

PCTEST

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MEASUREMENT REPORT

LTE

Applicant Name: Netcomm Wireless Limited 18-20 Orion Road Lane Cove NSW 2066 Sydney, Austrailia Date of Testing: 3/31/2020 - 7/23/2020, 10/3/2020 - 10/6/2020 Test Site/Location: PCTEST Lab. Columbia, MD, USA Test Report Serial No.: 1M2009150144-01.XIA

FCC ID:XIA-CFW2172APPLICANT:Netcomm Wireless Limited

Application Type:	Certification
Model:	CFW-2172
EUT Type:	Handheld LTE Router
FCC Classification:	Citizens Band End User Device (CBE)
FCC Rule Part(s):	96
Test Procedure(s):	ANSI C63.26-2015, ANSI/TIA-603-E-2016, KDB 971168 D01 v03r01

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in §2.947. Test results reported herein relate only to the item(s) tested.

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

Randy Ortanez President



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MEASUREMENT REPORT FCC Part 96



			EIRP				
Mode	FCC Rule Part	Tx Frequency (MHz)	Max. Pow er (W)	Max. Pow er (dBm)	Emission Designator	Modulation	
LTE Band 48	96	3552.5 - 3697.5	0.107	20.31	4M54G7D	QPSK	
LTE Band 48	96	3552.5 - 3697.5	0.108	20.35	4M51W7D	16QAM	
LTE Band 48	96	3552.5 - 3697.5	0.108	20.33	4M52W7D	64QAM	
LTE Band 48	96	3555 - 3695	0.110	20.42	9M00G7D	QPSK	
LTE Band 48	96	3555 - 3695	0.110	20.43	8M99W7D	16QAM	
LTE Band 48	96	3555 - 3695	0.110	20.42	9M02W7D	64QAM	
LTE Band 48	96	3557.5 - 3692.5	0.138	21.40	13M5G7D	QPSK	
LTE Band 48	96	3557.5 - 3692.5	0.138	21.41	13M5W7D	16QAM	
LTE Band 48	96	3557.5 - 3692.5	0.138	21.41	13M5W7D	64QAM	
LTE Band 48	96	3560 - 3690	0.194	22.87	18M0G7D	QPSK	
LTE Band 48	96	3560 - 3690	0.193	22.86	18M0W7D	16QAM	
LTE Band 48	96	3560 - 3690	0.194	22.87	17M9W7D	64QAM	

EUT Overview (LTE B48)

Note: EIRP listed in table above is measured over the entire channel bandwidth.

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1.0 INTRODUCTION

1.1 Scope

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

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 a CBRS Alliance (OnGo) Approved Test Lab
- PCTEST is a WInnForum Approved Test Lab
- PCTEST is an ISO 17025-2005 accredited test facility under the American Association for Laboratory Accreditation (A2LA) with Certificate number 2041.01 for CBRS Alliance Certification Test Plan and WInnForum Conformance and Performance Test Technical Standard.
- PCTEST is an ISO 17025-2005 accredited test facility under the American Association for Laboratory Accreditation (A2LA) with Certificate number 2041.01 for Specific Absorption Rate (SAR), Hearing Aid Compatibility (HAC) testing, where applicable, and Electromagnetic Compatibility (EMC) testing for FCC and Innovation, Science, and Economic Development Canada rules.
- PCTEST TCB is a Telecommunication Certification Body (TCB) accredited to ISO/IEC 17065-2012 by A2LA (Certificate number 2041.03) in all scopes of FCC Rules and ISED Standards (RSS).
- PCTEST facility is a registered (2451B) test laboratory with the site description on file with ISED.

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2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **Netcomm Handheld LTE Router FCC ID: XIA-CFW2172**. The test data contained in this report pertains only to the emissions due to the EUT's LTE Band 48 operation in the CBRS band. This device is an end user device.

Test Device Serial No.: 00349

2.2 Device Capabilities

This device contains the following capabilities:

LTE B48

2.3 Test Configuration

The EUT was tested per the guidance of ANSI/TIA-603-E-2016 and KDB 971168 D01 v03r01. See Section 7.0 of this test report for a description of the radiated and antenna port conducted emissions tests.

2.4 EMI Suppression Device(s)/Modifications

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

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3.0 DESCRIPTION OF TESTS

3.1 Measurement Procedure

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

3.2 Radiated Power and Radiated Spurious Emissions

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

The equipment under test was transmitting while connected to its integral antenna and is placed on a 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. Radiated power levels are also investigated with the receive antenna horizontally and vertically polarized. The maximized power level is recorded using the spectrum analyzer "Channel Power" function with the integration band set to the emissions' occupied bandwidth, a RMS detector, RBW = 100kHz, VBW = 300kHz, and a 1 second sweep time over a minimum of 10 sweeps, per the guidelines of KDB 971168 D01 v03r01.

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

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

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].

The calculated P_d levels are then compared to the absolute spurious emission limit of -13dBm which is equivalent to the required minimum attenuation of 43 + 10log₁₀(Power [Watts]).

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

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4.0 MEASUREMENT UNCERTAINTY

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

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

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5.0 TEST EQUIPMENT CALIBRATION DATA

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

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
-	LTx2	Licensed Transmitter Cable Set	4/9/2020	Annual	4/9/2021	LTx2
Agilent	N9020A	MXA Signal Analyzer	8/4/2020	Annual	8/4/2021	US46470561
Agilent	N9030A	PXA Signal Analyzer (44GHz)	7/17/2020	Annual	7/17/2021	MY52350166
Com-Power	AL-130	9kHz - 30MHz Loop Antenna	10/10/2019	Biennial	10/10/2021	121034
ETS Lindgren	3164-08	Quad Ridge Horn Antenna	3/12/2020	Biennial	3/12/2022	128337
Mini Circuits	TVA-11-422	RF Power Amp		N/A		
Mini-Circuits	SSG-4000HP	Synthesized Signal Generator		N/A		
Rohde & Schwarz	CMW500	Radio Communication Tester		N/A		102060
Rohde & Schwarz	TS-PR26	18-26.5 GHz Pre-Amplifier	11/1/2019	Annual	11/1/2020	100040
Rohde & Schwarz	ESU26	EMI Test Receiver (26.5GHz)	7/15/2020	Annual	7/15/2021	100342
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	2/10/2020	Annual	2/10/2021	102134
Sunol	DRH-118	Horn Antenna (1-18 GHz)	8/27/2019	Biennial	8/27/2021	A042511
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	7/27/2020	Biennial	7/27/2022	A051107

Table 5-1. Test Equipment

Notes:

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

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6.0 SAMPLE CALCULATIONS

Emission Designator

QPSK Modulation

Emission Designator = 8M62G7D

LTE BW = 8.62 MHz

G = Phase Modulation

7 = Quantized/Digital Info

D = Data transmission, telemetry, telecommand

QAM Modulation

Emission Designator = 8M45W7D

LTE BW = 8.45 MHz W = Amplitude/Angle Modulated 7 = Quantized/Digital Info D = Data transmission, telemetry, telecommand

Spurious Radiated Emission – LTE Band

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

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

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7.0 TEST RESULTS

7.1 Summary

Company Name:	Netcomm Wireless Limited
FCC ID:	XIA-CFW2172

Mode(s): LTE

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
2.1049	Occupied Bandwidth	N/A		PASS	Section 7.2
2.1046, 96.41(b)	Transmitter Conducted Output Power (Calculated EIRP)	23dBm / 10MHz EIRP (average)		PASS	Section 7.8
		-13 dBm/Mhz at frequencies within 0-10MHz of channel edge			
2.1051 96.41(e)	Out of Band Emissions	-25 dBm/MHz at frequencies greater than 10MHz above and below channel edge		PASS	Section 7.3
		-40 dBm/MHz at frequencies below 3530 MHz and above 3720 MHz			
96.41(g)	Peak-Average Ratio	< 13 dB	CONDUCTED	PASS	Section 7.6
		-13 dBm/Mhz at frequencies within 0-10MHz of channel edge			
96.41(e)	Uplink Carrier Aggregation Out of Band Emissions	-25 dBm/MHz at frequencies greater than 10MHz above and below channel edge		PASS	Section 7.6
		-40 dBm/MHz at frequencies below 3530 MHz and above 3720 MHz			
2.1055	Frequency Stability	Fundamental emissions stay within authorized frequency block		PASS	Section 7.11

Table 7-1. Summary	of	Conducted	Test	Results
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FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
2.1053 96.41(e)	Undesirable Emissions	-40 dBm/MHz	RADIATED	PASS	Section 7.8
96.41(e)	Uplink Carrier Aggregation	Undesirable emissions must meet the limits detailed in 96.41(e)		PASS	Section 7.10

 Table 7-2. Summary of Radiated 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) For conducted spurious emissions, automated test software was used to measure emissions and capture the corresponding plots necessary to show compliance. The measurement software utilized is PCTEST "LTE Automation," Version 5.1.
- 5) Some data in this test report was taken from FCC ID: XIA-CFW2182 since the internal hardware and circuitry is idenitical.

