



PART 27 MEASUREMENT REPORT

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


Date of Testing:
04/12/2021 – 06/11/2021
Test Site/Location:
PCTEST Lab. Columbia, MD, USA
Test Report Serial No.:
1M2104070032-05.A3L

| | |
|------------------------|--------------------------------------|
| FCC ID: | A3LSMF711U |
| Applicant Name: | Samsung Electronics Co., Ltd. |

| | |
|-----------------------------|---|
| Application Type: | Certification |
| Model: | SM-F711U |
| Additional Model(s): | SM-F711U1 |
| 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

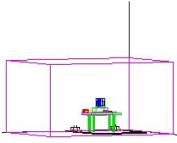


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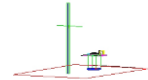
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| Mode | Bandwidth | Modulation | Tx Frequency Range [MHz] | EIRP | | Emission Designator |
|---------------------|-----------|--------------|--------------------------|----------------|------------------|---------------------|
| | | | | Max. Power [W] | Max. Power [dBm] | |
| LTE Band 30 | 10 MHz | QPSK | 2310.0 | 0.194 | 22.88 | 9M04G7D |
| | | 16QAM | 2310.0 | 0.157 | 21.96 | 8M97W7D |
| | 5 MHz | QPSK | 2307.5 - 2312.5 | 0.192 | 22.83 | 4M51G7D |
| | | 16QAM | 2307.5 - 2312.5 | 0.150 | 21.75 | 4M50W7D |
| LTE Band 7 | 20 MHz | QPSK | 2510.0 - 2560.0 | 0.259 | 24.13 | 18M0G7D |
| | | 16QAM | 2510.0 - 2560.0 | 0.238 | 23.76 | 18M0W7D |
| | 15 MHz | QPSK | 2507.5 - 2562.5 | 0.259 | 24.13 | 13M5G7D |
| | | 16QAM | 2507.5 - 2562.5 | 0.245 | 23.89 | 13M5W7D |
| | 10 MHz | QPSK | 2505.0 - 2565.0 | 0.263 | 24.21 | 9M04G7D |
| | | 16QAM | 2505.0 - 2565.0 | 0.235 | 23.71 | 9M01W7D |
| | 5 MHz | QPSK | 2502.5 - 2567.5 | 0.268 | 24.27 | 4M51G7D |
| | | 16QAM | 2502.5 - 2567.5 | 0.238 | 23.77 | 4M52W7D |
| LTE Band 41(PC2) | 20 MHz | QPSK | 2506.0 - 2680.0 | 0.604 | 27.81 | 18M0G7D |
| | | 16QAM | 2506.0 - 2680.0 | 0.531 | 27.25 | 17M9W7D |
| | 15 MHz | QPSK | 2503.5 - 2682.5 | 0.593 | 27.73 | 13M5G7D |
| | | 16QAM | 2503.5 - 2682.5 | 0.529 | 27.23 | 13M5W7D |
| | 10 MHz | QPSK | 2501.0 - 2685.0 | 0.599 | 27.77 | 9M00G7D |
| | | 16QAM | 2501.0 - 2685.0 | 0.540 | 27.32 | 9M00W7D |
| | 5 MHz | QPSK | 2498.5 - 2687.5 | 0.603 | 27.80 | 4M52G7D |
| | | 16QAM | 2498.5 - 2687.5 | 0.542 | 27.34 | 4M51W7D |
| LTE Band 41(PC3)/38 | 20 MHz | QPSK | 2506.0 - 2680.0 | 0.350 | 25.44 | 18M0G7D |
| | | 16QAM | 2506.0 - 2680.0 | 0.330 | 25.18 | 17M9W7D |
| | 15 MHz | QPSK | 2503.5 - 2682.5 | 0.348 | 25.41 | 13M5G7D |
| | | 16QAM | 2503.5 - 2682.5 | 0.324 | 25.11 | 13M5W7D |
| | 10 MHz | QPSK | 2501.0 - 2685.0 | 0.350 | 25.44 | 9M04G7D |
| | | 16QAM | 2501.0 - 2685.0 | 0.335 | 25.25 | 9M00W7D |
| | 5 MHz | QPSK | 2498.5 - 2687.5 | 0.352 | 25.46 | 4M52G7D |
| | | 16QAM | 2498.5 - 2687.5 | 0.331 | 25.20 | 4M51W7D |
| NR Band n30 | 10 MHz | $\pi/2$ BPSK | 2310.0 | 0.198 | 22.96 | 8M99G7D |
| | | QPSK | 2310.0 | 0.193 | 22.85 | 9M35G7D |
| | | 16QAM | 2310.0 | 0.169 | 22.27 | 9M34W7D |
| | 5 MHz | $\pi/2$ BPSK | 2307.5 - 2312.5 | 0.196 | 22.92 | 4M52G7D |
| | | QPSK | 2307.5 - 2312.5 | 0.189 | 22.76 | 4M52G7D |
| | | 16QAM | 2307.5 - 2312.5 | 0.164 | 22.14 | 4M55W7D |
| NR Band n41 PC2 | 100 MHz | $\pi/2$ BPSK | 2546.0 - 2640.0 | 0.381 | 25.81 | 96M8G7D |
| | | QPSK | 2546.0 - 2640.0 | 0.364 | 25.61 | 98M0G7D |
| | | 16QAM | 2546.0 - 2640.0 | 0.250 | 23.98 | 98M1W7D |
| | 90 MHz | $\pi/2$ BPSK | 2541.0 - 2645.0 | 0.345 | 25.38 | 87M4G7D |
| | | QPSK | 2541.0 - 2645.0 | 0.289 | 24.61 | 87M8G7D |
| | | 16QAM | 2541.0 - 2645.0 | 0.196 | 22.92 | 87M9W7D |
| | 80 MHz | $\pi/2$ BPSK | 2536.0 - 2650.0 | 0.336 | 25.26 | 77M6G7D |
| | | QPSK | 2536.0 - 2650.0 | 0.318 | 25.03 | 77M8G7D |
| | | 16QAM | 2536.0 - 2650.0 | 0.214 | 23.31 | 77M9W7D |
| | 60 MHz | $\pi/2$ BPSK | 2526.0 - 2660.0 | 0.381 | 25.81 | 58M3G7D |
| | | QPSK | 2526.0 - 2660.0 | 0.364 | 25.61 | 58M2G7D |
| | | 16QAM | 2526.0 - 2660.0 | 0.250 | 23.98 | 58M3W7D |
| | 50 MHz | $\pi/2$ BPSK | 2521.0 - 2665.0 | 0.375 | 25.74 | 46M2G7D |
| | | QPSK | 2521.0 - 2665.0 | 0.321 | 25.06 | 47M7G7D |
| | | 16QAM | 2521.0 - 2665.0 | 0.232 | 23.65 | 47M7W7D |
| | 40 MHz | $\pi/2$ BPSK | 2516.0 - 2670.0 | 0.282 | 24.50 | 35M8G7D |
| | | QPSK | 2516.0 - 2670.0 | 0.268 | 24.28 | 37M9G7D |
| | | 16QAM | 2516.0 - 2670.0 | 0.172 | 22.35 | 38M0W7D |
| | 30 MHz | $\pi/2$ BPSK | 2511.0 - 2675.0 | 0.304 | 24.83 | 27M0G7D |
| | | QPSK | 2511.0 - 2675.0 | 0.277 | 24.42 | 28M0G7D |
| | | 16QAM | 2511.0 - 2675.0 | 0.177 | 22.47 | 28M0W7D |
| | 20 MHz | $\pi/2$ BPSK | 2506.0 - 2680.0 | 0.372 | 25.71 | 22M9G7D |
| | | QPSK | 2506.0 - 2680.0 | 0.326 | 25.14 | 23M2G7D |
| | | 16QAM | 2506.0 - 2680.0 | 0.209 | 23.21 | 23M3W7D |

EUT Overview

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|---|--|-----------------------------------|---|-----------------------------------|
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| Mode | Bandwidth | Modulation | Tx Frequency Range [MHz] | EIRP | | Emission Designator |
|--------------------|-----------|--------------|--------------------------|-----------------|------------------|---------------------|
| | | | | Max. Power [W] | Max. Power [dBm] | |
| NR Band n41 PC3 | 100 MHz | $\pi/2$ BPSK | 2546.0 - 2640.0 | 0.205 | 23.11 | 97M1G7D |
| | | QPSK | 2546.0 - 2640.0 | 0.200 | 23.01 | 97M8G7D |
| | | 16QAM | 2546.0 - 2640.0 | 0.155 | 21.90 | 97M8W7D |
| | 90 MHz | $\pi/2$ BPSK | 2541.0 - 2645.0 | 0.189 | 22.76 | 87M2G7D |
| | | QPSK | 2541.0 - 2645.0 | 0.201 | 23.02 | 88M0G7D |
| | | 16QAM | 2541.0 - 2645.0 | 0.127 | 21.05 | 88M1W7D |
| | 80 MHz | $\pi/2$ BPSK | 2536.0 - 2650.0 | 0.190 | 22.78 | 77M3G7D |
| | | QPSK | 2536.0 - 2650.0 | 0.216 | 23.34 | 77M6G7D |
| | | 16QAM | 2536.0 - 2650.0 | 0.133 | 21.23 | 77M9W7D |
| | 60 MHz | $\pi/2$ BPSK | 2526.0 - 2660.0 | 0.205 | 23.11 | 58M3G7D |
| | | QPSK | 2526.0 - 2660.0 | 0.200 | 23.01 | 58M3G7D |
| | | 16QAM | 2526.0 - 2660.0 | 0.155 | 21.90 | 58M1W7D |
| | 50 MHz | $\pi/2$ BPSK | 2521.0 - 2665.0 | 0.198 | 22.98 | 46M0G7D |
| | | QPSK | 2521.0 - 2665.0 | 0.207 | 23.15 | 47M6G7D |
| | | 16QAM | 2521.0 - 2665.0 | 0.144 | 21.58 | 48M0W7D |
| | 40 MHz | $\pi/2$ BPSK | 2516.0 - 2670.0 | 0.149 | 21.74 | 35M8G7D |
| | | QPSK | 2516.0 - 2670.0 | 0.147 | 21.68 | 37M9G7D |
| | | 16QAM | 2516.0 - 2670.0 | 0.106 | 20.27 | 37M9W7D |
| | 30 MHz | $\pi/2$ BPSK | 2511.0 - 2675.0 | 0.162 | 22.09 | 26M9G7D |
| | | QPSK | 2511.0 - 2675.0 | 0.152 | 21.82 | 26M9G7D |
| | | 16QAM | 2511.0 - 2675.0 | 0.109 | 20.39 | 26M9W7D |
| | 20 MHz | $\pi/2$ BPSK | 2506.0 - 2680.0 | 0.197 | 22.95 | 17M9G7D |
| | | QPSK | 2506.0 - 2680.0 | 0.179 | 22.54 | 18M3G7D |
| | | | 16QAM | 2506.0 - 2680.0 | 0.130 | 21.13 |

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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 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: A3LSMF711U**. 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.: 0859M, 0123M, 0846M, 0834M, 0129M, 0130M, 1964M, 0151M, 0811M, 0880M

2.2 Device Capabilities

This device contains the following capabilities:

850/1900 CDMA/EvDO Rev0/A, 1x Advanced (BC0, BC1), 850/1900 GSM/GPRS/EDGE, 850/1700/1900 WCDMA/HSPA, Multi-band LTE, 5G NR (n71, n12, n5, n66, n2, n25, n30, n41, n77, n260, n261), 802.11b/g/n/ax WLAN, 802.11a/n/ac/ax UNII (5GHz), Bluetooth (1x, EDR, LE), NFC, Wireless Power Transfer

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.

This device supports two configurations: one is with screen open, and one is with screen closed. Both configurations are tested, and 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 “Land Mobile FM or PM – Communications Equipment – Measurements and Performance Standards” (ANSI/TIA-603-E-2016) and “Measurement Guidance for Certification of Licensed Digital Transmitters” (KDB 971168 D01 v03r01) were used in the measurement of the EUT.

Deviation from Measurement Procedure.....None

3.2 Radiated Power and Radiated Spurious Emissions

The radiated test facilities consisted of an indoor 3 meter semi-anechoic chamber used for final measurements and exploratory measurements, when necessary. The measurement area is contained within the semi-anechoic chamber which is shielded from any ambient interference. The test site inside the chamber is a 6m x 5.2m elliptical, obstruction-free area in accordance with Figure 5.7 of Clause 5 in ANSI C63.4-2014. Absorbers are arranged on the floor between the turn table and the antenna mast in such a way so as to maximize the reduction of reflections for measurements above 1GHz. For measurements below 1GHz, the absorbers are removed. A raised turntable is used for radiated measurement. The turn table is a continuously rotatable, remote-controlled, metallic turntable and 2 meters (6.56 ft.) in diameter. The turn table is flush with the raised floor of the chamber in order to maintain its function as a ground plane. An 80cm tall test table made of Styrodur is placed on top of the turn table. A Styrodur pedestal is placed on top of the test table to bring the total table height to 1.5m.

The equipment under test was transmitting while connected to its integral antenna and is placed on a turntable 3 meters from the receive antenna. The receive antenna height is adjusted between 1 and 4 meter height, the turntable is rotated through 360 degrees, and the EUT is manipulated through all orthogonal planes representative of its typical use to achieve the highest reading on the receive spectrum analyzer.

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

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

where P_d is the dipole equivalent power, P_g is the generator output into the substitution antenna, and the antenna gain is the gain of the substitute antenna used relative to either a half-wave dipole (dBd) or an isotropic source (dBi). The substitute level is equal to $P_g \text{ [dBm]} - \text{cable loss [dB]}$.

For radiated spurious emissions measurements and calculations, conversion method is used per the formulas in KDB 971168 Section 5.8.4. Field Strength (EIRP) is calculated using the following formulas:



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

And

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

All radiated measurements are performed in a chamber that meets the site requirements per ANSI C63.4-2014. Additionally, radiated emissions below 30MHz are also validated on an Open Area Test Site to assert correlation with the chamber measurements per the requirements of KDB 414788 D01.



Radiated power and radiated spurious emission levels are investigated with the receive antenna horizontally and vertically polarized per ANSI/TIA-603-E-2016.

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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 |
|-----------------------|------------|----------------------------------|------------|--------------|------------|---------------|
| - | AP2 | EMC Cable and Switch System | 9/9/2020 | Annual | 9/9/2021 | AP2 |
| - | AP1 | EMC Cable and Switch System | 9/10/2020 | Annual | 9/10/2021 | AP1 |
| - | LTX2 | Licensed Transmitter Cable Set | 9/16/2020 | Annual | 9/16/2021 | LTX2 |
| - | LTX5 | Licensed Transmitter Cable Set | 9/16/2020 | Annual | 9/16/2021 | LTX5 |
| Agilent | E5515C | Wireless Communications Test Set | | N/A | | GB45360985 |
| Agilent | E5515C | Wireless Communications Test Set | | N/A | | GB46310798 |
| 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 |
| ETS Lindgren | 3164-08 | Quad Ridge Horn Antenna | 3/12/2020 | Biennial | 3/12/2022 | 128337 |
| Keysight Technologies | N9020A | MXA Signal Analyzer | 9/22/2020 | Annual | 9/22/2021 | MY54500644 |
| Keysight Technologies | N9020A | MXA Signal Analyzer | 8/14/2020 | Annual | 8/14/2021 | US46470561 |
| Keysight Technologies | N9038A | MXE EMI Receiver | 8/11/2020 | Annual | 8/11/2021 | MY51210133 |
| Keysight Technologies | N9030A | PXA Signal Analyzer (44GHz) | 8/17/2020 | Annual | 8/17/2021 | MY52350166 |
| Keysight Technologies | N9030B | PXA Signal Analyzer, Multi-touch | 9/17/2020 | Annual | 9/17/2021 | MY57141001 |
| Mini-Circuits | SSG-4000HP | Synthesized Signal Generator | | N/A | | 11208010032 |
| Mini-Circuits | SSG-4000HP | Synthesized Signal Generator | | N/A | | 11403100002 |
| Rohde & Schwarz | CMW500 | Radio Communication Tester | | N/A | | 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 | ESU40 | EMI Test Receiver (40GHz) | 9/9/2020 | Annual | 9/9/2021 | 100348 |
| Rohde & Schwarz | FSW67 | Signal / Spectrum Analyzer | 8/10/2020 | Annual | 8/10/2021 | 103200 |
| Sunol | DRH-118 | Horn Antenna (1-18GHz) | 10/3/2019 | Biennial | 10/3/2021 | A050307 |

Table 5-1. Test Equipment

Notes:

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

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|---|---|-----------------------------------|
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6.0 SAMPLE CALCULATIONS

QPSK Modulation

Emission Designator = 8M62G7D

LTE BW = 8.62 MHz

G = Phase Modulation

7 = Quantized/Digital Info

D = Data transmission, telemetry, telecommand

QAM Modulation

Emission Designator = 8M45W7D

LTE BW = 8.45 MHz

W = Amplitude/Angle Modulated



7 = Quantized/Digital Info

D = Data transmission, telemetry, telecommand

Spurious Radiated Emission

Example: Spurious emission at 3700.40 MHz

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

| | | | |
|---|--|---|-----------------------------------|
| FCC ID: A3LSMF711U |  PART 27 MEASUREMENT REPORT |  | Approved by: Technical Manager |
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7.0 TEST RESULTS

7.1 Summary

Company Name: Samsung Electronics Co., Ltd.
 FCC ID: A3LSMF711U
 FCC Classification: PCS Licensed Transmitter Held to Ear (PCE)
 Mode(s): LTE/NR/ULCA



| Test Condition | Test Description | FCC Part Section(s) | Test Limit | Test Result | Reference | | |
|----------------|--|---------------------|---|------------------|--------------------------|------|-------------|
| CONDUCTED | Conducted Power | 2.1046 | N/A | PASS | Sections 7.2, 7.6 | | |
| | Occupied Bandwidth | 2.1049 | N/A | PASS | Section 7.3 | | |
| | Conducted Band Edge / Spurious Emissions (LTE Band 30) | 2.1051, 27.53(a) | Undesirable emissions must meet the limits detailed in 27.53(a) | PASS | Sections 7.4, 7.5 | | |
| | Conducted Band Edge / Spurious Emissions (NR Band n30) | | | PASS | Sections 7.4, 7.5 | | |
| | Conducted Band Edge / Spurious Emissions (LTE Band 7) | 2.1051, 27.53(m) | Undesirable emissions must meet the limits detailed in 27.53(m) | PASS | Sections 7.4, 7.5 | | |
| | Conducted Band Edge / Spurious Emissions (LTE Band 41) | | | PASS | Sections 7.4, 7.5, 7.6 | | |
| | Conducted Band Edge / Spurious Emissions (NR Band n41) | | | PASS | Sections 7.4, 7.5 | | |
| | Conducted Band Edge / Spurious Emissions (LTE Band 38) | | | PASS | Sections 7.4, 7.5 | | |
| | Transmitter Conducted Output Power | 2.1046 | N/A | PASS | See RF Exposure Report | | |
| | Frequency Stability | 2.1055, 27.54 | Fundamental emissions stay within authorized frequency block | PASS | Section 7.9 | | |
| RADIATED | Effective Radiated Power / Equivalent Isotropic Radiated Power (LTE Band 30) | 27.50(a)(3) | < 0.25 Watts max. EIRP | PASS | Section 7.7 | | |
| | Effective Radiated Power / Equivalent Isotropic Radiated Power (NR Band n30) | | | PASS | Section 7.7 | | |
| | Effective Radiated Power / Equivalent Isotropic Radiated Power (LTE Band 7) | 27.50(h)(2) | < 2 Watts max. EIRP | PASS | Section 7.7 | | |
| | Effective Radiated Power / Equivalent Isotropic Radiated Power (LTE Band 41) | | | PASS | Section 7.7 | | |
| | Effective Radiated Power / Equivalent Isotropic Radiated Power (NR Band n41) | | | PASS | Section 7.7 | | |
| | Effective Radiated Power / Equivalent Isotropic Radiated Power (LTE Band 38) | | | PASS | Section 7.7 | | |
| | Radiated Spurious Emissions (LTE Band 30) | | | 2.1053, 27.53(a) | > 70 + 10log10(P[Watts]) | PASS | Section 7.8 |
| | Radiated Spurious Emissions (NR Band n30) | | | | | PASS | Section 7.8 |
| | Radiated Spurious Emissions (LTE Band 7) | 2.1053, 27.53(m) | Undesirable emissions must meet the limits detailed in 27.53(m) | PASS | Section 7.8 | | |
| | Radiated Spurious Emissions (LTE Band 41) | | | PASS | Section 7.8 | | |
| | Radiated Spurious Emissions (NR Band n41) | | | PASS | Section 7.8 | | |
| | Radiated Spurious Emissions (LTE Band 38) | | | PASS | Section 7.8 | | |
| | | | | PASS | Section 7.8 | | |

Table 7-1. Summary of Test Results

| | | |
|---|---|-----------------------------------|
| FCC ID: A3LSMF711U |  PART 27 MEASUREMENT REPORT  | Approved by: Technical Manager |
| Test Report S/N: 1M2104070032-05.A3L | Test Dates: 04/12/2021 – 06/11/2021 | EUT Type: Portable Handset |
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Notes:

- 1) All modes of operation and data rates were investigated. The test results shown in the following sections represent the worst case emissions.
- 2) The analyzer plots were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables, directional couplers, and attenuators used as part of the system to maintain a link between the call box and the EUT at all frequencies of interest.
- 3) All antenna port conducted emissions testing was performed on a test bench with the antenna port of the EUT connected to the spectrum analyzer through calibrated cables, attenuators, and couplers.
- 4) All conducted emissions measurements are performed with automated test software to capture the corresponding plots necessary to show compliance. The measurement software utilized is PCTEST EMC Software Tool Beta 8.

| | | | |
|---|---|-------------------------------|-----------------------------------|
| FCC ID: A3LSMF711U |  PART 27 MEASUREMENT REPORT  | | Approved by: Technical Manager |
| Test Report S/N: 1M2104070032-05.A3L | Test Dates: 04/12/2021 – 06/11/2021 | EUT Type: Portable Handset | Page 12 of 169 |

7.2 Conducted Power Output Data

§2.1046

Test Overview

The EUT is set up to transmit at maximum power for LTE. All power levels 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.

A-MPR is implemented in this device per the A-MPR specification in 3GPP TS 36.101. The conducted powers are shown herein to cover the different A-MPR levels specified in the standard. Measurement equipment was set up with triggering/gating on the spectrum analyzer such that powers were measured only during the on-time of the signal.

Test Procedure Used

KDB 971168 D01 v03r01 – Section 6.0

Test Settings

1. Span = 2 x OBW to 3 x OBW
2. RBW = 1% to 5% of the OBW
3. Number of measurement points in sweep $\geq 2 \times \text{span} / \text{RBW}$
4. Sweep = auto-couple (less than transmission burst duration)
5. Detector = RMS (power)
6. Trigger was set to enable power measurements only on full power bursts
7. Trace was allowed to stabilize
8. Spectrum analyzer's "Channel Power" function was used to compute the power by integrating the spectrum across the OBW of the signal

Test Setup

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

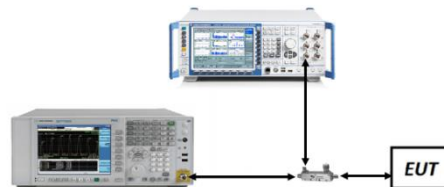






Figure 7-1. Test Instrument & Measurement Setup

| | | | | |
|--|--|--------------------------------------|---|--|
| FCC ID: A3LSMF711U |  PCTEST Proud to be part of element | PART 27 MEASUREMENT REPORT |  | Approved by: Technical Manager |
| Test Report S/N: 1M2104070032-05.A3L | Test Dates: 04/12/2021 – 06/11/2021 | EUT Type: Portable Handset | Page 13 of 169 | |

| Bandwidth | Modulation | Channel | Frequency [MHz] | RB Size/Offset | Conducted Power [dBm] |
|-----------|--------------|---------|-----------------|----------------|-----------------------|
| 100 MHz | $\pi/2$ BPSK | 509202 | 2546.0 | 1 / 136 | 27.59 |
| | QPSK | 509202 | 2546.0 | 1 / 136 | 27.12 |
| | | 518598 | 2593.0 | 1 / 68 | 26.79 |
| | | 528000 | 2640.0 | 1 / 136 | 27.26 |
| | 16-QAM | 528000 | 2640.0 | 1 / 136 | 26.55 |
| | 64-QAM | 528000 | 2640.0 | 1 / 136 | 24.87 |
| 256-QAM | 528000 | 2640.0 | 1 / 136 | 23.19 | |
| 90 MHz | $\pi/2$ BPSK | 508200 | 2541.0 | 1 / 122 | 27.76 |
| | QPSK | 508200 | 2541.0 | 1 / 122 | 27.48 |
| | | 518592 | 2593.0 | 1 / 61 | 26.14 |
| | | 529002 | 2645.0 | 1 / 122 | 26.26 |
| | 16-QAM | 508200 | 2541.0 | 1 / 122 | 27.01 |
| | 64-QAM | 508200 | 2541.0 | 1 / 122 | 25.59 |
| 256-QAM | 508200 | 2541.0 | 1 / 122 | 23.69 | |
| 80 MHz | $\pi/2$ BPSK | 507204 | 2536.0 | 1 / 108 | 27.73 |
| | QPSK | 507204 | 2536.0 | 1 / 108 | 27.74 |
| | | 518598 | 2593.0 | 1 / 54 | 25.81 |
| | | 529998 | 2650.0 | 1 / 108 | 26.68 |
| | 16-QAM | 507204 | 2536.0 | 1 / 108 | 26.97 |
| | 64-QAM | 507204 | 2536.0 | 1 / 108 | 25.52 |
| 256-QAM | 507204 | 2536.0 | 1 / 108 | 23.76 | |
| 60 MHz | $\pi/2$ BPSK | 505200 | 2526.0 | 1 / 81 | 27.75 |
| | QPSK | 505200 | 2526.0 | 1 / 81 | 27.12 |
| | | 518598 | 2593.0 | 1 / 40 | 26.79 |
| | | 531996 | 2660.0 | 1 / 81 | 27.26 |
| | 16-QAM | 531996 | 2660.0 | 1 / 81 | 26.55 |
| | 64-QAM | 531996 | 2660.0 | 1 / 81 | 24.87 |
| 256-QAM | 505200 | 2526.0 | 1 / 81 | 23.82 | |
| 50 MHz | $\pi/2$ BPSK | 504204 | 2521.0 | 1 / 66 | 27.77 |
| | QPSK | 504204 | 2521.0 | 1 / 66 | 27.61 |
| | | 518598 | 2593.0 | 1 / 33 | 26.86 |
| | | 532998 | 2665.0 | 1 / 66 | 26.71 |
| | 16-QAM | 504204 | 2521.0 | 1 / 66 | 26.89 |
| | 64-QAM | 504204 | 2521.0 | 1 / 66 | 25.39 |
| 256-QAM | 504204 | 2521.0 | 1 / 66 | 23.99 | |
| 40 MHz | $\pi/2$ BPSK | 534000 | 2670.0 | 1 / 53 | 26.43 |
| | QPSK | 503202 | 2516.0 | 1 / 53 | 25.86 |
| | | 518598 | 2593.0 | 1 / 26 | 24.87 |
| | | 534000 | 2670.0 | 1 / 53 | 25.93 |
| | 16-QAM | 534000 | 2670.0 | 1 / 53 | 24.92 |
| | 64-QAM | 534000 | 2670.0 | 1 / 53 | 23.61 |
| 256-QAM | 534000 | 2670.0 | 1 / 53 | 22.63 | |
| 30 MHz | $\pi/2$ BPSK | 502203 | 2511.0 | 1 / 39 | 27.24 |
| | QPSK | 502203 | 2511.0 | 1 / 39 | 26.05 |
| | | 518598 | 2593.0 | 1 / 19 | 25.16 |
| | | 534999 | 2675.0 | 1 / 39 | 26.07 |
| | 16-QAM | 534999 | 2675.0 | 1 / 39 | 25.04 |
| | 64-QAM | 534999 | 2675.0 | 1 / 39 | 23.79 |
| 256-QAM | 534999 | 2675.0 | 1 / 39 | 22.76 | |
| 20 MHz | $\pi/2$ BPSK | 535998 | 2680.0 | 1 / 25 | 27.64 |
| | QPSK | 501204 | 2506.0 | 1 / 25 | 26.12 |
| | | 518598 | 2593.0 | 1 / 13 | 25.39 |
| | | 535998 | 2680.0 | 1 / 25 | 26.79 |
| | 16-QAM | 535998 | 2680.0 | 1 / 25 | 25.78 |
| | 64-QAM | 535998 | 2680.0 | 1 / 25 | 24.24 |
| 256-QAM | 535998 | 2680.0 | 1 / 25 | 23.17 | |

Table 7-2. Conducted Power Output Data (n41 PC2)

| | | | | |
|---|--|-----------------------------------|---|-----------------------------------|
| FCC ID: A3LSMF711U |  PCTEST Proud to be part of element | PART 27 MEASUREMENT REPORT |  | Approved by: Technical Manager |
| Test Report S/N: 1M2104070032-05.A3L | Test Dates: 04/12/2021 – 06/11/2021 | EUT Type: Portable Handset | | Page 14 of 169 |

7.3 Occupied Bandwidth

Test Overview

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured. All modes of operation were investigated and the worst case configuration results are reported in this section.

