



ELEMENT WASHINGTON DC LLC

7185 Oakland Mills Road, Columbia, MD 21046 USA

Tel. 410.290.6652 / Fax 410.290.6654

<http://www.element.com>

PART 27 MEASUREMENT REPORT

Applicant Name:

Centum Research & Technology S.L
Fonte das Abelleiras S/N
Edificio Citexvi
36310 Vigo (Spain)

Date of Testing:

04/05 - 10/09/2024

Test Report Issue Date:

12/2/2024

Test Site/Location:

Element lab., Columbia, MD, USA

Test Report Serial No.:

1M2402290014-03.2A93U

FCC ID:

2A93U-58450

APPLICANT:

Centum Research & Technology S.L

Application Type:

Certification

Model:

Lifeseeker SAR XL S10

EUT Type:

Geolocation System

FCC Classification:

PCS Licensed Transmitter (PCB)

FCC Rule Part:

27

Test Procedure(s):

ANSI C63.26-2015

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

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

RJ Ortanez
Executive Vice President



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MEASUREMENT REPORT

FCC Part 27

Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	EIRP		Emission Designator
				Max. Power [W]	Max. Power [dBm]	
WCDMA1700	N/A	Spread Spectrum	2112.4 - 2152.6	0.545	27.36	4M36F9W
LTE Band 66/4	5 MHz	QPSK	2112.5 - 2177.5	0.499	26.98	4M68G7D

Mode	Bandwidth	Tx Frequency Range [MHz]	ERP		EIRP		Emission Designator
			Max. Power [W]	Max. Power [dBm]	Max. Power [W]	Max. Power [dBm]	
LTE Band 12	5 MHz	731.5 - 743.5	0.018	12.57	0.030	14.72	4M71G7D
LTE Band 13	5 MHz	748.5 - 753.5	1.486	31.72	2.438	33.87	4M94G7D
WCDMA Band 12	5 MHz	731.4 - 743.6	0.002	2.67	0.003	4.82	4M39G7D
WCDMA Band 13	5 MHz	748.4 - 753.6	0.483	26.84	0.793	28.99	4M36G7D

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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 ISSED Standards (RSS).
- Element Washington DC LLC facility is a registered (2451B) test laboratory with the site description on file with ISSED.
- Element Washington DC LLC is a Recognized U.S. Certification Assessment Body (CAB # US0110) for ISSED 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 **Centum Geolocation System FCC ID: 2A93U-58450**. The test data contained in this report pertains only to the emissions due to the EUT's licensed transmitters that operate under the provisions of Part 27.

Test Device Serial No.: 213006

2.2 Device Capabilities

This device contains the following capabilities: LTE Bands 26/5, 25/2, 12, 13, 66/4 (with 5MHz operation only), UMTS 850, UMTS 1700, UMTS 1900, UMTS B12, UMTS B13, GSM 850, and GSM1900

LTE operation only supports QPSK modulation.

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.

The EUT used test software provided by the manufacturer to generate the RF waveforms at maximum (>98%) duty cycle.

2.4 Software and Firmware

Testing was performed on device(s) using software/firmware version 3.x installed 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 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, 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:

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

And

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

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
N/A	ETS-001	EMC Cable and Switch System	4/2/2024	Annual	4/2/2025	ETS-001
N/A	ETS-002	EMC Cable and Switch System	4/2/2024	Annual	4/2/2025	ETS-002
EMCO	3115	Horn Antenna (1-18GHz)	8/8/2022	Biennial	8/8/2024	9704-5182
Keysight Technologies	N9030A	PXA Signal Analyzer (44GHz)	4/9/2024	Annual	4/9/2025	MY52350166
Keysight Technologies	N9038A	MXE EMI Receiver	8/30/2023	Annual	8/30/2024	MY51210133
Rohde & Schwarz	ESU26	EMI Test Receiver (26.5GHz)	9/25/2023	Annual	9/25/2024	100342
Sunol Sciences	JB5	Bi-Log Antenna (30M-5GHz)	8/30/2022	Biennial	8/30/2024	A051107
N/A	RF010	SMA-SMA RF Cable	5/21/2024	Annual	5/21/2025	RF010
N/A	WL25-4	WLAN Cable Set (25GHz)	5/21/2024	Annual	5/21/2025	WL25-4

Table 5-1. Test Equipment (04/05 – 06/24/2024)

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Espec	ESX-2CA	Environmental Chamber	9/26/2024	Biennial	9/26/2026	017620

Table 5-2. Test Equipment (10/07 – 10/09/2024)

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6.0 SAMPLE CALCULATIONS

Emission Designator

QPSK Modulation

Emission Designator = 8M62G7D

LTE BW = 8.62 MHz

G = Phase Modulation

7 = Quantized/Digital Info

D = Data transmission, telemetry, telecommand

Spurious Radiated Emission – LTE Band

Example: Middle Channel LTE Mode 2nd Harmonic (1564 MHz)

The average spectrum analyzer reading at 3 meters with the EUT on the turntable was -81.0 dBm. The gain of the substituted antenna is 8.1 dBi. The signal generator connected to the substituted antenna terminals is adjusted to produce a reading of -81.0 dBm on the spectrum analyzer. The loss of the cable between the signal generator and the terminals of the substituted antenna is 2.0 dB at 1564 MHz. So 6.1 dB is added to the signal generator reading of -30.9 dBm yielding -24.80 dBm. The fundamental EIRP was 25.501 dBm so this harmonic was 25.501 dBm $- (-24.80) = 50.3$ dBc.

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7.0 TEST RESULTS

7.1 Summary

Company Name: Centum Research & Technology S.L

FCC ID: 2A93U-58450

FCC Classification: PCS Licensed Transmitter (PCB)

Mode(s): GSM/GPRS/WCDMA/LTE

Test Condition	Test Description	FCC Part Section(s)	Test Limit	Test Result	Reference
CONDUCTED	Transmitter Conducted Output Power	2.1046	N/A	PASS	Section 7.2
	Effective Radiated Power (Band 12)	27.50(b)(9)	≤ 30 Watts max. ERP	PASS	Section 7.2
	Effective Radiated Power (Band 13)	27.50(c)(9)	≤ 30 Watts max. ERP	PASS	Section 7.2
	Equivalent Isotropic Radiated Power (Band 66)	27.50(d)(4)	≤ 1 Watts max. EIRP	PASS	Section 7.2
	Occupied Bandwidth	2.1049	N/A	PASS	Section 7.3
	Conducted Band Edge / Spurious Emissions	2.1051, 27.53(c)(1), 27.53(c)(4), 27.53(g), 27.53(h)(1)	≥ 43 + 10 log (P[Watts]) dB at Band Edge and for all out-of-band emissions	PASS	Sections 7.4, 7.5
	Conducted Band Edge / Spurious Emissions (LTE Band 13)	2.1051, 27.53(c)(4)	≥ 65 + 10 log (P[Watts]) dB for operations between 763-775 MHz and 793-805 MHz in a 6.25kHz band segment	PASS	Sections 7.4, 7.5
	Peak-to-Average Ratio	27.50(d)(5)	≤ 13 dB	PASS	Section 7.6
	Frequency Stability	2.1055, 27.54	Fundamental emissions stay within authorized frequency block	PASS	Section 7.8
RADIATED	Radiated Spurious Emissions	2.1053, 27.53 (c)(1), 27.53(g), 27.53(h)(1)	≥ 43 + 10 log (P[Watts]) dB at Band Edge and for all out-of-band emissions	PASS	Section 7.7
	Radiated Spurious Emissions (LTE Band 13)	2.1053, 27.53(f)	≤ -40dBm/MHz	PASS	Section 7.7
	Radiated Spurious Emissions (WCDMA AWS; LTE Band 4, 66)	2.1053, 27.53(h)(1)	≥ 43 + 10 log (P[Watts]) dB of attenuation below transmitter power	PASS	Section 7.8

Table 7-1. Summary of Test Results

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Notes:

- 1) All modes of operation and data rates were investigated. The test results shown in the following sections represent the worst-case emissions.
- 2) The analyzer plots shown in Section 7.0 were 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) For conducted spurious emissions, automated test software was used to measure emissions and capture the corresponding plots necessary to show compliance. The measurement software utilized is EMC Software Tool v1.2.2.

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7.2 Transmitter Conducted Output Power/ Radiated Power

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 5.2.4.4.1

Test Settings

1. Span = 2x to 3x the OBW
2. RBW = 1% to 5% of the OBW
3. VBW $\geq 3 \times$ RBW
4. Number of measurement points per sweep = 1,001
5. Sweep time = auto couple
6. Detector = RMS
7. Trace mode = trace average for continuous emissions
8. Output power was measured using the analyzers built-in Channel Power function using the above settings while setting the integration BW approximately equal to the OBW of the signal
9. The trace was allowed to stabilize

Test Setup

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



Figure 7-1. Test Instrument & Measurement Setup

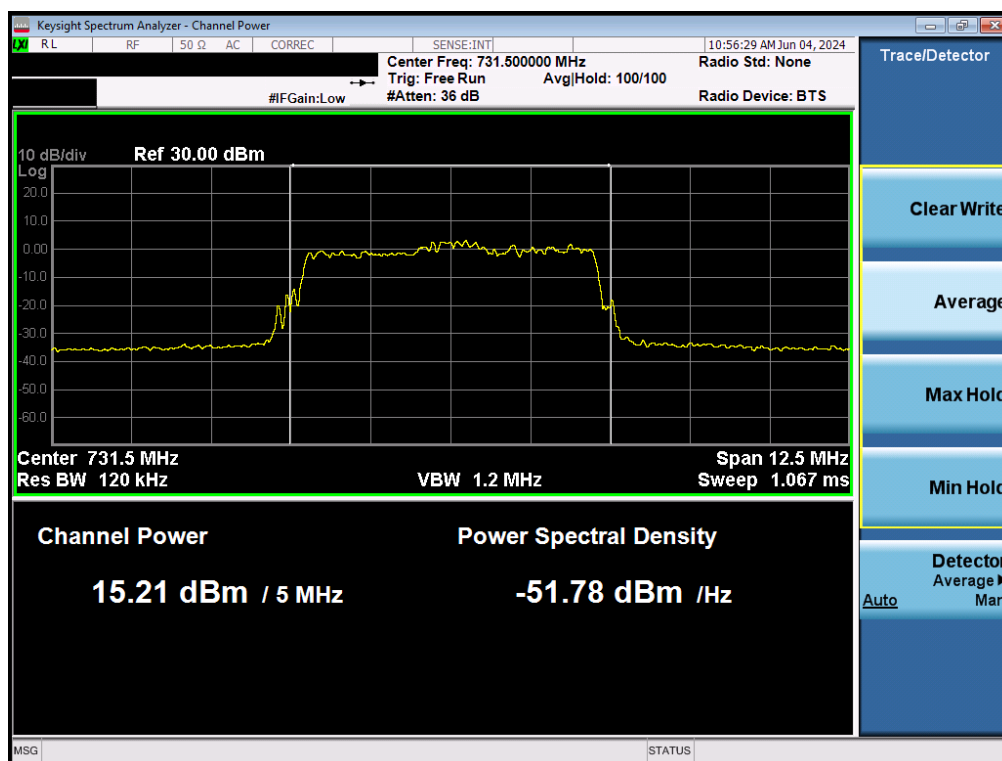
Test Notes

1. For operating frequencies below 1GHz, the applicant has declared the usage of a 5dBi antenna.
2. For operating frequencies above 1GHz, the applicant has declared the usage of a 6dBi antenna.
3. Additionally, the applicant has declared that it will always use a long RF cable with similar path loss as shown in the tables in this section. Thus, there is a net antenna gain used to determine ERP compliance per Part 27.
4. In the following tables, the ERP is determined by subtracting 2.15dB from the calculated EIRP value.

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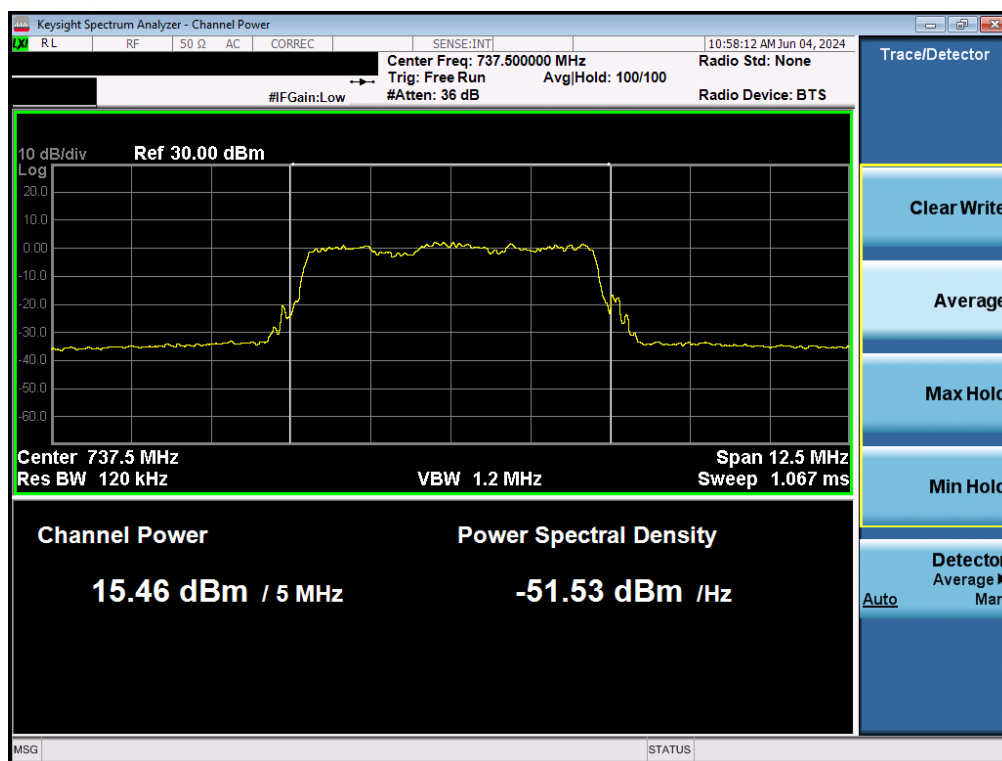
Bandwidth	Modulation	Channel	Frequency [MHz]	Conducted Power [dBm]	Ant Gain [dBi]	Cable Loss [dBm]	Ant Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
5 MHz	QPSK	5035	731.5	15.21	5.00	6.02	-1.02	12.04	0.016	44.77	-32.73
		5095	737.5	15.46	5.00	6.06	-1.06	12.25	0.017	44.77	-32.52
		5155	743.5	15.83	5.00	6.11	-1.11	12.57	0.018	44.77	-32.20

Table 7-2. Transmitter Conducted Output Power/ Effective Radiated Power (LTE Band 12)

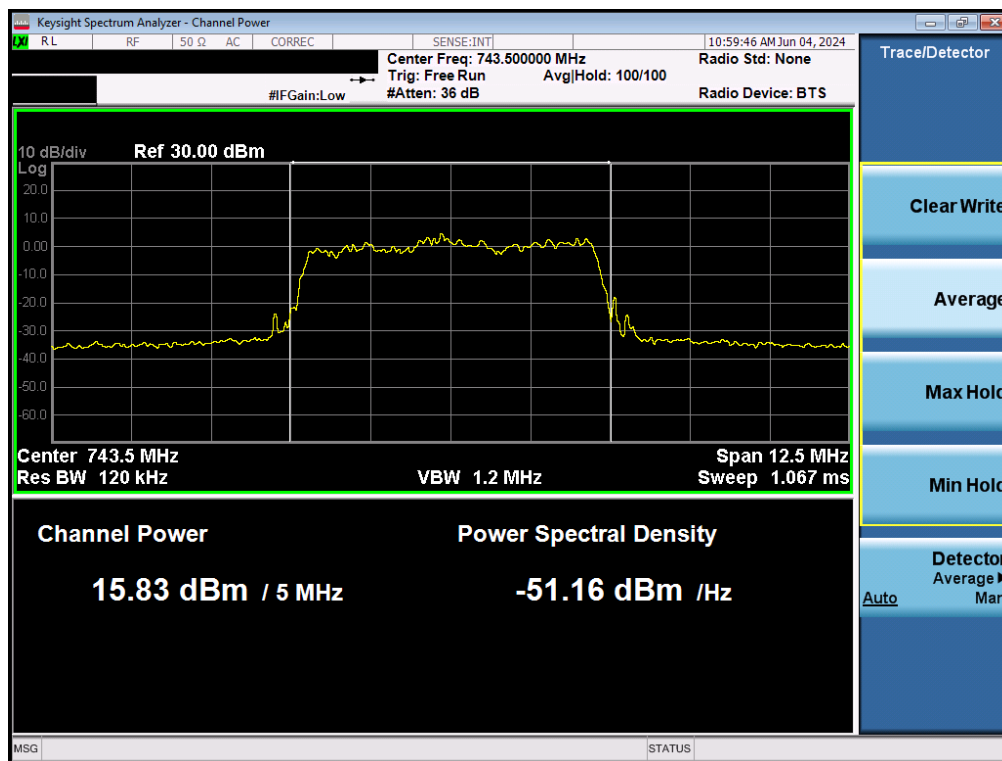


Plot 7-1. Conducted Power Output Data (LTE Band 12 - Low Channel)

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Plot 7-2. Conducted Power Output Data (LTE Band 12 - Mid Channel)

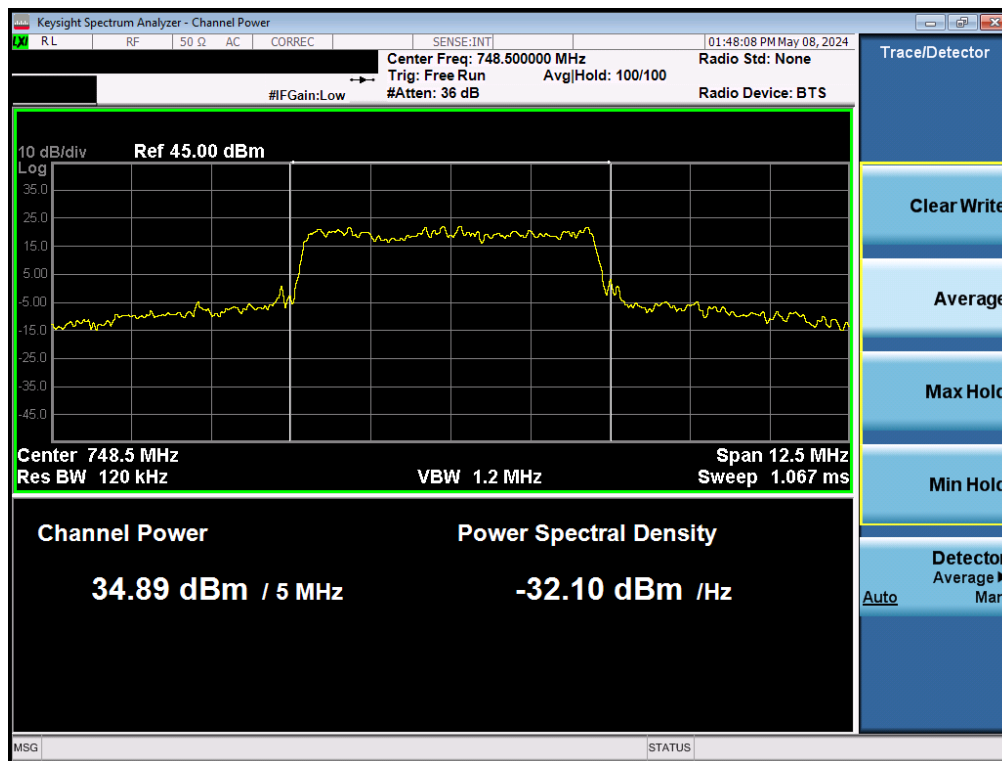


Plot 7-3. Conducted Power Output Data (LTE Band 12 - High Channel)

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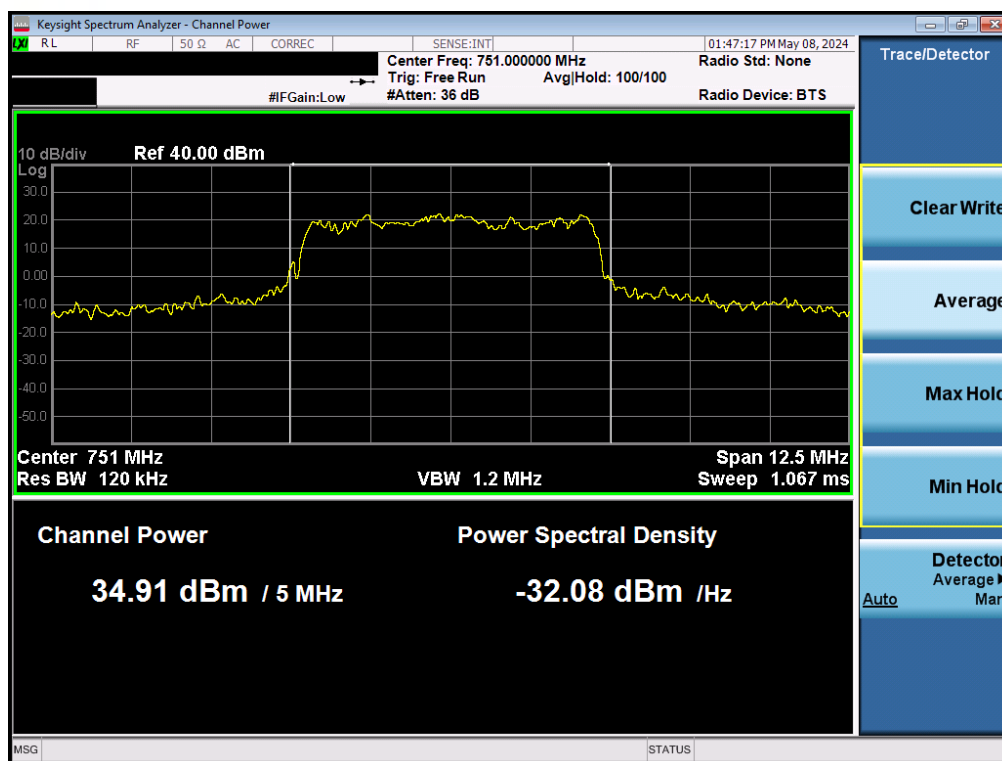
Bandwidth	Modulation	Channel	Frequency [MHz]	Conducted Power [dBm]	Ant Gain [dBi]	Cable Loss [dBm]	Ant Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
5 MHz	QPSK	5205	748.5	34.89	5.00	6.02	-1.02	31.72	1.486	44.77	-13.05
		5230	751.0	34.91	5.00	6.06	-1.06	31.70	1.479	44.77	-13.07
		5255	753.5	34.75	5.00	6.12	-1.12	31.48	1.406	44.77	-13.29

Table 7-3. Transmitter Conducted Output Power/ Effective Radiated Power (LTE Band 13)

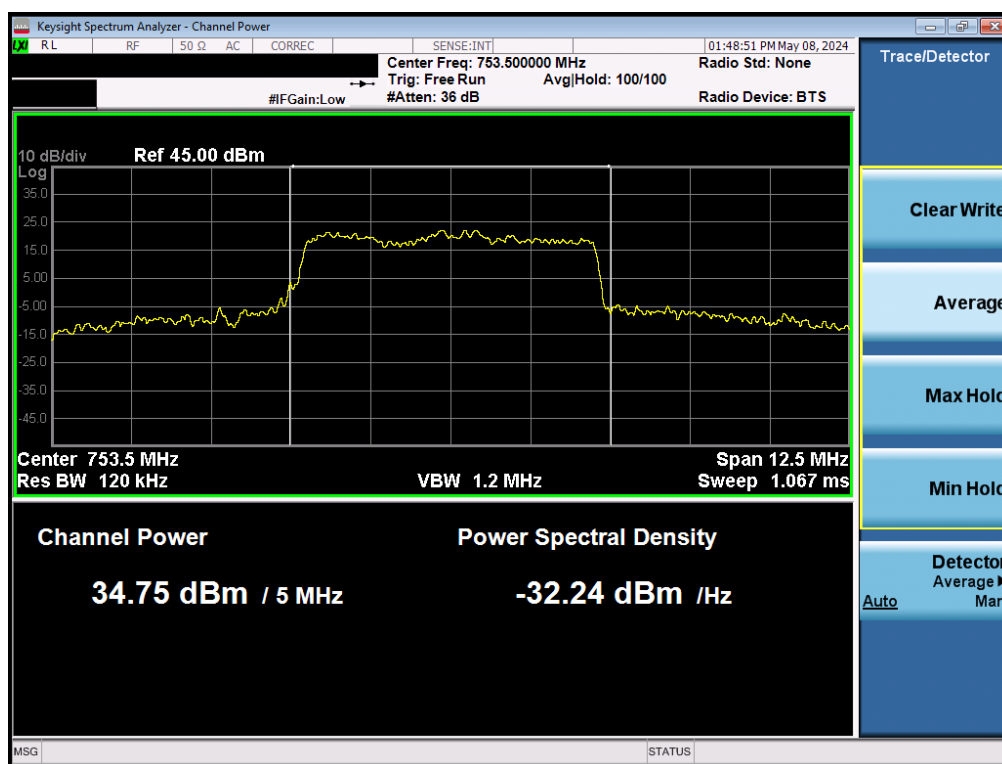


Plot 7-4. Conducted Power Output Data (LTE Band 13 - Low Channel)

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Plot 7-5. Conducted Power Output Data (LTE Band 13 - Mid Channel)

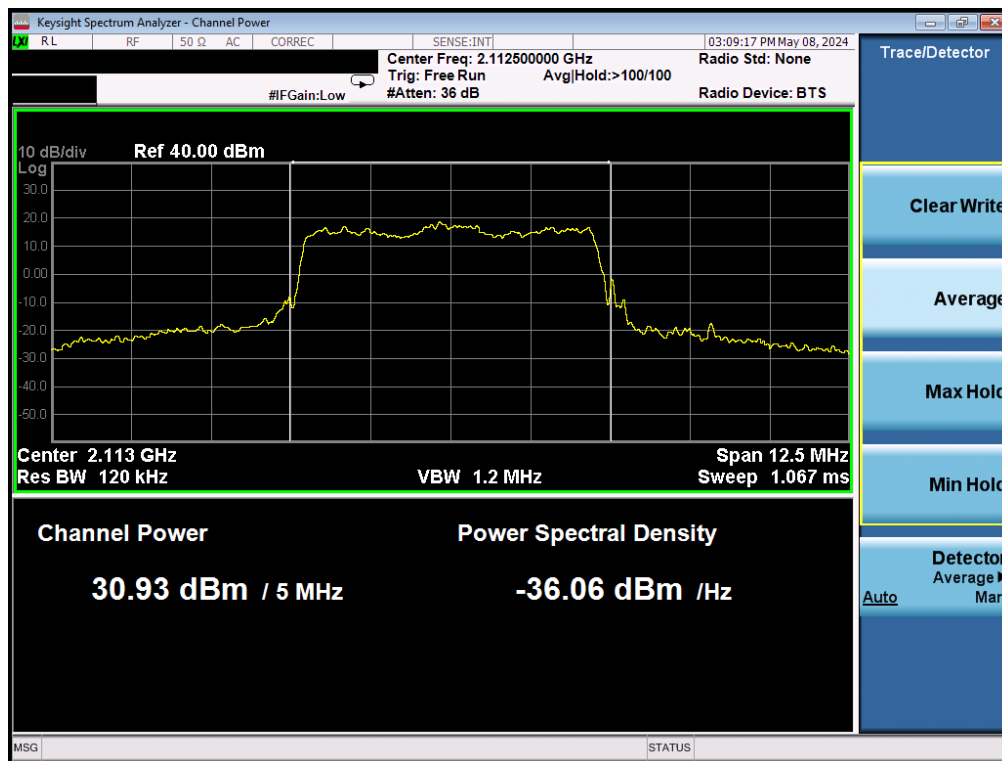


Plot 7-6. Conducted Power Output Data (LTE Band 13 - High Channel)

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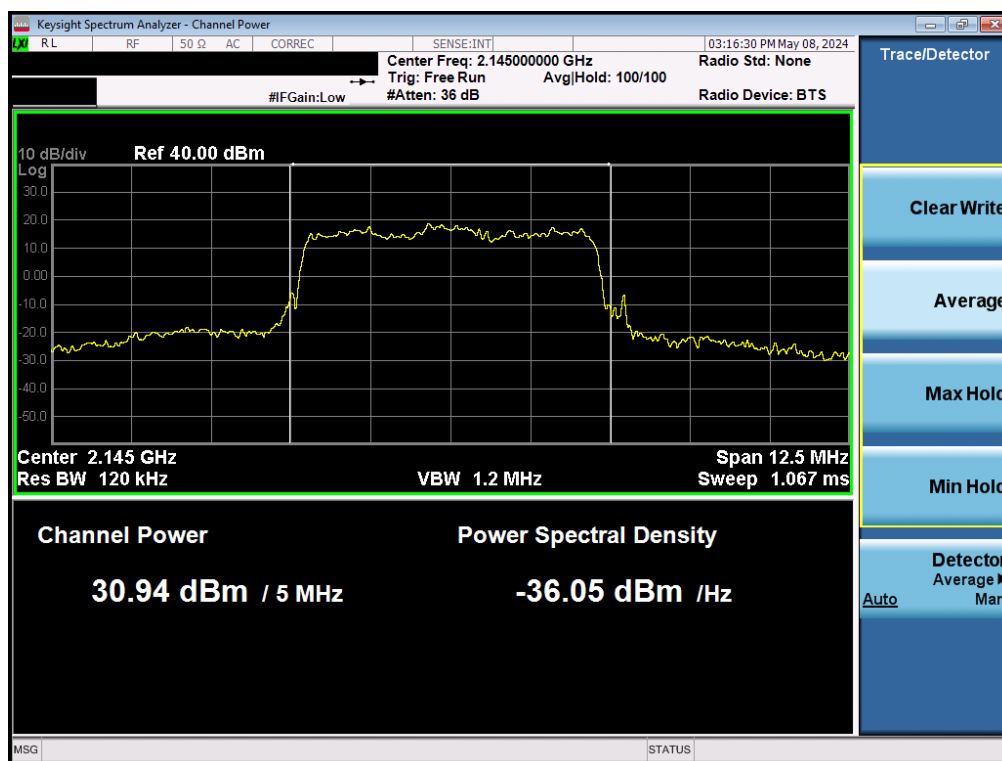
Bandwidth	Modulation	Channel	Frequency [MHz]	Conducted Power [dBm]	Ant Gain [dBi]	Cable Loss [dBm]	Ant Gain [dBi]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
5 MHz	QPSK	66461	2112.5	30.93	6.00	9.95	-3.95	26.98	0.499	30.00	-3.02
		66786	2145.0	30.94	6.00	10.06	-4.06	26.88	0.488	30.00	-3.12
		67111	2177.5	30.79	6.00	10.15	-4.15	26.64	0.461	30.00	-3.36

Table 7-4. Transmitter Conducted Output Power/ Equivalent Isotropic Radiated Power (LTE Band 66/4)

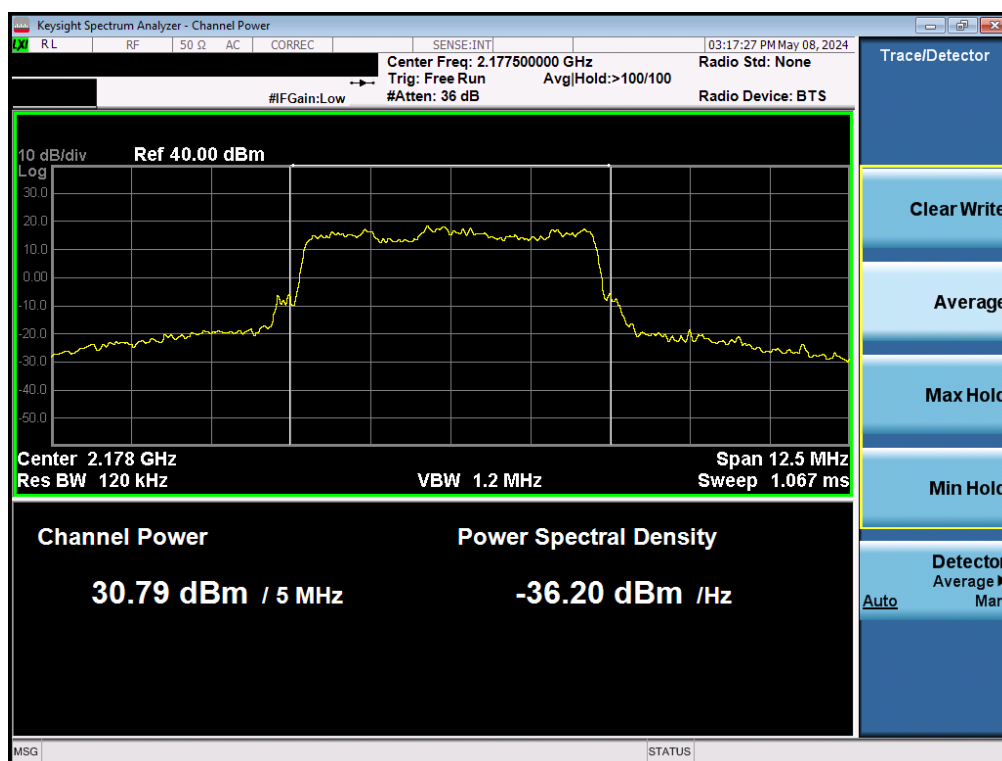


Plot 7-7. Conducted Power Output Data (LTE Band 66/4 - Low Channel)

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Plot 7-8. Conducted Power Output Data (LTE Band 66/4 - Mid Channel)

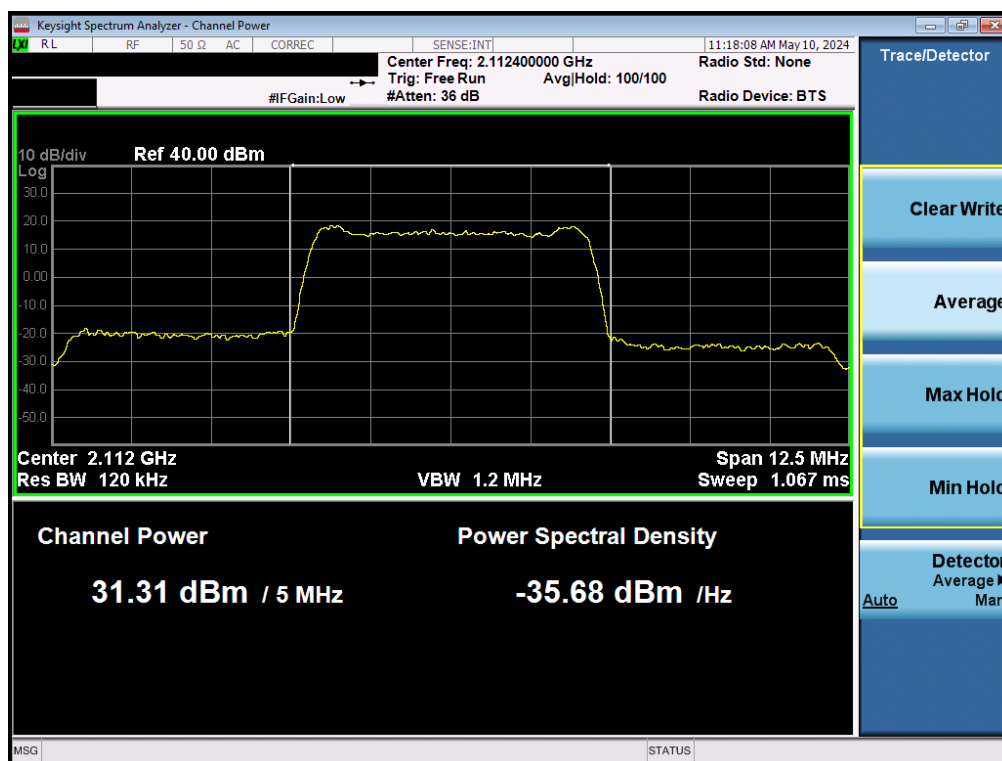


Plot 7-9. Conducted Power Output Data (LTE Band 66/4 - High Channel)

