

PART 22 MEASUREMENT REPORT

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

Date of Testing:
 03/15/2022 - 06/20/2022
Test Report Issue Date:
 07/06/2022
Test Site/Location:
 Element, Columbia, MD, USA
Test Report Serial No.:
 1M2204040049-04-R1.C3K

FCC ID:	C3K1997
Applicant Name:	Microsoft Corporation

Application Type: Certification
Model: 1997
EUT Type: Portable Computing Device
FCC Classification: PCS Licensed Transmitter (PCB)
FCC Rule Part: 22
Test Procedure(s): ANSI C63.26-2015, KDB 648474 D03 v01r04

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

Note: This revised Test Report (S/N: 1M2204040049-04-R1.C3K) supersedes and replaces the previously issued test report on the same subject device for the same type of testing as indicated. Please discard or destroy the previously issued test report(s) and dispose of it accordingly.

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



RJ Ortanez
 Executive Vice President



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Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	ERP		EIRP		Emission Designator
				Max. Power [W]	Max. Power [dBm]	Max. Power [W]	Max. Power [dBm]	
WCDMA	N/A	Spread Spectrum	826.4 - 846.6	0.110	20.43	0.181	22.58	4M18F9W
LTE Band 26/5	15MHz (Band 26 only)	QPSK	831.5 - 841.5	0.142	21.51	0.232	23.66	13M5G7D
		16QAM	831.5 - 841.5	0.116	20.64	0.190	22.79	13M5W7D
	10 MHz	QPSK	829.0 - 844.0	0.139	21.44	0.229	23.59	9M00G7D
		16QAM	829.0 - 844.0	0.118	20.73	0.194	22.88	8M98W7D
	5 MHz	QPSK	826.5 - 846.5	0.141	21.50	0.232	23.65	4M52G7D
		16QAM	826.5 - 846.5	0.123	20.89	0.201	23.04	4M53W7D
	3 MHz	QPSK	825.5 - 847.5	0.138	21.41	0.227	23.56	2M70G7D
		16QAM	825.5 - 847.5	0.120	20.81	0.198	22.96	2M70W7D
	1.4 MHz	QPSK	824.7 - 848.3	0.137	21.36	0.224	23.51	1M09G7D
		16QAM	824.7 - 848.3	0.117	20.68	0.192	22.83	1M10W7D
NR Band n5	20 MHz	$\pi/2$ BPSK	834.0 - 839.0	0.094	19.75	0.155	21.90	17M9G7D
		QPSK	834.0 - 839.0	0.098	19.90	0.160	22.05	19M0G7D
		16QAM	834.0 - 839.0	0.086	19.37	0.142	21.52	19M0W7D
	15 MHz	$\pi/2$ BPSK	831.5 - 841.5	0.095	19.79	0.156	21.94	13M4G7D
		QPSK	831.5 - 841.5	0.095	19.78	0.156	21.93	14M1G7D
		16QAM	831.5 - 841.5	0.091	19.61	0.150	21.76	14M2W7D
	10 MHz	$\pi/2$ BPSK	829.0 - 844.0	0.095	19.76	0.155	21.91	9M03G7D
		QPSK	829.0 - 844.0	0.096	19.82	0.157	21.97	9M32G7D
		16QAM	829.0 - 844.0	0.090	19.52	0.147	21.67	9M34W7D
	5 MHz	$\pi/2$ BPSK	826.5 - 846.5	0.097	19.85	0.159	22.00	4M51G7D
QPSK		826.5 - 846.5	0.098	19.90	0.160	22.05	4M51G7D	
16QAM		826.5 - 846.5	0.089	19.52	0.147	21.67	4M50W7D	

EUT Overview

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1.0 INTRODUCTION

1.1 Scope

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

1.2 Element Test Location

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

1.3 Test Facility / Accreditations

Measurements were performed at Element lab located in Columbia, MD 21046, U.S.A.

- Element Washington DC LLC is an ISO 17025-2017 accredited test facility under the American Association for Laboratory Accreditation (A2LA) with Certificate number 2041.01 for Specific Absorption Rate (SAR), Hearing Aid Compatibility (HAC) testing, where applicable, and Electromagnetic Compatibility (EMC) testing for FCC and Innovation, Science, and Economic Development Canada rules.
- Element Washington DC LLC TCB is a Telecommunication Certification Body (TCB) accredited to ISO/IEC 17065-2012 by A2LA (Certificate number 2041.03) in all scopes of FCC Rules and ISED Standards (RSS).
- Element Washington DC LLC facility is a registered (2451B) test laboratory with the site description on file with ISED.
- Element Washington DC LLC is a Recognized U.S. Certification Assessment Body (CAB # US0110) for ISED Canada as designated by NIST under the U.S. and Canada Mutual Recognition Agreement.

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2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **Portable Computing Device FCC ID: C3K1997**. The test data contained in this report pertains only to the emissions due to the EUT's licensed transmitters that operate under the provisions of Part 22 and RSS-132.

Test Device Serial No.: JP220, JS220, 5S220, JT220

2.2 Device Capabilities

This device contains the following capabilities:

850/1900 WCDMA/HSPA, Multi-band LTE, 5G NR (FR1 and FR2), 802.11b/g/n/ax WLAN, 802.11a/n/ac/ax UNII (5, 6GHz), Bluetooth (1x, EDR, LE)

2.3 Test Configuration

The EUT was tested per the guidance of ANSI C63.26-2015. See Section 7.0 of this test report for a description of the radiated and antenna port conducted emissions tests.

2.4 Software and Firmware

Testing was performed on device(s) using software/firmware version 1.930.0 on the EUT.

2.5 EMI Suppression Device(s)/Modifications

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

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3.0 DESCRIPTION OF TESTS

3.1 Evaluation Procedure

The measurement procedures described in the “American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services” (ANSI C63.26-2015) were used in the measurement of the EUT.

Deviation from Measurement Procedure.....None

3.2 Radiated Power and Radiated Spurious Emissions

The radiated test facilities consisted of an indoor 3 meter semi-anechoic chamber used for final measurements and exploratory measurements, when necessary. The measurement area is contained within the semi-anechoic chamber which is shielded from any ambient interference. The test site inside the chamber is a 6m x 5.2m elliptical, obstruction-free area in accordance with Figure 5.7 of Clause 5 in ANSI C63.4-2014. Absorbers are arranged on the floor between the turn table and the antenna mast in such a way so as to maximize the reduction of reflections for measurements above 1GHz. For measurements below 1GHz, the absorbers are removed. A raised turntable is used for radiated measurement. The turn table is a continuously rotatable, remote-controlled, metallic turntable and 2 meters (6.56 ft.) in diameter. The turn table is flush with the raised floor of the chamber in order to maintain its function as a ground plane. An 80cm tall test table made of Styrodur is placed on top of the turn table. A Styrodur pedestal is placed on top of the test table to bring the total table height to 1.5m.

The equipment under test was transmitting while connected to its integral antenna and is placed on a turntable 3 meters from the receive antenna. The receive antenna height is adjusted between 1 and 4 meter height, the turntable is rotated through 360 degrees, and the EUT is manipulated through all orthogonal planes representative of its typical use to achieve the highest reading on the receive spectrum analyzer.

For radiated power measurements, substitution method is used per the guidance of ANSI C63.26-2015. For emissions below 1GHz, a half-wave dipole is substituted in place of the EUT. For emissions above 1GHz, a horn antenna is substituted in place of the EUT. The substitute antenna is driven by a signal generator with the level of the signal generator being adjusted to obtain the same receive spectrum analyzer level previously recorded from the spurious emission from the EUT. The power of the emission is calculated using the following formula:

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

where P_d is the dipole equivalent power, P_g is the generator output into the substitution antenna, and the antenna gain is the gain of the substitute antenna used relative to either a half-wave dipole (dBd) or an isotropic source (dBi). The substitute level is equal to $P_g \text{ [dBm]} - \text{cable loss [dB]}$.

For radiated spurious emissions measurements, the field strength conversion method is used per the formulas in Section 5.2.7 of ANSI C63.26-2015. Field Strength (EIRP) is calculated using the following formulas:

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

And

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

All radiated measurements are performed in a chamber that meets the site requirements per ANSI C63.4-2014. Additionally, radiated emissions below 30MHz are also validated on an Open Area Test Site to assert correlation with the chamber measurements per the requirements of KDB 414788 D01 v01r01.

Radiated power and radiated spurious emission levels are investigated with the receive antenna horizontally and vertically polarized per ANSI C63.26-2015.

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4.0 MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.4-2014. All measurement uncertainty values are shown with a coverage factor of $k = 2$ to indicate a 95% level of confidence. The measurement uncertainty shown below meets or exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

Contribution	Expanded Uncertainty (\pm dB)
Conducted Bench Top Measurements	1.13
Radiated Disturbance (<1GHz)	4.98
Radiated Disturbance (>1GHz)	5.07
Radiated Disturbance (>18GHz)	5.09

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5.0 TEST EQUIPMENT CALIBRATION DATA

Test Equipment Calibration is traceable to the National Institute of Standards and Technology (NIST). Measurements antennas used during testing were calibrated in accordance to the requirements of ANSI C63.5-2017.

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
-	AP2	EMC Cable and Switch System	1/4/2022	Annual	1/4/2023	AP2
-	ETS	EMC Cable and Switch System	12/9/2021	Annual	12/9/2022	ETS
-	LTx1	Licensed Transmitter Cable Set	12/19/2021	Annual	12/19/2022	LTx1
-	LTx2	Licensed Transmitter Cable Set	12/19/2021	Annual	12/19/2022	LTx2
Anritsu	MT8821C	Radio Communication Analyzer	N/A			6201525694
Emco	3115	Horn Antenna (1-18GHz)	6/18/2020	Biennial	6/18/2022	9704-5182
Keysight Technologies	N9020A	MXA Signal Analyzer	3/15/2022	Annual	3/15/2023	MY54500644
Keysight Technologies	N9030A	PXA Signal Analyzer (44GHz)	7/21/2021	Annual	7/21/2022	MY49430494
Keysight Technologies	N9038A	MXE EMI Receiver	1/21/2022	Annual	1/21/2023	MY51210133
Rohde & Schwarz	CMW500	Radio Communication Tester	N/A			112347
Rohde & Schwarz	ESU26	EMI Test Receiver (26.5GHz)	8/3/2021	Annual	8/3/2022	100342
Rohde & Schwarz	ESU40	EMI Test Receiver (40GHz)	5/25/2022	Annual	5/25/2022	100348
Rohde & Schwarz	ESW44	EMI Test Receiver 2Hz to 44 GHz	3/28/2022	Annual	3/28/2023	101716
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	7/27/2020	Biennial	7/27/2022	A051107

Table 5-1. Test Equipment

Notes:

1. For equipment listed above that has a calibration date or calibration due date that falls within the test date range, care was taken to ensure that this equipment was used after the calibration date and before the calibration due date.
2. Equipment with a calibration date of "N/A" shown in this list was not used to make direct calibrated measurements.

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6.0 SAMPLE CALCULATIONS

WCDMA Emission Designator

Emission Designator = 4M16F9W

WCDMA BW = 4.16 MHz
 F = Frequency Modulation
 9 = Composite Digital Info
 W = Combination (Audio/Data)

QPSK Modulation

Emission Designator = 8M62G7D

LTE BW = 8.62 MHz
 G = Phase Modulation
 7 = Quantized/Digital Info
 D = Data transmission, telemetry, telecommand

QAM Modulation

Emission Designator = 8M45W7D

LTE BW = 8.45 MHz
 W = Amplitude/Angle Modulated
 7 = Quantized/Digital Info
 D = Data transmission, telemetry, telecommand

Spurious Radiated Emission

Example: Spurious emission at 3700.40 MHz

The receive spectrum analyzer reading at 3 meters with the EUT on the turntable was -81.0 dBm. The gain of the substituted antenna is 8.1 dBi. The signal generator connected to the substituted antenna terminals is adjusted to produce a reading of -81.0 dBm on the spectrum analyzer. The loss of the cable between the signal generator and the terminals of the substituted antenna is 2.0 dB at 3700.40 MHz. So 6.1 dB is added to the signal generator reading of -30.9 dBm yielding -24.80 dBm. The fundamental EIRP was 25.50 dBm so this harmonic was 25.50 dBm $- (-24.80) = 50.3$ dBc.

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7.0 TEST RESULTS

7.1 Summary

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

Test Condition	Test Description	FCC Part Section(s)	RSS Section(s)	Test Limit	Test Result	Reference
CONDUCTED	Transmitter Conducted Output Power	2.1046(a), 2.1046(c)	RSS-Gen(6.12)	N/A	PASS	Section 7.2
	Occupied Bandwidth	2.1049(h)	RSS-Gen(6.7)	N/A	PASS	Section 7.3
	Conducted Band Edge / Spurious Emissions	2.1051, 22.917(a)	RSS-Gen(6.13), RSS-132(5.5)	$\geq 43 + 10 \log (P[\text{Watts}])$ dB of attenuation below transmitter power	PASS	Sections 7.4, 7.5
	Peak-to-Average Ratio	N/A	RSS-132(5.4)	≤ 13 dB	PASS	Section 7.6
	Frequency Stability	2.1055, 22.355	RSS-Gen(6.11), RSS-132(5.3)	The carrier frequency of the transmitter must be maintained within the 2.5ppm	PASS	Section 7.9
RADIATED	Effective Radiated Power / Equivalent Isotropic Radiated Power	22.913(a)(5)	RSS-Gen(6.12), RSS-132(5.4)	< 7 Watts max. ERP	PASS	Section 7.7
	Radiated Spurious Emissions	2.1053, 22.917(a)	RSS-Gen(7.3), RSS-132(5.6)	$> 43 + 10 \log_{10} (P[\text{Watts}])$ for all out-of-band emissions	PASS	Section 7.8

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 is EMC Software Tool v1.0.

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7.2 Conducted Power Output Data

Test Overview

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

Test Procedure Used

ANSI C63.26-2015 – Section 5.2

Test Settings

1. Detector = RMS
2. Trace mode = trace average for continuous emissions, max hold for pulse emissions
3. Sweep time = auto couple
4. The trace was allowed to stabilize
5. Please see test notes below for RBW and VBW settings

Test Setup

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

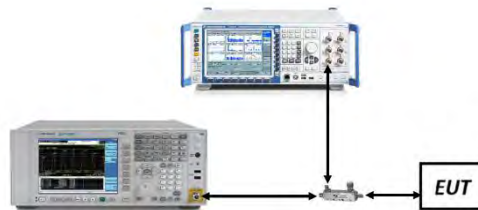


Figure 7-1. Test Instrument & Measurement Setup

Test Notes

1. Uplink carrier aggregation is only supported in this EUT while operating in Power Class 3.
2. Conducted power measurements were evaluated 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.
3. Compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater for frequencies less than 1 GHz and 1 MHz or greater for frequencies greater than 1 GHz.
4. All other conducted power measurements are contained in the RF exposure report for this filing.

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Power State	Band	Bandwidth (PCC + SCC)	PCC				SCC				ULCA Tx. Power [dBm]		
			Modulation	UL Channel	UL Frequency	UL # RB	UL RB Offset	Modulation	UL Channel	UL Frequency		UL # RB	UL RB Offset
Max	LTE B5	10MHz + 10MHz	QPSK	20450	829.0	1	49	QPSK	20549	838.9	1	0	24.97
				20475	831.5	1	49		20574	841.4	1	0	24.9
				20600	844.0	1	0		20501	834.1	1	49	24.93
			16-QAM	20450	829	50	0	16-QAM	20549	838.9	50	0	22.67
				20450	829	50	0		20549	838.9	50	0	21.57
				20450	829	50	0		64-QAM	20549	838.9	50	0

Table 7-2. Conducted Power Output Data (ULCA LTE Band 5)

EN-DC configuration

NR (SCS 15kHz)						LTE						NR Conducted Power [dBm]	LTE Conducted Power [dBm]	EN-DC Total Tx. Power [dBm]
NR Band	NR Bandwidth [MHz]	NR Channel	NR Frequency [MHz]	Mod.	NR RB#/Offset	LTE Band	LTE Bandwidth [MHz]	LTE Channel	LTE Frequency [MHz]	Mod.	LTE RB#/Offset			
n5	20	Mid	836.5	QPSK	100/0	B2	20	Mid	1880	QPSK	100/0	19.05	23.23	24.63
				QPSK	100/0					19.11	23.01	24.49		
				QPSK	1/53					18.75	22.99	24.38		
				QPSK	1/53					18.92	23.08	24.49		
				16Q	100/0					18.62	22.85	24.24		

Table 7-3. Conducted Powers (n5-B2)

NR (SCS 15kHz)						LTE						NR Conducted Power [dBm]	LTE Conducted Power [dBm]	EN-DC Total Tx. Power [dBm]
NR Band	NR Bandwidth [MHz]	NR Channel	NR Frequency [MHz]	Mod.	NR RB#/Offset	LTE Band	LTE Bandwidth [MHz]	LTE Channel	LTE Frequency [MHz]	Mod.	LTE RB#/Offset			
n5	20	Mid	836.5	QPSK	100/0	B30	10	Mid	2310	QPSK	50/0	19.25	22.25	24.01
				QPSK	100/0					19.35	22.12	23.96		
				QPSK	1/53					19.20	21.99	23.83		
				QPSK	1/53					19.01	22.15	23.87		
				16Q	100/0					18.96	22.00	23.75		

Table 7-4. Conducted Powers (n5-B30)

NR (SCS 15kHz)						LTE						NR Conducted Power [dBm]	LTE Conducted Power [dBm]	EN-DC Total Tx. Power [dBm]
NR Band	NR Bandwidth [MHz]	NR Channel	NR Frequency [MHz]	Mod.	NR RB#/Offset	LTE Band	LTE Bandwidth [MHz]	LTE Channel	LTE Frequency [MHz]	Mod.	LTE RB#/Offset			
n5	20	Mid	836.5	QPSK	100/0	B48	20	Mid	3625	QPSK	100/0	20.55	19.99	23.29
				QPSK	100/0					20.45	20.25	23.36		
				QPSK	1/53					20.65	20.10	23.39		
				QPSK	1/53					20.52	19.75	23.16		
				16Q	100/0					19.95	19.52	22.75		

Table 7-5. Conducted Powers (n5-B48)

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7.3 Occupied Bandwidth

Test Overview

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

Test Procedure Used

ANSI C63.26-2015 – Section 5.4.4

Test Settings

1. The signal analyzer's automatic bandwidth measurement capability was used to perform the 99% occupied bandwidth and the 26dB bandwidth. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
2. RBW = 1 – 5% of the expected OBW
3. VBW \geq 3 x RBW
4. Detector = Peak
5. Trace mode = max hold
6. Sweep = auto couple
7. The trace was allowed to stabilize
8. If necessary, steps 2 – 7 were repeated after changing the RBW such that it would be within 1 – 5% of the 99% occupied bandwidth observed in Step 7

Test Setup

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

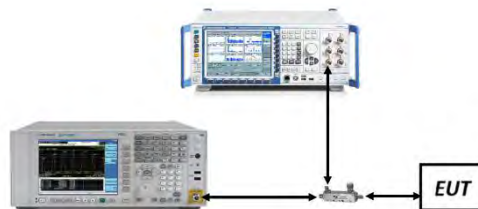


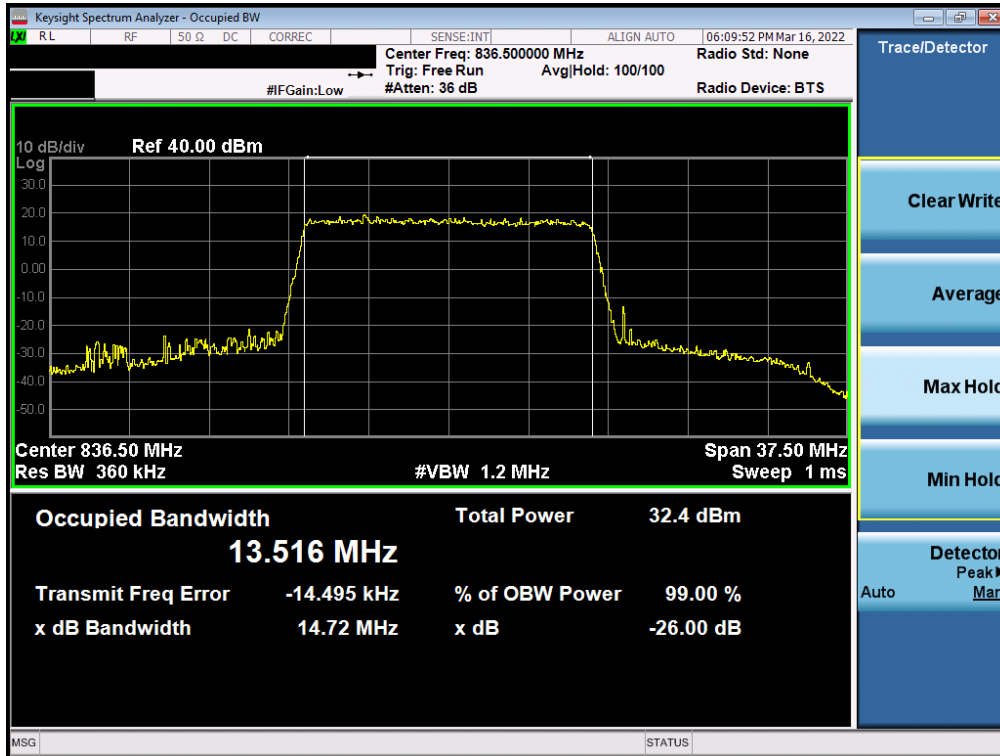
Figure 7-2. Test Instrument & Measurement Setup

Test Notes

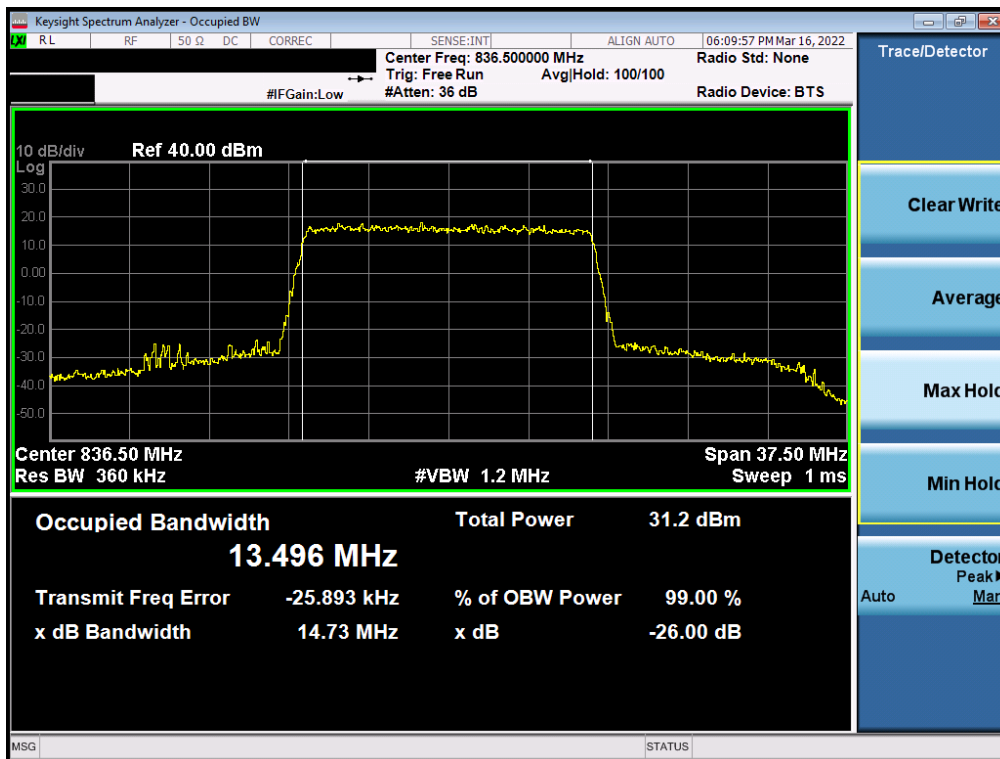
None.

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LTE Band 26/5

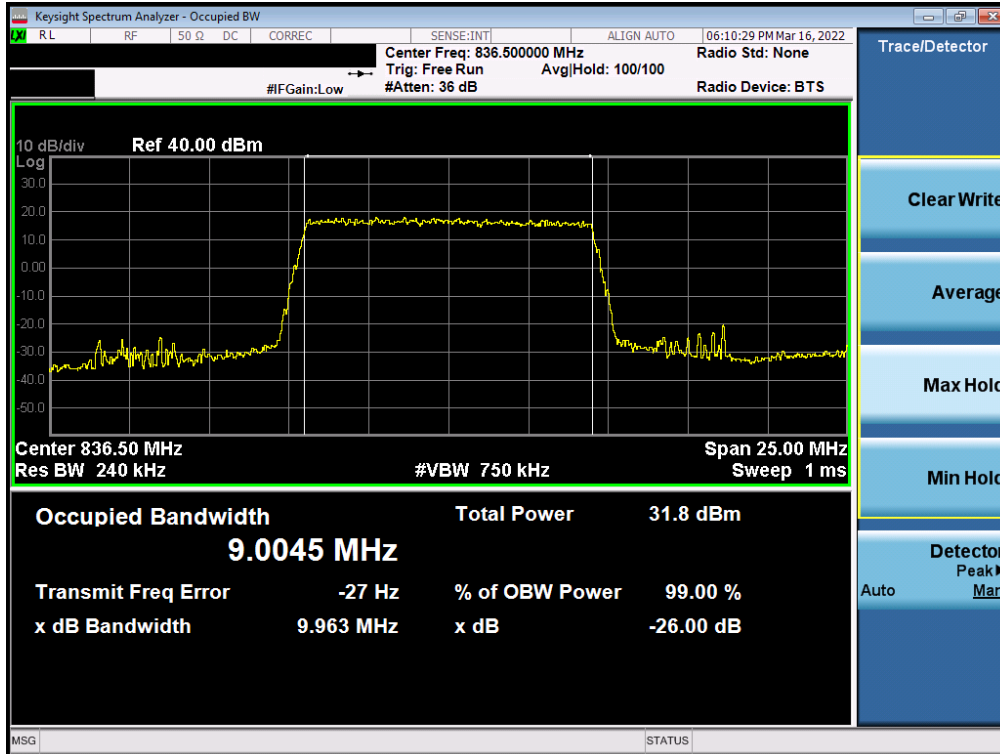


Plot 7-1. Occupied Bandwidth Plot (LTE Band 26 - 15MHz QPSK - Full RB)

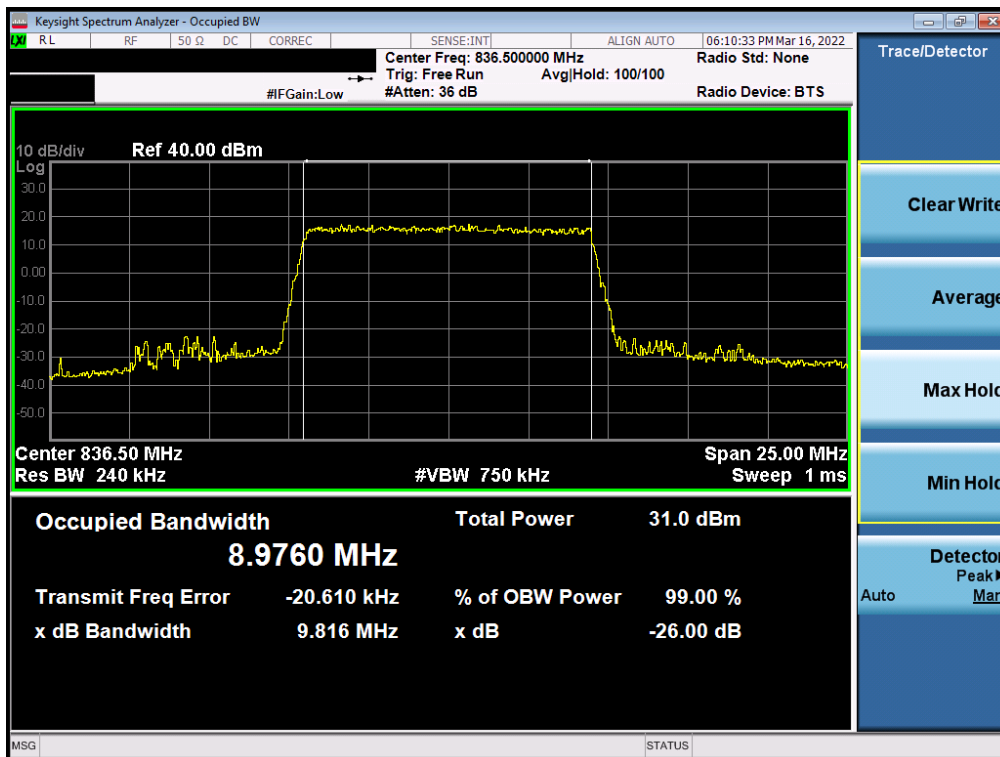


Plot 7-2. Occupied Bandwidth Plot (LTE Band 26 - 15MHz 16-QAM - Full RB)

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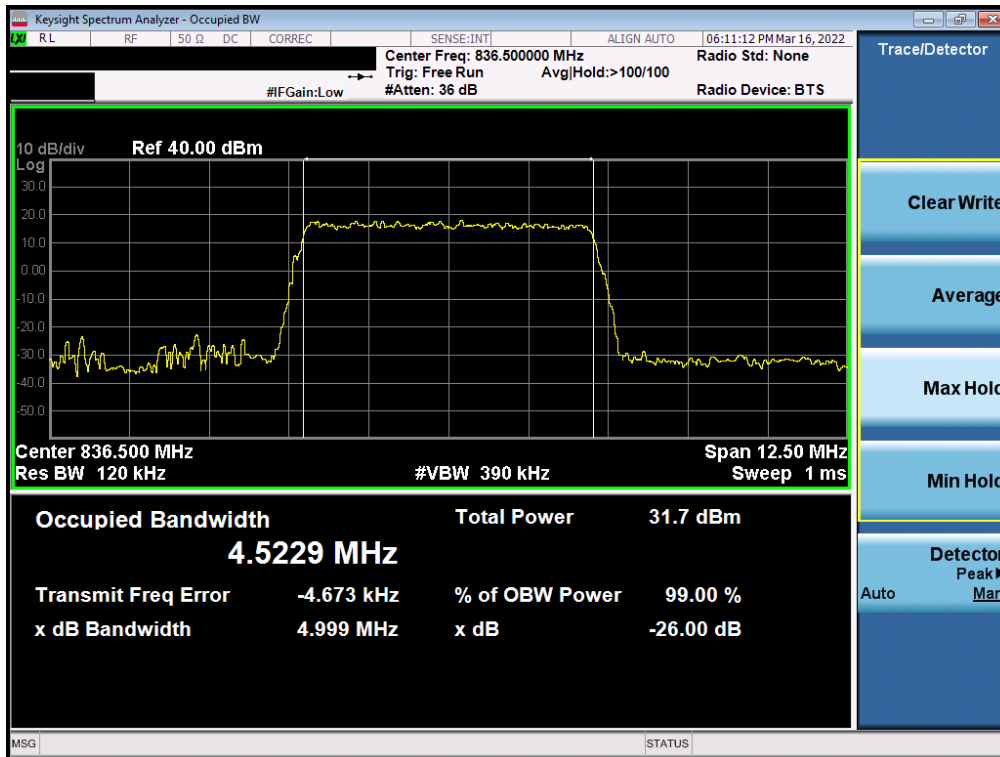


