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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:
6/15 - 7/4/2022
Test Report Issue Date:
7/7/2022
Test Site/Location:
Element lab. Columbia, MD, USA
Test Report Serial No.:
1M2206010070-02.A3L

FCC ID:	**A3LSMF936JPN**
Applicant Name:	**Samsung Electronics Co., Ltd.**

Application Type:	Certification
Model:	SC-55C
Additional Model(s):	SCG16
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

ACCREDITED
CERT #2041.01

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PART 22 MEASUREMENT REPORT

Mode	Modulation	Tx Frequency Range [MHz]	ERP		EIRP		Emission Designator
			Max. Power [W]	Max. Power [dBm]	Max. Power [W]	Max. Power [dBm]	
GSM/GPRS	GMSK	824.2 - 848.8	0.484	26.85	0.794	29.00	244KGXW
EDGE	8-PSK	824.2 - 848.8	0.099	19.97	0.163	22.12	241KG7W
WCDMA	Spread Spectrum	826.4 - 846.6	0.070	18.43	0.114	20.58	4M15F9W

Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	ERP		EIRP		Emission Designator
				Max. Power [W]	Max. Power [dBm]	Max. Power [W]	Max. Power [dBm]	
LTE Band 5	10 MHz	QPSK	829.0 - 844.0	0.051	17.07	0.083	19.22	9M01G7D
		16QAM	829.0 - 844.0	0.043	16.32	0.070	18.47	9M01W7D
	5 MHz	QPSK	826.5 - 846.5	0.051	17.05	0.083	19.20	4M54G7D
		16QAM	826.5 - 846.5	0.043	16.34	0.071	18.49	4M54W7D
	3 MHz	QPSK	825.5 - 847.5	0.051	17.04	0.083	19.19	2M72G7D
		16QAM	825.5 - 847.5	0.042	16.27	0.069	18.42	2M71W7D
	1.4 MHz	QPSK	824.7 - 848.3	0.050	17.00	0.082	19.15	1M10G7D
		16QAM	824.7 - 848.3	0.042	16.26	0.069	18.41	1M11W7D

EUT Overview

1.0 INTRODUCTION

1.1 Scope

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

1.2 Element Test Location

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

1.3 Test Facility / Accreditations

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

- Element Washington DC LLC is an ISO 17025-2017 accredited test facility under the American Association for laboratory Accreditation (A2LA) with Certificate number 2041.01 for Specific Absorption Rate (SAR), Hearing Aid Compatibility (HAC) testing, where applicable, and Electromagnetic Compatibility (EMC) testing for FCC and Innovation, Science, and Economic Development Canada rules.

- Element Washington DC LLC TCB is a Telecommunication Certification Body (TCB) accredited to ISO/IEC 17065-2012 by A2LA (Certificate number 2041.03) in all scopes of FCC Rules and ISED Standards (RSS).

- Element Washington DC LLC facility is a registered (2451B) test laboratory with the site description on file with ISED.

- Element Washington DC LLC is a Recognized U.S. Certification Assessment Body (CAB # US0110) for ISED Canada as designated by NIST under the U.S. and Canada Mutual Recognition Agreement.

2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **Samsung Portable Handset FCC ID: A3LSMF936JPN**. The test data contained in this report pertains only to the emissions due to the EUT's licensed transmitters that operate under the provisions of Part 22.

Test Device Serial No.: 0370M, 0402M, 0421M, 0068M

2.2 Device Capabilities

This device contains the following capabilities:

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

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-N5100 while operating under normal conditions in a simulated call or data transmission configuration. The worst case radiated emissions data is shown in this report.

This device supports two configurations: one is with screen open and one is with screen closed. Open, half opened and closed configurations are tested, and the worst case radiated emissions data is shown in this report.

This device supports two additional antenna configurations for GSM, WCDMA, LTE Low bands [AFS operation]: one is with two antennas transmitting from one feed, and one is with a singular antenna transmitting. Both configurations are tested, and the worst case radiated emissions data is shown in this report.

2.4 Software and Firmware

Testing was performed on device(s) using software/firmware version SC55COMU0AVEE 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.

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:

$$P_{d\ [dBm]} = P_{g\ [dBm]} - \text{cable loss}_{\ [dB]} + \text{antenna gain}_{\ [dBd/dBi]};$$

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 $P_{g\ [dBm]}$ – 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:

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

And

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

All radiated measurements are performed in a chamber that meets the site requirements per ANSI C63.4-2014. 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.

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 (±dB)
Conducted Bench Top Measurements	1.13
Radiated Disturbance (<1GHz)	4.98
Radiated Disturbance (>1GHz)	5.07
Radiated Disturbance (>18GHz)	5.09

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
-	AP2-001	EMC Cable and Switch System	1/4/2022	Annual	1/4/2023	AP2-001
-	AP2-002	EMC Cable and Switch System	3/11/2022	Annual	3/11/2023	AP2-002
-	ETS-001	EMC Cable and Switch System	12/9/2021	Annual	12/9/2022	ETS-001
-	ETS-002	EMC Cable and Switch System	3/10/2022	Annual	3/10/2023	ETS-002
-	LTx1	Licensed Transmitter Cable Set	12/19/2021	Annual	12/19/2022	LTx1
-	LTx3	LIcensed Transmitter Cable Set	8/18/2021	Annual	8/18/2022	LTx3
-	LTx5	LIcensed Transmitter Cable Set	12/19/2021	Annual	12/19/2022	LTx5
-	LTx6-40	Licensed Transmitter Cable Set	12/19/2021	Annual	12/19/2022	LTx6-40
-	WL40-1	WLAN Cable Set (40GHz)	12/19/2021	Annual	12/19/2022	WL40-1
Anritsu	MT8000A	Radio Communication Test Station	8/2/2021	Annual	8/2/2022	6272337437
Anritsu	MT8821C	Radio Communication Analyzer	N/A			6201525694
Espec	ESX-2CA	Environmental Chamber	8/27/2020	Annual	8/27/2022	17620
ETS-Lindgren	3116C	DRG Horn Antenna	5/11/2021	Biennial	5/11/2023	218893
ETS Lindgren	3117	1-18 GHz DRG Horn (Medium)	4/20/2021	Biennial	4/20/2023	00125518
Keysight Technologies	N9030A	PXA Signal Analyzer (44GHz)	7/21/2021	Annual	7/21/2022	MY49430494
Keysight Technologies	N9030A	PXA Signal Analyzer (44GHz)	2/14/2022	Annual	2/14/2023	MY52350166
Keysight Technologies	N9030B	PXA Signal Analyzer, Multi-touch	1/7/2022	Annual	1/7/2023	MY57141001
Keysight Technologies	N9038A	MXE EMI Receiver	1/21/2022	Annual	1/21/2023	MY51210133
Rohde & Schwarz	CMW500	Radio Communication Tester	N/A			100976
Rohde & Schwarz	CMW500	Radio Communication Tester	N/A			112347
Rohde & Schwarz	ESU40	EMI Test Receiver (40GHz)	5/25/2021	Annual	7/25/2022	100348
Rohde & Schwarz	ESW44	EMI Test Receiver 2Hz to 44 GHz	3/28/2022	Annual	3/28/2023	101716
Rohde & Schwarz	TC-TA18	Cross Polarized Vivaldi Test Antenna	8/13/2020	Biennial	8/13/2022	101073
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	7/27/2020	Biennial	7/27/2022	A051107
Sunol	JB6	LB6 Antenna	11/13/2020	Biennial	11/13/2022	A082816

Table 5-1. Test Equipment

Notes:

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

2. Equipment with a calibration date of “N/A” shown in this list was not used to make direct calibrated measurements.

6.0 SAMPLE CALCULATIONS

GSM Emission Designator

Emission Designator = 250KGXW
GSM BW = 250 kHz
G = Phase Modulation
X = Cases not otherwise covered
W = Combination (Audio/Data)

EDGE Emission Designator

Emission Designator = 250KG7W
EDGE BW = 250 kHz
G = Phase Modulation
7 = Quantized/Digital Info
W = Combination (Audio/Data)

WCDMA Emission Designator

Emission Designator = 4M16F9W
WCDMA BW = 4.16 MHz
F = Frequency Modulation
9 = Composite Digital Info
W = Combination (Audio/Data)

QPSK Modulation

Emission Designator = 8M62G7D
LTE BW = 8.62 MHz
G = Phase Modulation
7 = Quantized/Digital Info
D = Data transmission, telemetry, telecommand

QAM Modulation

Emission Designator = 8M45W7D
LTE BW = 8.45 MHz
W = Amplitude/Angle Modulated
7 = Quantized/Digital Info
D = Data transmission, telemetry, telecommand

Spurious Radiated Emission

Example: Spurious emission at 3700.40 MHz

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

7.0 TEST RESULTS

7.1 Summary

Company Name: Samsung Electronics Co., Ltd.

FCC ID: A3LSMF936JPN

FCC Classification: PCS Licensed Transmitter Held to Ear (PCE)

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(a), 2.1046(c)	N/A	PASS	Section 7.2
	Occupied Bandwidth	2.1049(h)	N/A	PASS	Section 7.3
	Conducted Band Edge / Spurious Emissions	2.1051, 22.917(a)	≥ 43 + 10 log (P[Watts]) dB of attenuation below transmitter power	PASS	Sections 7.4, 7.5
	Peak-to-Average Ratio	N/A	≤ 13 dB	PASS	Section 7.6
	Frequency Stability	2.1055, 22.355	The carrier frequency of the transmitter must be maintained within the 2.5ppm	PASS	Section 7.9
RADIATED	Effective Radiated Power / Equivalent Isotropic Radiated Power	22.913(a)(5)	< 7 Watts max. ERP	PASS	Section 7.7
	Radiated Spurious Emissions	2.1053, 22.917(a)	> 43 + 10 log10 (P[Watts]) for all out-of-band emissions	PASS	Section 7.8

Table 7-1. Summary of Test Results

Notes:

1) All modes of operation and data rates were investigated. The test results shown in the following sections represent the worst case emissions.
2) The analyzer plots were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables, directional couplers, and attenuators used as part of the system to maintain a link between the call box and the EUT at all frequencies of interest.
3) All antenna port conducted emissions testing was performed on a test bench with the antenna port of the EUT connected to the spectrum analyzer through calibrated cables, attenuators, and couplers.
4) All conducted emissions measurements are performed with automated test software to capture the corresponding plots necessary to show compliance. The measurement software utilized is EMC Software Tool v1.1.

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 ≥ 3 x RBW
4. Detector = Peak
5. Trace mode = max hold
6. Sweep = auto couple
7. The trace was allowed to stabilize
8. If necessary, steps 2 – 7 were repeated after changing the RBW such that it would be within 1 – 5% of the 99% occupied bandwidth observed in Step 7

Test Setup

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

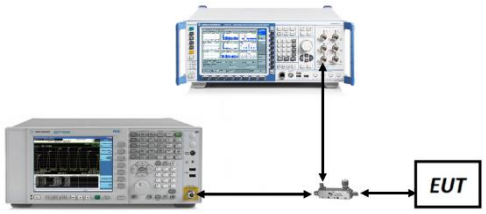
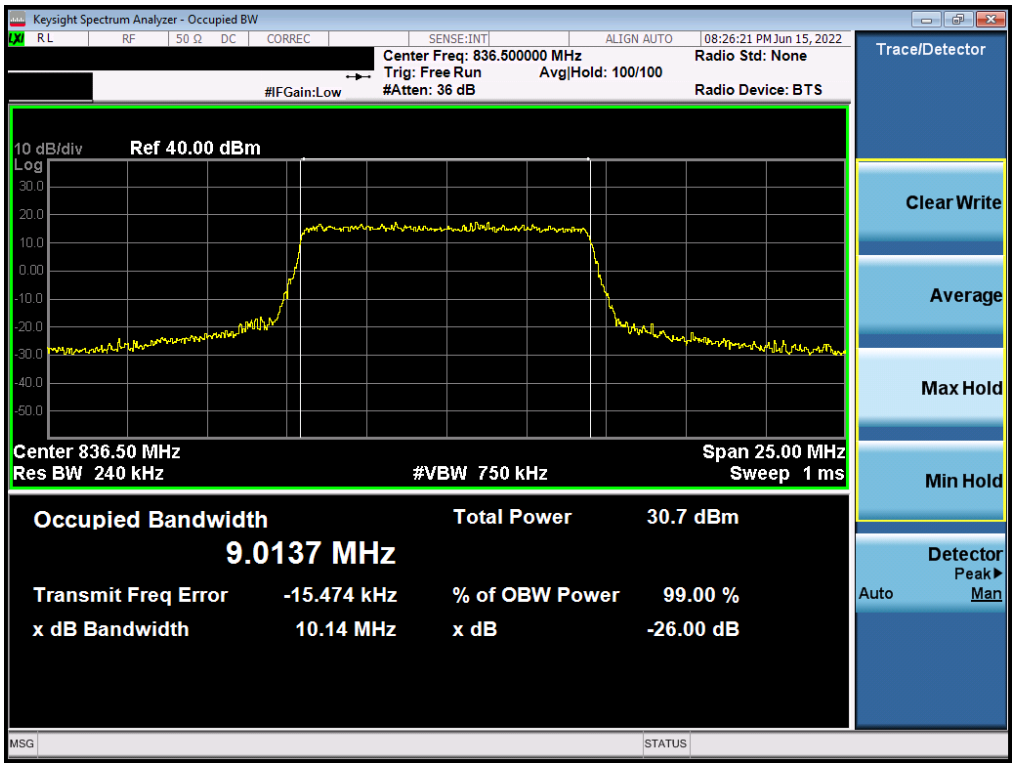


Figure 7-1. Test Instrument & Measurement Setup

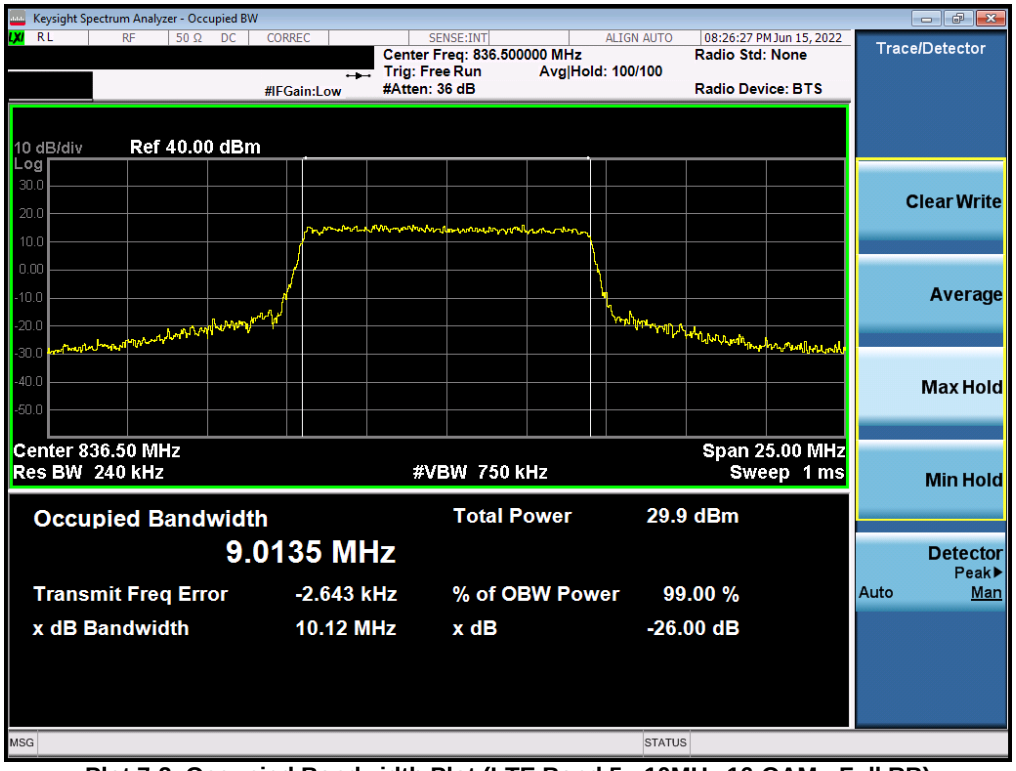
Test Notes

None.

LTE Band 5

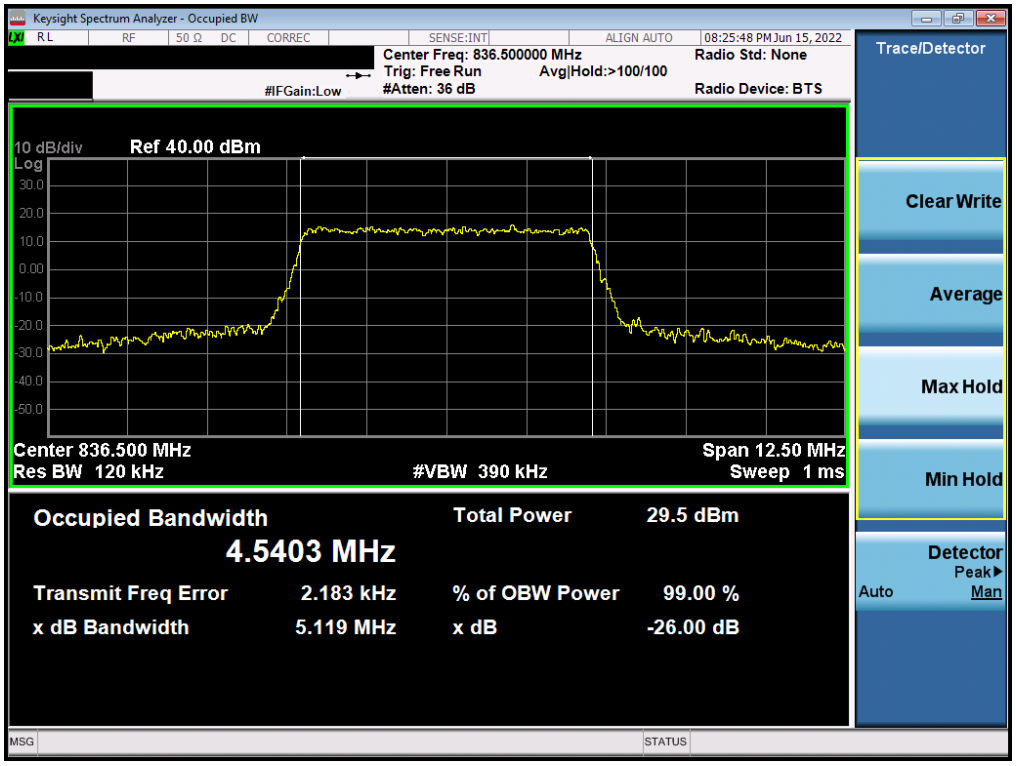


Plot 7-1. Occupied Bandwidth Plot (LTE Band 5 - 10MHz QPSK - Full RB)

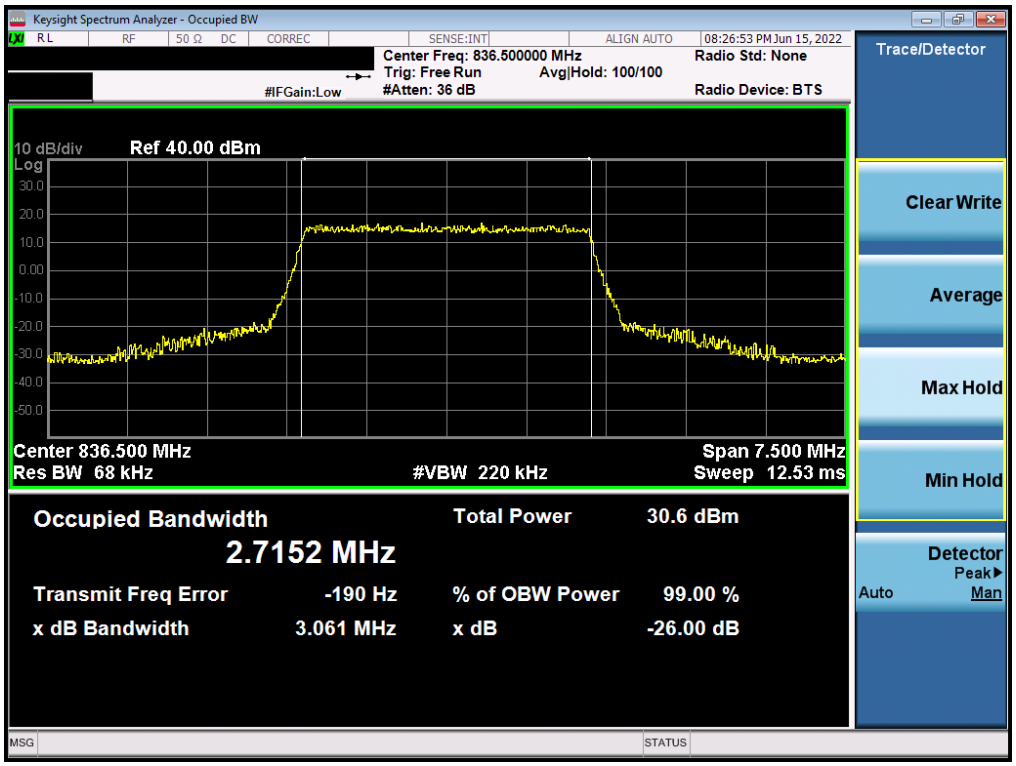


Plot 7-2. Occupied Bandwidth Plot (LTE Band 5 - 10MHz 16-QAM - Full RB)

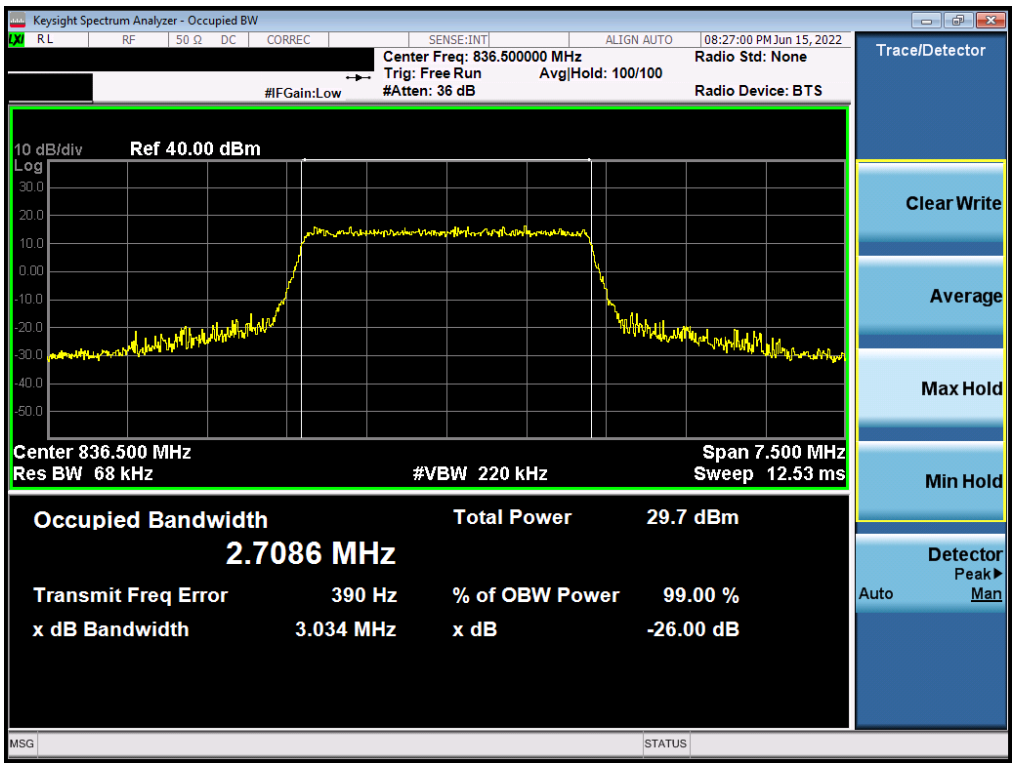
Plot 7-3. Occupied Bandwidth Plot (LTE Band 5 - 5MHz QPSK - Full RB)



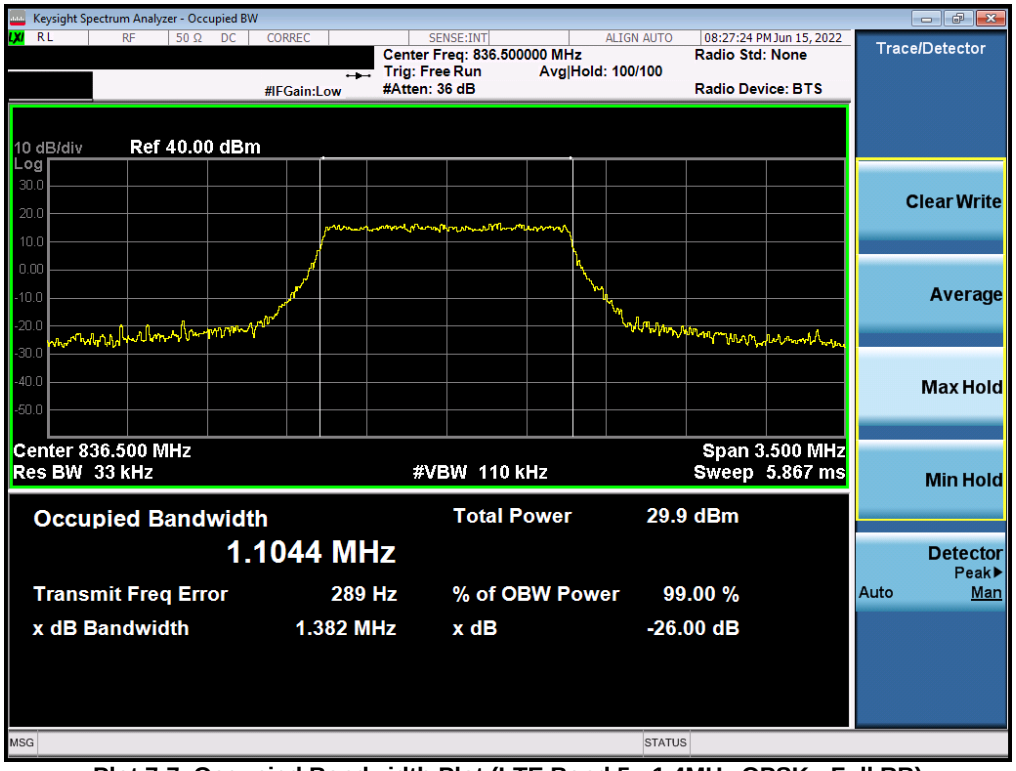
Plot 7-4. Occupied Bandwidth Plot (LTE Band 5 - 5MHz 16-QAM - Full RB)