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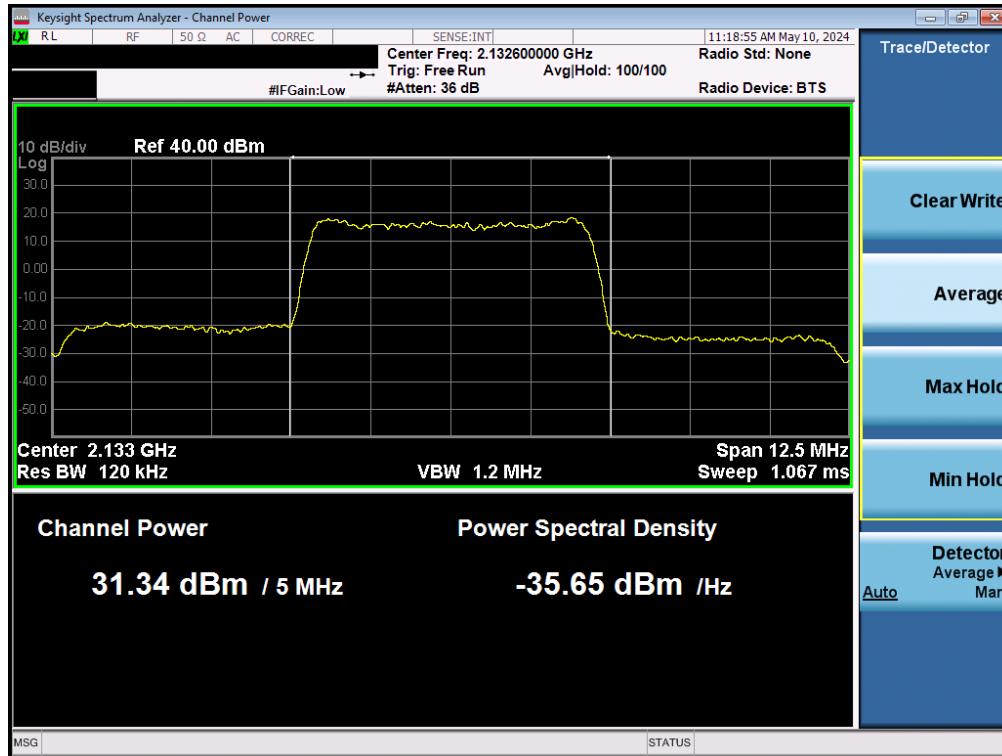
Channel	Frequency [MHz]	Conducted Power [dBm]	Ant Gain [dBi]	Cable Loss [dBm]	Ant Gain [dBi]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
1537	2112.4	31.31	6.00	9.95	-3.95	27.36	0.545	30.00	-2.64
1638	2132.6	31.34	6.00	10.05	-4.05	27.29	0.536	30.00	-2.71
1738	2152.6	31.31	6.00	10.13	-4.13	27.18	0.522	30.00	-2.82

Table 7-5. Transmitter Conducted Output Power/ Equivalent Isotropic Radiated Power (WCDMA AWS)

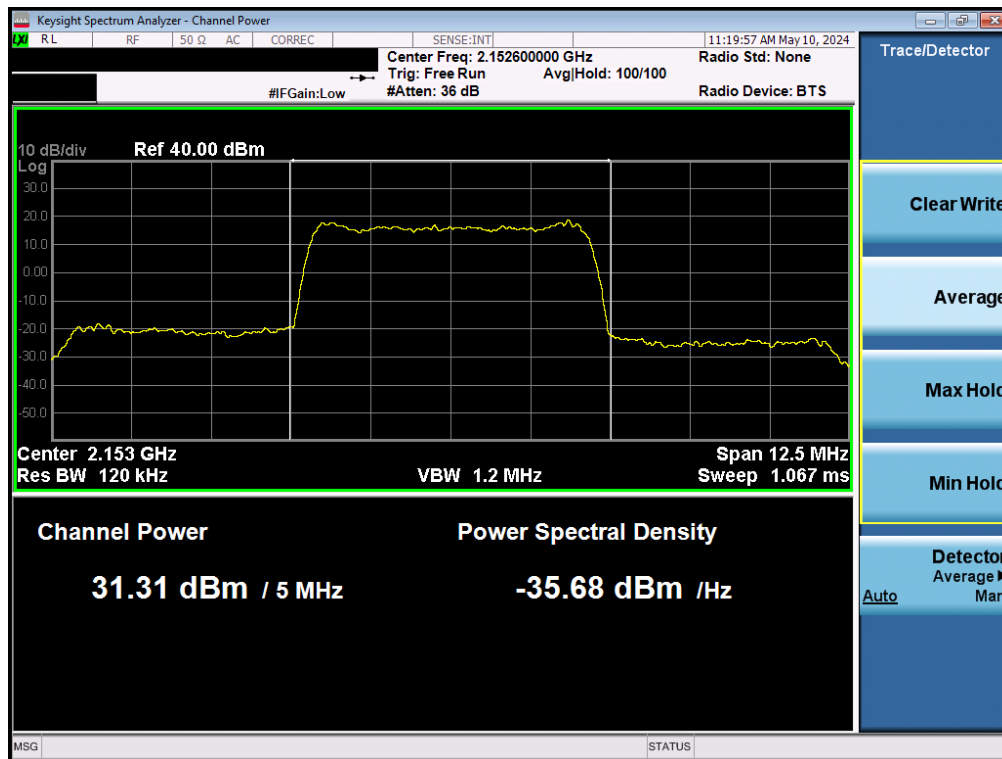


Plot 7-10. Conducted Power Output Data (WCDMA AWS - Low Channel)

FCC ID: 2A93U-58450	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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Plot 7-11. Conducted Power Output Data (WCDMA AWS - Mid Channel)

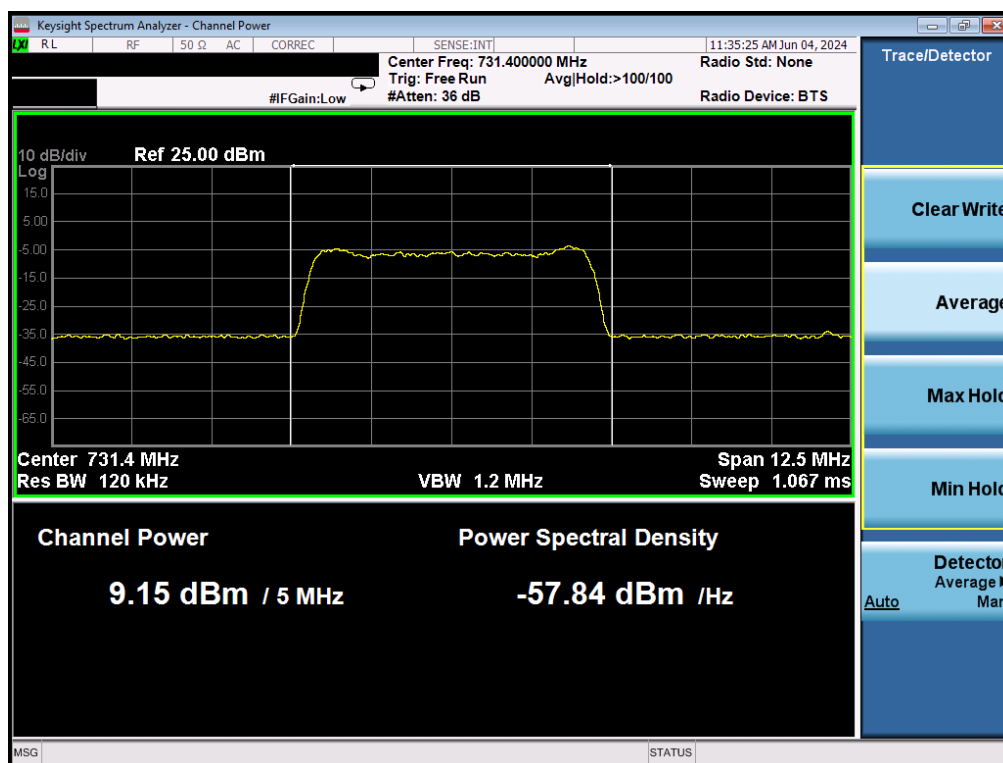


Plot 7-12. Conducted Power Output Data (WCDMA AWS- High Channel)

FCC ID: 2A93U-58450	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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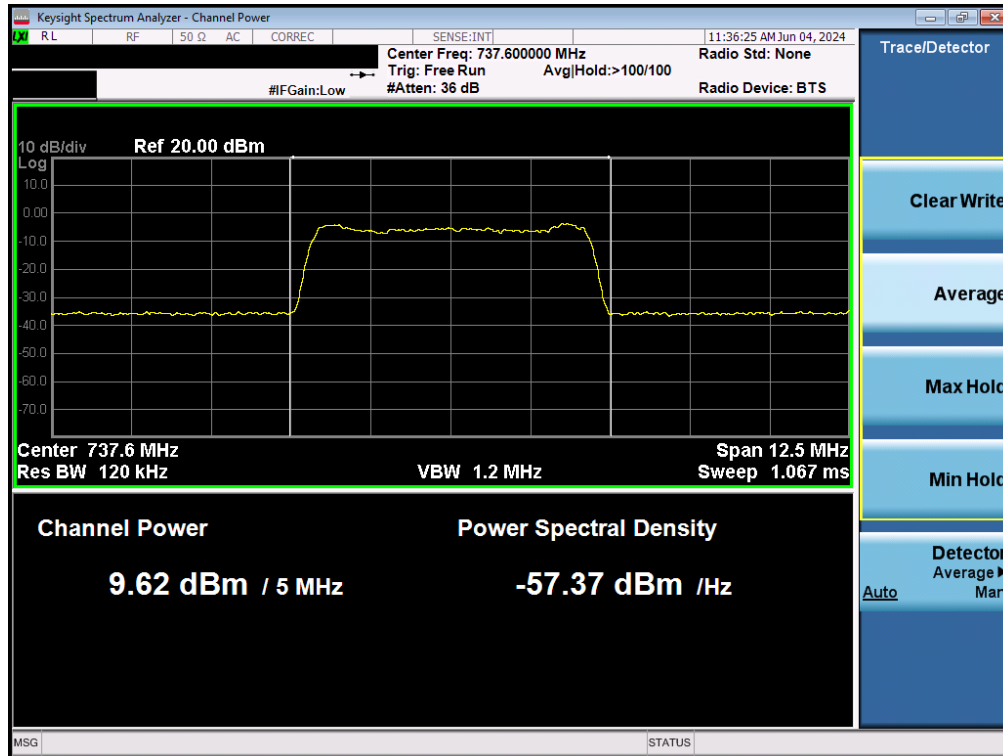
Channel	Frequency [MHz]	Conducted Power [dBm]	Ant Gain [dBi]	Cable Loss [dBm]	Ant Gain [dBi]	EIRP [dBm]	EIRP [Watts]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
3842	731.4	9.15	5.00	9.94	-4.94	4.21	0.00	2.06	0.002	44.77	-42.71
3873	737.6	9.62	5.00	10.05	-5.05	4.57	0.00	2.42	0.002	44.77	-42.35
3903	743.6	9.96	5.00	10.14	-5.14	4.82	0.00	2.67	0.002	44.77	-42.10

Table 7-6. Transmitter Conducted Output Power/ Effective Radiated Power (WCDMA B12)

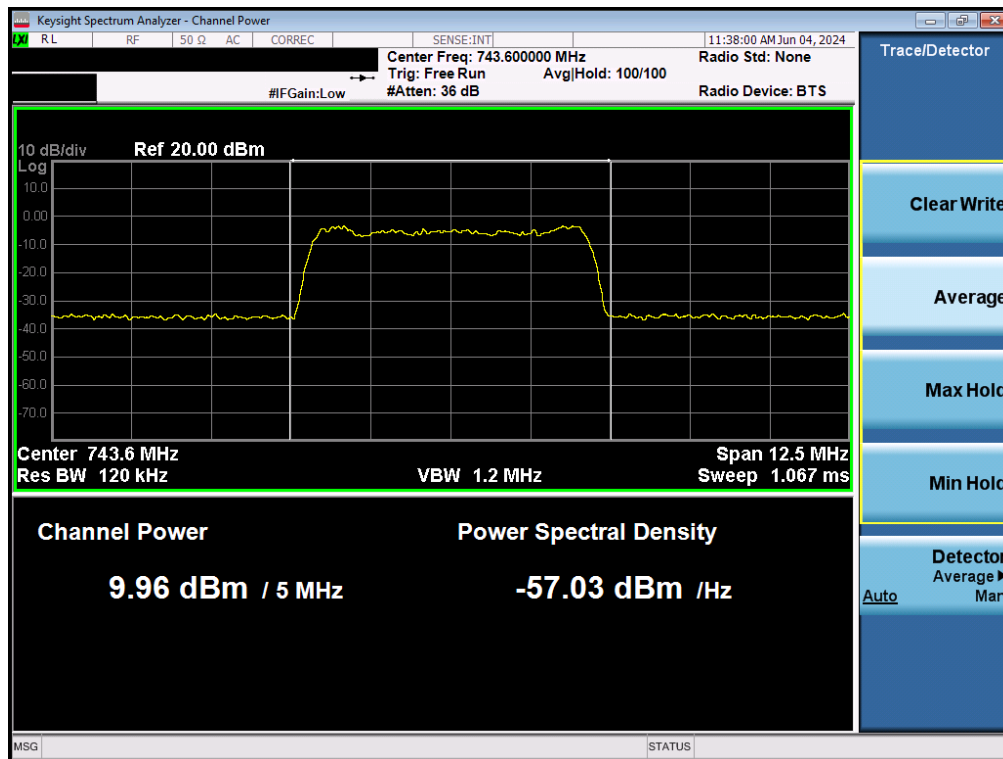


Plot 7-13. Conducted Power Output Data (WCDMA B12 - Low Channel)

FCC ID: 2A93U-58450	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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Plot 7-14. Conducted Power Output Data (WCDMA B12 - Mid Channel)

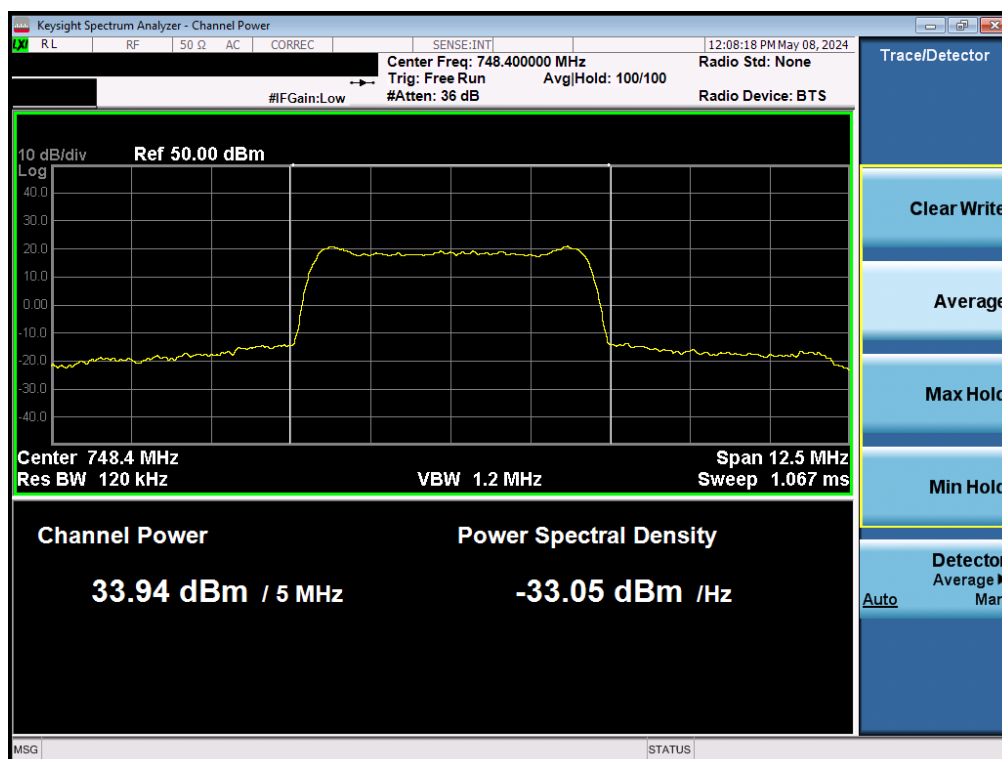


Plot 7-15. Conducted Power Output Data (WCDMA B12 - High Channel)

FCC ID: 2A93U-58450	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2402290014-03.2A93U	Test Dates: 04/05 - 10/09/2024	EUT Type: Geolocation System	Page 22 of 96

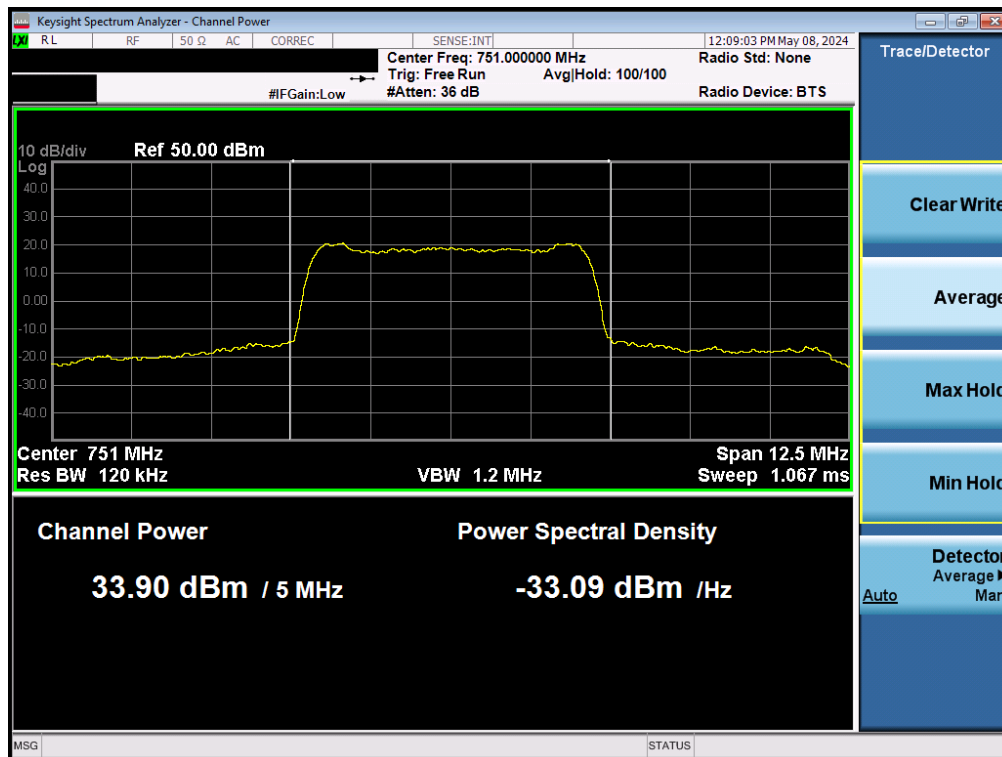
Channel	Frequency [MHz]	Conducted Power [dBm]	Ant Gain [dBi]	Cable Loss [dBm]	Ant Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
4017	748.4	33.94	5.00	9.95	-4.95	26.84	0.483	44.77	-17.93
4030	751.0	33.90	5.00	10.05	-5.05	26.70	0.468	44.77	-18.07
4043	753.6	33.89	5.00	10.13	-5.13	26.61	0.458	44.77	-18.16

Table 7-7. Transmitter Conducted Output Power/ Effective Radiated Power (WCDMA B13)

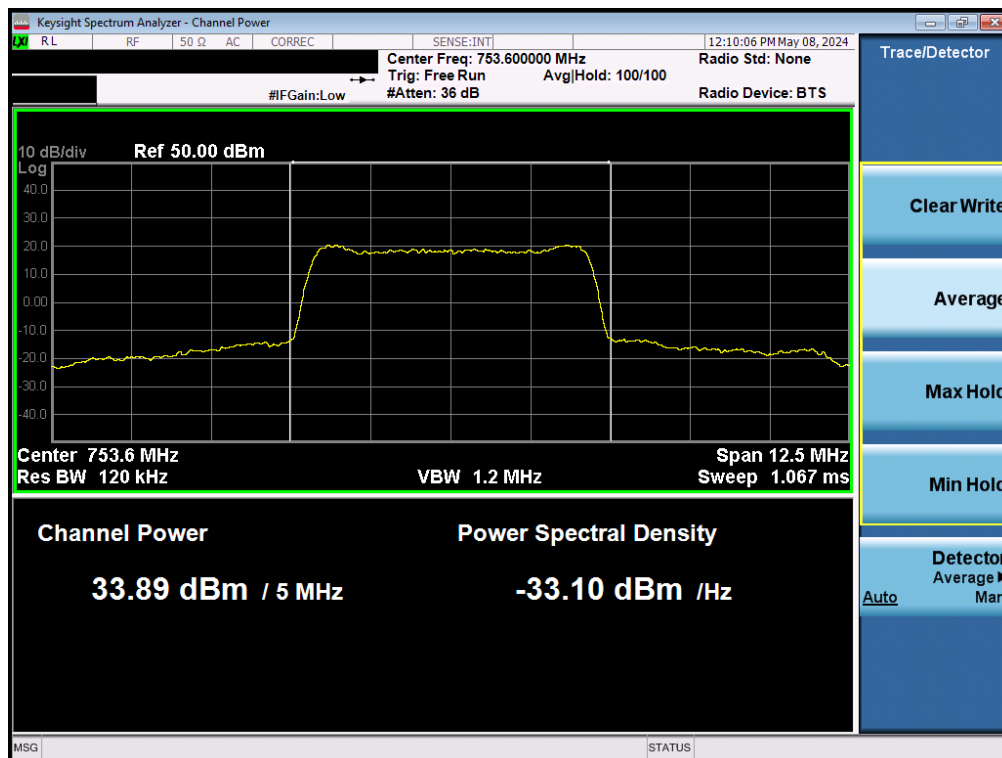


Plot 7-16. Conducted Power Output Data (WCDMA B13 - Low Channel)

FCC ID: 2A93U-58450	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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Plot 7-17. Conducted Power Output Data (WCDMA B13 - Mid Channel)



Plot 7-18. Conducted Power Output Data (WCDMA B13 - High Channel)

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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 $\geq 3 \times$ 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.

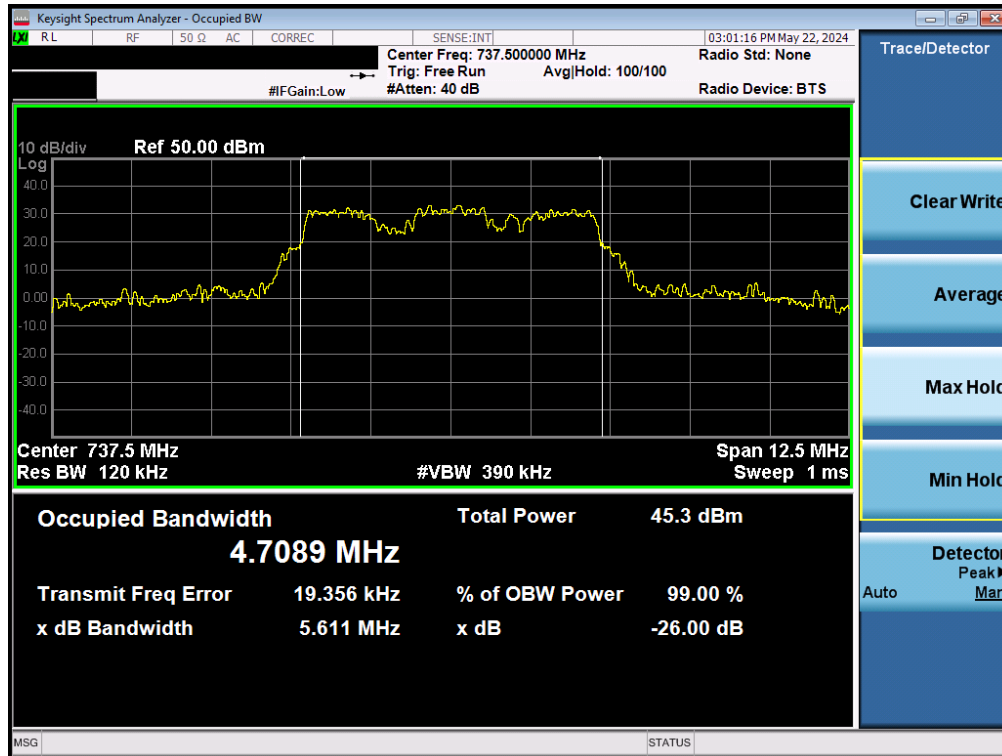


Figure 7-2. Test Instrument & Measurement Setup

Test Notes

None.

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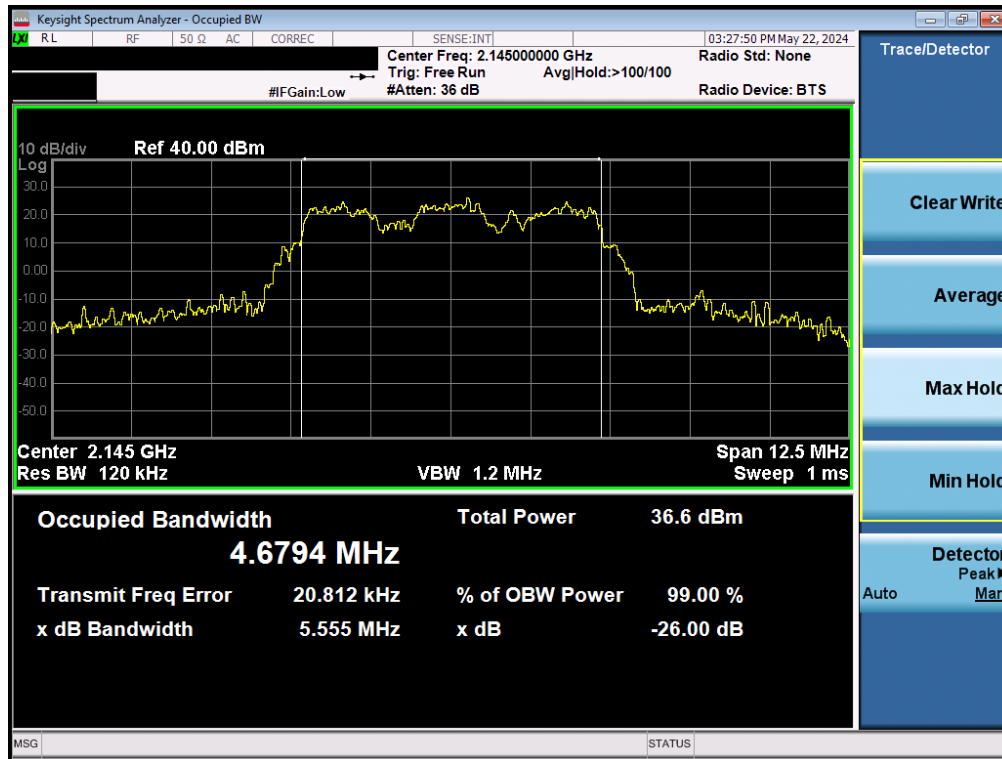


Plot 7-19. Occupied Bandwidth Plot (LTE Band 12)

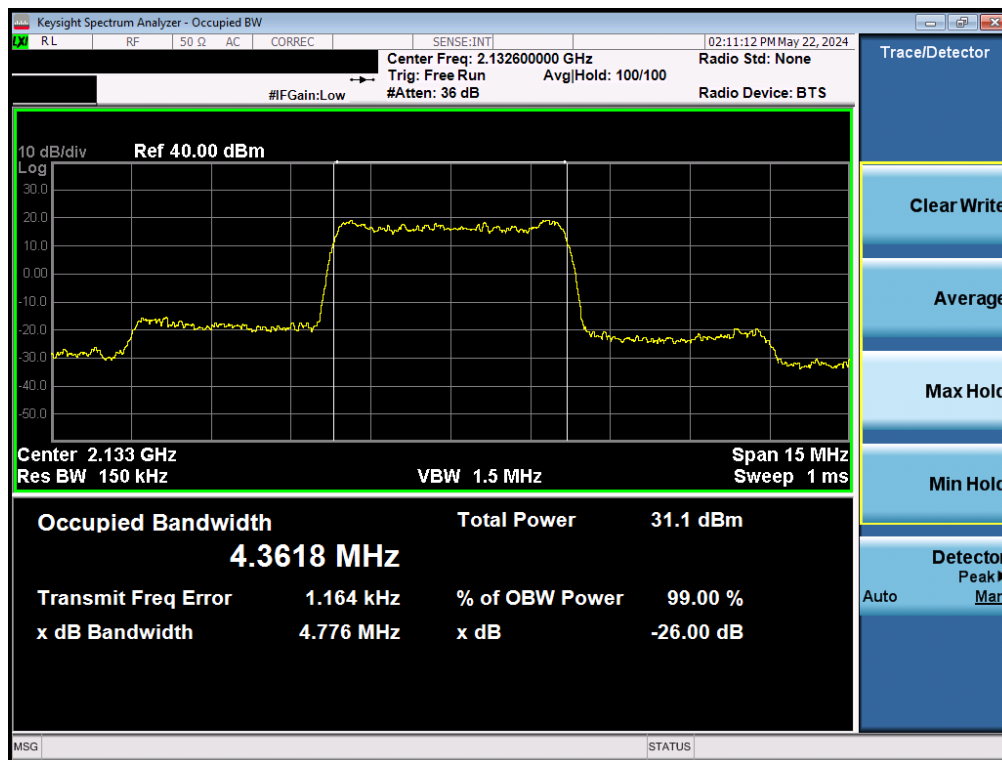


Plot 7-20. Occupied Bandwidth Plot (LTE Band 13)

FCC ID: 2A93U-58450	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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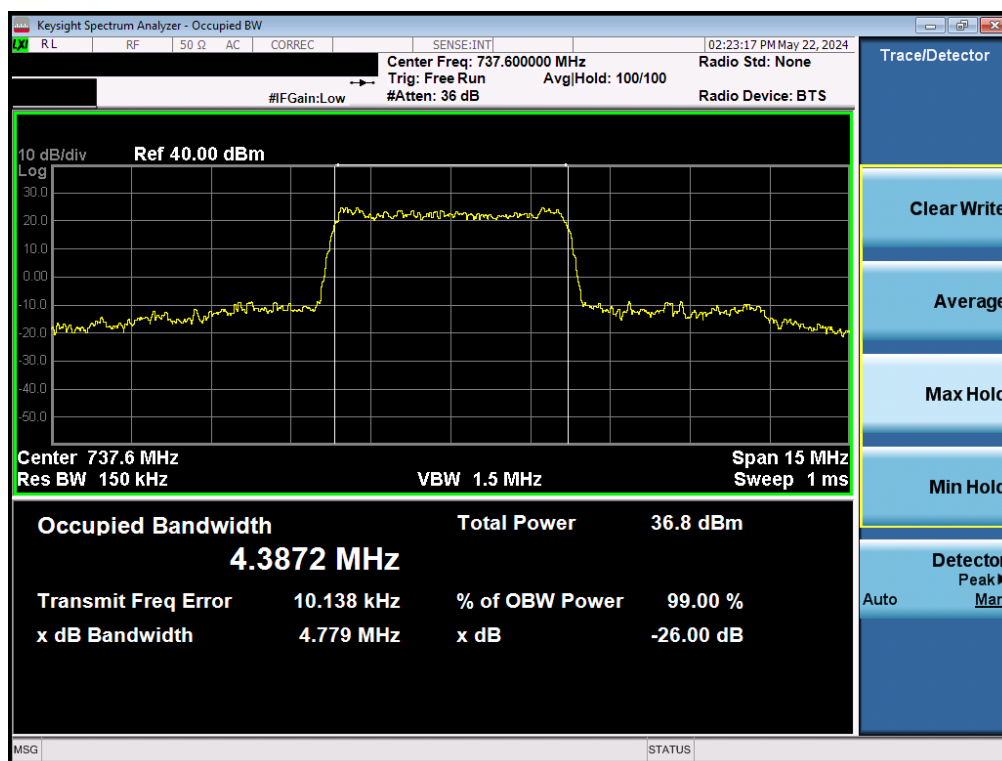


Plot 7-21. Occupied Bandwidth Plot (LTE Band 66/4)

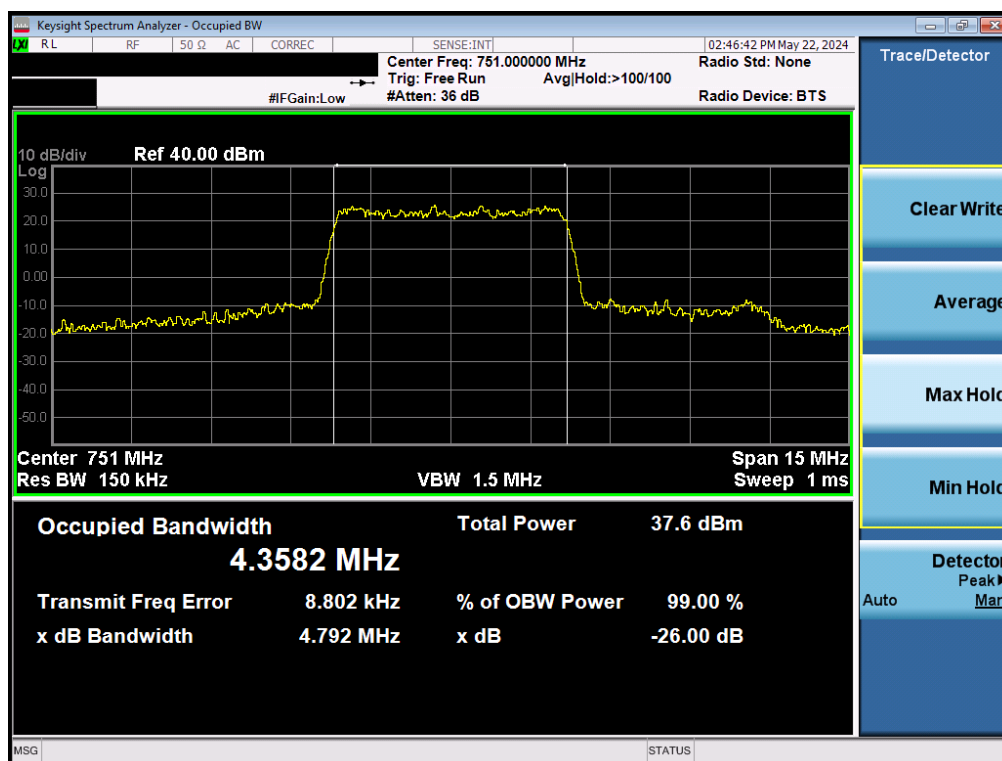


Plot 7-22. Occupied Bandwidth Plot (WCDMA AWS)

FCC ID: 2A93U-58450	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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Plot 7-23. Occupied Bandwidth Plot (WCDMA B12)



Plot 7-24. Occupied Bandwidth Plot (WCDMA B13)

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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 $43 + 10 \log_{10}(P_{\text{Watts}})$, 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 18GHz (separated into at least two plots per channel)
2. RBW \geq 100kHz
3. VBW \geq 3 x RBW
4. Detector = RMS
5. Trace mode = max hold
6. Sweep time = auto couple
7. The trace was allowed to stabilize

Test Setup

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



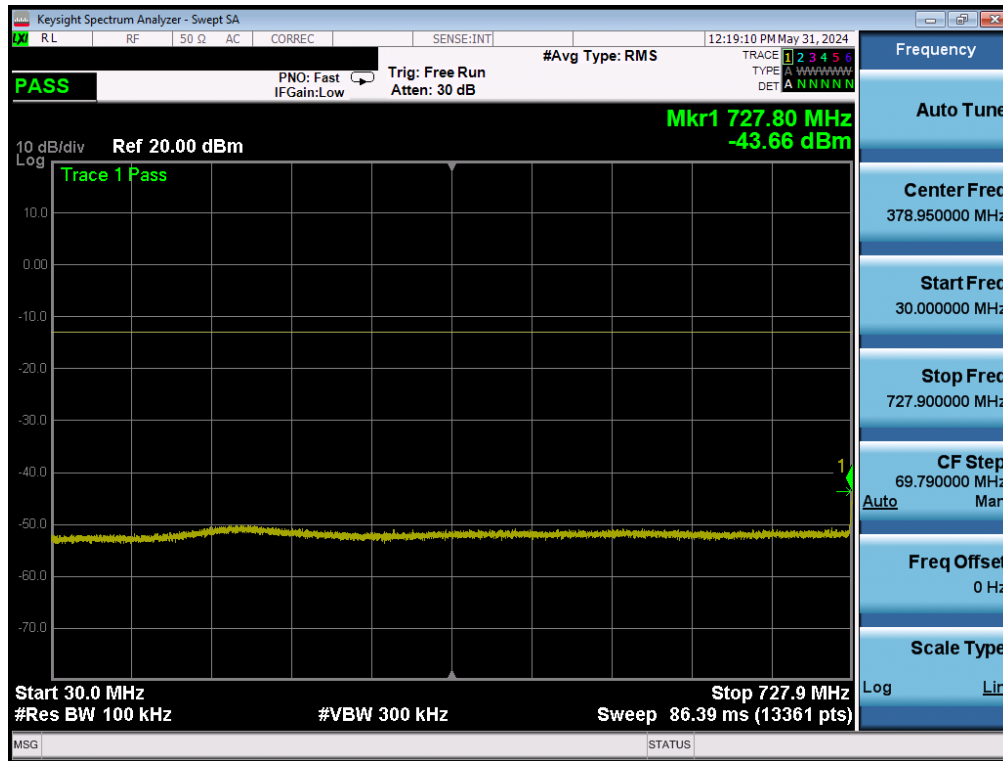
Figure 7-3. Test Instrument & Measurement Setup

Test Notes

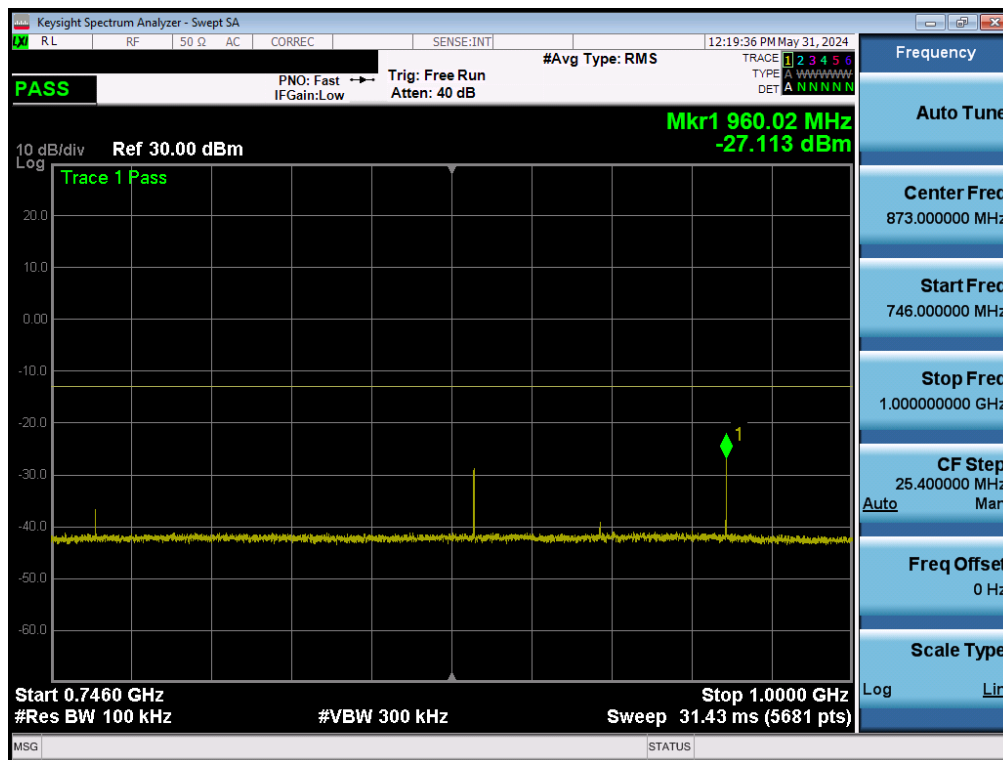
Per Part 27, compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth 100 kHz or greater for measurements below 1GHz. For measurements above 1GHz, a resolution bandwidth of 1MHz is used.

