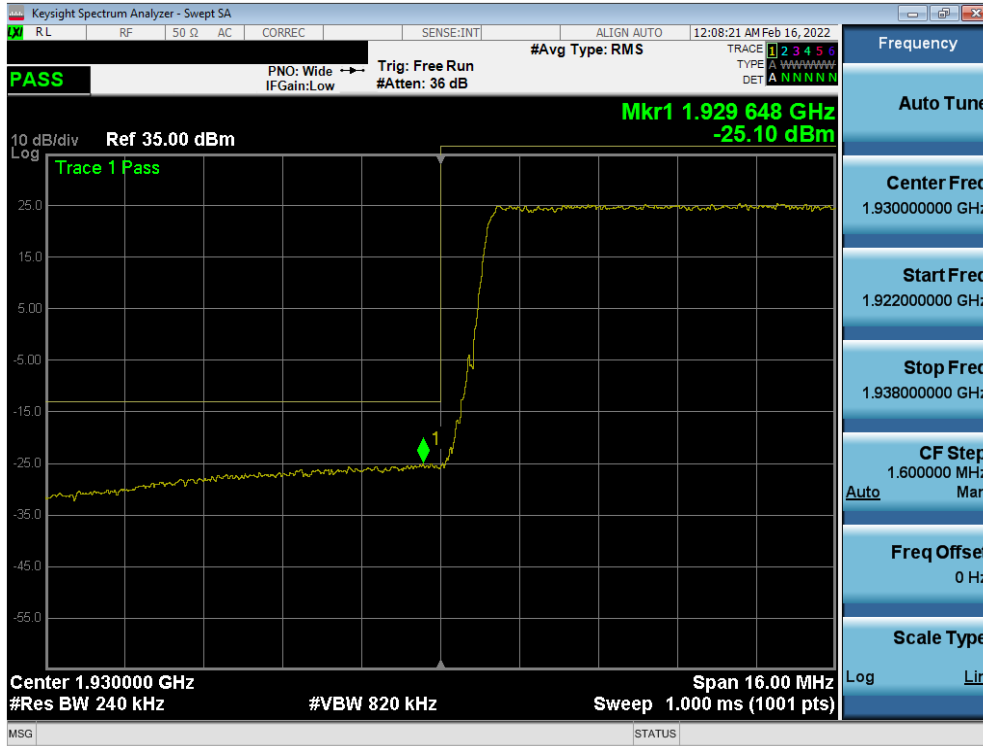
Figure 7-4. Test Instrument & Measurement Setup

Test Note

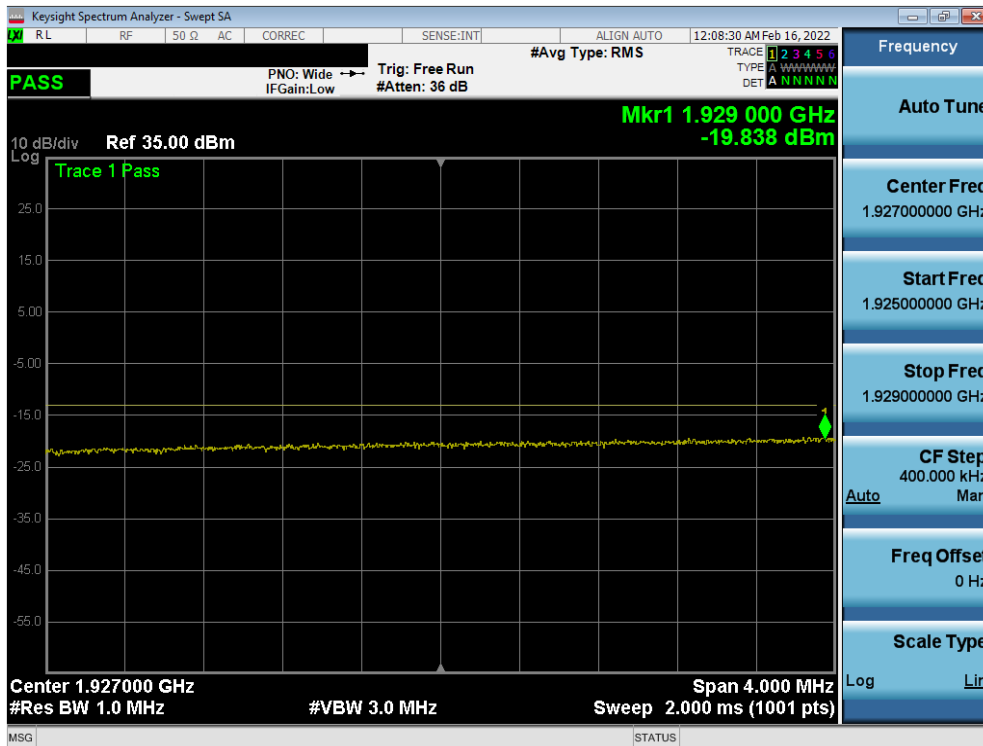
Per 24.238(b), in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed to demonstrate compliance with the out-of-band emissions limit. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emission are attenuated at least 26 dB below the transmitter power.

FCC ID: QLJNIB-002	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2202140017-01.QLJ	Test Dates: 02/14/2022 - 03/15/2022	EUT Type: Band 2 iCore NIB	Page 49 of 106

LTE Band 2 – Ant1

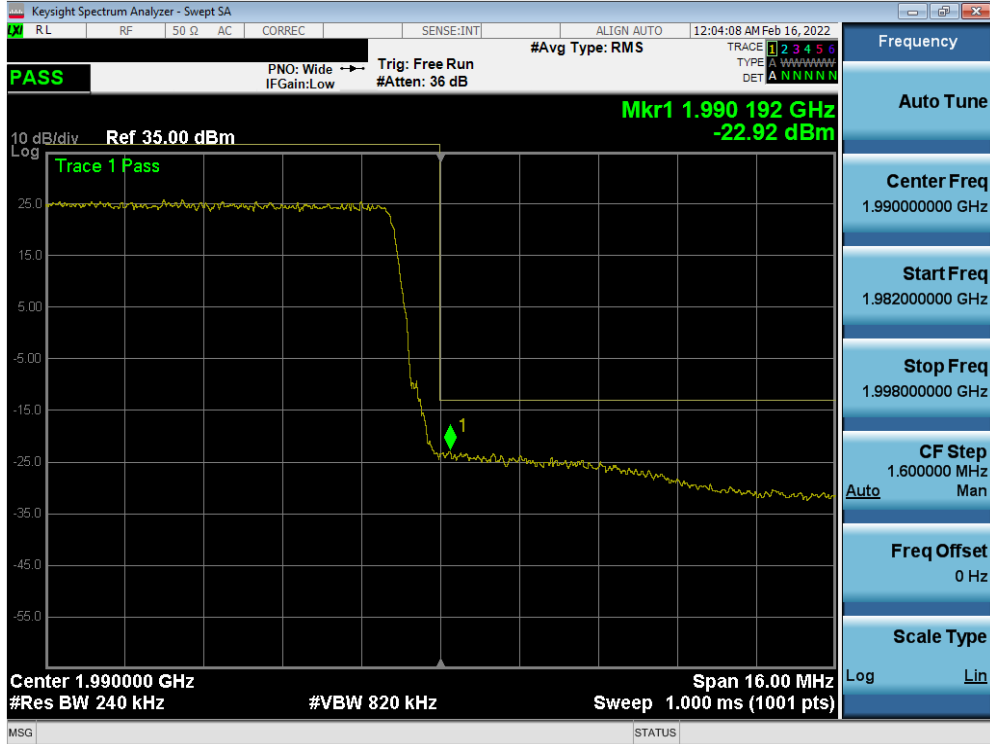


Plot 7-67. Lower Band Edge Plot (LTE Band 2 - 20MHz QPSK – Full RB - Ant1)

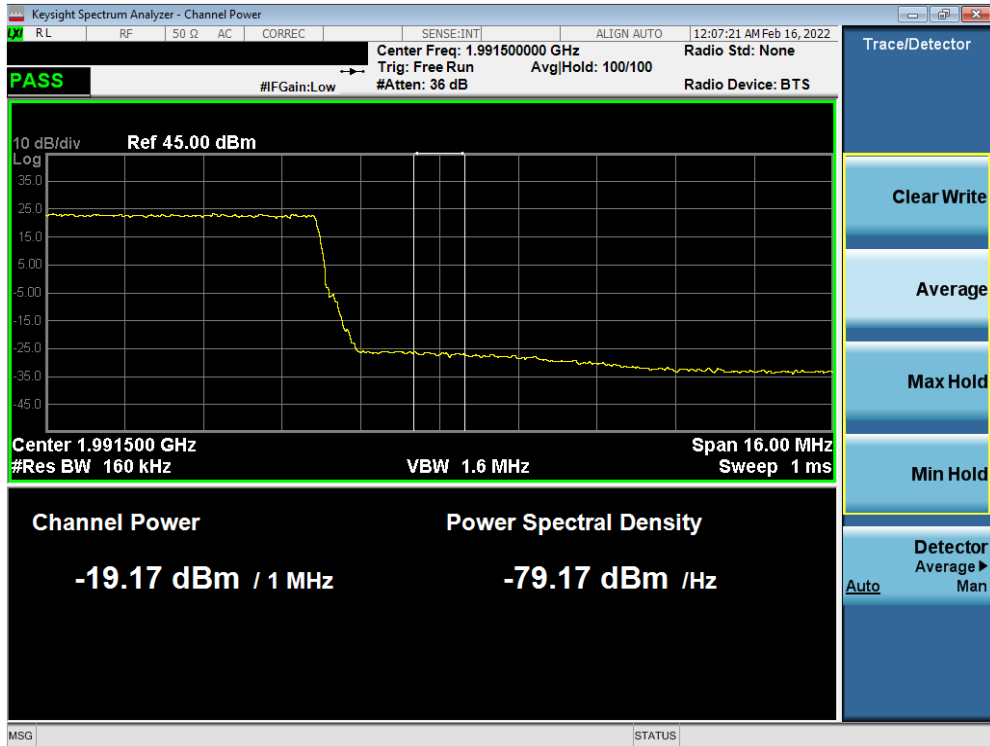


Plot 7-68. Extended Lower Band Edge Plot (LTE Band 2 - 20MHz QPSK – Full RB - Ant1)

FCC ID: QLJNIB-002	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2202140017-01.QLJ	Test Dates: 02/14/2022 - 03/15/2022	EUT Type: Band 2 iCore NIB	Page 50 of 106

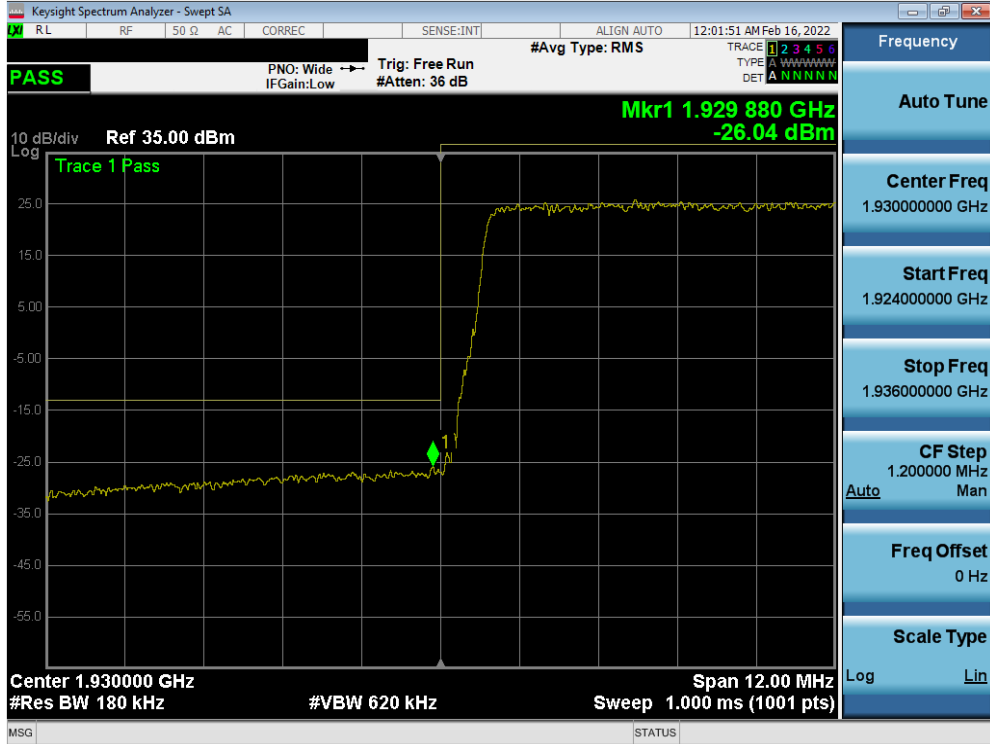


Plot 7-69. Upper Band Edge Plot (LTE Band 2 - 20MHz QPSK – Full RB - Ant1)

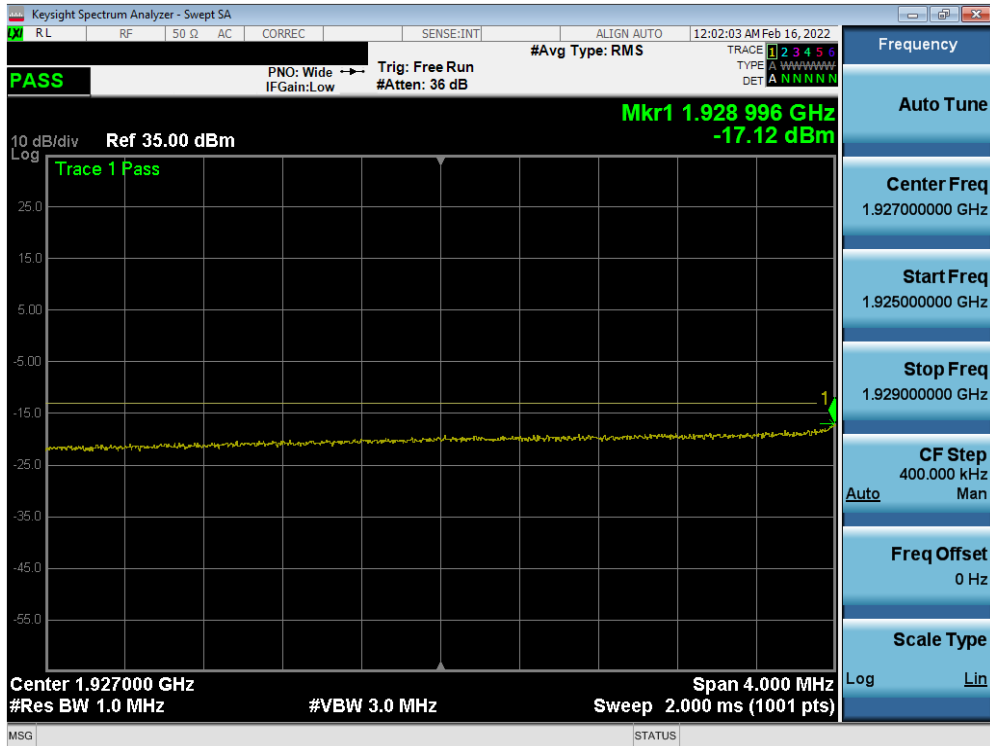


Plot 7-70. Extended Upper Band Edge Plot (LTE Band 2 - 20MHz QPSK – Full RB - Ant1)

FCC ID: QLJNIB-002	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2202140017-01.QLJ	Test Dates: 02/14/2022 - 03/15/2022	EUT Type: Band 2 iCore NIB	Page 51 of 106

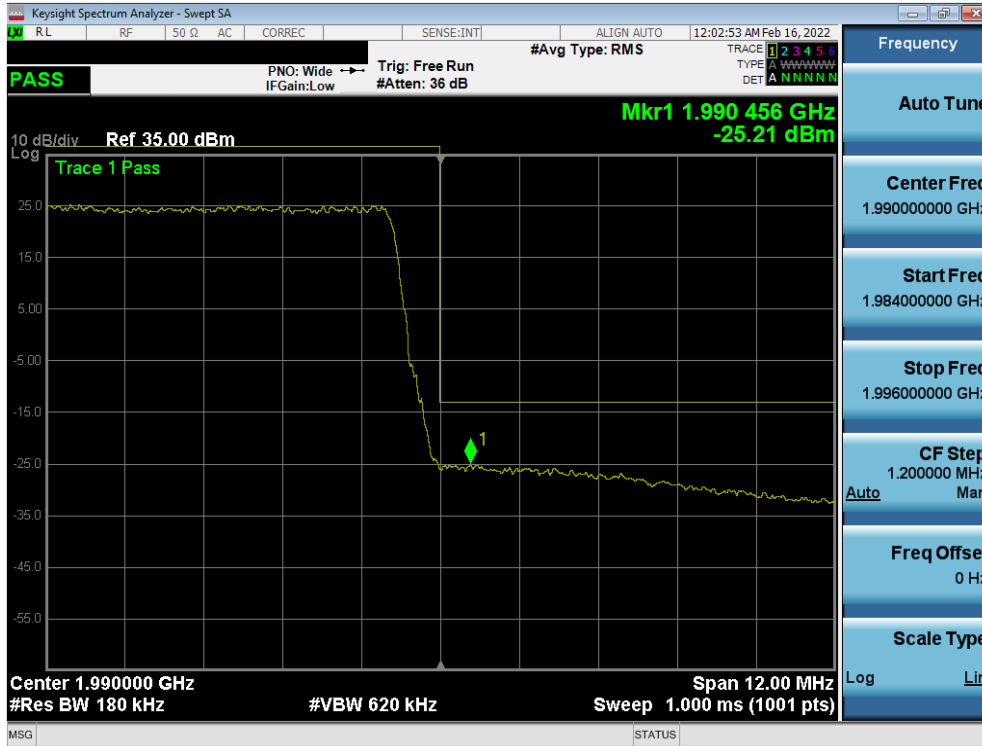


Plot 7-71. Lower Band Edge Plot (LTE Band 2 - 15MHz QPSK – Full RB - Ant1)



Plot 7-72. Extended Lower Band Edge Plot (LTE Band 2 - 15MHz QPSK – Full RB - Ant1)

FCC ID: QLJNIB-002	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2202140017-01.QLJ	Test Dates: 02/14/2022 - 03/15/2022	EUT Type: Band 2 iCore NIB	Page 52 of 106