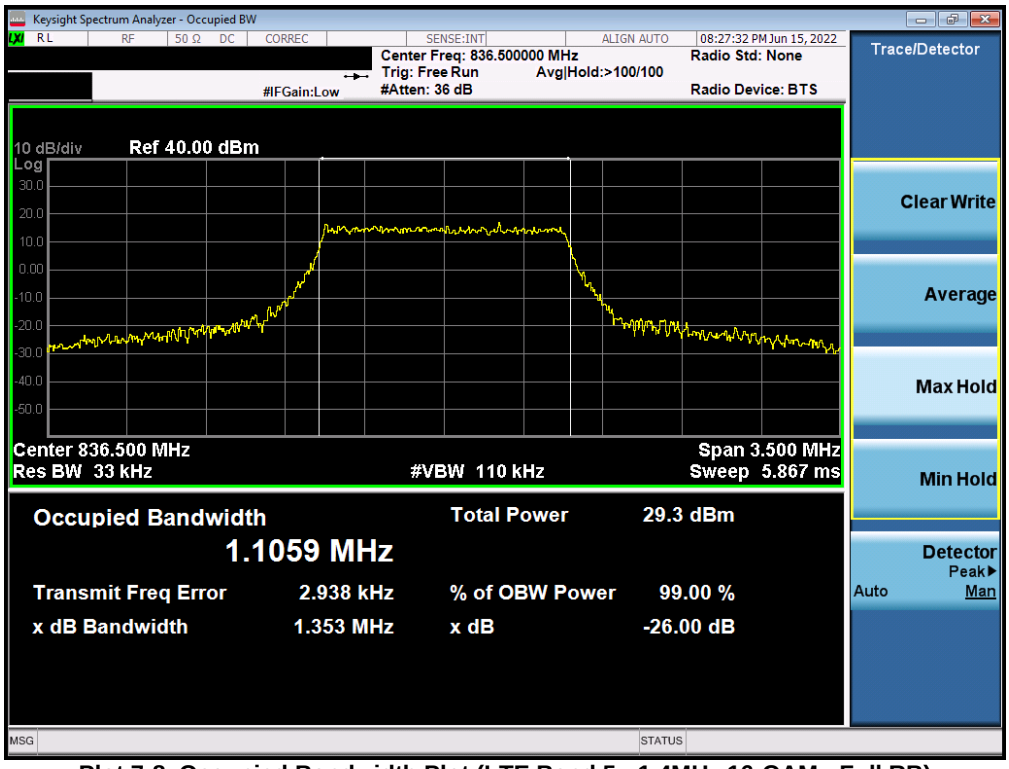
Plot 7-5. Occupied Bandwidth Plot (LTE Band 5 - 3MHz QPSK - Full RB)



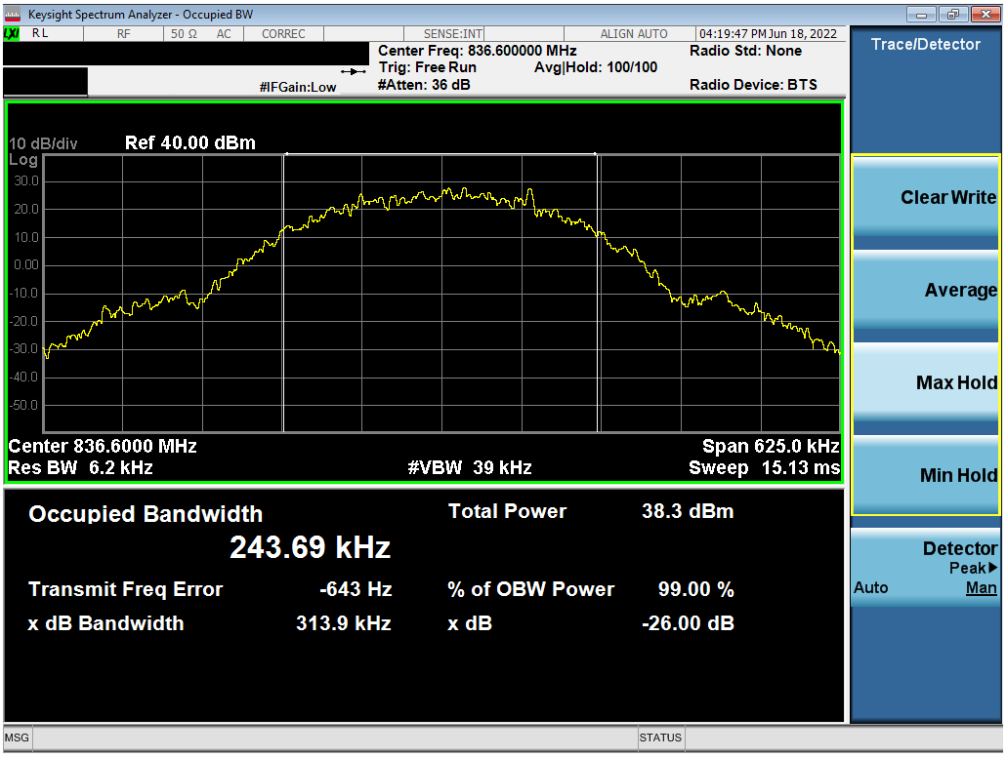
Plot 7-6. Occupied Bandwidth Plot (LTE Band 5 - 3MHz 16-QAM - Full RB)



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



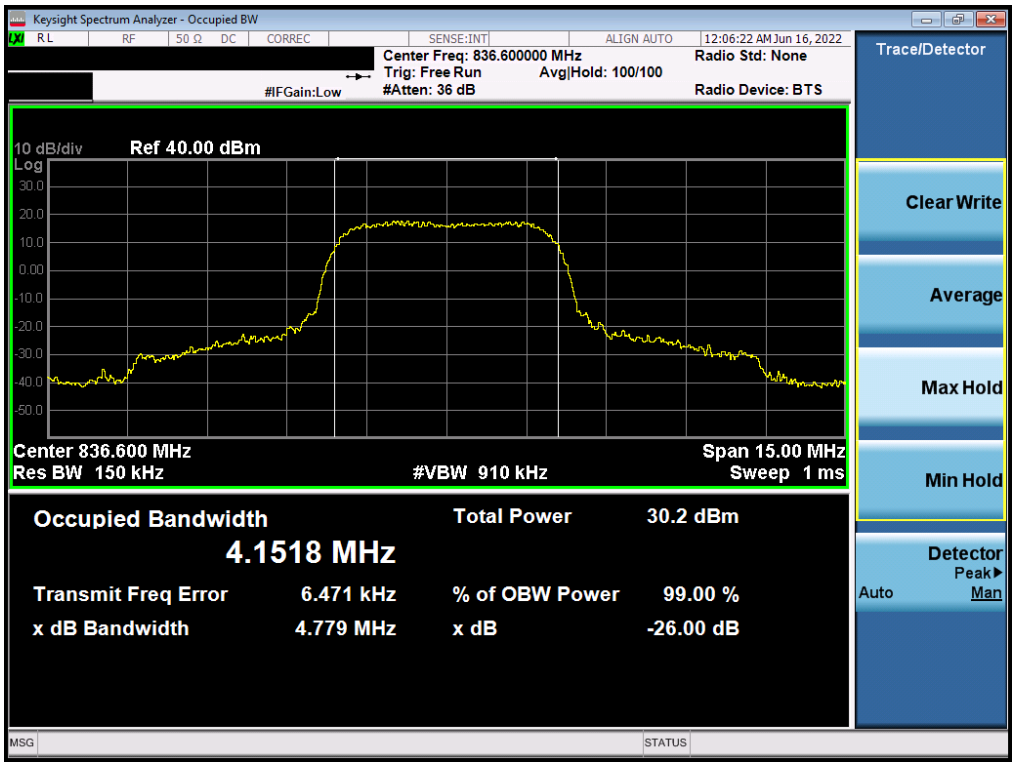
Plot 7-8. Occupied Bandwidth Plot (LTE Band 5 - 1.4MHz 16-QAM - Full RB)



Plot 7-9. Occupied Bandwidth Plot (GPRS, Ch. 190)

Plot 7-10. Occupied Bandwidth Plot (EDGE, Ch. 190)

WCDMA Cell



Plot 7-11. Occupied Bandwidth Plot (WCDMA, Ch. 4183)

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 $log_{10}(P_{[Watts]})$, 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.

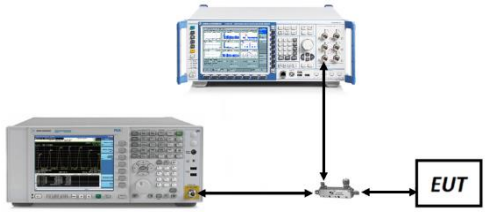
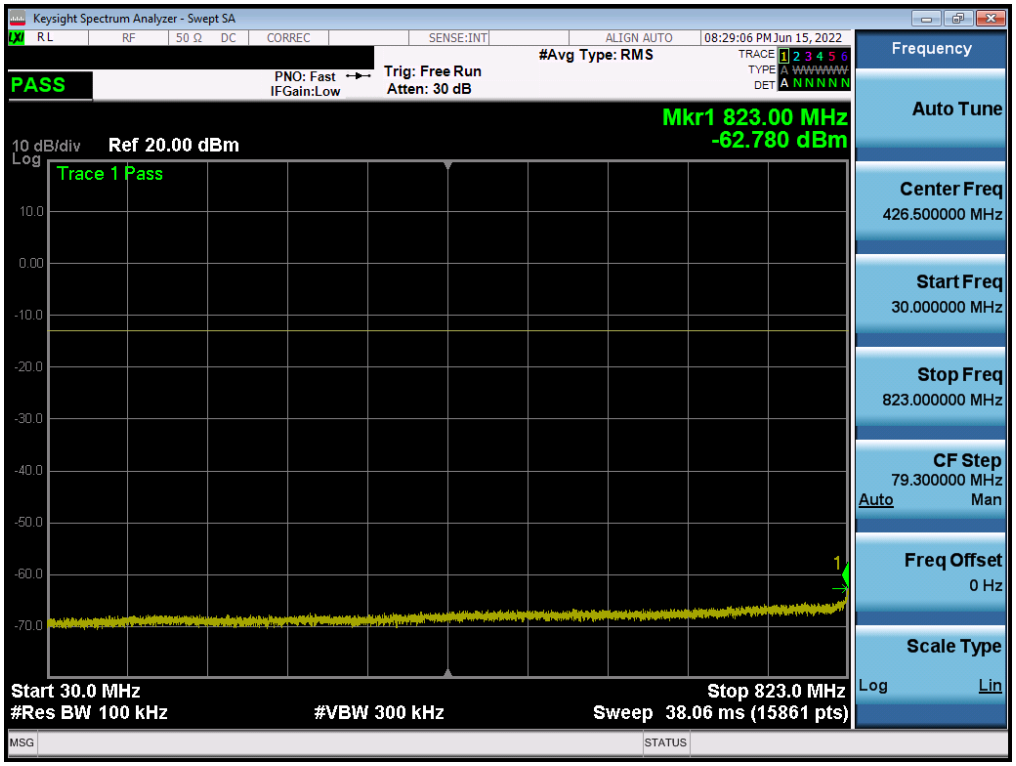


Figure 7-2. Test Instrument & Measurement Setup

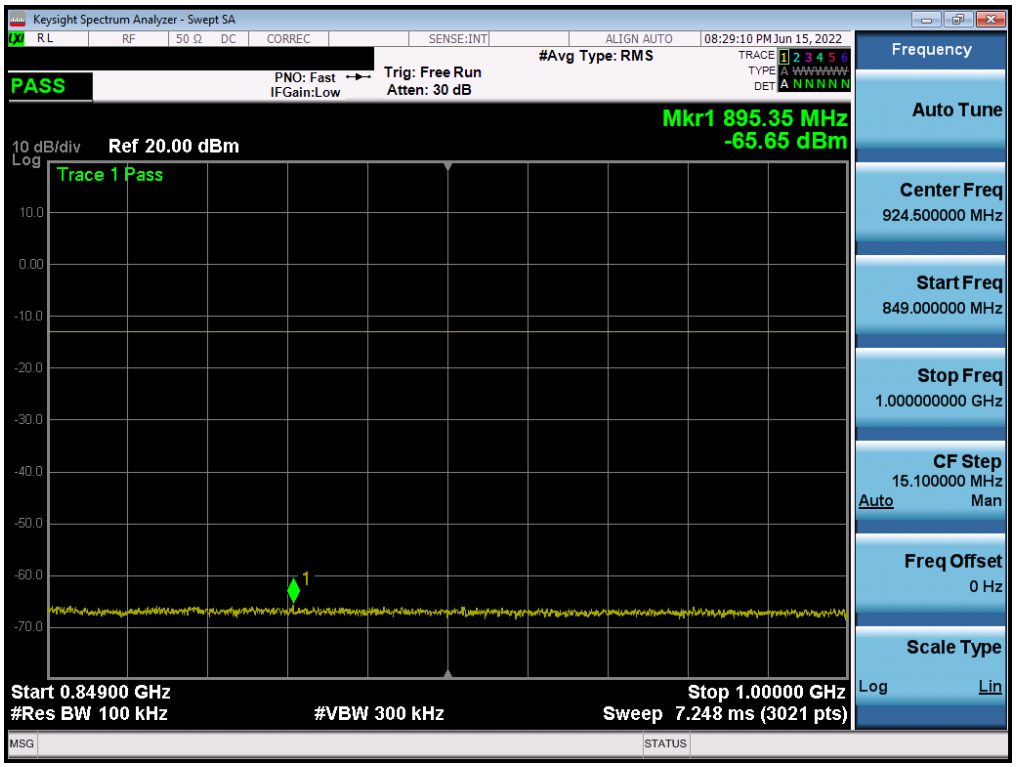
Test Notes

1. Per Part 22, 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.

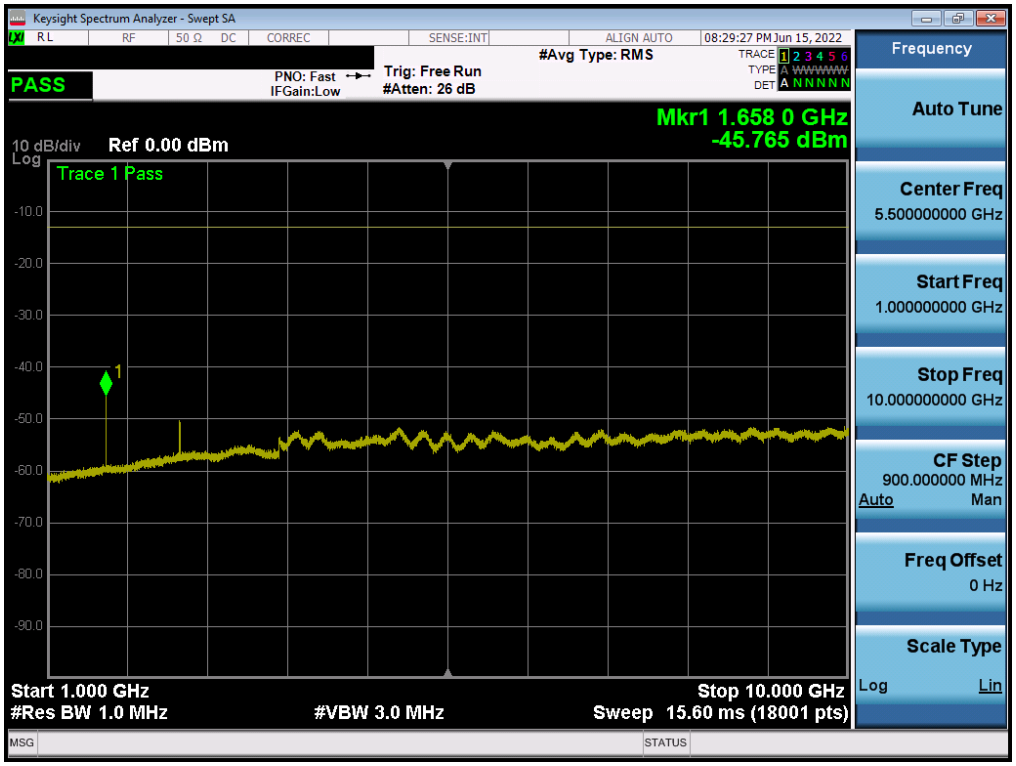
LTE Band 5



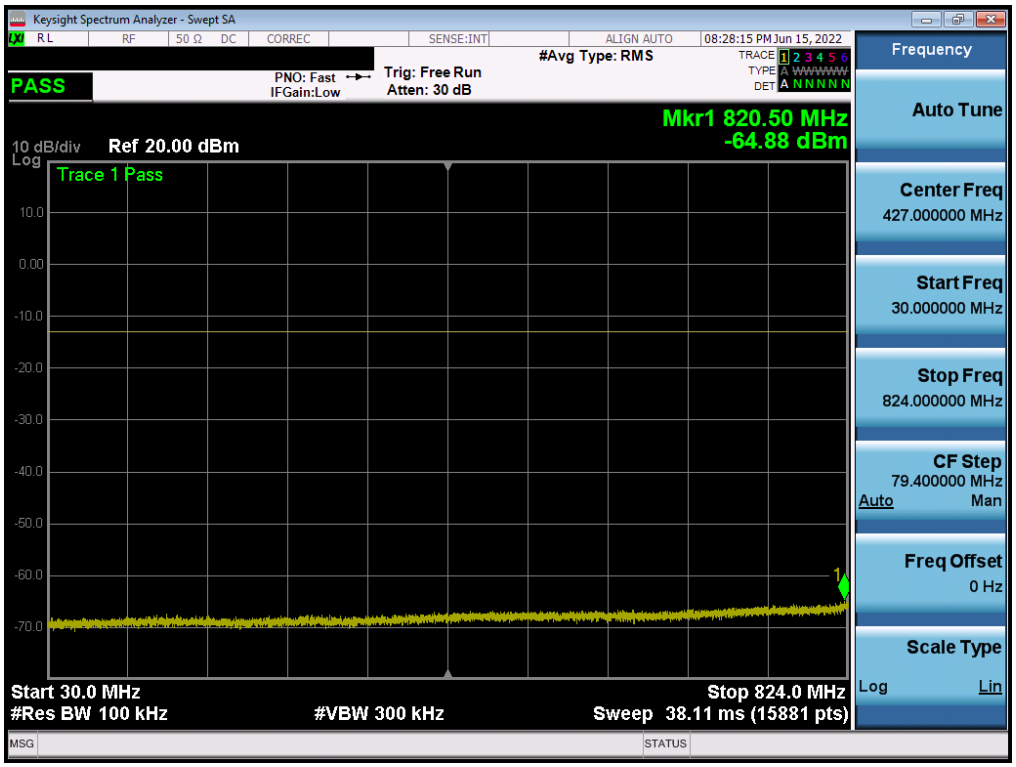
Plot 7-12. Conducted Spurious Plot (LTE Band 5 - 10MHz QPSK - 1 RB - Low Channel)



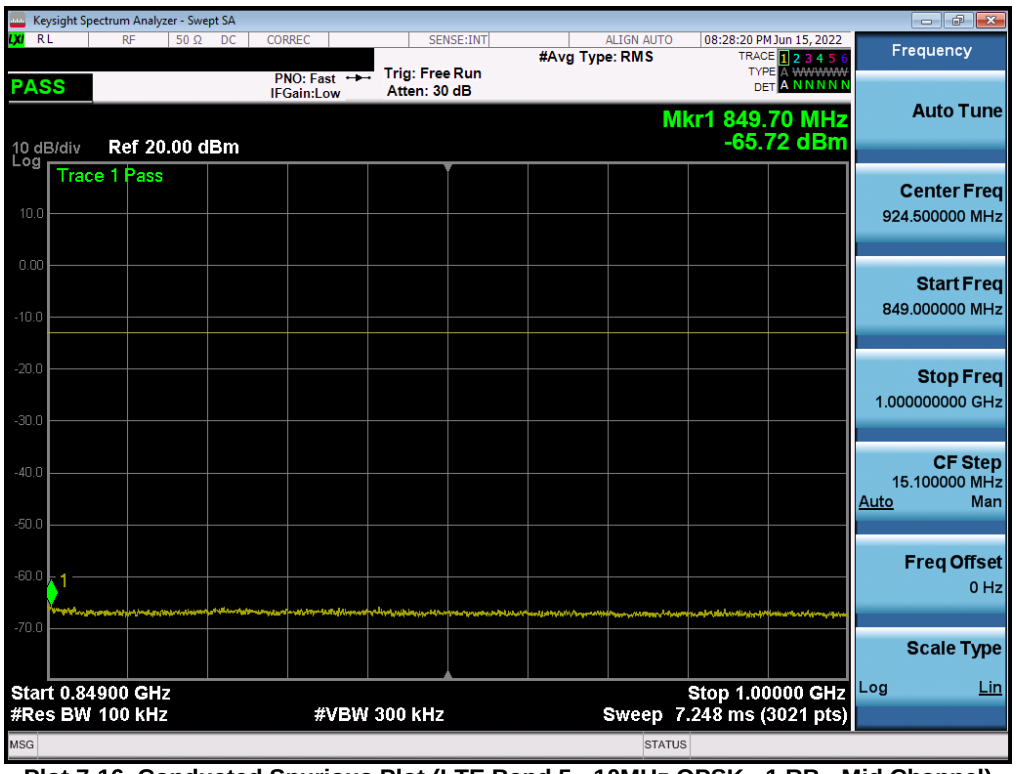
Plot 7-13. Conducted Spurious Plot (LTE Band 5 - 10MHz QPSK - 1 RB - Low Channel)



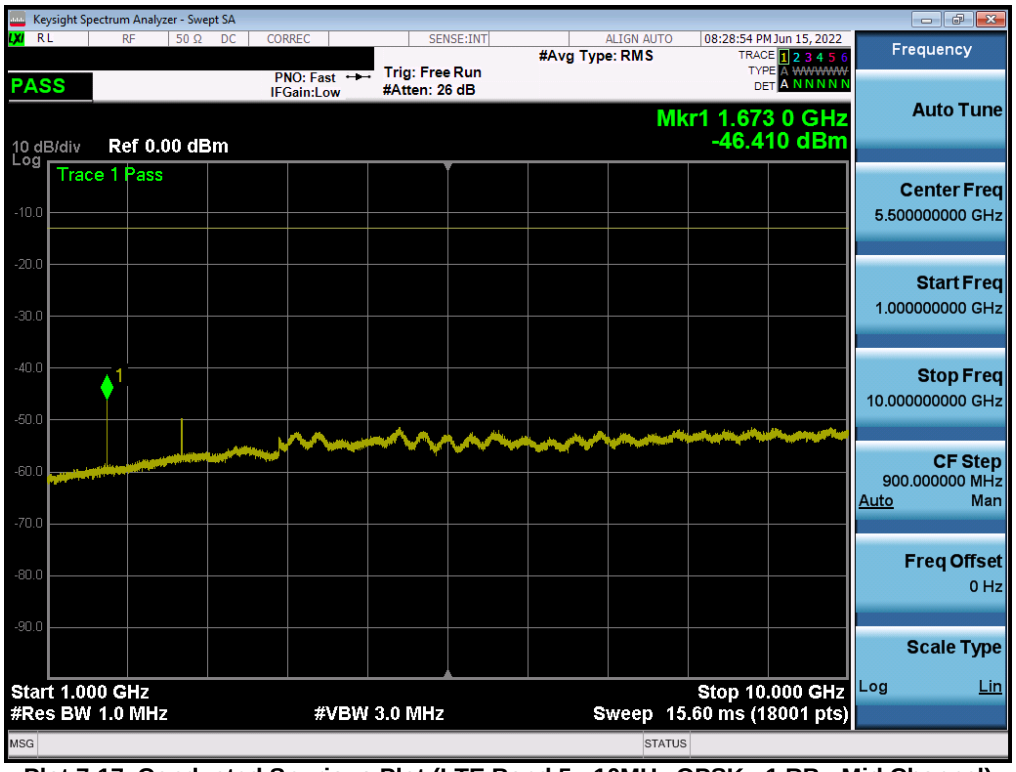
Plot 7-14. Conducted Spurious Plot (LTE Band 5 - 10MHz QPSK - 1 RB - Low Channel)



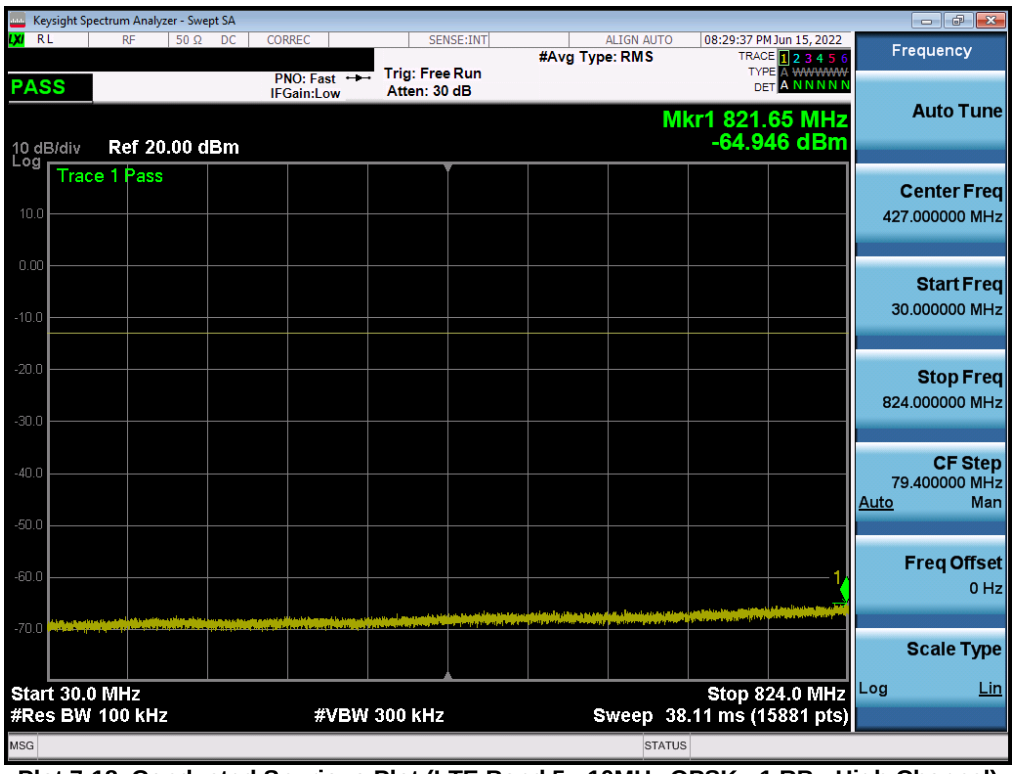
Plot 7-15. Conducted Spurious Plot (LTE Band 5 - 10MHz QPSK - 1 RB - Mid Channel)