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LTE Band 12



Plot 7-25. Conducted Spurious Plot (LTE Band 12 – Low Channel)



Plot 7-26. Conducted Spurious Plot (LTE Band 12 - Low Channel)

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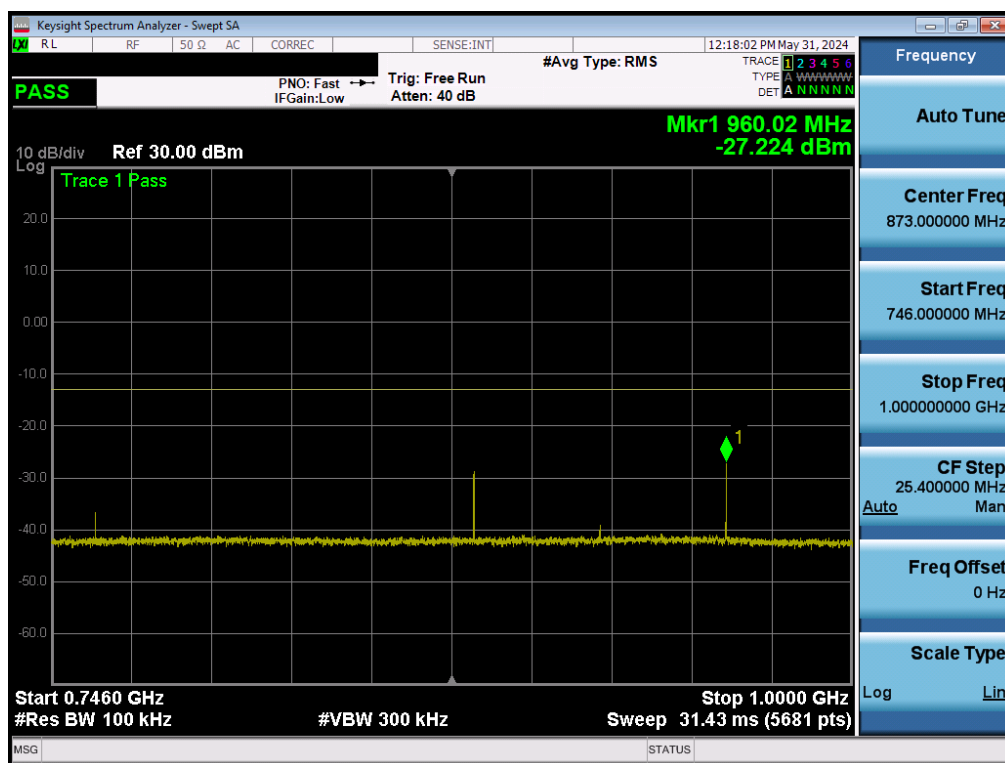


Plot 7-27. Conducted Spurious Plot (LTE Band 12 - Low Channel)

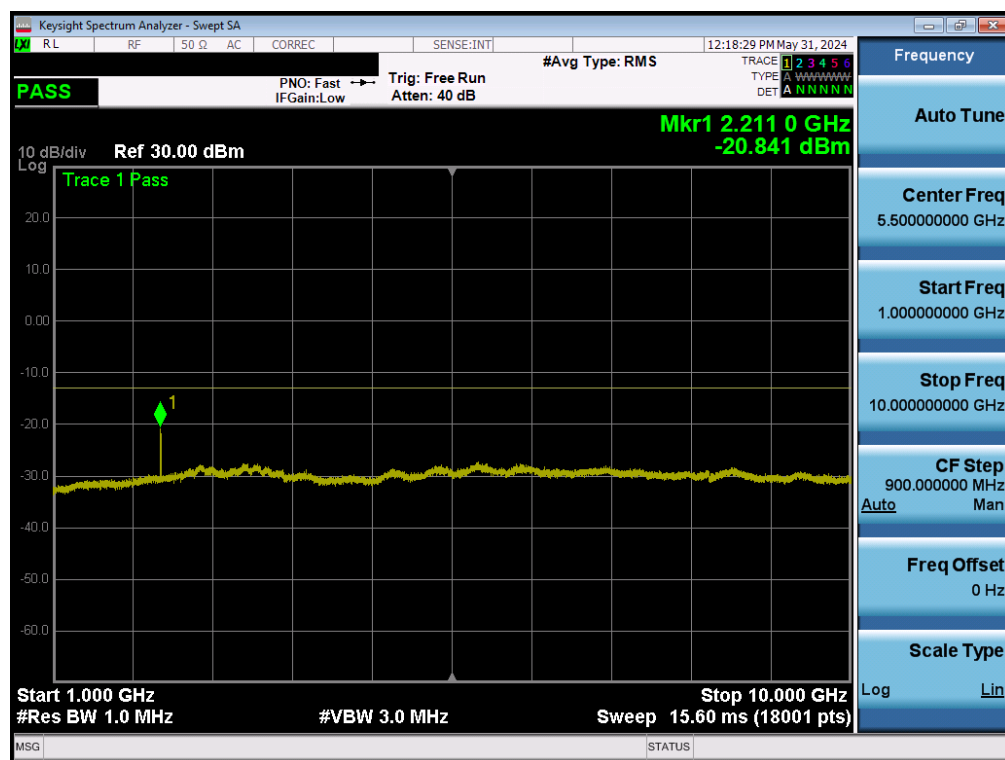


Plot 7-28. Conducted Spurious Plot (LTE Band 12 - Mid Channel)

FCC ID: 2A93U-58450	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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Plot 7-29. Conducted Spurious Plot (LTE Band 12 - Mid Channel)

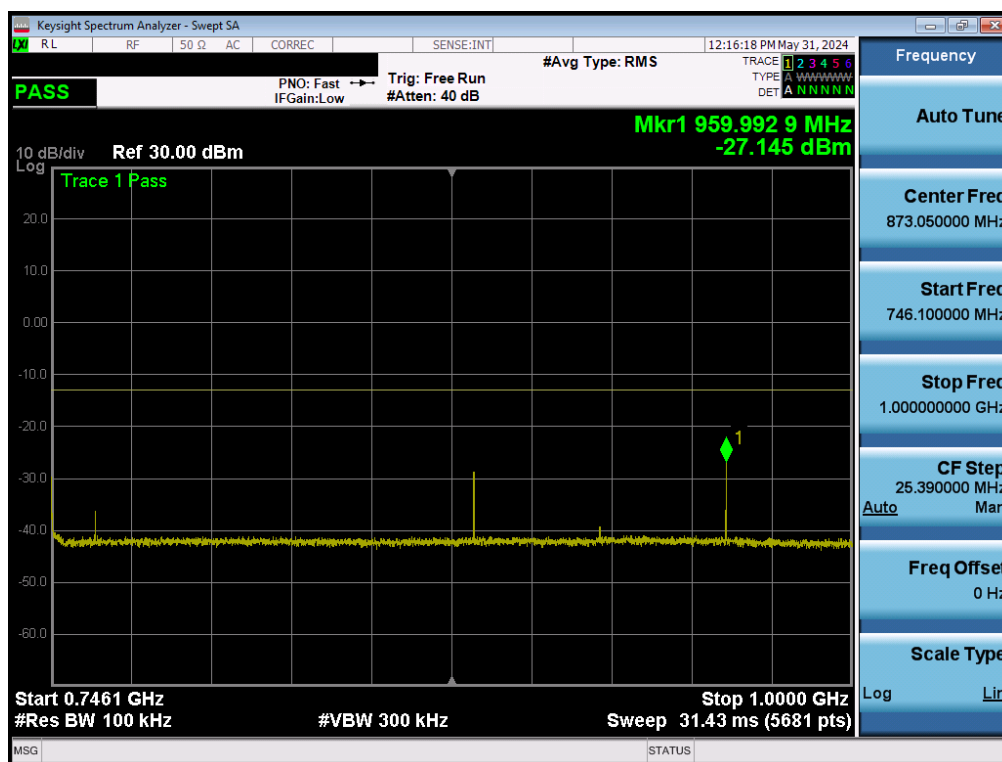


Plot 7-30. Conducted Spurious Plot (LTE Band 12 - Mid Channel)

FCC ID: 2A93U-58450	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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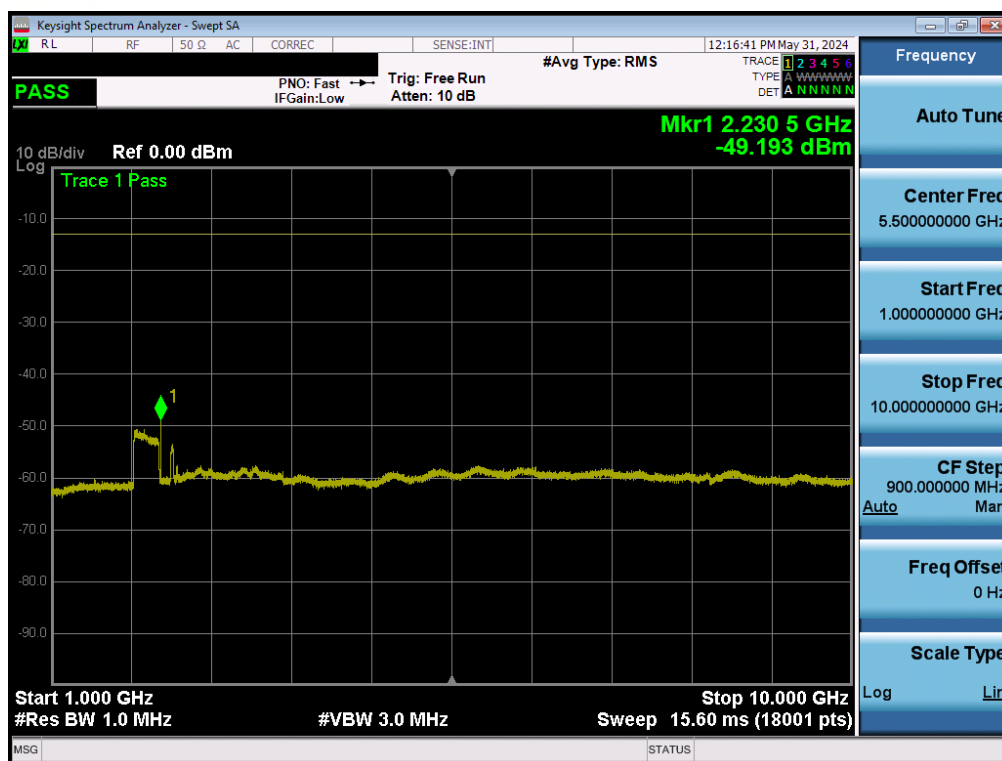


Plot 7-31. Conducted Spurious Plot (LTE Band 12 - High Channel)



Plot 7-32. Conducted Spurious Plot (LTE Band 12 - High Channel)

FCC ID: 2A93U-58450	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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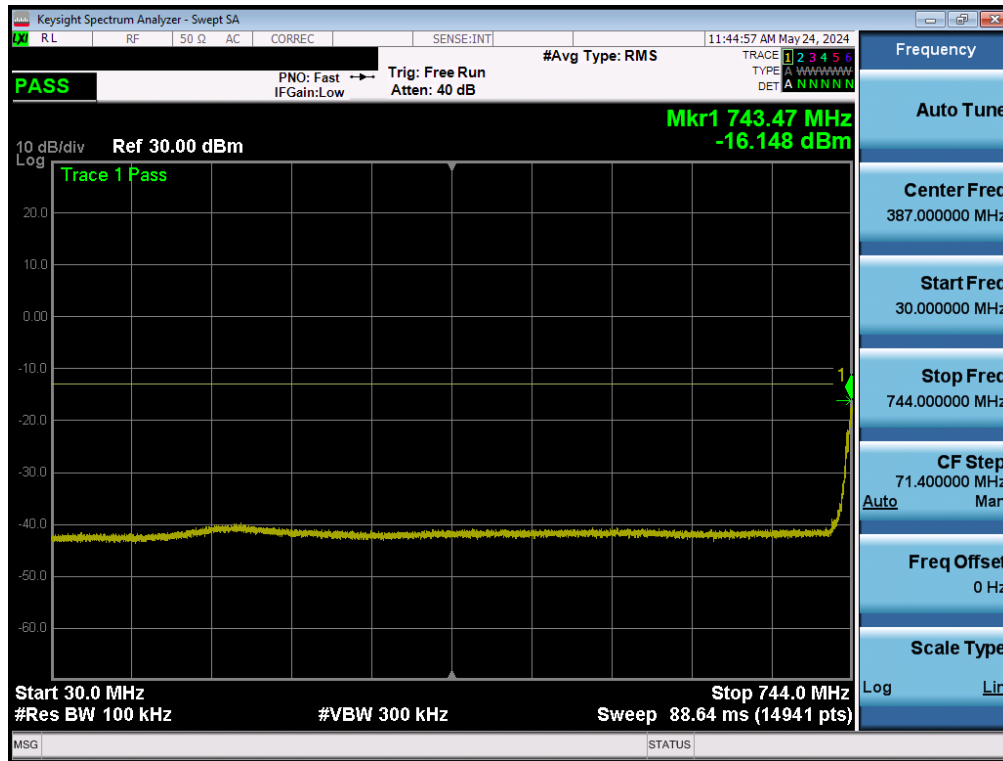


Plot 7-33. Conducted Spurious Plot (LTE Band 12 - High Channel)

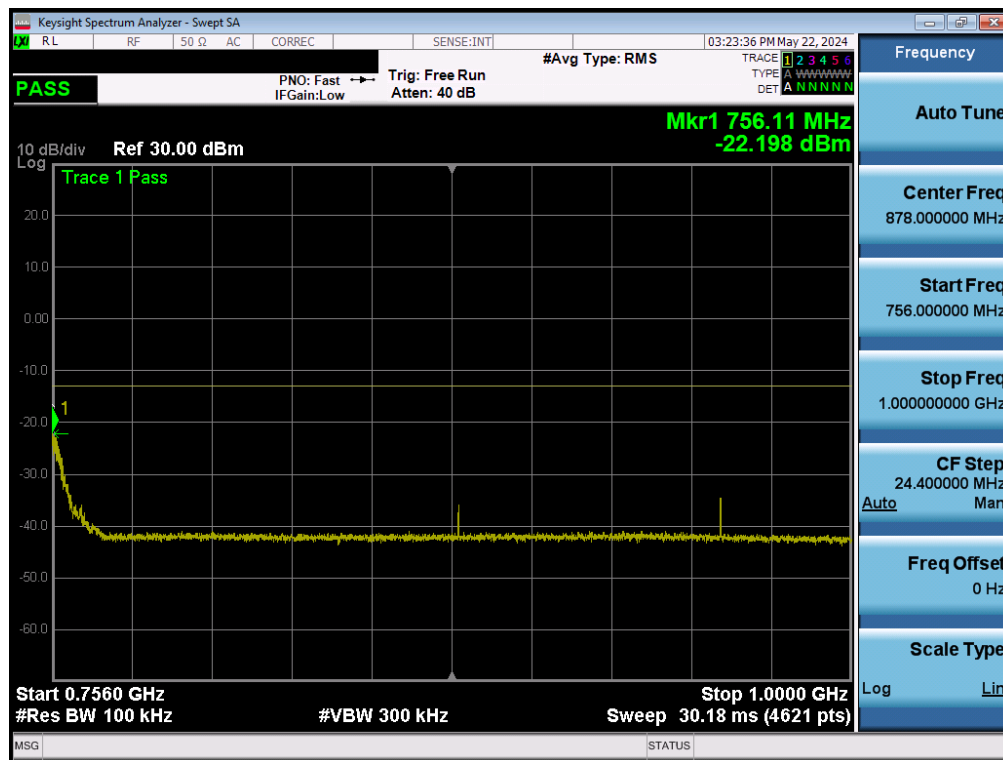
FCC ID: 2A93U-58450	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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LTE Band 13



Plot 7-34. Conducted Spurious Plot (LTE Band 13 – Low Channel)



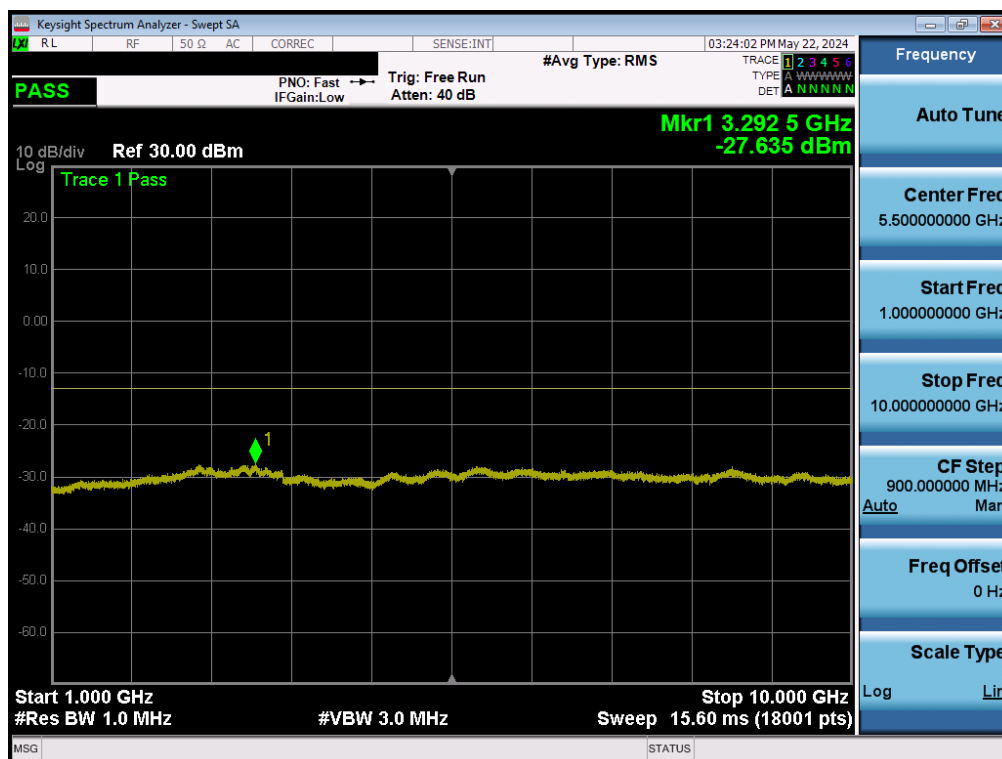
Plot 7-35. Conducted Spurious Plot (LTE Band 13 - Low Channel)

FCC ID: 2A93U-58450	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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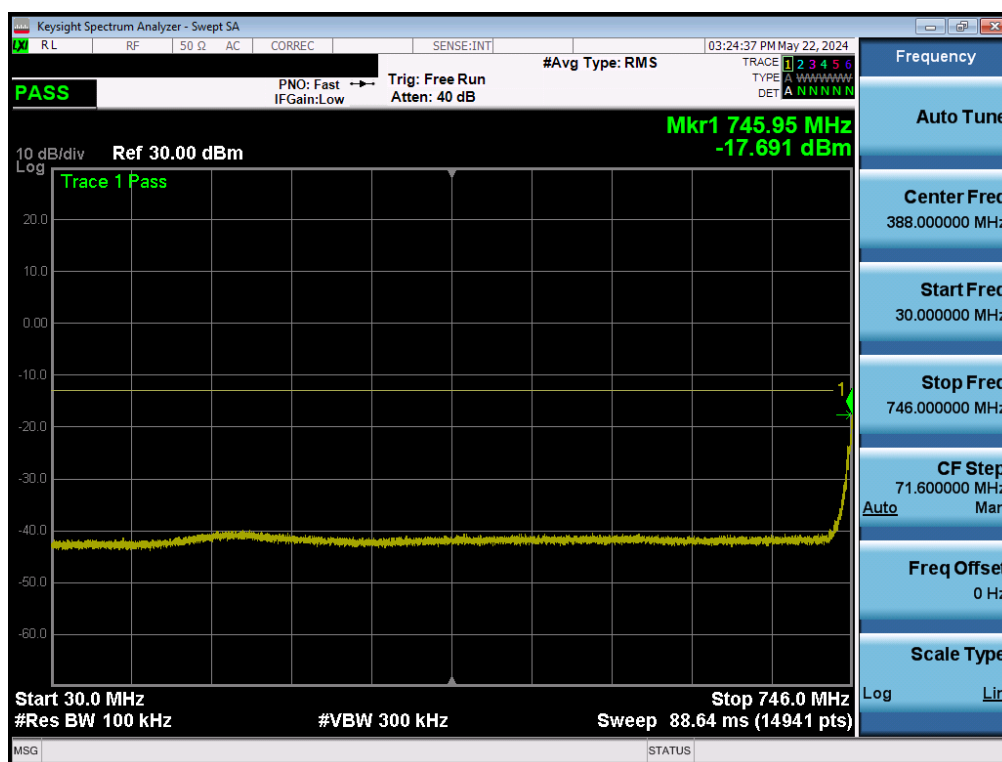
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V11.1 08/28/2023

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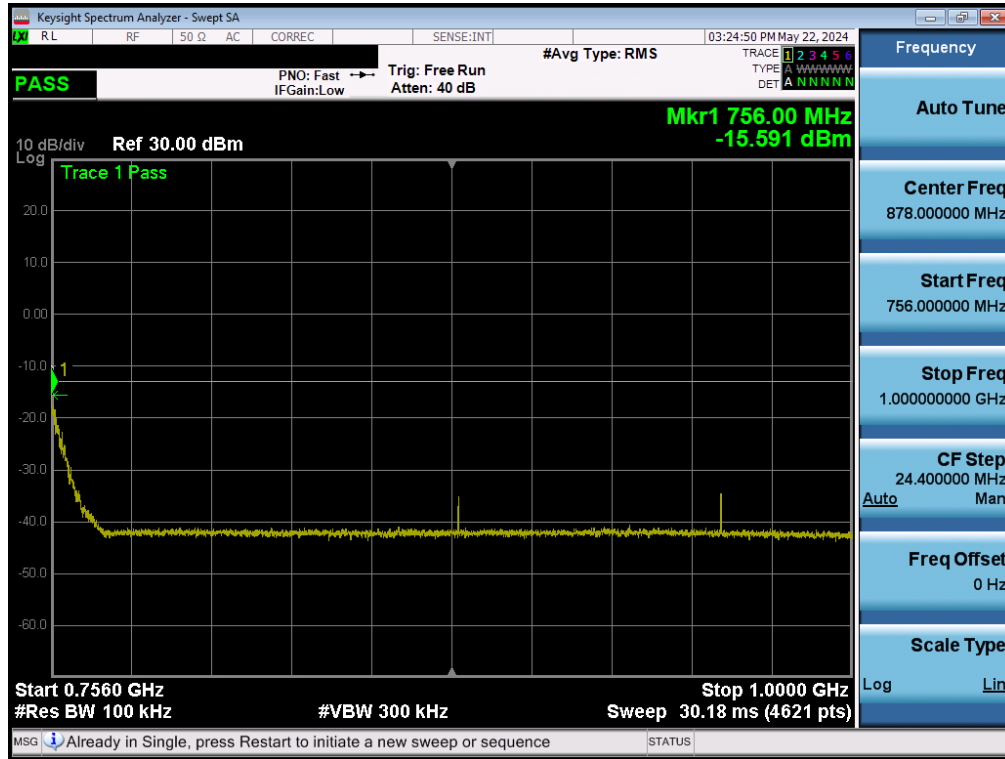


Plot 7-36. Conducted Spurious Plot (LTE Band 13 - Low Channel)

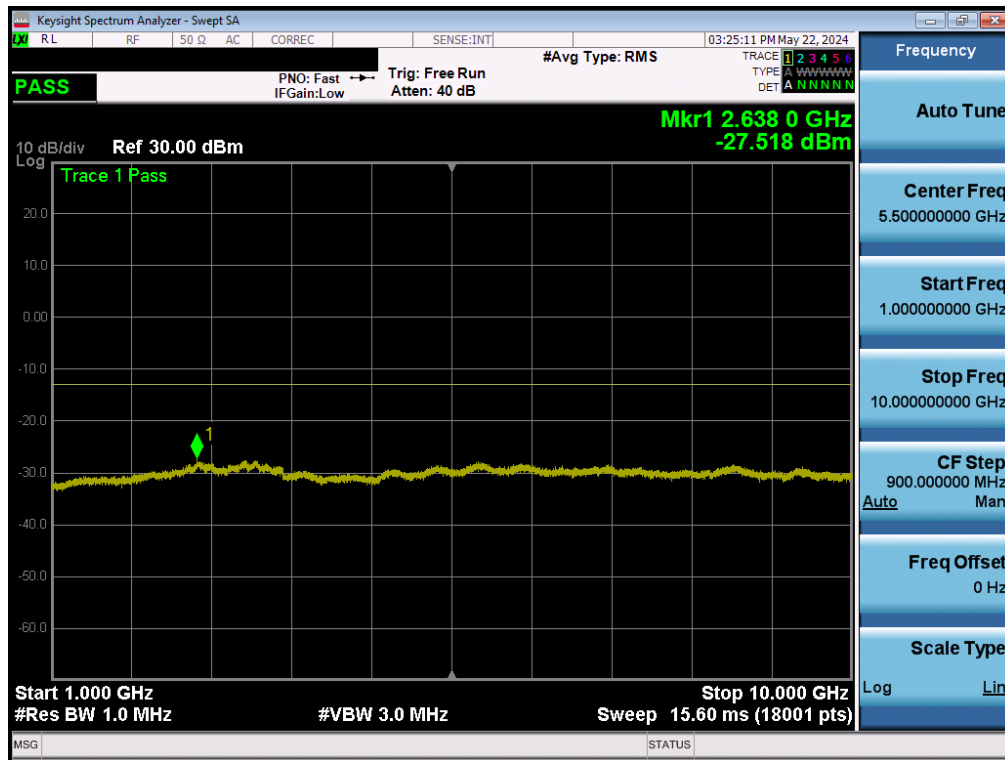


Plot 7-37. Conducted Spurious Plot (LTE Band 13 - Mid Channel)

FCC ID: 2A93U-58450	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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Plot 7-38. Conducted Spurious Plot (LTE Band 13 - Mid Channel)

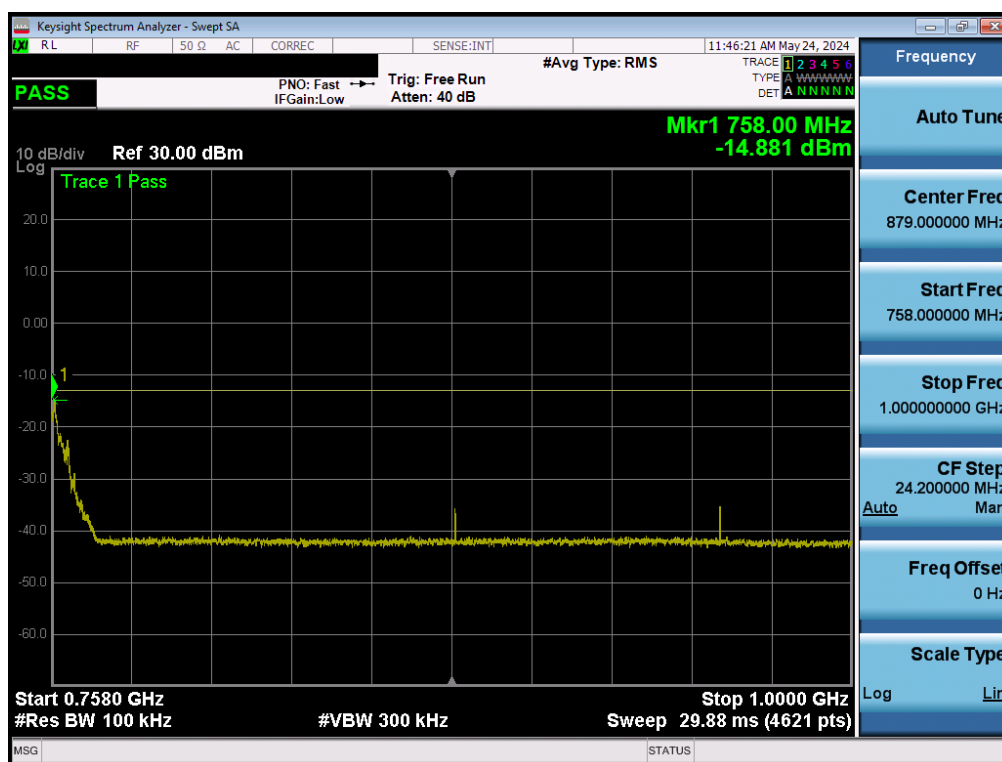


Plot 7-39. Conducted Spurious Plot (LTE Band 13 - Mid Channel)

FCC ID: 2A93U-58450	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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Plot 7-40. Conducted Spurious Plot (LTE Band 13 - High Channel)



Plot 7-41. Conducted Spurious Plot (LTE Band 13 - High Channel)

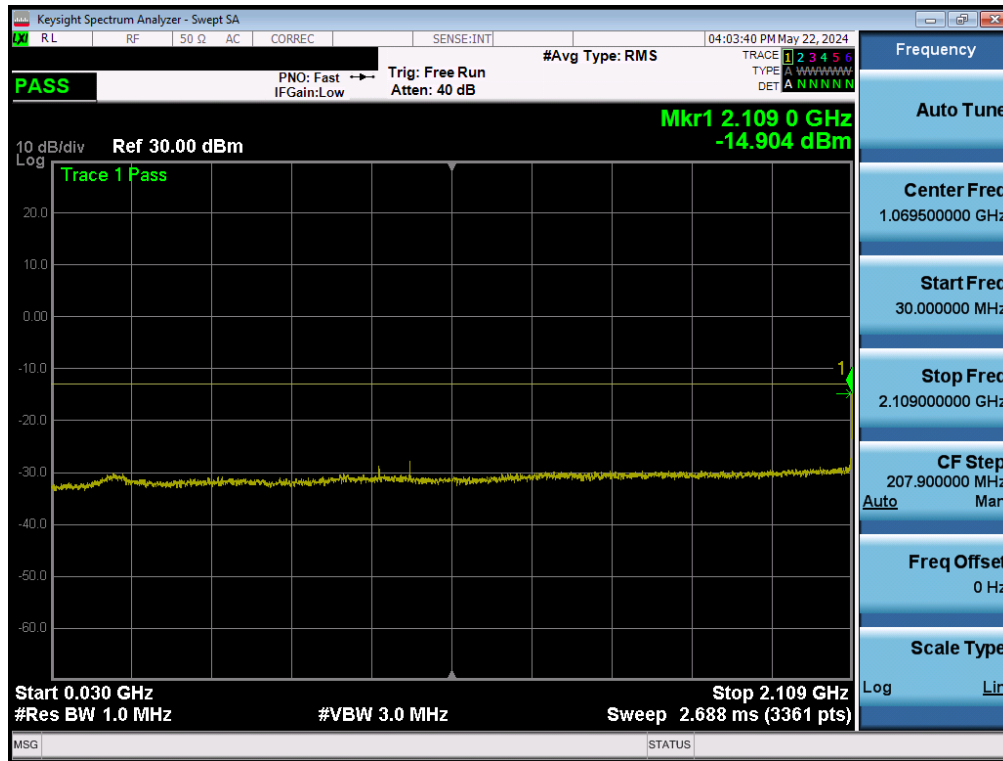
FCC ID: 2A93U-58450	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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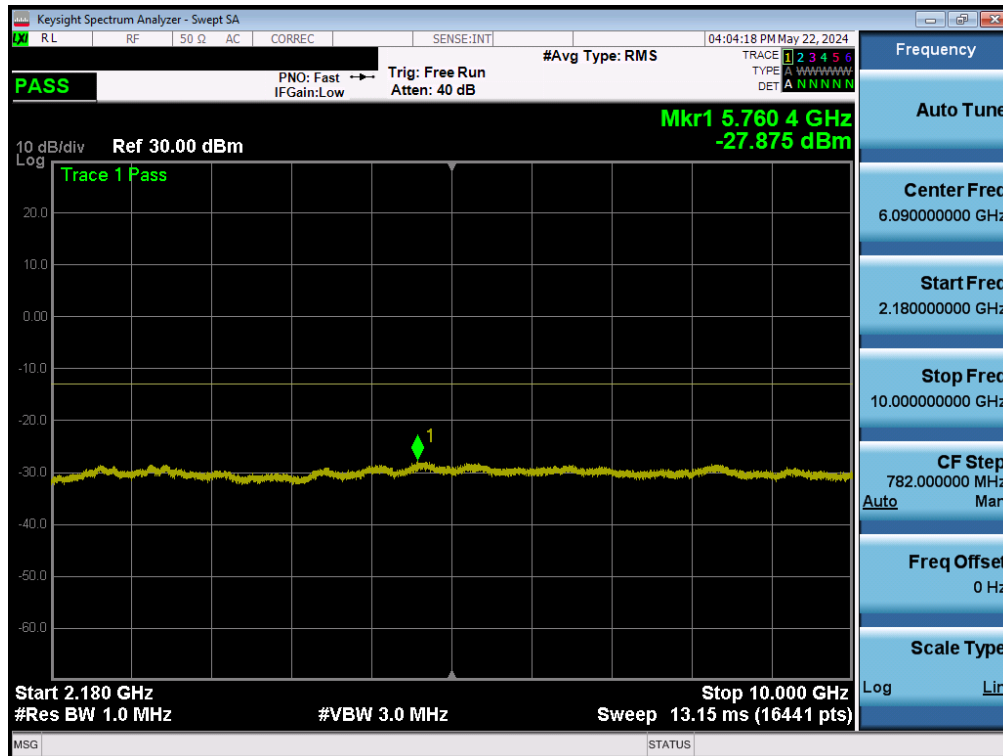
Plot 7-42. Conducted Spurious Plot (LTE Band 13 - High Channel)

