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PART 27 MEASUREMENT REPORT

Applicant Name:
SONY Corporation
1-7-1 Konan
Minato-ku
Tokyo, 108-0075, Japan

Date of Testing:
8/2 – 9/23/2021
Test Site/Location:
PCTEST Lab. Columbia, MD, USA
Test Report Serial No.:
1M2108040087-05-R1.PY7

FCC ID:	**PY7-95324M**
Applicant Name:	**SONY Corporation**

Application Type:	Certification
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

Note: This revised Test Report (S/N: 1M2108040087-05-R1.PY7) supersedes and replaces the previously issued test report on the same subject device for the same type of testing as indicated. Please discard or destroy the previously issued test report(s) and dispose of it accordingly.

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.

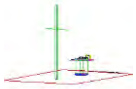
I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

Randy Ortanez
President

ACCREDITED
CERT #2041.01

TABLE OF CONTENTS

PART 27 MEASUREMENT REPORT



Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	EIRP		Emission Designator
				Max. Power [W]	Max. Power [dBm]	
LTE Band 41(PC3)	20 MHz	QPSK	2506.0 - 2680.0	0.177	22.47	18M0G7D
		16QAM	2506.0 - 2680.0	0.148	21.71	18M0W7D
	15 MHz	QPSK	2503.5 - 2682.5	0.187	22.71	13M5G7D
		16QAM	2503.5 - 2682.5	0.139	21.42	13M5W7D
	10 MHz	QPSK	2501.0 - 2685.0	0.168	22.26	9M02G7D
		16QAM	2501.0 - 2685.0	0.128	21.07	9M00W7D
	5 MHz	QPSK	2498.5 - 2687.5	0.131	21.17	4M55G7D
		16QAM	2498.5 - 2687.5	0.120	20.80	4M52W7D
NR Band n41	100 MHz	π/2 BPSK	2546.0 - 2640.0	0.140	21.47	96M5G7D
		QPSK	2546.0 - 2640.0	0.136	21.33	97M4G7D
		16QAM	2546.0 - 2640.0	0.117	20.68	97M3W7D
	90 MHz	π/2 BPSK	2541.0 - 2645.0	0.144	21.60	86M7G7D
		QPSK	2541.0 - 2645.0	0.132	21.21	87M5G7D
		16QAM	2541.0 - 2645.0	0.145	21.61	87M3W7D
	80 MHz	π/2 BPSK	2536.0 - 2650.0	0.144	21.59	77M0G7D
		QPSK	2536.0 - 2650.0	0.135	21.30	77M7G7D
		16QAM	2536.0 - 2650.0	0.149	21.73	77M6W7D
	60 MHz	π/2 BPSK	2526.0 - 2660.0	0.155	21.91	58M1G7D
		QPSK	2526.0 - 2660.0	0.142	21.51	58M1G7D
		16QAM	2526.0 - 2660.0	0.159	22.01	58M2W7D
	50 MHz	π/2 BPSK	2521.0 - 2665.0	0.155	21.92	45M9G7D
		QPSK	2521.0 - 2665.0	0.143	21.55	47M7G7D
		16QAM	2521.0 - 2665.0	0.162	22.09	47M6W7D
	40 MHz	π/2 BPSK	2516.0 - 2670.0	0.159	22.00	35M8G7D
		QPSK	2516.0 - 2670.0	0.145	21.62	38M0G7D
		16QAM	2516.0 - 2670.0	0.160	22.04	38M0W7D
	30 MHz	π/2 BPSK	2511.0 - 2675.0	0.156	21.93	26M9G7D
		QPSK	2511.0 - 2675.0	0.145	21.62	27M8G7D
		16QAM	2511.0 - 2675.0	0.157	21.97	27M9W7D
	20 MHz	π/2 BPSK	2506.0 - 2680.0	0.151	21.80	18M0G7D
		QPSK	2506.0 - 2680.0	0.142	21.53	18M3G7D
		16QAM	2506.0 - 2680.0	0.157	21.97	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 **SONY Portable Handset FCC ID: PY7-95324M**. 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.: 44909, 45088, 00J9M

2.2 Device Capabilities

This device contains the following capabilities:

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, 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 3.4 of this test report for a description of the radiated and antenna port conducted emissions tests.

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 414788 D01.

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

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
-	LTx4	Licensed Transmitter Cable Set	3/12/2021	Annual	3/12/2022	LTx4
-	LTx5	LIcensed Transmitter Cable Set	3/3/2021	Annual	3/3/2022	LTx5
Agilent	E5515C	Wireless Communications Test Set	N/A			GB45360985
Agilent	N9030A	50GHz PXA Signal Analyzer	1/20/2021	Annual	1/20/2022	US51350301
Anritsu	MT8821C	Radio Communication Analyzer	N/A			6201525694
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	3117	1-18 GHz DRG Horn (Medium)	4/20/2021	Biennial	4/20/2023	00125518
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
Mini-Circuits	SSG-4000HP	Synthesized Signal Generator	N/A			11208010032
Mini-Circuits	SSG-4000HP	Synthesized Signal Generator	N/A			11403100002
Rohde & Schwarz	CMW500	Radio Communication Tester	N/A			100976
Rohde & Schwarz	CMW500	Radio Communication Tester	N/A			112347
Rohde & Schwarz	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
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	7/27/2020	Biennial	7/27/2022	A051107
Sunol	JB6	LB6 Antenna	11/13/2020	Biennial	11/13/2022	A082816

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: SONY Corporation

FCC ID: PY7-95324M

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

Mode(s): LTE/NR

Test Condition	Test Description	FCC Part Section(s)	Test Limit	Test Result	Reference
CONDUCTED	Transmitter Conducted Output Power*	2.1046(a), 2.1046(c)	N/A	PASS	Section 7.2
	Occupied Bandwidth	2.1049(h)	N/A	PASS	Section 7.3
	Conducted Band Edge / Spurious Emissions (LTE Band 41; 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
	Frequency Stability	2.1055, 27.54	Fundamental emissions stay within authorized frequency block	PASS	Section 7.8
RADIATED	Equivalent Isotropic Radiated Power (LTE Band 41; NR Band n41)	27.50(h)(2)	≤ 2 Watts max. EIRP	PASS	Section 7.6
	Radiated Spurious Emissions (LTE Band 41; 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 (FCC)

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 v1.1.

7.2 Occupied Bandwidth

Test Overview

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

Test Procedure Used

KDB 971168 D01 v03r01 – Section 4.2

Test Settings

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

Test Setup

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

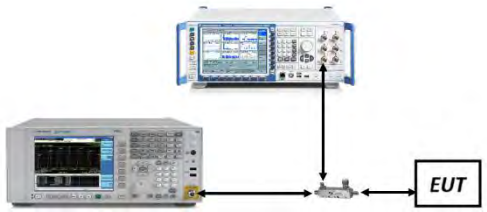
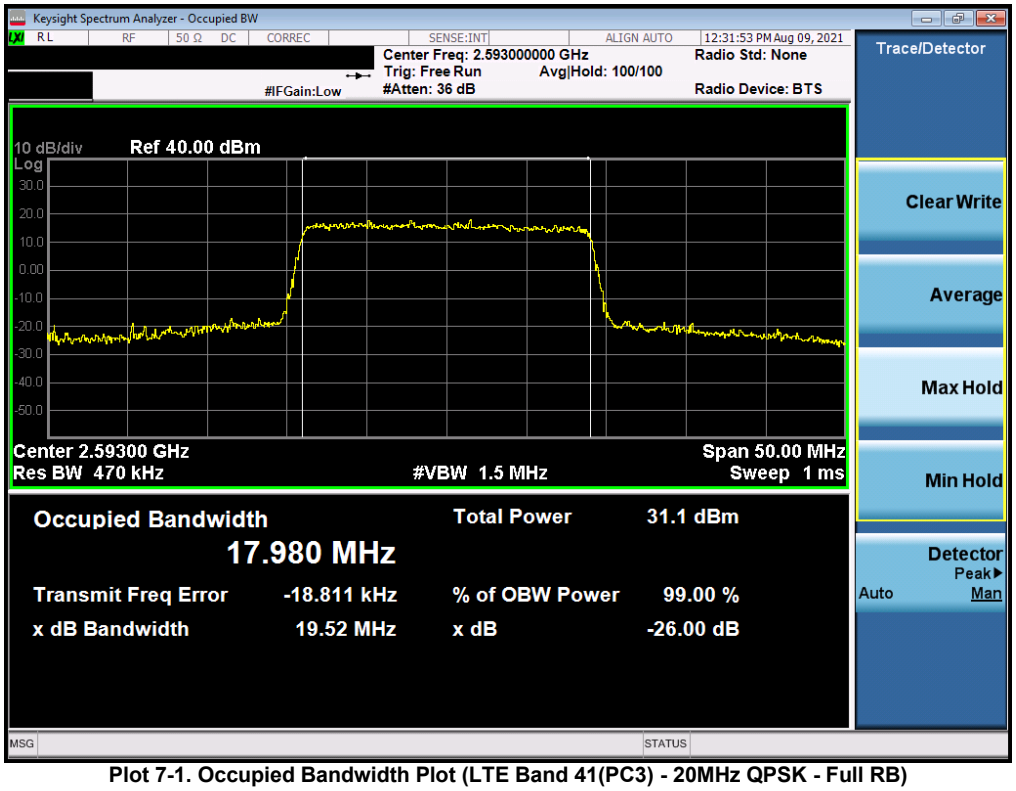


Figure 7-1. Test Instrument & Measurement Setup

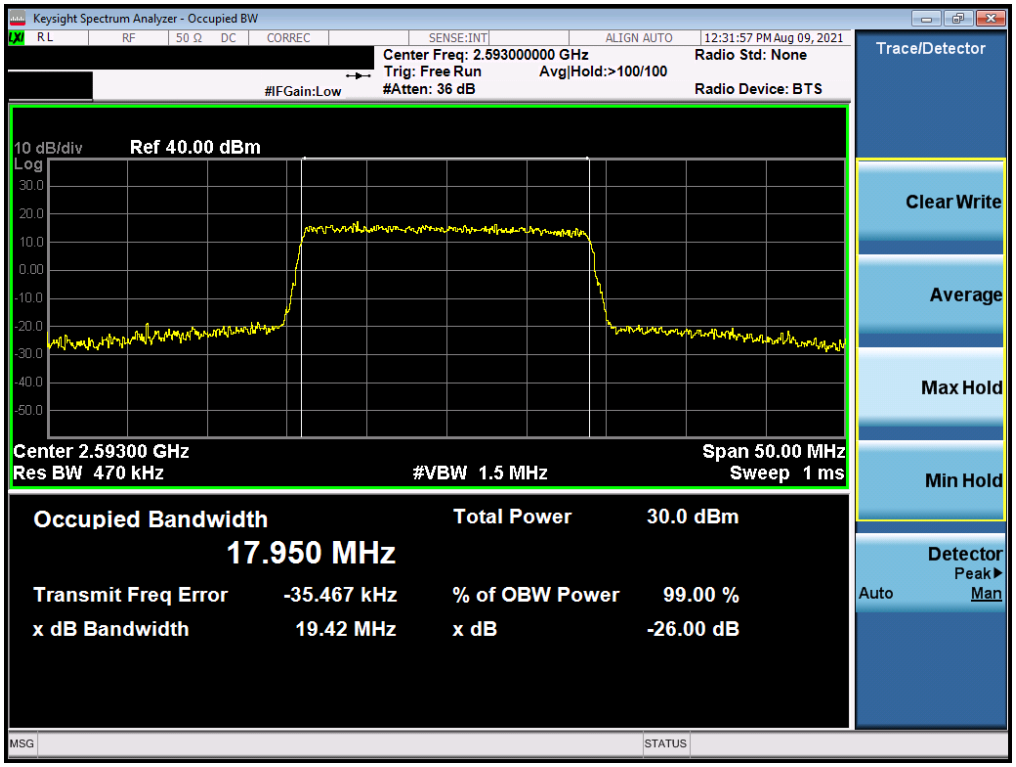
Test Notes

None.