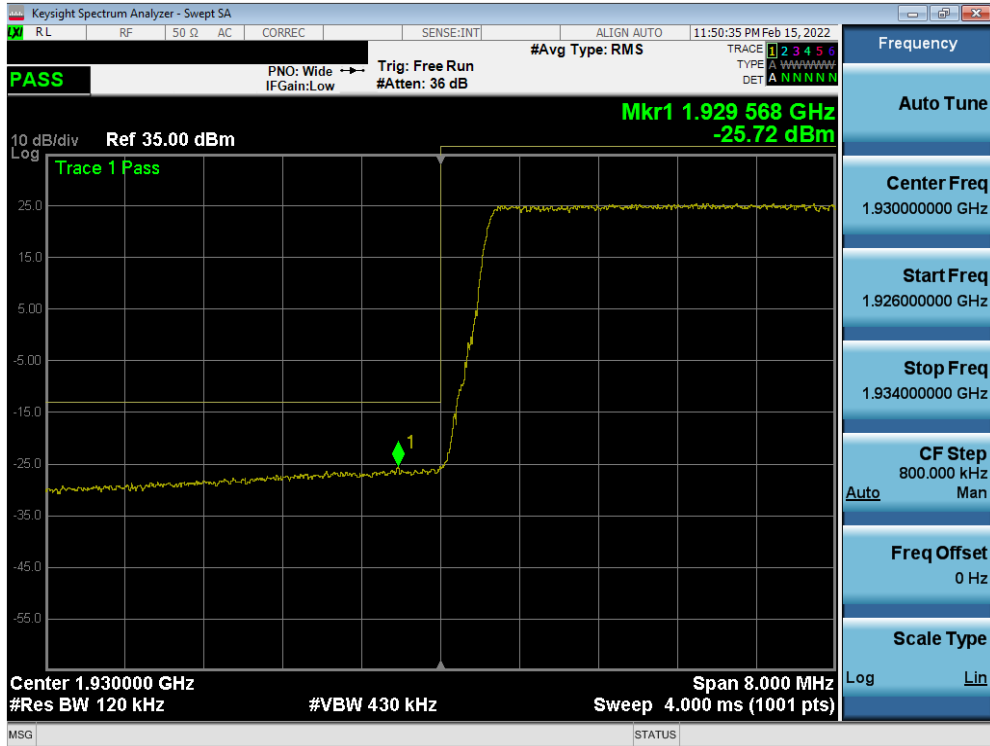


Plot 7-73. Upper Band Edge Plot (LTE Band 2 - 15MHz QPSK – Full RB - Ant1)

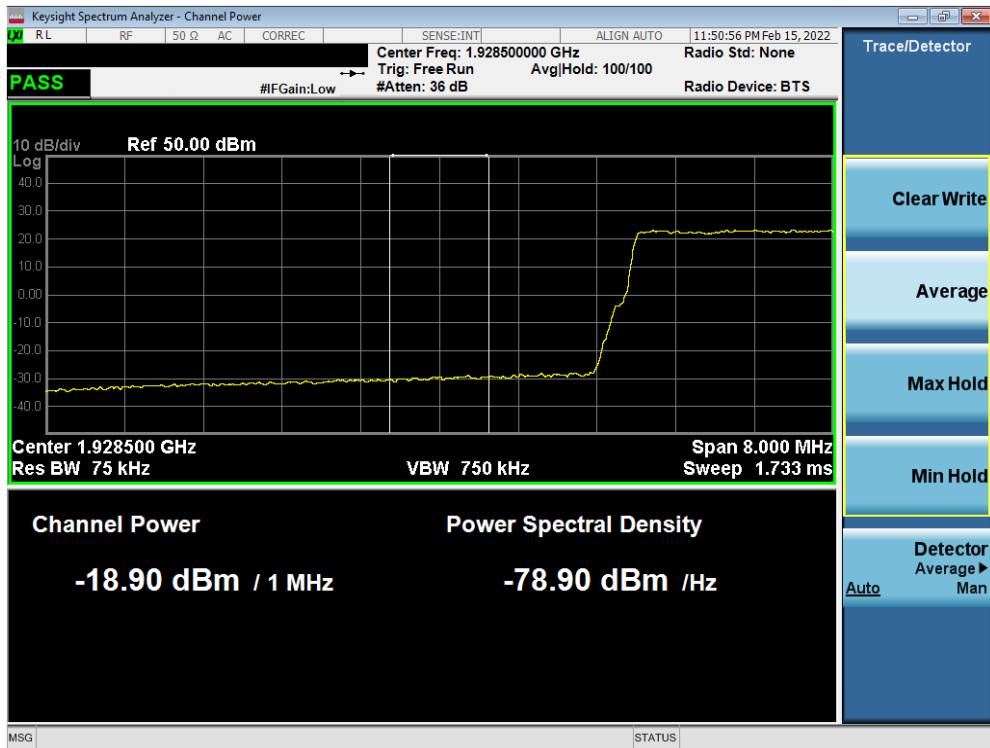


Plot 7-74. Extended Upper Band Edge Plot (LTE Band 2 - 15MHz QPSK – Full RB - Ant1)

FCC ID: QLJNIB-002	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2202140017-01.QLJ	Test Dates: 02/14/2022 - 03/15/2022	EUT Type: Band 2 iCore NIB	Page 53 of 106

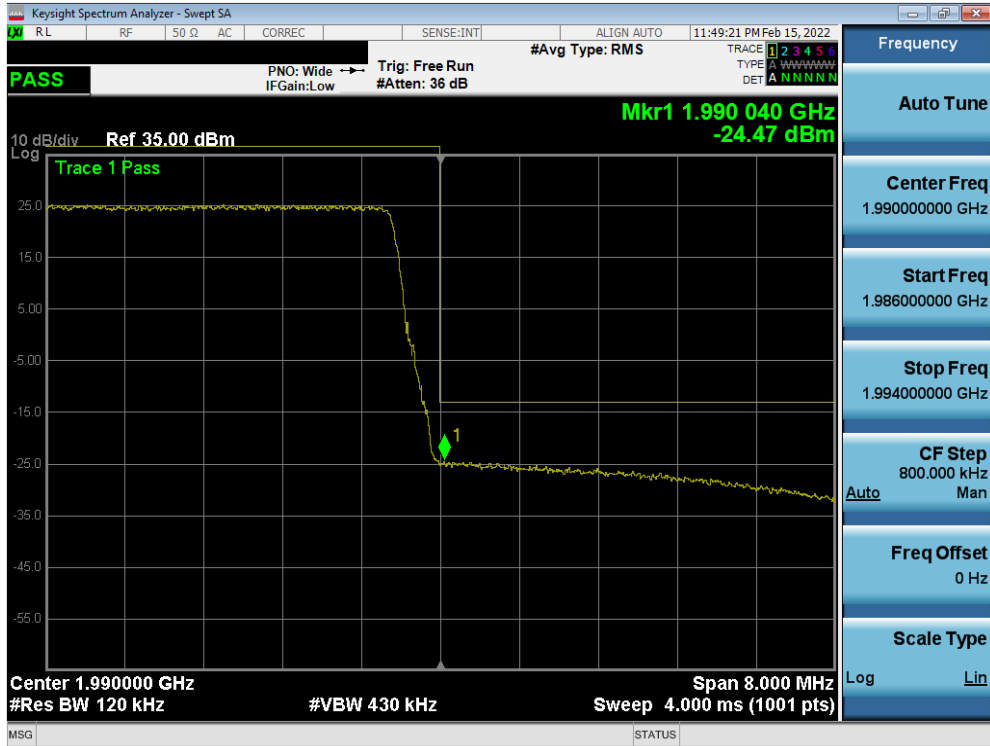


Plot 7-75. Lower Band Edge Plot (LTE Band 2 - 10MHz QPSK – Full RB - Ant1)

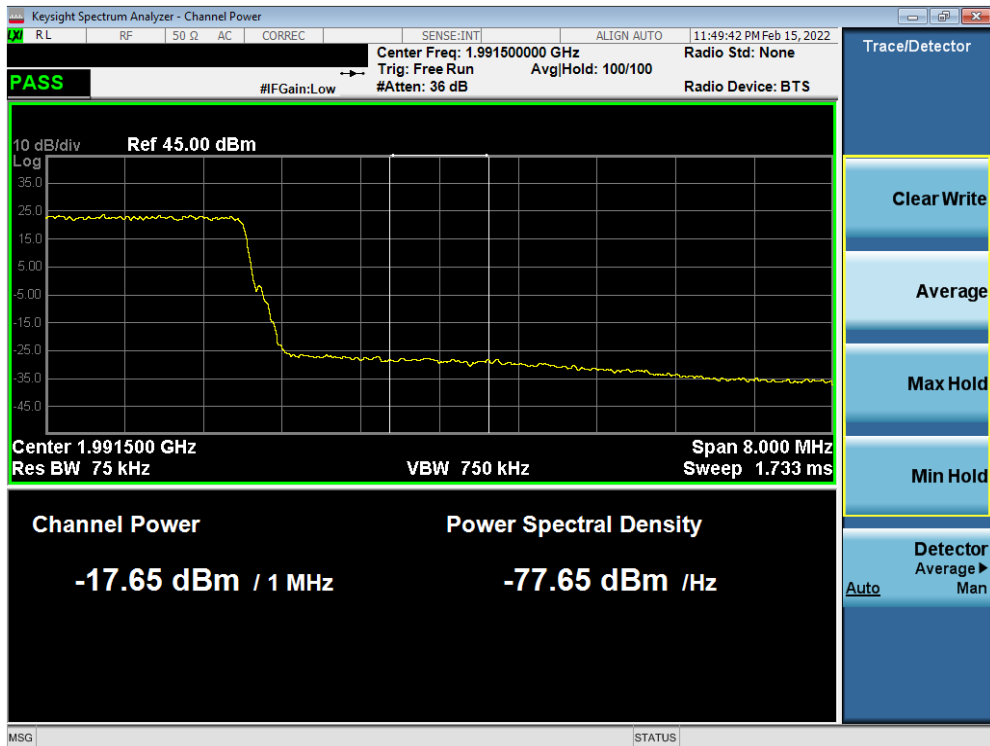


Plot 7-76. Extended Lower Band Edge Plot (LTE Band 2 - 10MHz QPSK – Full RB - Ant1)

FCC ID: QLJNIB-002	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2202140017-01.QLJ	Test Dates: 02/14/2022 - 03/15/2022	EUT Type: Band 2 iCore NIB	Page 54 of 106

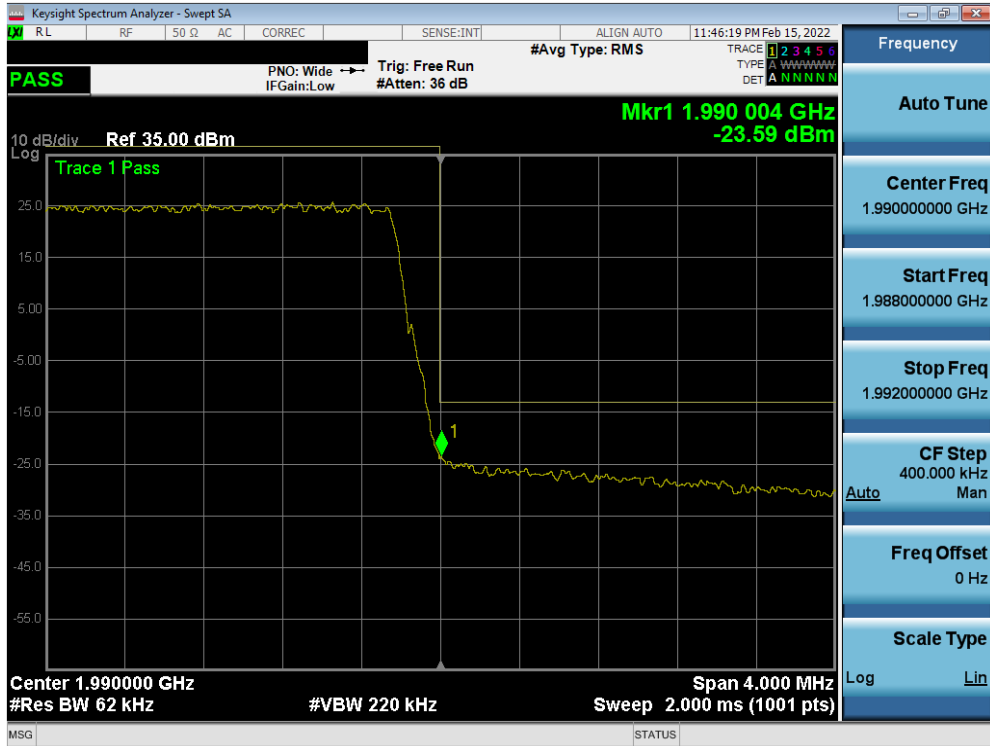


Plot 7-77. Upper Band Edge Plot (LTE Band 2 - 10MHz QPSK – Full RB - Ant1)

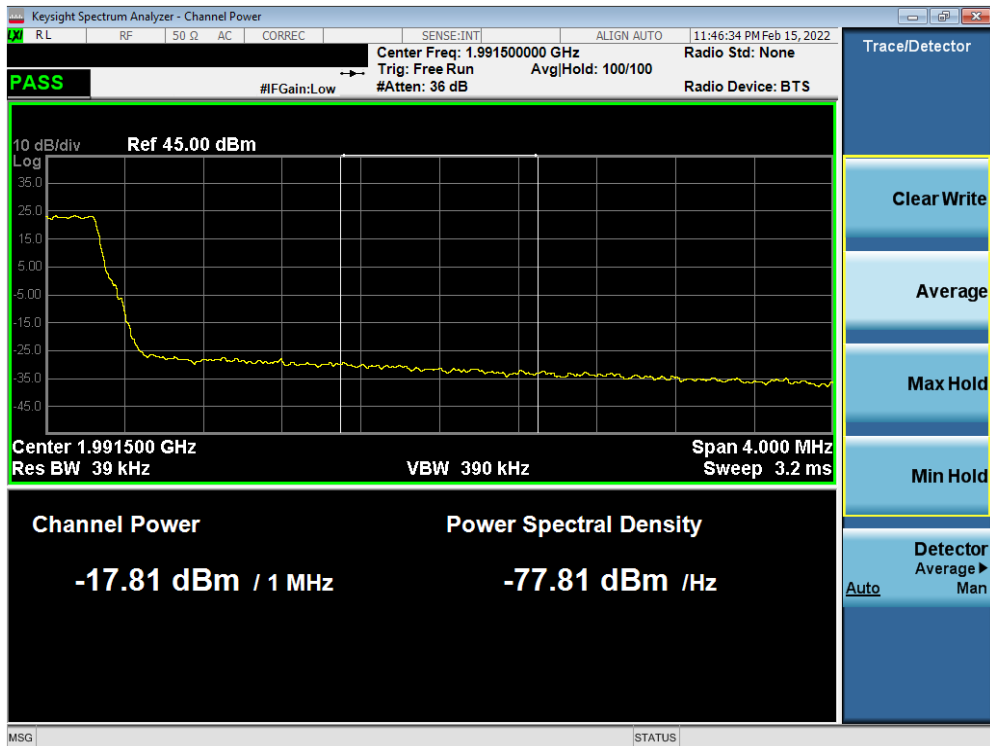


Plot 7-78. Extended Upper Band Edge Plot (LTE Band 2 - 10MHz QPSK – Full RB - Ant1)

FCC ID: QLJNIB-002	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2202140017-01.QLJ	Test Dates: 02/14/2022 - 03/15/2022	EUT Type: Band 2 iCore NIB	Page 55 of 106

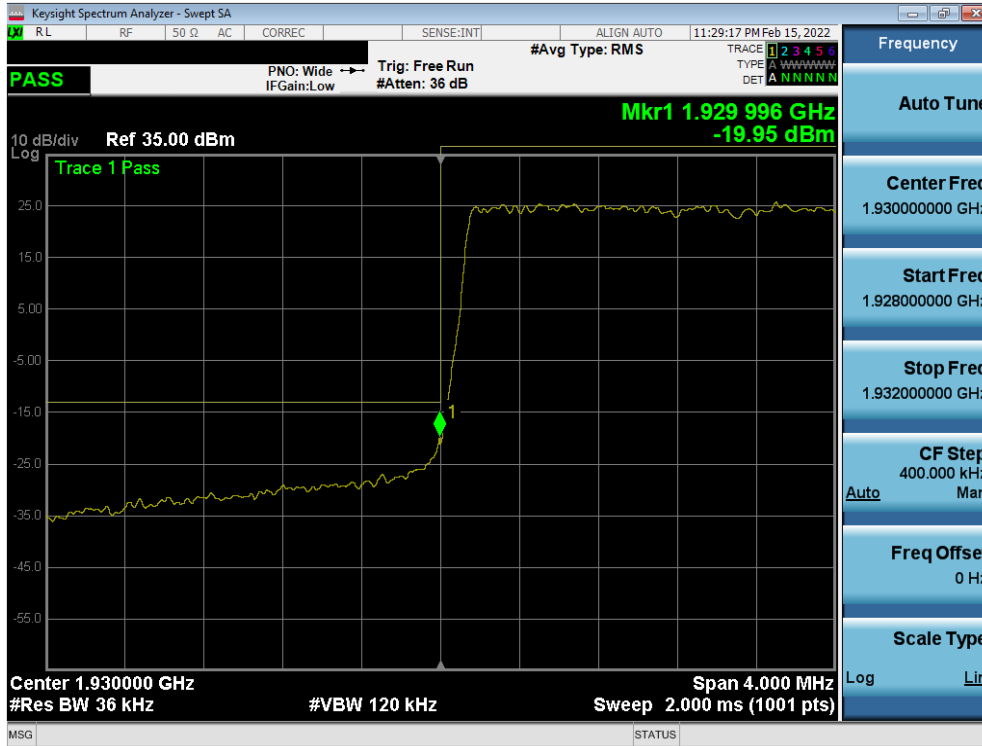


Plot 7-81. Upper Band Edge Plot (LTE Band 2 - 5MHz QPSK – Full RB - Ant1)

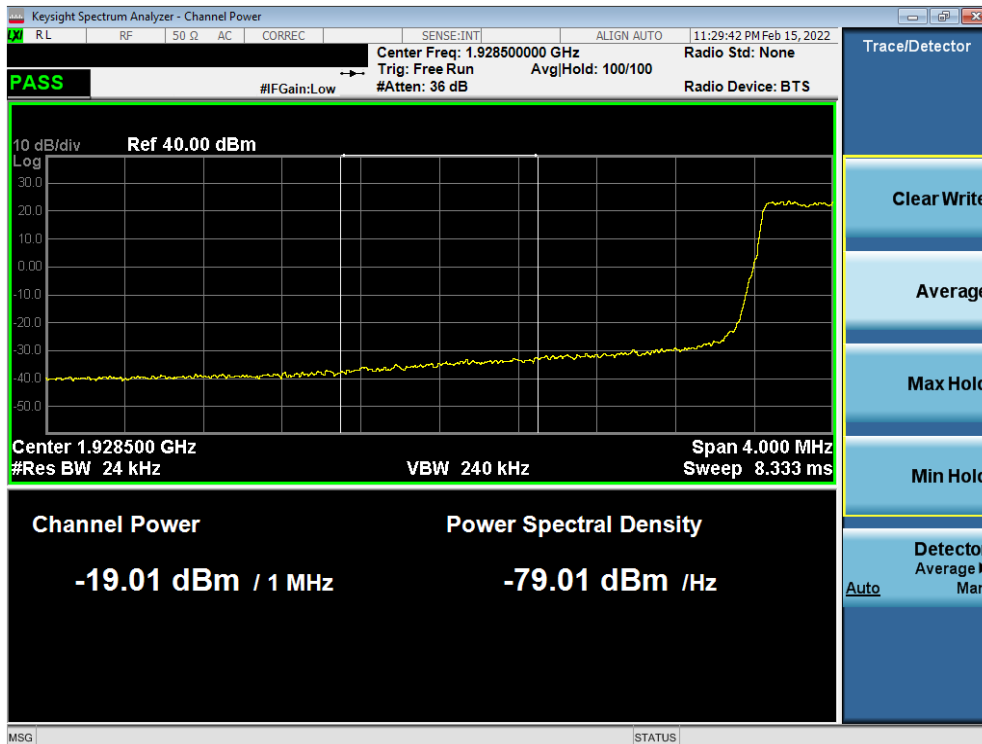


Plot 7-82. Extended Upper Band Edge Plot (LTE Band 2 - 5MHz QPSK – Full RB - Ant1)

