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PART 22 MEASUREMENT REPORT

Applicant Name:

Samsung Electronics Co., Ltd.
129, Samsung-ro,
Yeongtong-gu, Suwon-si
Gyeonggi-do, 16677, Korea

Date of Testing:

8/30/2024 - 10/01/2024

Test Report Issue Date:

10/22/2024

Test Site/Location:

Element Lab., Columbia, MD, USA

Element Lab., Morgan Hill, CA, USA

Test Report Serial No.:

1M2408260064-01.A3L

FCC ID:

A3LSMS936U

APPLICANT:

Samsung Electronics Co., Ltd.

Application Type:

Certification

Model:

SM-S936U

Additional Model(s):

SM-S936U1

EUT Type:

Portable Handset

FCC Classification:

PCS Licensed Transmitter Held to Ear (PCE)

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.

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



CERT #2041.01

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Antenna-1						
Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	ERP		Emission Designator
				Max. Power [W]	Max. Power [dBm]	
GSM/GPRS	N/A	GMSK	824.2 - 848.8	0.555	27.44	242KGXW
EDGE	N/A	8-PSK	824.2 - 848.8	0.516	27.12	237KG7W
WCDMA	N/A	Spread Spectrum	826.4 - 846.6	0.090	19.52	4M19F9W
LTE Band 26/5	15MHz (Band 26 only)	QPSK	831.5 - 841.5	0.067	18.26	13M6G7D
		16QAM	831.5 - 841.5	0.054	17.33	13M5W7D
	10 MHz	QPSK	829.0 - 844.0	0.071	18.52	9M02G7D
		16QAM	829.0 - 844.0	0.059	17.70	9M02W7D
	5 MHz	QPSK	826.5 - 846.5	0.069	18.38	4M52G7D
		16QAM	826.5 - 846.5	0.062	17.89	4M53W7D
	3 MHz	QPSK	825.5 - 847.5	0.071	18.51	2M72G7D
		16QAM	825.5 - 847.5	0.059	17.74	2M71W7D
		QPSK	824.7 - 848.3	0.072	18.57	1M10G7D
		16QAM	824.7 - 848.3	0.059	17.71	1M10W7D
	1.4 MHz	QPSK	834.0 - 839.0	0.115	20.60	18M0G7D
		16QAM	834.0 - 839.0	0.091	19.57	19M1W7D
NR Band n26/5	20 MHz	16QAM	834.0 - 839.0	0.091	19.57	19M1W7D
		QPSK	834.0 - 839.0	0.110	20.43	19M0G7D
		16QAM	834.0 - 839.0	0.091	19.57	19M1W7D
	15 MHz	16QAM	831.5 - 841.5	0.084	19.23	14M2W7D
		QPSK	831.5 - 841.5	0.107	20.28	14M2G7D
		16QAM	831.5 - 841.5	0.084	19.23	14M2W7D
	10 MHz	16QAM	829.0 - 844.0	0.086	19.35	9M34W7D
		QPSK	829.0 - 844.0	0.113	20.51	9M35G7D
		16QAM	829.0 - 844.0	0.086	19.35	9M34W7D
	5 MHz	16QAM	826.5 - 846.5	0.107	20.31	4M52G7D
		QPSK	826.5 - 846.5	0.087	19.40	4M51W7D
		16QAM	826.5 - 846.5	0.087	19.40	4M51W7D

Antenna-2							
Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	ERP		Emission Designator	
				Max. Power [W]	Max. Power [dBm]		
GSM/GPRS	N/A	GMSK	824.2 - 848.8	0.462	26.64	249KGXW	
EDGE	N/A	8-PSK	824.2 - 848.8	0.113	20.52	244KG7W	
WCDMA	N/A	Spread Spectrum	826.4 - 846.6	0.069	18.38	4M16F9W	
LTE Band 26/5	15MHz (Band 26 only)	QPSK	831.5 - 841.5	0.063	17.96	13M5G7D	
		16QAM	831.5 - 841.5	0.053	17.21	13M5W7D	
	10 MHz	QPSK	829.0 - 844.0	0.061	17.84	9M01G7D	
		16QAM	829.0 - 844.0	0.054	17.29	9M02W7D	
	5 MHz	QPSK	826.5 - 846.5	0.061	17.88	4M50G7D	
		16QAM	826.5 - 846.5	0.053	17.26	4M52W7D	
	3 MHz	QPSK	825.5 - 847.5	0.061	17.83	2M70G7D	
		16QAM	825.5 - 847.5	0.055	17.40	2M71W7D	
	1.4 MHz	QPSK	824.7 - 848.3	0.060	17.76	1M10G7D	
		16QAM	824.7 - 848.3	0.051	17.10	1M11W7D	
	NR Band n26/5	20 MHz	$\pi/2$ BPSK	834.0 - 839.0	0.075	18.77	18M0G7D
			QPSK	834.0 - 839.0	0.077	18.88	19M0G7D
16QAM			834.0 - 839.0	0.059	17.73	19M1W7D	
15 MHz		$\pi/2$ BPSK	831.5 - 841.5	0.077	18.87	13M5G7D	
		QPSK	831.5 - 841.5	0.080	19.02	14M2G7D	
		16QAM	831.5 - 841.5	0.061	17.82	14M2W7D	
10 MHz		$\pi/2$ BPSK	829.0 - 844.0	0.077	18.86	9M01G7D	
		QPSK	829.0 - 844.0	0.078	18.92	9M36G7D	
		16QAM	829.0 - 844.0	0.064	18.04	9M35W7D	
5 MHz		$\pi/2$ BPSK	826.5 - 846.5	0.075	18.73	4M50G7D	
		QPSK	826.5 - 846.5	0.079	18.96	4M51G7D	
		16QAM	826.5 - 846.5	0.066	18.16	4M50W7D	

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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

Measurements were conducted at the Element laboratory(ies) indicated in Section 1.3 below. All measurement facilities are compliant with the test site requirements specified in ANSI C63.4-2014 and KDB 414788 D01 v01r01.

1.3 Test Facility / Accreditations

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

- 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 Agreements (MRAs).

Measurements were performed at Element located in Morgan Hill, CA 95037, U.S.A. ("CA")

- Element is an ISO 17025-2017 accredited test facility under the American Association for Laboratory Accreditation (A2LA) with Certificate number 2041.02 for Specific Absorption Rate (SAR), Hearing Aid Compatibility (HAC) testing, where applicable, and Electromagnetic Compatibility (EMC) testing for FCC and Innovation, Science, and Economic Development Canada rules.
- Element facility is a registered (22831) test laboratory with the site description on file with ISED.

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2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **Samsung Portable Handset FCC ID: A3LSMS936U**. 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.: 2299M, 1268M, 1299M, 1287M

2.2 Device Capabilities

This device contains the following capabilities:

800/1900 GSM/GPRS/EDGE, 850/1700/1900 WCDMA/HSPA, Multi-band LTE, Multi-band 5G NR (FR1 and FR2), 802.11b/g/n/ac/ax/be WLAN, 802.11a/n/ac/ax/be UNII (5GHz and 6GHz), Bluetooth (1x, EDR, LE), Wireless Power Transfer, UWB

This device uses a tuner circuit that dynamically updates the antenna impedance parameters to optimize antenna performance for certain bands and modes of operation. The tuner for this device was set to simulate a "free space" condition where the transmit antenna is matched to the medium into which it is transmitting and, thus, the power is at its maximum level.

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.

This device supports wireless charging capability and, thus, is subject to the test requirements of KDB 648474 D03 v01r04. Additional radiated spurious emission measurements were performed with the EUT lying flat on an authorized wireless charging pad (WCP) Model: EP-P2400 while operating under normal conditions in a simulated call or data transmission configuration. The worst case radiated emissions data is shown in this report.

Band	Ant1	Ant2
GSM/GPRS	Ant A	Ant E
WCDMA	Ant A	Ant E
LTE Band 26/5	Ant A	Ant E
NR Band n26/5	Ant A	Ant E

Table 2-1. Antenna Naming Convention

2.4 Software and Firmware

Testing was performed on device(s) using software/firmware version S936USQU0AXHJ 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 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

Table 4-1. Measurement Uncertainty Budget – MD

Contribution	Expanded Uncertainty ($\pm$ dB)
Conducted Bench Top Measurements	1.65
Line Conducted Disturbance	2.71
Radiated Disturbance (<30MHz)	4.06
Radiated Disturbance (30MHz - 1GHz)	4.30
Radiated Disturbance (1 - 18GHz)	4.78
Radiated Disturbance (>18GHz)	4.79

Table 4-2. Measurement Uncertainty Budget – CA

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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	4/2/2024	Annual	4/2/2025	AP2
-	AP1	EMC Cable and Switch System	4/2/2024	Annual	4/2/2025	AP1
-	ETS	EMC Cable and Switch System	4/2/2024	Annual	4/2/2025	ETS
-	LTx1	Licensed Transmitter Cable Set	4/2/2024	Annual	4/2/2025	LTx1
-	LTx4	Licensed Transmitter Cable Set	4/2/2024	Annual	4/2/2025	LTx4
-	LTx5	Licensed Transmitter Cable Set	4/2/2024	Annual	4/2/2025	LTx5
Agilent	N9030A	50GHz PXA Signal Analyzer	4/23/2024	Annual	4/23/2025	US51350301
Anritsu	MT8821C	Radio Communication Analyzer	N/A			6201381794
Emco	3116	Horn Antenna (18 - 40GHz)	7/5/2023	Triennial	7/5/2025	9203-2178
Espec	ESX-2CA	Environmental Chamber	9/26/2024	Annual	9/26/2026	17620
ETS Lindgren	3164-08	Quad Ridge Horn Antenna	3/29/2023	Biennial	3/29/2025	128337
ETS Lindgren	3164-10	Quad Ridge Horn 400MHz - 10000MHz	7/13/2023	Biennial	7/13/2025	00166283
Keysight Technologies	N9020A	MXA Signal Analyzer	4/11/2024	Annual	4/11/2025	MY54500644
Keysight Technologies	N9030A	PXA Signal Analyzer	2/29/2024	Annual	3/1/2025	MY55410501
Mini-Circuits	SSG-4000HP	Synthesized Signal Generator	N/A			11208010032
Mini-Circuits	SSG-4000HP	Synthesized Signal Generator	N/A			11403100002
Rohde & Schwarz	CMW500	Radio Communication Tester	N/A			112347
Rohde & Schwarz	ESU26	EMI Test Receiver (26.5GHz)	10/16/2024	Annual	10/16/2025	100342
Rohde & Schwarz	FSW26	2Hz-26.5GHz Signal and Spectrum Analyzer	3/8/2024	Annual	3/8/2025	103187
Sunol	JB6	LB6 Antenna	3/2/2023	Biennial	3/2/2025	A082816

Table 5-1. Test Equipment Calibration Table – MD

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
ETS Lindgren	ETS 3117	1-18GHz Rx Antenna	8/29/2024	Annual	8/29/2025	205956
Rohde & Schwarz	TS-SFUNIT	1-18GHz Preamp	5/29/2024	Annual	5/29/2025	102141
Rohde & Schwarz	TS-PR8	30M-1GHz Preamp	7/3/2024	Annual	7/3/2025	102356
Rohde & Schwarz	FSW43	EMI Receiver/Analyzer	2/12/2024	Annual	2/12/2025	104092

Table 5-2. Test Equipment Calibration Table – CA

Notes:

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

GSM Emission Designator

Emission Designator = 250KGXW

GSM BW = 250 kHz

G = Phase Modulation

X = Cases not otherwise covered

W = Combination (Audio/Data)

EDGE Emission Designator

Emission Designator = 250KG7W

EDGE BW = 250 kHz

G = Phase Modulation

7 = Quantized/Digital Info

W = Combination (Audio/Data)

WCDMA Emission Designator

Emission Designator = 4M16F9W

WCDMA BW = 4.16 MHz

F = Frequency Modulation

9 = Composite Digital Info

W = Combination (Audio/Data)

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

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7.0 TEST RESULTS

7.1 Summary

Company Name: Samsung Electronics Co., Ltd.
 FCC ID: A3LSMS936U
 FCC Classification: PCS Licensed Transmitter Held to Ear (PCE)
 Mode(s): GSM/GPRS/WCDMA/NR/LTE

Test Condition	Test Description	FCC Part Section(s)	Test Limit	Test Result	Reference	Test Lab Location
CONDUCTED	Occupied Bandwidth	2.1049(h)	N/A	PASS	Section 7.2	MD
	Conducted Band Edge / Spurious Emissions	2.1051, 22.917(a)	$\geq 43 + 10 \log (P[\text{Watts}])$ dB of attenuation below transmitter power	PASS	Sections 7.3, 7.4	MD
	Frequency Stability	2.1055, 22.355	The carrier frequency of the transmitter must be maintained within the 2.5ppm	PASS	Section 7.7	MD
RADIATED	Effective Radiated Power / Equivalent Isotropic Radiated Power	22.913(a)(5)	< 7 Watts max. ERP	PASS	Section 7.5	MD
	Radiated Spurious Emissions	2.1053, 22.917(a)	$> 43 + 10 \log_{10} (P[\text{Watts}])$ for all out-of-band emissions	PASS	Section 7.6	CA

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 v1.2.2.
- 5) No conducted powers were included in the report. For the conducted power measurements please see the **RF Exposure Report**.

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7.2 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.

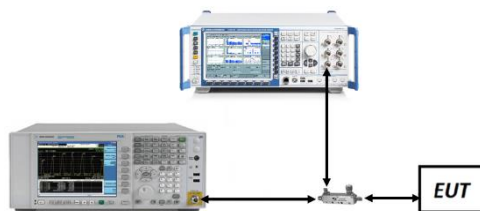


Figure 7-1. Test Instrument & Measurement Setup

Test Notes

None.

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Mode	Bandwidth	Modulation	OBW [MHz]
GSM-Cell	N/A	GMSK	0.242
GSM-Cell Edge		8-PSK	0.237
WCDMA-Cell		Spread Spectrum	4.19
LTE-B26-5	15MHz	QPSK	13.60
		16QAM	13.50
	10MHz	QPSK	9.02
		16QAM	9.02
	5 MHz	QPSK	4.52
		16QAM	4.53
	3 MHz	QPSK	2.72
		16QAM	2.71
	1.4 MHz	QPSK	1.10
		16QAM	1.10
NR-n26-5	20 MHz	$\pi/2$ BPSK	17.98
		QPSK	18.98
		16QAM	19.10
	15 MHz	$\pi/2$ BPSK	13.53
		QPSK	14.19
		16QAM	14.17
	10 MHz	$\pi/2$ BPSK	9.01
		QPSK	9.35
		16QAM	9.34
	5 MHz	$\pi/2$ BPSK	4.50
		QPSK	4.52
		16QAM	4.51

Table 7-2. Occupied Bandwidth Results – Ant1

FCC ID: A3LSMS936U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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GPRS Cell – Ant1



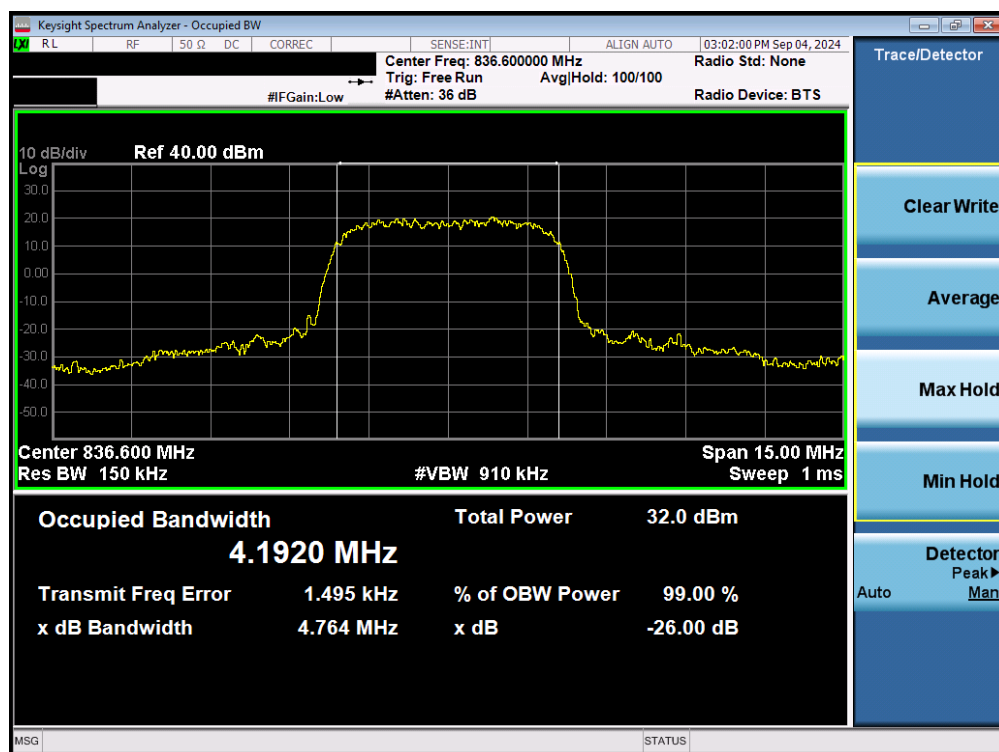
Plot 7-1. Occupied Bandwidth Plot (GPRS, Ch. 190 – Ant1)



Plot 7-2. Occupied Bandwidth Plot (EDGE, Ch. 190 – Ant1)

FCC ID: A3LSMS936U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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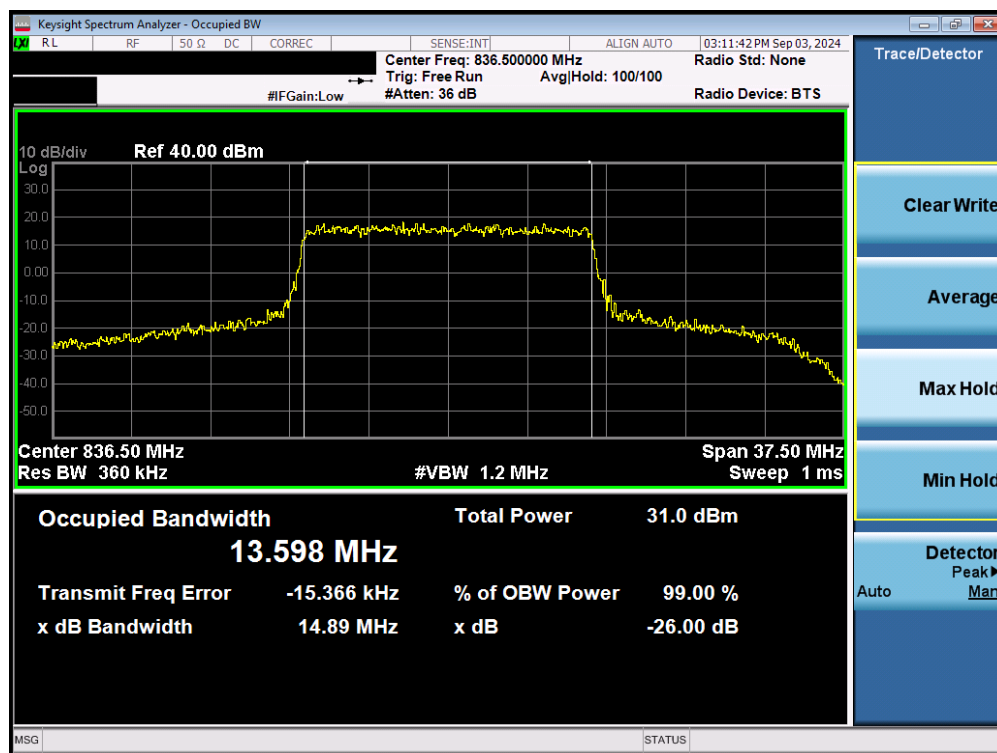
WCDMA Cell – Ant1



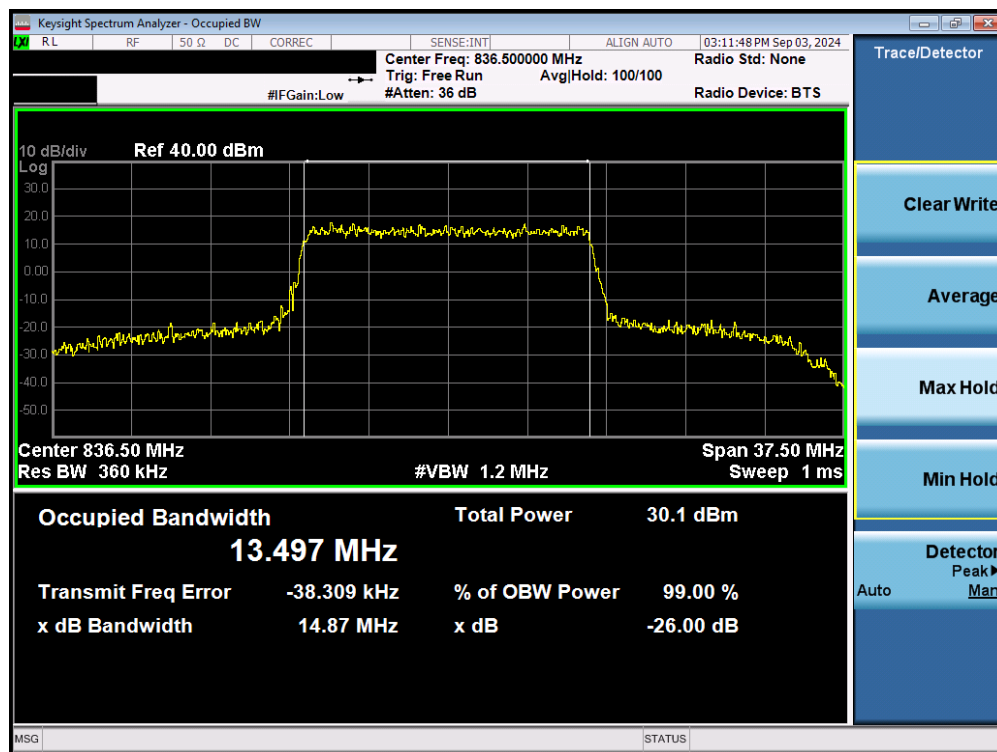
Plot 7-3. Occupied Bandwidth Plot (WCDMA, Ch. 4183 – Ant1)

FCC ID: A3LSMS936U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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LTE Band 26/5 – Ant1

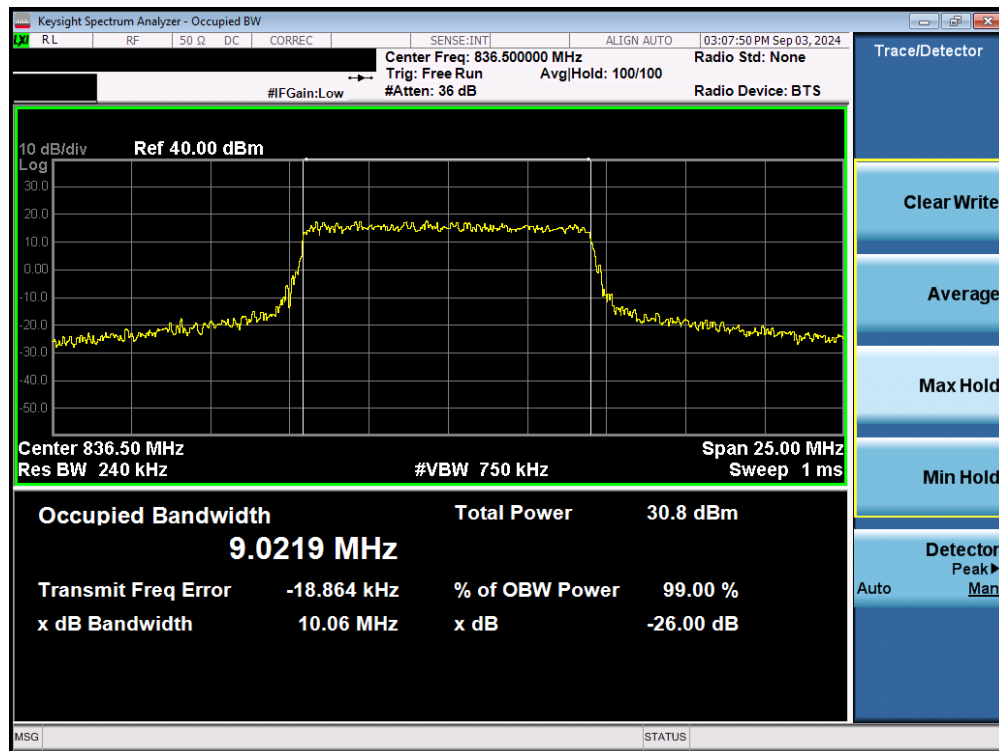


Plot 7-4. Occupied Bandwidth Plot (LTE Band 26 - 15MHz QPSK - Full RB - Ant1)



Plot 7-5. Occupied Bandwidth Plot (LTE Band 26 - 15MHz 16-QAM - Full RB - Ant1)

FCC ID: A3LSMS936U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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Plot 7-6. Occupied Bandwidth Plot (LTE Band 26/5 - 10MHz QPSK - Full RB - Ant1)

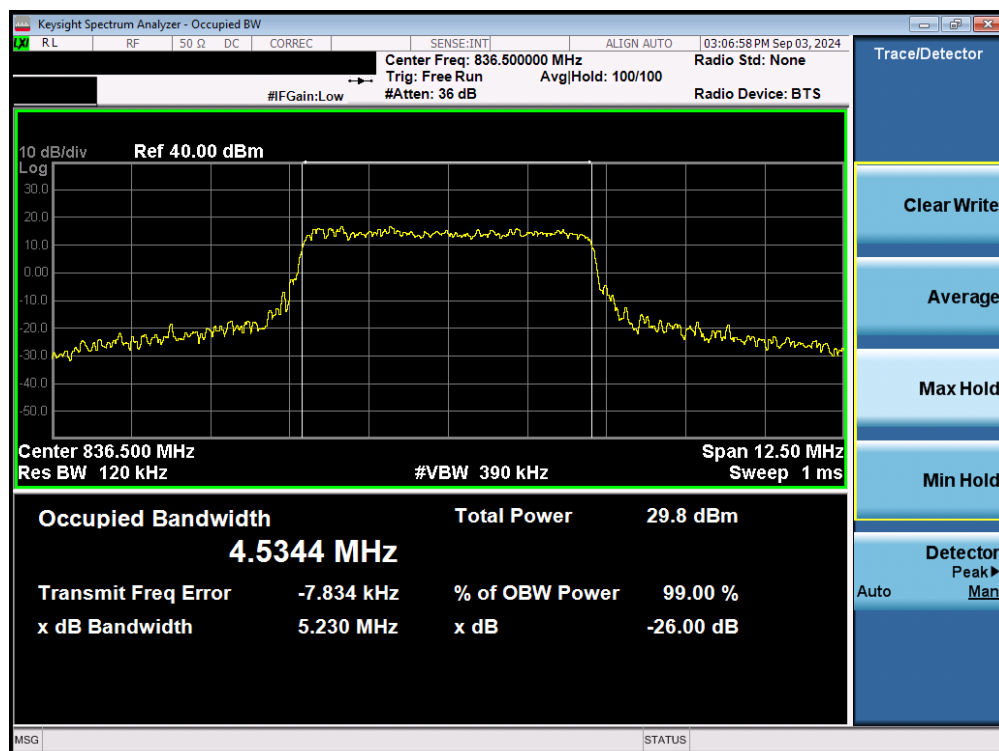


Plot 7-7. Occupied Bandwidth Plot (LTE Band 26/5 - 10MHz 16-QAM - Full RB - Ant1)

FCC ID: A3LSMS936U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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Plot 7-8. Occupied Bandwidth Plot (LTE Band 26/5 - 5MHz QPSK - Full RB - Ant1)

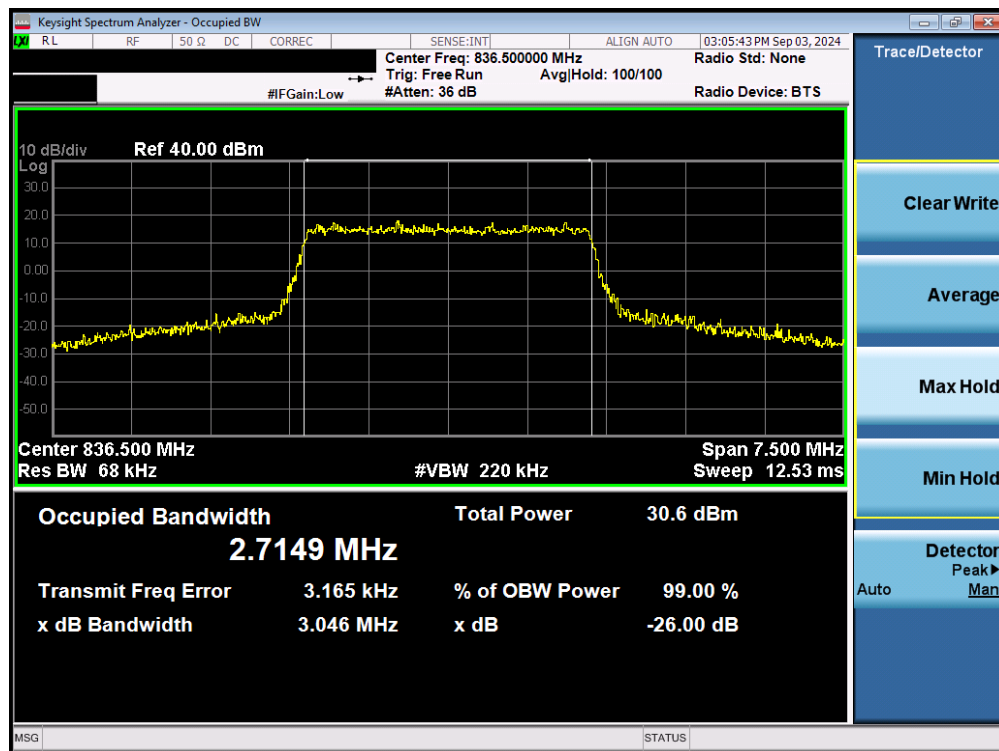


Plot 7-9. Occupied Bandwidth Plot (LTE Band 26/5 - 5MHz 16-QAM - Full RB - Ant1)

