

## PART 27 MEASUREMENT REPORT

**Applicant Name:**

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

**Date of Testing:**

6/7/2021 - 7/30/2021

**Test Site/Location:**

PCTEST Lab. Morgan Hill, CA, USA

**Test Report Serial No.:**

1C2106080051-03.BCG

**FCC ID:**

**BCGA2603**

**APPLICANT:**

**Apple Inc.**

**Application Type:**

Certification

**Model:**

A2603

**EUT Type:**

Tablet Device

**FCC Classification:**

PCS Licensed Transmitter (PCB)

**FCC Rule Part:**

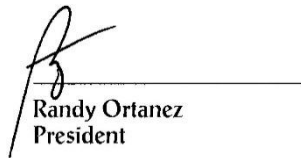
27

**Test Procedure(s):**

ANSI C63.26-2015, ANSI/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.




Randy Ortanez  
President

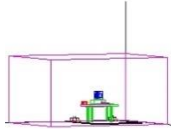


<b>FCC ID:</b> BCGA2603	 <b>PART 27 MEASUREMENT REPORT</b>		<b>Approved by:</b> Quality Manager
<b>Test Report S/N:</b> 1C2106080051-03.BCG	<b>Test Dates:</b> 6/7/2021 - 7/30/2021	<b>EUT Type:</b> Tablet Device	Page 1 of 158

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

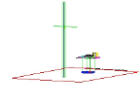
1.0	INTRODUCTION .....	5
1.1	Scope .....	5
1.2	PCTEST Test Location.....	5
1.3	Test Facility / Accreditations.....	5
2.0	PRODUCT INFORMATION.....	6
2.1	Equipment Description .....	6
2.2	Device Capabilities.....	6
2.3	Antenna Description .....	6
2.4	Test Support Equipment.....	6
2.5	Test Configuration .....	7
2.6	Software and Firmware .....	7
2.7	EMI Suppression Device(s)/Modifications .....	7
3.0	DESCRIPTION OF TESTS .....	8
3.1	Evaluation Procedure .....	8
3.2	Radiated Spurious Emissions .....	8
4.0	MEASUREMENT UNCERTAINTY .....	9
5.0	TEST EQUIPMENT CALIBRATION DATA .....	10
6.0	SAMPLE CALCULATIONS .....	11
7.0	TEST RESULTS.....	12
7.1	Summary.....	12
7.2	Occupied Bandwidth .....	14
7.3	Spurious and Harmonic Emissions at Antenna Terminal .....	40
7.4	Band Edge Emissions at Antenna Terminal .....	64
7.5	Peak-Average Ratio .....	106
7.6	Radiated Power (ERP/EIRP).....	126
7.7	Radiated Spurious Emissions .....	134
7.8	Frequency Stability / Temperature Variation .....	152
8.0	CONCLUSION.....	158

<b>FCC ID:</b> BCGA2603	 <b>PART 27 MEASUREMENT REPORT</b>	<b>Approved by:</b> Quality Manager
<b>Test Report S/N:</b> 1C2106080051-03.BCG	<b>Test Dates:</b> 6/7/2021 - 7/30/2021	<b>EUT Type:</b> Tablet Device
		Page 2 of 158




# MEASUREMENT REPORT

## FCC Part 27




Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	OBW [MHz]	ERP		EIRP		Emission Designator
					Max. Power [W]	Max. Power [dBm]	Max. Power [W]	Max. Power [dBm]	
LTE Band 71	5 MHz	QPSK	665.5 - 695.5	4.5500	0.193	22.85	0.316	25.00	4M55G7W
		16QAM	665.5 - 695.5	4.5476	0.171	22.34	0.281	24.49	4M55D7W
		64QAM	665.5 - 695.5	4.5329	0.141	21.48	0.231	23.63	4M53D7W
	10 MHz	QPSK	668.0 - 693.0	9.0434	0.193	22.85	0.316	25.00	9M04G7W
		16QAM	668.0 - 693.0	9.0427	0.167	22.23	0.274	24.38	9M04D7W
		64QAM	668.0 - 693.0	9.0344	0.142	21.53	0.233	23.68	9M03D7W
	15 MHz	QPSK	670.5 - 690.5	13.6201	0.193	22.85	0.316	25.00	13M6G7W
		16QAM	670.5 - 690.5	13.5607	0.175	22.43	0.287	24.58	13M6D7W
		64QAM	670.5 - 690.5	13.5656	0.138	21.41	0.227	23.56	13M6D7W
	20 MHz	QPSK	673.0 - 688.0	18.1139	0.193	22.85	0.316	25.00	18M1G7W
		16QAM	673.0 - 688.0	18.0668	0.174	22.41	0.286	24.56	18M1D7W
		64QAM	673.0 - 688.0	18.0351	0.145	21.60	0.237	23.75	18M0D7W
LTE Band 12	1.4 MHz	QPSK	699.7 - 715.3	1.1062	0.193	22.85	0.316	25.00	1M11G7W
		16QAM	699.7 - 715.3	1.1053	0.163	22.12	0.267	24.27	1M11D7W
		64QAM	699.7 - 715.3	1.1043	0.126	21.00	0.207	23.15	1M10D7W
	3 MHz	QPSK	700.5 - 714.5	2.7291	0.193	22.85	0.316	25.00	2M73G7W
		16QAM	700.5 - 714.5	2.7256	0.169	22.29	0.278	24.44	2M73D7W
		64QAM	700.5 - 714.5	2.7367	0.130	21.13	0.213	23.28	2M74D7W
	5 MHz	QPSK	701.5 - 713.5	4.5555	0.193	22.85	0.316	25.00	4M56G7W
		16QAM	701.5 - 713.5	4.5339	0.164	22.16	0.270	24.31	4M53D7W
		64QAM	701.5 - 713.5	4.5433	0.131	21.17	0.215	23.32	4M54D7W
	10 MHz	QPSK	704.0 - 711.0	9.0646	0.193	22.85	0.316	25.00	9M06G7W
		16QAM	704.0 - 711.0	9.0581	0.170	22.31	0.279	24.46	9M06D7W
		64QAM	704.0 - 711.0	9.0506	0.130	21.15	0.214	23.30	9M05D7W
LTE Band 17	5 MHz	QPSK	706.5 - 713.5	4.5555	0.193	22.85	0.316	25.00	4M56G7W
		16QAM	706.5 - 713.5	4.5339	0.169	22.28	0.277	24.43	4M53D7W
		64QAM	706.5 - 713.5	4.5433	0.137	21.36	0.224	23.51	4M54D7W
	10 MHz	QPSK	709.0 - 711.0	9.0646	0.193	22.85	0.316	25.00	9M06G7W
		16QAM	709.0 - 711.0	9.0581	0.169	22.28	0.277	24.43	9M06D7W
		64QAM	709.0 - 711.0	9.0506	0.133	21.25	0.219	23.40	9M05D7W
LTE Band 13	5 MHz	QPSK	779.5 - 784.5	4.5512	0.193	22.85	0.316	25.00	4M55G7W
		16QAM	779.5 - 784.5	4.5710	0.170	22.31	0.279	24.46	4M57D7W
		64QAM	779.5 - 784.5	4.5336	0.136	21.35	0.224	23.50	4M53D7W
	10 MHz	QPSK	782.0	9.0456	0.188	22.74	0.308	24.89	9M05G7W
		16QAM	782.0	9.0119	0.156	21.93	0.256	24.08	9M01D7W
		64QAM	782.0	9.0165	0.115	20.61	0.189	22.76	9M02D7W

Overview Table (<1GHz Bands)

FCC ID: BCGA2603	 <b>PART 27 MEASUREMENT REPORT</b>		Approved by: Quality Manager
Test Report S/N: 1C2106080051-03.BCG	Test Dates: 6/7/2021 - 7/30/2021	EUT Type: Tablet Device	Page 3 of 158

Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	OBW [MHz]	PAR at 0.1% [dB]	EIRP		Emission Designator
						Max. Power [W]	Max. Power [dBm]	
WCDMA1700	5 MHz	Spread Spectrum	1712.4 - 1752.6	4.0959	3.29	0.501	27.00	4M10F9W
LTE Band 4	1.4 MHz	QPSK	1710.7 - 1754.3	1.1072	5.87	0.476	26.78	1M11D7W
		16QAM	1710.7 - 1754.3	1.1025	6.51	0.418	26.21	1M10D7W
		64QAM	1710.7 - 1754.3	1.1044	6.49	0.322	25.08	1M10D7W
	3 MHz	QPSK	1711.5 - 1753.5	2.7336	5.88	0.463	26.66	2M73D7W
		16QAM	1711.5 - 1753.5	2.7257	6.58	0.416	26.19	2M73D7W
		64QAM	1711.5 - 1753.5	2.7266	6.64	0.316	25.00	2M73D7W
	5 MHz	QPSK	1712.5 - 1752.5	4.5599	5.91	0.482	26.83	4M56D7W
		16QAM	1712.5 - 1752.5	4.5399	6.52	0.434	26.37	4M54D7W
		64QAM	1712.5 - 1752.5	4.5266	6.62	0.327	25.14	4M53D7W
	10MHz	QPSK	1715.0 - 1750.0	9.0641	5.83	0.466	26.68	9M06D7W
		16QAM	1715.0 - 1750.0	9.0391	6.43	0.428	26.31	9M04D7W
		64QAM	1715.0 - 1750.0	9.0569	6.42	0.318	25.03	9M06D7W
	15 MHz	QPSK	1717.5 - 1747.5	13.6199	6.11	0.481	26.82	13M6D7W
		16QAM	1717.5 - 1747.5	13.6180	6.39	0.419	26.22	13M6D7W
		64QAM	1717.5 - 1747.5	13.5769	6.4	0.321	25.07	13M6D7W
	20 MHz	QPSK	1720.0 - 1745.0	18.1059	5.8	0.479	26.80	18M1D7W
		16QAM	1720.0 - 1745.0	18.0987	6.42	0.420	26.23	18M1D7W
		64QAM	1720.0 - 1745.0	18.0718	6.5	0.328	25.16	18M1D7W
LTE Band 66	1.4 MHz	QPSK	1710.7 - 1779.3	1.1072	5.94	0.484	26.85	1M11G7W
		16QAM	1710.7 - 1779.3	1.1025	6.65	0.416	26.19	1M10D7W
		64QAM	1710.7 - 1779.3	1.1044	6.8	0.333	25.22	1M10D7W
	3 MHz	QPSK	1711.5 - 1778.5	2.7336	5.86	0.470	26.72	2M73G7W
		16QAM	1711.5 - 1778.5	2.7257	6.75	0.416	26.19	2M73D7W
		64QAM	1711.5 - 1778.5	2.7266	6.75	0.318	25.02	2M73D7W
	5 MHz	QPSK	1712.5 - 1777.5	4.5599	6.06	0.485	26.86	4M56G7W
		16QAM	1712.5 - 1777.5	4.5399	6.62	0.423	26.26	4M54D7W
		64QAM	1712.5 - 1777.5	4.5266	6.69	0.333	25.22	4M53D7W
	10 MHz	QPSK	1715.0 - 1775.0	9.0641	5.94	0.465	26.67	9M06G7W
		16QAM	1715.0 - 1775.0	9.0391	6.55	0.413	26.16	9M04D7W
		64QAM	1715.0 - 1775.0	9.0569	6.63	0.318	25.03	9M06D7W
	15 MHz	QPSK	1717.5 - 1772.5	13.6199	6.2	0.488	26.88	13M6G7W
		16QAM	1717.5 - 1772.5	13.6180	6.52	0.420	26.23	13M6D7W
		64QAM	1717.5 - 1772.5	13.5769	6.57	0.316	25.00	13M6D7W
	20 MHz	QPSK	1720.0 - 1770.0	18.1059	5.72	0.474	26.76	18M1G7W
		16QAM	1720.0 - 1770.0	18.0987	6.46	0.406	26.09	18M1D7W
		64QAM	1720.0 - 1770.0	18.0718	6.61	0.334	25.24	18M1D7W

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

<b>FCC ID:</b> BCGA2603	 <b>PART 27 MEASUREMENT REPORT</b>		<b>Approved by:</b> Quality Manager
<b>Test Report S/N:</b> 1C2106080051-03.BCG	<b>Test Dates:</b> 6/7/2021 - 7/30/2021	<b>EUT Type:</b> Tablet Device	Page 4 of 158

## 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 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 PCTEST located in Morgan Hill, CA 95037, U.S.A.

- PCTEST 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.
- 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 ISSED Standards (RSS).
- PCTEST facility is a registered (22831) test laboratory with the site description on file with ISSED.

<b>FCC ID:</b> BCGA2603	 <b>PART 27 MEASUREMENT REPORT</b>		<b>Approved by:</b> Quality Manager
<b>Test Report S/N:</b> 1C2106080051-03.BCG	<b>Test Dates:</b> 6/7/2021 - 7/30/2021	<b>EUT Type:</b> Tablet Device	Page 5 of 158

## 2.0 PRODUCT INFORMATION

### 2.1 Equipment Description

The Equipment Under Test (EUT) is the **Apple Tablet Device FCC ID: BCGA2603**. 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.:** QCQ16N0YCW, VCXH667WN9, F9F11660HE012891K

### 2.2 Device Capabilities

This device contains the following capabilities:

WCDMA/HSPA, Multi-band LTE, 802.11b/g/n WLAN, 802.11a/n/ac UNII, BT (1x, EDR, LE)

### 2.3 Antenna Description

Following antenna gains provided by manufacturer were used for testing.


Frequency [MHz]	Antennas	
	Antenna C	Antenna D
650-800	-0.5	-0.7
1700-1800	1.4	2.0

**Table 2-1. Highest Antenna Gain**

### 2.4 Test Support Equipment

1	Apple MacBook	Model:	A2141	S/N:	C02DV7VKMD6T
	w/AC/DC Adapter	Model:	A2166	S/N:	N/A
2	Apple Cable	Model:	Kanzi	S/N:	32530F
3	Apple USB-C to Lightning Cable	Model:	N/A	S/N:	N/A
	w/ AC/DC Adapter	Model:	A2305	S/N:	N/A
4	DC Power Supply	Model:	KPS3010D	S/N:	N/A

**Table 2-2. Test Support Equipment**

<b>FCC ID:</b> BCGA2603	 <b>PART 27 MEASUREMENT REPORT</b>		<b>Approved by:</b> Quality Manager
<b>Test Report S/N:</b> 1C2106080051-03.BCG	<b>Test Dates:</b> 6/7/2021 - 7/30/2021	<b>EUT Type:</b> Tablet Device	Page 6 of 158

## 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 19A32670z 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.

<b>FCC ID:</b> BCGA2603	 <b>PART 27 MEASUREMENT REPORT</b>		<b>Approved by:</b> Quality Manager
<b>Test Report S/N:</b> 1C2106080051-03.BCG	<b>Test Dates:</b> 6/7/2021 - 7/30/2021	<b>EUT Type:</b> Tablet Device	Page 7 of 158

## 3.0 DESCRIPTION OF TESTS

### 3.1 Evaluation Procedure

The measurement procedures described in the document titled "Land Mobile FM or PM – Communications Equipment – Measurements and Performance Standards" (ANSI C63.26-2015/TIA-603-E-2016) and "Procedures for Compliance Measurement of the Fundamental Emission Power of Licensed Wideband (> 1 MHz) Digital Transmission Systems" (KDB 971168 D01 v03r01) were used in the measurement of the EUT.

### 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: BCGA2603	 <b>PART 27 MEASUREMENT REPORT</b>		Approved by: Quality Manager
Test Report S/N: 1C2106080051-03.BCG	Test Dates: 6/7/2021 - 7/30/2021	EUT Type: Tablet Device	Page 8 of 158



## 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  $U_{\text{CISPR}}$  measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

Contribution	Expanded Uncertainty ( $\pm$ dB)
Conducted Bench Top Measurements	1.65
Radiated Disturbance (<30MHz)	4.06
Radiated Disturbance (30MHz-1GHz)	4.30
Radiated Disturbance (1-18GHz)	4.78
Radiated Disturbance (>18GHz)	4.79

FCC ID: BCGA2603	 <b>PART 27 MEASUREMENT REPORT</b>	Approved by: Quality Manager
Test Report S/N: 1C2106080051-03.BCG	Test Dates: 6/7/2021 - 7/30/2021	EUT Type: Tablet Device
		Page 9 of 158

## 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	3/31/2021	Annual	3/31/2022	MY49430244
ATM	180-442A-KF	20dB Nominal Gain Horn Antenna	12/1/2020	Annual	12/1/2021	T058701-02
ETS-Lindgren	3142E	BiConiLog Antenna (30MHz - 6GHz)	9/15/2020	Annual	9/15/2021	208204
ETS-Lindgren	3117	Double Ridged Guide Antenna (1-18 GHz)	11/4/2020	Annual	11/4/2021	227597
ESPEC	SU-241	Tabletop Temperature Chamber	9/28/2020	Annual	9/28/2021	92009574
Keysight Technology	N9040B	UXA Signal Analyzer	12/19/2020	Annual	12/19/2021	MY57212015
Rohde & Schwarz	TS-PR8	Pre-Amplifier (30MHz - 8GHz)	12/3/2020	Annual	12/3/2021	102327
Rohde & Schwarz	TS-PR18	Pre-Amplifier (1GHz - 18GHz)	12/3/2020	Annual	12/3/2021	101648
Rohde & Schwarz	FSV40	Signal Analyzer (10Hz-40GHz)	3/16/2021	Annual	3/16/2022	101619
Rohde & Schwarz	ESW26	EMI Test Receiver	6/11/2021	Annual	6/11/2022	101299
Rohde & Schwarz	ESW44	EMI Test Receiver	12/14/2020	Annual	12/14/2021	101867
Rohde & Schwarz	CMW500	Wideband Radio Communication Tester	10/13/2020	Annual	10/13/2021	161616
Rohde & Schwarz	CMW500	Wideband Radio Communication Tester	9/24/2020	Annual	9/24/2021	151888
Rohde & Schwarz	TS-PR1840	Pre-Amplifier (18GHz - 40GHz)	4/29/2021	Annual	4/29/2022	100051
Rohde & Schwarz	TC-TA18	Cross Polarized Vivaldi Antenna (400MHz-18GHz)	10/2/2020	Annual	10/2/2021	101063
Rohde & Schwarz	HFH2-Z2	Loop Antenna	4/5/2021	Annual	4/5/2022	100519

**Table 5-1. Summary of Test Results**

### 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: BCGA2603	 <b>PART 27 MEASUREMENT REPORT</b>		Approved by: Quality Manager
Test Report S/N: 1C2106080051-03.BCG	Test Dates: 6/7/2021 - 7/30/2021	EUT Type: Tablet Device	Page 10 of 158

## 6.0 SAMPLE CALCULATIONS

### Emission Designator

#### WCDMA Emission Designator

**Emission Designator = 4M16F9W**

WCDMA BW = 4.16 MHz

F = Frequency Modulation

9 = Composite Digital Info

W = Combination (Audio/Data)

#### QPSK Modulation

**Emission Designator = 8M62G7W**

BW = 8.62 MHz

G = Phase Modulation

7 = Quantized/Digital Info

W = Combination of Any

#### QAM Modulation

**Emission Designator = 8M45D7W**

LTE BW = 8.45 MHz

W = Amplitude/Angle Modulated


7 = Quantized/Digital Info

W = Combination of Any

### Spurious Radiated Emission

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

The average spectrum analyzer reading at 3 meters with the EUT on the turntable was -81.0 dBm. The gain of the substituted antenna is 8.1 dBi. The signal generator connected to the substituted antenna terminals is adjusted to produce a reading of -81.0 dBm on the spectrum analyzer. The loss of the cable between the signal generator and the terminals of the substituted antenna is 2.0 dB at 1564 MHz. So 6.1 dB is added to the signal generator reading of -30.9 dBm yielding -24.80 dBm. The fundamental EIRP was 25.501 dBm so this harmonic was 25.501 dBm - (-24.80).

<b>FCC ID:</b> BCGA2603		<b>PART 27 MEASUREMENT REPORT</b>	<b>Approved by:</b> Quality Manager
<b>Test Report S/N:</b> 1C2106080051-03.BCG	<b>Test Dates:</b> 6/7/2021 - 7/30/2021	<b>EUT Type:</b> Tablet Device	Page 11 of 158


## 7.0 TEST RESULTS

### 7.1 Summary

Company Name: Apple Inc.  
FCC ID: BCGA2603  
FCC Classification: PCS Licensed Transmitter (PCB)  
Mode(s): WCDMA/LTE


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	2.1051, 27.53	-13 dBm at Band Edge and for all out-of-band emissions	PASS	Sections 7.3, 7.4
	Peak-Average Ratio	27.50(d)(5)	< 13 dB	PASS	Section 7.5
	Transmitter Conducted Output Power	2.1046	N/A	N/A	See RF Exposure Report
	Frequency Stability	2.1055, 27.54	Fundamental emissions stay within authorized frequency block over the temperature and voltage range as tested	PASS	Section 7.8
	Effective Radiated Power / Equivalent Isotropic Radiated Power (LTE Band 71)	27.50(b)(10)	< 3 Watts max. ERP	PASS	Section 7.6
	Effective Radiated Power / Equivalent Isotropic Radiated Power (LTE Band 12/17)			PASS	Section 7.6
	Effective Radiated Power / Equivalent Isotropic Radiated Power (LTE Band 13)	27.50(c)(10)	< 3 Watts max. ERP	PASS	Section 7.6
	Equivalent Isotropic Radiated Power (WCDMA)	27.50(d)(4)	< 1 Watts max. EIRP	PASS	Section 7.6
	Equivalent Isotropic Radiated Power (LTE Band 4/66)			PASS	Section 7.6
RADIATED	Radiated Spurious Emissions (LTE Band 13)	2.1053, 27.53(f)	< -70 dBW/MHz (for wideband signals) < -80 dBW (for discrete emissions less than 700Hz BW) For all emissions in the band 1559 - 1610 MHz	PASS	Section 7.7
	Radiated Spurious Emissions	2.1053, 27.53	-13 dBm for all out-of-band emissions	PASS	Section 7.7

Table 7-1. Summary of Test Results

FCC ID: BCGA2603	 <b>PART 27 MEASUREMENT REPORT</b>		Approved by: Quality Manager
Test Report S/N: 1C2106080051-03.BCG	Test Dates: 6/7/2021 - 7/30/2021	EUT Type: Tablet Device	Page 12 of 158

### Notes:

1. All modes of operation and data rates were investigated. The test results shown in the following sections represent the worst case emissions.
2. The analyzer plots were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables, directional couplers, and attenuators used as part of the system to maintain a link between the call box and the EUT at all frequencies of interest.
3. All antenna port conducted emissions testing was performed on a test bench with the antenna port of the EUT connected to the spectrum analyzer through calibrated cables, attenuators, and couplers.
4. All conducted emissions measurements are performed with automated test software to capture the corresponding plots necessary to show compliance. The measurement software utilized is PCTEST EMC Software Tool 1.0.

<b>FCC ID:</b> BCGA2603	 <b>PART 27 MEASUREMENT REPORT</b>		<b>Approved by:</b> Quality Manager
<b>Test Report S/N:</b> 1C2106080051-03.BCG	<b>Test Dates:</b> 6/7/2021 - 7/30/2021	<b>EUT Type:</b> Tablet Device	Page 13 of 158

## 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

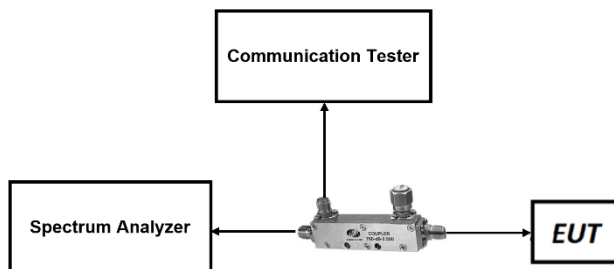
KDB 971168 D01 v03r01 – Section 4.2

#### 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.



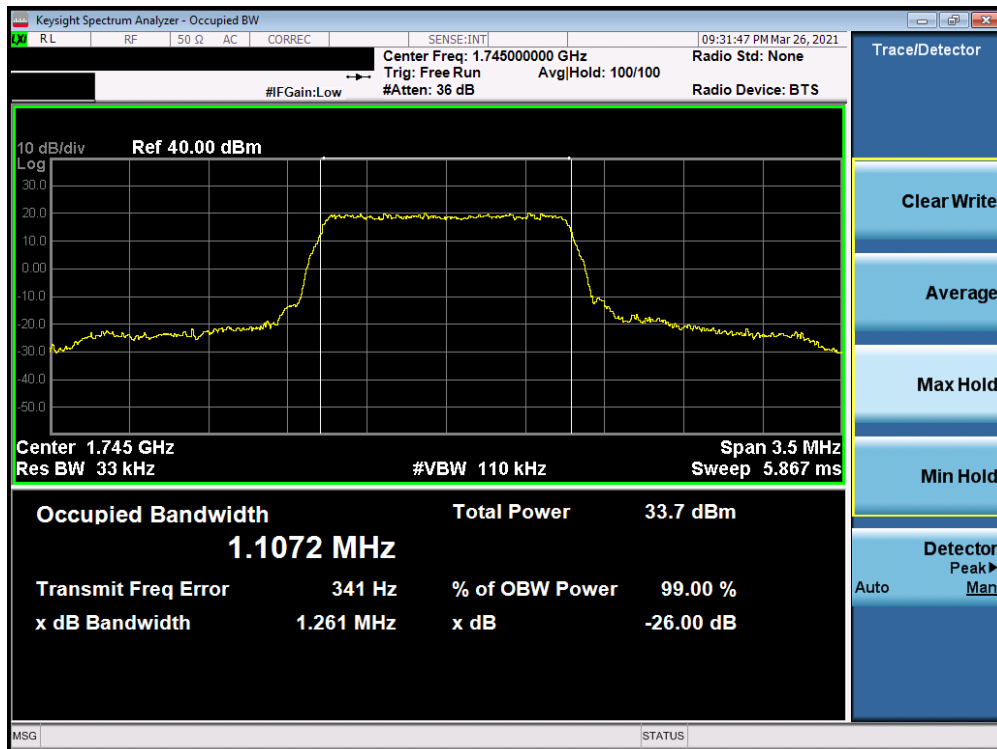
**Figure 7-1. Test Instrument & Measurement Setup**

#### Test Notes

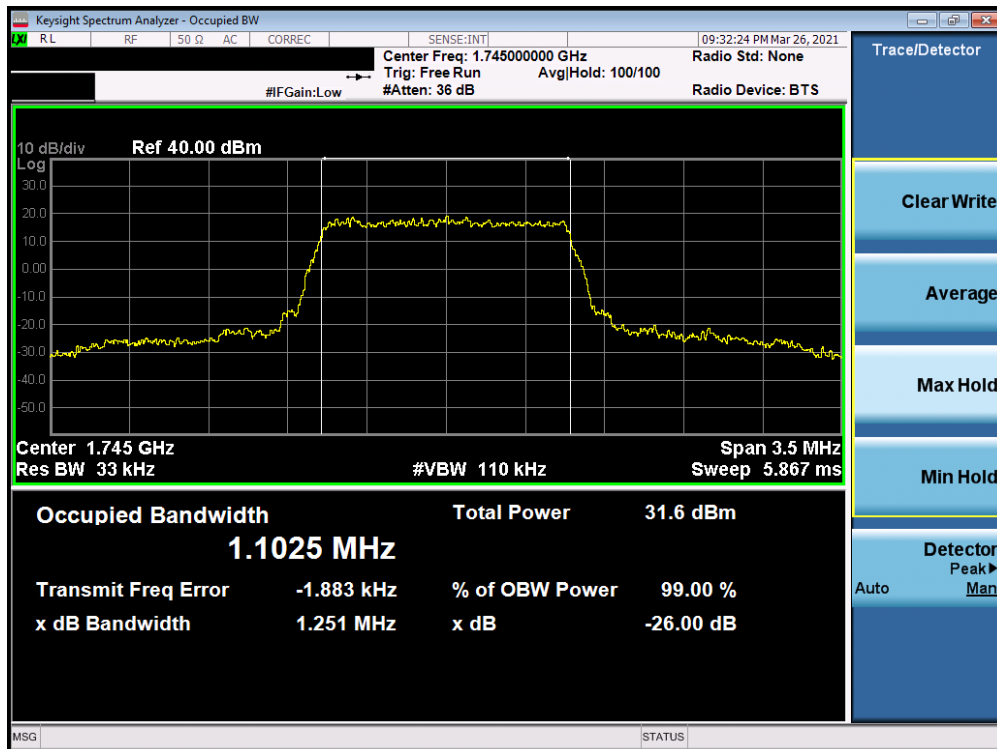
None.