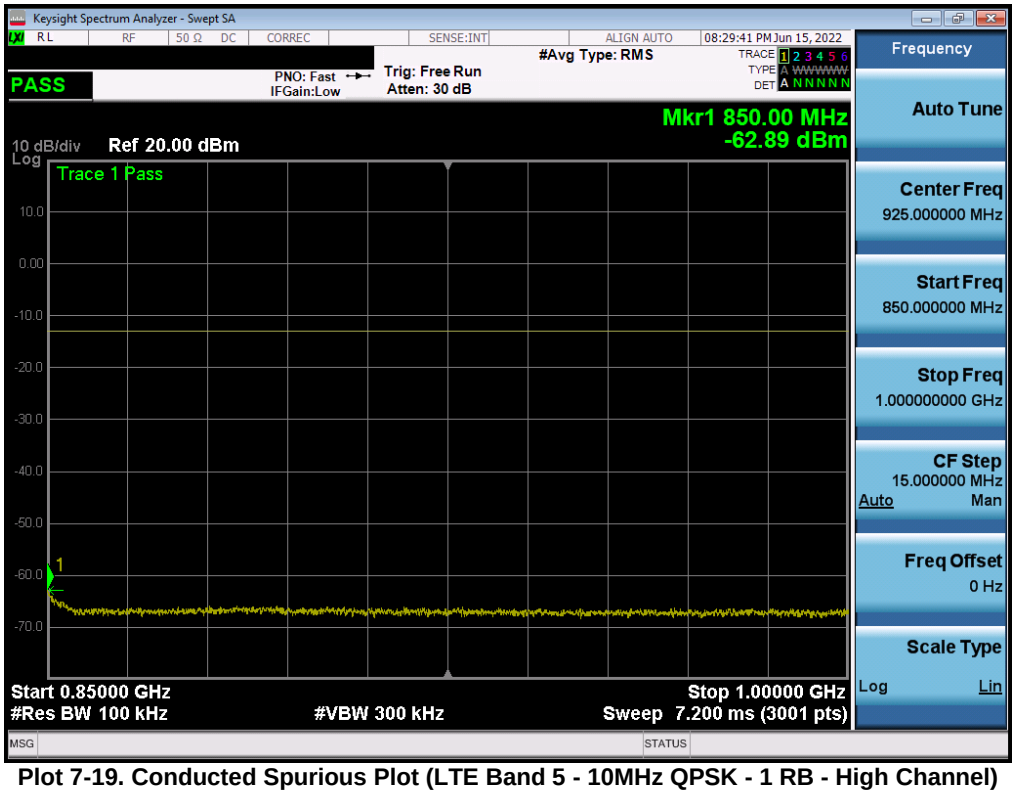
Plot 7-16. Conducted Spurious Plot (LTE Band 5 - 10MHz QPSK - 1 RB - Mid Channel)



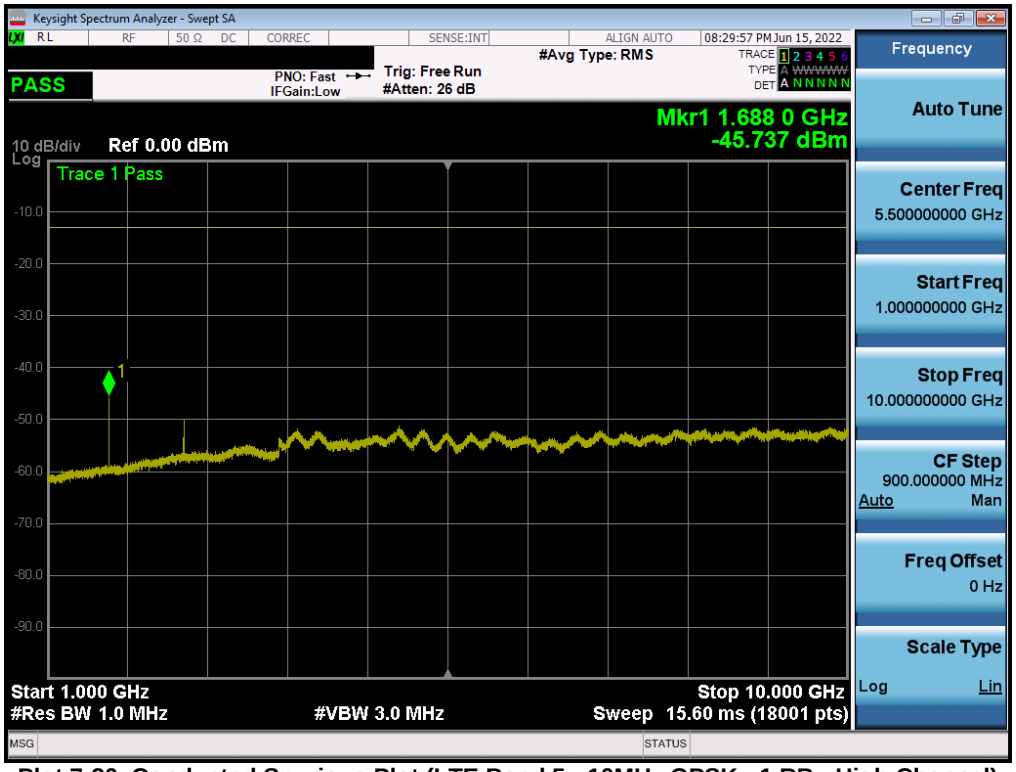
Plot 7-17. Conducted Spurious Plot (LTE Band 5 - 10MHz QPSK - 1 RB - Mid Channel)



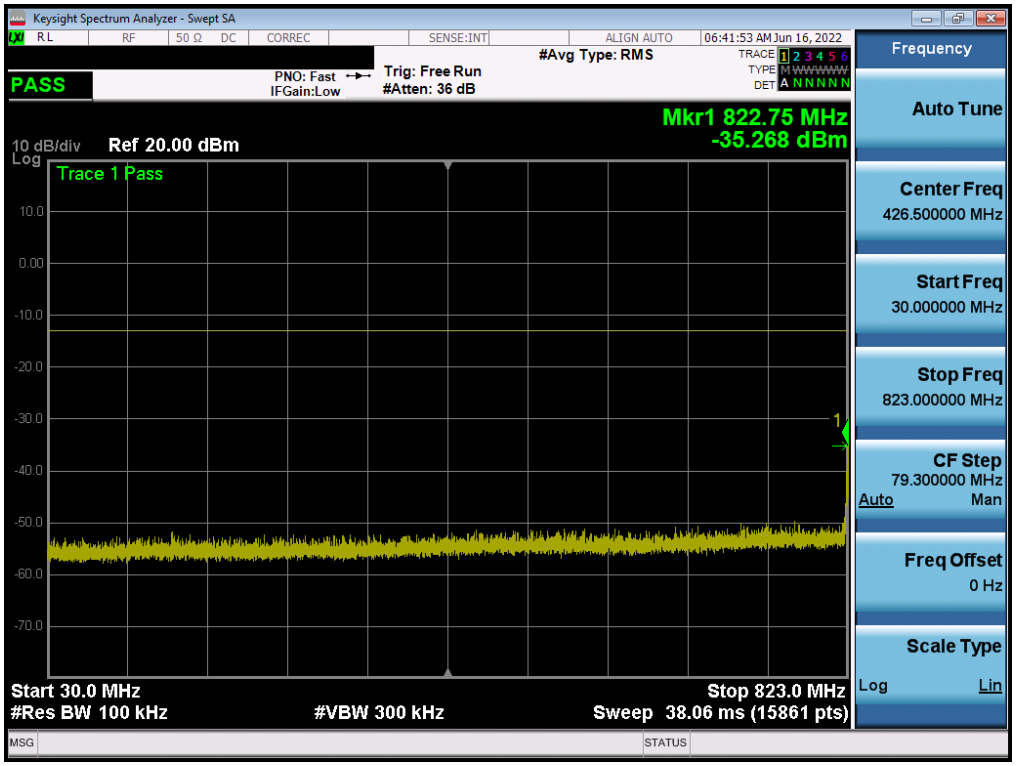
Plot 7-18. Conducted Spurious Plot (LTE Band 5 - 10MHz QPSK - 1 RB - High Channel)



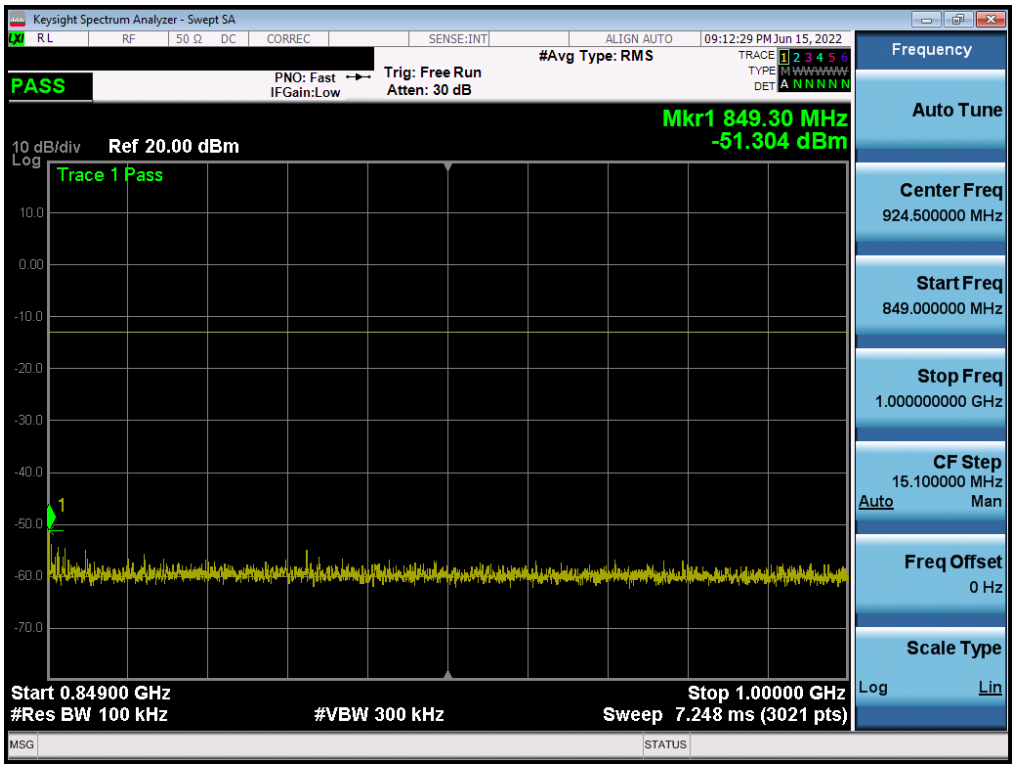
Plot 7-19. Conducted Spurious Plot (LTE Band 5 - 10MHz QPSK - 1 RB - High Channel)



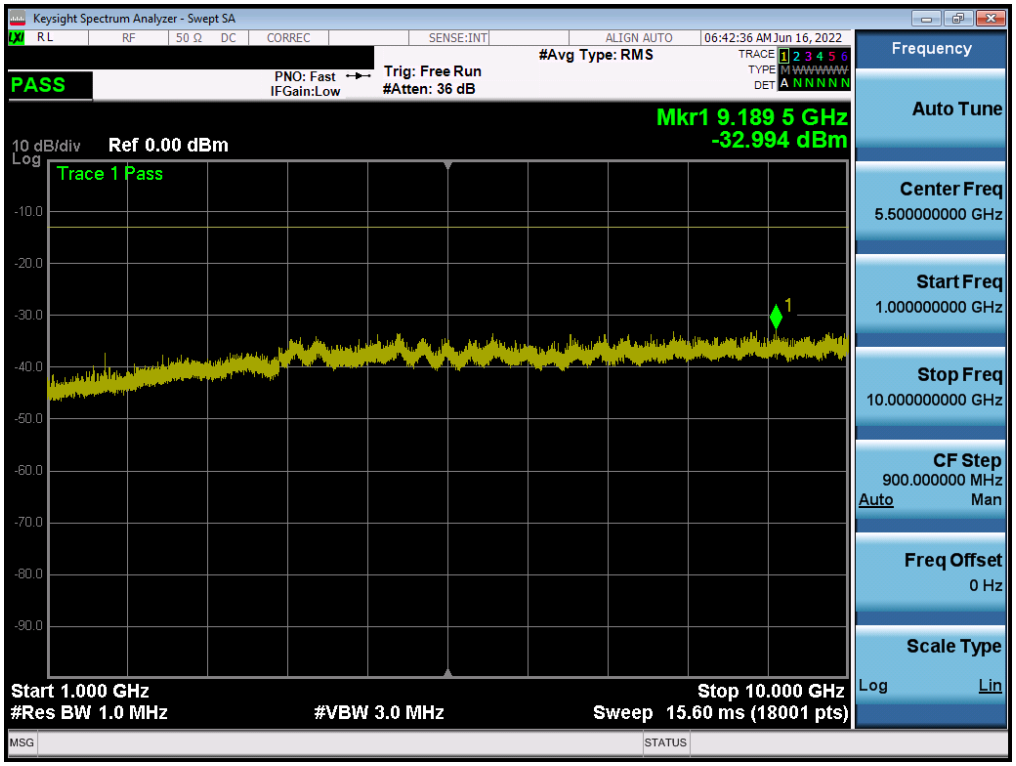
Plot 7-20. Conducted Spurious Plot (LTE Band 5 - 10MHz QPSK - 1 RB - High Channel)



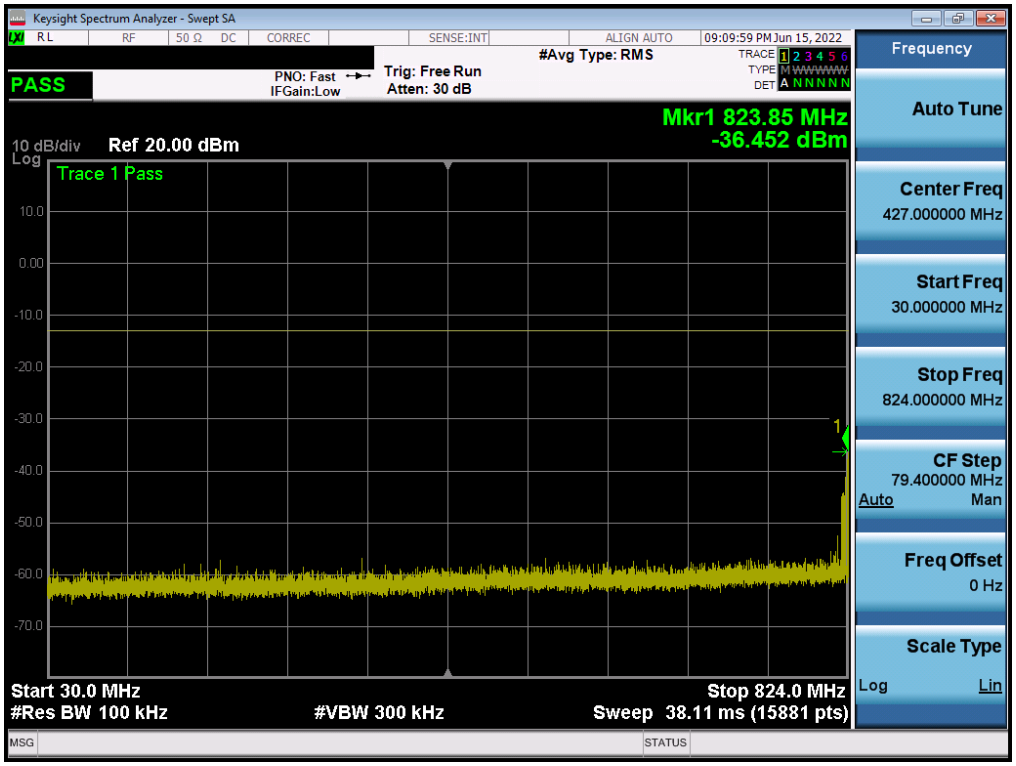
Plot 7-21. Conducted Spurious Plot (GPRS Ch. 128)



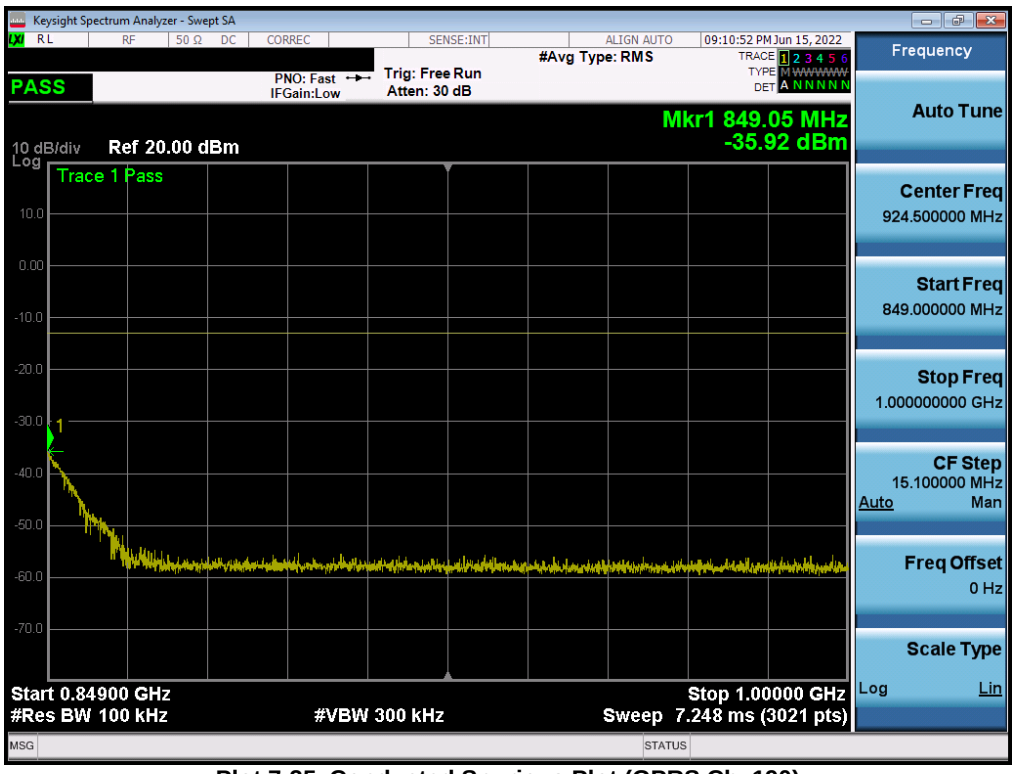
Plot 7-22. Conducted Spurious Plot (GPRS Ch. 128)



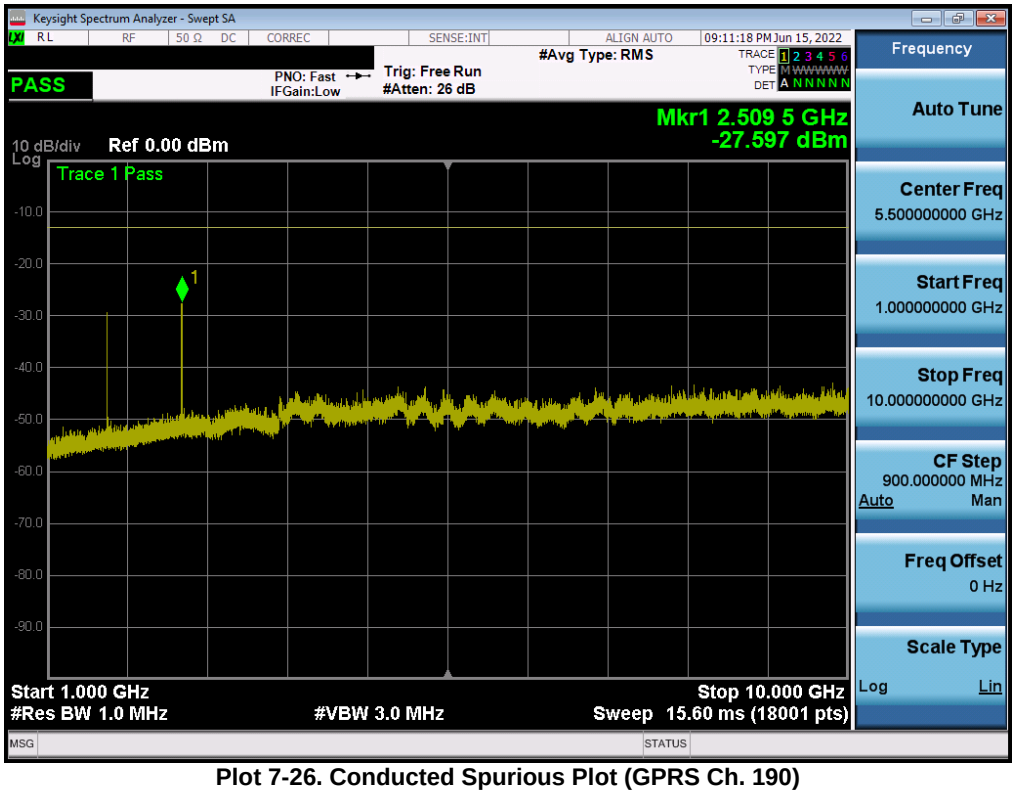
Plot 7-23. Conducted Spurious Plot (GPRS Ch. 128)



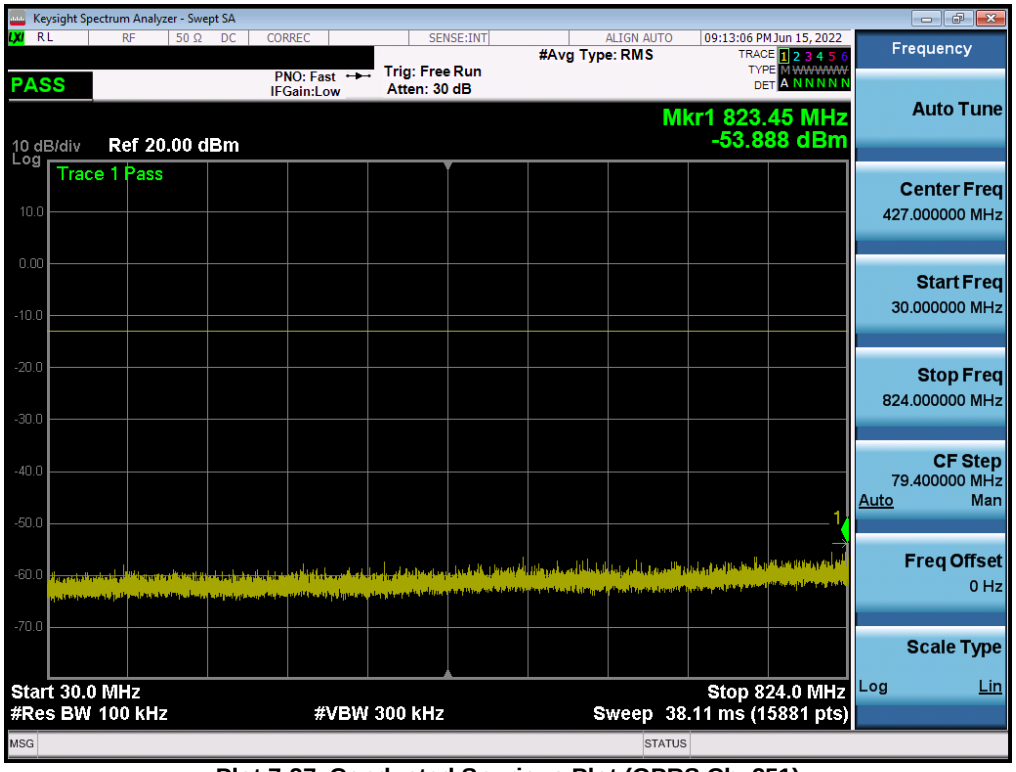
Plot 7-24. Conducted Spurious Plot (GPRS Ch. 190)



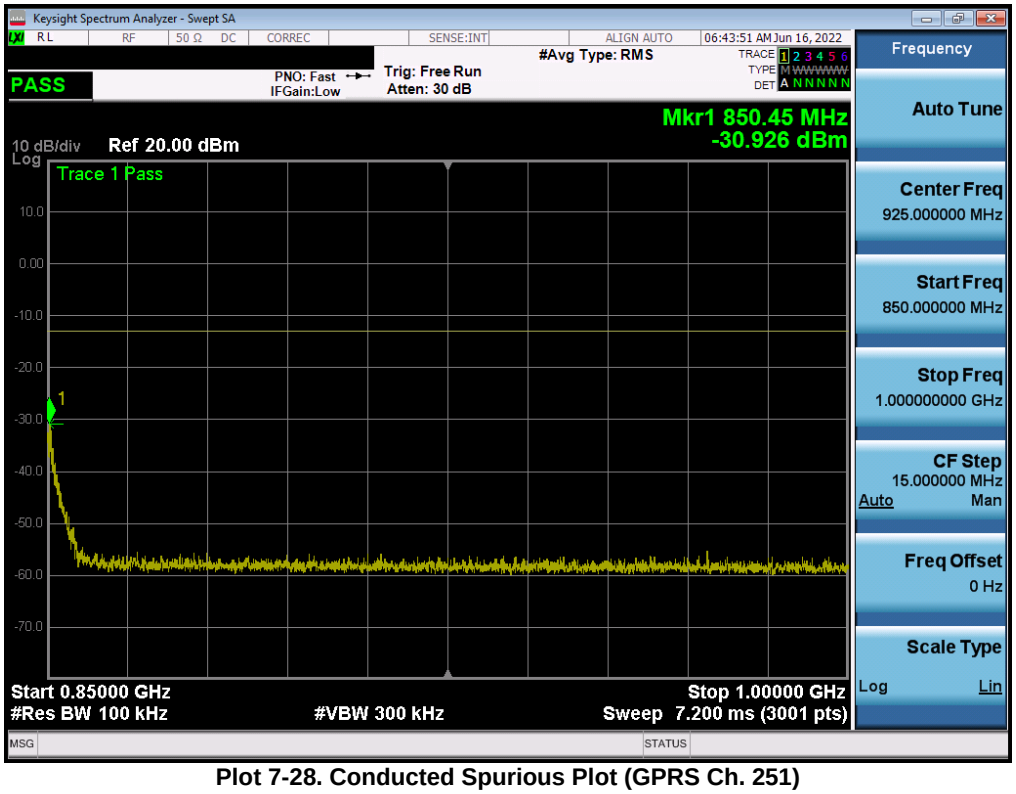
Plot 7-25. Conducted Spurious Plot (GPRS Ch. 190)



