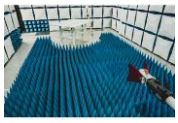
PCTEST
7185 Oakland Mills Road, Columbia, MD 21046 USA
Tel. 410.290.6652 / Fax 410.290.6654
http://www.pctest.com



PART 27 MEASUREMENT REPORT

Applicant Name:
Microsoft Corporation
One Microsoft way
Redmond, WA, 98052
United States

Date of Testing:
9/12/2021 - 9/16/2021
Test Site/Location:
PCTEST Lab. Columbia, MD, USA
Test Report Serial No.:
1M2109130107-04.C3K

FCC ID:	**C3K1995**
Applicant Name:	**Microsoft Corporation**

Application Type:	Class II Permissive Change
Model:	1995
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
Class II Permissive Change:	Please see FCC change document
Original Grant Date:	9/17/2021

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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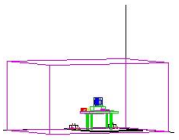
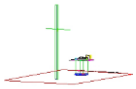


PART 27 MEASUREMENT REPORT



Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	EIRP		Emission Designator
				Max. Power [W]	Max. Power [dBm]	
NR Band n41	100 MHz	π/2 BPSK	2546.0 - 2640.0	0.129	21.10	96M8G7D
		QPSK	2546.0 - 2640.0	0.117	20.68	97M9G7D
		16QAM	2546.0 - 2640.0	0.096	19.83	98M0W7D
	90 MHz	π/2 BPSK	2541.0 - 2645.0	0.133	21.23	87M5G7D
		QPSK	2541.0 - 2645.0	0.118	20.71	88M0G7D
		16QAM	2541.0 - 2645.0	0.097	19.87	88M2W7D
	80 MHz	π/2 BPSK	2536.0 - 2650.0	0.134	21.27	77M6G7D
		QPSK	2536.0 - 2650.0	0.121	20.84	78M0G7D
		16QAM	2536.0 - 2650.0	0.099	19.96	77M7W7D
	60 MHz	π/2 BPSK	2526.0 - 2660.0	0.141	21.50	58M2G7D
		QPSK	2526.0 - 2660.0	0.131	21.19	58M3G7D
		16QAM	2526.0 - 2660.0	0.107	20.29	58M3W7D
	50 MHz	π/2 BPSK	2521.0 - 2665.0	0.144	21.58	46M0G7D
		QPSK	2521.0 - 2665.0	0.126	21.00	47M8G7D
		16QAM	2521.0 - 2665.0	0.100	20.01	47M8W7D
	40 MHz	π/2 BPSK	2516.0 - 2670.0	0.148	21.70	35M8G7D
		QPSK	2516.0 - 2670.0	0.132	21.22	37M9G7D
		16QAM	2516.0 - 2670.0	0.103	20.14	37M9W7D
	30 MHz	π/2 BPSK	2511.0 - 2675.0	0.130	21.13	27M0G7D
		QPSK	2511.0 - 2675.0	0.102	20.10	28M0G7D
		16QAM	2511.0 - 2675.0	0.078	18.93	27M9W7D
	20 MHz	π/2 BPSK	2506.0 - 2680.0	0.142	21.53	18M1G7D
		QPSK	2506.0 - 2680.0	0.129	21.10	18M4G7D
		16QAM	2506.0 - 2680.0	0.097	19.87	18M3W7D

EUT Overview

1.0 INTRODUCTION

1.1 Scope

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

1.2 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 **Microsoft Corporation Portable Handset FCC ID:C3K1995**. 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.: M4211

2.2 Device Capabilities

This device contains the following capabilities:

850/1900 GSM/GPRS, 850/1900 WCDMA/HSPA, Multi-band LTE, Multi-band 5G NR, 802.11b/g/n/ax WLAN, 802.11a/n/ac/ax UNII (5GHz), Bluetooth (1x, EDR, LE), NFC

2.3 Test Configuration

The EUT was tested per the guidance of ANSI/TIA-603-E-2016 and KDB 971168 D01 v03r01. See Section 3.2 of this test report for a description of the radiated and antenna port conducted emissions tests.

This device supports open and closed configurations. Multiple angles are tested and the worst case radiated emissions data is shown in the report.

2.4 Software and Firmware

The firmware installed during testing was Build number developer - generic 2021.728.20.

2.5 EMI Suppression Device(s)/Modifications

No EMI suppression device(s) were added and no modifications were made during testing.

3.0 DESCRIPTION OF TESTS

3.1 Evaluation Procedure

The measurement procedures described in the "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	3/4/2021	Annual	3/4/2022	AP2
-	AP1	EMC Cable and Switch System	3/9/2021	Annual	3/9/2022	AP1
-	ETS	EMC Cable and Switch System	3/4/2021	Annual	3/4/2022	ETS
-	LTx1	Licensed Transmitter Cable Set	3/12/2021	Annual	3/12/2022	LTx1
-	LTx2	Licensed Transmitter Cable Set	3/12/2021	Annual	3/12/2022	LTx2
Agilent	E5515C	Wireless Communications Test Set	N/A			GB45360985
Agilent	N9030A	50GHz PXA Signal Analyzer	1/20/2021	Annual	1/20/2022	US51350301
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
ETS Lindgren	3164-08	Quad Ridge Horn Antenna	3/12/2020	Biennial	3/12/2022	128337
ETS Lindgren	3816/2NM	LISN	7/9/2020	Biennial	7/9/2022	00114451
Keysight Technologies	N9020A	MXA Signal Analyzer	9/22/2020	Annual	9/22/2021	MY54500644
Keysight Technologies	N9030A	PXA Signal Analyzer	10/16/2020	Annual	10/16/2021	MY54490576
Keysight Technologies	N9030B	PXA Signal Analyzer, Multi-touch	9/17/2020	Annual	9/17/2021	MY57141001
Rohde & Schwarz	ESW44	EMI Test Receiver 2Hz to 44 GHz	1/21/2021	Annual	1/21/2022	101716
Rohde & Schwarz	FSW26	2Hz-26.5GHz Signal and Spectrum Analyzer	2/10/2021	Annual	2/10/2022	103187

Table 5-1. Test Equipment

Notes:

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

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

6.0 SAMPLE CALCULATIONS

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: Microsoft Corporation

FCC ID: C3K1995

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

Mode(s): NR

Test Condition	Test Description	FCC Part Section(s)	Test Limit	Test Result	Reference
CONDUCTED	Occupied Bandwidth	2.1049	N/A	PASS	Section 7.3
	Conducted Band Edge / Spurious Emissions (NR Band n41)	2.1051, 27.53(m)	Undesirable emissions must meet the limits detailed in 27.53(m)	PASS	Sections 7.4, 7.5
	Transmitter Conducted Output Power	2.1046	N/A	PASS	Section 7.2
RADIATED	Effective Radiated Power / Equivalent Isotropic Radiated Power (NR Band n41)	27.50(h)(2)	< 2 Watts max. EIRP	PASS	Section 7.6
	Radiated Spurious Emissions (NR Band n41)	2.1053, 27.53(m)	Undesirable emissions must meet the limits detailed in 27.53(m)	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 v1.0.

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 ≥ 2 x span / 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.

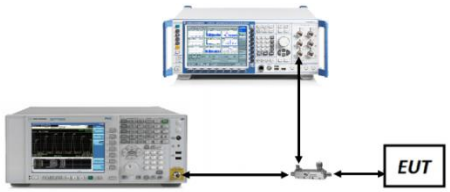


Figure 7-1. Test Instrument & Measurement Setup

Bandwidth	Modulation	Channel	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]
100 MHz	π/2 BPSK	509202	2546.0	1 / 136	20.56
		518598	2593.0	1 / 136	20.56
		528000	2640.0	1 / 204	20.56
	QPSK	509202	2546.0	1 / 136	20.72
		518598	2593.0	1 / 136	20.51
		528000	2640.0	1 / 204	20.63
	16-QAM	509202	2546.0	1 / 136	19.77
90 MHz	π/2 BPSK	508200	2541.0	1 / 183	20.62
		518592	2593.0	1 / 122	20.58
		529002	2645.0	1 / 122	20.57
	QPSK	508200	2541.0	1 / 183	20.63
		518592	2593.0	1 / 122	20.52
		529002	2645.0	1 / 122	20.64
	16-QAM	508200	2541.0	1 / 183	19.89
80 MHz	π/2 BPSK	507204	2536.0	1 / 162	20.49
		518598	2593.0	1 / 54	20.58
		529998	2650.0	1 / 54	20.58
	QPSK	507204	2536.0	1 / 162	20.59
		518598	2593.0	1 / 54	20.56
		529998	2650.0	1 / 54	20.60
	16-QAM	507204	2536.0	1 / 162	19.71
60 MHz	π/2 BPSK	505200	2526.0	1 / 121	20.84
		518598	2593.0	1 / 40	20.97
		531996	2660.0	1 / 40	20.82
	QPSK	505200	2526.0	1 / 121	20.90
		518598	2593.0	1 / 40	20.95
		531996	2660.0	1 / 40	20.92
	16-QAM	505200	2526.0	1 / 121	19.91
50 MHz	π/2 BPSK	504204	2521.0	1 / 99	20.85
		518598	2593.0	1 / 66	20.92
		532998	2665.0	1 / 33	20.86
	QPSK	504204	2521.0	1 / 99	20.85
		518598	2593.0	1 / 66	20.92
		532998	2665.0	1 / 33	20.91
	16-QAM	504204	2521.0	1 / 99	20.00
40 MHz	π/2 BPSK	503202	2516.0	1 / 79	20.94
		518598	2593.0	1 / 26	20.98
		534000	2670.0	1 / 26	20.98
	QPSK	503202	2516.0	1 / 79	20.88
		518598	2593.0	1 / 53	20.91
		534000	2670.0	1 / 26	20.98
	16-QAM	503202	2516.0	1 / 79	20.05
30 MHz	π/2 BPSK	502203	2511.0	1 / 58	20.81
		518598	2593.0	1 / 19	20.97
		534999	2675.0	1 / 58	20.91
	QPSK	502203	2511.0	1 / 58	20.93
		518598	2593.0	1 / 19	20.99
		534999	2675.0	1 / 58	20.90
	16-QAM	502203	2511.0	1 / 58	19.93
20 MHz	π/2 BPSK	501204	2506.0	1 / 37	20.71
		518598	2593.0	1 / 13	20.99
		535998	2680.0	1 / 13	20.82
	QPSK	501204	2506.0	1 / 37	20.74
		518598	2593.0	1 / 13	20.98
		535998	2680.0	1 / 13	20.88
	16-QAM	501204	2506.0	1 / 37	19.70

Table 7-2. Conducted Power Output Data (NR Band n41 – MIMO North)

Bandwidth	Modulation	Channel	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]
100 MHz	π/2 BPSK	509202	2546.0	1 / 136	20.24
		518598	2593.0	1 / 68	19.99
		528000	2640.0	1 / 136	19.72
	QPSK	509202	2546.0	1 / 136	20.37
		518598	2593.0	1 / 68	20.15
		528000	2640.0	1 / 136	19.74
	16-QAM	528000	2640.0	1 / 136	18.90
90 MHz	π/2 BPSK	508200	2541.0	1 / 122	20.34
		518592	2593.0	1 / 61	20.01
		529002	2645.0	1 / 122	19.85
	QPSK	508200	2541.0	1 / 122	20.39
		518592	2593.0	1 / 61	20.18
		529002	2645.0	1 / 122	19.77
	16-QAM	529002	2645.0	1 / 122	18.94
80 MHz	π/2 BPSK	507204	2536.0	1 / 108	20.40
		518598	2593.0	1 / 54	20.18
		529998	2650.0	1 / 54	19.90
	QPSK	507204	2536.0	1 / 108	20.36
		518598	2593.0	1 / 54	20.09
		529998	2650.0	1 / 54	19.89
	16-QAM	529998	2650.0	1 / 54	19.03
60 MHz	π/2 BPSK	505200	2526.0	1 / 40	20.80
		518598	2593.0	1 / 40	20.42
		531996	2660.0	1 / 40	20.12
	QPSK	505200	2526.0	1 / 40	20.70
		518598	2593.0	1 / 40	20.52
		531996	2660.0	1 / 40	20.25
	16-QAM	531996	2660.0	1 / 40	19.36
50 MHz	π/2 BPSK	504204	2521.0	1 / 33	20.86
		518598	2593.0	1 / 33	20.43
		532998	2665.0	1 / 99	20.20
	QPSK	504204	2521.0	1 / 33	20.88
		518598	2593.0	1 / 33	20.56
		532998	2665.0	1 / 99	20.06
	16-QAM	532998	2665.0	1 / 99	19.08
40 MHz	π/2 BPSK	503202	2516.0	1 / 53	20.98
		518598	2593.0	1 / 26	20.53
		534000	2670.0	1 / 79	20.32
	QPSK	503202	2516.0	1 / 53	20.83
		518598	2593.0	1 / 26	20.44
		534000	2670.0	1 / 79	20.27
	16-QAM	534000	2670.0	1 / 79	19.20
30 MHz	π/2 BPSK	502203	2511.0	1 / 39	20.96
		518598	2593.0	1 / 19	20.41
		534999	2675.0	1 / 58	20.27
	QPSK	502203	2511.0	1 / 39	20.89
		518598	2593.0	1 / 19	20.40
		534999	2675.0	1 / 58	20.19
	16-QAM	534999	2675.0	1 / 58	19.17
20 MHz	π/2 BPSK	501204	2506.0	1 / 37	20.99
		518598	2593.0	1 / 13	20.32
		535998	2680.0	1 / 37	20.15
	QPSK	501204	2506.0	1 / 37	20.89
		518598	2593.0	1 / 13	20.41
		535998	2680.0	1 / 37	20.16
	16-QAM	535998	2680.0	1 / 37	18.94

Table 7-3. Conducted Power Output Data (NR Band n41 – MIMO South)

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.

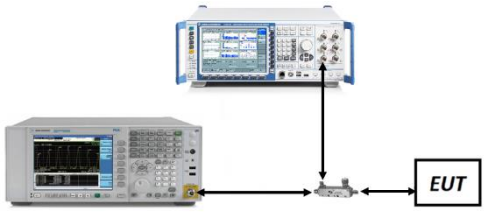
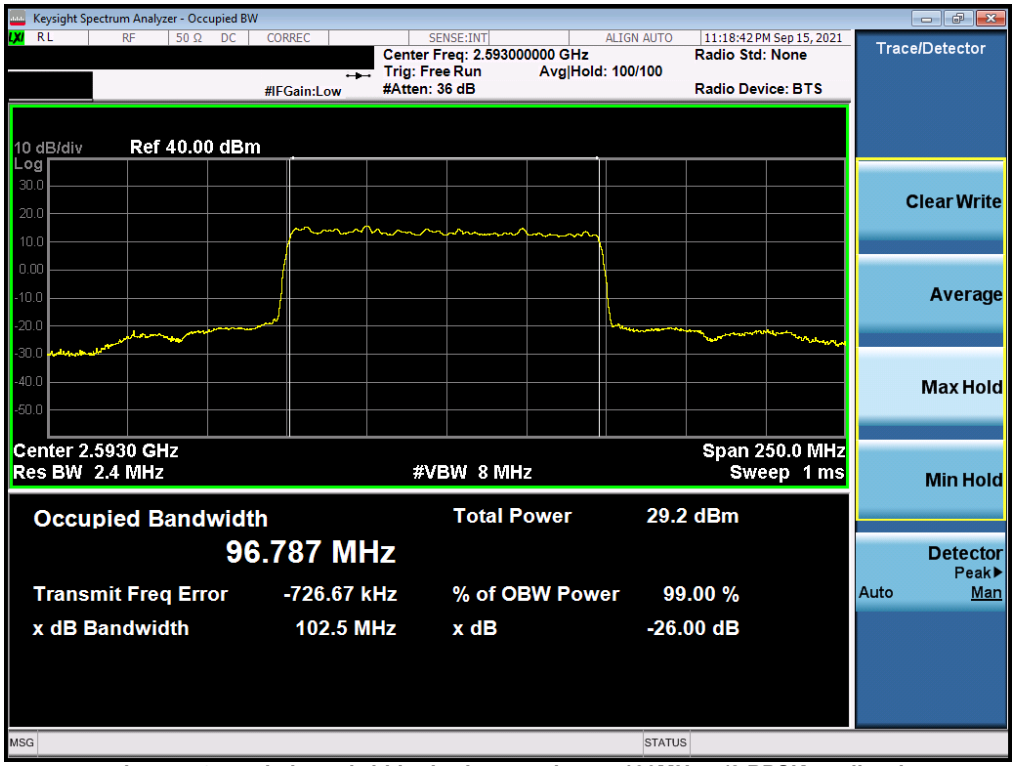


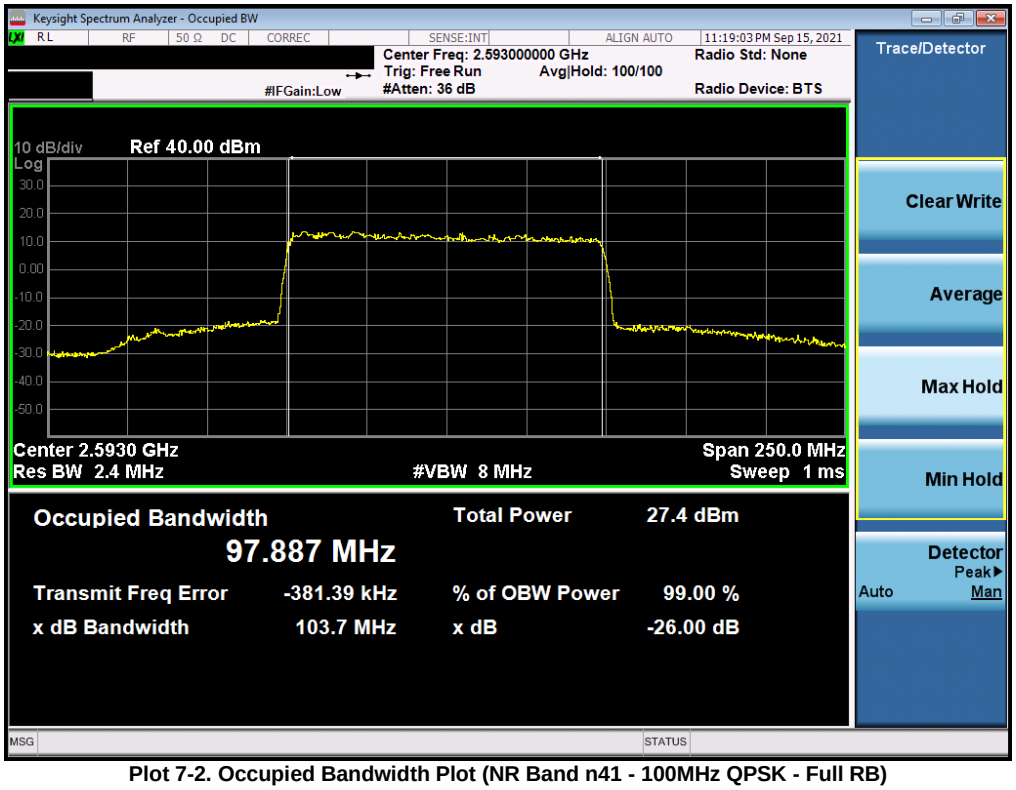
Figure 7-2. Test Instrument & Measurement Setup

Test Notes

None.

