

PART 22 MEASUREMENT REPORT

Applicant Name:

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

Date of Testing:

6/17/2022 - 07/07/2022

Test Report Issue Date:

07/22/2022

Test Site/Location:

Element Lab. Yongin-Si, Gyeonggi-do, South Korea

Test Report Serial No.:

1M2206140073-01.A3L

FCC ID:

A3LSMF721JPN

Applicant Name:

Samsung Electronics Co., Ltd.

Application Type:

Certification

Model:

SC-54C

Additional Model(s):

SCG17

EUT Type:

Portable Handset

FCC Classification:

PCS Licensed Transmitter Held to Ear (PCE)

FCC Rule Part:

22

Test Procedure(s):

ANSI C63.26-2015, ANSI/TIA-603-E-2016, KDB 971168
D01 v03r01, 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.



Prepared by



Reviewed by

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Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	ERP		EIRP		Emission Designator
				Max. Power [W]	Max. Power [dBm]	Max. Power [W]	Max. Power [dBm]	
LTE Band 26/5	15MHz (Band 26 only)	QPSK	831.5 - 841.5	0.075	18.73	0.122	20.88	13M6G7D
		16QAM	831.5 - 841.5	0.062	17.96	0.102	20.11	13M6W7D
	10 MHz	QPSK	829.0 - 844.0	0.098	19.89	0.160	22.04	9M04G7D
		16QAM	829.0 - 844.0	0.082	19.15	0.135	21.30	9M03W7D
	5 MHz	QPSK	826.5 - 846.5	0.097	19.88	0.160	22.03	4M55G7D
		16QAM	826.5 - 846.5	0.080	19.03	0.131	21.18	4M56W7D
	3 MHz	QPSK	825.5 - 847.5	0.097	19.88	0.160	22.03	2M72G7D
		16QAM	825.5 - 847.5	0.080	19.05	0.132	21.20	2M72W7D
	1.4 MHz	QPSK	824.7 - 848.3	0.098	19.89	0.160	22.04	1M11G7D
		16QAM	824.7 - 848.3	0.079	18.98	0.130	21.13	1M11W7D

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	0.513	27.10	0.842	29.25	242KGXW
EDGE	8-PSK	824.2 - 848.8	0.144	21.57	0.236	23.72	239KG7W
WCDMA	Spread Spectrum	826.4 - 846.6	0.072	18.57	0.118	20.72	4M17F9W

EUT Overview

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1.0 INTRODUCTION

1.1 Scope

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

1.2 Element Test Location

These measurement tests were conducted at the Element Suwon Laboratory located at 13, Heungdeok 1-ro, Giheung-gu, Yongin-si, Gyeonggi-do, 16954, South Korea. 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 Materials Technology Suwon, Ltd. located in Yongin-si, Gyeonggi-do, 16954, South Korea.

- Element Materials Technology Suwon, Ltd. is an ISO 17025-2017 accredited test facility under the American Association for Laboratory Accreditation(A2LA) with Certificate number 2041.04 for Specific Absorption Rate (SAR), and Electromagnetic Compatibility (EMC) & Telecommunications testing for FCC and Innovation, Science, and Economic Development Canada rules.
- Element Materials Technology Suwon, Ltd. facility is accredited, designated, and recognized in accordance with the provision of Radio Wave Act and International Standard ISO/IEC 17025:2017 under the National Radio Research Agency.
 - Designation Number / CABID: KR0169
 - Test Firm Registration Number of FCC: 417945
 - Test Firm Registration Number of ISED: 26168

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2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **Samsung Portable Handset FCC ID: A3LSMF721JPN**. 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.: 1185M, 1186M

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 (5GHz), Bluetooth (1x, EDR, LE), NFC, 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.

LTE Band 26 (814.7 – 849 MHz) overlaps the entire frequency range of LTE Band 5 (824 – 849 MHz). Therefore, test data provided in this report covers Band 5 and the portion of Band 26 subject to Part 22.

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.

2.4 Software and Firmware

Testing was performed on device(s) using software/firmware version SC54COMU0AVFF 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:

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

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 $P_g [dBm] - \text{cable loss} [dB]$.

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:

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

And

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

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	1.60
Radiated Disturbance (<1GHz)	3.94
Radiated Disturbance (>1GHz)	4.75
Radiated Disturbance (>18GHz)	3.08

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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
Agilent	N9030A	PXA Signal Analyzer	2022-07-04	Annual	2023-07-03	MY49432391
Anritsu	S820E	Cable and Antenna Analyzer	2022-07-06	Annual	2023-07-05	1839097
Anritsu	MA24106A	USB Power Sensor	2022-07-06	Annual	2023-07-05	1244512
Com-Power	AL-130	9kHz - 30MHz Loop Antenna	2020-10-29	Biennial	2022-10-28	10160045
Com-Power	PAM-118A	Preamplifier	2022-07-06	Annual	2023-07-05	551042
Espec	SH-242	Environmental Chamber	2021-09-15	Annual	2022-09-14	93011064
Fairview Microwave	FM2CP1122-10	Coupler	2022-07-06	Annual	2023-07-05	1946
Keysight Technologies	N9030B	MXA Signal Analyzer	2022-05-10	Annual	2023-05-19	MY57142018
Mini Circuits	ZUDC10-83-S+	Coupler	2021-09-15	Annual	2022-09-14	2111
Mini-Circuits	BW-N10W5+	Attenuator	2022-05-09	Annual	2023-05-08	1607
Mini-Circuits	BW-N10W5+	Attenuator	2022-05-09	Annual	2023-05-08	1607
Rohde & Schwarz	TS-PR18	Preamplifier	2022-07-06	Annual	2023-07-05	102141
Rohde & Schwarz	SMBV100B	Signal Generator	2021-11-04	Annual	2022-11-03	101568
Rohde & Schwarz	CMW500	Wideband Radio Communication Tester	2022-02-18	Annual	2023-02-17	131453
Rohde & Schwarz	ESW	EMI Test Receiver	2022-07-04	Annual	2023-07-03	101761
Rohde & Schwarz	FSW43	Signal & Spectrum Analyzer	2021-09-15	Annual	2022-09-14	101250
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	2022-02-18	Annual	2023-02-17	102131
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	2022-03-28	Annual	2023-03-27	102151
Schwarzbeck	VULB9162	Broadband TRILOG Antenna	2021-07-13	Biennial	2023-07-12	9162-217
Schwarzbeck	UHA9105	Dipole Antenna	2020-07-09	Biennial	2022-07-08	91052522
Sunol	DRH-118	Horn Antenna	2021-07-14	Biennial	2023-07-13	A102416-1
Sunol	DRH-118	Horn Antenna	2021-01-12	Biennial	2023-01-11	A060215

Table 5-1. Test Equipment

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.

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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.

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7.0 TEST RESULTS

7.1 Summary

Company Name: Samsung Electronics Co., Ltd.
 FCC ID: A3LSMF721JPN
 FCC Classification: PCS Licensed Transmitter Held to Ear (PCE)
 Mode(s): GSM/GPRS/WCDMA/LTE

Test Condition	Test Description	FCC Part Section(s)	RSS Section(s)	Test Limit	Test Result	Reference
CONDUCTED	Occupied Bandwidth	2.1049	RSS-Gen(6.7)	N/A	PASS	Section 7.2
	Conducted Band Edge / Spurious Emissions	2.1051, 22.917(a)	RSS-132(5.5)	> 43 + 10log10(P[Watts]) at Band Edge and for all out-of-band emissions	PASS	Sections 7.3, 7.4
	Frequency Stability	2.1055, 22.355	RSS-132(5.3)	Fundamental emissions stay within authorized frequency block	PASS	Section 7.7
RADIATED	Effective Radiated Power / Equivalent Isotropic Radiated Power	22.913(a)(5)	RSS-132(5.4)	< 7 Watts max. ERP	PASS	Section 7.5
	Radiated Spurious Emissions	2.1053, 22.917(a)	RSS-132(5.5)	> 43 + 10 log10 (P[Watts]) for all out-of-band emissions	PASS	Section 7.6

Table 7-1. Summary of Test Results

Notes:

- 1) All modes of operation and data rates were investigated. The test results shown in the following sections represent the worst case emissions.
- 2) The analyzer plots were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables, directional couplers, and attenuators used as part of the system to maintain a link between the call box and the EUT at all frequencies of interest.
- 3) All antenna port conducted emissions testing was performed on a test bench with the antenna port of the EUT connected to the spectrum analyzer through calibrated cables, attenuators, and couplers.
- 4) All conducted emissions measurements are performed with automated test software to capture the corresponding plots necessary to show compliance. The measurement software utilized is EMC Software Tool v1.0.

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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.

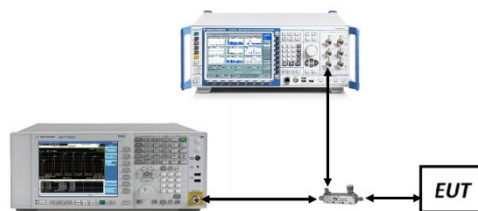


Figure 7-1. Test Instrument & Measurement Setup

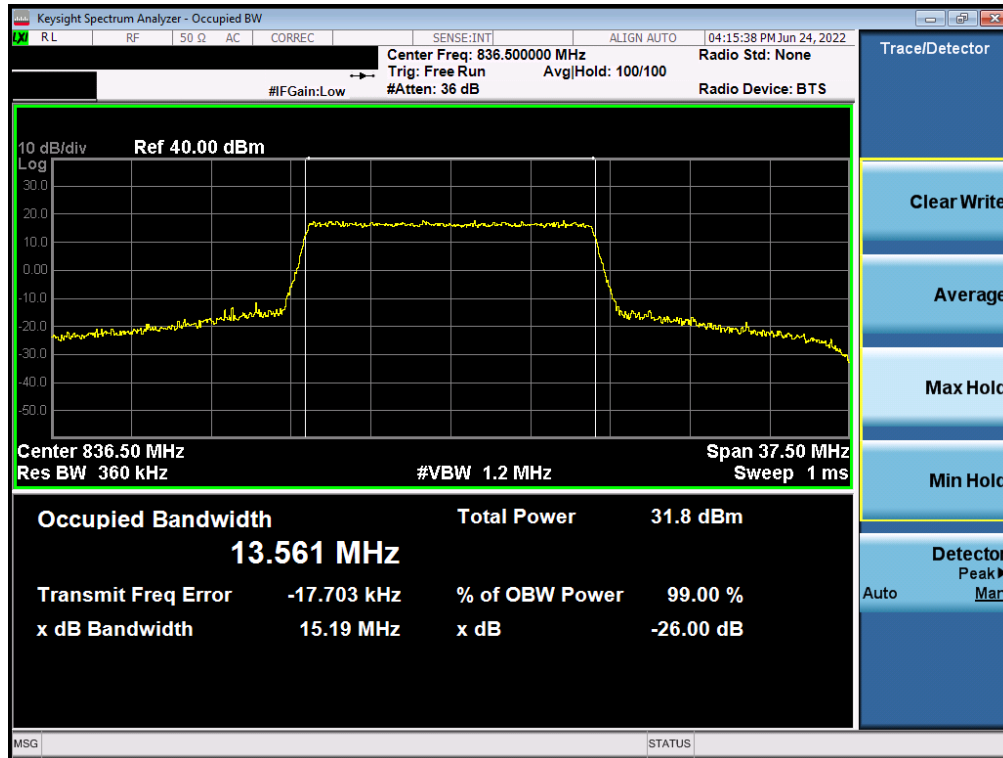
Test Notes

None.

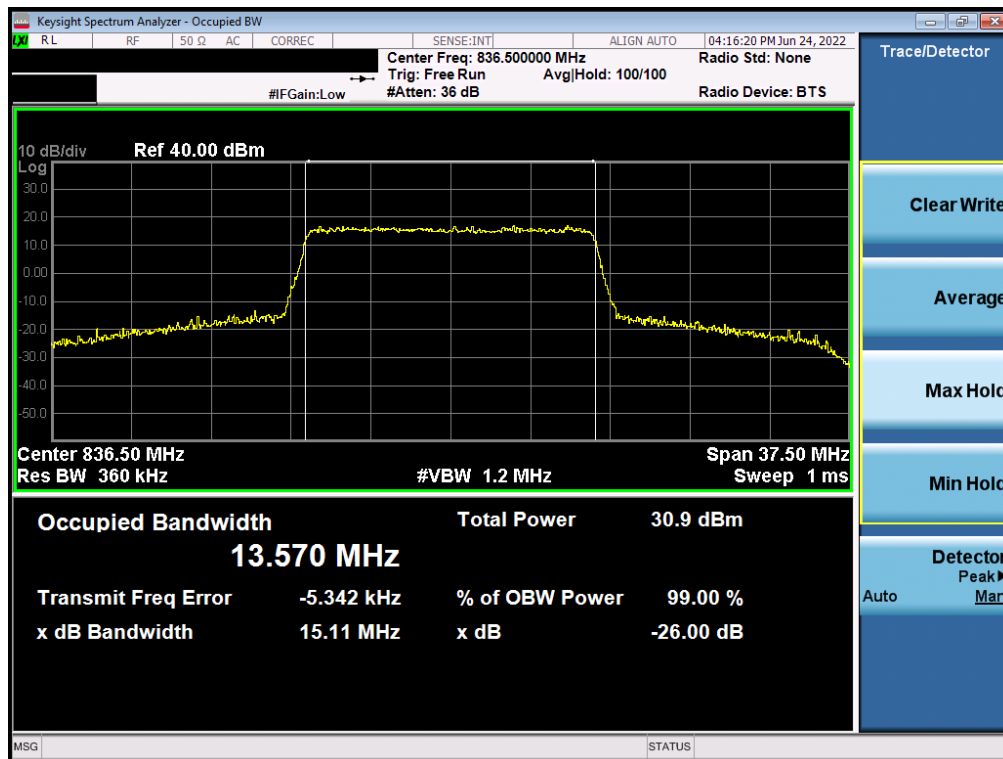
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LTE Band 26/5



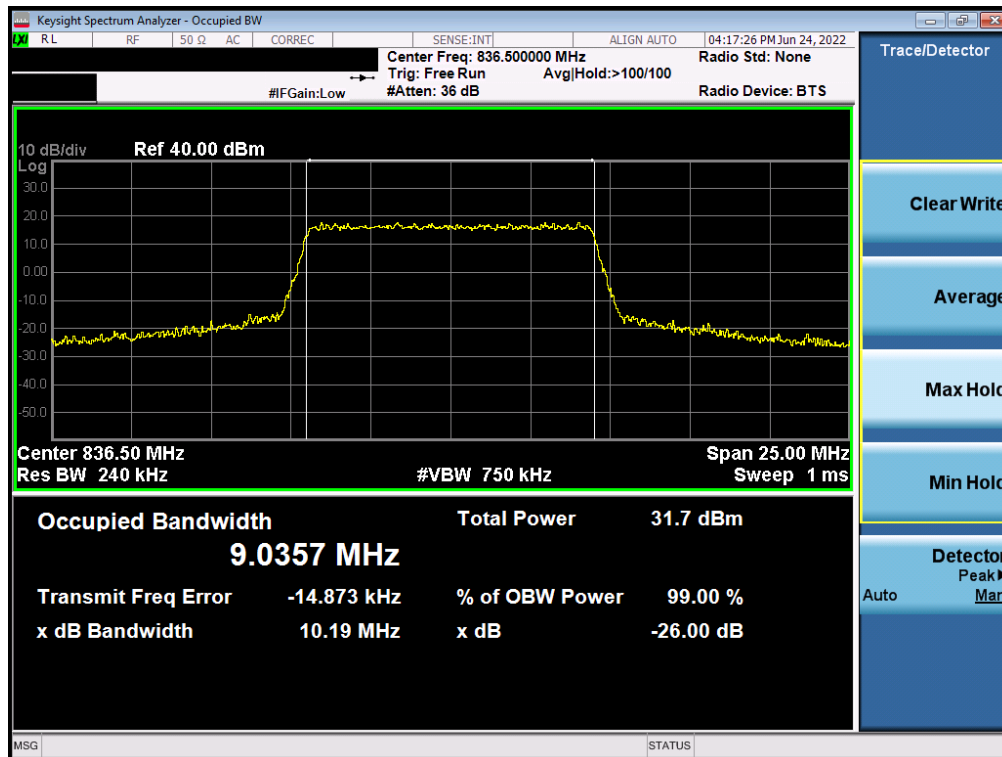
Plot 7-1. Occupied Bandwidth Plot (LTE Band 26 - 15MHz QPSK - Full RB)



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

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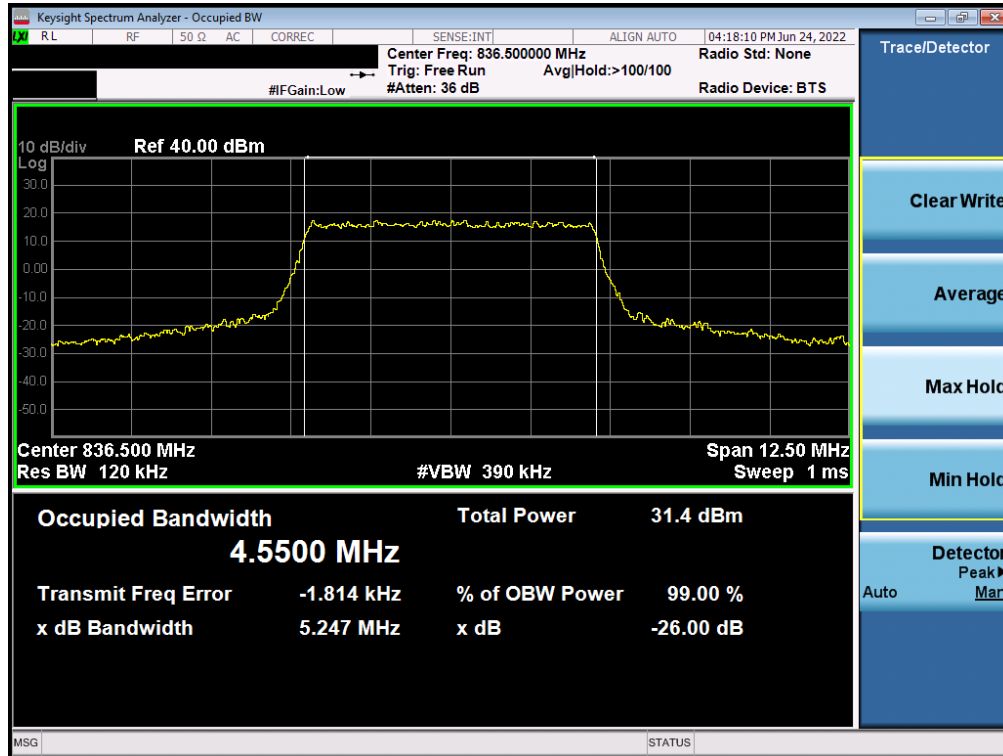
Plot 7-3. Occupied Bandwidth Plot (LTE Band 26/5 - 10MHz QPSK - Full RB)



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

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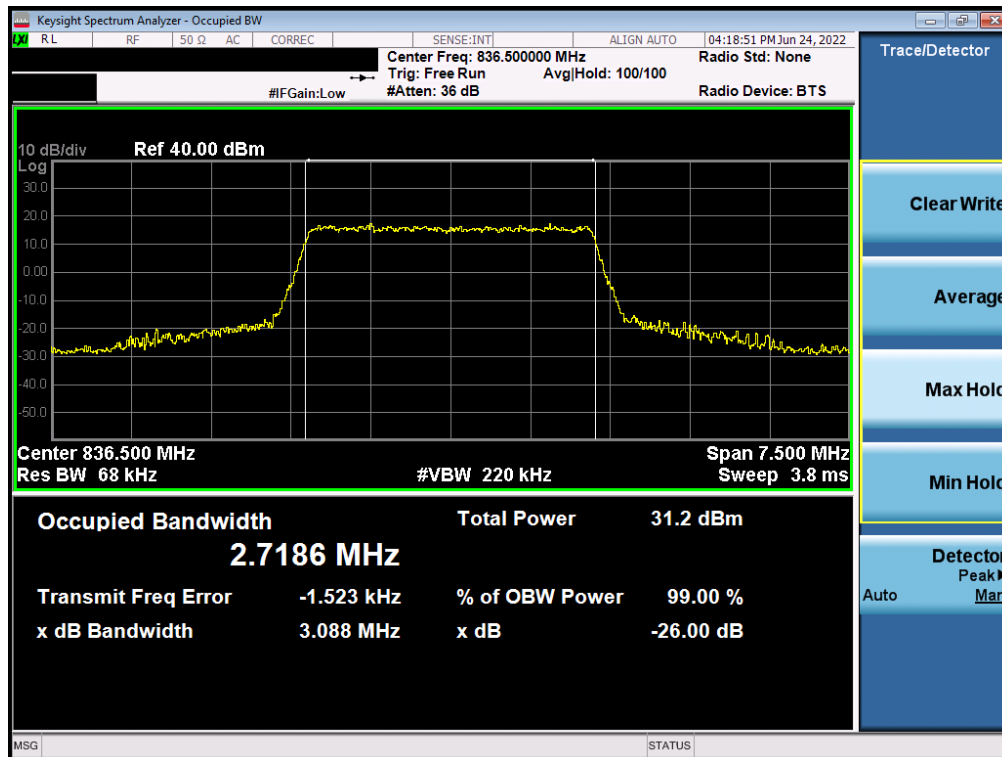
Plot 7-5. Occupied Bandwidth Plot (LTE Band 26/5 - 5MHz QPSK - Full RB)



