

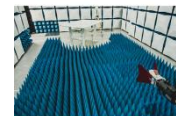


Element Washington DC LLC

18855 Adams Court, Morgan Hill, CA 95037 USA

Tel. 410.290.6652 / Fax 410.290.6654

<http://www.element.com>



DATA REFERENCE REPORT PART 27

Applicant Name:

Apple Inc.
One Apple Park Way
Cupertino, CA 95014
United States

Date of Testing:

5/30/2022 - 9/16/2022

Test Site/Location:

Element Washington DC LLC. Morgan Hill, CA, USA

Test Report Serial No.:

1C2205090029-05.BCG

FCC ID:

BCGA2437

APPLICANT:

Apple Inc.

Reference Model:

A2764

Variant Model:

A2437(A2766)

EUT Type:

Tablet Device

FCC Classification:

PCS Licensed Transmitter (PCB)

FCC Rule Part:

27

Test Procedure(s):

ANSI C63.26-2015, TIA-603-E-2016, 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.

RJ Ortanez

Executive Vice President




FCC ID: BCGA2437	PART 27 DATA REFERENCE REPORT	Approved by: Technical Manager
Test Report S/N: 1C2205090029-05.BCG	Test Dates: 5/30/2022 - 9/16/2022	EUT Type: Tablet Device
		Page 1 of 7

V2.1 11/9/2021

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TABLE OF CONTENTS

1.0	INTRODUCTION	3
1.1	Scope	3
1.2	Element Washington DC LLC Test Location	3
1.3	Test Facility / Accreditations.....	3
2.0	PRODUCT INFORMATION.....	4
2.1	Equipment Description	4
2.2	Device Capabilities.....	4
2.3	Antenna Description	5
3.0	CONCLUSION	6
4.0	APPENDIX A: REFERENCE MODEL TEST REPORT.....	7

FCC ID: BCGA2437	 PART 27 DATA REFERENCE REPORT	Approved by: Technical Manager
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		Page 2 of 7

V2.1 11/9/2021

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1.0 INTRODUCTION

1.1 Scope

Per manufacturer declaration, there are two tablet device models, A2764 and A2437(A2766), with high degree of similarity, reference model FCC ID: BCGA2764 and variant model **FCC ID: BCGA2437**. The reference model support mmWave operations, while the variant models have the mmWave components/antennas removed. Both models share the same material, form factor, circuit design, and components, including antennas and their locations. The reference and variant models use the same power tables and have same tune-up tolerances.

Per FCC approved Data Referencing Test Plan, testing was done fully on the reference model FCC ID: BCGA2764, while conducted and radiated spot-check verification has been performed on variant model **FCC ID: BCGA2437**. Spot-check measurements were conducted, all measurements were investigated and found to be within acceptable tolerance.

Equipment Class	Reference Model FCC ID	Reference Report	Report Title
PCB	BCGA2764	1C2205090028-05.BCG	RF Part 27c Test Report

Table 1-1. Reference Model Details

Spot-check verification are not applicable to this test report; therefore, all data for variant model **FCC ID: BCGA2437** can be fully referenced from the reference model.

Reference model FCC ID: BCGA2764 test report has been included in Appendix A


1.2 Element Washington DC LLC Test Location

These measurement tests were conducted at the Element facility located at 18855 Adams Court, Morgan Hill, CA 95037. The measurement facility is compliant with the test site requirements specified in ANSI C63.4-2014 and KDB 414788 D01 v01r01.

1.3 Test Facility / Accreditations

Measurements were performed at Element located in Morgan Hill, CA 95037, 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 2041.02 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 ISSED Standards (RSS).
- Element Washington DC LLC facility is a registered (22831) test laboratory with the site description on file with ISSED.

FCC ID: BCGA2437		PART 27 DATA REFERENCE REPORT	Approved by: Technical Manager
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V2.1 11/9/2021

2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **Apple Tablet Device FCC ID: BCGA2437**. 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.

2.2 Device Capabilities

This device contains the following capabilities:

850/1700/1900 WCDMA/HSPA, Multi-band LTE, Multi-band 5G NR (FR1), 802.11b/g/n/ax WLAN, 802.11a/n/ac/ax UNII, 802.11a/ax WIFI 6E, Bluetooth (1x, EDR, LE1M, LE2M, HDR4, HDR8), NB UNII (1x, HDR4, HDR8), WPT

This device supports BT Beamforming

This device supports simultaneous transmission operations, which allows for multiple transmitters to transmit simultaneously on the same antenna. The table below shows all configurations possible.

Antenna	Simultaneous Tx Config	WiFi 2.4GHz	Bluetooth	NB UNII	WiFi 5GHz	WiFi 6GHz	LTE / FR1 NR
		802.11 b/g/n/ax	BDR, EDR, HDR4/8, LE1/2M	BDR, HDR4/8	802.11 a/n/ac/ax	802.11 a/ax	Ultra High Band
2a	Config 1	✓	✗	✗	✗	✗	✓
2a	Config 2	✗	✓	✗	✗	✗	✓
4a	Config 3	✓	✗	✓	✗	✗	✗
4a	Config 4	✗	✓	✗	✓	✗	✗


Table 2-1. Simultaneous Transmission Configurations

✓ = Support; ✗ = Not Support

Note:

All the above simultaneous transmission configurations have been tested and the worst case configuration was found to be Config 2 and reported in RF Bluetooth and RF Part 96 test reports.

Wi-Fi 2.4GHz and Bluetooth 2.4 GHz can transmit simultaneously on separate antennas. Specific 2.4 GHz Wi-Fi antenna that can only transmit simultaneously with 2.4 GHz Bluetooth antenna is listed in the SAR test report. For BT (2.4 GHz) in connected mode and Wi-Fi (2.4 GHz) – Wi-Fi max power will not exceed minimum of (13.5dBm, SAR max cap, Reg max cap) power. For BT (2.4 GHz) in disconnected mode and Wi-Fi (2.4 GHz) – BT will be using iPA only and Wi-Fi max power will not exceed minimum of (SAR max cap, Reg max cap) power.

FCC ID: BCGA2437	 PART 27 DATA REFERENCE REPORT		Approved by: Technical Manager
Test Report S/N: 1C2205090029-05.BCG	Test Dates: 5/30/2022 - 9/16/2022	EUT Type: Tablet Device	Page 4 of 7


V2.1 11/9/2021

2.3 Antenna Description

Following antenna gains provided by manufacturer were used for testing.

Band	Antenna Gain [dBi]			
	Antenna 3	Antenna 1	Antenna 4b	Antenna 2a
NR Band n77	-0.3	1.1	-1.6	0.7


Table 2-2. Highest Antenna Gain

FCC ID: BCGA2437	 PART 27 DATA REFERENCE REPORT	Approved by: Technical Manager
Test Report S/N: 1C2205090029-05.BCG	Test Dates: 5/30/2022 - 9/16/2022	EUT Type: Tablet Device
		Page 5 of 7

V2.1 11/9/2021

3.0 CONCLUSION


The spot-check data measured for variant model **FCC ID: BCGA2437** is in tolerance with reference model FCC ID: BCGA2764 per FCC Approved Data Referencing Test Plan.

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Test Report S/N: 1C2205090029-05.BCG	Test Dates: 5/30/2022 - 9/16/2022	EUT Type: Tablet Device
		Page 6 of 7

V2.1 11/9/2021

4.0 APPENDIX A: REFERENCE MODEL TEST REPORT

Attached is the test report (1C2205090028-05.BCG) from reference model FCC ID: BCGA2764, which includes referenced data results.

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Test Report S/N: 1C2205090029-05.BCG	Test Dates: 5/30/2022 - 9/16/2022	EUT Type: Tablet Device
		Page 7 of 7

V2.1 11/9/2021

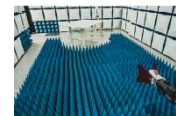


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PART 27 MEASUREMENT REPORT

Applicant Name:

Apple Inc.
One Apple Park Way
Cupertino, CA 95014
United States

Date of Testing:

5/30/2022 - 9/30/2022

Test Site/Location:

Element Washington DC LLC, Morgan Hill, CA,
USA

Test Report Serial No.:

1C2205090028-05.BCG

FCC ID:

BCGA2764

Applicant Name:

Apple Inc.

Application Type:

Certification

Model:

A2764

EUT Type:

Tablet Device

FCC Classification:

PCS Licensed Transmitter (PCB)

FCC Rule Part:

27

Test Procedure(s):

ANSI C63.26-2015, TIA-603-E-2016, 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.

RJ Ortanez
Executive Vice President




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		Page 1 of 200

V2.1 11/9/2021

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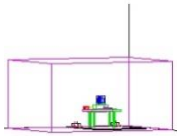
T A B L E O F C O N T E N T S

1.0	INTRODUCTION	7
1.1	Scope	7
1.2	Element Washington DC LLC Test Location	7
1.3	Test Facility / Accreditations.....	7
2.0	PRODUCT INFORMATION.....	8
2.1	Equipment Description	8
2.2	Device Capabilities.....	8
2.3	Antenna Description	9
2.4	Test Support Equipment.....	9
2.5	Test Configuration	10
2.6	Software and Firmware	10
2.7	EMI Suppression Device(s)/Modifications	10
3.0	DESCRIPTION OF TESTS	11
3.1	Evaluation Procedure	11
3.2	Radiated Spurious Emissions	11
4.0	MEASUREMENT UNCERTAINTY	12
5.0	TEST EQUIPMENT CALIBRATION DATA	13
6.0	SAMPLE CALCULATIONS	14
7.0	TEST RESULTS.....	15
7.1	Summary.....	15
7.2	Occupied Bandwidth	17
7.3	Spurious and Harmonic Emissions at Antenna Terminal	74
7.4	Band Edge Emissions at Antenna Terminal	86
7.5	Peak-Average Ratio	110
7.6	Radiated Power (EIRP).....	167
7.7	Radiated Spurious Emissions Measurements.....	184
7.8	Frequency Stability / Temperature Variation	197
8.0	CONCLUSION.....	200

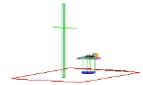
FCC ID: BCGA2764		PART 27 MEASUREMENT REPORT	Approved by: Technical Manager
Test Report S/N: 1C2205090028-05.BCG	Test Dates: 5/30/2022 - 9/30/2022	EUT Type: Tablet Device	Page 2 of 200

V2.1 11/9/2021

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PART 27 MEASUREMENT REPORT



Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	OBW [MHz]	PAR at 0.1% [dB]	EIRP		Emission Designator
						Max. Power [W]	Max. Power [dBm]	
NR Band n77 (PC2) (3450 - 3550MHz)	10 MHz	π/2 BPSK	3455.0 - 3545.0	8.721	4.10	0.520	27.16	8M72G7W
		QPSK	3455.0 - 3545.0	8.707	5.45	0.522	27.18	8M71G7W
		16QAM	3455.0 - 3545.0	8.716	6.22	0.416	26.19	8M72D7W
		64QAM	3455.0 - 3545.0	8.750	6.44	0.327	25.15	8M75D7W
		256QAM	3455.0 - 3545.0	8.841	6.57	0.165	22.18	8M84D7W
	15 MHz	π/2 BPSK	3457.5 - 3542.5	13.123	4.01	0.524	27.19	13M1G7W
		QPSK	3457.5 - 3542.5	13.828	5.38	0.521	27.17	13M8G7W
		16QAM	3457.5 - 3542.5	13.722	6.08	0.421	26.24	13M7D7W
		64QAM	3457.5 - 3542.5	13.714	6.39	0.335	25.25	13M7D7W
		256QAM	3457.5 - 3542.5	13.724	6.66	0.168	22.25	13M7D7W
	20 MHz	π/2 BPSK	3460.0 - 3540.0	18.047	3.91	0.513	27.10	18M0G7W
		QPSK	3460.0 - 3540.0	18.460	5.30	0.524	27.19	18M5G7W
		16QAM	3460.0 - 3540.0	18.351	6.13	0.420	26.23	18M4D7W
		64QAM	3460.0 - 3540.0	18.308	6.47	0.332	25.21	18M3D7W
		256QAM	3460.0 - 3540.0	18.299	6.65	0.167	22.24	18M3D7W
	30MHz	π/2 BPSK	3465.0 - 3535.0	27.092	4.10	0.508	27.06	27M1G7W
		QPSK	3465.0 - 3535.0	28.009	5.40	0.514	27.11	28M0G7W
		16QAM	3465.0 - 3535.0	28.062	6.21	0.421	26.24	28M1D7W
		64QAM	3465.0 - 3535.0	28.086	6.44	0.331	25.20	28M1D7W
		256QAM	3465.0 - 3535.0	27.906	6.74	0.167	22.23	27M9D7W
	40 MHz	π/2 BPSK	3470.0 - 3530.0	35.988	3.93	0.522	27.18	36M0G7W
		QPSK	3470.0 - 3530.0	35.952	5.47	0.520	27.16	36M0G7W
		16QAM	3470.0 - 3530.0	35.944	6.29	0.403	26.05	35M9D7W
		64QAM	3470.0 - 3530.0	35.952	6.52	0.327	25.15	36M0D7W
		256QAM	3470.0 - 3530.0	35.969	6.74	0.163	22.13	36M0D7W
	50 MHz	π/2 BPSK	3475.0 - 3525.0	45.955	3.78	0.516	27.13	46M0G7W
		QPSK	3475.0 - 3525.0	47.826	5.32	0.512	27.09	47M8G7W
		16QAM	3475.0 - 3525.0	47.744	6.12	0.410	26.13	47M7D7W
		64QAM	3475.0 - 3525.0	47.823	6.51	0.334	25.24	47M8D7W
		256QAM	3475.0 - 3525.0	47.696	6.73	0.167	22.24	47M7D7W
	60 MHz	π/2 BPSK	3480.0 - 3520.0	58.270	3.88	0.519	27.15	58M3G7W
		QPSK	3480.0 - 3520.0	58.313	5.30	0.516	27.13	58M3G7W
		16QAM	3480.0 - 3520.0	58.259	6.17	0.419	26.22	58M3D7W
		64QAM	3480.0 - 3520.0	58.074	6.48	0.334	25.24	58M1D7W
		256QAM	3480.0 - 3520.0	58.234	6.60	0.164	22.16	58M2D7W
	70 MHz	π/2 BPSK	3485.0 - 3515.0	64.938	4.20	0.509	27.07	64M9G7W
		QPSK	3485.0 - 3515.0	67.822	5.65	0.512	27.09	67M8G7W
		16QAM	3485.0 - 3515.0	67.772	6.37	0.415	26.18	67M8D7W
		64QAM	3485.0 - 3515.0	67.854	6.60	0.331	25.20	67M9D7W
		256QAM	3485.0 - 3515.0	67.840	6.65	0.165	22.18	67M8D7W
	80 MHz	π/2 BPSK	3490.0 - 3510.0	77.612	3.90	0.514	27.11	77M6G7W
		QPSK	3490.0 - 3510.0	77.715	5.30	0.512	27.09	77M7G7W
		16QAM	3490.0 - 3510.0	77.626	6.19	0.418	26.21	77M6D7W
		64QAM	3490.0 - 3510.0	77.847	6.45	0.329	25.17	77M8D7W
		256QAM	3490.0 - 3510.0	77.639	6.66	0.164	22.16	77M6D7W
	90 MHz	π/2 BPSK	3495.0 - 3505.0	86.075	3.83	0.525	27.20	86M1G7W
		QPSK	3495.0 - 3505.0	87.783	5.29	0.509	27.07	87M8G7W
		16QAM	3495.0 - 3505.0	87.878	6.16	0.417	26.20	87M9D7W
		64QAM	3495.0 - 3505.0	87.863	6.54	0.329	25.17	87M9D7W
		256QAM	3495.0 - 3505.0	87.624	6.60	0.166	22.21	87M6D7W
	100 MHz	π/2 BPSK	3500	96.775	4.01	0.518	27.14	96M8G7W
		QPSK	3500	97.788	5.32	0.509	27.07	97M8G7W
		16QAM	3500	97.870	6.26	0.402	26.04	97M9D7W
		64QAM	3500	98.058	6.41	0.330	25.18	98M1D7W
		256QAM	3500	97.468	6.65	0.166	22.19	97M5D7W

EUT Overview


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V2.1 11/9/2021

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						Max. Power [W]	Max. Power [dBm]	
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		QPSK	3455.0 - 3545.0	8.707	5.45	0.522	25.28	8M71G7W
		16QAM	3455.0 - 3545.0	8.716	6.22	0.416	24.35	8M72D7W
		64QAM	3455.0 - 3545.0	8.750	6.44	0.327	23.42	8M75D7W
		256QAM	3455.0 - 3545.0	8.841	6.57	0.165	20.40	8M84D7W
	15 MHz	$\pi/2$ BPSK	3457.5 - 3542.5	13.123	4.01	0.524	25.33	13M1G7W
		QPSK	3457.5 - 3542.5	13.828	5.38	0.521	25.32	13M8G7W
		16QAM	3457.5 - 3542.5	13.722	6.08	0.421	24.45	13M7D7W
		64QAM	3457.5 - 3542.5	13.714	6.39	0.335	23.39	13M7D7W
		256QAM	3457.5 - 3542.5	13.724	6.66	0.168	20.44	13M7D7W
	20 MHz	$\pi/2$ BPSK	3460.0 - 3540.0	18.047	3.91	0.513	25.27	18M0G7W
		QPSK	3460.0 - 3540.0	18.460	5.30	0.524	25.12	18M5G7W
		16QAM	3460.0 - 3540.0	18.351	6.13	0.420	24.41	18M4D7W
		64QAM	3460.0 - 3540.0	18.308	6.47	0.332	23.38	18M3D7W
		256QAM	3460.0 - 3540.0	18.299	6.65	0.167	20.35	18M3D7W
	30MHz	$\pi/2$ BPSK	3465.0 - 3535.0	27.092	4.10	0.508	25.26	27M1G7W
		QPSK	3465.0 - 3535.0	28.009	5.40	0.514	25.29	28M0G7W
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		64QAM	3465.0 - 3535.0	28.086	6.44	0.331	24.83	28M1D7W
		256QAM	3465.0 - 3535.0	27.906	6.74	0.167	20.38	27M9D7W
	40 MHz	$\pi/2$ BPSK	3470.0 - 3530.0	35.988	3.93	0.522	25.38	36M0G7W
		QPSK	3470.0 - 3530.0	35.952	5.47	0.520	25.37	36M0G7W
		16QAM	3470.0 - 3530.0	35.944	6.29	0.403	24.53	35M9D7W
		64QAM	3470.0 - 3530.0	35.952	6.52	0.327	23.40	36M0D7W
		256QAM	3470.0 - 3530.0	35.969	6.74	0.163	20.29	36M0D7W
	50 MHz	$\pi/2$ BPSK	3475.0 - 3525.0	45.955	3.78	0.516	25.38	46M0G7W
		QPSK	3475.0 - 3525.0	47.826	5.32	0.512	25.40	47M8G7W
		16QAM	3475.0 - 3525.0	47.744	6.12	0.410	24.41	47M7D7W
		64QAM	3475.0 - 3525.0	47.823	6.51	0.334	23.45	47M8D7W
		256QAM	3475.0 - 3525.0	47.696	6.73	0.167	20.43	47M7D7W
	60 MHz	$\pi/2$ BPSK	3480.0 - 3520.0	58.270	3.88	0.519	25.24	58M3G7W
		QPSK	3480.0 - 3520.0	58.313	5.30	0.516	25.30	58M3G7W
		16QAM	3480.0 - 3520.0	58.259	6.17	0.419	24.48	58M3D7W
		64QAM	3480.0 - 3520.0	58.074	6.48	0.334	23.37	58M1D7W
		256QAM	3480.0 - 3520.0	58.234	6.60	0.164	20.36	58M2D7W
	70 MHz	$\pi/2$ BPSK	3485.0 - 3515.0	64.938	4.20	0.509	25.24	64M9G7W
		QPSK	3485.0 - 3515.0	67.822	5.65	0.512	25.25	67M8G7W
		16QAM	3485.0 - 3515.0	67.772	6.37	0.415	24.36	67M8D7W
		64QAM	3485.0 - 3515.0	67.854	6.60	0.331	23.40	67M9D7W
		256QAM	3485.0 - 3515.0	67.840	6.65	0.165	20.43	67M8D7W
	80 MHz	$\pi/2$ BPSK	3490.0 - 3510.0	77.612	3.90	0.514	25.31	77M6G7W
		QPSK	3490.0 - 3510.0	77.715	5.30	0.512	25.34	77M7G7W
		16QAM	3490.0 - 3510.0	77.626	6.19	0.418	26.13	77M6D7W
		64QAM	3490.0 - 3510.0	77.847	6.45	0.329	25.20	77M8D7W
		256QAM	3490.0 - 3510.0	77.639	6.66	0.164	22.17	77M6D7W
	90 MHz	$\pi/2$ BPSK	3495.0 - 3505.0	86.075	3.83	0.525	25.13	86M1G7W
		QPSK	3495.0 - 3505.0	87.783	5.29	0.509	25.28	87M8G7W
		16QAM	3495.0 - 3505.0	87.878	6.16	0.417	24.36	87M9D7W
		64QAM	3495.0 - 3505.0	87.863	6.54	0.329	23.39	87M9D7W
		256QAM	3495.0 - 3505.0	87.624	6.60	0.166	20.39	87M6D7W
	100 MHz	$\pi/2$ BPSK	3500	96.775	4.01	0.518	25.19	96M8G7W
		QPSK	3500	97.788	5.32	0.509	25.39	97M8G7W
		16QAM	3500	97.870	6.26	0.402	24.02	97M9D7W
		64QAM	3500	98.058	6.41	0.330	23.39	98M1D7W
		256QAM	3500	97.468	6.65	0.166	20.13	97M5D7W

EUT Overview


FCC ID: BCGA2764	 PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1C2205090028-05.BCG	Test Dates: 5/30/2022 - 9/30/2022	EUT Type: Tablet Device	Page 4 of 200

V2.1 11/9/2021

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Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	OBW [MHz]	PAR at 0.1% [dB]	EIRP		Emission Designator
						Max. Power [W]	Max. Power [dBm]	
NR Band n77 (PC2) (3700 - 3980MHz)	10 MHz	$\pi/2$ BPSK	3705.0 - 3975.0	8.727	4.04	0.525	27.20	8M73G7W
		QPSK	3705.0 - 3975.0	8.734	5.26	0.516	27.13	8M73G7W
		16QAM	3705.0 - 3975.0	8.724	5.96	0.418	26.21	8M72D7W
		64QAM	3705.0 - 3975.0	8.714	6.31	0.389	25.90	8M71D7W
		256QAM	3705.0 - 3975.0	8.916	6.21	0.389	25.90	8M92D7W
	15 MHz	$\pi/2$ BPSK	3707.5 - 3972.5	13.065	3.98	0.525	27.20	13M1G7W
		QPSK	3707.5 - 3972.5	13.708	5.20	0.521	27.17	13M7G7W
		16QAM	3707.5 - 3972.5	13.739	5.88	0.415	26.18	13M7D7W
		64QAM	3707.5 - 3972.5	13.719	6.19	0.389	25.90	13M7D7W
		256QAM	3707.5 - 3972.5	13.728	6.22	0.389	25.90	13M7D7W
	20 MHz	$\pi/2$ BPSK	3710.0 - 3970.0	19.083	3.81	0.524	27.19	19M1G7W
		QPSK	3710.0 - 3970.0	19.264	5.14	0.525	27.20	19M3G7W
		16QAM	3710.0 - 3970.0	19.329	5.89	0.417	26.20	19M3D7W
		64QAM	3710.0 - 3970.0	19.258	6.18	0.389	25.90	19M3D7W
		256QAM	3710.0 - 3970.0	19.249	6.22	0.389	25.90	19M2D7W
	30MHz	$\pi/2$ BPSK	3715.0 - 3965.0	27.693	3.92	0.518	27.14	27M7G7W
		QPSK	3715.0 - 3965.0	28.744	5.25	0.525	27.20	28M7G7W
		16QAM	3715.0 - 3965.0	28.690	6.02	0.418	26.21	28M7D7W
		64QAM	3715.0 - 3965.0	28.684	6.14	0.389	25.90	28M7D7W
		256QAM	3715.0 - 3965.0	28.637	6.19	0.389	25.90	28M6D7W
	40 MHz	$\pi/2$ BPSK	3720.0 - 3960.0	36.558	3.88	0.521	27.17	36M6G7W
		QPSK	3720.0 - 3960.0	38.434	5.46	0.525	27.20	38M4G7W
		16QAM	3720.0 - 3960.0	38.388	6.24	0.422	26.25	38M4D7W
		64QAM	3720.0 - 3960.0	38.357	6.42	0.389	25.90	38M4D7W
		256QAM	3720.0 - 3960.0	38.301	6.64	0.389	25.90	38M3D7W
	50 MHz	$\pi/2$ BPSK	3725.0 - 3955.0	45.910	3.76	0.525	27.20	45M9G7W
		QPSK	3725.0 - 3955.0	47.647	5.28	0.525	27.20	47M6G7W
		16QAM	3725.0 - 3955.0	47.590	6.06	0.416	26.19	47M6D7W
		64QAM	3725.0 - 3955.0	47.744	6.46	0.389	25.90	47M7D7W
		256QAM	3725.0 - 3955.0	47.633	6.64	0.389	25.90	47M6D7W
	60 MHz	$\pi/2$ BPSK	3730.0 - 3950.0	58.122	3.84	0.524	27.19	58M1G7W
		QPSK	3730.0 - 3950.0	58.184	5.30	0.525	27.20	58M2G7W
		16QAM	3730.0 - 3950.0	57.988	6.17	0.409	26.12	58M0D7W
		64QAM	3730.0 - 3950.0	58.027	6.42	0.389	25.90	58M0D7W
		256QAM	3730.0 - 3950.0	57.988	6.57	0.389	25.90	58M0D7W
	70 MHz	$\pi/2$ BPSK	3735.0 - 3945.0	64.645	4.17	0.525	27.20	64M6G7W
		QPSK	3735.0 - 3945.0	67.714	5.56	0.524	27.19	67M7G7W
		16QAM	3735.0 - 3945.0	67.863	6.22	0.410	26.13	67M9D7W
		64QAM	3735.0 - 3945.0	68.004	6.51	0.389	25.90	68M0D7W
		256QAM	3735.0 - 3945.0	67.583	6.55	0.389	25.90	67M6D7W
	80 MHz	$\pi/2$ BPSK	3740.0 - 3940.0	77.254	3.85	0.525	27.20	77M3G7W
		QPSK	3740.0 - 3940.0	77.678	5.31	0.519	27.15	77M7G7W
		16QAM	3740.0 - 3940.0	77.635	6.11	0.419	26.22	77M6D7W
		64QAM	3740.0 - 3940.0	77.660	6.40	0.389	25.90	77M7D7W
		256QAM	3740.0 - 3940.0	77.589	6.54	0.389	25.90	77M6D7W
	90 MHz	$\pi/2$ BPSK	3745.0 - 3935.0	85.823	3.79	0.525	27.20	85M8G7W
		QPSK	3745.0 - 3935.0	87.693	5.32	0.522	27.18	87M7G7W
		16QAM	3745.0 - 3935.0	87.630	6.12	0.415	26.18	87M6D7W
		64QAM	3745.0 - 3935.0	87.759	6.43	0.389	25.90	87M8D7W
		256QAM	3745.0 - 3935.0	87.648	6.55	0.389	25.90	87M6D7W
	100 MHz	$\pi/2$ BPSK	3750.0 - 3930.0	96.782	4.00	0.477	26.78	96M8G7W
		QPSK	3750.0 - 3930.0	97.661	5.33	0.498	26.98	97M7G7W
		16QAM	3750.0 - 3930.0	97.666	6.21	0.419	26.22	97M7D7W
		64QAM	3750.0 - 3930.0	97.579	6.37	0.389	25.90	97M6D7W
		256QAM	3750.0 - 3930.0	97.615	6.56	0.389	25.90	97M6D7W

EUT Overview


FCC ID: BCGA2764	 PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1C2205090028-05.BCG	Test Dates: 5/30/2022 - 9/30/2022	EUT Type: Tablet Device	Page 5 of 200

V2.1 11/9/2021

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Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	OBW [MHz]	PAR at 0.1% [dB]	EIRP		Emission Designator
						Max. Power [W]	Max. Power [dBm]	
NR Band n77 (PC3) (3700 - 3980MHz)	10 MHz	$\pi/2$ BPSK	3705.0 - 3975.0	8.727	4.04	0.304	25.33	8M73G7W
		QPSK	3705.0 - 3975.0	8.734	5.26	0.340	25.39	8M73G7W
		16QAM	3705.0 - 3975.0	8.724	5.96	0.345	24.41	8M72D7W
		64QAM	3705.0 - 3975.0	8.714	6.31	0.344	23.42	8M71D7W
		256QAM	3705.0 - 3975.0	8.916	6.21	0.278	20.38	8M92D7W
	15 MHz	$\pi/2$ BPSK	3707.5 - 3972.5	13.065	3.98	0.219	25.39	13M1G7W
		QPSK	3707.5 - 3972.5	13.708	5.20	0.334	25.36	13M7G7W
		16QAM	3707.5 - 3972.5	13.739	5.88	0.345	24.40	13M7D7W
		64QAM	3707.5 - 3972.5	13.719	6.19	0.347	23.35	13M7D7W
		256QAM	3707.5 - 3972.5	13.728	6.22	0.274	20.38	13M7D7W
	20 MHz	$\pi/2$ BPSK	3710.0 - 3970.0	18.014	3.81	0.220	25.38	18M0G7W
		QPSK	3710.0 - 3970.0	18.385	5.14	0.321	25.33	18M4G7W
		16QAM	3710.0 - 3970.0	18.359	5.89	0.339	24.37	18M4D7W
		64QAM	3710.0 - 3970.0	18.396	6.18	0.328	23.30	18M4D7W
		256QAM	3710.0 - 3970.0	18.314	6.22	0.281	20.37	18M3D7W
	30MHz	$\pi/2$ BPSK	3715.0 - 3965.0	26.999	3.92	0.215	25.34	27M0G7W
		QPSK	3715.0 - 3965.0	28.102	5.25	0.318	25.39	28M1G7W
		16QAM	3715.0 - 3965.0	28.046	6.02	0.335	24.40	28M0D7W
		64QAM	3715.0 - 3965.0	28.037	6.14	0.330	23.38	28M0D7W
		256QAM	3715.0 - 3965.0	28.089	6.19	0.272	20.42	28M1D7W
	40 MHz	$\pi/2$ BPSK	3720.0 - 3960.0	36.558	3.88	0.219	25.39	36M6G7W
		QPSK	3720.0 - 3960.0	38.434	5.46	0.340	25.36	38M4G7W
		16QAM	3720.0 - 3960.0	38.388	6.24	0.334	24.31	38M4D7W
		64QAM	3720.0 - 3960.0	38.357	6.42	0.410	23.33	38M4D7W
		256QAM	3720.0 - 3960.0	38.301	6.64	0.408	20.38	38M3D7W
	50 MHz	$\pi/2$ BPSK	3725.0 - 3955.0	45.910	3.76	0.331	25.39	45M9G7W
		QPSK	3725.0 - 3955.0	47.647	5.28	0.323	25.41	47M6G7W
		16QAM	3725.0 - 3955.0	47.590	6.06	0.337	24.43	47M6D7W
		64QAM	3725.0 - 3955.0	47.744	6.46	0.330	23.44	47M7D7W
		256QAM	3725.0 - 3955.0	47.633	6.64	0.273	20.31	47M6D7W
	60 MHz	$\pi/2$ BPSK	3730.0 - 3950.0	58.122	3.84	0.218	25.36	58M1G7W
		QPSK	3730.0 - 3950.0	58.184	5.30	0.109	25.22	58M2G7W
		16QAM	3730.0 - 3950.0	57.988	6.17	0.330	24.38	58M0D7W
		64QAM	3730.0 - 3950.0	58.027	6.42	0.346	23.43	58M0D7W
		256QAM	3730.0 - 3950.0	57.988	6.57	0.252	20.41	58M0D7W
	70 MHz	$\pi/2$ BPSK	3735.0 - 3945.0	64.645	4.17	0.218	25.33	64M6G7W
		QPSK	3735.0 - 3945.0	67.714	5.56	0.103	25.31	67M7G7W
		16QAM	3735.0 - 3945.0	67.863	6.22	0.001	24.39	67M9D7W
		64QAM	3735.0 - 3945.0	68.004	6.51	0.001	23.43	68M0D7W
		256QAM	3735.0 - 3945.0	67.583	6.55	0.001	20.36	67M6D7W
	80 MHz	$\pi/2$ BPSK	3740.0 - 3940.0	77.254	3.85	0.516	25.39	77M3G7W
		QPSK	3740.0 - 3940.0	77.678	5.31	0.519	25.32	77M7G7W
		16QAM	3740.0 - 3940.0	77.635	6.11	0.509	24.26	77M6D7W
		64QAM	3740.0 - 3940.0	77.660	6.40	0.418	23.35	77M7D7W
		256QAM	3740.0 - 3940.0	77.589	6.54	0.324	20.31	77M6D7W
	90 MHz	$\pi/2$ BPSK	3745.0 - 3935.0	85.823	3.79	0.519	25.37	85M8G7W
		QPSK	3745.0 - 3935.0	87.693	5.32	0.520	25.26	87M7G7W
		16QAM	3745.0 - 3935.0	87.630	6.12	0.482	24.43	87M6D7W
		64QAM	3745.0 - 3935.0	87.759	6.43	0.397	23.33	87M8D7W
		256QAM	3745.0 - 3935.0	87.648	6.55	0.324	20.44	87M6D7W
	100 MHz	$\pi/2$ BPSK	3750.0 - 3930.0	96.782	4.00	0.524	25.38	96M8G7W
		QPSK	3750.0 - 3930.0	97.661	5.33	0.511	25.36	97M7G7W
		16QAM	3750.0 - 3930.0	97.666	6.21	0.513	24.34	97M7D7W
		64QAM	3750.0 - 3930.0	97.579	6.37	0.417	23.37	97M6D7W
		256QAM	3750.0 - 3930.0	97.615	6.56	0.317	20.30	97M6D7W

EUT Overview

FCC ID: BCGA2764	 PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1C2205090028-05.BCG	Test Dates: 5/30/2022 - 9/30/2022	EUT Type: Tablet Device	Page 6 of 200

V2.1 11/9/2021

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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 Washington DC LLC Test Location

These measurement tests were conducted at the Element Washington DC LLC facility located at 18855 Adams Court, Morgan Hill, CA 95037. The measurement facility is compliant with the test site requirements specified in ANSI C63.4-2014 and KDB 414788 D01 v01r01.