FCC ID: QLJNIB-002	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2202140017-01.QLJ	Test Dates: 02/14/2022 - 03/15/2022	EUT Type: Band 2 iCore NIB	Page 57 of 106



Plot 7-83. Lower Band Edge Plot (LTE Band 2 - 3MHz QPSK – Full RB - Ant1)

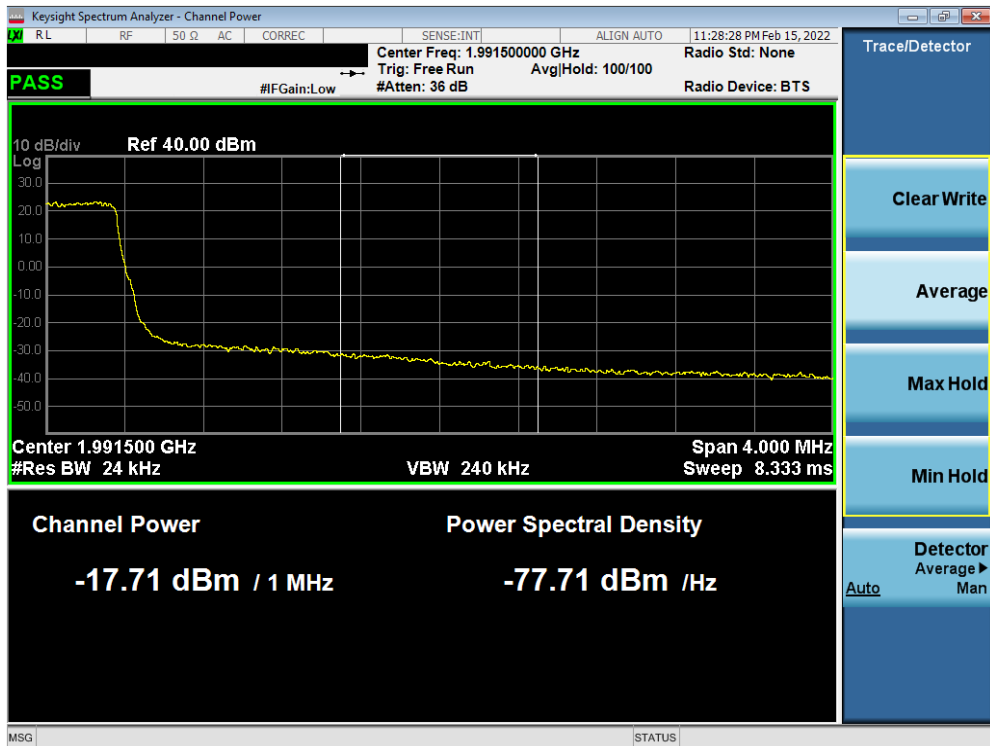


Plot 7-84. Extended Lower Band Edge Plot (LTE Band 2 - 3MHz QPSK – Full RB - Ant1)

FCC ID: QLJNIB-002	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2202140017-01.QLJ	Test Dates: 02/14/2022 - 03/15/2022	EUT Type: Band 2 iCore NIB	Page 58 of 106

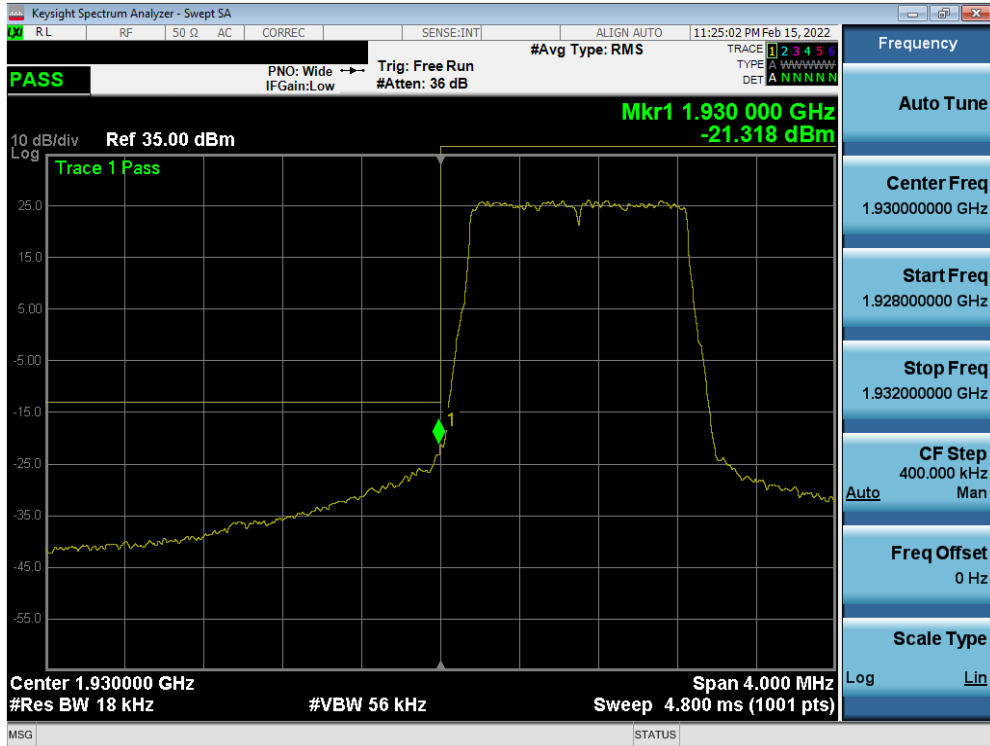


Plot 7-85. Upper Band Edge Plot (LTE Band 2 - 3MHz QPSK – Full RB - Ant1)

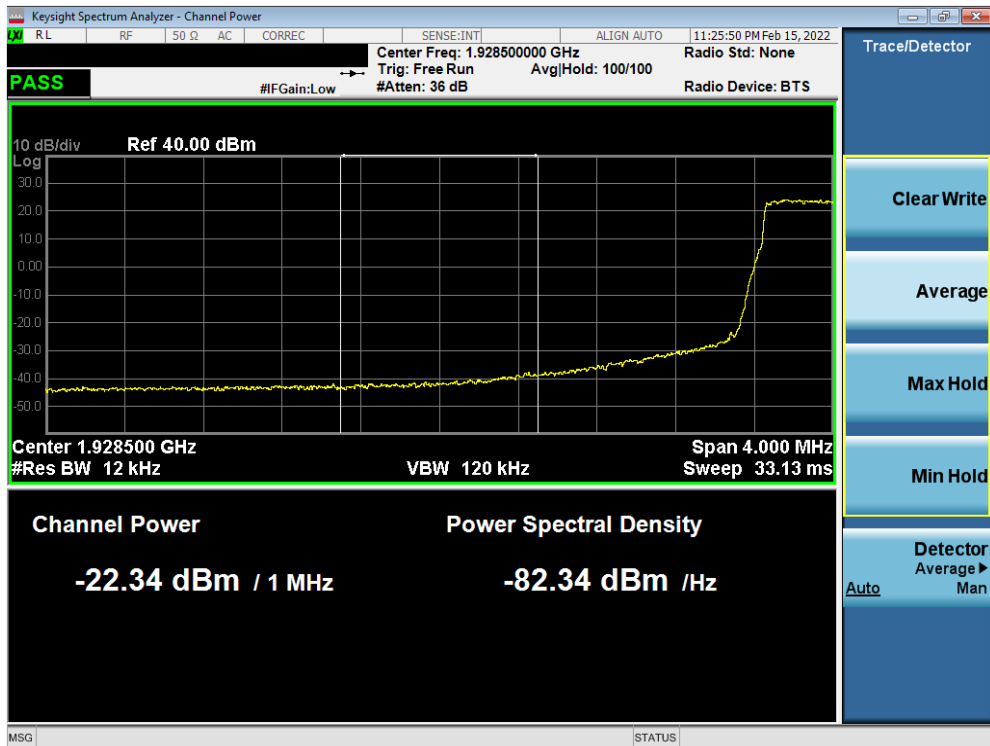


Plot 7-86. Extended Upper Band Edge Plot (LTE Band 2 - 3MHz QPSK – Full RB - Ant1)

FCC ID: QLJNIB-002	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2202140017-01.QLJ	Test Dates: 02/14/2022 - 03/15/2022	EUT Type: Band 2 iCore NIB	Page 59 of 106



Plot 7-87. Lower Band Edge Plot (LTE Band 2 – 1.4MHz QPSK – Full RB - Ant1)

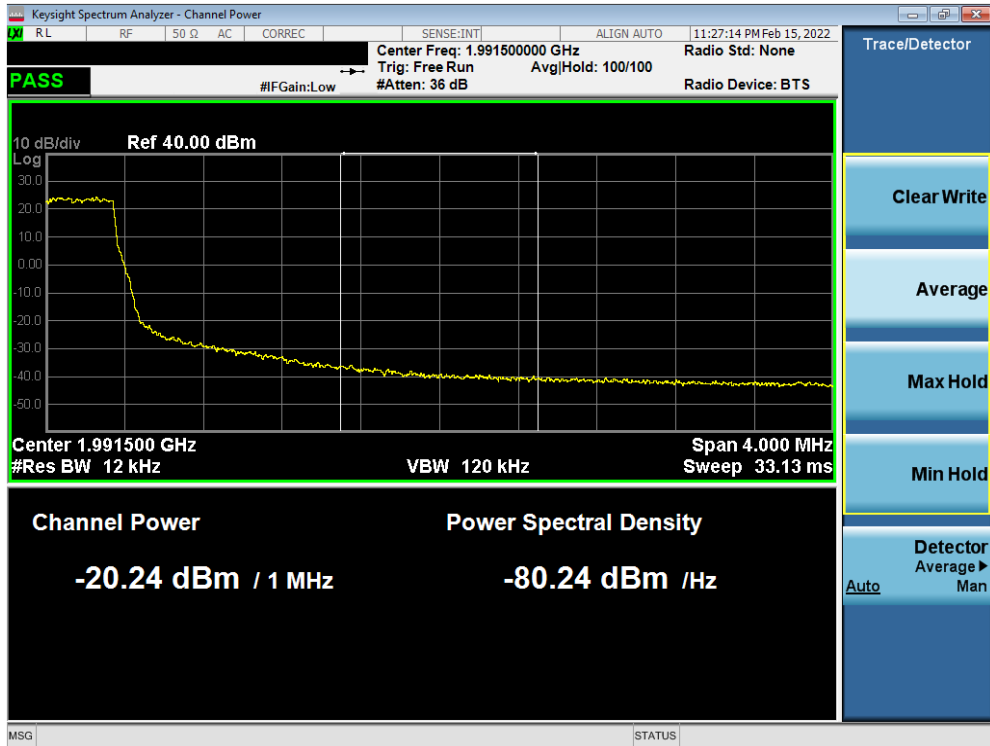


Plot 7-88. Extended Lower Band Edge Plot (LTE Band 2 – 1.4MHz QPSK – Full RB - Ant1)

FCC ID: QLJNIB-002	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2202140017-01.QLJ	Test Dates: 02/14/2022 - 03/15/2022	EUT Type: Band 2 iCore NIB	Page 60 of 106



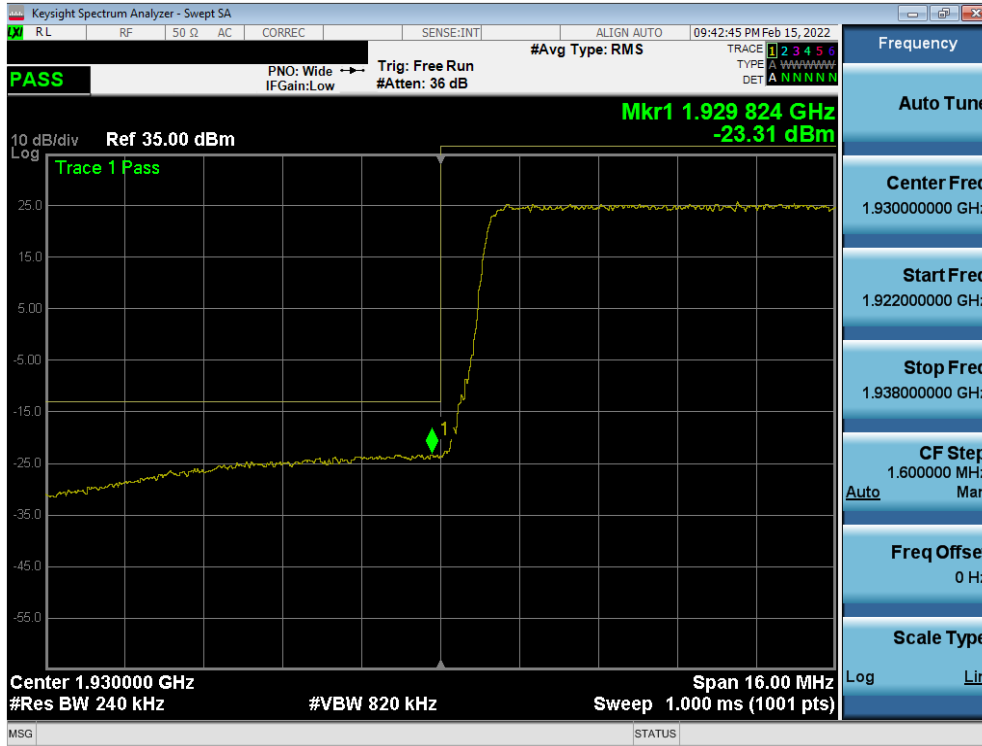
Plot 7-89. Upper Band Edge Plot (LTE Band 2 – 1.4MHz QPSK – Full RB - Ant1)



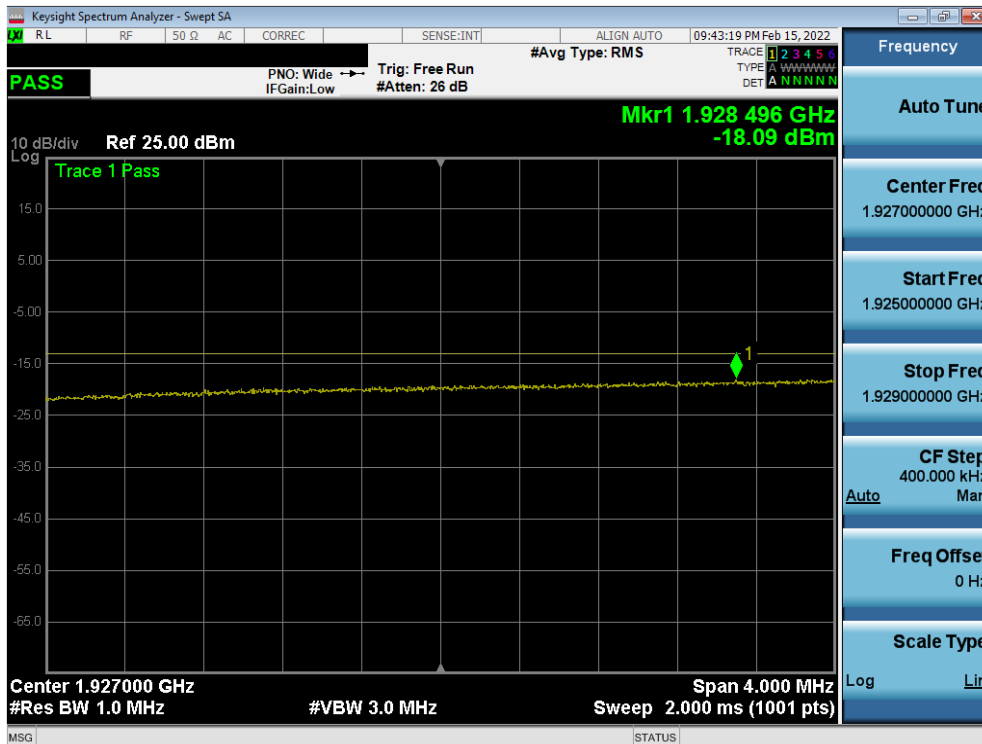
Plot 7-90. Extended Upper Band Edge Plot (LTE Band 2 – 1.4MHz QPSK – Full RB - Ant1)

FCC ID: QLJNIB-002	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2202140017-01.QLJ	Test Dates: 02/14/2022 - 03/15/2022	EUT Type: Band 2 iCore NIB	Page 61 of 106

LTE Band 2 – Ant2

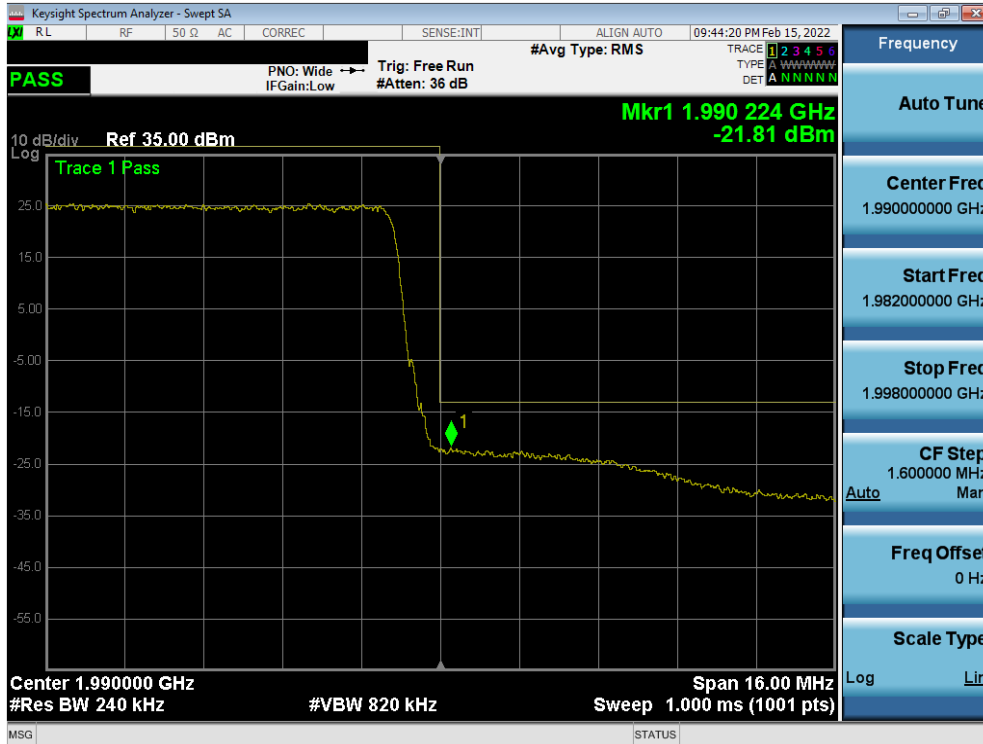


Plot 7-91. Lower Band Edge Plot (LTE Band 2 - 20MHz QPSK – Full RB - Ant2)