FCC ID: 2A93U-58450	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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LTE Band 66/4

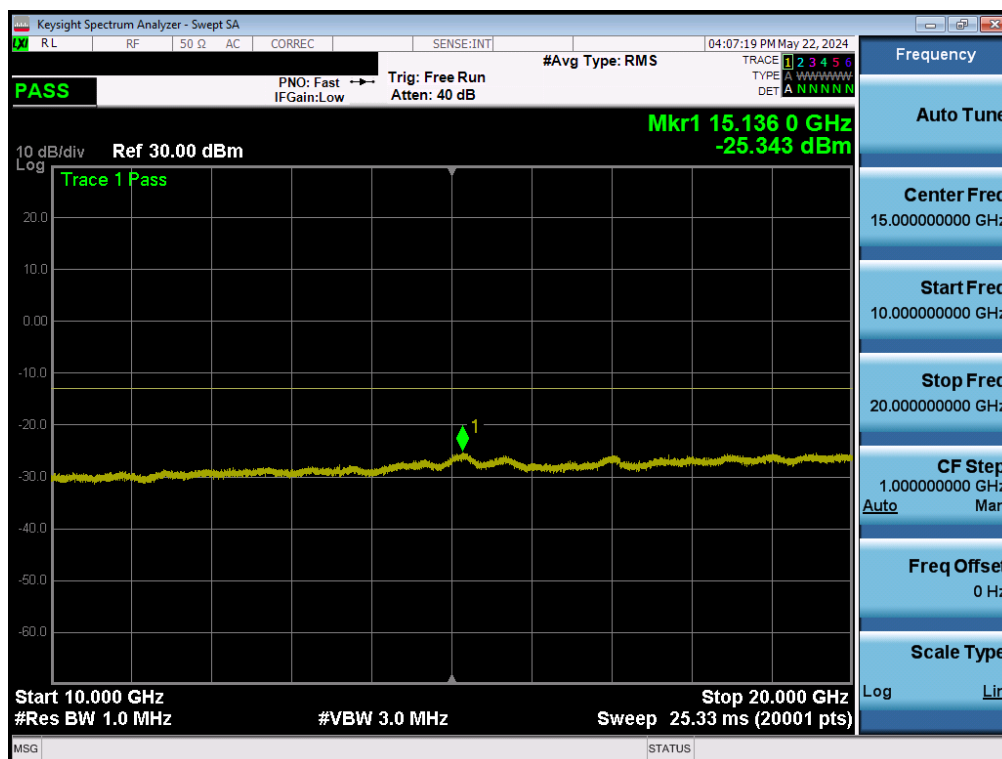


Plot 7-43. Conducted Spurious Plot (LTE Band 66/4 – Low Channel)

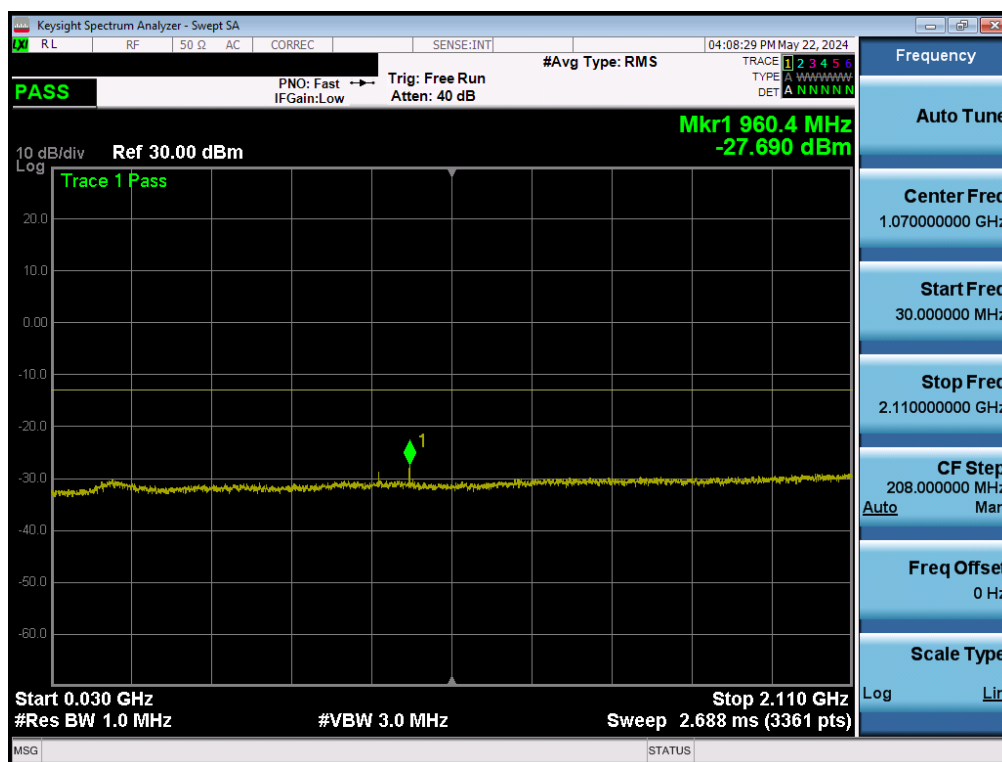


Plot 7-44. Conducted Spurious Plot (LTE Band 66/4 – Low Channel)

FCC ID: 2A93U-58450	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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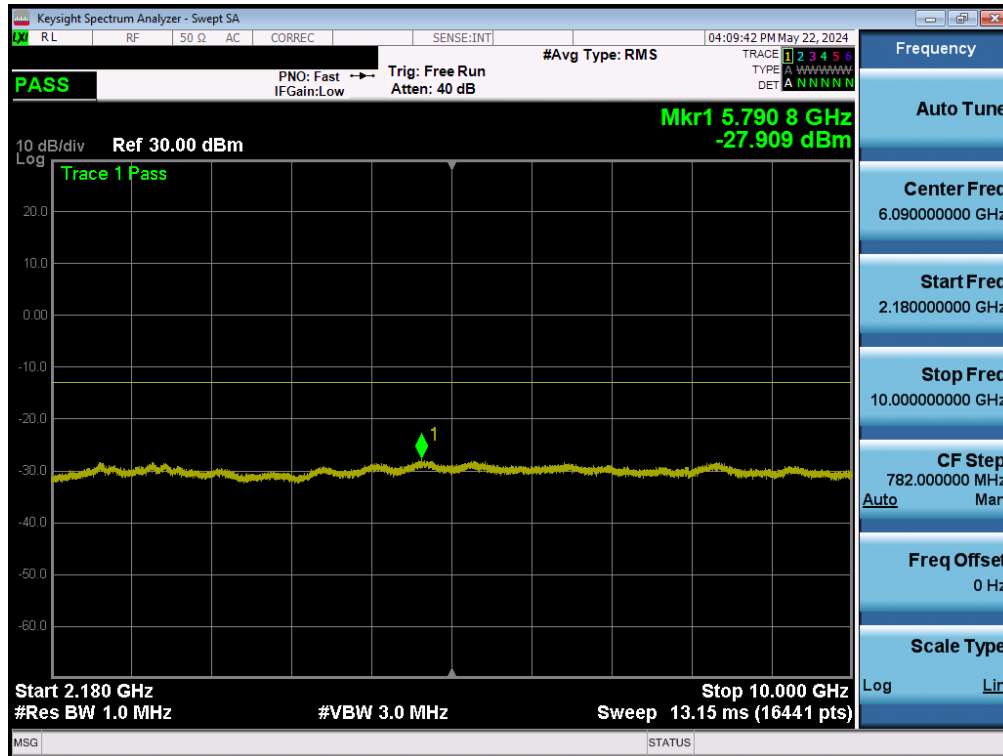


Plot 7-45. Conducted Spurious Plot (LTE Band 66/4 – Low Channel)



Plot 7-46. Conducted Spurious Plot (LTE Band 66/4 – Mid Channel)

FCC ID: 2A93U-58450	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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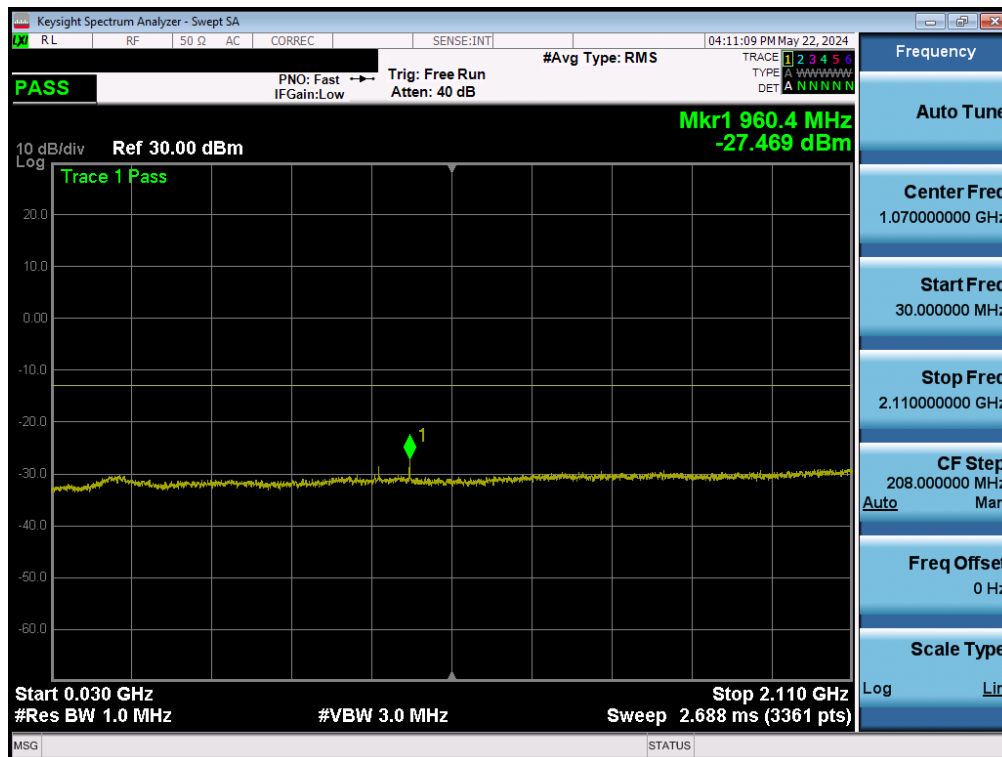


Plot 7-47. Conducted Spurious Plot (LTE Band 66/4 – Mid Channel)

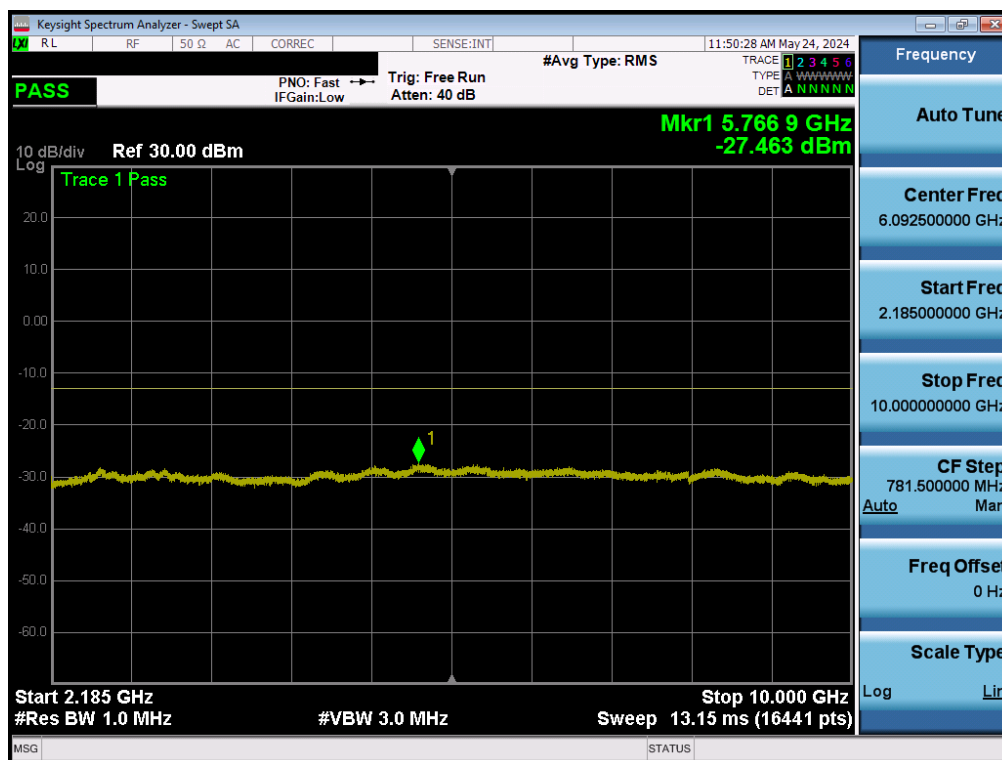


Plot 7-48. Conducted Spurious Plot (LTE Band 66/4 – Mid Channel)

FCC ID: 2A93U-58450	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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Plot 7-49. Conducted Spurious Plot (LTE Band 66/4 – High Channel)



Plot 7-50. Conducted Spurious Plot (LTE Band 66/4 – High Channel)

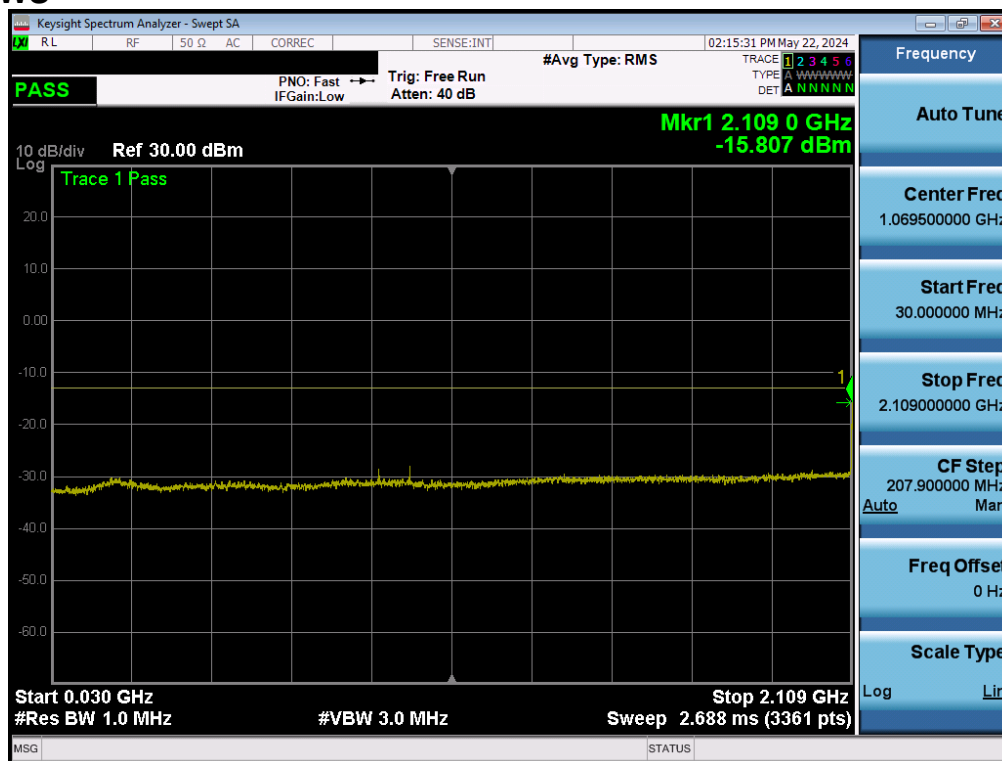
FCC ID: 2A93U-58450	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2402290014-03.2A93U	Test Dates: 04/05 - 10/09/2024	EUT Type: Geolocation System	Page 43 of 96



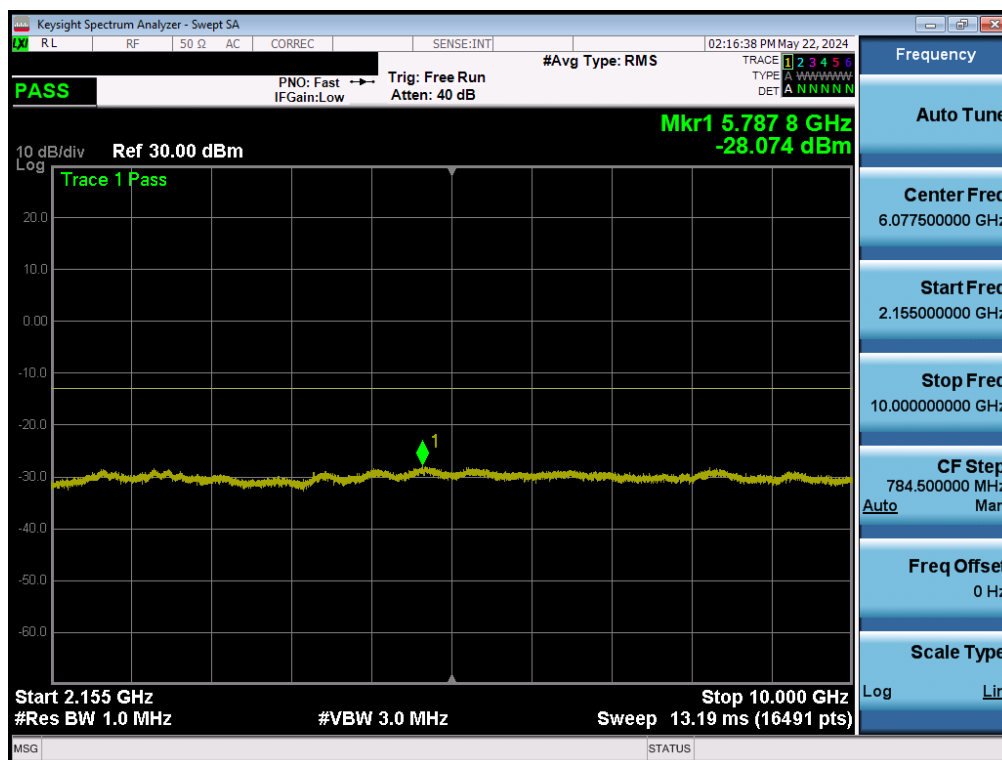
Plot 7-51. Conducted Spurious Plot (LTE Band 66/4 – High Channel)

FCC ID: 2A93U-58450	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2402290014-03.2A93U	Test Dates: 04/05 - 10/09/2024	EUT Type: Geolocation System	Page 44 of 96

WCDMA AWS

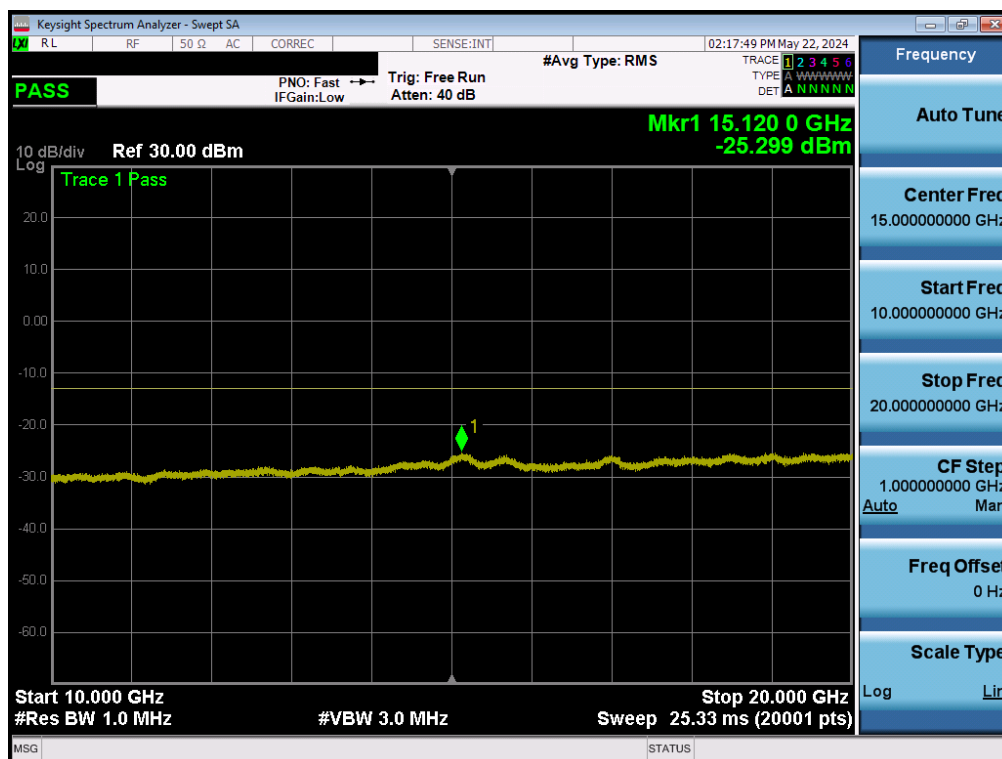


Plot 7-52. Conducted Spurious Plot (WCDMA AWS - Low Channel)

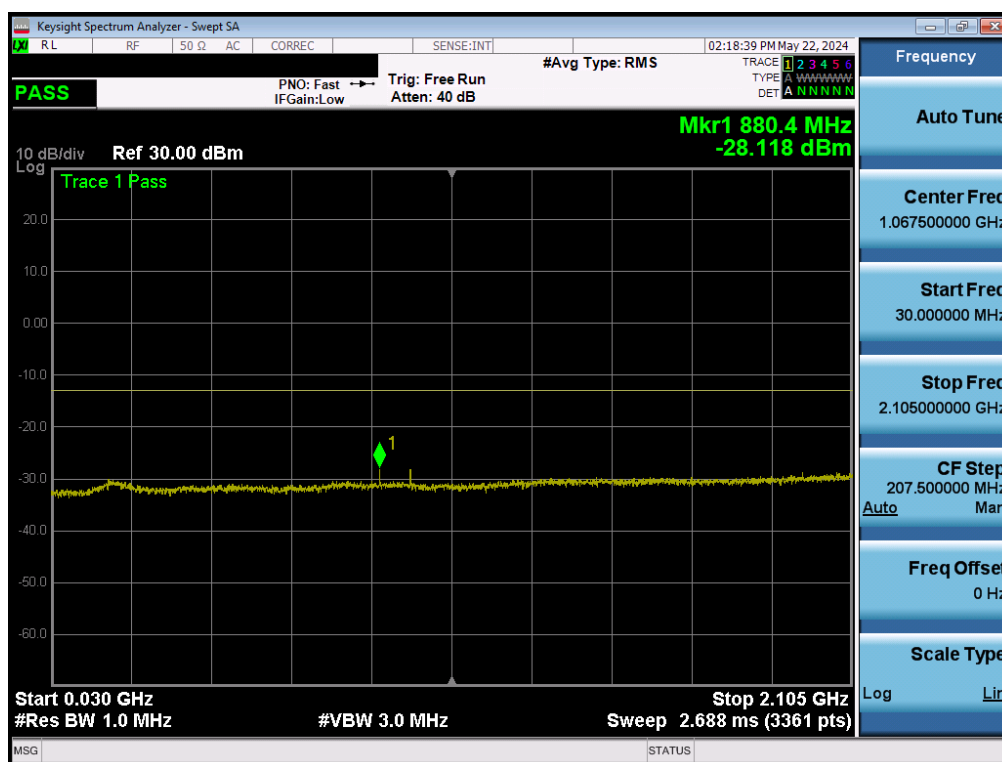


Plot 7-53. Conducted Spurious Plot (WCDMA AWS - Low Channel)

FCC ID: 2A93U-58450	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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Plot 7-54. Conducted Spurious Plot (WCDMA AWS - Low Channel)

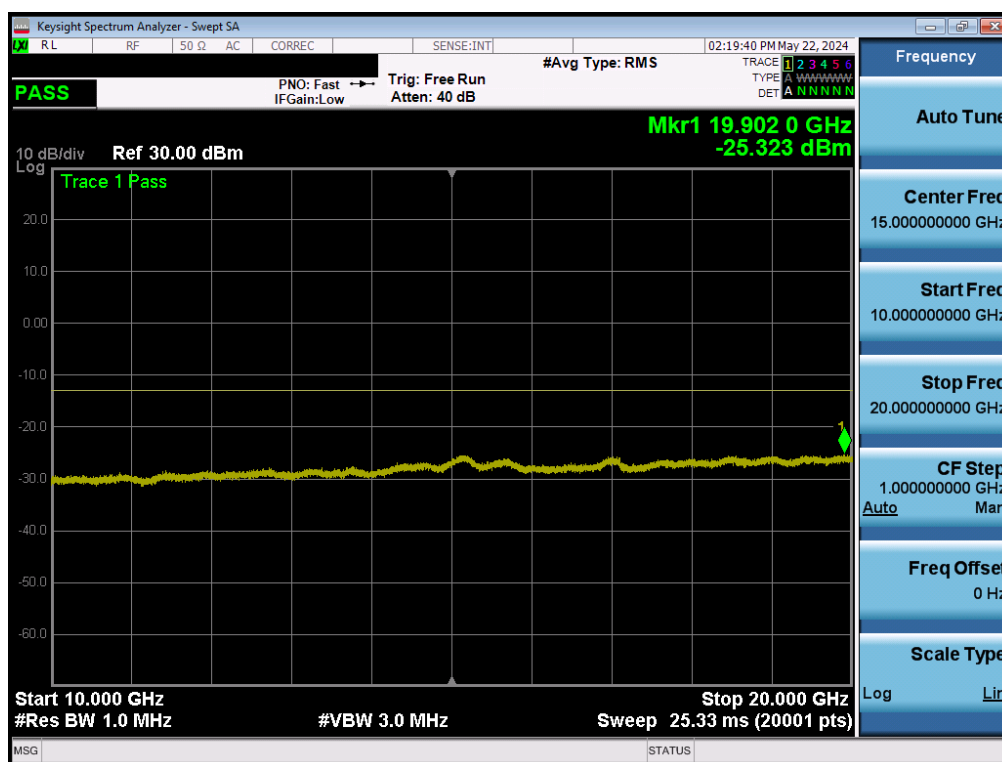


Plot 7-55. Conducted Spurious Plot (WCDMA AWS - Mid Channel)

FCC ID: 2A93U-58450	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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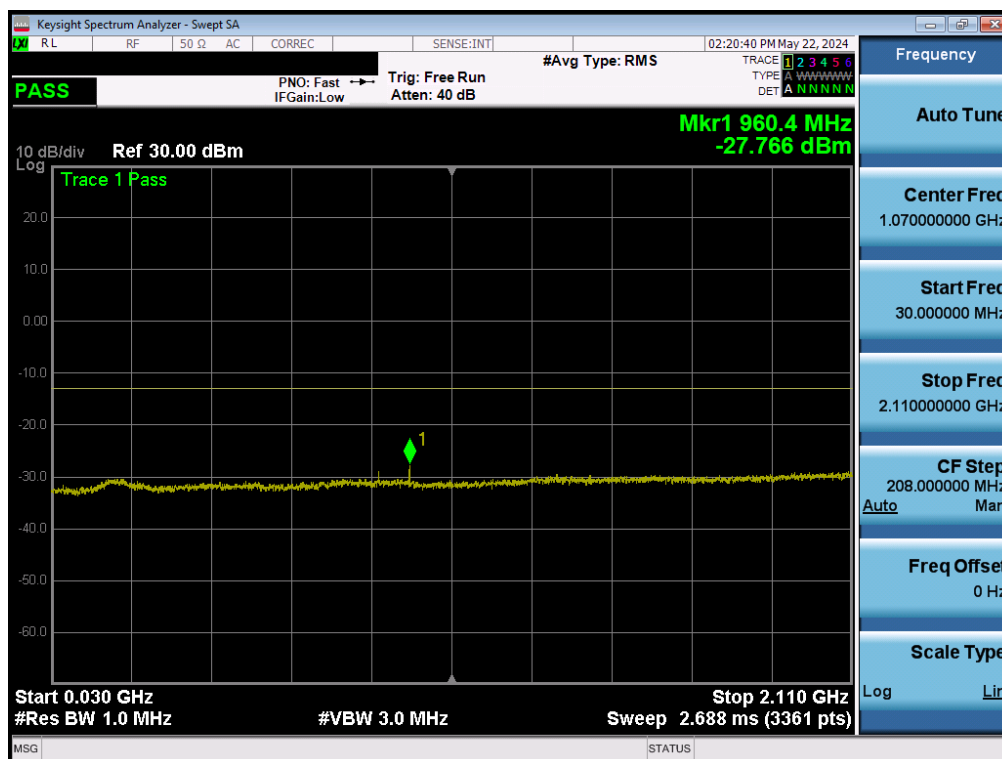


Plot 7-56. Conducted Spurious Plot (WCDMA AWS- Mid Channel)

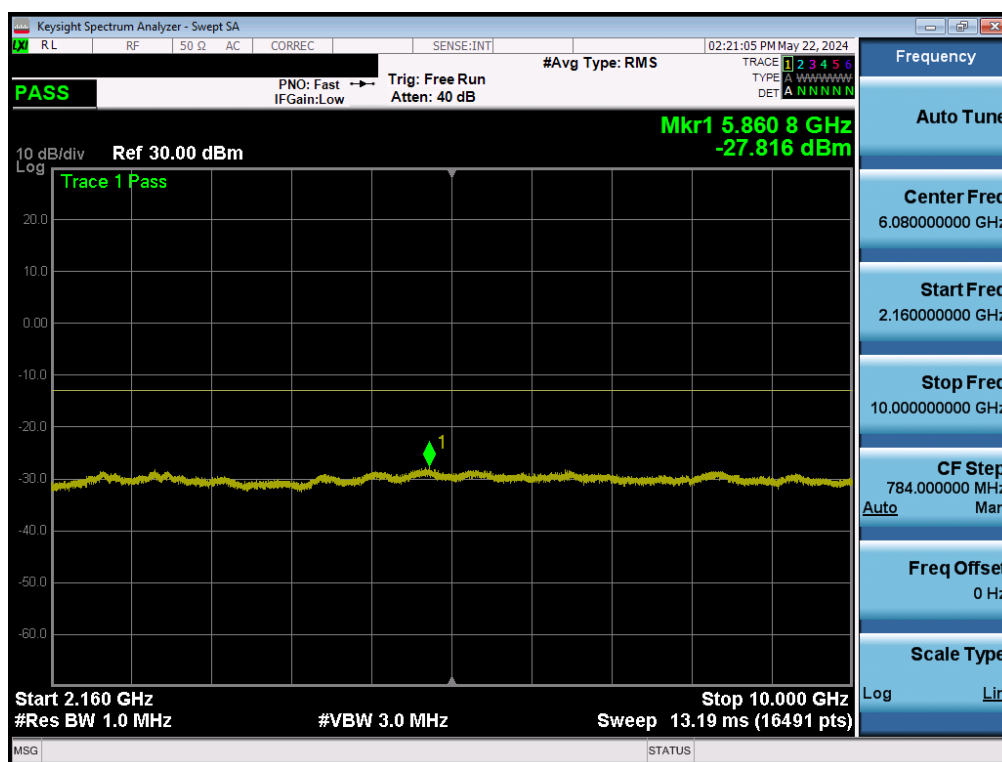


Plot 7-57. Conducted Spurious Plot (WCDMA AWS- Mid Channel)

FCC ID: 2A93U-58450	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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Plot 7-58. Conducted Spurious Plot (WCDMA AWS - High Channel)



Plot 7-59. Conducted Spurious Plot (WCDMA AWS - High Channel)

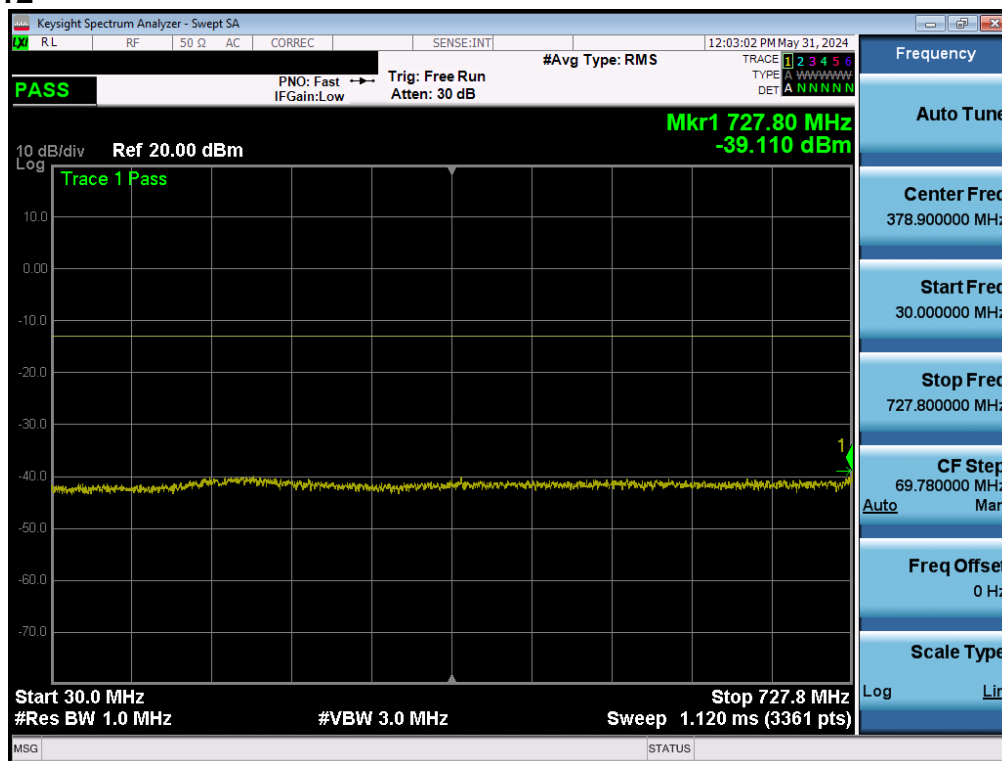
FCC ID: 2A93U-58450	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2402290014-03.2A93U	Test Dates: 04/05 - 10/09/2024	EUT Type: Geolocation System	Page 48 of 96



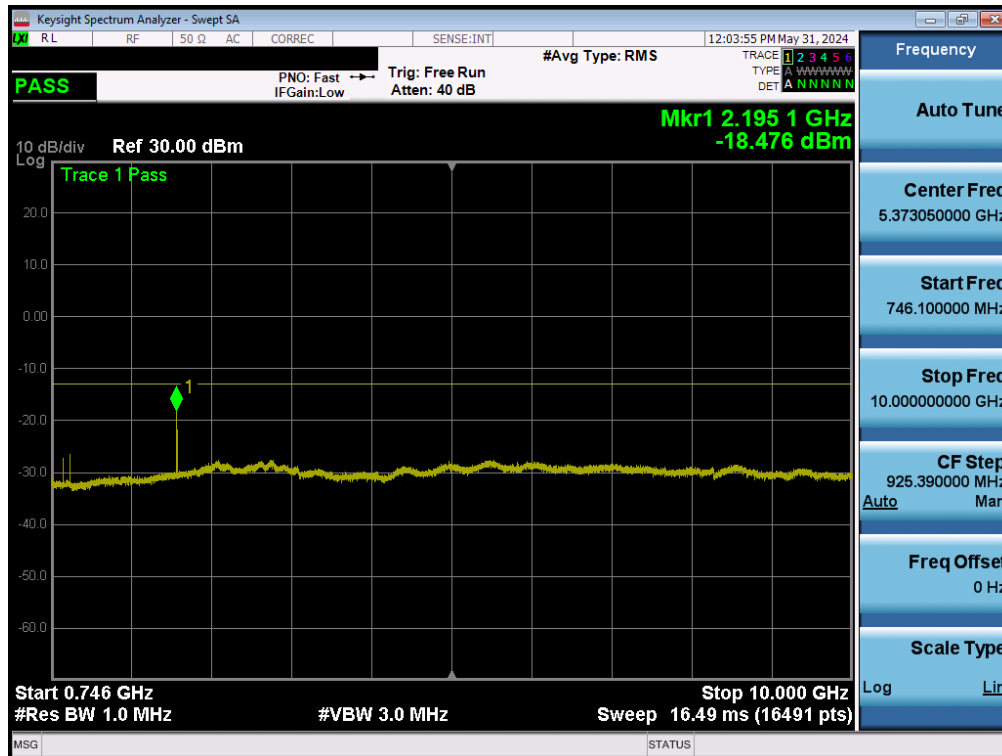
Plot 7-60. Conducted Spurious Plot (WCDMA AWS - High Channel)