1.3 Test Facility / Accreditations

Measurements were performed at Element Washington DC LLC located in Morgan Hill, CA 95037, 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 2041.02 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 (22831) test laboratory with the site description on file with ISED.

FCC ID: BCGA2764		PART 27 MEASUREMENT REPORT	Approved by: Technical Manager
Test Report S/N: 1C2205090028-05.BCG	Test Dates: 5/30/2022 - 9/30/2022	EUT Type: Tablet Device	Page 7 of 200

V2.1 11/9/2021

2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **Apple Tablet Device FCC ID:BCGA2764**. 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.: DLX2184009B1M9L1M, KRRF2YPXDHM, H4QHXRFX21, CC6D2QF1Q5

2.2 Device Capabilities

This device contains the following capabilities:

850/1700/1900 WCDMA/HSPA, Multi-band LTE, Multi-band 5G NR (FR1, FR2), 802.11b/g/n/ax WLAN, 802.11a/n/ac/ax UNII, 802.11a/ax WIFI 6E, Bluetooth (1x, EDR, LE1M, LE2M, HDR4, HDR8), NB UNII (1x, HDR4, HDR8), WPT

This device supports BT Beamforming

This device supports simultaneous transmission operations, which allows for multiple transmitters to transmit simultaneously on the same antenna. The table below shows all configurations possible.


Antenna	Simultaneous Tx Config	WiFi 2.4GHz	Bluetooth	NB UNII	WiFi 5GHz	WiFi 6GHz	LTE / FR1 NR
		802.11 b/g/n/ax	BDR, EDR, HDR4/8, LE1/2M	BDR, HDR4/8	802.11 a/n/ac/ax	802.11 a/ax	Ultra High Band
2a	Config 1	✓	✗	✗	✗	✗	✓
2a	Config 2	✗	✓	✗	✗	✗	✓
4a	Config 3	✓	✗	✓	✗	✗	✗
4a	Config 4	✗	✓	✗	✓	✗	✗

Table 2-1. Simultaneous Transmission Configurations

✓ = Support; ✗ = Not Support

Note:

1. All the above simultaneous transmission configurations have been tested and the worst case configuration was found to be Bluetooth and LTE B48. Results can be found on RF Bluetooth and RF Part 96 Test Reports.
2. Wi-Fi 2.4GHz and Bluetooth 2.4 GHz can transmit simultaneously on separate antennas. Specific 2.4 GHz Wi-Fi antenna that can only transmit simultaneously with 2.4 GHz Bluetooth antenna is listed in the SAR test report. For BT (2.4 GHz) in connected mode and Wi-Fi (2.4 GHz) – Wi-Fi max power will not exceed minimum of (13.5dBm, SAR max cap, Reg max cap) power. For BT (2.4 GHz) in disconnected mode and Wi-Fi (2.4 GHz) – BT will be using iPA only and Wi-Fi max power will not exceed minimum of (SAR max cap, Reg max cap) power.

FCC ID: BCGA2764	 PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1C2205090028-05.BCG	Test Dates: 5/30/2022 - 9/30/2022	EUT Type: Tablet Device	Page 8 of 200

V2.1 11/9/2021

2.3 Antenna Description

Following antenna gains provided by manufacturer were used for testing.


Band	Antenna Gain [dBi]			
	Antenna 3	Antenna 1	Antenna 4b	Antenna 2a
NR Band n77	-0.3	1.1	-1.6	0.7

Table 2-2. Highest Antenna Gain

2.4 Test Support Equipment

1	Apple MacBook Pro	Model: A2141	S/N: C02DV7VKMD6T
	w/AC/DC Adapter	Model: A2166	S/N: N/A
2	Apple USB-C Cable	Model: Spartan	S/N: 000MKTR02U
3	USB-C Cable	Model: A246	S/N: N/A
	w/ AC Adapter	Model: A2305	S/N: N/A
4	Apple Pencil	Model: N/A	S/N: GQXGSXBJKM9
5	DC Power Supply	Model: KPS3010D	S/N: N/A

Table 2-3. Test Support Equipment

FCC ID: BCGA2764	 PART 27 MEASUREMENT REPORT	Approved by: Technical Manager
Test Report S/N: 1C2205090028-05.BCG	Test Dates: 5/30/2022 - 9/30/2022	EUT Type: Tablet Device
		Page 9 of 200

V2.1 11/9/2021

2.5 Test Configuration

The EUT was tested per the guidance of ANSI C63.26 2015, TIA-603-E-2016 and KDB 971168 D01 v03r01. See Section 7.0 of this test report for a description of the radiated and antenna port conducted emissions tests.

For emissions from 1GHz – 18GHz, low, mid, and high channels were tested with highest power and worst case configuration. The emissions below 1GHz and above 18GHz were tested with the highest transmitting power and the worst case channel.


The EUT was manipulated through three orthogonal planes of X-orientation (flatbed), Y-orientation (landscape), and Z-orientation (portrait) during the testing. Only the worst case emissions were reported in this test report.

2.6 Software and Firmware

The test was conducted with firmware version 20A8359 installed on the EUT.

2.7 EMI Suppression Device(s)/Modifications

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

FCC ID: BCGA2764	 PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1C2205090028-05.BCG	Test Dates: 5/30/2022 - 9/30/2022	EUT Type: Tablet Device	Page 10 of 200

V2.1 11/9/2021

3.0 DESCRIPTION OF TESTS

3.1 Evaluation Procedure

The measurement procedures described in the “Land Mobile FM or PM – Communications Equipment – Measurements and Performance Standards” (ANSI C63.26 2015, TIA-603-E-2016) 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 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 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:

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


And

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

All radiated measurements are performed in a chamber that meets the site requirements per ANSI C63.4-2014.

Per KDB 414788 D01 v01r01, radiated emission test sites other than open-field test sites (e.g., shielded anechoic chambers), may be employed for emission measurements below 30MHz if characterized so that the measurements correspond to those obtained at an open-field test site. To determine test site equivalency, a reference sample transmitting at 149kHz was measured on an open field test site (asphalt with no ground plane) and then measured in the 3m semi-anechoic chamber. A calibrated 60cm loop antenna was used while the reference device was rotated through the X, Y and Z axis in order to capture the worst case level. A maximum deviation of 2.77dB at 149kHz was measured when comparing the 3 meter semi-anechoic chamber to the open field site.

Radiated spurious emission levels are investigated with the receive antenna horizontally and vertically polarized per ANSI C63.26-2015 and TIA-603-E-2016.


FCC ID: BCGA2764		PART 27 MEASUREMENT REPORT	Approved by: Technical Manager
Test Report S/N: 1C2205090028-05.BCG	Test Dates: 5/30/2022 - 9/30/2022	EUT Type: Tablet Device	Page 11 of 200

V2.1 11/9/2021

4.0 MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.23-2012. 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	1.77
Radiated Disturbance (<30MHz)	4.38
Radiated Disturbance (30MHz - 1GHz)	4.75
Radiated Disturbance (1 - 18GHz)	5.20
Radiated Disturbance (>18GHz)	4.72

FCC ID: BCGA2764	 PART 27 MEASUREMENT REPORT	Approved by: Technical Manager
Test Report S/N: 1C2205090028-05.BCG	Test Dates: 5/30/2022 - 9/30/2022	EUT Type: Tablet Device
		Page 12 of 200

V2.1 11/9/2021

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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
Agilent Technologies	N9030A	3Hz-44GHz PXA Signal Analyzer	6/10/2022	Annual	6/10/2023	MY49430244
Agilent Technologies	N9020A	MXA Signal Analyzer	4/26/2022	Annual	4/26/2023	MY56470202
ATM	180-442A-KF	20dB Nominal Gain Horn Antenna	1/19/2022	Annual	1/19/2023	T058701-02
ETS-Lindgren	3142E	Biconilog Antenna (26-6000MHz)	10/21/2021	Annual	10/21/2022	208204
ETS-Lindgren	3117	Double Ridged Guide Horn Antenna (1-18GHz)	10/25/2021	Annual	10/25/2022	227597
ETS-Lindgren	SU-241	Table Top Temperature Chamber	10/6/2021	Annual	10/6/2022	92009574
Keysight Technology	N9040B	UXA Signal Analyzer	2/8/2022	Annual	2/8/2023	MY57212015
Rohde & Schwarz	TS-PR8	Pre-Amplifier (30MHz-6GHz)	1/6/2022	Annual	1/6/2023	102328
Rohde & Schwarz	CMW500	Wideband Radio Communication Tester	10/11/2021	Annual	10/11/2022	161616
Rohde & Schwarz	CMW500	Wideband Radio Communication Tester	11/4/2021	Annual	11/4/2022	151888
Rohde & Schwarz	ESW26	EMI Test Receiver	5/19/2022	Annual	5/19/2023	101299
Rohde & Schwarz	ESW44	EMI Test Receiver	12/2/2021	Annual	12/2/2022	101570
Rohde & Schwarz	FSV40	Signal Analyzer (10Hz-40GHz)	3/4/2022	Annual	3/4/2023	101619
Rohde & Schwarz	FSVA3044	Signal Analyzer (up to 44 GHz)	5/12/2022	Annual	5/12/2023	101098
Rohde & Schwarz	HFH2-Z2	Loop Antenna	4/3/2022	Annual	4/3/2023	100546
Rohde & Schwarz	TC-TA18	Cross-Polarized Antenna 400MHz-18GHz	1/25/2022	Annual	1/25/2023	101063
Rohde & Schwarz	TS-PR18	Pre-Amplifier (1GHz-18GHz)	1/6/2022	Annual	1/6/2023	101639
Rohde & Schwarz	TS-PR1840	Pre-Amplifier (18GHz-40GHz)	4/18/2022	Annual	4/18/2023	100050

Table 5-1. Test Equipment

Notes:

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.

FCC ID: BCGA2764	 PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1C2205090028-05.BCG	Test Dates: 5/30/2022 - 9/30/2022	EUT Type: Tablet Device	Page 13 of 200

V2.1 11/9/2021

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6.0 SAMPLE CALCULATIONS

Emission Designator

$\pi/2$ BPSK / QPSK Modulation

Emission Designator = 8M62G7W

BW = 8.62 MHz

G = Phase Modulation

7 = Quantized/Digital Info

W = Combination of Any

QAM Modulation

Emission Designator = 8M45D7W

BW = 8.45 MHz

D = Amplitude/Angle Modulated


7 = Quantized/Digital Info

W = Combination of Any

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: BCGA2764		PART 27 MEASUREMENT REPORT	Approved by: Technical Manager
Test Report S/N: 1C2205090028-05.BCG	Test Dates: 5/30/2022 - 9/30/2022	EUT Type: Tablet Device	Page 14 of 200

V2.1 11/9/2021

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7.0 TEST RESULTS

7.1 Summary

Company Name: Apple Inc.
 FCC ID: BCGA2764
 FCC Classification: PCS Licensed Transmitter (PCB)
 Mode(s): NR

Test Condition	Test Description	FCC Part Section(s)	Test Limit	Test Result	Reference
CONDUCTED	Occupied Bandwidth	2.1049	N/A	N/A	Section 7.2
	Conducted Band Edge / Spurious Emissions (NR Band n77 - 3450-3550MHz)	2.1051, 27.53(n)(2)	-13 dBm at Band Edge and for all out-of-band emissions	PASS	Sections 7.3, 7.4
	Conducted Band Edge / Spurious Emissions (NR Band n77 - 3700-3980MHz)	2.1051, 27.53(l)(2)		PASS	Sections 7.3, 7.4
	Peak-Average Ratio (NR Band n77 - 3450-3550MHz)	27.50(k)(4)	< 13 dB	PASS	Sections 7.5
	Peak-Average Ratio (NR Band n77 - 3700-3980MHz)	27.50(j)(4)		PASS	Sections 7.5
	Transmitter Conducted Output Power	2.1046	N/A	N/A	See RF Exposure Report
	Equivalent Isotropic Radiated Power (NR Band n77 - 3450-3550MHz)	27.50(k)(3)	< 1 Watts max. EIRP	PASS	Section 7.6
	Equivalent Isotropic Radiated Power (NR Band n77 - 3700-3980MHz)	27.50(j)(3)		PASS	Section 7.6
	Frequency Stability	2.1055, 27.54	Fundamental emissions stay within authorized frequency block	PASS	Section 7.8
RADIATED	Radiated Spurious Emissions (NR Band n77 - 3450-3550MHz)	2.1051, 27.53(n)(2)	-13 for all out-of-band emissions	PASS	Section 7.7
	Radiated Spurious Emissions (NR Band n77 - 3700-3980MHz)	2.1051, 27.53(l)(2)		PASS	Section 7.7

Table 7-1. Summary of Test Results


FCC ID: BCGA2764	 PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1C2205090028-05.BCG	Test Dates: 5/30/2022 - 9/30/2022	EUT Type: Tablet Device	Page 15 of 200

V2.1 11/9/2021

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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 were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables, directional couplers, and attenuators used as part of the system to maintain a link between the call box and the EUT at all frequencies of interest.
3. All antenna port conducted emissions testing was performed on a test bench with the antenna port of the EUT connected to the spectrum analyzer through calibrated cables, attenuators, and couplers.
4. All conducted emissions measurements are performed with automated test software to capture the corresponding plots necessary to show compliance. The measurement software utilized was Element EMC Software Tool v1.1.

FCC ID: BCGA2764	 PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1C2205090028-05.BCG	Test Dates: 5/30/2022 - 9/30/2022	EUT Type: Tablet Device	Page 16 of 200

V2.1 11/9/2021

7.2 Occupied Bandwidth

\$2.1049

Test Overview

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

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 $\geq 3 \times$ 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.

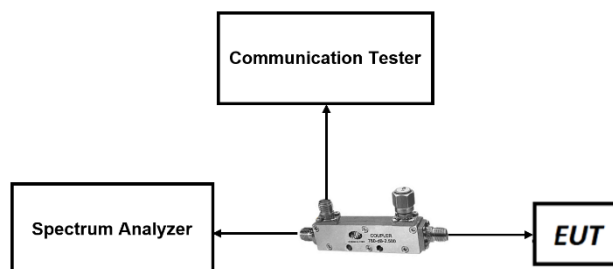



Figure 7-1. Test Instrument & Measurement Setup

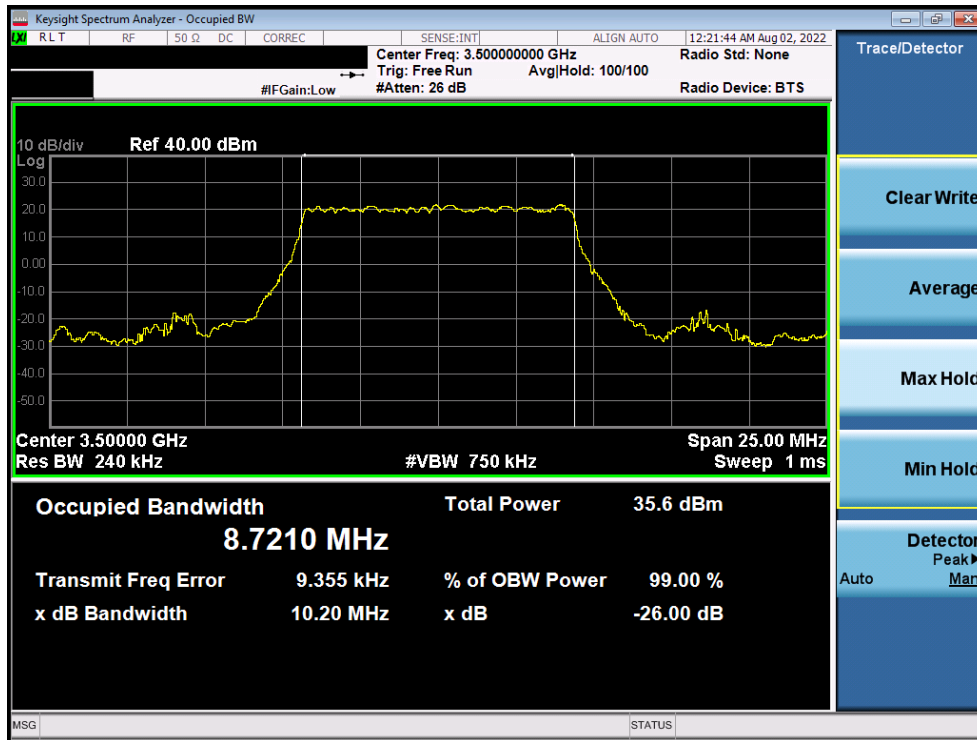
Test Notes

None.

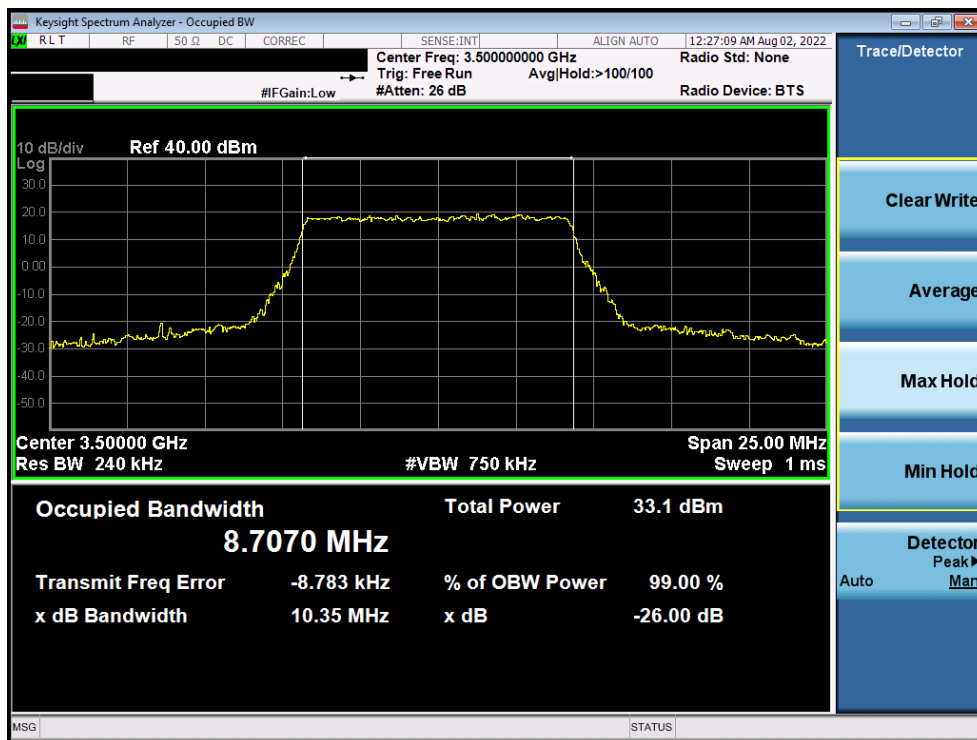
FCC ID: BCGA2764	 PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1C2205090028-05.BCG	Test Dates: 5/30/2022 - 9/30/2022	EUT Type: Tablet Device	Page 17 of 200

V2.1 11/9/2021


NR Band n77 DoD-Band

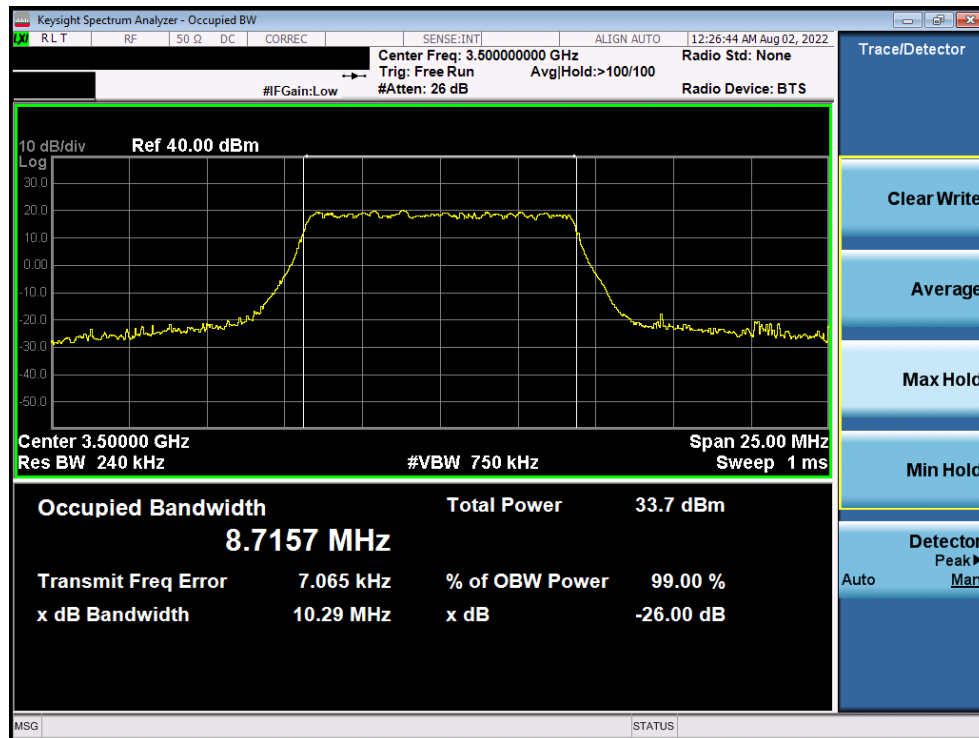


Plot 7-1. Occupied Bandwidth Plot (NR Band n77 DoD Band - 10MHz DFT-s-OFDM $\pi/2$ BPSK - Full RB)

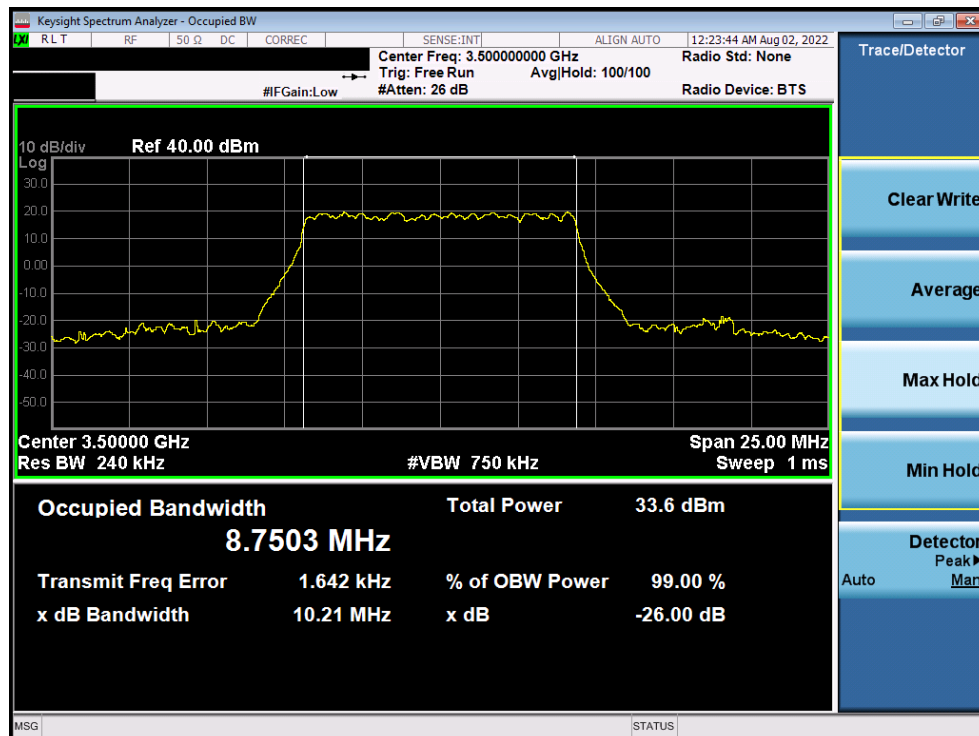


Plot 7-2. Occupied Bandwidth Plot (NR Band n77 DoD Band - 10MHz CP-OFDM QPSK - Full RB)


FCC ID: BCGA2764		PART 27 MEASUREMENT REPORT	Approved by: Technical Manager
Test Report S/N: 1C2205090028-05.BCG	Test Dates: 5/30/2022 - 9/30/2022	EUT Type: Tablet Device	Page 18 of 200



Plot 7-3. Occupied Bandwidth Plot (NR Band n77 DoD Band - 10MHz CP-OFDM 16-QAM - Full RB)

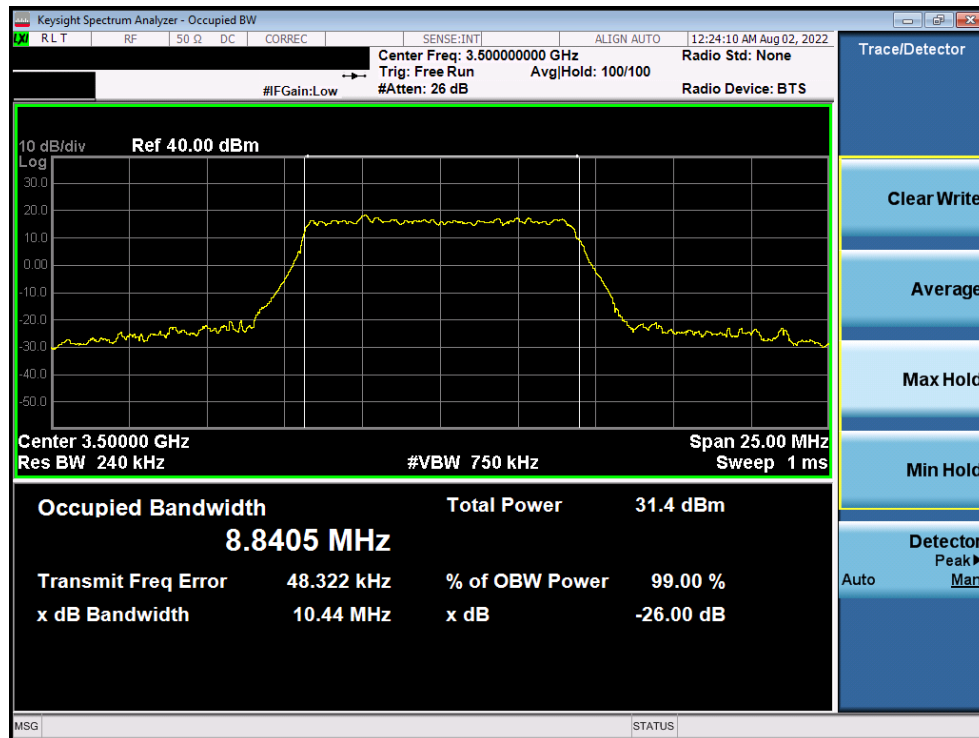


Plot 7-4. Occupied Bandwidth Plot (NR Band n77 DoD Band - 10MHz DFT-s-OFDM 64-QAM - Full RB)

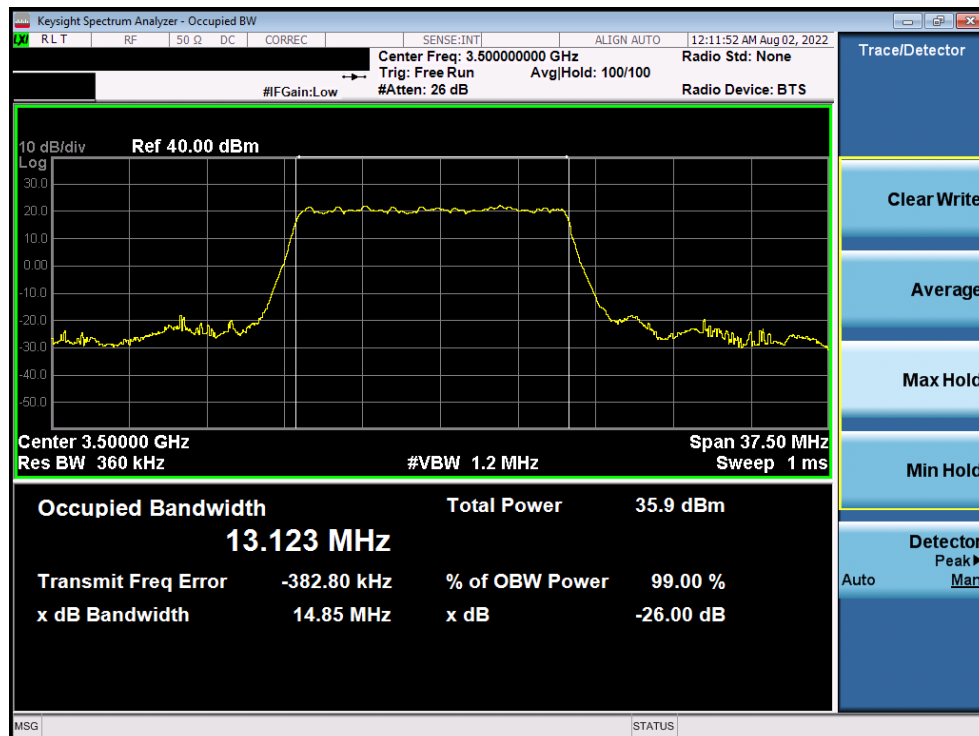
FCC ID: BCGA2764	 PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1C2205090028-05.BCG	Test Dates: 5/30/2022 - 9/30/2022	EUT Type: Tablet Device	Page 19 of 200

V2.1 11/9/2021


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Plot 7-5. Occupied Bandwidth Plot (NR Band n77 DoD Band - 10MHz DFT-s-OFDM 256-QAM - Full RB)

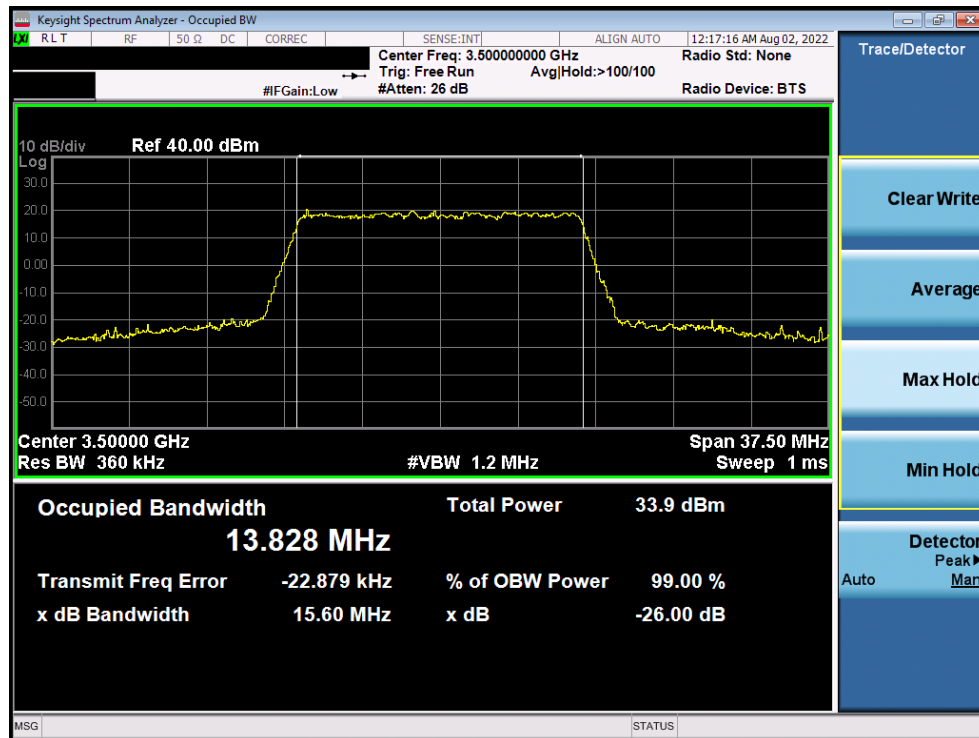


Plot 7-6. Occupied Bandwidth Plot (NR Band n77 DoD Band - 15MHz DFT-s-OFDM $\pi/2$ BPSK - Full RB)

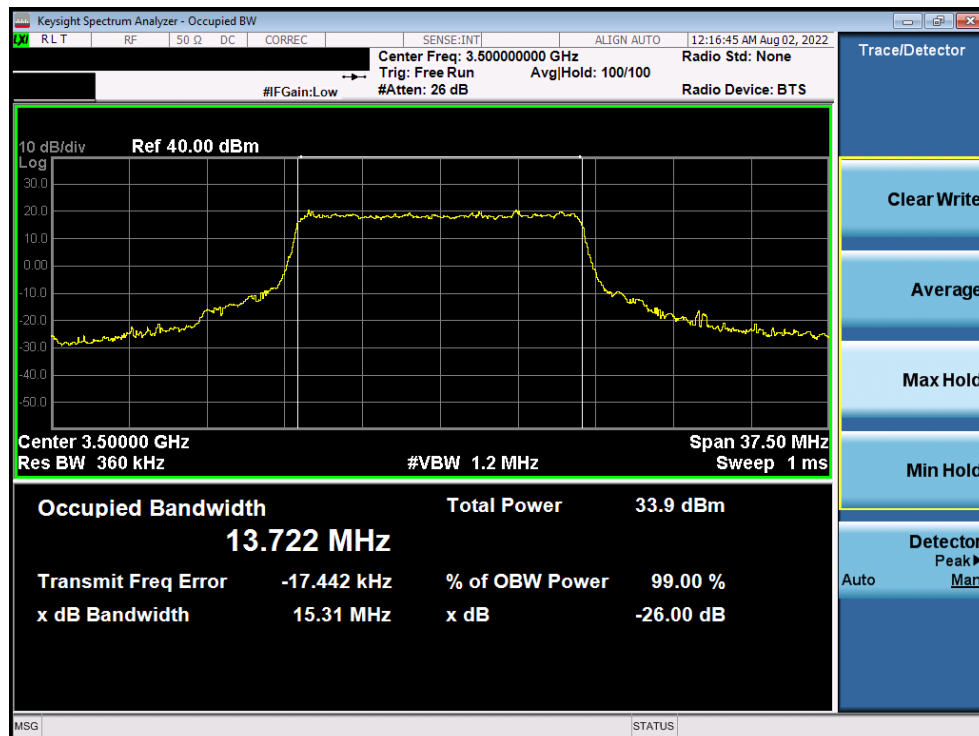
FCC ID: BCGA2764	 PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1C2205090028-05.BCG	Test Dates: 5/30/2022 - 9/30/2022	EUT Type: Tablet Device	Page 20 of 200