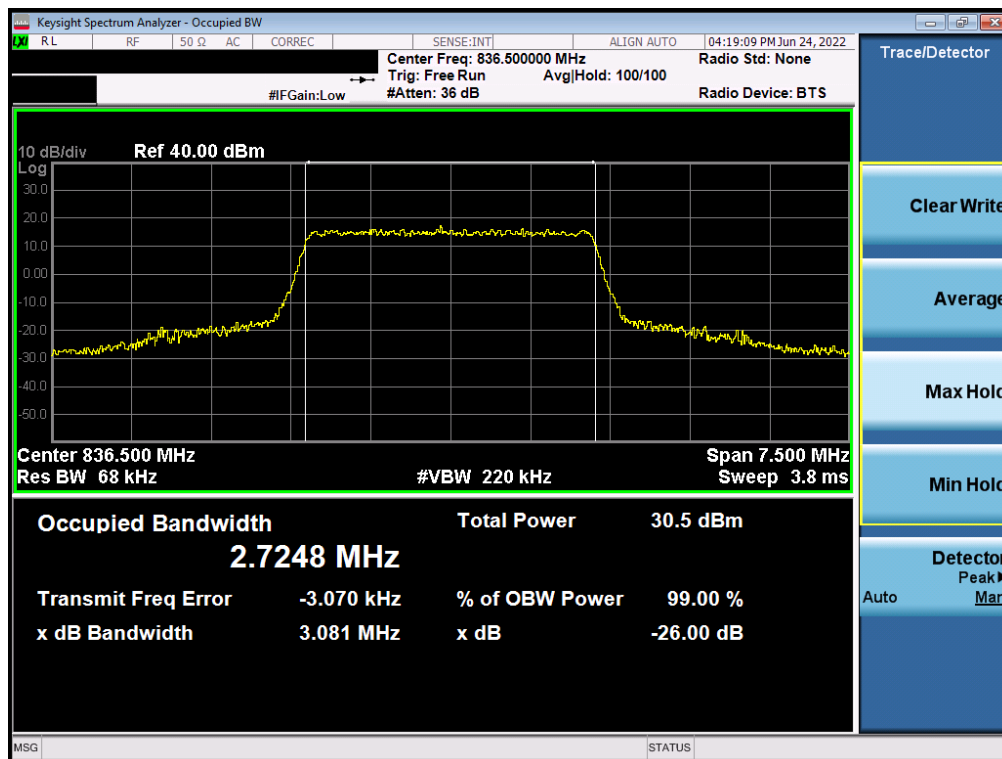
Plot 7-6. Occupied Bandwidth Plot (LTE Band 26/5 - 5MHz 16-QAM - Full RB)

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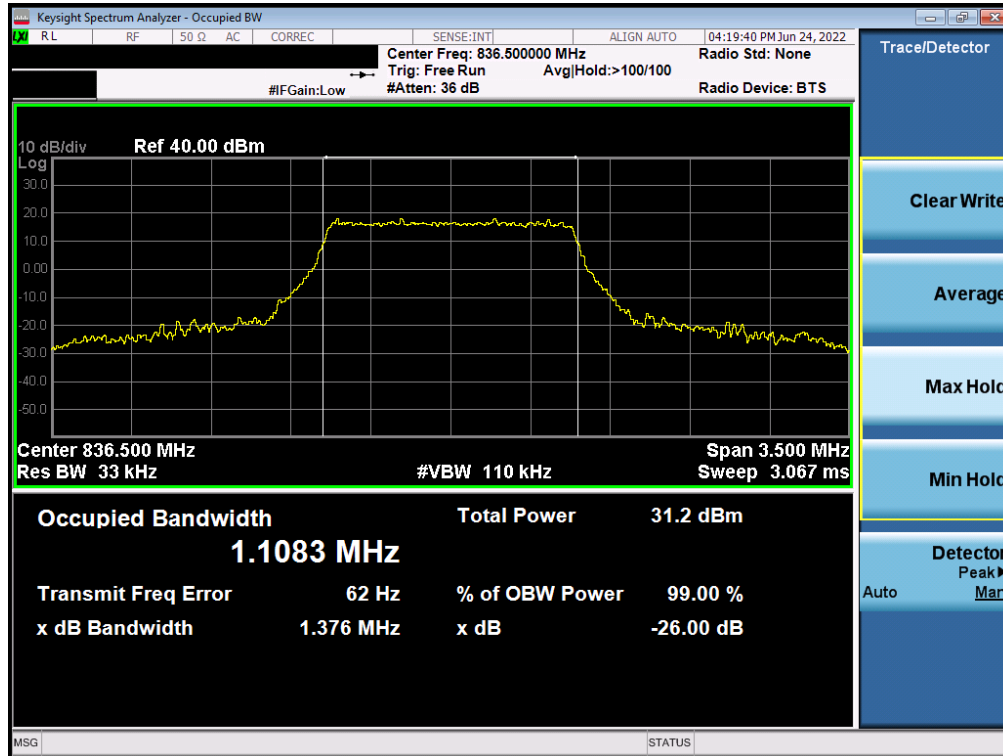
Plot 7-7. Occupied Bandwidth Plot (LTE Band 26/5 - 3MHz QPSK - Full RB)



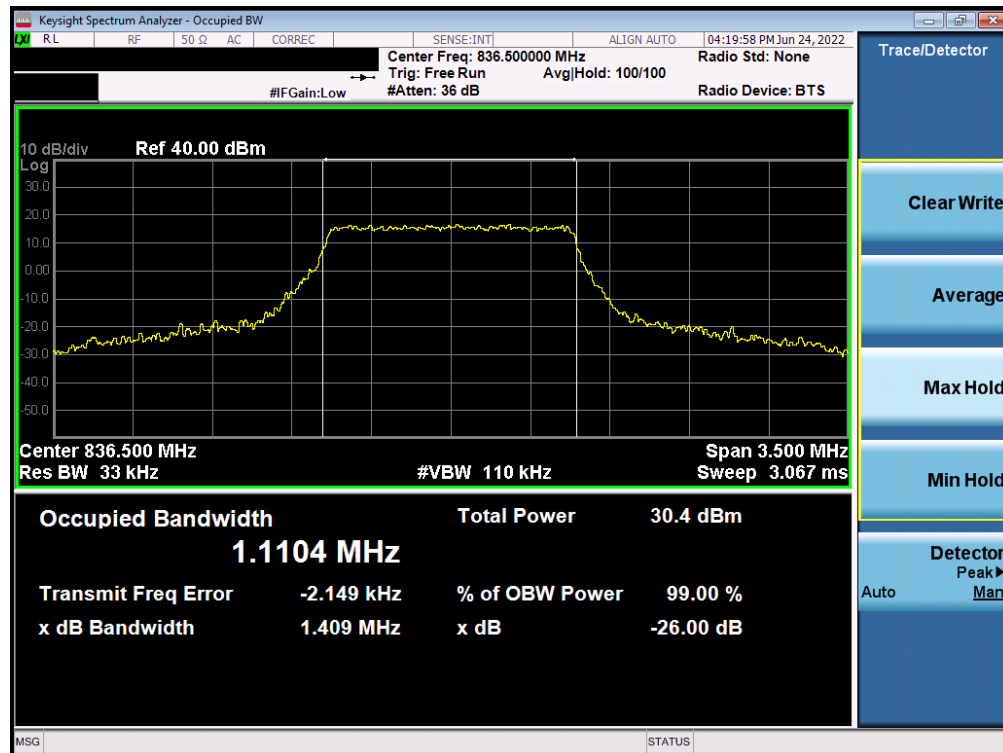
Plot 7-8. Occupied Bandwidth Plot (LTE Band 26/5 - 3MHz 16-QAM - Full RB)

FCC ID: A3LSMF721JPN	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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Plot 7-9. Occupied Bandwidth Plot (LTE Band 26/5 - 1.4MHz QPSK - Full RB)

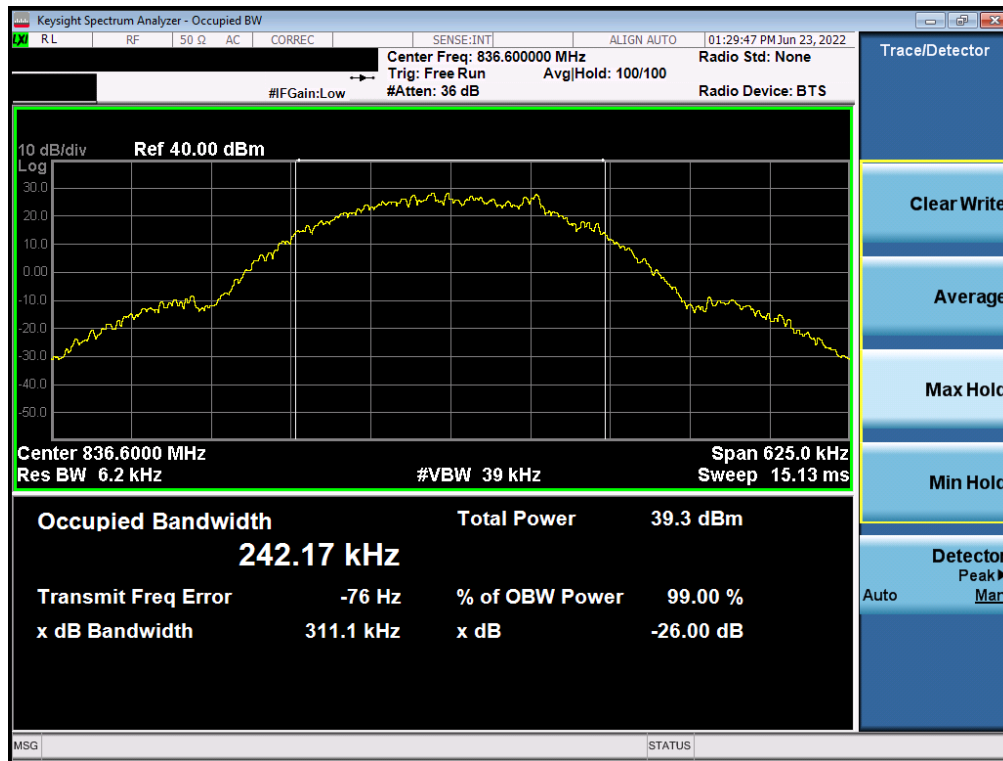


Plot 7-10. Occupied Bandwidth Plot (LTE Band 26/5 - 1.4MHz 16-QAM - Full RB)

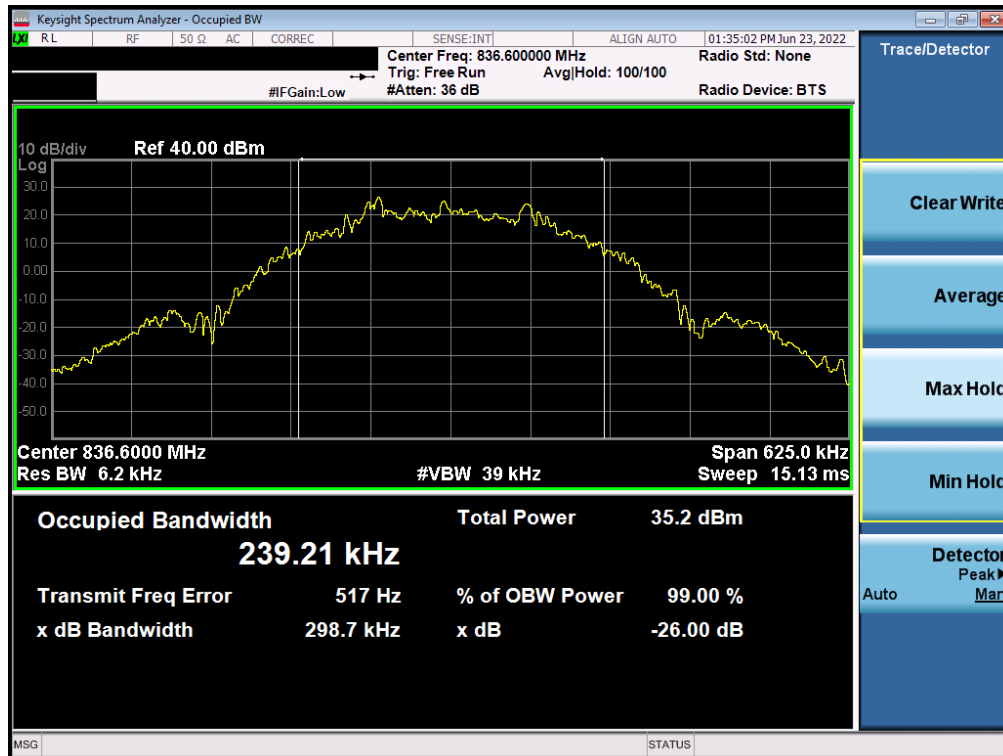
FCC ID: A3LSMF721JPN	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2206140073-01.A3L	Test Dates: 06/17/2022 – 07/07/2022	EUT Type: Portable Handset	Page 16 of 62

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GPRS Cell



Plot 7-11. Occupied Bandwidth Plot (GPRS, Ch. 190)

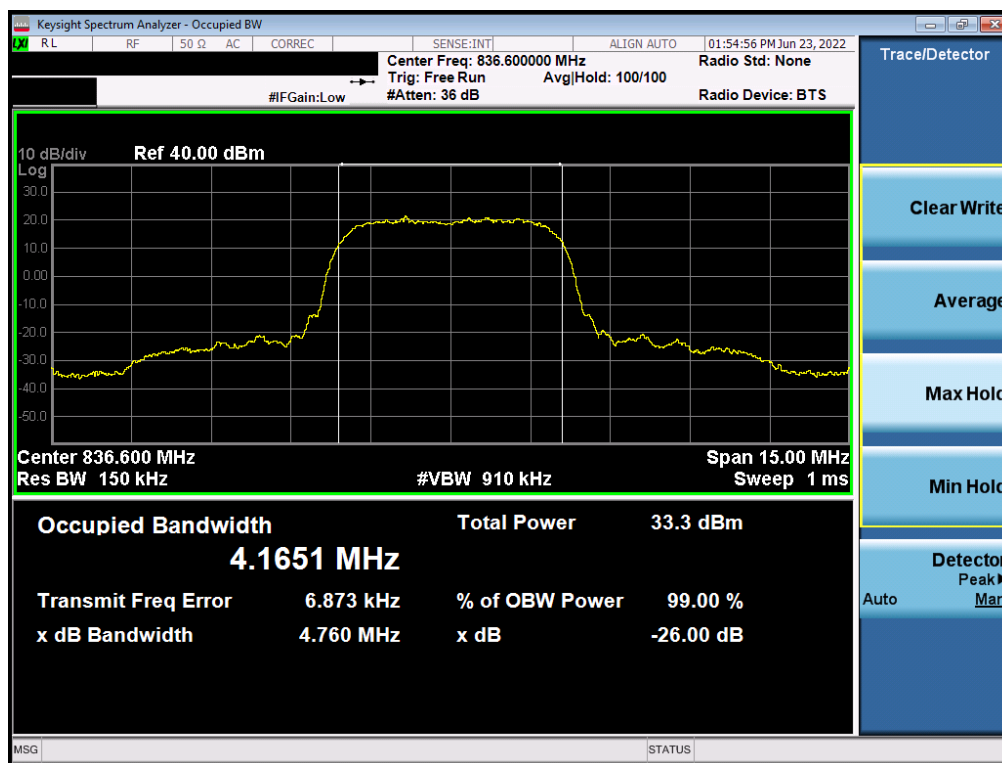


Plot 7-12. Occupied Bandwidth Plot (EDGE, Ch. 190)

FCC ID: A3LSMF721JPN	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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WCDMA Cell



Plot 7-13. Occupied Bandwidth Plot (WCDMA, Ch. 4183)

FCC ID: A3LSMF721JPN	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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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.

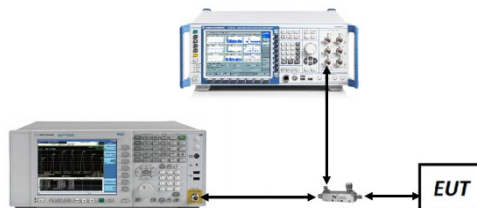


Figure 7-2. Test Instrument & Measurement Setup

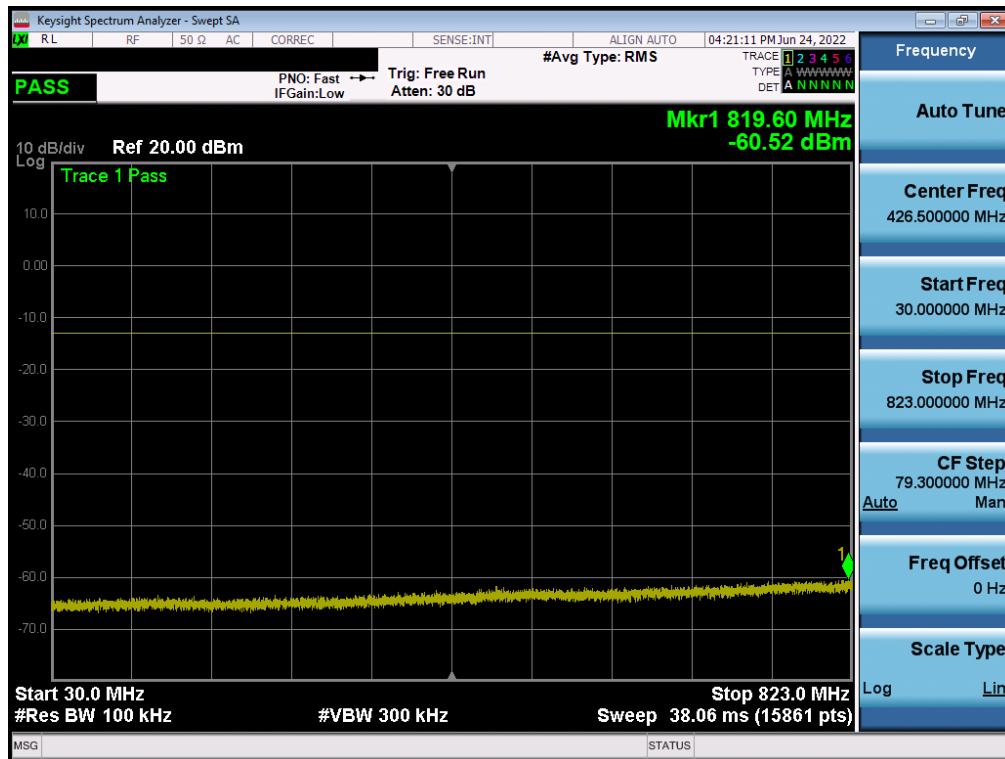
Test Notes

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.

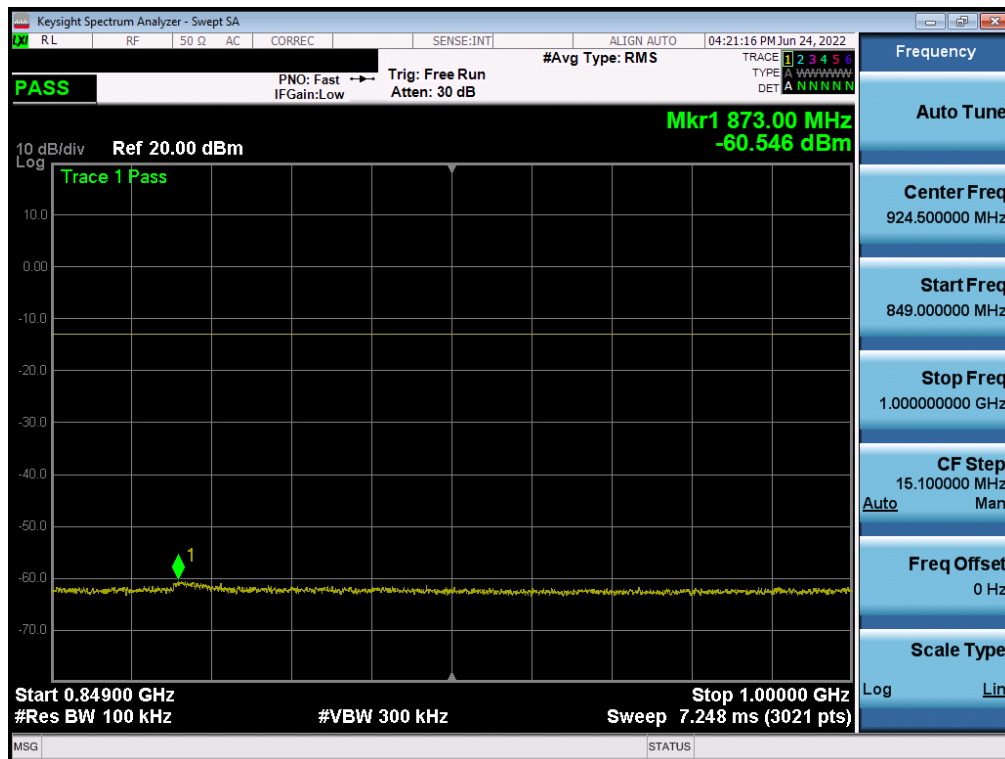
FCC ID: A3LSMF721JPN	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2206140073-01.A3L	Test Dates: 06/17/2022 – 07/07/2022	EUT Type: Portable Handset	Page 19 of 62

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LTE Band 26/5



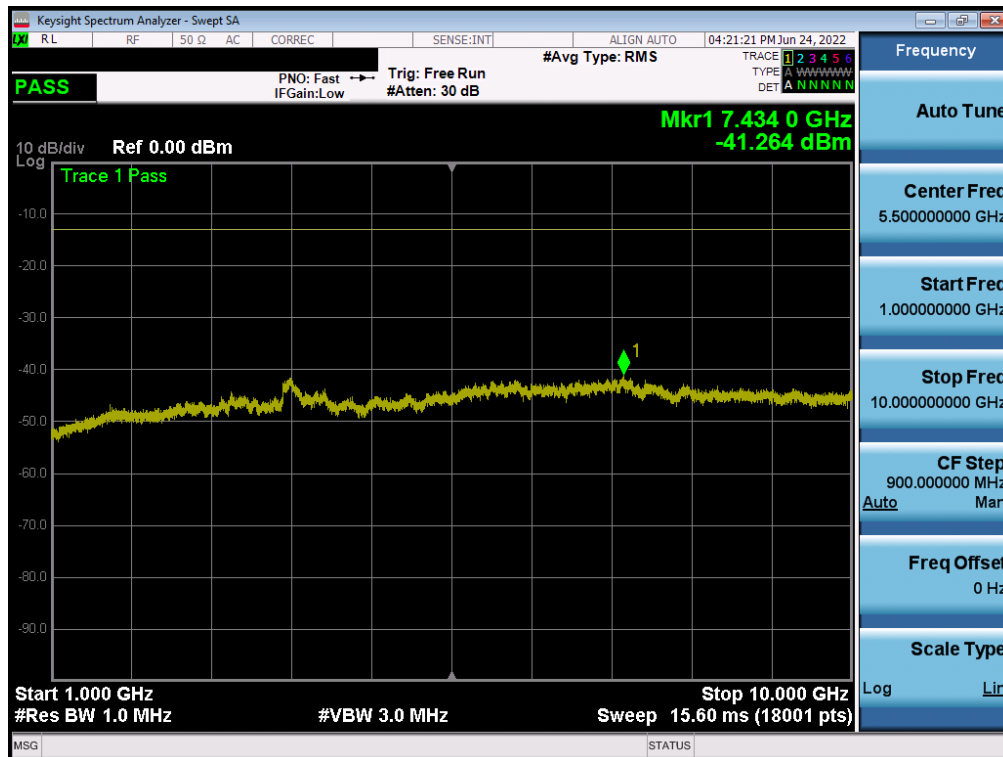
Plot 7-14. Conducted Spurious Plot (LTE Band 26/5 - 10MHz QPSK – 1 RB - Low Channel)