FCC ID: BCGA2603	 <b>PART 27 MEASUREMENT REPORT</b>		Approved by: Quality Manager
Test Report S/N: 1C2106080051-03.BCG	Test Dates: 6/7/2021 - 7/30/2021	EUT Type: Tablet Device	Page 14 of 158

## LTE Band 66/4

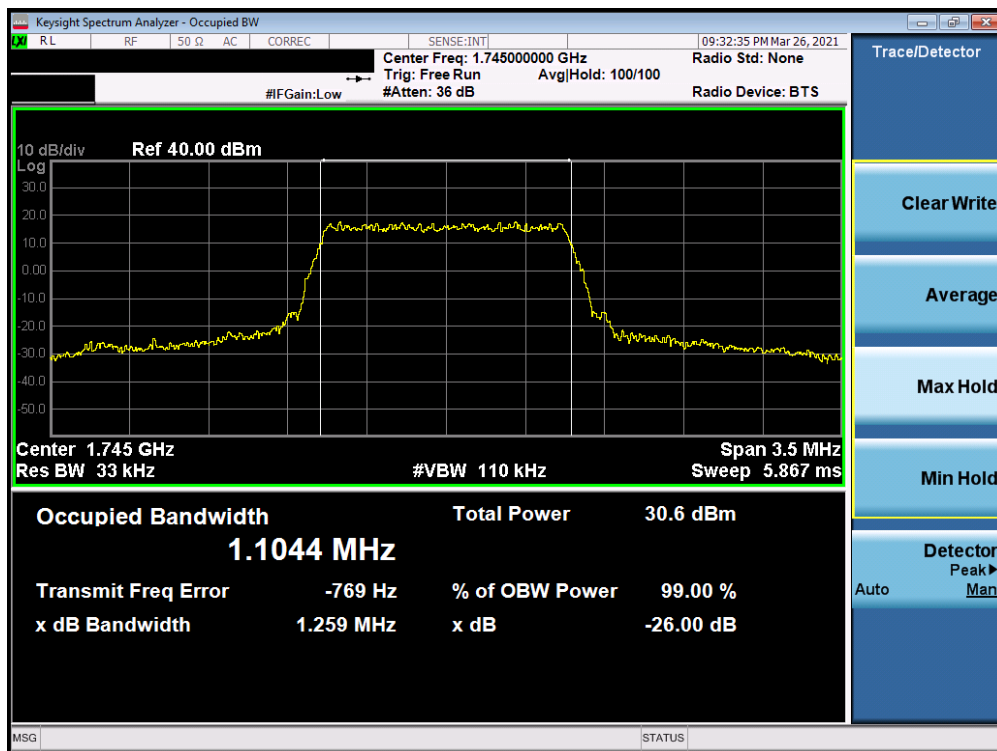


Plot 7-1. Occupied Bandwidth Plot (LTE Band 66/4 - 1.4MHz QPSK - Full RB Configuration)

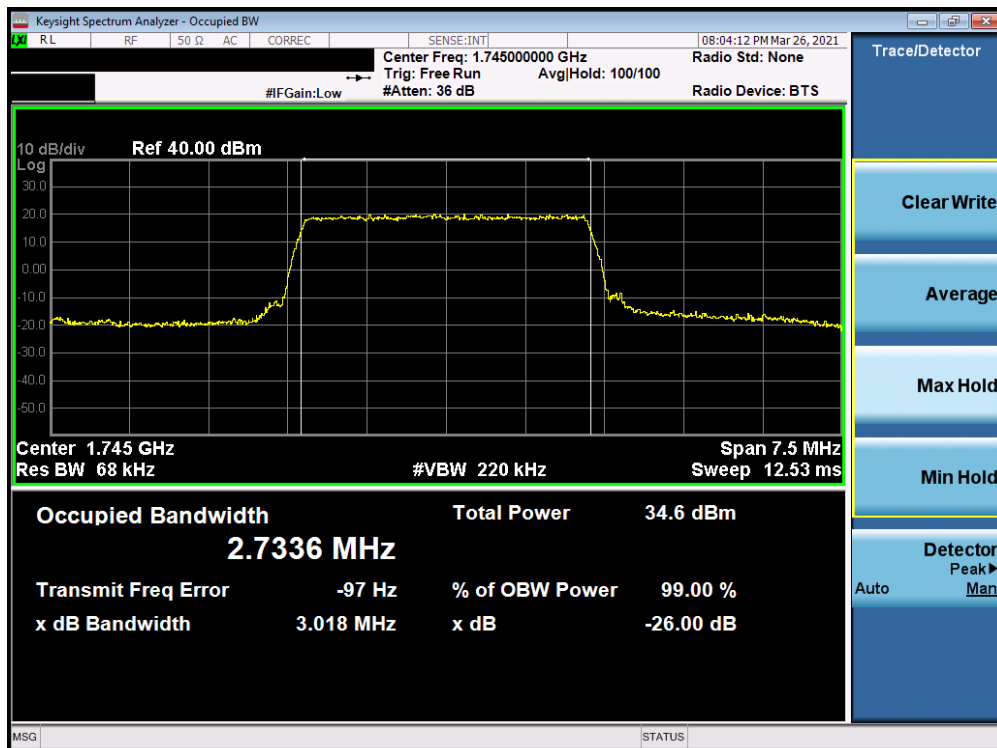


Plot 7-2. Occupied Bandwidth Plot (LTE Band 66/4 - 1.4MHz 16-QAM - Full RB Configuration)

FCC ID: BCGA2603	<b>PART 27 MEASUREMENT REPORT</b>		Approved by: Quality Manager
Test Report S/N: 1C2106080051-03.BCG	Test Dates: 6/7/2021 - 7/30/2021	EUT Type: Tablet Device	Page 15 of 158



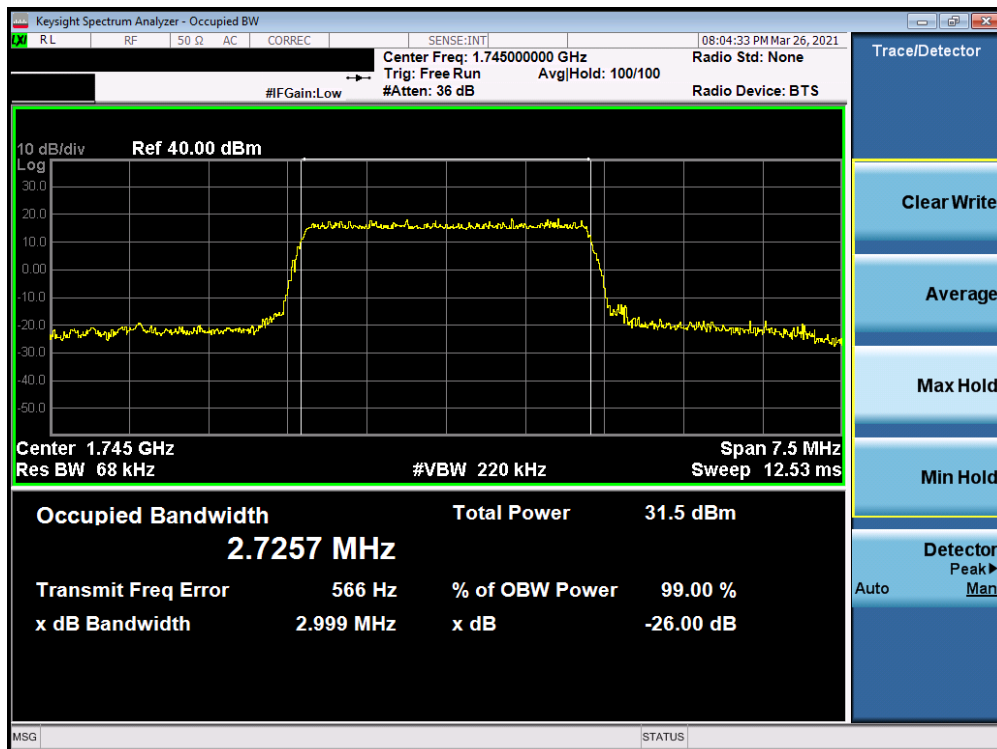
Plot 7-3. Occupied Bandwidth Plot (LTE Band 66/4 - 1.4MHz 64-QAM - Full RB Configuration)



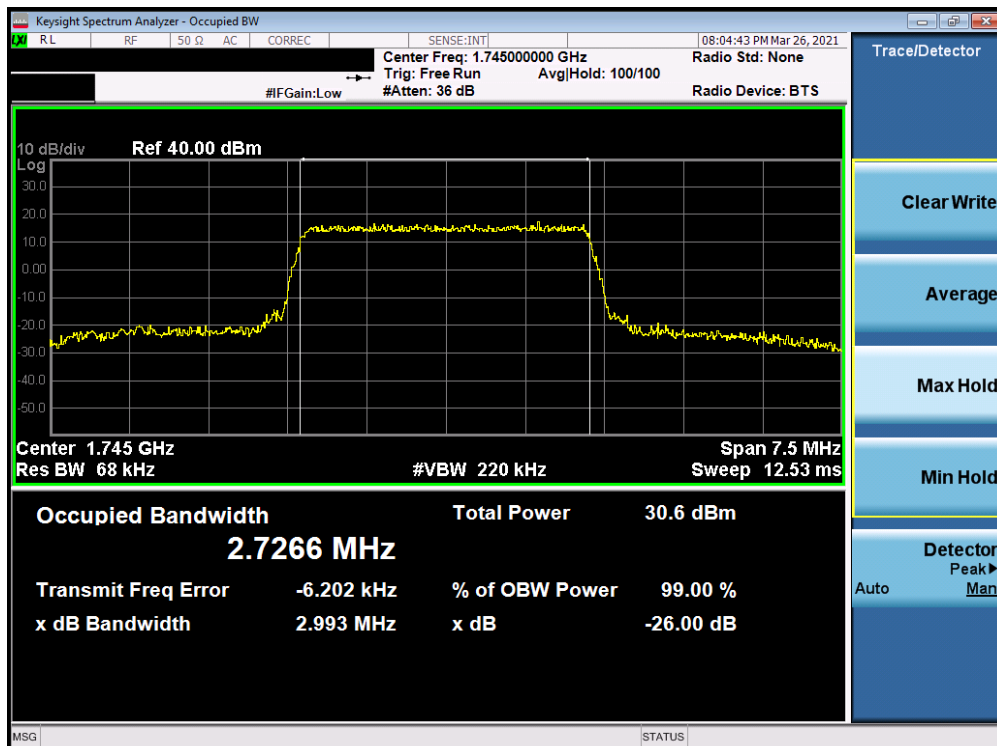
Plot 7-4. Occupied Bandwidth Plot (LTE Band 66/4 - 3MHz QPSK - Full RB Configuration)

FCC ID: BCGA2603	<b>PART 27 MEASUREMENT REPORT</b>		Approved by: Quality Manager
Test Report S/N: 1C2106080051-03.BCG	Test Dates: 6/7/2021 - 7/30/2021	EUT Type: Tablet Device	Page 16 of 158



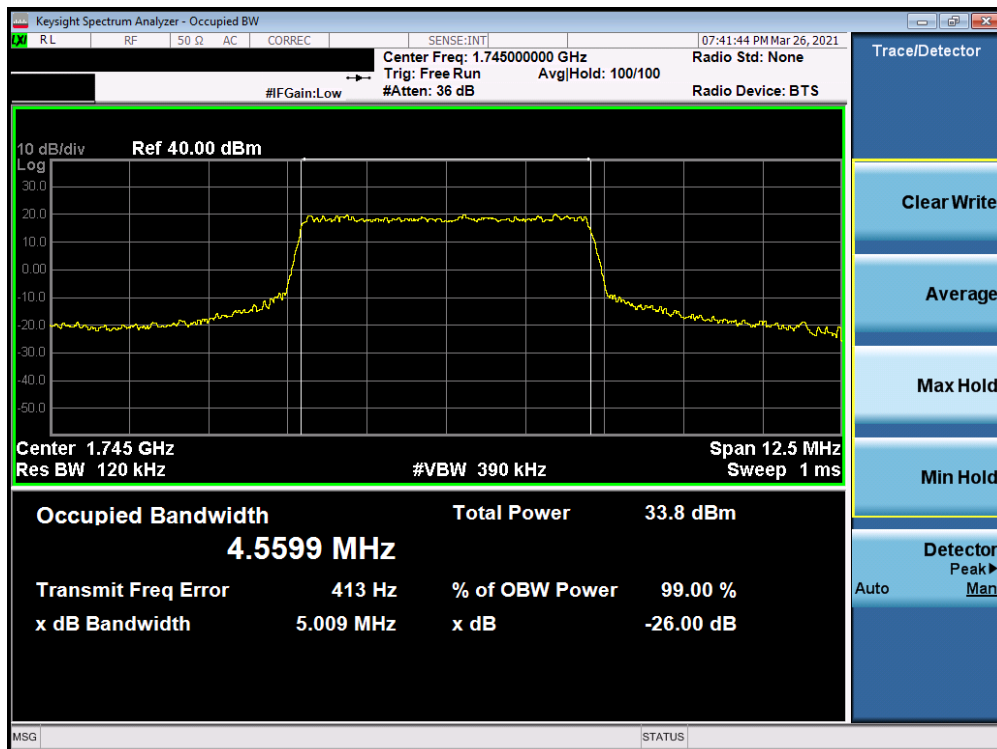


Plot 7-5. Occupied Bandwidth Plot (LTE Band 66/4 - 3MHz 16-QAM - Full RB Configuration)

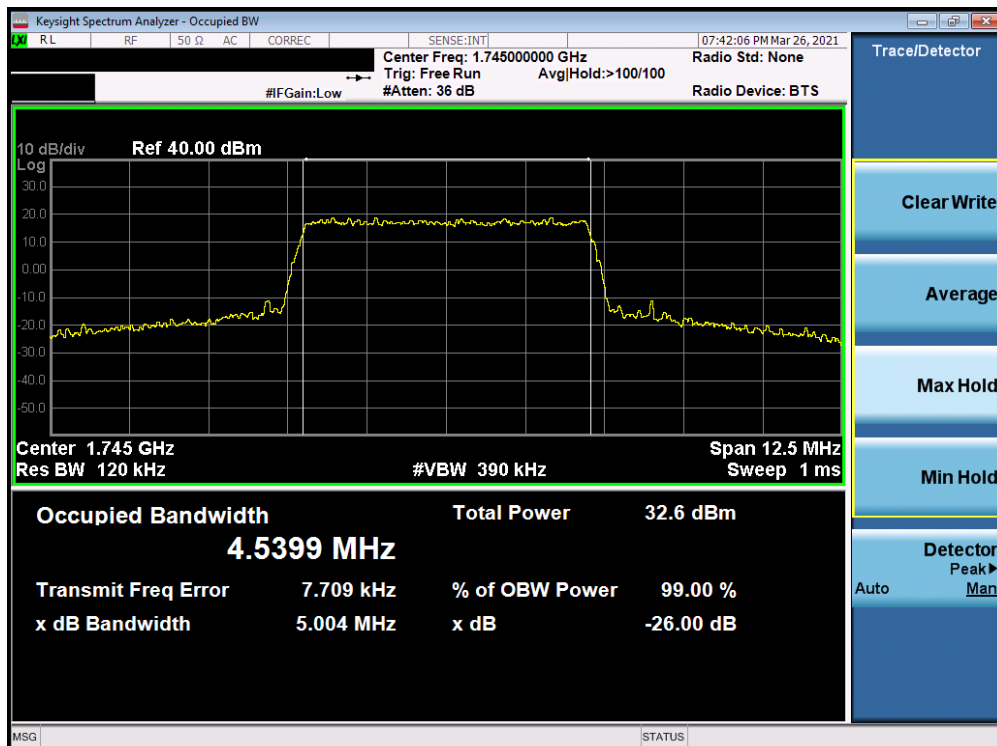


Plot 7-6. Occupied Bandwidth Plot (LTE Band 66/4 - 3MHz 64-QAM - Full RB Configuration)

FCC ID: BCGA2603	<b>PART 27 MEASUREMENT REPORT</b>		Approved by: Quality Manager
Test Report S/N: 1C2106080051-03.BCG	Test Dates: 6/7/2021 - 7/30/2021	EUT Type: Tablet Device	Page 17 of 158



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

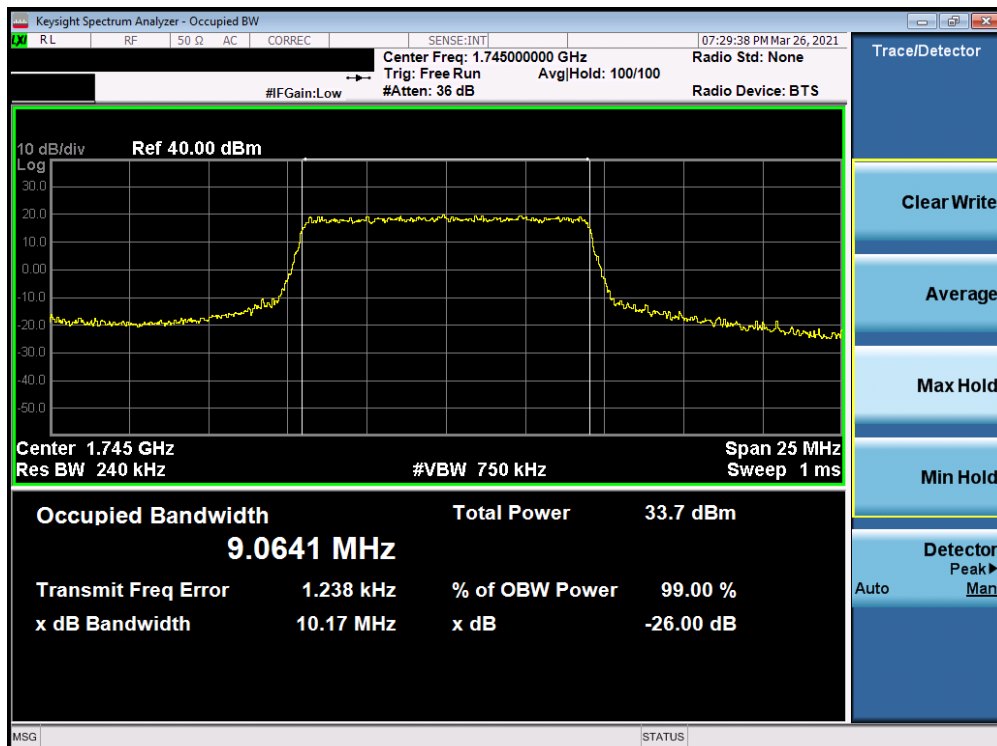


Plot 7-8. Occupied Bandwidth Plot (LTE Band 66/4 - 5MHz 16-QAM - Full RB Configuration)


FCC ID: BCGA2603	<b>PART 27 MEASUREMENT REPORT</b>		Approved by: Quality Manager
Test Report S/N: 1C2106080051-03.BCG	Test Dates: 6/7/2021 - 7/30/2021	EUT Type: Tablet Device	Page 18 of 158

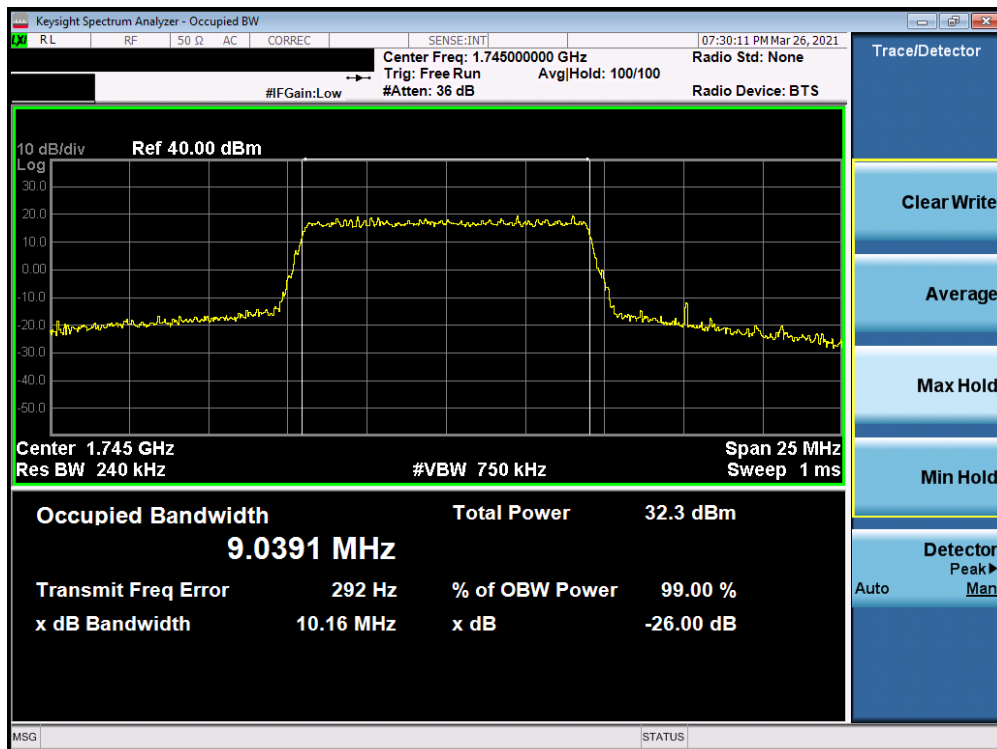


Plot 7-9. Occupied Bandwidth Plot (LTE Band 66/4 - 5MHz 64-QAM - Full RB Configuration)

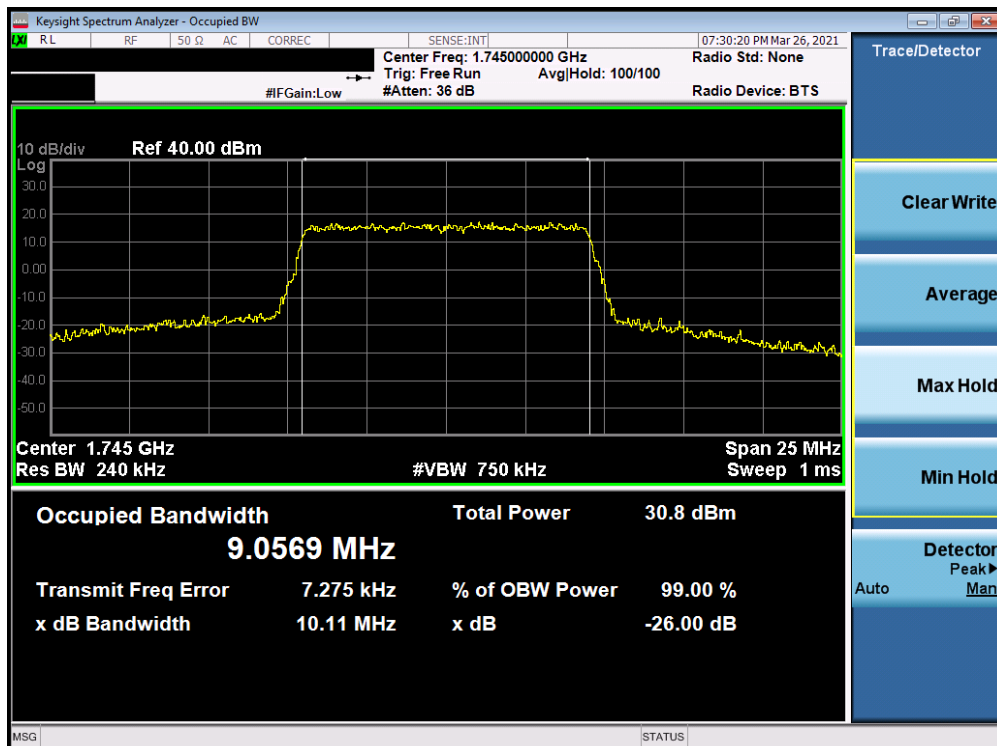


Plot 7-10. Occupied Bandwidth Plot (LTE Band 66/4 - 10MHz QPSK - Full RB Configuration)

FCC ID: BCGA2603	 <b>PART 27 MEASUREMENT REPORT</b>		Approved by: Quality Manager
Test Report S/N: 1C2106080051-03.BCG	Test Dates: 6/7/2021 - 7/30/2021	EUT Type: Tablet Device	Page 19 of 158

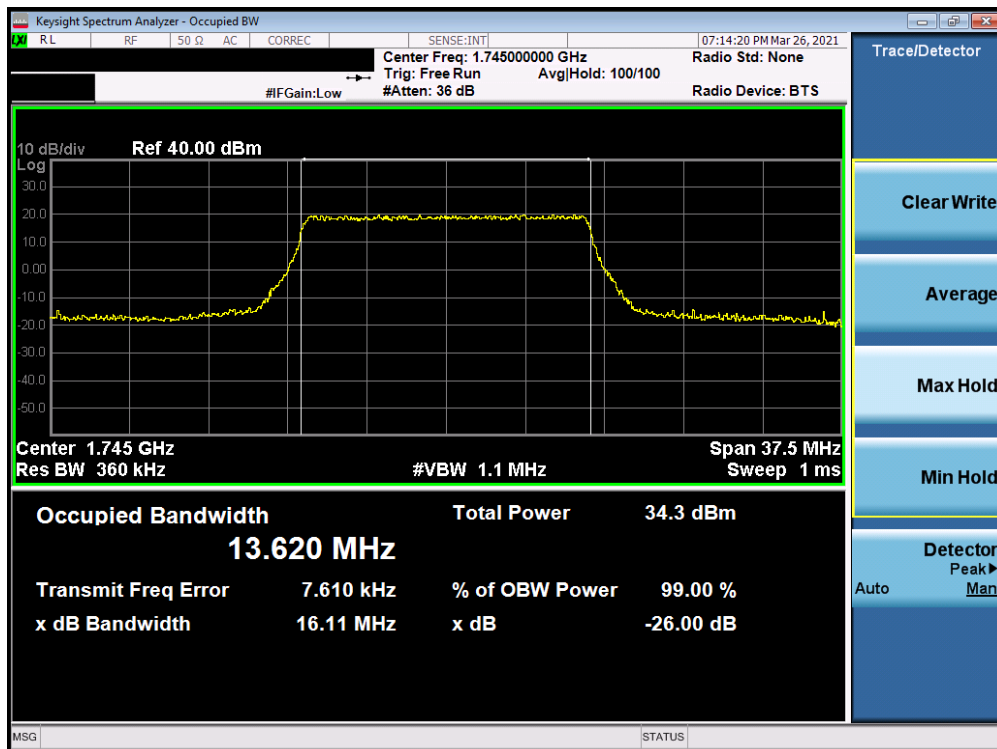


Plot 7-11. Occupied Bandwidth Plot (LTE Band 66/4 - 10MHz 16-QAM - Full RB Configuration)

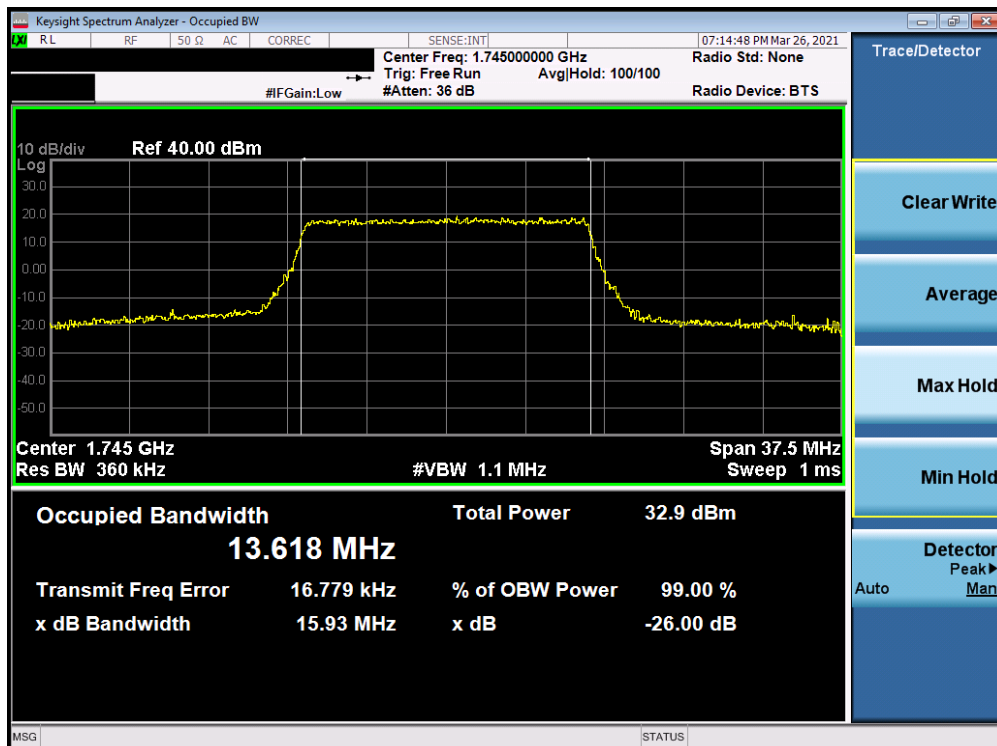


Plot 7-12. Occupied Bandwidth Plot (LTE Band 66/4 - 10MHz 64-QAM - Full RB Configuration)