V2.1 11/9/2021


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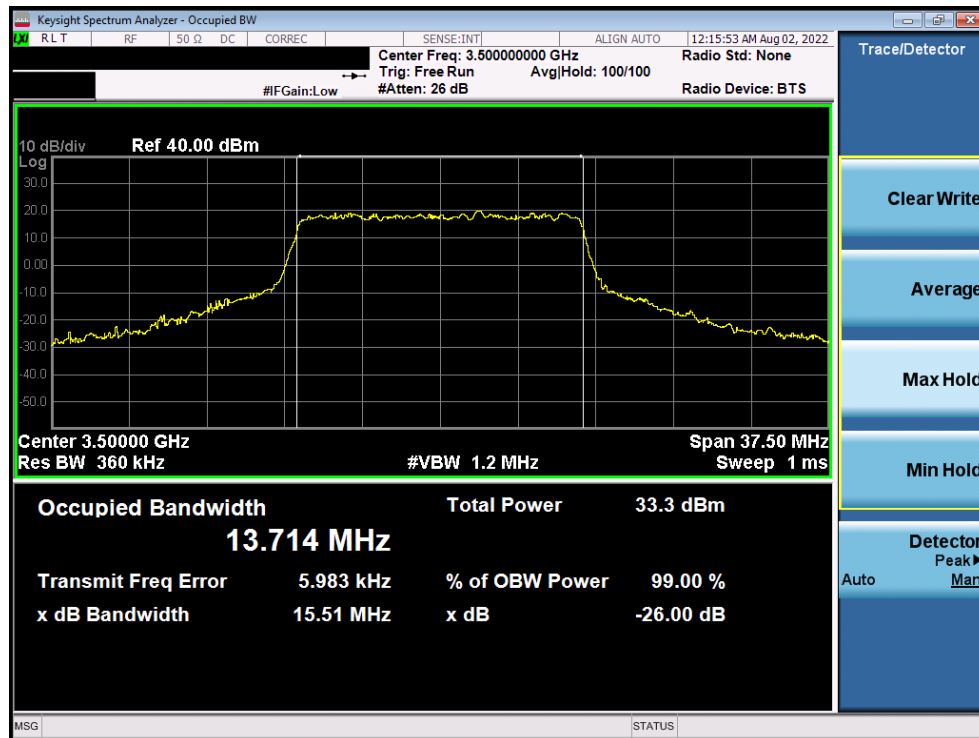
Plot 7-7. Occupied Bandwidth Plot (NR Band n77 DoD Band - 15MHz CP-OFDM QPSK - Full RB)



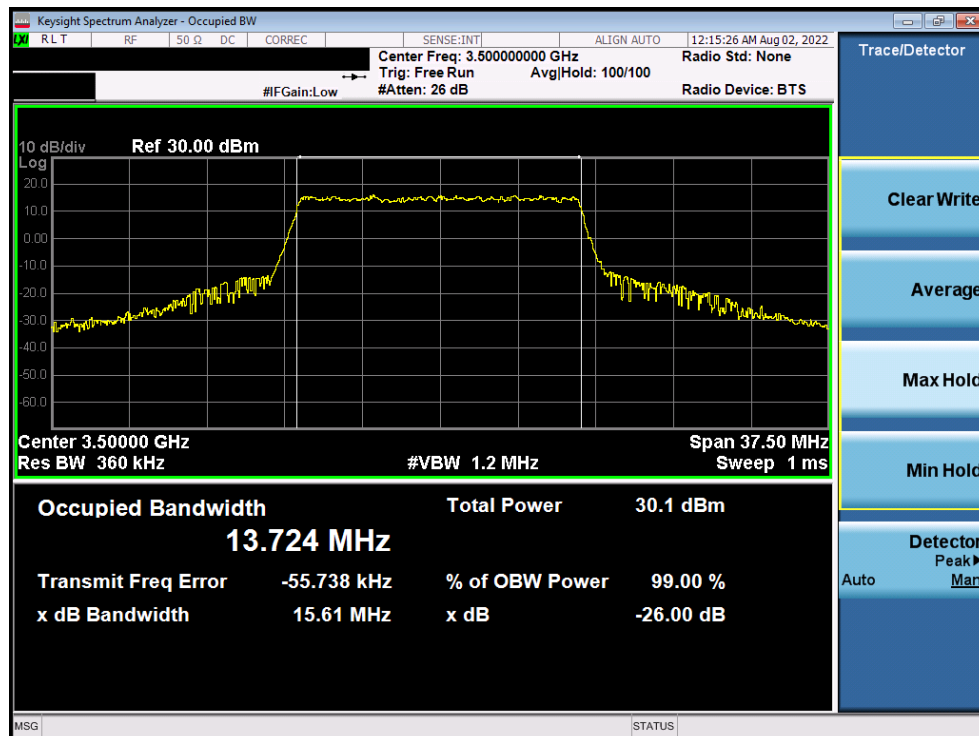
Plot 7-8. Occupied Bandwidth Plot (NR Band n77 DoD Band - 15MHz CP-OFDM 16-QAM - Full RB)

FCC ID: BCGA2764		PART 27 MEASUREMENT REPORT	Approved by: Technical Manager
Test Report S/N: 1C2205090028-05.BCG	Test Dates: 5/30/2022 - 9/30/2022	EUT Type: Tablet Device	Page 21 of 200


V2.1 11/9/2021

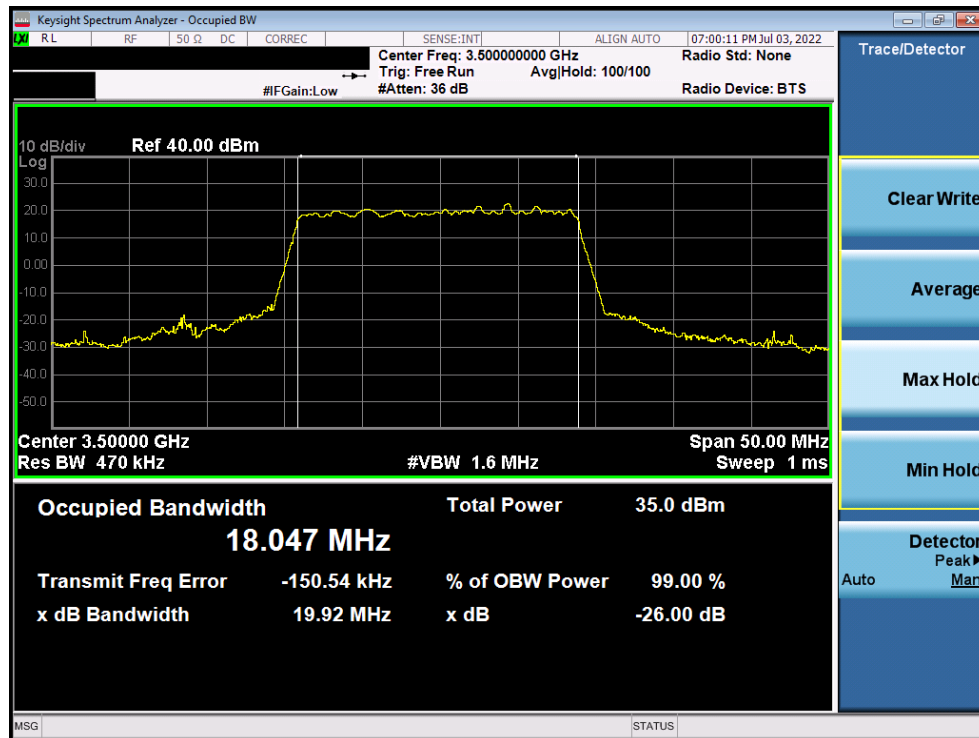


Plot 7-9. Occupied Bandwidth Plot (NR Band n77 DoD Band - 15MHz CP-OFDM 64-QAM - Full RB)

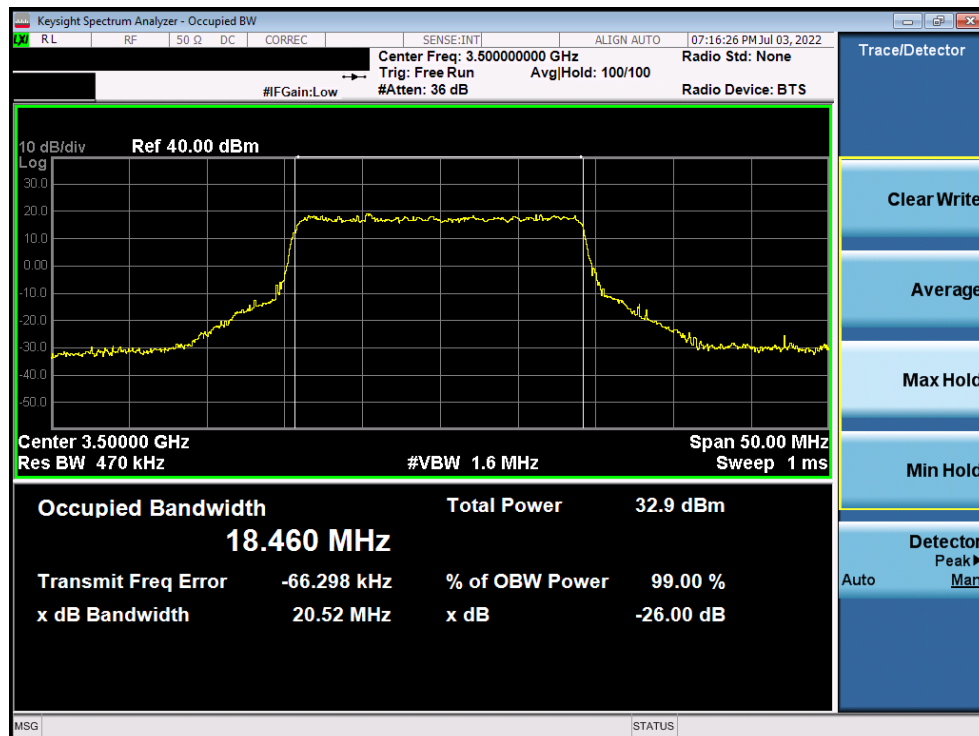


Plot 7-10. Occupied Bandwidth Plot (NR Band n77 DoD Band - 15MHz CP-OFDM 256-QAM - Full RB)

FCC ID: BCGA2764	 PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1C2205090028-05.BCG	Test Dates: 5/30/2022 - 9/30/2022	EUT Type: Tablet Device	Page 22 of 200



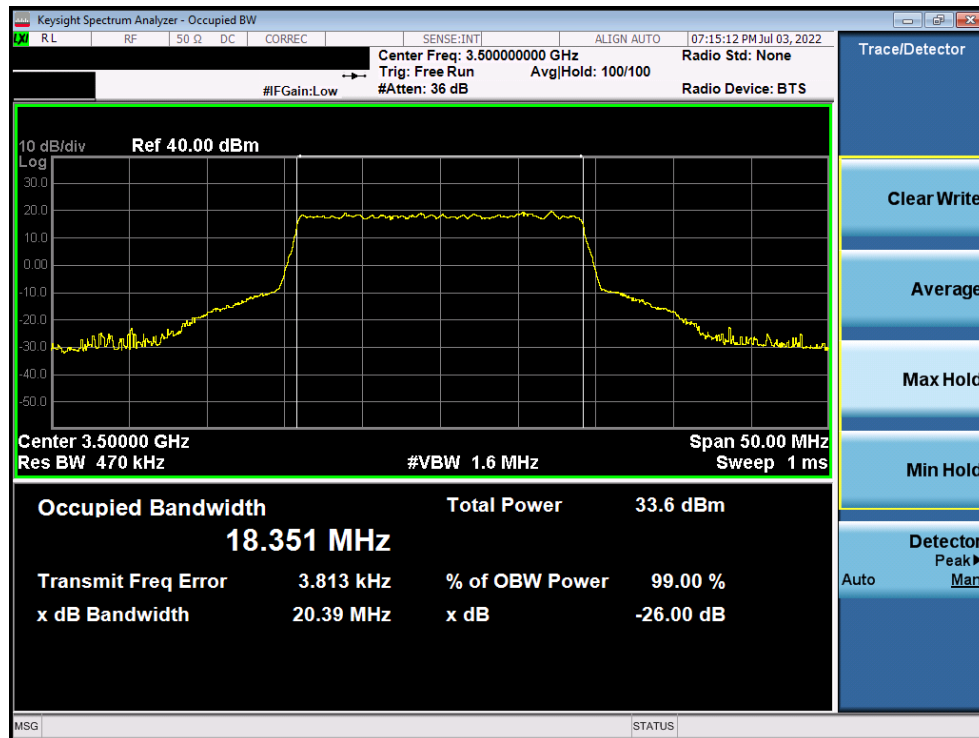
Plot 7-11. Occupied Bandwidth Plot (NR Band n77 DoD Band - 20MHz DFT-s-OFDM $\pi/2$ BPSK - Full RB)



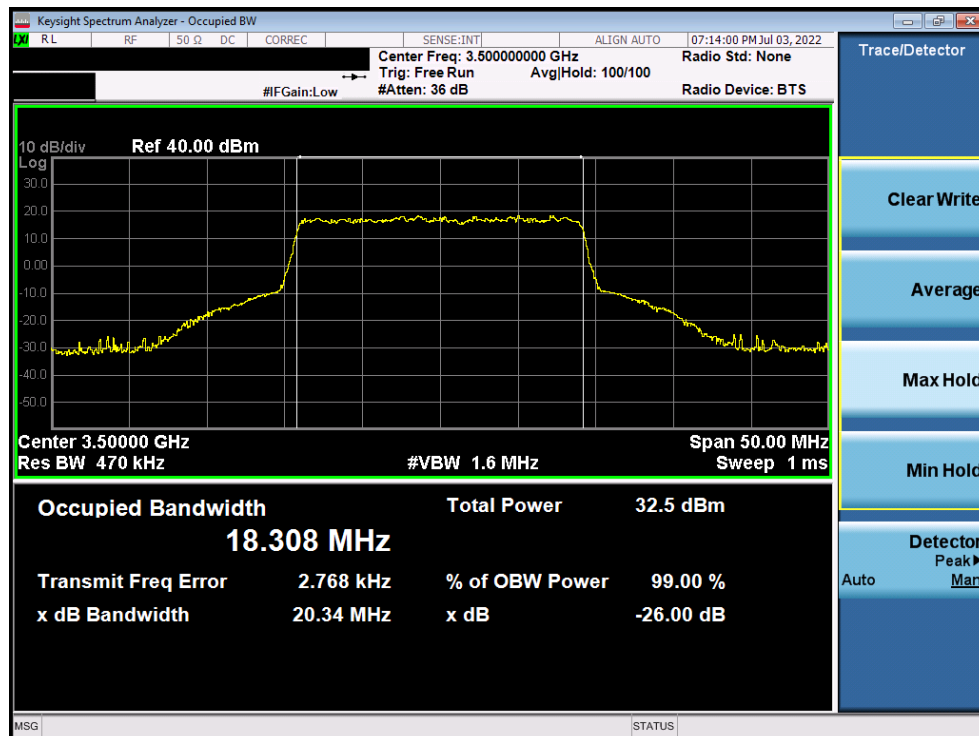
Plot 7-12. Occupied Bandwidth Plot (NR Band n77 DoD Band - 20MHz CP-OFDM QPSK - Full RB)

FCC ID: BCGA2764	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1C2205090028-05.BCG	Test Dates: 5/30/2022 - 9/30/2022	EUT Type: Tablet Device	Page 23 of 200


V2.1 11/9/2021

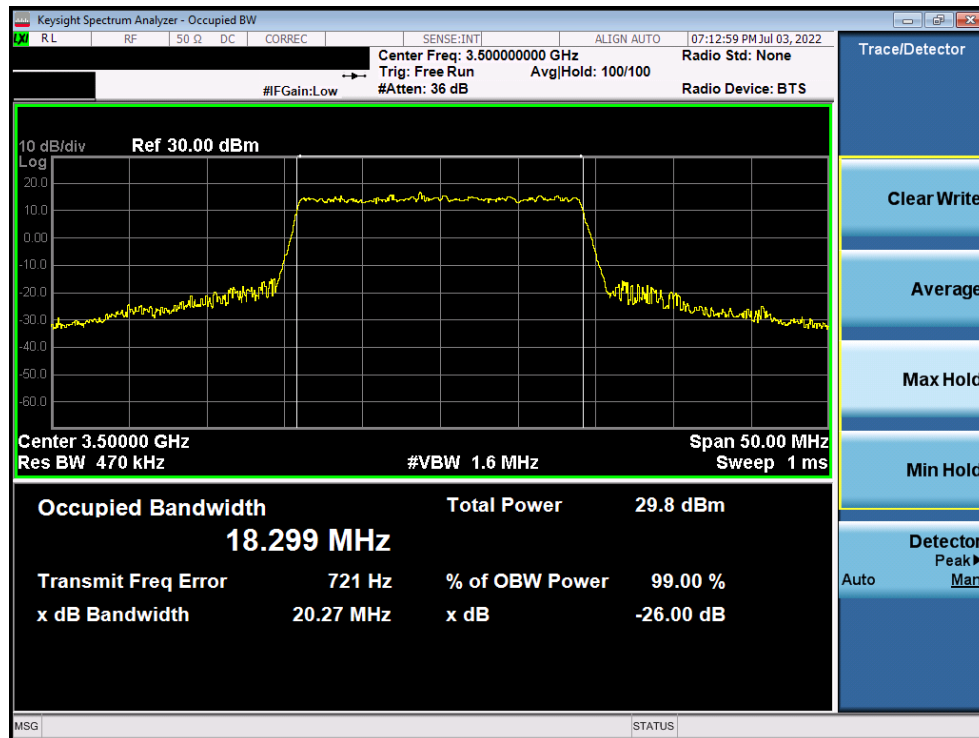


Plot 7-13. Occupied Bandwidth Plot (NR Band n77 DoD Band - 20MHz CP-OFDM 16-QAM - Full RB)

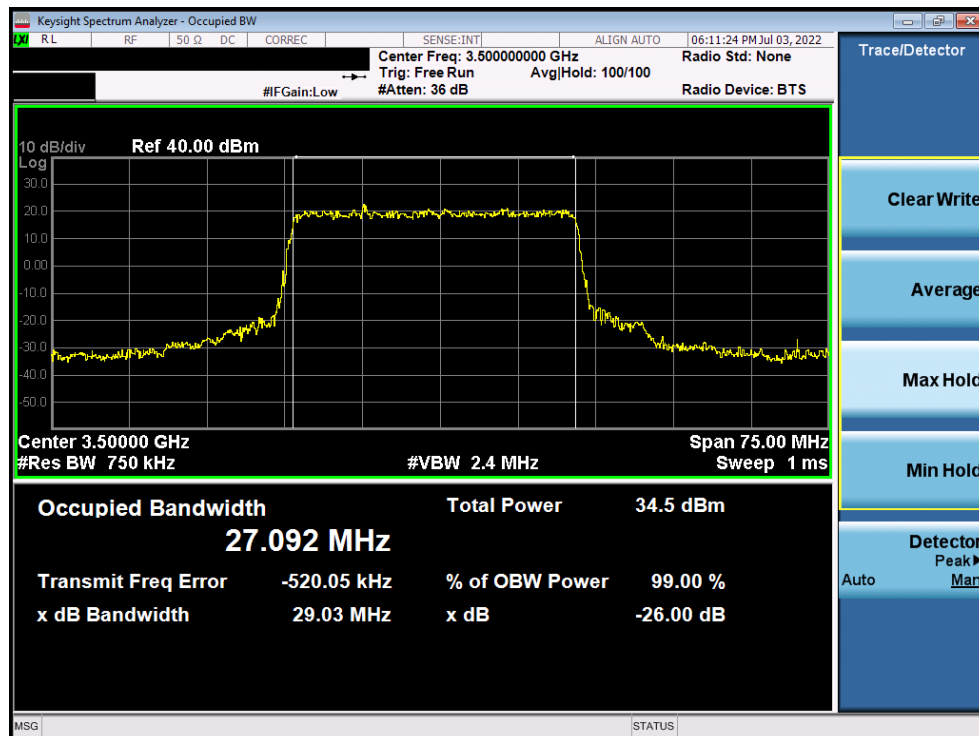


Plot 7-14. Occupied Bandwidth Plot (NR Band n77 DoD Band - 20MHz CP-OFDM 64-QAM - Full RB)


FCC ID: BCGA2764		PART 27 MEASUREMENT REPORT	Approved by: Technical Manager
Test Report S/N: 1C2205090028-05.BCG	Test Dates: 5/30/2022 - 9/30/2022	EUT Type: Tablet Device	Page 24 of 200

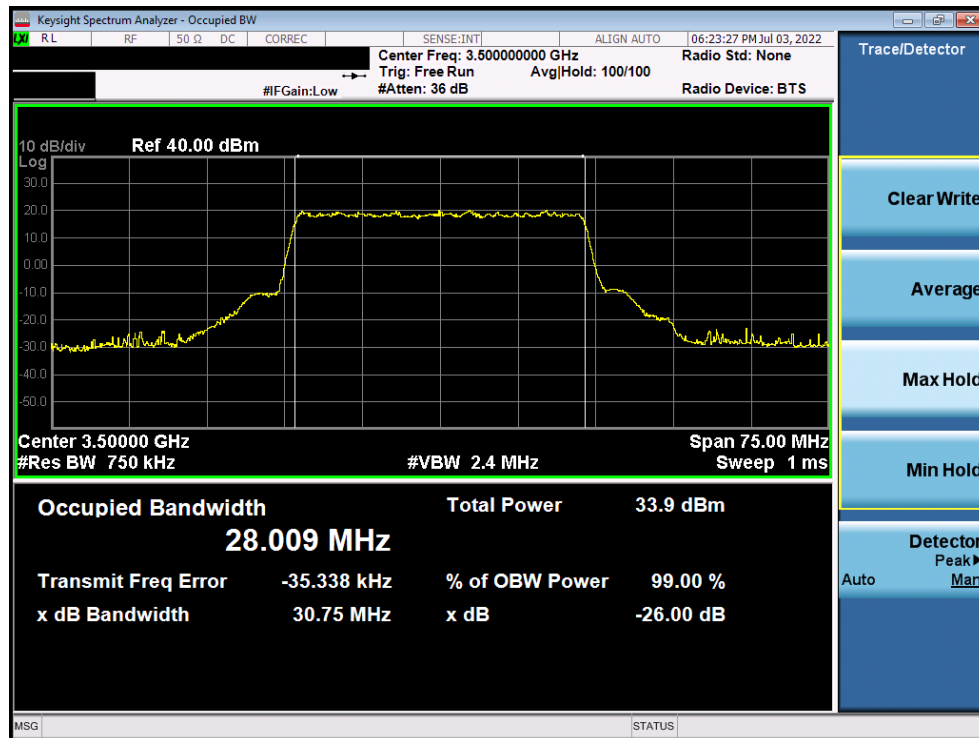


Plot 7-15. Occupied Bandwidth Plot (NR Band n77 DoD Band - 20MHz CP-OFDM 256-QAM - Full RB)

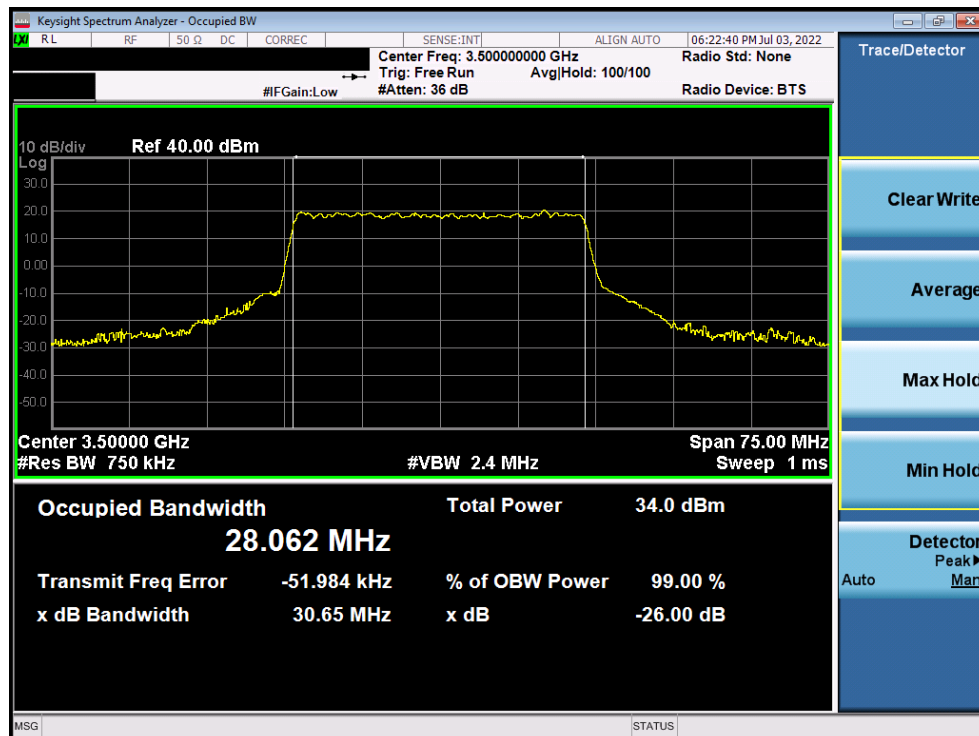


Plot 7-16. Occupied Bandwidth Plot (NR Band n77 DoD Band - 30MHz DFT-s-OFDM $\pi/2$ BPSK - Full RB)

FCC ID: BCGA2764	 PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1C2205090028-05.BCG	Test Dates: 5/30/2022 - 9/30/2022	EUT Type: Tablet Device	Page 25 of 200



Plot 7-17. Occupied Bandwidth Plot (NR Band n77 DoD Band - 30MHz CP-OFDM QPSK - Full RB)



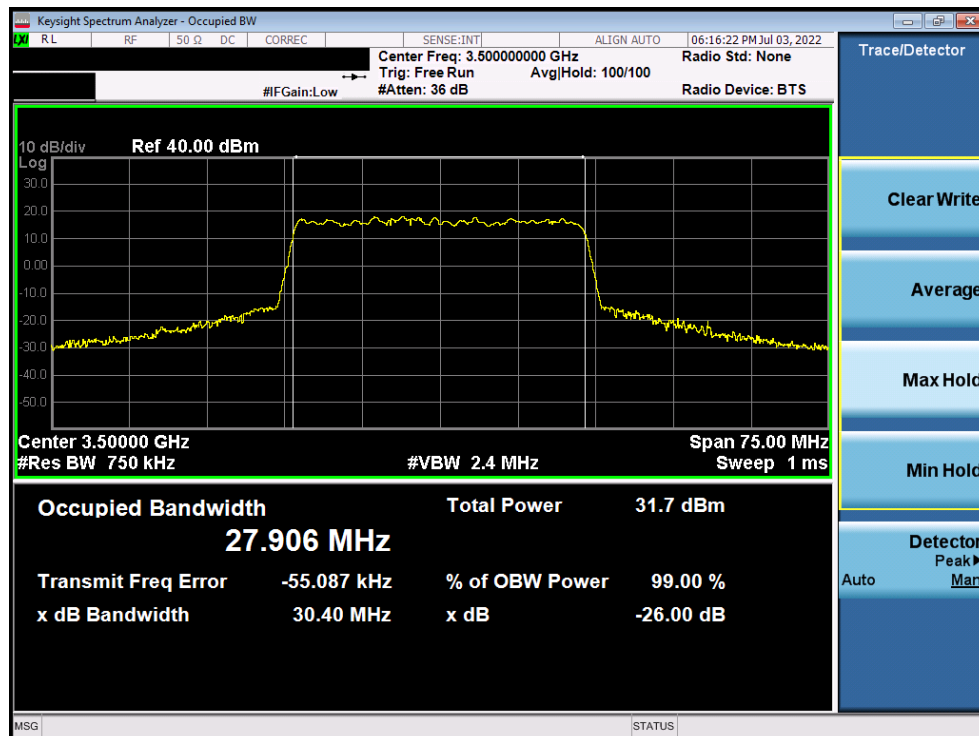
Plot 7-18. Occupied Bandwidth Plot (NR Band n77 DoD Band - 30MHz CP-OFDM 16-QAM - Full RB)

FCC ID: BCGA2764	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1C2205090028-05.BCG	Test Dates: 5/30/2022 - 9/30/2022	EUT Type: Tablet Device	Page 26 of 200


V2.1 11/9/2021



Plot 7-19. Occupied Bandwidth Plot (NR Band n77 DoD Band - 30MHz CP-OFDM 64-QAM - Full RB)

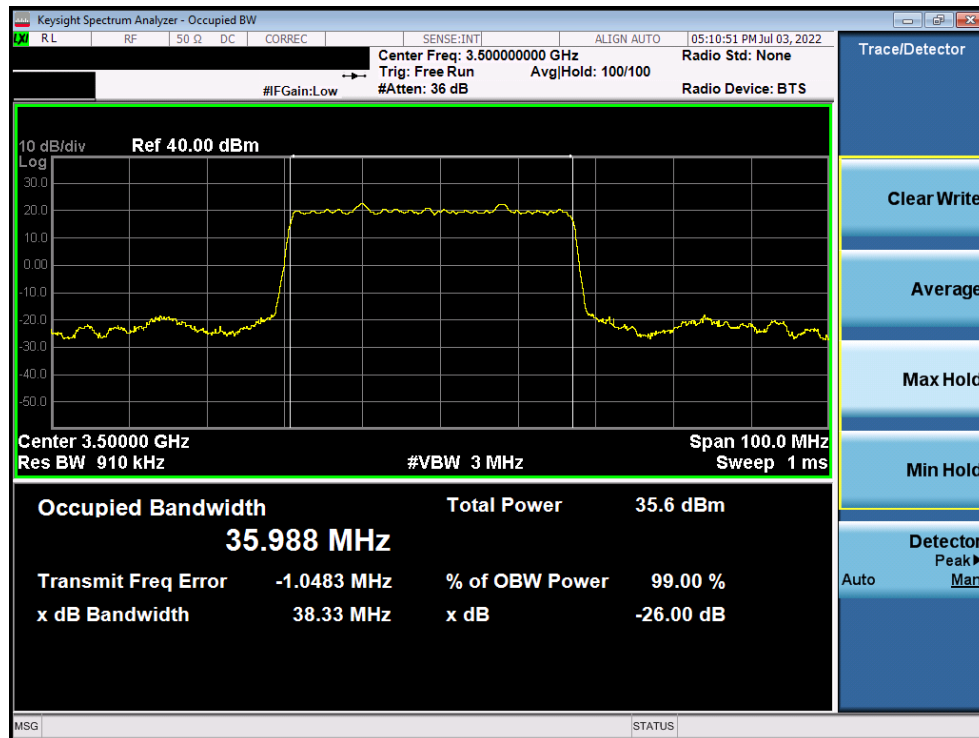


Plot 7-20. Occupied Bandwidth Plot (NR Band n77 DoD Band - 30MHz CP-OFDM 256-QAM - Full RB)

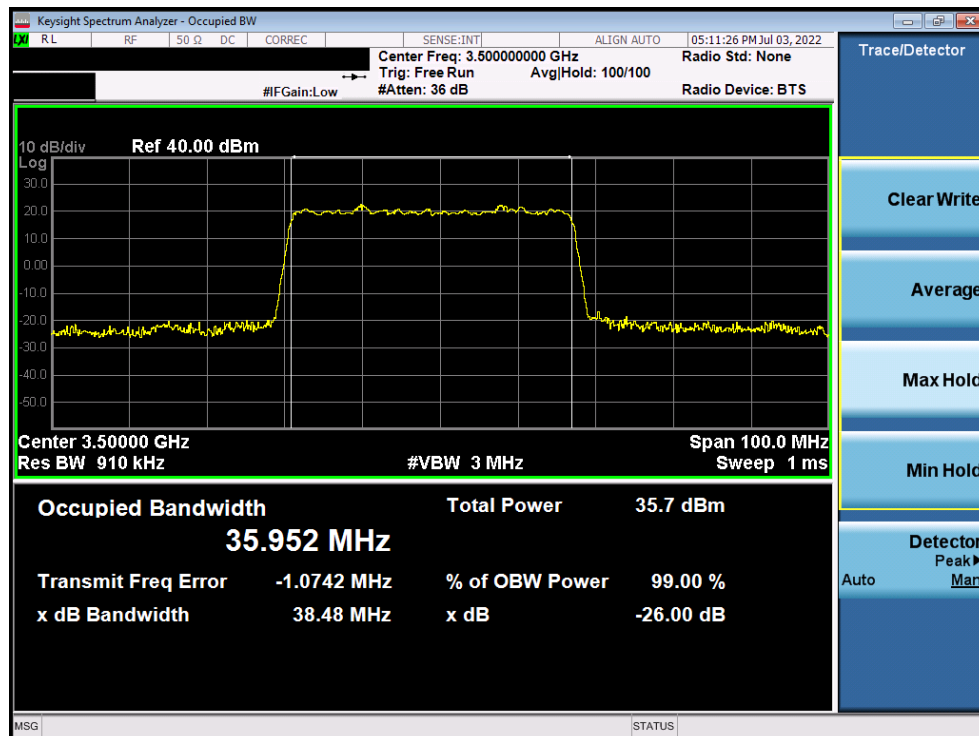
FCC ID: BCGA2764	 PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1C2205090028-05.BCG	Test Dates: 5/30/2022 - 9/30/2022	EUT Type: Tablet Device	Page 27 of 200

V2.1 11/9/2021

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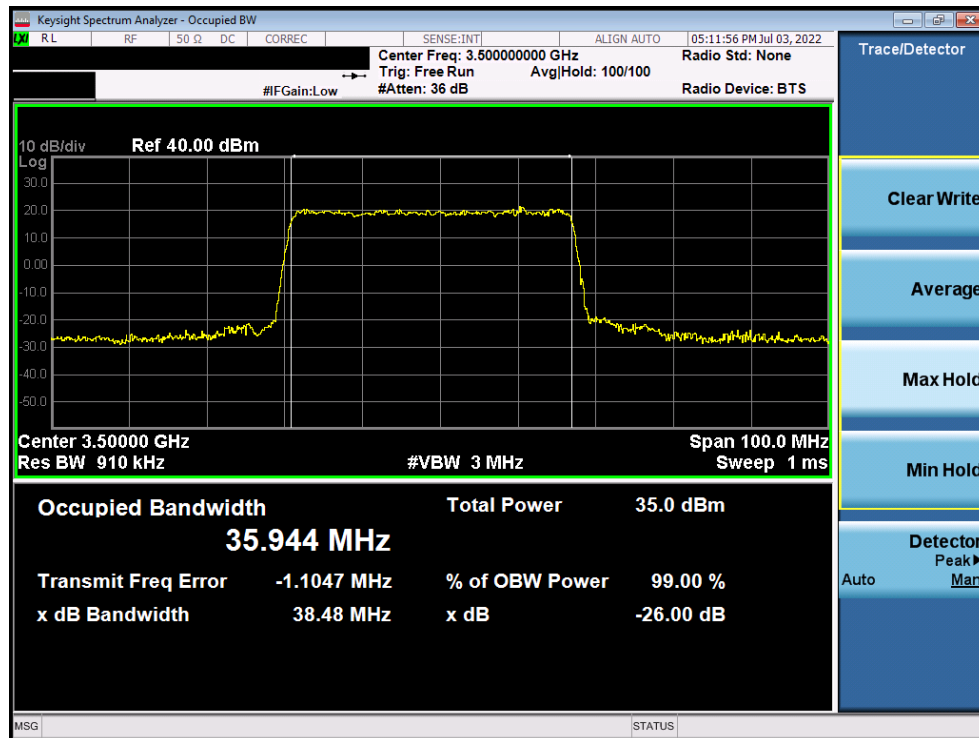