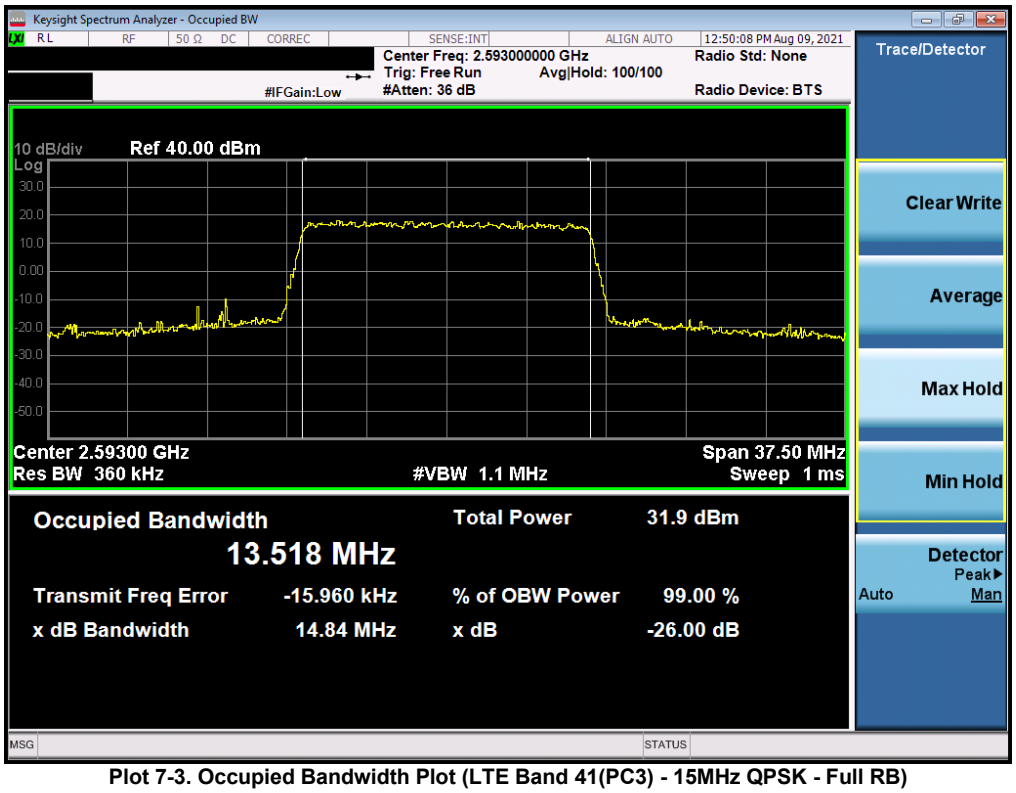
LTE Band 41(PC3)



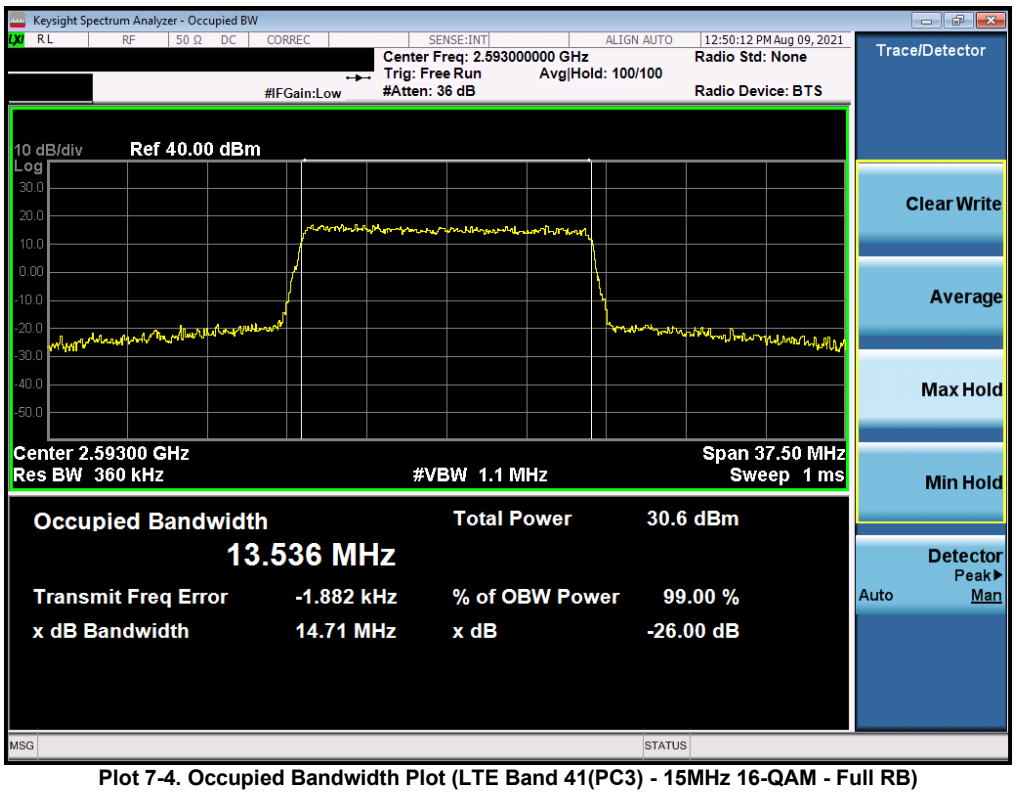
Plot 7-1. Occupied Bandwidth Plot (LTE Band 41(PC3) - 20MHz QPSK - Full RB)



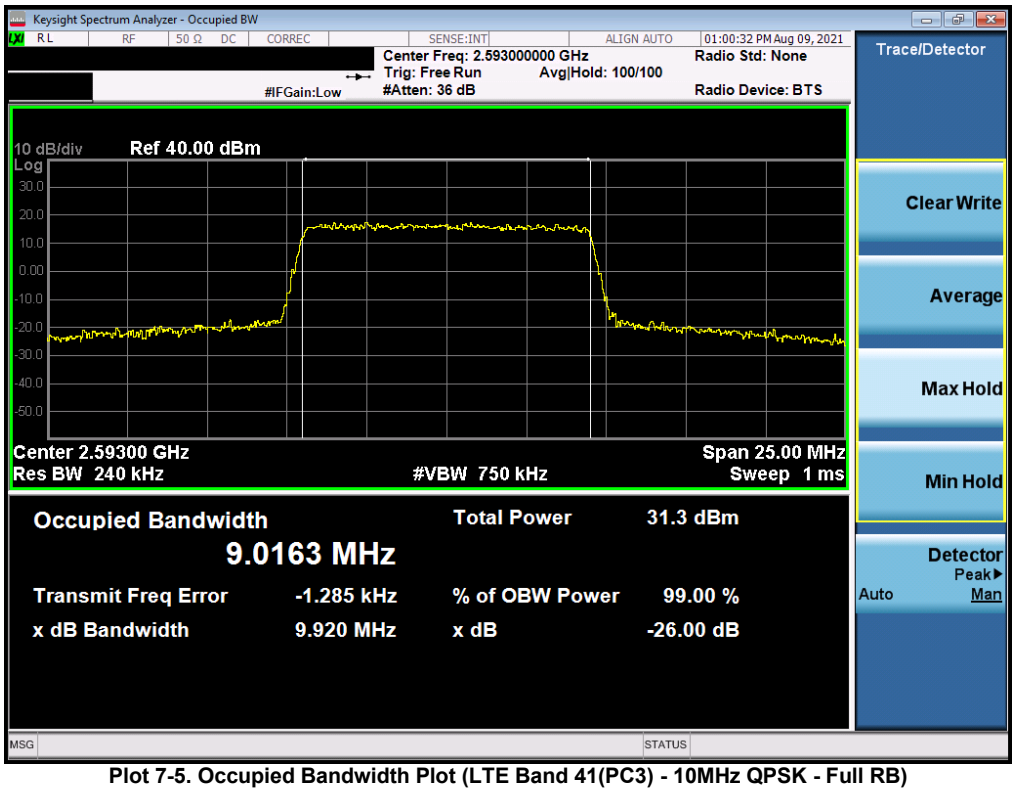
Plot 7-2. Occupied Bandwidth Plot (LTE Band 41(PC3) - 20MHz 16-QAM - Full RB)



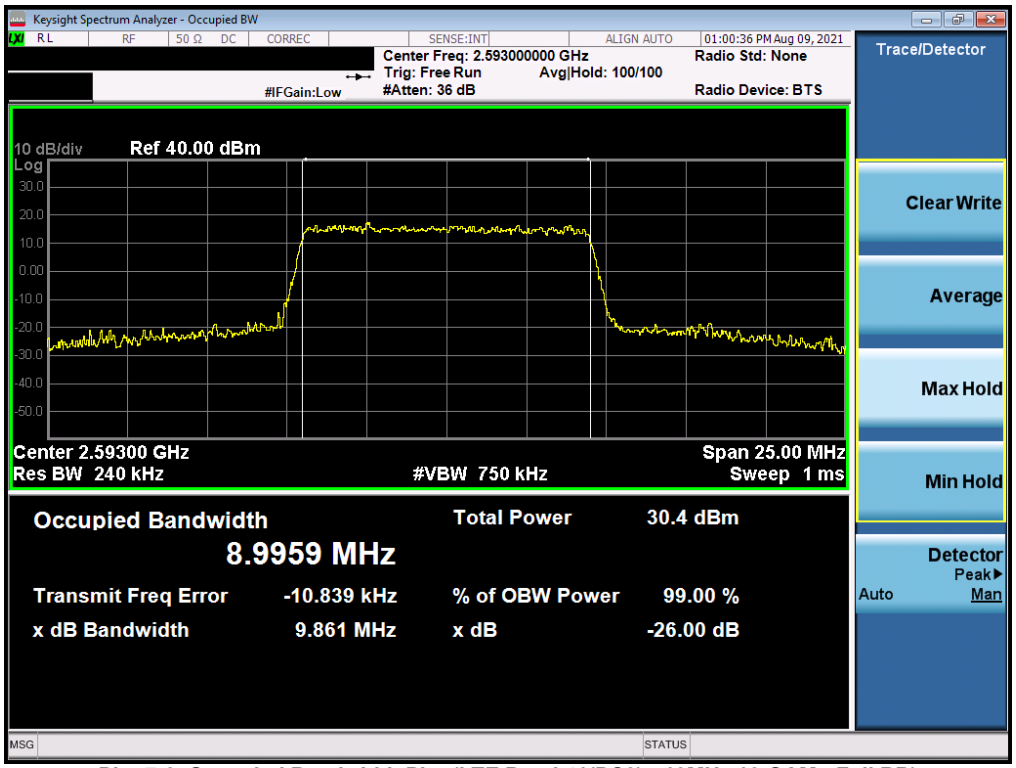
Plot 7-3. Occupied Bandwidth Plot (LTE Band 41(PC3) - 15MHz QPSK - Full RB)



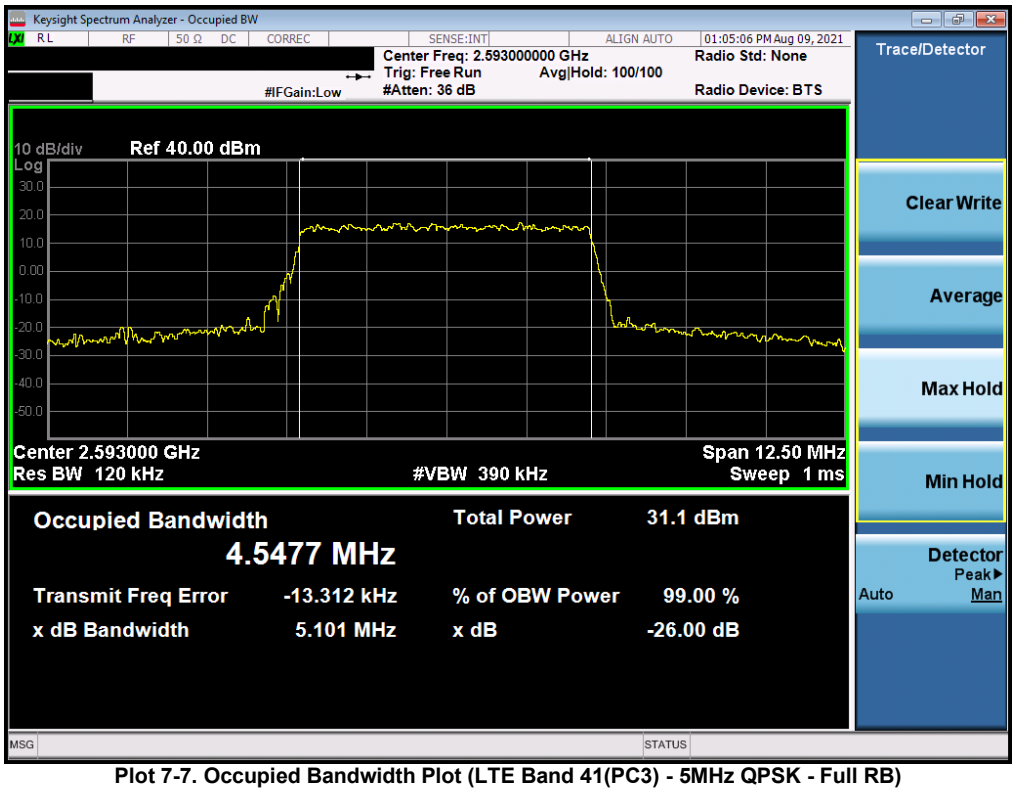
Plot 7-4. Occupied Bandwidth Plot (LTE Band 41(PC3) - 15MHz 16-QAM - Full RB)



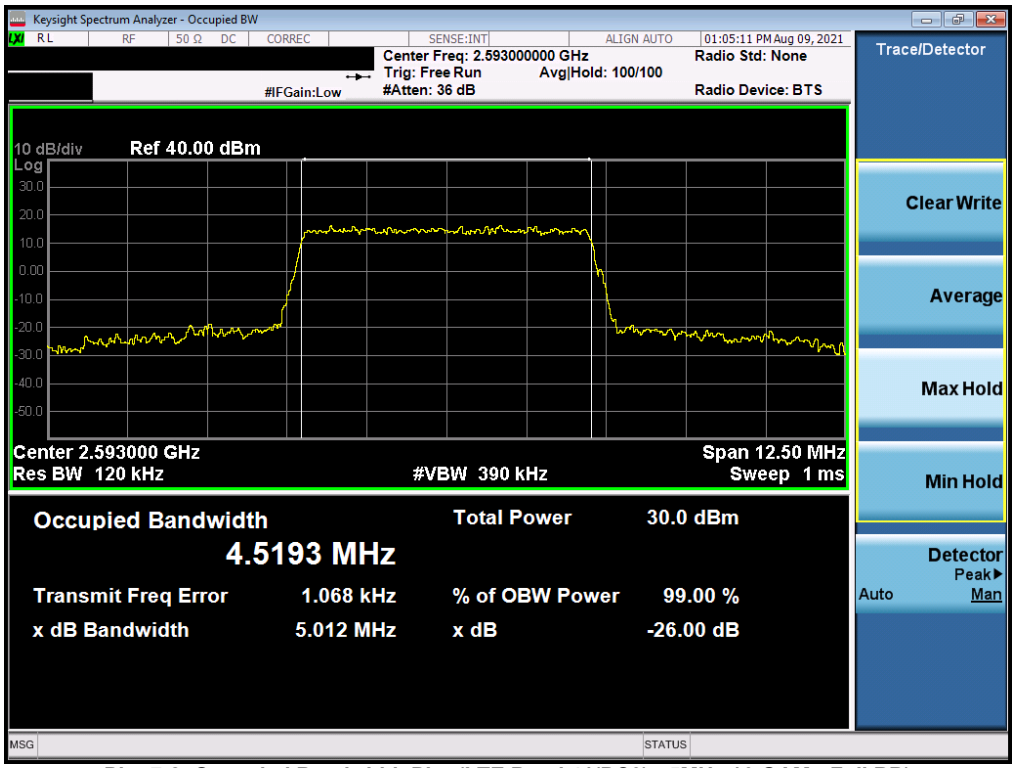
Plot 7-5. Occupied Bandwidth Plot (LTE Band 41(PC3) - 10MHz QPSK - Full RB)



