

PART 27 MEASUREMENT REPORT

Applicant Name:
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 Gyeonggi-do, 16677, Korea

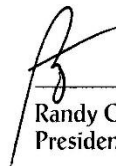
Date of Testing:
 1/17/2021 - 2/11/2021
Test Site/Location:
 PCTEST Lab. Columbia, MD, USA
Test Report Serial No.:
 1M2101110003-04.A3L

| | |
|-------------------|--------------------------------------|
| FCC ID: | A3LSMG998JPN |
| APPLICANT: | Samsung Electronics Co., Ltd. |

Application Type: Certification
Model: SC-52B
EUT Type: Portable Handset
FCC Classification: PCS Licensed Transmitter Held to Ear (PCE)
FCC Rule Part: 27
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.


 Randy Ortanez
 President







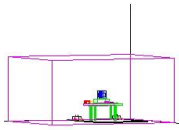
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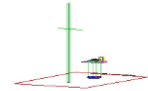
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FCC Part 27





| 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 12 | 10 MHz | QPSK | 704.0 - 711.0 | 0.038 | 15.77 | 0.062 | 17.92 | 9M01G7D |
| | | 16QAM | 704.0 - 711.0 | 0.033 | 15.19 | 0.054 | 17.34 | 8M98W7D |
| | | 64QAM | 704.0 - 711.0 | 0.025 | 14.00 | 0.041 | 16.15 | 9M01W7D |
| | 5 MHz | QPSK | 701.5 - 713.5 | 0.038 | 15.75 | 0.062 | 17.90 | 4M51G7D |
| | | 16QAM | 701.5 - 713.5 | 0.033 | 15.15 | 0.054 | 17.30 | 4M51W7D |
| | | 64QAM | 701.5 - 713.5 | 0.025 | 13.96 | 0.041 | 16.11 | 4M50W7D |
| | 3 MHz | QPSK | 700.5 - 714.5 | 0.038 | 15.76 | 0.062 | 17.91 | 2M69G7D |
| | | 16QAM | 700.5 - 714.5 | 0.033 | 15.17 | 0.054 | 17.32 | 2M70W7D |
| | | 64QAM | 700.5 - 714.5 | 0.025 | 13.99 | 0.041 | 16.14 | 2M71W7D |
| | 1.4 MHz | QPSK | 699.7 - 715.3 | 0.037 | 15.69 | 0.061 | 17.84 | 1M10G7D |
| | | 16QAM | 699.7 - 715.3 | 0.032 | 15.09 | 0.053 | 17.24 | 1M09W7D |
| | | 64QAM | 699.7 - 715.3 | 0.025 | 13.90 | 0.040 | 16.05 | 1M09W7D |
| LTE Band 13 | 10 MHz | QPSK | 782.0 | 0.053 | 17.26 | 0.087 | 19.41 | 9M03G7D |
| | | 16QAM | 782.0 | 0.045 | 16.51 | 0.074 | 18.66 | 8M96W7D |
| | | 64QAM | 782.0 | 0.036 | 15.52 | 0.059 | 17.67 | 8M97W7D |
| | 5 MHz | QPSK | 779.5 - 784.5 | 0.056 | 17.47 | 0.092 | 19.62 | 4M52G7D |
| | | 16QAM | 779.5 - 784.5 | 0.046 | 16.60 | 0.075 | 18.75 | 4M52W7D |
| | | 64QAM | 779.5 - 784.5 | 0.036 | 15.54 | 0.059 | 17.69 | 4M52W7D |

Below 1GHz Bands

| Mode | Bandwidth | Modulation | Tx Frequency Range [MHz] | EIRP | | Emission Designator |
|------------|-----------|------------|--------------------------|----------------|------------------|---------------------|
| | | | | Max. Power [W] | Max. Power [dBm] | |
| LTE Band 4 | 20 MHz | QPSK | 1720.0 - 1745.0 | 0.174 | 22.41 | 17M9G7D |
| | | 16QAM | 1720.0 - 1745.0 | 0.150 | 21.75 | 17M9W7D |
| | | 64QAM | 1720.0 - 1745.0 | 0.111 | 20.45 | 18M0W7D |
| | 15 MHz | QPSK | 1717.5 - 1747.5 | 0.171 | 22.32 | 13M5G7D |
| | | 16QAM | 1717.5 - 1747.5 | 0.148 | 21.69 | 13M5W7D |
| | | 64QAM | 1717.5 - 1747.5 | 0.109 | 20.37 | 13M5W7D |
| | 10 MHz | QPSK | 1715.0 - 1750.0 | 0.179 | 22.52 | 9M00G7D |
| | | 16QAM | 1715.0 - 1750.0 | 0.146 | 21.64 | 8M99W7D |
| | | 64QAM | 1715.0 - 1750.0 | 0.106 | 20.24 | 9M00W7D |
| | 5 MHz | QPSK | 1712.5 - 1752.5 | 0.176 | 22.46 | 4M49G7D |
| | | 16QAM | 1712.5 - 1752.5 | 0.144 | 21.57 | 4M51W7D |
| | | 64QAM | 1712.5 - 1752.5 | 0.107 | 20.31 | 4M50W7D |
| | 3 MHz | QPSK | 1711.5 - 1753.5 | 0.176 | 22.44 | 2M70G7D |
| | | 16QAM | 1711.5 - 1753.5 | 0.137 | 21.38 | 2M70W7D |
| | | 64QAM | 1711.5 - 1753.5 | 0.108 | 20.33 | 2M70W7D |
| | 1.4 MHz | QPSK | 1710.7 - 1754.3 | 0.167 | 22.22 | 1M09G7D |
| | | 16QAM | 1710.7 - 1754.3 | 0.142 | 21.52 | 1M10W7D |
| | | 64QAM | 1710.7 - 1754.3 | 0.106 | 20.24 | 1M09W7D |

Above 1GHz Band

| | | | |
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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 PCTEST Test Location

These measurement tests were conducted at the PCTEST Engineering Laboratory, Inc. facility 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 PCTEST Engineering Lab located in Columbia, MD 21046, U.S.A.

- PCTEST 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.
- PCTEST 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).
- PCTEST facility is a registered (2451B) test laboratory with the site description on file with ISED.

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2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **Samsung Portable Handset FCC ID: A3LSMG998JPN**. The test data contained in this report pertains only to the emissions due to the EUT's licensed transmitters that operate under the provisions of Part 27.

Test Device Serial No.: 0466M, 70564H, 0482M

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, UWB



2.3 Test Configuration

The EUT was tested per the guidance of ANSI/TIA-603-E-2016 and KDB 971168 D01 v03r01. 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.

2.4 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 document titled “Land Mobile FM or PM – Communications Equipment – Measurements and Performance Standards” (ANSI/TIA-603-E-2016) and “Procedures for Compliance Measurement of the Fundamental Emission Power of Licensed Wideband (> 1 MHz) Digital Transmission Systems” (KDB 971168 D01 v03r01) were used in the measurement of the EUT.

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 wooden turntable 80cm above the ground plane and 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. Radiated power levels are also investigated with the receive antenna horizontally and vertically polarized. The maximized power level is recorded using the spectrum analyzer “Channel Power” function with the integration band set to the emissions’ occupied bandwidth, a RMS detector, RBW = 100kHz, VBW = 300kHz, and a 1 second sweep time over a minimum of 10 sweeps, per the guidelines of KDB 971168 D01 v03r01.



Per the guidance of ANSI/TIA-603-E-2016, a half-wave dipole is then substituted in place of the EUT. For emissions above 1GHz, a horn antenna is substituted in place of the EUT. The substitute antenna is driven by a signal generator with the level of the signal generator being adjusted to obtain the same receive spectrum analyzer level previously recorded from the spurious emission from the EUT. The power of the emission is calculated using the following formula:

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

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 (dBi) or an isotropic source (dBd). The substitute level is equal to $P_g \text{ [dBm]} - \text{cable loss [dB]}$.

For fundamental radiated power measurements, the guidance of KDB 971168 D01 v03r01 is used to record the EUT power level that is subsequently matched via the aforementioned substitution method given in ANSI/TIA-603-E-2016.



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 474788 D01.

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4.0 MEASUREMENT UNCERTAINTY

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

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

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5.0 TEST EQUIPMENT CALIBRATION DATA



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

| Manufacturer | Model | Description | Cal Date | Cal Interval | Cal Due | Serial Number |
|-----------------|------------|--------------------------------|------------|--------------|------------|---------------|
| - | LTx2 | Licensed Transmitter Cable Set | 4/9/2020 | Annual | 4/9/2021 | LTx2 |
| - | LTx4 | Licensed Transmitter Cable Set | 7/9/2020 | Annual | 7/9/2021 | LTx4 |
| - | LTx5 | Licensed Transmitter Cable Set | 4/9/2020 | Annual | 4/6/2021 | LTx5 |
| Agilent | N9020A | MXA Signal Analyzer | 8/4/2020 | Annual | 8/4/2021 | US46470561 |
| Agilent | N9030A | PXA Signal Analyzer (44GHz) | 7/17/2020 | Annual | 7/17/2021 | MY52350166 |
| Anritsu | MT8820C | Radio Communication Analyzer | N/A | | | 6201300731 |
| Anritsu | MT8821C | Radio Communication Analyzer | N/A | | | 6201381794 |
| Anritsu | MT8821C | Radio Communication Analyzer | N/A | | | 6200901190 |
| Com-Power | AL-130 | 9kHz - 30MHz Loop Antenna | 10/10/2019 | Biennial | 10/10/2021 | 121034 |
| Emco | 3115 | Horn Antenna (1-18GHz) | 6/18/2020 | Biennial | 6/18/2022 | 9704-5182 |
| Mini-Circuits | SSG-4000HP | Synthesized Signal Generator | N/A | | | 11403100002 |
| Rohde & Schwarz | CMW500 | Radio Communication Tester | N/A | | | 100976 |
| Rohde & Schwarz | CMW500 | Radio Communication Tester | N/A | | | 112347 |
| Rohde & Schwarz | ESU26 | EMI Test Receiver (26.5GHz) | 7/15/2020 | Annual | 7/15/2021 | 100342 |
| Rohde & Schwarz | SFUNIT-Rx | Shielded Filter Unit | 2/10/2020 | Annual | 2/10/2021 | 102134 |
| Rohde & Schwarz | SFUNIT-Rx | Shielded Filter Unit | 2/21/2020 | Annual | 2/21/2021 | 102133 |
| Sunol | DRH-118 | Horn Antenna (1-18GHz) | 10/3/2019 | Biennial | 10/3/2021 | A050307 |
| Sunol | DRH-118 | Horn Antenna (1-18 GHz) | 8/27/2019 | Biennial | 8/27/2021 | A042511 |

Table 5-1. Summary of Test Results

Notes:

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

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6.0 SAMPLE CALCULATIONS

Emission Designator

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 – LTE Band

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

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

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7.0 TEST RESULTS

7.1 Summary



Company Name: Samsung Electronics Co., Ltd.
 FCC ID: A3LSMG998JPN
 FCC Classification: PCS Licensed Transmitter Held to Ear (PCE)
 Mode(s): 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, 27.53 | RSS-139(6.6) | > 43 + 10log ₁₀ (P[Watts]) at Band Edge and for all out-of-band emissions | PASS | Sections 7.3, 7.4 |
| | Transmitter Conducted Output Power | 2.1046 | RSS-139(4.1) | N/A | PASS | See RF Exposure Report |
| | Frequency Stability | 2.1055, 27.54 | RSS-139(6.4) | Fundamental emissions stay within authorized frequency block | PASS | Section 7.8 |
| RADIATED | Effective Radiated Power / Equivalent Isotropic Radiated Power (LTE Band 12) | 27.50(b)(10) | RSS-130(4.4) | < 3 Watts max. ERP < 5 Watts max. EIRP | PASS | Section 7.6 |
| | Effective Radiated Power / Equivalent Isotropic Radiated Power (LTE Band 13) | 27.50(c)(10) | RSS-130(4.4) | < 3 Watts max. ERP < 5 Watts max. EIRP | PASS | Section 7.6 |
| | Equivalent Isotropic Radiated Power (LTE Band 4) | 27.50(d)(4) | RSS-139(6.5) | < 1 Watts max. EIRP | PASS | Section 7.6 |
| | Radiated Spurious Emissions (LTE Band 13) | 2.1053, 27.53(f) | RSS-139(6.6) | < -70 dBW/MHz (for wideband signals) < -80 dBW (for discrete emissions less than 700Hz BW) For all emissions in the band 1559 - 1610 MHz | PASS | Section 7.7 |
| | Radiated Spurious Emissions | 2.1053, 27.53 | RSS-139(6.6) | > 43 + 10 log ₁₀ (P[Watts]) for all out-of-band emissions | PASS | Section 7.7 |

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 shown in Section 7.0 were taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables, directional couplers, and attenuators used as part of the system to maintain a link between the call box and the EUT at all frequencies of interest.
- 3) All antenna port conducted emissions testing was performed on a test bench with the antenna port of the EUT connected to the spectrum analyzer through calibrated cables, attenuators, and couplers.
- 4) For conducted spurious emissions, automated test software was used to measure emissions and capture the corresponding plots necessary to show compliance. The measurement software utilized is PCTEST 2G/3G Automation Version 4.2.

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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

KDB 971168 D01 v03r01 – Section 4.2

Test Settings

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

Test Setup

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

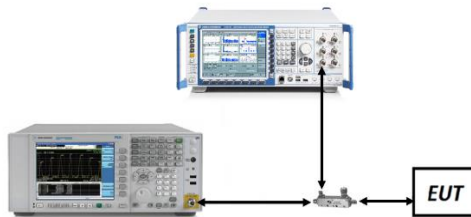


Figure 7-1. Test Instrument & Measurement Setup

Test Notes

None.

| | | | |
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LTE Band 4

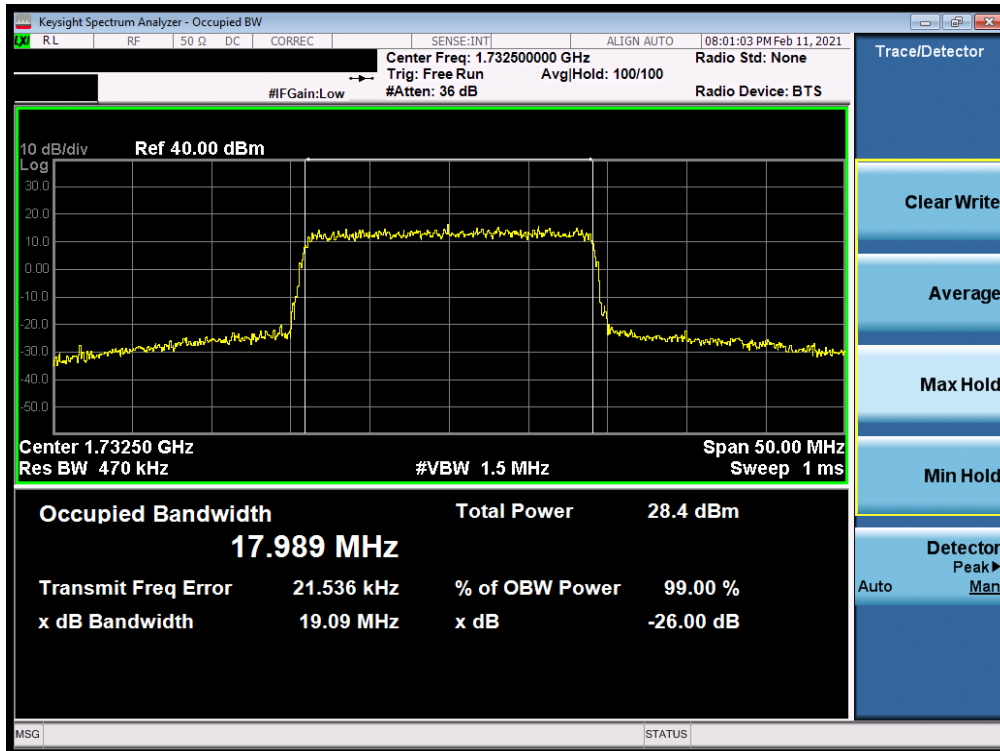


Plot 7-1. Occupied Bandwidth Plot (LTE Band 4 - 20MHz QPSK - Full RB Configuration)



Plot 7-2. Occupied Bandwidth Plot (LTE Band 4 - 20MHz 16-QAM - Full RB Configuration)

| | | | | |
|---|--|-------------------------------|----------------|-----------------------------------|
| FCC ID: A3LSMG998JPN | PCTEST Proud to be part of element | PART 27 MEASUREMENT REPORT | SAMSUNG | Approved by: Technical Manager |
| Test Report S/N: 1M2101110003-04.A3L | Test Dates: 1/17/2021 - 2/11/2021 | EUT Type: Portable Handset | | Page 12 of 83 |

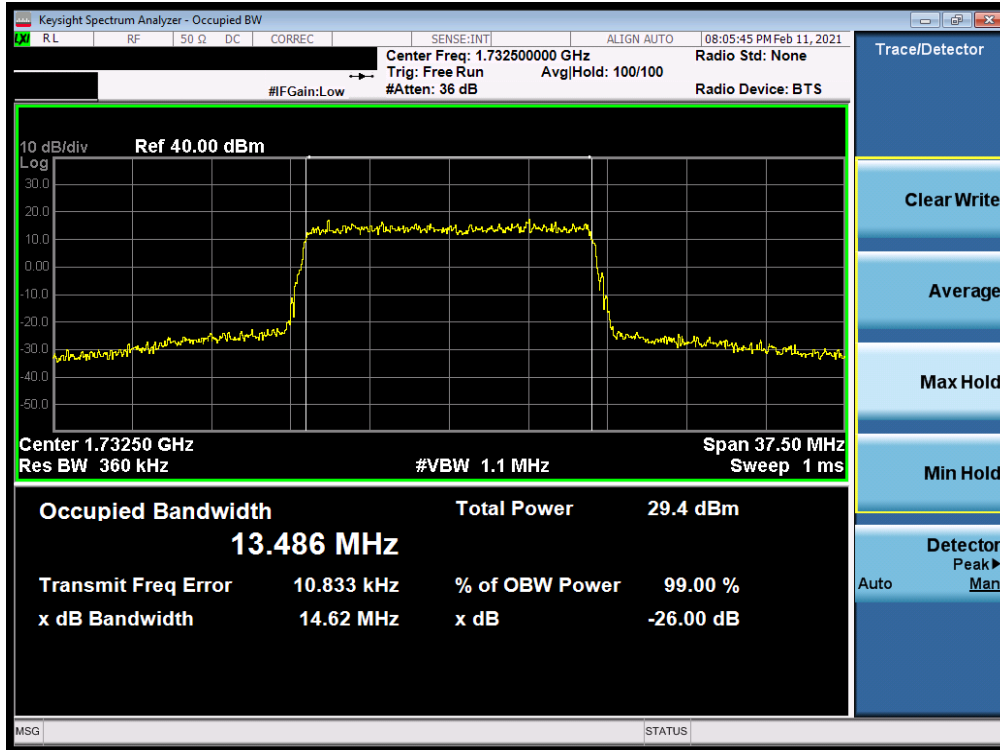


Plot 7-3. Occupied Bandwidth Plot (LTE Band 4 - 20MHz 64-QAM - Full RB Configuration)



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

| | | | |
|---|--|-----------------------------------|--|
| FCC ID: A3LSMG998JPN | PCTEST Proud to be part of element | PART 27 MEASUREMENT REPORT | Approved by: Technical Manager |
| Test Report S/N: 1M2101110003-04.A3L | Test Dates: 1/17/2021 - 2/11/2021 | EUT Type: Portable Handset | Page 13 of 83 |

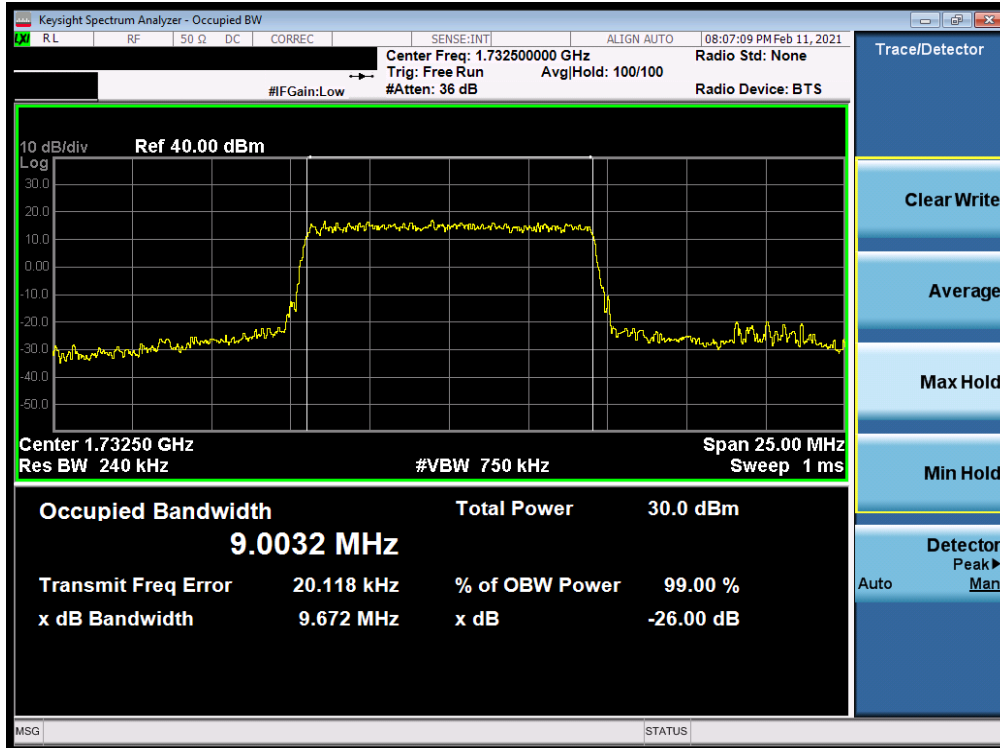


Plot 7-5. Occupied Bandwidth Plot (LTE Band 4 - 15MHz 16-QAM - Full RB Configuration)

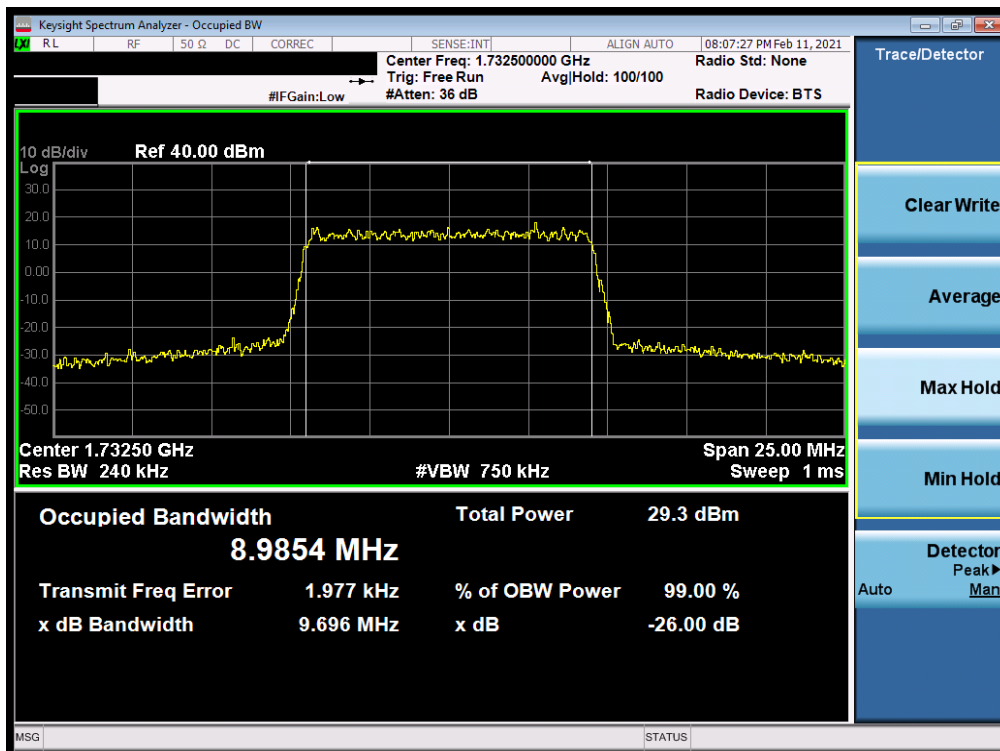


Plot 7-6. Occupied Bandwidth Plot (LTE Band 4 - 15MHz 64-QAM - Full RB Configuration)

| | | | | |
|---|--|-------------------------------|----------------|-----------------------------------|
| FCC ID: A3LSMG998JPN | PCTEST Proud to be part of element | PART 27 MEASUREMENT REPORT | SAMSUNG | Approved by: Technical Manager |
| Test Report S/N: 1M2101110003-04.A3L | Test Dates: 1/17/2021 - 2/11/2021 | EUT Type: Portable Handset | | Page 14 of 83 |

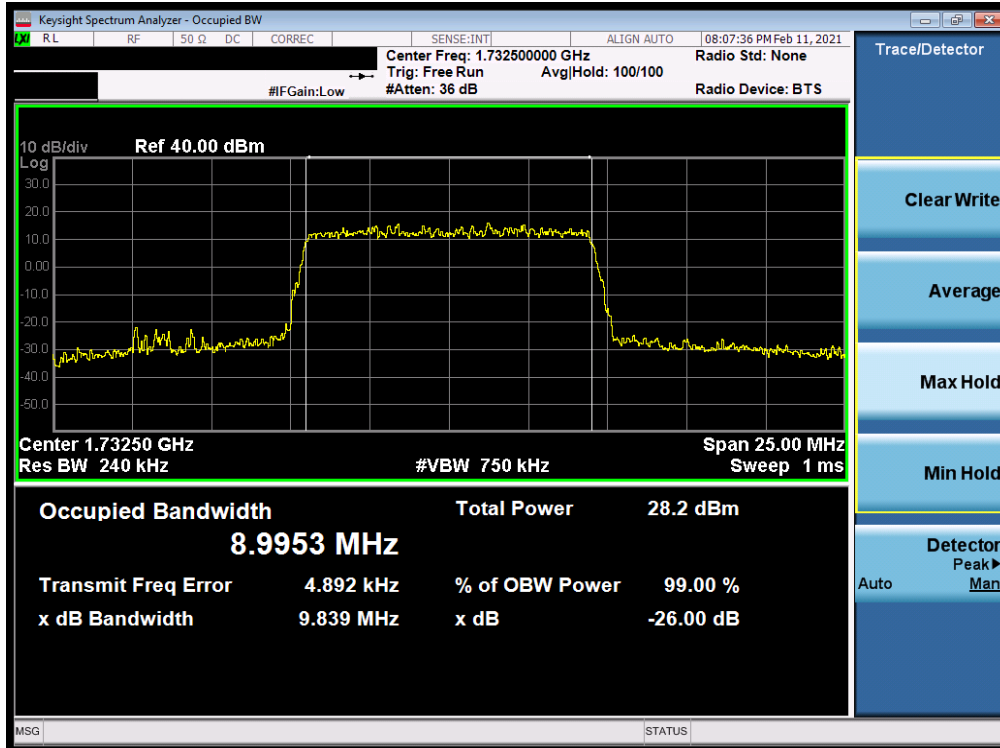


Plot 7-7. Occupied Bandwidth Plot (LTE Band 4 - 10MHz QPSK - Full RB Configuration)

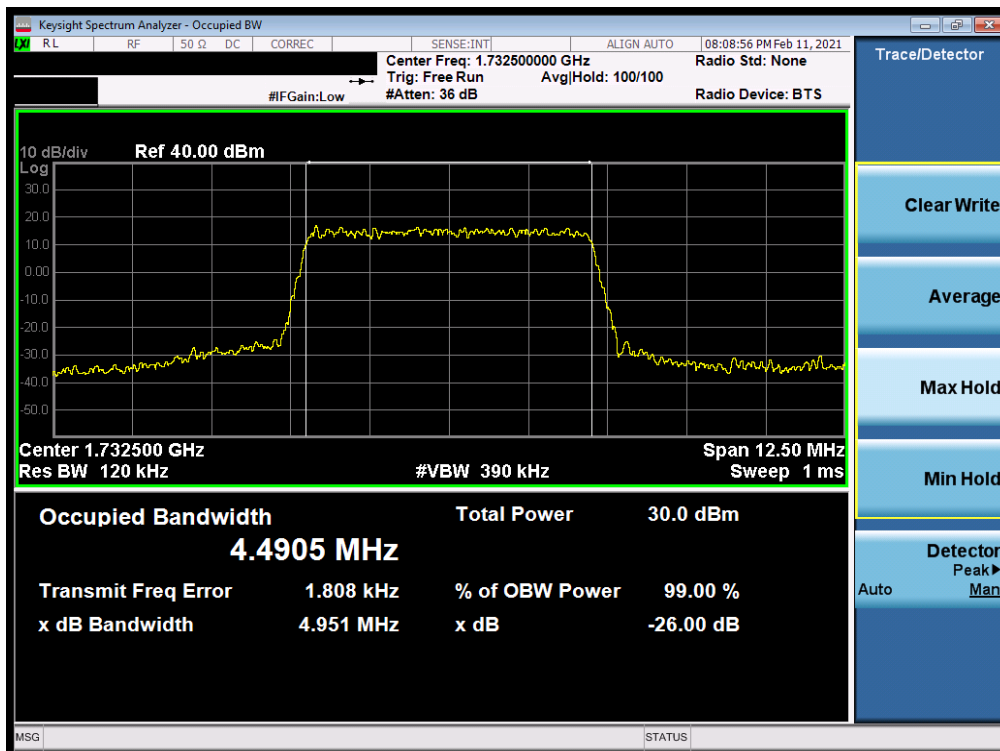


Plot 7-8. Occupied Bandwidth Plot (LTE Band 4 - 10MHz 16-QAM - Full RB Configuration)

| | | | | |
|---|--|-------------------------------|----------------|-----------------------------------|
| FCC ID: A3LSMG998JPN | PCTEST Proud to be part of element | PART 27 MEASUREMENT REPORT | SAMSUNG | Approved by: Technical Manager |
| Test Report S/N: 1M2101110003-04.A3L | Test Dates: 1/17/2021 - 2/11/2021 | EUT Type: Portable Handset | | Page 15 of 83 |

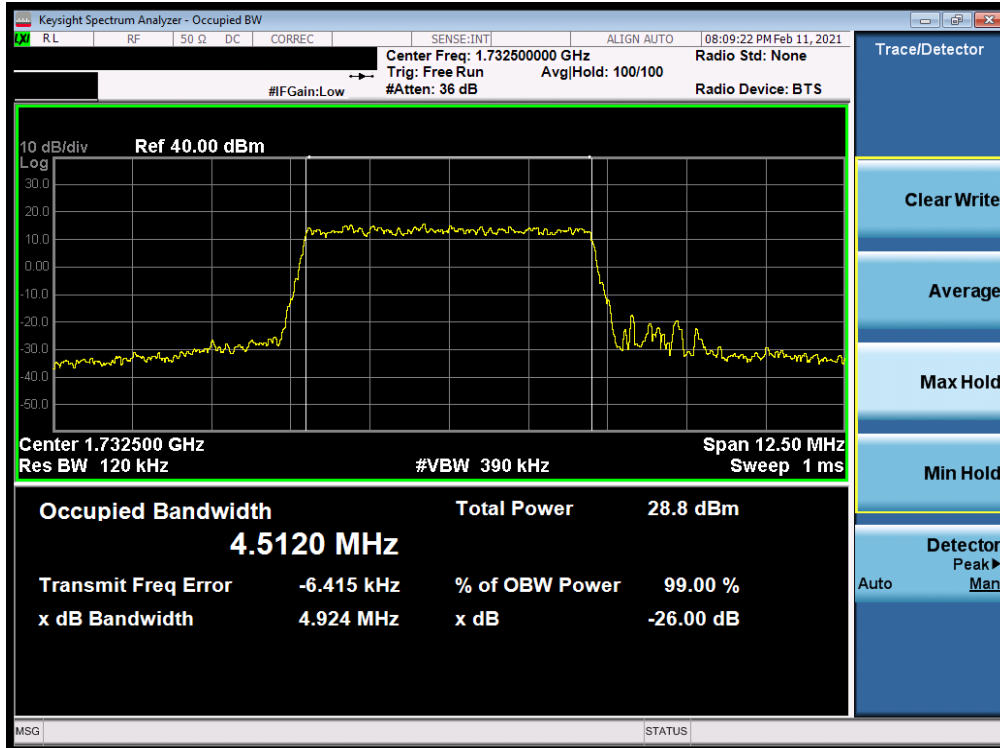


Plot 7-9. Occupied Bandwidth Plot (LTE Band 4 - 10MHz 64-QAM - Full RB Configuration)

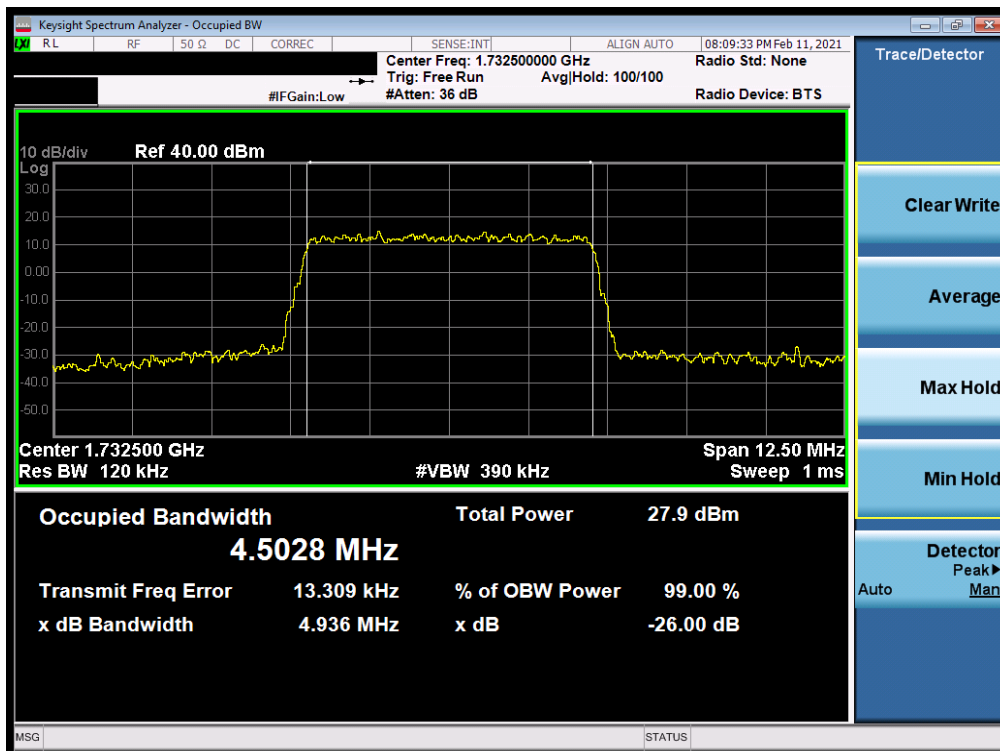


Plot 7-10. Occupied Bandwidth Plot (LTE Band 4 - 5MHz QPSK - Full RB Configuration)

| | | | | |
|---|--|-------------------------------|----------------|-----------------------------------|
| FCC ID: A3LSMG998JPN | PCTEST Proud to be part of element | PART 27 MEASUREMENT REPORT | SAMSUNG | Approved by: Technical Manager |
| Test Report S/N: 1M2101110003-04.A3L | Test Dates: 1/17/2021 - 2/11/2021 | EUT Type: Portable Handset | | Page 16 of 83 |

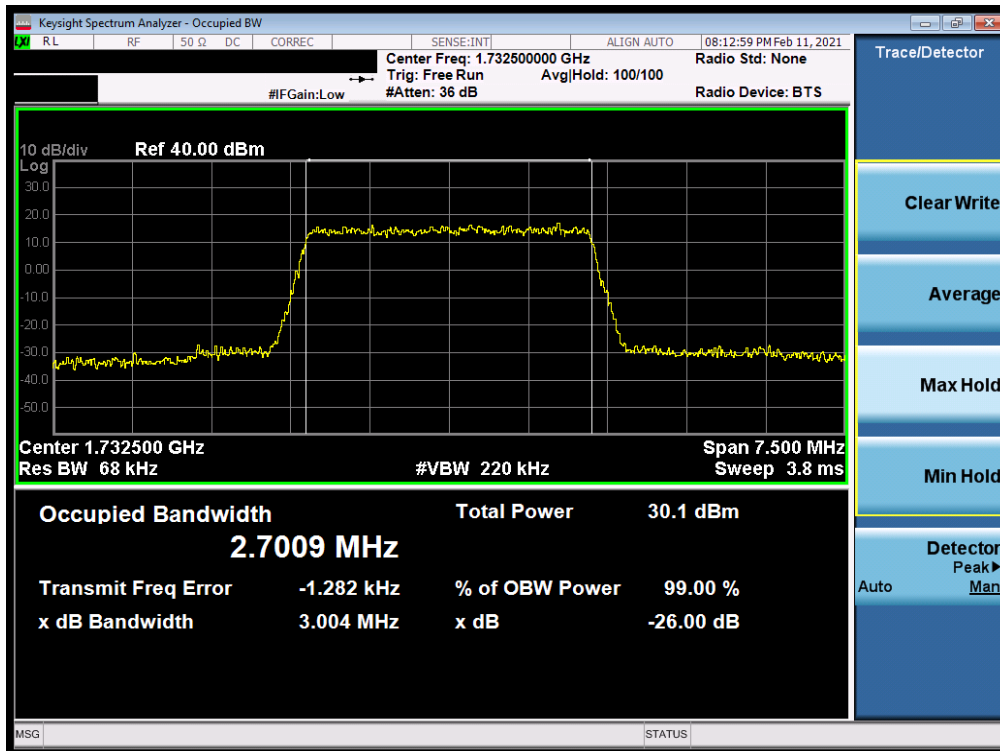


Plot 7-11. Occupied Bandwidth Plot (LTE Band 4 - 5MHz 16-QAM - Full RB Configuration)