Plot 7-3. Occupied Bandwidth Plot (LTE Band 26/5 - 10MHz QPSK - Full RB)

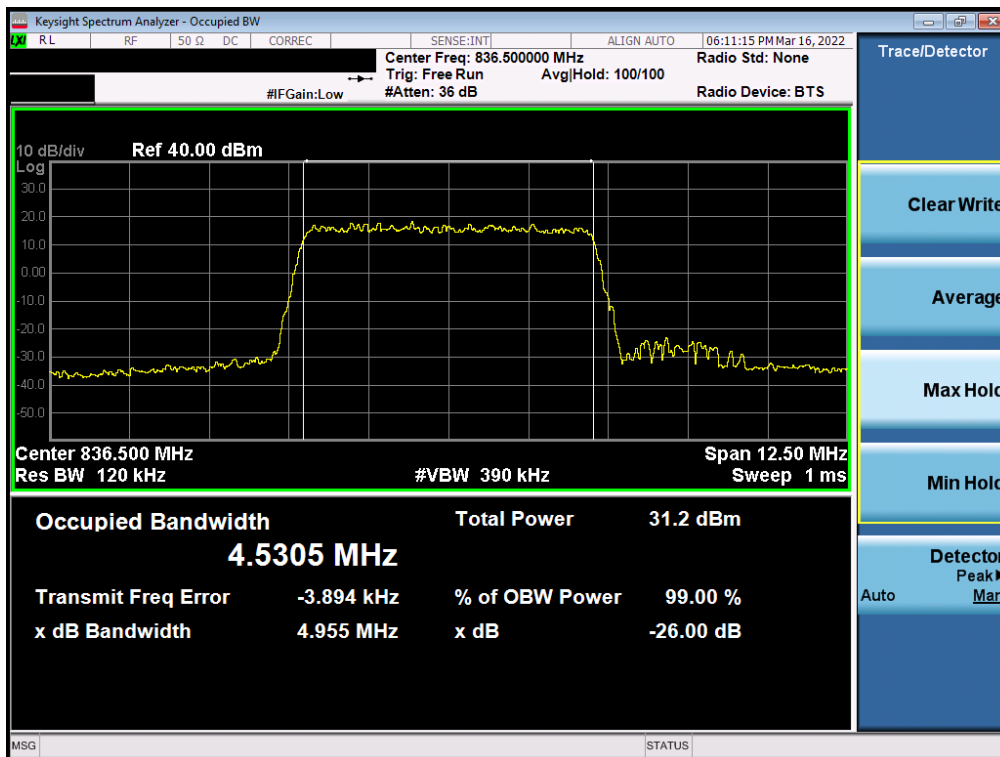


Plot 7-4. Occupied Bandwidth Plot (LTE Band 26/5 - 10MHz 16-QAM - Full RB)

FCC ID: C3K1997	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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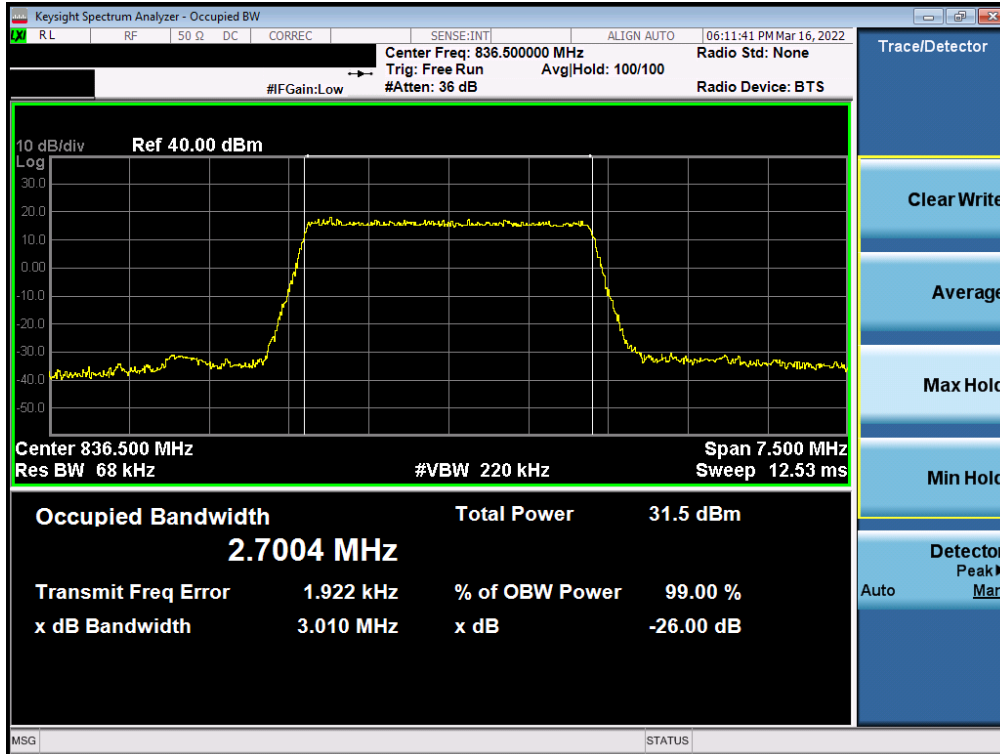


Plot 7-5. Occupied Bandwidth Plot (LTE Band 26/5 - 5MHz QPSK - Full RB)

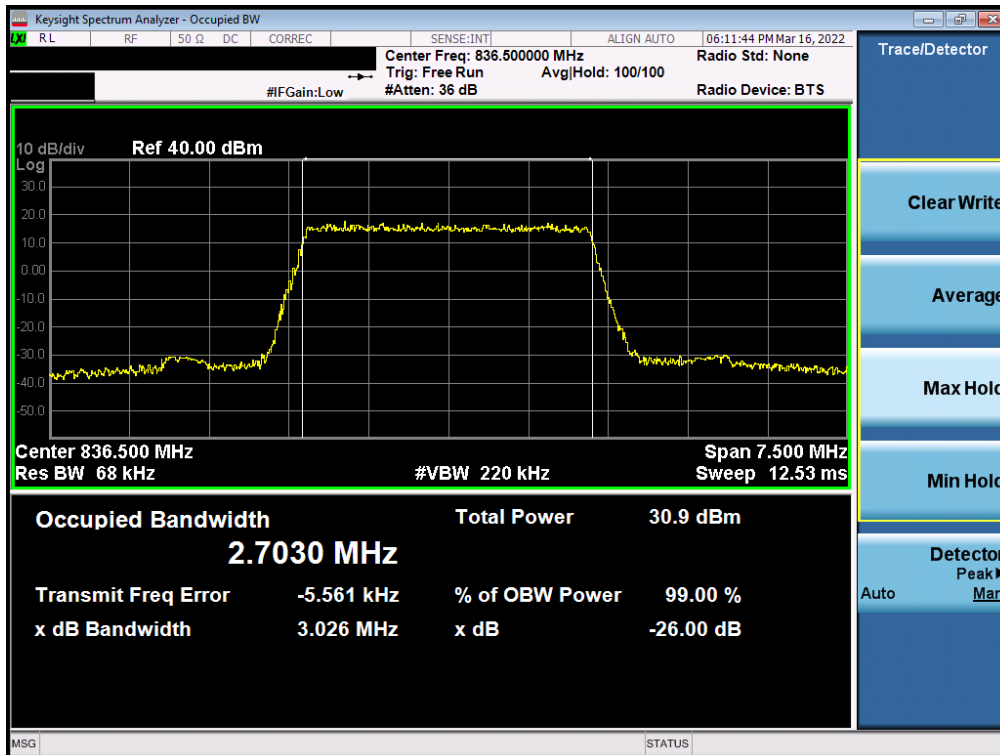


Plot 7-6. Occupied Bandwidth Plot (LTE Band 26/5 - 5MHz 16-QAM - Full RB)

FCC ID: C3K1997	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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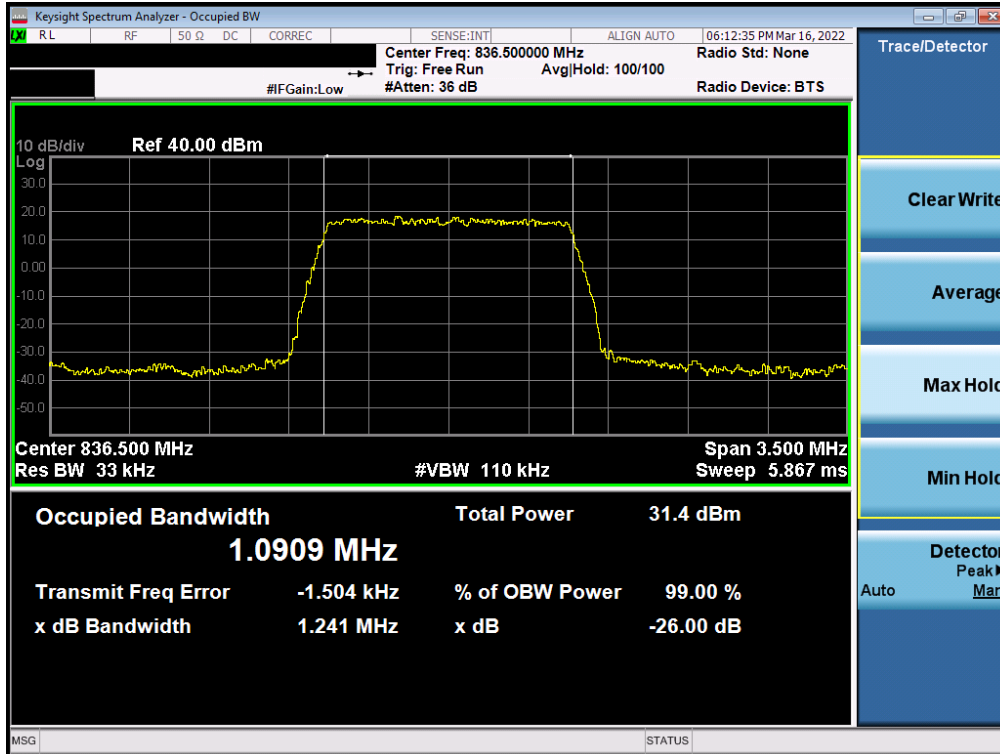


Plot 7-7. Occupied Bandwidth Plot (LTE Band 26/5 - 3MHz QPSK - Full RB)

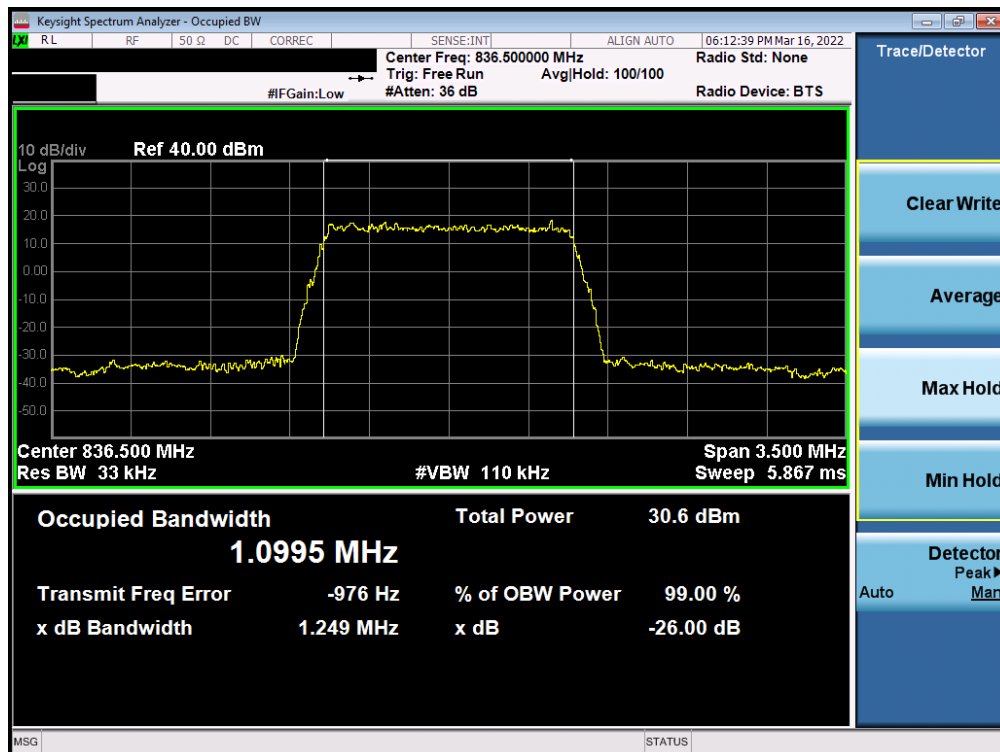


Plot 7-8. Occupied Bandwidth Plot (LTE Band 26/5 - 3MHz 16-QAM - Full RB)

FCC ID: C3K1997	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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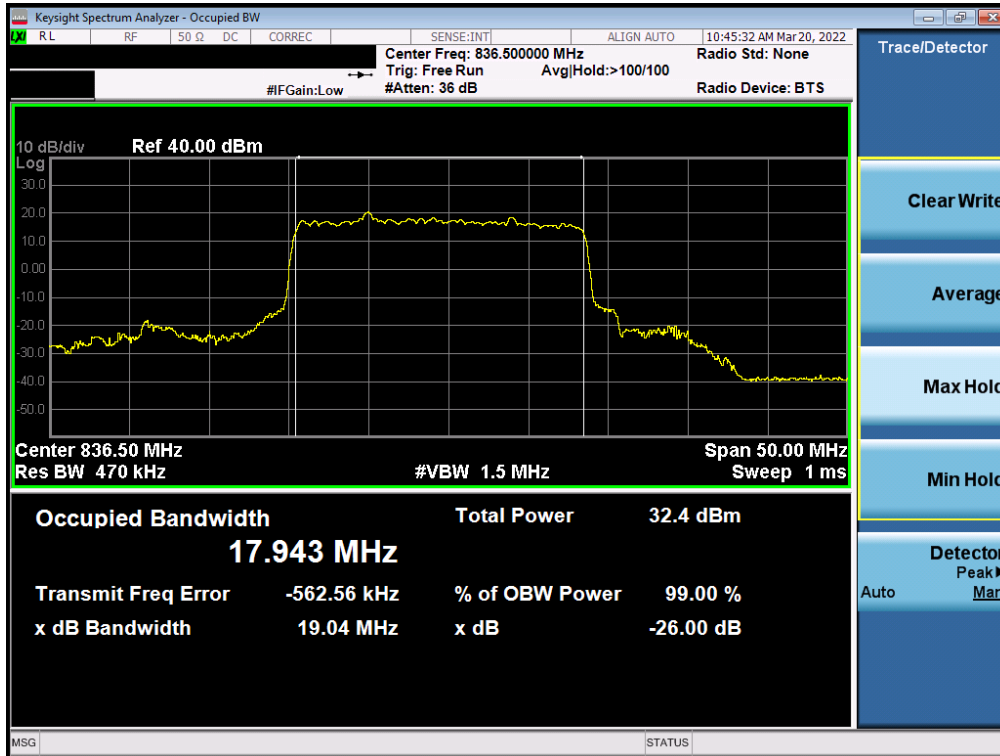
Plot 7-9. Occupied Bandwidth Plot (LTE Band 26/5 - 1.4MHz QPSK - Full RB)



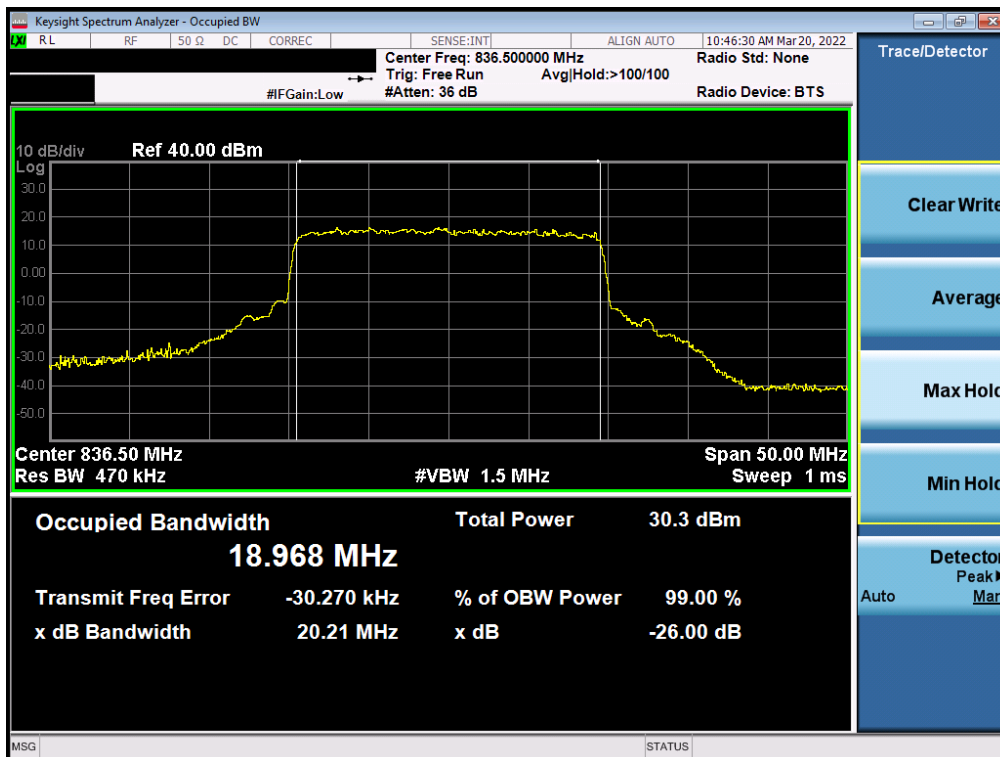
Plot 7-10. Occupied Bandwidth Plot (LTE Band 26/5 - 1.4MHz 16-QAM - Full RB)

FCC ID: C3K1997	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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NR Band n5



Plot 7-11. Occupied Bandwidth Plot (NR Band n5 - 20MHz $\pi/2$ BPSK - Full RB)

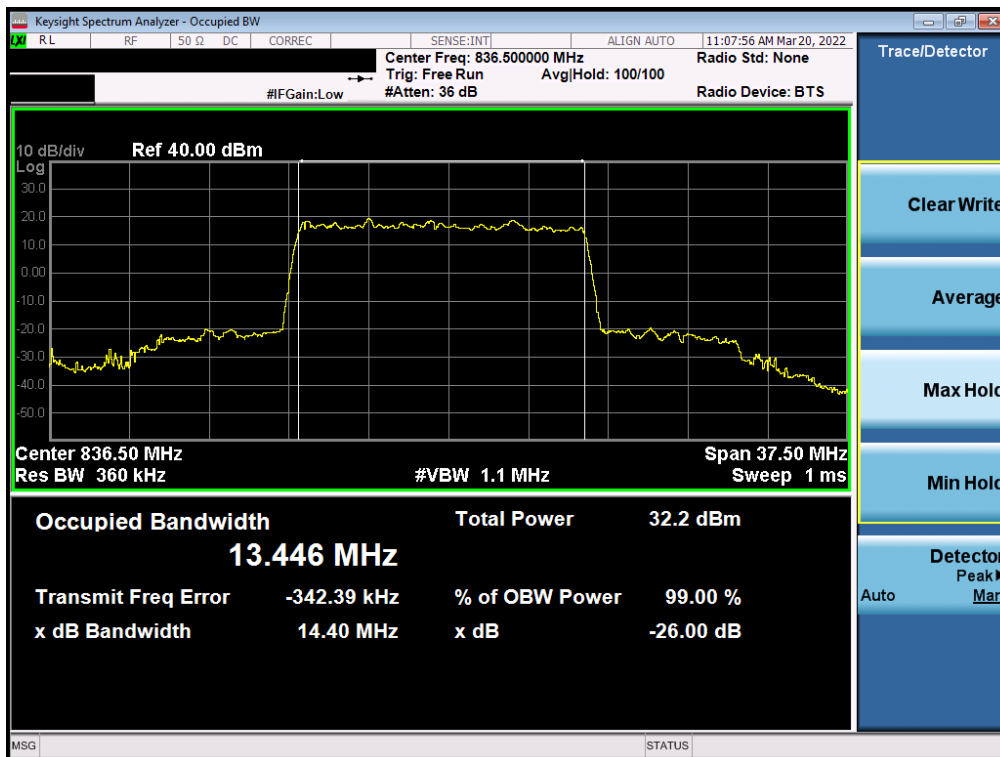


Plot 7-12. Occupied Bandwidth Plot (NR Band n5 - 20MHz QPSK - Full RB)

FCC ID: C3K1997	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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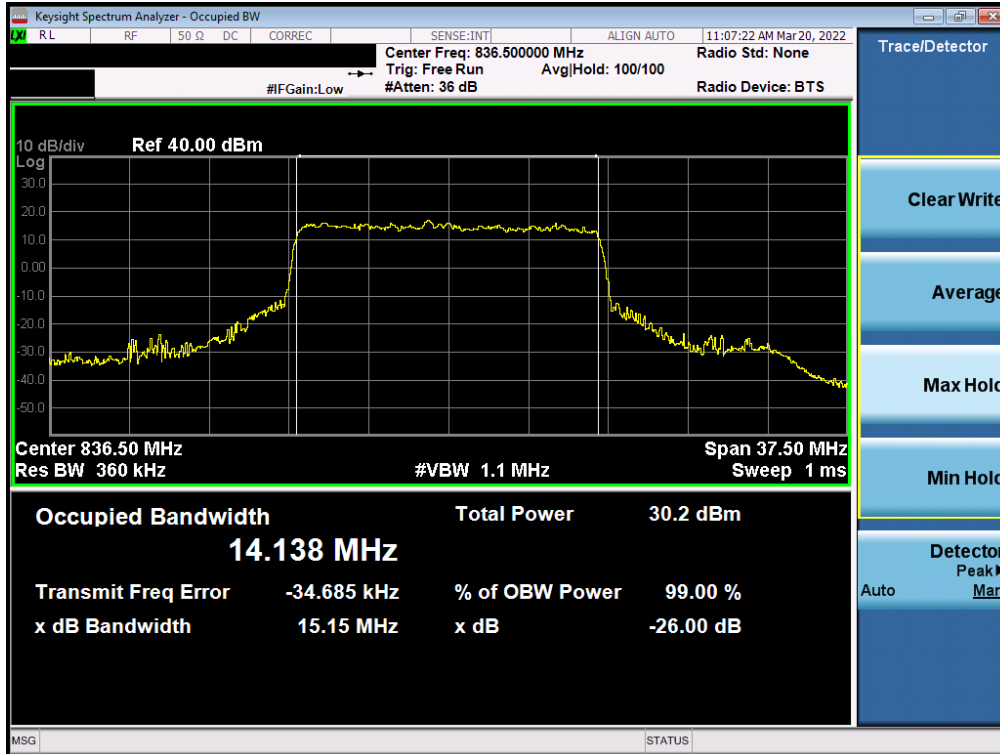


Plot 7-13. Occupied Bandwidth Plot (NR Band n5 - 20MHz 16-QAM - Full RB)

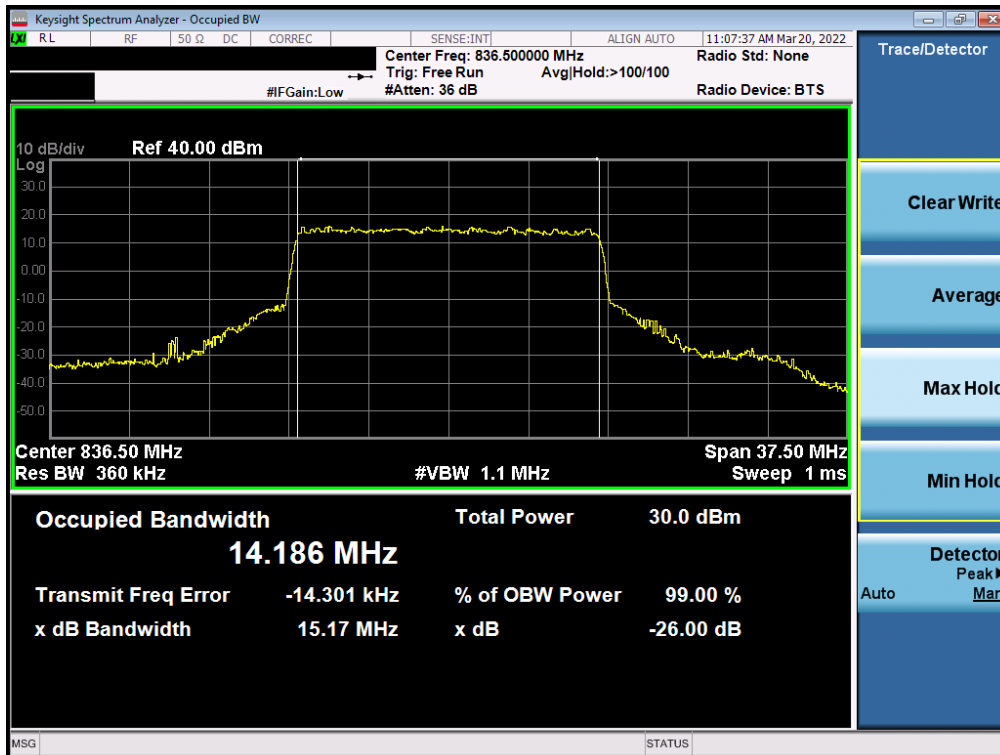


Plot 7-14. Occupied Bandwidth Plot (NR Band n5 - 15MHz $\pi/2$ BPSK - Full RB)

FCC ID: C3K1997	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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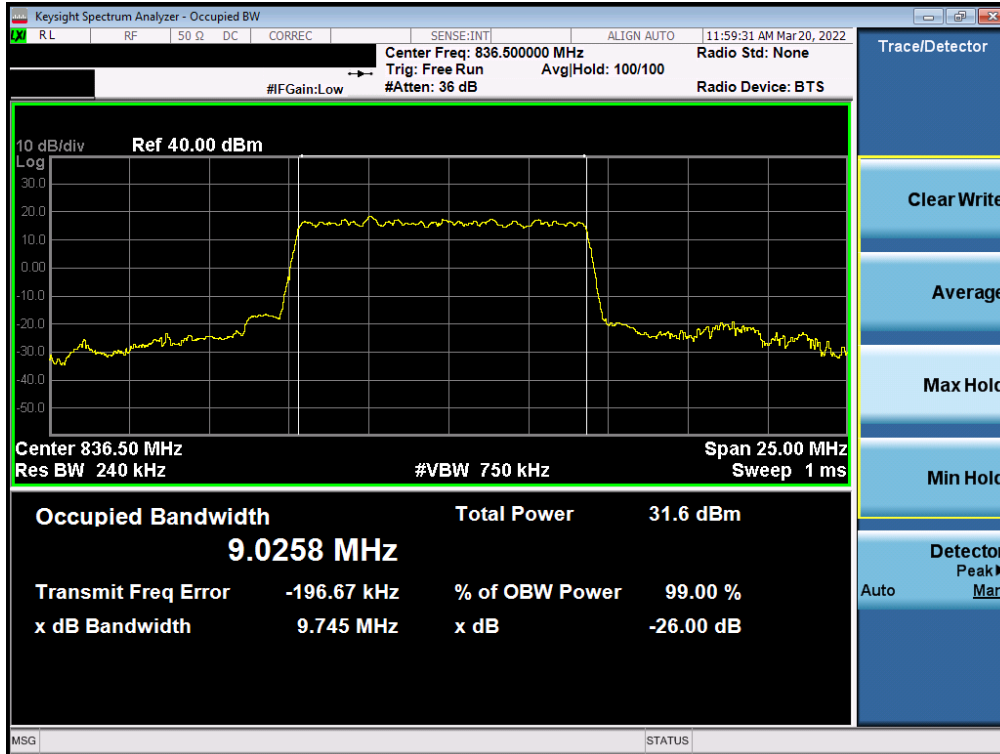


Plot 7-15. Occupied Bandwidth Plot (NR Band n5 - 15MHz QPSK - Full RB)

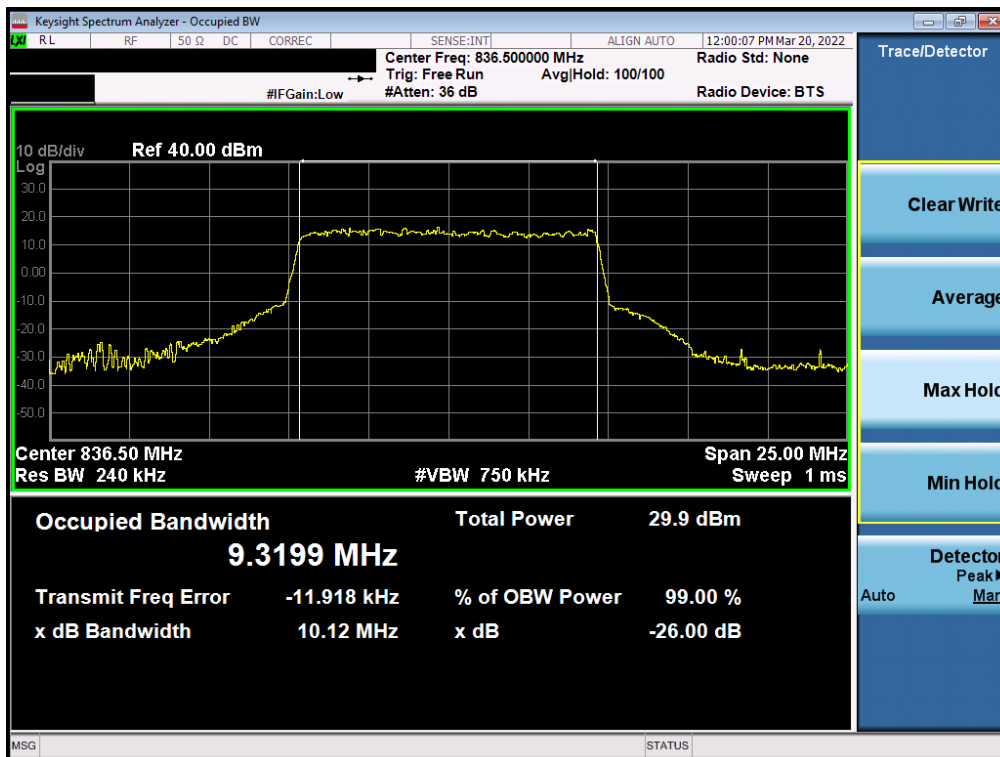


Plot 7-16. Occupied Bandwidth Plot (NR Band n5 - 15MHz 16-QAM - Full RB)