Test Procedure Used

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

Test Setup

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

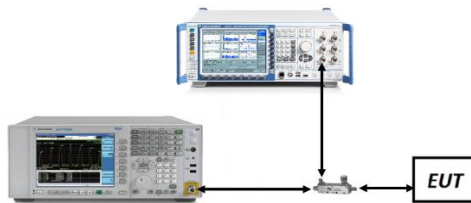


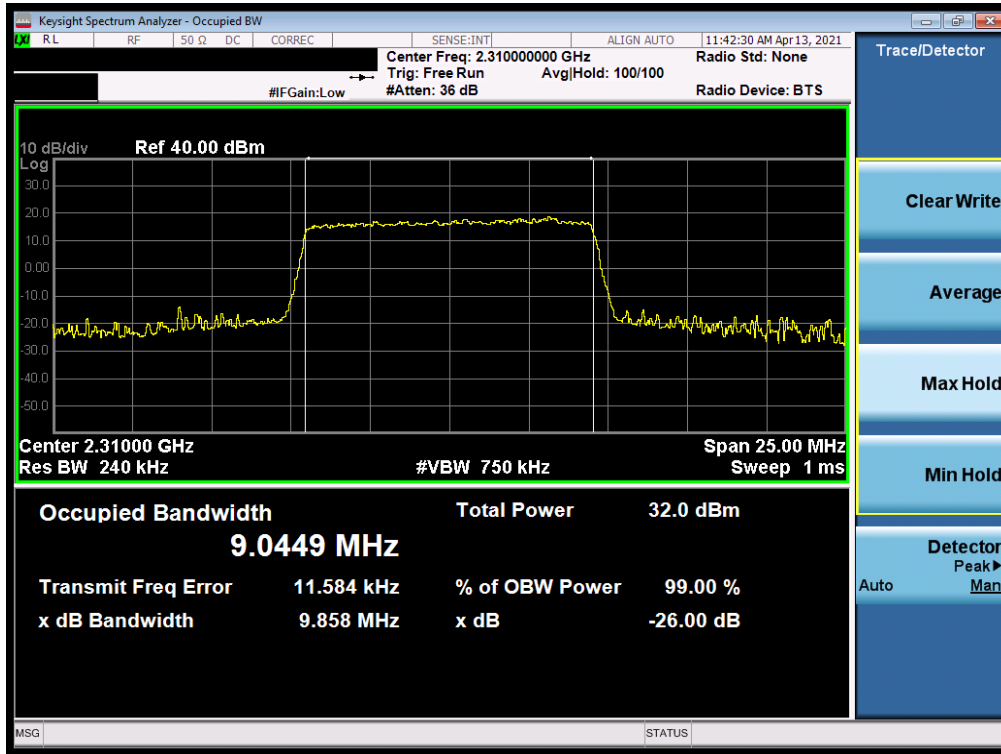
Figure 7-2. Test Instrument & Measurement Setup

Test Notes

None.

| | | | | |
|---|--|-----------------------------------|----------------|-----------------------------------|
| FCC ID: A3LSMF711U | PCTEST Proud to be part of element | PART 27 MEASUREMENT REPORT | SAMSUNG | Approved by: Technical Manager |
| Test Report S/N: 1M2104070032-05.A3L | Test Dates: 04/12/2021 – 06/11/2021 | EUT Type: Portable Handset | | Page 15 of 169 |

LTE Band 30

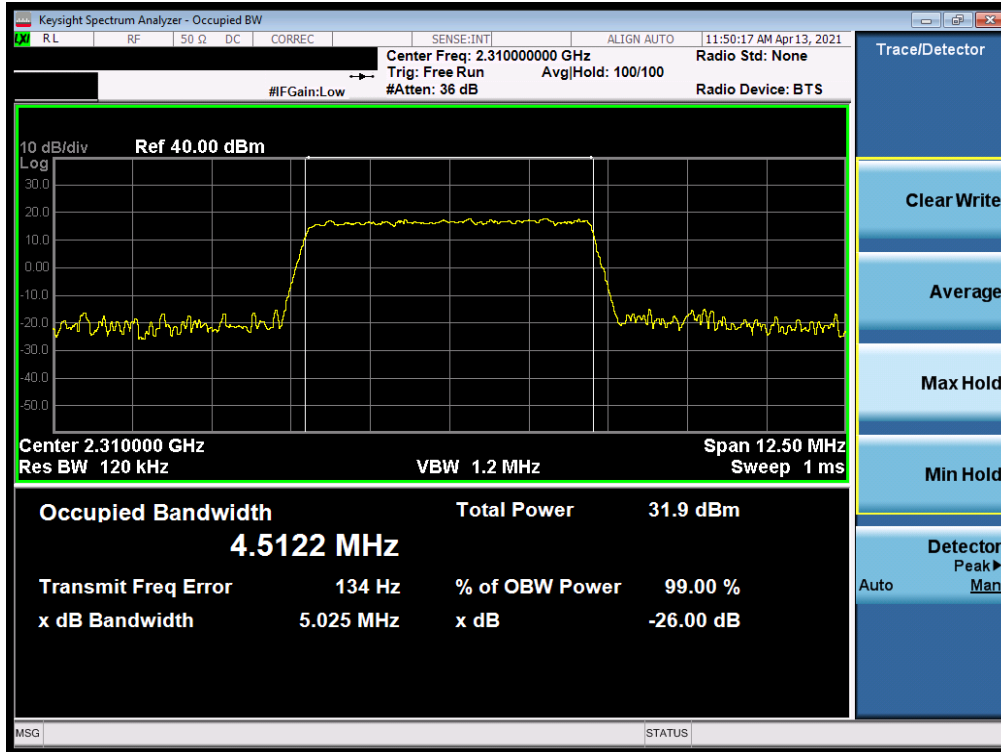


Plot 7-1. Occupied Bandwidth Plot (LTE Band 30 - 10MHz QPSK - Full RB)

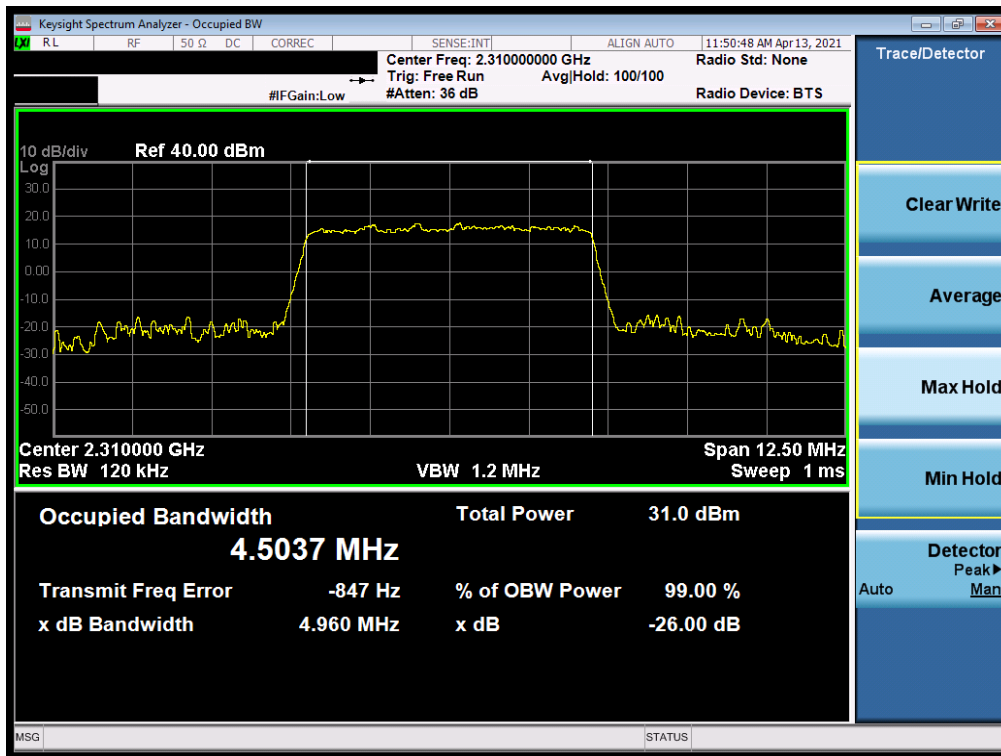


Plot 7-2. Occupied Bandwidth Plot (LTE Band 30 - 10MHz 16-QAM - Full RB)



| | | | |
|---|--|-------------------------------|-----------------------------------|
| FCC ID: A3LSMF711U | PART 27 MEASUREMENT REPORT | | Approved by: Technical Manager |
| Test Report S/N: 1M2104070032-05.A3L | Test Dates: 04/12/2021 – 06/11/2021 | EUT Type: Portable Handset | Page 16 of 169 |



Plot 7-3. Occupied Bandwidth Plot (LTE Band 30 - 5MHz QPSK - Full RB)

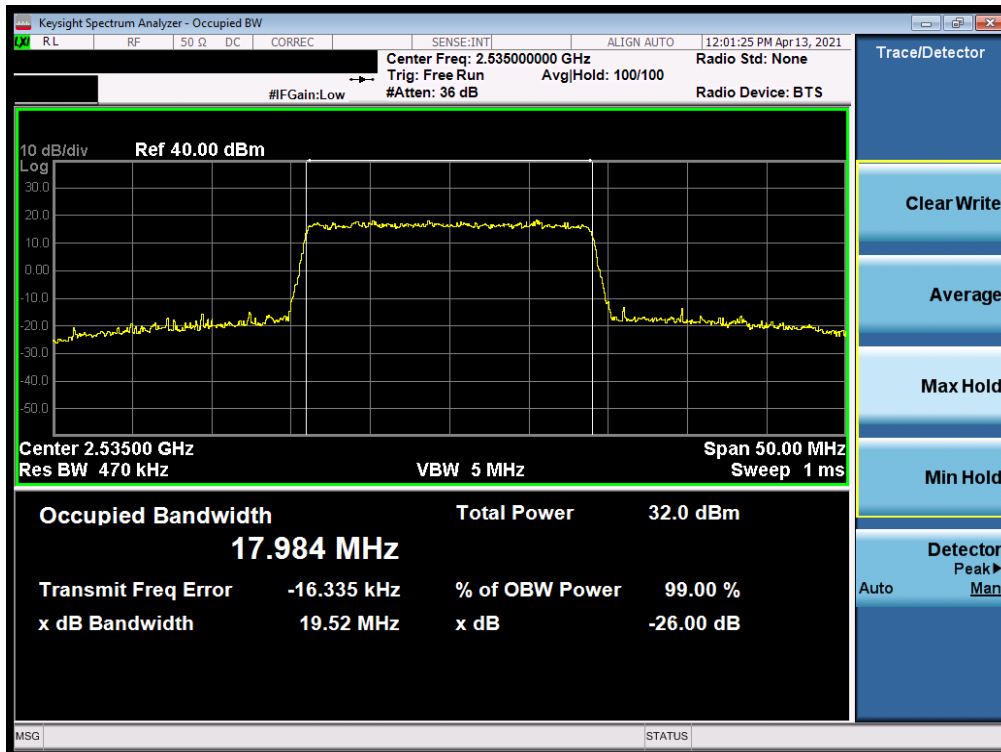


Plot 7-4. Occupied Bandwidth Plot (LTE Band 30 - 5MHz 16-QAM - Full RB)

| | | | |
|---|--|---|-----------------------------------|
| FCC ID: A3LSMF711U |  PART 27 MEASUREMENT REPORT |  | Approved by: Technical Manager |
| Test Report S/N: 1M2104070032-05.A3L | Test Dates: 04/12/2021 - 06/11/2021 | EUT Type: Portable Handset | Page 17 of 169 |

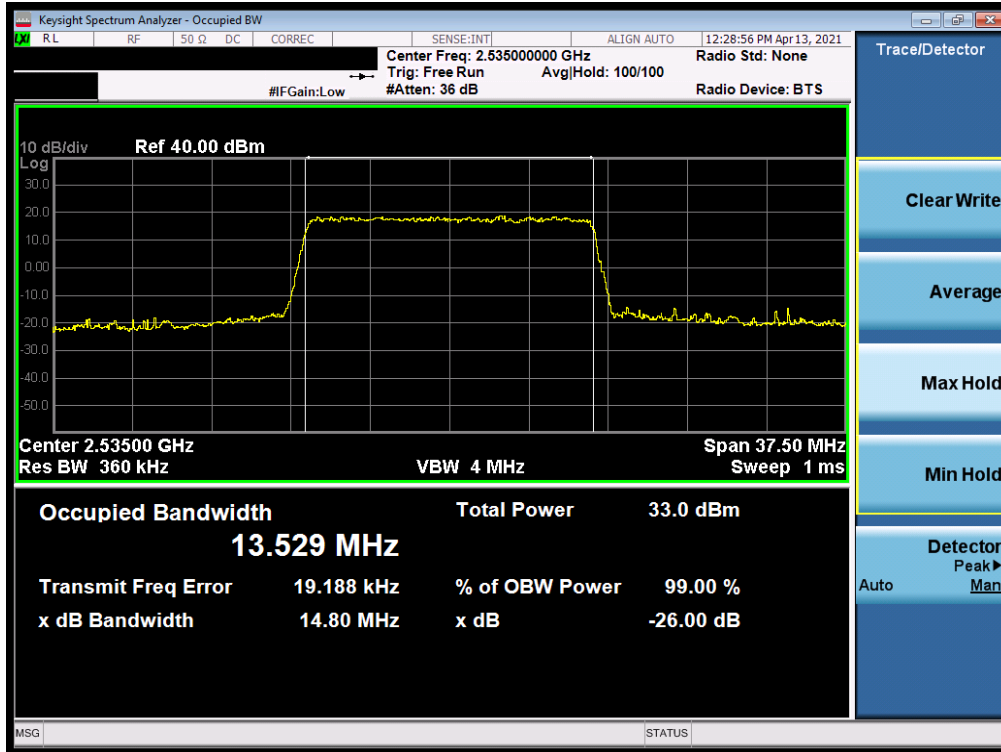


Plot 7-5. Occupied Bandwidth Plot (LTE Band 7 - 20MHz QPSK - Full RB)

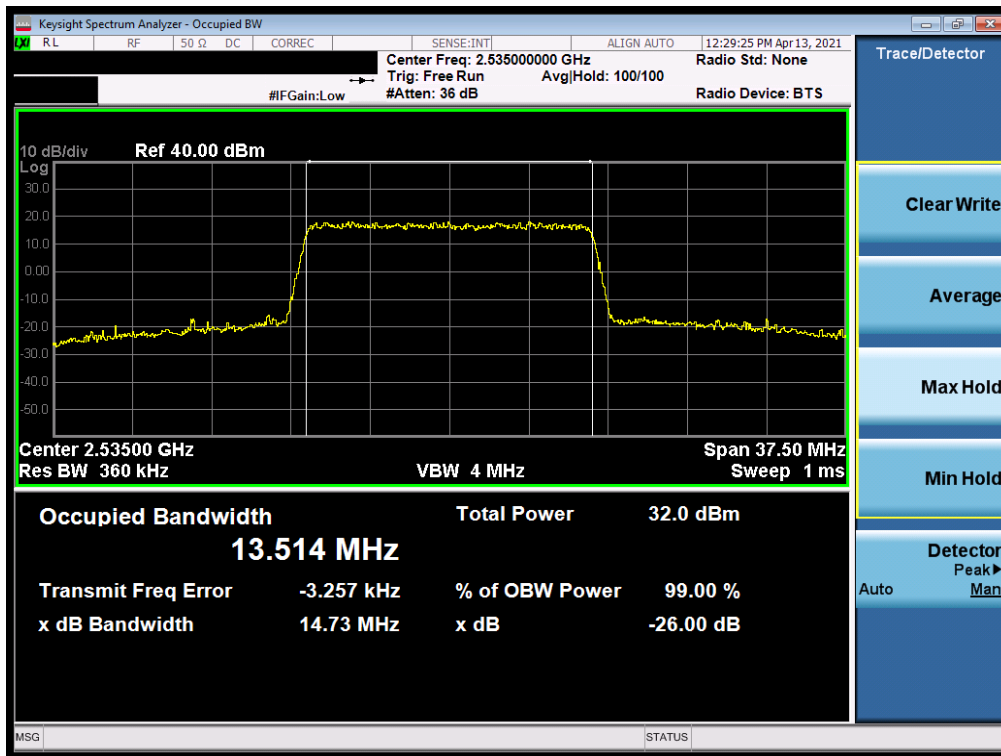


Plot 7-6. Occupied Bandwidth Plot (LTE Band 7 - 20MHz 16-QAM - Full RB)




| | | | | |
|---|--|-------------------------------|--|-----------------------------------|
| FCC ID: A3LSMF711U | PCTEST Proud to be part of element | PART 27 MEASUREMENT REPORT | | Approved by: Technical Manager |
| Test Report S/N: 1M2104070032-05.A3L | Test Dates: 04/12/2021 – 06/11/2021 | EUT Type: Portable Handset | | Page 18 of 169 |

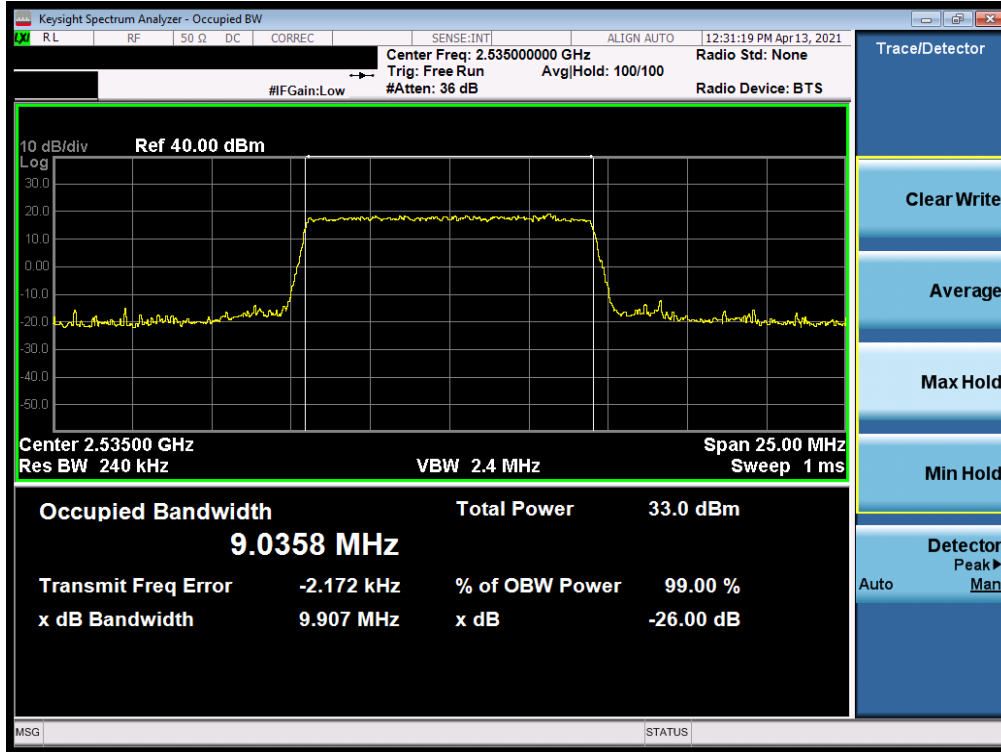


Plot 7-7. Occupied Bandwidth Plot (LTE Band 7 - 15MHz QPSK - Full RB)



Plot 7-8. Occupied Bandwidth Plot (LTE Band 7 - 15MHz 16-QAM - Full RB)



| | | | | |
|---|--|-----------------------------------|---|-----------------------------------|
| FCC ID: A3LSMF711U |  PCTEST Proud to be part of  | PART 27 MEASUREMENT REPORT |  | Approved by: Technical Manager |
| Test Report S/N: 1M2104070032-05.A3L | Test Dates: 04/12/2021 - 06/11/2021 | EUT Type: Portable Handset | | Page 19 of 169 |



Plot 7-9. Occupied Bandwidth Plot (LTE Band 7 - 10MHz QPSK - Full RB)



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



| | | | |
|---|--|---|-----------------------------------|
| FCC ID: A3LSMF711U |  PART 27 MEASUREMENT REPORT |  | Approved by: Technical Manager |
| Test Report S/N: 1M2104070032-05.A3L | Test Dates: 04/12/2021 – 06/11/2021 | EUT Type: Portable Handset | Page 20 of 169 |



Plot 7-11. Occupied Bandwidth Plot (LTE Band 7 - 5MHz QPSK - Full RB)



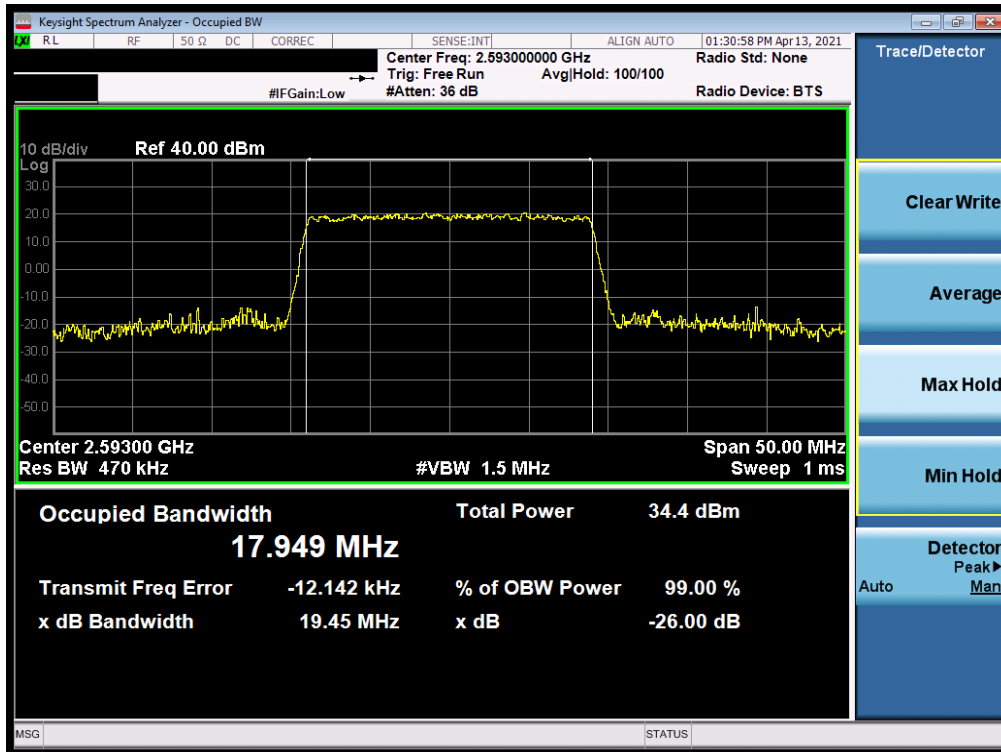
Plot 7-12. Occupied Bandwidth Plot (LTE Band 7 - 5MHz 16-QAM - Full RB)

| | | | |
|---|--|---|-----------------------------------|
| FCC ID: A3LSMF711U |  PART 27 MEASUREMENT REPORT |  | Approved by: Technical Manager |
| Test Report S/N: 1M2104070032-05.A3L | Test Dates: 04/12/2021 - 06/11/2021 | EUT Type: Portable Handset | Page 21 of 169 |




LTE Band 41(PC2)

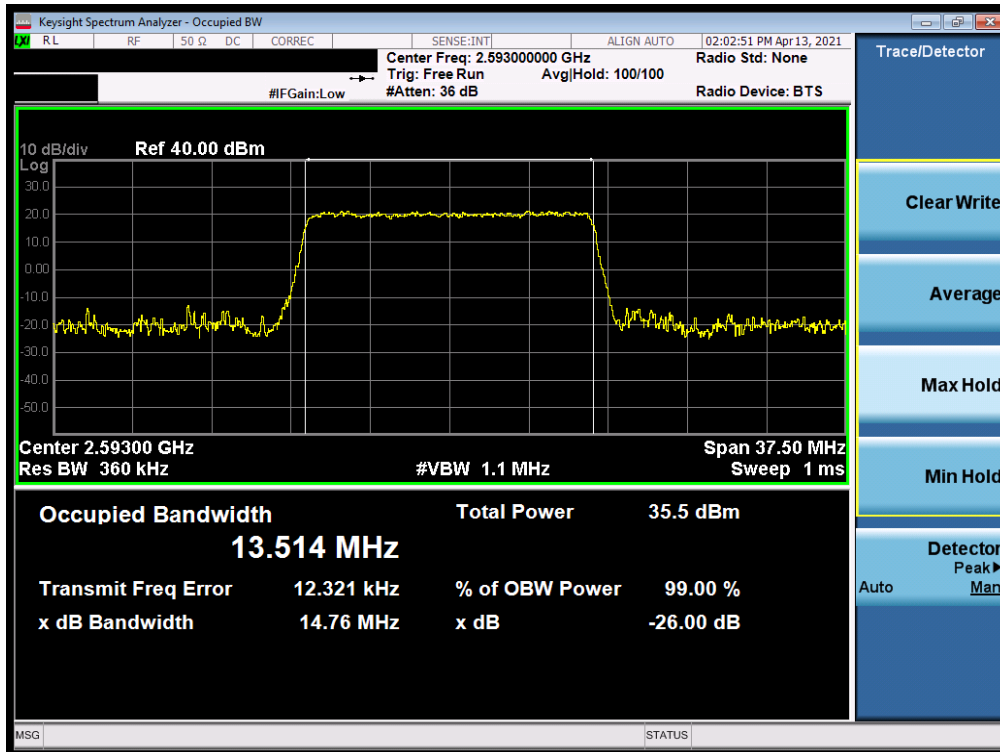


Plot 7-13. Occupied Bandwidth Plot (LTE Band 41(PC2) - 20MHz QPSK - Full RB)

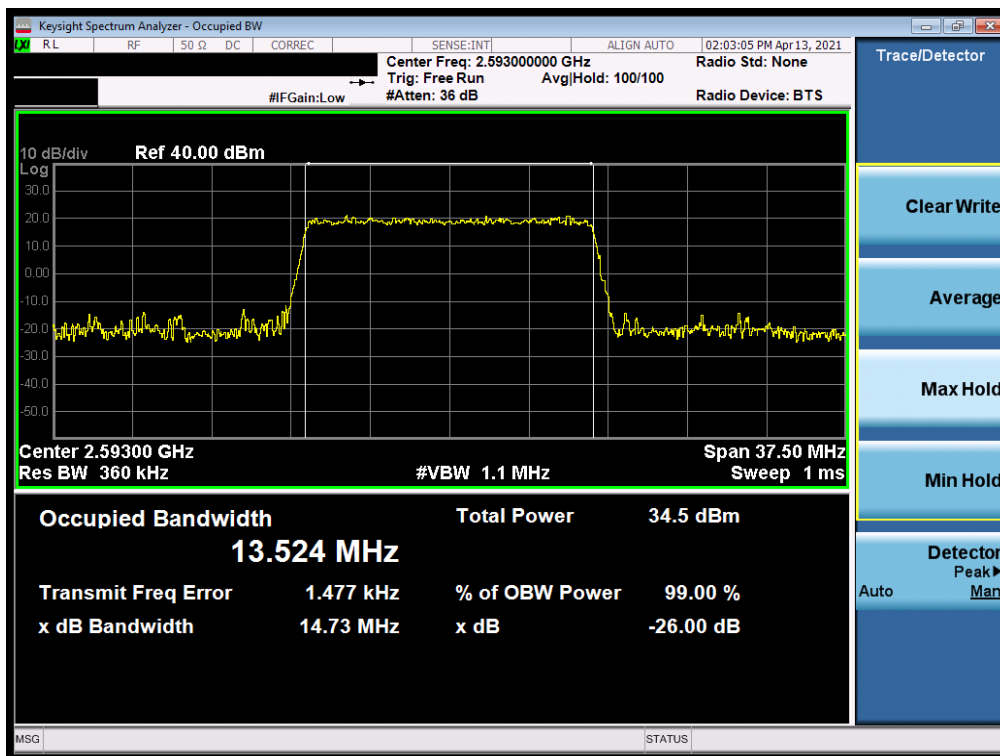


Plot 7-14. Occupied Bandwidth Plot (LTE Band 41(PC2) - 20MHz 16-QAM - Full RB)




| | | | | |
|---|--|-------------------------------|---|-----------------------------------|
| FCC ID: A3LSMF711U |  PCTEST Proud to be part of  | PART 27 MEASUREMENT REPORT |  | Approved by: Technical Manager |
| Test Report S/N: 1M2104070032-05.A3L | Test Dates: 04/12/2021 – 06/11/2021 | EUT Type: Portable Handset | | Page 22 of 169 |