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7.2 Occupied Bandwidth §2.1049

Test Overview

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

Test Procedure Used

KDB 971168 D01 v03r01 - Section 4.2

Test Settings

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

1-5% of the 99% occupied bandwidth observed in Step 7

Test Setup

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



Figure 7-1. Test Instrument & Measurement Setup

Test Notes

None.

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Band 48

www. Keysight Spectrum Analyzer - Occupied BW								
LX/ RL RF 50 Ω AC CORF		SENSE:INT Center Freg: 3.625000		ALIGN AUTO	11:19:28 A	4 Apr 14, 2020	Trac	e/Detector
NFE	↓	Trig: Free Run	Avg Hold:	>100/100				
#IFG	ain:Low	#Atten: 36 dB			Radio Dev	ice: BTS		
10 dB/div Ref 40.00 dBm	_							
30.0								
20.0							C	Clear Write
10.0	mon	M.C.mmann	Amonty					
0.00								
-10.0			}					Average
				An A.	_			Average
-20.0 what marked the for				الالهمم لا إن	mMm	Mohn		
-30.0								
-40.0								Max Hold
-50.0								
Center 3.625000 GHz					Span 1	2.50 MHz		
Res BW 120 kHz		#VBW 390 k	Hz			ep 1 ms		Min Hold
								Millinoid
Occupied Bandwidth		Total P	ower	30.1	dBm			
4.53	59 MH	Z						Detector
								Peak▶
Transmit Freq Error	-5.411 kH	Iz % of OE	BW Powe	r 99	.00 %		Auto	<u>Man</u>
x dB Bandwidth	4.923 MF	lz xdB		-26.	00 dB			
MSG				STATUS				

Plot 7-1. Occupied Bandwidth Plot (Band 48 - 5.0MHz QPSK - Full RB Configuration)

Keysight Spectrum Analyzer - Occupied BW					
KX RL RF 50Ω AC	🛶 Trig	SENSE:INT ter Freq: 3.625000000 : Free Run Av :en: 36 dB	ALIGN AUTO GHz g Hold: 83/100	11:20:39 AM Apr14, 2020 Radio Std: None Radio Device: BTS	Trace/Detector
10 dB/div Ref 40.00 dBm					
20.0	panhapman	mannan	M		Clear Write
-10.0	NH		Anno A	tar a Ar	Average
-20.0 -30.0 -40.0 -50.0				en n n n n n n n n n n n n n n n n n n	Max Hold
Center 3.625000 GHz Res BW 120 kHz		#VBW 390 kHz		Span 12.50 MHz Sweep 1 ms	Min Hold
Occupied Bandwidth		Total Powe	er 28.3	dBm	
	5111 MHz				Detector Peak▶
Transmit Freq Error	-3.998 kHz	% of OBW	Power 99	.00 %	Auto <u>Man</u>
x dB Bandwidth	4.900 MHz	x dB	-26.	00 dB	
MSG			STATUS	3	

Plot 7-2. Occupied Bandwidth Plot (Band 48 - 5.0MHz 16-QAM - Full RB Configuration)

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🔤 Keysight Spectrum Anal	lyzer - Occu	upied BW									
KK RE RF		AC	CORREC		SENSE:INT Freq: 3.6250 Free Run		ALIGN AUTO	11:20:20 A Radio Std	M Apr 14, 2020 : None	Trac	e/Detector
			#IFGain:Low	-	n: 36 dB			Radio Dev	vice: BTS		
10 dB/div Ref	f 30.00	dBm									
20.0			m	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	marcon	m				¢	Clear Write
-10.0											
-20.0 -30.0	~~~~N	M	\$r#				Mahan	n N N	mmm		Average
-40.0											Max Hold
-60.0											Widx Hold
Center 3.625000 Res BW 120 kH				#	VBW 390	kHz			2.50 MHz ep 1 ms		Min Hold
Occupied E	3and\	width			Total F	ower	28.2	2 dBm			
		4.5	5 24 0	MHz							Detector Peak▶
Transmit Fre	eq Erro	or	-1.43	9 kHz	% of O	BW Pow	ver 99	.00 %		Auto	<u>Man</u>
x dB Bandwi	idth		4.91	3 MHz	x dB		-26.	00 dB			
MSG							STATUS	3			

Plot 7-3. Occupied Bandwidth Plot (Band 48 - 5.0MHz 64-QAM - Full RB Configuration)



Plot 7-4. Occupied Bandwidth Plot (Band 48 - 10.0MHz QPSK - Full RB Configuration)

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🔤 Keysi	ght Spectrum /	Analyzer - Oo	ccupied E	W									
L <mark>XI</mark> RL	RF	50 S	2 AC	CORR	EC		SENSE:INT		ALIGN AUT		M Apr 14, 2020	Trac	e/Detector
			NFE				Freq: 3.6250 ree Run		ld: 82/100	Radio Std	: None		
			NFE	#IFGa	in:Low	#Atten:				Radio Dev	ice: BTS		
10 dB/	div	Ref 40.0	00 dB	m									
Log 30.0													
20.0												(Clear Write
					one doe a	the other a los	VINUN AND MAL	MYL MANULL I					
10.0						in with a subset	ola maddatailatt	1.00.0 · · V.M.					
0.00									1				
-10.0)					1				Average
-20.0			_						N			_	
-30.0 🕶	many	MANNAM	*********	MAN WI					. Altrack Mark	Arthurenau	lo wardler		
-40.0													
-50.0													Max Hold
-30.0													
Cente	er 3.6250	0 GHz								Span 2	5.00 MHz		
Res E	3W 2401	kHz				#\	/BW 7501	kHz			eep 1 ms		Min Hold
													Minifiona
00	cupied	l Banc	lwid	th			Total F	ower	2	7.8 dBm			
			8	987	'8 M	Hz							Detector
			0	.001		112							Peak►
Tra	ansmit F	req Er	ror		7.515	kHz	% of O	BW Pov	ver	99.00 %		Auto	<u>Man</u>
v d	B Band	width			9.784	MHz	x dB		-2	26.00 dB			
	B Bana	witatin			0.104	101112	A GD			10.00 ab			
MSG									ST/	ATUS			

Plot 7-5. Occupied Bandwidth Plot (Band 48 - 10.0MHz 16-QAM - Full RB Configuration)



Plot 7-6. Occupied Bandwidth Plot (Band 48 - 10.0MHz 64-QAM - Full RB Configuration)

FCC ID: XIA-CFW2172	PCTEST Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Wireless	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga 15 of 74
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Plot 7-7. Occupied Bandwidth Plot (Band 48 - 15.0MHz QPSK - Full RB Configuration)



Plot 7-8. Occupied Bandwidth Plot (Band 48 - 15.0MHz 16-QAM - Full RB Configuration)

FCC ID: XIA-CFW2172	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	
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🔤 Keysight Spectrum Analyzer - Occupie	ed BW						
ΙΧ΄ RL RF 50Ω A			ALIGN AUTO Hz Hold: 100/100	08:17:46 AM / Radio Std: N	lone	Trace/D	etector
	#IFGain:Low	#Atten: 36 dB		Radio Devic	e: BTS		
10 dB/div Ref 40.00 d	IBm						
20.0						Cle	ar Write
10.0	massimme	Malinia and an and	4 <u> </u>				
-10.0							Average
-20.0 -30.0 maylulan markally mark	mmmula		howellow	-hannan march	Winner		
-40.0							ax Hold
-50.0						N	
Center 3.62500 GHz				Span 37	50 MHz		
Res BW 360 kHz		#VBW 1.1 MHz			p 1 ms	r	Min Hold
Occupied Bandwi		Total Power	26.9	∂ dBm			
·	13.450 MH	Z					Detector Peak
Transmit Freq Error	3.140 kl	Hz % of OBW P	ower 99	9.00 %		Auto	Man
x dB Bandwidth	14.59 MI	Hz x dB	-26.	00 dB			
							1
							<u> </u>
MSG			STATU	S			