FCC ID: C3K1997	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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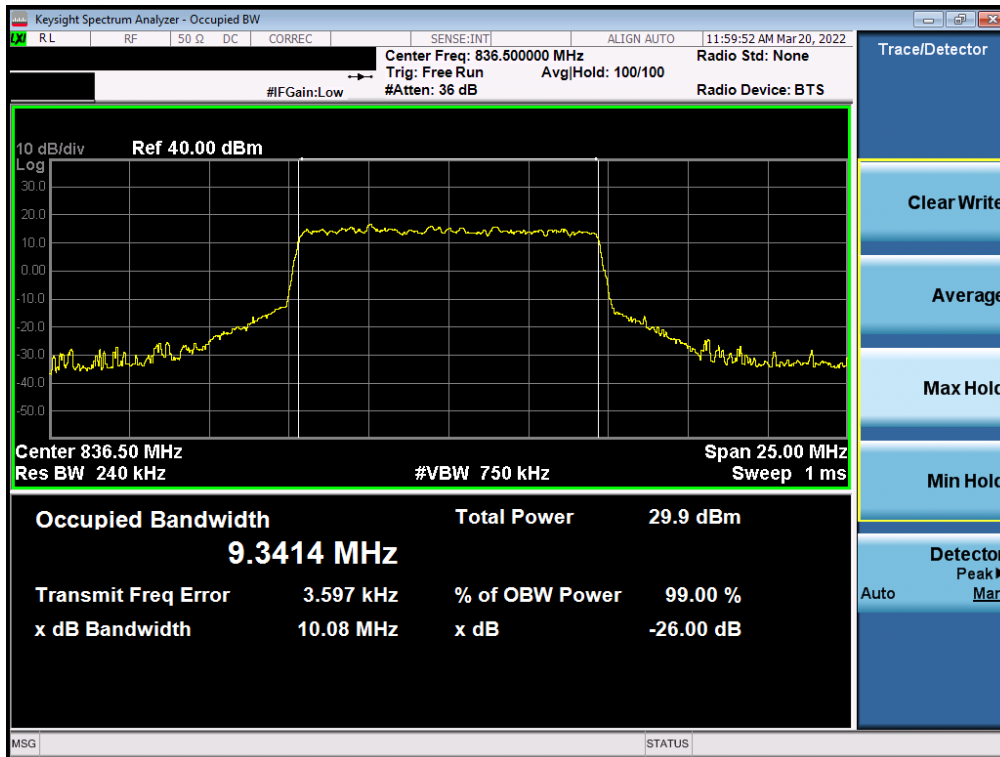


Plot 7-17. Occupied Bandwidth Plot (NR Band n5 - 10MHz $\pi/2$ BPSK - Full RB)

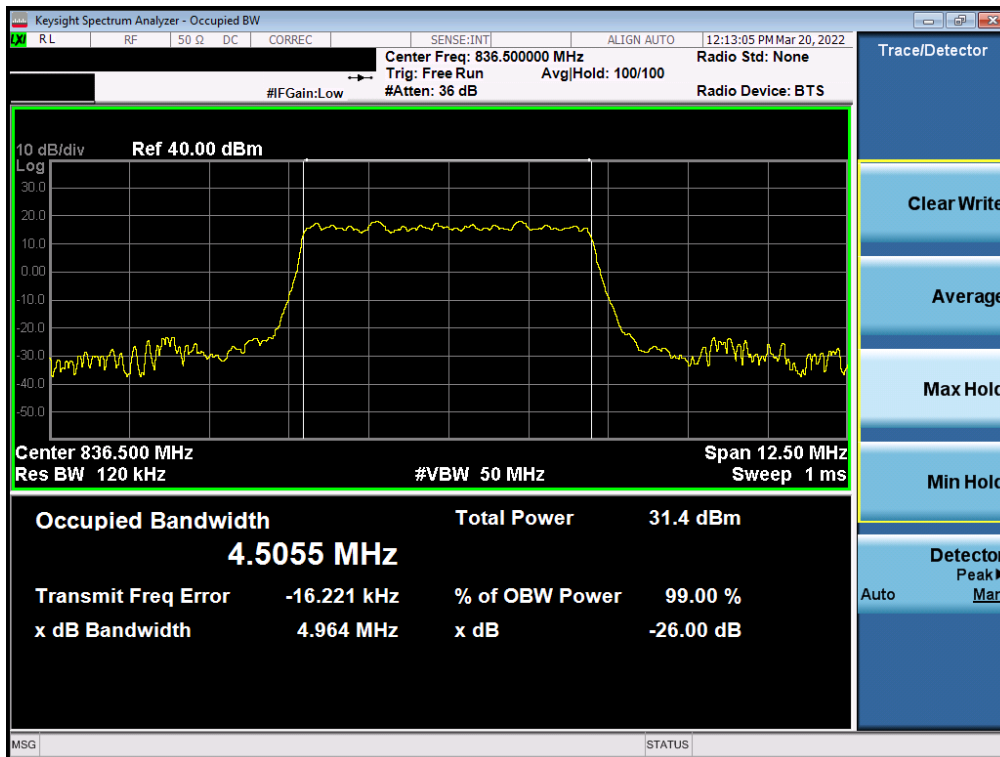


Plot 7-18. Occupied Bandwidth Plot (NR Band n5 - 10MHz QPSK - Full RB)

FCC ID: C3K1997	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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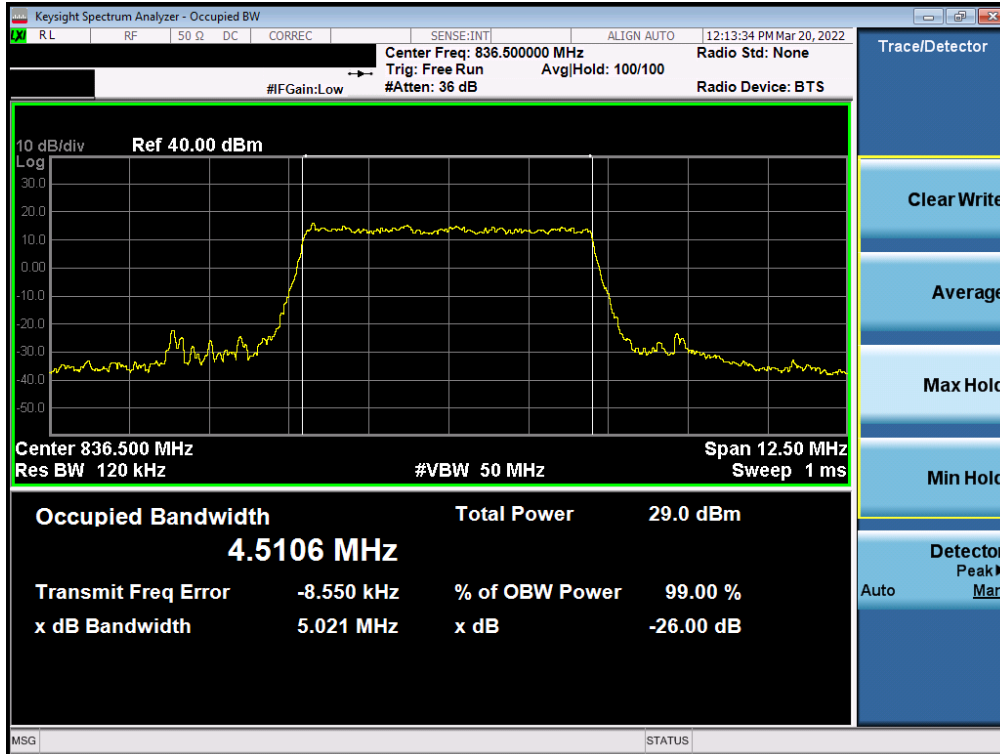


Plot 7-19. Occupied Bandwidth Plot (NR Band n5 - 10MHz 16-QAM - Full RB)

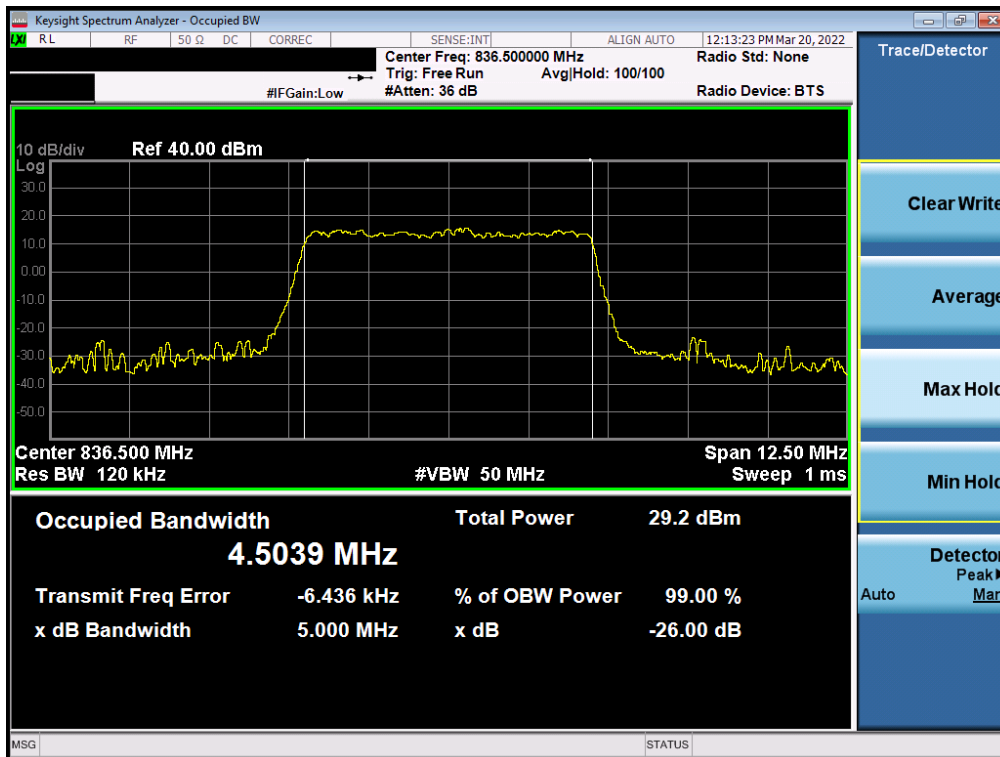


Plot 7-20. Occupied Bandwidth Plot (NR Band n5 - 5MHz $\pi/2$ BPSK - Full RB)

FCC ID: C3K1997	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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Plot 7-21. Occupied Bandwidth Plot (NR Band n5 - 5MHz QPSK - Full RB)



Plot 7-22. Occupied Bandwidth Plot (NR Band n5 - 5MHz 16-QAM - Full RB)

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WCDMA Cell



Plot 7-23. Occupied Bandwidth Plot (WCDMA, Ch. 4183)

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7.4 Spurious and Harmonic Emissions at Antenna Terminal

Test Overview

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

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

Test Procedure Used

ANSI C63.26-2015 – Section 5.7.4

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.

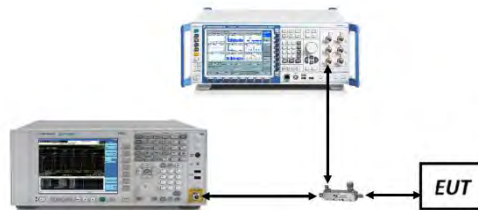


Figure 7-3. Test Instrument & Measurement Setup

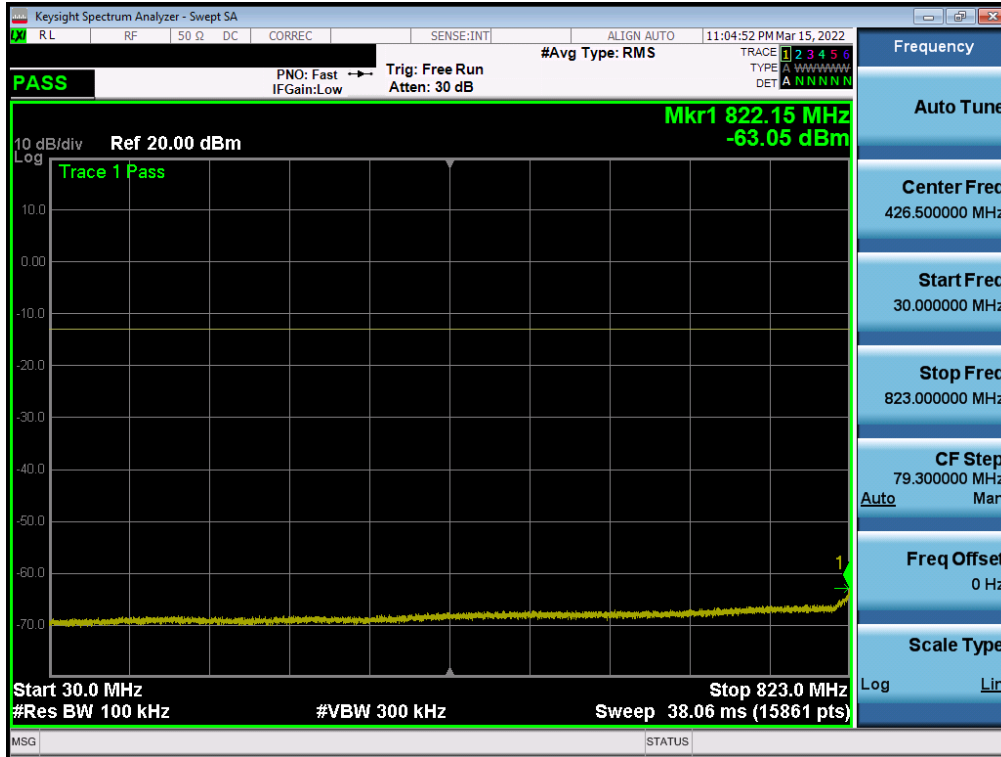
Test Notes

1. Per Part 22 and RSS-132, 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.

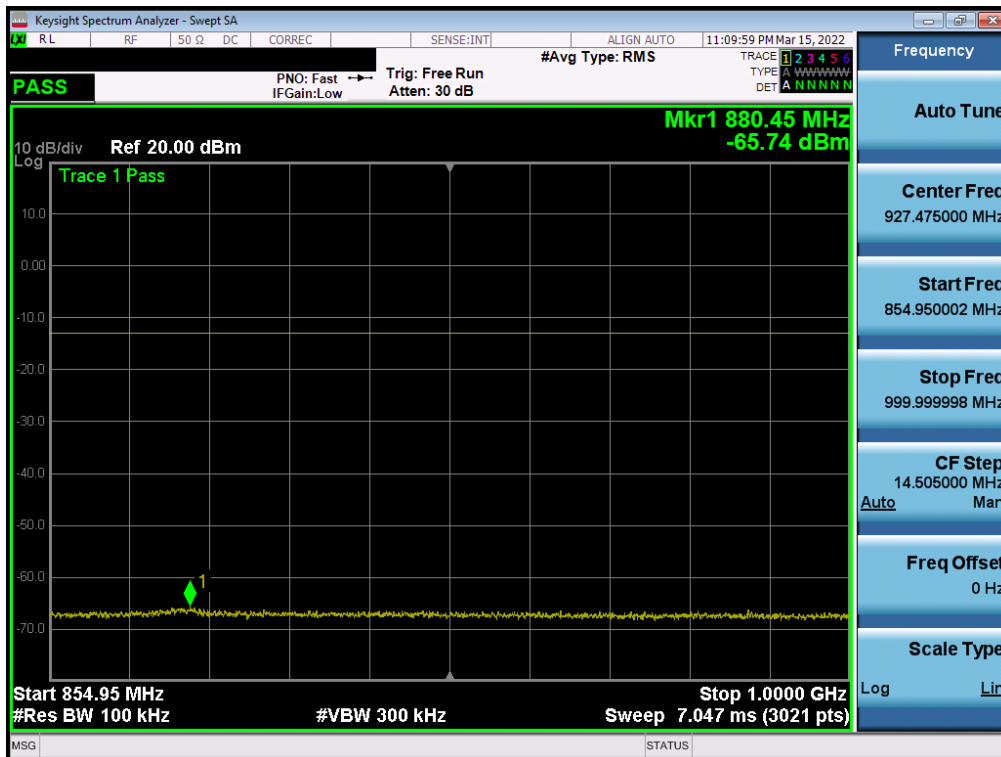
FCC ID: C3K1997	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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V3.0 1/4/2022

LTE Band 26/5



Plot 7-24. Conducted Spurious Plot (LTE Band 26/5 - 10MHz QPSK – 1 RB - Low Channel)



Plot 7-25. Conducted Spurious Plot (LTE Band 26/5 - 10MHz QPSK - 1 RB - Low Channel)

FCC ID: C3K1997	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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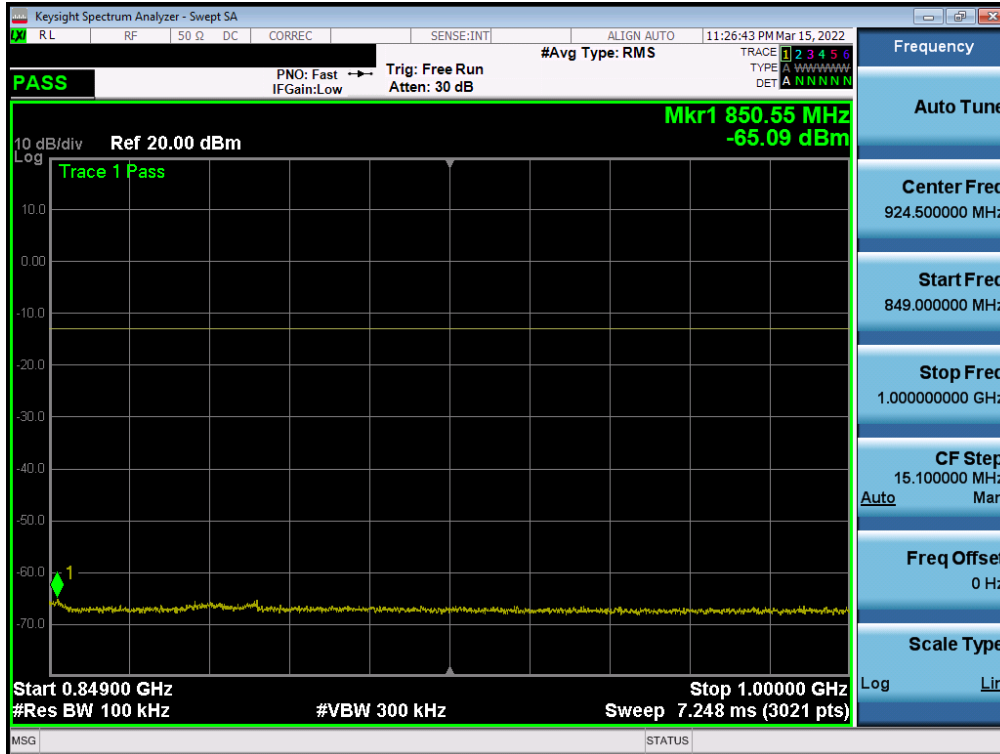


Plot 7-26. Conducted Spurious Plot (LTE Band 26/5 - 10MHz QPSK - 1 RB - Low Channel)



Plot 7-27. Conducted Spurious Plot (LTE Band 26/5 - 10MHz QPSK - 1 RB - Mid Channel)

FCC ID: C3K1997	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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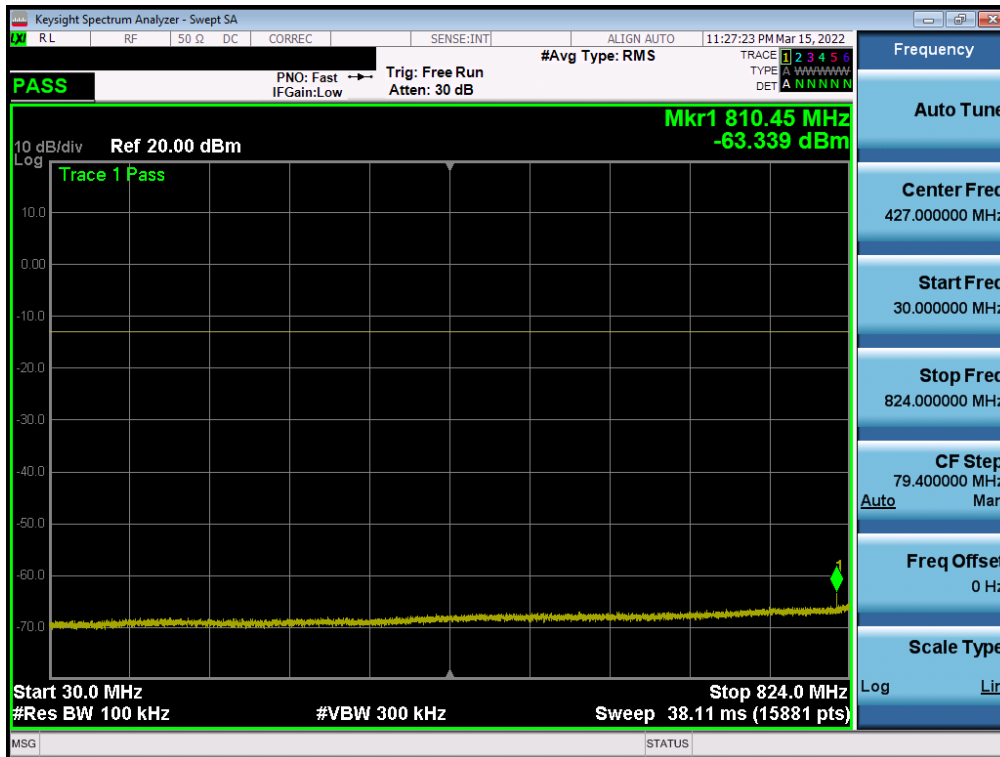


Plot 7-28. Conducted Spurious Plot (LTE Band 26/5 - 10MHz QPSK - 1 RB - Mid Channel)

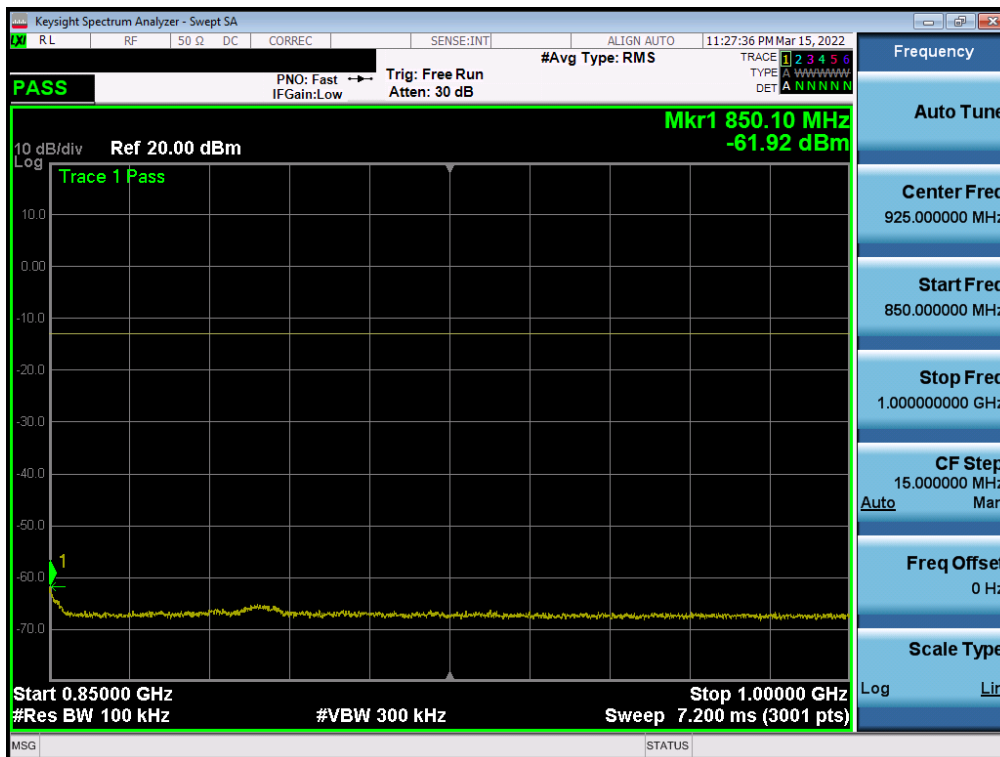


Plot 7-29. Conducted Spurious Plot (LTE Band 26/5 - 10MHz QPSK - 1 RB - Mid Channel)

FCC ID: C3K1997	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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Plot 7-30. Conducted Spurious Plot (LTE Band 26/5 - 10MHz QPSK - 1 RB - High Channel)



Plot 7-31. Conducted Spurious Plot (LTE Band 26/5 - 10MHz QPSK - 1 RB - High Channel)

FCC ID: C3K1997	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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Plot 7-32. Conducted Spurious Plot (LTE Band 26/5 - 10MHz QPSK - 1 RB - High Channel)

FCC ID: C3K1997	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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ULCA LTE Band 5

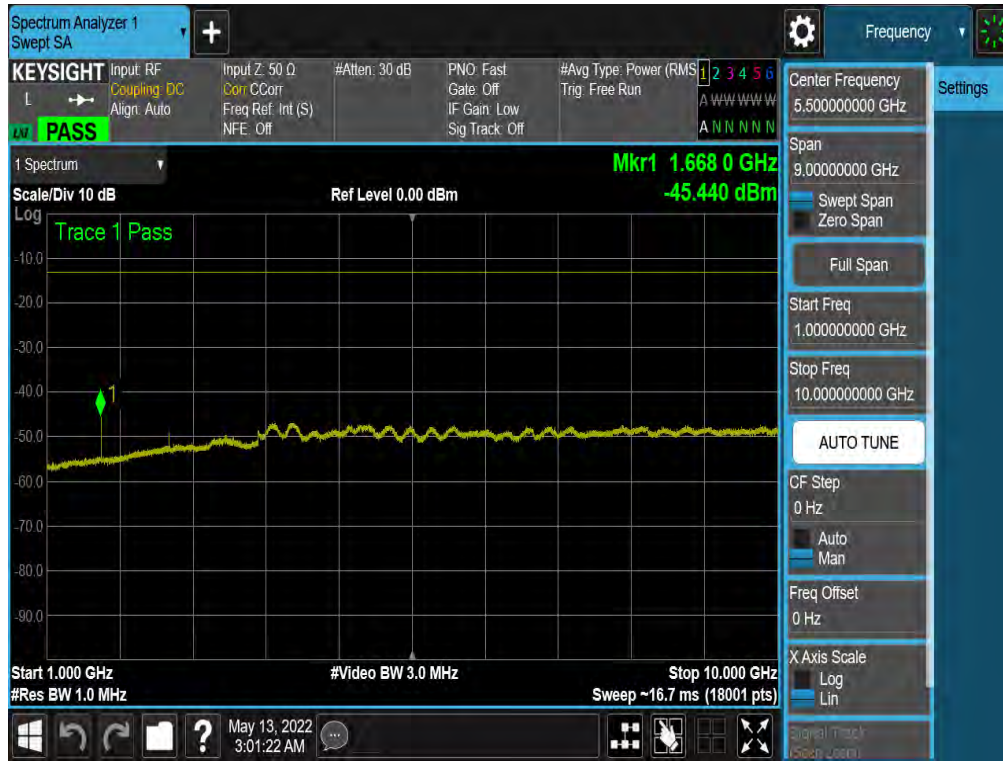


Plot 7-33. Conducted Spurious Plot (ULCA LTE Band 5 – 10+10MHz QPSK – PCC 1/49 SCC 1/0 - Low Channel)



Plot 7-34. Conducted Spurious Plot (ULCA LTE Band 5 – 10+10MHz QPSK – PCC 1/49 SCC 1/0 - Low Channel)

FCC ID: C3K1997	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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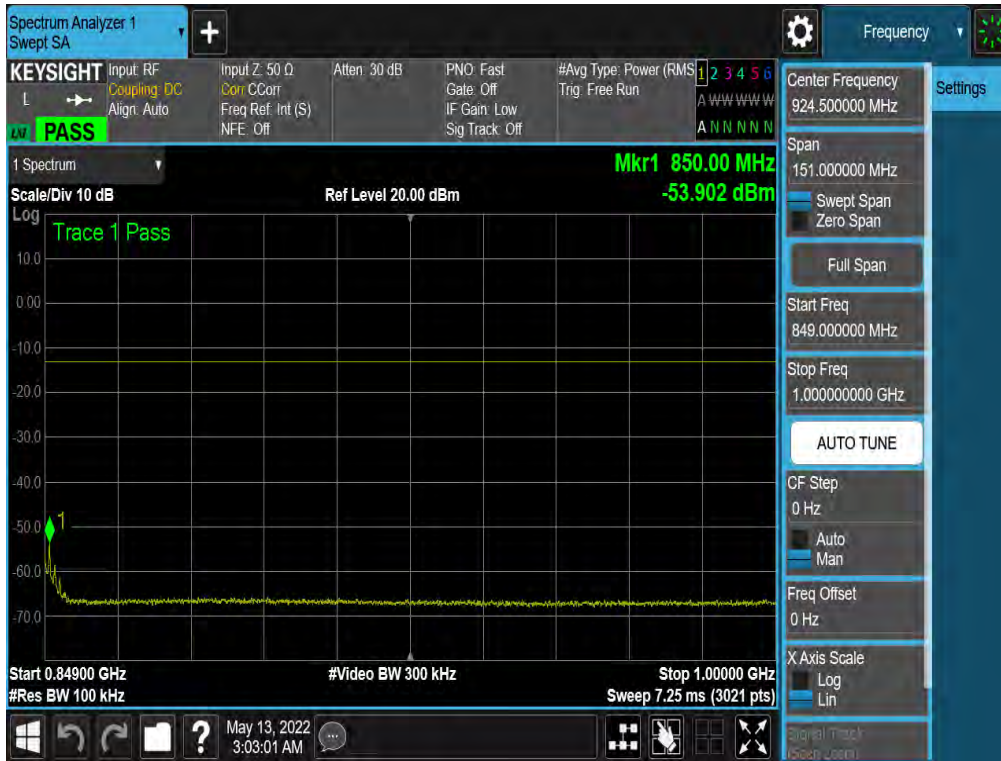