Plot 7-21. Occupied Bandwidth Plot (NR Band n77 DoD Band - 40MHz DFT-s-OFDM $\pi/2$ BPSK - Full RB)

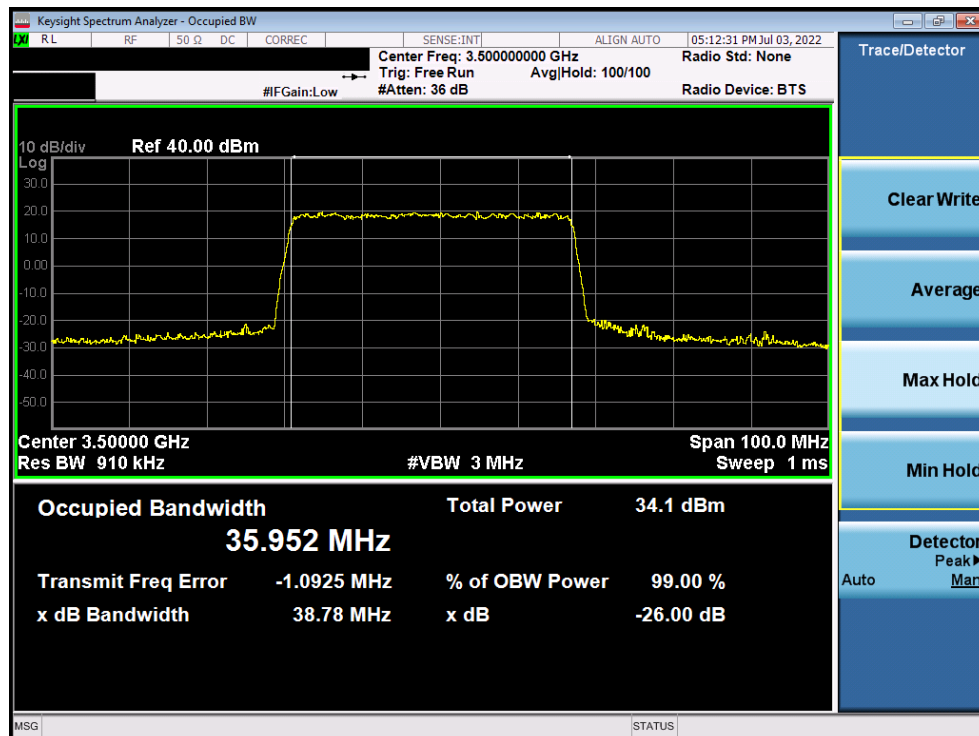


Plot 7-22. Occupied Bandwidth Plot (NR Band n77 DoD Band - 40MHz DFT-s-OFDM QPSK - Full RB)


FCC ID: BCGA2764	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1C2205090028-05.BCG	Test Dates: 5/30/2022 - 9/30/2022	EUT Type: Tablet Device	Page 28 of 200



Plot 7-23. Occupied Bandwidth Plot (NR Band n77 DoD Band - 40MHz DFT-s-OFDM 16-QAM - Full RB)

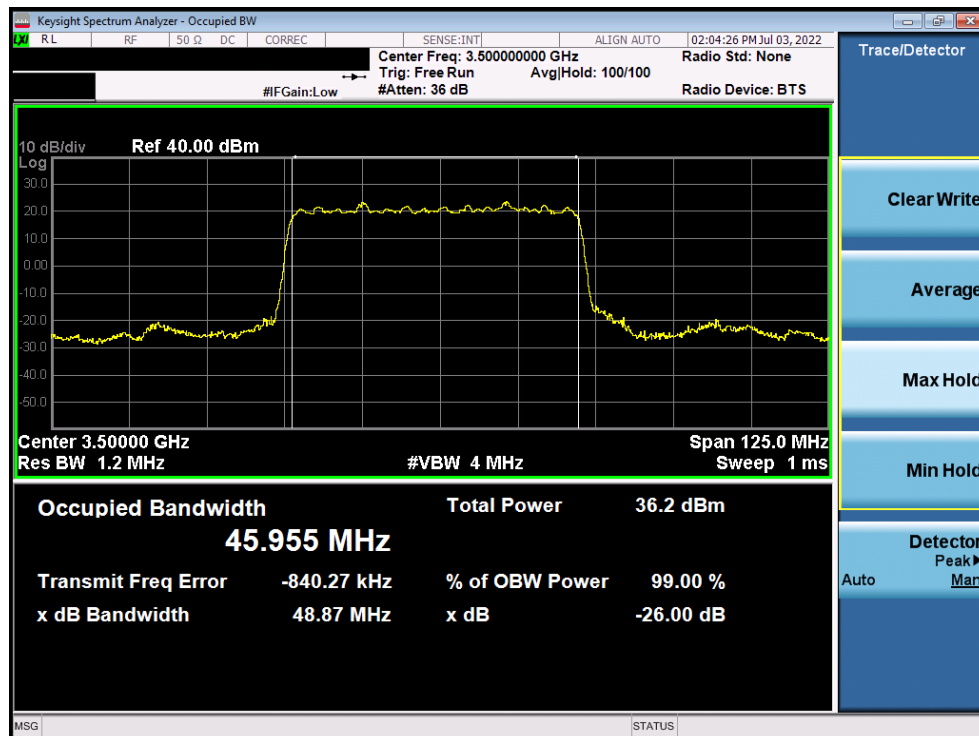


Plot 7-24. Occupied Bandwidth Plot (NR Band n77 DoD Band - 40MHz DFT-s-OFDM 64-QAM - Full RB)

FCC ID: BCGA2764	 PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1C2205090028-05.BCG	Test Dates: 5/30/2022 - 9/30/2022	EUT Type: Tablet Device	Page 29 of 200

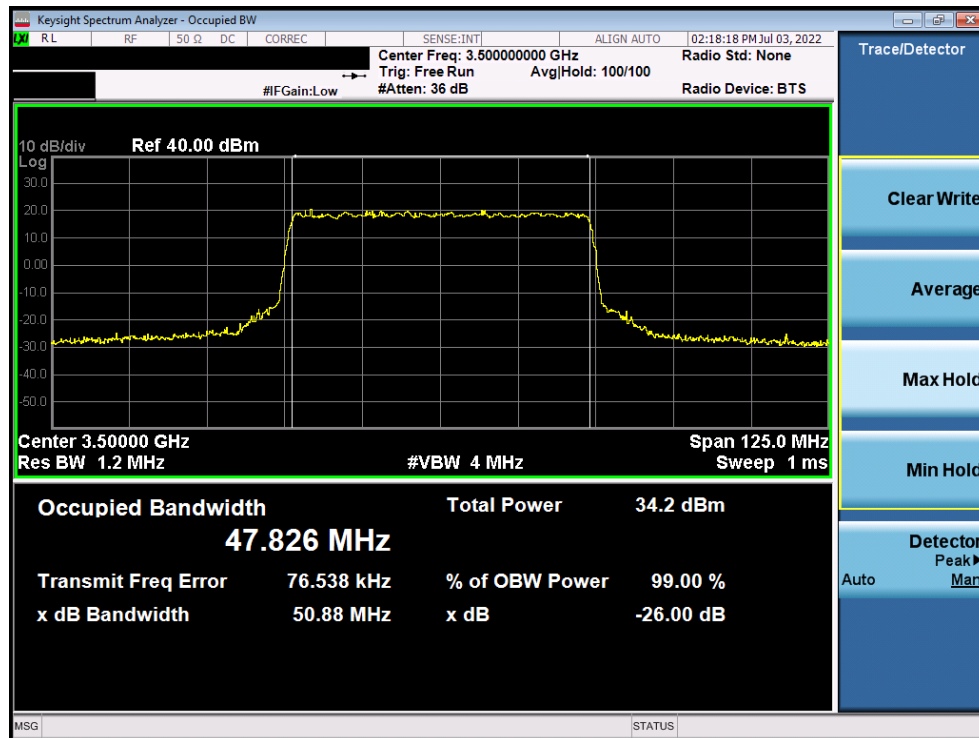


Plot 7-25. Occupied Bandwidth Plot (NR Band n77 DoD Band - 40MHz CP-OFDM 256-QAM - Full RB)

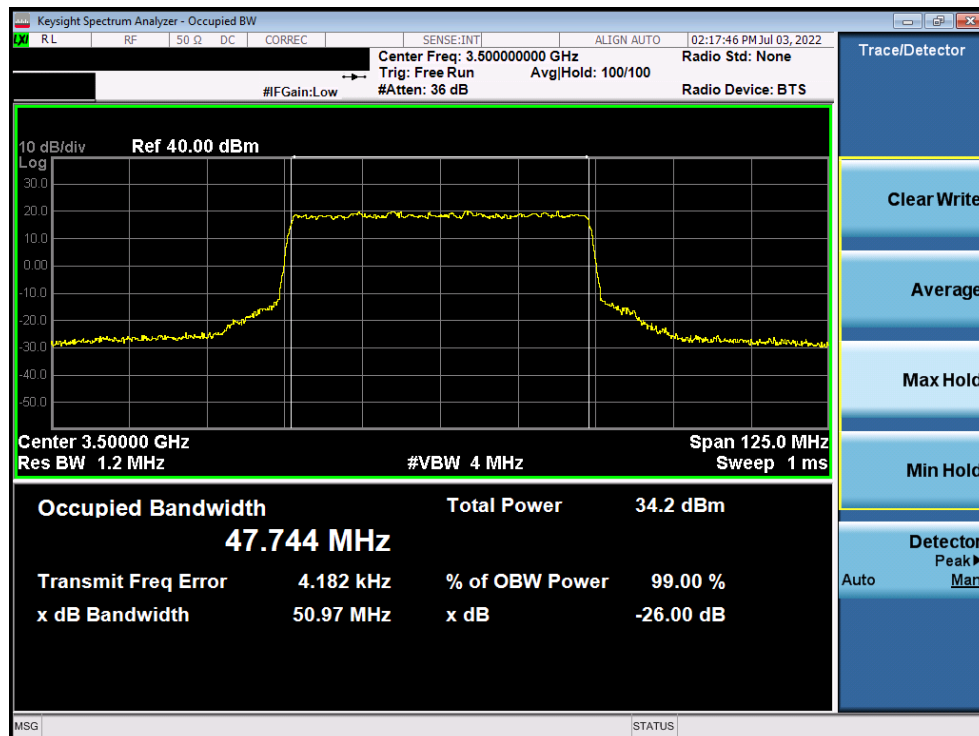


Plot 7-26. Occupied Bandwidth Plot (NR Band n77 DoD Band - 50MHz DFT-s-OFDM $\pi/2$ BPSK - Full RB)

FCC ID: BCGA2764	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1C2205090028-05.BCG	Test Dates: 5/30/2022 - 9/30/2022	EUT Type: Tablet Device	Page 30 of 200



Plot 7-27. Occupied Bandwidth Plot (NR Band n77 DoD Band - 50MHz CP-OFDM QPSK - Full RB)

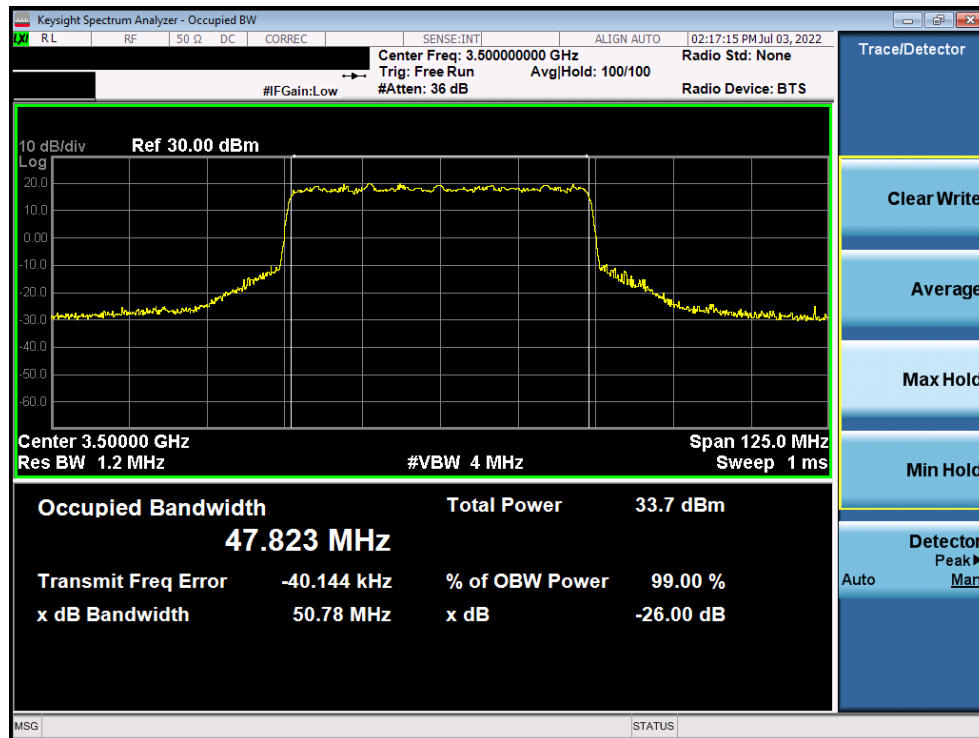


Plot 7-28. Occupied Bandwidth Plot (NR Band n77 DoD Band - 50MHz CP-OFDM 16-QAM - Full RB)

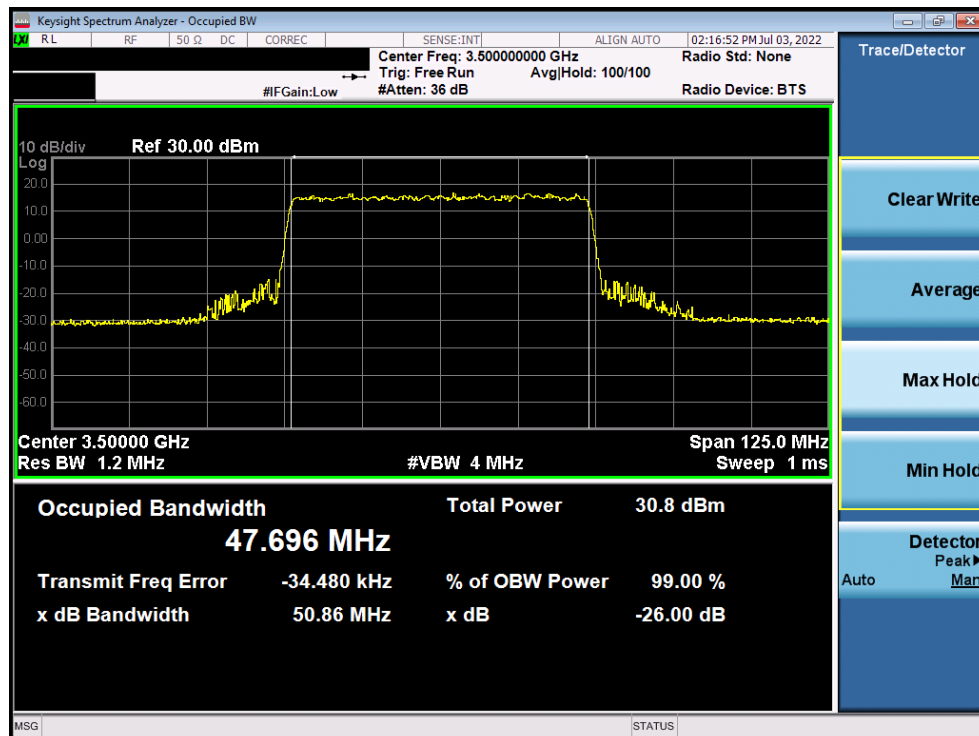
FCC ID: BCGA2764	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1C2205090028-05.BCG	Test Dates: 5/30/2022 - 9/30/2022	EUT Type: Tablet Device	Page 31 of 200

V2.1 11/9/2021


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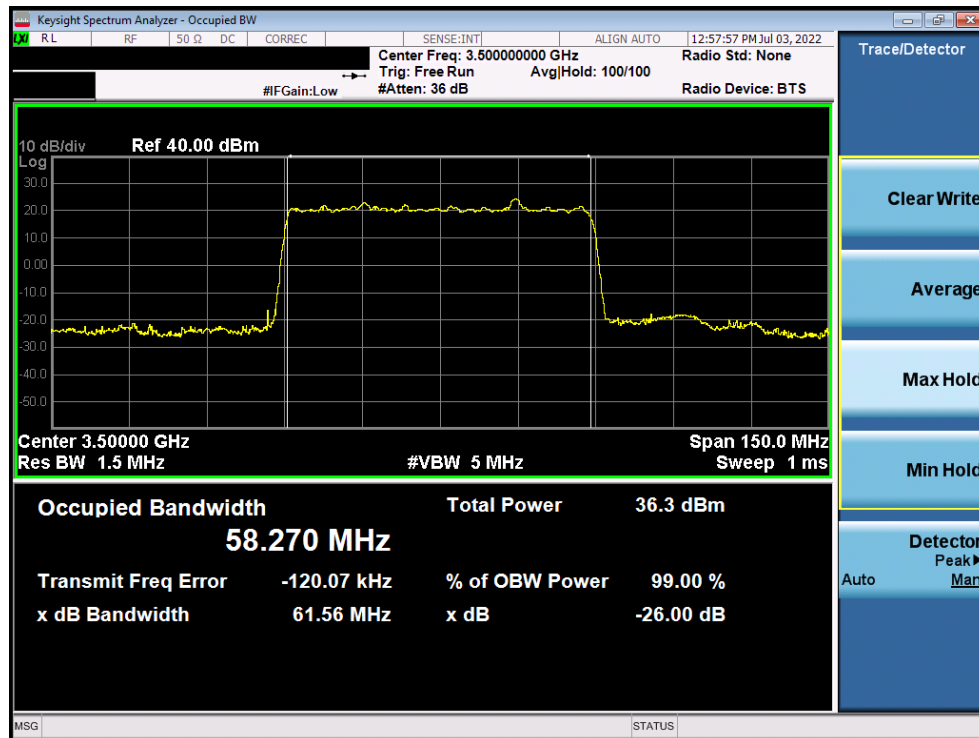


Plot 7-29. Occupied Bandwidth Plot (NR Band n77 DoD Band - 50MHz CP-OFDM 64-QAM - Full RB)

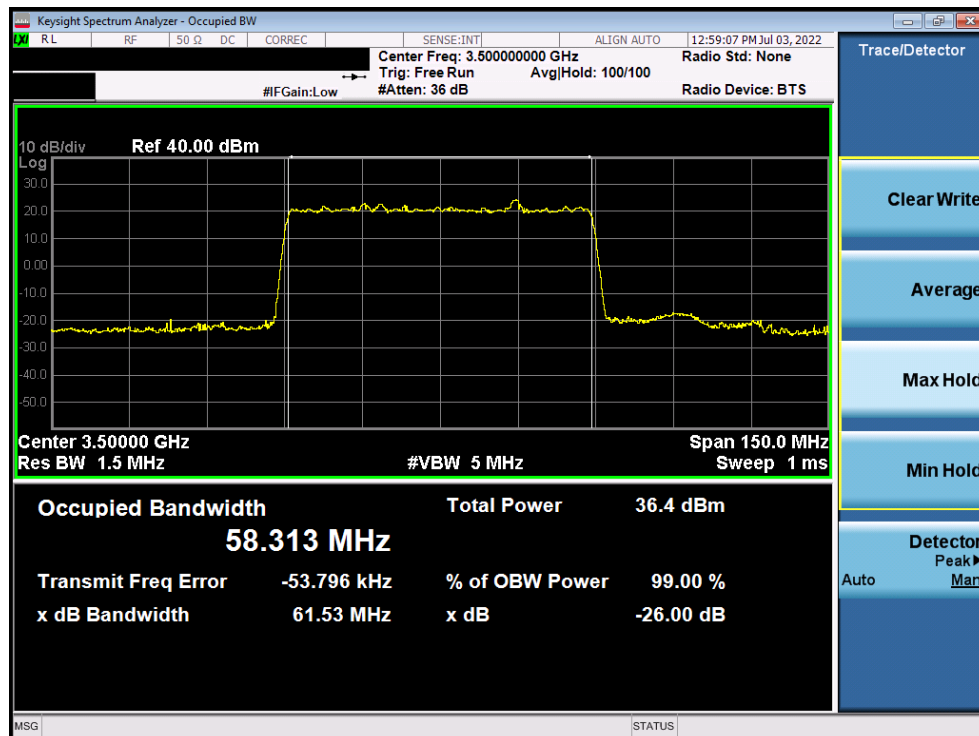


Plot 7-30. Occupied Bandwidth Plot (NR Band n77 DoD Band - 50MHz CP-OFDM 256-QAM - Full RB)


FCC ID: BCGA2764	 PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1C2205090028-05.BCG	Test Dates: 5/30/2022 - 9/30/2022	EUT Type: Tablet Device	Page 32 of 200



Plot 7-31. Occupied Bandwidth Plot (NR Band n77 DoD Band - 60MHz DFT-s-OFDM $\pi/2$ BPSK - Full RB)

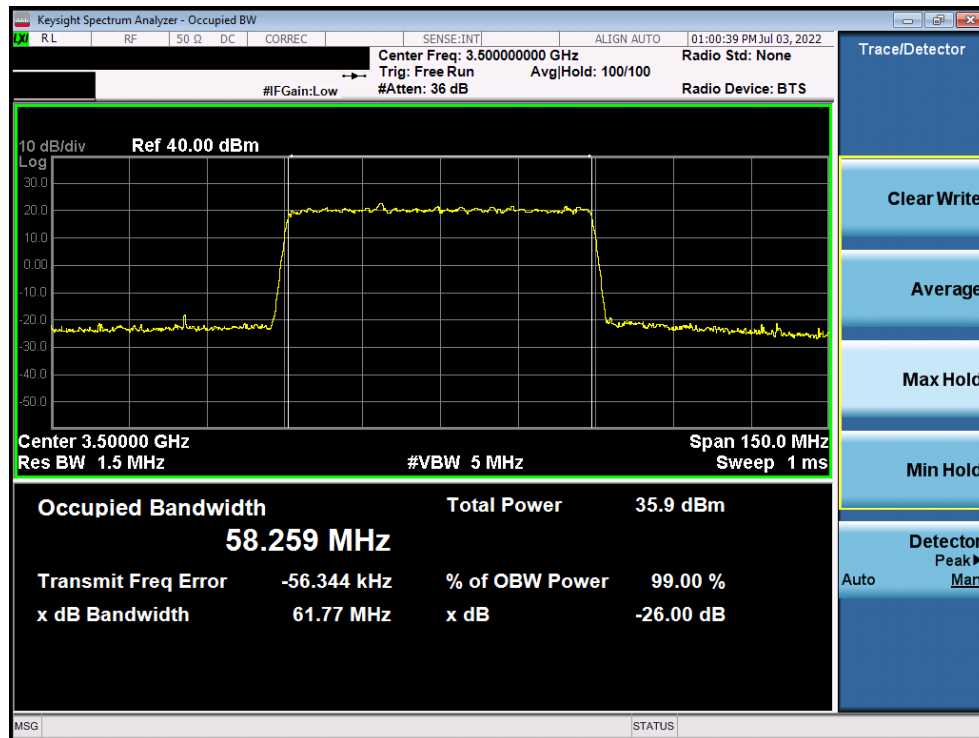


Plot 7-32. Occupied Bandwidth Plot (NR Band n77 DoD Band - 60MHz DFT-s-OFDM QPSK - Full RB)

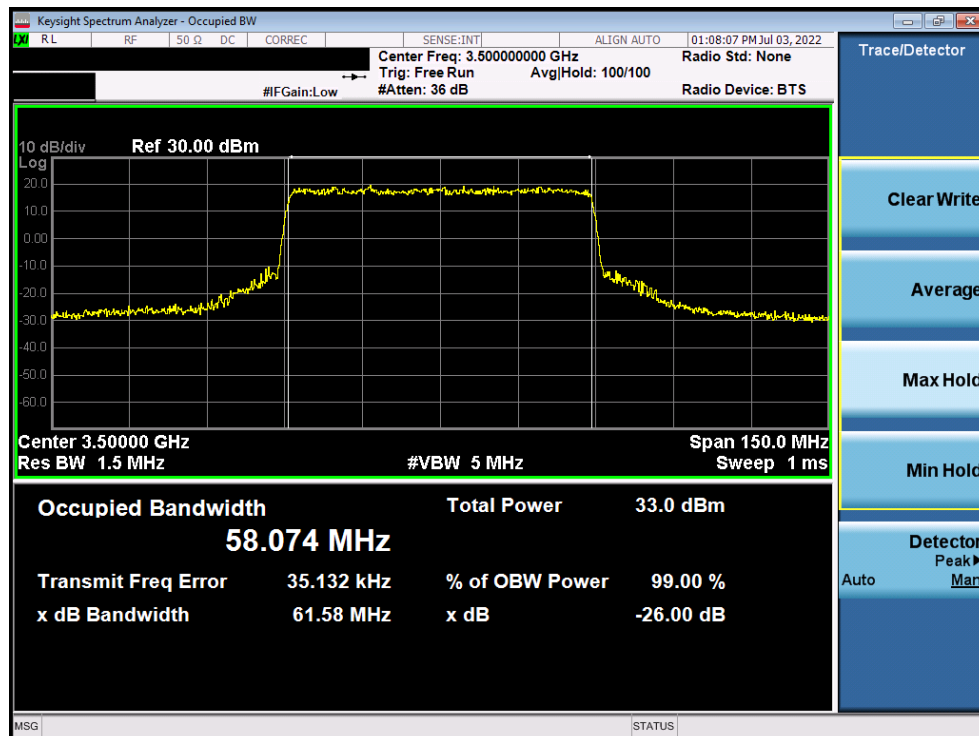
FCC ID: BCGA2764		PART 27 MEASUREMENT REPORT	Approved by: Technical Manager
Test Report S/N: 1C2205090028-05.BCG	Test Dates: 5/30/2022 - 9/30/2022	EUT Type: Tablet Device	Page 33 of 200

V2.1 11/9/2021

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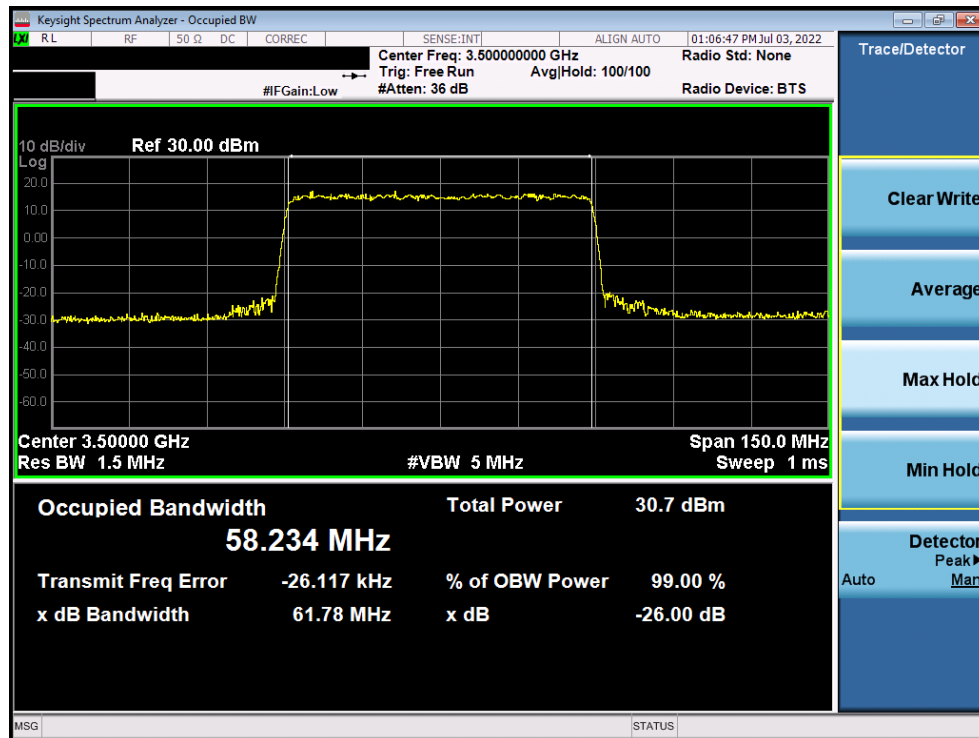


Plot 7-33. Occupied Bandwidth Plot (NR Band n77 DoD Band - 60MHz DFT-s-OFDM 16-QAM - Full RB)

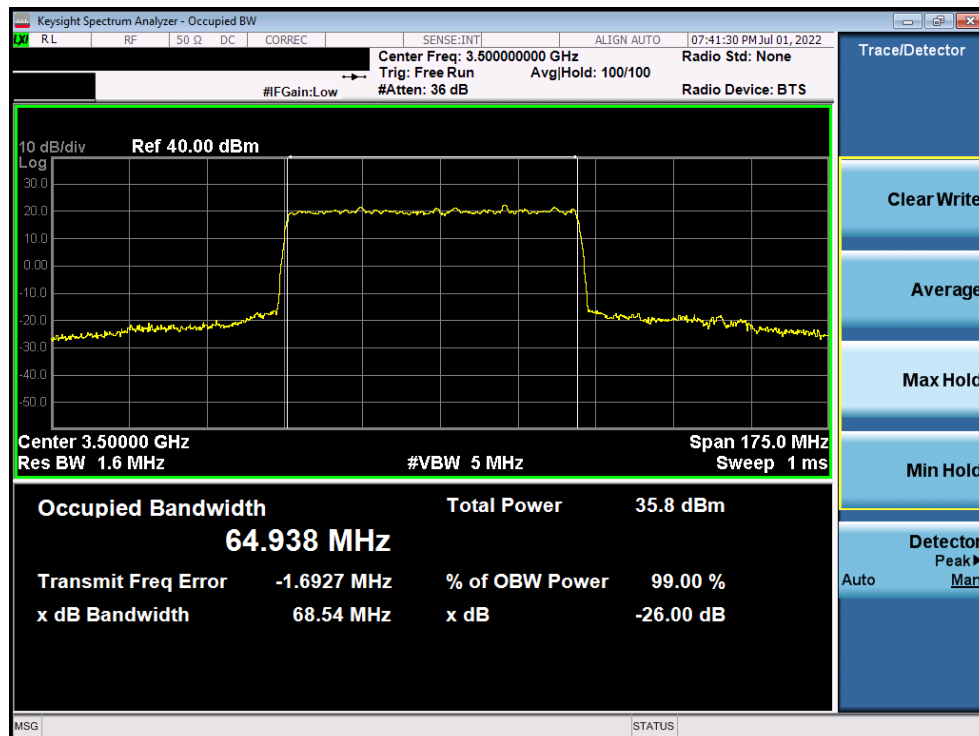


Plot 7-34. Occupied Bandwidth Plot (NR Band n77 DoD Band - 60MHz DFT-s-OFDM 64-QAM - Full RB)


FCC ID: BCGA2764	element	PART 27 MEASUREMENT REPORT	Approved by: Technical Manager
Test Report S/N: 1C2205090028-05.BCG	Test Dates: 5/30/2022 - 9/30/2022	EUT Type: Tablet Device	Page 34 of 200

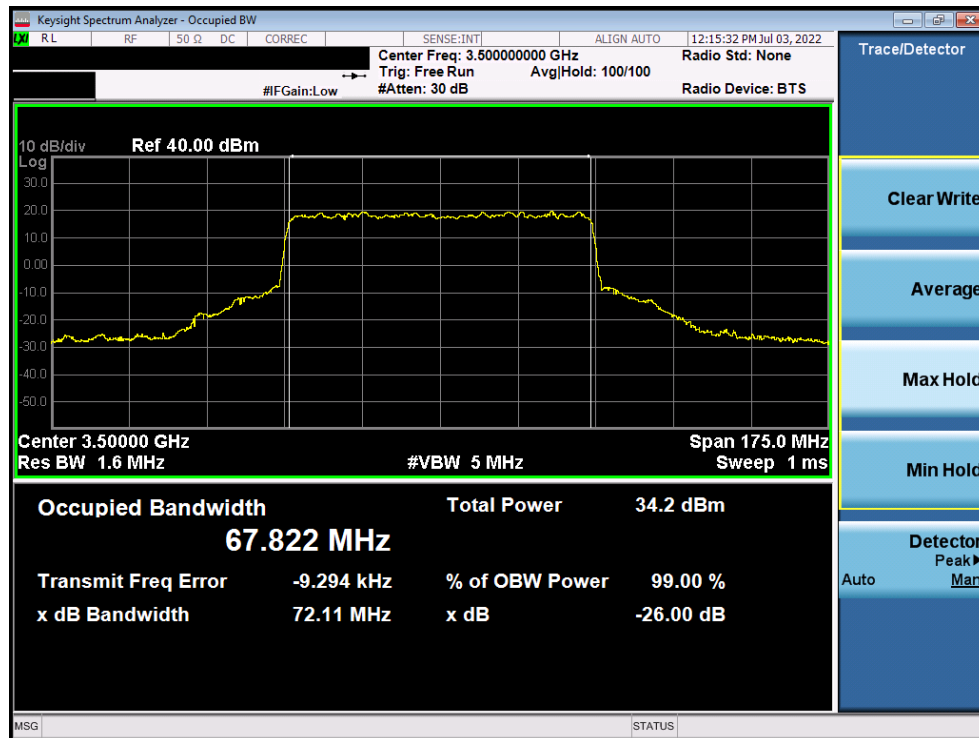


Plot 7-35. Occupied Bandwidth Plot (NR Band n77 DoD Band - 60MHz CP-OFDM 256-QAM - Full RB)