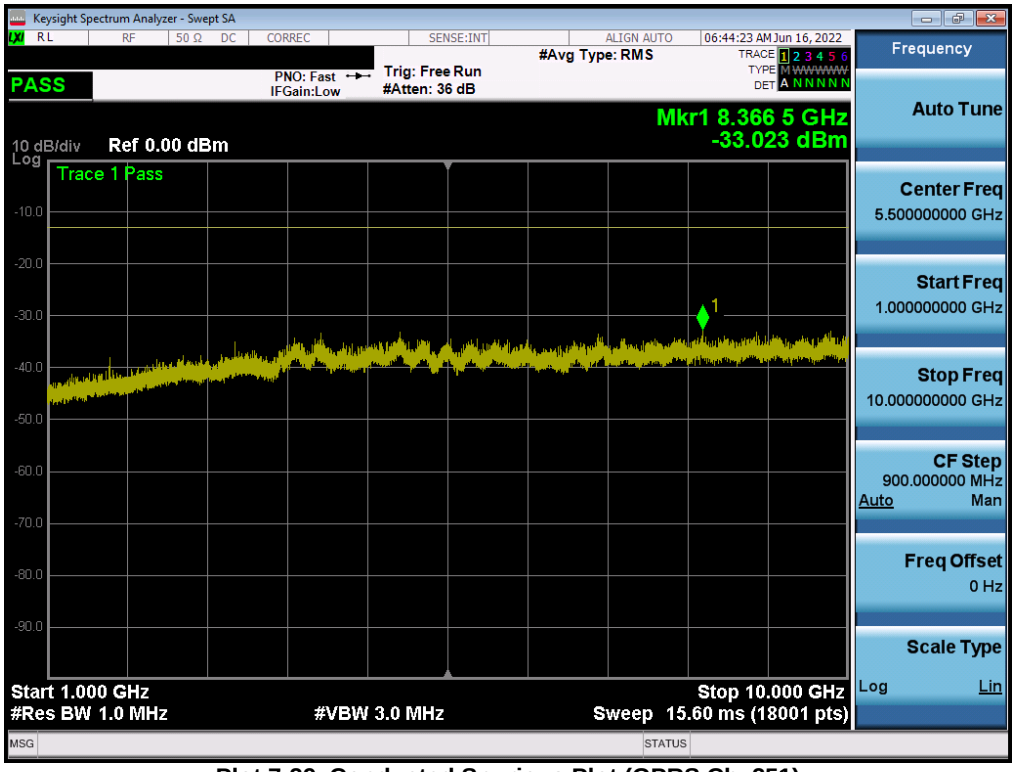
Plot 7-26. Conducted Spurious Plot (GPRS Ch. 190)



Plot 7-27. Conducted Spurious Plot (GPRS Ch. 251)

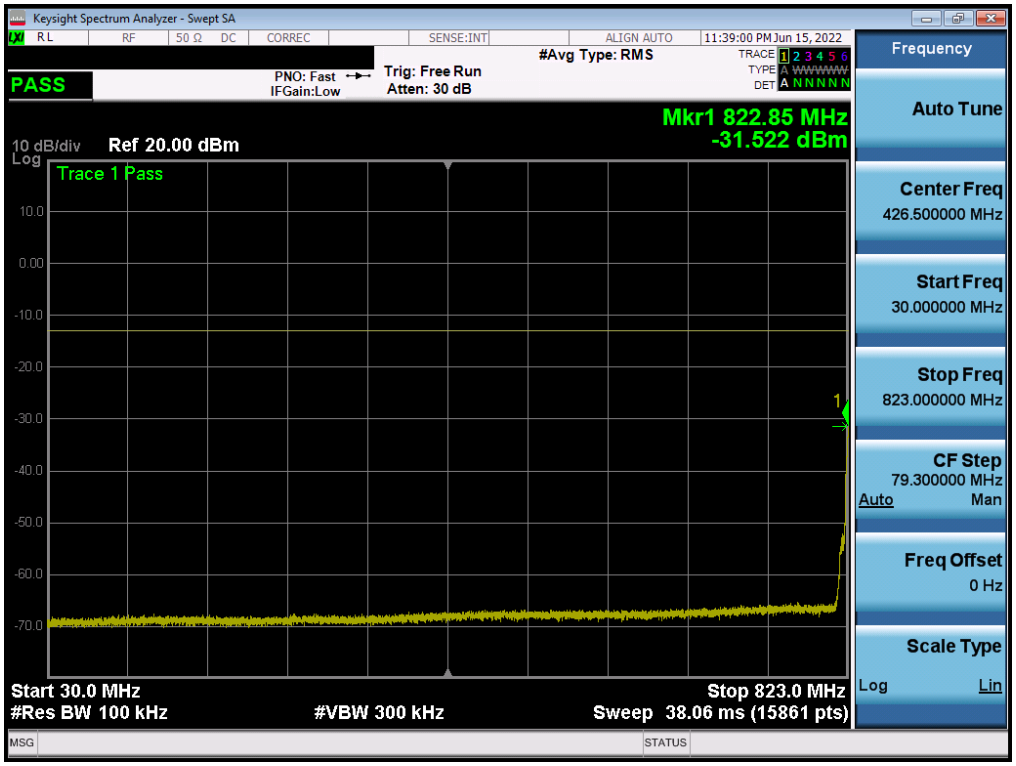


Plot 7-28. Conducted Spurious Plot (GPRS Ch. 251)

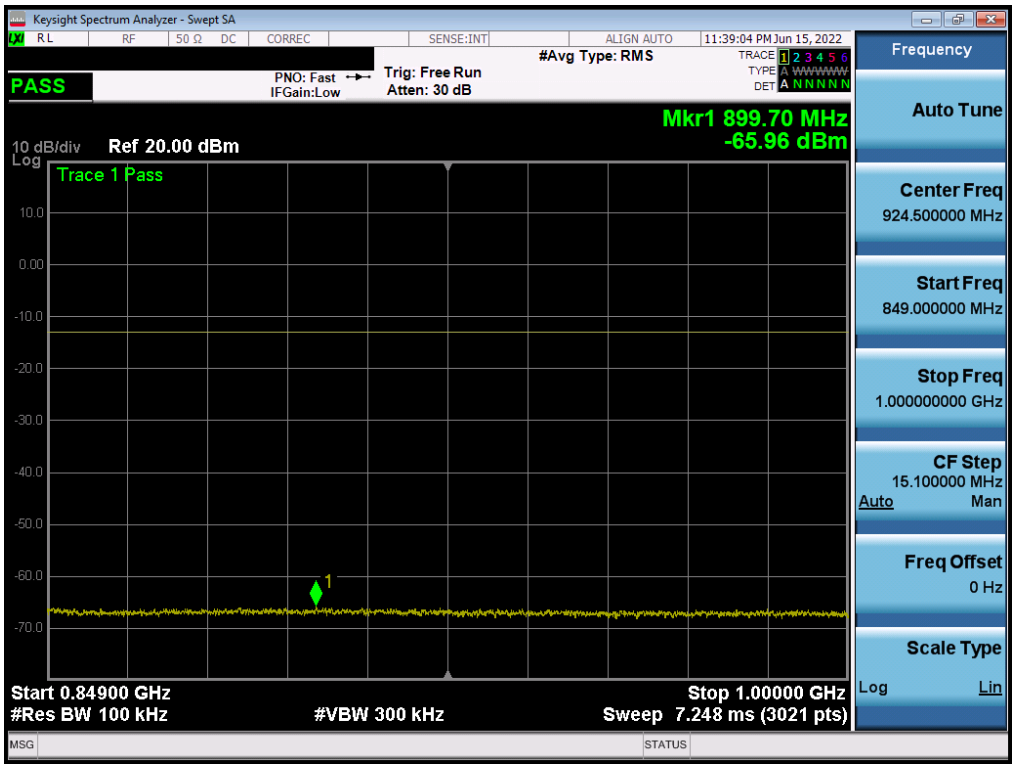


Plot 7-29. Conducted Spurious Plot (GPRS Ch. 251)

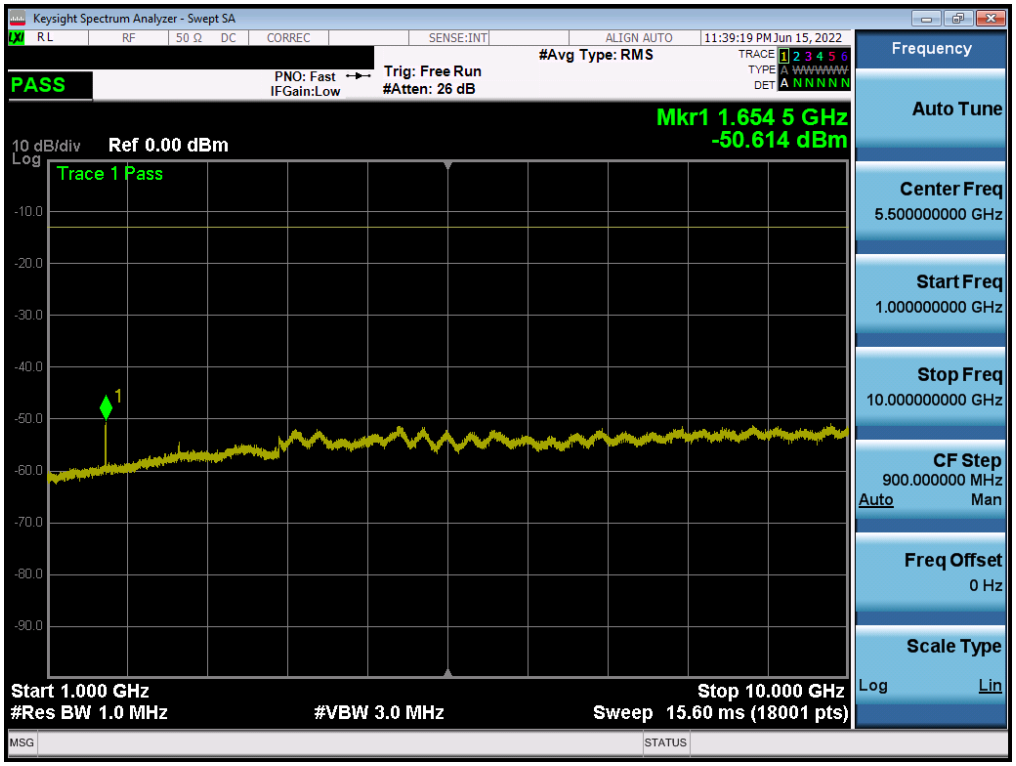
WCDMA Cell



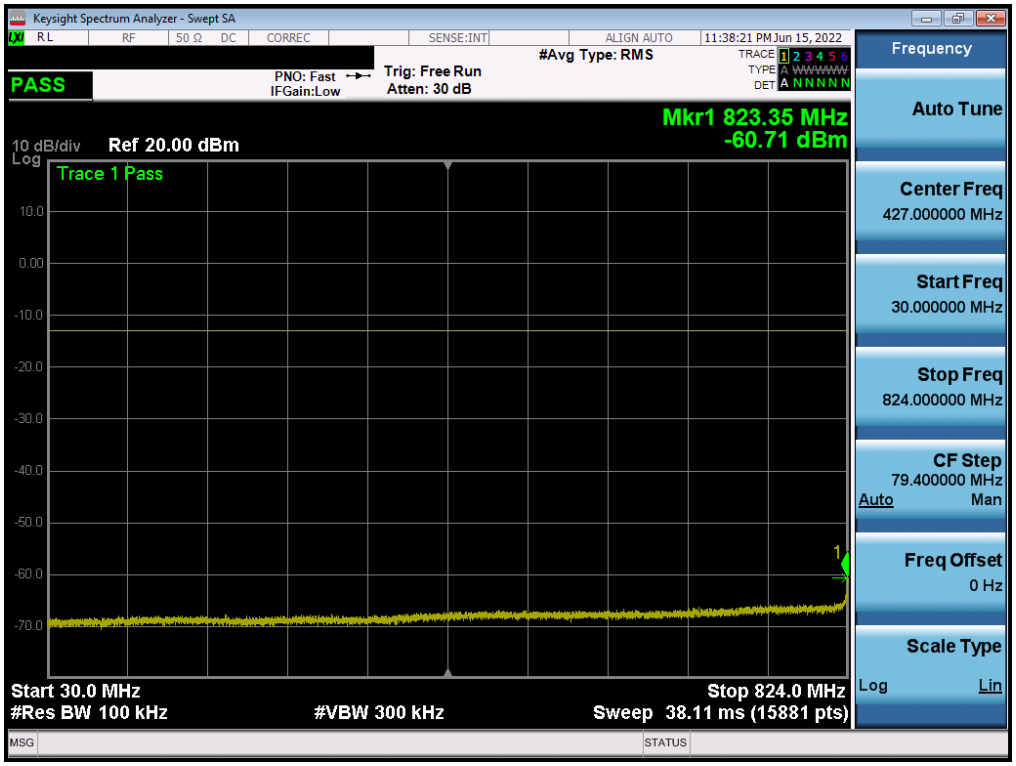
Plot 7-30. Conducted Spurious Plot (WCDMA Ch. 4132)



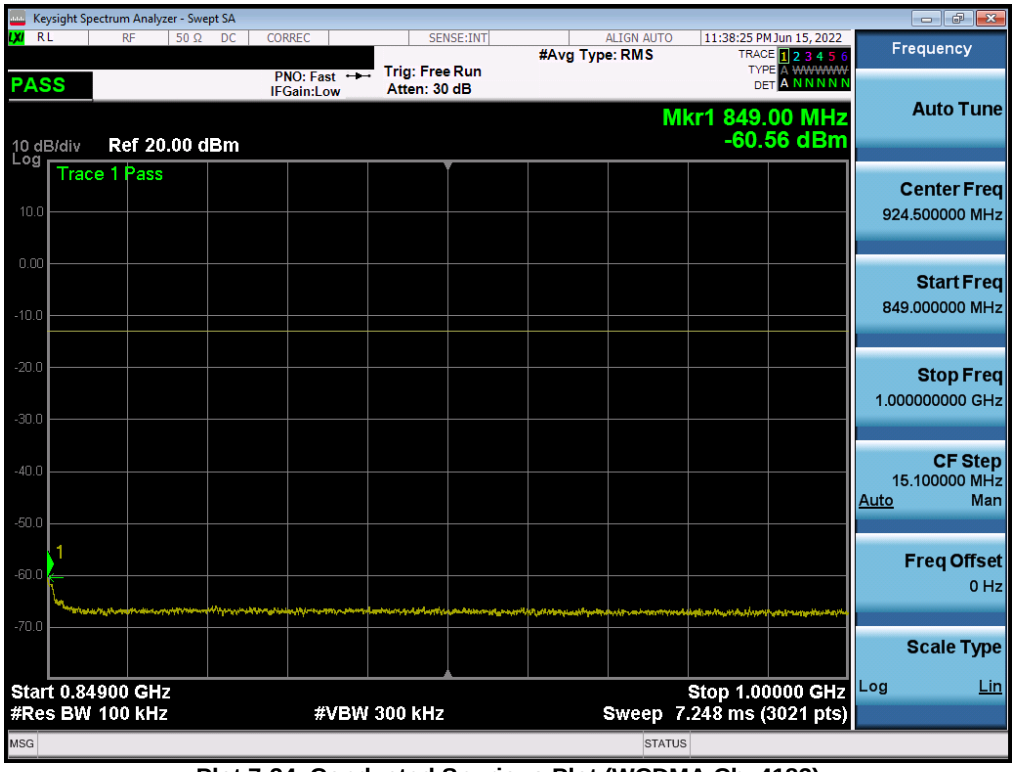
Plot 7-31. Conducted Spurious Plot (WCDMA Ch. 4132)



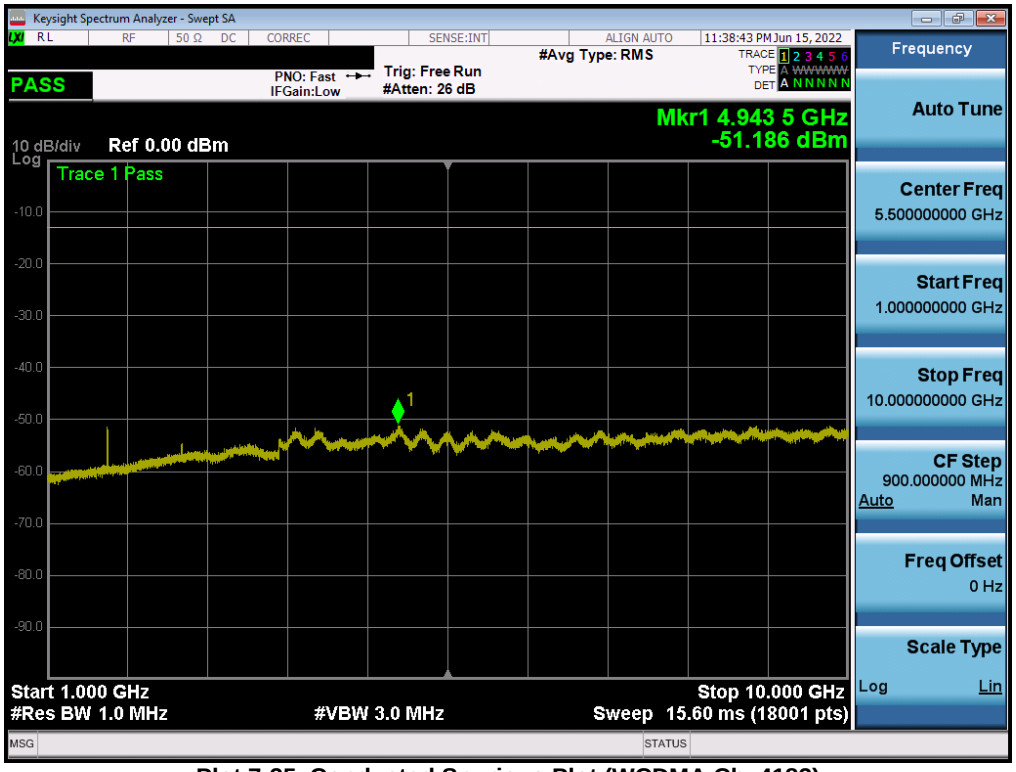
Plot 7-32. Conducted Spurious Plot (WCDMA Ch. 4132)



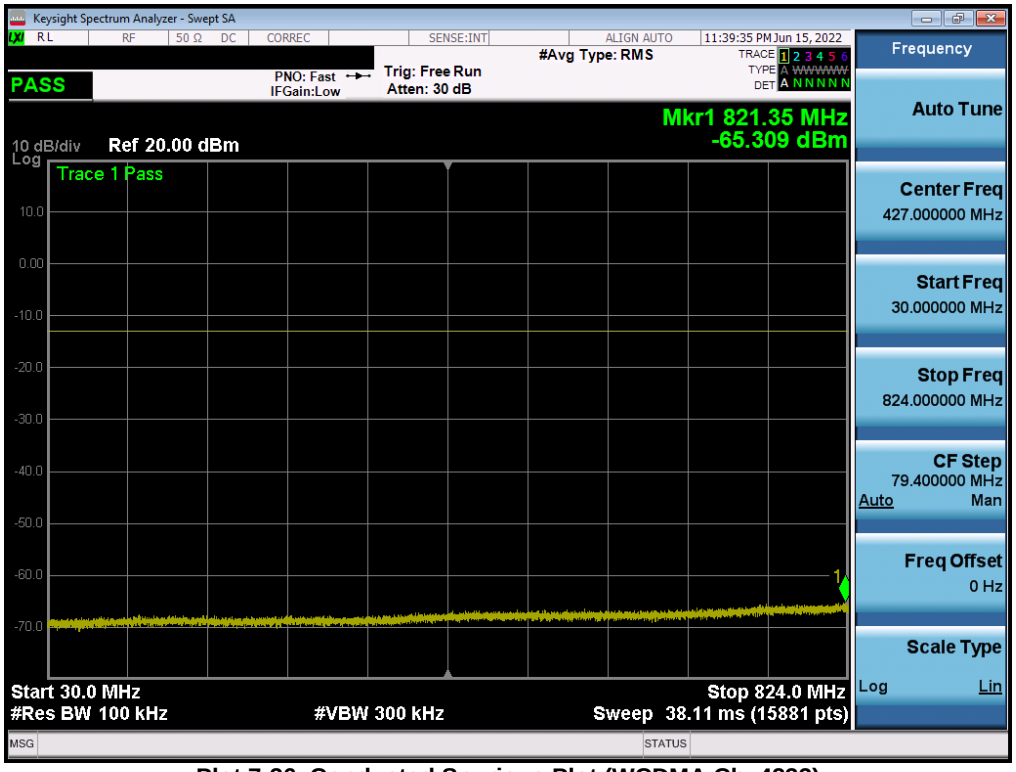
Plot 7-33. Conducted Spurious Plot (WCDMA Ch. 4183)



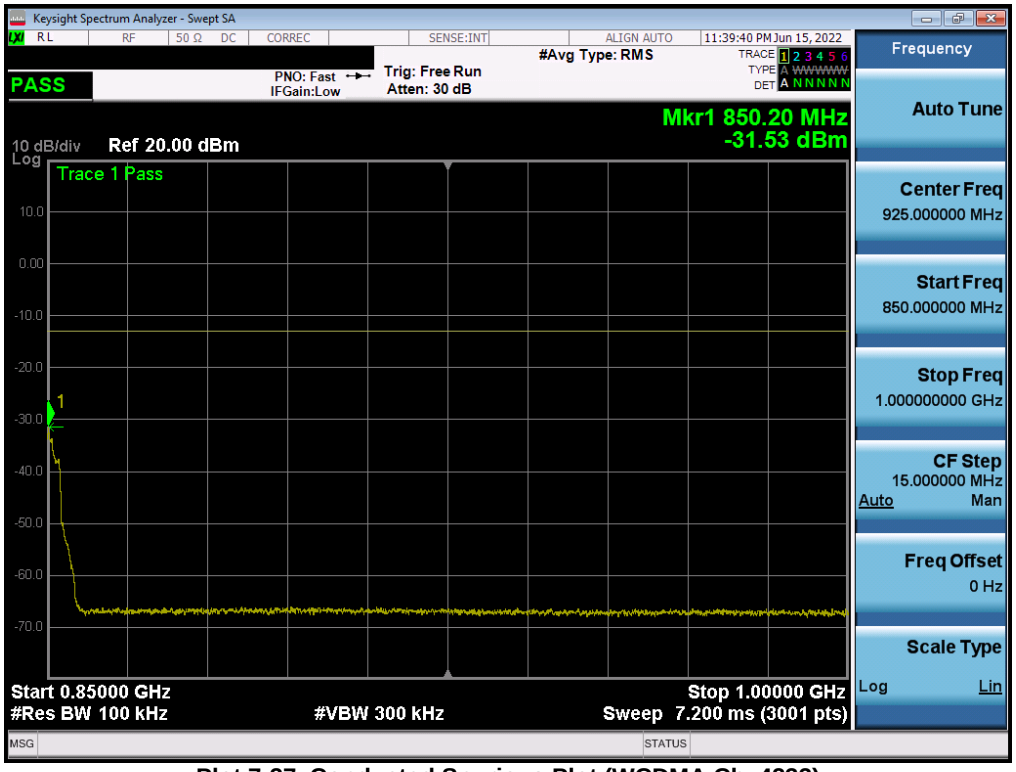
Plot 7-34. Conducted Spurious Plot (WCDMA Ch. 4183)



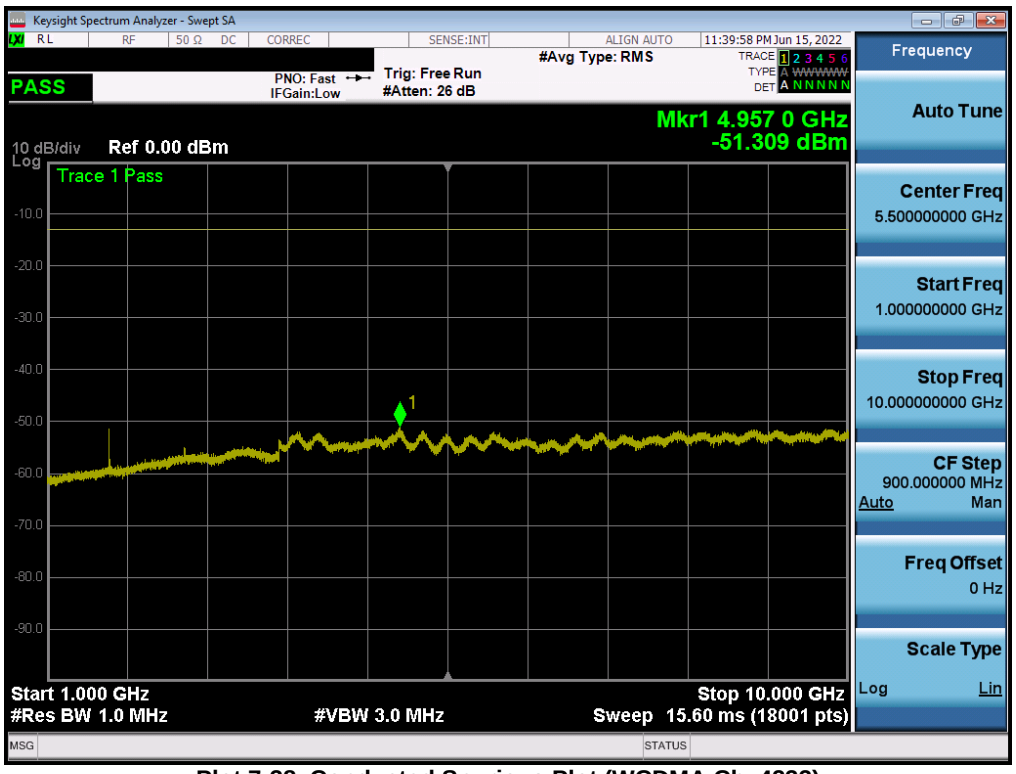
Plot 7-35. Conducted Spurious Plot (WCDMA Ch. 4183)



Plot 7-36. Conducted Spurious Plot (WCDMA Ch. 4233)



Plot 7-37. Conducted Spurious Plot (WCDMA Ch. 4233)



Plot 7-38. Conducted Spurious Plot (WCDMA Ch. 4233)

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 $log_{10}(P_{[Watts]})$, where P is the transmitter power in Watts.