Plot 7-35. Conducted Spurious Plot (ULCA LTE Band 5 – 10+10MHz QPSK – PCC 1/49 SCC 1/0 - Low Channel)



Plot 7-36. Conducted Spurious Plot (ULCA LTE Band 5 – 10+10MHz QPSK – PCC 1/49 SCC 1/0 - Mid Channel)

FCC ID: C3K1997	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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Plot 7-37. Conducted Spurious Plot (ULCA LTE Band 5 – 10+10MHz QPSK – PCC 1/49 SCC 1/0 - Mid Channel)



Plot 7-38. Conducted Spurious Plot (ULCA LTE Band 5 – 10+10MHz QPSK – PCC 1/49 SCC 1/0 - Mid Channel)

FCC ID: C3K1997	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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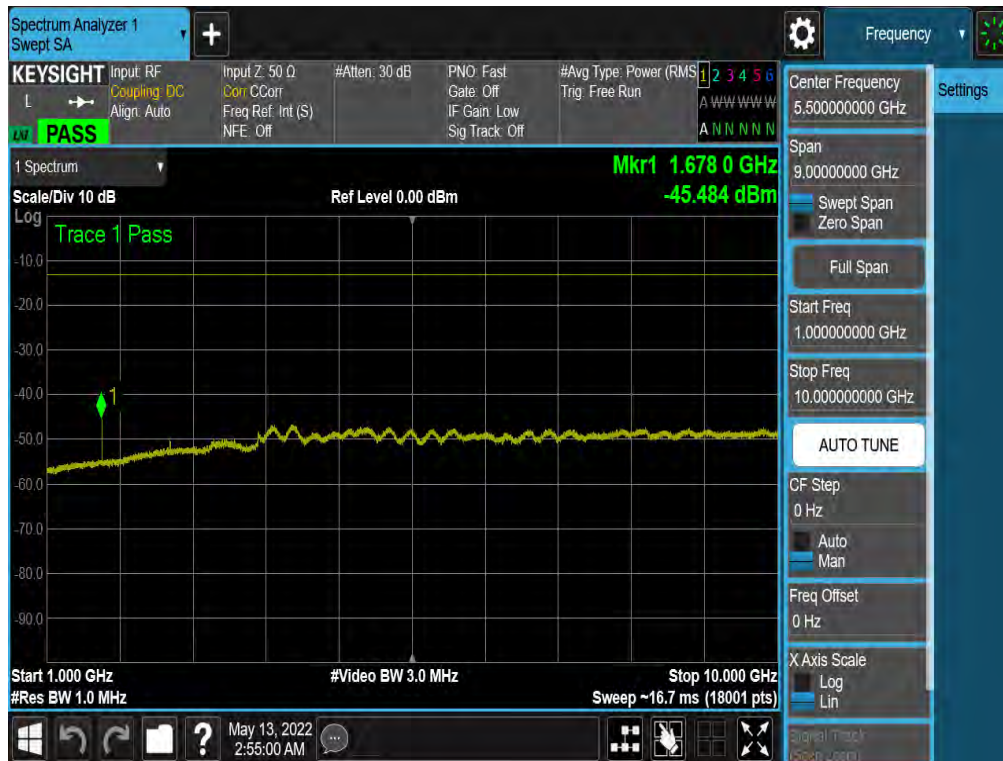


Plot 7-39. Conducted Spurious Plot (ULCA LTE Band 5 – 10+10MHz QPSK – PCC 1/0 SCC 1/49 - High Channel)



Plot 7-40. Conducted Spurious Plot (ULCA LTE Band 5 – 10+10MHz QPSK – PCC 1/0 SCC 1/49 - High Channel)

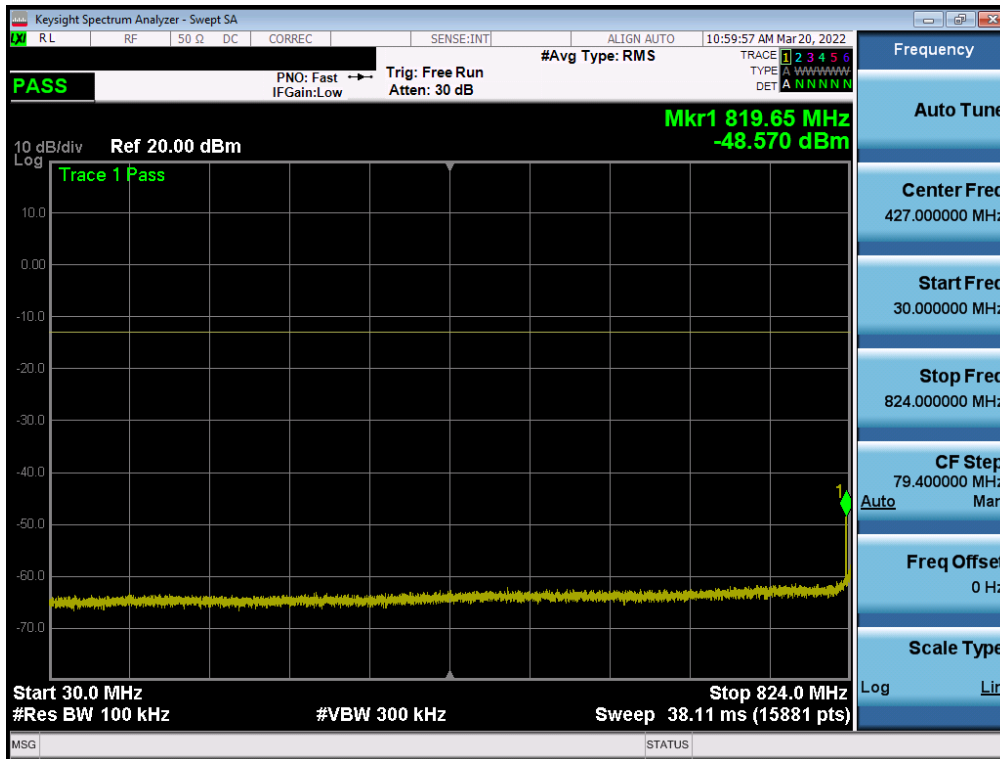
FCC ID: C3K1997	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2204040049-04-R1.C3K	Test Dates: 03/15/2022 - 06/20/2022	EUT Type: Portable Computing Device	Page 35 of 83



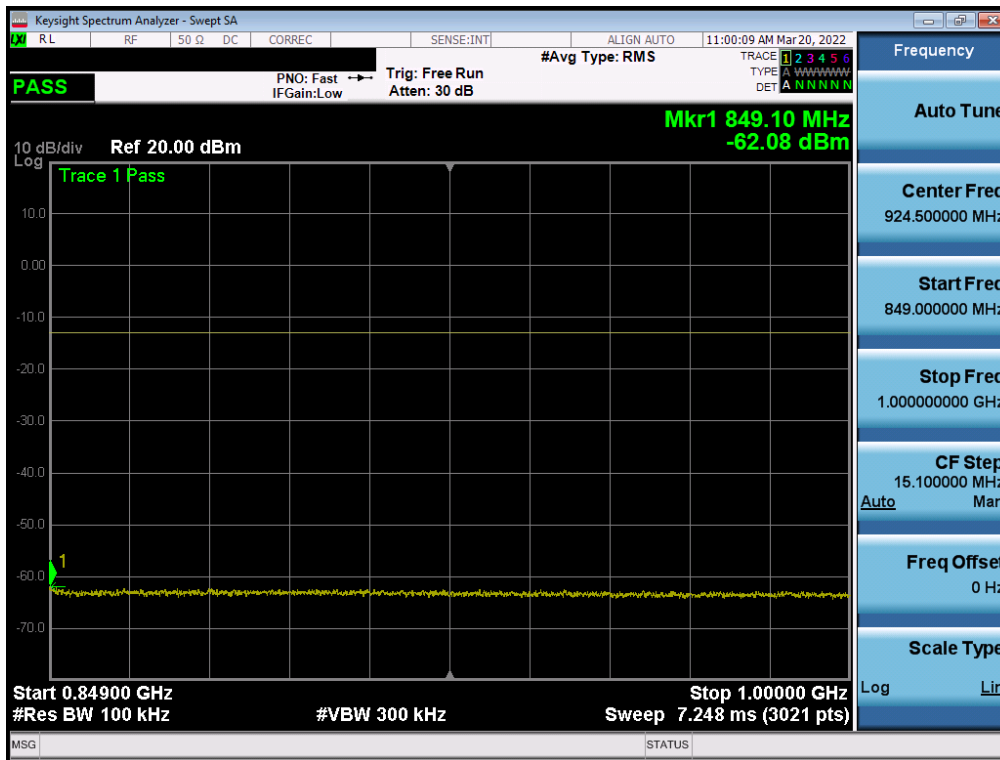
Plot 7-41. Conducted Spurious Plot (ULCA LTE Band 5 – 10+10MHz QPSK – PCC 1/0 SCC 1/49 - High Channel)

FCC ID: C3K1997	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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NR Band n5

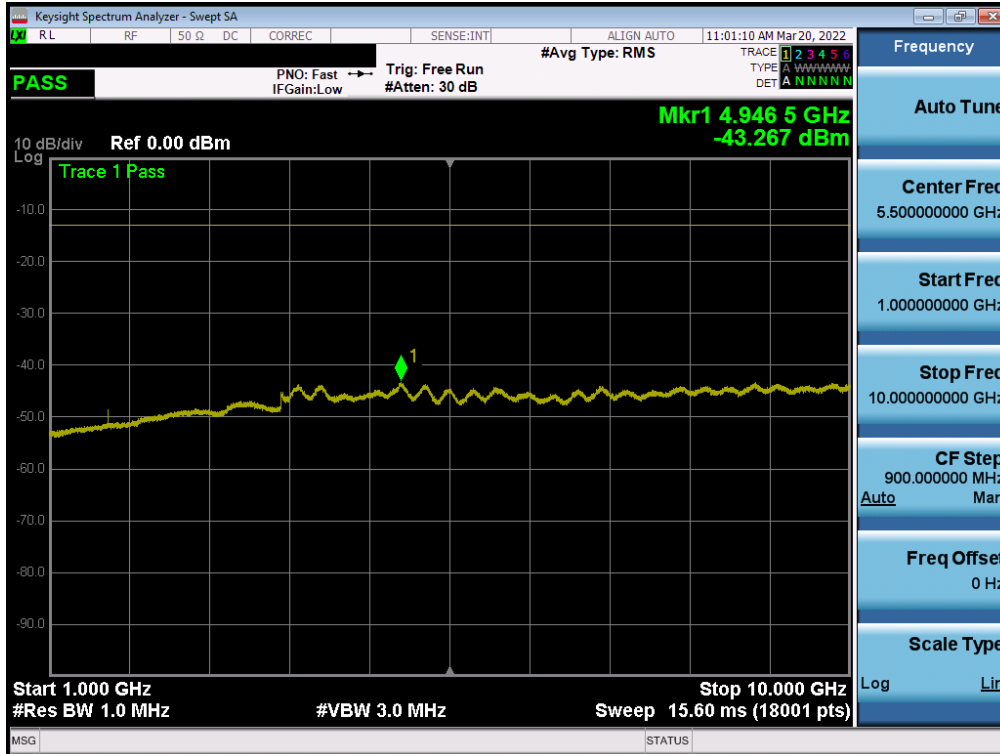


Plot 7-42. Conducted Spurious Plot (NR Band n5 - 20.0MHz - 1 RB - Low Channel)

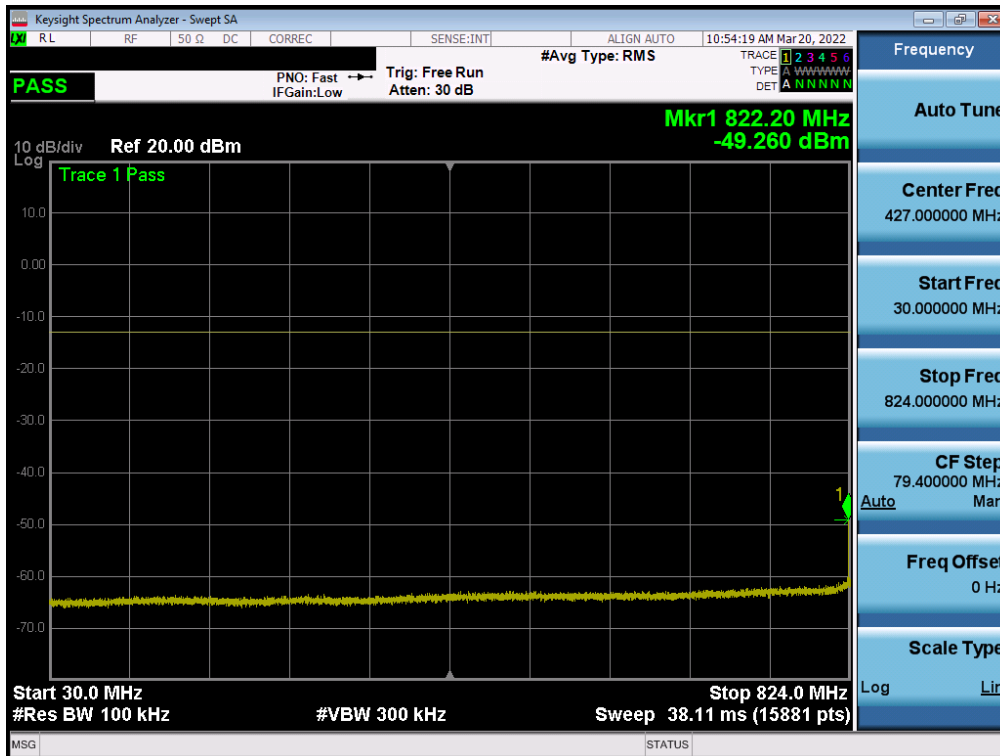


Plot 7-43. Conducted Spurious Plot (NR Band n5 - 20.0MHz - 1 RB - Low Channel)

FCC ID: C3K1997	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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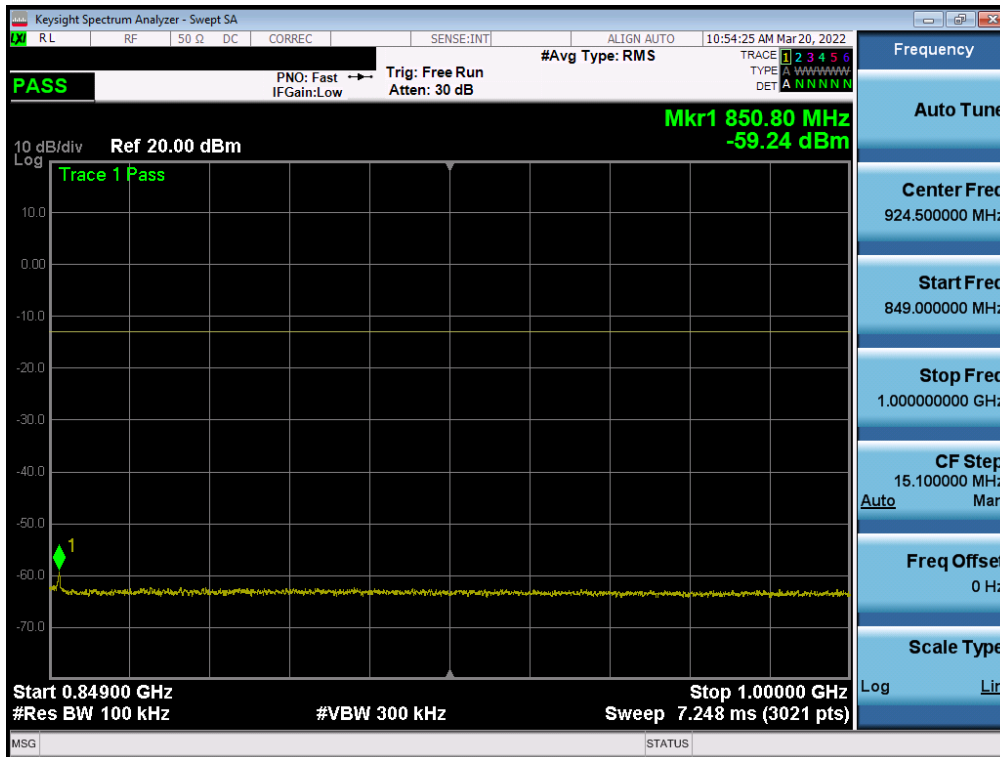


Plot 7-44. Conducted Spurious Plot (NR Band n5 - 20.0MHz - 1 RB - Low Channel)

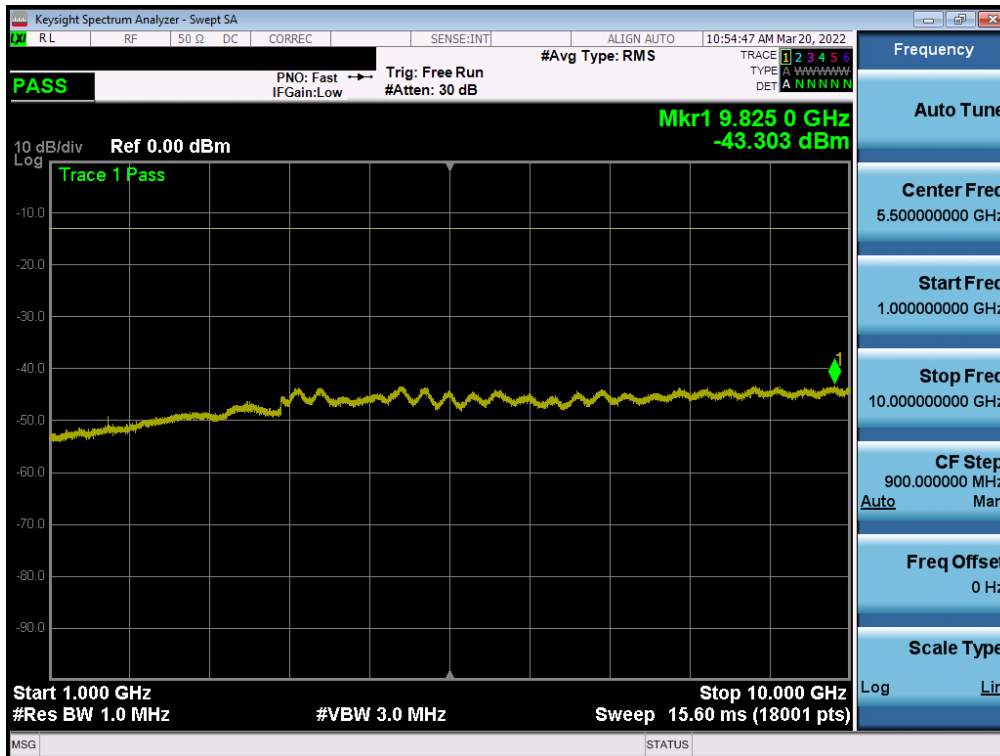


Plot 7-45. Conducted Spurious Plot (NR Band n5 - 20.0MHz - 1 RB - Mid Channel)

FCC ID: C3K1997	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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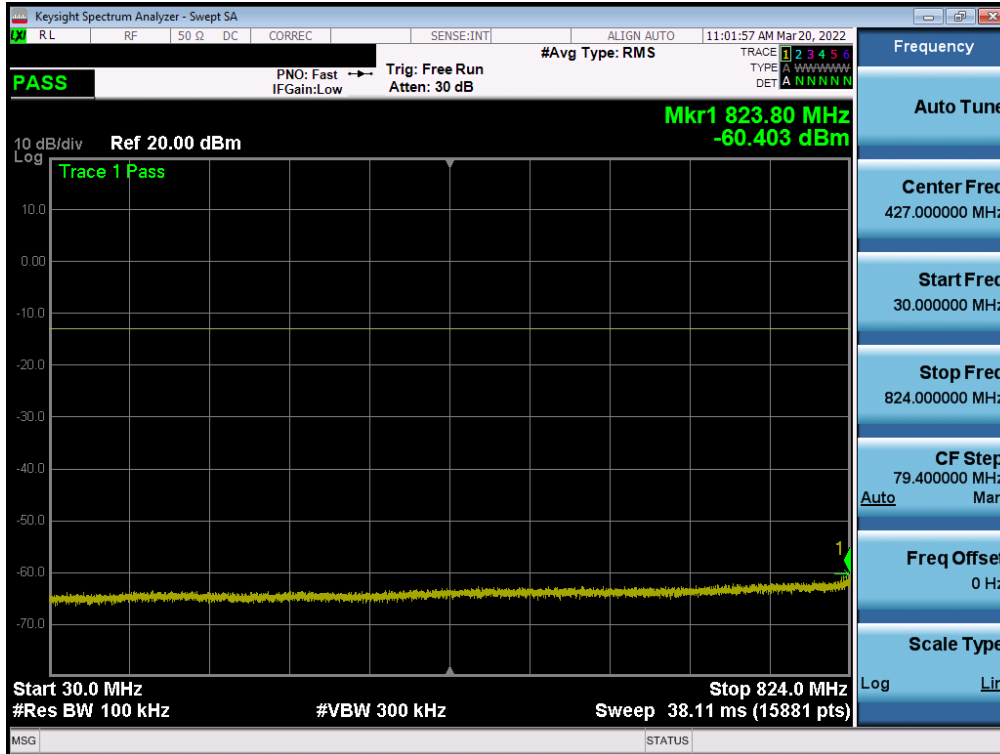


Plot 7-46. Conducted Spurious Plot (NR Band n5 - 20.0MHz - 1 RB - Mid Channel)

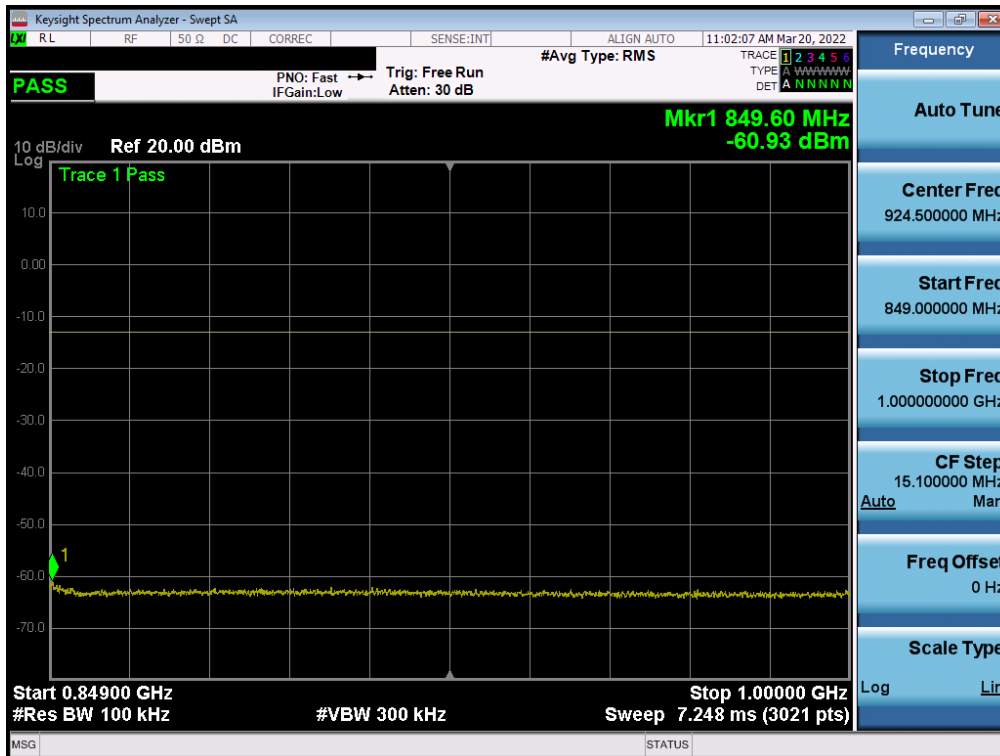


Plot 7-47. Conducted Spurious Plot (NR Band n5 - 20.0MHz - 1 RB - Mid Channel)

FCC ID: C3K1997	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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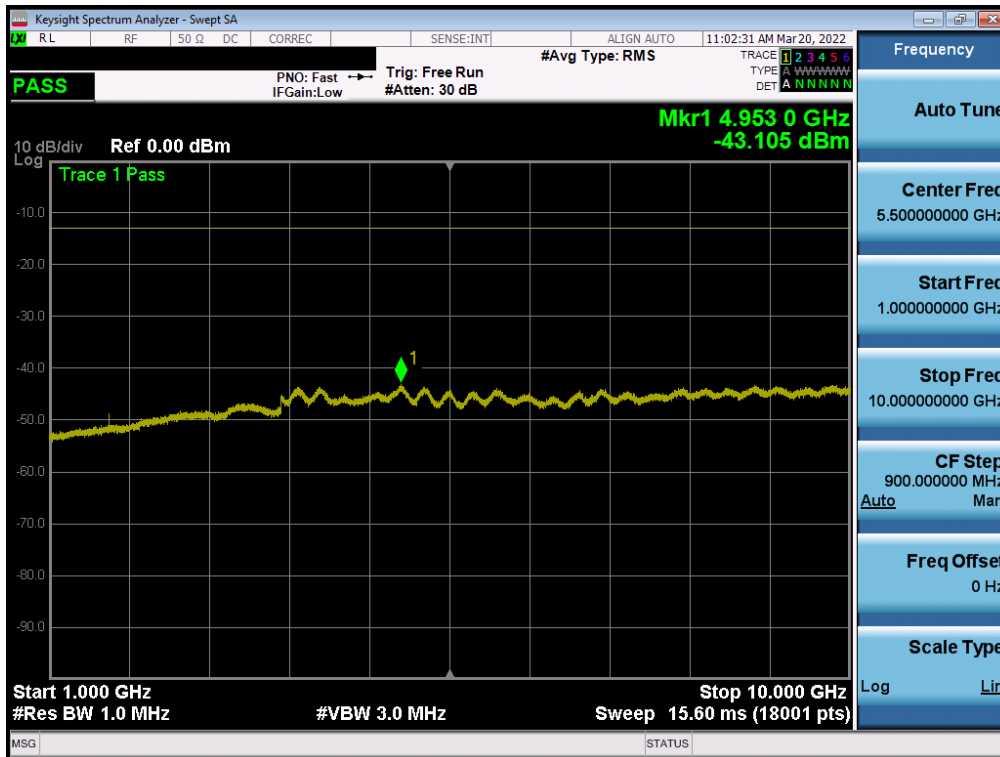


Plot 7-48. Conducted Spurious Plot (NR Band n5 - 20.0MHz - 1 RB - High Channel)



Plot 7-49. Conducted Spurious Plot (NR Band n5 - 20.0MHz - 1 RB - High Channel)

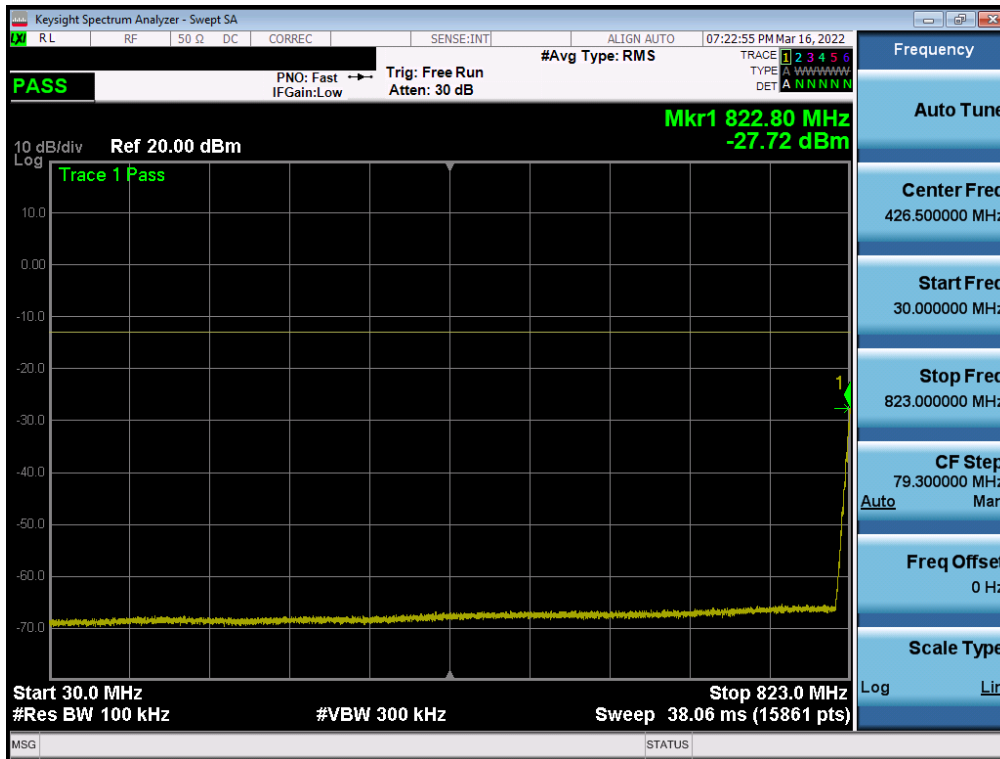
FCC ID: C3K1997	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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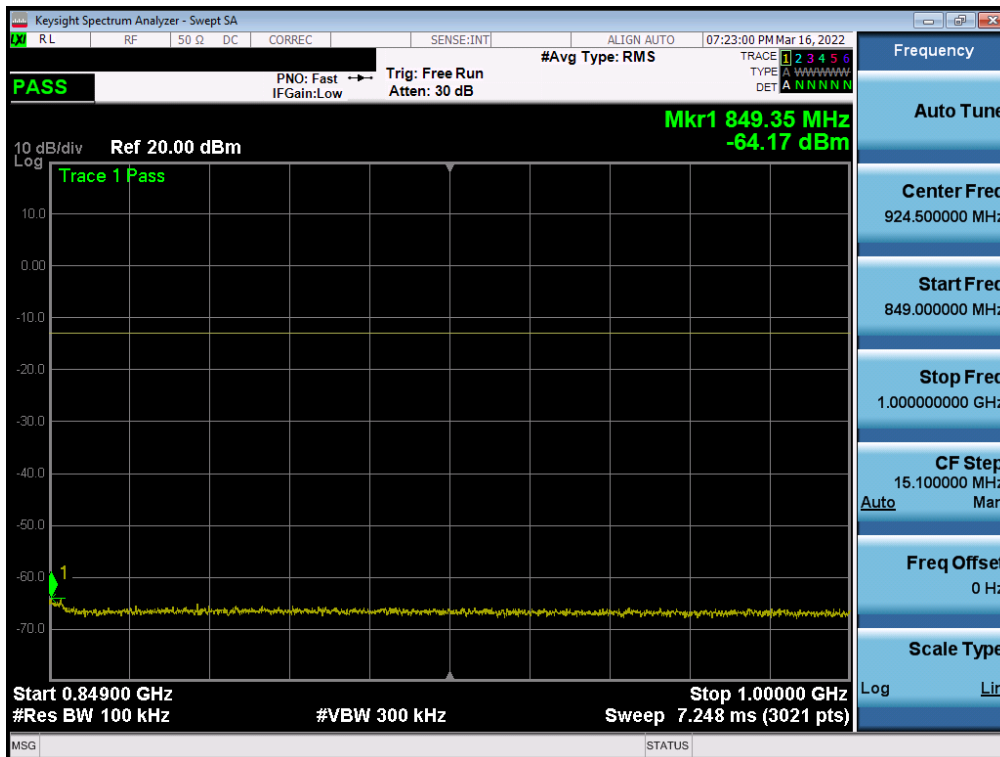
Plot 7-50. Conducted Spurious Plot (NR Band n5 - 20.0MHz - 1 RB - High Channel)

