PCTEST
7185 Oakland Mills Road, Columbia, MD 21046 USA
Tel. 410.290.6652 / Fax 410.290.6654
http://www.pctest.com

PART 27 MEASUREMENT REPORT

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

Date of Testing:
03/26 – 06/10/2021
Test Site/Location:
PCTEST Lab. Columbia, MD, USA
Test Report Serial No.:
1M2104020031-05.A3L

FCC ID:	**A3LSMF926U**
Applicant Name:	**Samsung Electronics Co., Ltd.**

Application Type:	Certification
Model:	SM-F926U
Additional Model(s):	SM-F926U1
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

ACCREDITED
CERT #2041.01

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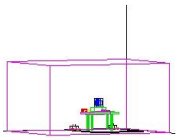
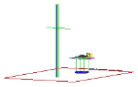


PART 27 MEASUREMENT REPORT



Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	EIRP		Emission Designator
				Max. Power [W]	Max. Power [dBm]	
LTE Band 30	10 MHz	QPSK	2310.0	0.198	22.97	8M99G7D
		16QAM	2310.0	0.178	22.51	9M00W7D
	5 MHz	QPSK	2307.5 - 2312.5	0.198	22.96	4M54G7D
		16QAM	2307.5 - 2312.5	0.181	22.58	4M52W7D
LTE Band 7	20 MHz	QPSK	2510.0 - 2560.0	0.239	23.78	18M0G7D
		16QAM	2510.0 - 2560.0	0.195	22.90	18M0W7D
	15 MHz	QPSK	2507.5 - 2562.5	0.240	23.81	13M5G7D
		16QAM	2507.5 - 2562.5	0.219	23.40	13M5W7D
	10 MHz	QPSK	2505.0 - 2565.0	0.243	23.86	9M00G7D
		16QAM	2505.0 - 2565.0	0.230	23.62	9M00W7D
	5 MHz	QPSK	2502.5 - 2567.5	0.240	23.80	4M56G7D
		16QAM	2502.5 - 2567.5	0.222	23.46	4M51W7D
LTE Band 41(PC2)	20 MHz	QPSK	2506.0 - 2680.0	0.458	26.61	18M0G7D
		16QAM	2506.0 - 2680.0	0.397	25.99	18M0W7D
	15 MHz	QPSK	2503.5 - 2682.5	0.449	26.52	13M5G7D
		16QAM	2503.5 - 2682.5	0.424	26.27	13M5W7D
	10 MHz	QPSK	2501.0 - 2685.0	0.454	26.57	8M99G7D
		16QAM	2501.0 - 2685.0	0.446	26.49	8M99W7D
	5 MHz	QPSK	2498.5 - 2687.5	0.446	26.49	4M52G7D
		16QAM	2498.5 - 2687.5	0.469	26.71	4M53W7D
LTE Band 41(PC3)/38	20 MHz	QPSK	2506.0 - 2680.0	0.264	24.22	18M0G7D
		16QAM	2506.0 - 2680.0	0.180	22.55	18M0W7D
	15 MHz	QPSK	2503.5 - 2682.5	0.210	23.23	13M4G7D
		16QAM	2503.5 - 2682.5	0.169	22.28	13M4W7D
	10 MHz	QPSK	2501.0 - 2685.0	0.211	23.24	8M99G7D
		16QAM	2501.0 - 2685.0	0.175	22.42	9M01W7D
	5 MHz	QPSK	2498.5 - 2687.5	0.213	23.29	4M52G7D
		16QAM	2498.5 - 2687.5	0.264	24.22	4M52W7D
NR Band n30	10 MHz	π/2 BPSK	2310.0	0.197	22.95	9M00G7D
		QPSK	2310.0	0.195	22.91	9M35G7D
		16QAM	2310.0	0.172	22.36	9M34W7D
	5 MHz	π/2 BPSK	2307.5 - 2312.5	0.199	22.99	4M51G7D
		QPSK	2307.5 - 2312.5	0.199	22.98	4M50G7D
		16QAM	2307.5 - 2312.5	0.172	22.35	4M53W7D
NR Band n41	100 MHz	π/2 BPSK	2546.0 - 2640.0	0.252	24.02	97M2G7D
		QPSK	2546.0 - 2640.0	0.250	23.98	98M0G7D
		16QAM	2546.0 - 2640.0	0.163	22.13	98M2W7D
	90 MHz	π/2 BPSK	2541.0 - 2645.0	0.262	24.19	87M3G7D
		QPSK	2541.0 - 2645.0	0.218	23.38	87M9G7D
		16QAM	2541.0 - 2645.0	0.152	21.81	87M9W7D
	80 MHz	π/2 BPSK	2536.0 - 2650.0	0.272	24.35	77M2G7D
		QPSK	2536.0 - 2650.0	0.236	23.73	77M3G7D
		16QAM	2536.0 - 2650.0	0.164	22.16	77M4W7D
	60 MHz	π/2 BPSK	2526.0 - 2660.0	0.266	24.25	58M4G7D
		QPSK	2526.0 - 2660.0	0.211	23.24	57M9G7D
		16QAM	2526.0 - 2660.0	0.147	21.68	57M8W7D
	50 MHz	π/2 BPSK	2521.0 - 2665.0	0.240	23.79	45M9G7D
		QPSK	2521.0 - 2665.0	0.225	23.53	47M5G7D
		16QAM	2521.0 - 2665.0	0.154	21.86	47M6W7D
	40 MHz	π/2 BPSK	2516.0 - 2670.0	0.253	24.04	36M1G7D
		QPSK	2516.0 - 2670.0	0.213	23.27	37M7G7D
		16QAM	2516.0 - 2670.0	0.157	21.95	38M1W7D
	30 MHz	π/2 BPSK	2511.0 - 2675.0	0.223	23.48	26M7G7D
		QPSK	2511.0 - 2675.0	0.192	22.84	27M8G7D
		16QAM	2511.0 - 2675.0	0.122	20.88	27M7W7D
	20 MHz	π/2 BPSK	2506.0 - 2680.0	0.240	23.81	18M0G7D
		QPSK	2506.0 - 2680.0	0.178	22.51	18M3G7D
		16QAM	2506.0 - 2680.0	0.124	20.94	18M3W7D

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.

2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **Samsung Portable Handset FCC ID:A3LSMF926U**. 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.: 0224M, 0943M, 1008M, 0224M, 0131M, 0209M, 0105M, 0314M

2.2 Device Capabilities

This device contains the following capabilities:

800/850/1900 CDMA/EvDO Rev0/A, 1x Advanced (BC0, BC1, BC10), 850/1900 GSM/GPRS/EDGE, 850/1700/1900 WCDMA/HSPA, Multi-band LTE, Multi-band 5G NR, 802.11b/g/n/ax WLAN, 802.11a/n/ac/ax UNII (5GHz and 6GHz), 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 3.0 of this test report for a description of the radiated and antenna port conducted emissions tests.

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.

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.

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:

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

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

For radiated spurious emissions measurements 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:

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

And

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

All radiated measurements are performed in a chamber that meets the site requirements per ANSI C63.4-2014. Additionally, radiated emissions below 30MHz are also validated on an Open Area Test Site to assert correlation with the chamber measurements per the requirements of KDB 474788 D01.

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

4.0 MEASUREMENT UNCERTAINTY

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

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

5.0 TEST EQUIPMENT CALIBRATION DATA

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

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
-	AP2	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
-	LTx4	Licensed Transmitter Cable Set	9/16/2020	Annual	9/16/2021	LTx4
-	LTx5	LIcensed Transmitter Cable Set	9/16/2020	Annual	9/16/2021	LTx5
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
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
Espec	ESX-2CA	Environmental Chamber	8/27/2020	Annual	8/27/2022	17620
Keysight Technologies	N9020A	MXA Signal Analyzer	9/22/2020	Annual	9/22/2021	MY54500644
Keysight Technologies	N9030B	PXA Signal Analyzer, Multi-touch	9/17/2020	Annual	9/17/2021	MY57141001
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 (1-18 GHz)	8/27/2019	Biennial	8/27/2021	A042511
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	7/27/2020	Biennial	7/27/2022	A051107

Table 5-1. Test Equipment

Notes:

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

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.

7.0 TEST RESULTS

7.1 Summary

Company Name: Samsung Electronics Co., Ltd.

FCC ID: A3LSMF926U

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

Mode(s): LTE/NR/ULCA

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 (LTE Band 30)	2.1051, 27.53(a)	RSS-195(5.6)	Undesirable emissions must meet the limits detailed in 27.53(a)	PASS	Sections 7.3, 7.4
	Conducted Band Edge / Spurious Emissions (NR Band n30)				PASS	Sections 7.3, 7.4
	Conducted Band Edge / Spurious Emissions (LTE Band 7)	2.1051, 27.53(m)	RSS-199(4.5)	Undesirable emissions must meet the limits detailed in 27.53(m)	PASS	Sections 7.3, 7.4
	Conducted Band Edge / Spurious Emissions (LTE Band 41)				PASS	Sections 7.3, 7.4
	Conducted Band Edge / Spurious Emissions (NR Band n41)				PASS	Sections 7.3, 7.4
	Transmitter Conducted Output Power	2.1046	RSS-199(4.4)	N/A	PASS	See RF Exposure Report
	Frequency Stability	2.1055, 27.54	RSS-199(4.3)	Fundamental emissions stay within authorized frequency block	PASS	Section 7.8
RADIATED	Effective Radiated Power / Equivalent Isotropic Radiated Power (LTE Band 30)	27.50(a)(3)	RSS-195(5.5)	< 0.25 Watts max. EIRP	PASS	Section 7.6
	Effective Radiated Power / Equivalent Isotropic Radiated Power (NR Band n30)				PASS	Section 7.6
	Effective Radiated Power / Equivalent Isotropic Radiated Power (LTE Band 7)	27.50(h)(2)	RSS-199(4.4)	< 2 Watts max. EIRP	PASS	Section 7.6
	Effective Radiated Power / Equivalent Isotropic Radiated Power (LTE Band 41)				PASS	Section 7.6
	Effective Radiated Power / Equivalent Isotropic Radiated Power (NR Band n41)				PASS	Section 7.6
	Radiated Spurious Emissions (LTE Band 30)	2.1053, 27.53(a)	RSS-195(5.6)	> 70 + 10log10(P[Watts])	PASS	Section 7.7
	Radiated Spurious Emissions (NR Band n30)				PASS	Section 7.7
	Radiated Spurious Emissions (LTE Band 7)	2.1053, 27.53(m)	RSS-199(4.5)	Undesirable emissions must meet the limits detailed in 27.53(m)	PASS	Section 7.7
	Radiated Spurious Emissions (LTE Band 41)				PASS	Section 7.7
	Radiated Spurious Emissions (NR Band n41)				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 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.

7.2 Conducted Power Output Data

Test Overview

The EUT is set up to transmit two contiguous LTE channels. The power level of both carriers is measured by means of a calibrated spectrum analyzer. All 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.

A-MPR is implemented in this device when operating at Power Class 2 in LTE Band 41 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. 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.

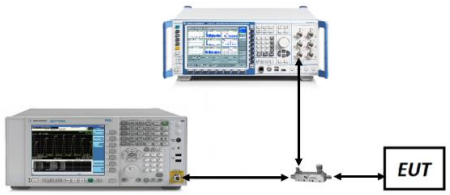


Figure 7-1. Test Instrument & Measurement Setup

Test Notes

1. Uplink carrier aggregation is only supported in this EUT while operating in Power Class 3.
2. For ULCA, conducted power measurements were evaluated for the two contiguous channels using various combinations of RB size, RB offset, modulation, and channel bandwidth. Channel bandwidth data is shown in the tables below based only on the channel bandwidths that were supported in this device.
3. For ULCA, compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater for frequencies less than 1 GHz and 1 MHz or greater for frequencies greater than 1 GHz.
4. All other conducted power measurements are contained in the RF exposure report for this filing.

Bandwidth	Modulation	Channel	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]
10 MHz	QPSK	27710	2310.0	1 / 25	22.10
	16-QAM	27710	2310.0	1 / 25	21.36
5 MHz	QPSK	27685	2307.5	1 / 24	22.06
		27710	2310.0	1 / 12	22.09
		27735	2312.5	1 / 0	22.05
	16-QAM	27710	2310.0	1 / 0	21.34

Table 7-2. Conducted Max Powers (LTE Band 30)

Bandwidth	Modulation	Channel	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]
20 MHz	QPSK	20850	2510.0	1 / 0	24.01
		21100	2535.0	1 / 0	24.15
		21350	2560.0	1 / 50	23.97
	16-QAM	21100	2535.0	1 / 0	23.18
15 MHz	QPSK	20825	2507.5	1 / 37	24.21
		21100	2535.0	1 / 0	24.10
		21375	2562.5	1 / 0	24.03
	16-QAM	21100	2535.0	1 / 37	22.90
10 MHz	QPSK	20800	2505.0	1 / 0	24.16
		21100	2535.0	1 / 49	24.23
		21400	2565.0	1 / 25	24.21
	16-QAM	21100	2535.0	1 / 25	23.51
5 MHz	QPSK	20775	2502.5	1 / 0	24.20
		21100	2535.0	1 / 12	24.08
		21425	2567.5	1 / 0	24.14
	16-QAM	20775	2502.5	1 / 0	23.57

Table 7-3. Conducted Max Powers (LTE Band 7)

Bandwidth	Modulation	Channel	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]
20 MHz	QPSK	39750	2506.0	1 / 50	27.20
		40620	2593.0	1 / 50	27.02
		41490	2680.0	1 / 50	26.56
	16-QAM	39750	2506.0	1 / 50	26.25
15 MHz	QPSK	39725	2503.5	1 / 74	27.11
		40620	2593.0	1 / 74	27.30
		41515	2682.5	1 / 74	26.98
	16-QAM	40620	2593.0	1 / 74	25.18
10 MHz	QPSK	39700	2501.0	1 / 25	27.16
		40620	2593.0	1 / 25	27.01
		41540	2685.0	1 / 49	26.81
	16-QAM	40620	2593.0	1 / 25	25.40
5 MHz	QPSK	39675	2498.5	1 / 12	26.12
		40620	2593.0	1 / 0	26.86
		41565	2687.5	1 / 24	27.10
	16-QAM	40620	2593.0	1 / 0	25.62

Table 7-4. Conducted Max Powers (LTE Band 41 PC2)

Bandwidth	Modulation	Channel	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]
20 MHz	QPSK	39750	2506.0	1 / 50	23.95
		40620	2593.0	1 / 50	23.90
		41490	2680.0	1 / 50	24.29
	16-QAM	41490	2680.0	1 / 50	23.43
15 MHz	QPSK	39725	2503.5	1 / 0	23.67
		40620	2593.0	1 / 36	23.57
		41515	2682.5	1 / 36	23.95
	16-QAM	41515	2682.5	1 / 36	23.12
10 MHz	QPSK	39700	2501.0	1 / 0	23.68
		40620	2593.0	1 / 25	23.57
		41540	2685.0	1 / 25	24.06
	16-QAM	41540	2685.0	1 / 25	23.15
5 MHz	QPSK	39675	2498.5	1 / 24	23.73
		40620	2593.0	1 / 12	22.82
		41565	2687.5	1 / 0	23.59
	16-QAM	40620	2593.0	1 / 12	24.60

Table 7-5. Conducted Max Powers (LTE Band 41 PC3)

Bandwidth	Modulation	Channel	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]
10 MHz	π/2 BPSK	27710	2310.0	1 / 38	22.86
	QPSK	27710	2310.0	1 / 38	22.91
	16-QAM	27710	2310.0	1 / 38	22.15
5 MHz	π/2 BPSK	27685	2307.5	1 / 18	22.23
		27710	2310.0	1 / 12	22.90
		27735	2312.5	1 / 18	22.69
	QPSK	27685	2307.5	1 / 18	22.38
		27710	2310.0	1 / 12	22.90
		27735	2312.5	1 / 18	22.98
	16-QAM	27710	2310.0	1 / 12	22.14

Table 7-6. Conducted Max Powers (NR Band n30)

Bandwidth	Modulation	Channel	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]
100 MHz	π/2 BPSK	509202	2546.0	1 / 204	25.69
		518598	2593.0	1 / 68	25.92
		528000	2640.0	1 / 68	25.13
	QPSK	509202	2546.0	1 / 204	25.80
		518598	2593.0	1 / 68	25.90
		528000	2640.0	1 / 68	25.25
	16-QAM	518598	2593.0	1 / 68	24.90
90 MHz	π/2 BPSK	508200	2541.0	1 / 122	26.33
		518592	2593.0	1 / 61	26.08
		529002	2645.0	1 / 183	25.82
	QPSK	508200	2541.0	1 / 122	26.36
		518592	2593.0	1 / 61	25.30
		529002	2645.0	1 / 183	25.71
	16-QAM	518592	2593.0	1 / 61	24.57
80 MHz	π/2 BPSK	507204	2536.0	1 / 162	26.07
		518598	2593.0	1 / 54	26.25
		529998	2650.0	1 / 108	25.80
	QPSK	507204	2536.0	1 / 162	26.17
		518598	2593.0	1 / 54	25.65
		529998	2650.0	1 / 108	25.72
	16-QAM	518598	2593.0	1 / 54	24.92
60 MHz	π/2 BPSK	505200	2526.0	1 / 121	26.32
		518598	2593.0	1 / 40	26.15
		531996	2660.0	1 / 81	26.02
	QPSK	505200	2526.0	1 / 121	26.41
		518598	2593.0	1 / 40	25.17
		531996	2660.0	1 / 81	26.16
	16-QAM	518598	2593.0	1 / 40	24.45
50 MHz	π/2 BPSK	504204	2521.0	1 / 99	26.55
		518598	2593.0	1 / 33	25.69
		532998	2665.0	1 / 99	26.18
	QPSK	504204	2521.0	1 / 99	26.67
		518598	2593.0	1 / 33	25.45
		532998	2665.0	1 / 99	25.71
	16-QAM	518598	2593.0	1 / 33	24.63
40 MHz	π/2 BPSK	503202	2516.0	1 / 79	26.51
		518598	2593.0	1 / 26	25.93
		534000	2670.0	1 / 26	26.12
	QPSK	503202	2516.0	1 / 79	26.43
		518598	2593.0	1 / 26	25.20
		534000	2670.0	1 / 26	25.84
	16-QAM	518598	2593.0	1 / 26	24.72
30 MHz	π/2 BPSK	502203	2511.0	1 / 58	26.59
		518598	2593.0	1 / 19	25.11
		534999	2675.0	1 / 19	26.24
	QPSK	502203	2511.0	1 / 58	25.87
		518598	2593.0	1 / 19	24.76
		534999	2675.0	1 / 58	24.73
	16-QAM	518598	2593.0	1 / 19	23.64
20 MHz	π/2 BPSK	501204	2506.0	1 / 37	25.79
		518598	2593.0	1 / 13	25.71
		535998	2680.0	1 / 13	25.99
	QPSK	501204	2506.0	1 / 37	24.88
		518598	2593.0	1 / 13	24.43
		535998	2680.0	1 / 13	25.09
	16-QAM	518598	2593.0	1 / 13	23.71

Table 7-7. Conducted Max Powers (NR Band n41 – PC2)

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 ≥ 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.

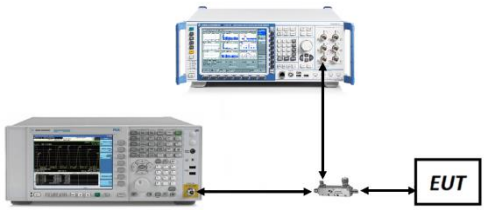
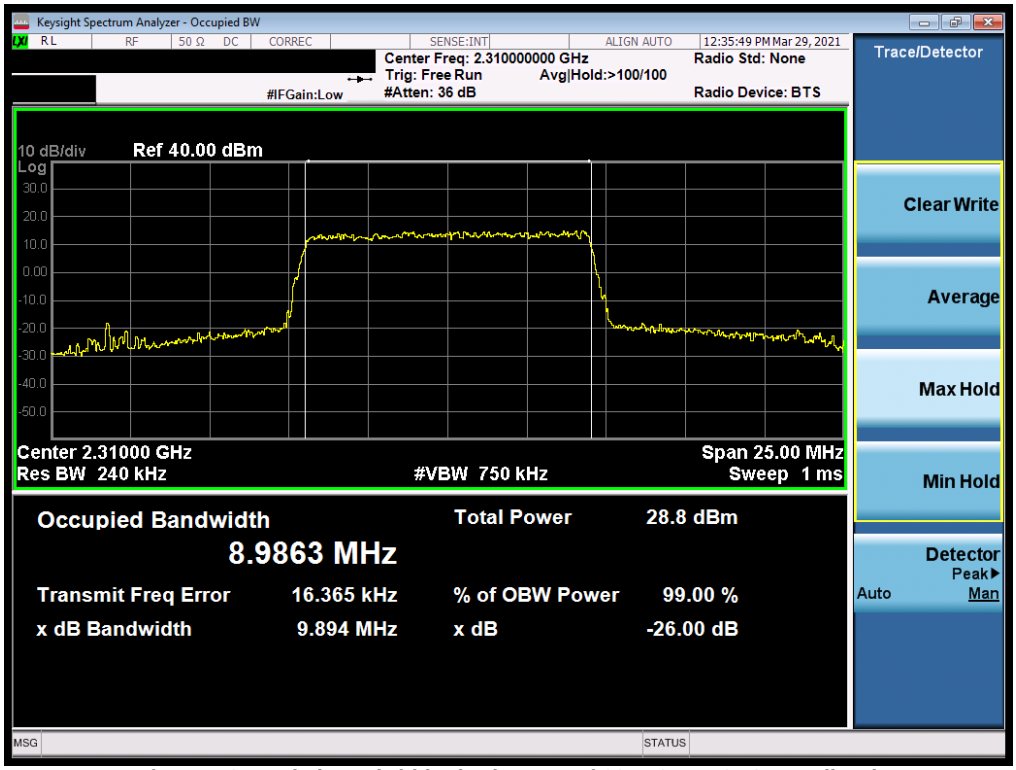


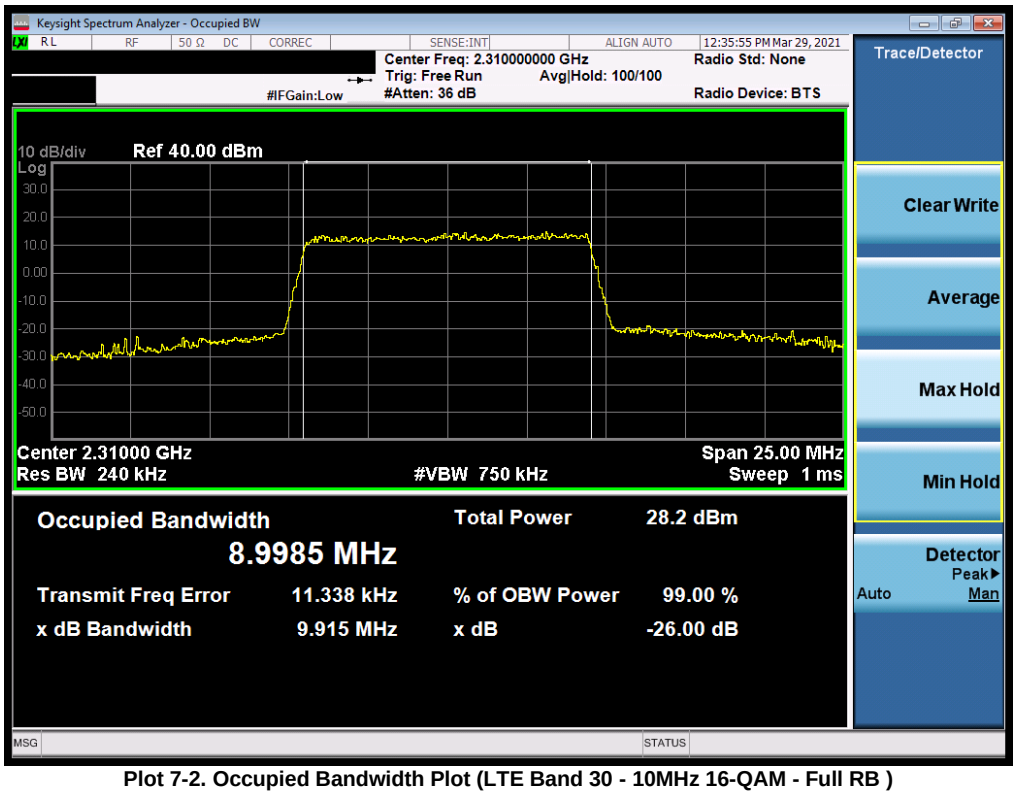
Figure 7-2. Test Instrument & Measurement Setup

Test Notes

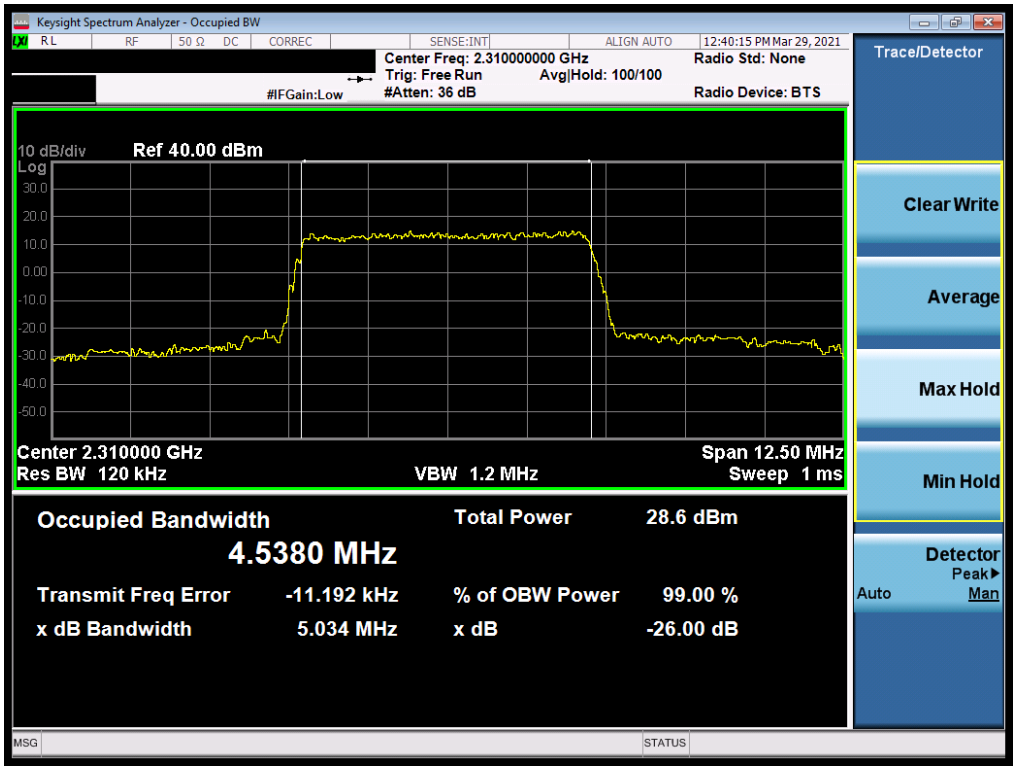
None.



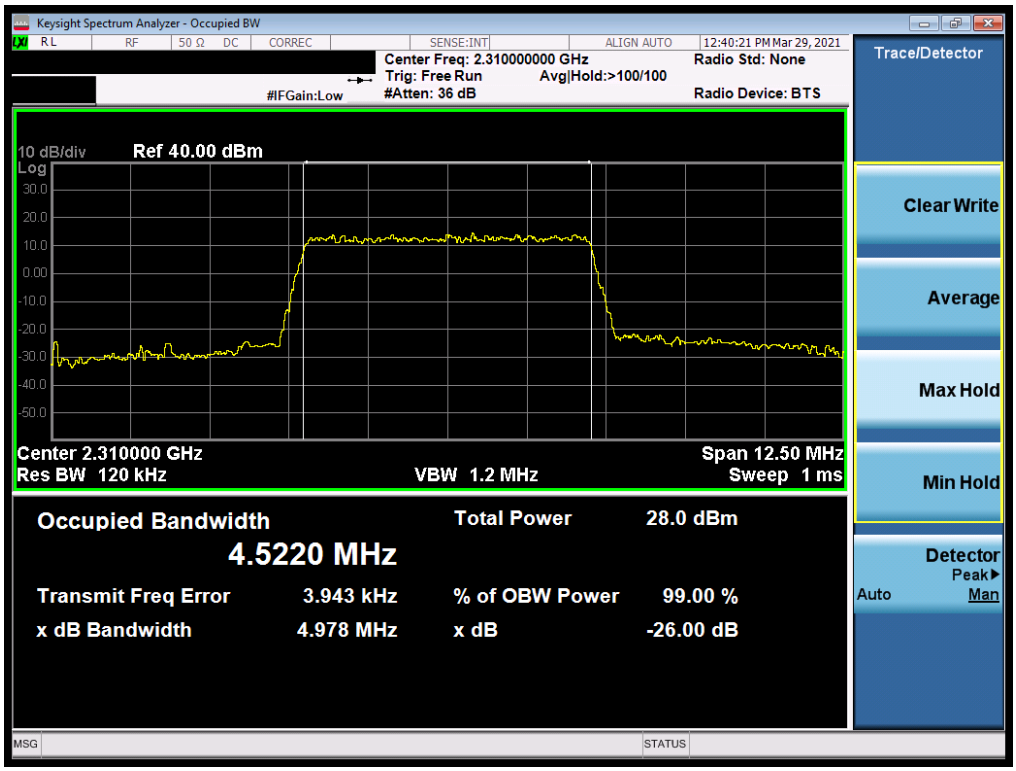
Plot 7-1. Occupied Bandwidth Plot (LTE Band 30 - 10MHz QPSK - Full RB)



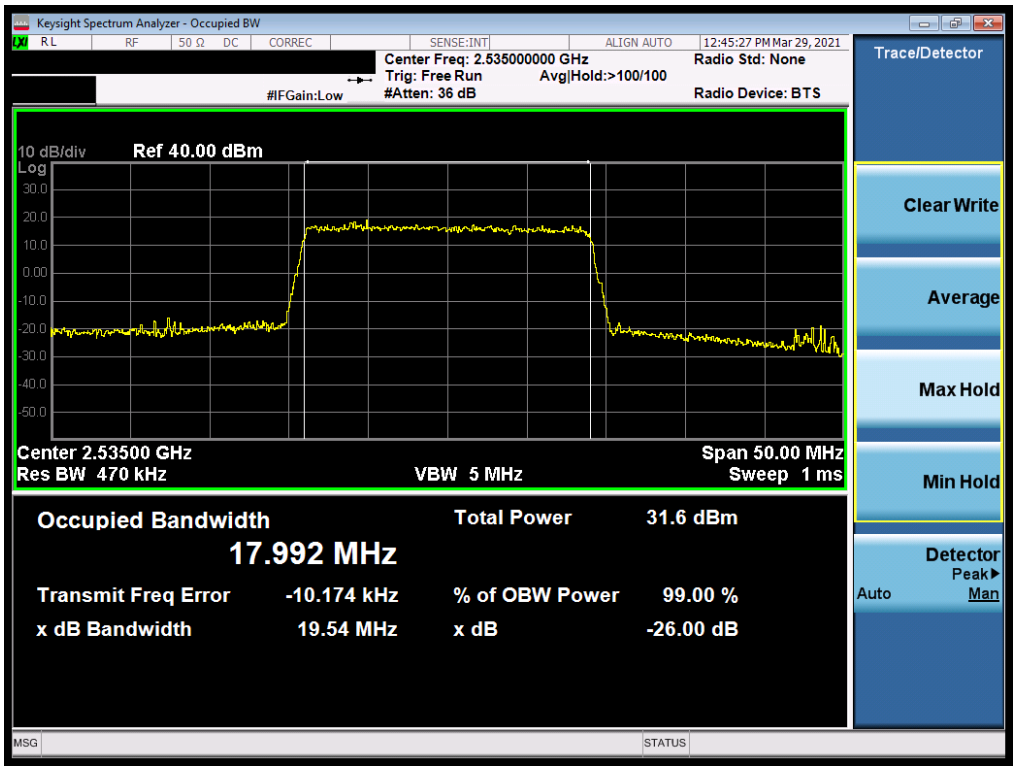
Plot 7-2. Occupied Bandwidth Plot (LTE Band 30 - 10MHz 16-QAM - Full RB)



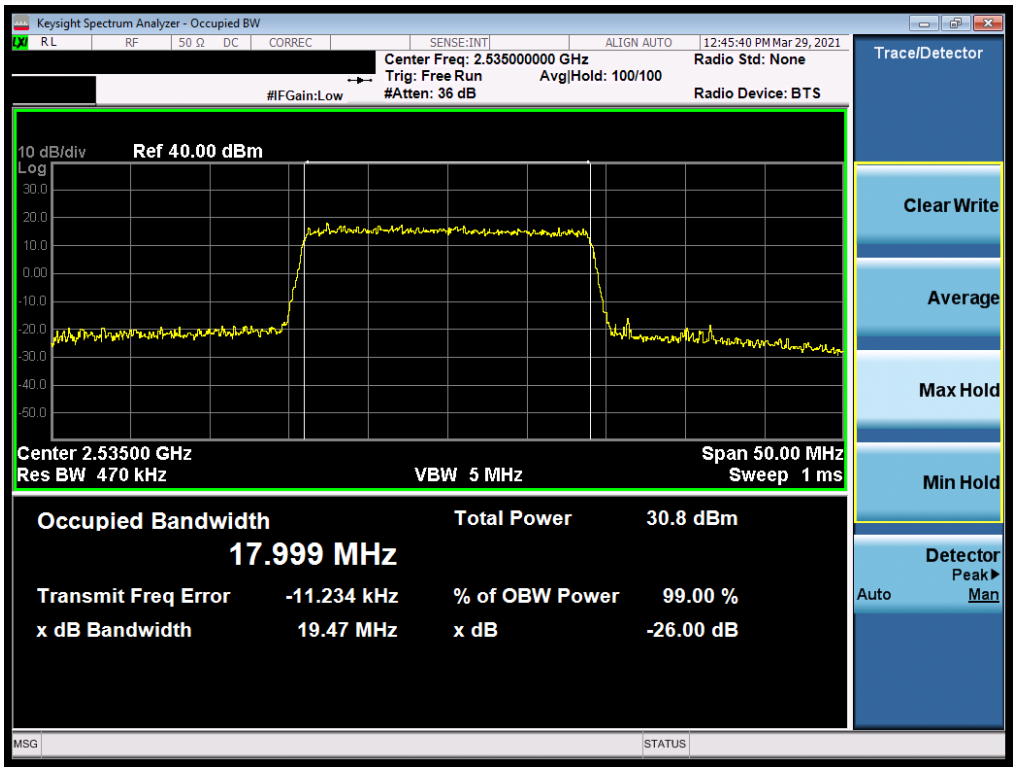
Plot 7-3. Occupied Bandwidth Plot (LTE Band 30 - 5MHz QPSK - Full RB)