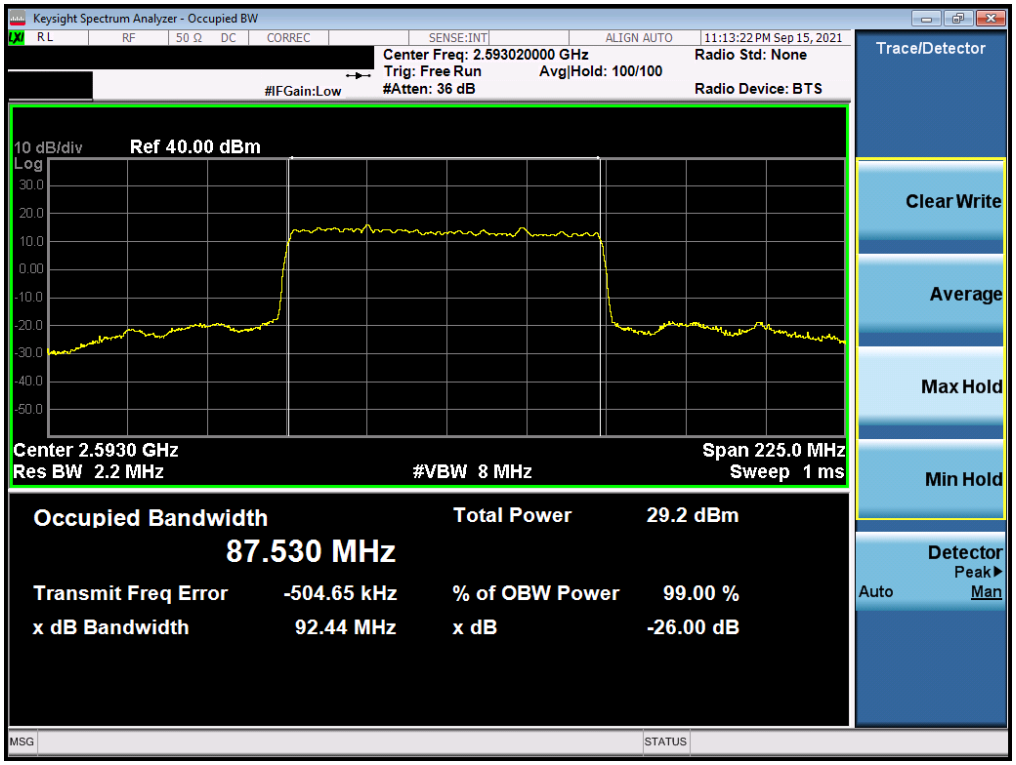


Plot 7-1. Occupied Bandwidth Plot (NR Band n41 - 100MHz π/2 BPSK - Full RB)



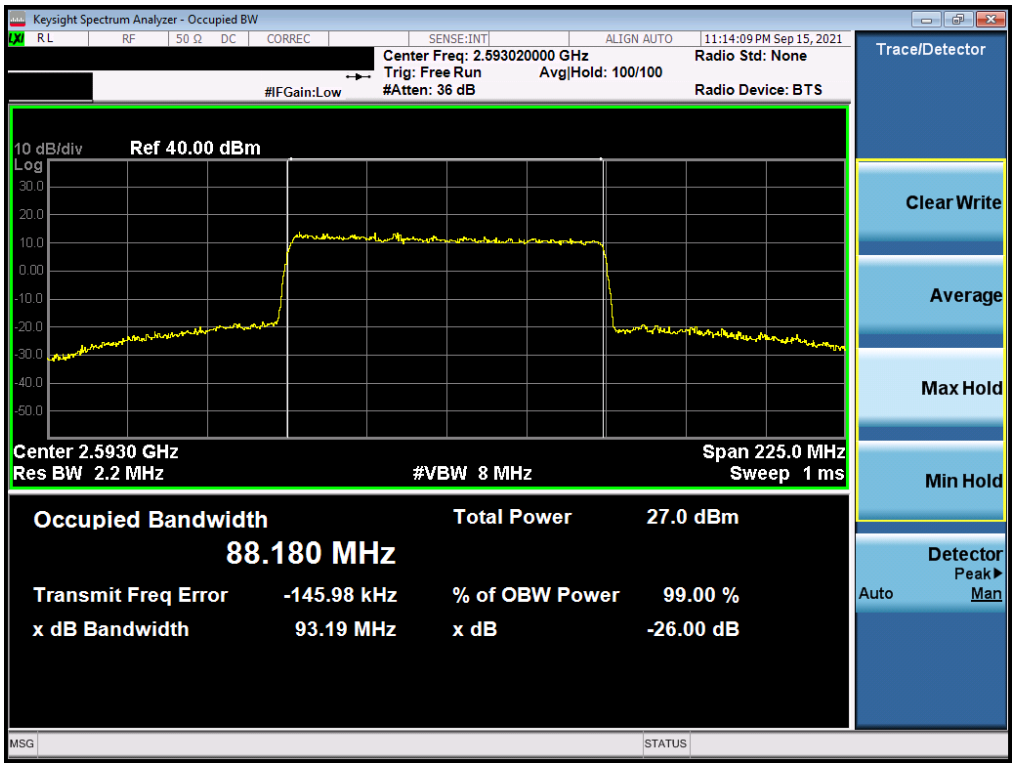
Plot 7-2. Occupied Bandwidth Plot (NR Band n41 - 100MHz QPSK - Full RB)

Plot 7-3. Occupied Bandwidth Plot (NR Band n41 - 100MHz 16-QAM - Full RB)

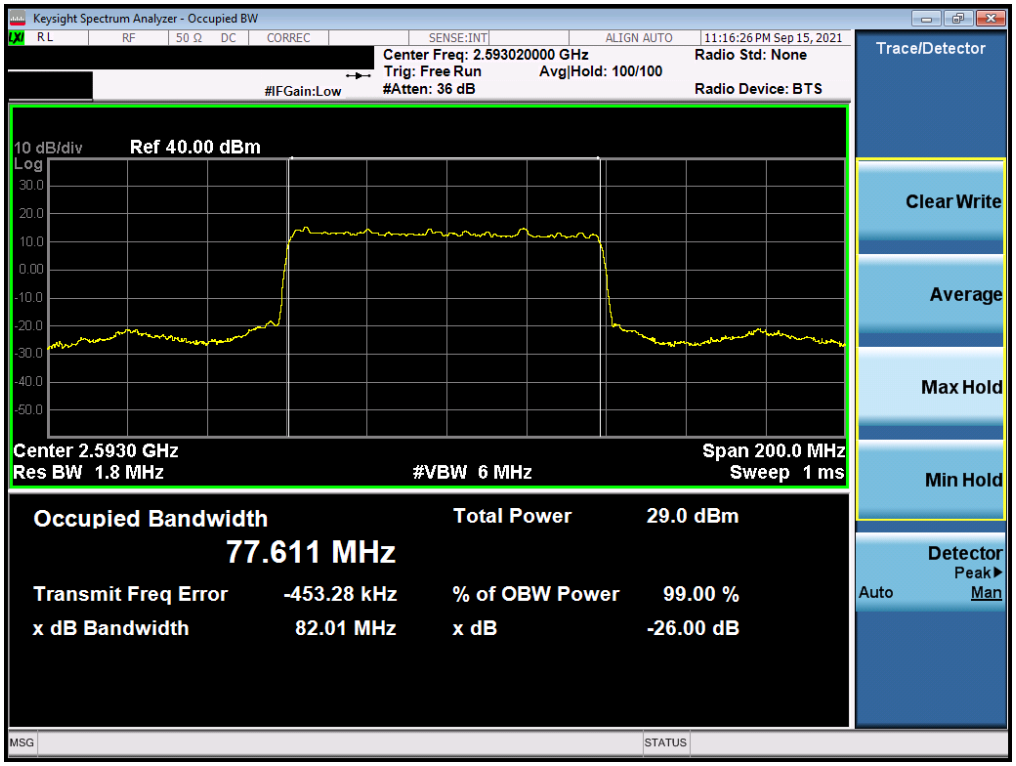


Plot 7-4. Occupied Bandwidth Plot (NR Band n41 - 90MHz π/2 BPSK - Full RB)

Plot 7-5. Occupied Bandwidth Plot (NR Band n41 - 90MHz QPSK - Full RB)

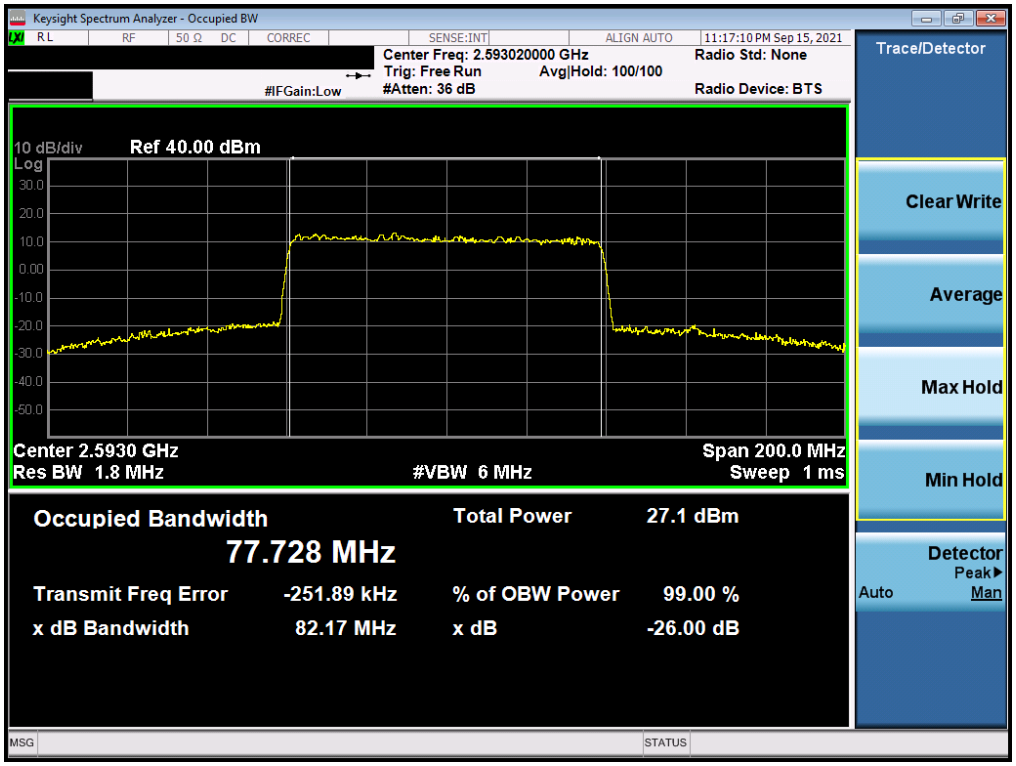


Plot 7-6. Occupied Bandwidth Plot (NR Band n41 - 90MHz 16-QAM - Full RB)

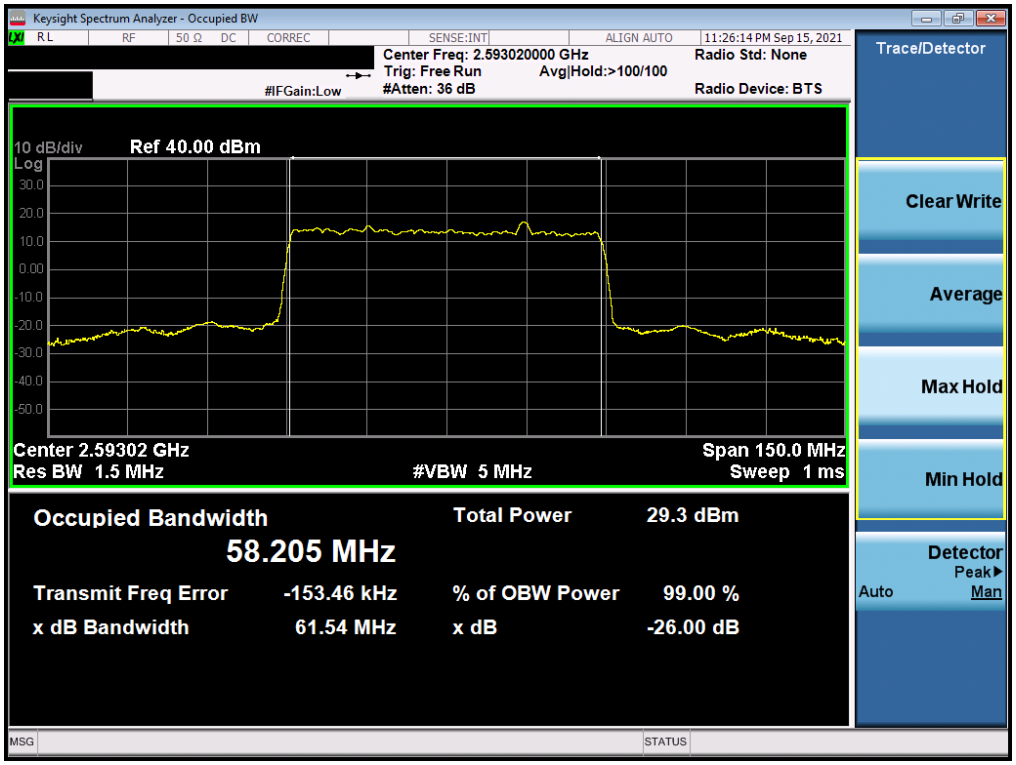


Plot 7-7. Occupied Bandwidth Plot (NR Band n41 - 80MHz π/2 BPSK - Full RB)

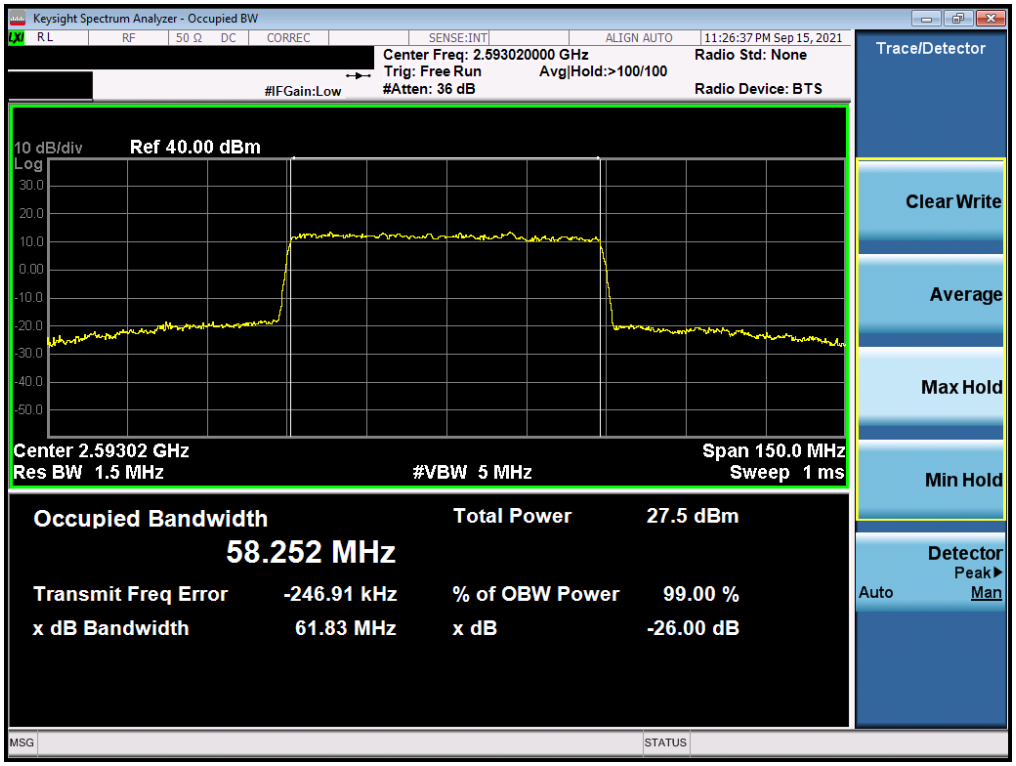
Plot 7-8. Occupied Bandwidth Plot (NR Band n41 - 80MHz QPSK - Full RB)



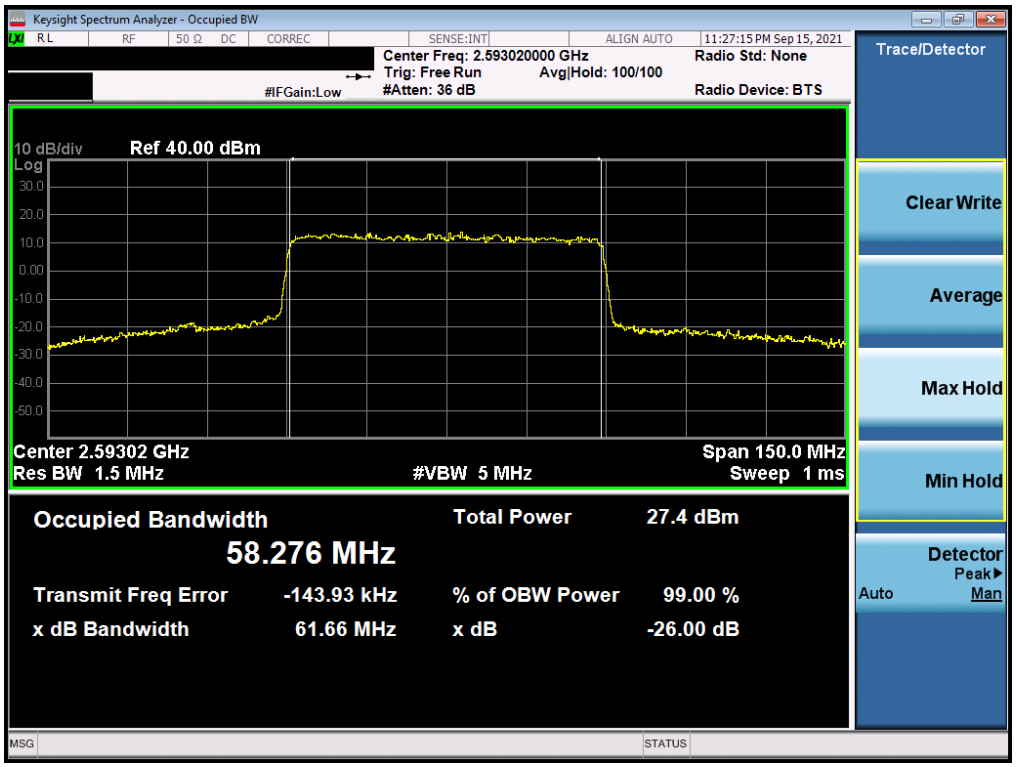
Plot 7-9. Occupied Bandwidth Plot (NR Band n41 - 80MHz 16-QAM - Full RB)



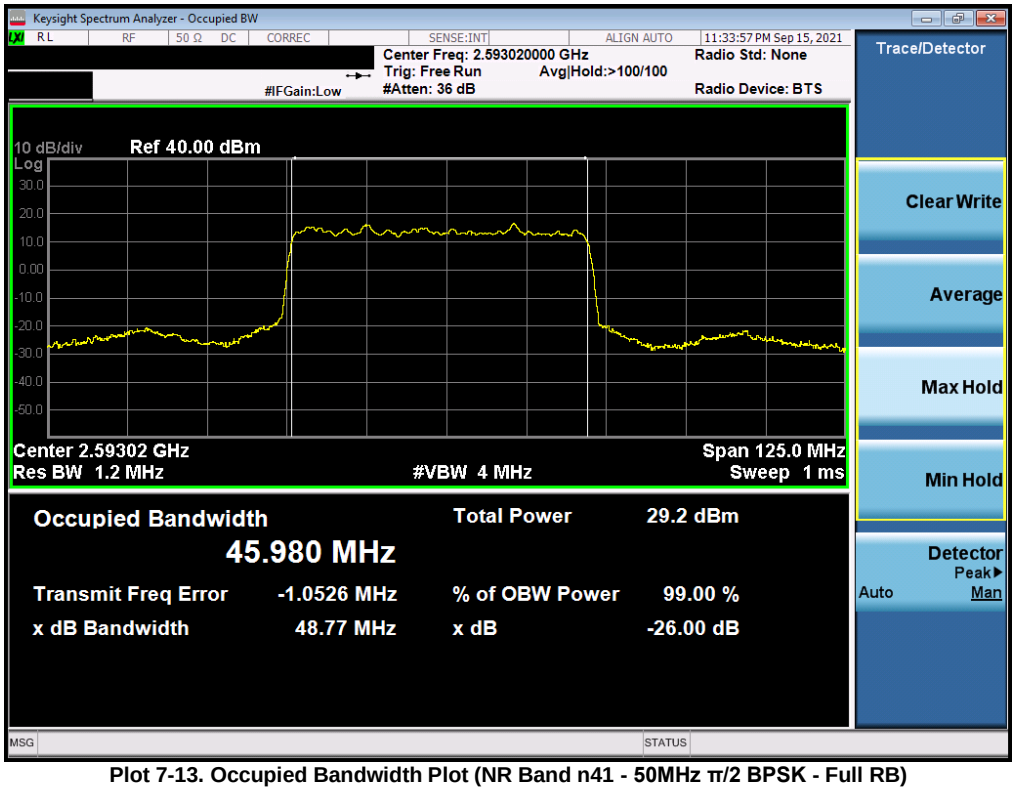
Plot 7-10. Occupied Bandwidth Plot (NR Band n41 - 60MHz π/2 BPSK - Full RB)



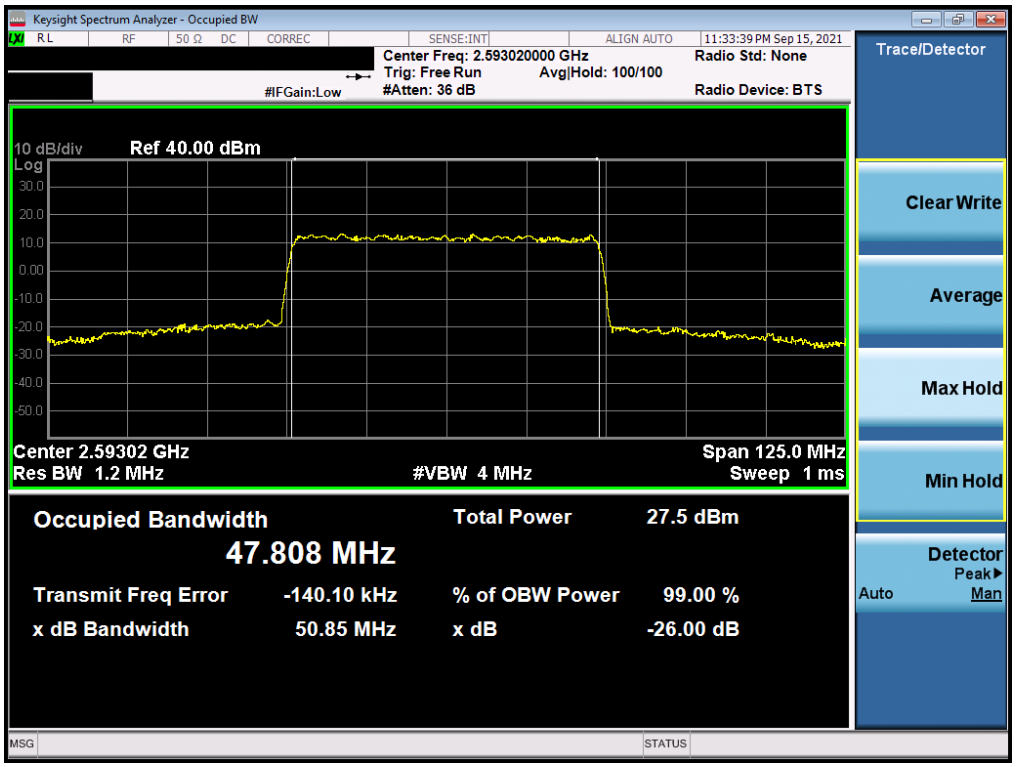
Plot 7-11. Occupied Bandwidth Plot (NR Band n41 - 60MHz QPSK - Full RB)