Plot 7-6. Occupied Bandwidth Plot (LTE Band 41(PC3) - 10MHz 16-QAM - Full RB)



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



Plot 7-8. Occupied Bandwidth Plot (LTE Band 41(PC3) - 5MHz 16-QAM - Full RB)

Plot 7-9. Occupied Bandwidth Plot (NR Band n41 - 100MHz π/2 BPSK - Full RB)

Plot 7-10. Occupied Bandwidth Plot (NR Band n41 - 100MHz QPSK - Full RB)

Plot 7-11. Occupied Bandwidth Plot (NR Band n41 - 100MHz 16-QAM - Full RB)

Plot 7-12. Occupied Bandwidth Plot (NR Band n41 - 90MHz π/2 BPSK - Full RB)

Plot 7-13. Occupied Bandwidth Plot (NR Band n41 - 90MHz QPSK - Full RB)

Plot 7-14. Occupied Bandwidth Plot (NR Band n41 - 90MHz 16-QAM - Full RB)

Plot 7-15. Occupied Bandwidth Plot (NR Band n41 - 80MHz π/2 BPSK - Full RB)

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

Plot 7-17. Occupied Bandwidth Plot (NR Band n41 - 80MHz 16-QAM - Full RB)

Plot 7-18. Occupied Bandwidth Plot (NR Band n41 - 60MHz π/2 BPSK - Full RB)

Plot 7-19. Occupied Bandwidth Plot (NR Band n41 - 60MHz QPSK - Full RB)

Plot 7-20. Occupied Bandwidth Plot (NR Band n41 - 60MHz 16-QAM - Full RB)

Plot 7-21. Occupied Bandwidth Plot (NR Band n41 - 50MHz π/2 BPSK - Full RB)

Plot 7-22. Occupied Bandwidth Plot (NR Band n41 - 50MHz QPSK - Full RB)

Plot 7-23. Occupied Bandwidth Plot (NR Band n41 - 50MHz 16-QAM - Full RB)

Plot 7-24. Occupied Bandwidth Plot (NR Band n41 - 40MHz π/2 BPSK - Full RB)

Plot 7-25. Occupied Bandwidth Plot (NR Band n41 - 40MHz QPSK - Full RB)

Plot 7-26. Occupied Bandwidth Plot (NR Band n41 - 40MHz 16-QAM - Full RB)

Plot 7-27. Occupied Bandwidth Plot (NR Band n41 - 30MHz π/2 BPSK - Full RB)

Plot 7-28. Occupied Bandwidth Plot (NR Band n41 - 30MHz QPSK - Full RB)

Plot 7-29. Occupied Bandwidth Plot (NR Band n41 - 30MHz 16-QAM - Full RB)

Plot 7-30. Occupied Bandwidth Plot (NR Band n41 - 20MHz π/2 BPSK - Full RB)

Plot 7-31. Occupied Bandwidth Plot (NR Band n41 - 20MHz QPSK - Full RB)

Plot 7-32. Occupied Bandwidth Plot (NR Band n41 - 20MHz 16-QAM - Full RB)

7.3 Spurious and Harmonic Emissions at Antenna Terminal

Test Overview

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

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

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

Test Procedure Used

KDB 971168 D01 v03r01 – Section 6.0

Test Settings

1. Start frequency was set to 30MHz and stop frequency was set to 10GHz (separated into at least two plots per channel)
2. Detector = RMS
3. Trace mode = trace average for continuous emissions, max hold for pulse emissions
4. Sweep time = auto couple
5. The trace was allowed to stabilize
6. Please see test notes below for RBW and VBW settings

Test Setup

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

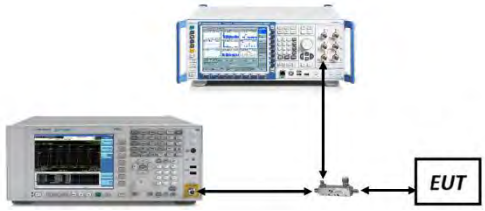


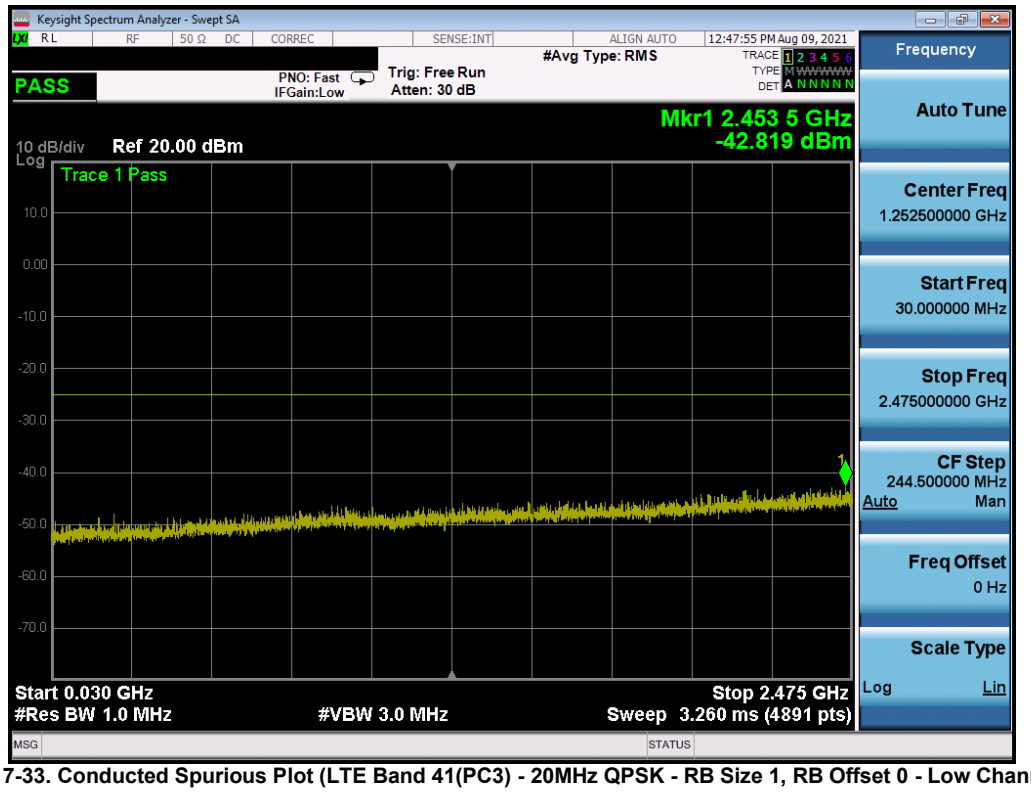
Figure 7-2. Test Instrument & Measurement Setup

Test Notes

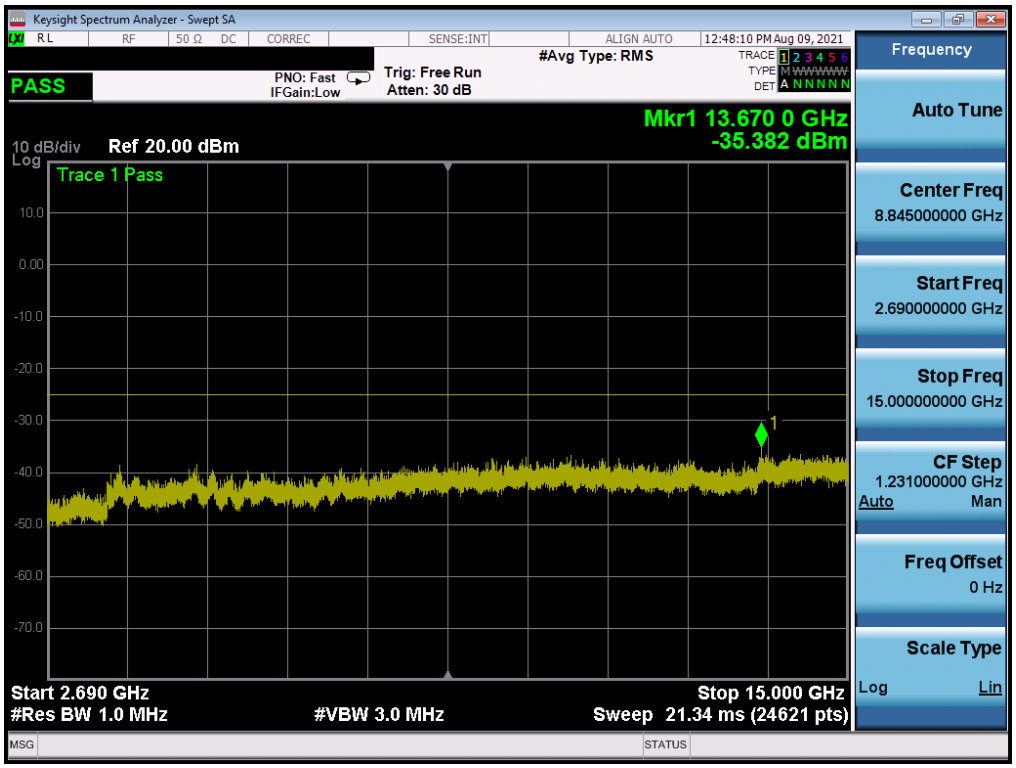
1. Per Part 27, RSS-195 and RSS-199, compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth 100 kHz or greater for measurements below 1GHz. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution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

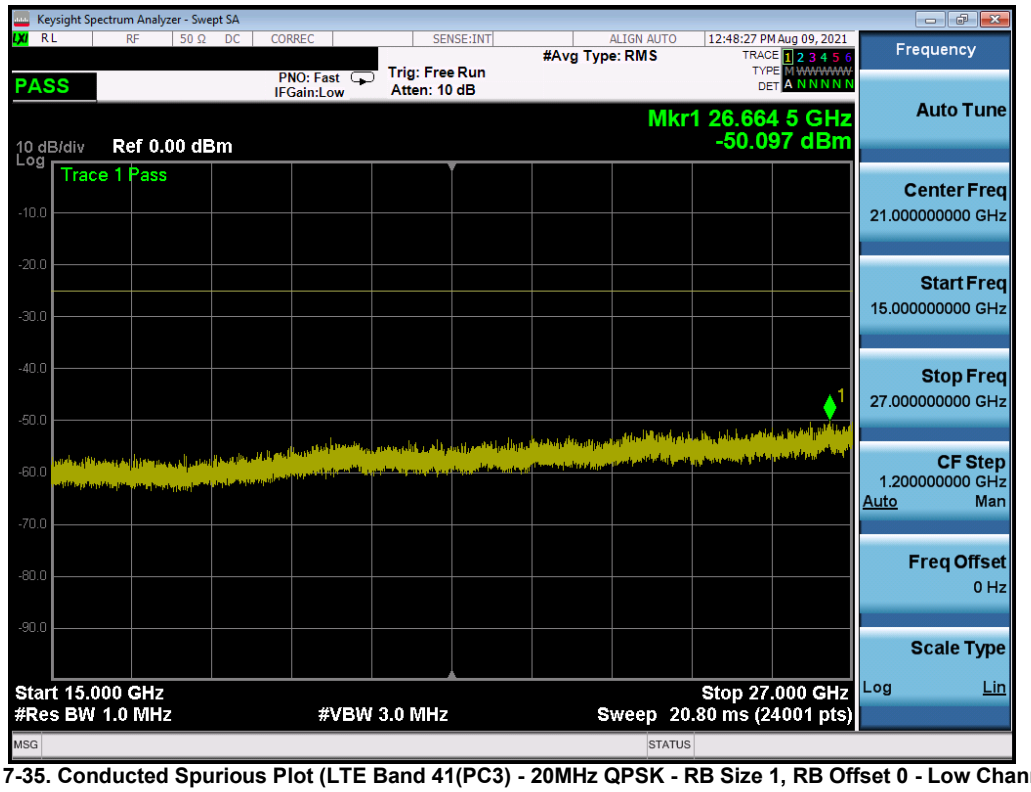
LTE Band 41(PC3)