Plot 7-9. Occupied Bandwidth Plot (Band 48 - 15.0MHz 64-QAM - Full RB Configuration)



Plot 7-10. Occupied Bandwidth Plot (Band 48 - 20.0MHz QPSK - Full RB Configuration)

FCC ID: XIA-CFW2172	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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www. Keysight Spectrum Analyzer - Occupied BW							- 6 💌
X/RL RF 50Ω AC CC		ENSE:INT Freg: 3.625000000 GHz	ALIGN AUTO	11:15:41 A Radio Std	M Apr 14, 2020	Trac	e/Detector
NFE	Trig: Fr	ee Run Avg Hol	d: 91/100				
#IF	Gain:Low #Atten:	36 dB		Radio Dev	rice: BTS		
10 dB/div Ref 40.00 dBm							
20.0							
20.0						(Clear Write
10.0	My Marth Bally Mark & Gal	Manhaman					
			1				
							Average
-10.0							Average
-20.0 mlalmant population of the all more thank	r		" And Showstore	the way have	how when he was		
-30.0							
-40.0							Max Hold
-50.0							
Center 3.62500 GHz				Span 5	0.00 MHz		
Res BW 470 kHz	#V	BW 1.5 MHz			ep 1 ms		Min Hold
							Millinoid
Occupied Bandwidth		Total Power	28.6	dBm			
17.9	954 MHz						Detector
							Peak▶
Transmit Freq Error	-586 Hz	% of OBW Pov	ver 99	.00 %		Auto	Man
x dB Bandwidth	19.42 MHz	x dB	-26.	00 dB			
MSG			STATUS	5			

Plot 7-11. Occupied Bandwidth Plot (Band 48 - 20.0MHz 16-QAM - Full RB Configuration)



Plot 7-12. Occupied Bandwidth Plot (Band 48 - 20.0MHz 64-QAM - Full RB Configuration)

FCC ID: XIA-CFW2172	Proud to be part of @ element		
Test Report S/N:	Test Dates:	EUT Type:	Dogo 19 of 74
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7.3 Spurious and Harmonic Emissions at Antenna Terminal

§2.1051 §96.41(e)

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

The conducted power of any emissions below 3530 MHz or above 3720 MHz shall not exceed -40 dBm/Mhz.

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 at least 10 * the fundamental frequency (separated into at least two plots per channel)
- 2. Detector = RMS
- 3. Trace mode = Max Hold
- 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

Compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater for frequencies less than 1 GHz and 1 MHz or greater for frequencies greater than 1 GHz. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emission are attenuated at least 26 dB below the transmitter power.

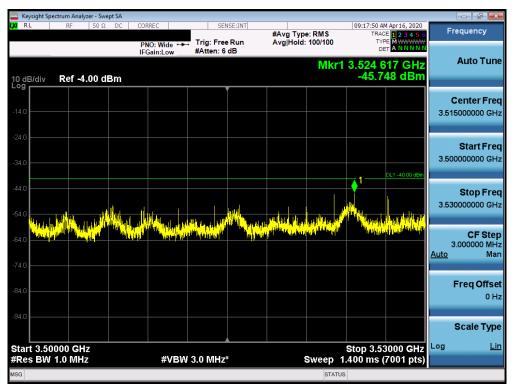
FCC ID: XIA-CFW2172	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 10 of 74
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Band 48



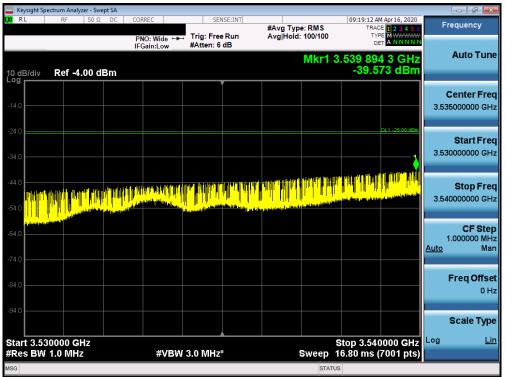
Plot 7-13. Conducted Spurious Plot (Band 48 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



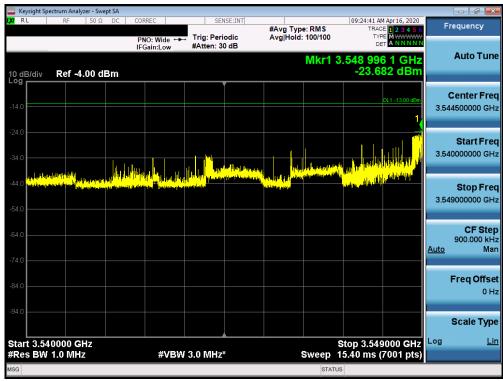
Plot 7-14. Conducted Spurious Plot (Band 48 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)

FCC ID: XIA-CFW2172	PCTEST [®] Proud to be part of ® element	MEASUREMENT REPORT (CERTIFICATION)	eless Approved by: Quality Manager
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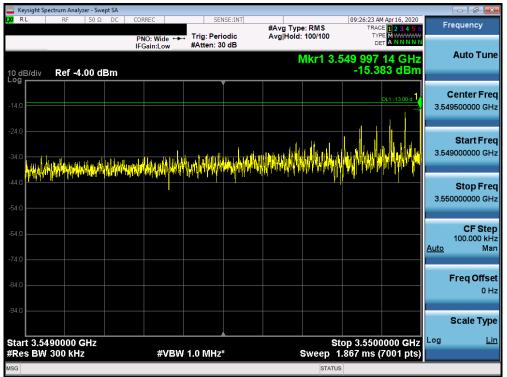
Plot 7-15. Conducted Spurious Plot (Band 48 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



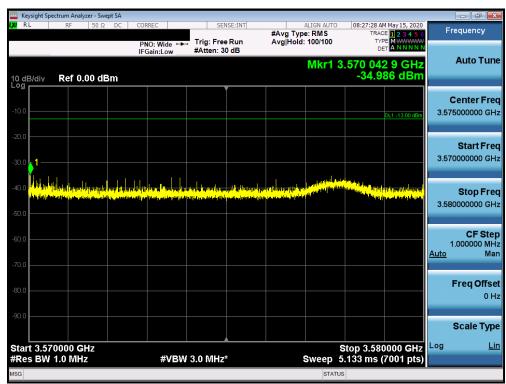
Plot 7-16. Conducted Spurious Plot (Band 48 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)

FCC ID: XIA-CFW2172	PCTEST [°] Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Daga 21 of 74
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Plot 7-17. Conducted Spurious Plot (Band 48 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



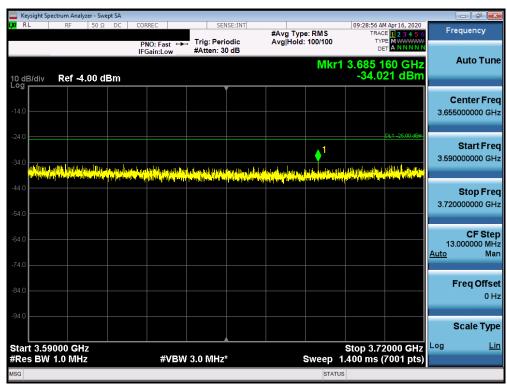
Plot 7-18. Conducted Spurious Plot (Band 48 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)