FCC ID: C3K1997	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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WCDMA Cell

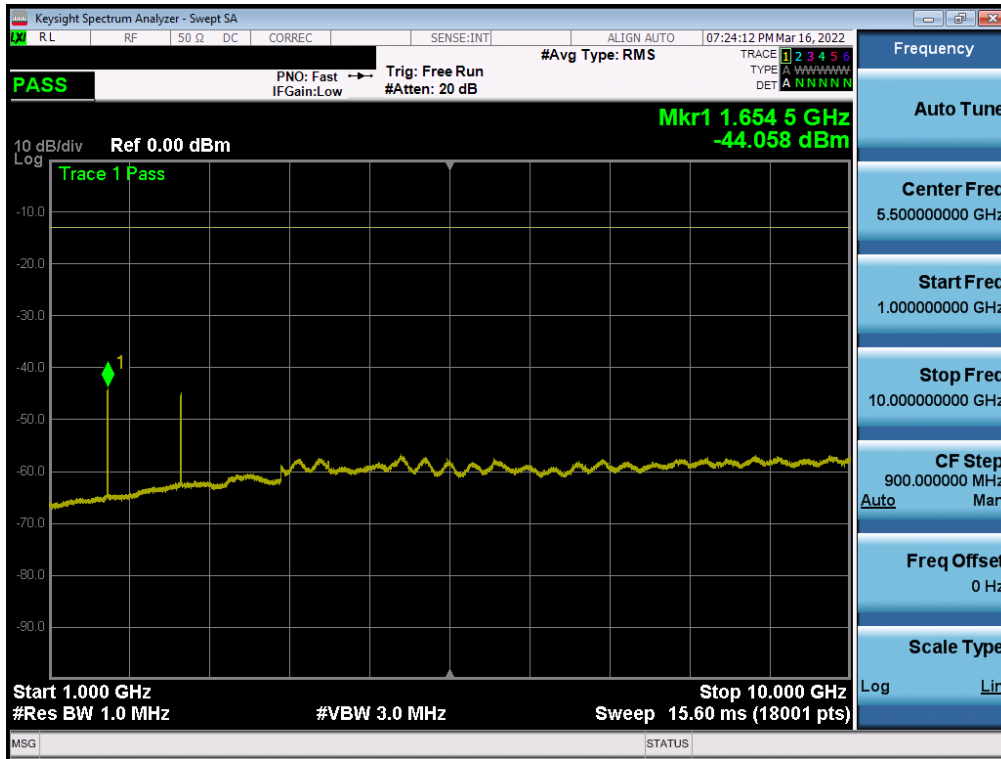


Plot 7-51. Conducted Spurious Plot (WCDMA Ch. 4132)

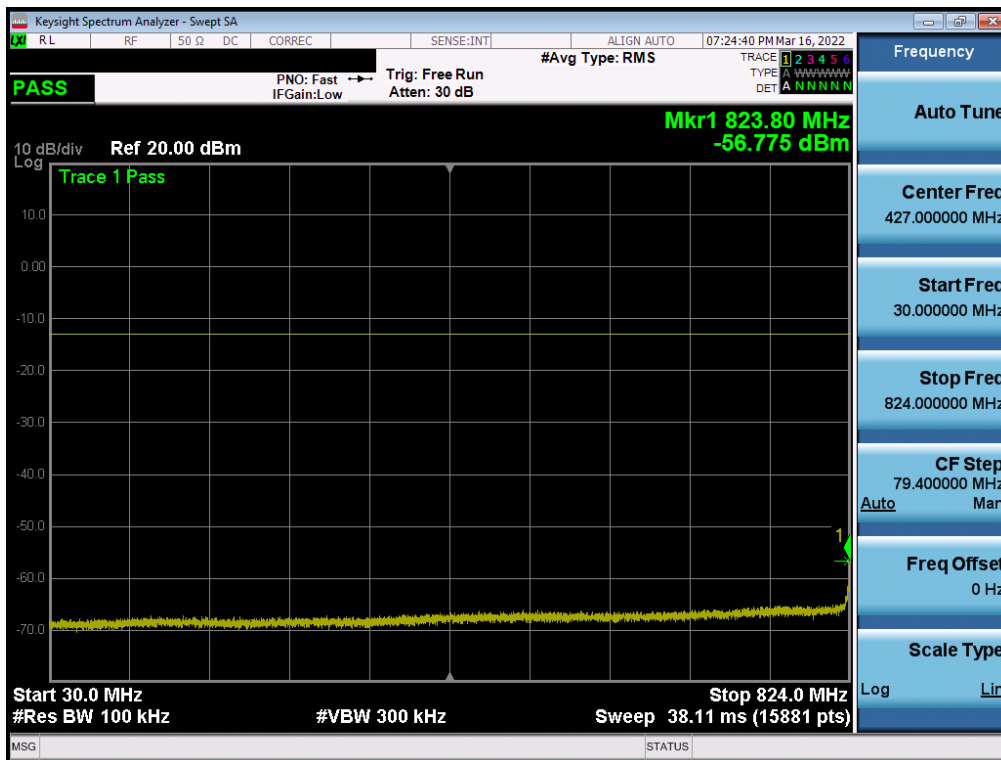


Plot 7-52. Conducted Spurious Plot (WCDMA Ch. 4132)

FCC ID: C3K1997	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2204040049-04-R1.C3K	Test Dates: 03/15/2022 - 06/20/2022	EUT Type: Portable Computing Device	Page 42 of 83

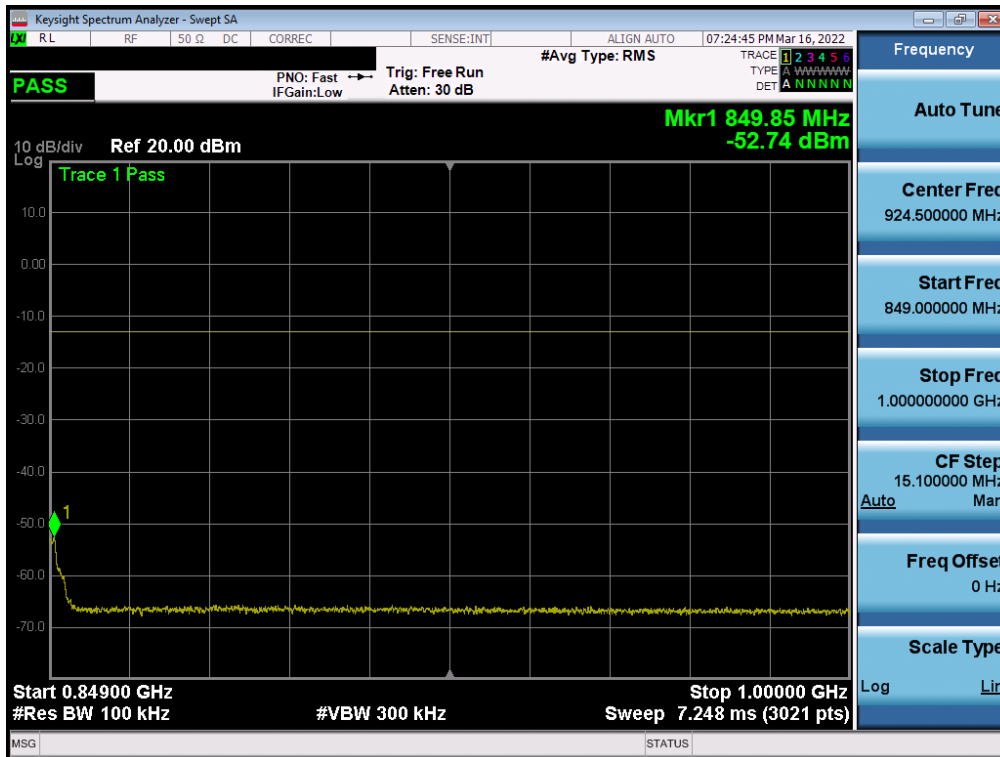


Plot 7-53. Conducted Spurious Plot (WCDMA Ch. 4132)

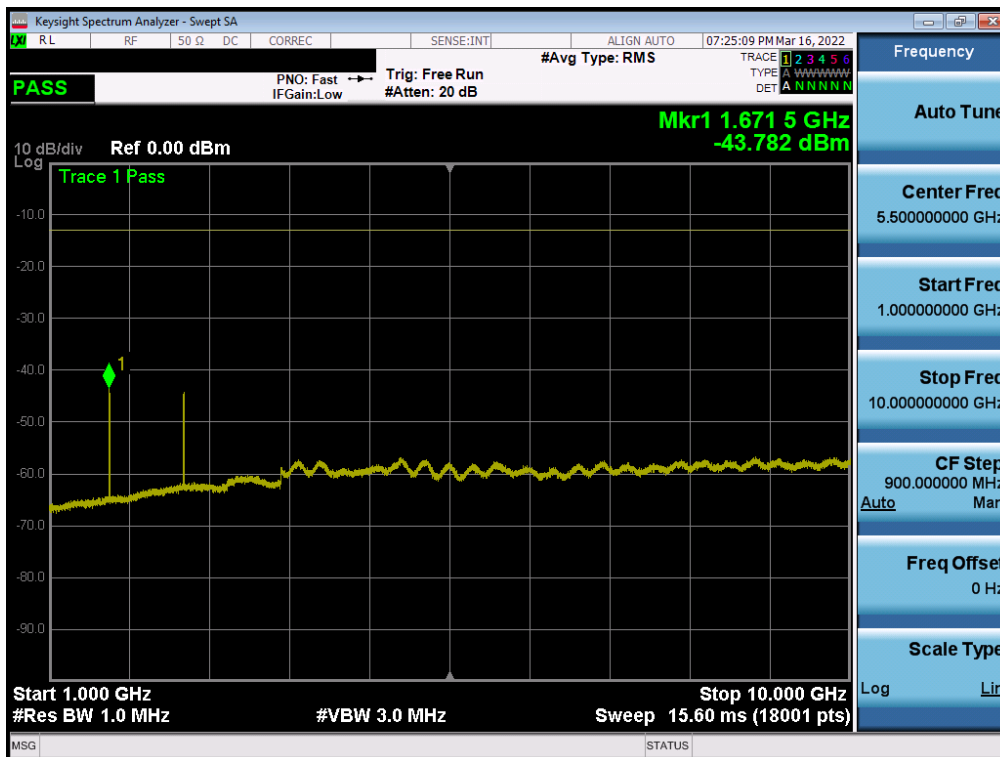


Plot 7-54. Conducted Spurious Plot (WCDMA Ch. 4183)

FCC ID: C3K1997	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2204040049-04-R1.C3K	Test Dates: 03/15/2022 - 06/20/2022	EUT Type: Portable Computing Device	Page 43 of 83

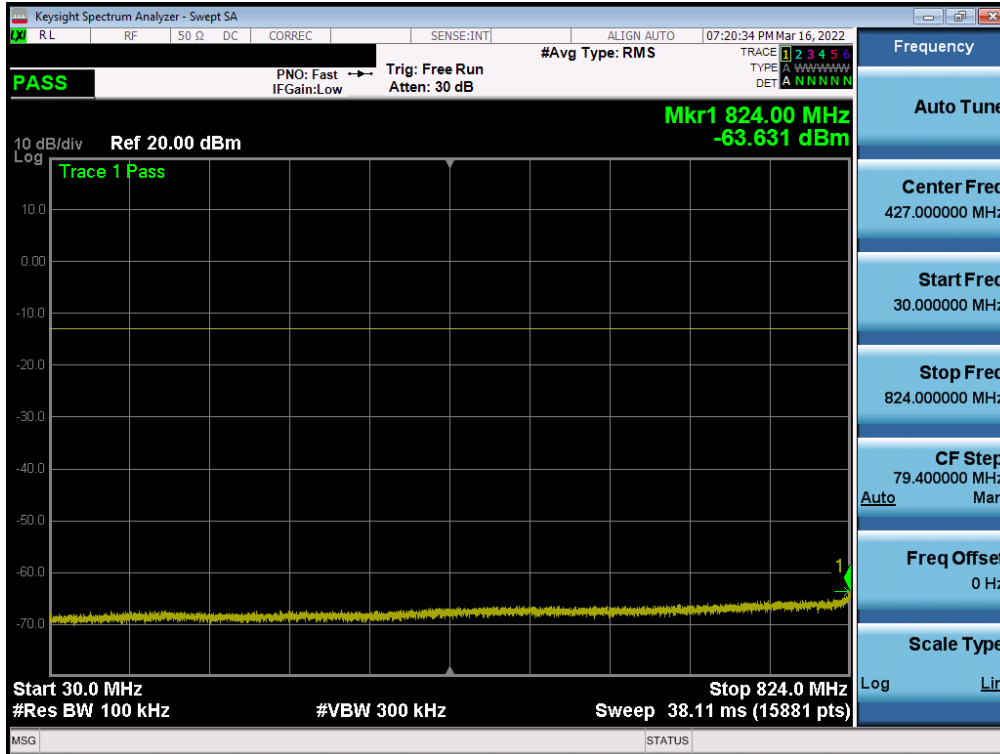


Plot 7-55. Conducted Spurious Plot (WCDMA Ch. 4183)

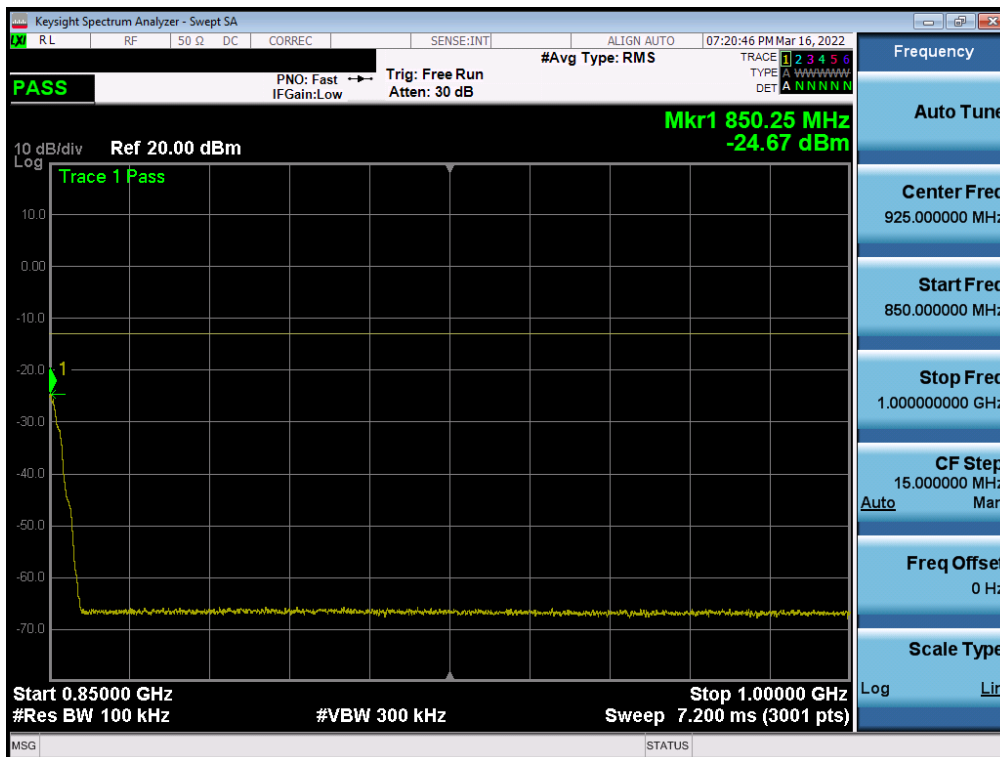


Plot 7-56. Conducted Spurious Plot (WCDMA Ch. 4183)

FCC ID: C3K1997	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2204040049-04-R1.C3K	Test Dates: 03/15/2022 - 06/20/2022	EUT Type: Portable Computing Device	Page 44 of 83

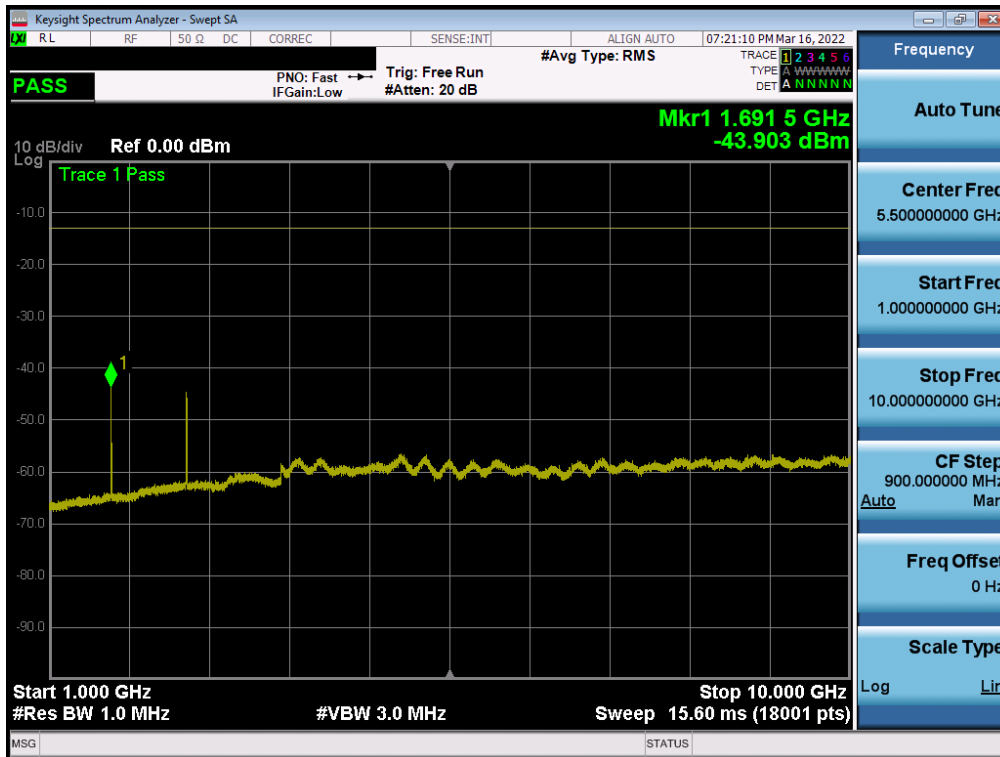


Plot 7-57. Conducted Spurious Plot (WCDMA Ch. 4233)



Plot 7-58. Conducted Spurious Plot (WCDMA Ch. 4233)

FCC ID: C3K1997	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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Plot 7-59. Conducted Spurious Plot (WCDMA Ch. 4233)

FCC ID: C3K1997	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2204040049-04-R1.C3K	Test Dates: 03/15/2022 - 06/20/2022	EUT Type: Portable Computing Device	Page 46 of 83

7.5 Band Edge Emissions at Antenna Terminal

Test Overview

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

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

Test Procedure Used

ANSI C63.26-2015 – Section 5.7.3

Test Settings

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

Test Setup

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

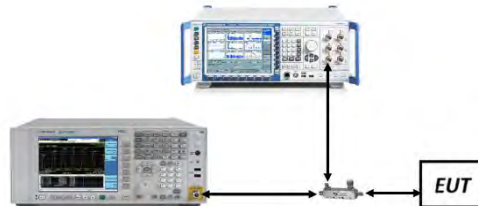


Figure 7-4. Test Instrument & Measurement Setup

FCC ID: C3K1997	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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V3.0 1/4/2022

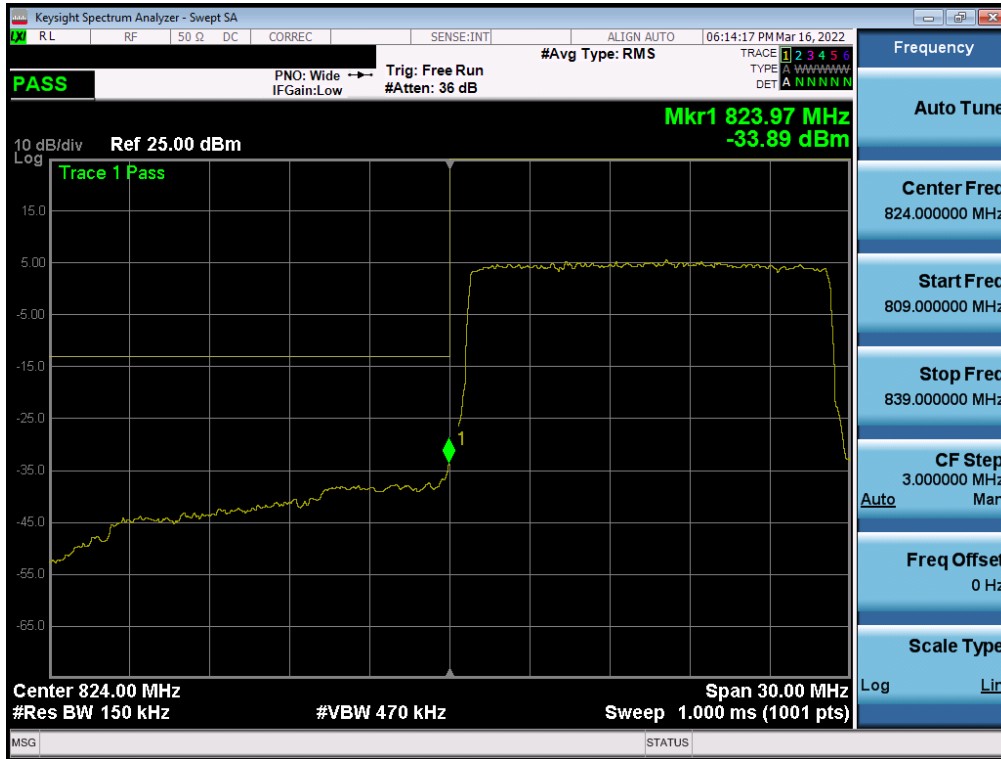
Test Notes

1. Per 22.917(b) and RSS-132(5.5), 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.

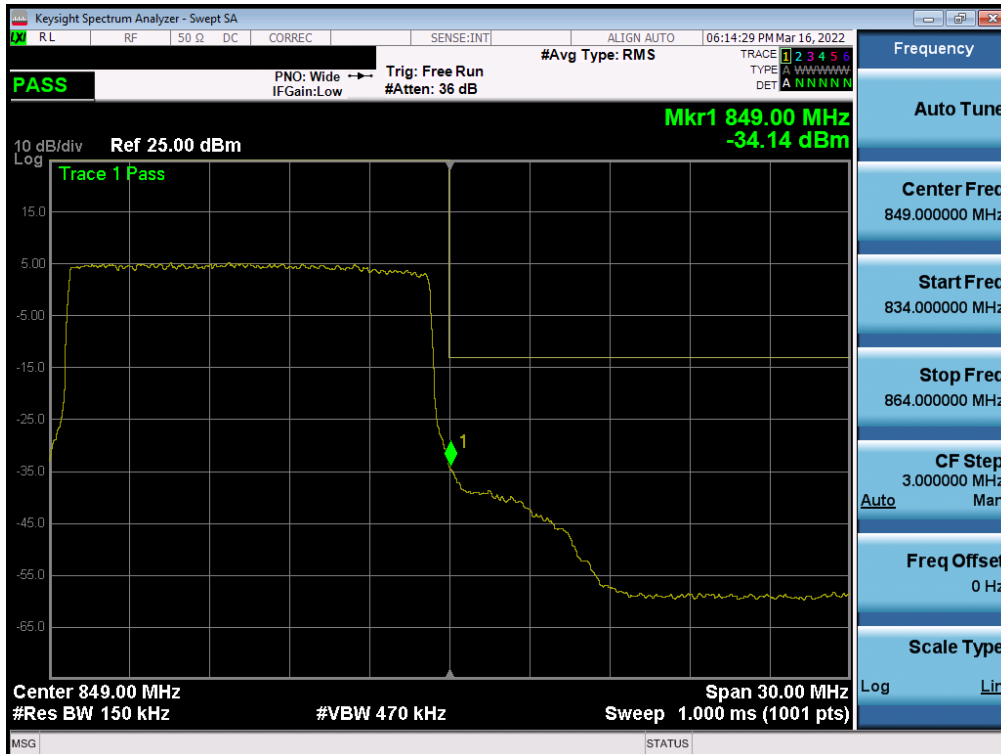
FCC ID: C3K1997	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2204040049-04-R1.C3K	Test Dates: 03/15/2022 - 06/20/2022	EUT Type: Portable Computing Device	Page 48 of 83

V3.0 1/4/2022

LTE Band 26/5

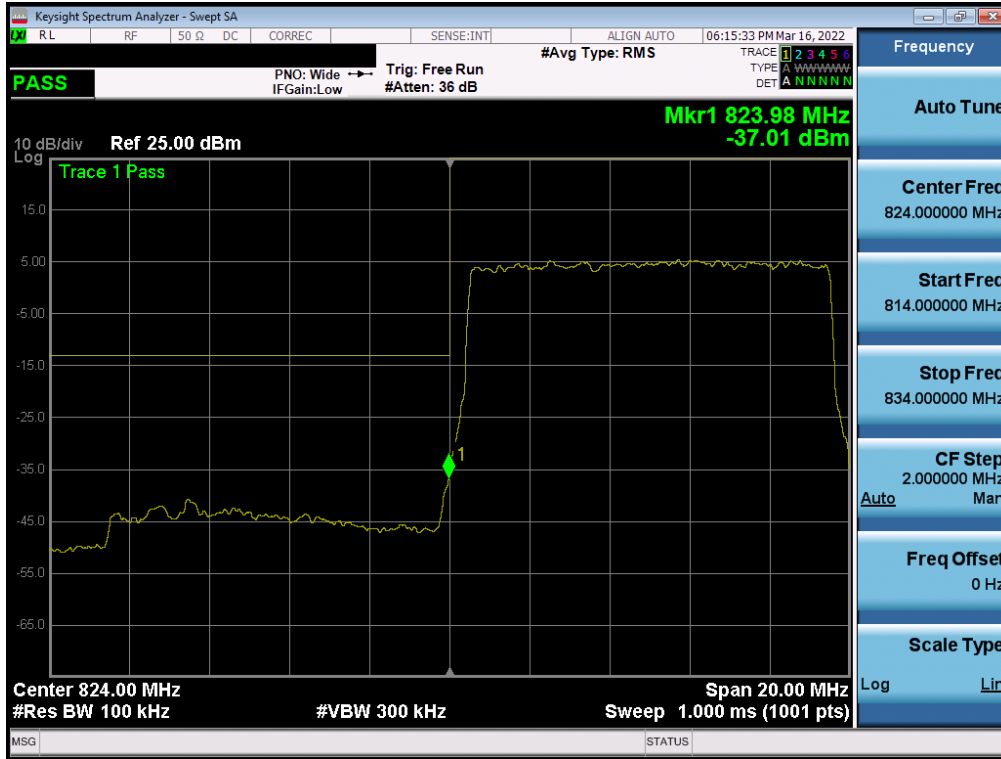


Plot 7-60. Lower Band Edge Plot (LTE Band 26 - 15MHz QPSK – Full RB)



Plot 7-61. Upper Band Edge Plot (LTE Band 26 - 15MHz QPSK – Full RB)

FCC ID: C3K1997	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2204040049-04-R1.C3K	Test Dates: 03/15/2022 - 06/20/2022	EUT Type: Portable Computing Device	Page 49 of 83

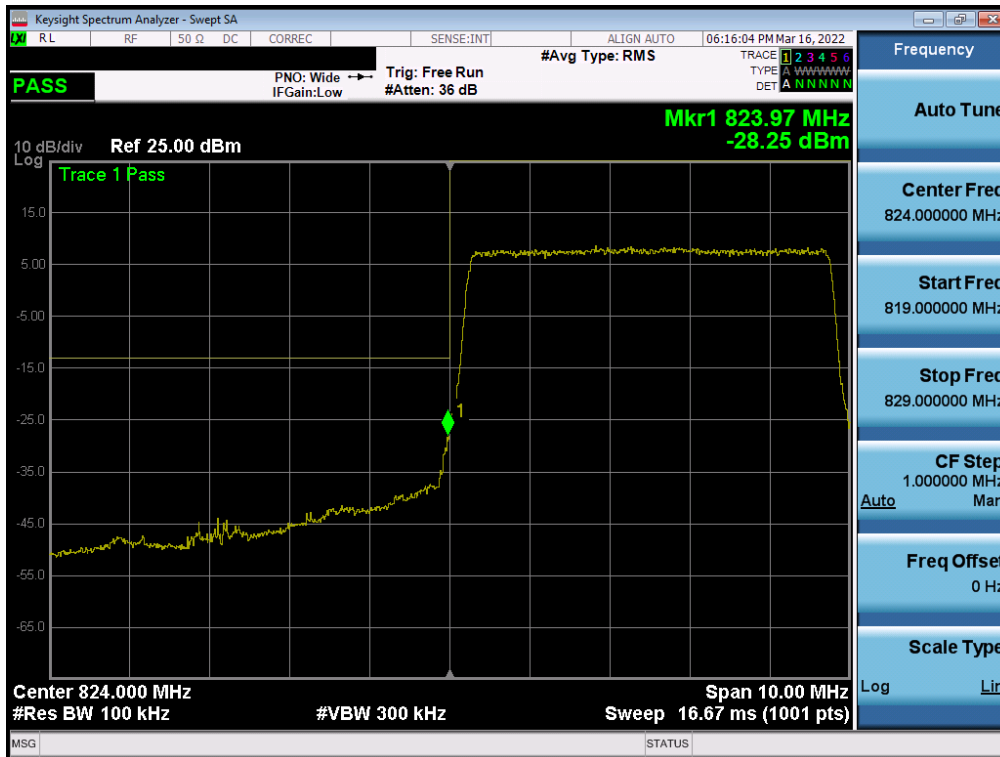


Plot 7-62. Lower Band Edge Plot (LTE Band 26/5 - 10MHz QPSK – Full RB)



Plot 7-63. Upper Band Edge Plot (LTE Band 26/5 - 10MHz QPSK – Full RB)