FCC ID: BCGA2603	<b>PART 27 MEASUREMENT REPORT</b>		Approved by: Quality Manager
Test Report S/N: 1C2106080051-03.BCG	Test Dates: 6/7/2021 - 7/30/2021	EUT Type: Tablet Device	Page 20 of 158

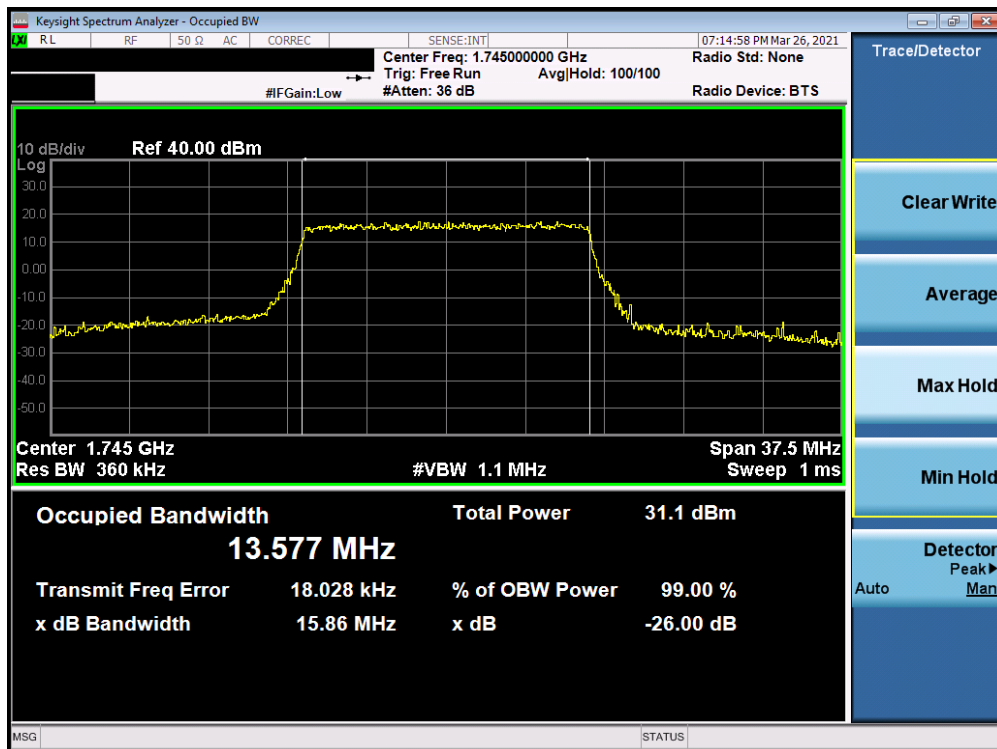


Plot 7-13. Occupied Bandwidth Plot (LTE Band 66/4 - 15MHz QPSK - Full RB Configuration)

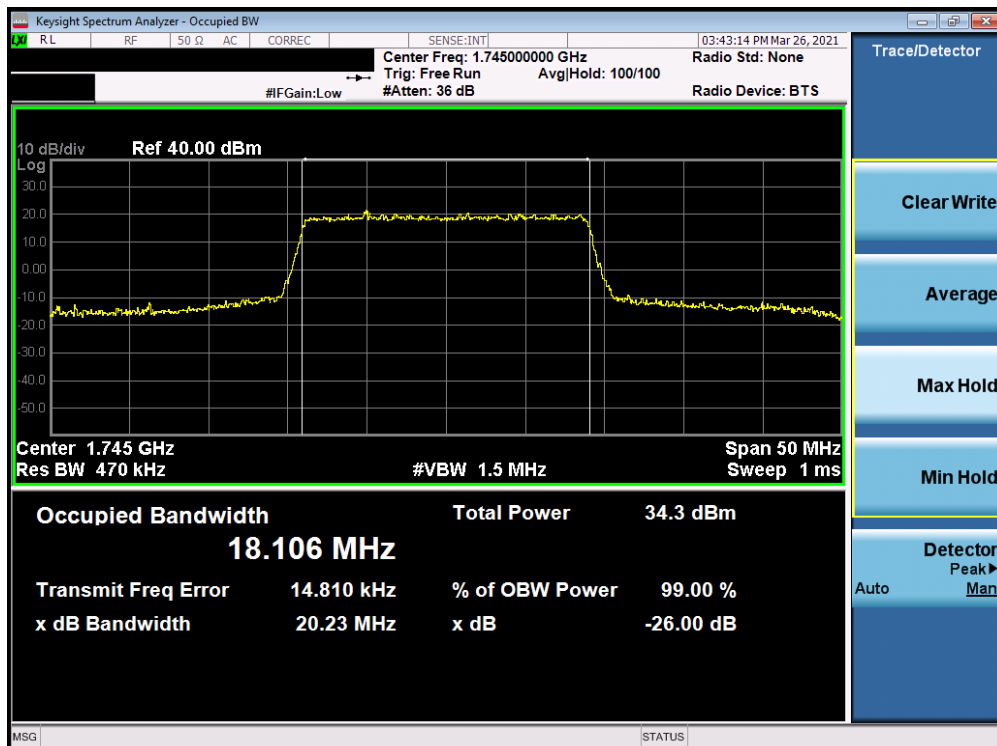


Plot 7-14. Occupied Bandwidth Plot (LTE Band 66/4 - 15MHz 16-QAM - Full RB Configuration)

FCC ID: BCGA2603	<b>PART 27 MEASUREMENT REPORT</b>		Approved by: Quality Manager
Test Report S/N: 1C2106080051-03.BCG	Test Dates: 6/7/2021 - 7/30/2021	EUT Type: Tablet Device	Page 21 of 158

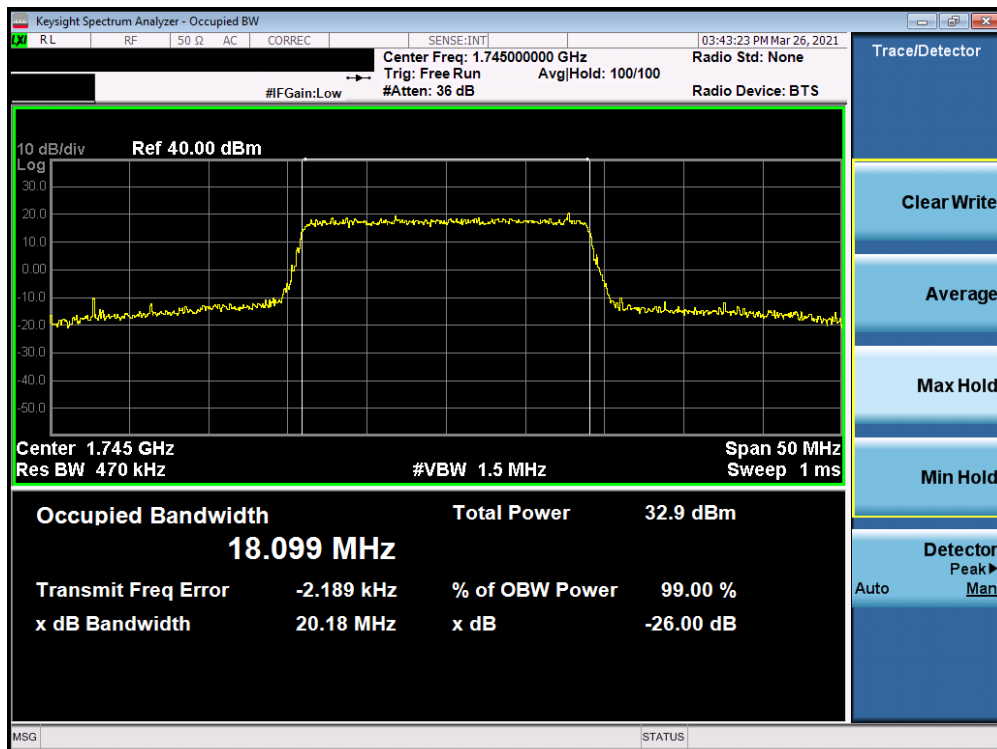


Plot 7-15. Occupied Bandwidth Plot (LTE Band 66/4 - 15MHz 64-QAM - Full RB Configuration)

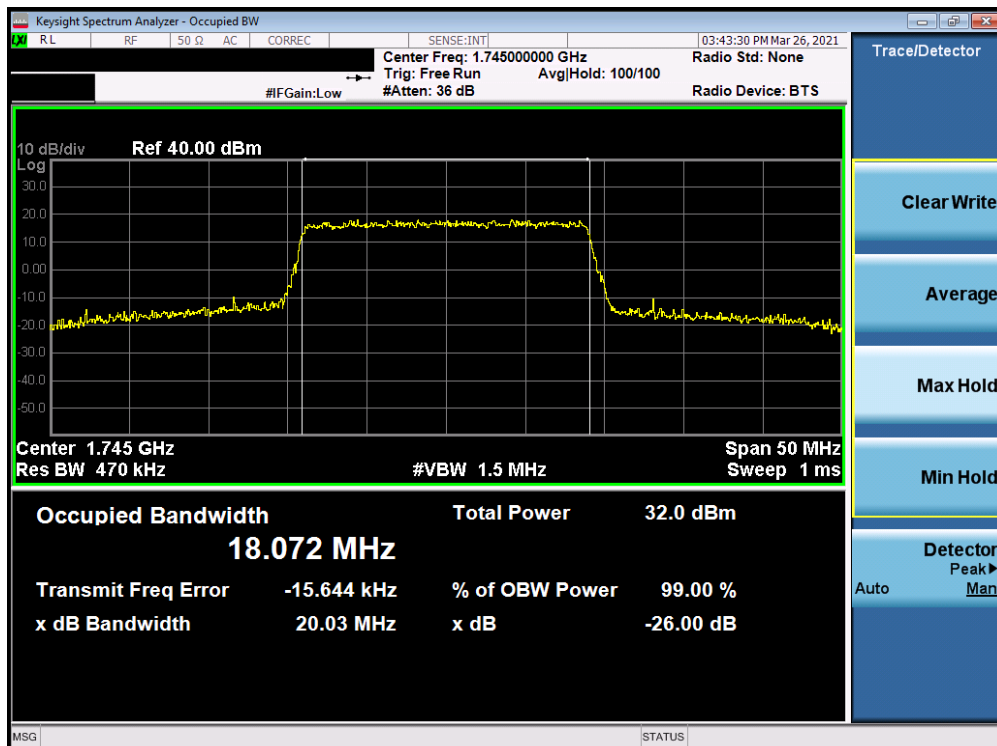


Plot 7-16. Occupied Bandwidth Plot (LTE Band 66/4 - 20MHz QPSK - Full RB Configuration)

FCC ID: BCGA2603	<b>PART 27 MEASUREMENT REPORT</b>		Approved by: Quality Manager
Test Report S/N: 1C2106080051-03.BCG	Test Dates: 6/7/2021 - 7/30/2021	EUT Type: Tablet Device	Page 22 of 158



Plot 7-17. Occupied Bandwidth Plot (LTE Band 66/4 - 20MHz 16-QAM - Full RB Configuration)



Plot 7-18. Occupied Bandwidth Plot (LTE Band 66/4 - 20MHz 64-QAM - Full RB Configuration)

FCC ID: BCGA2603	<b>PART 27 MEASUREMENT REPORT</b>		Approved by: Quality Manager
Test Report S/N: 1C2106080051-03.BCG	Test Dates: 6/7/2021 - 7/30/2021	EUT Type: Tablet Device	Page 23 of 158



## LTE Band 71



Plot 7-19. Occupied Bandwidth Plot (LTE Band 71 - 5MHz QPSK - Full RB Configuration)



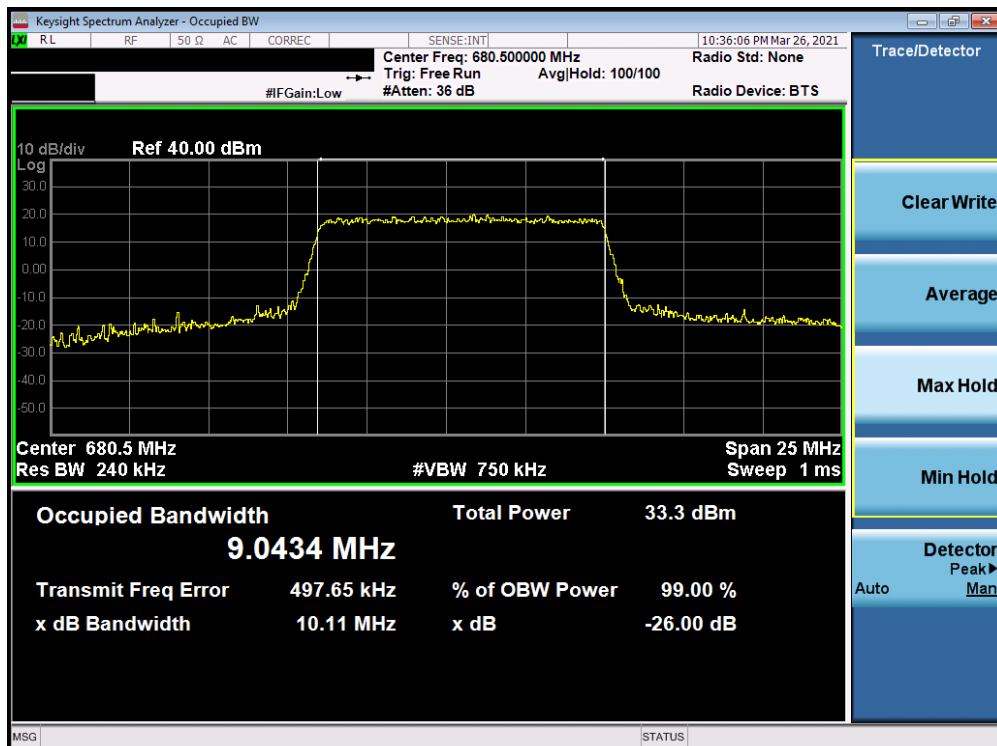
Plot 7-20. Occupied Bandwidth Plot (LTE Band 71 - 5MHz 16-QAM - Full RB Configuration)

FCC ID: BCGA2603	<b>PART 27 MEASUREMENT REPORT</b>		Approved by: Quality Manager
Test Report S/N: 1C2106080051-03.BCG	Test Dates: 6/7/2021 - 7/30/2021	EUT Type: Tablet Device	Page 24 of 158



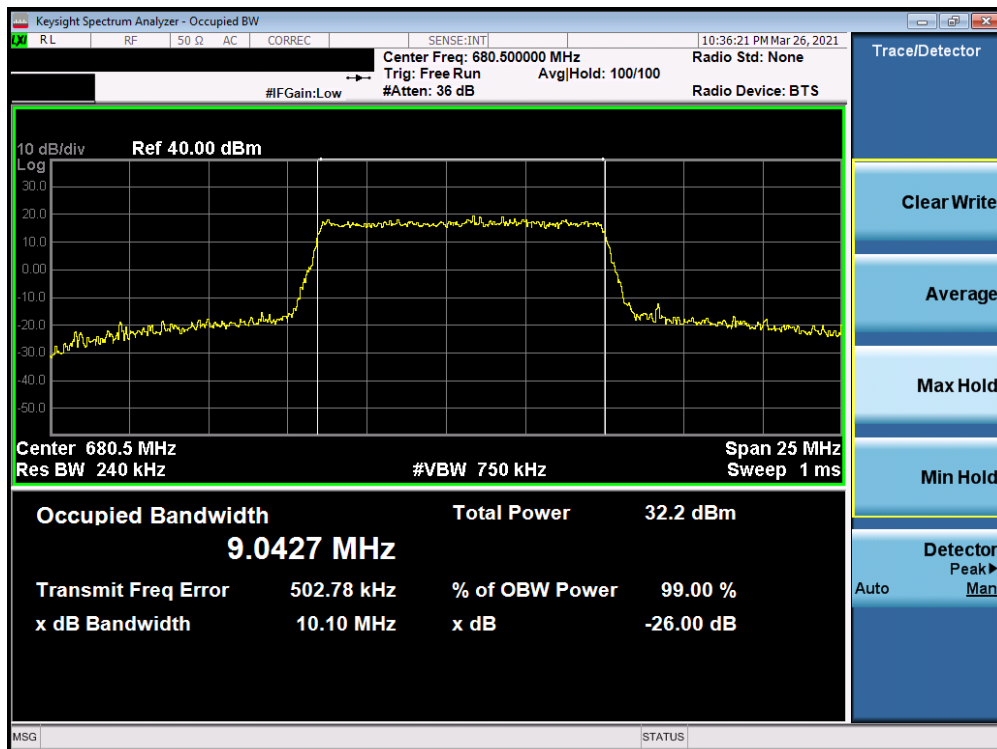


Plot 7-21. Occupied Bandwidth Plot (LTE Band 71 - 5MHz 64-QAM - Full RB Configuration)

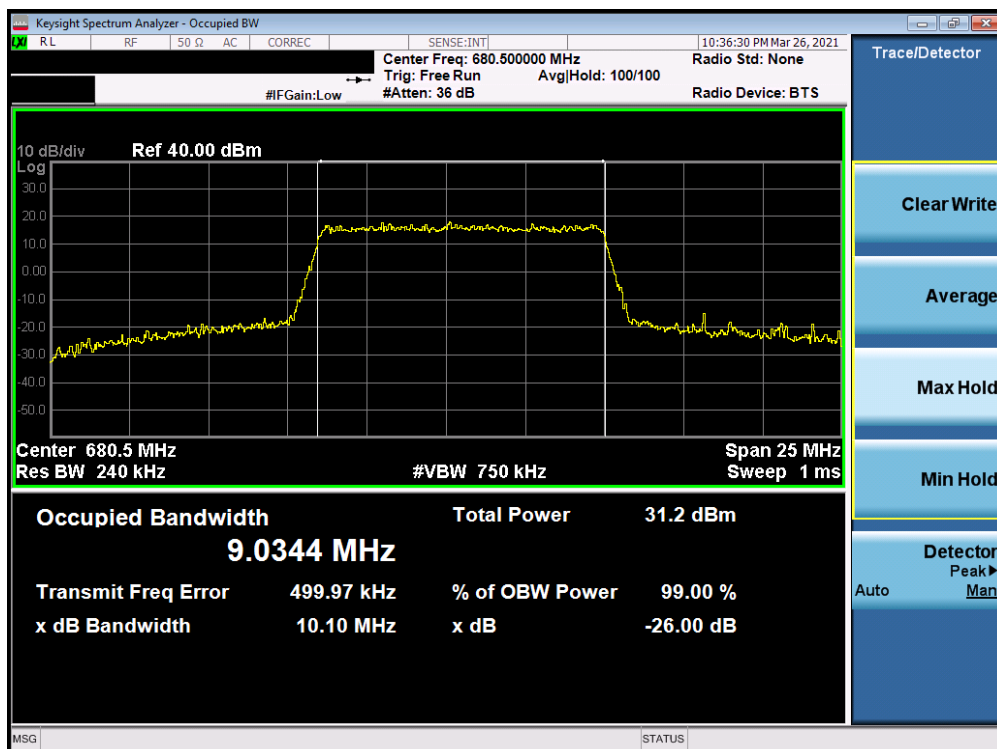


Plot 7-22. Occupied Bandwidth Plot (LTE Band 71 - 10MHz QPSK - Full RB Configuration)

FCC ID: BCGA2603	<b>PART 27 MEASUREMENT REPORT</b>		Approved by: Quality Manager
Test Report S/N: 1C2106080051-03.BCG	Test Dates: 6/7/2021 - 7/30/2021	EUT Type: Tablet Device	Page 25 of 158

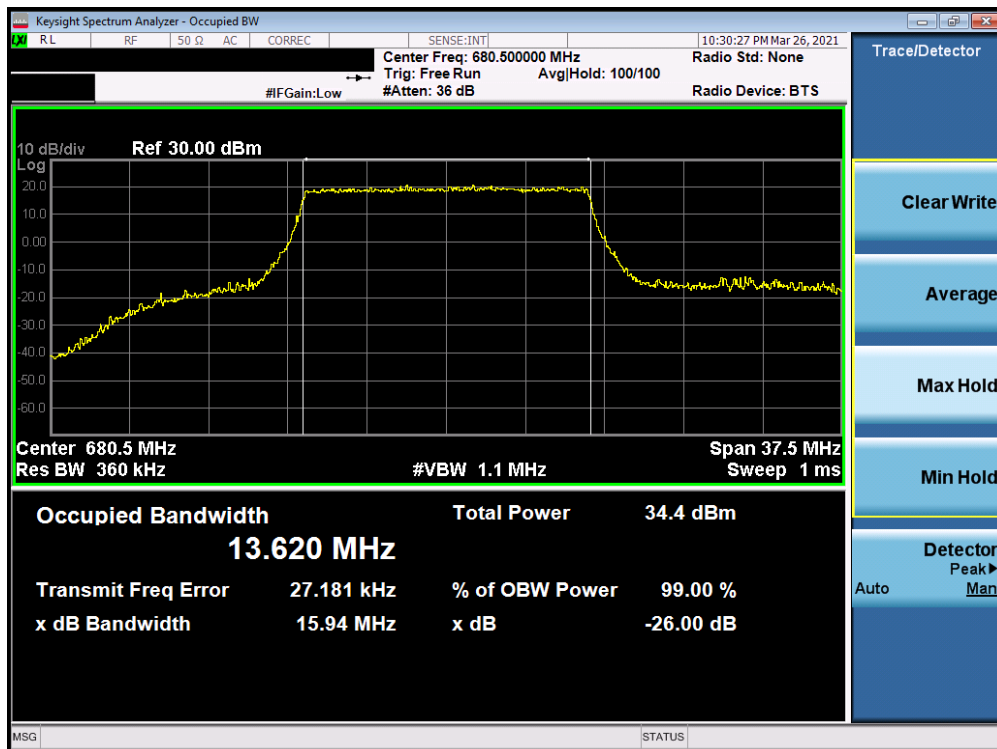


Plot 7-23. Occupied Bandwidth Plot (LTE Band 71 - 10MHz 16-QAM - Full RB Configuration)

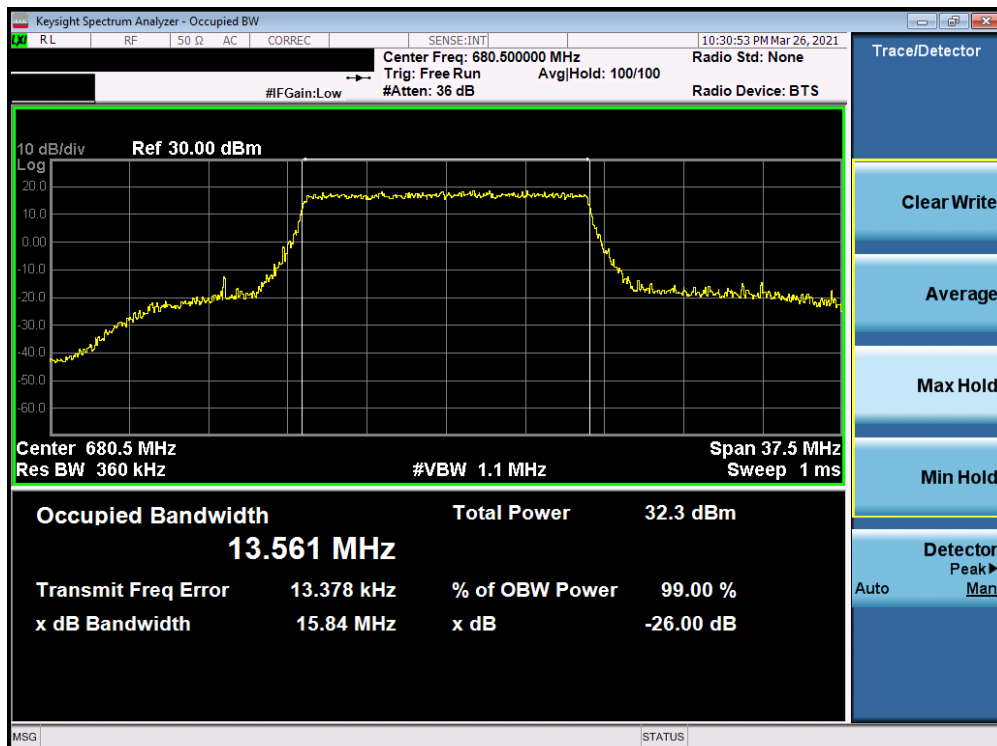


Plot 7-24. Occupied Bandwidth Plot (LTE Band 71 - 10MHz 64-QAM - Full RB Configuration)

FCC ID: BCGA2603	<b>PART 27 MEASUREMENT REPORT</b>		Approved by: Quality Manager
Test Report S/N: 1C2106080051-03.BCG	Test Dates: 6/7/2021 - 7/30/2021	EUT Type: Tablet Device	Page 26 of 158

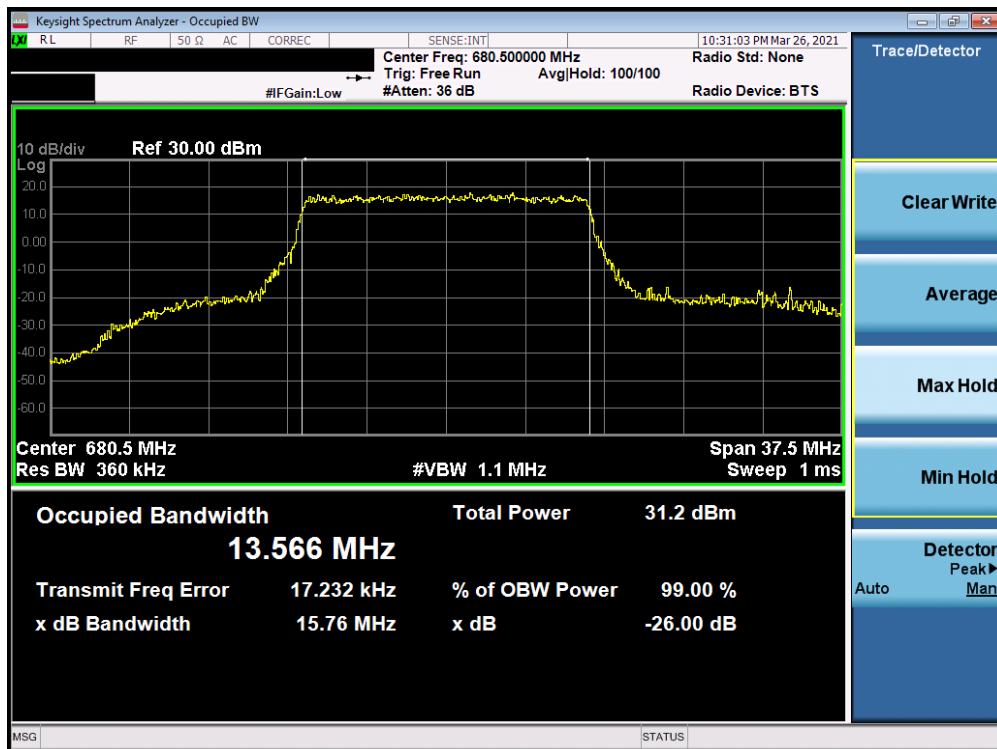


Plot 7-25. Occupied Bandwidth Plot (LTE Band 71 - 15MHz QPSK - Full RB Configuration)