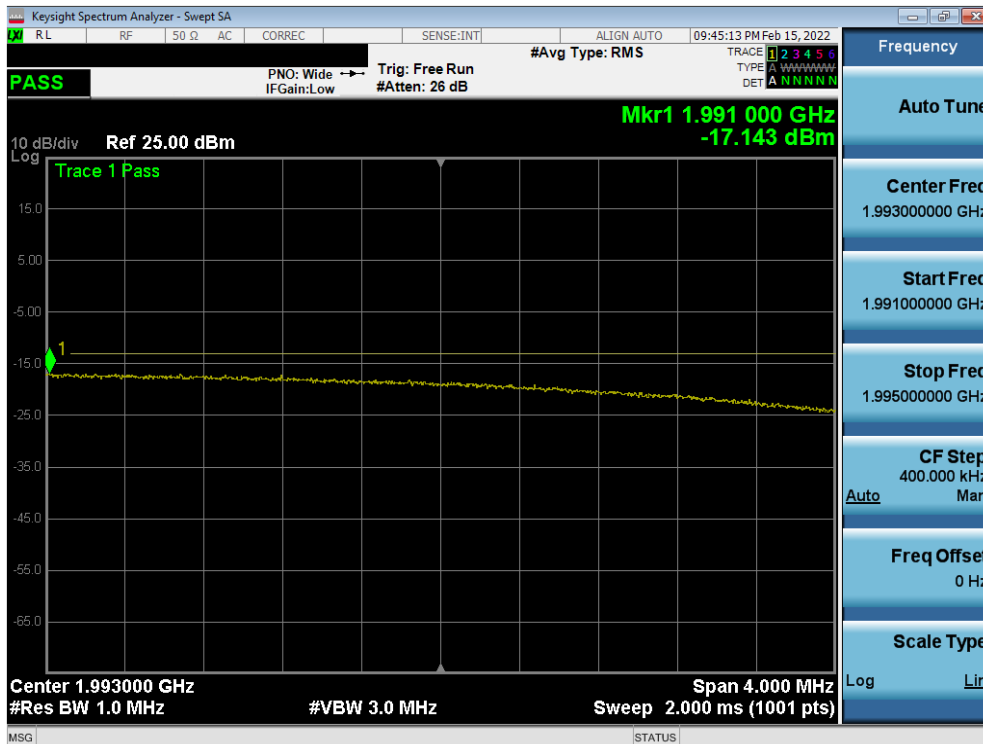


Plot 7-92. Extended Lower Band Edge Plot (LTE Band 2 - 20MHz QPSK – Full RB - Ant2)

FCC ID: QLJNIB-002	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2202140017-01.QLJ	Test Dates: 02/14/2022 - 03/15/2022	EUT Type: Band 2 iCore NIB	Page 62 of 106

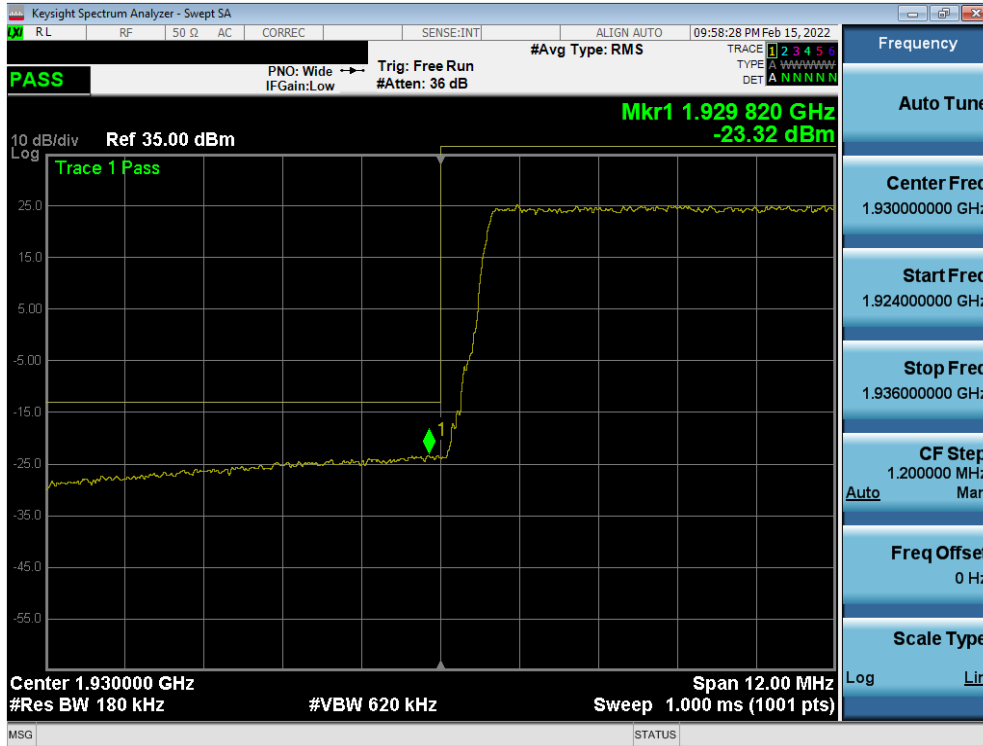


Plot 7-93. Upper Band Edge Plot (LTE Band 2 - 20MHz QPSK – Full RB - Ant2)

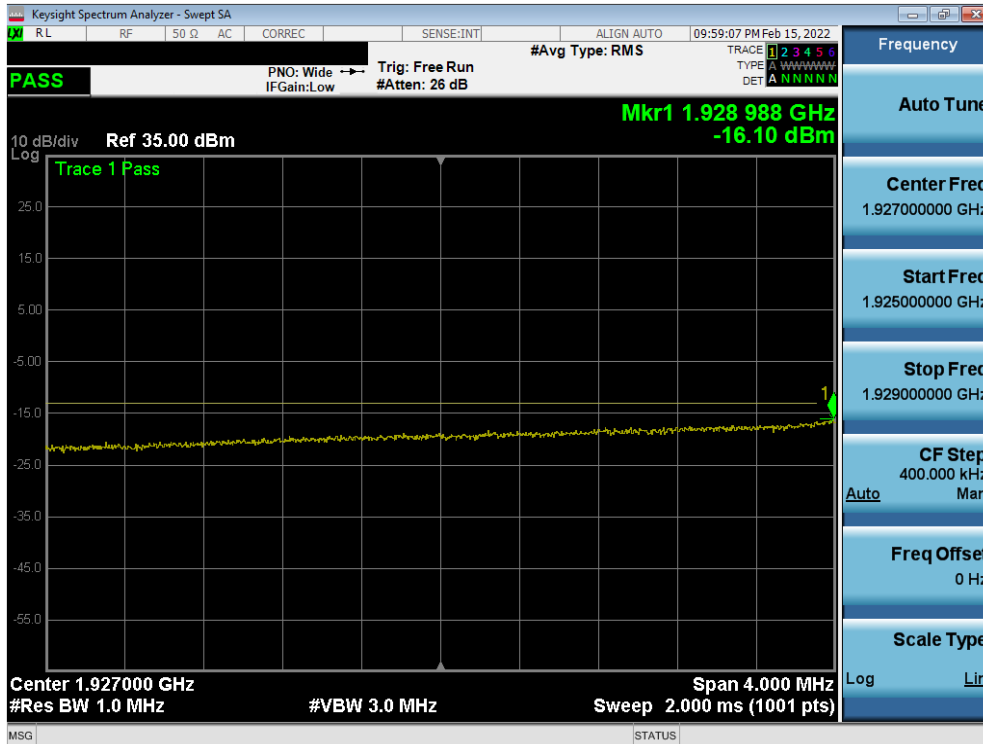


Plot 7-94. Extended Upper Band Edge Plot (LTE Band 2 - 20MHz QPSK – Full RB - Ant2)

FCC ID: QLJNIB-002	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2202140017-01.QLJ	Test Dates: 02/14/2022 - 03/15/2022	EUT Type: Band 2 iCore NIB	Page 63 of 106

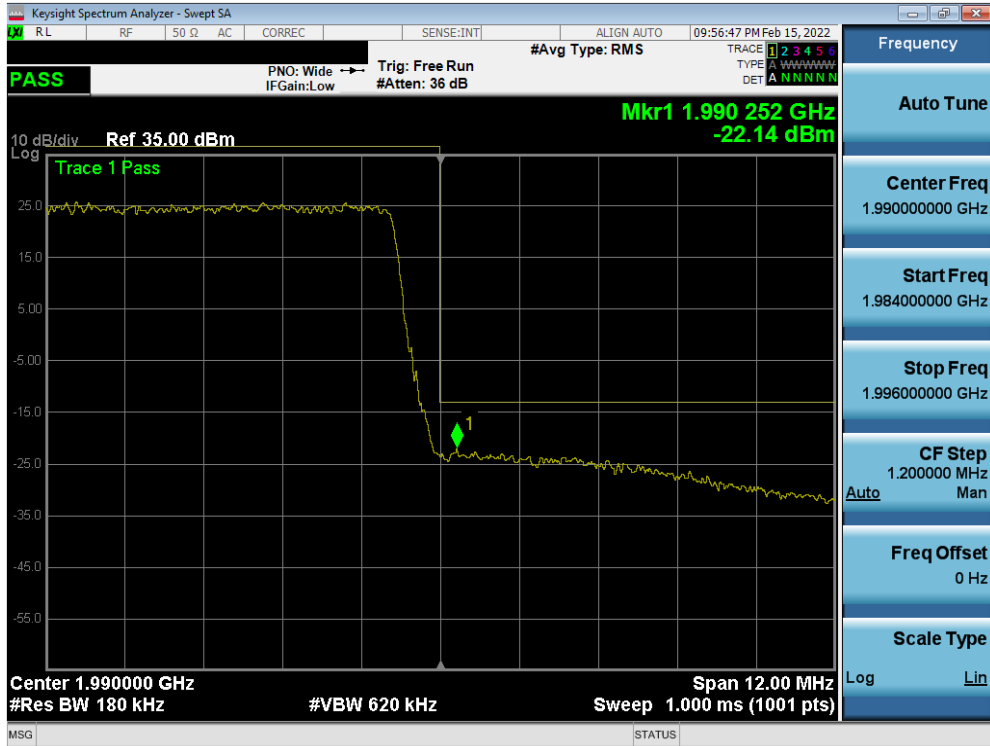


Plot 7-95. Lower Band Edge Plot (LTE Band 2 - 15MHz QPSK – Full RB - Ant2)

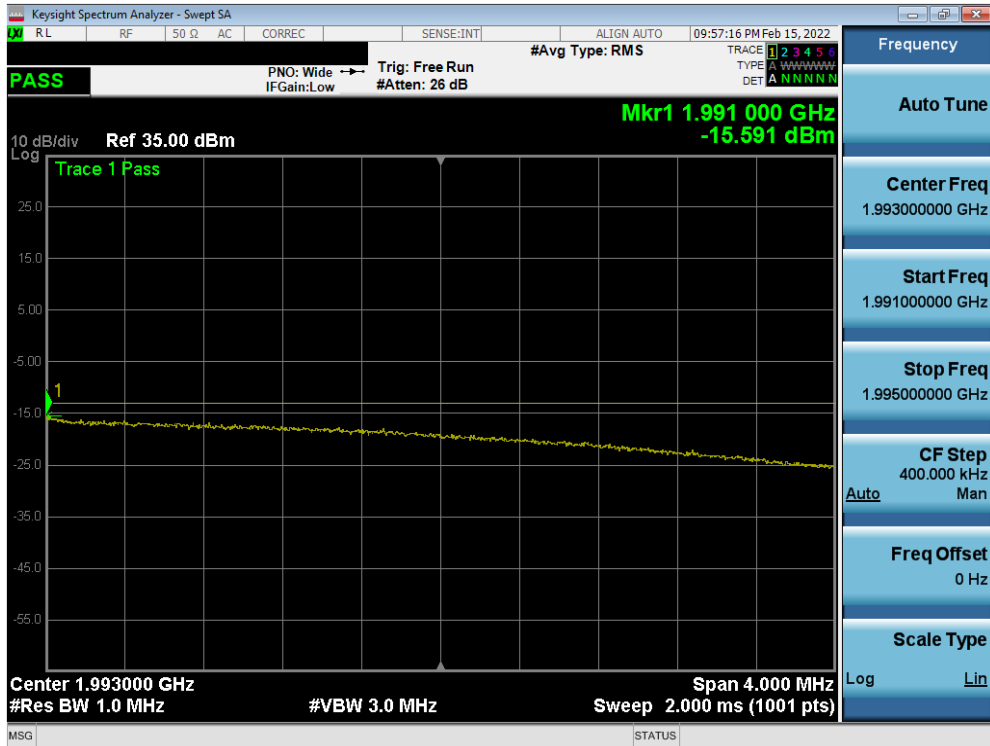


Plot 7-96. Extended Lower Band Edge Plot (LTE Band 2 - 15MHz QPSK – Full RB - Ant2)

FCC ID: QLJNIB-002	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2202140017-01.QLJ	Test Dates: 02/14/2022 - 03/15/2022	EUT Type: Band 2 iCore NIB	Page 64 of 106

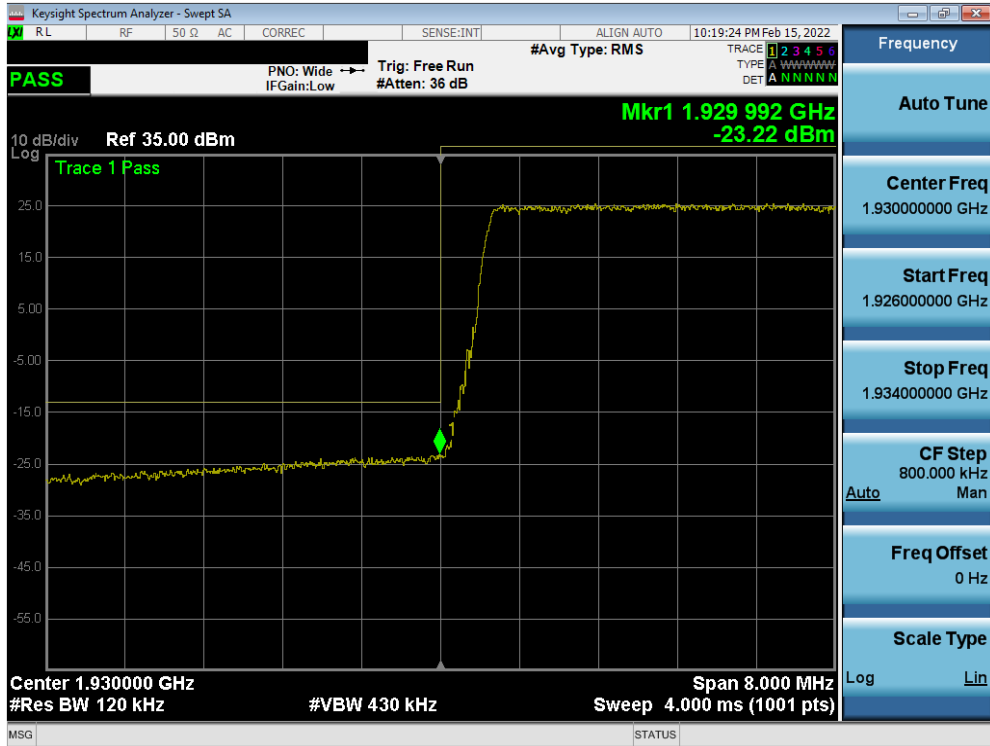


Plot 7-97. Upper Band Edge Plot (LTE Band 2 - 15MHz QPSK – Full RB - Ant2)

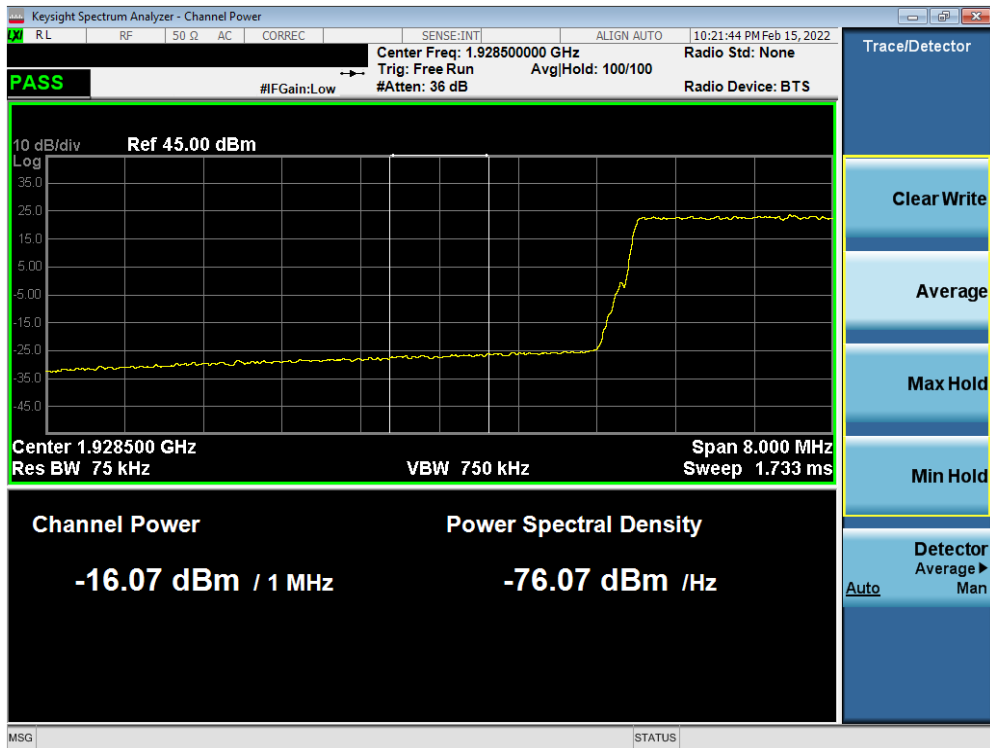


Plot 7-98. Extended Upper Band Edge Plot (LTE Band 2 - 15MHz QPSK – Full RB - Ant2)