FCC ID: XIA-CFW2172	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 22 of 74
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			nalyzer - Sw											
l ,XI R	L	RF	50 Ω	DC	CORREC		SEN	ISE:INT	#Avg Typ	ALIGN AUTO e: RMS		M May 15, 2020	F	requency
	B/div	Ref	0.00 di	Зm	PNO: W IFGain:	/ide ↔ Low	Trig: Free #Atten: 30		Avg Hold	100/100	3.586 17			Auto Tune
Log -10.0														Center Freq 5000000 GHz
												DL1 -25.00 dBm	3.58	Start Freq
	n fra de la como de la Como de la como de la co	alle reality States and a s	angelan ters per <mark>t</mark> unya Manifi yaka manana	k dan bergan sejar Yan terse pasa di belepi	igenplinen Glandinasi	Harin (tark) and Aparta antifactor (ta	nder bleg general seder be Franz de signe fan de se	ta dar bilda antique A consequent, Bellinge			in billing him on the second second in Second Second	eligen and an an and here , he hay agreen heller, a. ()	3.59	Stop Freq 0000000 GHz
-60.0 -70.0													Auto	CF Step 1.000000 MHz Man
														Freq Offset 0 Hz
-90.0 Star	t 3.58	0000	GHz								Stop 3.59	0000 GHz	Log	Scale Type <u>Lin</u>
	s BW					#VBW	3.0 MHz*	\$		Sweep	5.133 ms (7001 pts)		
MSG										STAT	rus			

Plot 7-19. Conducted Spurious Plot (Band 48 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



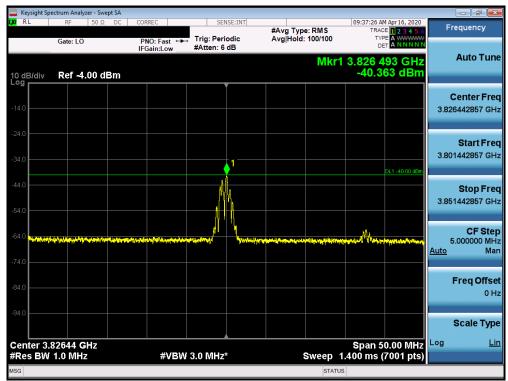
Plot 7-20. Conducted Spurious Plot (Band 48 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)

FCC ID: XIA-CFW2172	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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	sysight Spect			pt SA									_	
l,XI R	L	RF	50 Ω	DC		Fast ↔			#Avg Typ Avg Hold		TRAC	M Apr 16, 2020 E 1 2 3 4 5 6 E M WWWWW T A N N N N N	F	requency
10 dl Log	B/div	Ref -4	.00 dE	Зm	IFGair	n:Low	#Atten: 6	dB		Mkr1		51 GHz 34 dBm		Auto Tune
-14.0														Center Freq 5000000 GHz
												DL1 -40.00 dBm	3.72	Start Freq
					1								3.81	Stop Freq 0000000 GHz
	dellas derilija progenspilosp				ilian kadada Manakata kaj	inite particular Angle particular		i i na senera da sen Senera da senera da s Senera da senera da s	in in the state of	li fisati shekari sati Qiti ya nemena katiya		han a dijedina da	Auto S	CF Step 9.000000 MHz Man
														Freq Offset 0 Hz
-94.0 Star	t 3.720	00 CH	7								Stop 3.8	1000 GHz	Log	Scale Type
	s BW 1					#VBW	/ 3.0 MHz	*		Sweep 1		7001 pts)		
MSG										STATU	s			

Plot 7-21. Conducted Spurious Plot (Band 48 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



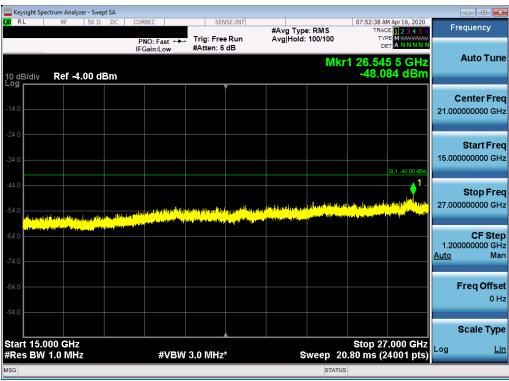
Plot 7-22. Conducted Spurious Plot (Band 48 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)

FCC ID: XIA-CFW2172	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		
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	ctrum Analyzer - Swept SA								- • •
LX/RL	RF 50 Ω DC	CORREC	SENSE		pe: RMS		Apr 16, 2020	Fre	equency
	Gate: LO	PNO: Fast +++ IFGain:Low	Trig: Period #Atten: 20 d		d: 100/100	TYP			
		II Gam.Low		-	Mk	r1 10.65	2 8 GHz		Auto Tune
10 dB/div	Ref -4.00 dBm					-43.9	40 dBm		
			ľ					-	enter Freg
-14.0									000000 GHz
-24.0									Start Freq
-34.0								3.850	000000 GHz
				1			DL1 -40.00 dBm		
-44.0									Stop Freq
-54 0								15.000	000000 GHz
~~Y~~									
-64.0									CF Step
-74.0								1.115 Auto	Man
-74.0									
-84.0								F	req Offset
									0 Hz
-94.0									
								\$	Scale Type
Start 3.85 #Res BW		#VBW	3.0 MHz*		Sweep 1'	Stop 15 12.7 ms_(2	.000 GHz 2841 pts)	Log	<u>Lin</u>
MSG					STATU				

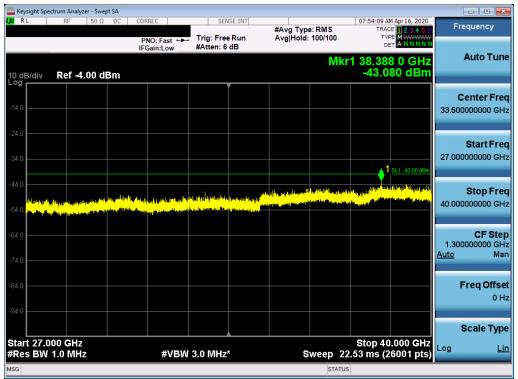
Plot 7-23. Conducted Spurious Plot (Band 48 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



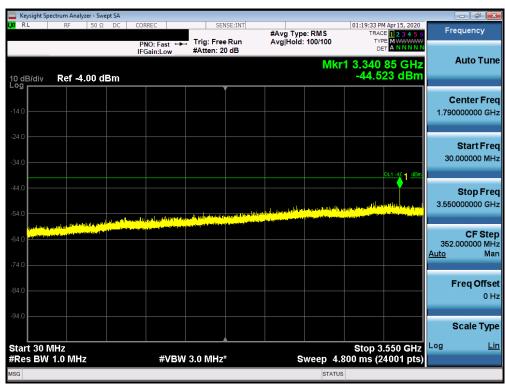
Plot 7-24. Conducted Spurious Plot (Band 48 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)

FCC ID: XIA-CFW2172	PCTEST [°] Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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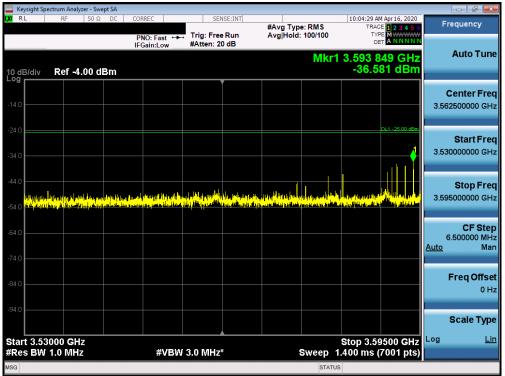
Plot 7-25. Conducted Spurious Plot (Band 48 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



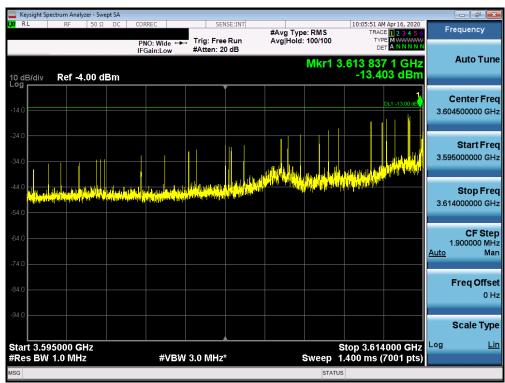
Plot 7-26. Conducted Spurious Plot (Band 48 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