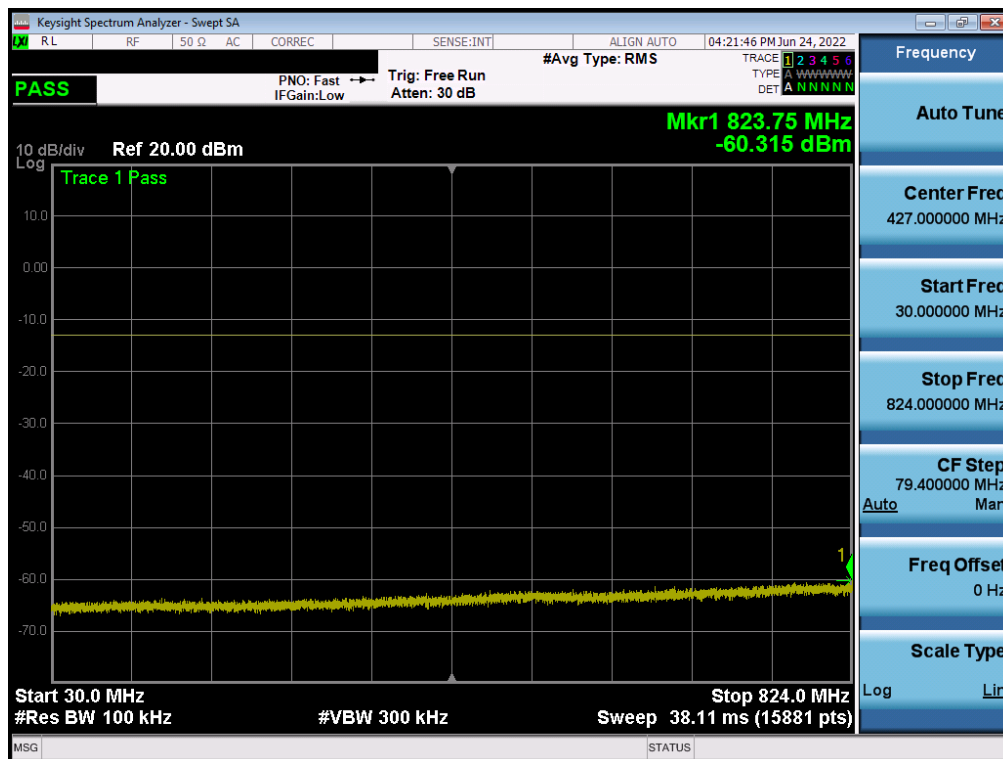
Plot 7-15. Conducted Spurious Plot (LTE Band 26/5 - 10MHz QPSK - 1 RB - Low Channel)

FCC ID: A3LSMF721JPN	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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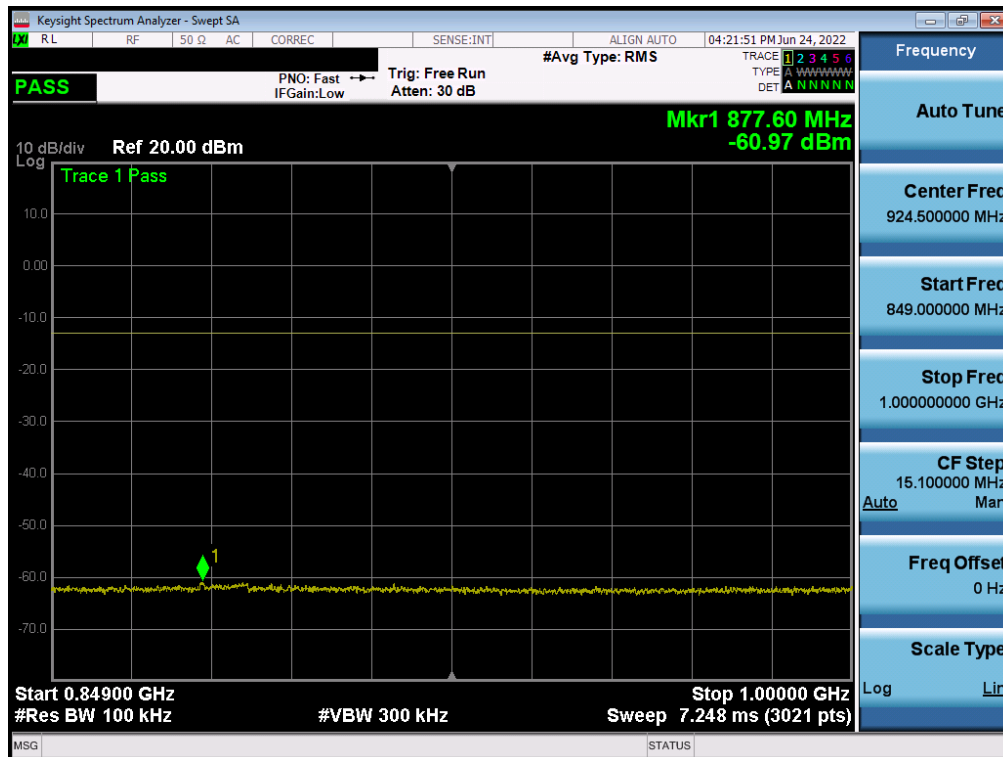


Plot 7-16. Conducted Spurious Plot (LTE Band 26/5 - 10MHz QPSK - 1 RB - Low Channel)

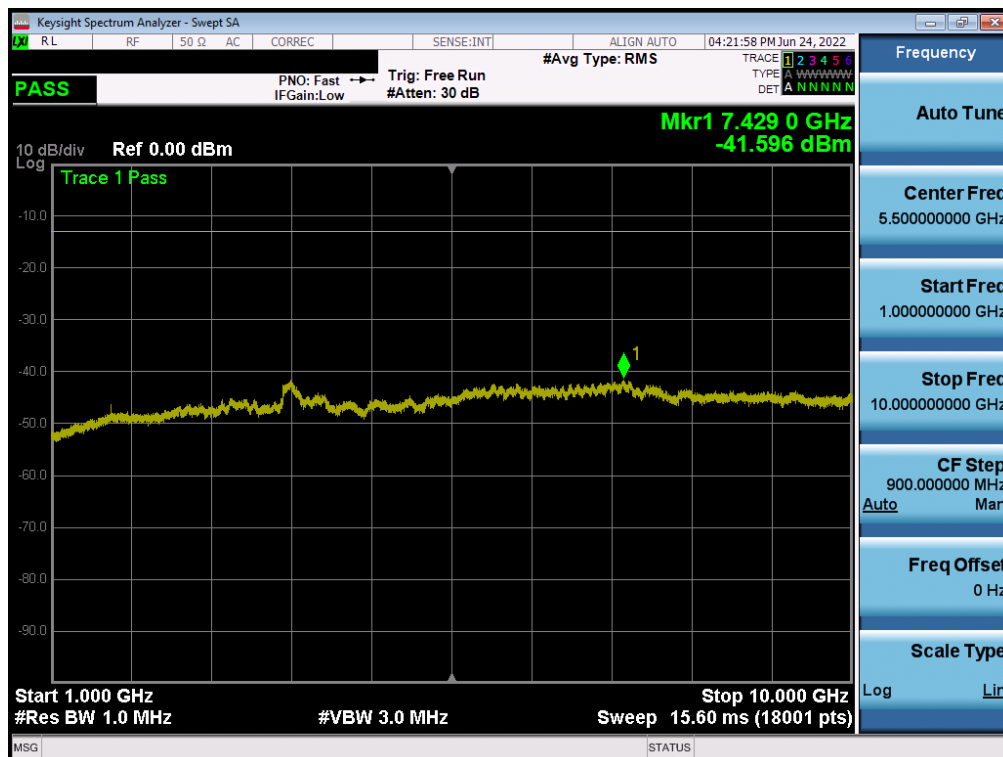


Plot 7-17. Conducted Spurious Plot (LTE Band 26/5 - 10MHz QPSK - 1 RB - Mid Channel)

FCC ID: A3LSMF721JPN	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2206140073-01.A3L	Test Dates: 06/17/2022 – 07/07/2022	EUT Type: Portable Handset	Page 21 of 62

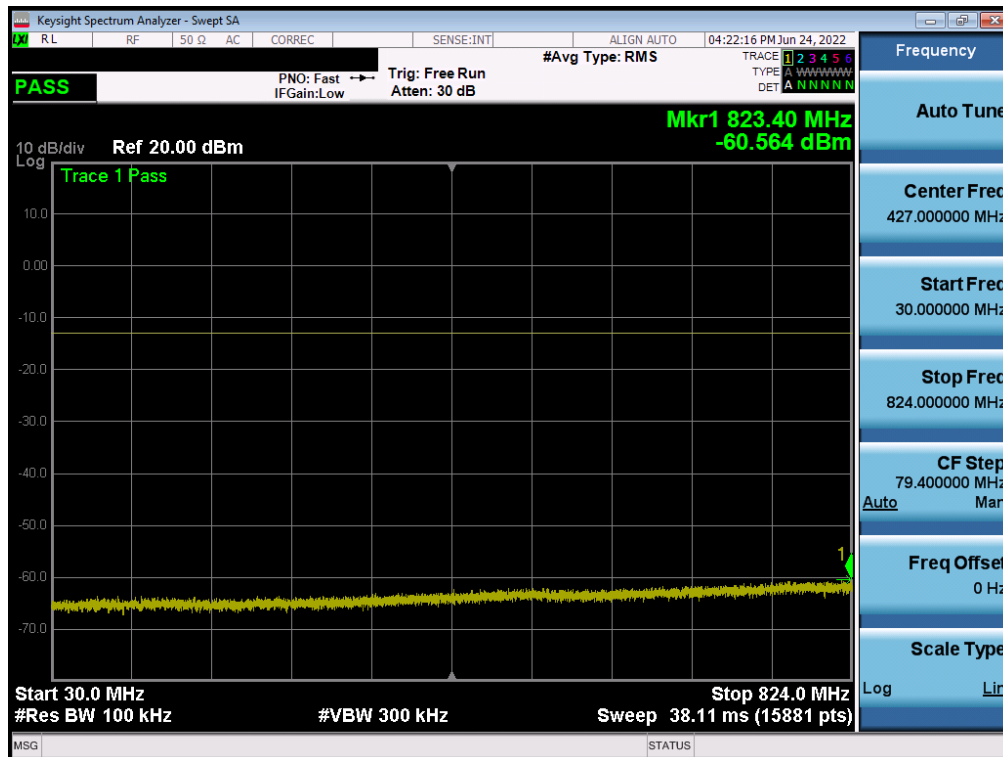


Plot 7-18. Conducted Spurious Plot (LTE Band 26/5 - 10MHz QPSK - 1 RB - Mid Channel)

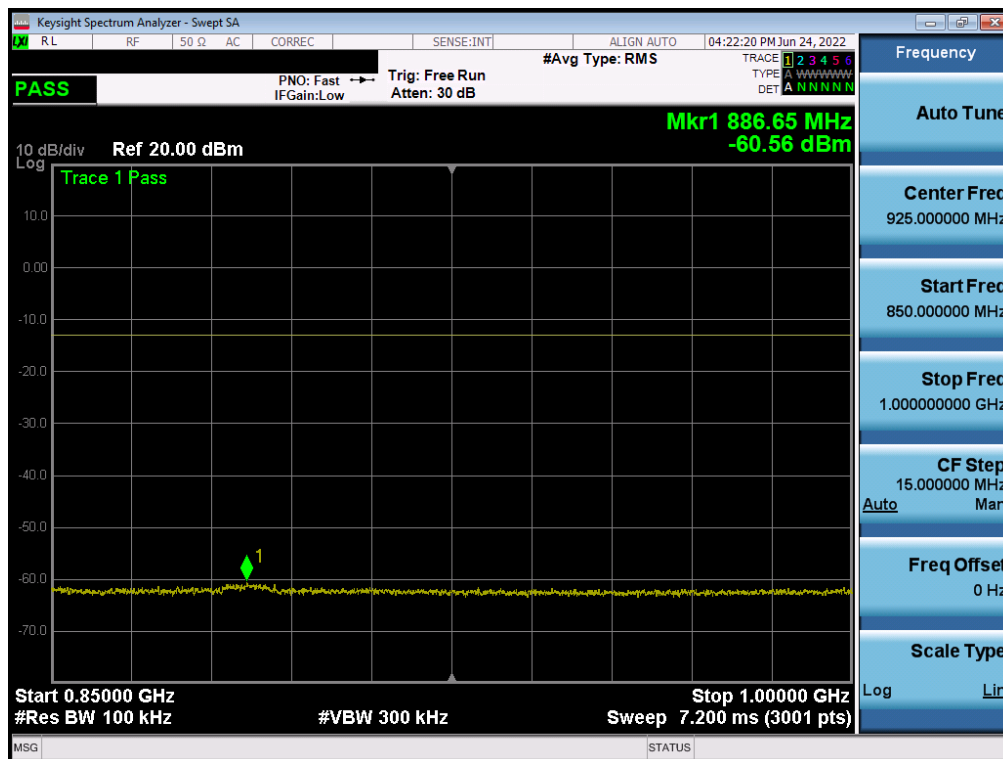


Plot 7-19. Conducted Spurious Plot (LTE Band 26/5 - 10MHz QPSK - 1 RB - Mid Channel)

FCC ID: A3LSMF721JPN	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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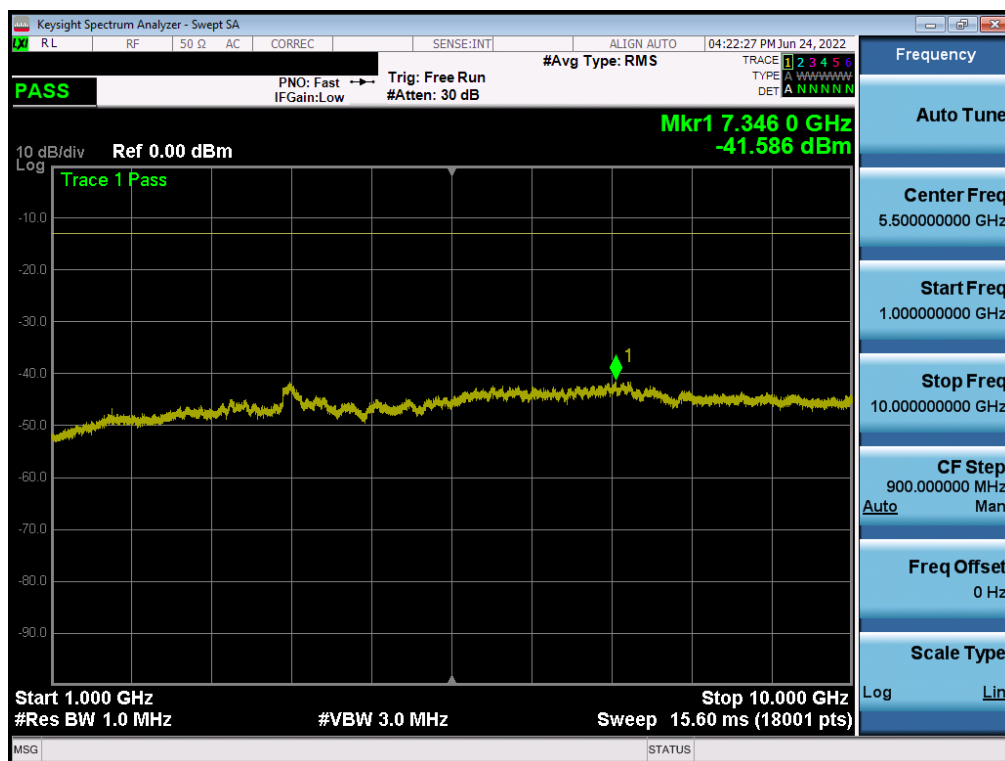


Plot 7-20. Conducted Spurious Plot (LTE Band 26/5 - 10MHz QPSK - 1 RB - High Channel)



Plot 7-21. Conducted Spurious Plot (LTE Band 26/5 - 10MHz QPSK - 1 RB - High Channel)

FCC ID: A3LSMF721JPN	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2206140073-01.A3L	Test Dates: 06/17/2022 – 07/07/2022	EUT Type: Portable Handset	Page 23 of 62

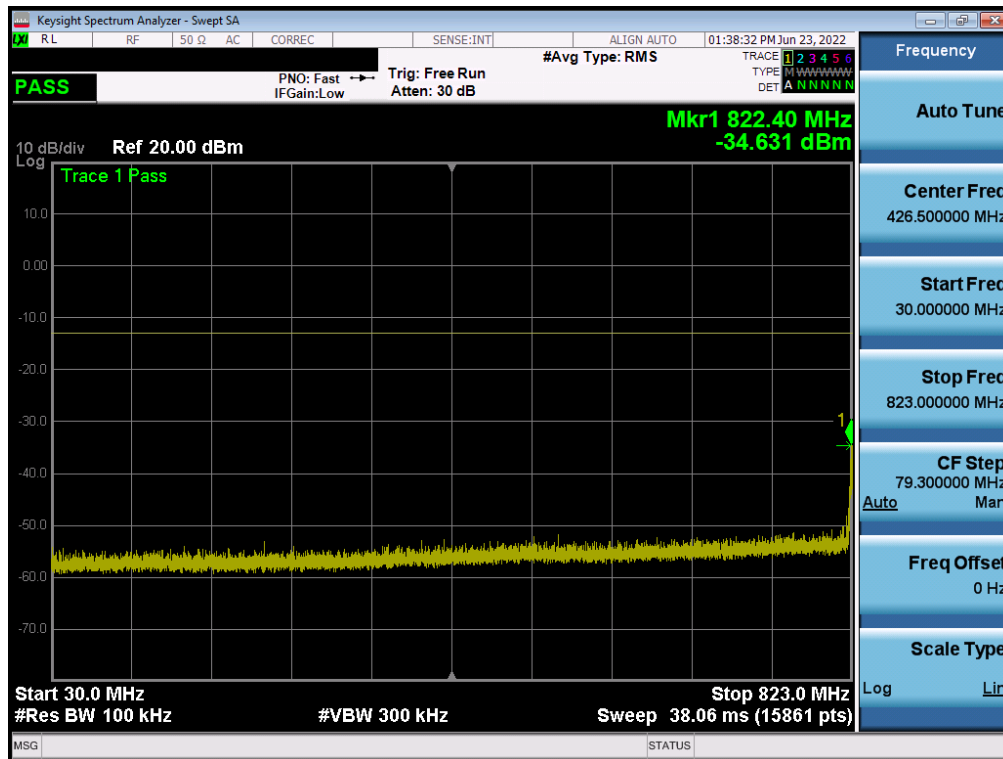


Plot 7-22. Conducted Spurious Plot (LTE Band 26/5 - 10MHz QPSK - 1 RB - High Channel)

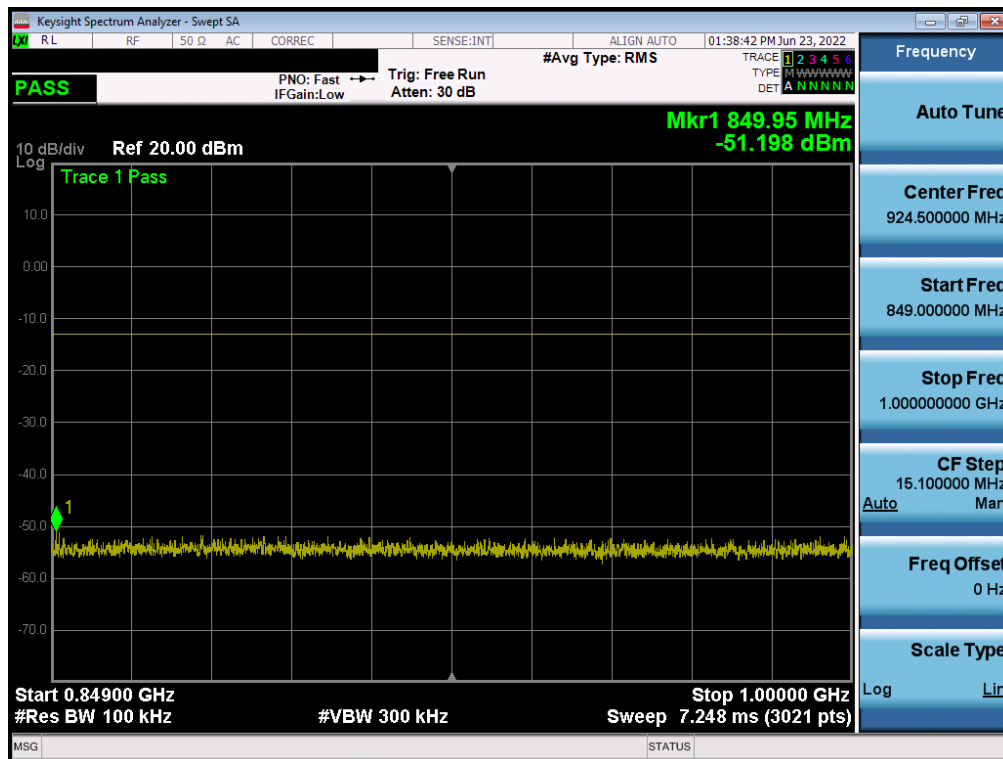
FCC ID: A3LSMF721JPN	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2206140073-01.A3L	Test Dates: 06/17/2022 – 07/07/2022	EUT Type: Portable Handset	Page 24 of 62