FCC ID: A3LSMS936U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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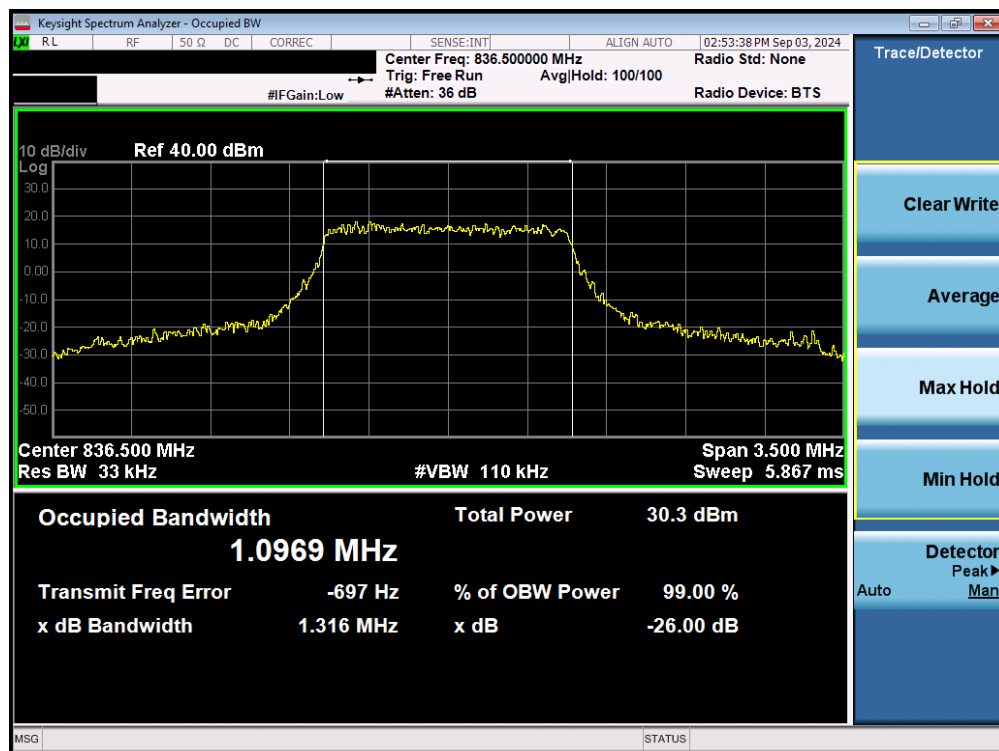


Plot 7-10. Occupied Bandwidth Plot (LTE Band 26/5 - 3MHz QPSK - Full RB - Ant1)



Plot 7-11. Occupied Bandwidth Plot (LTE Band 26/5 - 3MHz 16-QAM - Full RB - Ant1)

FCC ID: A3LSMS936U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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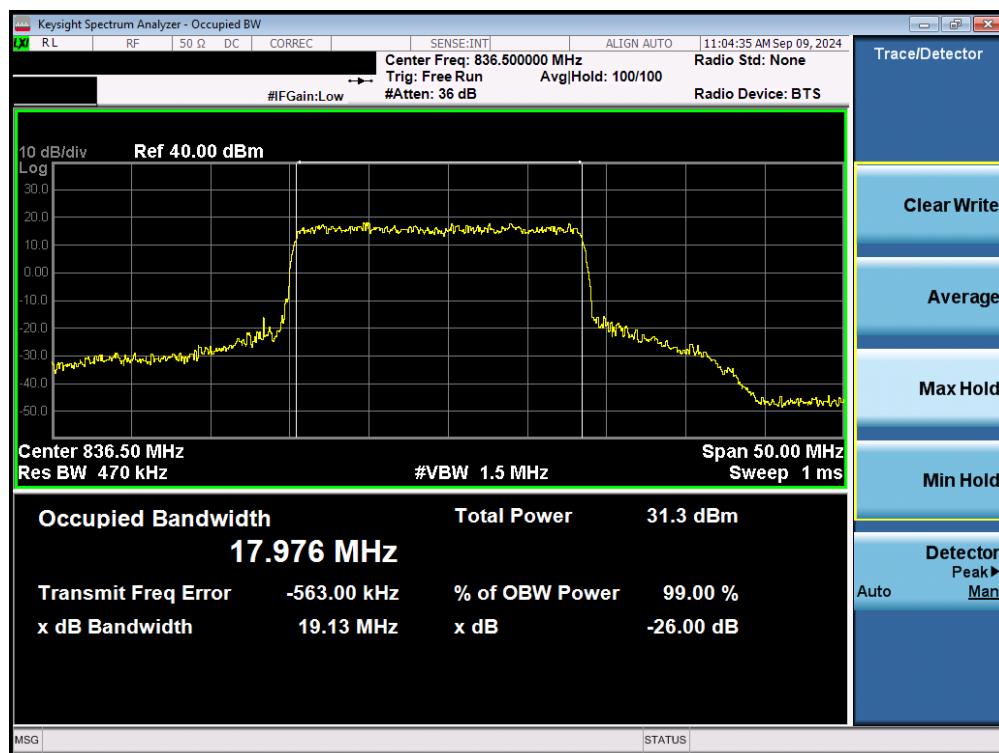
Plot 7-12. Occupied Bandwidth Plot (LTE Band 26/5 - 1.4MHz QPSK - Full RB - Ant1)



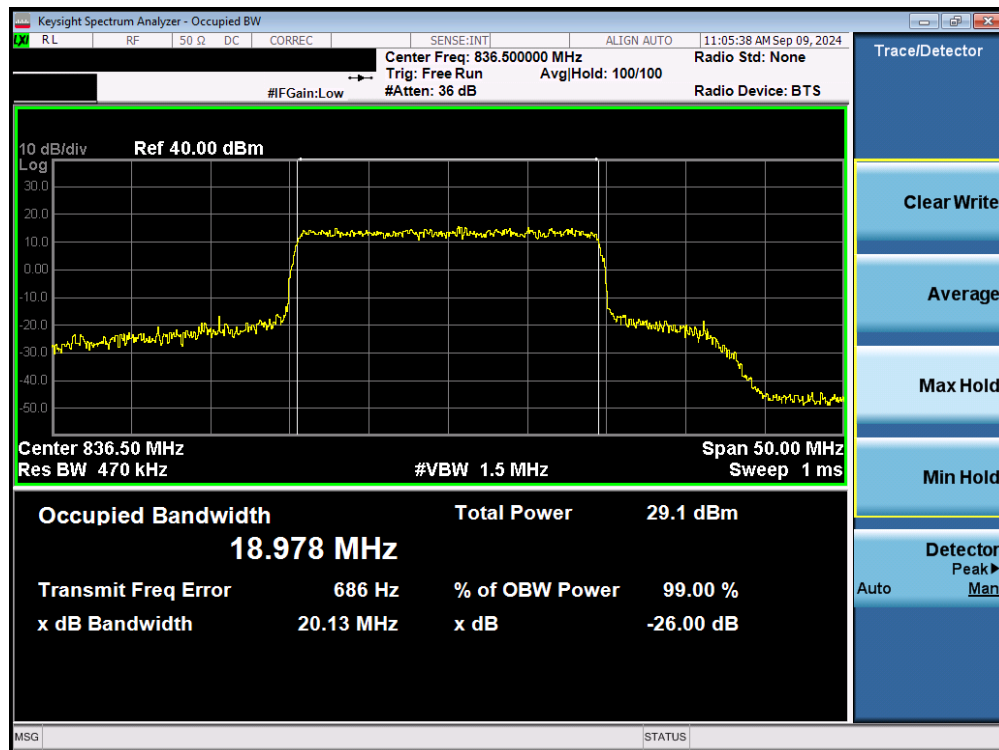
Plot 7-13. Occupied Bandwidth Plot (LTE Band 26/5 - 1.4MHz 16-QAM - Full RB - Ant1)

FCC ID: A3LSMS936U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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NR Band n26/5 – Ant1

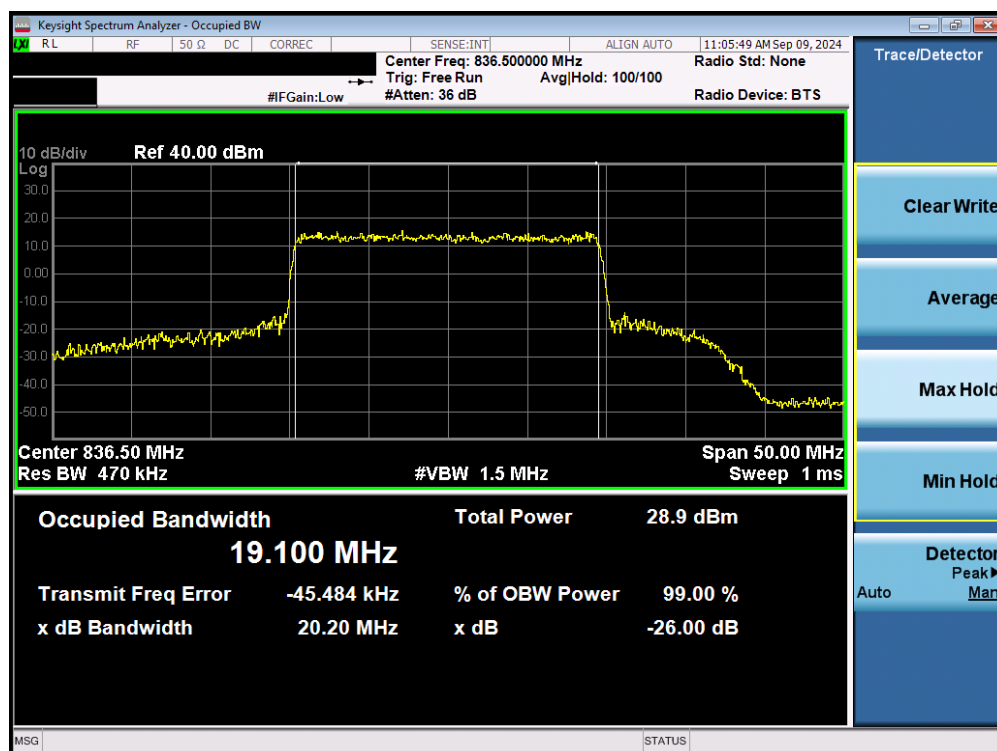


Plot 7-14. Occupied Bandwidth Plot (NR Band n26/5 - 20MHz $\pi/2$ BPSK - Full RB - Ant1)

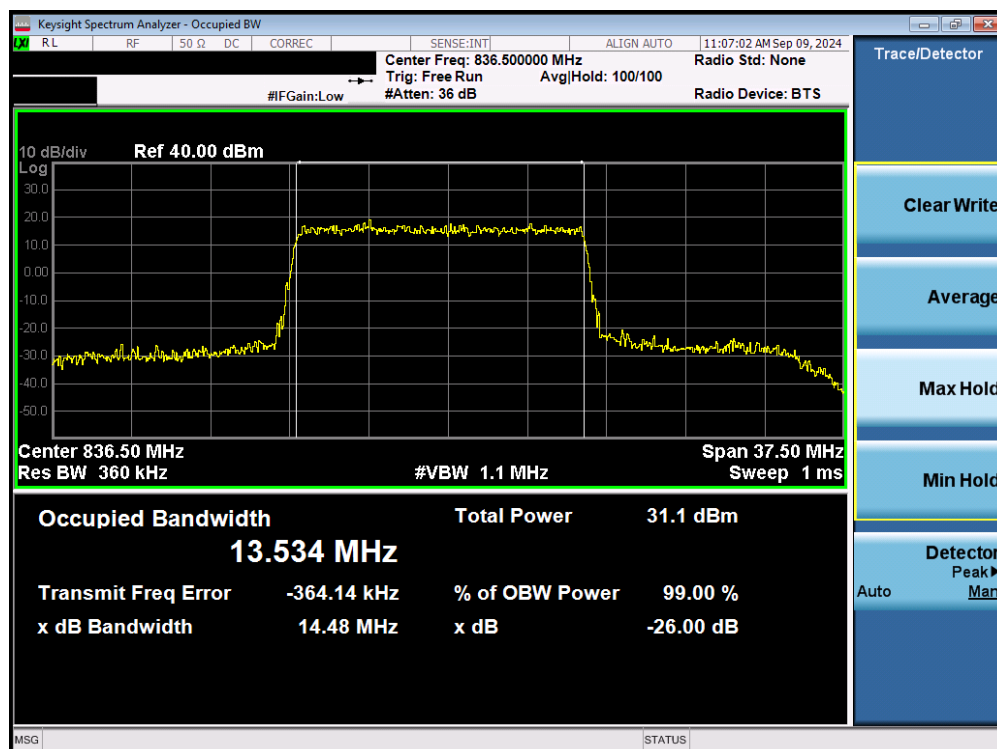


Plot 7-15. Occupied Bandwidth Plot (NR Band n26/5 - 20MHz QPSK - Full RB - Ant1)

FCC ID: A3LSMS936U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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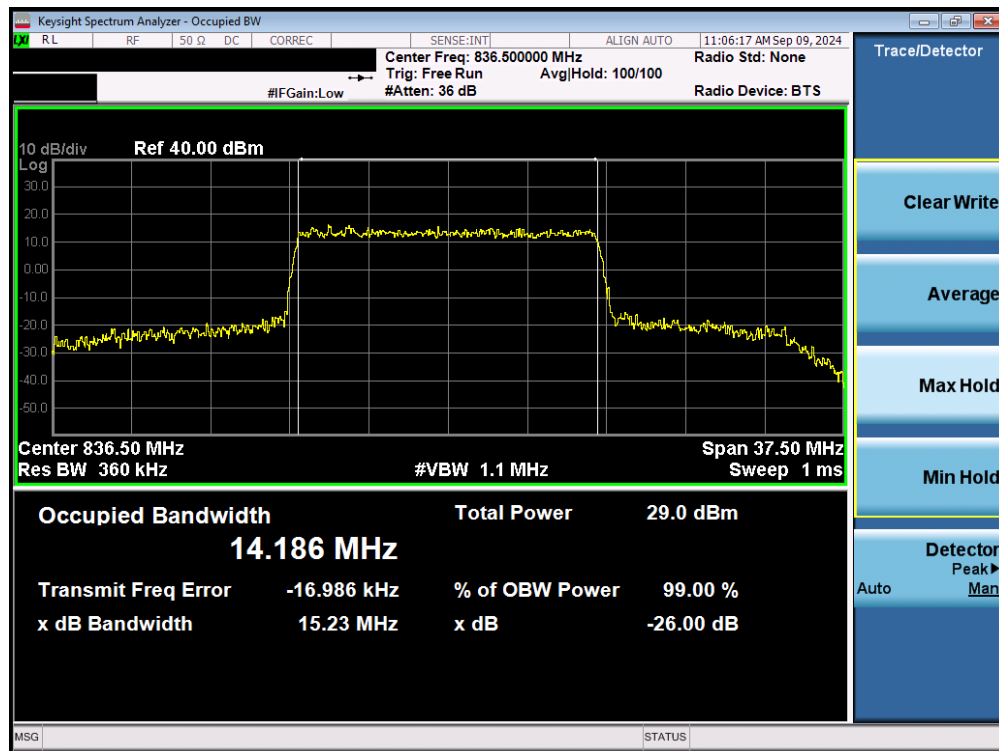


Plot 7-16. Occupied Bandwidth Plot (NR Band n26/5 - 20MHz 16-QAM - Full RB - Ant1)

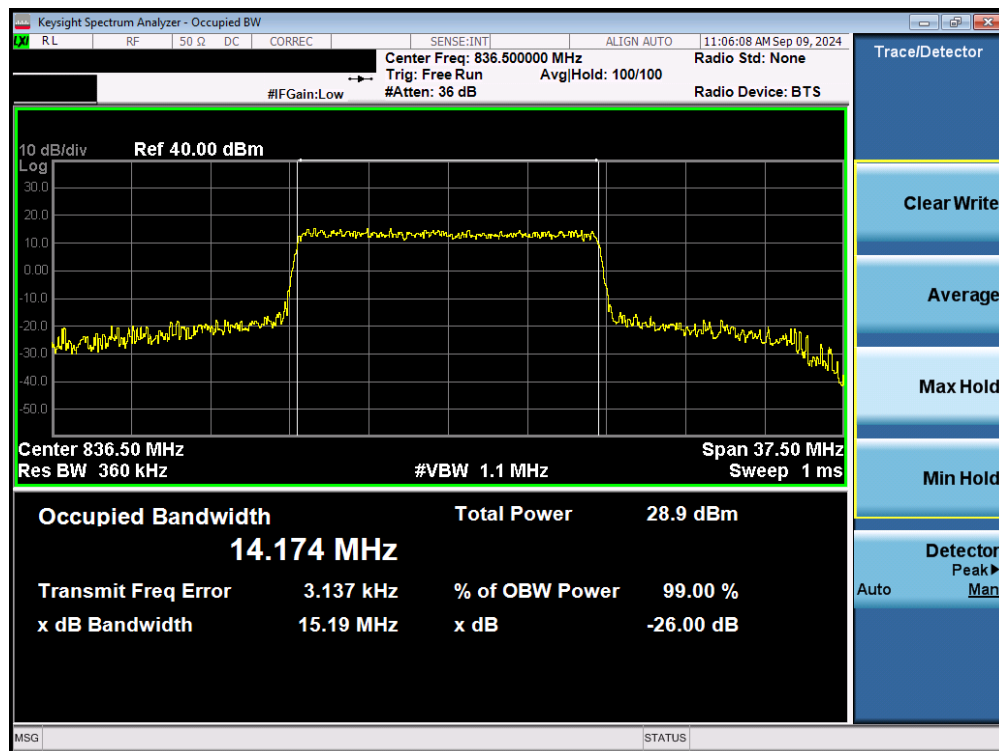


Plot 7-17. Occupied Bandwidth Plot (NR Band n26/5 - 15MHz $\pi/2$ BPSK - Full RB - Ant1)

FCC ID: A3LSMS936U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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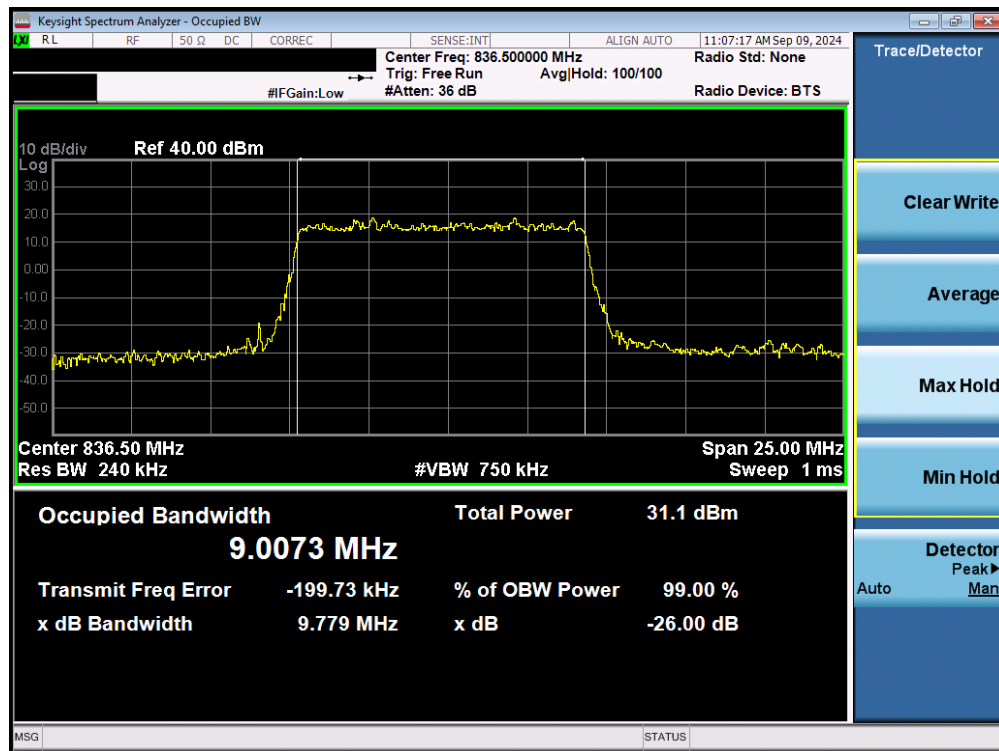


Plot 7-18. Occupied Bandwidth Plot (NR Band n26/5 - 15MHz QPSK - Full RB - Ant1)

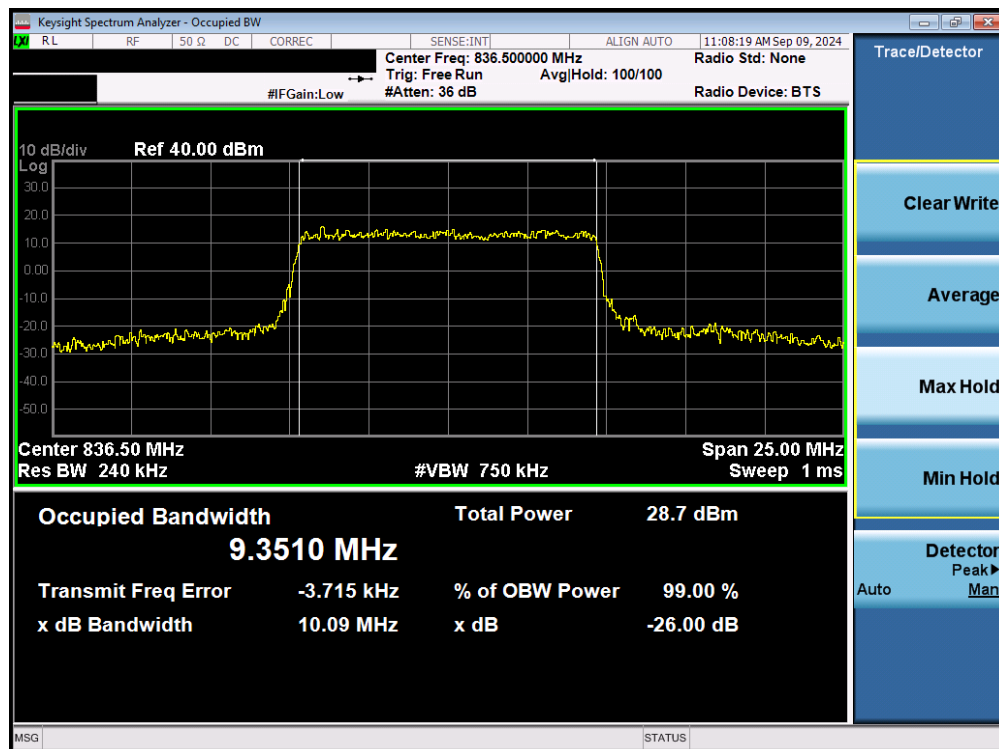


Plot 7-19. Occupied Bandwidth Plot (NR Band n26/5 - 15MHz 16-QAM - Full RB - Ant1)

FCC ID: A3LSMS936U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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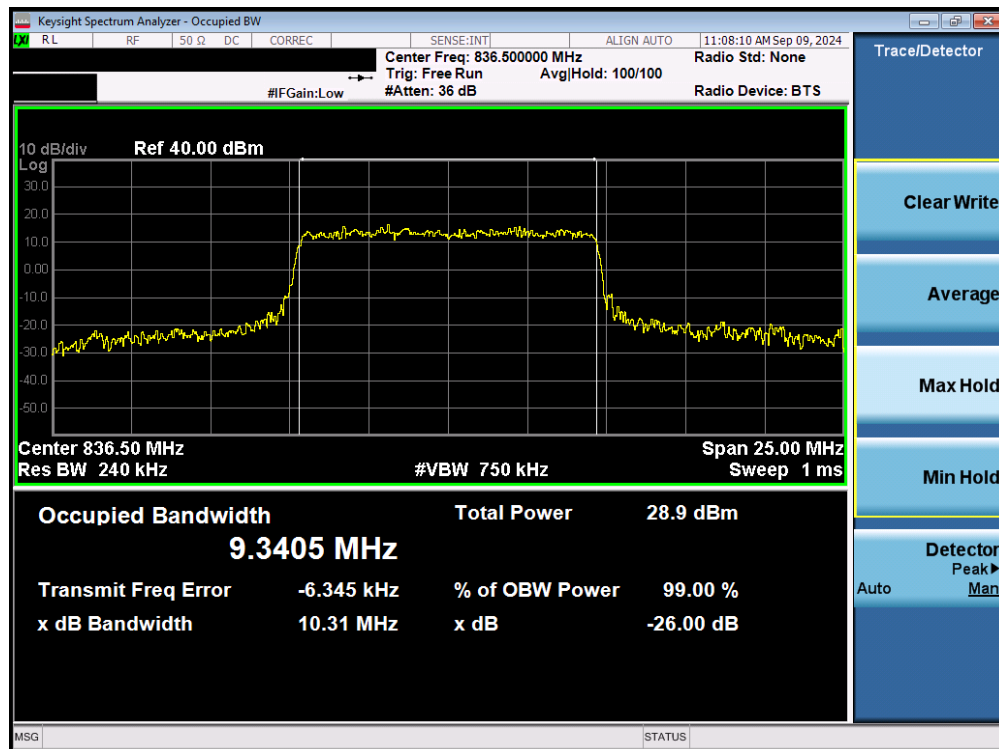


Plot 7-20. Occupied Bandwidth Plot (NR Band n26/5 - 10MHz $\pi/2$ BPSK - Full RB - Ant1)

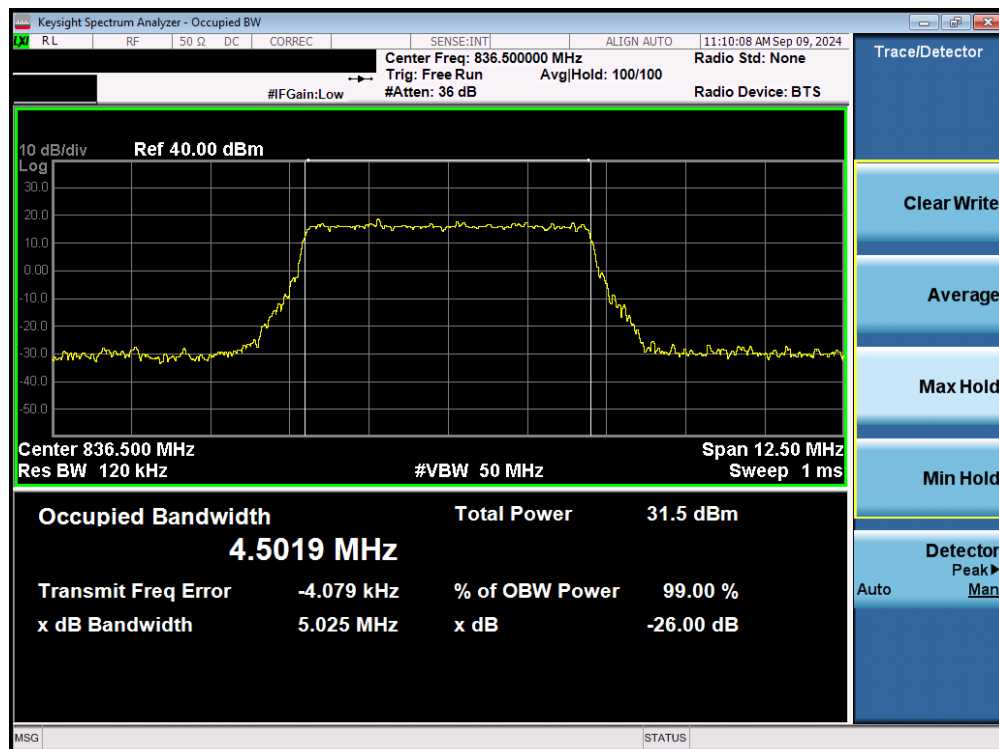


Plot 7-21. Occupied Bandwidth Plot (NR Band n26/5 - 10MHz QPSK - Full RB - Ant1)

FCC ID: A3LSMS936U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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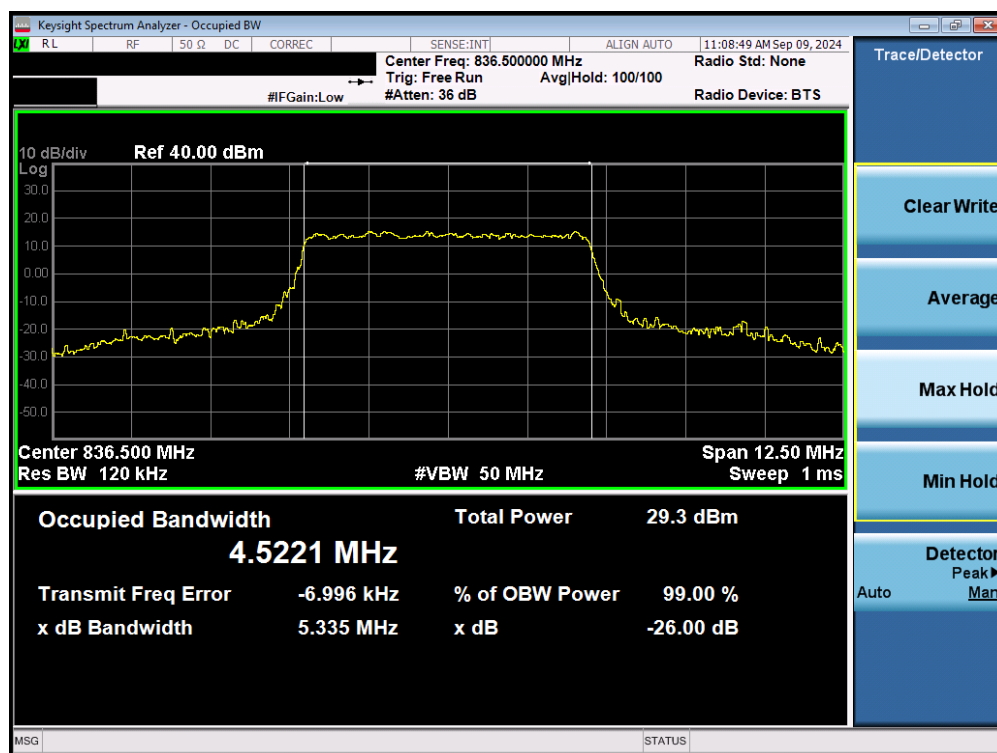