FCC ID: C3K1997	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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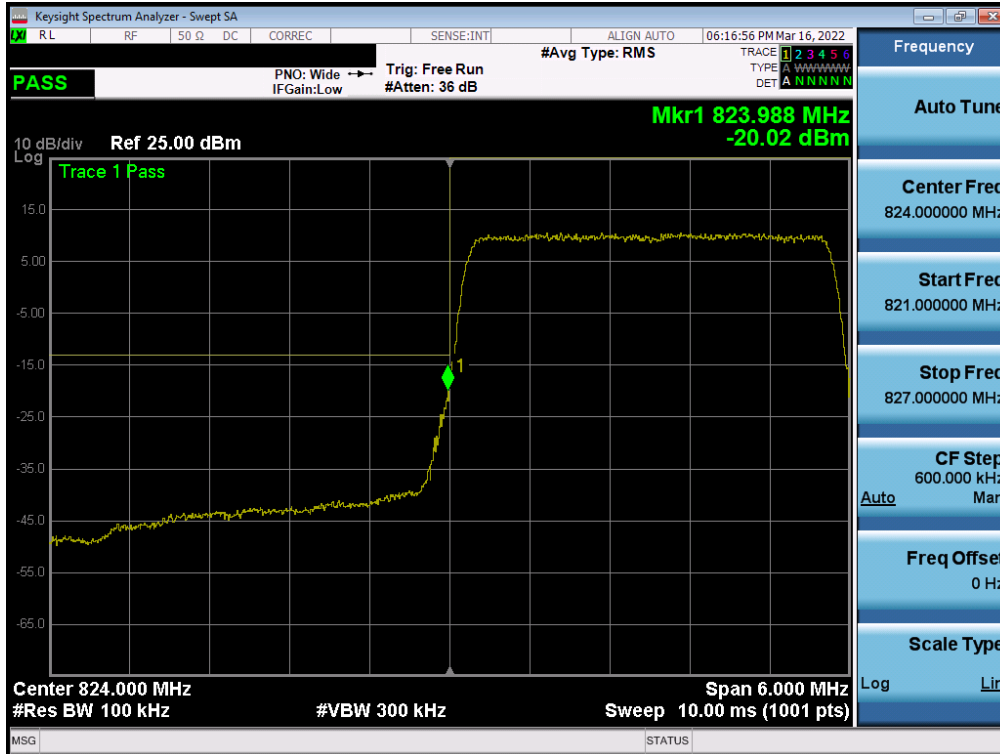


Plot 7-64. Lower Band Edge Plot (LTE Band 26/5 - 5MHz QPSK – Full RB)



Plot 7-65. Upper Band Edge Plot (LTE Band 26/5 - 5MHz QPSK – Full RB)

FCC ID: C3K1997	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2204040049-04-R1.C3K	Test Dates: 03/15/2022 - 06/20/2022	EUT Type: Portable Computing Device	Page 51 of 83

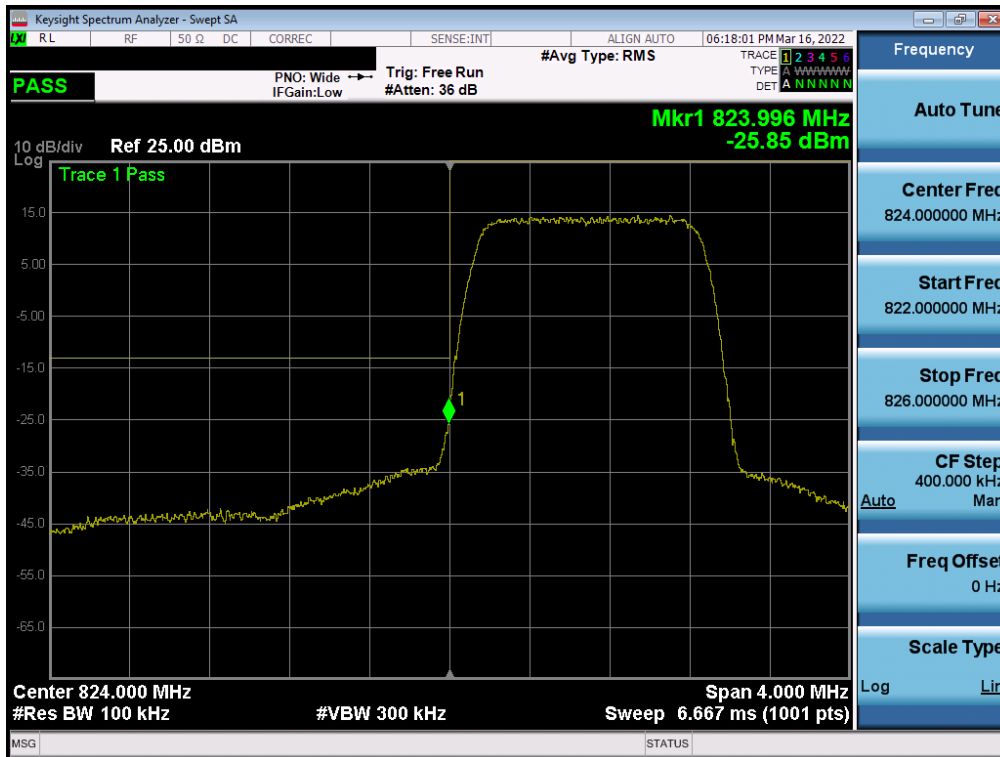


Plot 7-66. Lower Band Edge Plot (LTE Band 26/5 - 3MHz QPSK – Full RB)

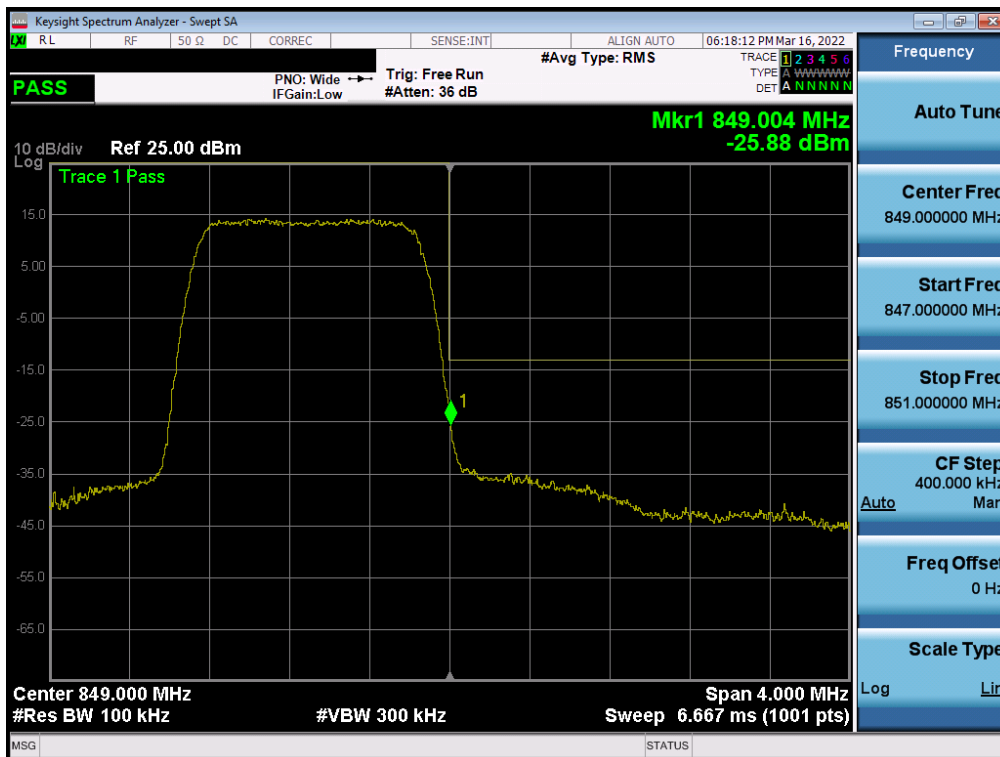


Plot 7-67. Upper Band Edge Plot (LTE Band 26/5 - 3MHz QPSK – Full RB)

FCC ID: C3K1997	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2204040049-04-R1.C3K	Test Dates: 03/15/2022 - 06/20/2022	EUT Type: Portable Computing Device	Page 52 of 83



Plot 7-68. Lower Band Edge Plot (LTE Band 26/5 – 1.4MHz QPSK – Full RB)



Plot 7-69. Upper Band Edge Plot (LTE Band 26/5 – 1.4MHz QPSK – Full RB)

FCC ID: C3K1997	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2204040049-04-R1.C3K	Test Dates: 03/15/2022 - 06/20/2022	EUT Type: Portable Computing Device	Page 53 of 83

NR Band n5

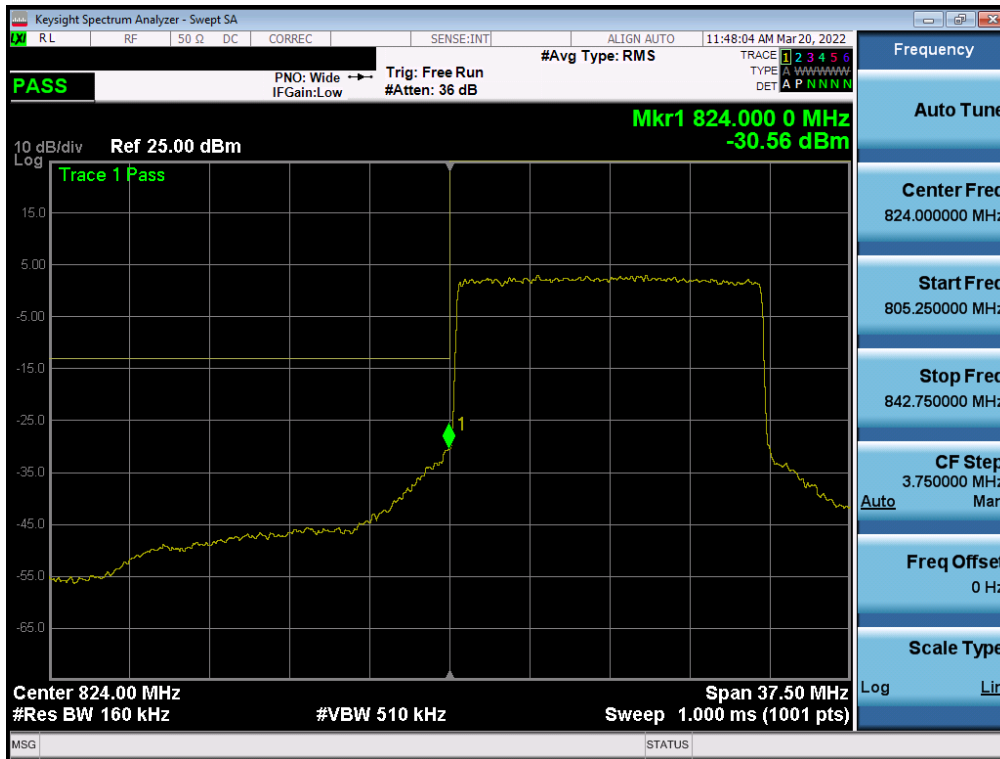


Plot 7-70. Lower Band Edge Plot (NR Band n5 – 20.0MHz - Full RB)



Plot 7-71. Upper Band Edge Plot (NR Band n5 – 20.0MHz - Full RB)

FCC ID: C3K1997	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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Plot 7-72. Lower Band Edge Plot (NR Band n5 – 15.0MHz - Full RB)



Plot 7-73. Upper Band Edge Plot (NR Band n5 – 15.0MHz - Full RB)

FCC ID: C3K1997	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2204040049-04-R1.C3K	Test Dates: 03/15/2022 - 06/20/2022	EUT Type: Portable Computing Device	Page 55 of 83

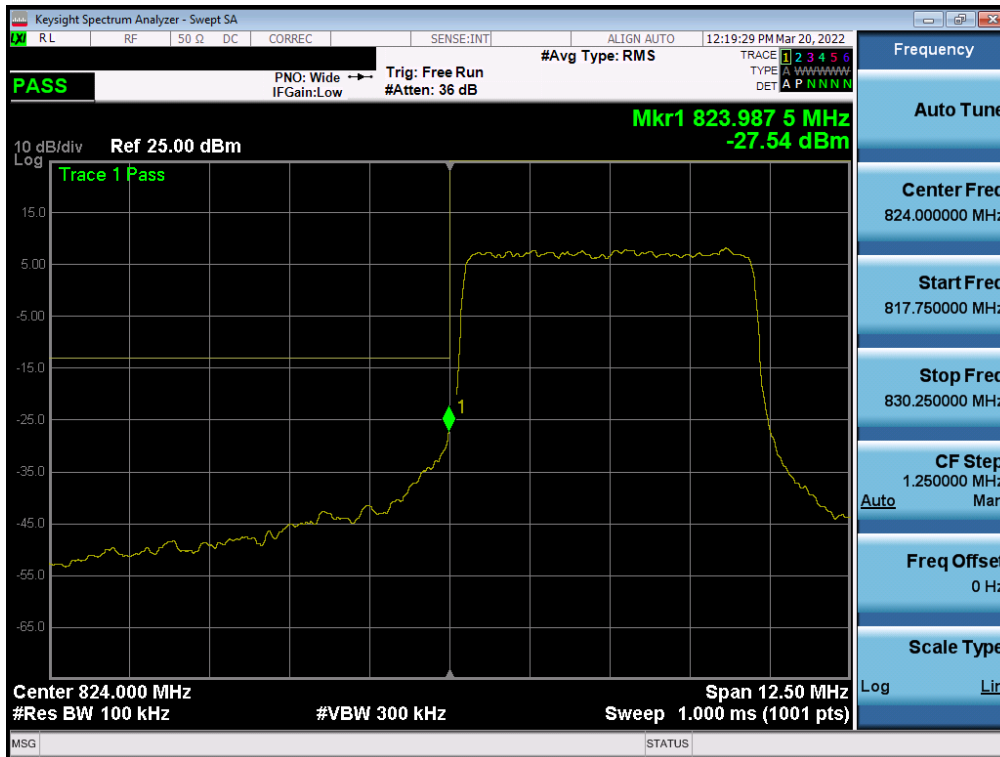


Plot 7-74. Lower Band Edge Plot (NR Band n5 – 10.0MHz - Full RB)



Plot 7-75. Upper Band Edge Plot (NR Band n5 – 10.0MHz - Full RB)

FCC ID: C3K1997	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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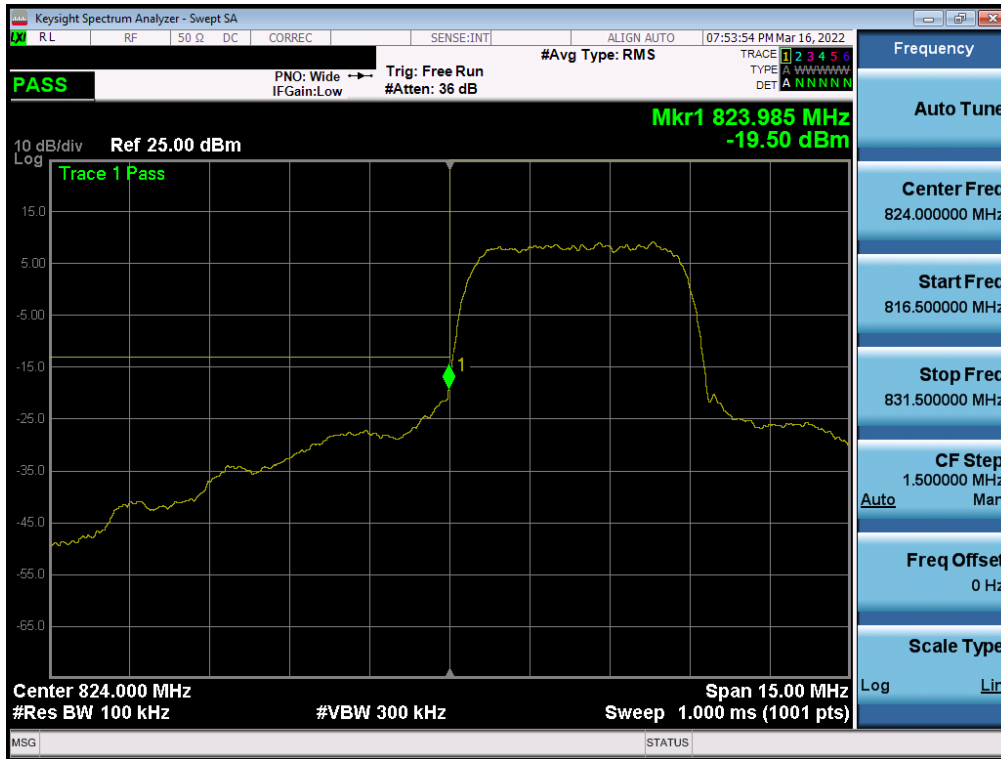
Plot 7-76. Lower Band Edge Plot (NR Band n5 – 5.0MHz - Full RB)



Plot 7-77. Upper Band Edge Plot (NR Band n5 – 5.0MHz - Full RB)

FCC ID: C3K1997	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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WCDMA Cell



Plot 7-78. Lower Band Edge Plot (WCDMA Cell – Ch. 4132)



Plot 7-79. Upper Band Edge Plot (WCDMA Cell – Ch. 4233)

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7.6 Radiated Power (ERP)

Test Overview

Effective Radiated Power (ERP) measurements are performed using the substitution method described in ANSI C63.26-2015 with the EUT transmitting into an integral antenna. Measurements are performed using vertically and horizontally polarized broadband horn antennas. All measurements are performed as RMS average measurements while the EUT is operating at maximum power, and at the appropriate frequencies.

Test Procedures Used

ANSI C63.26-2015 – Section 5.2.4.4

Test Settings

1. Radiated power measurements are performed using the signal analyzer’s “channel power” measurement capability for signals with continuous operation. For signals with burst transmission, the signal analyzer’s “time domain power” measurement capability is used.
2. RBW = 1 – 5% of the expected OBW, not to exceed 1MHz
3. VBW \geq 3 x RBW
4. Span = 1.5 times the OBW
5. No. of sweep points \geq 2 x span / RBW
6. Detector = RMS
7. Trigger is set to “free run” for signals with continuous operation with the sweep times set to “auto”. Trigger is set to enable triggering only on full power bursts with the sweep time set less than or equal to the transmission burst duration.
8. The integration bandwidth was roughly set equal to the measured OBW of the signal for signals with continuous operation. For signals with burst transmission, the “gating” function was enabled to ensure that measurements are performed during times in which the transmitter is operating at its maximum power.
9. Trace mode = trace averaging (RMS) over 100 sweeps
10. The trace was allowed to stabilize.

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Test Setup

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

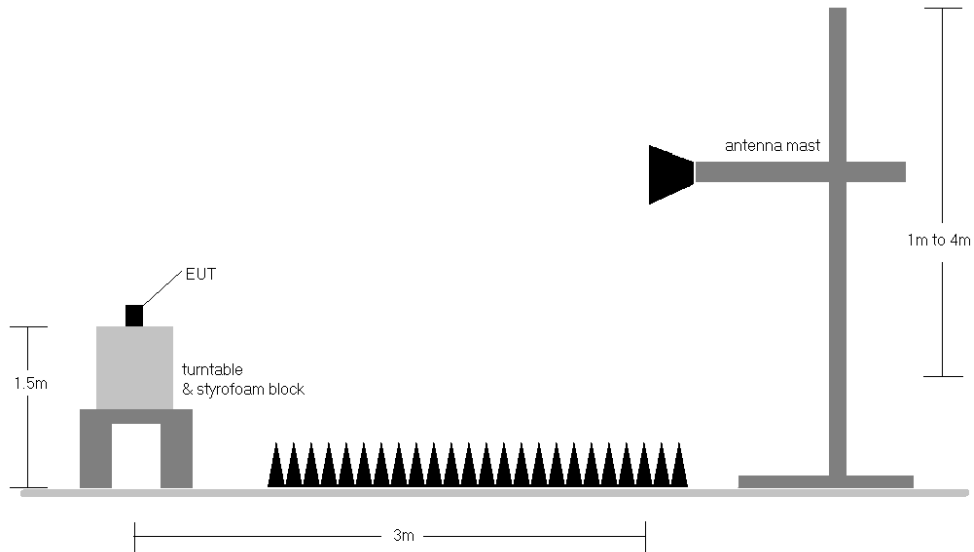


Figure 7-5. Radiated Test Setup < 1GHz

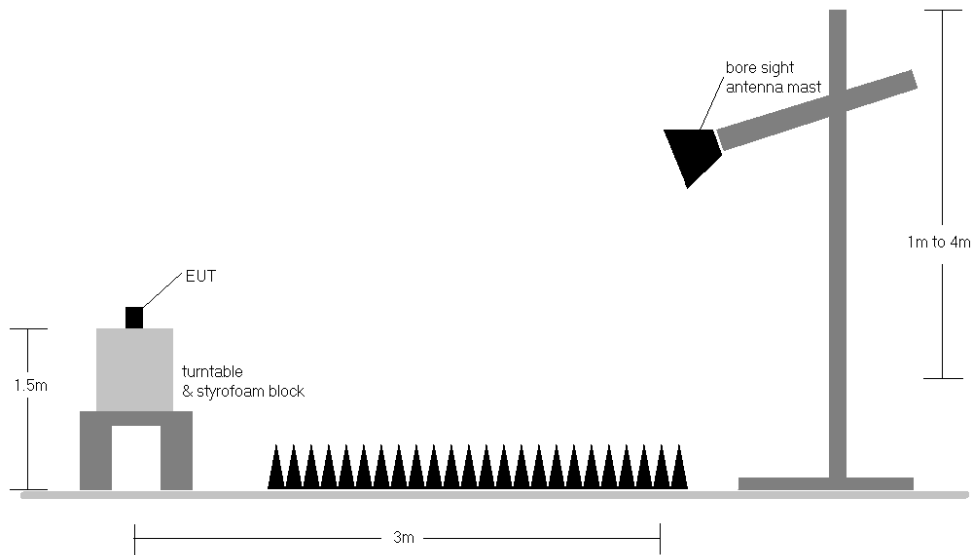


Figure 7-6. Radiated Test Setup > 1GHz

FCC ID: C3K1997	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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Test Notes

- 1) This device employs UMTS technology with WCDMA (AMR/RMC) and HSDPA capabilities. The EUT was tested under all configurations and the highest powers are reported in WCDMA mode with HSDPA Inactive at 12.2 kbps RMC and TPC bits all set to “1”.
- 2) 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.
- 3) This unit was tested with its standard battery.
- 4) For NR operation, all subcarrier spacings (SCS) and transmission schemes (e.g. CP-OFDM and DFT-s-OFDM) were investigated to determine the worst case configuration. All modes of operation were investigated and the worst-case configuration results are reported in this section.

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Bandwidth	Mod.	Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Ant. Gain [dBi]	RB Size/Offset	Substitute Level [dBm]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
15MHz (Band 26 only)	QPSK	831.5	H	200	116	6.73	1/37	16.89	21.47	0.140	38.45	-16.98	23.62	0.230	40.61	-16.99
	QPSK	836.5	H	202	116	6.73	1/0	16.93	21.51	0.142	38.45	-16.94	23.66	0.232	40.61	-16.95
	QPSK	841.5	H	202	123	6.73	1/0	16.40	20.98	0.125	38.45	-17.47	23.13	0.206	40.61	-17.48
	16-QAM	836.5	H	202	116	6.73	1/0	16.06	20.64	0.116	38.45	-17.81	22.79	0.190	40.61	-17.82
10 MHz	QPSK	829.0	H	200	116	6.70	1/0	16.89	21.44	0.139	38.45	-17.01	23.59	0.229	40.61	-17.01
	QPSK	836.5	H	202	116	6.73	1/0	16.69	21.27	0.134	38.45	-17.18	23.42	0.220	40.61	-17.19
	QPSK	844.0	H	202	123	6.76	1/0	16.40	21.01	0.126	38.45	-17.44	23.16	0.207	40.61	-17.45
	16-QAM	829.0	H	200	116	6.70	1/0	16.18	20.73	0.118	38.45	-17.72	22.88	0.194	40.61	-17.72
5 MHz	QPSK	826.5	H	200	116	6.67	1/0	16.96	21.49	0.141	38.45	-16.97	23.64	0.231	40.61	-16.97
	QPSK	836.5	H	202	116	6.73	1/12	16.92	21.50	0.141	38.45	-16.95	23.65	0.232	40.61	-16.96
	QPSK	846.5	H	202	123	6.78	1/12	16.30	20.93	0.124	38.45	-17.52	23.08	0.203	40.61	-17.52
	16-QAM	826.5	H	200	116	6.67	1/0	16.37	20.89	0.123	38.45	-17.56	23.04	0.201	40.61	-17.57
3 MHz	QPSK	825.5	H	200	116	6.66	1/7	16.89	21.40	0.138	38.45	-17.05	23.55	0.227	40.61	-17.06
	QPSK	836.5	H	202	116	6.73	1/0	16.83	21.41	0.138	38.45	-17.04	23.56	0.227	40.61	-17.04
	QPSK	847.5	H	202	123	6.79	1/7	16.21	20.85	0.122	38.45	-17.60	23.00	0.200	40.61	-17.61
	16-QAM	825.5	H	200	116	6.66	1/7	16.29	20.81	0.120	38.45	-17.64	22.96	0.198	40.61	-17.65
1.4 MHz	QPSK	824.7	H	200	116	6.66	1/3	16.82	21.32	0.136	38.45	-17.13	23.47	0.223	40.61	-17.13
	QPSK	836.5	H	202	116	6.73	1/5	16.78	21.36	0.137	38.45	-17.09	23.51	0.224	40.61	-17.10
	QPSK	848.3	H	202	123	6.77	1/3	16.16	20.78	0.120	38.45	-17.67	22.93	0.196	40.61	-17.68
	16-QAM	824.7	H	200	116	6.66	1/3	16.17	20.68	0.117	38.45	-17.77	22.83	0.192	40.61	-17.78
15MHz	QPSK (Opposite Pol.)	836.5	V	147	281	6.18	1/49	15.39	19.42	0.087	38.45	-19.03	21.57	0.144	40.61	-19.04

Table 7-6. ERP Data (LTE Band 26/5)

Bandwidth	Mod.	Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Ant. Gain [dBi]	RB Size/Offset	Substitute Level [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	V	175	292	6.15	1/26	15.32	19.32	0.086	38.45	-19.13	21.47	0.140	40.61	-19.13
	π/2 BPSK	836.5	V	170	290	6.18	1/26	15.72	19.75	0.094	38.45	-18.70	21.90	0.155	40.61	-18.71
	π/2 BPSK	839.0	V	171	290	6.30	1/26	14.84	18.99	0.079	38.45	-19.46	21.14	0.130	40.61	-19.46
	QPSK	834.0	V	175	292	6.15	1/26	15.50	19.50	0.089	38.45	-18.95	21.65	0.146	40.61	-18.95
	QPSK	836.5	V	170	290	6.18	1/26	15.87	19.90	0.098	38.45	-18.55	22.05	0.160	40.61	-18.56
	QPSK	839.0	V	171	290	6.30	1/26	14.94	19.09	0.081	38.45	-19.36	21.24	0.133	40.61	-19.36
15 MHz	16-QAM	836.5	V	170	290	6.18	1/26	15.34	19.37	0.086	38.45	-19.08	21.52	0.142	40.61	-19.09
	π/2 BPSK	831.5	V	175	292	6.13	1/58	15.23	19.21	0.083	38.45	-19.24	21.36	0.137	40.61	-19.25
	π/2 BPSK	836.5	V	170	290	6.18	1/58	15.76	19.79	0.095	38.45	-18.66	21.94	0.156	40.61	-18.67
	π/2 BPSK	841.5	V	171	290	6.33	1/58	14.80	18.98	0.079	38.45	-19.47	21.13	0.130	40.61	-19.48
	QPSK	831.5	V	175	292	6.13	1/58	15.61	19.59	0.091	38.45	-18.87	21.74	0.149	40.61	-18.87
	QPSK	836.5	V	170	290	6.18	1/58	15.75	19.78	0.095	38.45	-18.67	21.93	0.156	40.61	-18.68
10 MHz	QPSK	841.5	V	171	290	6.33	1/58	14.63	18.81	0.076	38.45	-19.64	20.96	0.125	40.61	-19.65
	16-QAM	836.5	V	170	290	6.18	1/58	15.58	19.61	0.091	38.45	-18.84	21.76	0.150	40.61	-18.85
	π/2 BPSK	829.0	V	175	292	6.10	1/13	15.25	19.20	0.083	38.45	-19.25	21.35	0.137	40.61	-19.26
	π/2 BPSK	836.5	V	170	290	6.18	1/38	15.73	19.76	0.095	38.45	-18.69	21.91	0.155	40.61	-18.70
	π/2 BPSK	844.0	V	171	290	6.36	1/13	14.54	18.74	0.075	38.45	-19.71	20.89	0.123	40.61	-19.71
	QPSK	829.0	V	175	292	6.10	1/13	15.65	19.60	0.091	38.45	-18.85	21.75	0.150	40.61	-18.85
5 MHz	QPSK	836.5	V	170	290	6.18	1/38	15.79	19.82	0.096	38.45	-18.63	21.97	0.157	40.61	-18.64
	QPSK	844.0	V	171	290	6.36	1/13	14.75	18.96	0.079	38.45	-19.49	21.11	0.129	40.61	-19.50
	16-QAM	836.5	V	170	290	6.18	1/38	15.50	19.52	0.090	38.45	-18.93	21.67	0.147	40.61	-18.93
	π/2 BPSK	829.0	V	175	292	6.07	1/12	15.29	19.22	0.083	38.45	-19.23	21.37	0.137	40.61	-19.24
	π/2 BPSK	836.5	V	170	290	6.18	1/6	15.82	19.85	0.097	38.45	-18.60	22.00	0.159	40.61	-18.60
	π/2 BPSK	844.0	V	171	290	6.38	1/6	14.79	19.02	0.080	38.45	-19.43	21.17	0.131	40.61	-19.43
20 MHz	QPSK	829.0	V	175	292	6.07	1/12	15.57	19.50	0.089	38.45	-18.95	21.65	0.146	40.61	-18.96
	QPSK	836.5	V	170	290	6.18	1/6	15.87	19.90	0.098	38.45	-18.55	22.05	0.160	40.61	-18.56
	QPSK	844.0	V	171	290	6.38	1/6	14.86	19.09	0.081	38.45	-19.36	21.24	0.133	40.61	-19.37
	16-QAM	836.5	V	170	290	6.18	1/6	15.49	19.52	0.089	38.45	-18.93	21.67	0.147	40.61	-18.94
20 MHz	QPSK (CP-OFDM)	836.5	V	165	290	6.18	1/26	13.72	17.75	0.060	38.45	-20.70	19.90	0.098	40.61	-20.71
	QPSK (Opposite Pol.)	836.5	H	201	126	6.18	1/26	14.91	18.94	0.078	38.45	-19.51	21.09	0.128	40.61	-19.52

Table 7-7. ERP Data (NR Band n5)

Frequency [MHz]	Mode	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Substitute Level [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	H	195.00	210.00	15.54	6.67	20.06	0.101	38.45	-18.39	22.21	0.166	40.61	-18.39
836.60	WCDMA850	H	180.00	217.00	15.84	6.74	20.43	0.110	38.45	-18.02	22.58	0.181	40.61	-18.03
846.60	WCDMA850	H	186.00	219.00	15.08	6.78	19.71	0.094	38.45	-18.74	21.86	0.154	40.61	-18.74
836.60	WCDMA850	V	147.00	276.00	15.58	6.18	19.61	0.091	38.45	-18.84	21.76	0.150	40.61	-18.85

Table 7-8. ERP Data (WCDMA Cell)

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7.7 Radiated Spurious Emissions Measurements

Test Overview

Radiated spurious emissions measurements are performed using the field strength conversion method described in ANSI C63.26-2015 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using hybrid (biconical/log) antennas. Measurements on signals operating above 1GHz are performed using vertically and horizontally polarized broadband horn antennas. All measurements are performed as RMS measurements while the EUT is operating at maximum power, and at the appropriate frequencies.