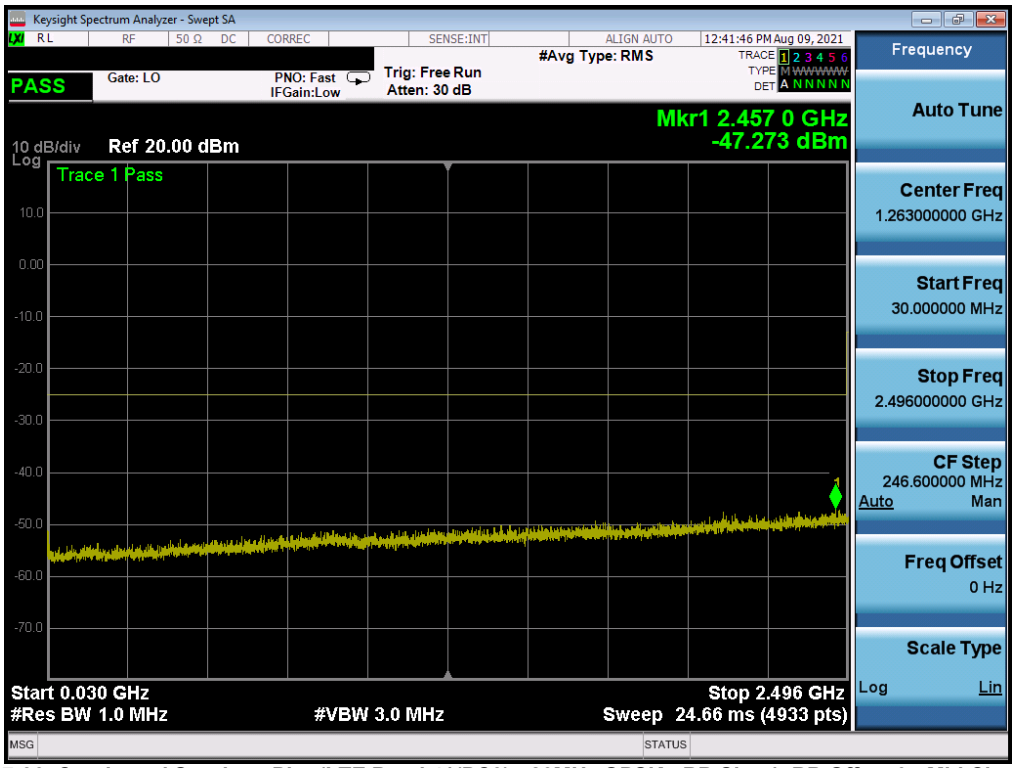
Plot 7-33. Conducted Spurious Plot (LTE Band 41(PC3) - 20MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



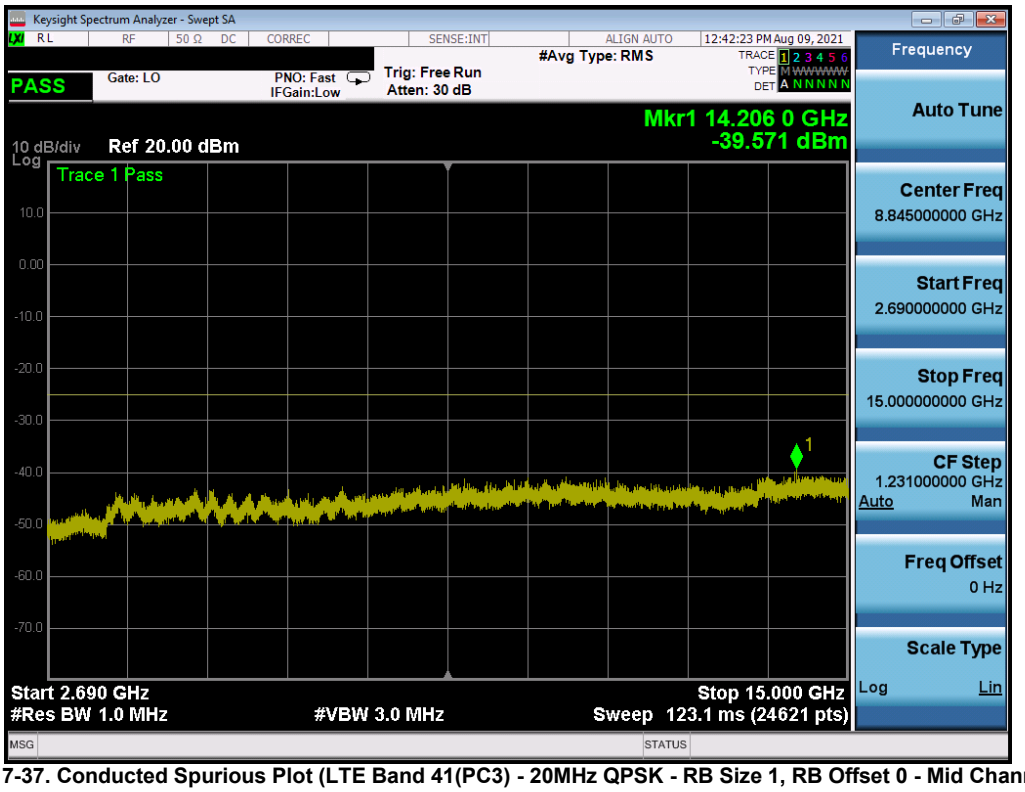
Plot 7-34. Conducted Spurious Plot (LTE Band 41(PC3) - 20MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



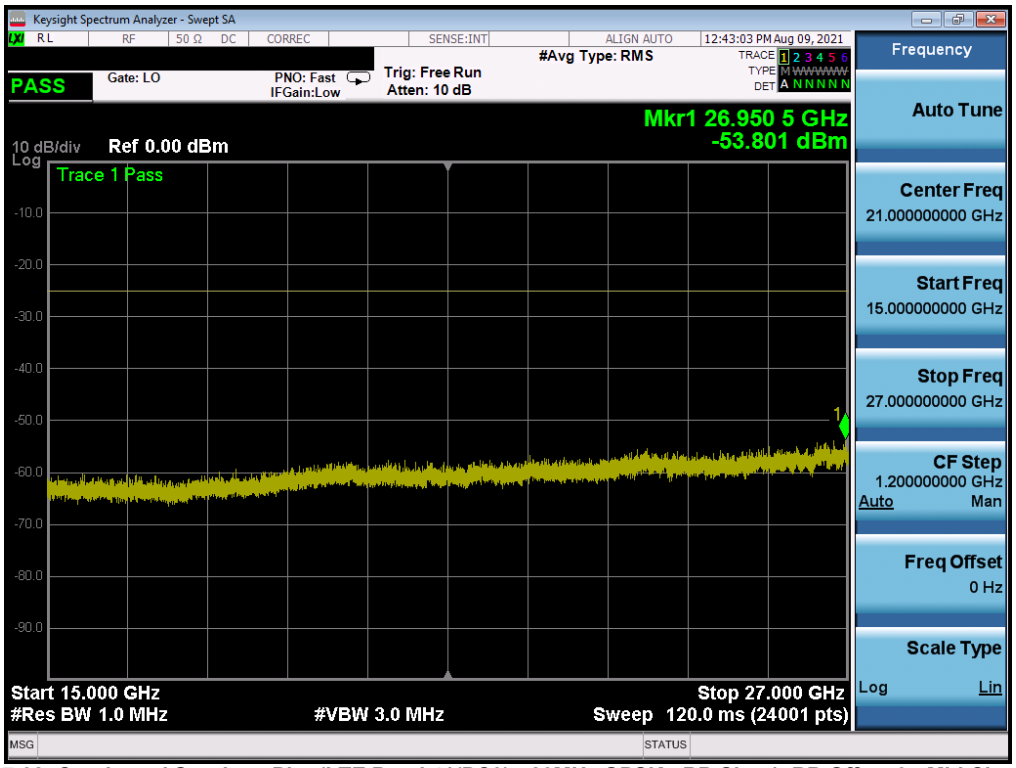
Plot 7-35. Conducted Spurious Plot (LTE Band 41(PC3) - 20MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



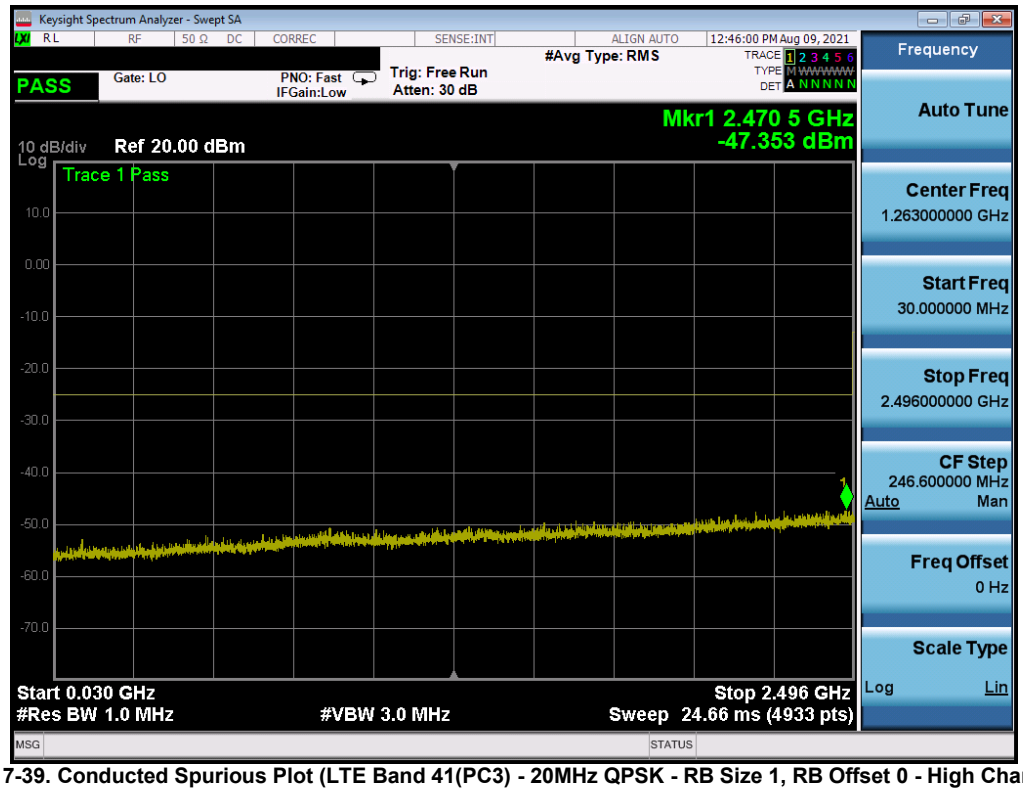
Plot 7-36. Conducted Spurious Plot (LTE Band 41(PC3) - 20MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)



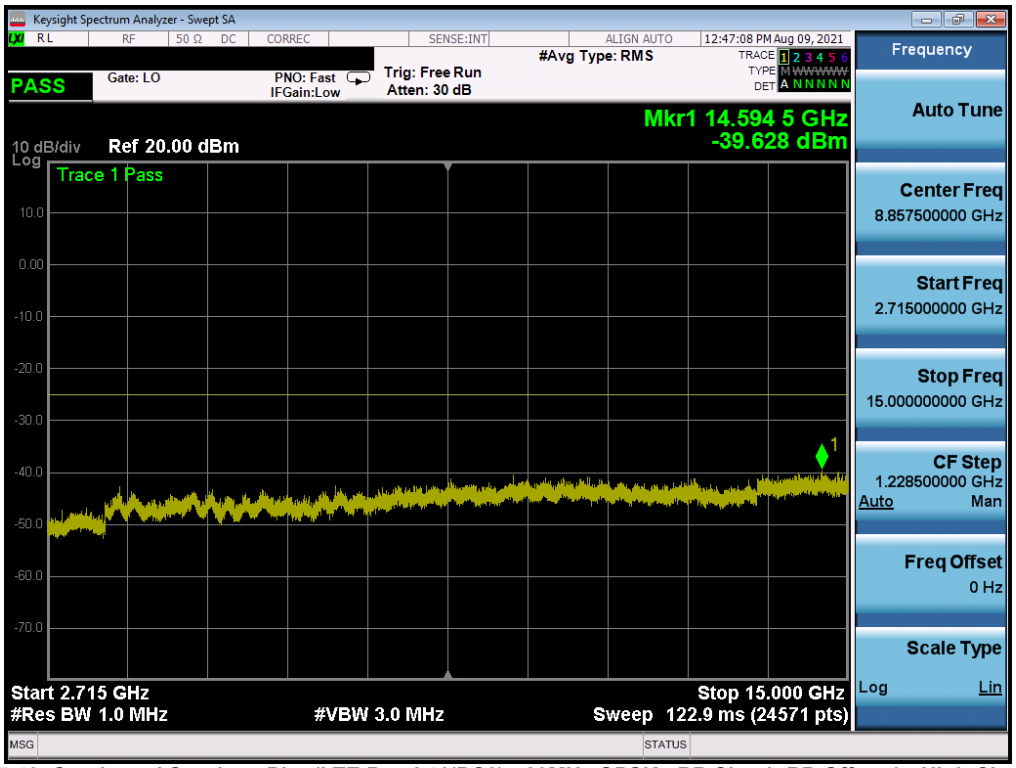
Plot 7-37. Conducted Spurious Plot (LTE Band 41(PC3) - 20MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)



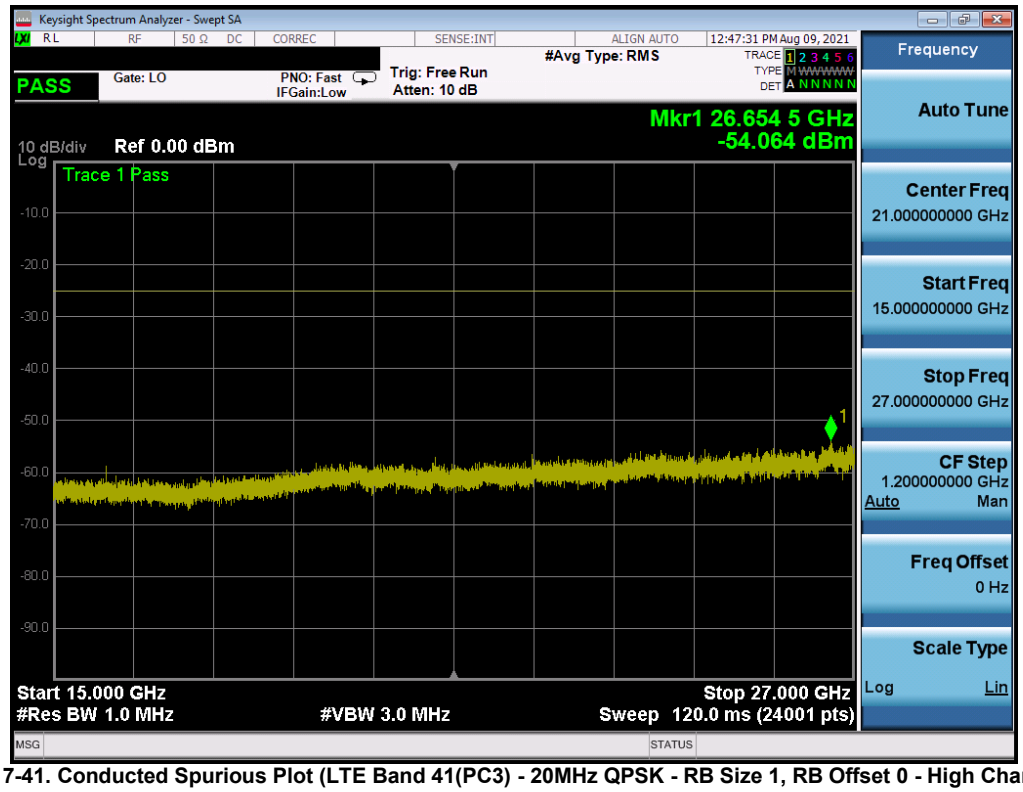
Plot 7-38. Conducted Spurious Plot (LTE Band 41(PC3) - 20MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)