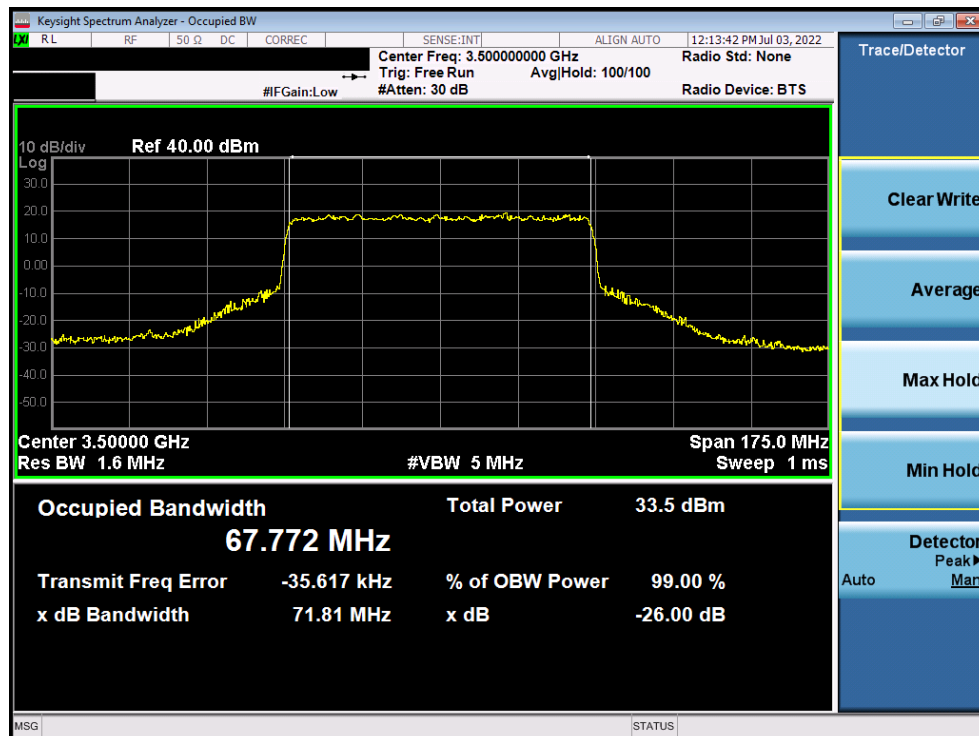


Plot 7-36. Occupied Bandwidth Plot (NR Band n77 DoD Band - 70MHz DFT-s-OFDM $\pi/2$ BPSK - Full RB)

FCC ID: BCGA2764		PART 27 MEASUREMENT REPORT	Approved by: Technical Manager
Test Report S/N: 1C2205090028-05.BCG	Test Dates: 5/30/2022 - 9/30/2022	EUT Type: Tablet Device	Page 35 of 200



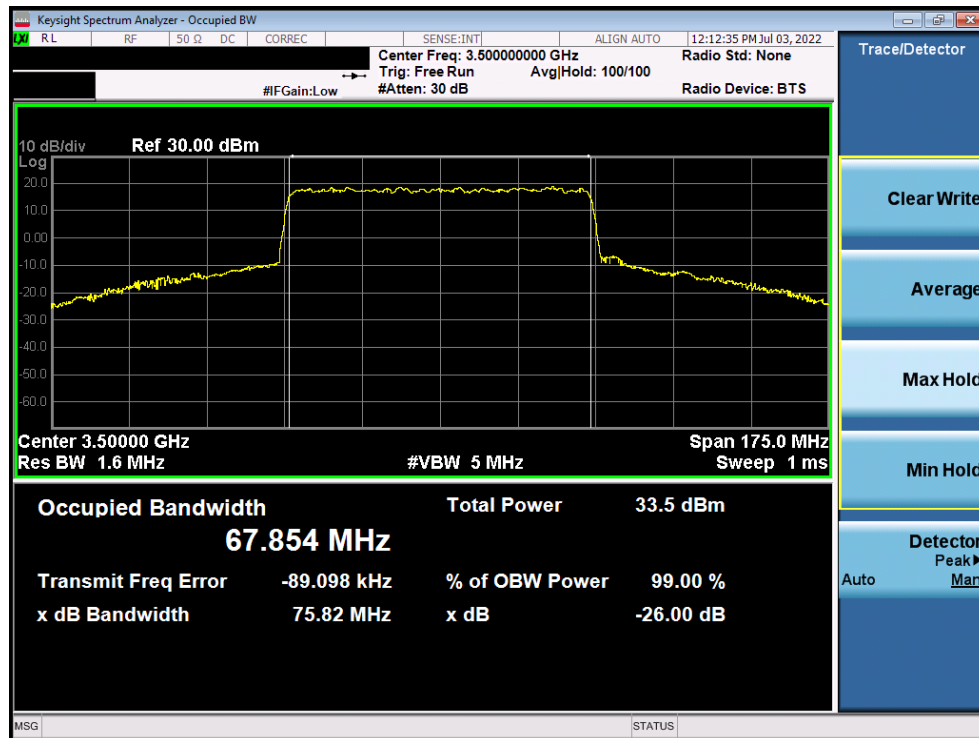
Plot 7-37. Occupied Bandwidth Plot (NR Band n77 DoD Band - 70MHz CP-OFDM QPSK - Full RB)



Plot 7-38. Occupied Bandwidth Plot (NR Band n77 DoD Band - 70MHz CP-OFDM 16-QAM - Full RB)

FCC ID: BCGA2764	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1C2205090028-05.BCG	Test Dates: 5/30/2022 - 9/30/2022	EUT Type: Tablet Device	Page 36 of 200

V2.1 11/9/2021

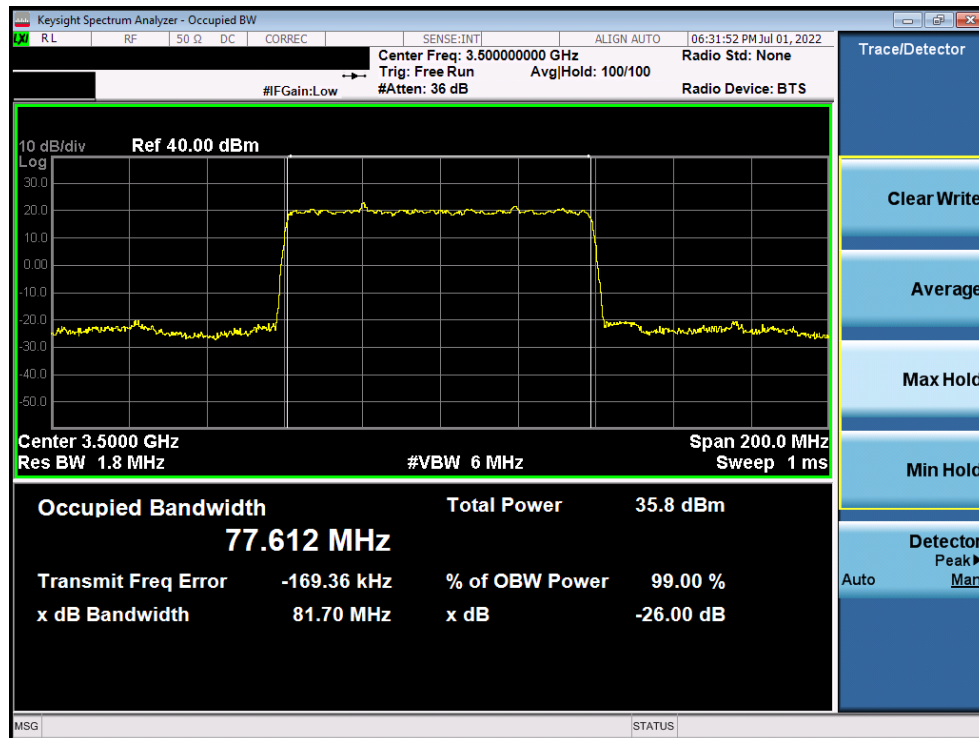


Plot 7-39. Occupied Bandwidth Plot (NR Band n77 DoD Band - 70MHz CP-OFDM 64-QAM - Full RB)

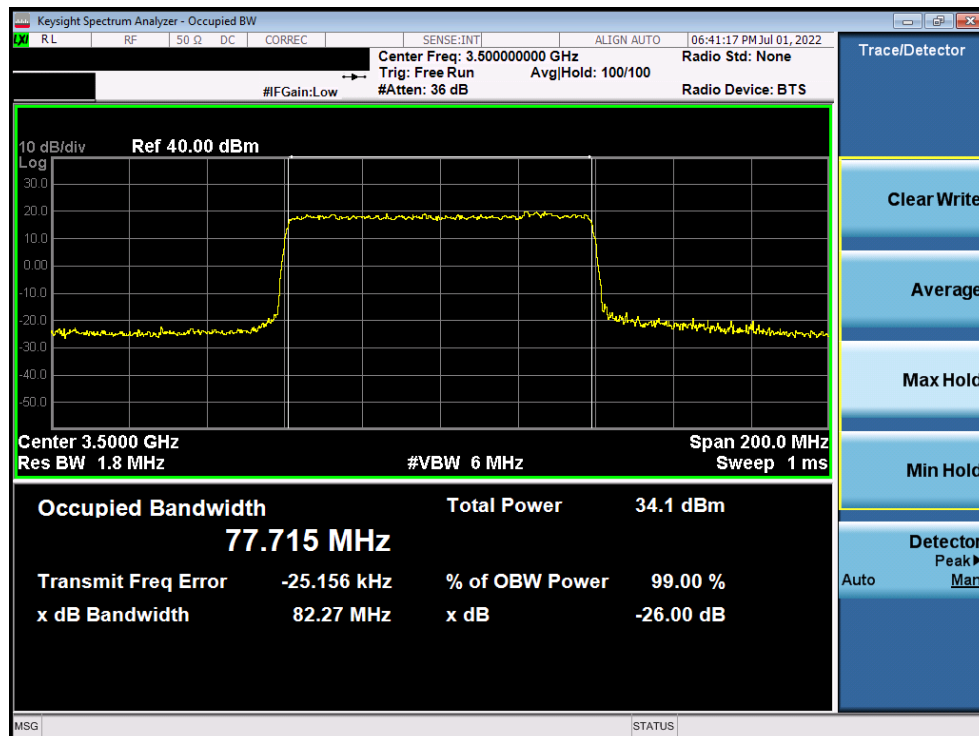


Plot 7-40. Occupied Bandwidth Plot (NR Band n77 DoD Band - 70MHz CP-OFDM 256-QAM - Full RB)


FCC ID: BCGA2764	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1C2205090028-05.BCG	Test Dates: 5/30/2022 - 9/30/2022	EUT Type: Tablet Device	Page 37 of 200



Plot 7-41. Occupied Bandwidth Plot (NR Band n77 DoD Band - 80MHz DFT-s-OFDM $\pi/2$ BPSK - Full RB)

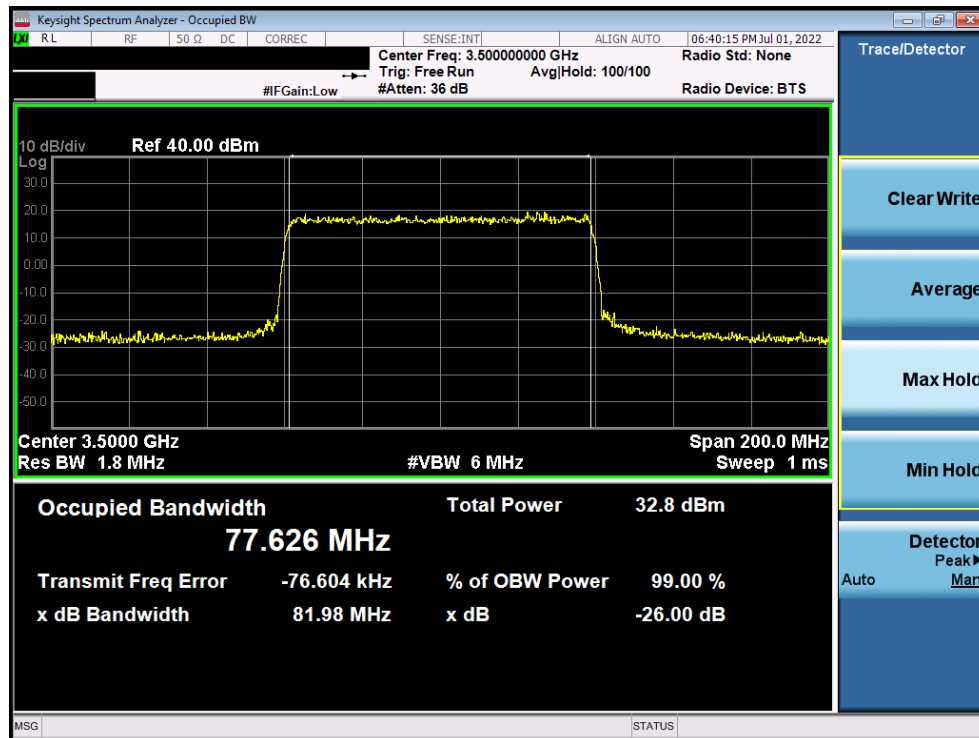


Plot 7-42. Occupied Bandwidth Plot (NR Band n77 DoD Band - 80MHz CP-OFDM QPSK - Full RB)

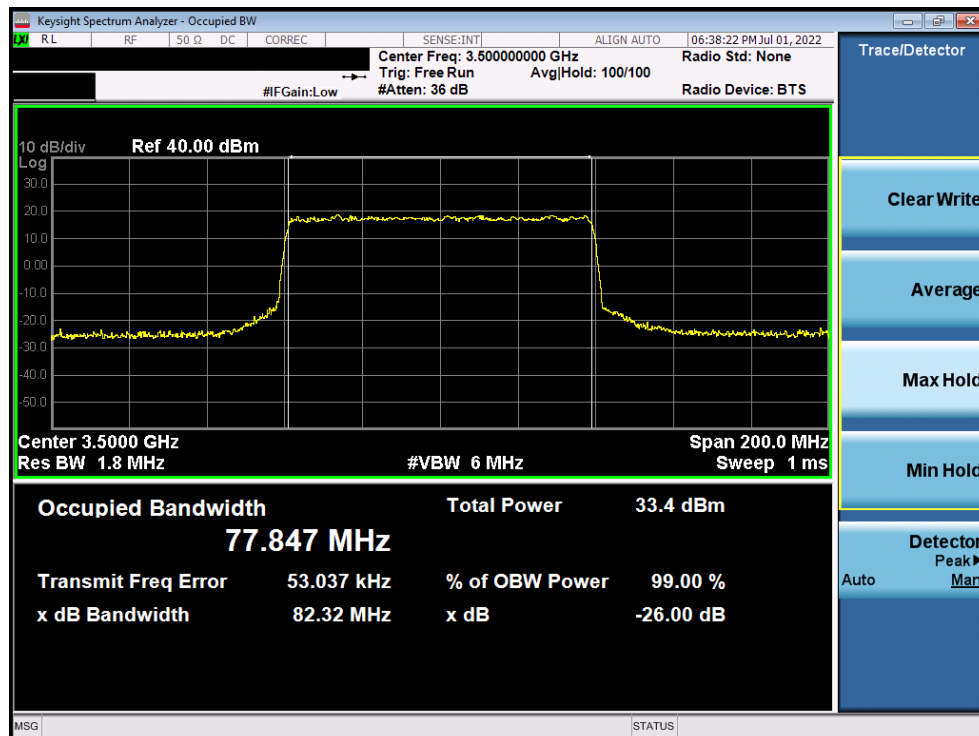
FCC ID: BCGA2764	 PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1C2205090028-05.BCG	Test Dates: 5/30/2022 - 9/30/2022	EUT Type: Tablet Device	Page 38 of 200

V2.1 11/9/2021


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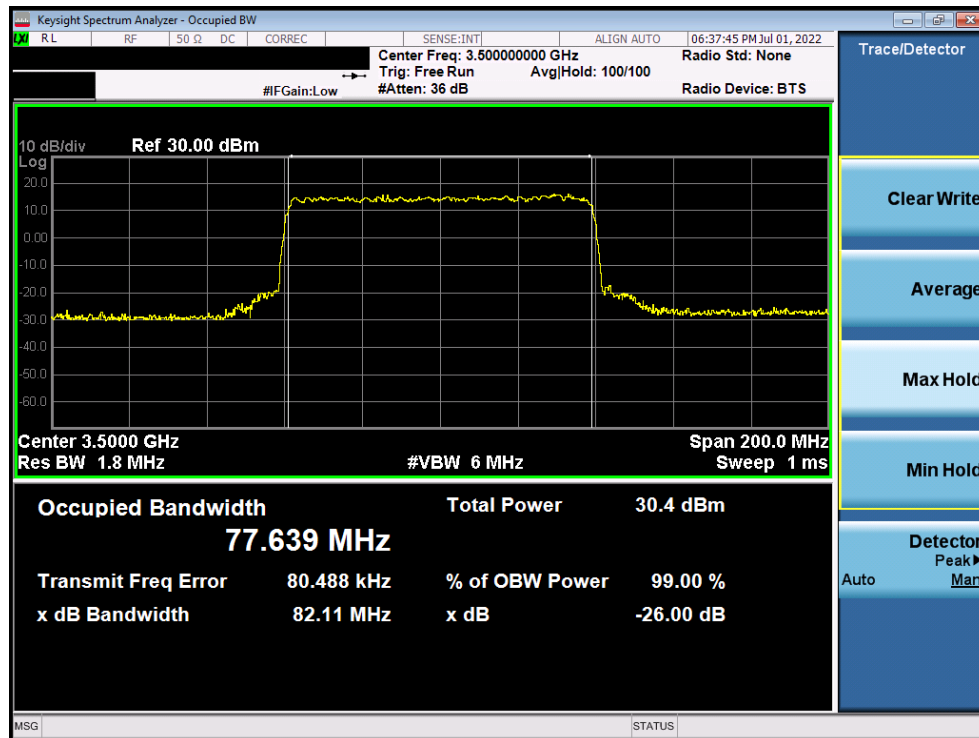


Plot 7-43. Occupied Bandwidth Plot (NR Band n77 DoD Band - 80MHz CP-OFDM 16-QAM - Full RB)

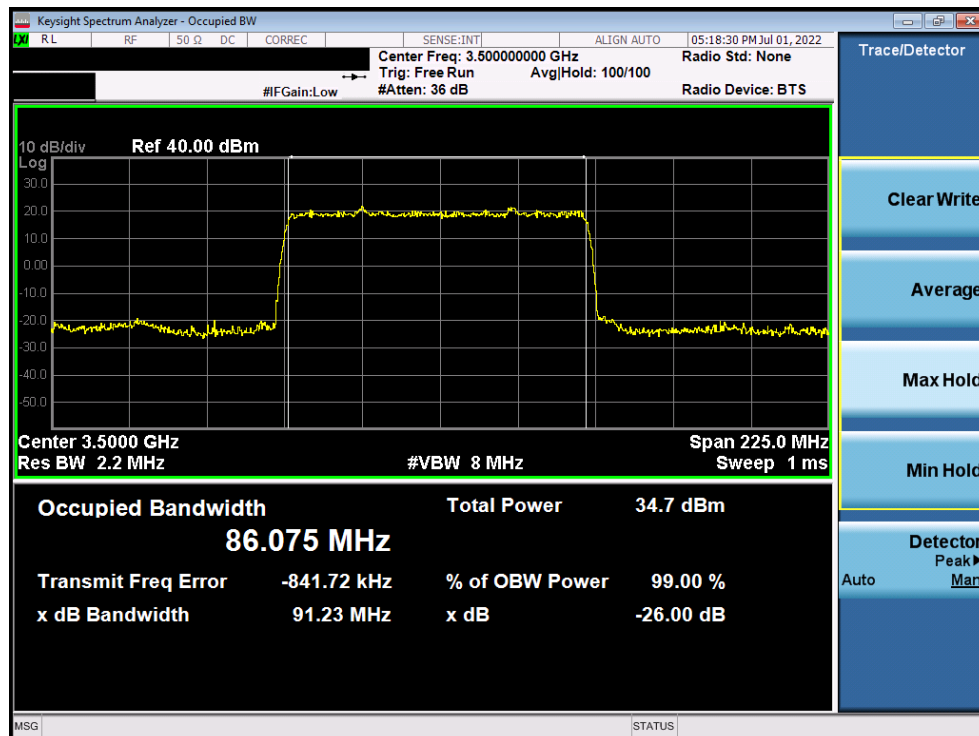


Plot 7-44. Occupied Bandwidth Plot (NR Band n77 DoD Band - 80MHz CP-OFDM 64-QAM - Full RB)


FCC ID: BCGA2764	 PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1C2205090028-05.BCG	Test Dates: 5/30/2022 - 9/30/2022	EUT Type: Tablet Device	Page 39 of 200

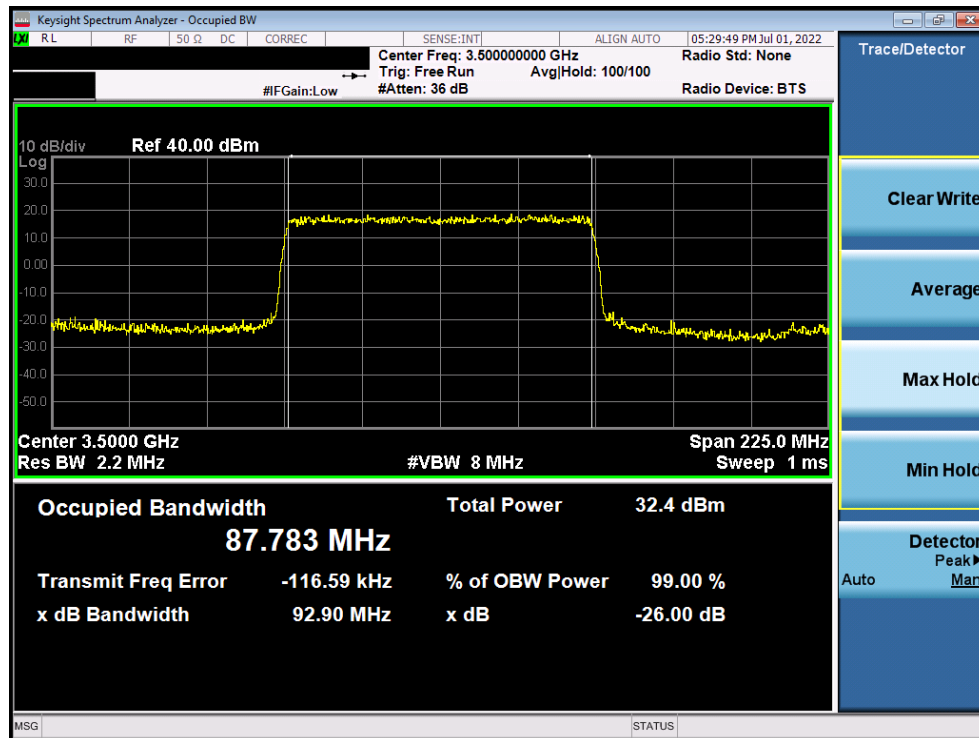


Plot 7-45. Occupied Bandwidth Plot (NR Band n77 DoD Band - 80MHz CP-OFDM 256-QAM - Full RB)

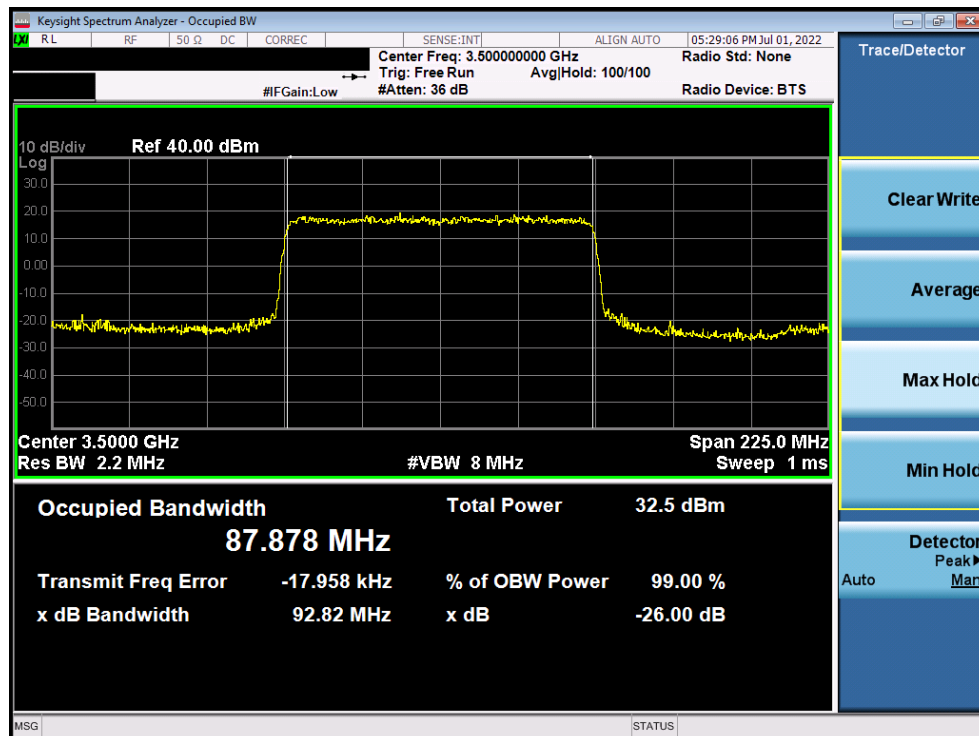


Plot 7-46. Occupied Bandwidth Plot (NR Band n77 DoD Band - 90MHz DFT-s-OFDM $\pi/2$ BPSK - Full RB)

FCC ID: BCGA2764	 PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1C2205090028-05.BCG	Test Dates: 5/30/2022 - 9/30/2022	EUT Type: Tablet Device	Page 40 of 200

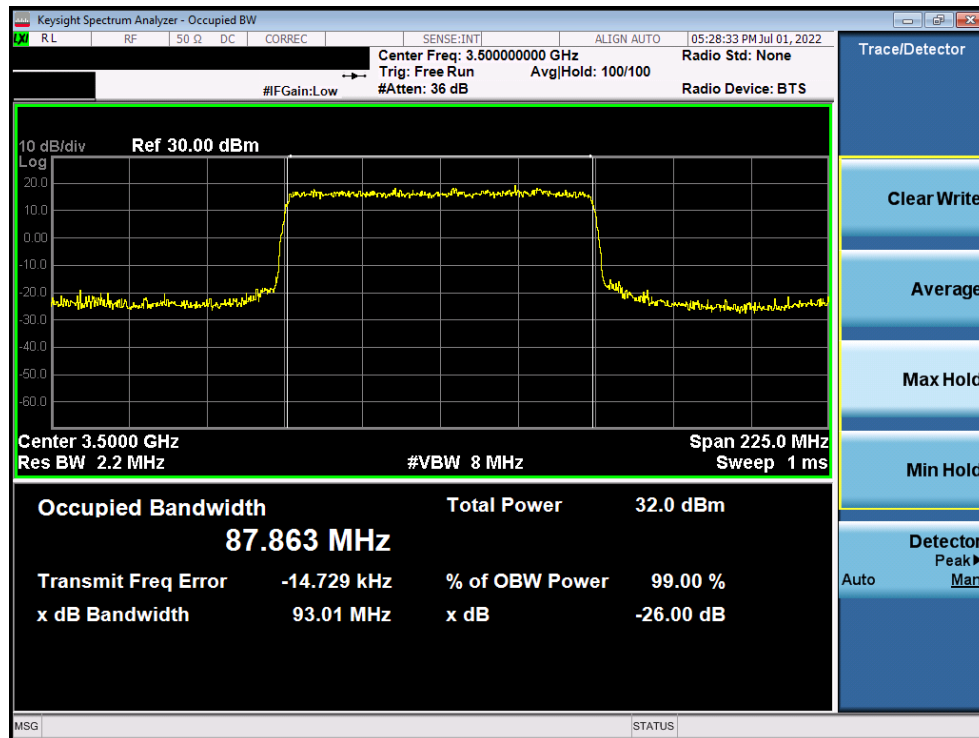


Plot 7-47. Occupied Bandwidth Plot (NR Band n77 DoD Band - 90MHz CP-OFDM QPSK - Full RB)

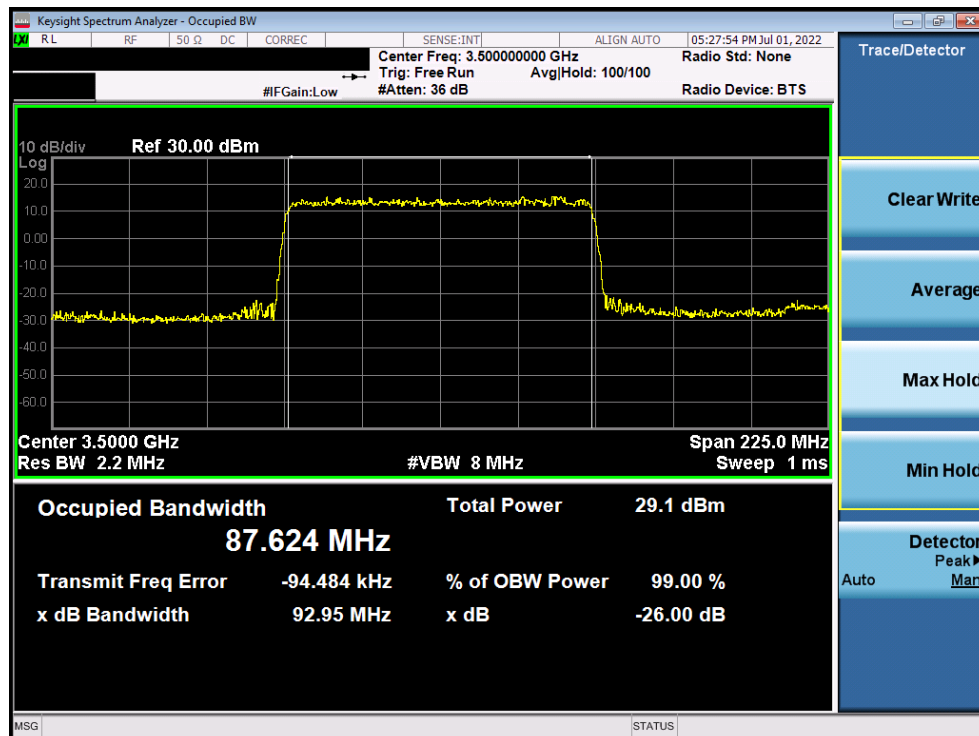


Plot 7-48. Occupied Bandwidth Plot (NR Band n77 DoD Band - 90MHz CP-OFDM 16-QAM - Full RB)


FCC ID: BCGA2764	element	PART 27 MEASUREMENT REPORT	Approved by: Technical Manager
Test Report S/N: 1C2205090028-05.BCG	Test Dates: 5/30/2022 - 9/30/2022	EUT Type: Tablet Device	Page 41 of 200

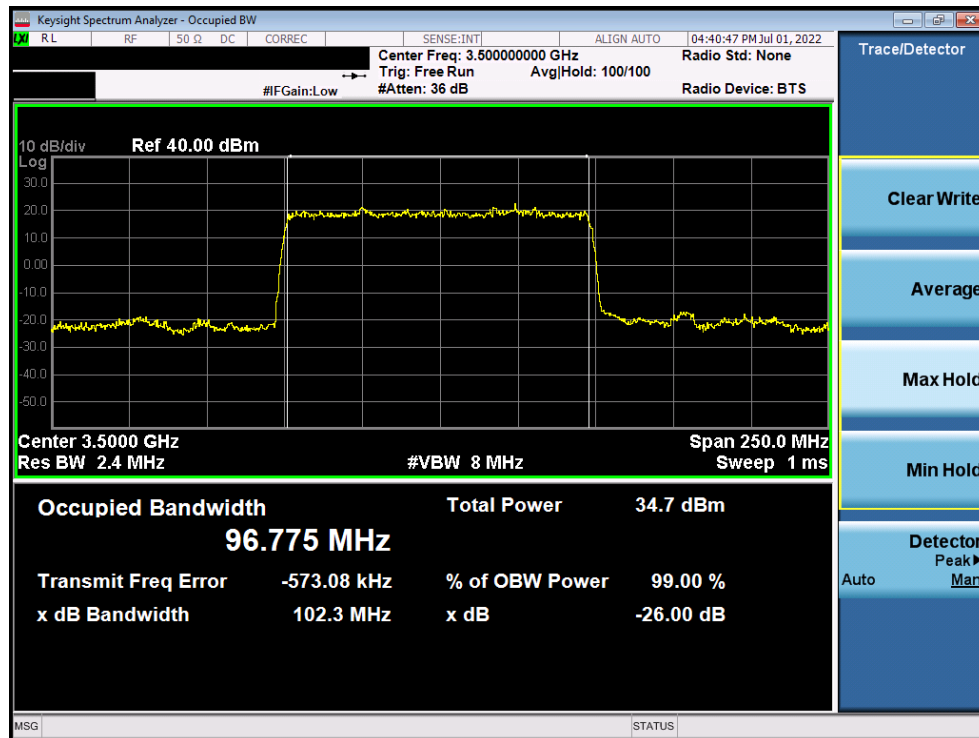


Plot 7-49. Occupied Bandwidth Plot (NR Band n77 DoD Band - 90MHz CP-OFDM 64-QAM - Full RB)

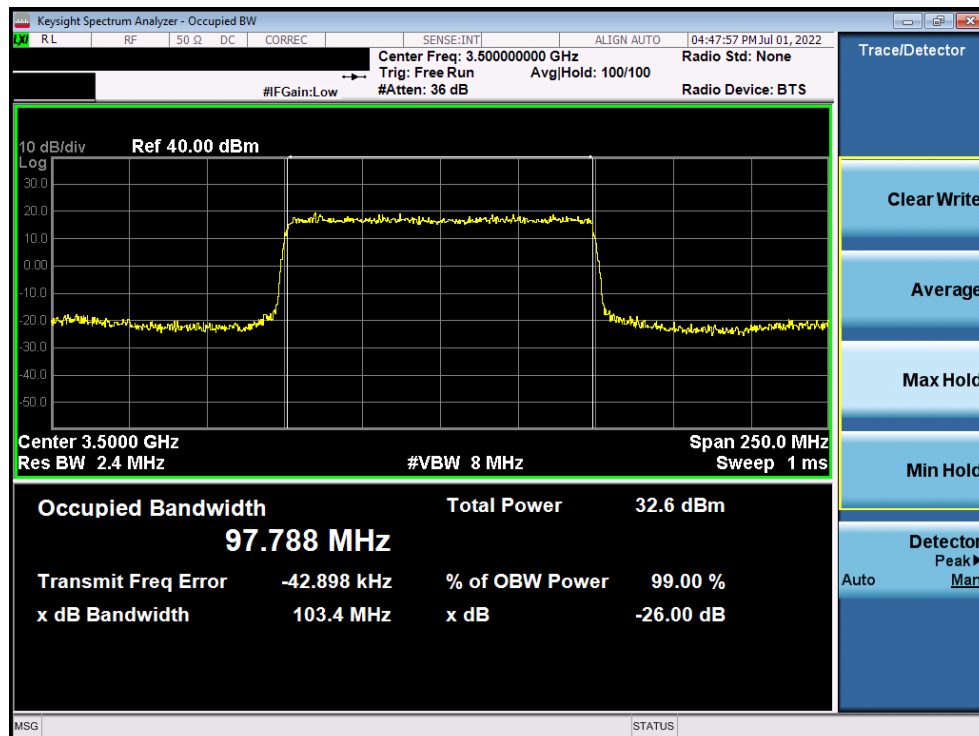


Plot 7-50. Occupied Bandwidth Plot (NR Band n77 DoD Band - 90MHz CP-OFDM 256-QAM - Full RB)