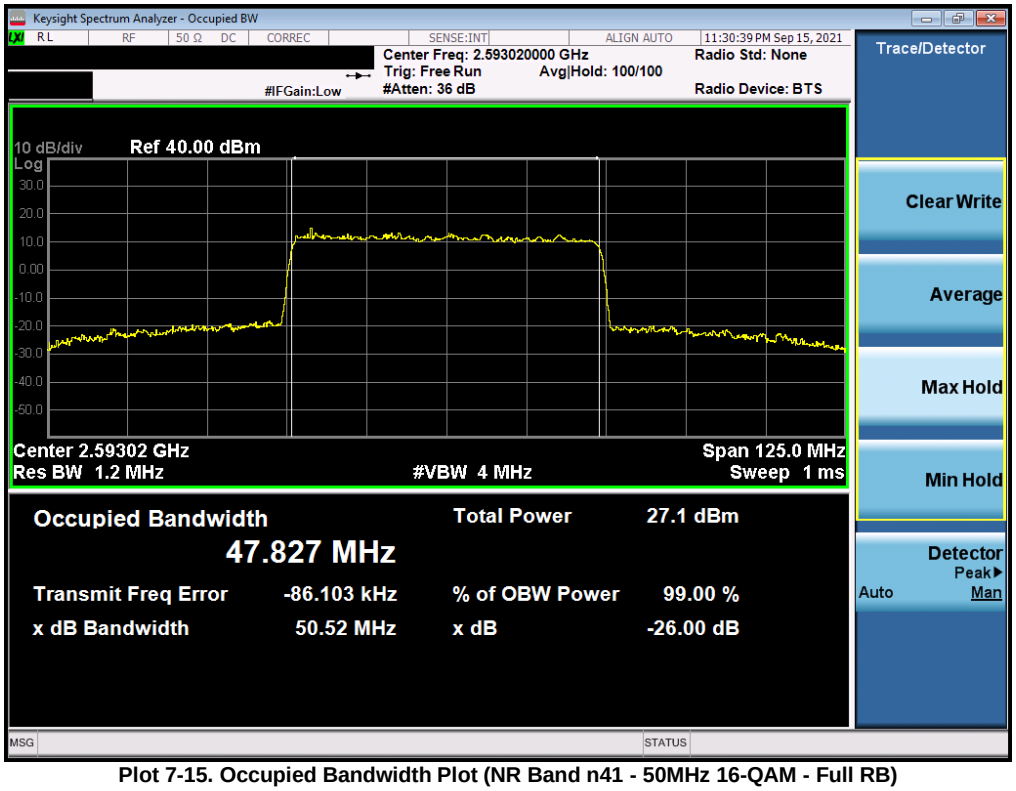
Plot 7-12. Occupied Bandwidth Plot (NR Band n41 - 60MHz 16-QAM - Full RB)



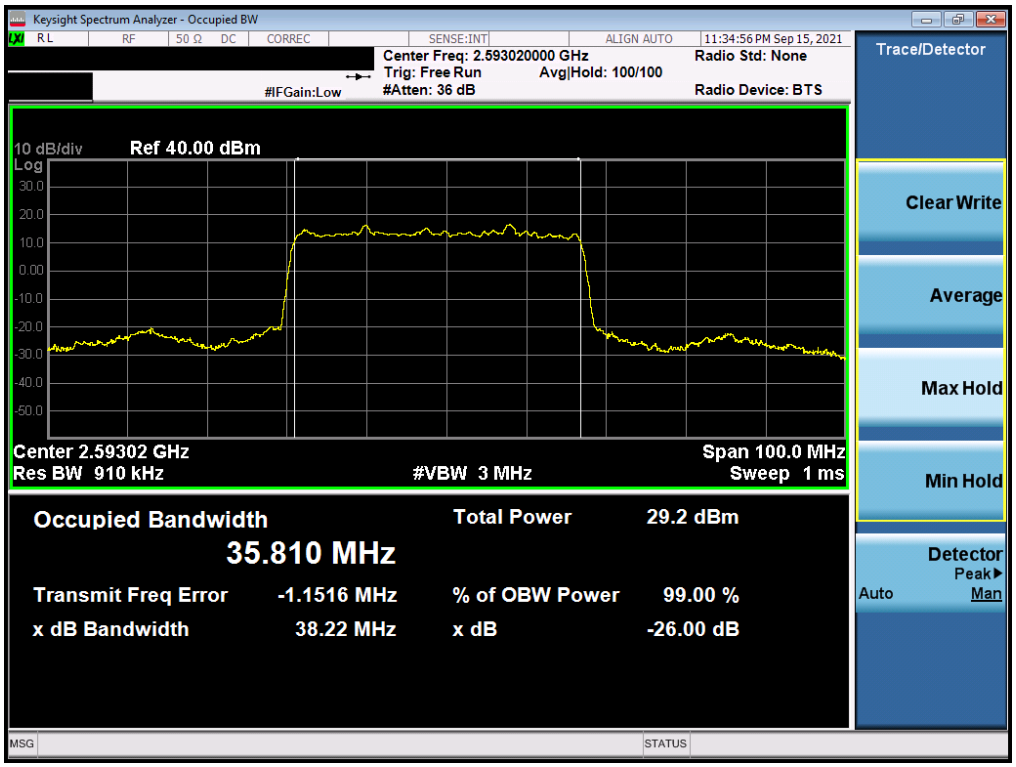
Plot 7-13. Occupied Bandwidth Plot (NR Band n41 - 50MHz π/2 BPSK - Full RB)



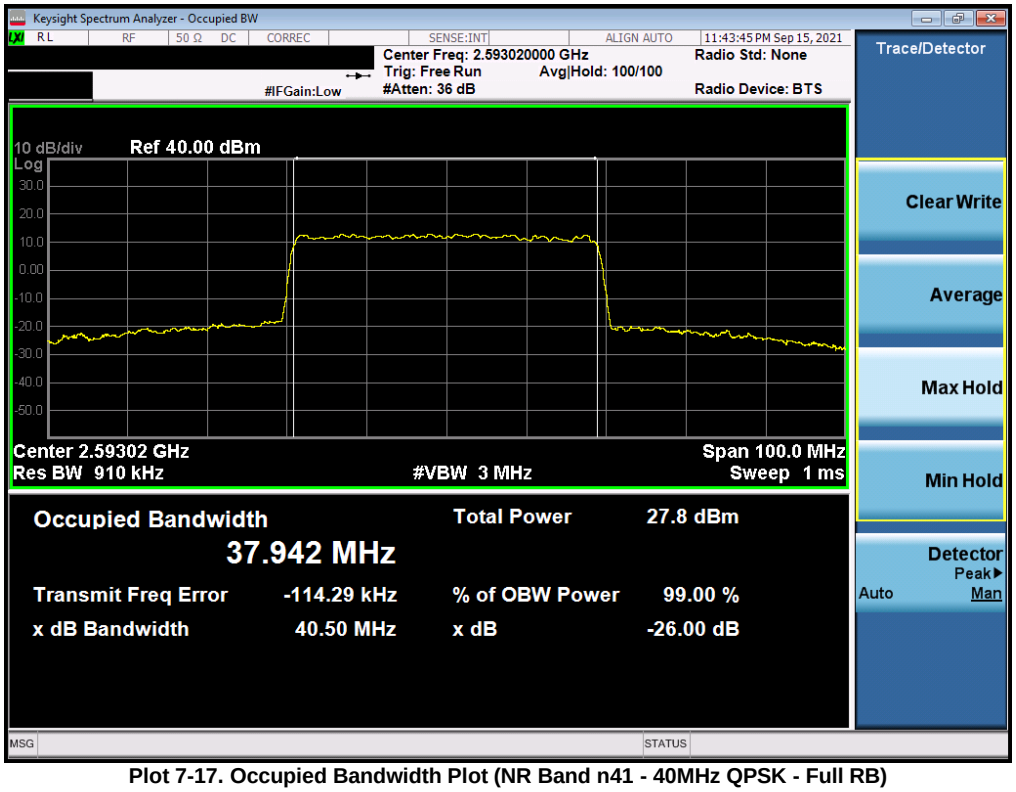
Plot 7-14. Occupied Bandwidth Plot (NR Band n41 - 50MHz QPSK - Full RB)



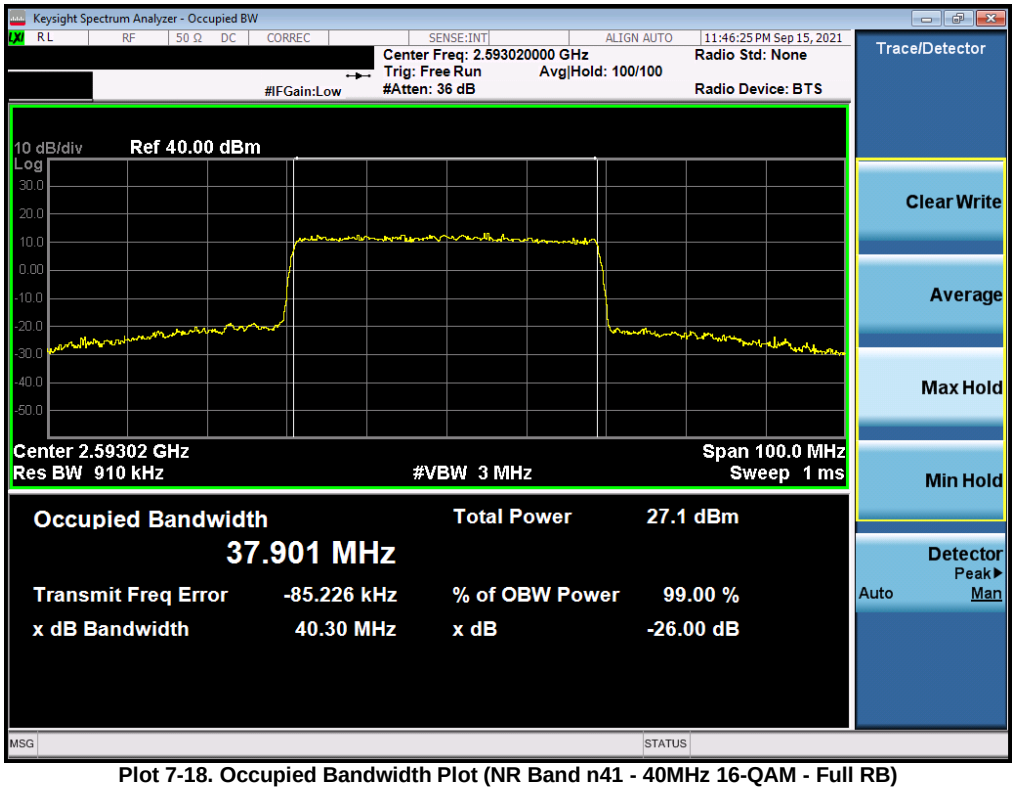
Plot 7-15. Occupied Bandwidth Plot (NR Band n41 - 50MHz 16-QAM - Full RB)



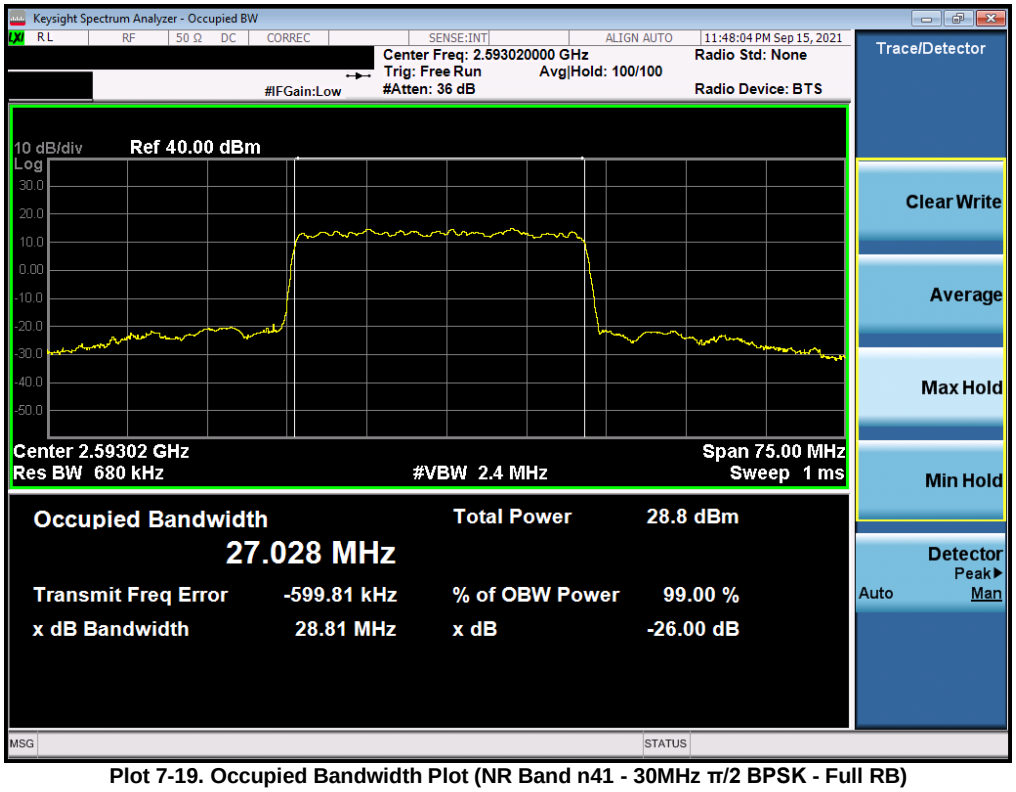
Plot 7-16. Occupied Bandwidth Plot (NR Band n41 - 40MHz π/2 BPSK - Full RB)



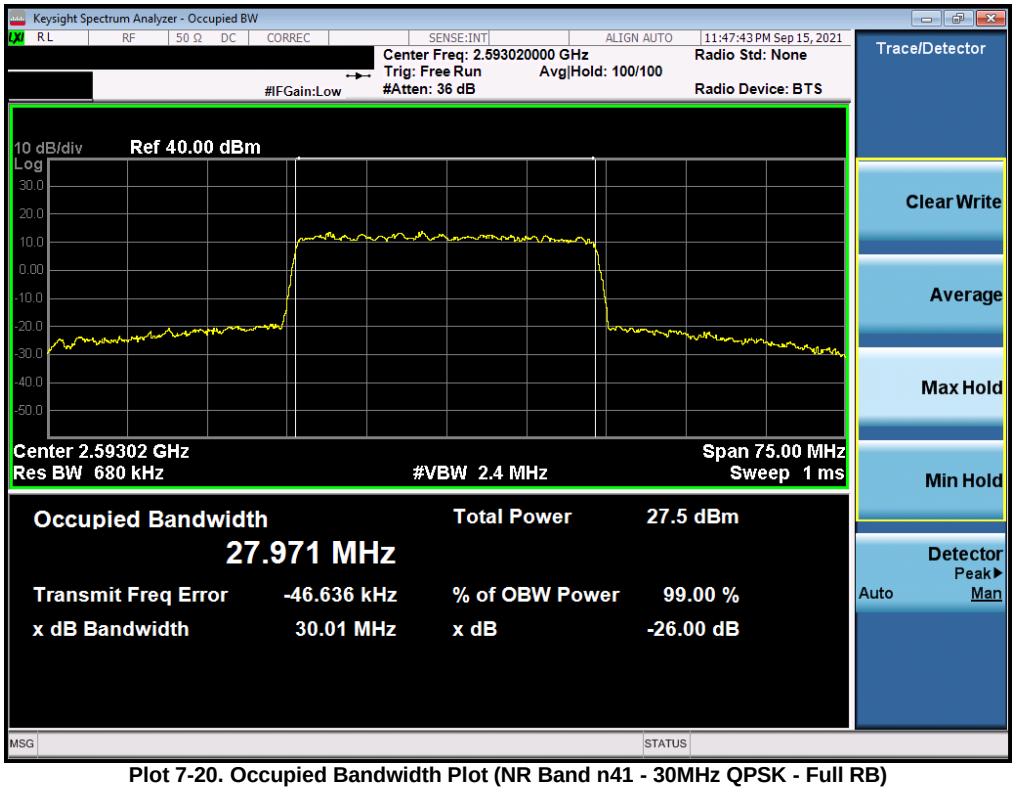
Plot 7-17. Occupied Bandwidth Plot (NR Band n41 - 40MHz QPSK - Full RB)



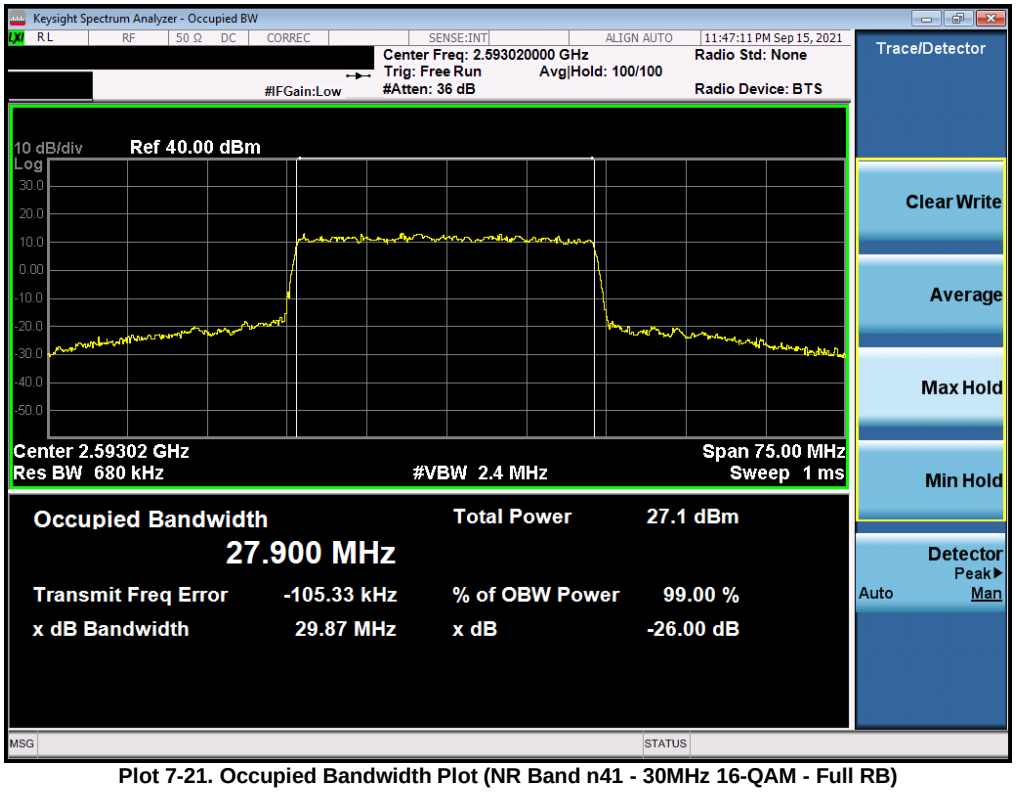
Plot 7-18. Occupied Bandwidth Plot (NR Band n41 - 40MHz 16-QAM - Full RB)



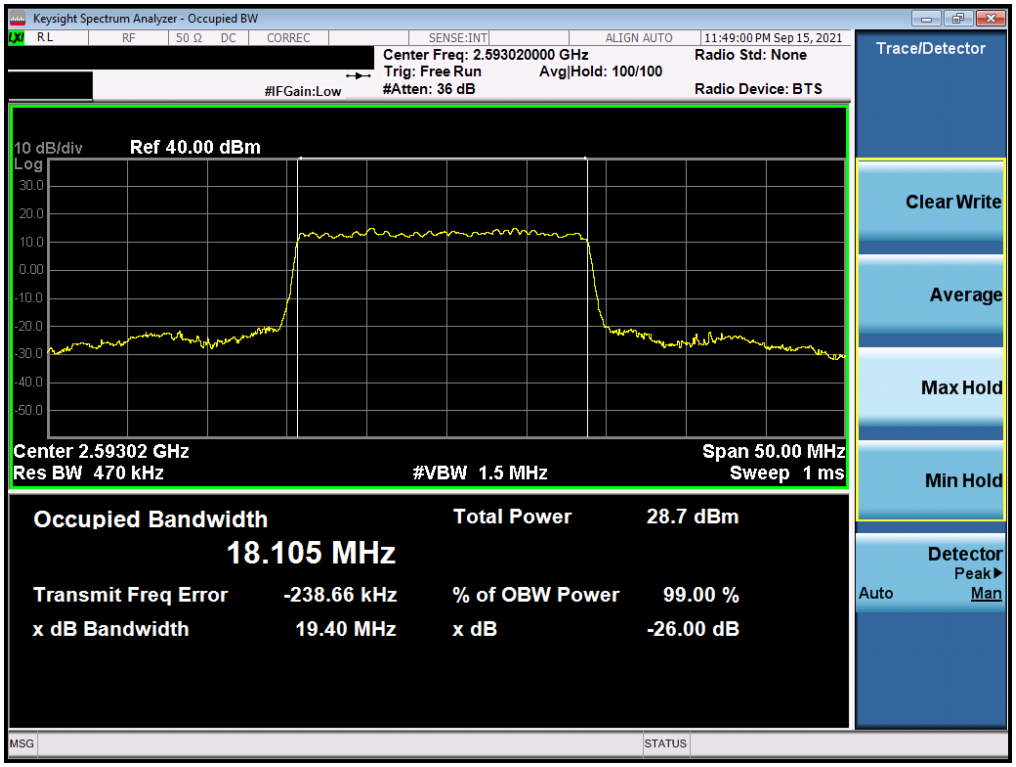
Plot 7-19. Occupied Bandwidth Plot (NR Band n41 - 30MHz π/2 BPSK - Full RB)



