

PART 22 MEASUREMENT REPORT

Applicant Name:

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

Date of Testing:

12/15/2020 - 02/27/2021

Test Site/Location:

PCTEST Lab. Morgan Hill, CA, USA

Test Report Serial No.:

1C2101020005-02-R1.BCG

FCC ID:

BCGA2379

Applicant Name:

Apple Inc.

Application Type:

Certification

Model:

A2379

EUT Type:

Tablet Device

FCC Classification:

PCS Licensed Transmitter (PCB)

FCC Rule Part:

22

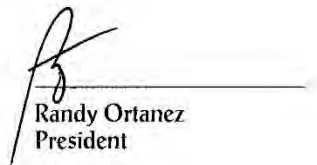
Test Procedure(s):

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.

This revised Test Report (S/N: 1C2101020005-02-R1.BCG Report SNs) supersedes and replaces the previously issued test report on the same subject device for the same type of testing as indicated. Please discard or destroy the previously issued test report(s) and dispose of it accordingly.

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



Randy Ortanez
President





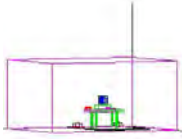
FCC ID: BCGA2379	 PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device
		Page 1 of 108

TABLE OF CONTENTS

1.0	INTRODUCTION	4
1.1	Scope	4
1.2	PCTEST Test Location.....	4
1.3	Test Facility / Accreditations.....	4
2.0	PRODUCT INFORMATION.....	5
2.1	Equipment Description	5
2.2	Device Capabilities.....	5
2.3	Antenna Description	6
2.4	Test Support Equipment.....	6
2.5	Test Configuration	6
2.6	Software and Firmware	7
2.7	EMI Suppression Device(s)/Modifications	7
3.0	DESCRIPTION OF TESTS	8
3.1	Measurement 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	13
7.3	Spurious and Harmonic Emissions at Antenna Terminal	36
7.4	Band Edge Emissions at Antenna Terminal	61
7.5	Radiated Power (ERP/EIRP).....	78
7.6	Radiated Spurious Emissions	86
7.7	Frequency Tolerance / Temperature Variation.....	103
8.0	CONCLUSION.....	108

FCC ID: BCGA2379	 PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device
		Page 2 of 108




PART 22 MEASUREMENT REPORT



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]	
GSM850	250 kHz	GMSK	824.2 - 848.8	0.2419	0.560	27.48	0.918	29.63	242KGXW
EDGE850		8-PSK	824.2 - 848.8	0.2435	0.143	21.56	0.235	23.71	244KG7W
WCDMA850	5 MHz	Spread Spectrum	826.4 - 846.6	4.1636	0.099	19.95	0.162	22.10	4M16F9W
Band 5	10 MHz	QPSK	829.0 - 844.0	9.0082	0.111	20.45	0.182	22.60	9M01G7W
		16QAM	829.0 - 844.0	9.0302	0.092	19.64	0.151	21.79	9M03D7W
		64QAM	829.0 - 844.0	8.9864	0.078	18.92	0.128	21.07	8M99D7W
		256QAM	829.0 - 844.0	9.0082	0.043	16.29	0.070	18.44	9M01D7W
	5 MHz	QPSK	826.5 - 846.5	4.5167	0.111	20.45	0.182	22.60	4M52G7W
		16QAM	826.5 - 846.5	4.5099	0.094	19.73	0.154	21.88	4M51D7W
		64QAM	826.5 - 846.5	4.5238	0.084	19.26	0.138	21.41	4M52D7W
		256QAM	826.5 - 846.5	4.5243	0.042	16.25	0.069	18.40	4M52D7W
	3 MHz	QPSK	825.5 - 847.5	2.7149	0.111	20.45	0.182	22.60	2M71G7W
		16QAM	825.5 - 847.5	2.7045	0.096	19.83	0.158	21.98	2M70D7W
		64QAM	825.5 - 847.5	2.7075	0.083	19.19	0.136	21.34	2M71D7W
		256QAM	825.5 - 847.5	2.7079	0.043	16.34	0.071	18.49	2M71D7W
	1.4 MHz	QPSK	824.7 - 848.3	1.0869	0.111	20.45	0.182	22.60	1M09G7W
		16QAM	824.7 - 848.3	1.0950	0.097	19.85	0.158	22.00	1M10D7W
		64QAM	824.7 - 848.3	1.0926	0.084	19.26	0.138	21.41	1M09D7W
		256QAM	824.7 - 848.3	1.0945	0.041	16.15	0.068	18.30	1M09D7W
Band 26	10 MHz	QPSK	829.0 - 844.0	9.0082	0.111	20.45	0.182	22.60	9M01G7W
		16QAM	829.0 - 844.0	9.0302	0.098	19.91	0.161	22.06	9M03D7W
		64QAM	829.0 - 844.0	8.9864	0.075	18.73	0.122	20.88	8M99D7W
		256QAM	829.0 - 844.0	9.0082	0.034	15.37	0.056	17.52	9M01D7W
	5 MHz	QPSK	826.5 - 846.5	4.5167	0.111	20.45	0.182	22.60	4M52G7W
		16QAM	826.5 - 846.5	4.5099	0.102	20.07	0.167	22.22	4M51D7W
		64QAM	826.5 - 846.5	4.5238	0.078	18.92	0.128	21.07	4M52D7W
		256QAM	826.5 - 846.5	4.5243	0.034	15.30	0.056	17.45	4M52D7W
	3 MHz	QPSK	825.5 - 847.5	2.7149	0.111	20.45	0.182	22.60	2M71G7W
		16QAM	825.5 - 847.5	2.7045	0.097	19.87	0.159	22.02	2M70D7W
		64QAM	825.5 - 847.5	2.7075	0.074	18.70	0.122	20.85	2M71D7W
		256QAM	825.5 - 847.5	2.7079	0.034	15.36	0.056	17.51	2M71D7W
	1.4 MHz	QPSK	824.7 - 848.3	1.0869	0.111	20.45	0.182	22.60	1M09G7W
		16QAM	824.7 - 848.3	1.0950	0.095	19.78	0.156	21.93	1M10D7W
		64QAM	824.7 - 848.3	1.0926	0.074	18.67	0.121	20.82	1M09D7W
		256QAM	824.7 - 848.3	1.0945	0.033	15.25	0.055	17.40	1M09D7W
ULCA Band 5	10 + 10 MHz	QPSK	829.0 - 844.0	18.8850	0.111	20.45	0.182	22.60	18M9G7W
		16QAM	829.0 - 844.0	18.8680	0.060	17.79	0.099	19.94	18M9D7W
		64QAM	829.0 - 844.0	18.8630	0.059	17.71	0.097	19.86	18M9D7W
		256QAM	829.0 - 844.0	18.8970	0.041	16.15	0.068	18.30	18M9D7W
NR Band n5	20 MHz	$\pi/2$ BPSK	834.0 - 839.0	17.9870	0.111	20.45	0.182	22.60	18M0G7W
		QPSK	834.0 - 839.0	18.9764	0.110	20.41	0.180	22.56	19M0G7W
		16QAM	834.0 - 839.0	19.0100	0.085	19.30	0.139	21.45	19M0D7W
		64QAM	834.0 - 839.0	18.9859	0.059	17.70	0.097	19.85	19M0D7W
		256QAM	834.0 - 839.0	18.9546	0.043	16.32	0.070	18.47	19M0D7W
		$\pi/2$ BPSK	831.5 - 841.5	13.4950	0.111	20.45	0.182	22.60	13M5G7W
	15 MHz	QPSK	831.5 - 841.5	14.1978	0.111	20.44	0.182	22.59	14M2G7W
		16QAM	831.5 - 841.5	14.1578	0.093	19.70	0.153	21.85	14M2D7W
		64QAM	831.5 - 841.5	14.2176	0.063	18.02	0.104	20.17	14M2D7W
		256QAM	831.5 - 841.5	14.1537	0.041	16.13	0.067	18.28	14M2D7W
	10 MHz	$\pi/2$ BPSK	829.0 - 844.0	9.0000	0.108	20.33	0.177	22.48	9M00G7W
		QPSK	829.0 - 844.0	9.3277	0.108	20.33	0.177	22.48	9M33G7W
		16QAM	829.0 - 844.0	9.3206	0.090	19.56	0.148	21.71	9M32D7W
		64QAM	829.0 - 844.0	9.3447	0.063	17.97	0.103	20.12	9M34D7W
	5 MHz	256QAM	829.0 - 844.0	9.2738	0.041	16.16	0.068	18.31	9M27D7W
		$\pi/2$ BPSK	826.5 - 846.5	4.5332	0.111	20.45	0.182	22.60	4M53G7W
		QPSK	826.5 - 846.5	4.5109	0.108	20.31	0.176	22.46	4M51G7W
		16QAM	826.5 - 846.5	4.4992	0.088	19.43	0.144	21.58	4M50D7W
		64QAM	826.5 - 846.5	4.5122	0.065	18.12	0.106	20.27	4M51D7W
		256QAM	826.5 - 846.5	4.5275	0.043	16.37	0.071	18.52	4M53D7W

EUT Overview

FCC ID: BCGA2379	 PART 22 MEASUREMENT REPORT		Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 3 of 108

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

- 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.

FCC ID: BCGA2379	 <small>Proud to be part of element</small>	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 4 of 108

2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **Apple Tablet Device FCC ID:BCGA2379**. 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 22.

Test Device Serial No.: H4MTX492NT, NN63X069PP

2.2 Device Capabilities

This device contains the following capabilities:

850/1900 GSM/GPRS/EDGE, 850/1700/1900 WCDMA/HSPA, Multi-band LTE, 5G NR (FR1/FR2), 802.11b/g/n/ax WLAN, 802.11a/n/ac/ax UNII, Bluetooth (1x, EDR, LE1M, LE2M, 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	WLAN	Bluetooth	GSM / WCDMA	LTE / FR1 NR			UNII
		802.11 b/g/n/ax	BDR, EDR, HDR4/8, LE1/2M	Mid Band	Mid Band	High Band	Ultra High Band	802.11 a/n/ac/ax
2a	Config 1	✓	✗	✗	✗	✗	✓	✗
2a	Config 2	✗	✓	✗	✗	✗	✓	✗
4a	Config 3	✓	✗	✗	✗	✗	✓	✗
4a	Config 4	✗	✓	✗	✗	✗	✓	✗
4b	Config 5	✗	✗	✓	✗	✗	✗	✓
4b	Config 6	✗	✗	✗	✓	✗	✗	✓
4b	Config 7	✗	✗	✗	✗	✓	✗	✓

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 7 and reported in UNII (OFDMA) and Part 27b test reports.

FCC ID: BCGA2379	 PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device

2.3 Antenna Description

Following antenna gains provided by manufacturer were used for the testing.

Band	Antenna Gain (dBi)	
	Antenna 3	Antenna 1
GSM850	-3.1	-2.5
EDGE850		
WCDMA850		
LTE Band 5/26		
NR Band n5		

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: Chimp	S/N: 420A57
3	USB-C Cable	Model: A146	S/N: N/A
	w/ AC Adapter	Model: A2305	S/N: N/A
4	Apple Pencil	Model: N/A	S/N: GQXYGSXBJKM9
5	DC Power Supply	Model: KPS3010D	S/N: N/A


Table 2-3. Test Support Equipment

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.


FCC ID: BCGA2379	 PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device
Page 6 of 108		

2.6 Software and Firmware

The test was conducted with firmware version 18E20700y 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: BCGA2379	 <small>Proud to be part of element</small>	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 7 of 108

3.0 DESCRIPTION OF TESTS

3.1 Measurement 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


$$\text{EIRP}_{[\text{dBm}]} = E_{[\text{dB}\mu\text{V/m}]} + 20\log D - 104.8;$$

Where D 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 and TIA-603-E-2016.

FCC ID: BCGA2379	 PCTEST Proud to be part of element	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 8 of 108

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	1.65
Radiated Disturbance (<30MHz)	4.06
Radiated Disturbance (30MHz-1GHz)	4.30
Radiated Disturbance (1-18GHz)	4.78
Radiated Disturbance (>18GHz)	4.79

FCC ID: BCGA2379	 PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device
		Page 9 of 108

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	PXA Signal Analyzer (3Hz - 26.5 GHz)	7/24/2020	Annual	7/24/2021	MY55330128
Keysight Technology	N9040B	UXA Signal Analyzer	12/19/2020	Annual	12/19/2021	MY57212015
Keysight Technology	E7515B	UXM 5G Wireless Test Platform	11/14/2020	Annual	11/14/2021	MY60192562
ATM	180-442A-KF	20dB Nominal Gain Horn Antenna	8/11/2020	Annual	8/11/2021	T058701-01
ESPEC	SU-241	Tabletop Temperature Chamber	9/28/2020	Annual	9/28/2021	92009574
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)	4/21/2020	Annual	4/21/2021	205956
Rohde & Schwarz	TS-PR8	Pre-Amplifier (30MHz - 8GHz)	7/15/2020	Annual	7/15/2021	102356
Rohde & Schwarz	TS-PR18	Pre-Amplifier (1GHz - 18GHz)	12/3/2020	Annual	12/3/2021	101648
Rohde & Schwarz	ESW26	EMI Test Receiver	6/8/2020	Annual	6/8/2021	101299
Rohde & Schwarz	ESW44	EMI Test Receiver	8/6/2020	Annual	8/6/2021	101668
Rohde & Schwarz	CMW500	Wideband Radio Communication Tester	10/13/2020	Annual	10/13/2021	161616
Rohde & Schwarz	CMW500	Wideband Radio Communication Tester	4/16/2020	Annual	4/16/2021	166869
Rohde & Schwarz	TS-PR1840	Pre-Amplifier (18GHz - 40GHz)	4/23/2020	Annual	4/23/2021	100052
Rohde & Schwarz	TC-TA18	Cross Polarized Vivaldi Antenna (400MHz-18GHz)	10/2/2020	Annual	10/2/2021	101063
Rohde & Schwarz	HFH2-Z2	Loop Antenna	3/12/2020	Annual	3/12/2021	100546

Table 5-1. Test Equipment

Notes:

1. For equipment listed above that has a calibration date or calibration due date that falls within the test date range, care was taken to ensure that this equipment was used after the calibration date and before the calibration due date.

FCC ID: BCGA2379	 PCTEST <small>Proud to be part of element</small>	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 10 of 108

6.0 SAMPLE CALCULATIONS

GSM Emission Designator

Emission Designator = 250KGXW

GSM BW = 250 kHz

G = Phase Modulation

X = Cases not otherwise covered

W = Combination (Audio/Data)

EDGE Emission Designator

Emission Designator = 250KG7W

EDGE BW = 250 kHz

G = Phase Modulation

7 = Quantized/Digital Info

W = Combination (Audio/Data)

WCDMA Emission Designator

Emission Designator = 4M16F9W

WCDMA BW = 4.16 MHz

F = Frequency Modulation

9 = Composite Digital Info

W = Combination (Audio/Data)

$\pi/2$ 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

LTE BW = 8.45 MHz

W = 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: BCGA2379	 PCTEST <small>Proud to be part of element</small>	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 11 of 108

7.0 TEST RESULTS

7.1 Summary


Company Name: Apple Inc.
 FCC ID: BCGA2379
 FCC Classification: PCS Licensed Transmitter (PCB)
 Mode(s): NR/GSM/GPRS/WCDMA/NR/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, 22.917(a)	$> 43 + 10\log_{10}(P[\text{Watts}])$ at Band Edge and for all out-of-band emissions	PASS	Sections 7.3, 7.4
	Transmitter Conducted Output Power	2.1046	N/A	N/A	See RF Exposure Report
	Effective Radiated Power / Equivalent Isotropic Radiated Power	22.913(a)(5)	< 7 Watts max. ERP	PASS	Section 7.5
	Frequency Tolerance	2.1055, 22.355	$\pm 0.00025\%$ (± 2.5 ppm)	PASS	Section 7.7
RADIATED	Radiated Spurious Emissions	2.1053, 22.917(a)	$> 43 + 10\log_{10}(P[\text{Watts}])$ for all out-of-band emissions	PASS	Section 7.6

Table 7-1. Summary of Test Results

Notes:

- 1) All modes of operation and data rates were investigated. The test results shown in the following sections represent the worst case emissions.
- 2) The analyzer plots were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables, directional couplers, and attenuators used as part of the system to maintain a link between the call box and the EUT at all frequencies of interest.
- 3) All antenna port conducted emissions testing was performed on a test bench with the antenna port of the EUT connected to the spectrum analyzer through calibrated cables, attenuators, and couplers.
- 4) All conducted emissions measurements are performed with automated test software to capture the corresponding plots necessary to show compliance. The measurement software utilized are PCTEST 2G/3G Automation Version 4.5 and LTE Automation Version 5.3.

FCC ID: BCGA2379	 PCTEST <small>Proud to be part of element</small>	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 12 of 108

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.

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.

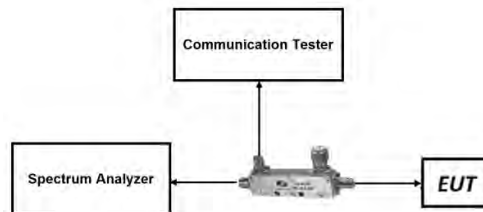


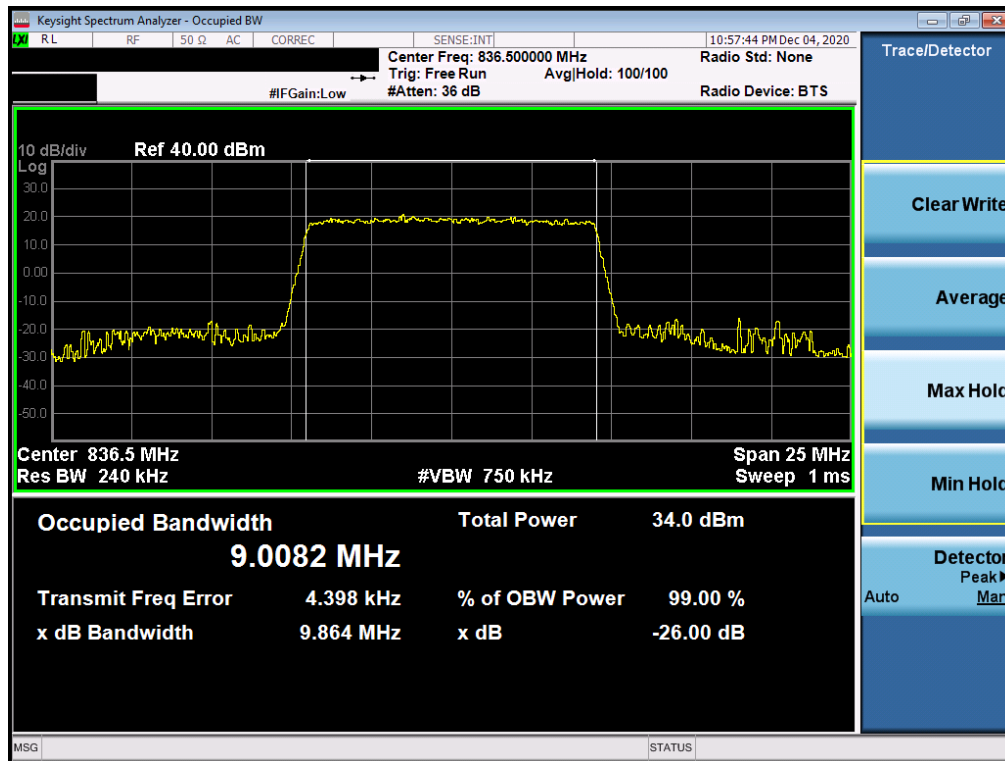
Figure 7-1. Test Instrument & Measurement Setup

Test Notes

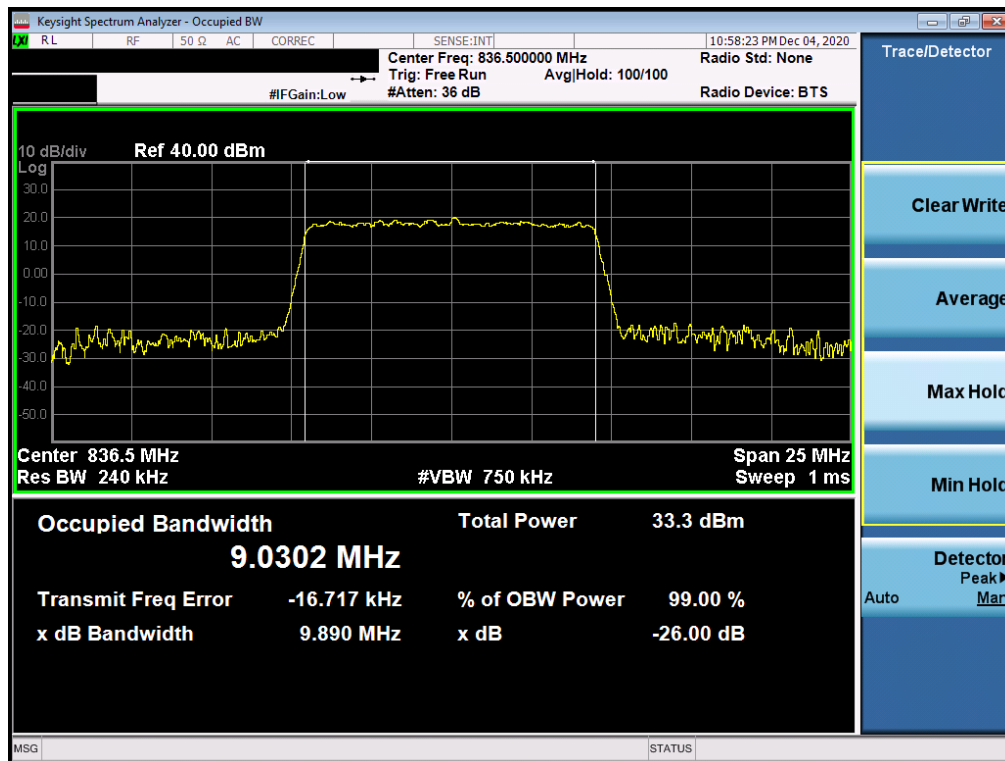
None.

FCC ID: BCGA2379	PCTEST Proud to be part of element	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 13 of 108

LTE Band 26/5

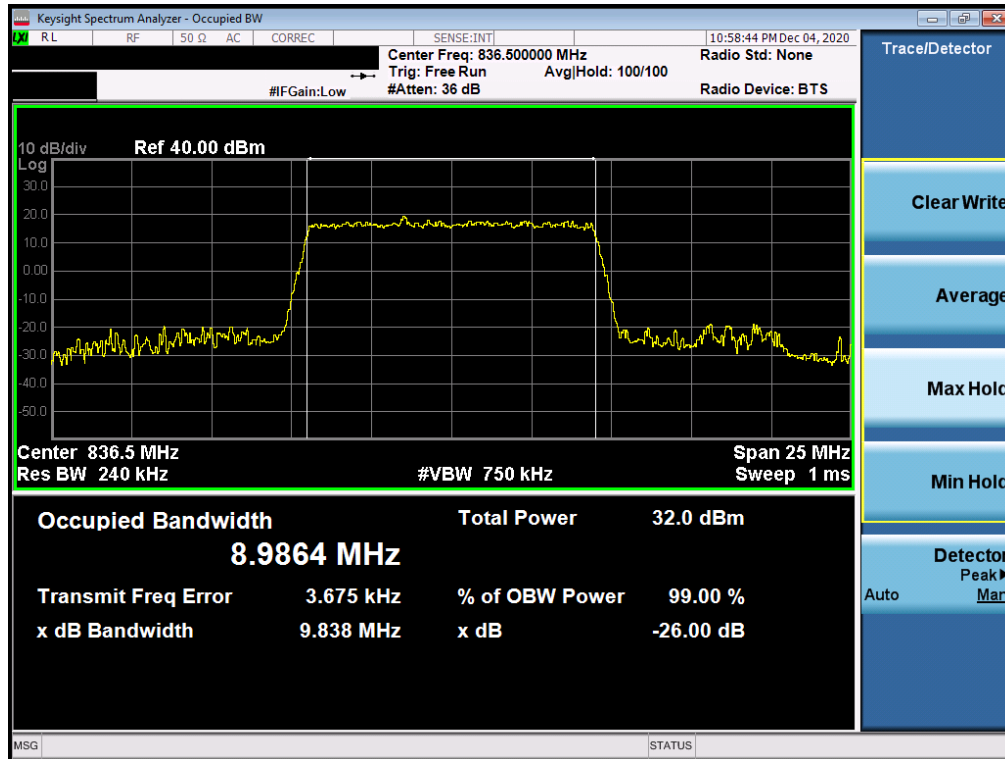


Plot 7-1. Occupied Bandwidth Plot (LTE Band 26/5 - 10MHz QPSK - Full RB Configuration)

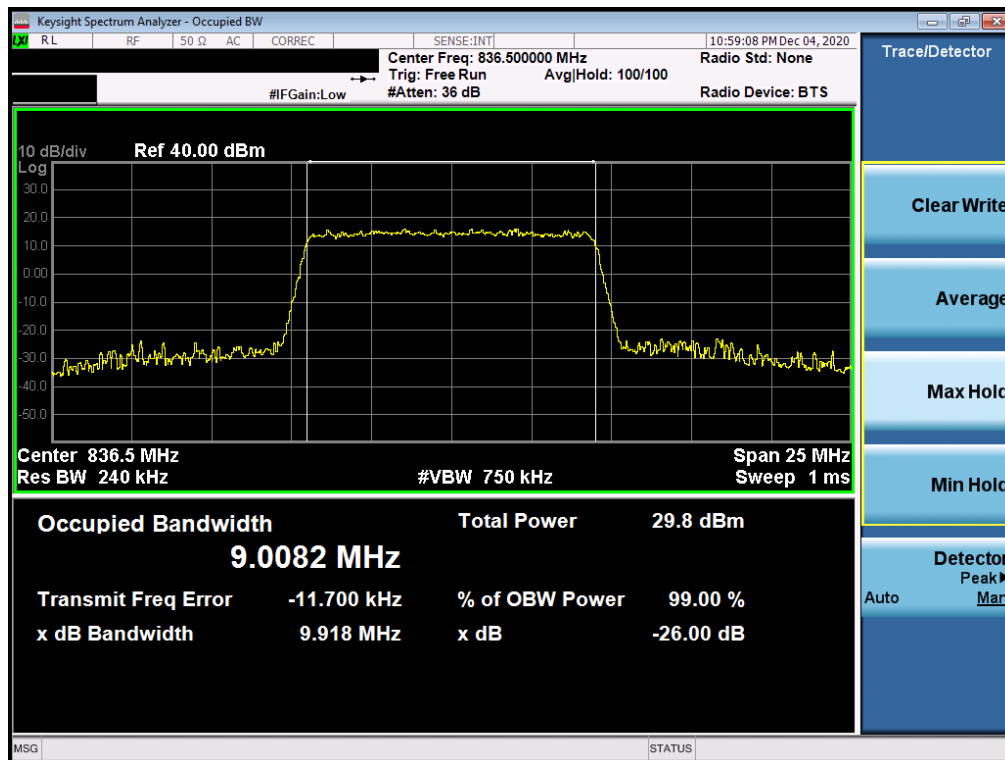


Plot 7-2. Occupied Bandwidth Plot (LTE Band 26/5 - 10MHz 16-QAM - Full RB Configuration)

FCC ID: BCGA2379	PCTEST Proud to be part of element	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 14 of 108

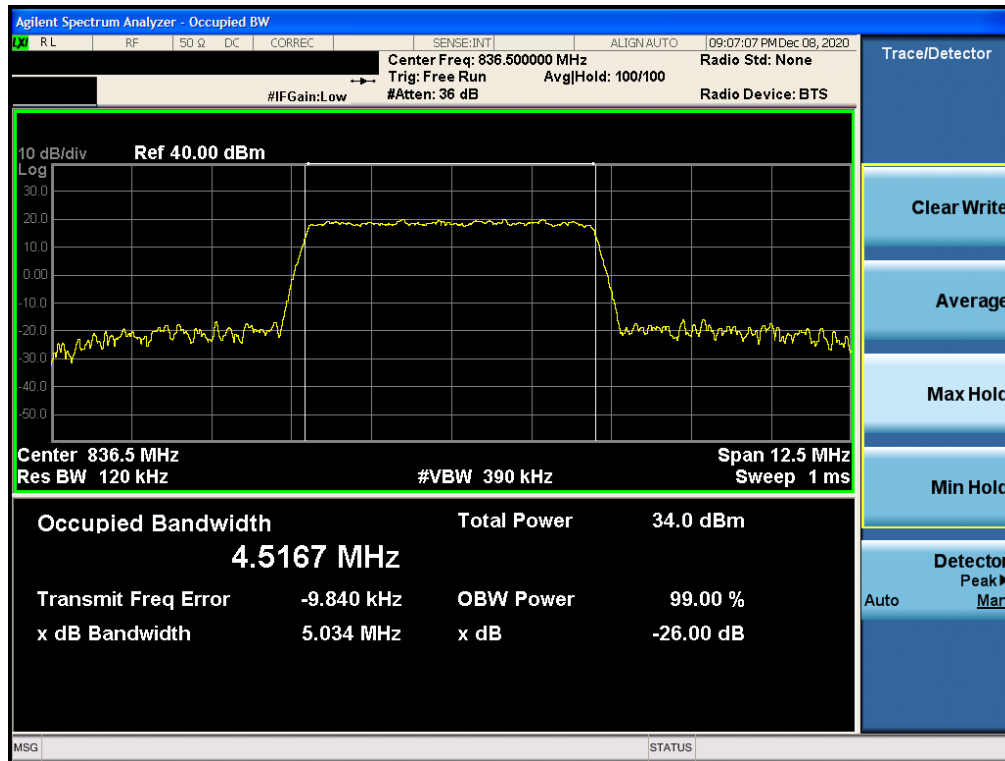


Plot 7-3. Occupied Bandwidth Plot (LTE Band 26/5 - 10MHz 64-QAM - Full RB Configuration)

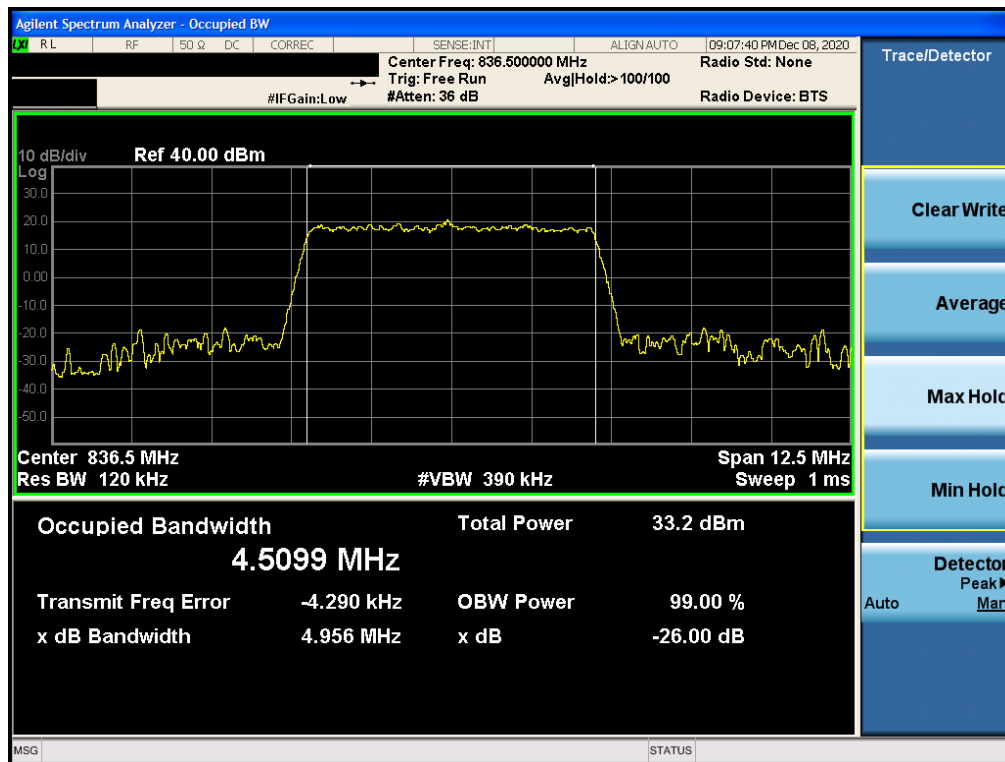


Plot 7-4. Occupied Bandwidth Plot (LTE Band 26/5 - 10MHz 256-QAM - Full RB Configuration)

FCC ID: BCGA2379	PCTEST Proud to be part of element	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 15 of 108

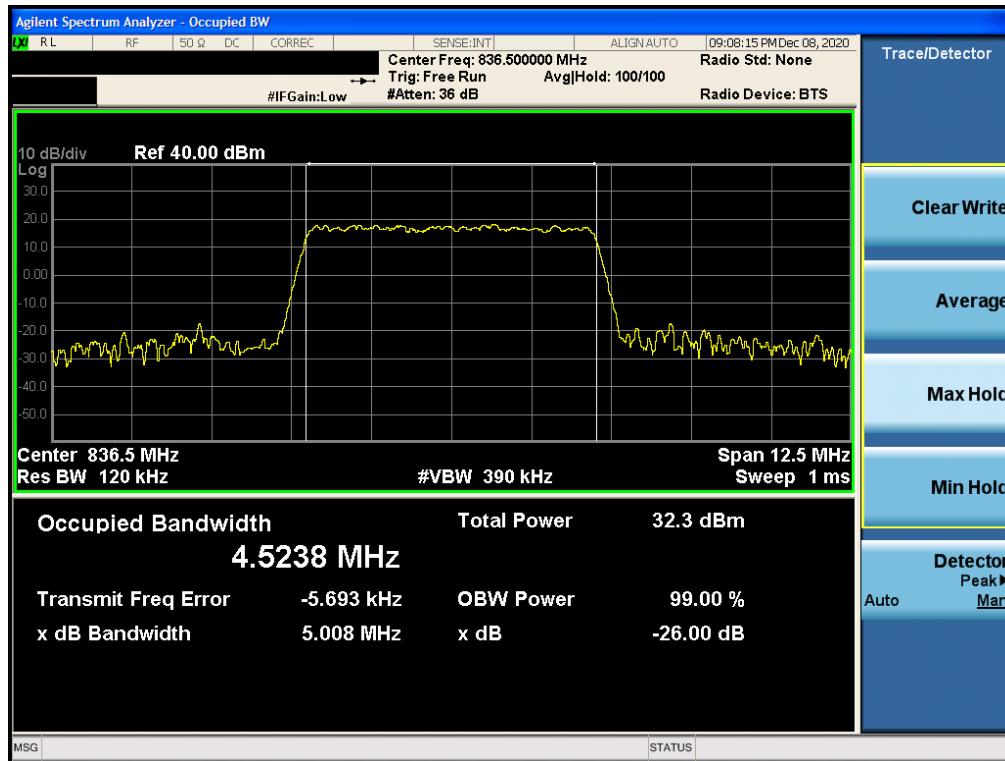


Plot 7-5. Occupied Bandwidth Plot (LTE Band 26/5 - 5MHz QPSK - Full RB Configuration)

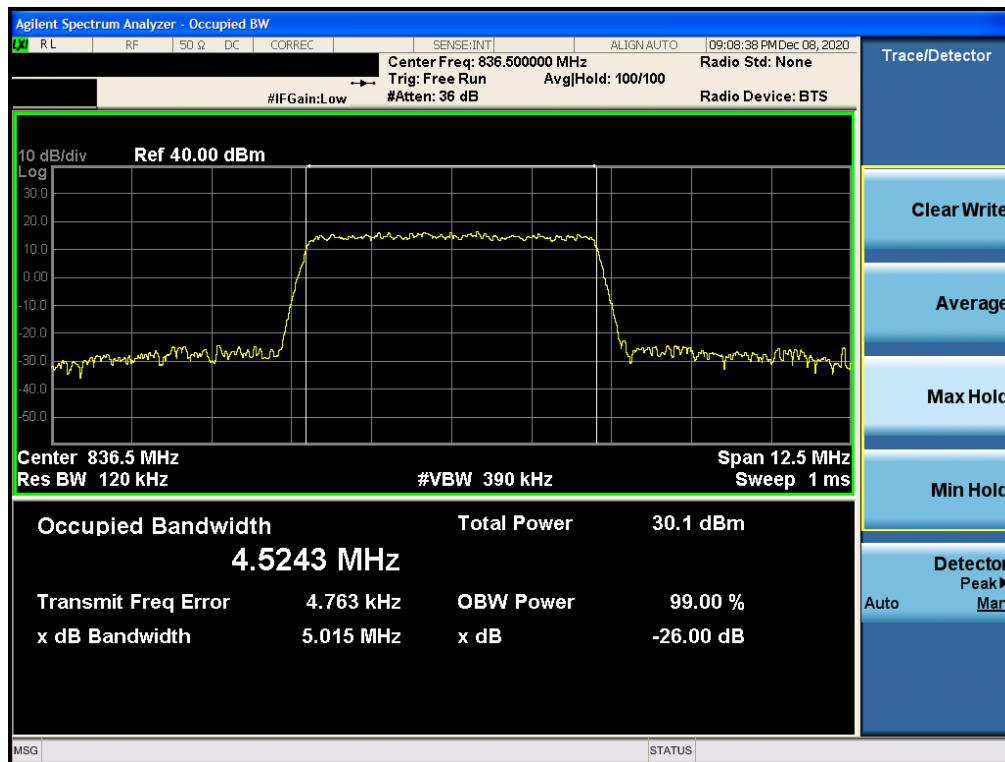


Plot 7-6. Occupied Bandwidth Plot (LTE Band 26/5 - 5MHz 16-QAM - Full RB Configuration)

FCC ID: BCGA2379	PCTEST Proud to be part of element	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 16 of 108

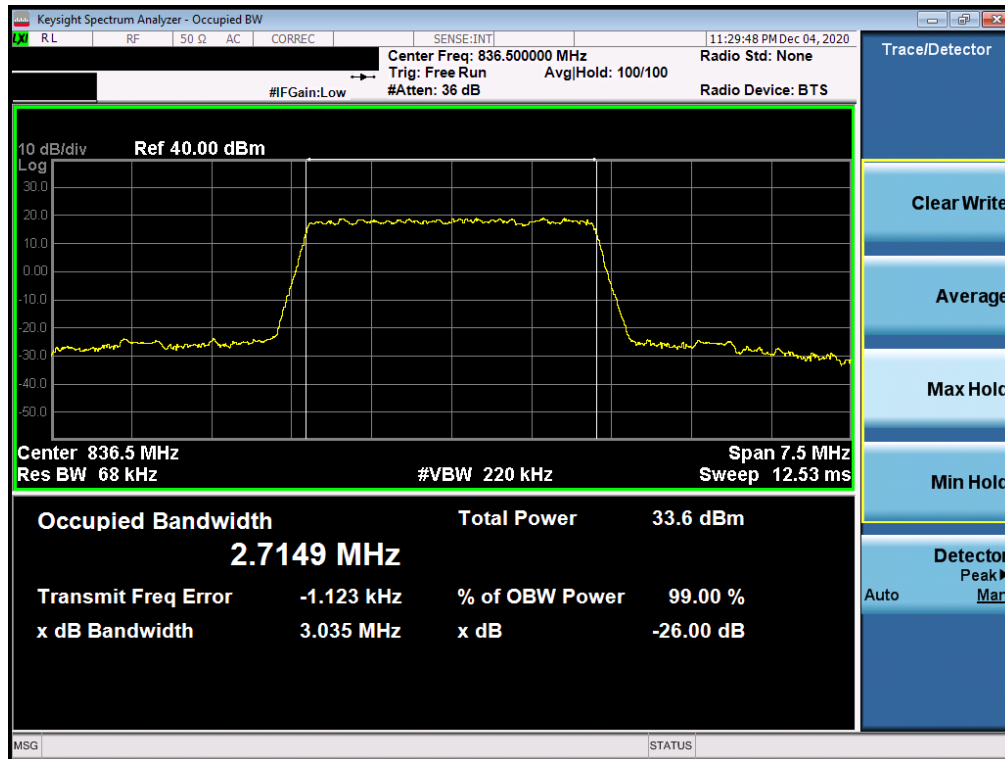


Plot 7-7. Occupied Bandwidth Plot (LTE Band 26/5 - 5MHz 64-QAM - Full RB Configuration)

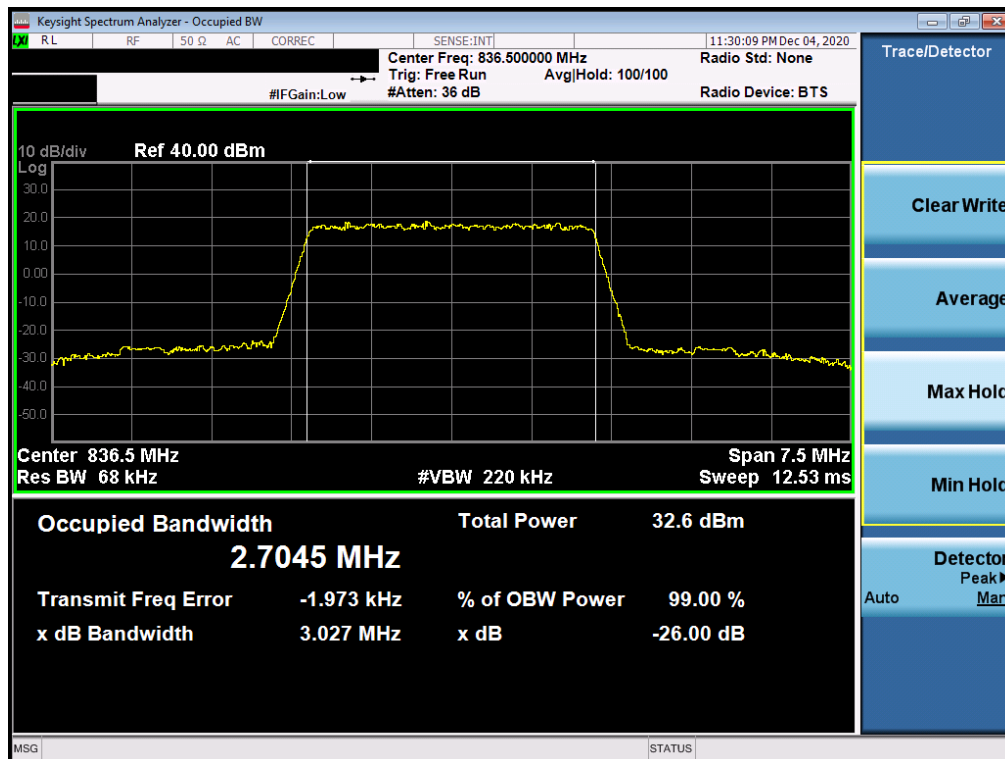


Plot 7-8. Occupied Bandwidth Plot (LTE Band 26/5 - 5MHz 256-QAM - Full RB Configuration)

FCC ID: BCGA2379	PCTEST Proud to be part of element	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 17 of 108