FCC ID: BCGA2764	 PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1C2205090028-05.BCG	Test Dates: 5/30/2022 - 9/30/2022	EUT Type: Tablet Device	Page 42 of 200



Plot 7-51. Occupied Bandwidth Plot (NR Band n77 DoD Band - 100MHz DFT-s-OFDM $\pi/2$ BPSK - Full RB)

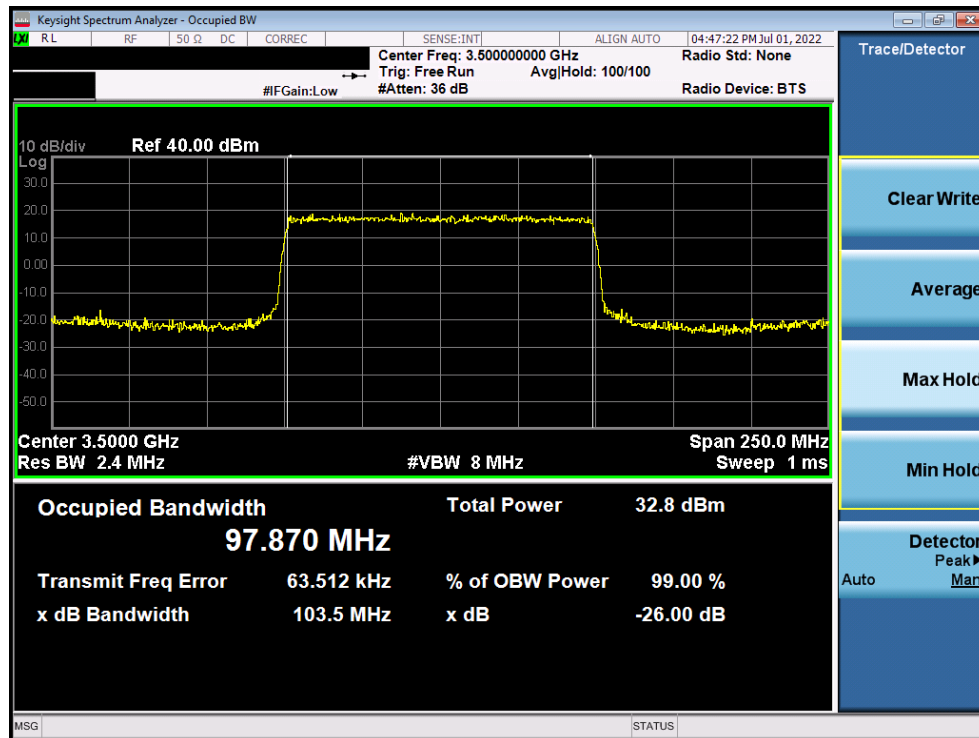


Plot 7-52. Occupied Bandwidth Plot (NR Band n77 DoD Band - 100MHz CP-OFDM QPSK - Full RB)

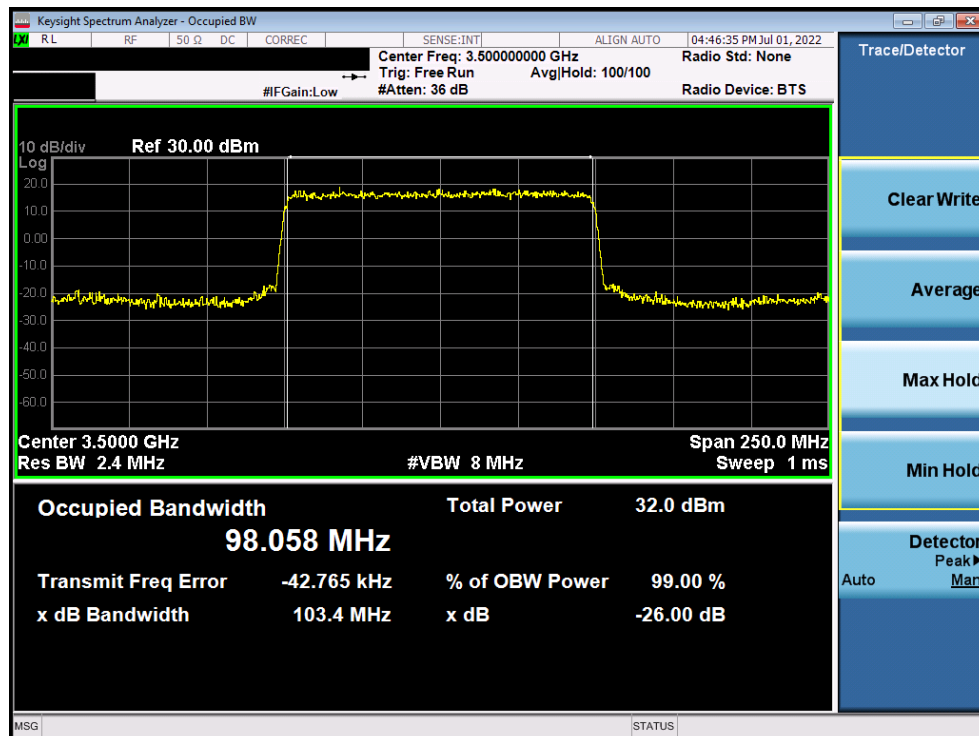
FCC ID: BCGA2764	 PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1C2205090028-05.BCG	Test Dates: 5/30/2022 - 9/30/2022	EUT Type: Tablet Device	Page 43 of 200

V2.1 11/9/2021

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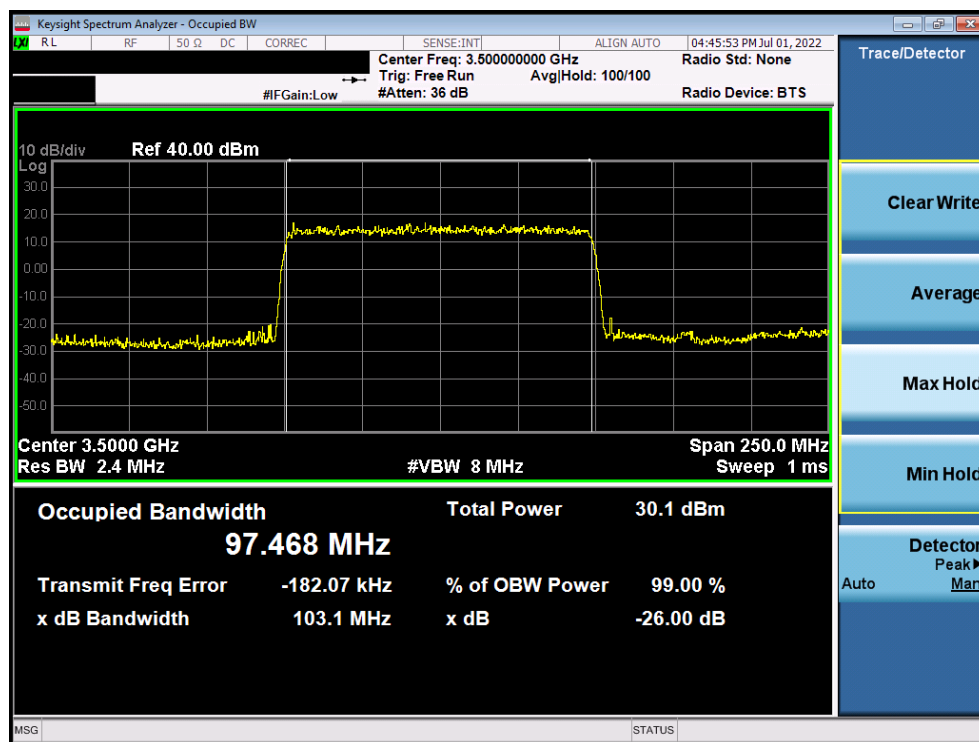


Plot 7-53. Occupied Bandwidth Plot (NR Band n77 DoD Band - 100MHz CP-OFDM 16-QAM - Full RB)



Plot 7-54. Occupied Bandwidth Plot (NR Band n77 DoD Band - 100MHz CP-OFDM 64-QAM - Full RB)

FCC ID: BCGA2764	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1C2205090028-05.BCG	Test Dates: 5/30/2022 - 9/30/2022	EUT Type: Tablet Device	Page 44 of 200

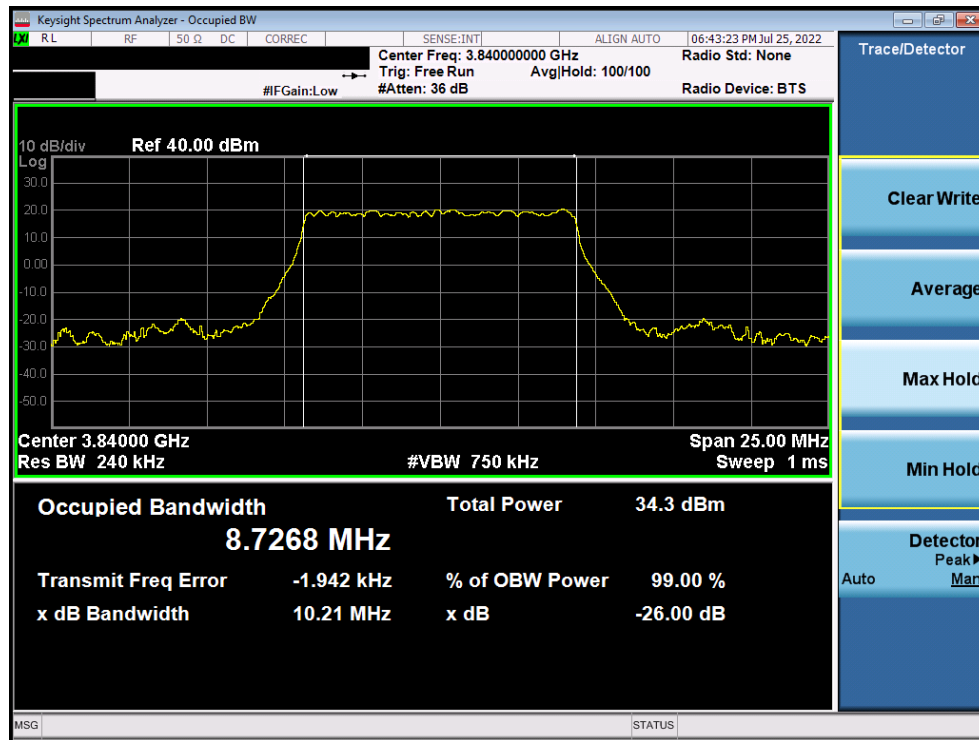


Plot 7-55. Occupied Bandwidth Plot (NR Band n77 DoD Band - 100MHz CP-OFDM 256-QAM - Full RB)

FCC ID: BCGA2764	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1C2205090028-05.BCG	Test Dates: 5/30/2022 - 9/30/2022	EUT Type: Tablet Device	Page 45 of 200

V2.1 11/9/2021


NR Band n77 C-Band



Plot 7-56. Occupied Bandwidth Plot (NR Band n77 C-Band - 10MHz DFT-s-OFDM $\pi/2$ BPSK - Full RB)

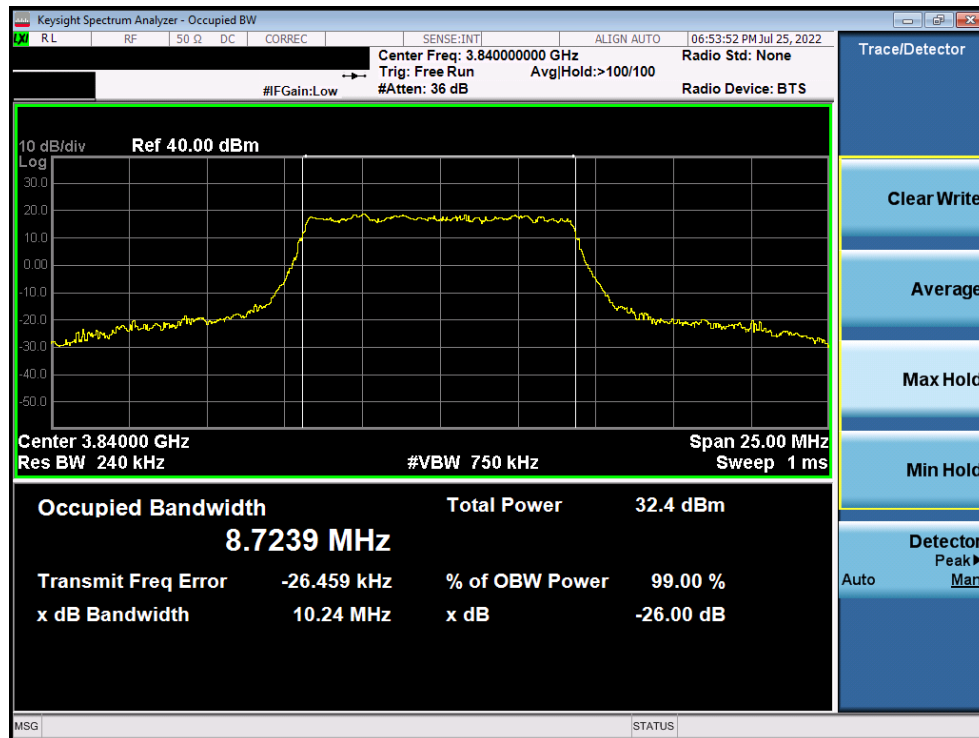


Plot 7-57. Occupied Bandwidth Plot (NR Band n77 C-Band - 10MHz CP-OFDM QPSK - Full RB)

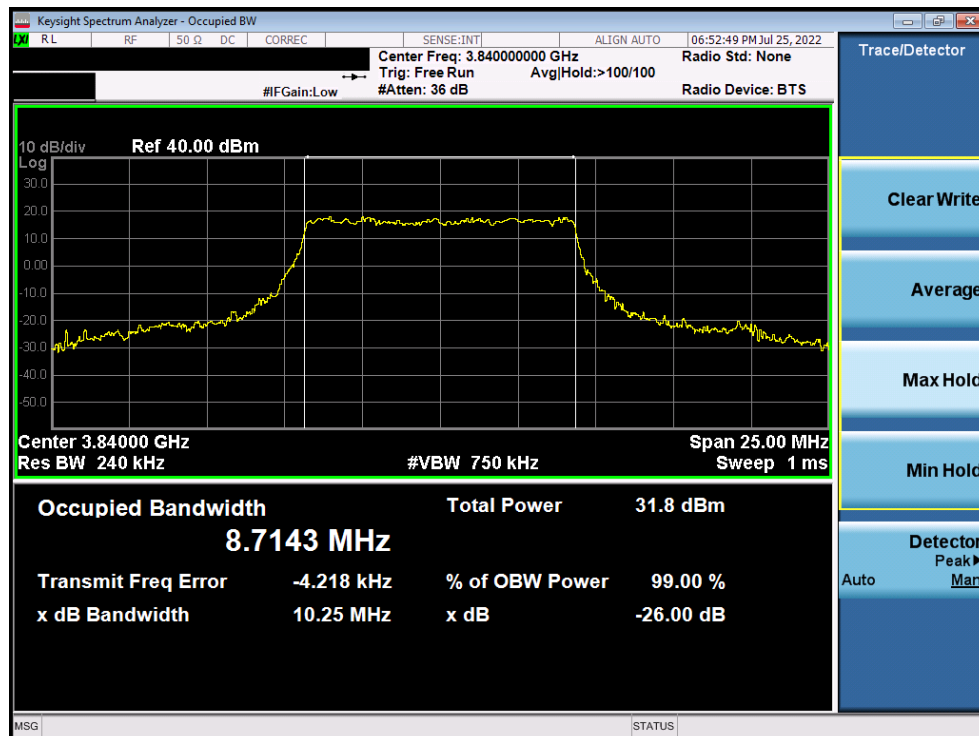
FCC ID: BCGA2764	 PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1C2205090028-05.BCG	Test Dates: 5/30/2022 - 9/30/2022	EUT Type: Tablet Device	Page 46 of 200

V2.1 11/9/2021

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Plot 7-58. Occupied Bandwidth Plot (NR Band n77 C-Band - 10MHz CP-OFDM 16-QAM - Full RB)



Plot 7-59. Occupied Bandwidth Plot (NR Band n77 C-Band - 10MHz CP-OFDM 64-QAM - Full RB)

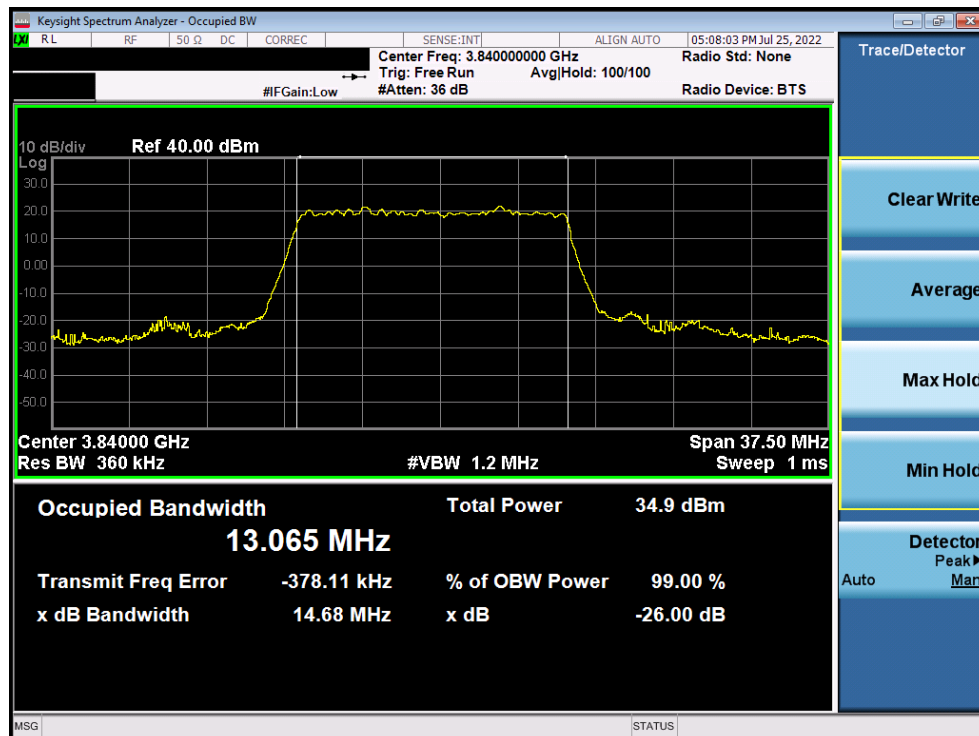
FCC ID: BCGA2764	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1C2205090028-05.BCG	Test Dates: 5/30/2022 - 9/30/2022	EUT Type: Tablet Device	Page 47 of 200

V2.1 11/9/2021

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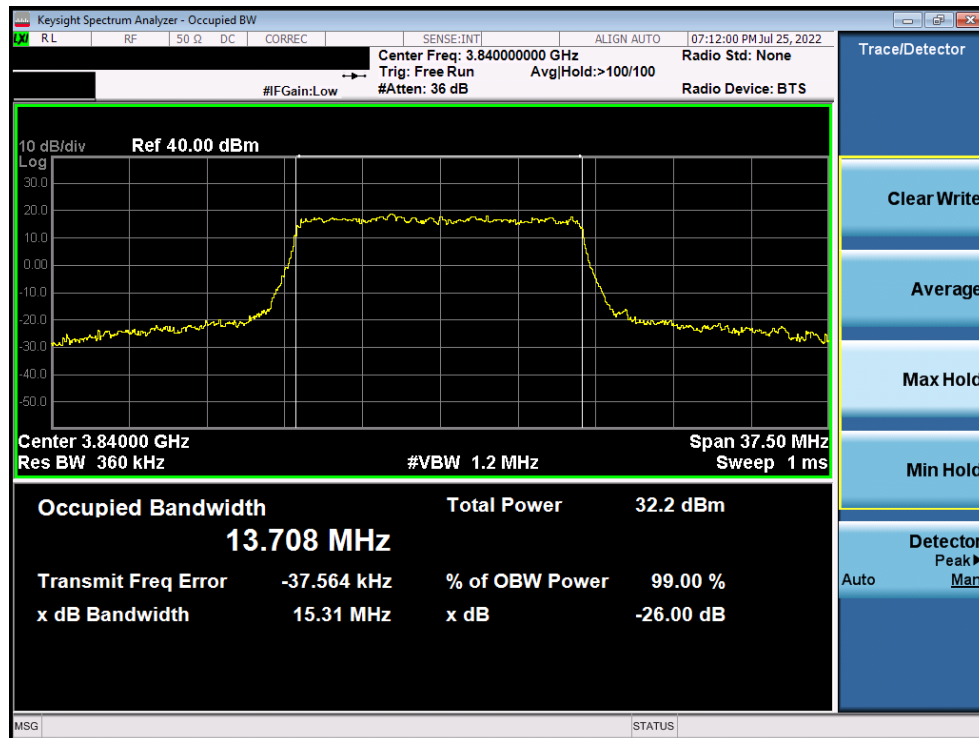


Plot 7-60. Occupied Bandwidth Plot (NR Band n77 C-Band - 10MHz CP-OFDM 256-QAM - Full RB)

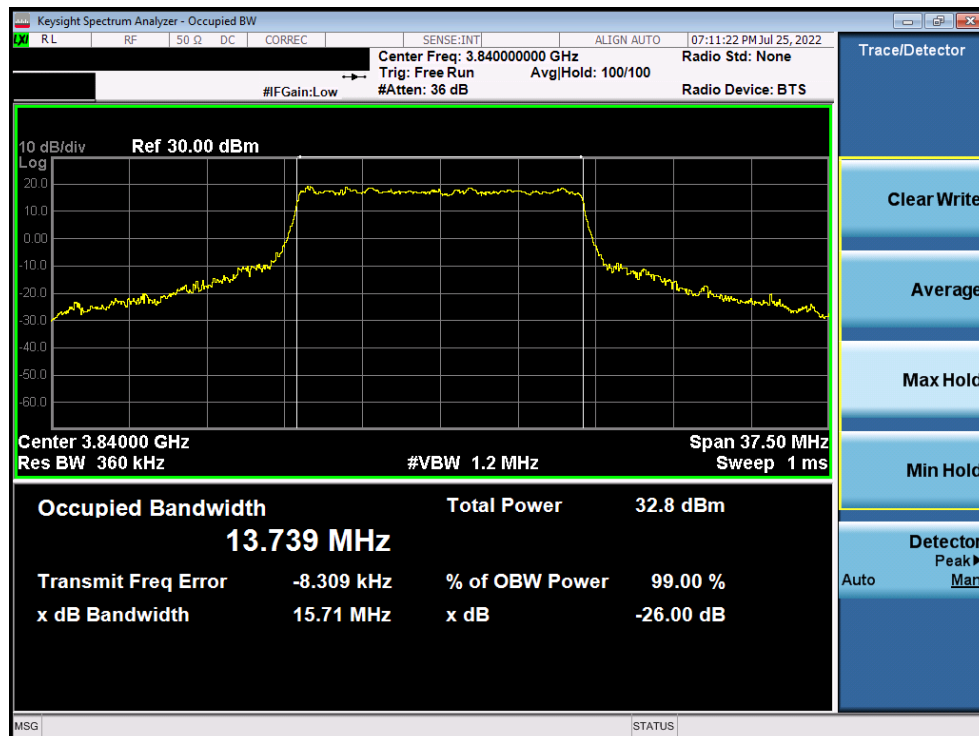


Plot 7-61. Occupied Bandwidth Plot (NR Band n77 C-Band - 15MHz DFT-s-OFDM $\pi/2$ BPSK - Full RB)

FCC ID: BCGA2764	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1C2205090028-05.BCG	Test Dates: 5/30/2022 - 9/30/2022	EUT Type: Tablet Device	Page 48 of 200



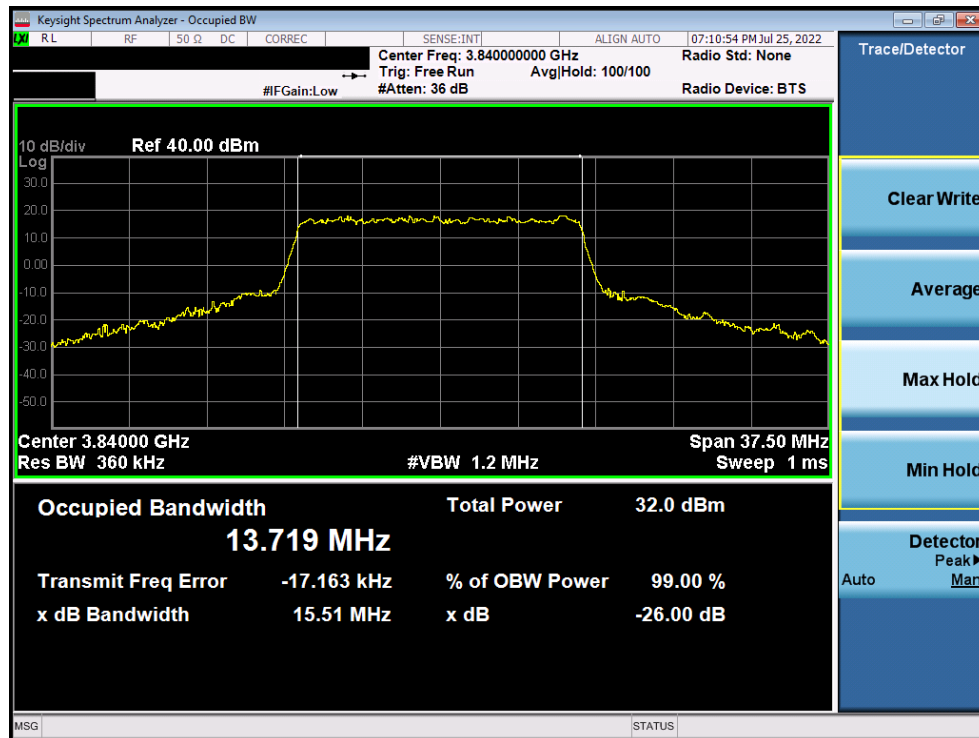
Plot 7-62. Occupied Bandwidth Plot (NR Band n77 C-Band - 15MHz CP-OFDM QPSK - Full RB)



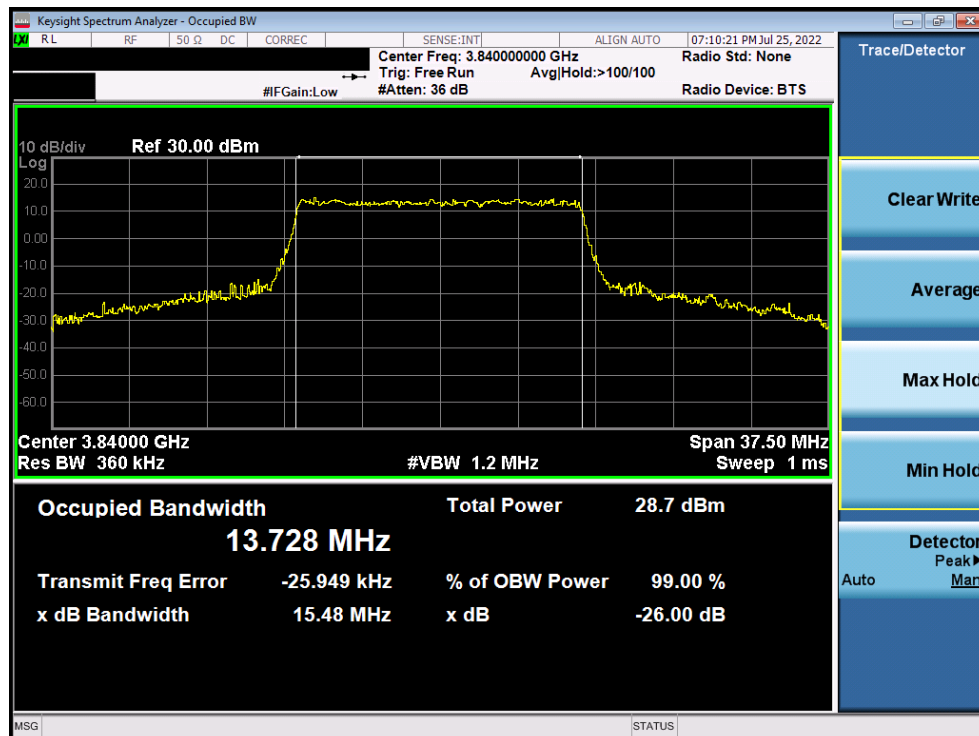
Plot 7-63. Occupied Bandwidth Plot (NR Band n77 C-Band - 15MHz CP-OFDM 16-QAM - Full RB)

FCC ID: BCGA2764	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1C2205090028-05.BCG	Test Dates: 5/30/2022 - 9/30/2022	EUT Type: Tablet Device	Page 49 of 200


V2.1 11/9/2021



Plot 7-64. Occupied Bandwidth Plot (NR Band n77 C-Band - 15MHz CP-OFDM 64-QAM - Full RB)

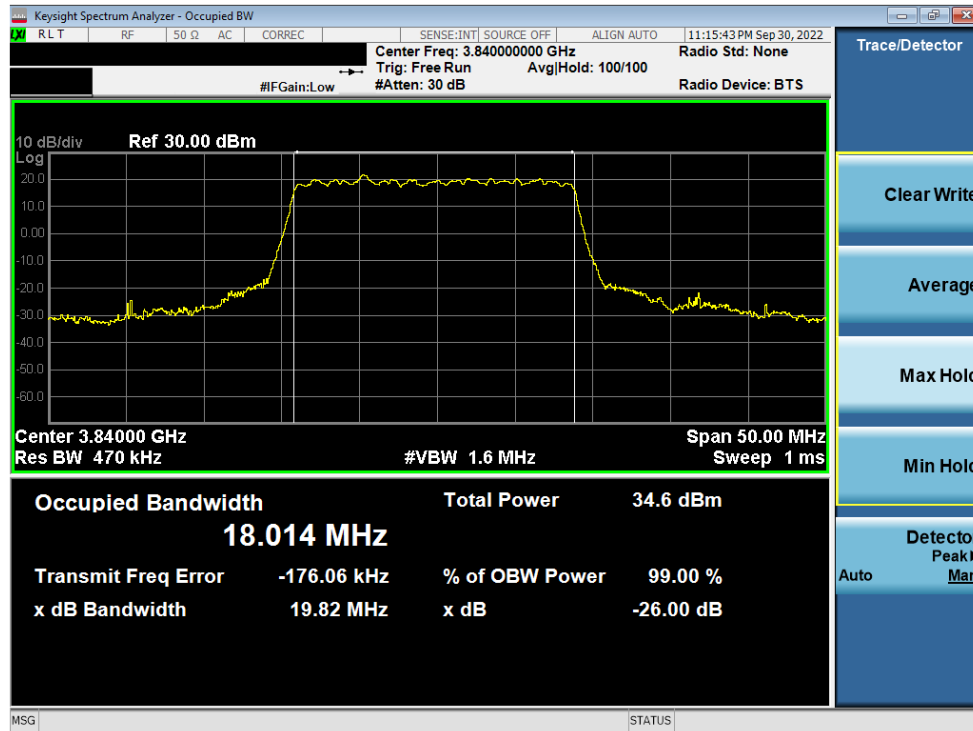


Plot 7-65. Occupied Bandwidth Plot (NR Band n77 C-Band - 15MHz CP-OFDM 256-QAM - Full RB)

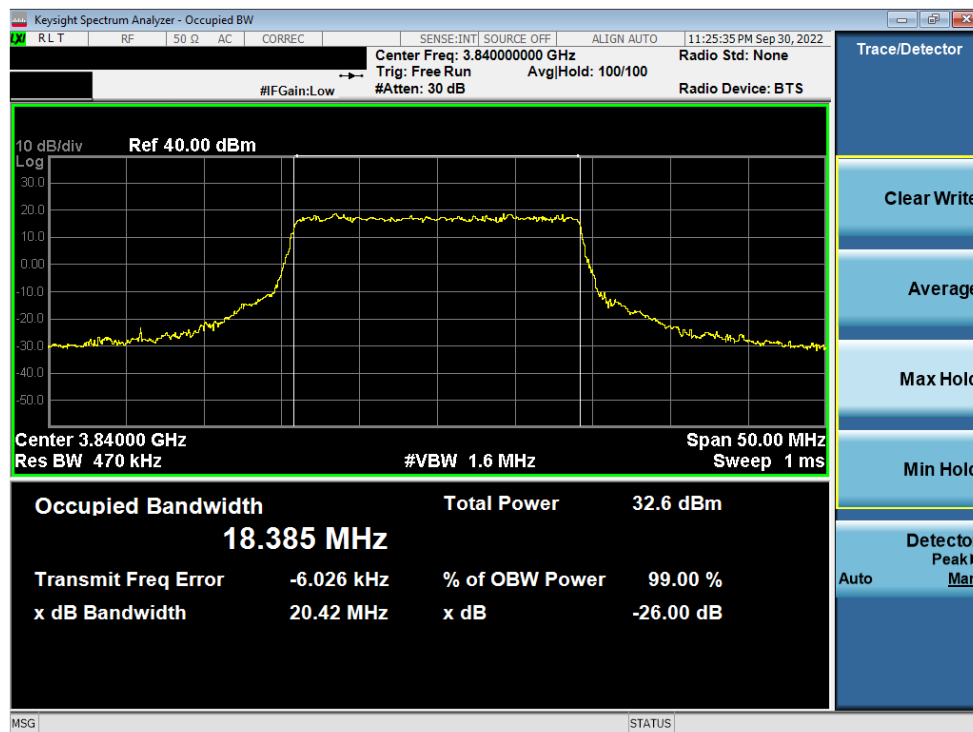
FCC ID: BCGA2764	 PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1C2205090028-05.BCG	Test Dates: 5/30/2022 - 9/30/2022	EUT Type: Tablet Device	Page 50 of 200