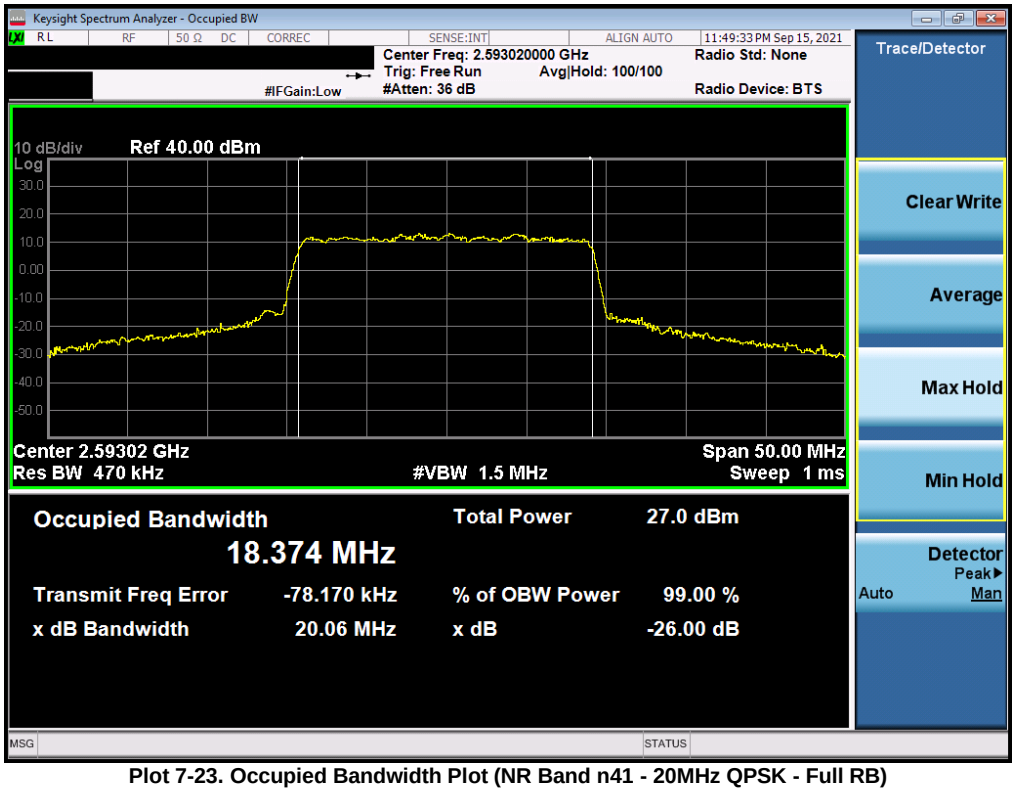
Plot 7-20. Occupied Bandwidth Plot (NR Band n41 - 30MHz QPSK - Full RB)



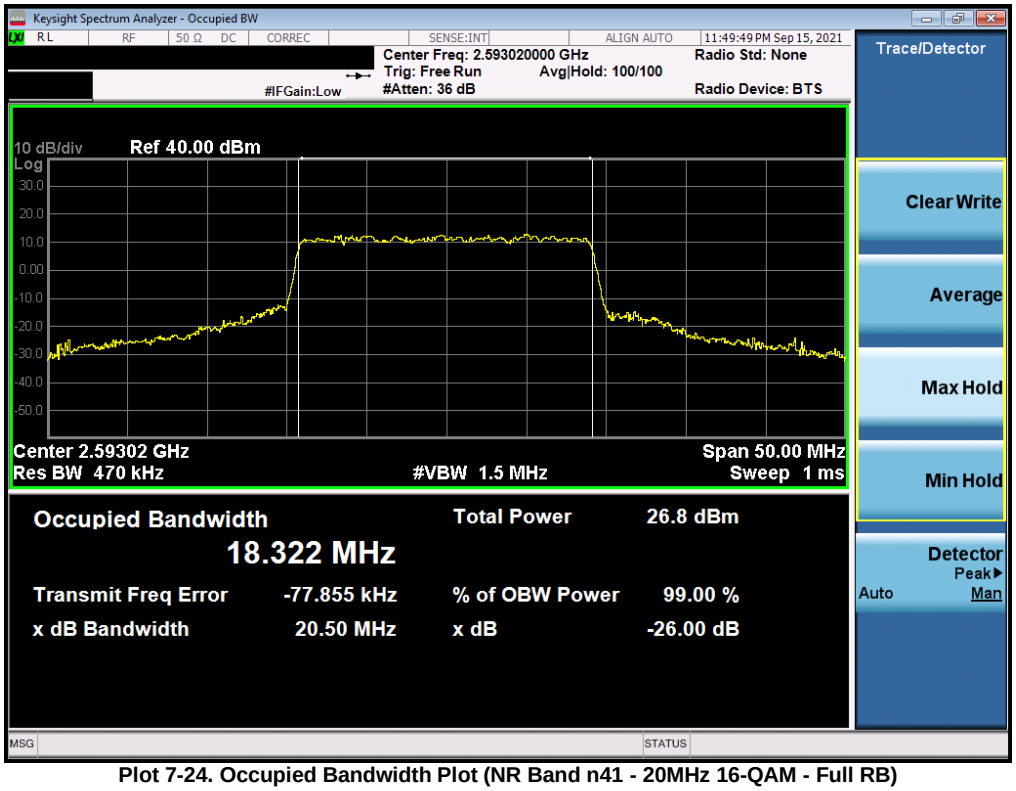
Plot 7-21. Occupied Bandwidth Plot (NR Band n41 - 30MHz 16-QAM - Full RB)



Plot 7-22. Occupied Bandwidth Plot (NR Band n41 - 20MHz π/2 BPSK - Full RB)



Plot 7-23. Occupied Bandwidth Plot (NR Band n41 - 20MHz QPSK - Full RB)



Plot 7-24. 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 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.

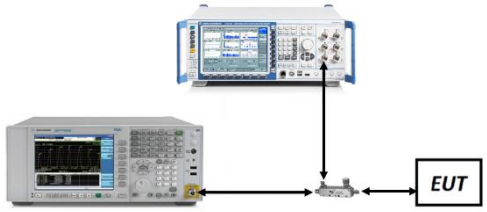


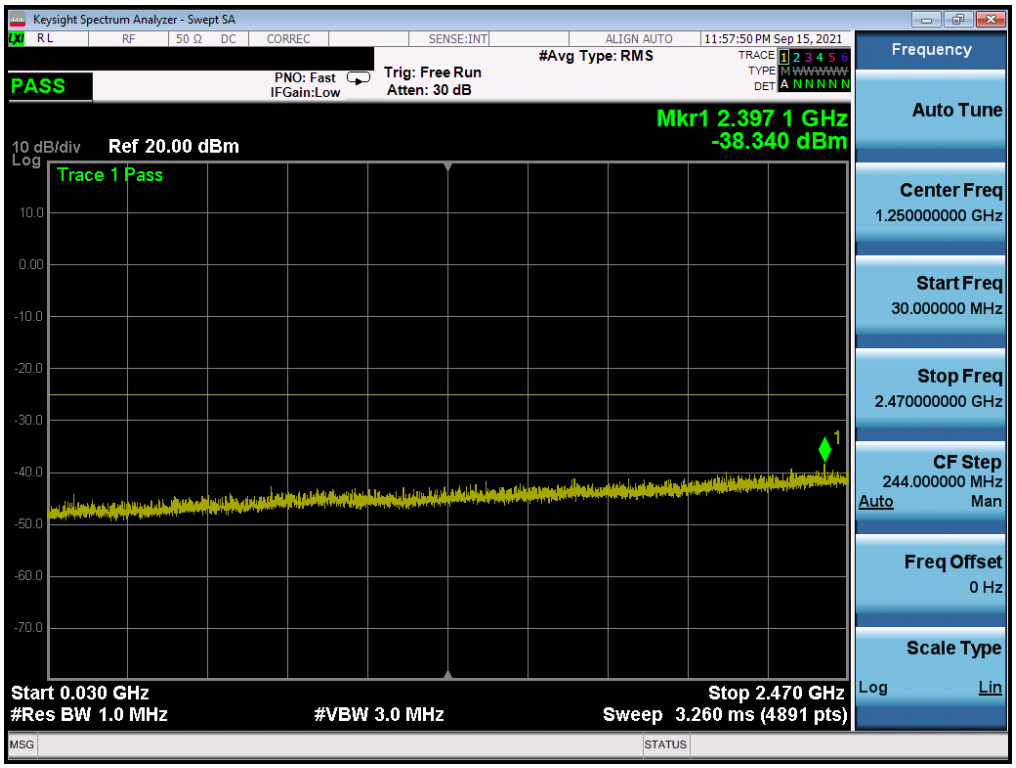
Figure 7-3. Test Instrument & Measurement Setup

Test Notes

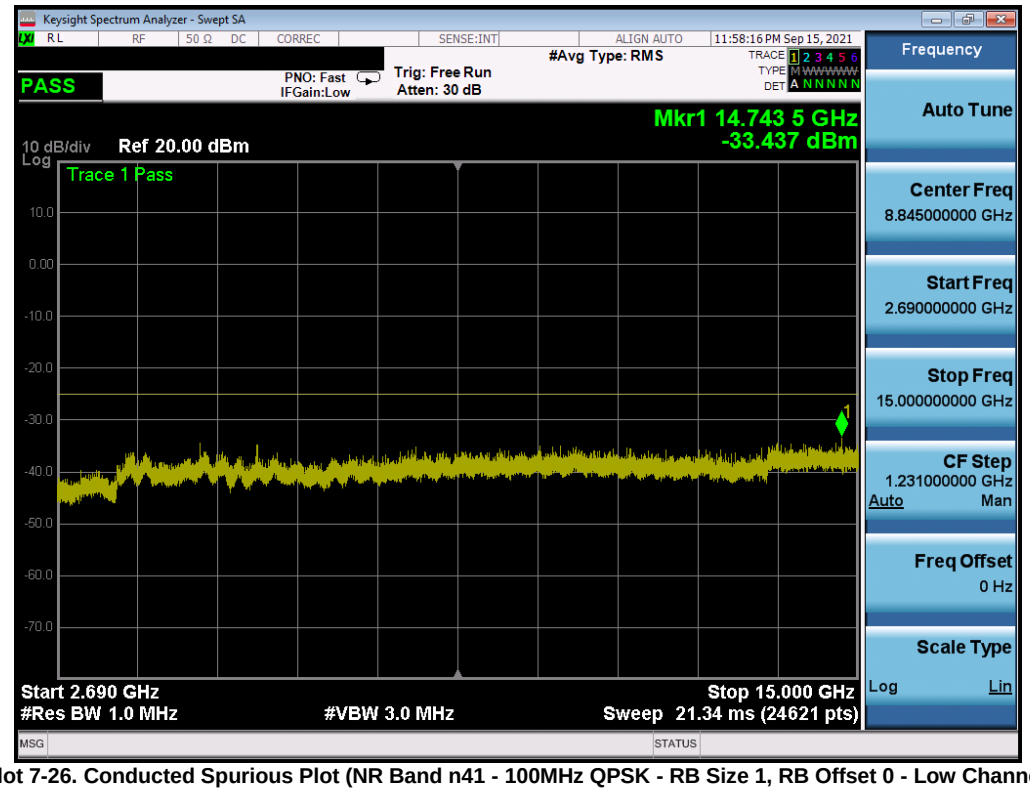
1. Per Part 27, RSS-195 and RSS-199, compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth 100 kHz or greater for measurements below 1GHz. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution 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 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.

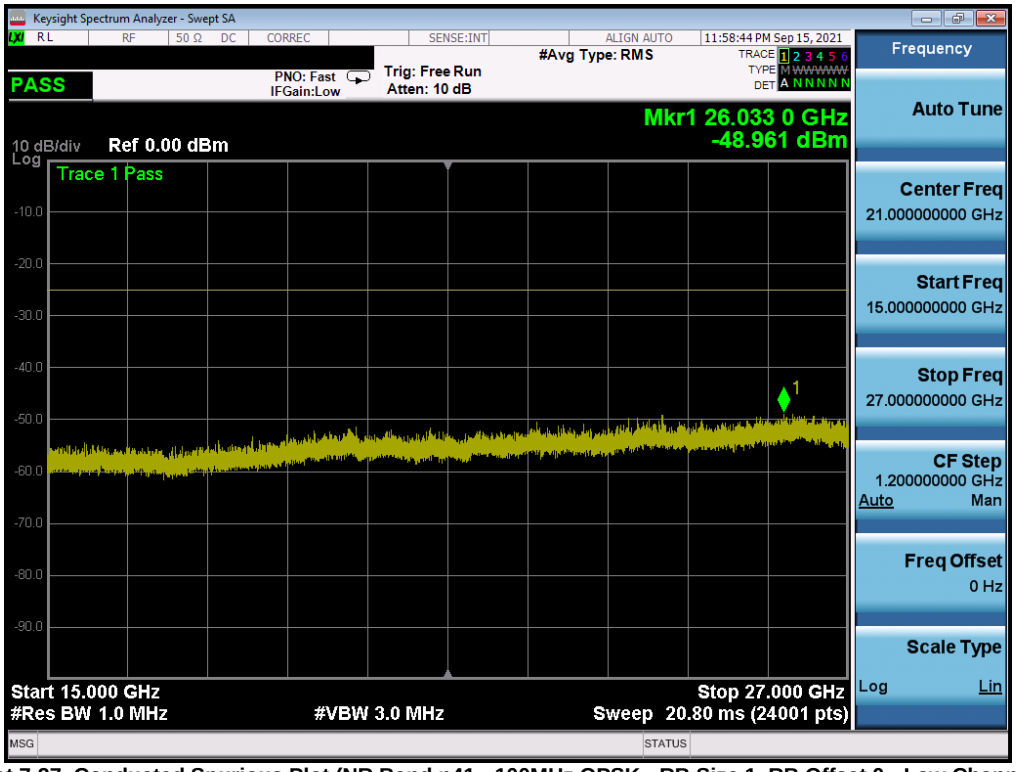
NR Band n41



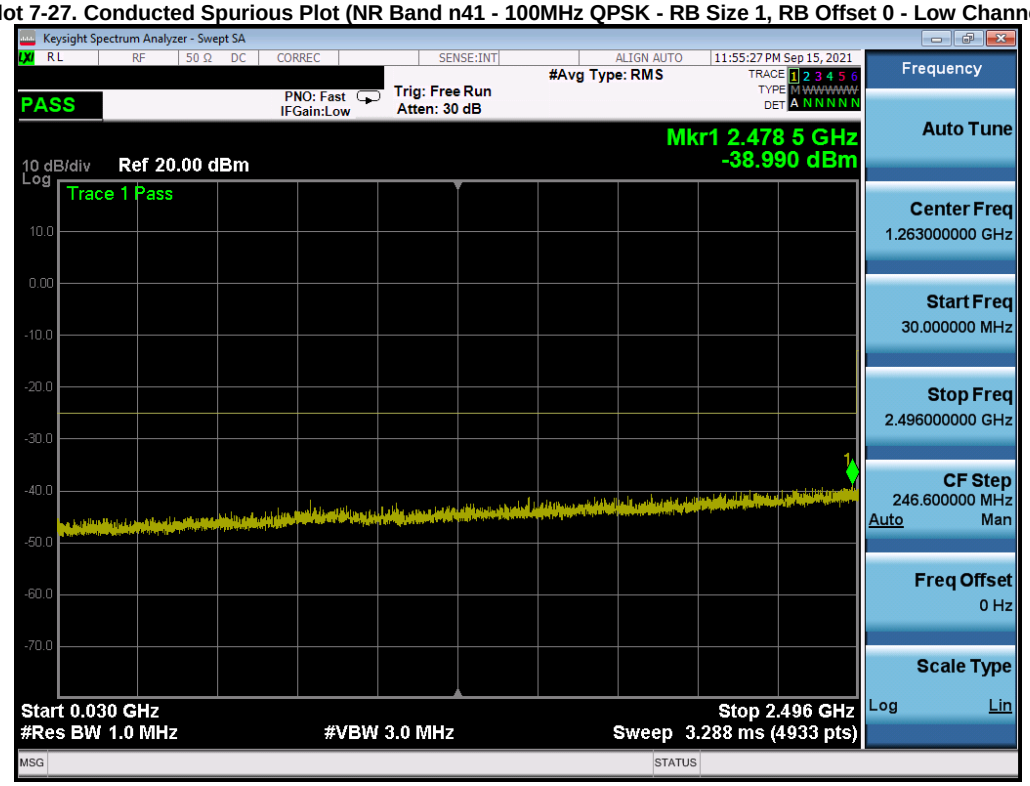
Plot 7-25. Conducted Spurious Plot (NR Band n41 - 100MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



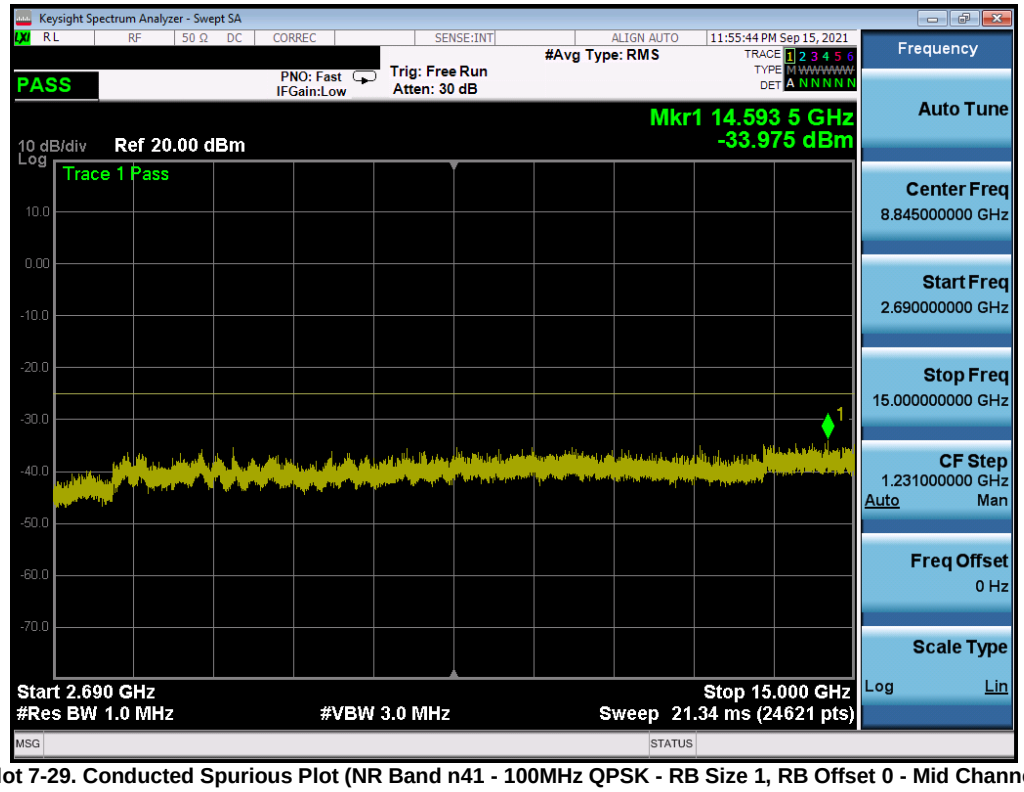
Plot 7-26. Conducted Spurious Plot (NR Band n41 - 100MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



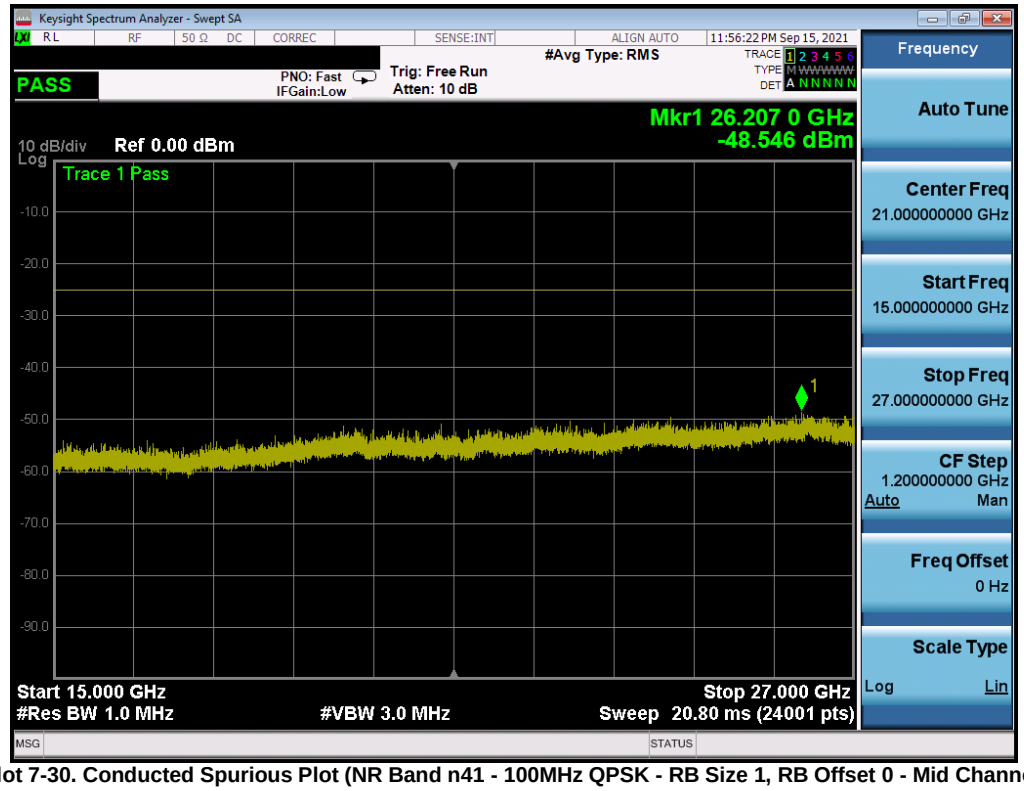
Plot 7-27. Conducted Spurious Plot (NR Band n41 - 100MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