Test Procedure Used

ANSI C63.26-2015 – Section 5.7.3

Test Settings

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

Test Setup

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

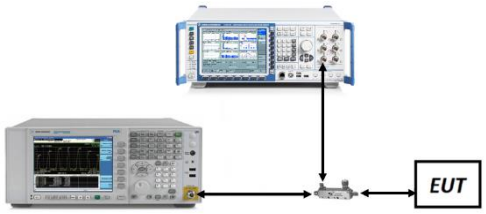


Figure 7-3. Test Instrument & Measurement Setup

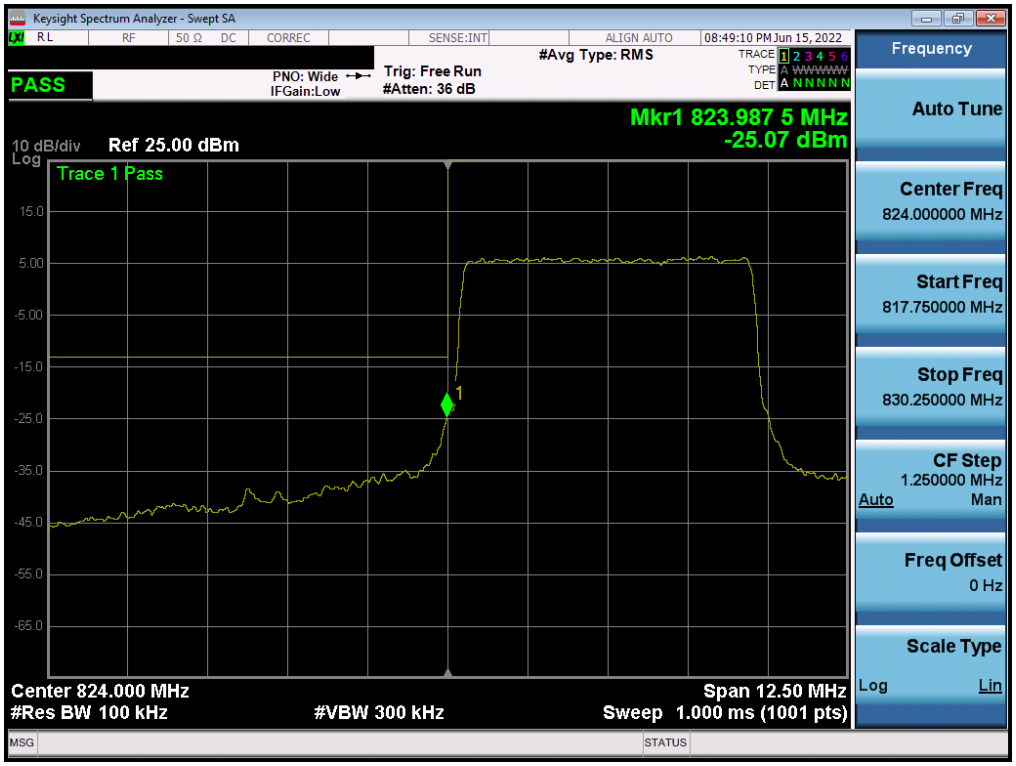
Test Notes

1. Per 22.917(b), in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed to demonstrate compliance with the out-of-band emissions limit. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emission are attenuated at least 26 dB below the transmitter power.

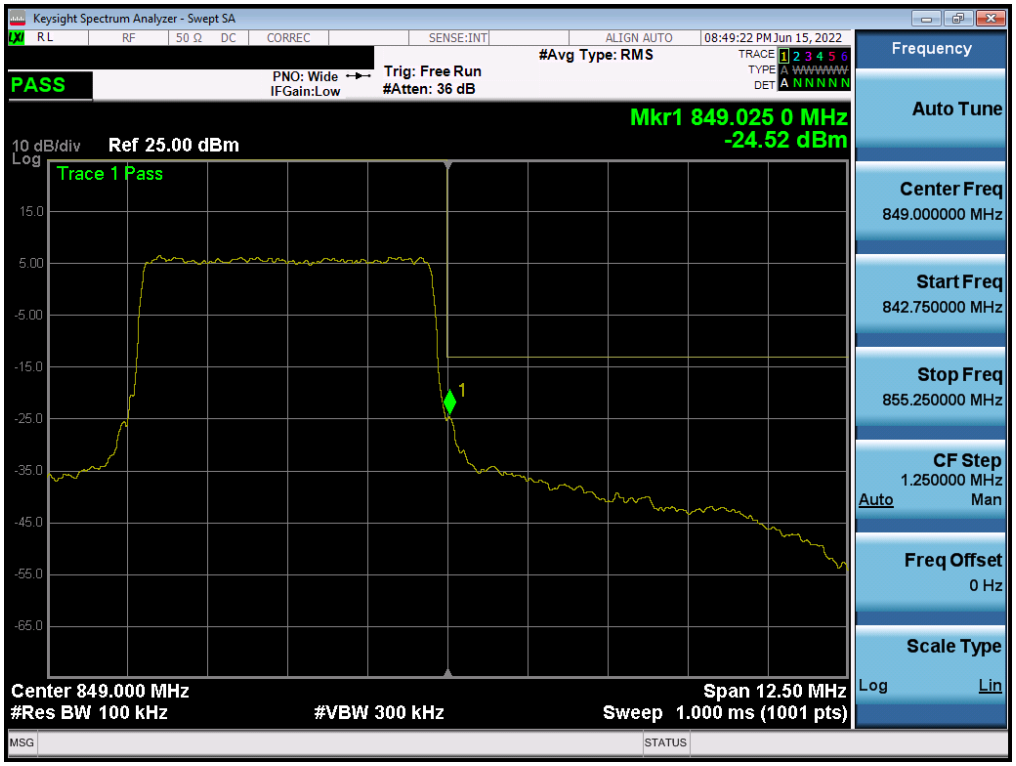
LTE Band 5

Plot 7-39. Lower Band Edge Plot (LTE Band 5 - 10MHz QPSK – Full RB)

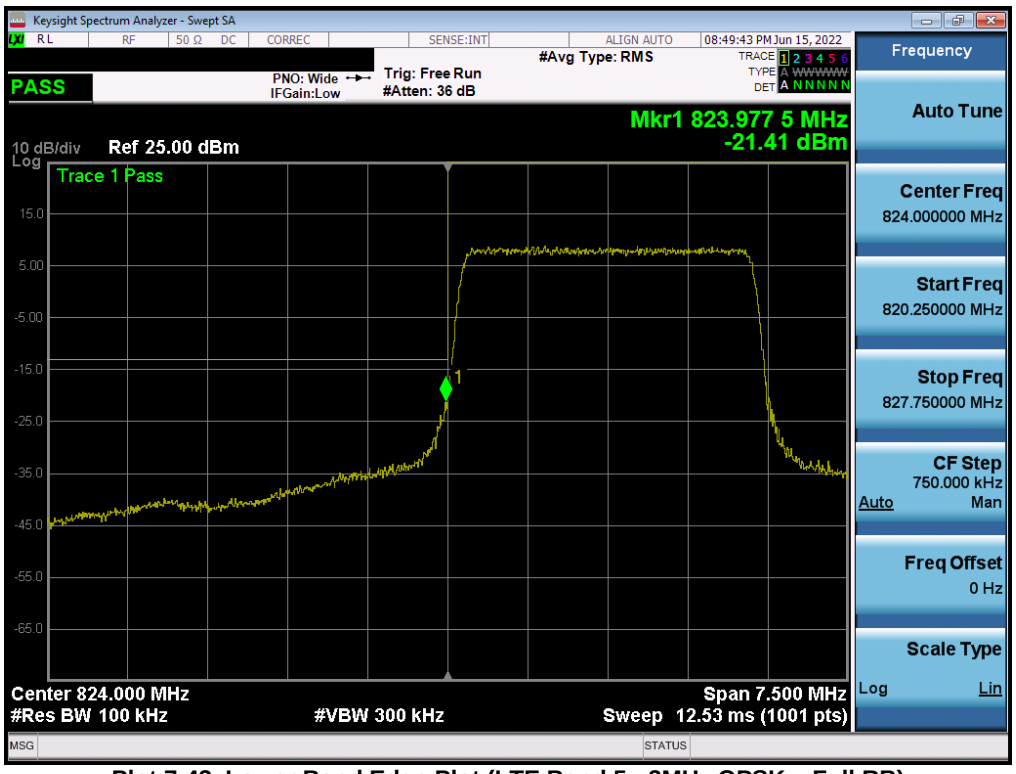
Plot 7-40. Upper Band Edge Plot (LTE Band 5 - 10MHz QPSK – Full RB)



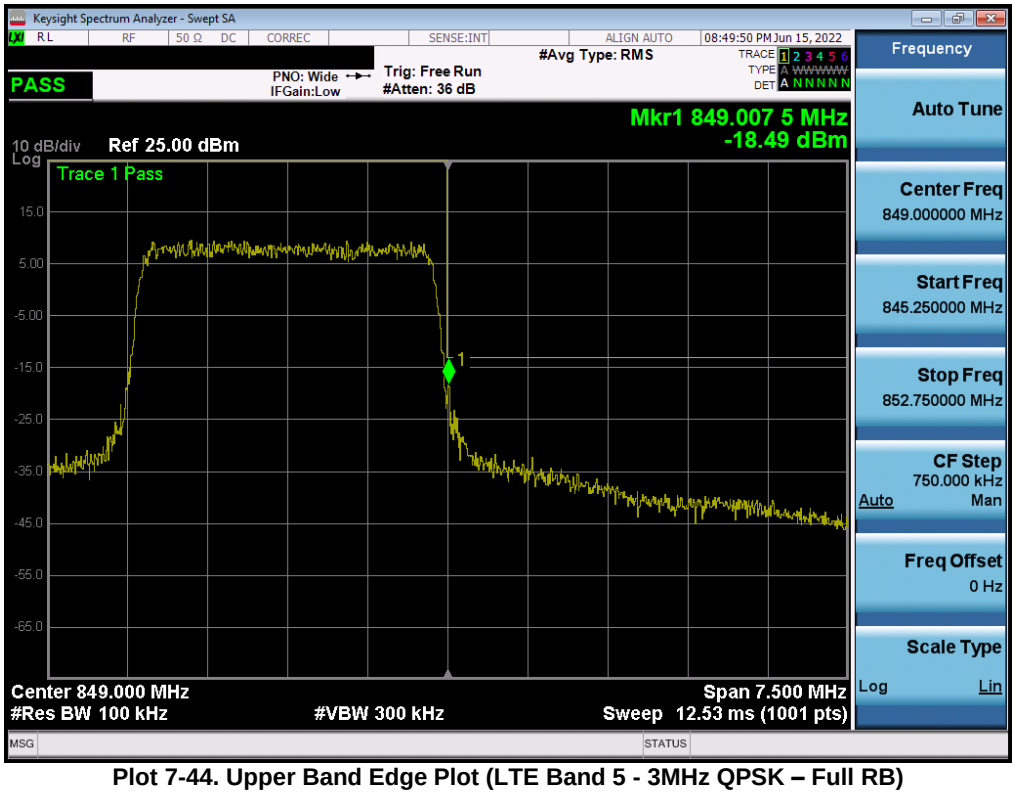
Plot 7-41. Lower Band Edge Plot (LTE Band 5 - 5MHz QPSK – Full RB)



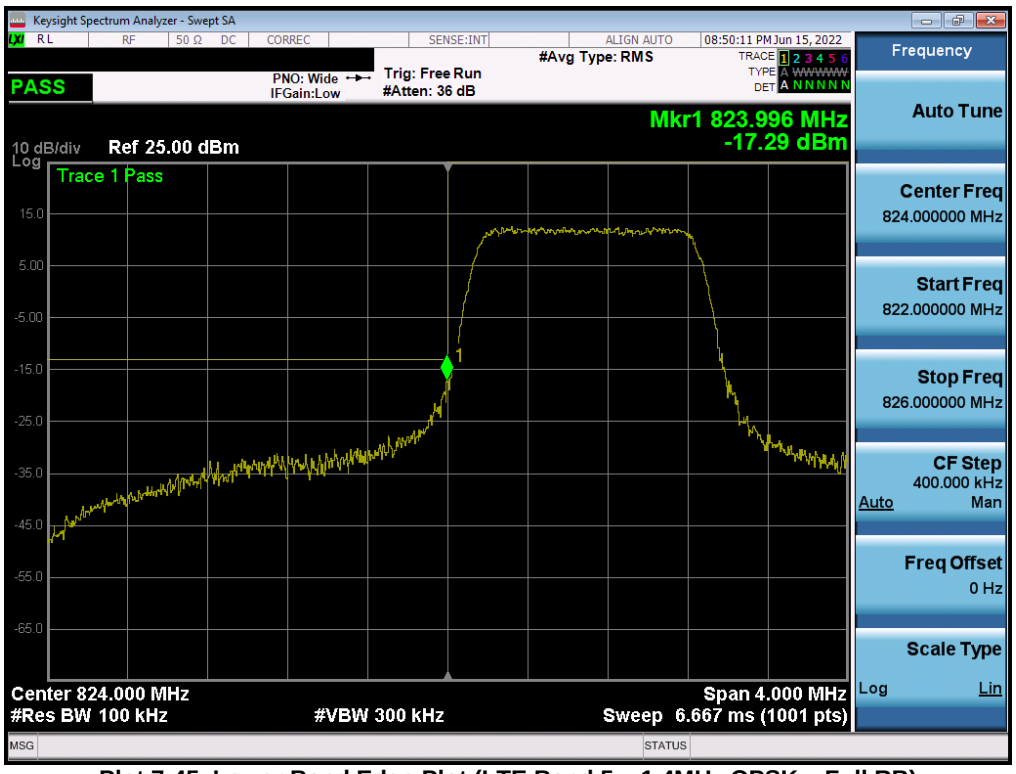
Plot 7-42. Upper Band Edge Plot (LTE Band 5 - 5MHz QPSK – Full RB)



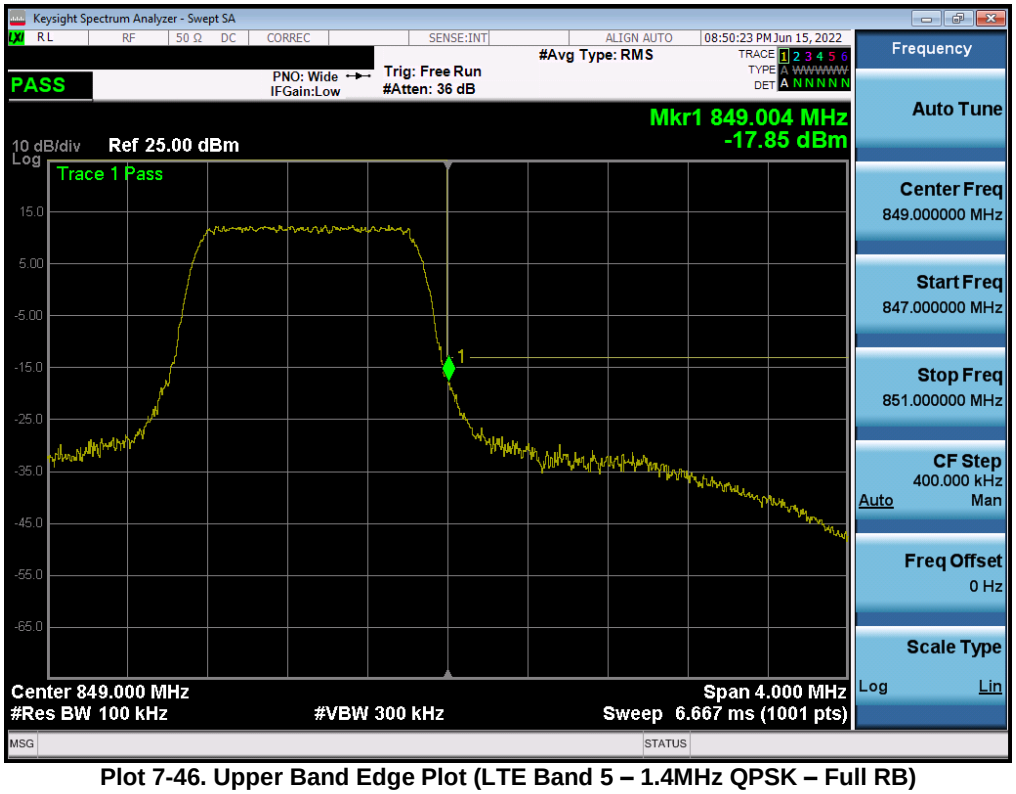
Plot 7-43. Lower Band Edge Plot (LTE Band 5 - 3MHz QPSK – Full RB)



Plot 7-44. Upper Band Edge Plot (LTE Band 5 - 3MHz QPSK – Full RB)

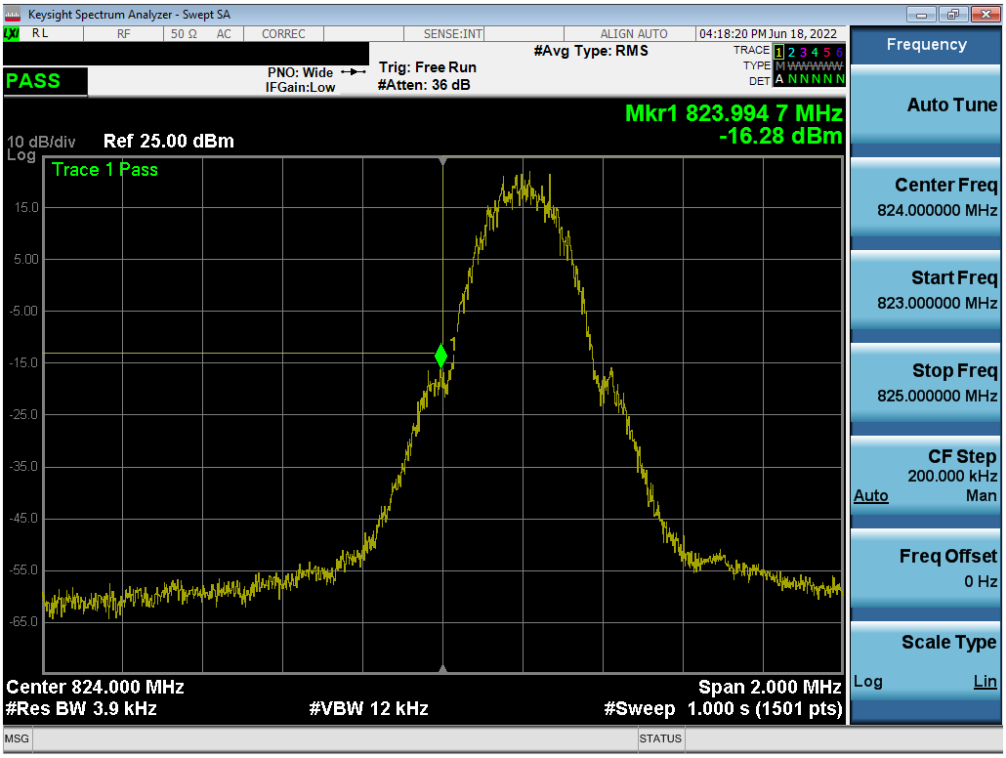


Plot 7-45. Lower Band Edge Plot (LTE Band 5 – 1.4MHz QPSK – Full RB)

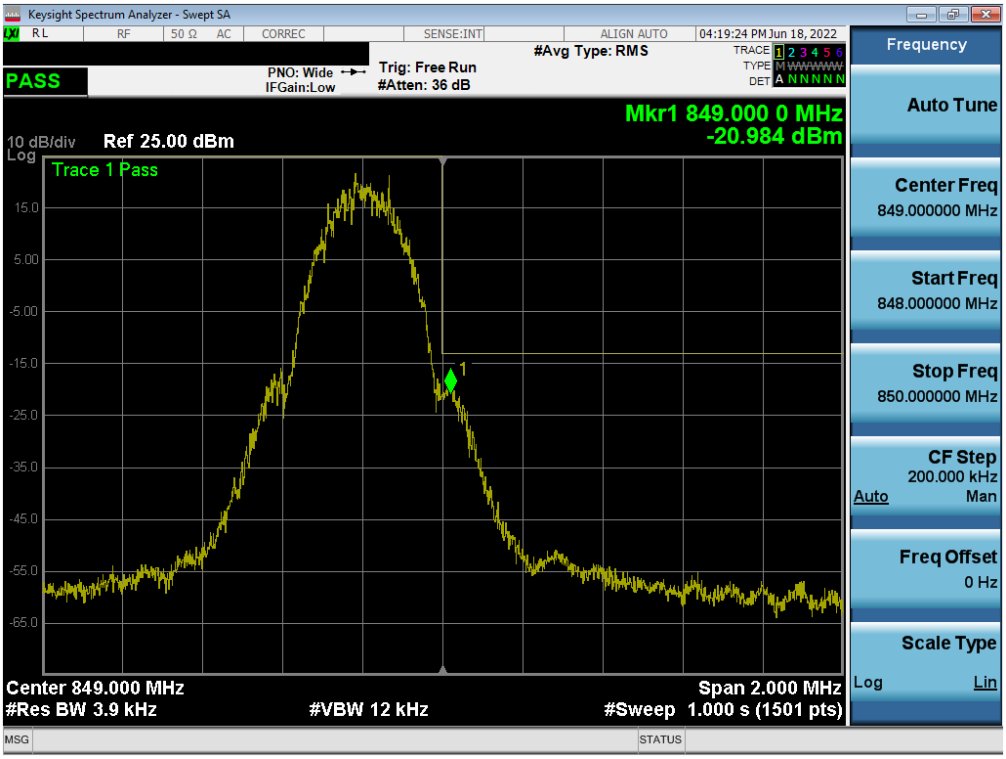


Plot 7-46. Upper Band Edge Plot (LTE Band 5 – 1.4MHz QPSK – Full RB)

GSM/GPRS Cell

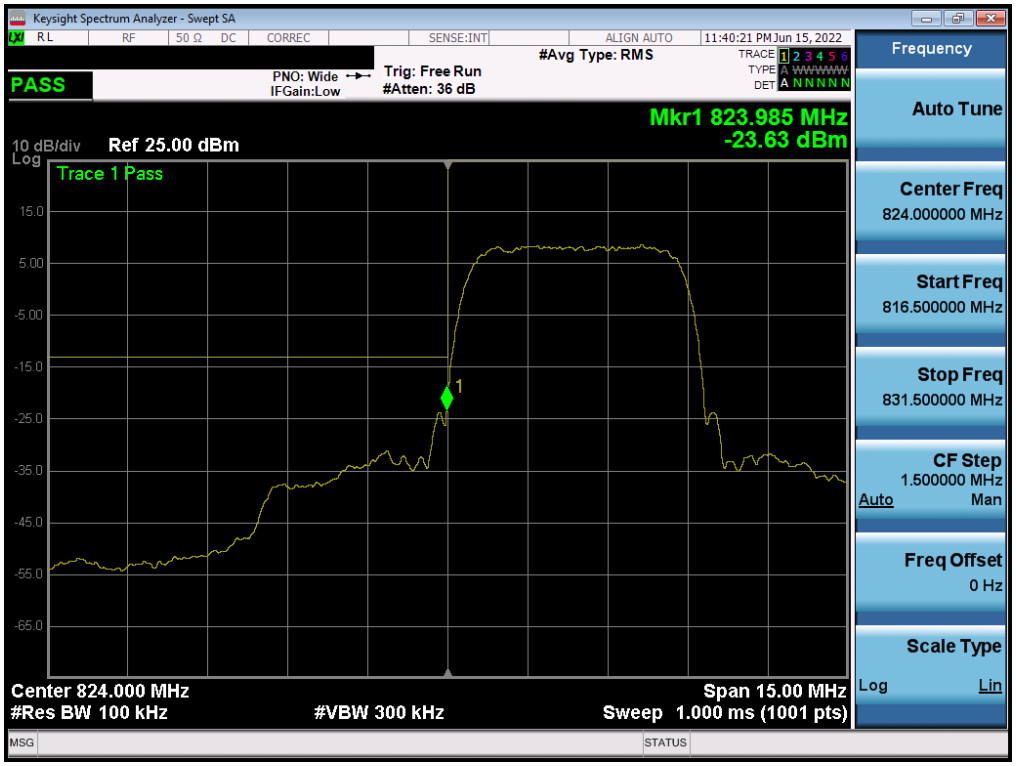


Plot 7-47. Lower Band Edge Plot (GPRS Cell – Ch. 128)



Plot 7-48. Upper Band Edge Plot (GPRS Cell – Ch. 251)

WCDMA Cell



Plot 7-49. Lower Band Edge Plot (WCDMA Cell – Ch. 4132)

Plot 7-50. Upper Band Edge Plot (WCDMA Cell – Ch. 4233)

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 ≥ 3 x RBW
4. Span = 1.5 times the OBW
5. No. of sweep points ≥ 2 x span / RBW
6. Detector = RMS
7. Trigger is set to "free run" for signals with continuous operation with the sweep times set to "auto". Trigger is set to enable triggering only on full power bursts with the sweep time set less than or equal to the transmission burst duration.
8. The integration bandwidth was roughly set equal to the measured OBW of the signal for signals with continuous operation. For signals with burst transmission, the "gating" function was enabled to ensure that measurements are performed during times in which the transmitter is operating at its maximum power.
9. Trace mode = trace averaging (RMS) over 100 sweeps
10. The trace was allowed to stabilize.