Plot 7-39. Conducted Spurious Plot (LTE Band 41(PC3) - 20MHz QPSK - RB Size 1, RB Offset 0 - High Channel)



Plot 7-40. Conducted Spurious Plot (LTE Band 41(PC3) - 20MHz QPSK - RB Size 1, RB Offset 0 - High Channel)



Plot 7-41. Conducted Spurious Plot (LTE Band 41(PC3) - 20MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

Plot 7-42. Conducted Spurious Plot (NR Band n41 - 100MHz QPSK - RB Size 1, RB Offset 0 - Low Channel Ant1)

Plot 7-43. Conducted Spurious Plot (NR Band n41 - 100MHz QPSK - RB Size 1, RB Offset 0 - Low Channel Ant1)

Plot 7-44. Conducted Spurious Plot (NR Band n41 - 100MHz QPSK - RB Size 1, RB Offset 0 - Low Channel Ant1)

Plot 7-45. Conducted Spurious Plot (NR Band n41 - 100MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel Ant1)

Plot 7-46. Conducted Spurious Plot (NR Band n41 - 100MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel Ant1)

Plot 7-47. Conducted Spurious Plot (NR Band n41 - 100MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel Ant1)

Plot 7-48. Conducted Spurious Plot (NR Band n41 - 100MHz QPSK - RB Size 1, RB Offset 0 - High Channel Ant1)

Plot 7-49. Conducted Spurious Plot (NR Band n41 - 100MHz QPSK - RB Size 1, RB Offset 0 - High Channel Ant1)

Plot 7-50. Conducted Spurious Plot (NR Band n41 - 100MHz QPSK - RB Size 1, RB Offset 0 - High Channel Ant1)

7.4 Band Edge Emissions at Antenna Terminal

Test Overview

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

The minimum permissible attenuation level 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.

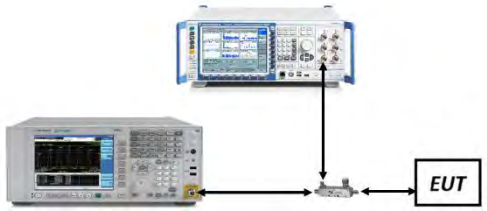


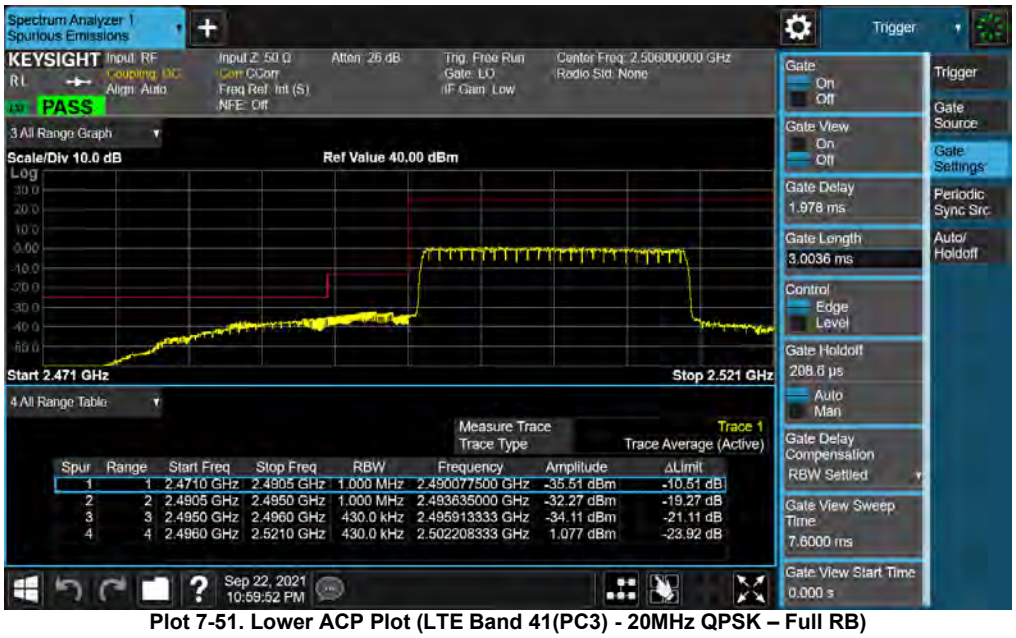
Figure 7-3. Test Instrument & Measurement Setup

Test Notes

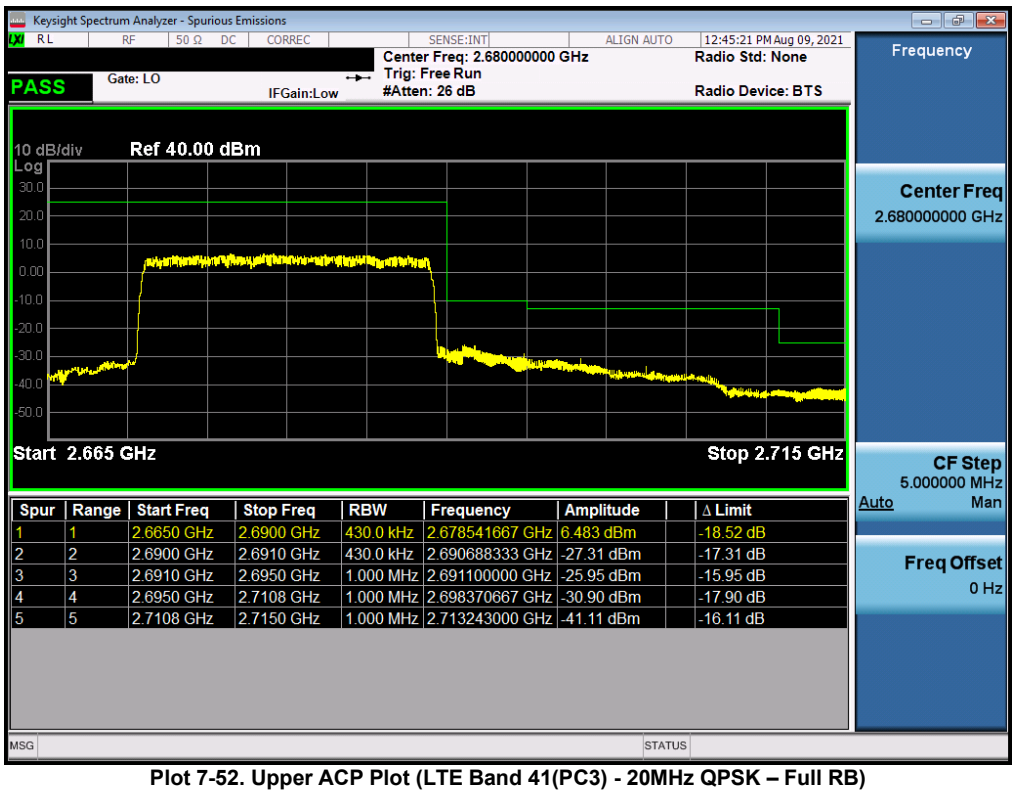
1. Per 27.53(m) for operations in the BRS/EBS bands, the attenuation factor shall be not less than 40 + 10 log (P) dB on all frequencies between the channel edge and 5 megahertz from the channel edge, 43 + 10 log (P) dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and 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.

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.

LTE Band 41(PC3)



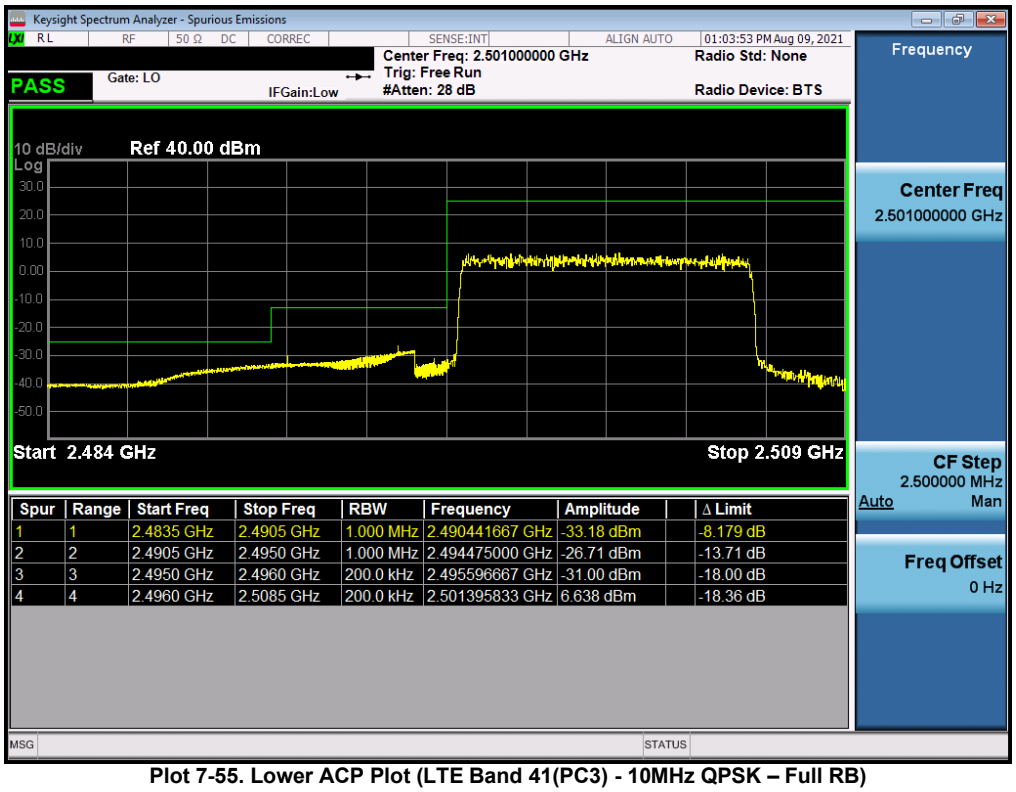
Plot 7-51. Lower ACP Plot (LTE Band 41(PC3) - 20MHz QPSK – Full RB)



Plot 7-52. Upper ACP Plot (LTE Band 41(PC3) - 20MHz QPSK – Full RB)

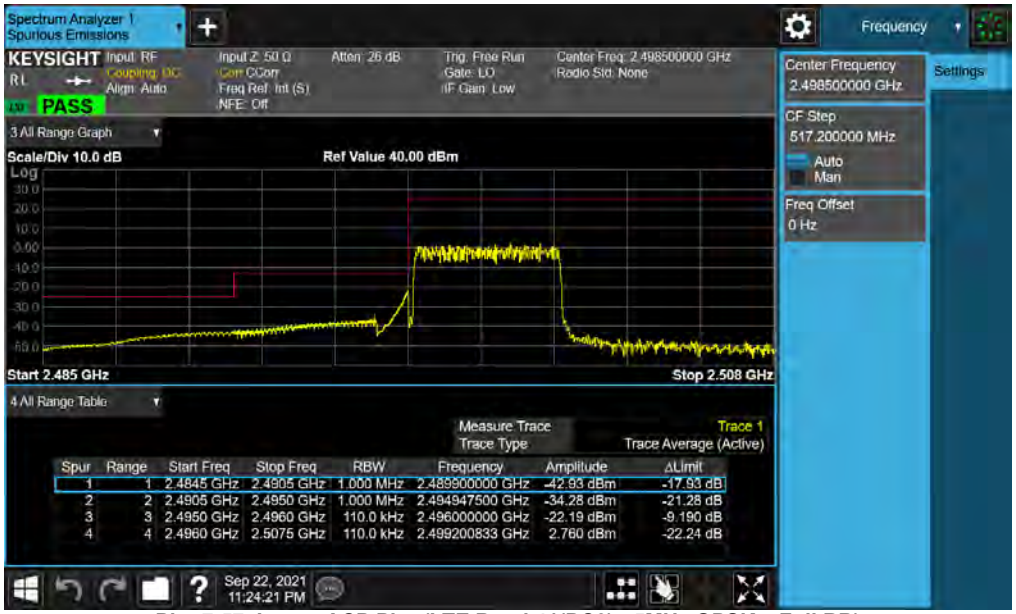
Plot 7-53. Lower ACP Plot (LTE Band 41(PC3) - 15MHz QPSK – Full RB)

Plot 7-54. Upper ACP Plot (LTE Band 41(PC3) - 15MHz QPSK – Full RB)