FCC ID: XIA-CFW2172	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:	Dage 26 of 74	
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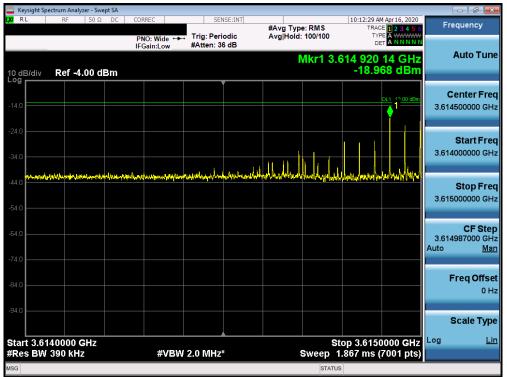
Plot 7-27. Conducted Spurious Plot (Band 48 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)



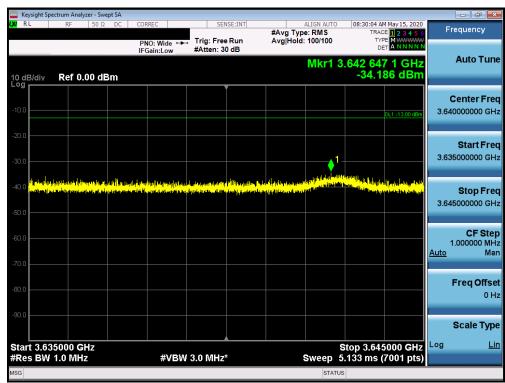
Plot 7-28. Conducted Spurious Plot (Band 48 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

FCC ID: XIA-CFW2172	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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Plot 7-29. Conducted Spurious Plot (Band 48 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)



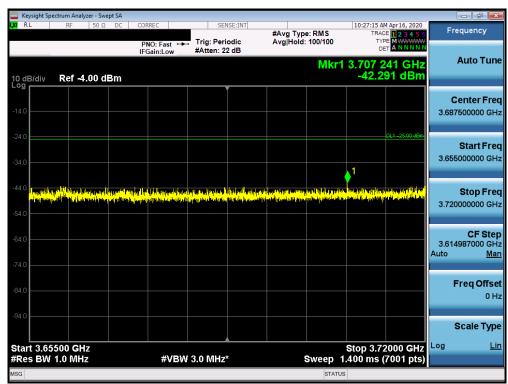
Plot 7-30. Conducted Spurious Plot (Band 48 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

FCC ID: XIA-CFW2172	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:	Page 28 of 74	
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	pectrum Analyzer - Swept SA								_	
LXI RL	RF 50 Ω DC	CORREC	SEN	SE:INT	#Avg Typ	ALIGN AUTO		May 15, 2020	Fi	requency
10 dB/div	Ref 0.00 dBm	PNO: Wide ↔ IFGain:Low	Trig: Free #Atten: 22		Avg Hold	100/100	TYF DE .651 34			Auto Tune
-10.0				/						Center Freq 0000000 GHz
-20.0								DL1 -25.00 dBm	3.64	Start Freq 5000000 GHz
-40.0 1947-90 -50.0	n dilahan mening perjangan perjangan perjangan perjangan perjangan perjangan perjangan perjangan perjangan perj Reference perjangan pe	Harling and the comparison of the set	ulalah kapitalah salah sala National salah s	n para para di selati Na sara ragan di se		a filin (jarda bara ta) Maria a sa kata a sa	n jan ka kan yan jan Yan ka ka ya jan ya ma	th irr pathala, and farm	3.65	Stop Freq 5000000 GHz
-60.0									Auto	CF Step 1.000000 MHz Man
-80.0										Freq Offset 0 Hz
-90.0	45000 GHz						Stop 3.655	000 GHz	Log	Scale Type Lin
#Res BW		#VBW	3.0 MHz*				5.133 ms (OUD GITZ		
MSG						STATU	5			

Plot 7-31. Conducted Spurious Plot (Band 48 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)



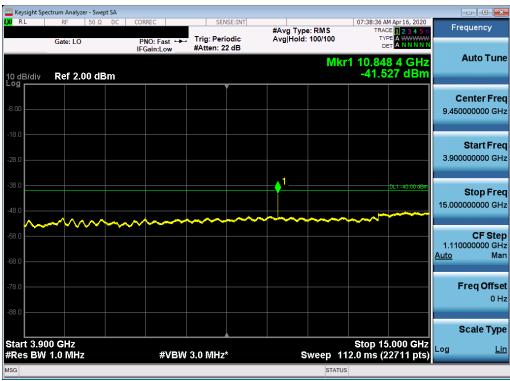
Plot 7-32. Conducted Spurious Plot (Band 48 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

FCC ID: XIA-CFW2172	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	
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	ectrum Analyze										
LX/RL	RF	50 Ω	DC C	ORREC	SEN	ISE:INT	#Avg Typ	e: RMS		M Apr 16, 2020	Frequency
				PNO:Fast ↔ FGain:Low	Trig: Peri #Atten: 6		Avg Hold		TY		
				FGain:Low	#Attent o	ub		Mkr	1 3.891 2	57 CH7	Auto Tune
10 dB/div	Ref -4.0	00 dB	m					WIN	-40.3	59 dBm	
)						
-14.0											Center Freq
-14.0											3.810000000 GHz
-24.0											
											Start Freq
-34.0										1	3.720000000 GHz
										DL1 -400 dBm	
-44.0											Stop Freq
											3.90000000 GHz
-54.0											
	المستعلم وتقريل	للغالله	اللبار بالجلير	A However the	and the shelles	والعائدة والمتعاد	روار في الأور الأسوال	distant de com	hlutinhathartagi		CF Step
-64.0	(I I THE PARTY	na wala w	www.www	3.614987000 GHz
-74.0											Auto <u>Man</u>
14.0											
-84.0											Freq Offset
											0 Hz
-94.0											
											Scale Type
Start 3.72	2000 GHz								Stop 3.9	0000 GHz	Log <u>Lin</u>
#Res BW				#VBV	V 2.0 MHz	*		Sweep	1.400 ms (7001 pts)	
MSG								STATU	IS		

Plot 7-33. Conducted Spurious Plot (Band 48 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)



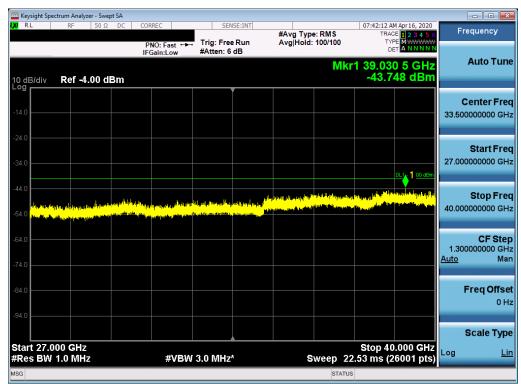
Plot 7-34. Conducted Spurious Plot (Band 48 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

FCC ID: XIA-CFW2172	PCTEST [°] Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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	sight Spectru		er - Swep	ot SA										- d ×
L <mark>XI</mark> RL		RF	50 Ω	DC	CORREC PNO: Fa	ast ⊶⊷ .ow			#Avg Typ Avg Hold		TRAC	M Apr 15, 2020 DE 1 2 3 4 5 6 PE M WWWWW ET A N N N N N		equency
10 dB Log r	l/div R	lef -4.0	00 dE	3m						Mk		4 5 GHz 67 dBm		Auto Tune
-14.0 -														Center Freq 0000000 GHz
-24.0 -34.0												DL1 -40.00 dBm	15.000	Start Freq
-44.0							and a local data		, din dina , uni pi a la				27.000	Stop Freq
-64.0	al carl testinates (c Marine la carl carl carl carl carl carl carl c	di indra di u Nya Sangi daga		nadian) die <mark>Rep</mark> rinter			eilte Hanner effange	an tanàn amin'ny taona 2014. No kaominina dia kaominina d	a din di seran di seta di seta Seta di seta di	ين ولا المح ^{ري} نيا إلياني. الما يعاد المح ^{ري} نيا	nik na sin ya di ya sini dali i		1.200 <u>Auto</u>	CF Step 0000000 GHz Man
-74.0 - -84.0 -													I	Freq Offset 0 Hz
-94.0														Scale Type
	: 15.000 ; BW 1.0				;	≠vbw	3.0 MHz*		9	weep 2	Stop 27 0.80 ms (2	.000 GHz 4001 pts)	Log	<u>Lin</u>
MSG										STATU	s			