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GSM/GPRS Cell



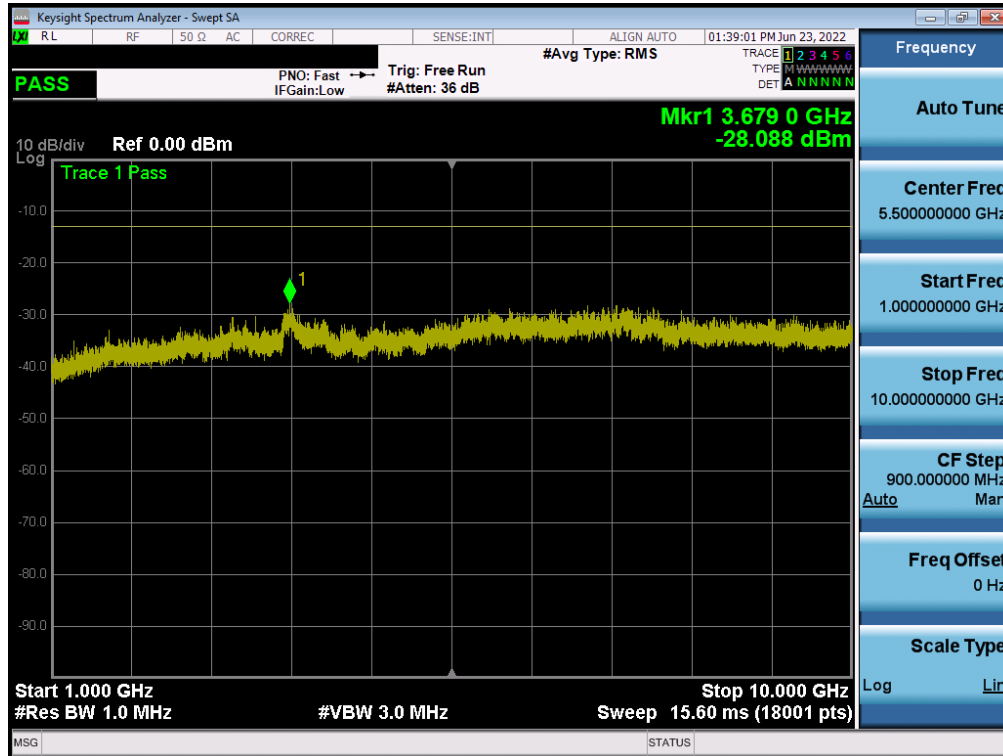
Plot 7-23. Conducted Spurious Plot (GPRS Ch. 128)



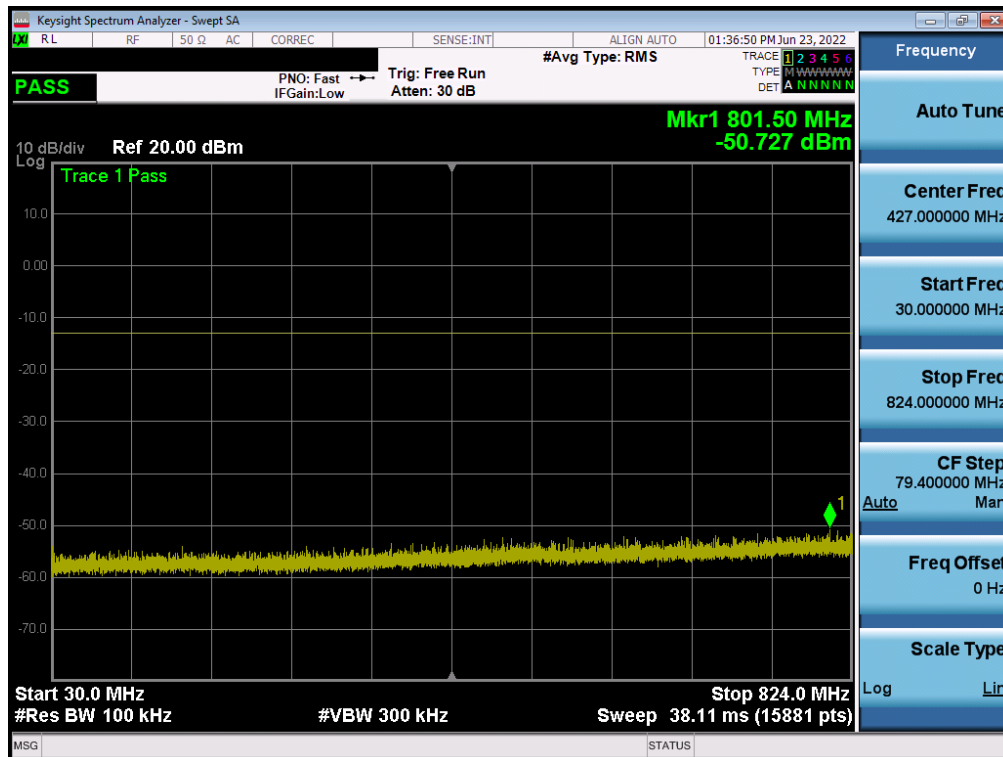
Plot 7-24. Conducted Spurious Plot (GPRS Ch. 128)

FCC ID: A3LSMF721JPN	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2206140073-01.A3L	Test Dates: 06/17/2022 – 07/07/2022	EUT Type: Portable Handset	Page 25 of 62

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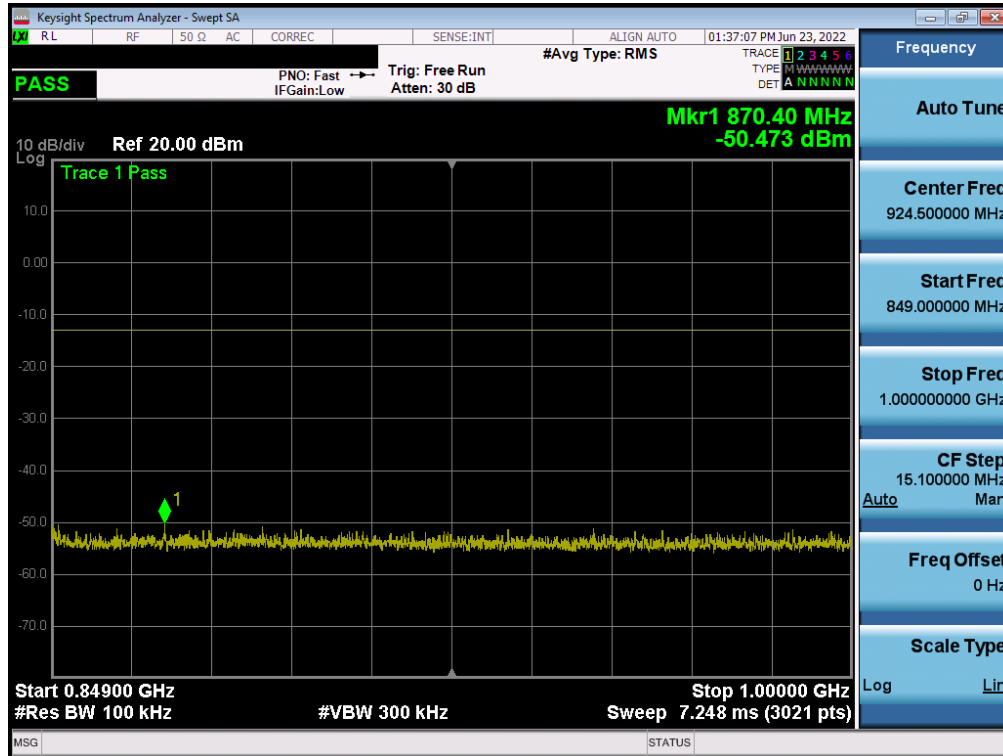


Plot 7-25. Conducted Spurious Plot (GPRS Ch. 128)

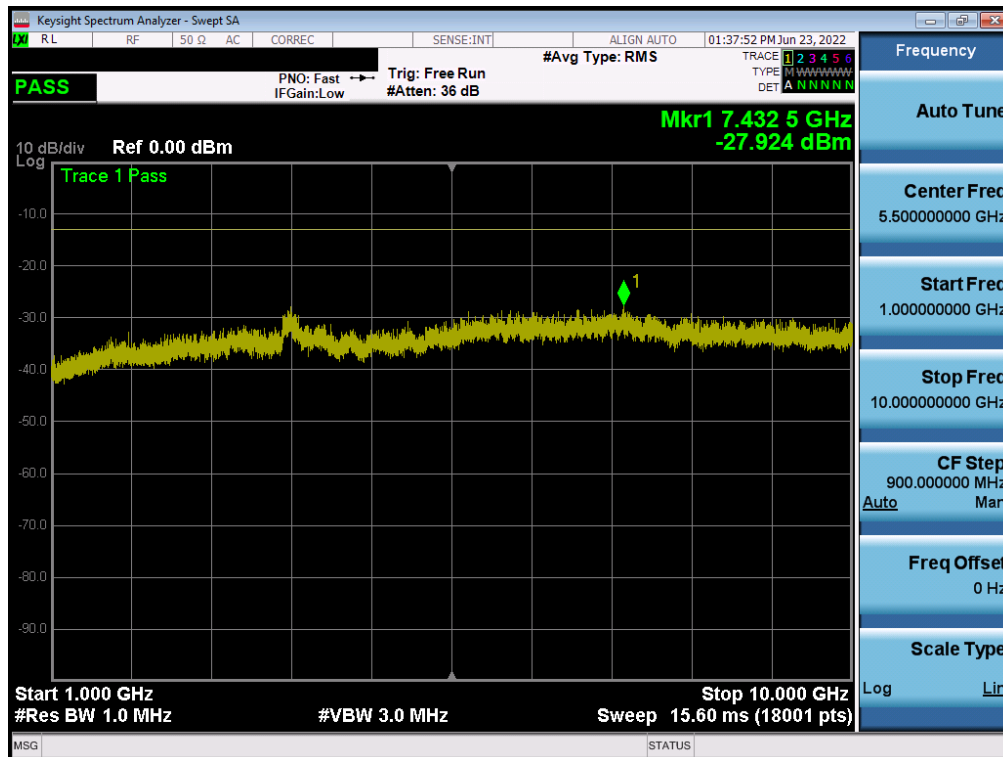


Plot 7-26. Conducted Spurious Plot (GPRS Ch. 190)

FCC ID: A3LSMF721JPN	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2206140073-01.A3L	Test Dates: 06/17/2022 – 07/07/2022	EUT Type: Portable Handset	Page 26 of 62

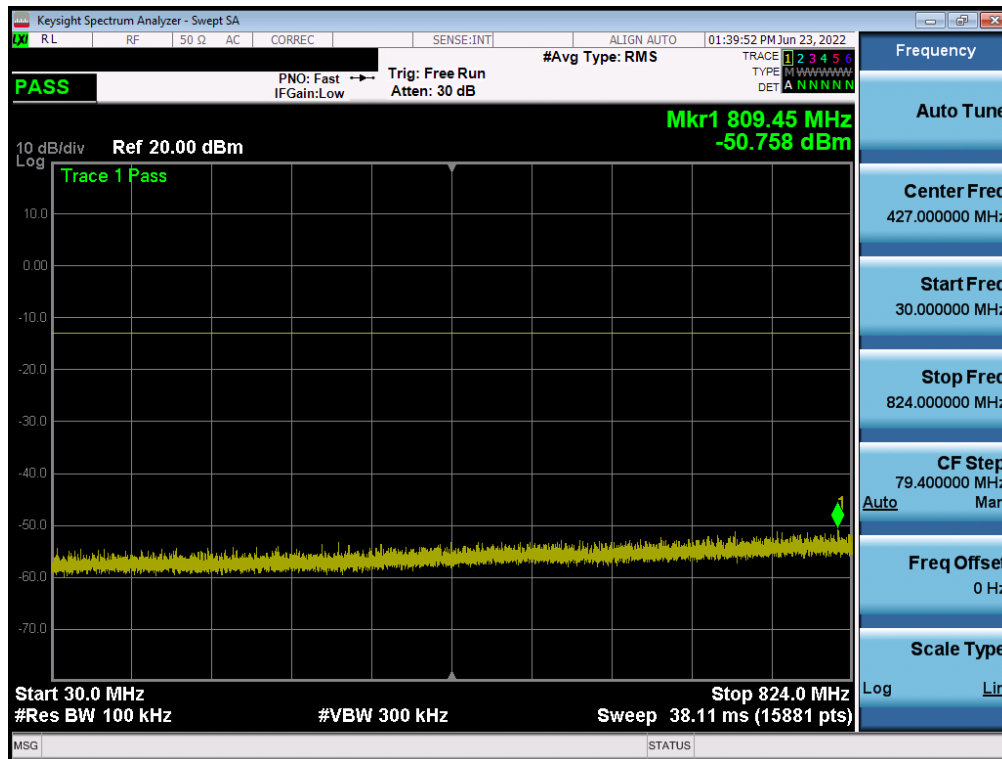


Plot 7-27. Conducted Spurious Plot (GPRS Ch. 190)

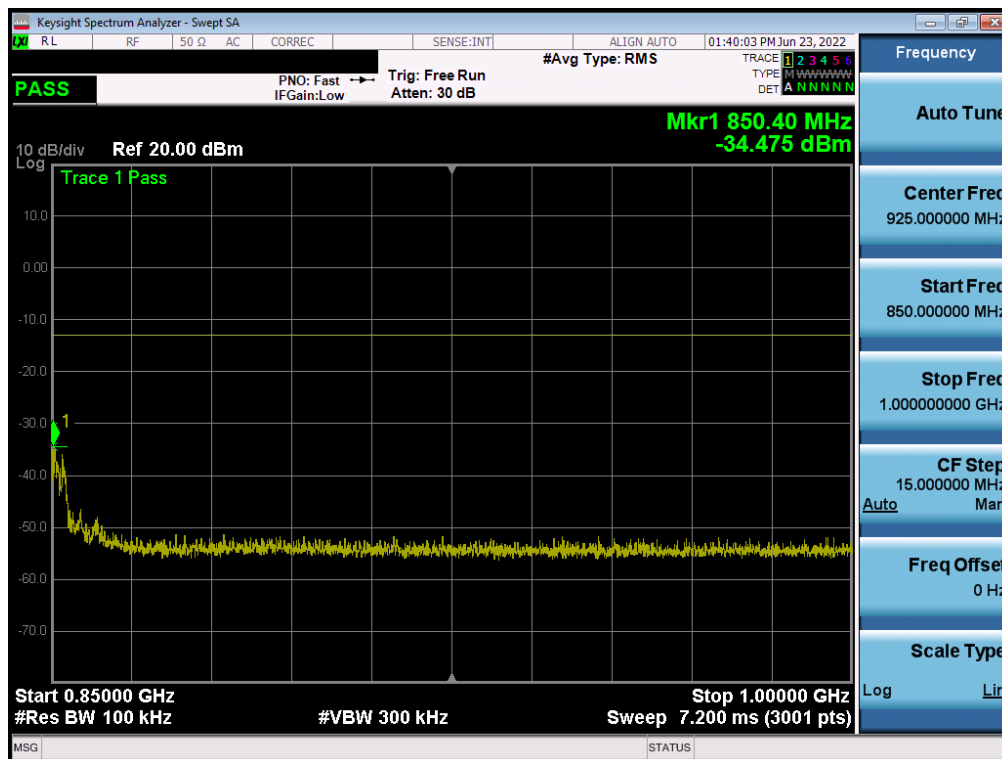


Plot 7-28. Conducted Spurious Plot (GPRS Ch. 190)

FCC ID: A3LSMF721JPN	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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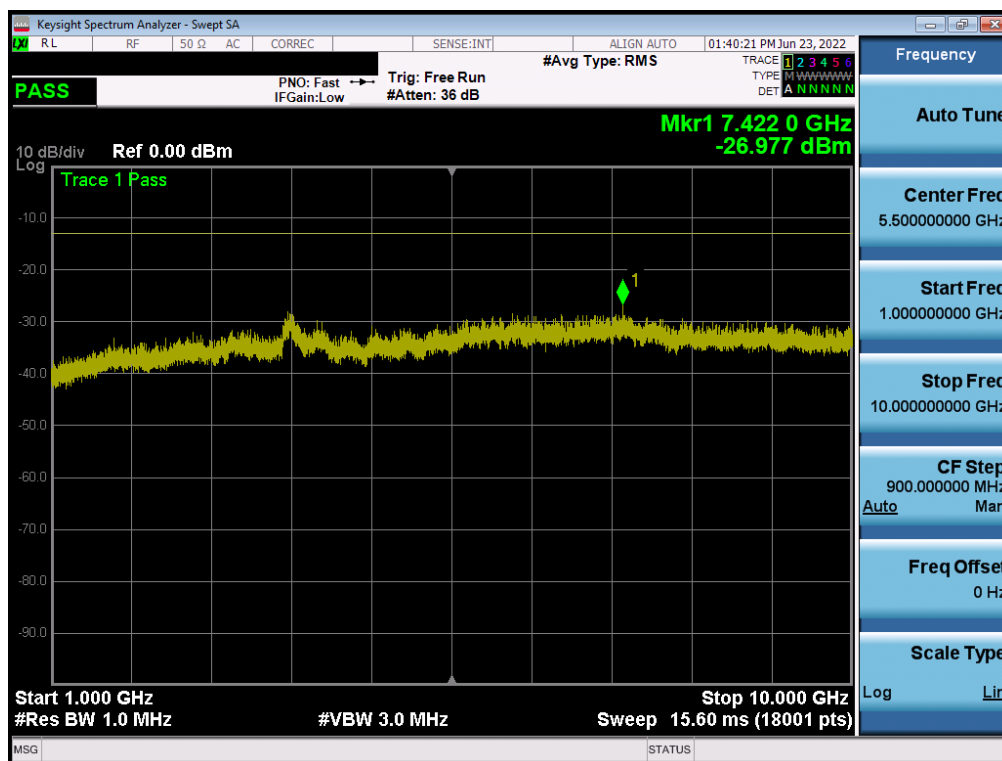


Plot 7-29. Conducted Spurious Plot (GPRS Ch. 251)



Plot 7-30. Conducted Spurious Plot (GPRS Ch. 251)

FCC ID: A3LSMF721JPN	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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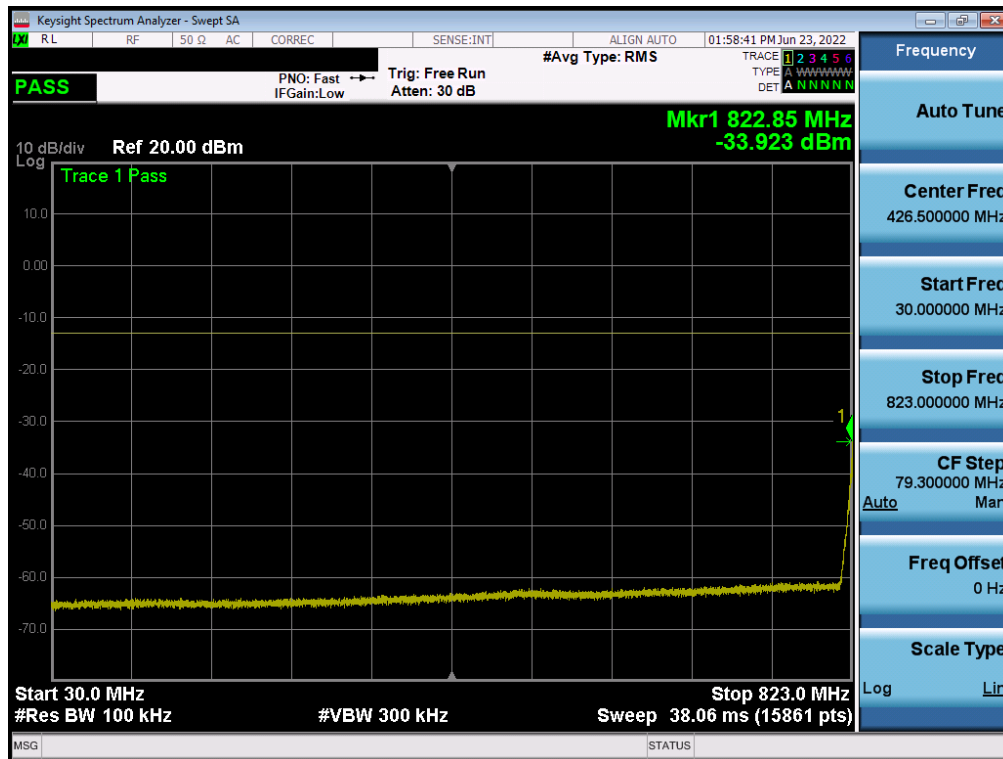


Plot 7-31. Conducted Spurious Plot (GPRS Ch. 251)

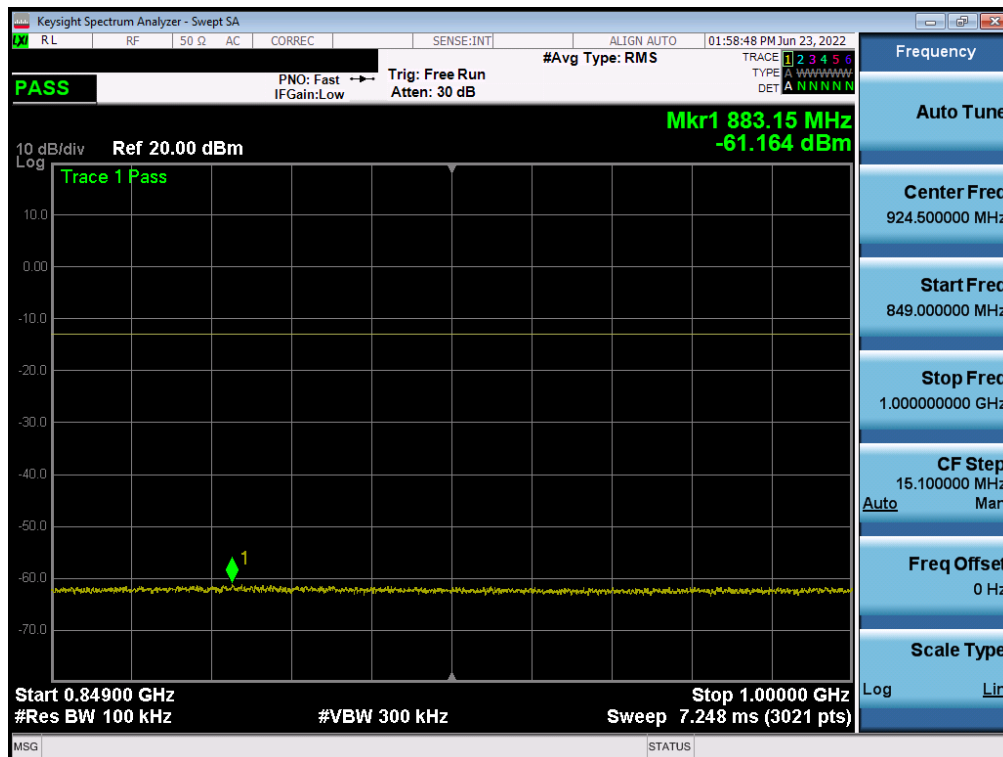
FCC ID: A3LSMF721JPN	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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WCDMA Cell