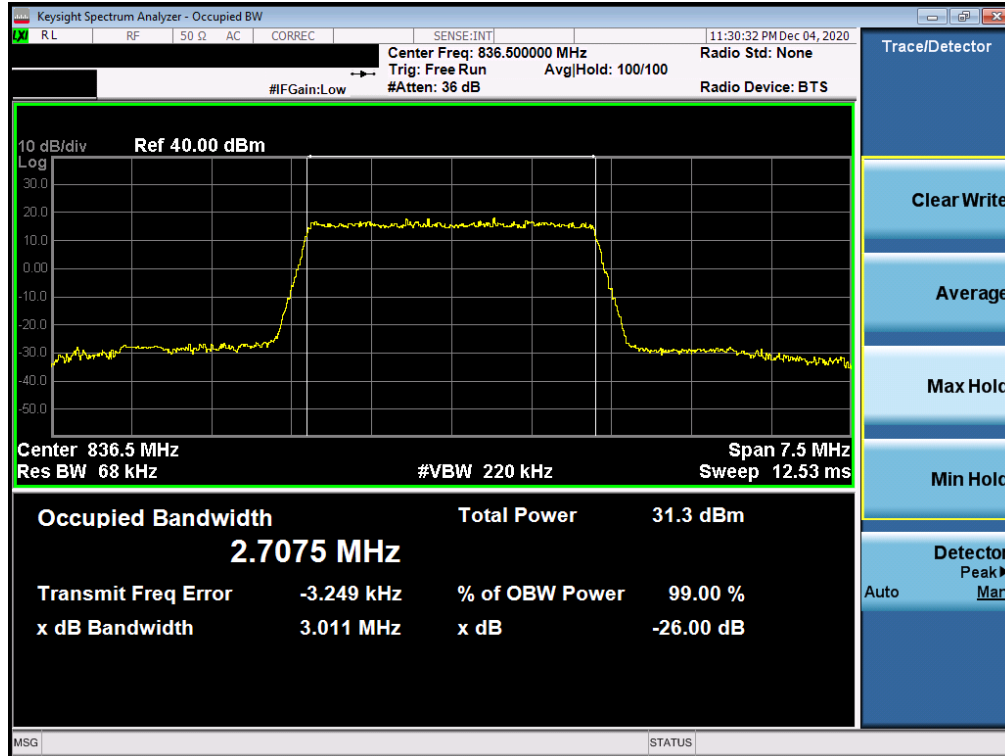


Plot 7-9. Occupied Bandwidth Plot (LTE Band 26/5 - 3MHz QPSK - Full RB Configuration)

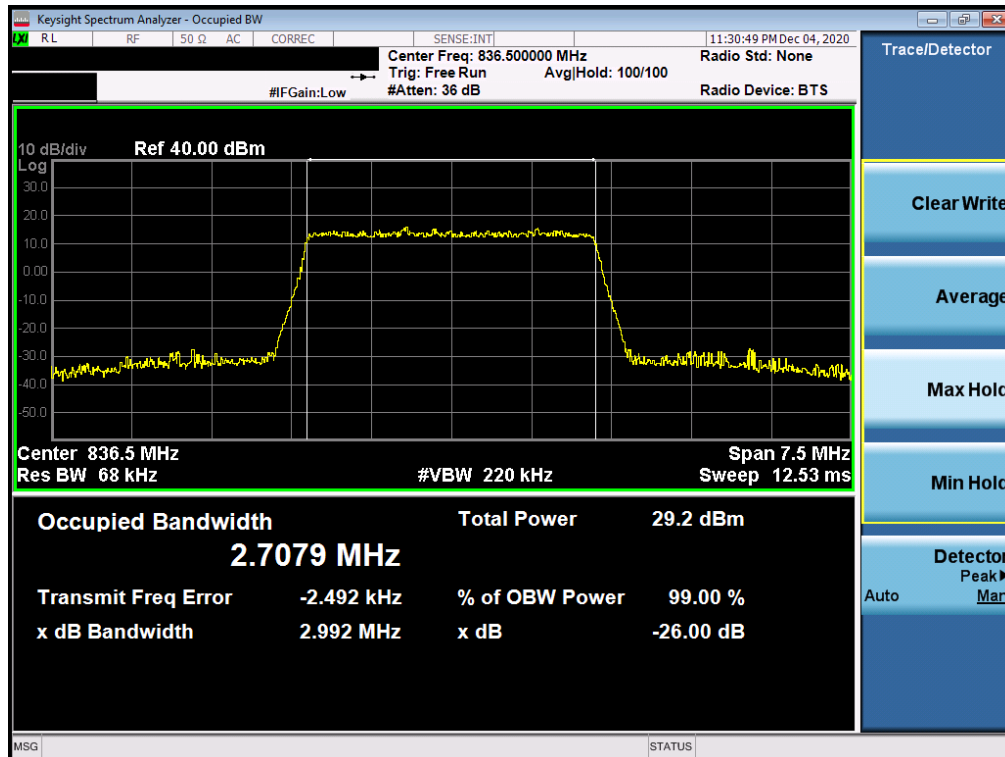


Plot 7-10. Occupied Bandwidth Plot (LTE Band 26/5 - 3MHz 16-QAM - Full RB Configuration)

FCC ID: BCGA2379	PCTEST Proud to be part of element	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 18 of 108

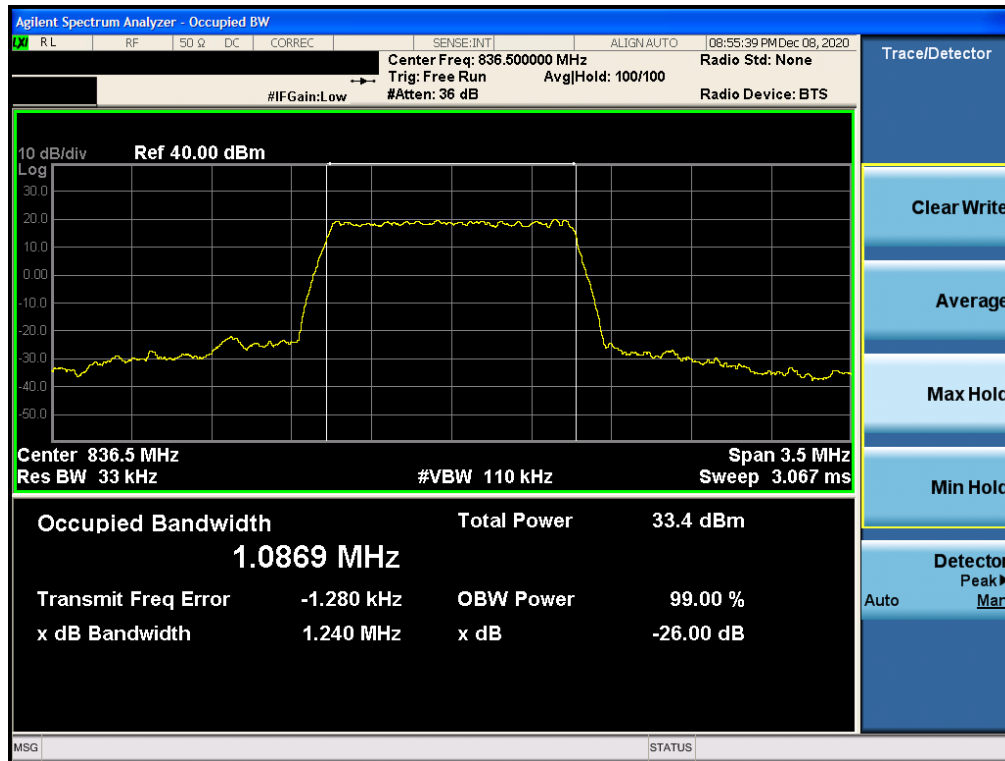


Plot 7-11. Occupied Bandwidth Plot (LTE Band 26/5 - 3MHz 64-QAM - Full RB Configuration)

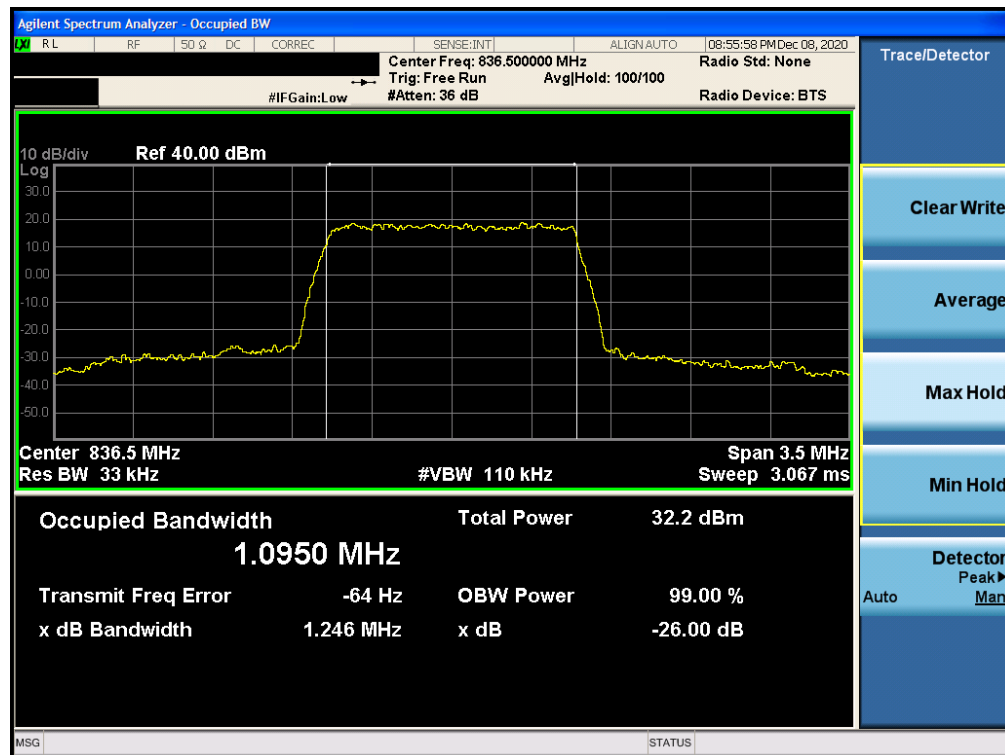


Plot 7-12. Occupied Bandwidth Plot (LTE Band 26/5 - 3MHz 256-QAM - Full RB Configuration)

FCC ID: BCGA2379	PCTEST Proud to be part of element	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 19 of 108

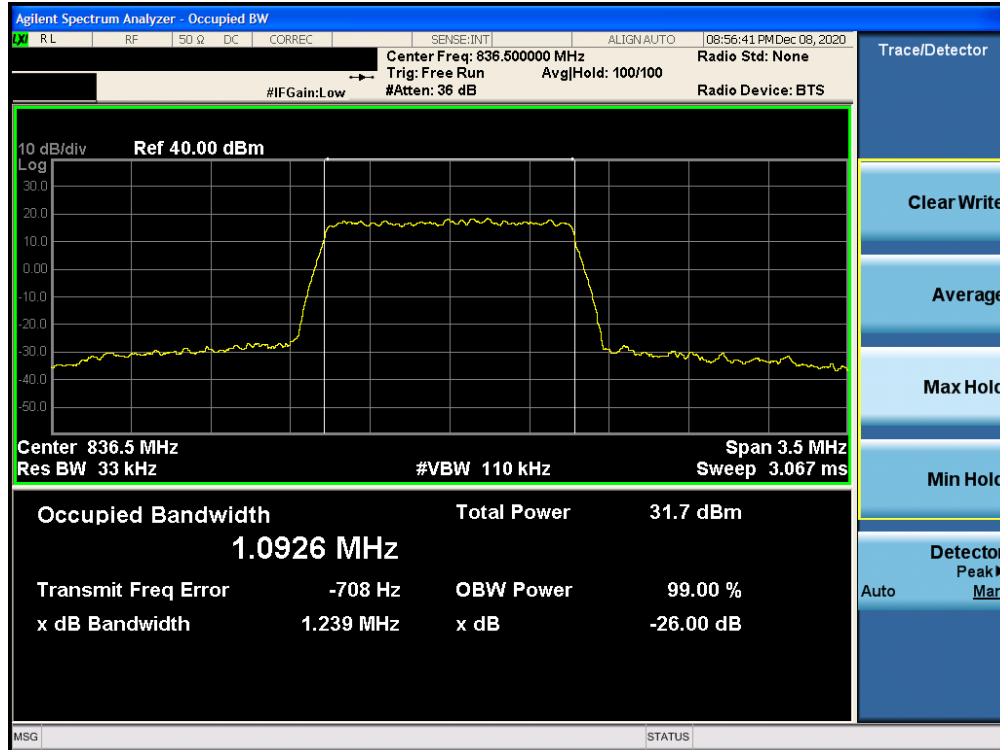


Plot 7-13. Occupied Bandwidth Plot (LTE Band 26/5 - 1.4MHz QPSK - Full RB Configuration)

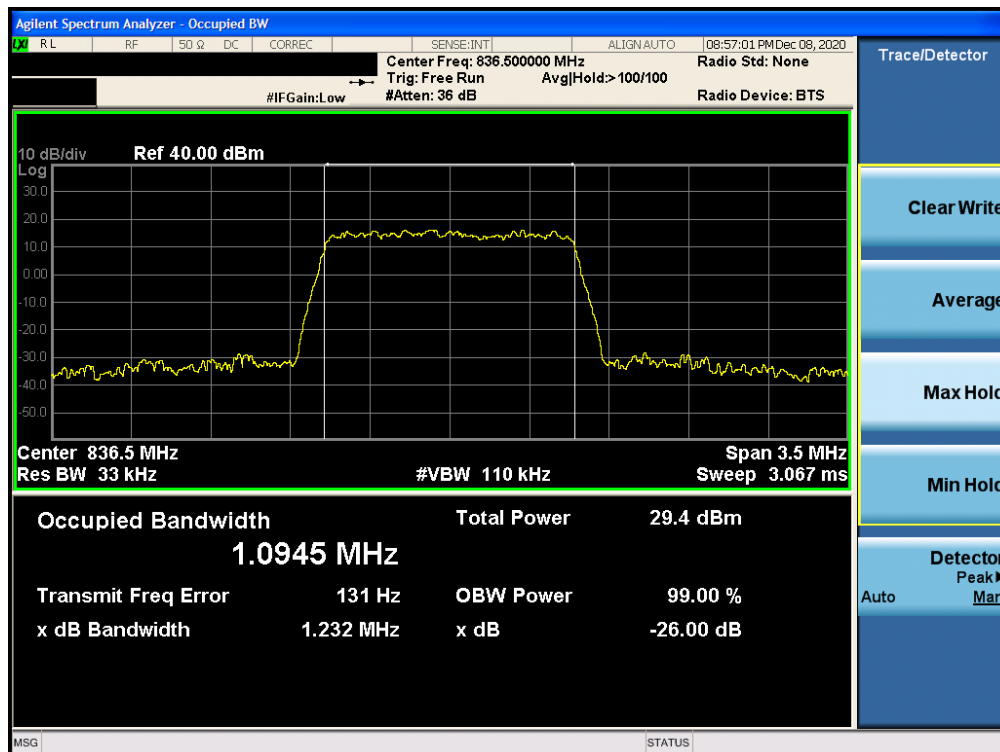


Plot 7-14. Occupied Bandwidth Plot (LTE Band 26/5 - 1.4MHz 16-QAM - Full RB Configuration)

FCC ID: BCGA2379	PCTEST Proud to be part of element	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 20 of 108



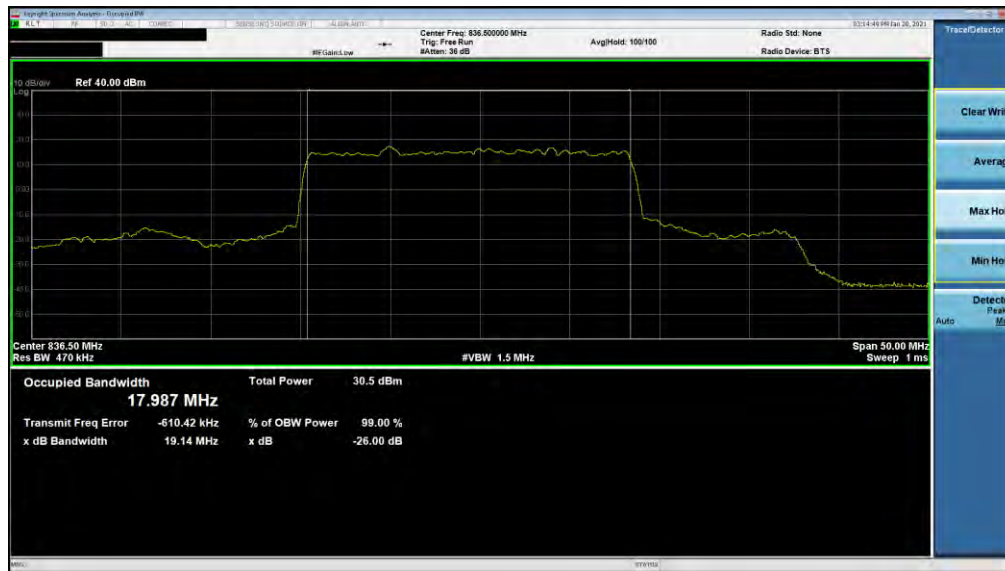
Plot 7-15. Occupied Bandwidth Plot (LTE Band 26/5 - 1.4MHz 64-QAM - Full RB Configuration)



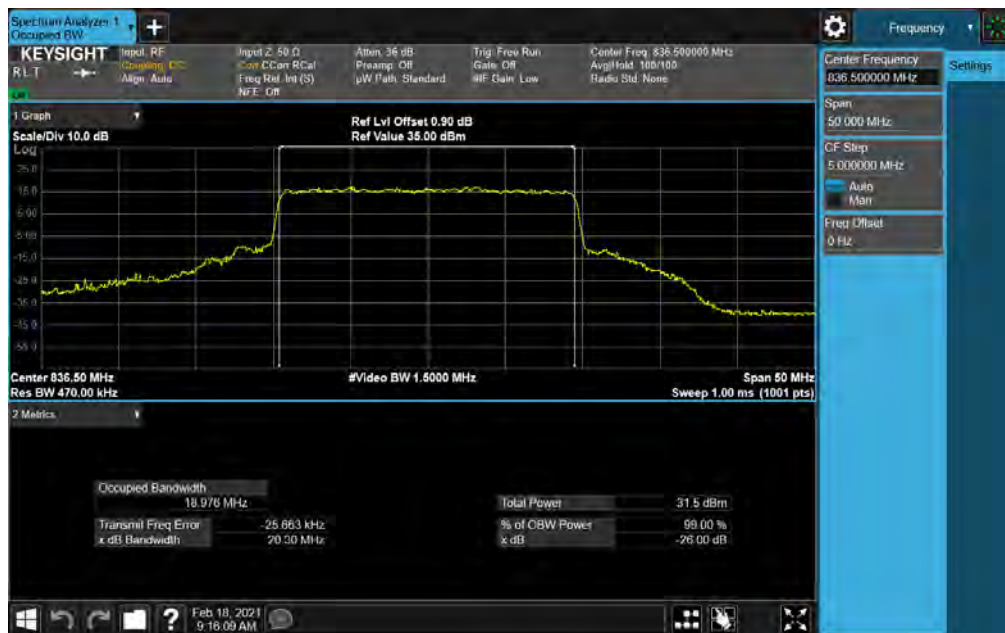
Plot 7-16. Occupied Bandwidth Plot (LTE Band 26/5 - 1.4MHz 256-QAM - Full RB Configuration)

FCC ID: BCGA2379	PCTEST Proud to be part of element	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 21 of 108

NR Band n5

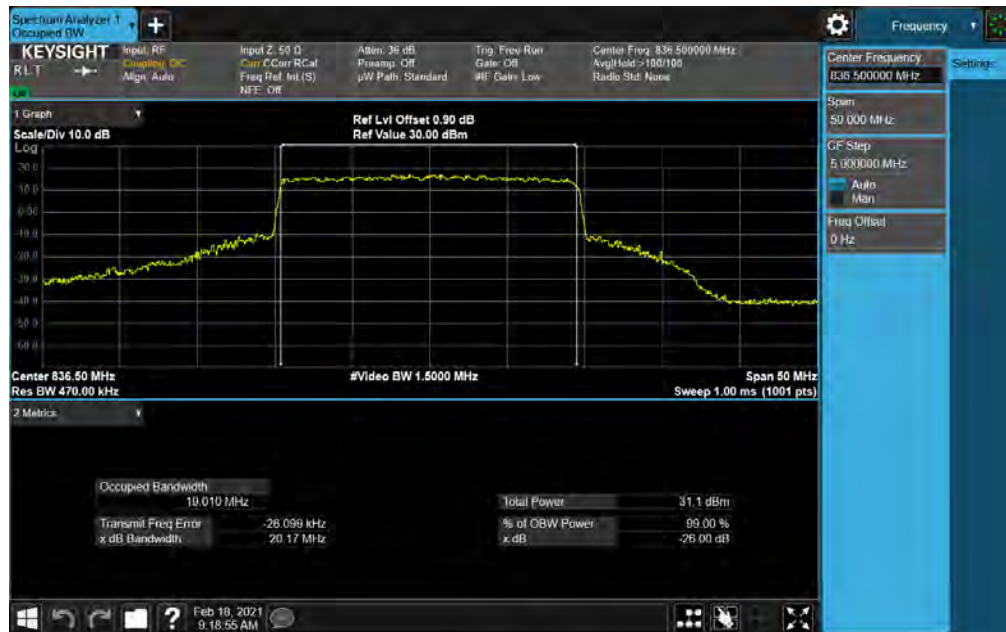


Plot 7-17. Occupied Bandwidth Plot (NR Band n5 - 20MHz DFT-s-OFDM $\pi/2$ BPSK - Full RB Configuration)

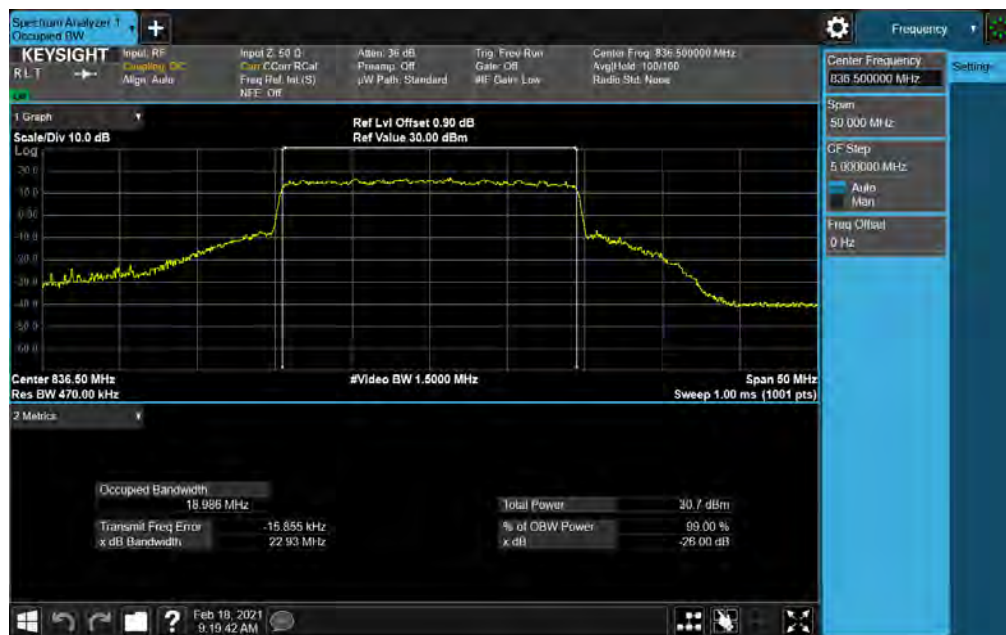


Plot 7-18. Occupied Bandwidth Plot (NR Band n5 - 20MHz CP-OFDM -QPSK - Full RB Configuration)

FCC ID: BCGA2379	PCTEST Proud to be part of element	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 22 of 108

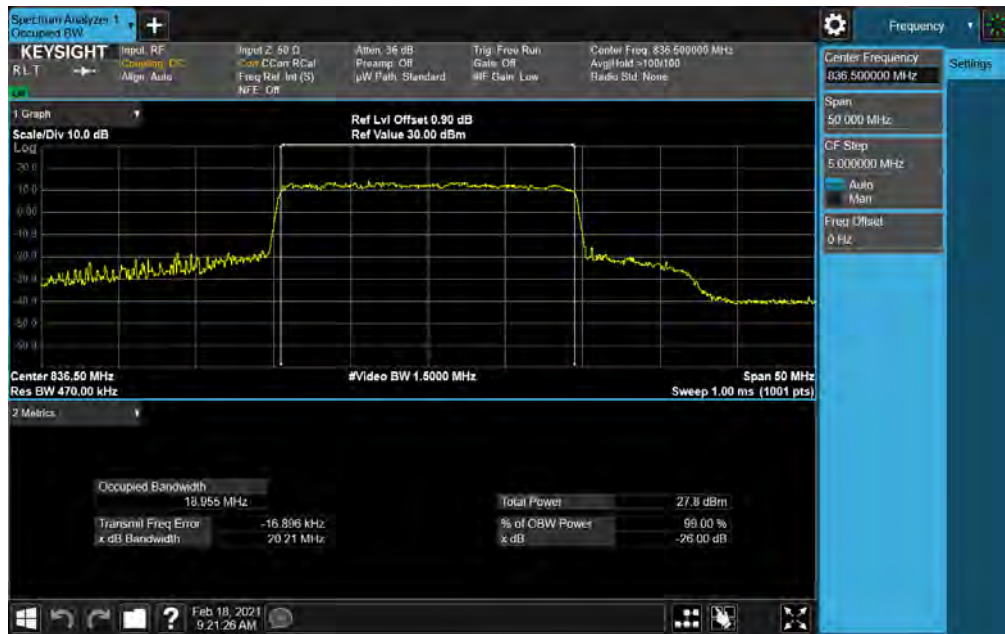


Plot 7-19. Occupied Bandwidth Plot (NR Band n5 - 20MHz CP-OFDM -16-QAM - Full RB Configuration)



Plot 7-20. Occupied Bandwidth Plot (NR Band n5 - 20MHz CP-OFDM 64-QAM - Full RB Configuration)

FCC ID: BCGA2379	PCTEST Proud to be part of element	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 23 of 108



Plot 7-21. Occupied Bandwidth Plot (NR Band n5 - 20MHz CP-OFDM 256-QAM - Full RB Configuration)



Plot 7-22. Occupied Bandwidth Plot (NR Band n5 - 15MHz DFT-s-OFDM $\pi/2$ BPSK - Full RB Configuration)

FCC ID: BCGA2379	PCTEST Proud to be part of element	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 24 of 108



Plot 7-23. Occupied Bandwidth Plot (NR Band n5 - 15MHz CP-OFDM QPSK - Full RB Configuration)



Plot 7-24. Occupied Bandwidth Plot (NR Band n5 - 15MHz CP-OFDM 16-QAM - Full RB Configuration)

FCC ID: BCGA2379	PCTEST Proud to be part of element	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 25 of 108

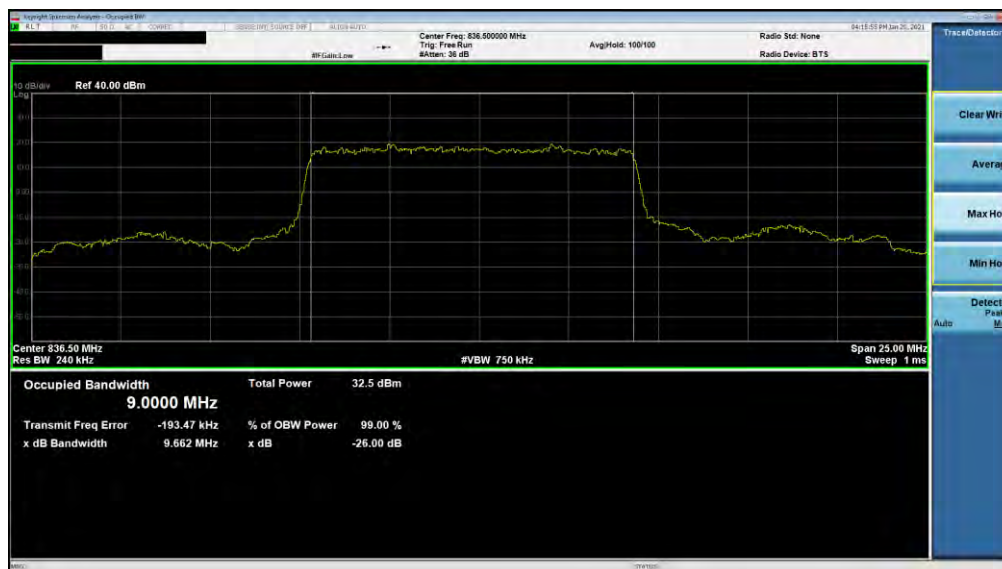


Plot 7-25. Occupied Bandwidth Plot (NR Band n5 - 15MHz CP-OFDM 64-QAM - Full RB Configuration)



Plot 7-26. Occupied Bandwidth Plot (NR Band n5 - 15MHz CP-OFDM 256-QAM - Full RB Configuration)


FCC ID: BCGA2379	PCTEST Proud to be part of element	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 26 of 108

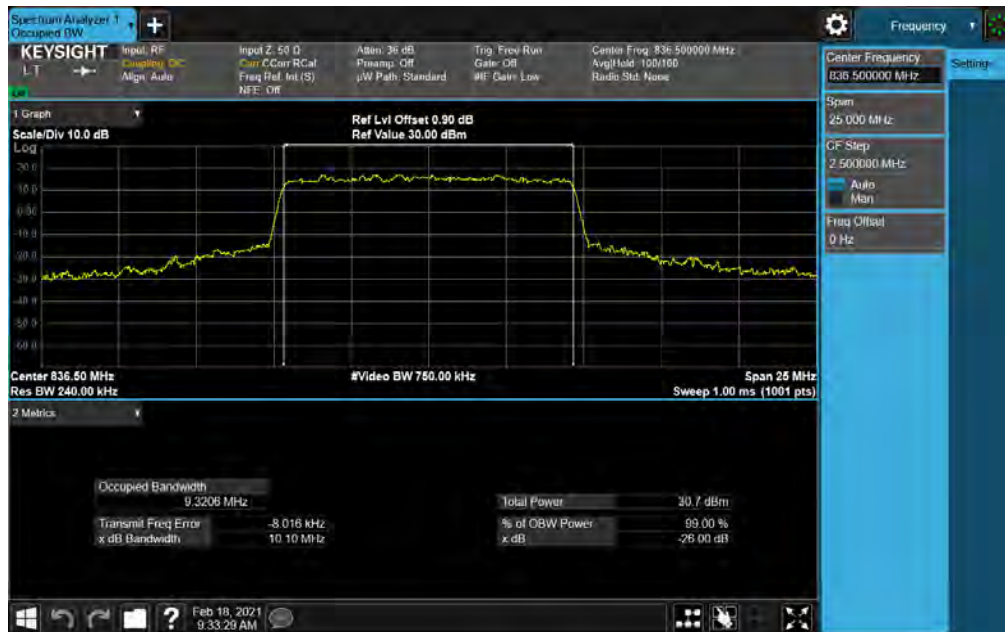


Plot 7-27. Occupied Bandwidth Plot (NR Band n5 - 10MHz DFT-s-OFDM $\pi/2$ BPSK - Full RB Configuration)

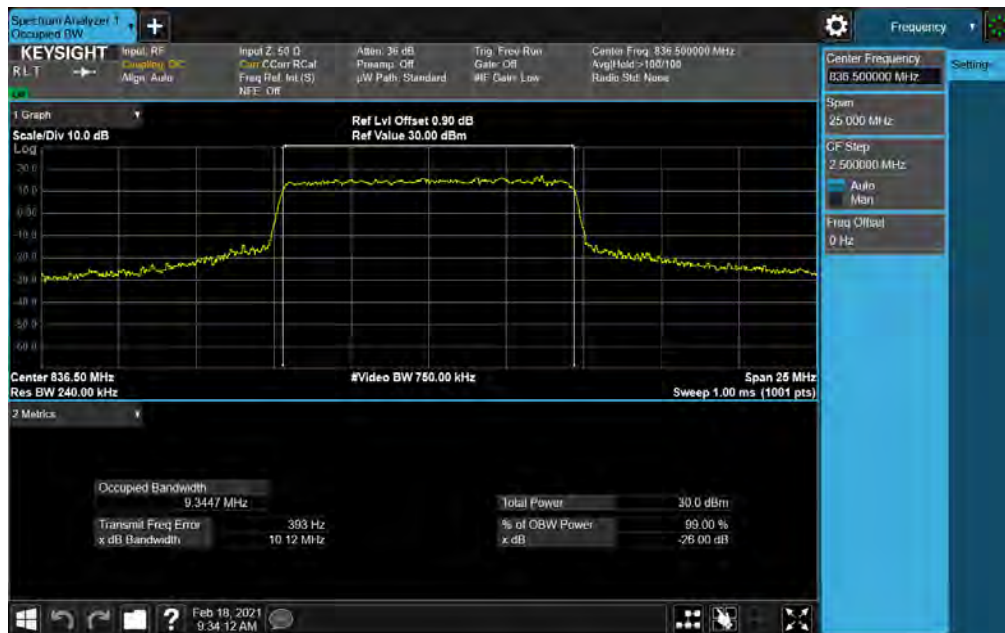


Plot 7-28. Occupied Bandwidth Plot (NR Band n5 - 10MHz CP-OFDM QPSK - Full RB Configuration)

FCC ID: BCGA2379	 PART 22 MEASUREMENT REPORT		Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 27 of 108

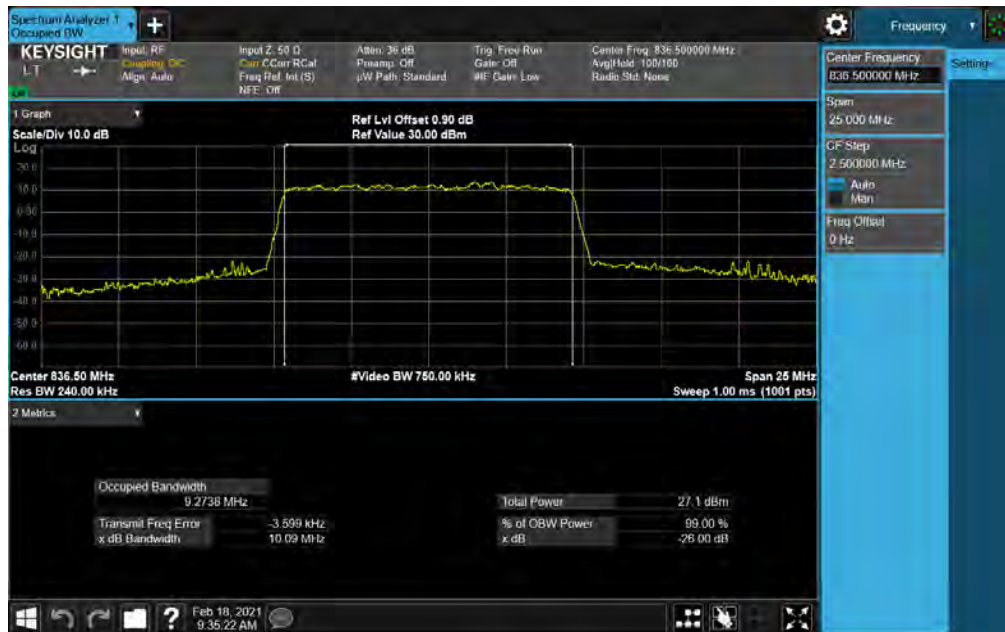


Plot 7-29. Occupied Bandwidth Plot (NR Band n5 - 10MHz CP-OFDM 16-QAM - Full RB Configuration)



Plot 7-30. Occupied Bandwidth Plot (NR Band n5 - 10MHz CP-OFDM 64-QAM - Full RB Configuration)

FCC ID: BCGA2379	PCTEST Proud to be part of element	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 28 of 108



Plot 7-31. Occupied Bandwidth Plot (NR Band n5 - 10MHz CP-OFDM 256-QAM - Full RB Configuration)

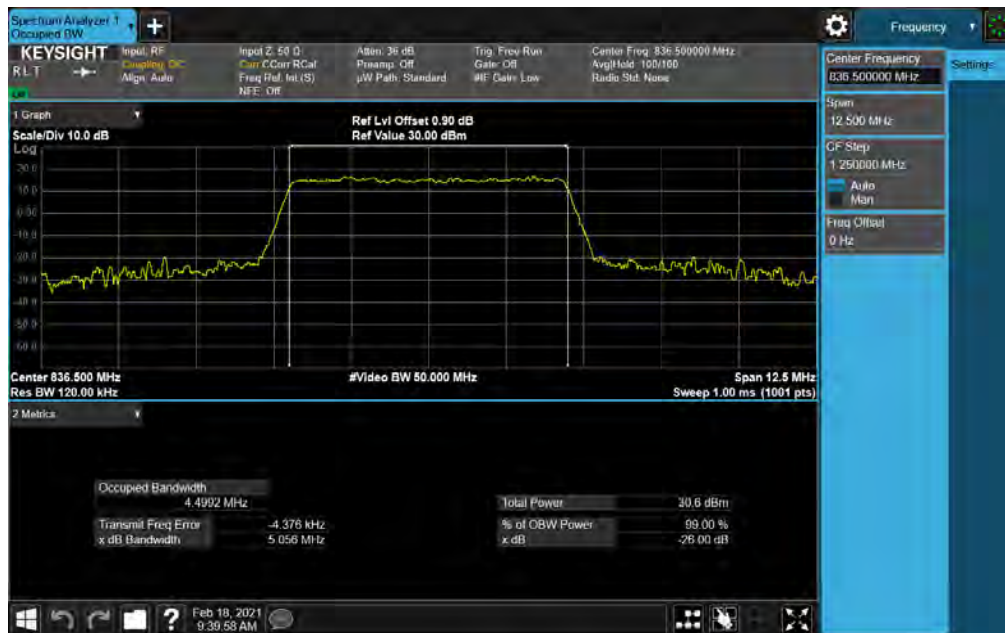


Plot 7-32. Occupied Bandwidth Plot (NR Band n5 - 5MHz DFT-s-OFDM $\pi/2$ BPSK - Full RB Configuration)

FCC ID: BCGA2379	PCTEST Proud to be part of element	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 29 of 108



Plot 7-33. Occupied Bandwidth Plot (NR Band n5 - 5MHz CP-OFDM QPSK - Full RB Configuration)



Plot 7-34. Occupied Bandwidth Plot (NR Band n5 - 5MHz CP-OFDM 16-QAM - Full RB Configuration)

FCC ID: BCGA2379	PCTEST Proud to be part of element	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 30 of 108



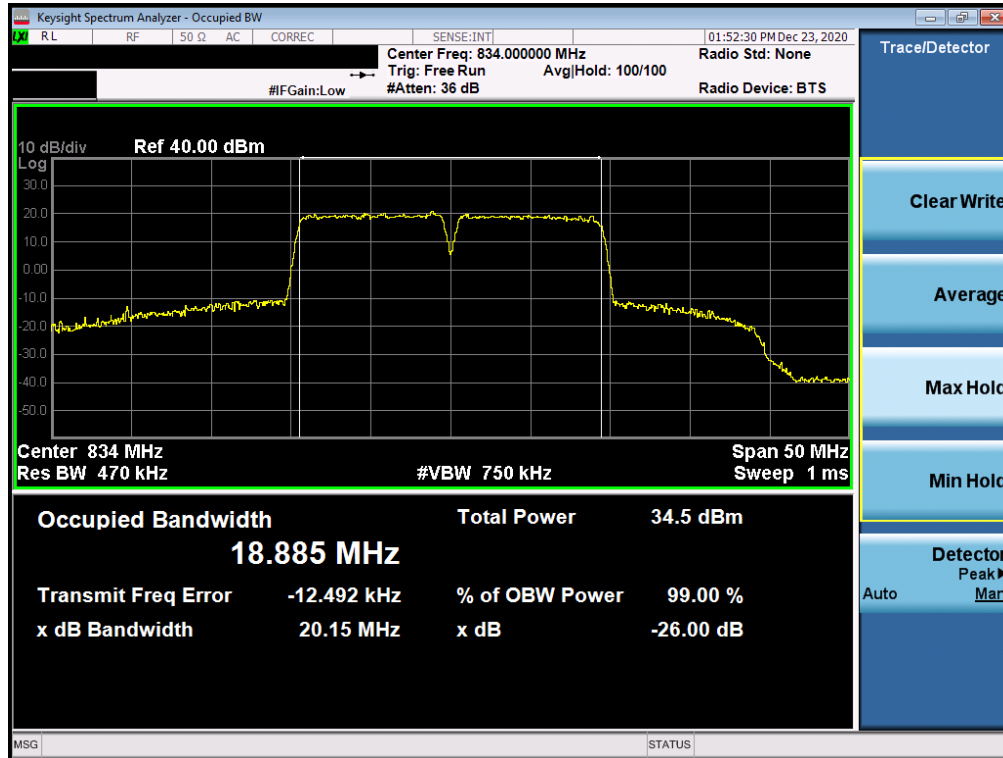
Plot 7-35. Occupied Bandwidth Plot (NR Band n5 - 5MHz CP-OFDM 64-QAM - Full RB Configuration)



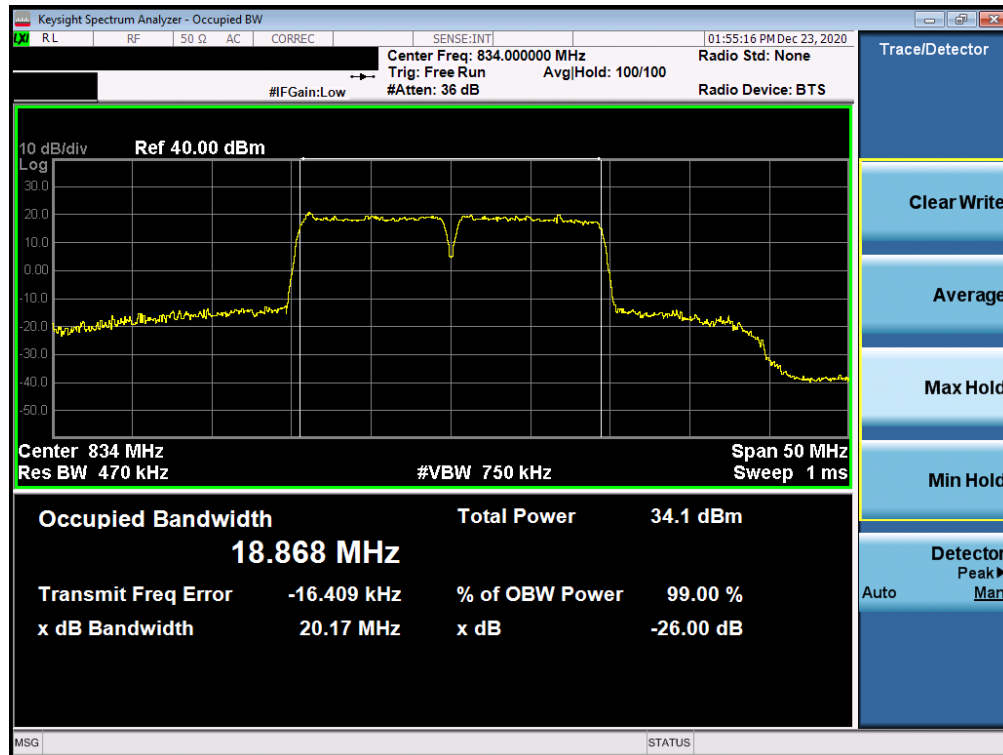
Plot 7-36. Occupied Bandwidth Plot (NR Band n5 - 5MHz CP-OFDM 256-QAM - Full RB Configuration)

FCC ID: BCGA2379	PCTEST Proud to be part of element	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 31 of 108