Test Setup

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

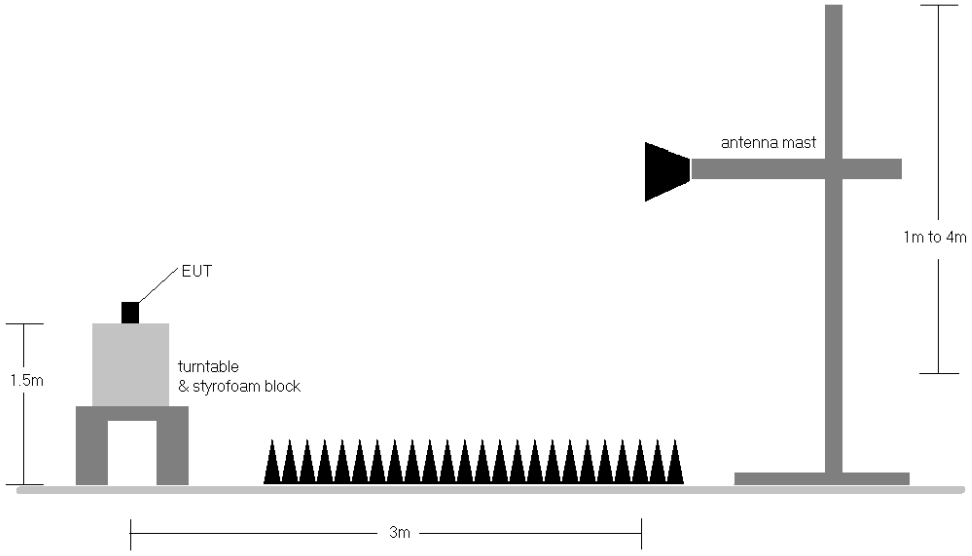


Figure 7-4. Radiated Test Setup < 1GHz

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”.

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.

Bandwidth	Mod.	Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Ant. Gain [dBi]	RB Size/Offset	Substitute Level [dBm]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
10 MHz	QPSK	829.0	H	102	327	6.70	1 / 0	12.43	16.98	0.050	38.45	-21.47	19.13	0.082	40.61	-21.48
	QPSK	836.5	H	112	334	6.73	1 / 25	12.15	16.73	0.047	38.45	-21.72	18.88	0.077	40.61	-21.73
	QPSK	844.0	H	207	331	6.76	1 / 25	12.46	**17.07**	0.051	38.45	-21.38	**19.22**	0.083	40.61	-21.39
	16-QAM	844.0	H	207	331	6.76	1 / 25	11.71	16.32	0.043	38.45	-22.13	18.47	0.070	40.61	-22.14
5 MHz	QPSK	829.0	H	102	327	6.67	1 / 12	12.53	**17.05**	0.051	38.45	-21.40	**19.20**	0.083	40.61	-21.41
	QPSK	836.5	H	112	334	6.73	1 / 12	12.23	16.81	0.048	38.45	-21.64	18.96	0.079	40.61	-21.65
	QPSK	844.0	H	207	331	6.78	1 / 12	12.35	16.99	0.050	38.45	-21.46	19.14	0.082	40.61	-21.47
	16-QAM	844.0	H	207	331	6.78	1 / 12	11.71	16.34	0.043	38.45	-22.11	18.49	0.071	40.61	-22.11
3 MHz	QPSK	829.0	H	102	327	6.66	1 / 7	12.53	**17.04**	0.051	38.45	-21.41	**19.19**	0.083	40.61	-21.42
	QPSK	836.5	H	112	334	6.73	1 / 7	12.03	16.61	0.046	38.45	-21.84	18.76	0.075	40.61	-21.85
	QPSK	844.0	H	207	331	6.79	1 / 7	12.36	17.01	0.050	38.45	-21.45	19.16	0.082	40.61	-21.45
	16-QAM	844.0	H	207	331	6.79	1 / 7	11.62	16.27	0.042	38.45	-22.19	18.42	0.069	40.61	-22.19
1.4 MHz	QPSK	829.0	H	102	327	6.66	1 / 3	12.50	**17.00**	0.050	38.45	-21.45	**19.15**	0.082	40.61	-21.45
	QPSK	836.5	H	112	334	6.73	1 / 3	12.11	16.68	0.047	38.45	-21.77	18.83	0.076	40.61	-21.77
	QPSK	844.0	H	207	331	6.77	1 / 3	12.37	16.99	0.050	38.45	-21.46	19.14	0.082	40.61	-21.47
	16-QAM	844.0	H	207	331	6.77	1 / 3	11.64	16.26	0.042	38.45	-22.20	18.41	0.069	40.61	-22.20
10 MHz	QPSK (Opposite Pol.)	844.0	V	137	48	6.36	1 / 49	12.60	16.81	0.048	38.45	-21.64	18.96	0.079	40.61	-21.65
	QPSK (Half Open)	844.0	H	190	331	6.76	1 / 49	11.89	16.50	0.045	38.45	-21.95	18.65	0.073	40.61	-21.96
	QPSK (WCP)	844.0	H	188	350	6.76	1 / 49	8.97	13.58	0.023	38.45	-24.87	15.73	0.037	40.61	-24.88

Table 7-2. ERP Data (LTE Band 5 _Ant A + Ant B) _OPEN

Bandwidth	Mod.	Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Ant. Gain [dBi]	RB Size/Offset	Substitute Level [dBm]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
10 MHz	QPSK	829.0	H	197	205	6.70	1 / 25	7.91	12.46	0.018	38.45	-25.99	14.61	0.029	40.61	-26.00
	QPSK	836.5	H	201	205	6.73	1 / 0	8.10	**12.68**	0.019	38.45	-25.77	**14.83**	0.030	40.61	-25.78
	QPSK	844.0	H	191	204	6.76	1 / 0	7.42	12.03	0.016	38.45	-26.42	14.18	0.026	40.61	-26.43
	16-QAM	836.5	H	201	205	6.73	1 / 0	7.22	11.80	0.015	38.45	-26.65	13.95	0.025	40.61	-26.66
5 MHz	QPSK	829.0	H	197	205	6.70	1 / 12	7.98	12.53	0.018	38.45	-25.92	14.68	0.029	40.61	-25.93
	QPSK	836.5	H	201	205	6.73	1 / 12	8.18	**12.76**	0.019	38.45	-25.69	**14.91**	0.031	40.61	-25.70
	QPSK	844.0	H	191	204	6.76	1 / 12	7.34	11.95	0.016	38.45	-26.50	14.10	0.026	40.61	-26.51
	16-QAM	829.0	H	197	205	6.70	1 / 12	7.14	11.69	0.015	38.45	-26.76	13.84	0.024	40.61	-26.76
3 MHz	QPSK	829.0	H	197	205	6.70	1 / 7	7.97	12.52	0.018	38.45	-25.93	14.67	0.029	40.61	-25.94
	QPSK	836.5	H	201	205	6.73	1 / 7	7.98	**12.56**	0.018	38.45	-25.89	**14.71**	0.030	40.61	-25.90
	QPSK	844.0	H	191	204	6.76	1 / 7	7.36	11.97	0.016	38.45	-26.49	14.12	0.026	40.61	-26.49
	16-QAM	836.5	H	201	205	6.73	1 / 7	7.14	11.72	0.015	38.45	-26.73	13.87	0.024	40.61	-26.74
1.4 MHz	QPSK	829.0	H	197	205	6.70	1 / 3	7.93	12.48	0.018	38.45	-25.97	14.63	0.029	40.61	-25.97
	QPSK	836.5	H	201	205	6.73	1 / 3	8.06	**12.63**	0.018	38.45	-25.82	**14.78**	0.030	40.61	-25.82
	QPSK	844.0	H	191	204	6.76	1 / 3	7.34	11.95	0.016	38.45	-26.50	14.10	0.026	40.61	-26.51
	16-QAM	829.0	H	197	205	6.70	1 / 3	7.07	11.62	0.015	38.45	-26.83	13.77	0.024	40.61	-26.84
10 MHz	QPSK (Opposite Pol.)	836.5	V	121	209	6.18	1 / 25	8.54	12.57	0.018	38.45	-25.88	14.72	0.030	40.61	-25.89
	QPSK (WCP)	836.5	H	103	164	6.73	1 / 0	6.43	11.01	0.013	38.45	-27.44	13.16	0.021	40.61	-27.45

Table 7-3. ERP Data (LTE Band 5 _Ant A) _CLOSED

Frequency [MHz]	Mode	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
824.20	GPRS850	H	103	349	22.35	6.65	**26.85**	**0.484**	38.45	-11.60	**29.00**	**0.794**	40.61	-11.61
836.60	GPRS850	H	102	351	21.88	6.74	26.47	0.444	38.45	-11.98	28.62	0.728	40.61	-11.99
848.80	GPRS850	H	106	356	21.07	6.73	25.65	0.367	38.45	-12.81	27.80	0.602	40.61	-12.81
824.20	GPRS850 (Opposite Pol.)	V	137	64	22.22	6.13	26.20	0.417	38.45	-12.25	28.35	0.684	40.61	-12.26
824.20	EDGE850	H	103	349	15.47	6.65	**19.97**	0.099	38.45	-18.48	**22.12**	**0.163**	40.61	-18.49
824.20	GPRS850 (Half Open)	H	102	319	21.77	6.65	26.27	0.424	38.45	-12.18	28.42	0.695	40.61	-12.19
824.20	GPRS850 (WCP)	H	114	328	17.77	6.65	22.27	0.169	38.45	-16.18	24.42	0.277	40.61	-16.19

Table 7-4. ERP Data (GPRS Cell _Ant A + Ant B) _OPEN

Frequency [MHz]	Mode	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
824.20	GPRS850	V	137	358	17.65	6.13	**21.63**	**0.146**	38.45	-16.82	**23.78**	**0.239**	40.61	-16.83
836.60	GPRS850	V	127	5	17.54	6.18	21.57	0.144	38.45	-16.88	23.72	0.235	40.61	-16.89
848.80	GPRS850	V	226	21	16.69	6.41	20.95	0.124	38.45	-17.51	23.10	0.204	40.61	-17.51
824.20	GPRS850 (Opposite Pol.)	H	217	229	15.61	6.65	20.11	0.103	38.45	-18.34	22.26	0.168	40.61	-18.35
824.20	EDGE850	V	137	358	12.43	6.18	**16.46**	0.044	38.45	-21.99	**18.61**	**0.073**	40.61	-22.00
824.20	GPRS850 (WCP)	V	137	183	16.58	6.18	20.61	0.115	38.45	-17.84	22.76	0.189	40.61	-17.85

Table 7-5. ERP Data (GPRS Cell _Ant A) _CLOSED

Frequency [MHz]	Mode	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
826.40	WCDMA850	H	103	351	13.91	6.67	**18.43**	**0.070**	38.45	-20.02	**20.58**	**0.114**	40.61	-20.02
836.60	WCDMA850	H	104	351	13.60	6.74	18.19	0.066	38.45	-20.26	20.34	0.108	40.61	-20.27
846.60	WCDMA850	H	203	356	12.65	6.78	17.28	0.053	38.45	-21.17	19.43	0.088	40.61	-21.17
826.40	WCDMA850(Opposite Pol.)	V	102	47	13.77	6.07	17.69	0.059	38.45	-20.76	19.84	0.096	40.61	-20.76
826.40	WCDMA850 (Half Open)	H	155	351	13.10	6.67	17.62	0.058	38.45	-20.83	19.77	0.095	40.61	-20.83
826.40	WCDMA850 (WCP)	H	328	345	8.72	6.67	13.24	0.021	38.45	-25.21	15.39	0.035	40.61	-25.21

Table 7-6. ERP Data (WCDMA Cell _Ant A + Ant B) _OPEN

Frequency [MHz]	Mode	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
826.40	WCDMA850	H	220	41	8.73	6.67	13.25	0.021	38.45	-25.20	15.40	0.035	40.61	-25.20
836.60	WCDMA850	H	207	199	8.79	6.74	**13.38**	**0.022**	38.45	-25.07	**15.53**	**0.036**	40.61	-25.08
846.60	WCDMA850	H	204	189	6.70	6.78	11.33	0.014	38.45	-27.12	13.48	0.022	40.61	-27.12
836.60	WCDMA850(Opposite Pol.)	V	134	16	8.11	6.18	12.14	0.016	38.45	-26.31	14.29	0.027	40.61	-26.32
836.60	WCDMA850 (WCP)	H	122	171	6.97	6.74	11.56	0.014	38.45	-26.89	13.71	0.023	40.61	-26.90

Table 7-7. ERP Data (WCDMA Cell _Ant A) _CLOSED

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 ≥ 3 x RBW
3. Span = 1.5 times the OBW
4. No. of sweep points ≥ 2 x span / RBW
5. Detector = RMS
6. Trace mode = Average (Max Hold for pulsed emissions)
7. The trace was allowed to stabilize

Test Setup

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

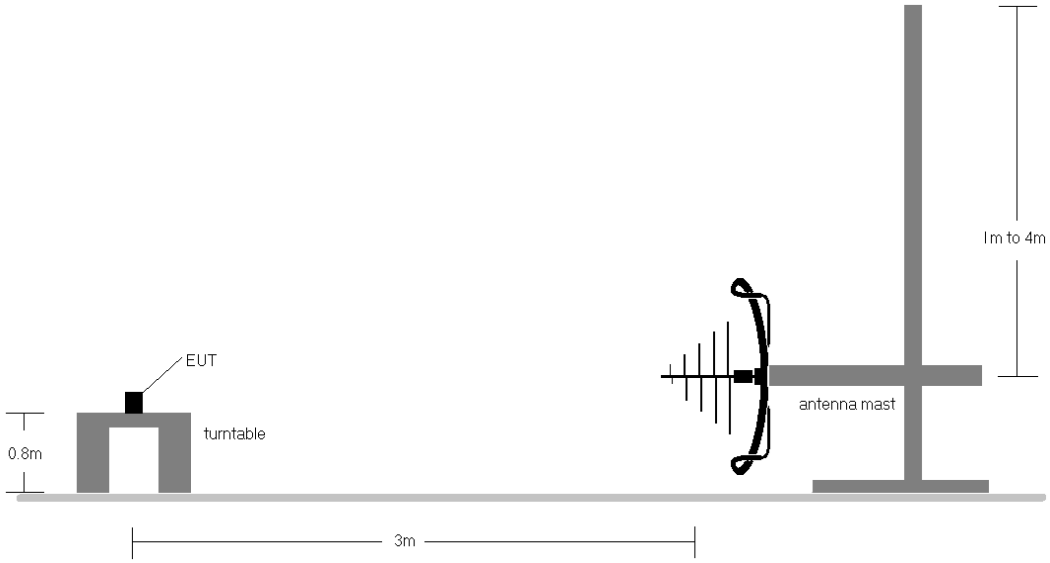


Figure 7-5. Test Instrument & Measurement Setup < 1GHz

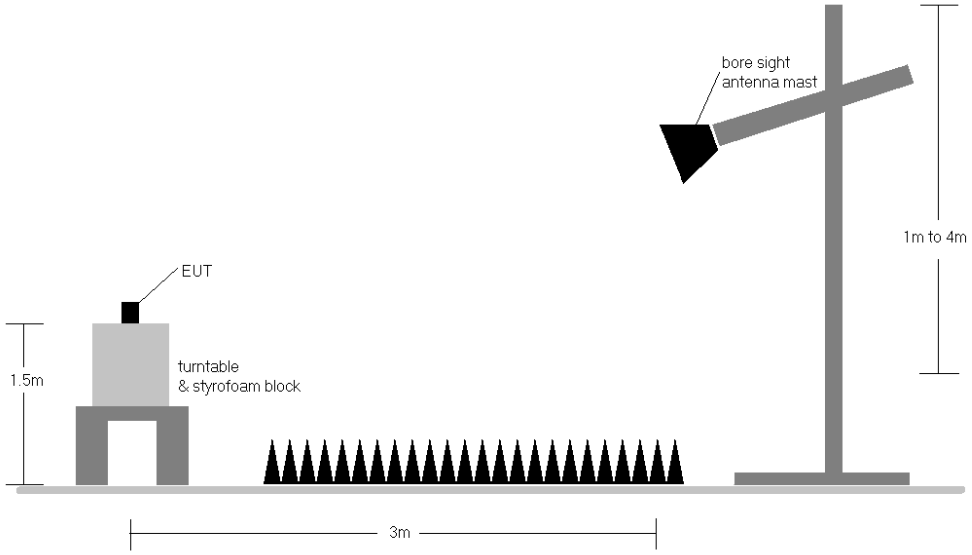


Figure 7-6. Test Instrument & Measurement Setup > 1GHz

Test Notes

1) Field strengths are calculated using the Measurement quantity conversions in ANSI C63.26-2015 Section 5.2.7:
   a) E(dBµV/m) = Measured amplitude level (dBm) + 107 + Cable Loss (dB) + Antenna Factor (dB/m)
   b) EIRP (dBm) = E(dBµV/m) + 20logD – 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.

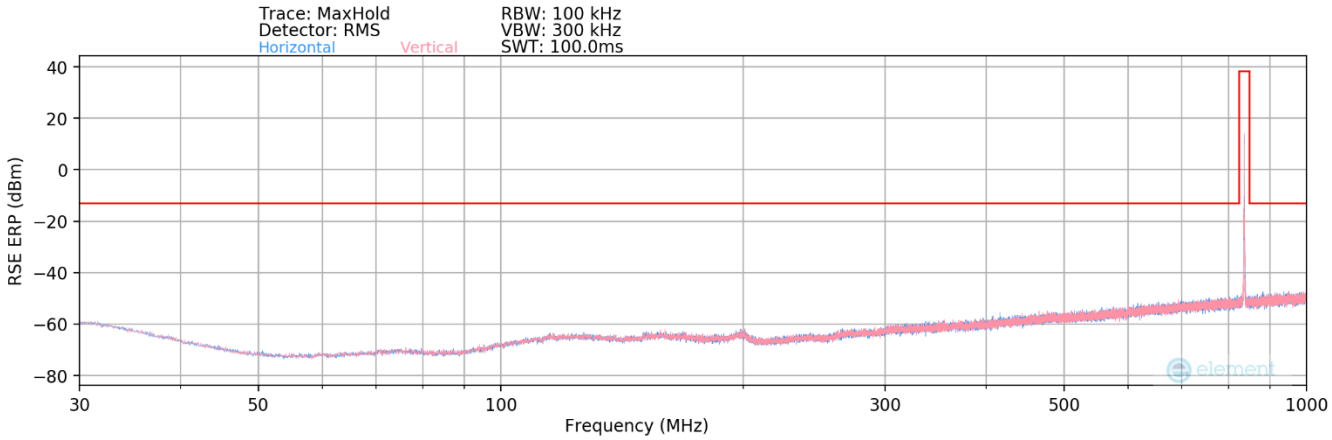
5) This unit was tested with its standard battery.

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.

LTE Band 5 _Ant A + Ant B

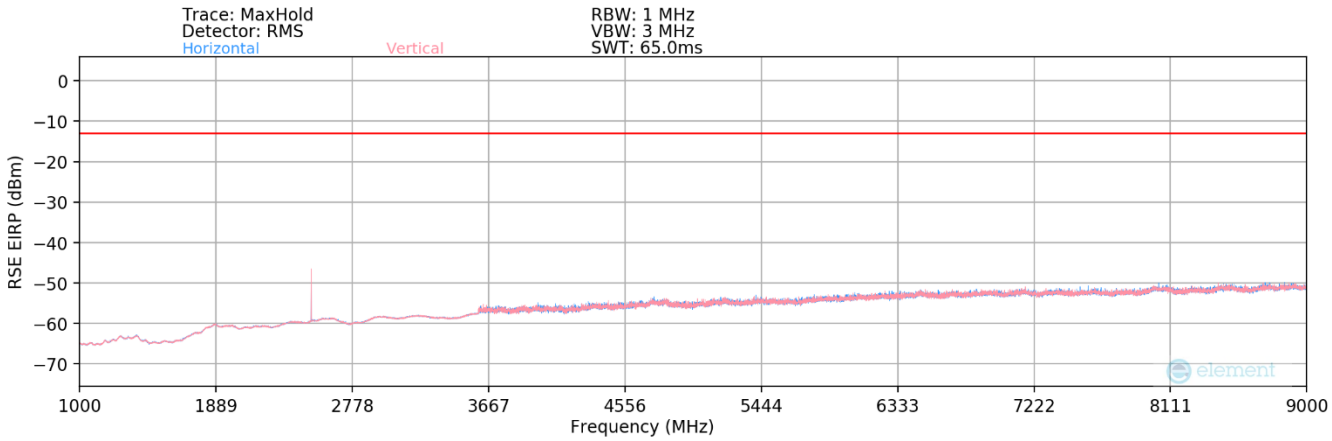


Plot 7-51. Radiated Spurious Plot (LTE Band 5 _Ant A + Ant B)

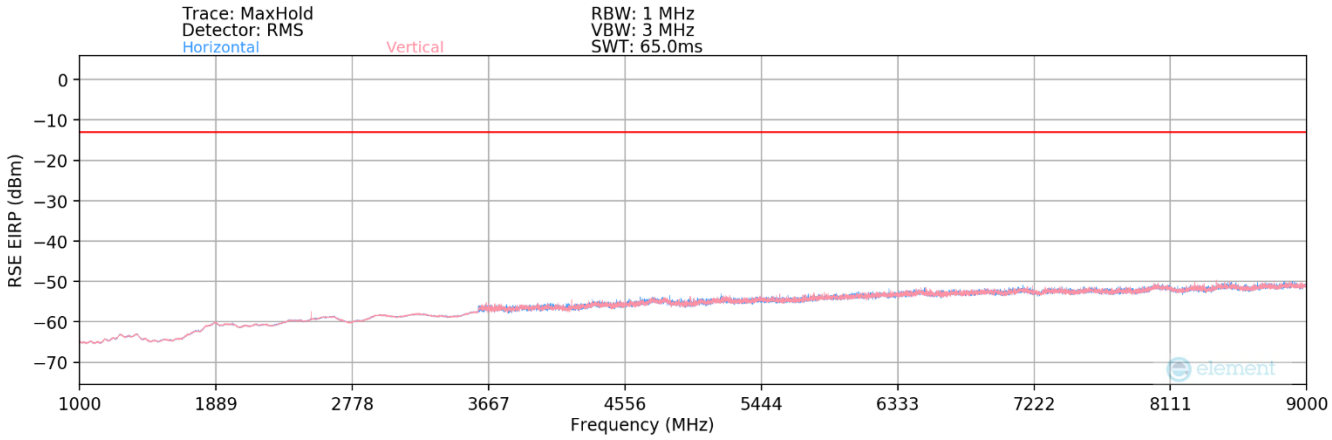
Bandwidth (MHz):	10
Frequency (MHz):	836.5
RB / Offset:	1 / 25

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]
429.14	V	-	-	-101.26	24.25	29.99	-67.42	-13.00	-54.42

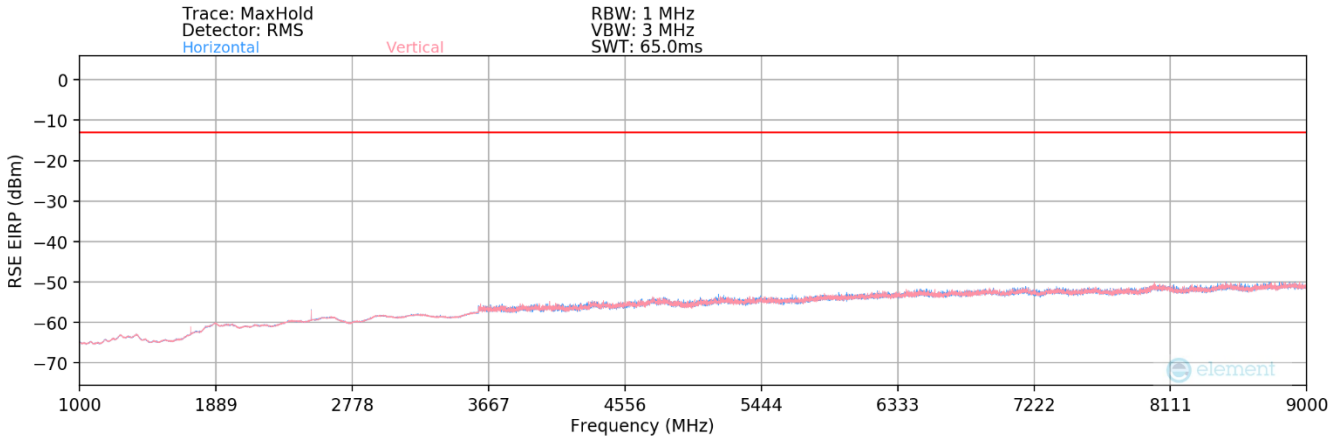
Table 7-8. Radiated Spurious Data (LTE Band 5 – Mid Channel _Ant A + Ant B)



Plot 7-52. Radiated Spurious Plot (LTE Band 5 _Ant A + Ant B) _OPEN



Plot 7-53. Radiated Spurious Plot (LTE Band 5 _Ant A + Ant B) _HALF



Plot 7-54. Radiated Spurious Plot (LTE Band 5 _Ant A + Ant B) _CLOSED

Bandwidth (MHz):	10
Frequency (MHz):	829
RB / Offset:	1 / 25

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1658.00	V	-	-	-76.42	-3.75	26.83	-68.42	-13.00	-55.42
2487.00	V	311	321	-58.97	0.56	48.59	-46.66	-13.00	-33.66
3316.00	V	-	-	-77.18	1.92	31.74	-63.52	-13.00	-50.52
4145.00	V	-	-	-77.28	2.87	32.59	-62.67	-13.00	-49.67
4974.00	V	-	-	-78.09	4.07	32.98	-62.28	-13.00	-49.28

Table 7-9. Radiated Spurious Data (LTE Band 5 – Low Channel _Ant A + Ant B)