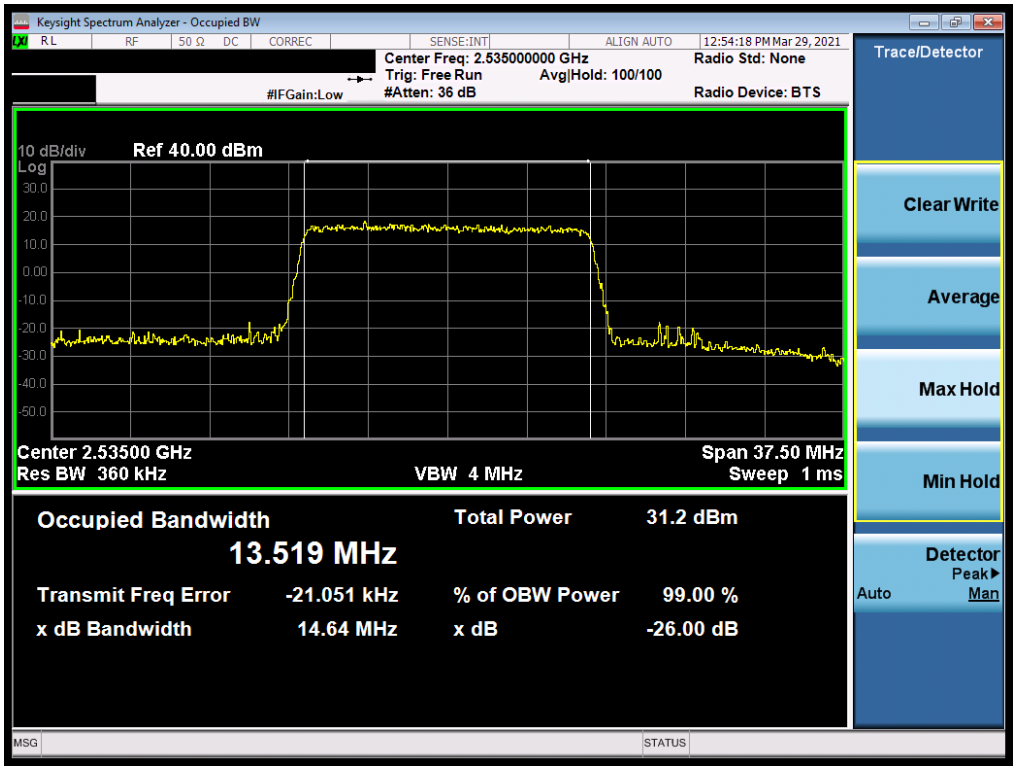
Plot 7-4. Occupied Bandwidth Plot (LTE Band 30 - 5MHz 16-QAM - Full RB)



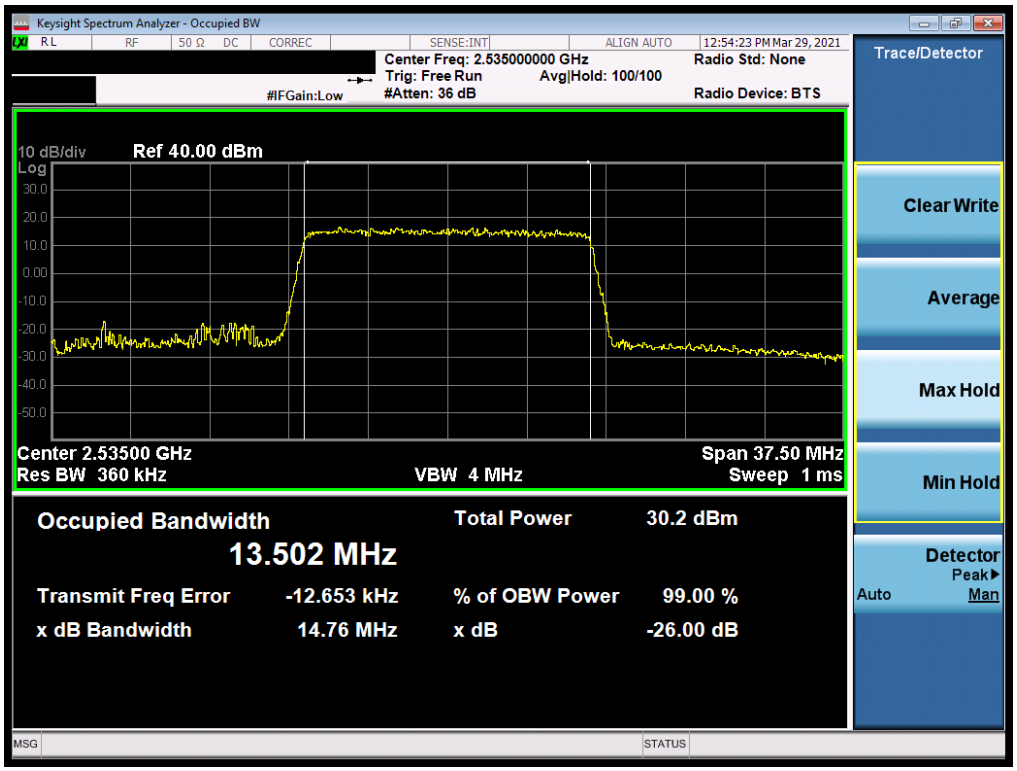
Plot 7-5. Occupied Bandwidth Plot (LTE Band 7 - 20MHz QPSK - Full RB)



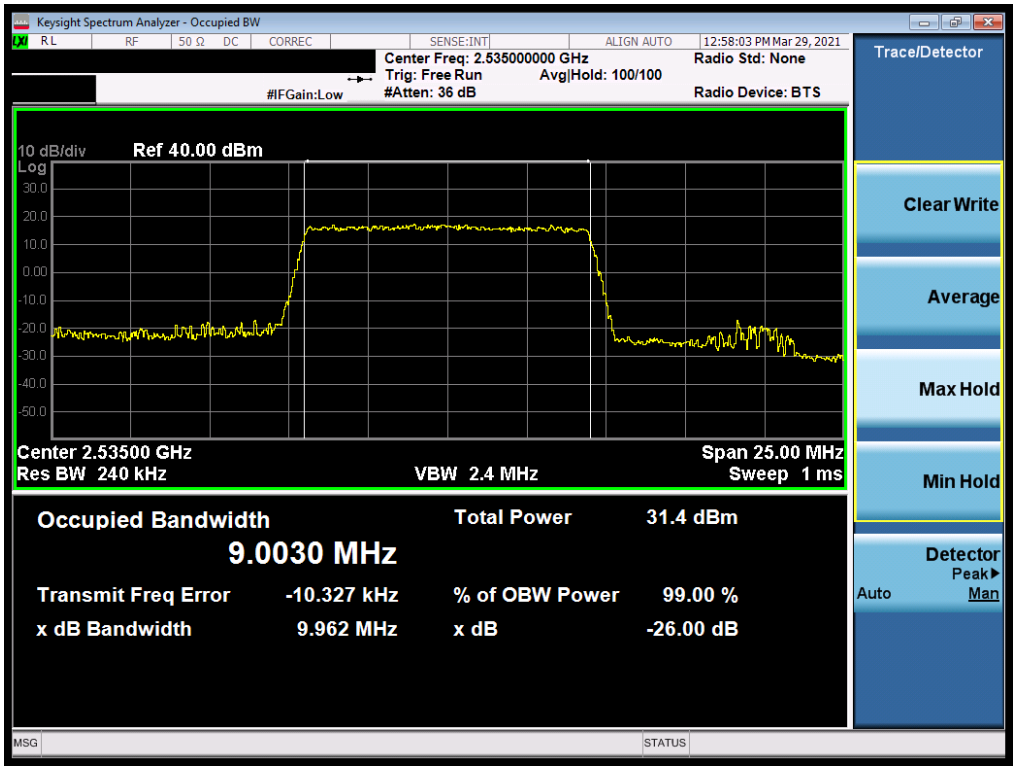
Plot 7-6. Occupied Bandwidth Plot (LTE Band 7 - 20MHz 16-QAM - Full RB)



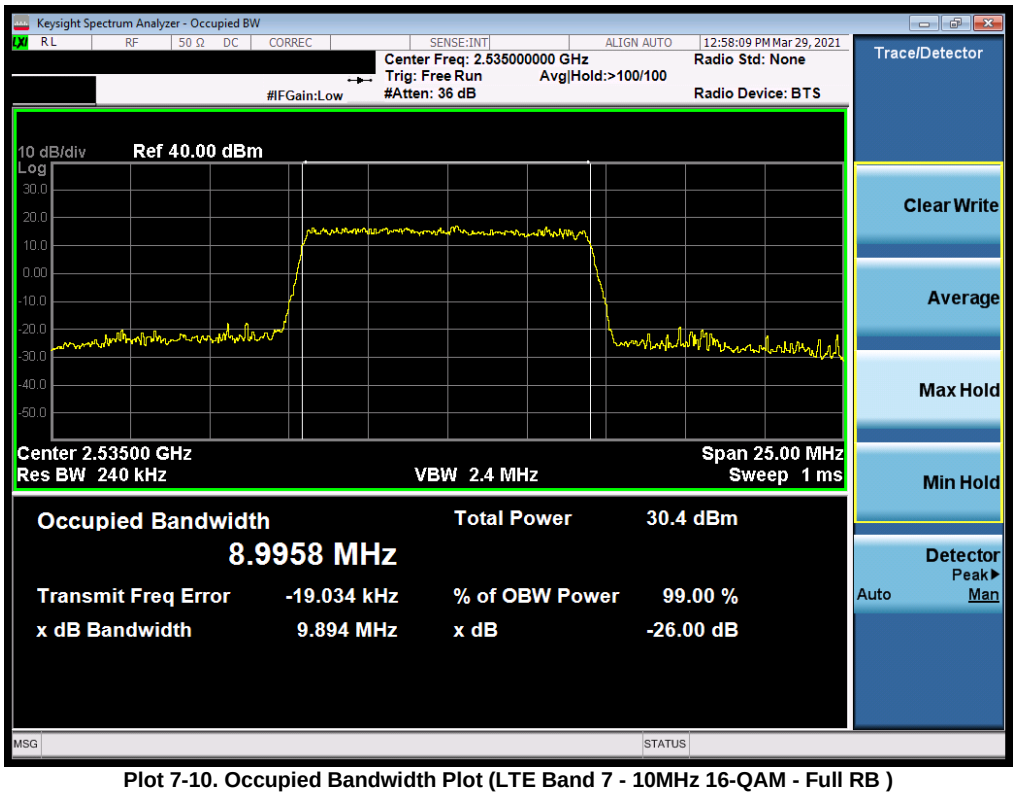
Plot 7-7. Occupied Bandwidth Plot (LTE Band 7 - 15MHz QPSK - Full RB)



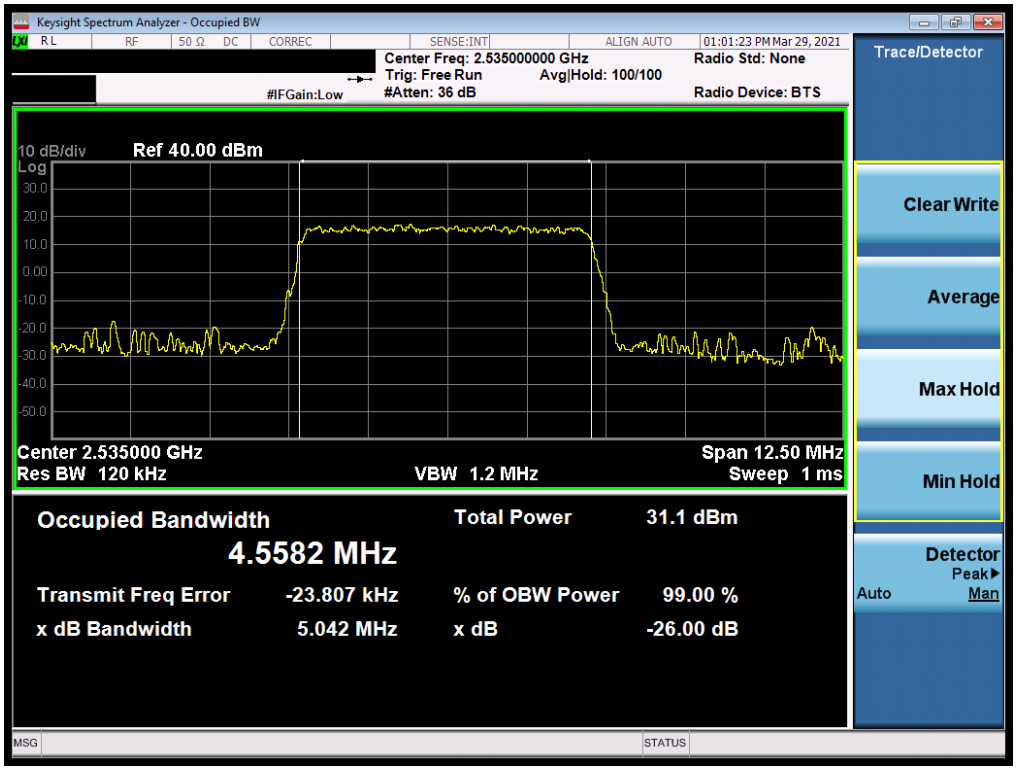
Plot 7-8. Occupied Bandwidth Plot (LTE Band 7 - 15MHz 16-QAM - Full RB)



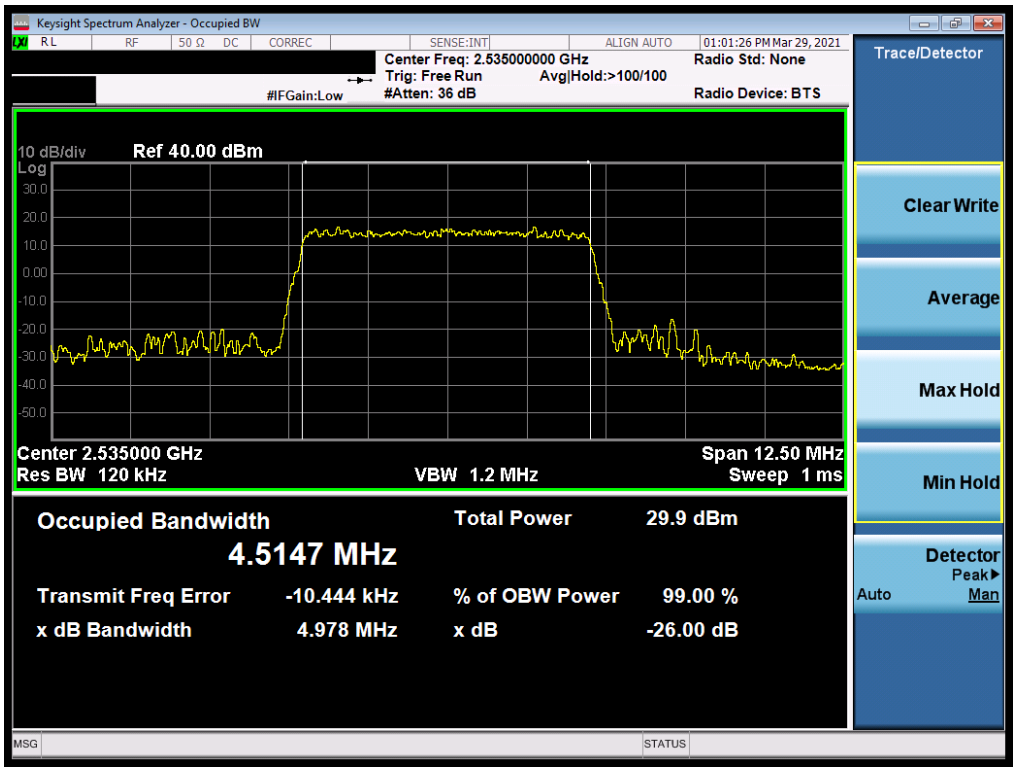
Plot 7-9. Occupied Bandwidth Plot (LTE Band 7 - 10MHz QPSK - Full RB)



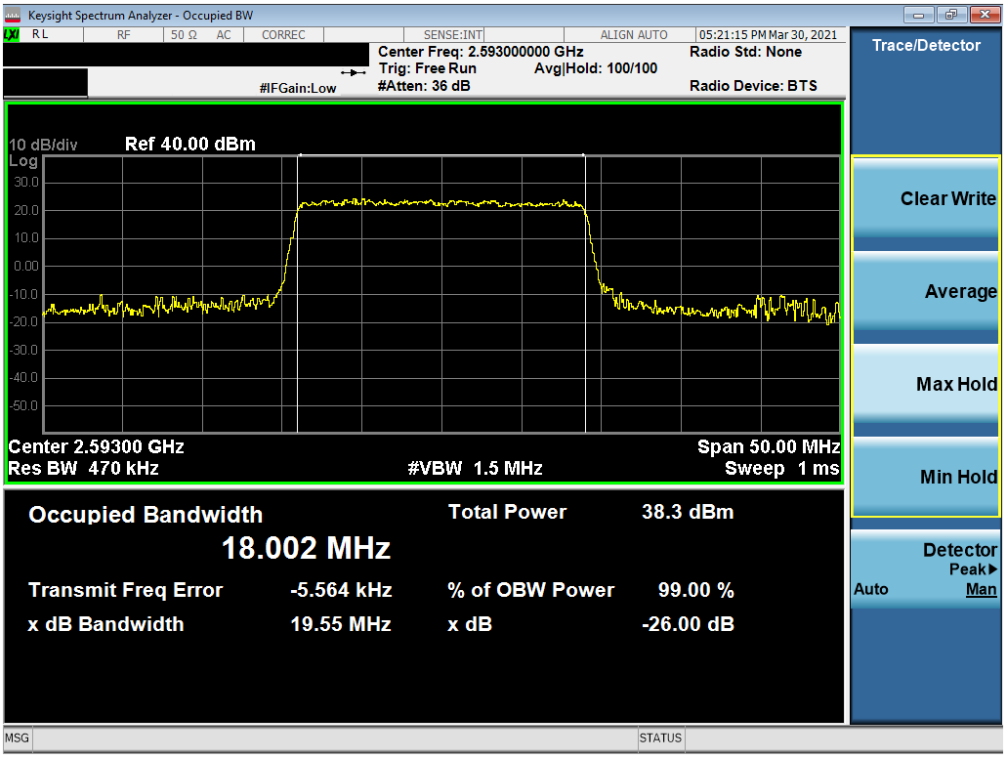
Plot 7-10. Occupied Bandwidth Plot (LTE Band 7 - 10MHz 16-QAM - Full RB)



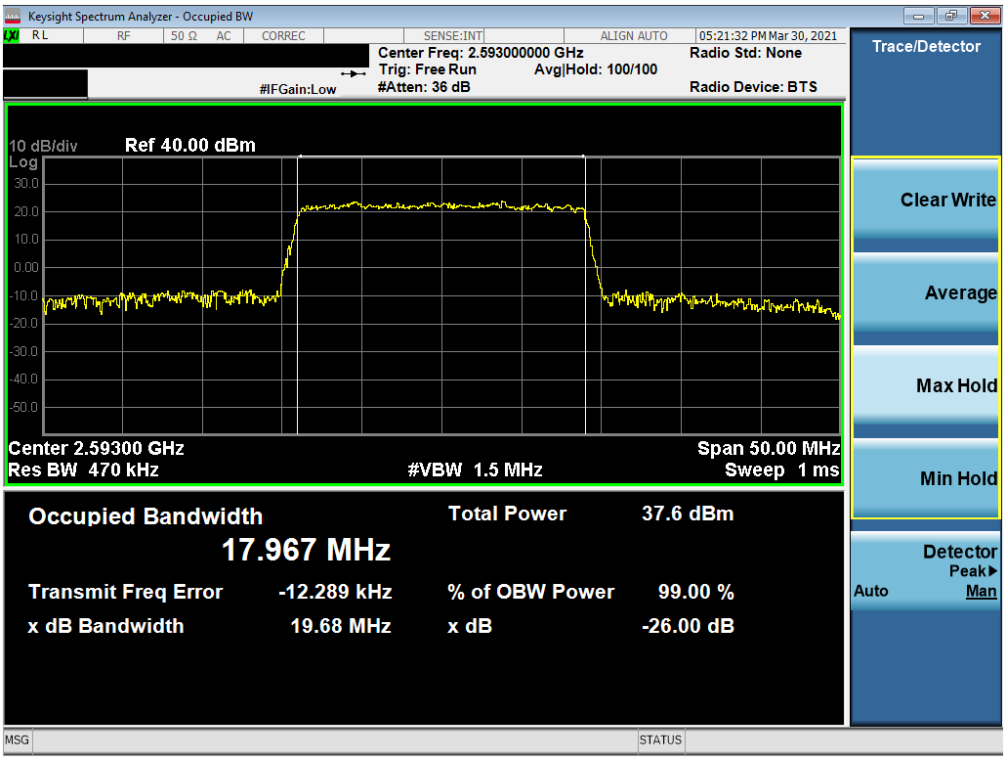
Plot 7-11. Occupied Bandwidth Plot (LTE Band 7 - 5MHz QPSK - Full RB)



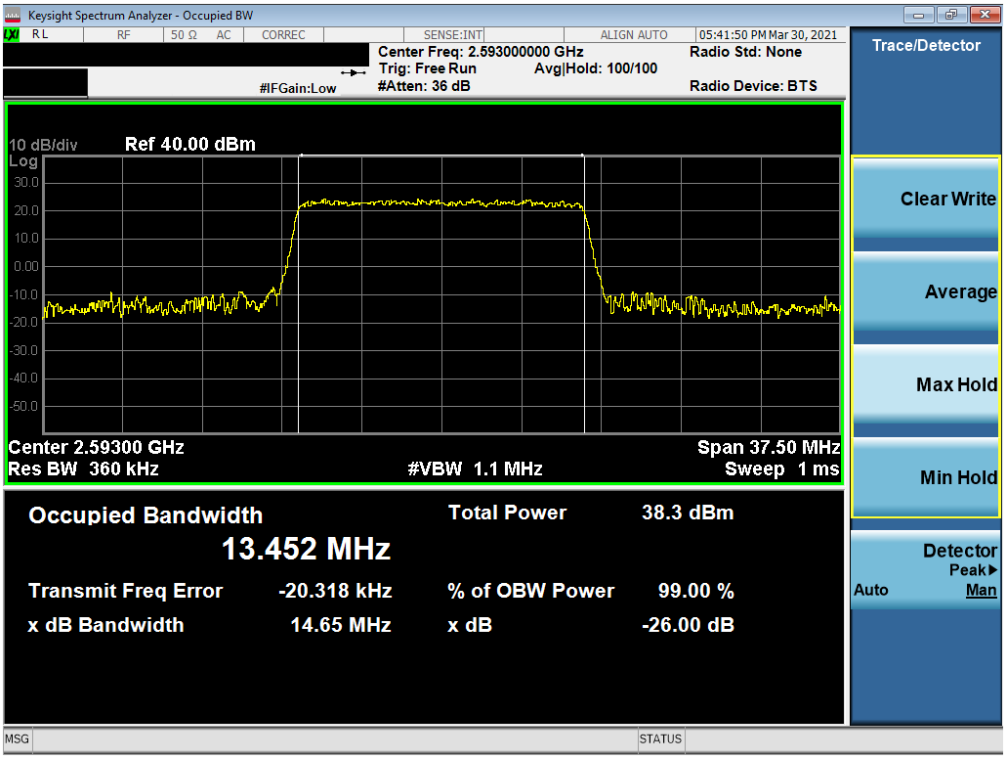
Plot 7-12. Occupied Bandwidth Plot (LTE Band 7 - 5MHz 16-QAM - Full RB)



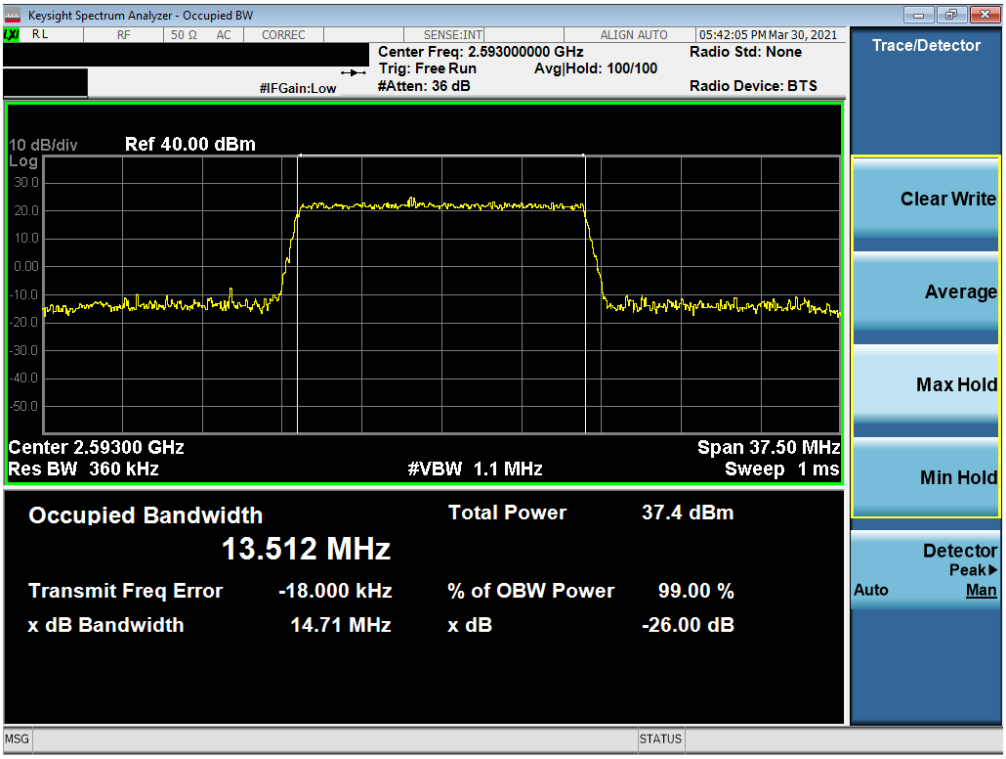
Plot 7-13. Occupied Bandwidth Plot (LTE Band 41(PC2) - 20MHz QPSK - Full RB)



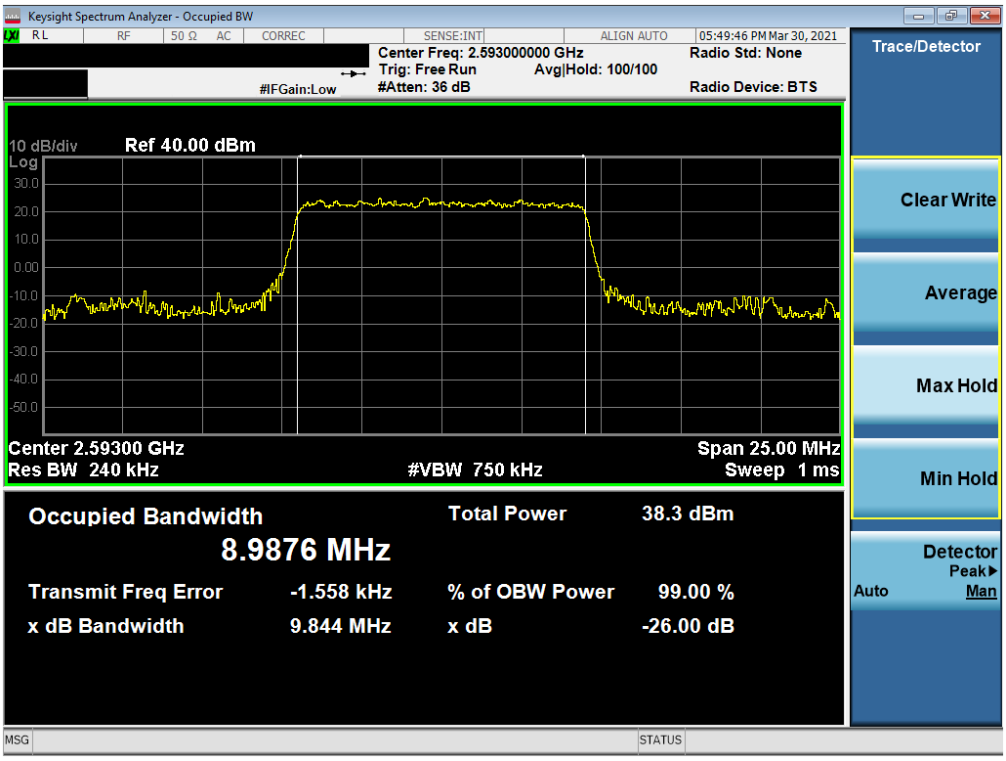
Plot 7-14. Occupied Bandwidth Plot (LTE Band 41(PC2) - 20MHz 16-QAM - Full RB)



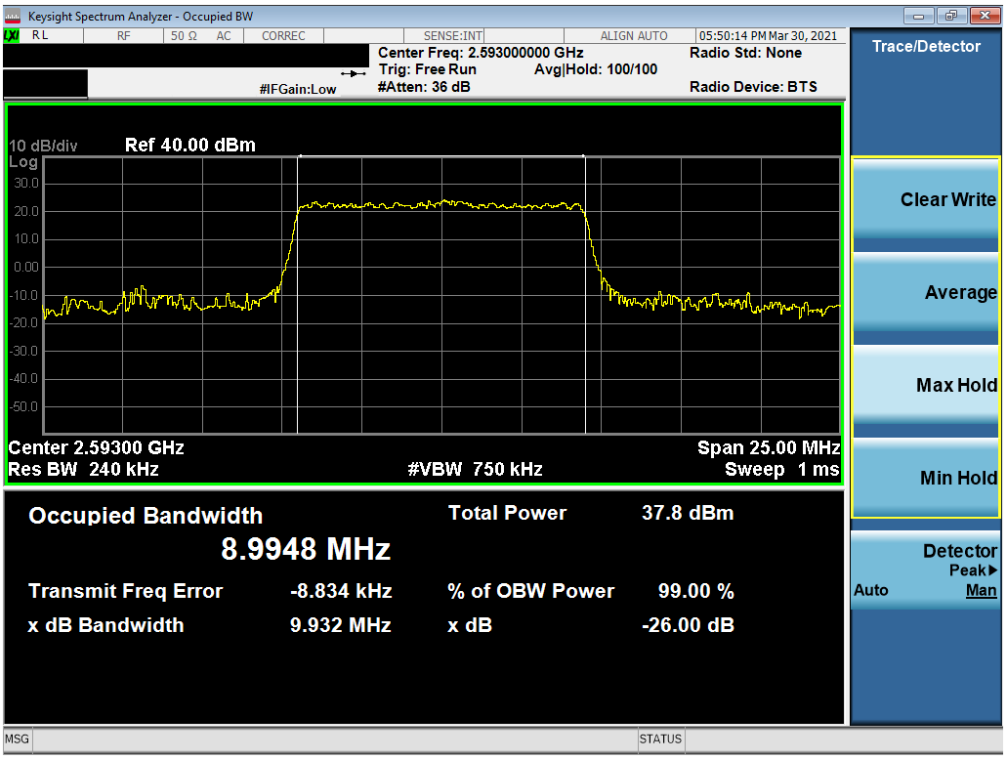
Plot 7-15. Occupied Bandwidth Plot (LTE Band 41(PC2) - 15MHz QPSK - Full RB)



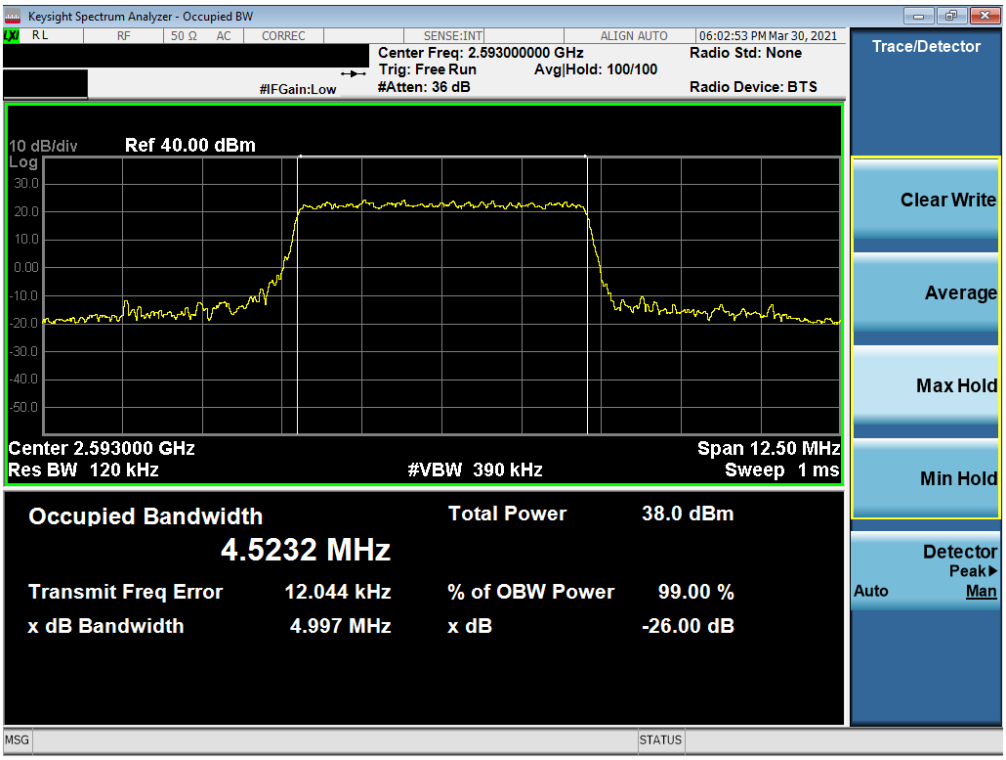
Plot 7-16. Occupied Bandwidth Plot (LTE Band 41(PC2) - 15MHz 16-QAM - Full RB)



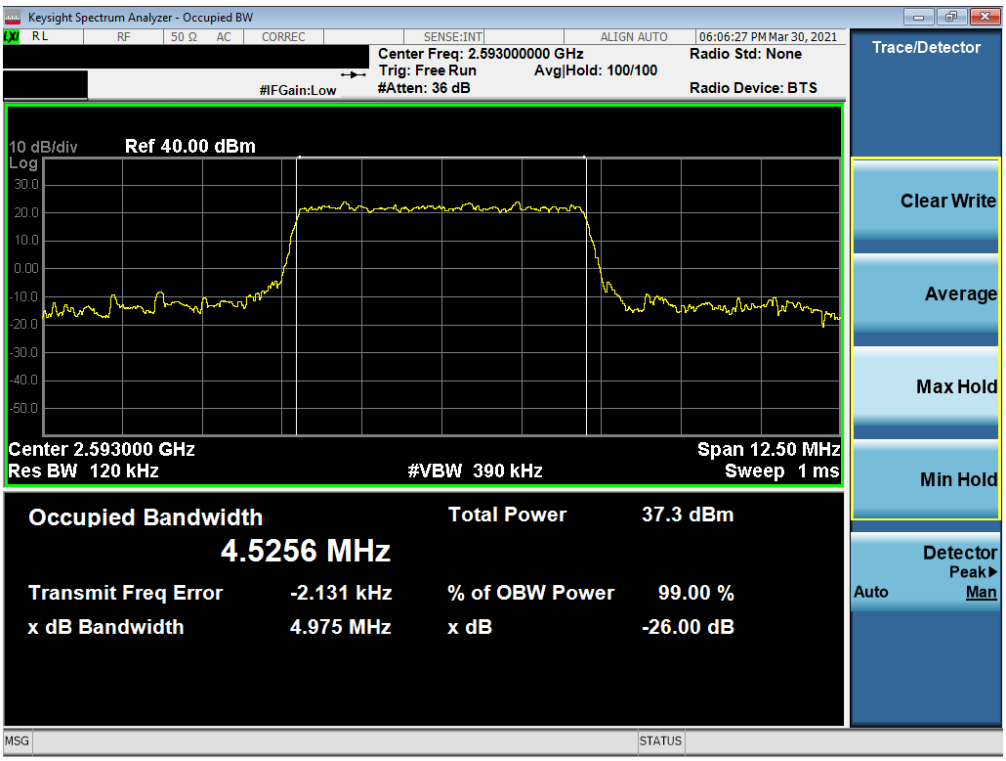
Plot 7-17. Occupied Bandwidth Plot (LTE Band 41(PC2) - 10MHz QPSK - Full RB)