FCC ID: QLJNIB-002	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2202140017-01.QLJ	Test Dates: 02/14/2022 - 03/15/2022	EUT Type: Band 2 iCore NIB	Page 65 of 106

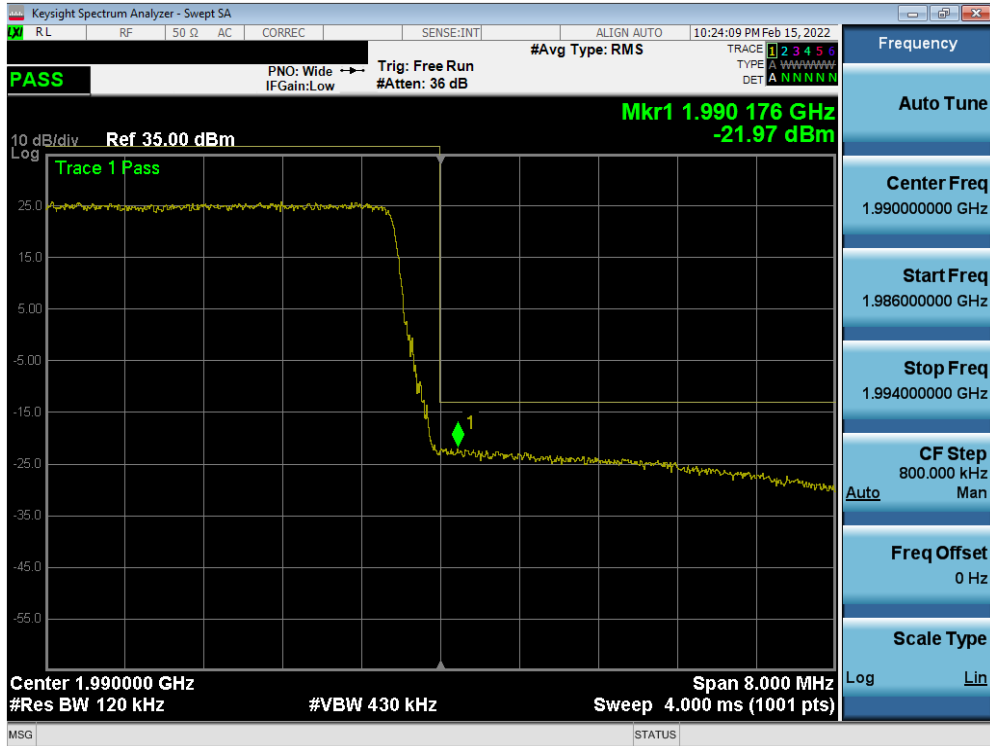


Plot 7-99. Lower Band Edge Plot (LTE Band 2 - 10MHz QPSK – Full RB - Ant2)

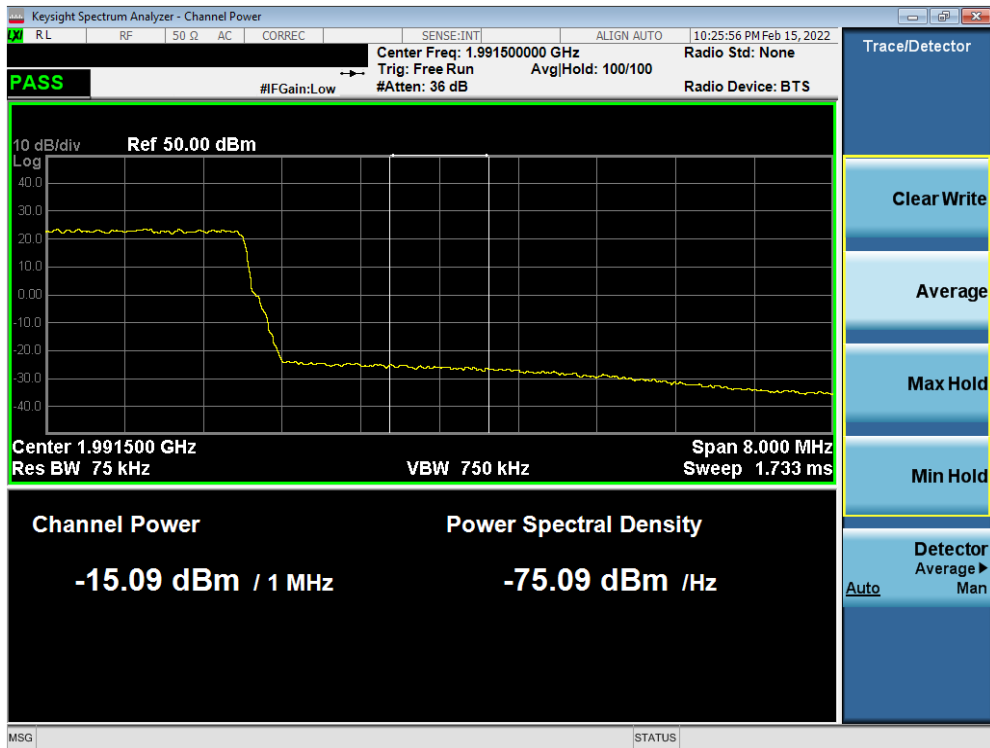


Plot 7-100. Extended Lower Band Edge Plot (LTE Band 2 - 10MHz QPSK – Full RB - Ant2)

FCC ID: QLJNIB-002	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2202140017-01.QLJ	Test Dates: 02/14/2022 - 03/15/2022	EUT Type: Band 2 iCore NIB	Page 66 of 106

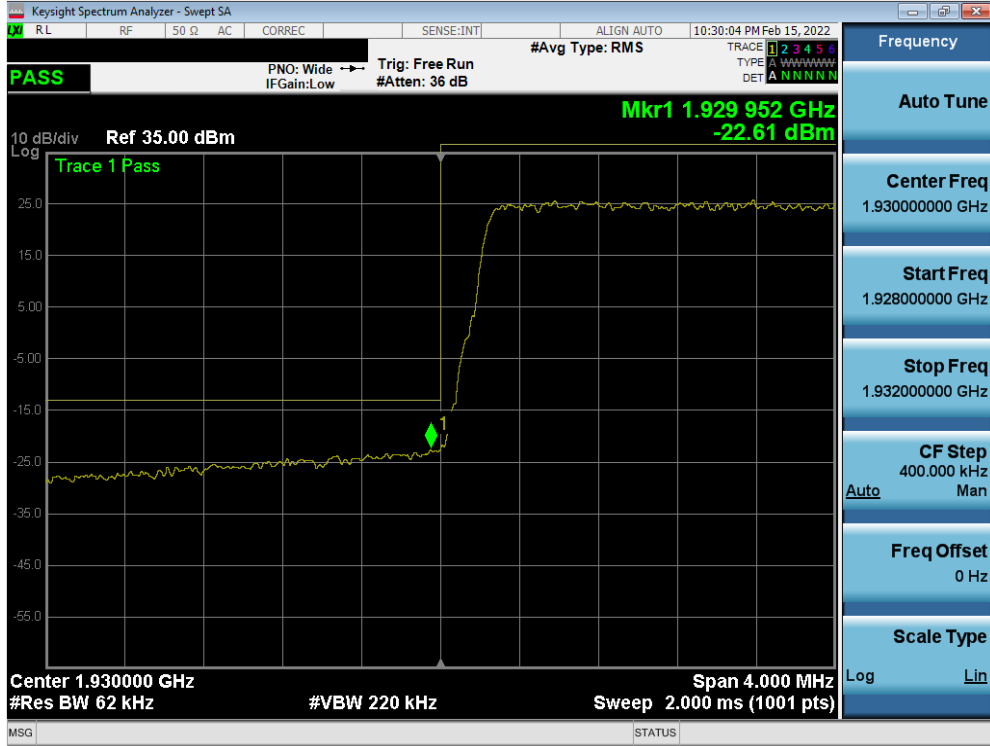


Plot 7-101. Upper Band Edge Plot (LTE Band 2 - 10MHz QPSK – Full RB - Ant2)

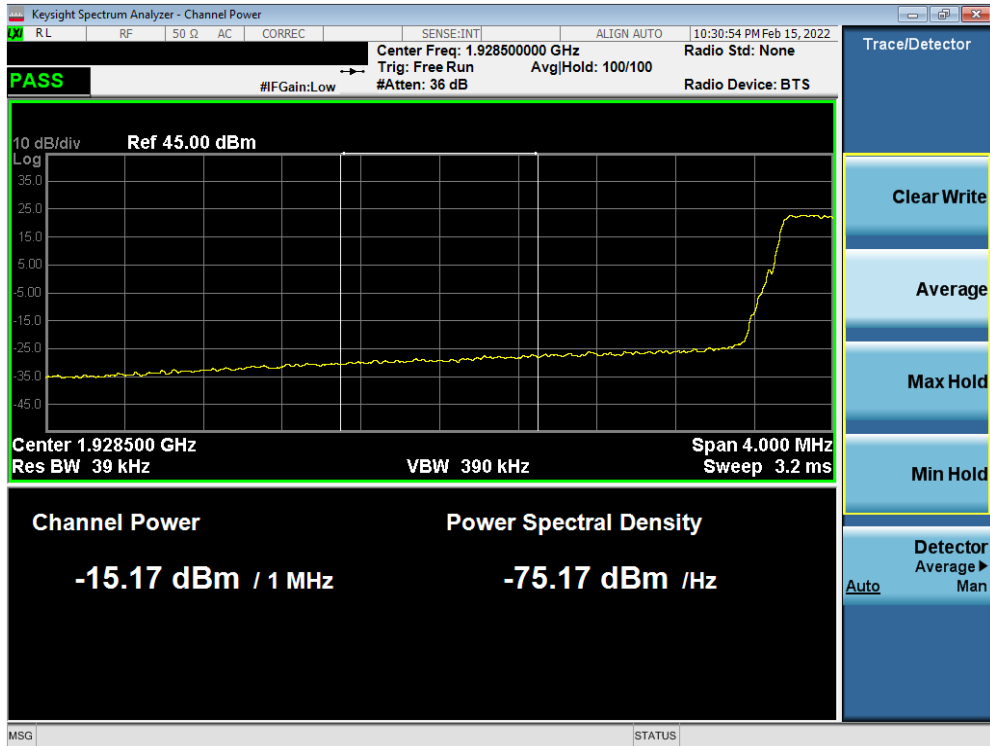


Plot 7-102. Extended Upper Band Edge Plot (LTE Band 2 - 10MHz QPSK – Full RB - Ant2)

FCC ID: QLJNIB-002	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2202140017-01.QLJ	Test Dates: 02/14/2022 - 03/15/2022	EUT Type: Band 2 iCore NIB	Page 67 of 106

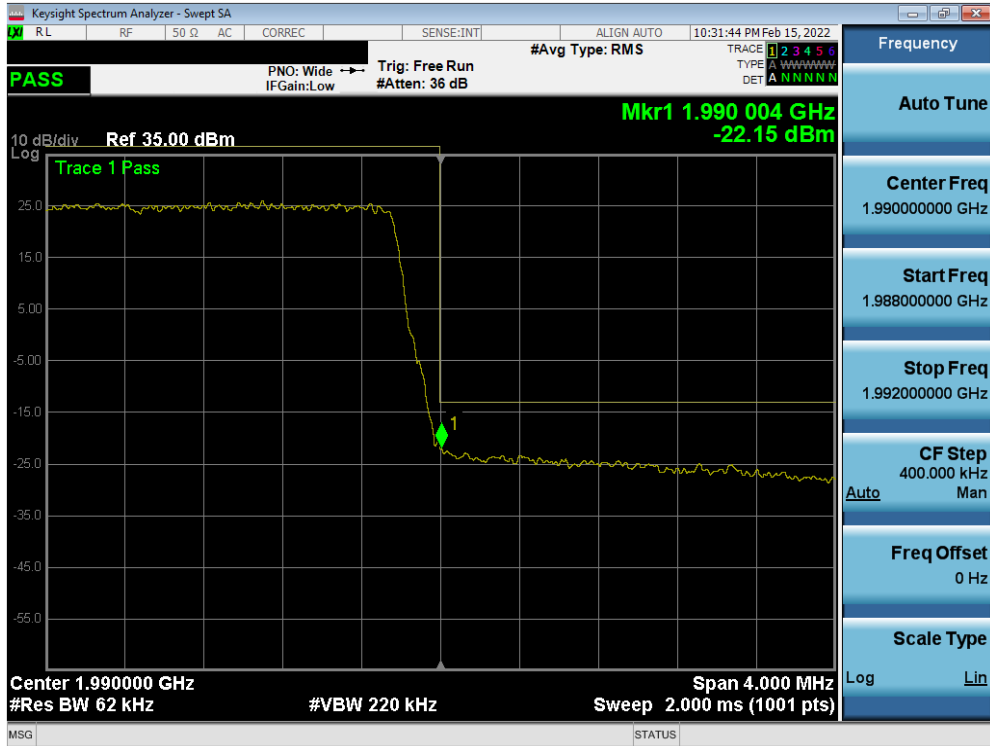


Plot 7-103. Lower Band Edge Plot (LTE Band 2 - 5MHz QPSK – Full RB - Ant2)

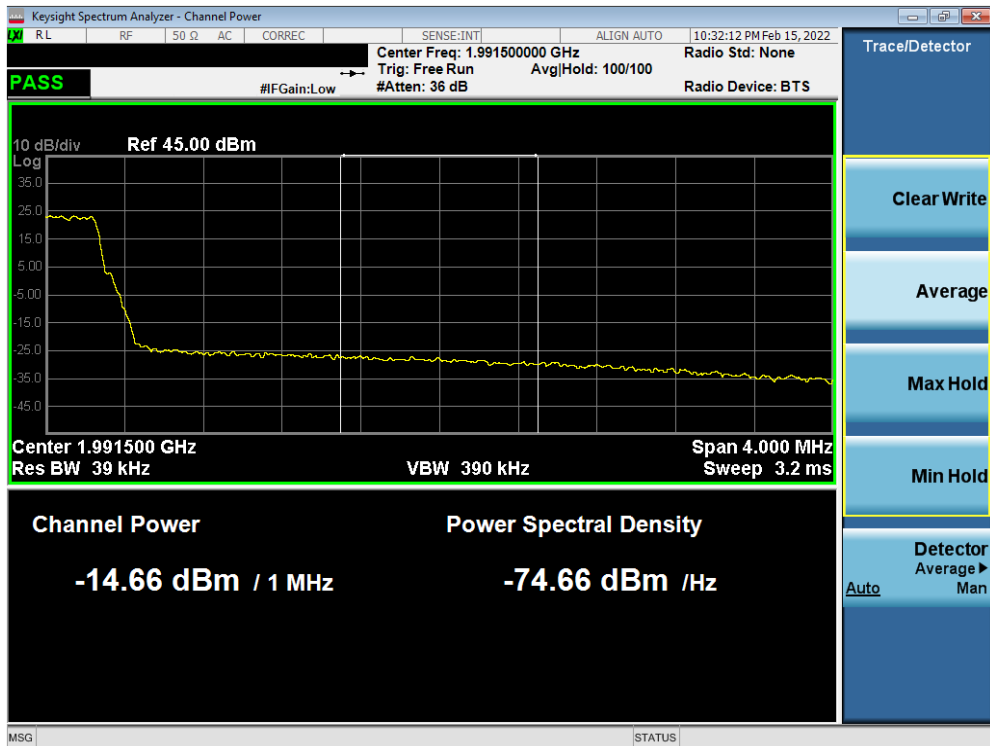


Plot 7-104. Extended Lower Band Edge Plot (LTE Band 2 - 5MHz QPSK – Full RB - Ant2)

FCC ID: QLJNIB-002	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2202140017-01.QLJ	Test Dates: 02/14/2022 - 03/15/2022	EUT Type: Band 2 iCore NIB	Page 68 of 106

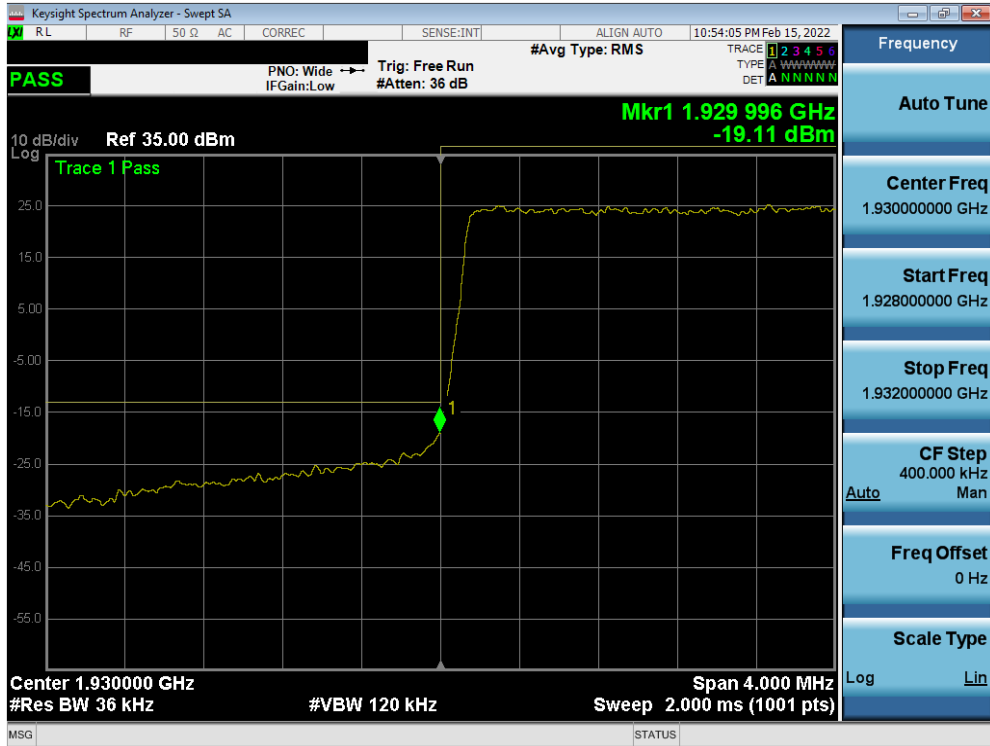


Plot 7-105. Upper Band Edge Plot (LTE Band 2 - 5MHz QPSK – Full RB - Ant2)