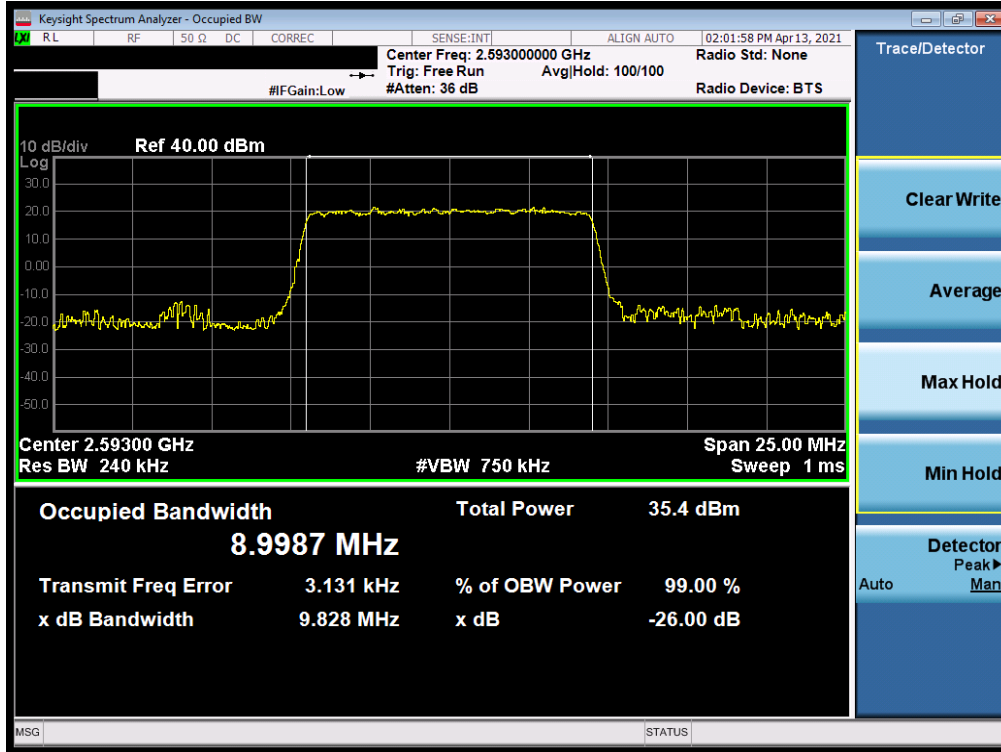


Plot 7-15. Occupied Bandwidth Plot (LTE Band 41(PC2) - 15MHz QPSK - Full RB)

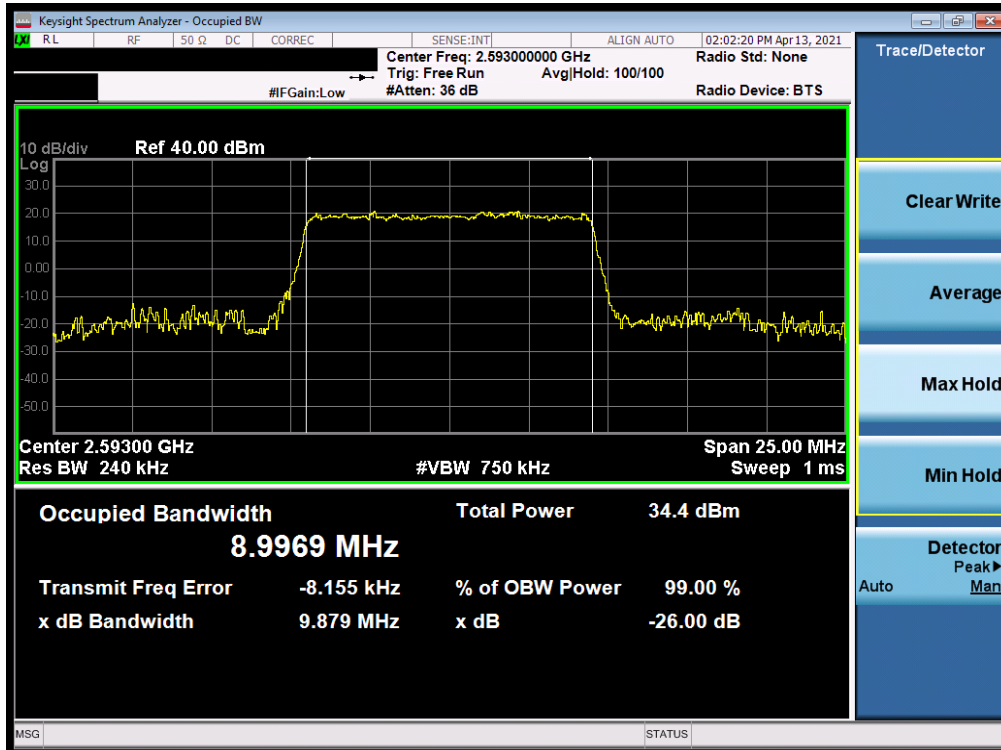


Plot 7-16. Occupied Bandwidth Plot (LTE Band 41(PC2) - 15MHz 16-QAM - Full RB)

| | | | | |
|---|--|-----------------------------------|---|-----------------------------------|
| FCC ID: A3LSMF711U |  PCTEST Proud to be part of  | PART 27 MEASUREMENT REPORT |  | Approved by: Technical Manager |
| Test Report S/N: 1M2104070032-05.A3L | Test Dates: 04/12/2021 - 06/11/2021 | EUT Type: Portable Handset | | Page 23 of 169 |

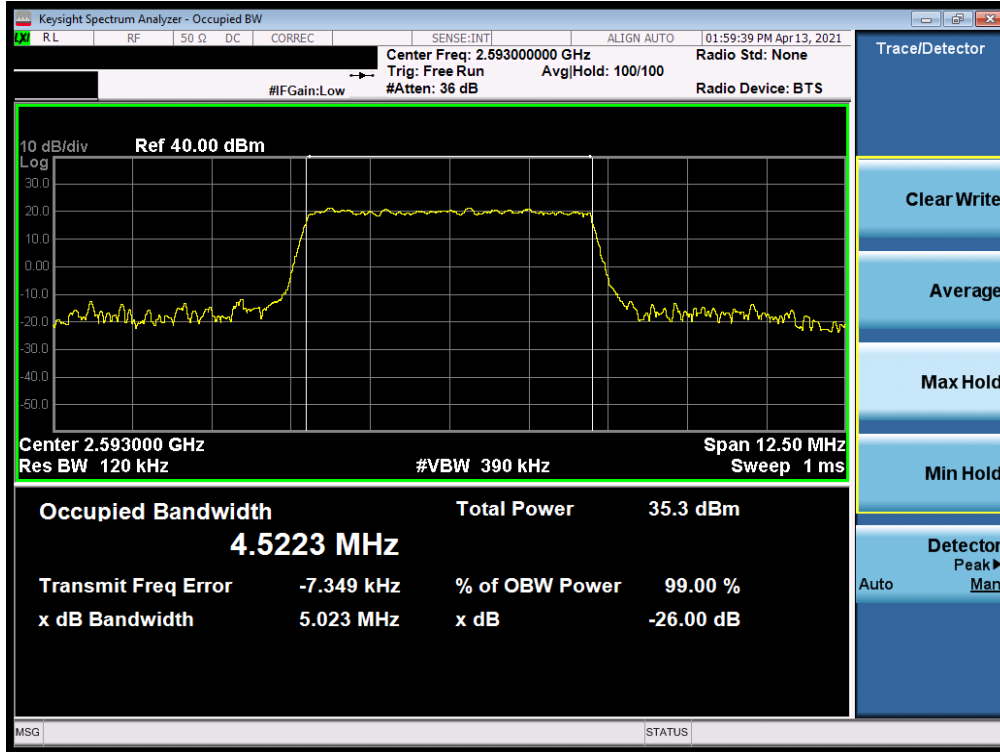


Plot 7-17. Occupied Bandwidth Plot (LTE Band 41(PC2) - 10MHz QPSK - Full RB)

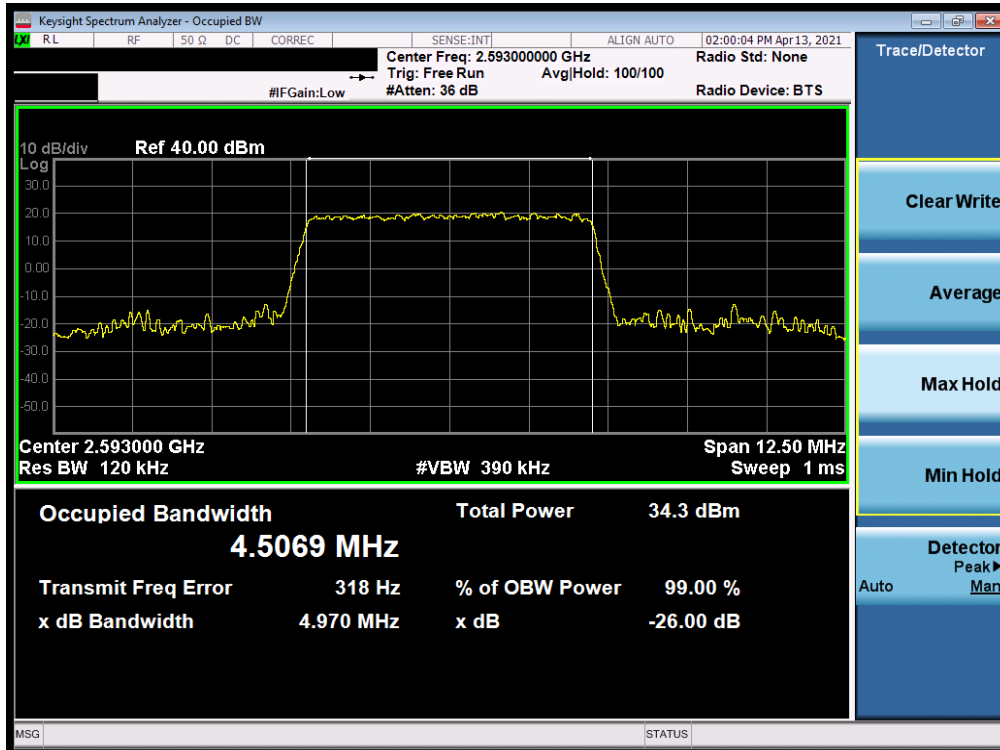


Plot 7-18. Occupied Bandwidth Plot (LTE Band 41(PC2) - 10MHz 16-QAM - Full RB)



| | | | | |
|---|---|-----------------------------------|--|-----------------------------------|
| FCC ID: A3LSMF711U | PCTEST Proud to be part of element | PART 27 MEASUREMENT REPORT | | Approved by: Technical Manager |
| Test Report S/N: 1M2104070032-05.A3L | Test Dates: 04/12/2021 – 06/11/2021 | EUT Type: Portable Handset | | Page 24 of 169 |



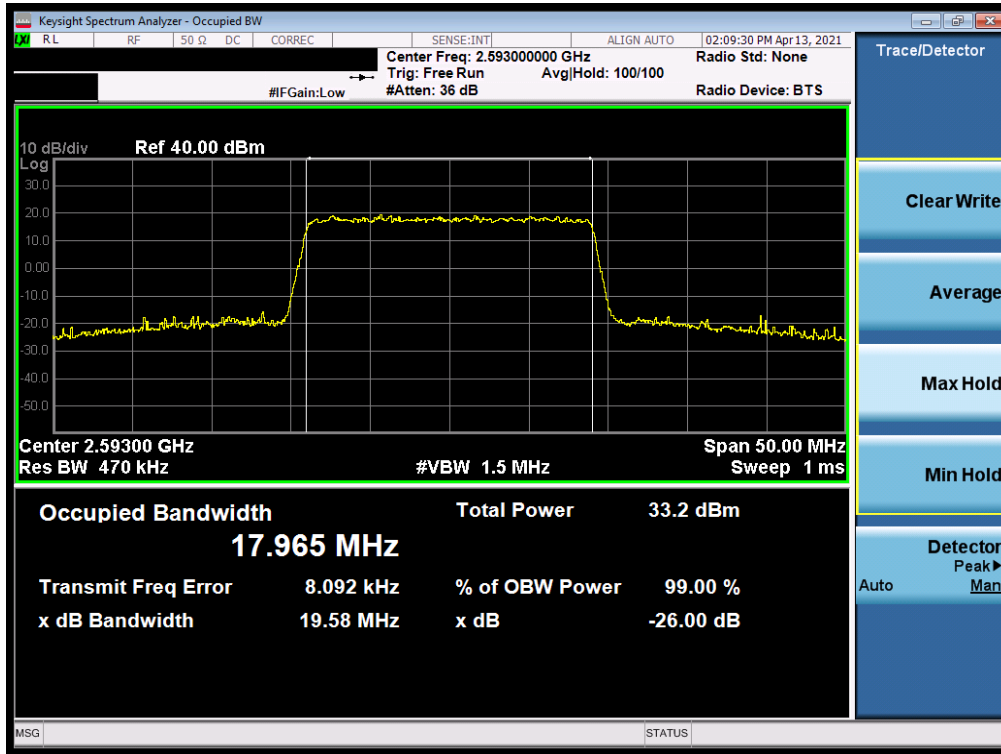
Plot 7-19. Occupied Bandwidth Plot (LTE Band 41(PC2) - 5MHz QPSK - Full RB)



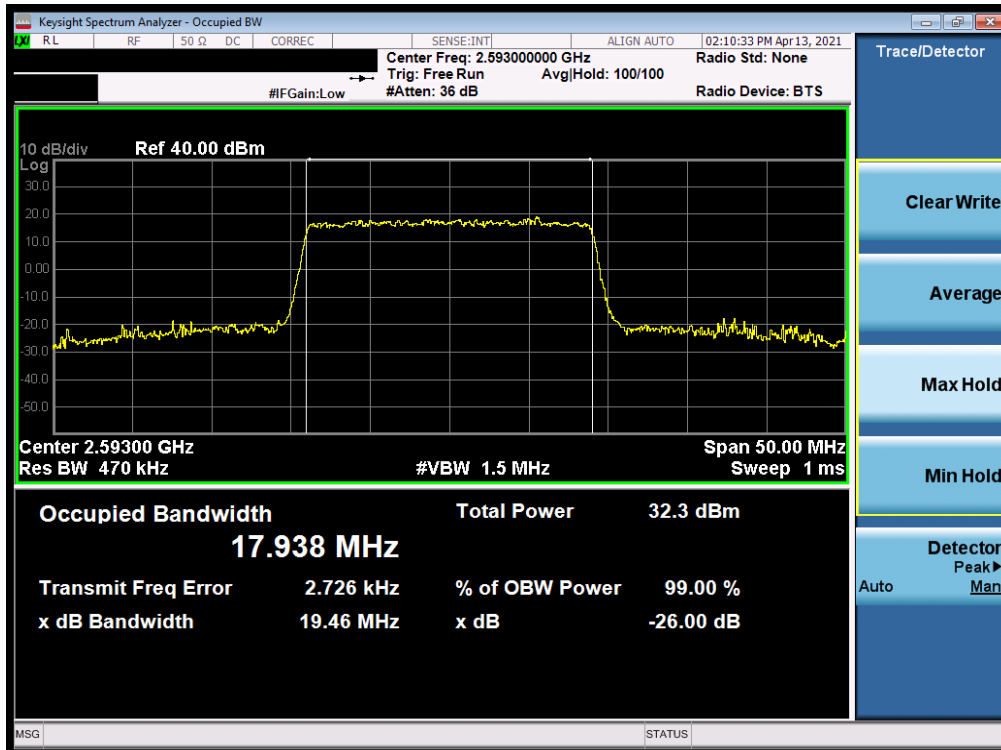
Plot 7-20. Occupied Bandwidth Plot (LTE Band 41(PC2) - 5MHz 16-QAM - Full RB)

| | | | |
|---|--|---|-----------------------------------|
| FCC ID: A3LSMF711U |  PART 27 MEASUREMENT REPORT |  | Approved by: Technical Manager |
| Test Report S/N: 1M2104070032-05.A3L | Test Dates: 04/12/2021 - 06/11/2021 | EUT Type: Portable Handset | Page 25 of 169 |



LTE Band 41(PC3)/38

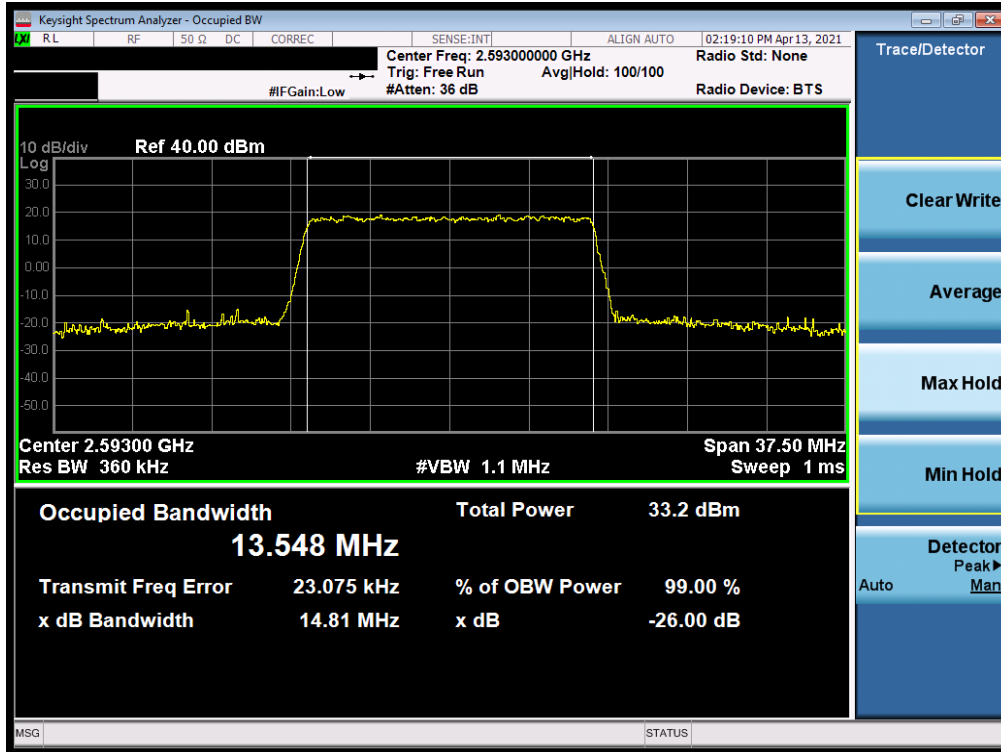


Plot 7-21. Occupied Bandwidth Plot (LTE Band 41(PC3)/38 - 20MHz QPSK - Full RB)

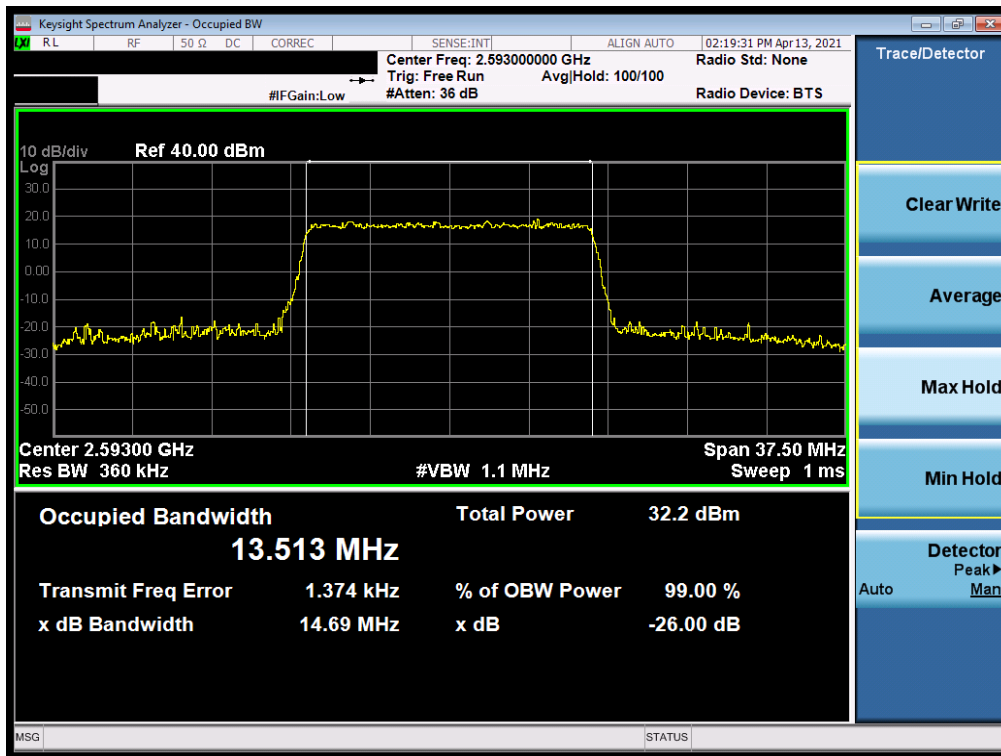


Plot 7-22. Occupied Bandwidth Plot (LTE Band 41(PC3)/38 - 20MHz 16-QAM - Full RB)




| | | | | |
|---|---|-------------------------------|---|-----------------------------------|
| FCC ID: A3LSMF711U |  PCTEST Proud to be part of element | PART 27 MEASUREMENT REPORT |  | Approved by: Technical Manager |
| Test Report S/N: 1M2104070032-05.A3L | Test Dates: 04/12/2021 – 06/11/2021 | EUT Type: Portable Handset | | Page 26 of 169 |

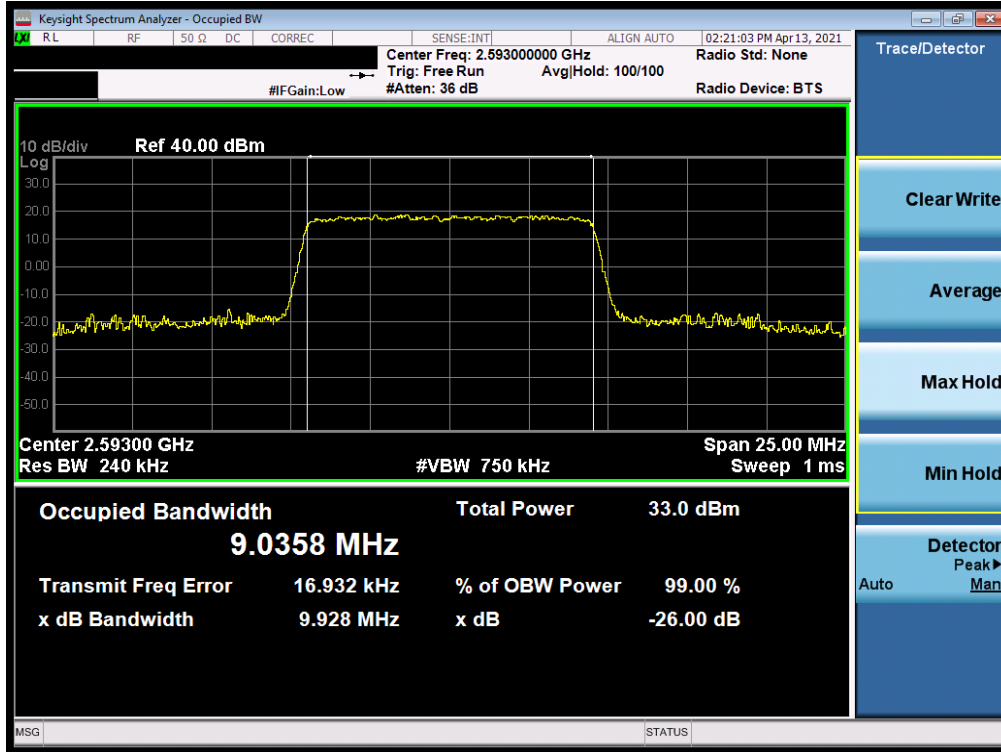


Plot 7-23. Occupied Bandwidth Plot (LTE Band 41(PC3)/38 - 15MHz QPSK - Full RB)

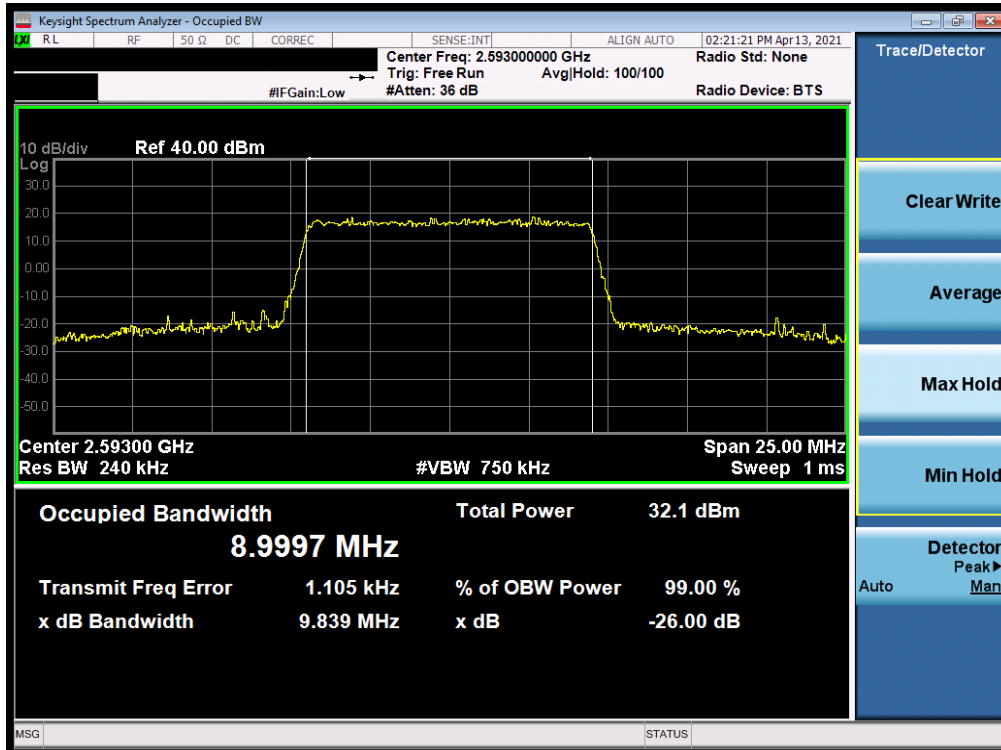


Plot 7-24. Occupied Bandwidth Plot (LTE Band 41(PC3)/38 - 15MHz 16-QAM - Full RB)




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|---|--|-----------------------------------|---|-----------------------------------|
| FCC ID: A3LSMF711U |  PCTEST Proud to be part of  | PART 27 MEASUREMENT REPORT |  | Approved by: Technical Manager |
| Test Report S/N: 1M2104070032-05.A3L | Test Dates: 04/12/2021 – 06/11/2021 | EUT Type: Portable Handset | | Page 27 of 169 |