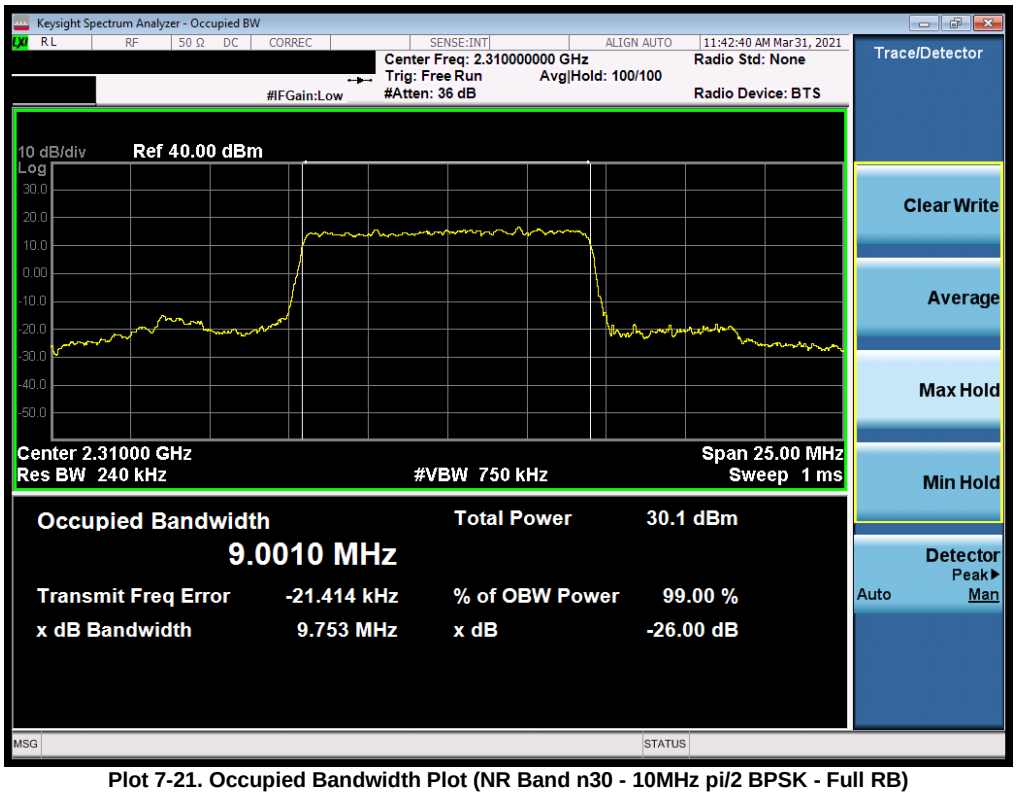
Plot 7-18. Occupied Bandwidth Plot (LTE Band 41(PC2) - 10MHz 16-QAM - Full RB)



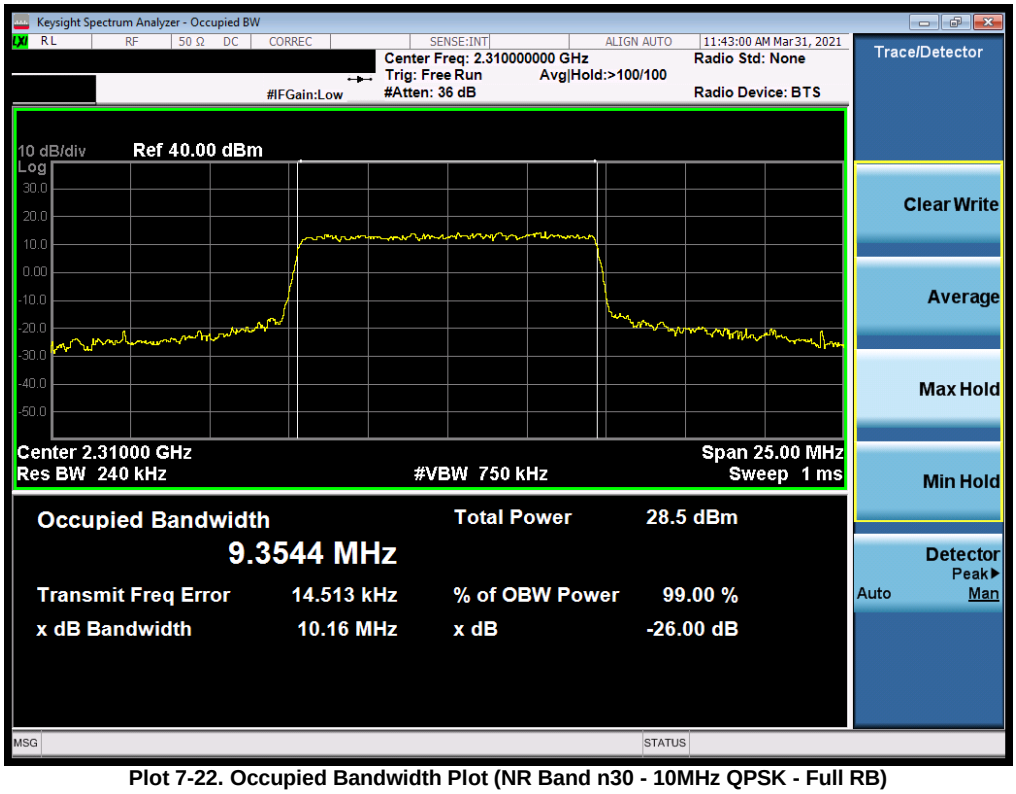
Plot 7-19. Occupied Bandwidth Plot (LTE Band 41(PC2) - 5MHz QPSK - Full RB)



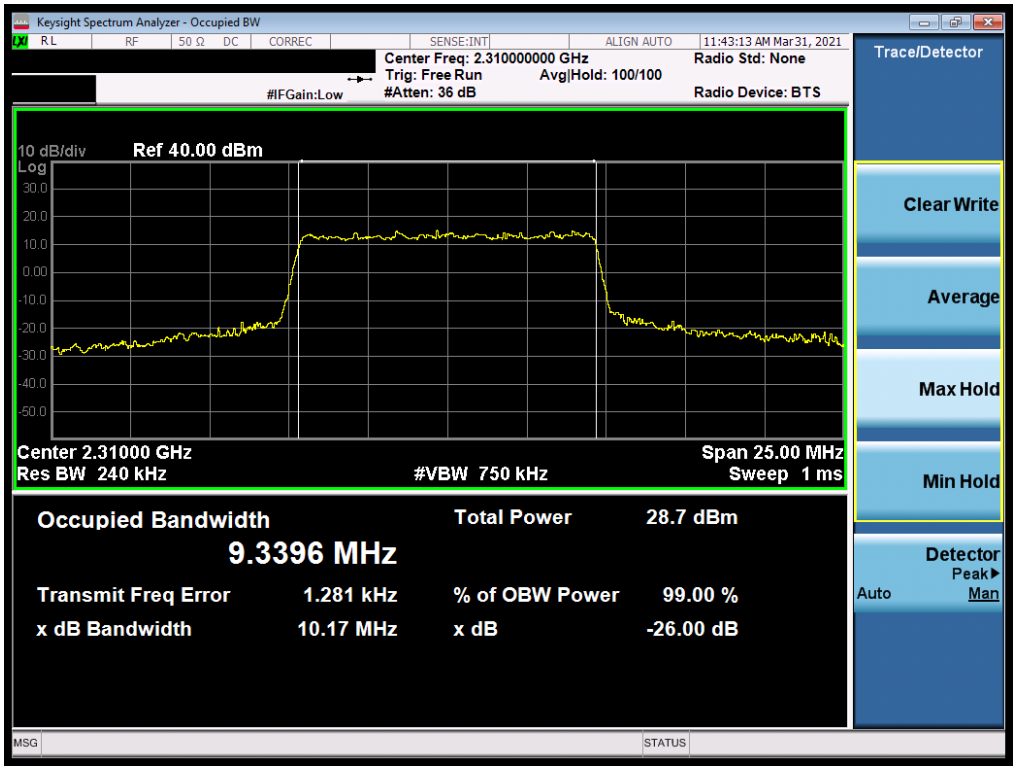
Plot 7-20. Occupied Bandwidth Plot (LTE Band 41(PC2) - 5MHz 16-QAM - Full RB)



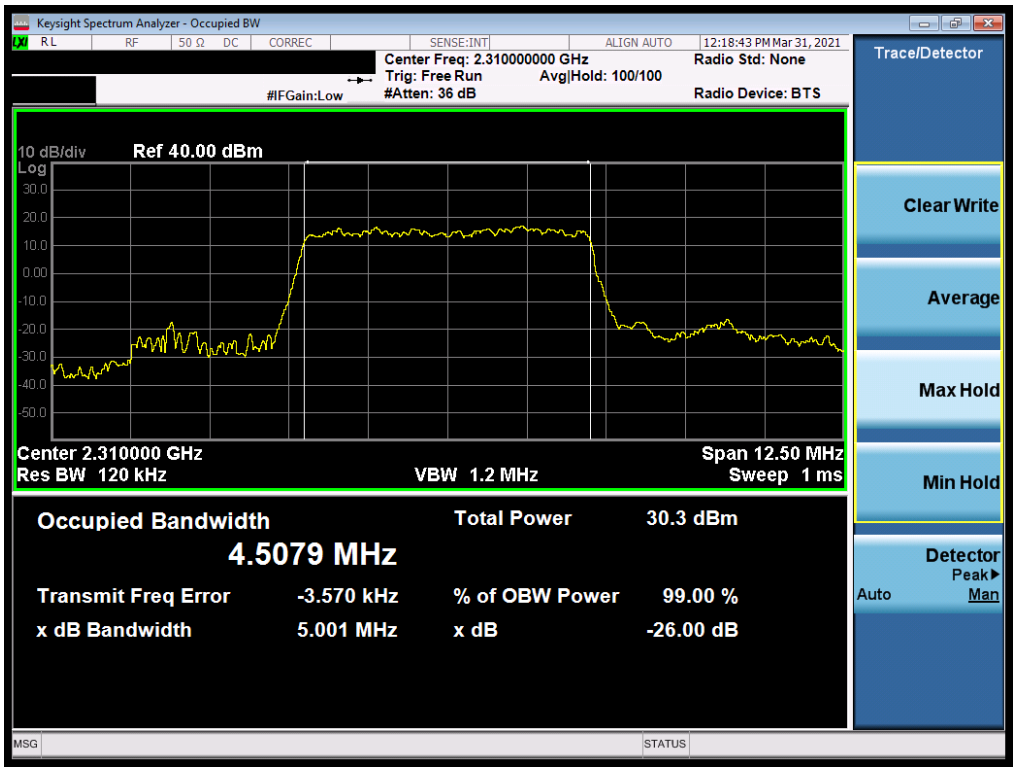
Plot 7-21. Occupied Bandwidth Plot (NR Band n30 - 10MHz pi/2 BPSK - Full RB)



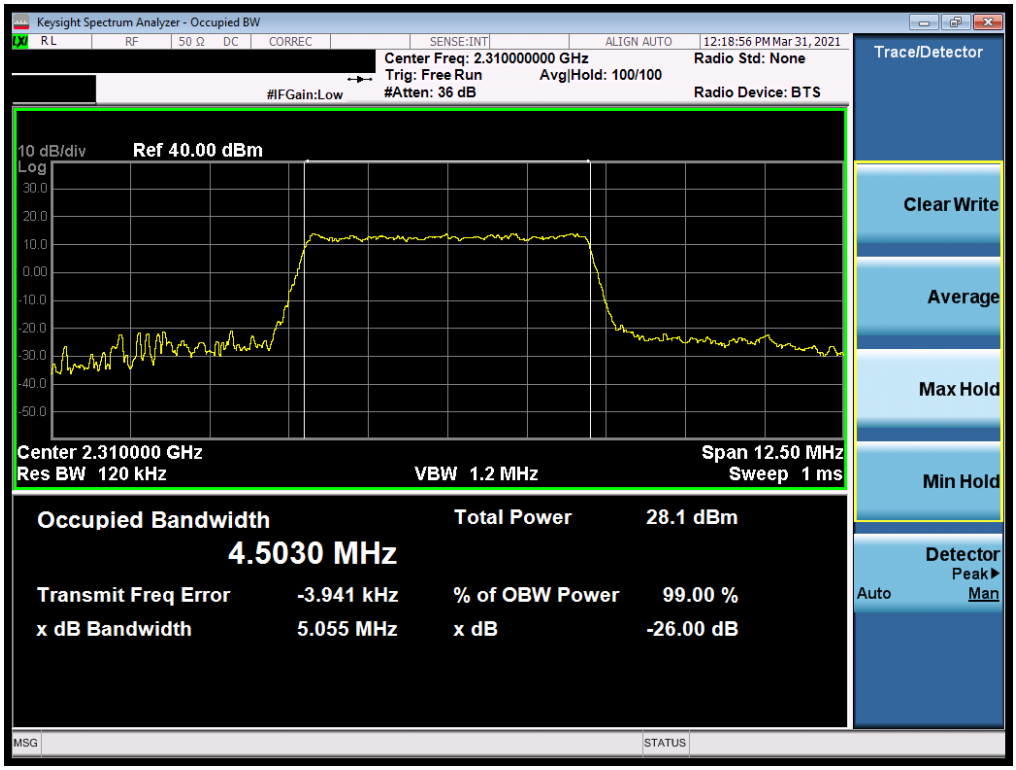
Plot 7-22. Occupied Bandwidth Plot (NR Band n30 - 10MHz QPSK - Full RB)



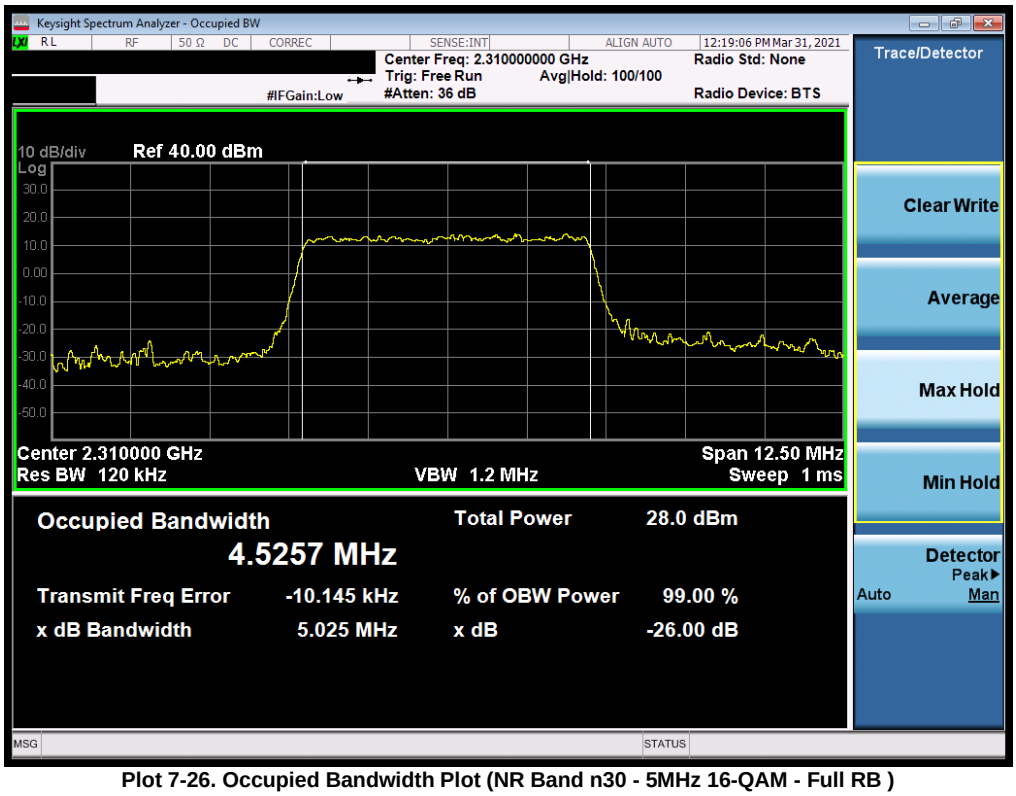
Plot 7-23. Occupied Bandwidth Plot (NR Band n30 - 10MHz 16-QAM - Full RB)



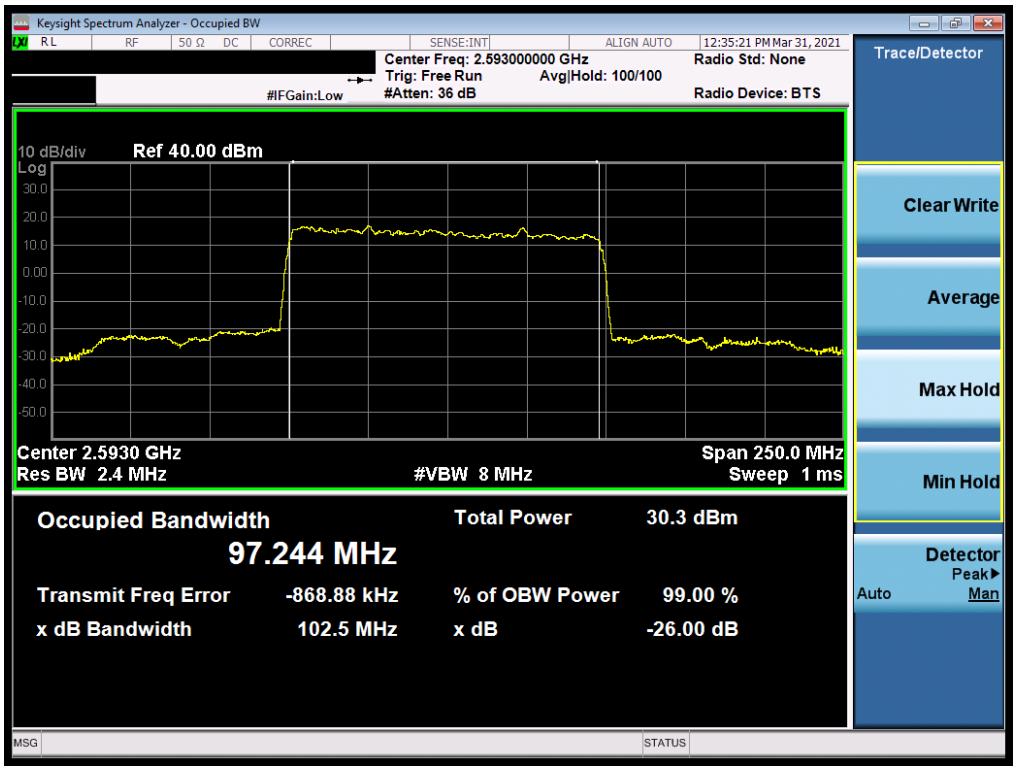
Plot 7-24. Occupied Bandwidth Plot (NR Band n30 - 5MHz pi/2 BPSK - Full RB)



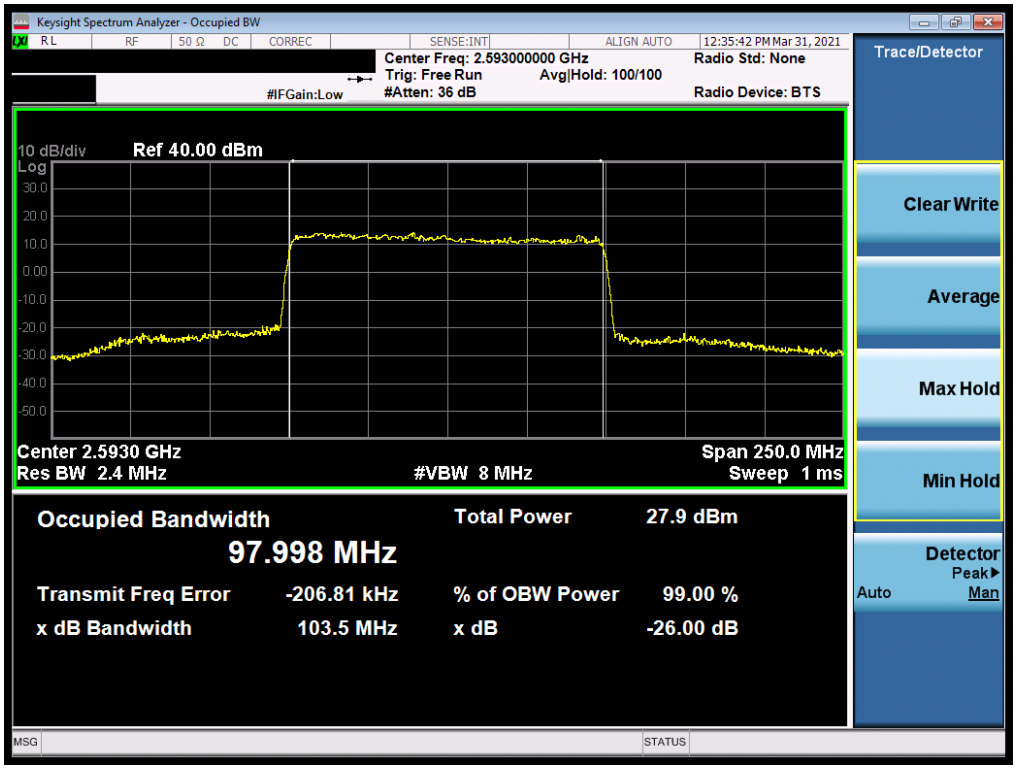
Plot 7-25. Occupied Bandwidth Plot (NR Band n30 - 5MHz QPSK - Full RB)



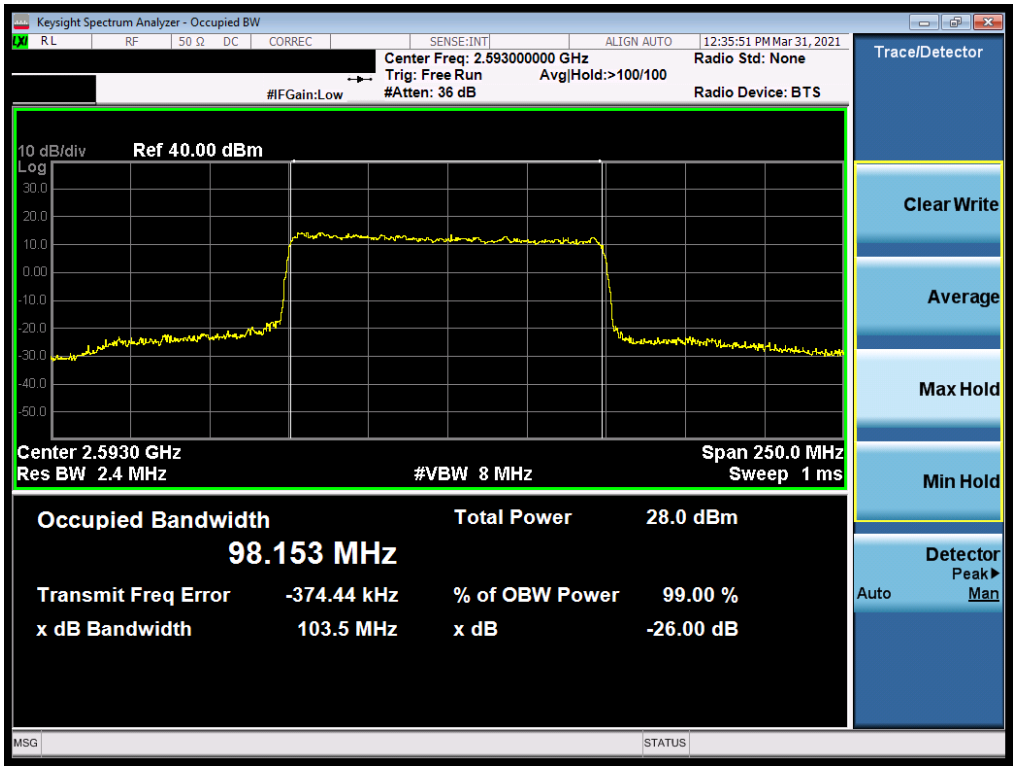
Plot 7-26. Occupied Bandwidth Plot (NR Band n30 - 5MHz 16-QAM - Full RB)



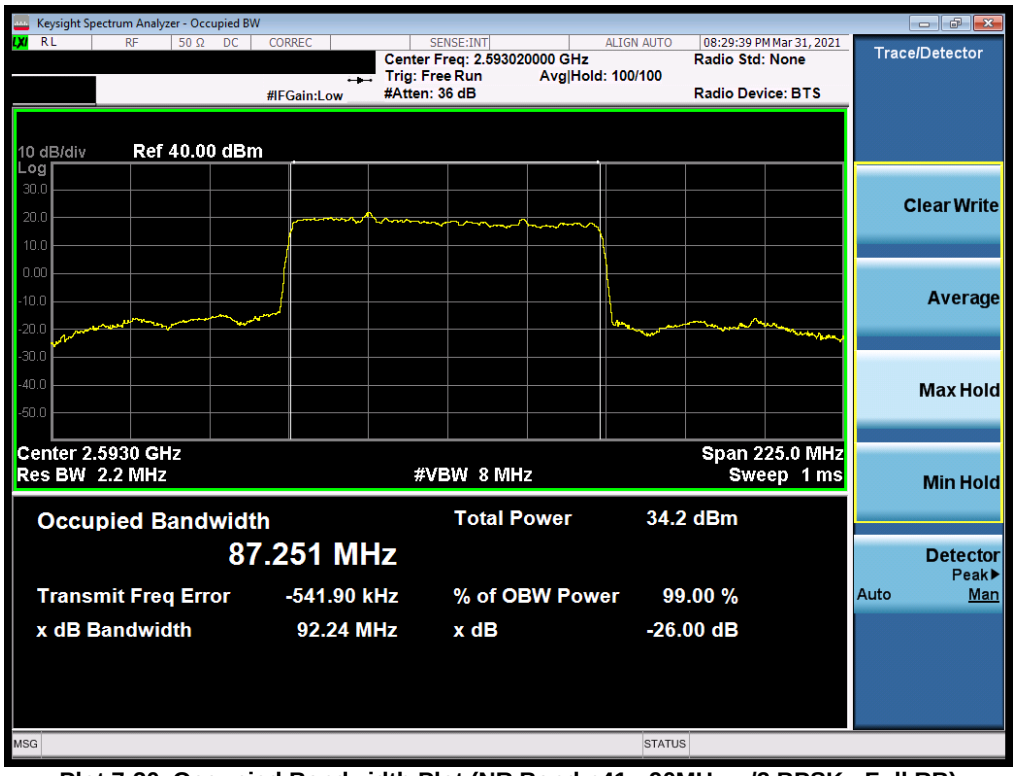
Plot 7-27. Occupied Bandwidth Plot (NR Band n41 - 100MHz π/2 BPSK - Full RB)



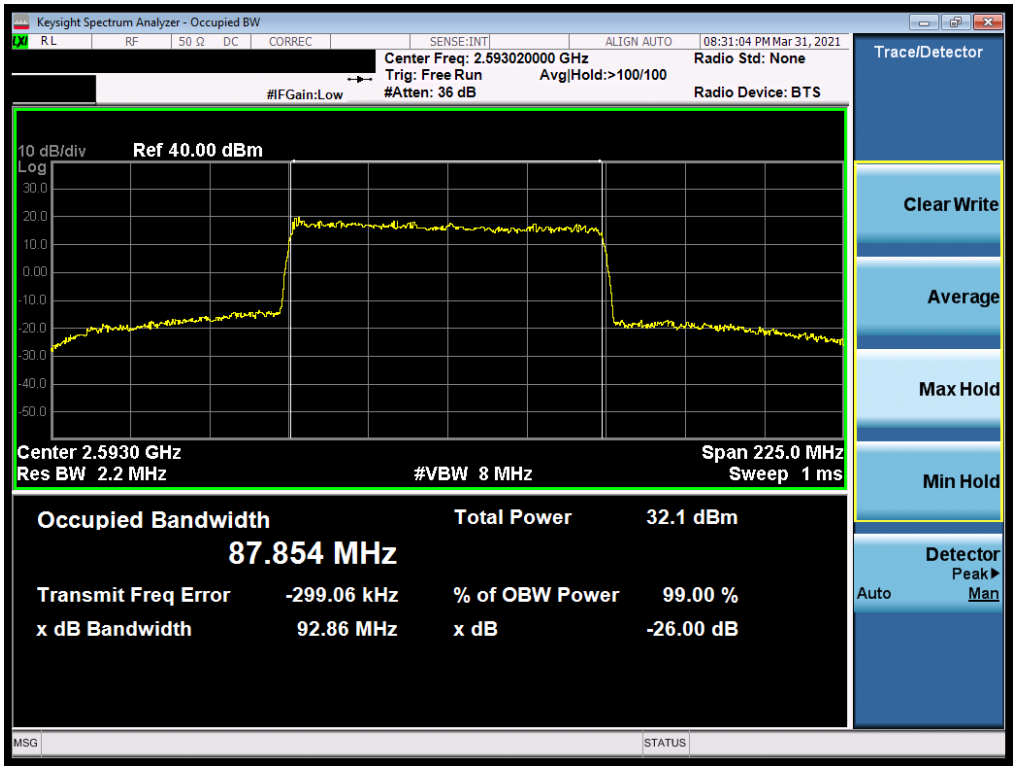
Plot 7-28. Occupied Bandwidth Plot (NR Band n41 - 100MHz QPSK - Full RB)



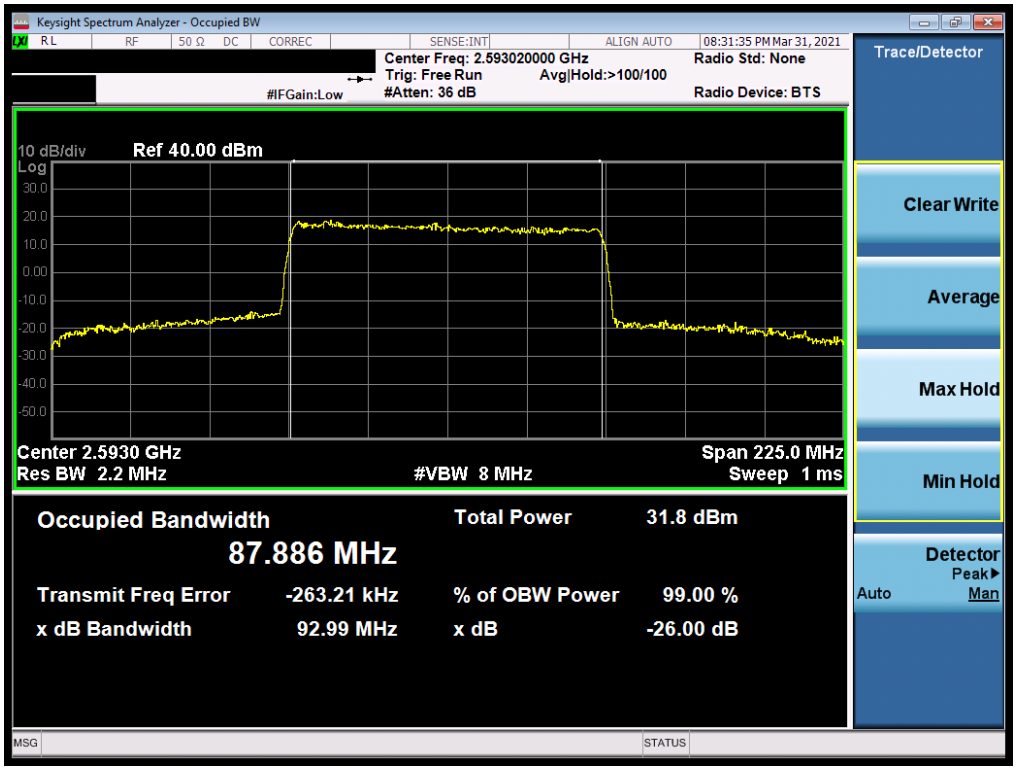
Plot 7-29. Occupied Bandwidth Plot (NR Band n41 - 100MHz 16-QAM - Full RB)



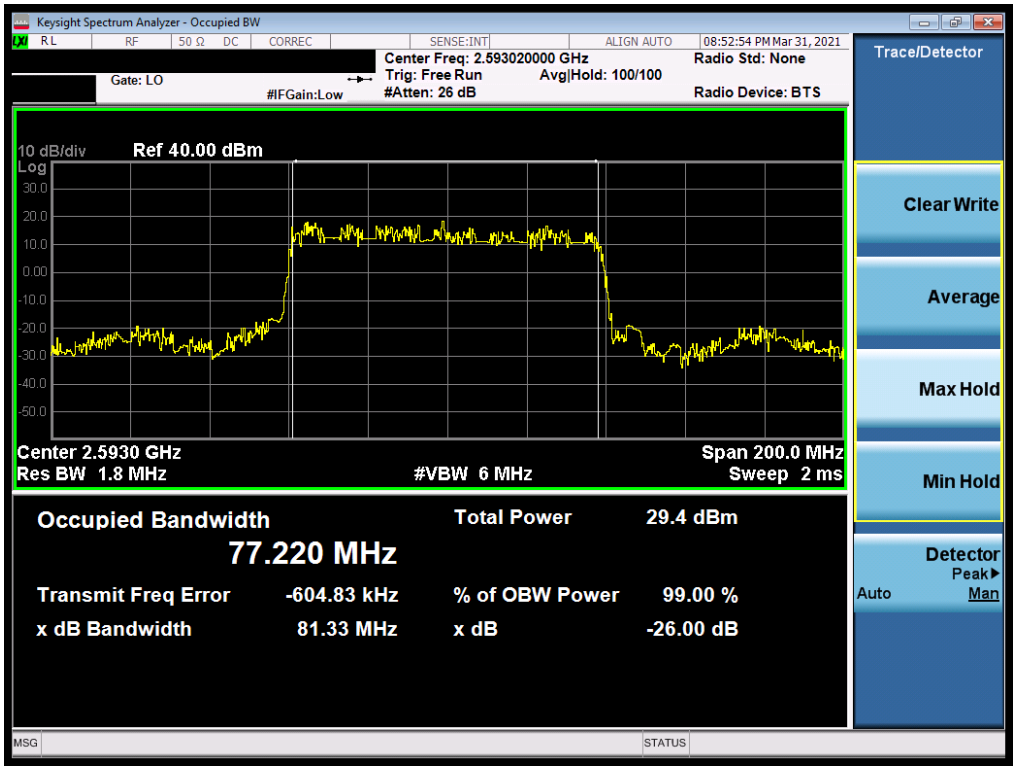
Plot 7-30. Occupied Bandwidth Plot (NR Band n41 - 90MHz π/2 BPSK - Full RB)



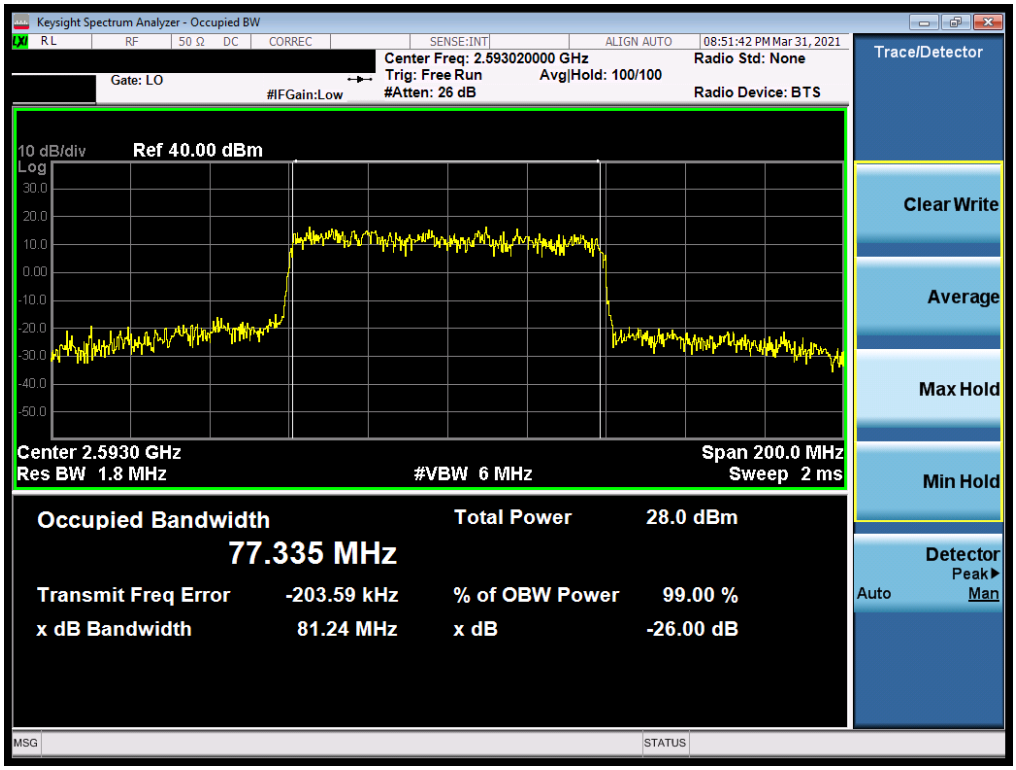
Plot 7-31. Occupied Bandwidth Plot (NR Band n41 - 90MHz QPSK - Full RB)