FCC ID: 2A93U-58450	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2402290014-03.2A93U	Test Dates: 04/05 - 10/09/2024	EUT Type: Geolocation System	Page 49 of 96

WCDMA B12



Plot 7-61. Conducted Spurious Plot (WCDMA B12 – Low Channel)

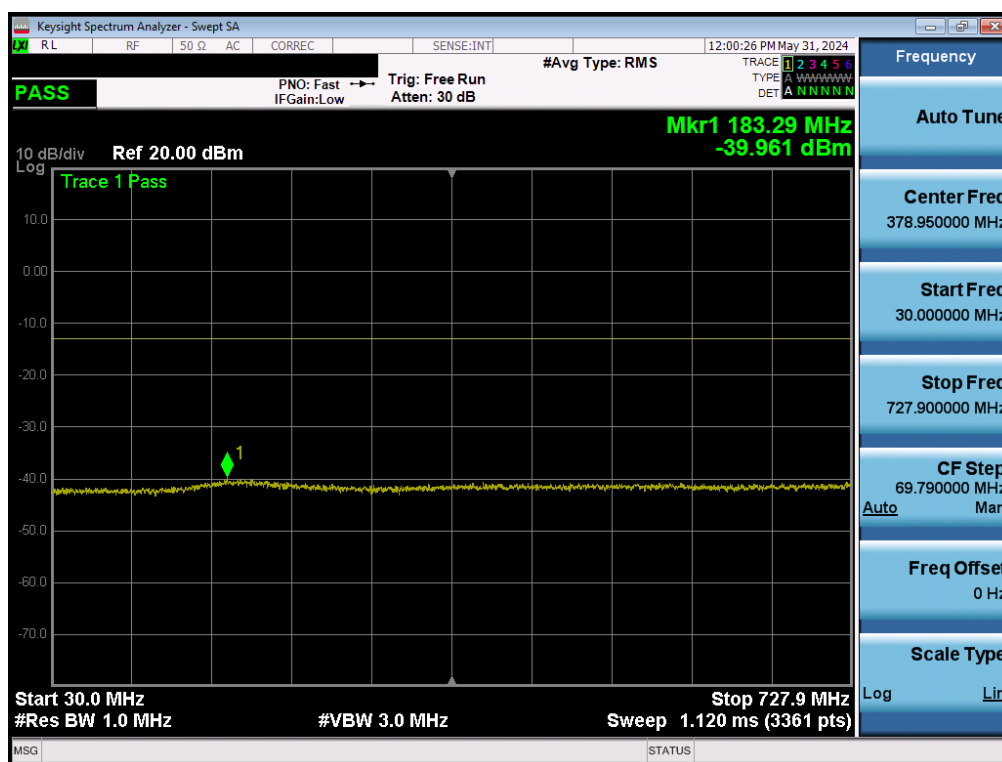


Plot 7-62. Conducted Spurious Plot (WCDMA B12 – Low Channel)

FCC ID: 2A93U-58450	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2402290014-03.2A93U	Test Dates: 04/05 - 10/09/2024	EUT Type: Geolocation System	Page 50 of 96

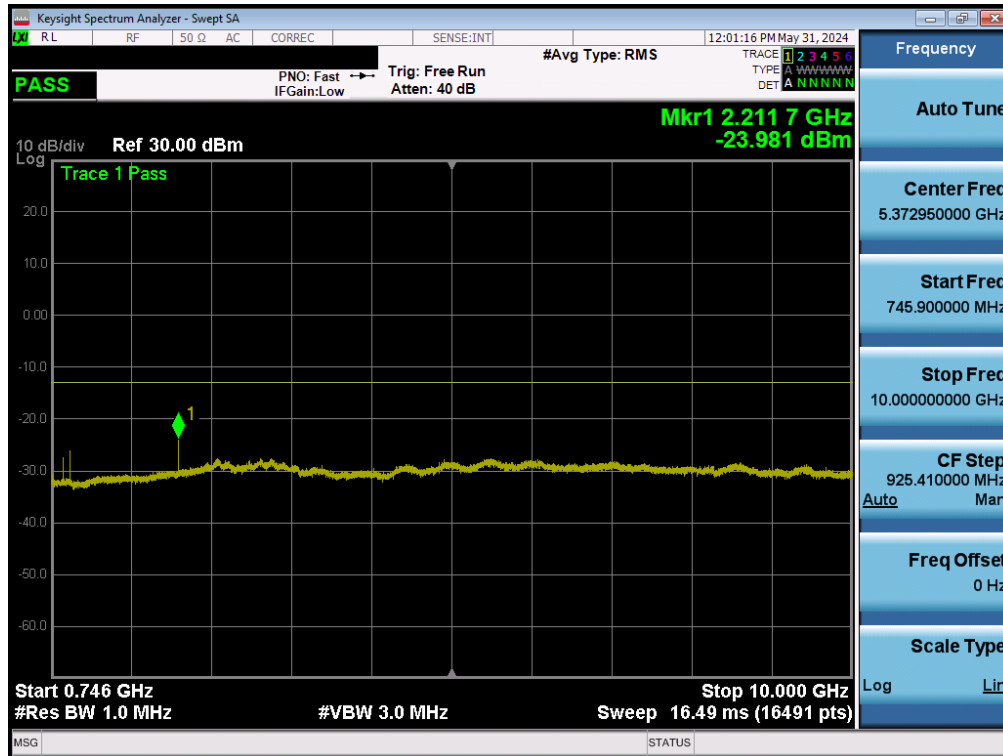


Plot 7-63. Conducted Spurious Plot (WCDMA B12 – Low Channel)

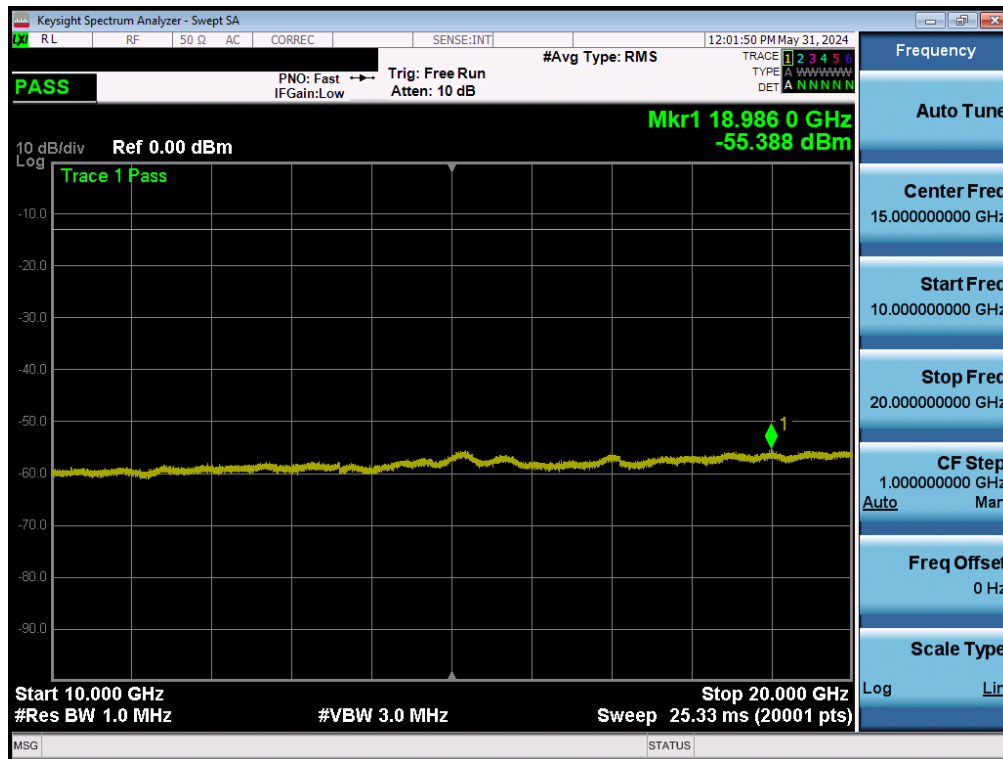


Plot 7-64. Conducted Spurious Plot (WCDMA B12 – Mid Channel)

FCC ID: 2A93U-58450	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2402290014-03.2A93U	Test Dates: 04/05 - 10/09/2024	EUT Type: Geolocation System	Page 51 of 96

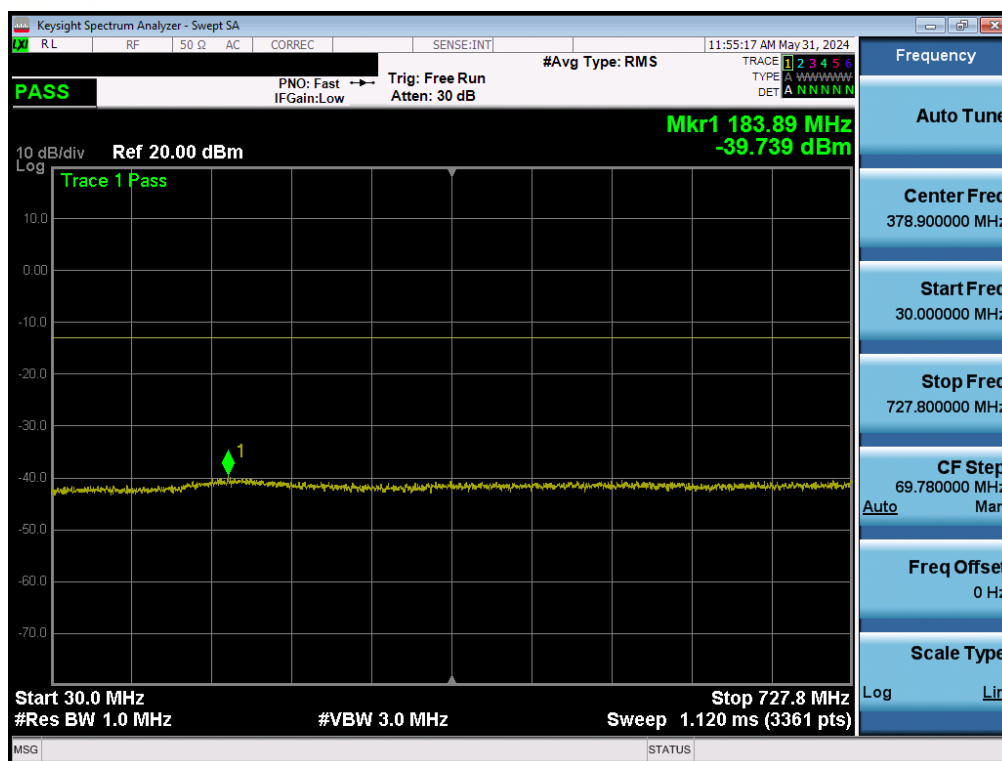


Plot 7-65. Conducted Spurious Plot (WCDMA B12 – Mid Channel)

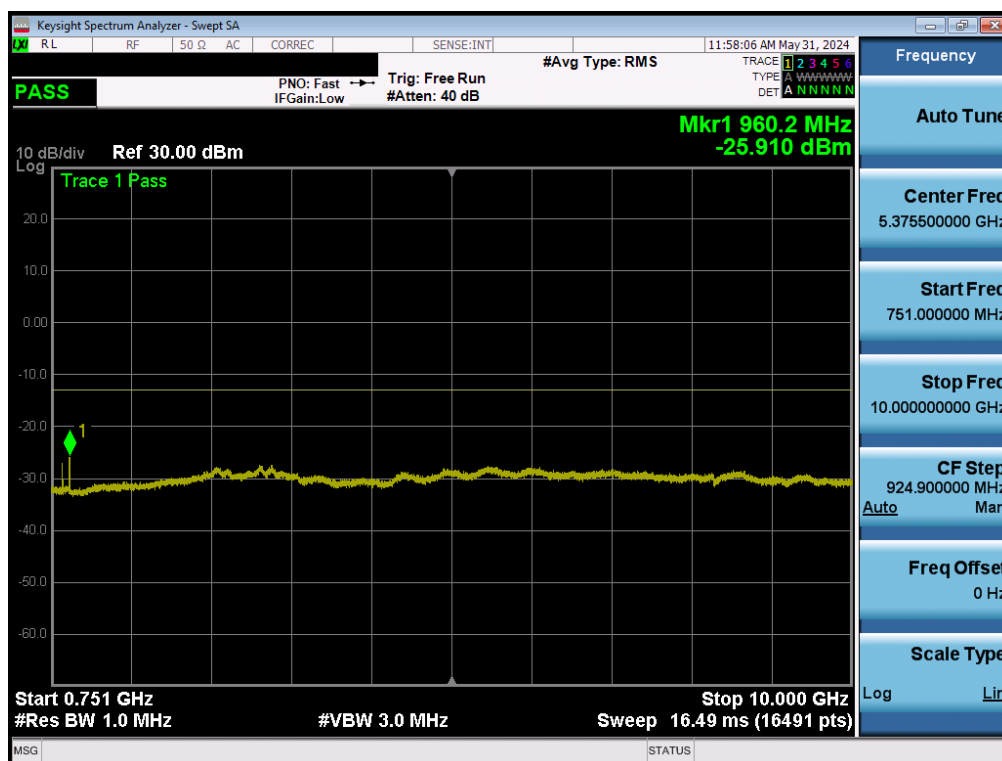


Plot 7-66. Conducted Spurious Plot (WCDMA B12 – Mid Channel)

FCC ID: 2A93U-58450	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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Plot 7-67. Conducted Spurious Plot (WCDMA B12 – High Channel)



Plot 7-68. Conducted Spurious Plot (WCDMA B12 – High Channel)

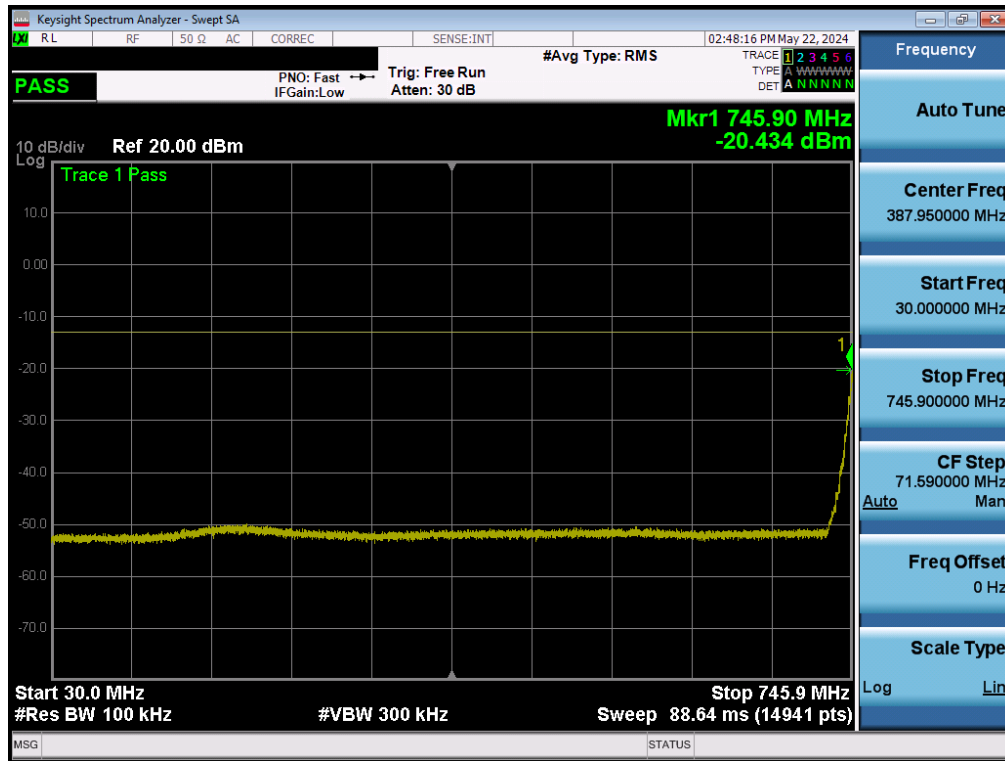
FCC ID: 2A93U-58450	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2402290014-03.2A93U	Test Dates: 04/05 - 10/09/2024	EUT Type: Geolocation System	Page 53 of 96



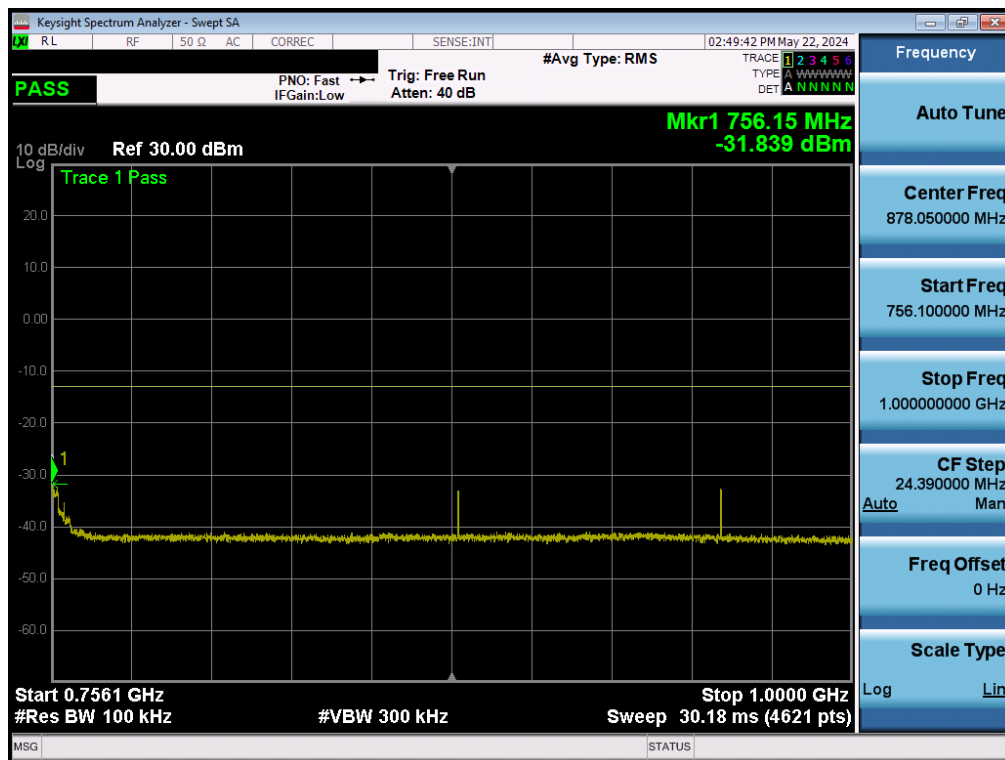
Plot 7-69. Conducted Spurious Plot (WCDMA B12 – High Channel)

FCC ID: 2A93U-58450	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2402290014-03.2A93U	Test Dates: 04/05 - 10/09/2024	EUT Type: Geolocation System	Page 54 of 96

WCDMA B13

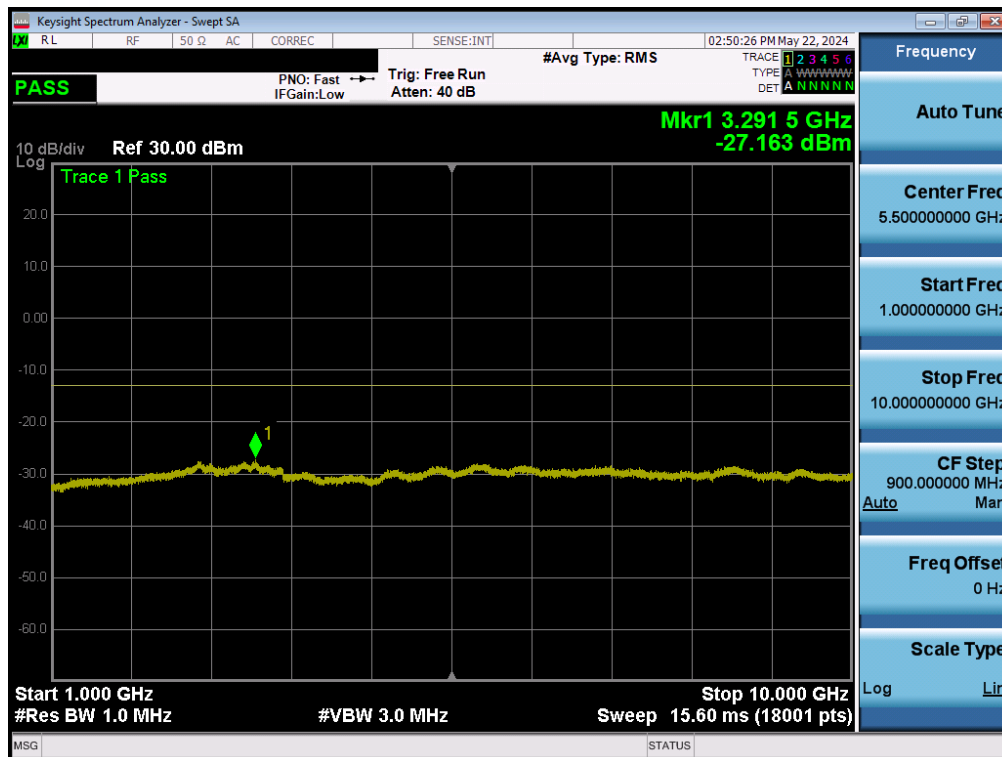


Plot 7-70. Conducted Spurious Plot (WCDMA B13 – Low Channel)



Plot 7-71. Conducted Spurious Plot (WCDMA B13 – Low Channel)

FCC ID: 2A93U-58450	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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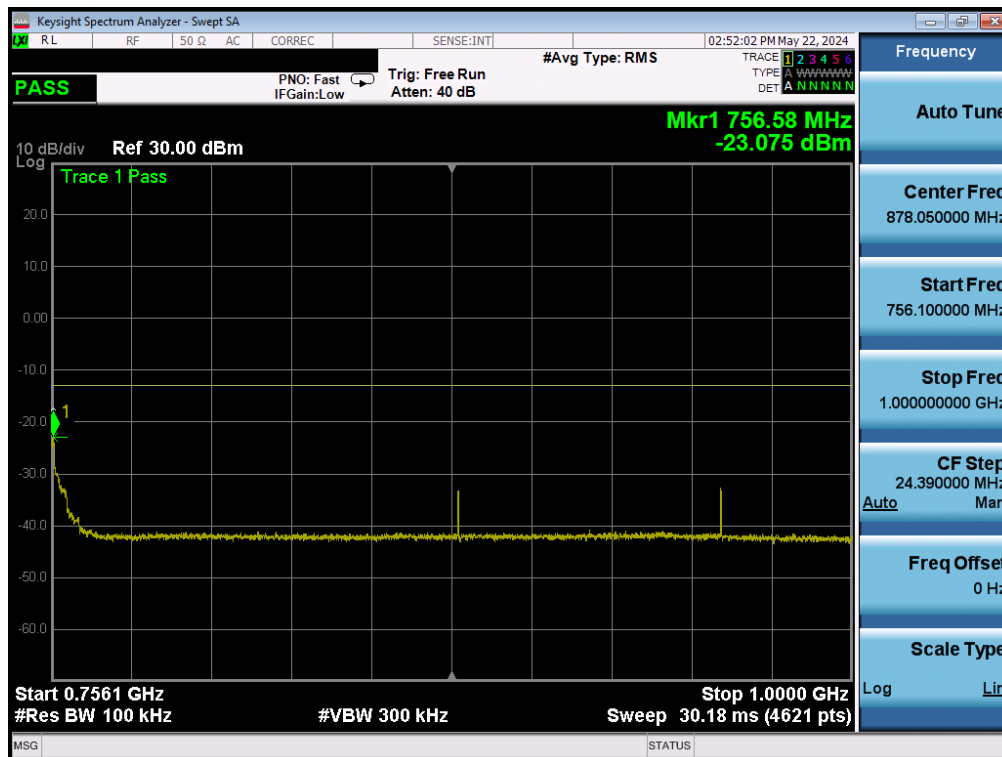


Plot 7-72. Conducted Spurious Plot (WCDMA B13 – Low Channel)

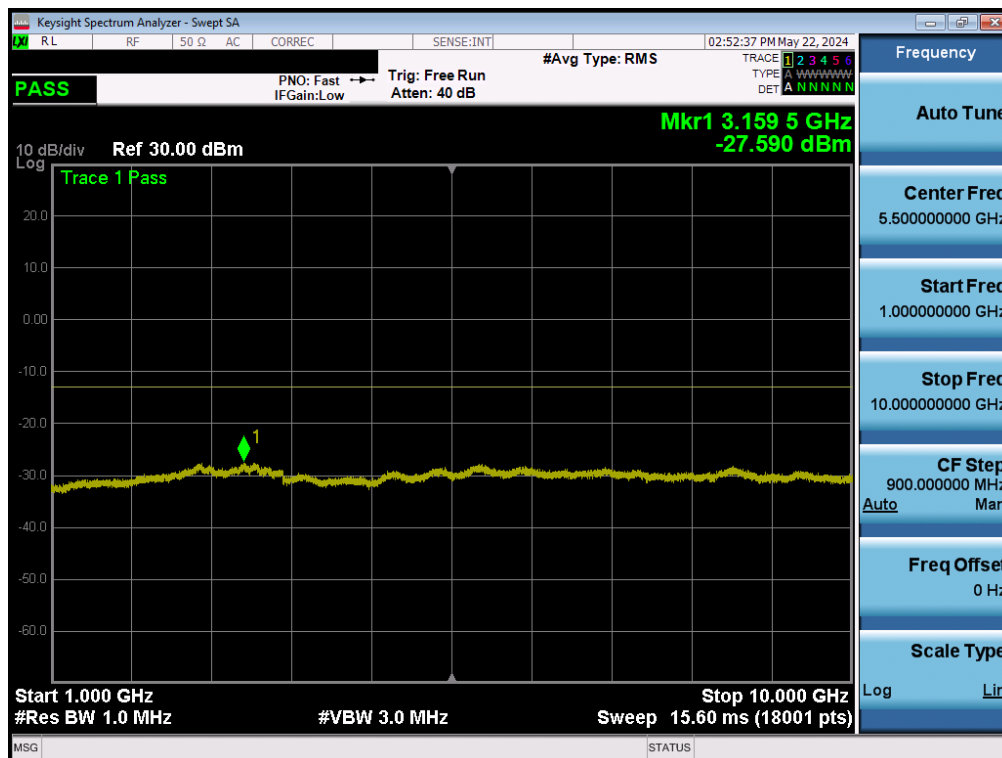


Plot 7-73. Conducted Spurious Plot (WCDMA B13 – Mid Channel)

FCC ID: 2A93U-58450	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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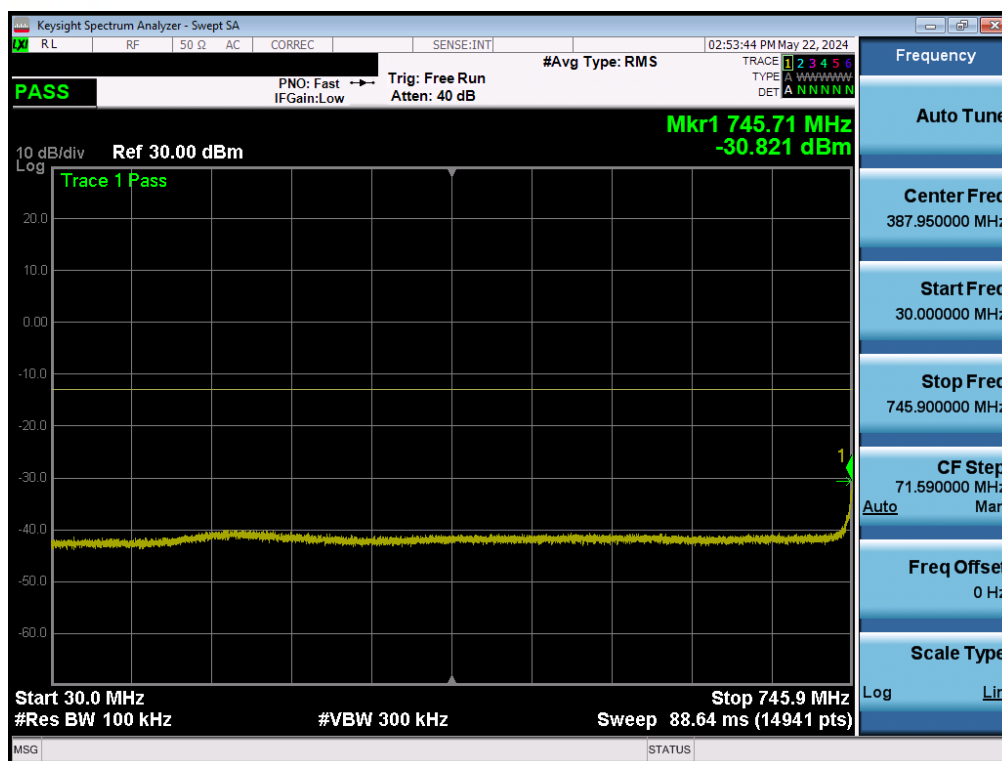


Plot 7-74. Conducted Spurious Plot (WCDMA B13 – Mid Channel)

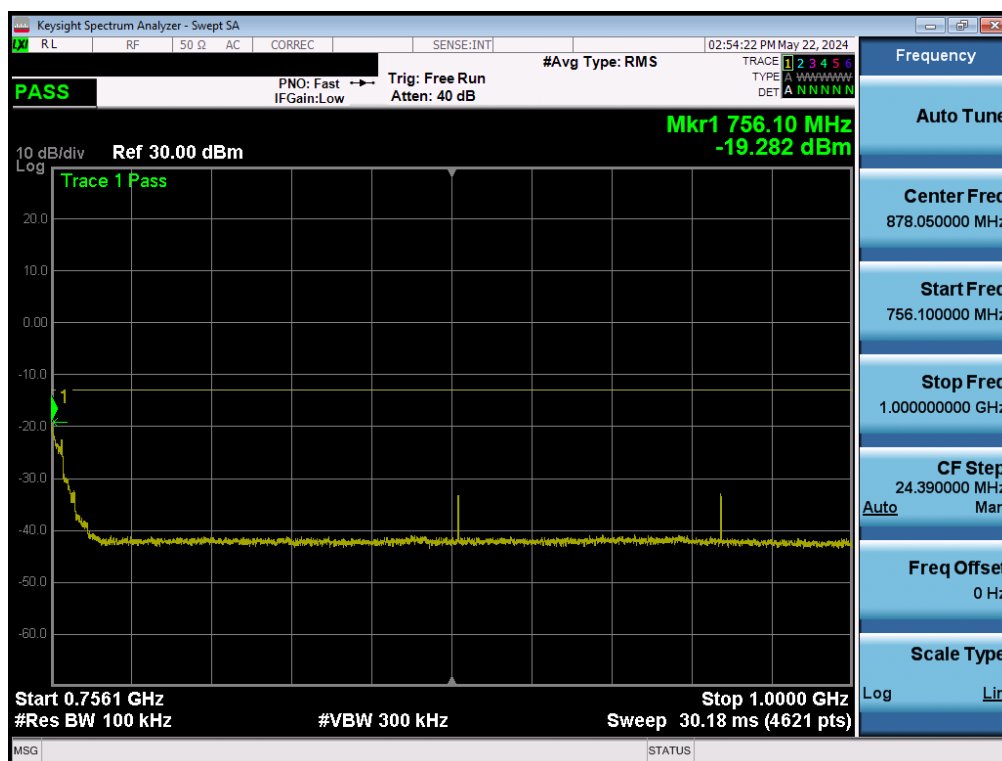


Plot 7-75. Conducted Spurious Plot (WCDMA B13 – Mid Channel)

FCC ID: 2A93U-58450	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2402290014-03.2A93U	Test Dates: 04/05 - 10/09/2024	EUT Type: Geolocation System	Page 57 of 96

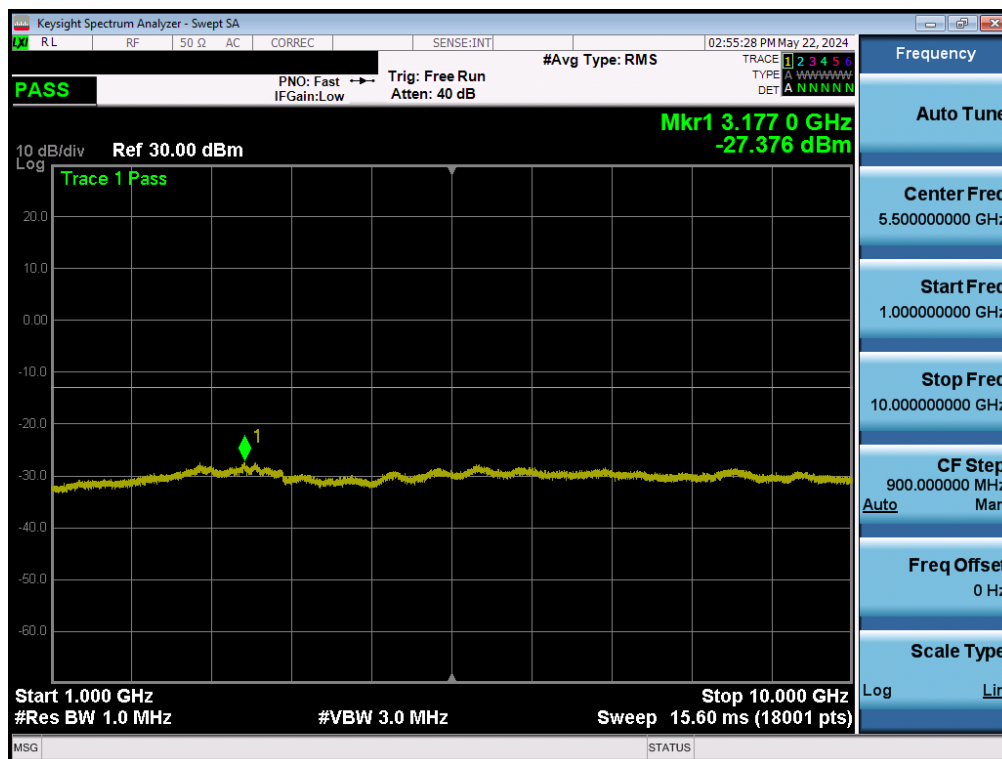


Plot 7-76. Conducted Spurious Plot (WCDMA B13 – High Channel)



Plot 7-77. Conducted Spurious Plot (WCDMA B13 – High Channel)

FCC ID: 2A93U-58450	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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Plot 7-78. Conducted Spurious Plot (WCDMA B13 – High Channel)

FCC ID: 2A93U-58450	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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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 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.