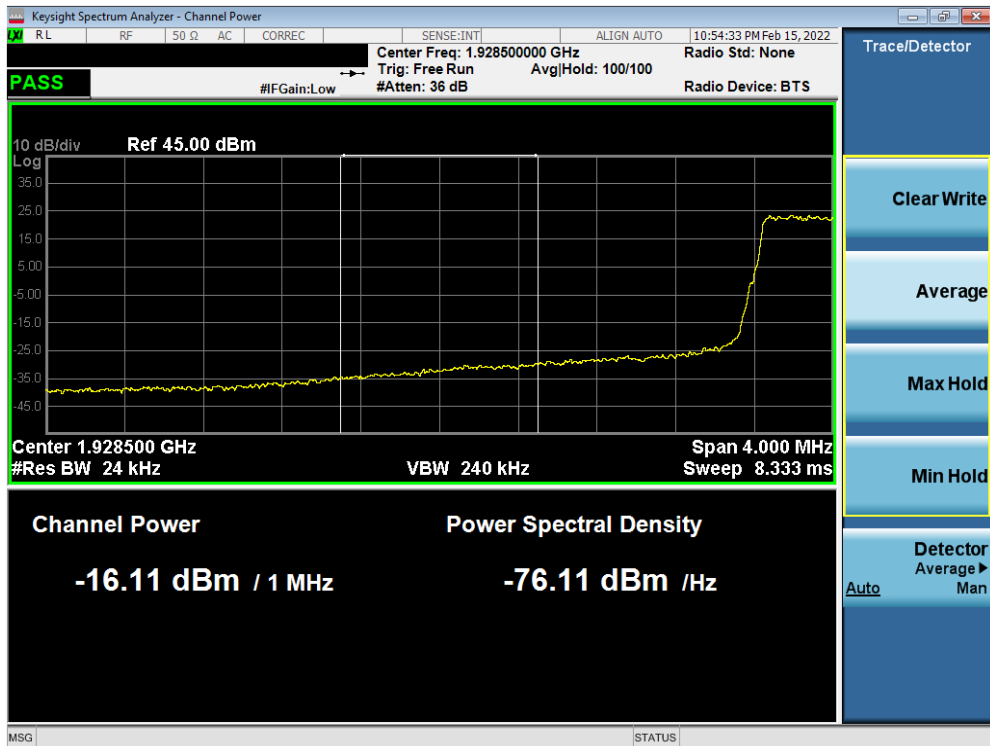


Plot 7-106. Extended Upper Band Edge Plot (LTE Band 2 - 5MHz QPSK – Full RB - Ant2)

FCC ID: QLJNIB-002	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2202140017-01.QLJ	Test Dates: 02/14/2022 - 03/15/2022	EUT Type: Band 2 iCore NIB	Page 69 of 106



Plot 7-107. Lower Band Edge Plot (LTE Band 2 - 3MHz QPSK – Full RB - Ant2)

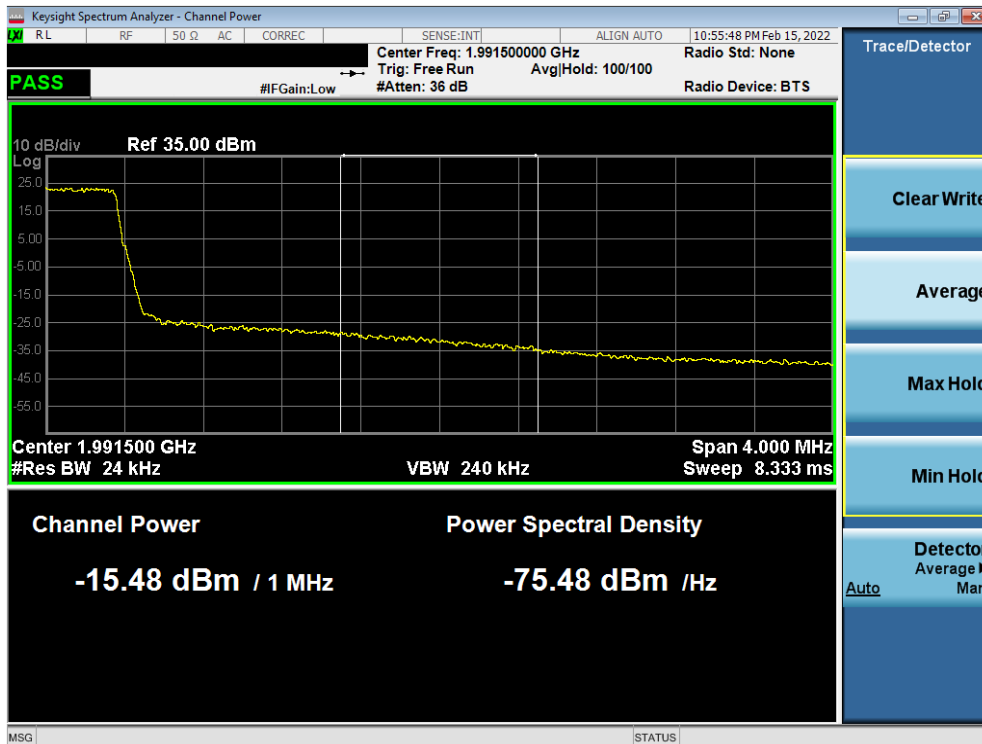


Plot 7-108. Extended Lower Band Edge Plot (LTE Band 2 - 3MHz QPSK – Full RB - Ant2)

FCC ID: QLJNIB-002	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2202140017-01.QLJ	Test Dates: 02/14/2022 - 03/15/2022	EUT Type: Band 2 iCore NIB	Page 70 of 106

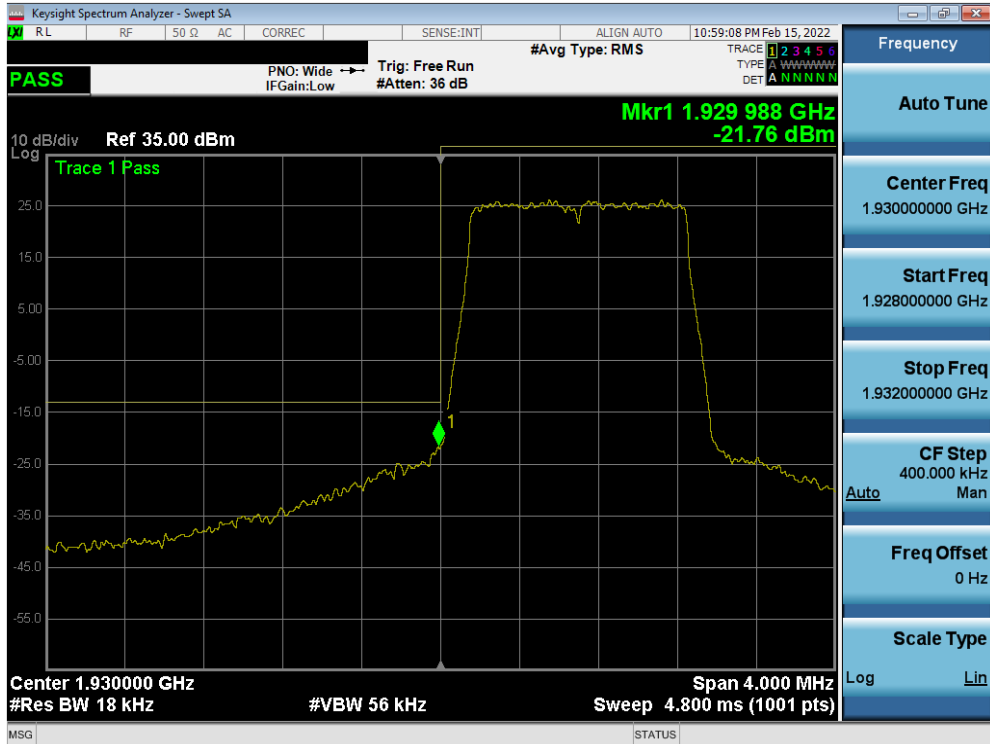


Plot 7-109. Upper Band Edge Plot (LTE Band 2 - 3MHz QPSK – Full RB - Ant2)

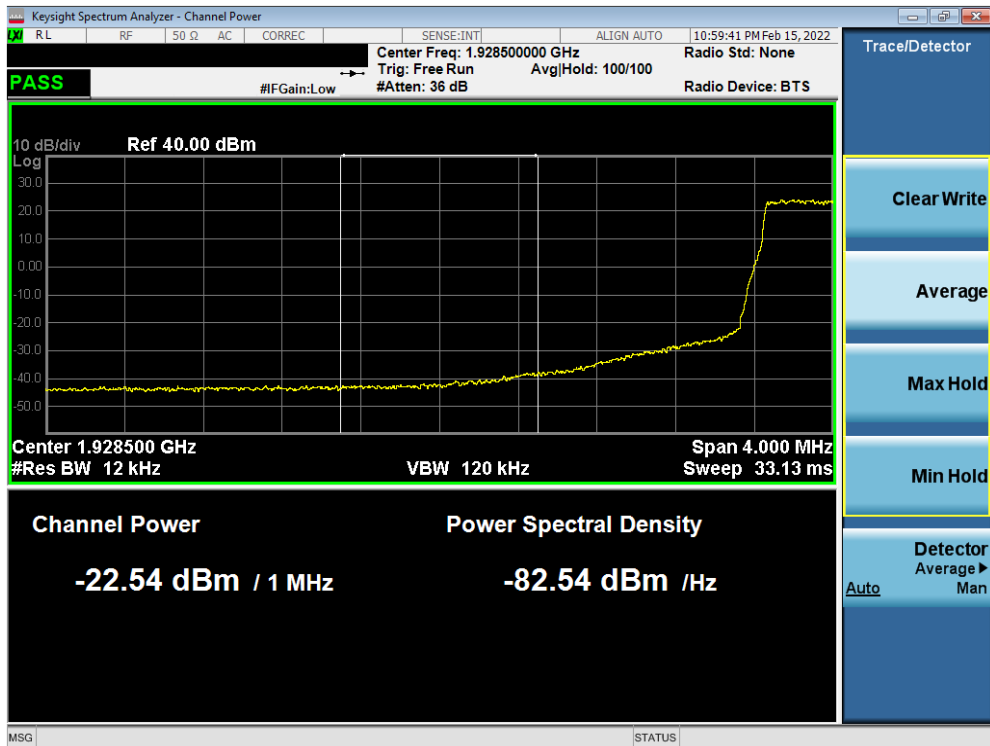


Plot 7-110. Extended Upper Band Edge Plot (LTE Band 2 - 3MHz QPSK – Full RB - Ant2)

FCC ID: QLJNIB-002	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2202140017-01.QLJ	Test Dates: 02/14/2022 - 03/15/2022	EUT Type: Band 2 iCore NIB	Page 71 of 106



Plot 7-111. Lower Band Edge Plot (LTE Band 2 – 1.4MHz QPSK – Full RB - Ant2)

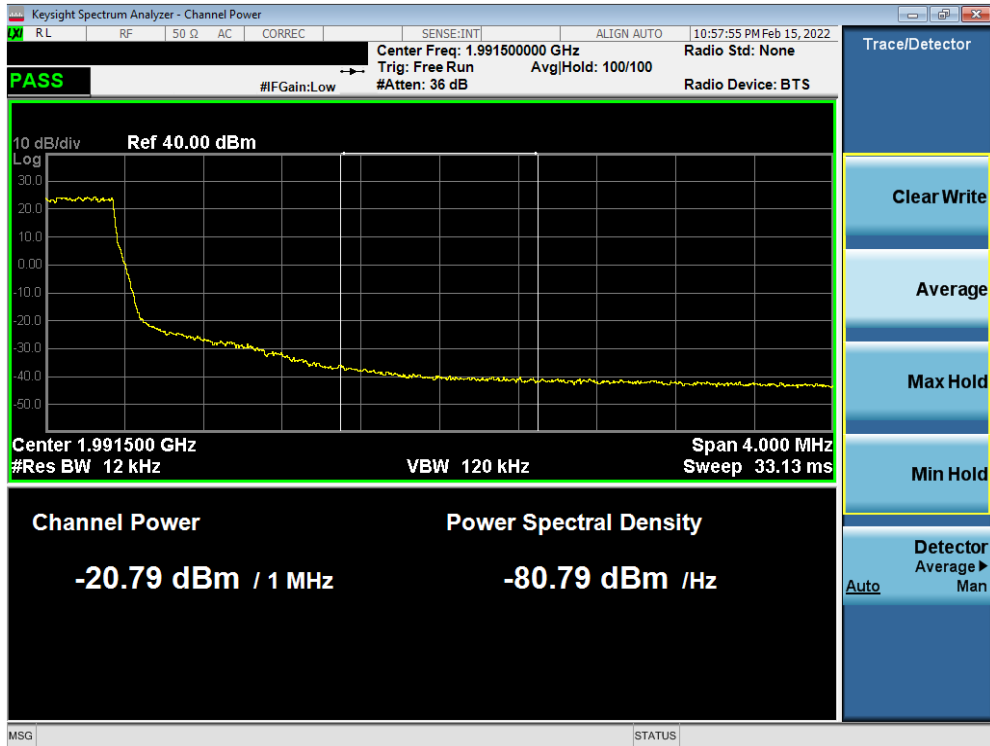


Plot 7-112. Extended Lower Band Edge Plot (LTE Band 2 – 1.4MHz QPSK – Full RB - Ant2)

FCC ID: QLJNIB-002	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2202140017-01.QLJ	Test Dates: 02/14/2022 - 03/15/2022	EUT Type: Band 2 iCore NIB	Page 72 of 106



Plot 7-113. Upper Band Edge Plot (LTE Band 2 – 1.4MHz QPSK – Full RB - Ant2)



Plot 7-114. Extended Upper Band Edge Plot (LTE Band 2 – 1.4MHz QPSK – Full RB - Ant2)

FCC ID: QLJNIB-002	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2202140017-01.QLJ	Test Dates: 02/14/2022 - 03/15/2022	EUT Type: Band 2 iCore NIB	Page 73 of 106

7.6 Peak-Average Ratio

Test Overview

A peak to average ratio measurement is performed at the conducted port of the EUT. The spectrum analyzers Complementary Cumulative Distribution Function (CCDF) measurement profile is used to determine the largest deviation between the average and the peak power of the EUT in a given bandwidth. The CCDF curve shows how much time the peak waveform spends at or above a given average power level. The percent of time the signal spends at or above the level defines the probability for that particular power level.

Test Procedure Used

KDB 971168 D01 v03r01 – Section 5.7.1

Test Settings

1. The signal analyzer’s CCDF measurement profile is enabled
2. Frequency = carrier center frequency
3. Measurement BW \geq OBW or specified reference bandwidth
4. The signal analyzer was set to collect one million samples to generate the CCDF curve
5. The measurement interval was set depending on the type of signal analyzed. For continuous signals (>98% duty cycle), the measurement interval was set to 1ms. For burst transmissions, the spectrum analyzer is set to use an internal “RF Burst” trigger that is synced with an incoming pulse and the measurement interval is set to less than the duration of the “on time” of one burst to ensure that energy is only captured during a time in which the transmitter is operating at maximum power

Test Setup

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

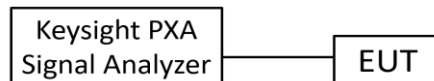


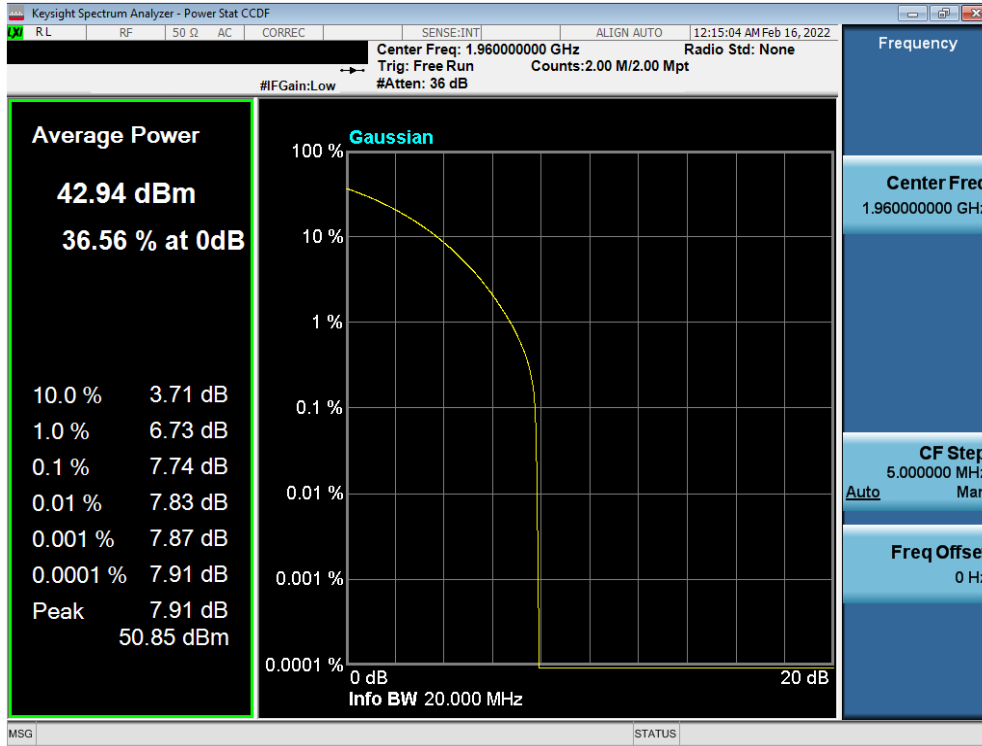
Figure 7-5. Test Instrument & Measurement Setup

Test Notes

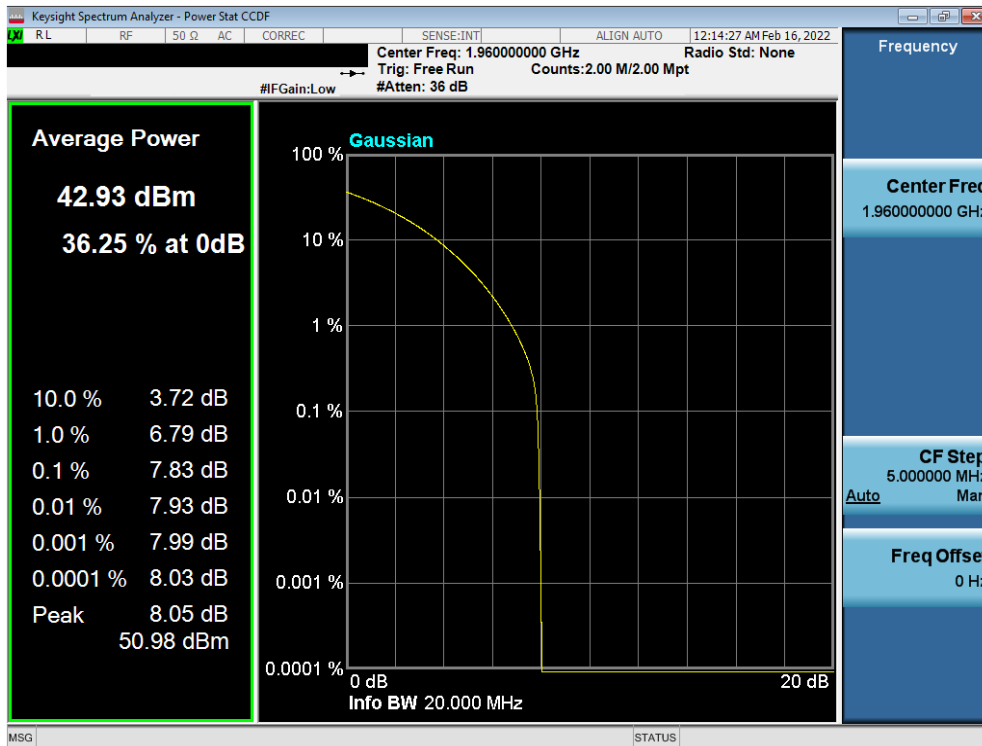
None.