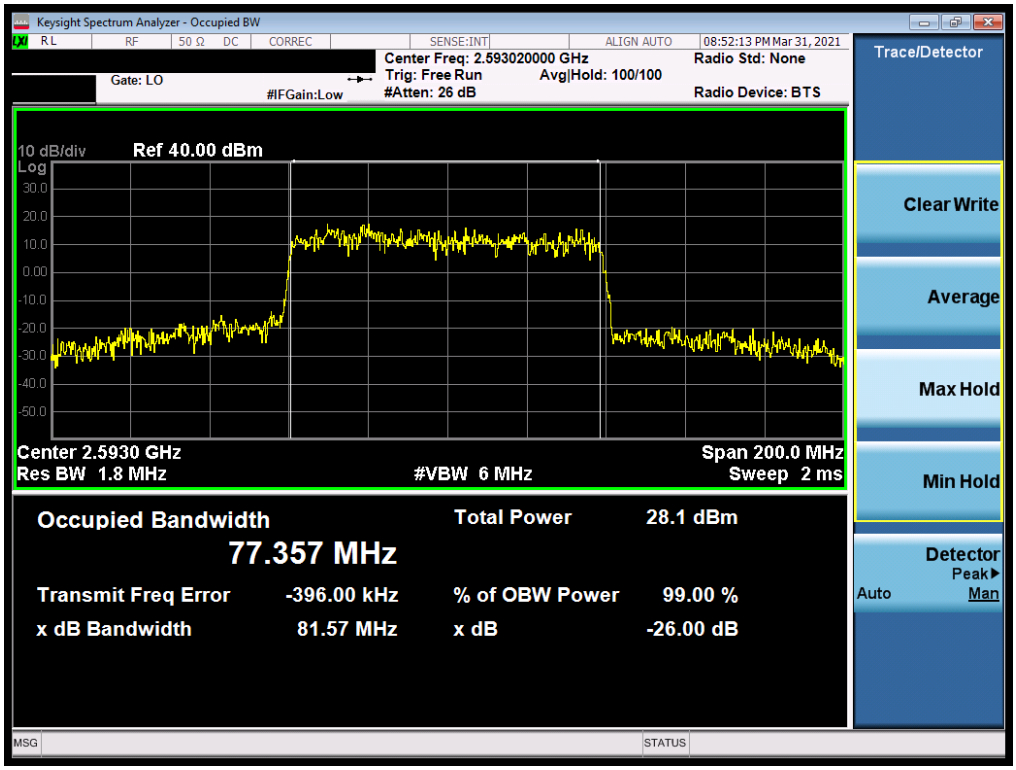
Plot 7-32. Occupied Bandwidth Plot (NR Band n41 - 90MHz 16-QAM - Full RB)



Plot 7-33. Occupied Bandwidth Plot (NR Band n41 - 80MHz π/2 BPSK - Full RB)

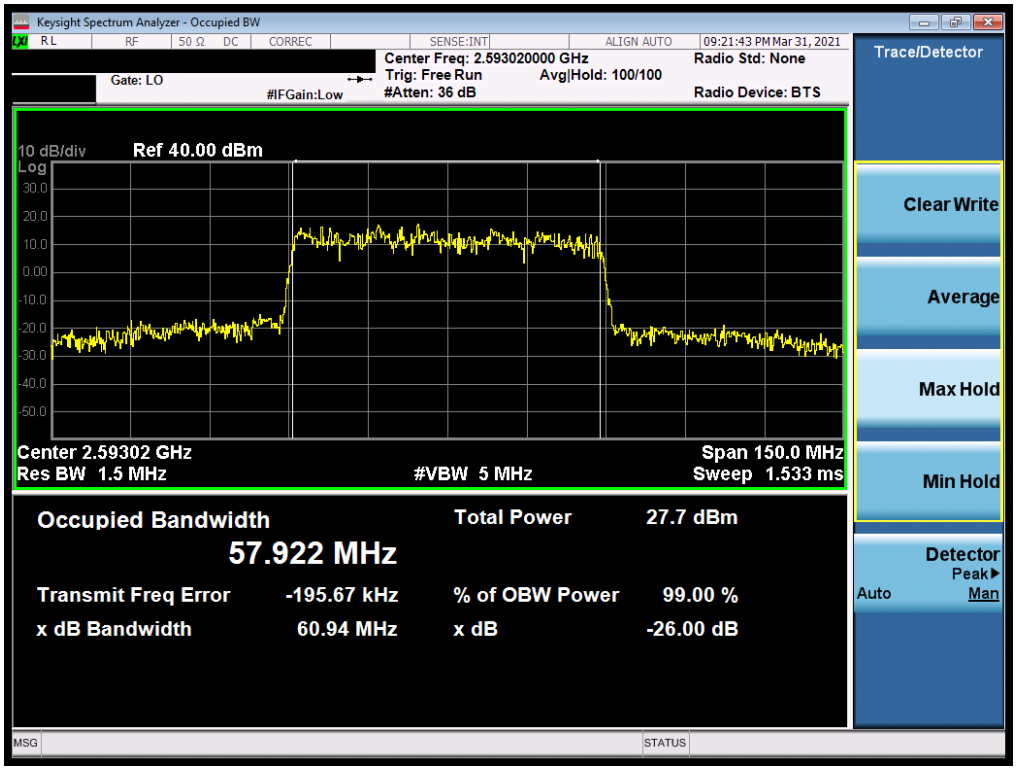


Plot 7-34. Occupied Bandwidth Plot (NR Band n41 - 80MHz QPSK - Full RB)

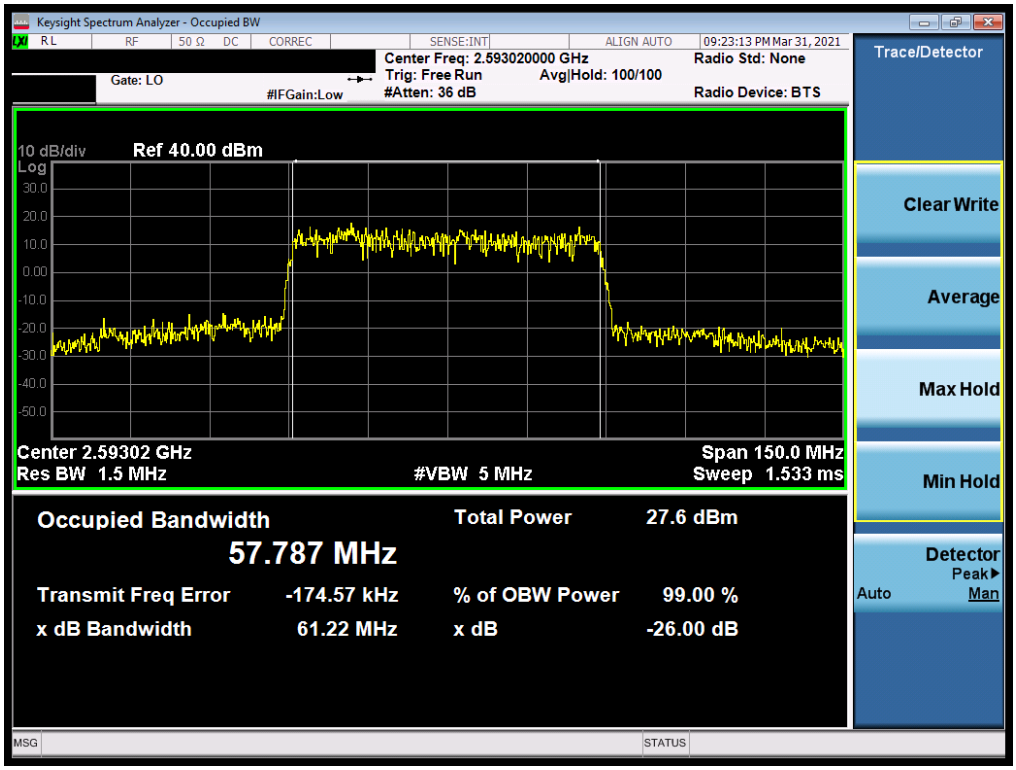


Plot 7-35. Occupied Bandwidth Plot (NR Band n41 - 80MHz 16-QAM - Full RB)

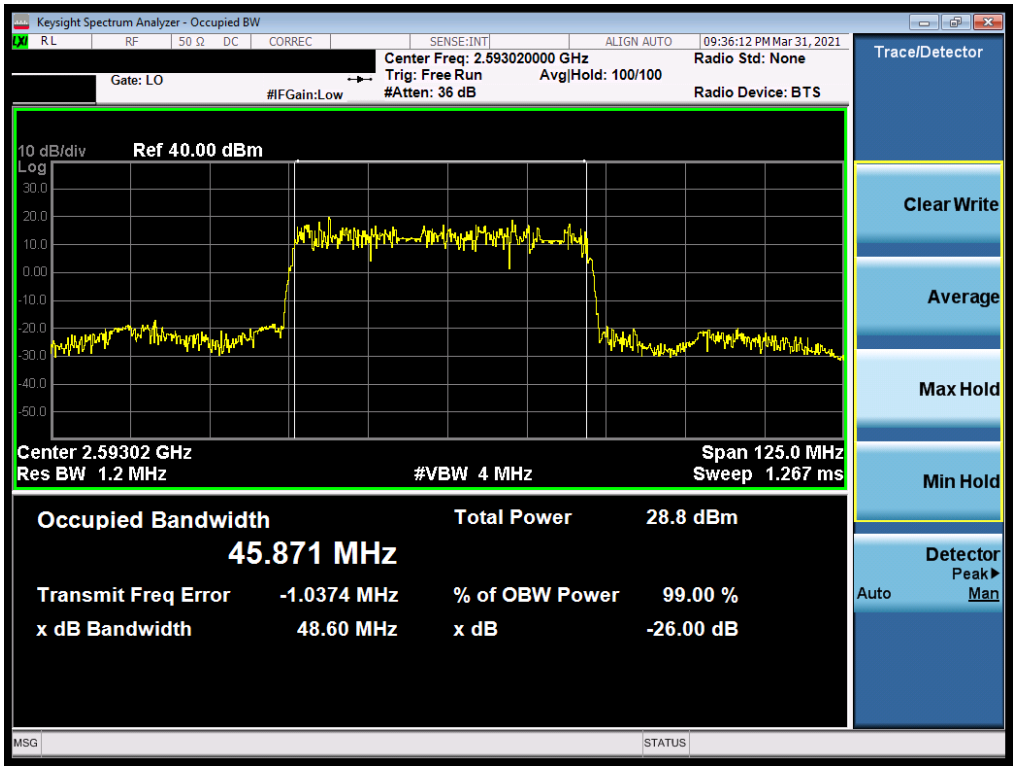
Plot 7-36. Occupied Bandwidth Plot (NR Band n41 - 60MHz π/2 BPSK - Full RB)



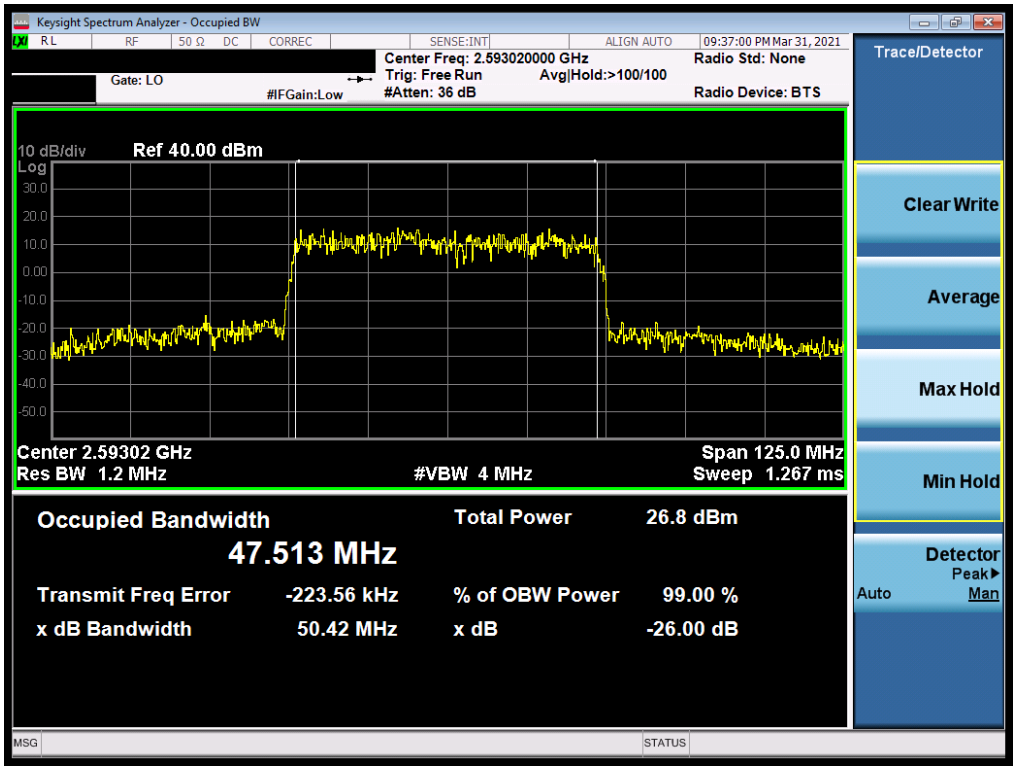
Plot 7-37. Occupied Bandwidth Plot (NR Band n41 - 60MHz QPSK - Full RB)



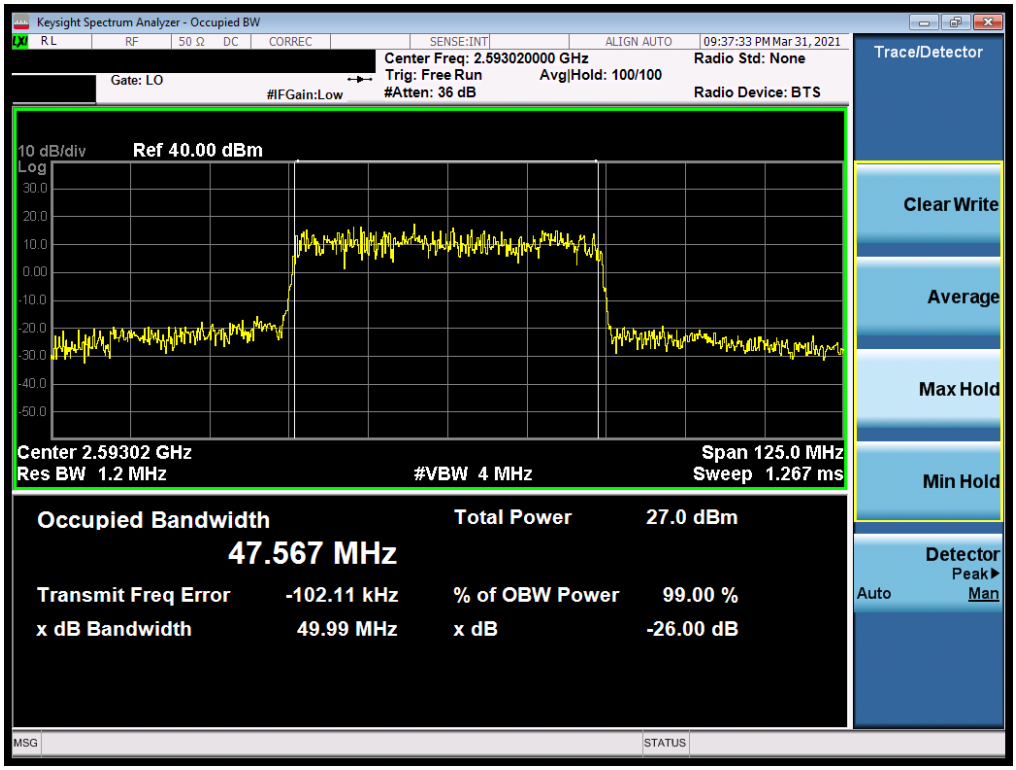
Plot 7-38. Occupied Bandwidth Plot (NR Band n41 - 60MHz 16-QAM - Full RB)



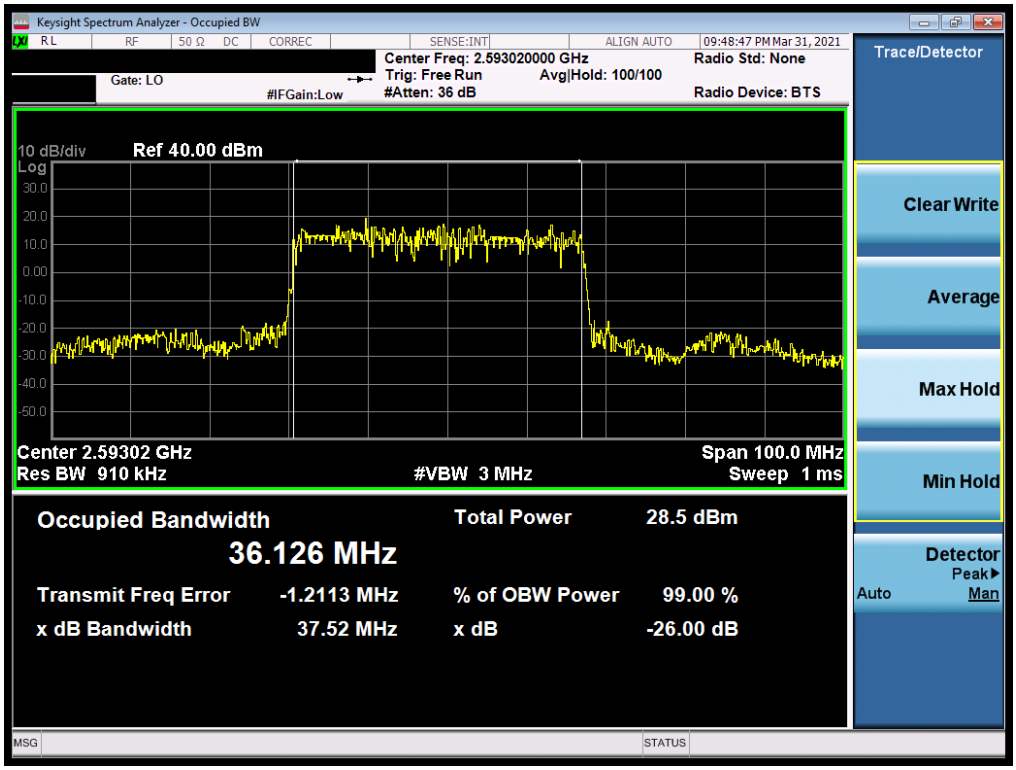
Plot 7-39. Occupied Bandwidth Plot (NR Band n41 - 50MHz π/2 BPSK - Full RB)



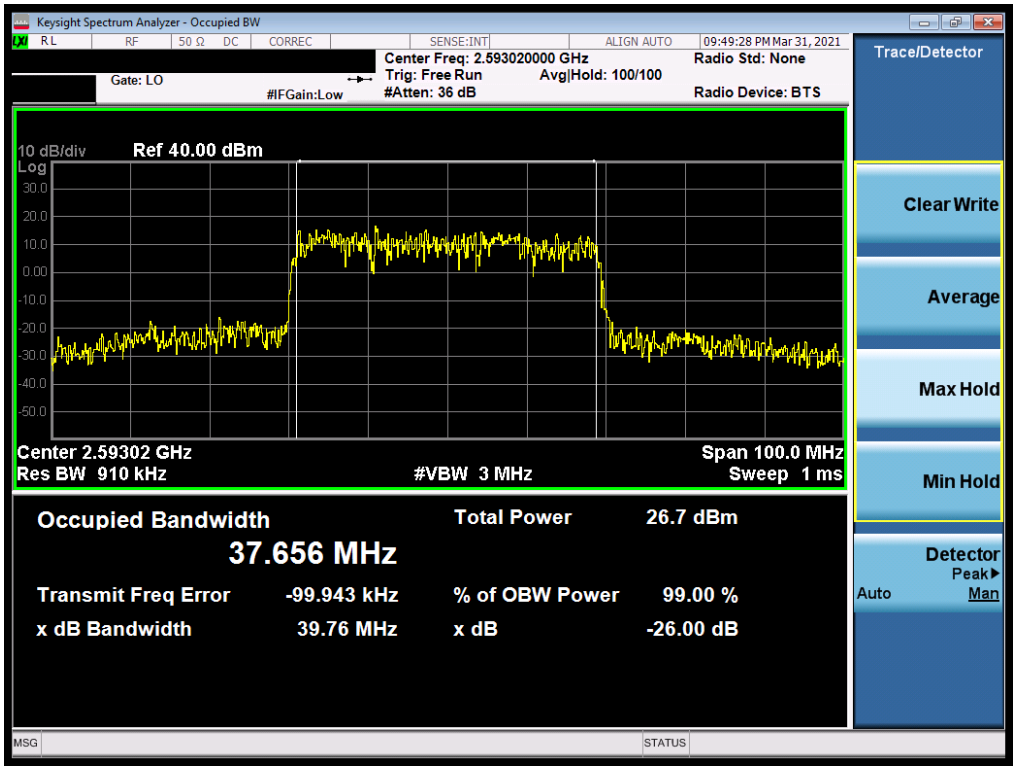
Plot 7-40. Occupied Bandwidth Plot (NR Band n41 - 50MHz QPSK - Full RB)



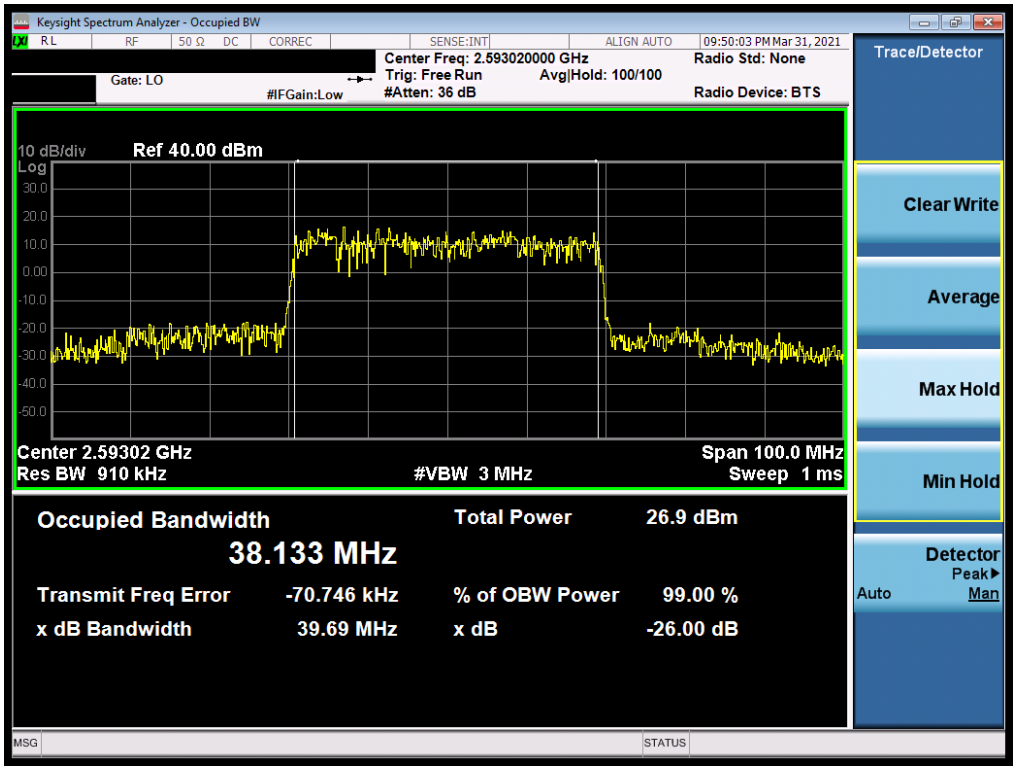
Plot 7-41. Occupied Bandwidth Plot (NR Band n41 - 50MHz 16-QAM - Full RB)



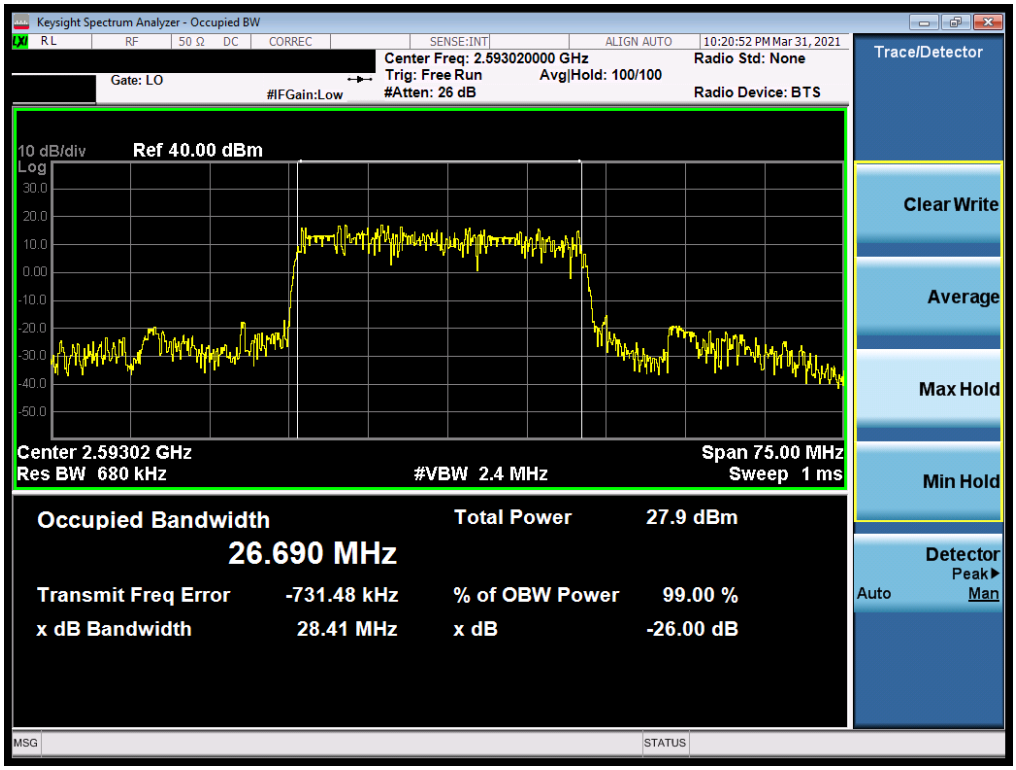
Plot 7-42. Occupied Bandwidth Plot (NR Band n41 - 40MHz π/2 BPSK - Full RB)



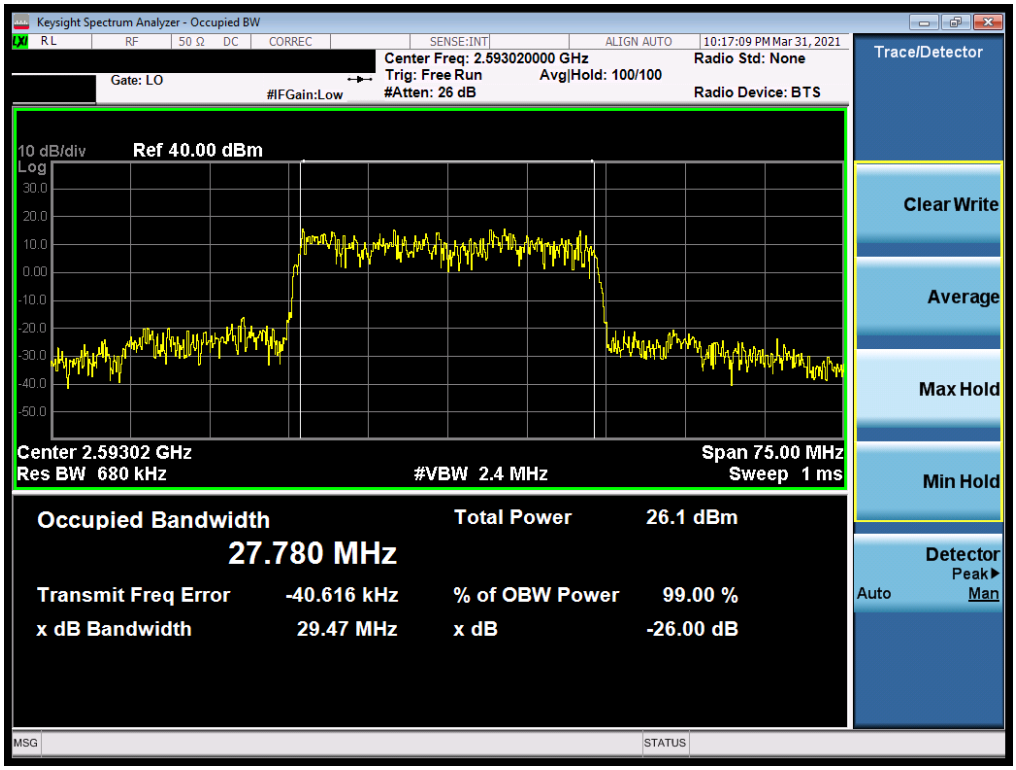
Plot 7-43. Occupied Bandwidth Plot (NR Band n41 - 40MHz QPSK - Full RB)



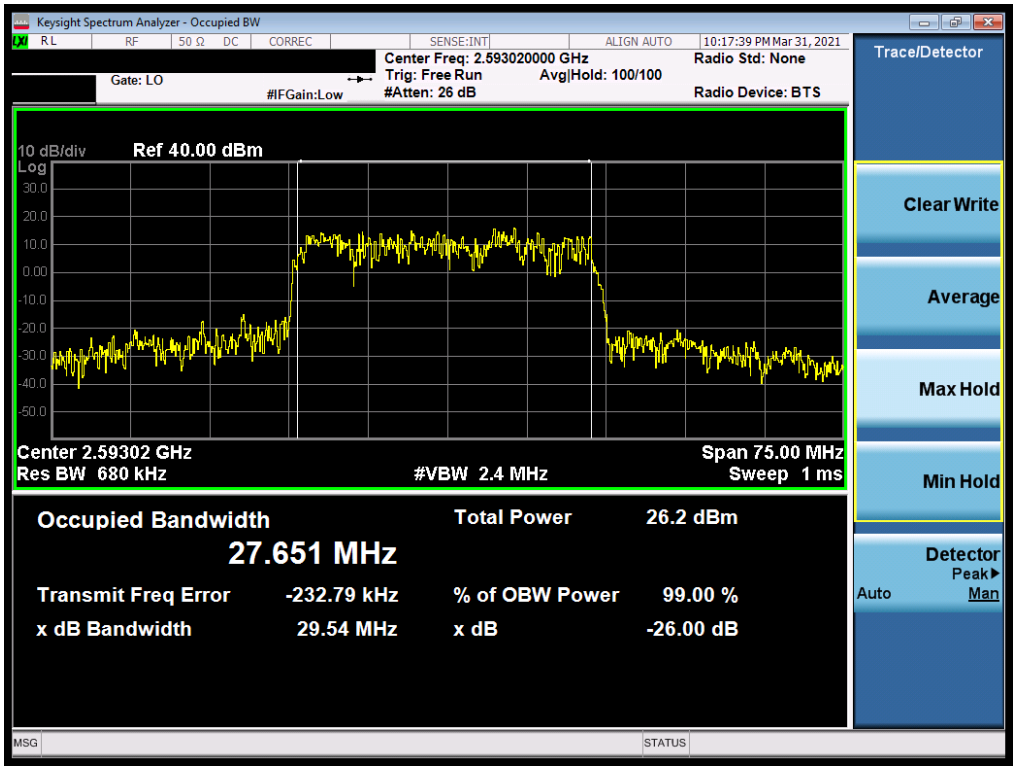
Plot 7-44. Occupied Bandwidth Plot (NR Band n41 - 40MHz 16-QAM - Full RB)



Plot 7-45. Occupied Bandwidth Plot (NR Band n41 - 30MHz π/2 BPSK - Full RB)

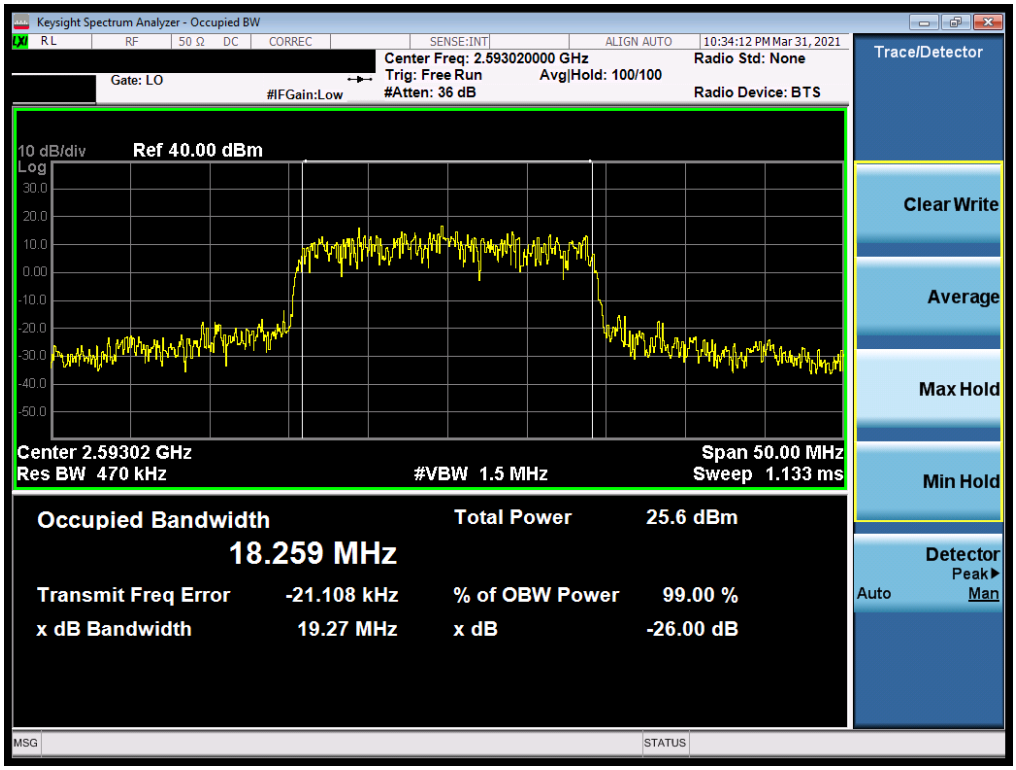


Plot 7-46. Occupied Bandwidth Plot (NR Band n41 - 30MHz QPSK - Full RB)

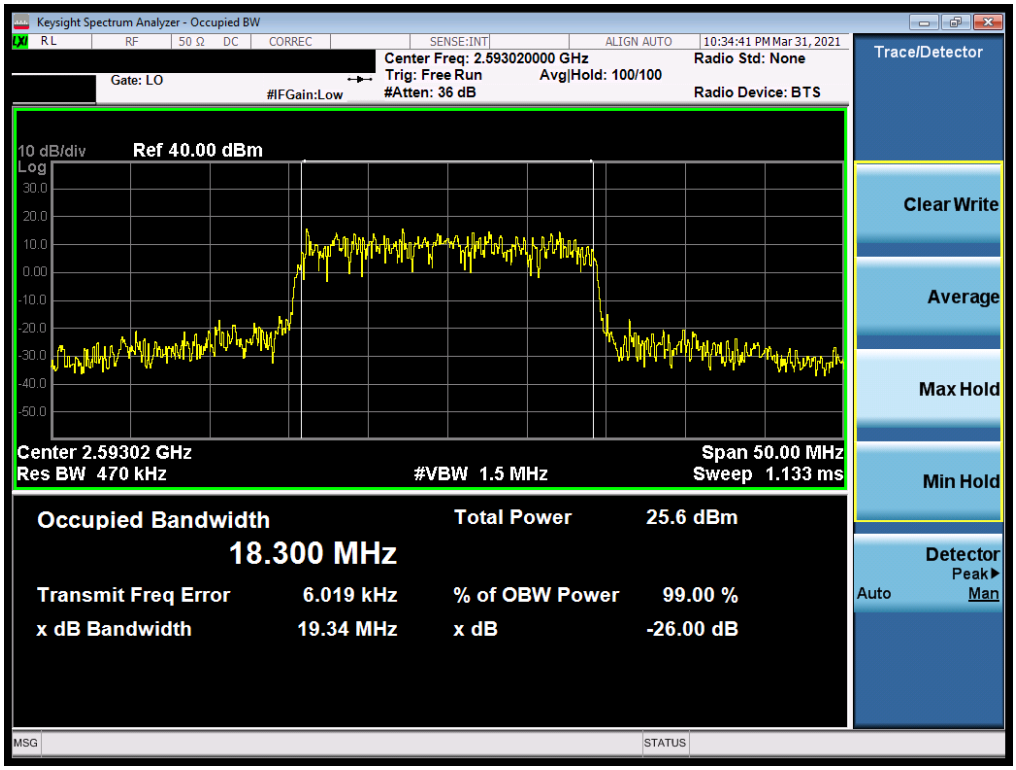


Plot 7-47. Occupied Bandwidth Plot (NR Band n41 - 30MHz 16-QAM - Full RB)

Plot 7-48. Occupied Bandwidth Plot (NR Band n41 - 20MHz π/2 BPSK - Full RB)



Plot 7-49. Occupied Bandwidth Plot (NR Band n41 - 20MHz QPSK - Full RB)



Plot 7-50. Occupied Bandwidth Plot (NR Band n41 - 20MHz 16-QAM - Full RB)

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 + 10log$_{10}$(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.