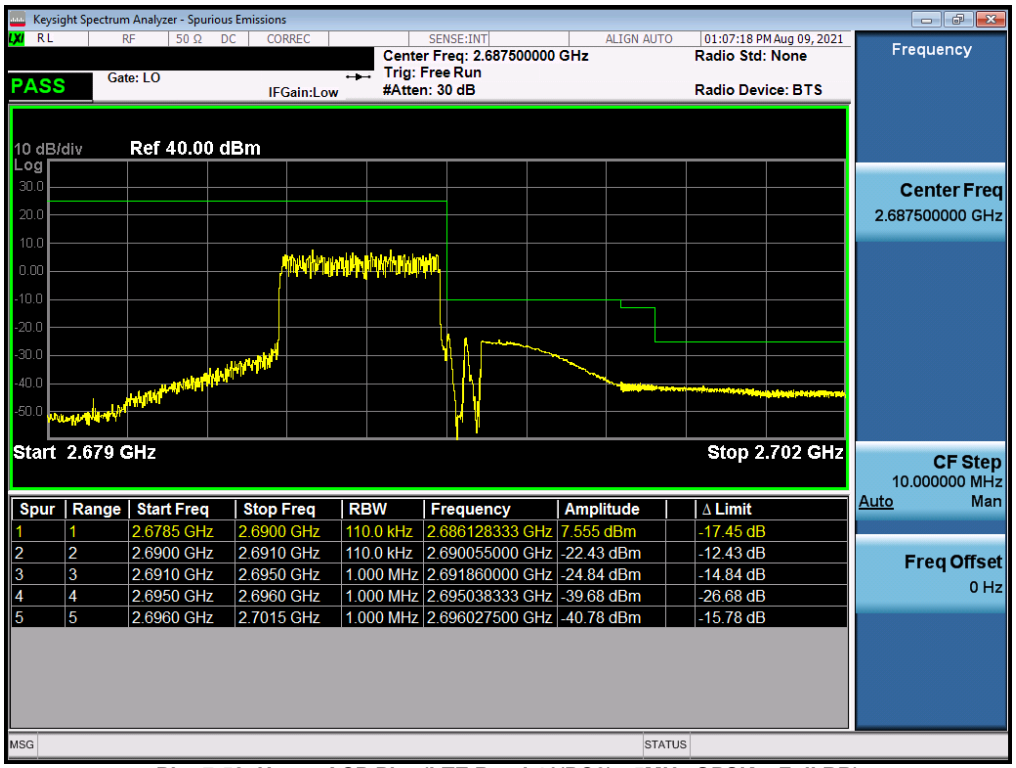


Plot 7-55. Lower ACP Plot (LTE Band 41(PC3) - 10MHz QPSK – Full RB)

Plot 7-56. Upper ACP Plot (LTE Band 41(PC3) - 10MHz QPSK – Full RB)



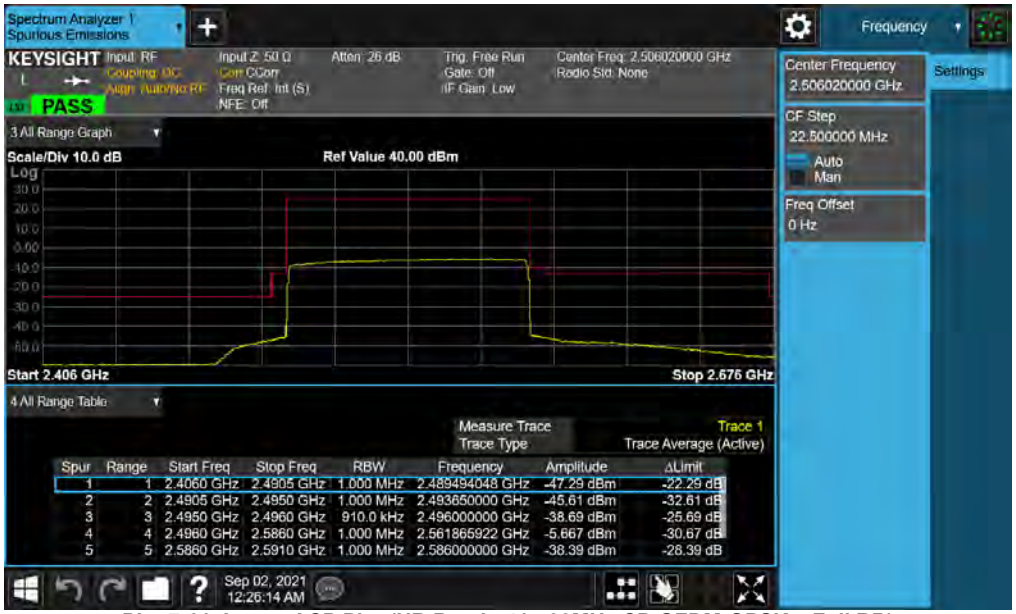
Plot 7-57. Lower ACP Plot (LTE Band 41(PC3) - 5MHz QPSK – Full RB)



Plot 7-58. Upper ACP Plot (LTE Band 41(PC3) - 5MHz QPSK – Full RB)

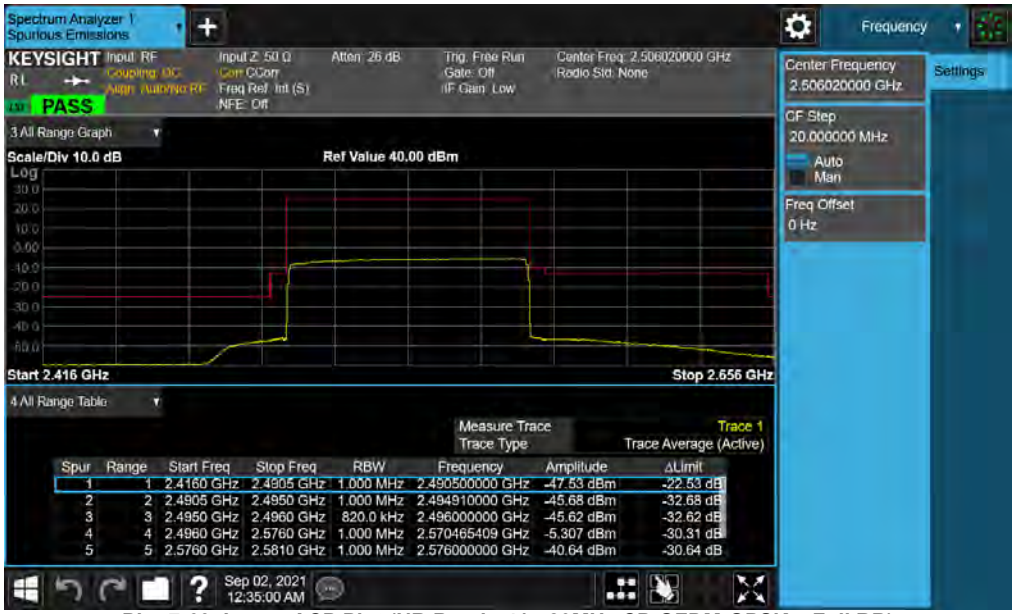
Plot 7-59. Lower ACP Plot (NR Band n41 - 100MHz CP-OFDM-QPSK – Full RB)

Plot 7-60. Upper ACP Plot (NR Band n41 - 100MHz CP-OFDM-QPSK – Full RB)



Plot 7-61. Lower ACP Plot (NR Band n41 - 90MHz CP-OFDM-QPSK – Full RB)

Plot 7-62. Upper ACP Plot (NR Band n41 - 90MHz CP-OFDM-QPSK – Full RB)



Plot 7-63. Lower ACP Plot (NR Band n41 - 80MHz CP-OFDM-QPSK – Full RB)

Plot 7-64. Upper ACP Plot (NR Band n41 - 80MHz CP-OFDM-QPSK – Full RB)

Plot 7-65. Lower ACP Plot (NR Band n41 - 60MHz CP-OFDM-QPSK – Full RB)

Plot 7-66. Upper ACP Plot (NR Band n41 - 60MHz CP-OFDM-QPSK – Full RB)

Plot 7-67. Lower ACP Plot (NR Band n41 - 50MHz CP-OFDM-QPSK – Full RB)

Plot 7-68. Upper ACP Plot (NR Band n41 - 50MHz CP-OFDM-QPSK – Full RB)

Plot 7-69. Lower ACP Plot (NR Band n41 - 40MHz CP-OFDM-QPSK – Full RB)

Plot 7-70. Upper ACP Plot (NR Band n41 - 40MHz CP-OFDM-QPSK – Full RB)

Plot 7-71. Lower ACP Plot (NR Band n41 - 30MHz CP-OFDM-QPSK – Full RB - Ant1)

Plot 7-72. Upper ACP Plot (NR Band n41 - 30MHz CP-OFDM-QPSK – Full RB - Ant1)

Plot 7-73. Lower ACP Plot (NR Band n41 - 20MHz CP-OFDM-QPSK – Full RB)

Plot 7-74. Upper ACP Plot (NR Band n41 - 20MHz CP-OFDM-QPSK – Full RB)

7.5 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.

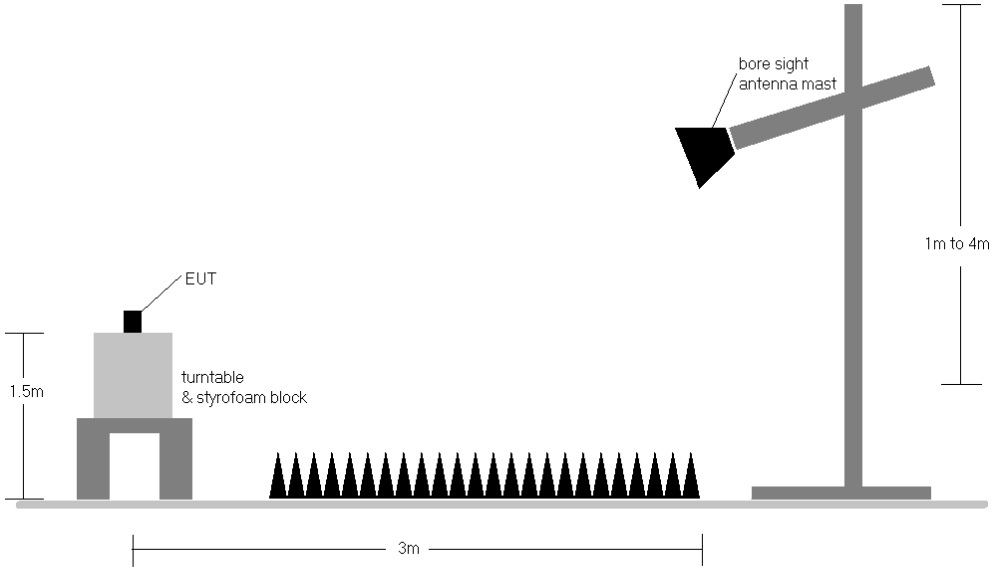


Figure 7-4. Radiated Test Setup >1GHz

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]
20 MHz	QPSK	2506.0	H	118	199	9.54	1 / 99	12.93	**22.47**	0.177	33.01	-10.54
	QPSK	2593.0	H	133	200	9.46	1 / 50	12.92	22.38	0.173	33.01	-10.63
	QPSK	2680.0	H	153	198	9.51	1 / 50	12.12	21.63	0.146	33.01	-11.38
	16-QAM	2506.0	H	118	199	9.54	1 / 99	12.17	21.71	0.148	33.01	-11.30
15 MHz	QPSK	2503.5	H	118	199	9.54	1 / 0	13.16	**22.71**	0.187	33.01	-10.30
	QPSK	2593.0	H	133	200	9.46	1 / 74	12.07	21.54	0.142	33.01	-11.47
	QPSK	2682.5	H	153	198	9.51	1 / 0	12.25	21.77	0.150	33.01	-11.24
	16-QAM	2503.5	H	118	199	9.54	1 / 0	11.88	21.42	0.139	33.01	-11.59
10 MHz	QPSK	2501.0	H	118	199	9.55	1 / 49	12.72	**22.26**	0.168	33.01	-10.75
	QPSK	2593.0	H	133	200	9.46	1 / 49	12.77	22.23	0.167	33.01	-10.78
	QPSK	2685.0	H	153	198	9.52	1 / 0	12.02	21.54	0.142	33.01	-11.47
	16-QAM	2593.0	H	133	200	9.46	1 / 0	11.61	21.07	0.128	33.01	-11.94
5 MHz	QPSK	2498.5	H	118	199	9.53	1 / 12	11.64	**21.17**	0.131	33.01	-11.84
	QPSK	2593.0	H	133	200	9.46	1 / 12	11.64	21.10	0.129	33.01	-11.91
	QPSK	2687.5	H	153	198	9.52	1 / 0	10.90	20.43	0.110	33.01	-12.58
	16-QAM	2498.5	H	118	199	9.53	1 / 12	11.27	20.80	0.120	33.01	-12.21
20 MHz	Opposite Pol.	2506.0	V	201	166	9.46	1 / 99	10.84	20.30	0.107	33.01	-12.71

Table 7-2. EIRP Data (LTE Band 41(PC3))