V2.1 11/9/2021

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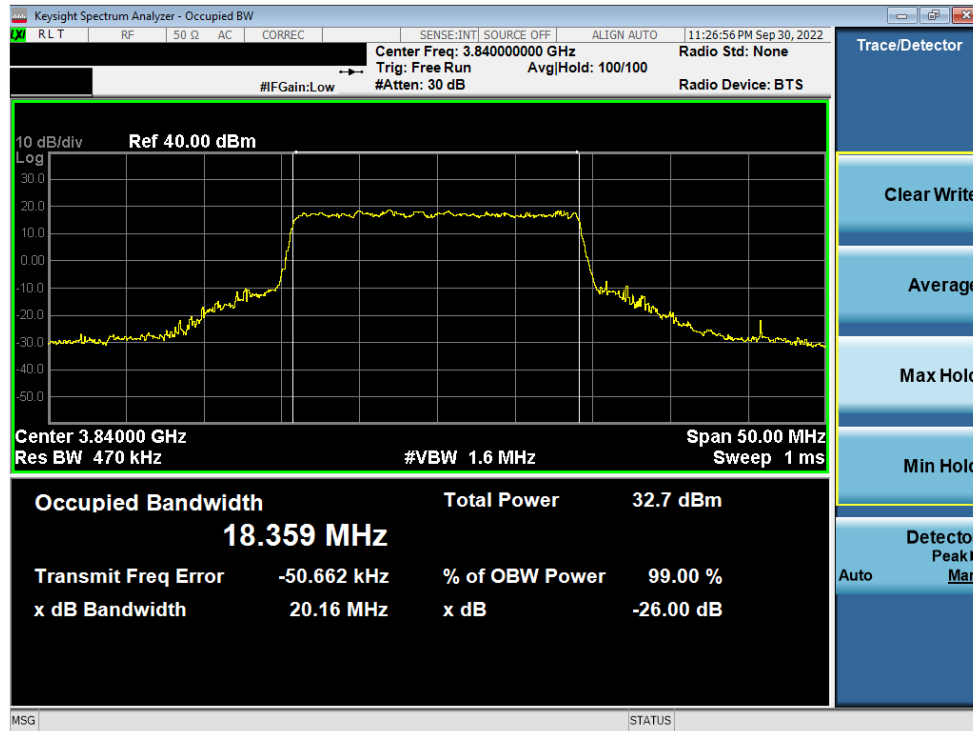


Plot 7-66. Occupied Bandwidth Plot (NR Band n77 C-Band - 20MHz DFT-s-OFDM $\pi/2$ BPSK - Full RB)



Plot 7-67. Occupied Bandwidth Plot (NR Band n77 C-Band - 20MHz CP-OFDM QPSK - Full RB)

FCC ID: BCGA2764	element	PART 27 MEASUREMENT REPORT	Approved by: Technical Manager
Test Report S/N: 1C2205090028-05.BCG	Test Dates: 5/30/2022 - 9/30/2022	EUT Type: Tablet Device	Page 51 of 200



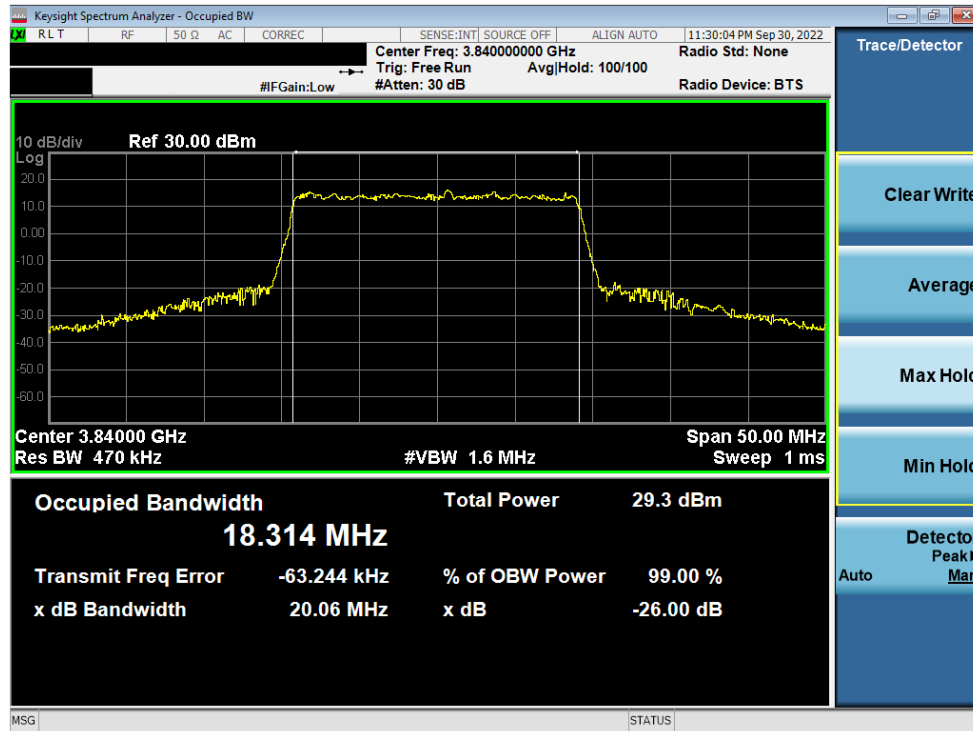
Plot 7-68. Occupied Bandwidth Plot (NR Band n77 C-Band - 20MHz CP-OFDM 16-QAM - Full RB)



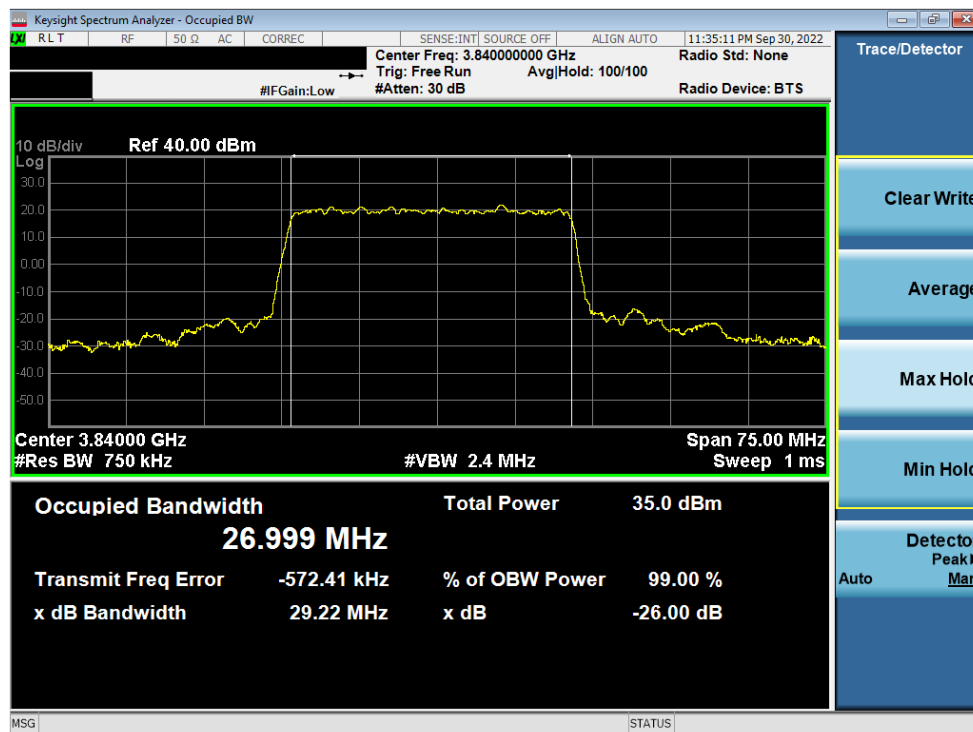
Plot 7-69. Occupied Bandwidth Plot (NR Band n77 C-Band - 20MHz CP-OFDM 64-QAM - Full RB)

FCC ID: BCGA2764	element	PART 27 MEASUREMENT REPORT	Approved by: Technical Manager
Test Report S/N: 1C2205090028-05.BCG	Test Dates: 5/30/2022 - 9/30/2022	EUT Type: Tablet Device	Page 52 of 200

V2.1 11/9/2021

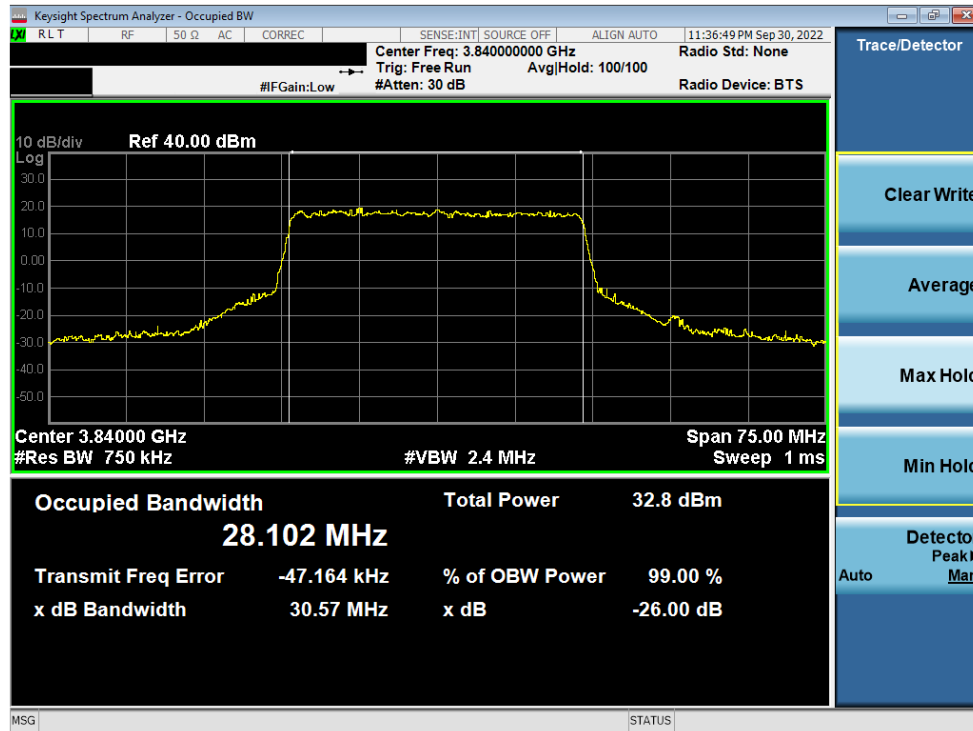


Plot 7-70. Occupied Bandwidth Plot (NR Band n77 C-Band - 20MHz CP-OFDM 256-QAM - Full RB)



Plot 7-71. Occupied Bandwidth Plot (NR Band n77 C-Band - 30MHz DFT-s-OFDM $\pi/2$ BPSK - Full RB)

FCC ID: BCGA2764	element	PART 27 MEASUREMENT REPORT	Approved by: Technical Manager
Test Report S/N: 1C2205090028-05.BCG	Test Dates: 5/30/2022 - 9/30/2022	EUT Type: Tablet Device	Page 53 of 200

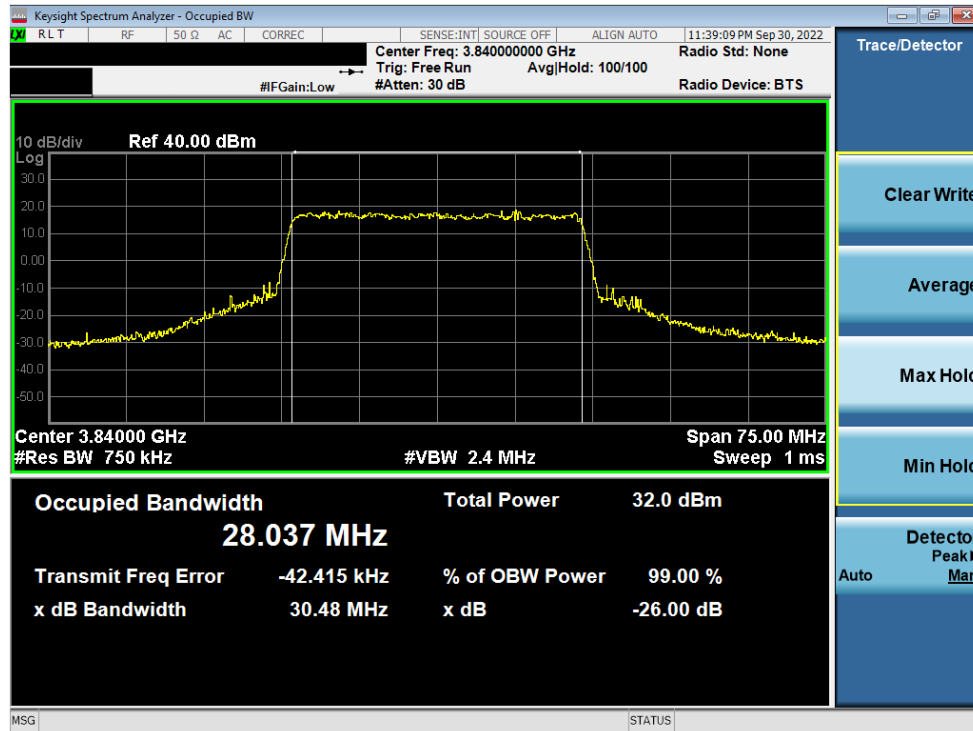


Plot 7-72. Occupied Bandwidth Plot (NR Band n77 C-Band - 30MHz CP-OFDM QPSK - Full RB)

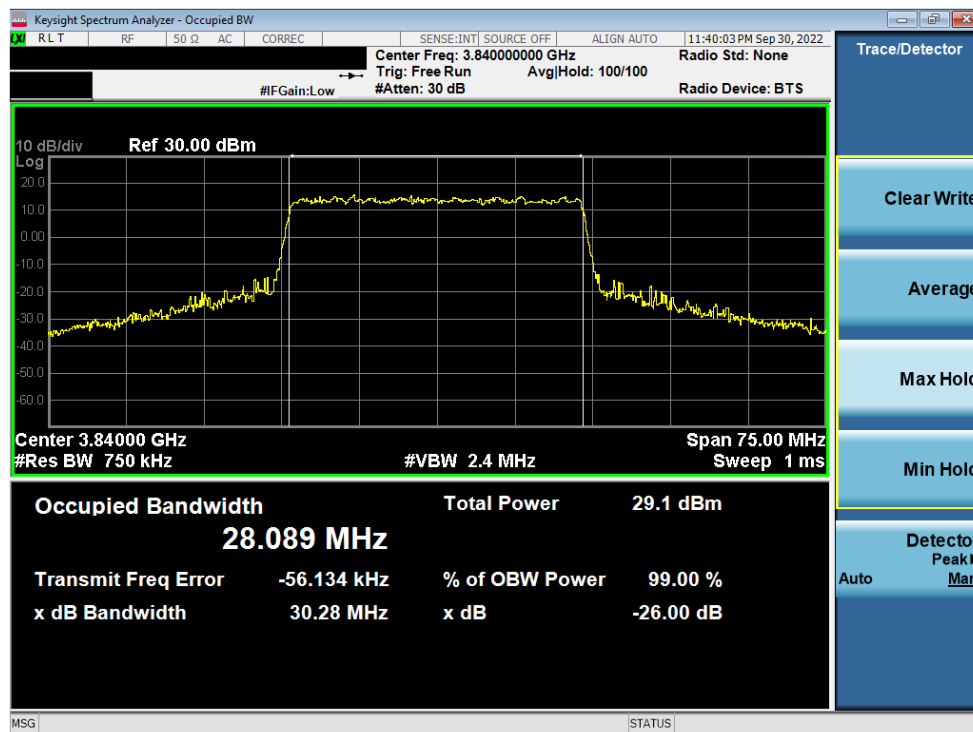


Plot 7-73. Occupied Bandwidth Plot (NR Band n77 C-Band - 30MHz CP-OFDM 16-QAM - Full RB)

FCC ID: BCGA2764	element	PART 27 MEASUREMENT REPORT	Approved by: Technical Manager
Test Report S/N: 1C2205090028-05.BCG	Test Dates: 5/30/2022 - 9/30/2022	EUT Type: Tablet Device	Page 54 of 200

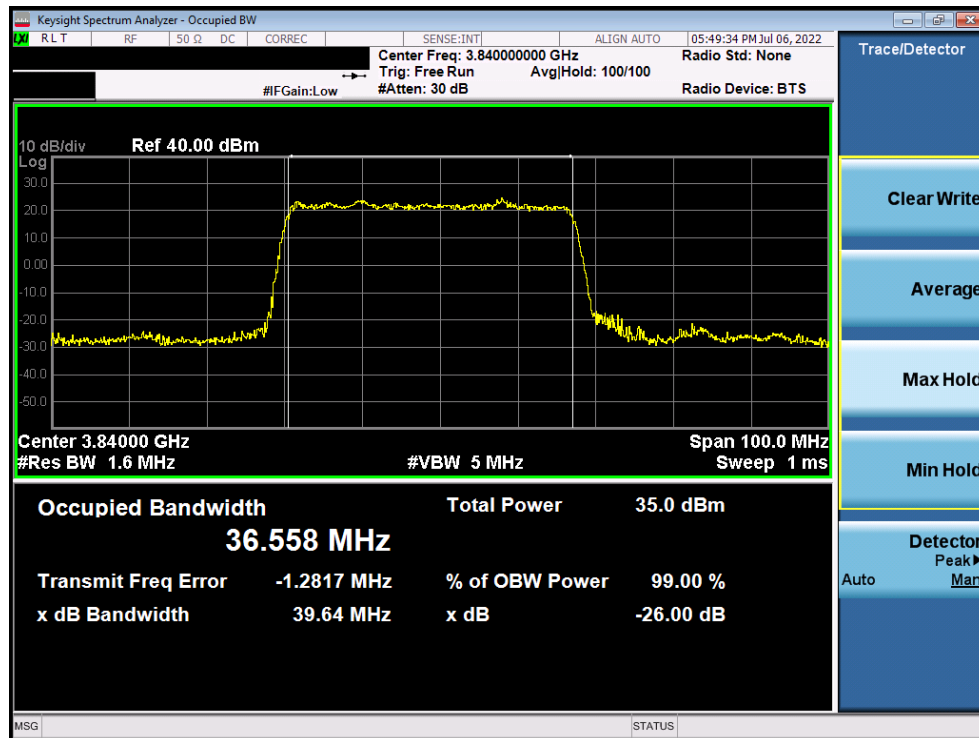


Plot 7-74. Occupied Bandwidth Plot (NR Band n77 C-Band - 30MHz CP-OFDM 64-QAM - Full RB)

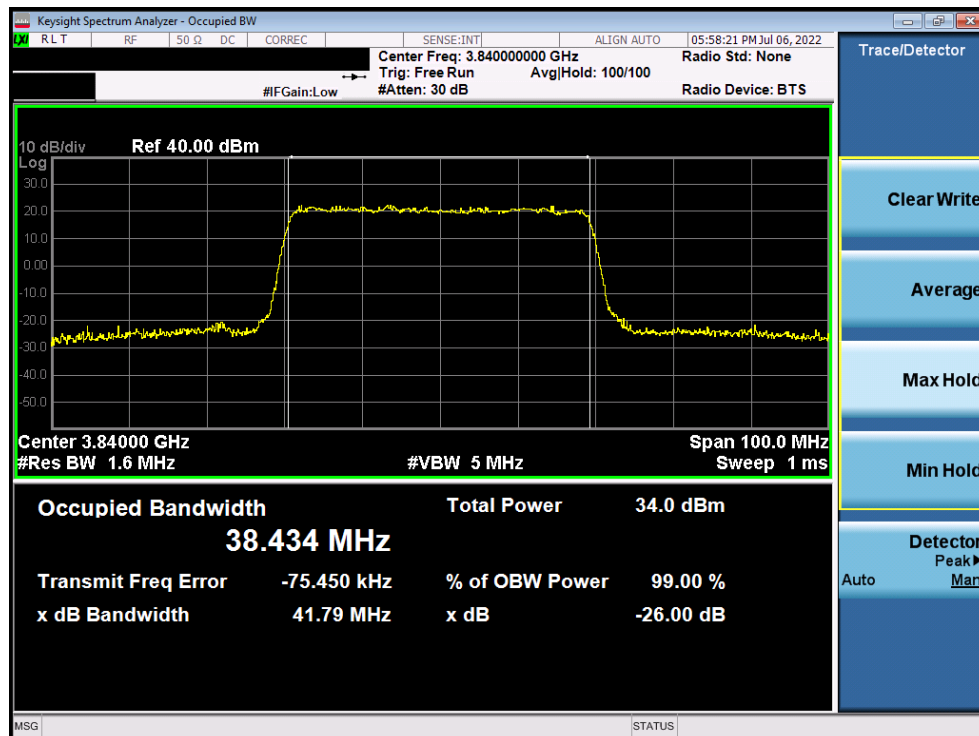


Plot 7-75. Occupied Bandwidth Plot (NR Band n77 C-Band - 30MHz CP-OFDM 256-QAM - Full RB)


FCC ID: BCGA2764	element	PART 27 MEASUREMENT REPORT	Approved by: Technical Manager
Test Report S/N: 1C2205090028-05.BCG	Test Dates: 5/30/2022 - 9/30/2022	EUT Type: Tablet Device	Page 55 of 200



Plot 7-76. Occupied Bandwidth Plot (NR Band n77 C-Band - 40MHz DFT-s-OFDM $\pi/2$ BPSK - Full RB)

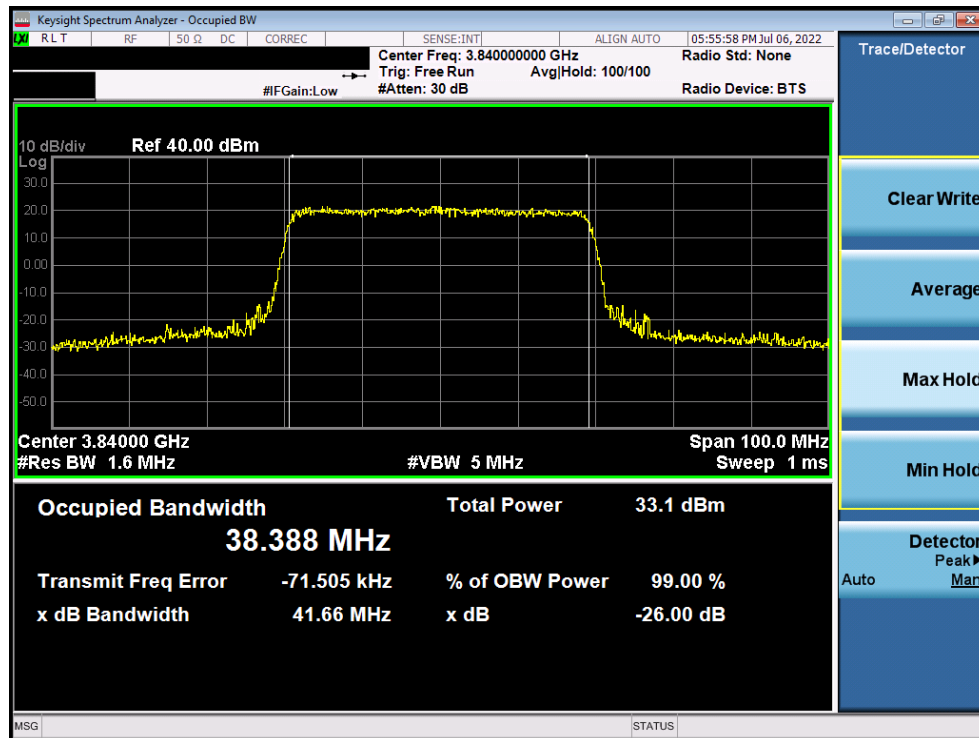


Plot 7-77. Occupied Bandwidth Plot (NR Band n77 C-Band - 40MHz CP-OFDM QPSK - Full RB)

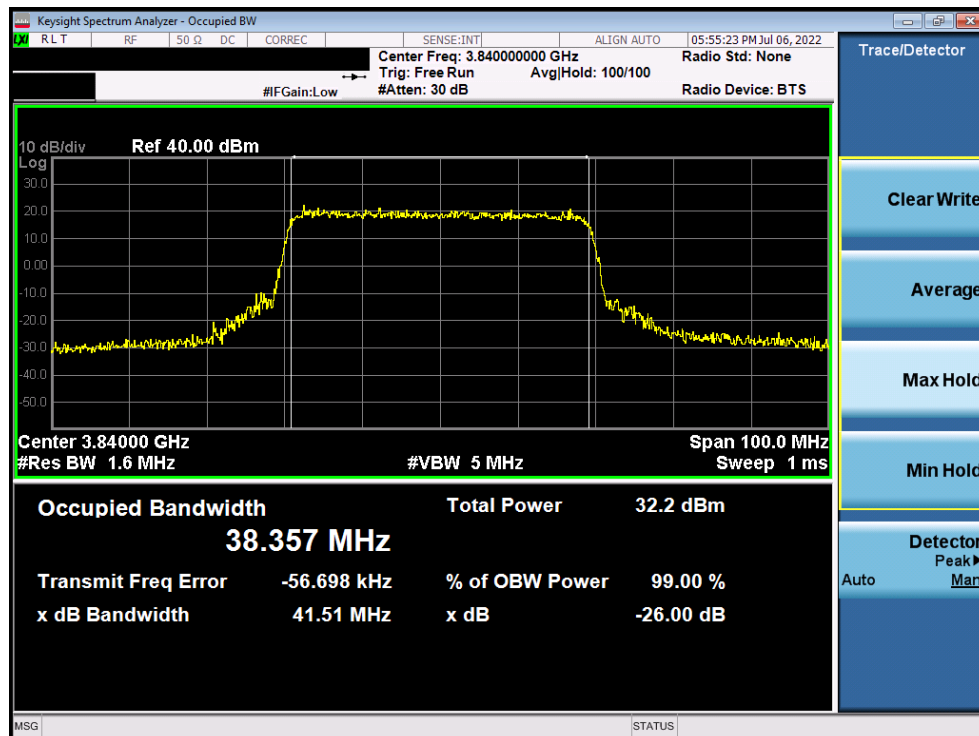
FCC ID: BCGA2764	 PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1C2205090028-05.BCG	Test Dates: 5/30/2022 - 9/30/2022	EUT Type: Tablet Device	Page 56 of 200

V2.1 11/9/2021


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Plot 7-78. Occupied Bandwidth Plot (NR Band n77 C-Band - 40MHz CP-OFDM 16-QAM - Full RB)

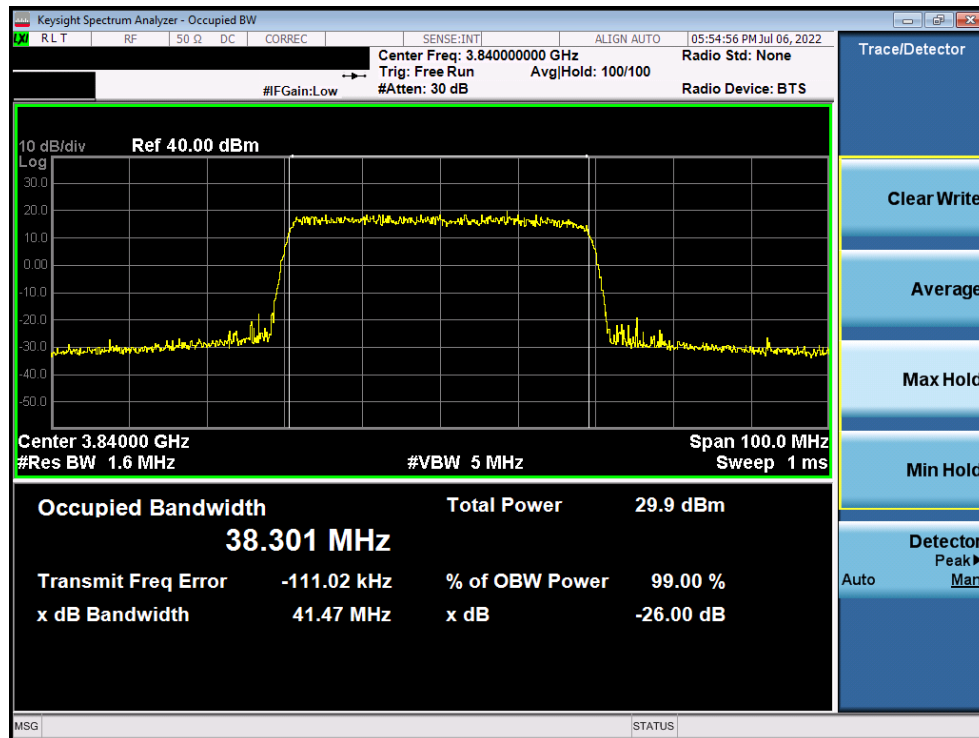


Plot 7-79. Occupied Bandwidth Plot (NR Band n77 C-Band - 40MHz CP-OFDM 64-QAM - Full RB)

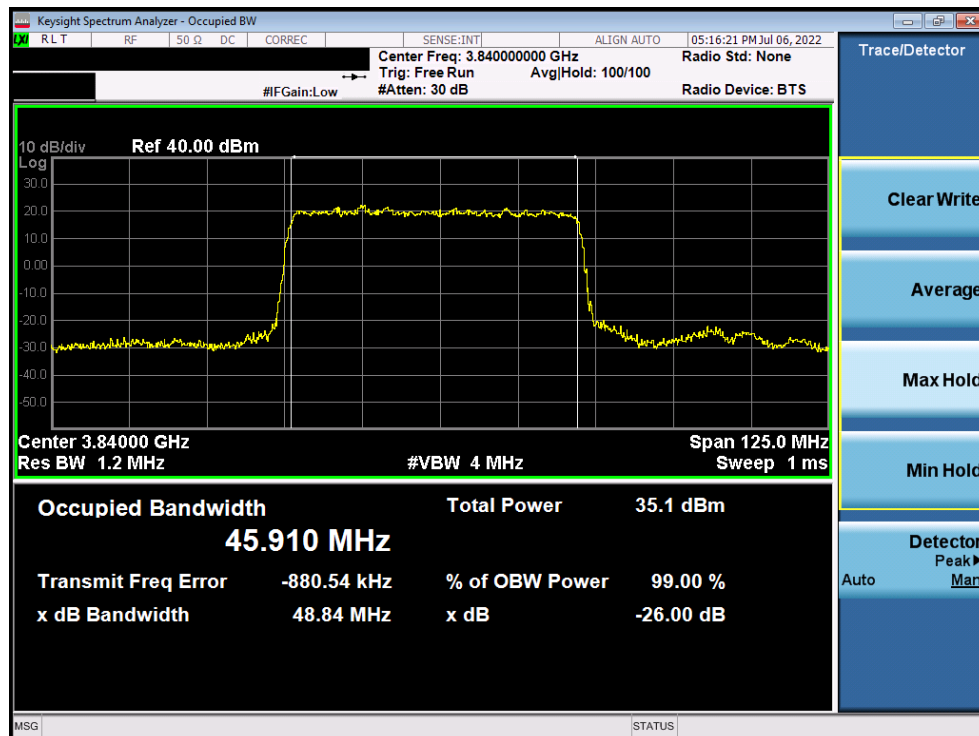
FCC ID: BCGA2764		PART 27 MEASUREMENT REPORT	Approved by: Technical Manager
Test Report S/N: 1C2205090028-05.BCG	Test Dates: 5/30/2022 - 9/30/2022	EUT Type: Tablet Device	Page 57 of 200

V2.1 11/9/2021

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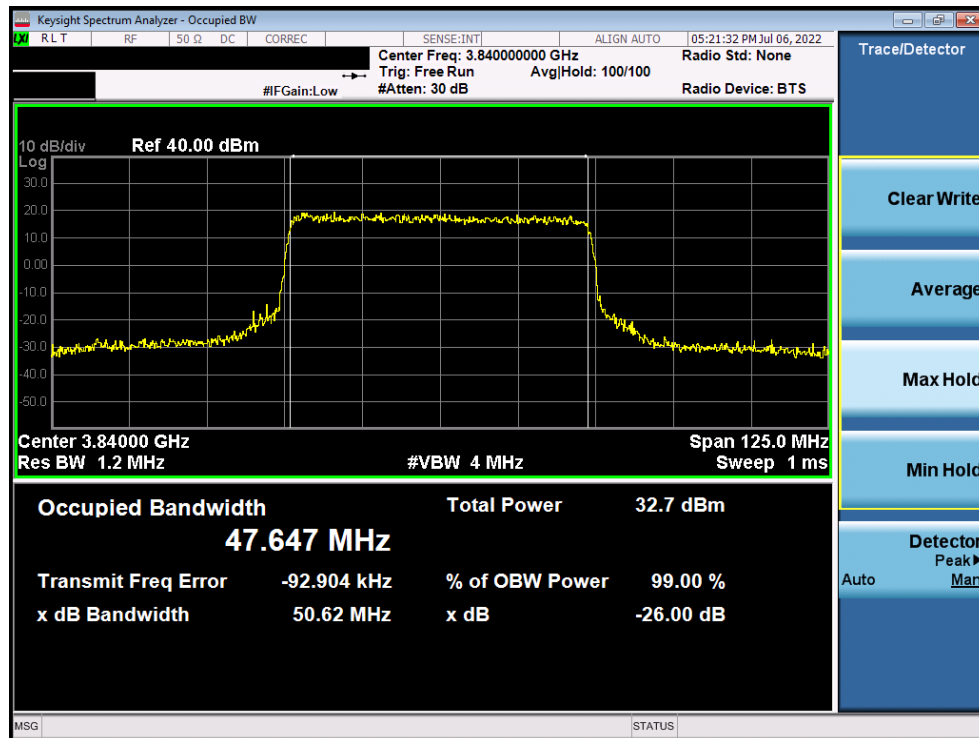


Plot 7-80. Occupied Bandwidth Plot (NR Band n77 C-Band - 40MHz CP-OFDM 256-QAM - Full RB)