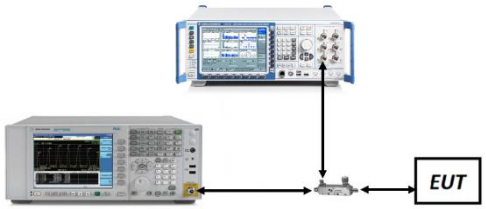
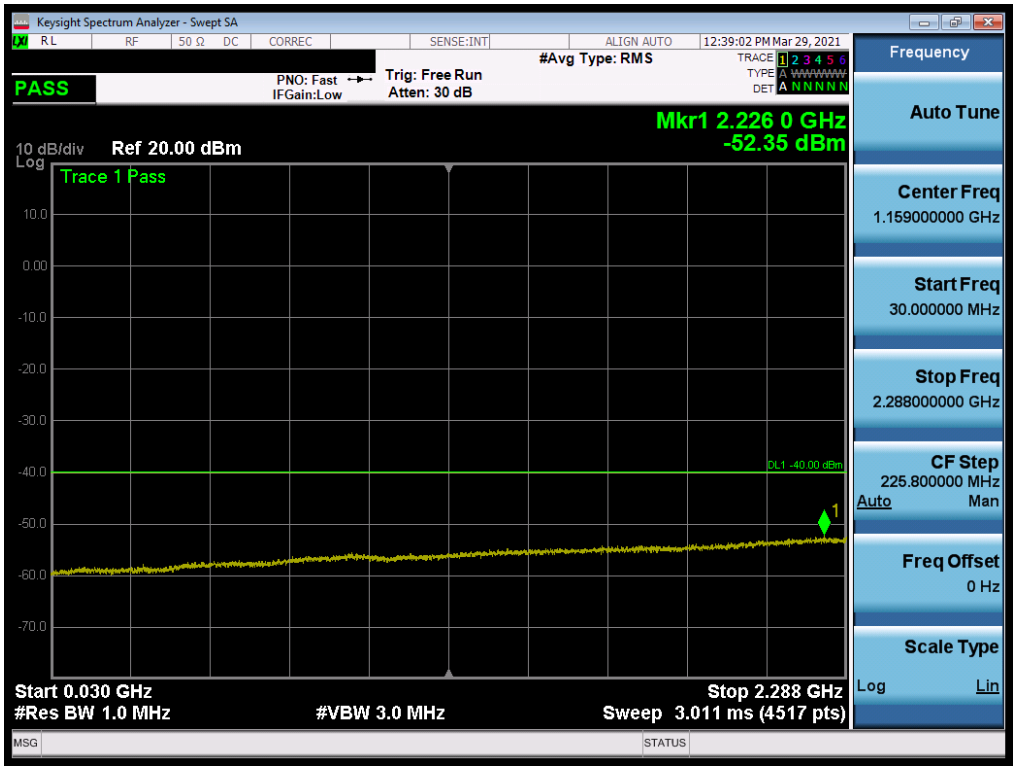


Figure 7-3. Test Instrument & Measurement Setup

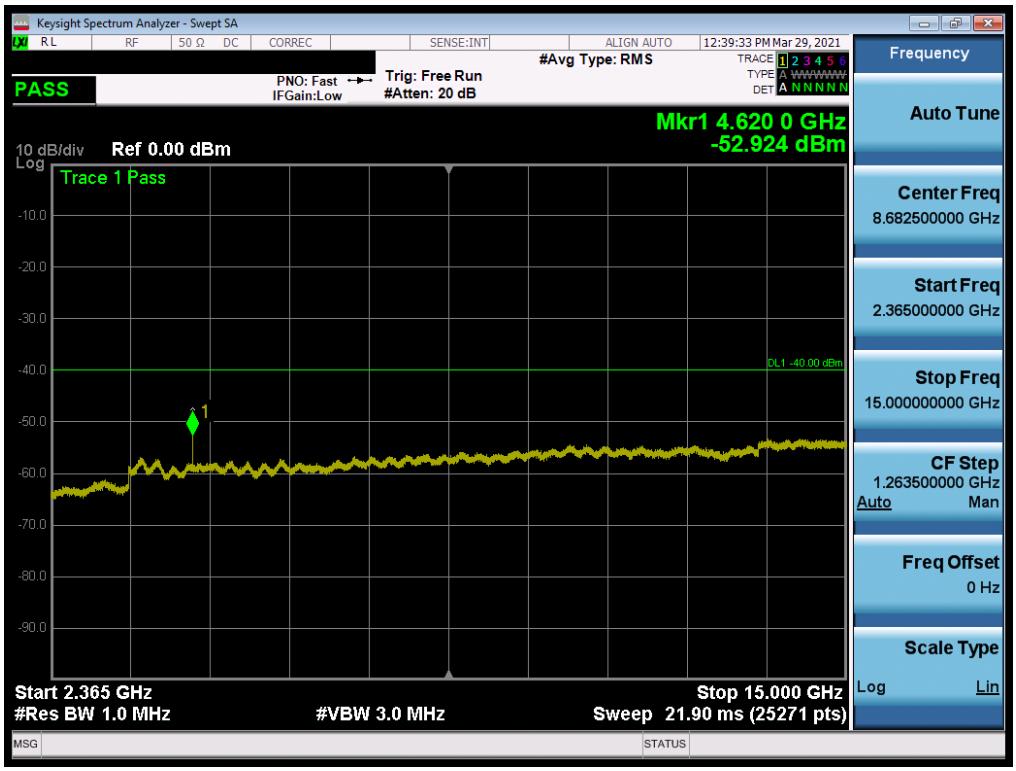
Test Notes

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 100 kHz or greater for measurements below 1GHz. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emission are attenuated at least 26 dB below the transmitter power.

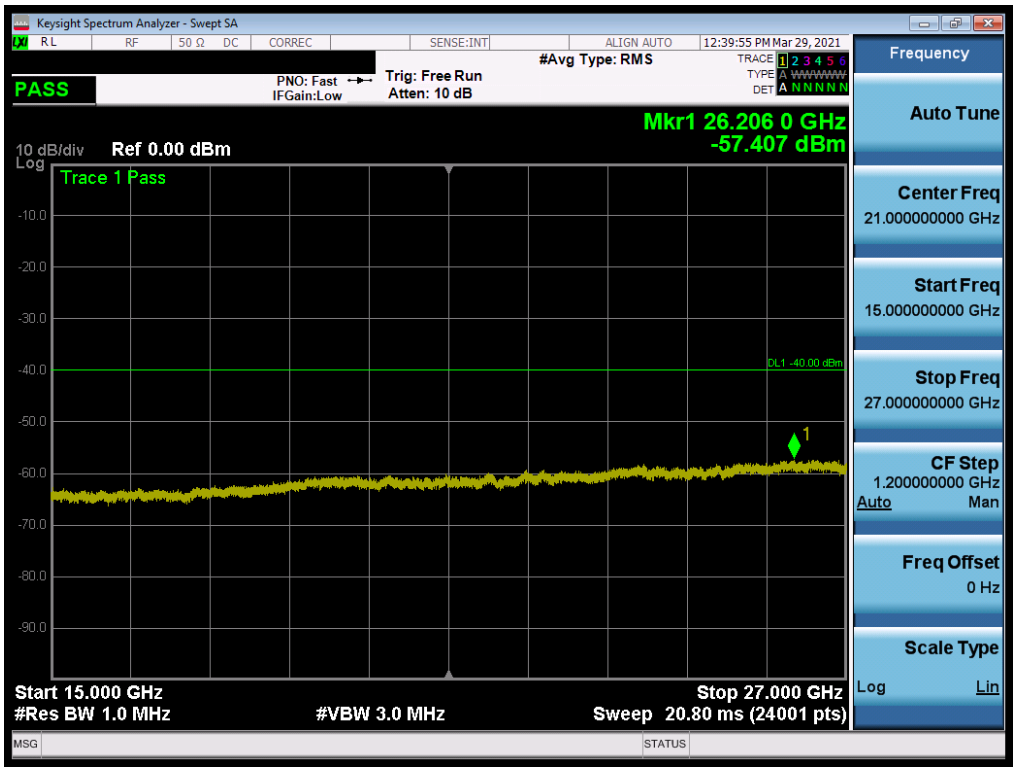
2. For NR operation, all transmission schemes (e.g. CP-OFDM and DFT-s-OFDM) were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.



Plot 7-51. Conducted Spurious Plot (LTE Band 30 - 10MHz QPSK - RB Size 1, RB Offset 0)

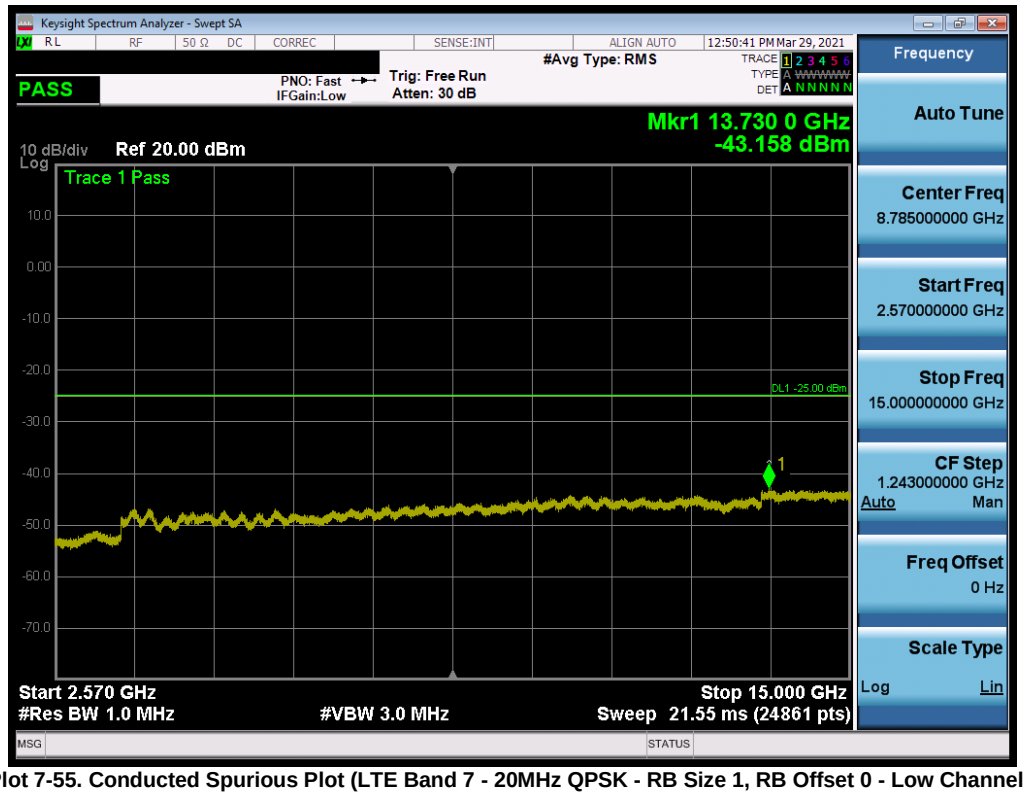


Plot 7-52. Conducted Spurious Plot (LTE Band 30 - 10MHz QPSK - RB Size 1, RB Offset 0)

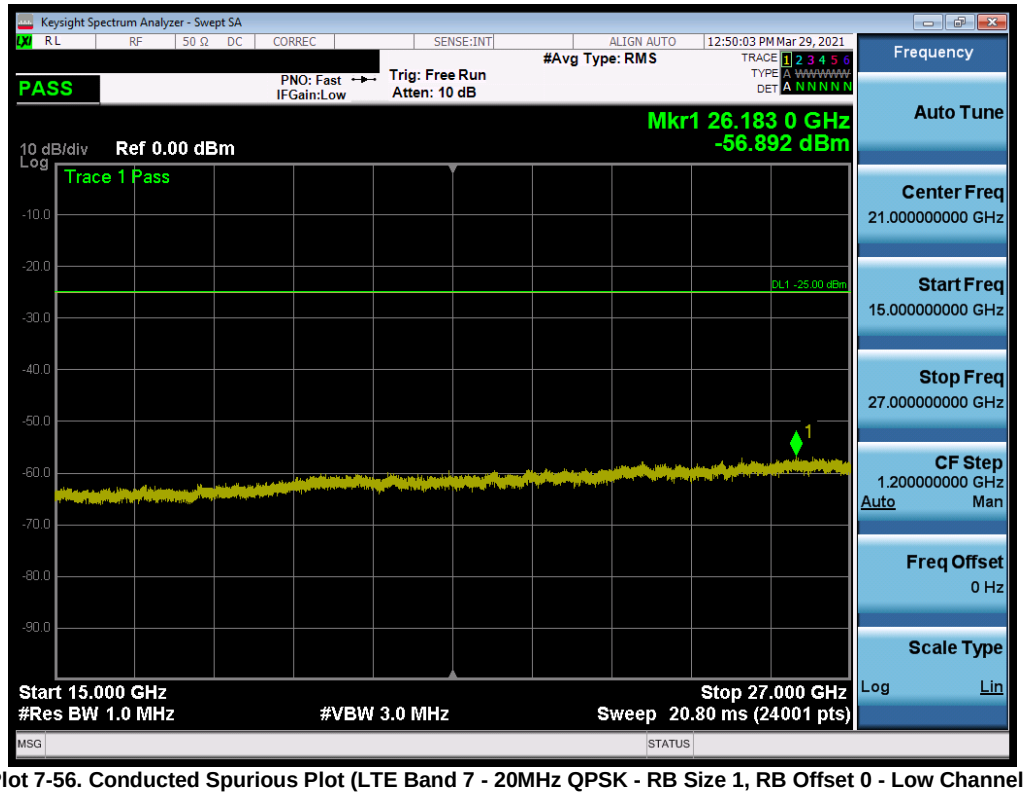


Plot 7-53. Conducted Spurious Plot (LTE Band 30 - 10MHz QPSK - RB Size 1, RB Offset 0)

Plot 7-54. Conducted Spurious Plot (LTE Band 7 - 20MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)

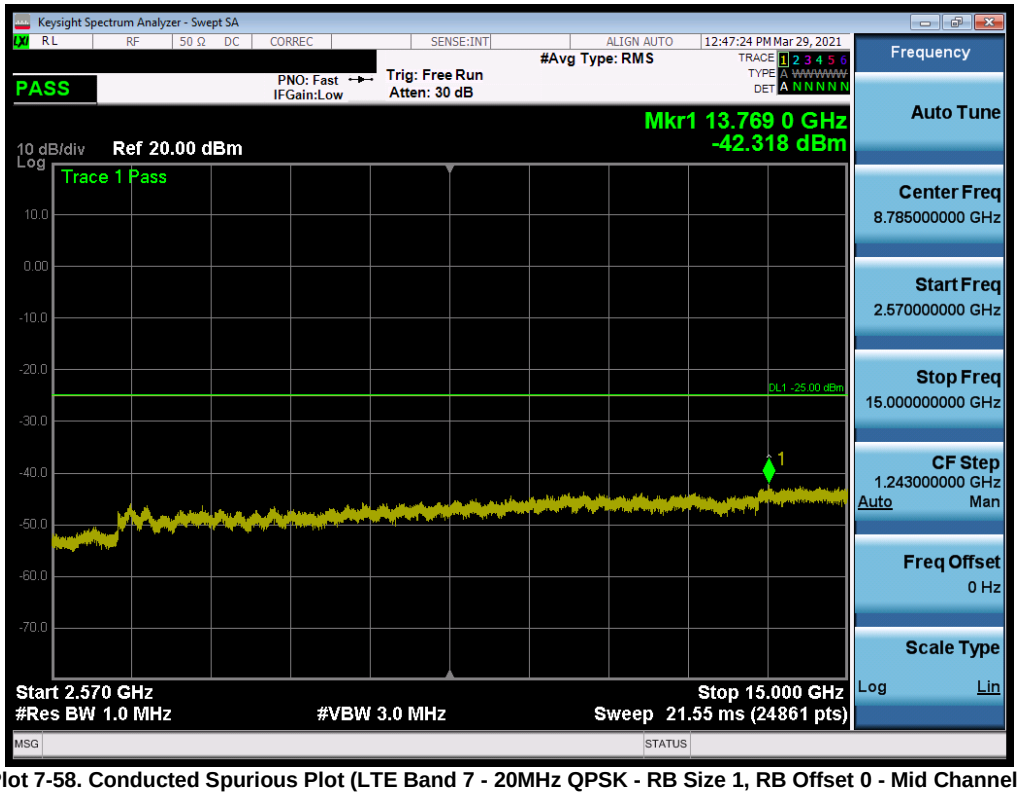


Plot 7-55. Conducted Spurious Plot (LTE Band 7 - 20MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)

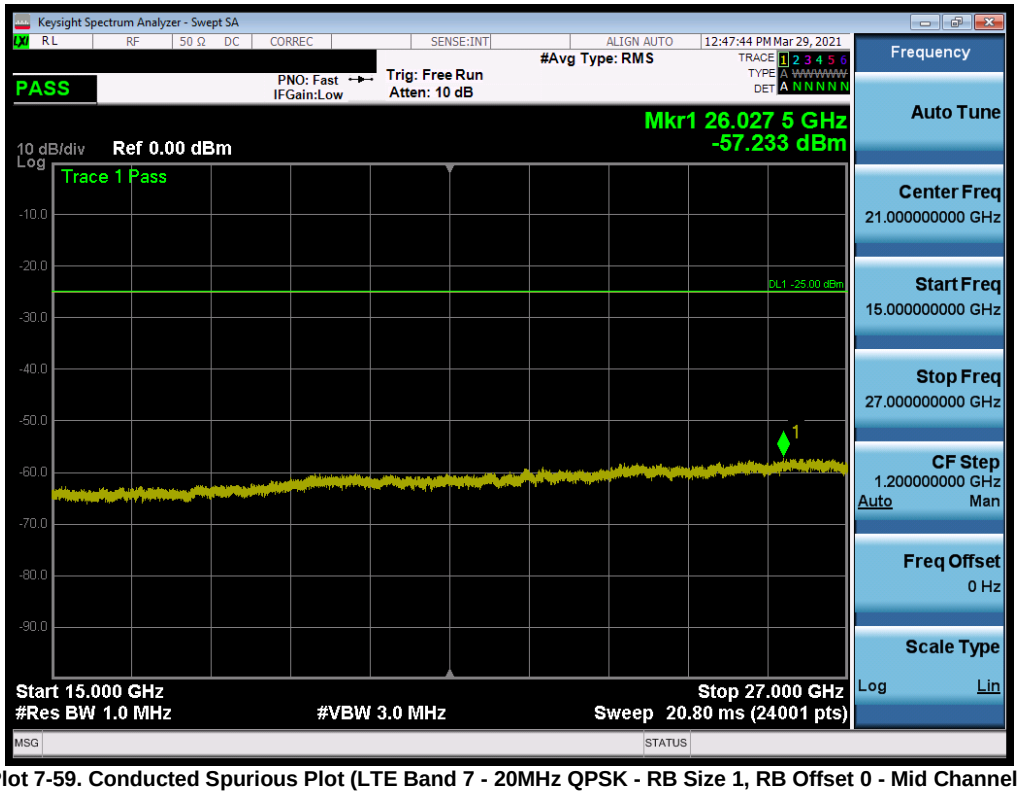


Plot 7-56. Conducted Spurious Plot (LTE Band 7 - 20MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)

Plot 7-57. Conducted Spurious Plot (LTE Band 7 - 20MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

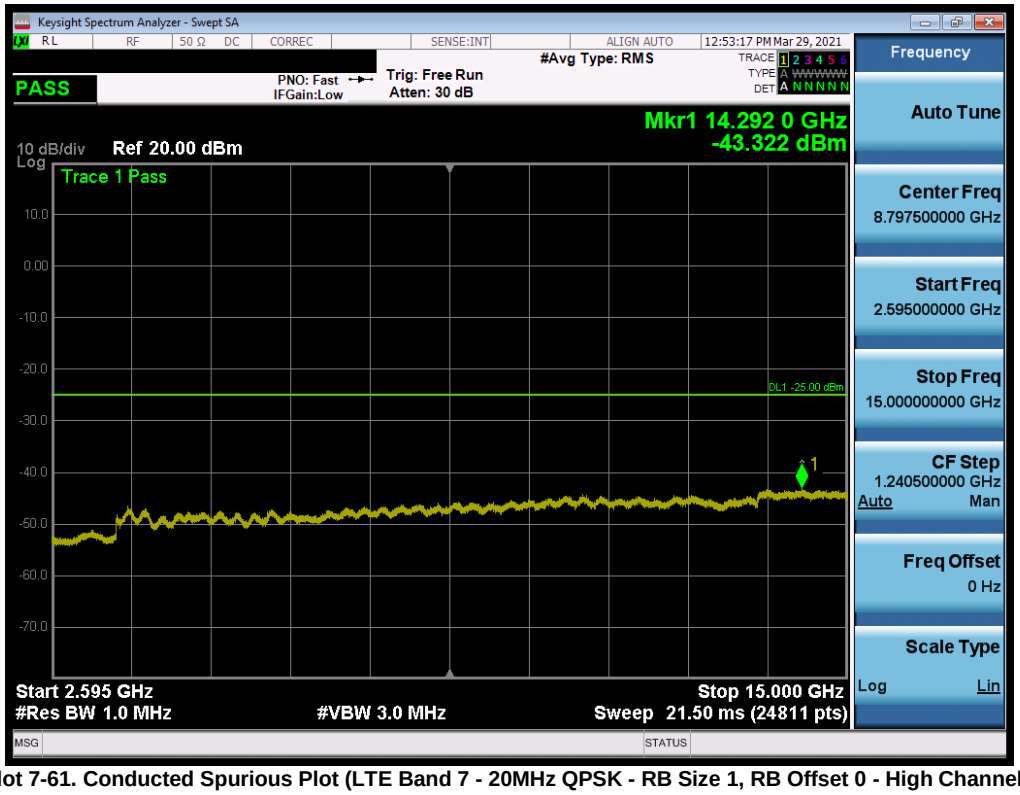


Plot 7-58. Conducted Spurious Plot (LTE Band 7 - 20MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

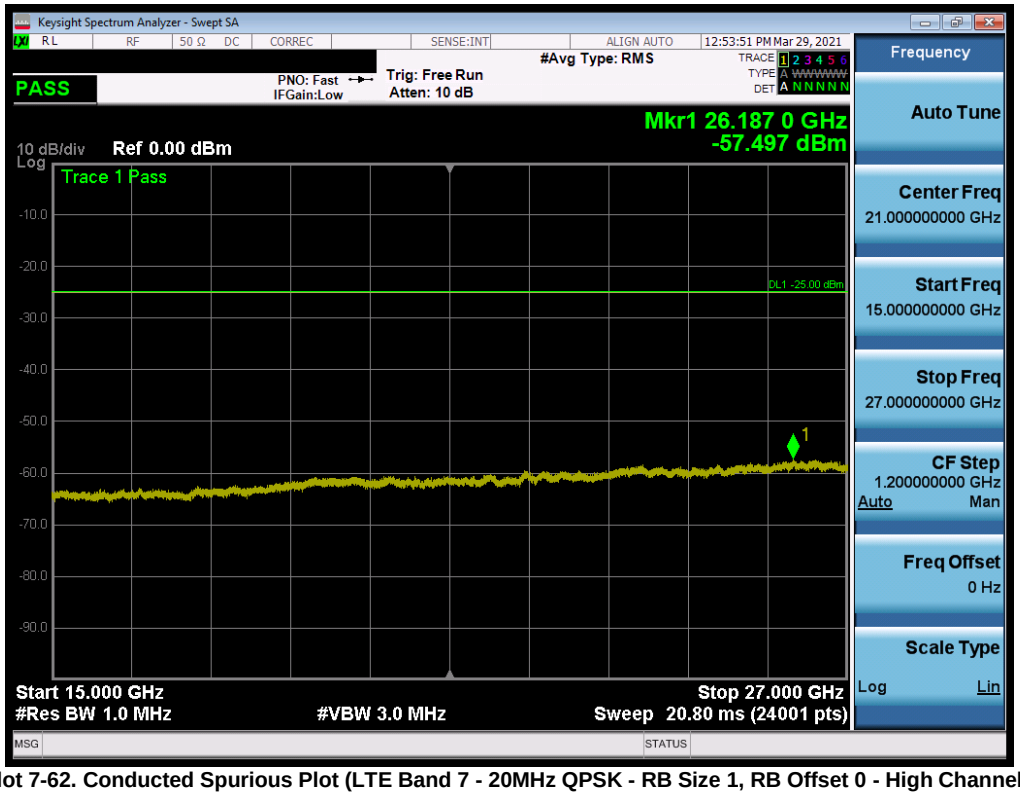


Plot 7-59. Conducted Spurious Plot (LTE Band 7 - 20MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

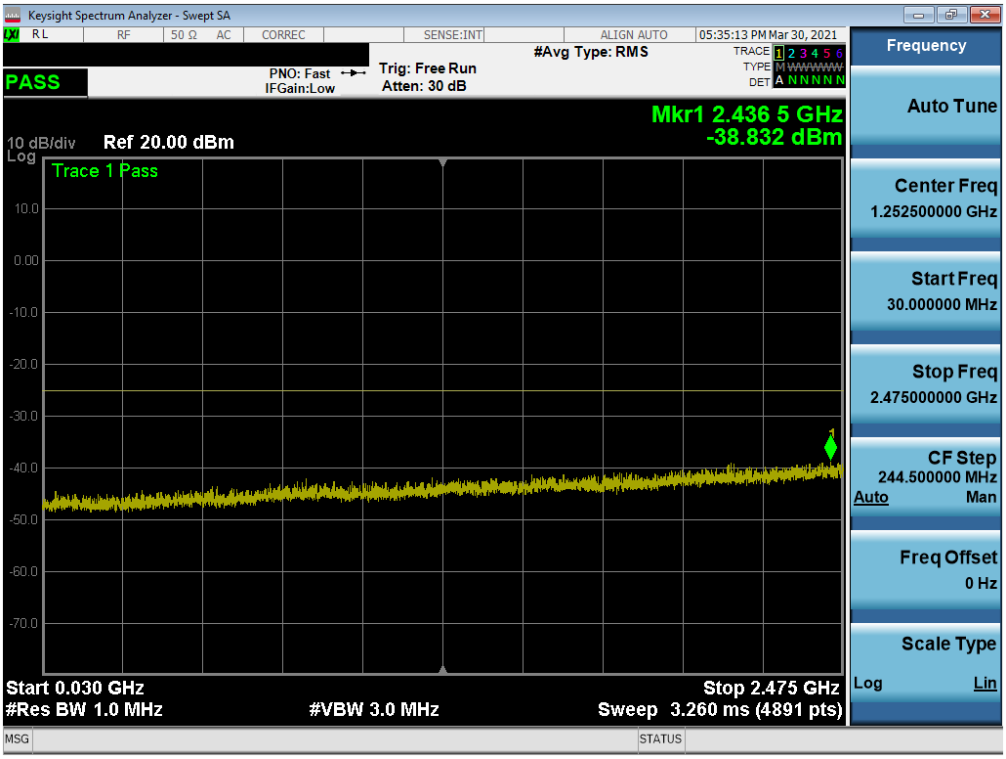
Plot 7-60. Conducted Spurious Plot (LTE Band 7 - 20MHz QPSK - RB Size 1, RB Offset 0 - High Channel)



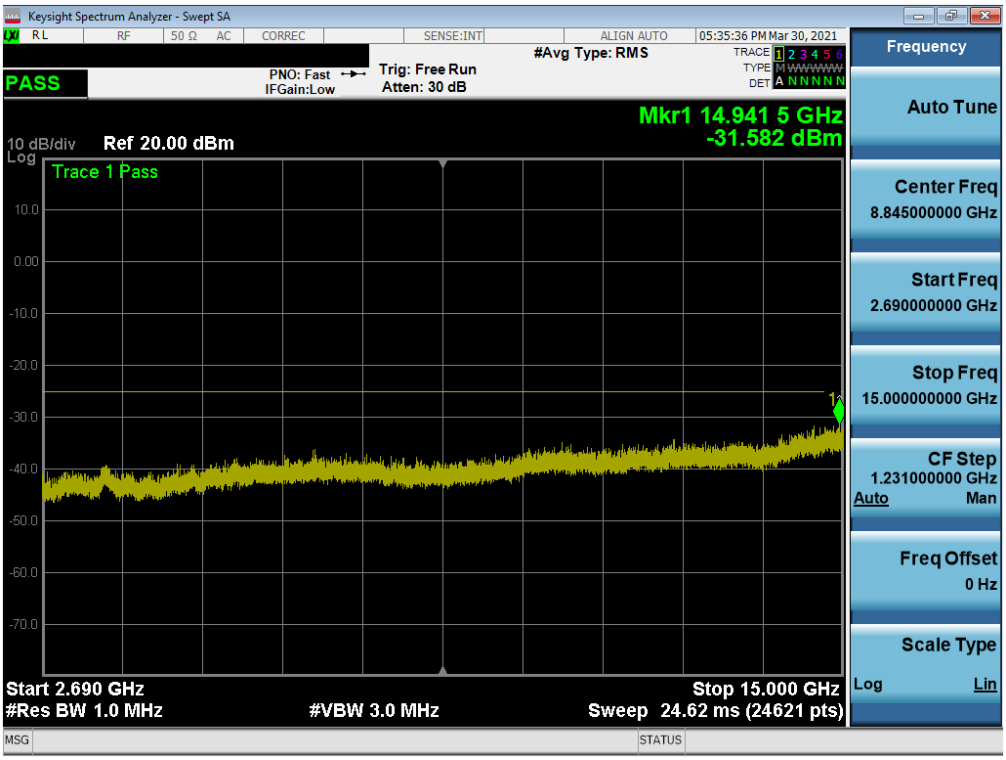
Plot 7-61. Conducted Spurious Plot (LTE Band 7 - 20MHz QPSK - RB Size 1, RB Offset 0 - High Channel)



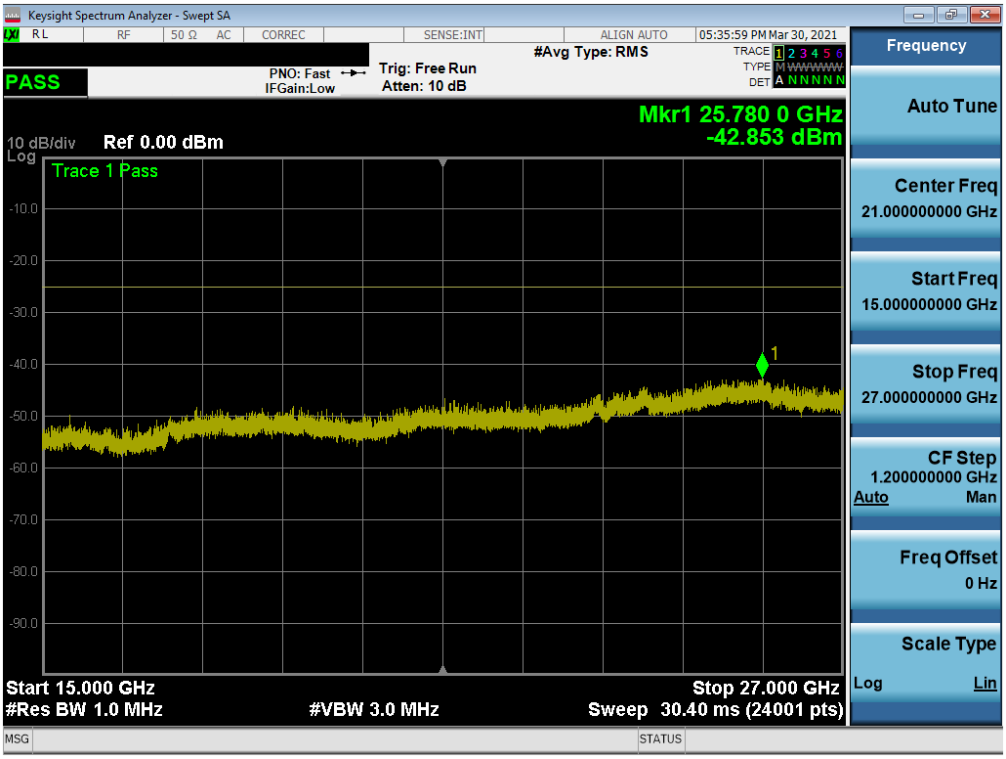
Plot 7-62. Conducted Spurious Plot (LTE Band 7 - 20MHz QPSK - RB Size 1, RB Offset 0 - High Channel)



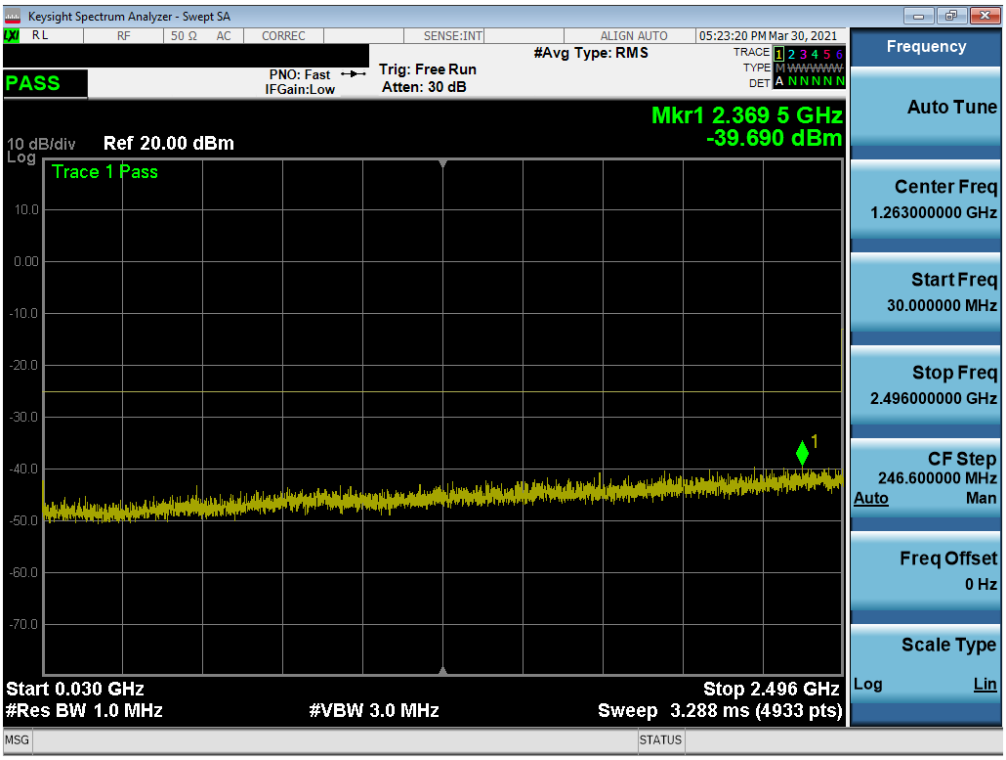
Plot 7-63. Conducted Spurious Plot (LTE Band 41(PC2) - 20MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