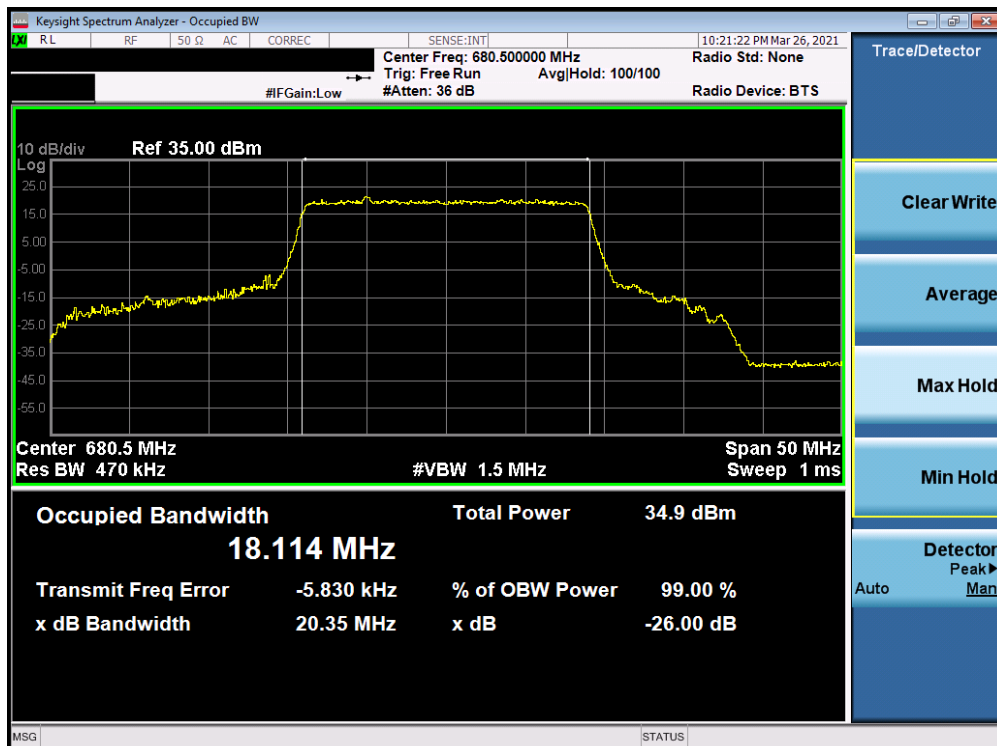


Plot 7-26. Occupied Bandwidth Plot (LTE Band 71 - 15MHz 16-QAM - Full RB Configuration)

FCC ID: BCGA2603	<b>PART 27 MEASUREMENT REPORT</b>		Approved by: Quality Manager
Test Report S/N: 1C2106080051-03.BCG	Test Dates: 6/7/2021 - 7/30/2021	EUT Type: Tablet Device	Page 27 of 158

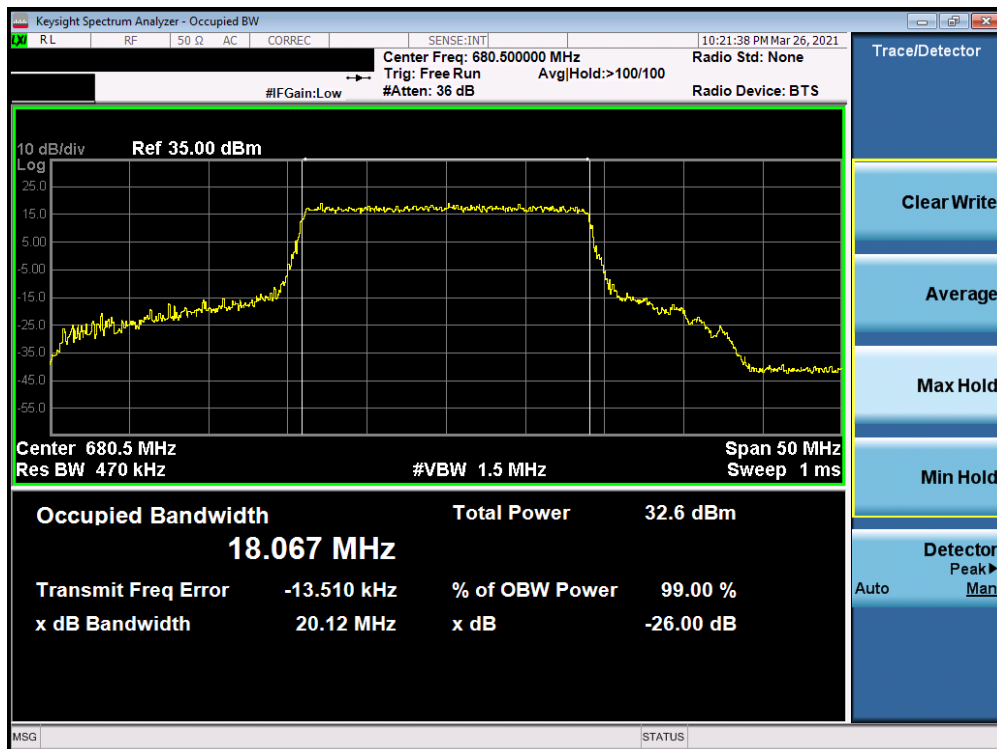


Plot 7-27. Occupied Bandwidth Plot (LTE Band 71 - 15MHz 64-QAM - Full RB Configuration)

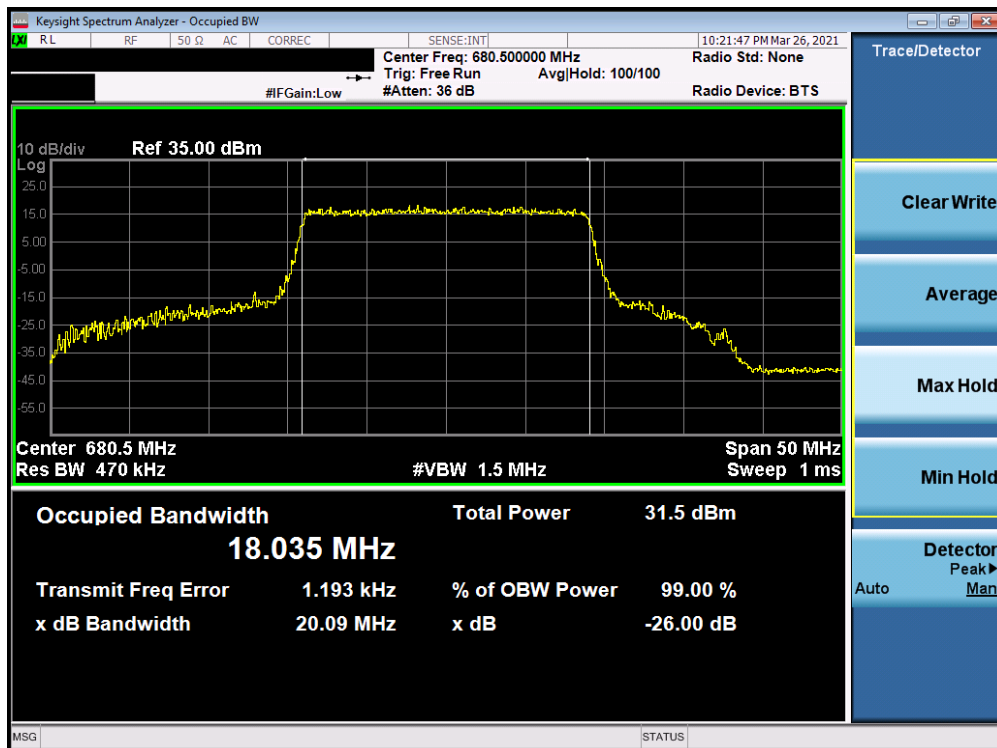


Plot 7-28. Occupied Bandwidth Plot (LTE Band 71 - 20MHz QPSK - Full RB Configuration)

FCC ID: BCGA2603	<b>PART 27 MEASUREMENT REPORT</b>		Approved by: Quality Manager
Test Report S/N: 1C2106080051-03.BCG	Test Dates: 6/7/2021 - 7/30/2021	EUT Type: Tablet Device	Page 28 of 158



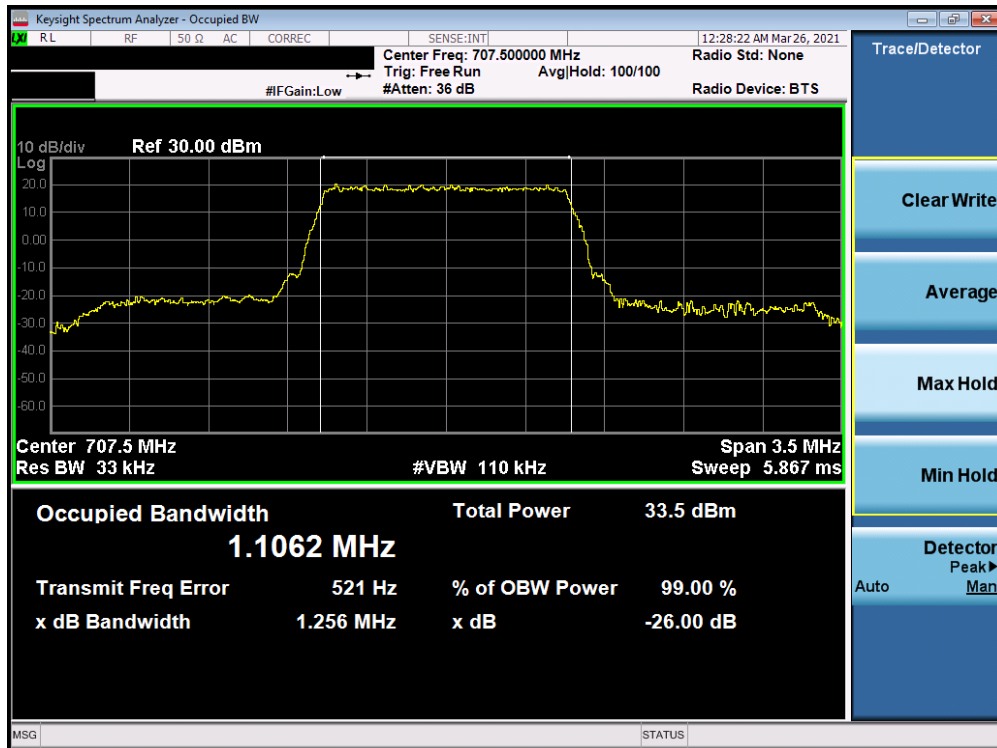
Plot 7-29. Occupied Bandwidth Plot (LTE Band 71 - 20MHz 16-QAM - Full RB Configuration)



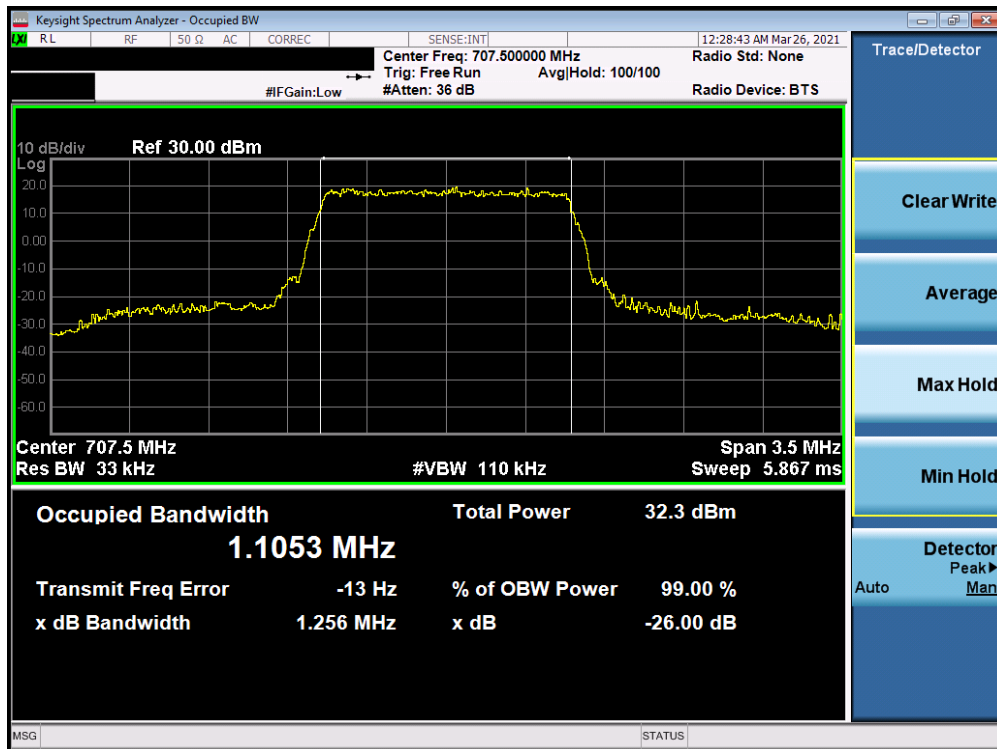
Plot 7-30. Occupied Bandwidth Plot (LTE Band 71 - 20MHz 64-QAM - Full RB Configuration)

FCC ID: BCGA2603	<b>PART 27 MEASUREMENT REPORT</b>		Approved by: Quality Manager
Test Report S/N: 1C2106080051-03.BCG	Test Dates: 6/7/2021 - 7/30/2021	EUT Type: Tablet Device	Page 29 of 158

## LTE Band 12/17

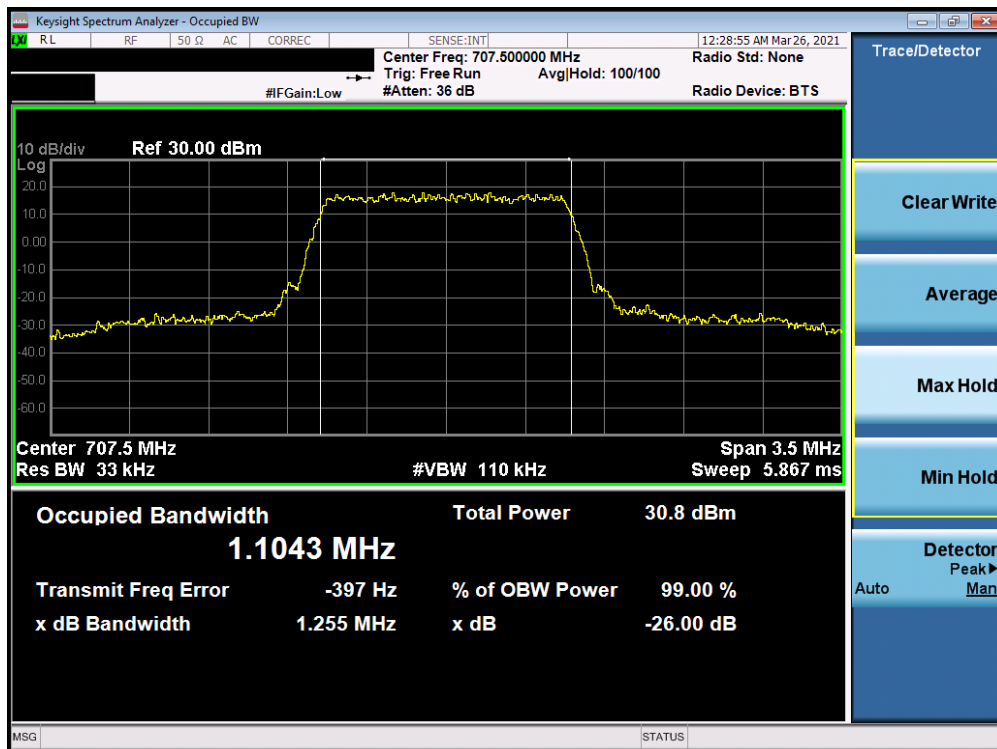


Plot 7-31. Occupied Bandwidth Plot (LTE Band 12 – 1.4MHz QPSK - Full RB Configuration)

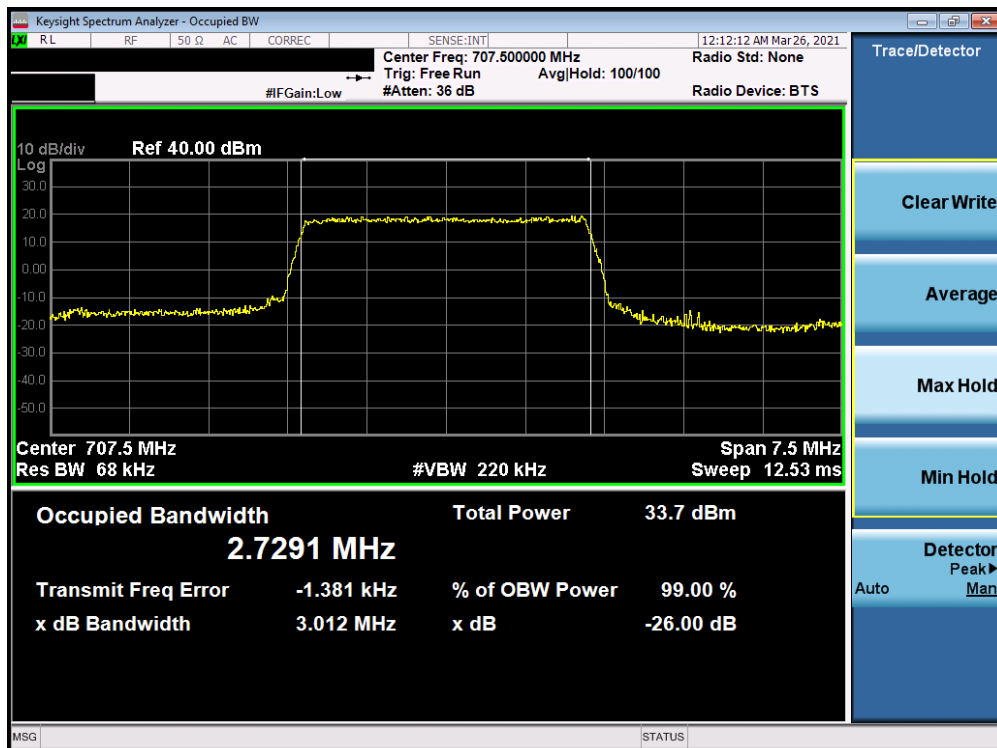


Plot 7-32. Occupied Bandwidth Plot (LTE Band 12 – 1.4MHz 16-QAM - Full RB Configuration)

FCC ID: BCGA2603	<b>PART 27 MEASUREMENT REPORT</b>		Approved by: Quality Manager
Test Report S/N: 1C2106080051-03.BCG	Test Dates: 6/7/2021 - 7/30/2021	EUT Type: Tablet Device	Page 30 of 158



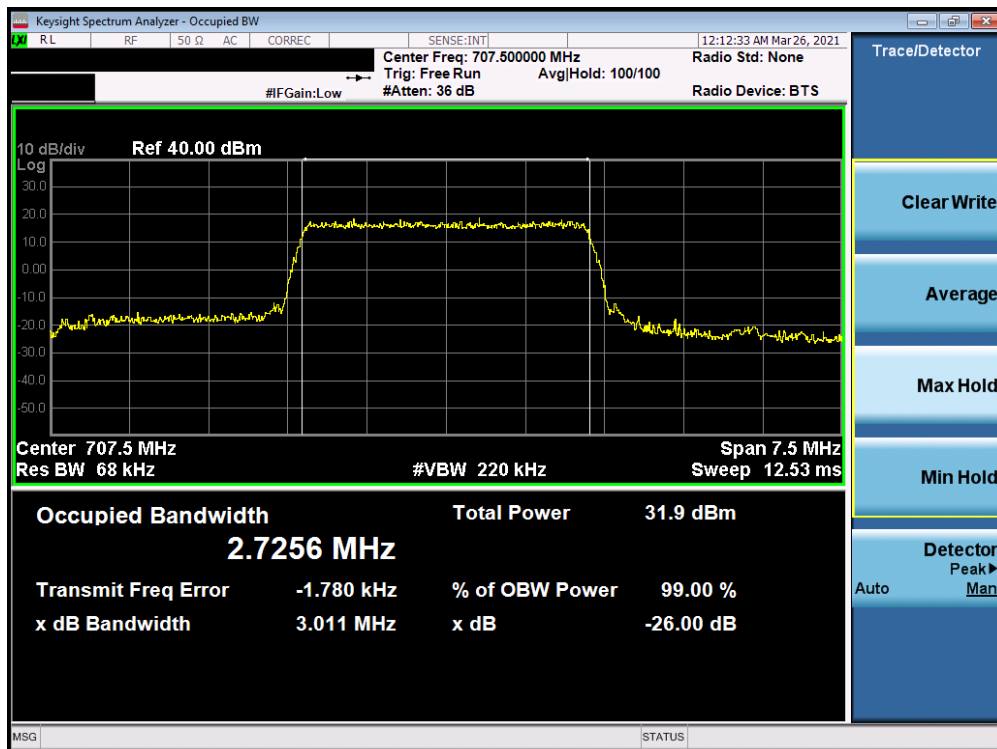
Plot 7-33. Occupied Bandwidth Plot (LTE Band 12 – 1.4MHz 64-QAM - Full RB Configuration)



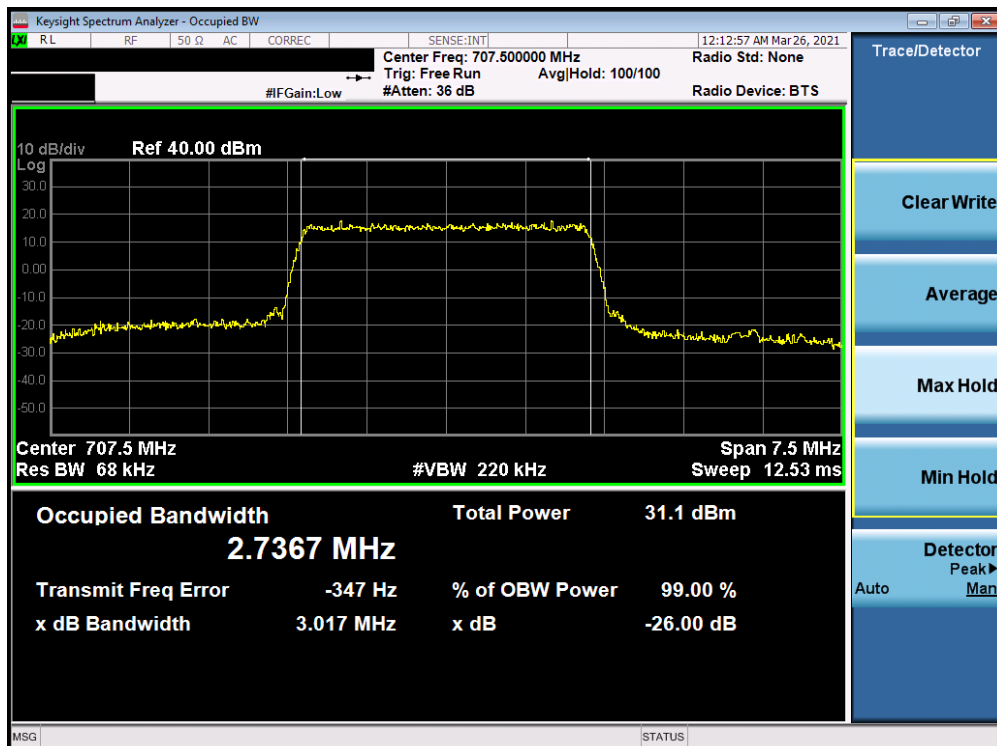
Plot 7-34. Occupied Bandwidth Plot (LTE Band 12 - 3MHz QPSK - Full RB Configuration)

FCC ID: BCGA2603	<b>PART 27 MEASUREMENT REPORT</b>		Approved by: Quality Manager
Test Report S/N: 1C2106080051-03.BCG	Test Dates: 6/7/2021 - 7/30/2021	EUT Type: Tablet Device	Page 31 of 158





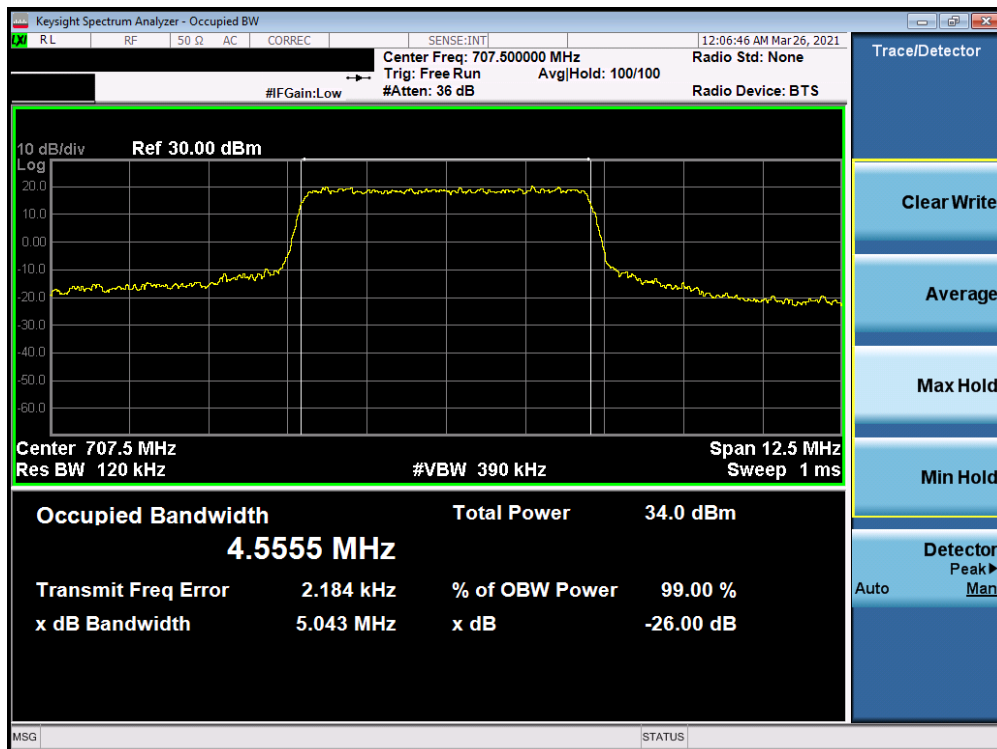
Plot 7-35. Occupied Bandwidth Plot (LTE Band 12 - 3MHz 16-QAM - Full RB Configuration)



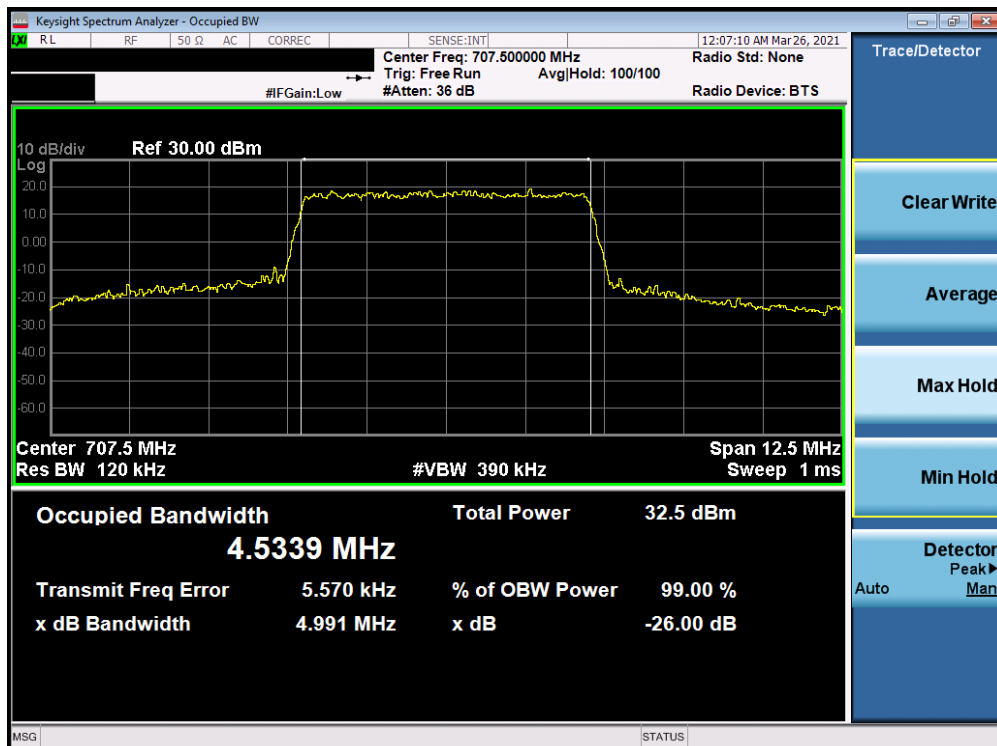
Plot 7-36. Occupied Bandwidth Plot (LTE Band 12 - 3MHz 64-QAM - Full RB Configuration)

FCC ID: BCGA2603	<b>PART 27 MEASUREMENT REPORT</b>		Approved by: Quality Manager
Test Report S/N: 1C2106080051-03.BCG	Test Dates: 6/7/2021 - 7/30/2021	EUT Type: Tablet Device	Page 32 of 158