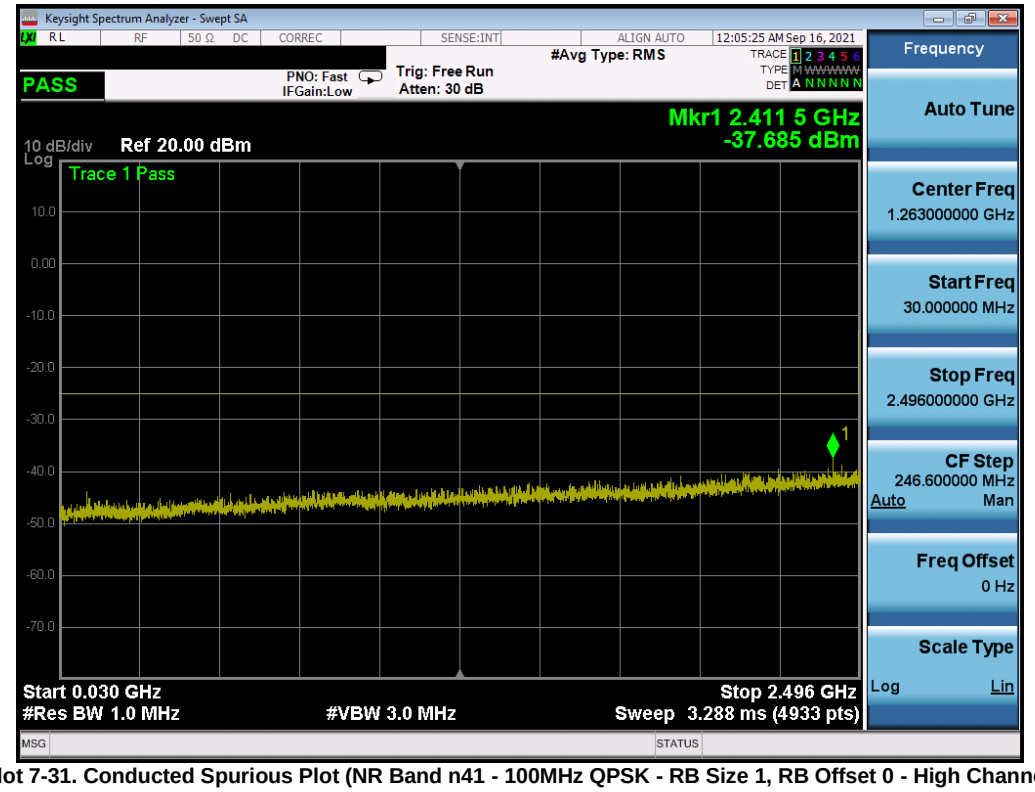
Plot 7-28. Conducted Spurious Plot (NR Band n41 - 100MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)



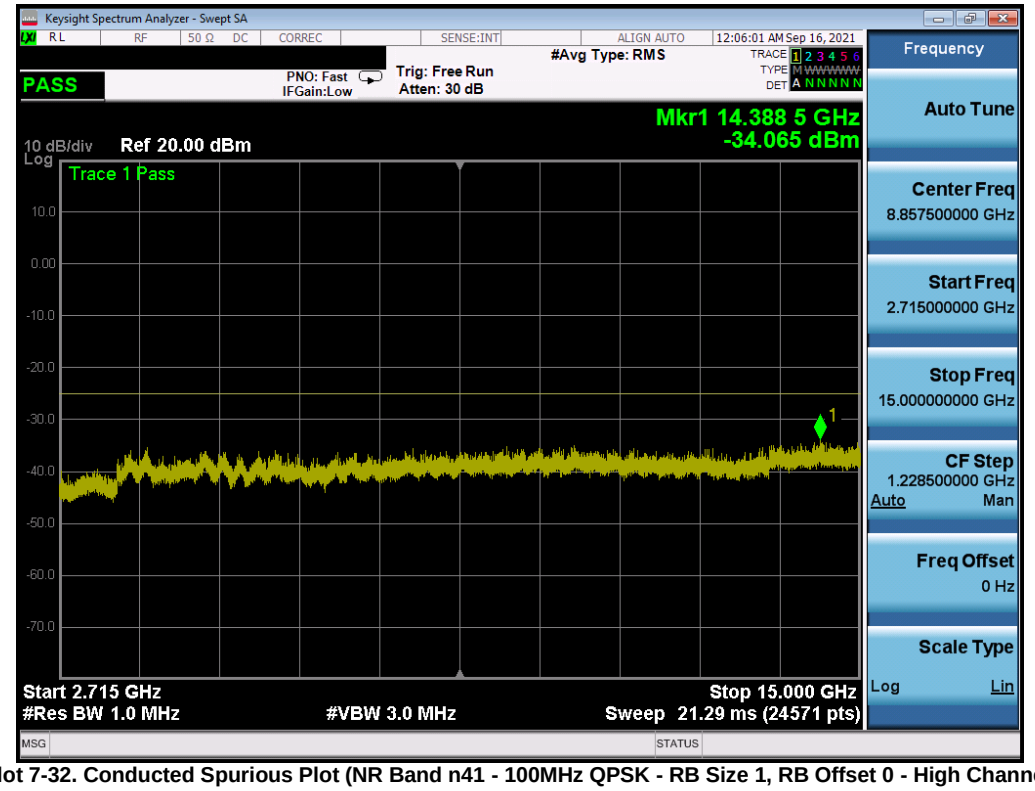
Plot 7-29. Conducted Spurious Plot (NR Band n41 - 100MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)



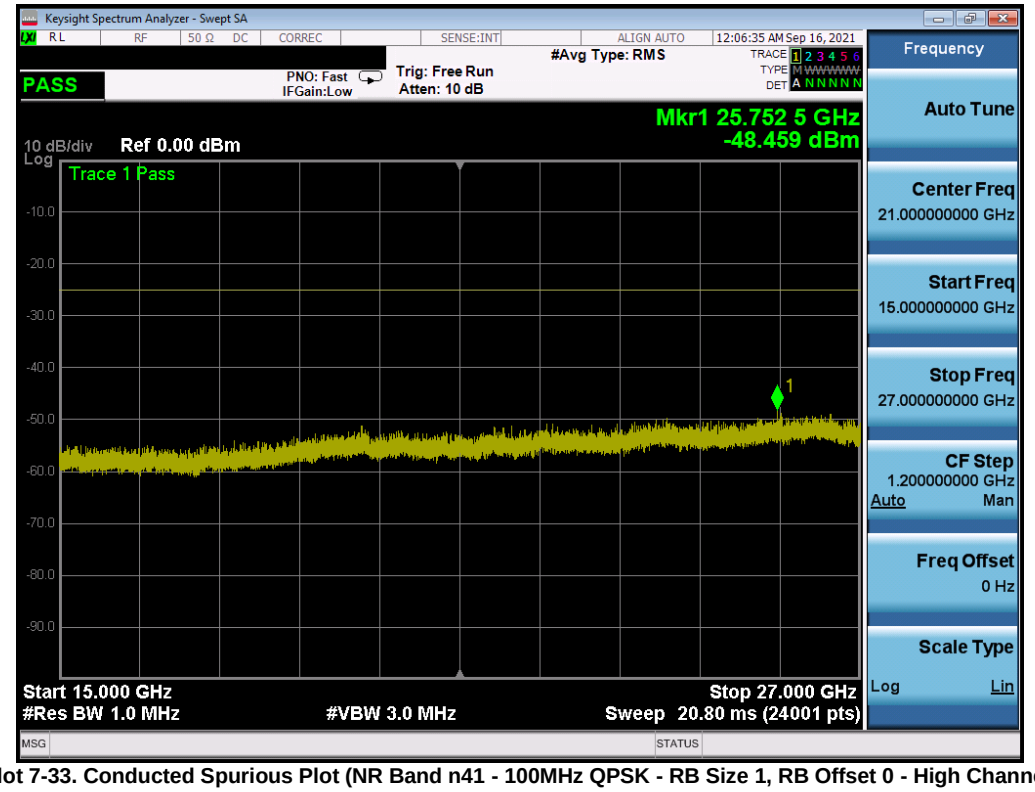
Plot 7-30. Conducted Spurious Plot (NR Band n41 - 100MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)



Plot 7-31. Conducted Spurious Plot (NR Band n41 - 100MHz QPSK - RB Size 1, RB Offset 0 - High Channel)



Plot 7-32. Conducted Spurious Plot (NR Band n41 - 100MHz QPSK - RB Size 1, RB Offset 0 - High Channel)



Plot 7-33. 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 of any spurious emission is 43 + 10 $log_{10}(P_{[Watts]})$, where P is the transmitter power in Watts.

The minimum permissible attenuation level for Band 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.

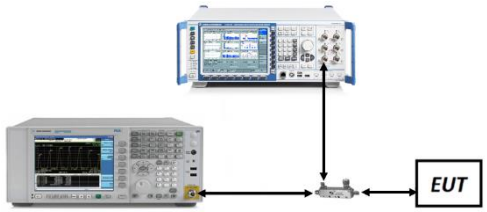


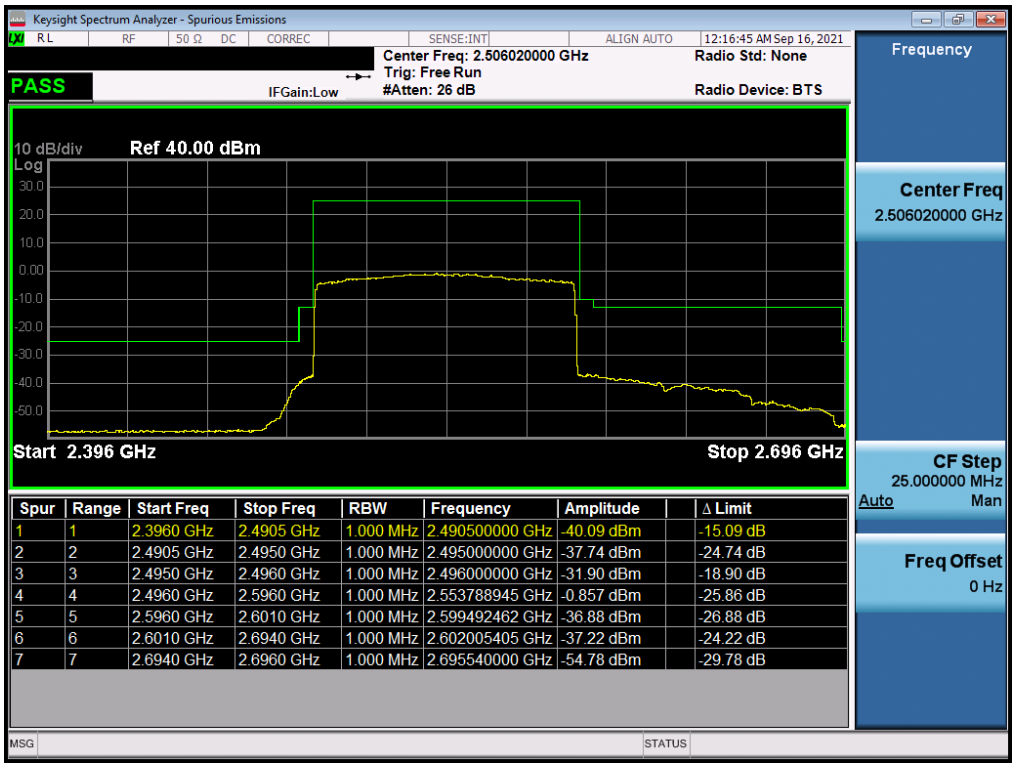
Figure 7-4. Test Instrument & Measurement Setup

Test Notes

1. Per 27.53(m), in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed to demonstrate compliance with the out-of-band emissions limit. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emission are attenuated at least 26 dB below the transmitter power.

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 on 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.



Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.3960 GHz	2.4905 GHz	1.000 MHz	2.490500000 GHz	-40.09 dBm	-15.09 dB
2	2	2.4905 GHz	2.4950 GHz	1.000 MHz	2.495000000 GHz	-37.74 dBm	-24.74 dB
3	3	2.4950 GHz	2.4960 GHz	1.000 MHz	2.496000000 GHz	-31.90 dBm	-18.90 dB
4	4	2.4960 GHz	2.5960 GHz	1.000 MHz	2.553788945 GHz	-0.857 dBm	-25.86 dB
5	5	2.5960 GHz	2.6010 GHz	1.000 MHz	2.599492462 GHz	-36.88 dBm	-26.88 dB
6	6	2.6010 GHz	2.6940 GHz	1.000 MHz	2.602005405 GHz	-37.22 dBm	-24.22 dB
7	7	2.6940 GHz	2.6960 GHz	1.000 MHz	2.695540000 GHz	-54.78 dBm	-29.78 dB

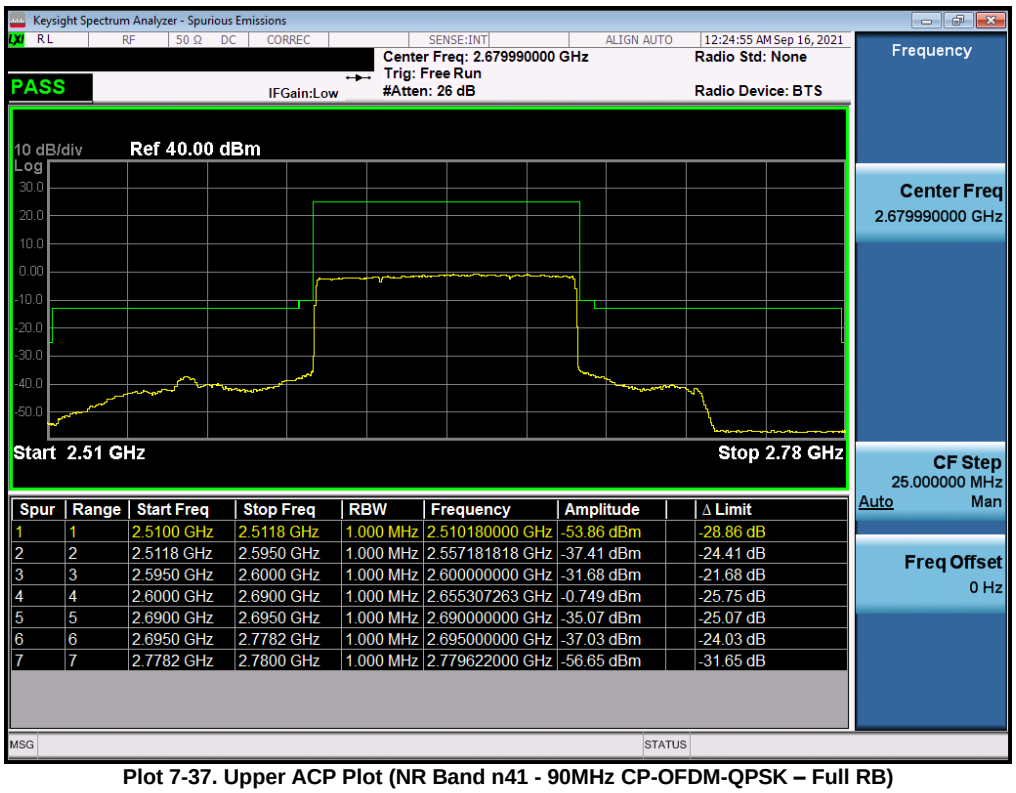
Plot 7-34. Lower ACP Plot (NR Band n41 - 100MHz CP-OFDM-QPSK – Full RB)

Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.4900 GHz	2.4920 GHz	1.000 MHz	2.491860000 GHz	-55.24 dBm	-30.24 dB
2	2	2.4920 GHz	2.5850 GHz	1.000 MHz	2.581983784 GHz	-36.09 dBm	-23.09 dB
3	3	2.5850 GHz	2.5900 GHz	1.000 MHz	2.590000000 GHz	-30.31 dBm	-20.31 dB
4	4	2.5900 GHz	2.6900 GHz	1.000 MHz	2.651306533 GHz	-1.552 dBm	-26.55 dB
5	5	2.6900 GHz	2.6950 GHz	1.000 MHz	2.693643216 GHz	-35.37 dBm	-25.37 dB
6	6	2.6950 GHz	2.7880 GHz	1.000 MHz	2.696005405 GHz	-35.66 dBm	-22.66 dB
7	7	2.7880 GHz	2.7900 GHz	1.000 MHz	2.788520000 GHz	-56.59 dBm	-31.59 dB

Plot 7-35. Upper ACP Plot (NR Band n41 - 100MHz CP-OFDM-QPSK – Full RB)

Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.4060 GHz	2.4905 GHz	1.000 MHz	2.490500000 GHz	-40.89 dBm	-15.89 dB
2	2	2.4905 GHz	2.4950 GHz	1.000 MHz	2.494595000 GHz	-37.39 dBm	-24.39 dB
3	3	2.4950 GHz	2.4960 GHz	910.0 kHz	2.496000000 GHz	-33.63 dBm	-20.63 dB
4	4	2.4960 GHz	2.5860 GHz	1.000 MHz	2.538737430 GHz	-0.799 dBm	-25.80 dB
5	5	2.5860 GHz	2.5910 GHz	1.000 MHz	2.586200000 GHz	-36.33 dBm	-26.33 dB
6	6	2.5910 GHz	2.6742 GHz	1.000 MHz	2.593016970 GHz	-37.50 dBm	-24.50 dB
7	7	2.6742 GHz	2.6760 GHz	1.000 MHz	2.675190000 GHz	-53.76 dBm	-28.76 dB

Plot 7-36. Lower ACP Plot (NR Band n41 - 90MHz CP-OFDM-QPSK – Full RB)



Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.5100 GHz	2.5118 GHz	1.000 MHz	2.510180000 GHz	-53.86 dBm	-28.86 dB
2	2	2.5118 GHz	2.5950 GHz	1.000 MHz	2.557181818 GHz	-37.41 dBm	-24.41 dB
3	3	2.5950 GHz	2.6000 GHz	1.000 MHz	2.600000000 GHz	-31.68 dBm	-21.68 dB
4	4	2.6000 GHz	2.6900 GHz	1.000 MHz	2.655307263 GHz	-0.749 dBm	-25.75 dB
5	5	2.6900 GHz	2.6950 GHz	1.000 MHz	2.690000000 GHz	-35.07 dBm	-25.07 dB
6	6	2.6950 GHz	2.7782 GHz	1.000 MHz	2.695000000 GHz	-37.03 dBm	-24.03 dB
7	7	2.7782 GHz	2.7800 GHz	1.000 MHz	2.779622000 GHz	-56.65 dBm	-31.65 dB

Plot 7-37. Upper ACP Plot (NR Band n41 - 90MHz CP-OFDM-QPSK – Full RB)

Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.4160 GHz	2.4905 GHz	1.000 MHz	2.490500000 GHz	-40.17 dBm	-15.17 dB
2	2	2.4905 GHz	2.4950 GHz	1.000 MHz	2.495000000 GHz	-37.32 dBm	-24.32 dB
3	3	2.4950 GHz	2.4960 GHz	820.0 kHz	2.495980000 GHz	-37.83 dBm	-24.83 dB
4	4	2.4960 GHz	2.5760 GHz	1.000 MHz	2.538264151 GHz	-1.347 dBm	-26.35 dB
5	5	2.5760 GHz	2.5810 GHz	1.000 MHz	2.577700000 GHz	-35.78 dBm	-25.78 dB
6	6	2.5810 GHz	2.6541 GHz	1.000 MHz	2.582008276 GHz	-36.49 dBm	-23.49 dB
7	7	2.6541 GHz	2.6560 GHz	1.000 MHz	2.654423000 GHz	-54.97 dBm	-29.97 dB

Plot 7-38. Lower ACP Plot (NR Band n41 - 80MHz CP-OFDM-QPSK – Full RB)

Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.5300 GHz	2.5319 GHz	1.000 MHz	2.531634000 GHz	-53.26 dBm	-28.26 dB
2	2	2.5319 GHz	2.6050 GHz	1.000 MHz	2.605000000 GHz	-36.38 dBm	-23.38 dB
3	3	2.6050 GHz	2.6100 GHz	1.000 MHz	2.607650000 GHz	-36.18 dBm	-26.18 dB
4	4	2.6100 GHz	2.6900 GHz	1.000 MHz	2.652767296 GHz	-1.775 dBm	-26.77 dB
5	5	2.6900 GHz	2.6950 GHz	1.000 MHz	2.690000000 GHz	-34.59 dBm	-24.59 dB
6	6	2.6950 GHz	2.7681 GHz	1.000 MHz	2.696008276 GHz	-36.30 dBm	-23.30 dB
7	7	2.7681 GHz	2.7700 GHz	1.000 MHz	2.769639000 GHz	-57.02 dBm	-32.02 dB

Plot 7-39. Upper ACP Plot (NR Band n41 - 80MHz CP-OFDM-QPSK – Full RB)

Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.4360 GHz	2.4905 GHz	1.000 MHz	2.490500000 GHz	-39.24 dBm	-14.24 dB
2	2	2.4905 GHz	2.4950 GHz	1.000 MHz	2.494928000 GHz	-36.86 dBm	-23.86 dB
3	3	2.4950 GHz	2.4960 GHz	620.0 kHz	2.496000000 GHz	-37.70 dBm	-24.70 dB
4	4	2.4960 GHz	2.5560 GHz	1.000 MHz	2.537344538 GHz	-0.084 dBm	-25.08 dB
5	5	2.5560 GHz	2.5610 GHz	1.000 MHz	2.556000000 GHz	-27.99 dBm	-17.99 dB
6	6	2.5610 GHz	2.6140 GHz	1.000 MHz	2.561000000 GHz	-35.02 dBm	-22.02 dB
7	7	2.6140 GHz	2.6160 GHz	1.000 MHz	2.614000000 GHz	-53.13 dBm	-28.13 dB

Plot 7-40. Lower ACP Plot (NR Band n41 - 60MHz CP-OFDM-QPSK – Full RB)

Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.5700 GHz	2.5720 GHz	1.000 MHz	2.572000000 GHz	-51.99 dBm	-26.99 dB
2	2	2.5720 GHz	2.6250 GHz	1.000 MHz	2.624495238 GHz	-36.16 dBm	-23.16 dB
3	3	2.6250 GHz	2.6300 GHz	1.000 MHz	2.630000000 GHz	-27.50 dBm	-17.50 dB
4	4	2.6300 GHz	2.6900 GHz	1.000 MHz	2.671344538 GHz	-0.526 dBm	-25.53 dB
5	5	2.6900 GHz	2.6950 GHz	1.000 MHz	2.690000000 GHz	-28.19 dBm	-18.19 dB
6	6	2.6950 GHz	2.7480 GHz	1.000 MHz	2.695000000 GHz	-35.79 dBm	-22.79 dB
7	7	2.7480 GHz	2.7500 GHz	1.000 MHz	2.748100000 GHz	-57.12 dBm	-32.12 dB

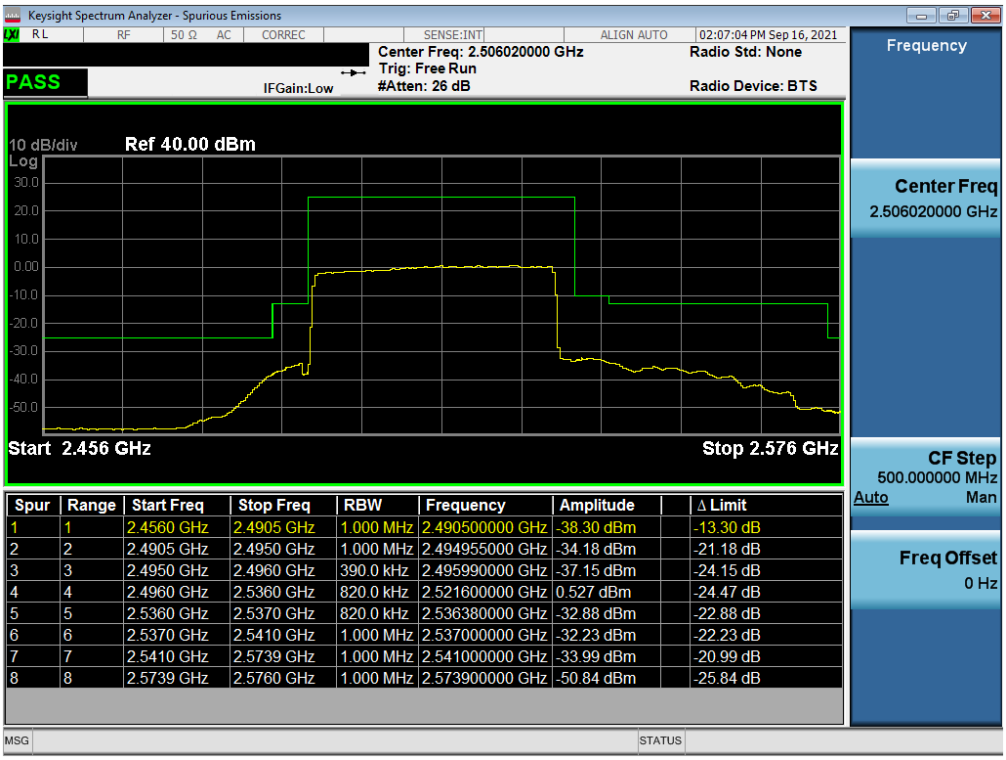
Plot 7-41. Upper ACP Plot (NR Band n41 - 60MHz CP-OFDM-QPSK – Full RB)

Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.4460 GHz	2.4905 GHz	1.000 MHz	2.490500000 GHz	-39.33 dBm	-14.33 dB
2	2	2.4905 GHz	2.4950 GHz	1.000 MHz	2.494955000 GHz	-34.86 dBm	-21.86 dB
3	3	2.4950 GHz	2.4960 GHz	560.0 kHz	2.495400000 GHz	-37.28 dBm	-24.28 dB
4	4	2.4960 GHz	2.5460 GHz	1.000 MHz	2.532500000 GHz	0.895 dBm	-24.11 dB
5	5	2.5460 GHz	2.5510 GHz	1.000 MHz	2.546200000 GHz	-32.64 dBm	-22.64 dB
6	6	2.5510 GHz	2.5938 GHz	1.000 MHz	2.551000000 GHz	-34.82 dBm	-21.82 dB
7	7	2.5938 GHz	2.5960 GHz	1.000 MHz	2.595494000 GHz	-51.73 dBm	-26.73 dB

Plot 7-42. Lower ACP Plot (NR Band n41 - 50MHz CP-OFDM-QPSK – Full RB)

Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.5900 GHz	2.5922 GHz	1.000 MHz	2.590220000 GHz	-52.53 dBm	-27.53 dB
2	2	2.5922 GHz	2.6350 GHz	1.000 MHz	2.635000000 GHz	-36.26 dBm	-23.26 dB
3	3	2.6350 GHz	2.6400 GHz	1.000 MHz	2.640000000 GHz	-34.42 dBm	-24.42 dB
4	4	2.6400 GHz	2.6900 GHz	1.000 MHz	2.678500000 GHz	0.329 dBm	-24.67 dB
5	5	2.6900 GHz	2.6950 GHz	1.000 MHz	2.690000000 GHz	-33.30 dBm	-23.30 dB
6	6	2.6950 GHz	2.7378 GHz	1.000 MHz	2.695000000 GHz	-35.85 dBm	-22.85 dB
7	7	2.7378 GHz	2.7400 GHz	1.000 MHz	2.738614000 GHz	-57.28 dBm	-32.28 dB

Plot 7-43. Upper ACP Plot (NR Band n41 - 50MHz CP-OFDM-QPSK – Full RB)

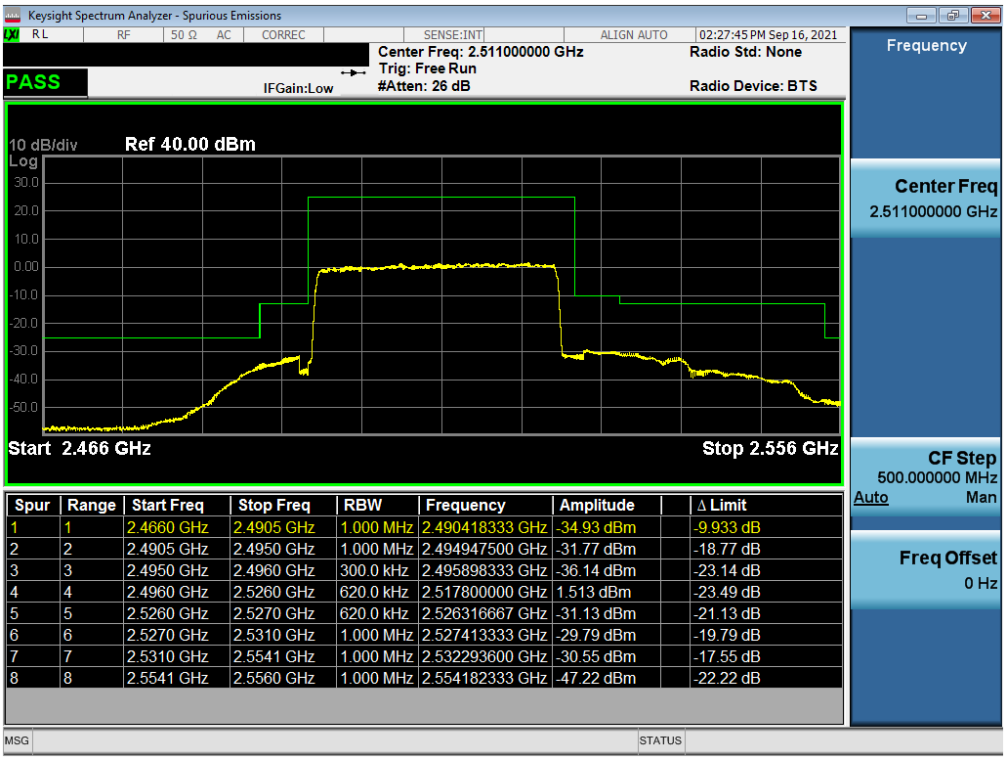


Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.4560 GHz	2.4905 GHz	1.000 MHz	2.490500000 GHz	-38.30 dBm	-13.30 dB
2	2	2.4905 GHz	2.4950 GHz	1.000 MHz	2.494955000 GHz	-34.18 dBm	-21.18 dB
3	3	2.4950 GHz	2.4960 GHz	390.0 kHz	2.495990000 GHz	-37.15 dBm	-24.15 dB
4	4	2.4960 GHz	2.5360 GHz	820.0 kHz	2.521600000 GHz	0.527 dBm	-24.47 dB
5	5	2.5360 GHz	2.5370 GHz	820.0 kHz	2.536380000 GHz	-32.88 dBm	-22.88 dB
6	6	2.5370 GHz	2.5410 GHz	1.000 MHz	2.537000000 GHz	-32.23 dBm	-22.23 dB
7	7	2.5410 GHz	2.5739 GHz	1.000 MHz	2.541000000 GHz	-33.99 dBm	-20.99 dB
8	8	2.5739 GHz	2.5760 GHz	1.000 MHz	2.573900000 GHz	-50.84 dBm	-25.84 dB

Plot 7-44. Lower ACP Plot (NR Band n41 - 40MHz CP-OFDM-QPSK – Full RB)

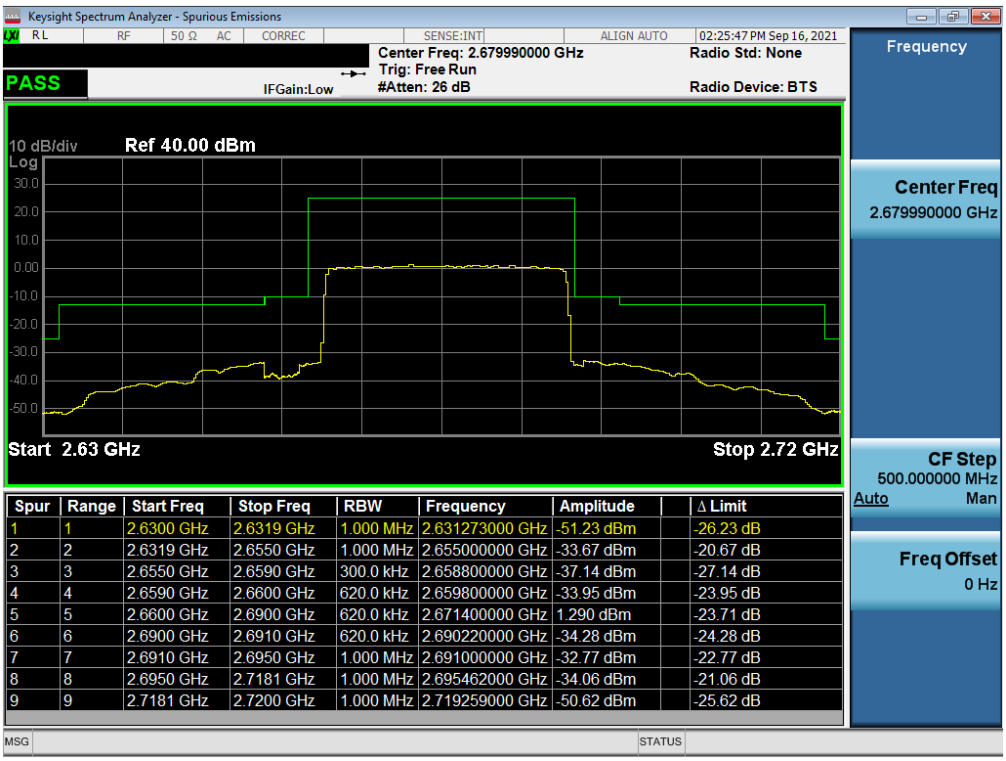
Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.6100 GHz	2.6121 GHz	1.000 MHz	2.612100000 GHz	-52.96 dBm	-27.96 dB
2	2	2.6121 GHz	2.6450 GHz	1.000 MHz	2.645000000 GHz	-36.79 dBm	-23.79 dB
3	3	2.6450 GHz	2.6490 GHz	1.000 MHz	2.648960000 GHz	-34.52 dBm	-24.52 dB
4	4	2.6490 GHz	2.6500 GHz	820.0 kHz	2.649060000 GHz	-35.58 dBm	-25.58 dB
5	5	2.6500 GHz	2.6900 GHz	820.0 kHz	2.672000000 GHz	0.659 dBm	-24.34 dB
6	6	2.6900 GHz	2.6910 GHz	820.0 kHz	2.690000000 GHz	-35.08 dBm	-25.08 dB
7	7	2.6910 GHz	2.6950 GHz	1.000 MHz	2.691040000 GHz	-34.40 dBm	-24.40 dB
8	8	2.6950 GHz	2.7279 GHz	1.000 MHz	2.695000000 GHz	-35.94 dBm	-22.94 dB
9	9	2.7279 GHz	2.7300 GHz	1.000 MHz	2.728362000 GHz	-52.85 dBm	-27.85 dB

Plot 7-45. Upper ACP Plot (NR Band n41 - 40MHz CP-OFDM-QPSK – Full RB)



Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.4660 GHz	2.4905 GHz	1.000 MHz	2.490418333 GHz	-34.93 dBm	-9.933 dB
2	2	2.4905 GHz	2.4950 GHz	1.000 MHz	2.494947500 GHz	-31.77 dBm	-18.77 dB
3	3	2.4950 GHz	2.4960 GHz	300.0 kHz	2.495898333 GHz	-36.14 dBm	-23.14 dB
4	4	2.4960 GHz	2.5260 GHz	620.0 kHz	2.517800000 GHz	1.513 dBm	-23.49 dB
5	5	2.5260 GHz	2.5270 GHz	620.0 kHz	2.526316667 GHz	-31.13 dBm	-21.13 dB
6	6	2.5270 GHz	2.5310 GHz	1.000 MHz	2.527413333 GHz	-29.79 dBm	-19.79 dB
7	7	2.5310 GHz	2.5541 GHz	1.000 MHz	2.532293600 GHz	-30.55 dBm	-17.55 dB
8	8	2.5541 GHz	2.5560 GHz	1.000 MHz	2.554182333 GHz	-47.22 dBm	-22.22 dB

Plot 7-46. Lower ACP Plot (NR Band n41 - 30MHz CP-OFDM-QPSK – Full RB)

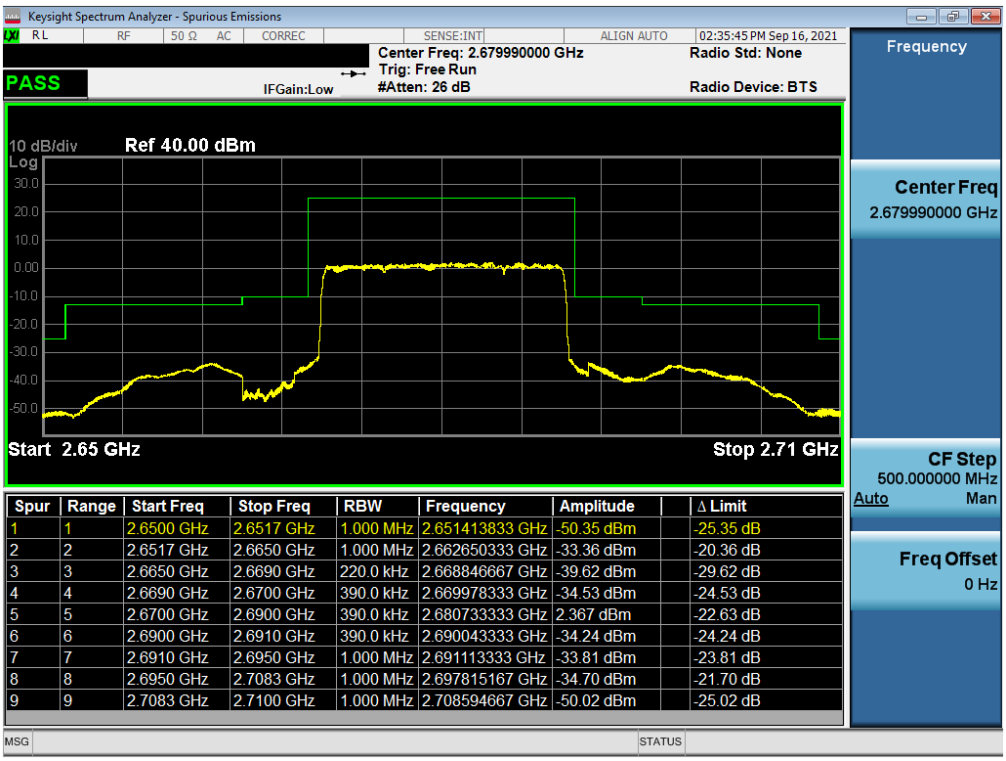


Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.6300 GHz	2.6319 GHz	1.000 MHz	2.631273000 GHz	-51.23 dBm	-26.23 dB
2	2	2.6319 GHz	2.6550 GHz	1.000 MHz	2.655000000 GHz	-33.67 dBm	-20.67 dB
3	3	2.6550 GHz	2.6590 GHz	300.0 kHz	2.658800000 GHz	-37.14 dBm	-27.14 dB
4	4	2.6590 GHz	2.6600 GHz	620.0 kHz	2.659800000 GHz	-33.95 dBm	-23.95 dB
5	5	2.6600 GHz	2.6900 GHz	620.0 kHz	2.671400000 GHz	1.290 dBm	-23.71 dB
6	6	2.6900 GHz	2.6910 GHz	620.0 kHz	2.690220000 GHz	-34.28 dBm	-24.28 dB
7	7	2.6910 GHz	2.6950 GHz	1.000 MHz	2.691000000 GHz	-32.77 dBm	-22.77 dB
8	8	2.6950 GHz	2.7181 GHz	1.000 MHz	2.695462000 GHz	-34.06 dBm	-21.06 dB
9	9	2.7181 GHz	2.7200 GHz	1.000 MHz	2.719259000 GHz	-50.62 dBm	-25.62 dB

Plot 7-47. Upper ACP Plot (NR Band n41 - 30MHz CP-OFDM-QPSK – Full RB)

Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.4760 GHz	2.4905 GHz	1.000 MHz	2.490451667 GHz	-36.38 dBm	-11.38 dB
2	2	2.4905 GHz	2.4950 GHz	1.000 MHz	2.494782500 GHz	-31.40 dBm	-18.40 dB
3	3	2.4950 GHz	2.4960 GHz	200.0 kHz	2.495976667 GHz	-35.80 dBm	-22.80 dB
4	4	2.4960 GHz	2.5160 GHz	390.0 kHz	2.508633333 GHz	1.418 dBm	-23.58 dB
5	5	2.5160 GHz	2.5170 GHz	390.0 kHz	2.516023333 GHz	-31.68 dBm	-21.68 dB
6	6	2.5170 GHz	2.5210 GHz	1.000 MHz	2.517053333 GHz	-29.60 dBm	-19.60 dB
7	7	2.5210 GHz	2.5343 GHz	1.000 MHz	2.523305333 GHz	-31.54 dBm	-18.54 dB
8	8	2.5343 GHz	2.5360 GHz	1.000 MHz	2.534611667 GHz	-44.63 dBm	-19.63 dB

Plot 7-48. Lower ACP Plot (NR Band n41 - 20MHz CP-OFDM-QPSK – Full RB)



Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.6500 GHz	2.6517 GHz	1.000 MHz	2.651413833 GHz	-50.35 dBm	-25.35 dB
2	2	2.6517 GHz	2.6650 GHz	1.000 MHz	2.662650333 GHz	-33.36 dBm	-20.36 dB
3	3	2.6650 GHz	2.6690 GHz	220.0 kHz	2.668846667 GHz	-39.62 dBm	-29.62 dB
4	4	2.6690 GHz	2.6700 GHz	390.0 kHz	2.669978333 GHz	-34.53 dBm	-24.53 dB
5	5	2.6700 GHz	2.6900 GHz	390.0 kHz	2.680733333 GHz	2.367 dBm	-22.63 dB
6	6	2.6900 GHz	2.6910 GHz	390.0 kHz	2.690043333 GHz	-34.24 dBm	-24.24 dB
7	7	2.6910 GHz	2.6950 GHz	1.000 MHz	2.691113333 GHz	-33.81 dBm	-23.81 dB
8	8	2.6950 GHz	2.7083 GHz	1.000 MHz	2.697815167 GHz	-34.70 dBm	-21.70 dB
9	9	2.7083 GHz	2.7100 GHz	1.000 MHz	2.708594667 GHz	-50.02 dBm	-25.02 dB

Plot 7-49. Upper ACP Plot (NR Band n41 - 20MHz CP-OFDM-QPSK – Full RB)

7.6 Radiated Power (EIRP)

Test Overview

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

Test Procedures Used

KDB 971168 D01 v03r01 – Section 5.2.1

ANSI/TIA-603-E-2016 – Section 2.2.17

Test Settings

1. Radiated power measurements are performed using the signal analyzer's "channel power" measurement capability for signals with continuous operation. For signals with burst transmission, the signal analyzer's "time domain power" measurement capability is used
2. RBW = 1 – 5% of the expected OBW, not to exceed 1MHz
3. VBW ≥ 3 x RBW
4. Span = 1.5 times the OBW
5. No. of sweep points ≥ 2 x span / RBW
6. Detector = RMS
7. Trigger is set to "free run" for signals with continuous operation with the sweep times set to "auto". Trigger is set to enable triggering only on full power bursts with the sweep time set less than or equal to the transmission burst duration
8. The integration bandwidth was roughly set equal to the measured OBW of the signal for signals with continuous operation. For signals with burst transmission, the "gating" function was enabled to ensure that measurements are performed during times in which the transmitter is operating at its maximum power
9. Trace mode = trace averaging (RMS) over 100 sweeps
10. The trace was allowed to stabilize

Test Setup

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

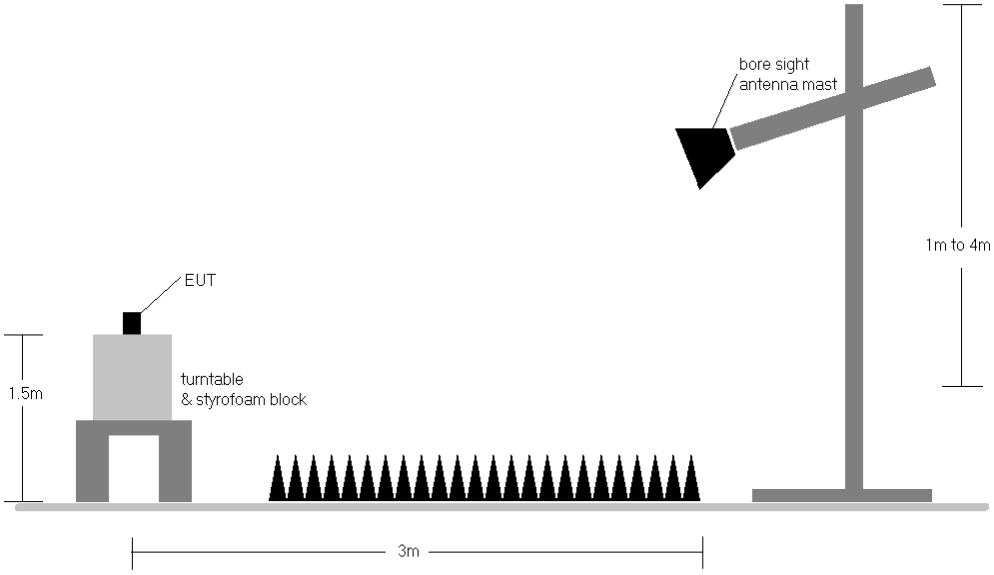


Figure 7-5. Radiated Test Setup >1GHz

Test Notes

1) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the tables below.