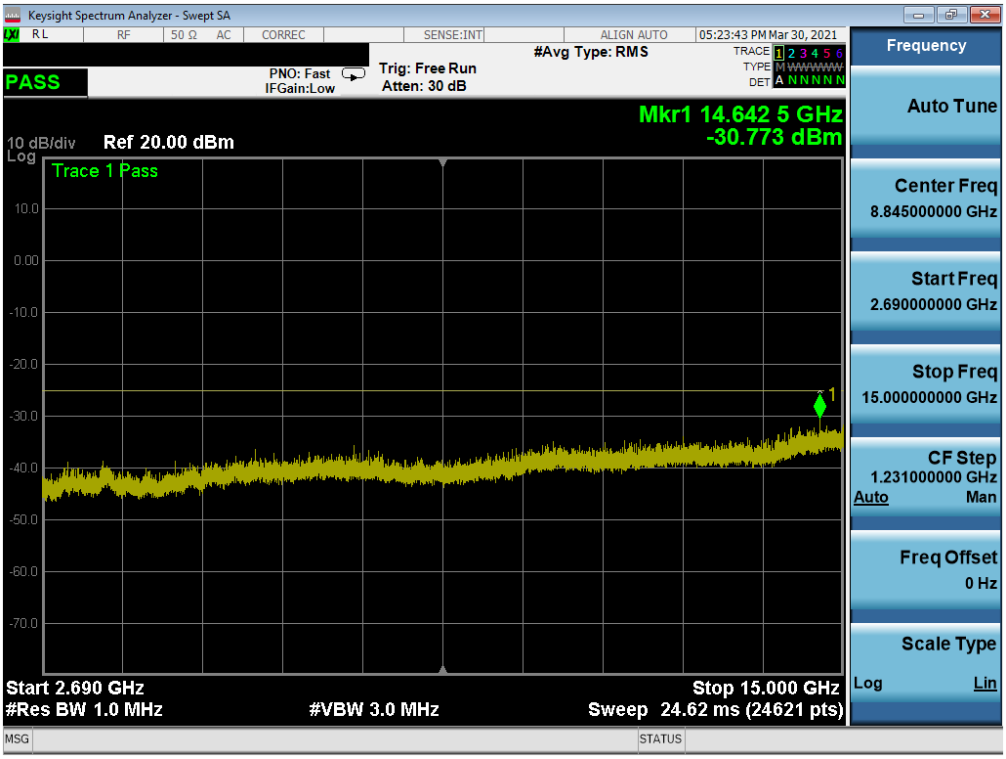
Plot 7-64. Conducted Spurious Plot (LTE Band 41(PC2) - 20MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



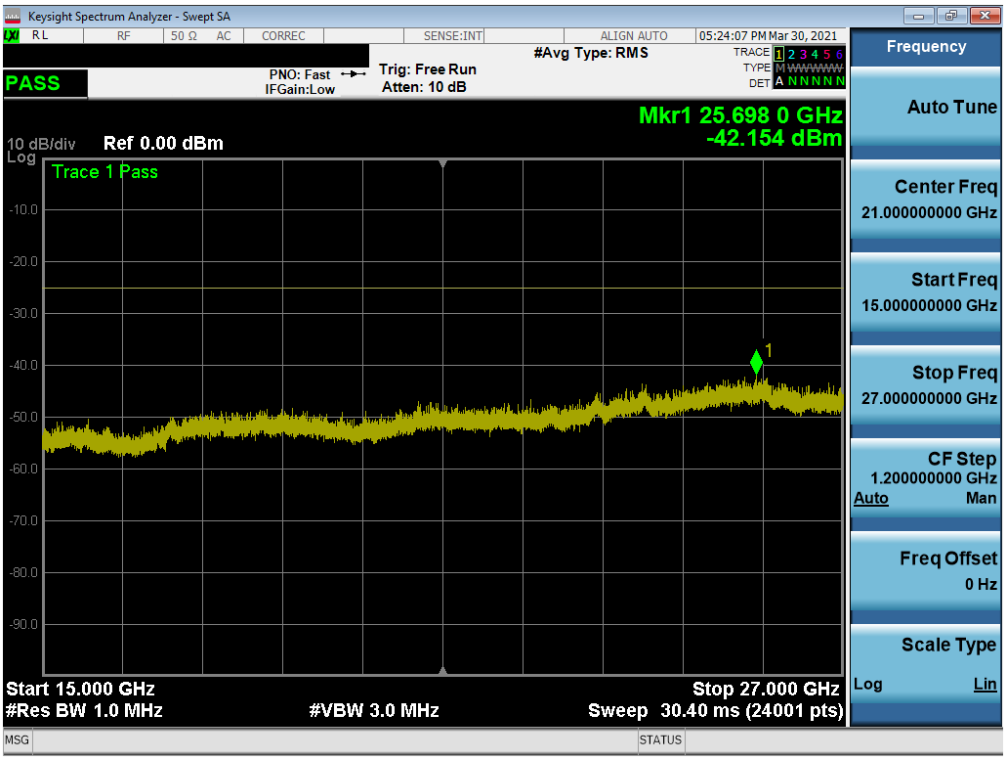
Plot 7-65. Conducted Spurious Plot (LTE Band 41(PC2) - 20MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



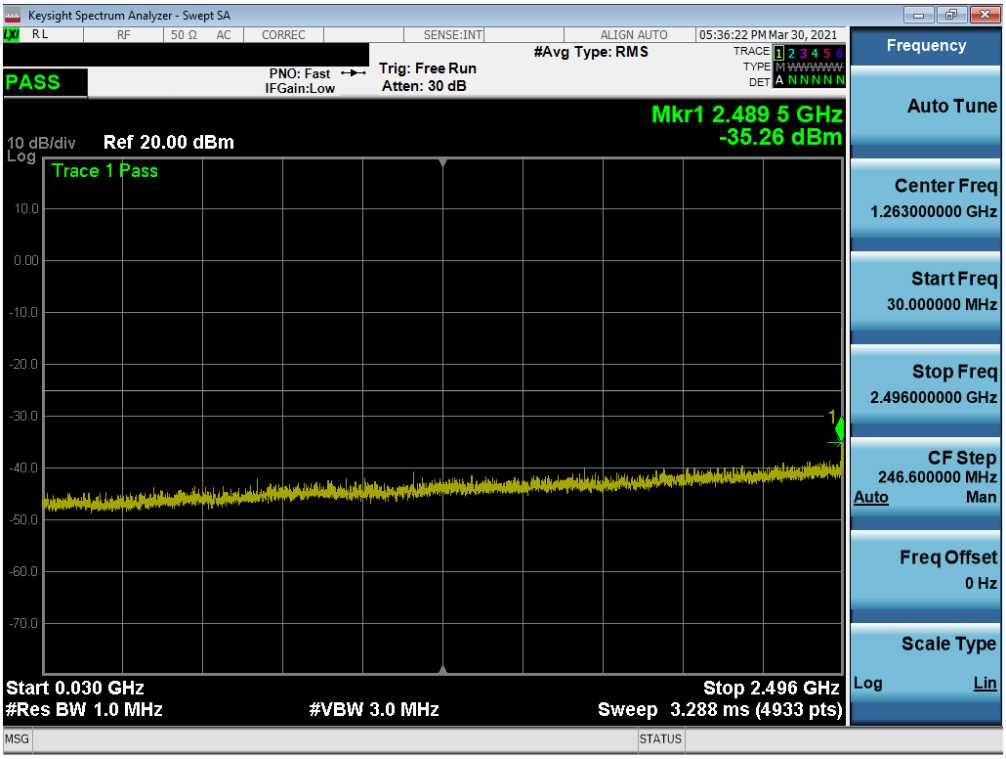
Plot 7-66. Conducted Spurious Plot (LTE Band 41(PC2) - 20MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)



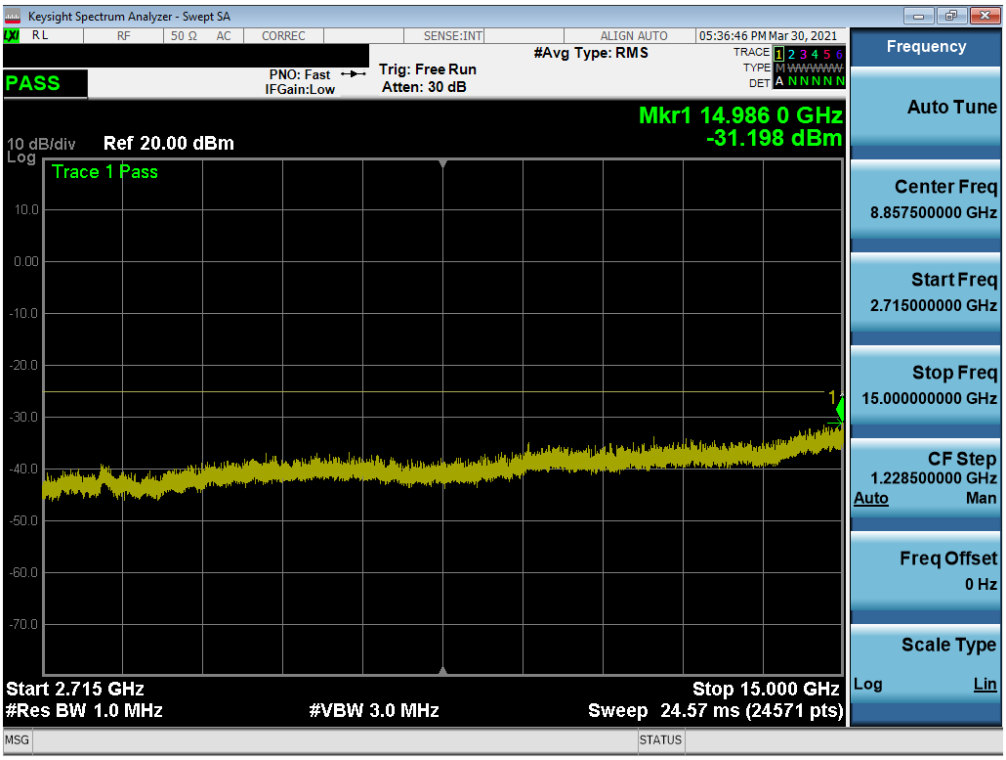
Plot 7-67. Conducted Spurious Plot (LTE Band 41(PC2) - 20MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)



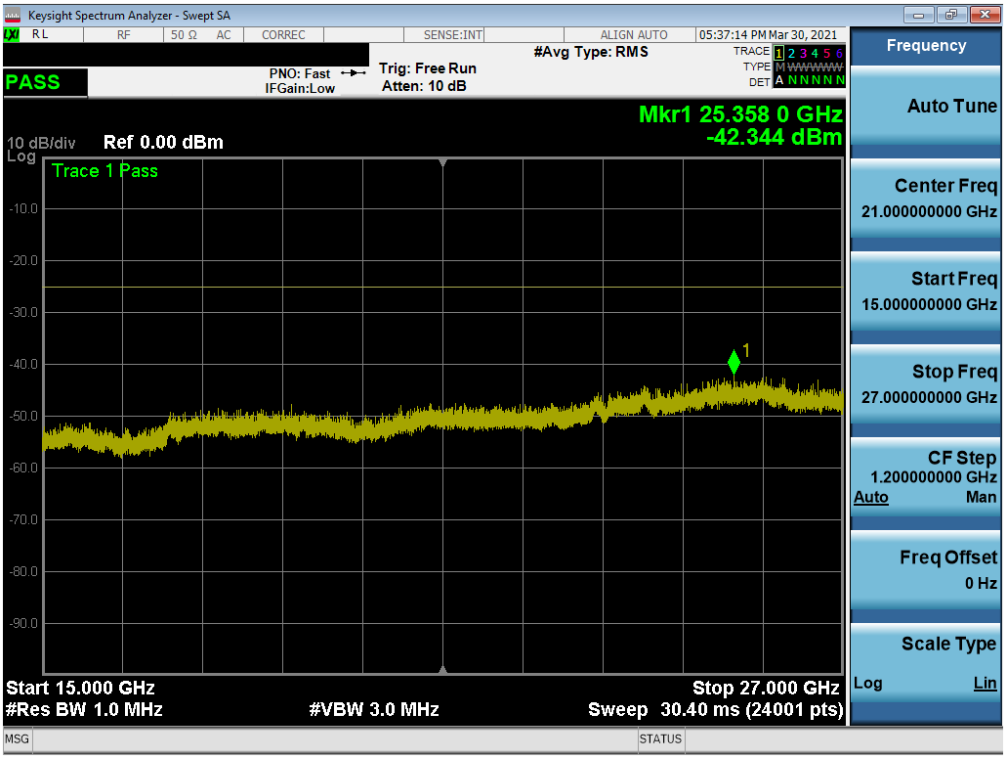
Plot 7-68. Conducted Spurious Plot (LTE Band 41(PC2) - 20MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)



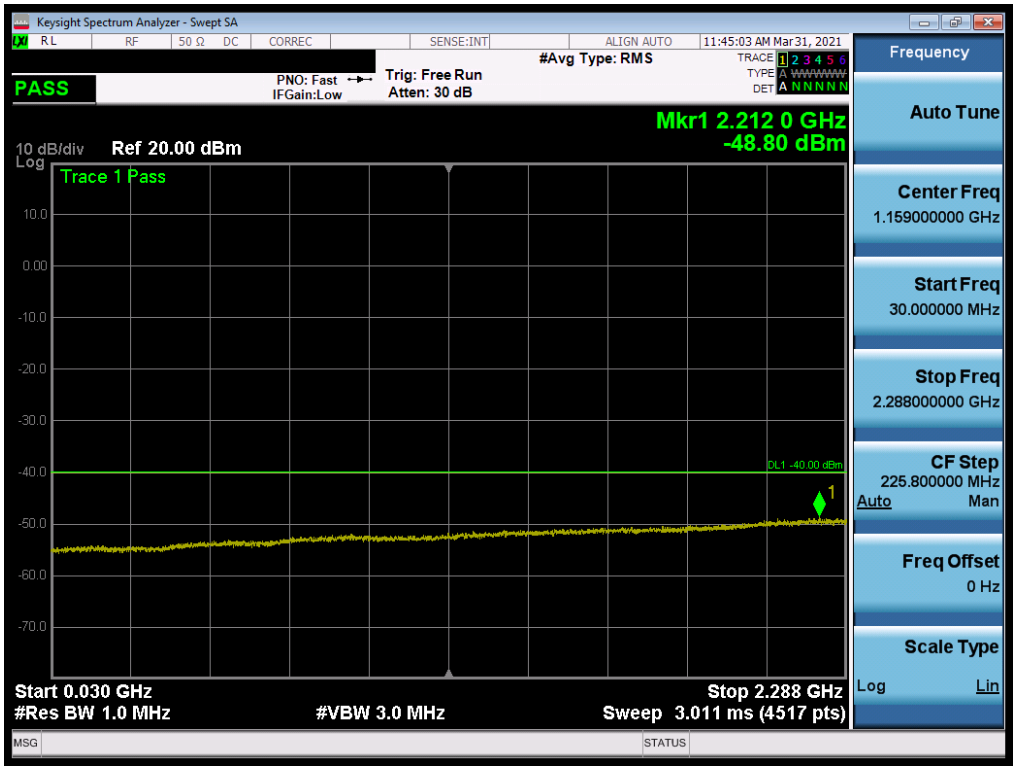
Plot 7-69. Conducted Spurious Plot (LTE Band 41(PC2) - 20MHz QPSK - RB Size 1, RB Offset 0 - High Channel)



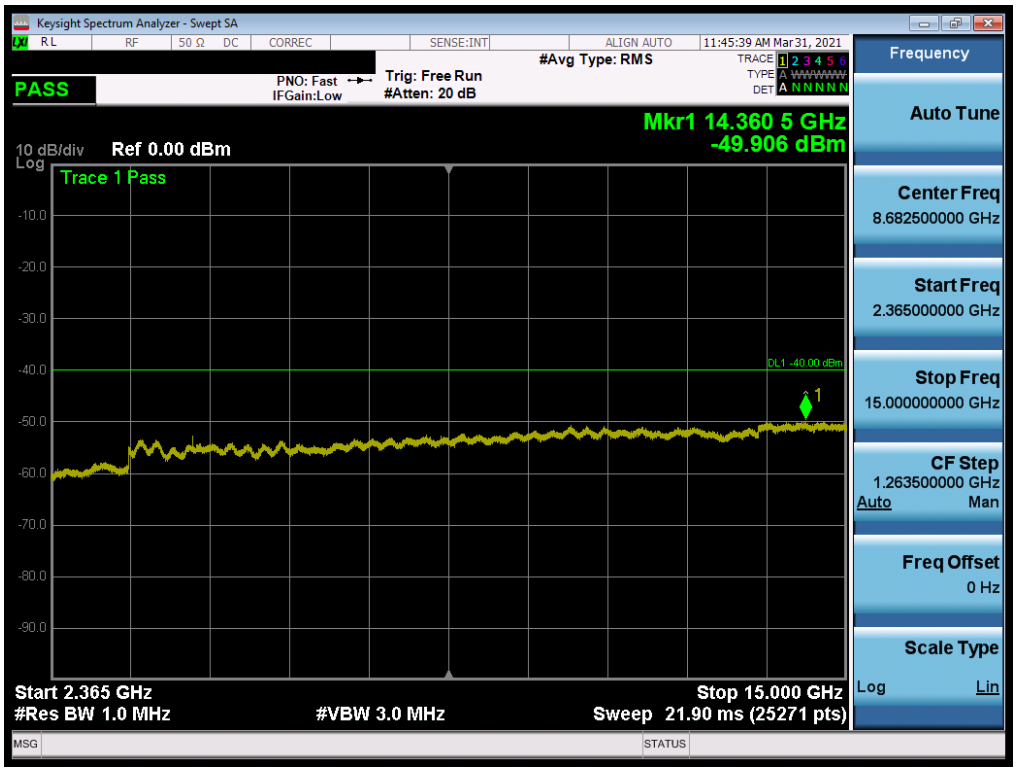
Plot 7-70. Conducted Spurious Plot (LTE Band 41(PC2) - 20MHz QPSK - RB Size 1, RB Offset 0 - High Channel)



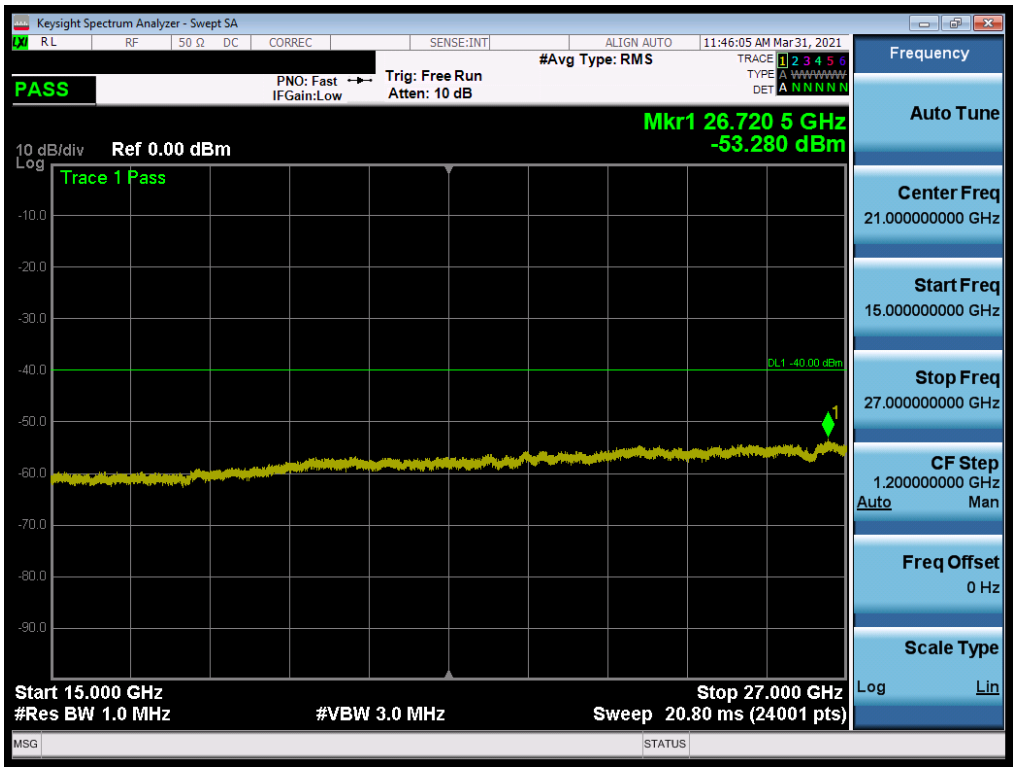
Plot 7-71. Conducted Spurious Plot (LTE Band 41(PC2) - 20MHz QPSK - RB Size 1, RB Offset 0 - High Channel)



Plot 7-72. Conducted Spurious Plot (NR Band n30 - 10MHz QPSK - RB Size 1, RB Offset 0 –)

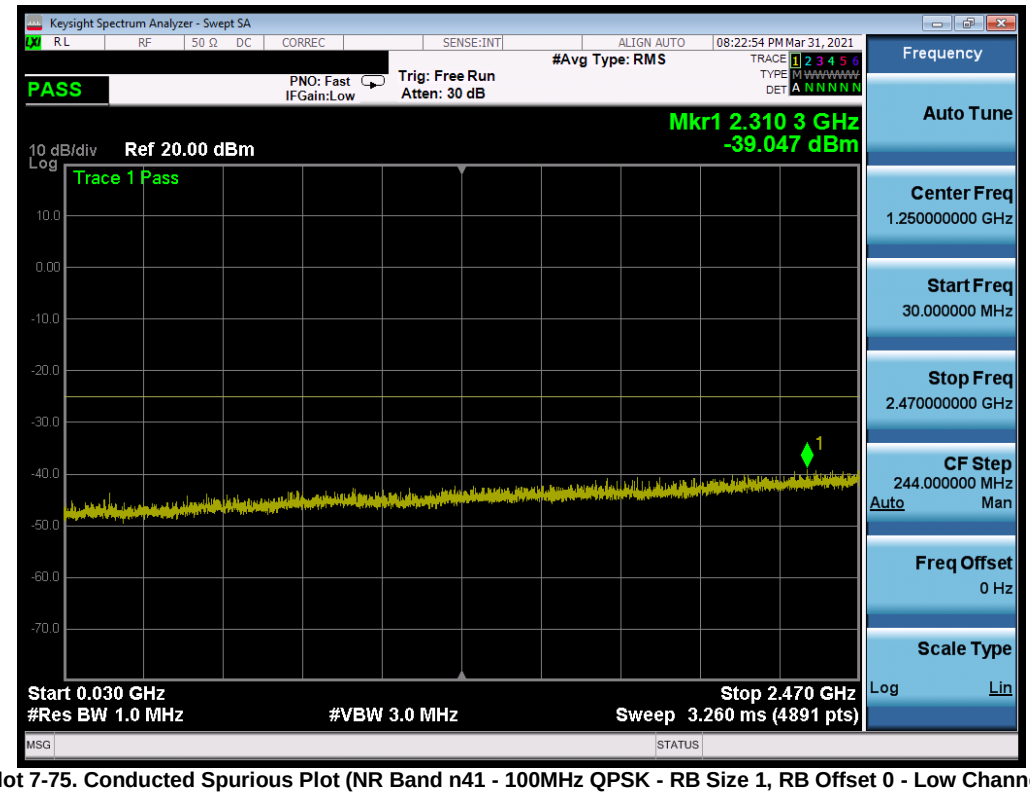


Plot 7-73. Conducted Spurious Plot (NR Band n30 - 10MHz QPSK - RB Size 1, RB Offset 0 –)

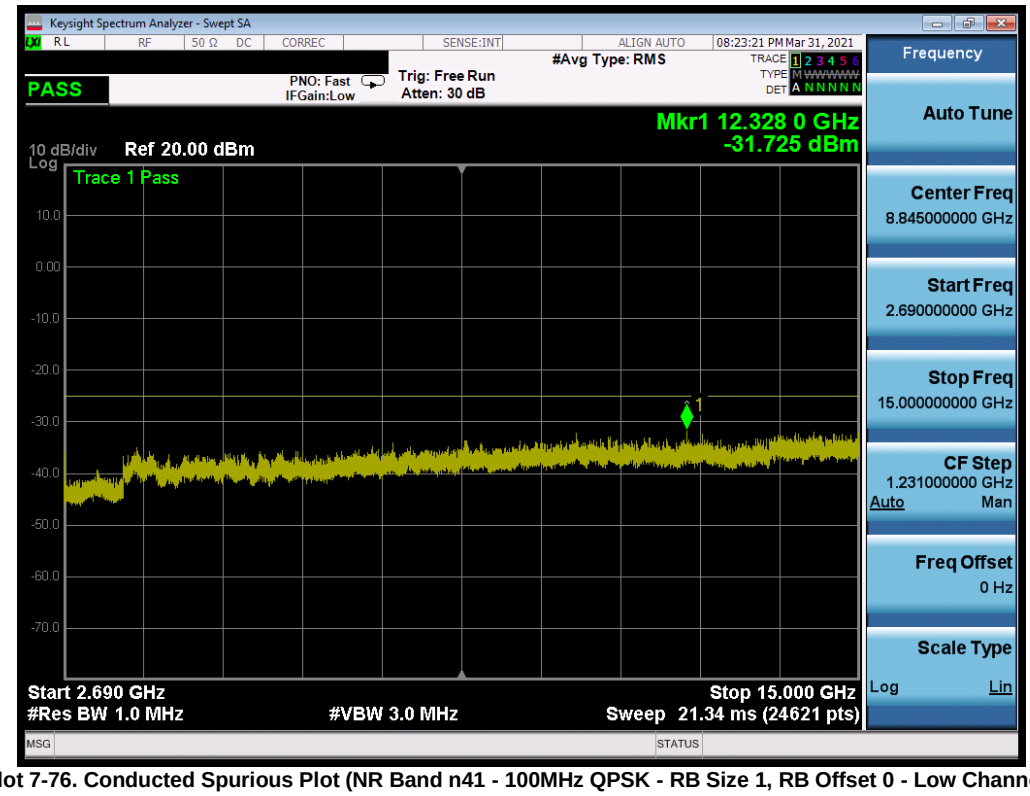


Plot 7-74. Conducted Spurious Plot (NR Band n30 - 10MHz QPSK - RB Size 1, RB Offset 0 –)

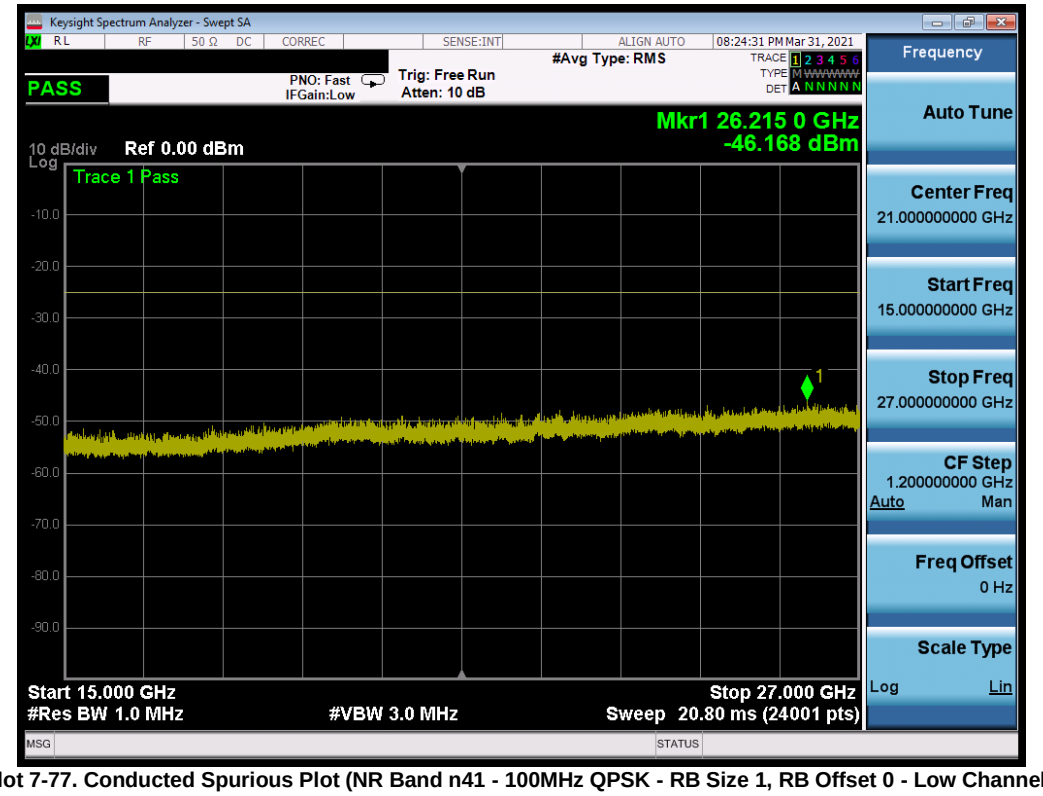
NR Band n41



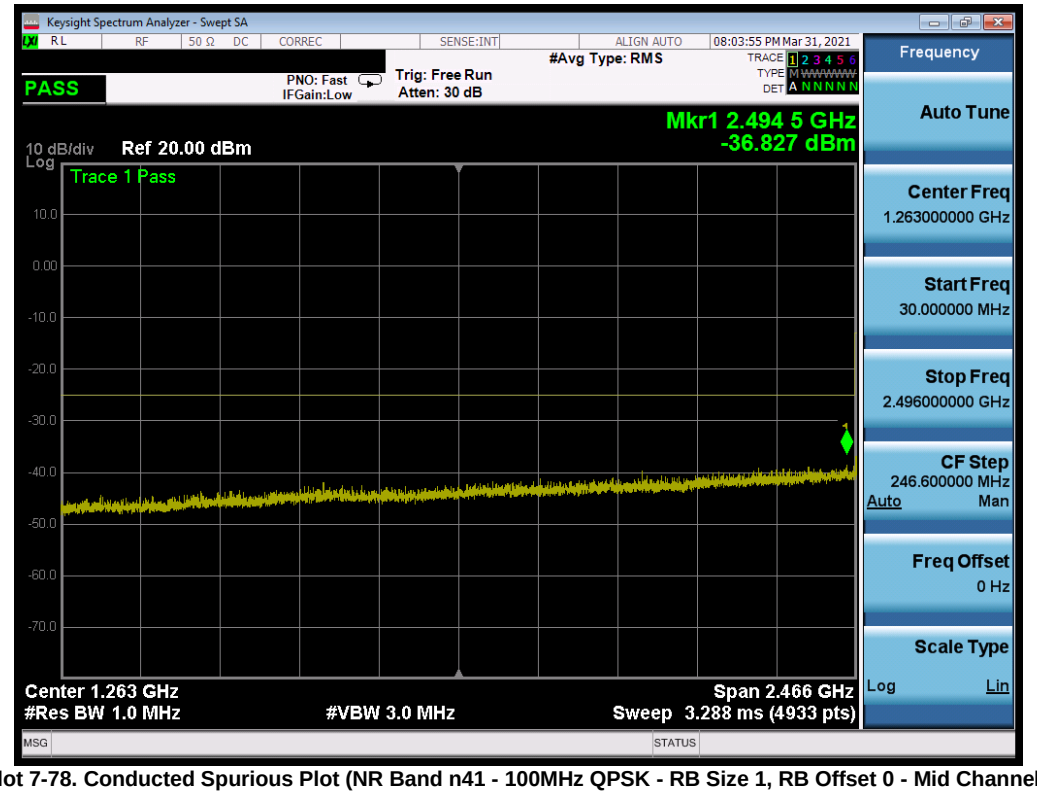
Plot 7-75. Conducted Spurious Plot (NR Band n41 - 100MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



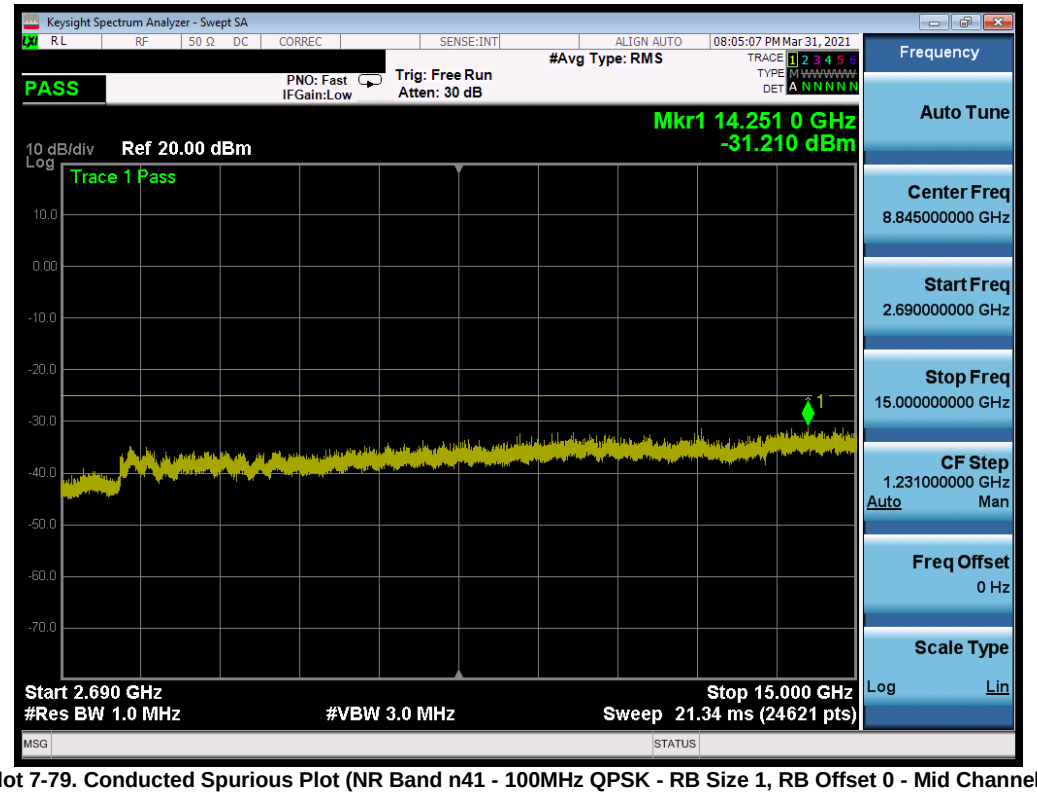
Plot 7-76. Conducted Spurious Plot (NR Band n41 - 100MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