ULCA - LTE Band 5

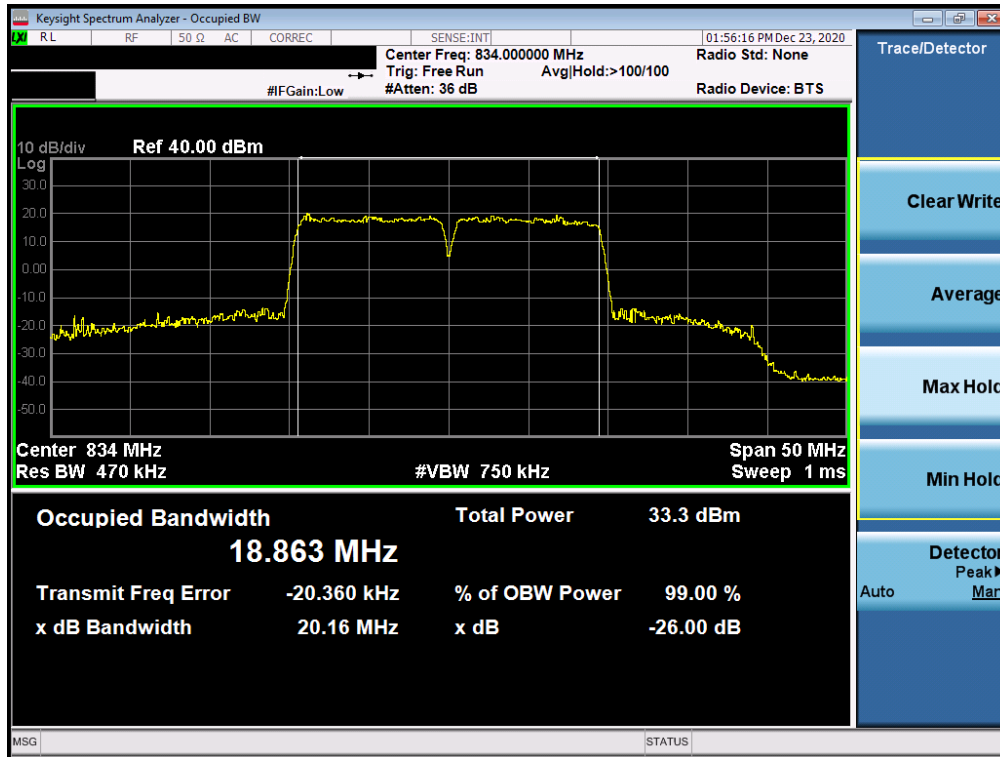


Plot 7-37. Occupied Bandwidth Plot (ULCA - LTE Band 5 – (10 + 10)MHz QPSK - Full RB Configuration)

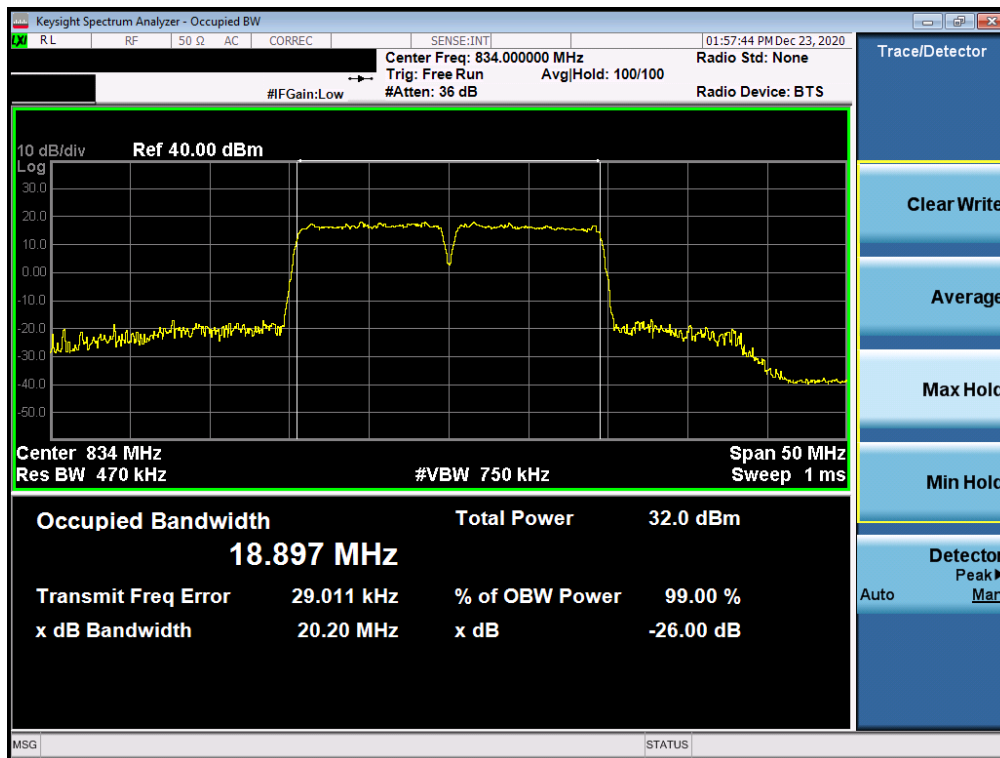


Plot 7-38. Occupied Bandwidth Plot (ULCA - LTE Band 5 - (10 + 10)MHz 16-QAM - Full RB Configuration)

FCC ID: BCGA2379	PCTEST Proud to be part of element	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 32 of 108



Plot 7-39. Occupied Bandwidth Plot (ULCA - LTE Band 5 - (10 + 10)MHz 64-QAM - Full RB Configuration)



Plot 7-40. Occupied Bandwidth Plot (ULCA - LTE Band 5 - (10 + 10)MHz 256-QAM - Full RB Configuration)

FCC ID: BCGA2379	PCTEST Proud to be part of element	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 33 of 108

GPRS Cell



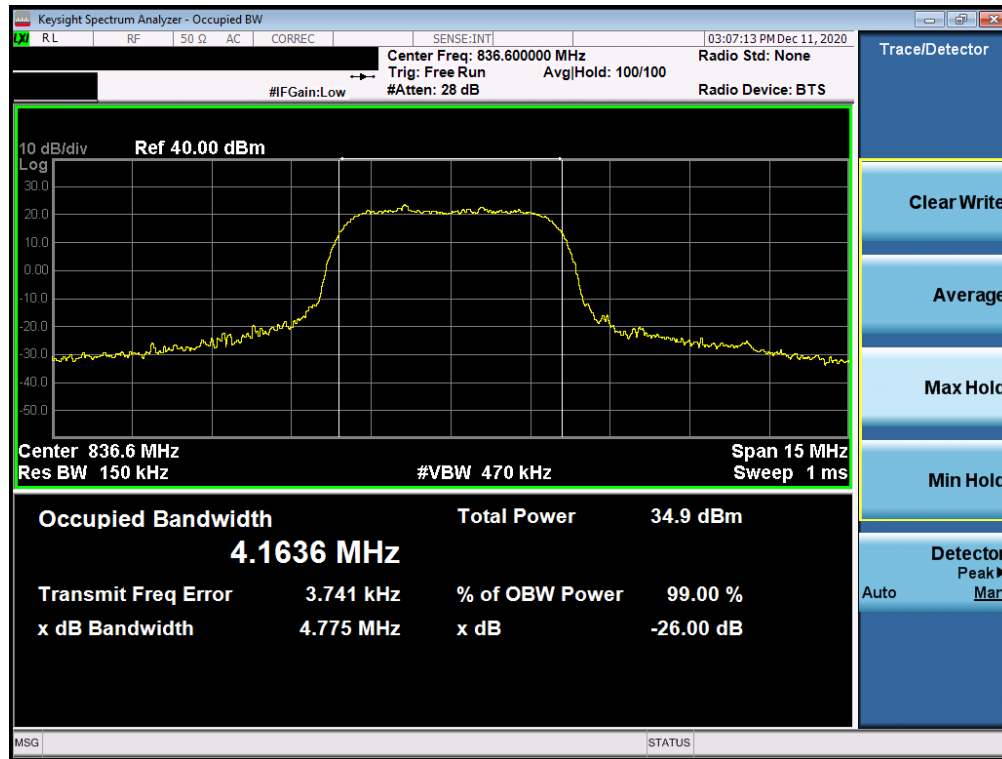
Plot 7-41. Occupied Bandwidth Plot (GPRS, Ch. 190)



Plot 7-42. Occupied Bandwidth Plot (EDGE, Ch. 190)

FCC ID: BCGA2379	PCTEST Proud to be part of element	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 34 of 108

WCDMA Cell



Plot 7-43. Occupied Bandwidth Plot (WCDMA, Ch. 4183)

FCC ID: BCGA2379	PCTEST Proud to be part of element	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 35 of 108

7.3 Spurious and Harmonic Emissions at Antenna Terminal

§2.1051, 22.917(a)

Test Overview

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

The minimum permissible attenuation level of any spurious emission is $43 + 10 \log_{10}(P_{\text{Watts}})$, 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 10GHz (separated into at least two plots per channel)
2. Detector = RMS
3. Trace mode = trace average for continuous emissions, max hold for pulse emissions
4. Sweep time = auto couple
5. The trace was allowed to stabilize
6. Please see test notes below for RBW and VBW settings

Test Setup

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

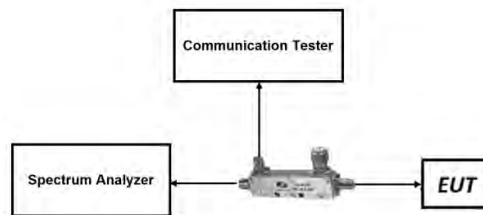



Figure 7-2. Test Instrument & Measurement Setup

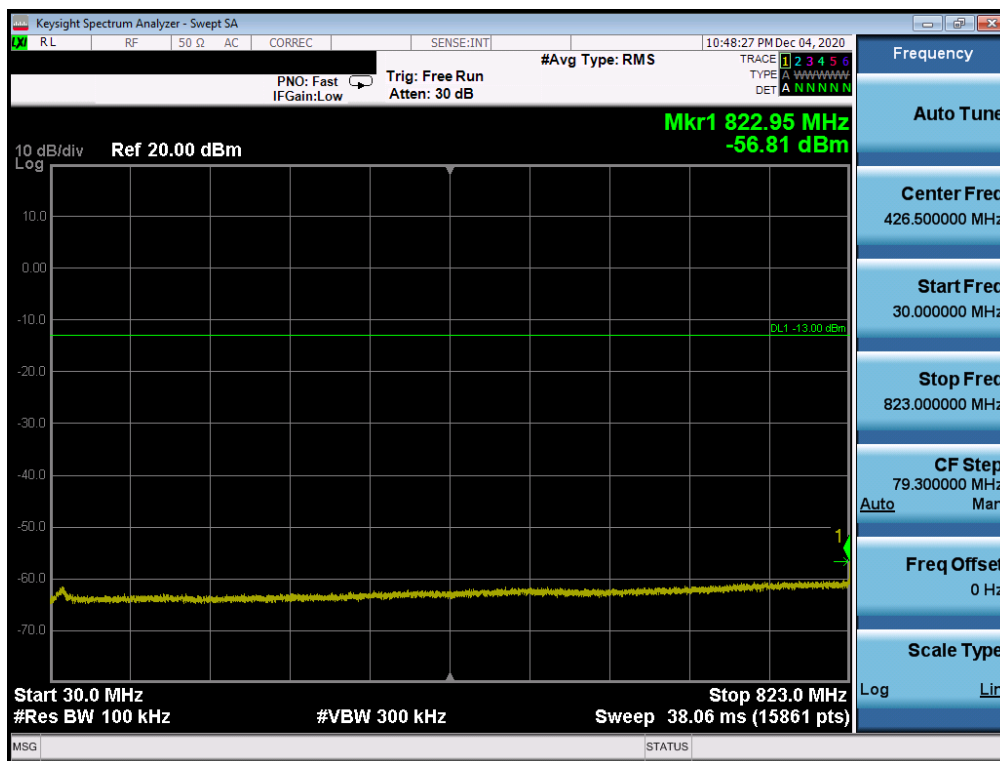
FCC ID: BCGA2379	PCTEST Proud to be part of element	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 36 of 108

Test Notes

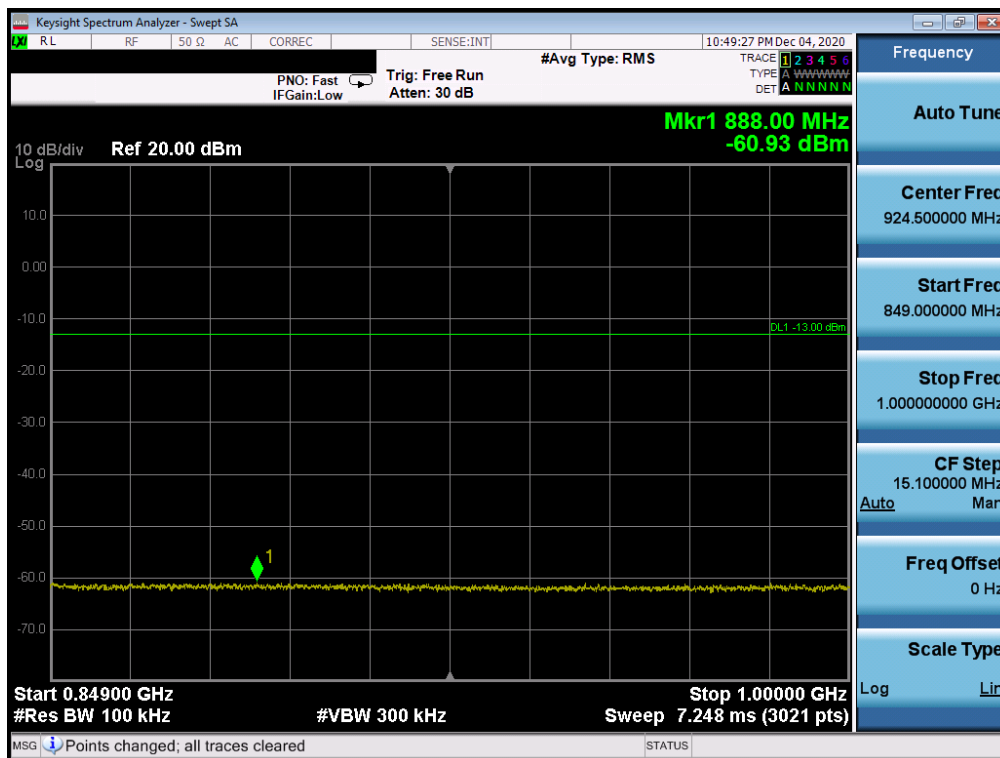
1. Per Part 22, compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth 100 kHz or greater for measurements below 1GHz. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least 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.
2. For NR operation, all subcarrier spacings (SCS) and transmission schemes (e.g. CP-OFDM and DFT-s-OFDM) were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.
3. Uplink carrier aggregation conducted spurious emissions measurements were evaluated for the two contiguous channels using various combinations of RB size, RB offset, modulation, and channel bandwidth. The worst case (highest) powers were found while operating with QPSK modulation with both carriers set to transmit using 1RB.
4. Uplink carrier aggregation inter-band emission was investigated and found to not be the worst case

FCC ID: BCGA2379	 PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device
		Page 37 of 108

LTE Band 26/5

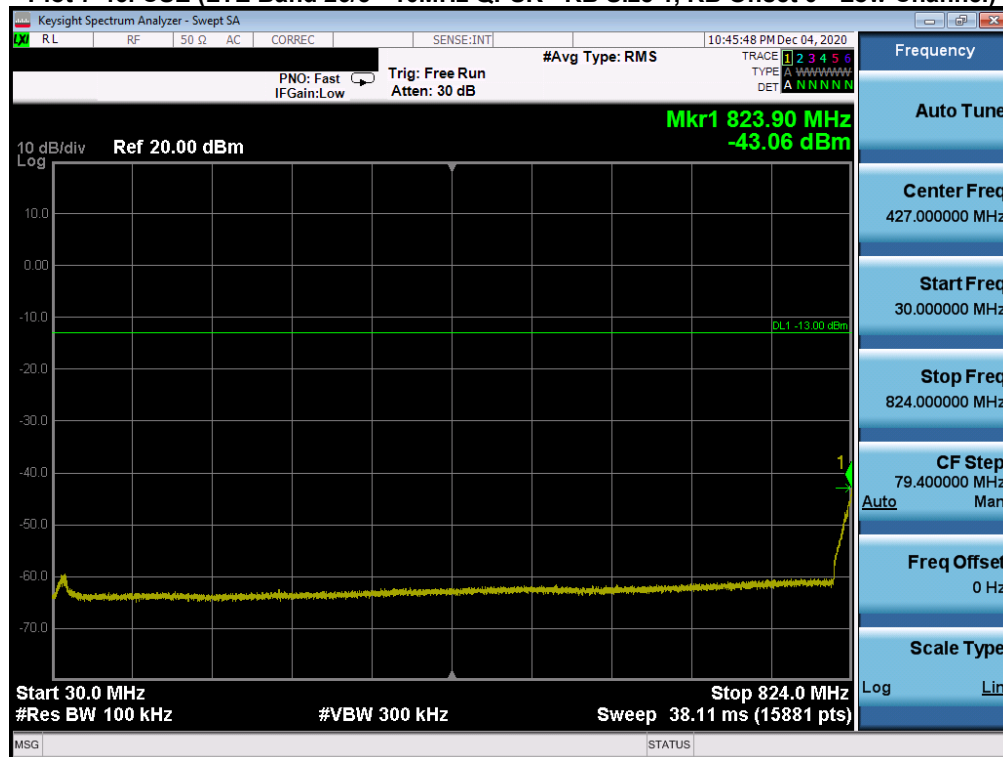
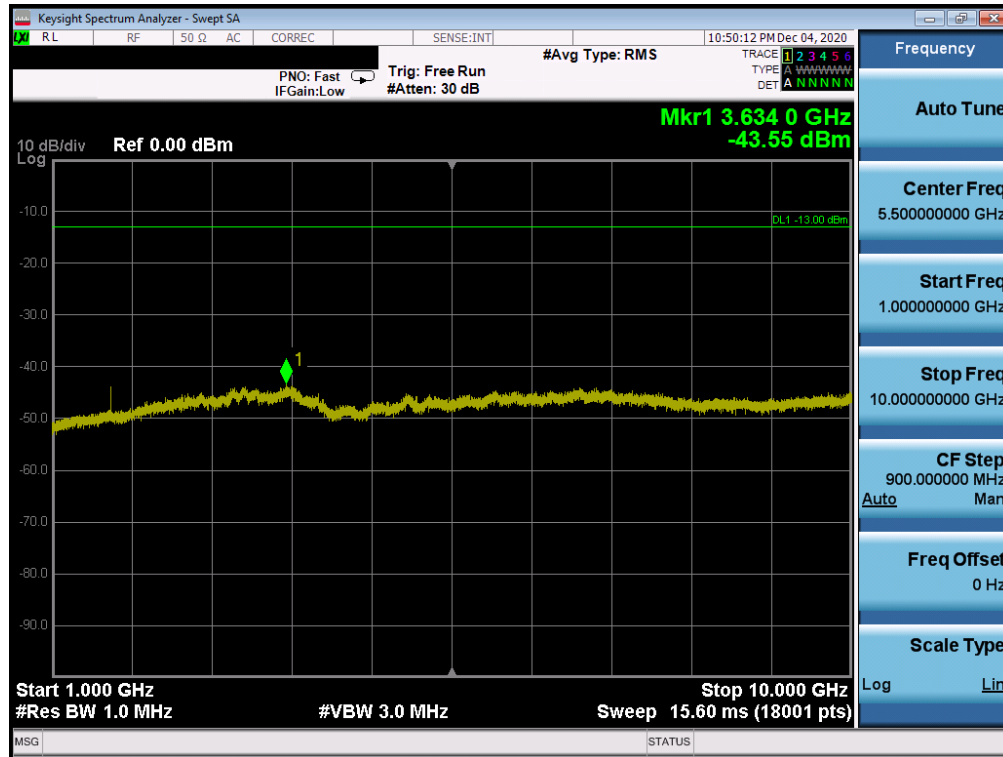


Plot 7-44. CSE (LTE Band 26/5 - 10MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)

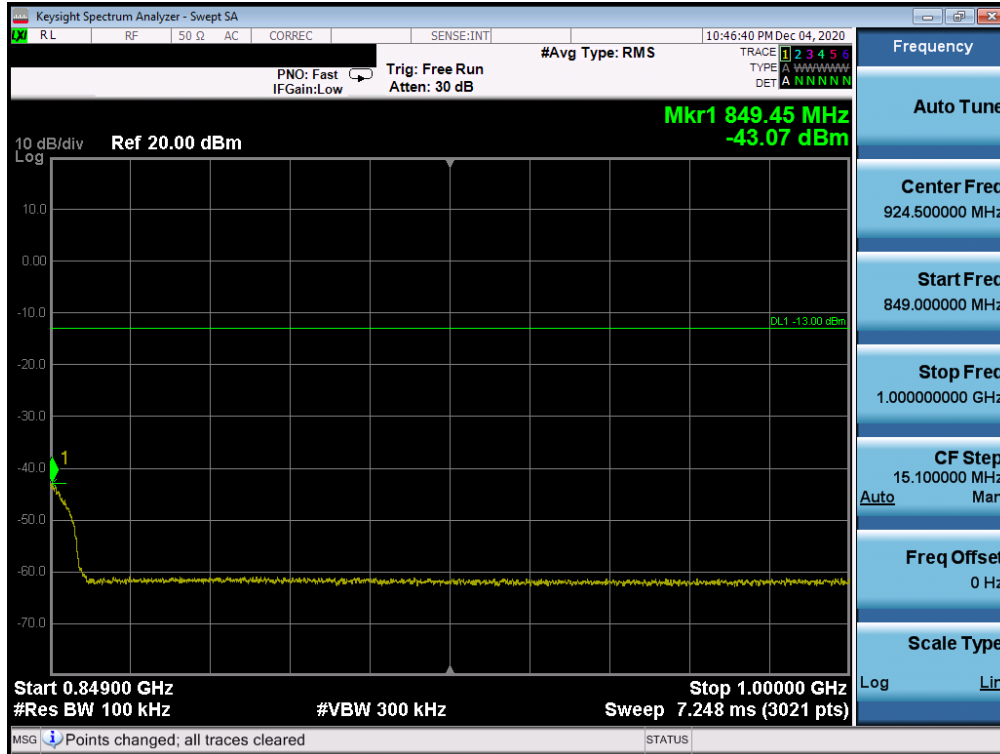


Plot 7-45. CSE (LTE Band 26/5 - 10MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)

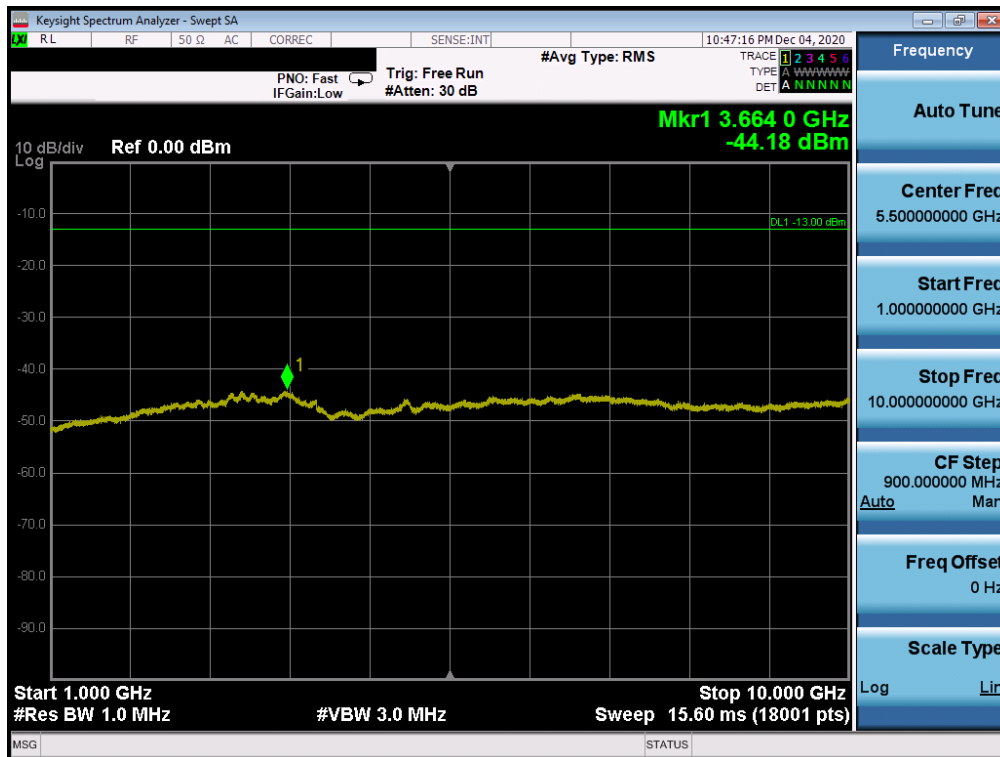
FCC ID: BCGA2379	PCTEST Proud to be part of element	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 38 of 108



FCC ID: BCGA2379	PCTEST Proud to be part of element	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 39 of 108

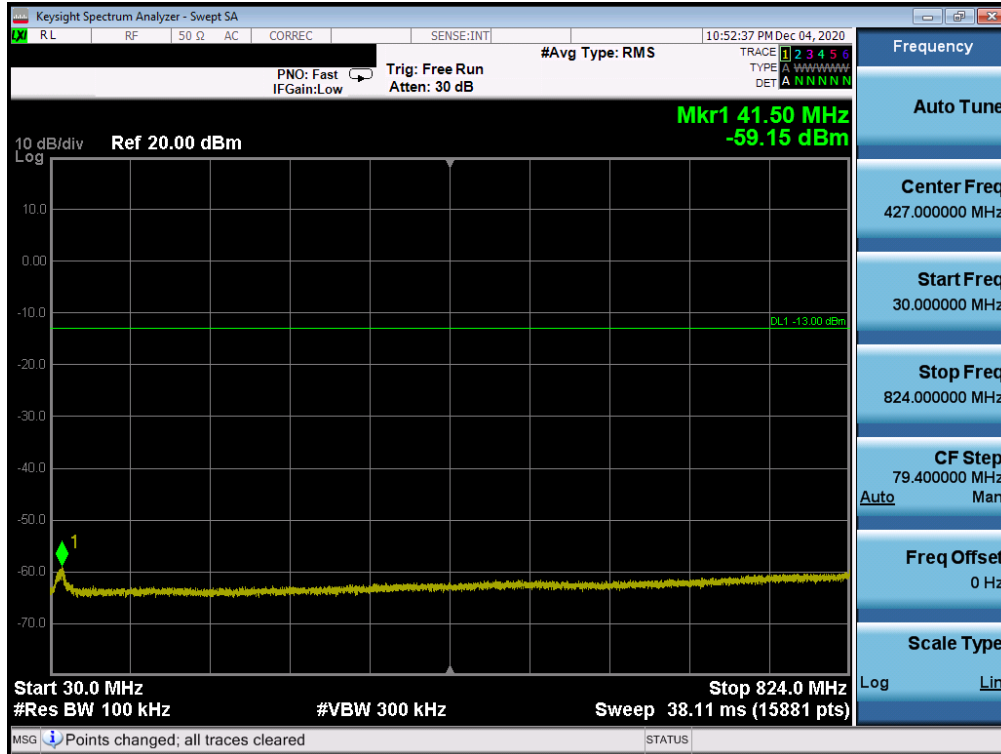


Plot 7-48. CSE (LTE Band 26/5 - 10MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

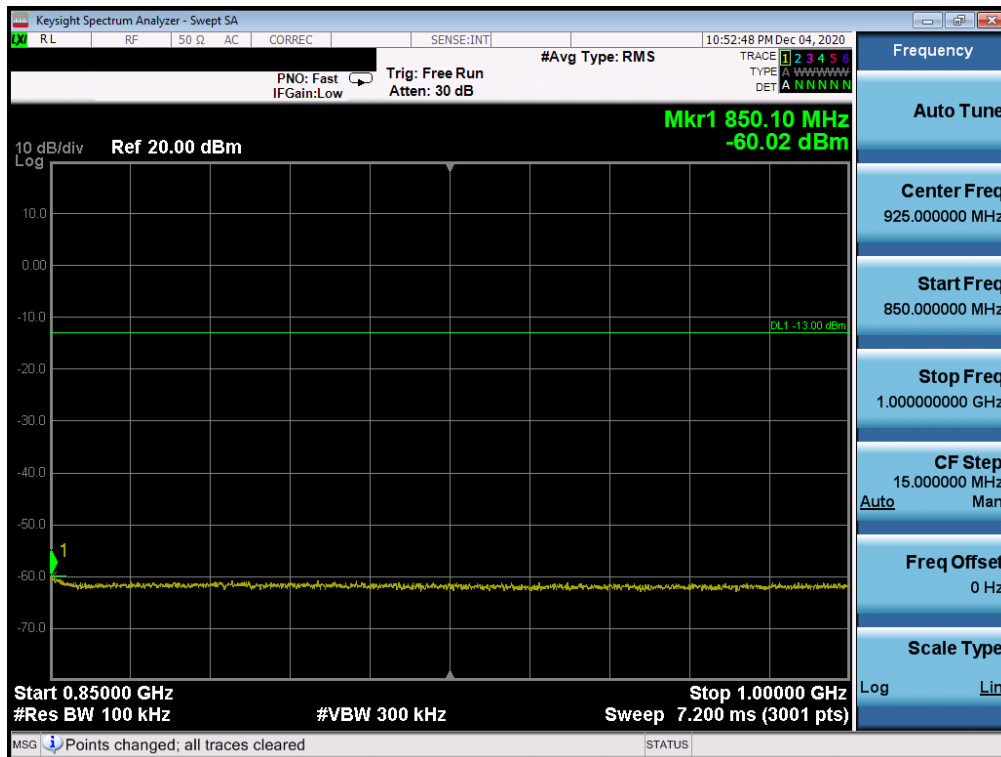


Plot 7-49. CSE (LTE Band 26/5 - 10MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

FCC ID: BCGA2379	PCTEST Proud to be part of element	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 40 of 108

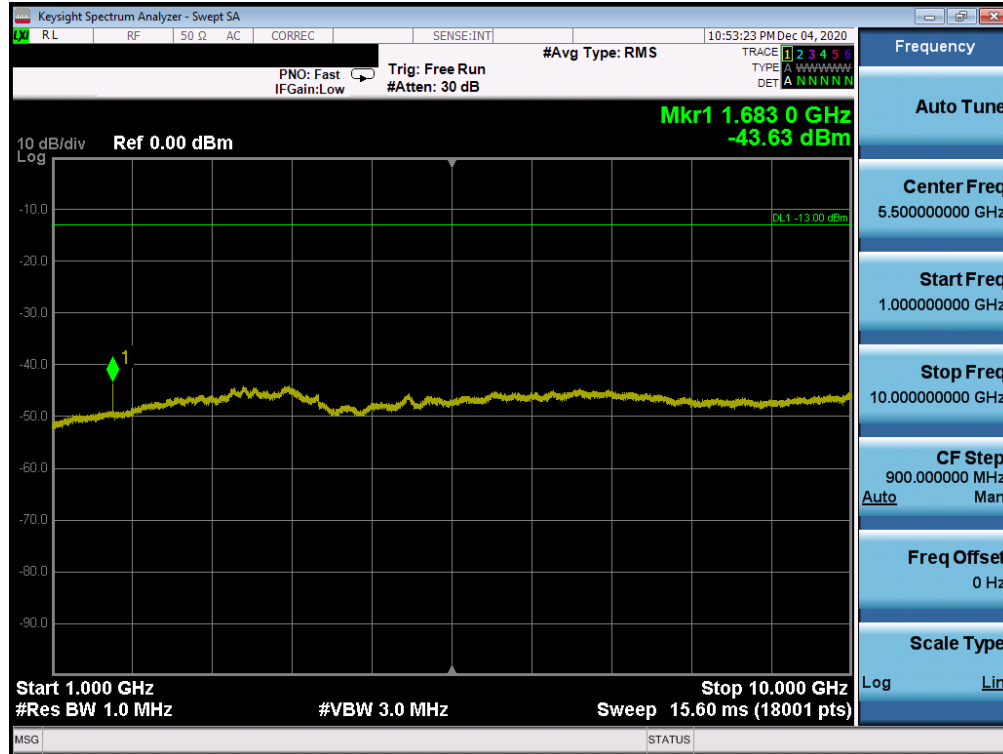


Plot 7-50. CSE (LTE Band 26/5 - 10MHz QPSK - RB Size 1, RB Offset 0 - High Channel)



Plot 7-51. CSE (LTE Band 26/5 - 10MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

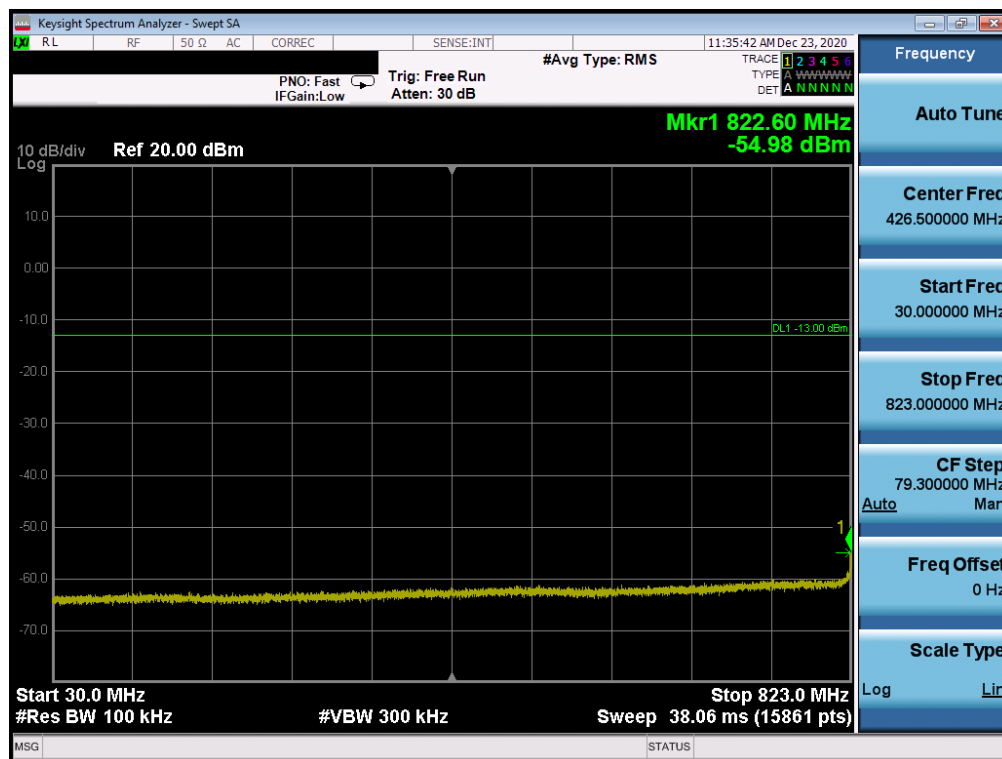
FCC ID: BCGA2379	PCTEST Proud to be part of element	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 41 of 108



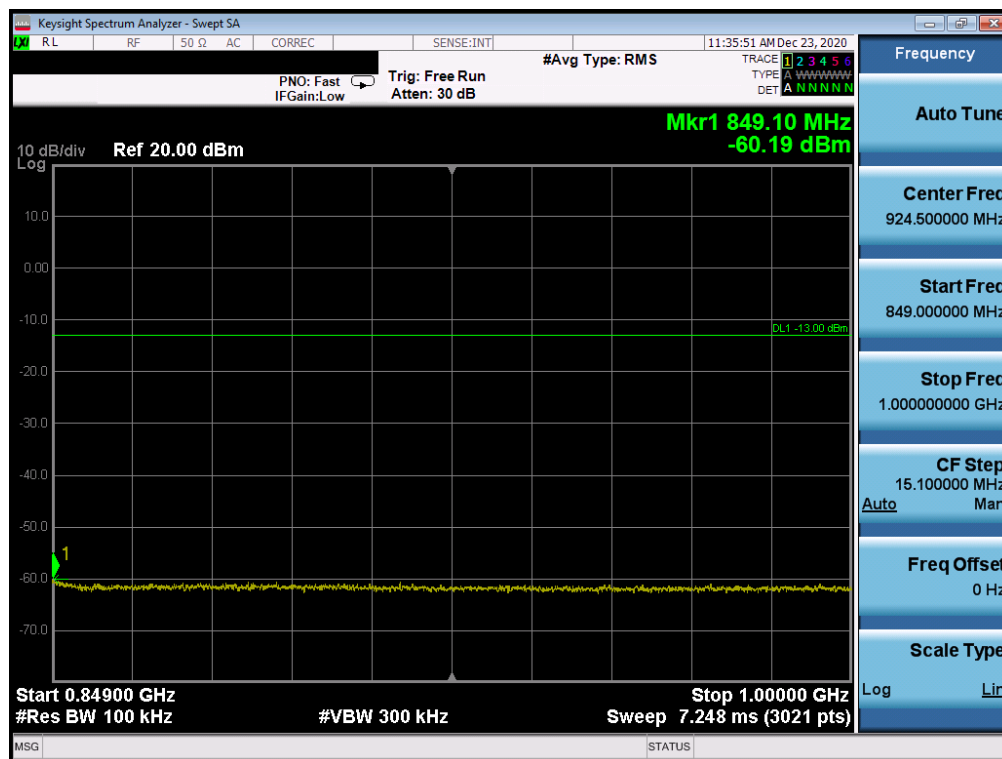
Plot 7-52. CSE (LTE Band 26/5 - 10MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

FCC ID: BCGA2379	PCTEST Proud to be part of element	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 42 of 108

ULCA LTE Band 5

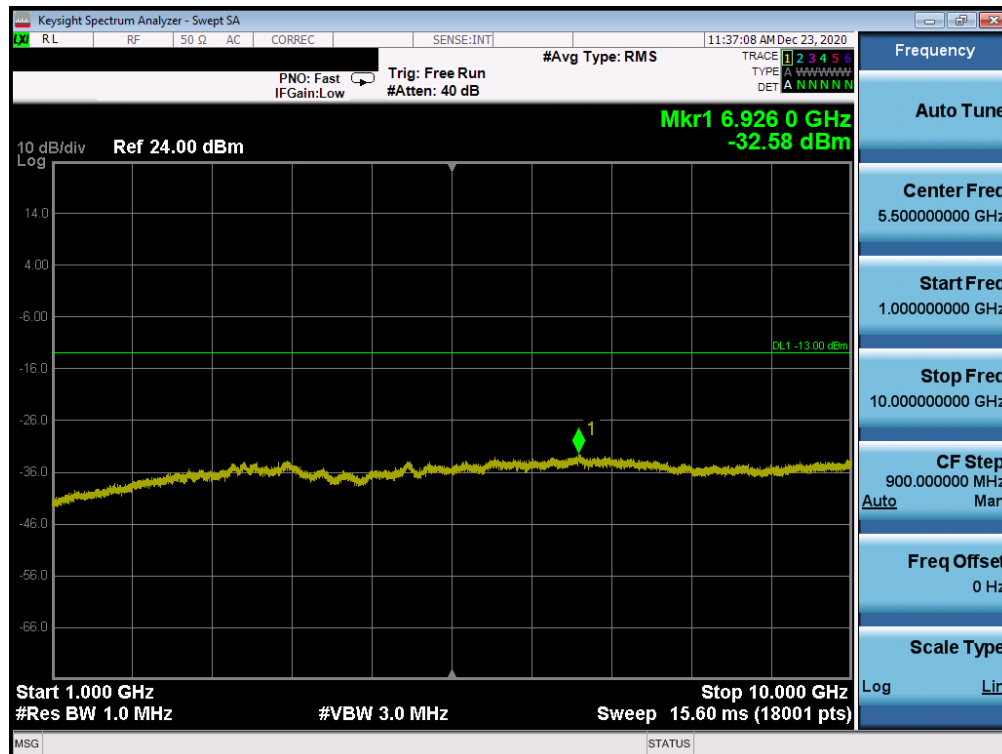


Plot 7-53. CSE (ULCA LTE Band 5 - (10 + 10)MHz QPSK - PCC 1/49 SCC 1/0 - Low Channel)

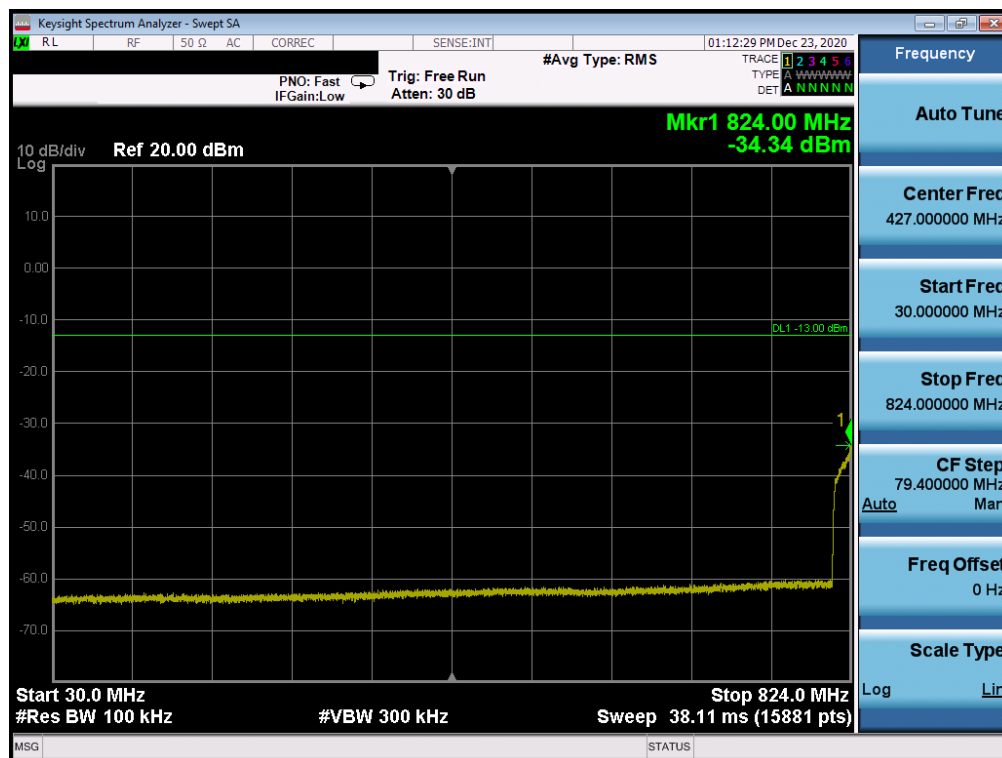


Plot 7-54. CSE (ULCA LTE Band 5 - (10 + 10)MHz QPSK - PCC 1/49 SCC 1/0 - Low Channel)

FCC ID: BCGA2379	PCTEST Proud to be part of element	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 43 of 108