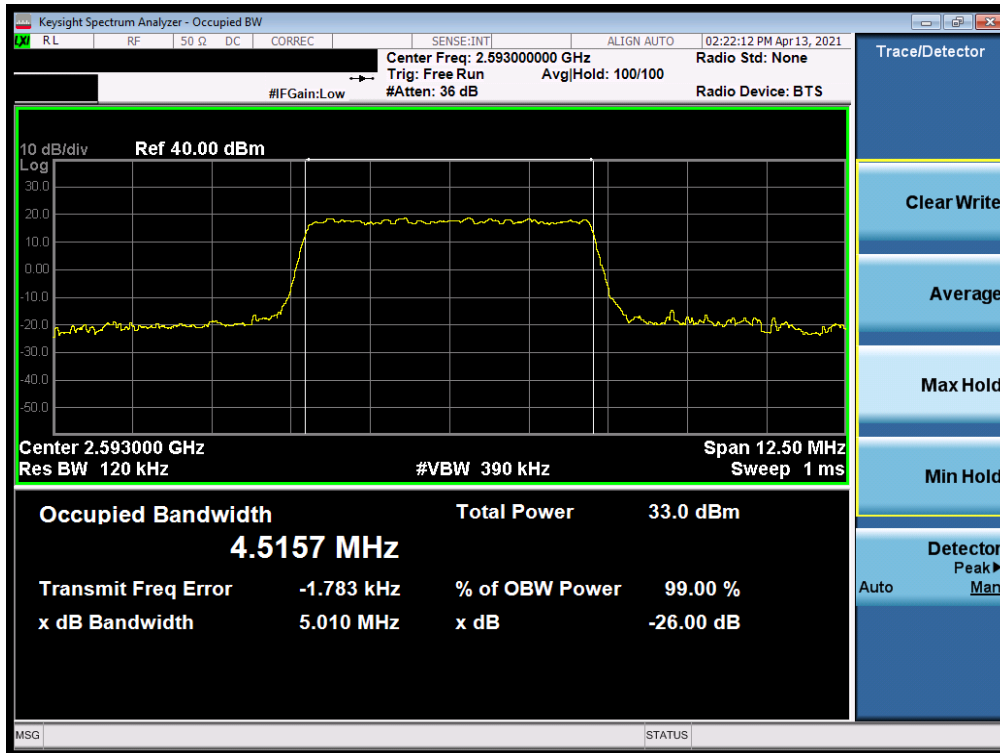


Plot 7-25. Occupied Bandwidth Plot (LTE Band 41(PC3)/38 - 10MHz QPSK - Full RB)

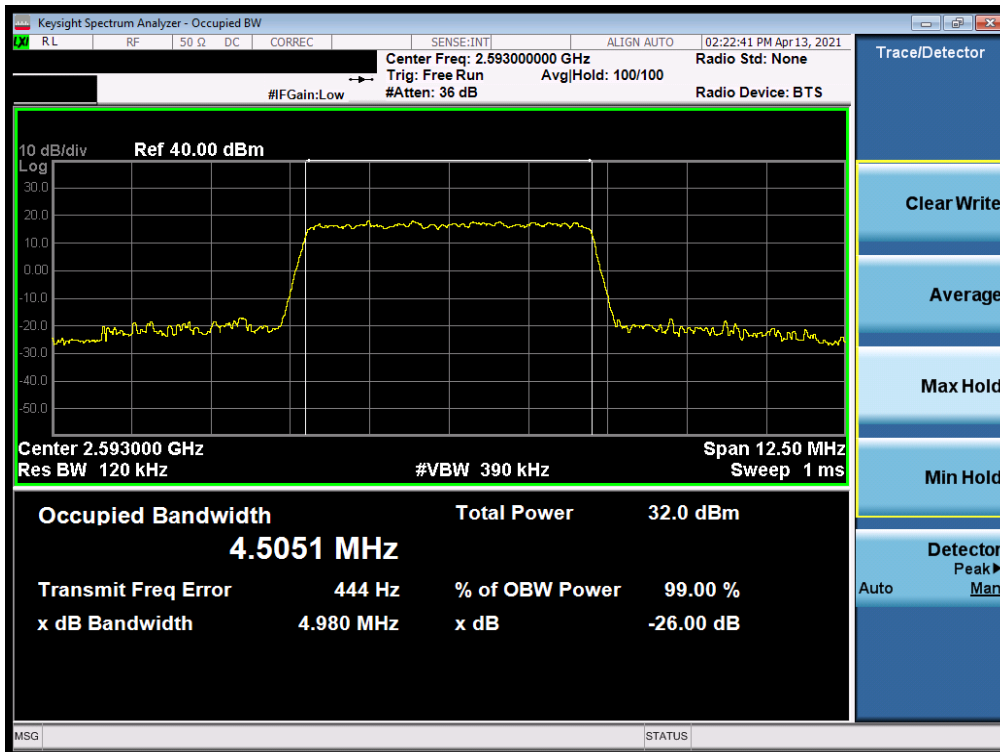


Plot 7-26. Occupied Bandwidth Plot (LTE Band 41(PC3)/38 - 10MHz 16-QAM - Full RB)




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|---|--|-----------------------------------|---|-----------------------------------|
| FCC ID: A3LSMF711U |  PCTEST Proud to be part of  | PART 27 MEASUREMENT REPORT |  | Approved by: Technical Manager |
| Test Report S/N: 1M2104070032-05.A3L | Test Dates: 04/12/2021 – 06/11/2021 | EUT Type: Portable Handset | | Page 28 of 169 |

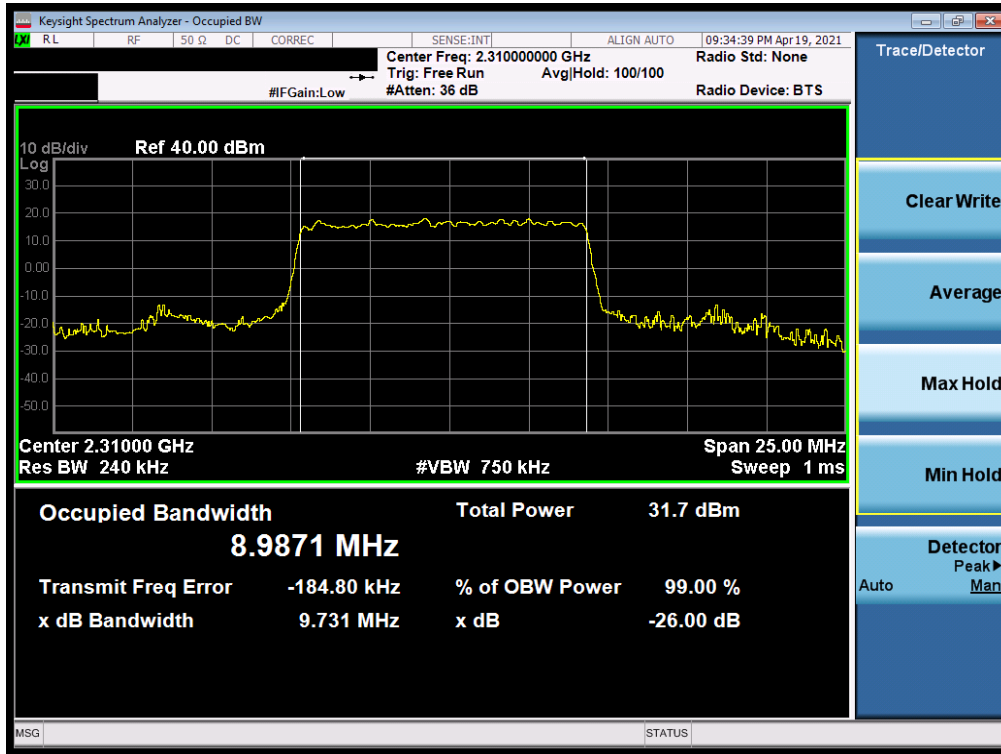


Plot 7-27. Occupied Bandwidth Plot (LTE Band 41(PC3)/38 - 5MHz QPSK - Full RB)

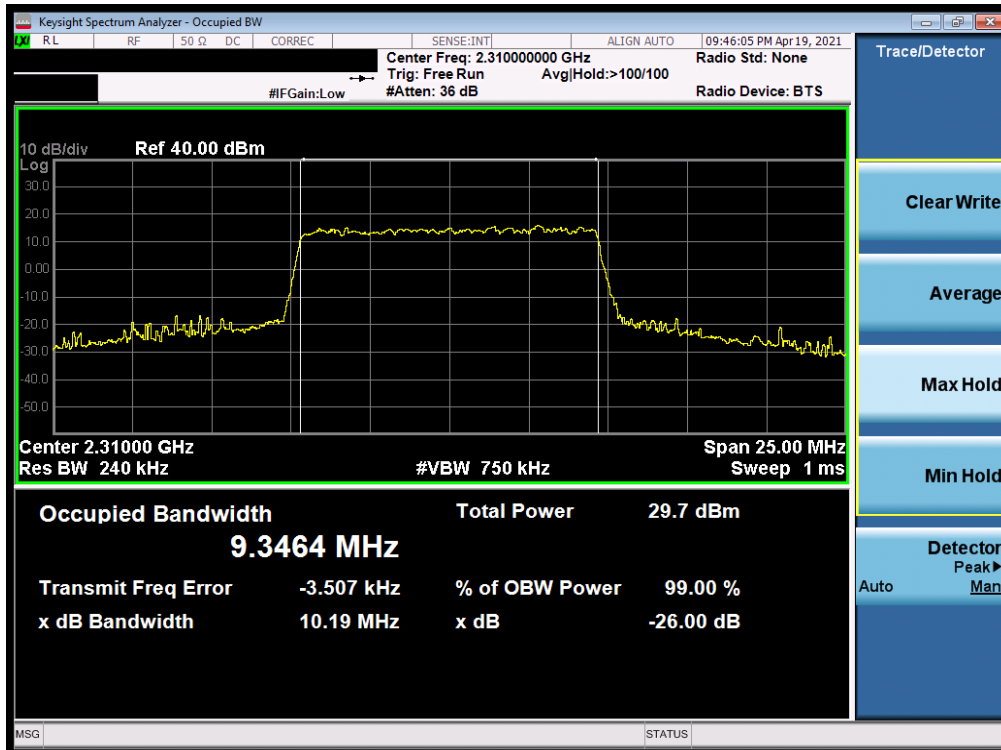


Plot 7-28. Occupied Bandwidth Plot (LTE Band 41(PC3)/38 - 5MHz 16-QAM - Full RB)




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|---|--|-----------------------------------|---|-----------------------------------|
| FCC ID: A3LSMF711U |  PCTEST Proud to be part of  | PART 27 MEASUREMENT REPORT |  | Approved by: Technical Manager |
| Test Report S/N: 1M2104070032-05.A3L | Test Dates: 04/12/2021 – 06/11/2021 | EUT Type: Portable Handset | | Page 29 of 169 |

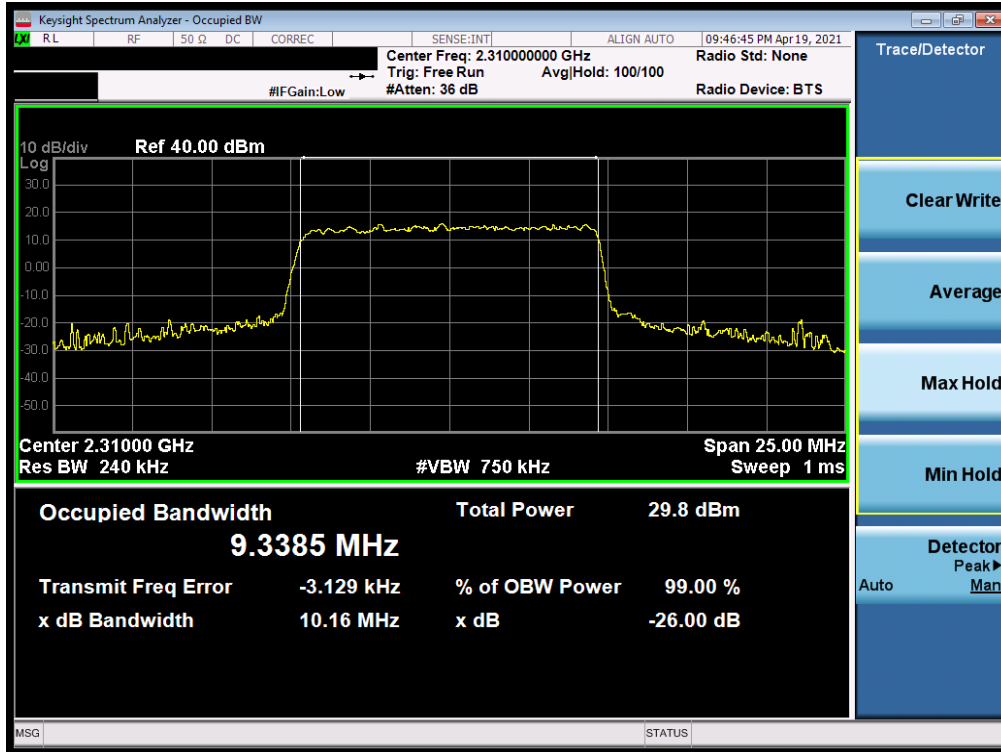


Plot 7-29. Occupied Bandwidth Plot (NR Band n30 - 10MHz $\pi/2$ BPSK - Full RB)



Plot 7-30. Occupied Bandwidth Plot (NR Band n30 - 10MHz QPSK - Full RB)



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| FCC ID: A3LSMF711U |  PCTEST Proud to be part of  | PART 27 MEASUREMENT REPORT |  | Approved by: Technical Manager |
| Test Report S/N: 1M2104070032-05.A3L | Test Dates: 04/12/2021 – 06/11/2021 | EUT Type: Portable Handset | | Page 30 of 169 |

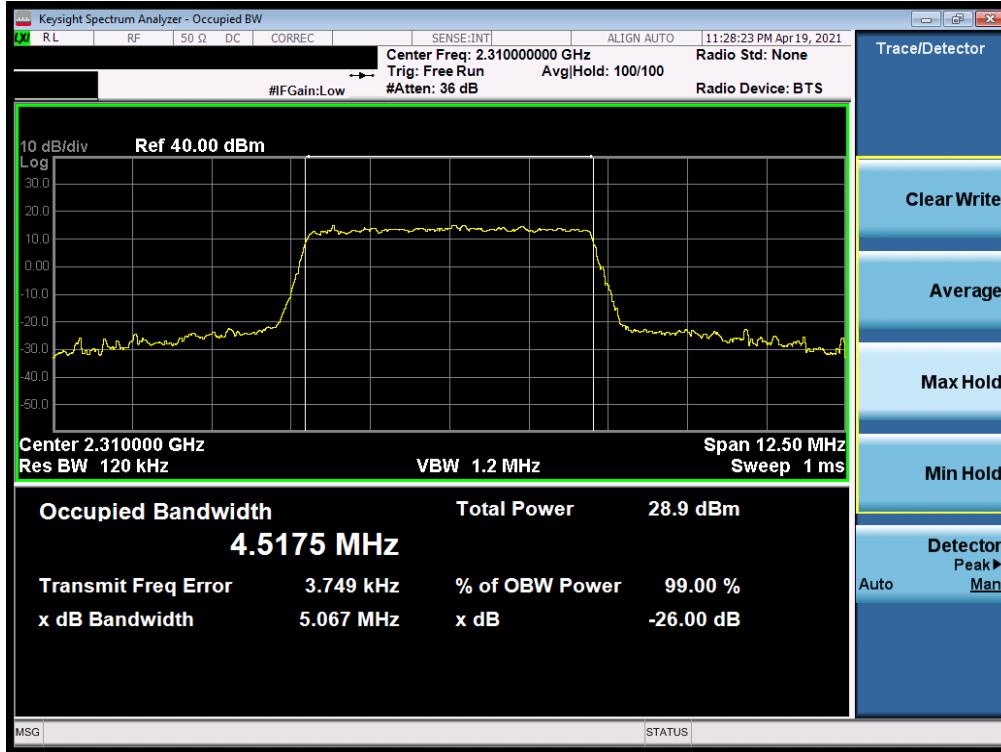


Plot 7-31. Occupied Bandwidth Plot (NR Band n30 - 10MHz 16-QAM - Full RB)

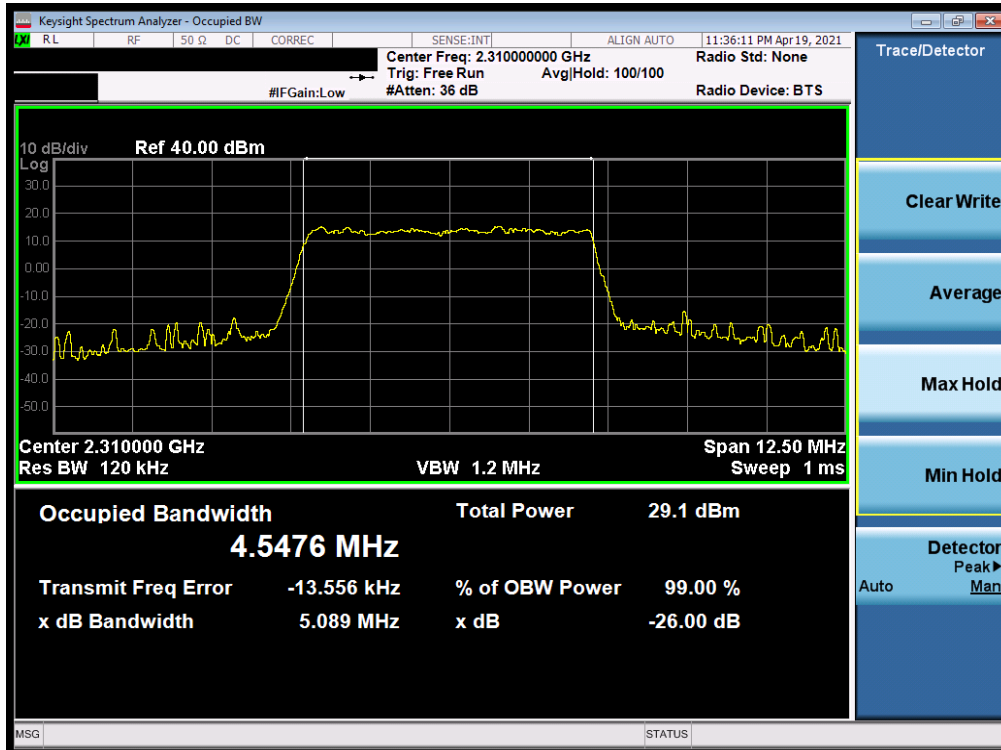


Plot 7-32. Occupied Bandwidth Plot (NR Band n30 - 5MHz $\pi/2$ BPSK - Full RB)




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| FCC ID: A3LSMF711U |  PART 27 MEASUREMENT REPORT |  | Approved by: Technical Manager |
| Test Report S/N: 1M2104070032-05.A3L | Test Dates: 04/12/2021 - 06/11/2021 | EUT Type: Portable Handset | Page 31 of 169 |



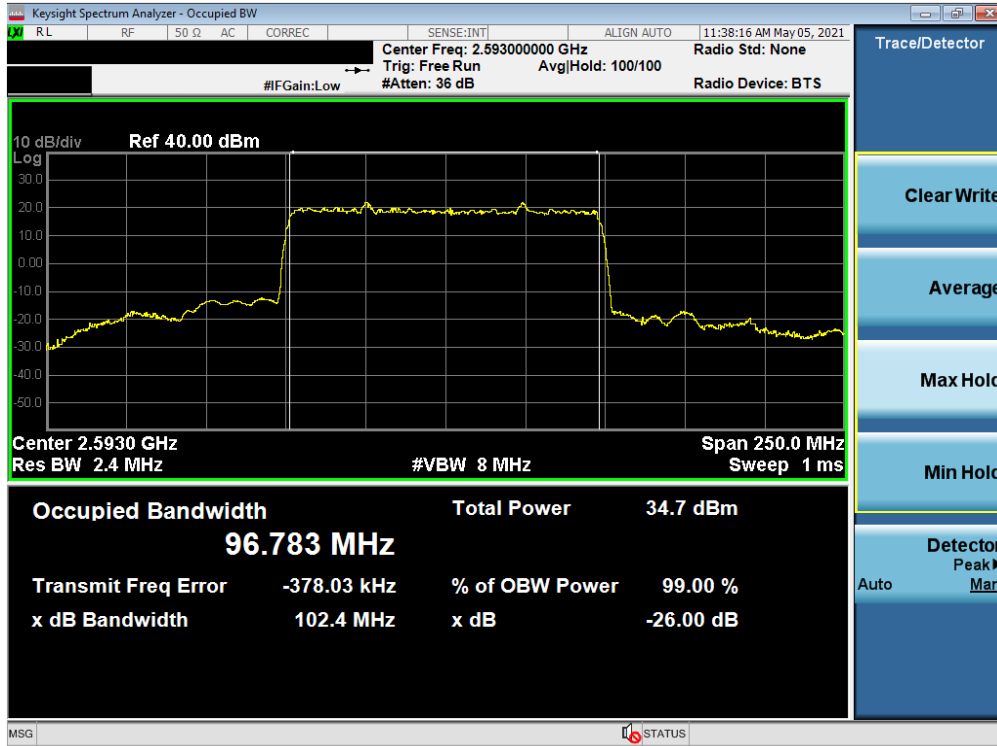
Plot 7-33. Occupied Bandwidth Plot (NR Band n30 - 5MHz QPSK - Full RB)



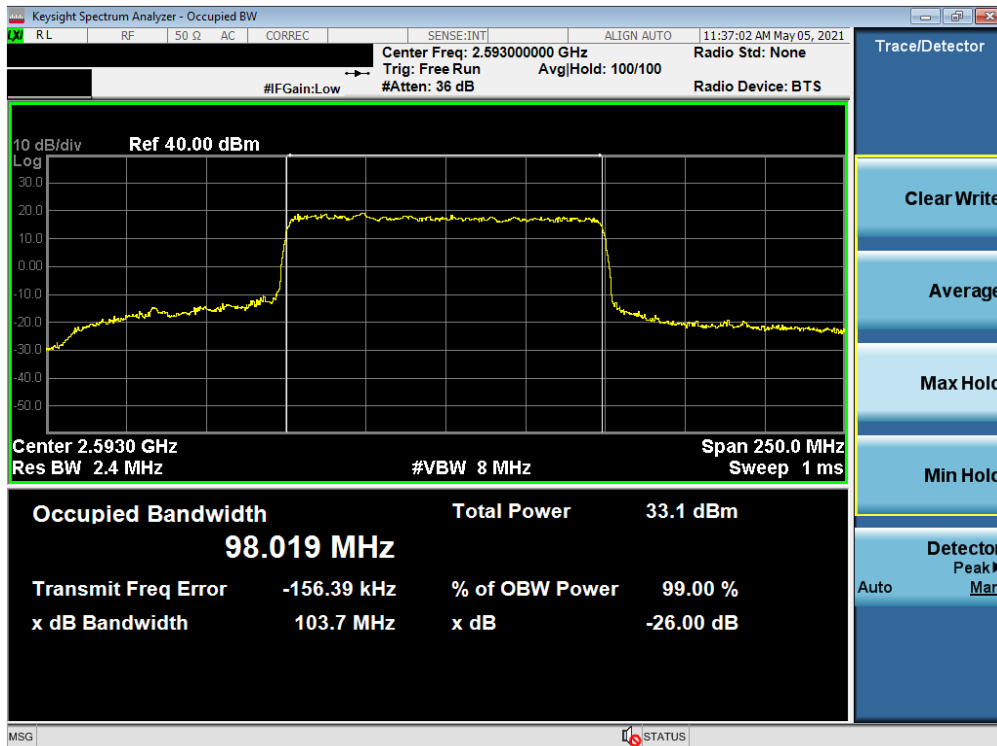
Plot 7-34. Occupied Bandwidth Plot (NR Band n30 - 5MHz 16-QAM - Full RB)

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|---|--|-----------------------------------|---|-----------------------------------|
| FCC ID: A3LSMF711U |  PCTEST Proud to be part of  | PART 27 MEASUREMENT REPORT |  | Approved by: Technical Manager |
| Test Report S/N: 1M2104070032-05.A3L | Test Dates: 04/12/2021 – 06/11/2021 | EUT Type: Portable Handset | | Page 32 of 169 |

NR Band n41 (PC2)

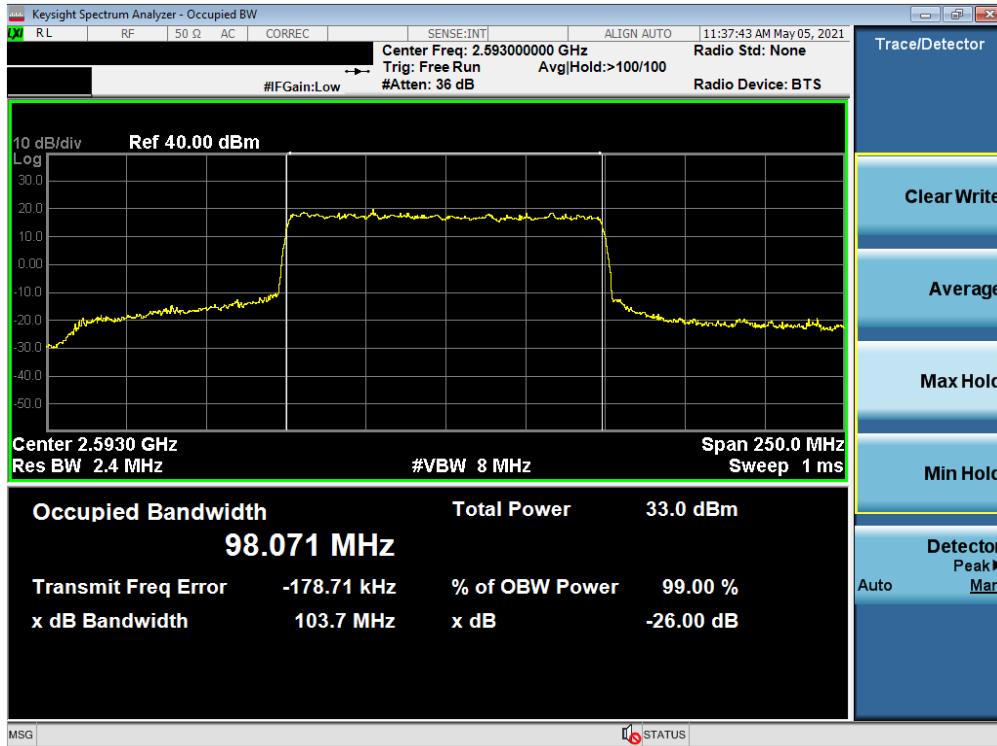


Plot 7-35. Occupied Bandwidth Plot (NR Band n41 - 100MHz $\pi/2$ BPSK - Full RB)

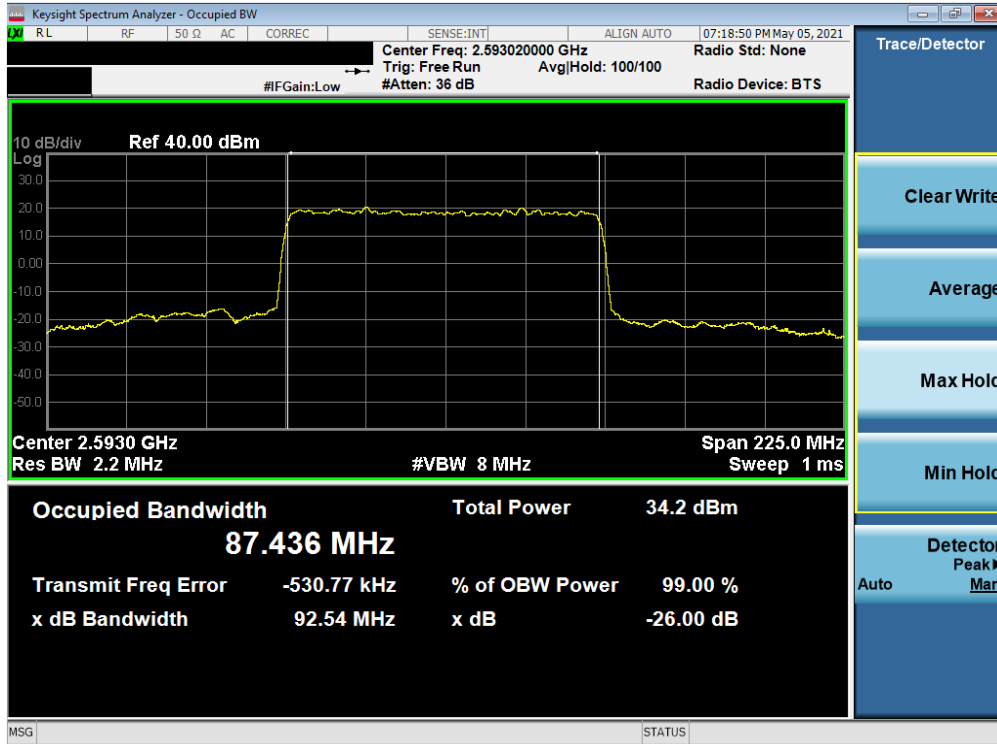


Plot 7-36. Occupied Bandwidth Plot (NR Band n41 - 100MHz QPSK - Full RB)