Bandwidth (MHz):	10
Frequency (MHz):	836.5
RB / Offset:	1 / 25

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1673.00	V	-	-	-76.42	-3.55	27.03	-68.22	-13.00	-55.22
2509.50	V	316	296	-56.13	0.80	51.67	-43.59	-13.00	-30.59
3346.00	V	-	-	-77.21	1.95	31.74	-63.52	-13.00	-50.52
4182.50	V	-	-	-77.68	2.95	32.27	-62.99	-13.00	-49.99
5019.00	V	-	-	-78.13	4.33	33.20	-62.05	-13.00	-49.05

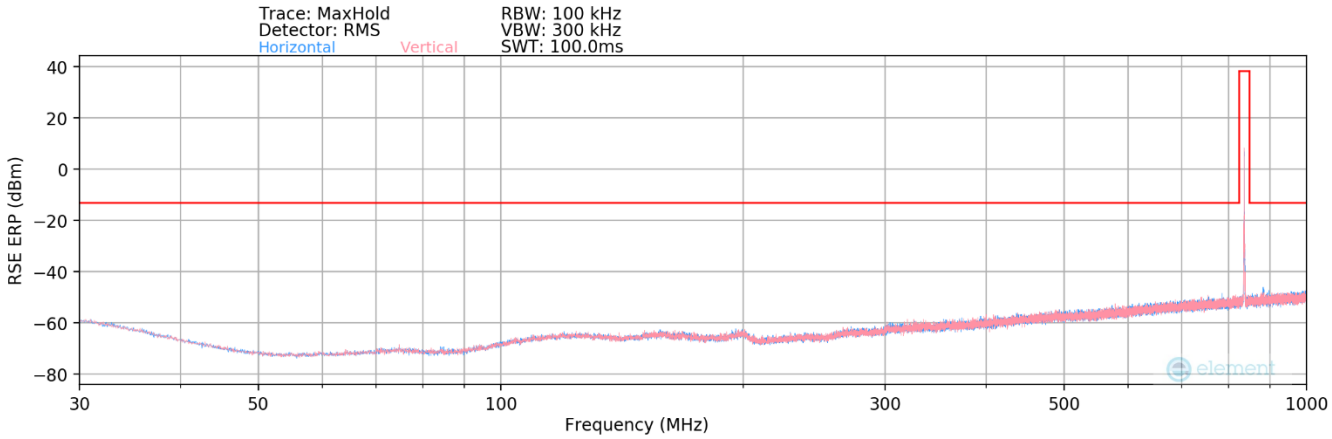
Table 7-10. Radiated Spurious Data (LTE Band 5 – Mid Channel _Ant A + Ant B)

Bandwidth (MHz):	10
Frequency (MHz):	844
RB / Offset:	1 / 25

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1688.00	V	-	-	-76.24	-3.19	27.57	-67.69	-13.00	-54.69
2532.00	V	344	277	-57.12	1.17	51.05	-44.20	-13.00	-31.20
3376.00	V	-	-	-76.58	1.79	32.21	-63.05	-13.00	-50.05
4220.00	V	-	-	-76.85	2.94	33.09	-62.16	-13.00	-49.16
5064.00	V	-	-	-78.49	4.86	33.37	-61.88	-13.00	-48.88

Table 7-11. Radiated Spurious Data (LTE Band 5 – High Channel _Ant A + Ant B)

LTE Band 5 _Ant A

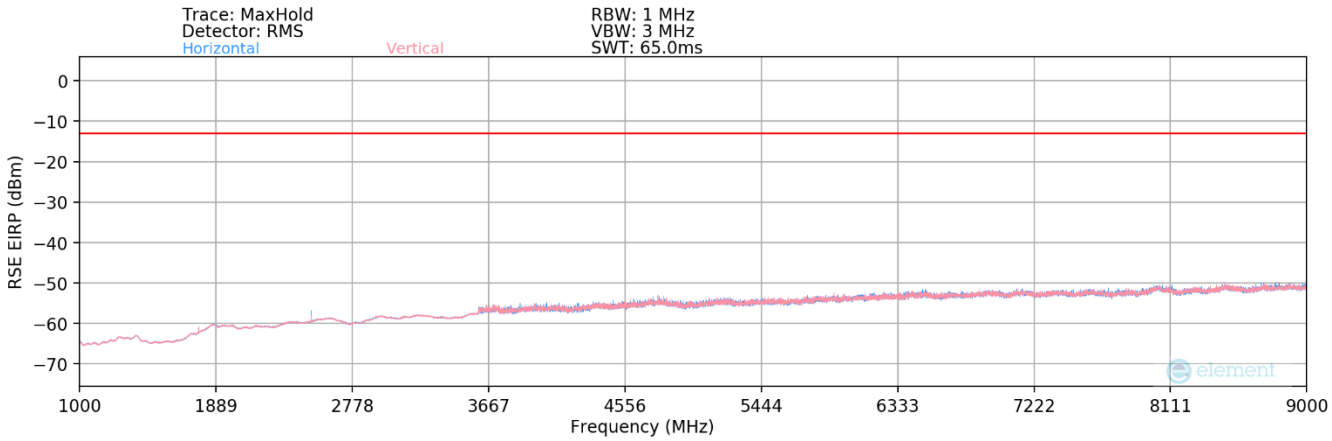


Plot 7-55. Radiated Spurious Plot (LTE Band 5 _Ant A)

Bandwidth (MHz):	10
Frequency (MHz):	836.5
RB / Offset:	1 / 25

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]
778.48	H	-	-	-99.32	29.79	37.47	-59.94	-13.00	-46.94
881.50	H	-	-	-99.13	30.76	38.63	-58.78	-13.00	-45.78

Table 7-12. Radiated Spurious Data (LTE Band 5 – Mid Channel _Ant A)



Plot 7-56. Radiated Spurious Plot (LTE Band 5 _Ant A) _CLOSED

Bandwidth (MHz):	10
Frequency (MHz):	829
RB / Offset:	1 / 25

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1658.00	H	147	222	-75.76	-3.87	27.37	-67.89	-13.00	-54.89
2487.00	H	149	137	-66.72	0.42	40.70	-54.56	-13.00	-41.56
3316.00	H	-	-	-76.88	1.85	31.97	-63.29	-13.00	-50.29
4145.00	H	-	-	-76.74	2.88	33.14	-62.11	-13.00	-49.11
4974.00	H	-	-	-77.42	4.02	33.60	-61.66	-13.00	-48.66

Table 7-13. Radiated Spurious Data (LTE Band 5 – Low Channel _Ant A)

Bandwidth (MHz):	10
Frequency (MHz):	836.5
RB / Offset:	1 / 25

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1673.00	H	-	-	-75.96	-3.66	27.38	-67.87	-13.00	-54.87
2509.50	H	181	130	-68.41	0.73	39.32	-55.94	-13.00	-42.94
3346.00	H	-	-	-76.65	1.85	32.20	-63.06	-13.00	-50.06
4182.50	H	-	-	-77.14	2.76	32.62	-62.63	-13.00	-49.63
5019.00	H	-	-	-77.90	4.18	33.28	-61.98	-13.00	-48.98

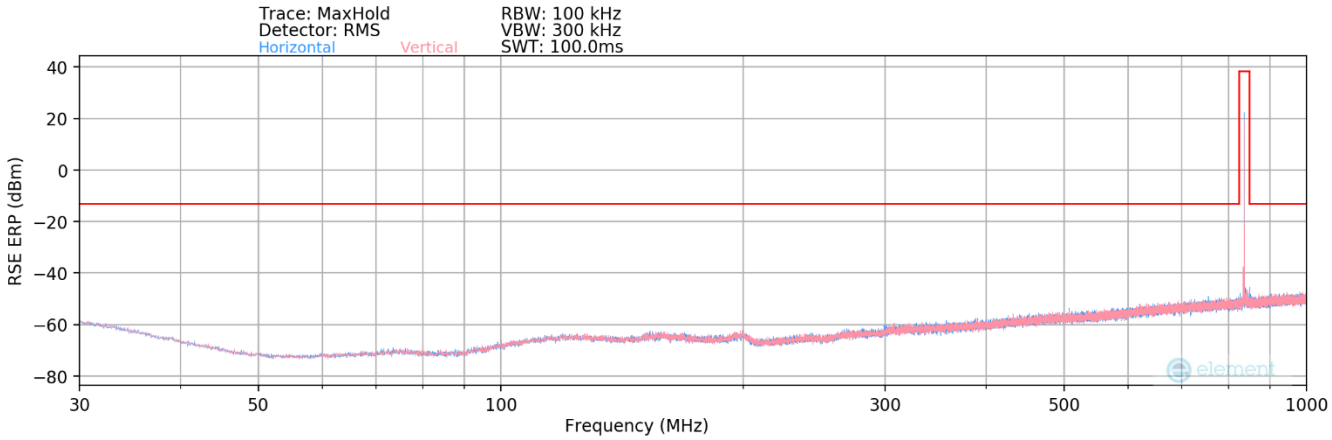
Table 7-14. Radiated Spurious Data (LTE Band 5 – Mid Channel _Ant A)

Bandwidth (MHz):	10
Frequency (MHz):	844
RB / Offset:	1 / 25

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1688.00	H	-	-	-76.21	-3.26	27.53	-67.73	-13.00	-54.73
2532.00	H	174	132	-71.34	1.03	36.69	-58.56	-13.00	-45.56
3376.00	H	-	-	-76.50	1.77	32.27	-62.98	-13.00	-49.98
4220.00	H	-	-	-76.65	2.79	33.14	-62.12	-13.00	-49.12
5064.00	H	-	-	-77.72	4.56	33.84	-61.42	-13.00	-48.42

Table 7-15. Radiated Spurious Data (LTE Band 5 – High Channel _Ant A)

GSM/GPRS Cell _Ant A + Ant B

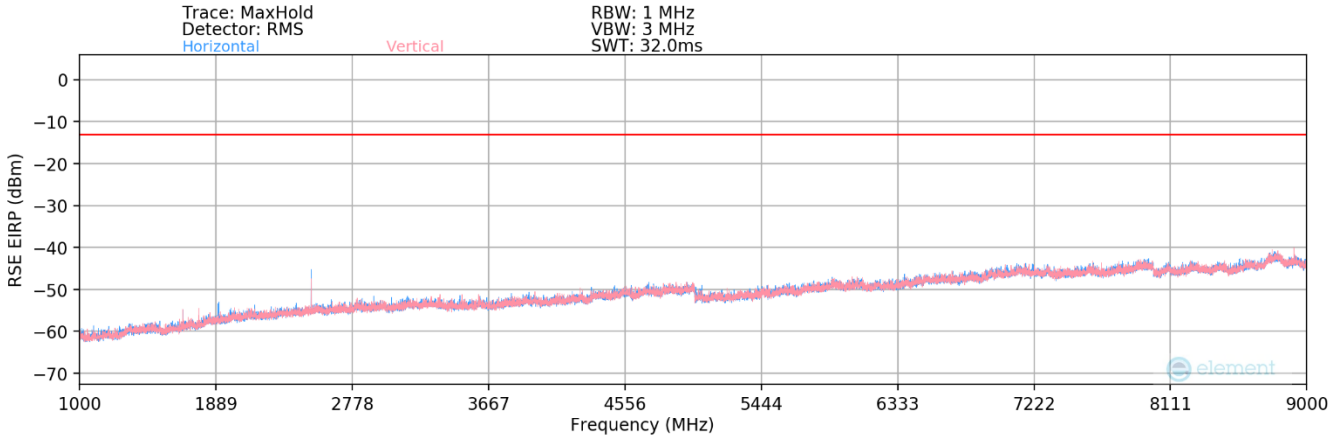


Plot 7-57. Radiated Spurious Plot (GPRS Cell _Ant A + Ant B)

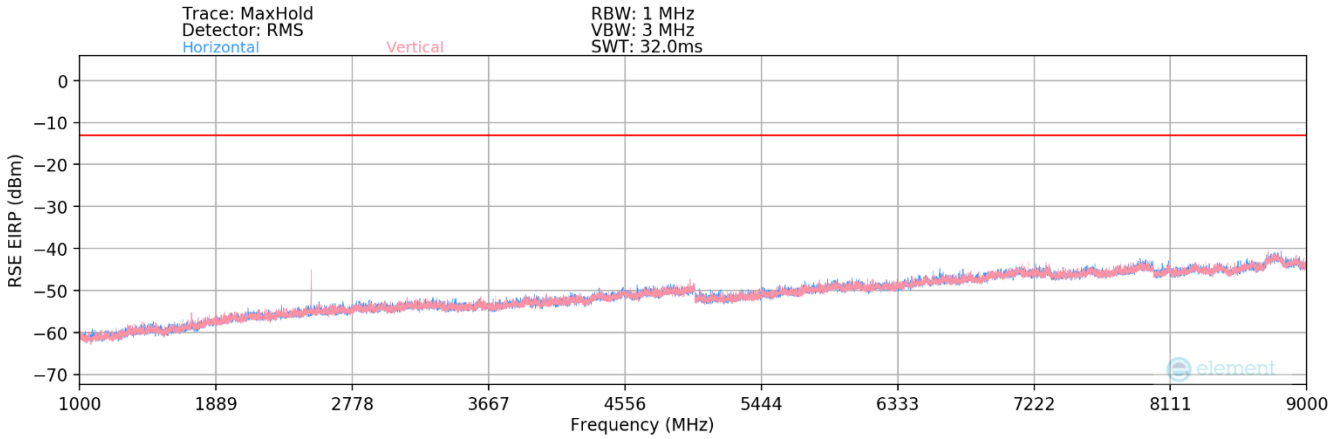
Mode:	GPRS 1 Tx Slot
Channel:	190
Frequency (MHz):	836.6

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	ERP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
161.38	H	-	-	-93.98	19.67	32.69	-64.72	-13.00	-51.72
506.70	H	-	-	-92.51	25.91	40.40	-57.00	-13.00	-44.00
881.60	H	-	-	-91.55	30.75	46.20	-51.21	-13.00	-38.21

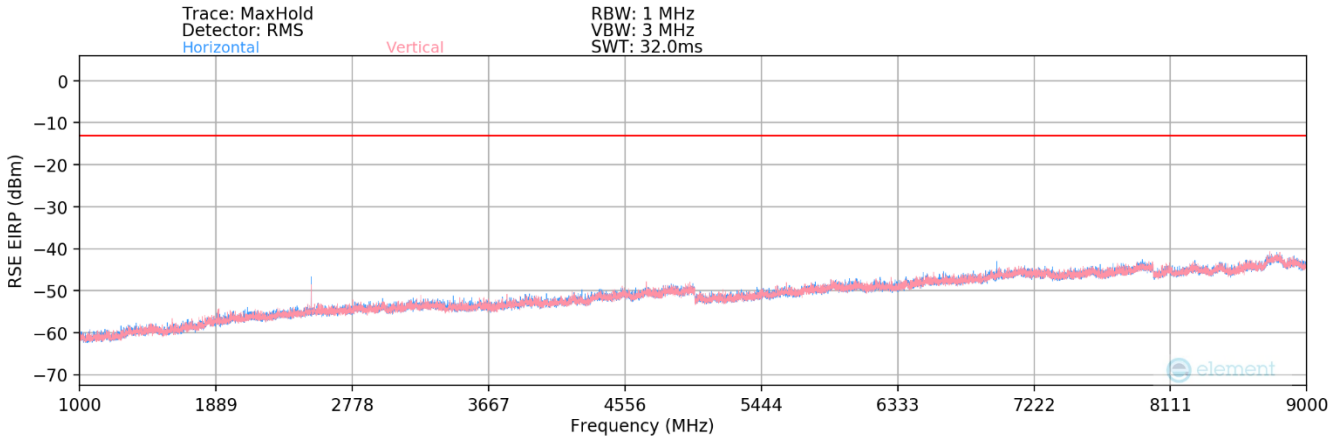
Table 7-16. Radiated Spurious Data (GPRS Cell – Mid Channel _Ant A + Ant B)



Plot 7-58. Radiated Spurious Plot (GPRS Cell _Ant A + Ant B) _OPEN



Plot 7-59. Radiated Spurious Plot (GPRS Cell _Ant A + Ant B) _HALF



Plot 7-60. Radiated Spurious Plot (GPRS Cell _Ant A + Ant B) _CLOSED

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]
1648.40	H	168	9	-69.26	-3.81	33.93	-61.33	-13.00	-48.33
2472.60	H	218	143	-55.14	0.49	52.35	-42.90	-13.00	-29.90
3296.80	H	-	-	-72.28	1.99	36.71	-58.55	-13.00	-45.55
4121.00	H	-	-	-74.92	3.09	35.17	-60.09	-13.00	-47.09
4945.20	H	-	-	-75.52	3.90	35.38	-59.88	-13.00	-46.88

Table 7-17. Radiated Spurious Data (GPRS Cell – Low Channel _Ant A + Ant B)

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]
1673.20	H	153	353	-69.41	-3.54	34.05	-61.21	-13.00	-48.21
2509.80	H	124	141	-51.10	0.80	56.70	-38.55	-13.00	-25.55
3346.40	H	-	-	-72.08	1.95	36.87	-58.39	-13.00	-45.39
4183.00	H	-	-	-75.29	2.95	34.66	-60.60	-13.00	-47.60
5019.60	H	-	-	-75.42	4.35	35.93	-59.33	-13.00	-46.33
5856.20	H	-	-	-76.32	6.10	36.78	-58.48	-13.00	-45.48

Table 7-18. Radiated Spurious Data (GPRS Cell – Mid Channel _Ant A + Ant B)

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]
1697.60	H	152	121	-67.05	-2.94	37.01	-58.25	-13.00	-45.25
2546.40	H	137	143	-53.40	1.29	54.89	-40.37	-13.00	-27.37
3395.20	H	-	-	-71.87	1.69	36.82	-58.43	-13.00	-45.43
4244.00	H	-	-	-74.97	3.00	35.03	-60.23	-13.00	-47.23
5092.80	H	-	-	-75.36	4.49	36.13	-59.12	-13.00	-46.12

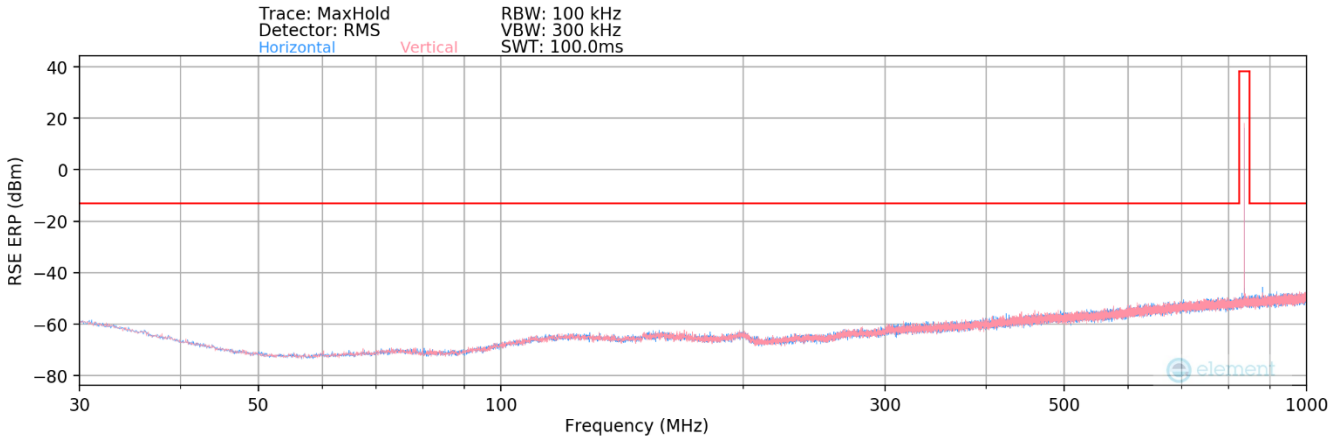
Table 7-19. Radiated Spurious Data (GPRS Cell – High Channel _Ant A + Ant B)

Case:	w/ Wireless Charging Pad
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]
1673.20	H	172	245	-69.47	-3.54	33.99	-61.27	-13.00	-48.27
2509.80	H	142	145	-57.45	0.80	50.35	-44.90	-13.00	-31.90
3346.40	H	-	-	-71.41	1.95	37.54	-57.72	-13.00	-44.72
4183.00	H	-	-	-74.68	2.95	35.27	-59.99	-13.00	-46.99
5019.60	H	-	-	-75.56	4.35	35.79	-59.47	-13.00	-46.47

Table 7-20. Radiated Spurious Data with WCP (GPRS Cell _Ant A + Ant B)

GSM/GPRS Cell _Ant A

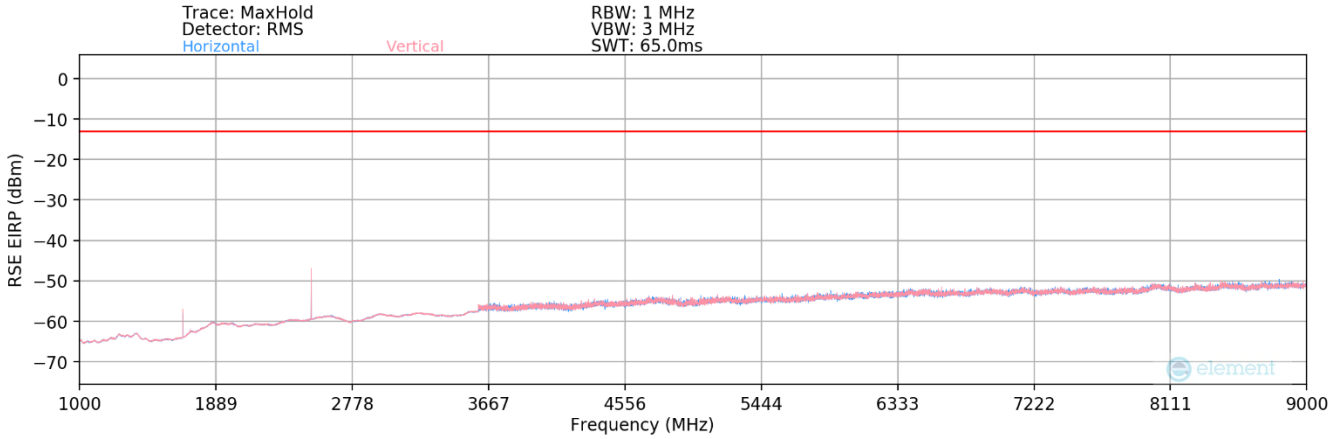


Plot 7-61. Radiated Spurious Plot (GPRS Cell _Ant A)

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]	ERP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
185.52	V	-	-	-91.73	18.56	33.83	-63.58	-13.00	-50.58
428.52	V	-	-	-92.43	24.20	38.77	-58.64	-13.00	-45.64
881.60	V	-	-	-91.23	30.75	46.52	-50.89	-13.00	-37.89

Table 7-21. Radiated Spurious Data (GPRS Cell – Mid Channel _Ant A)



Plot 7-62. Radiated Spurious Plot (GPRS Cell _Ant A) _CLOSED

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]
1648.40	V	266	267	-63.10	-3.94	39.96	-55.30	-13.00	-42.30
2472.60	V	233	158	-51.67	0.32	55.65	-39.61	-13.00	-26.61
3296.80	V	361	3	-71.09	2.00	37.91	-57.35	-13.00	-44.35
4121.00	V	131	171	-70.12	2.95	39.83	-55.43	-13.00	-42.43
4945.20	V	-	-	-75.66	3.76	35.10	-60.15	-13.00	-47.15
5769.40	V	-	-	-75.83	5.42	36.59	-58.67	-13.00	-45.67
6593.60	V	-	-	-75.54	6.36	37.83	-57.43	-13.00	-44.43

Table 7-22. Radiated Spurious Data (GPRS Cell – Low Channel _Ant A)

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]
1673.20	V	141	265	-60.80	-3.65	42.55	-52.71	-13.00	-39.71
2509.80	V	191	158	-53.91	0.74	53.83	-41.43	-13.00	-28.43
3346.40	V	-	-	-71.88	1.85	36.97	-58.29	-13.00	-45.29
4183.00	V	150	198	-72.99	2.76	36.77	-58.48	-13.00	-45.48
5019.60	V	-	-	-75.86	4.18	35.32	-59.93	-13.00	-46.93
5856.20	V	-	-	-76.19	5.68	36.49	-58.76	-13.00	-45.76
6692.80	V	-	-	-76.11	6.91	37.80	-57.46	-13.00	-44.46

Table 7-23. Radiated Spurious Data (GPRS Cell – Mid Channel _Ant A)

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]
1697.60	V	190	247	-62.12	-2.97	41.91	-53.34	-13.00	-40.34
2546.40	V	128	348	-51.77	1.23	56.46	-38.80	-13.00	-25.80
3395.20	V	-	-	-71.93	1.61	36.68	-58.57	-13.00	-45.57
4244.00	V	147	293	-70.56	2.95	39.39	-55.87	-13.00	-42.87
5092.80	V	-	-	-75.72	4.56	35.84	-59.42	-13.00	-46.42
5941.60	V	-	-	-76.12	5.72	36.60	-58.66	-13.00	-45.66
6790.40	V	-	-	-76.16	6.76	37.60	-57.66	-13.00	-44.66

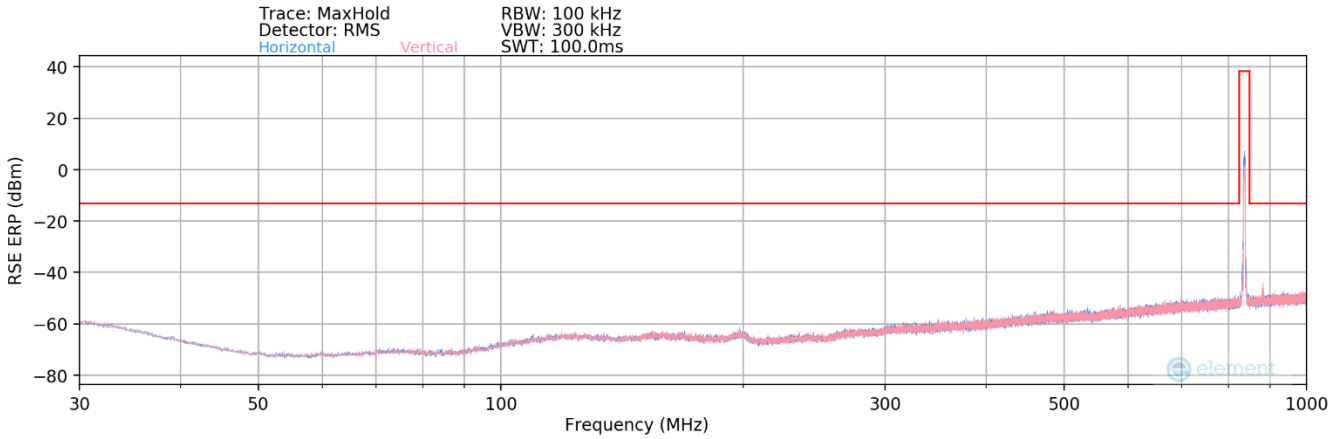
Table 7-24. Radiated Spurious Data (GPRS Cell – High Channel _Ant A)