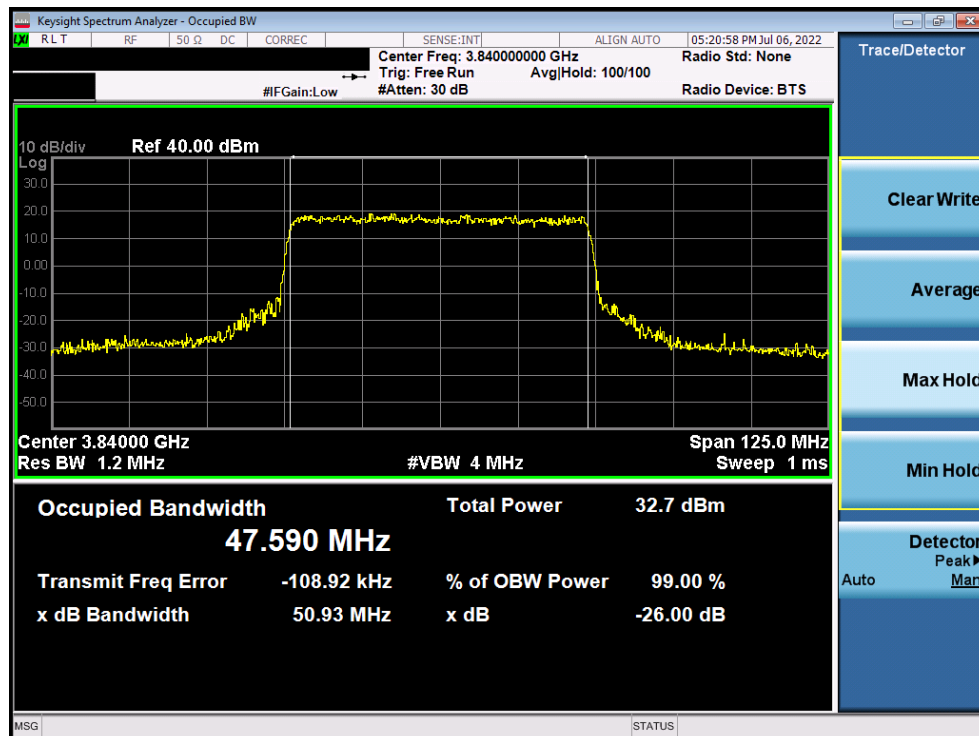


Plot 7-81. Occupied Bandwidth Plot (NR Band n77 C-Band - 50MHz DFT-s-OFDM $\pi/2$ BPSK - Full RB)


FCC ID: BCGA2764	element	PART 27 MEASUREMENT REPORT	Approved by: Technical Manager
Test Report S/N: 1C2205090028-05.BCG	Test Dates: 5/30/2022 - 9/30/2022	EUT Type: Tablet Device	Page 58 of 200

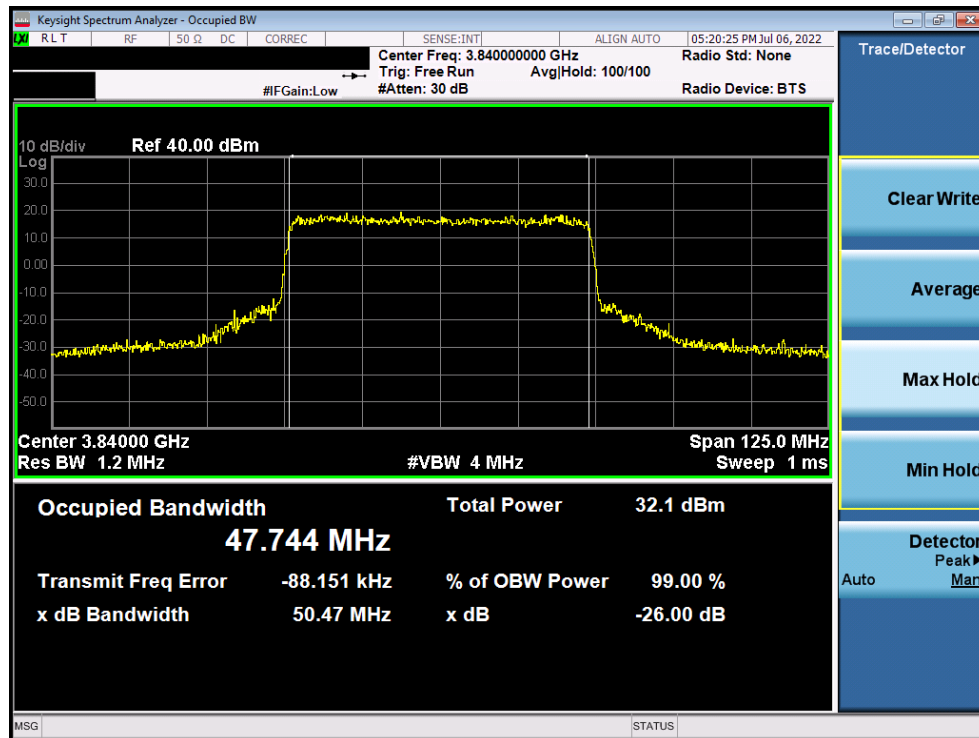


Plot 7-82. Occupied Bandwidth Plot (NR Band n77 C-Band - 50MHz CP-OFDM QPSK - Full RB)

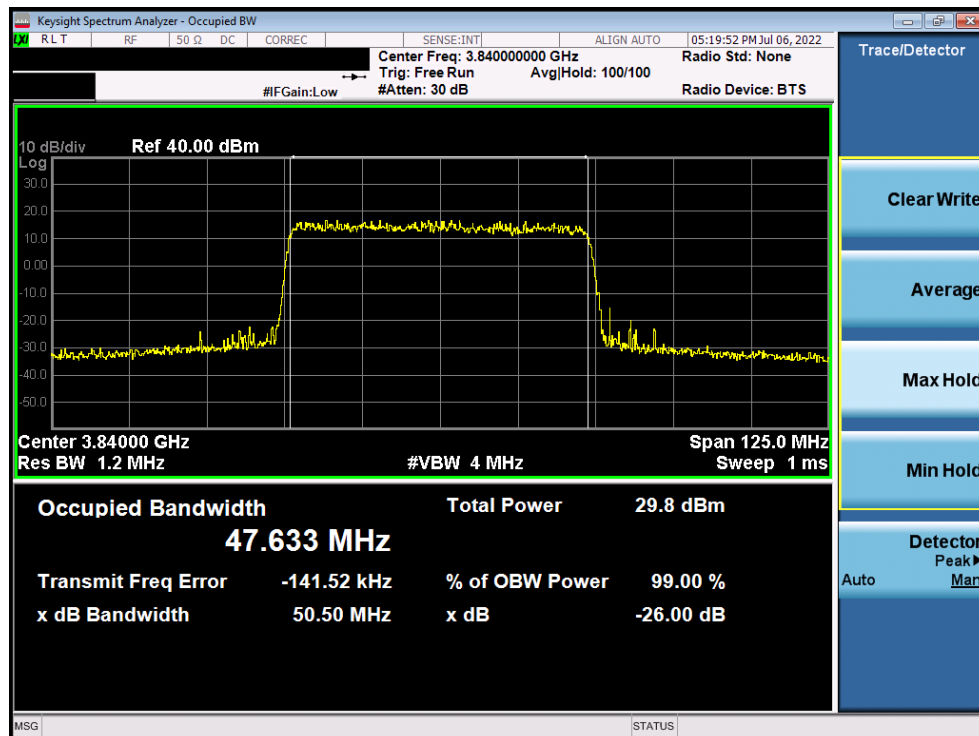


Plot 7-83. Occupied Bandwidth Plot (NR Band n77 C-Band - 50MHz CP-OFDM 16-QAM - Full RB)

FCC ID: BCGA2764	 PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1C2205090028-05.BCG	Test Dates: 5/30/2022 - 9/30/2022	EUT Type: Tablet Device	Page 59 of 200



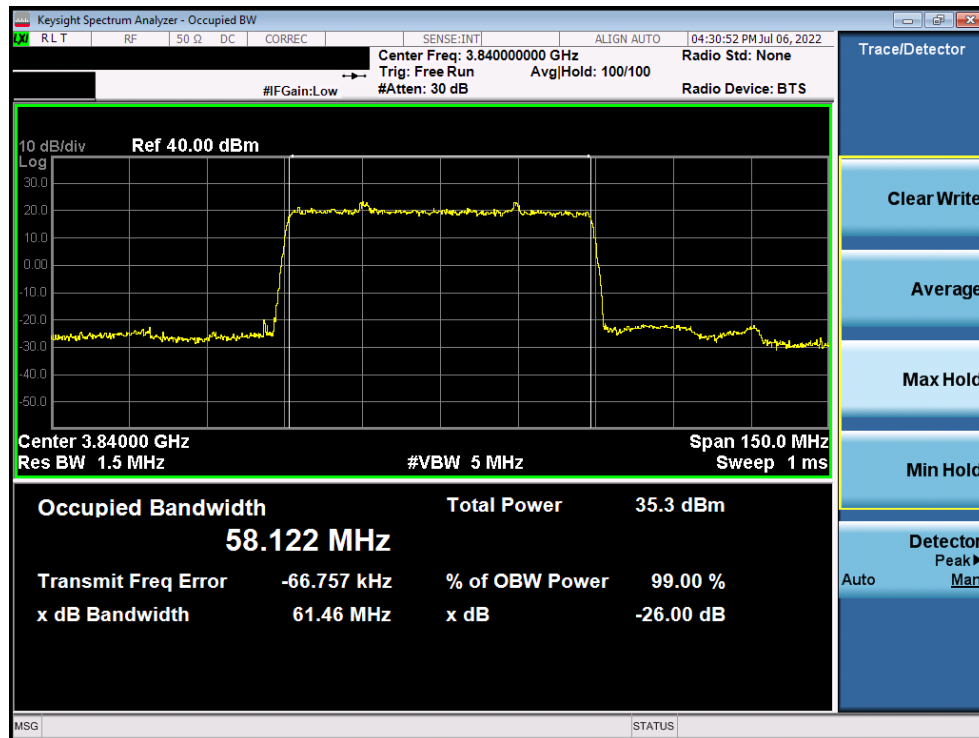
Plot 7-84. Occupied Bandwidth Plot (NR Band n77 C-Band - 50MHz CP-OFDM 64-QAM - Full RB)



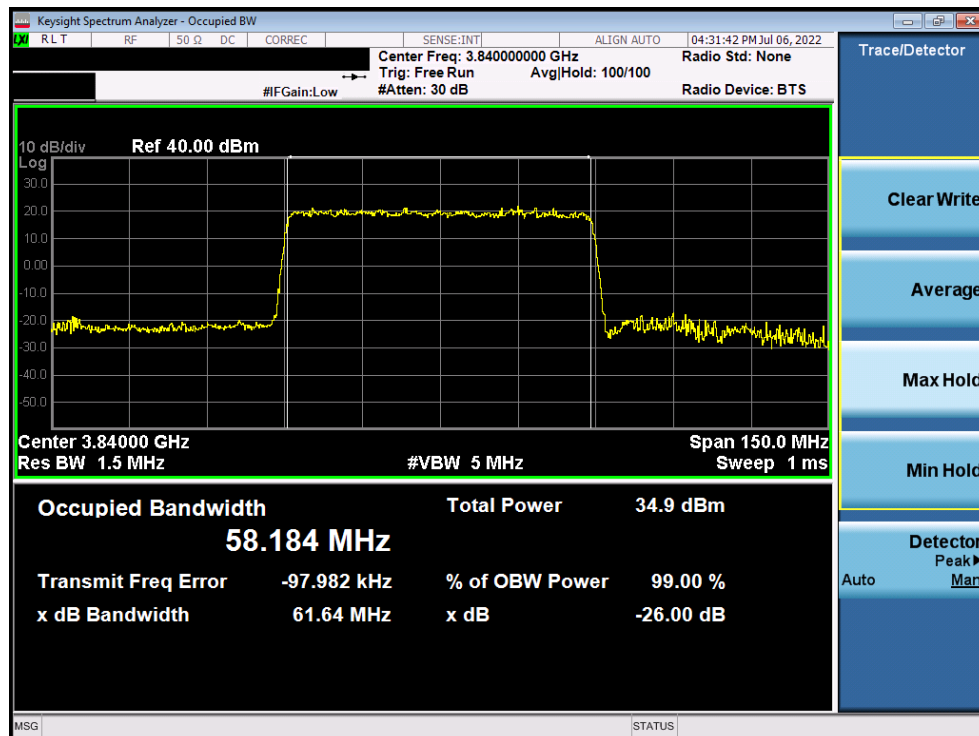
Plot 7-85. Occupied Bandwidth Plot (NR Band n77 C-Band - 50MHz CP-OFDM 256-QAM - Full RB)

FCC ID: BCGA2764	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1C2205090028-05.BCG	Test Dates: 5/30/2022 - 9/30/2022	EUT Type: Tablet Device	Page 60 of 200


V2.1 11/9/2021



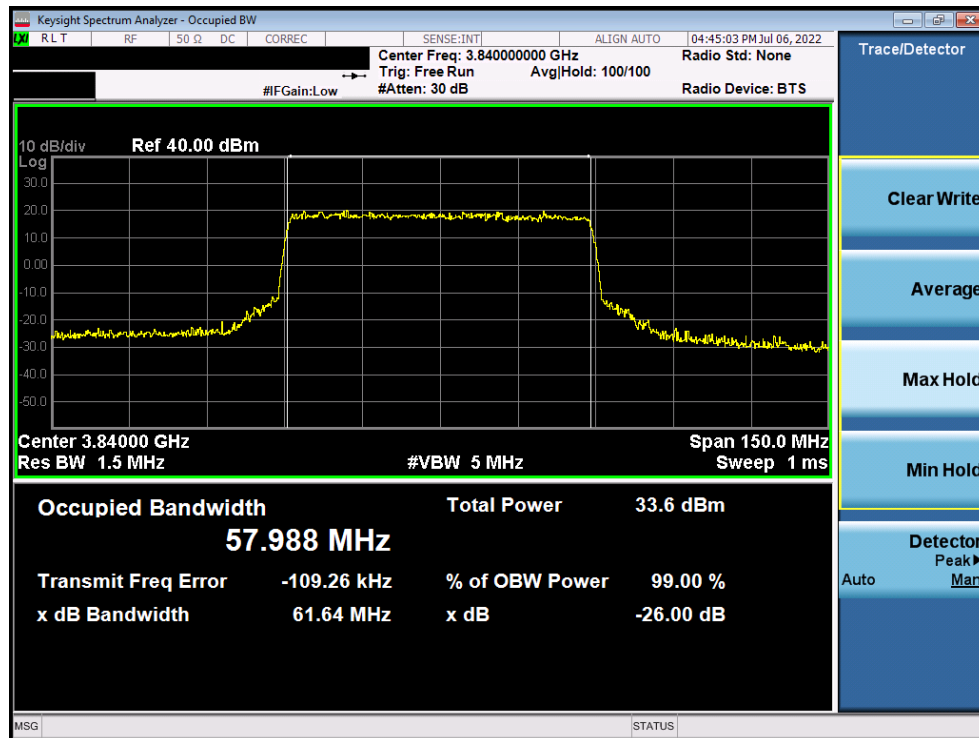
Plot 7-86. Occupied Bandwidth Plot (NR Band n77 C-Band - 60MHz DFT-s-OFDM $\pi/2$ BPSK - Full RB)



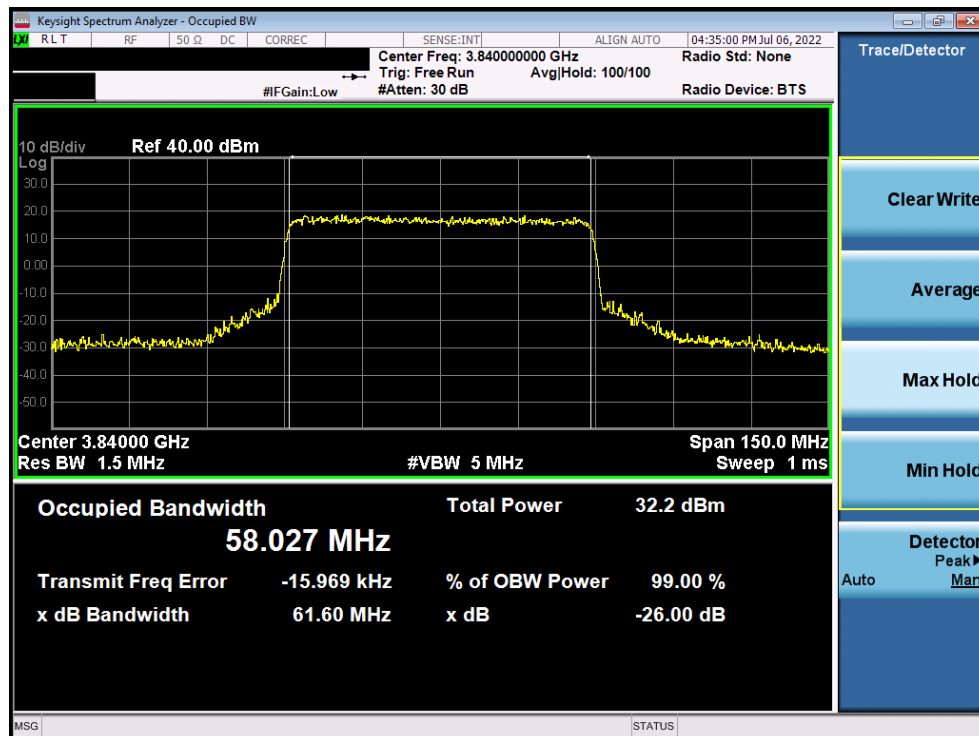
Plot 7-87. Occupied Bandwidth Plot (NR Band n77 C-Band - 60MHz DFT-s-OFDM QPSK - Full RB)

FCC ID: BCGA2764		PART 27 MEASUREMENT REPORT	Approved by: Technical Manager
Test Report S/N: 1C2205090028-05.BCG	Test Dates: 5/30/2022 - 9/30/2022	EUT Type: Tablet Device	Page 61 of 200


V2.1 11/9/2021



Plot 7-88. Occupied Bandwidth Plot (NR Band n77 C-Band - 60MHz CP-OFDM 16-QAM - Full RB)

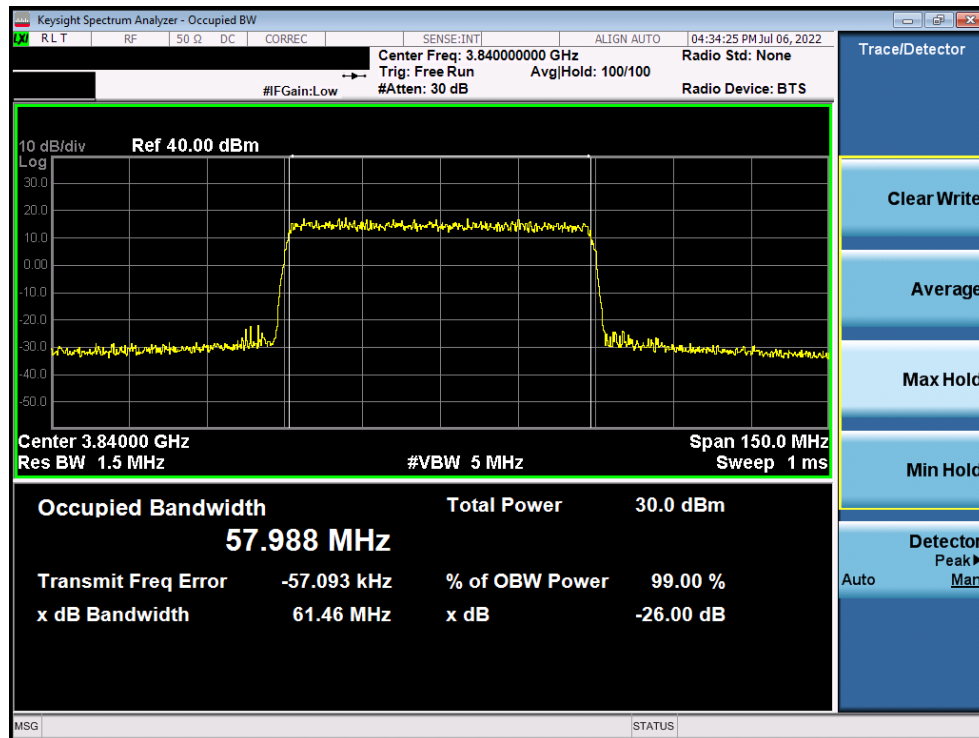


Plot 7-89. Occupied Bandwidth Plot (NR Band n77 C-Band - 60MHz CP-OFDM 64-QAM - Full RB)

FCC ID: BCGA2764	 PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1C2205090028-05.BCG	Test Dates: 5/30/2022 - 9/30/2022	EUT Type: Tablet Device	Page 62 of 200

V2.1 11/9/2021


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Plot 7-90. Occupied Bandwidth Plot (NR Band n77 C-Band - 60MHz CP-OFDM 256-QAM - Full RB)



Plot 7-91. Occupied Bandwidth Plot (NR Band n77 C-Band - 70MHz DFT-s-OFDM $\pi/2$ BPSK - Full RB)

FCC ID: BCGA2764	 PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1C2205090028-05.BCG	Test Dates: 5/30/2022 - 9/30/2022	EUT Type: Tablet Device	Page 63 of 200

V2.1 11/9/2021

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Plot 7-92. Occupied Bandwidth Plot (NR Band n77 C-Band - 70MHz CP-OFDM QPSK - Full RB)



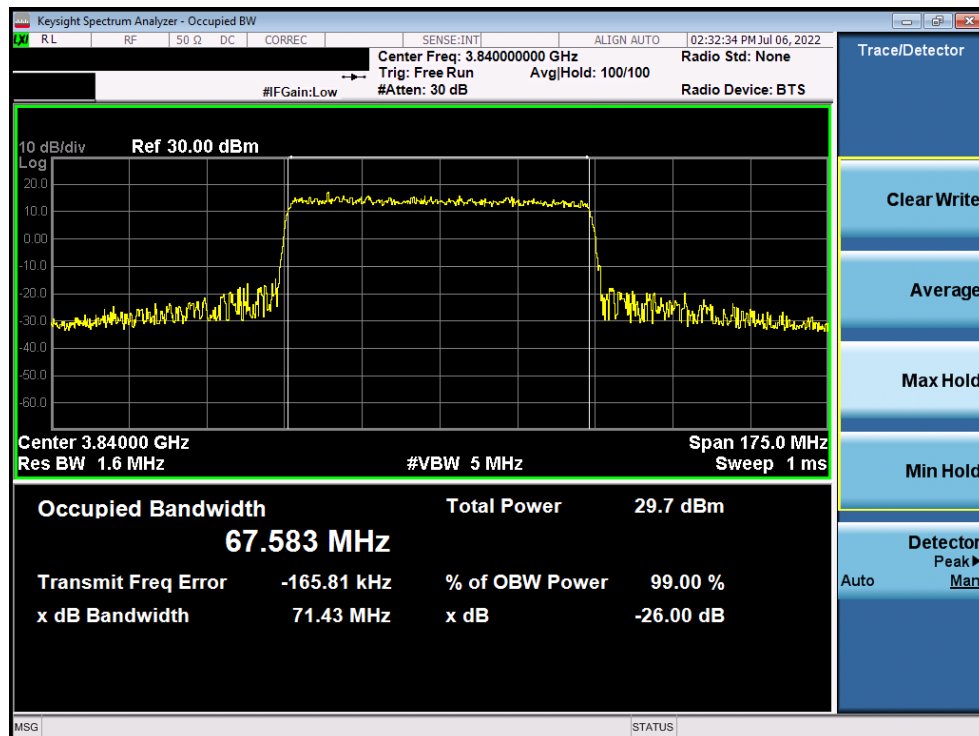
Plot 7-93. Occupied Bandwidth Plot (NR Band n77 C-Band - 70MHz CP-OFDM 16-QAM - Full RB)

FCC ID: BCGA2764	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1C2205090028-05.BCG	Test Dates: 5/30/2022 - 9/30/2022	EUT Type: Tablet Device	Page 64 of 200


V2.1 11/9/2021

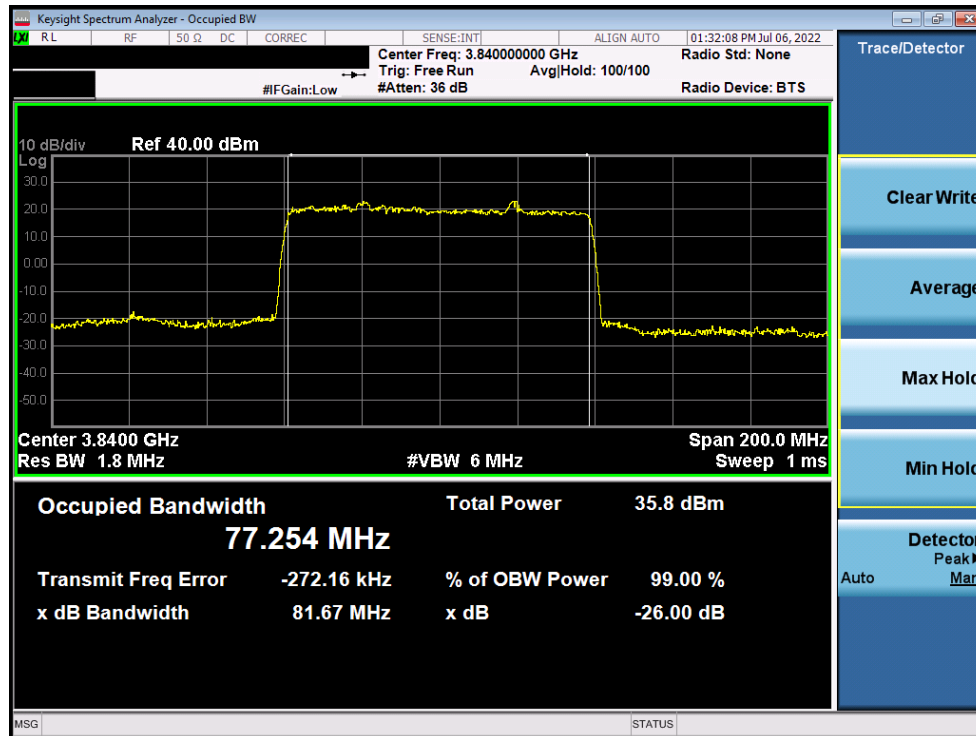


Plot 7-94. Occupied Bandwidth Plot (NR Band n77 C-Band - 70MHz CP-OFDM 64-QAM - Full RB)

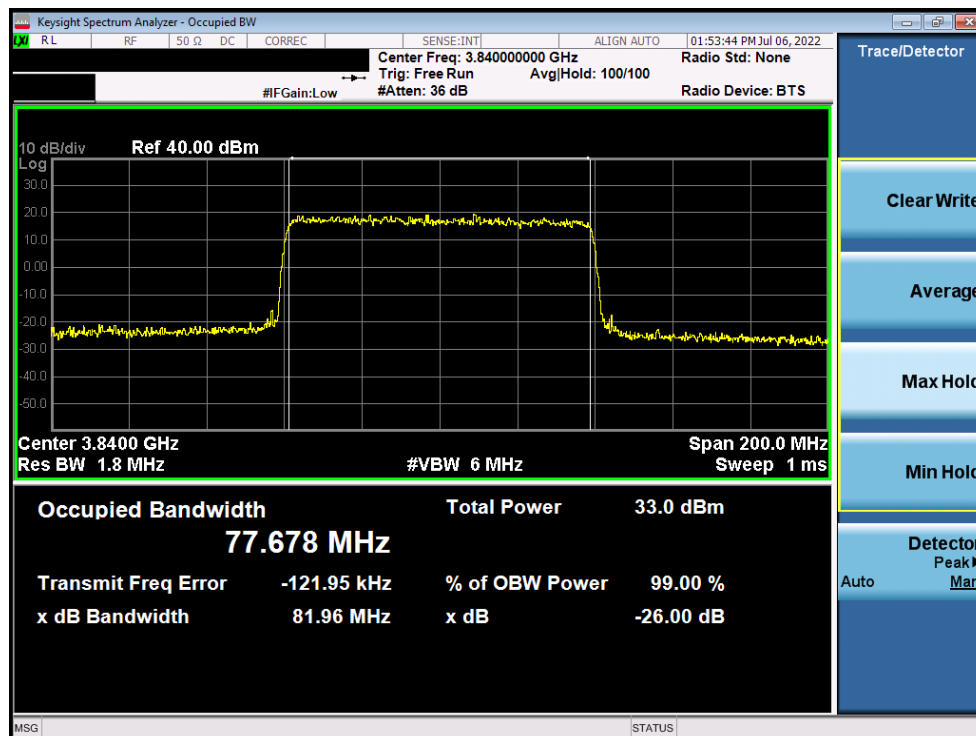


Plot 7-95. Occupied Bandwidth Plot (NR Band n77 C-Band - 70MHz CP-OFDM 256-QAM - Full RB)

FCC ID: BCGA2764	 PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1C2205090028-05.BCG	Test Dates: 5/30/2022 - 9/30/2022	EUT Type: Tablet Device	Page 65 of 200



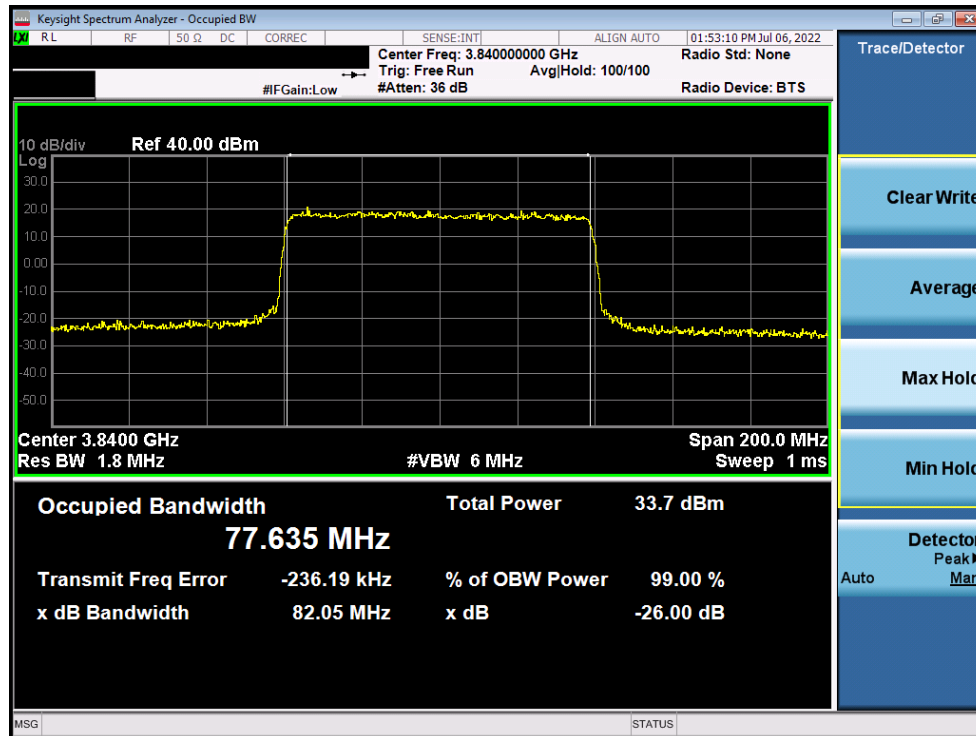
Plot 7-96. Occupied Bandwidth Plot (NR Band n77 C-Band - 80MHz DFT-s-OFDM $\pi/2$ BPSK - Full RB)



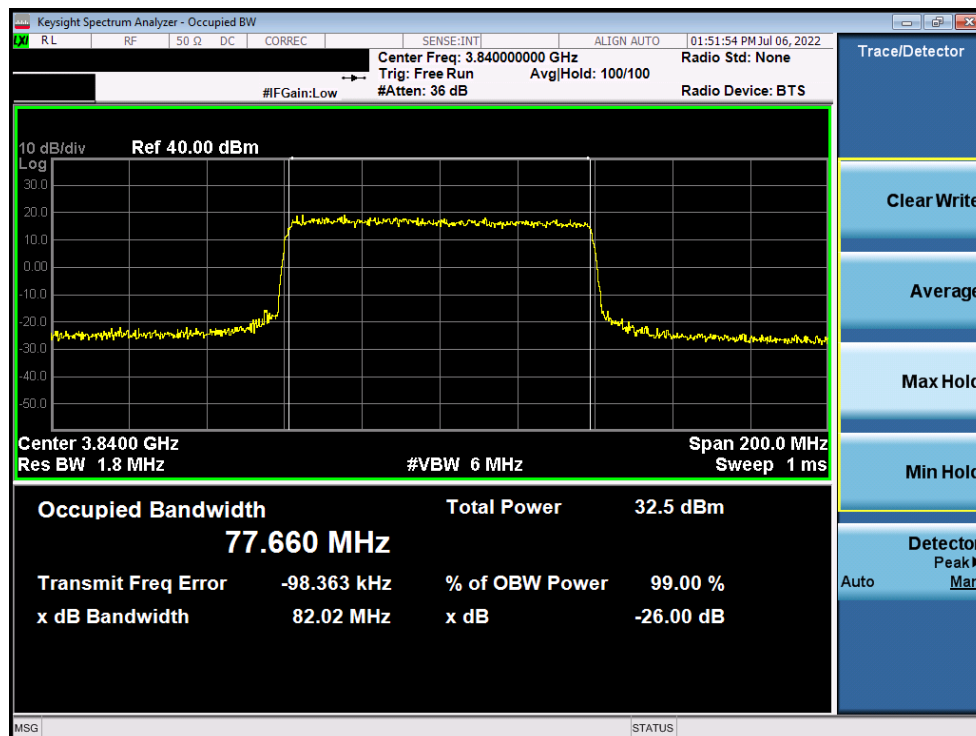
Plot 7-97. Occupied Bandwidth Plot (NR Band n77 C-Band - 80MHz CP-OFDM QPSK - Full RB)

FCC ID: BCGA2764	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1C2205090028-05.BCG	Test Dates: 5/30/2022 - 9/30/2022	EUT Type: Tablet Device	Page 66 of 200

V2.1 11/9/2021



Plot 7-98. Occupied Bandwidth Plot (NR Band n77 C-Band - 80MHz CP-OFDM 16-QAM - Full RB)



Plot 7-99. Occupied Bandwidth Plot (NR Band n77 C-Band - 80MHz CP-OFDM 64-QAM - Full RB)

FCC ID: BCGA2764	element	PART 27 MEASUREMENT REPORT	Approved by: Technical Manager
Test Report S/N: 1C2205090028-05.BCG	Test Dates: 5/30/2022 - 9/30/2022	EUT Type: Tablet Device	Page 67 of 200

V2.1 11/9/2021