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	112	198	9.38	1 / 136	12.09	**21.47**	0.140	33.01	-11.54
	π/2 BPSK	2593.0	H	107	198	9.49	1 / 68	11.78	21.27	0.134	33.01	-11.74
	π/2 BPSK	2640.0	H	104	205	9.89	1 / 68	11.18	21.07	0.128	33.01	-11.94
	QPSK	2546.0	H	112	198	9.38	1 / 136	11.95	21.33	0.136	33.01	-11.68
	QPSK	2593.0	H	107	198	9.49	1 / 68	11.43	20.92	0.124	33.01	-12.09
	QPSK	2640.0	H	104	205	9.89	1 / 68	11.01	20.90	0.123	33.01	-12.11
	16-QAM	2546.0	H	112	198	9.38	1 / 136	11.30	20.68	0.117	33.01	-12.33
90 MHz	π/2 BPSK	2541.0	H	112	198	9.39	1 / 183	12.21	21.60	0.144	33.01	-11.42
	π/2 BPSK	2593.0	H	107	198	9.49	1 / 183	11.82	21.31	0.135	33.01	-11.70
	π/2 BPSK	2645.0	H	104	205	9.91	1 / 122	11.28	21.19	0.132	33.01	-11.82
	QPSK	2541.0	H	112	198	9.39	1 / 183	11.83	21.21	0.132	33.01	-11.80
	QPSK	2593.0	H	107	198	9.49	1 / 183	11.53	21.02	0.126	33.01	-11.99
	QPSK	2645.0	H	104	205	9.91	1 / 122	11.12	21.03	0.127	33.01	-11.98
	16-QAM	2541.0	H	112	198	9.39	1 / 183	12.23	**21.61**	0.145	33.01	-11.40
80 MHz	π/2 BPSK	2536.0	H	112	198	9.40	1 / 162	12.19	21.59	0.144	33.01	-11.42
	π/2 BPSK	2593.0	H	107	198	9.49	1 / 108	11.88	21.37	0.137	33.01	-11.64
	π/2 BPSK	2650.0	H	104	205	9.93	1 / 108	11.32	21.26	0.134	33.01	-11.75
	QPSK	2536.0	H	112	198	9.40	1 / 162	11.90	21.30	0.135	33.01	-11.71
	QPSK	2593.0	H	107	198	9.49	1 / 108	11.50	20.99	0.126	33.01	-12.02
	QPSK	2650.0	H	104	205	9.93	1 / 108	11.06	21.00	0.126	33.01	-12.01
	16-QAM	2536.0	H	112	198	9.40	1 / 162	12.33	**21.73**	0.149	33.01	-11.28
60 MHz	π/2 BPSK	2526.0	H	112	198	9.43	1 / 121	12.48	21.91	0.155	33.01	-11.10
	π/2 BPSK	2593.0	H	107	198	9.49	1 / 40	12.27	21.76	0.150	33.01	-11.25
	π/2 BPSK	2660.0	H	104	205	9.85	1 / 81	11.64	21.49	0.141	33.01	-11.52
	QPSK	2526.0	H	112	198	9.43	1 / 121	12.08	21.51	0.142	33.01	-11.50
	QPSK	2593.0	H	107	198	9.49	1 / 40	11.86	21.35	0.137	33.01	-11.66
	QPSK	2660.0	H	104	205	9.85	1 / 81	11.36	21.21	0.132	33.01	-11.80
	16-QAM	2526.0	H	112	198	9.43	1 / 121	12.58	**22.01**	0.159	33.01	-11.00
50 MHz	π/2 BPSK	2521.0	H	112	198	9.45	1 / 33	12.41	21.86	0.154	33.01	-11.15
	π/2 BPSK	2593.0	H	107	198	9.49	1 / 33	12.42	21.92	0.155	33.01	-11.10
	π/2 BPSK	2665.0	H	104	205	9.84	1 / 33	11.74	21.58	0.144	33.01	-11.43
	QPSK	2521.0	H	112	198	9.45	1 / 33	12.10	21.55	0.143	33.01	-11.46
	QPSK	2593.0	H	107	198	9.49	1 / 33	11.98	21.47	0.140	33.01	-11.54
	QPSK	2665.0	H	104	205	9.84	1 / 33	11.53	21.36	0.137	33.01	-11.65
	16-QAM	2593.0	H	107	198	9.49	1 / 33	12.60	**22.09**	0.162	33.01	-10.92
40 MHz	π/2 BPSK	2516.0	H	112	198	9.48	1 / 26	12.47	21.95	0.157	33.01	-11.07
	π/2 BPSK	2593.0	H	107	198	9.49	1 / 26	12.51	22.00	0.159	33.01	-11.01
	π/2 BPSK	2670.0	H	104	205	9.82	1 / 26	11.99	21.81	0.152	33.01	-11.20
	QPSK	2516.0	H	112	198	9.48	1 / 26	12.15	21.62	0.145	33.01	-11.39
	QPSK	2593.0	H	107	198	9.49	1 / 79	11.92	21.41	0.139	33.01	-11.60
	QPSK	2670.0	H	104	205	9.82	1 / 26	11.70	21.52	0.142	33.01	-11.49
	16-QAM	2516.0	H	112	198	9.48	1 / 26	12.56	**22.04**	0.160	33.01	-10.97
30 MHz	π/2 BPSK	2511.0	H	112	198	9.50	1 / 58	12.42	21.93	0.156	33.01	-11.08
	π/2 BPSK	2593.0	H	107	198	9.49	1 / 19	12.36	21.86	0.153	33.01	-11.15
	π/2 BPSK	2675.0	H	104	205	9.85	1 / 19	11.75	21.60	0.145	33.01	-11.41
	QPSK	2511.0	H	112	198	9.50	1 / 58	12.11	21.62	0.145	33.01	-11.39
	QPSK	2593.0	H	107	198	9.49	1 / 19	11.97	21.46	0.140	33.01	-11.55
	QPSK	2675.0	H	104	205	9.85	1 / 19	11.46	21.30	0.135	33.01	-11.71
	16-QAM	2511.0	H	112	198	9.50	1 / 58	12.47	**21.97**	0.157	33.01	-11.04
20 MHz	π/2 BPSK	2506.0	H	112	198	9.50	1 / 13	12.30	21.80	0.151	33.01	-11.21
	π/2 BPSK	2593.0	H	107	198	9.49	1 / 13	12.14	21.63	0.146	33.01	-11.38
	π/2 BPSK	2680.0	H	104	205	9.87	1 / 13	11.47	21.34	0.136	33.01	-11.67
	QPSK	2506.0	H	112	198	9.50	1 / 13	12.03	21.53	0.142	33.01	-11.48
	QPSK	2593.0	H	107	198	9.49	1 / 13	11.90	21.39	0.138	33.01	-11.62
	QPSK	2680.0	H	104	205	9.87	1 / 13	11.34	21.21	0.132	33.01	-11.80
	16-QAM	2506.0	H	112	198	9.50	1 / 13	12.46	**21.97**	0.157	33.01	-11.04
100 MHz	QPSK (CP-OFDM)	2546.0	H	112	198	9.38	1 / 136	10.98	20.36	0.109	33.01	-12.65
	QPSK (Opposite Pol.)	2546.0	V	322	300	9.38	1 / 136	11.38	20.76	0.119	33.01	-12.25

Table 7-3. EIRP Data (NR Band n41)

7.6 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.

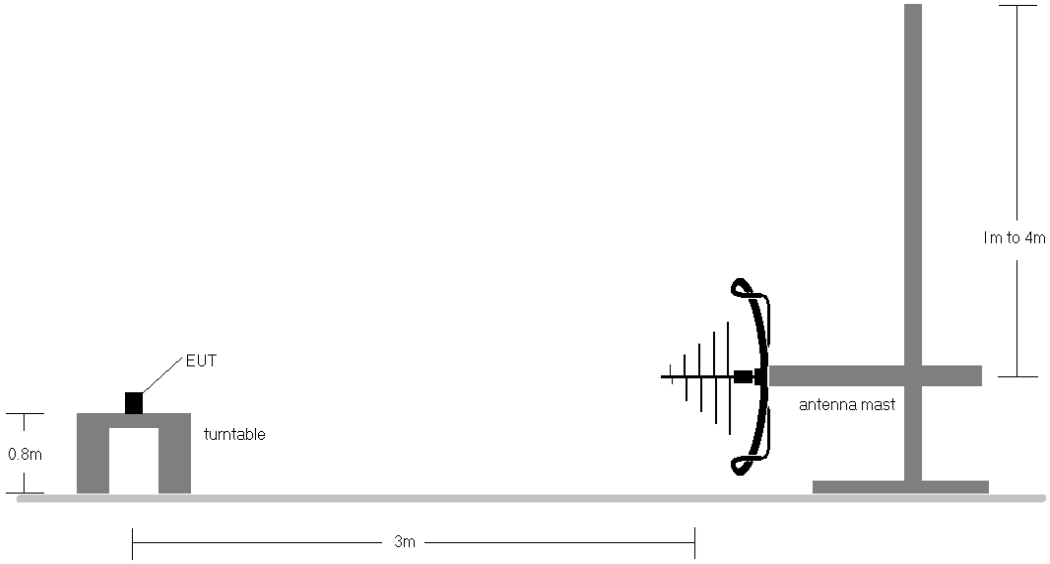


Figure 7-5. Test Instrument & Measurement Setup < 1GHz

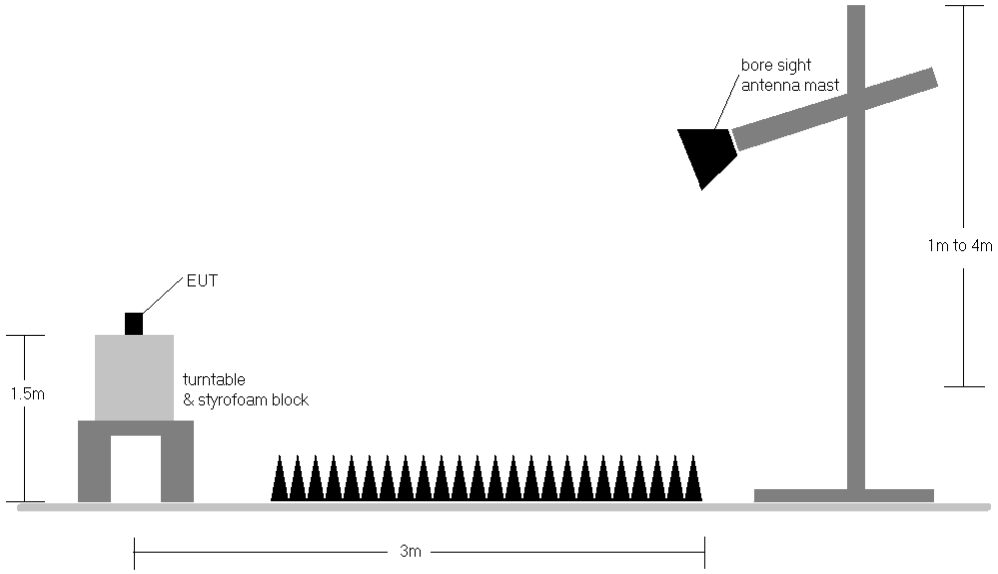


Figure 7-6. Test Instrument & Measurement Setup >1 GHz

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.

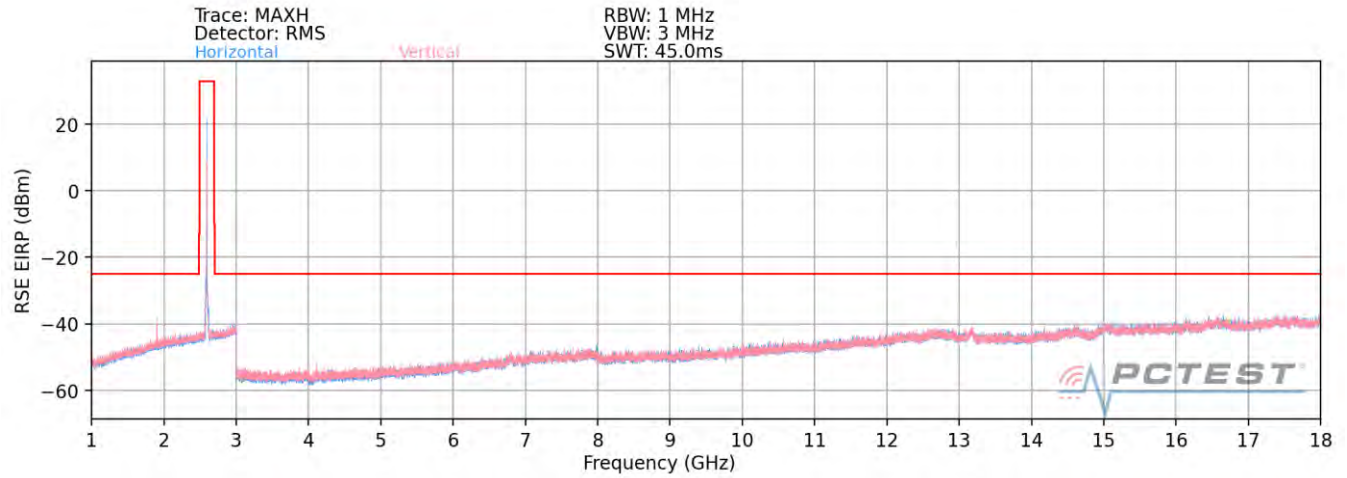
5) Emissions below 18GHz were measured at a 3 meter test distance while emissions above 18GHz were measured at a 1 meter test distance with the application of a distance correction factor.

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.

8) Spurious emissions shown in this section are measured while operating in EN-DC mode with Sub 6GHz NR carrier as well as an LTE carrier (anchor). Spurious emissions from the NR carrier device, is subject to the rules under which the NR carrier operates. Spurious emission caused by the LTE carrier must meet the requirements of the rules under which the LTE carrier operates.