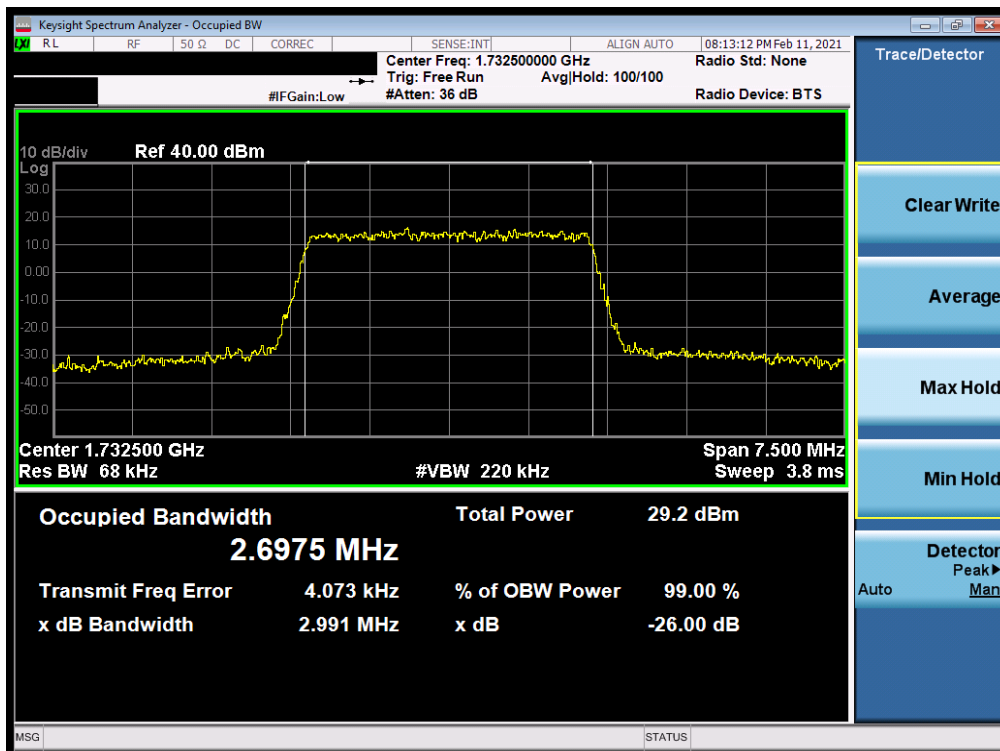


Plot 7-12. Occupied Bandwidth Plot (LTE Band 4 - 5MHz 64-QAM - Full RB Configuration)

| | | | | |
|---|--|-------------------------------|----------------|-----------------------------------|
| FCC ID: A3LSMG998JPN | PCTEST Proud to be part of element | PART 27 MEASUREMENT REPORT | SAMSUNG | Approved by: Technical Manager |
| Test Report S/N: 1M2101110003-04.A3L | Test Dates: 1/17/2021 - 2/11/2021 | EUT Type: Portable Handset | | Page 17 of 83 |

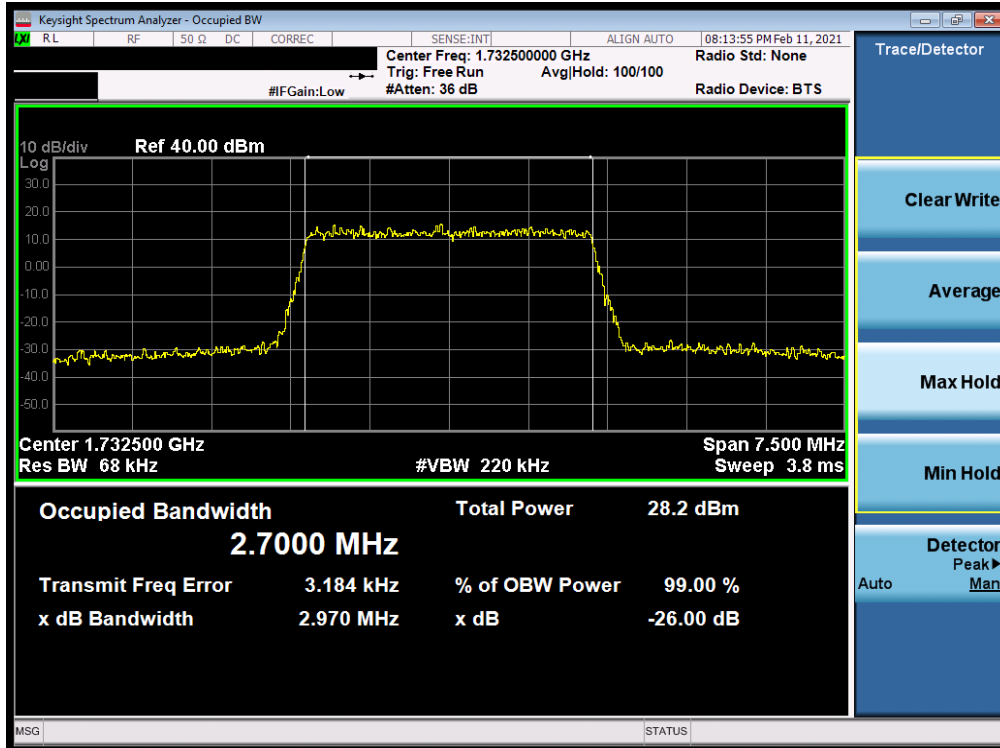


Plot 7-13. Occupied Bandwidth Plot (LTE Band 4 - 3MHz QPSK - Full RB Configuration)

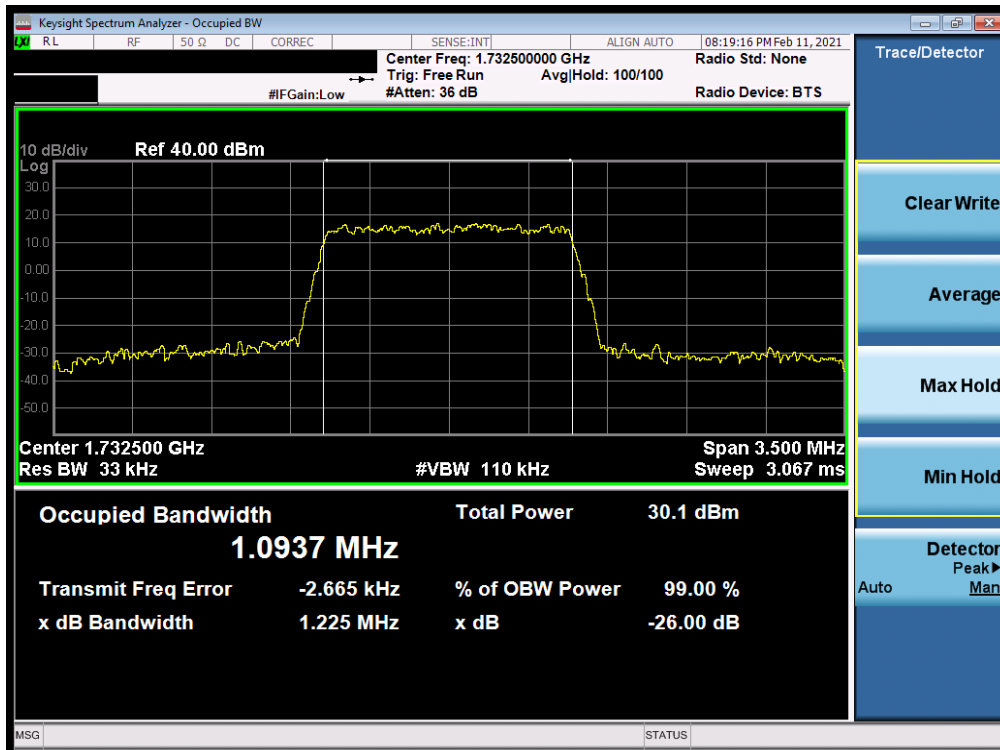


Plot 7-14. Occupied Bandwidth Plot (LTE Band 4 - 3MHz 16-QAM - Full RB Configuration)

| | | | | |
|---|--|-------------------------------|----------------|-----------------------------------|
| FCC ID: A3LSMG998JPN | PCTEST Proud to be part of element | PART 27 MEASUREMENT REPORT | SAMSUNG | Approved by: Technical Manager |
| Test Report S/N: 1M2101110003-04.A3L | Test Dates: 1/17/2021 - 2/11/2021 | EUT Type: Portable Handset | | Page 18 of 83 |

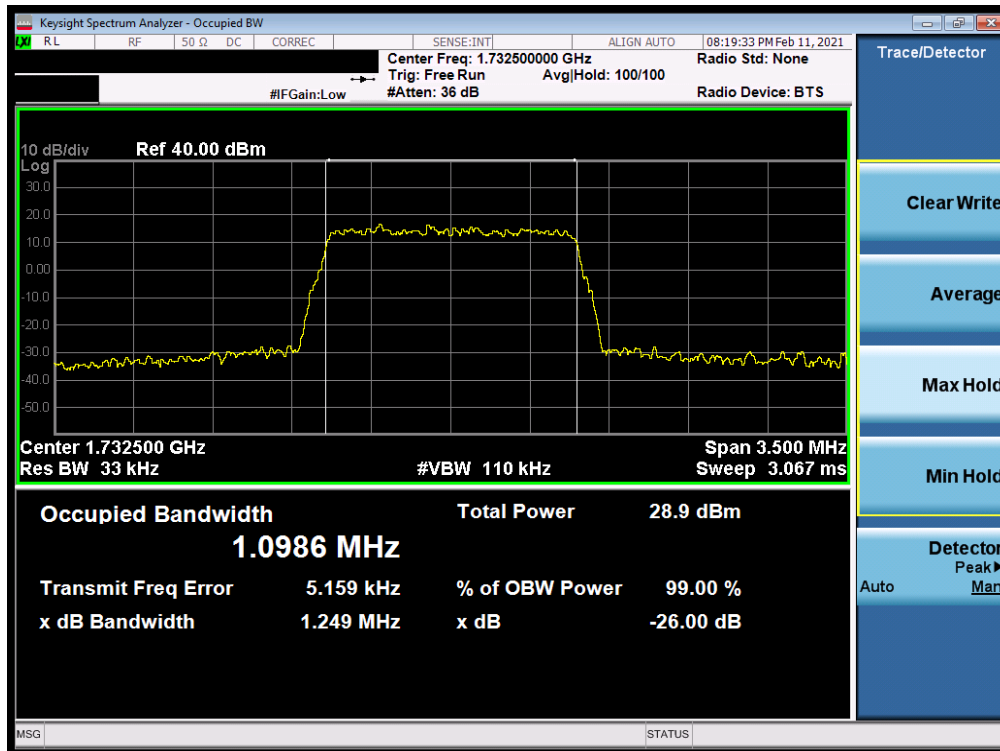


Plot 7-15. Occupied Bandwidth Plot (LTE Band 4 - 3MHz 64-QAM - Full RB Configuration)

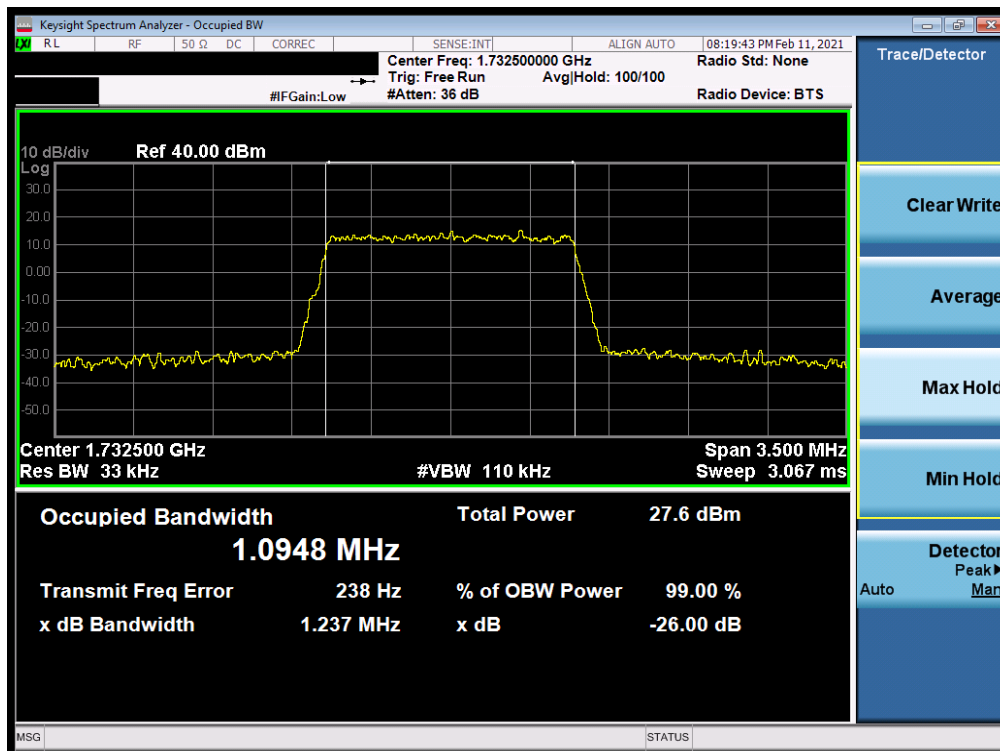


Plot 7-16. Occupied Bandwidth Plot (LTE Band 4 - 1.4MHz QPSK - Full RB Configuration)

| | | | | |
|---|--|-----------------------------------|----------------|-----------------------------------|
| FCC ID: A3LSMG998JPN | PCTEST Proud to be part of element | PART 27 MEASUREMENT REPORT | SAMSUNG | Approved by: Technical Manager |
| Test Report S/N: 1M2101110003-04.A3L | Test Dates: 1/17/2021 - 2/11/2021 | EUT Type: Portable Handset | | Page 19 of 83 |



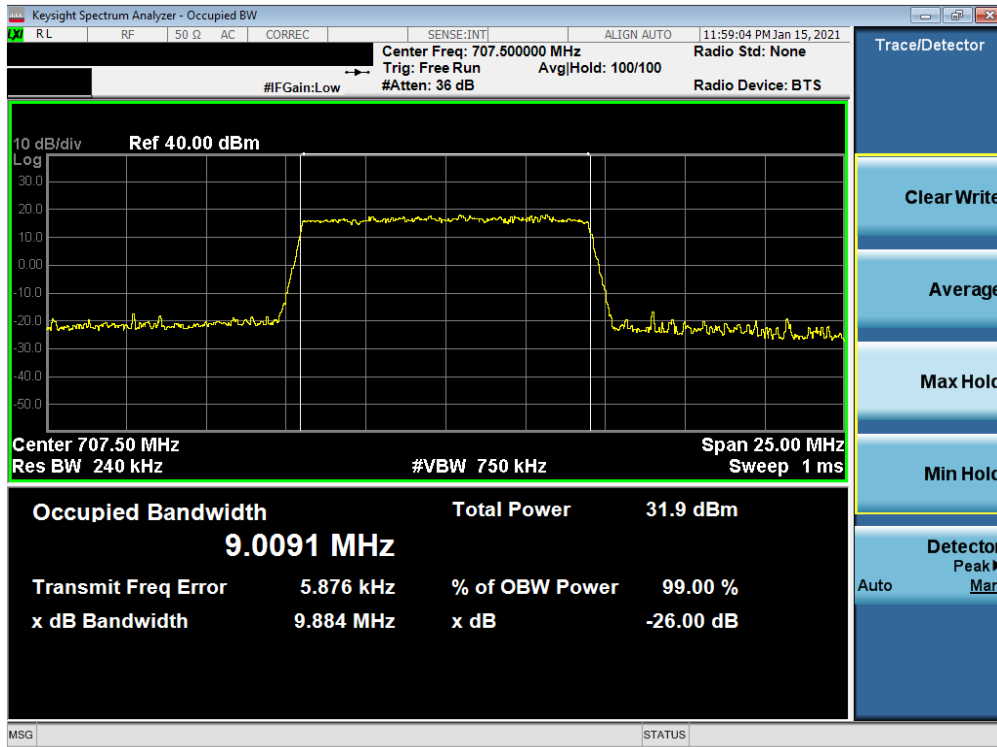
Plot 7-17. Occupied Bandwidth Plot (LTE Band 4 - 1.4MHz 16-QAM - Full RB Configuration)



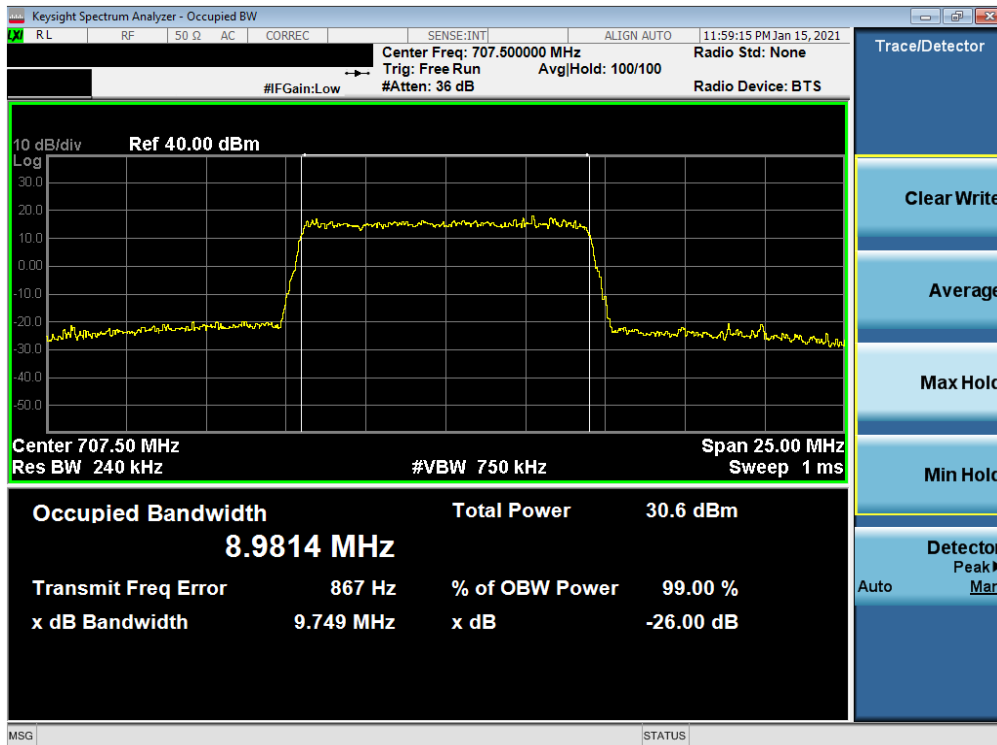
Plot 7-18. Occupied Bandwidth Plot (LTE Band 4 - 1.4MHz 64-QAM - Full RB Configuration)

| | | | | |
|---|--|-------------------------------|----------------|-----------------------------------|
| FCC ID: A3LSMG998JPN | PCTEST Proud to be part of element | PART 27 MEASUREMENT REPORT | SAMSUNG | Approved by: Technical Manager |
| Test Report S/N: 1M2101110003-04.A3L | Test Dates: 1/17/2021 - 2/11/2021 | EUT Type: Portable Handset | | Page 20 of 83 |

LTE Band 12

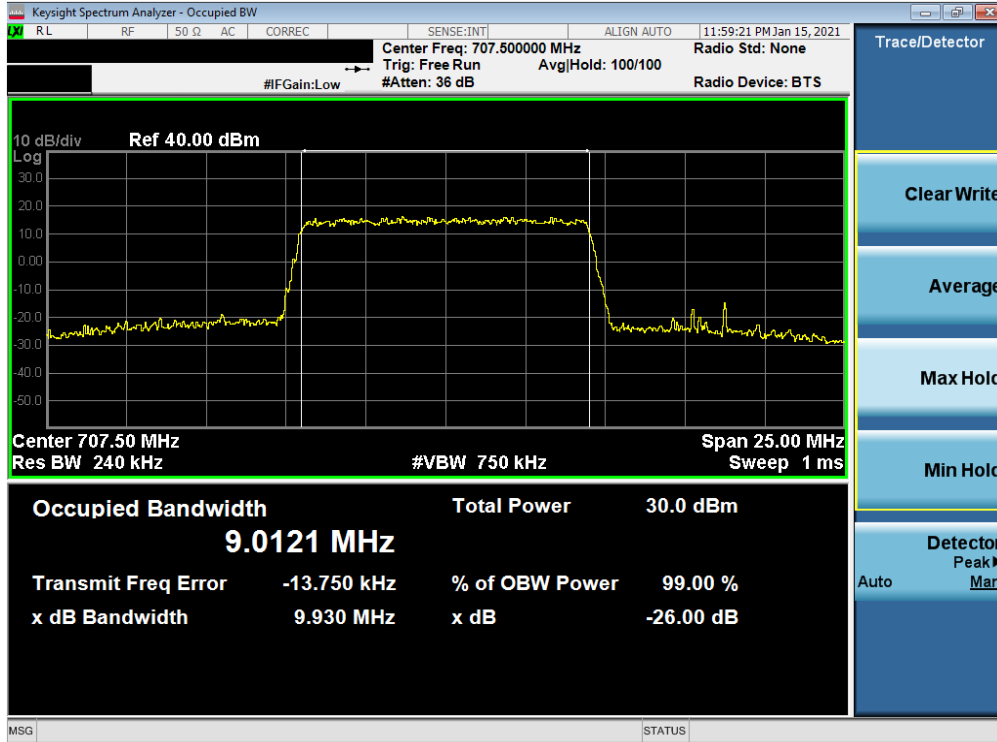


Plot 7-19. Occupied Bandwidth Plot (LTE Band 12 - 10MHz QPSK - Full RB)

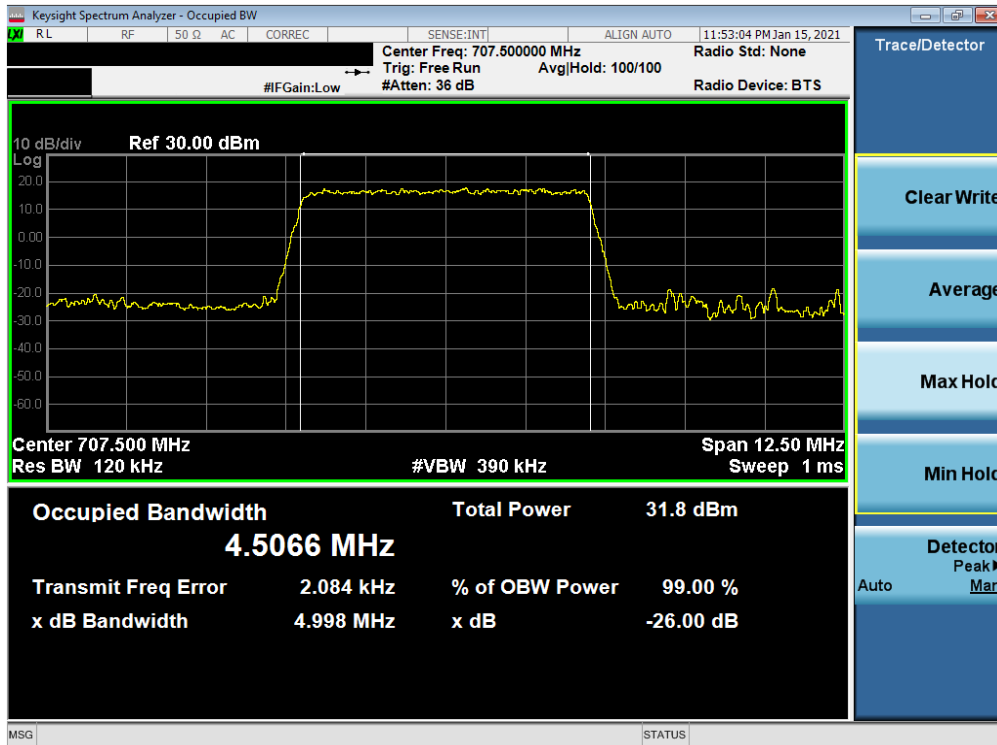


Plot 7-20. Occupied Bandwidth Plot (LTE Band 12 - 10MHz 16-QAM - Full RB)

| | | | |
|---|--|-----------------------------------|--|
| FCC ID: A3LSMG998JPN | PCTEST Proud to be part of element | PART 27 MEASUREMENT REPORT | Approved by: Technical Manager |
| Test Report S/N: 1M2101110003-04.A3L | Test Dates: 1/17/2021 - 2/11/2021 | EUT Type: Portable Handset | Page 21 of 83 |

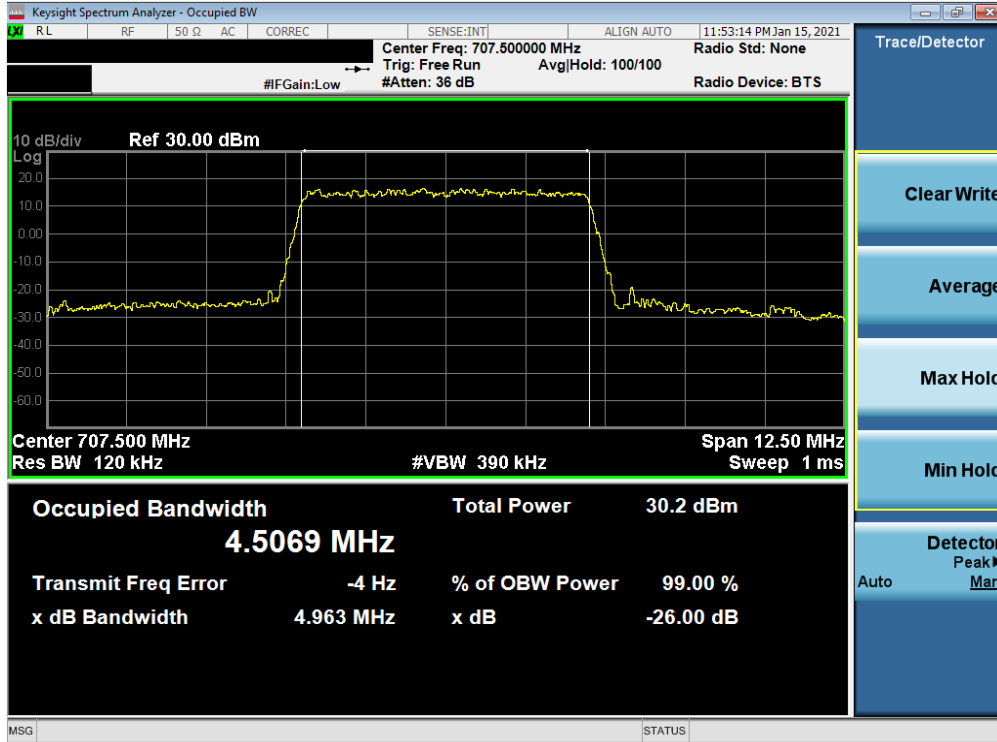


Plot 7-21. Occupied Bandwidth Plot (LTE Band 12 - 10MHz 64-QAM - Full RB)

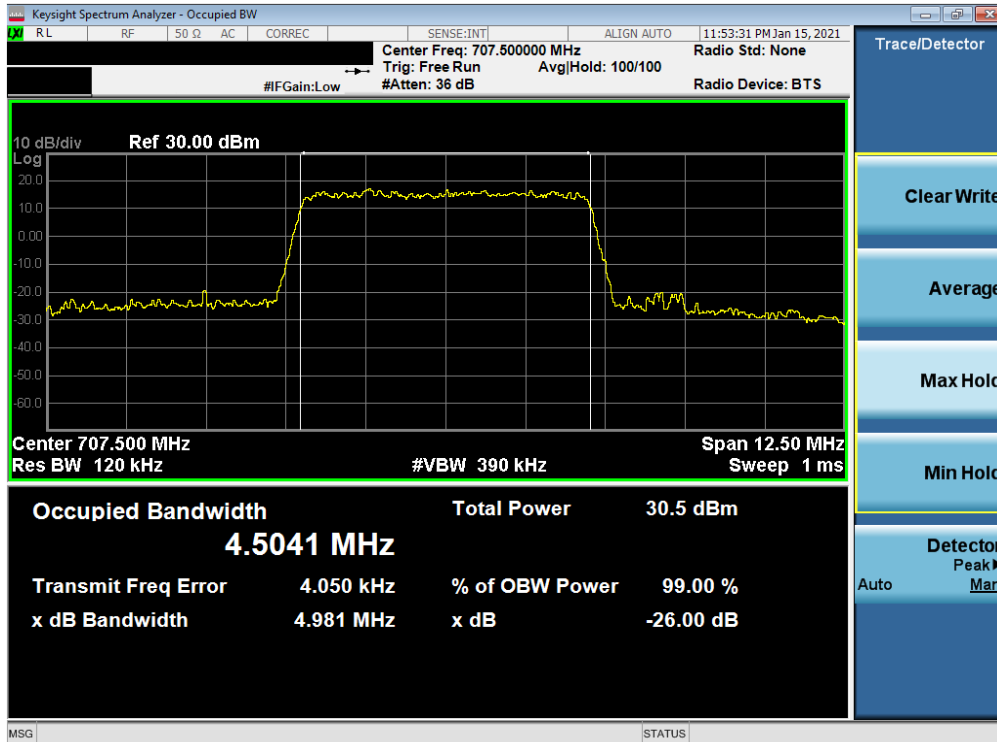


Plot 7-22. Occupied Bandwidth Plot (LTE Band 12 - 5MHz QPSK - Full RB)

| | | | | |
|---|--|-------------------------------|----------------|-----------------------------------|
| FCC ID: A3LSMG998JPN | PCTEST Proud to be part of element | PART 27 MEASUREMENT REPORT | SAMSUNG | Approved by: Technical Manager |
| Test Report S/N: 1M2101110003-04.A3L | Test Dates: 1/17/2021 - 2/11/2021 | EUT Type: Portable Handset | | Page 22 of 83 |

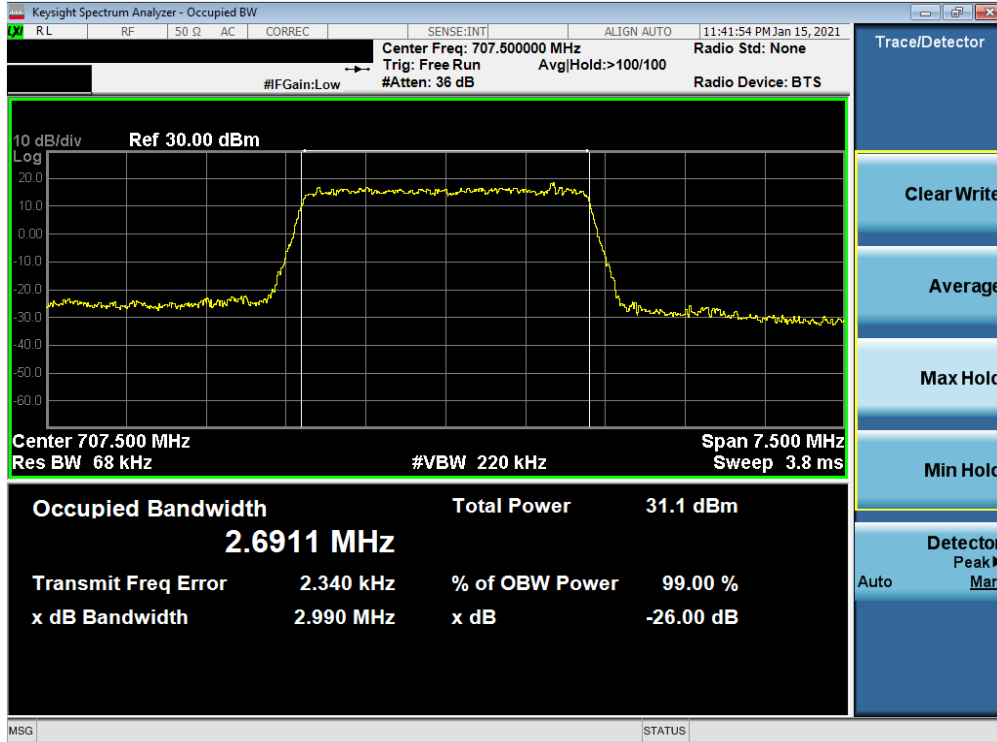


Plot 7-23. Occupied Bandwidth Plot (LTE Band 12 - 5MHz 16-QAM - Full RB)

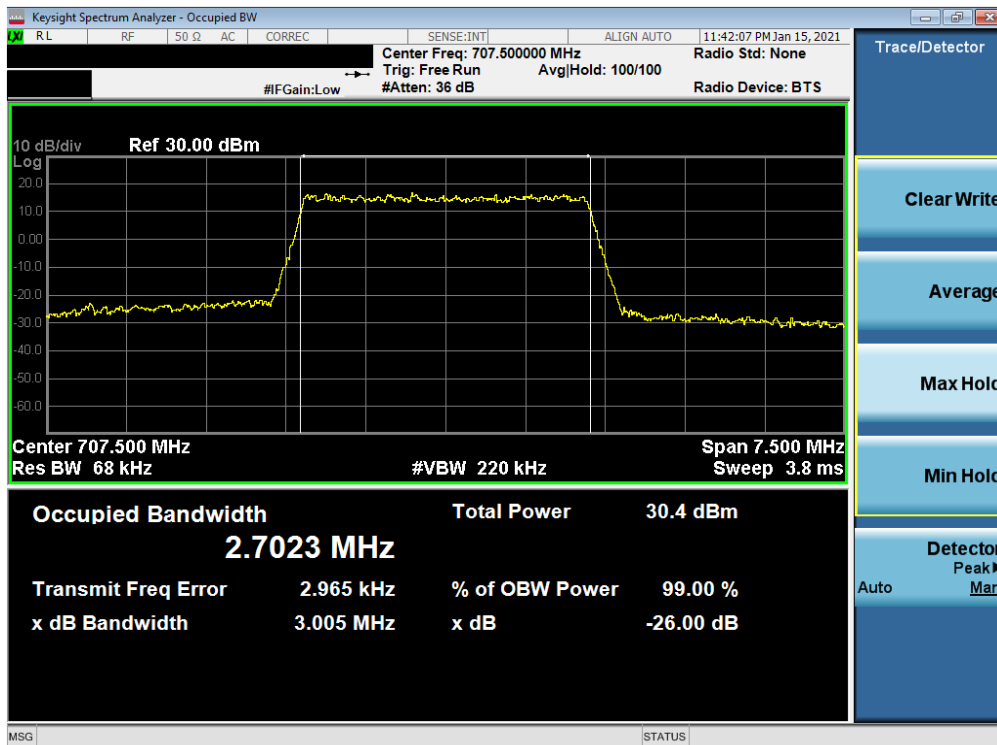


Plot 7-24. Occupied Bandwidth Plot (LTE Band 12 - 5MHz 64-QAM - Full RB)

| | | | |
|---|--|-----------------------------------|--|
| FCC ID: A3LSMG998JPN | PCTEST Proud to be part of element | PART 27 MEASUREMENT REPORT | Approved by: Technical Manager |
| Test Report S/N: 1M2101110003-04.A3L | Test Dates: 1/17/2021 - 2/11/2021 | EUT Type: Portable Handset | Page 23 of 83 |

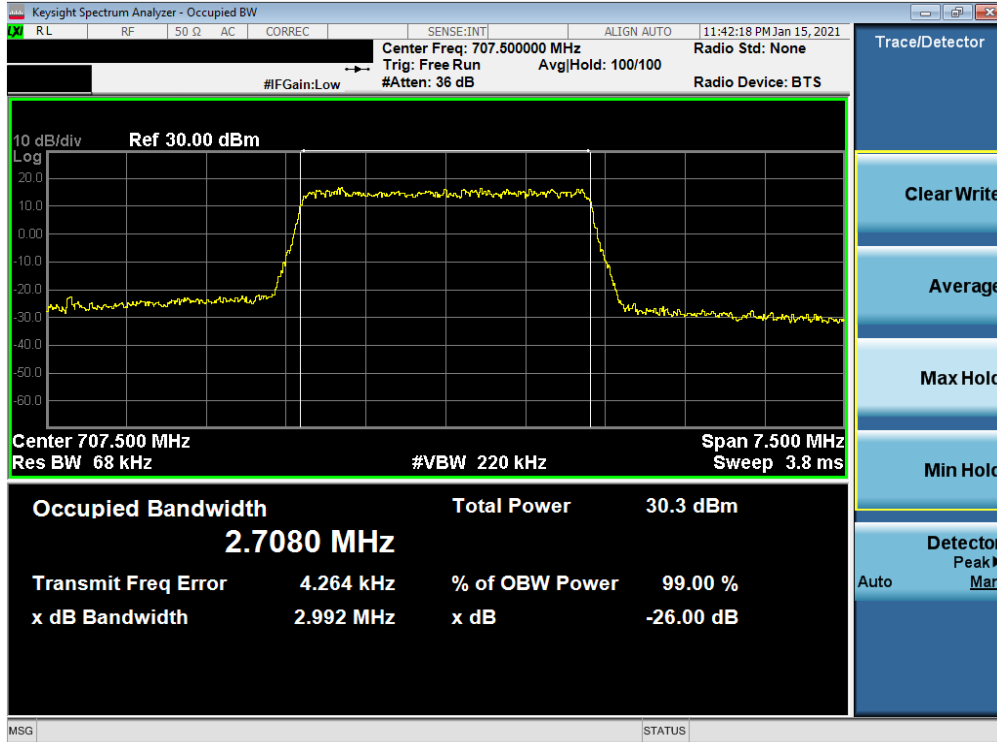


Plot 7-25. Occupied Bandwidth Plot (LTE Band 12 - 3MHz QPSK - Full RB)

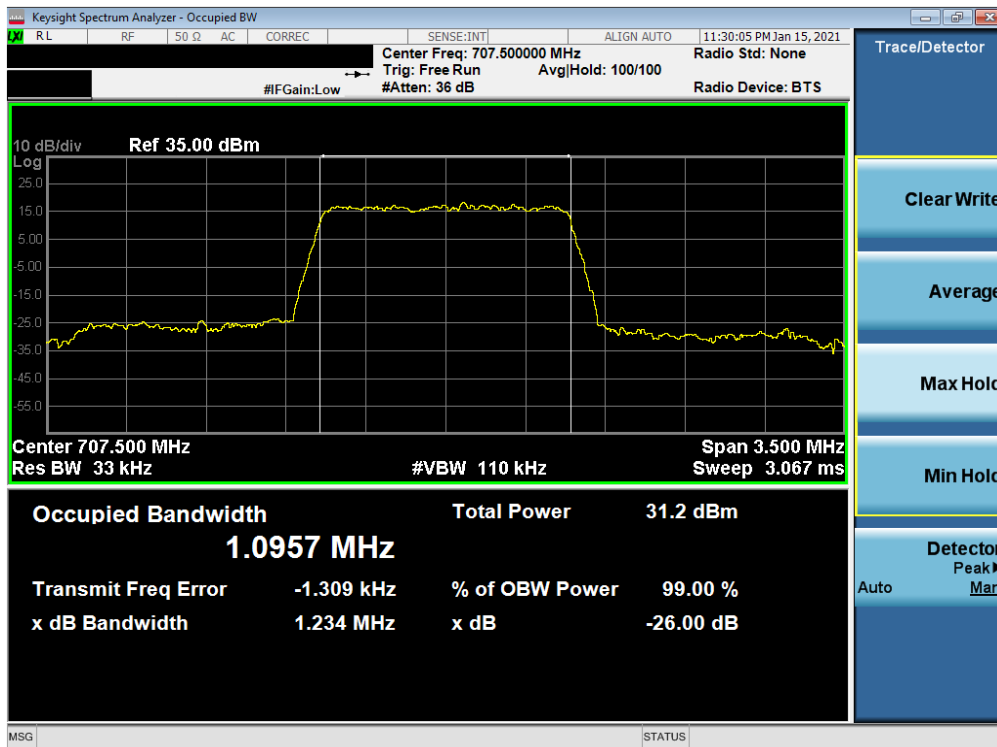


Plot 7-26. Occupied Bandwidth Plot (LTE Band 12 - 3MHz 16-QAM - Full RB)

| | | | | |
|---|--|-------------------------------|----------------|-----------------------------------|
| FCC ID: A3LSMG998JPN | PCTEST Proud to be part of element | PART 27 MEASUREMENT REPORT | SAMSUNG | Approved by: Technical Manager |
| Test Report S/N: 1M2101110003-04.A3L | Test Dates: 1/17/2021 - 2/11/2021 | EUT Type: Portable Handset | | Page 24 of 83 |