Plot 7-35. Conducted Spurious Plot (Band 48 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)



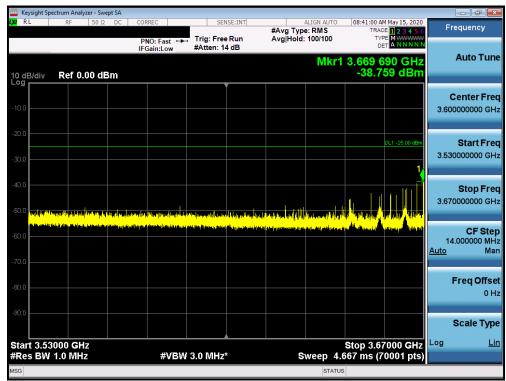
Plot 7-36. Conducted Spurious Plot (Band 48 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

FCC ID: XIA-CFW2172	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 21 of 74
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	ectrum Analyzer - Swept									×
(XU) RL	RF 50 Ω	DC CORREC PNO: Fast ↔ IFGain:Low			#Avg Typ Avg Hold:		TRAC TYP	May 15, 2020 E 1 2 3 4 5 6 E M A NNNNN	Frequency	
10 dB/div	Ref 0.00 dBr					Mk	r1 3.423 -50.5	50 GHz 18 dBm	Auto Tu	ine
-10.0									Center Fr 1.780000000 G	
-20.0									Start Fr 30.000000 M	
-40.0								DL1 -40.00 dBm	Stop Fr 3.530000000 G	
-60.0 1991 - 1994 -70.0	n ya an af basa sa an Balan da an Balan ya an Afrika. Manang manang		y Hondatay a Mila Honda Magyana ya Mila Magya Magya Magya Magya Mag	n en de la segui de la segui La presentação e compositor de la segui	gibergi tekkhodide _{Mangga} aksensport	egyd offiliau con Ywyg officiau gallanau	a alla alfabeli de la la de Angles angles alfabeli de la de la Angles alfabeli de la	officer Deteljionty Den Herena gravnik	CF St 350.000000 M <u>Auto</u> M	
-80.0									Freq Offs 0	set Hz
-90.0									Scale Ty	
Start 30 N #Res BW		#VBW	3.0 MHz*		s	weep 4.	Stop 3. 667 ms (7	530 GHz 0001 pts)	Log	Lin
MSG						STATU	s			

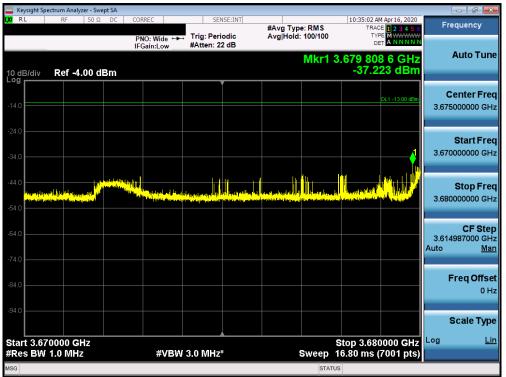
Plot 7-37. Conducted Spurious Plot (Band 48 - 20.0MHz QPSK - RB Size 1, RB Offset 99 - High Channel)



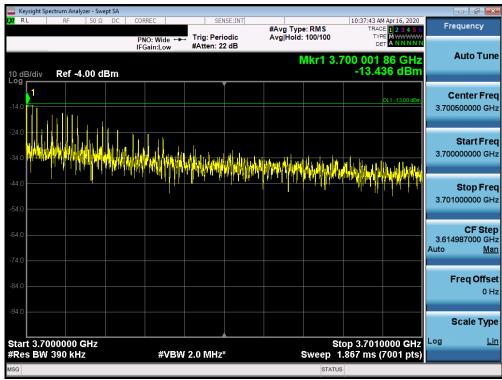
Plot 7-38. Conducted Spurious Plot (Band 48 - 20.0MHz QPSK - RB Size 1, RB Offset 99 - High Channel)

FCC ID: XIA-CFW2172	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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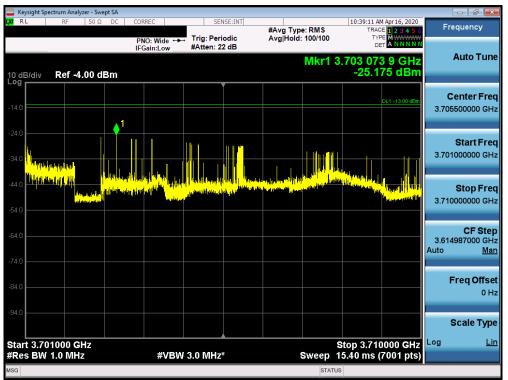
Plot 7-39. Conducted Spurious Plot (Band 48 - 20.0MHz QPSK - RB Size 1, RB Offset 99 - High Channel)



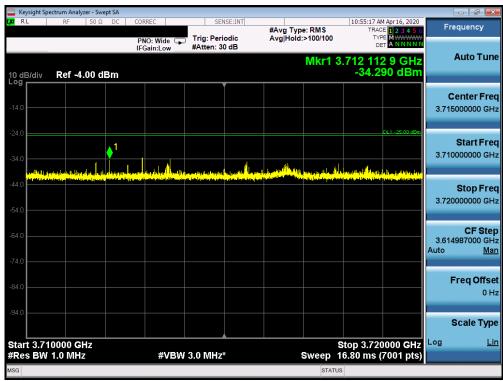
Plot 7-40. Conducted Spurious Plot (Band 48 - 20.0MHz QPSK - RB Size 1, RB Offset 99 - High Channel)

FCC ID: XIA-CFW2172	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager					
Test Report S/N:	Test Dates:	EUT Type:	Dage 22 of 74					
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Plot 7-41. Conducted Spurious Plot (Band 48 - 20.0MHz QPSK - RB Size 1, RB Offset 99 - High Channel)



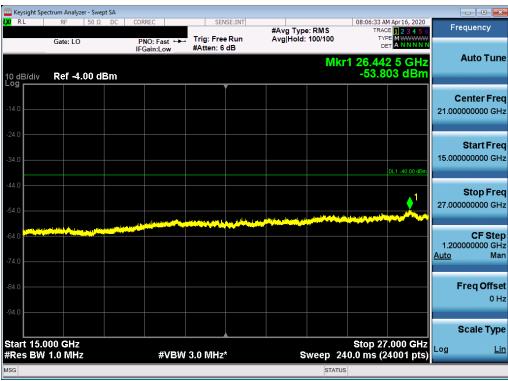
Plot 7-42. Conducted Spurious Plot (Band 48 - 20.0MHz QPSK - RB Size 1, RB Offset 99 - High Channel)

FCC ID: XIA-CFW2172	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager					
Test Report S/N:	Test Dates:	EUT Type:	Dage 24 of 74					
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Plot 7-43. Conducted Spurious Plot (Band 48 - 20.0MHz QPSK - RB Size 1, RB Offset 99 - High Channel)



Plot 7-44. Conducted Spurious Plot (Band 48 - 20.0MHz QPSK - RB Size 1, RB Offset 99 - High Channel)

FCC ID: XIA-CFW2172	PCTEST° Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	
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	ectrum Analyzer - Swept										
XI RL	RF 50 Ω	DC CORRE	C	SEN	SE:INT	#Avg Typ	e RMS		Apr 16, 2020	Frequ	ency
	Gate: LO	PNO IFGai		Trig: Free #Atten: 6		Avg Hold		TYF De			
10 dB/div	Ref -4.00 dB	m					Mk	r1 38.96 -49.3	3 0 GHz 83 dBm	Au	to Tune
og											ter Freq
14.0										33.500000	000 GHz
24.0											art Frec
34.0									DL1 -40.00 dBm	27.000000	000 GHz
44.0								مىريانىلەر ي	1 −−−		op Frec
54.0		Letter and the second	www.etwalerite	di senanta di se						40.000000	000 GHz
64.0										1.300000	CF Step 000 GHz
74.0										<u>Auto</u>	Mar
34.0										Free	q Offset 0 Hz
94.0											U Hz
											іе Туре
	000 GHz / 1.0 MHz		#VBW 3	3.0 MHz*		s	weep 2	80.0 Stop 40 60.0 ms (2	.000 GHz 6001 pts)	Log	Lin
ISG							STATU	IS			

Plot 7-45. Conducted Spurious Plot (Band 48 - 20.0MHz QPSK - RB Size 1, RB Offset 99 - High Channel)

FCC ID: XIA-CFW2172	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	
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7.4 Band Edge Emissions at Antenna Terminal

§2.1051 §96.41(e)

Test Overview

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

The conducted power of any emission outside the fundamental emission (whether in or outside of the authorized band) shall not exceed -13 dBm/MHz within 0-10 megahertz above the upper SAS-assigned channel edge and within 0-10 megahertz below the lower SAS-assigned channel edge. At all frequencies greater than 10 megahertz above the upper SAS assigned channel edge and less than 10 MHz below the lower SAS assigned channel edge, the conducted power of any emission shall not exceed -25 dBm/MHz.