FCC ID: QLJNIB-002	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2202140017-01.QLJ	Test Dates: 02/14/2022 - 03/15/2022	EUT Type: Band 2 iCore NIB	Page 74 of 106

LTE Band 2 – Ant1

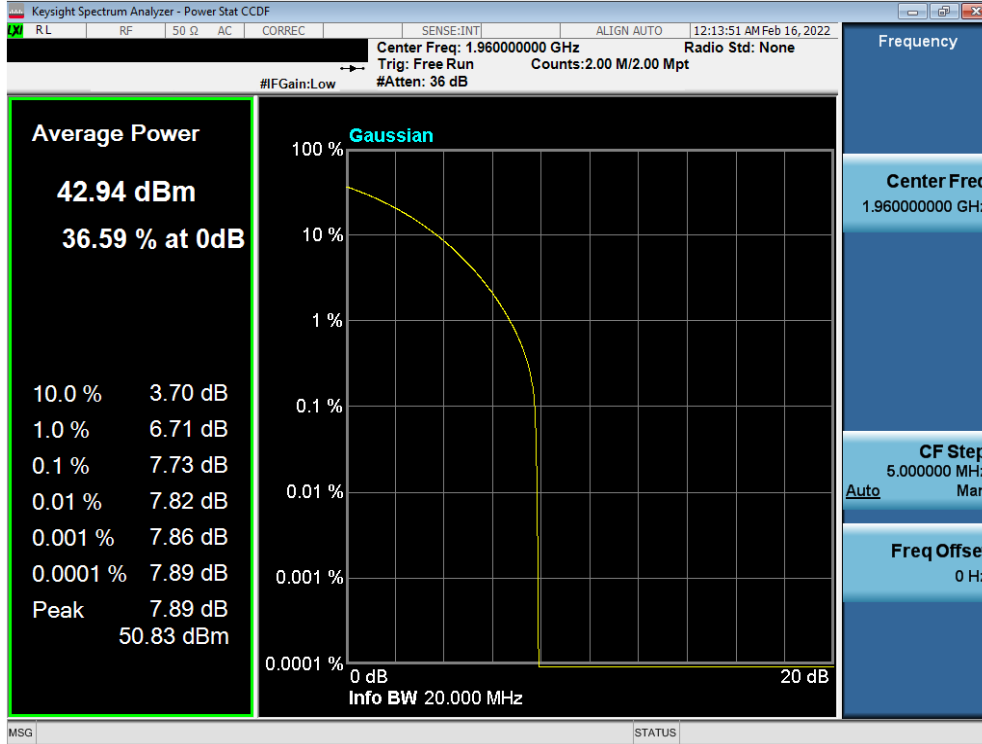


Plot 7-115. PAR Plot (LTE Band 2 - 20MHz QPSK - Full RB - Ant1)

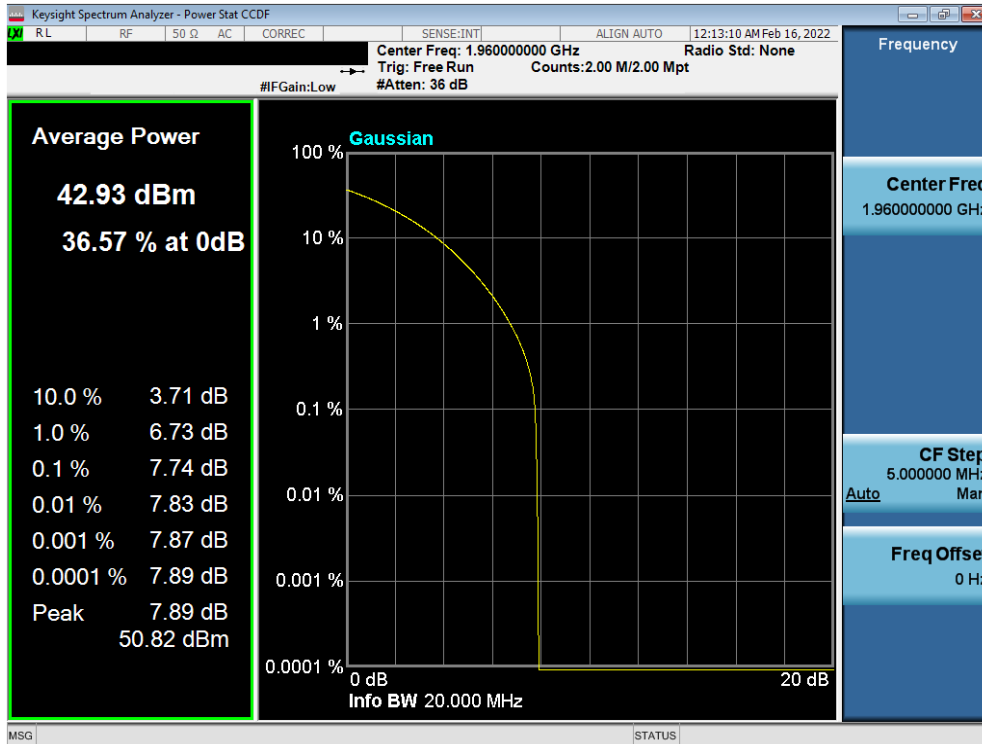


Plot 7-116. PAR Plot (LTE Band 2 - 20MHz 16-QAM - Full RB - Ant1)

FCC ID: QLJNIB-002		PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2202140017-01.QLJ	Test Dates: 02/14/2022 - 03/15/2022	EUT Type: Band 2 iCore NIB	Page 75 of 106	

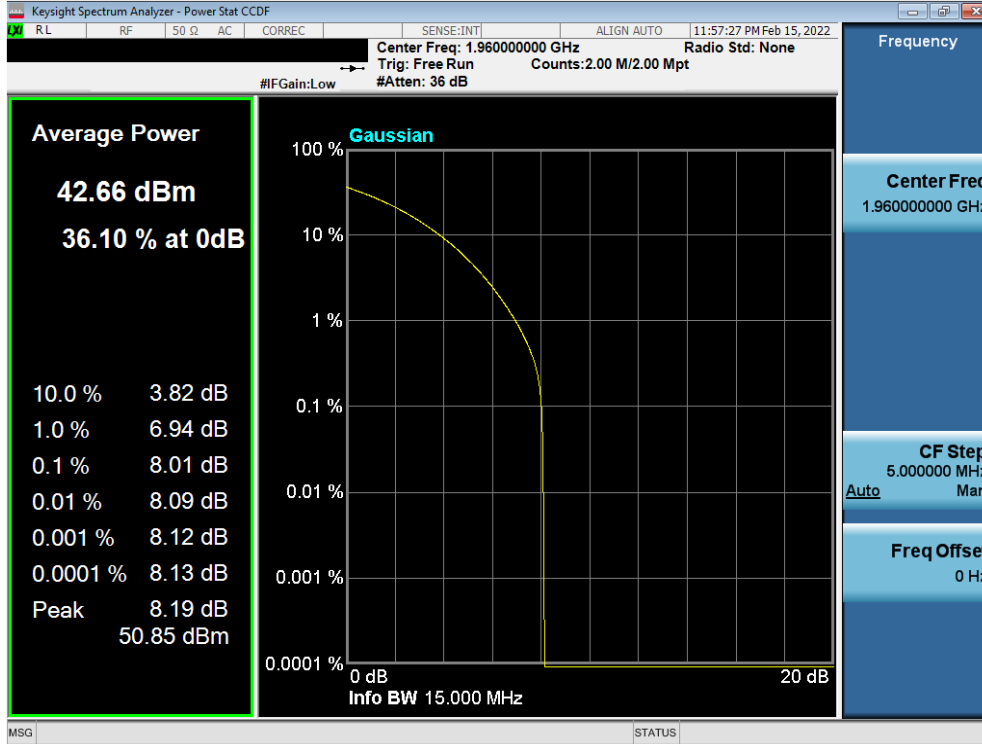


Plot 7-117. PAR Plot (LTE Band 2 - 20MHz 64-QAM - Full RB - Ant1)

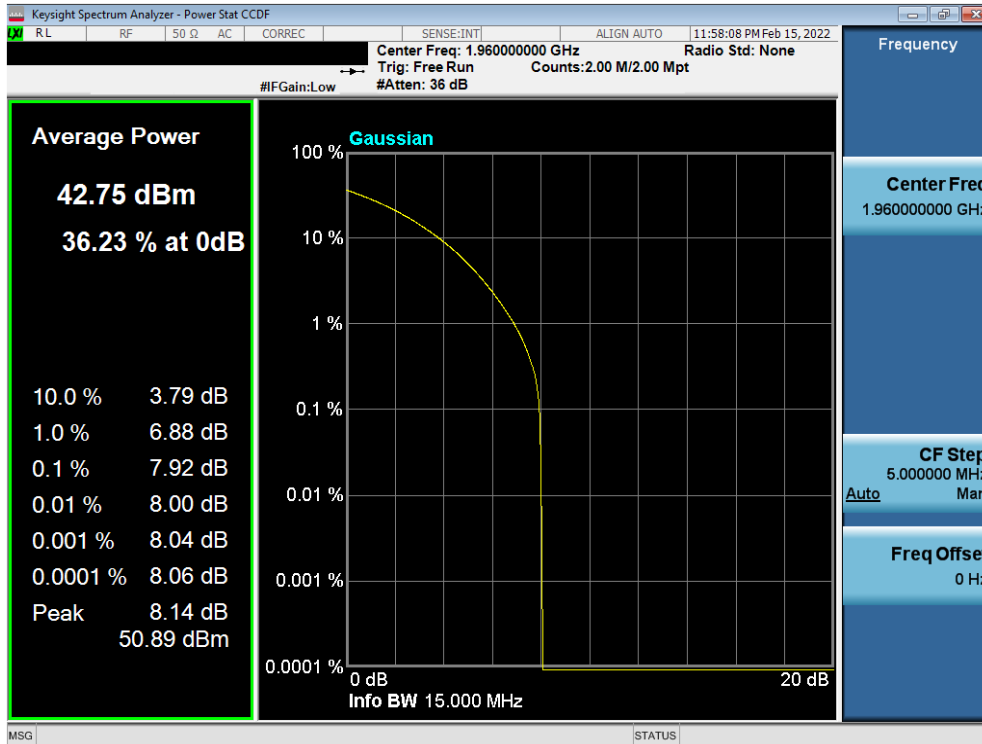


Plot 7-118. PAR Plot (LTE Band 2 - 20MHz 256-QAM - Full RB - Ant1)

FCC ID: QLJNIB-002	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2202140017-01.QLJ	Test Dates: 02/14/2022 - 03/15/2022	EUT Type: Band 2 iCore NIB	Page 76 of 106

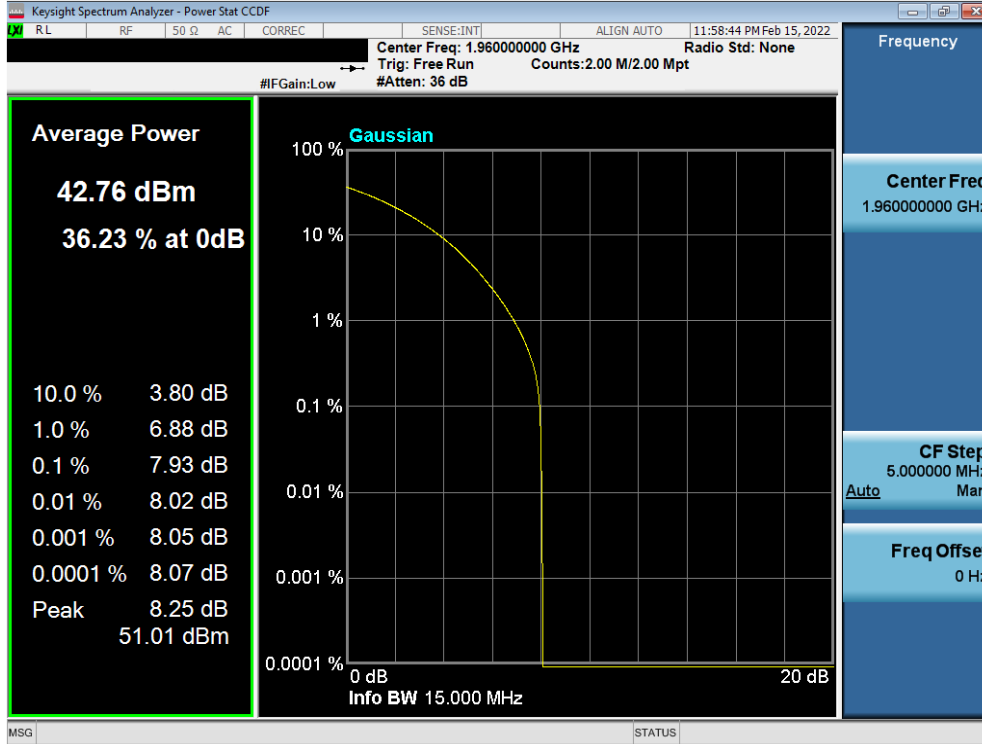


Plot 7-119. PAR Plot (LTE Band 2 - 15MHz QPSK - Full RB - Ant1)

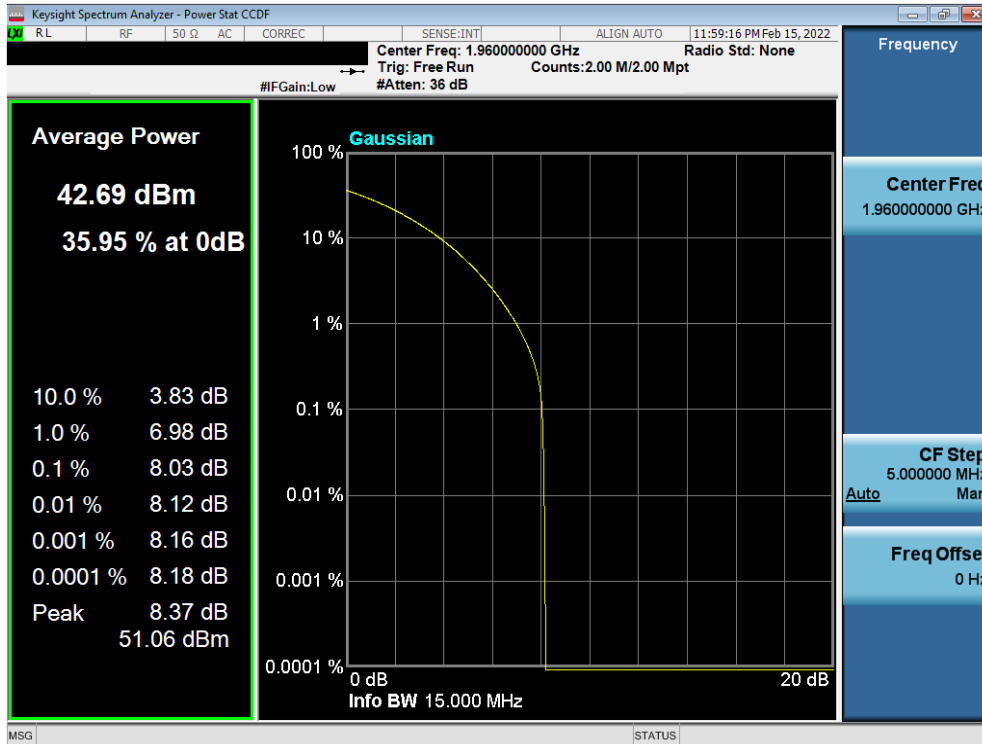


Plot 7-120. PAR Plot (LTE Band 2 - 15MHz 16-QAM - Full RB - Ant1)

FCC ID: QLJNIB-002	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2202140017-01.QLJ	Test Dates: 02/14/2022 - 03/15/2022	EUT Type: Band 2 iCore NIB	Page 77 of 106

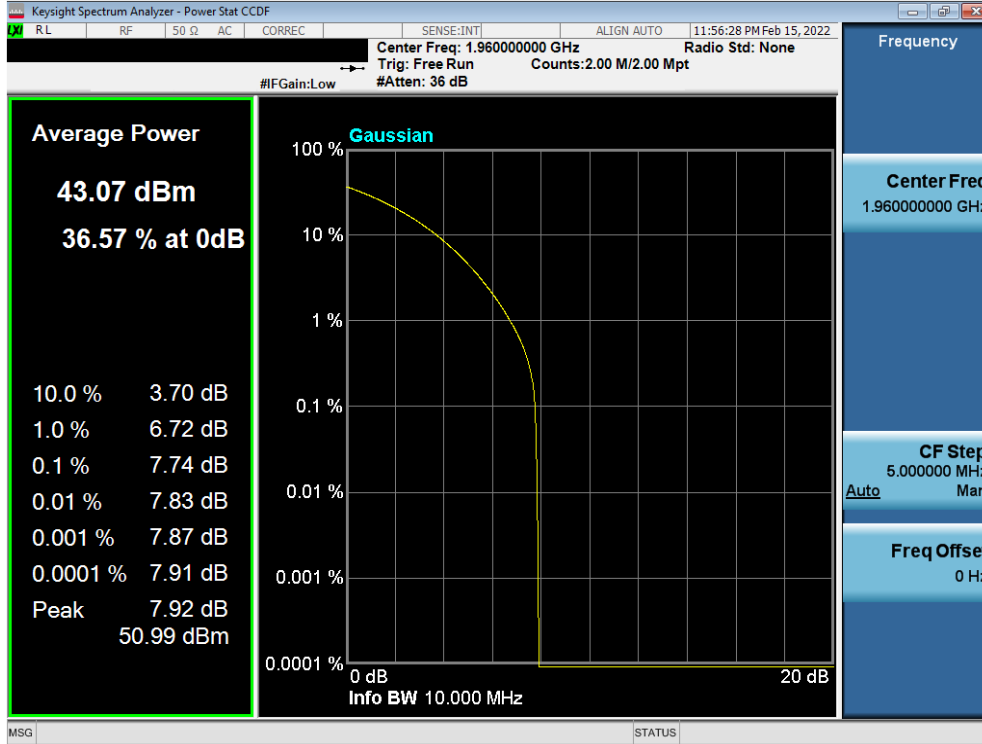


Plot 7-121. PAR Plot (LTE Band 2 - 15MHz 64-QAM - Full RB - Ant1)