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

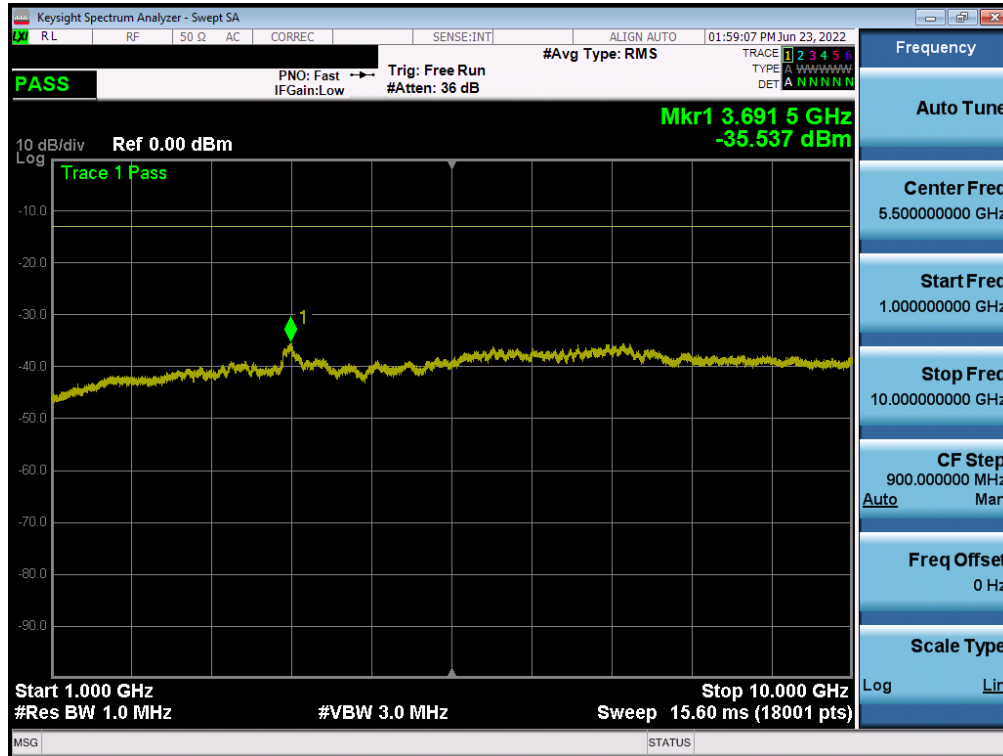


Plot 7-33. Conducted Spurious Plot (WCDMA Ch. 4132)

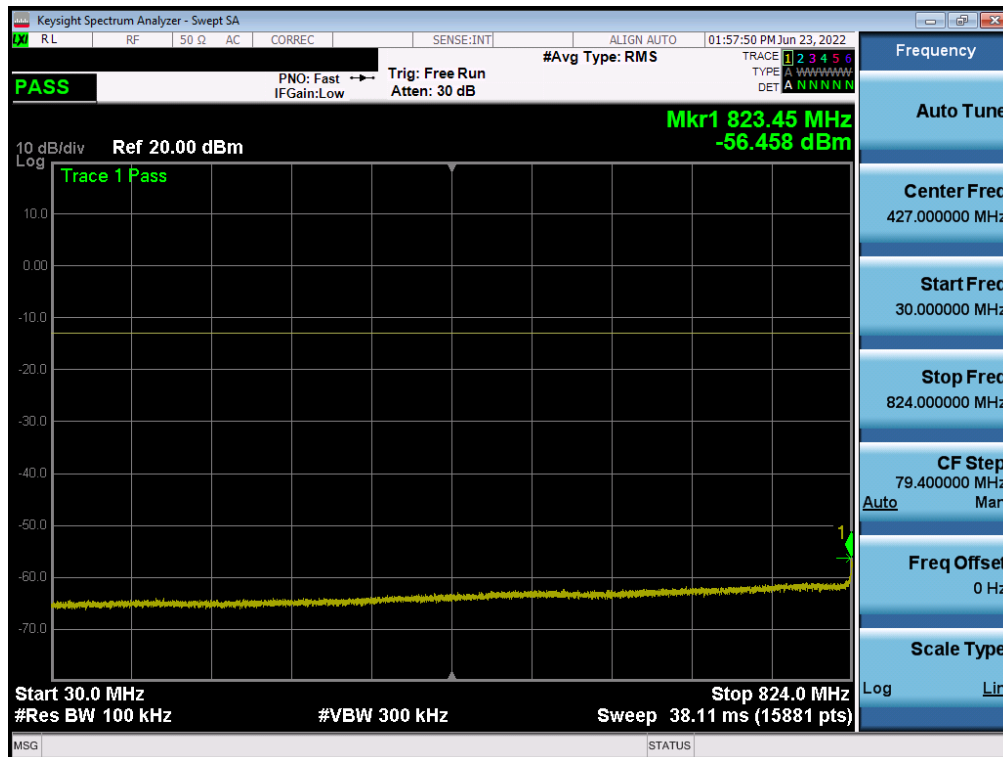
FCC ID: A3LSMF721JPN	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2206140073-01.A3L	Test Dates: 06/17/2022 – 07/07/2022	EUT Type: Portable Handset	Page 30 of 62

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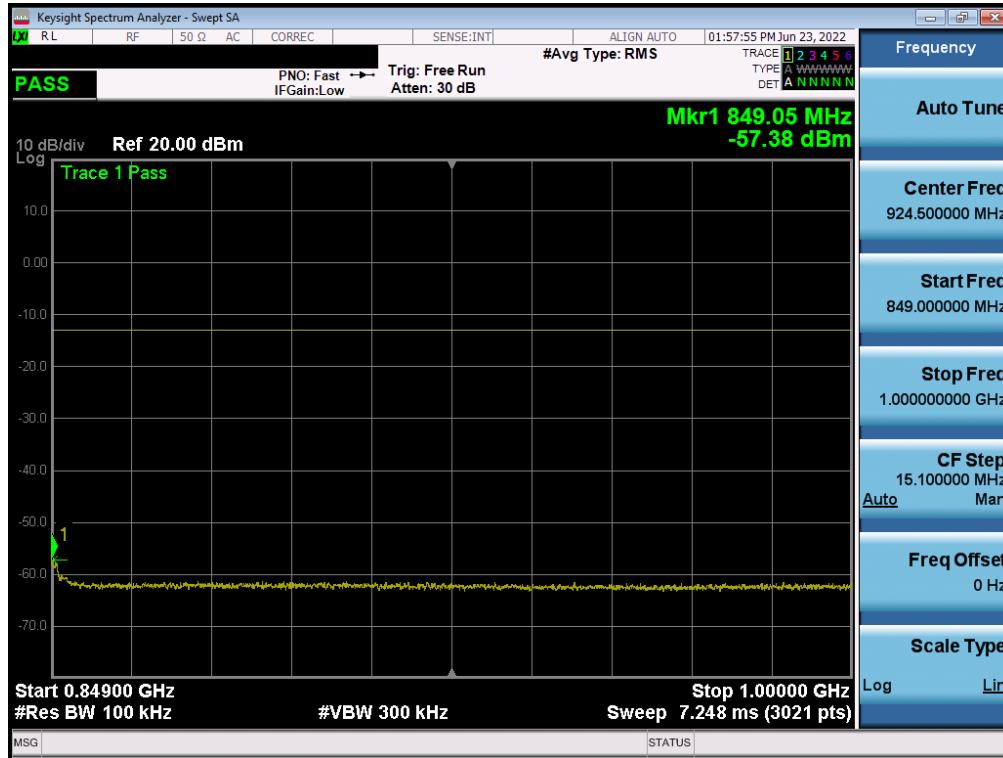


Plot 7-34. Conducted Spurious Plot (WCDMA Ch. 4132)

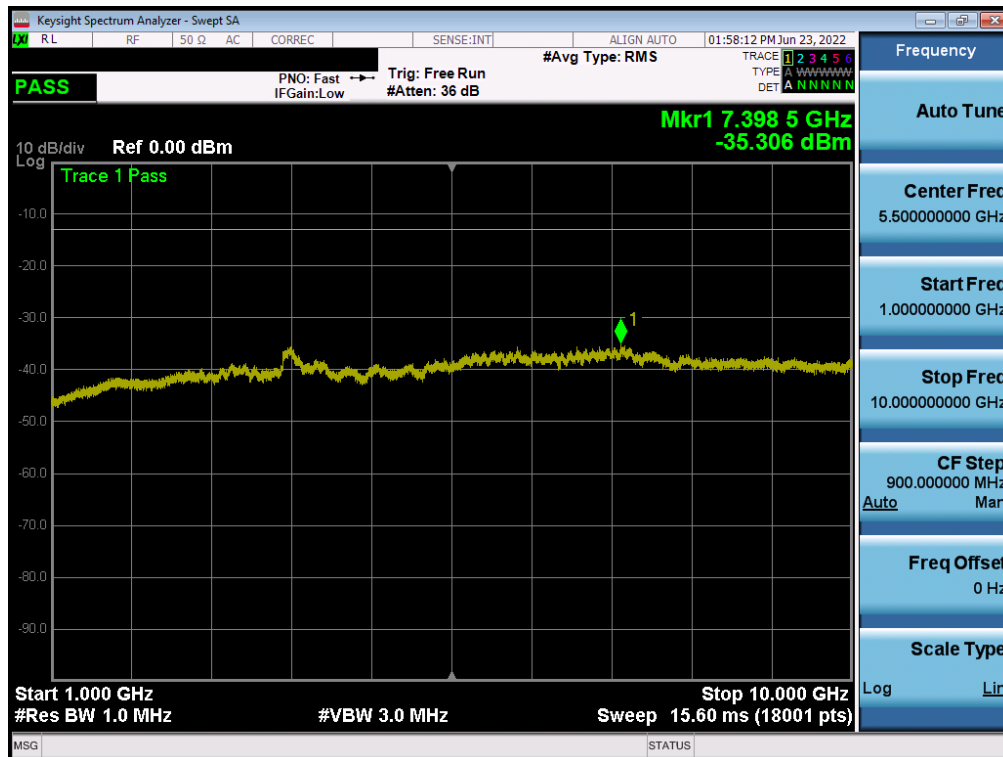


Plot 7-35. Conducted Spurious Plot (WCDMA Ch. 4183)

FCC ID: A3LSMF721JPN	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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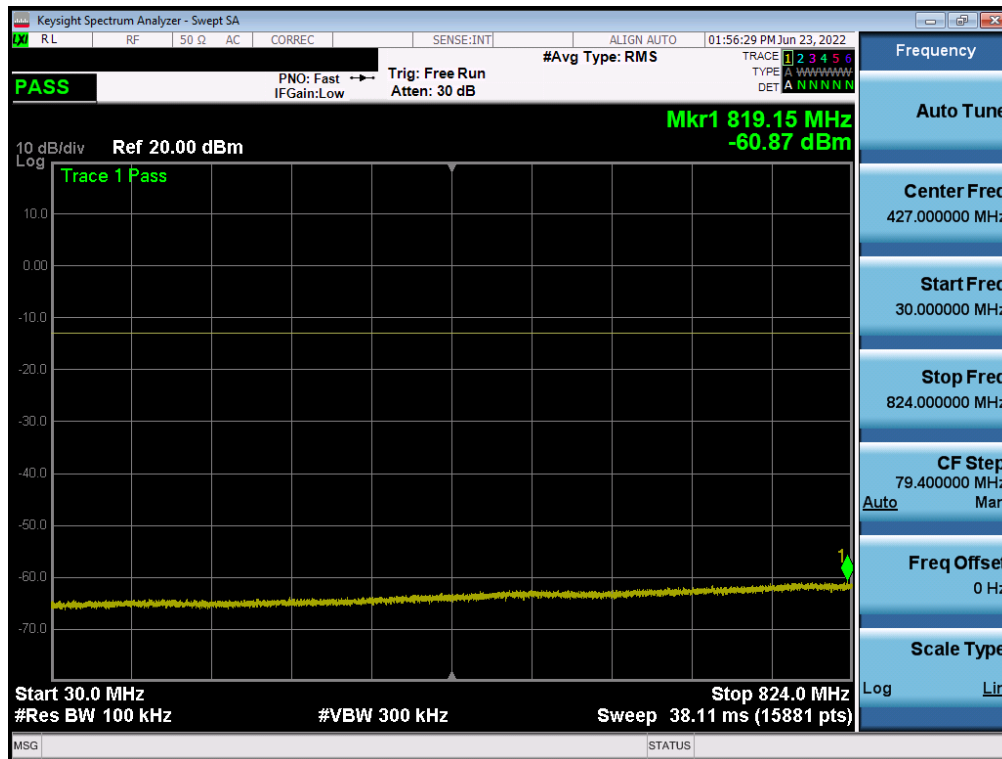


Plot 7-36. Conducted Spurious Plot (WCDMA Ch. 4183)

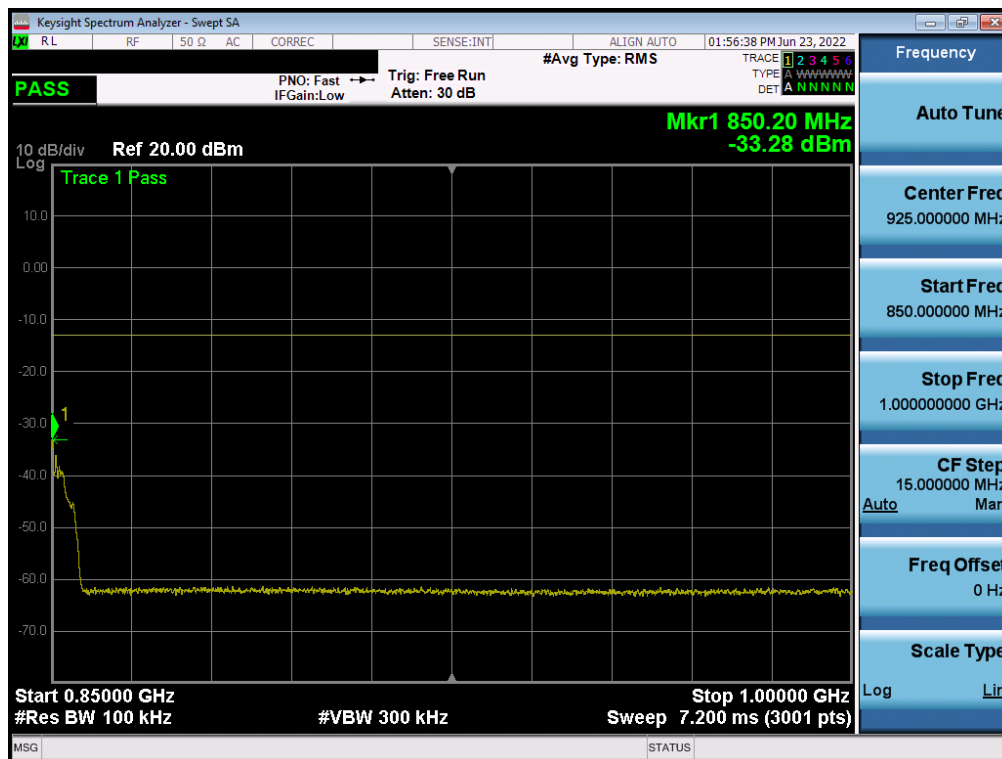


Plot 7-37. Conducted Spurious Plot (WCDMA Ch. 4183)

FCC ID: A3LSMF721JPN	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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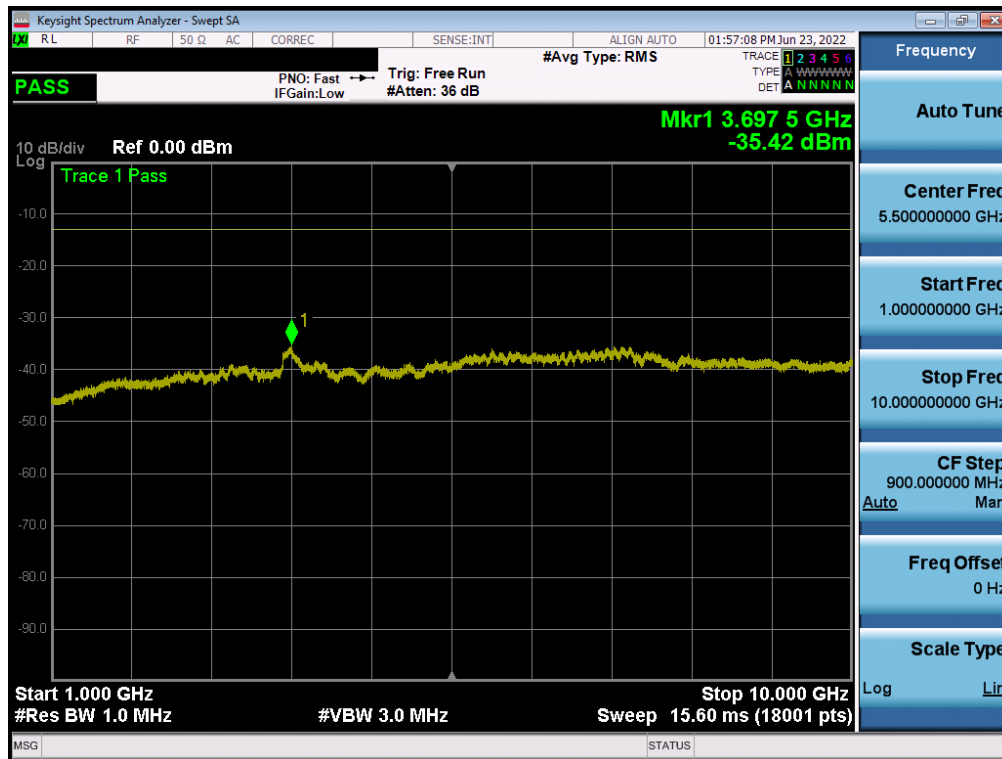


Plot 7-38. Conducted Spurious Plot (WCDMA Ch. 4233)



Plot 7-39. Conducted Spurious Plot (WCDMA Ch. 4233)

FCC ID: A3LSMF721JPN	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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Plot 7-40. Conducted Spurious Plot (WCDMA Ch. 4233)

FCC ID: A3LSMF721JPN	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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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 $\geq 1\%$ of the emission bandwidth
4. VBW $\geq 3 \times$ RBW
5. Detector = RMS
6. Number of sweep points $\geq 2 \times$ 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.

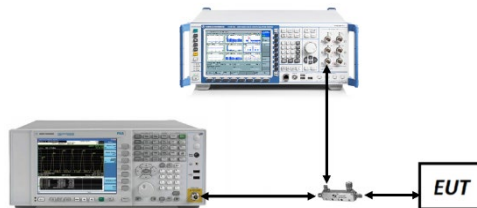


Figure 7-3. Test Instrument & Measurement Setup

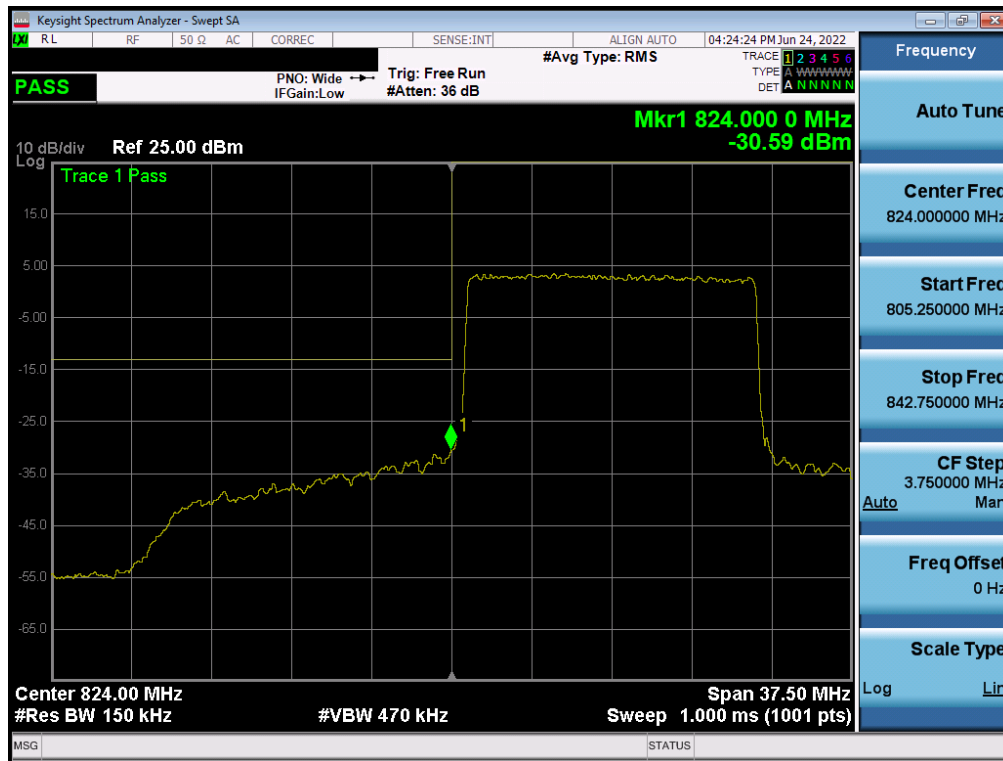
Test Notes

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.