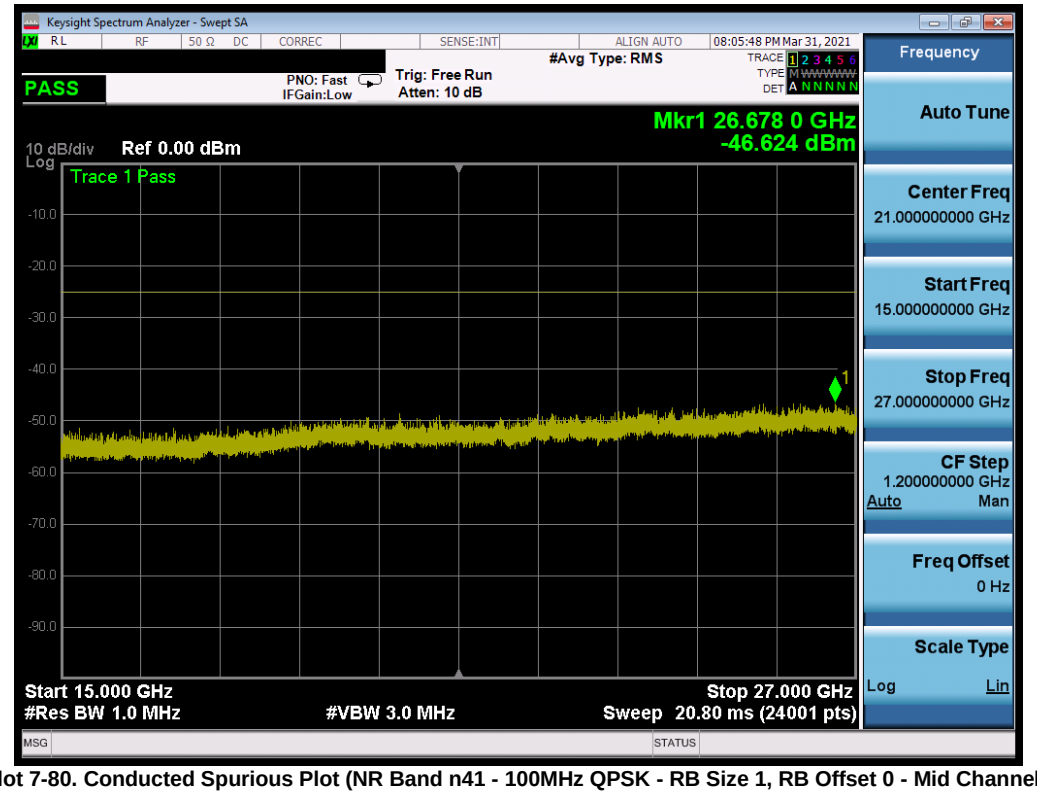
Plot 7-77. Conducted Spurious Plot (NR Band n41 - 100MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



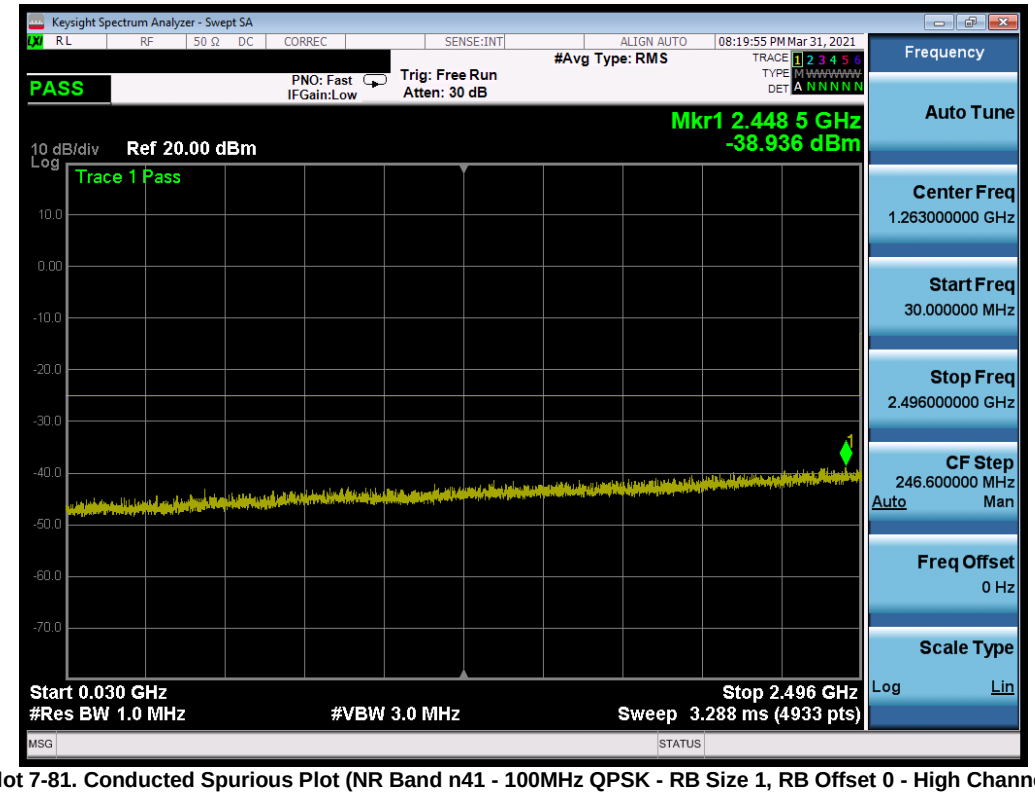
Plot 7-78. Conducted Spurious Plot (NR Band n41 - 100MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)



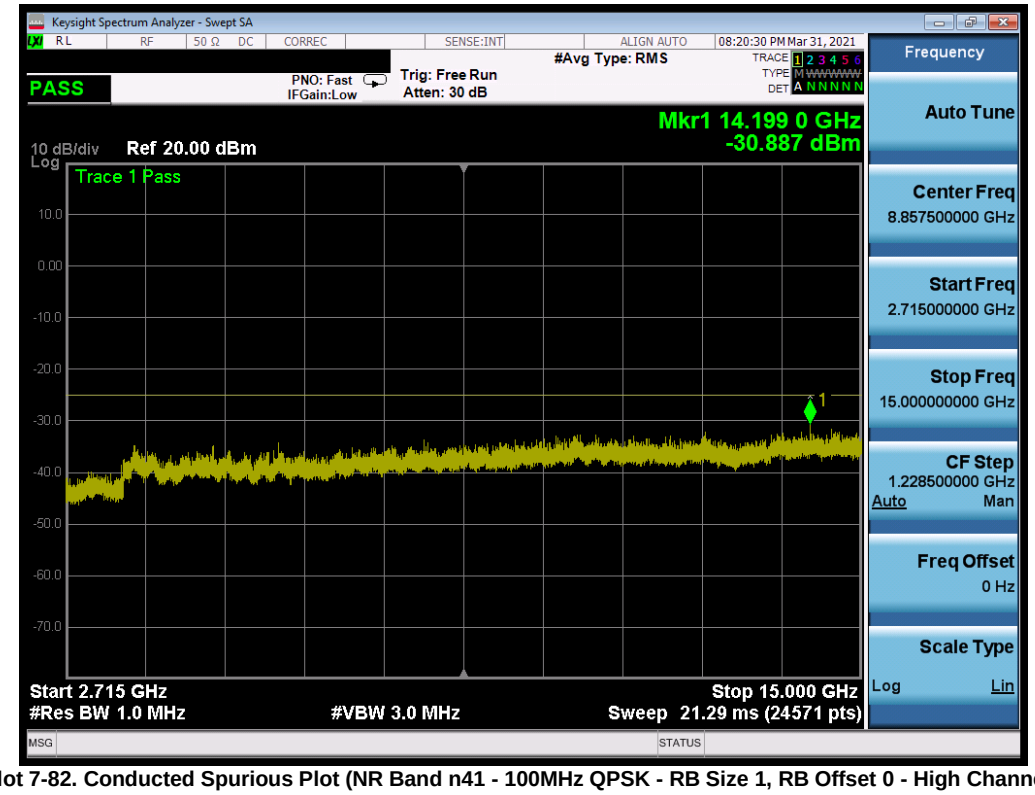
Plot 7-79. Conducted Spurious Plot (NR Band n41 - 100MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)



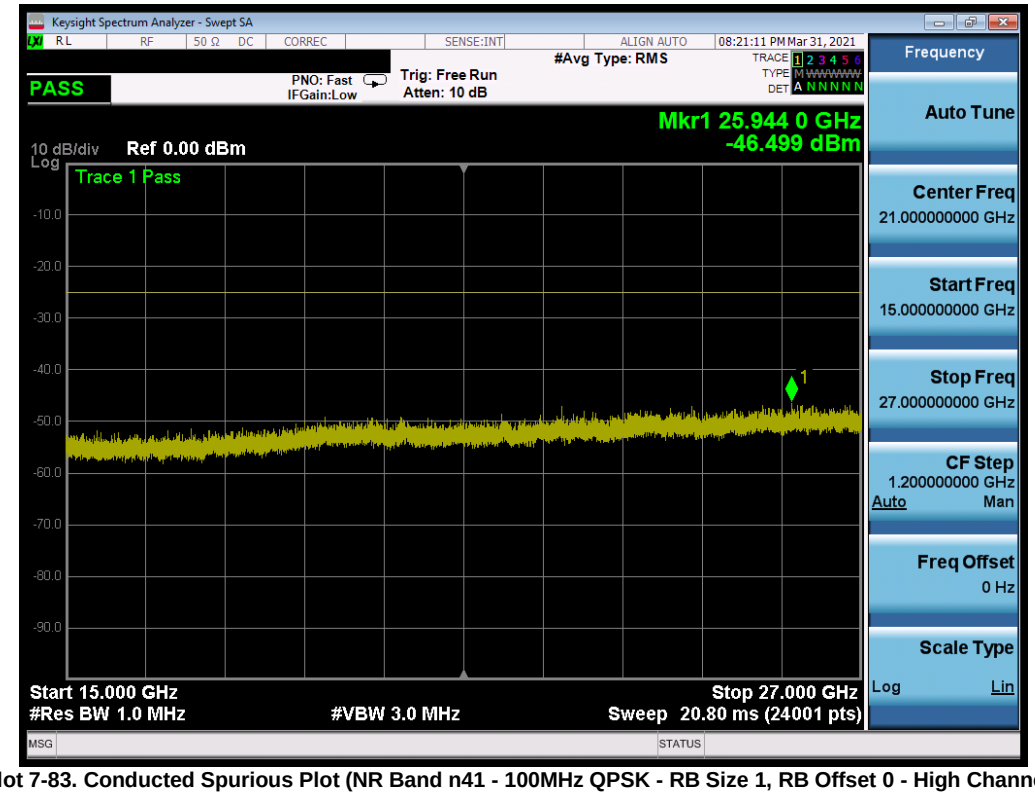
Plot 7-80. Conducted Spurious Plot (NR Band n41 - 100MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)



Plot 7-81. Conducted Spurious Plot (NR Band n41 - 100MHz QPSK - RB Size 1, RB Offset 0 - High Channel)



Plot 7-82. Conducted Spurious Plot (NR Band n41 - 100MHz QPSK - RB Size 1, RB Offset 0 - High Channel)



Plot 7-83. Conducted Spurious Plot (NR Band n41 - 100MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

7.5 Band Edge Emissions at Antenna Terminal

Test Overview

All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

The minimum permissible attenuation level for Band 30 is > 43 + 10 log10 (P[Watts] at 2300-2305MHz & 2345-2360MHz, > 55 + 10 log10 (P[Watts]) at 2320-2324MHz & 2341-2345MHz, > 61 + 10 log10 (P[Watts]) at 2324-2328MHz & 2337-2341MHz, > 67 + 10 log10 (P[Watts]) at 2288-2292MHz & 2328-2337MHz, and > 70 + 10 log10 (P[Watts]) at frequencies < 2288MHz & >2365MHz.

The minimum permissible attenuation level for Band 7 and 41 is as noted in the Test Notes on the following page.

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 ≥ 1% of the emission bandwidth
4. VBW ≥ 3 x RBW
5. Detector = RMS
6. Number of sweep points ≥ 2 x Span/RBW
7. Trace mode = trace average for continuous emissions, max hold for pulse emissions
8. Sweep time = auto couple
9. The trace was allowed to stabilize

Test Setup

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

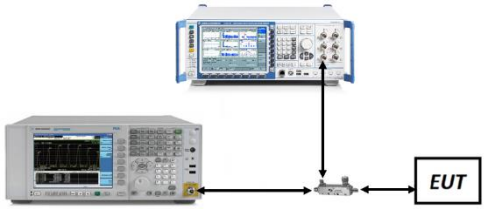


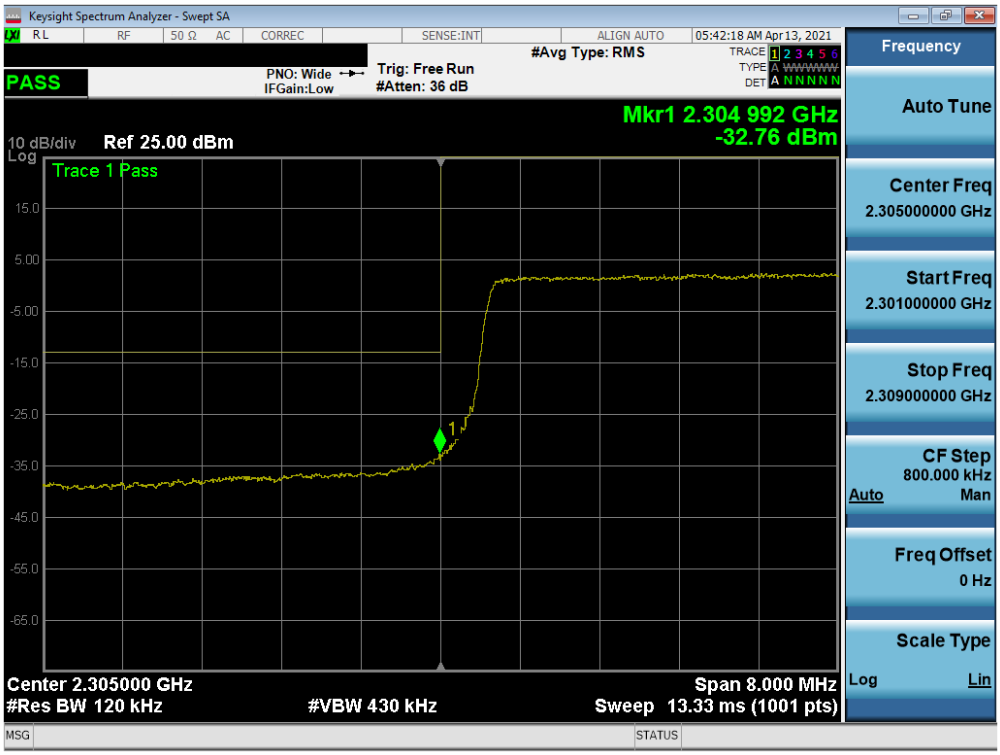
Figure 7-4. Test Instrument & Measurement Setup

Test Notes

1. Per 27.53(a)(5) in the 1 MHz bands immediately outside and adjacent to the channel blocks at 2305, 2310, 2315, 2320, 2345, 2350, 2355, and 2360 MHz, a resolution bandwidth of at least 1 percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e., 1 MHz). 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 emissions are attenuated at least 26 dB below the transmitter power.

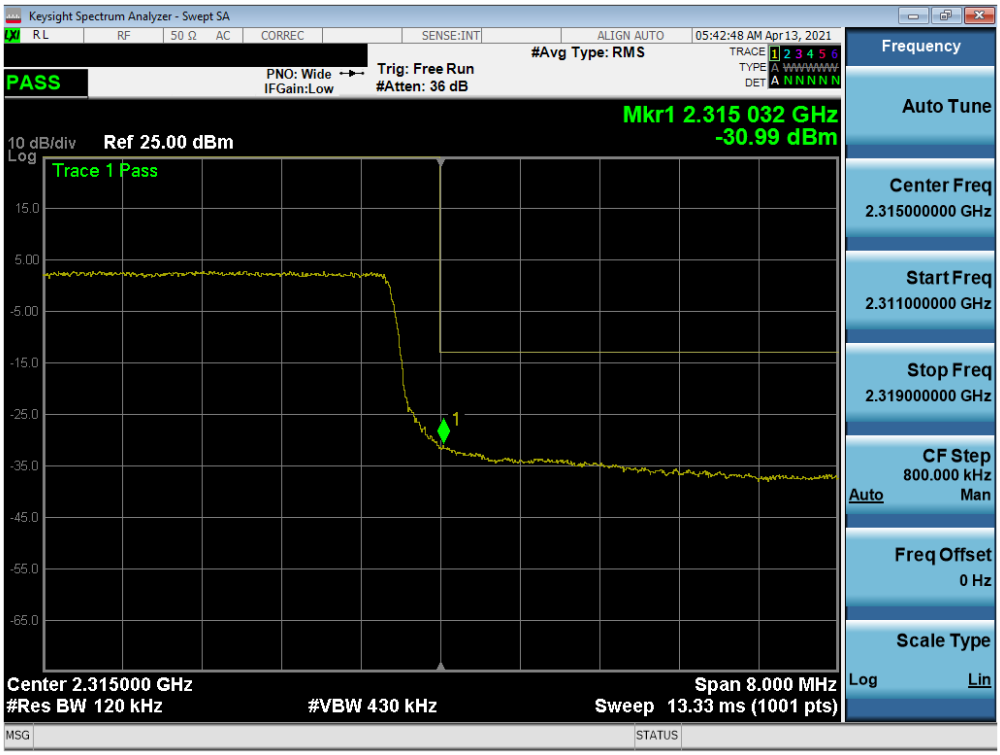
2. Per 27.53(m) for operations in the BRS/EBS bands, the attenuation factor shall be not less than 40 + 10 log (P) dB on all frequencies between the channel edge and 5 megahertz from the channel edge, 43 + 10 log (P) dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and 55 + 10 log (P) dB oCWn all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth. In addition, the attenuation factor shall not be less that 43 + 10 log (P) dB on all frequencies between 2490.5 MHz and 2496 MHz and 55 + 10 log (P) dB at or below 2490.5 MHz.

3. 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.



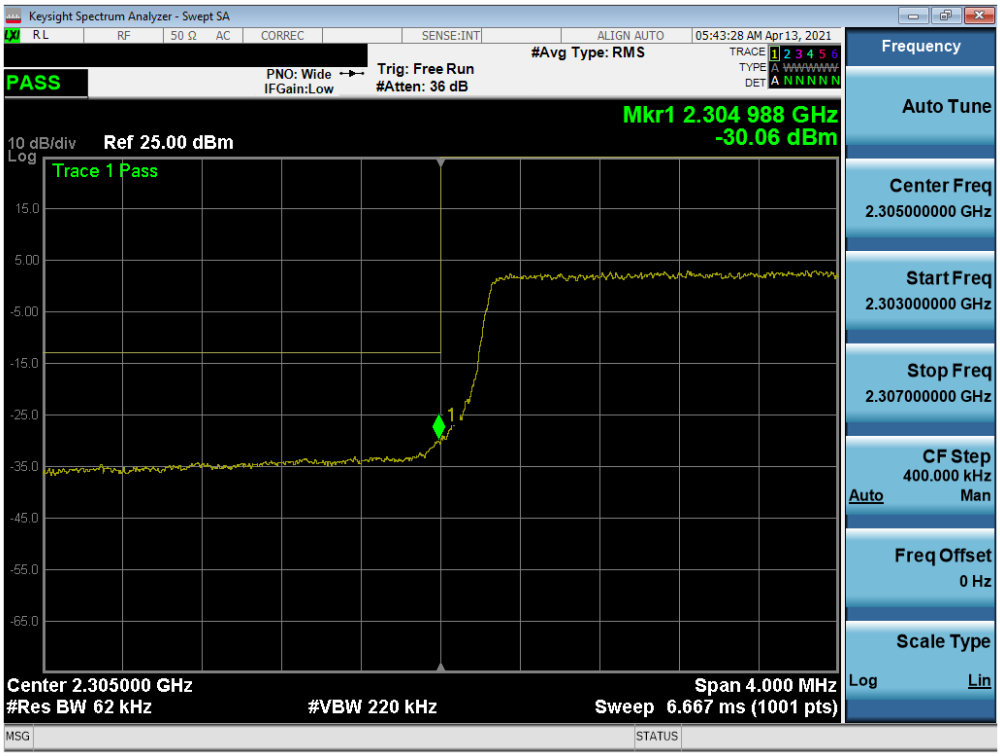
Plot 7-84. Lower Band Edge Plot (LTE Band 30 - 10MHz QPSK – Full RB)

Plot 7-85. Extended Lower Band Edge Plot (LTE Band 30 - 10MHz QPSK – Full RB)



Plot 7-86. Upper Band Edge Plot (LTE Band 30 - 10MHz QPSK – Full RB)

Plot 7-87. Extended Upper Band Edge Plot (LTE Band 30 - 10MHz QPSK – Full RB)

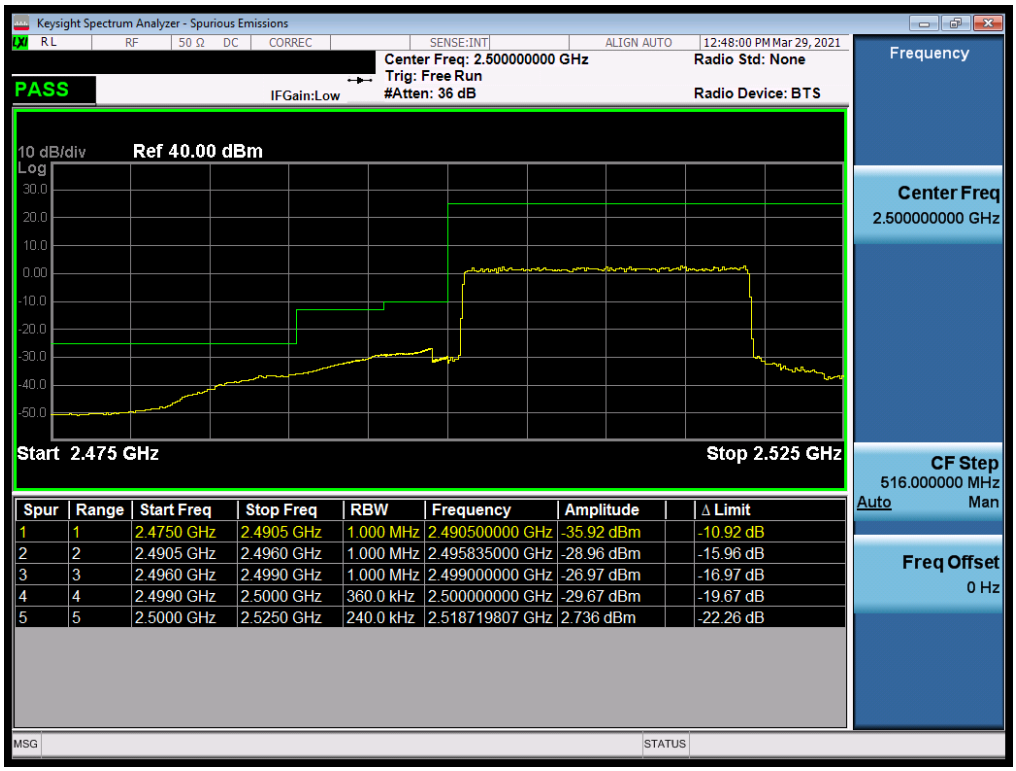


Plot 7-88. Lower Band Edge Plot (LTE Band 30 - 5MHz QPSK – Full RB)

Plot 7-89. Extended Lower Band Edge Plot (LTE Band 30 - 5MHz QPSK – Full RB)

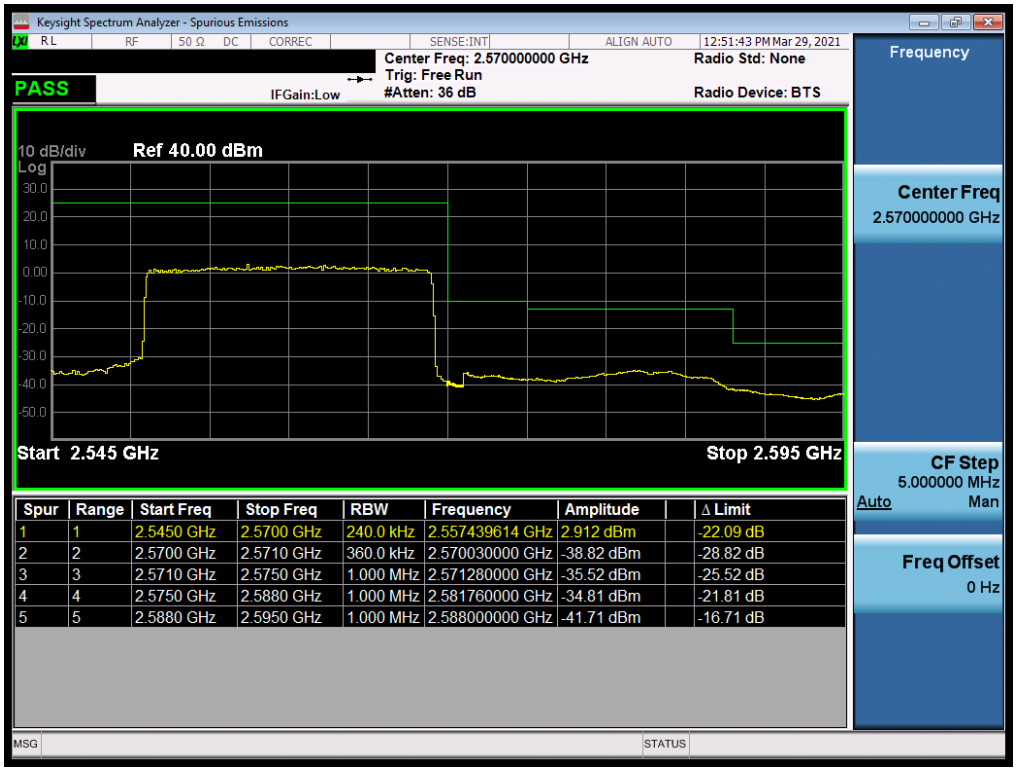
Plot 7-90. Upper Band Edge Plot (LTE Band 30 - 5MHz QPSK – Full RB)

Plot 7-91. Extended Upper Band Edge Plot (LTE Band 30 - 5MHz QPSK – Full RB)



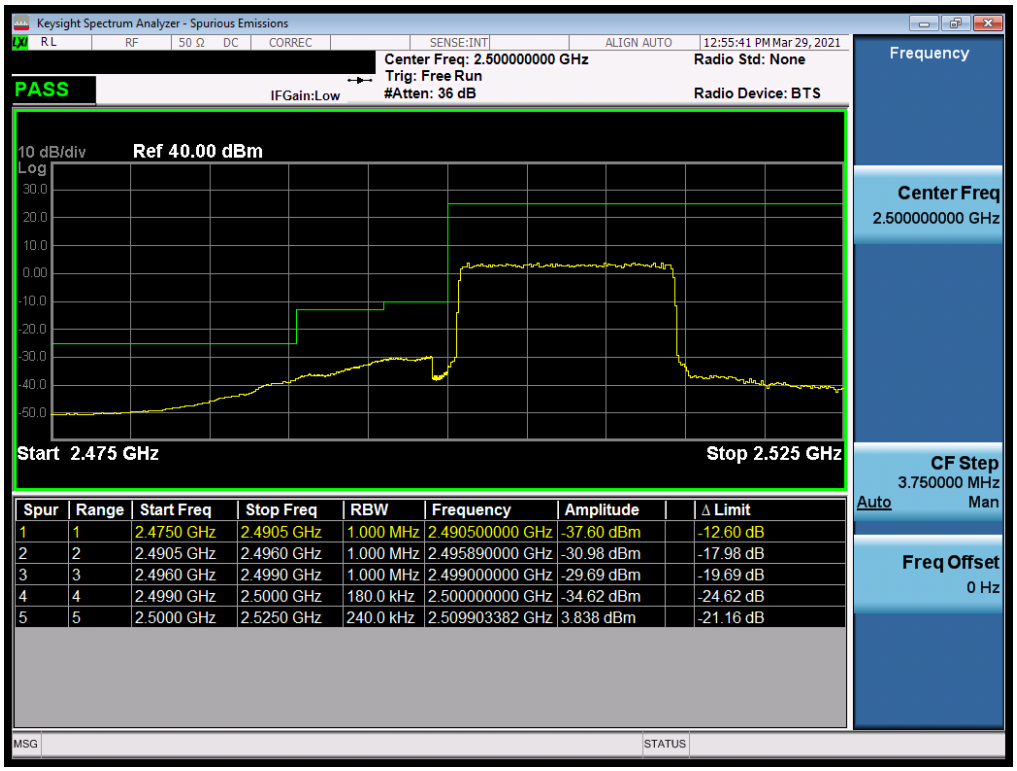
Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.4750 GHz	2.4905 GHz	1.000 MHz	2.490500000 GHz	-35.92 dBm	-10.92 dB
2	2	2.4905 GHz	2.4960 GHz	1.000 MHz	2.495835000 GHz	-28.96 dBm	-15.96 dB
3	3	2.4960 GHz	2.4990 GHz	1.000 MHz	2.499000000 GHz	-26.97 dBm	-16.97 dB
4	4	2.4990 GHz	2.5000 GHz	360.0 kHz	2.500000000 GHz	-29.67 dBm	-19.67 dB
5	5	2.5000 GHz	2.5250 GHz	240.0 kHz	2.518719807 GHz	2.736 dBm	-22.26 dB

Plot 7-92. Lower ACP Plot (LTE Band 7 - 20MHz QPSK – Full RB)



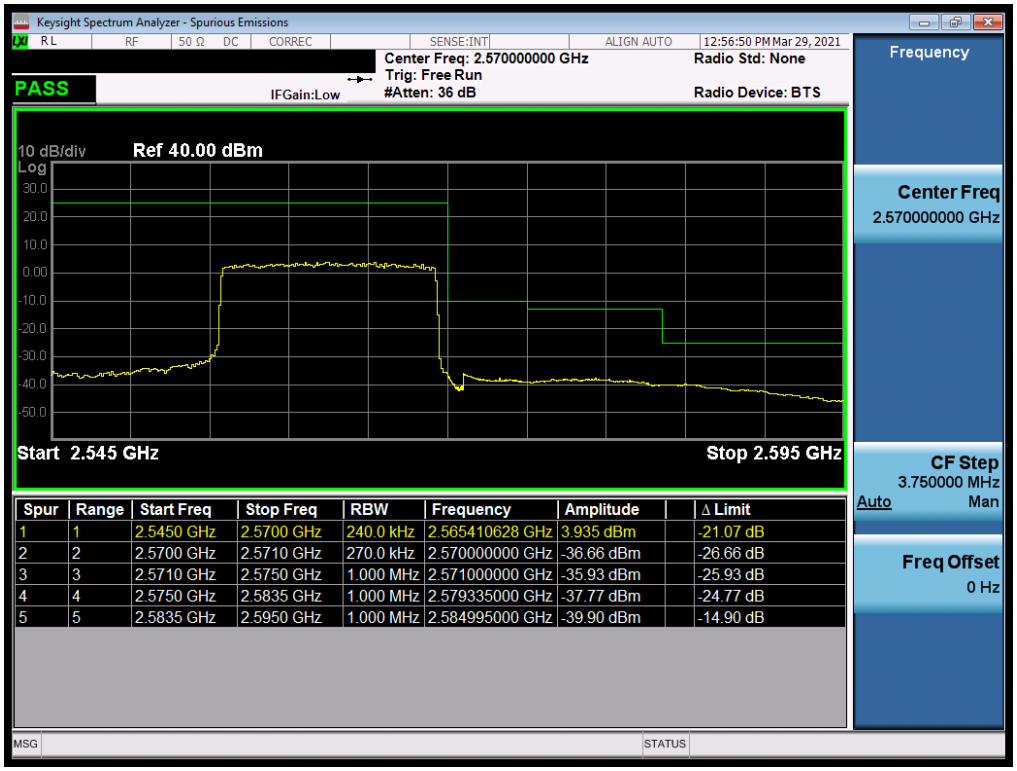
Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.5450 GHz	2.5700 GHz	240.0 kHz	2.557439614 GHz	2.912 dBm	-22.09 dB
2	2	2.5700 GHz	2.5710 GHz	360.0 kHz	2.570030000 GHz	-38.82 dBm	-28.82 dB
3	3	2.5710 GHz	2.5750 GHz	1.000 MHz	2.571280000 GHz	-35.52 dBm	-25.52 dB
4	4	2.5750 GHz	2.5880 GHz	1.000 MHz	2.581760000 GHz	-34.81 dBm	-21.81 dB
5	5	2.5880 GHz	2.5950 GHz	1.000 MHz	2.588000000 GHz	-41.71 dBm	-16.71 dB

Plot 7-93. Upper ACP Plot (LTE Band 7 - 20MHz QPSK – Full RB)



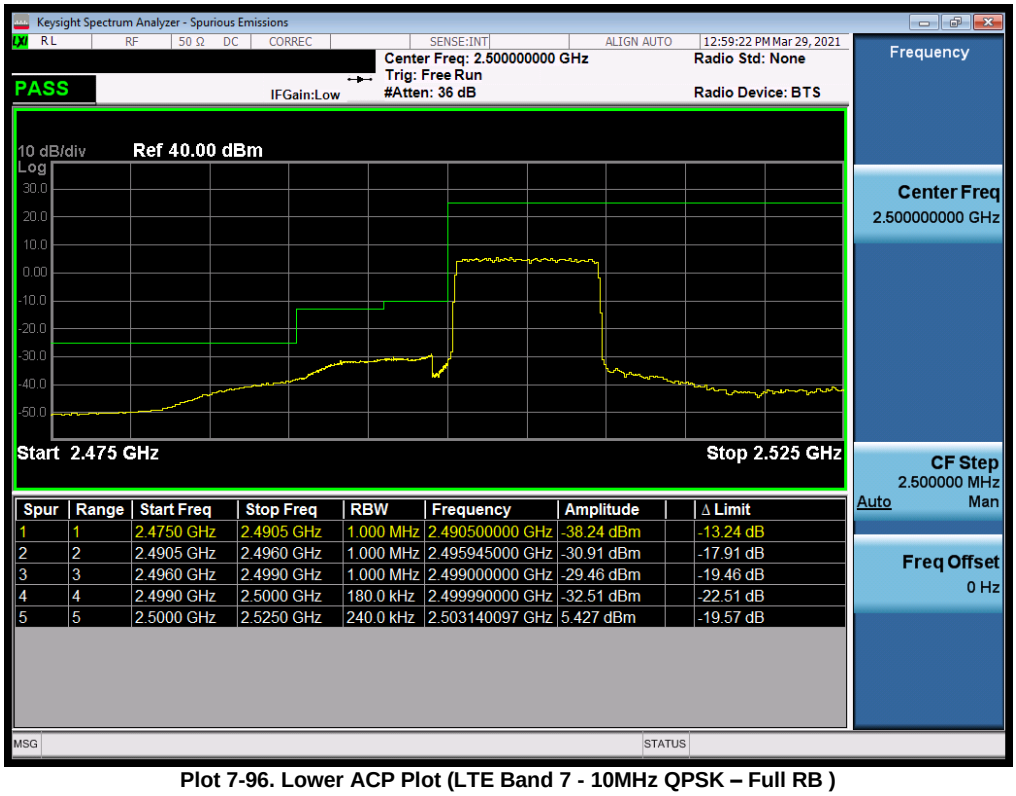
Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.4750 GHz	2.4905 GHz	1.000 MHz	2.490500000 GHz	-37.60 dBm	-12.60 dB
2	2	2.4905 GHz	2.4960 GHz	1.000 MHz	2.495890000 GHz	-30.98 dBm	-17.98 dB
3	3	2.4960 GHz	2.4990 GHz	1.000 MHz	2.499000000 GHz	-29.69 dBm	-19.69 dB
4	4	2.4990 GHz	2.5000 GHz	180.0 kHz	2.500000000 GHz	-34.62 dBm	-24.62 dB
5	5	2.5000 GHz	2.5250 GHz	240.0 kHz	2.509903382 GHz	3.838 dBm	-21.16 dB

Plot 7-94. Lower ACP Plot (LTE Band 7 - 15MHz QPSK – Full RB)