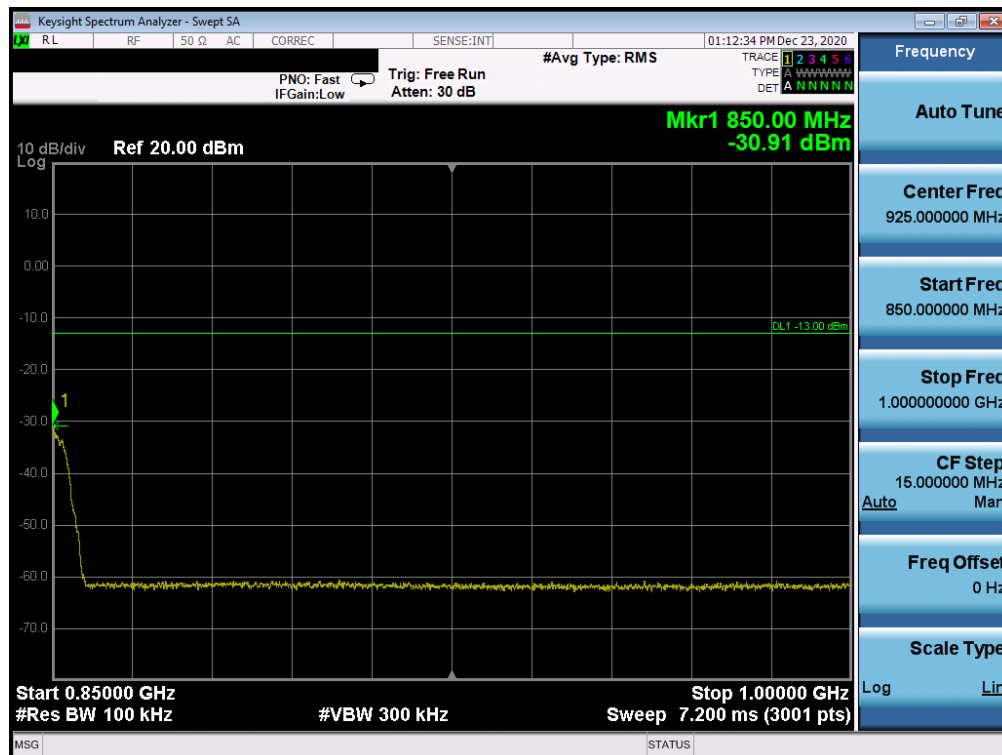


Plot 7-55. CSE (ULCA LTE Band 5 - (10 + 10)MHz QPSK - PCC 1/49 SCC 1/0 - Low Channel)

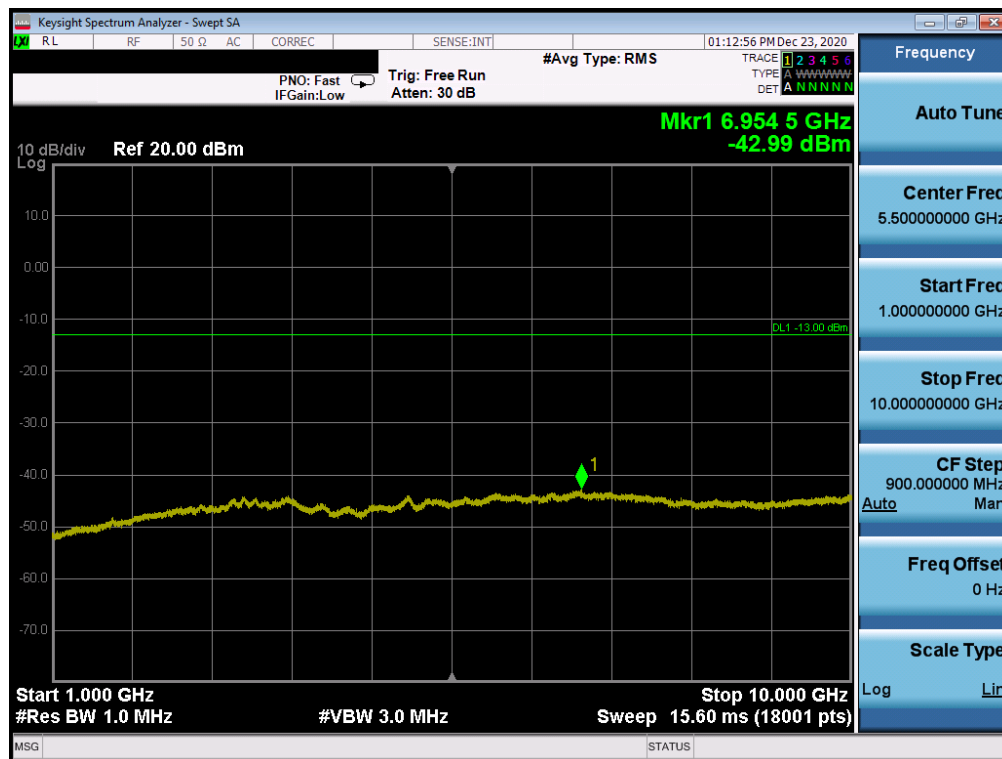


Plot 7-56. CSE (ULCA LTE Band 5 - (10 + 10)MHz QPSK - PCC 1/0 SCC 1/49 - High Channel)

FCC ID: BCGA2379	PCTEST Proud to be part of element	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 44 of 108



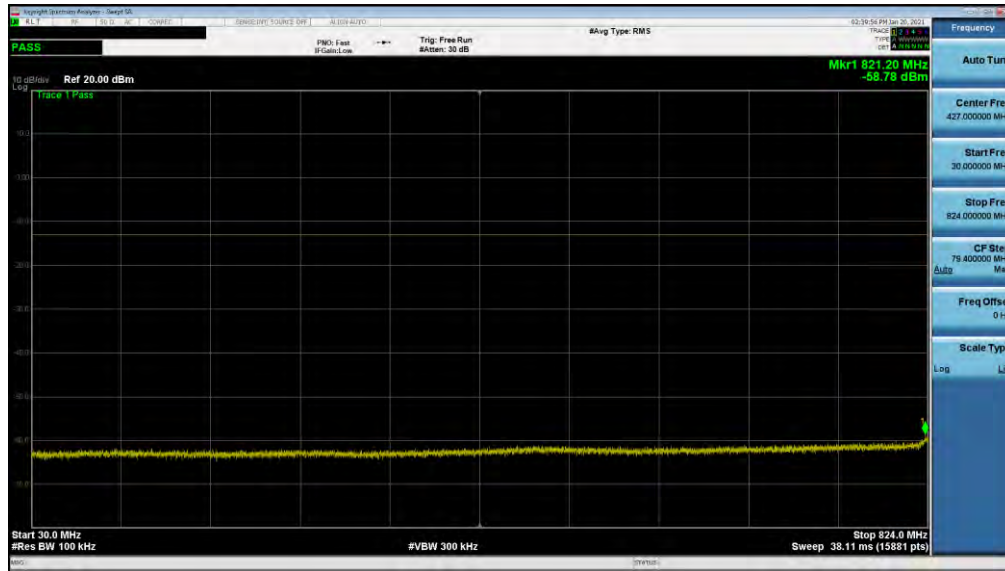
Plot 7-57. CSE (ULCA LTE Band 5 - (10 + 10)MHz QPSK - PCC 1/0 SCC 1/49 - High Channel)



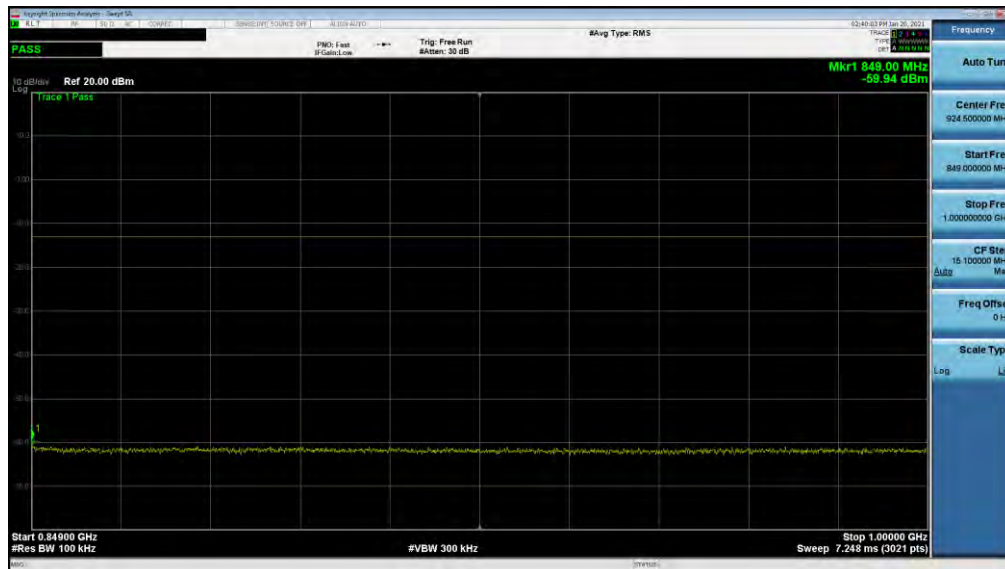
Plot 7-58. CSE (ULCA LTE Band 5 - (10 + 10)MHz QPSK - PCC 1/0 SCC 1/49 - High Channel)

FCC ID: BCGA2379	PCTEST Proud to be part of element	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 45 of 108

NR Band n5

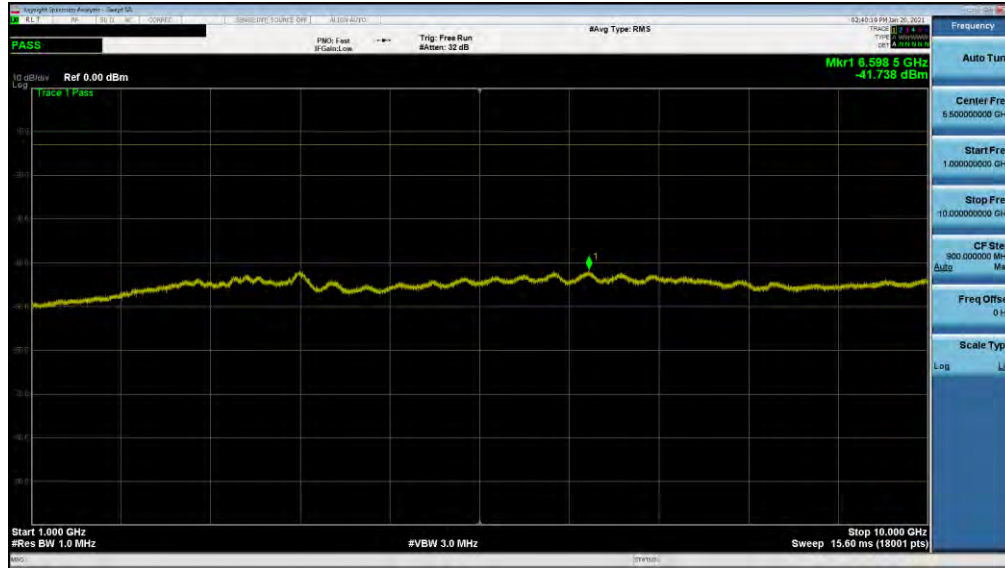


Plot 7-59. CSE (NR Band n5 - 20.0MHz DFT-s-OFDM QPSK - RB Size 1, RB Offset 0 - Low Channel)

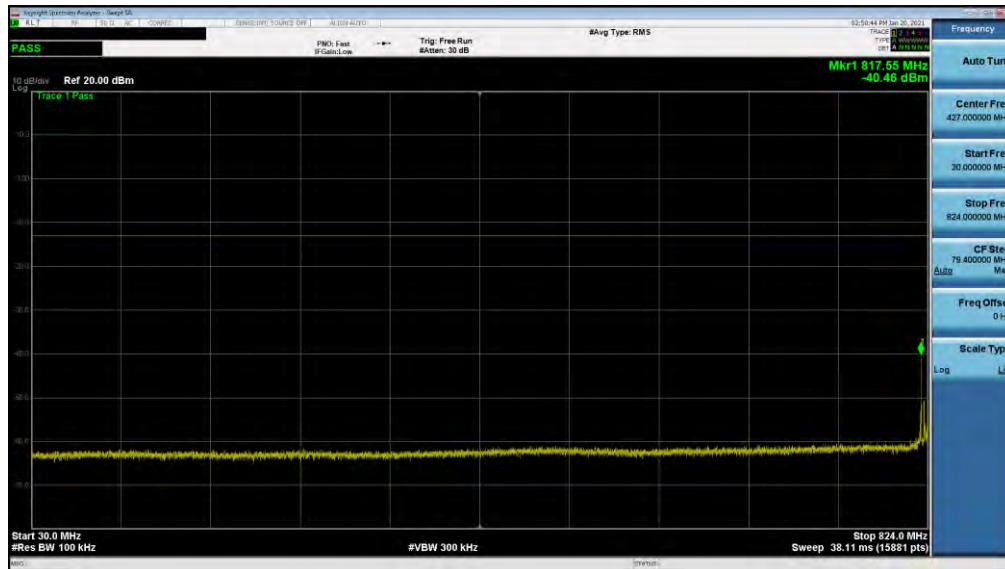


Plot 7-60. CSE (NR Band n5 - 20.0MHz DFT-s-OFDM QPSK - RB Size 1, RB Offset 0 - Low Channel)

FCC ID: BCGA2379	PCTEST Proud to be part of element	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 46 of 108

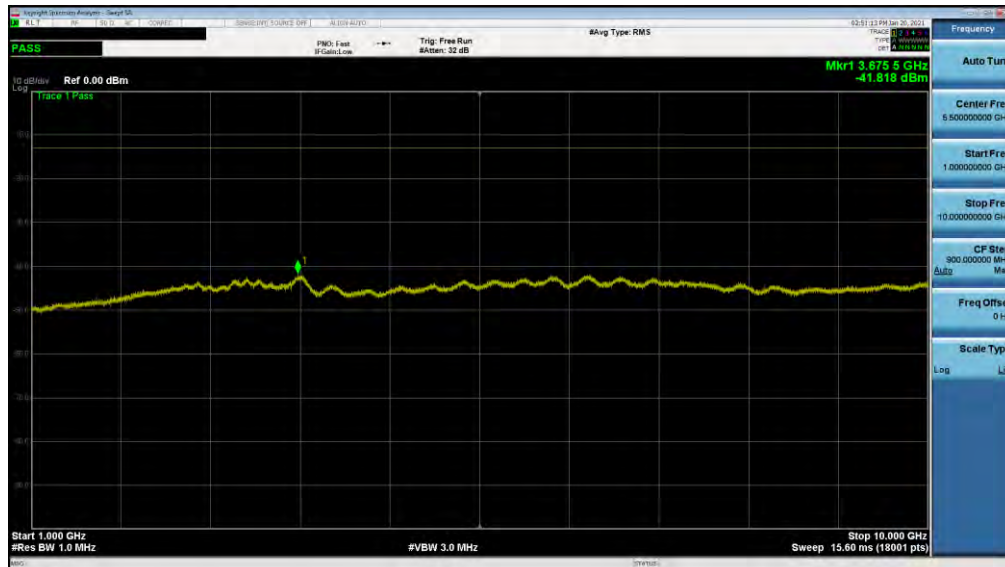
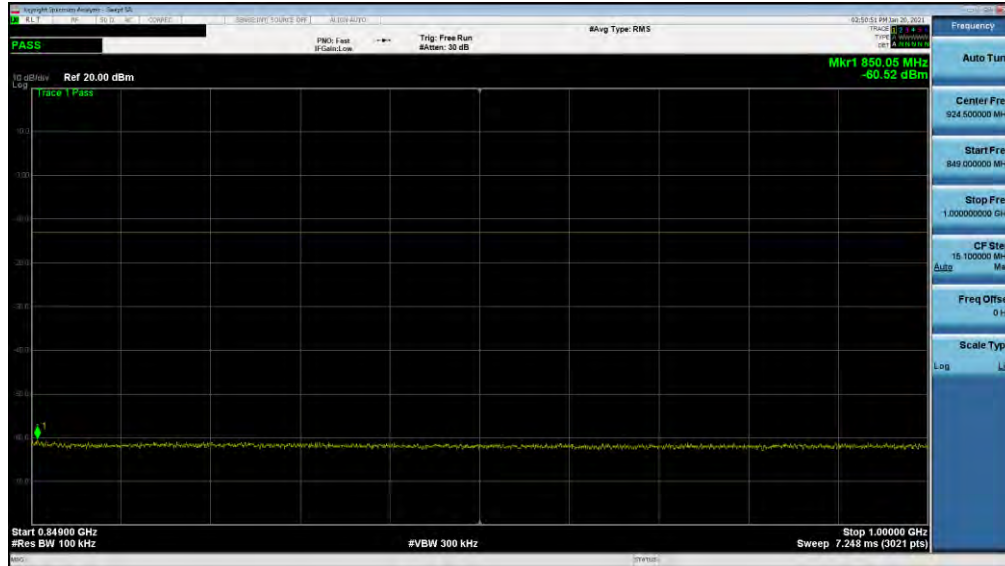


Plot 7-61. CSE (NR Band n5 - 20.0MHz DFT-s-OFDM QPSK - RB Size 1, RB Offset 0 - Low Channel)

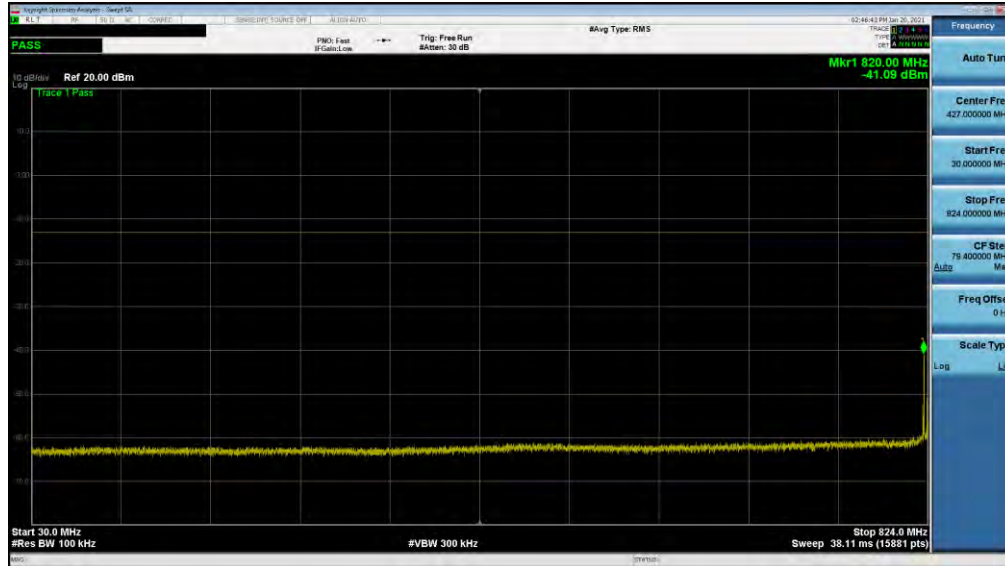


Plot 7-62. CSE (NR Band n5 - 20.0MHz DFT-s-OFDM QPSK - RB Size 1, RB Offset 0 - Mid Channel)

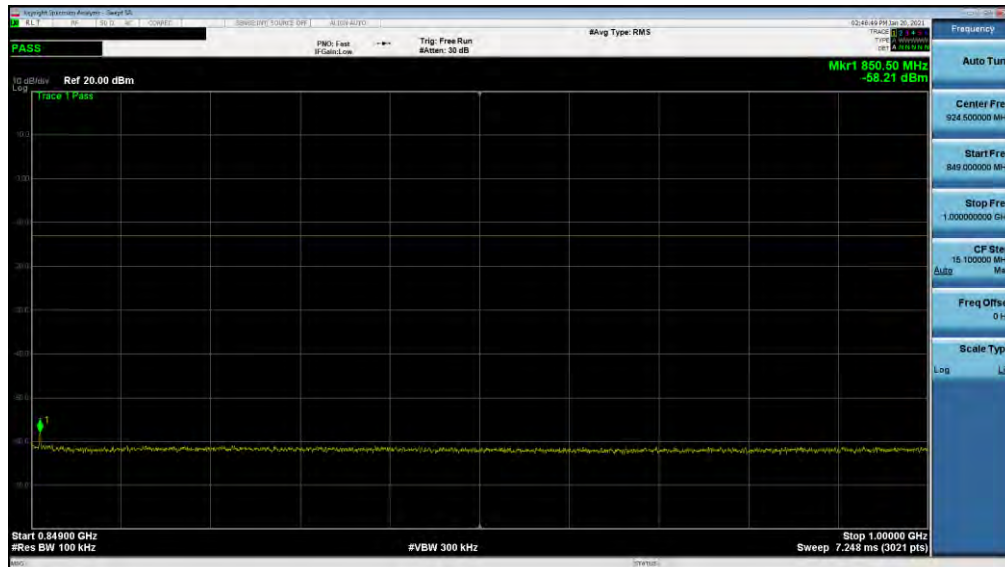
FCC ID: BCGA2379	PCTEST Proud to be part of element	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 47 of 108



FCC ID: BCGA2379	PCTEST Proud to be part of element	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 48 of 108

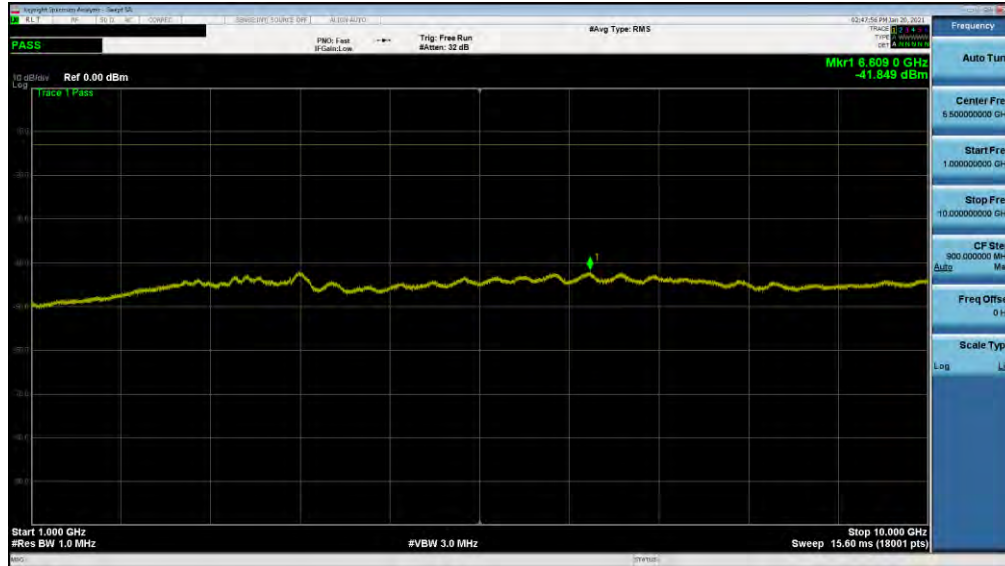


Plot 7-65. CSE (NR Band n5 - 20.0MHz DFT-s-OFDM QPSK - RB Size 1, RB Offset 0 - High Channel)



Plot 7-66. CSE (NR Band n5 - 20.0MHz DFT-s-OFDM QPSK - RB Size 1, RB Offset 0 - High Channel)

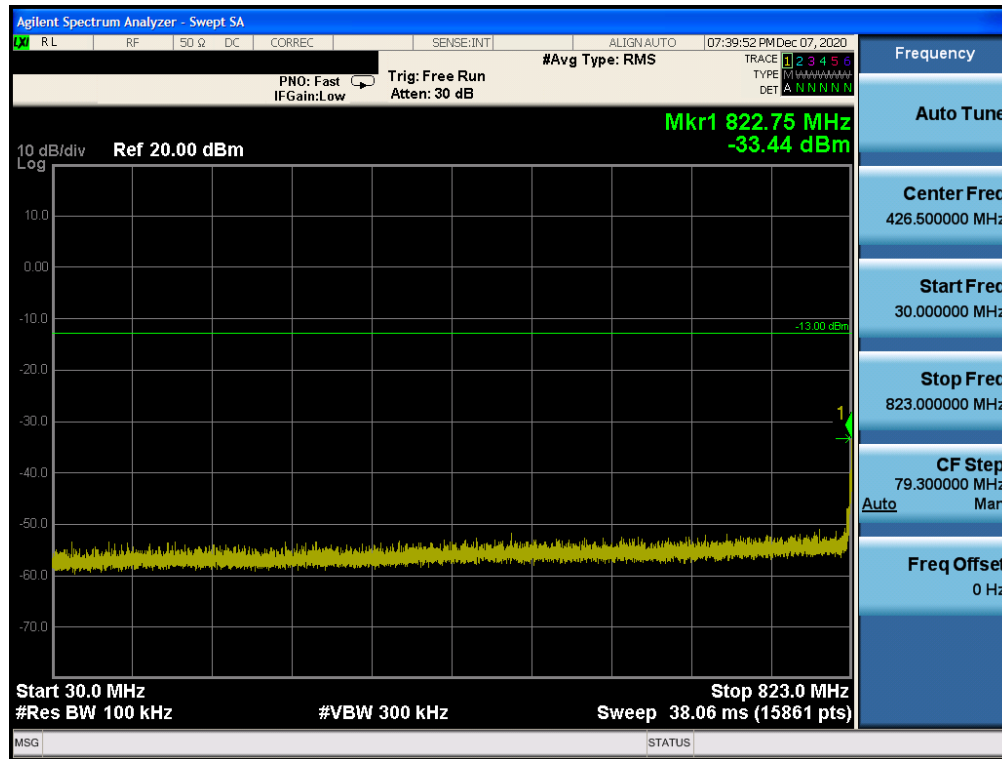
FCC ID: BCGA2379	PCTEST Proud to be part of element	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 49 of 108



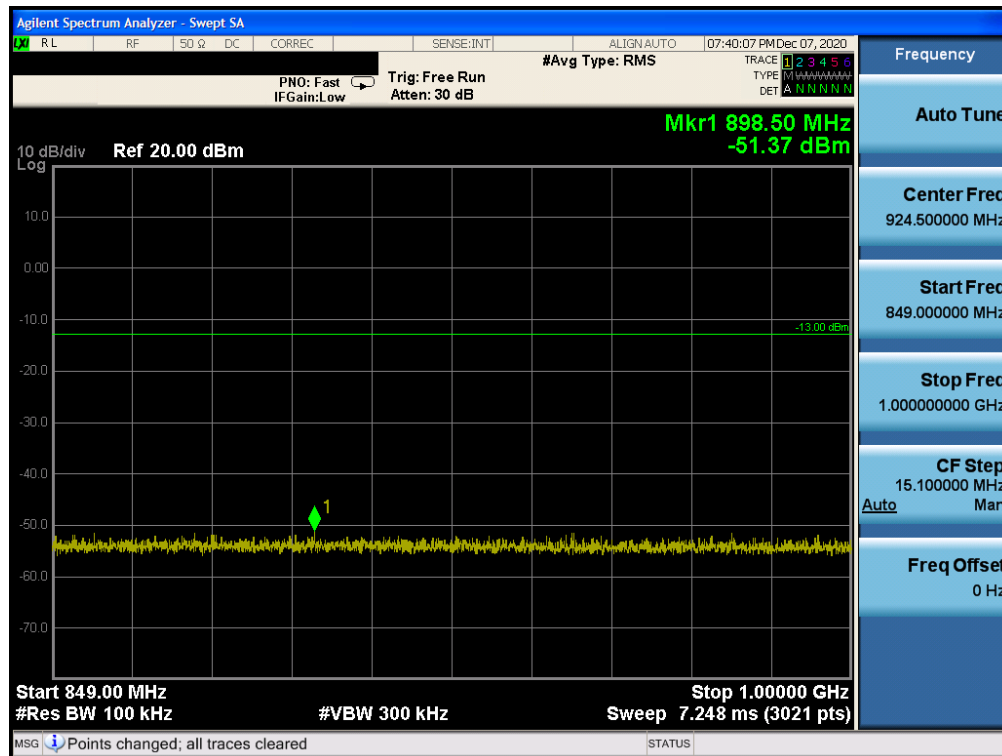
Plot 7-67. CSE (NR Band n5 - 20.0MHz DFT-s-OFDM QPSK - RB Size 1, RB Offset 0 - High Channel)

FCC ID: BCGA2379	PCTEST Proud to be part of element	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 50 of 108

GSM/GPRS Cell

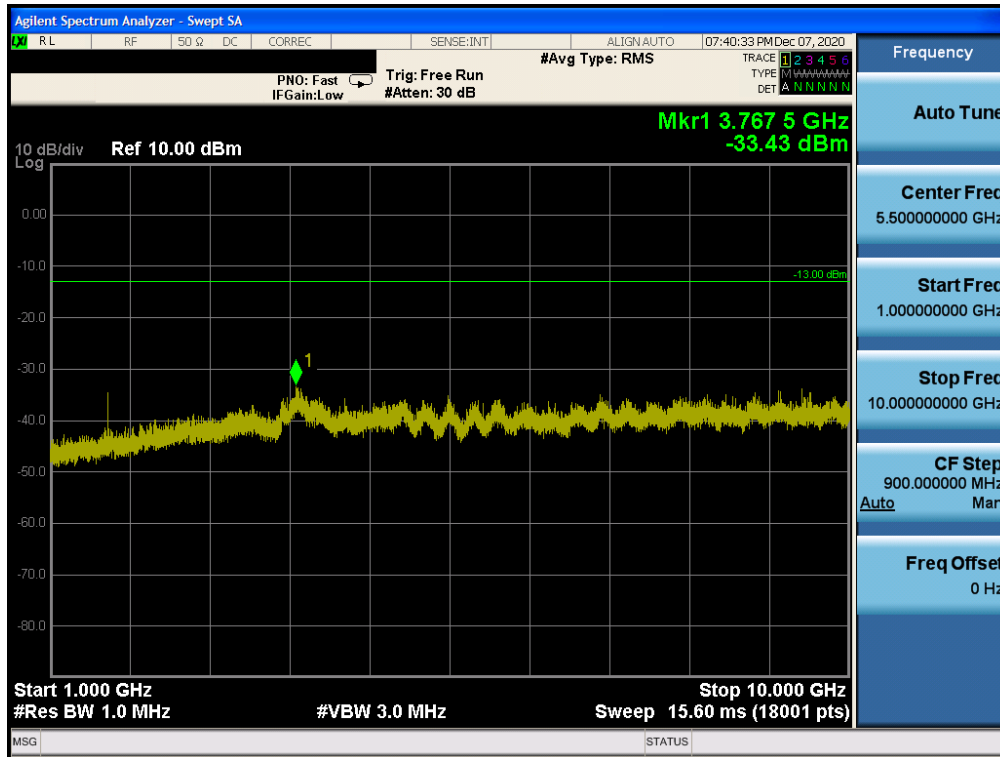


Plot 7-68. CSE (GPRS Ch. 128)

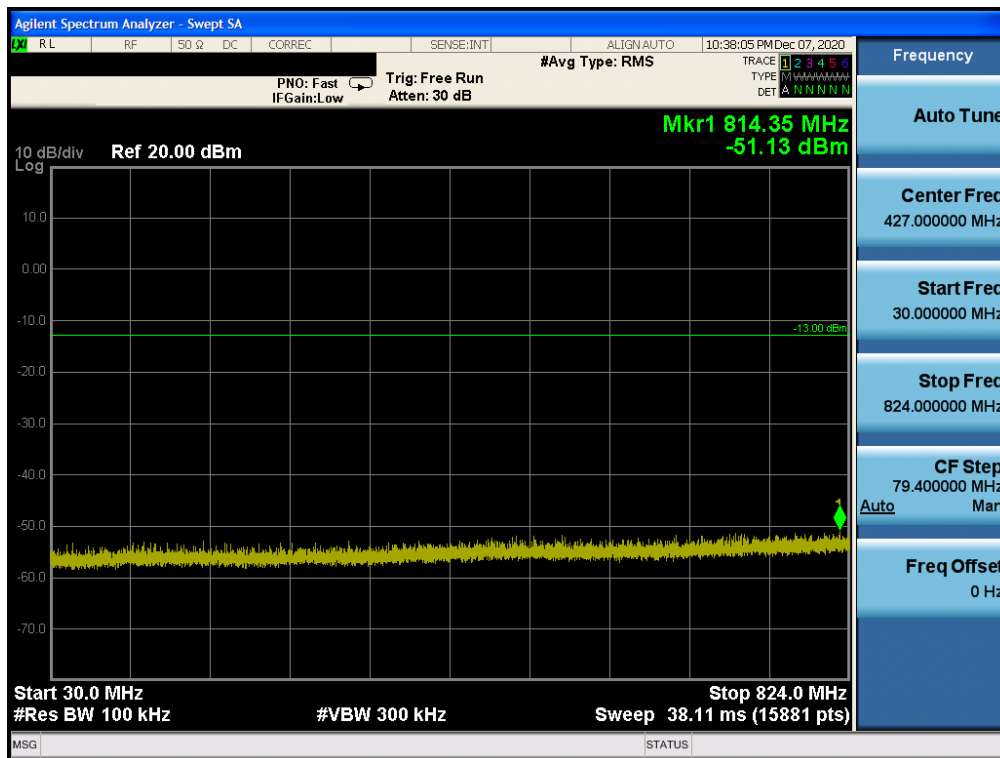


Plot 7-69. CSE (GPRS Ch. 128)

FCC ID: BCGA2379	PCTEST Proud to be part of element	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 51 of 108

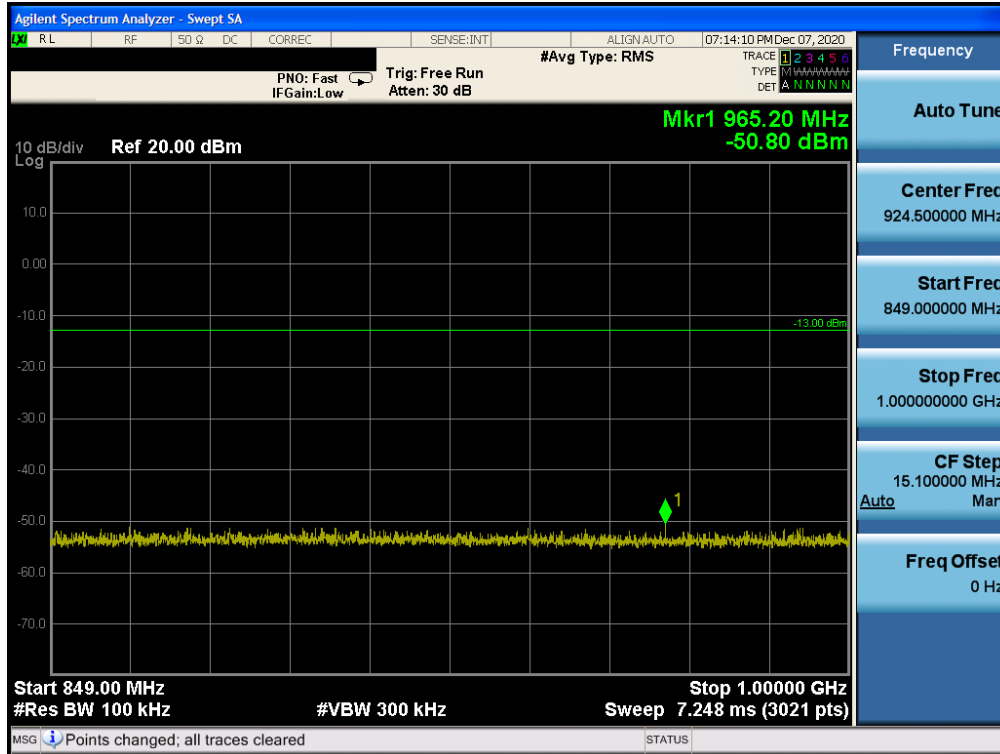


Plot 7-70. CSE (GPRS Ch. 128)

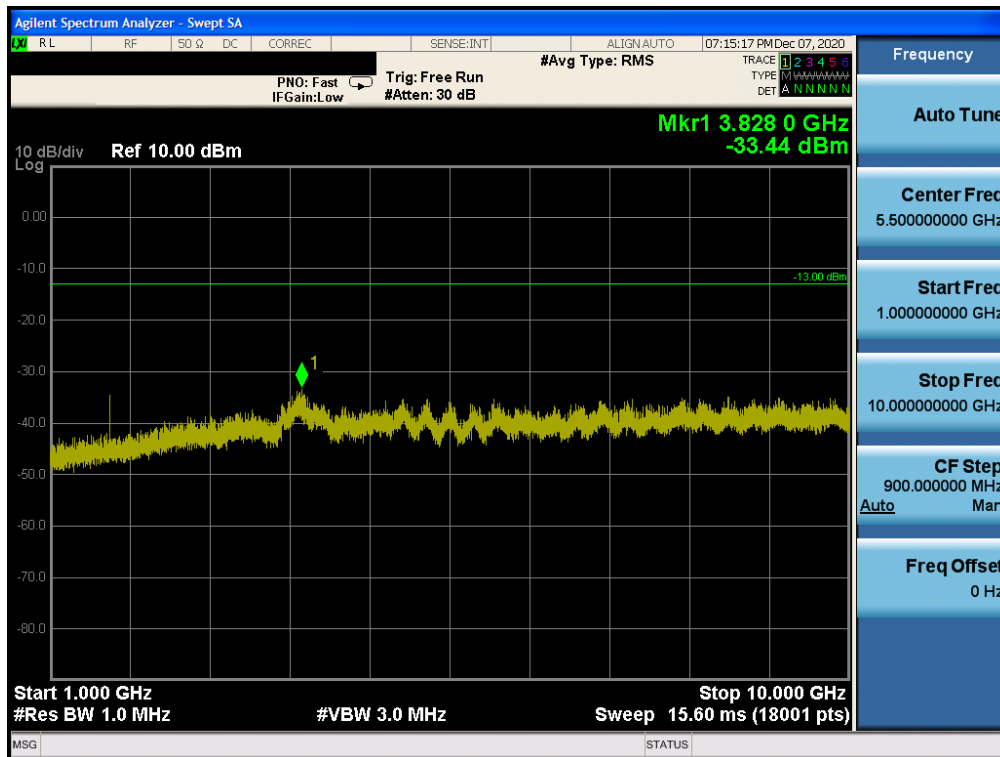


Plot 7-71. CSE (GPRS Ch. 190)

FCC ID: BCGA2379	PCTEST Proud to be part of element	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 52 of 108

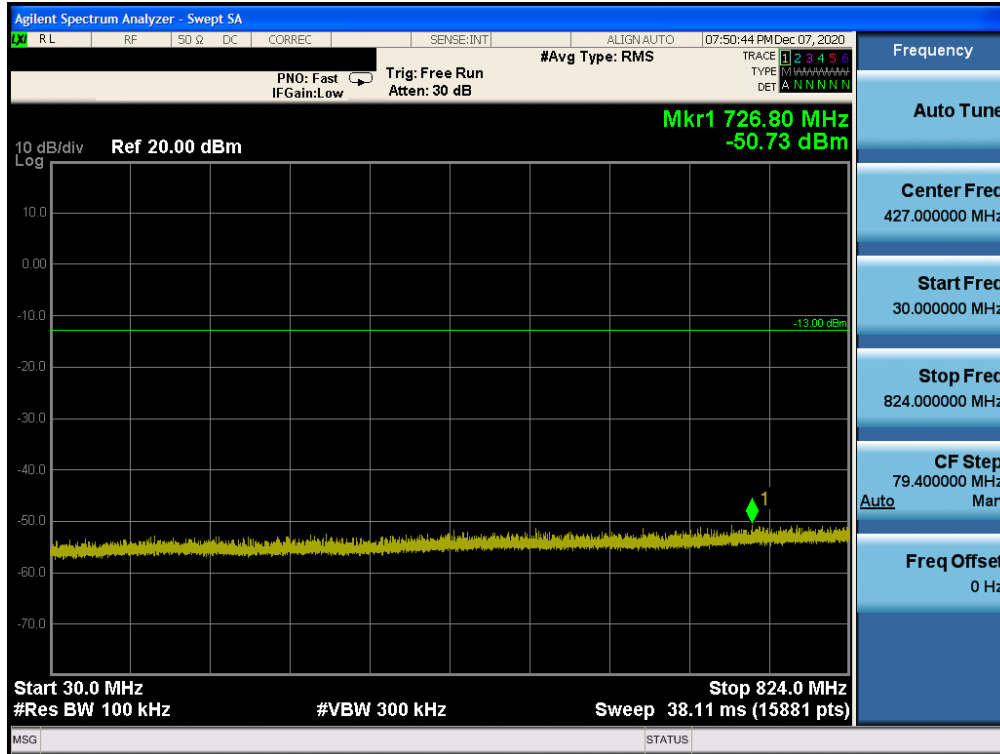


Plot 7-72. CSE (GPRS Ch. 190)

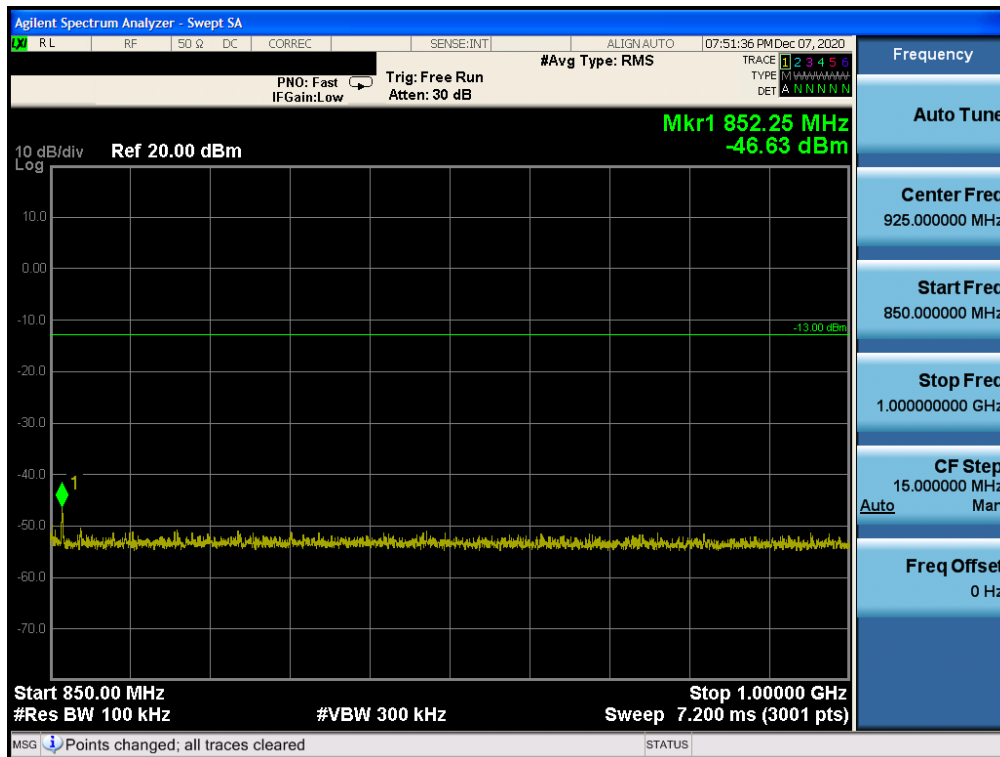


Plot 7-73. CSE (GPRS Ch. 190)

FCC ID: BCGA2379	PCTEST Proud to be part of element	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 53 of 108