Plot 7-22. Occupied Bandwidth Plot (NR Band n26/5 - 10MHz 16-QAM - Full RB - Ant1)

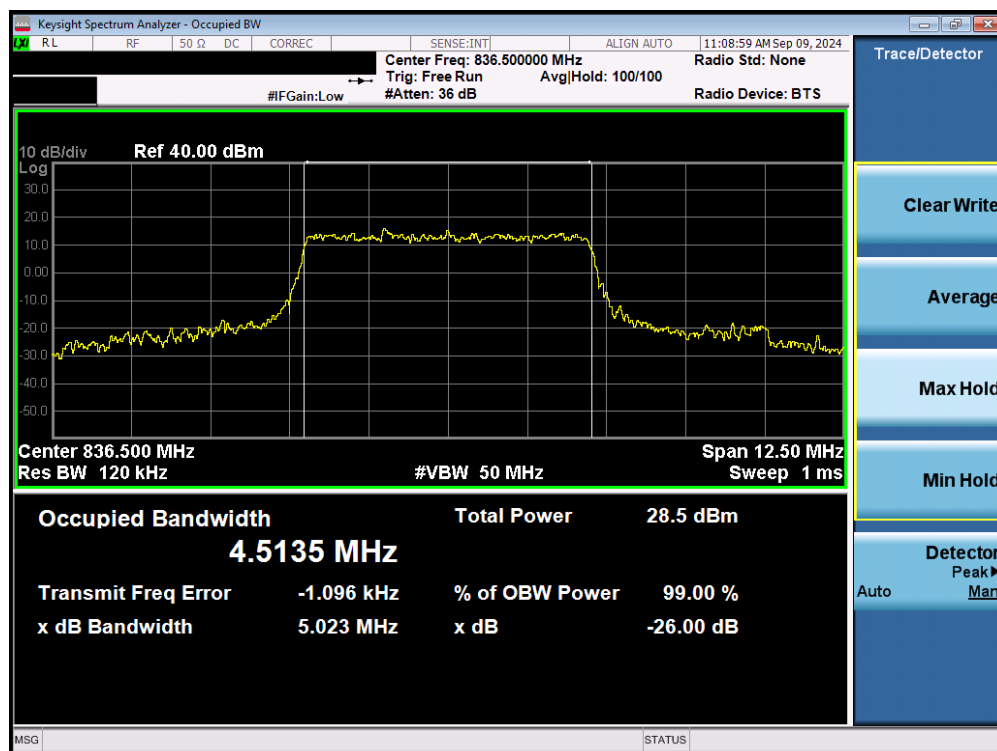


Plot 7-23. Occupied Bandwidth Plot (NR Band n26/5 - 5MHz $\pi/2$ BPSK - Full RB - Ant1)

FCC ID: A3LSMS936U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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Plot 7-24. Occupied Bandwidth Plot (NR Band n26/5 - 5MHz QPSK - Full RB - Ant1)



Plot 7-25. Occupied Bandwidth Plot (NR Band n26/5 - 5MHz 16-QAM - Full RB - Ant1)

FCC ID: A3LSMS936U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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Mode	Bandwidth	Modulation	OBW [MHz]
GSM-Cell	N/A	GMSK	0.249
GSM-Cell Edge		8-PSK	0.244
WCDMA-Cell		Spread Spectrum	4.16
LTE-B26-5	15MHz	QPSK	13.52
		16QAM	13.51
	10MHz	QPSK	9.01
		16QAM	9.02
	5 MHz	QPSK	4.50
		16QAM	4.52
	3 MHz	QPSK	2.70
		16QAM	2.71
	1.4 MHz	QPSK	1.10
		16QAM	1.11
NR-n26-5	20 MHz	$\pi/2$ BPSK	18.03
		QPSK	19.03
		16QAM	19.07
	15 MHz	$\pi/2$ BPSK	13.53
		QPSK	14.23
		16QAM	14.16
	10 MHz	$\pi/2$ BPSK	9.01
		QPSK	9.36
		16QAM	9.35
	5 MHz	$\pi/2$ BPSK	4.50
		QPSK	4.51
		16QAM	4.50

Table 7-3. Occupied Bandwidth Results – Ant2

FCC ID: A3LSMS936U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2408260064-01.A3L	Test Dates: 8/30/2024 - 10/01/2024	EUT Type: Portable Handset	Page 26 of 101

GPRS Cell – Ant2



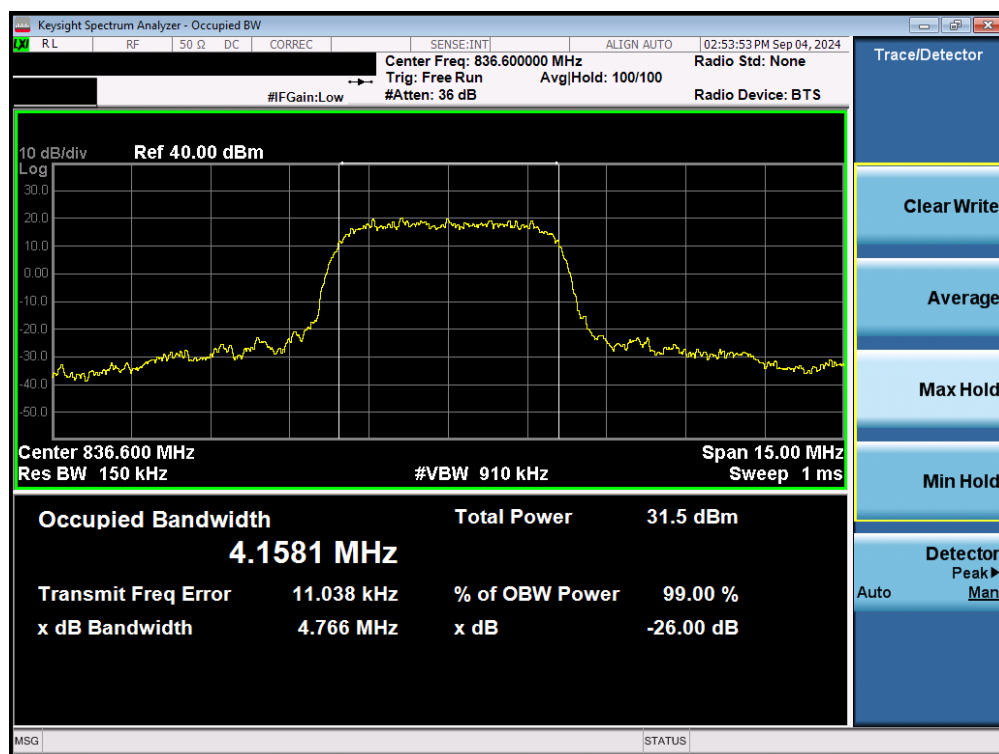
Plot 7-26. Occupied Bandwidth Plot (GPRS, Ch. 190 – Ant2)



Plot 7-27. Occupied Bandwidth Plot (EDGE, Ch. 190 – Ant2)

FCC ID: A3LSMS936U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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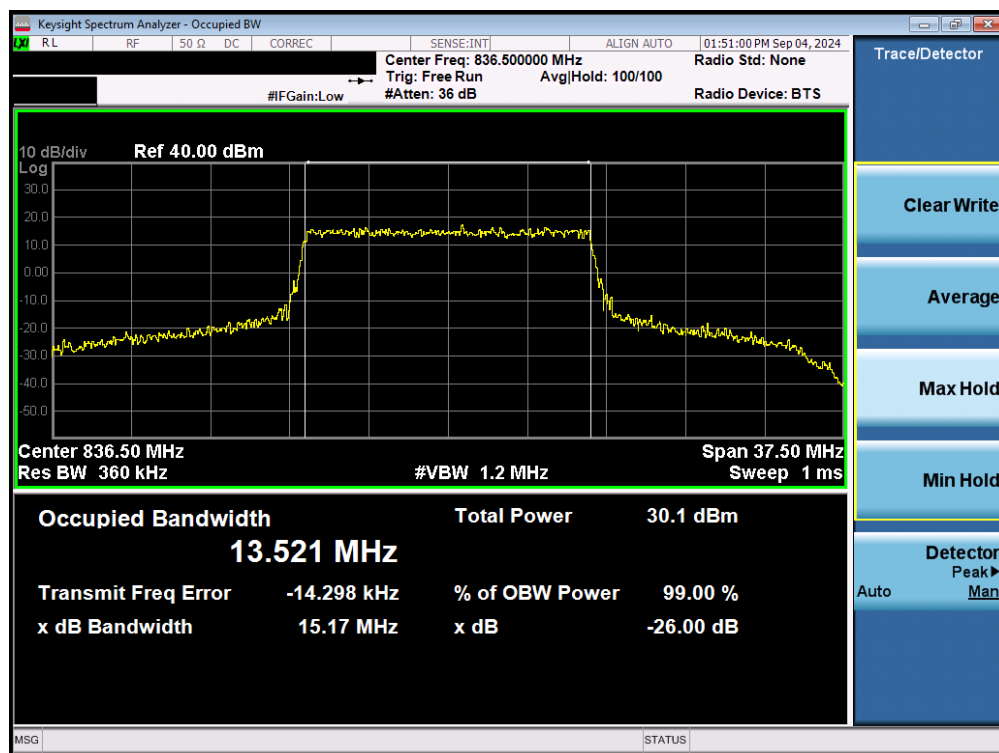
WCDMA Cell – Ant2



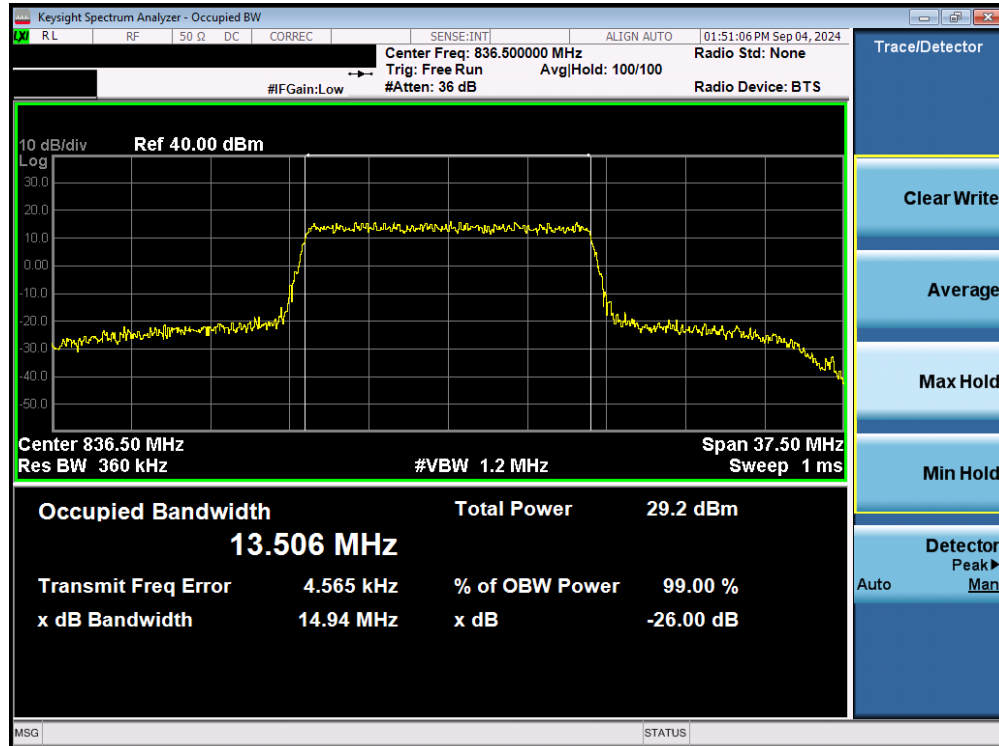
Plot 7-28. Occupied Bandwidth Plot (WCDMA, Ch. 4183 – Ant2)

FCC ID: A3LSMS936U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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LTE Band 26/5 – Ant2

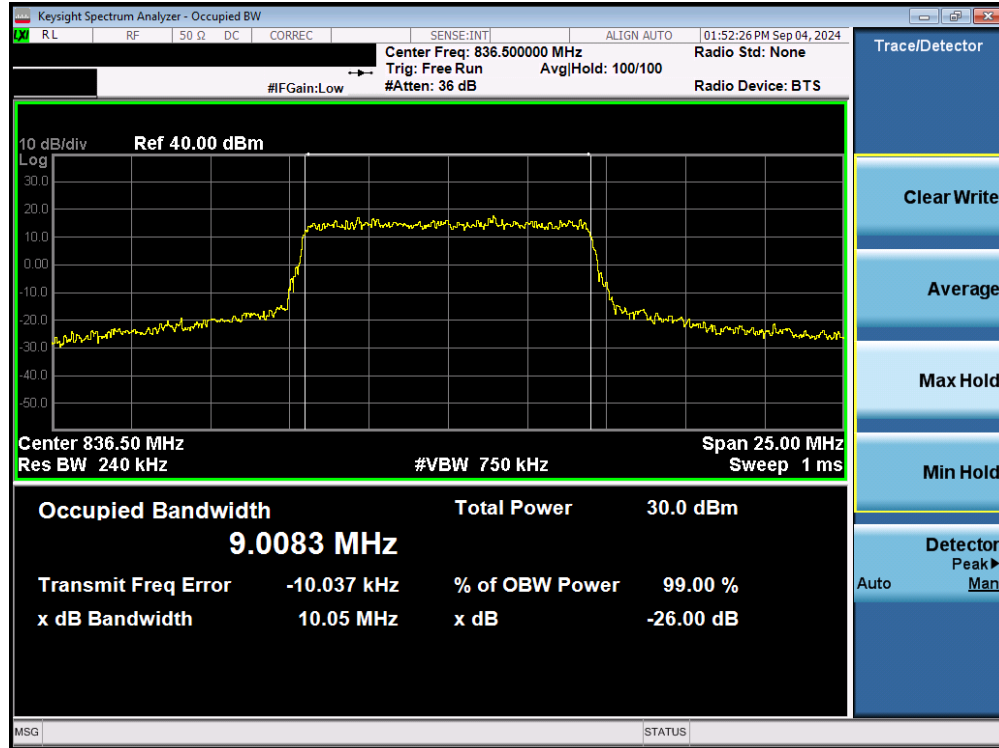


Plot 7-29. Occupied Bandwidth Plot (LTE Band 26 - 15MHz QPSK - Full RB - Ant2)



Plot 7-30. Occupied Bandwidth Plot (LTE Band 26 - 15MHz 16-QAM - Full RB - Ant2)

FCC ID: A3LSMS936U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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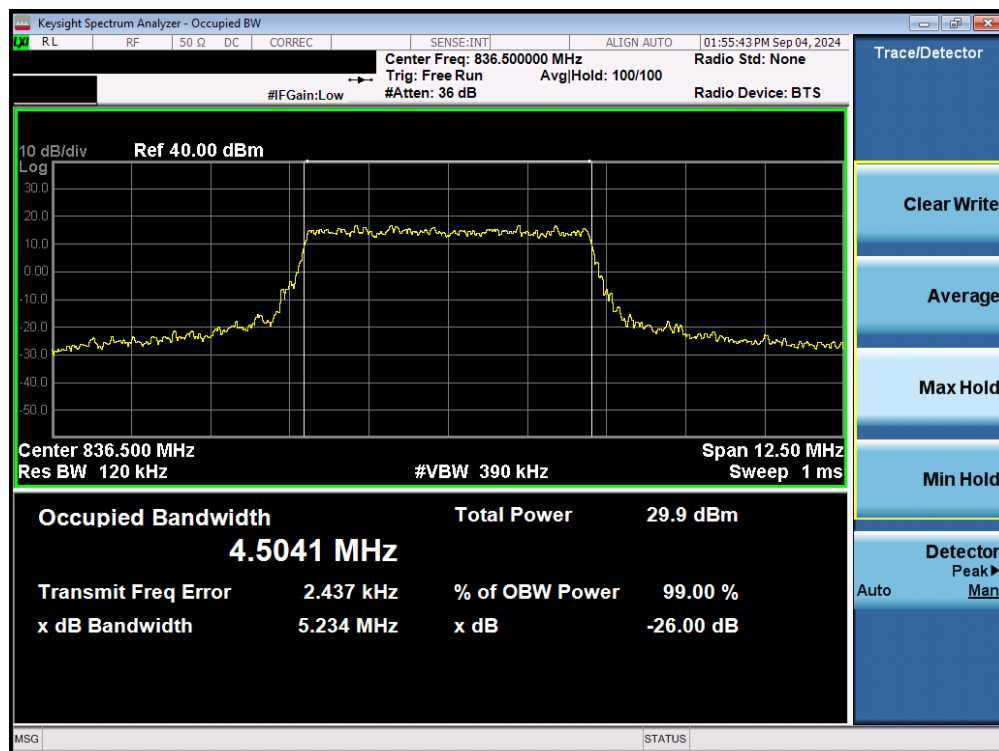


Plot 7-31. Occupied Bandwidth Plot (LTE Band 26/5 - 10MHz QPSK - Full RB - Ant2)

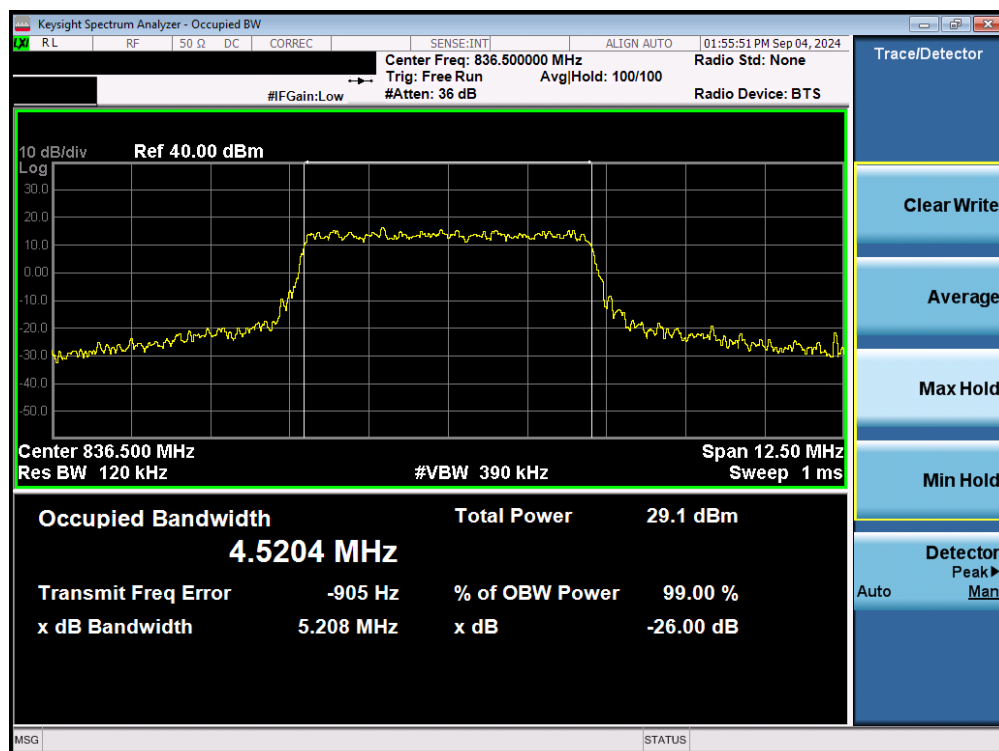


Plot 7-32. Occupied Bandwidth Plot (LTE Band 26/5 - 10MHz 16-QAM - Full RB - Ant2)

FCC ID: A3LSMS936U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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Plot 7-33. Occupied Bandwidth Plot (LTE Band 26/5 - 5MHz QPSK - Full RB - Ant2)



Plot 7-34. Occupied Bandwidth Plot (LTE Band 26/5 - 5MHz 16-QAM - Full RB - Ant2)

FCC ID: A3LSMS936U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2408260064-01.A3L	Test Dates: 8/30/2024 - 10/01/2024	EUT Type: Portable Handset	Page 31 of 101

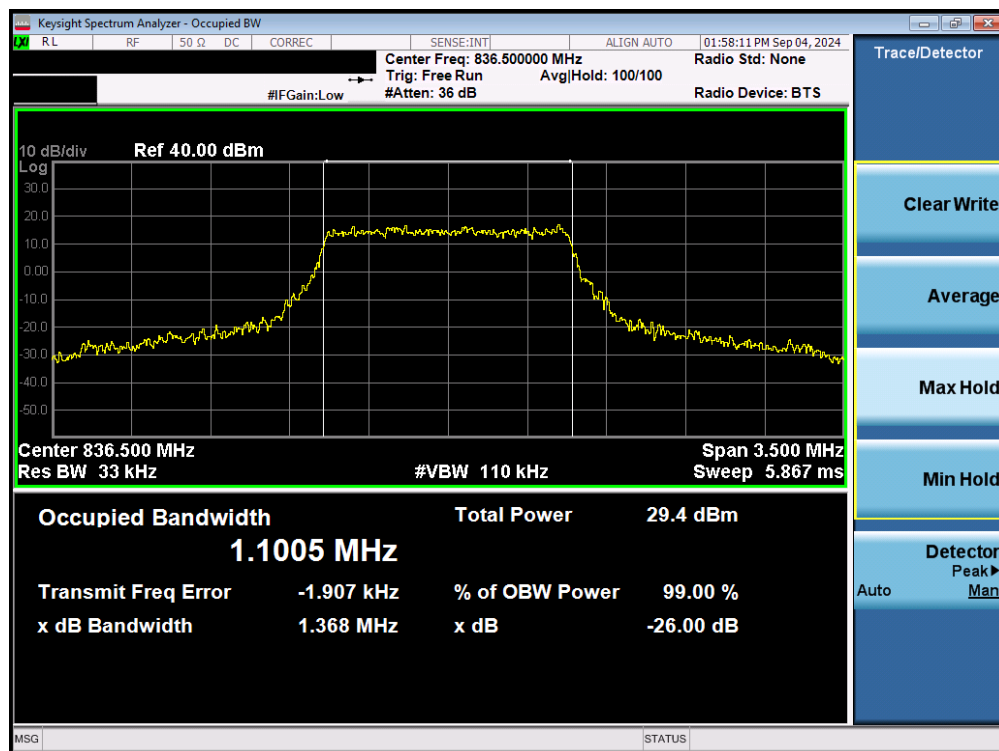


Plot 7-35. Occupied Bandwidth Plot (LTE Band 26/5 - 3MHz QPSK - Full RB - Ant2)

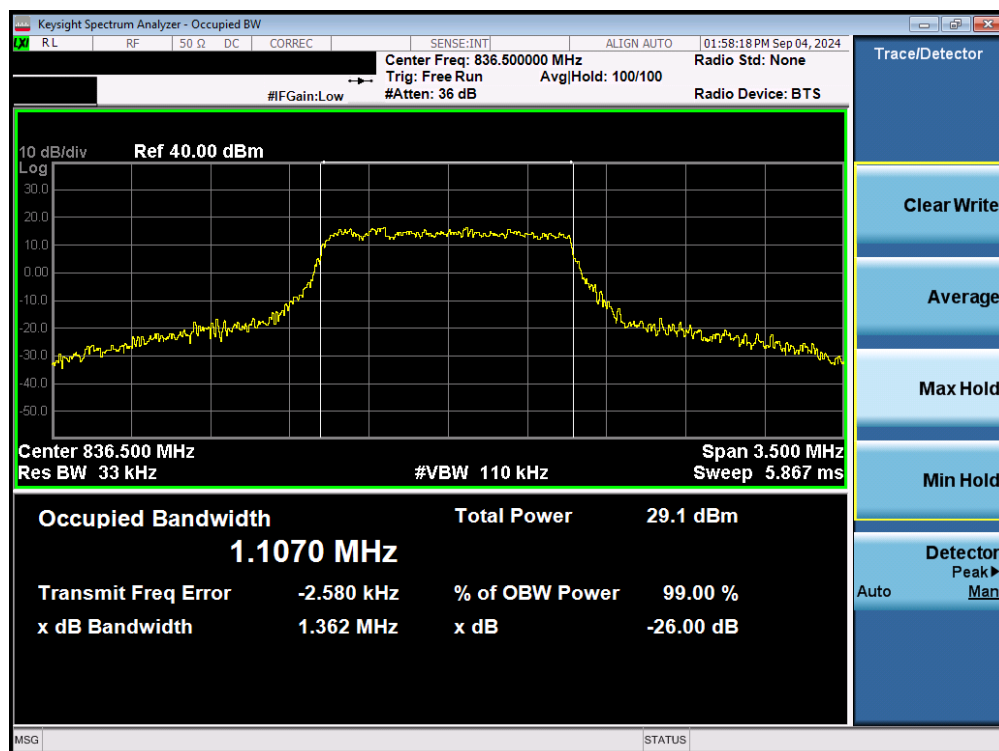


Plot 7-36. Occupied Bandwidth Plot (LTE Band 26/5 - 3MHz 16-QAM - Full RB - Ant2)

FCC ID: A3LSMS936U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2408260064-01.A3L	Test Dates: 8/30/2024 - 10/01/2024	EUT Type: Portable Handset	Page 32 of 101



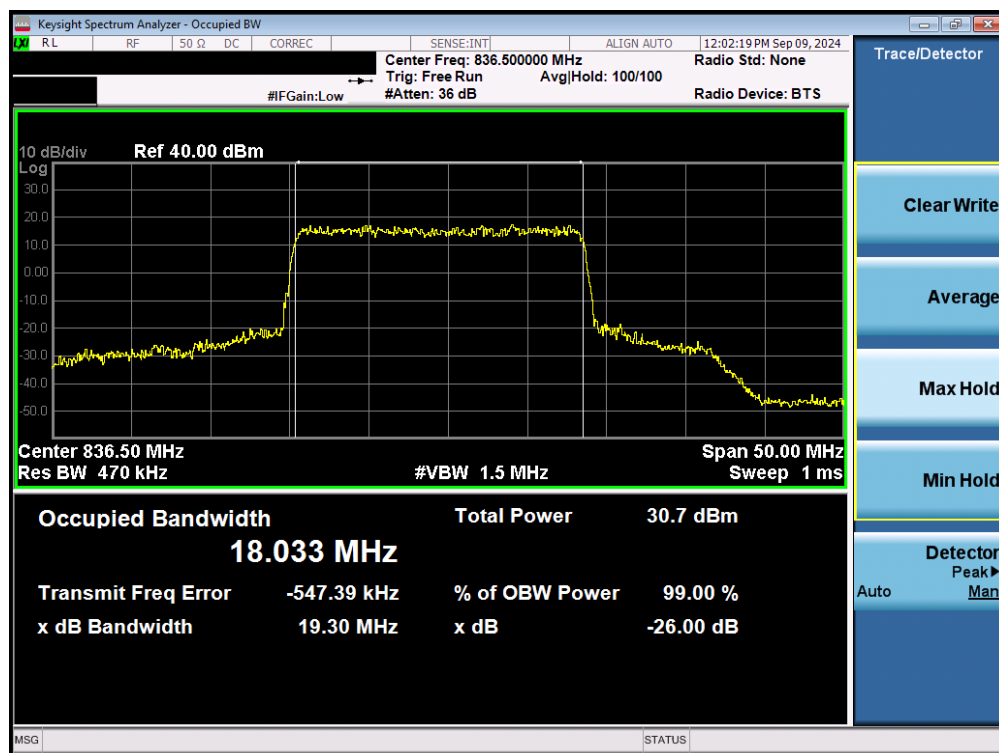
Plot 7-37. Occupied Bandwidth Plot (LTE Band 26/5 - 1.4MHz QPSK - Full RB - Ant2)