LTE Band 41(PC3)



Plot 7-75. Radiated Spurious Plot (LTE Band 41(PC3))

Bandwidth (MHz):	20
Frequency (MHz):	2506.0
RB / Offset:	1 / 50

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
5012.00	H	-	-	-70.71	7.58	43.87	-51.39	-25.00	-26.39
7518.00	H	299	26	-70.82	12.54	48.72	-46.53	-25.00	-21.53
10024.00	H	-	-	-72.51	15.35	49.84	-45.42	-25.00	-20.42
12530.00	H	-	-	-73.10	19.35	53.25	-42.01	-25.00	-17.01

Table 7-4. Radiated Spurious Data (LTE Band 41(PC3) – Low Channel)

Bandwidth (MHz):	20
Frequency (MHz):	2593.0
RB / Offset:	1 / 50

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
5186.00	H	-	-	-70.71	7.10	43.39	-51.87	-25.00	-26.87
7779.00	H	346	26	-70.82	12.66	48.84	-46.42	-25.00	-21.42
10372.00	H	-	-	-72.51	16.05	50.54	-44.72	-25.00	-19.72
12965.00	H	-	-	-73.10	19.52	53.42	-41.84	-25.00	-16.84

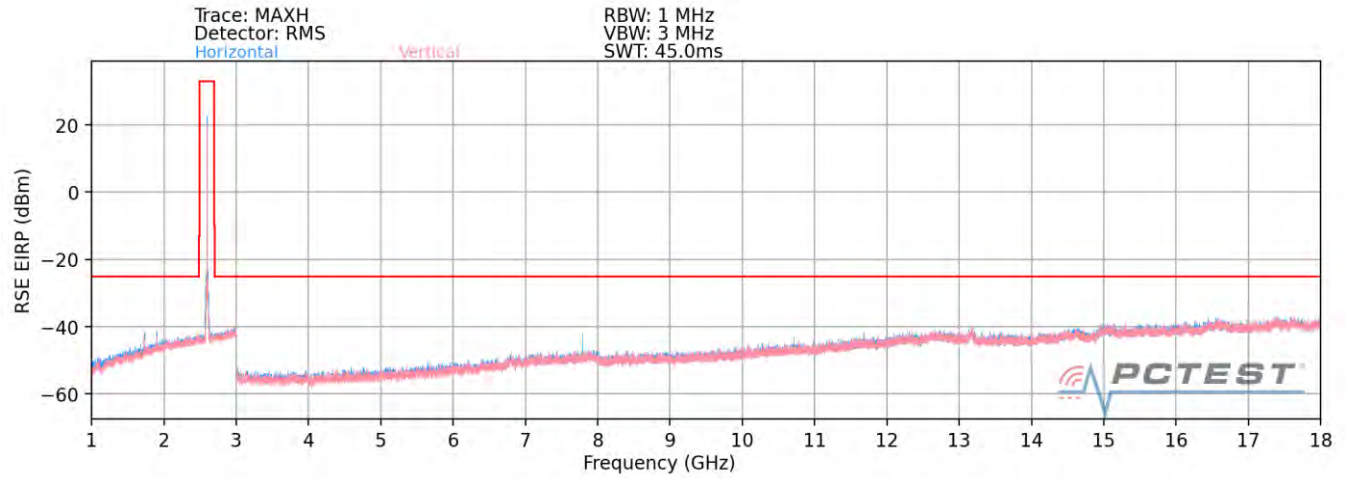
Table 7-5. Radiated Spurious Data (LTE Band 41(PC3) – Mid Channel)

Bandwidth (MHz):	20
Frequency (MHz):	2680.0
RB / Offset:	1 / 50

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
5360.00	H	-	-	-71.11	8.46	44.35	-50.91	-25.00	-25.91
8040.00	H	333	19	-70.41	12.71	49.30	-45.95	-25.00	-20.95
10720.00	H	-	-	-72.64	16.55	50.91	-44.35	-25.00	-19.35
13400.00	H	-	-	-72.89	20.55	54.66	-40.60	-25.00	-15.60

Table 7-6. Radiated Spurious Data (LTE Band 41(PC3) – High Channel)

NR Band n4



Plot 7-76. Radiated Spurious Plot (NR Band n41)

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

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]
5092.00	H	-	-	-71.22	7.18	42.96	-52.30	-25.00	-27.30
7638.00	H	-	-	-70.21	12.88	49.67	-45.59	-25.00	-20.59
10184.00	H	-	-	-73.21	15.22	49.01	-46.24	-25.00	-21.24
12730.00	H	-	-	-72.22	20.10	54.88	-40.38	-25.00	-15.38

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

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

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]
5186.00	H	-	-	-70.85	7.10	43.25	-52.01	-25.00	-27.01
7779.00	H	301	266	-70.05	12.66	49.61	-45.65	-25.00	-20.65
10372.00	H	-	-	-72.82	16.05	50.23	-45.03	-25.00	-20.03
12965.00	H	-	-	-71.95	19.52	54.57	-40.69	-25.00	-15.69

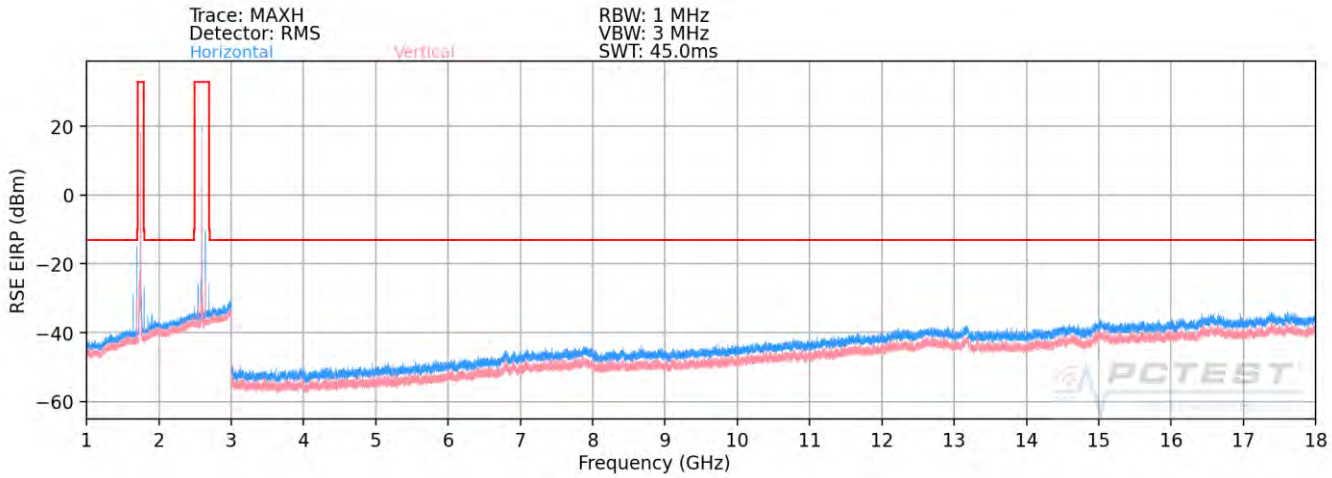
Table 7-8. Radiated Spurious Data (NR Band n41 – Mid Channel)

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

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]
5280.00	H	-	-	-71.01	7.63	43.62	-51.63	-25.00	-26.63
7920.00	H	298	255	-69.80	13.91	51.11	-44.15	-25.00	-19.15
10560.00	H	-	-	-72.78	16.41	50.63	-44.63	-25.00	-19.63
13200.00	H	-	-	-72.04	20.83	55.79	-39.46	-25.00	-14.46

Table 7-9. Radiated Spurious Data (NR Band n41 – High Channel)

NR Band n41 – B66



Plot 7-77. Radiated Spurious Plot (NR Band n41 – B66)

Bandwidth (MHz):	100 / 20
Frequency (MHz):	2593 / 1745
RB / Offset:	1 / 135 & 1 / 53
Mode:	EN-DC
Anchor Band:	LTE Band 66

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]
1647.00	H	-	-	-70.21	9.55	46.34	-48.92	-13.00	-35.92
3441.00	H	-	-	-68.99	15.22	53.23	-42.03	-13.00	-29.03
4289.00	H	-	-	-70.12	16.27	53.15	-42.11	-13.00	-29.11
5137.00	H	-	-	-72.06	17.35	52.29	-42.97	-13.00	-29.97

Table 7-10. Radiated Spurious Data (NR Band n41 – B66)

7.7 Frequency Stability / Temperature Variation

Test Overview and Limit

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

a.) **Temperature:** The temperature is varied from -30°C to +50°C in 10°C increments using an environmental chamber.

b.) **Primary Supply Voltage:** The primary supply voltage is varied from 85% to 115% of the nominal value for non hand-carried battery and AC powered equipment. For hand-carried, battery-powered equipment, primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacturer.

Test Procedure Used

ANSI/TIA-603-E-2016

Test Settings

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

Test Setup

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

Test Notes

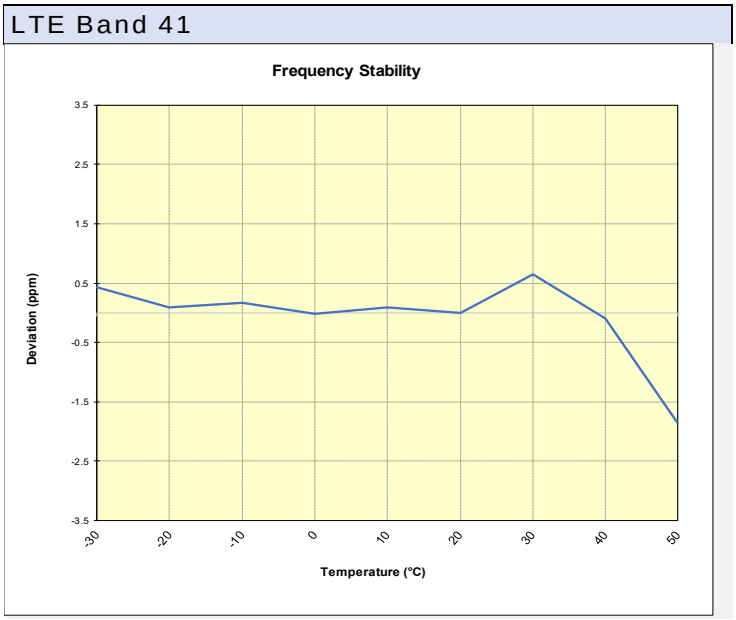
None

LTE Band B41

LTE Band 41	
Operating Frequency (Hz):	2,593,000,000
Ref. Voltage (VDC):	3.86

Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.86	- 30	2,593,049,336	1,115	0.0000430
		- 20	2,593,048,457	236	0.0000091
		- 10	2,593,048,665	444	0.0000171
		0	2,593,048,199	-22	-0.0000008
		+ 10	2,593,048,474	253	0.0000098
		+ 20 (Ref)	2,593,048,221	0	0.0000000
		+ 30	2,593,049,919	1,698	0.0000655
		+ 40	2,593,047,999	-222	-0.0000086
		+ 50	2,593,043,395	-4,826	-0.0001861
Battery Endpoint	3.32	+ 20	2,593,048,199	-22	-0.0000008

Table 7-11. LTE Band B41 Frequency Stability Data



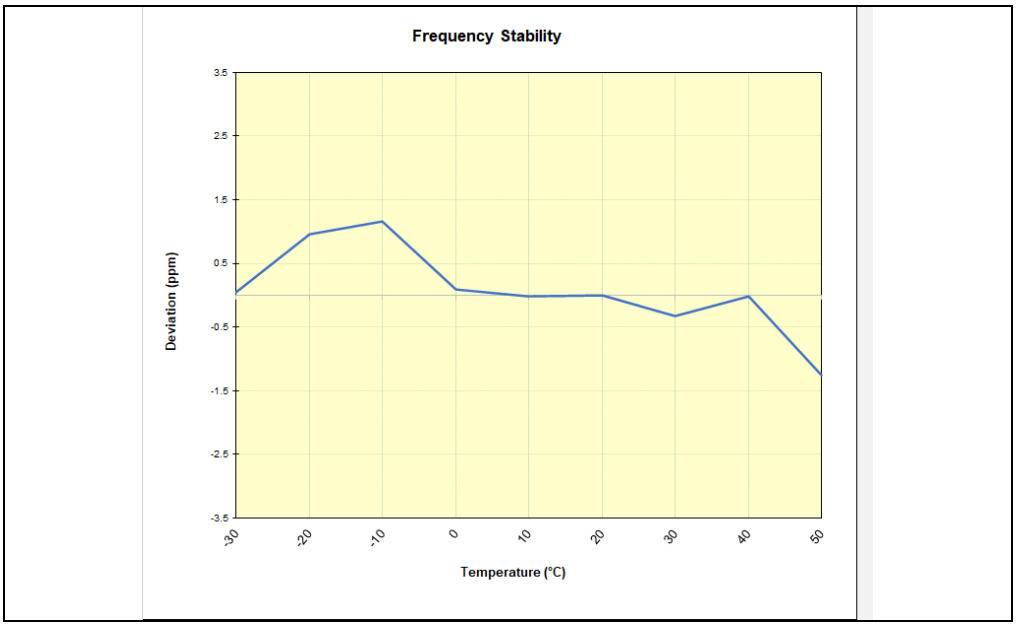
Plot 7-78. LTE Band B41 Frequency Stability Chart

NR Band n41

Operating Frequency (Hz):	2,593,000,000
Ref. Voltage (VDC):	3.86

Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.86	- 30	2,593,048,226	115	0.0000044
		- 20	2,593,050,597	2,486	0.0000959
		- 10	2,593,051,125	3,014	0.0001162
		0	2,593,048,352	241	0.0000093
		+ 10	2,593,048,089	-22	-0.0000008
		+ 20 (Ref)	2,593,048,111	0	0.0000000
		+ 30	2,593,047,269	-842	-0.0000325
		+ 40	2,593,048,079	-32	-0.0000012
		+ 50	2,593,044,846	-3,265	-0.0001259
Battery Endpoint	3.32	+ 20	2,593,049,703	1,592	0.0000614

Table 7-12. NR Band n41 Frequency Stability Data



Plot 7-79. NR Band n41 Frequency Stability Chart

8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the SONY **Portable Handset FCC ID: PY7-95324M** complies with all the requirements of Part 27 of the FCC rules.