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

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. $\text{RBW} \geq 1\%$ of the emission bandwidth
4. $\text{VBW} \geq 3 \times \text{RBW}$
5. Detector = RMS
6. Number of sweep points $\geq 2 \times \text{Span}/\text{RBW}$
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

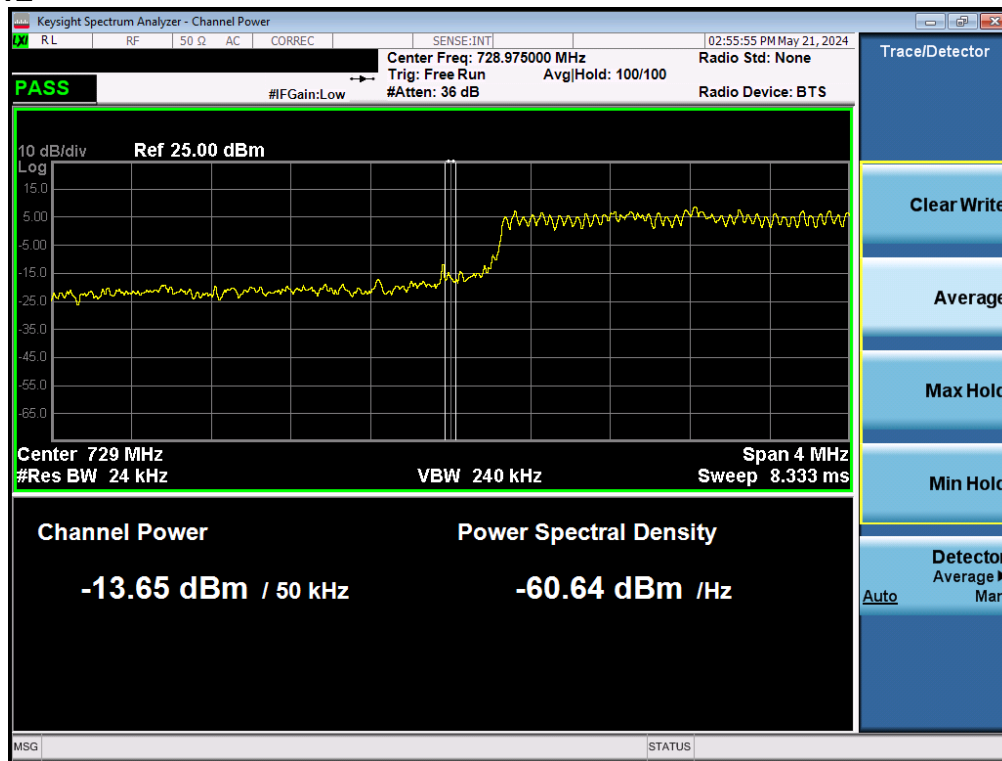
FCC ID: 2A93U-58450	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2402290014-03.2A93U	Test Dates: 04/05 - 10/09/2024	EUT Type: Geolocation System	Page 60 of 96

Test Notes

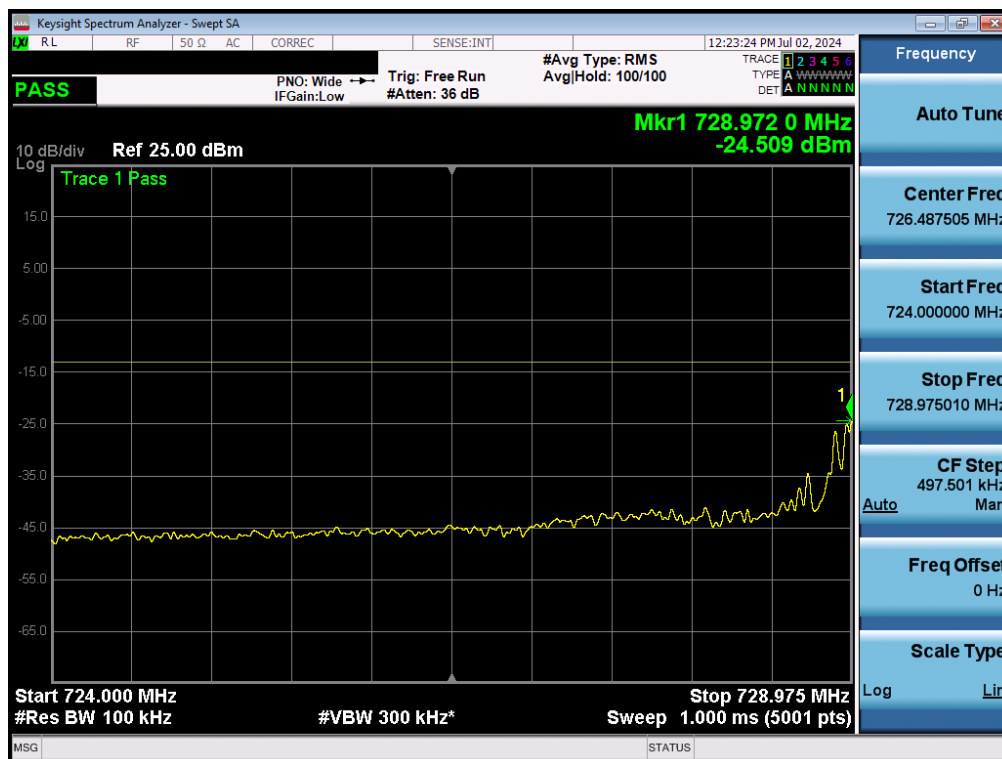
1. Per 27.53(h) for AWS band operation, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed to demonstrate compliance with the out-of-band emissions 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. Per 27.53(g) for operations in the 663 - 698 MHz and 698 – 746MHz bands, in the 100 kHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least 30 kHz may be employed to demonstrate compliance with the out-of-band emissions limit.
3. Per 27.53(c)(5) for operations in the 776-788 MHz band, in the 100 kHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least 30 kHz may be employed to demonstrate compliance with the out-of-band emissions limit.
4. For all plots showing emissions in the 763 – 775MHz and 793 – 805MHz band, the FCC limit per 27.53(c)(4) is $65 + 10 \log_{10}(P) = -35\text{dBm}$ in a 6.25kHz bandwidth.

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LTE Band 12

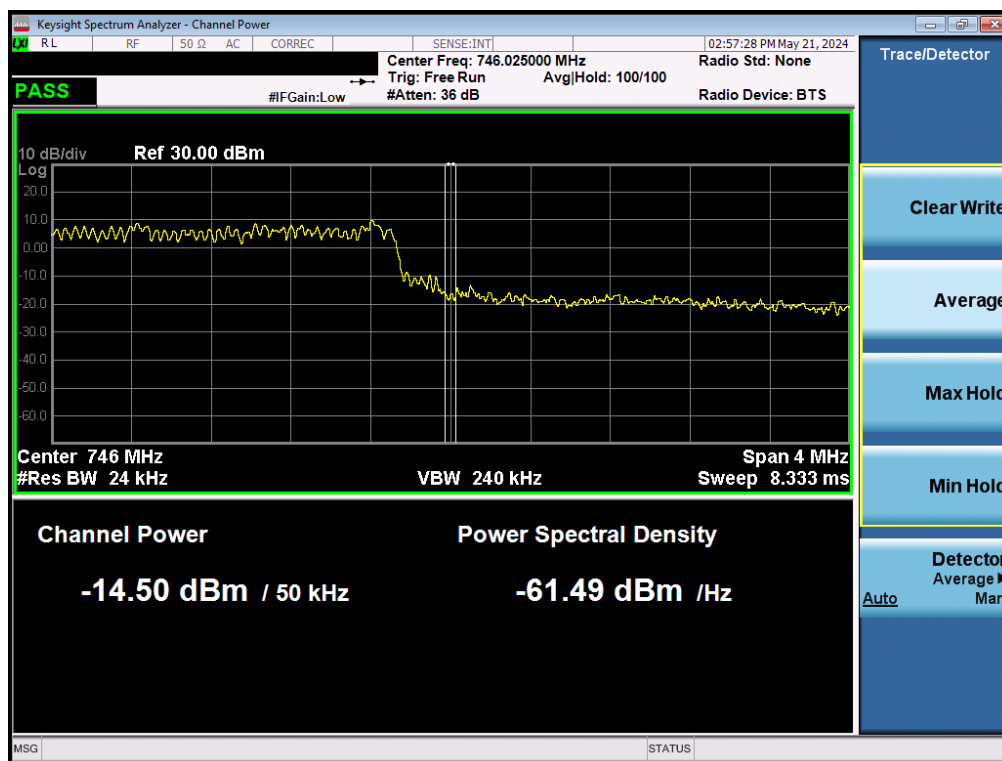


Plot 7-79. Lower Band Edge Plot (LTE Band 12 - 5MHz QPSK – Full RB)

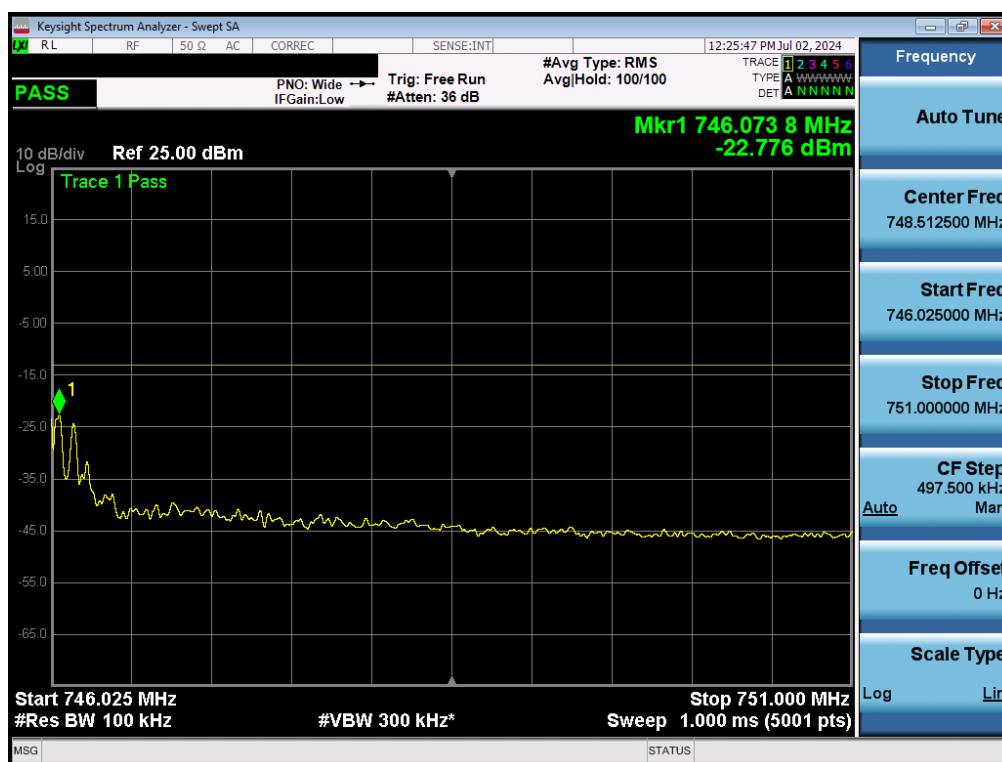


Plot 7-80. Lower Extended Band Edge Plot (LTE Band 12 - 5MHz QPSK – Full RB)

FCC ID: 2A93U-58450	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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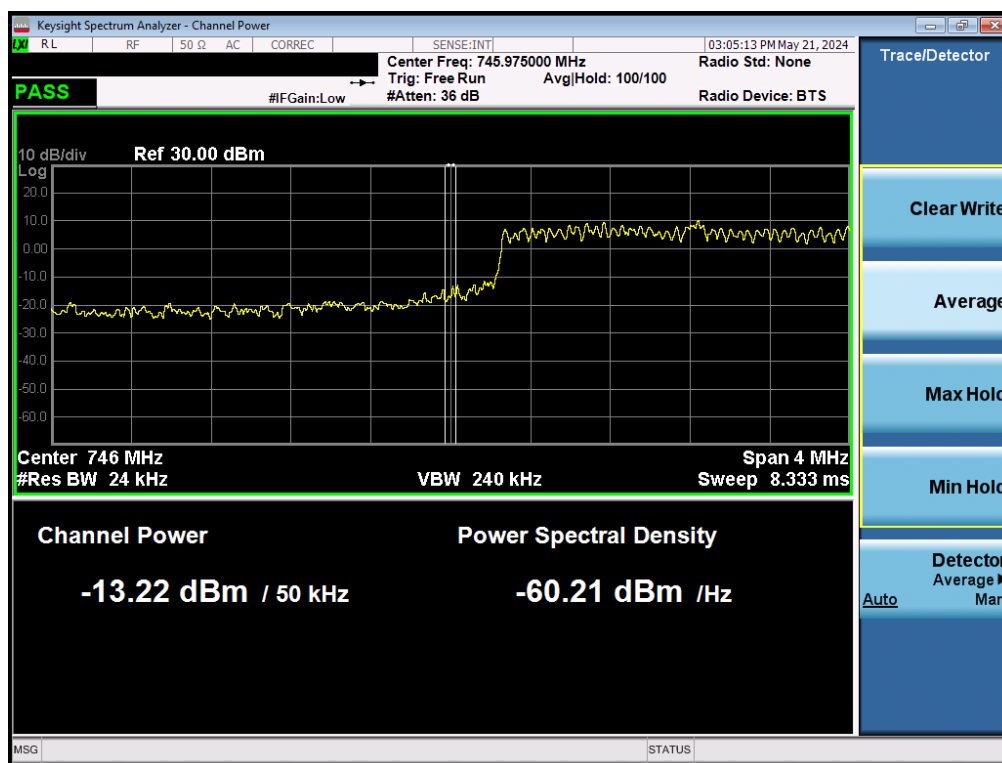
Plot 7-81. Upper Band Edge Plot (LTE Band 12 - 5MHz QPSK – Full RB)



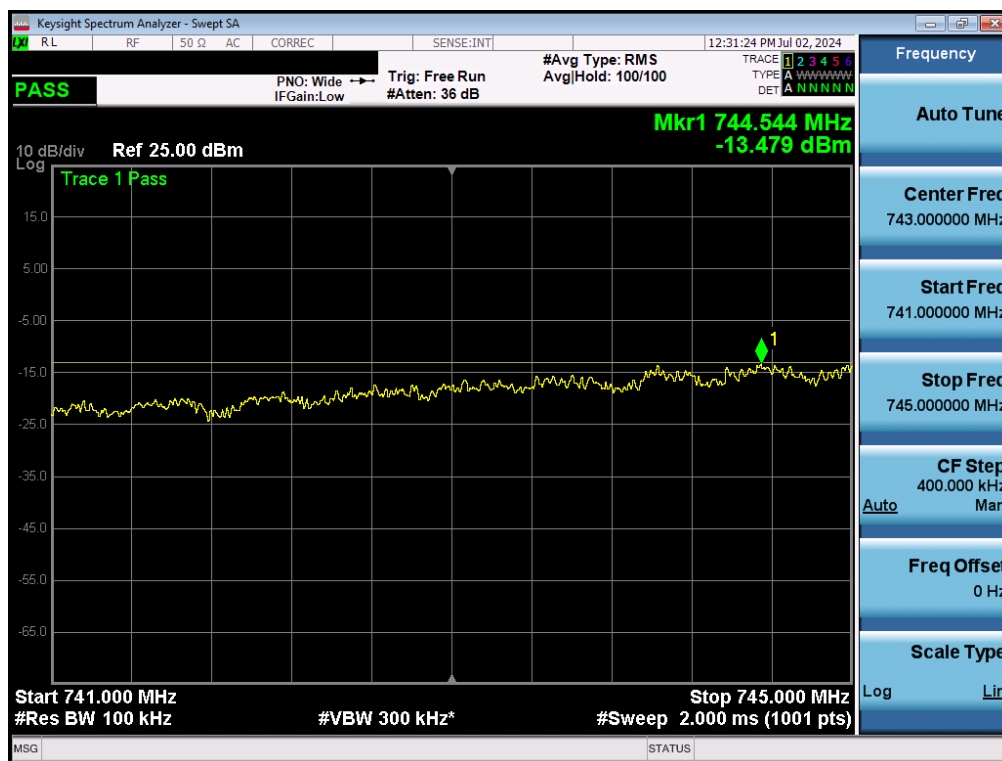
Plot 7-82. Upper Extended Band Edge Plot (LTE Band 12 - 5MHz QPSK – Full RB)

FCC ID: 2A93U-58450	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2402290014-03.2A93U	Test Dates: 04/05 - 10/09/2024	EUT Type: Geolocation System	Page 63 of 96

LTE Band 13

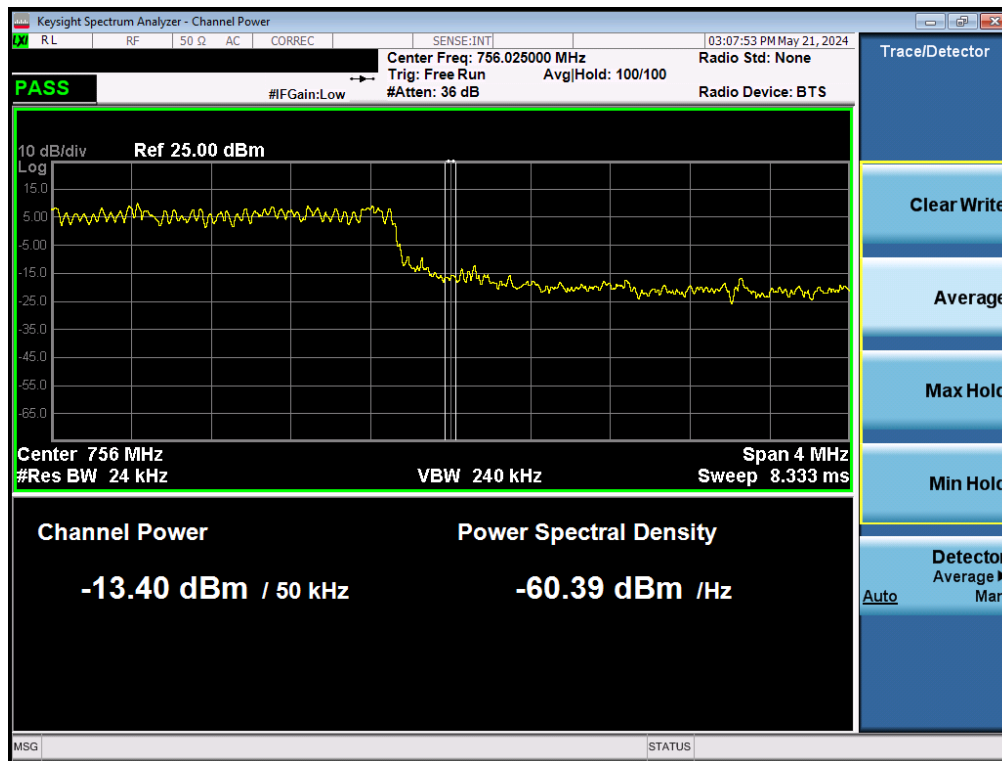


Plot 7-83. Lower Extended Band Edge Plot (LTE Band 13 - 5MHz QPSK – Full RB)

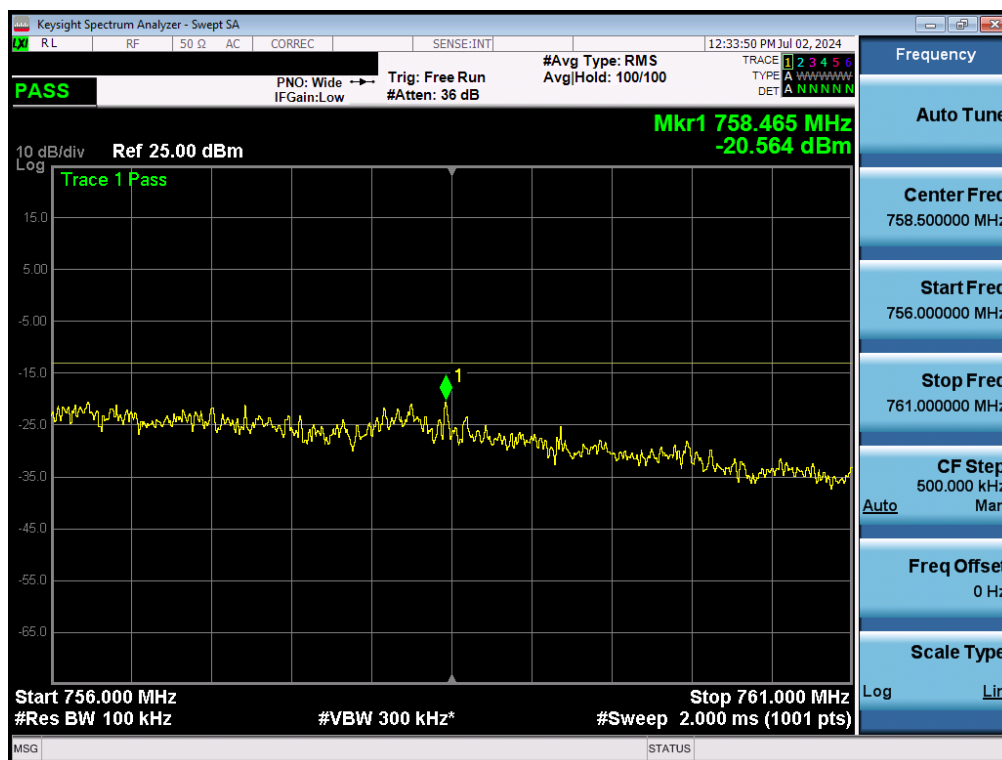


Plot 7-84. Lower Band Edge Plot (LTE Band 13 - 5MHz QPSK – Full RB)

FCC ID: 2A93U-58450	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2402290014-03.2A93U	Test Dates: 04/05 - 10/09/2024	EUT Type: Geolocation System	Page 64 of 96



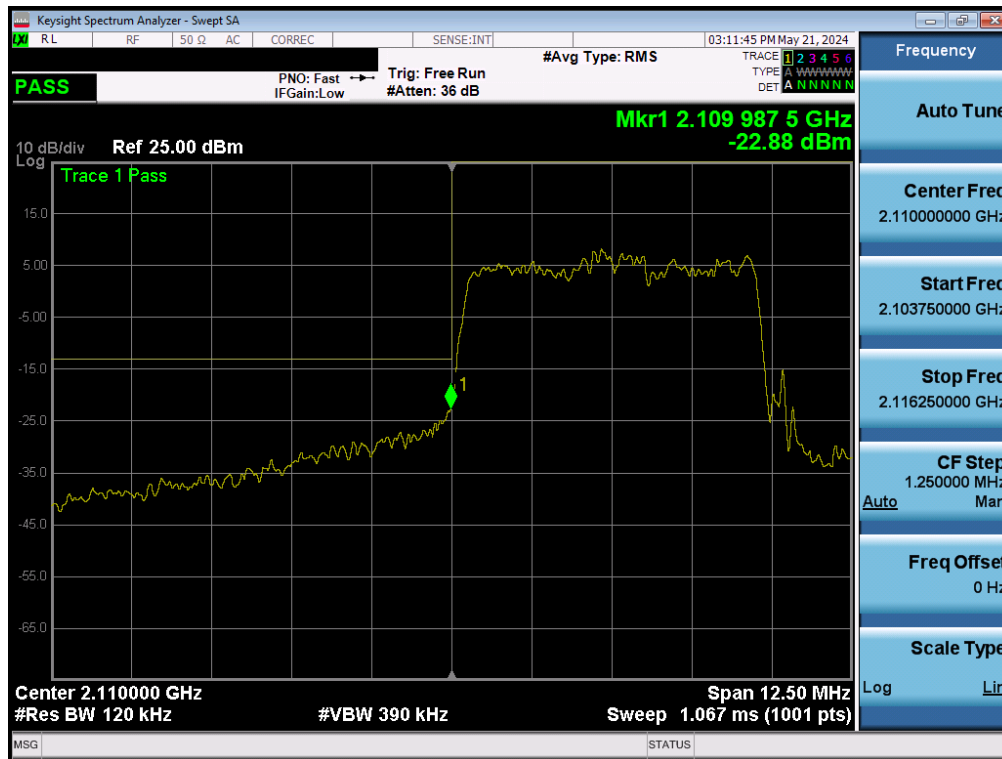
Plot 7-85. Upper Band Edge Plot (LTE Band 13 - 5MHz QPSK – Full RB)



Plot 7-86. Upper Extended Band Edge Plot (LTE Band 13 - 5MHz QPSK – Full RB)

FCC ID: 2A93U-58450	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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LTE Band 66/4



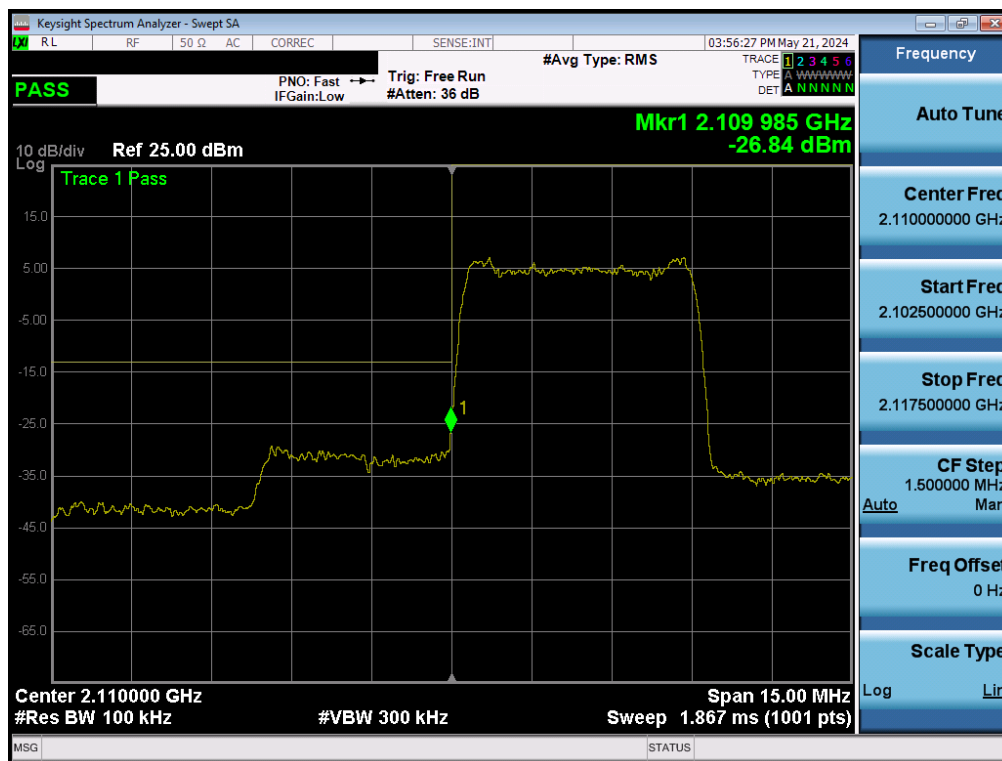
Plot 7-87. Lower Band Edge Plot (LTE Band 66/4 - 5MHz QPSK – Full RB)



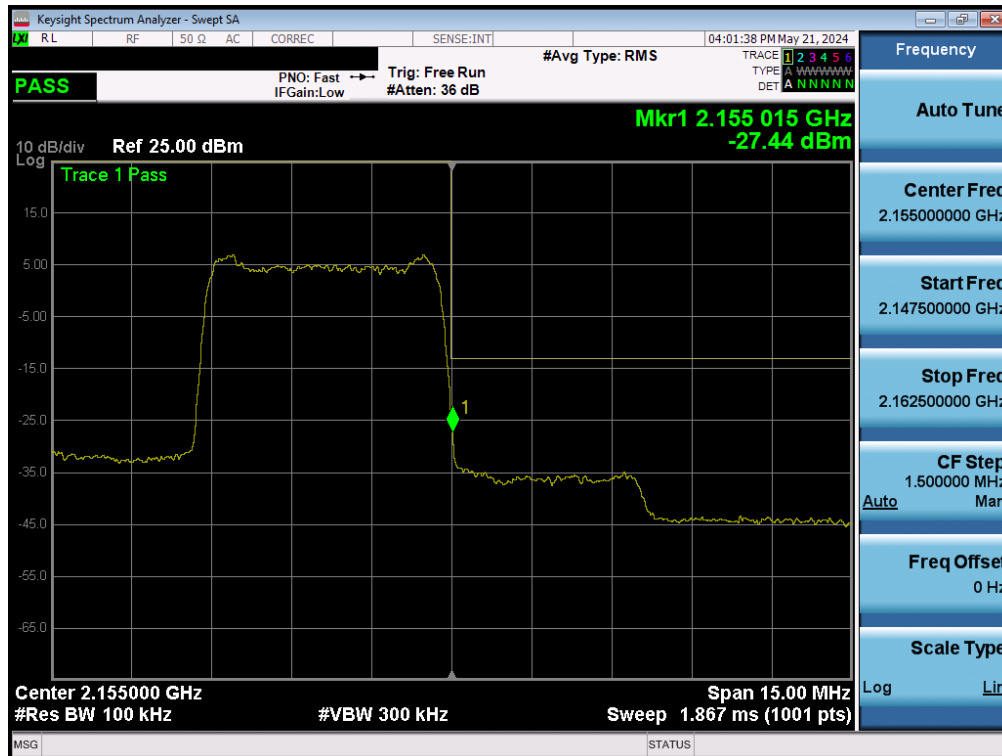
Plot 7-88. Upper Band Edge Plot (LTE Band 66 - 5MHz QPSK – Full RB)

FCC ID: 2A93U-58450	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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WCDMA AWS



Plot 7-89. Lower Band Edge Plot (WCDMA AWS – Ch. 1537)



Plot 7-90. Upper Band Edge Plot (WCDMA AWS – Ch. 1738)

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WCDMA B12



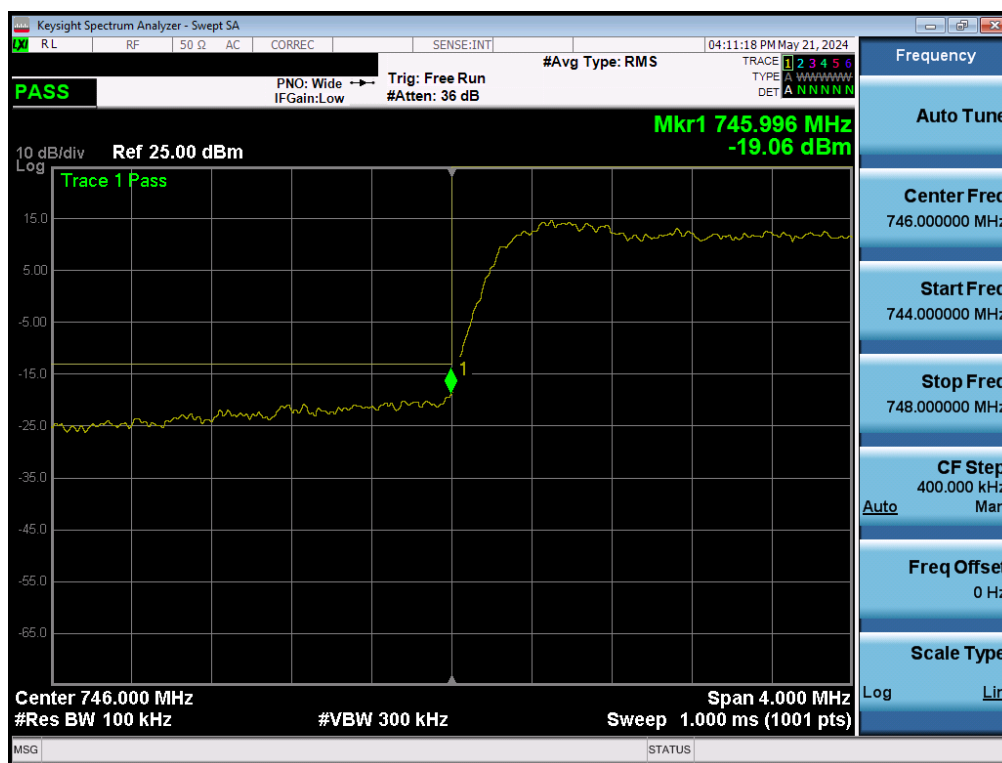
Plot 7-91. Lower Band Edge Plot (WCDMA B12)



Plot 7-92. Upper Band Edge Plot (WCDMA B12)

FCC ID: 2A93U-58450	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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WCDMA B13



Plot 7-93. Lower Band Edge Plot (WCDMA B13)



Plot 7-94. Upper Band Edge Plot (WCDMA B13)

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7.6 Peak-Average Ratio

Test Overview

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

Test Procedure Used

ANSI C63.26-2015 – Section 5.2.3.4

Test Settings

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

Test Setup

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

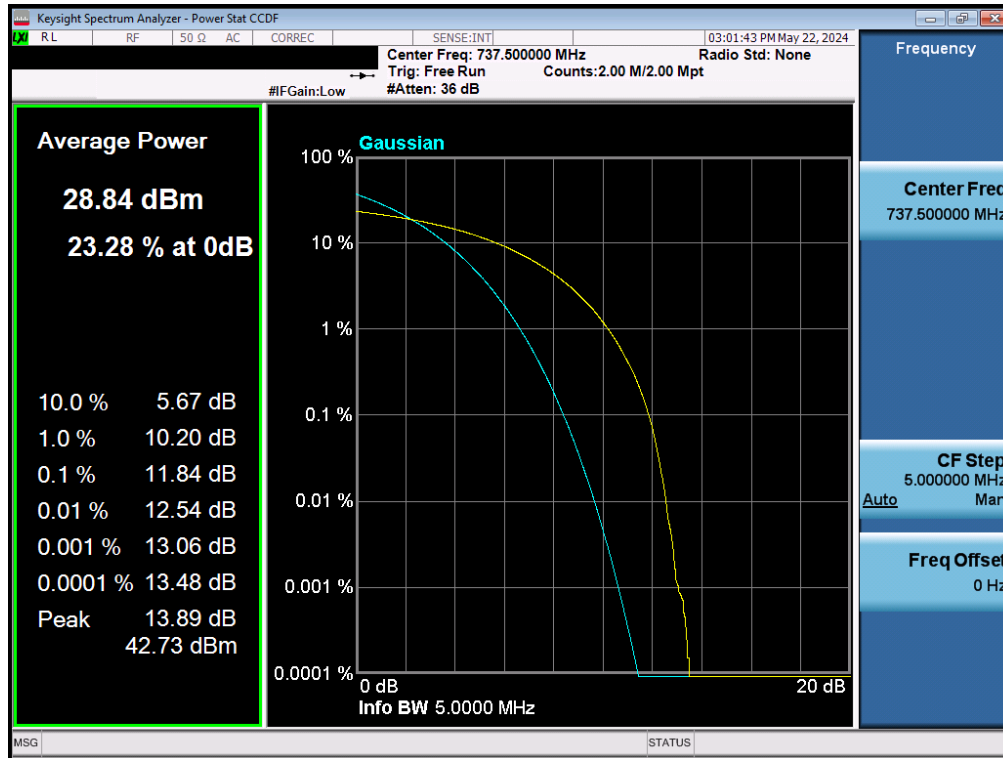


Figure 7-5. Test Instrument & Measurement Setup

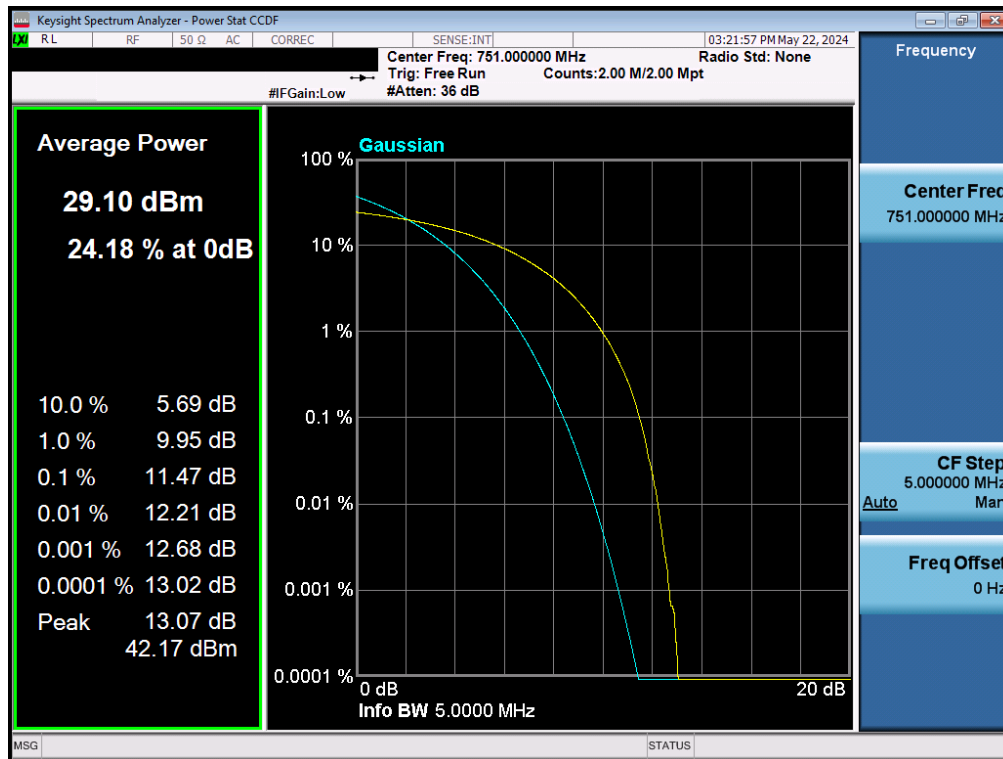
Test Notes

None.