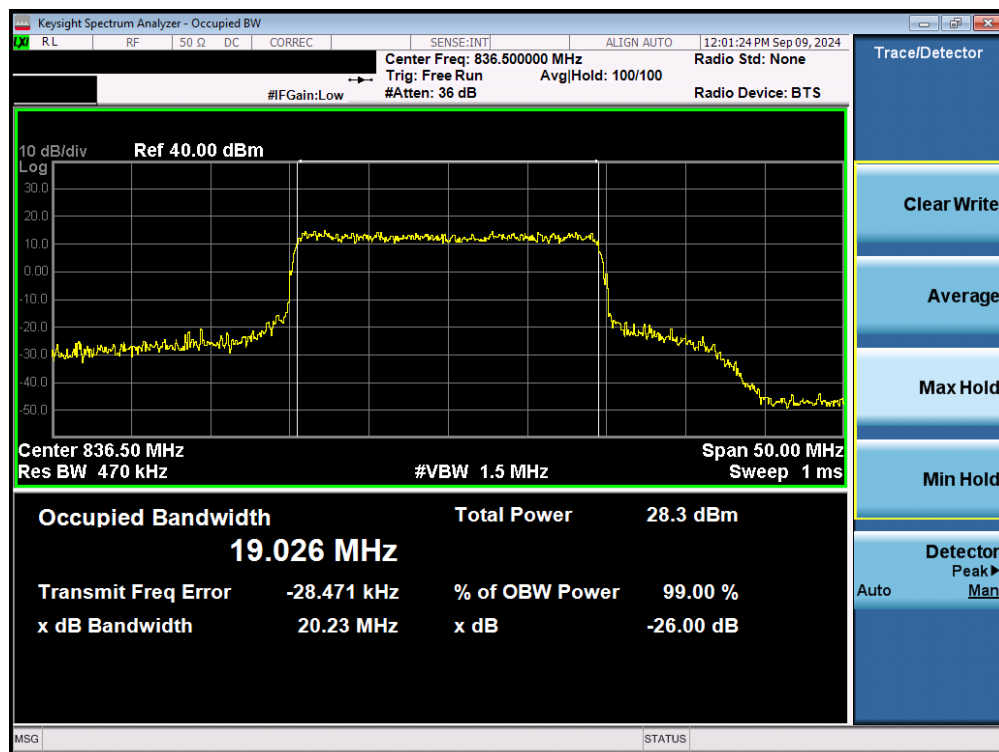
Plot 7-38. Occupied Bandwidth Plot (LTE Band 26/5 - 1.4MHz 16-QAM - Full RB - Ant2)

FCC ID: A3LSMS936U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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NR Band n26/5 – Ant2

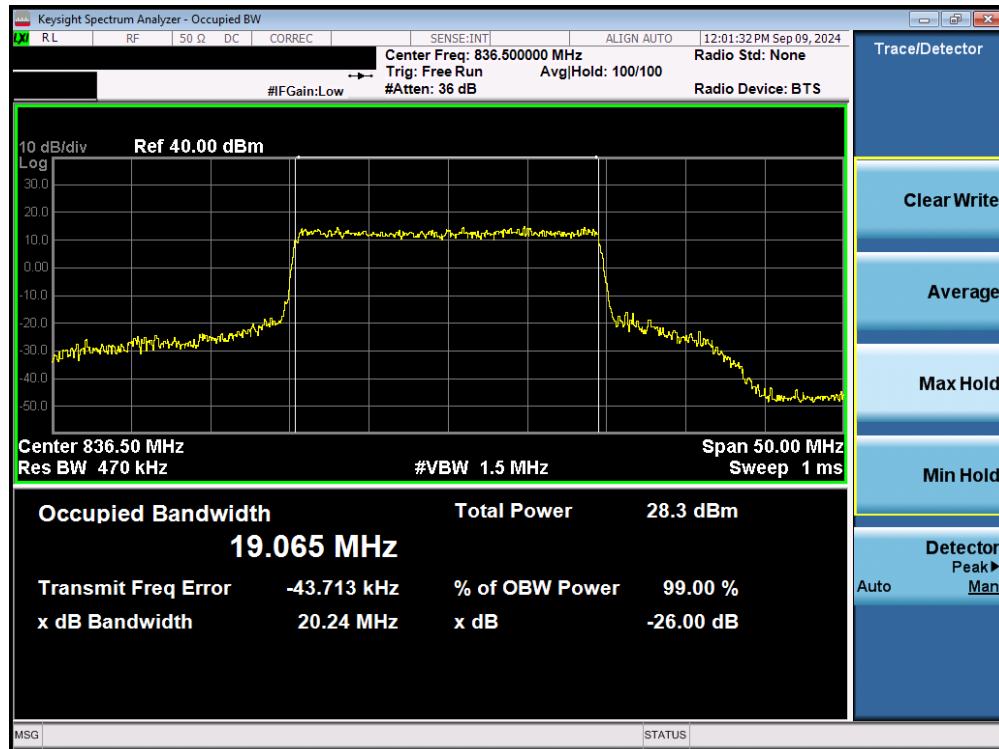


Plot 7-39. Occupied Bandwidth Plot (NR Band n26/5 - 20MHz $\pi/2$ BPSK - Full RB - Ant2)

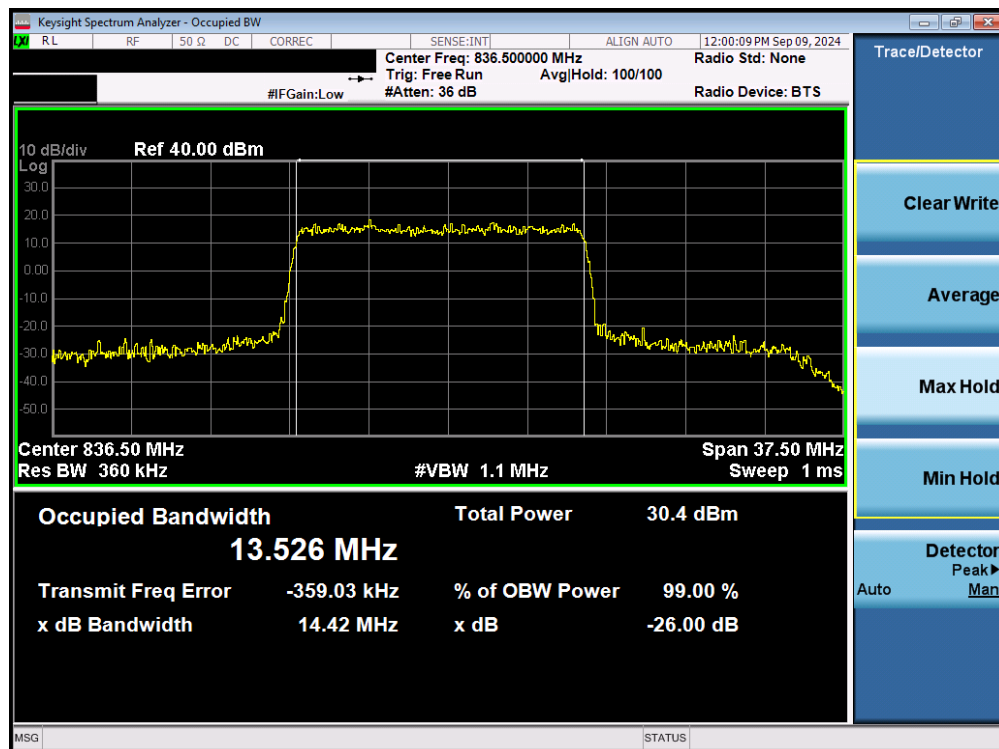


Plot 7-40. Occupied Bandwidth Plot (NR Band n26/5 - 20MHz QPSK - Full RB - Ant2)

FCC ID: A3LSMS936U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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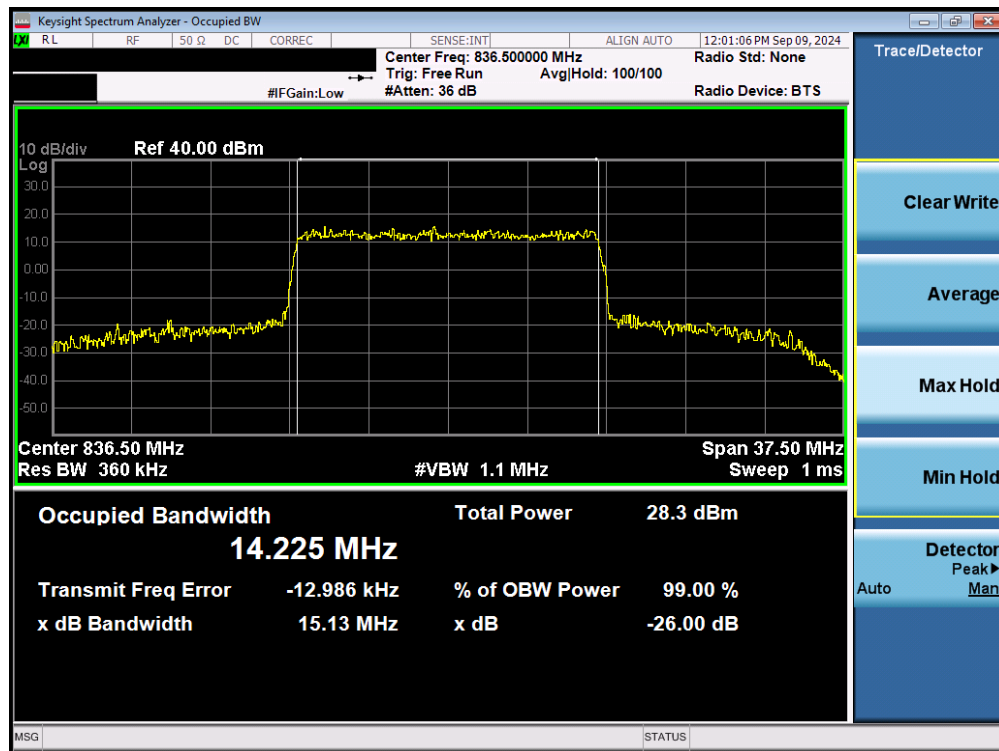


Plot 7-41. Occupied Bandwidth Plot (NR Band n26/5 - 20MHz 16-QAM - Full RB - Ant2)

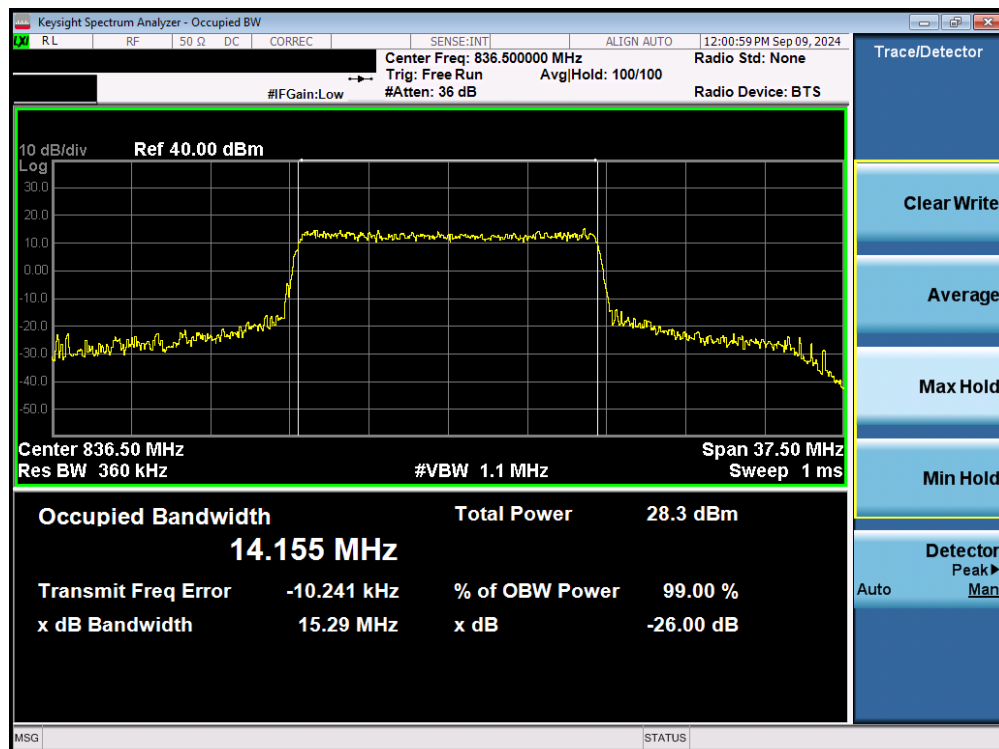


Plot 7-42. Occupied Bandwidth Plot (NR Band n26/5 - 15MHz $\pi/2$ BPSK - Full RB - Ant2)

FCC ID: A3LSMS936U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2408260064-01.A3L	Test Dates: 8/30/2024 - 10/01/2024	EUT Type: Portable Handset	Page 35 of 101

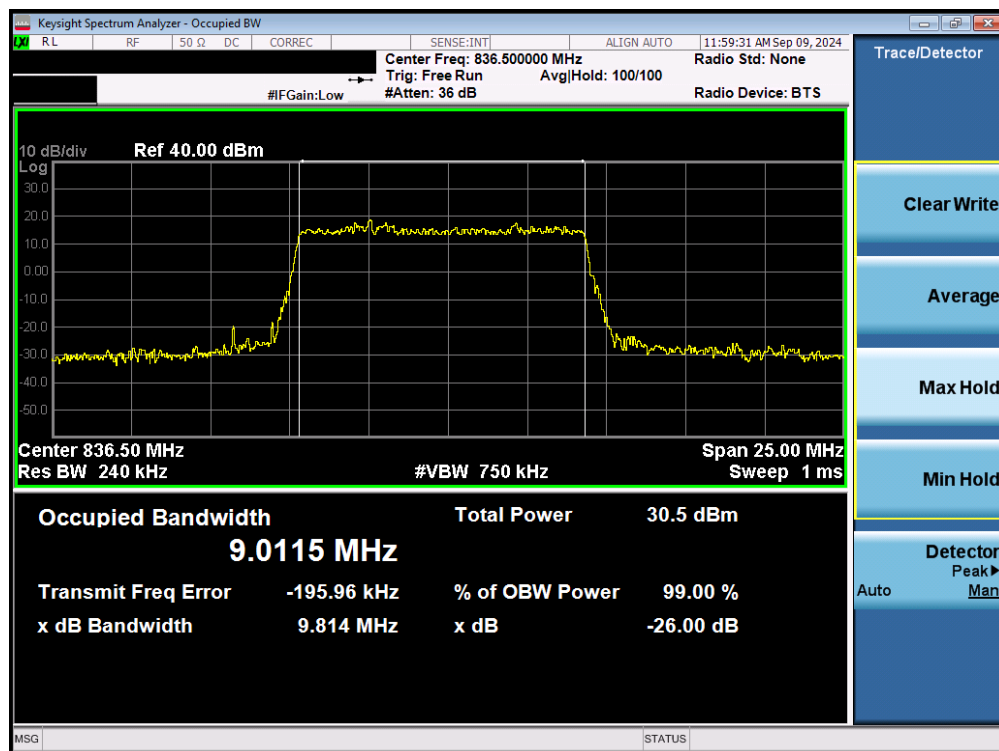


Plot 7-43. Occupied Bandwidth Plot (NR Band n26/5 - 15MHz QPSK - Full RB - Ant2)

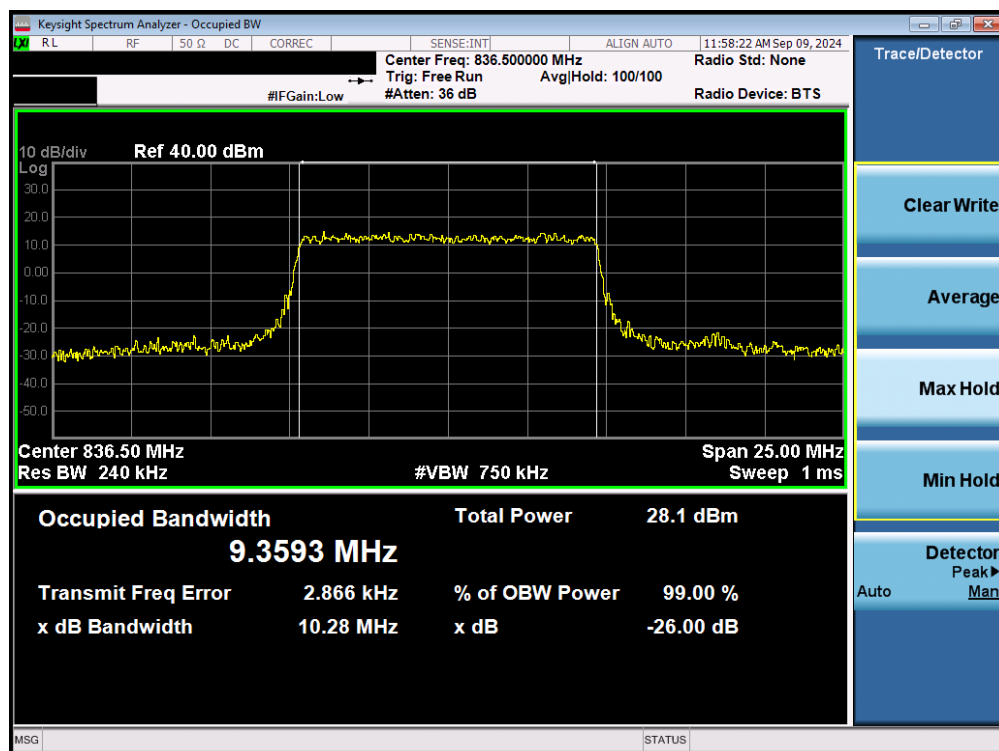


Plot 7-44. Occupied Bandwidth Plot (NR Band n26/5 - 15MHz 16-QAM - Full RB - Ant2)

FCC ID: A3LSMS936U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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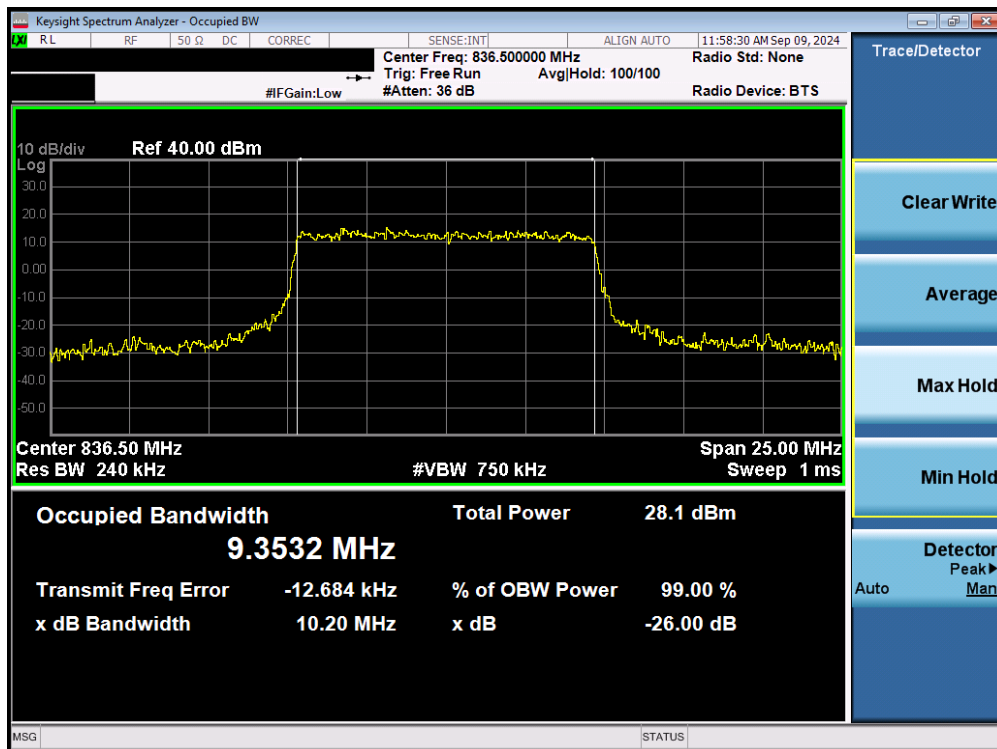


Plot 7-45. Occupied Bandwidth Plot (NR Band n26/5 - 10MHz $\pi/2$ BPSK - Full RB - Ant2)

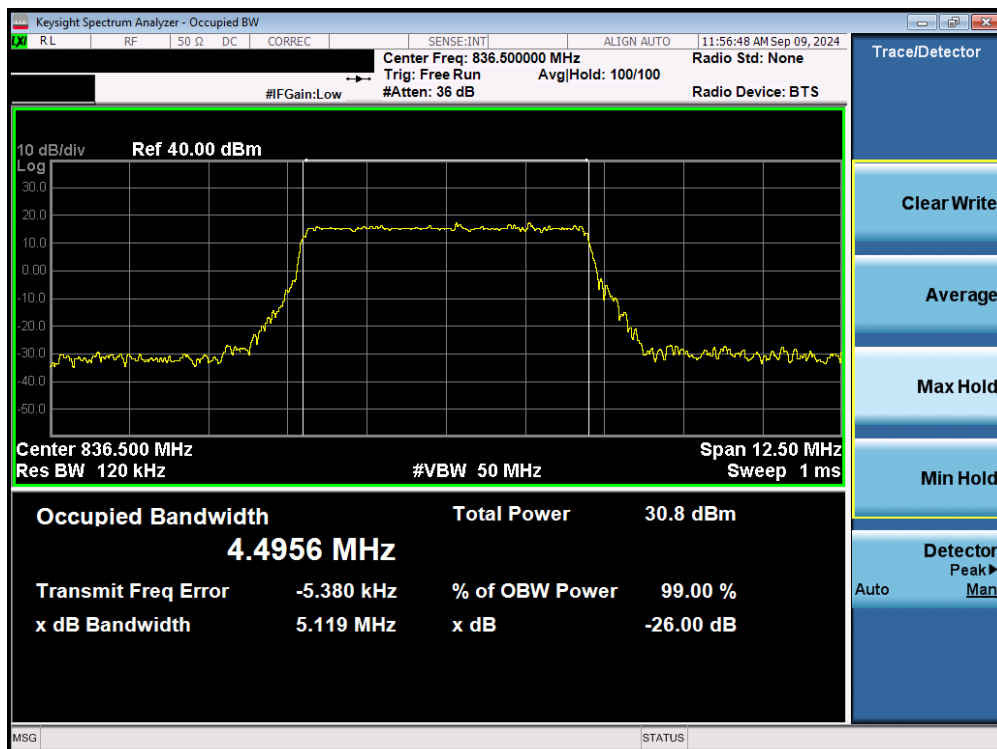


Plot 7-46. Occupied Bandwidth Plot (NR Band n26/5 - 10MHz QPSK - Full RB - Ant2)

FCC ID: A3LSMS936U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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Plot 7-47. Occupied Bandwidth Plot (NR Band n26/5 - 10MHz 16-QAM - Full RB - Ant2)

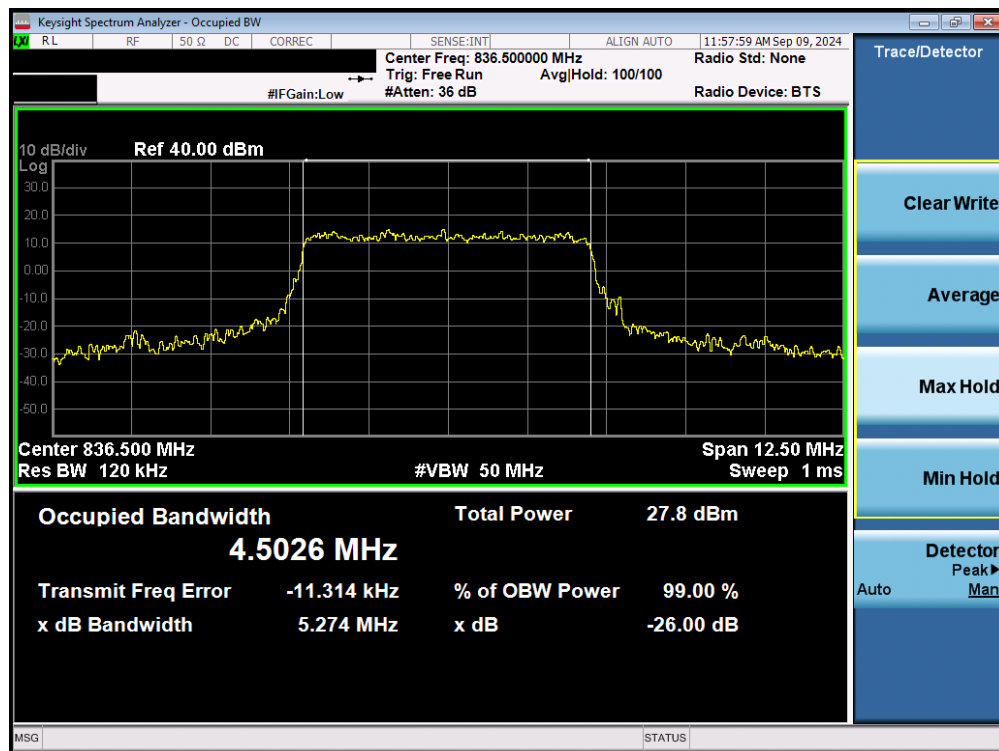


Plot 7-48. Occupied Bandwidth Plot (NR Band n26/5 - 5MHz $\pi/2$ BPSK - Full RB - Ant2)

FCC ID: A3LSMS936U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2408260064-01.A3L	Test Dates: 8/30/2024 - 10/01/2024	EUT Type: Portable Handset	Page 38 of 101



Plot 7-49. Occupied Bandwidth Plot (NR Band n26/5 - 5MHz QPSK - Full RB - Ant2)



Plot 7-50. Occupied Bandwidth Plot (NR Band n26/5 - 5MHz 16-QAM - Full RB - ABnt2)

FCC ID: A3LSMS936U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2408260064-01.A3L	Test Dates: 8/30/2024 - 10/01/2024	EUT Type: Portable Handset	Page 39 of 101

7.3 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 10GHz (separated into at least two plots per channel)
2. Detector = RMS
3. Trace mode = trace average for continuous emissions, max hold for pulse emissions
4. Sweep time = auto couple
5. The trace was allowed to stabilize
6. Please see test notes below for RBW and VBW settings

Test Setup

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

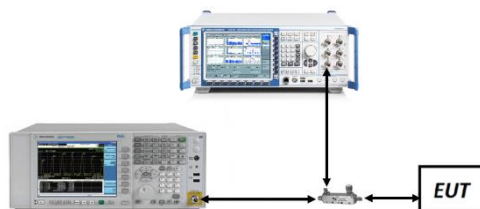


Figure 7-2. Test Instrument & Measurement Setup

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.