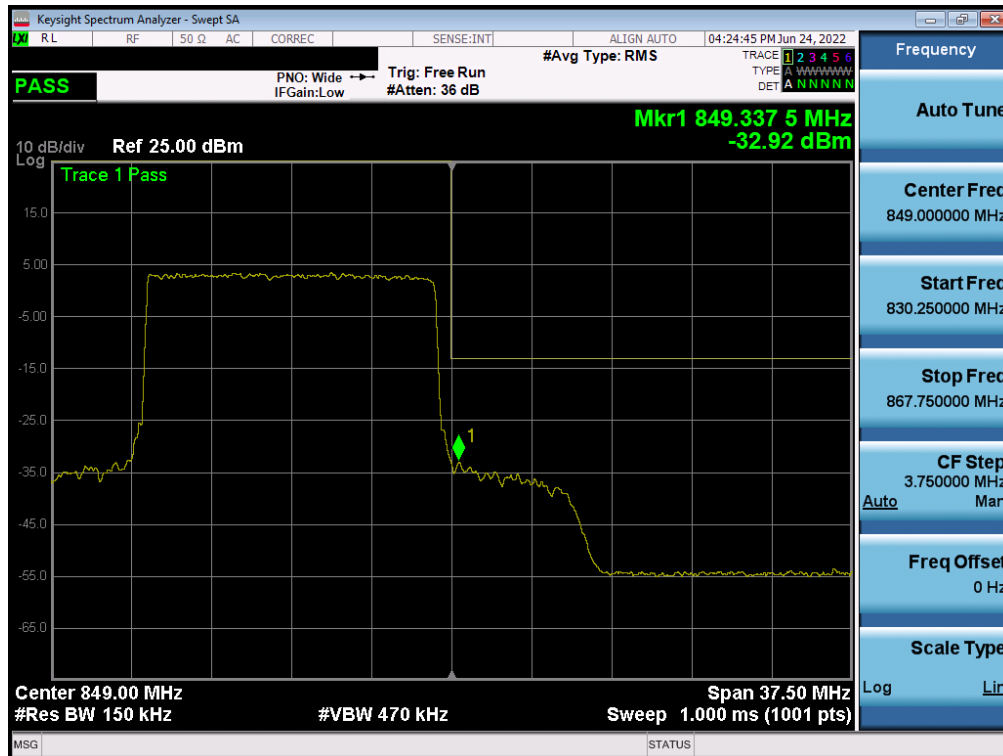
FCC ID: A3LSMF721JPN	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2206140073-01.A3L	Test Dates: 06/17/2022 – 07/07/2022	EUT Type: Portable Handset	Page 35 of 62

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LTE Band 26/5



Plot 7-41. Lower Band Edge Plot (LTE Band 26 - 15MHz QPSK – Full RB)

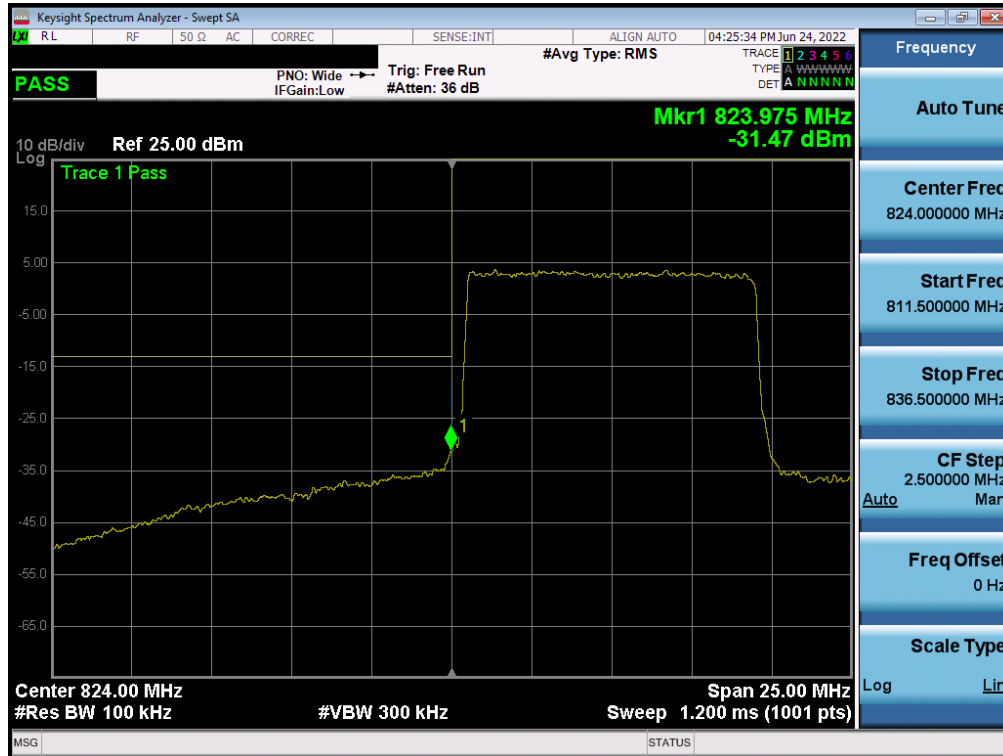


Plot 7-42. Upper Band Edge Plot (LTE Band 26 - 15MHz QPSK – Full RB)

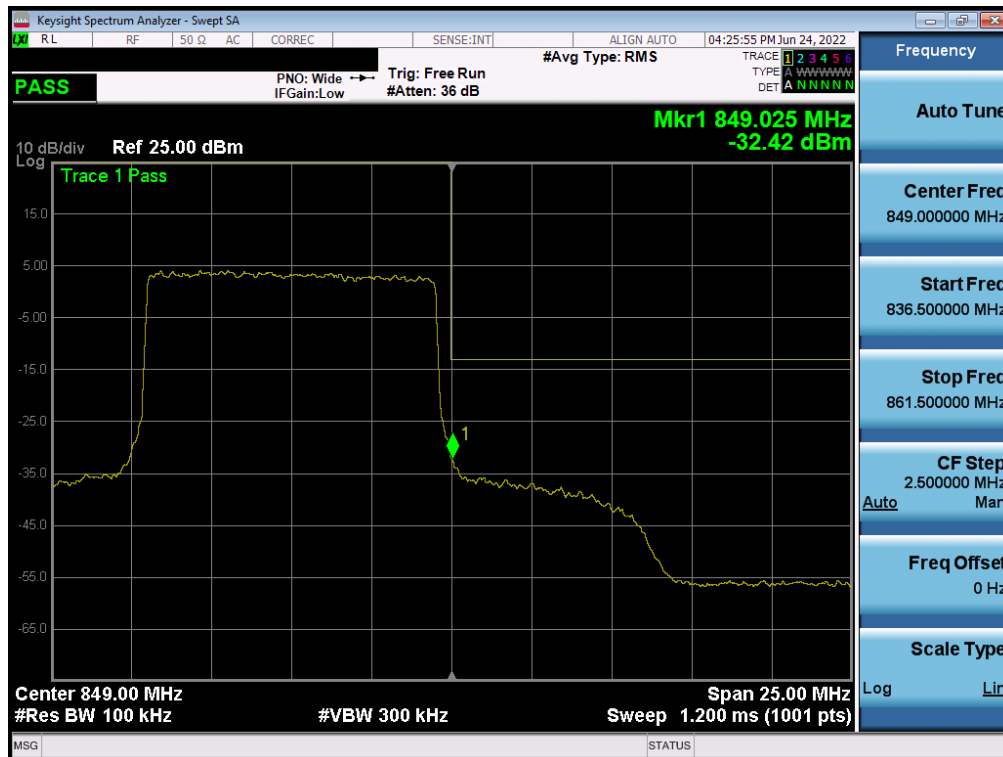
FCC ID: A3LSMF721JPN	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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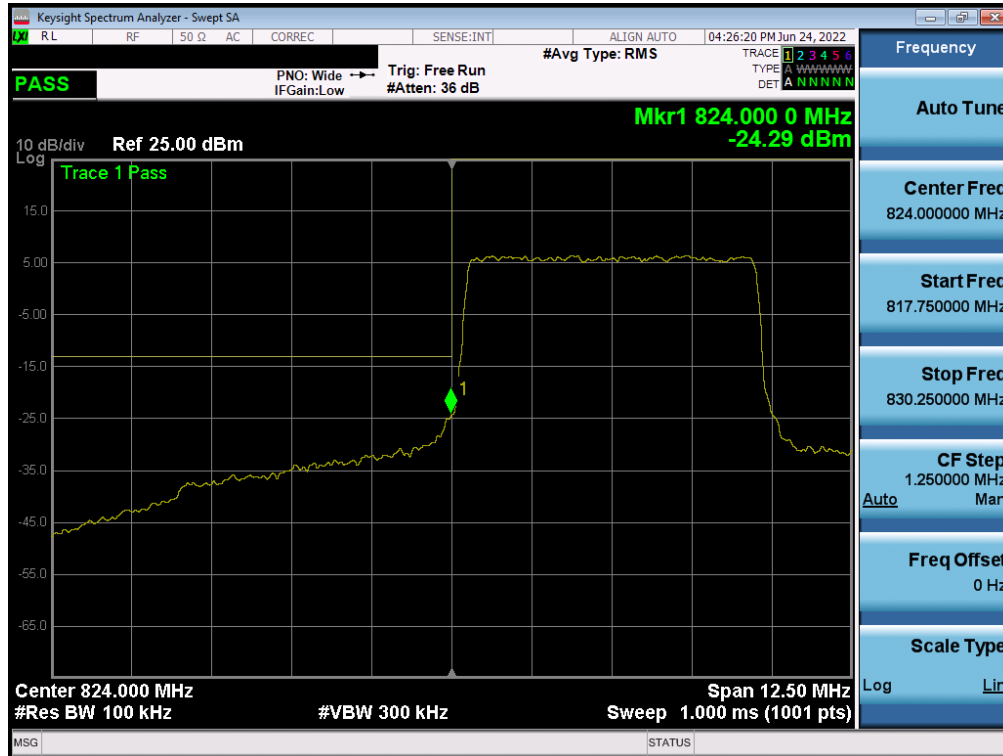


Plot 7-43. Lower Band Edge Plot (LTE Band 26/5 - 10MHz QPSK – Full RB)



Plot 7-44. Upper Band Edge Plot (LTE Band 26/5 - 10MHz QPSK – Full RB)

FCC ID: A3LSMF721JPN	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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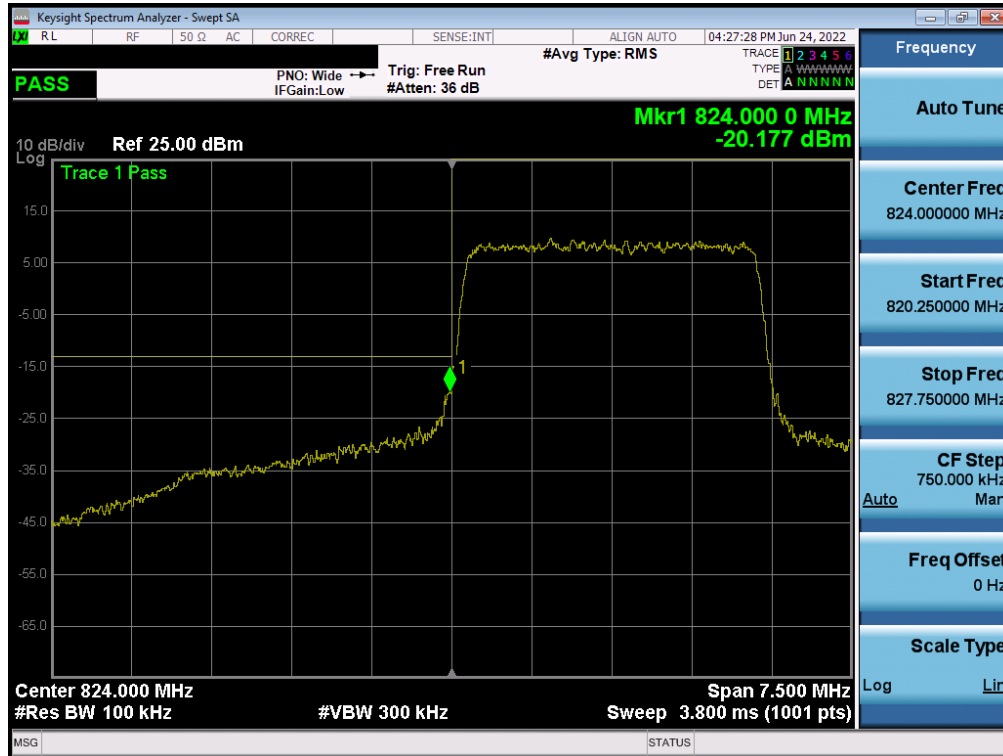


Plot 7-45. Lower Band Edge Plot (LTE Band 26/5 - 5MHz QPSK – Full RB)

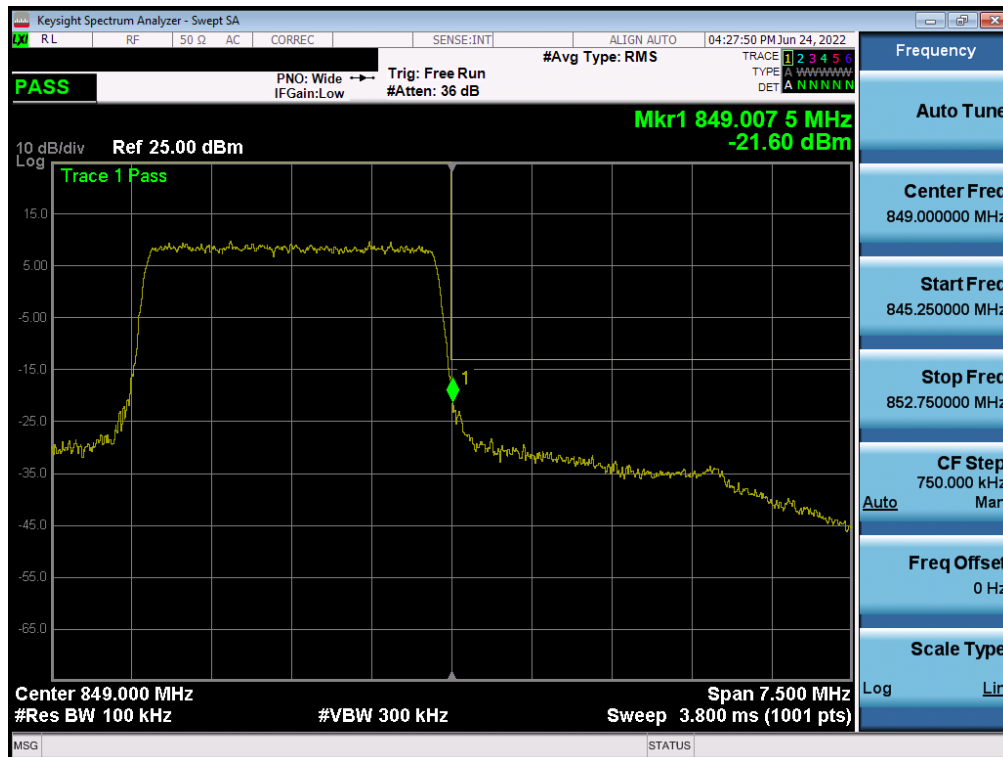


Plot 7-46. Upper Band Edge Plot (LTE Band 26/5 - 5MHz QPSK – Full RB)

FCC ID: A3LSMF721JPN	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2206140073-01.A3L	Test Dates: 06/17/2022 – 07/07/2022	EUT Type: Portable Handset	Page 38 of 62

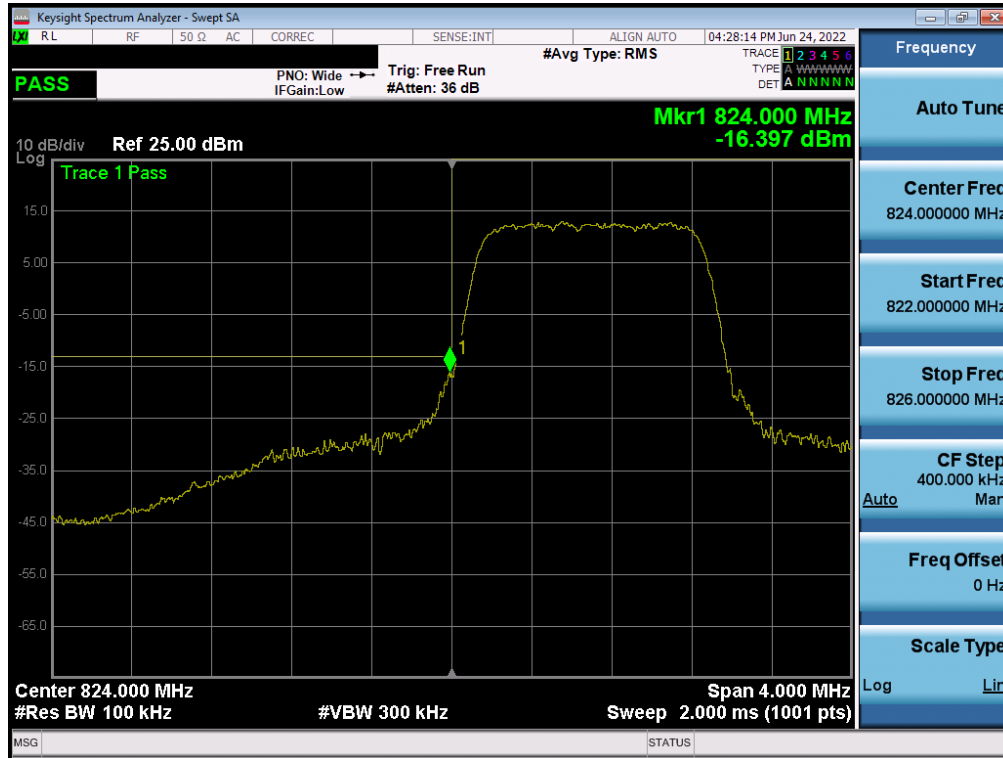


Plot 7-47. Lower Band Edge Plot (LTE Band 26/5 - 3MHz QPSK - Full RB)



Plot 7-48. Upper Band Edge Plot (LTE Band 26/5 - 3MHz QPSK - Full RB)

FCC ID: A3LSMF721JPN	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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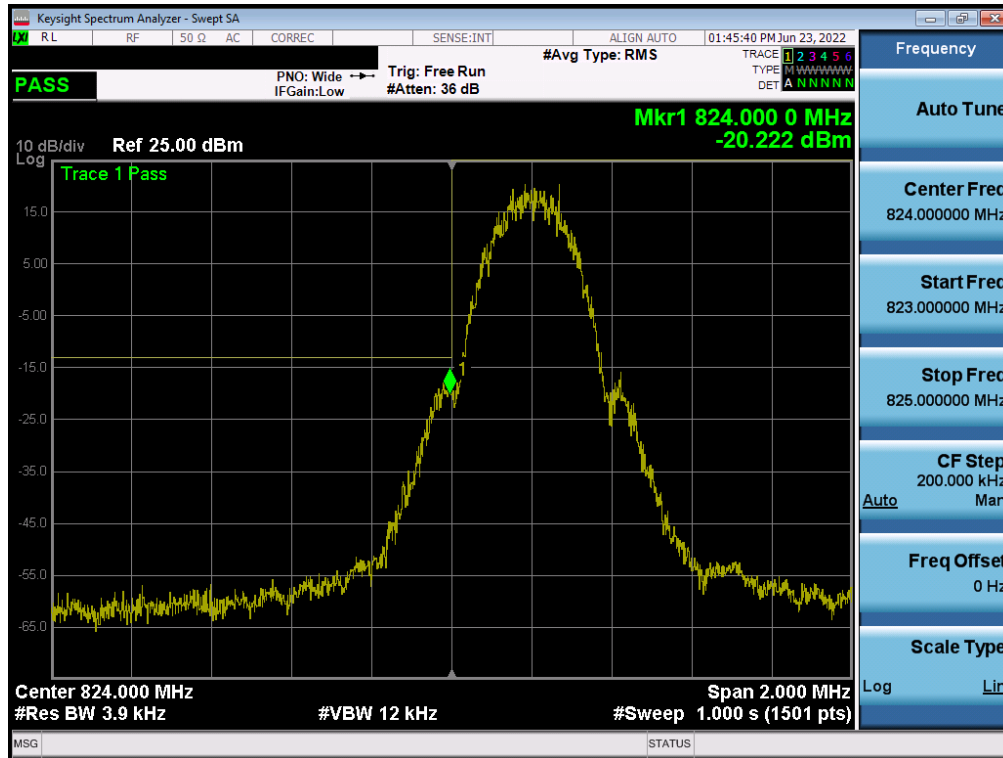
Plot 7-49. Lower Band Edge Plot (LTE Band 26/5 - 1.4MHz QPSK - Full RB)



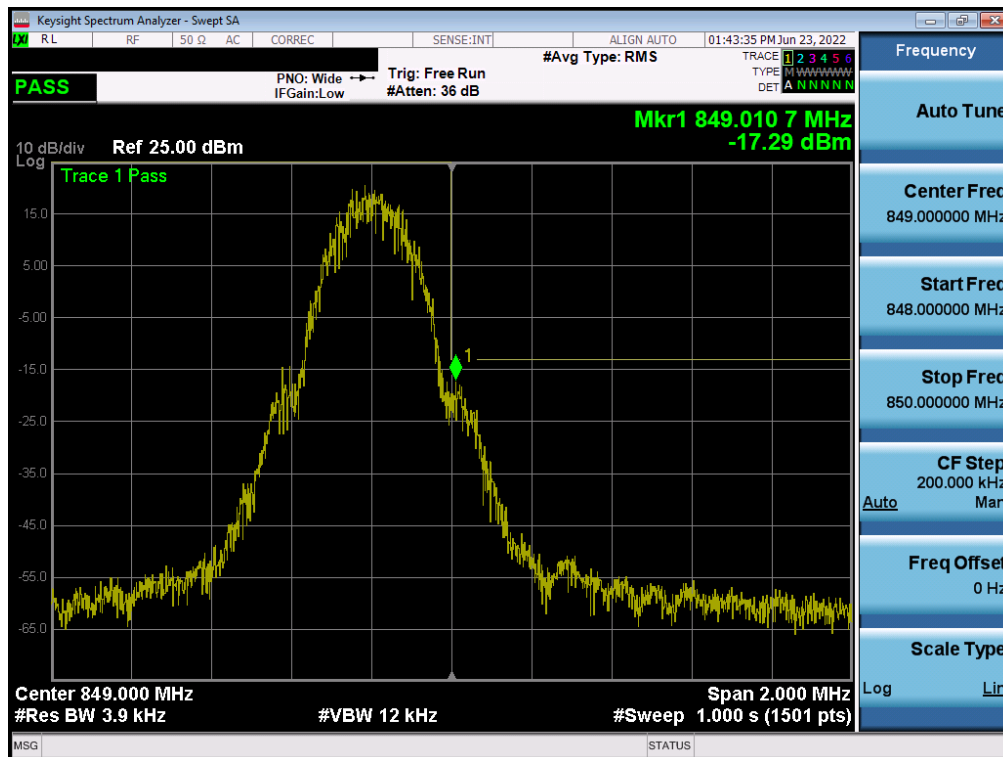
Plot 7-50. Upper Band Edge Plot (LTE Band 26/5 - 1.4MHz QPSK - Full RB)

FCC ID: A3LSMF721JPN	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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GSM/GPRS Cell



Plot 7-51. Lower Band Edge Plot (GPRS Cell – Ch. 128)



Plot 7-52. Upper Band Edge Plot (GPRS Cell – Ch. 251)

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WCDMA Cell



Plot 7-53. Lower Band Edge Plot (WCDMA Cell – Ch. 4132)



Plot 7-54. Upper Band Edge Plot (WCDMA Cell – Ch. 4233)

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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.