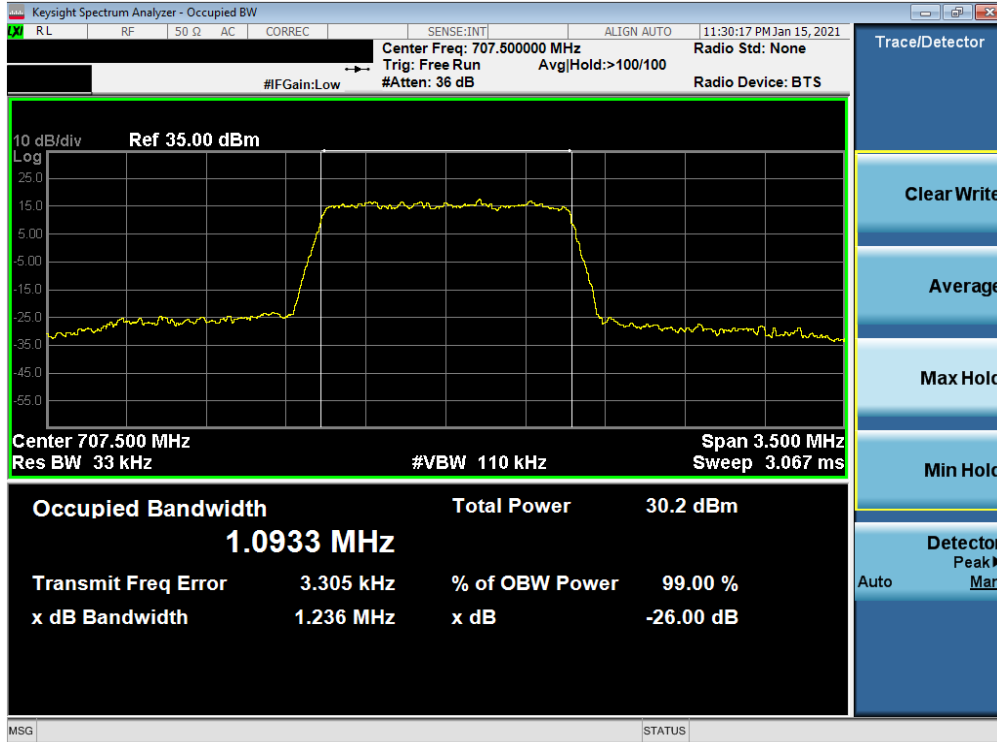


Plot 7-27. Occupied Bandwidth Plot (LTE Band 12 - 3MHz 64-QAM - Full RB)

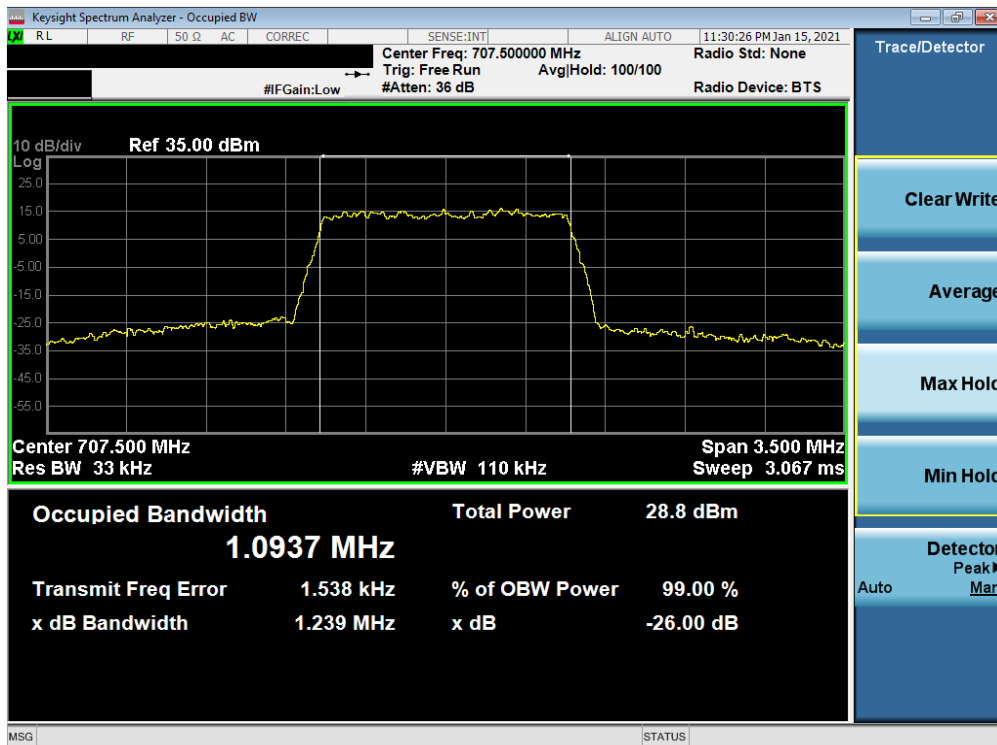


Plot 7-28. Occupied Bandwidth Plot (LTE Band 12 - 1.4MHz QPSK - Full RB)

| | | | | |
|---|--|-------------------------------|----------------|-----------------------------------|
| FCC ID: A3LSMG998JPN | PCTEST Proud to be part of element | PART 27 MEASUREMENT REPORT | SAMSUNG | Approved by: Technical Manager |
| Test Report S/N: 1M2101110003-04.A3L | Test Dates: 1/17/2021 - 2/11/2021 | EUT Type: Portable Handset | | Page 25 of 83 |



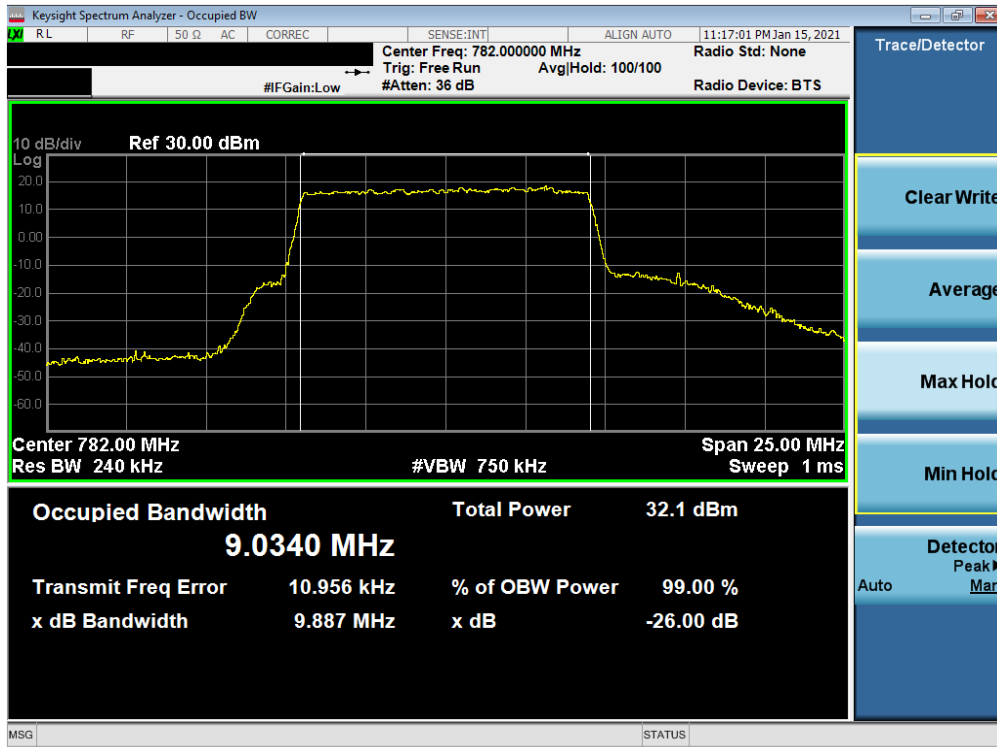
Plot 7-29. Occupied Bandwidth Plot (LTE Band 12 – 1.4MHz 16-QAM - Full RB)



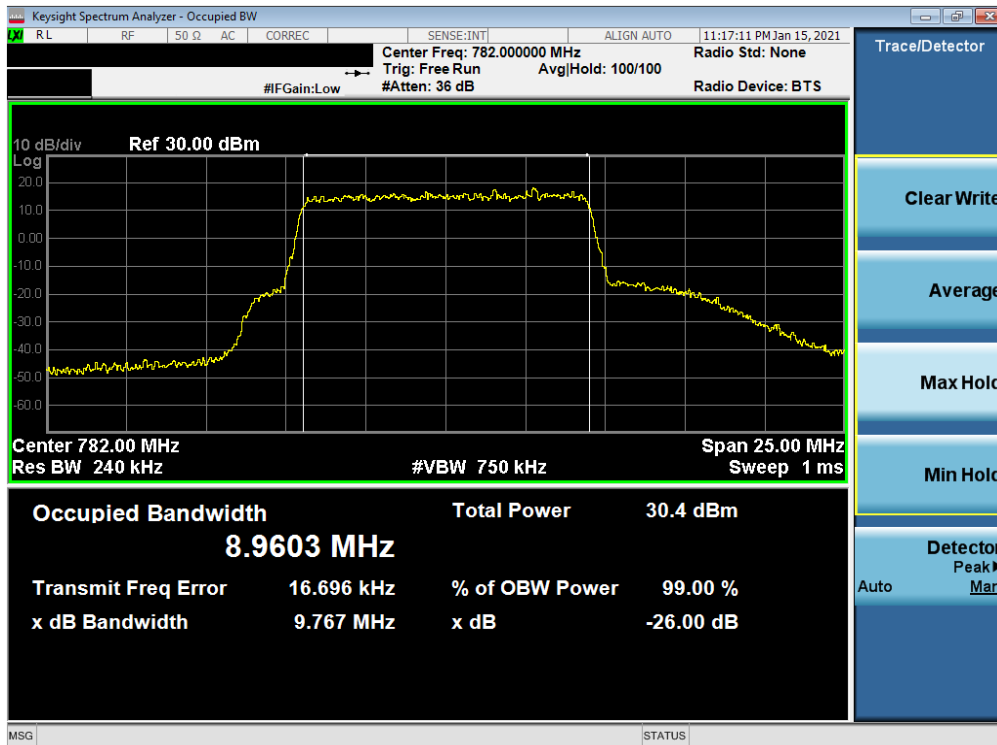
Plot 7-30. Occupied Bandwidth Plot (LTE Band 12 – 1.4MHz 64-QAM - Full RB)

| | | | |
|---|--|-----------------------------------|--|
| FCC ID: A3LSMG998JPN | PCTEST Proud to be part of element | PART 27 MEASUREMENT REPORT | Approved by: Technical Manager |
| Test Report S/N: 1M2101110003-04.A3L | Test Dates: 1/17/2021 - 2/11/2021 | EUT Type: Portable Handset | Page 26 of 83 |

LTE Band 13

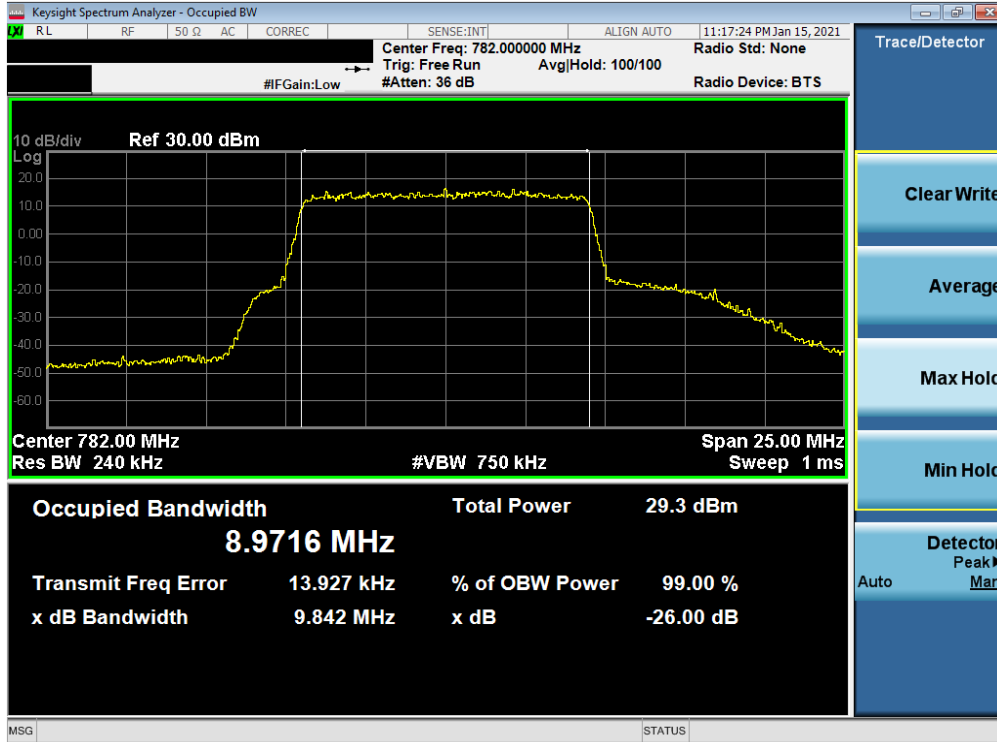


Plot 7-31. Occupied Bandwidth Plot (LTE Band 13 - 10MHz QPSK - Full RB)

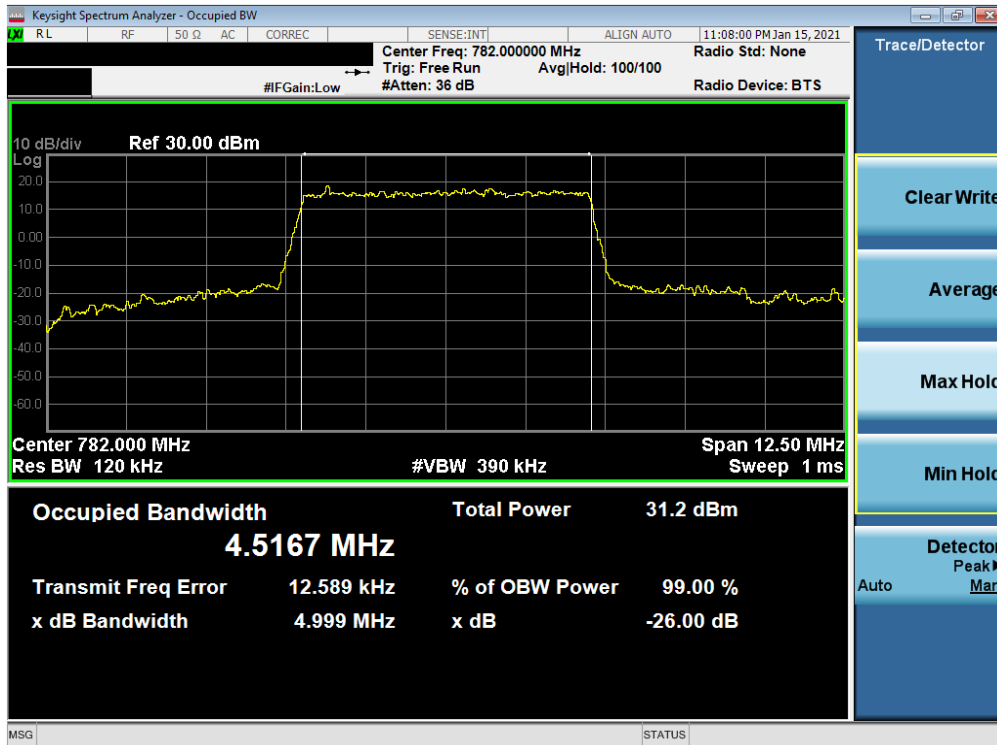


Plot 7-32. Occupied Bandwidth Plot (LTE Band 13 - 10MHz 16-QAM - Full RB)

| | | | | |
|---|--|-----------------------------------|----------------|-----------------------------------|
| FCC ID: A3LSMG998JPN | PCTEST Proud to be part of element | PART 27 MEASUREMENT REPORT | SAMSUNG | Approved by: Technical Manager |
| Test Report S/N: 1M2101110003-04.A3L | Test Dates: 1/17/2021 - 2/11/2021 | EUT Type: Portable Handset | | Page 27 of 83 |

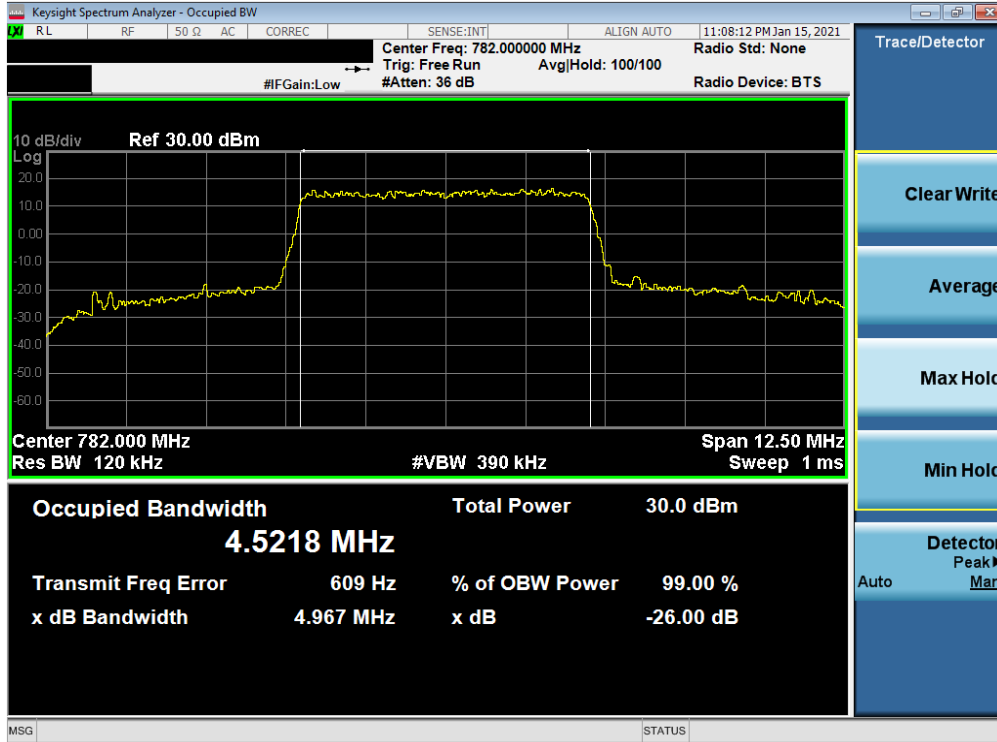


Plot 7-33. Occupied Bandwidth Plot (LTE Band 13 - 10MHz 64-QAM - Full RB)

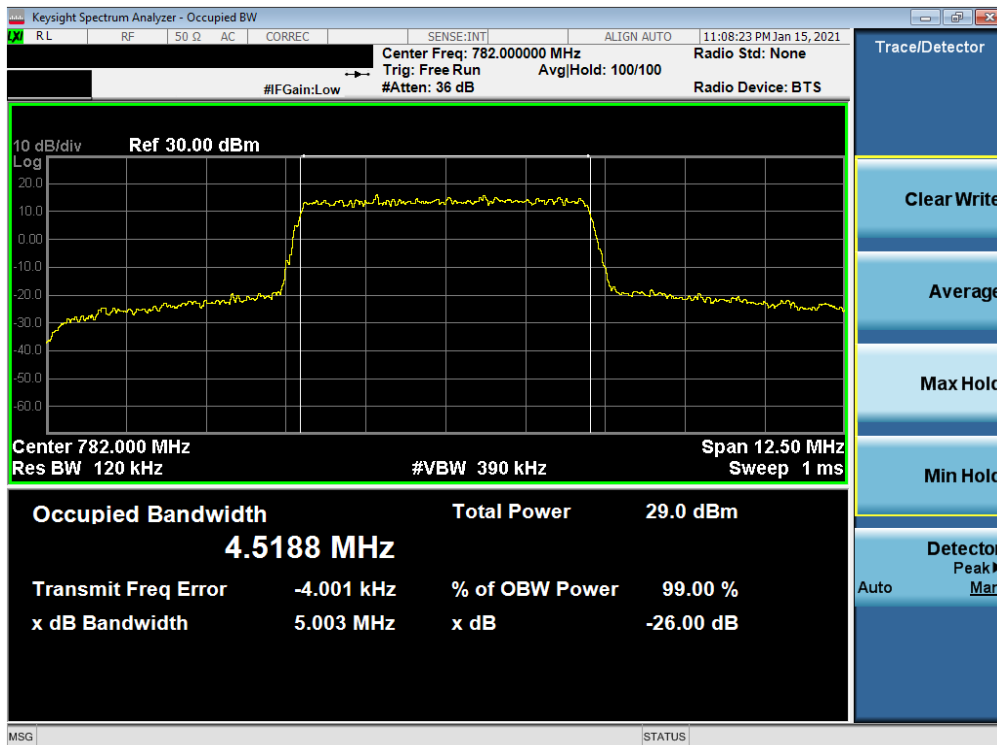


Plot 7-34. Occupied Bandwidth Plot (LTE Band 13 - 5MHz QPSK - Full RB)

| | | | | |
|---|--|-------------------------------|----------------|-----------------------------------|
| FCC ID: A3LSMG998JPN | PCTEST Proud to be part of element | PART 27 MEASUREMENT REPORT | SAMSUNG | Approved by: Technical Manager |
| Test Report S/N: 1M2101110003-04.A3L | Test Dates: 1/17/2021 - 2/11/2021 | EUT Type: Portable Handset | | Page 28 of 83 |



Plot 7-35. Occupied Bandwidth Plot (LTE Band 13 - 5MHz 16-QAM - Full RB)



Plot 7-36. Occupied Bandwidth Plot (LTE Band 13 - 5MHz 64-QAM - Full RB)

| | | | | |
|---|--|-------------------------------|----------------|-----------------------------------|
| FCC ID: A3LSMG998JPN | PCTEST Proud to be part of element | PART 27 MEASUREMENT REPORT | SAMSUNG | Approved by: Technical Manager |
| Test Report S/N: 1M2101110003-04.A3L | Test Dates: 1/17/2021 - 2/11/2021 | EUT Type: Portable Handset | | Page 29 of 83 |

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

KDB 971168 D01 v03r01 – Section 6.0

Test Settings

1. Start frequency was set to 30MHz and stop frequency was set to 18GHz (separated into at least two plots per channel)
2. RBW \geq 100kHz
3. VBW \geq 3 x RBW
4. Detector = RMS
5. Trace mode = max hold
6. Sweep time = auto couple
7. The trace was allowed to stabilize

Test Setup

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

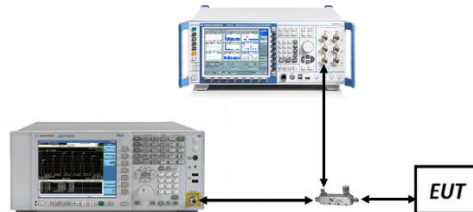


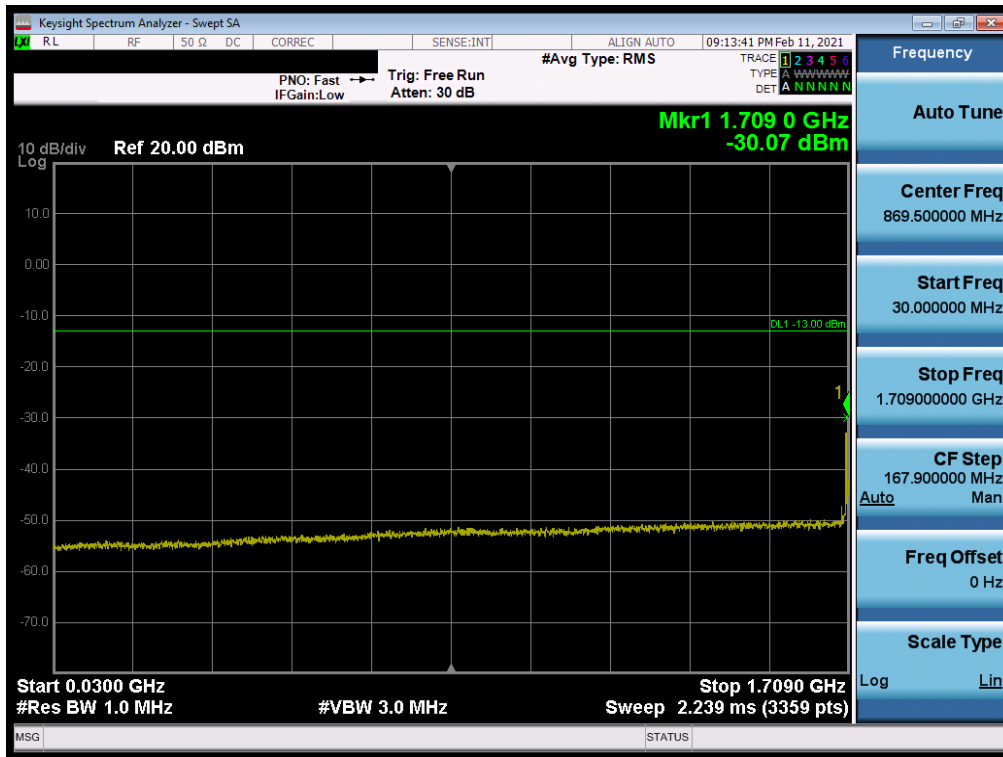
Figure 7-2. Test Instrument & Measurement Setup

Test Notes

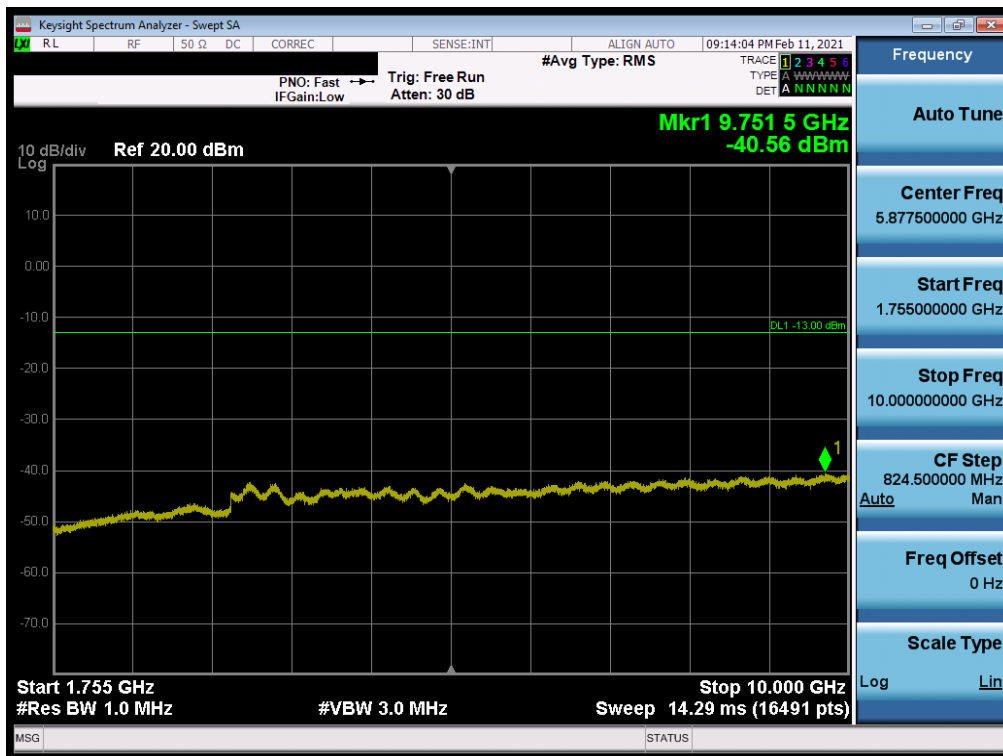
Per Part 27 and RSS-139, compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth 100 kHz or greater for measurements below 1GHz. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth 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: A3LSMG998JPN | PCTEST Proud to be part of element | PART 27 MEASUREMENT REPORT | Approved by: Technical Manager |
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LTE Band 4

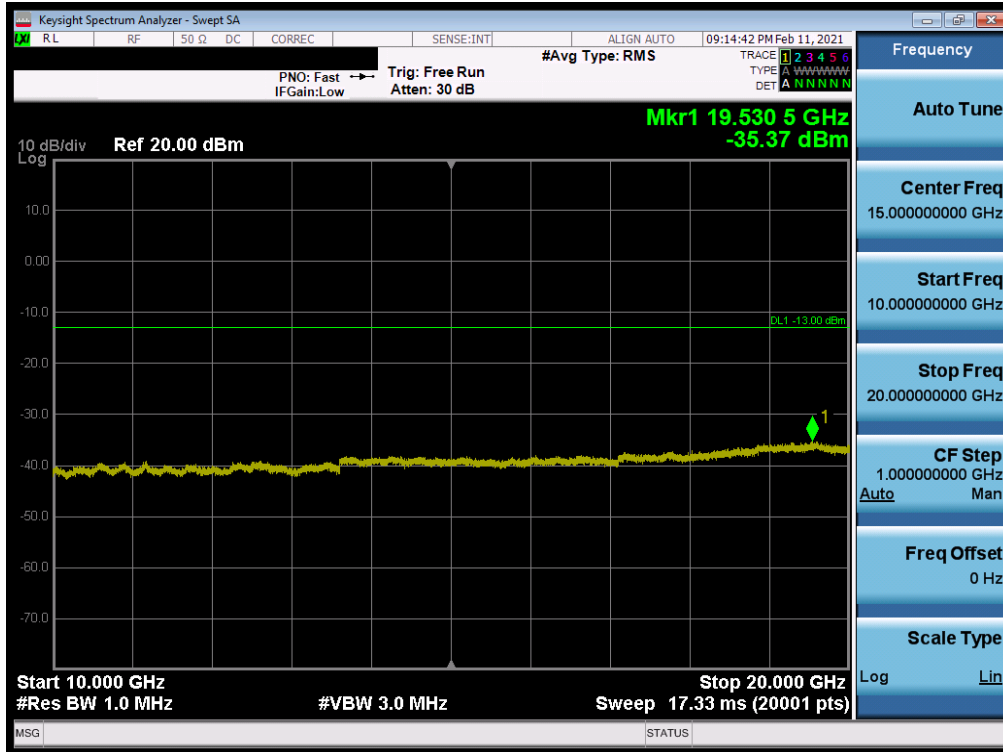


Plot 7-37. Conducted Spurious Plot (LTE Band 4 - 20MHz QPSK - RB Size 1, RB Offset 0-Low Channel)

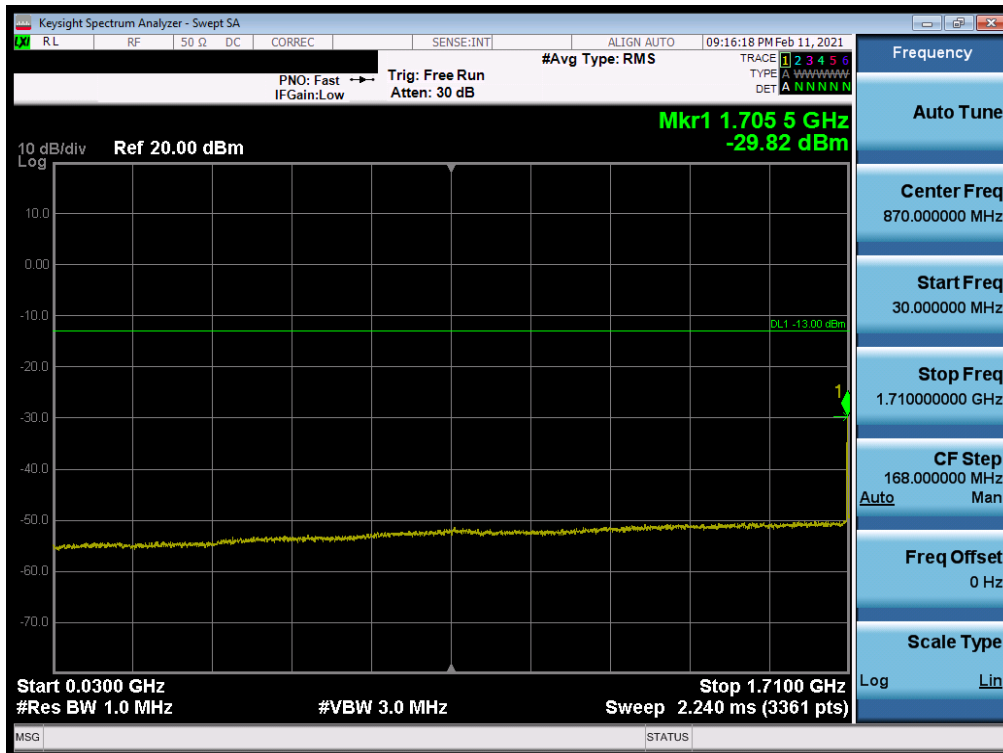


Plot 7-38. Conducted Spurious Plot (LTE Band 4 - 20MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)

| | | | | |
|---|---------------------------------------|-------------------------------|---------|-----------------------------------|
| FCC ID: A3LSMG998JPN | PCTEST Proud to be part of element | PART 27 MEASUREMENT REPORT | SAMSUNG | Approved by: Technical Manager |
| Test Report S/N: 1M2101110003-04.A3L | Test Dates: 1/17/2021 - 2/11/2021 | EUT Type: Portable Handset | | Page 31 of 83 |

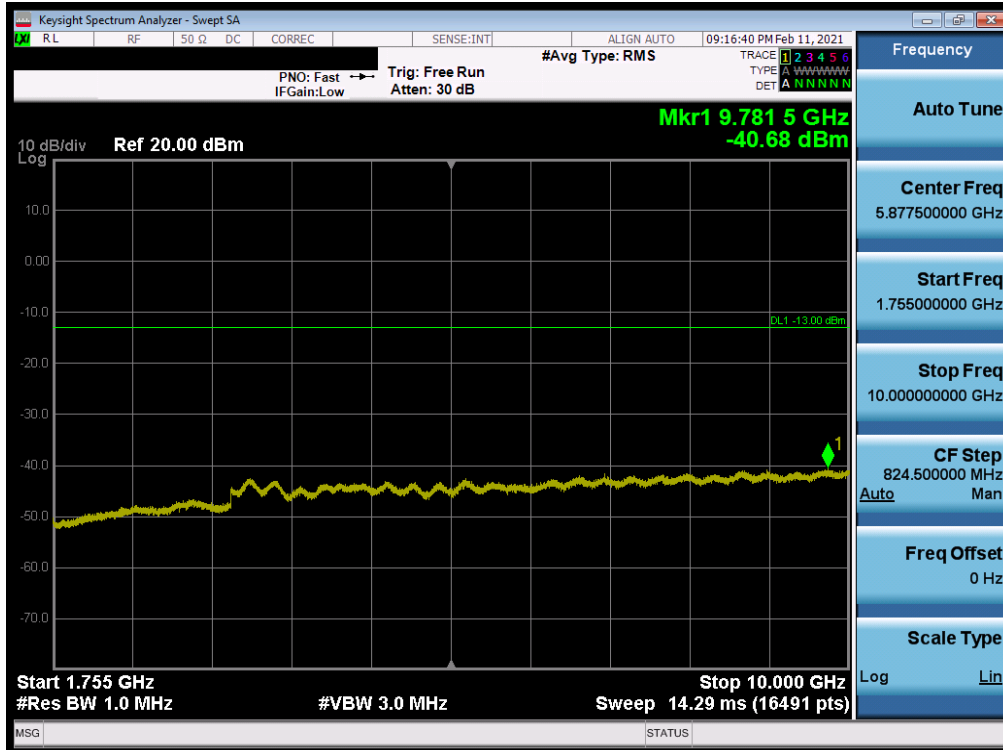


Plot 7-39. Conducted Spurious Plot (LTE Band 4 - 20MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)

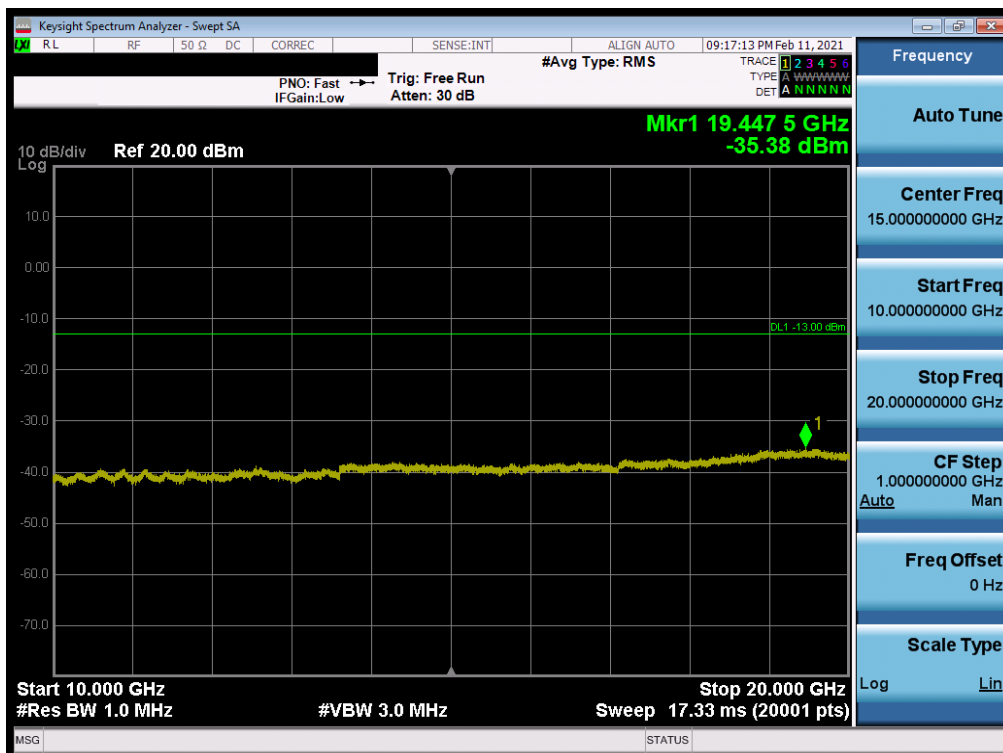


Plot 7-40. Conducted Spurious Plot (LTE Band 4 - 20MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

| | | | | |
|---|--|-------------------------------|----------------|-----------------------------------|
| FCC ID: A3LSMG998JPN | PCTEST Proud to be part of element | PART 27 MEASUREMENT REPORT | SAMSUNG | Approved by: Technical Manager |
| Test Report S/N: 1M2101110003-04.A3L | Test Dates: 1/17/2021 - 2/11/2021 | EUT Type: Portable Handset | | Page 32 of 83 |