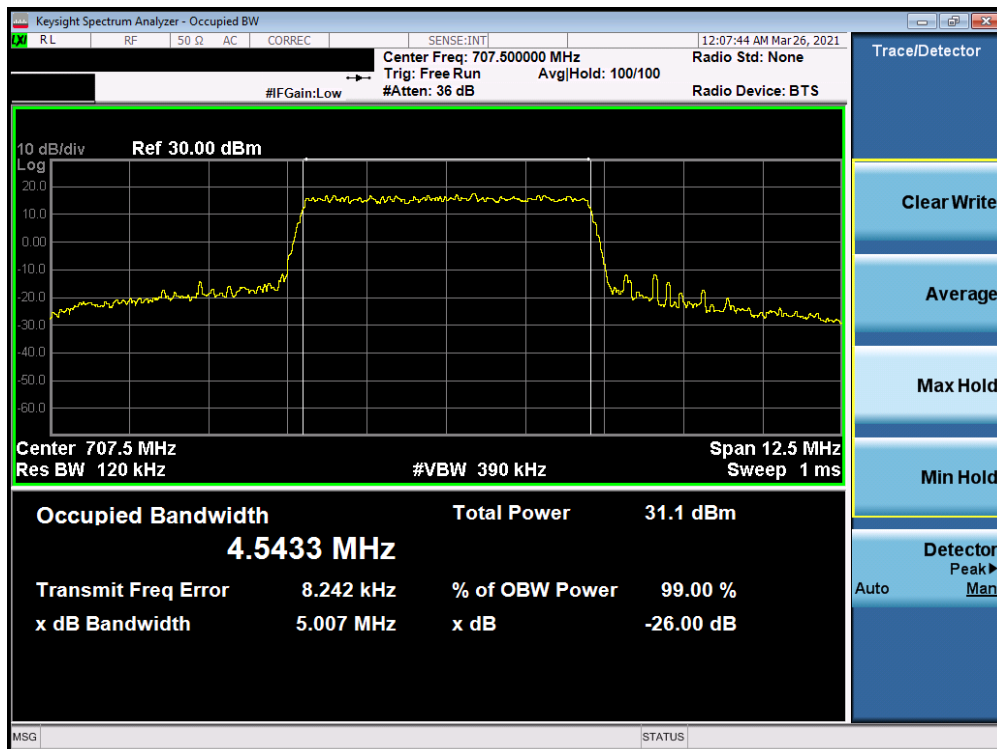


Plot 7-37. Occupied Bandwidth Plot (LTE Band 12/17 - 5MHz QPSK - Full RB Configuration)

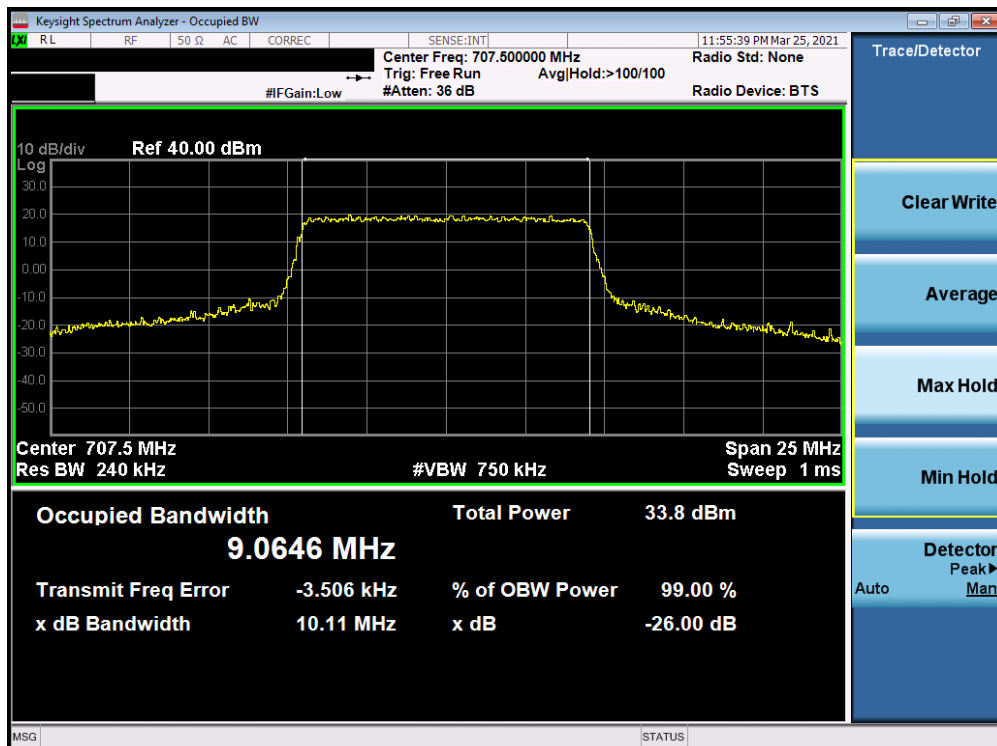


Plot 7-38. Occupied Bandwidth Plot (LTE Band 12/17 - 5MHz 16-QAM - Full RB Configuration)

FCC ID: BCGA2603	<b>PART 27 MEASUREMENT REPORT</b>		Approved by: Quality Manager
Test Report S/N: 1C2106080051-03.BCG	Test Dates: 6/7/2021 - 7/30/2021	EUT Type: Tablet Device	Page 33 of 158



Plot 7-39. Occupied Bandwidth Plot (LTE Band 12/17 - 5MHz 64-QAM - Full RB Configuration)

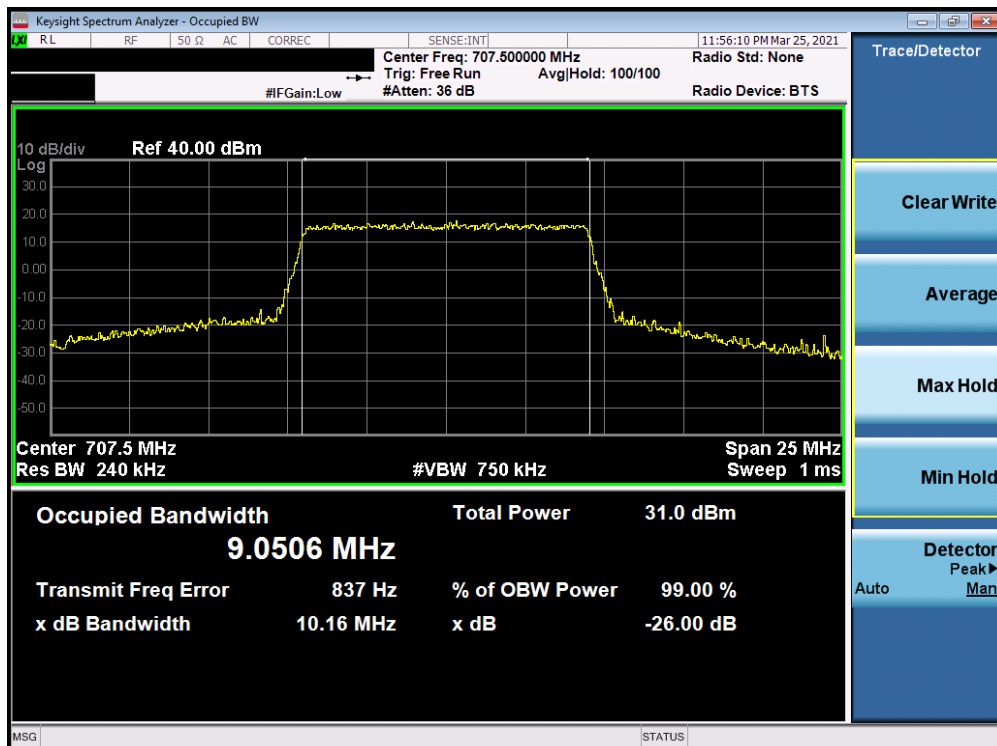


Plot 7-40. Occupied Bandwidth Plot (LTE Band 12/17 - 10MHz QPSK - Full RB Configuration)

FCC ID: BCGA2603	<b>PART 27 MEASUREMENT REPORT</b>		Approved by: Quality Manager
Test Report S/N: 1C2106080051-03.BCG	Test Dates: 6/7/2021 - 7/30/2021	EUT Type: Tablet Device	Page 34 of 158



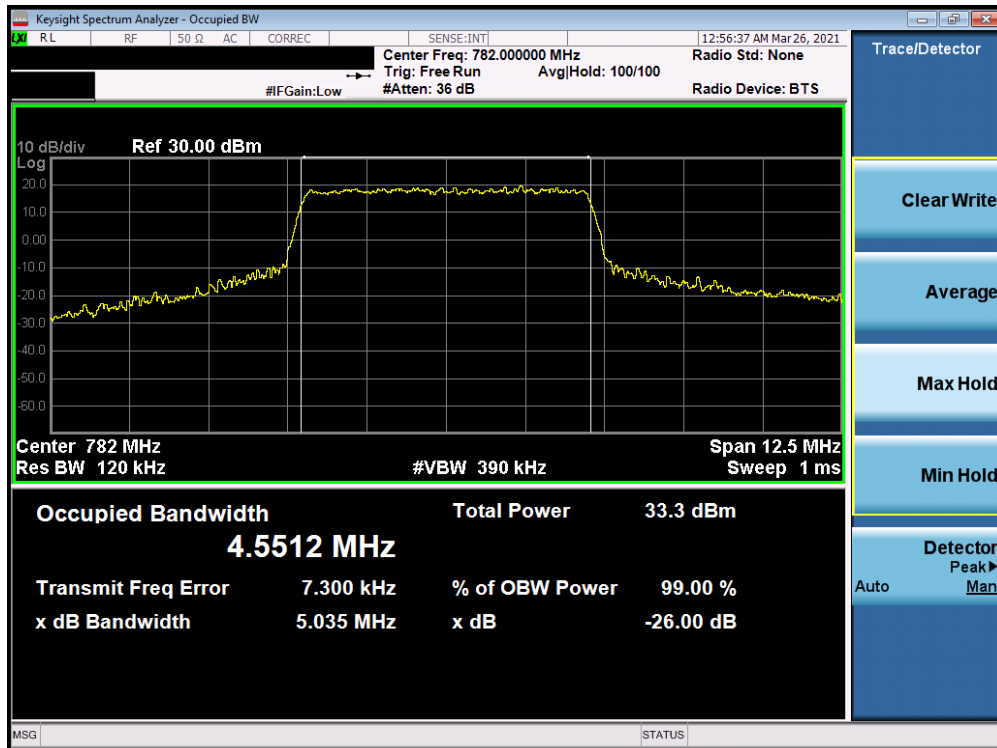
Plot 7-41. Occupied Bandwidth Plot (LTE Band 12/17 - 10MHz 16-QAM - Full RB Configuration)



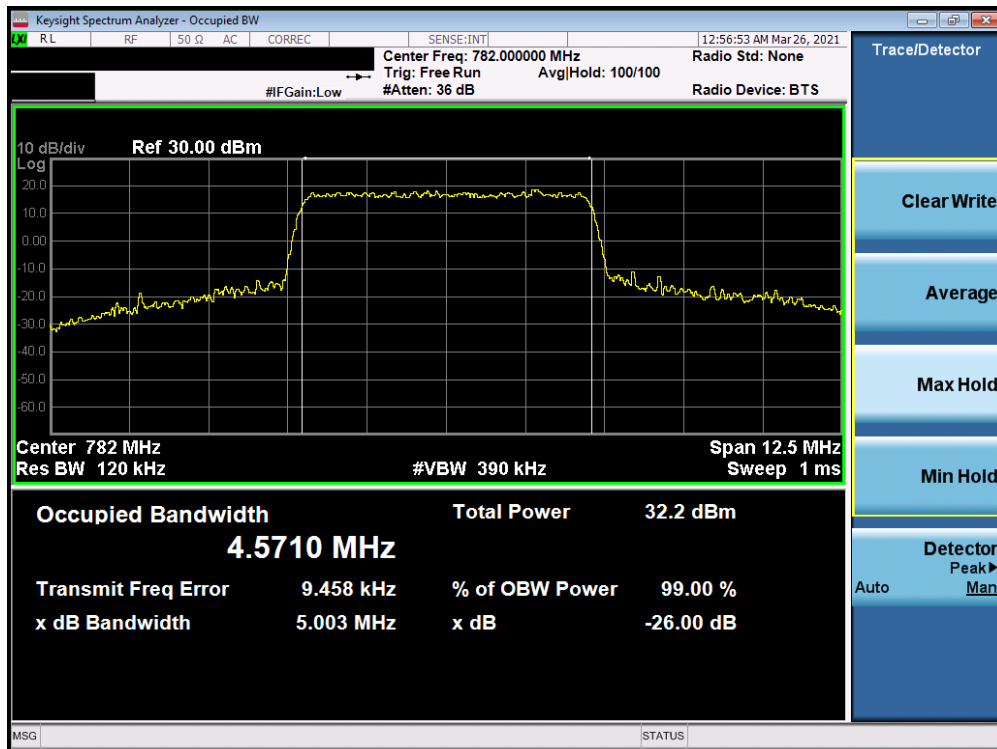
Plot 7-42. Occupied Bandwidth Plot (LTE Band 12/17 - 10MHz 64-QAM - Full RB Configuration)

FCC ID: BCGA2603	<b>PART 27 MEASUREMENT REPORT</b>		Approved by: Quality Manager
Test Report S/N: 1C2106080051-03.BCG	Test Dates: 6/7/2021 - 7/30/2021	EUT Type: Tablet Device	Page 35 of 158

## LTE Band 13

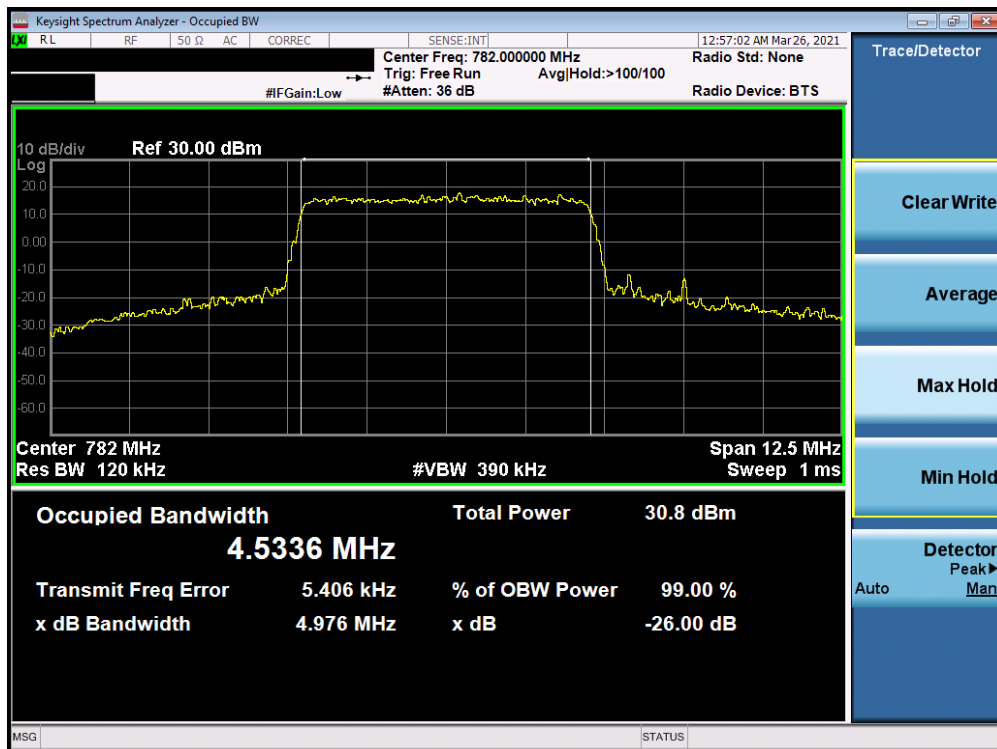


Plot 7-43. Occupied Bandwidth Plot (LTE Band 13 - 5MHz QPSK - Full RB Configuration)

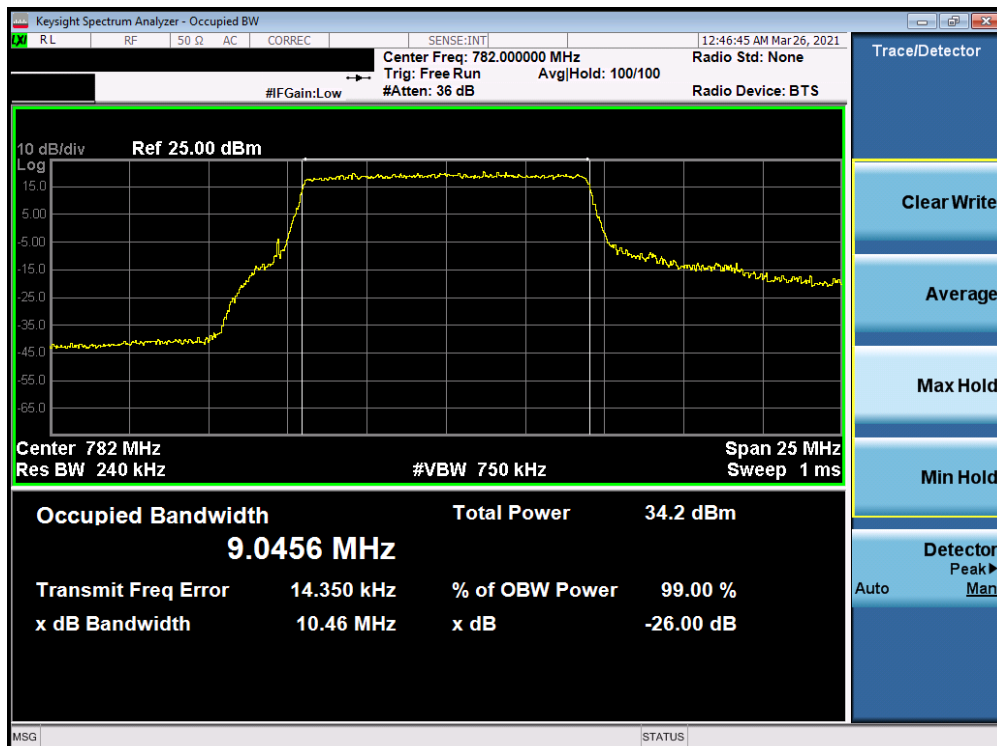


Plot 7-44. Occupied Bandwidth Plot (LTE Band 13 - 5MHz 16-QAM - Full RB Configuration)

FCC ID: BCGA2603	<b>PART 27 MEASUREMENT REPORT</b>		Approved by: Quality Manager
Test Report S/N: 1C2106080051-03.BCG	Test Dates: 6/7/2021 - 7/30/2021	EUT Type: Tablet Device	Page 36 of 158

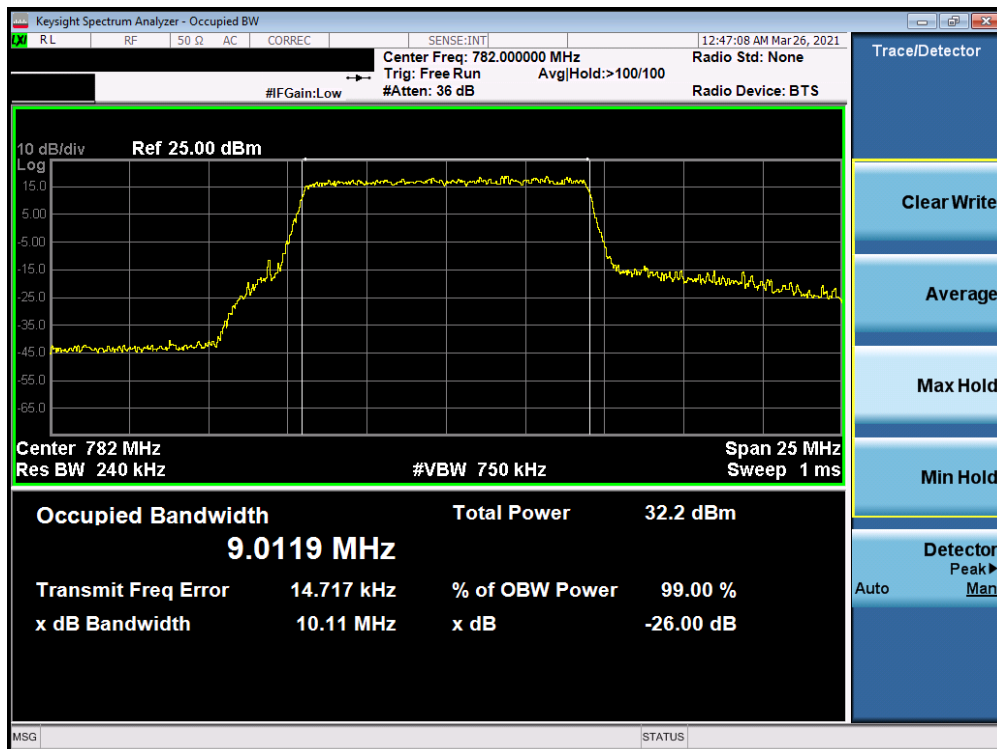


Plot 7-45. Occupied Bandwidth Plot (LTE Band 13 - 5MHz 64-QAM - Full RB Configuration)

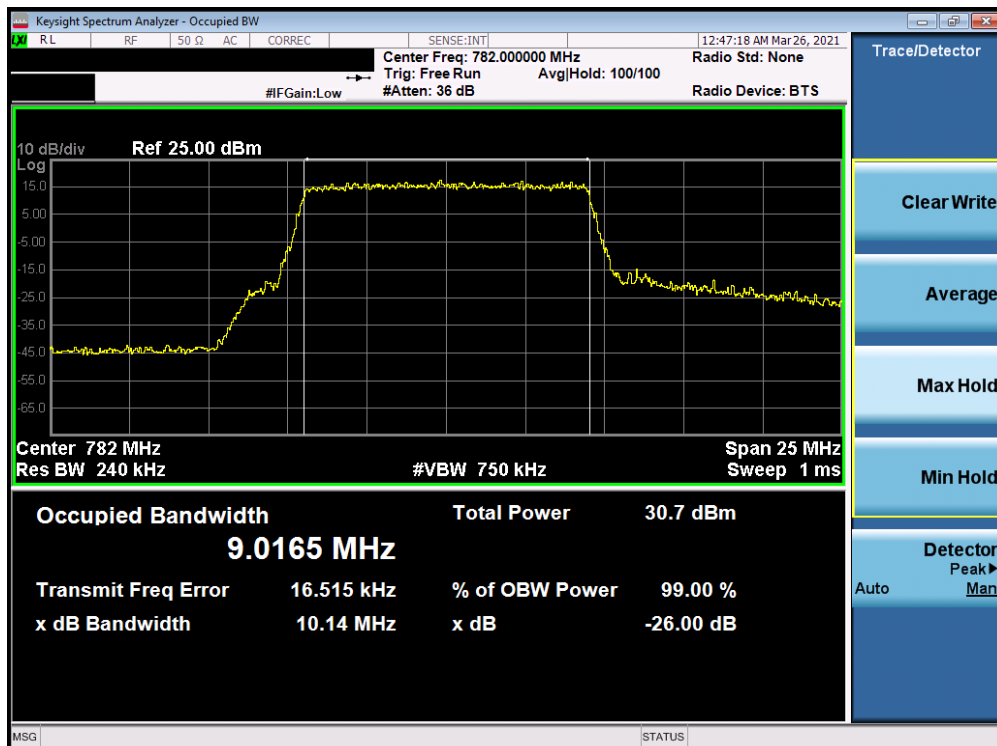


Plot 7-46. Occupied Bandwidth Plot (LTE Band 13 - 10MHz QPSK - Full RB Configuration)

FCC ID: BCGA2603	<b>PART 27 MEASUREMENT REPORT</b>		Approved by: Quality Manager
Test Report S/N: 1C2106080051-03.BCG	Test Dates: 6/7/2021 - 7/30/2021	EUT Type: Tablet Device	Page 37 of 158



Plot 7-47. Occupied Bandwidth Plot (LTE Band 13 - 10MHz 16-QAM - Full RB Configuration)




Plot 7-48. Occupied Bandwidth Plot (LTE Band 13 - 10MHz 64-QAM - Full RB Configuration)

FCC ID: BCGA2603	<b>PART 27 MEASUREMENT REPORT</b>		Approved by: Quality Manager
Test Report S/N: 1C2106080051-03.BCG	Test Dates: 6/7/2021 - 7/30/2021	EUT Type: Tablet Device	Page 38 of 158

## WCDMA AWS



Plot 7-49. Occupied Bandwidth Plot (WCDMA, Ch. 1413)

FCC ID: BCGA2603	 <b>PART 27 MEASUREMENT REPORT</b>		Approved by: Quality Manager
Test Report S/N: 1C2106080051-03.BCG	Test Dates: 6/7/2021 - 7/30/2021	EUT Type: Tablet Device	Page 39 of 158

## 7.3 Spurious and Harmonic Emissions at Antenna Terminal

### \$2.1051, \$27.53

#### Test Overview

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

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

#### Test Procedure Used

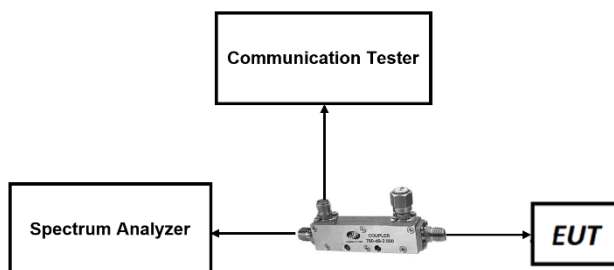
KDB 971168 D01 v03r01 – Section 6.0

#### Test Settings


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

#### Test Setup

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




**Figure 7-2. Test Instrument & Measurement Setup**

FCC ID: BCGA2603	 <b>PART 27 MEASUREMENT REPORT</b>		Approved by: Quality Manager
Test Report S/N: 1C2106080051-03.BCG	Test Dates: 6/7/2021 - 7/30/2021	EUT Type: Tablet Device	Page 40 of 158

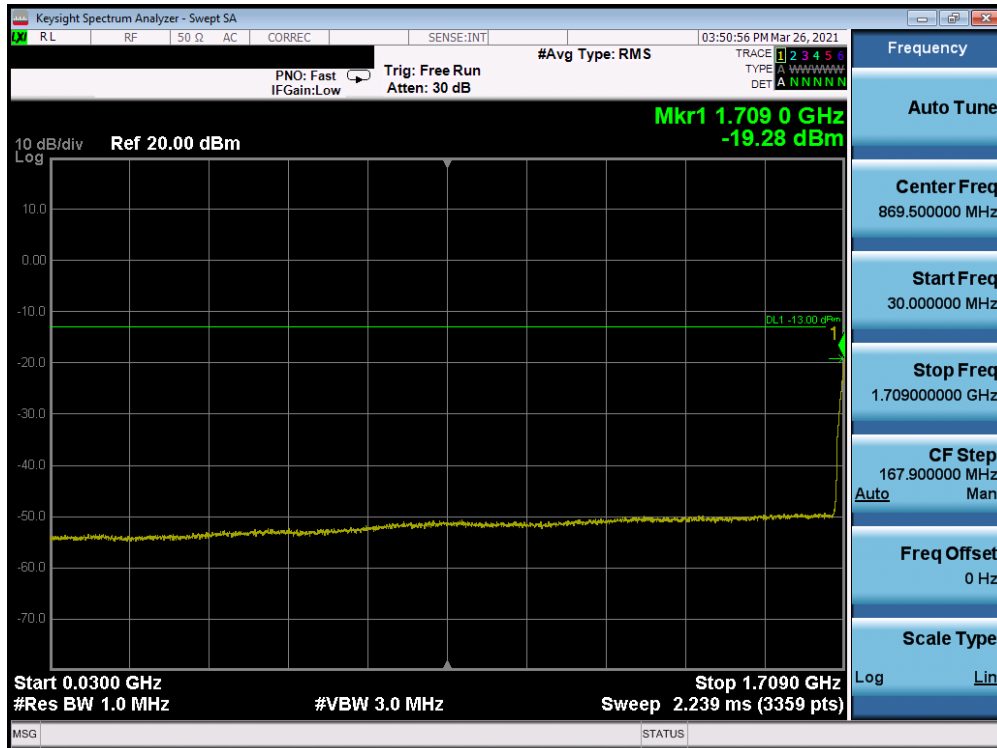


## Test Notes

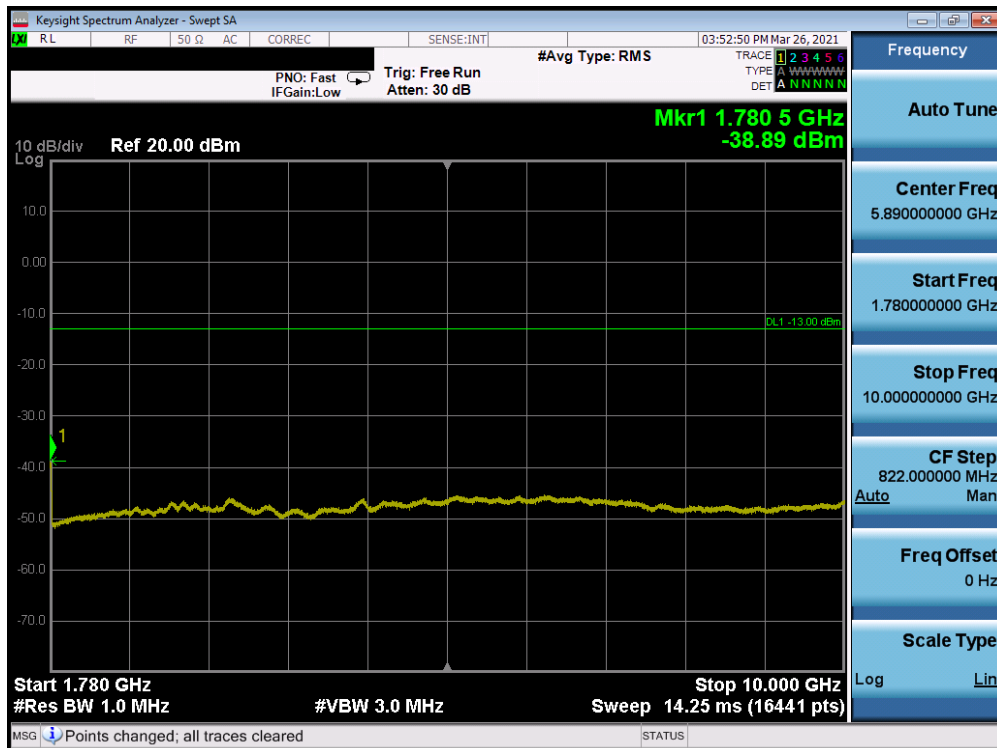
1. Per Part 27, compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth 100 kHz or greater for measurements below 1GHz. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. 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.