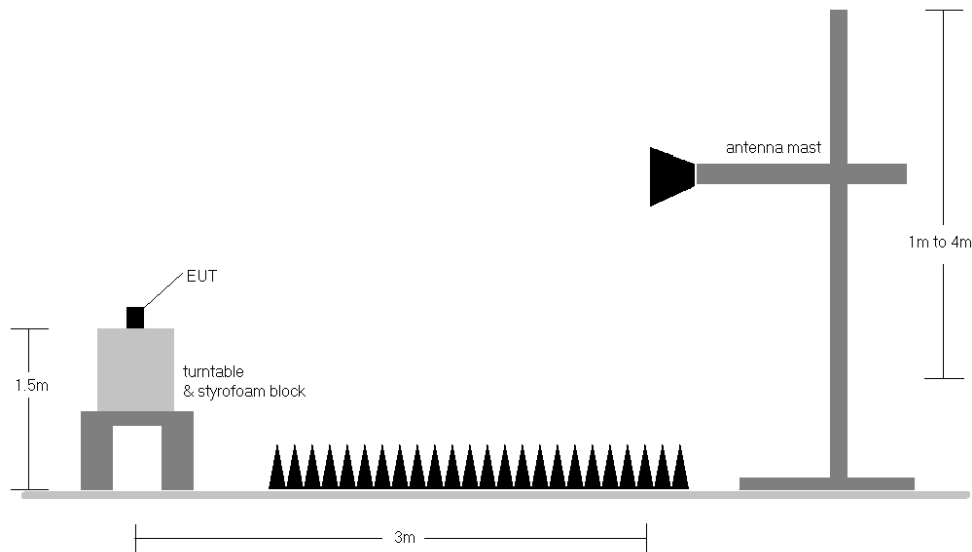


Figure 7-4. Radiated Test Setup < 1GHz

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.

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Bandwidth	Mod.	Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Ant. Gain [dBi]	RB Size/Offset	Substitute Level [dBm]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
15MHz (Band 26 only)	QPSK	831.5	V	148	253	1.29	1 / 37	19.59	18.73	0.075	38.45	-19.72	20.88	0.122	40.61	-19.73
	QPSK	836.5	V	161	254	1.31	1 / 0	19.39	18.55	0.072	38.45	-19.90	20.70	0.117	40.61	-19.91
	QPSK	841.5	V	148	283	1.33	1 / 0	19.46	18.64	0.073	38.45	-19.81	20.79	0.120	40.61	-19.81
	16-QAM	831.5	V	148	253	1.29	1 / 37	18.82	17.96	0.062	38.45	-20.49	20.11	0.102	40.61	-20.50
10 MHz	QPSK	829.0	V	148	253	1.27	1 / 49	20.72	19.85	0.097	38.45	-18.60	22.00	0.158	40.61	-18.61
	QPSK	836.5	V	161	254	1.31	1 / 49	20.60	19.76	0.095	38.45	-18.69	21.91	0.155	40.61	-18.70
	QPSK	844.0	V	148	283	1.35	1 / 49	20.70	19.89	0.098	38.45	-18.56	22.04	0.160	40.61	-18.56
	16-QAM	829.0	V	148	253	1.27	1 / 49	20.02	19.15	0.082	38.45	-19.30	21.30	0.135	40.61	-19.31
5 MHz	QPSK	826.5	V	148	253	1.26	1 / 12	20.69	19.81	0.096	38.45	-18.64	21.96	0.157	40.61	-18.65
	QPSK	836.5	V	161	254	1.31	1 / 12	20.60	19.76	0.095	38.45	-18.69	21.91	0.155	40.61	-18.70
	QPSK	846.5	V	148	283	1.36	1 / 12	20.68	19.88	0.097	38.45	-18.57	22.03	0.160	40.61	-18.57
	16-QAM	836.5	V	161	254	1.31	1 / 12	19.87	19.03	0.080	38.45	-19.42	21.18	0.131	40.61	-19.43
3 MHz	QPSK	825.5	V	148	253	1.26	1 / 7	20.62	19.73	0.094	38.45	-18.72	21.88	0.154	40.61	-18.73
	QPSK	836.5	V	161	254	1.31	1 / 0	20.49	19.65	0.092	38.45	-18.80	21.80	0.151	40.61	-18.81
	QPSK	847.5	V	148	283	1.36	1 / 7	20.67	19.88	0.097	38.45	-18.57	22.03	0.160	40.61	-18.57
	16-QAM	825.5	V	148	253	1.26	1 / 7	19.94	19.05	0.080	38.45	-19.40	21.20	0.132	40.61	-19.41
1.4 MHz	QPSK	824.7	V	148	253	1.25	1 / 3	20.57	19.68	0.093	38.45	-18.77	21.83	0.152	40.61	-18.78
	QPSK	836.5	V	161	254	1.31	1 / 3	20.45	19.61	0.091	38.45	-18.84	21.76	0.150	40.61	-18.85
	QPSK	848.3	V	148	283	1.37	1 / 3	20.68	19.89	0.098	38.45	-18.56	22.04	0.160	40.61	-18.56
	16-QAM	824.7	V	148	253	1.25	1 / 0	19.83	18.94	0.078	38.45	-19.51	21.09	0.128	40.61	-19.52
10 MHz	QPSK (Opposite Pol.)	831.5	H	376	287	1.29	1 / 49	18.41	17.55	0.057	38.45	-20.90	19.70	0.093	40.61	-20.91
	QPSK (WCP)	831.5	V	183	353	1.29	1 / 0	15.14	14.28	0.027	38.45	-24.17	16.43	0.044	40.61	-24.18
10 MHz	QPSK (Half Open)	836.5	V	161	310	1.31	1 / 49	20.44	19.60	0.091	38.45	-18.85	21.75	0.150	40.61	-18.86

Table 7-2. ERP Data (LTE Band 26/5) – 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	148	312	28.00	1.25	27.10	0.513	38.45	-11.35	29.25	0.842	40.61	-11.36
836.60	GPRS850	V	144	306	26.67	1.31	25.83	0.383	38.45	-12.62	27.98	0.628	40.61	-12.63
848.80	GPRS850	V	147	305	26.62	1.37	25.84	0.384	38.45	-12.61	27.99	0.629	40.61	-12.62
824.20	GPRS850 (Opposite Pol.)	H	222	271	24.94	1.25	24.04	0.254	38.45	-14.41	26.19	0.416	40.61	-14.42
824.20	EDGE850	V	148	312	22.47	1.25	21.57	0.144	38.45	-16.88	23.72	0.236	40.61	-16.89
824.20	GPRS850 (WCP)	V	148	292	25.87	1.25	24.97	0.314	38.45	-13.48	27.12	0.515	40.61	-13.49
848.80	GPRS850 (Open)	V	143	250	27.68	1.37	26.90	0.490	38.45	-11.55	29.05	0.803	40.61	-11.56

Table 7-3. ERP Data (GPRS Cell) – HALF 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	V	151	309	19.14	1.26	18.25	0.067	38.45	-20.20	20.40	0.110	40.61	-20.21
836.60	WCDMA850	V	143	279	19.24	1.31	18.40	0.069	38.45	-20.05	20.55	0.114	40.61	-20.06
846.60	WCDMA850	V	141	272	19.36	1.36	18.57	0.072	38.45	-19.88	20.72	0.118	40.61	-19.89
846.60	WCDMA850	H	226	290	16.92	1.36	16.13	0.041	38.45	-22.32	18.28	0.067	40.61	-22.33
846.60	WCDMA850 (WCP)	V	138	302	15.26	1.36	14.47	0.028	38.45	-23.98	16.62	0.046	40.61	-23.99
826.40	WCDMA850 (Half Open)	V	150	299	19.13	1.26	18.24	0.067	38.45	-20.21	20.39	0.109	40.61	-20.22

Table 7-4. ERP Data (WCDMA Cell) – OPEN

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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.

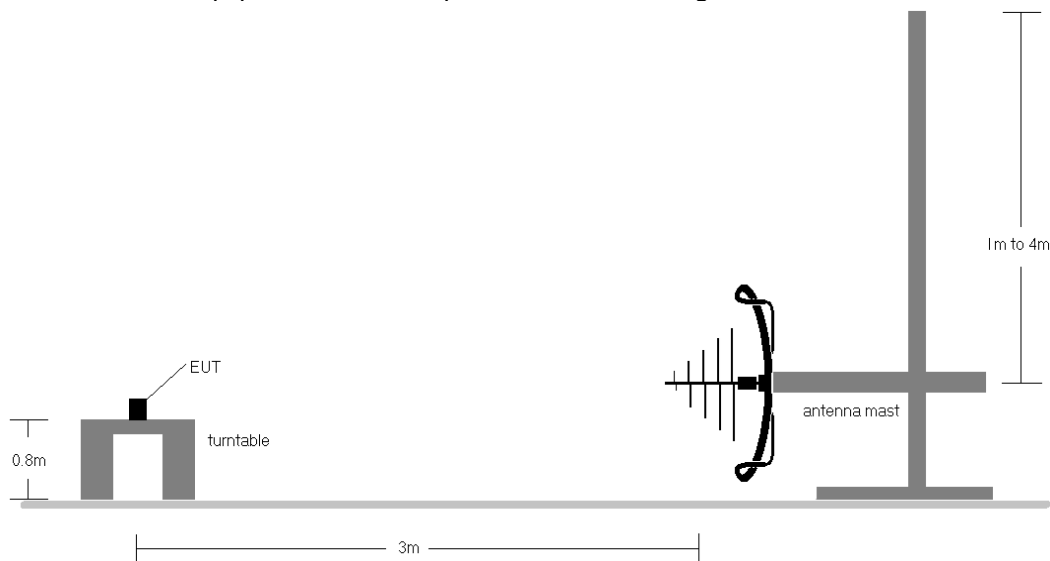


Figure 7-5. Test Instrument & Measurement Setup < 1GHz

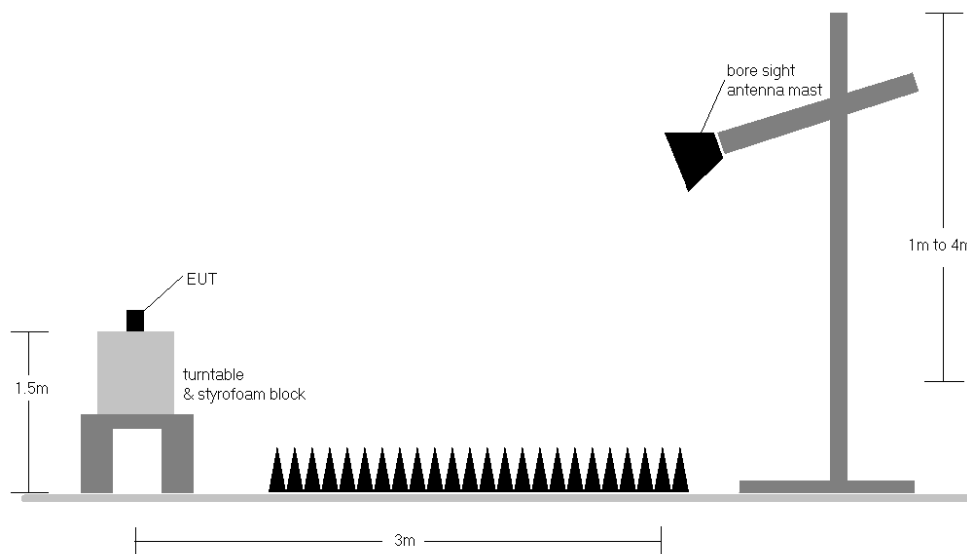


Figure 7-6. Test Instrument & Measurement Setup > 1GHz

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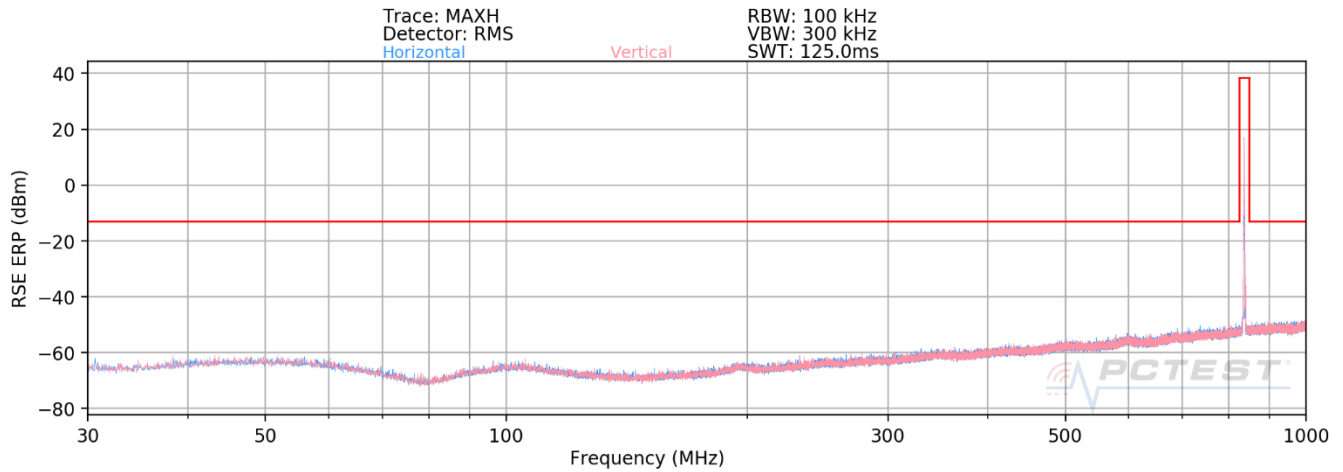
Test Notes

- 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.

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LTE Band 26/5

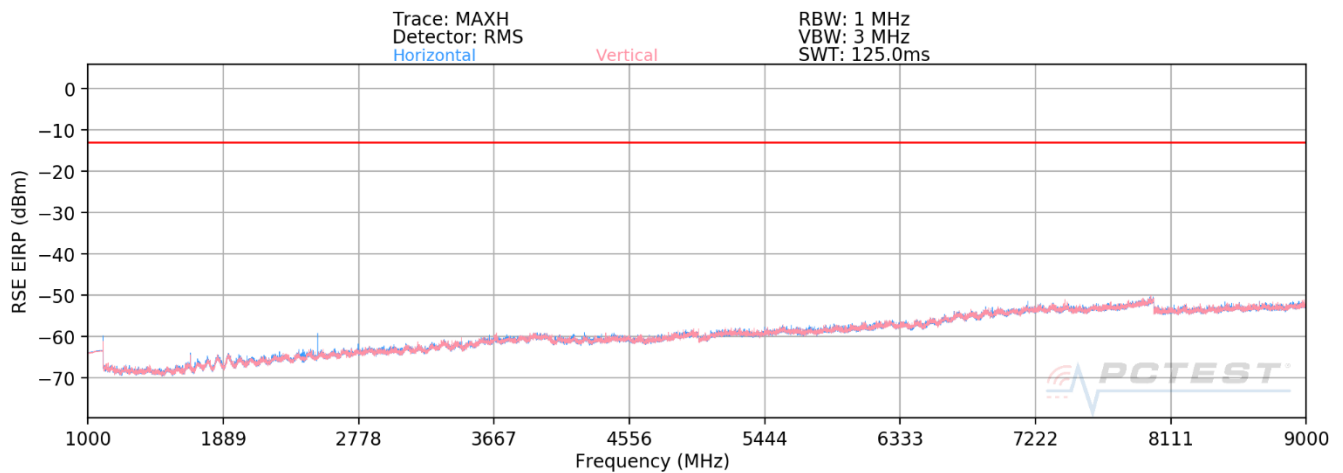


Plot 7-55. Radiated Spurious Plot Below 1GHz (LTE Band 26/5) – OPEN

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]
917.21	H	-	-	-94.58	25.24	37.66	-57.60	-13.00	-44.60

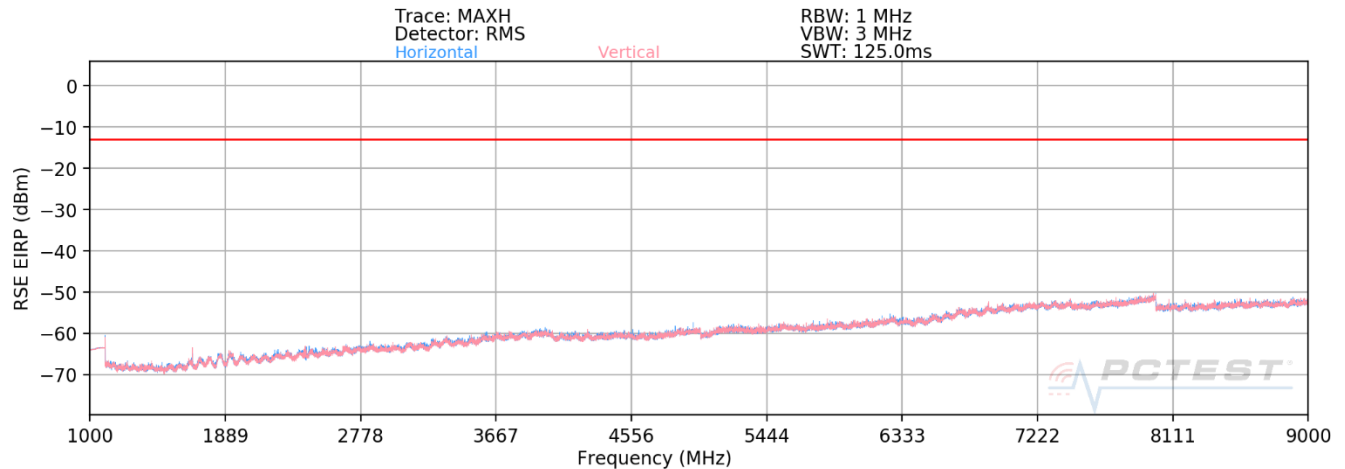
Table 7-5. Radiated Spurious Data (LTE Band 26/5) – OPEN



Plot 7-56. Radiated Spurious Plot Above 1GHz (LTE Band 26/5) – OPEN

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Plot 7-57. Radiated Spurious Plot Above 1GHz (LTE Band 26/5) – HALF OPEN

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	386	10	-72.53	-6.88	27.59	-67.67	-13.00	-54.67
2487.00	H	400	345	-76.01	-3.82	27.17	-68.09	-13.00	-55.09
3316.00	H	-	-	-76.90	-0.18	29.92	-65.34	-13.00	-52.34
4145.00	H	-	-	-77.53	1.59	31.06	-64.19	-13.00	-51.19
4974.00	H	-	-	-77.27	1.99	31.72	-63.54	-13.00	-50.54
5803.00	H	-	-	-78.32	4.37	33.05	-62.21	-13.00	-49.21

Table 7-6. Radiated Spurious Data (LTE Band 26/5 – Low Channel) – OPEN

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	378	355	-73.11	-6.96	26.93	-68.33	-13.00	-55.33
2509.50	H	400	328	-75.23	-4.05	27.72	-67.54	-13.00	-54.54
3346.00	H	-	-	-76.04	-0.44	30.52	-64.74	-13.00	-51.74
4182.50	H	-	-	-76.60	1.09	31.49	-63.77	-13.00	-50.77
5019.00	H	-	-	-77.09	1.95	31.86	-63.39	-13.00	-50.39
5855.50	H	-	-	-78.78	4.93	33.15	-62.11	-13.00	-49.11

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

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

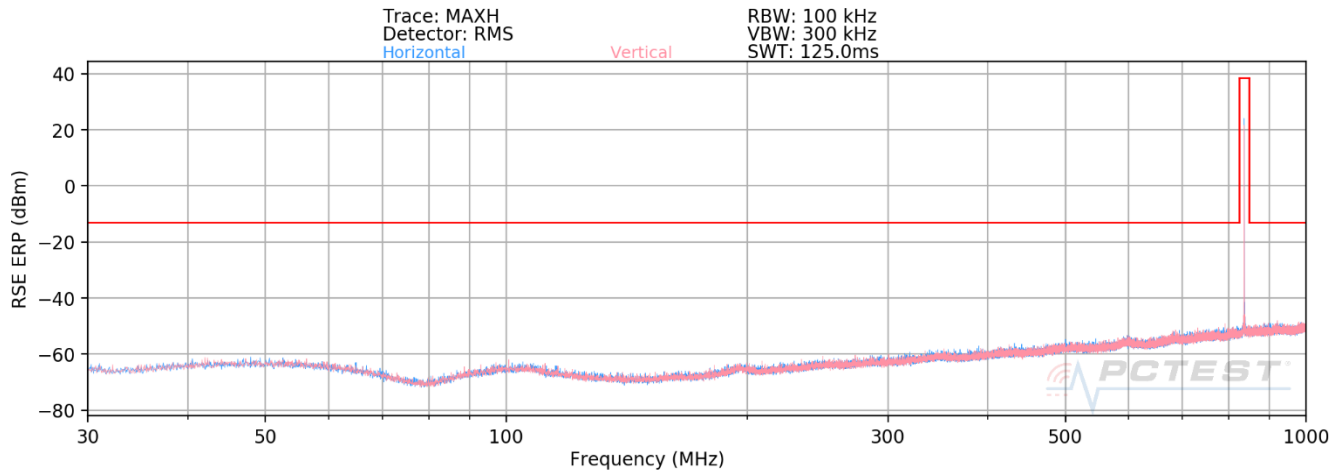
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1688.00	H	-	-	-75.79	-7.41	23.80	-71.46	-13.00	-58.46
2532.00	H	369	331	-74.33	-3.98	28.69	-66.57	-13.00	-53.57
3376.00	H	-	-	-77.23	-0.49	29.28	-65.97	-13.00	-52.97
4220.00	H	-	-	-77.33	0.95	30.62	-64.64	-13.00	-51.64
5064.00	H	-	-	-77.24	2.16	31.92	-63.33	-13.00	-50.33
5908.00	H	-	-	-78.63	5.14	33.51	-61.75	-13.00	-48.75

Table 7-8. Radiated Spurious Data (LTE Band 26/5 – High Channel) – OPEN

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GSM/GPRS Cell

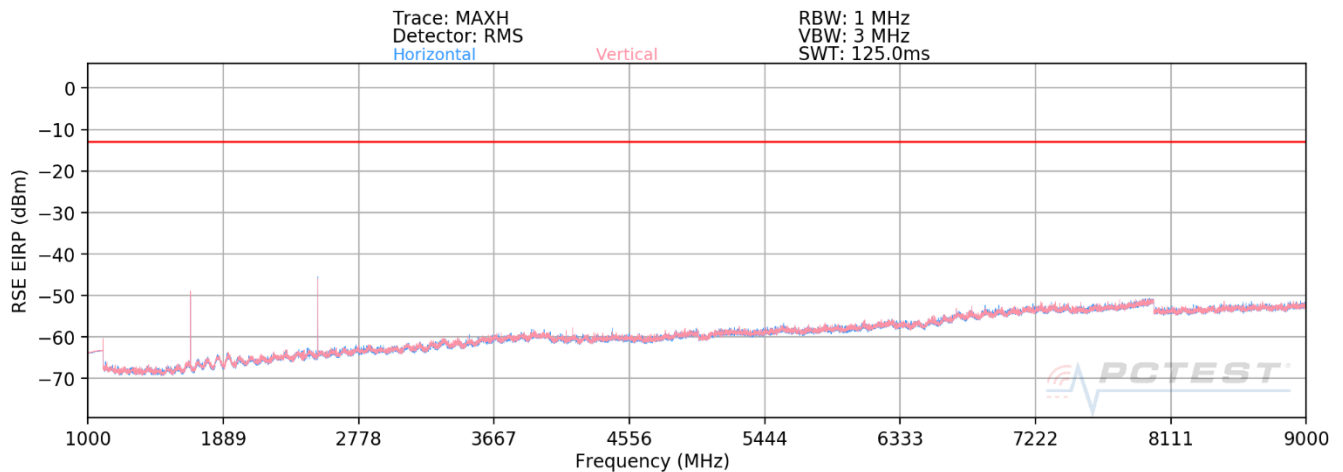


Plot 7-58. Radiated Spurious Plot Below 1GHz (GPRS Cell) – HALF OPEN

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]
873.30	H	-	-	-84.01	24.78	47.77	-47.48	-13.00	-34.48