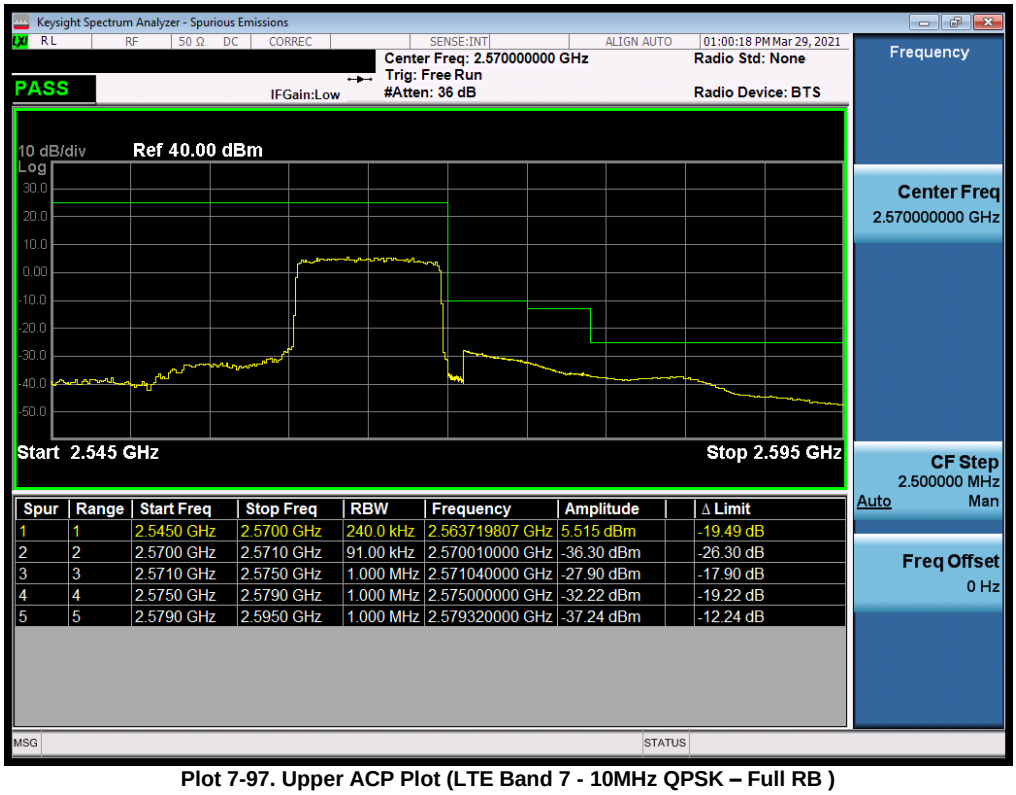
Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.5450 GHz	2.5700 GHz	240.0 kHz	2.565410628 GHz	3.935 dBm	-21.07 dB
2	2	2.5700 GHz	2.5710 GHz	270.0 kHz	2.570000000 GHz	-36.66 dBm	-26.66 dB
3	3	2.5710 GHz	2.5750 GHz	1.000 MHz	2.571000000 GHz	-35.93 dBm	-25.93 dB
4	4	2.5750 GHz	2.5835 GHz	1.000 MHz	2.579335000 GHz	-37.77 dBm	-24.77 dB
5	5	2.5835 GHz	2.5950 GHz	1.000 MHz	2.584995000 GHz	-39.90 dBm	-14.90 dB

Plot 7-95. Upper ACP Plot (LTE Band 7 - 15MHz QPSK – Full RB)



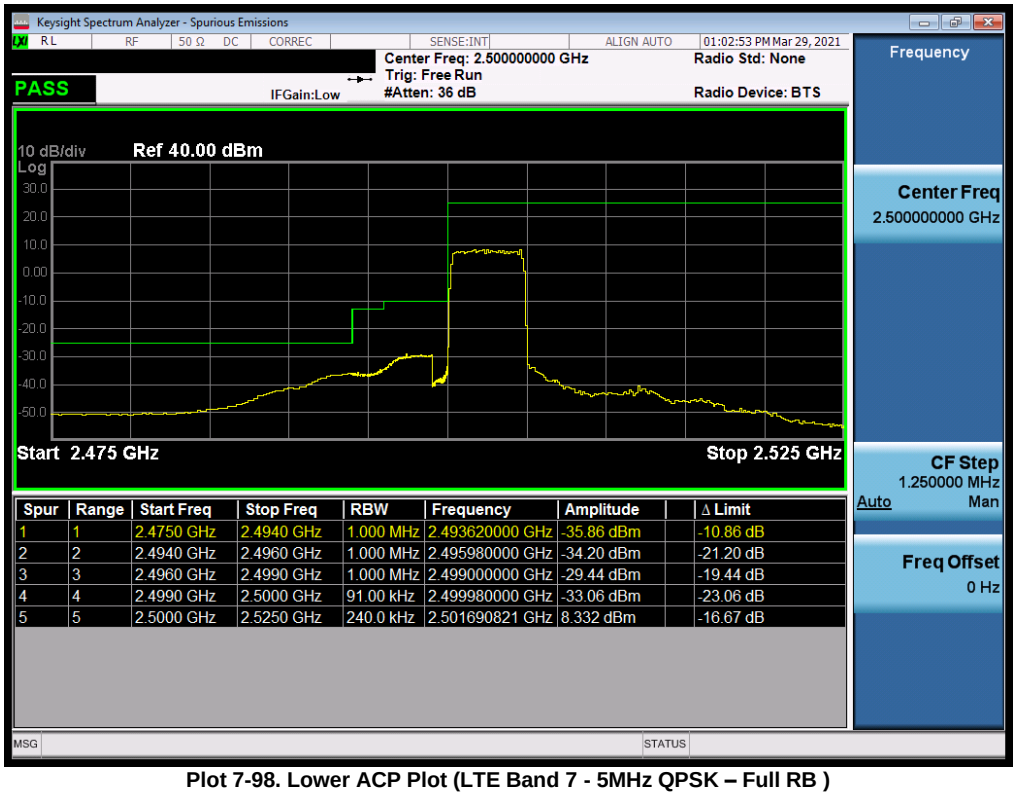
Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.4750 GHz	2.4905 GHz	1.000 MHz	2.490500000 GHz	-38.24 dBm	-13.24 dB
2	2	2.4905 GHz	2.4960 GHz	1.000 MHz	2.495945000 GHz	-30.91 dBm	-17.91 dB
3	3	2.4960 GHz	2.4990 GHz	1.000 MHz	2.499000000 GHz	-29.46 dBm	-19.46 dB
4	4	2.4990 GHz	2.5000 GHz	180.0 kHz	2.499990000 GHz	-32.51 dBm	-22.51 dB
5	5	2.5000 GHz	2.5250 GHz	240.0 kHz	2.503140097 GHz	5.427 dBm	-19.57 dB

Plot 7-96. Lower ACP Plot (LTE Band 7 - 10MHz QPSK – Full RB)

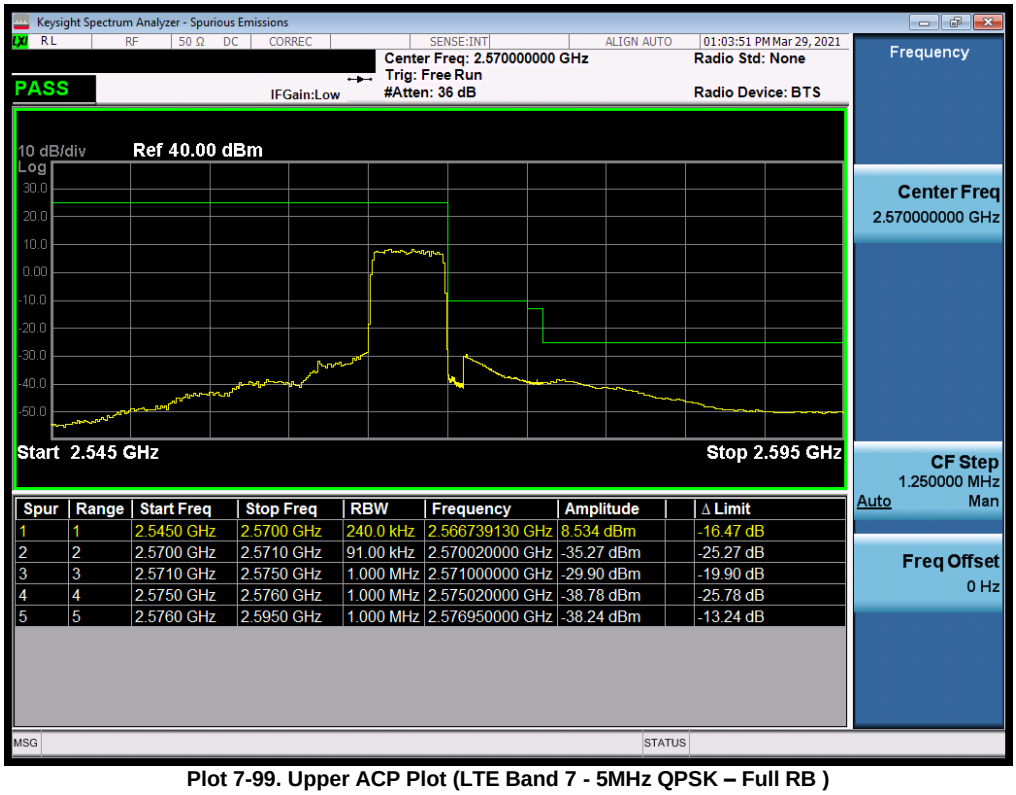


Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.5450 GHz	2.5700 GHz	240.0 kHz	2.563719807 GHz	5.515 dBm	-19.49 dB
2	2	2.5700 GHz	2.5710 GHz	91.00 kHz	2.570010000 GHz	-36.30 dBm	-26.30 dB
3	3	2.5710 GHz	2.5750 GHz	1.000 MHz	2.571040000 GHz	-27.90 dBm	-17.90 dB
4	4	2.5750 GHz	2.5790 GHz	1.000 MHz	2.575000000 GHz	-32.22 dBm	-19.22 dB
5	5	2.5790 GHz	2.5950 GHz	1.000 MHz	2.579320000 GHz	-37.24 dBm	-12.24 dB

Plot 7-97. Upper ACP Plot (LTE Band 7 - 10MHz QPSK – Full RB)

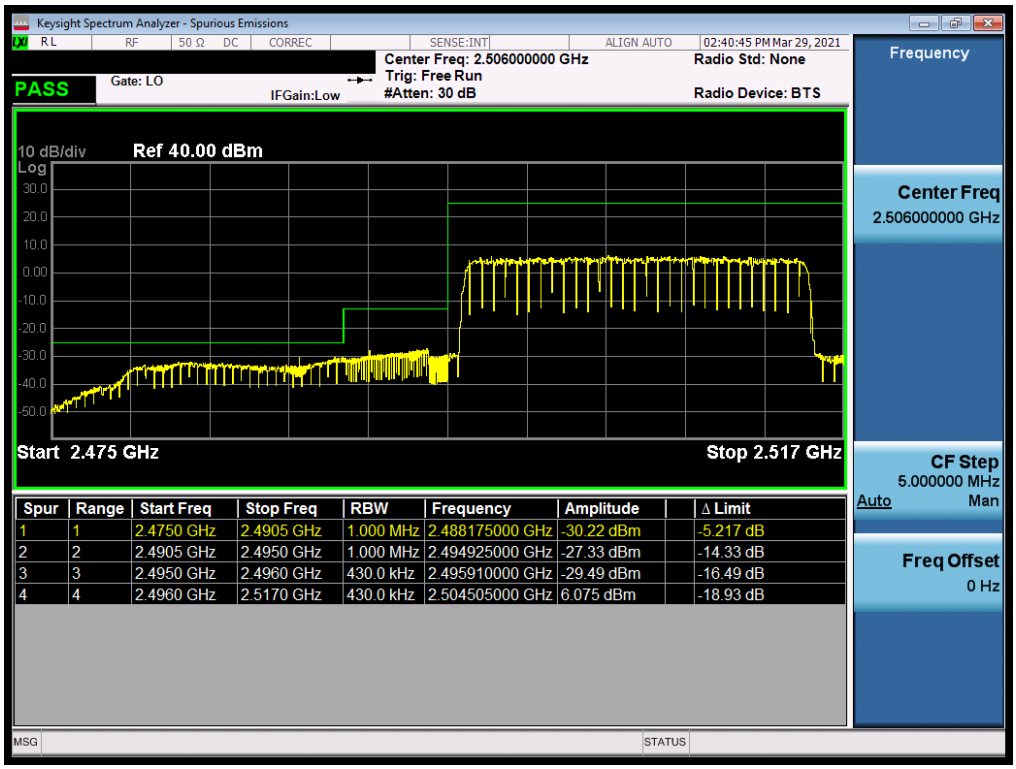


Plot 7-98. Lower ACP Plot (LTE Band 7 - 5MHz QPSK – Full RB)



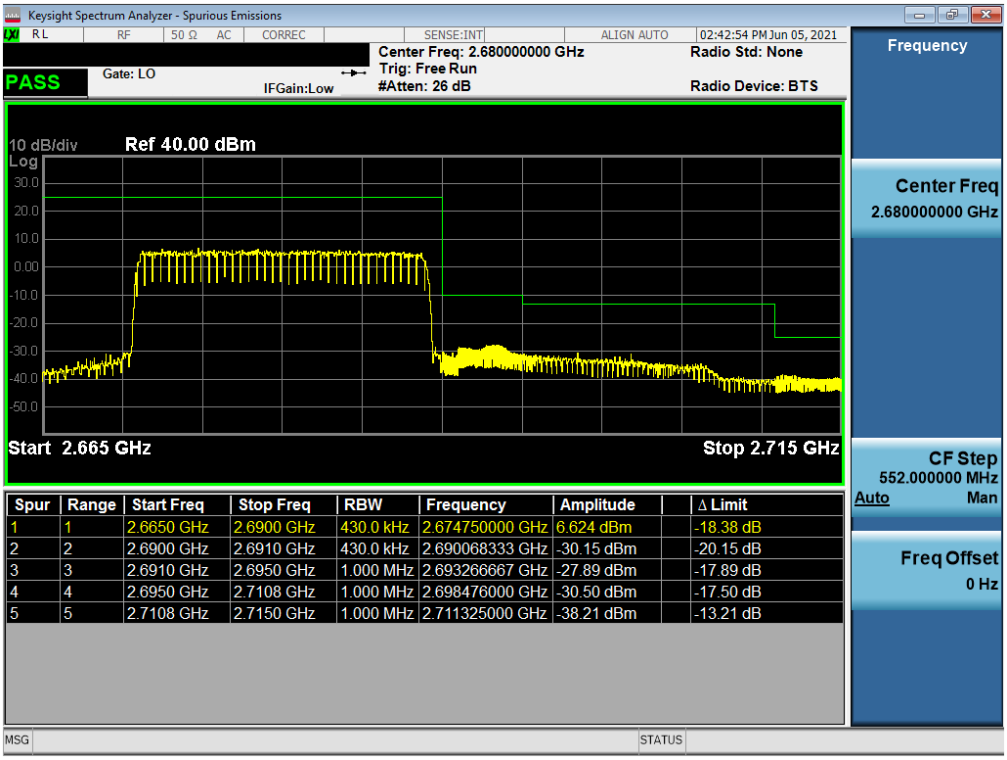
Plot 7-99. Upper ACP Plot (LTE Band 7 - 5MHz QPSK – Full RB)

LTE Band 41(PC2)



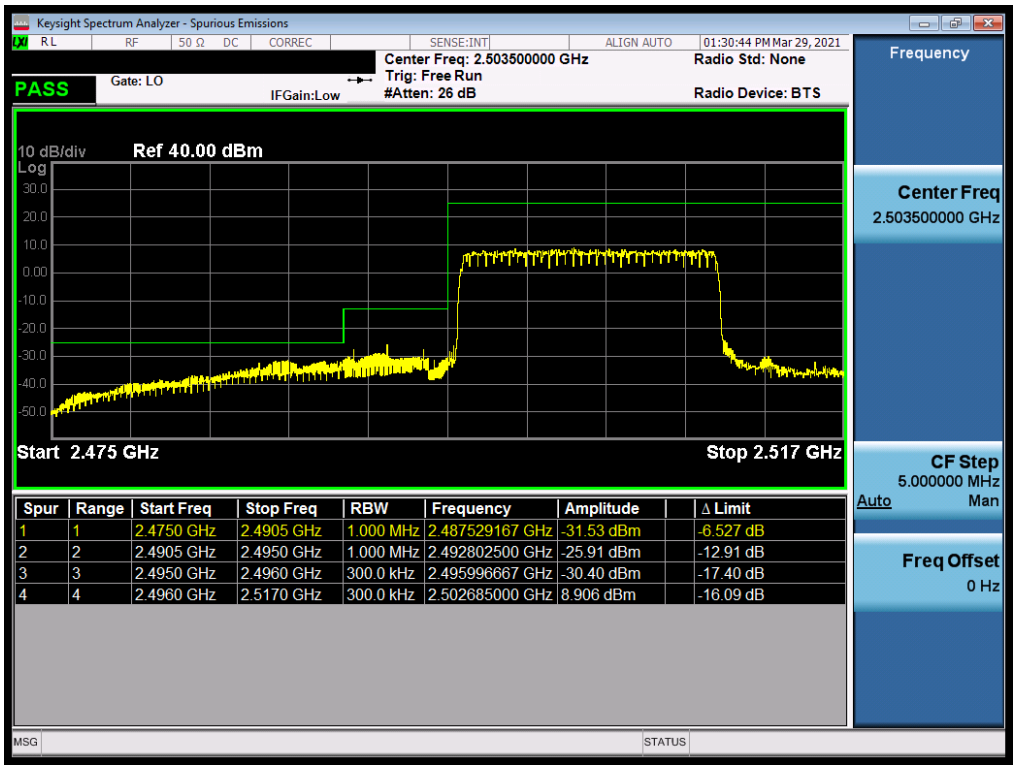
Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.4750 GHz	2.4905 GHz	1.000 MHz	2.488175000 GHz	-30.22 dBm	-5.217 dB
2	2	2.4905 GHz	2.4950 GHz	1.000 MHz	2.494925000 GHz	-27.33 dBm	-14.33 dB
3	3	2.4950 GHz	2.4960 GHz	430.0 kHz	2.495910000 GHz	-29.49 dBm	-16.49 dB
4	4	2.4960 GHz	2.5170 GHz	430.0 kHz	2.504505000 GHz	6.075 dBm	-18.93 dB

Plot 7-100. Lower ACP Plot (LTE Band 41(PC2) - 20MHz QPSK – Full RB)



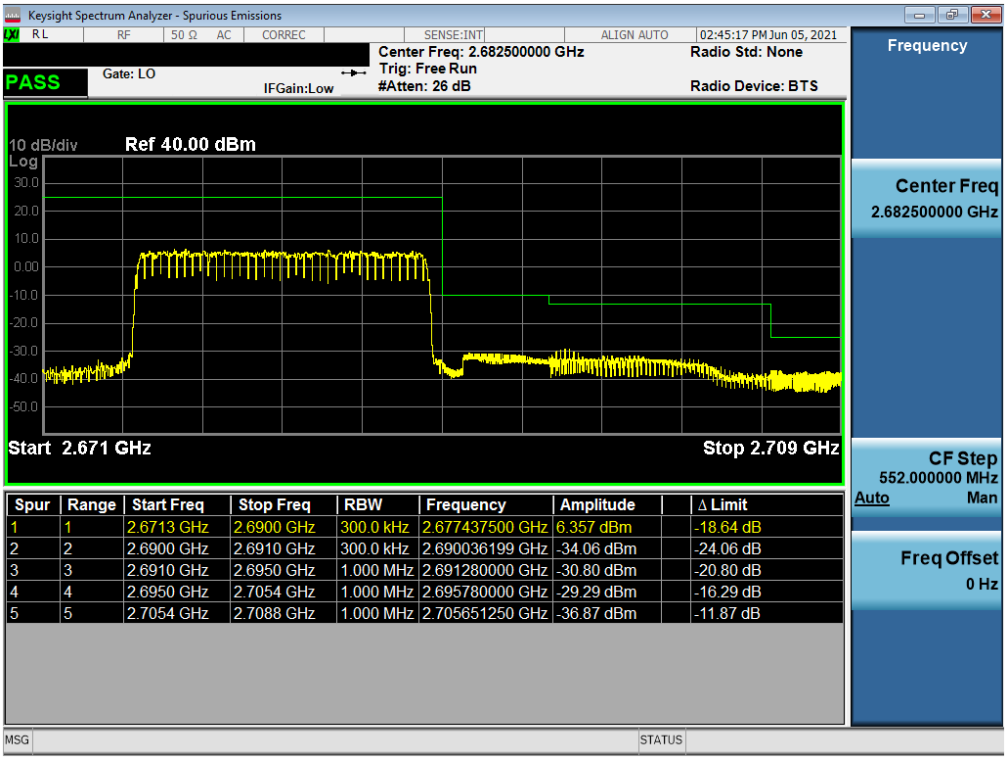
Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.6650 GHz	2.6900 GHz	430.0 kHz	2.674750000 GHz	6.624 dBm	-18.38 dB
2	2	2.6900 GHz	2.6910 GHz	430.0 kHz	2.690068333 GHz	-30.15 dBm	-20.15 dB
3	3	2.6910 GHz	2.6950 GHz	1.000 MHz	2.693266667 GHz	-27.89 dBm	-17.89 dB
4	4	2.6950 GHz	2.7108 GHz	1.000 MHz	2.698476000 GHz	-30.50 dBm	-17.50 dB
5	5	2.7108 GHz	2.7150 GHz	1.000 MHz	2.711325000 GHz	-38.21 dBm	-13.21 dB

Plot 7-101. Upper ACP Plot (LTE Band 41(PC2) - 20MHz QPSK – Full RB)



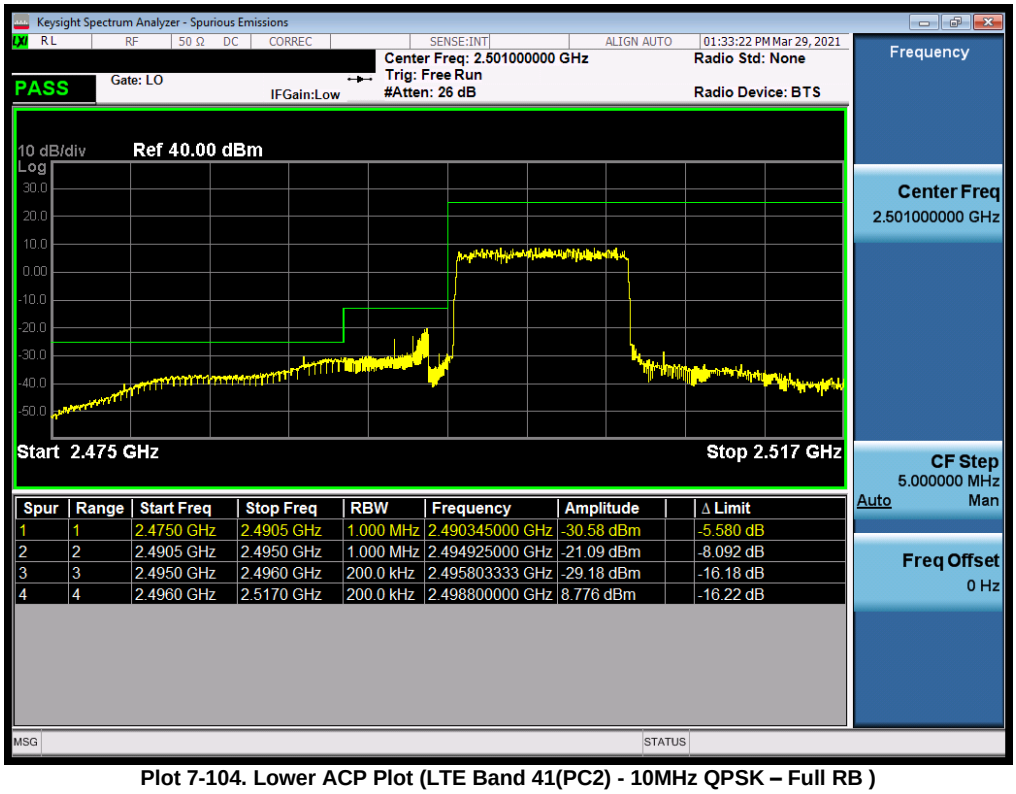
Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.4750 GHz	2.4905 GHz	1.000 MHz	2.487529167 GHz	-31.53 dBm	-6.527 dB
2	2	2.4905 GHz	2.4950 GHz	1.000 MHz	2.492802500 GHz	-25.91 dBm	-12.91 dB
3	3	2.4950 GHz	2.4960 GHz	300.0 kHz	2.495996667 GHz	-30.40 dBm	-17.40 dB
4	4	2.4960 GHz	2.5170 GHz	300.0 kHz	2.502685000 GHz	8.906 dBm	-16.09 dB

Plot 7-102. Lower ACP Plot (LTE Band 41(PC2) - 15MHz QPSK – Full RB)



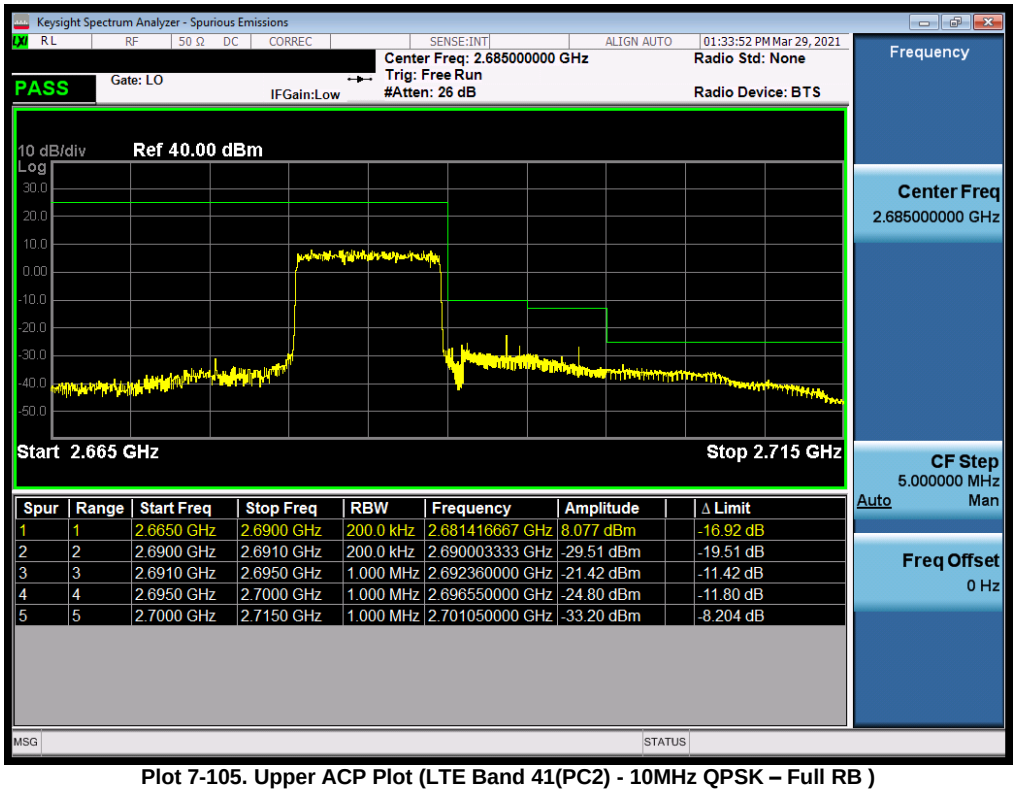
Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.6713 GHz	2.6900 GHz	300.0 kHz	2.677437500 GHz	6.357 dBm	-18.64 dB
2	2	2.6900 GHz	2.6910 GHz	300.0 kHz	2.690036199 GHz	-34.06 dBm	-24.06 dB
3	3	2.6910 GHz	2.6950 GHz	1.000 MHz	2.691280000 GHz	-30.80 dBm	-20.80 dB
4	4	2.6950 GHz	2.7054 GHz	1.000 MHz	2.695780000 GHz	-29.29 dBm	-16.29 dB
5	5	2.7054 GHz	2.7088 GHz	1.000 MHz	2.705651250 GHz	-36.87 dBm	-11.87 dB

Plot 7-103. Upper ACP Plot (LTE Band 41(PC2) - 15MHz QPSK – Full RB)



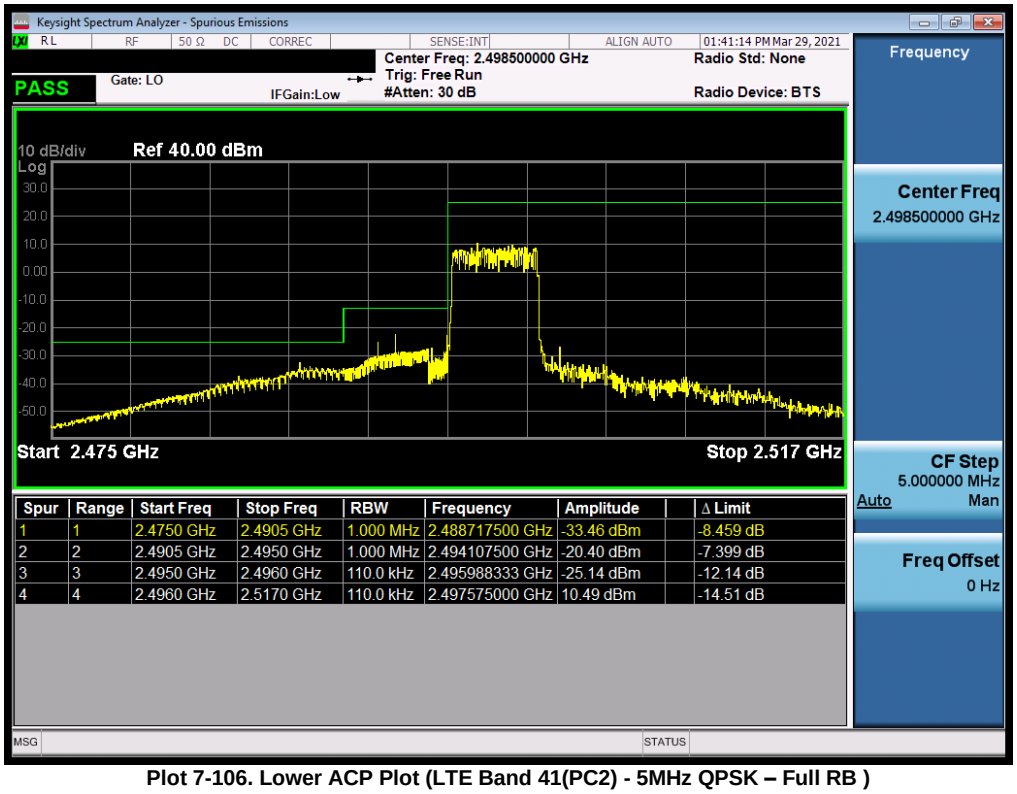
Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.4750 GHz	2.4905 GHz	1.000 MHz	2.490345000 GHz	-30.58 dBm	-5.580 dB
2	2	2.4905 GHz	2.4950 GHz	1.000 MHz	2.494925000 GHz	-21.09 dBm	-8.092 dB
3	3	2.4950 GHz	2.4960 GHz	200.0 kHz	2.495803333 GHz	-29.18 dBm	-16.18 dB
4	4	2.4960 GHz	2.5170 GHz	200.0 kHz	2.498800000 GHz	8.776 dBm	-16.22 dB

Plot 7-104. Lower ACP Plot (LTE Band 41(PC2) - 10MHz QPSK – Full RB)



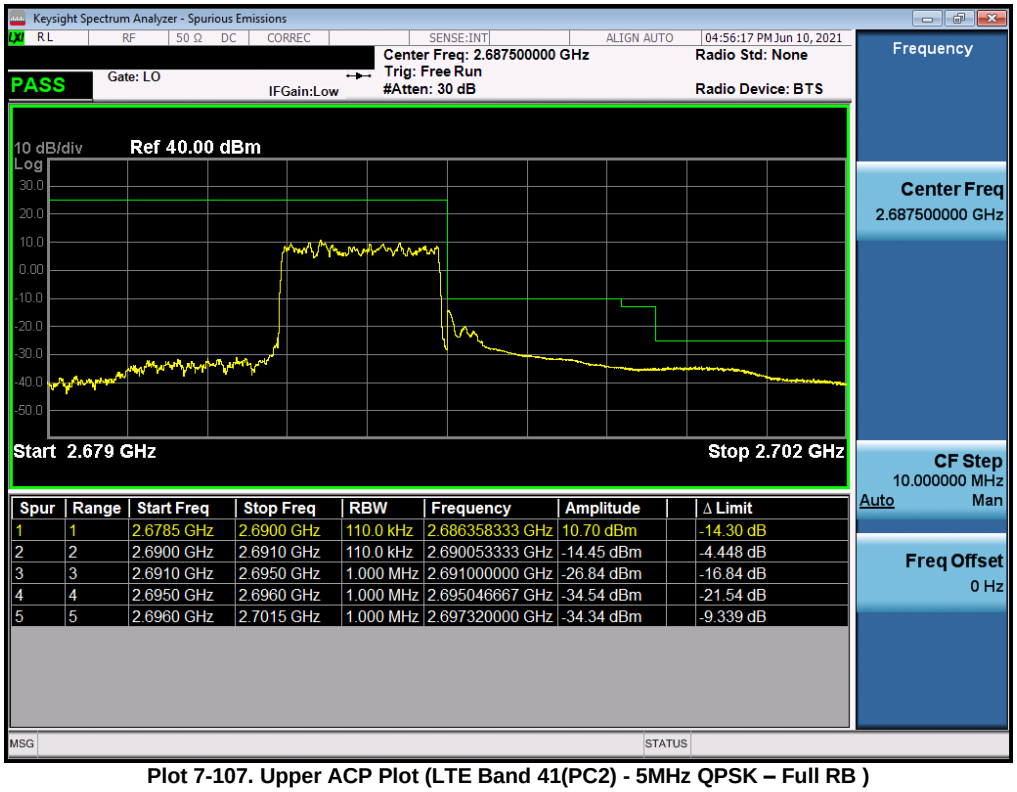
Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.6650 GHz	2.6900 GHz	200.0 kHz	2.681416667 GHz	8.077 dBm	-16.92 dB
2	2	2.6900 GHz	2.6910 GHz	200.0 kHz	2.690003333 GHz	-29.51 dBm	-19.51 dB
3	3	2.6910 GHz	2.6950 GHz	1.000 MHz	2.692360000 GHz	-21.42 dBm	-11.42 dB
4	4	2.6950 GHz	2.7000 GHz	1.000 MHz	2.696550000 GHz	-24.80 dBm	-11.80 dB
5	5	2.7000 GHz	2.7150 GHz	1.000 MHz	2.701050000 GHz	-33.20 dBm	-8.204 dB

Plot 7-105. Upper ACP Plot (LTE Band 41(PC2) - 10MHz QPSK – Full RB)



Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.4750 GHz	2.4905 GHz	1.000 MHz	2.488717500 GHz	-33.46 dBm	-8.459 dB
2	2	2.4905 GHz	2.4950 GHz	1.000 MHz	2.494107500 GHz	-20.40 dBm	-7.399 dB
3	3	2.4950 GHz	2.4960 GHz	110.0 kHz	2.495988333 GHz	-25.14 dBm	-12.14 dB
4	4	2.4960 GHz	2.5170 GHz	110.0 kHz	2.497575000 GHz	10.49 dBm	-14.51 dB

Plot 7-106. Lower ACP Plot (LTE Band 41(PC2) - 5MHz QPSK – Full RB)



Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.6785 GHz	2.6900 GHz	110.0 kHz	2.686358333 GHz	10.70 dBm	-14.30 dB
2	2	2.6900 GHz	2.6910 GHz	110.0 kHz	2.690053333 GHz	-14.45 dBm	-4.448 dB
3	3	2.6910 GHz	2.6950 GHz	1.000 MHz	2.691000000 GHz	-26.84 dBm	-16.84 dB
4	4	2.6950 GHz	2.6960 GHz	1.000 MHz	2.695046667 GHz	-34.54 dBm	-21.54 dB
5	5	2.6960 GHz	2.7015 GHz	1.000 MHz	2.697320000 GHz	-34.34 dBm	-9.339 dB

Plot 7-107. Upper ACP Plot (LTE Band 41(PC2) - 5MHz QPSK – Full RB)