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|---|--|-------------------------------|----------------|-----------------------------------|
| FCC ID: A3LSMF711U | PCTEST Proud to be part of element | PART 27 MEASUREMENT REPORT | SAMSUNG | Approved by: Technical Manager |
| Test Report S/N: 1M2104070032-05.A3L | Test Dates: 04/12/2021 – 06/11/2021 | EUT Type: Portable Handset | | Page 33 of 169 |

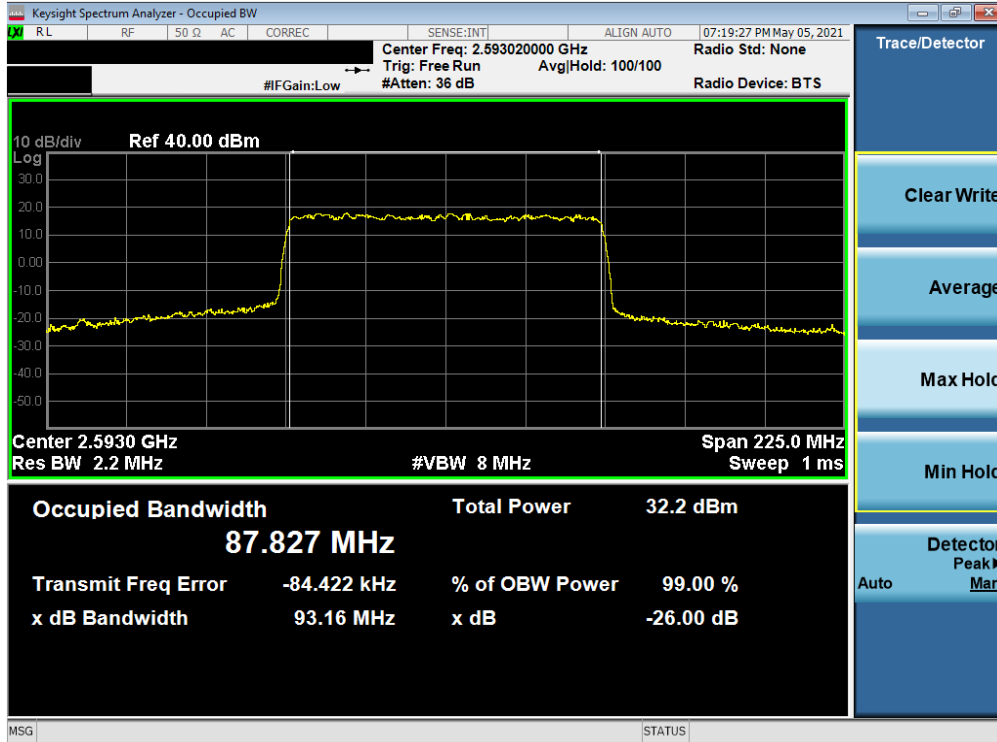


Plot 7-37. Occupied Bandwidth Plot (NR Band n41 - 100MHz 16-QAM - Full RB)

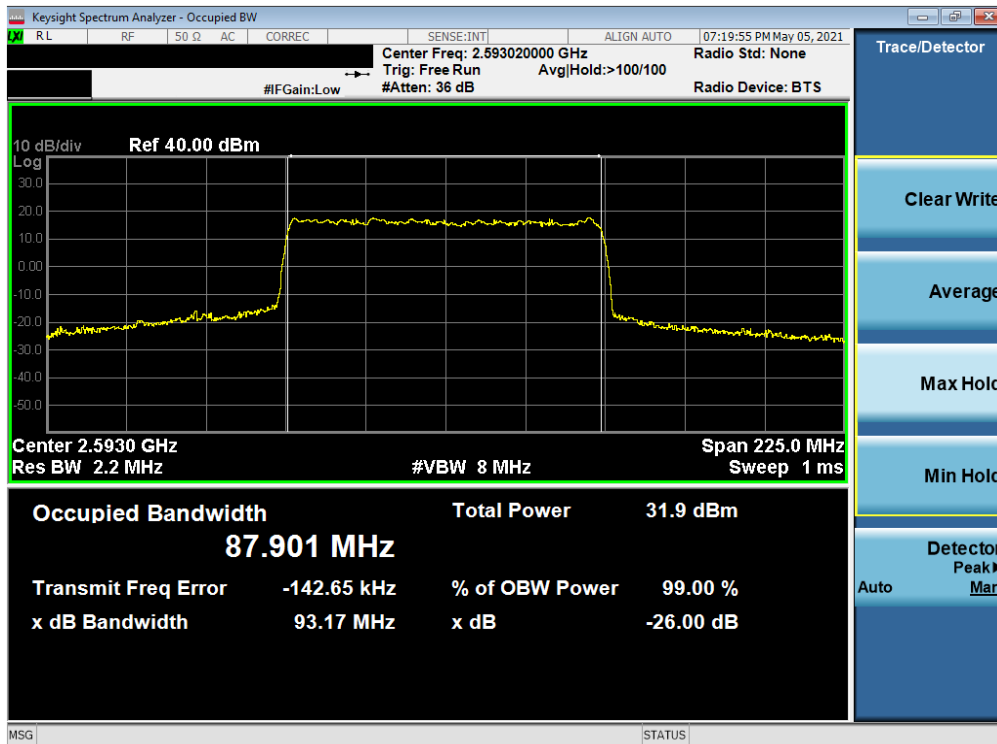


Plot 7-38. Occupied Bandwidth Plot (NR Band n41 - 90MHz $\pi/2$ BPSK - Full RB)




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|---|--|-------------------------------|---|-----------------------------------|
| FCC ID: A3LSMF711U |  PCTEST Proud to be part of  | PART 27 MEASUREMENT REPORT |  | Approved by: Technical Manager |
| Test Report S/N: 1M2104070032-05.A3L | Test Dates: 04/12/2021 – 06/11/2021 | EUT Type: Portable Handset | | Page 34 of 169 |

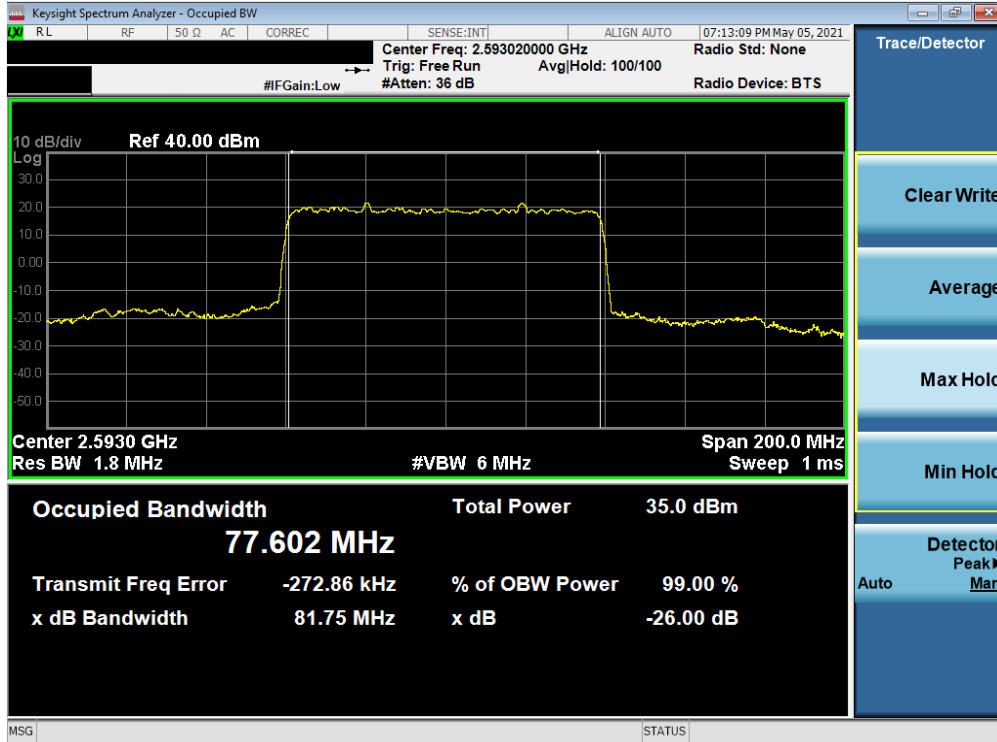


Plot 7-39. Occupied Bandwidth Plot (NR Band n41 - 90MHz QPSK - Full RB)

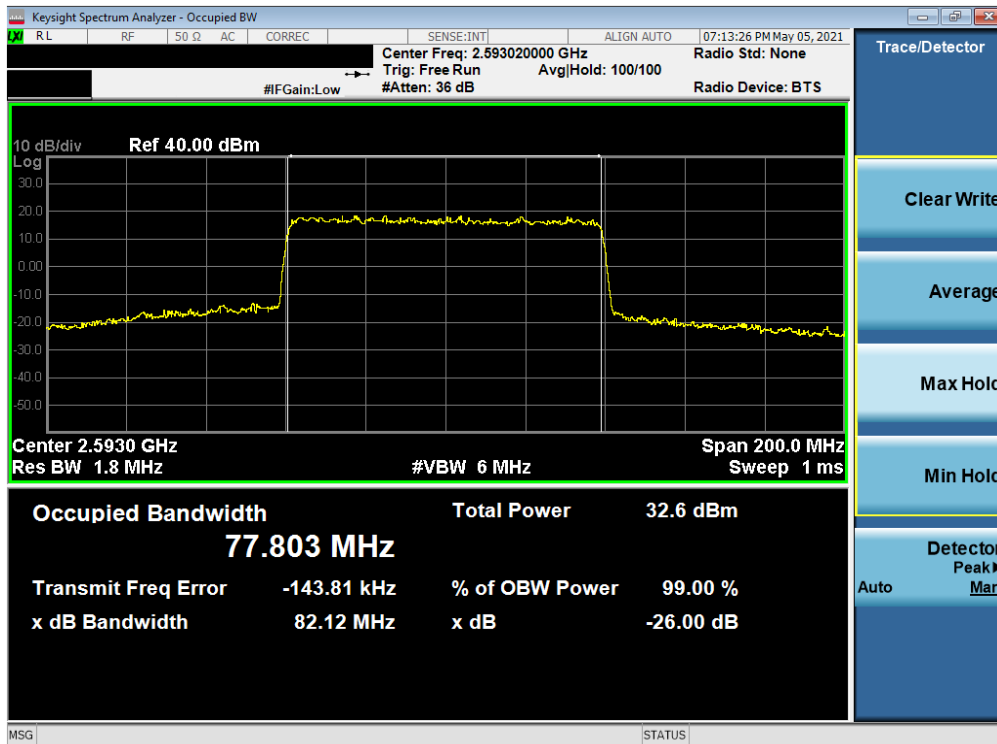


Plot 7-40. Occupied Bandwidth Plot (NR Band n41 - 90MHz 16-QAM - Full RB)




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|---|--|-------------------------------|---|-----------------------------------|
| FCC ID: A3LSMF711U |  PCTEST Proud to be part of  | PART 27 MEASUREMENT REPORT |  | Approved by: Technical Manager |
| Test Report S/N: 1M2104070032-05.A3L | Test Dates: 04/12/2021 - 06/11/2021 | EUT Type: Portable Handset | | Page 35 of 169 |

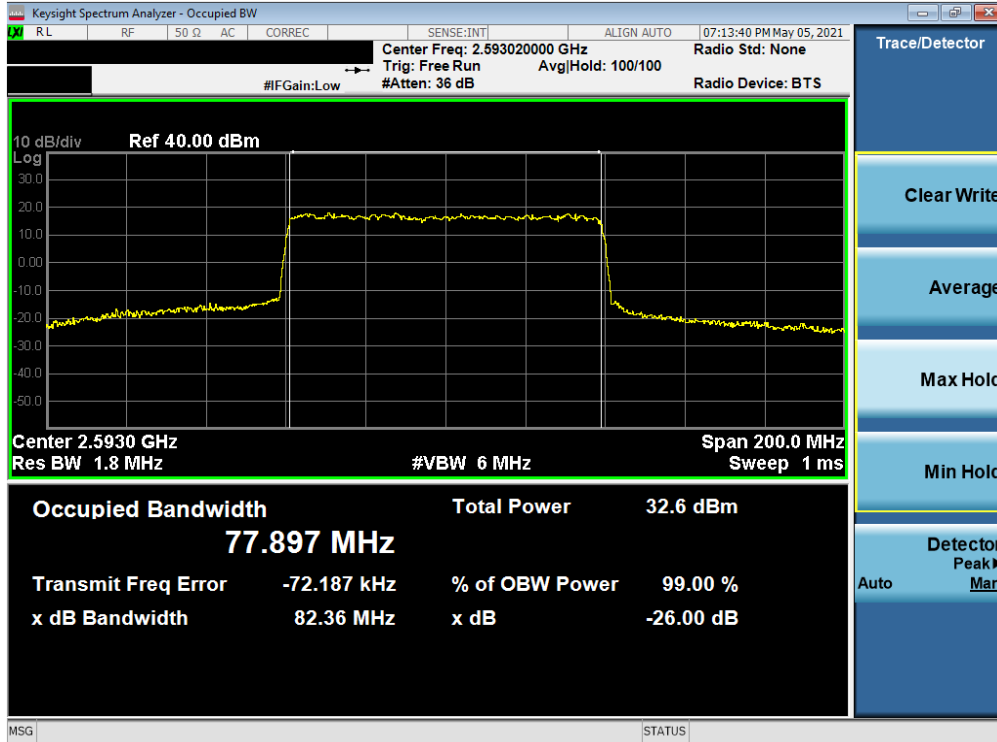


Plot 7-41. Occupied Bandwidth Plot (NR Band n41 - 80MHz $\pi/2$ BPSK - Full RB)

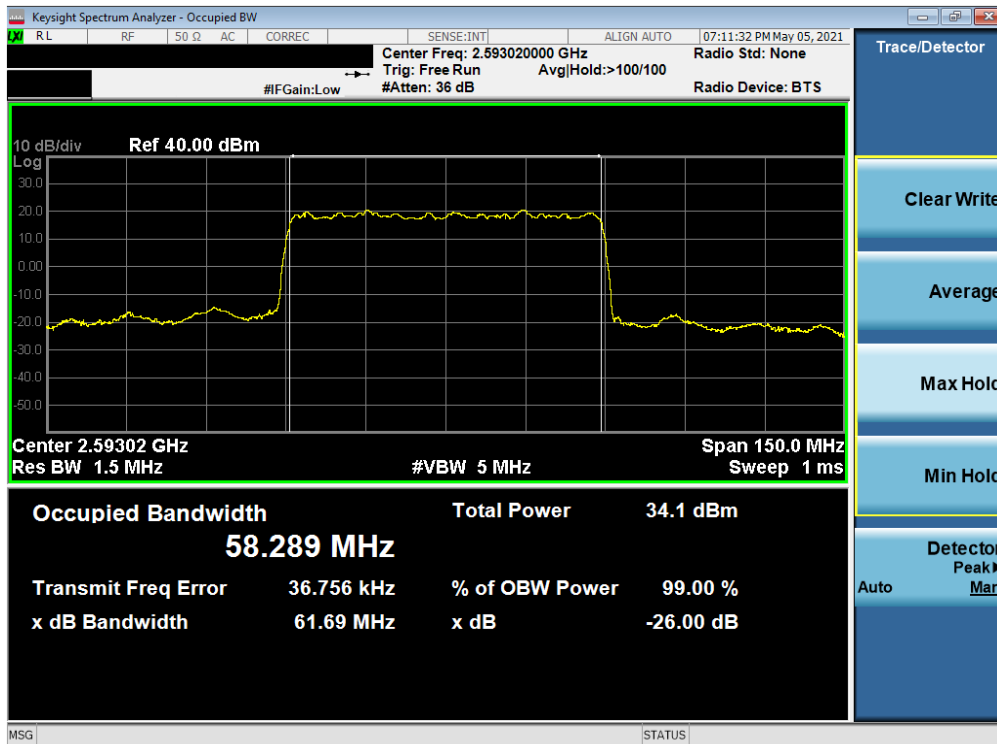


Plot 7-42. Occupied Bandwidth Plot (NR Band n41 - 80MHz QPSK - Full RB)




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|---|--|-----------------------------------|---|-----------------------------------|
| FCC ID: A3LSMF711U |  PCTEST Proud to be part of  | PART 27 MEASUREMENT REPORT |  | Approved by: Technical Manager |
| Test Report S/N: 1M2104070032-05.A3L | Test Dates: 04/12/2021 - 06/11/2021 | EUT Type: Portable Handset | | Page 36 of 169 |

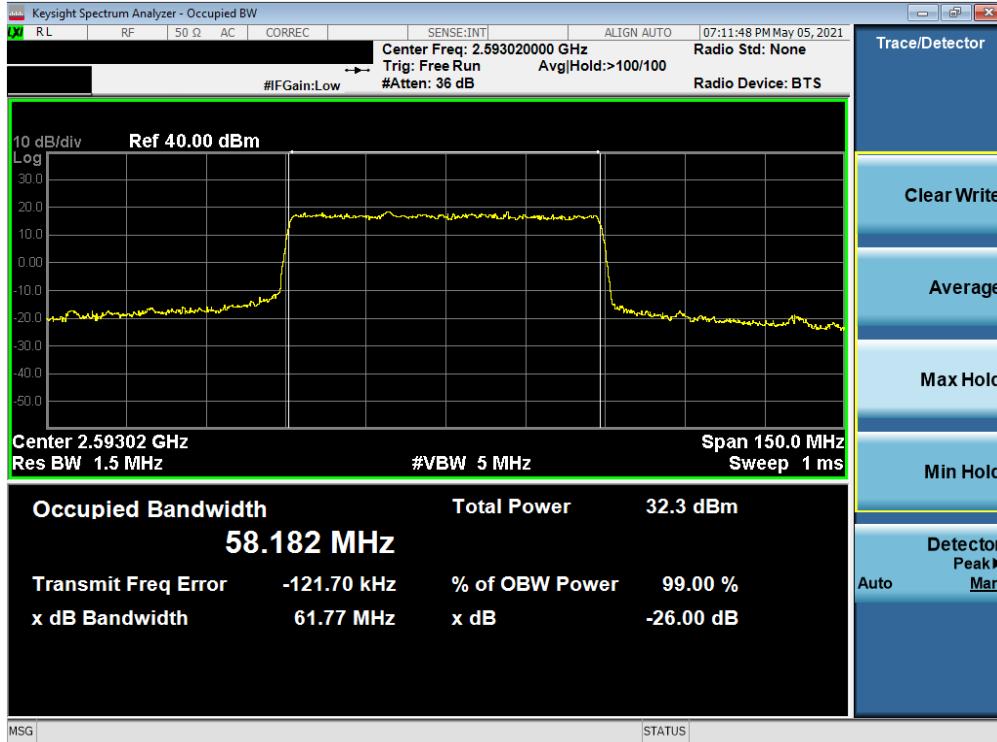


Plot 7-43. Occupied Bandwidth Plot (NR Band n41 - 80MHz 16-QAM - Full RB)

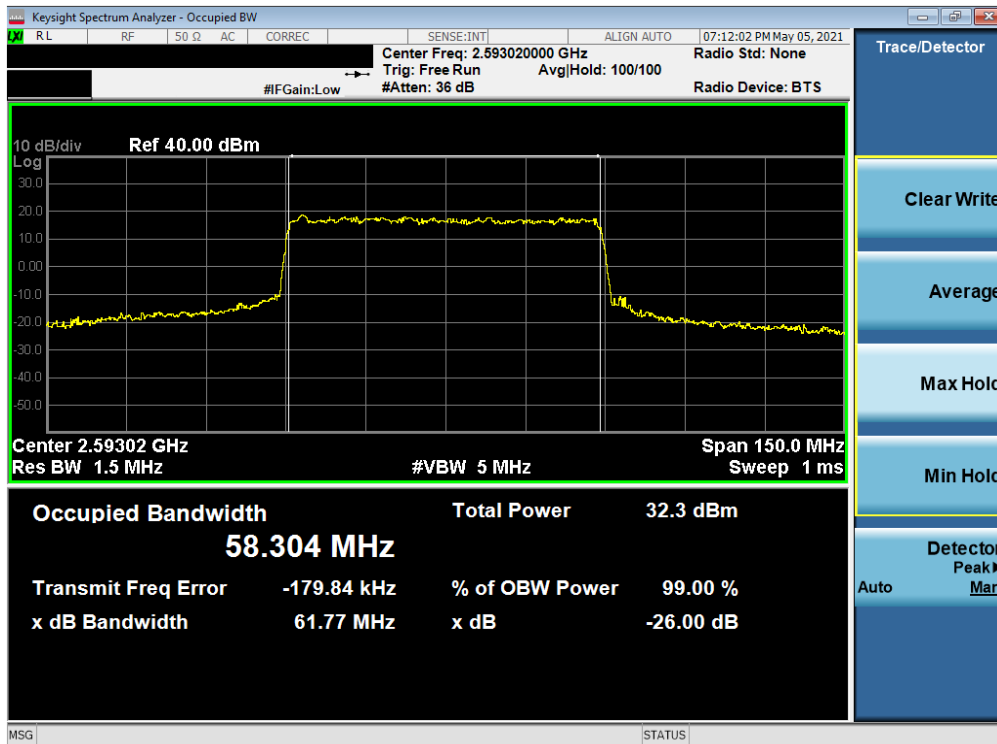


Plot 7-44. Occupied Bandwidth Plot (NR Band n41 - 60MHz $\pi/2$ BPSK - Full RB)




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| FCC ID: A3LSMF711U |  PCTEST Proud to be part of  | PART 27 MEASUREMENT REPORT |  | Approved by: Technical Manager |
| Test Report S/N: 1M2104070032-05.A3L | Test Dates: 04/12/2021 - 06/11/2021 | EUT Type: Portable Handset | | Page 37 of 169 |

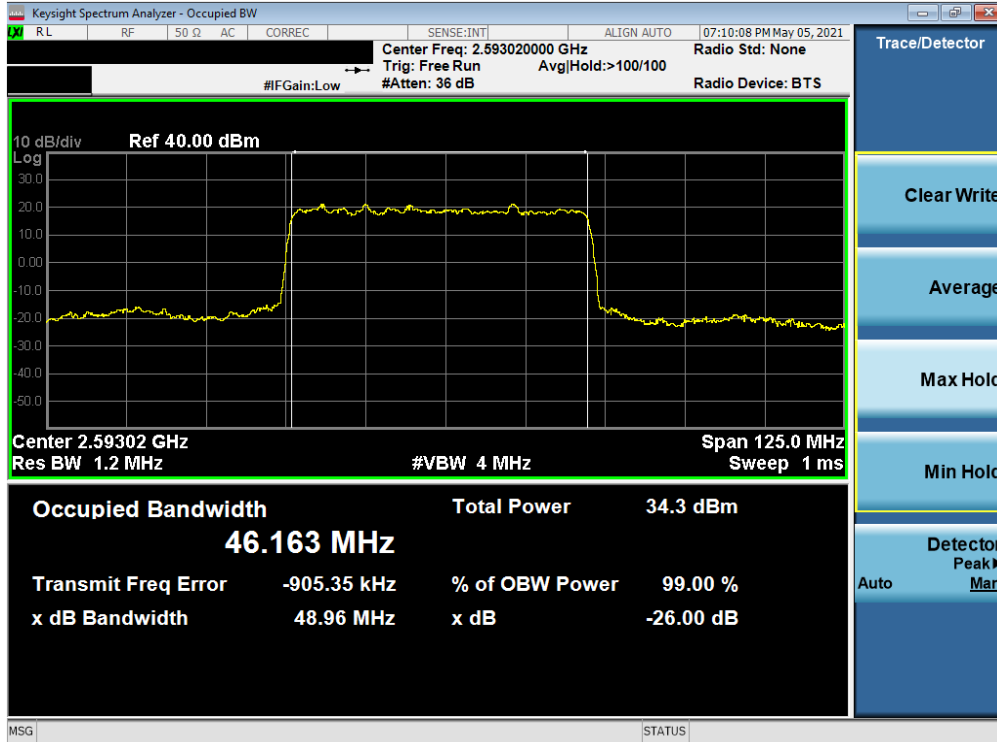


Plot 7-45. Occupied Bandwidth Plot (NR Band n41 - 60MHz QPSK - Full RB)

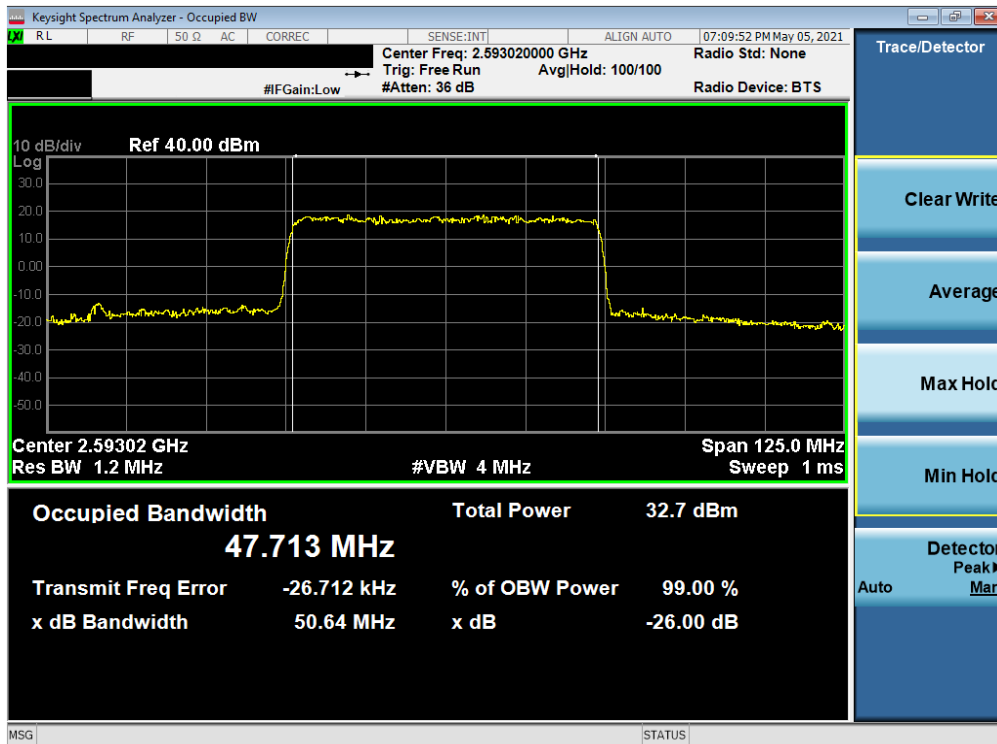


Plot 7-46. Occupied Bandwidth Plot (NR Band n41 - 60MHz 16-QAM - Full RB)




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| FCC ID: A3LSMF711U |  PCTEST Proud to be part of  | PART 27 MEASUREMENT REPORT |  | Approved by: Technical Manager |
| Test Report S/N: 1M2104070032-05.A3L | Test Dates: 04/12/2021 - 06/11/2021 | EUT Type: Portable Handset | | Page 38 of 169 |

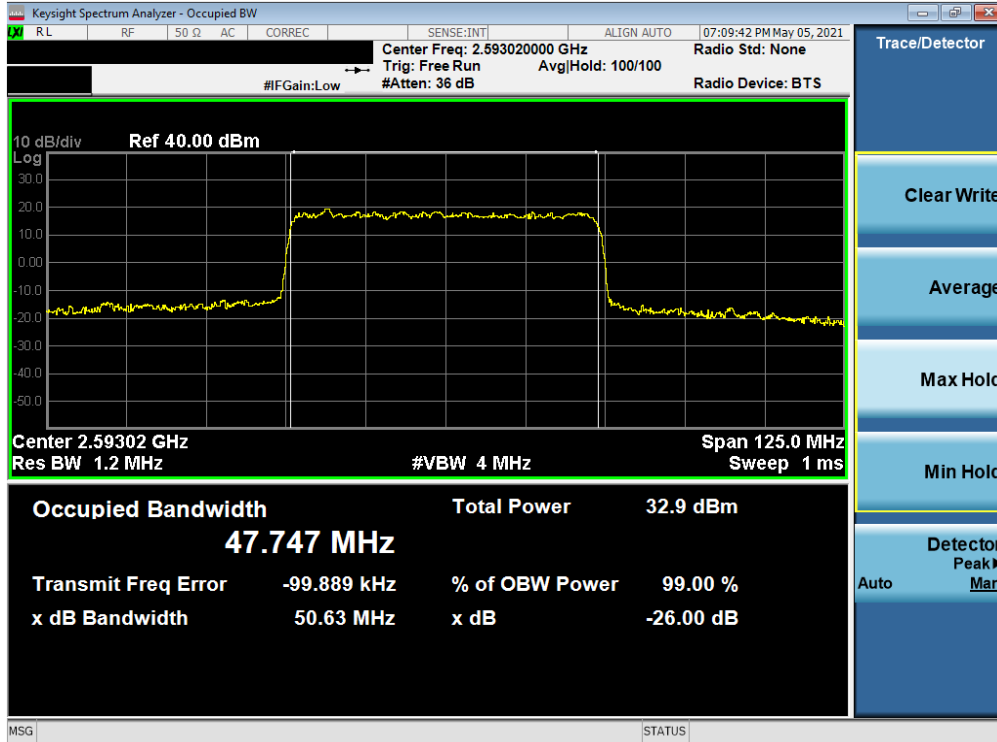


Plot 7-47. Occupied Bandwidth Plot (NR Band n41 - 50MHz $\pi/2$ BPSK - Full RB)