Test Procedures Used

ANSI C63.26-2015 – Section 5.5.4

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

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Test Setup

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

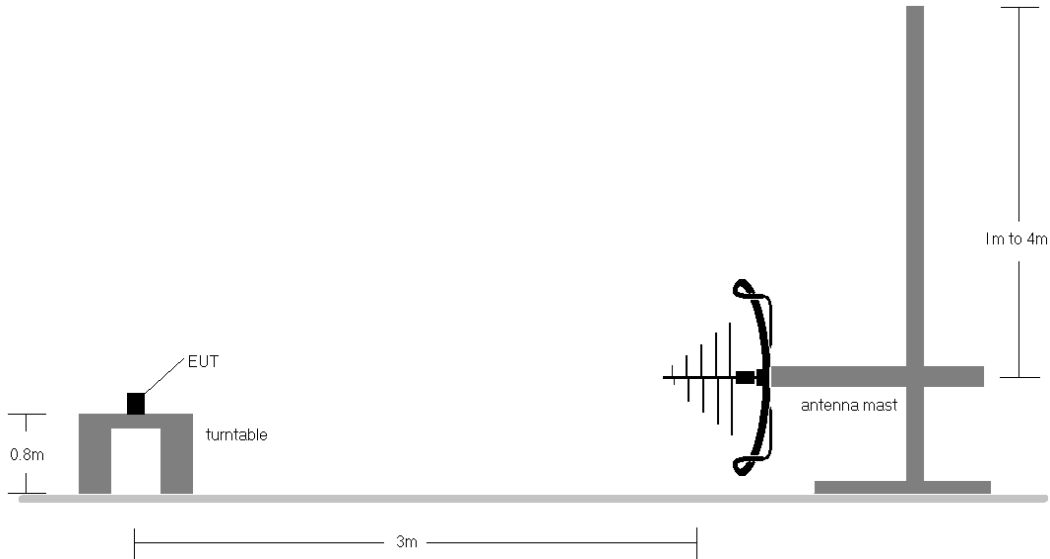


Figure 7-7. Test Instrument & Measurement Setup < 1GHz

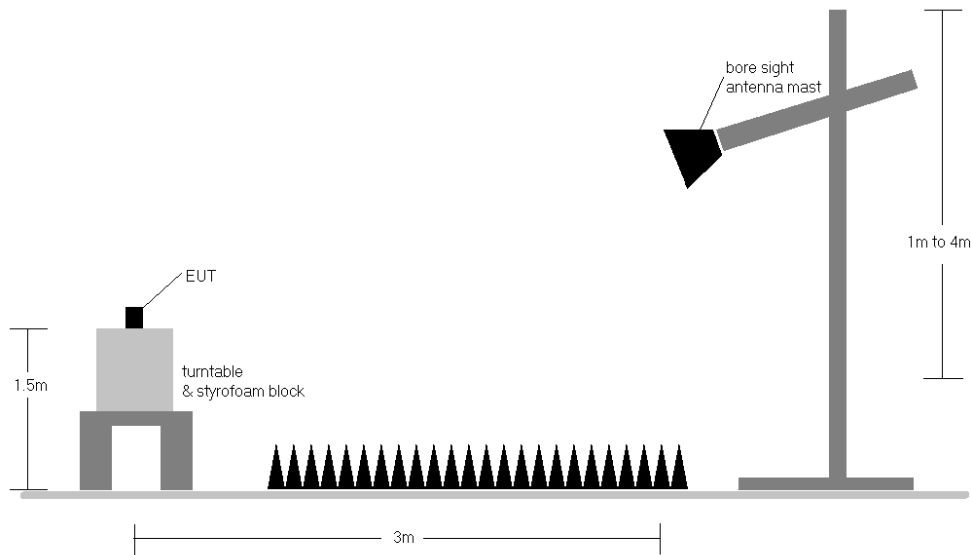


Figure 7-8. Test Instrument & Measurement Setup > 1GHz

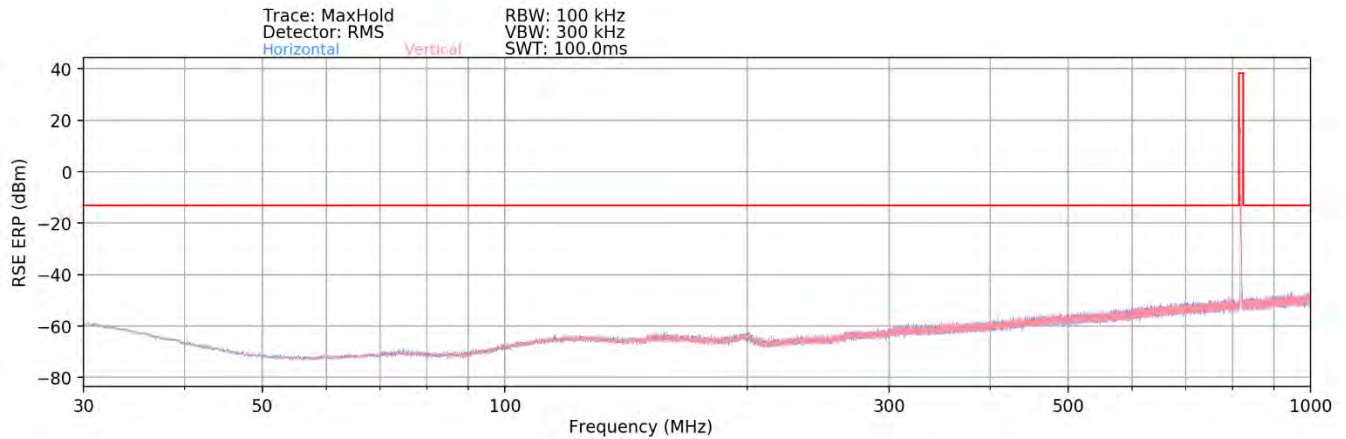
FCC ID: C3K1997	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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Test Notes

- 1) Field strengths are calculated using the Measurement quantity conversions in ANSI C63.26-2015 Section 5.2.7:
 - a) $E(\text{dB}\mu\text{V}/\text{m}) = \text{Measured amplitude level (dBm)} + 107 + \text{Cable Loss (dB)} + \text{Antenna Factor (dB/m)}$
 - b) $\text{EIRP (dBm)} = E(\text{dB}\mu\text{V}/\text{m}) + 20\log D - 104.8$; where D is the measurement distance in meters.
- 2) This device employs UMTS technology with WCDMA (AMR/RMC) and HSDPA capabilities. The EUT was tested under all configurations and the highest powers are reported in WCDMA mode with HSDPA Inactive at 12.2 kbps RMC and TPC bits all set to "1".
- 3) 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.
- 4) This unit was tested with its standard battery.
- 5) The spectrum is measured from 9kHz to the 10th harmonic of the fundamental frequency of the transmitter. The worst-case emissions are reported.
- 6) Emissions below 18GHz were measured at a 3-meter test distance while emissions above 18GHz were measured at a 1-meter test distance with the application of a distance correction factor.
- 7) The "-" shown in the following RSE tables are used to denote a noise floor measurement.
- 8) 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.
- 9) 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.
- 10) Spurious emissions shown in this section are measured while operating in EN-DC mode with Sub 6GHz NR carrier as well as an LTE carrier (anchor). Spurious emissions from the NR carrier device are subject to the rules under which the NR carrier operates. Spurious emissions caused by the LTE carrier must meet the requirements of the rules under which the LTE carrier operates.

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LTE Band 26/5

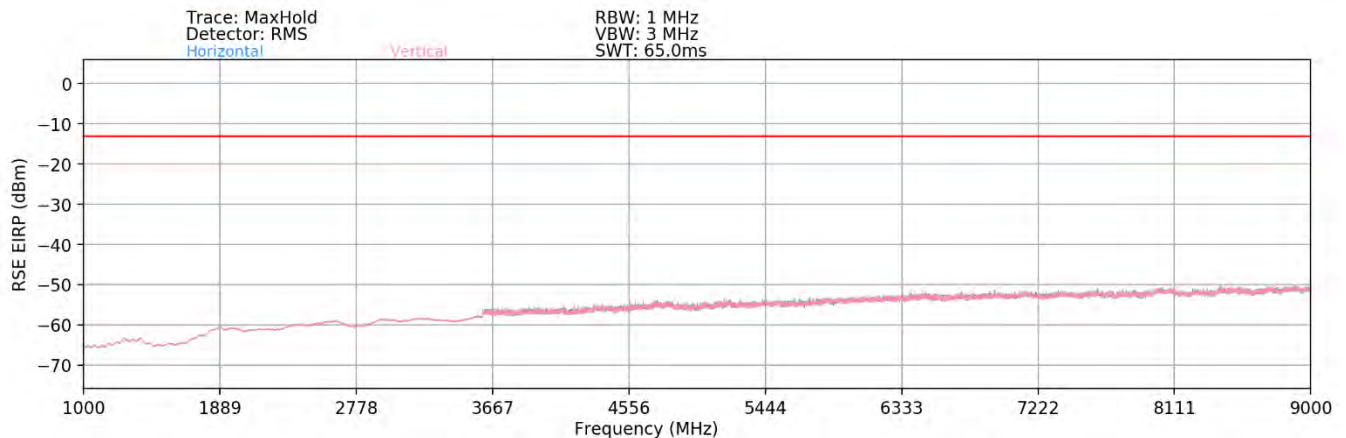


Plot 7-80. Radiated Spurious Plot Below 1GHz (LTE Band 26/5)

Bandwidth (MHz):	15
Frequency (MHz):	836.5
RB / Offset:	1/37
Detector / Trace Mode:	RMS / Average
RBW / VBW:	100kHz / 300kHz

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	ERP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
139.25	H	-	-	-99.02	19.53	27.51	-67.75	-13.00	-54.75
325.12	H	-	-	-98.76	21.71	29.95	-65.31	-13.00	-52.31

Table 7-9. Radiated Spurious Data (LTE Band 26/5)



Plot 7-81. Radiated Spurious Plot Above 1GHz (LTE Band 26/5)

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Bandwidth (MHz):	15
Frequency (MHz):	831.5
RB / Offset:	1 / 37

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dB μ V/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1663.00	H	-	-	-77.36	-3.72	25.92	-69.34	-13.00	-56.34
2494.50	H	-	-	-77.87	0.65	29.78	-65.48	-13.00	-52.48
3326.00	H	-	-	-78.25	1.92	30.67	-64.59	-13.00	-51.59
4157.50	H	161	145	-76.28	2.85	33.57	-61.69	-13.00	-48.69
4989.00	H	-	-	-79.11	4.05	31.94	-63.31	-13.00	-50.31

Table 7-10. Radiated Spurious Data (LTE Band 26/5 – Low Channel)

Bandwidth (MHz):	15
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 [dB μ V/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1673.00	H	-	-	-77.23	-3.55	26.22	-69.03	-13.00	-56.03
2509.50	H	185	259	-76.96	0.80	30.84	-64.42	-13.00	-51.42
3346.00	H	-	-	-78.31	1.95	30.64	-64.62	-13.00	-51.62
4182.50	H	181	146	-76.72	2.95	33.23	-62.03	-13.00	-49.03
5019.00	H	-	-	-79.40	4.33	31.93	-63.32	-13.00	-50.32
5855.50	H	-	-	-79.70	6.10	33.40	-61.85	-13.00	-48.85

Table 7-11. Radiated Spurious Data (LTE Band 26/5 – Mid Channel)

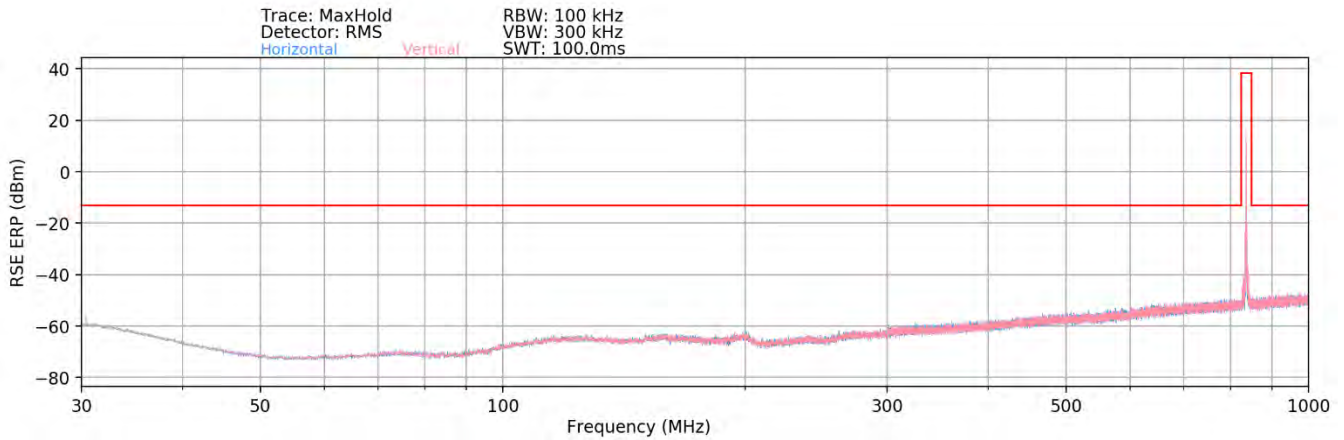
Bandwidth (MHz):	15
Frequency (MHz):	841.5
RB / Offset:	1 / 37

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dB μ V/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1683.00	H	-	-	-77.19	-3.28	26.53	-68.73	-13.00	-55.73
2524.50	H	-	-	-77.47	1.12	30.65	-64.61	-13.00	-51.61
3366.00	H	-	-	-77.89	1.86	30.97	-64.29	-13.00	-51.29
4207.50	H	152	144	-76.39	3.00	33.61	-61.64	-13.00	-48.64
5049.00	H	-	-	-79.32	4.88	32.56	-62.69	-13.00	-49.69

Table 7-12. Radiated Spurious Data (LTE Band 26/5 – High Channel)

FCC ID: C3K1997	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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ULCA LTE Band 5

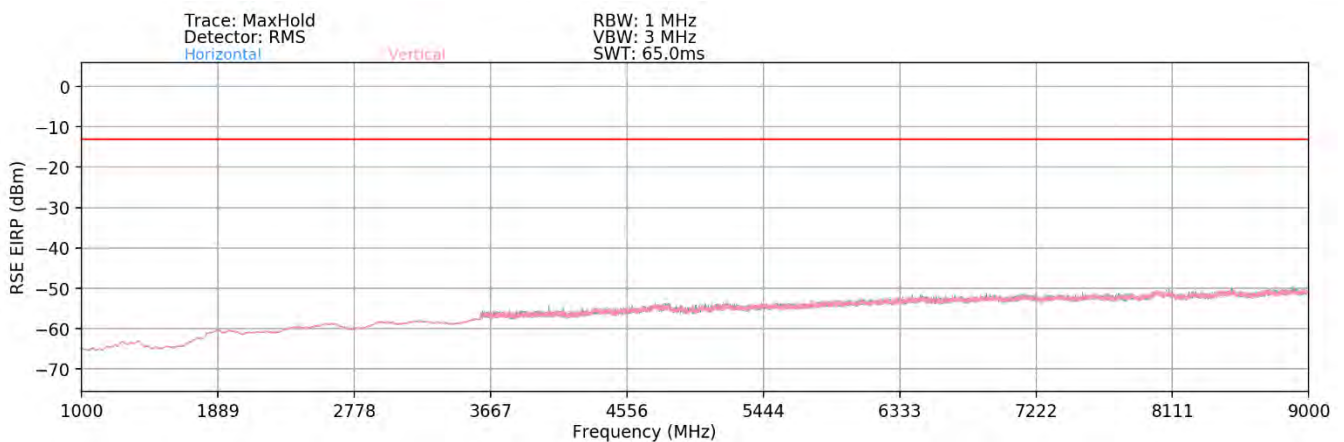


Plot 7-82. Radiated Spurious Plot Below 1GHz (ULCA LTE Band 5)

PCC Bandwidth (MHz):	10
PCC Frequency (MHz):	831.5
PCC RB / Offset:	1/49
SCC Bandwidth (MHz):	10
SCC Frequency (MHz):	841.4
SCC RB / Offset:	1/0
Detector / Trace Mode:	RMS / Average
RBW / VBW:	100kHz / 300kHz

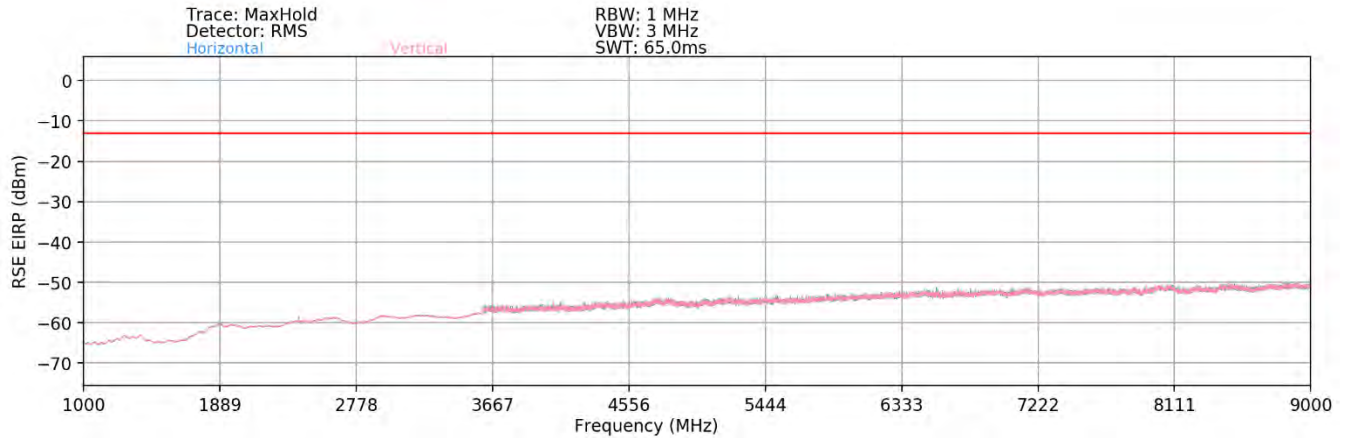
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	ERP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
147.50	H	-	-	-100.18	19.70	26.52	-68.74	-13.00	-55.74
326.47	H	-	-	-99.70	21.70	29.00	-66.25	-13.00	-53.25

Table 7-13. Radiated Spurious Data (ULCA LTE Band 5)

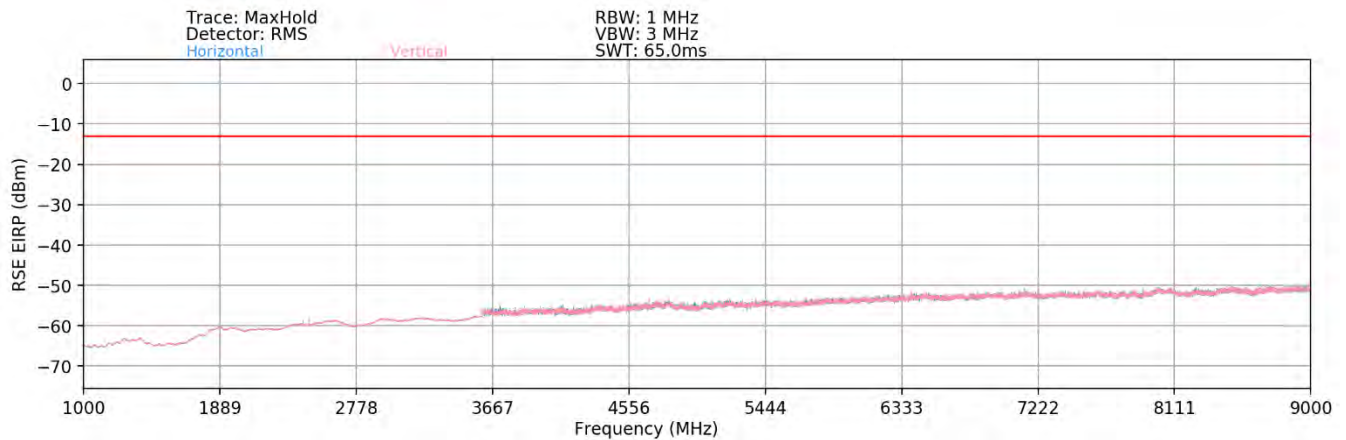


Plot 7-83. Radiated Spurious Plot Above 1GHz (ULCA LTE Band 5 – Low Channel)

FCC ID: C3K1997	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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Plot 7-84. Radiated Spurious Plot (ULCA LTE Band 5 – Mid Channel)



Plot 7-85. Radiated Spurious Plot (ULCA LTE Band 5 – High Channel)

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
Detector / Trace Mode:	RMS / Average
RBW / VBW:	1MHz / 3MHz

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]
1667.90	H	-	-	-77.37	-3.75	25.88	-69.37	-13.00	-56.37
2501.85	H	154	257	-77.01	0.56	30.55	-64.70	-13.00	-51.70
3335.80	H	-	-	-78.05	1.92	30.87	-64.39	-13.00	-51.39
4169.75	H	165	145	-77.81	2.87	32.06	-63.20	-13.00	-50.20
5003.70	H	-	-	-79.21	4.07	31.86	-63.40	-13.00	-50.40
5837.65	H	-	-	-79.71	5.71	33.00	-62.26	-13.00	-49.26

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

FCC ID: C3K1997	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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PCC Bandwidth (MHz):	10
PCC Frequency (MHz):	831.5
PCC RB / Offset:	1 / 49
SCC Bandwidth (MHz):	10
SCC Frequency (MHz):	841.4
SCC RB / Offset:	1 / 0
Detector / Trace Mode:	RMS / Average
RBW / VBW:	1MHz / 3MHz

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]
1672.00	H	-	-	-77.05	-3.57	26.38	-68.88	-13.00	-55.88
2508.00	H	211	209	-76.20	0.79	31.59	-63.67	-13.00	-50.67
3344.00	H	-	-	-78.06	1.95	30.89	-64.37	-13.00	-51.37
4180.00	H	185	145	-78.02	2.93	31.91	-63.35	-13.00	-50.35
5016.00	H	-	-	-79.33	4.27	31.94	-63.32	-13.00	-50.32
5852.00	H	-	-	-79.61	6.13	33.52	-61.73	-13.00	-48.73

Table 7-15. Radiated Spurious Data (ULCA LTE Band 5 – Mid 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
Detector / Trace Mode:	RMS / Average
RBW / VBW:	1MHz / 3MHz

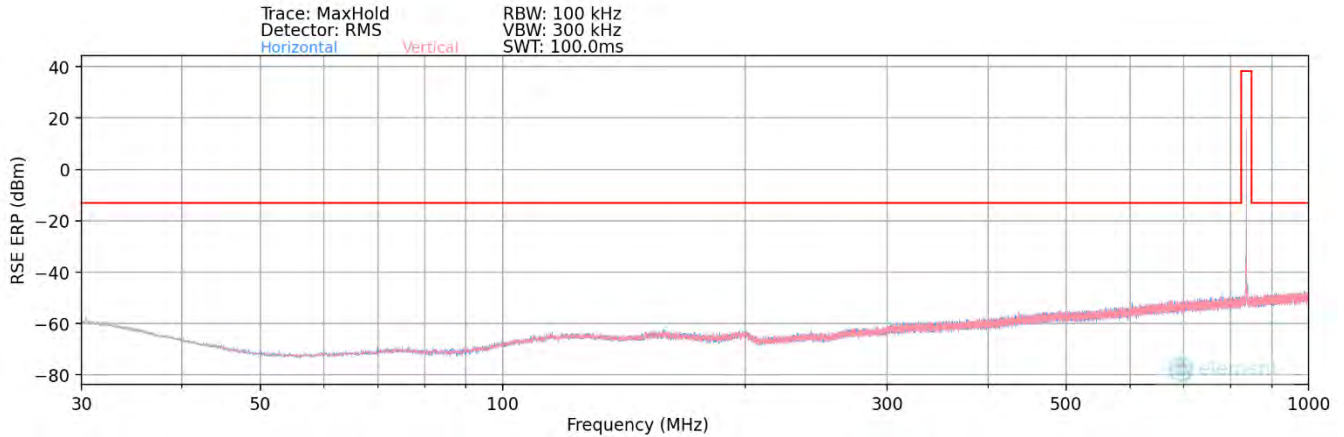
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1678.10	H	-	-	-77.01	-3.19	26.80	-68.46	-13.00	-55.46
2517.15	H	170	187	-77.19	1.17	30.98	-64.27	-13.00	-51.27
3356.20	H	-	-	-78.03	1.79	30.76	-64.50	-13.00	-51.50
4195.25	H	170	316	-78.05	2.94	31.89	-63.36	-13.00	-50.36
5034.30	H	-	-	-79.34	4.86	32.52	-62.73	-13.00	-49.73
5873.35	H	-	-	-79.74	6.17	33.43	-61.82	-13.00	-48.82

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

FCC ID: C3K1997	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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NR Band n5

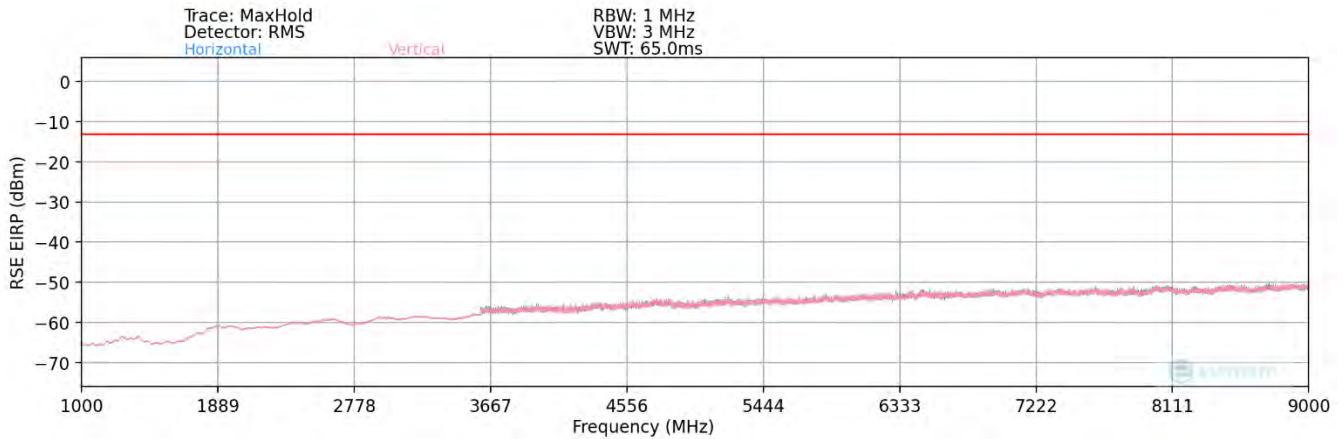


Plot 7-86. Radiated Spurious Plot (NR Band n5)

Bandwidth (MHz):	20
Frequency (MHz):	836.5
RB / Offset:	1/53
Mode:	Stand-alone

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	ERP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
125.70	V	-	-	-100.78	20.43	26.65	-68.61	-13.00	-55.61
445.20	V	-	-	-98.97	24.69	32.72	-62.54	-13.00	-49.54

Table 7-17. Radiated Spurious Data (NR Band n5)



Plot 7-87. Radiated Spurious Plot (NR Band n5)

FCC ID: C3K1997	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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Bandwidth (MHz):	20
Frequency (MHz):	834
RB / Offset:	1 / 53
Mode:	Stand Alone

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]
1668.00	H	-	-	-77.61	-3.66	25.73	-69.53	-13.00	-56.53
2502.00	H	-	-	-77.54	0.75	30.21	-65.05	-13.00	-52.05
3336.00	H	-	-	-77.95	1.93	30.98	-64.28	-13.00	-51.28

Table 7-18. Radiated Spurious Data (NR Band n5 – Low Channel)

Bandwidth (MHz):	20
Frequency (MHz):	836.5
RB / Offset:	1 / 53
Mode:	Stand Alone

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]
1673.00	H	-	-	-77.43	-3.55	26.02	-69.23	-13.00	-56.23
2509.50	H	-	-	-78.34	0.80	29.46	-65.80	-13.00	-52.80
3346.00	H	-	-	-78.11	1.95	30.84	-64.42	-13.00	-51.42

Table 7-19. Radiated Spurious Data (NR Band n5 – Mid Channel)

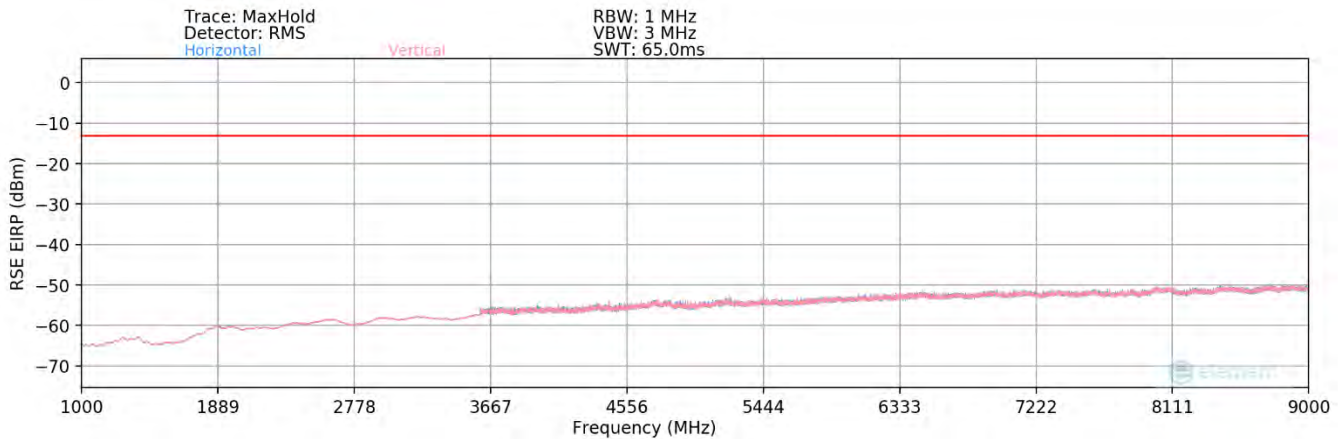
Bandwidth (MHz):	20
Frequency (MHz):	839
RB / Offset:	1 / 53
Mode:	Stand Alone