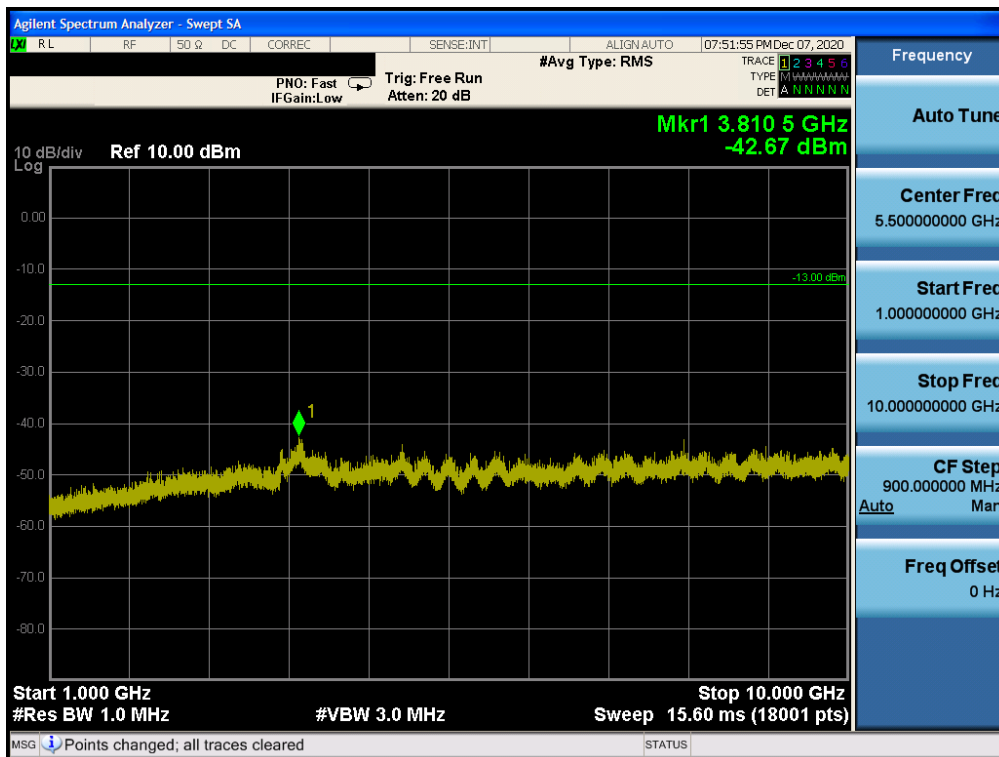


Plot 7-74. CSE (GPRS Ch. 251)



Plot 7-75. CSE (GPRS Ch. 251)

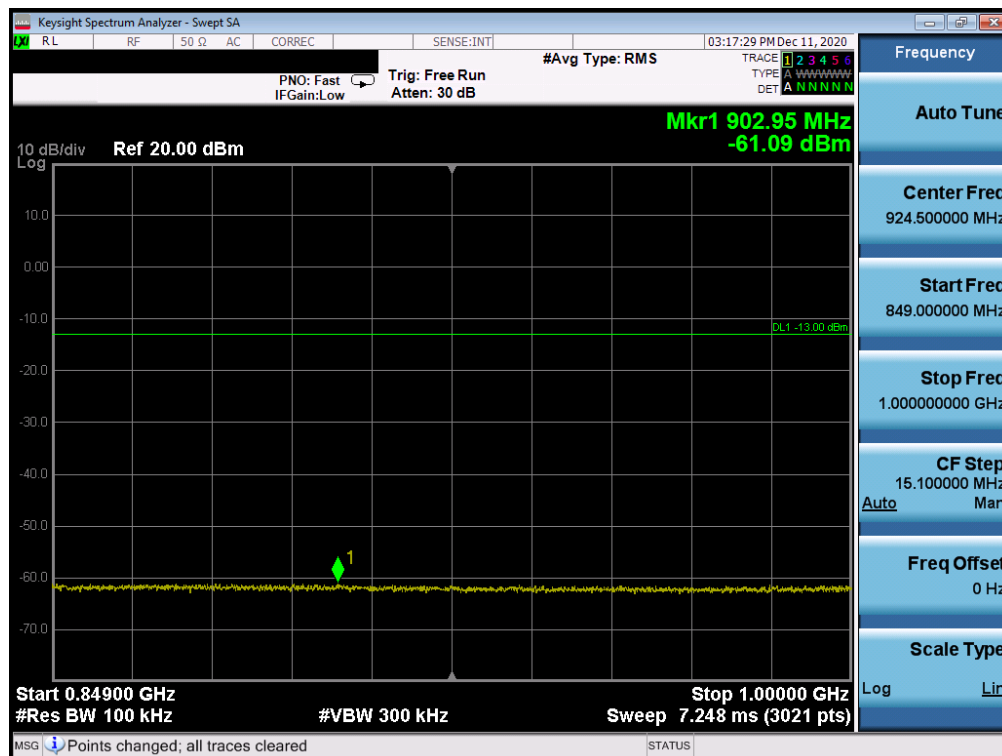
FCC ID: BCGA2379	PCTEST Proud to be part of element	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 54 of 108



WCDMA Cell

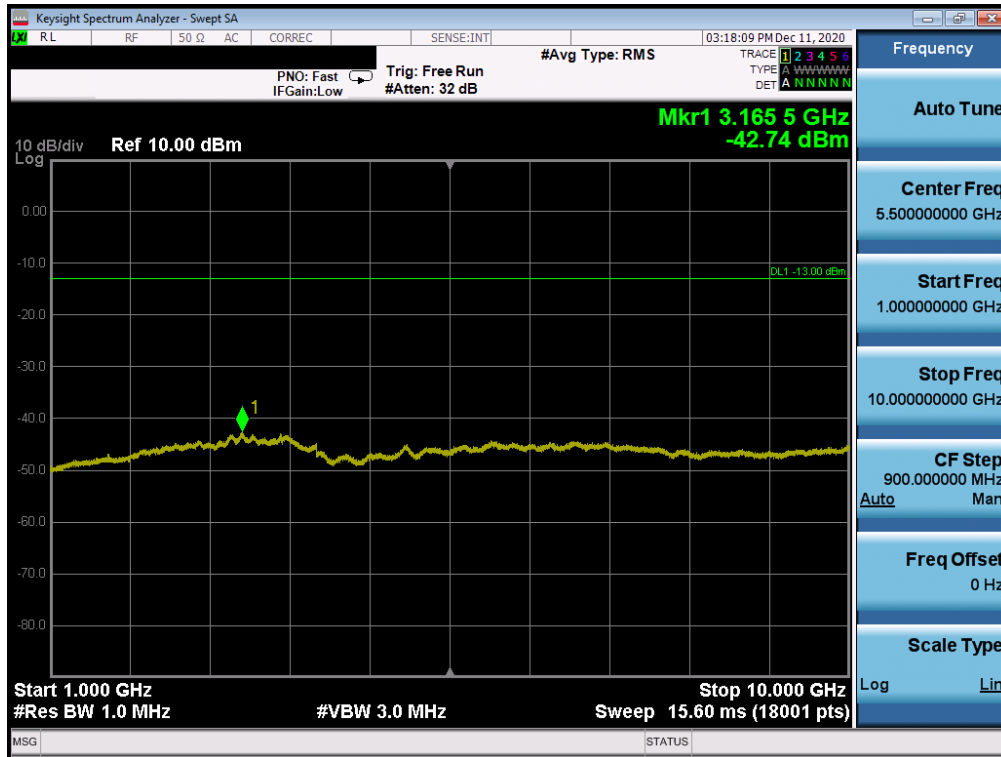


Plot 7-77. CSE (WCDMA Ch. 4132)

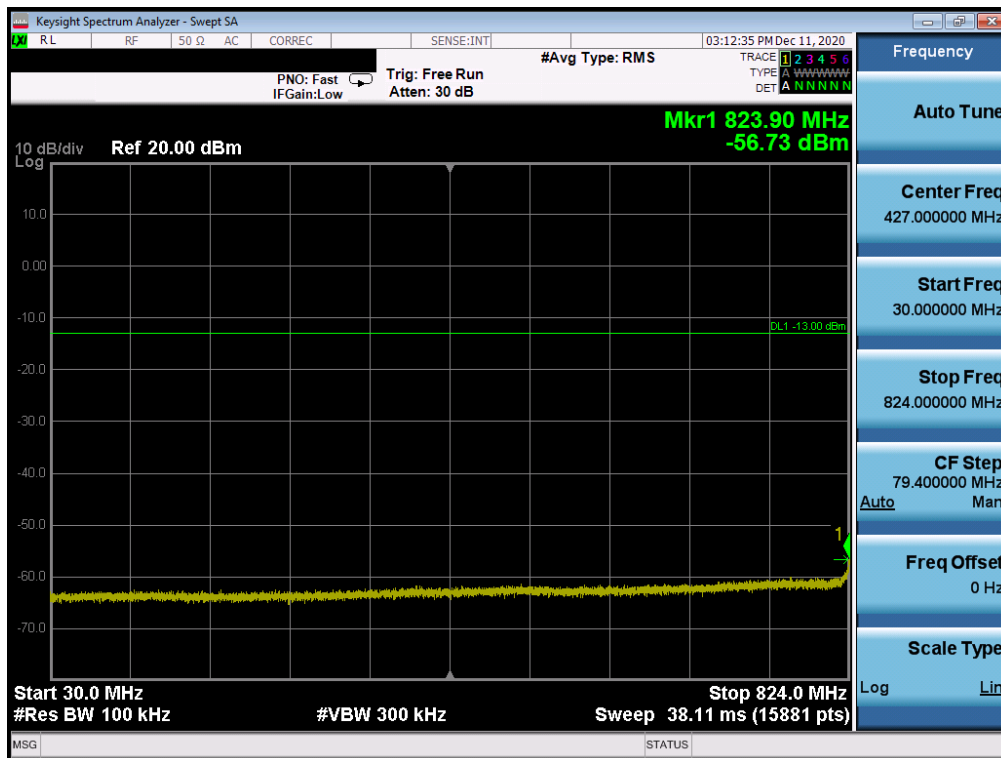


Plot 7-78. CSE (WCDMA Ch. 4132)

FCC ID: BCGA2379	PCTEST Proud to be part of element	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 56 of 108

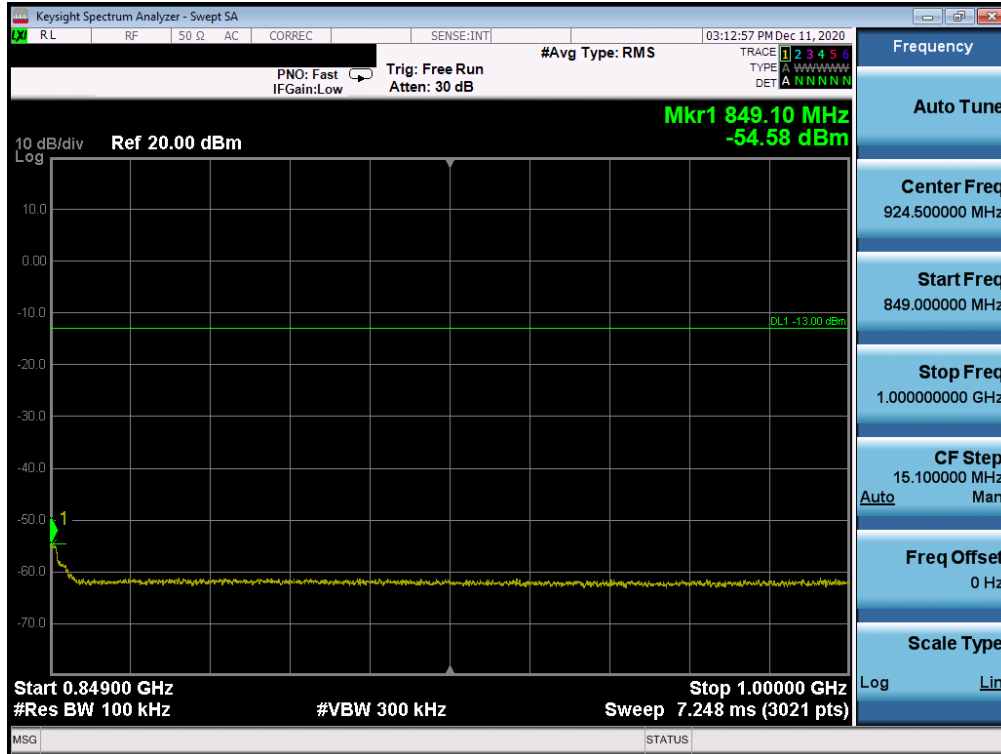


Plot 7-79. CSE (WCDMA Ch. 4132)

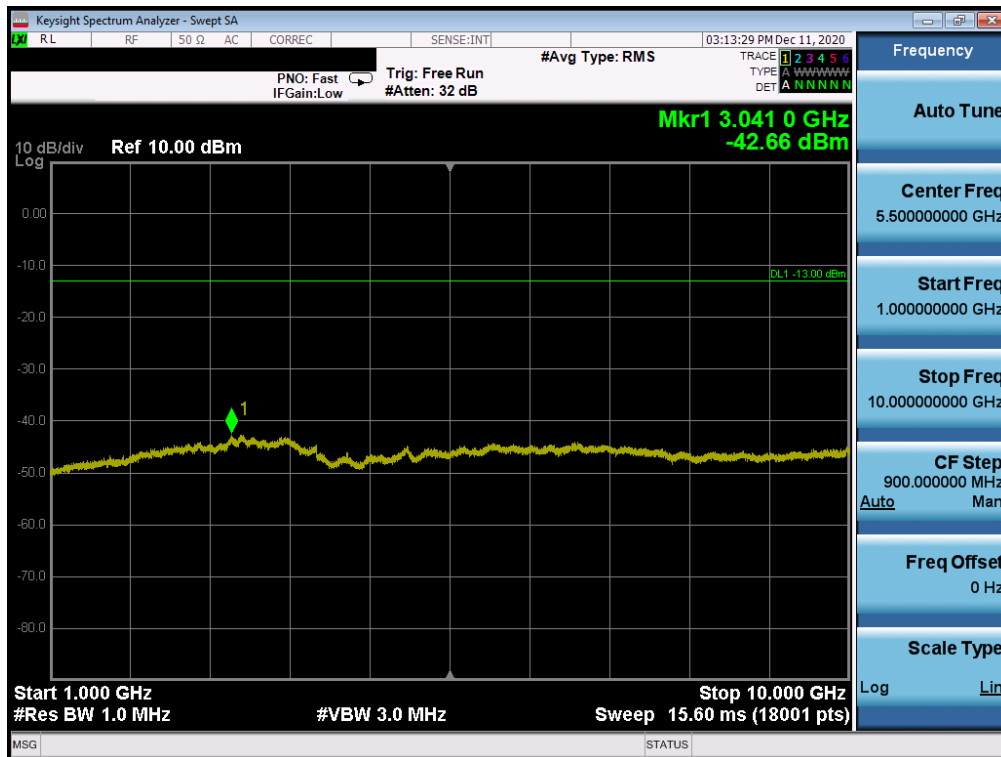


Plot 7-80. CSE (WCDMA Ch. 4183)

FCC ID: BCGA2379	PCTEST Proud to be part of element	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 57 of 108

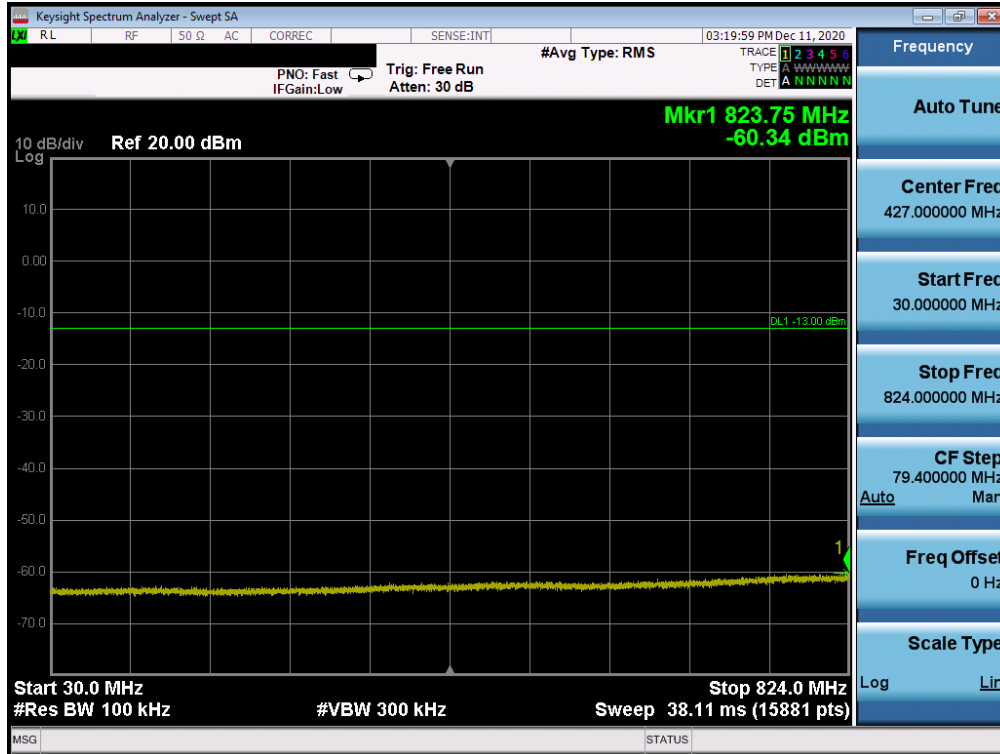


Plot 7-81. CSE (WCDMA Ch. 4183)

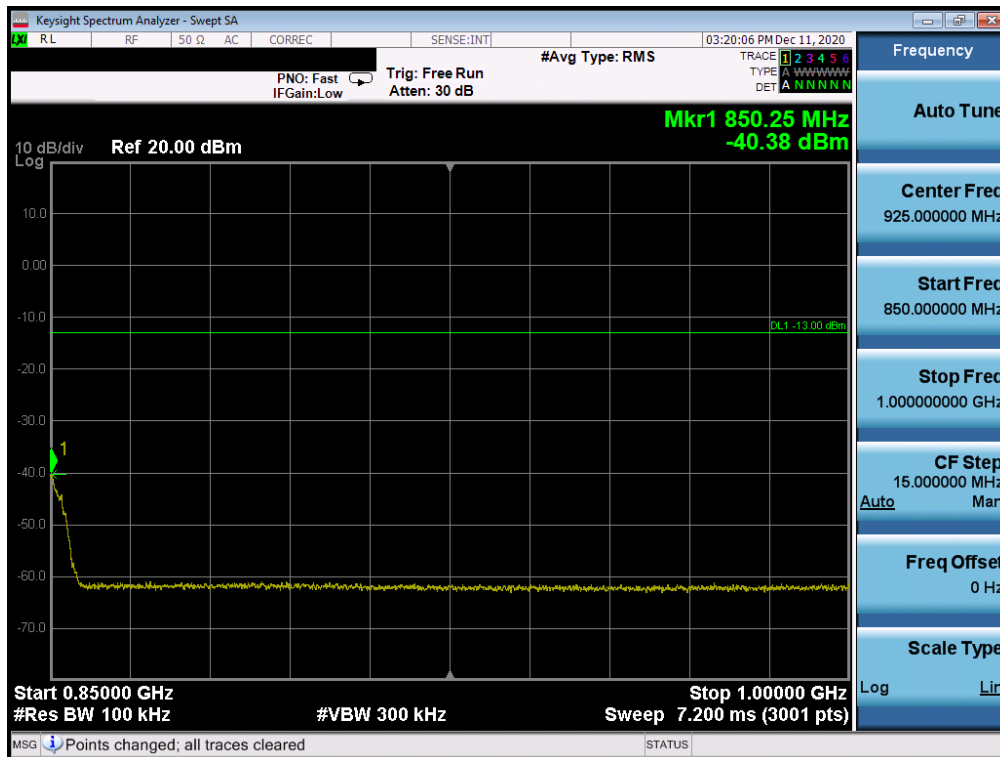


Plot 7-82. CSE (WCDMA Ch. 4183)

FCC ID: BCGA2379	PCTEST Proud to be part of element	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 58 of 108

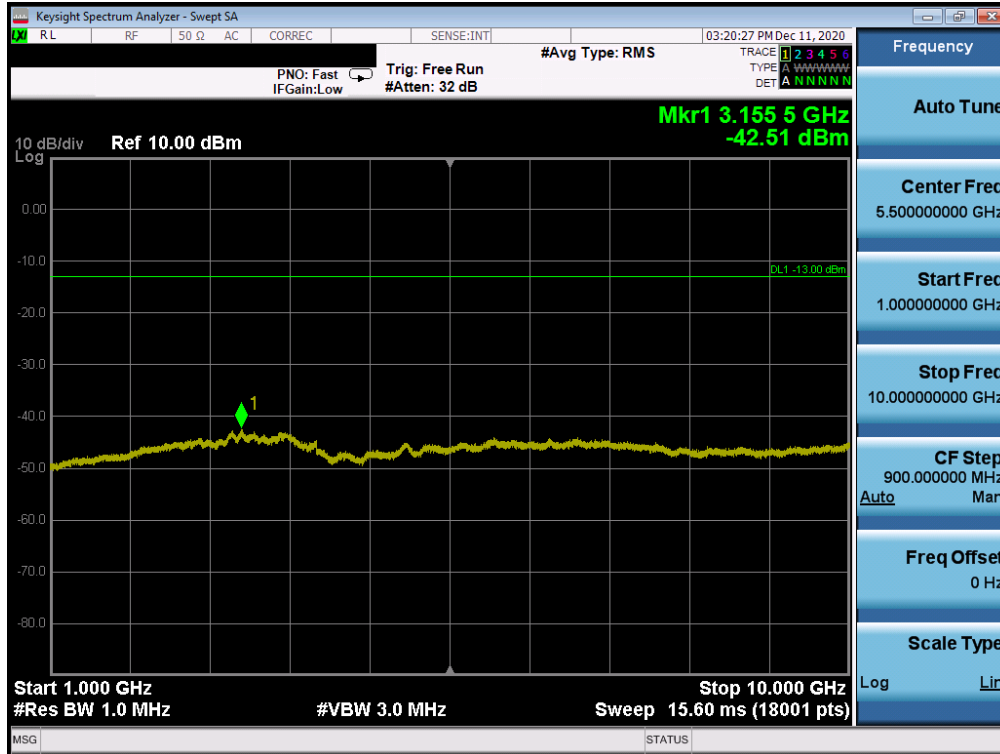


Plot 7-83. CSE (WCDMA Ch. 4233)



Plot 7-84. CSE (WCDMA Ch. 4233)

FCC ID: BCGA2379	PCTEST Proud to be part of element	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 59 of 108



Plot 7-85. CSE (WCDMA Ch. 4233)

FCC ID: BCGA2379	PCTEST Proud to be part of element	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 60 of 108

7.4 Band Edge Emissions at Antenna Terminal §2.1051, 22.917(a)

Test Overview

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

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

Test Procedure Used

KDB 971168 D01 v03r01 – Section 6.0

Test Settings

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

Test Setup

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

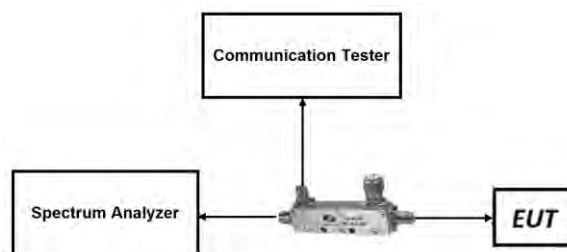



Figure 7-3. Test Instrument & Measurement Setup

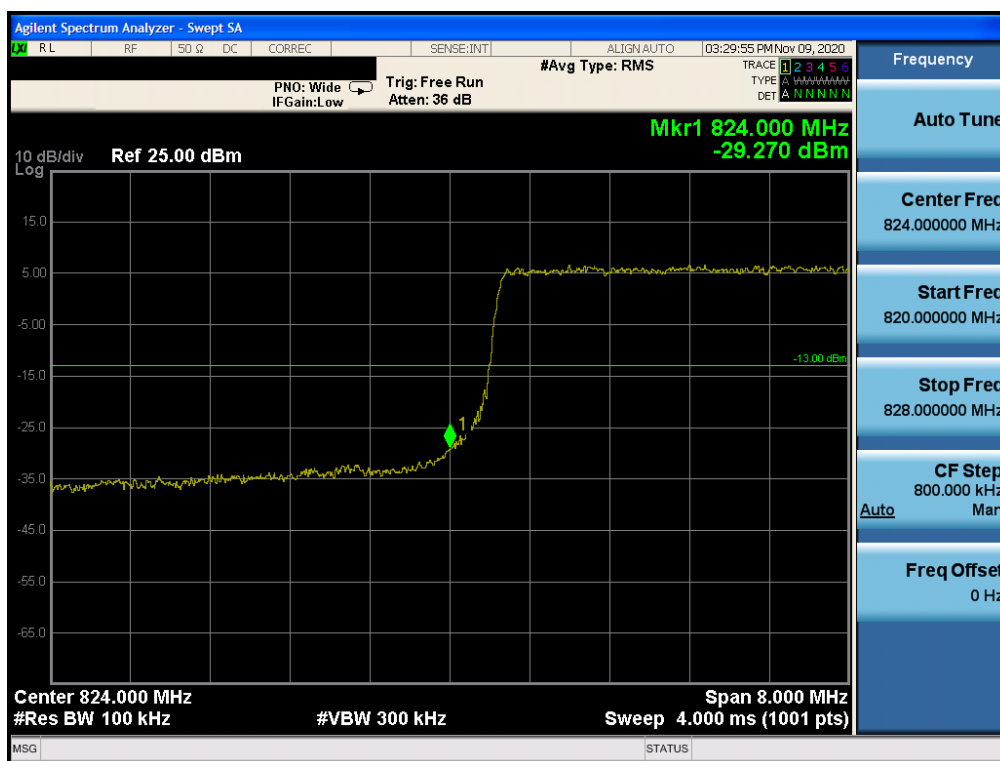
FCC ID: BCGA2379	PCTEST Proud to be part of element	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 61 of 108

Test Notes

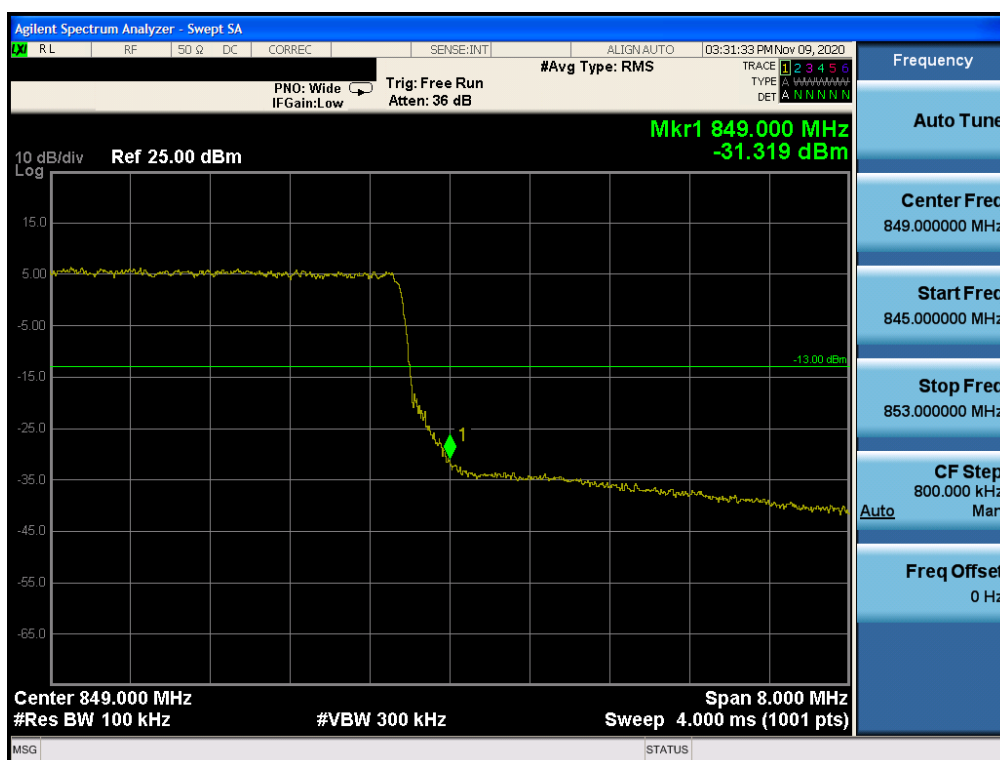
1. Per 22.917(b), in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed to demonstrate compliance with the out-of-band emissions limit. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emission are attenuated at least 26 dB below the transmitter power.
2. For NR operation, all subcarrier spacings (SCS) and transmission schemes (e.g. CP-OFDM and DFT-s-OFDM) were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

FCC ID: BCGA2379	 PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device
		Page 62 of 108


LTE Band 5

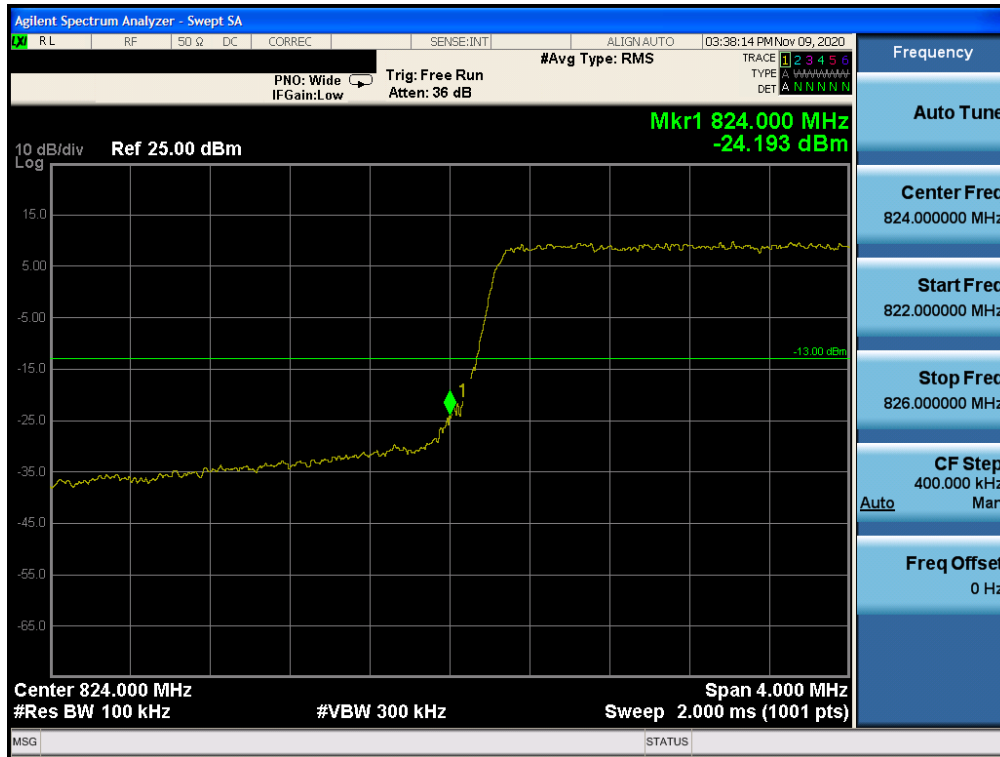


Plot 7-86. Lower Band Edge Plot (LTE Band 5 - 10MHz QPSK – Full RB Configuration)

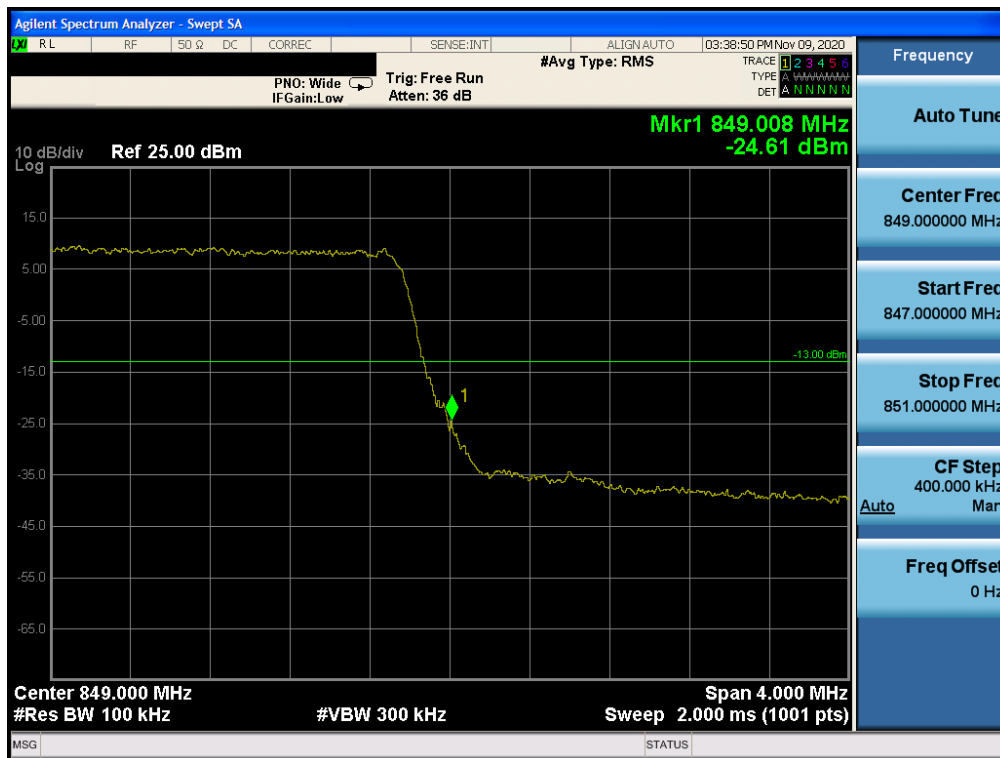


Plot 7-87. Upper Band Edge Plot (LTE Band 5 - 10MHz QPSK – Full RB Configuration)

FCC ID: BCGA2379	 PART 22 MEASUREMENT REPORT		Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 63 of 108

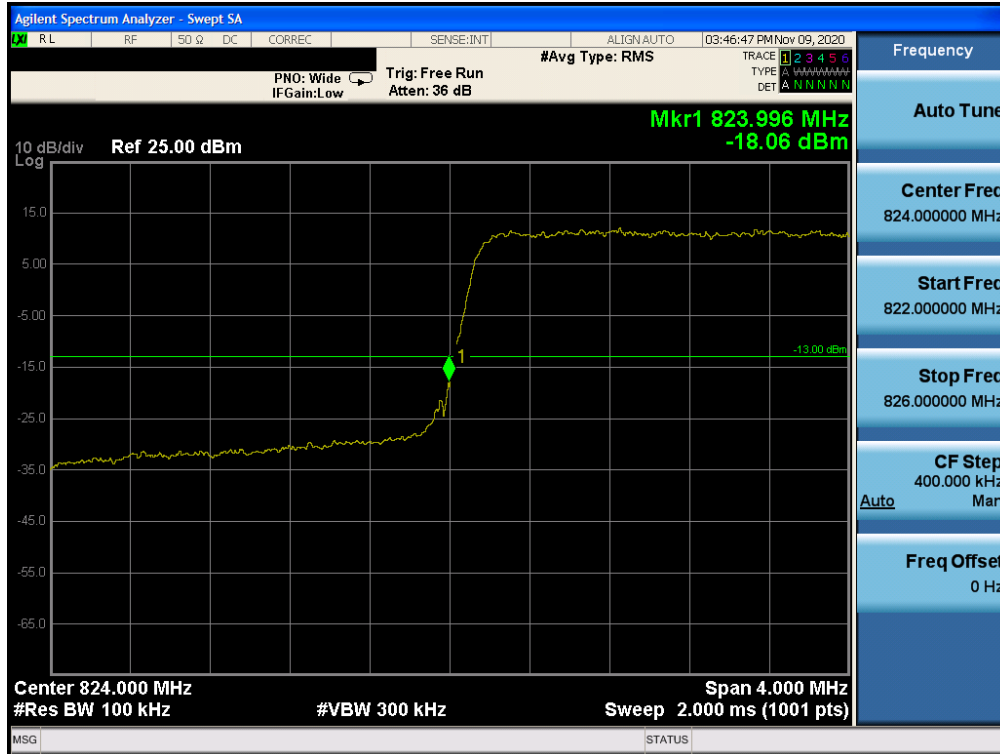


Plot 7-88. Lower Band Edge Plot (LTE Band 5 - 5MHz QPSK – Full RB Configuration)

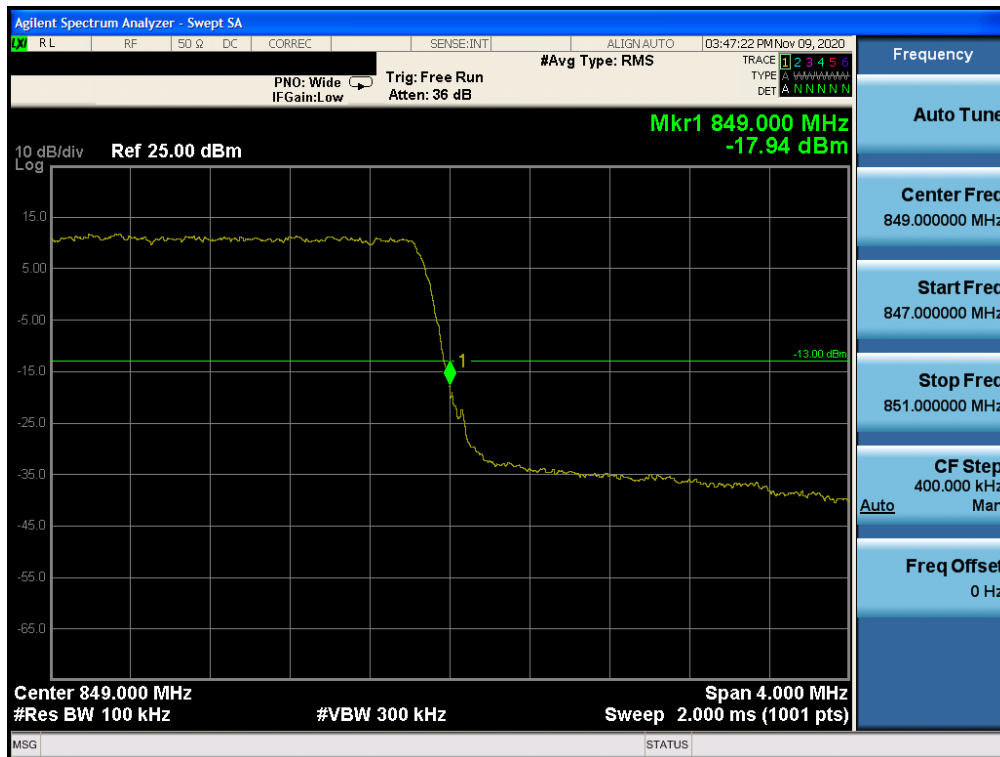


Plot 7-89. Upper Band Edge Plot (LTE Band 5 - 5MHz QPSK – Full RB Configuration)

FCC ID: BCGA2379	PCTEST Proud to be part of element	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 64 of 108

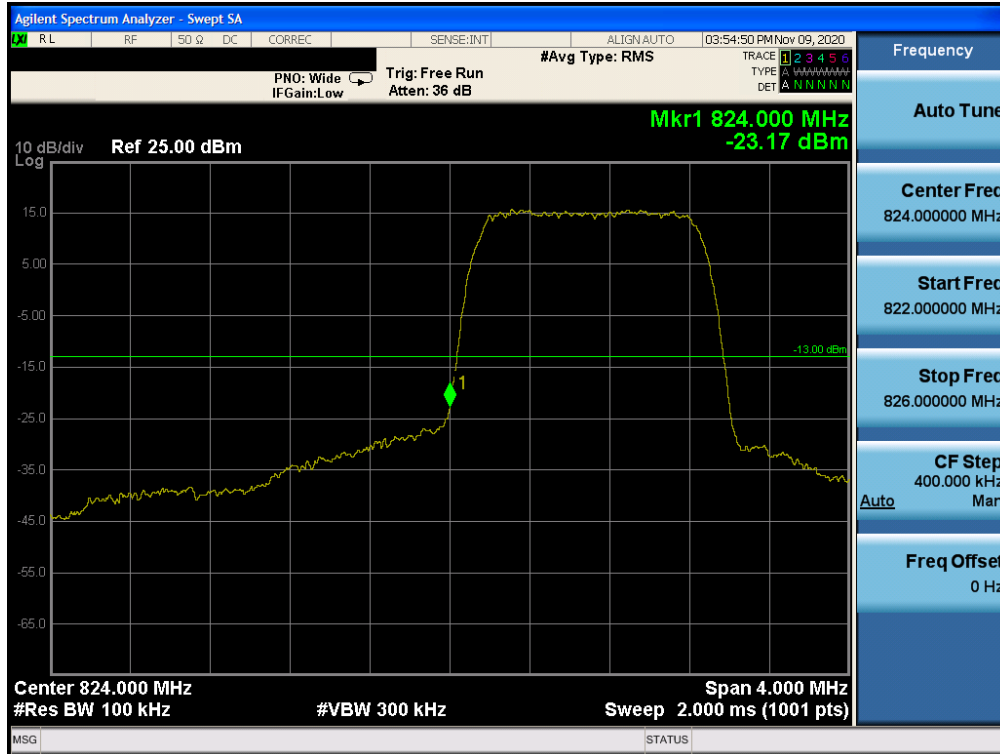


Plot 7-90. Lower Band Edge Plot (LTE Band 5 - 3MHz QPSK – Full RB Configuration)

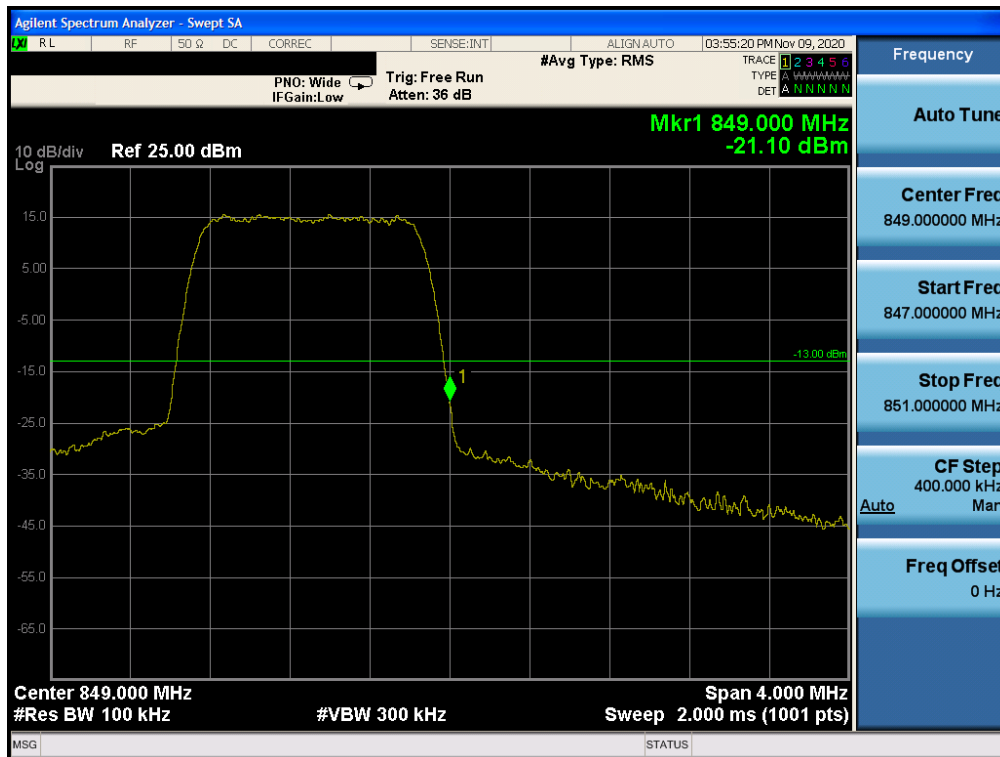


Plot 7-91. Upper Band Edge Plot (LTE Band 5 - 3MHz QPSK – Full RB Configuration)

FCC ID: BCGA2379	PCTEST Proud to be part of element	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 65 of 108