2) This unit was tested with its standard battery.

3) 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.

Bandwidth	Mod.	Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Ant. Gain [dBi]	RB Size/Offset	Substitute Level [dBm]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
100 MHz	π/2 BPSK	2546.0	H	114	213	9.38	1 / 68	4.70	14.08	0.026	33.01	-18.93
		2593.0	H	111	214	9.49	1 / 68	5.23	**14.72**	0.030	33.01	-18.29
		2640.0	H	207	213	9.89	1 / 68	4.52	14.41	0.028	33.01	-18.60
	QPSK	2546.0	H	114	213	9.38	1 / 68	4.67	14.05	0.025	33.01	-18.96
		2593.0	H	111	214	9.49	1 / 68	4.49	13.98	0.025	33.01	-19.03
		2640.0	H	207	213	9.89	1 / 68	3.88	13.77	0.024	33.01	-19.24
	16-QAM	2546.0	H	114	213	9.38	1 / 68	4.43	13.81	0.024	33.01	-19.20
90 MHz	π/2 BPSK	2541.0	H	114	213	9.39	1 / 183	4.74	14.13	0.026	33.01	-18.88
		2593.0	H	111	214	9.49	1 / 122	5.25	**14.74**	0.030	33.01	-18.27
		2645.0	H	207	213	9.91	1 / 122	4.51	14.42	0.028	33.01	-18.59
	QPSK	2541.0	H	114	213	9.39	1 / 183	4.58	13.97	0.025	33.01	-19.04
		2593.0	H	111	214	9.49	1 / 122	4.50	13.99	0.025	33.01	-19.02
		2645.0	H	207	213	9.91	1 / 122	3.87	13.78	0.024	33.01	-19.23
	16-QAM	2541.0	H	114	213	9.39	1 / 183	4.54	13.93	0.025	33.01	-19.08
80 MHz	π/2 BPSK	2536.0	H	114	213	9.40	1 / 162	4.60	14.00	0.025	33.01	-19.01
		2593.0	H	111	214	9.49	1 / 54	5.24	**14.74**	0.030	33.01	-18.27
		2650.0	H	207	213	9.93	1 / 54	4.50	14.43	0.028	33.01	-18.58
	QPSK	2536.0	H	114	213	9.40	1 / 162	4.52	13.92	0.025	33.01	-19.09
		2593.0	H	111	214	9.49	1 / 54	4.54	14.03	0.025	33.01	-18.98
		2650.0	H	207	213	9.93	1 / 54	3.81	13.74	0.024	33.01	-19.27
	16-QAM	2536.0	H	114	213	9.40	1 / 162	4.35	13.75	0.024	33.01	-19.26
60 MHz	π/2 BPSK	2526.0	H	114	213	9.43	1 / 121	4.93	14.36	0.027	33.01	-18.65
		2593.0	H	111	214	9.49	1 / 40	5.64	**15.13**	0.033	33.01	-17.88
		2660.0	H	207	213	9.85	1 / 40	4.83	14.68	0.029	33.01	-18.33
	QPSK	2526.0	H	114	213	9.43	1 / 121	4.80	14.24	0.027	33.01	-18.77
		2593.0	H	111	214	9.49	1 / 40	4.93	14.42	0.028	33.01	-18.59
		2660.0	H	207	213	9.85	1 / 40	4.22	14.07	0.026	33.01	-18.94
	16-QAM	2526.0	H	114	213	9.43	1 / 121	4.52	13.95	0.025	33.01	-19.06
50 MHz	π/2 BPSK	2521.0	H	114	213	9.45	1 / 99	4.92	14.37	0.027	33.01	-18.64
		2593.0	H	111	214	9.49	1 / 66	5.59	**15.08**	0.032	33.01	-17.93
		2665.0	H	207	213	9.84	1 / 33	4.88	14.71	0.030	33.01	-18.30
	QPSK	2521.0	H	114	213	9.45	1 / 99	4.74	14.19	0.026	33.01	-18.82
		2593.0	H	111	214	9.49	1 / 66	4.90	14.39	0.027	33.01	-18.62
		2665.0	H	207	213	9.84	1 / 33	4.21	14.05	0.025	33.01	-18.96
	16-QAM	2521.0	H	114	213	9.45	1 / 99	4.59	14.04	0.025	33.01	-18.97
40 MHz	π/2 BPSK	2516.0	H	114	213	9.48	1 / 79	4.98	14.46	0.028	33.01	-18.55
		2593.0	H	111	214	9.49	1 / 26	5.65	**15.14**	0.033	33.01	-17.87
		2670.0	H	207	213	9.82	1 / 26	5.01	14.83	0.030	33.01	-18.18
	QPSK	2516.0	H	114	213	9.48	1 / 79	4.74	14.21	0.026	33.01	-18.80
		2593.0	H	111	214	9.49	1 / 53	4.89	14.38	0.027	33.01	-18.63
		2670.0	H	207	213	9.82	1 / 26	4.29	14.12	0.026	33.01	-18.89
	16-QAM	2516.0	H	114	213	9.48	1 / 79	4.61	14.09	0.026	33.01	-18.92
30 MHz	π/2 BPSK	2511.0	H	114	213	9.50	1 / 58	4.82	14.32	0.027	33.01	-18.69
		2593.0	H	111	214	9.49	1 / 19	5.64	**15.13**	0.033	33.01	-17.88
		2675.0	H	207	213	9.85	1 / 58	4.92	14.76	0.030	33.01	-18.25
	QPSK	2511.0	H	114	213	9.50	1 / 58	4.76	14.26	0.027	33.01	-18.75
		2593.0	H	111	214	9.49	1 / 19	4.97	14.46	0.028	33.01	-18.55
		2675.0	H	207	213	9.85	1 / 58	4.19	14.04	0.025	33.01	-18.97
	16-QAM	2511.0	H	114	213	9.50	1 / 58	4.47	13.97	0.025	33.01	-19.04
20 MHz	π/2 BPSK	2506.0	H	114	213	9.50	1 / 37	4.72	14.22	0.026	33.01	-18.79
		2593.0	H	111	214	9.49	1 / 13	5.65	**15.15**	0.033	33.01	-17.86
		2680.0	H	207	213	9.87	1 / 13	4.80	14.68	0.029	33.01	-18.33
	QPSK	2506.0	H	114	213	9.50	1 / 37	4.57	14.07	0.026	33.01	-18.94
		2593.0	H	111	214	9.49	1 / 13	4.96	14.45	0.028	33.01	-18.56
		2680.0	H	207	213	9.87	1 / 13	4.15	14.02	0.025	33.01	-18.99
	16-QAM	2506.0	H	114	213	9.50	1 / 37	4.24	13.74	0.024	33.01	-19.27
100 MHz	QPSK (CP-OFDM)	2593.0	H	110	217	9.49	1 / 136	3.73	13.22	0.021	33.01	-19.79
	QPSK (Opposite Pol.)	2593.0	V	320	85	9.46	1 / 136	3.34	12.80	0.019	33.01	-20.21
	QPSK (15deg)	2593.0	H	139	328	9.49	1 / 204	4.19	13.68	0.023	33.01	-19.33

Table 7-4. EIRP Data (NR Band n41 – MIMO North)

Bandwidth	Mod.	Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Ant. Gain [dBi]	RB Size/Offset	Substitute Level [dBm]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
100 MHz	π/2 BPSK	2546.0	H	104	218	9.38	1 / 204	9.25	18.63	0.073	33.01	-14.38
		2593.0	H	102	217	9.49	1 / 68	10.29	19.78	0.095	33.01	-13.23
		2640.0	H	167	215	9.89	1 / 204	11.21	**21.10**	0.129	33.01	-11.91
	QPSK	2546.0	H	104	218	9.38	1 / 204	9.24	18.62	0.073	33.01	-14.39
		2593.0	H	102	217	9.49	1 / 68	10.23	19.72	0.094	33.01	-13.29
		2640.0	H	167	215	9.89	1 / 204	10.79	20.68	0.117	33.01	-12.33
	16-QAM	2640.0	H	167	215	9.89	1 / 204	9.94	19.83	0.096	33.01	-13.18
90 MHz	π/2 BPSK	2541.0	H	104	218	9.39	1 / 122	9.34	18.73	0.075	33.01	-14.28
		2593.0	H	102	217	9.49	1 / 61	10.31	19.81	0.096	33.01	-13.20
		2645.0	H	167	215	9.91	1 / 122	11.32	**21.23**	0.133	33.01	-11.78
	QPSK	2541.0	H	104	218	9.39	1 / 122	9.25	18.64	0.073	33.01	-14.37
		2593.0	H	102	217	9.49	1 / 61	10.26	19.76	0.095	33.01	-13.26
		2645.0	H	167	215	9.91	1 / 122	10.80	20.71	0.118	33.01	-12.30
	16-QAM	2645.0	H	167	215	9.91	1 / 122	9.96	19.87	0.097	33.01	-13.14
80 MHz	π/2 BPSK	2536.0	H	104	218	9.40	1 / 108	9.39	18.79	0.076	33.01	-14.22
		2593.0	H	102	217	9.49	1 / 54	10.48	19.97	0.099	33.01	-13.04
		2650.0	H	167	215	9.93	1 / 54	11.34	**21.27**	0.134	33.01	-11.74
	QPSK	2536.0	H	104	218	9.40	1 / 108	9.21	18.61	0.073	33.01	-14.40
		2593.0	H	102	217	9.49	1 / 54	10.17	19.66	0.092	33.01	-13.35
		2650.0	H	167	215	9.93	1 / 54	10.90	20.84	0.121	33.01	-12.17
	16-QAM	2650.0	H	167	215	9.93	1 / 54	10.03	19.96	0.099	33.01	-13.05
60 MHz	π/2 BPSK	2526.0	H	104	218	9.43	1 / 40	9.76	19.19	0.083	33.01	-13.82
		2593.0	H	102	217	9.49	1 / 40	10.72	20.22	0.105	33.01	-12.79
		2660.0	H	167	215	9.85	1 / 40	11.65	**21.50**	0.141	33.01	-11.52
	QPSK	2526.0	H	104	218	9.43	1 / 40	9.52	18.95	0.079	33.01	-14.06
		2593.0	H	102	217	9.49	1 / 40	10.61	20.10	0.102	33.01	-12.91
		2660.0	H	167	215	9.85	1 / 40	11.34	21.19	0.131	33.01	-11.82
	16-QAM	2660.0	H	167	215	9.85	1 / 40	10.44	20.29	0.107	33.01	-12.72
50 MHz	π/2 BPSK	2521.0	H	104	218	9.45	1 / 33	9.81	19.25	0.084	33.01	-13.76
		2593.0	H	102	217	9.49	1 / 33	10.73	20.22	0.105	33.01	-12.79
		2665.0	H	167	215	9.84	1 / 99	11.74	**21.58**	0.144	33.01	-11.43
	QPSK	2521.0	H	104	218	9.45	1 / 33	9.68	19.13	0.082	33.01	-13.88
		2593.0	H	102	217	9.49	1 / 33	10.64	20.13	0.103	33.01	-12.88
		2665.0	H	167	215	9.84	1 / 99	11.16	21.00	0.126	33.01	-12.01
	16-QAM	2665.0	H	167	215	9.84	1 / 99	10.17	20.01	0.100	33.01	-13.00
40 MHz	π/2 BPSK	2516.0	H	104	218	9.48	1 / 53	9.89	19.37	0.086	33.01	-13.64
		2593.0	H	102	217	9.49	1 / 26	10.84	20.33	0.108	33.01	-12.68
		2670.0	H	167	215	9.82	1 / 79	11.88	**21.70**	0.148	33.01	-11.31
	QPSK	2516.0	H	104	218	9.48	1 / 53	9.60	19.08	0.081	33.01	-13.93
		2593.0	H	102	217	9.49	1 / 26	10.52	20.01	0.100	33.01	-13.00
		2670.0	H	167	215	9.82	1 / 79	11.39	21.22	0.132	33.01	-11.79
	16-QAM	2670.0	H	167	215	9.82	1 / 79	10.31	20.14	0.103	33.01	-12.87
30 MHz	π/2 BPSK	2511.0	H	104	218	9.50	1 / 39	9.85	19.36	0.086	33.01	-13.66
		2593.0	H	102	217	9.49	1 / 19	10.71	20.20	0.105	33.01	-12.81
		2675.0	H	167	215	9.85	1 / 58	11.80	**21.65**	0.146	33.01	-11.36
	QPSK	2511.0	H	104	218	9.50	1 / 39	9.64	19.14	0.082	33.01	-13.87
		2593.0	H	102	217	9.49	1 / 19	10.49	19.98	0.100	33.01	-13.03
		2675.0	H	167	215	9.85	1 / 58	11.29	21.13	0.130	33.01	-11.88
	16-QAM	2675.0	H	167	215	9.85	1 / 58	10.25	20.10	0.102	33.01	-12.91
20 MHz	π/2 BPSK	2506.0	H	104	218	9.50	1 / 37	9.88	19.38	0.087	33.01	-13.63
		2593.0	H	102	217	9.49	1 / 13	10.62	20.11	0.103	33.01	-12.90
		2680.0	H	167	215	9.87	1 / 37	11.66	**21.53**	0.142	33.01	-11.48
	QPSK	2506.0	H	104	218	9.50	1 / 37	9.63	19.13	0.082	33.01	-13.88
		2593.0	H	102	217	9.49	1 / 13	10.50	19.99	0.100	33.01	-13.02
		2680.0	H	167	215	9.87	1 / 37	11.23	21.10	0.129	33.01	-11.91
	16-QAM	2680.0	H	167	215	9.87	1 / 37	10.00	19.87	0.097	33.01	-13.14
100 MHz	QPSK (CP-OFDM)	2640.0	H	169	217	9.46	1 / 204	9.69	19.15	0.082	33.01	-13.86
	QPSK (Opposite Pol.)	2640.0	V	117	260	9.46	1 / 204	10.64	20.10	0.102	33.01	-12.91
	QPSK (15deg)	2640.0	H	105	237	9.46	1 / 204	10.88	20.34	0.108	33.01	-12.67

Table 7-5. EIRP Data (NR Band n41 – MIMO South)

7.7 Radiated Spurious Emissions Measurements

Test Overview

Radiated spurious emissions measurements are performed using the field strength conversion method described in KDB 971168 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using horizontally and vertically polarized tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically and horizontally polarized broadband horn antennas. All measurements are performed as RMS measurements while the EUT is operating at maximum power, and at the appropriate frequencies.

Test Procedures Used

KDB 971168 D01 v03r01 – Section 5.8

Test Settings

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

Test Setup

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

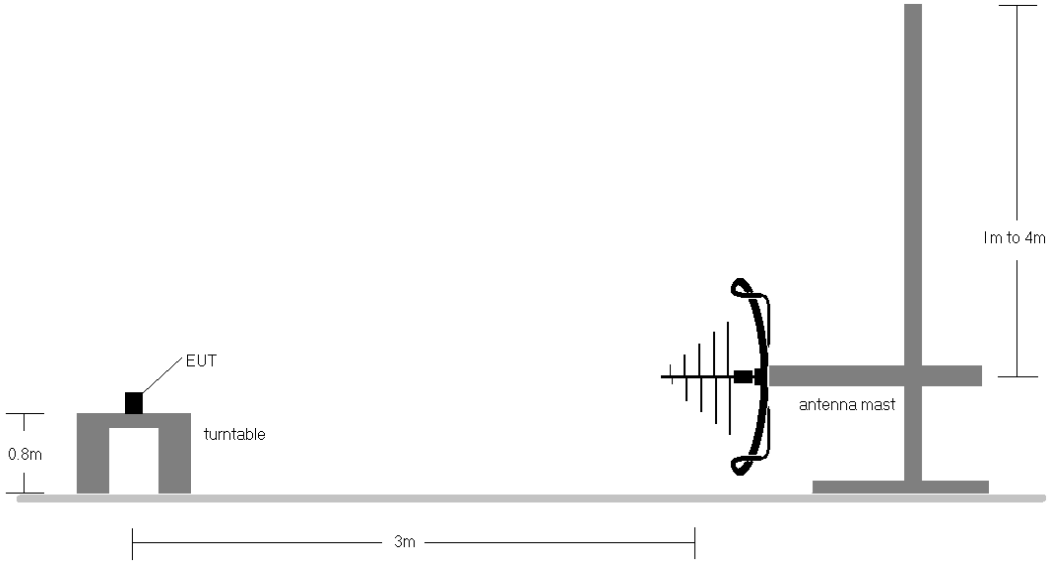


Figure 7-6. Test Instrument & Measurement Setup < 1GHz

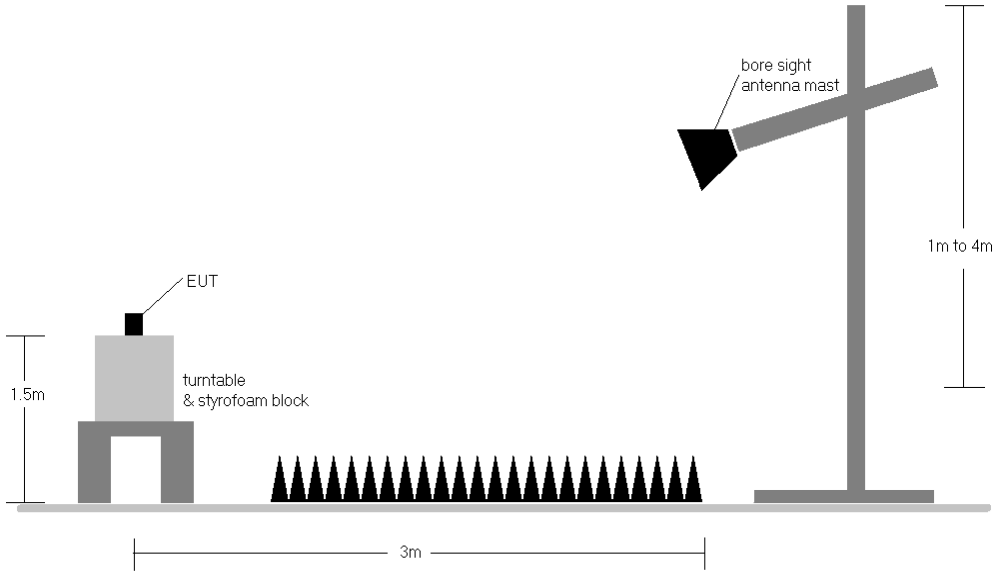


Figure 7-7. Test Instrument & Measurement Setup >1 GHz

Test Notes

1) Field strengths are calculated using the Measurement quantity conversions in KDB 971168 Section 5.8.4.
   a) E(dBµV/m) = Measured amplitude level (dBm) + 107 + Cable Loss (dB) + Antenna Factor (dB/m)
   b) EIRP (dBm) = E(dBµV/m) + 20logD – 104.8; where D is the measurement distance in meters.

2) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the tables below.

3) This unit was tested with its standard battery.

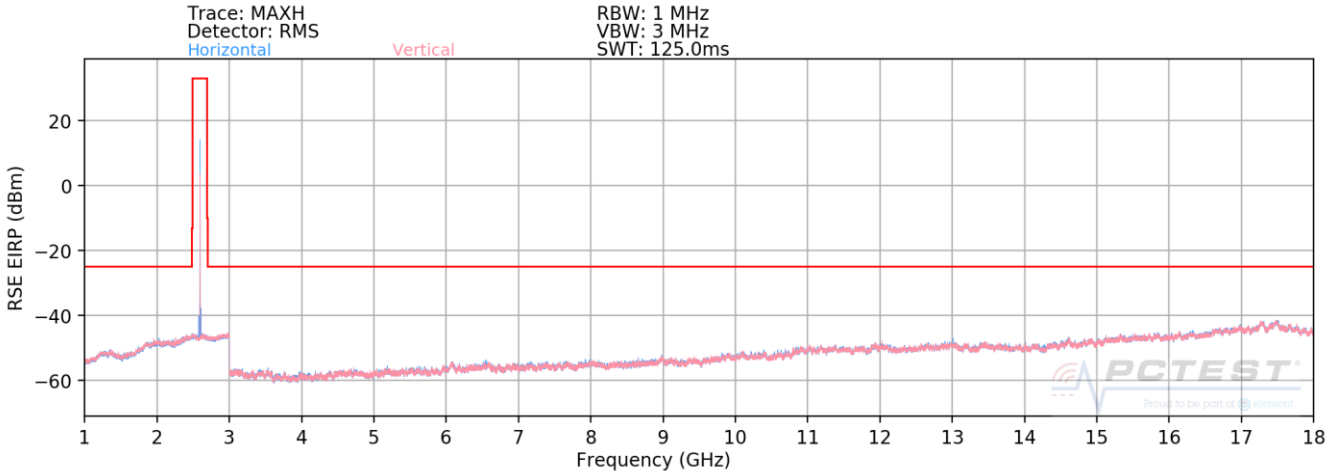
4) The spectrum is measured from 9kHz to the 10th harmonic of the fundamental frequency of the transmitter. The worst-case emissions are reported.

5) Emissions below 18GHz were measured at a 3 meter test distance while emissions above 18GHz were measured at a 1 meter test distance with the application of a distance correction factor.

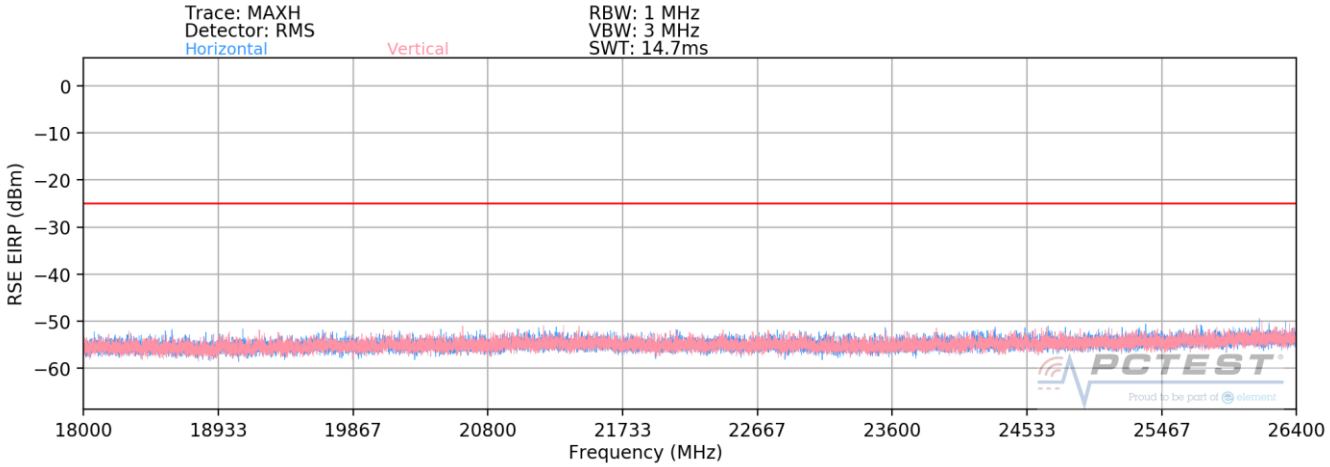
6) The "-" shown in the following RSE tables are used to denote a noise floor measurement.

7) 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.

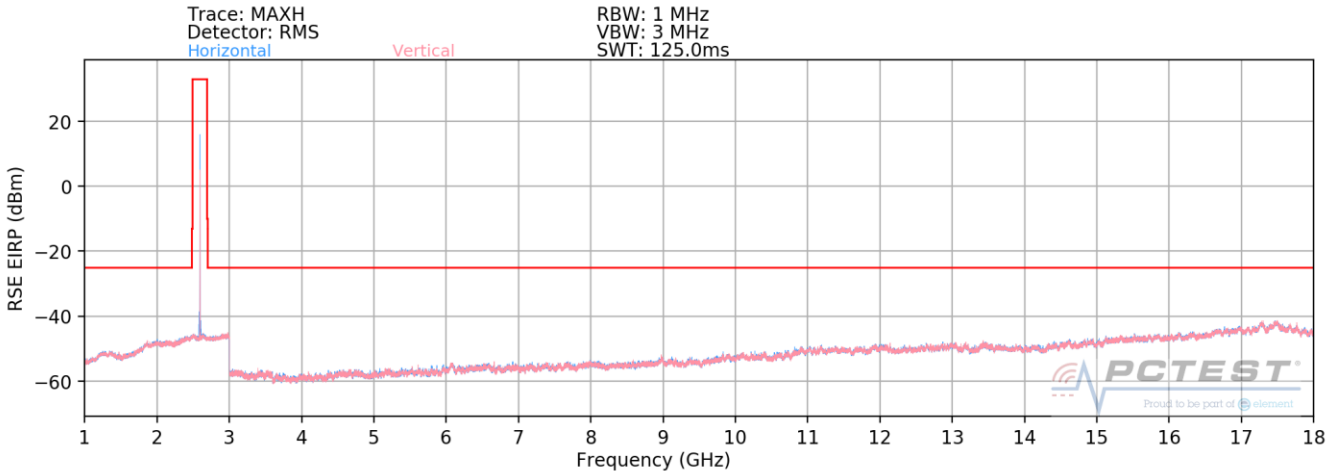
NR Band n41 – MIMO North



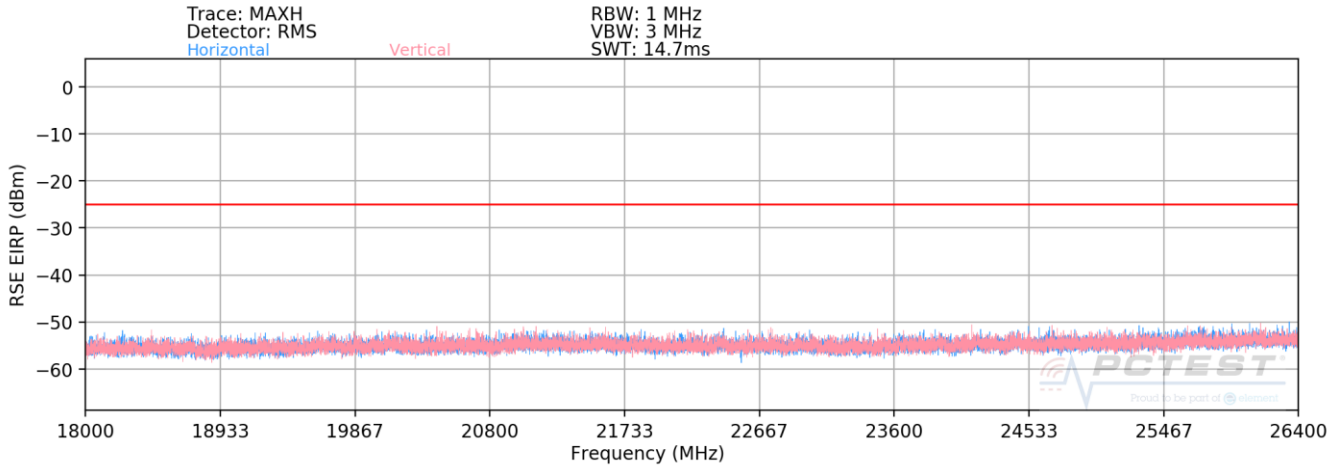
Plot 7-50. Radiated Spurious Plot (NR Band n41 – MIMO North) – Closed



Plot 7-51. Radiated Spurious Plot (NR Band n41 – MIMO North) - Closed



Plot 7-52. Radiated Spurious Plot (NR Band n41 – MIMO North) – Half



Plot 7-53. Radiated Spurious Plot (NR Band n41 – MIMO North) - Half

Bandwidth (MHz):	100
Frequency (MHz):	2546.0
RB / Offset:	1 / 136
Mode:	SA

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
5092.0	V	-	-	-76.42	5.30	35.88	-59.38	-25.00	-34.38
7638.0	V	-	-	-77.32	8.63	38.31	-56.95	-25.00	-31.95
10184.0	V	-	-	-78.21	11.33	40.12	-55.14	-25.00	-30.14
12730.0	V	-	-	-78.72	14.87	43.15	-52.11	-25.00	-27.11

Table 7-6. Radiated Spurious Data (NR Band n41 – Low Channel – MIMO North)

Bandwidth (MHz):	100
Frequency (MHz):	2593.0
RB / Offset:	1 / 136
Mode:	SA

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
5186.0	V	-	-	-76.55	6.27	36.72	-58.54	-25.00	-33.54
7779.0	V	-	-	-77.09	7.64	37.55	-57.71	-25.00	-32.71
10372.0	V	-	-	-78.51	11.99	40.48	-54.78	-25.00	-29.78
12965.0	V	-	-	-78.48	15.05	43.57	-51.68	-25.00	-26.68

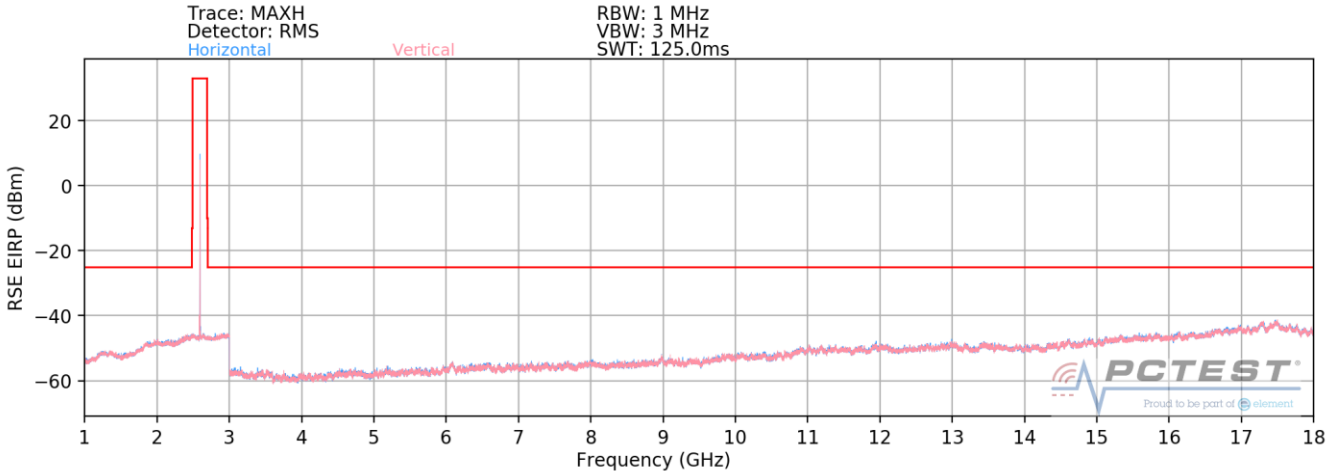
Table 7-7. Radiated Spurious Data (NR Band n41 – Mid Channel – MIMO North)

Bandwidth (MHz):	100
Frequency (MHz):	2640.0
RB / Offset:	1 / 136
Mode:	SA

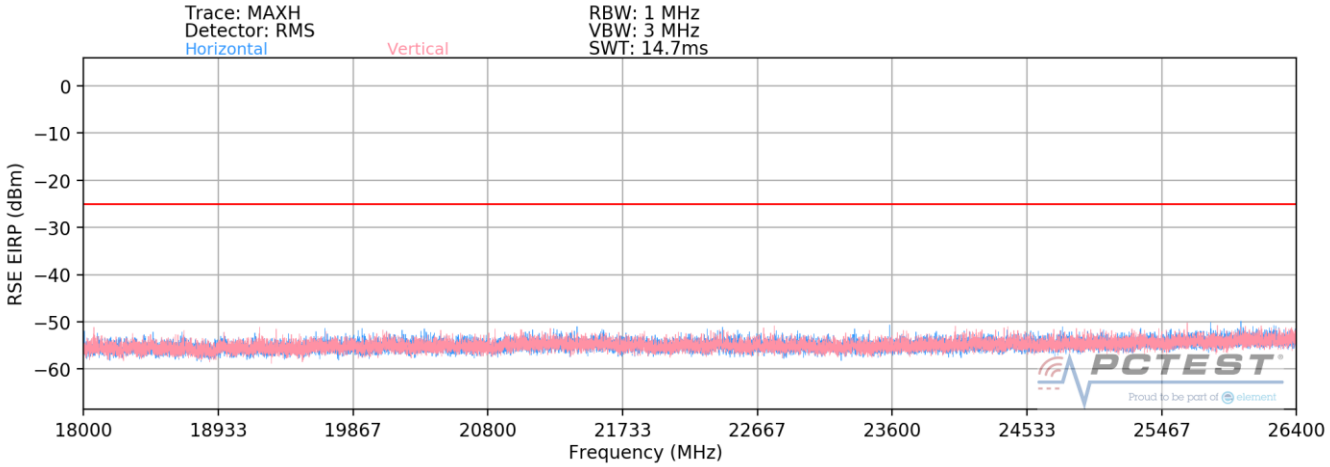
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
5280.0	V	-	-	-76.28	5.34	36.06	-59.20	-25.00	-34.20
7920.0	V	-	-	-77.16	8.73	38.57	-56.69	-25.00	-31.69
10560.0	V	-	-	-78.79	11.65	39.86	-55.40	-25.00	-30.40
13200.0	V	-	-	-78.66	14.93	43.27	-51.99	-25.00	-26.99

Table 7-8. Radiated Spurious Data (NR Band n41 – High Channel – MIMO North)

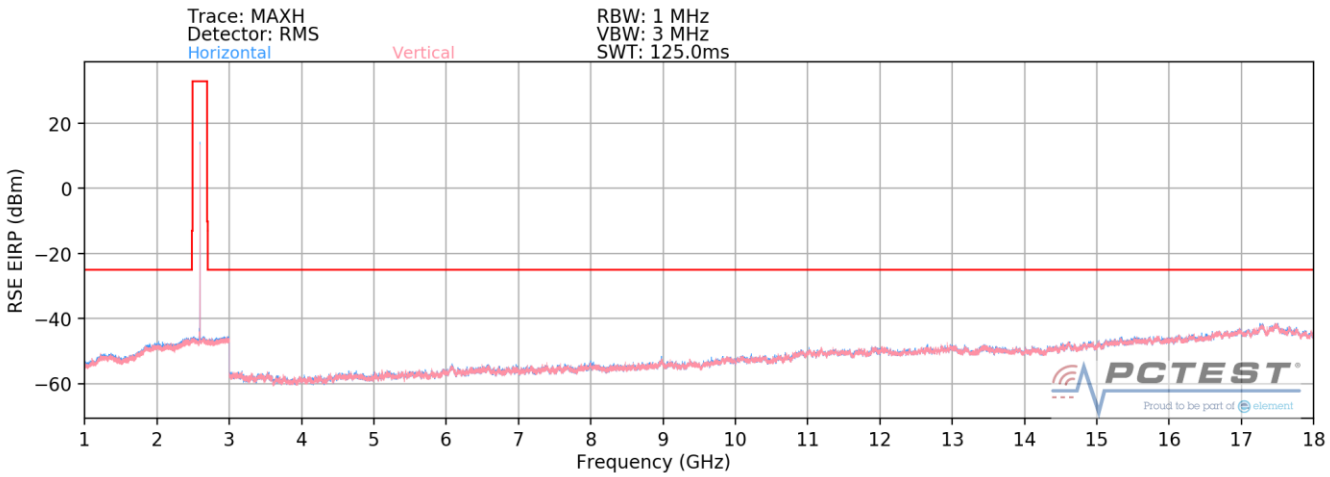
NR Band n41 – MIMO South



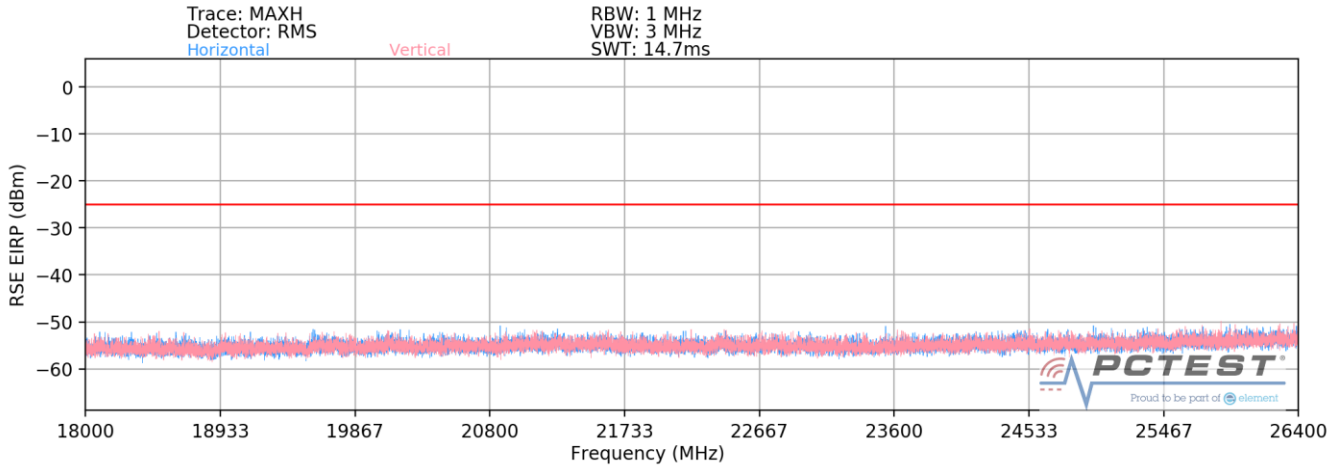
Plot 7-54. Radiated Spurious Plot (NR Band n41 – MIMO South) – Closed



Plot 7-55. Radiated Spurious Plot (NR Band n41 – MIMO South) – Closed



Plot 7-56. Radiated Spurious Plot (NR Band n41 – MIMO South) – Flip



Plot 7-57. Radiated Spurious Plot (NR Band n41 – MIMO South) – Flip

Bandwidth (MHz):	100
Frequency (MHz):	2546.0
RB / Offset:	1 / 136
Mode:	SA

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
5092.0	V	-	-	-76.42	5.30	35.88	-59.38	-25.00	-34.38
7638.0	V	113	266	-76.26	8.63	39.37	-55.89	-25.00	-30.89
10184.0	V	-	-	-78.30	11.33	40.03	-55.23	-25.00	-30.23
12730.0	V	-	-	-78.63	14.87	43.24	-52.02	-25.00	-27.02
15276.0	V	-	-	-78.54	17.12	45.58	-49.68	-25.00	-24.68

Table 7-9. Radiated Spurious Data (NR Band n41 – Low Channel – MIMO South)

Bandwidth (MHz):	100
Frequency (MHz):	2593.0
RB / Offset:	1 / 136
Mode:	SA

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
5186.0	V	-	-	-76.71	6.27	36.56	-58.70	-25.00	-33.70
7779.0	V	139	348	-73.30	7.64	41.34	-53.92	-25.00	-28.92
10372.0	V	-	-	-78.74	11.99	40.25	-55.01	-25.00	-30.01
12965.0	V	-	-	-78.26	15.05	43.79	-51.46	-25.00	-26.46
15558.0	V	-	-	-78.39	17.37	45.98	-49.27	-25.00	-24.27

Table 7-10. Radiated Spurious Data (NR Band n41 – Mid Channel – MIMO South)

Bandwidth (MHz):	100
Frequency (MHz):	2640.0
RB / Offset:	1 / 136
Mode:	SA

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
5280.0	V	-	-	-76.44	5.34	35.90	-59.36	-25.00	-34.36
7920.0	V	113	358	-76.18	8.73	39.55	-55.71	-25.00	-30.71
10560.0	V	-	-	-78.75	11.65	39.90	-55.36	-25.00	-30.36
13200.0	V	-	-	-78.18	14.93	43.75	-51.51	-25.00	-26.51
15840.0	V	-	-	-79.22	18.69	46.47	-48.78	-25.00	-23.78

Table 7-11. Radiated Spurious Data (NR Band n41 – High Channel – MIMO South)

8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **Microsoft Corporation Portable Handset FCC ID:C3K1995** complies with all the requirements of Part 27 of the FCC rules.