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]
1678.00	H	-	-	-77.32	-3.42	26.26	-68.99	-13.00	-55.99
2517.00	H	-	-	-77.51	1.00	30.49	-64.77	-13.00	-51.77
3356.00	H	-	-	-77.91	1.94	31.03	-64.23	-13.00	-51.23

Table 7-20. Radiated Spurious Data (NR Band n5 – High Channel)

FCC ID: C3K1997	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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WCDMA Cell



Plot 7-88. Radiated Spurious Plot Above 1GHz (WCDMA Cell)

Mode:	WCDMA RMC
Channel:	4132
Frequency (MHz):	826.4
Detector / Trace Mode:	RMS / Average
RBW / VBW:	1MHz / 3MHz

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]
1652.80	H	-	-	-76.91	-3.78	26.31	-68.94	-13.00	-55.94
2479.20	H	-	-	-76.47	0.51	31.04	-64.21	-13.00	-51.21
3305.60	H	-	-	-76.45	1.95	32.50	-62.76	-13.00	-49.76
4132.00	H	-	-	-78.49	2.98	31.49	-63.77	-13.00	-50.77

Table 7-21. Radiated Spurious Data (WCDMA Cell – Low Channel)

Mode:	WCDMA RMC
Channel:	4183
Frequency (MHz):	836.6
Detector / Trace Mode:	RMS / Average
RBW / VBW:	1MHz / 3MHz

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]
1673.20	H	-	-	-76.87	-3.54	26.59	-68.67	-13.00	-55.67
2509.80	H	221	70	-75.59	0.80	32.21	-63.04	-13.00	-50.04
3346.40	H	-	-	-77.83	1.95	31.12	-64.14	-13.00	-51.14
4183.00	H	-	-	-78.32	2.95	31.63	-63.63	-13.00	-50.63
5019.60	H	-	-	-79.23	4.35	32.12	-63.14	-13.00	-50.14

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

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Mode:	WCDMA RMC
Channel:	4233
Frequency (MHz):	846.6
Detector / Trace Mode:	RMS / Average
RBW / VBW:	1MHz / 3MHz

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dB μ V/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1693.20	H	-	-	-77.05	-3.06	26.89	-68.37	-13.00	-55.37
2539.80	H	-	-	-76.47	1.21	31.74	-63.52	-13.00	-50.52
3386.40	H	360	139	-77.49	1.72	31.23	-64.03	-13.00	-51.03
4233.00	H	-	-	-77.80	2.89	32.09	-63.16	-13.00	-50.16

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

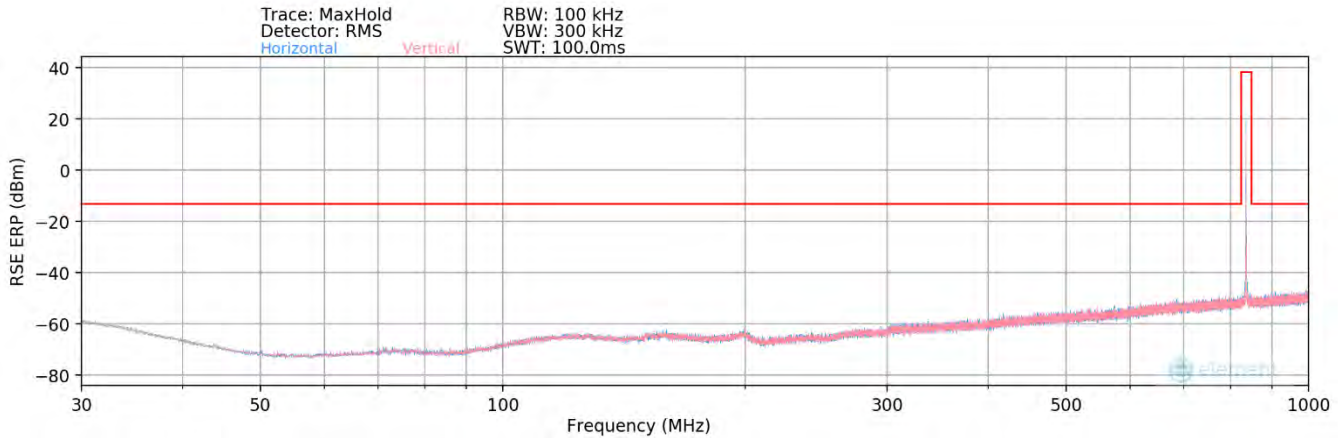
Mode:	WCDMA RMC
Channel:	4183
Frequency (MHz):	836.6
Detector / Trace Mode:	RMS / Average
RBW / VBW:	100kHz / 300kHz

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dB μ V/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
193.01	V	-	-	-90.28	19.07	35.79	-59.47	-13.00	-46.47
539.80	V	-	-	-90.06	26.17	43.11	-52.15	-13.00	-39.15

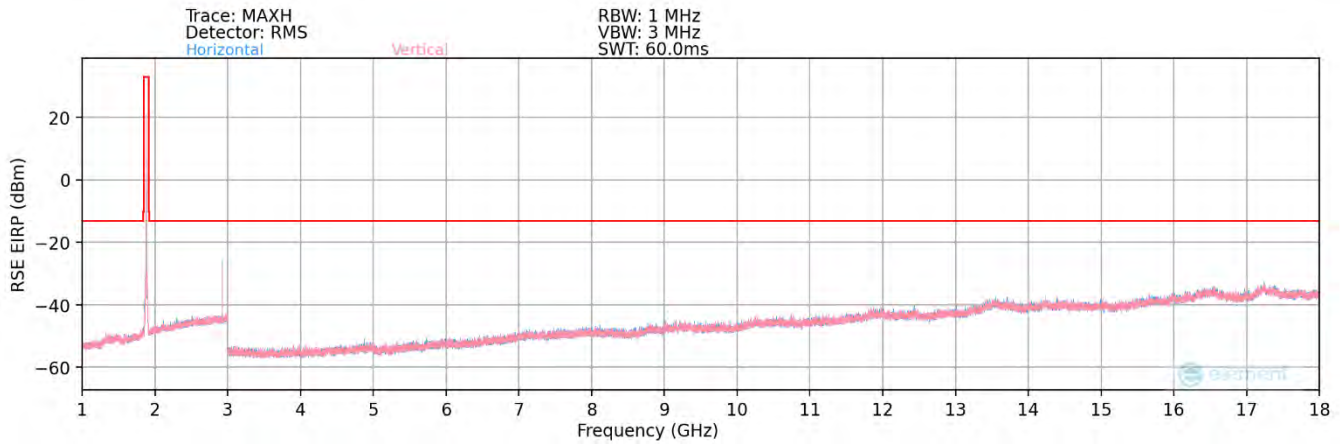
Table 7-24. Radiated Spurious Data (WCDMA Cell)

FCC ID: C3K1997	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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NR Band n5 – B2



Plot 7-89. Radiated Spurious Plot Below 1GHz (NR Band n5- B2)



Plot 7-90. Radiated Spurious Plot Above 1GHz (NR Band n5- B2)

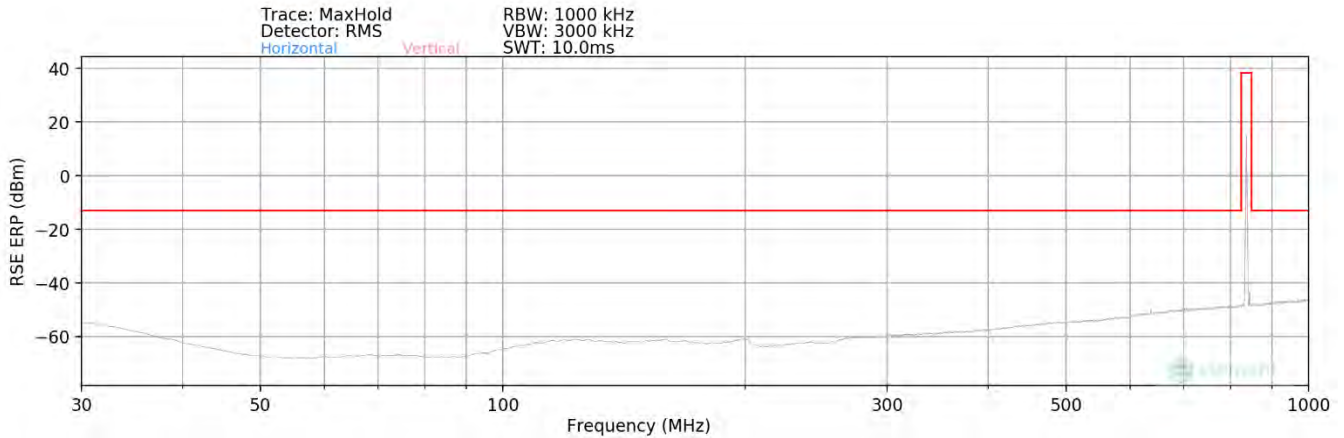
Bandwidth (MHz):	20
Frequency (MHz):	836.5
RB / Offset:	1/50
Mode:	EN-DC
Anchor Band:	LTE Band 2

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]
1250.50	H	-	-	-71.20	-1.48	34.32	-60.93	-13.00	-47.93
2294.00	H	-	-	-70.52	4.73	41.21	-54.05	-13.00	-41.05
2923.50	H	341	55	-51.41	5.82	61.41	-33.84	-13.00	-20.84
3337.50	H	-	-	-80.56	7.92	34.36	-60.89	-13.00	-47.89
3967.00	H	-	-	-80.23	8.91	35.68	-59.57	-13.00	-46.57

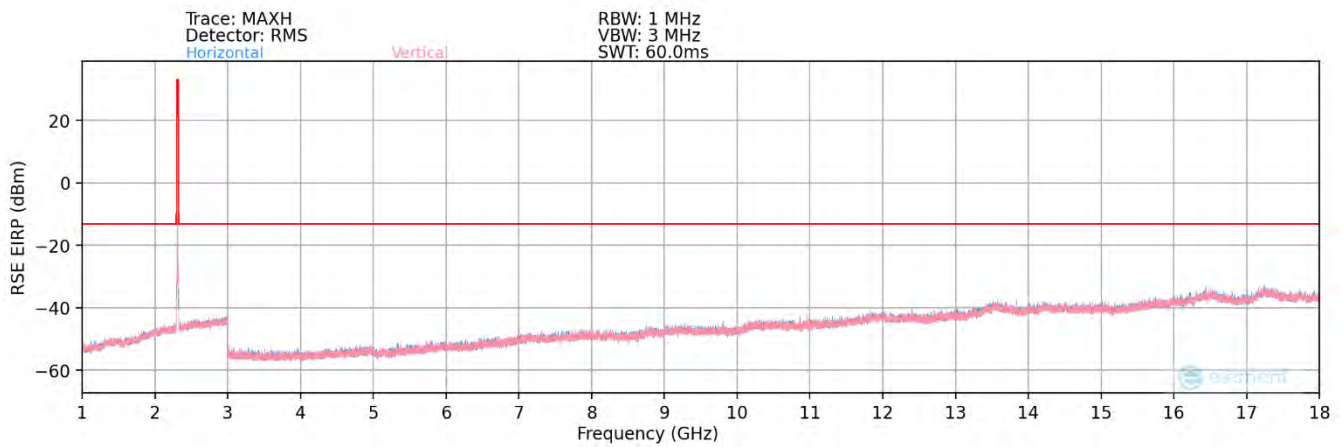
Table 7-25. Radiated Spurious Data (NR Band n5- B2 – Low Channel)

FCC ID: C3K1997	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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NR Band n5 – B30



Plot 7-91. Radiated Spurious Plot Below 1GHz (NR Band n5- B2)



Plot 7-92. Radiated Spurious Plot Above 1GHz (NR Band n5- B2)

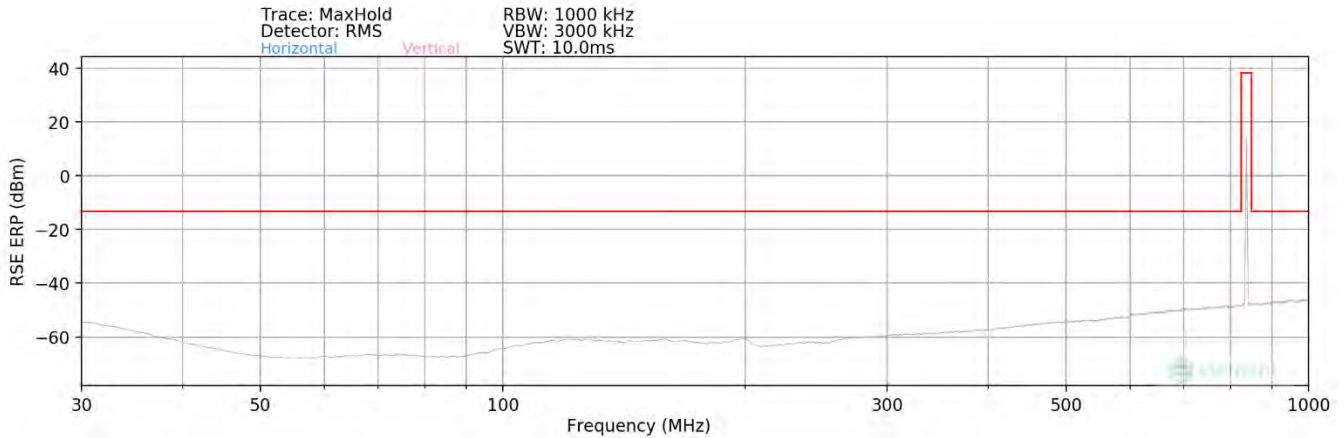
Bandwidth (MHz):	20
Frequency (MHz):	836.5
RB / Offset:	1/50
Mode:	EN-DC
Anchor Band:	LTE Band 30

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]
2110.50	H	-	-	-78.21	4.33	33.12	-62.14	-13.00	-49.14
3584.00	H	-	-	-79.76	8.39	35.63	-59.63	-13.00	-46.63
3783.50	H	-	-	-79.41	8.50	36.09	-59.17	-13.00	-46.17

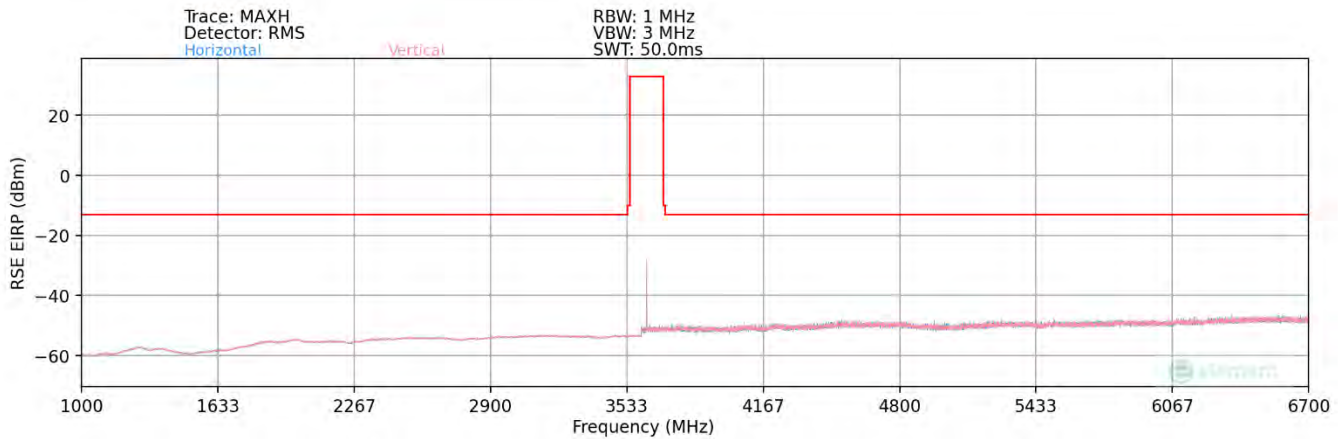
Table 7-26. Radiated Spurious Data (NR Band n5- B2 – Low Channel)

FCC ID: C3K1997	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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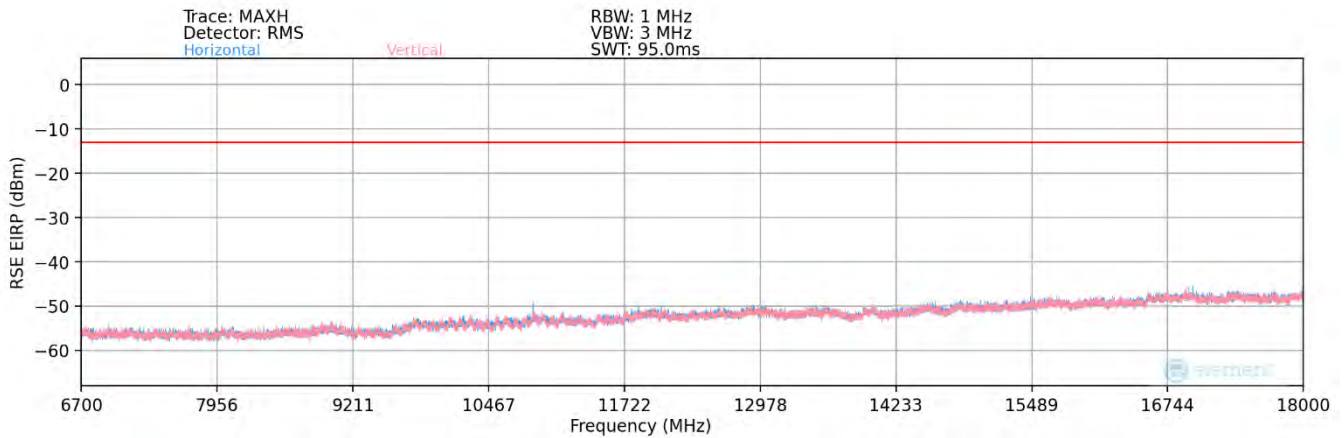
NR Band n5 – B48



Plot 7-93. Radiated Spurious Plot Below 1GHz (NR Band n5- B48)



Plot 7-94. Radiated Spurious Plot 1-6.7GHz (NR Band n5- B48)



Plot 7-95. Radiated Spurious Plot 6.7-18GHz (NR Band n5- B48)

FCC ID: C3K1997	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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Bandwidth (MHz):	20
Frequency (MHz):	836.5
RB / Offset:	1/50
Mode:	EN-DC
Anchor Band:	48

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dB μ V/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
515.00	V	-	-	-95.58	25.94	37.36	-57.90	-13.00	-44.90
4740.50	V	-	-	-78.03	14.49	43.46	-51.80	-13.00	-38.80
6413.50	V	-	-	-78.98	17.34	45.36	-49.89	-13.00	-36.89
7529.00	V	-	-	-79.62	8.44	35.82	-59.44	-13.00	-46.44
9202.00	V	-	-	-77.90	8.96	38.06	-57.20	-13.00	-44.20
10875.00	V	318	142	-75.45	12.18	43.73	-51.52	-13.00	-38.52

Table 7-27. Radiated Spurious Data (NR Band n5- B48 – Low Channel)

FCC ID: C3K1997	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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7.8 Frequency Stability / Temperature Variation

Test Overview and Limit

Frequency stability testing is performed in accordance with the guidelines of ANSI C63.26-2015. The frequency stability 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 and RSS-132, the frequency stability of the transmitter shall be maintained within ±0.00025% (±2.5 ppm) of the center frequency.

Test Procedure Used

ANSI C63.26-2015 – Section 5.6

Test Settings

1. The carrier frequency of the transmitter is measured at room temperature (20°C to provide a reference).
2. 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.
3. 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

The EUT was connected via an RF cable to a spectrum analyzer with the EUT placed inside an environmental chamber.

Test Notes

None

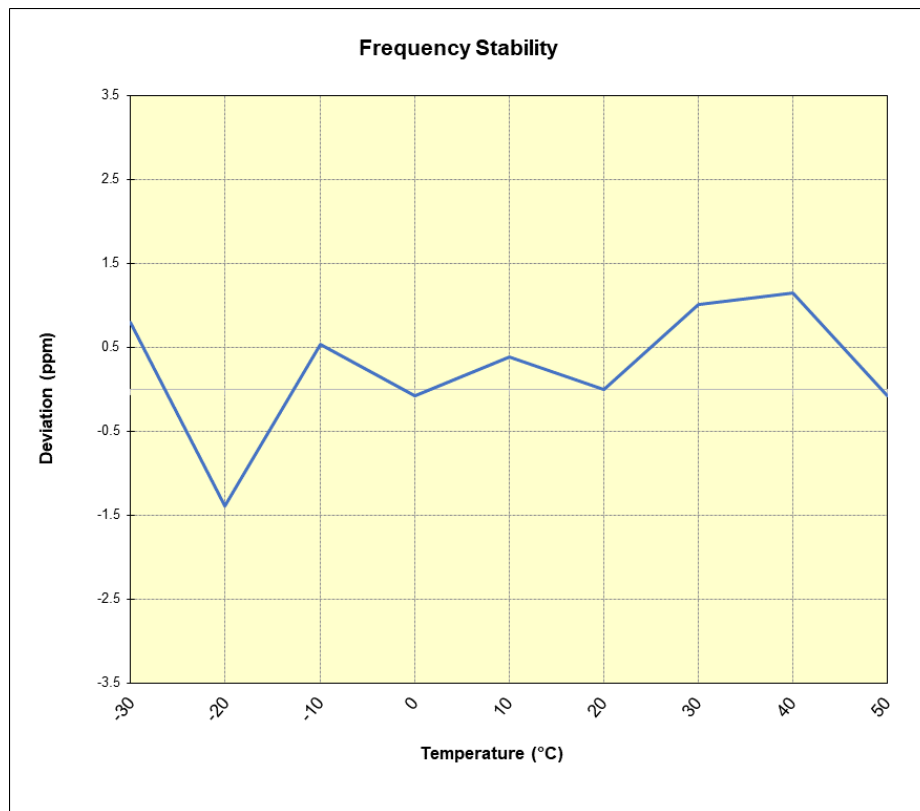
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LTE Band 26/5					
Operating Frequency (Hz):		836,500,000			
Ref. Voltage (VDC):		7.60			
Deviation Limit:		± 0.00025% or 2.5 ppm			
Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	7.60	- 30	836,680,689	670	0.0000800
		- 20	836,678,858	-1,162	-0.0001389
		- 10	836,680,466	446	0.0000533
		0	836,679,951	-68	-0.0000082
		+ 10	836,680,340	320	0.0000382
		+ 20 (Ref)	836,680,020	0	0.0000000
		+ 30	836,680,861	841	0.0001005
		+ 40	836,680,983	963	0.0001151
		+ 50	836,679,956	-64	-0.0000077
Battery Endpoint	7.20	+ 20	836,680,150	130	0.0000156

Table 7-28. LTE Band 26/5 Frequency Stability Data

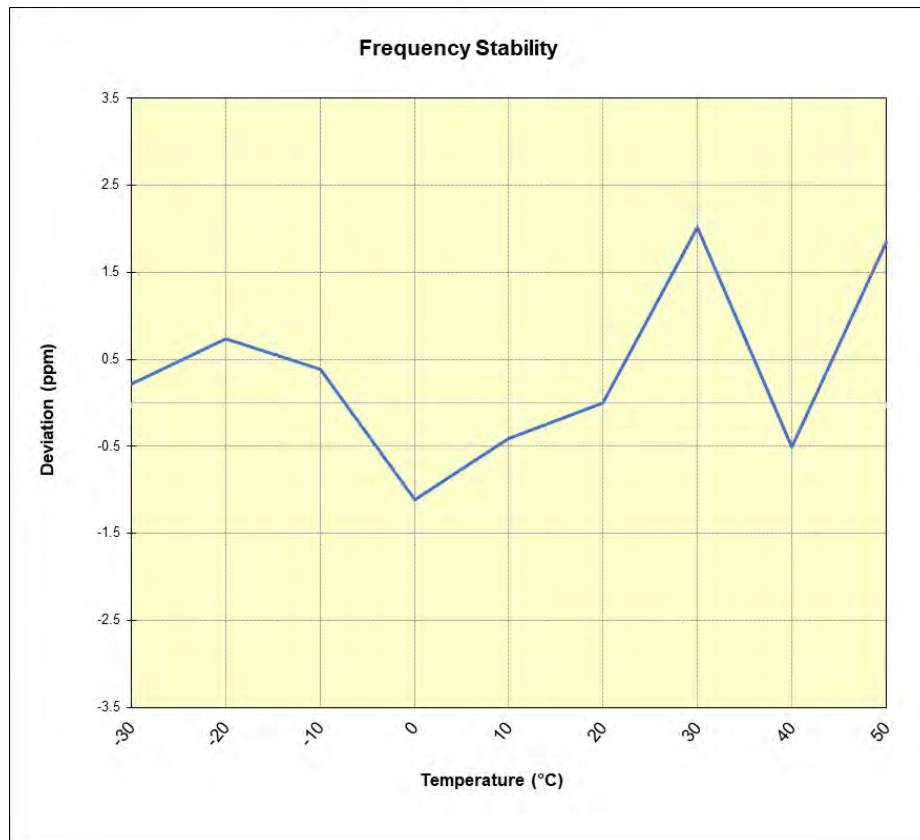


Plot 7-96. LTE Band 26/5 Frequency Stability Chart

FCC ID: C3K1997	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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NR Band n5					
Operating Frequency (Hz):		836,500,000			
Ref. Voltage (VDC):		7.60			
Deviation Limit:		± 0.00025% or 2.5 ppm			
Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	7.60	- 30	836,579,540	179	0.0000214
		- 20	836,579,978	617	0.0000738
		- 10	836,579,684	323	0.0000386
		0	836,578,427	-934	-0.0001116
		+ 10	836,579,021	-340	-0.0000406
		+ 20 (Ref)	836,579,361	0	0.0000000
		+ 30	836,581,048	1,688	0.0002017
		+ 40	836,578,935	-426	-0.0000509
		+ 50	836,580,905	1,544	0.0001846
Battery Endpoint	7.20	+ 20	836,579,541	180	0.0000216

Table 7-29. NR Band n5 Frequency Stability Data

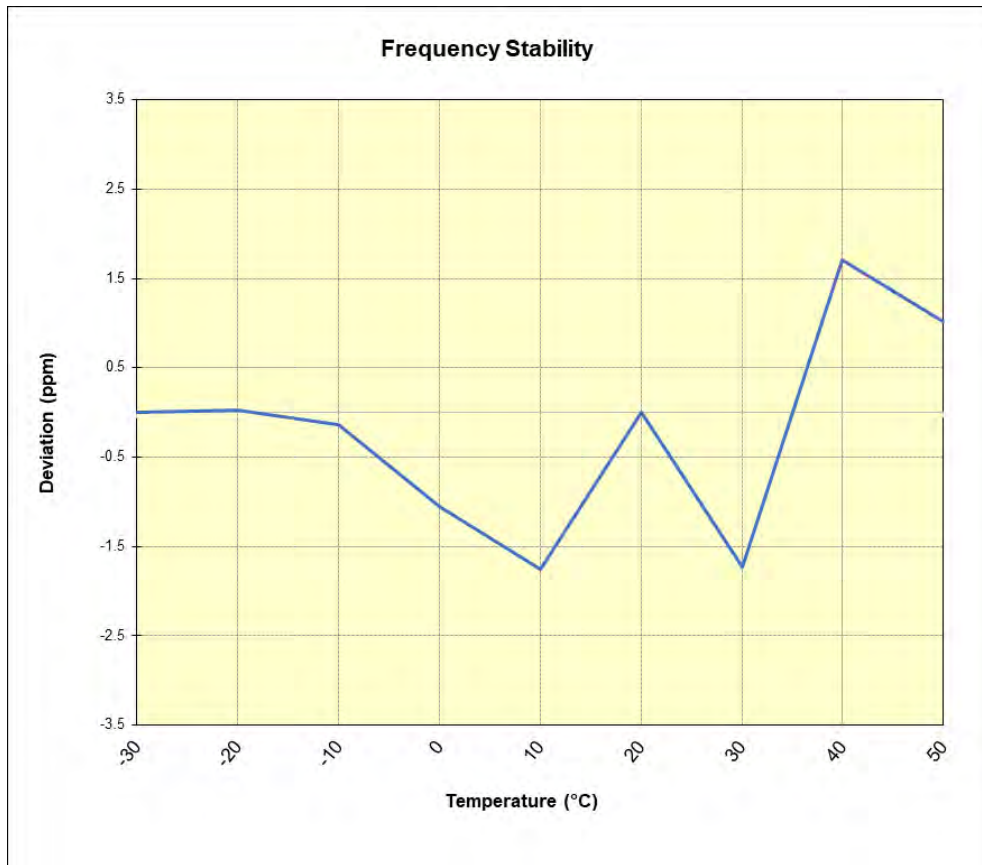


Plot 7-97. NR Band n5 Frequency Stability Chart

FCC ID: C3K1997	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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WCDMA Cellular					
Operating Frequency (Hz):		836,600,000			
Ref. Voltage (VDC):		7.60			
Deviation Limit:		± 0.00025% or 2.5 ppm			
Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	7.60	- 30	836,534,486	167	0.0000199
		- 20	836,534,347	28	0.0000033
		- 10	836,534,207	-112	-0.0000134
		0	836,533,440	-880	-0.0001052
		+ 10	836,532,850	-1,470	-0.0001757
		+ 20 (Ref)	836,534,319	0	0.0000000
		+ 30	836,532,876	-1,444	-0.0001726
		+ 40	836,535,748	1,429	0.0001708
		+ 50	836,535,175	856	0.0001023
Battery Endpoint	7.20	+ 20	836,534,463	144	0.0000172

Table 7-30. WCDMA Cell Frequency Stability Data



Plot 7-98. WCDMA Cell Frequency Stability Chart

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8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **Portable Computing Device FCC ID: C3K1997** complies with all the requirements of Part 22 of the FCC rules.

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