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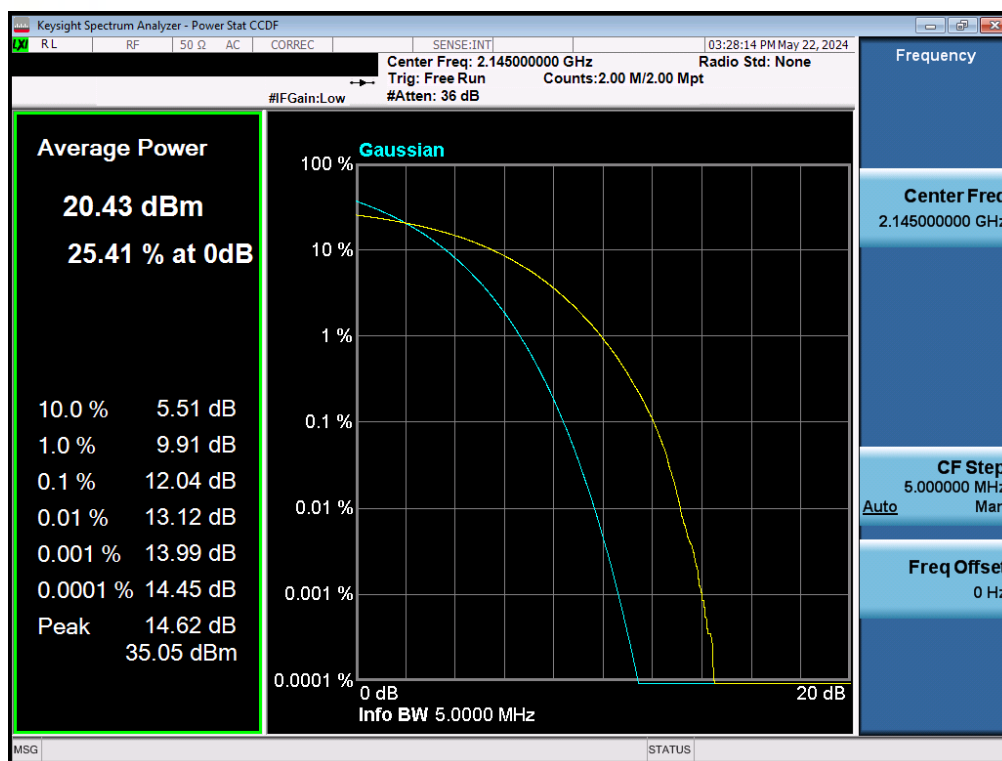


Plot 7-95. PAR Plot (LTE Band 12)

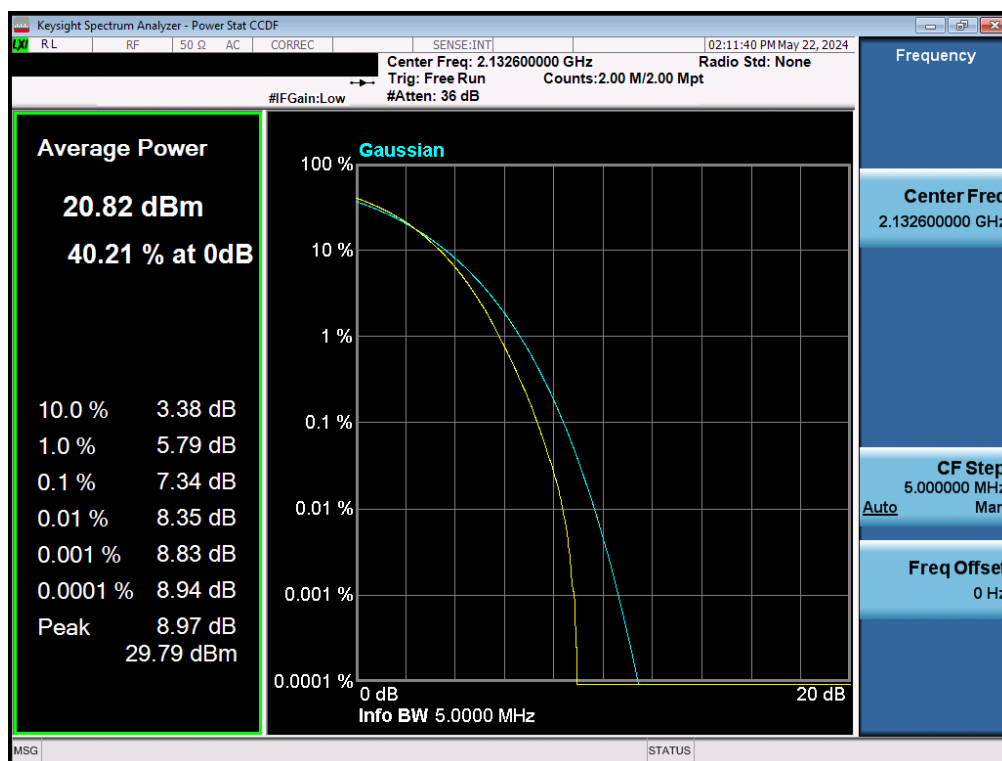


Plot 7-96. PAR Plot (LTE Band 13)

FCC ID: 2A93U-58450	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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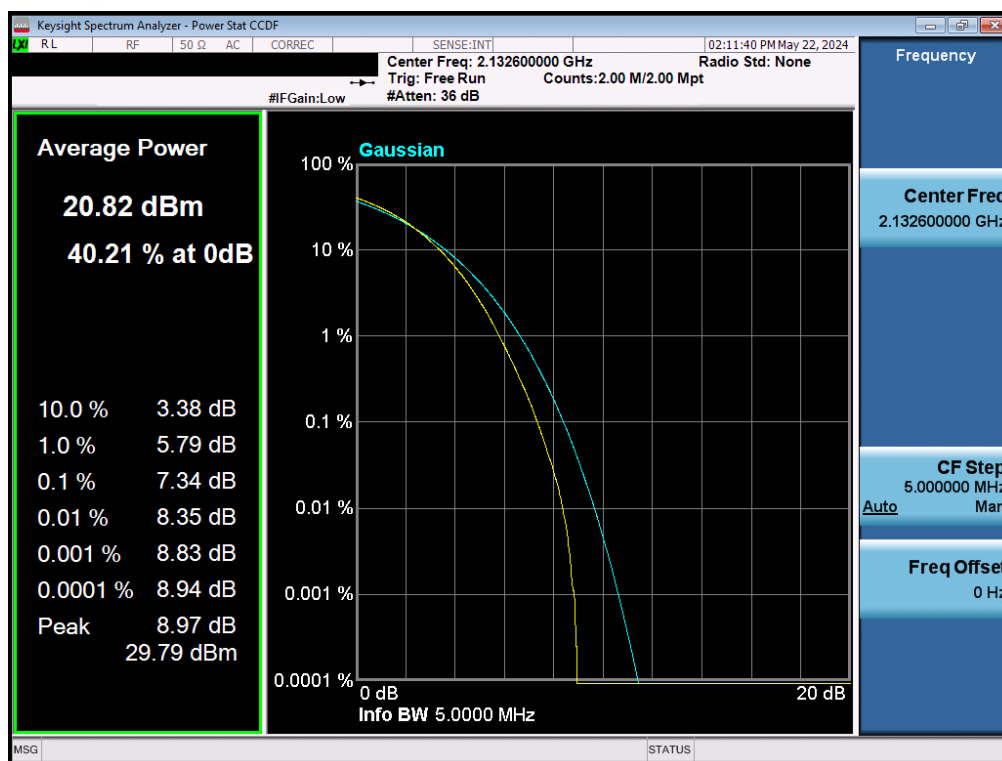


Plot 7-97. PAR Plot (LTE Band 66/4)

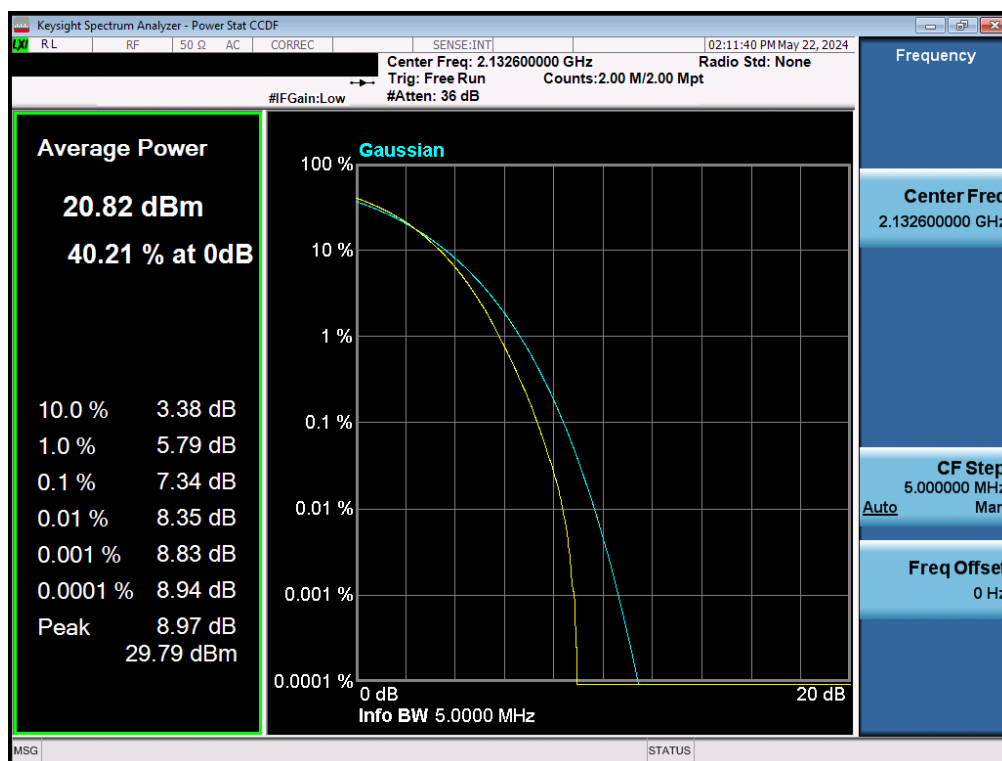


Plot 7-98. PAR Plot (WCDMA AWS)

FCC ID: 2A93U-58450	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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Plot 7-99. PAR Plot (WCDMA B12)



Plot 7-100. PAR Plot (WCDMA B13)

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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 a 50 ohm termination. 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.

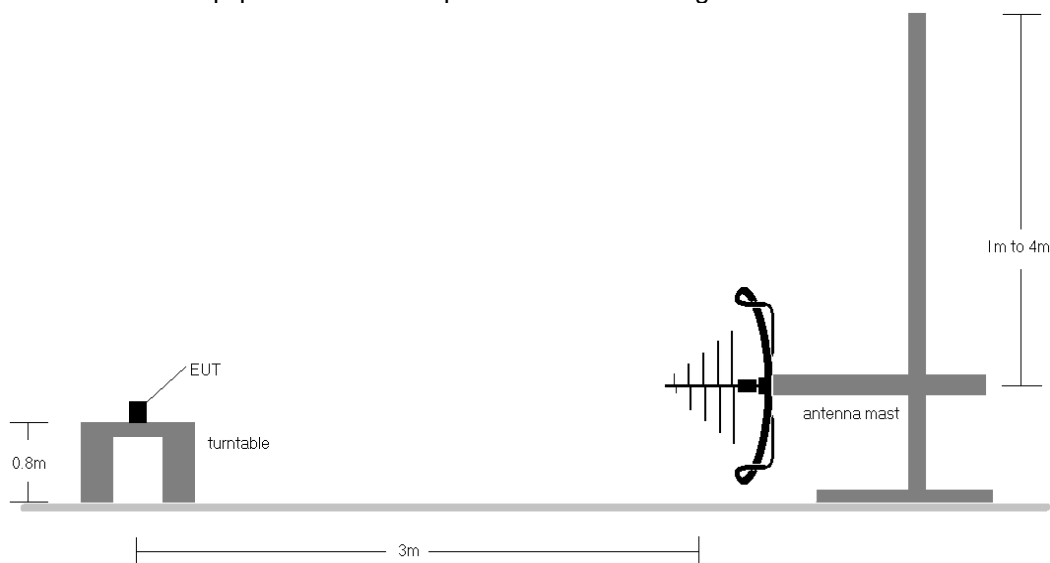


Figure 7-6. Test Instrument & Measurement Setup < 1GHz

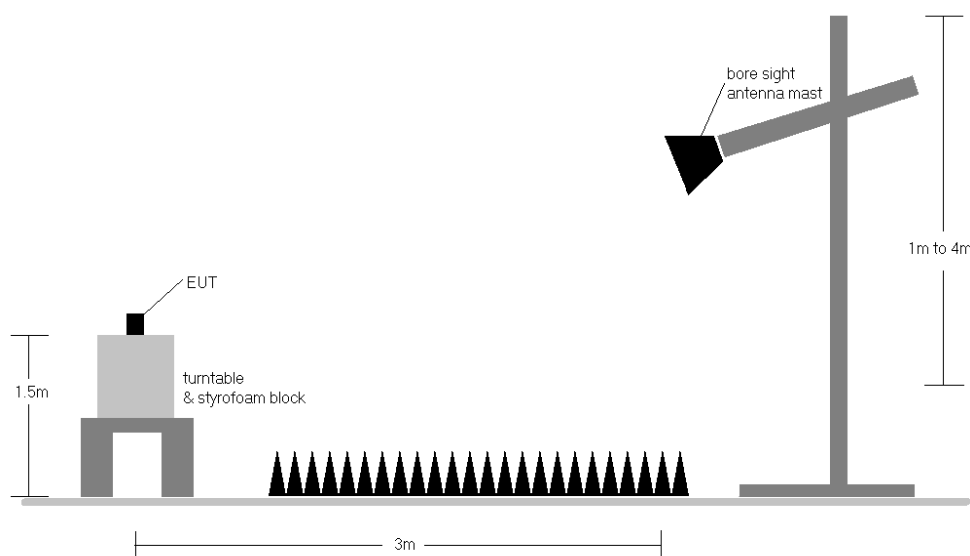


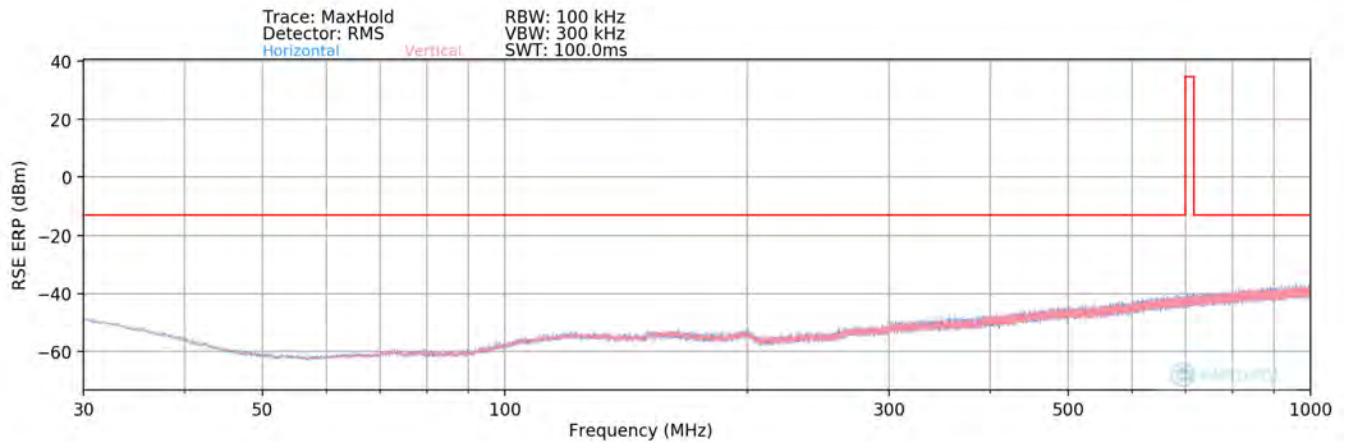
Figure 7-7. Test Instrument & Measurement Setup > 1GHz

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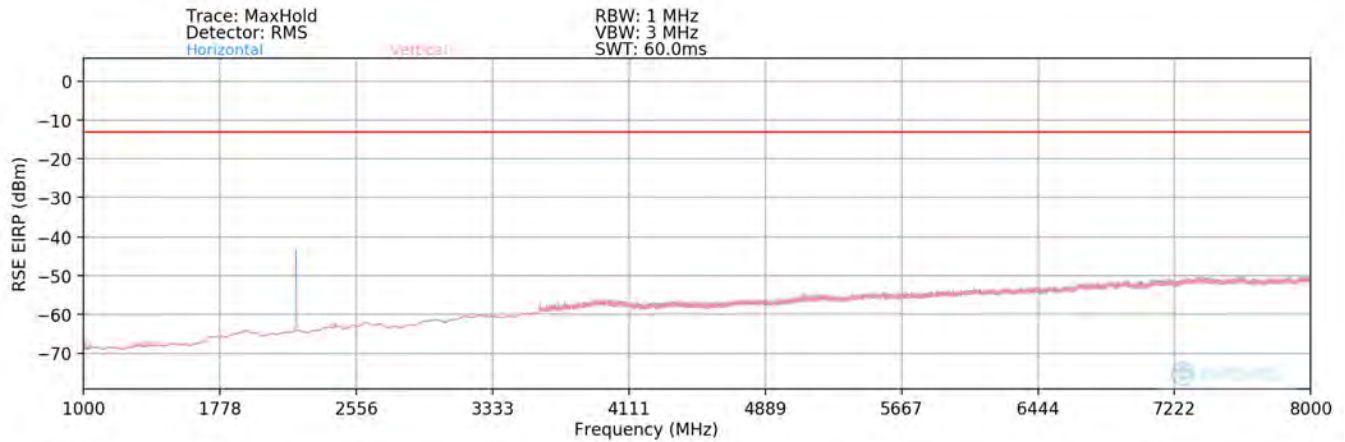
Test Notes

- 1) Field strengths are calculated using the Measurement quantity conversions in ANSI C63.26-2015 Section 5.2.7:
 - a) $E(\text{dB}\mu\text{V/m}) = \text{Measured amplitude level (dBm)} + 107 + \text{Cable Loss (dB)} + \text{Antenna Factor (dB/m)}$
 - b) $\text{EIRP (dBm)} = E(\text{dB}\mu\text{V/m}) + 20\log D - 104.8$; where D is the measurement distance in meters.
- 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 while powered by a 28VDC power source.
- 4) The spectrum is measured from 9kHz to the 10th harmonic of the fundamental frequency of the transmitter. The worst-case emissions are reported.
- 5) 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.
- 6) The "-" shown in the following RSE tables are used to denote a noise floor measurement.

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Plot 7-101. Radiated Spurious Plot (LTE Band 12) - Below 1GHz



Plot 7-102. Radiated Spurious Plot (LTE Band 12) – Above 1GHz

Bandwidth (MHz):	5
Frequency (MHz):	731.5

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]
1463.00	H	-	-	-76.20	2.61	33.41	-61.85	-13.00	-48.85
2194.50	H	155	340	-55.82	6.01	57.19	-38.07	-13.00	-25.07
2926.00	H	-	-	-76.93	7.64	37.71	-57.55	-13.00	-44.55
3657.50	H	-	-	-77.73	10.76	40.03	-55.23	-13.00	-42.23
4389.00	H	-	-	-77.76	11.55	40.79	-54.47	-13.00	-41.47

Table 7-8. Radiated Spurious Data (LTE Band 12) – Low Channel

FCC ID: 2A93U-58450	PART 27 MEASUREMENT REPORT			Approved by: Technical Manager
Test Report S/N: 1M2402290014-03.2A93U	Test Dates: 04/05 - 10/09/2024	EUT Type: Geolocation System		Page 77 of 96

Bandwidth (MHz):	5
Frequency (MHz):	737.5

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]
1475.00	H	-	-	-76.37	2.60	33.23	-62.03	-13.00	-49.03
2212.50	H	153	333	-57.79	6.05	55.26	-40.00	-13.00	-27.00
2950.00	H	-	-	-77.27	7.80	37.53	-57.73	-13.00	-44.73
3687.50	H	-	-	-78.05	10.85	39.80	-55.46	-13.00	-42.46
4425.00	H	-	-	-77.82	11.68	40.86	-54.40	-13.00	-41.40

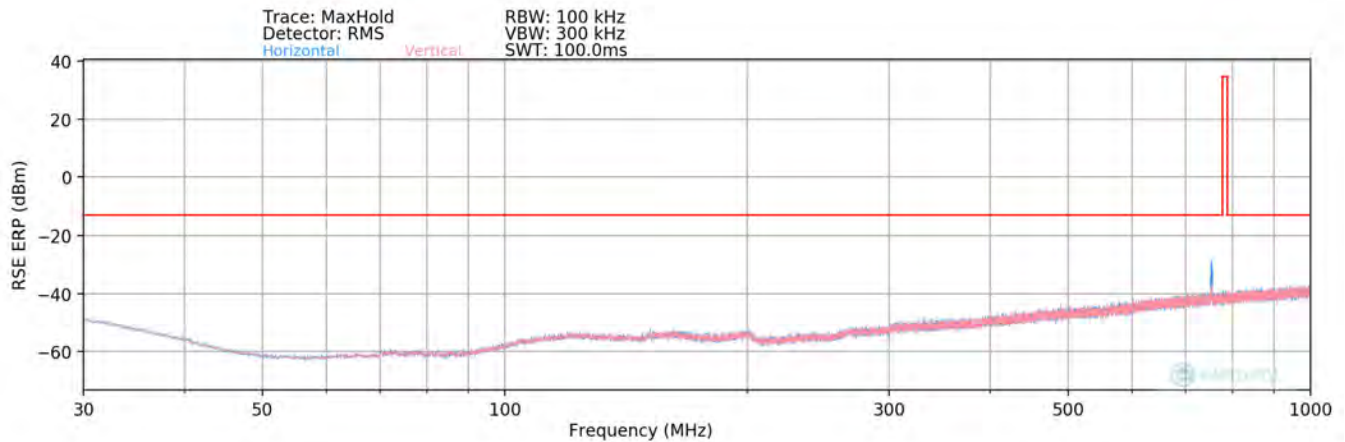
Table 7-9. Radiated Spurious Data (LTE Band 12) – Mid Channel

Bandwidth (MHz):	5
Frequency (MHz):	743.5

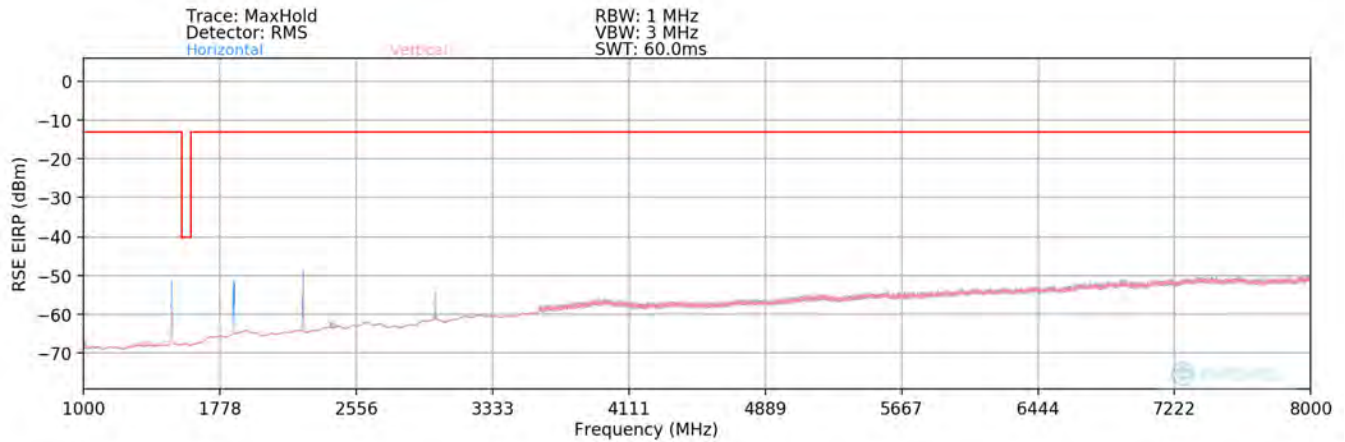
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1487.00	H	-	-	-76.83	2.61	32.78	-62.48	-13.00	-49.48
2230.50	H	166	333	-74.24	6.08	38.84	-56.42	-13.00	-43.42
2974.00	H	166	331	-76.56	7.88	38.32	-56.93	-13.00	-43.93
3717.50	H	-	-	-78.19	11.00	39.81	-55.45	-13.00	-42.45
4461.00	H	-	-	-77.84	11.80	40.96	-54.29	-13.00	-41.29
5204.50	H	-	-	-78.48	12.81	41.33	-53.93	-13.00	-40.93

Table 7-10. Radiated Spurious Data (LTE Band 12) – High Channel

FCC ID: 2A93U-58450	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2402290014-03.2A93U	Test Dates: 04/05 - 10/09/2024	EUT Type: Geolocation System	Page 78 of 96



Plot 7-103. Radiated Spurious Plot (LTE Band 13) - Below 1GHz



Plot 7-104. Radiated Spurious Plot (LTE Band 13) - Above 1GHz

Bandwidth (MHz):	5
Frequency (MHz):	748.5

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]
1497.00	H	196	135	-58.55	3.10	51.55	-43.71	-40.00	-3.71
2245.50	H	199	135	-65.56	6.43	47.87	-47.38	-13.00	-34.38
2994.00	H	196	137	-67.38	9.46	49.08	-46.18	-13.00	-33.18
3742.50	H	-	-	-77.27	11.35	41.08	-54.18	-13.00	-41.18
4491.00	H	-	-	-77.37	11.86	41.49	-53.77	-13.00	-40.77
5239.50	H	-	-	-78.29	14.12	42.83	-52.43	-13.00	-39.43

Table 7-11. Radiated Spurious Data (LTE Band 13) - Low Channel

FCC ID: 2A93U-58450	PART 27 MEASUREMENT REPORT			Approved by: Technical Manager
Test Report S/N: 1M2402290014-03.2A93U	Test Dates: 04/05 - 10/09/2024	EUT Type: Geolocation System		Page 79 of 96

Bandwidth (MHz):	5
Frequency (MHz):	751

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]
1502.00	H	130	136	-56.39	3.14	53.75	-41.51	-40.00	-1.51
2253.00	H	133	135	-60.61	6.38	52.77	-42.49	-13.00	-29.49
3004.00	H	137	135	-68.99	9.45	47.46	-47.79	-13.00	-34.79
3755.00	H	-	-	-77.89	11.41	40.52	-54.74	-13.00	-41.74
4506.00	H	-	-	-77.34	11.99	41.65	-53.61	-13.00	-40.61
5257.00	H	-	-	-78.42	13.94	42.52	-52.74	-13.00	-39.74

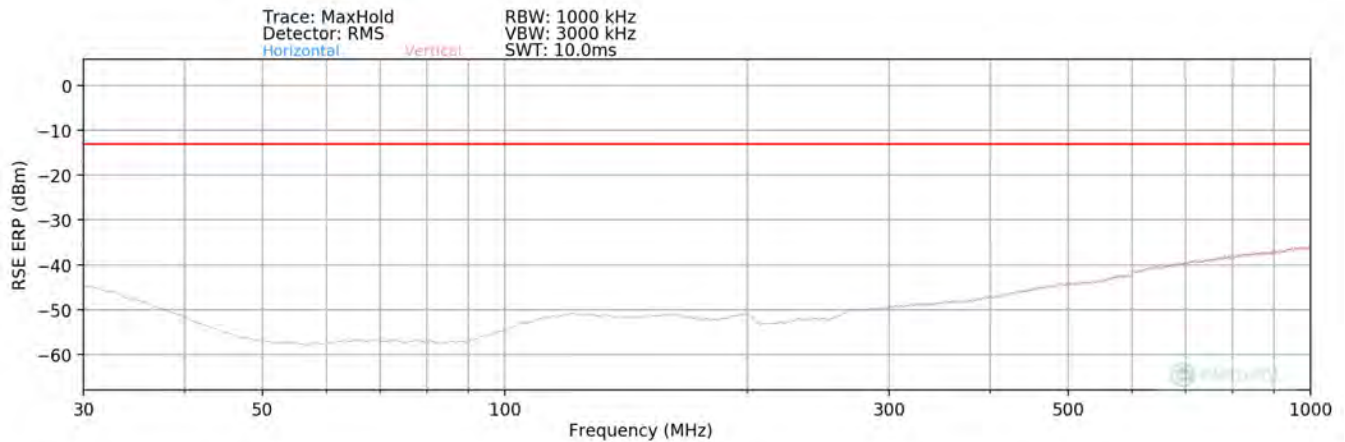
Table 7-12. Radiated Spurious Data (LTE Band 13) – Mid Channel

Bandwidth (MHz):	5
Frequency (MHz):	753.5

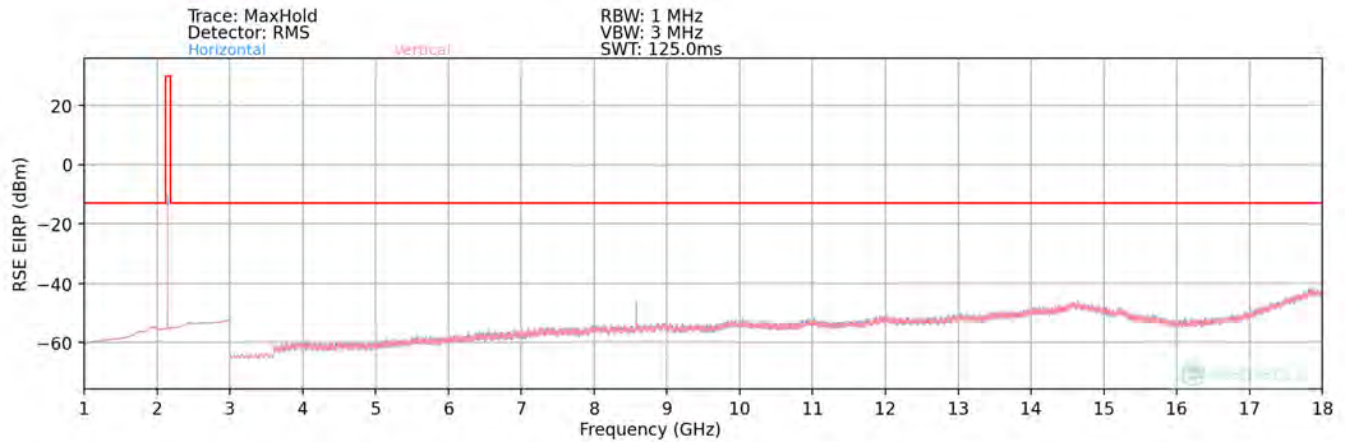
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1507.00	H	253	319	-59.12	3.16	51.04	-44.22	-40.00	-4.22
2260.50	H	253	321	-73.59	6.35	39.76	-55.50	-13.00	-42.50
3014.00	H	251	320	-74.73	9.41	41.68	-53.57	-13.00	-40.57
3767.50	H	-	-	-78.00	11.45	40.45	-54.81	-13.00	-41.81
4521.00	H	-	-	-77.56	12.02	41.46	-53.80	-13.00	-40.80
5274.50	H	-	-	-78.42	13.89	42.47	-52.78	-13.00	-39.78

Table 7-13. Radiated Spurious Data (LTE Band 13) – High Channel

FCC ID: 2A93U-58450	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2402290014-03.2A93U	Test Dates: 04/05 - 10/09/2024	EUT Type: Geolocation System	Page 80 of 96



Plot 7-105. Radiated Spurious Plot (LTE Band 66/4) - Below 1GHz



Plot 7-106. Radiated Spurious Plot (LTE Band 66/4) - 1-18GHz

Bandwidth (MHz):	5
Frequency (MHz):	2112.5

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]
4225.00	V	-	-	-77.37	12.07	41.70	-53.56	-13.00	-40.56
6337.50	V	172	189	-75.84	16.23	47.39	-47.87	-13.00	-34.87
8450.00	V	-	-	-79.74	19.92	47.18	-48.08	-13.00	-35.08
10562.50	V	-	-	-79.58	21.93	49.35	-45.91	-13.00	-32.91
12675.00	V	-	-	-80.31	23.78	50.47	-44.79	-13.00	-31.79

Table 7-14. Radiated Spurious Data (LTE Band 66/4) – Low Channel

FCC ID: 2A93U-58450	PART 27 MEASUREMENT REPORT			Approved by: Technical Manager
Test Report S/N: 1M2402290014-03.2A93U	Test Dates: 04/05 - 10/09/2024	EUT Type: Geolocation System		Page 81 of 96

Bandwidth (MHz):	5
Frequency (MHz):	2145

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]
4290.00	V	-	-	-77.87	11.94	41.07	-54.19	-13.00	-41.19
6435.00	V	-	-	-79.20	16.82	44.62	-50.64	-13.00	-37.64
8580.00	V	291	184	-75.83	19.99	51.16	-44.10	-13.00	-31.10
10725.00	V	-	-	-80.09	21.83	48.74	-46.51	-13.00	-33.51
12870.00	V	-	-	-80.39	24.09	50.70	-44.56	-13.00	-31.56
15015.00	V	-	-	-80.72	27.12	53.40	-41.86	-13.00	-28.86

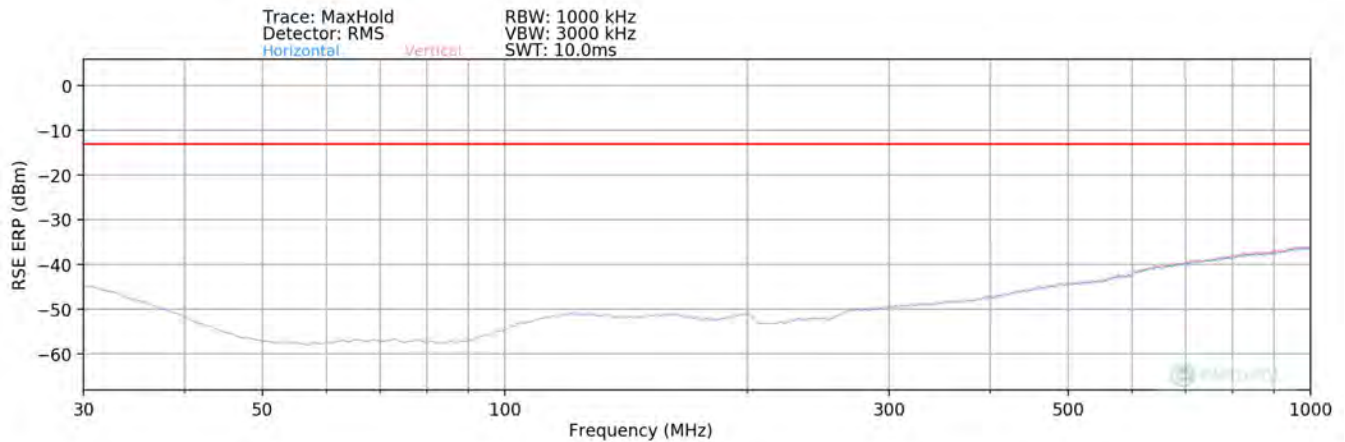
Table 7-15. Radiated Spurious Data (LTE Band 66/4) – Mid Channel

Bandwidth (MHz):	5
Frequency (MHz):	2177.5

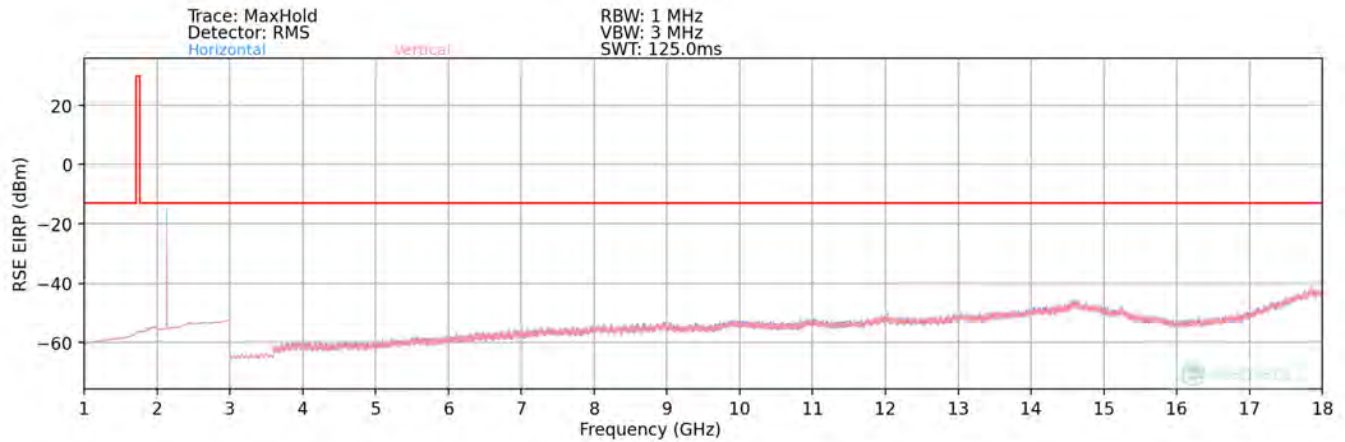
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
4355.00	V	-	-	-77.79	11.85	41.06	-54.20	-13.00	-41.20
6532.50	V	169	174	-77.18	16.45	46.27	-48.99	-13.00	-35.99
8710.00	V	-	-	-78.84	20.03	48.19	-47.07	-13.00	-34.07
10887.50	V	-	-	-80.13	22.08	48.95	-46.31	-13.00	-33.31
13065.00	V	-	-	-80.36	24.56	51.20	-44.06	-13.00	-31.06