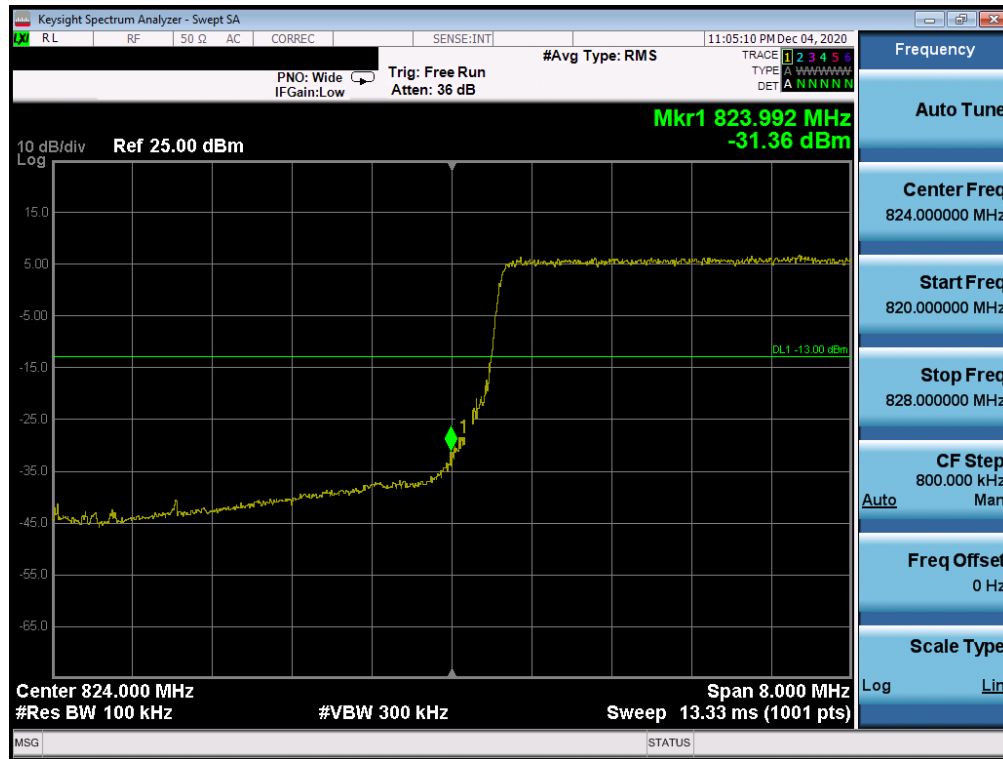
Plot 7-92. Lower Band Edge Plot (LTE Band 5 – 1.4MHz QPSK – Full RB Configuration)



Plot 7-93. Upper Band Edge Plot (LTE Band 5 – 1.4MHz QPSK – Full RB Configuration)

FCC ID: BCGA2379	PCTEST Proud to be part of element	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 66 of 108

LTE Band 26/5

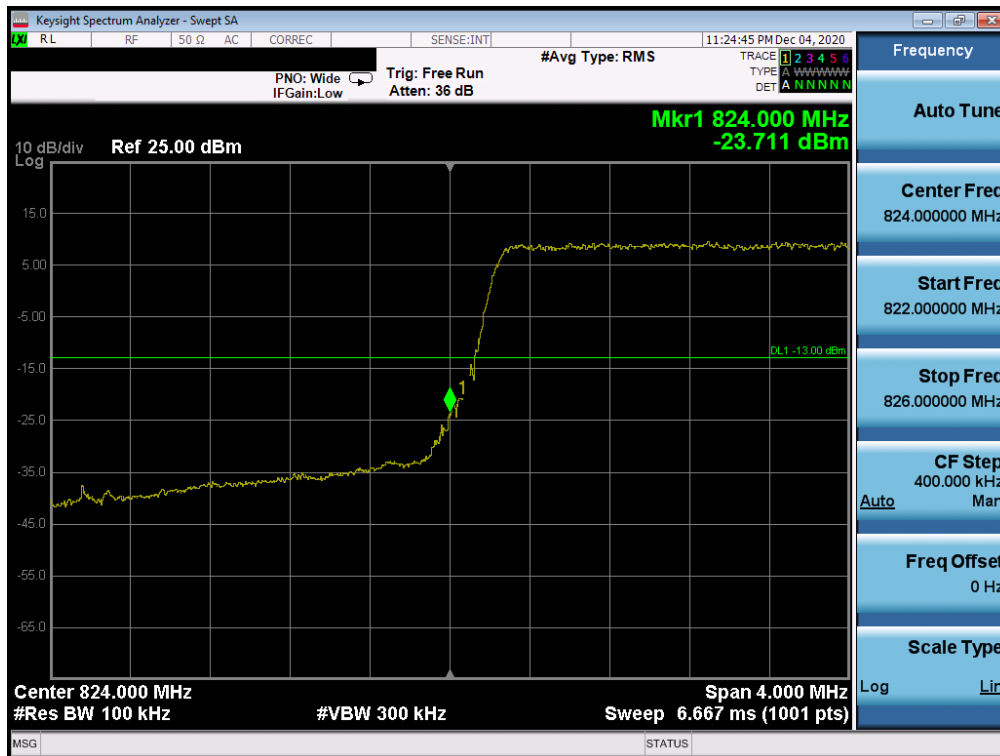


Plot 7-94. Lower Band Edge Plot (LTE Band 26/5 - 10MHz QPSK – Full RB Configuration)



Plot 7-95. Upper Band Edge Plot (LTE Band 26/5 - 10MHz QPSK – Full RB Configuration)

FCC ID: BCGA2379	PCTEST Proud to be part of element	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 67 of 108

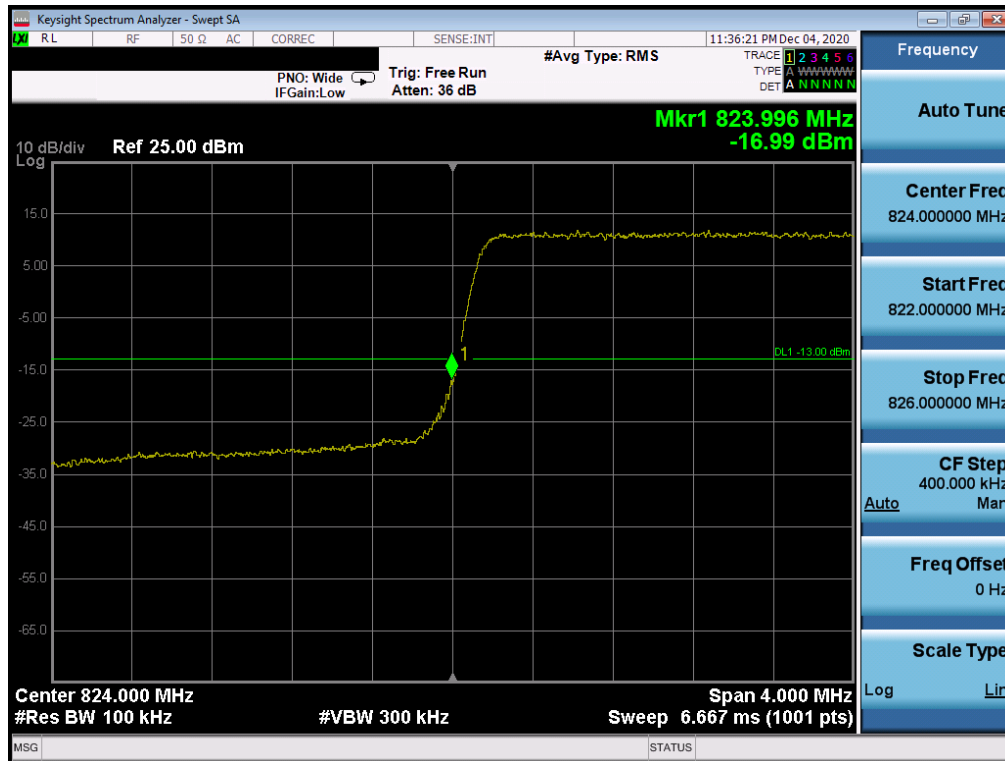


Plot 7-96. Lower Band Edge Plot (LTE Band 26/5 - 5MHz QPSK – Full RB Configuration)

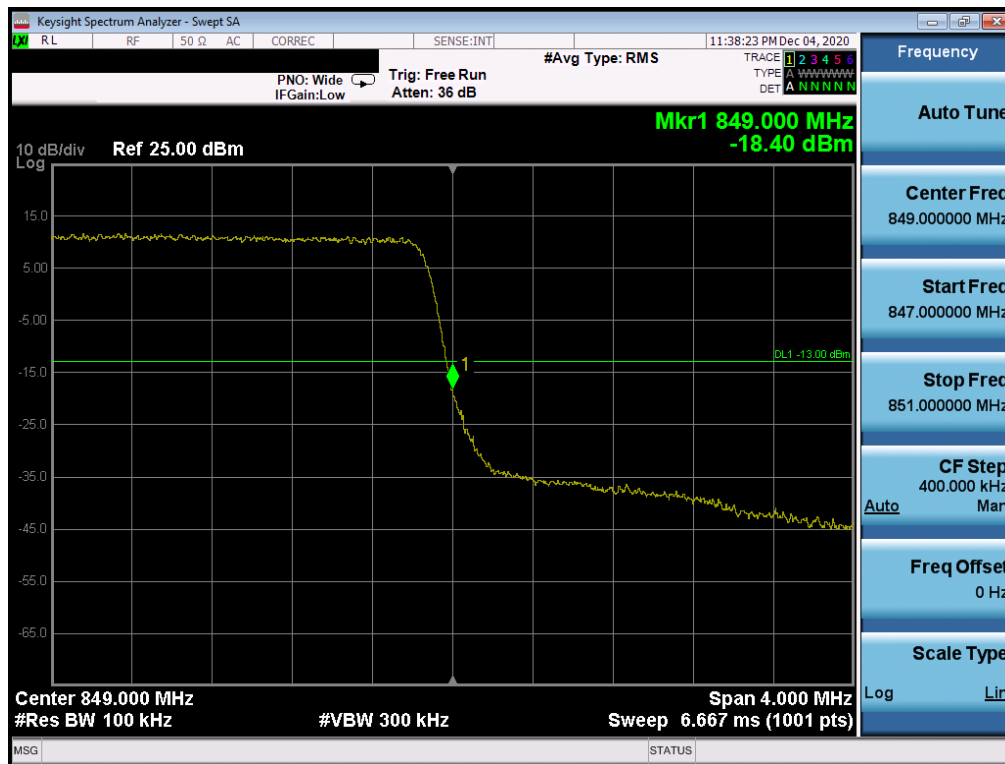


Plot 7-97. Upper Band Edge Plot (LTE Band 26/5 - 5MHz QPSK – Full RB Configuration)

FCC ID: BCGA2379	PCTEST Proud to be part of element	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 68 of 108

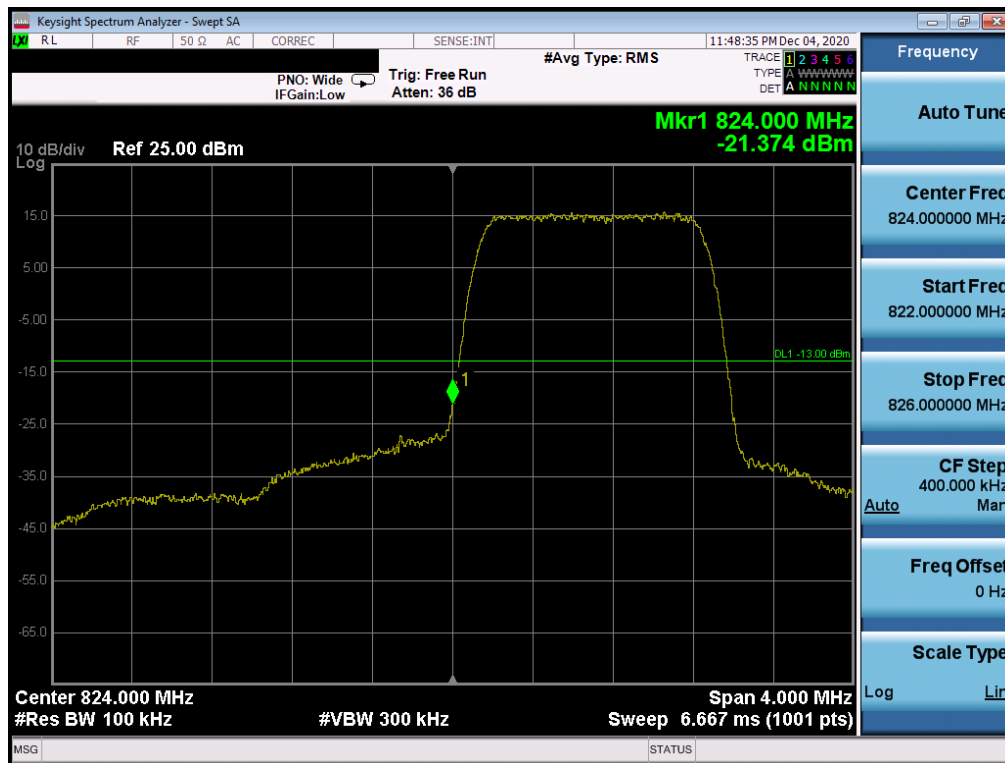


Plot 7-98. Lower Band Edge Plot (LTE Band 26/5 - 3MHz QPSK – Full RB Configuration)

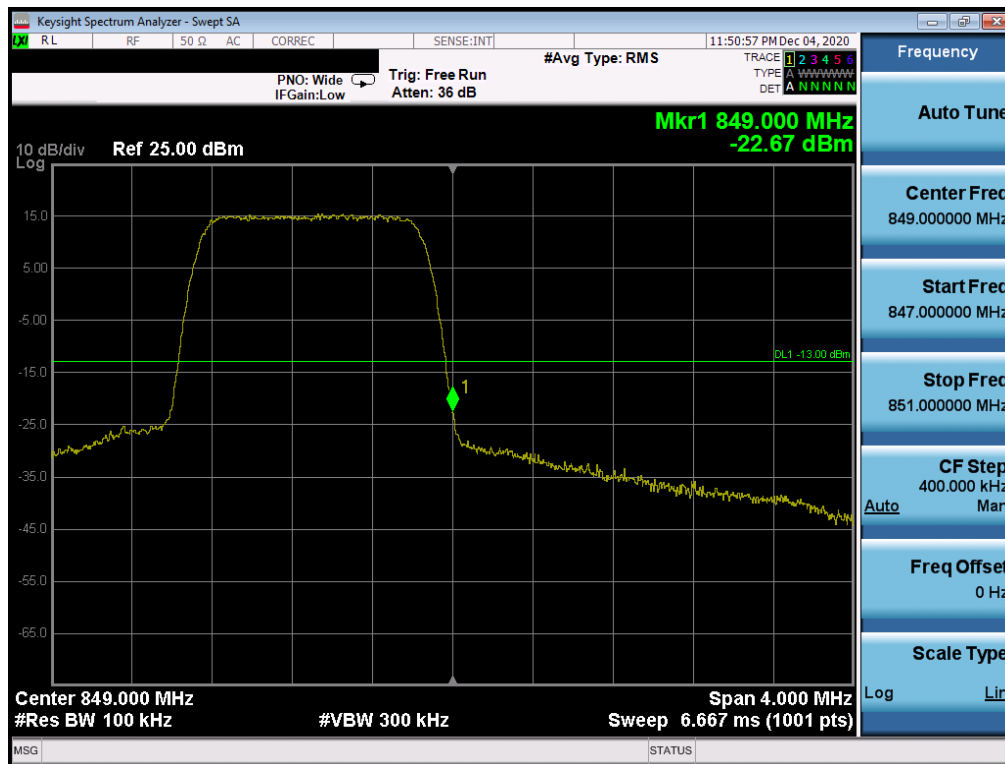


Plot 7-99. Upper Band Edge Plot (LTE Band 26/5 - 3MHz QPSK – Full RB Configuration)

FCC ID: BCGA2379	PCTEST Proud to be part of element	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 69 of 108



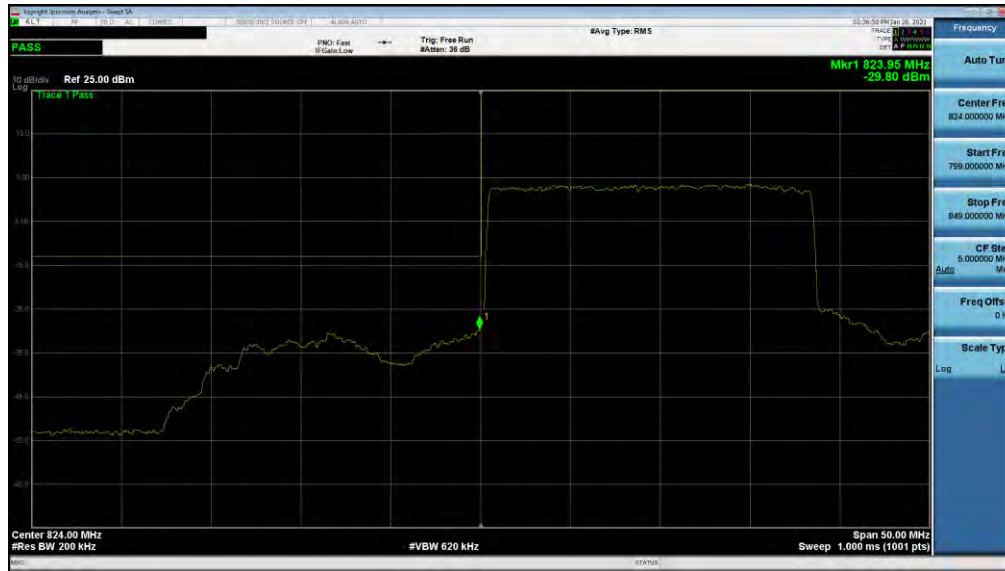
Plot 7-100. Lower Band Edge Plot (LTE Band 26/5 – 1.4MHz QPSK – Full RB Configuration)



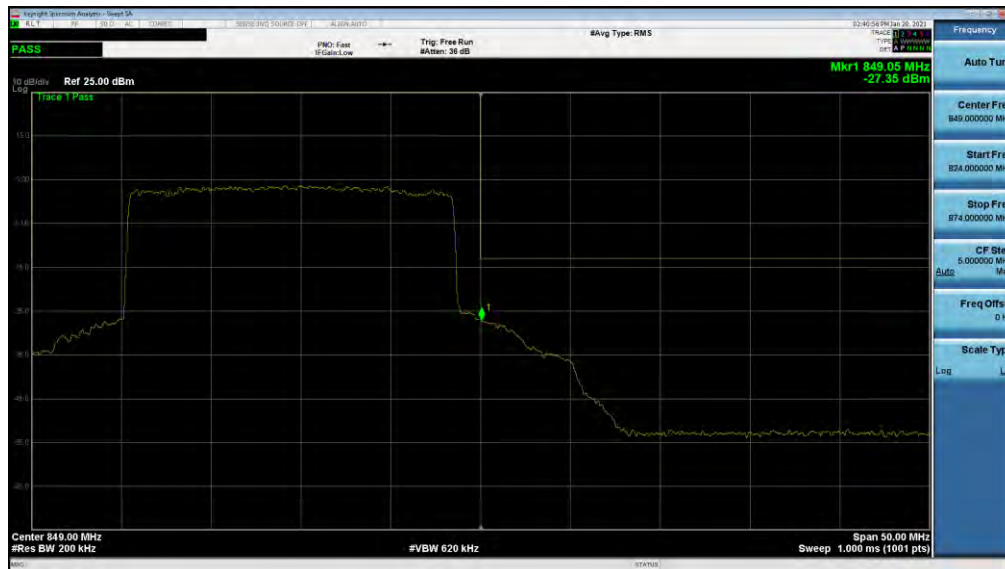
Plot 7-101. Upper Band Edge Plot (LTE Band 26/5 – 1.4MHz QPSK – Full RB Configuration)

FCC ID: BCGA2379	PCTEST Proud to be part of element	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 70 of 108

NR Band n5

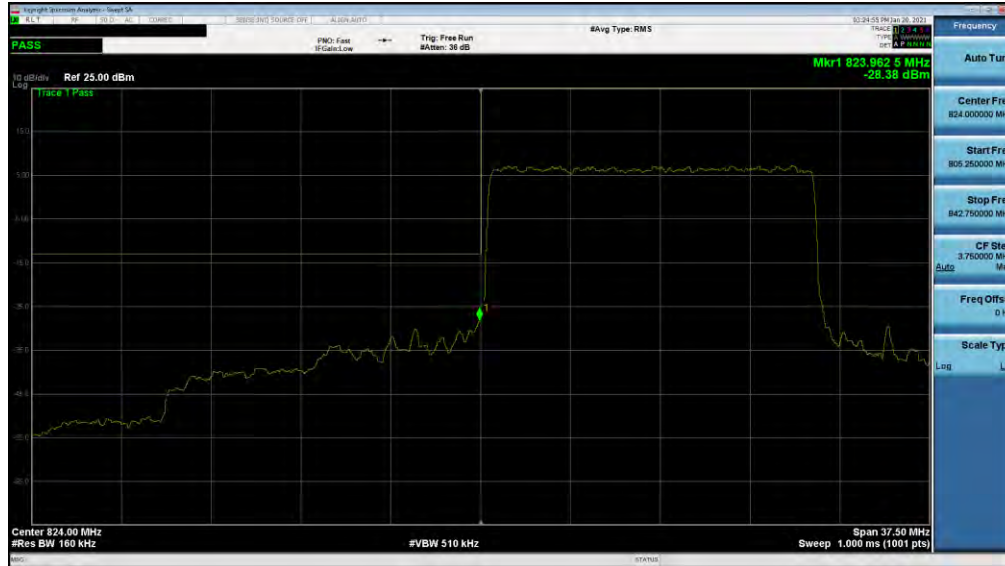


Plot 7-102. Lower Band Edge Plot (NR Band n5 DFT-s-OFDM BPSK – 20.0MHz - Full RB)

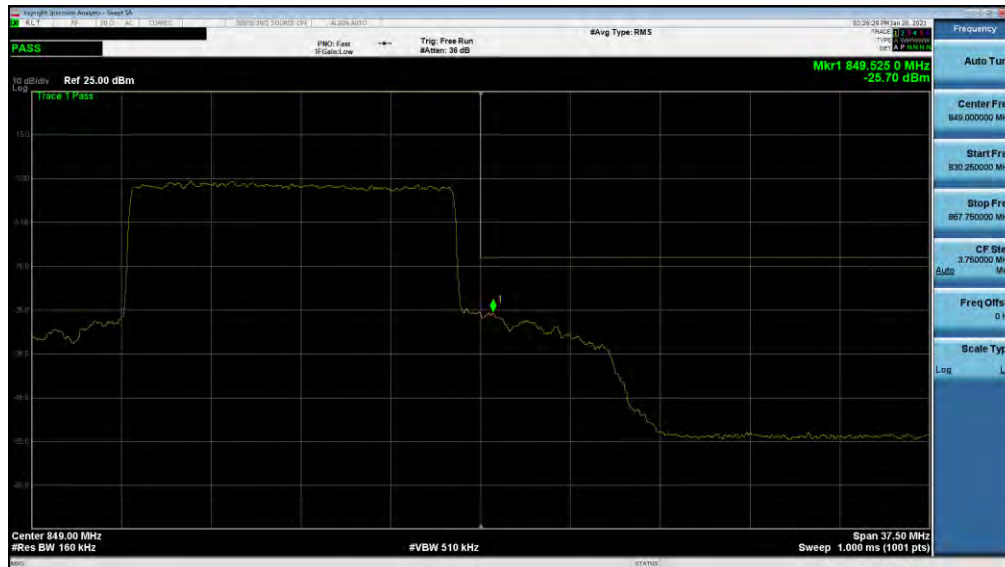


Plot 7-103. Upper Band Edge Plot (NR Band n5 DFT-s-OFDM BPSK– 20.0MHz - Full RB)

FCC ID: BCGA2379	PCTEST Proud to be part of element	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 71 of 108

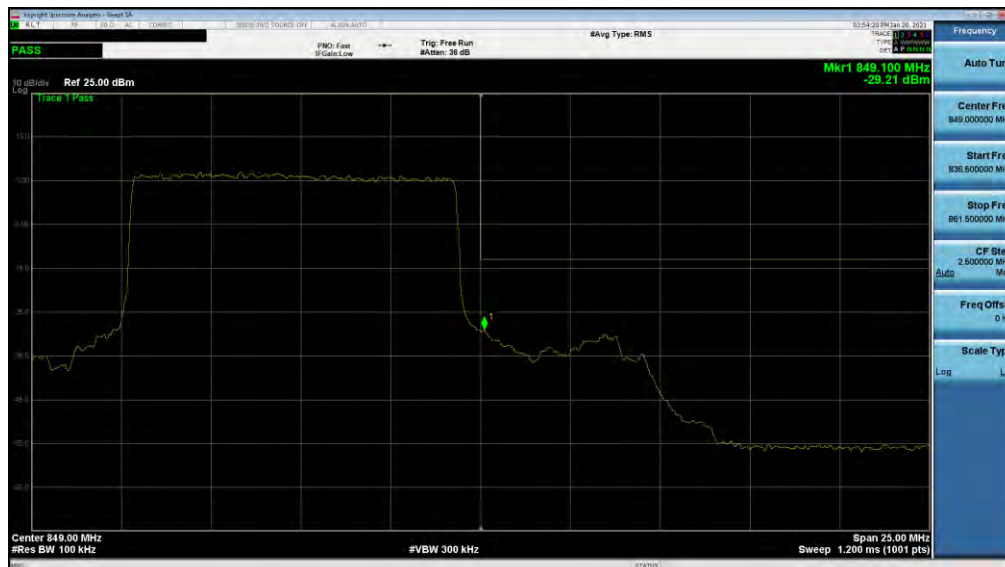
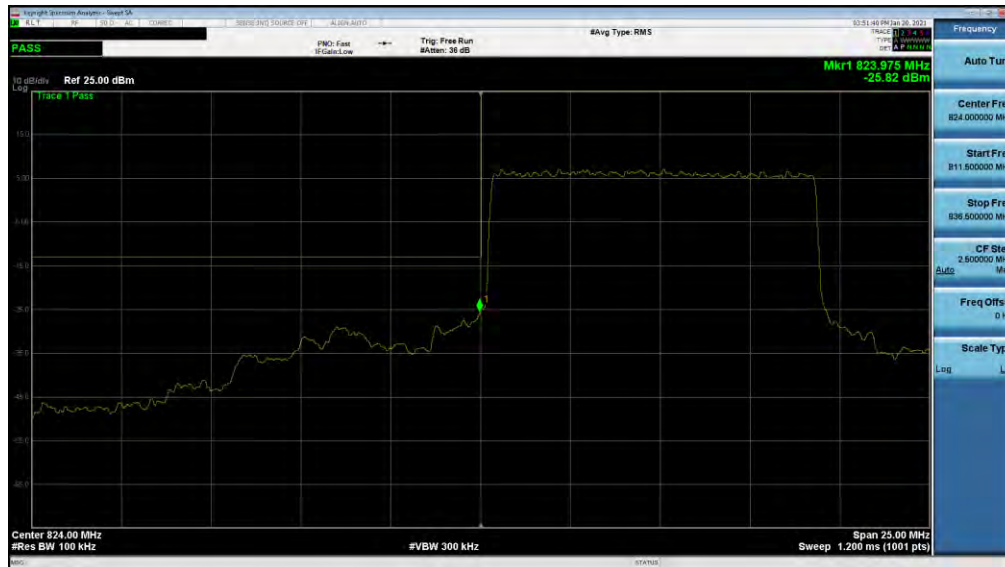


Plot 7-104. Lower Band Edge Plot (NR Band n5 DFT-s-OFDM BPSK– 15.0MHz - Full RB)

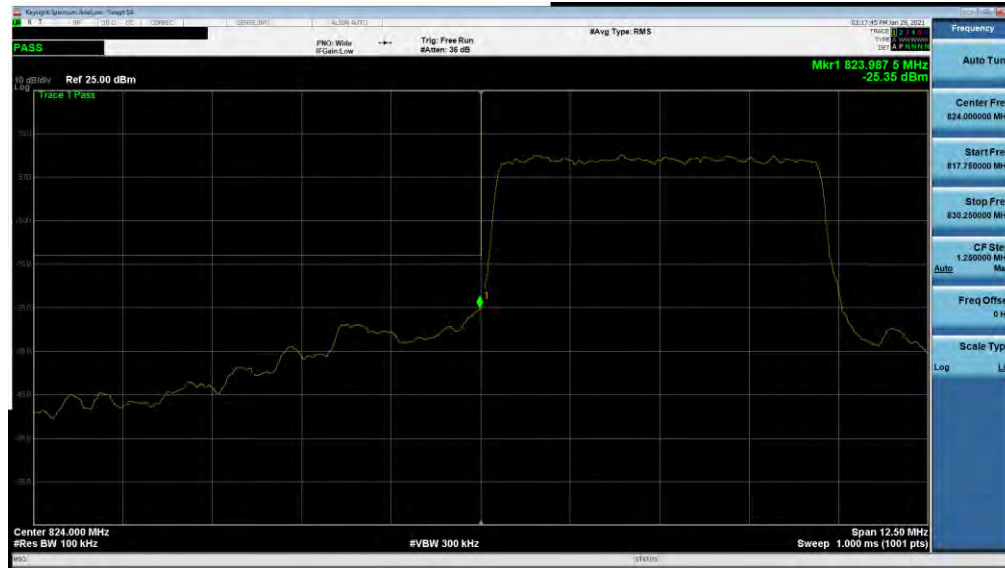


Plot 7-105. Upper Band Edge Plot (NR Band n5 DFT-s-OFDM BPSK– 15.0MHz - Full RB)

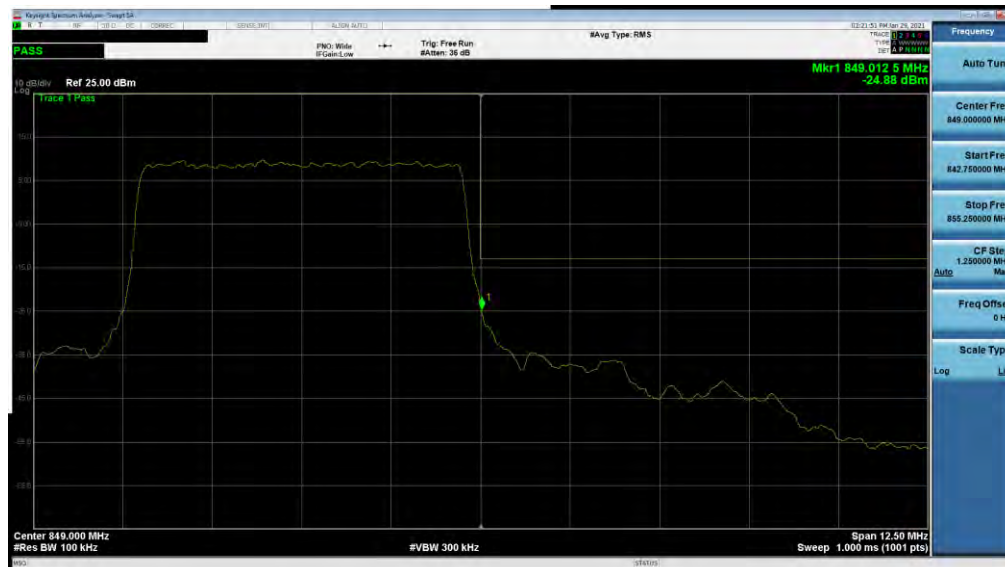
FCC ID: BCGA2379	PCTEST Proud to be part of element	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 72 of 108



FCC ID: BCGA2379	PCTEST Proud to be part of element	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 73 of 108



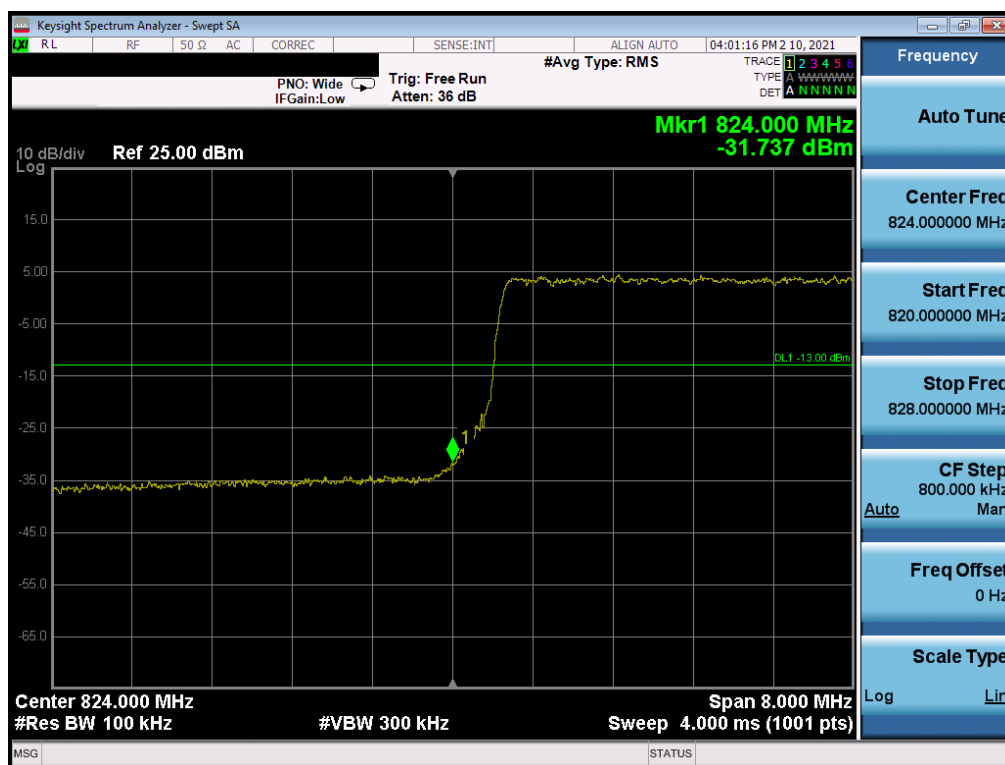
Plot 7-108. Lower Band Edge Plot (NR Band n5 DFT-s-OFDM BPSK- 5.0MHz - Full RB)



Plot 7-109. Upper Band Edge Plot (NR Band n5 DFT-s-OFDM BPSK- 5.0MHz - Full RB)

FCC ID: BCGA2379	PCTEST Proud to be part of element	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 74 of 108


ULCA - LTE Band 5



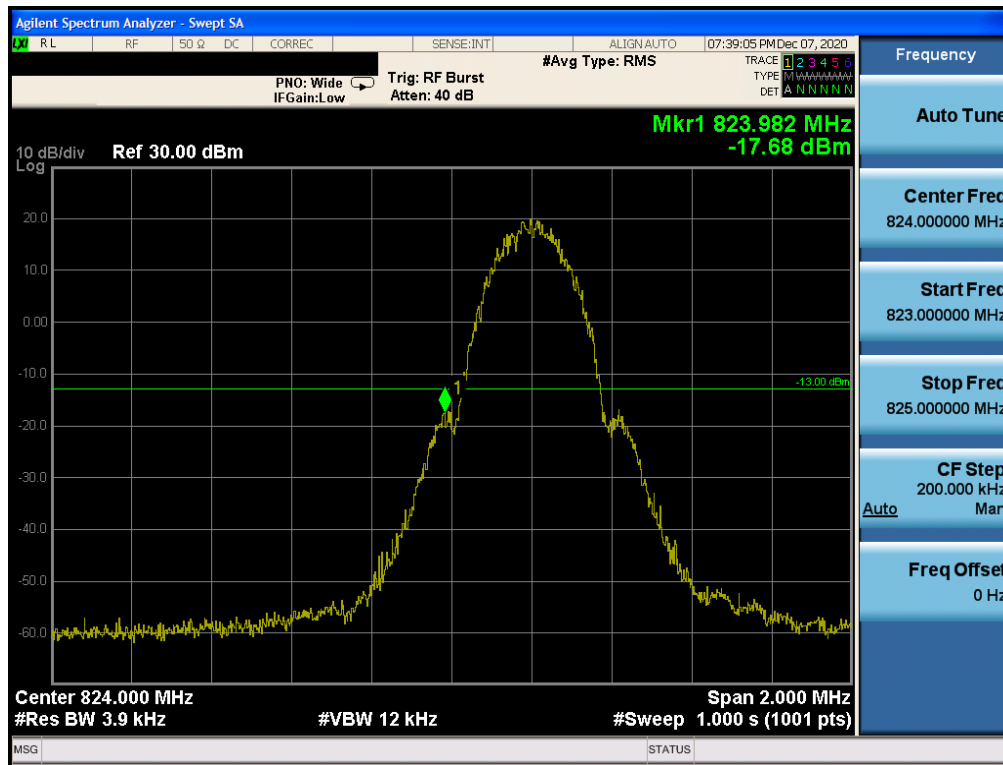
Plot 7-110. Lower BE Plot (ULCA LTE Band 5 - (10 + 10)MHz QPSK – Full RB Configuration)



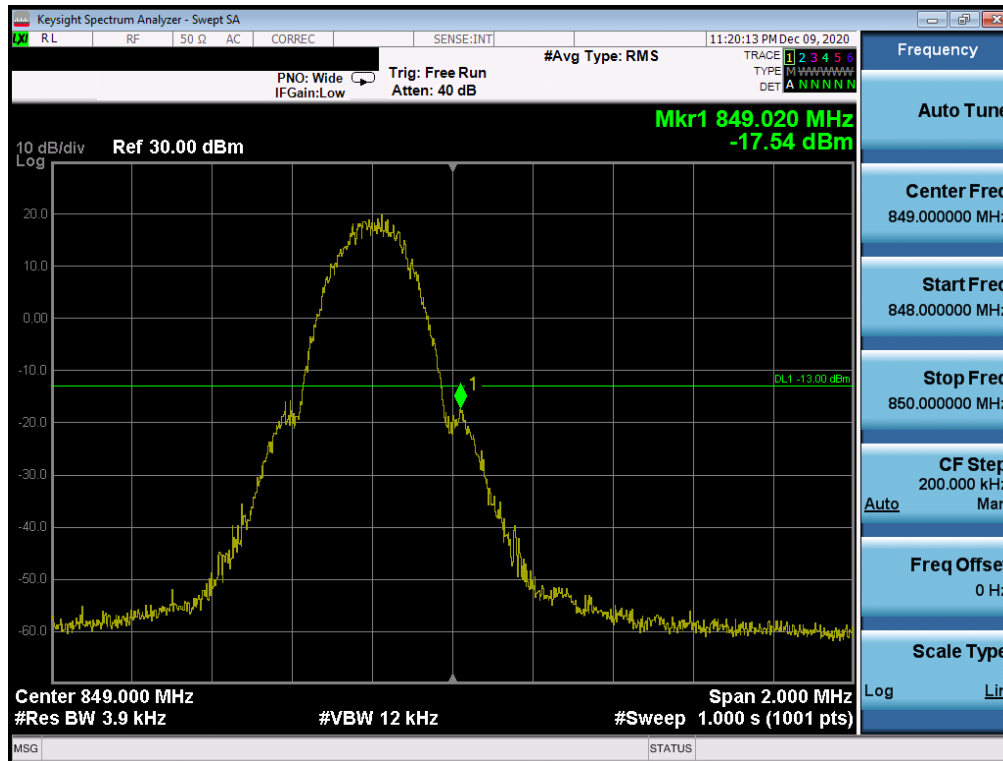
Plot 7-111. Upper BE Plot (ULCA LTE Band 5 - (10 + 10)MHz QPSK – Full RB Configuration)

FCC ID: BCGA2379	 PART 22 MEASUREMENT REPORT		Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 75 of 108

GSM/GPRS Cell



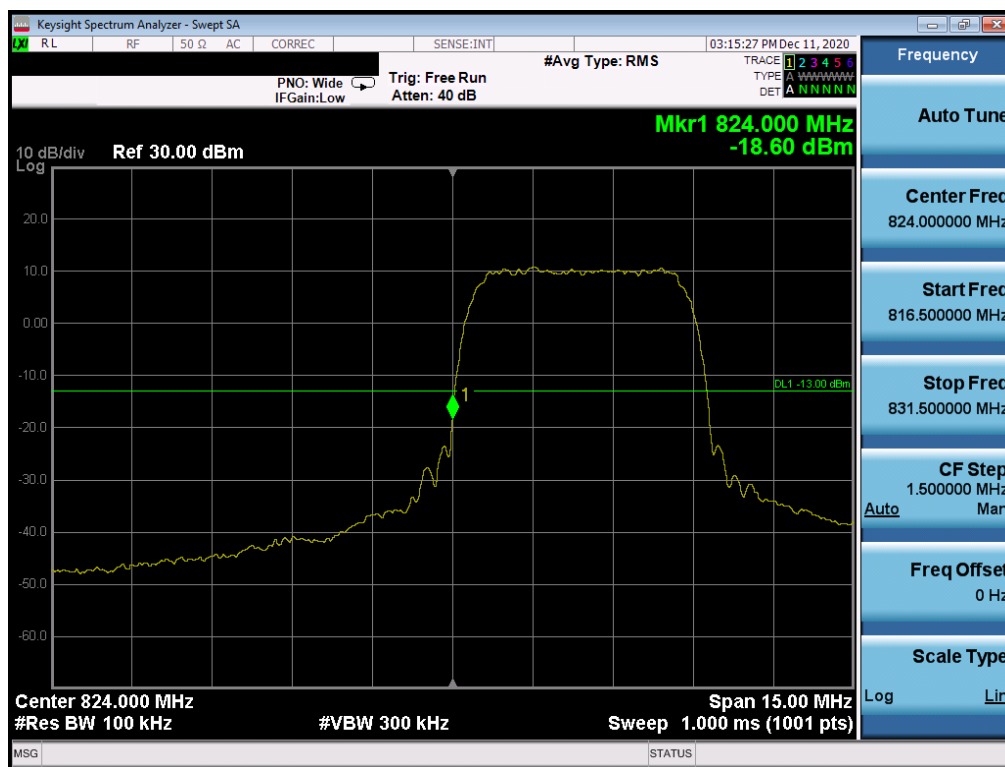
Plot 7-112. Lower Band Edge Plot (GPRS Cell – Ch. 128)



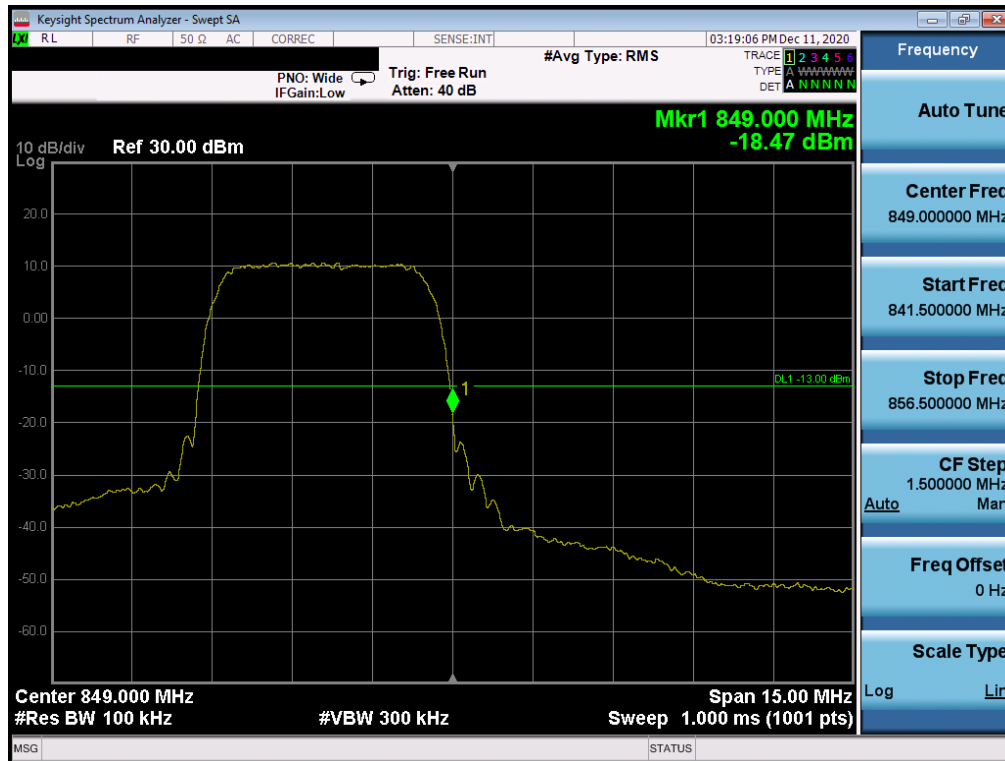
Plot 7-113. Upper Band Edge Plot (GPRS Cell – Ch. 251)

FCC ID: BCGA2379	PCTEST Proud to be part of element	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 76 of 108


WCDMA Cell



Plot 7-114. Lower Band Edge Plot (WCDMA Cell – Ch. 4132)



Plot 7-115. Upper Band Edge Plot (WCDMA Cell – Ch. 4233)

FCC ID: BCGA2379	 PART 22 MEASUREMENT REPORT		Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 77 of 108

7.5 Radiated Power (ERP/EIRP)

§22.913(a)(5)

Test Overview

Effective Radiated Power (ERP) and Equivalent Isotropic Radiated Power (EIRP) measurements are calculated by adding highest antenna gain to maximum measured conducted output power. All measurements are performed as RMS average measurements while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

Test Procedures Used

KDB 971168 D01 v03r01 – Section 5.2.1
ANSI C63.26-2015 – Section 5.2.5.5

Test Settings

The relevant equation for determining the ERP or EIRP from the conducted RF output power measured is:

$$\text{ERP/EIRP} = \text{PMeas} - \text{LC} + \text{GT}$$

Where:

ERP/EIRP = effective or equivalent radiated power, respectively (expressed in the same units as PMeas, typically dBW or dBm)

PMeas = measured transmitter output power or PSD, in dBW or dBm

LC = signal attenuation in the connecting cable between the transmitter and antenna in dB

GT = gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP)

Test Setup

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

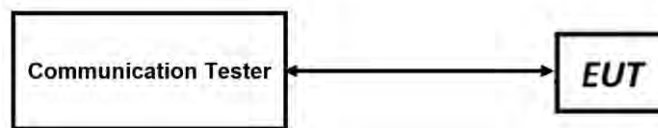



Figure 7-4. ERP/EIRP Measurement Setup

FCC ID: BCGA2379	PCTEST Proud to be part of element	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 78 of 108

Test Notes:

1. The EUT was tested in all possible test configurations. The worst case emissions are reported with the EUT modulations, RB sizes and offsets, and channel bandwidth configurations shown in the tables below.
2. This unit was tested with its standard battery.
3. The Level (dBm) readings in the table were taken with a correction table loaded into the base station simulator. The correction table was used to account for the signal attenuation in the connecting cable between the transmitter and antenna.
4. Uplink carrier aggregation for LTE B5 is only supported in this EUT while operating in Power Class 3.
5. Conducted power measurements were evaluated for the two contiguous channels using various combinations of RB size, RB offset, modulation, and channel bandwidth. Channel bandwidth data is shown in the tables below based only on the channel bandwidths that were supported in this device.
6. The Ant. Gains (GT) are listed in dBi.