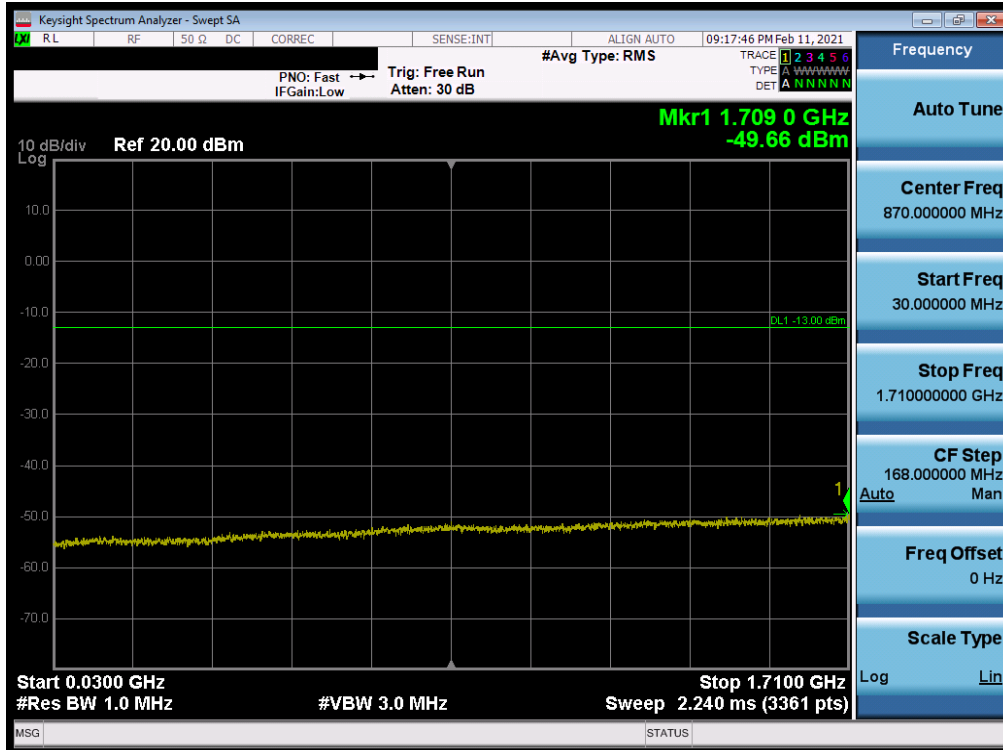


Plot 7-41. Conducted Spurious Plot (LTE Band 4 - 20MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

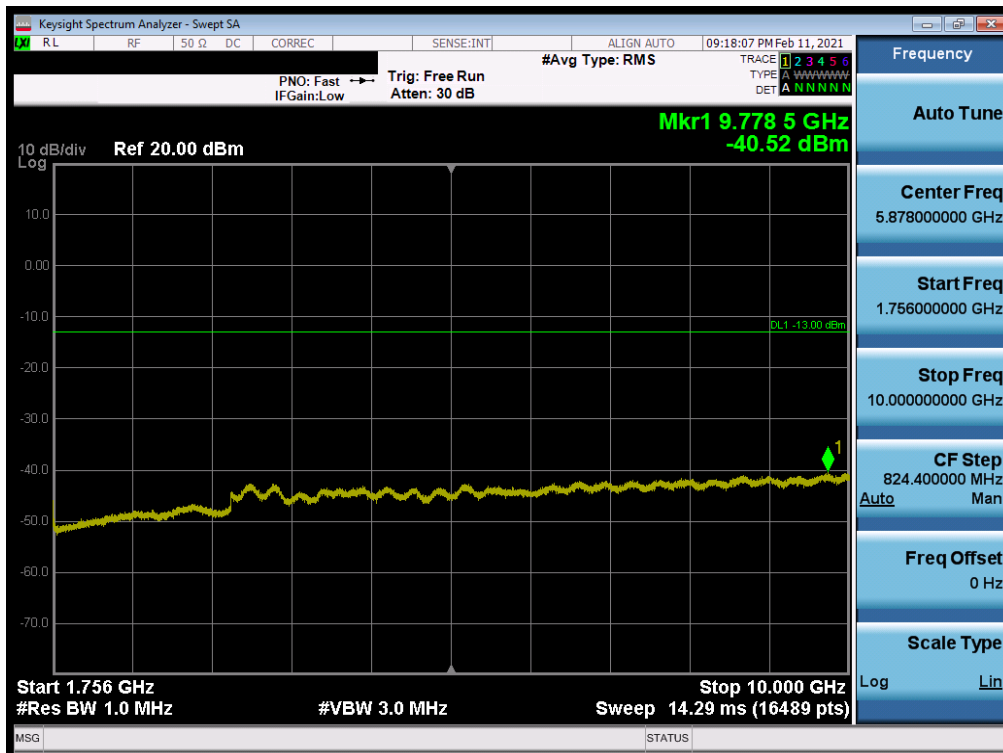


Plot 7-42. Conducted Spurious Plot (LTE Band 4 - 20MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

| | | | | |
|---|---------------------------------------|-------------------------------|---------|-----------------------------------|
| FCC ID: A3LSMG998JPN | PCTEST Proud to be part of element | PART 27 MEASUREMENT REPORT | SAMSUNG | Approved by: Technical Manager |
| Test Report S/N: 1M2101110003-04.A3L | Test Dates: 1/17/2021 - 2/11/2021 | EUT Type: Portable Handset | | Page 33 of 83 |

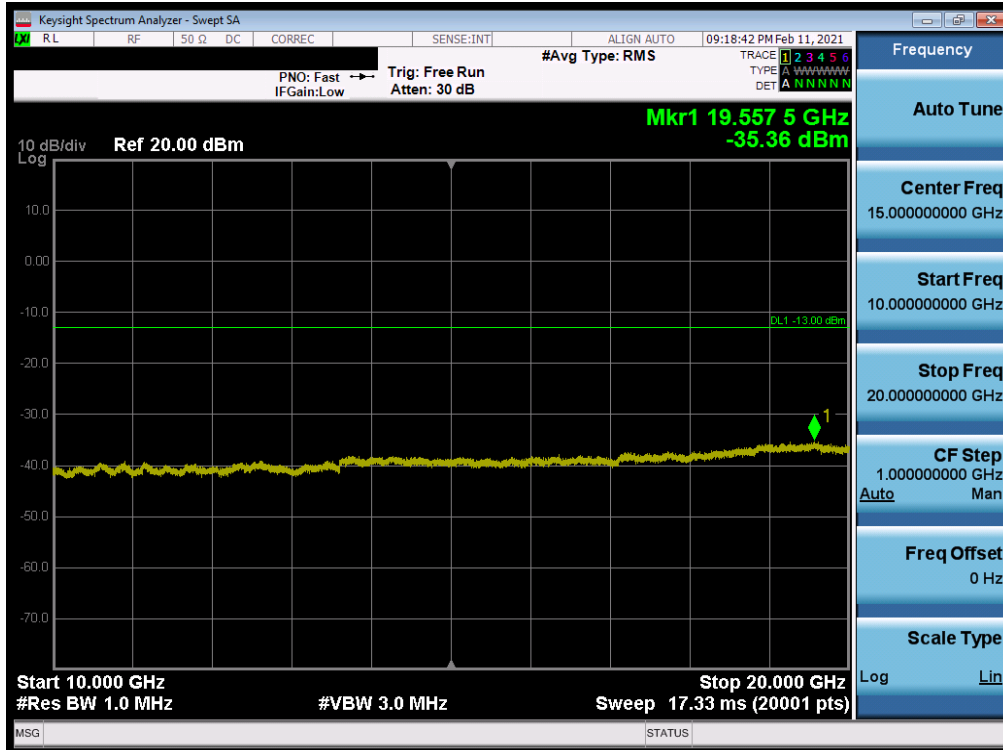


Plot 7-43. Conducted Spurious Plot (LTE Band 4 - 20MHz QPSK - RB Size 1, RB Offset 0 - High Channel)



Plot 7-44. Conducted Spurious Plot (LTE Band 4 - 20MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

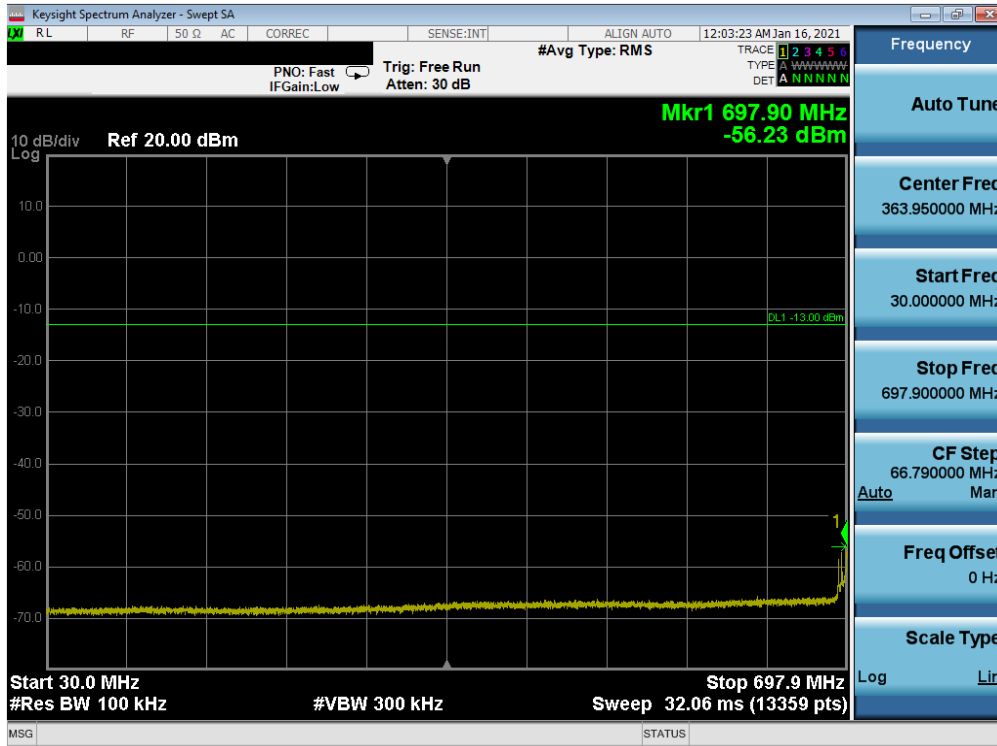
| | | | | |
|---|---------------------------------------|-------------------------------|---------|-----------------------------------|
| FCC ID: A3LSMG998JPN | PCTEST Proud to be part of element | PART 27 MEASUREMENT REPORT | SAMSUNG | Approved by: Technical Manager |
| Test Report S/N: 1M2101110003-04.A3L | Test Dates: 1/17/2021 - 2/11/2021 | EUT Type: Portable Handset | | Page 34 of 83 |



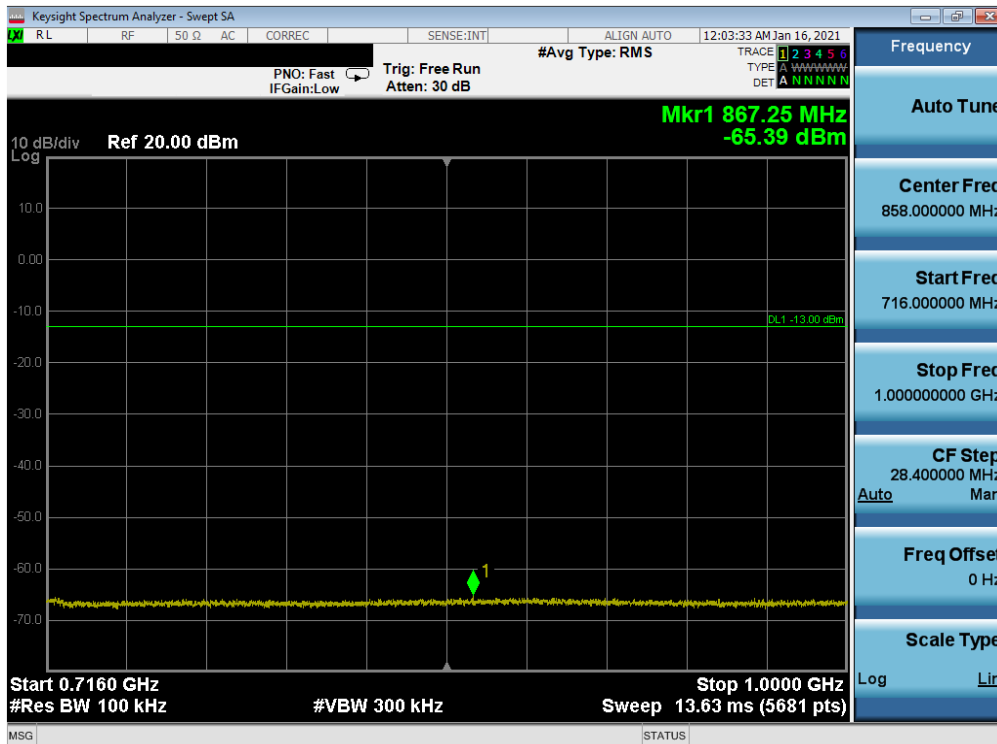
Plot 7-45. Conducted Spurious Plot (LTE Band 4 - 20MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

| | | | | |
|---|--|-----------------------------------|--|-----------------------------------|
| FCC ID: A3LSMG998JPN | PCTEST Proud to be part of element | PART 27 MEASUREMENT REPORT | | Approved by: Technical Manager |
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LTE Band 12

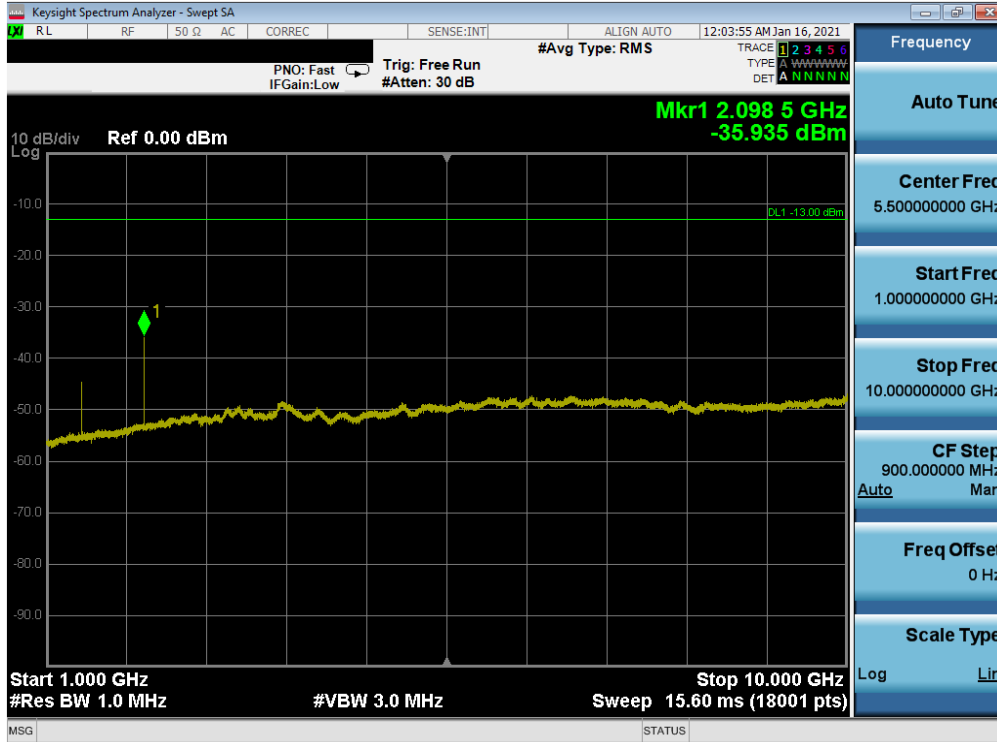


Plot 7-46. Conducted Spurious Plot (LTE Band 12 - 10MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)

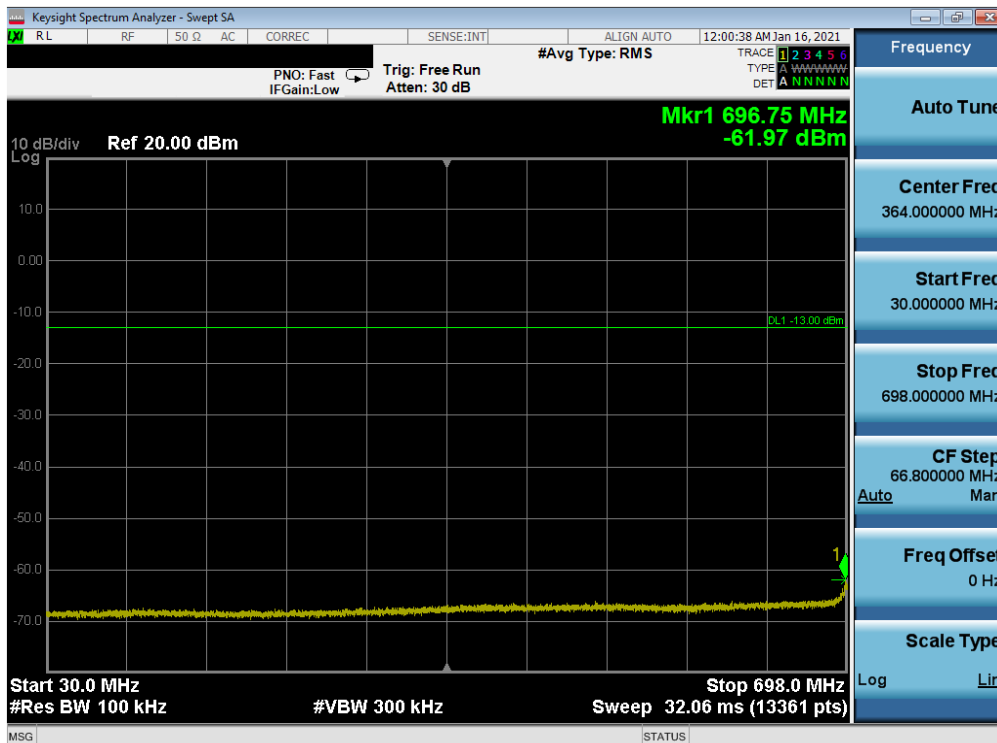


Plot 7-47. Conducted Spurious Plot (LTE Band 12 - 10MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)

| | | | | |
|---|--|-------------------------------|----------------|-----------------------------------|
| FCC ID: A3LSMG998JPN | PCTEST Proud to be part of element | PART 27 MEASUREMENT REPORT | SAMSUNG | Approved by: Technical Manager |
| Test Report S/N: 1M2101110003-04.A3L | Test Dates: 1/17/2021 - 2/11/2021 | EUT Type: Portable Handset | | Page 36 of 83 |

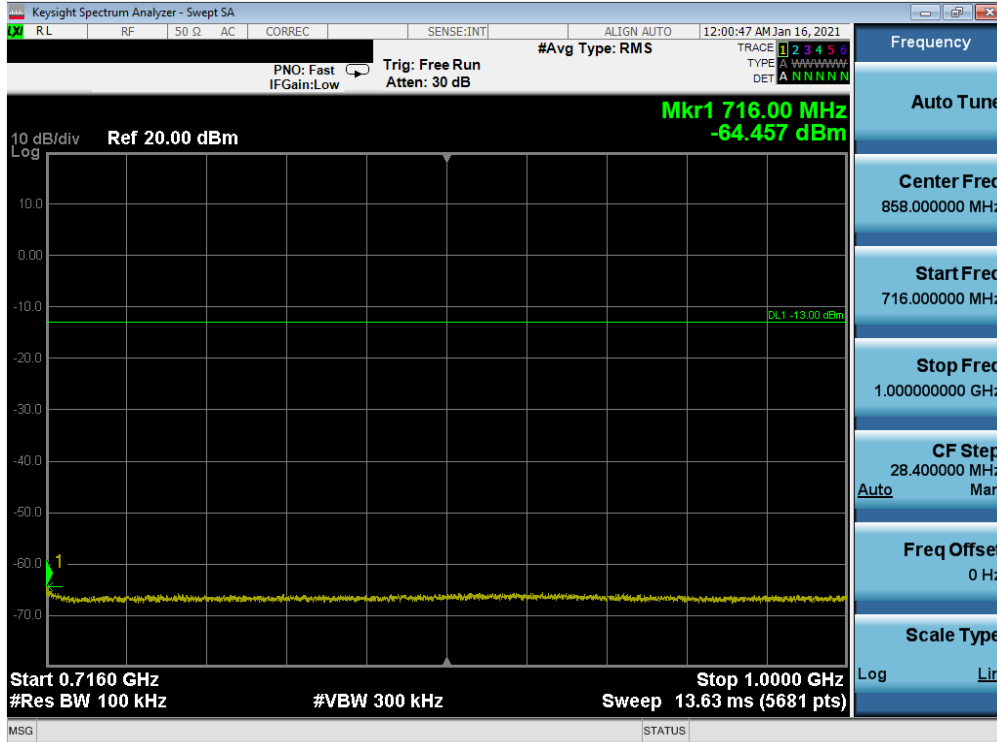


Plot 7-48. Conducted Spurious Plot (LTE Band 12 - 10MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)

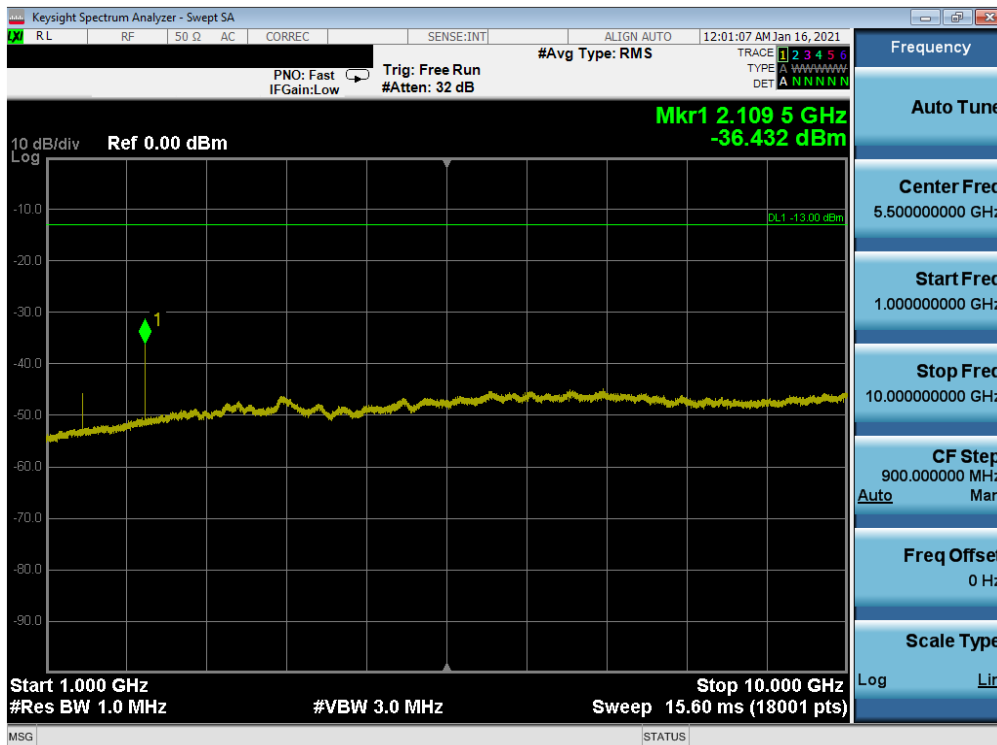


Plot 7-49. Conducted Spurious Plot (LTE Band 12 - 10MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

| | | | | |
|---|--|-------------------------------|----------------|-----------------------------------|
| FCC ID: A3LSMG998JPN | PCTEST Proud to be part of element | PART 27 MEASUREMENT REPORT | SAMSUNG | Approved by: Technical Manager |
| Test Report S/N: 1M2101110003-04.A3L | Test Dates: 1/17/2021 - 2/11/2021 | EUT Type: Portable Handset | | Page 37 of 83 |

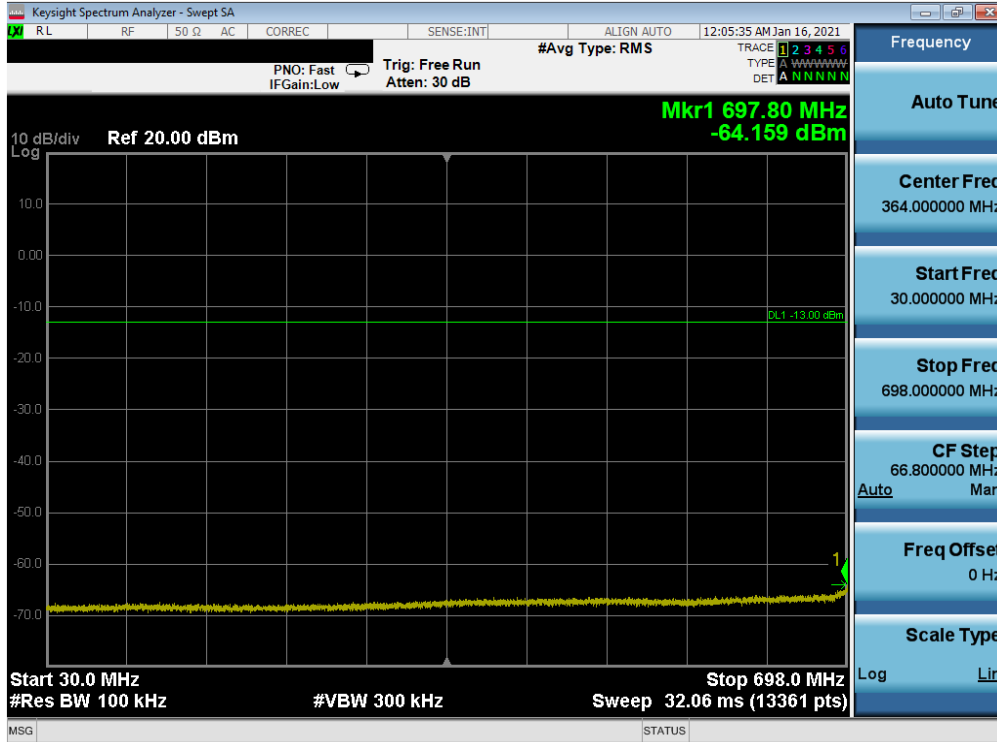


Plot 7-50. Conducted Spurious Plot (LTE Band 12 - 10MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

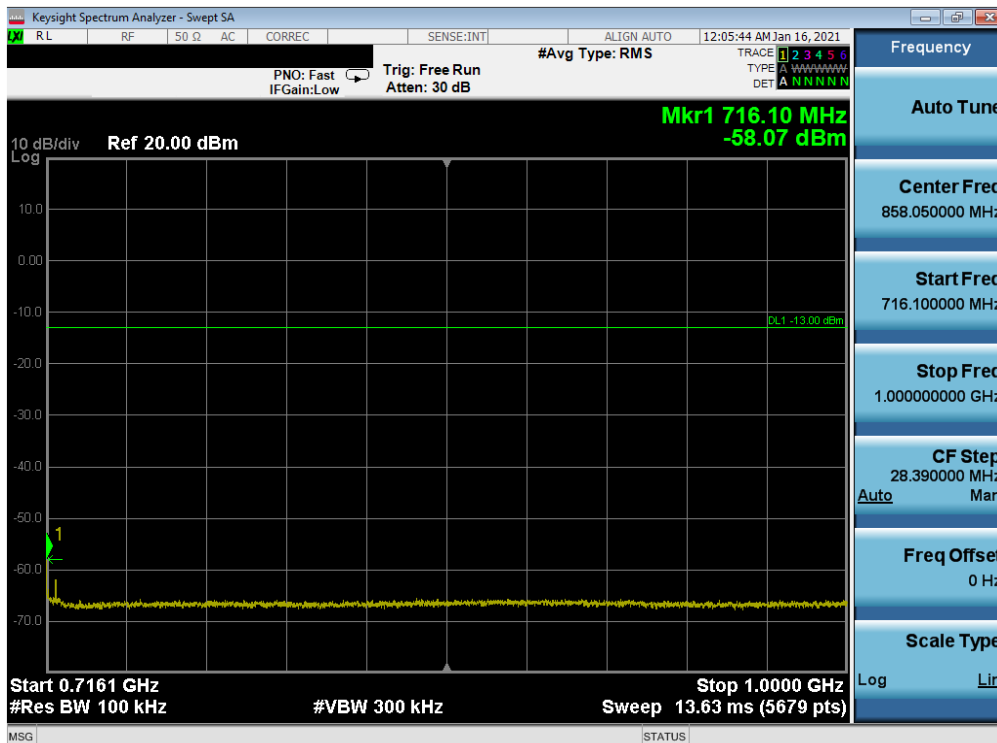


Plot 7-51. Conducted Spurious Plot (LTE Band 12 - 10MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

| | | | | |
|---|---------------------------------------|-------------------------------|---------|-----------------------------------|
| FCC ID: A3LSMG998JPN | PCTEST Proud to be part of element | PART 27 MEASUREMENT REPORT | SAMSUNG | Approved by: Technical Manager |
| Test Report S/N: 1M2101110003-04.A3L | Test Dates: 1/17/2021 - 2/11/2021 | EUT Type: Portable Handset | | Page 38 of 83 |

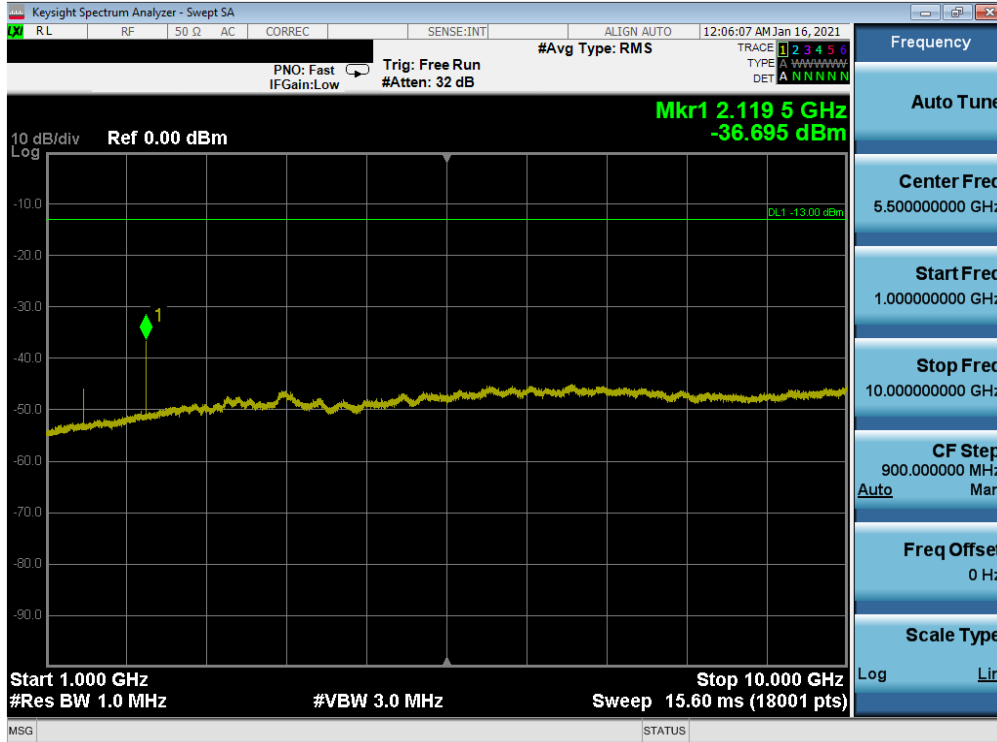


Plot 7-52. Conducted Spurious Plot (LTE Band 12 - 10MHz QPSK - RB Size 1, RB Offset 0 - High Channel)



Plot 7-53. Conducted Spurious Plot (LTE Band 12 - 10MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

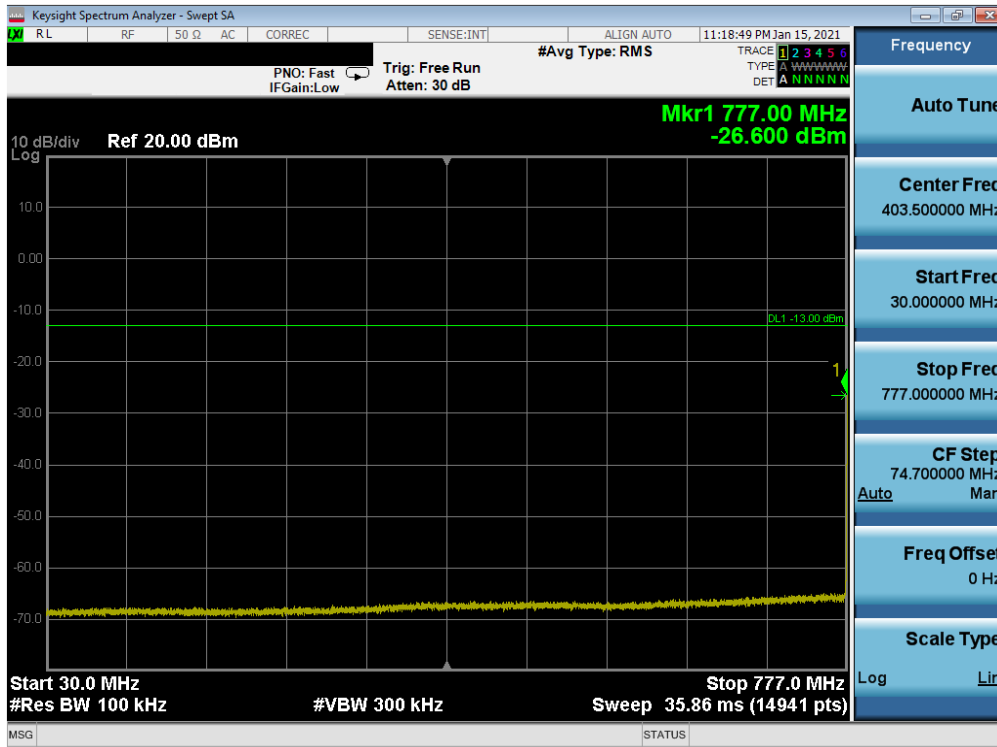
| | | | | |
|---|--|-----------------------------------|--|-----------------------------------|
| FCC ID: A3LSMG998JPN | PCTEST Proud to be part of element | PART 27 MEASUREMENT REPORT | | Approved by: Technical Manager |
| Test Report S/N: 1M2101110003-04.A3L | Test Dates: 1/17/2021 - 2/11/2021 | EUT Type: Portable Handset | | Page 39 of 83 |



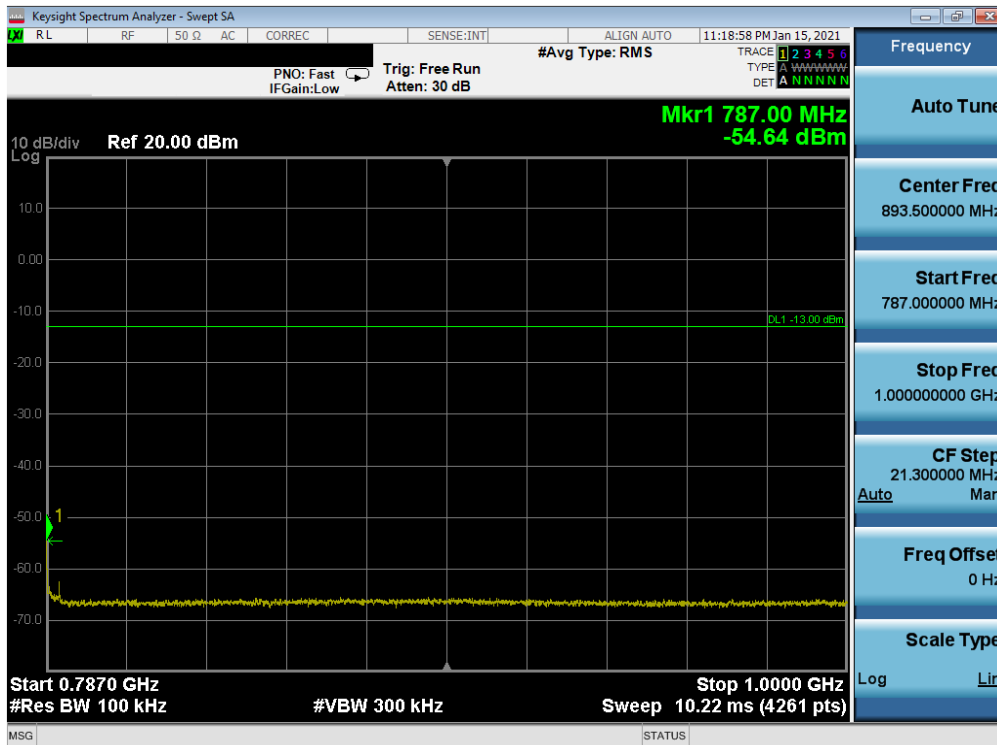
Plot 7-54. Conducted Spurious Plot (LTE Band 12 - 10MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

| | | | | |
|---|--|-----------------------------------|--|-----------------------------------|
| FCC ID: A3LSMG998JPN | PCTEST Proud to be part of element | PART 27 MEASUREMENT REPORT | | Approved by: Technical Manager |
| Test Report S/N: 1M2101110003-04.A3L | Test Dates: 1/17/2021 - 2/11/2021 | EUT Type: Portable Handset | | Page 40 of 83 |

LTE Band 13

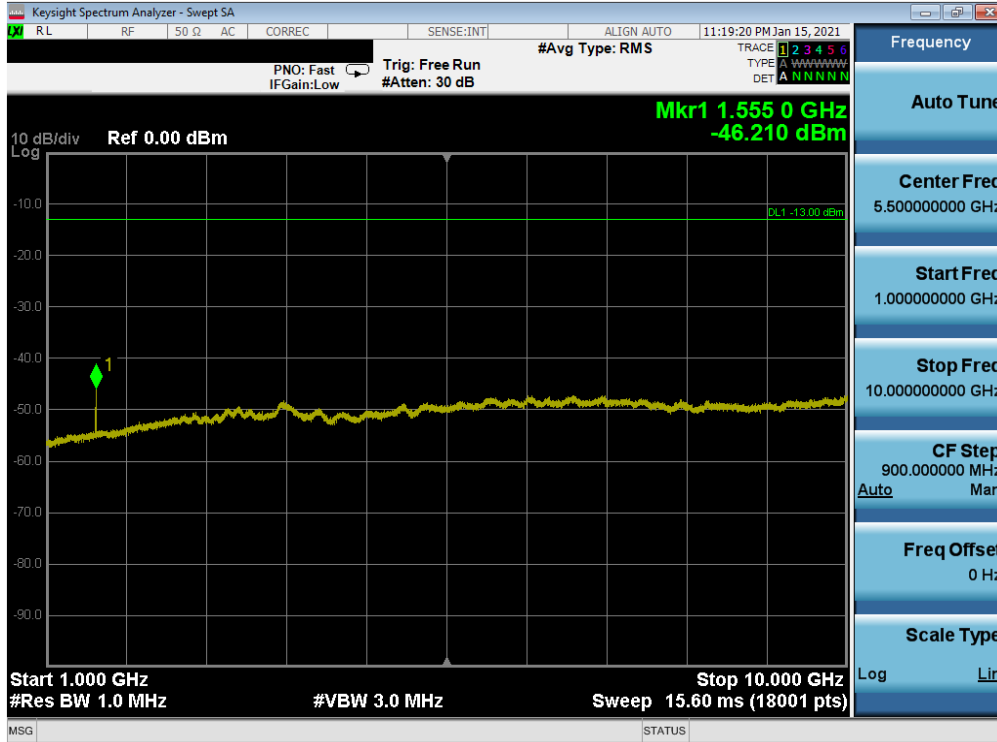


Plot 7-55. Conducted Spurious Plot (LTE Band 13 - 10MHz QPSK - RB Size 1, RB Offset 0)





Plot 7-56. Conducted Spurious Plot (LTE Band 13 - 10MHz QPSK - RB Size 1, RB Offset 0)

| | | | | |
|---|--|-------------------------------|----------------|-----------------------------------|
| FCC ID: A3LSMG998JPN | PCTEST Proud to be part of element | PART 27 MEASUREMENT REPORT | SAMSUNG | Approved by: Technical Manager |
| Test Report S/N: 1M2101110003-04.A3L | Test Dates: 1/17/2021 - 2/11/2021 | EUT Type: Portable Handset | | Page 41 of 83 |



Plot 7-57. Conducted Spurious Plot (LTE Band 13 - 10MHz QPSK - RB Size 1, RB Offset 0)

| | | | |
|--|---|--------------------------------------|--|
| FCC ID: A3LSMG998JPN |  | PART 27 MEASUREMENT REPORT |  Approved by: Technical Manager |
| Test Report S/N: 1M2101110003-04.A3L | Test Dates: 1/17/2021 - 2/11/2021 | EUT Type: Portable Handset | Page 42 of 83 |

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 its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

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

Test Procedure Used

KDB 971168 D01 v03r01 – Section 6.0

Test Settings

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

Test Setup

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

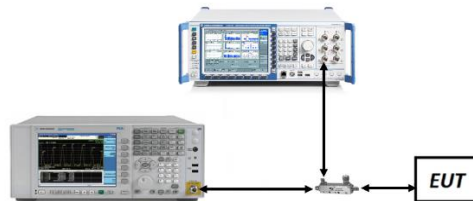


Figure 7-3. Test Instrument & Measurement Setup

| | | | |
|---|--|-----------------------------------|--|
| FCC ID: A3LSMG998JPN | PCTEST Proud to be part of element | PART 27 MEASUREMENT REPORT | Approved by: Technical Manager |
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Test Notes

Per 27.53(h) 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.