Sample #:	w/ Wireless Charging Pad
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]
1697.60	V	173	62	-63.84	-2.97	40.19	-55.06	-13.00	-42.06
2546.40	V	184	10	-52.64	1.23	55.59	-39.67	-13.00	-26.67
3395.20	V	-	-	-71.43	1.61	37.18	-58.07	-13.00	-45.07
4244.00	V	139	320	-70.52	2.95	39.43	-55.83	-13.00	-42.83
5092.80	V	-	-	-75.70	4.56	35.86	-59.40	-13.00	-46.40
5941.60	V	-	-	-76.19	5.72	36.53	-58.73	-13.00	-45.73
6790.40	V	-	-	-76.31	6.76	37.45	-57.81	-13.00	-44.81

Table 7-25. Radiated Spurious Data with WCP (GPRS Cell _Ant A)

WCDMA Cell _Ant A + Ant B

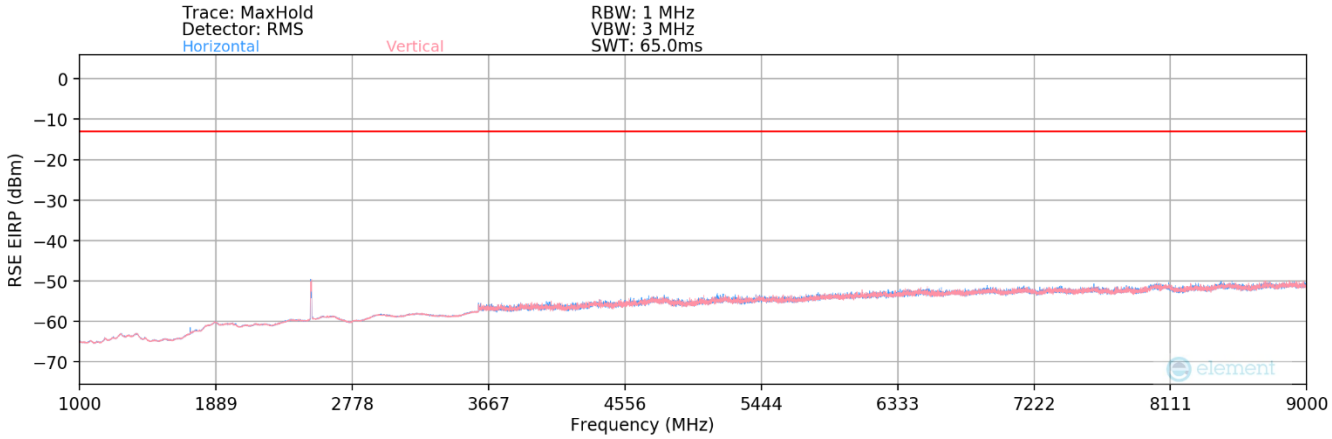


Plot 7-63. Radiated Spurious Plot (WCDMA Cell _Ant A + Ant B)

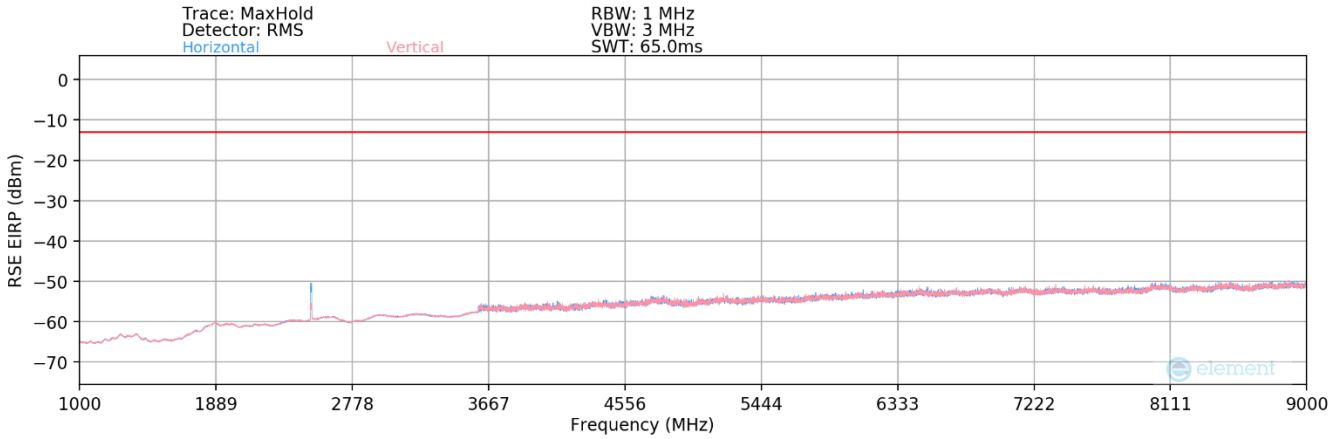
Mode:	WCDMA RMC
Channel:	4183
Frequency (MHz):	836.6

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	ERP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
194.14	H	-	-	-100.92	19.57	25.65	-71.76	-13.00	-58.76
537.66	H	-	-	-100.81	26.22	32.41	-65.00	-13.00	-52.00
881.60	H	-	-	-97.16	30.75	40.59	-56.82	-13.00	-43.82

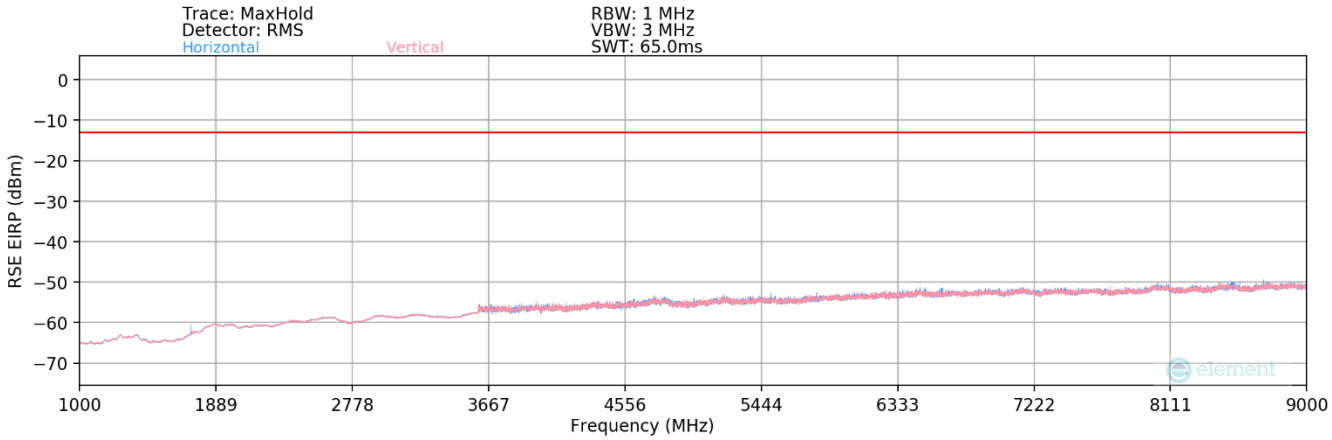
Table 7-26. Radiated Spurious Data (WCDMA Cell – Mid Channel _Ant A + Ant B)



Plot 7-64. Radiated Spurious Plot (WCDMA Cell _Ant A + Ant B) _OPEN



Plot 7-65. Radiated Spurious Plot (WCDMA Cell _Ant A + Ant B) _HALF



Plot 7-66. Radiated Spurious Plot (WCDMA Cell _Ant A + Ant B) _CLOSED

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]
1652.80	H	158	68	-74.68	-3.78	28.54	-66.71	-13.00	-53.71
2479.20	H	168	145	-63.06	0.51	44.45	-50.80	-13.00	-37.80
3305.60	H	-	-	-77.06	1.95	31.89	-63.37	-13.00	-50.37
4132.00	H	-	-	-77.15	2.98	32.83	-62.43	-13.00	-49.43
4958.40	H	-	-	-77.64	3.94	33.30	-61.96	-13.00	-48.96

Table 7-27. Radiated Spurious Data (WCDMA Cell – Low Channel _Ant A + Ant B)

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]
1673.20	H	205	57	-74.32	-3.54	29.14	-66.12	-13.00	-53.12
2509.80	H	199	210	-62.98	0.80	44.82	-50.43	-13.00	-37.43
3346.40	H	-	-	-77.01	1.95	31.94	-63.32	-13.00	-50.32
4183.00	H	-	-	-77.62	2.95	32.33	-62.93	-13.00	-49.93
5019.60	H	-	-	-77.81	4.35	33.54	-61.72	-13.00	-48.72

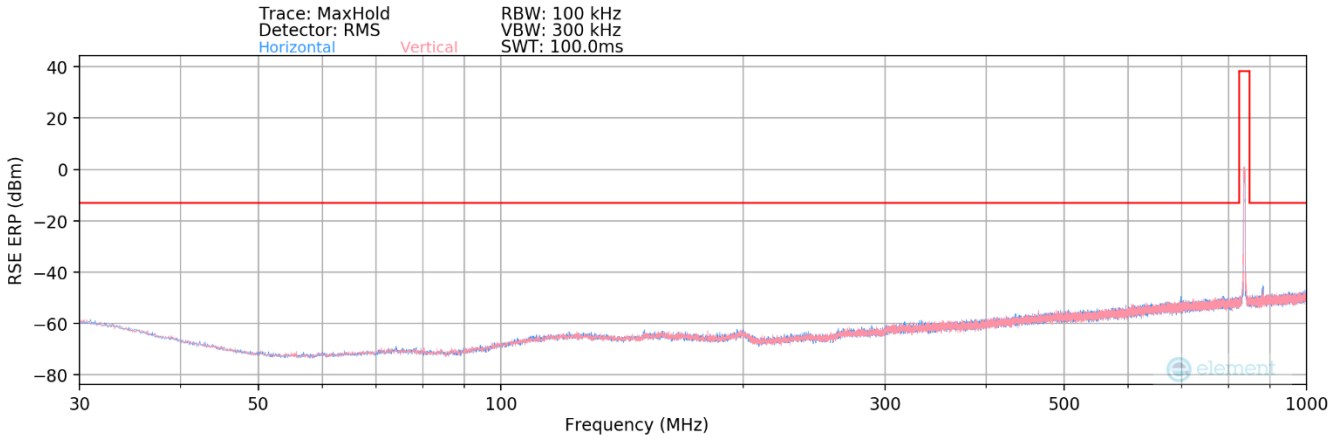
Table 7-28. Radiated Spurious Data (WCDMA Cell – Mid Channel _Ant A + Ant B)

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]
1693.20	H	143	58	-75.01	-3.06	28.93	-66.33	-13.00	-53.33
2539.80	H	139	202	-63.55	1.21	44.66	-50.60	-13.00	-37.60
3386.40	H	-	-	-76.43	1.72	32.29	-62.97	-13.00	-49.97
4233.00	H	-	-	-77.09	2.89	32.80	-62.45	-13.00	-49.45
5079.60	H	-	-	-78.18	4.56	33.38	-61.88	-13.00	-48.88

Table 7-29. Radiated Spurious Data (WCDMA Cell – High Channel _Ant A + Ant B)

WCDMA Cell _Ant A

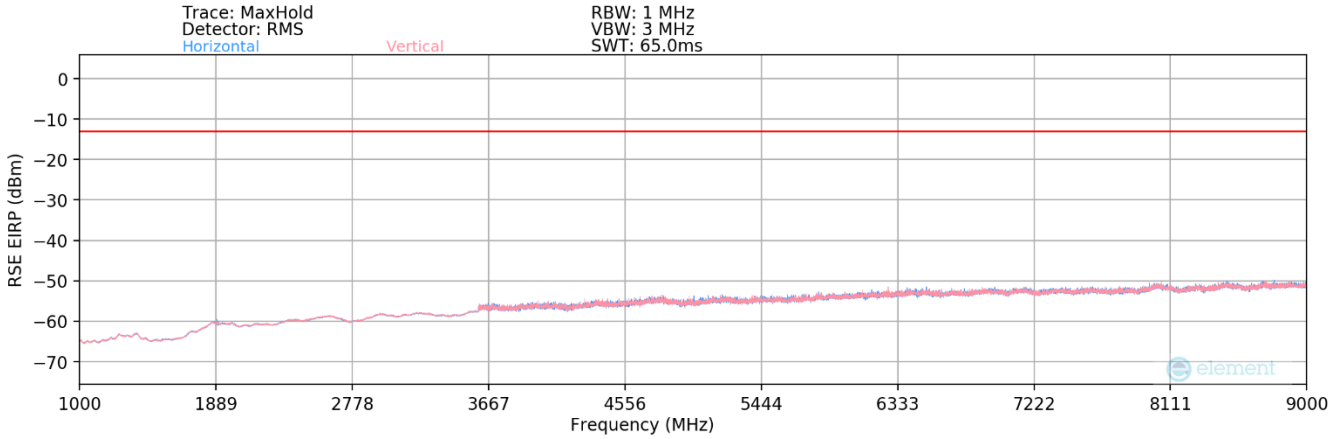


Plot 7-67. Radiated Spurious Plot (WCDMA Cell _Ant A)

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]	ERP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
154.30	H	-	-	-101.82	19.83	25.01	-72.40	-13.00	-59.40
692.12	H	-	-	-99.52	28.34	35.82	-61.59	-13.00	-48.59
881.60	H	-	-	-99.26	30.75	38.49	-58.92	-13.00	-45.92

Table 7-30. Radiated Spurious Data (WCDMA Cell – Mid Channel _Ant A)



Plot 7-68. Radiated Spurious Plot (WCDMA Cell _Ant A) _CLOSED

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]
1652.80	H	-	-	-75.92	-3.90	27.18	-68.08	-13.00	-55.08
2479.20	H	157	143	-75.49	0.35	31.86	-63.40	-13.00	-50.40
3305.60	H	-	-	-76.72	1.93	32.21	-63.05	-13.00	-50.05
4132.00	H	-	-	-77.24	2.86	32.62	-62.64	-13.00	-49.64
4958.40	H	-	-	-77.85	3.90	33.05	-62.21	-13.00	-49.21

Table 7-31. Radiated Spurious Data (WCDMA Cell – Low Channel _Ant A)

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]
1673.20	H	-	-	-76.18	-3.65	27.17	-68.09	-13.00	-55.09
2509.80	H	153	352	-75.98	0.74	31.76	-63.50	-13.00	-50.50
3346.40	H	-	-	-76.73	1.85	32.12	-63.14	-13.00	-50.14
4183.00	H	-	-	-77.39	2.76	32.37	-62.88	-13.00	-49.88
5019.60	H	-	-	-78.15	4.18	33.03	-62.22	-13.00	-49.22

Table 7-32. Radiated Spurious Data (WCDMA Cell – Mid Channel _Ant A)

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]
1693.20	H	-	-	-76.52	-3.11	27.37	-67.89	-13.00	-54.89
2539.80	H	184	332	-75.94	1.12	32.18	-63.08	-13.00	-50.08
3386.40	H	-	-	-76.62	1.66	32.04	-63.22	-13.00	-50.22
4233.00	H	-	-	-77.62	2.84	32.22	-63.04	-13.00	-50.04
5079.60	H	-	-	-78.09	4.52	33.43	-61.82	-13.00	-48.82

Table 7-33. Radiated Spurious Data (WCDMA Cell – High Channel _Ant A)

7.7 Frequency Stability / Temperature Variation

Test Overview and Limit

Frequency stability testing is performed in accordance with the guidelines of ANSI C63.26-2015. The frequency stability of the transmitter is measured by:

a.) **Temperature:** The temperature is varied from -30°C to +50°C in 10°C increments using an environmental chamber.

b.) **Primary Supply Voltage:** The primary supply voltage is varied from 85% to 115% of the nominal value for non hand-carried battery and AC powered equipment. For hand-carried, battery-powered equipment, primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacturer.

For Part 22 and RSS-132, the frequency stability of the transmitter shall be maintained within ±0.00025% (±2.5 ppm) of the center frequency.

Test Procedure Used

ANSI C63.26-2015 – Section 5.6

Test Settings

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

Test Setup

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

Test Notes

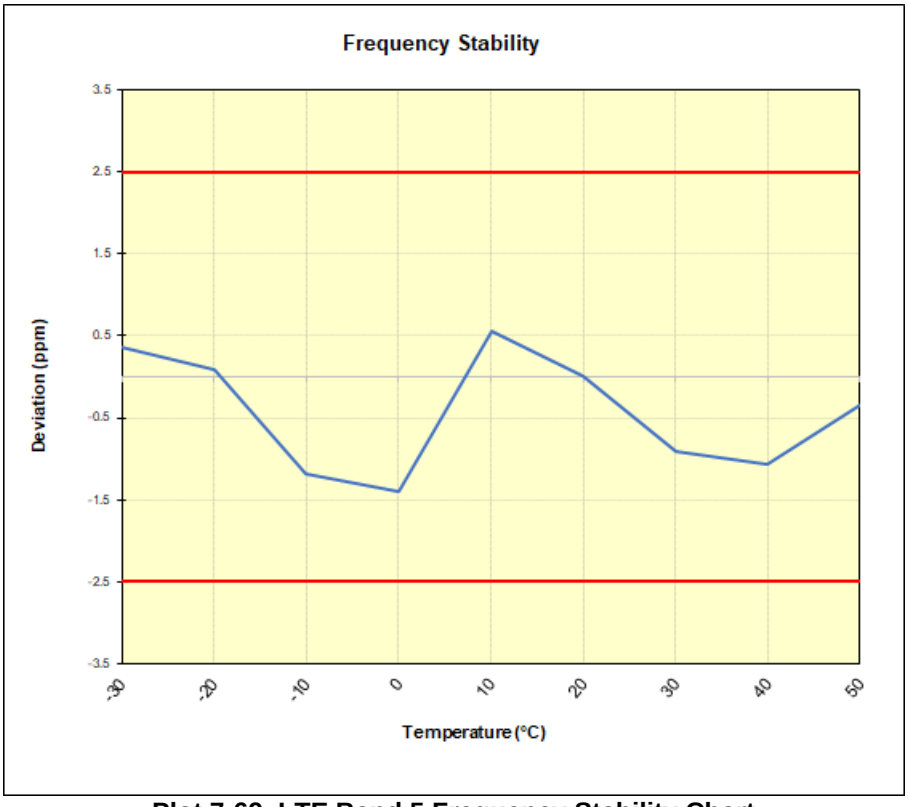
None

LTE Band 5

Operating Frequency (Hz):	836,500,000
Ref. Voltage (VDC):	4.38
Deviation Limit:	± 0.00025% or 2.5 ppm

Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.38	- 30	836,500,476	300	0.0000359
		- 20	836,500,241	65	0.0000078
		- 10	836,499,183	-993	-0.0001187
		0	836,499,010	-1,166	-0.0001394
		+ 10	836,500,638	463	0.0000553
		+ 20 (Ref)	836,500,176	0	0.0000000
		+ 30	836,499,420	-756	-0.0000903
		+ 40	836,499,291	-885	-0.0001057
		+ 50	836,499,886	-290	-0.0000347
Battery Endpoint	3.35	+ 20	836,499,327	-849	-0.0001015

Table 7-34. LTE Band 5 Frequency Stability Data



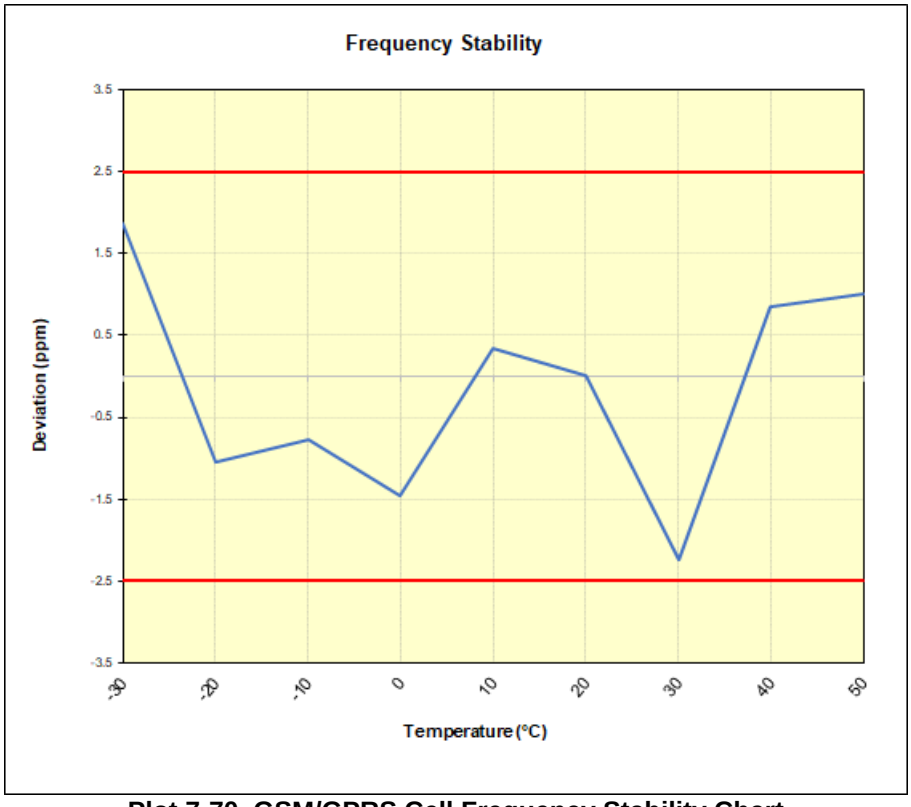
Plot 7-69. LTE Band 5 Frequency Stability Chart

GSM/GPRS Cellular

Operating Frequency (Hz):	836,600,000
Ref. Voltage (VDC):	4.38
Deviation Limit:	± 0.00025% or 2.5 ppm

Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.38	- 30	836,604,719	1,566	0.0001871
		- 20	836,602,273	-880	-0.0001052
		- 10	836,602,511	-642	-0.0000768
		0	836,601,938	-1,215	-0.0001453
		+ 10	836,603,440	287	0.0000343
		+ 20 (Ref)	836,603,153	0	0.0000000
		+ 30	836,601,283	-1,870	-0.0002235
		+ 40	836,603,865	712	0.0000851
		+ 50	836,604,002	849	0.0001015
Battery Endpoint	3.35	+ 20	836,601,781	-1,372	-0.0001640

Table 7-35. GSM/GPRS Cell Frequency Stability Data



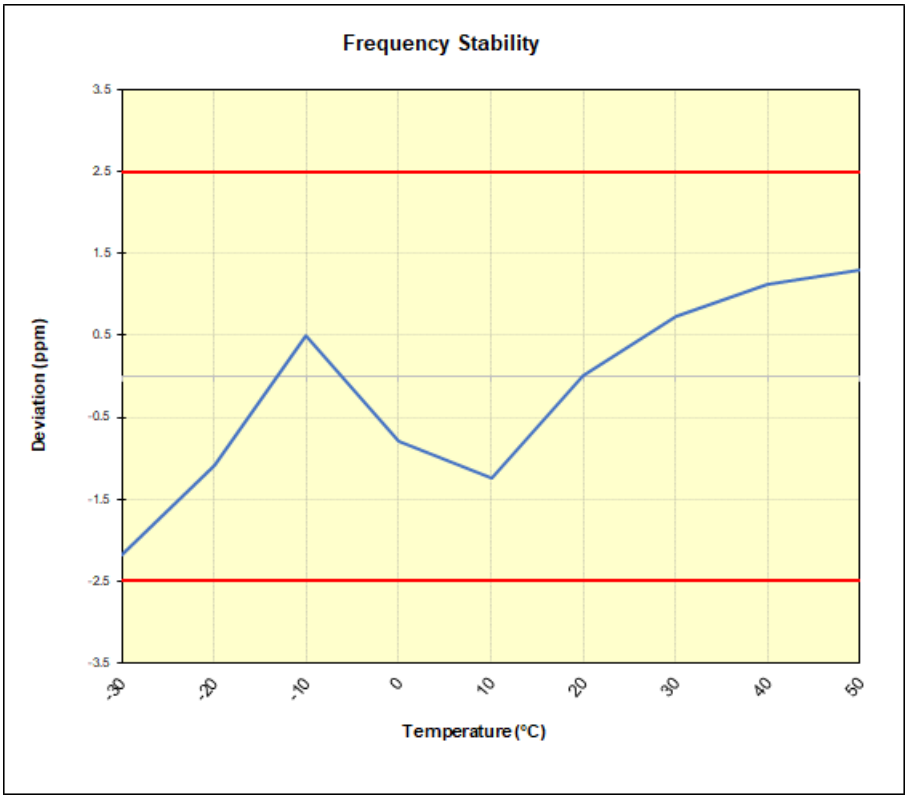
Plot 7-70. GSM/GPRS Cell Frequency Stability Chart

WCDMA Cellular

Operating Frequency (Hz):	826,400,000
Ref. Voltage (VDC):	4.38
Deviation Limit:	± 0.00025% or 2.5 ppm

Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.38	- 30	826,407,275	-1,802	-0.0002181
		- 20	826,408,187	-891	-0.0001078
		- 10	826,409,490	412	0.0000499
		0	826,408,427	-651	-0.0000787
		+ 10	826,408,050	-1,028	-0.0001244
		+ 20 (Ref)	826,409,077	0	0.0000000
		+ 30	826,409,682	605	0.0000732
		+ 40	826,410,011	934	0.0001130
		+ 50	826,410,153	1,076	0.0001301
Battery Endpoint	3.35	+ 20	826,410,694	1,617	0.0001956

Table 7-36. WCDMA Cell Frequency Stability Data



Plot 7-71. WCDMA Cell Frequency Stability Chart

8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **Samsung Portable Handset FCC ID: A3LSMF936JPN** complies with all the requirements of Part 22 of the FCC rules.