Table 7-16. Radiated Spurious Data (LTE Band 66/4) – High Channel

FCC ID: 2A93U-58450	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2402290014-03.2A93U	Test Dates: 04/05 - 10/09/2024	EUT Type: Geolocation System	Page 82 of 96



Plot 7-107. Radiated Spurious Plot (WCDMA 1700) - Below 1GHz



Plot 7-108. Radiated Spurious Plot (WCDMA 1700) - 1-18GHz

Channel:	1537
Frequency (MHz):	2112.4

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]
4224.80	H	-	-	-77.42	12.07	41.65	-53.61	-13.00	-40.61
6337.20	H	-	-	-78.82	12.07	40.25	-55.01	-13.00	-42.01
8449.60	H	-	-	-80.11	12.07	38.96	-56.30	-13.00	-43.30

Table 7-17. Radiated Spurious Data (WCDMA 1700) – Low Channel

FCC ID: 2A93U-58450	PART 27 MEASUREMENT REPORT			Approved by: Technical Manager
Test Report S/N: 1M2402290014-03.2A93U	Test Dates: 04/05 - 10/09/2024	EUT Type: Geolocation System		Page 83 of 96

Channel:	1638
Frequency (MHz):	2132.6

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]
4265.20	H	-	-	-77.78	12.07	41.29	-53.97	-13.00	-40.97
6397.80	H	-	-	-78.86	12.07	40.21	-55.05	-13.00	-42.05
8530.40	H	-	-	-79.94	12.07	39.13	-56.13	-13.00	-43.13

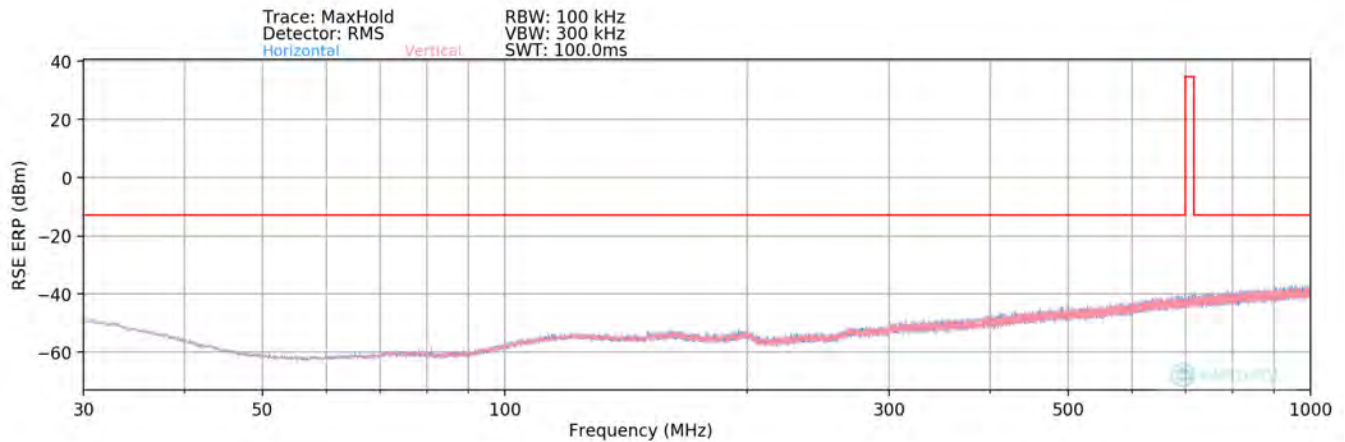
Table 7-18. Radiated Spurious Data (WCDMA 1700) – Mid Channel

Channel:	1738
Frequency (MHz):	2152.6

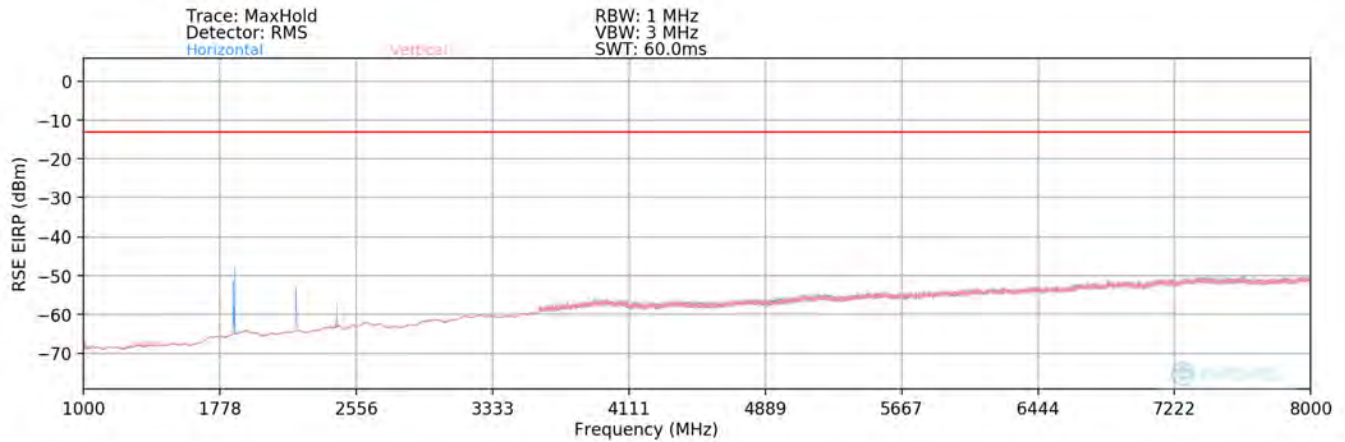
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
4305.20	H	-	-	-77.62	12.07	41.45	-53.81	-13.00	-40.81
6457.80	H	-	-	-78.82	12.07	40.25	-55.01	-13.00	-42.01
8610.40	H	249	163	-75.80	12.07	43.27	-51.99	-13.00	-38.99
10763.00	H	-	-	-79.84	12.07	39.23	-56.03	-13.00	-43.03
12915.60	H	-	-	-80.73	12.07	38.34	-56.92	-13.00	-43.92
15068.20	H	-	-	-81.29	12.07	37.78	-57.48	-13.00	-44.48

Table 7-19. Radiated Spurious Data (WCDMA 1700) – High Channel

FCC ID: 2A93U-58450	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2402290014-03.2A93U	Test Dates: 04/05 - 10/09/2024	EUT Type: Geolocation System	Page 84 of 96



Plot 7-109. Radiated Spurious Plot (WCDMA Bands 12) - Below 1GHz



Plot 7-110. Radiated Spurious Plot (WCDMA Bands 12) – Above 1GHz

Channel:	3842
Frequency (MHz):	731.4

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]
1462.80	V	-	-	-76.40	2.74	33.34	-61.91	-13.00	-48.91
2194.20	V	368	182	-58.69	6.55	54.86	-40.40	-13.00	-27.40
2925.60	V	-	-	-76.97	8.80	38.83	-56.43	-13.00	-43.43
3657.00	V	-	-	-77.68	11.06	40.38	-54.88	-13.00	-41.88
4388.40	V	-	-	-77.70	12.22	41.52	-53.74	-13.00	-40.74

Table 7-20. Radiated Spurious Data (WCDMA Bands 12) – Low Channel

FCC ID: 2A93U-58450	PART 27 MEASUREMENT REPORT			Approved by: Technical Manager
Test Report S/N: 1M2402290014-03.2A93U	Test Dates: 04/05 - 10/09/2024	EUT Type: Geolocation System		Page 85 of 96

Channel:	3873
Frequency (MHz):	737.6

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]
1475.20	V	-	-	-76.61	2.90	33.29	-61.97	-13.00	-48.97
2212.80	V	332	213	-61.96	6.61	51.65	-43.61	-13.00	-30.61
2950.40	V	-	-	-77.15	9.13	38.98	-56.28	-13.00	-43.28
3688.00	V	-	-	-77.96	11.14	40.18	-55.08	-13.00	-42.08
4425.60	V	-	-	-77.70	12.20	41.50	-53.75	-13.00	-40.75

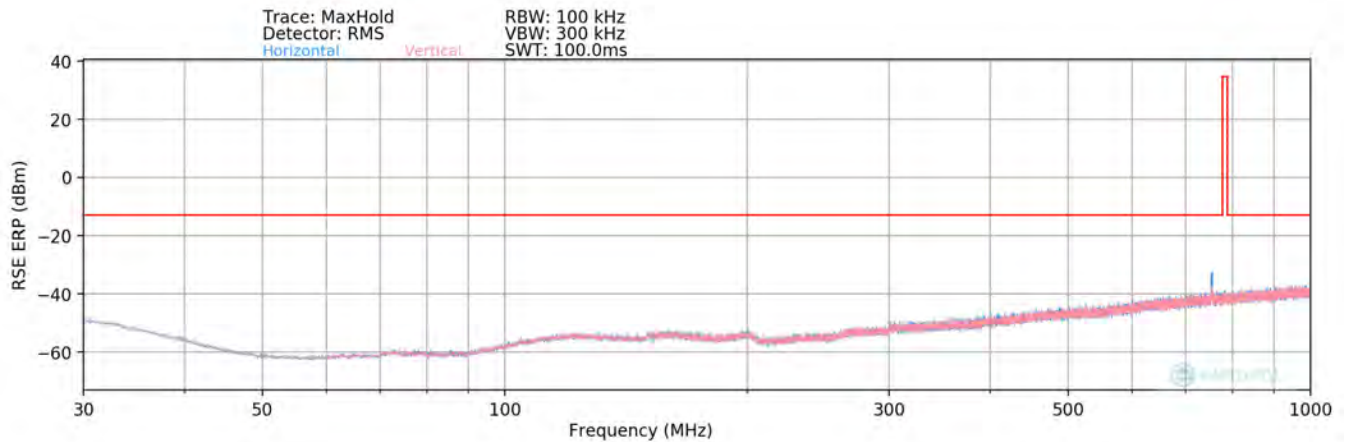
Table 7-21. Radiated Spurious Data (WCDMA Bands 12) – Mid Channel

Channel:	3903
Frequency (MHz):	743.6

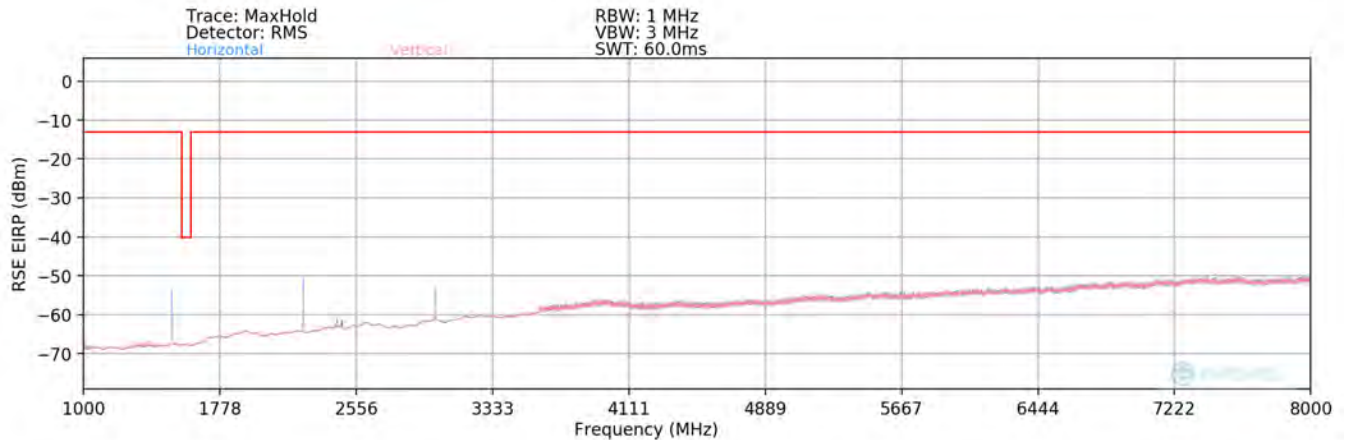
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1487.20	V	-	-	-76.67	3.02	33.35	-61.90	-13.00	-48.90
2230.80	V	-	-	-76.57	6.52	36.95	-58.31	-13.00	-45.31
2974.40	V	-	-	-77.90	9.37	38.47	-56.79	-13.00	-43.79
3718.00	V	-	-	-78.35	11.25	39.90	-55.36	-13.00	-42.36

Table 7-22. Radiated Spurious Data (WCDMA Bands 12) – High Channel

FCC ID: 2A93U-58450	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2402290014-03.2A93U	Test Dates: 04/05 - 10/09/2024	EUT Type: Geolocation System	Page 86 of 96



Plot 7-111. Radiated Spurious Plot (WCDMA Bands 13) - Below 1GHz



Plot 7-112. Radiated Spurious Plot (WCDMA Bands 13) – Above 1GHz

Channel:	4017
Frequency (MHz):	748.4

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]
1496.80	H	140	136	-58.48	3.10	51.62	-43.64	-13.00	-30.64
2245.20	H	142	122	-58.17	6.44	55.27	-39.99	-13.00	-26.99
2993.60	H	140	124	-62.33	9.46	54.13	-41.13	-13.00	-28.13
3742.00	H	-	-	-77.59	11.34	40.75	-54.50	-13.00	-41.50
4490.40	H	-	-	-77.38	11.85	41.47	-53.79	-13.00	-40.79
5238.80	H	-	-	-78.46	14.13	42.67	-52.59	-13.00	-39.59

Table 7-23. Radiated Spurious Data (WCDMA Bands 13) – Low Channel

FCC ID: 2A93U-58450	PART 27 MEASUREMENT REPORT			Approved by: Technical Manager
Test Report S/N: 1M2402290014-03.2A93U	Test Dates: 04/05 - 10/09/2024	EUT Type: Geolocation System		Page 87 of 96

Channel:	4030
Frequency (MHz):	751

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]
1502.00	H	134	135	-57.11	3.14	53.03	-42.23	-13.00	-29.23
2253.00	H	141	120	-57.59	6.38	55.79	-39.47	-13.00	-26.47
3004.00	H	140	107	-62.56	9.45	53.89	-41.36	-13.00	-28.36
3755.00	H	-	-	-77.94	11.41	40.47	-54.79	-13.00	-41.79
4506.00	H	-	-	-77.40	11.99	41.59	-53.67	-13.00	-40.67
5257.00	H	-	-	-78.38	13.94	42.56	-52.70	-13.00	-39.70

Table 7-24. Radiated Spurious Data (WCDMA Bands 13) – Mid Channel

Channel:	4043
Frequency (MHz):	753.6

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]
1507.20	H	276	141	-57.89	3.16	52.27	-42.99	-13.00	-29.99
2260.80	H	276	156	-64.71	6.35	48.64	-46.62	-13.00	-33.62
3014.40	H	278	171	-64.18	9.41	52.23	-43.03	-13.00	-30.03
3768.00	H	-	-	-78.03	11.45	40.42	-54.84	-13.00	-41.84
4521.60	H	-	-	-77.60	12.02	41.42	-53.84	-13.00	-40.84
5275.20	H	-	-	-78.45	13.89	42.44	-52.81	-13.00	-39.81

Table 7-25. Radiated Spurious Data (WCDMA Bands 13) – High Channel

FCC ID: 2A93U-58450	PART 27 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 27, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

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

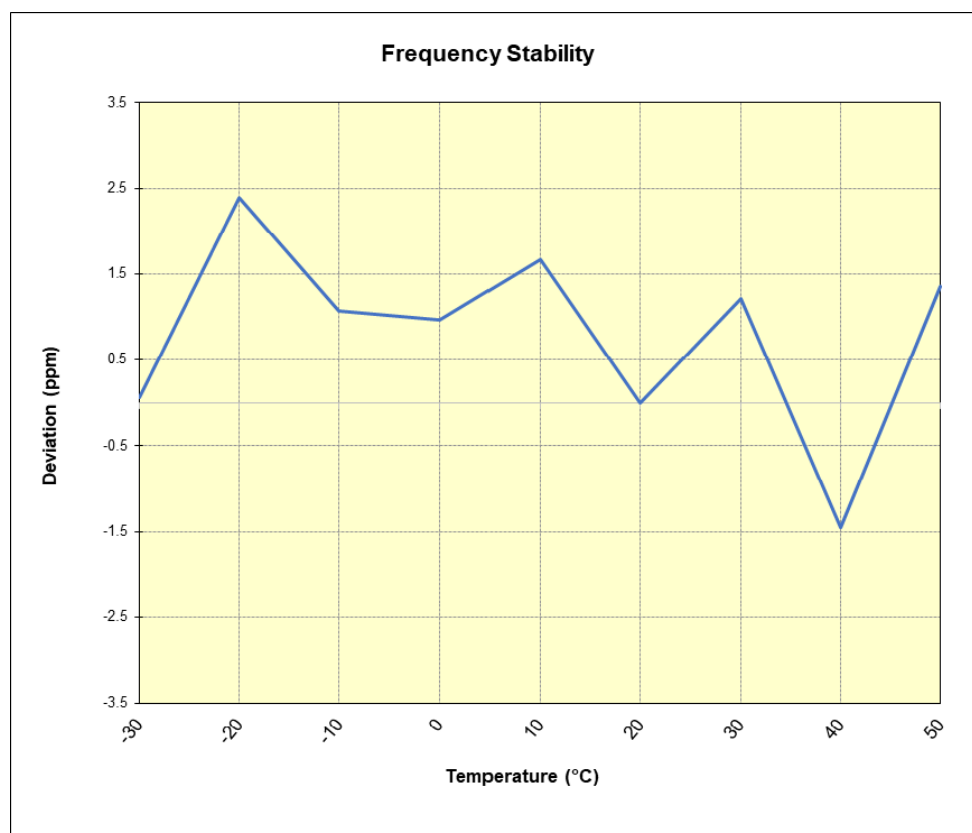
FCC ID: 2A93U-58450	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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LTE Band 12

Operating Frequency (Hz):	737,500,000
Ref. Voltage (VDC):	28.0

Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	28.0	- 30	737,491,576	44	0.0000060
		- 20	737,493,293	1,761	0.0002388
		- 10	737,492,325	793	0.0001075
		0	737,492,241	709	0.0000961
		+ 10	737,492,759	1,227	0.0001664
		+ 20 (Ref)	737,491,532	0	0.0000000
		+ 30	737,492,425	893	0.0001211
		+ 40	737,490,462	-1,070	-0.0001451
		+ 50	737,492,534	1,002	0.0001359
85 %	23.8	+ 20	737,491,069	-463	-0.0000628
115 %	32.2	+ 20	737,491,930	398	0.0000540

Table 7-26. LTE Band 12 Frequency Stability Data



Plot 7-113. LTE Band 12 Frequency Stability Chart

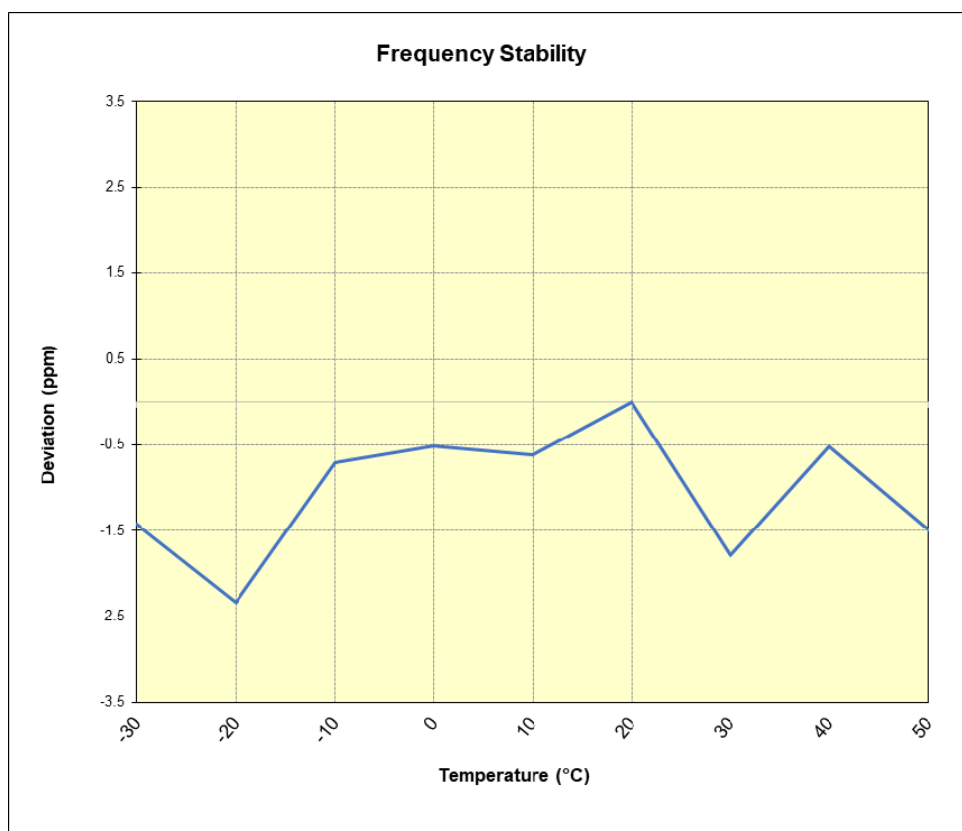
FCC ID: 2A93U-58450	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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LTE Band 13

Operating Frequency (Hz):	751,000,000
Ref. Voltage (VDC):	28.0

Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	28.0	- 30	750,994,937	-1,060	-0.0001411
		- 20	750,994,246	-1,751	-0.0002332
		- 10	750,995,468	-529	-0.0000704
		0	750,995,615	-382	-0.0000509
		+ 10	750,995,532	-465	-0.0000619
		+ 20 (Ref)	750,995,997	0	0.0000000
		+ 30	750,994,651	-1,346	-0.0001792
		+ 40	750,995,611	-386	-0.0000514
		+ 50	750,994,875	-1,122	-0.0001494
85 %	23.8	+ 20	750,995,531	-466	-0.0000621
115 %	32.2	+ 20	750,995,293	-704	-0.0000937

Table 7-27. LTE Band 13 Frequency Stability Data



Plot 7-114. LTE Band 13 Frequency Stability Chart

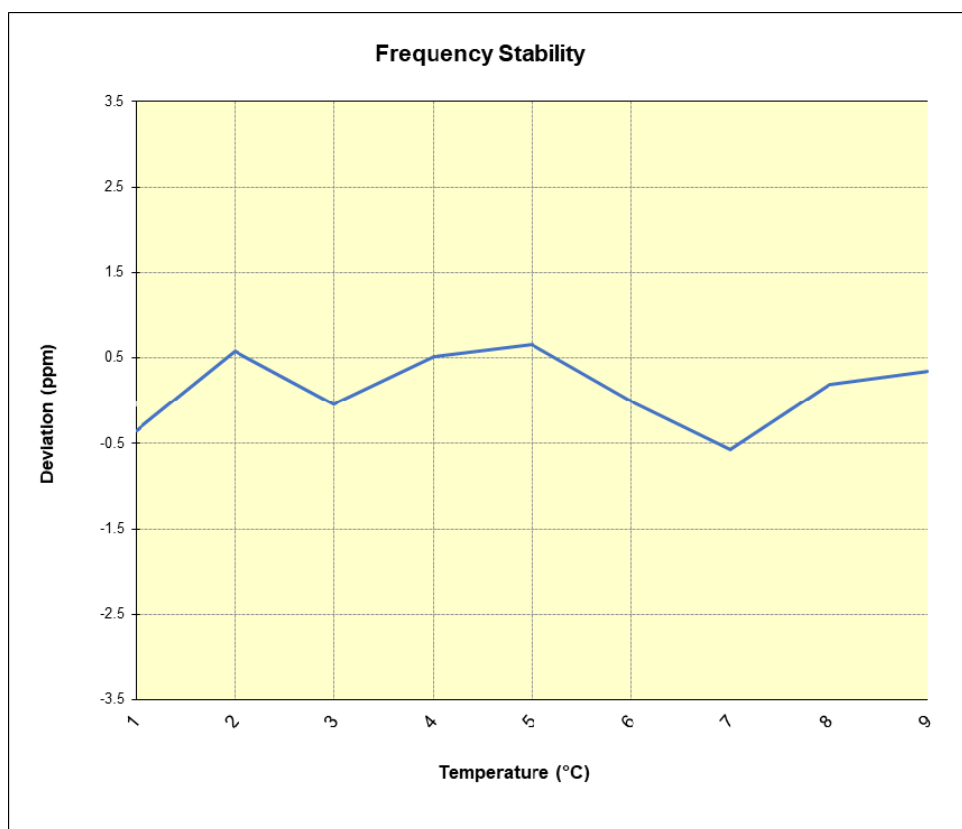
FCC ID: 2A93U-58450	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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LTE Band 66/4

Operating Frequency (Hz):	2,145,000,000
Ref. Voltage (VDC):	28.0

Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	28.0	- 30	2,145,013,711	-766	-0.0000357
		- 20	2,145,015,706	1,229	0.0000573
		- 10	2,145,014,384	-93	-0.0000043
		0	2,145,015,584	1,107	0.0000516
		+ 10	2,145,015,893	1,416	0.0000660
		+ 20 (Ref)	2,145,014,477	0	0.0000000
		+ 30	2,145,013,234	-1,243	-0.0000579
		+ 40	2,145,014,872	395	0.0000184
		+ 50	2,145,015,231	754	0.0000352
85 %	23.8	+ 20	2,145,014,897	420	0.0000196
115 %	32.2	+ 20	2,145,014,635	158	0.0000074

Table 7-28. LTE Band 66/4 Frequency Stability Data



Plot 7-115. LTE Band 66/4 Frequency Stability Chart

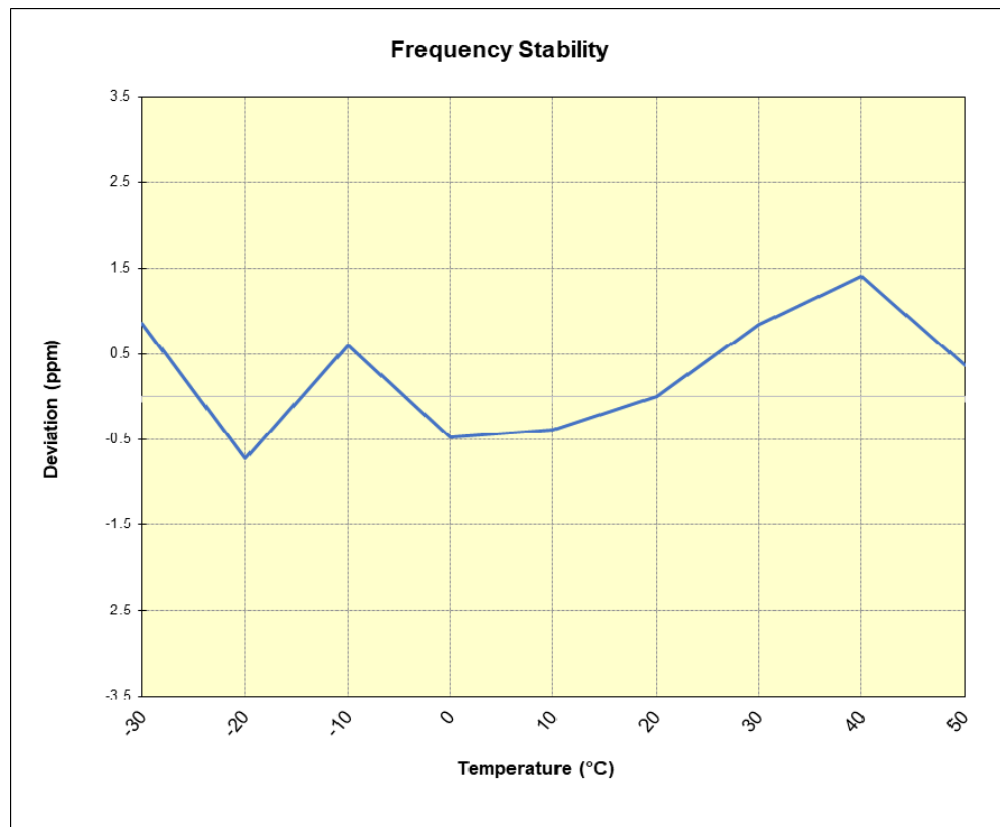
FCC ID: 2A93U-58450	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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WCDMA AWS

Operating Frequency (Hz):	2,132,600,000
Ref. Voltage (VDC):	28.0

Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	28.0	- 30	2,132,602,401	1,836	0.0000861
		- 20	2,132,599,021	-1,544	-0.0000724
		- 10	2,132,601,843	1,278	0.0000599
		0	2,132,599,558	-1,007	-0.0000472
		+ 10	2,132,599,757	-808	-0.0000379
		+ 20 (Ref)	2,132,600,565	0	0.0000000
		+ 30	2,132,602,364	1,799	0.0000844
		+ 40	2,132,603,545	2,980	0.0001397
		+ 50	2,132,601,337	772	0.0000362
85 %	23.8	+ 20	2,132,600,037	-528	-0.0000248
115 %	32.2	+ 20	2,132,600,664	99	0.0000046

Table 7-29. WCDMA 1700 Frequency Stability Data



Plot 7-116. WCDMA 1700 Frequency Stability Chart

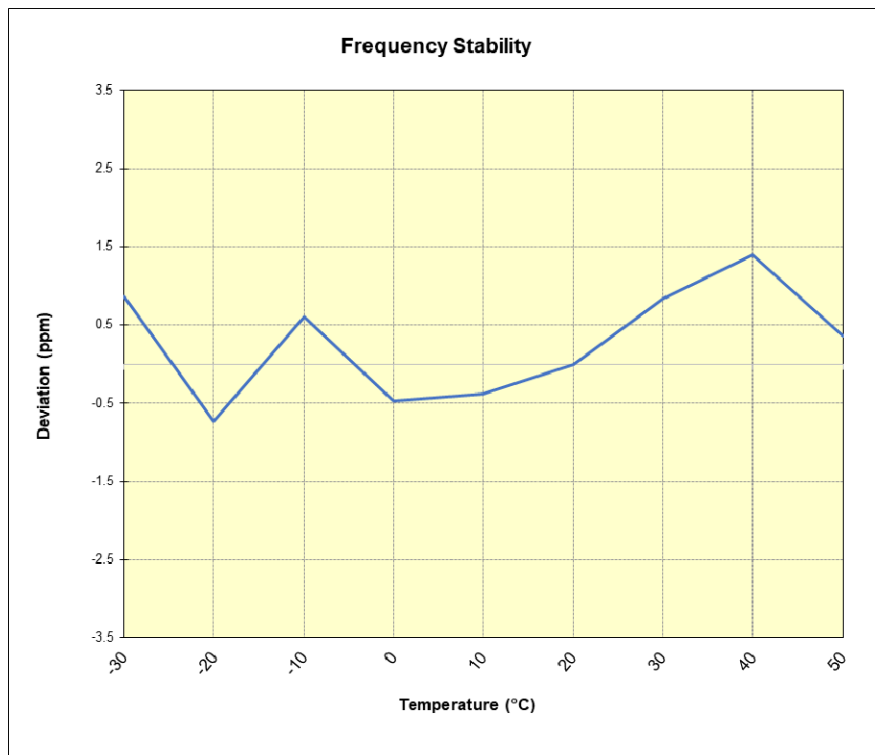
FCC ID: 2A93U-58450	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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WCDMA B12

Operating Frequency (Hz):	737,600,000
Ref. Voltage (VDC):	28.0

Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	28.0	- 30	737,602,865	1,759	0.0002385
		- 20	737,602,569	1,463	0.0001983
		- 10	737,597,823	-3,283	-0.0004451
		0	737,600,763	-343	-0.0000465
		+ 10	737,602,092	986	0.0001337
		+ 20 (Ref)	737,601,106	0	0.0000000
		+ 30	737,603,802	2,696	0.0003655
		+ 40	737,606,443	5,337	0.0007236
		+ 50	737,606,463	5,357	0.0007263
85 %	23.8	+ 20	737,601,553	447	0.0000606
115 %	32.2	+ 20	737,601,357	251	0.0000340

Table 7-30. WCDMA Band 12 Frequency Stability Data



Plot 7-117. WCDMA Band 12 Frequency Stability Chart

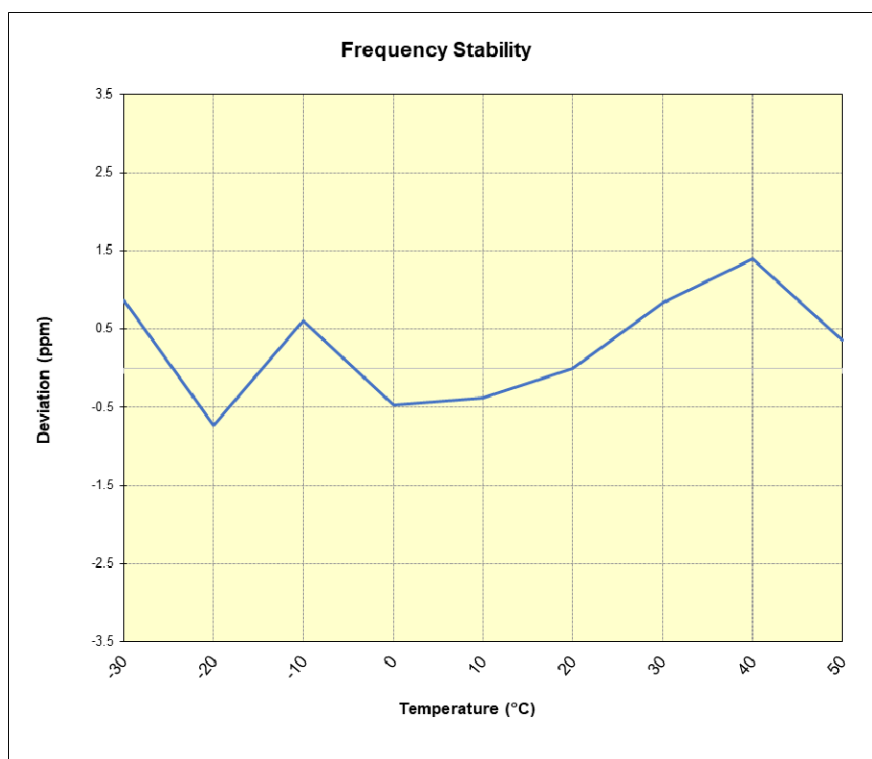
FCC ID: 2A93U-58450	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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WCDMA B13

Operating Frequency (Hz):	751,000,000
Ref. Voltage (VDC):	28.0

Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	28.0	- 30	750,999,681	-2,196	-0.0002924
		- 20	750,999,605	-2,272	-0.0003025
		- 10	750,999,032	-2,845	-0.0003788
		0	750,999,997	-1,880	-0.0002503
		+ 10	751,002,933	1,056	0.0001406
		+ 20 (Ref)	751,001,877	0	0.0000000
		+ 30	751,003,641	1,764	0.0002349
		+ 40	751,001,122	-755	-0.0001005
		+ 50	751,003,064	1,187	0.0001581
85 %	23.8	+ 20	751,001,937	60	0.0000080
115 %	32.2	+ 20	751,001,821	-56	-0.0000075

Table 7-31. WCDMA Band 13 Frequency Stability Data



Plot 7-118. WCDMA Band 13 Frequency Stability Chart

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8.0CONCLUSION

The data collected relate only to the item(s) tested and show that the **Centum Geolocation System** **FCC ID: 2A93U-58450** complies with all the requirements of Part 27 of the FCC rules.

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