The conducted power of any emissions below 3530 MHz or above 3720 MHz shall not exceed -40 dBm/Mhz.

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 <u>≥</u> 3 x RBW
- 5. Detector = RMS
- 6. Number of sweep points $\geq 2 \times \text{Span/RBW}$
- 7. Trace mode = trace average
- 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

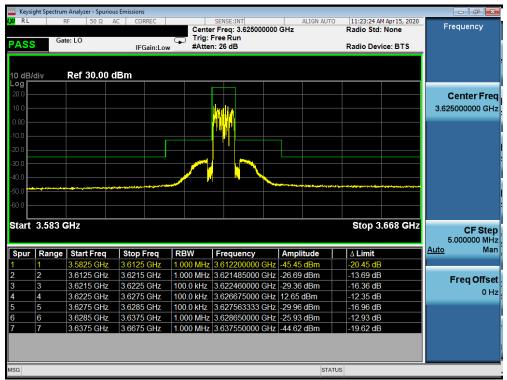
N/A Band 48

FCC ID: XIA-CFW2172	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 27 of 74
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RL	R	n Analyzer - Spuriou ເF 50 Ω /	AC CORREC	Trig:	SENSE:INT r Freq: 3.552500000 Free Run	ALIGN AUTO	11:29:53 AM Apr 15, 2020 Radio Std: None	Frequency
ASS			IFGain:Low	, #Atter	n: 26 dB		Radio Device: BTS	
		D-5 00 00 -	- D					
odB/	div	Ref 30.00 c	ивт					
0.0								Center Fre
0.0					tat Mil			3.552500000 GH
0.0								
			٦					
0.0								
0.0								
0.0								
0.0 🚧	mender die anter							
0.0								
0.0								
tart	3.51 G	Hz					Stop 3.595 GHz	CF Ste
								5.000000 MH
bpur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	∆ Limit	<u>Auto</u> Ma
pui	1	3.5100 GHz	3.5300 GHz	1.000 MHz	3.528900000 GHz	-48.08 dBm	-8.083 dB	
pui	2	3.5300 GHz	3.5400 GHz	1.000 MHz	3.539800000 GHz	-45.69 dBm	-20.69 dB	Freq Offs
pur	2			4 000 1411-	3.549000000 GHz	24.15 dBm	-11.15 dB	
	3	3.5400 GHz	3.5490 GHz	1.000 MHZ	3.34900000 GHZ	-24.15 ubiii	-11.15 ub	
	3 4	3.5400 GHz 3.5490 GHz	3.5490 GHz 3.5500 GHz		3.549996667 GHz		-14.61 dB	01
	3 4 5			100.0 kHz		-27.61 dBm		01
	3 4	3.5490 GHz	3.5500 GHz	100.0 kHz 100.0 kHz	3.549996667 GHz	-27.61 dBm 13.05 dBm	-14.61 dB	01
	3 4 5	3.5490 GHz 3.5500 GHz	3.5500 GHz 3.5550 GHz	100.0 kHz 100.0 kHz 100.0 kHz	3.549996667 GHz 3.554208333 GHz	-27.61 dBm 13.05 dBm -26.52 dBm	-14.61 dB -11.95 dB	01
	3 4 5 6	3.5490 GHz 3.5500 GHz 3.5550 GHz	3.5500 GHz 3.5550 GHz 3.5560 GHz	100.0 kHz 100.0 kHz 100.0 kHz 1.000 MHz	3.549996667 GHz 3.554208333 GHz 3.555018333 GHz	-27.61 dBm 13.05 dBm -26.52 dBm -24.04 dBm	-14.61 dB -11.95 dB -13.52 dB	0
	3 4 5 6 7	3.5490 GHz 3.5500 GHz 3.5550 GHz 3.5560 GHz	3.5500 GHz 3.5550 GHz 3.5560 GHz 3.5650 GHz	100.0 kHz 100.0 kHz 100.0 kHz 1.000 MHz	3.549996667 GHz 3.554208333 GHz 3.555018333 GHz 3.556030000 GHz	-27.61 dBm 13.05 dBm -26.52 dBm -24.04 dBm	-14.61 dB -11.95 dB -13.52 dB -11.04 dB	0

Plot 7-46. Lower Channel Edge Plot (Band 48 - 5.0MHz QPSK - Full RB Configuration)



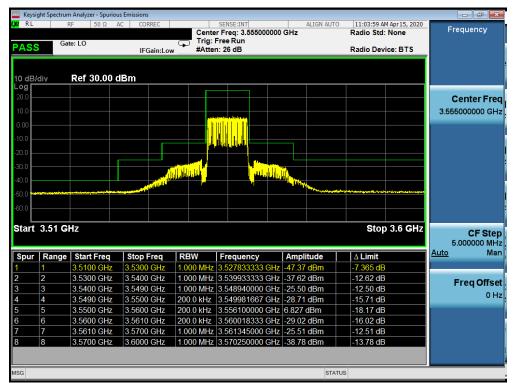
Plot 7-47. Mid Channel Edge Plot (Band 48 - 5.0MHz QPSK - Full RB Configuration)