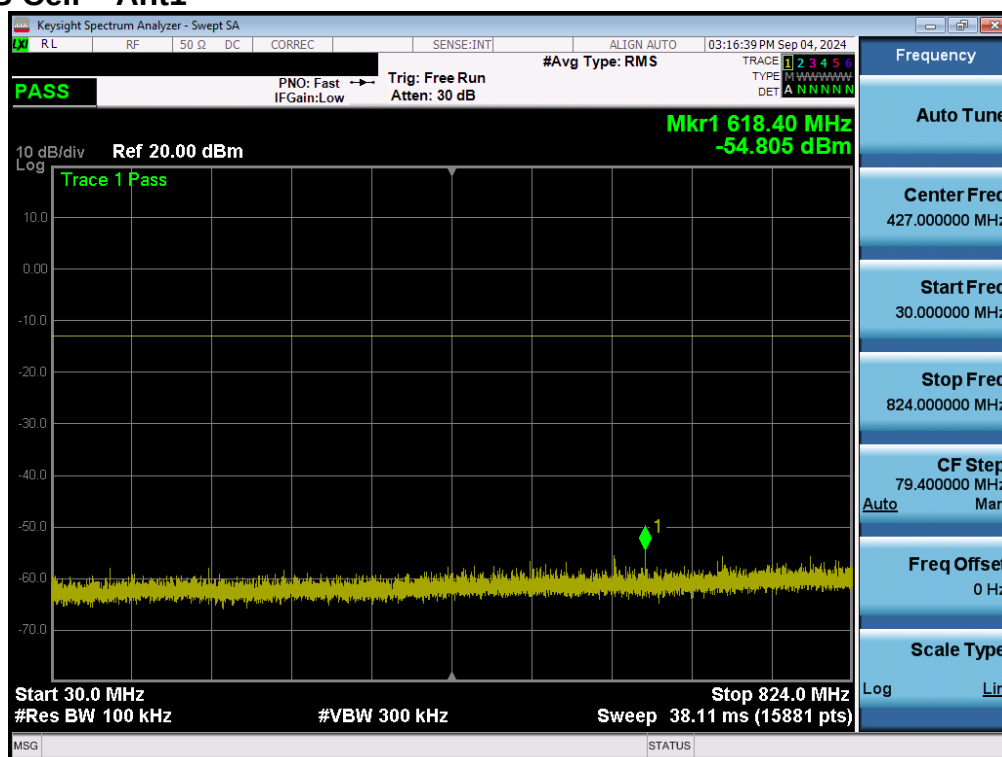
FCC ID: A3LSMS936U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2408260064-01.A3L	Test Dates: 8/30/2024 - 10/01/2024	EUT Type: Portable Handset	Page 40 of 101

Mode	Bandwidth	Channel	Range [MHz]	Level [dBm]	Limit [dBm]	Margin [dB]
GSM-Cell	250kHz	Low	30.0 - 823.0	-37.48	-13.0	-24.48
		Low	849.0 - 1000.0	-57.12	-13.0	-44.12
		Low	1000.0 - 10000.0	-32.79	-13.0	-19.79
		Mid	30.0 - 824.0	-50.77	-13.0	-37.77
		Mid	849.0 - 1000.0	-49.96	-13.0	-36.96
		Mid	1000.0 - 10000.0	-32.38	-13.0	-19.38
		High	30.0 - 824.0	-54.81	-13.0	-41.81
		High	850.0 - 1000.0	-33.27	-13.0	-20.27
		High	1000.0 - 10000.0	-31.51	-13.0	-18.51
WCDMA-Cell	5MHz	Low	30.0 - 823.0	-34.49	-13.0	-21.49
		Low	849.0 - 1000.0	-65.70	-13.0	-52.70
		Low	1000.0 - 10000.0	-47.65	-13.0	-34.65
		Mid	30.0 - 824.0	-54.78	-13.0	-41.78
		Mid	849.0 - 1000.0	-56.39	-13.0	-43.39
		Mid	1000.0 - 10000.0	-47.61	-13.0	-34.61
		High	30.0 - 824.0	-64.77	-13.0	-51.77
		High	850.0 - 1000.0	-29.63	-13.0	-16.63
		High	1000.0 - 10000.0	-47.38	-13.0	-34.38
LTE-B26-5	10MHz	Low	30.0 - 823.0	-61.34	-13.0	-48.34
		Low	849.0 - 1000.0	-65.45	-13.0	-52.45
		Low	1000.0 - 10000.0	-47.26	-13.0	-34.26
		Mid	30.0 - 824.0	-64.32	-13.0	-51.32
		Mid	849.0 - 1000.0	-65.12	-13.0	-52.12
		Mid	1000.0 - 10000.0	-46.56	-13.0	-33.56
		High	30.0 - 824.0	-64.46	-13.0	-51.46
		High	850.0 - 1000.0	-61.64	-13.0	-48.64
		High	1000.0 - 10000.0	-46.75	-13.0	-33.74
NR-n26-5	20MHz	Low	30.0 - 824.0	-60.16	-13.0	-47.16
		Low	849.0 - 1000.0	-63.91	-13.0	-50.91
		Low	1000.0 - 10000.0	-47.47	-13.0	-34.47
		Mid	30.0 - 824.0	-61.89	-13.0	-48.89
		Mid	849.0 - 1000.0	-63.15	-13.0	-50.15
		Mid	1000.0 - 10000.0	-46.98	-13.0	-33.98
		High	30.0 - 824.0	-63.15	-13.0	-50.15
		High	849.0 - 1000.0	-62.36	-13.0	-49.36
		High	1000.0 - 10000.0	-47.52	-13.0	-34.52

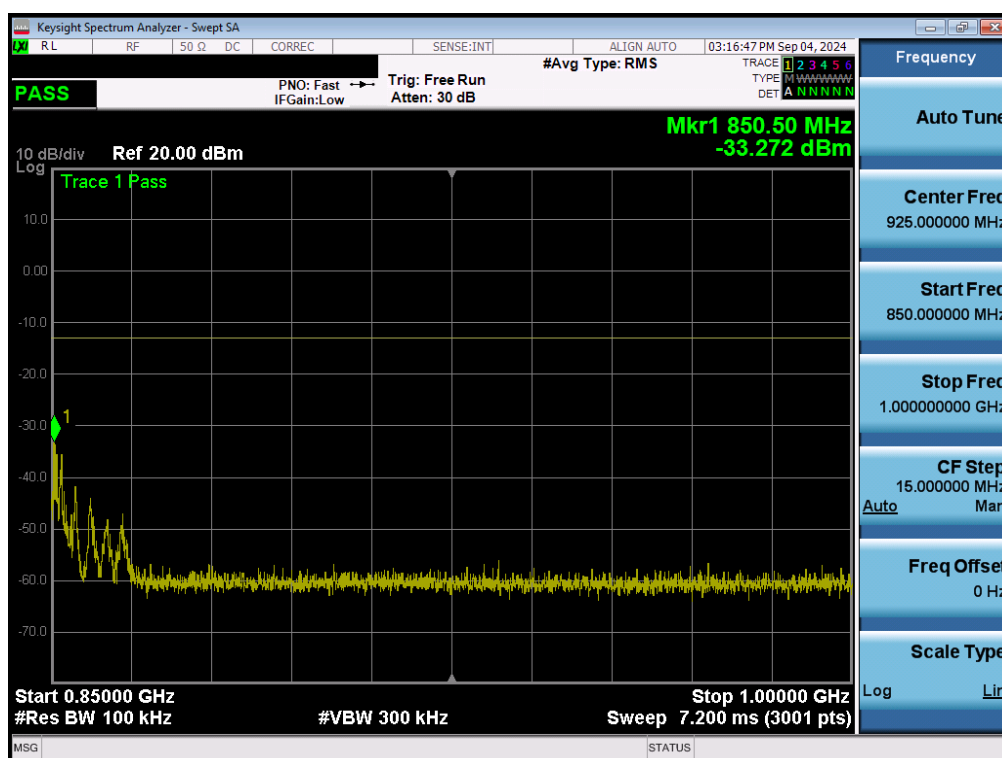
Table 7-4. Conducted Spurious Emissions Results – Ant1

FCC ID: A3LSMS936U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2408260064-01.A3L	Test Dates: 8/30/2024 - 10/01/2024	EUT Type: Portable Handset	Page 41 of 101

GSM/GPRS Cell – Ant1

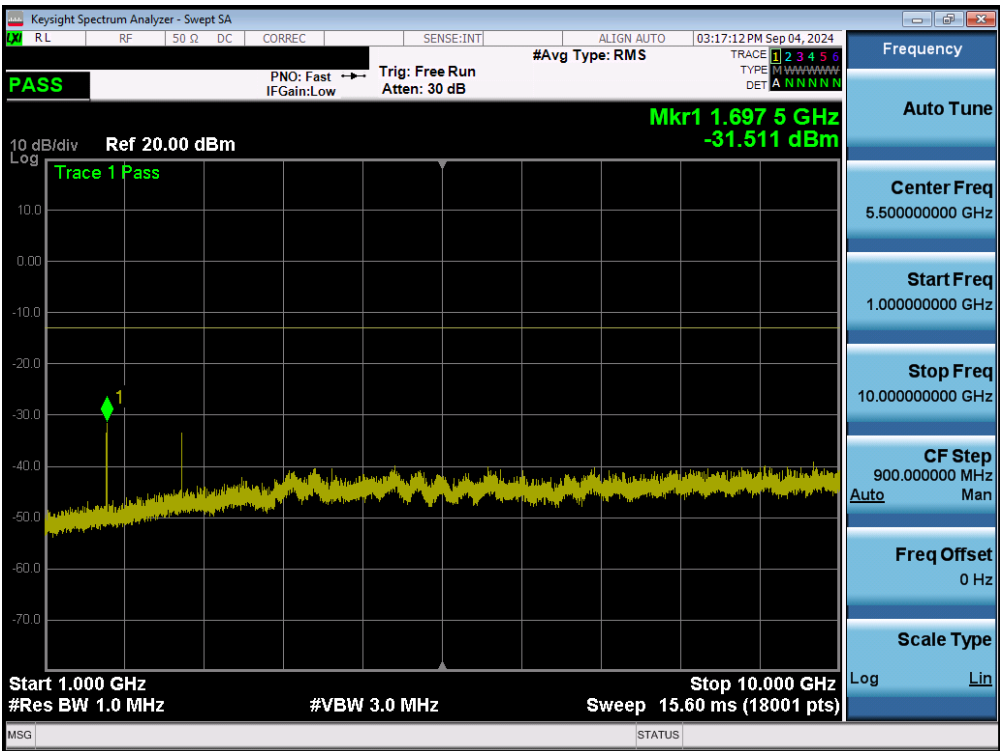


Plot 7-51. Conducted Spurious Plot (GPRS Ch. 251 – Ant1)



Plot 7-52. Conducted Spurious Plot (GPRS Ch. 251 – Ant1)

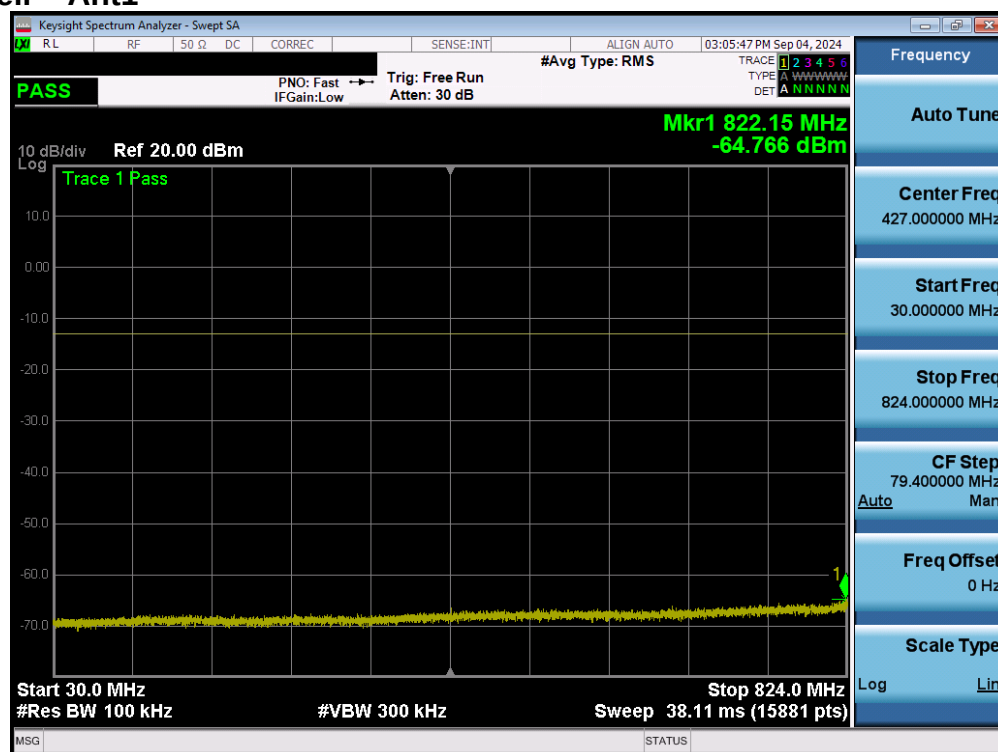
FCC ID: A3LSMS936U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2408260064-01.A3L	Test Dates: 8/30/2024 - 10/01/2024	EUT Type: Portable Handset	Page 42 of 101



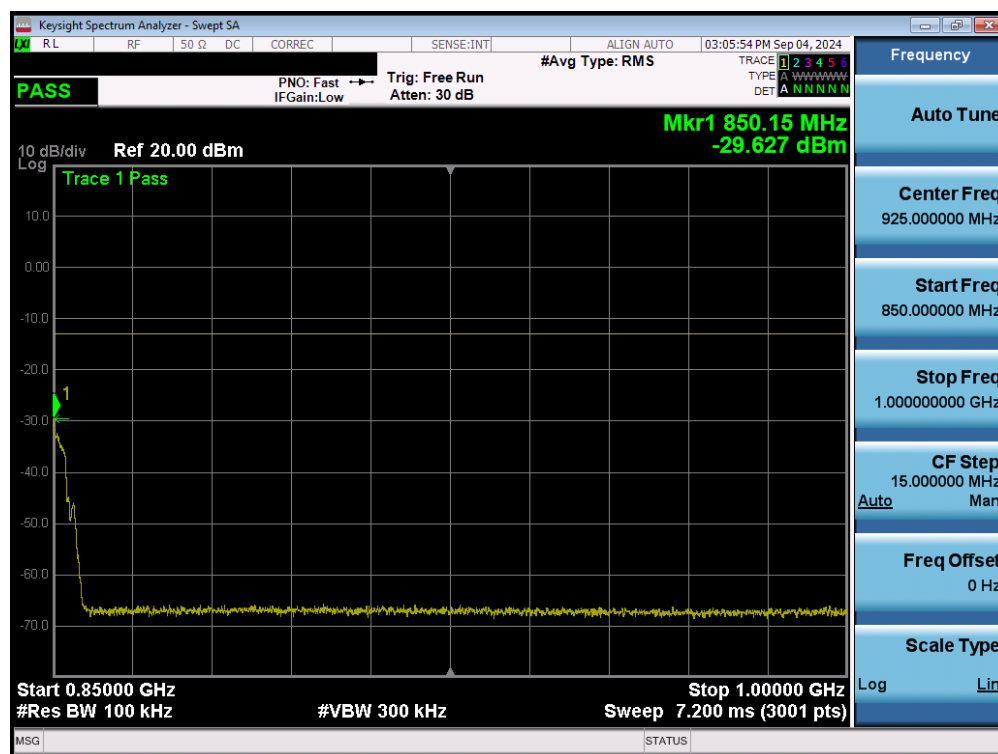
Plot 7-53. Conducted Spurious Plot (GPRS Ch. 251 – Ant1)

FCC ID: A3LSMS936U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2408260064-01.A3L	Test Dates: 8/30/2024 - 10/01/2024	EUT Type: Portable Handset	Page 43 of 101

WCDMA Cell – Ant1

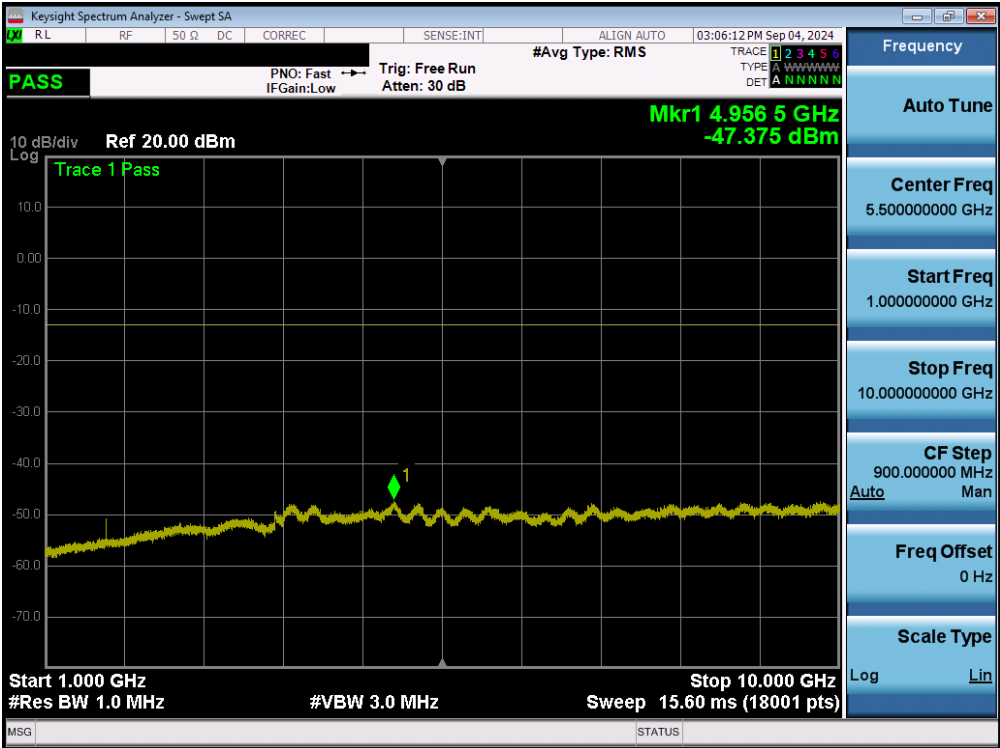


Plot 7-54. Conducted Spurious Plot (WCDMA Ch. 4233 – Ant1)



Plot 7-55. Conducted Spurious Plot (WCDMA Ch. 4233 – Ant1)

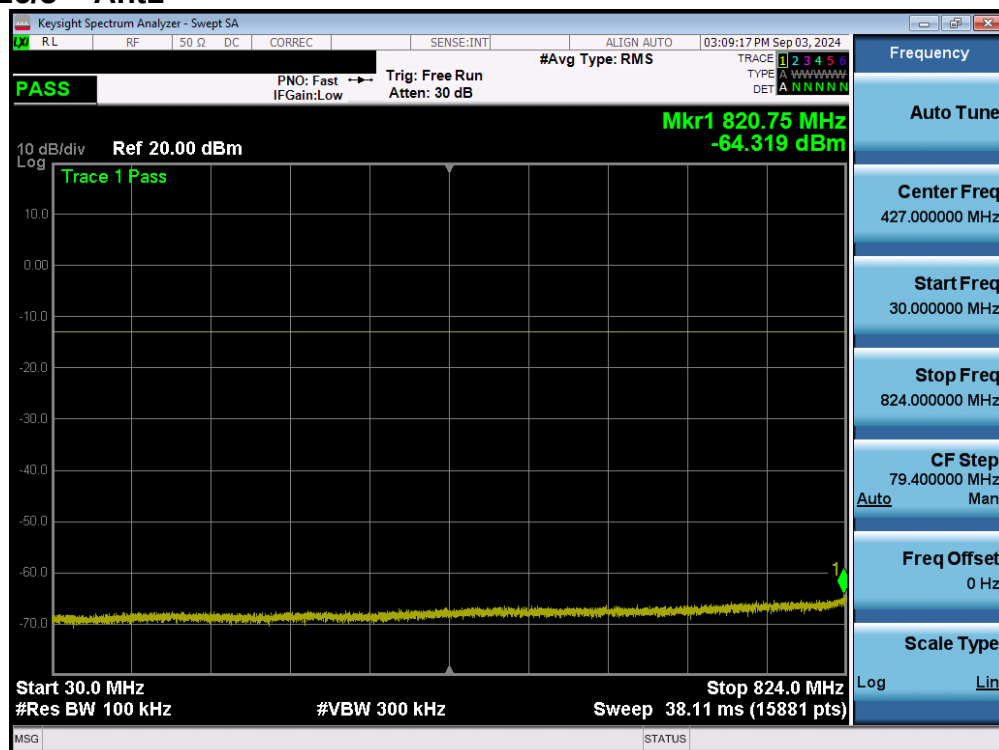
FCC ID: A3LSMS936U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2408260064-01.A3L	Test Dates: 8/30/2024 - 10/01/2024	EUT Type: Portable Handset	Page 44 of 101



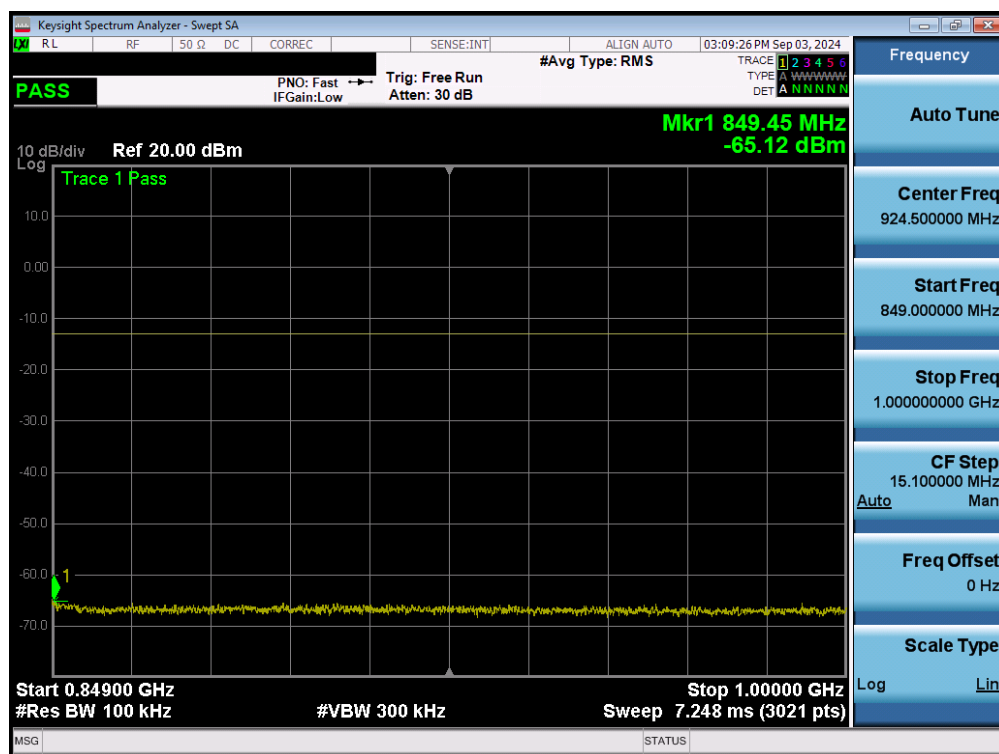
Plot 7-56. Conducted Spurious Plot (WCDMA Ch. 4233 – Ant1)

FCC ID: A3LSMS936U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2408260064-01.A3L	Test Dates: 8/30/2024 - 10/01/2024	EUT Type: Portable Handset	Page 45 of 101

LTE Band 26/5 – Ant1



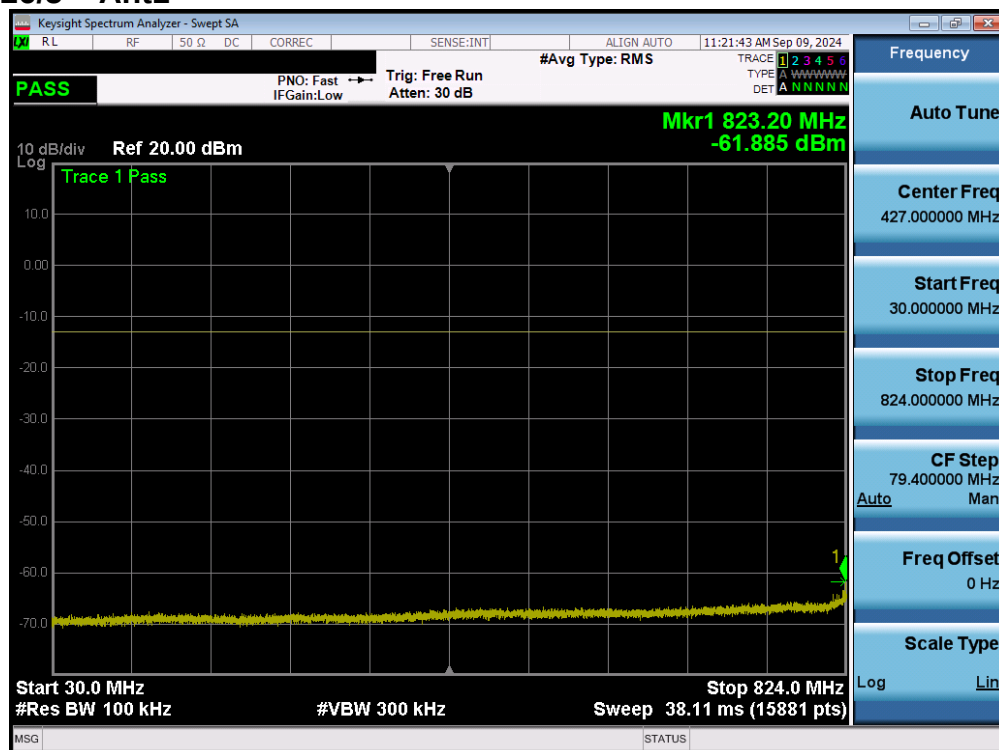
Plot 7-57. Conducted Spurious Plot (LTE Band 26/5 - 10MHz QPSK - 1 RB - Mid Channel – Ant1)



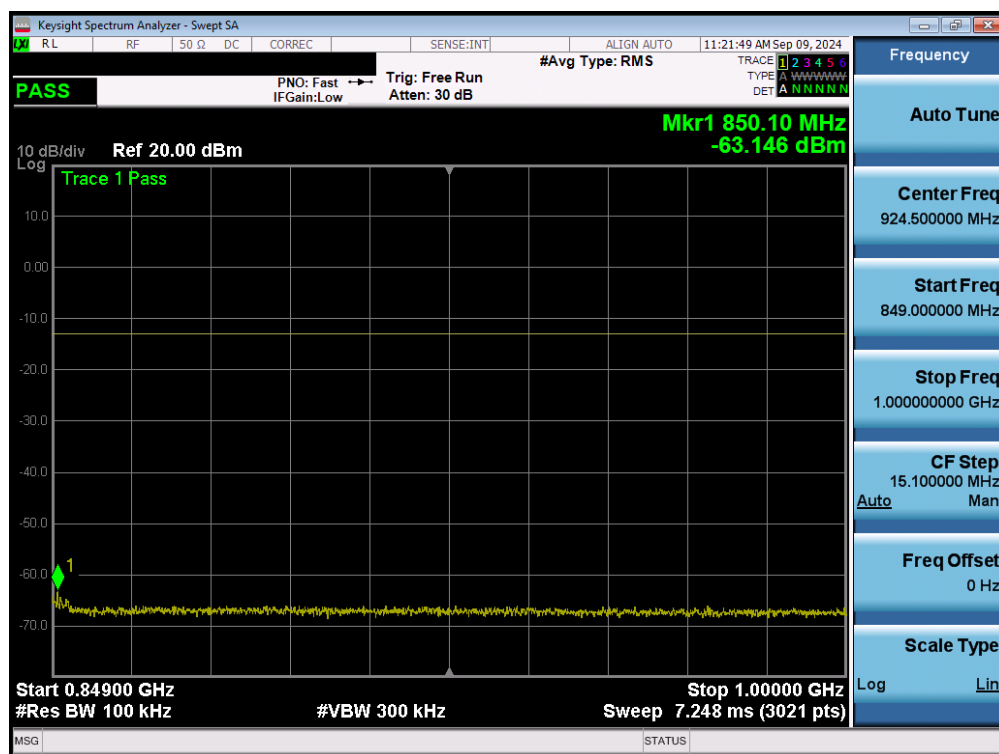
Plot 7-58. Conducted Spurious Plot (LTE Band 26/5 - 10MHz QPSK - 1 RB - Mid Channel – Ant1)

FCC ID: A3LSMS936U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2408260064-01.A3L	Test Dates: 8/30/2024 - 10/01/2024	EUT Type: Portable Handset	Page 46 of 101

NR Band n26/5 – Ant1

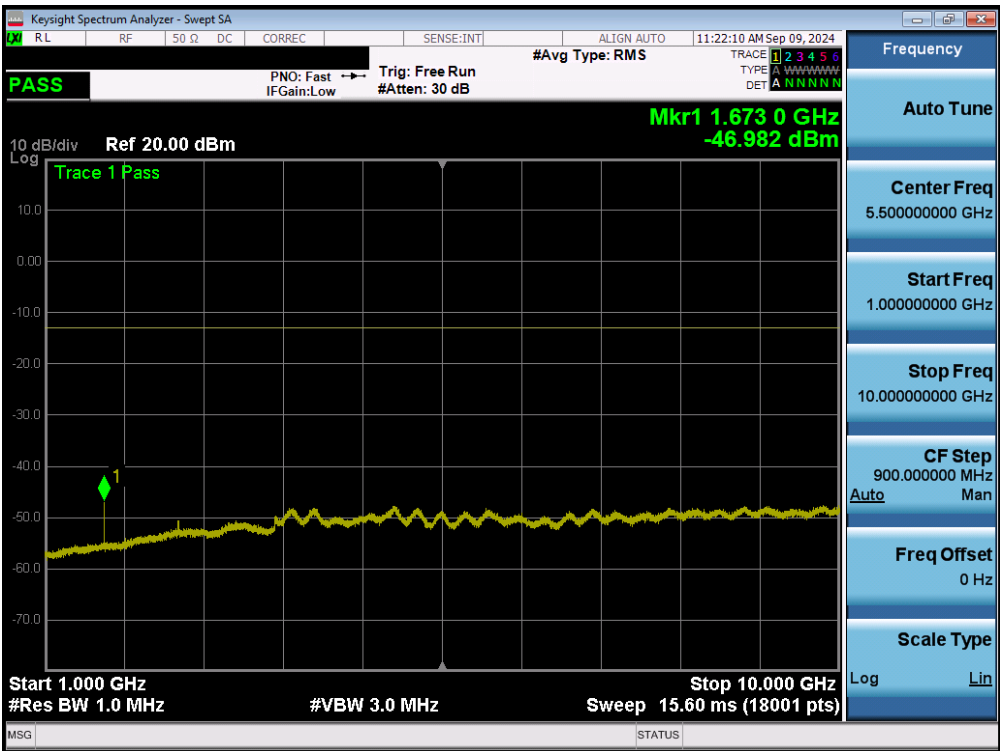


Plot 7-60. Conducted Spurious Plot (NR Band n26/5 - 20.0MHz - 1 RB - Mid Channel - Ant1)



Plot 7-61. Conducted Spurious Plot (NR Band n26/5 - 20.0MHz - 1 RB - Mid Channel - Ant1)

FCC ID: A3LSMS936U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2408260064-01.A3L	Test Dates: 8/30/2024 - 10/01/2024	EUT Type: Portable Handset	Page 48 of 101



Plot 7-62. Conducted Spurious Plot (NR Band n26/5 - 20.0MHz - 1 RB - Mid Channel - Ant1)

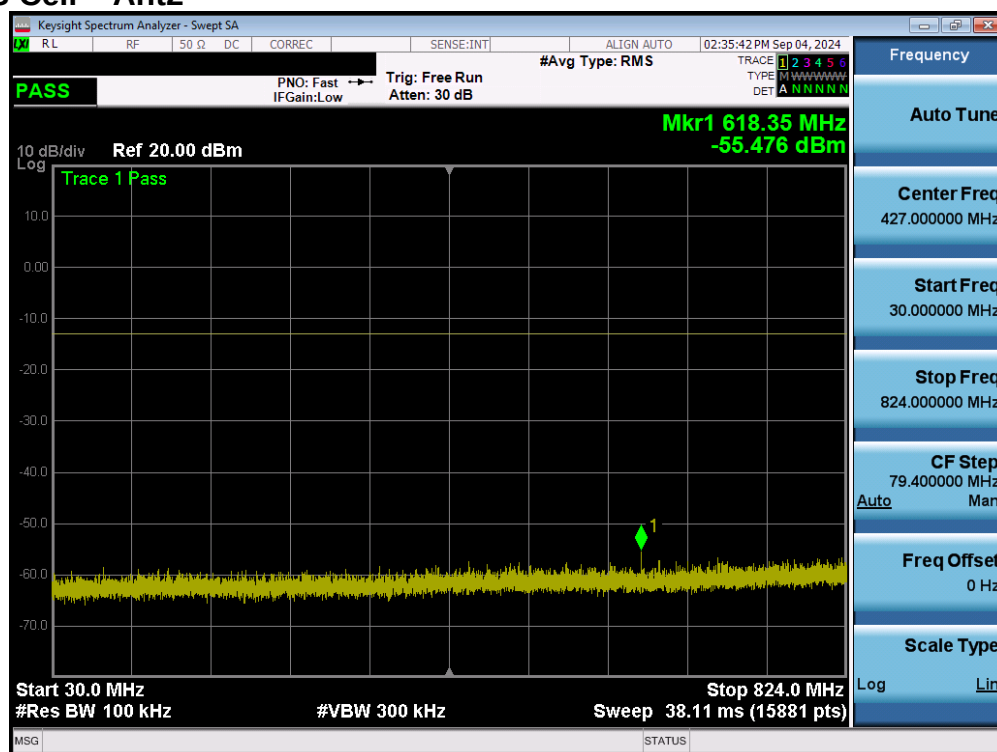
FCC ID: A3LSMS936U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2408260064-01.A3L	Test Dates: 8/30/2024 - 10/01/2024	EUT Type: Portable Handset	Page 49 of 101