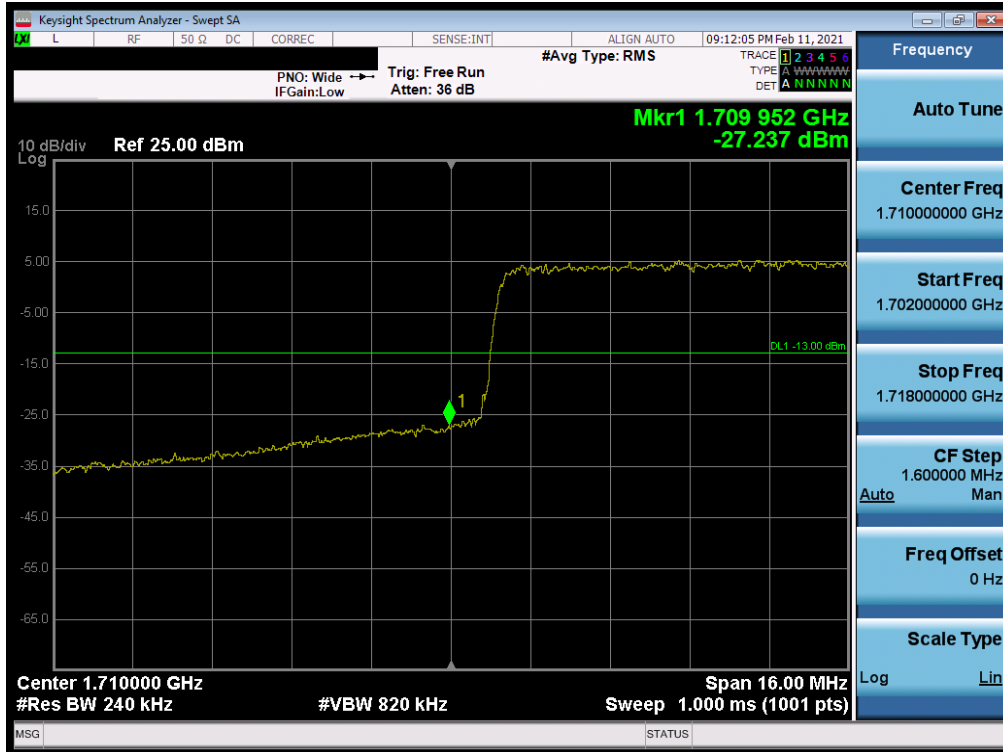
Per 27.53(g) for operations in the 663 - 698 MHz and 698 – 746MHz bands, in the 100 kHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least 30 kHz may be employed to demonstrate compliance with the out-of-band emissions limit.

Per 27.53(c)(5) for operations in the 776-788 MHz band, in the 100 kHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least 30 kHz may be employed to demonstrate compliance with the out-of-band emissions limit.

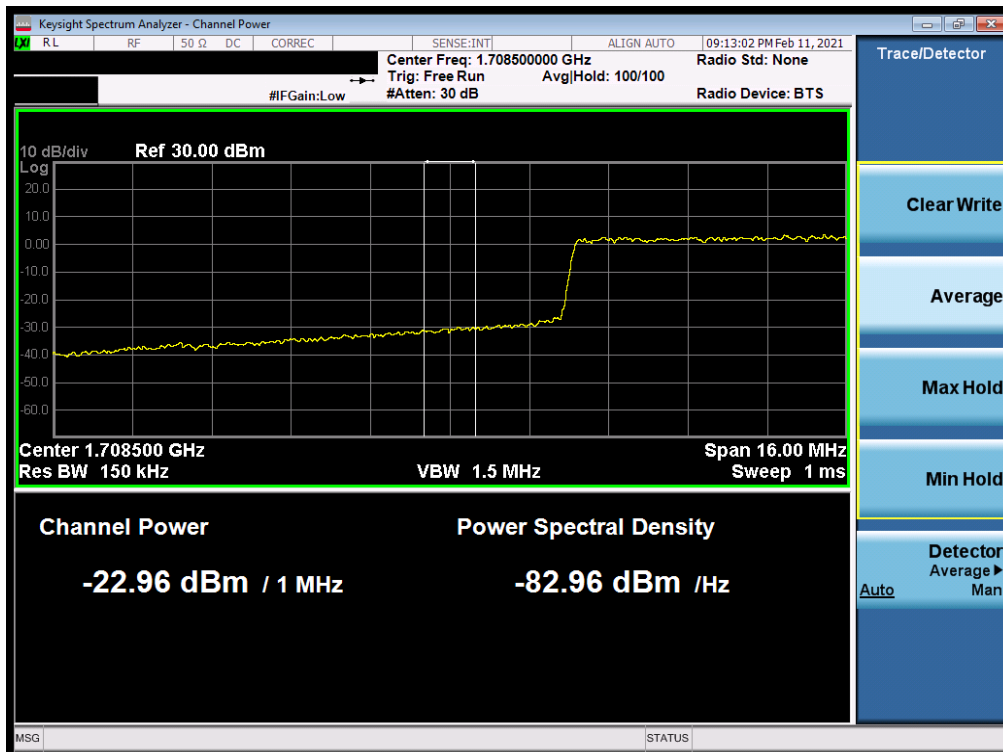
For all plots showing emissions in the 763 – 775MHz and 793 – 805MHz band, the FCC limit per 27.53(c)(4) is $65 + 10 \log_{10}(P) = -35\text{dBm}$ in a 6.25kHz bandwidth.

| | | | |
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| FCC ID: A3LSMG998JPN |  PART 27 MEASUREMENT REPORT  | | Approved by: Technical Manager |
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LTE Band 4

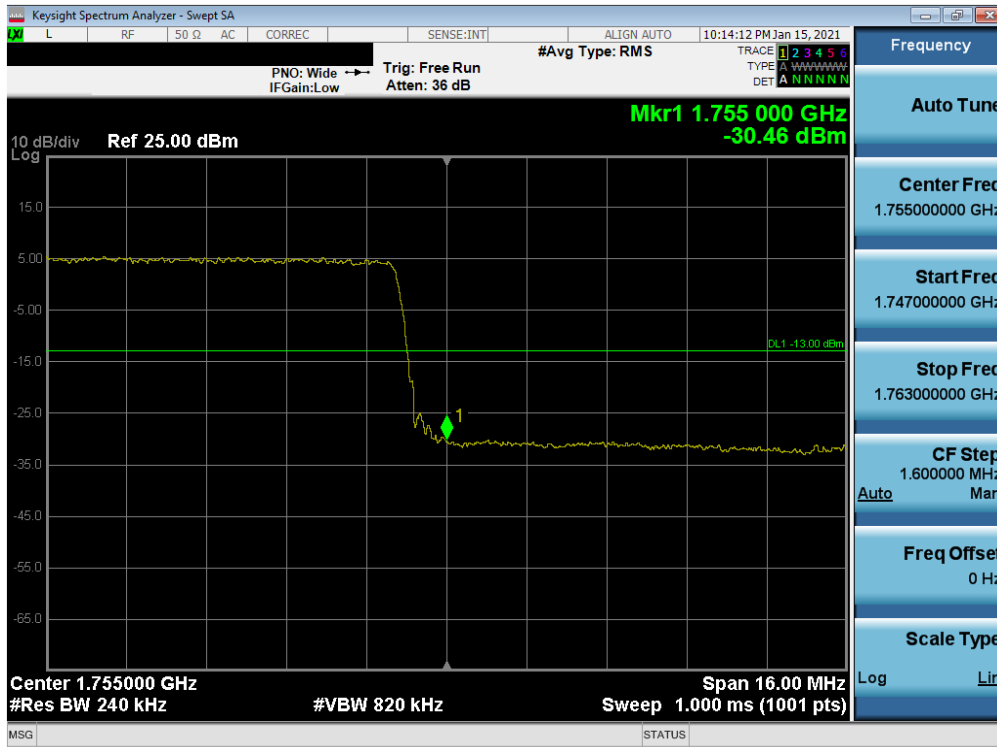


Plot 7-58. Lower Band Edge Plot (LTE Band 4 - 20MHz QPSK – Full RB)

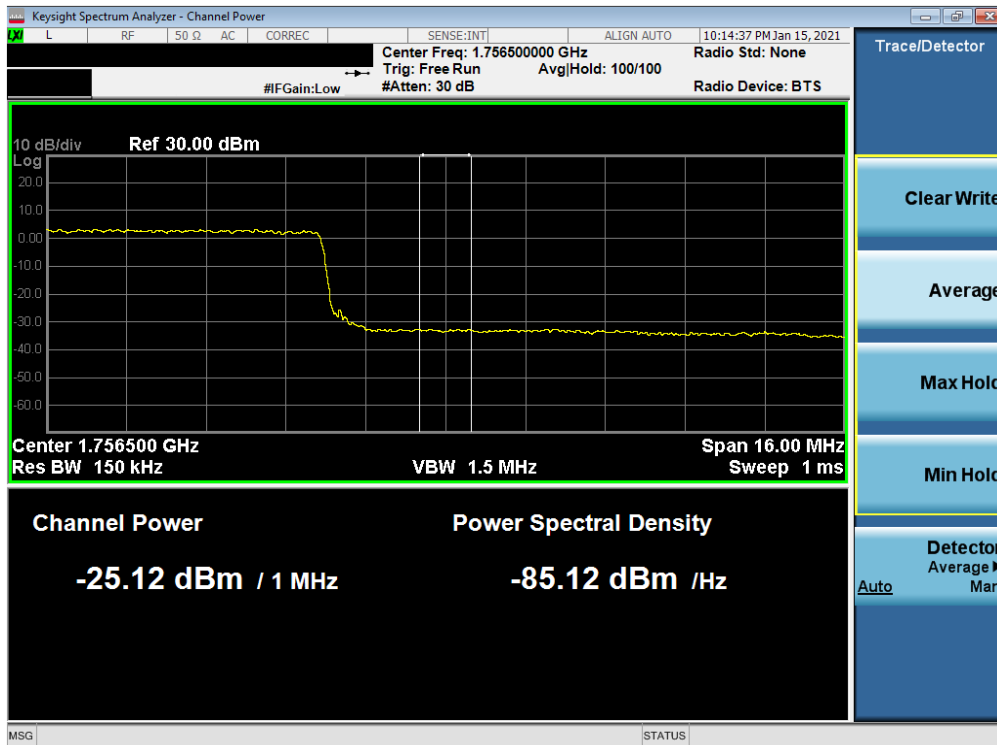


Plot 7-59. Lower Extended Band Edge Plot (LTE Band 4 - 20MHz QPSK – Full RB)

| | | | | |
|---|--|-------------------------------|----------------|-----------------------------------|
| FCC ID: A3LSMG998JPN | PCTEST Proud to be part of element | PART 27 MEASUREMENT REPORT | SAMSUNG | Approved by: Technical Manager |
| Test Report S/N: 1M2101110003-04.A3L | Test Dates: 1/17/2021 - 2/11/2021 | EUT Type: Portable Handset | | Page 45 of 83 |

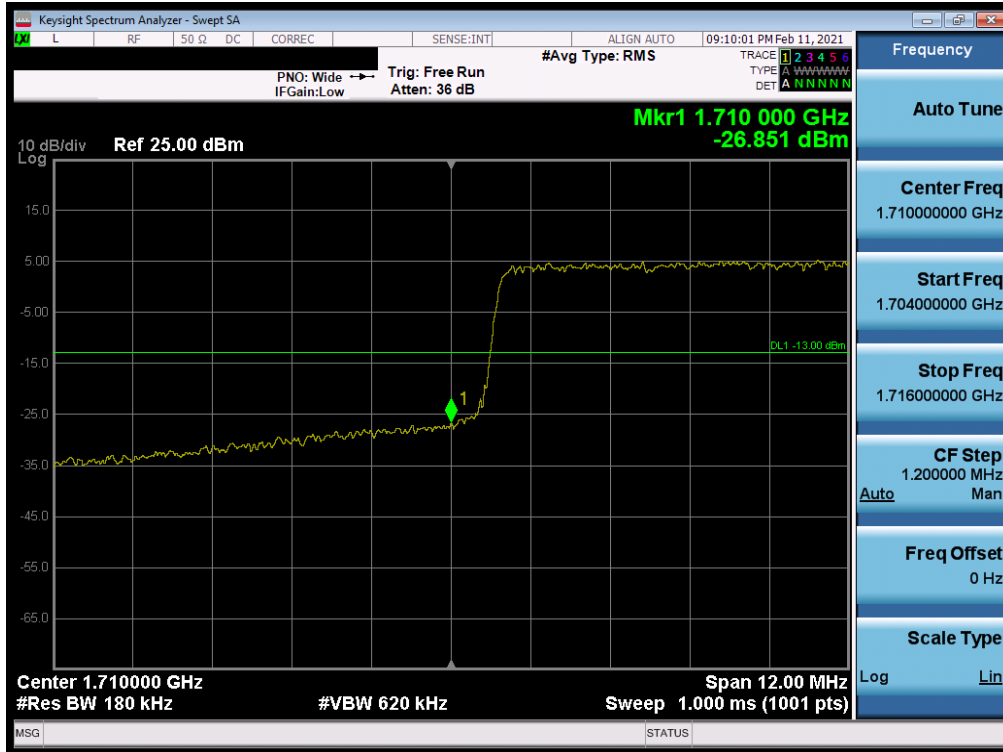


Plot 7-60. Upper Band Edge Plot (LTE Band 4 - 20MHz QPSK – Full RB)

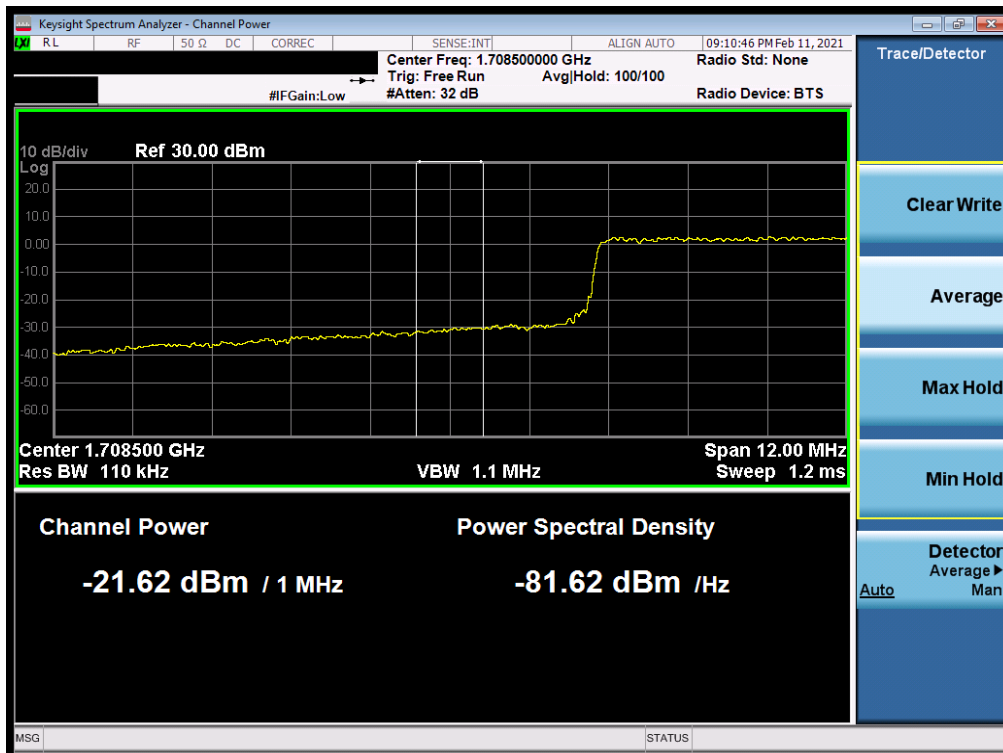


Plot 7-61. Upper Extended Band Edge Plot (LTE Band 4 - 20MHz QPSK – Full RB)

| | | | | |
|---|--|-------------------------------|----------------|-----------------------------------|
| FCC ID: A3LSMG998JPN | PCTEST Proud to be part of element | PART 27 MEASUREMENT REPORT | SAMSUNG | Approved by: Technical Manager |
| Test Report S/N: 1M2101110003-04.A3L | Test Dates: 1/17/2021 - 2/11/2021 | EUT Type: Portable Handset | | Page 46 of 83 |



Plot 7-62. Lower Band Edge Plot (LTE Band 4 - 15MHz QPSK – Full RB)

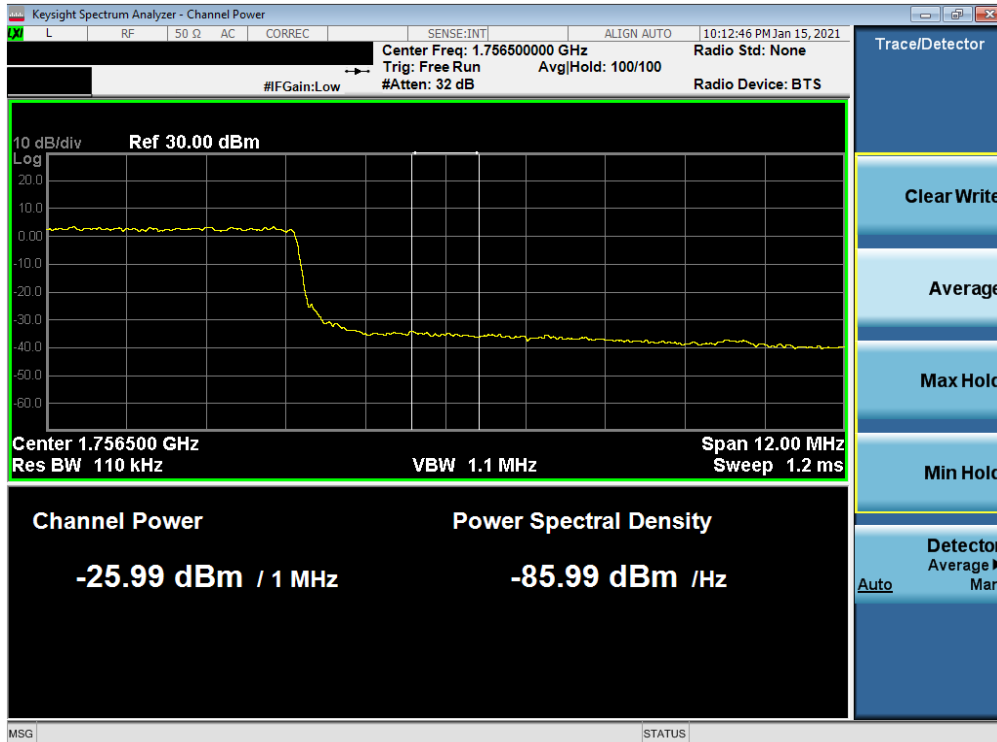


Plot 7-63. Lower Extended Band Edge Plot (LTE Band 4 - 15MHz QPSK – Full RB)

| | | | | |
|---|--|-------------------------------|----------------|-----------------------------------|
| FCC ID: A3LSMG998JPN | PCTEST Proud to be part of element | PART 27 MEASUREMENT REPORT | SAMSUNG | Approved by: Technical Manager |
| Test Report S/N: 1M2101110003-04.A3L | Test Dates: 1/17/2021 - 2/11/2021 | EUT Type: Portable Handset | | Page 47 of 83 |

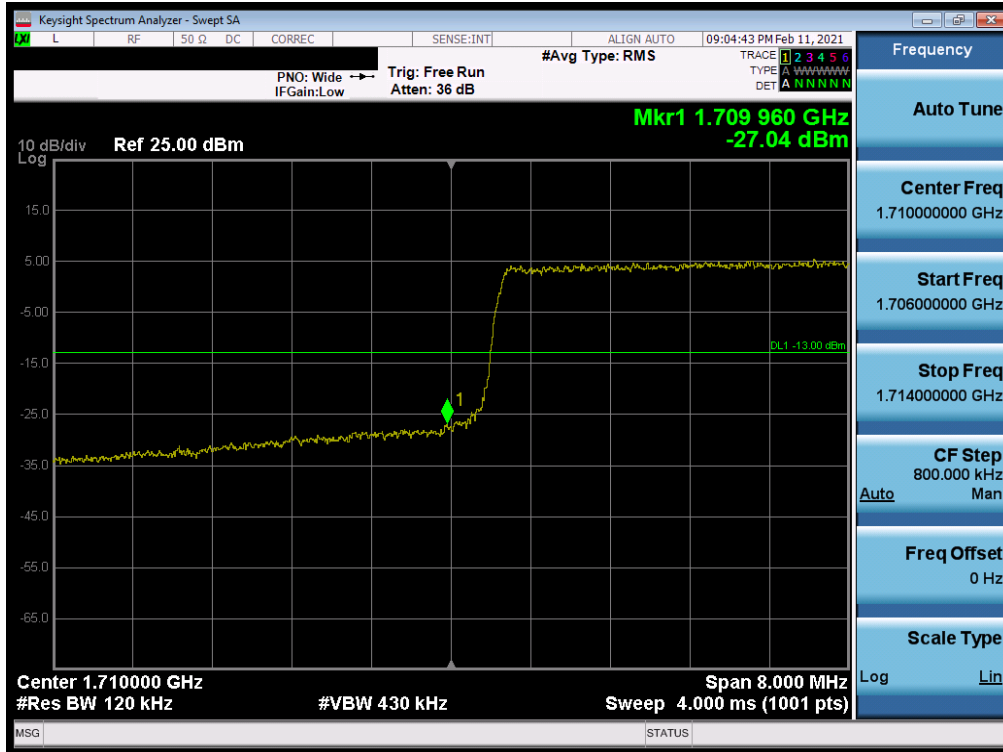


Plot 7-64. Upper Band Edge Plot (LTE Band 4 - 15MHz QPSK – Full RB)

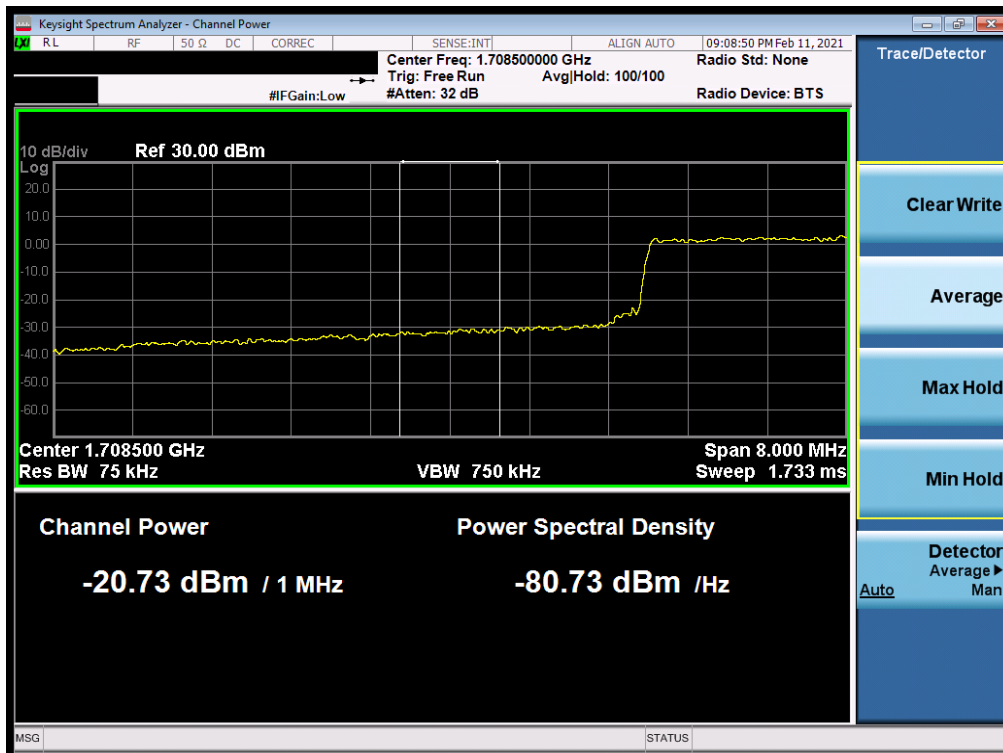


Plot 7-65. Upper Extended Band Edge Plot (LTE Band 4 - 15MHz QPSK – Full RB)

| | | | | |
|---|--|-------------------------------|----------------|-----------------------------------|
| FCC ID: A3LSMG998JPN | PCTEST Proud to be part of element | PART 27 MEASUREMENT REPORT | SAMSUNG | Approved by: Technical Manager |
| Test Report S/N: 1M2101110003-04.A3L | Test Dates: 1/17/2021 - 2/11/2021 | EUT Type: Portable Handset | | Page 48 of 83 |



Plot 7-66. Lower Band Edge Plot (LTE Band 4 - 10MHz QPSK – Full RB)

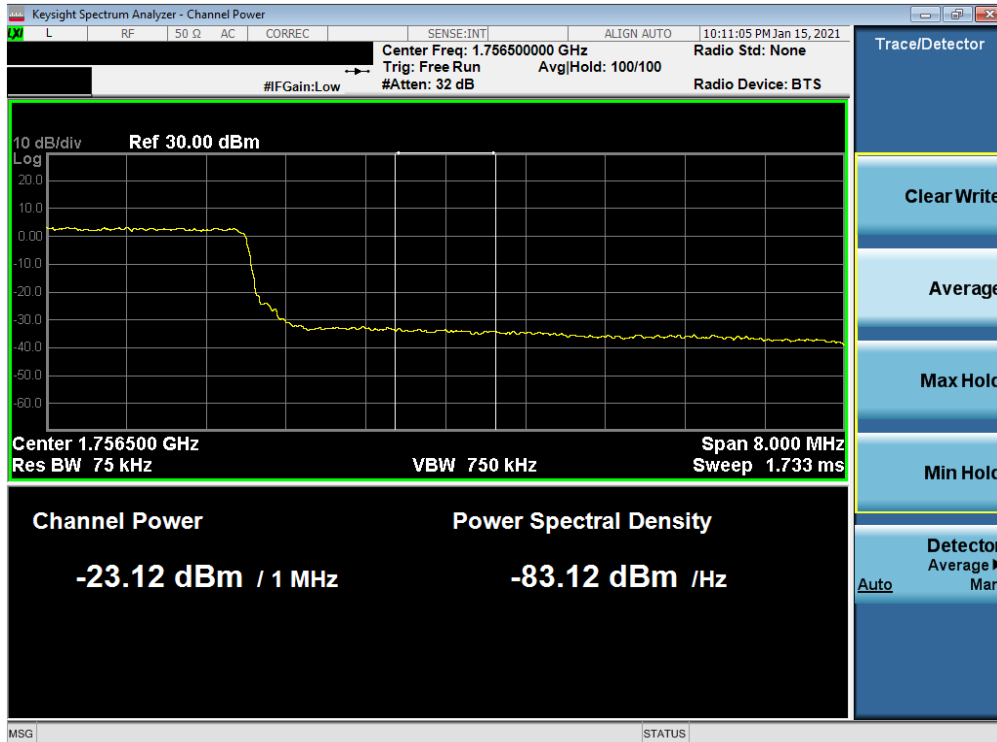


Plot 7-67. Lower Extended Band Edge Plot (LTE Band 4 - 10MHz QPSK – Full RB)

| | | | | |
|---|--|-------------------------------|----------------|-----------------------------------|
| FCC ID: A3LSMG998JPN | PCTEST Proud to be part of element | PART 27 MEASUREMENT REPORT | SAMSUNG | Approved by: Technical Manager |
| Test Report S/N: 1M2101110003-04.A3L | Test Dates: 1/17/2021 - 2/11/2021 | EUT Type: Portable Handset | | Page 49 of 83 |

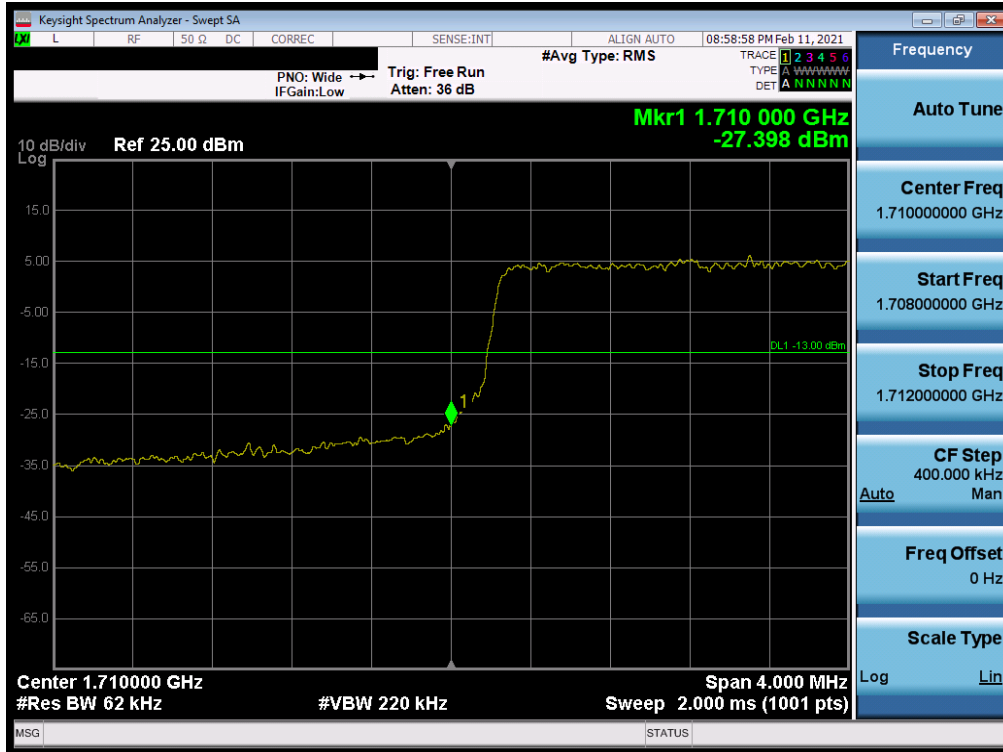


Plot 7-68. Upper Band Edge Plot (LTE Band 4 - 10MHz QPSK – Full RB)

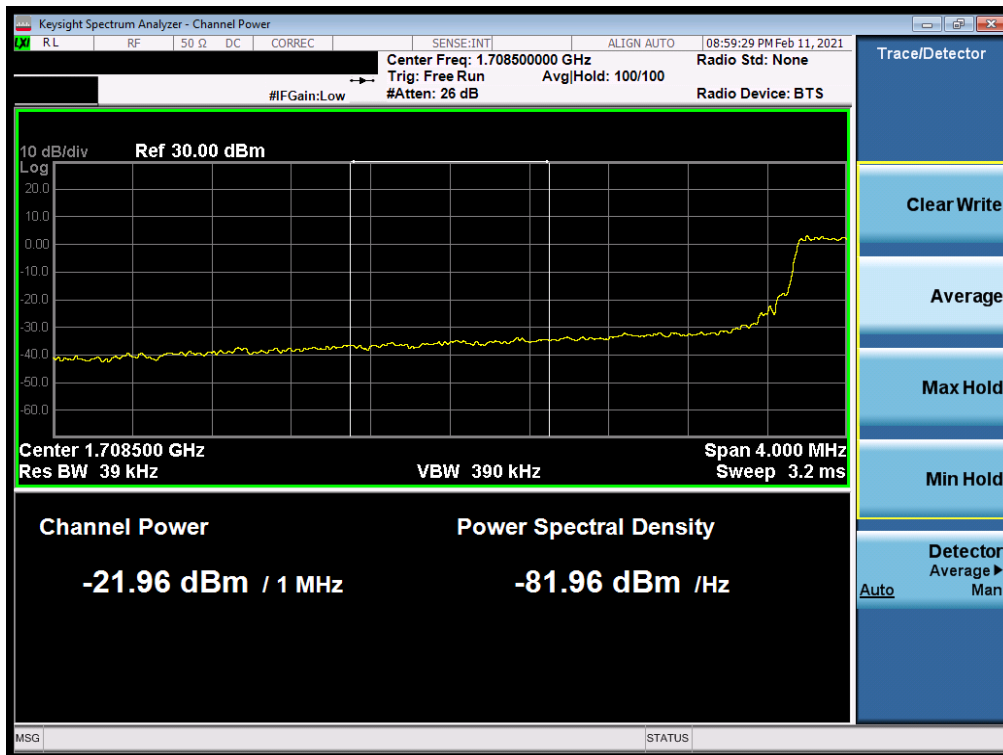


Plot 7-69. Upper Extended Band Edge Plot (LTE Band 4 - 10MHz QPSK – Full RB)

| | | | | |
|---|--|-------------------------------|----------------|-----------------------------------|
| FCC ID: A3LSMG998JPN | PCTEST Proud to be part of element | PART 27 MEASUREMENT REPORT | SAMSUNG | Approved by: Technical Manager |
| Test Report S/N: 1M2101110003-04.A3L | Test Dates: 1/17/2021 - 2/11/2021 | EUT Type: Portable Handset | | Page 50 of 83 |



Plot 7-70. Lower Band Edge Plot (LTE Band 4 - 5MHz QPSK – Full RB)

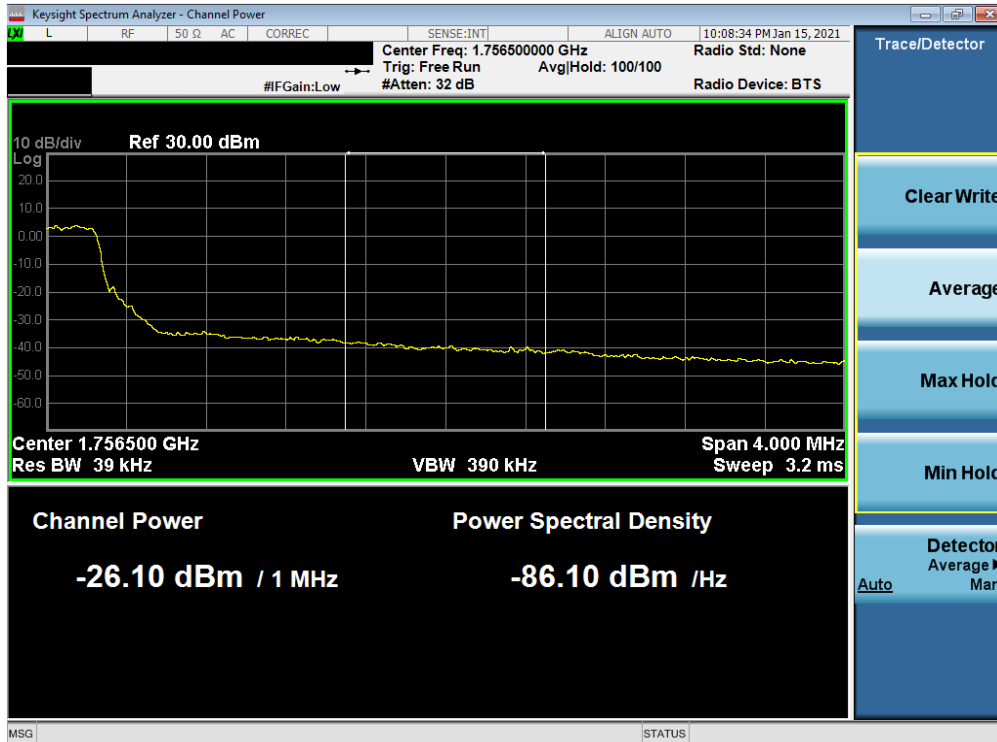


Plot 7-71. Lower Extended Band Edge Plot (LTE Band 4 - 5MHz QPSK – Full RB)

| | | | | |
|---|---------------------------------------|-------------------------------|---------|-----------------------------------|
| FCC ID: A3LSMG998JPN | PCTEST Proud to be part of element | PART 27 MEASUREMENT REPORT | SAMSUNG | Approved by: Technical Manager |
| Test Report S/N: 1M2101110003-04.A3L | Test Dates: 1/17/2021 - 2/11/2021 | EUT Type: Portable Handset | | Page 51 of 83 |