<b>FCC ID:</b> BCGA2603	 <b>PART 27 MEASUREMENT REPORT</b>		<b>Approved by:</b> Quality Manager
<b>Test Report S/N:</b> 1C2106080051-03.BCG	<b>Test Dates:</b> 6/7/2021 - 7/30/2021	<b>EUT Type:</b> Tablet Device	Page 41 of 158


## LTE Band 66/4

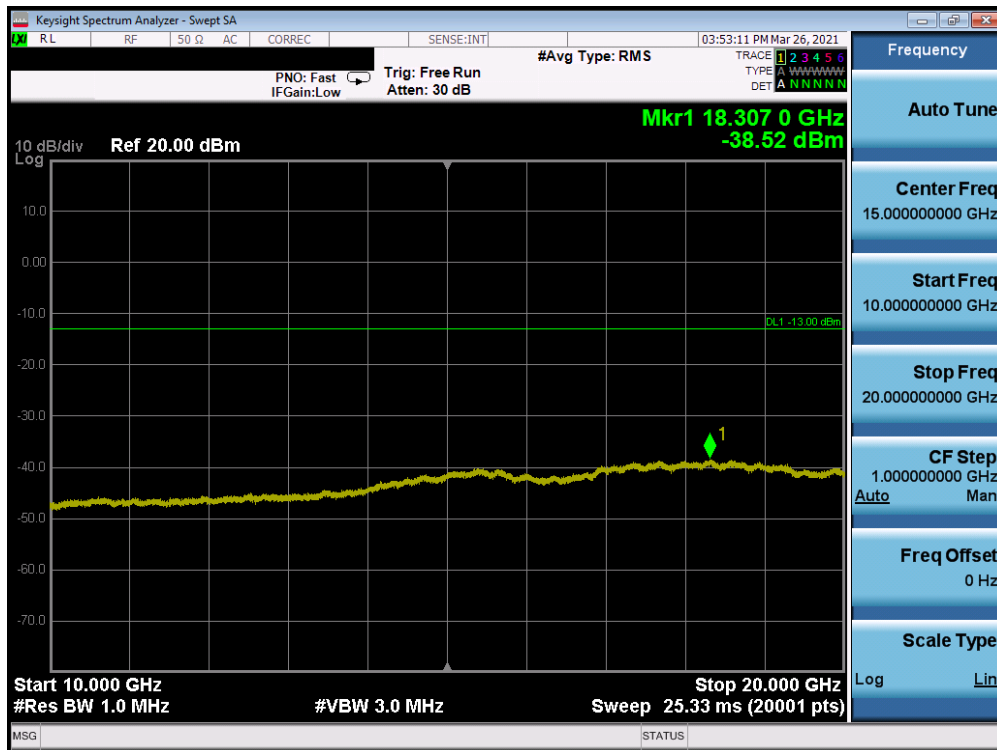


Plot 7-50. CSE (LTE Band 66/4 - 20MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)

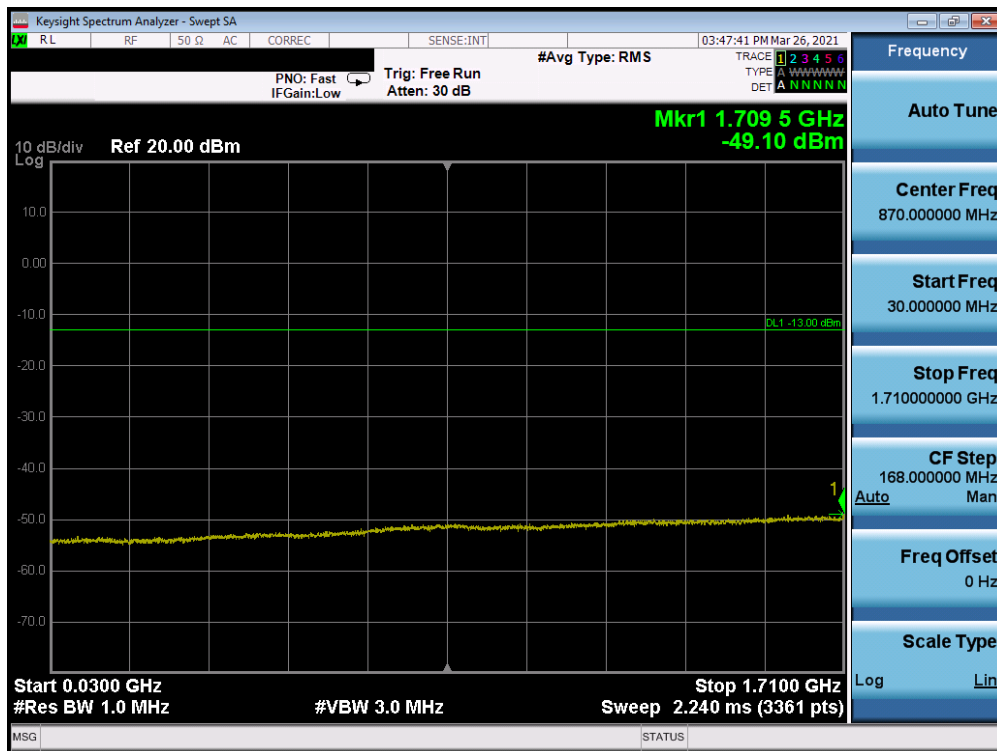


Plot 7-51. CSE (LTE Band 66/4 - 20MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)


FCC ID: BCGA2603	 <b>PART 27 MEASUREMENT REPORT</b>		Approved by: Quality Manager
Test Report S/N: 1C2106080051-03.BCG	Test Dates: 6/7/2021 - 7/30/2021	EUT Type: Tablet Device	Page 42 of 158

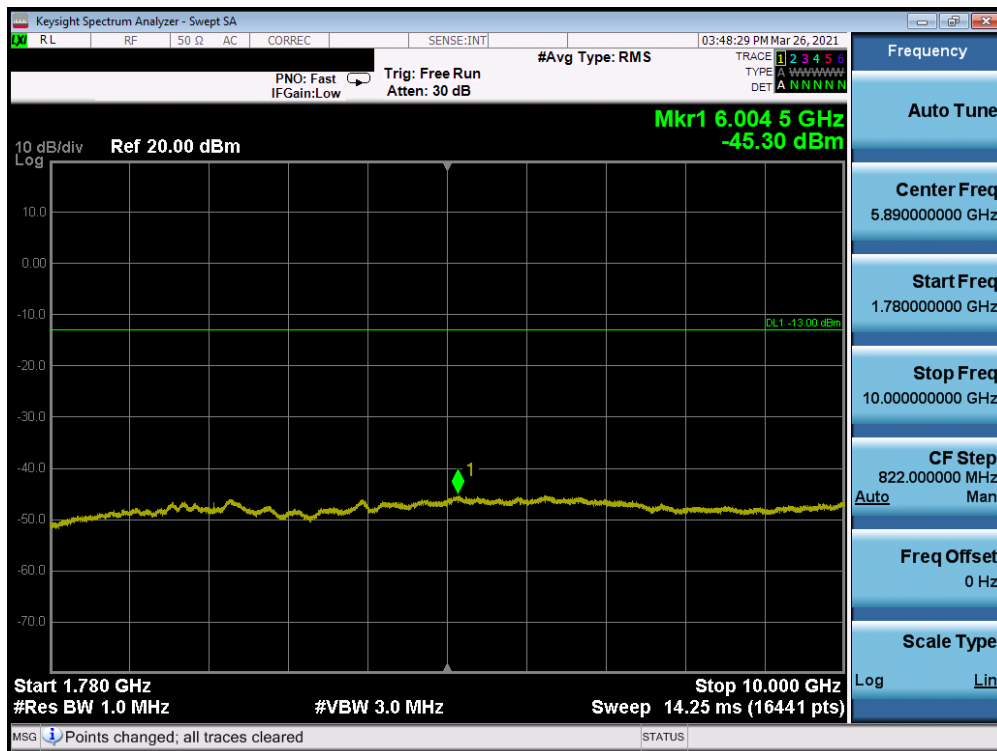


Plot 7-52. CSE (LTE Band 66/4 - 20MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)

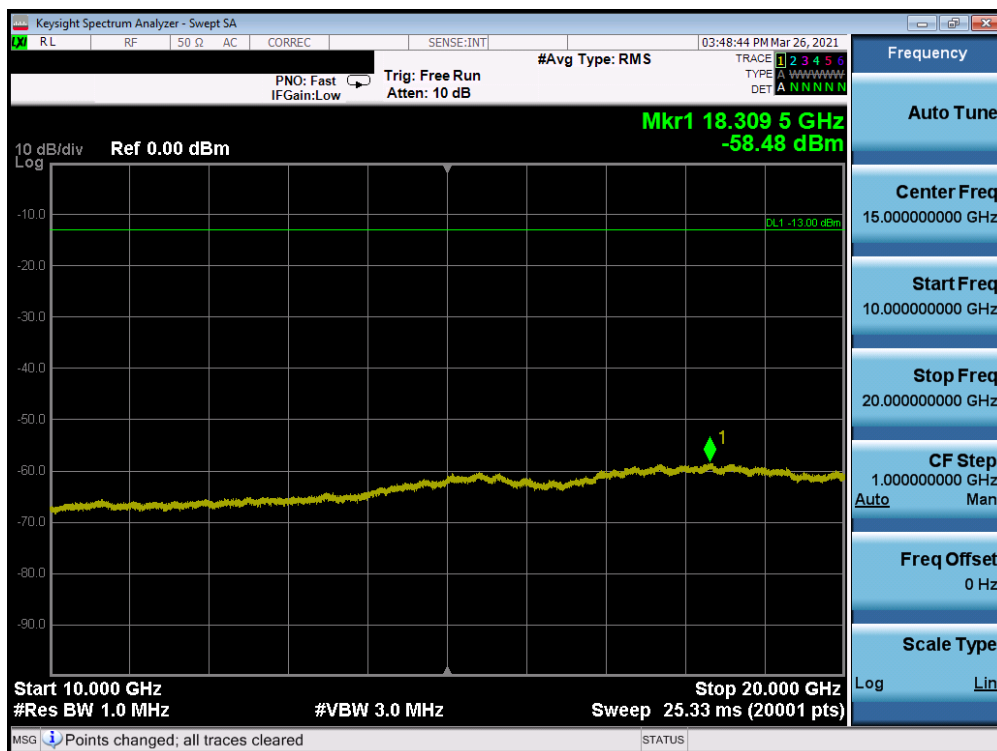


Plot 7-53. CSE (LTE Band 66/4 - 20MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)


FCC ID: BCGA2603	 <b>PART 27 MEASUREMENT REPORT</b>		Approved by: Quality Manager
Test Report S/N: 1C2106080051-03.BCG	Test Dates: 6/7/2021 - 7/30/2021	EUT Type: Tablet Device	Page 43 of 158

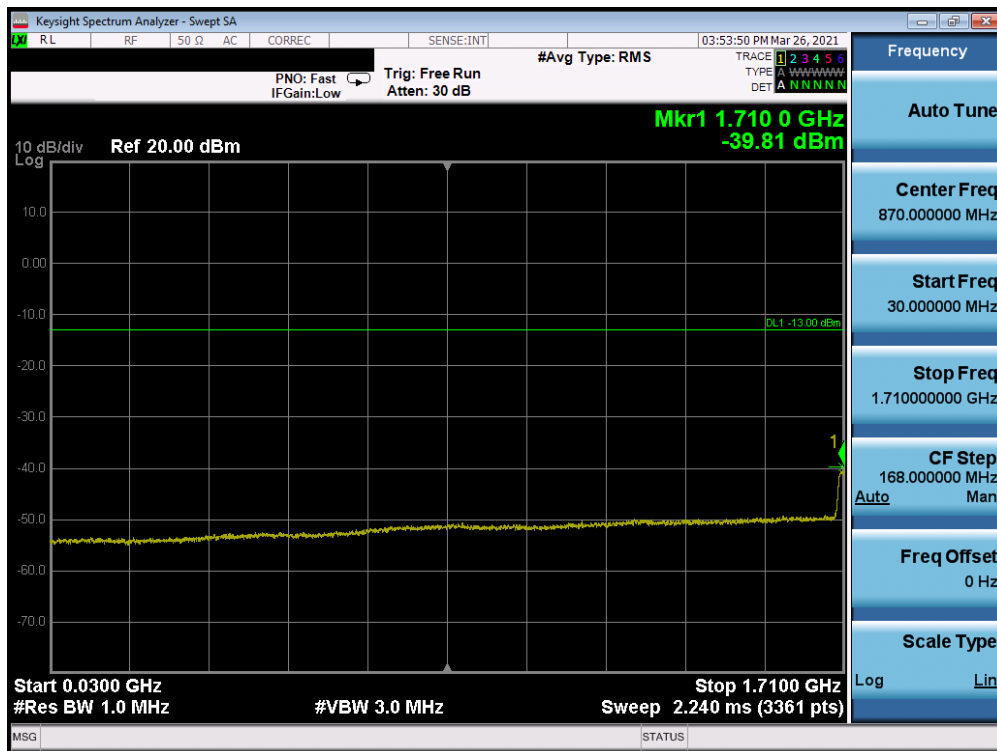


Plot 7-54. CSE (LTE Band 66/4 - 20MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

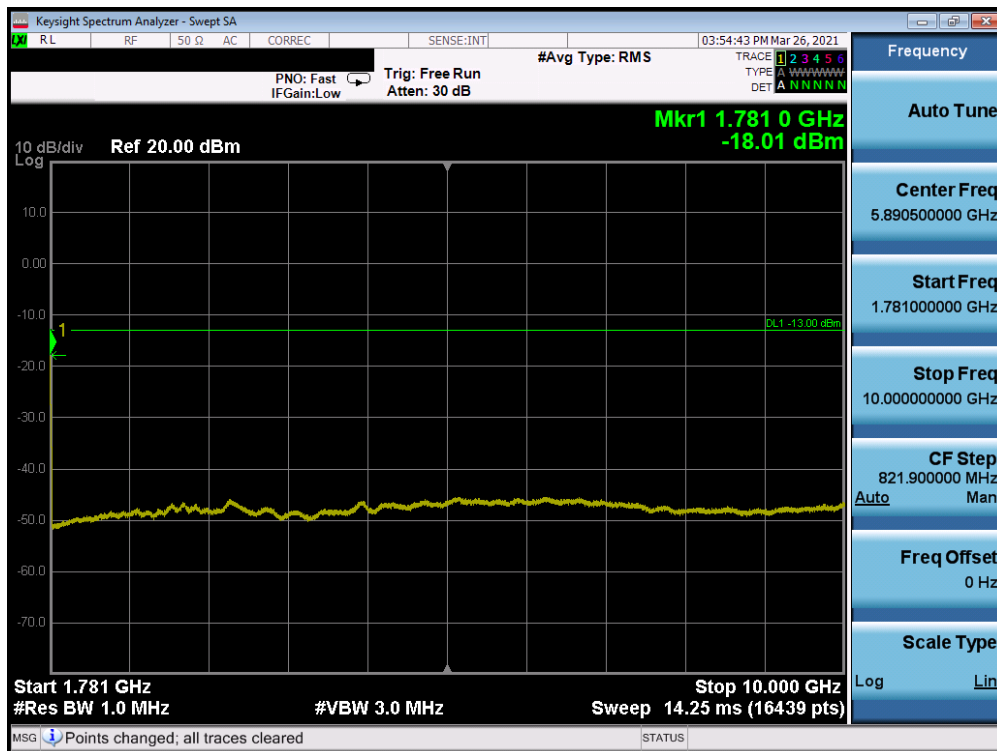


Plot 7-55. CSE (LTE Band 66/4 - 20MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)


FCC ID: BCGA2603	 <b>PART 27 MEASUREMENT REPORT</b>		Approved by: Quality Manager
Test Report S/N: 1C2106080051-03.BCG	Test Dates: 6/7/2021 - 7/30/2021	EUT Type: Tablet Device	Page 44 of 158

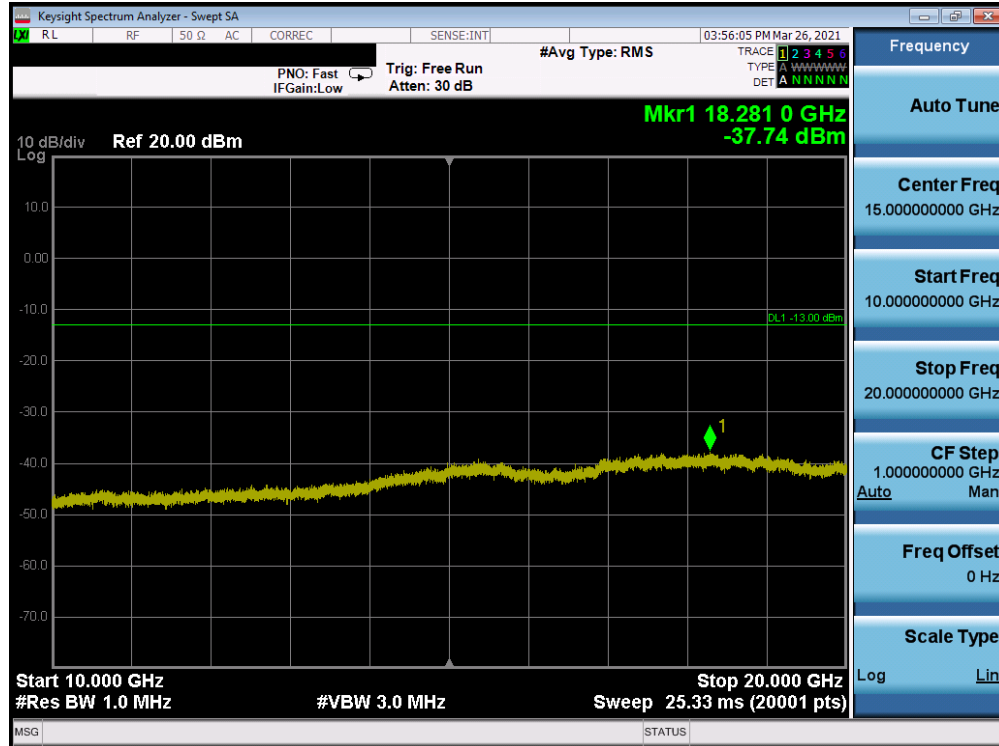


Plot 7-56. CSE (LTE Band 66/4 - 20MHz QPSK - RB Size 1, RB Offset 0 - High Channel)




Plot 7-57. CSE (LTE Band 66/4 - 20MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

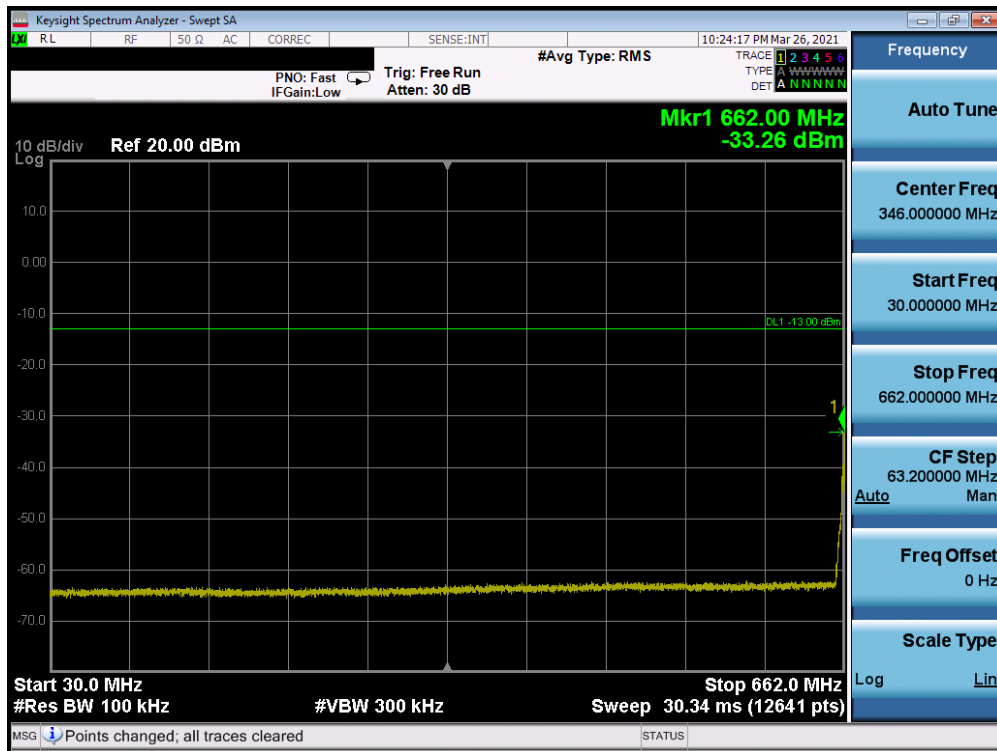
FCC ID: BCGA2603	 <b>PART 27 MEASUREMENT REPORT</b>		Approved by: Quality Manager
Test Report S/N: 1C2106080051-03.BCG	Test Dates: 6/7/2021 - 7/30/2021	EUT Type: Tablet Device	Page 45 of 158



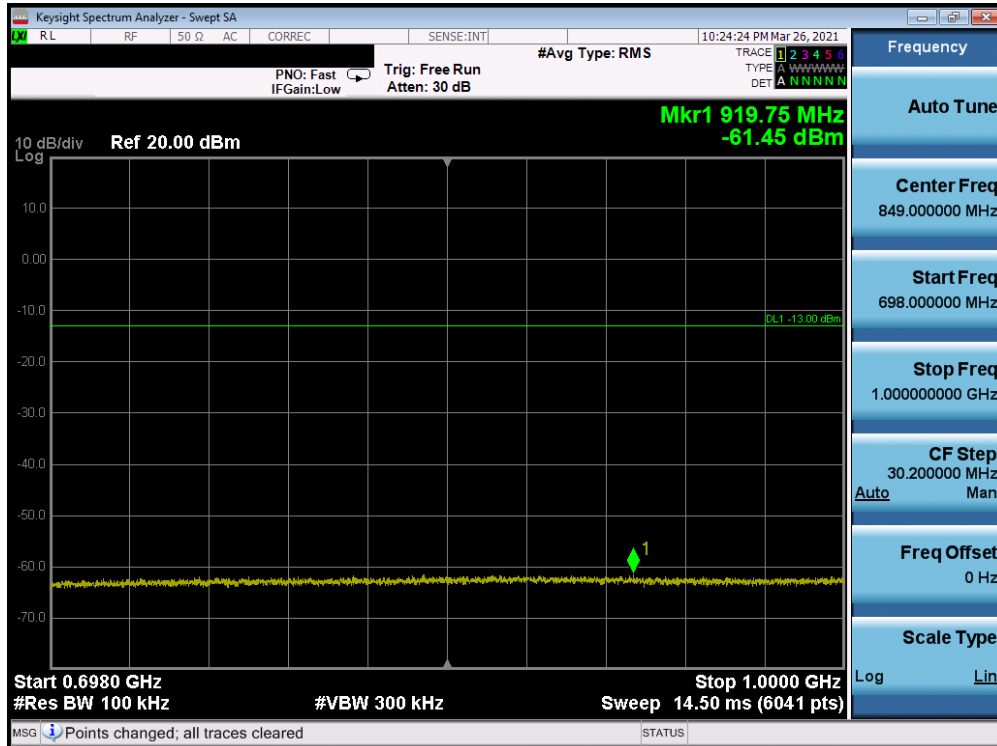
Plot 7-58. CSE (LTE Band 66/4 - 20MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

FCC ID: BCGA2603	 <b>PART 27 MEASUREMENT REPORT</b>		Approved by: Quality Manager
Test Report S/N: 1C2106080051-03.BCG	Test Dates: 6/7/2021 - 7/30/2021	EUT Type: Tablet Device	Page 46 of 158

## LTE Band 71

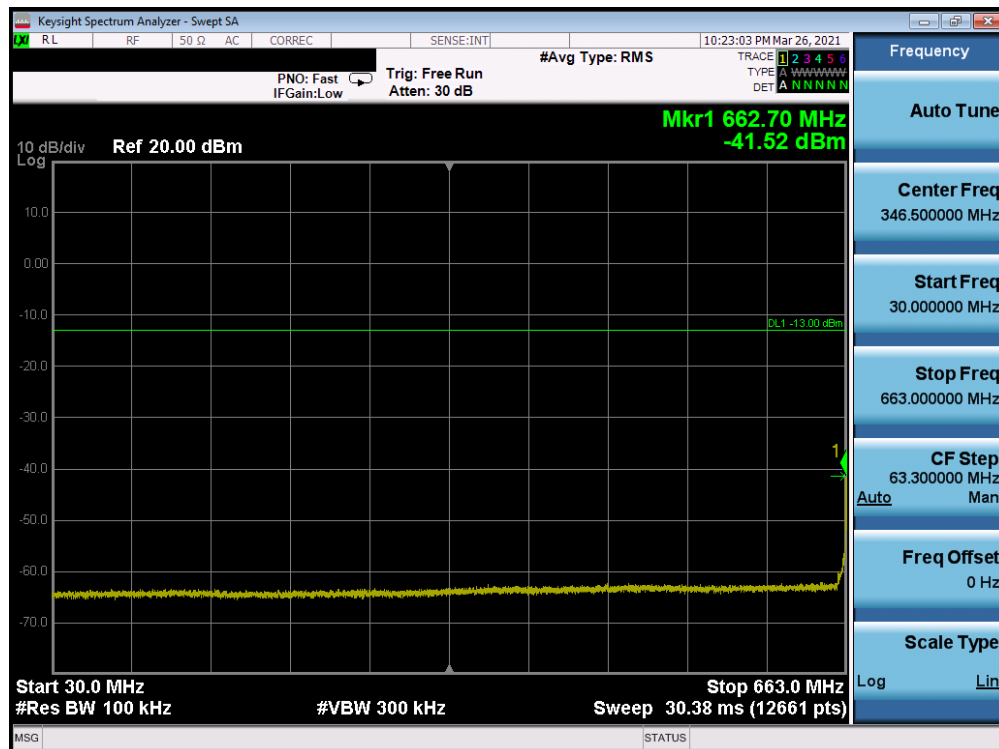
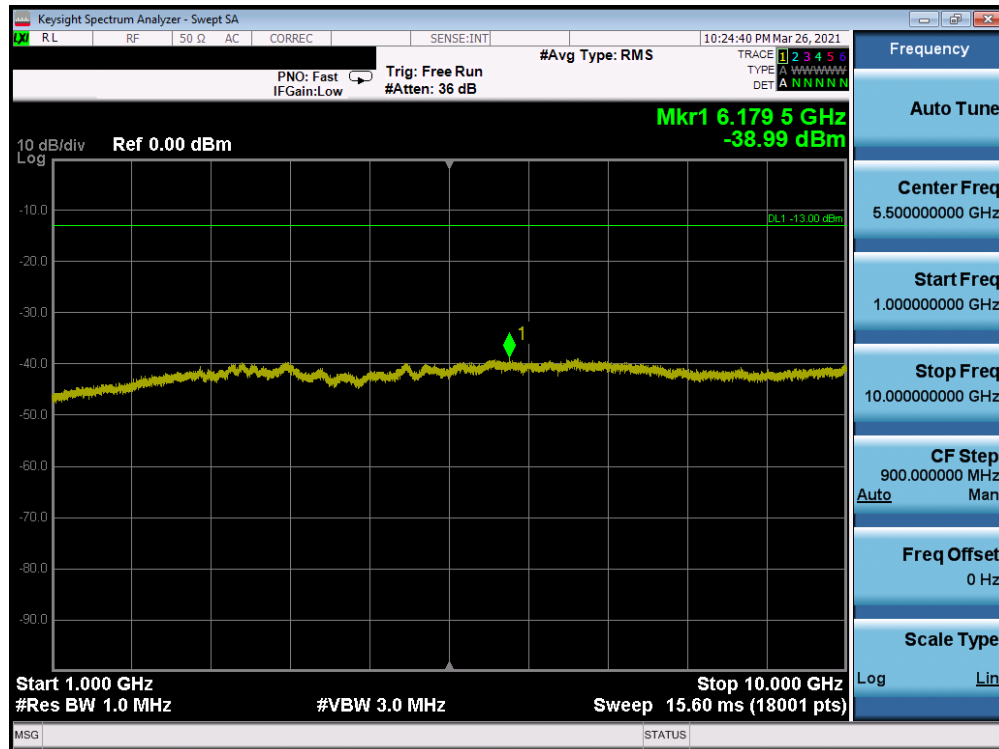