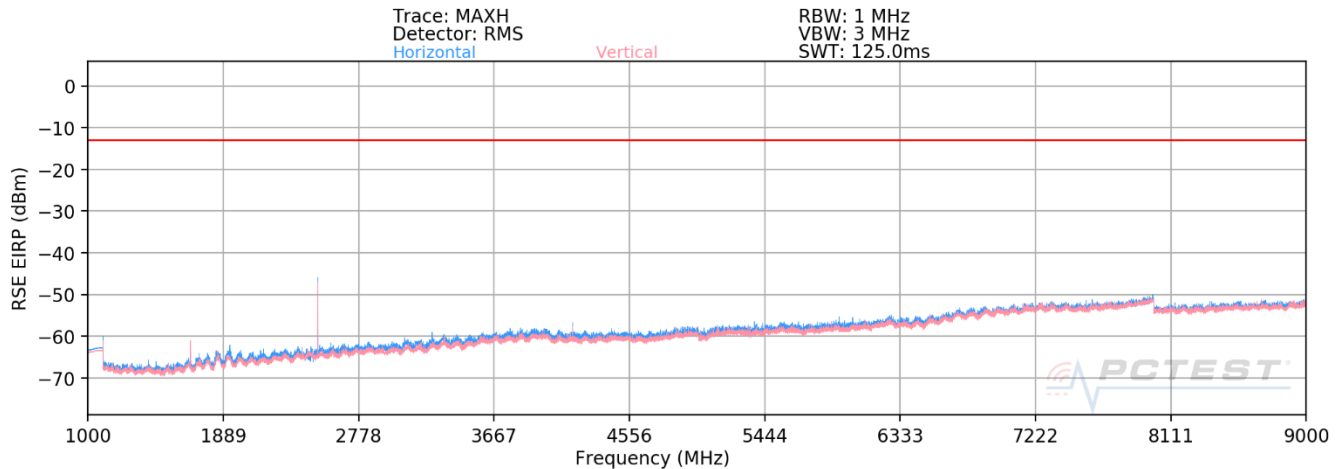
Table 7-9. Radiated Spurious Data (GPRS Cell) – HALF OPEN



Plot 7-59. Radiated Spurious Plot Above 1GHz (GPRS Cell) – HALF OPEN

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Plot 7-60. Radiated Spurious Plot Above 1GHz (GPRS Cell) – CLOSE

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	124	158	-51.94	-7.12	47.94	-47.32	-13.00	-34.32
2472.60	H	109	171	-52.26	-3.84	50.90	-44.36	-13.00	-31.36
3296.80	H	137	137	-69.19	-0.53	37.28	-57.98	-13.00	-44.98
4121.00	H	-	-	-68.61	1.47	39.86	-55.40	-13.00	-42.40
4945.20	H	-	-	-69.15	2.17	40.02	-55.24	-13.00	-42.24
5769.40	H	-	-	-70.39	4.20	40.81	-54.44	-13.00	-41.44
6593.60	H	-	-	-70.91	6.55	42.64	-52.62	-13.00	-39.62

Table 7-10. Radiated Spurious Data (GPRS Cell – Low Channel) – HALF OPEN

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	119	161	-52.96	-6.97	47.07	-48.19	-13.00	-35.19
2509.80	H	130	186	-51.27	-4.05	51.68	-43.58	-13.00	-30.58
3346.40	H	101	150	-68.03	-0.44	38.53	-56.73	-13.00	-43.73
4183.00	H	-	-	-68.62	1.09	39.47	-55.79	-13.00	-42.79
5019.60	H	-	-	-68.35	1.96	40.61	-54.65	-13.00	-41.65
5856.20	H	-	-	-69.92	4.94	42.02	-53.24	-13.00	-40.24
6692.80	H	-	-	-70.30	7.54	44.24	-51.02	-13.00	-38.02

Table 7-11. Radiated Spurious Data (GPRS Cell – Mid Channel) – HALF OPEN

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

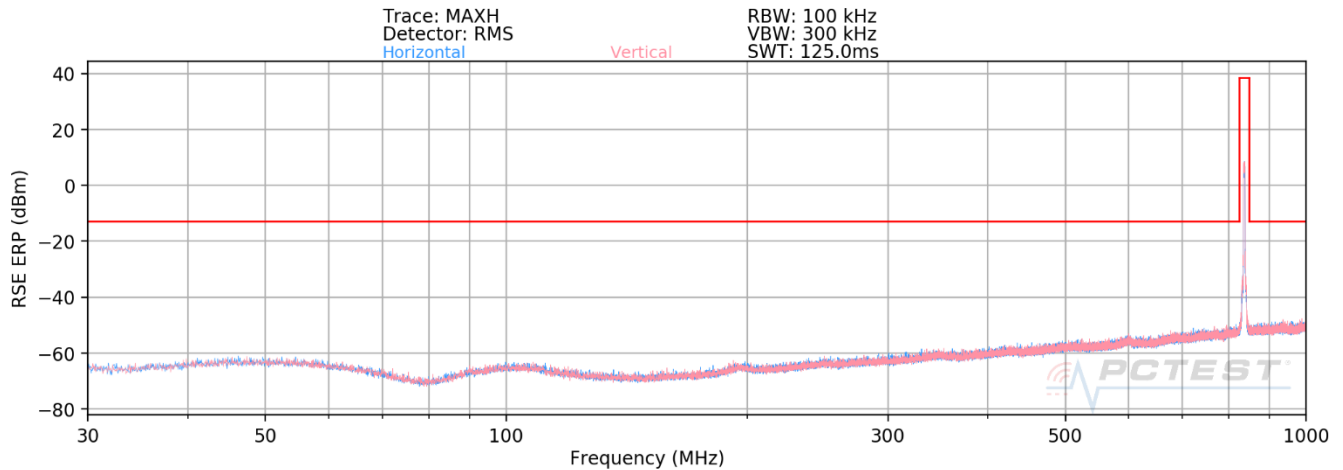
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1697.60	H	145	151	-52.86	-7.59	46.55	-48.71	-13.00	-35.71
2546.40	H	154	169	-53.88	-3.87	49.25	-46.01	-13.00	-33.01
3395.20	H	-	-	-68.76	-0.47	37.77	-57.49	-13.00	-44.49
4244.00	H	-	-	-68.91	0.85	38.94	-56.32	-13.00	-43.32
5092.80	H	-	-	-69.00	3.12	41.12	-54.14	-13.00	-41.14
5941.60	H	-	-	-70.23	4.86	41.63	-53.63	-13.00	-40.63
6790.40	H	-	-	-70.50	7.76	44.26	-51.00	-13.00	-38.00

Table 7-12. Radiated Spurious Data (GPRS Cell – High Channel) – HALF OPEN

FCC ID: A3LSMF721JPN	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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WCDMA Cell

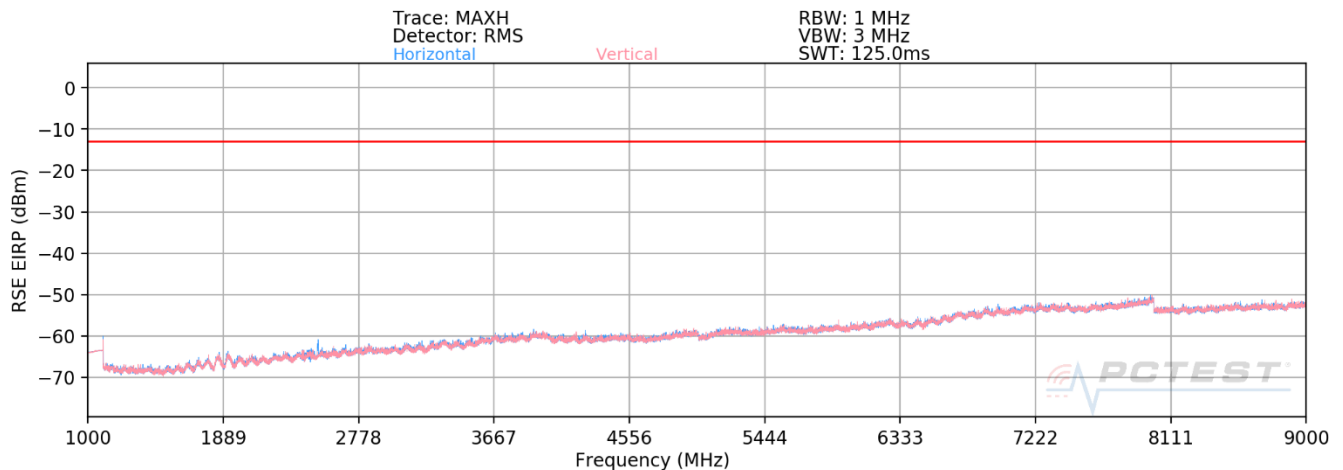


Plot 7-61. Radiated Spurious Plot Below 1GHz (WCDMA Cell) – HALF OPEN

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]
920.65	H	-	-	-93.16	25.24	39.08	-56.17	-13.00	-43.17

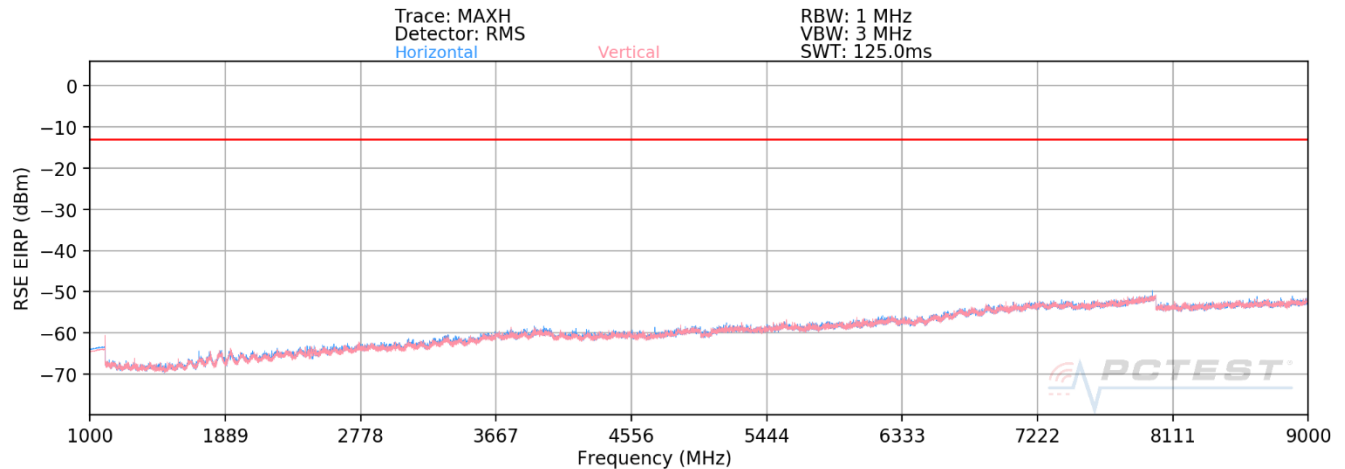
Table 7-13. Radiated Spurious Data (WCDMA Cell) – HALF OPEN



Plot 7-62. Radiated Spurious Plot Above 1GHz (WCDMA Cell) – HALF OPEN

FCC ID: A3LSMF721JPN	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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Plot 7-63. Radiated Spurious Plot Above 1GHz (WCDMA Cell) – CLOSE

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	133	181	-73.06	-7.02	26.92	-68.33	-13.00	-55.33
2479.20	H	103	209	-71.52	-3.83	31.65	-63.61	-13.00	-50.61
3305.60	H	-	-	-77.71	-0.39	28.90	-66.36	-13.00	-53.36
4132.00	H	-	-	-77.88	1.52	30.64	-64.61	-13.00	-51.61
4958.40	H	-	-	-77.69	2.06	31.37	-63.89	-13.00	-50.89
5784.80	H	-	-	-78.84	4.22	32.38	-62.88	-13.00	-49.88

Table 7-14. Radiated Spurious Data (WCDMA Cell – Low Channel) – HALF OPEN

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	-	-	-75.58	-6.97	24.45	-70.81	-13.00	-57.81
2509.80	H	129	186	-70.52	-4.05	32.43	-62.83	-13.00	-49.83
3346.40	H	-	-	-76.68	-0.44	29.88	-65.38	-13.00	-52.38
4183.00	H	-	-	-77.21	1.09	30.88	-64.38	-13.00	-51.38
5019.60	H	-	-	-77.62	1.96	31.34	-63.92	-13.00	-50.92
5856.20	H	-	-	-78.85	4.94	33.09	-62.17	-13.00	-49.17

Table 7-15. Radiated Spurious Data (WCDMA Cell – Mid Channel) – HALF OPEN

FCC ID: A3LSMF721JPN	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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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	-	-	-75.58	-7.51	23.91	-71.35	-13.00	-58.35
2539.80	H	117	197	-70.10	-3.92	32.98	-62.28	-13.00	-49.28
3386.40	H	-	-	-77.44	-0.43	29.13	-66.13	-13.00	-53.13
4233.00	H	-	-	-77.62	0.82	30.20	-65.06	-13.00	-52.06
5079.60	H	-	-	-77.91	2.59	31.68	-63.58	-13.00	-50.58
5926.20	H	-	-	-78.62	5.10	33.48	-61.78	-13.00	-48.78

Table 7-16. Radiated Spurious Data (WCDMA Cell – High Channel) –HALF OPEN

FCC ID: A3LSMF721JPN	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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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 $\pm 0.00025\%$ (± 2.5 ppm) of the center frequency.

Test Procedure Used

ANSI C63.26-2015 – Section 5.6

Test Settings

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

Test Setup

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

Test Notes

None

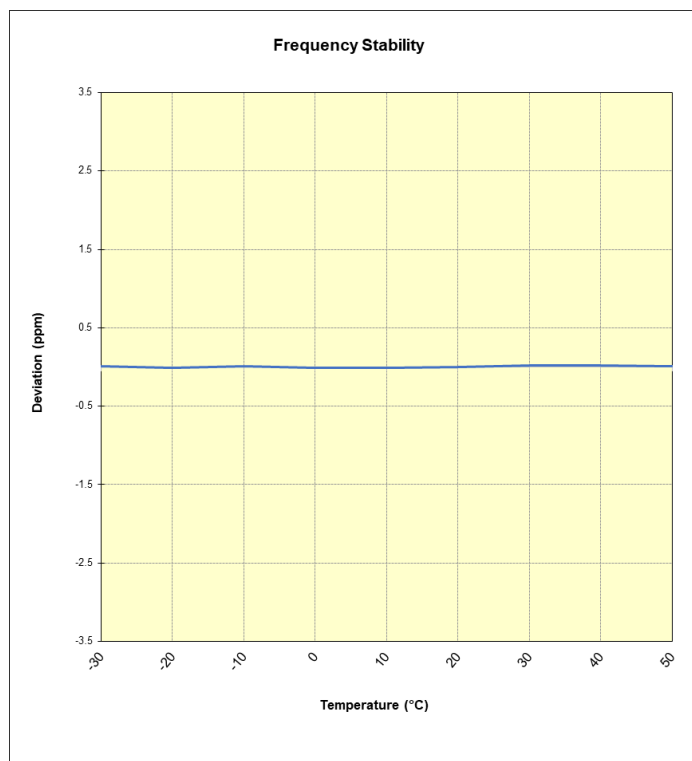
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LTE Band 26/5

LTE Band 26/5					
		Operating Frequency (Hz):	836,500,000		
		Ref. Voltage (VDC):	4.25		
		Deviation Limit:	± 0.00025% or 2.5 ppm		
Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.25	- 30	836,500,006	10	0.0000012
		- 20	836,499,990	-6	-0.0000007
		- 10	836,500,004	8	0.0000009
		0	836,499,984	-12	-0.0000015
		+ 10	836,499,987	-9	-0.0000010
		+ 20 (Ref)	836,499,996	0	0.0000000
		+ 30	836,500,009	13	0.0000015
		+ 40	836,500,012	16	0.0000019
		+ 50	836,500,003	7	0.0000008
Battery Endpoint	3.58	+ 20	836,499,995	-1	-0.0000002

Table 7-17. LTE Band 26/5 Frequency Stability Data



Plot 7-64. LTE Band 26/5 Frequency Stability Chart

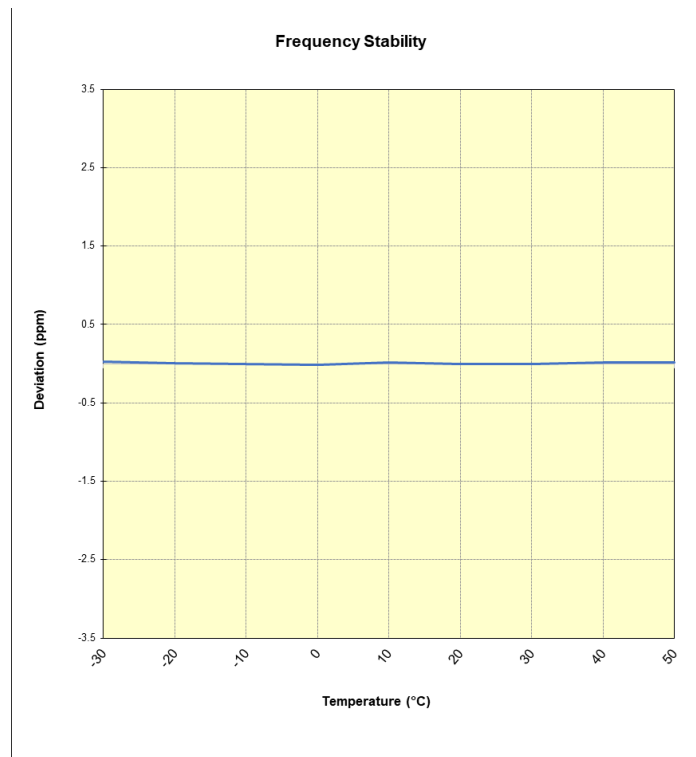
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GSM/GPRS Cell

GSM/GPRS Cellular					
		Operating Frequency (Hz):		836,600,000	
		Ref. Voltage (VDC):		4.25	
		Deviation Limit:		± 0.00025% or 2.5 ppm	
Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.25	- 30	836,600,020	23	0.0000028
		- 20	836,600,005	9	0.0000011
		- 10	836,599,990	-6	-0.0000007
		0	836,599,986	-11	-0.0000013
		+ 10	836,600,009	12	0.0000015
		+ 20 (Ref)	836,599,996	0	0.0000000
		+ 30	836,599,989	-8	-0.0000009
		+ 40	836,600,006	9	0.0000011
		+ 50	836,600,010	13	0.0000016
Battery Endpoint	3.58	+ 20	836,599,989	-8	-0.0000010

Table 7-18. GSM/GPRS Cell Frequency Stability Data



Plot 7-65. GSM/GPRS Cell Frequency Stability Chart

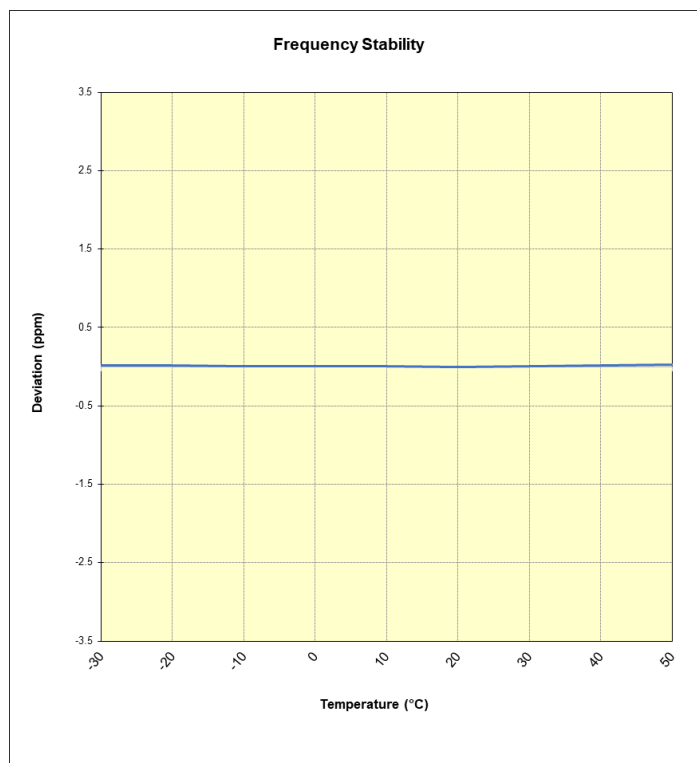
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WCDMA Cell

WCDMA Cellular					
		Operating Frequency (Hz):		836,600,000	
		Ref. Voltage (VDC):		4.25	
		Deviation Limit:		± 0.00025% or 2.5 ppm	
Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.25	- 30	836,600,002	12	0.0000014
		- 20	836,600,004	14	0.0000016
		- 10	836,599,994	4	0.0000005
		0	836,599,999	9	0.0000011
		+ 10	836,599,998	8	0.0000009
		+ 20 (Ref)	836,599,990	0	0.0000000
		+ 30	836,599,996	6	0.0000007
		+ 40	836,600,004	14	0.0000017
		+ 50	836,600,009	19	0.0000022
Battery Endpoint	3.58	+ 20	836,599,992	2	0.0000002

Table 7-19. WCDMA Cell Frequency Stability Data



Plot 7-66. WCDMA Cell Frequency Stability Chart

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8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **Samsung Portable Handset** **FCC ID: A3LSMF721JPN** complies with all the requirements of Part 22 of the FCC rules.

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