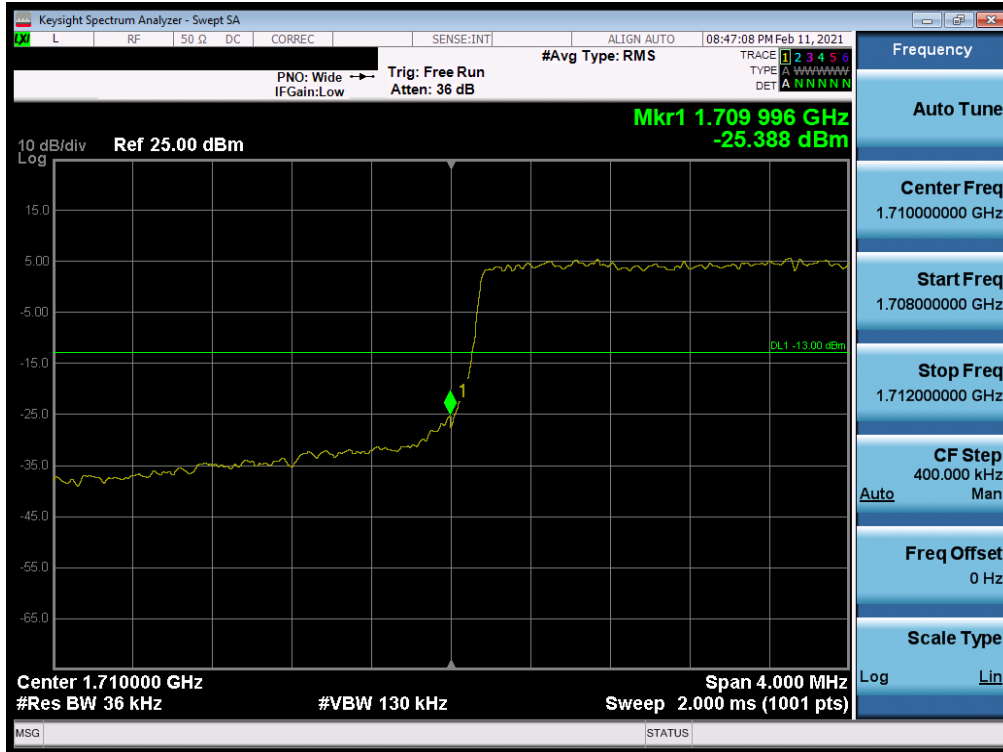


Plot 7-72. Upper Band Edge Plot (LTE Band 4 - 5MHz QPSK – Full RB)

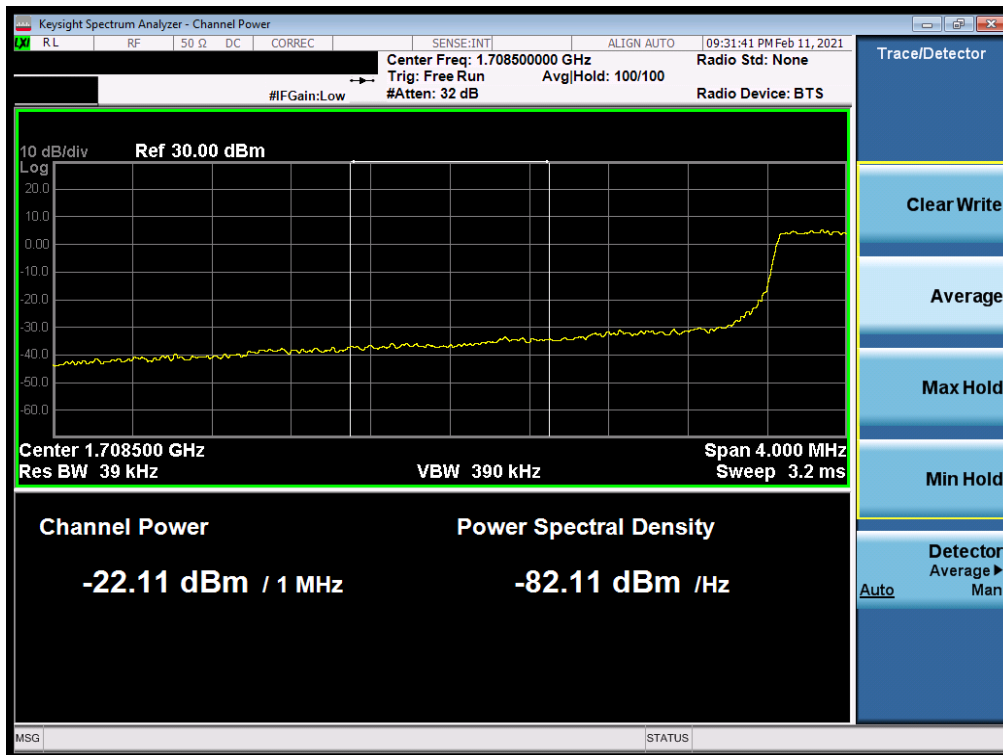


Plot 7-73. Upper Extended Band Edge Plot (LTE Band 4 - 5MHz QPSK – Full RB)

| | | | | |
|---|--|-------------------------------|----------------|-----------------------------------|
| FCC ID: A3LSMG998JPN | PCTEST Proud to be part of element | PART 27 MEASUREMENT REPORT | SAMSUNG | Approved by: Technical Manager |
| Test Report S/N: 1M2101110003-04.A3L | Test Dates: 1/17/2021 - 2/11/2021 | EUT Type: Portable Handset | | Page 52 of 83 |

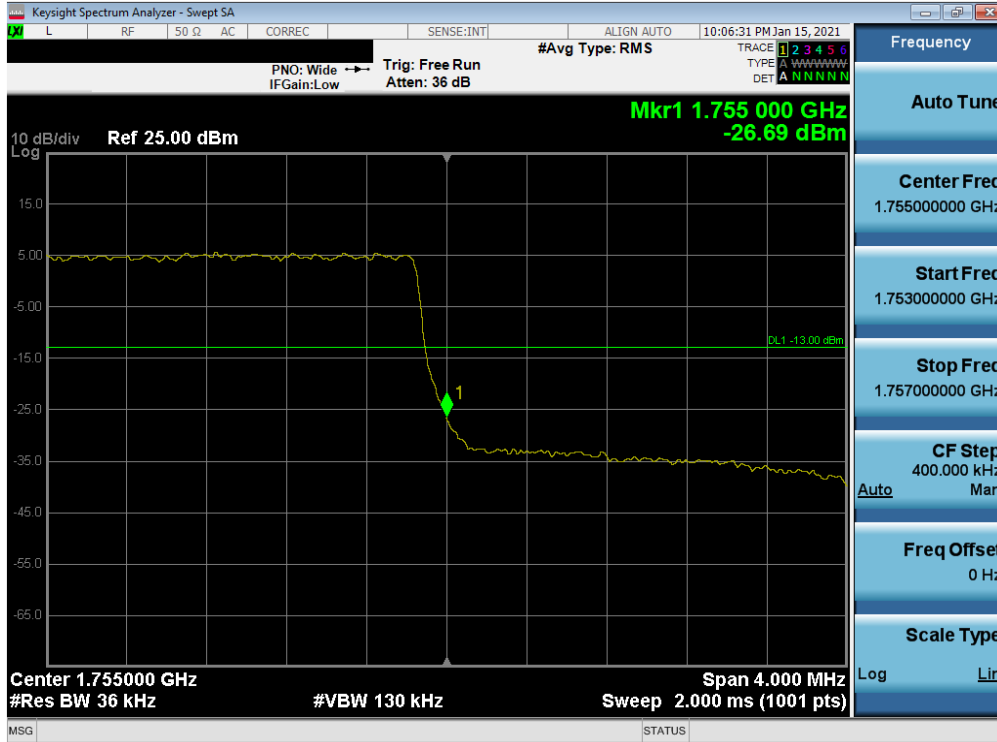


Plot 7-74. Lower Band Edge Plot (LTE Band 4 - 3MHz QPSK – Full RB)

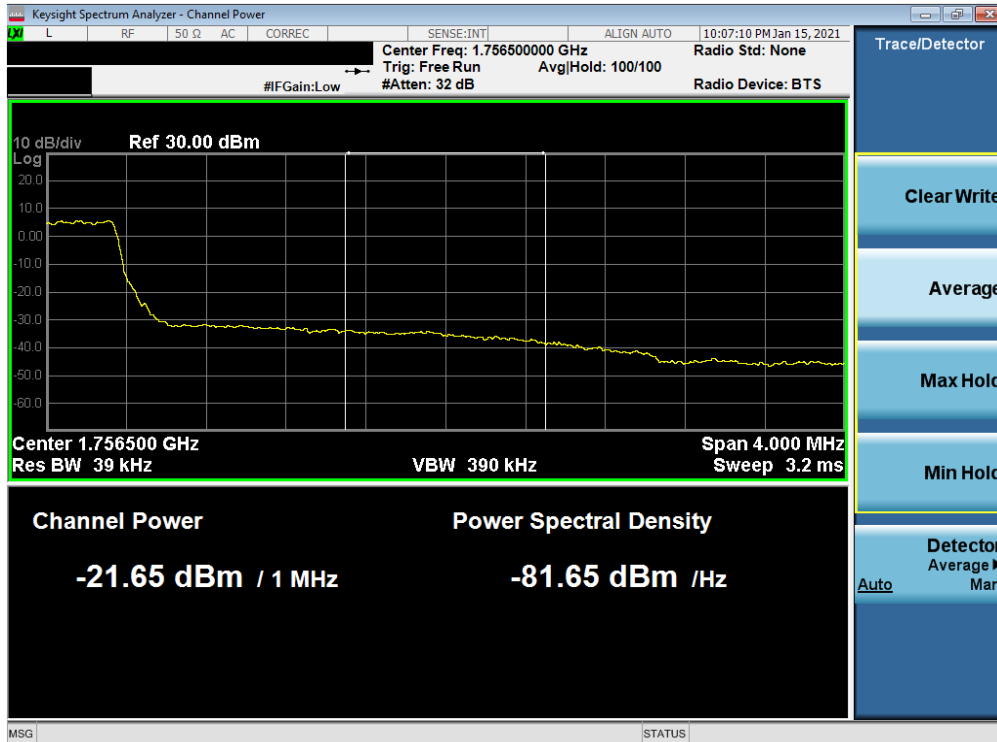


Plot 7-75. Lower Extended Band Edge Plot (LTE Band 4 - 3MHz QPSK – Full RB)

| | | | | |
|---|--|-------------------------------|----------------|-----------------------------------|
| FCC ID: A3LSMG998JPN | PCTEST Proud to be part of element | PART 27 MEASUREMENT REPORT | SAMSUNG | Approved by: Technical Manager |
| Test Report S/N: 1M2101110003-04.A3L | Test Dates: 1/17/2021 - 2/11/2021 | EUT Type: Portable Handset | | Page 53 of 83 |

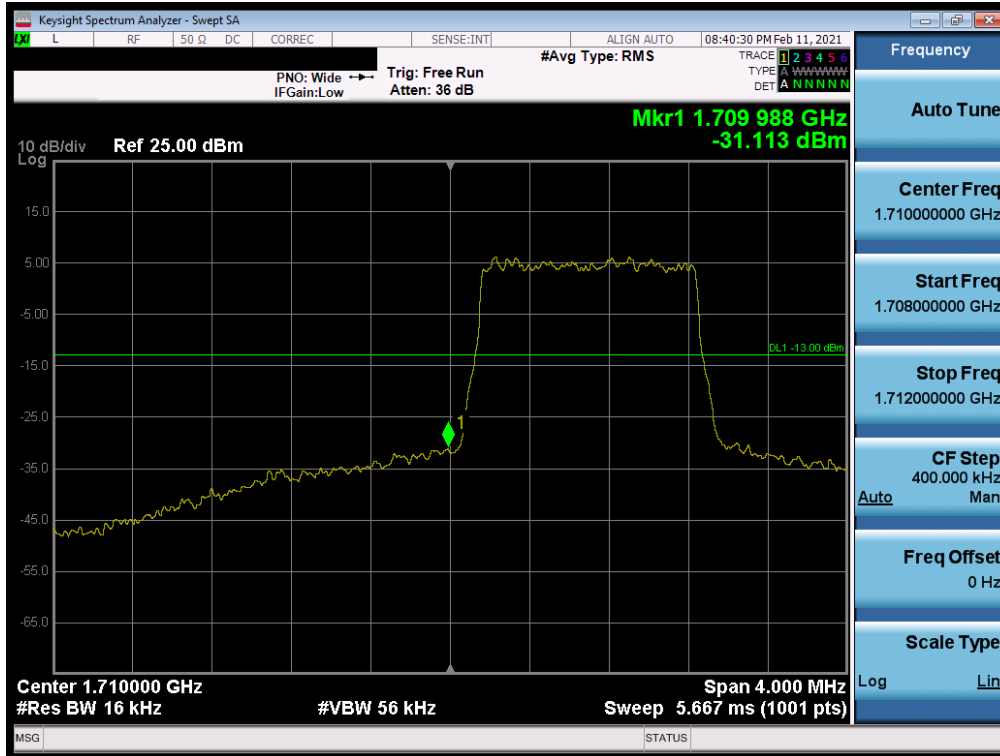


Plot 7-76. Upper Band Edge Plot (LTE Band 4 - 3MHz QPSK – Full RB)

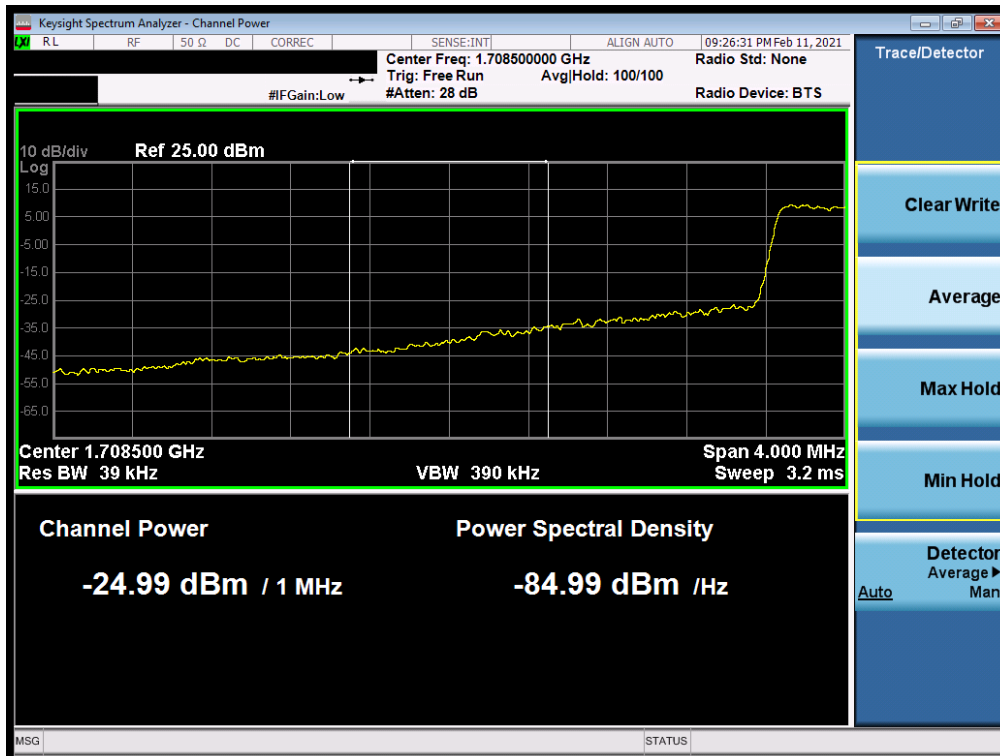


Plot 7-77. Upper Extended Band Edge Plot (LTE Band 4 - 3MHz QPSK – Full RB)

| | | | | |
|---|--|-------------------------------|----------------|-----------------------------------|
| FCC ID: A3LSMG998JPN | PCTEST Proud to be part of element | PART 27 MEASUREMENT REPORT | SAMSUNG | Approved by: Technical Manager |
| Test Report S/N: 1M2101110003-04.A3L | Test Dates: 1/17/2021 - 2/11/2021 | EUT Type: Portable Handset | | Page 54 of 83 |

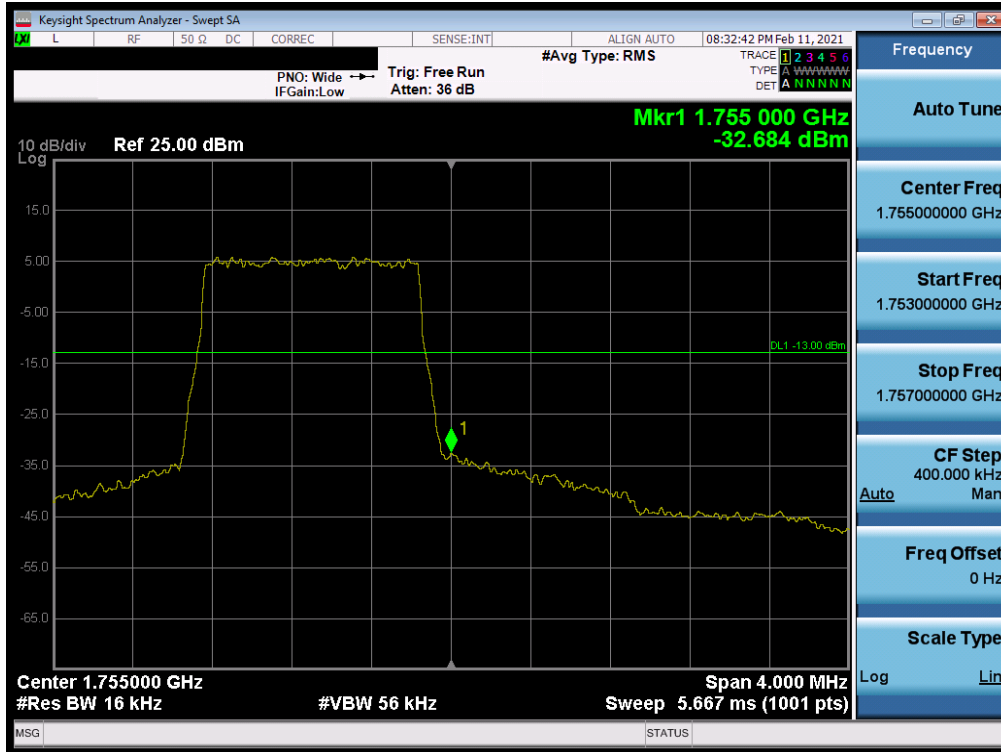


Plot 7-78. Lower Band Edge Plot (LTE Band 4 – 1.4MHz QPSK – Full RB)

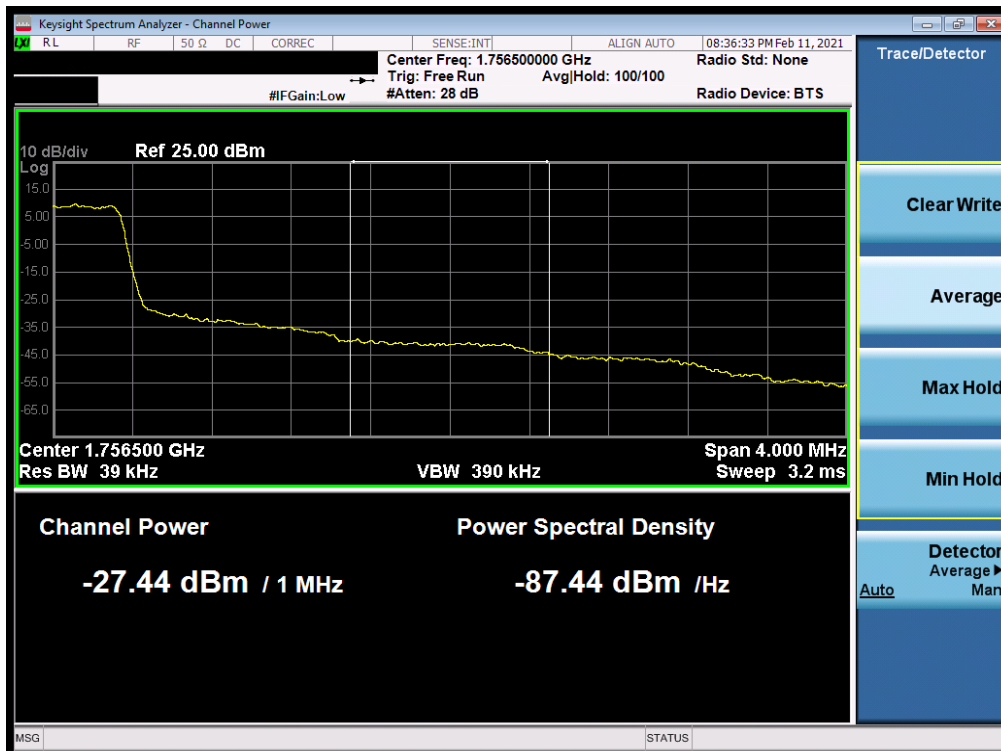


Plot 7-79. Lower Extended Band Edge Plot (LTE Band 4 – 1.4MHz QPSK – Full RB)

| | | | | |
|---|--|-------------------------------|----------------|-----------------------------------|
| FCC ID: A3LSMG998JPN | PCTEST Proud to be part of element | PART 27 MEASUREMENT REPORT | SAMSUNG | Approved by: Technical Manager |
| Test Report S/N: 1M2101110003-04.A3L | Test Dates: 1/17/2021 - 2/11/2021 | EUT Type: Portable Handset | | Page 55 of 83 |



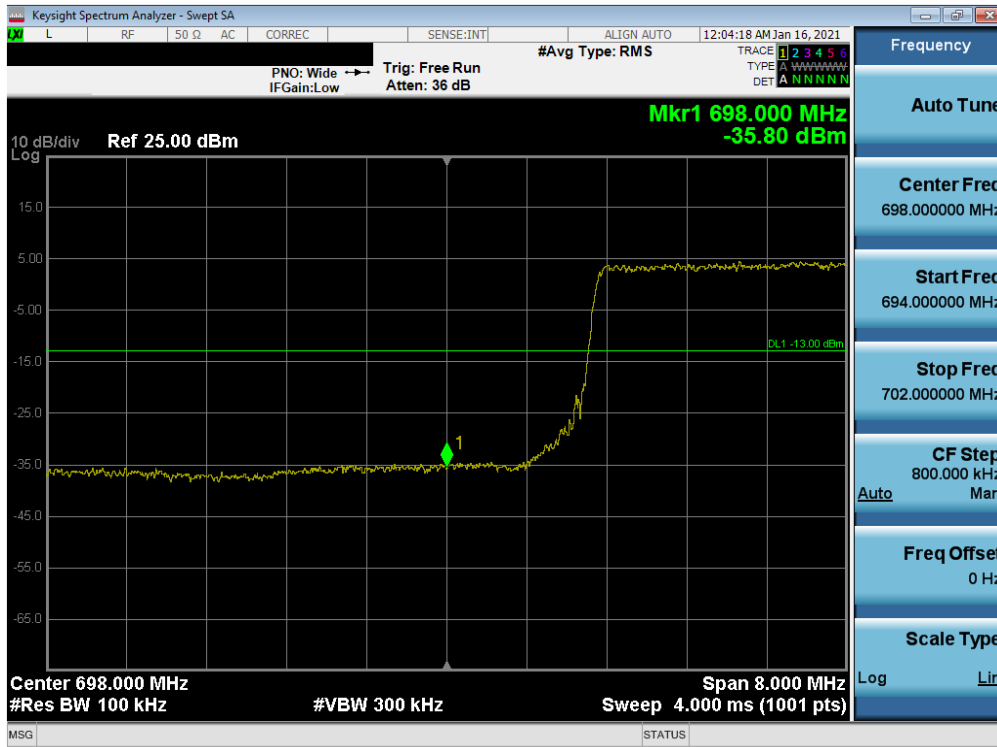
Plot 7-80. Upper Band Edge Plot (LTE Band 4 – 1.4MHz QPSK – Full RB)



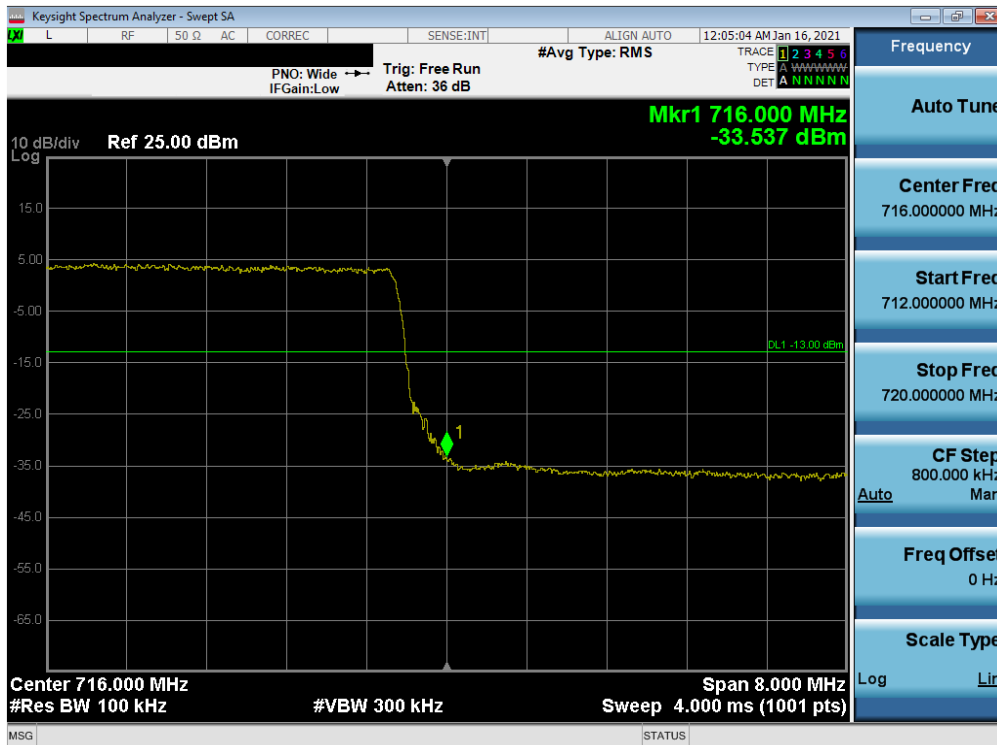
Plot 7-81. Upper Extended Band Edge Plot (LTE Band 4 – 1.4MHz QPSK – Full RB)

| | | | | |
|---|--|-------------------------------|----------------|-----------------------------------|
| FCC ID: A3LSMG998JPN | PCTEST Proud to be part of element | PART 27 MEASUREMENT REPORT | SAMSUNG | Approved by: Technical Manager |
| Test Report S/N: 1M2101110003-04.A3L | Test Dates: 1/17/2021 - 2/11/2021 | EUT Type: Portable Handset | | Page 56 of 83 |

LTE Band 12

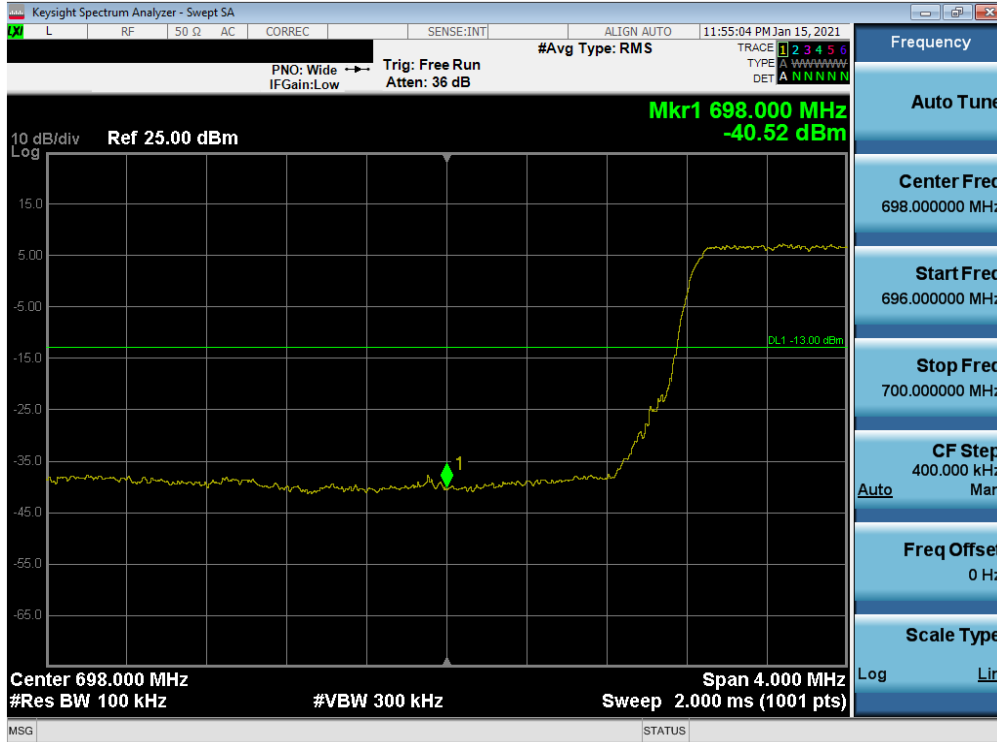


Plot 7-82. Lower Band Edge Plot (LTE Band 12 - 10MHz QPSK – Full RB)

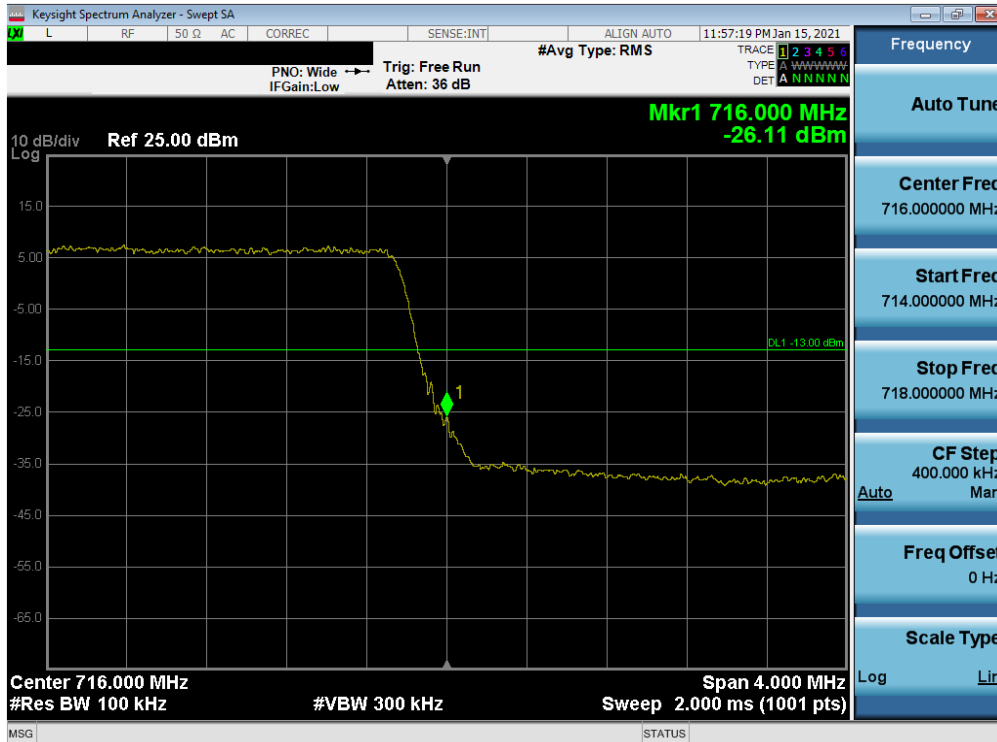


Plot 7-83. Upper Band Edge Plot (LTE Band 12 - 10MHz QPSK – Full RB)

| | | | | |
|---|--|-------------------------------|----------------|-----------------------------------|
| FCC ID: A3LSMG998JPN | PCTEST Proud to be part of element | PART 27 MEASUREMENT REPORT | SAMSUNG | Approved by: Technical Manager |
| Test Report S/N: 1M2101110003-04.A3L | Test Dates: 1/17/2021 - 2/11/2021 | EUT Type: Portable Handset | | Page 57 of 83 |

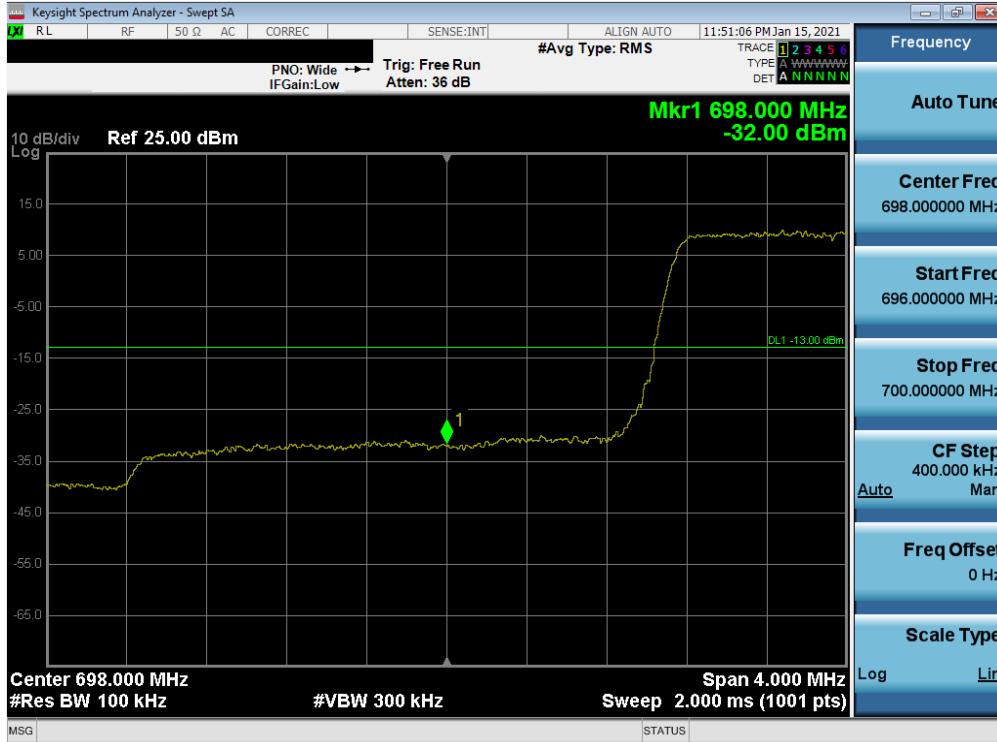


Plot 7-84. Lower Band Edge Plot (LTE Band 12 - 5MHz QPSK – Full RB)

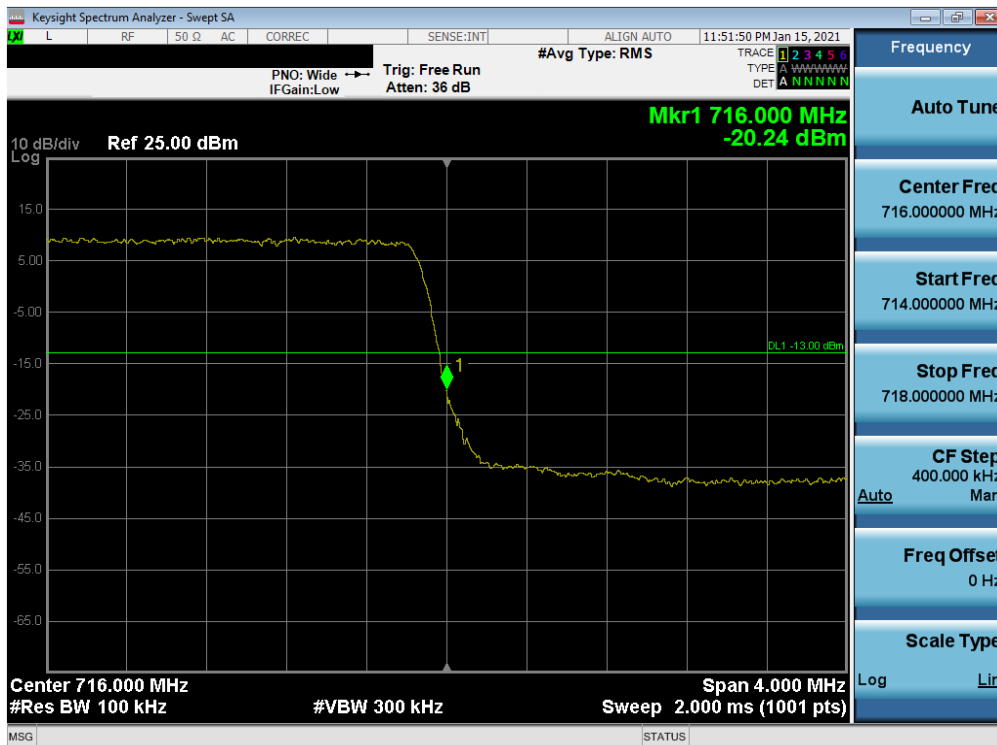


Plot 7-85. Upper Band Edge Plot (LTE Band 12 - 5MHz QPSK – Full RB)

| | | | | |
|---|--|-------------------------------|----------------|-----------------------------------|
| FCC ID: A3LSMG998JPN | PCTEST Proud to be part of element | PART 27 MEASUREMENT REPORT | SAMSUNG | Approved by: Technical Manager |
| Test Report S/N: 1M2101110003-04.A3L | Test Dates: 1/17/2021 - 2/11/2021 | EUT Type: Portable Handset | | Page 58 of 83 |

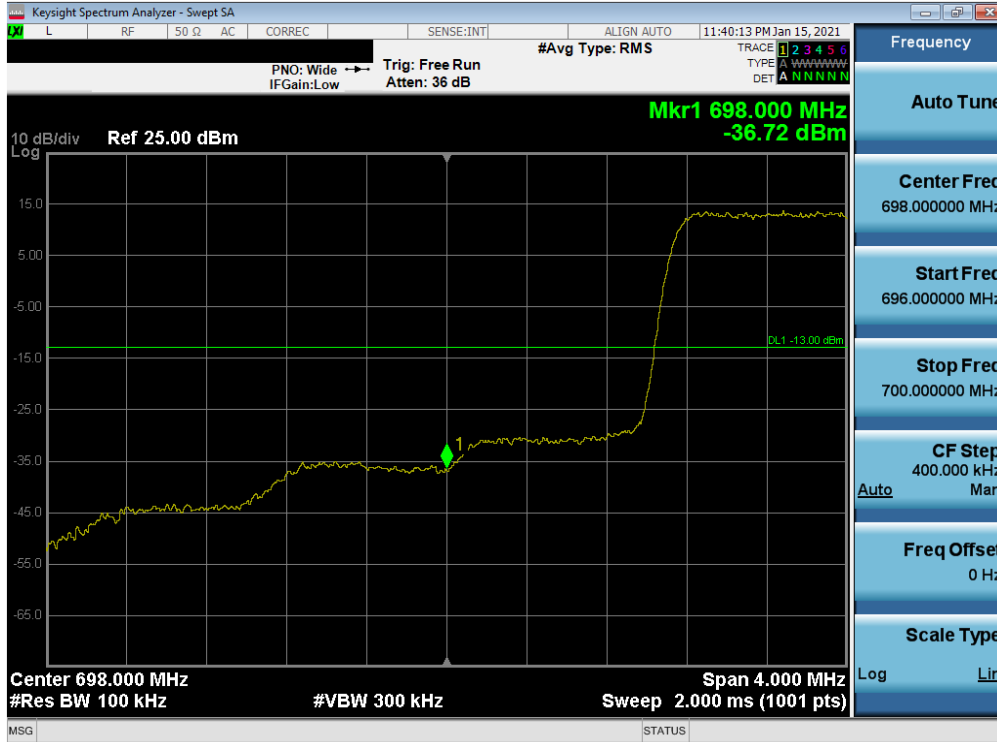


Plot 7-86. Lower Band Edge Plot (LTE Band 12 - 3MHz QPSK – Full RB)