Plot 7-59. CSE (LTE Band 71 - 20MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



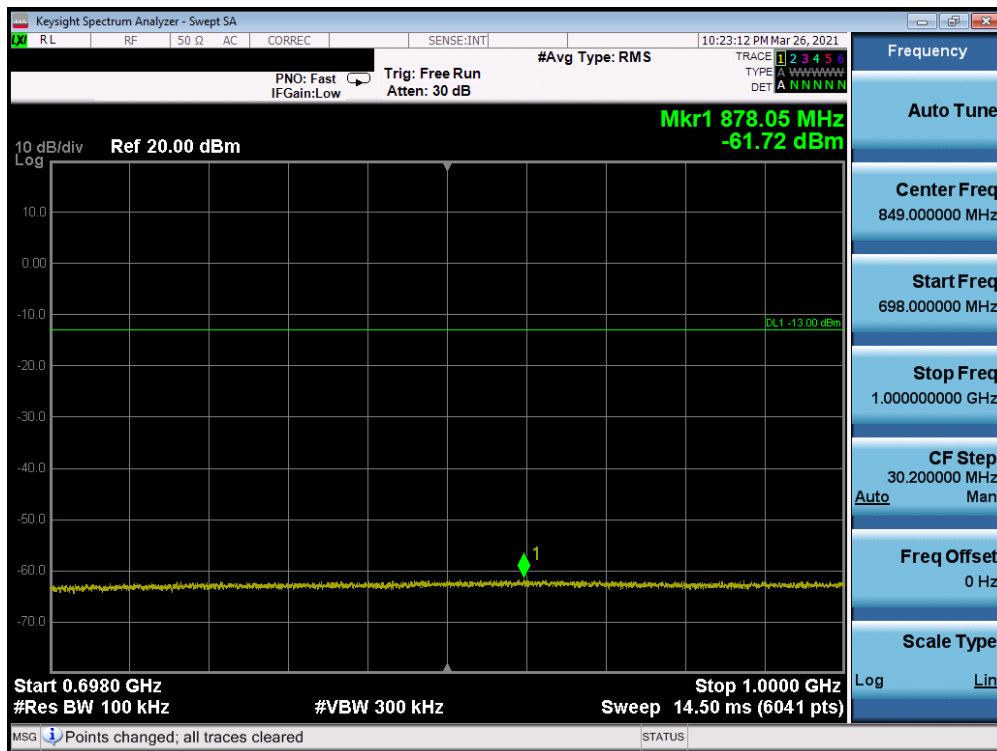
Plot 7-60. CSE (LTE Band 71 - 20MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)

FCC ID: BCGA2603	<b>PART 27 MEASUREMENT REPORT</b>		Approved by: Quality Manager
Test Report S/N: 1C2106080051-03.BCG	Test Dates: 6/7/2021 - 7/30/2021	EUT Type: Tablet Device	Page 47 of 158

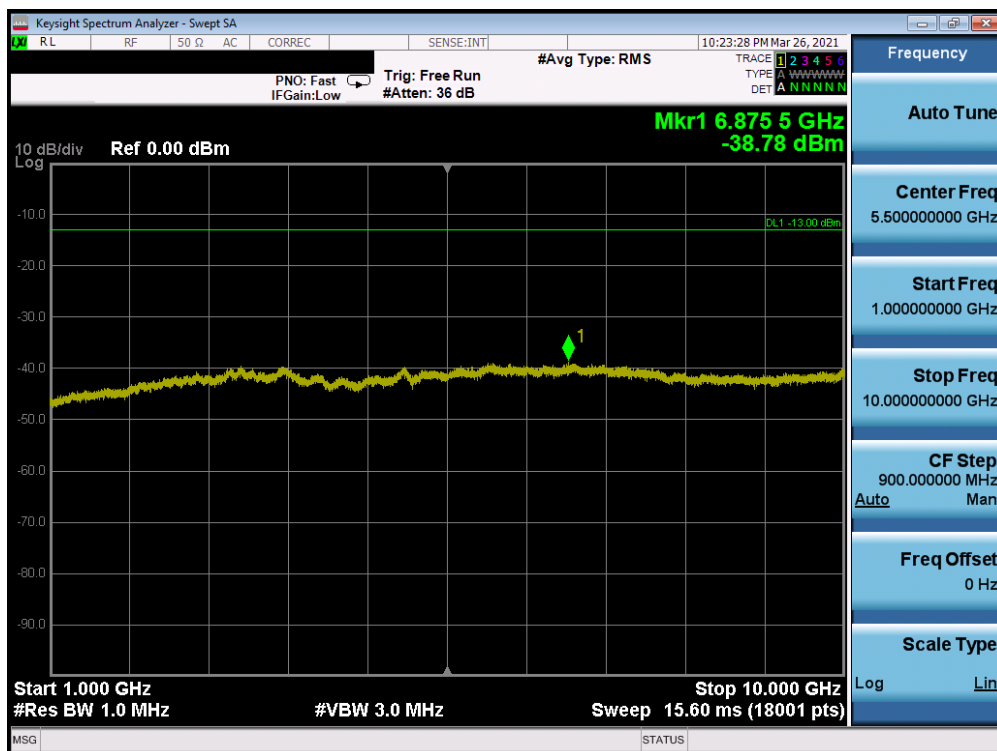


FCC ID: BCGA2603	 <b>PART 27 MEASUREMENT REPORT</b>		Approved by: Quality Manager
Test Report S/N: 1C2106080051-03.BCG	Test Dates: 6/7/2021 - 7/30/2021	EUT Type: Tablet Device	Page 48 of 158




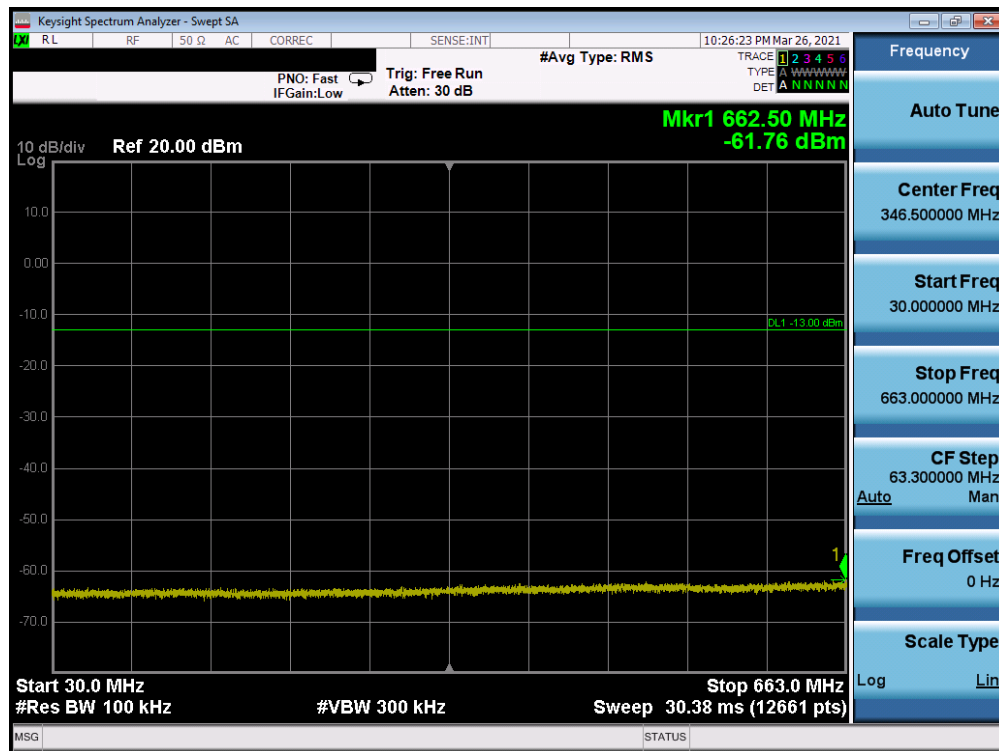


Plot 7-63. CSE (LTE Band 71 - 20MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

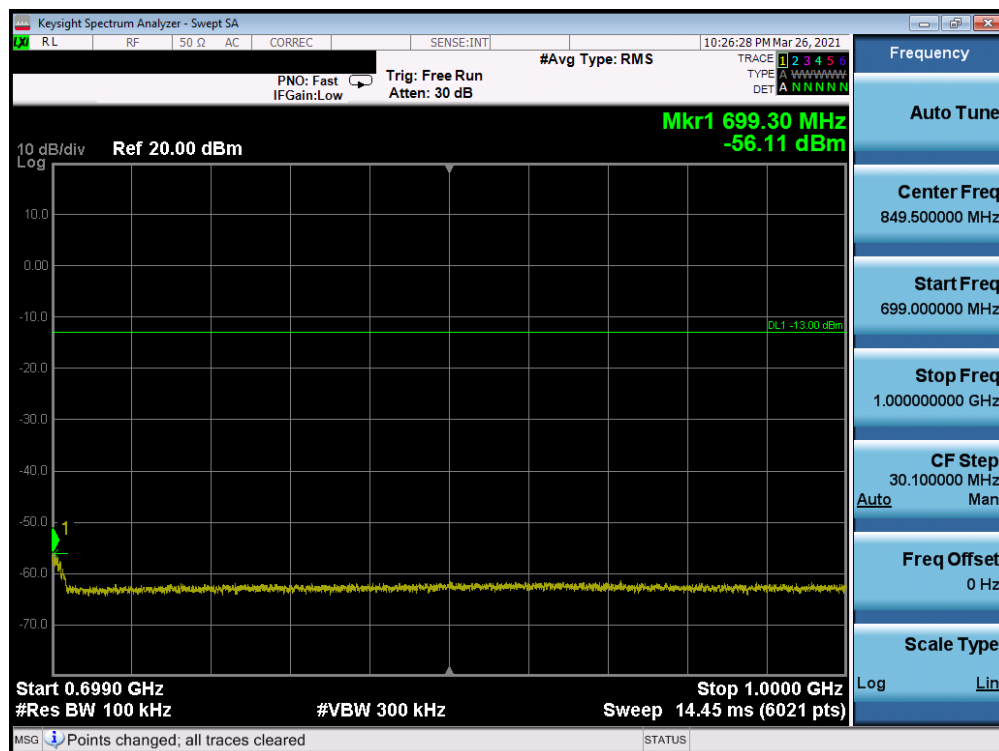


Plot 7-64. CSE (LTE Band 71 - 20MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)


FCC ID: BCGA2603	 <b>PART 27 MEASUREMENT REPORT</b>		Approved by: Quality Manager
Test Report S/N: 1C2106080051-03.BCG	Test Dates: 6/7/2021 - 7/30/2021	EUT Type: Tablet Device	Page 49 of 158

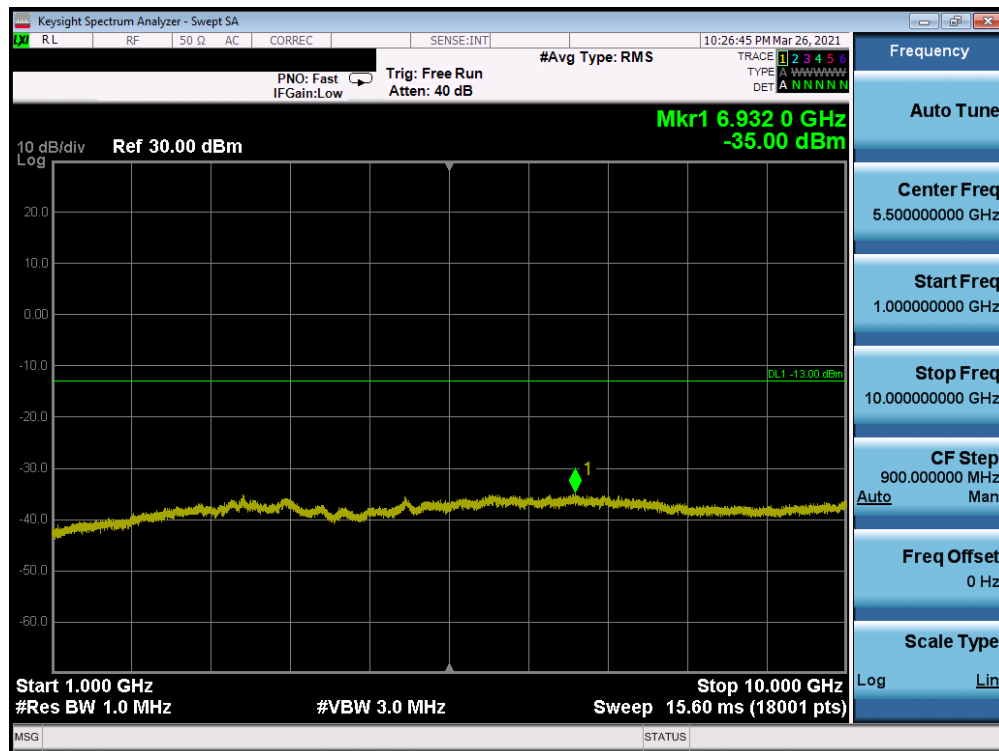


Plot 7-65. CSE (LTE Band 71 - 20MHz QPSK - RB Size 1, RB Offset 0 - High Channel)




Plot 7-66. CSE (LTE Band 71 - 20MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

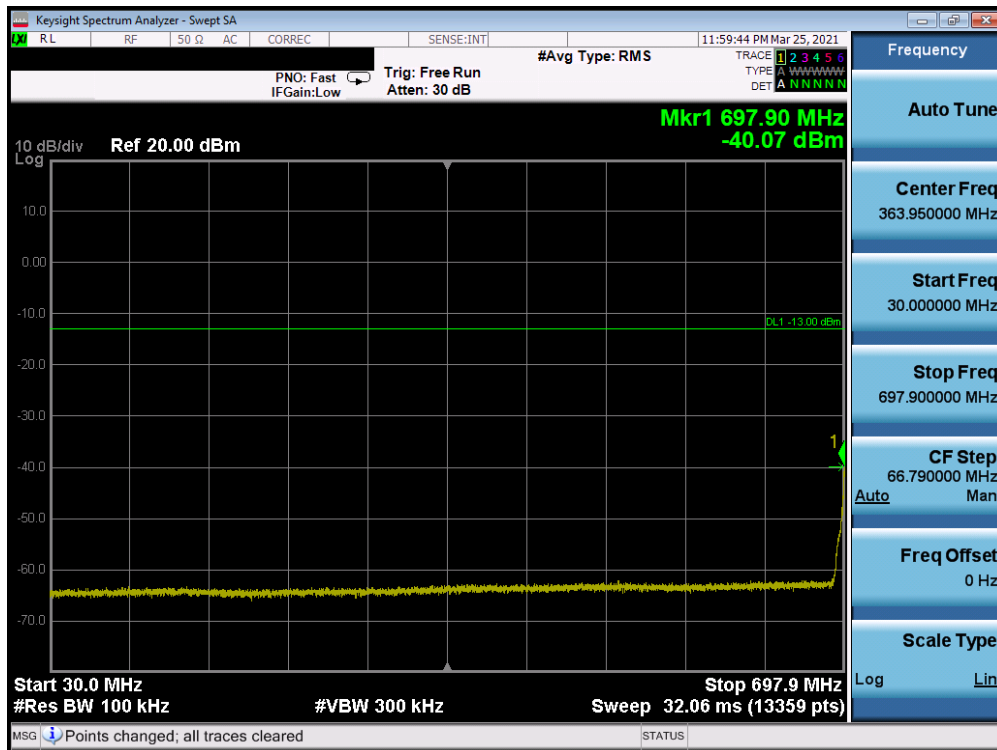
FCC ID: BCGA2603	 <b>PART 27 MEASUREMENT REPORT</b>		Approved by: Quality Manager
Test Report S/N: 1C2106080051-03.BCG	Test Dates: 6/7/2021 - 7/30/2021	EUT Type: Tablet Device	Page 50 of 158



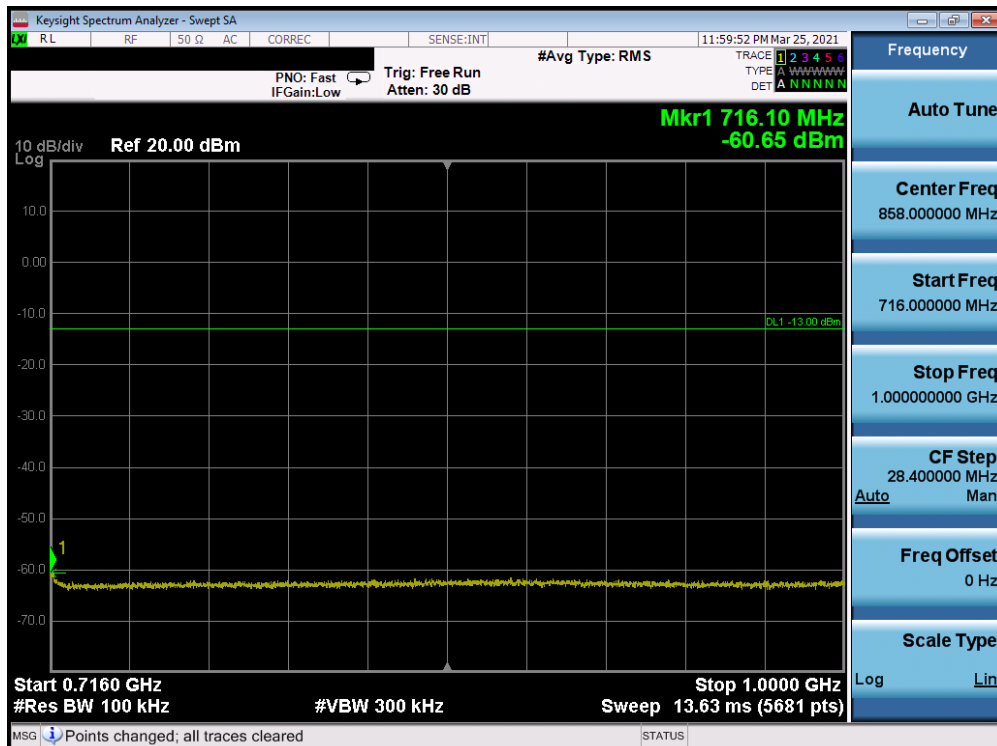
Plot 7-67. CSE (LTE Band 71 - 20MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

FCC ID: BCGA2603	 <b>PART 27 MEASUREMENT REPORT</b>		Approved by: Quality Manager
Test Report S/N: 1C2106080051-03.BCG	Test Dates: 6/7/2021 - 7/30/2021	EUT Type: Tablet Device	Page 51 of 158


## LTE Band 12/17

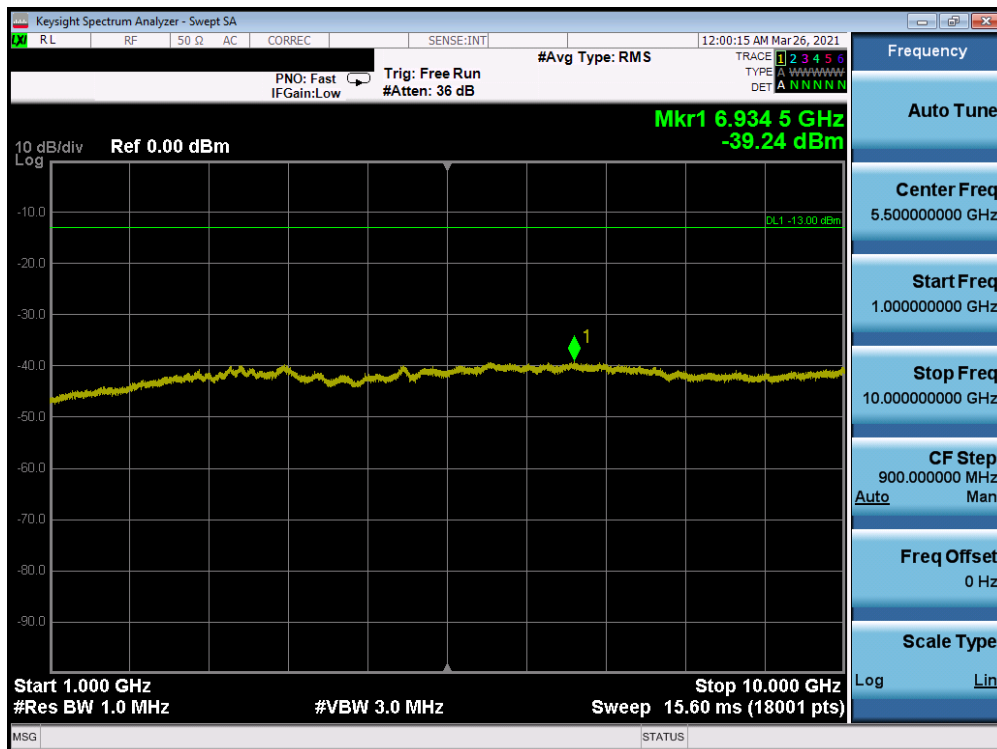


Plot 7-68. CSE (LTE Band 12/17 - 10MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)

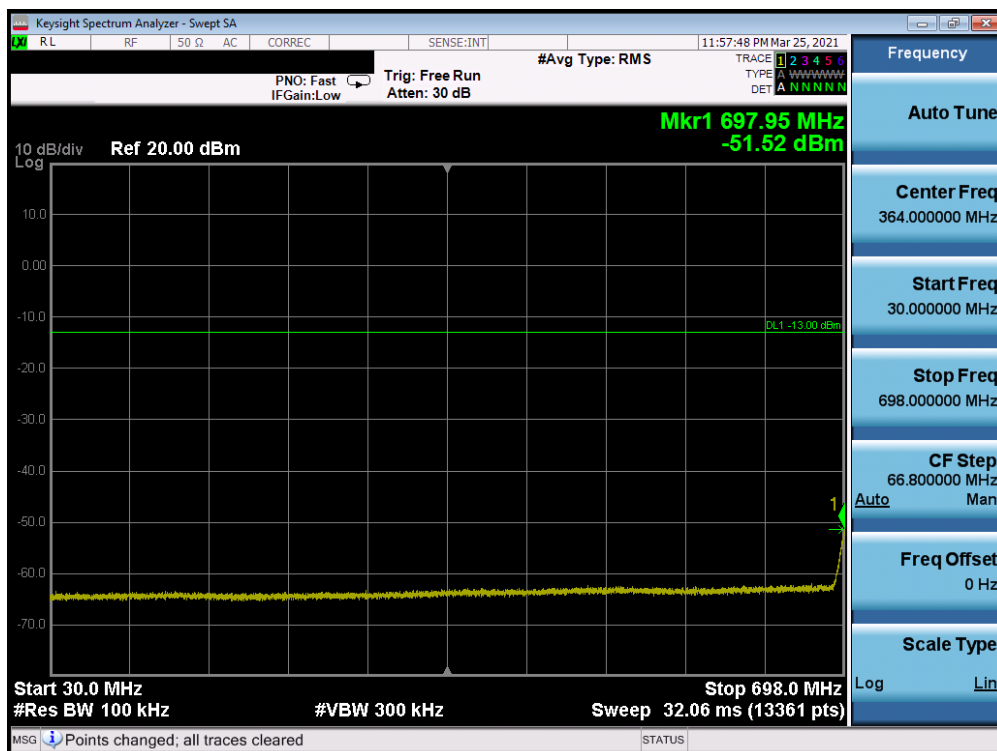


Plot 7-69. CSE (LTE Band 12/17 - 10MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)


FCC ID: BCGA2603	 <b>PART 27 MEASUREMENT REPORT</b>		Approved by: Quality Manager
Test Report S/N: 1C2106080051-03.BCG	Test Dates: 6/7/2021 - 7/30/2021	EUT Type: Tablet Device	Page 52 of 158

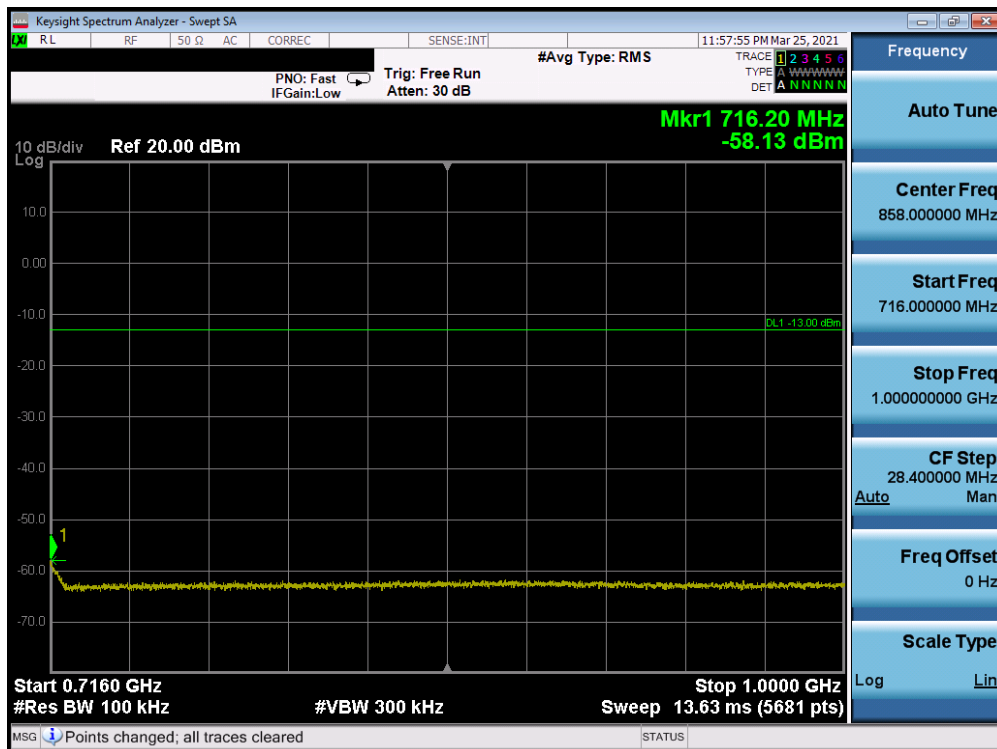


Plot 7-70. CSE (LTE Band 12/17 - 10MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)