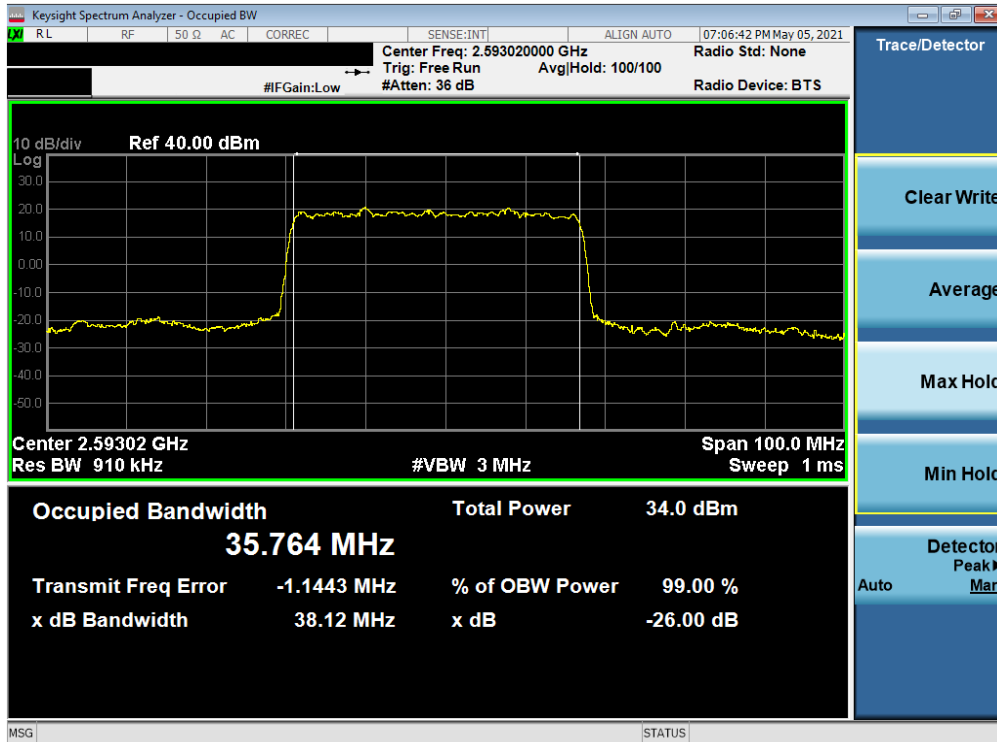


Plot 7-48. Occupied Bandwidth Plot (NR Band n41 - 50MHz QPSK - Full RB)




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|---|--|-----------------------------------|---|-----------------------------------|
| FCC ID: A3LSMF711U |  PCTEST Proud to be part of  | PART 27 MEASUREMENT REPORT |  | Approved by: Technical Manager |
| Test Report S/N: 1M2104070032-05.A3L | Test Dates: 04/12/2021 - 06/11/2021 | EUT Type: Portable Handset | | Page 39 of 169 |

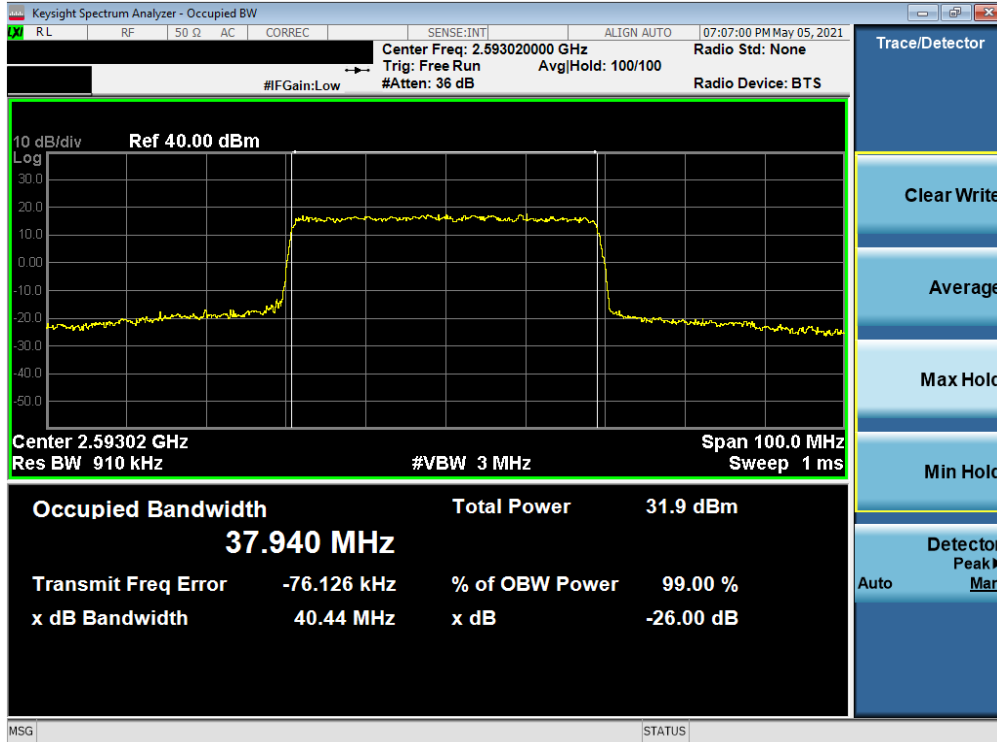


Plot 7-49. Occupied Bandwidth Plot (NR Band n41 - 50MHz 16-QAM - Full RB)

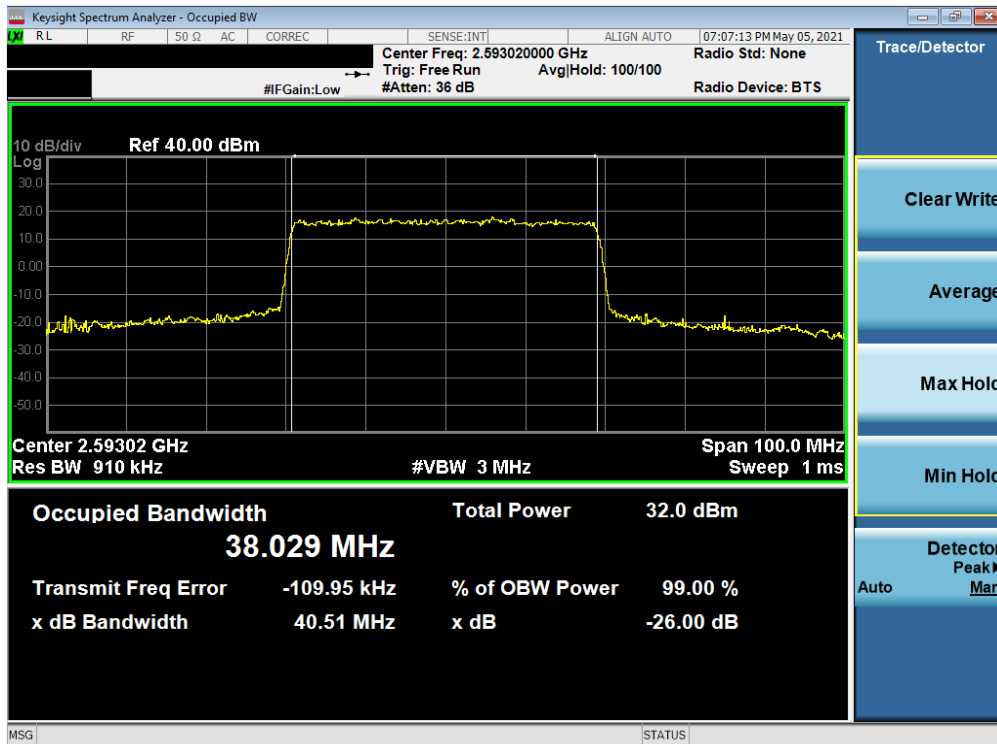


Plot 7-50. Occupied Bandwidth Plot (NR Band n41 - 40MHz $\pi/2$ BPSK - Full RB)




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| FCC ID: A3LSMF711U |  PCTEST Proud to be part of  | PART 27 MEASUREMENT REPORT |  | Approved by: Technical Manager |
| Test Report S/N: 1M2104070032-05.A3L | Test Dates: 04/12/2021 - 06/11/2021 | EUT Type: Portable Handset | | Page 40 of 169 |

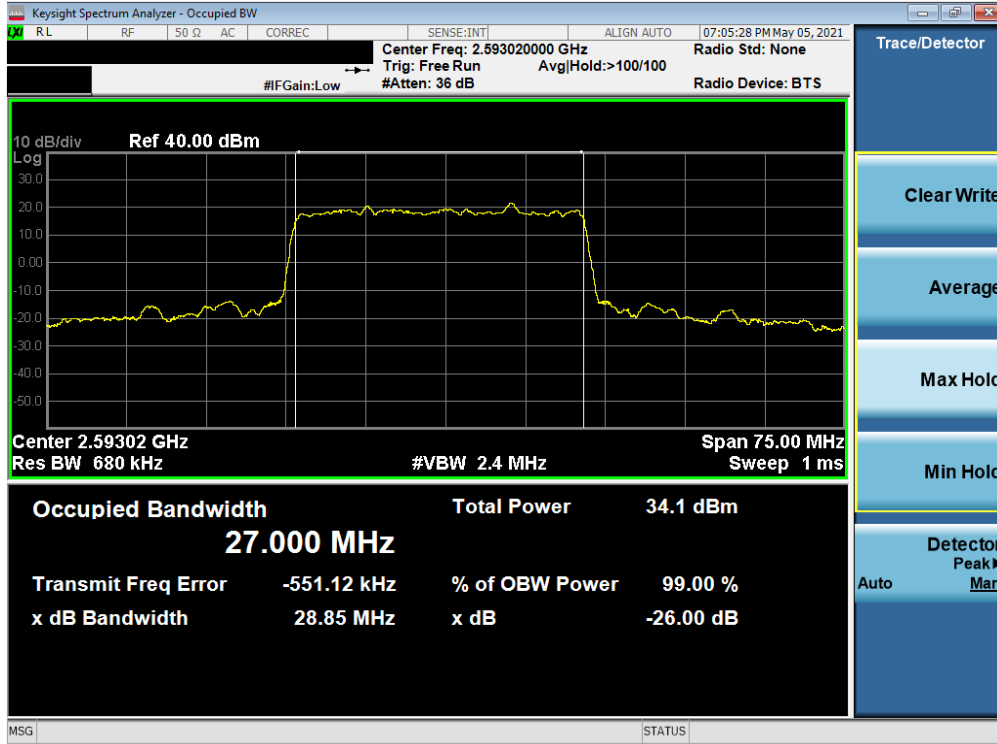


Plot 7-51. Occupied Bandwidth Plot (NR Band n41 - 40MHz QPSK - Full RB)

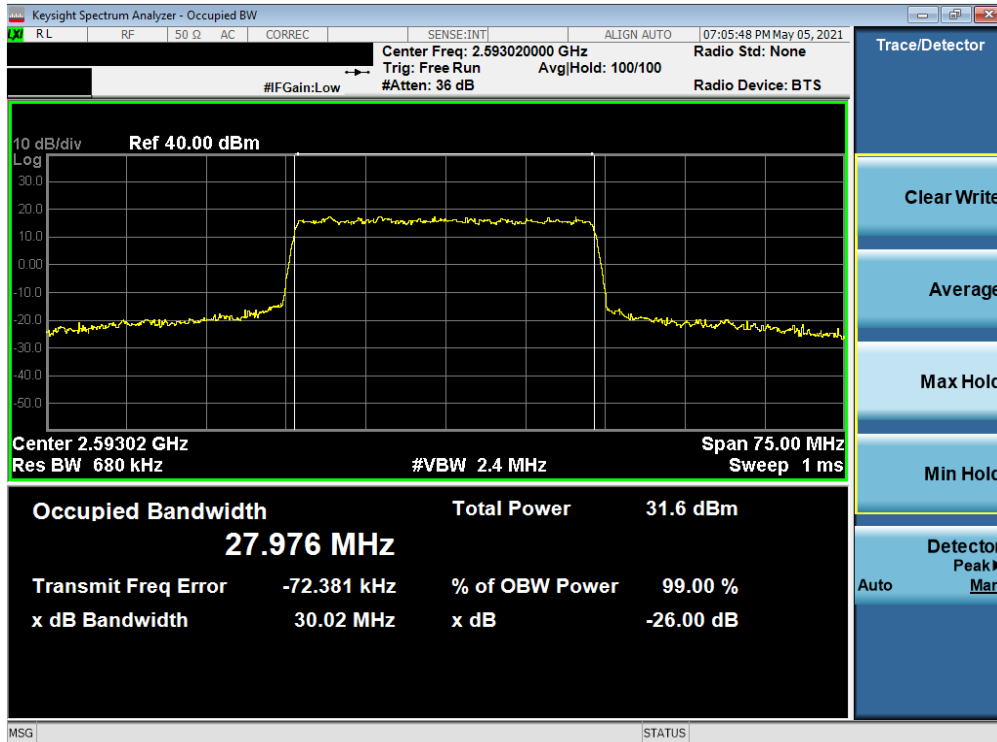


Plot 7-52. Occupied Bandwidth Plot (NR Band n41 - 40MHz 16-QAM - Full RB)




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|---|--|-----------------------------------|---|-----------------------------------|
| FCC ID: A3LSMF711U |  PCTEST Proud to be part of  | PART 27 MEASUREMENT REPORT |  | Approved by: Technical Manager |
| Test Report S/N: 1M2104070032-05.A3L | Test Dates: 04/12/2021 - 06/11/2021 | EUT Type: Portable Handset | | Page 41 of 169 |

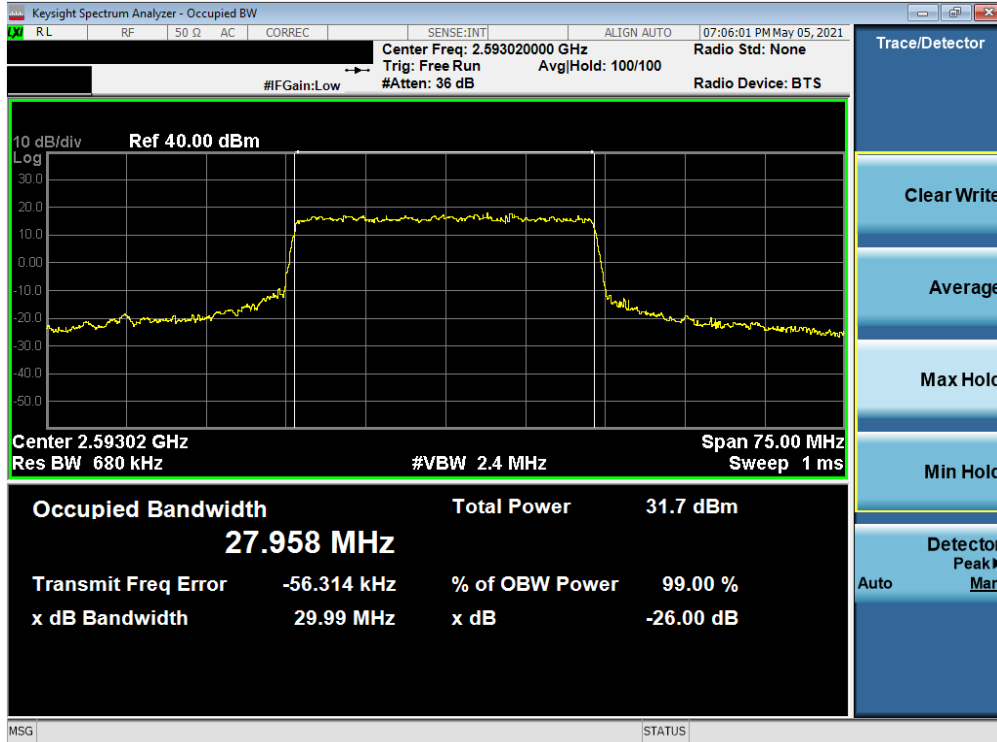


Plot 7-53. Occupied Bandwidth Plot (NR Band n41 - 30MHz $\pi/2$ BPSK - Full RB)

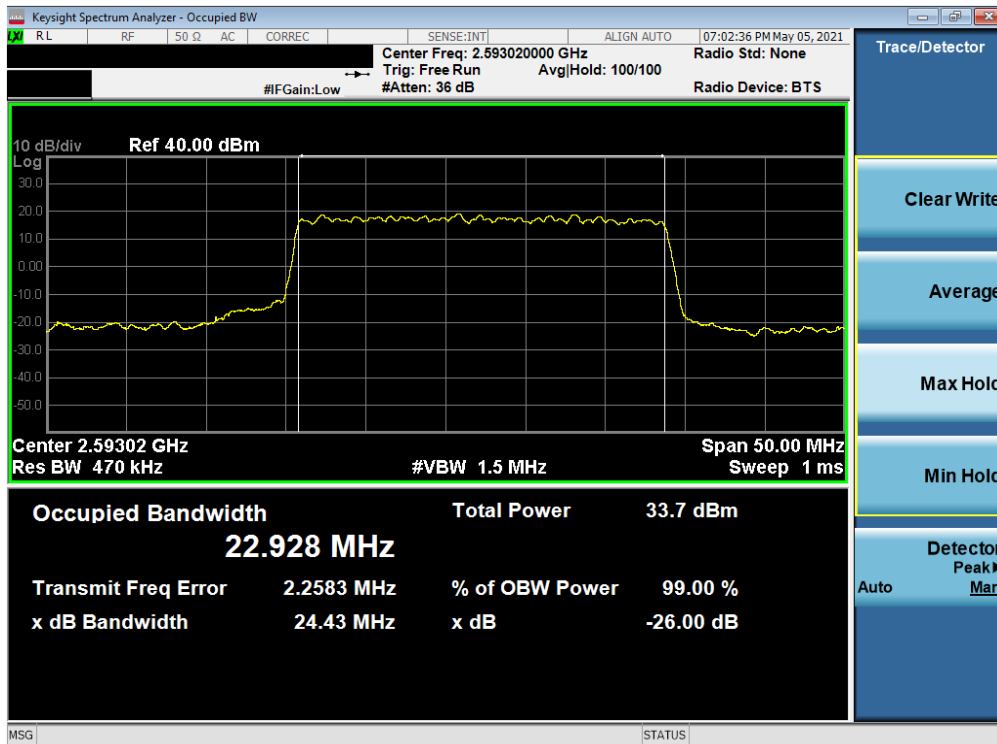


Plot 7-54. Occupied Bandwidth Plot (NR Band n41 - 30MHz QPSK - Full RB)




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|---|--|-----------------------------------|---|-----------------------------------|
| FCC ID: A3LSMF711U |  PCTEST Proud to be part of  | PART 27 MEASUREMENT REPORT |  | Approved by: Technical Manager |
| Test Report S/N: 1M2104070032-05.A3L | Test Dates: 04/12/2021 - 06/11/2021 | EUT Type: Portable Handset | | Page 42 of 169 |

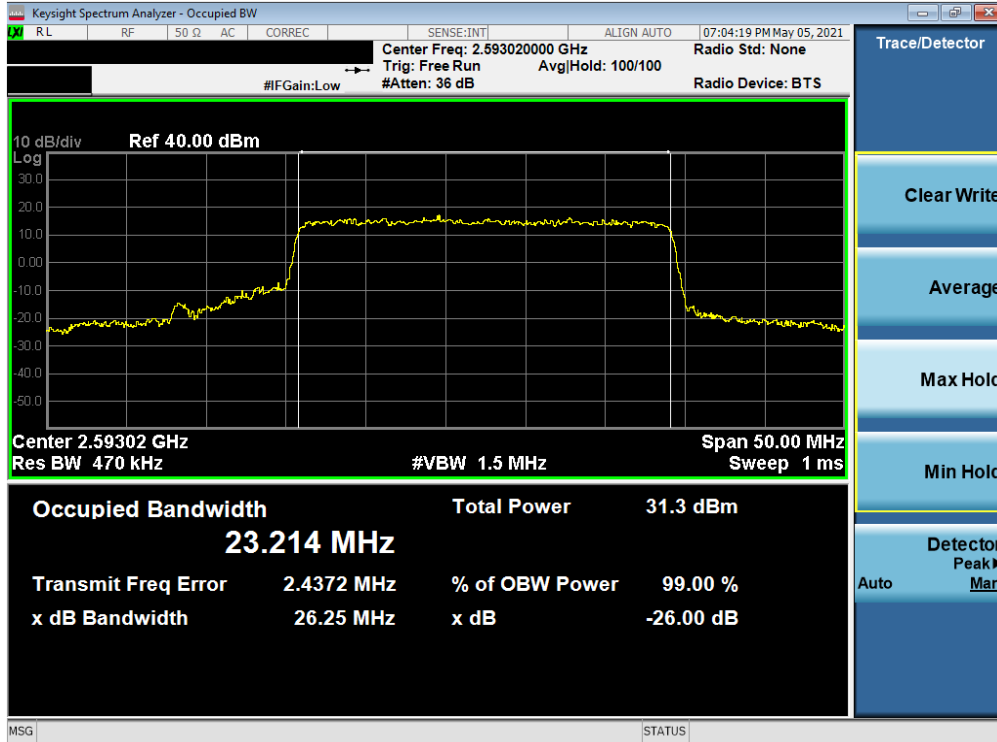


Plot 7-55. Occupied Bandwidth Plot (NR Band n41 - 30MHz 16-QAM - Full RB)

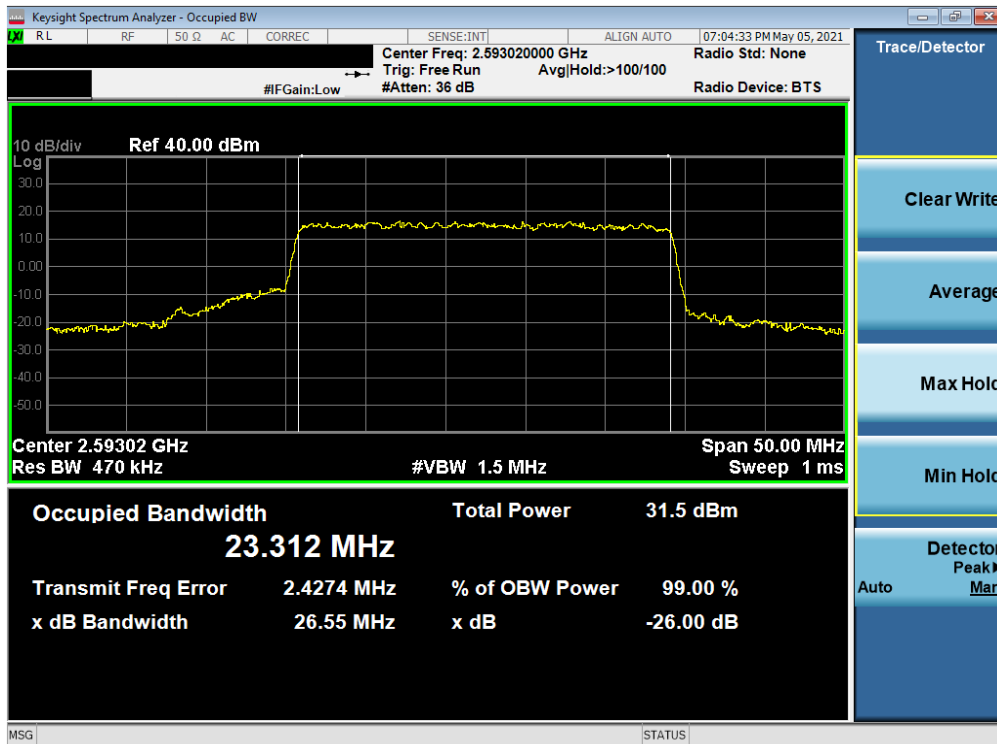


Plot 7-56. Occupied Bandwidth Plot (NR Band n41 - 20MHz $\pi/2$ BPSK - Full RB)




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| FCC ID: A3LSMF711U |  PCTEST Proud to be part of  | PART 27 MEASUREMENT REPORT |  | Approved by: Technical Manager |
| Test Report S/N: 1M2104070032-05.A3L | Test Dates: 04/12/2021 - 06/11/2021 | EUT Type: Portable Handset | | Page 43 of 169 |



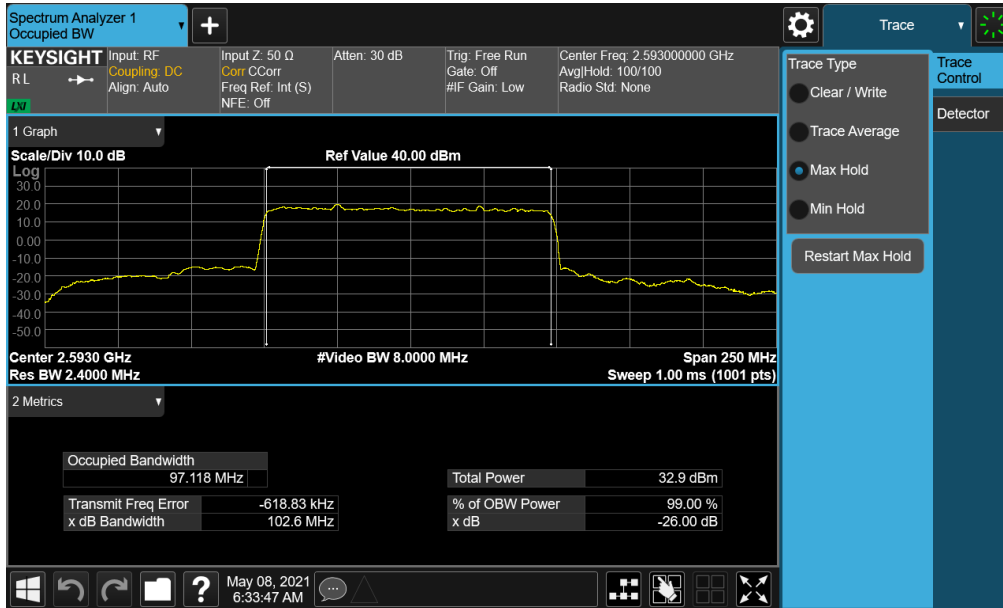
Plot 7-57. Occupied Bandwidth Plot (NR Band n41 - 20MHz QPSK - Full RB)



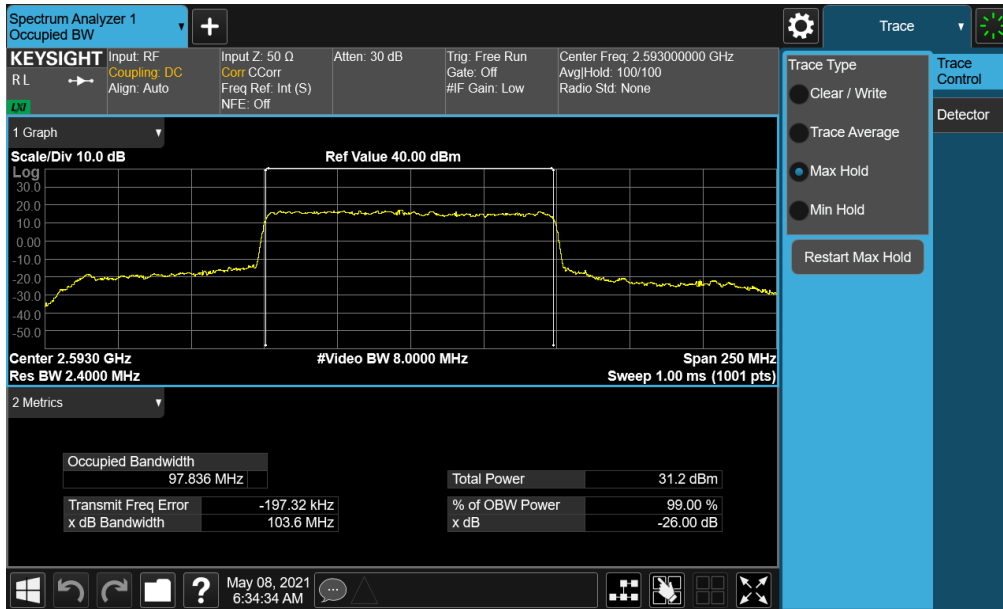
Plot 7-58. Occupied Bandwidth Plot (NR Band n41 - 20MHz 16-QAM - Full RB)