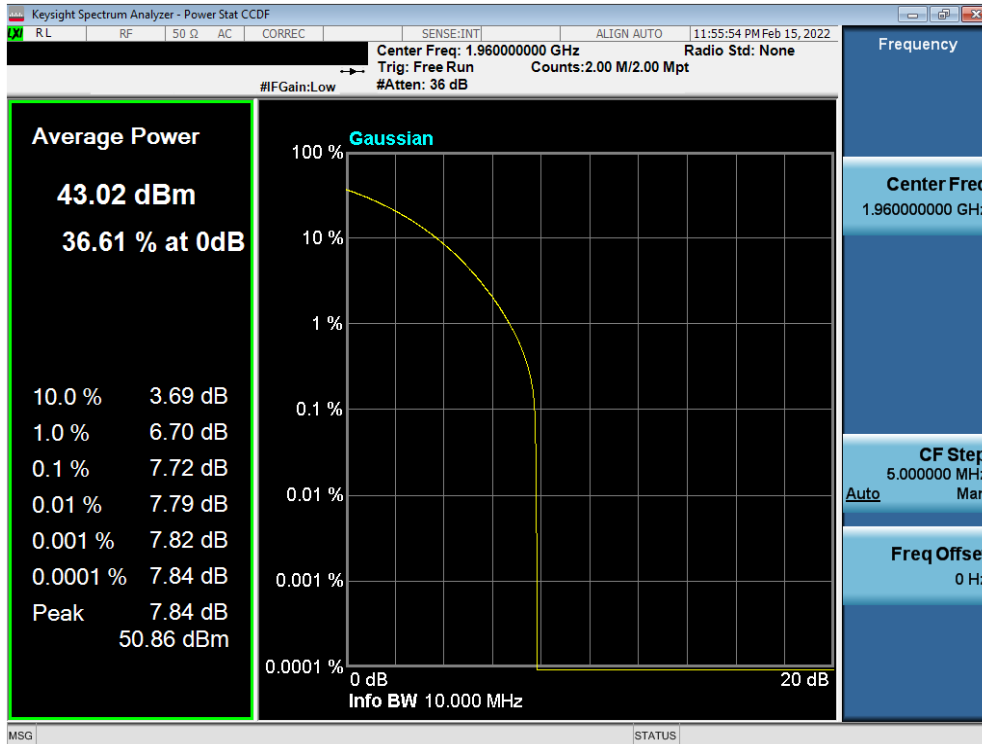


Plot 7-122. PAR Plot (LTE Band 2 - 15MHz 256-QAM - Full RB - Ant1)

FCC ID: QLJNIB-002	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2202140017-01.QLJ	Test Dates: 02/14/2022 - 03/15/2022	EUT Type: Band 2 iCore NIB	Page 78 of 106

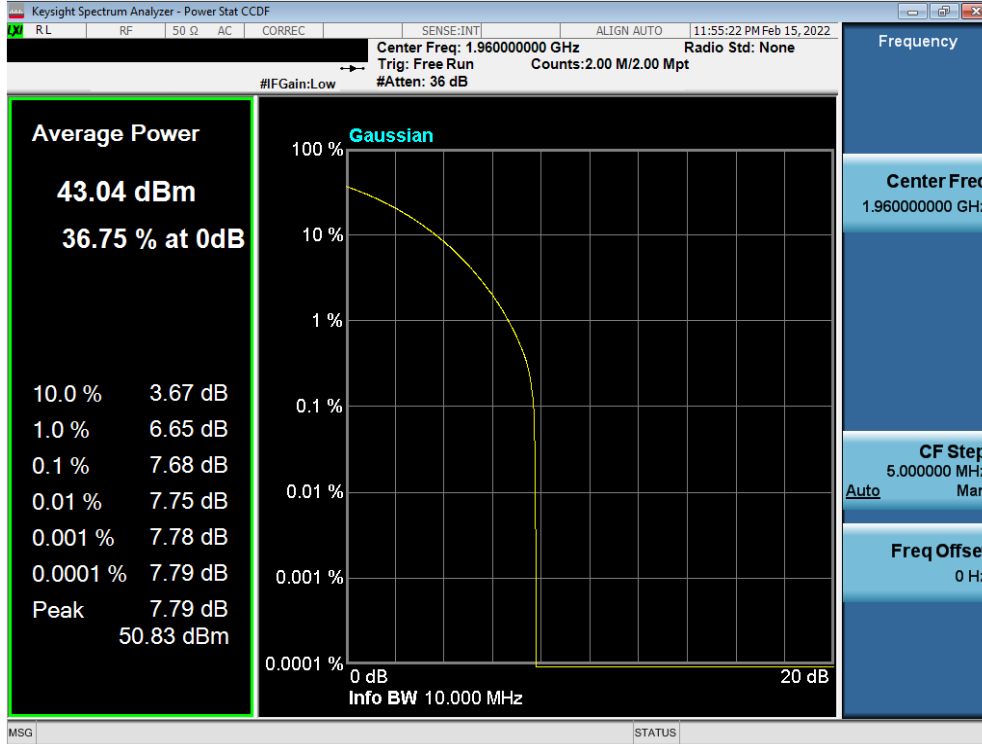


Plot 7-123. PAR Plot (LTE Band 2 - 10MHz QPSK - Full RB - Ant1)

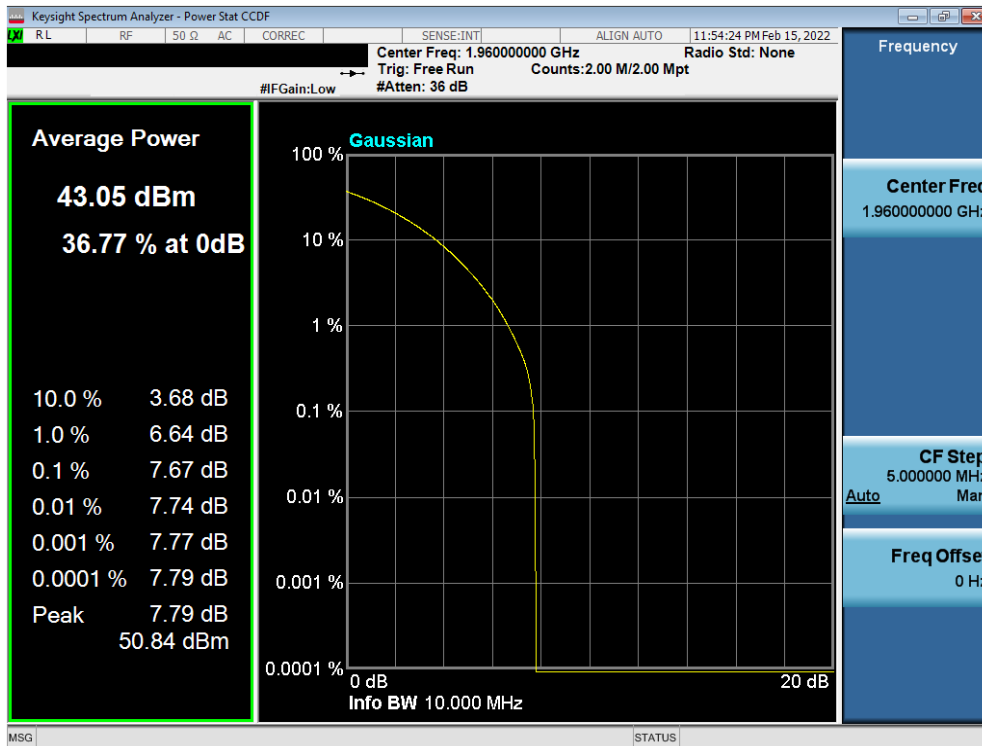


Plot 7-124. PAR Plot (LTE Band 2 - 10MHz 16-QAM - Full RB - Ant1)

FCC ID: QLJNIB-002	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2202140017-01.QLJ	Test Dates: 02/14/2022 - 03/15/2022	EUT Type: Band 2 iCore NIB	Page 79 of 106

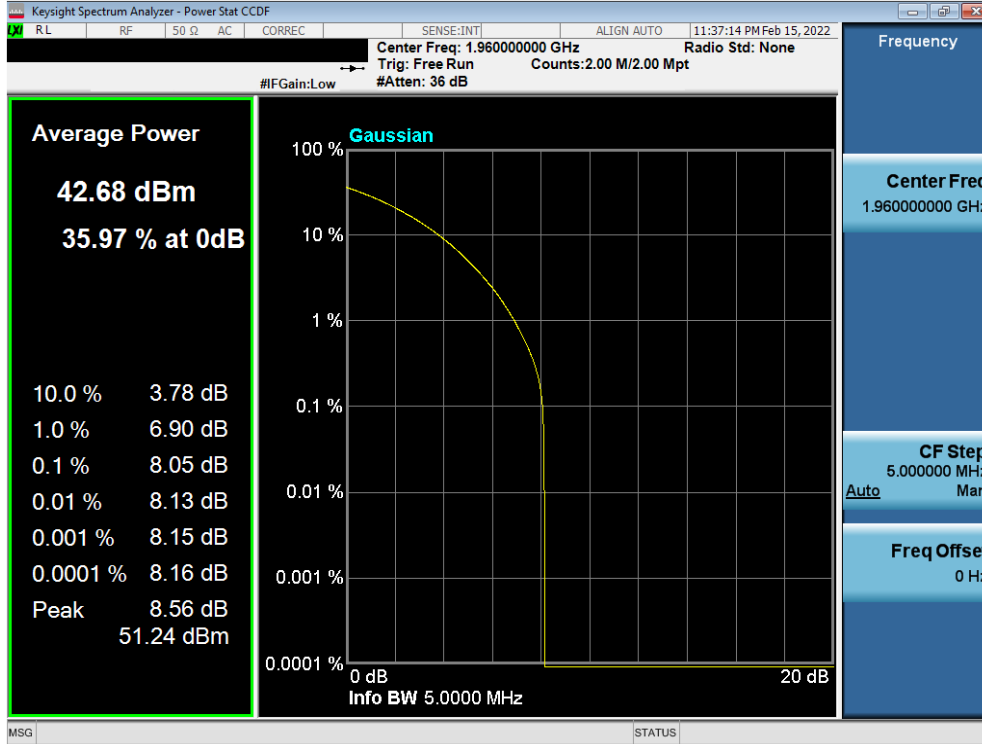


Plot 7-125. PAR Plot (LTE Band 2 - 10MHz 64-QAM - Full RB - Ant1)

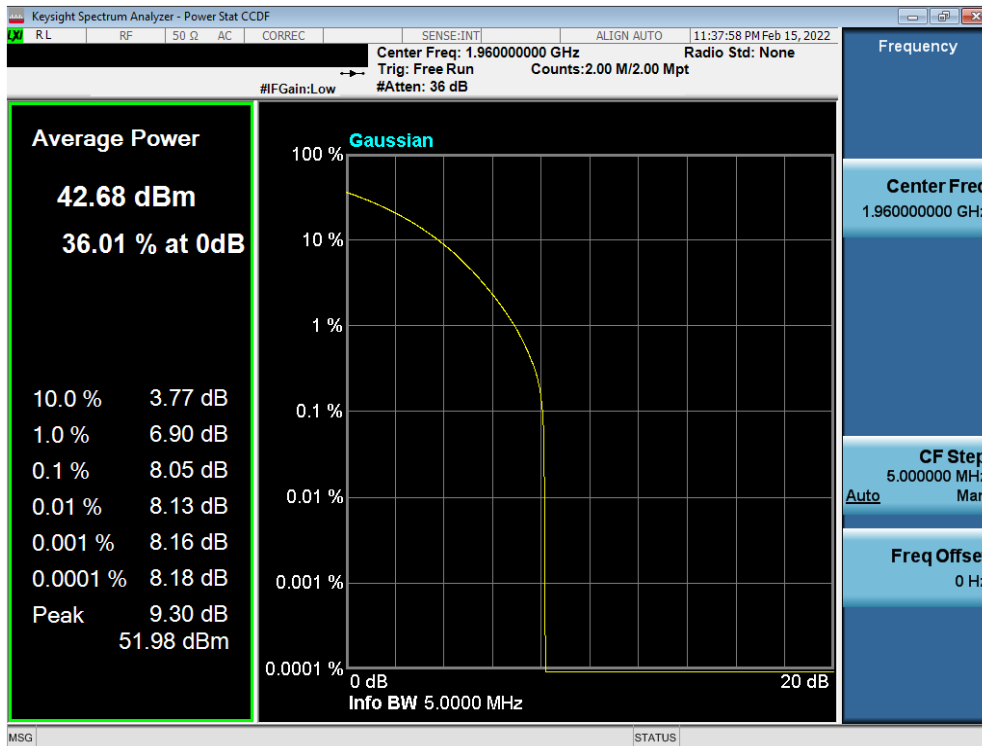


Plot 7-126. PAR Plot (LTE Band 2 - 10MHz 256-QAM - Full RB - Ant1)

FCC ID: QLJNIB-002	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2202140017-01.QLJ	Test Dates: 02/14/2022 - 03/15/2022	EUT Type: Band 2 iCore NIB	Page 80 of 106

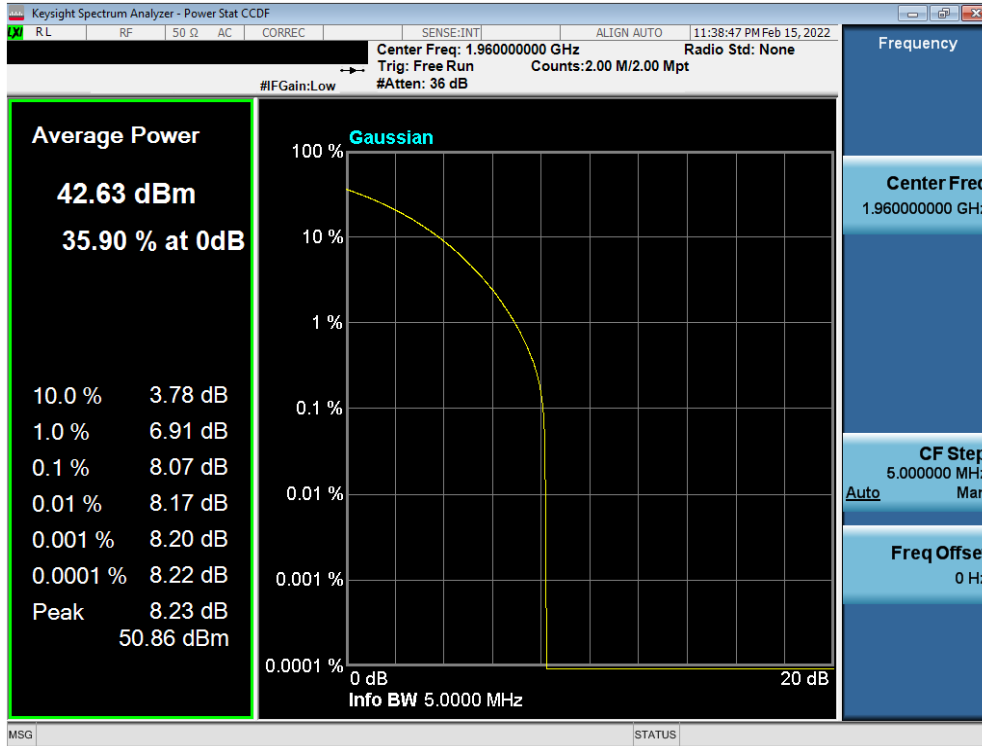


Plot 7-127. PAR Plot (LTE Band 2 - 5MHz QPSK - Full RB - Ant1)

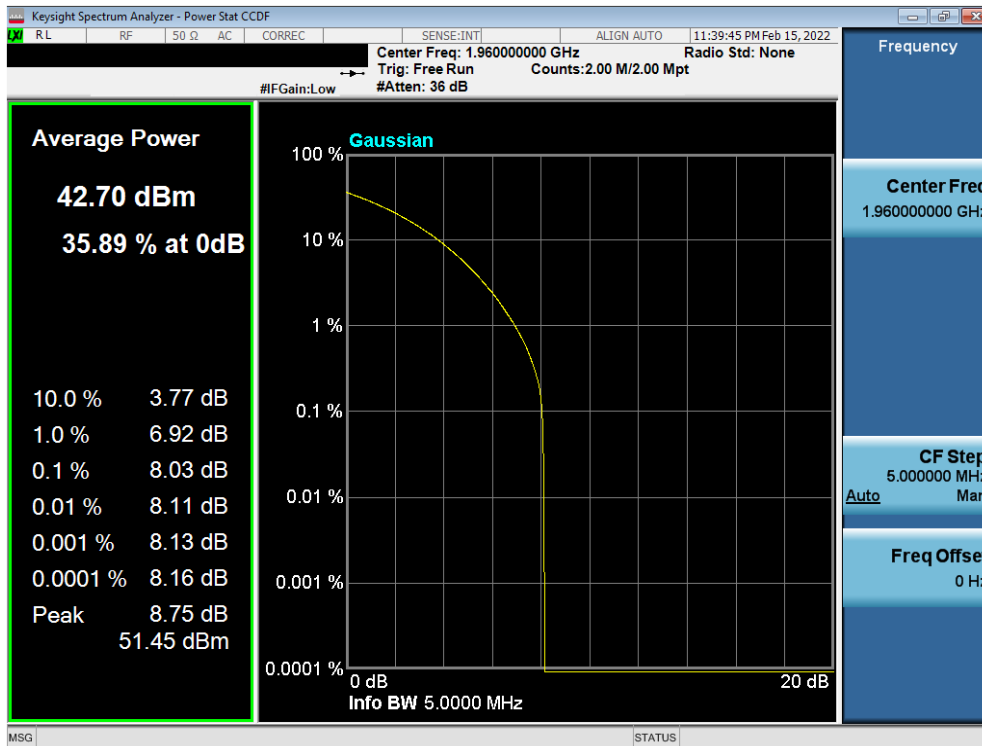


Plot 7-128. PAR Plot (LTE Band 2 - 5MHz 16-QAM - Full RB - Ant1)

FCC ID: QLJNIB-002	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2202140017-01.QLJ	Test Dates: 02/14/2022 - 03/15/2022	EUT Type: Band 2 iCore NIB	Page 81 of 106



Plot 7-129. PAR Plot (LTE Band 2 - 5MHz 64-QAM - Full RB - Ant1)



Plot 7-130. PAR Plot (LTE Band 2 - 5MHz 256-QAM - Full RB - Ant1)

FCC ID: QLJNIB-002	PART 24 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2202140017-01.QLJ	Test Dates: 02/14/2022 - 03/15/2022	EUT Type: Band 2 iCore NIB	Page 82 of 106