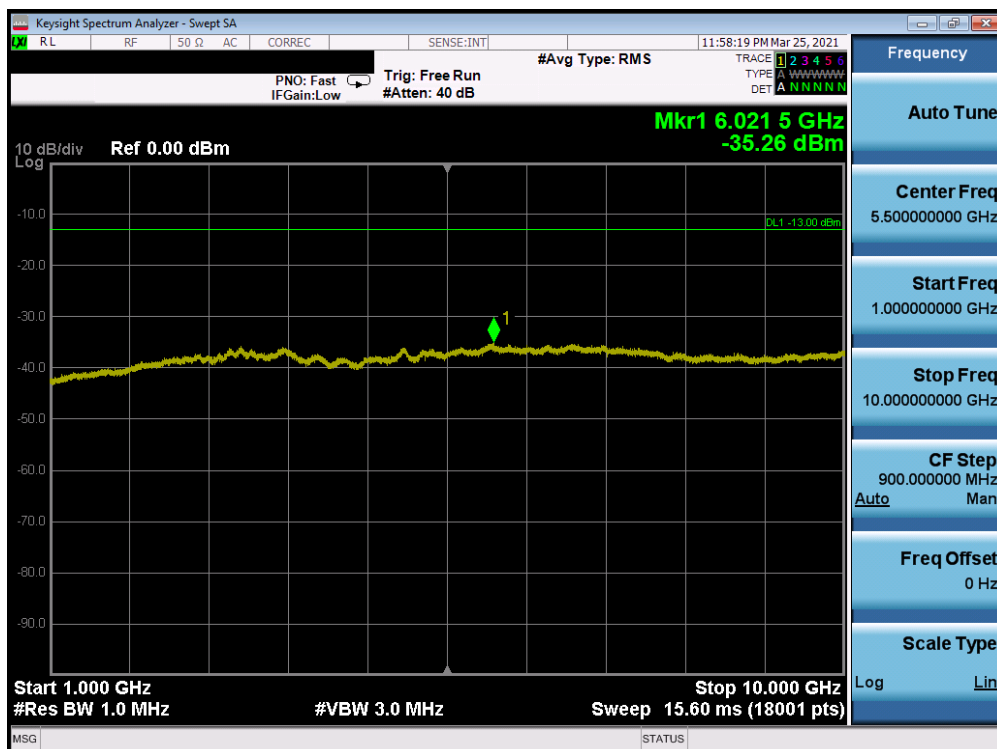


Plot 7-71. CSE (LTE Band 12/17 - 10MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

FCC ID: BCGA2603	 <b>PART 27 MEASUREMENT REPORT</b>		Approved by: Quality Manager
Test Report S/N: 1C2106080051-03.BCG	Test Dates: 6/7/2021 - 7/30/2021	EUT Type: Tablet Device	Page 53 of 158

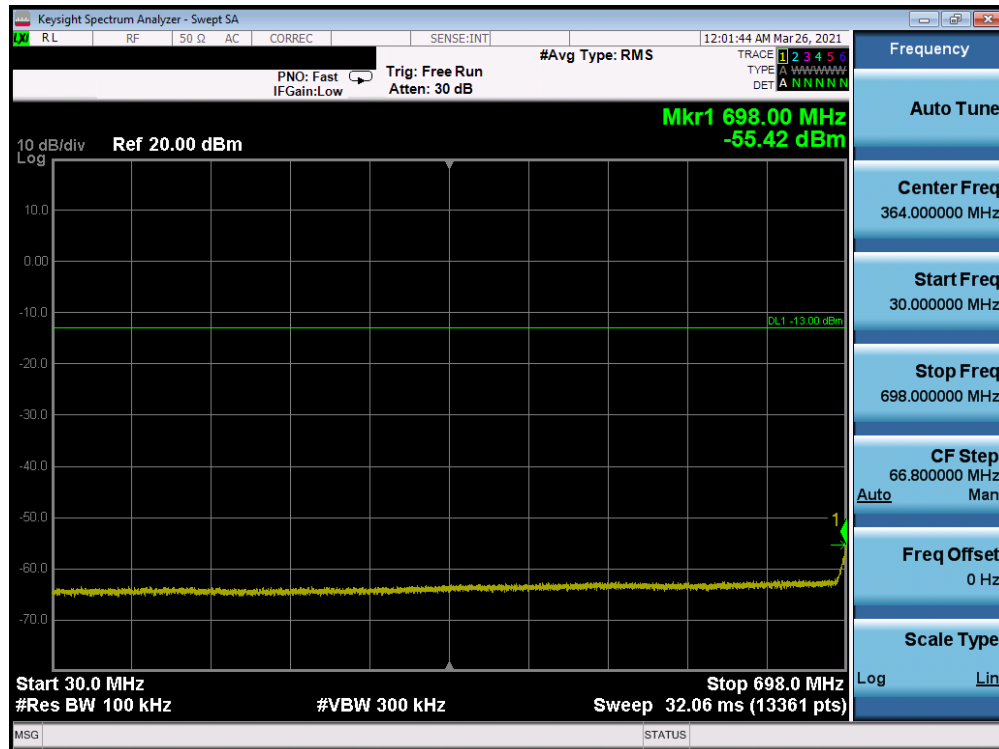


Plot 7-72. CSE (LTE Band 12/17 - 10MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

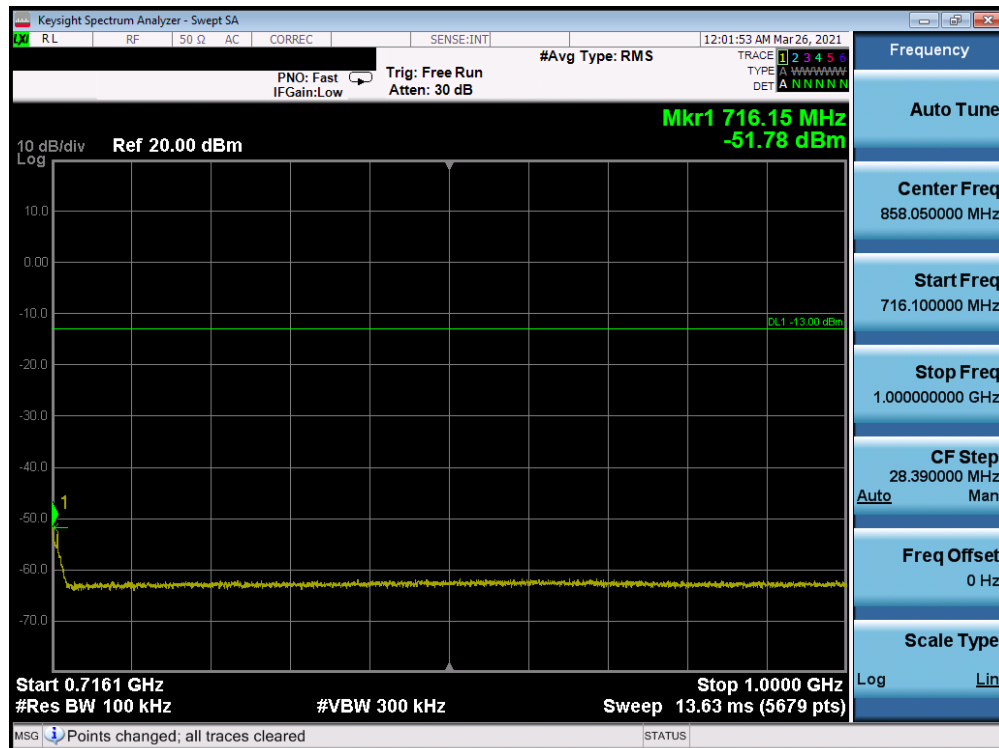


Plot 7-73. CSE (LTE Band 12/17 - 10MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)


FCC ID: BCGA2603	<b>PART 27 MEASUREMENT REPORT</b>		Approved by: Quality Manager
Test Report S/N: 1C2106080051-03.BCG	Test Dates: 6/7/2021 - 7/30/2021	EUT Type: Tablet Device	Page 54 of 158

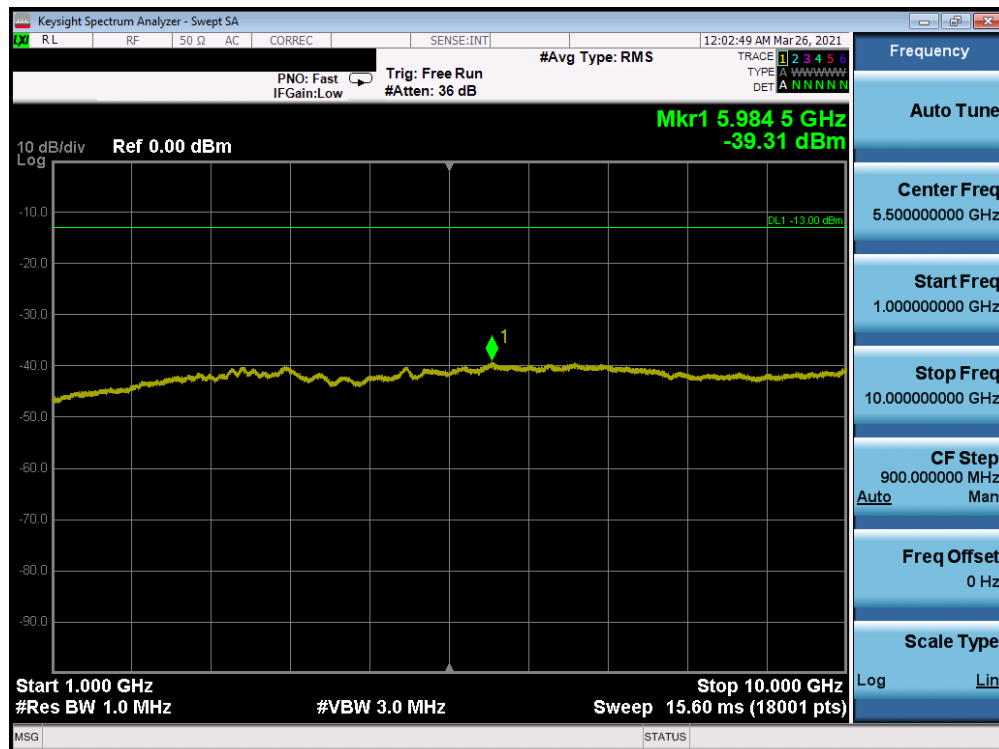


Plot 7-74. CSE (LTE Band 12/17 - 10MHz QPSK - RB Size 1, RB Offset 0 - High Channel)




Plot 7-75. CSE (LTE Band 12/17 - 10MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

FCC ID: BCGA2603	 <b>PART 27 MEASUREMENT REPORT</b>		Approved by: Quality Manager
Test Report S/N: 1C2106080051-03.BCG	Test Dates: 6/7/2021 - 7/30/2021	EUT Type: Tablet Device	Page 55 of 158

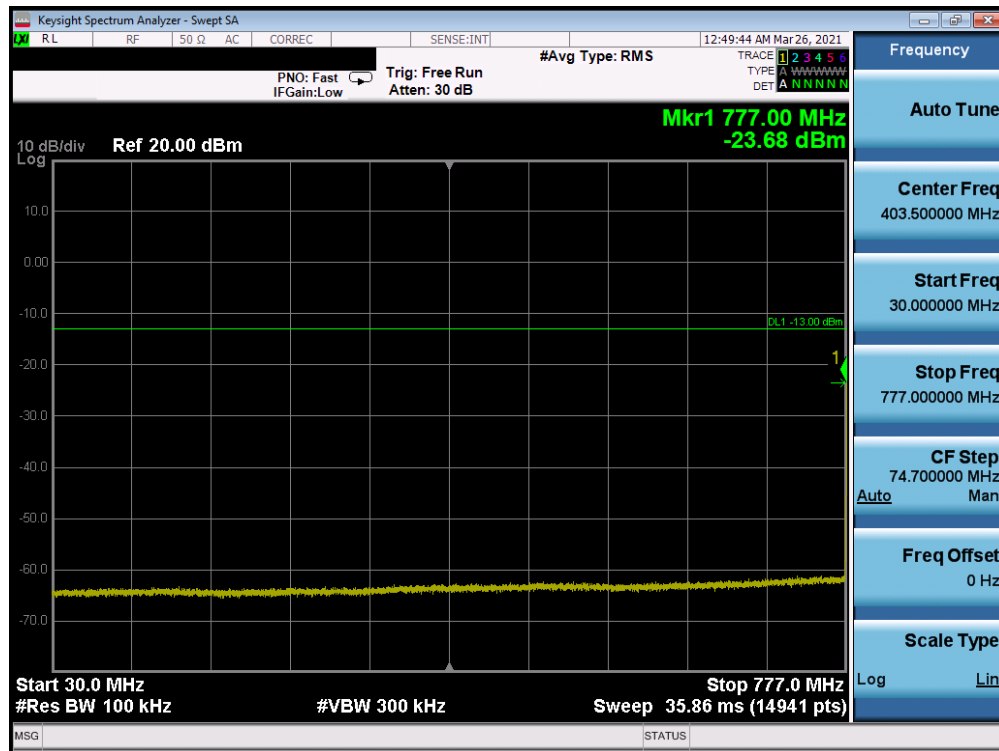


Plot 7-76. CSE (LTE Band 12/17 - 10MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

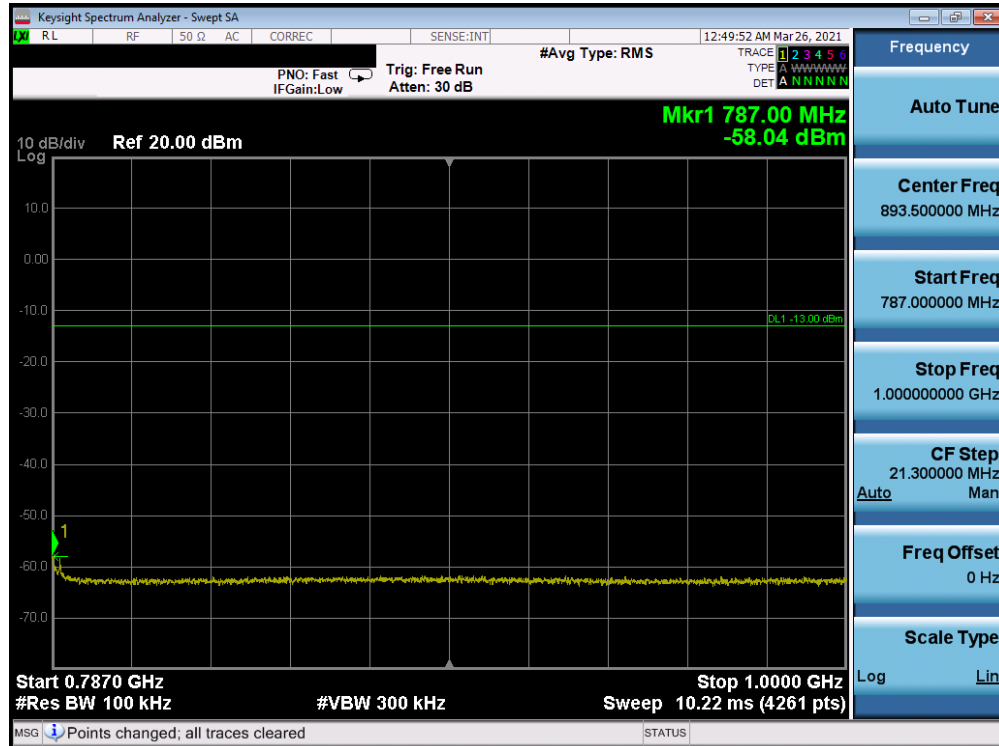
FCC ID: BCGA2603	 <b>PART 27 MEASUREMENT REPORT</b>		Approved by: Quality Manager
Test Report S/N: 1C2106080051-03.BCG	Test Dates: 6/7/2021 - 7/30/2021	EUT Type: Tablet Device	Page 56 of 158



## LTE Band 13

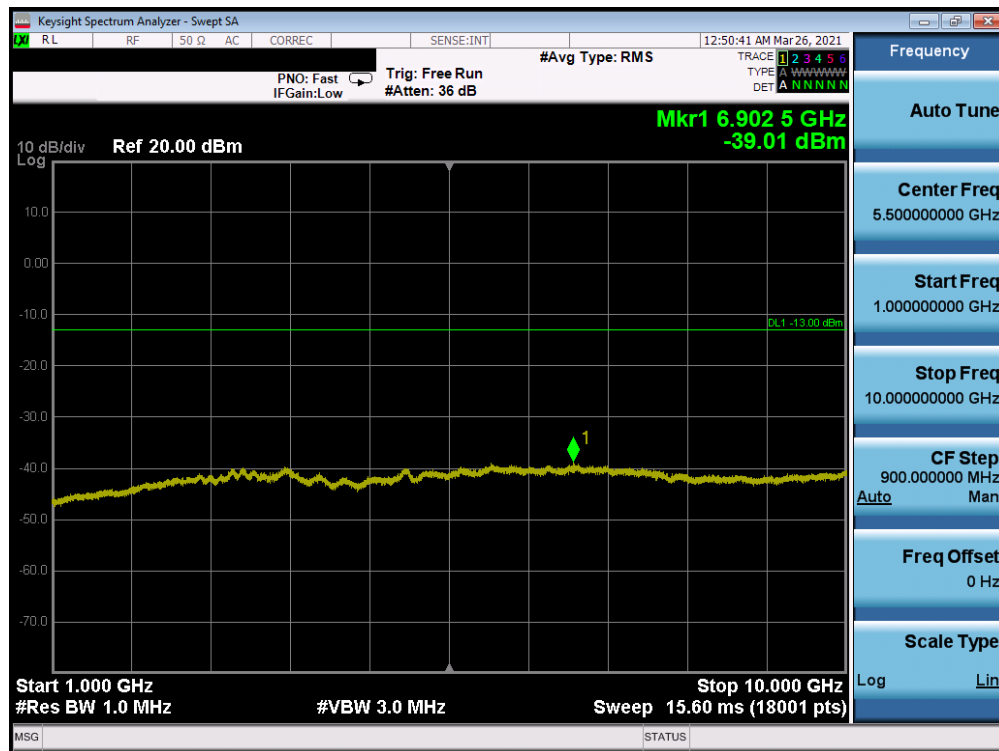


Plot 7-77. CSE (LTE Band 13 - 10MHz QPSK - RB Size 1, RB Offset 0)




Plot 7-78. CSE (LTE Band 13 - 10MHz QPSK - RB Size 1, RB Offset 0)

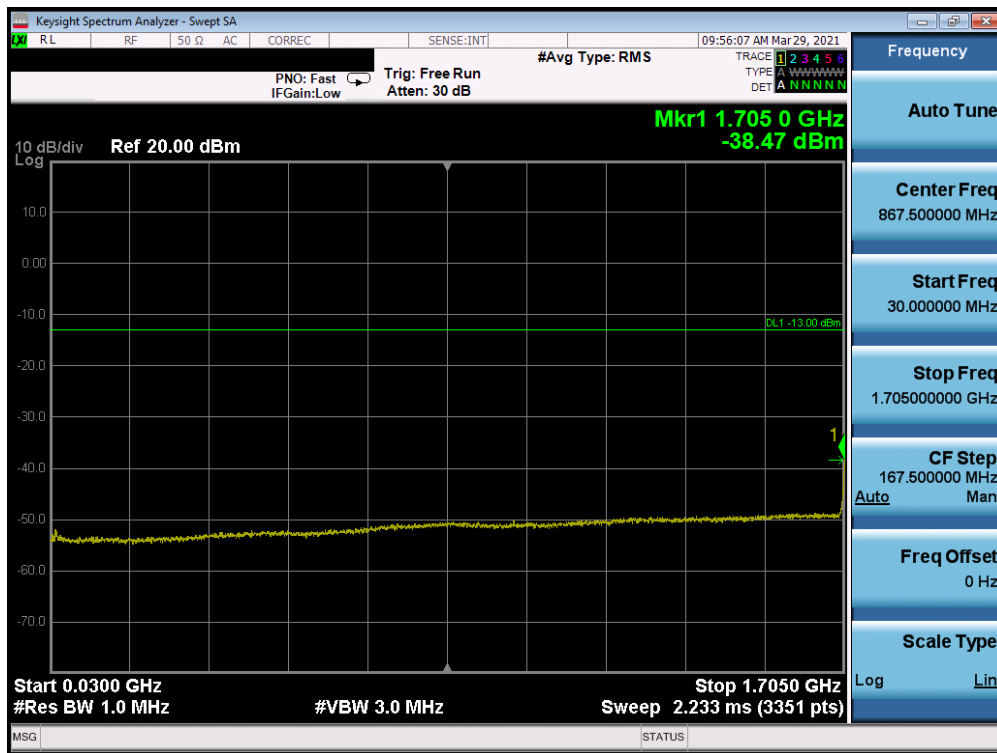
FCC ID: BCGA2603	<b>PART 27 MEASUREMENT REPORT</b>		Approved by: Quality Manager
Test Report S/N: 1C2106080051-03.BCG	Test Dates: 6/7/2021 - 7/30/2021	EUT Type: Tablet Device	Page 57 of 158



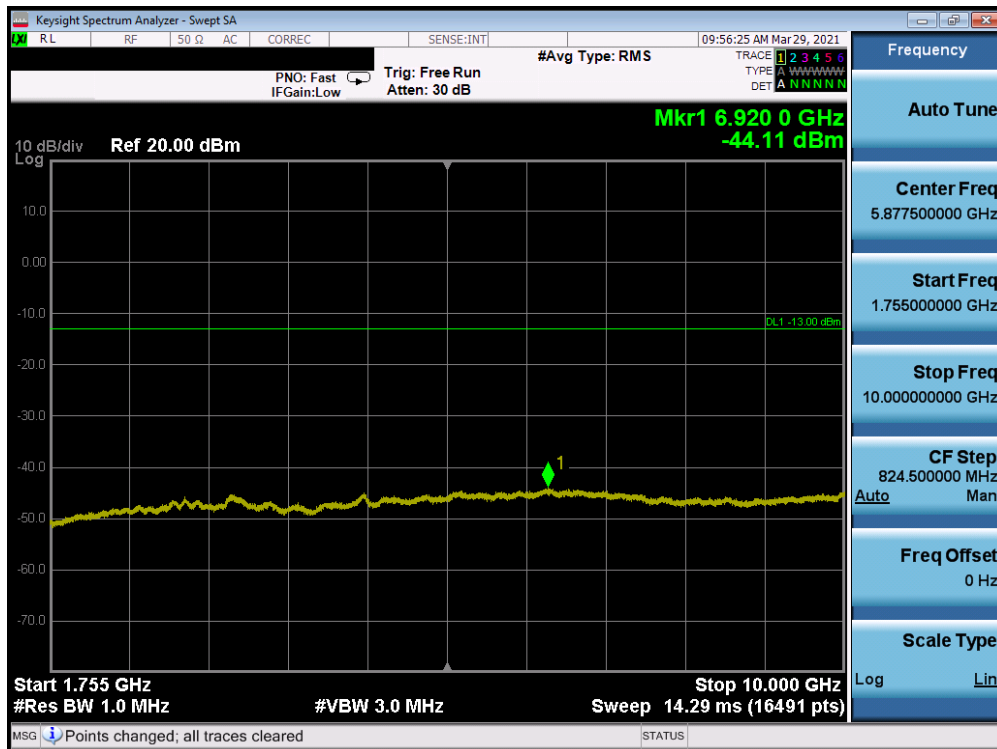
Plot 7-79. CSE (LTE Band 13 - 10MHz QPSK - RB Size 1, RB Offset 0)

FCC ID: BCGA2603	 <b>PART 27 MEASUREMENT REPORT</b>		Approved by: Quality Manager
Test Report S/N: 1C2106080051-03.BCG	Test Dates: 6/7/2021 - 7/30/2021	EUT Type: Tablet Device	Page 58 of 158

## WCDMA AWS

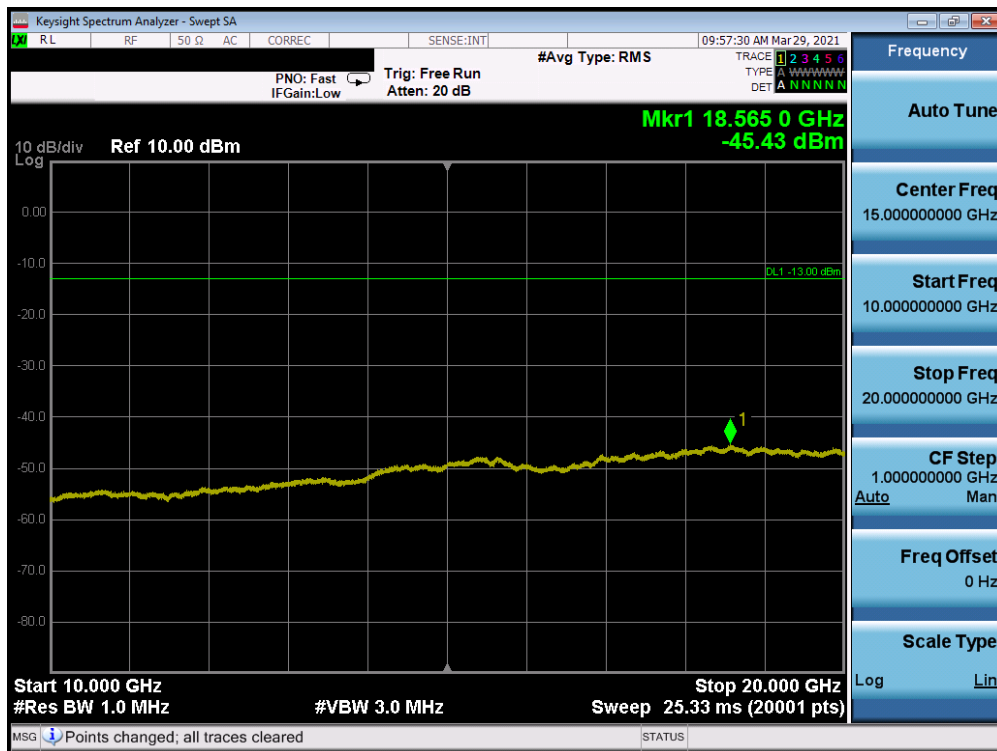


Plot 7-80. CSE (WCDMA Ch. 1312- Low Channel)

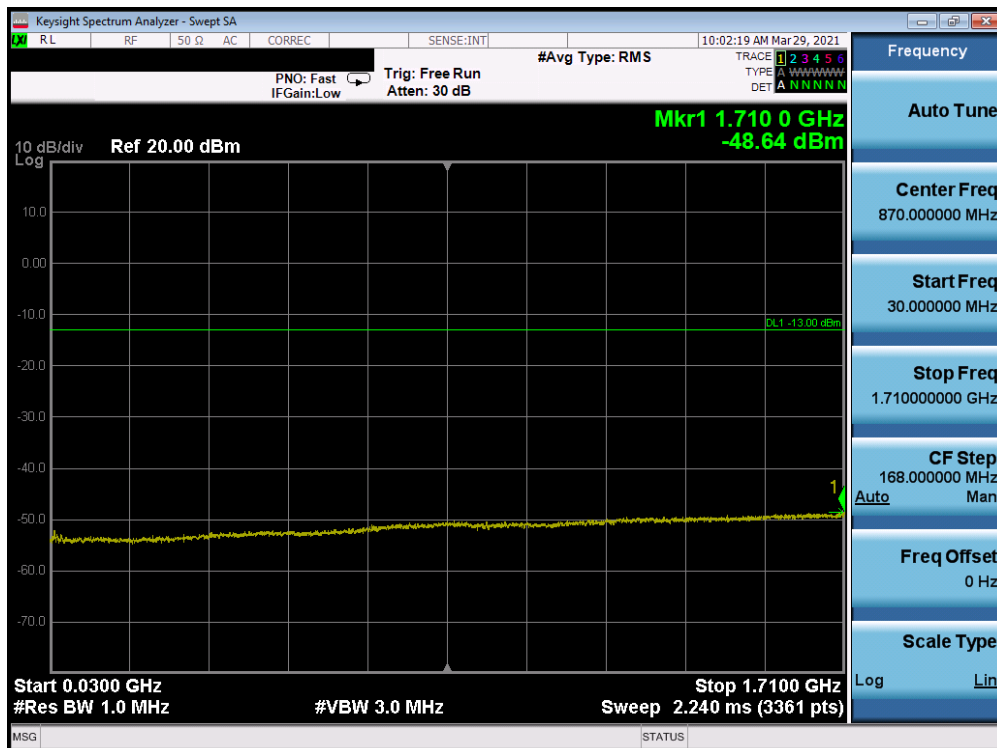


Plot 7-81. CSE (WCDMA Ch. 1312- Low Channel)


FCC ID: BCGA2603	<b>PART 27 MEASUREMENT REPORT</b>		Approved by: Quality Manager
Test Report S/N: 1C2106080051-03.BCG	Test Dates: 6/7/2021 - 7/30/2021	EUT Type: Tablet Device	Page 59 of 158



Plot 7-82. CSE (WCDMA Ch. 1312- Low Channel)



Plot 7-83. CSE (WCDMA Ch. 1413- Mid Channel)

FCC ID: BCGA2603	 <b>PART 27 MEASUREMENT REPORT</b>		Approved by: Quality Manager
Test Report S/N: 1C2106080051-03.BCG	Test Dates: 6/7/2021 - 7/30/2021	EUT Type: Tablet Device	Page 60 of 158