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| FCC ID: A3LSMF711U |  PCTEST Proud to be part of  | PART 27 MEASUREMENT REPORT |  | Approved by: Technical Manager |
| Test Report S/N: 1M2104070032-05.A3L | Test Dates: 04/12/2021 - 06/11/2021 | EUT Type: Portable Handset | | Page 44 of 169 |



NR Band n41 (PC3)

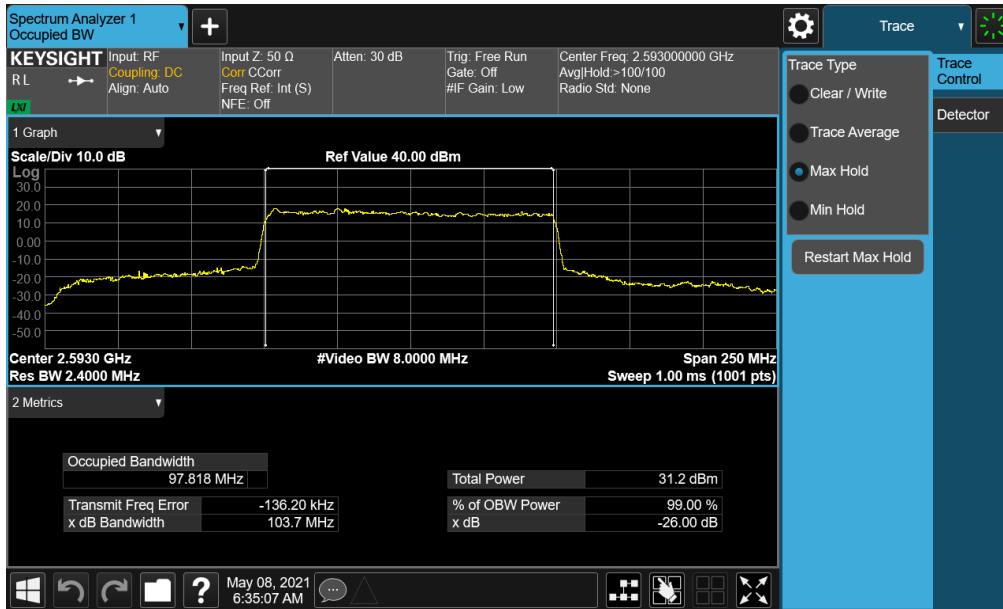


Plot 7-59. Occupied Bandwidth Plot (NR Band n41 - 100MHz $\pi/2$ BPSK - Full RB)

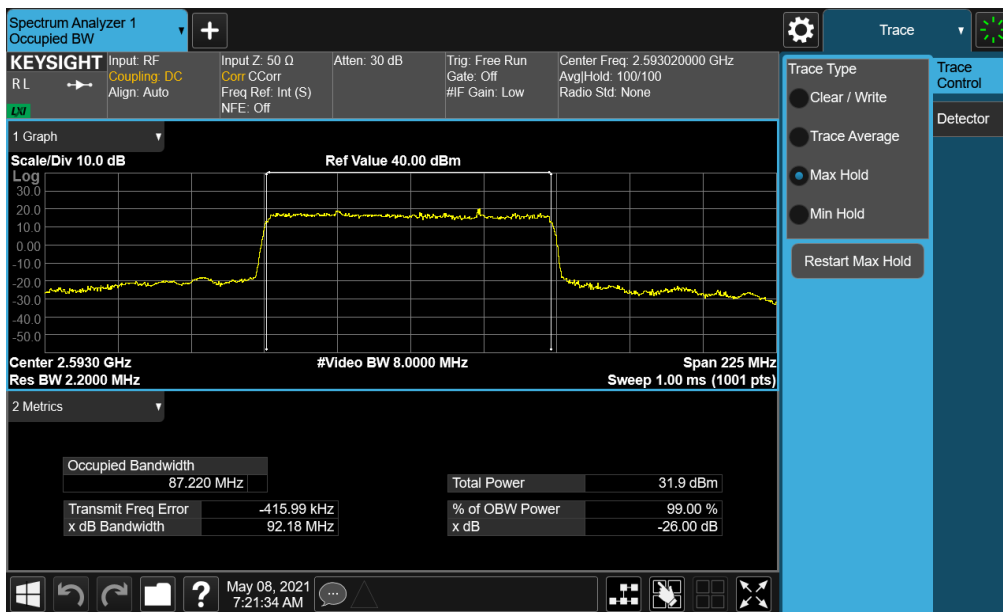


Plot 7-60. Occupied Bandwidth Plot (NR Band n41 - 100MHz QPSK - Full RB)




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| FCC ID: A3LSMF711U |  PART 27 MEASUREMENT REPORT |  | Approved by: Technical Manager |
| Test Report S/N: 1M2104070032-05.A3L | Test Dates: 04/12/2021 – 06/11/2021 | EUT Type: Portable Handset | Page 45 of 169 |

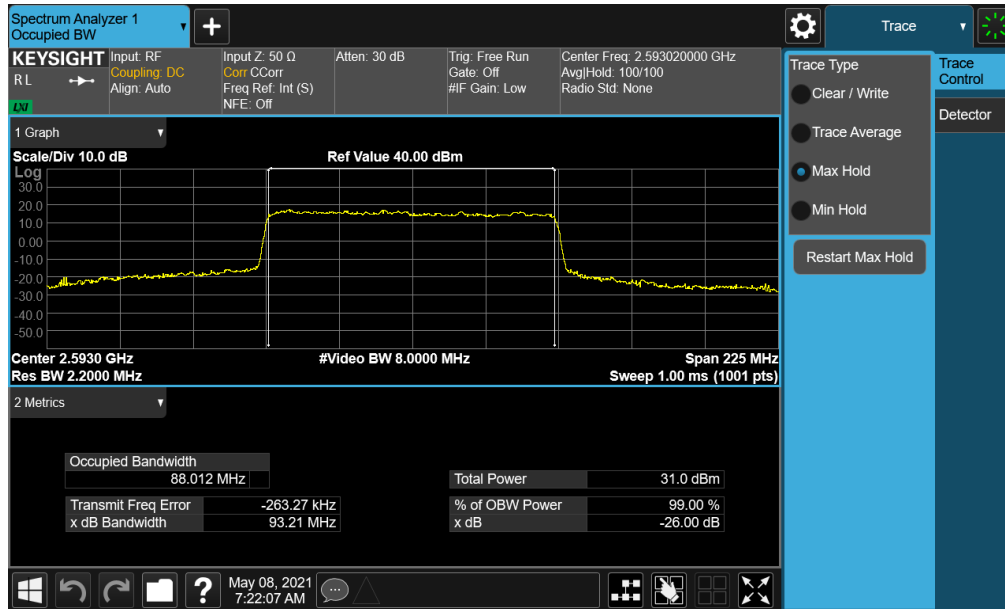


Plot 7-61. Occupied Bandwidth Plot (NR Band n41 - 100MHz 16-QAM - Full RB)

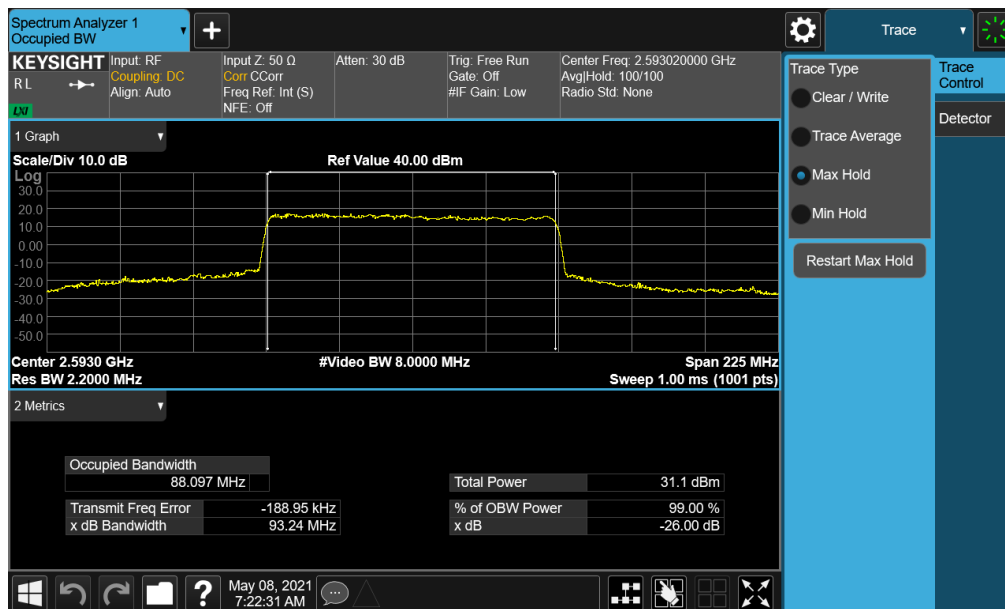


Plot 7-62. Occupied Bandwidth Plot (NR Band n41 - 90MHz $\pi/2$ BPSK - Full RB)



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|--|--|--------------------------------------|---|--|
| FCC ID: A3LSMF711U |  PCTEST Proud to be part of  | PART 27 MEASUREMENT REPORT |  | Approved by: Technical Manager |
| Test Report S/N: 1M2104070032-05.A3L | Test Dates: 04/12/2021 – 06/11/2021 | EUT Type: Portable Handset | | Page 46 of 169 |

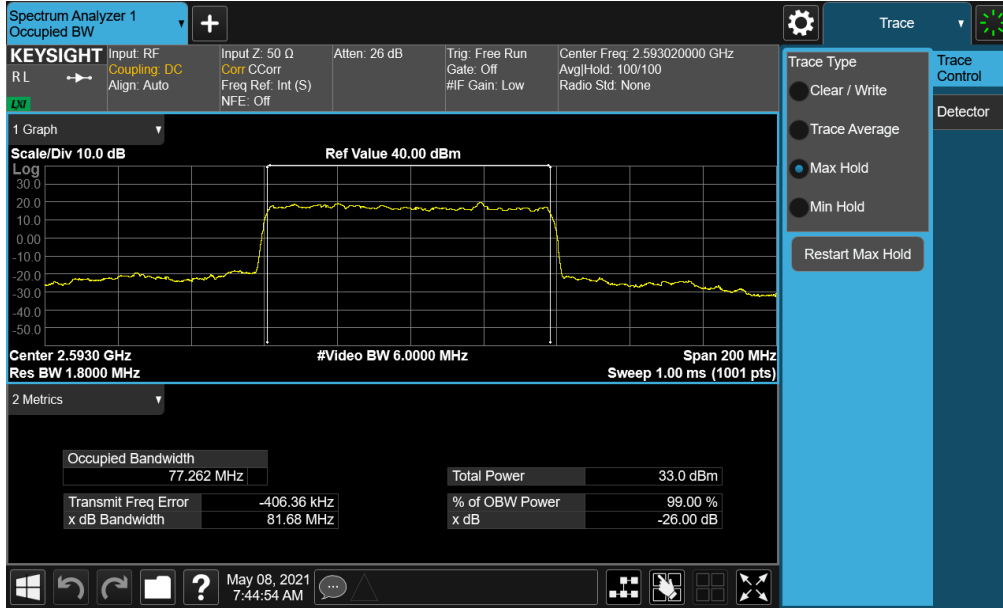


Plot 7-63. Occupied Bandwidth Plot (NR Band n41 - 90MHz QPSK - Full RB)

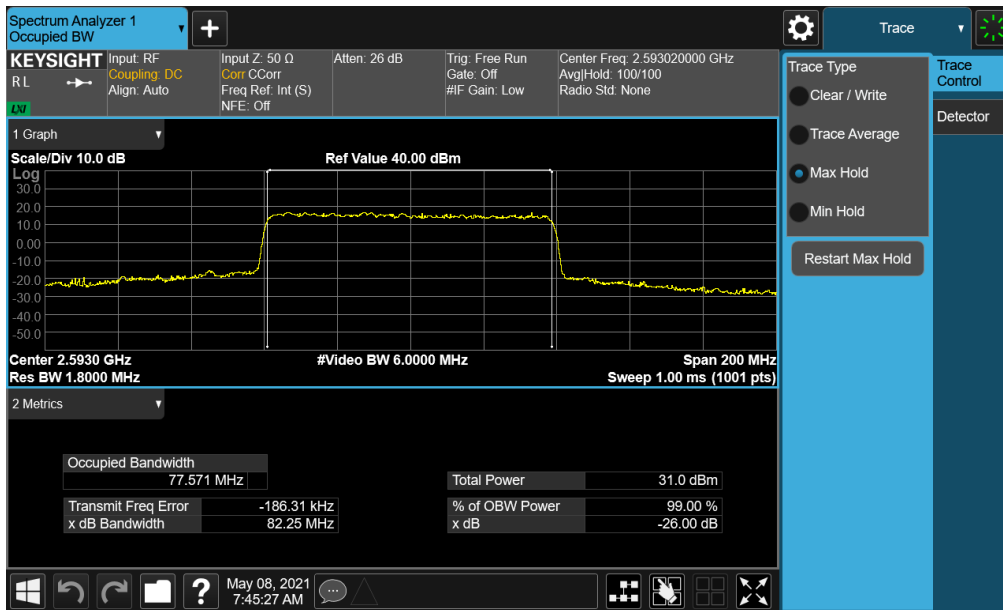


Plot 7-64. Occupied Bandwidth Plot (NR Band n41 - 90MHz 16-QAM - Full RB)




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| FCC ID: A3LSMF711U |  PART 27 MEASUREMENT REPORT  | Approved by: Technical Manager |
| Test Report S/N: 1M2104070032-05.A3L | Test Dates: 04/12/2021 – 06/11/2021 | EUT Type: Portable Handset |
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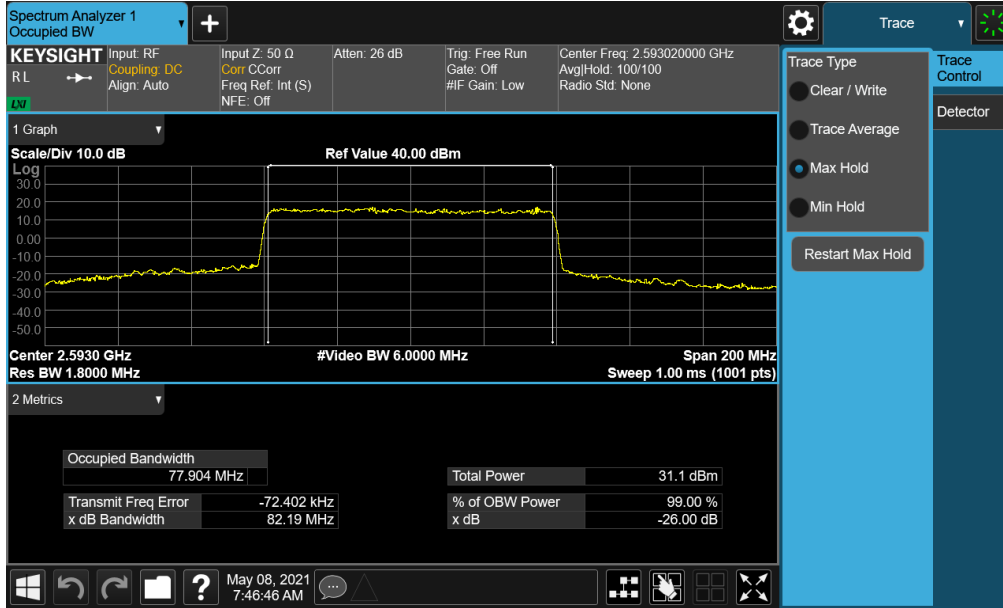


Plot 7-65. Occupied Bandwidth Plot (NR Band n41 - 80MHz $\pi/2$ BPSK - Full RB)

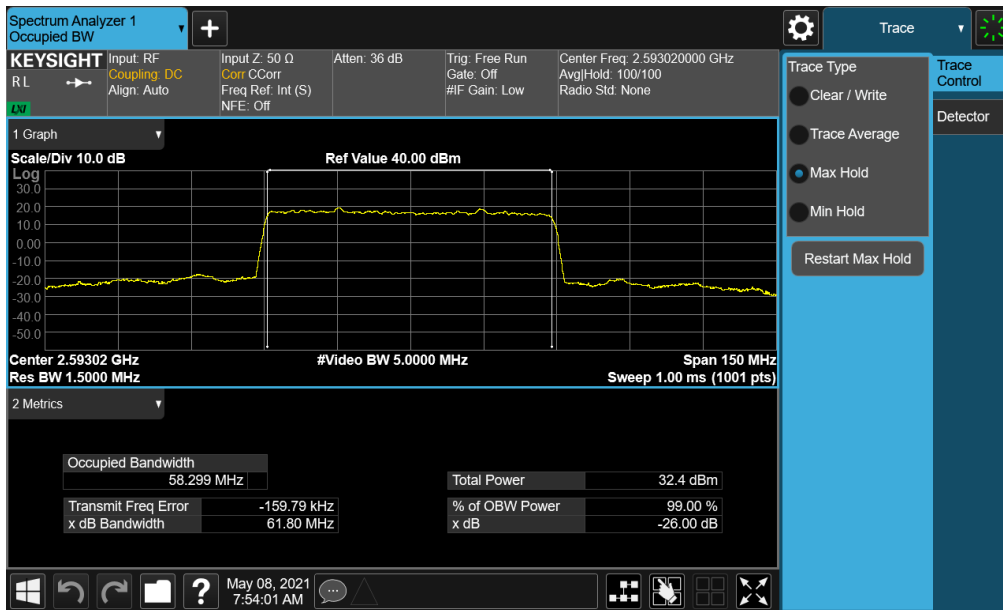


Plot 7-66. Occupied Bandwidth Plot (NR Band n41 - 80MHz QPSK - Full RB)




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|--|--|--------------------------------------|---|--|
| FCC ID: A3LSMF711U |  PCTEST Proud to be part of  | PART 27 MEASUREMENT REPORT |  | Approved by: Technical Manager |
| Test Report S/N: 1M2104070032-05.A3L | Test Dates: 04/12/2021 – 06/11/2021 | EUT Type: Portable Handset | | Page 48 of 169 |



Plot 7-67. Occupied Bandwidth Plot (NR Band n41 - 80MHz 16-QAM - Full RB)

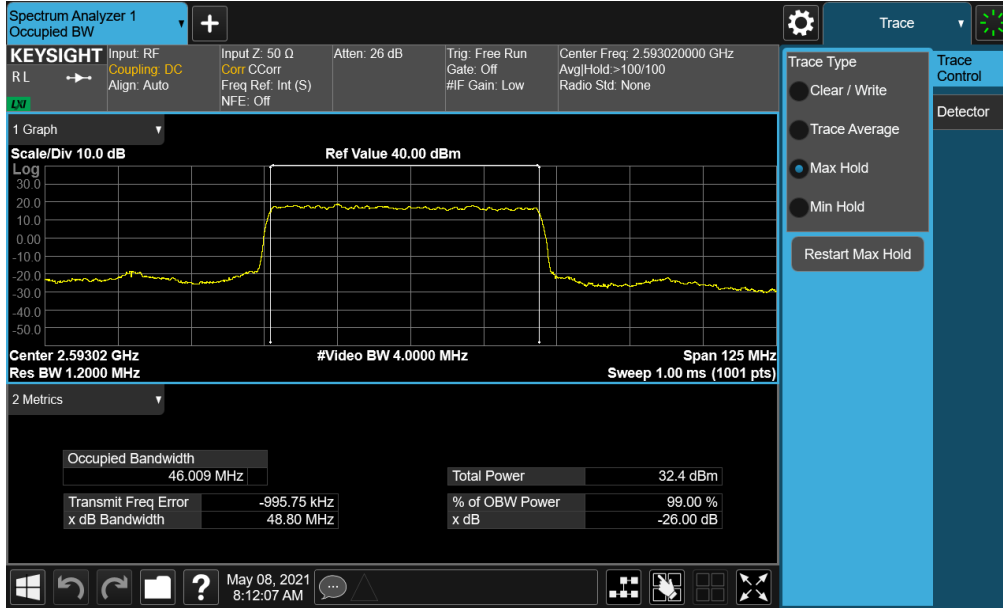


Plot 7-68. Occupied Bandwidth Plot (NR Band n41 - 60MHz $\pi/2$ BPSK - Full RB)

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|--|--|--------------------------------------|---|--|
| FCC ID: A3LSMF711U |  PCTEST Proud to be part of  | PART 27 MEASUREMENT REPORT |  | Approved by: Technical Manager |
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|---|---|-----------------------------------|--|-----------------------------------|
| FCC ID: A3LSMF711U | PCTEST Proud to be part of element | PART 27 MEASUREMENT REPORT | | Approved by: Technical Manager |
| Test Report S/N: 1M2104070032-05.A3L | Test Dates: 04/12/2021 – 06/11/2021 | EUT Type: Portable Handset | | Page 50 of 169 |

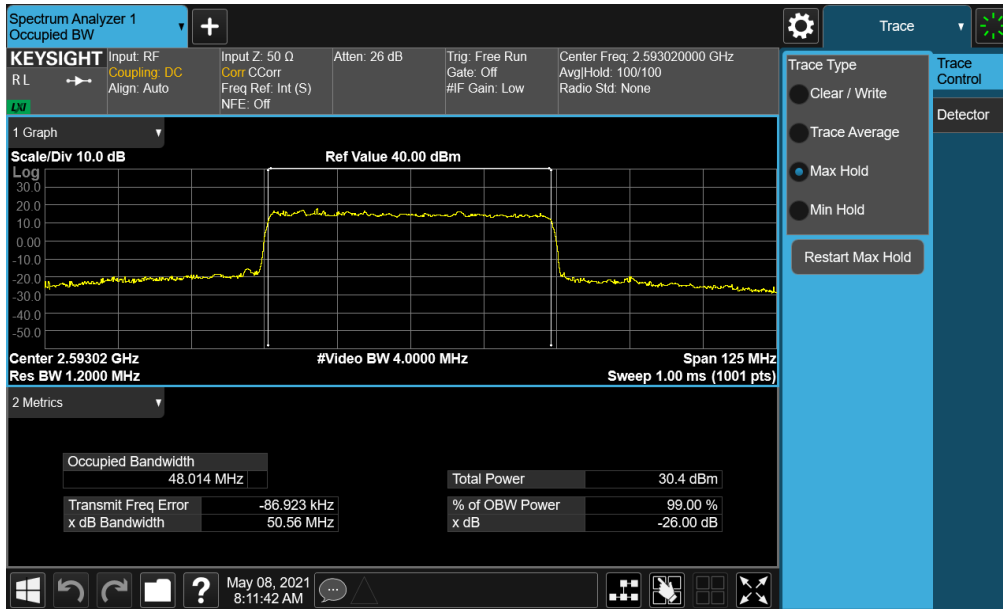


Plot 7-71. Occupied Bandwidth Plot (NR Band n41 - 50MHz $\pi/2$ BPSK - Full RB)

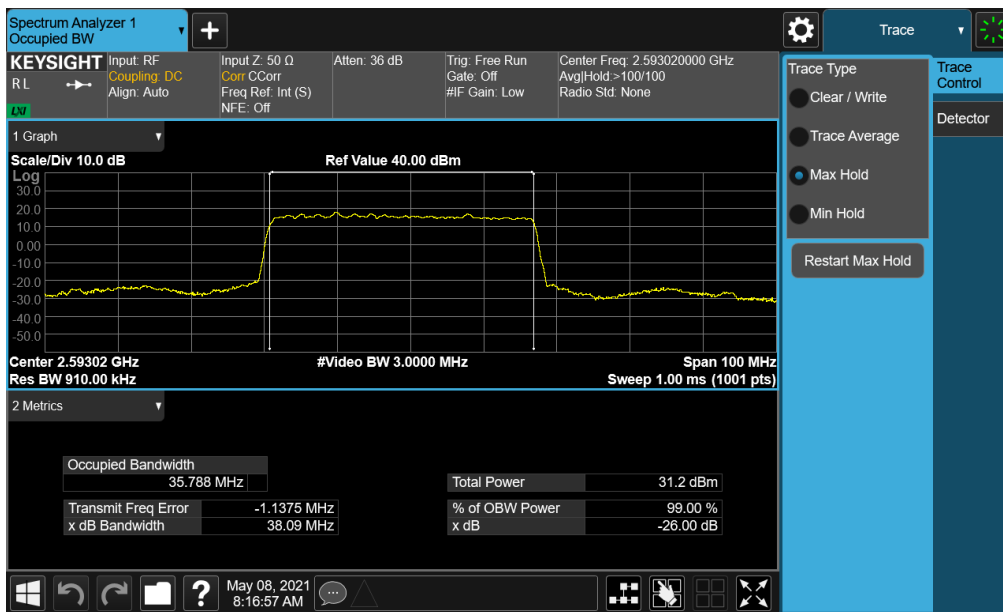


Plot 7-72. Occupied Bandwidth Plot (NR Band n41 - 50MHz QPSK - Full RB)




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| FCC ID: A3LSMF711U |  PCTEST Proud to be part of  | PART 27 MEASUREMENT REPORT |  | Approved by: Technical Manager |
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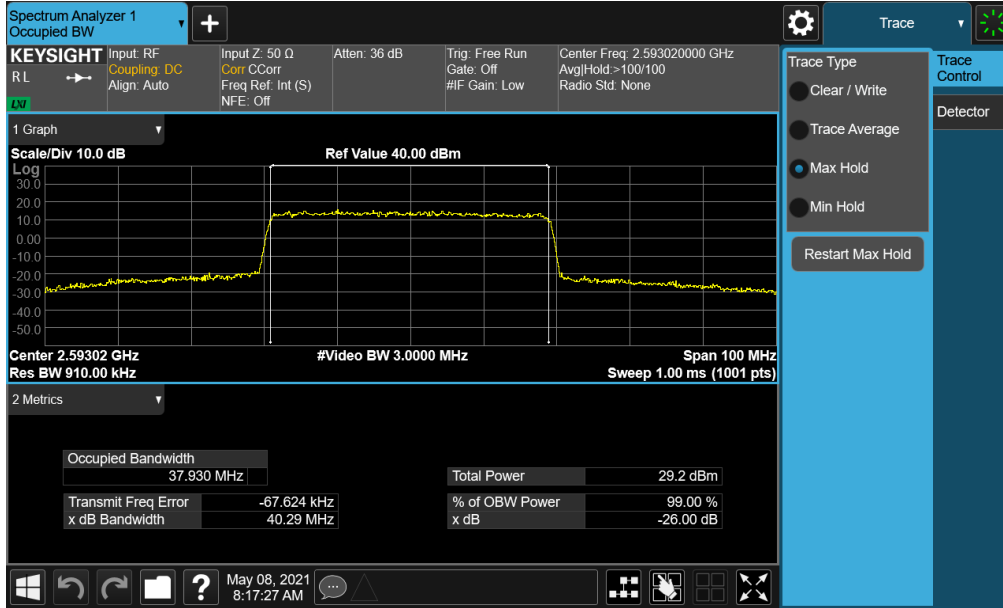


Plot 7-73. Occupied Bandwidth Plot (NR Band n41 - 50MHz 16-QAM - Full RB)