Mode	Bandwidth	Channel	Range [MHz]	Level [dBm]	Limit [dBm]	Margin [dB]
GSM-Cell	250kHz	Low	30.0 - 823.0	-36.28	-13.0	-23.28
		Low	849.0 - 1000.0	-56.51	-13.0	-43.51
		Low	1000.0 - 10000.0	-33.59	-13.0	-20.59
		Mid	30.0 - 824.0	-50.76	-13.0	-37.76
		Mid	849.0 - 1000.0	-50.36	-13.0	-37.36
		Mid	1000.0 - 10000.0	-33.70	-13.0	-20.70
		High	30.0 - 824.0	-55.48	-13.0	-42.48
		High	850.0 - 1000.0	-33.18	-13.0	-20.18
		High	1000.0 - 10000.0	-32.27	-13.0	-19.27
WCDMA-Cell	5MHz	Low	30.0 - 823.0	-34.77	-13.0	-21.76
		Low	849.0 - 1000.0	-65.79	-13.0	-52.79
		Low	1000.0 - 10000.0	-47.23	-13.0	-34.23
		Mid	30.0 - 824.0	-55.52	-13.0	-42.51
		Mid	849.0 - 1000.0	-56.70	-13.0	-43.70
		Mid	1000.0 - 10000.0	-47.26	-13.0	-34.26
		High	30.0 - 824.0	-64.77	-13.0	-51.77
		High	850.0 - 1000.0	-30.80	-13.0	-17.80
		High	1000.0 - 10000.0	-47.48	-13.0	-34.48
LTE-B26-5	10MHz	Low	30.0 - 823.0	-62.78	-13.0	-49.78
		Low	849.0 - 1000.0	-65.85	-13.0	-52.85
		Low	1000.0 - 10000.0	-47.32	-13.0	-34.32
		Mid	30.0 - 824.0	-65.70	-13.0	-52.70
		Mid	849.0 - 1000.0	-65.10	-13.0	-52.10
		Mid	1000.0 - 10000.0	-47.08	-13.0	-34.08
		High	30.0 - 824.0	-65.10	-13.0	-52.10
		High	850.0 - 1000.0	-63.00	-13.0	-50.00
		High	1000.0 - 10000.0	-47.30	-13.0	-34.30
NR-n26-5	20MHz	Low	30.0 - 824.0	-60.49	-13.0	-47.49
		Low	849.0 - 1000.0	-63.66	-13.0	-50.66
		Low	1000.0 - 10000.0	-47.27	-13.0	-34.27
		Mid	30.0 - 824.0	-61.32	-13.0	-48.32
		Mid	849.0 - 1000.0	-62.72	-13.0	-49.71
		Mid	1000.0 - 10000.0	-47.34	-13.0	-34.34
		High	30.0 - 824.0	-63.48	-13.0	-50.48
		High	849.0 - 1000.0	-62.96	-13.0	-49.96
		High	1000.0 - 10000.0	-47.34	-13.0	-34.34

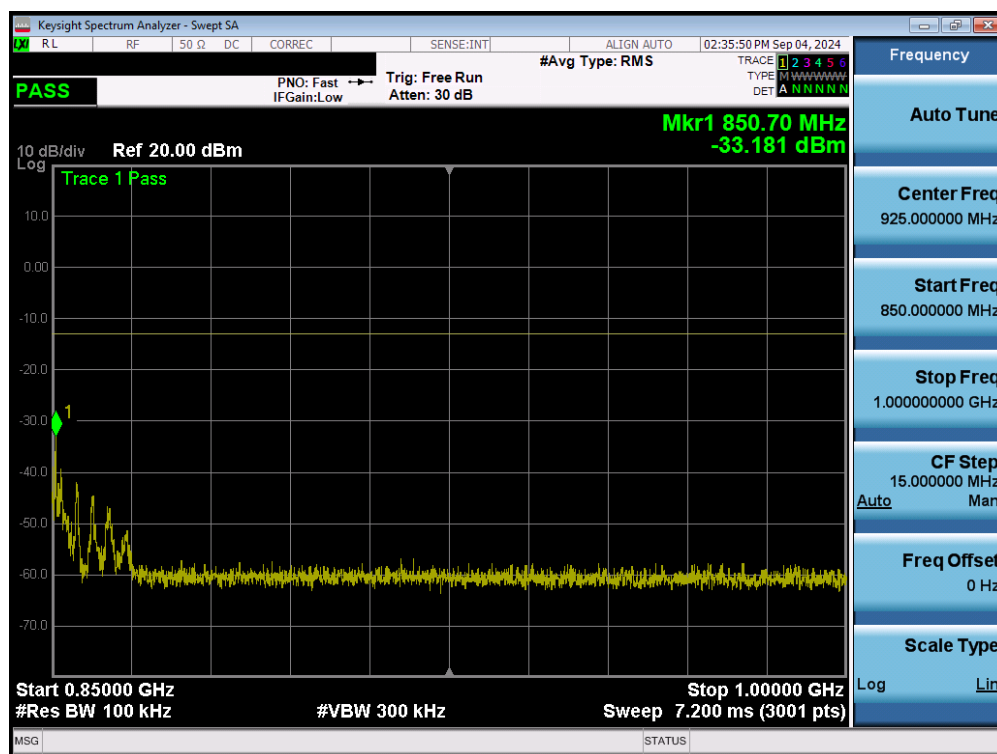
Table 7-5. Conducted Spurious Emissions Results – Ant2

FCC ID: A3LSMS936U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2408260064-01.A3L	Test Dates: 8/30/2024 - 10/01/2024	EUT Type: Portable Handset	Page 50 of 101

GSM/GPRS Cell – Ant2

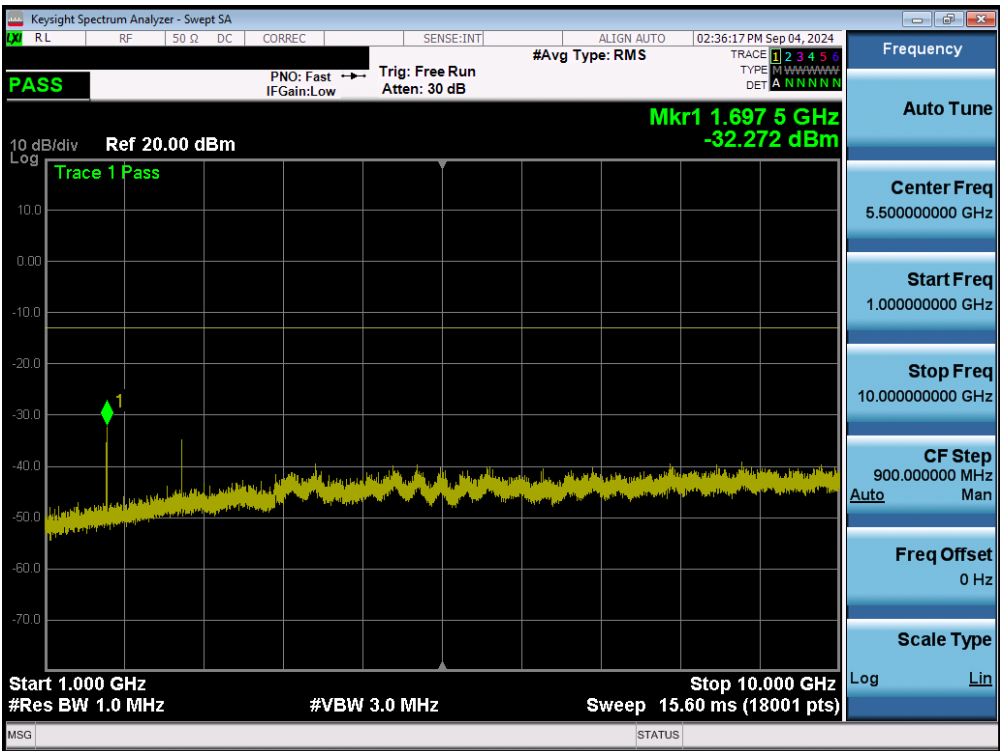


Plot 7-63. Conducted Spurious Plot (GPRS Ch. 251 – Ant2)



Plot 7-64. Conducted Spurious Plot (GPRS Ch. 251 – Ant2)

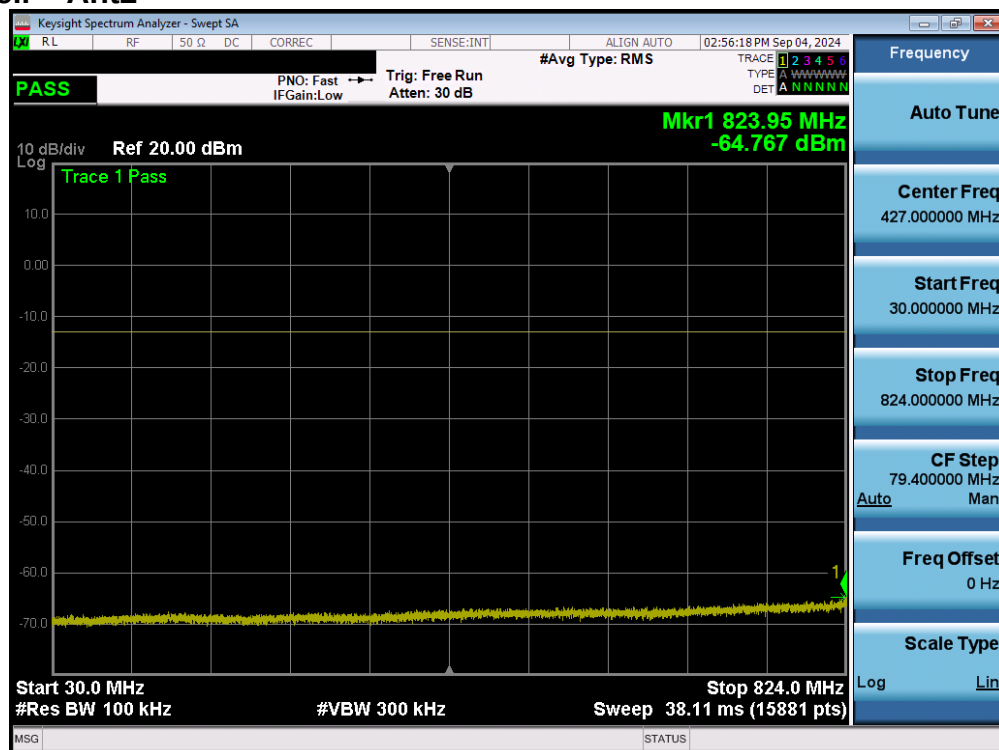
FCC ID: A3LSMS936U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2408260064-01.A3L	Test Dates: 8/30/2024 - 10/01/2024	EUT Type: Portable Handset	Page 51 of 101



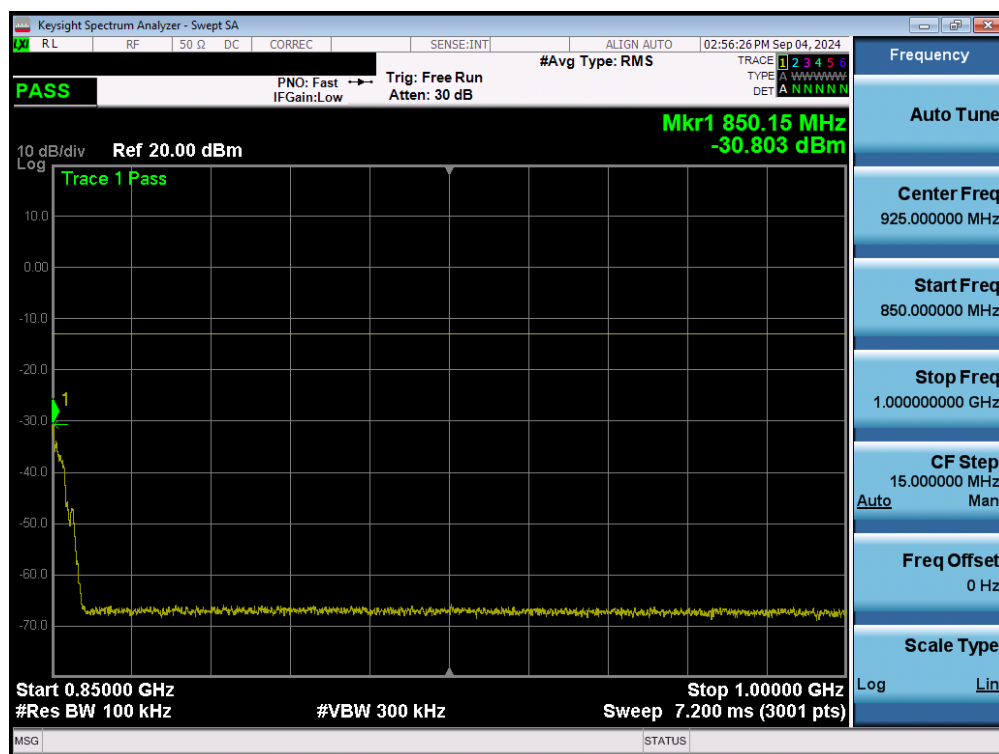
Plot 7-65. Conducted Spurious Plot (GPRS Ch. 251 – Ant2)

FCC ID: A3LSMS936U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2408260064-01.A3L	Test Dates: 8/30/2024 - 10/01/2024	EUT Type: Portable Handset	Page 52 of 101

WCDMA Cell – Ant2

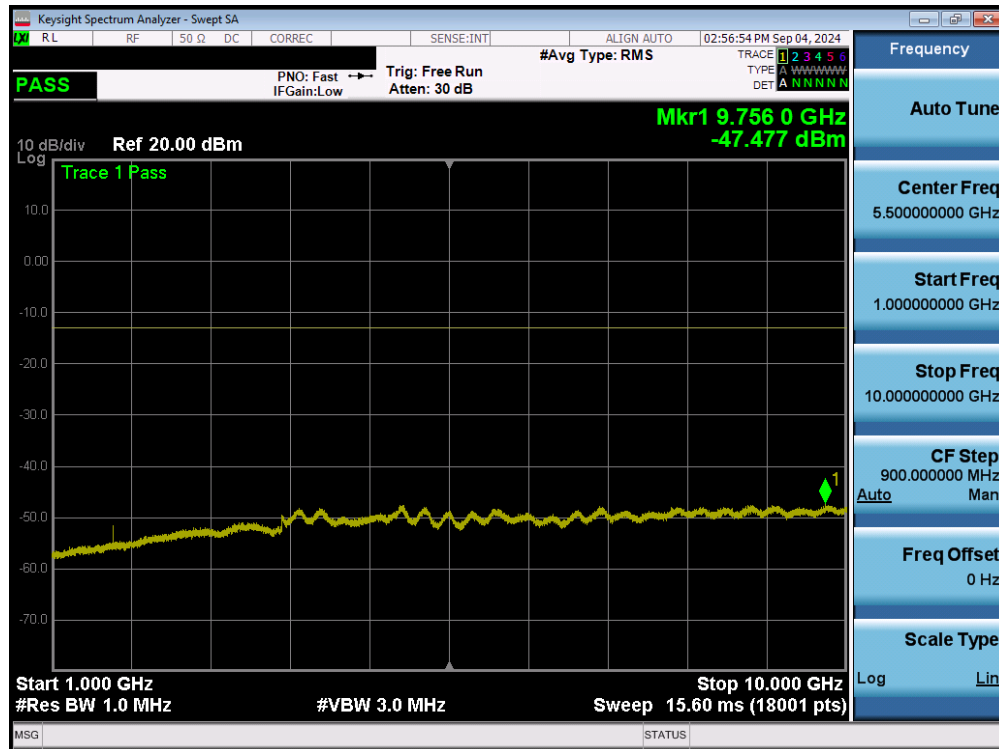


Plot 7-66. Conducted Spurious Plot (WCDMA Ch. 4233 – Ant2)



Plot 7-67. Conducted Spurious Plot (WCDMA Ch. 4233 – Ant2)

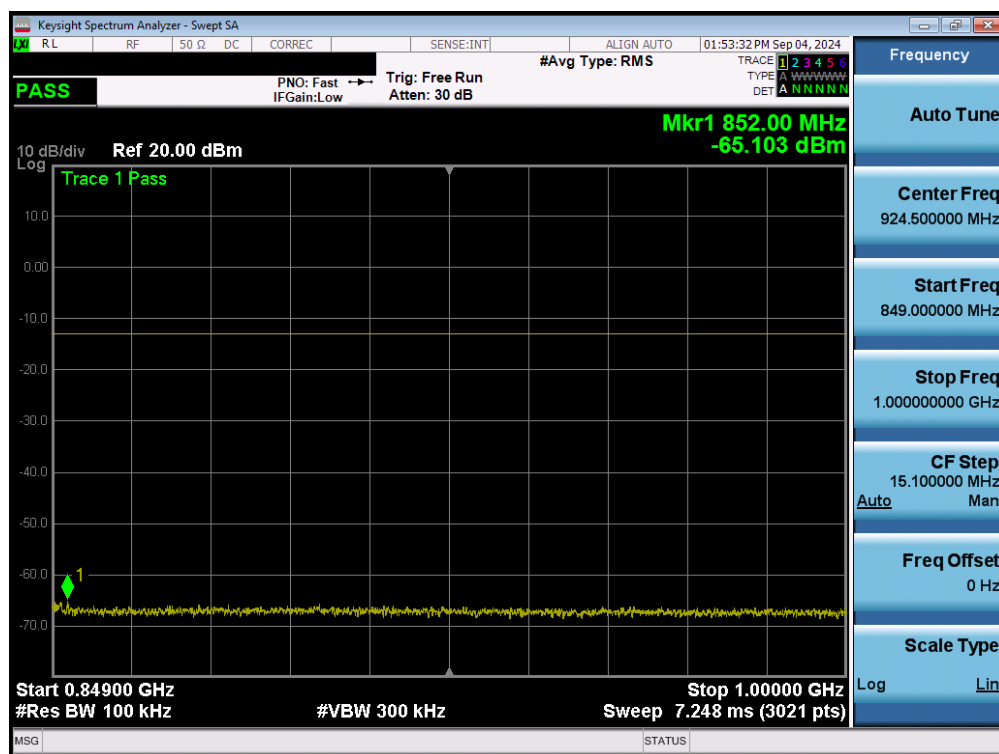
FCC ID: A3LSMS936U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2408260064-01.A3L	Test Dates: 8/30/2024 - 10/01/2024	EUT Type: Portable Handset	Page 53 of 101



LTE Band 26/5 – Ant2



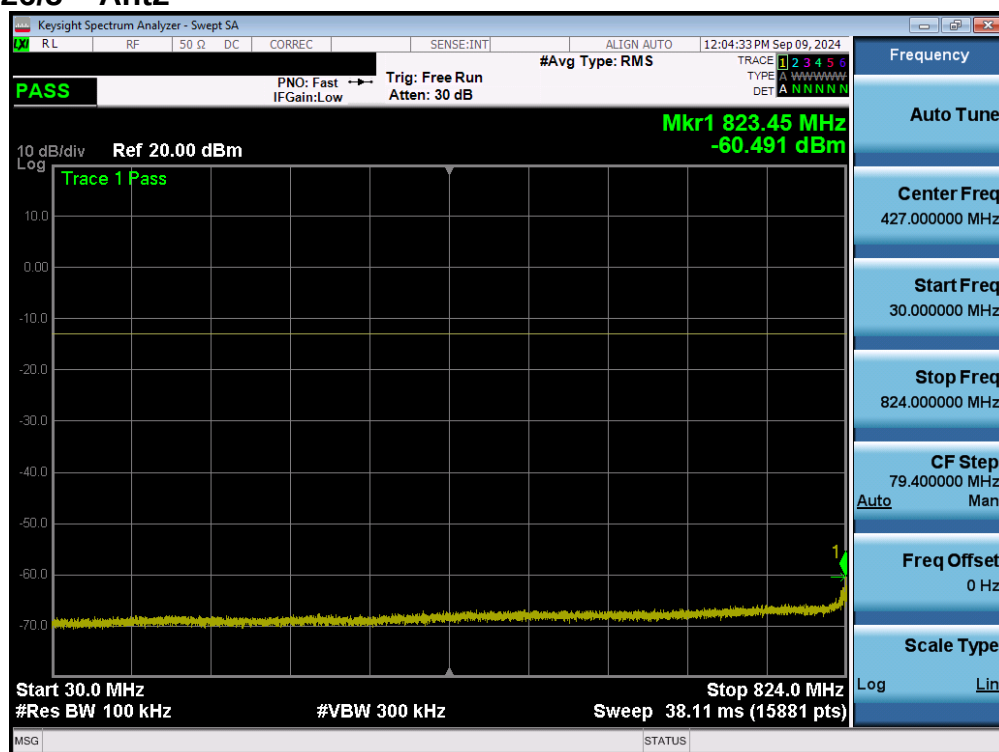
Plot 7-69. Conducted Spurious Plot (LTE Band 26/5 - 10MHz QPSK - 1 RB - Mid Channel – Ant2)



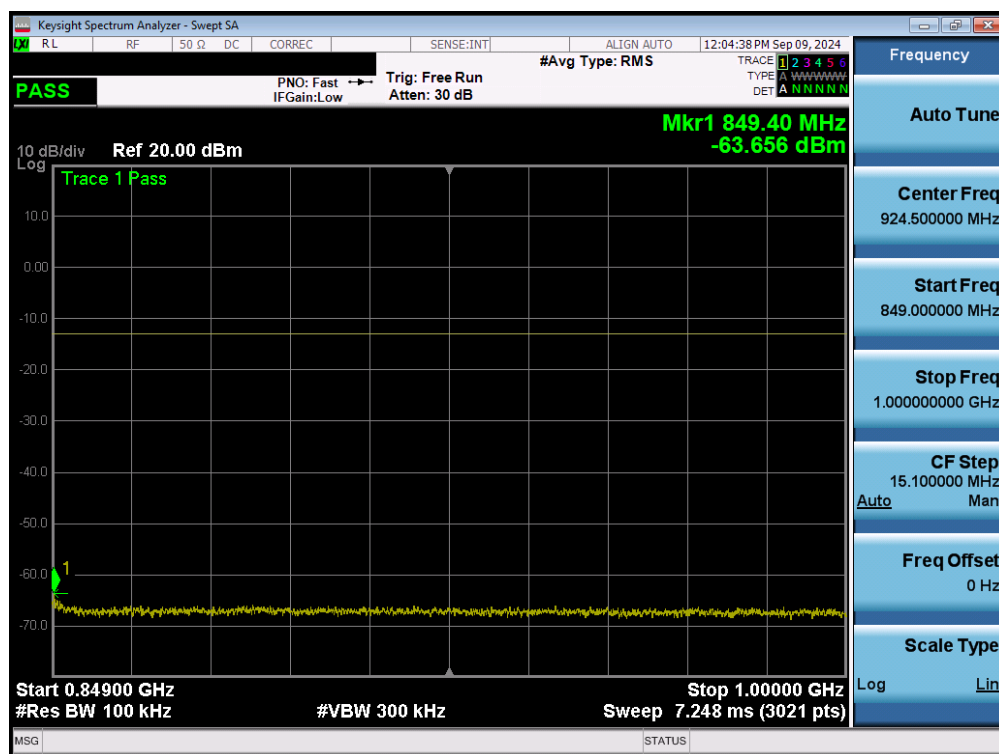
Plot 7-70. Conducted Spurious Plot (LTE Band 26/5 - 10MHz QPSK - 1 RB - Mid Channel – Ant2)

FCC ID: A3LSMS936U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2408260064-01.A3L	Test Dates: 8/30/2024 - 10/01/2024	EUT Type: Portable Handset	Page 55 of 101

NR Band n26/5 – Ant2

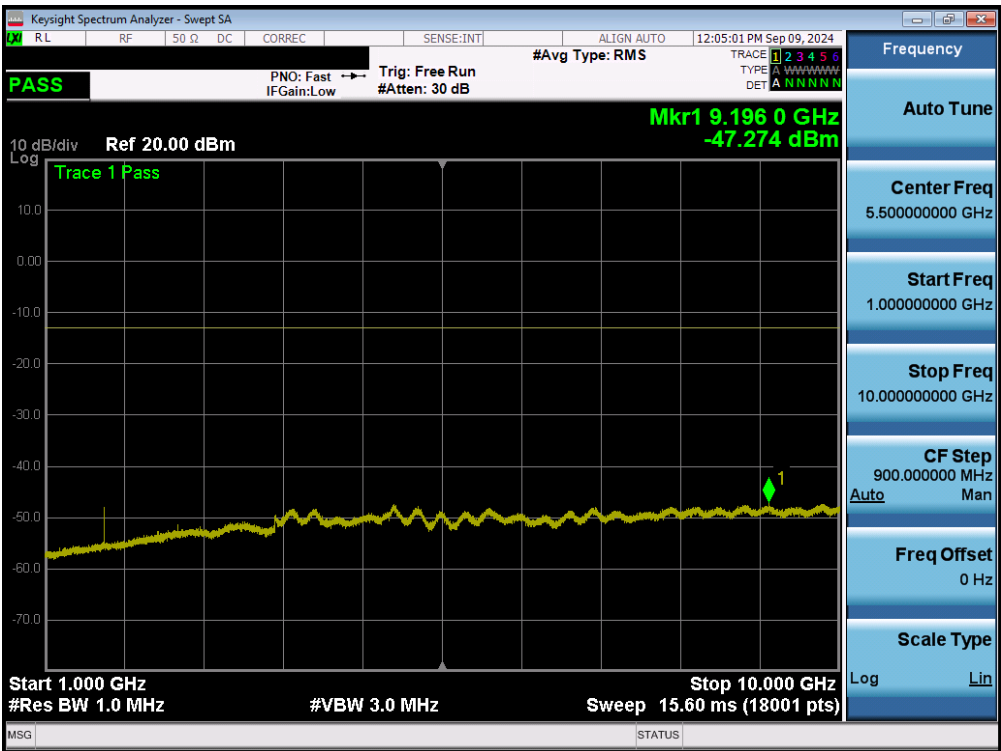


Plot 7-72. Conducted Spurious Plot (NR Band n26/5 - 20.0MHz - 1 RB - Low Channel - Ant2)



Plot 7-73. Conducted Spurious Plot (NR Band n26/5 - 20.0MHz - 1 RB - Low Channel - Ant2)

FCC ID: A3LSMS936U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2408260064-01.A3L	Test Dates: 8/30/2024 - 10/01/2024	EUT Type: Portable Handset	Page 57 of 101



Plot 7-74. Conducted Spurious Plot (NR Band n26/5 - 20.0MHz - 1 RB - Low Channel - Ant2)

FCC ID: A3LSMS936U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2408260064-01.A3L	Test Dates: 8/30/2024 - 10/01/2024	EUT Type: Portable Handset	Page 58 of 101

7.4 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 $43 + 10 \log_{10}(P_{\text{Watts}})$, 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.

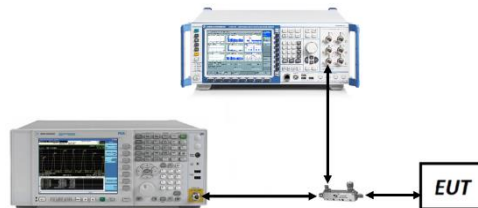


Figure 7-3. Test Instrument & Measurement Setup

FCC ID: A3LSMS936U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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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.