FCC ID: BCGA2379	 PART 22 MEASUREMENT REPORT		Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 79 of 108

7.5.1 Antenna 3 – ERP/EIRP

LTE Band 5


Bandwidth	Mod.	Frequency [MHz]	Ant. Gain [dBi]	RB Size/Offset	Conducted Power [dBm]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
10 MHz	QPSK	829.0	-3.10	1 / 25	25.70	20.45	0.111	38.45	-18.00	22.60	0.182	40.61	-18.01
		836.5	-3.10	1 / 25	25.61	20.36	0.109	38.45	-18.09	22.51	0.178	40.61	-18.10
		844.0	-3.10	1 / 49	25.68	20.43	0.110	38.45	-18.02	22.58	0.181	40.61	-18.03
	16-QAM	829.0	-3.10	1 / 25	24.89	19.64	0.092	38.45	-18.81	21.79	0.151	40.61	-18.82
	64-QAM	829.0	-3.10	1 / 25	24.17	18.92	0.078	38.45	-19.53	21.07	0.128	40.61	-19.54
5 MHz	QPSK	844.0	-3.10	1 / 0	21.54	16.29	0.043	38.45	-22.16	18.44	0.070	40.61	-22.17
		829.0	-3.10	1 / 12	25.70	20.45	0.111	38.45	-18.00	22.60	0.182	40.61	-18.01
		836.5	-3.10	1 / 0	25.63	20.38	0.109	38.45	-18.07	22.53	0.179	40.61	-18.08
	16-QAM	844.0	-3.10	1 / 0	25.68	20.43	0.110	38.45	-18.02	22.58	0.181	40.61	-18.03
	64-QAM	836.5	-3.10	1 / 12	24.98	19.73	0.094	38.45	-18.72	21.88	0.154	40.61	-18.73
3 MHz	QPSK	836.5	-3.10	1 / 12	24.51	19.26	0.084	38.45	-19.19	21.41	0.138	40.61	-19.20
		829.0	-3.10	1 / 12	21.50	16.25	0.042	38.45	-22.20	18.40	0.069	40.61	-22.21
		844.0	-3.10	1 / 7	25.70	20.45	0.111	38.45	-18.00	22.60	0.182	40.61	-18.01
	16-QAM	836.5	-3.10	1 / 7	25.61	20.36	0.109	38.45	-18.09	22.51	0.178	40.61	-18.10
	64-QAM	844.0	-3.10	1 / 0	25.69	20.44	0.111	38.45	-18.01	22.59	0.182	40.61	-18.02
1.4 MHz	QPSK	836.5	-3.10	1 / 7	25.08	19.83	0.096	38.45	-18.62	21.98	0.158	40.61	-18.63
		836.5	-3.10	1 / 7	24.44	19.19	0.083	38.45	-19.26	21.34	0.136	40.61	-19.27
		844.0	-3.10	1 / 7	21.59	16.34	0.043	38.45	-22.11	18.49	0.071	40.61	-22.12
	16-QAM	829.0	-3.10	1 / 5	25.70	20.45	0.111	38.45	-18.00	22.60	0.182	40.61	-18.01
	64-QAM	836.5	-3.10	1 / 3	25.70	20.45	0.111	38.45	-18.00	22.60	0.182	40.61	-18.01
1.4 MHz	QPSK	844.0	-3.10	1 / 0	25.70	20.45	0.111	38.45	-18.00	22.60	0.182	40.61	-18.01
		836.5	-3.10	1 / 3	25.10	19.85	0.097	38.45	-18.60	22.00	0.158	40.61	-18.61
		836.5	-3.10	1 / 3	24.51	19.26	0.084	38.45	-19.19	21.41	0.138	40.61	-19.20
	16-QAM	836.5	-3.10	1 / 0	21.40	16.15	0.041	38.45	-22.30	18.30	0.068	40.61	-22.31
	64-QAM	836.5	-3.10	1 / 0	21.40	16.15	0.041	38.45	-22.30	18.30	0.068	40.61	-22.31

Table 7-2. ERP/EIRP Data (LTE Band 5)

LTE Band 26

Bandwidth	Mod.	Frequency [MHz]	Ant. Gain [dBi]	RB Size/Offset	Conducted Power [dBm]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
10 MHz	QPSK	829.0	-3.10	1 / 0	25.60	20.35	0.108	38.45	-18.10	22.50	0.178	40.61	-18.11
		836.5	-3.10	1 / 25	25.70	20.45	0.111	38.45	-18.00	22.60	0.182	40.61	-18.01
		844.0	-3.10	1 / 25	25.68	20.43	0.110	38.45	-18.02	22.58	0.181	40.61	-18.03
	16-QAM	836.5	-3.10	1 / 25	25.16	19.91	0.098	38.45	-18.54	22.06	0.161	40.61	-18.55
	64-QAM	844.0	-3.10	1 / 0	23.98	18.73	0.075	38.45	-19.72	20.88	0.122	40.61	-19.73
5 MHz	QPSK	844.0	-3.10	1 / 0	20.62	15.37	0.034	38.45	-23.08	17.52	0.056	40.61	-23.09
		826.5	-3.10	1 / 0	25.65	20.40	0.110	38.45	-18.05	22.55	0.180	40.61	-18.06
		836.5	-3.10	1 / 24	25.70	20.45	0.111	38.45	-18.00	22.60	0.182	40.61	-18.01
	16-QAM	846.5	-3.10	1 / 12	25.52	20.27	0.106	38.45	-18.18	22.42	0.175	40.61	-18.19
	64-QAM	836.5	-3.10	1 / 24	25.32	20.07	0.102	38.45	-18.38	22.22	0.167	40.61	-18.39
3 MHz	QPSK	826.5	-3.10	1 / 24	24.17	18.92	0.078	38.45	-19.53	21.07	0.128	40.61	-19.54
		826.5	-3.10	25 / 0	20.55	15.30	0.034	38.45	-23.15	17.45	0.056	40.61	-23.16
		825.5	-3.10	1 / 0	25.70	20.45	0.111	38.45	-18.00	22.60	0.182	40.61	-18.01
	16-QAM	836.5	-3.10	1 / 14	25.69	20.44	0.111	38.45	-18.01	22.59	0.182	40.61	-18.02
	64-QAM	847.5	-3.10	1 / 7	25.60	20.35	0.108	38.45	-18.10	22.50	0.178	40.61	-18.11
1.4 MHz	QPSK	836.5	-3.10	1 / 0	25.12	19.87	0.097	38.45	-18.58	22.02	0.159	40.61	-18.59
		825.5	-3.10	1 / 7	23.95	18.70	0.074	38.45	-19.75	20.85	0.122	40.61	-19.76
		847.5	-3.10	1 / 7	20.61	15.36	0.034	38.45	-23.09	17.51	0.056	40.61	-23.10
	16-QAM	824.7	-3.10	1 / 0	25.57	20.32	0.108	38.45	-18.13	22.47	0.177	40.61	-18.14
	64-QAM	836.5	-3.10	1 / 0	25.54	20.29	0.107	38.45	-18.16	22.44	0.175	40.61	-18.17
1.4 MHz	QPSK	848.3	-3.10	1 / 0	25.70	20.45	0.111	38.45	-18.00	22.60	0.182	40.61	-18.01
		836.5	-3.10	1 / 0	25.03	19.78	0.095	38.45	-18.67	21.93	0.156	40.61	-18.68
		848.3	-3.10	1 / 0	23.92	18.67	0.074	38.45	-19.78	20.82	0.121	40.61	-19.79
	16-QAM	824.7	-3.10	6 / 0	20.50	15.25	0.033	38.45	-23.20	17.40	0.055	40.61	-23.21
	64-QAM	824.7	-3.10	6 / 0	20.50	15.25	0.033	38.45	-23.20	17.40	0.055	40.61	-23.21


Table 7-3. ERP/EIRP Data (LTE Band 26)

FCC ID: BCGA2379	 PCTEST Proud to be part of element	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 80 of 108

NR Band n5

Bandwidth	Mod.	Frequency [MHz]	Ant. Gain [dBi]	RB Size/Offset	Conducted Power [dBm]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
20 MHz	π/2 BPSK	834.0	-3.10	1 / 1	25.70	20.45	0.111	38.45	-18.00	22.60	0.182	40.61	-18.01
		836.5	-3.10	1 / 1	25.70	20.45	0.111	38.45	-18.00	22.60	0.182	40.61	-18.01
		839.0	-3.10	1 / 1	25.67	20.42	0.110	38.45	-18.03	22.57	0.181	40.61	-18.04
	QPSK	834.0	-3.10	1 / 50	25.17	19.92	0.098	38.45	-18.53	22.07	0.161	40.61	-18.54
		836.5	-3.10	1 / 1	25.39	20.14	0.103	38.45	-18.31	22.29	0.169	40.61	-18.32
		839.0	-3.10	1 / 1	25.66	20.41	0.110	38.45	-18.04	22.56	0.180	40.61	-18.04
	16-QAM	836.5	-3.10	1 / 50	24.55	19.30	0.085	38.45	-19.16	21.45	0.139	40.61	-19.16
	64-QAM	834.0	-3.10	100 / 0	22.95	17.70	0.059	38.45	-20.75	19.85	0.097	40.61	-20.76
15 MHz	π/2 BPSK	834.0	-3.10	1 / 1	21.57	16.32	0.043	38.45	-22.13	18.47	0.070	40.61	-22.14
		831.5	-3.10	1 / 1	25.70	20.45	0.111	38.45	-18.00	22.60	0.182	40.61	-18.01
		836.5	-3.10	1 / 1	25.69	20.44	0.111	38.45	-18.01	22.59	0.182	40.61	-18.02
	QPSK	841.5	-3.10	1 / 1	25.35	20.10	0.102	38.45	-18.35	22.25	0.168	40.61	-18.36
		831.5	-3.10	1 / 73	25.38	20.13	0.103	38.45	-18.32	22.28	0.169	40.61	-18.33
		836.5	-3.10	1 / 1	25.69	20.44	0.111	38.45	-18.01	22.59	0.182	40.61	-18.02
	16-QAM	831.5	-3.10	1 / 73	24.95	19.70	0.093	38.45	-18.75	21.85	0.153	40.61	-18.75
	64-QAM	831.5	-3.10	1 / 73	23.27	18.02	0.063	38.45	-20.43	20.17	0.104	40.61	-20.44
10 MHz	π/2 BPSK	836.5	-3.10	1 / 73	21.38	16.13	0.041	38.45	-22.32	18.28	0.067	40.61	-22.33
		829.0	-3.10	1 / 48	25.58	20.33	0.108	38.45	-18.12	22.48	0.177	40.61	-18.13
		836.5	-3.10	1 / 1	25.52	20.27	0.106	38.45	-18.18	22.42	0.175	40.61	-18.18
	QPSK	844.0	-3.10	1 / 48	25.46	20.21	0.105	38.45	-18.24	22.36	0.172	40.61	-18.25
		829.0	-3.10	1 / 25	25.51	20.26	0.106	38.45	-18.19	22.41	0.174	40.61	-18.20
		836.5	-3.10	1 / 48	25.58	20.33	0.108	38.45	-18.12	22.48	0.177	40.61	-18.13
	16-QAM	844.0	-3.10	1 / 25	25.34	20.09	0.102	38.45	-18.36	22.24	0.167	40.61	-18.37
	64-QAM	836.5	-3.10	1 / 1	24.81	19.56	0.090	38.45	-18.89	21.71	0.148	40.61	-18.90
5 MHz	π/2 BPSK	836.5	-3.10	1 / 25	23.22	17.97	0.063	38.45	-20.48	20.12	0.103	40.61	-20.49
		836.5	-3.10	1 / 1	21.41	16.16	0.041	38.45	-22.29	18.31	0.068	40.61	-22.29
		829.0	-3.10	1 / 1	25.56	20.31	0.107	38.45	-18.14	22.46	0.176	40.61	-18.15
	QPSK	836.5	-3.10	1 / 1	25.64	20.39	0.109	38.45	-18.06	22.54	0.179	40.61	-18.07
		844.0	-3.10	1 / 12	25.70	20.45	0.111	38.45	-18.00	22.60	0.182	40.61	-18.01
		829.0	-3.10	1 / 12	25.56	20.31	0.107	38.45	-18.14	22.46	0.176	40.61	-18.14
	16-QAM	836.5	-3.10	1 / 1	25.56	20.31	0.108	38.45	-18.14	22.46	0.176	40.61	-18.14
	64-QAM	844.0	-3.10	1 / 23	25.13	19.88	0.097	38.45	-18.57	22.03	0.160	40.61	-18.57
5 MHz	QPSK	829.0	-3.10	1 / 23	24.68	19.43	0.088	38.45	-19.02	21.58	0.144	40.61	-19.03
		829.0	-3.10	1 / 1	23.37	18.12	0.065	38.45	-20.33	20.27	0.106	40.61	-20.34
	256-QAM	829.0	-3.10	1 / 1	21.62	16.37	0.043	38.45	-22.08	18.52	0.071	40.61	-22.09

Table 7-4. ERP/EIRP Data (NR Band n5 – DFT-s-OFDM)

FCC ID: BCGA2379	 PCTEST Proud to be part of element	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 81 of 108

ULCA Band 5

Power State	Band	Bandwidth (PCC + SCC)	PCC					SCC					ULCATx Conducted Power [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP [Watts]	ERP Limit [dBm]	Margin [dB]
			Modulation	UL Channel	UL Frequency	UL # RB	UL RB Offset	Modulation	UL Channel	UL Frequency	UL # RB	UL RB Offset										
Max	LTE B5	10MHz + 10MHz	QPSK	20450	829.0	1	49	QPSK	20549	838.9	1	0	25.70	-3.10	20.45	0.111	38.45	-18.00	22.60	0.182	40.61	-18.01
				20475	831.5	1	49		20574	841.4	1	0	25.35	-3.10	20.10	0.102	38.45	-18.35	22.25	0.168	40.61	-18.36
				20600	844.0	1	0		20501	834.1	1	49	25.45	-3.10	20.20	0.105	38.45	-18.25	22.35	0.172	40.61	-18.26
				QPSK	20450	829	50		0	QPSK	20549	838.9	50	0	24.42	-3.10	19.17	0.083	38.45	-19.28	21.32	0.136
			16-QAM	20450	829	50	0	16-QAM	20549	838.9	50	0	23.04	-3.10	17.79	0.060	38.45	-20.66	19.94	0.099	40.61	-20.67
			64-QAM	20450	829	50	0	64-QAM	20549	838.9	50	0	22.96	-3.10	17.71	0.059	38.45	-20.74	19.86	0.097	40.61	-20.75
			256-QAM	20450	829	50	0	256-QAM	20549	838.9	50	0	21.40	-3.10	16.15	0.041	38.45	-22.30	18.30	0.068	40.61	-22.31

Table 7-5. ERP/EIRP Data (ULCA Band 5)

GPRS Cell


Frequency [MHz]	Mode	Conducted Power [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
824.20	GPRS850	32.59	-3.10	27.34	0.542	38.45	-11.11	29.49	0.889	40.61	-11.12
836.60	GPRS850	32.73	-3.10	27.48	0.560	38.45	-10.97	29.63	0.918	40.61	-10.98
848.80	GPRS850	32.56	-3.10	27.31	0.538	38.45	-11.14	29.46	0.883	40.61	-11.15
836.60	EDGE850	26.81	-3.10	21.56	0.143	38.45	-16.89	23.71	0.235	40.61	-16.90

Table 7-6. ERP/EIRP Data (GPRS Cell)

WCDMA Cell

Frequency [MHz]	Mode	Conducted Power [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
826.40	WCDMA850	25.13	-3.10	19.88	0.097	38.45	-18.57	22.03	0.160	40.61	-18.58
836.60	WCDMA850	25.20	-3.10	19.95	0.099	38.45	-18.50	22.10	0.162	40.61	-18.51
846.60	WCDMA850	25.10	-3.10	19.85	0.097	38.45	-18.60	22.00	0.158	40.61	-18.61

Table 7-7. ERP/EIRP Data (WCDMA Cell)

FCC ID: BCGA2379	 PCTEST Proud to be part of element	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 82 of 108

7.5.2 Antenna 1 – ERP/EIRP

LTE Band 5


Bandwidth	Mod.	Frequency [MHz]	Ant. Gain [dBi]	RB Size/Offset	Conducted Power [dBm]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
10 MHz	QPSK	829.0	-2.50	1 / 25	23.90	19.25	0.084	38.45	-19.20	21.40	0.138	40.61	-19.21
		836.5	-2.50	1 / 25	23.75	19.10	0.081	38.45	-19.35	21.25	0.133	40.61	-19.36
		844.0	-2.50	1 / 25	23.83	19.18	0.083	38.45	-19.27	21.33	0.136	40.61	-19.28
	16-QAM	829.0	-2.50	1 / 25	23.42	18.77	0.075	38.45	-19.68	20.92	0.124	40.61	-19.69
	64-QAM	836.5	-2.50	1 / 0	22.30	17.65	0.058	38.45	-20.80	19.80	0.095	40.61	-20.81
5 MHz	QPSK	829.0	-2.50	50 / 0	19.13	14.48	0.028	38.45	-23.97	16.63	0.046	40.61	-23.98
		829.0	-2.50	1 / 12	23.88	19.23	0.084	38.45	-19.22	21.38	0.137	40.61	-19.23
		836.5	-2.50	1 / 0	23.68	19.03	0.080	38.45	-19.42	21.18	0.131	40.61	-19.43
	16-QAM	844.0	-2.50	1 / 12	23.90	19.25	0.084	38.45	-19.20	21.40	0.138	40.61	-19.21
	64-QAM	829.0	-2.50	1 / 12	23.56	18.91	0.078	38.45	-19.54	21.06	0.128	40.61	-19.55
3 MHz	QPSK	829.0	-2.50	1 / 12	22.44	17.79	0.060	38.45	-20.66	19.94	0.099	40.61	-20.67
		829.0	-2.50	25 / 0	19.13	14.48	0.028	38.45	-23.97	16.63	0.046	40.61	-23.98
		829.0	-2.50	1 / 0	23.90	19.25	0.084	38.45	-19.20	21.40	0.138	40.61	-19.21
	16-QAM	836.5	-2.50	15 / 0	23.62	18.97	0.079	38.45	-19.48	21.12	0.129	40.61	-19.49
	64-QAM	844.0	-2.50	1 / 14	23.75	19.10	0.081	38.45	-19.35	21.25	0.133	40.61	-19.36
1.4 MHz	QPSK	829.0	-2.50	1 / 7	23.32	18.67	0.074	38.45	-19.78	20.82	0.121	40.61	-19.79
		829.0	-2.50	1 / 7	22.11	17.46	0.056	38.45	-20.99	19.61	0.091	40.61	-21.00
		829.0	-2.50	15 / 0	19.12	14.47	0.028	38.45	-23.98	16.62	0.046	40.61	-23.99
	16-QAM	829.0	-2.50	1 / 0	23.90	19.25	0.084	38.45	-19.20	21.40	0.138	40.61	-19.21
	64-QAM	836.5	-2.50	1 / 0	23.62	18.97	0.079	38.45	-19.48	21.12	0.129	40.61	-19.49
1.4 MHz	QPSK	844.0	-2.50	1 / 5	23.75	19.10	0.081	38.45	-19.35	21.25	0.133	40.61	-19.36
		829.0	-2.50	1 / 0	23.48	18.83	0.076	38.45	-19.62	20.98	0.125	40.61	-19.63
		829.0	-2.50	1 / 0	22.28	17.63	0.058	38.45	-20.82	19.78	0.095	40.61	-20.83
	16-QAM	829.0	-2.50	6 / 0	19.34	14.69	0.029	38.45	-23.76	16.84	0.048	40.61	-23.77
	64-QAM	829.0	-2.50	6 / 0	19.34	14.69	0.029	38.45	-23.76	16.84	0.048	40.61	-23.77

Table 7-8. ERP/EIRP Data (LTE Band 5)

LTE Band 26

Bandwidth	Mod.	Frequency [MHz]	Ant. Gain [dBi]	RB Size/Offset	Conducted Power [dBm]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
10 MHz	QPSK	829.0	-2.50	1 / 0	23.76	19.11	0.081	38.45	-19.34	21.26	0.134	40.61	-19.35
		836.5	-2.50	1 / 25	23.90	19.25	0.084	38.45	-19.20	21.40	0.138	40.61	-19.21
		844.0	-2.50	1 / 25	23.87	19.22	0.084	38.45	-19.23	21.37	0.137	40.61	-19.24
	16-QAM	836.5	-2.50	1 / 0	23.34	18.69	0.074	38.45	-19.76	20.84	0.121	40.61	-19.77
	64-QAM	836.5	-2.50	1 / 25	22.50	17.85	0.061	38.45	-20.60	20.00	0.100	40.61	-20.61
5 MHz	QPSK	844.0	-2.50	1 / 25	18.53	13.88	0.024	38.45	-24.57	16.03	0.040	40.61	-24.58
		826.5	-2.50	1 / 24	23.88	19.23	0.084	38.45	-19.22	21.38	0.137	40.61	-19.23
		836.5	-2.50	1 / 0	23.90	19.25	0.084	38.45	-19.20	21.40	0.138	40.61	-19.21
	16-QAM	846.5	-2.50	1 / 12	23.72	19.07	0.081	38.45	-19.38	21.22	0.132	40.61	-19.39
	64-QAM	836.5	-2.50	1 / 24	23.51	18.86	0.077	38.45	-19.59	21.01	0.126	40.61	-19.60
3 MHz	QPSK	836.5	-2.50	1 / 24	22.68	18.03	0.064	38.45	-20.42	20.18	0.104	40.61	-20.43
		826.5	-2.50	25 / 0	18.47	13.82	0.024	38.45	-24.63	15.97	0.040	40.61	-24.64
		825.5	-2.50	1 / 0	23.90	19.25	0.084	38.45	-19.20	21.40	0.138	40.61	-19.21
	16-QAM	836.5	-2.50	1 / 0	23.83	19.18	0.083	38.45	-19.27	21.33	0.136	40.61	-19.28
	64-QAM	847.5	-2.50	1 / 7	23.81	19.16	0.082	38.45	-19.29	21.31	0.135	40.61	-19.30
1.4 MHz	QPSK	836.5	-2.50	1 / 0	23.28	18.63	0.073	38.45	-19.82	20.78	0.120	40.61	-19.83
		836.5	-2.50	1 / 14	22.47	17.82	0.061	38.45	-20.63	19.97	0.099	40.61	-20.64
		847.5	-2.50	1 / 7	18.53	13.88	0.024	38.45	-24.57	16.03	0.040	40.61	-24.58
	16-QAM	824.7	-2.50	1 / 0	23.77	19.12	0.082	38.45	-19.33	21.27	0.134	40.61	-19.34
	64-QAM	836.5	-2.50	1 / 0	23.79	19.14	0.082	38.45	-19.31	21.29	0.135	40.61	-19.32
1.4 MHz	QPSK	848.3	-2.50	1 / 0	23.90	19.25	0.084	38.45	-19.20	21.40	0.138	40.61	-19.21
		836.5	-2.50	1 / 0	23.28	18.63	0.073	38.45	-19.82	20.78	0.120	40.61	-19.83
		836.5	-2.50	1 / 0	22.51	17.86	0.061	38.45	-20.59	20.01	0.100	40.61	-20.60
1.4 MHz	256-QAM	824.7	-2.50	6 / 0	18.44	13.79	0.024	38.45	-24.66	15.94	0.039	40.61	-24.67


Table 7-9. ERP/EIRP Data (LTE Band 26)

FCC ID: BCGA2379	 PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device
Page 83 of 108		

NR Band n5

Bandwidth	Mod.	Frequency [MHz]	Ant. Gain [dBi]	RB Size/Offset	Conducted Power [dBm]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
20 MHz	π/2 BPSK	834.0	-2.50	1 / 1	23.64	18.99	0.079	38.45	-19.46	21.14	0.130	40.61	-19.47
		836.5	-2.50	1 / 1	23.75	19.10	0.081	38.45	-19.36	21.25	0.133	40.61	-19.36
		839.0	-2.50	1 / 1	23.90	19.25	0.084	38.45	-19.20	21.40	0.138	40.61	-19.21
	QPSK	834.0	-2.50	1 / 50	23.59	18.94	0.078	38.45	-19.51	21.09	0.129	40.61	-19.52
		836.5	-2.50	1 / 98	23.78	19.13	0.082	38.45	-19.32	21.28	0.134	40.61	-19.33
		839.0	-2.50	1 / 1	23.59	18.94	0.078	38.45	-19.51	21.09	0.128	40.61	-19.52
	16-QAM	834.0	-2.50	1 / 1	23.21	18.56	0.072	38.45	-19.89	20.71	0.118	40.61	-19.90
	64-QAM	836.5	-2.50	1 / 98	21.58	16.93	0.049	38.45	-21.52	19.08	0.081	40.61	-21.52
15 MHz	π/2 BPSK	836.5	-2.50	1 / 1	19.53	14.88	0.031	38.45	-23.57	17.03	0.051	40.61	-23.57
		834.0	-2.50	1 / 75	23.68	19.03	0.080	38.45	-19.42	21.18	0.131	40.61	-19.42
		836.5	-2.50	1 / 75	23.84	19.19	0.083	38.45	-19.26	21.34	0.136	40.61	-19.26
	QPSK	839.0	-2.50	1 / 73	23.79	19.14	0.082	38.45	-19.32	21.29	0.134	40.61	-19.32
		834.0	-2.50	1 / 73	23.90	19.25	0.084	38.45	-19.20	21.40	0.138	40.61	-19.21
		836.5	-2.50	1 / 75	23.80	19.15	0.082	38.45	-19.30	21.30	0.135	40.61	-19.30
	16-QAM	839.0	-2.50	1 / 1	23.71	19.06	0.080	38.45	-19.39	21.21	0.132	40.61	-19.40
	64-QAM	836.5	-2.50	1 / 73	23.06	18.41	0.069	38.45	-20.04	20.56	0.114	40.61	-20.04
10 MHz	π/2 BPSK	839.0	-2.50	1 / 75	21.53	16.88	0.049	38.45	-21.57	19.03	0.080	40.61	-21.58
		834.0	-2.50	1 / 75	19.97	15.32	0.034	38.45	-23.13	17.47	0.056	40.61	-23.14
		836.5	-2.50	1 / 48	23.90	19.25	0.084	38.45	-19.20	21.40	0.138	40.61	-19.21
	QPSK	836.5	-2.50	1 / 1	23.70	19.05	0.080	38.45	-19.40	21.20	0.132	40.61	-19.41
		839.0	-2.50	1 / 25	23.78	19.13	0.082	38.45	-19.32	21.28	0.134	40.61	-19.33
		834.0	-2.50	1 / 1	23.74	19.09	0.081	38.45	-19.36	21.24	0.133	40.61	-19.36
	16-QAM	836.5	-2.50	1 / 1	23.79	19.14	0.082	38.45	-19.31	21.29	0.135	40.61	-19.32
	64-QAM	839.0	-2.50	1 / 25	23.71	19.06	0.081	38.45	-19.39	21.21	0.132	40.61	-19.40
5 MHz	π/2 BPSK	834.0	-2.50	1 / 25	22.93	18.28	0.067	38.45	-20.17	20.43	0.110	40.61	-20.18
		836.5	-2.50	1 / 25	21.63	16.98	0.050	38.45	-21.47	19.13	0.082	40.61	-21.47
		844.0	-2.50	1 / 25	19.57	14.92	0.031	38.45	-23.53	17.07	0.051	40.61	-23.54
	QPSK	834.0	-2.50	1 / 1	23.90	19.25	0.084	38.45	-19.20	21.40	0.138	40.61	-19.21
		836.5	-2.50	1 / 1	23.75	19.10	0.081	38.45	-19.35	21.25	0.133	40.61	-19.36
		839.0	-2.50	1 / 12	23.86	19.21	0.083	38.45	-19.24	21.36	0.137	40.61	-19.25
	16-QAM	834.0	-2.50	1 / 1	23.85	19.20	0.083	38.45	-19.25	21.35	0.137	40.61	-19.26
		836.5	-2.50	1 / 1	23.77	19.12	0.082	38.45	-19.33	21.27	0.134	40.61	-19.34
		839.0	-2.50	1 / 12	23.69	19.04	0.080	38.45	-19.41	21.19	0.132	40.61	-19.42
5 MHz	64-QAM	836.5	-2.50	1 / 12	22.87	18.22	0.066	38.45	-20.23	20.37	0.109	40.61	-20.23
	256-QAM	834.0	-2.50	1 / 23	21.73	17.08	0.051	38.45	-21.37	19.23	0.084	40.61	-21.38
	256-QAM	834.0	-2.50	1 / 12	19.58	14.93	0.031	38.45	-23.53	17.08	0.051	40.61	-23.53

Table 7-10. ERP/EIRP Data (NR Band n5 – DFTs-OFDM)

FCC ID: BCGA2379	 PCTEST Proud to be part of element	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 84 of 108

ULCA Band 5

Power State	Band	Bandwidth (PCC + SCC)	PCC					SCC					ULCA Tx. Conducted Power [dBm]	Ant. Gain [dB]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
			Modulation	UL Channel	UL Frequency	UL # RB	UL RB Offset	Modulation	UL Channel	UL Frequency	UL # RB	UL RB Offset										
Max	LTE B5	10MHz + 10MHz	QPSK	20450	829.0	1	49	QPSK	20549	838.9	1	0	23.90	-2.50	19.25	0.084	38.45	-19.20	21.40	0.138	40.61	-19.21
				20475	831.5	1	49		20574	841.4	1	0	23.89	-2.50	19.24	0.084	38.45	-19.21	21.39	0.138	40.61	-19.22
				20600	844.0	1	0		20501	834.1	1	49	23.50	-2.50	18.85	0.077	38.45	-19.60	21.00	0.126	40.61	-19.61
				QPSK	20450	829	50		0	QPSK	20549	838.9	50	0	21.52	-2.50	16.87	0.049	38.45	-21.58	19.02	0.080
			16-QAM	20450	829	50	0	16-QAM	20549	838.9	50	0	20.55	-2.50	15.90	0.039	38.45	-22.55	18.05	0.064	40.61	-22.56
			64-QAM	20450	829	50	0	64-QAM	20549	838.9	50	0	20.56	-2.50	15.91	0.039	38.45	-22.54	18.06	0.064	40.61	-22.55
			256-QAM	20450	829	50	0	256-QAM	20549	838.9	50	0	18.62	-2.50	13.97	0.025	38.45	-24.48	16.12	0.041	40.61	-24.49

Table 7-11. ERP/EIRP Data (ULCA Band 5)

GPRS Cell


Frequency [MHz]	Mode	Conducted Power [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
824.20	GPRS850	31.14	-2.50	26.49	0.446	38.45	-11.96	28.64	0.731	40.61	-11.97
836.60	GPRS850	31.28	-2.50	26.63	0.460	38.45	-11.82	28.78	0.755	40.61	-11.83
848.80	GPRS850	30.93	-2.50	26.28	0.425	38.45	-12.17	28.43	0.697	40.61	-12.18
836.60	EDGE850	25.44	-2.50	20.79	0.120	38.45	-17.66	22.94	0.197	40.61	-17.67

Table 7-12. ERP/EIRP Data (GPRS Cell)

WCDMA Cell

Frequency [MHz]	Mode	Conducted Power [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
826.40	WCDMA850	23.67	-2.50	19.02	0.080	38.45	-19.43	21.17	0.131	40.61	-19.44
836.60	WCDMA850	23.69	-2.50	19.04	0.080	38.45	-19.41	21.19	0.132	40.61	-19.42
846.60	WCDMA850	23.63	-2.50	18.98	0.079	38.45	-19.47	21.13	0.130	40.61	-19.48

Table 7-13. ERP/EIRP Data (WCDMA Cell)

FCC ID: BCGA2379	 PCTEST Proud to be part of element	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 85 of 108

7.6 Radiated Spurious Emissions

§2.1053, 22.917(a)

Test Overview


Radiated spurious emissions measurements are performed using the field strength conversion method described in KDB 971168 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using horizontally and vertically polarized tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically and horizontally polarized broadband horn antennas. All measurements are performed as peak measurements while the EUT is operating at maximum power, and at the appropriate frequencies.

Test Procedures Used

KDB 971168 D01 v03r01 – Section 5.8

Test Settings

1. RBW = 100kHz for emissions below 1GHz and 1MHz for emissions above 1GHz
2. VBW $\geq 3 \times$ RBW
3. Span = 1.5 times the OBW
4. No. of sweep points $\geq 2 \times$ span / RBW
5. Detector = RMS
6. Trace mode = Average (Max Hold for pulsed emissions)
7. The trace was allowed to stabilize

FCC ID: BCGA2379	 PART 22 MEASUREMENT REPORT		Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 86 of 108

Test Setup

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

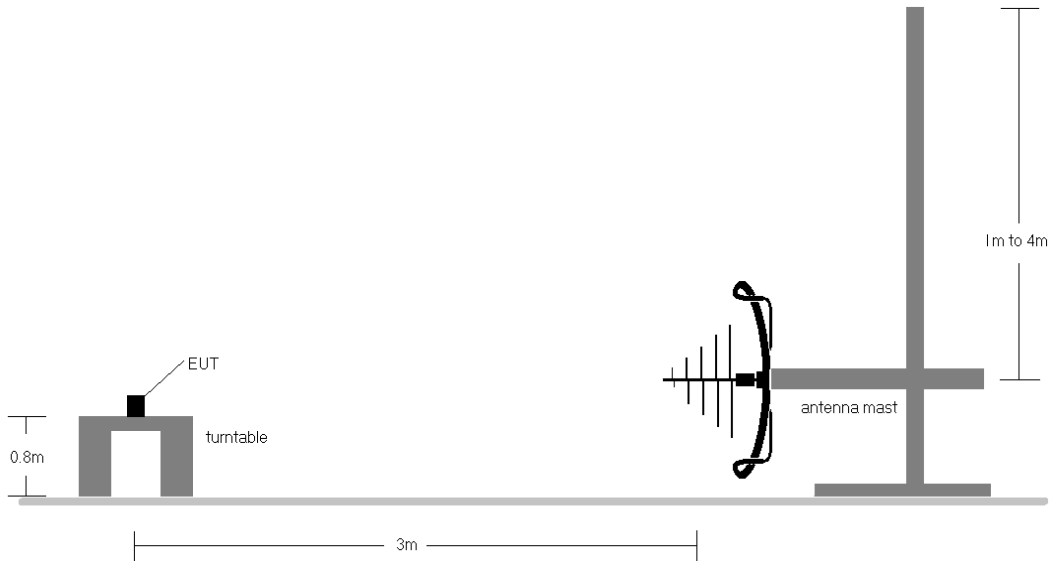


Figure 7-5. Test Instrument & Measurement Setup < 1GHz

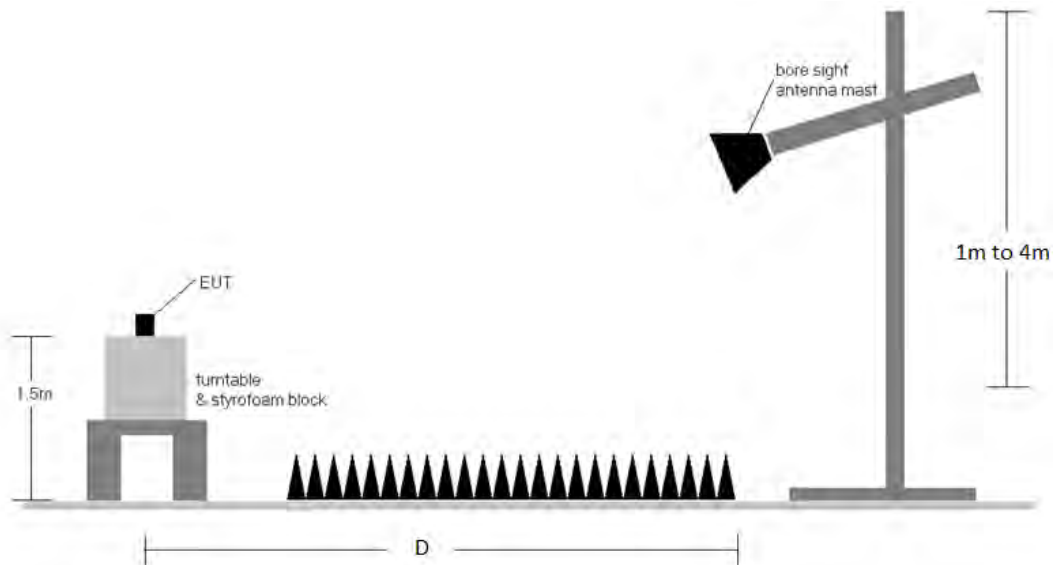



Figure 7-6. Test Instrument & Measurement Setup >1 GHz

FCC ID: BCGA2379	PCTEST Proud to be part of element	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 87 of 108

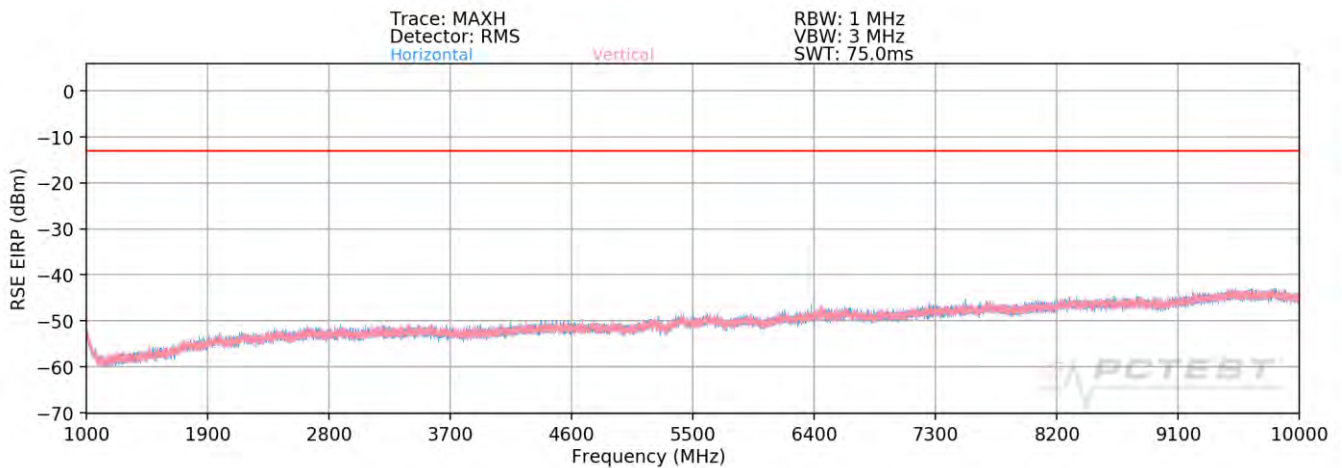
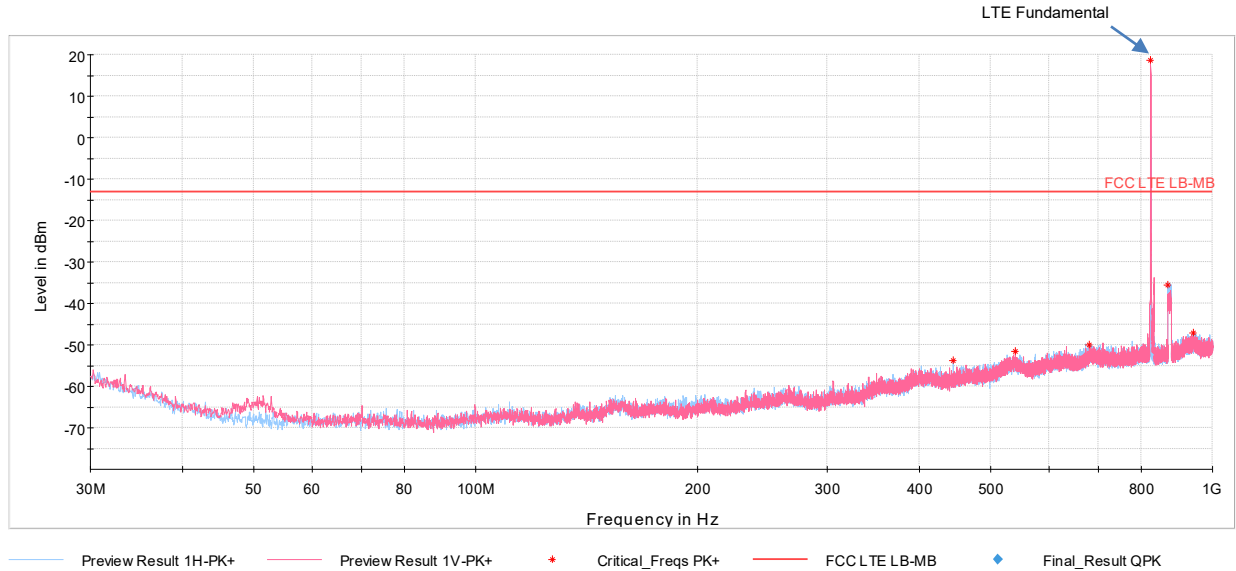
Test Notes

- 1) Field strengths are calculated using the Measurement quantity conversions in KDB 971168 Section 5.8.4.
 - b) $E(\text{dB}\mu\text{V/m}) = \text{Measured amplitude level (dBm)} + 107 + \text{Cable Loss (dB)} + \text{Antenna Factor (dB/m)}$
 - d) $\text{EIRP (dBm)} = E(\text{dB}\mu\text{V/m}) + 20\log D - 104.8$; where D is the measurement distance in meters.
- 2) This device employs GSM, GPRS, and EDGE capabilities. The EUT was tested under all configurations and the highest powers is reported in GPRS mode while transmitting with one slot active.
- 3) This device employs UMTS technology with WCDMA (AMR/RMC) and HSDPA capabilities. The EUT was tested under all configurations and the highest power is reported in WCDMA mode with HSDPA Inactive at 12.2 kbps RMC and TPC bits all set to "1".
- 4) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the tables below.
- 5) This unit was tested with its standard battery.
- 6) The spectrum is measured from 9kHz to the 10th harmonic of the fundamental frequency of the transmitter. The worst-case emissions are reported.
- 7) D is the measurement test distance and emissions 1-18GHz were measured at a 3 meters test distance while emissions above 18GHz were measured at a 1 meter test distance with the application of a distance correction factor.
- 8) The "-" shown in the following RSE tables are used to denote a noise floor measurement.
- 9) ULCA spurious emissions measurements were evaluated for the two contiguous channels using various combinations of RB size, RB offset, modulation, and channel bandwidth. Channel bandwidth data is shown in the tables below based only on the channel bandwidths that were supported in this device.
- 10) For NR operation, all subcarrier spacings (SCS) and transmission schemes (e.g. CP-OFDM and DFT-s-OFDM) were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.
- 11) Spurious emission in EN-DC Operating mode with Sub 6GHz NR carrier as well as an LTE carrier (anchor) has been included in this section. Spurious emissions from the NR and LTE carriers are subject to their own respective limits.