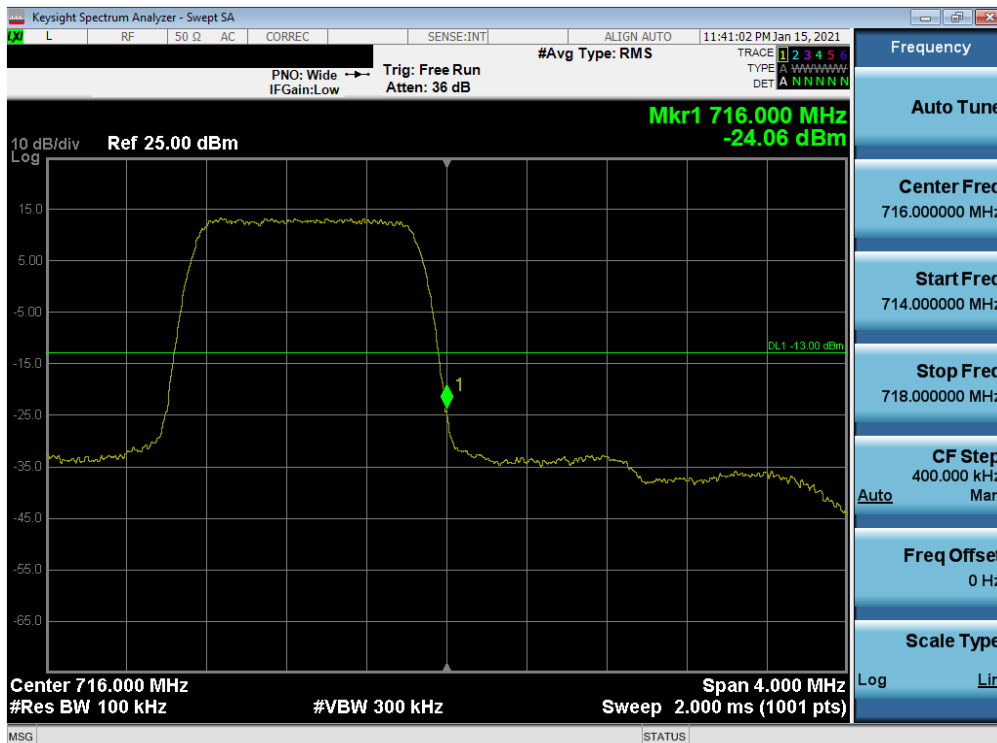


Plot 7-87. Upper Band Edge Plot (LTE Band 12 - 3MHz QPSK – Full RB)

| | | | | |
|---|--|-----------------------------------|----------------|-----------------------------------|
| FCC ID: A3LSMG998JPN | PCTEST Proud to be part of element | PART 27 MEASUREMENT REPORT | SAMSUNG | Approved by: Technical Manager |
| Test Report S/N: 1M2101110003-04.A3L | Test Dates: 1/17/2021 - 2/11/2021 | EUT Type: Portable Handset | | Page 59 of 83 |



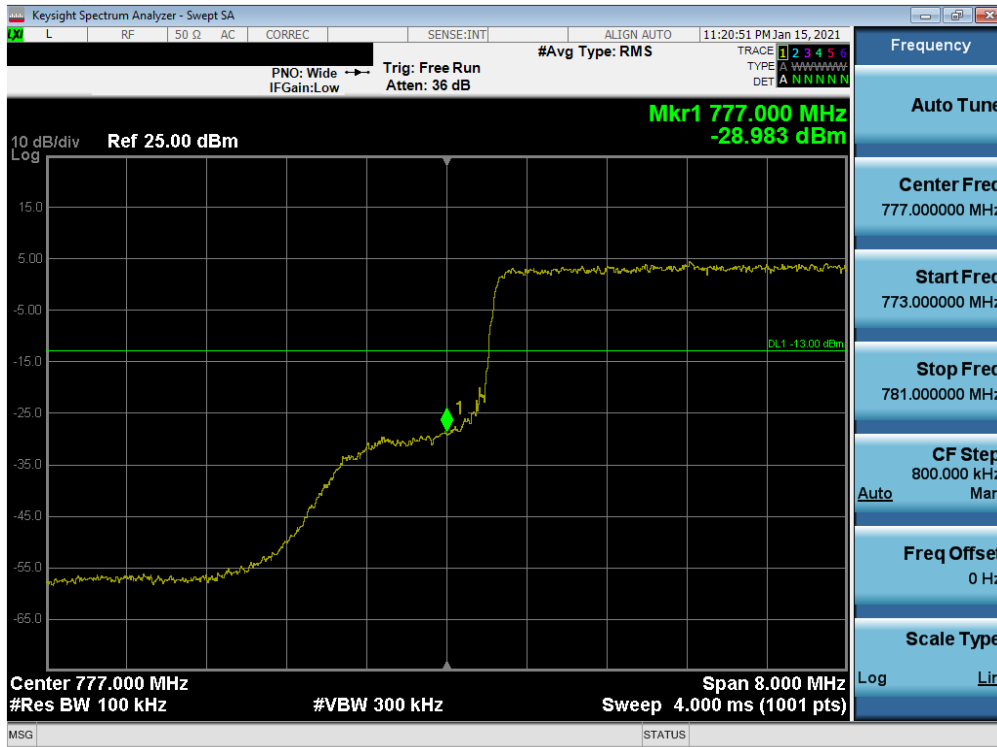
Plot 7-88. Lower Band Edge Plot (LTE Band 12 – 1.4MHz QPSK – Full RB)



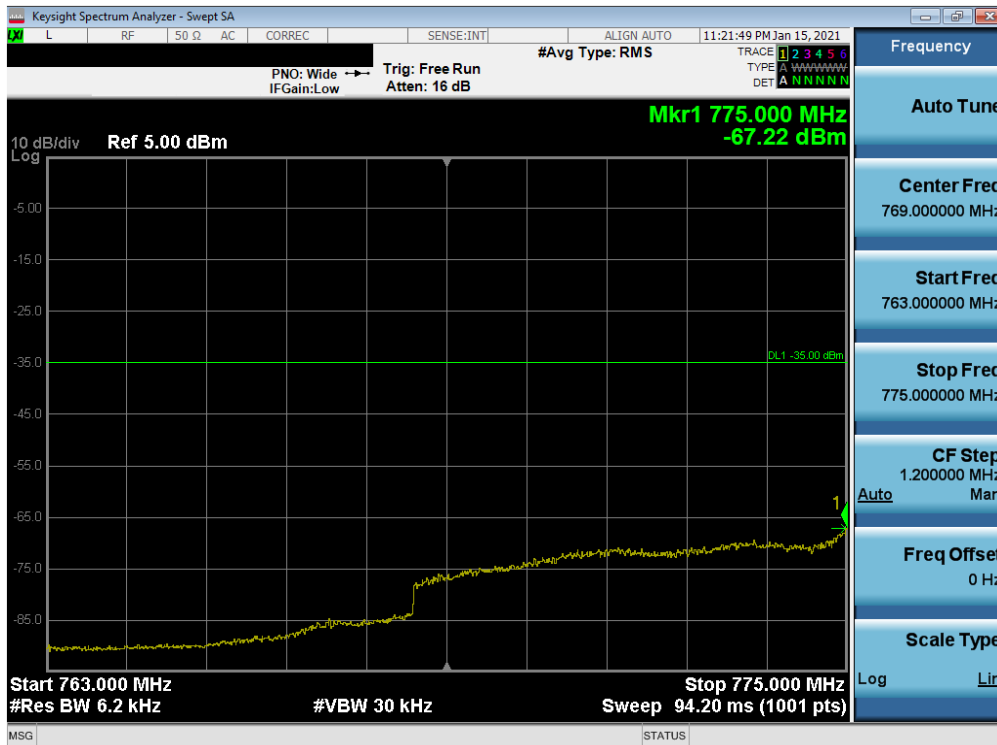
Plot 7-89. Upper Band Edge Plot (LTE Band 12 – 1.4MHz QPSK – Full RB)

| | | | | |
|---|--|-------------------------------|----------------|-----------------------------------|
| FCC ID: A3LSMG998JPN | PCTEST Proud to be part of element | PART 27 MEASUREMENT REPORT | SAMSUNG | Approved by: Technical Manager |
| Test Report S/N: 1M2101110003-04.A3L | Test Dates: 1/17/2021 - 2/11/2021 | EUT Type: Portable Handset | | Page 60 of 83 |

LTE Band 13



Plot 7-90. Lower Band Edge Plot (LTE Band 13 - 10MHz QPSK – Full RB)

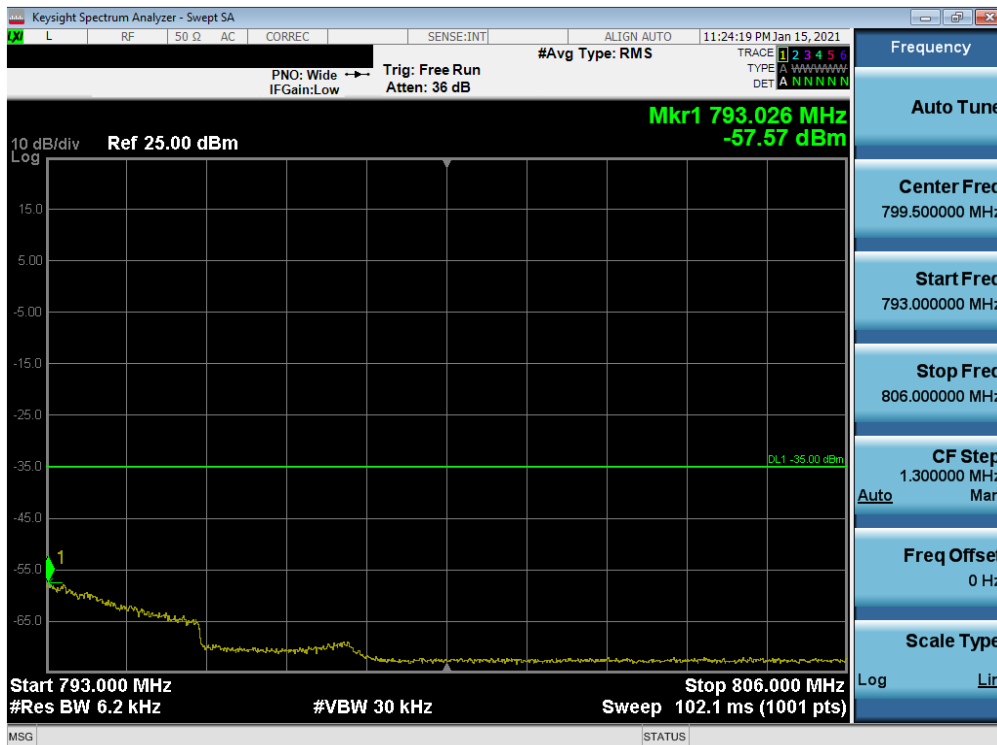


Plot 7-91. Lower Emission Mask Plot (LTE Band 13 - 10MHz QPSK – Full RB)

| | | | | |
|---|--|-------------------------------|----------------|-----------------------------------|
| FCC ID: A3LSMG998JPN | PCTEST Proud to be part of element | PART 27 MEASUREMENT REPORT | SAMSUNG | Approved by: Technical Manager |
| Test Report S/N: 1M2101110003-04.A3L | Test Dates: 1/17/2021 - 2/11/2021 | EUT Type: Portable Handset | | Page 61 of 83 |

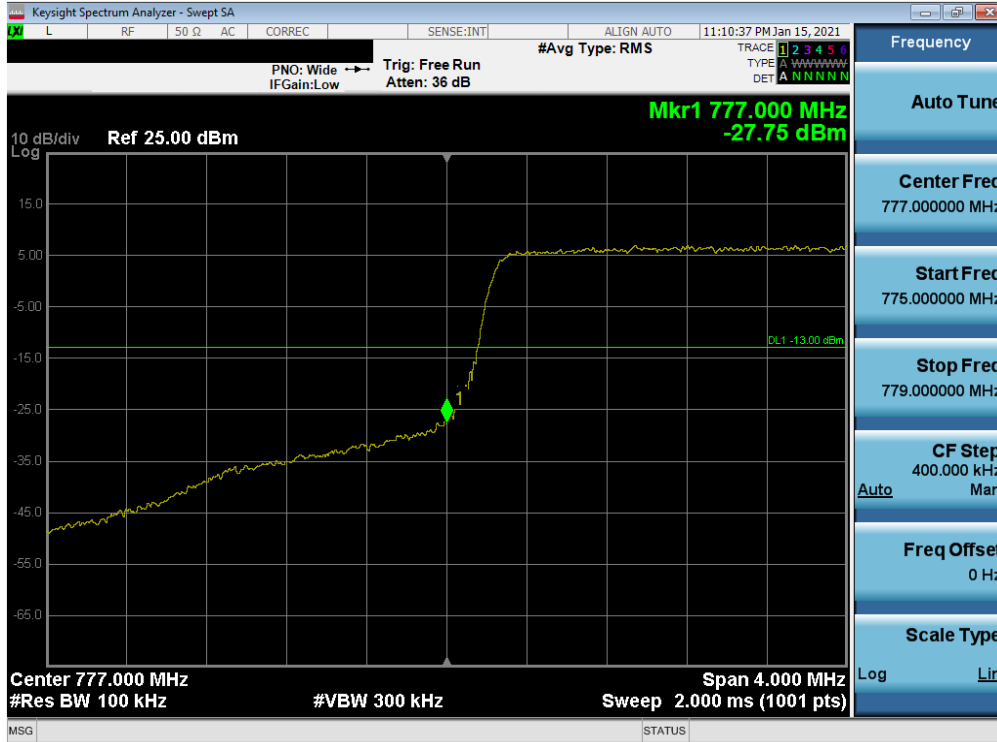


Plot 7-92. Upper Band Edge Plot (LTE Band 13 - 10MHz QPSK – Full RB)

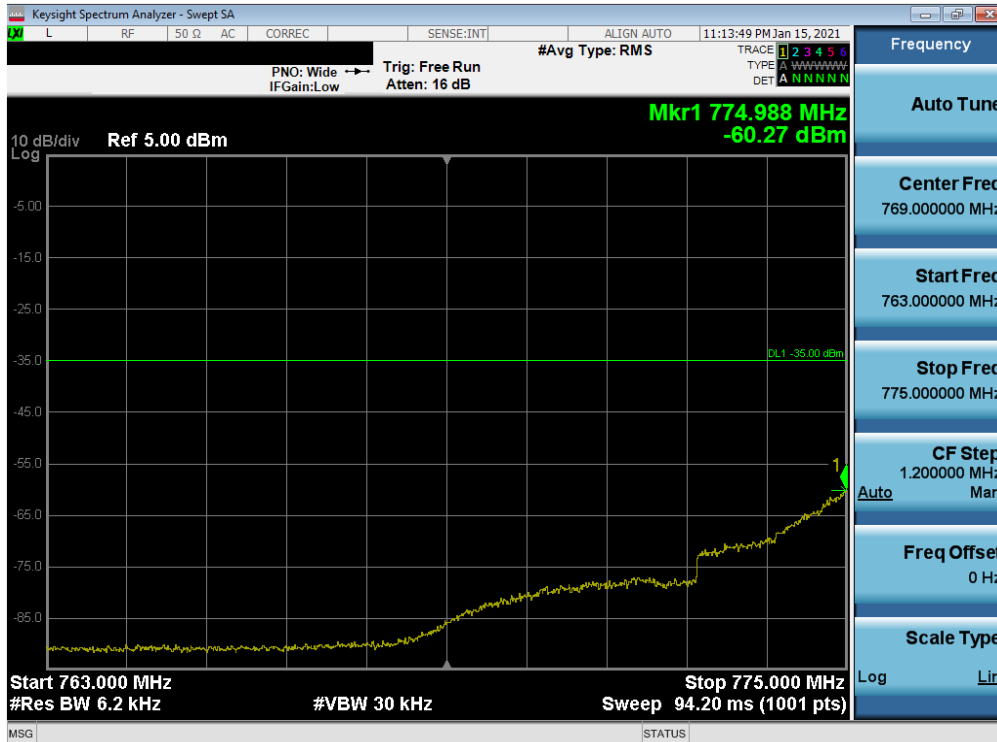


Plot 7-93. Upper Emission Mask Plot (LTE Band 13 - 10MHz QPSK – Full RB)

| | | | | |
|---|--|-------------------------------|----------------|-----------------------------------|
| FCC ID: A3LSMG998JPN | PCTEST Proud to be part of element | PART 27 MEASUREMENT REPORT | SAMSUNG | Approved by: Technical Manager |
| Test Report S/N: 1M2101110003-04.A3L | Test Dates: 1/17/2021 - 2/11/2021 | EUT Type: Portable Handset | | Page 62 of 83 |



Plot 7-94. Lower Band Edge Plot (LTE Band 13 - 5MHz QPSK – Full RB)

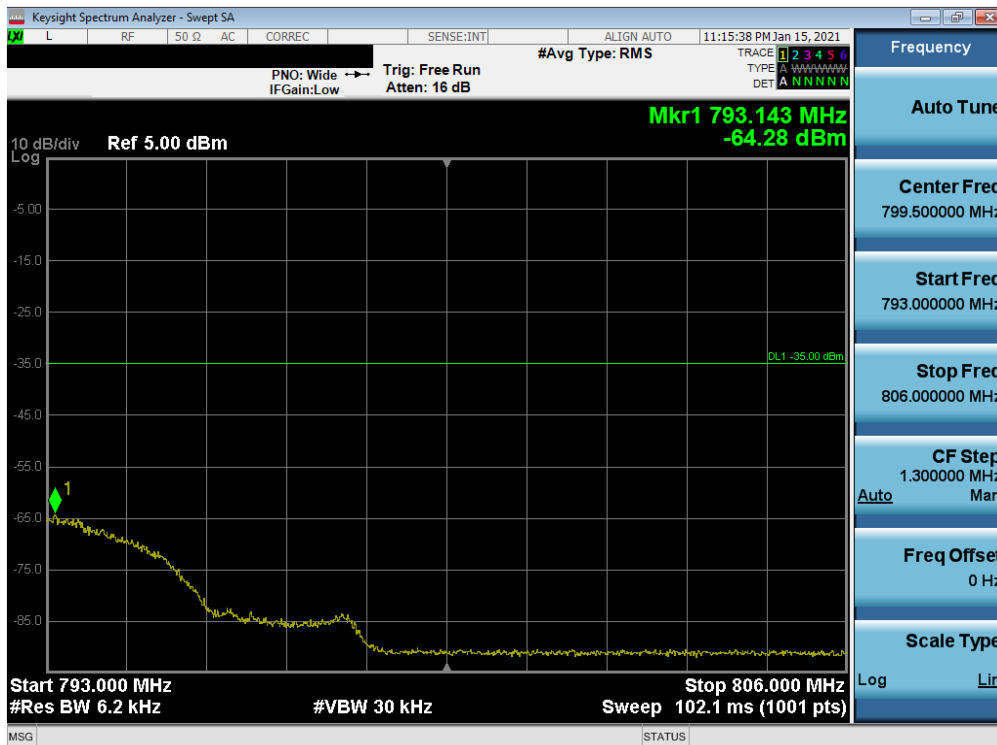


Plot 7-95. Lower Emission Mask Plot (LTE Band 13 - 5MHz QPSK – Full RB)

| | | | | |
|---|--|-----------------------------------|--|-----------------------------------|
| FCC ID: A3LSMG998JPN | PCTEST Proud to be part of element | PART 27 MEASUREMENT REPORT | | Approved by: Technical Manager |
| Test Report S/N: 1M2101110003-04.A3L | Test Dates: 1/17/2021 - 2/11/2021 | EUT Type: Portable Handset | | Page 63 of 83 |



Plot 7-96. Upper Band Edge Plot (LTE Band 13 - 5MHz QPSK – Full RB)



Plot 7-97. Upper Emission Mask Plot (LTE Band 13 - 5MHz QPSK – Full RB)

| | | | | |
|---|--|-------------------------------|----------------|-----------------------------------|
| FCC ID: A3LSMG998JPN | PCTEST Proud to be part of element | PART 27 MEASUREMENT REPORT | SAMSUNG | Approved by: Technical Manager |
| Test Report S/N: 1M2101110003-04.A3L | Test Dates: 1/17/2021 - 2/11/2021 | EUT Type: Portable Handset | | Page 64 of 83 |

7.5 Radiated Power (EIRP/ERP)

Test Overview

Effective Radiated Power (ERP) and Equivalent Isotropic Radiated Power (EIRP) measurements are performed using the substitution method described in ANSI/TIA-603-E-2016 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using vertically and horizontally polarized tuned dipole antennas. All measurements are performed as RMS average measurements while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.



Test Procedures Used

KDB 971168 D01 v03r01 – Section 5.2.1

ANSI/TIA-603-E-2016 – Section 2.2.17

Test Settings

1. Radiated power measurements are performed using the signal analyzer's "channel power" measurement capability for signals with continuous operation.
2. RBW = 1 – 5% of the expected OBW, not to exceed 1MHz
3. VBW \geq 3 x RBW
4. Span = 1.5 times the OBW
5. No. of sweep points \geq 2 x span / RBW
6. Detector = RMS
7. Trigger is set to "free run" for signals with continuous operation with the sweep times set to "auto".
8. The integration bandwidth was roughly set equal to the measured OBW of the signal for signals with continuous operation.
9. Trace mode = trace averaging (RMS) over 100 sweeps
10. The trace was allowed to stabilize

| | | | | |
|---|---|-------------------------------|---|-----------------------------------|
| FCC ID: A3LSMG998JPN |  PCTEST Proud to be part of element | PART 27 MEASUREMENT REPORT |  | Approved by: Technical Manager |
| Test Report S/N: 1M2101110003-04.A3L | Test Dates: 1/17/2021 - 2/11/2021 | EUT Type: Portable Handset | | Page 65 of 83 |

Test Setup

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

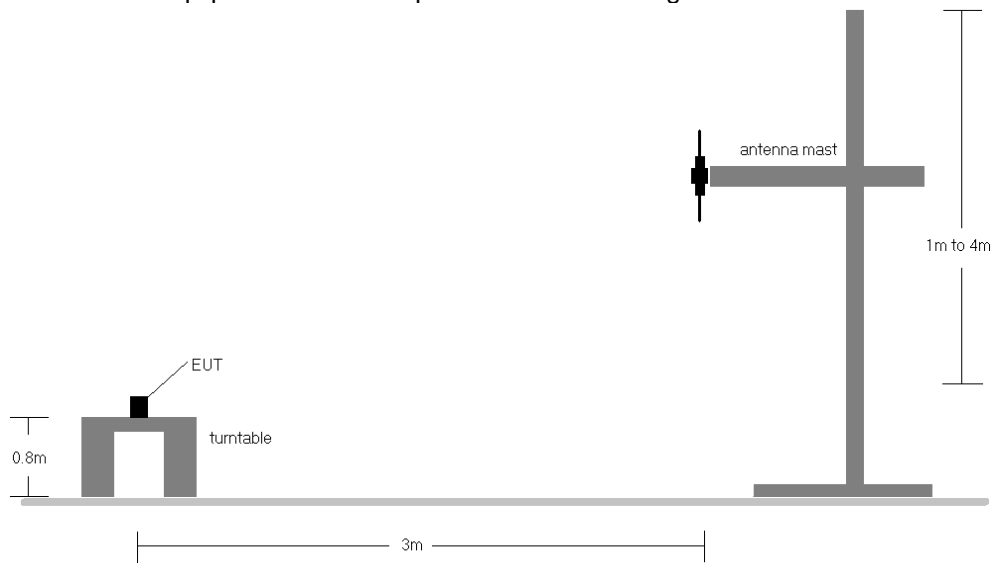


Figure 7-4. Radiated Test Setup <1GHz

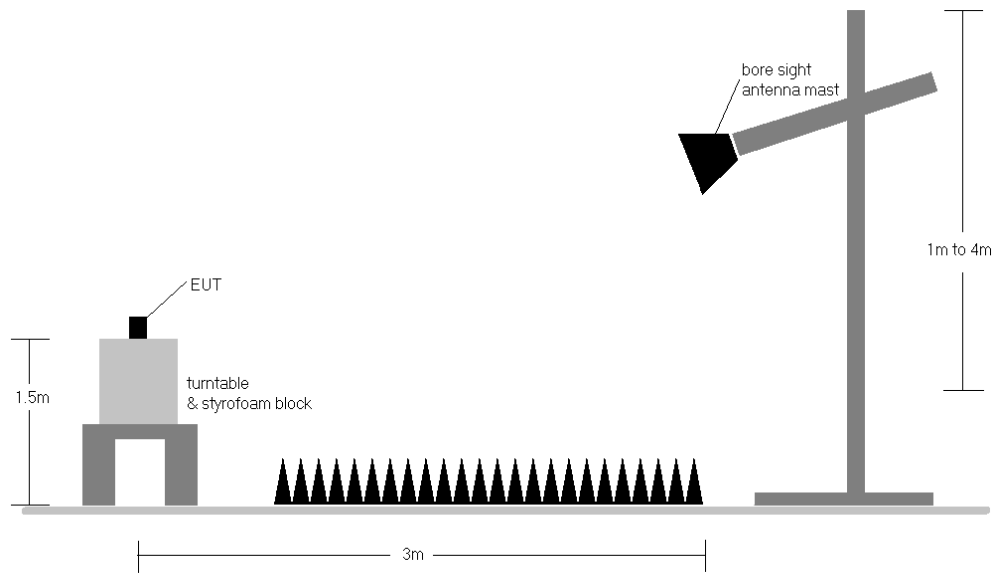




Figure 7-5. Radiated Test Setup >1GHz

| | | | | |
|--|--|--------------------------------------|----------------|--|
| FCC ID: A3LSMG998JPN | PCTEST Proud to be part of element | PART 27 MEASUREMENT REPORT | SAMSUNG | Approved by: Technical Manager |
| Test Report S/N: 1M2101110003-04.A3L | Test Dates: 1/17/2021 - 2/11/2021 | EUT Type: Portable Handset | | Page 66 of 83 |

Test Notes

- 1) 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.
- 2) This unit was tested with its standard battery.
- 3) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case setup is reported in the tables below.

| | | | |
|---|---|-------------------------------|--|
| FCC ID: A3LSMG998JPN |  | PART 27 MEASUREMENT REPORT |  Approved by: Technical Manager |
| Test Report S/N: 1M2101110003-04.A3L | Test Dates: 1/17/2021 - 2/11/2021 | EUT Type: Portable Handset | Page 67 of 83 |

| Bandwidth | Mod. | Frequency [MHz] | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Ant. Gain [dBi] | RB Size/Offset | Substitute Level [dBm] | EIRP [dBm] | EIRP [Watts] | EIRP Limit [dBm] | Margin [dB] |
|-----------|---------------|-----------------|-----------------|---------------------|----------------------------|-----------------|----------------|------------------------|--------------|--------------|------------------|-------------|
| 20 MHz | QPSK | 1720.0 | H | 181 | 216 | 9.41 | 1 / 0 | 13.00 | 22.41 | 0.174 | 30.00 | -7.59 |
| | | 1732.5 | H | 143 | 217 | 9.34 | 1 / 50 | 12.32 | 21.66 | 0.146 | 30.00 | -8.34 |
| | | 1745.0 | H | 135 | 214 | 9.26 | 1 / 50 | 12.75 | 22.01 | 0.159 | 30.00 | -7.99 |
| | 64-QAM | 1720.0 | H | 181 | 216 | 9.41 | 1 / 0 | 12.34 | 21.75 | 0.150 | 30.00 | -8.25 |
| 64-QAM | 1720.0 | H | 181 | 216 | 9.41 | 1 / 0 | 11.04 | 20.45 | 0.111 | 30.00 | -9.55 | |
| 15 MHz | QPSK | 1717.5 | H | 181 | 216 | 9.43 | 1 / 36 | 12.89 | 22.32 | 0.171 | 30.00 | -7.68 |
| | | 1732.5 | H | 143 | 217 | 9.34 | 1 / 36 | 12.36 | 21.70 | 0.148 | 30.00 | -8.30 |
| | | 1747.5 | H | 135 | 214 | 9.25 | 1 / 74 | 12.86 | 22.10 | 0.162 | 30.00 | -7.90 |
| | 64-QAM | 1717.5 | H | 181 | 216 | 9.43 | 1 / 36 | 12.26 | 21.69 | 0.148 | 30.00 | -8.31 |
| 64-QAM | 1717.5 | H | 181 | 216 | 9.43 | 1 / 74 | 10.94 | 20.37 | 0.109 | 30.00 | -9.63 | |
| 10 MHz | QPSK | 1715.0 | H | 181 | 216 | 9.44 | 1 / 25 | 13.08 | 22.52 | 0.179 | 30.00 | -7.48 |
| | | 1732.5 | H | 143 | 217 | 9.34 | 1 / 25 | 12.36 | 21.70 | 0.148 | 30.00 | -8.30 |
| | | 1750.0 | H | 135 | 214 | 9.23 | 1 / 25 | 12.88 | 22.11 | 0.163 | 30.00 | -7.89 |
| | 64-QAM | 1715.0 | H | 181 | 216 | 9.44 | 1 / 25 | 12.20 | 21.64 | 0.146 | 30.00 | -8.36 |
| 64-QAM | 1750.0 | H | 135 | 214 | 9.23 | 1 / 25 | 11.01 | 20.24 | 0.106 | 30.00 | -9.76 | |
| 5 MHz | QPSK | 1712.5 | H | 181 | 216 | 9.46 | 1 / 12 | 13.00 | 22.46 | 0.176 | 30.00 | -7.54 |
| | | 1732.5 | H | 143 | 217 | 9.34 | 1 / 12 | 12.37 | 21.71 | 0.148 | 30.00 | -8.29 |
| | | 1752.5 | H | 135 | 214 | 9.23 | 1 / 12 | 12.99 | 22.22 | 0.167 | 30.00 | -7.78 |
| | 64-QAM | 1712.5 | H | 181 | 216 | 9.46 | 1 / 12 | 12.11 | 21.57 | 0.144 | 30.00 | -8.43 |
| 64-QAM | 1752.5 | H | 135 | 214 | 9.23 | 1 / 0 | 11.08 | 20.31 | 0.107 | 30.00 | -9.69 | |
| 3 MHz | QPSK | 1711.5 | H | 181 | 216 | 9.47 | 1 / 14 | 12.98 | 22.44 | 0.176 | 30.00 | -7.56 |
| | | 1732.5 | H | 143 | 217 | 9.34 | 1 / 7 | 12.43 | 21.77 | 0.150 | 30.00 | -8.23 |
| | | 1753.5 | H | 135 | 214 | 9.24 | 1 / 7 | 12.91 | 22.15 | 0.164 | 30.00 | -7.85 |
| | 64-QAM | 1753.5 | H | 135 | 214 | 9.24 | 1 / 7 | 12.14 | 21.38 | 0.137 | 30.00 | -8.62 |
| 64-QAM | 1753.5 | H | 135 | 214 | 9.24 | 1 / 7 | 11.09 | 20.33 | 0.108 | 30.00 | -9.67 | |
| 1.4 MHz | QPSK | 1710.7 | H | 181 | 216 | 9.47 | 1 / 2 | 12.75 | 22.22 | 0.167 | 30.00 | -7.78 |
| | | 1732.5 | H | 143 | 217 | 9.34 | 1 / 2 | 12.25 | 21.59 | 0.144 | 30.00 | -8.41 |
| | | 1754.3 | H | 135 | 214 | 9.24 | 1 / 2 | 12.80 | 22.04 | 0.160 | 30.00 | -7.96 |
| | 64-QAM | 1710.7 | H | 181 | 216 | 9.47 | 1 / 2 | 12.05 | 21.52 | 0.142 | 30.00 | -8.48 |
| 64-QAM | 1754.3 | H | 135 | 214 | 9.24 | 1 / 2 | 11.00 | 20.24 | 0.106 | 30.00 | -9.76 | |
| 20 MHz | Opposite Pol. | 1720.0 | V | 142 | 298 | 9.31 | 1 / 0 | 13.06 | 22.37 | 0.173 | 30.00 | -7.63 |
| | WCP | 1720.0 | H | 101 | 181 | 9.41 | 1 / 0 | 11.43 | 20.84 | 0.121 | 30.00 | -9.16 |



Table 7-2. EIRP Data (LTE Band 4)

| Bandwidth | Mod. | Frequency [MHz] | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Ant. Gain [dBi] | RB Size/Offset | Substitute Level [dBm] | EIRP [dBm] | EIRP [Watts] | EIRP Limit [dBm] | Margin [dB] | ERP [dBm] | ERP [Watts] | ERP Limit [dBm] | Margin [dB] |
|-----------|---------------|-----------------|-----------------|---------------------|----------------------------|-----------------|----------------|------------------------|--------------|--------------|------------------|-------------|--------------|-------------|-----------------|-------------|
| 10 MHz | QPSK | 704.0 | V | 178 | 227 | 4.58 | 1 / 0 | 13.33 | 17.91 | 0.062 | 36.99 | -19.08 | 15.76 | 0.038 | 34.77 | -19.01 |
| | | 707.5 | V | 173 | 272 | 4.62 | 1 / 0 | 13.30 | 17.92 | 0.062 | 36.99 | -19.07 | 15.77 | 0.038 | 34.77 | -19.00 |
| | | 711.0 | V | 143 | 265 | 4.67 | 1 / 49 | 13.14 | 17.81 | 0.060 | 36.99 | -19.18 | 15.66 | 0.037 | 34.77 | -19.11 |
| | 64-QAM | 707.5 | V | 173 | 272 | 4.62 | 1 / 0 | 12.72 | 17.34 | 0.054 | 36.99 | -19.65 | 15.19 | 0.033 | 34.77 | -19.58 |
| 64-QAM | 707.5 | V | 173 | 272 | 4.62 | 1 / 0 | 11.53 | 16.15 | 0.041 | 36.99 | -20.84 | 14.00 | 0.025 | 34.77 | -20.77 | |
| 5 MHz | QPSK | 701.5 | V | 178 | 227 | 4.60 | 1 / 0 | 13.30 | 17.90 | 0.062 | 36.99 | -19.09 | 15.75 | 0.038 | 34.77 | -19.02 |
| | | 707.5 | V | 173 | 272 | 4.62 | 1 / 12 | 13.21 | 17.83 | 0.061 | 36.99 | -19.16 | 15.68 | 0.037 | 34.77 | -19.09 |
| | | 713.5 | V | 143 | 265 | 4.70 | 1 / 0 | 12.92 | 17.62 | 0.058 | 36.99 | -19.37 | 15.47 | 0.035 | 34.77 | -19.30 |
| | 64-QAM | 701.5 | V | 178 | 227 | 4.60 | 1 / 0 | 12.70 | 17.30 | 0.054 | 36.99 | -19.69 | 15.15 | 0.033 | 34.77 | -19.62 |
| 64-QAM | 701.5 | V | 178 | 227 | 4.60 | 1 / 0 | 11.51 | 16.11 | 0.041 | 36.99 | -20.88 | 13.96 | 0.025 | 34.77 | -20.81 | |
| 3 MHz | QPSK | 700.5 | V | 178 | 227 | 4.59 | 1 / 0 | 13.32 | 17.91 | 0.062 | 36.99 | -19.08 | 15.76 | 0.038 | 34.77 | -19.01 |
| | | 707.5 | V | 173 | 272 | 4.62 | 1 / 7 | 13.21 | 17.83 | 0.061 | 36.99 | -19.16 | 15.68 | 0.037 | 34.77 | -19.09 |
| | | 714.5 | V | 143 | 265 | 4.71 | 1 / 0 | 12.91 | 17.62 | 0.058 | 36.99 | -19.37 | 15.47 | 0.035 | 34.77 | -19.30 |
| | 64-QAM | 700.5 | V | 178 | 227 | 4.59 | 1 / 0 | 12.73 | 17.32 | 0.054 | 36.99 | -19.67 | 15.17 | 0.033 | 34.77 | -19.60 |
| 64-QAM | 700.5 | V | 178 | 227 | 4.59 | 1 / 0 | 11.55 | 16.14 | 0.041 | 36.99 | -20.85 | 13.99 | 0.025 | 34.77 | -20.78 | |
| 1.4 MHz | QPSK | 699.7 | V | 178 | 227 | 4.56 | 1 / 2 | 13.28 | 17.84 | 0.061 | 36.99 | -19.15 | 15.69 | 0.037 | 34.77 | -19.08 |
| | | 707.5 | V | 173 | 272 | 4.62 | 1 / 2 | 13.09 | 17.71 | 0.059 | 36.99 | -19.28 | 15.56 | 0.036 | 34.77 | -19.21 |
| | | 715.3 | V | 143 | 265 | 4.72 | 1 / 2 | 12.81 | 17.53 | 0.057 | 36.99 | -19.46 | 15.38 | 0.034 | 34.77 | -19.39 |
| | 64-QAM | 699.7 | V | 178 | 227 | 4.56 | 1 / 2 | 12.68 | 17.24 | 0.053 | 36.99 | -19.75 | 15.09 | 0.032 | 34.77 | -19.68 |
| 64-QAM | 707.5 | V | 173 | 272 | 4.62 | 1 / 2 | 11.43 | 16.05 | 0.040 | 36.99 | -20.94 | 13.90 | 0.025 | 34.77 | -20.87 | |
| 10 MHz | Opposite Pol. | 707.5 | H | 147 | 287 | 3.72 | 1 / 0 | 13.40 | 17.12 | 0.052 | 36.99 | -19.87 | 14.97 | 0.031 | 34.77 | -19.80 |
| | WCP | 707.5 | V | 186 | 69 | 4.62 | 1 / 0 | 8.92 | 13.54 | 0.023 | 36.99 | -23.45 | 11.39 | 0.014 | 34.77 | -23.38 |

Table 7-3. ERP Data (LTE Band 12)

| Bandwidth | Mod. | Frequency [MHz] | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Ant. Gain [dBi] | RB Size/Offset | Substitute Level [dBm] | EIRP [dBm] | EIRP [Watts] | EIRP Limit [dBm] | Margin [dB] | ERP [dBm] | ERP [Watts] | ERP Limit [dBm] | Margin [dB] |
|-----------|---------------|-----------------|-----------------|---------------------|----------------------------|-----------------|----------------|------------------------|--------------|--------------|------------------|-------------|--------------|-------------|-----------------|-------------|
| 10 MHz | QPSK | 782.0 | H | 100 | 289 | 5.89 | 1 / 0 | 13.52 | 19.41 | 0.087 | 36.99 | -17.58 | 17.26 | 0.053 | 34.77 | -17.51 |
| | 64-QAM | 782.0 | H | 100 | 289 | 5.89 | 1 / 0 | 12.77 | 18.66 | 0.074 | 36.99 | -18.33 | 16.51 | 0.045 | 34.77 | -18.26 |
| | 64-QAM | 782.0 | H | 100 | 289 | 5.89 | 1 / 0 | 11.78 | 17.67 | 0.059 | 36.99 | -19.32 | 15.52 | 0.036 | 34.77 | -19.25 |
| 5 MHz | QPSK | 779.5 | H | 100 | 289 | 5.82 | 1 / 12 | 13.10 | 18.92 | 0.078 | 36.99 | -18.07 | 16.77 | 0.048 | 34.77 | -18.00 |
| | | 782.0 | H | 100 | 289 | 5.89 | 1 / 12 | 13.73 | 19.62 | 0.092 | 36.99 | -17.37 | 17.47 | 0.056 | 34.77 | -17.30 |
| | | 784.5 | H | 100 | 289 | 5.92 | 1 / 12 | 13.18 | 19.10 | 0.081 | 36.99 | -17.89 | 16.95 | 0.050 | 34.77 | -17.82 |
| | 64-QAM | 782.0 | H | 100 | 289 | 5.89 | 1 / 0 | 12.86 | 18.75 | 0.075 | 36.99 | -18.24 | 16.60 | 0.046 | 34.77 | -18.17 |
| 64-QAM | 782.0 | H | 100 | 289 | 5.89 | 1 / 12 | 11.80 | 17.69 | 0.059 | 36.99 | -19.30 | 15.54 | 0.036 | 34.77 | -19.23 | |
| 10 MHz | Opposite Pol. | 779.5 | V | 100 | 284 | 5.77 | 1 / 0 | 12.96 | 18.73 | 0.075 | 36.99 | -18.26 | 16.58 | 0.045 | 34.77 | -18.19 |
| | WCP | 779.5 | V | 100 | 293 | 5.77 | 1 / 0 | 8.69 | 14.46 | 0.028 | 36.99 | -22.53 | 12.31 | 0.017 | 34.77 | -22.46 |

Table 7-4. ERP Data (LTE Band 13)

| | | | |
|---|--|---|-----------------------------------|
| FCC ID: A3LSMG998JPN |  PART 27 MEASUREMENT REPORT |  | Approved by: Technical Manager |
| Test Report S/N: 1M2101110003-04.A3L | Test Dates: 1/17/2021 - 2/11/2021 | EUT Type: Portable Handset | Page 68 of 83 |

7.6 Radiated Spurious Emissions Measurements

Test Overview

Radiated spurious emissions measurements are performed using the substitution method described in ANSI/TIA-603-E-2016 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using horizontally and vertically polarized tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically and horizontally polarized broadband horn antennas. All measurements are performed as peak measurements while the EUT is operating at maximum power, and at the appropriate frequencies.