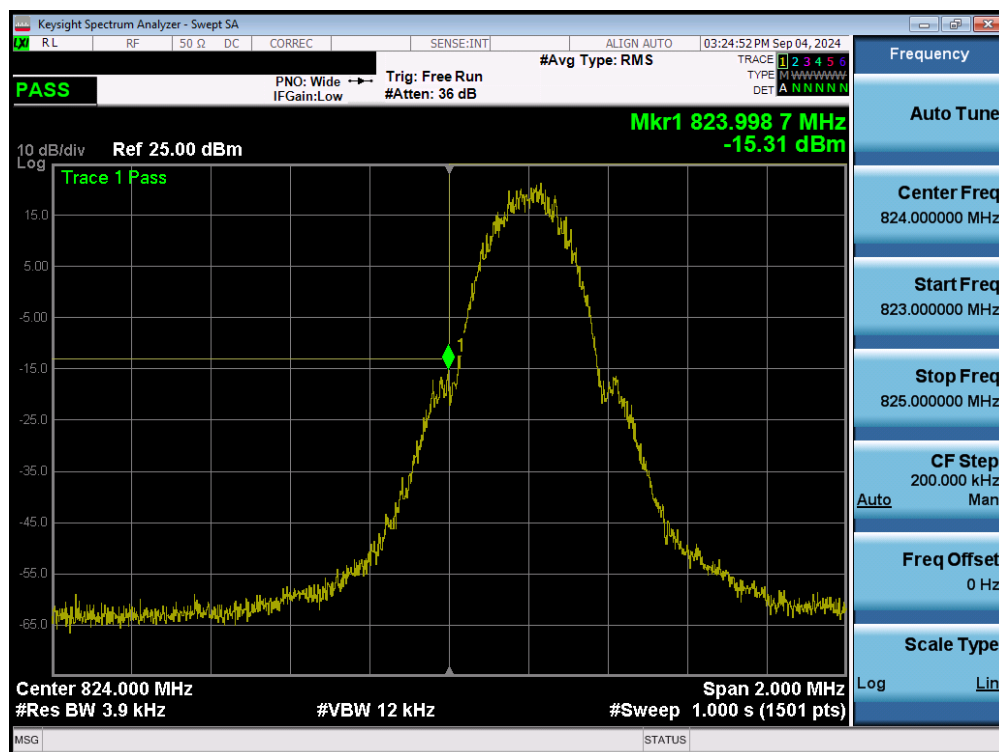
FCC ID: A3LSMS936U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2408260064-01.A3L	Test Dates: 8/30/2024 - 10/01/2024	EUT Type: Portable Handset	Page 60 of 101

Mode	Bandwidth	Channel	Test Case	Level [dBm]	Limit [dBm]	Margin [dB]
GSM-Cell	250kHz	Low	Band Edge	-15.31	-13	-2.31
		High	Band Edge	-15.64	-13	-2.64
WCDMA-Cell	5MHz	Low	Band Edge	-21.01	-13	-8.01
		High	Band Edge	-20.06	-13	-7.06
LTE-B26-5	15 MHz	Low	Band Edge	-27.53	-13	-14.53
		High	Band Edge	-25.32	-13	-12.32
	10 MHz	Low	Band Edge	-25.67	-13	-12.67
		High	Band Edge	-25.98	-13	-12.98
	5 MHz	Low	Band Edge	-22.43	-13	-9.43
		High	Band Edge	-21.07	-13	-8.07
	3 MHz	Low	Band Edge	-18.29	-13	-5.29
		High	Band Edge	-17.92	-13	-4.92
	1.4 MHz	Low	Band Edge	-15.91	-13	-2.91
		High	Band Edge	-15.55	-13	-2.55
NR-n26-5	20 MHz	Low	Band Edge	-29.91	-13	-16.91
		High	Band Edge	-30.89	-13	-17.89
	15 MHz	Low	Band Edge	-27.94	-13	-14.94
		High	Band Edge	-30.26	-13	-17.26
	10 MHz	Low	Band Edge	-25.20	-13	-12.20
		High	Band Edge	-27.97	-13	-14.97
	5 MHz	Low	Band Edge	-20.85	-13	-7.85
		High	Band Edge	-18.17	-13	-5.17

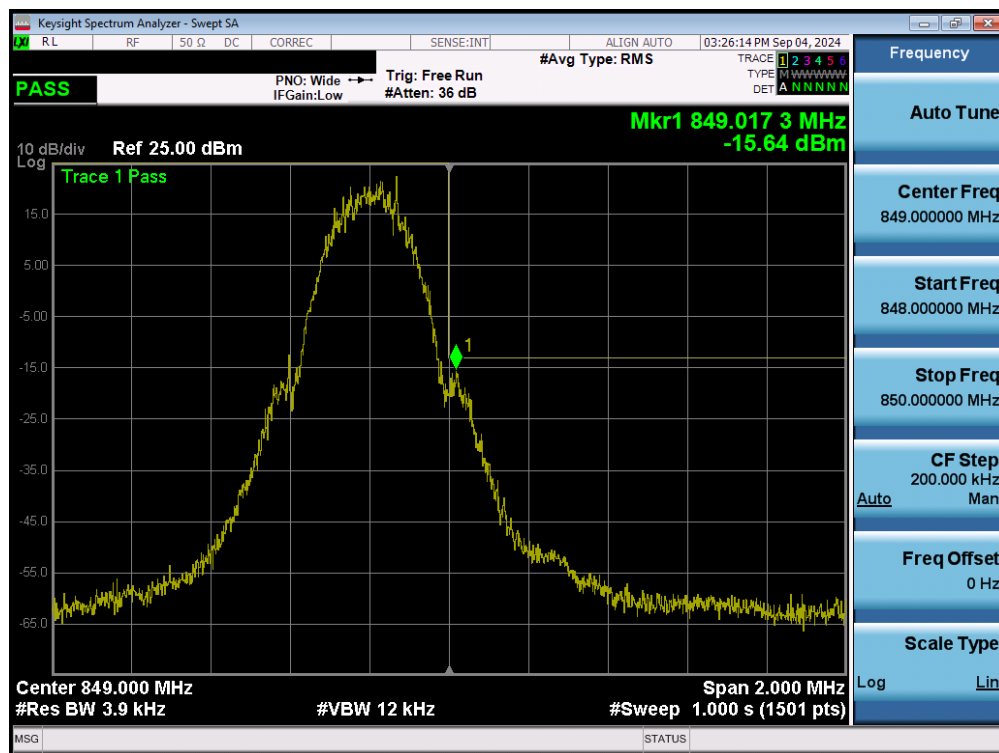
Table 7-6. Conducted Band Edge Results – Ant1

FCC ID: A3LSMS936U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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GSM/GPRS Cell – Ant1



Plot 7-75. Lower Band Edge Plot (GPRS Cell – Ch. 128 – Ant1)



Plot 7-76. Upper Band Edge Plot (GPRS Cell – Ch. 251 – Ant1)

FCC ID: A3LSMS936U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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WCDMA Cell – Ant1



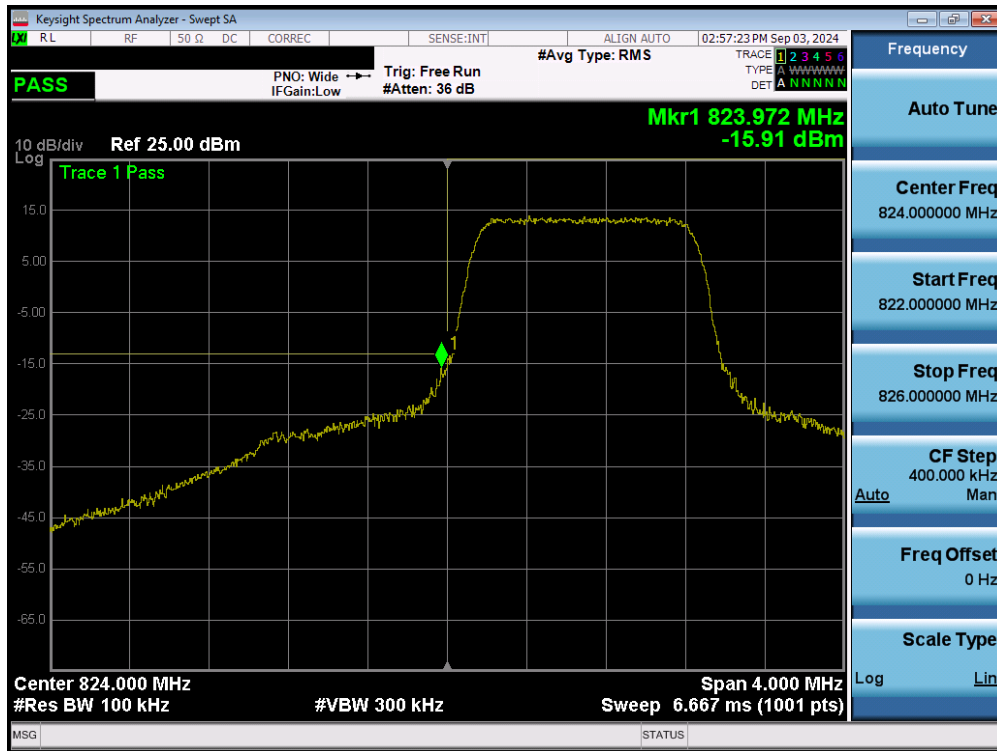
Plot 7-77. Lower Band Edge Plot (WCDMA Cell – Ch. 4132 – Ant1)



Plot 7-78. Upper Band Edge Plot (WCDMA Cell – Ch. 4233 – Ant1)

FCC ID: A3LSMS936U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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LTE Band 26/5 – Ant1



Plot 7-79. Lower Band Edge Plot (LTE Band 26/5 – 1.4MHz QPSK – Full RB - Ant1)



Plot 7-80. Upper Band Edge Plot (LTE Band 26/5 – 1.4MHz QPSK – Full RB - Ant1)

FCC ID: A3LSMS936U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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NR Band n26/5 – Ant1



Plot 7-81. Lower Band Edge Plot (NR Band n26/5 – 5.0MHz - Full RB - Ant1)



Plot 7-82. Upper Band Edge Plot (NR Band n26/5 – 5.0MHz - Full RB - Ant1)

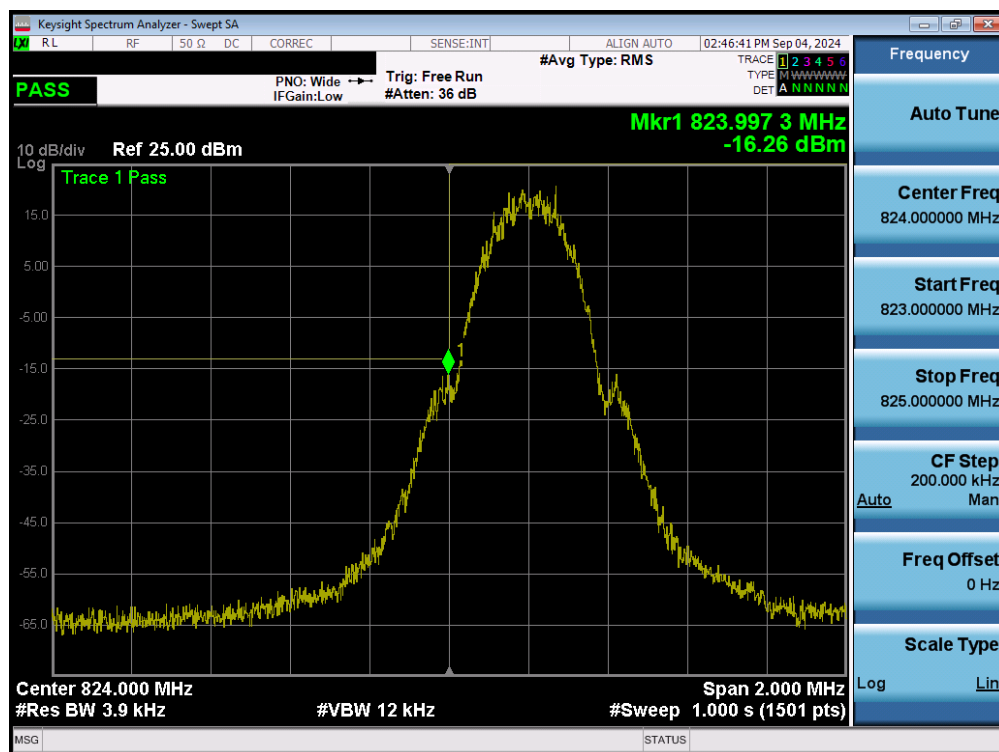
FCC ID: A3LSMS936U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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Mode	Bandwidth	Channel	Test Case	Level [dBm]	Limit [dBm]	Margin [dB]
GSM-Cell	250kHz	Low	Band Edge	-16.26	-13	-3.26
		High	Band Edge	-16.09	-13	-3.09
WCDMA-Cell	5MHz	Low	Band Edge	-21.94	-13	-8.94
		High	Band Edge	-20.77	-13	-7.77
LTE-B26-5	15 MHz	Low	Band Edge	-28.07	-13	-15.07
		High	Band Edge	-28.36	-13	-15.36
	10 MHz	Low	Band Edge	-25.89	-13	-12.89
		High	Band Edge	-27.63	-13	-14.63
	5 MHz	Low	Band Edge	-20.88	-13	-7.88
		High	Band Edge	-20.60	-13	-7.60
	3 MHz	Low	Band Edge	-18.01	-13	-5.01
		High	Band Edge	-17.16	-13	-4.16
	1.4 MHz	Low	Band Edge	-17.55	-13	-4.55
		High	Band Edge	-17.27	-13	-4.27
NR-n26-5	20 MHz	Low	Band Edge	-29.21	-13	-16.21
		High	Band Edge	-31.73	-13	-18.73
	15 MHz	Low	Band Edge	-26.40	-13	-13.40
		High	Band Edge	-30.19	-13	-17.19
	10 MHz	Low	Band Edge	-26.31	-13	-13.31
		High	Band Edge	-27.46	-13	-14.46
	5 MHz	Low	Band Edge	-21.68	-13	-8.68
		High	Band Edge	-22.13	-13	-9.13

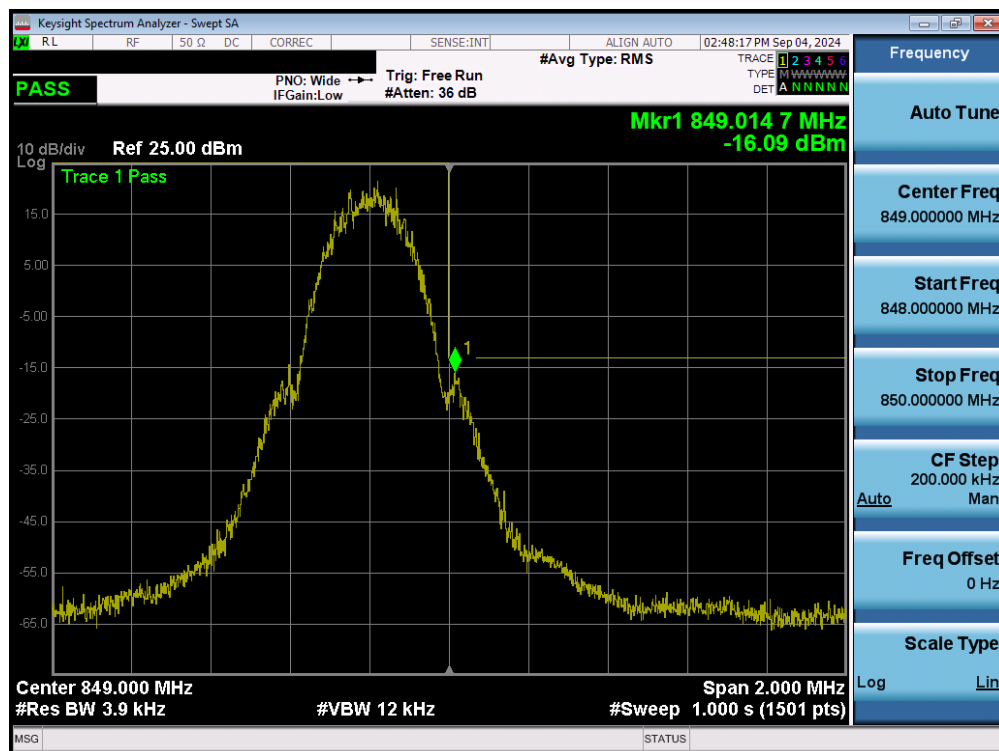
Table 7-7. Conducted Band Edge Results – Ant2

FCC ID: A3LSMS936U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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GSM/GPRS Cell – Ant2



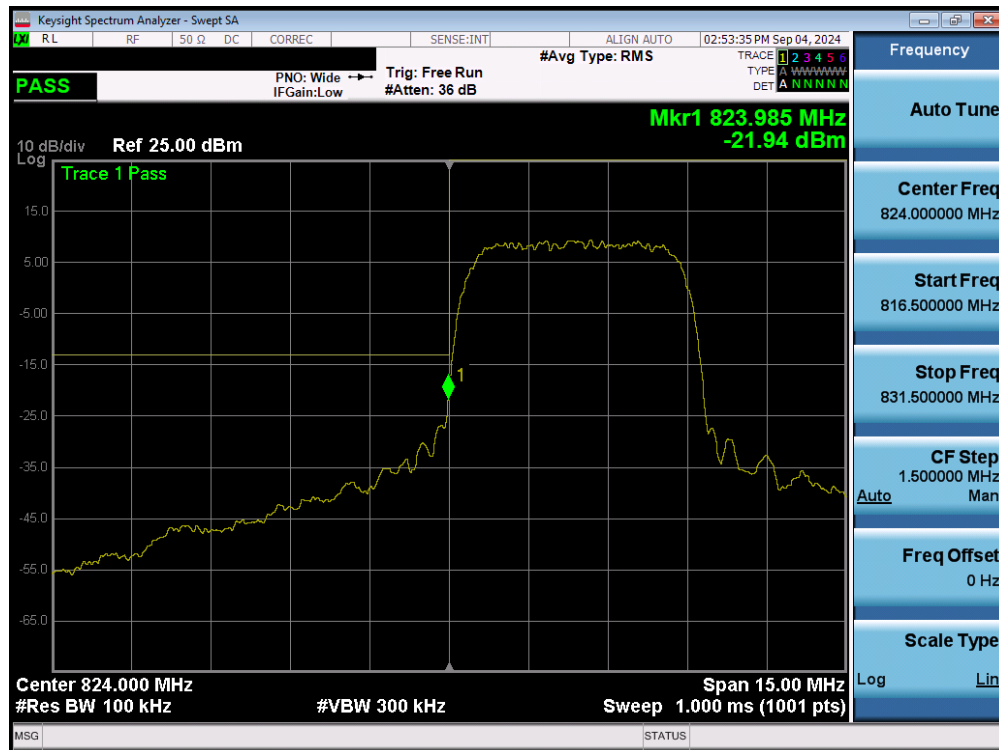
Plot 7-83. Lower Band Edge Plot (GPRS Cell – Ch. 128 – Ant2)



Plot 7-84. Upper Band Edge Plot (GPRS Cell – Ch. 251 – Ant2)

FCC ID: A3LSMS936U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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WCDMA Cell – Ant2



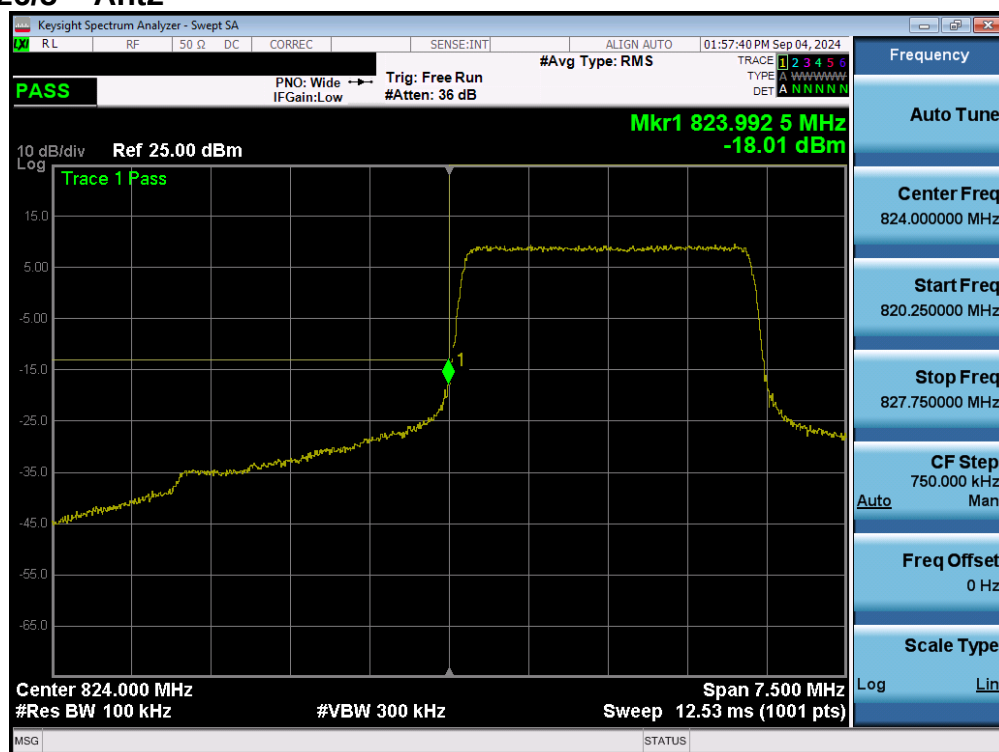
Plot 7-85. Lower Band Edge Plot (WCDMA Cell – Ch. 4132 – Ant2)



Plot 7-86. Upper Band Edge Plot (WCDMA Cell – Ch. 4233 – Ant2)

FCC ID: A3LSMS936U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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LTE Band 26/5 – Ant2



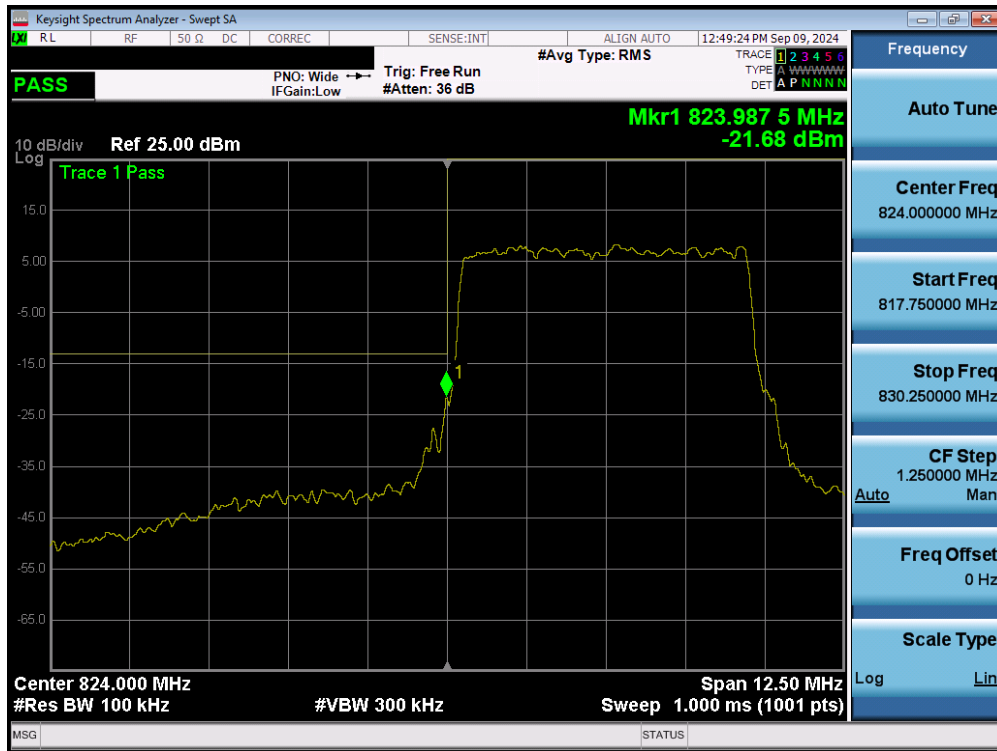
Plot 7-87. Lower Band Edge Plot (LTE Band 26/5 - 3MHz QPSK – Full RB - Ant2)



Plot 7-88. Upper Band Edge Plot (LTE Band 26/5 - 3MHz QPSK – Full RB - Ant2)

FCC ID: A3LSMS936U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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NR Band n26/5 – Ant2



Plot 7-89. Lower Band Edge Plot (NR Band n26/5 – 5.0MHz - Full RB - Ant2)



Plot 7-90. Upper Band Edge Plot (NR Band n26/5 – 5.0MHz - Full RB - Ant2)

FCC ID: A3LSMS936U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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7.5 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 $\geq 3 \times$ RBW
4. Span = 1.5 times the OBW
5. No. of sweep points $\geq 2 \times$ 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.

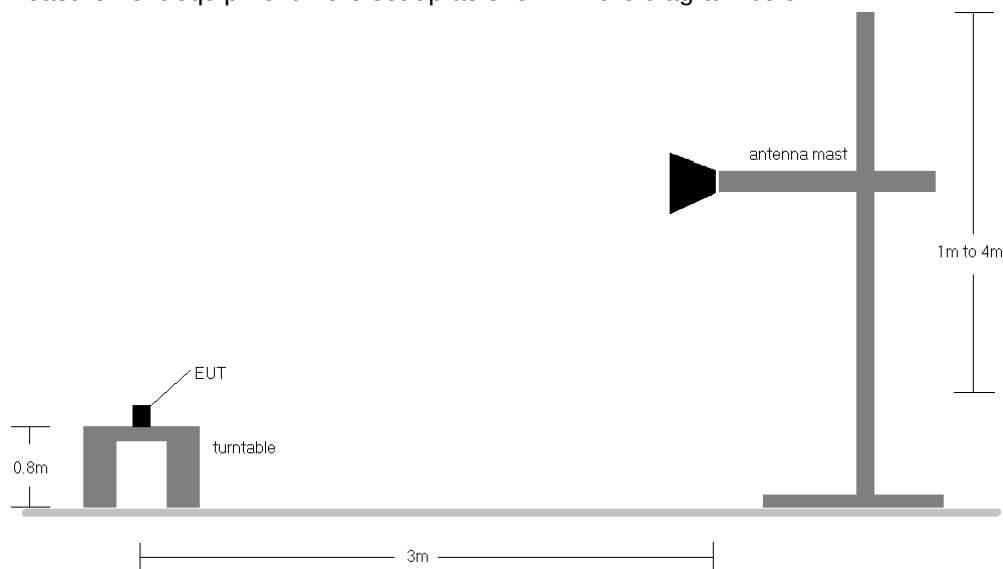


Figure 7-4. Radiated Test Setup < 1GHz

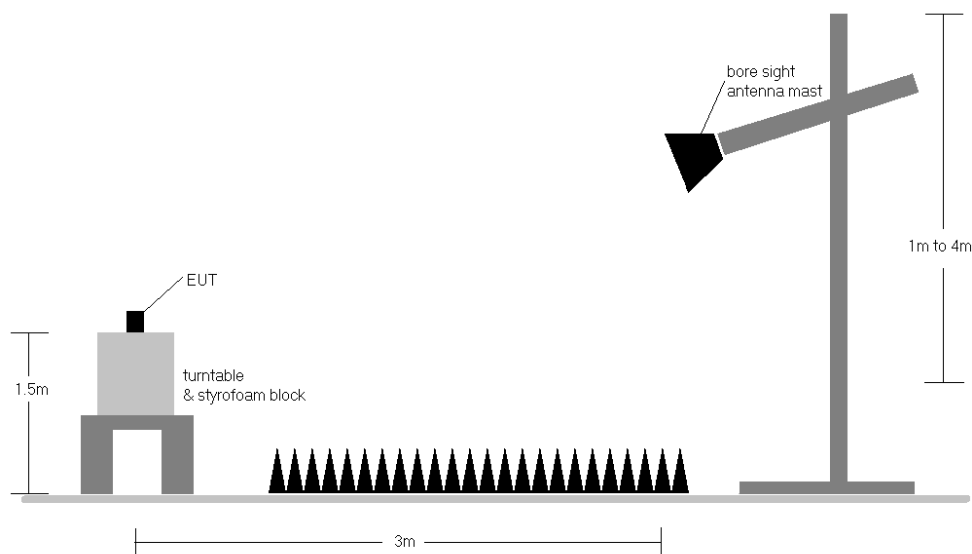


Figure 7-5. Radiated Test Setup > 1GHz

Test Notes

- 1) This device employs GSM, GPRS, and EDGE capabilities. The EUT was tested under all configurations and the highest powers are reported in GPRS mode while transmitting with one slot active.
- 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".