FCC ID: BCGA2379	 PART 22 MEASUREMENT REPORT		Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 88 of 108

7.6.1 Antenna 3 – Radiated Spurious Emission Measurements

LTE Band 26/5



FCC ID: BCGA2379	PCTEST Proud to be part of element	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 89 of 108

Bandwidth (MHz):	10
Frequency (MHz):	829.0
RB / Offset:	1 / 37

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1658.0	-	-	-	-76.49	2.76	33.27	-61.99	-13.00	-48.99
2487.0	-	-	-	-77.44	7.90	37.46	-57.80	-13.00	-44.80
3316.0	-	-	-	-77.74	11.96	41.22	-54.04	-13.00	-41.04

Table 7-14. Radiated Spurious Data (LTE Band 26/5 – Low Channel)

Bandwidth (MHz):	10
Frequency (MHz):	836.5
RB / Offset:	1 / 37


Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1673.0	-	-	-	-77.16	-0.47	29.37	-65.89	-13.00	-52.89
2509.5	-	-	-	-77.75	2.85	32.10	-63.16	-13.00	-50.16
3346.0	-	-	-	-77.90	4.15	33.25	-62.01	-13.00	-49.01

Table 7-15. Radiated Spurious Data (LTE Band 26/5 – Mid Channel)

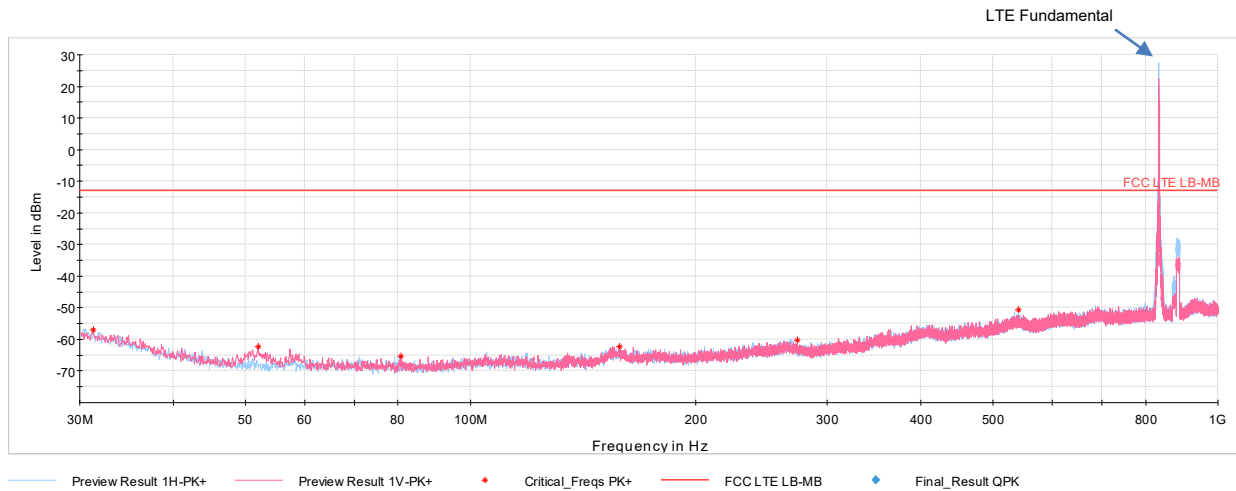
Bandwidth (MHz):	10
Frequency (MHz):	844.0
RB / Offset:	1 / 37

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1688.00	-	-	-	-76.88	-0.07	30.05	-65.21	-13.00	-52.21
2532.00	H	293	299	-76.71	2.79	33.08	-62.18	-13.00	-49.18
3376.00	-	-	-	-77.98	4.39	33.41	-61.85	-13.00	-48.85
4220.00	-	-	-	-78.93	5.71	33.78	-61.48	-13.00	-48.48
5064.00	-	-	-	-79.92	6.35	33.43	-61.83	-13.00	-48.83

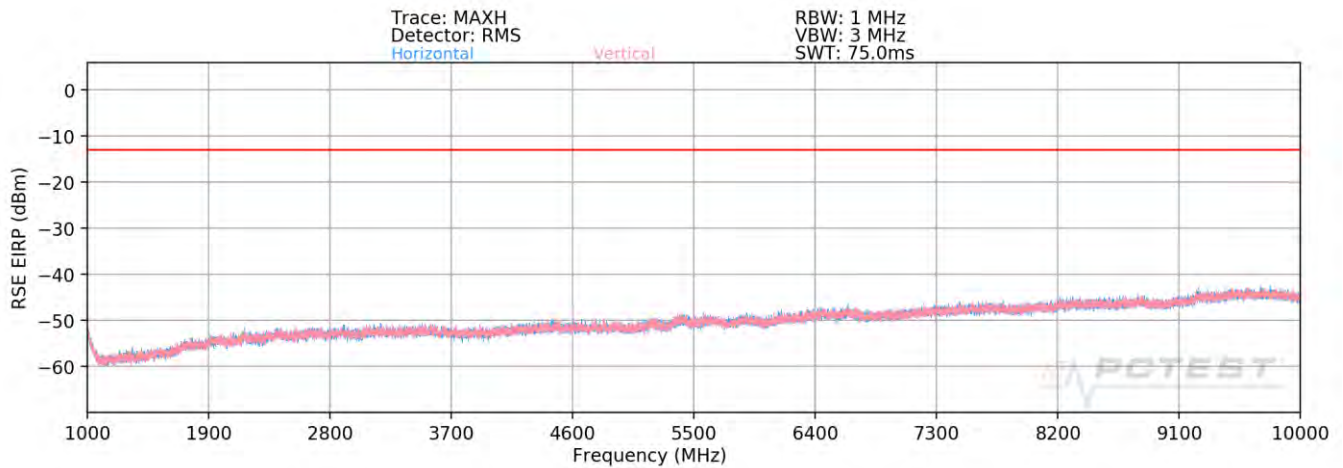
Table 7-16. Radiated Spurious Data (LTE Band 26/5 – High Channel)

FCC ID: BCGA2379	 PCTEST <small>Proud to be part of element</small>	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 90 of 108

ULCA LTE Band 5



Plot 7-118. Radiated Spurious Emission below 1GHz (ULCA LTE Band 5)



Plot 7-119. Radiated Spurious Emission above 1GHz (ULCA LTE Band 5)

FCC ID: BCGA2379	PCTEST Proud to be part of element	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 91 of 108

PCC Bandwidth (MHz):	10
PCC Frequency (MHz):	829.0
PCC RB / Offset:	1 / 49
SCC Bandwidth (MHz):	10
SCC Frequency (MHz):	838.9
SCC RB / Offset:	1 / 0


Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1668.0	H	-	-	-76.91	-0.54	29.55	-65.71	-13.00	-52.71
2502.0	H	-	-	-77.42	2.91	32.49	-62.76	-13.00	-49.76
3336.0	H	-	-	-77.81	4.07	33.26	-61.99	-13.00	-48.99

Table 7-17. Radiated Spurious Data (ULCA LTE Band 5 – Low Channel)

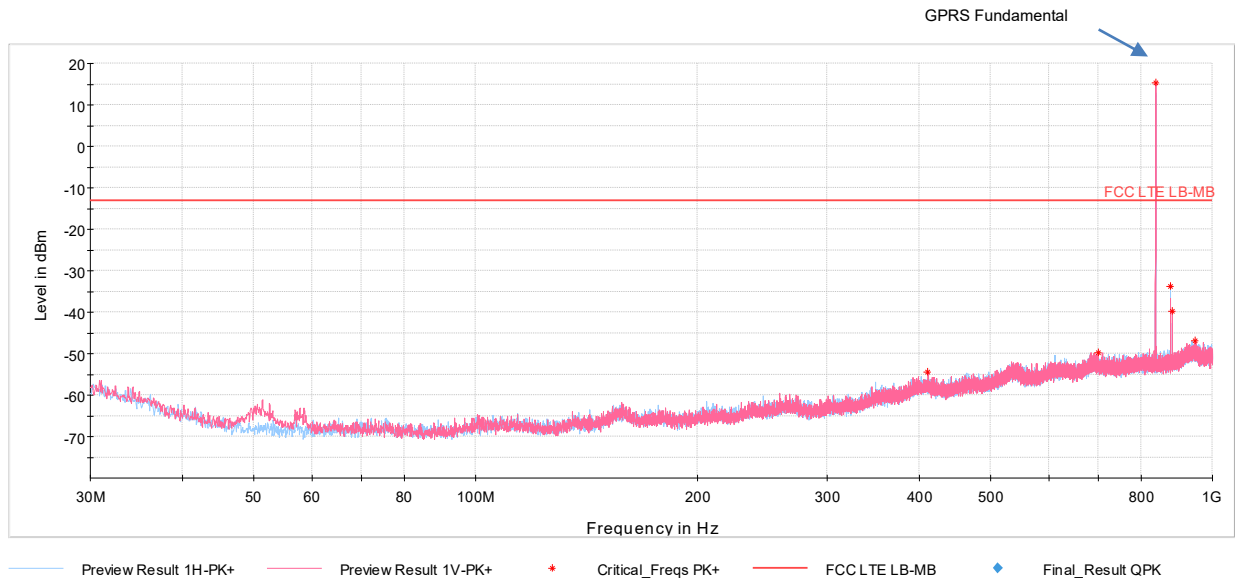
PCC Bandwidth (MHz):	10
PCC Frequency (MHz):	844.0
PCC RB / Offset:	1 / 0
SCC Bandwidth (MHz):	10
SCC Frequency (MHz):	834.1
SCC RB / Offset:	1 / 49

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1678.0	H	-	-	-76.93	-0.08	29.99	-65.26	-13.00	-52.26
2517.0	H	-	-	-77.51	2.80	32.29	-62.97	-13.00	-49.97
3356.0	H	-	-	-78.15	4.39	33.24	-62.01	-13.00	-49.01

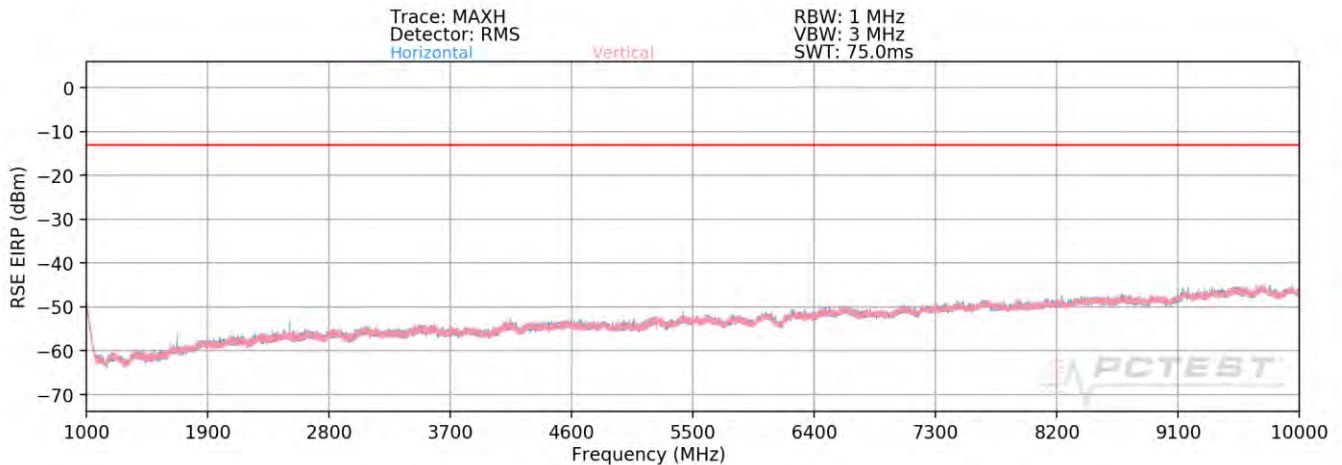
Table 7-18. Radiated Spurious Data (ULCA LTE Band 5 – High Channel)

FCC ID: BCGA2379	 PCTEST Proud to be part of element	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 92 of 108

GSM/GPRS Cell



Plot 7-120. Radiated Spurious Emission below 1GHz (GPRS Cell)



Plot 7-121. Radiated Spurious Emission above 1GHz (GPRS Cell)

FCC ID: BCGA2379	PCTEST Proud to be part of element	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 93 of 108

Mode:	GPRS 1 Tx Slot
Channel:	128
Frequency (MHz):	824.2

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1648.4	H	187	131	-66.34	-0.69	39.97	-55.29	-13.00	-42.29
2472.6	H	318	112	-64.42	3.15	45.73	-49.52	-13.00	-36.52
3296.8	-	-	-	-77.32	4.01	33.69	-61.57	-13.00	-48.57
4121.0	-	-	-	-75.66	5.01	36.35	-58.91	-13.00	-45.91
4945.2	-	-	-	-72.89	6.52	40.63	-54.62	-13.00	-41.62

Table 7-19. Radiated Spurious Data (GPRS Cell – Low Channel)

Mode:	GPRS 1 Tx Slot
Channel:	190
Frequency (MHz):	836.6


Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1673.2	H	142	168	-65.90	-0.47	40.63	-54.63	-13.00	-41.63
2509.8	H	321	262	-68.01	2.85	41.84	-53.42	-13.00	-40.42
3346.4	-	-	-	-76.93	4.16	34.23	-61.03	-13.00	-48.03
4183.0	-	-	-	-75.65	5.31	36.66	-58.60	-13.00	-45.60
5019.6	-	-	-	-72.71	6.40	40.69	-54.56	-13.00	-41.56

Table 7-20. Radiated Spurious Data (GPRS Cell – Mid Channel)

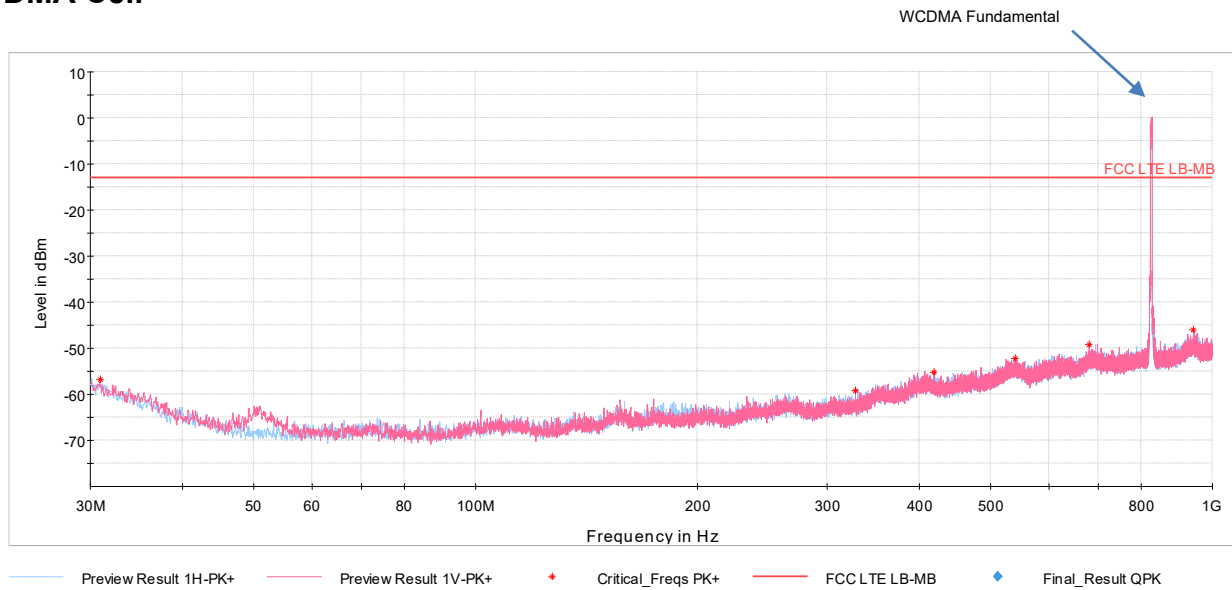
Mode:	GPRS 1 Tx Slot
Channel:	251
Frequency (MHz):	848.8

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1697.6	H	114	115	-67.94	0.36	39.42	-55.84	-13.00	-42.84
2546.4	H	289	152	-69.39	2.81	40.42	-54.83	-13.00	-41.83
3395.2	-	-	-	-77.92	4.48	33.56	-61.69	-13.00	-48.69
4244.0	-	-	-	-76.42	5.43	36.01	-59.25	-13.00	-46.25
5092.8	-	-	-	-72.83	6.68	40.85	-54.40	-13.00	-41.40

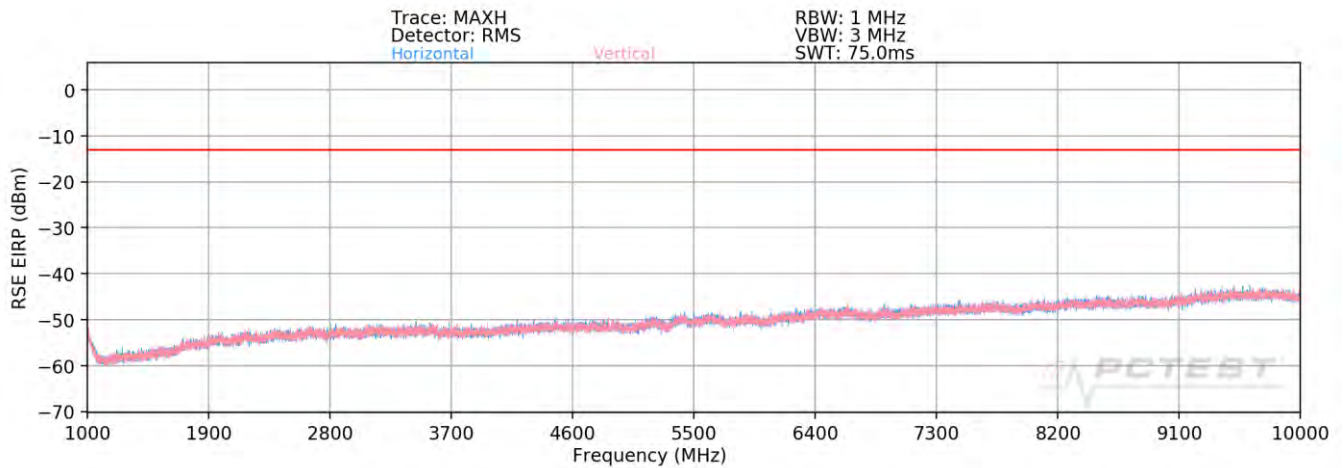
Table 7-21. Radiated Spurious Data (GPRS Cell – High Channel)

FCC ID: BCGA2379	 PCTEST Proud to be part of element	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 94 of 108

WCDMA Cell



Plot 7-122. Radiated Spurious Emission (WCDMA Cell)



Plot 7-123. Radiated Spurious Emission above 1GHz (WCDMA Cell)

FCC ID: BCGA2379	PCTEST Proud to be part of element	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 95 of 108

Mode:	WCDMA RMC
Channel:	4132
Frequency (MHz):	826.4

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1652.8	-	-	-	-76.29	-0.59	30.12	-65.14	-13.00	-52.14
2479.2	H	138	103	-76.27	3.21	33.94	-61.32	-13.00	-48.32
3305.6	-	-	-	-79.85	4.04	31.19	-64.06	-13.00	-51.06
4132.0	-	-	-	-78.87	4.81	32.94	-62.31	-13.00	-49.31
4958.4	-	-	-	-76.22	6.42	37.20	-58.05	-13.00	-45.05

Table 7-22. Radiated Spurious Data (WCDMA Cell – Low Channel)

Mode:	WCDMA RMC
Channel:	4183
Frequency (MHz):	836.6


Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1673.2	-	-	-	-78.68	-0.47	27.85	-67.41	-13.00	-54.41
2509.8	-	-	-	-75.97	2.85	33.88	-61.38	-13.00	-48.38
3346.4	-	-	-	-76.23	4.16	34.93	-60.33	-13.00	-47.33

Table 7-23. Radiated Spurious Data (WCDMA Cell – Mid Channel)

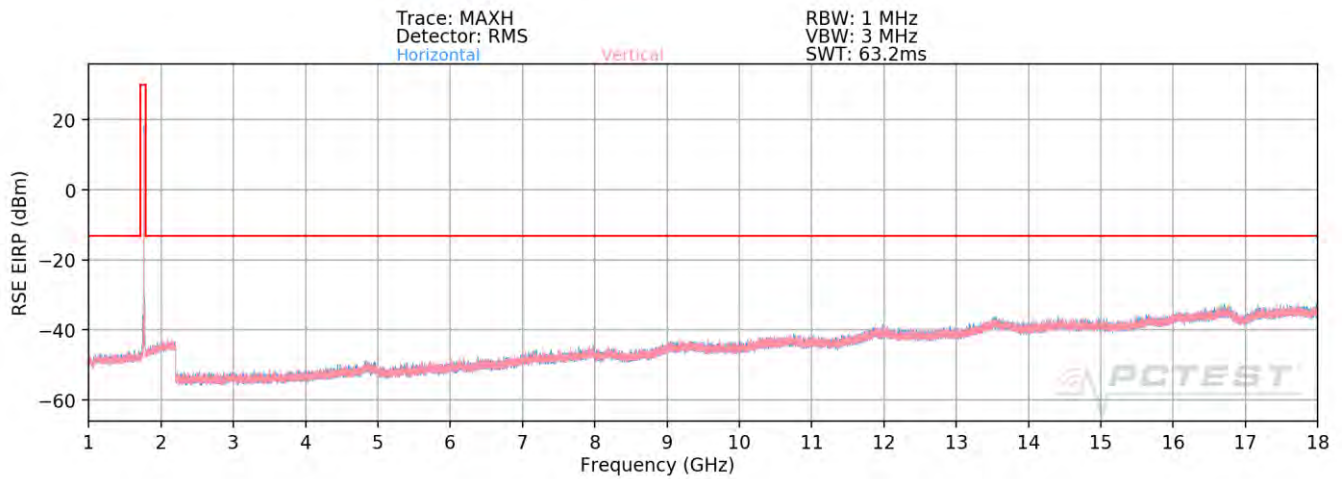
Mode:	WCDMA RMC
Channel:	4233
Frequency (MHz):	846.6

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1693.2	-	-	-	-78.73	0.16	28.43	-66.83	-13.00	-53.83
2539.8	-	-	-	-75.71	2.87	34.16	-61.10	-13.00	-48.10
3386.4	-	-	-	-76.08	4.41	35.33	-59.93	-13.00	-46.93

Table 7-24. Radiated Spurious Data (WCDMA Cell – High Channel)

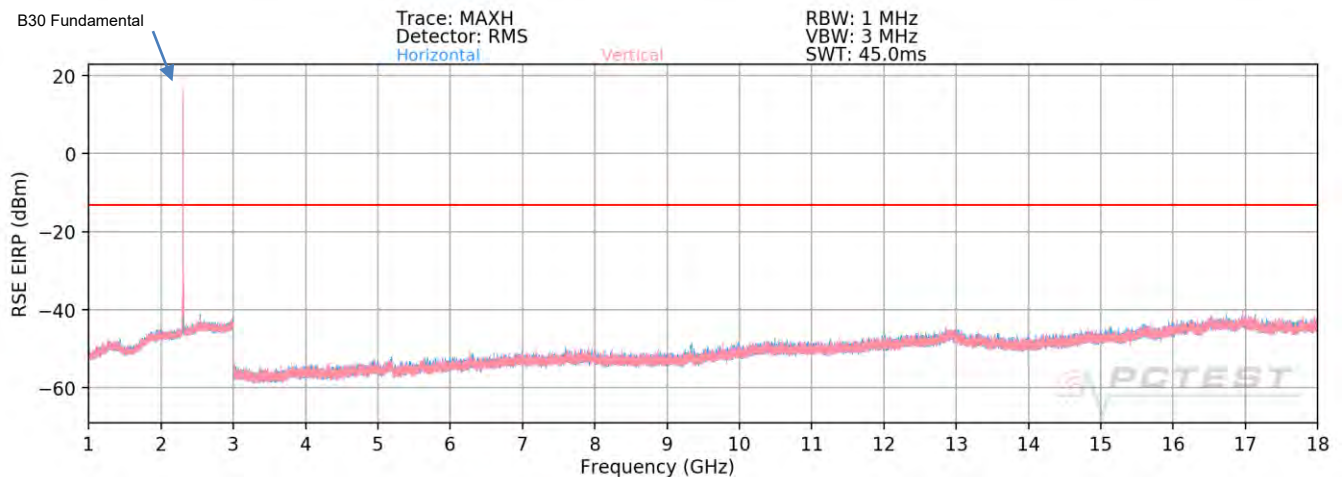
FCC ID: BCGA2379	 <small>Proud to be part of element</small>	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 96 of 108

EN-DC – n5 + LTE Band 66



Plot 7-124. Radiated Spurious Emission 1GHz – 18GHz (NR Band n5 + Anchor LTE Band 66 – EN-DC)

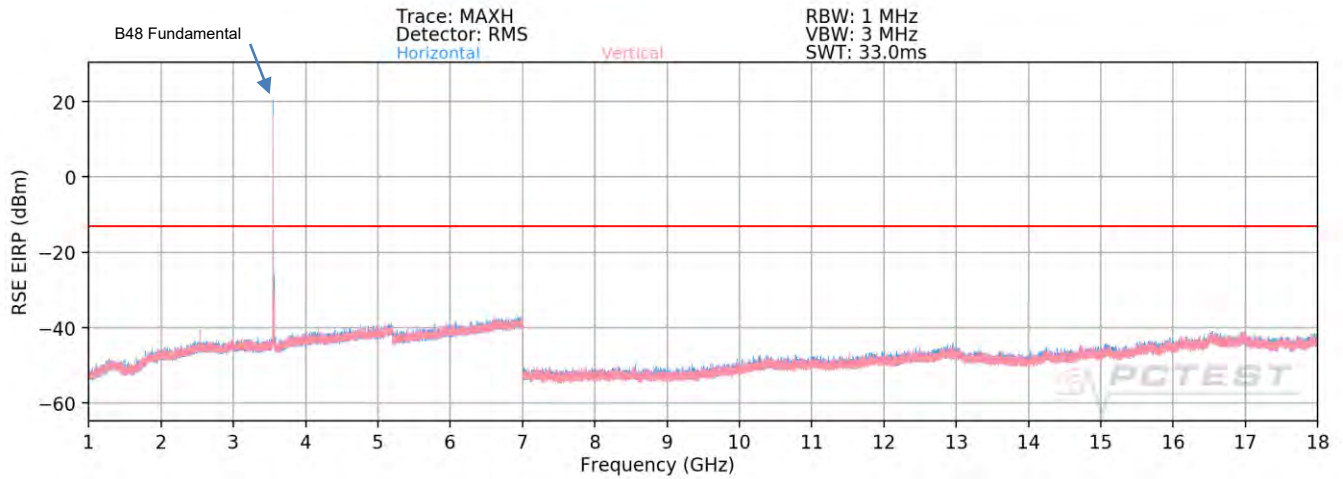
EN-DC – n5 + LTE Band 30



Plot 7-125. Radiated Spurious Emission 1GHz – 18GHz (NR Band n5 + Anchor LTE Band 30 – EN-DC)

FCC ID: BCGA2379	PCTEST Proud to be part of element	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 97 of 108

EN-DC – n5 + LTE Band 48



Plot 7-126. Radiated Spurious Emission 1GHz – 18GHz (NR Band n5 + Anchor LTE Band 48 – EN-DC)

FCC ID: BCGA2379	PCTEST Proud to be part of element	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 98 of 108

7.6.2 Antenna 1 – Radiated Spurious Emission Measurements

LTE Band 26/5

Bandwidth (MHz):	10
Frequency (MHz):	829.0
RB / Offset:	1 / 37

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1658.0	H	150	170	-77.73	-0.54	28.73	-66.53	-13.00	-53.53
2487.0	H	187	60	-70.53	2.91	39.38	-55.87	-13.00	-42.87
3316.0	-	-	-	-77.58	4.07	33.49	-61.76	-13.00	-48.76
4145.0	-	-	-	-77.65	5.07	34.42	-60.84	-13.00	-47.84
4974.0	-	-	-	-78.82	6.36	34.54	-60.72	-13.00	-47.72

Table 7-25. Radiated Spurious Data (LTE Band 26/5 – Low Channel)

Bandwidth (MHz):	10
Frequency (MHz):	836.5
RB / Offset:	1 / 37


Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1673.0	-	-	-	-79.61	-0.48	26.91	-68.34	-13.00	-55.34
2509.5	V	383	263	-67.86	2.85	41.99	-53.27	-13.00	-40.27
3346.0	-	-	-	-77.66	4.15	33.49	-61.77	-13.00	-48.77
4182.5	-	-	-	-75.99	5.29	36.30	-58.95	-13.00	-45.95
5019.0	-	-	-	-77.60	6.41	35.81	-59.45	-13.00	-46.45

Table 7-26. Radiated Spurious Data (LTE Band 26/5 – Mid Channel)

Bandwidth (MHz):	10
Frequency (MHz):	844.0
RB / Offset:	1 / 37

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1688.00	-	-	-	-76.85	-0.08	30.07	-65.18	-13.00	-52.18
2532.00	V	338	225	-77.26	2.80	32.54	-62.72	-13.00	-49.72
3376.00	-	-	-	-78.09	4.39	33.30	-61.95	-13.00	-48.95
4220.00	-	-	-	-79.05	5.71	33.66	-61.60	-13.00	-48.60
5064.00	-	-	-	-80.04	6.35	33.31	-61.94	-13.00	-48.94

Table 7-27. Radiated Spurious Data (LTE Band 26/5 – High Channel)

FCC ID: BCGA2379	 PCTEST <small>Proud to be part of element</small>	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 99 of 108

ULCA LTE Band 5

PCC Bandwidth (MHz):	10
PCC Frequency (MHz):	829.0
PCC RB / Offset:	1 / 49
SCC Bandwidth (MHz):	10
SCC Frequency (MHz):	838.9
SCC RB / Offset:	1 / 0


Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1668.0	H	338	171	-75.96	-0.54	30.50	-64.76	-13.00	-51.76
2502.0	-	-	-	-77.49	2.91	32.42	-62.83	-13.00	-49.83
3336.0	-	-	-	-77.81	4.07	33.26	-61.99	-13.00	-48.99
4170.0	-	-	-	-79.04	5.07	33.03	-62.23	-13.00	-49.23

Table 7-28. Radiated Spurious Data (ULCA LTE Band 5 – Low Channel)

PCC Bandwidth (MHz):	10
PCC Frequency (MHz):	844.0
PCC RB / Offset:	1 / 0
SCC Bandwidth (MHz):	10
SCC Frequency (MHz):	834.1
SCC RB / Offset:	1 / 49

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1678.0	-	-	-	-76.84	-0.08	30.08	-65.17	-13.00	-52.17
2517.0	-	-	-	-77.56	2.80	32.24	-63.02	-13.00	-50.02
3356.0	-	-	-	-78.11	4.39	33.28	-61.97	-13.00	-48.97

Table 7-29. Radiated Spurious Data (ULCA LTE Band 5 – High Channel)

FCC ID: BCGA2379	 PCTEST <small>Proud to be part of element</small>	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 100 of 108

GSM/GPRS Cell

Mode:	GPRS 1 Tx Slot
Channel:	128
Frequency (MHz):	824.2

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1648.4	H	163	134	-67.99	-0.69	38.32	-56.94	-13.00	-43.94
2472.6	V	268	97	-71.94	3.15	38.21	-57.04	-13.00	-44.04
3296.8	-	-	-	-77.17	4.01	33.84	-61.42	-13.00	-48.42
4121.0	-	-	-	-76.28	5.01	35.73	-59.53	-13.00	-46.53
4945.2	-	-	-	-73.47	6.52	40.05	-55.20	-13.00	-42.20

Table 7-30. Radiated Spurious Data (GPRS Cell – Low Channel)

Mode:	GPRS 1 Tx Slot
Channel:	190
Frequency (MHz):	836.6


Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1673.2	H	305	168	-69.95	-0.47	36.58	-58.68	-13.00	-45.68
2509.8	V	171	222	-70.15	2.85	39.70	-55.56	-13.00	-42.56
3346.4	-	-	-	-77.02	4.16	34.14	-61.12	-13.00	-48.12
4183.0	-	-	-	-76.09	5.31	36.22	-59.04	-13.00	-46.04
5019.6	-	-	-	-72.90	6.40	40.50	-54.75	-13.00	-41.75

Table 7-31. Radiated Spurious Data (GPRS Cell – Mid Channel)

Mode:	GPRS 1 Tx Slot
Channel:	251
Frequency (MHz):	848.8

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1697.6	H	126	174	-65.41	0.36	41.95	-53.31	-13.00	-40.31
2546.4	H	187	54	-69.78	2.81	40.03	-55.22	-13.00	-42.22
3395.2	-	-	-	-75.00	4.48	36.48	-58.77	-13.00	-45.77
4244.0	-	-	-	-72.93	5.43	39.50	-55.76	-13.00	-42.76
5092.8	-	-	-	-70.52	6.68	43.16	-52.09	-13.00	-39.09

Table 7-32. Radiated Spurious Data (GPRS Cell – High Channel)

FCC ID: BCGA2379	 <small>Proud to be part of element</small>	PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 101 of 108

WCDMA Cell

Mode:	WCDMA RMC
Channel:	4132
Frequency (MHz):	826.4

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1652.8	-	-	-	-78.96	-0.59	27.45	-67.81	-13.00	-54.81
2479.2	V	400	302	-76.23	3.21	33.98	-61.28	-13.00	-48.28
3305.6	-	-	-	-79.78	4.04	31.26	-63.99	-13.00	-50.99
4132.0	-	-	-	-78.80	4.81	33.01	-62.24	-13.00	-49.24
4958.4	-	-	-	-76.32	6.42	37.10	-58.15	-13.00	-45.15

Table 7-33. Radiated Spurious Data (WCDMA Cell – Low Channel)

Mode:	WCDMA RMC
Channel:	4183
Frequency (MHz):	836.6


Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1673.2	-	-	-	-78.93	-0.47	27.60	-67.66	-13.00	-54.66
2509.8	-	-	-	-75.97	2.85	33.88	-61.38	-13.00	-48.38
3346.4	-	-	-	-76.16	4.16	35.00	-60.26	-13.00	-47.26

Table 7-34. Radiated Spurious Data (WCDMA Cell – Mid Channel)

Mode:	WCDMA RMC
Channel:	4233
Frequency (MHz):	846.6

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1693.2	-	-	-	-78.74	0.16	28.42	-66.84	-13.00	-53.84
2539.8	-	-	-	-75.71	2.87	34.16	-61.10	-13.00	-48.10
3386.4	-	-	-	-76.10	4.41	35.31	-59.95	-13.00	-46.95

Table 7-35. Radiated Spurious Data (WCDMA Cell – High Channel)

FCC ID: BCGA2379	 PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device
		Page 102 of 108

7.7 Frequency Tolerance / Temperature Variation

§2.1055, 22.355

Test Overview and Limit

Frequency Tolerance testing is performed in accordance with the guidelines of ANSI C63.26-2015 and TIA-603-E-2016. All port were tested and only the worst case data were reported. The Frequency Tolerance of the transmitter is measured by:

- a.) **Temperature:** The temperature is varied from -30°C to +50°C in 10°C increments using an environmental chamber.
- b.) **Primary Supply Voltage:** The primary supply voltage is varied from 85% to 115% of the nominal value for non hand-carried battery and AC powered equipment. For hand-carried, battery-powered equipment, primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacturer.

For Part 22, the Frequency Tolerance of the transmitter shall be maintained within $\pm 0.00025\%$ (± 2.5 ppm) of the center frequency.

Test Procedure Used

ANSI C63.26 2015

TIA-603-E-2016

Test Settings

- The carrier frequency of the transmitter is measured at room temperature (20°C to provide a reference).
- The equipment is turned on in a “standby” condition for fifteen minutes before applying power to the transmitter. Measurement of the carrier frequency of the transmitter is made within one minute after applying power to the transmitter.
- Frequency measurements are made at 10°C intervals ranging from -30°C to +50°C. A period of at least one half-hour is provided to allow stabilization of the equipment at each temperature level.

Test Setup

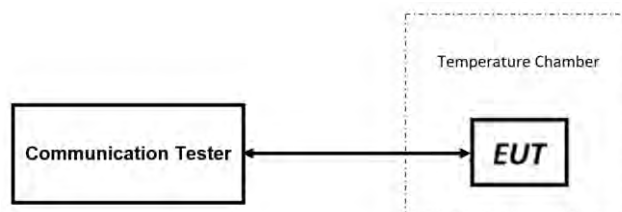



Figure 7-7. Test Instrument & Measurement Setup

Test Notes


- All port were tested and only the worst case data were reported.
- Only the worst-case NR bands with a wider bandwidth compared to LTE have been tested and reported. NR bands that have similar bandwidths as LTE is covered by the LTE bands.

FCC ID: BCGA2379	 PART 22 MEASUREMENT REPORT		Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 103 of 108

Frequency Tolerance / Temperature Variation

LTE Band 26/5					
		Operating Frequency (Hz):		836,500,000	
		Ref. Voltage (VDC):		3.80	
		Deviation Limit:		± 0.00025% or 2.5 ppm	
Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	- 30	836,499,999	-1	-0.0000001
		- 20	836,499,992	-8	-0.0000009
		- 10	836,500,002	2	0.0000002
		0	836,500,003	3	0.0000004
		+ 10	836,499,998	-2	-0.0000002
		+ 20	836,499,999	-1	-0.0000001
		+ 30	836,499,997	-3	-0.0000004
		+ 40	836,499,996	-4	-0.0000005
		+ 50	836,500,003	3	0.0000003
Battery Endpoint	3.23	+ 20	836,500,003	3	0.0000004


Table 7-36. LTE Band 26/5 Frequency Tolerance Data

FCC ID: BCGA2379	 PART 22 MEASUREMENT REPORT		Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 104 of 108

Frequency Tolerance / Temperature Variation

NR Band n5					
		Operating Frequency (Hz):		836,500,000	
		Ref. Voltage (VDC):		3.80	
		Deviation Limit:		± 0.00025% or 2.5 ppm	
Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	- 30	836,499,862	138	0.0000165
		- 20	836,500,169	-169	-0.0000202
		- 10	836,499,816	184	0.0000220
		0	836,500,004	-4	-0.0000005
		+ 10	836,499,788	212	0.0000253
		+ 20	836,500,194	-194	-0.0000232
		+ 30	836,499,995	5	0.0000006
		+ 40	836,500,179	-179	-0.0000214
		+ 50	836,499,943	57	0.0000068
Battery Endpoint	3.23	+ 20	836,500,102	-102	-0.0000122


Table 7-37. NR Band n5 Frequency Tolerance Data

FCC ID: BCGA2379	 PART 22 MEASUREMENT REPORT		Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 105 of 108

Frequency Tolerance / Temperature Variation

GSM/GPRS Cellular					
		Operating Frequency (Hz):		836,600,000	
		Ref. Voltage (VDC):		3.80	
		Deviation Limit:		± 0.00025% or 2.5 ppm	
Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	- 30	836,599,999	-1	-0.0000001
		- 20	836,599,992	-8	-0.0000009
		- 10	836,600,002	2	0.0000002
		0	836,600,003	3	0.0000004
		+ 10	836,599,998	-2	-0.0000002
		+ 20	836,599,999	-1	-0.0000001
		+ 30	836,599,997	-3	-0.0000004
		+ 40	836,599,996	-4	-0.0000005
		+ 50	836,600,003	3	0.0000003
Battery Endpoint	3.23	+ 20	836,600,003	3	0.0000004


Table 7-38. GSM/GPRS Cell Frequency Tolerance Data

FCC ID: BCGA2379	 PART 22 MEASUREMENT REPORT		Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 106 of 108

Frequency Tolerance / Temperature Variation


WCDMA Cellular					
		Operating Frequency (Hz):		836,600,000	
		Ref. Voltage (VDC):		3.80	
		Deviation Limit:		± 0.00025% or 2.5 ppm	
Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	- 30	836,599,999	-1	-0.0000001
		- 20	836,599,992	-8	-0.0000009
		- 10	836,600,002	2	0.0000002
		0	836,600,003	3	0.0000004
		+ 10	836,599,998	-2	-0.0000002
		+ 20	836,599,999	-1	-0.0000001
		+ 30	836,599,997	-3	-0.0000004
		+ 40	836,599,996	-4	-0.0000005
		+ 50	836,600,003	3	0.0000003
Battery Endpoint	3.23	+ 20	836,600,003	3	0.0000004

Table 7-39. WCDMA Cell Frequency Tolerance Data

FCC ID: BCGA2379	 PART 22 MEASUREMENT REPORT		Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device	Page 107 of 108

8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the Apple **Tablet Device** **FCC ID: BCGA2379** complies with all the requirements of Part 22 of the FCC rules.

FCC ID: BCGA2379	 PART 22 MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N: 1C2101020005-02-R1.BCG	Test Dates: 12/15/2020 - 02/27/2021	EUT Type: Tablet Device
Page 108 of 108		