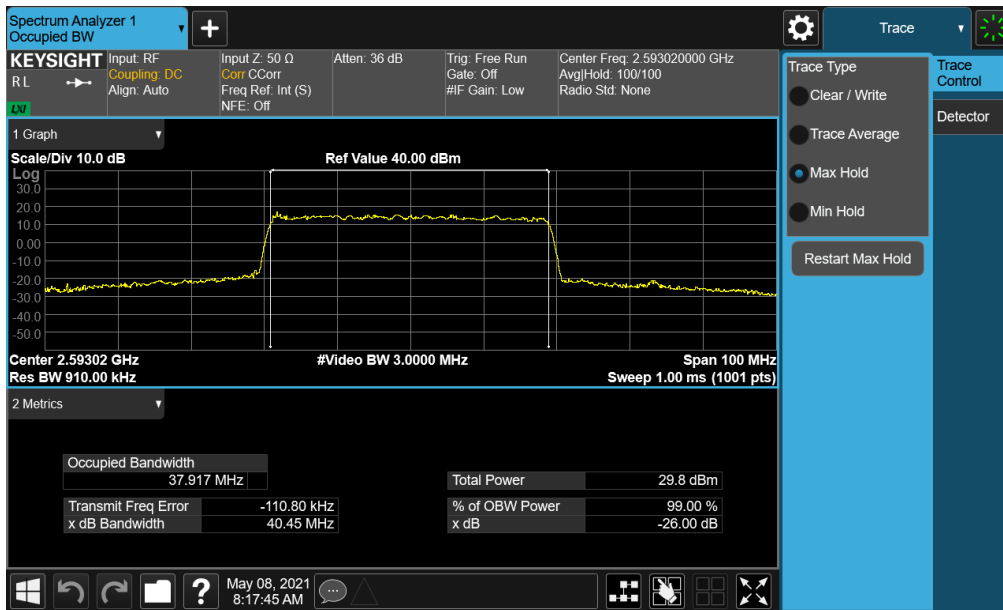


Plot 7-74. Occupied Bandwidth Plot (NR Band n41 - 40MHz $\pi/2$ BPSK - Full RB)




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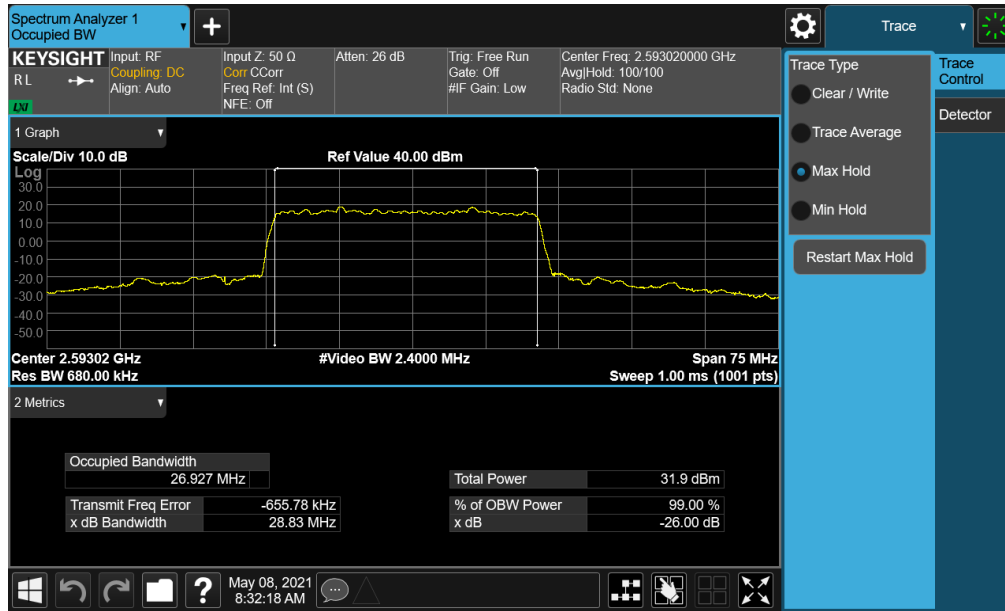


Plot 7-75. Occupied Bandwidth Plot (NR Band n41 - 40MHz QPSK - Full RB)



Plot 7-76. Occupied Bandwidth Plot (NR Band n41 - 40MHz 16-QAM - Full RB)



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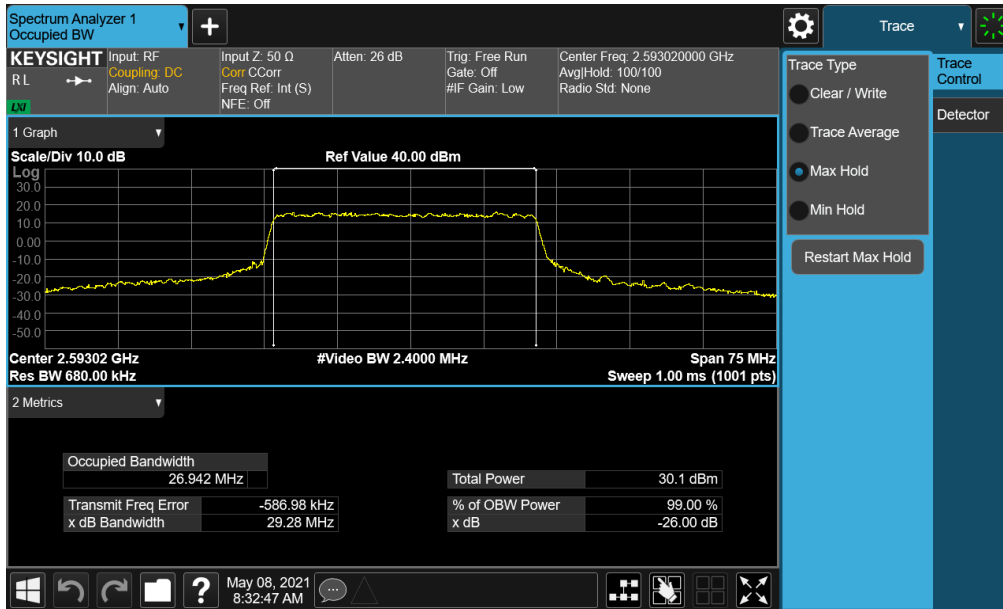


Plot 7-77. Occupied Bandwidth Plot (NR Band n41 - 30MHz $\pi/2$ BPSK - Full RB)

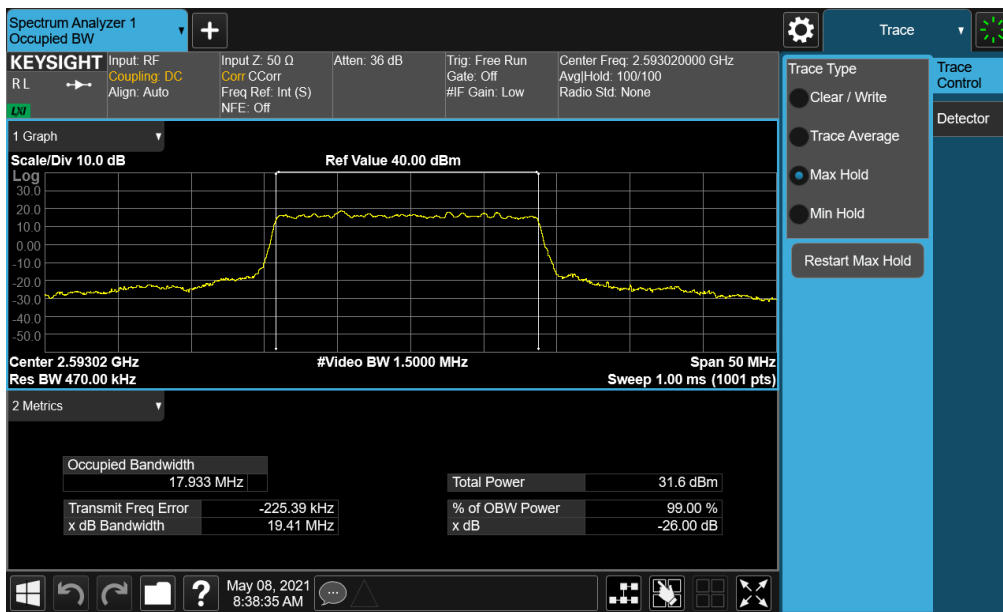


Plot 7-78. Occupied Bandwidth Plot (NR Band n41 - 30MHz QPSK - Full RB)




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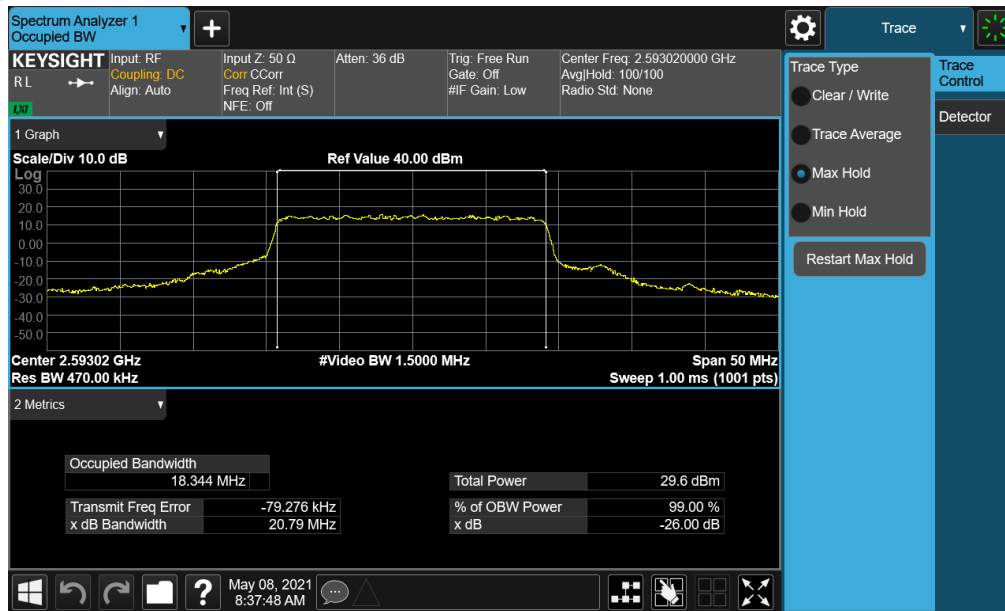


Plot 7-79. Occupied Bandwidth Plot (NR Band n41 - 30MHz 16-QAM - Full RB)

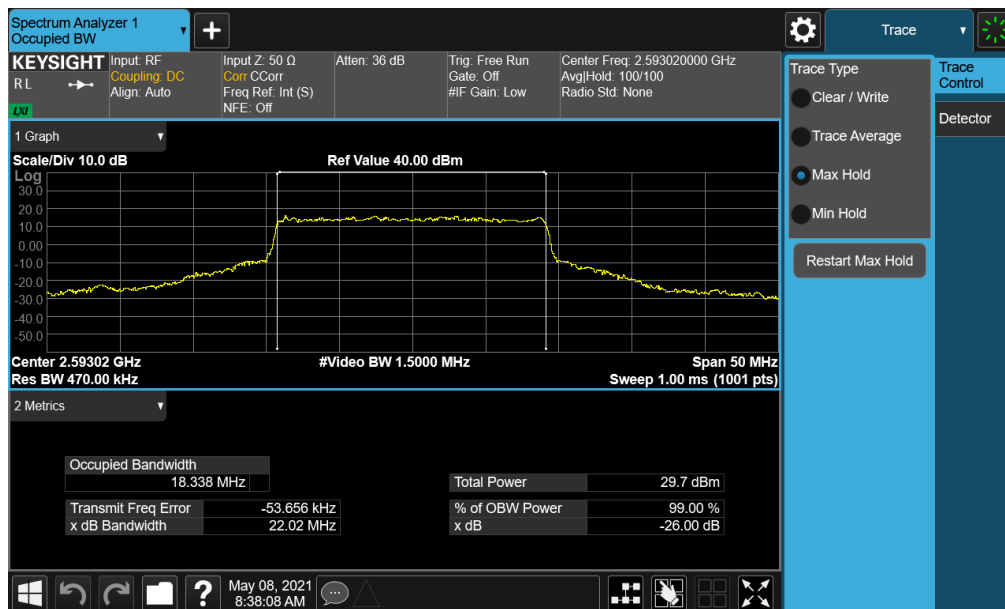


Plot 7-80. Occupied Bandwidth Plot (NR Band n41 - 20MHz $\pi/2$ BPSK - Full RB)




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Plot 7-81. Occupied Bandwidth Plot (NR Band n41 - 20MHz QPSK - Full RB)



Plot 7-82. Occupied Bandwidth Plot (NR Band n41 - 20MHz 16-QAM - Full RB)

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7.4 Spurious and Harmonic Emissions at Antenna Terminal

Test Overview

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10th harmonic. All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

For Band 30, the minimum permissible attenuation level of any spurious emission <2288MHz and >2365MHz is $70 + 10 \log_{10}(P_{[Watts]})$.

For Band 7 and 41, the minimum permissible attenuation level of any spurious emission is $55 + 10 \log_{10}(P_{[Watts]})$.

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

Test Setup

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

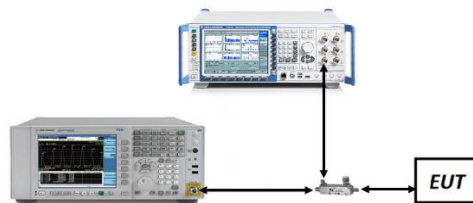




Figure 7-3. Test Instrument & Measurement Setup

Test Notes

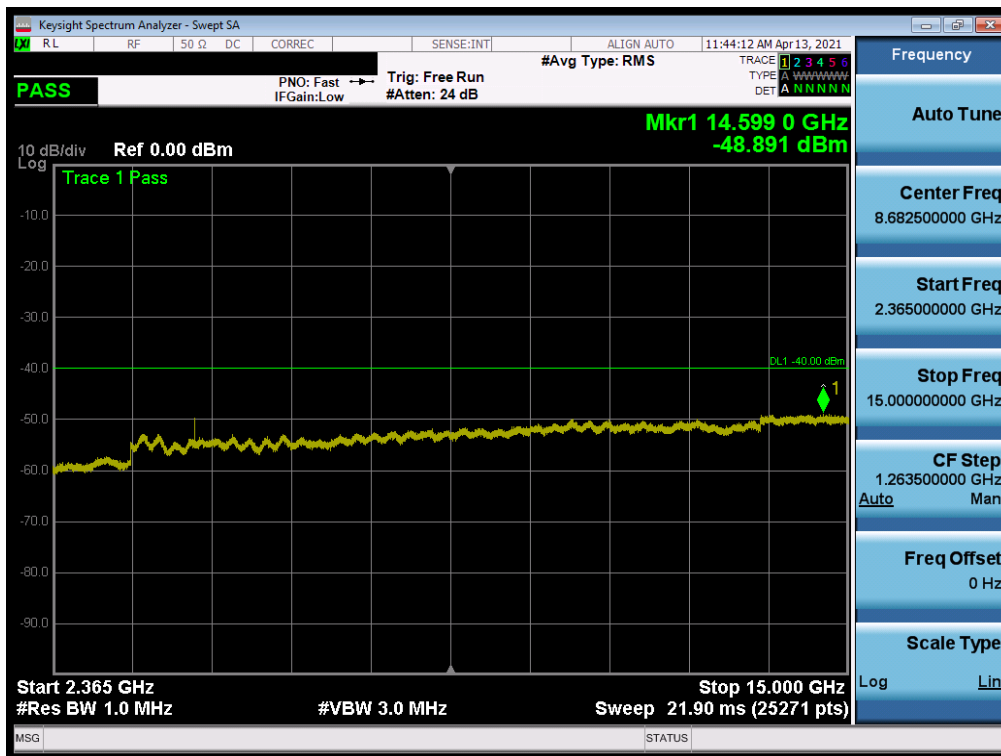
1. Per Part 27, RSS-195 and RSS-199, compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth of 1MHz for measurements above 1GHz. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emission are attenuated at least 26 dB below the transmitter power.
2. For NR operation, all subcarrier spacings (SCS) and transmission schemes (e.g. CP-OFDM and DFT-s-OFDM) were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

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LTE Band 30

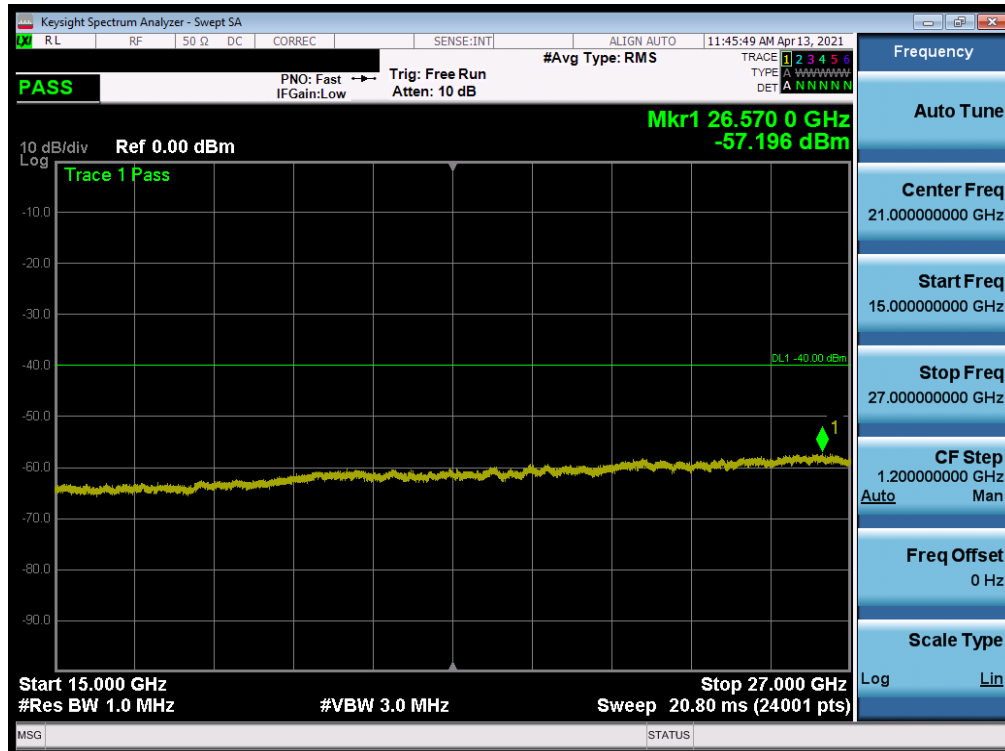


Plot 7-83. Conducted Spurious Plot (LTE Band 30 - 10MHz QPSK - RB Size 1, RB Offset 0)






Plot 7-84. Conducted Spurious Plot (LTE Band 30 - 10MHz QPSK - RB Size 1, RB Offset 0)

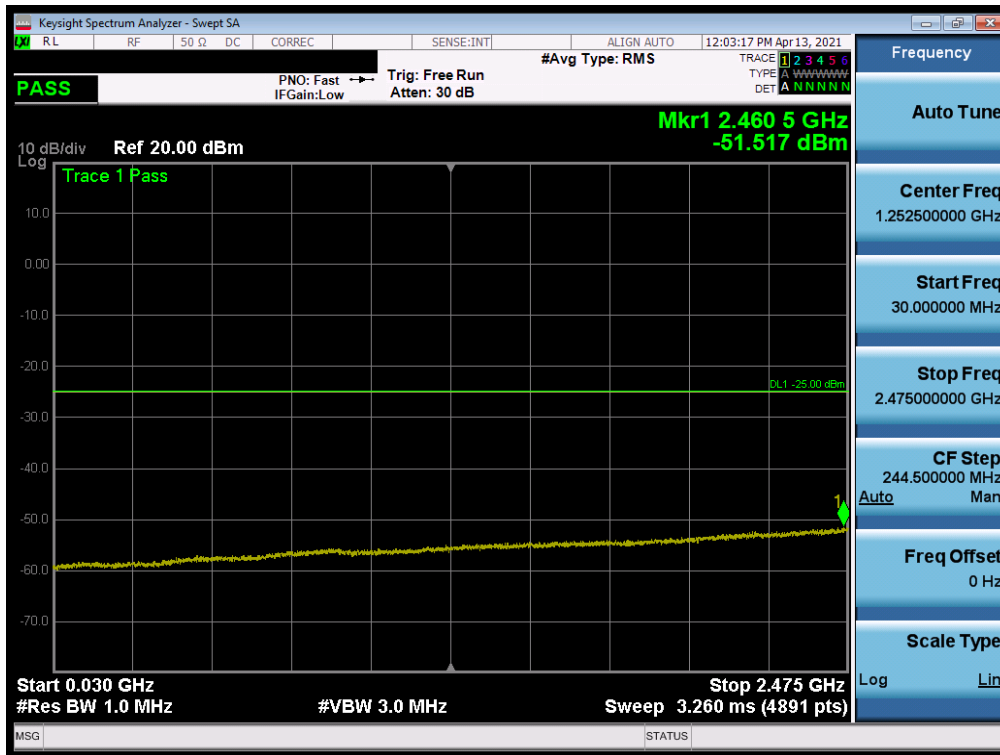
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| Test Report S/N: 1M2104070032-05.A3L | Test Dates: 04/12/2021 – 06/11/2021 | EUT Type: Portable Handset | | Page 58 of 169 |



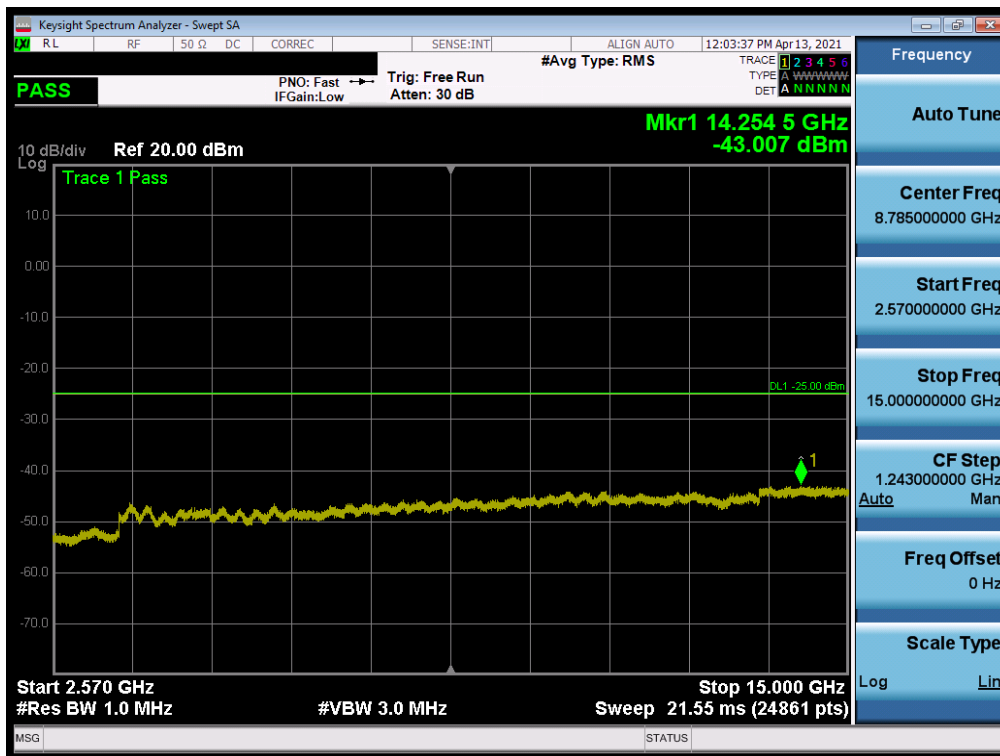
Plot 7-85. Conducted Spurious Plot (LTE Band 30 - 10MHz QPSK - RB Size 1, RB Offset 0)

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| FCC ID: A3LSMF711U |  PCTEST Proud to be part of  | PART 27 MEASUREMENT REPORT |  | Approved by: Technical Manager |
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LTE Band 7

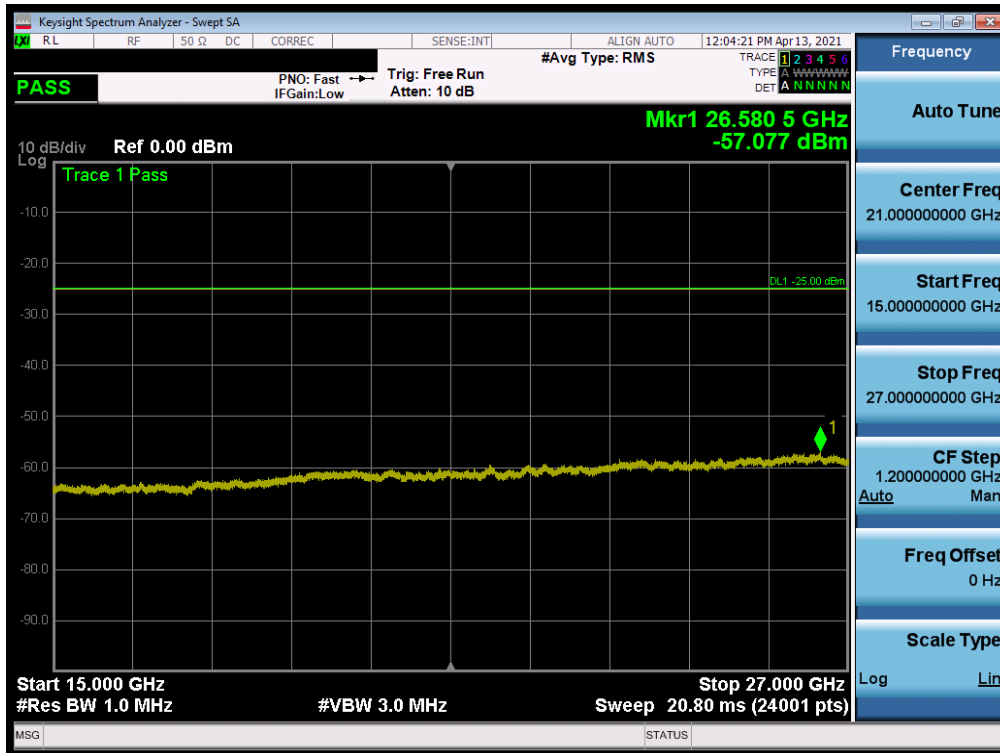


Plot 7-86. Conducted Spurious Plot (LTE Band 7 - 20MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)

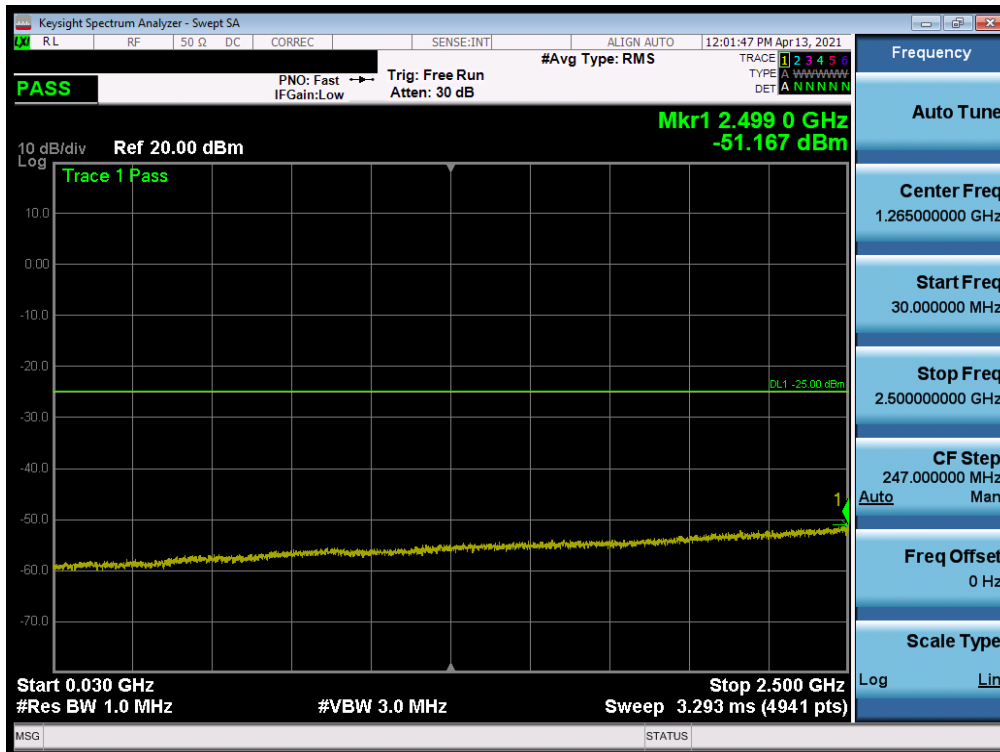


Plot 7-87. Conducted Spurious Plot (LTE Band 7 - 20MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)

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Plot 7-88. Conducted Spurious Plot (LTE Band 7 - 20MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



Plot 7-89. Conducted Spurious Plot (LTE Band 7 - 20MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

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