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- 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) 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: A3LSMS936U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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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]
824.20	GSM850	H	219	247	28.05	1.54	27.44	0.555	38.45	-11.01
836.60	GSM850	H	202	258	27.28	1.54	26.67	0.465	38.45	-11.78
848.80	GSM850	H	209	248	26.41	1.54	25.80	0.380	38.45	-12.65
824.20	GSM850	V	124	196	26.48	1.35	25.68	0.370	38.45	-12.77
824.20	EDGE850	H	219	247	27.73	1.54	27.12	0.516	38.45	-11.33
824.20	GSM850 (WCP)	H	104	302	26.90	1.54	26.29	0.426	38.45	-12.16

Table 7-8. ERP Data (GPRS Cell – Ant1)

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]
826.40	WCDMA850	H	200	262	19.67	1.54	19.06	0.081	38.45	-19.39
836.60	WCDMA850	H	204	254	20.13	1.54	19.52	0.090	38.45	-18.93
846.60	WCDMA850	H	202	253	18.07	1.54	17.46	0.056	38.45	-20.99
836.60	WCDMA850	V	126	212	18.61	1.35	17.81	0.060	38.45	-20.64
836.60	WCDMA850 (WCP)	H	189	276	19.52	1.54	18.91	0.078	38.45	-19.54

Table 7-9. ERP Data (WCDMA Cell – Ant1)

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]
15MHz (Band 26 only)	QPSK	831.50	H	204	341	1.54	1 / 0	18.73	18.12	0.065	38.45	-20.33	20.27
	QPSK	836.50	H	202	345	1.54	1 / 0	18.87	18.26	0.067	38.45	-20.19	20.41
	QPSK	841.50	H	193	345	1.54	1 / 74	16.71	16.10	0.041	38.45	-22.35	18.25
	16-QAM	836.50	H	202	345	1.54	1 / 0	17.94	17.33	0.054	38.45	-21.12	19.48
10 MHz	QPSK	829.00	H	204	341	1.54	1 / 25	18.94	18.34	0.068	38.45	-20.11	20.49
	QPSK	836.50	H	202	345	1.54	1 / 25	19.13	18.52	0.071	38.45	-19.93	20.67
	QPSK	844.00	H	193	345	1.54	1 / 0	16.72	16.12	0.041	38.45	-22.33	18.27
	16-QAM	836.50	H	202	345	1.54	1 / 49	18.30	17.70	0.059	38.45	-20.75	19.85
5 MHz	QPSK	826.50	H	204	341	1.54	1 / 24	18.68	18.07	0.064	38.45	-20.38	20.22
	QPSK	836.50	H	202	345	1.54	1 / 24	18.99	18.38	0.069	38.45	-20.07	20.53
	QPSK	846.50	H	193	345	1.54	1 / 12	16.69	16.08	0.041	38.45	-22.37	18.23
	16-QAM	836.50	H	202	345	1.54	1 / 0	18.50	17.89	0.062	38.45	-20.56	20.04
3 MHz	QPSK	825.50	H	204	341	1.54	1 / 7	18.52	17.91	0.062	38.45	-20.54	20.06
	QPSK	836.50	H	202	345	1.54	1 / 7	19.12	18.51	0.071	38.45	-19.94	20.66
	QPSK	847.50	H	193	345	1.54	1 / 7	16.74	16.13	0.041	38.45	-22.32	18.28
	16-QAM	836.50	H	202	345	1.54	1 / 0	18.35	17.74	0.059	38.45	-20.71	19.89
1.4 MHz	QPSK	824.70	H	204	341	1.54	1 / 3	18.70	18.09	0.064	38.45	-20.36	20.24
	QPSK	836.50	H	202	345	1.54	1 / 3	19.18	18.57	0.072	38.45	-19.88	20.72
	QPSK	848.30	H	193	345	1.54	1 / 5	16.81	16.21	0.042	38.45	-22.24	18.36
	16-QAM	836.50	H	202	345	1.54	1 / 3	18.31	17.71	0.059	38.45	-20.74	19.86
15MHz	QPSK (Opposite Pol.)	836.50	V	133	358	1.35	1 / 74	17.34	16.54	0.045	38.45	-21.91	18.69
	QPSK (WCP)	836.50	H	188	258	1.54	1 / 74	18.77	18.16	0.066	38.45	-20.29	20.31

Table 7-10. ERP Data (LTE Band 26/5 – Ant1)

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Bandwidth	Mod.	Frequency [MHz]	Ant. Pol. [H/V]	EUT Pol.	Antenna Height [cm]	Turntable Azimuth [degree]	Ant. Gain [dBi]	RB Size/Offset	Substitute Level [dBm]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
20 MHz	π/2 BPSK	834.00	V	Z	130	288	1.30	1 / 53	21.45	20.60	0.115	38.45	-17.85
	π/2 BPSK	836.50	V	Z	130	286	1.35	1 / 53	21.06	20.26	0.106	38.45	-18.19
	π/2 BPSK	839.00	V	Z	130	284	1.41	1 / 53	20.94	20.20	0.105	38.45	-18.26
	QPSK	834.00	V	Z	130	288	1.30	1 / 53	21.25	20.40	0.110	38.45	-18.05
	QPSK	836.50	V	Z	130	286	1.35	1 / 53	21.23	20.43	0.110	38.45	-18.02
	QPSK	839.00	V	Z	130	284	1.41	1 / 53	20.77	20.03	0.101	38.45	-18.43
15 MHz	16-QAM	834.00	V	Z	130	288	1.30	1 / 53	20.42	19.57	0.091	38.45	-18.88
	π/2 BPSK	831.50	V	Z	130	288	1.25	1 / 1	21.40	20.50	0.112	38.45	-17.95
	π/2 BPSK	836.50	V	Z	130	286	1.35	1 / 77	21.08	20.28	0.107	38.45	-18.17
	π/2 BPSK	841.50	V	Z	130	284	1.46	1 / 77	21.08	20.39	0.109	38.45	-18.06
	QPSK	831.50	V	Z	130	288	1.25	1 / 1	21.18	20.28	0.107	38.45	-18.17
	QPSK	836.50	V	Z	130	286	1.35	1 / 77	21.07	20.28	0.107	38.45	-18.17
10 MHz	QPSK	841.50	V	Z	130	284	1.46	1 / 77	20.66	19.97	0.099	38.45	-18.48
	16-QAM	836.50	V	Z	130	286	1.35	1 / 77	20.03	19.23	0.084	38.45	-19.22
	π/2 BPSK	829.00	V	Z	130	288	1.20	1 / 1	21.55	20.60	0.115	38.45	-17.85
	π/2 BPSK	836.50	V	Z	130	286	1.35	1 / 50	20.99	20.19	0.104	38.45	-18.26
	π/2 BPSK	844.00	V	Z	130	284	1.51	1 / 1	20.96	20.32	0.108	38.45	-18.14
	QPSK	829.00	V	Z	130	288	1.20	1 / 1	21.24	20.29	0.107	38.45	-18.17
5 MHz	QPSK	836.50	V	Z	130	286	1.35	1 / 50	21.31	20.51	0.113	38.45	-17.94
	QPSK	844.00	V	Z	130	284	1.51	1 / 1	20.29	19.65	0.092	38.45	-18.80
	16-QAM	836.50	V	Z	130	286	1.35	1 / 50	20.15	19.35	0.086	38.45	-19.10
	π/2 BPSK	829.00	V	Z	130	288	1.14	1 / 1	21.61	20.60	0.115	38.45	-17.85
	π/2 BPSK	836.50	V	Z	130	286	1.35	1 / 23	21.23	20.43	0.110	38.45	-18.02
	π/2 BPSK	844.00	V	Z	130	284	1.56	1 / 12	21.10	20.52	0.113	38.45	-17.94
20 MHz	QPSK	829.00	V	Z	130	288	1.14	1 / 1	21.00	19.99	0.100	38.45	-18.46
	QPSK	836.50	V	Z	130	286	1.35	1 / 23	21.11	20.31	0.107	38.45	-18.14
	QPSK	844.00	V	Z	130	284	1.56	1 / 12	20.74	20.15	0.103	38.45	-18.30
	16-QAM	844.00	V	Z	130	284	1.56	1 / 12	19.99	19.40	0.087	38.45	-19.05
20 MHz	QPSK (CP-OFDM)	834.00	V		133	290	1.30	1 / 53	19.65	18.80	0.076	38.45	-19.65
	QPSK (Opposite Pol.)	834.00	H	Y	202	209	1.50	1 / 53	18.55	17.90	0.062	38.45	-20.55
	QPSK (WCP)	834.00	V	X	207	21	1.30	1 / 53	16.92	16.07	0.040	38.45	-22.38

Table 7-11. ERP Data (NR Band n26/5 – Ant1)

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]
824.20	GSM850	V	137	230	27.33	1.35	26.53	0.450	38.45	-11.92
836.60	GSM850	V	145	230	27.44	1.35	26.64	0.462	38.45	-11.81
848.80	GSM850	V	136	232	27.26	1.35	26.46	0.443	38.45	-11.99
836.60	GSM850	H	205	284	19.19	1.54	18.58	0.072	38.45	-19.87
836.60	EDGE850	V	145	230	21.32	1.35	20.52	0.113	38.45	-17.93
836.60	GSM850 (WCP)	V	179	147	12.27	1.35	11.47	0.014	38.45	-26.98

Table 7-12. ERP Data (GPRS Cell – Ant2)

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]
826.40	WCDMA850	V	136	241	19.13	1.35	18.33	0.068	38.45	-20.12
836.60	WCDMA850	V	144	233	19.18	1.35	18.38	0.069	38.45	-20.07
846.60	WCDMA850	V	142	237	18.71	1.35	17.91	0.062	38.45	-20.54
836.60	WCDMA850	H	103	291	17.24	1.54	16.63	0.046	38.45	-21.82
836.60	WCDMA850 (WCP)	V	146	142	6.64	1.35	5.84	0.004	38.45	-32.61

Table 7-13. ERP Data (WCDMA Cell – Ant2)

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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]
15MHz (Band 26 only)	QPSK	831.50	V	134	256	1.25	1 / 0	18.77	17.87	0.061	38.45	-20.58
	QPSK	836.50	V	145	256	1.35	1 / 37	18.76	17.96	0.063	38.45	-20.49
	QPSK	841.50	V	136	247	1.46	1 / 37	17.46	16.77	0.048	38.45	-21.68
	16-QAM	836.50	V	145	256	1.35	1 / 37	18.01	17.21	0.053	38.45	-21.24
10 MHz	QPSK	829.00	V	134	256	1.20	1 / 25	18.80	17.84	0.061	38.45	-20.61
	QPSK	836.50	V	145	256	1.35	1 / 25	18.63	17.84	0.061	38.45	-20.61
	QPSK	844.00	V	136	247	1.51	1 / 0	17.72	17.08	0.051	38.45	-21.38
	16-QAM	829.00	V	134	256	1.20	1 / 25	18.25	17.29	0.054	38.45	-21.16
5 MHz	QPSK	826.50	V	134	256	1.14	1 / 12	18.89	17.88	0.061	38.45	-20.57
	QPSK	836.50	V	145	256	1.35	1 / 12	18.67	17.87	0.061	38.45	-20.58
	QPSK	846.50	V	136	247	1.56	1 / 12	17.55	16.96	0.050	38.45	-21.49
	16-QAM	826.50	V	134	256	1.14	1 / 0	18.27	17.26	0.053	38.45	-21.19
3 MHz	QPSK	825.50	V	134	256	1.12	1 / 0	18.86	17.83	0.061	38.45	-20.62
	QPSK	836.50	V	145	256	1.35	1 / 7	18.54	17.74	0.059	38.45	-20.71
	QPSK	847.50	V	136	247	1.58	1 / 7	17.45	16.88	0.049	38.45	-21.57
	16-QAM	836.50	V	145	256	1.35	1 / 14	18.19	17.40	0.055	38.45	-21.05
1.4 MHz	QPSK	824.70	V	134	256	1.11	1 / 3	18.72	17.67	0.058	38.45	-20.78
	QPSK	836.50	V	145	256	1.35	1 / 5	18.56	17.76	0.060	38.45	-20.69
	QPSK	848.30	V	136	247	1.60	1 / 5	17.29	16.74	0.047	38.45	-21.71
	16-QAM	836.50	V	145	256	1.35	1 / 3	17.89	17.10	0.051	38.45	-21.35
15MHz	QPSK (Opposite Pol.)	836.50	H	210	295	1.54	0.00	17.12	16.51	0.045	38.45	-21.94
	QPSK (WCP)	836.50	V	152	138	1.35	0.00	7.85	7.05	0.005	38.45	-31.40

Table 7-14. ERP Data (LTE Band 26/5 – Ant2)

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]
20 MHz	$\pi/2$ BPSK	834.00	V	143	251	1.30	1 / 53	19.34	18.49	0.071	38.45	-19.96
	$\pi/2$ BPSK	836.50	V	143	246	1.35	1 / 53	19.46	18.66	0.074	38.45	-19.79
	$\pi/2$ BPSK	839.00	V	143	252	1.41	1 / 53	19.51	18.77	0.075	38.45	-19.69
	QPSK	834.00	V	143	251	1.30	1 / 53	19.39	18.54	0.071	38.45	-19.91
	QPSK	836.50	V	143	246	1.35	1 / 53	19.54	18.74	0.075	38.45	-19.71
	QPSK	839.00	V	143	252	1.41	1 / 53	19.62	18.88	0.077	38.45	-19.58
	16-QAM	836.50	V	143	246	1.35	1 / 53	18.53	17.73	0.059	38.45	-20.72
15 MHz	$\pi/2$ BPSK	831.50	V	143	251	1.25	1 / 77	19.37	18.47	0.070	38.45	-19.98
	$\pi/2$ BPSK	836.50	V	143	246	1.35	1 / 77	19.53	18.73	0.075	38.45	-19.72
	$\pi/2$ BPSK	841.50	V	143	252	1.46	1 / 77	19.56	18.87	0.077	38.45	-19.58
	QPSK	831.50	V	143	251	1.25	1 / 77	19.53	18.63	0.073	38.45	-19.82
	QPSK	836.50	V	143	246	1.35	1 / 77	19.63	18.83	0.076	38.45	-19.62
	QPSK	841.50	V	143	252	1.46	1 / 77	19.72	19.02	0.080	38.45	-19.43
	16-QAM	831.50	V	143	251	1.25	1 / 77	18.72	17.82	0.061	38.45	-20.63
10 MHz	$\pi/2$ BPSK	829.00	V	143	251	1.20	1 / 50	19.36	18.41	0.069	38.45	-20.04
	$\pi/2$ BPSK	836.50	V	143	246	1.35	1 / 50	19.39	18.60	0.072	38.45	-19.85
	$\pi/2$ BPSK	844.00	V	143	252	1.51	1 / 50	19.50	18.86	0.077	38.45	-19.59
	QPSK	829.00	V	143	251	1.20	1 / 50	19.50	18.55	0.072	38.45	-19.90
	QPSK	836.50	V	143	246	1.35	1 / 50	19.67	18.87	0.077	38.45	-19.58
	QPSK	844.00	V	143	252	1.51	1 / 50	19.56	18.92	0.078	38.45	-19.53
	16-QAM	836.50	V	143	246	1.35	1 / 50	18.84	18.04	0.064	38.45	-20.41
5 MHz	$\pi/2$ BPSK	829.00	V	143	251	1.14	1 / 23	19.42	18.42	0.069	38.45	-20.03
	$\pi/2$ BPSK	836.50	V	143	246	1.35	1 / 23	19.43	18.64	0.073	38.45	-19.81
	$\pi/2$ BPSK	844.00	V	143	252	1.56	1 / 23	19.32	18.73	0.075	38.45	-19.72
	QPSK	829.00	V	143	251	1.14	1 / 23	19.59	18.59	0.072	38.45	-19.87
	QPSK	836.50	V	143	246	1.35	1 / 23	19.57	18.78	0.075		

7.6 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.

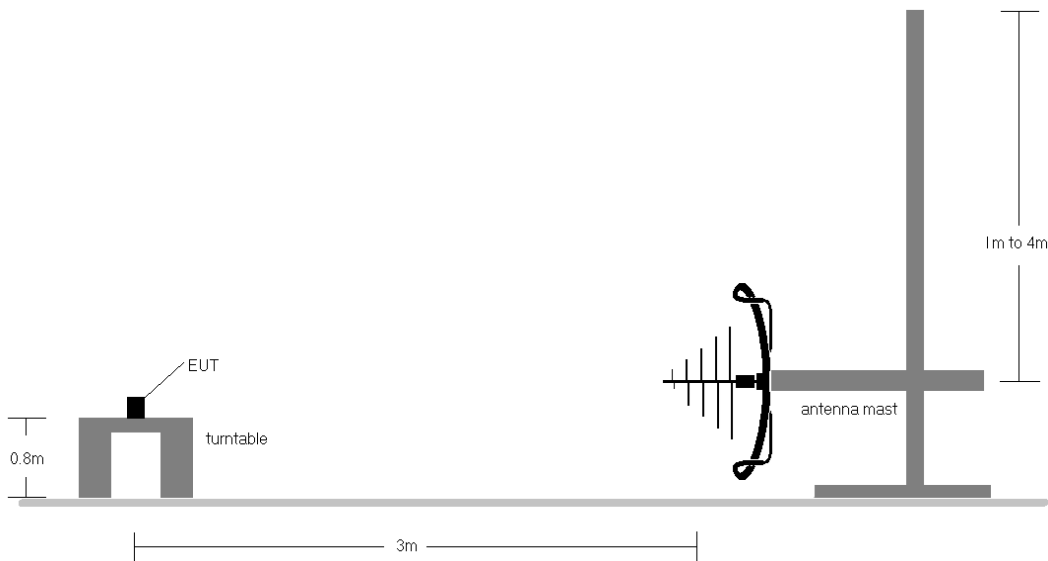


Figure 7-6. Test Instrument & Measurement Setup < 1GHz

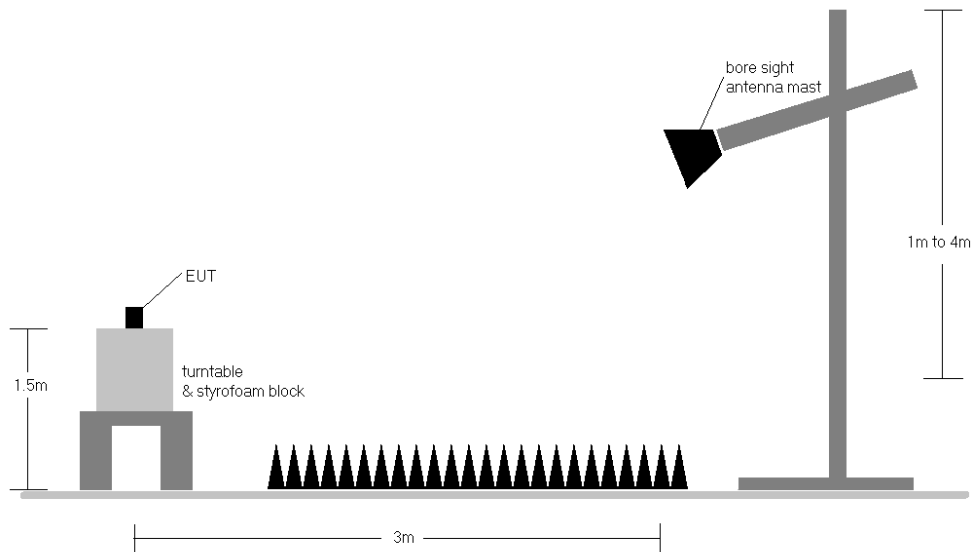


Figure 7-7. Test Instrument & Measurement Setup > 1GHz

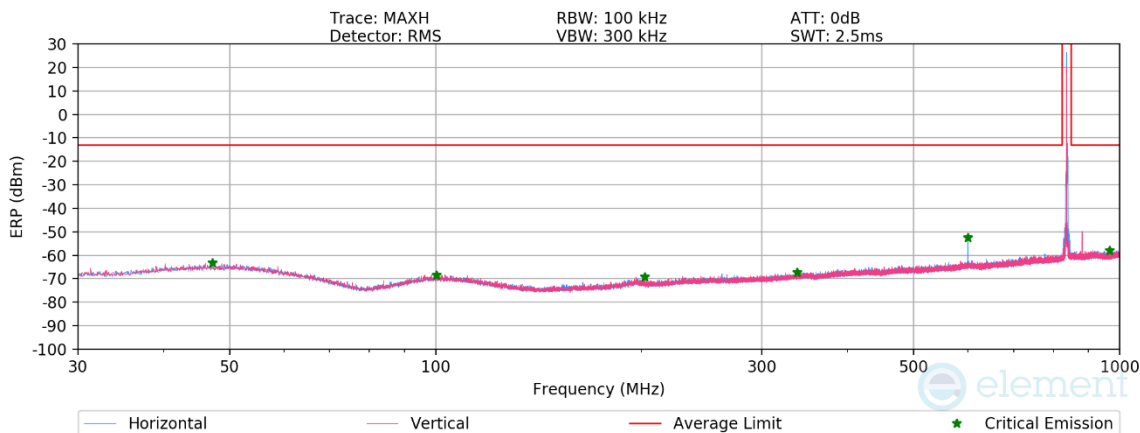
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Test Notes

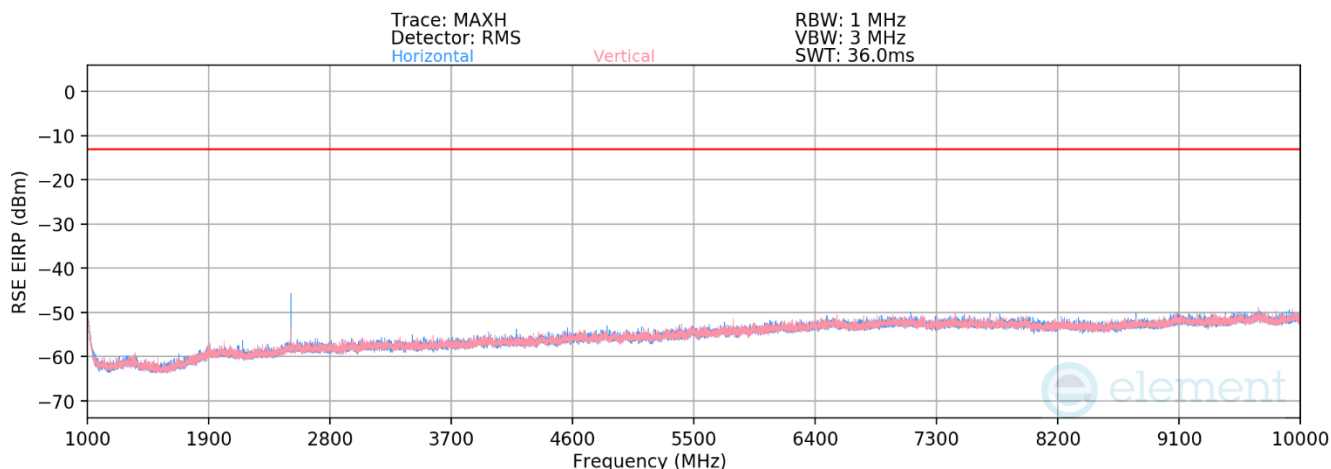
- 1) Field strengths are calculated using the Measurement quantity conversions in ANSI C63.26-2015 Section 5.2.7:
 - a) $E(\text{dB}\mu\text{V/m}) = \text{Measured amplitude level (dBm)} + 107 + \text{Cable Loss (dB)} + \text{Antenna Factor (dB/m)}$
 - b) $\text{EIRP (dBm)} = E(\text{dB}\mu\text{V/m}) + 20\log D - 104.8$; where D is the measurement distance in meters.
- 2) This device employs GSM, GPRS, and EDGE capabilities. The EUT was tested under all configurations and the highest powers are reported in GPRS mode while transmitting with one slot active.
- 3) This device employs UMTS technology with WCDMA (AMR/RMC) and HSDPA capabilities. The EUT was tested under all configurations and the highest powers are reported in WCDMA mode with HSDPA Inactive at 12.2 kbps RMC and TPC bits all set to "1".
- 4) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst-case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the tables below.
- 5) This unit was tested with its standard battery.
- 6) The spectrum is measured from 9kHz to the 10th harmonic of the fundamental frequency of the transmitter. The worst-case emissions are reported.
- 7) 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.
- 8) The "-" shown in the following RSE tables are used to denote a noise floor measurement.
- 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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GPRS Cell – Ant1



Plot 7-91. Radiated Spurious Plot Below 1GHz (GPRS Cell) – Ant1



Plot 7-92. Radiated Spurious Plot Above 1GHz (GPRS Cell) – Ant1

Mode:	GPRS 1 Tx Slot
Detector / Trace Mode:	RMS / Max Hold
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]
47.1	H	-	-	-71.42	-1.05	34.53	-63.23	-13.00	-50.23
100.3	H	-	-	-74.38	-3.30	29.32	-68.44	-13.00	-55.44
202.2	V	-	-	-75.11	-3.27	28.62	-69.13	-13.00	-56.13
337.5	H	-	-	-77.61	1.08	30.47	-67.29	-13.00	-54.29
599.8	H	-	-	-68.47	6.71	45.24	-52.52	-13.00	-39.52
966.8	V	-	-	-78.75	11.57	39.82	-57.94	-13.00	-44.94

Table 7-16. Radiated Spurious Data (GPRS Cell) – Ant1

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

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1648.4	H	124	152	-74.53	-2.58	29.89	-65.37	-13.00	-52.37
2472.6	H	122	214	-60.36	2.05	48.69	-46.57	-13.00	-33.57
3296.8	H	250	0	-78.43	4.13	32.69	-62.56	-13.00	-49.56
4121.0	H	250	0	-79.17	5.81	33.65	-61.61	-13.00	-48.61
4945.2	H	250	0	-80.27	7.79	34.52	-60.74	-13.00	-47.74

Table 7-17. Radiated Spurious Data (GPRS Cell – Low Channel) – Ant1

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

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1673.2	H	163	217	-74.08	-1.95	30.97	-64.29	-13.00	-51.29
2509.8	H	126	211	-59.54	2.69	50.16	-45.10	-13.00	-32.10
3346.4	H	250	0	-78.22	4.13	32.91	-62.35	-13.00	-49.35
4183.0	H	250	0	-79.56	6.29	33.74	-61.52	-13.00	-48.52
5019.6	H	250	0	-80.23	7.93	34.70	-60.56	-13.00	-47.56

Table 7-18. Radiated Spurious Data (GPRS Cell – Mid Channel) – Ant1

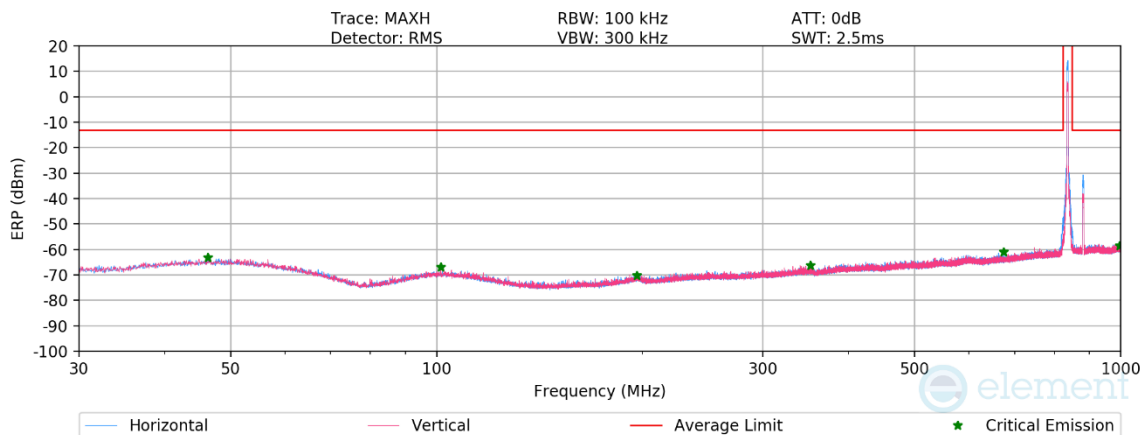
Mode:	GPRS 1 Tx Slot
Channel:	251
Frequency (MHz):	848.8

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1697.6	H	250	0	-76.57	-1.57	28.86	-66.39	-13.00	-53.39
2546.4	H	250	0	-77.34	2.70	32.36	-62.89	-13.00	-49.89
3395.2	H	250	0	-78.16	4.02	32.86	-62.40	-13.00	-49.40

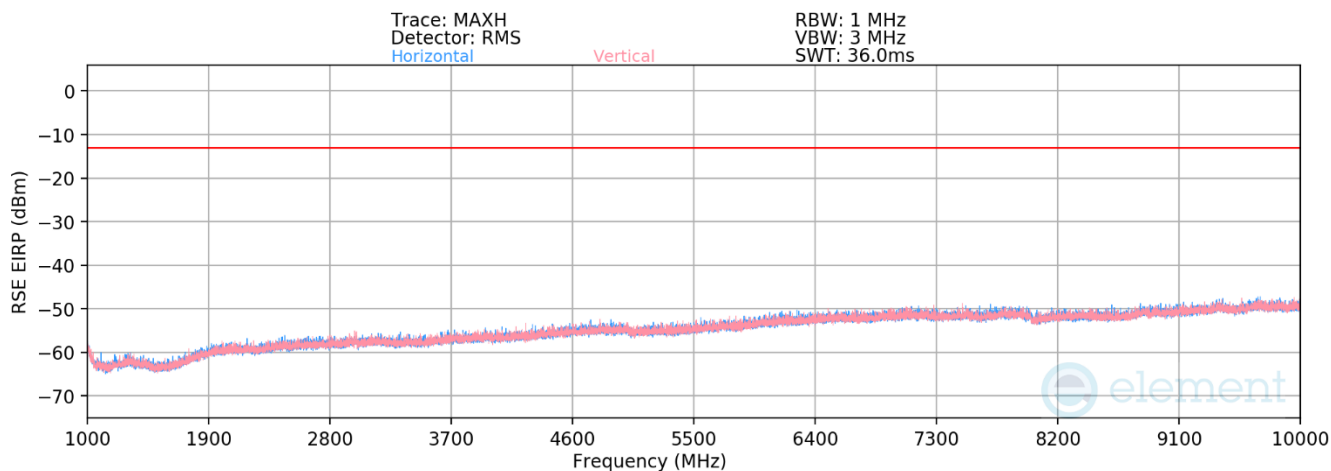
Table 7-19. Radiated Spurious Data (GPRS Cell – High Channel) – Ant1

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WCDMA Cell – Ant1



Plot 7-93. Radiated Spurious Plot Below 1GHz (WCDMA Cell) – Ant1



Plot 7-94. Radiated Spurious Plot Above 1GHz (WCDMA Cell) – Ant1

Mode:	WCDMA RMC
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]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
46.3	H	-	-	-71.20	-1.13	34.67	-63.09	-13.00	-50.09
101.4	V	-	-	-73.02	-3.21	30.77	-66.99	-13.00	-53.99
196.0	V	-	-	-76.86	-2.58	27.57	-70.19	-13.00	-57.19
351.9	V	-	-	-76.85	1.45	31.60	-66.16	-13.00	-53.16
674.8	H	-	-	-77.75	7.57	36.82	-60.94	-13.00	-47.94
995.8	V	-	-	-79.90	12.22	39.32	-58.43	-13.00	-45.43

Table 7-20. Radiated Spurious Data (WCDMA Cell) - Ant1

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

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1652.8	H	-	-	-78.42	-1.10	27.48	-67.78	-13.00	-54.78
2479.2	H	-	-	-79.45	4.03	31.58	-63.68	-13.00	-50.68
3305.6	H	-	-	-80.08	5.67	32.59	-62.67	-13.00	-49.67

Table 7-21. Radiated Spurious Data (WCDMA Cell – Low Channel) – Ant1

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

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1673.2	H	-	-	-78.52	-0.83	27.65	-67.61	-13.00	-54.61
2509.8	H	-	-	-79.45	4.05	31.61	-63.65	-13.00	-50.65
3346.4	H	-	-	-80.58	6.05	32.46	-62.79	-13.00	-49.79

Table 7-22. Radiated Spurious Data (WCDMA Cell – Mid Channel) – Ant1

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

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1693.2	H	-	-	-78.86	-0.25	27.89	-67.36	-13.00	-54.36
2539.8	H	-	-	-79.51	4.09	31.58	-63.67	-13.00	-50.67
3386.4	H	-	-	-80.57	6.16	32.59	-62.67	-13.00	-49.67

Table 7-23. Radiated Spurious Data (WCDMA Cell – High Channel) – Ant1

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