Test Procedures Used

KDB 971168 D01 v03r01 – Section 5.8

ANSI/TIA-603-E-2016 – Section 2.2.12

Test Settings

1. RBW = 100kHz for emissions below 1GHz and 1MHz for emissions above 1GHz
2. VBW \geq 3 x RBW
3. Span = 1.5 times the OBW
4. No. of sweep points \geq 2 x span / RBW
5. Detector = RMS
6. Trace mode = Average (Max Hold for pulsed emissions)
7. The trace was allowed to stabilize

| | | | |
|---|---|-------------------------------|--|
| FCC ID: A3LSMG998JPN |  | PART 27 MEASUREMENT REPORT |  Approved by: Technical Manager |
| Test Report S/N: 1M2101110003-04.A3L | Test Dates: 1/17/2021 - 2/11/2021 | EUT Type: Portable Handset | Page 69 of 83 |

Test Setup

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

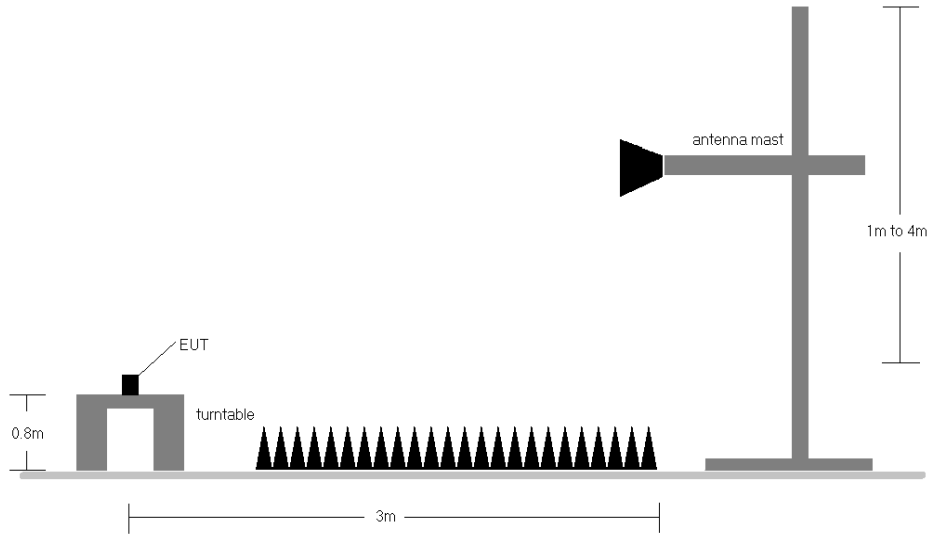


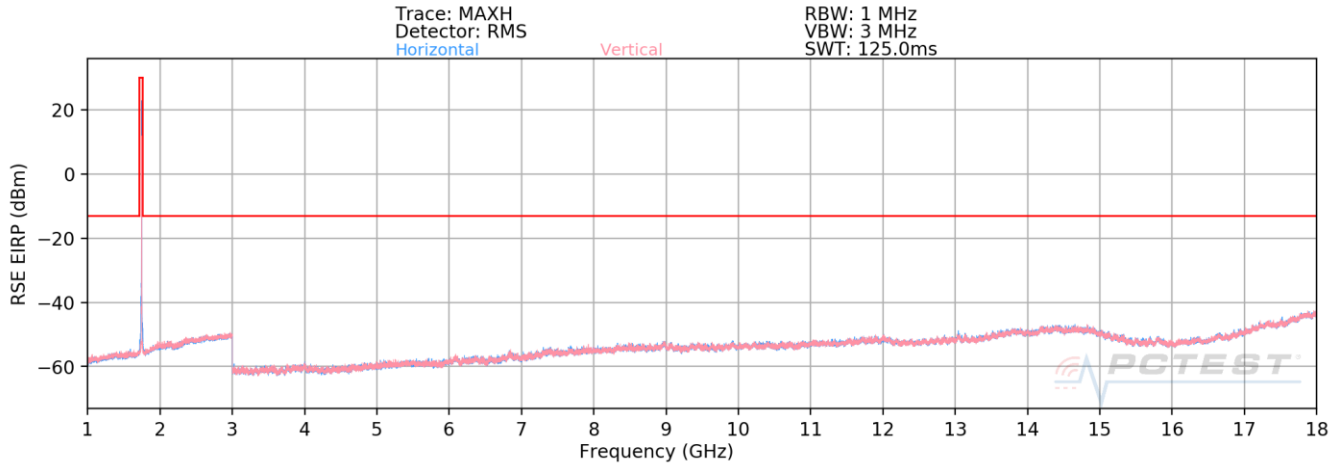
Figure 7-6. Test Instrument & Measurement Setup

Test Notes

- 1) Field strengths are calculated using the Measurement quantity conversions in KDB 971168 Section 5.8.4.
 - b) $E(\text{dB}\mu\text{V}/\text{m}) = \text{Measured amplitude level (dBm)} + 107 + \text{Cable Loss (dB)} + \text{Antenna Factor (dB/m)}$
 - d) $\text{EIRP (dBm)} = E(\text{dB}\mu\text{V}/\text{m}) + 20\log D - 104.8$; where D is the measurement distance in meters.
- 2) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the tables below.
- 3) This unit was tested with its standard battery.
- 4) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case setup is reported in the tables below.
- 5) The spectrum is measured from 9kHz to the 10th harmonic of the fundamental frequency of the transmitter. The worst-case emissions are reported.
- 6) Emissions below 18GHz were measured at a 3 meter test distance while emissions above 18GHz were measured at a 1 meter test distance with the application of a distance correction factor.
- 7) The "-" shown in the following RSE tables are used to denote a noise floor measurement.

| | | | | |
|--|--|--------------------------------------|----------------|--|
| FCC ID: A3LSMG998JPN | PCTEST Proud to be part of element | PART 27 MEASUREMENT REPORT | SAMSUNG | Approved by: Technical Manager |
| Test Report S/N: 1M2101110003-04.A3L | Test Dates: 1/17/2021 - 2/11/2021 | EUT Type: Portable Handset | Page 70 of 83 | |

LTE Band 4



Plot 7-98. Radiated Spurious Plot (LTE Band 4)

| | |
|------------------|--------|
| Bandwidth (MHz): | 20 |
| Frequency (MHz): | 1720.0 |
| RB / Offset: | 1 / 50 |



| Frequency [MHz] | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Field Strength [dB μ V/m] | EIRP Spurious Emission Level [dBm] | Limit [dBm] | Margin [dB] |
|-----------------|-----------------|---------------------|----------------------------|----------------------|-------------|-------------------------------|------------------------------------|-------------|-------------|
| 3440.0 | H | 227 | 172 | -77.86 | 1.69 | 30.83 | -64.43 | -13.00 | -51.43 |
| 5160.0 | H | - | - | -79.33 | 4.50 | 32.17 | -63.09 | -13.00 | -50.09 |
| 6880.0 | H | - | - | -81.32 | 8.67 | 34.35 | -60.90 | -13.00 | -47.90 |
| 8600.0 | H | - | - | -81.17 | 11.00 | 36.83 | -58.42 | -13.00 | -45.42 |

Table 7-5. Radiated Spurious Data (LTE Band 4 – Low Channel)

| | |
|------------------|--------|
| Bandwidth (MHz): | 20 |
| Frequency (MHz): | 1732.5 |
| RB / Offset: | 1 / 50 |

| Frequency [MHz] | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Field Strength [dB μ V/m] | EIRP Spurious Emission Level [dBm] | Limit [dBm] | Margin [dB] |
|-----------------|-----------------|---------------------|----------------------------|----------------------|-------------|-------------------------------|------------------------------------|-------------|-------------|
| 3465.0 | H | 141 | 50 | -77.29 | 1.29 | 31.00 | -64.26 | -13.00 | -51.26 |
| 5197.5 | H | - | - | -79.71 | 4.89 | 32.18 | -63.08 | -13.00 | -50.08 |
| 6930.0 | H | - | - | -81.27 | 7.41 | 33.14 | -62.12 | -13.00 | -49.12 |
| 8662.5 | H | - | - | -81.84 | 11.40 | 36.56 | -58.70 | -13.00 | -45.70 |



Table 7-6. Radiated Spurious Data (LTE Band 4 – Mid Channel)

| | | | |
|---|--|---|-----------------------------------|
| FCC ID: A3LSMG998JPN |  PART 27 MEASUREMENT REPORT |  | Approved by: Technical Manager |
| Test Report S/N: 1M2101110003-04.A3L | Test Dates: 1/17/2021 - 2/11/2021 | EUT Type: Portable Handset | Page 71 of 83 |

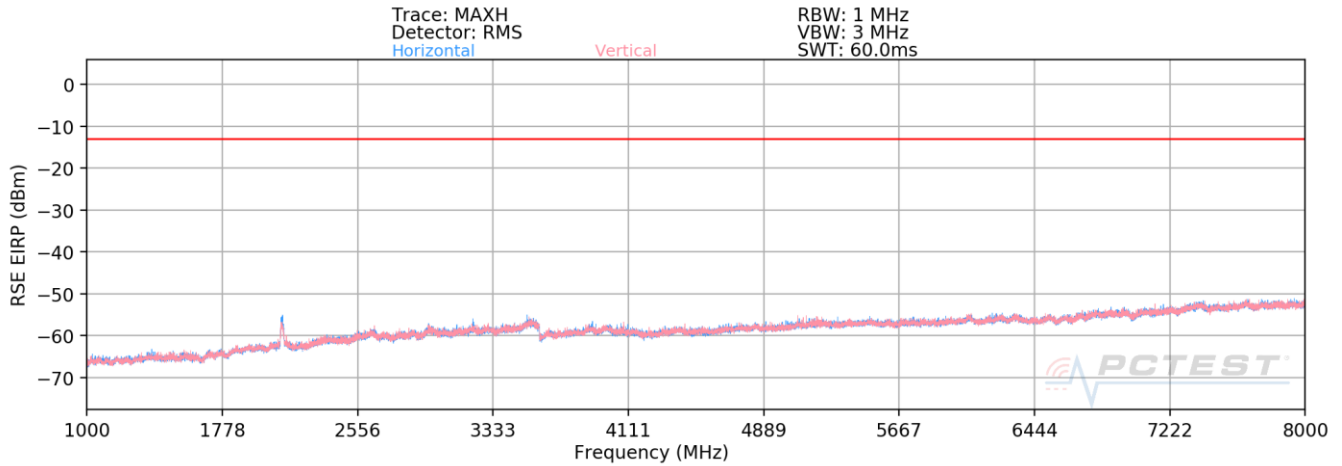
| | |
|------------------|--------|
| Bandwidth (MHz): | 20 |
| Frequency (MHz): | 1745.0 |
| RB / Offset: | 1 / 50 |

| 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] |
|-----------------|-----------------|---------------------|----------------------------|----------------------|-------------|-------------------------|------------------------------------|-------------|-------------|
| 3490.00 | H | 277 | 345 | -77.42 | 1.24 | 30.82 | -64.43 | -13.00 | -51.43 |
| 5235.00 | H | - | - | -79.85 | 4.52 | 31.67 | -63.59 | -13.00 | -50.59 |
| 6980.00 | H | - | - | -80.37 | 7.19 | 33.82 | -61.43 | -13.00 | -48.43 |
| 8725.00 | H | - | - | -80.98 | 10.69 | 36.71 | -58.55 | -13.00 | -45.55 |

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

| | | | |
|---|--|---|-----------------------------------|
| FCC ID: A3LSMG998JPN |  PART 27 MEASUREMENT REPORT |  | Approved by: Technical Manager |
| Test Report S/N: 1M2101110003-04.A3L | Test Dates: 1/17/2021 - 2/11/2021 | EUT Type: Portable Handset | Page 72 of 83 |

LTE Band 12



Plot 7-99. Radiated Spurious Plot (LTE Band 12)

| | |
|------------------|--------|
| Bandwidth (MHz): | 10 |
| Frequency (MHz): | 704.0 |
| 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] |
|-----------------|-----------------|---------------------|----------------------------|----------------------|-------------|-------------------------|------------------------------------|-------------|-------------|
| 1408.0 | H | 161 | 166 | -76.23 | -5.29 | 25.48 | -69.77 | -13.00 | -56.77 |
| 2112.0 | H | 142 | 205 | -65.01 | -2.85 | 39.14 | -56.11 | -13.00 | -43.11 |
| 2816.0 | H | - | - | -77.96 | -1.28 | 27.76 | -67.50 | -13.00 | -54.50 |
| 3520.0 | H | - | - | -78.58 | 1.37 | 29.79 | -65.46 | -13.00 | -52.46 |
| 4224.0 | H | - | - | -79.00 | 1.87 | 29.87 | -65.39 | -13.00 | -52.39 |

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

| | |
|------------------|--------|
| Bandwidth (MHz): | 10 |
| Frequency (MHz): | 707.5 |
| 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] |
|-----------------|-----------------|---------------------|----------------------------|----------------------|-------------|-------------------------|------------------------------------|-------------|-------------|
| 1415.0 | H | 174 | 163 | -75.96 | -5.37 | 25.67 | -69.59 | -13.00 | -56.59 |
| 2122.5 | H | 141 | 236 | -65.59 | -2.88 | 38.53 | -56.73 | -13.00 | -43.73 |
| 2830.0 | H | - | - | -77.83 | -1.15 | 28.02 | -67.24 | -13.00 | -54.24 |
| 3537.5 | H | - | - | -78.31 | 1.53 | 30.22 | -65.04 | -13.00 | -52.04 |
| 4245.0 | H | - | - | -78.87 | 1.97 | 30.10 | -65.16 | -13.00 | -52.16 |



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

| | | | |
|---|--|---|-----------------------------------|
| FCC ID: A3LSMG998JPN |  PART 27 MEASUREMENT REPORT |  | Approved by: Technical Manager |
| Test Report S/N: 1M2101110003-04.A3L | Test Dates: 1/17/2021 - 2/11/2021 | EUT Type: Portable Handset | Page 73 of 83 |

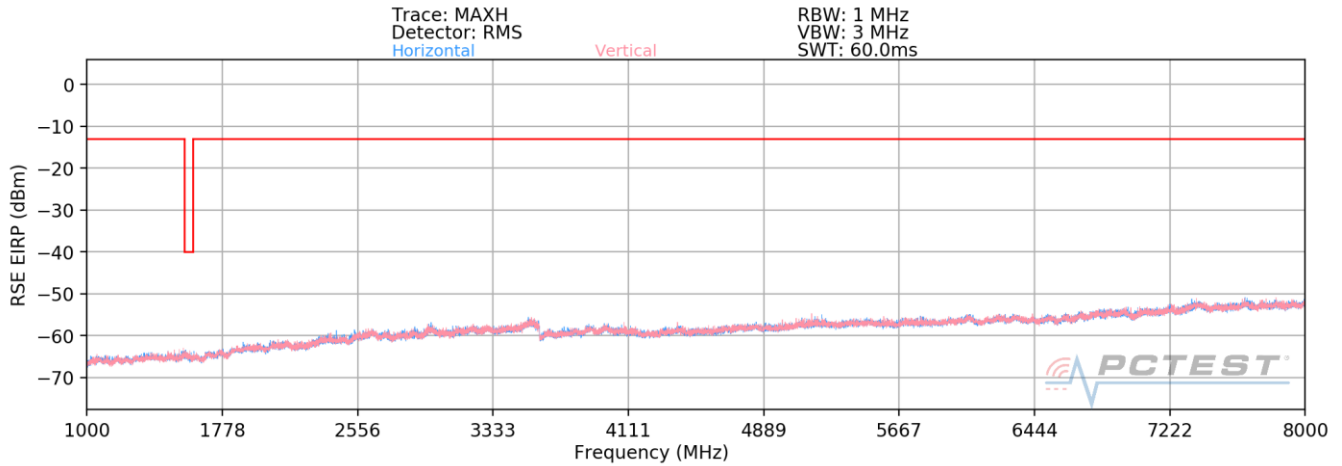
| | |
|------------------|--------|
| Bandwidth (MHz): | 10 |
| Frequency (MHz): | 711.0 |
| RB / Offset: | 1 / 25 |

| Frequency [MHz] | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Field Strength [dB μ V/m] | EIRP Spurious Emission Level [dBm] | Limit [dBm] | Margin [dB] |
|-----------------|-----------------|---------------------|----------------------------|----------------------|-------------|-------------------------------|------------------------------------|-------------|-------------|
| 1422.0 | H | 157 | 166 | -77.52 | -5.35 | 24.13 | -71.13 | -13.00 | -58.13 |
| 2133.0 | H | 141 | 237 | -65.93 | -2.88 | 38.19 | -57.06 | -13.00 | -44.06 |
| 2844.0 | H | - | - | -77.48 | -1.09 | 28.43 | -66.83 | -13.00 | -53.83 |
| 3555.0 | H | - | - | -78.24 | 1.45 | 30.21 | -65.05 | -13.00 | -52.05 |
| 4266.0 | H | - | - | -79.37 | 2.26 | 29.89 | -65.37 | -13.00 | -52.37 |

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

| | | | |
|---|--|---|-----------------------------------|
| FCC ID: A3LSMG998JPN |  PART 27 MEASUREMENT REPORT |  | Approved by: Technical Manager |
| Test Report S/N: 1M2101110003-04.A3L | Test Dates: 1/17/2021 - 2/11/2021 | EUT Type: Portable Handset | Page 74 of 83 |

LTE Band 13





Plot 7-100. Radiated Spurious Plot (LTE Band 13)

| | |
|------------------|--------|
| Bandwidth (MHz): | 10 |
| Frequency (MHz): | 782.0 |
| RB / Offset: | 1 / 25 |

| Frequency [MHz] | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Field Strength [dB μ V/m] | EIRP Spurious Emission Level [dBm] | Limit [dBm] | Margin [dB] |
|-----------------|-----------------|---------------------|----------------------------|----------------------|-------------|-------------------------------|------------------------------------|-------------|-------------|
| 1564.0 | H | 129 | 179 | -76.54 | -5.05 | 25.41 | -69.85 | -40.00 | -29.85 |
| 2346.0 | H | 117 | 209 | -76.14 | -2.12 | 28.74 | -66.52 | -13.00 | -53.52 |
| 3128.0 | H | 193 | 136 | -76.99 | 0.05 | 30.06 | -65.19 | -13.00 | -52.19 |
| 3910.0 | H | - | - | -78.83 | 2.85 | 31.02 | -64.24 | -13.00 | -51.24 |
| 4692.0 | H | - | - | -78.69 | 2.70 | 31.01 | -64.25 | -13.00 | -51.25 |
| 5474.0 | H | - | - | -79.92 | 5.52 | 32.60 | -62.66 | -13.00 | -49.66 |

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

| | | | |
|---|--|---|-----------------------------------|
| FCC ID: A3LSMG998JPN |  PART 27 MEASUREMENT REPORT |  | Approved by: Technical Manager |
| Test Report S/N: 1M2101110003-04.A3L | Test Dates: 1/17/2021 - 2/11/2021 | EUT Type: Portable Handset | Page 75 of 83 |

7.7 Frequency Stability / Temperature Variation

Test Overview and Limit

Frequency stability testing is performed in accordance with the guidelines of ANSI/TIA-603-E-2016. The frequency stability of the transmitter is measured by:

- a.) **Temperature:** The temperature is varied from -30°C to +50°C in 10°C increments using an environmental chamber.
- b.) **Primary Supply Voltage:** The primary supply voltage is varied from 85% to 115% of the nominal value for non hand-carried battery and AC powered equipment. For hand-carried, battery-powered equipment, primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacturer.

For Part 27, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

Test Procedure Used

ANSI/TIA-603-E-2016

Test Settings



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

Test Setup

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

Test Notes



None

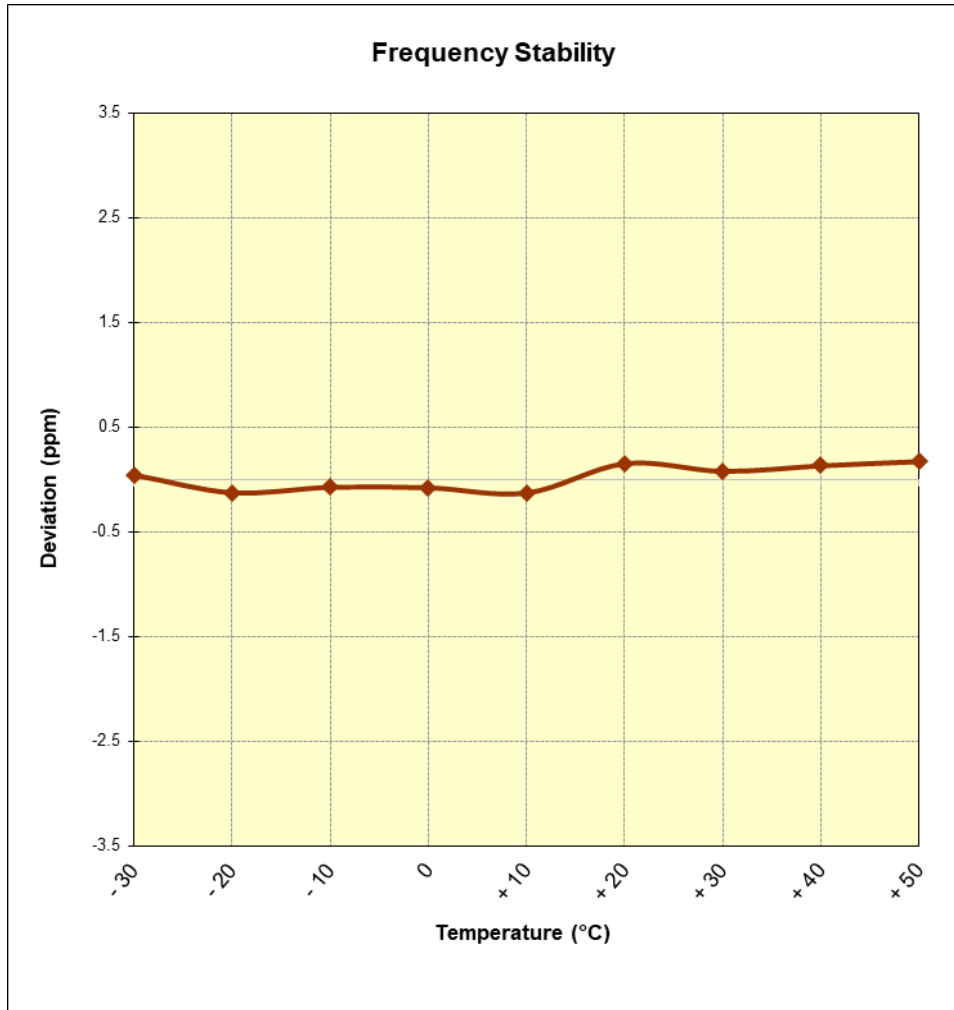
| | | |
|---|---|-----------------------------------|
| FCC ID: A3LSMG998JPN |  PART 27 MEASUREMENT REPORT  | Approved by: Technical Manager |
| Test Report S/N: 1M2101110003-04.A3L | Test Dates: 1/17/2021 - 2/11/2021 | EUT Type: Portable Handset |
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LTE Band 4

| OPERATING FREQUENCY: <u>1,732,500,000</u> Hz | | | | | |
|--|-------------|------------|----------------|-----------------|---------------|
| CHANNEL: <u>20175</u> | | | | | |
| REFERENCE VOLTAGE: <u>4.18</u> VDC | | | | | |
| VOLTAGE (%) | POWER (VDC) | TEMP (°C) | FREQUENCY (Hz) | Freq. Dev. (Hz) | Deviation (%) |
| 100 % | 4.18 | + 20 (Ref) | 1,732,500,441 | 441 | 0.0000000 |
| 100 % | | - 30 | 1,732,500,520 | 79 | 0.0000046 |
| 100 % | | - 20 | 1,732,500,224 | -217 | -0.0000125 |
| 100 % | | - 10 | 1,732,500,316 | -125 | -0.0000072 |
| 100 % | | 0 | 1,732,500,307 | -134 | -0.0000077 |
| 100 % | | + 10 | 1,732,500,220 | -221 | -0.0000128 |
| 100 % | | + 20 | 1,732,500,712 | 271 | 0.0000156 |
| 100 % | | + 30 | 1,732,500,582 | 141 | 0.0000081 |
| 100 % | | + 40 | 1,732,500,675 | 234 | 0.0000135 |
| 100 % | | + 50 | 1,732,500,745 | 304 | 0.0000175 |
| 85 % | | + 20 | 1,732,500,147 | -294 | -0.0000170 |
| BATT. ENDPOINT | | 2.98 | + 20 | 1,732,500,828 | 387 |

Table 7-12. LTE Band 4 Frequency Stability Data

| | | | |
|---|--|---|-----------------------------------|
| FCC ID: A3LSMG998JPN |  PART 27 MEASUREMENT REPORT |  | Approved by: Technical Manager |
| Test Report S/N: 1M2101110003-04.A3L | Test Dates: 1/17/2021 - 2/11/2021 | EUT Type: Portable Handset | Page 77 of 83 |





Plot 7-101. LTE Band 4 Frequency Stability Chart

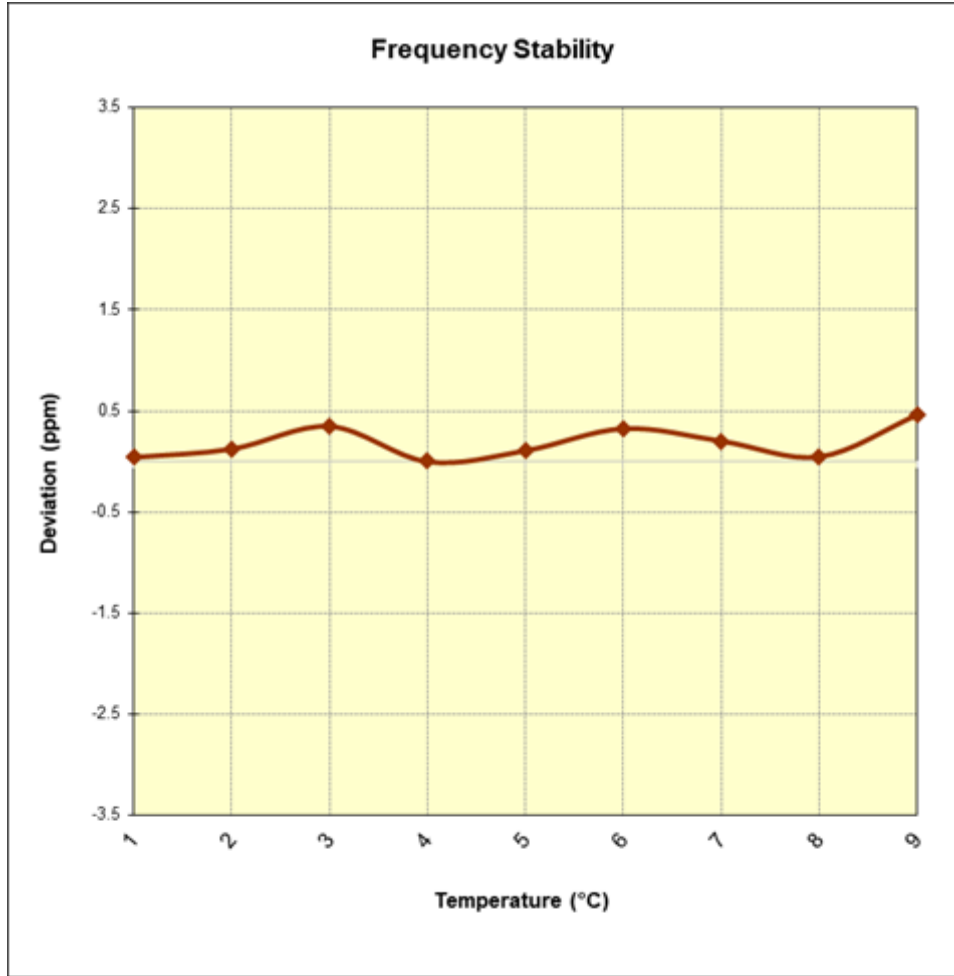
| | | | |
|--|---|--------------------------------------|--|
| FCC ID: A3LSMG998JPN | | PART 27 MEASUREMENT REPORT | Approved by: Technical Manager |
| Test Report S/N: 1M2101110003-04.A3L | Test Dates: 1/17/2021 - 2/11/2021 | EUT Type: Portable Handset | Page 78 of 83 |

LTE Band 12

| OPERATING FREQUENCY: <u>707,500,000</u> Hz | | | | | |
|--|-------------|------------|----------------|-----------------|---------------|
| CHANNEL: <u>23790</u> | | | | | |
| REFERENCE VOLTAGE: <u>4.18</u> VDC | | | | | |
| VOLTAGE (%) | POWER (VDC) | TEMP (°C) | FREQUENCY (Hz) | Freq. Dev. (Hz) | Deviation (%) |
| 100 % | 4.18 | + 20 (Ref) | 707,499,736 | -264 | 0.0000000 |
| 100 % | | - 30 | 707,499,769 | 33 | 0.0000047 |
| 100 % | | - 20 | 707,499,826 | 90 | 0.0000127 |
| 100 % | | - 10 | 707,499,981 | 245 | 0.0000346 |
| 100 % | | 0 | 707,499,738 | 2 | 0.0000003 |
| 100 % | | + 10 | 707,499,815 | 79 | 0.0000112 |
| 100 % | | + 20 | 707,499,966 | 230 | 0.0000325 |
| 100 % | | + 30 | 707,499,880 | 144 | 0.0000204 |
| 100 % | | + 40 | 707,499,773 | 37 | 0.0000052 |
| 100 % | | + 50 | 707,500,061 | 325 | 0.0000459 |
| 85 % | | + 20 | 707,499,646 | -90 | -0.0000127 |
| BATT. ENDPOINT | | 2.98 | + 20 | 707,499,598 | -138 |

Table 7-13. LTE Band 12 Frequency Stability Data

| | | | |
|---|--|---|-----------------------------------|
| FCC ID: A3LSMG998JPN |  PART 27 MEASUREMENT REPORT |  | Approved by: Technical Manager |
| Test Report S/N: 1M2101110003-04.A3L | Test Dates: 1/17/2021 - 2/11/2021 | EUT Type: Portable Handset | Page 79 of 83 |



Plot 7-102. LTE Band 12 Frequency Stability Chart



| | | | | |
|--|---|--------------------------------------|---------------|--|
| FCC ID: A3LSMG998JPN | | PART 27 MEASUREMENT REPORT | | Approved by: Technical Manager |
| Test Report S/N: 1M2101110003-04.A3L | Test Dates: 1/17/2021 - 2/11/2021 | EUT Type: Portable Handset | Page 80 of 83 | |

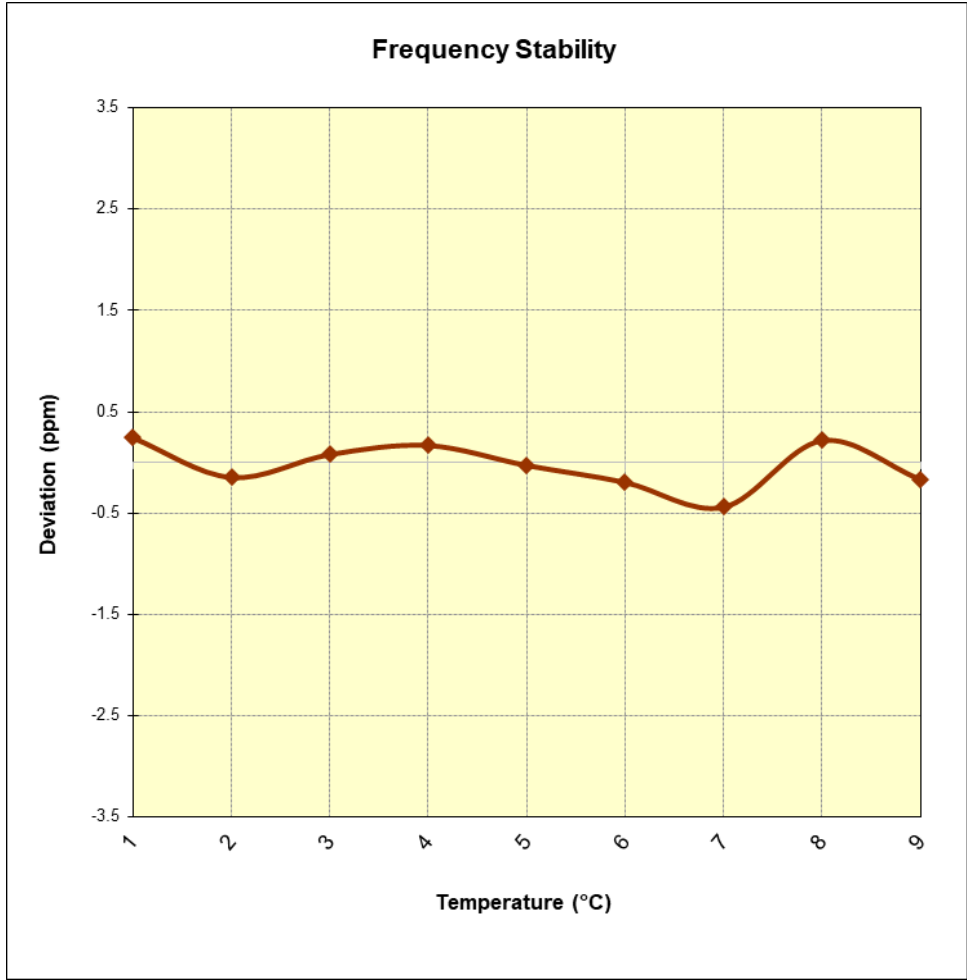
LTE Band 13

| | | |
|----------------------|-------------|-----|
| OPERATING FREQUENCY: | 782,000,000 | Hz |
| CHANNEL: | 23230 | |
| REFERENCE VOLTAGE: | 4.18 | VDC |

| VOLTAGE (%) | POWER (VDC) | TEMP (°C) | FREQUENCY (Hz) | Freq. Dev. (Hz) | Deviation (%) |
|----------------|-------------|------------|----------------|-----------------|---------------|
| 100 % | 4.18 | + 20 (Ref) | 781,999,814 | -186 | 0.0000000 |
| 100 % | | - 30 | 782,000,007 | 193 | 0.0000247 |
| 100 % | | - 20 | 781,999,702 | -112 | -0.0000143 |
| 100 % | | - 10 | 781,999,878 | 64 | 0.0000082 |
| 100 % | | 0 | 781,999,948 | 134 | 0.0000171 |
| 100 % | | + 10 | 781,999,795 | -19 | -0.0000024 |
| 100 % | | + 20 | 781,999,664 | -150 | -0.0000192 |
| 100 % | | + 30 | 781,999,473 | -341 | -0.0000436 |
| 100 % | | + 40 | 781,999,985 | 171 | 0.0000219 |
| 100 % | | + 50 | 781,999,686 | -128 | -0.0000164 |
| 85 % | | + 20 | 781,999,551 | -263 | -0.0000336 |
| BATT. ENDPOINT | | 2.98 | + 20 | 782,000,274 | 460 |

Table 7-14. LTE Band 13 Frequency Stability Data

| | | | |
|---|---|-------------------------------|---|
| FCC ID: A3LSMG998JPN |  | PART 27 MEASUREMENT REPORT |  |
| Test Report S/N: 1M2101110003-04.A3L | Test Dates: 1/17/2021 - 2/11/2021 | EUT Type: Portable Handset | Approved by: Technical Manager |
| | | | Page 81 of 83 |





Plot 7-103. LTE Band 13 Frequency Stability Chart

| | | | |
|--|---|--------------------------------------|--|
| FCC ID: A3LSMG998JPN | | PART 27 MEASUREMENT REPORT | Approved by: Technical Manager |
| Test Report S/N: 1M2101110003-04.A3L | Test Dates: 1/17/2021 - 2/11/2021 | EUT Type: Portable Handset | Page 82 of 83 |

8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **Samsung Portable Handset FCC ID: A3LSMG998JPN** complies with all the requirements of Part 27 of the FCC rules.

| | | | |
|--|---|---|--|
| FCC ID: A3LSMG998JPN |  | PART 27 MEASUREMENT REPORT  | Approved by: Technical Manager |
| Test Report S/N: 1M2101110003-04.A3L | Test Dates: 1/17/2021 - 2/11/2021 | EUT Type: Portable Handset | Page 83 of 83 |