FCC ID: XIA-CFW2172	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dago 29 of 74
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	- Ca	RF 50Ω	AC CORREC	Here Trig:	SENSE:INT er Freq: 3.69750000 External1	ALIGN AUTO O GHz	11:34:05 AM Apr 15, 202 Radio Std: None	E Frequency
ASS	s ca		IFGain:L	.ow #Atte	n: 26 dB		Radio Device: BTS	_
) dB/	/div	Ref 30.00	dBm					
								Center Fre
0.0					Mh			3.697500000 G
.00								
D.O 🗕					14 <u>1</u>			
					here,			
D.O -								
D.O 🂾	and and an and a second se	5					**************************************	
nnL								
Lart	3.655 0	GHz					Stop 3.74 GH	z cest
tart	3.655 0	GHz					Stop 3.74 GH	
			Stop Freg	RBW	Frequency	Amplitude		5.000000 M
		Start Freq	Stop Freq	RBW	Frequency	Amplitude	∆ Limit	5.000000 M
			3.6850 GHz	1.000 MHz	3.683700000 GH	z -44.53 dBm	Δ Limit -19.53 dB	5.000000 M Auto M
	Range	Start Freq 3.6550 GHz		1.000 MHz		z -44.53 dBm z -26.73 dBm	∆ Limit	Auto M Freq Offs
	Range	Start Freq 3.6550 GHz 3.6850 GHz	3.6850 GHz 3.6940 GHz	1.000 MHz 1.000 MHz 100.0 kHz	3.683700000 GH 3.694000000 GH	z -44.53 dBm z -26.73 dBm z -29.45 dBm	Δ Limit -19.53 dB -13.73 dB	Auto M Freq Offs
ipur	Range 1 2 3	Start Freq 3.6550 GHz 3.6850 GHz 3.6940 GHz	3.6850 GHz 3.6940 GHz 3.6950 GHz	1.000 MHz 1.000 MHz 1.000 MHz 100.0 kHz 100.0 kHz	3.683700000 GH 3.694000000 GH 3.694998333 GH	z -44.53 dBm z -26.73 dBm z -29.45 dBm z 12.50 dBm	Δ Limit -19.53 dB -13.73 dB -16.45 dB	Auto M Freq Offs
	Range 1 2 3 4	Start Freq 3.6550 GHz 3.6850 GHz 3.6940 GHz 3.6950 GHz	3.6850 GHz 3.6940 GHz 3.6950 GHz 3.7000 GHz	1.000 MHz 1.000 MHz 1.000 MHz 100.0 kHz 100.0 kHz 100.0 kHz	3.683700000 GH; 3.694000000 GH; 3.694998333 GH; 3.696058333 GH;	z -44.53 dBm z -26.73 dBm z -29.45 dBm z 12.50 dBm z -30.08 dBm	Δ Limit -19.53 dB -13.73 dB -16.45 dB -12.50 dB	5.000000 M
	Range 1 2 3 4 5	Start Freq 3.6550 GHz 3.6850 GHz 3.6940 GHz 3.6950 GHz 3.6950 GHz 3.7000 GHz	3.6850 GHz 3.6940 GHz 3.6950 GHz 3.7000 GHz 3.7010 GHz	1.000 MHz 1.000 MHz 100.0 kHz	3.683700000 GH; 3.694000000 GH; 3.694998333 GH; 3.696058333 GH; 3.700013333 GH;	z -44.53 dBm z -26.73 dBm z -29.45 dBm z 12.50 dBm z -30.08 dBm z -26.91 dBm	Δ Limit -19.53 dB -13.73 dB -16.45 dB -12.50 dB -17.08 dB	Auto M Freq Offs
	Range 1 2 3 4 5 6	Start Freq 3.6550 GHz 3.6850 GHz 3.6940 GHz 3.6950 GHz 3.7000 GHz 3.7010 GHz	3.6850 GHz 3.6940 GHz 3.6950 GHz 3.7000 GHz 3.7010 GHz 3.7100 GHz	1.000 MHz 1.000 MHz 100.0 kHz 1.000 MHz	3.683700000 GH; 3.694000000 GH; 3.694998333 GH; 3.696058333 GH; 3.700013333 GH; 3.701015000 GH;	z -44.53 dBm z -26.73 dBm z -29.45 dBm z 12.50 dBm z -30.08 dBm z -26.91 dBm z -44.60 dBm	Δ Limit -19.53 dB -13.73 dB -16.45 dB -12.50 dB -17.08 dB -13.91 dB	Auto M Freq Offs
	Range 1 2 3 4 5 6 7	Start Freq 3.6550 GHz 3.6850 GHz 3.6940 GHz 3.6950 GHz 3.7000 GHz 3.7010 GHz 3.7100 GHz	3.6850 GHz 3.6940 GHz 3.6950 GHz 3.7000 GHz 3.7010 GHz 3.7100 GHz 3.7200 GHz	1.000 MHz 1.000 MHz 100.0 kHz 1.000 MHz	3.683700000 GH; 3.694000000 GH; 3.694998333 GH; 3.696058333 GH; 3.700013333 GH; 3.701015000 GH; 3.710583333 GH;	z -44.53 dBm z -26.73 dBm z -29.45 dBm z 12.50 dBm z -30.08 dBm z -26.91 dBm z -44.60 dBm	Δ Limit -19.53 dB -13.73 dB -16.45 dB -12.50 dB -17.08 dB -13.91 dB -19.60 dB	Auto M Freq Offs

Plot 7-48. Upper Channel Edge Plot (Band 48 - 5.0MHz QPSK - Full RB Configuration)



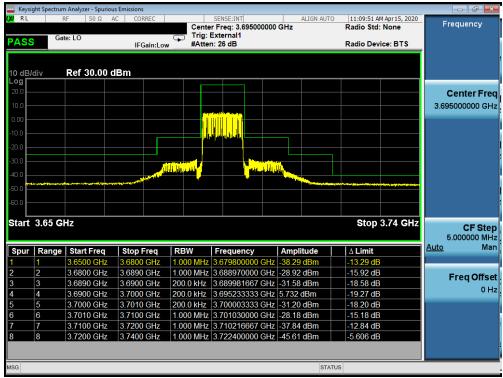
Plot 7-49. Lower Channel Edge Plot (Band 48 - 10.0MHz QPSK - Full RB Configuration)

FCC ID: XIA-CFW2172	PCTEST Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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RL	R	F 50 Ω	AC CORREC	Cente	SENSE:INT r Freg: 3.625000000	ALIGN AUTO	11:00:34 AM Apr 15, 2020 Radio Std: None	Frequency
PAS	S Gat	e: LO NF	E IFGain:Lov	Trig:	Free Run n: 26 dB	0112	Radio Device: BTS	
0 dB	/div	Ref 30.00	dBm					
20.0 - 10.0 -								Center Fre 3.625000000 GH
0.00 10.0 -								
20.0								
30.0						<u> </u>		
40.0			A STATE OF THE OWNER	·····		A DE LA DE L		
40.0 - 50.0 - 60.0 <mark>-</mark> /	aggiristpurchas <mark>i</mark> ntra	innere liderer	and the second s	·····		AND IN THE OWNER	ณ ีสารประ ประโภรโลสารประกอบสารประกอบสา	
50.0 60.0 <mark>4</mark>	3.58 GI		and the second s			AND IN THE OWNER	tin and a stop 3.67 GHz	Cr Sie
50.0 60.0 <mark>4</mark> Start	3.58 GI	lz	and the second s	RBW	Frequency	AND IN THE OWNER		5.000000 MH
50.0 60.0 <mark>4</mark> Start	3.58 GI	lz		RBW		Amplitude	Stop 3.67 GHz	5.000000 MH
50.0 60.0 4 Start Spur	3.58 GI	Hz Start Freq	Stop Freq	RBW 1.000 MHz	Frequency	Amplitude -38.77 dBm	Stop 3.67 GHz	5.000000 MH <u>Auto</u> Ma
50.0 60.0 4 Start	3.58 GI	Hz Start Freq 3.5800 GHz	Stop Freq 3.6100 GHz	RBW 1.000 MHz 1.000 MHz	Frequency 3.609800000 GHz	Amplitude -38.77 dBm -27.97 dBm	Stop 3.67 GHz	Er Ste 5.000000 M⊢ Auto Ma
50.0 4 50.0 4 Start Spur	3.58 Gl	Jz Start Freq 3.5800 GHz 3.6100 GHz	Stop Freq 3.6100 GHz 3.6190 GHz	RBW 1.000 MHz 1.000 MHz 200.0 kHz	Trequency 3.609800000 GHz 3.618940000 GHz	Amplitude -38.77 dBm -27.97 dBm -31.29 dBm	Stop 3.67 GHz	Er Ste 5.000000 M⊢ Auto Ma
50.0 50.0 Start Spur 2 3 4	3.58 GI Range 1 2 3	J z Start Freq 3.5800 GHz 3.6100 GHz 3.6190 GHz	Stop Freq 3.6100 GHz 3.6190 GHz 3.6200 GHz	RBW 1.000 MHz 1.000 MHz 200.0 kHz 200.0 kHz	Frequency 3.609800000 GHz 3.618940000 GHz 3.619996667 GHz	Amplitude -38.77 dBm -27.97 dBm -31.29 dBm 6.067 dBm	Stop 3.67 GHz △ Limit -13.77 dB -14.97 dB -18.29 dB	Er Ste 5.000000 M⊢ Auto Ma
50.0 60.0 <mark>4</mark>	3.58 GI Range 1 2 3 4	Iz Start Freq <u>3.5800 GHz</u> <u>3.6100 GHz</u> <u>3.6190 GHz</u> <u>3.6200 GHz</u>	Stop Freq 3.6100 GHz 3.6190 GHz 3.6200 GHz	RBW 1.000 MHz 1.000 MHz 200.0 kHz 200.0 kHz	Frequency 3.609800000 GHz 3.618940000 GHz 3.619996667 GHz 3.622550000 GHz	Amplitude -38.77 dBm -27.97 dBm -31.29 dBm -30.53 dBm -30.53 dBm	Stop 3.67 GHz Δ Limit -13.77 dB -14.97 dB -18.29 dB -18.93 dB	Er Ste 5.000000 MH Auto Ma
50.0 60.0 4 Start Spur 2 3 4 5	Range Range 1 2 3 4 5	Start Freq 3.5800 GHz 3.6100 GHz 3.6100 GHz 3.6200 GHz 3.6300 GHz	Stop Freq 3 6100 GHz 3 6200 GHz 3 6300 GHz 3 6310 GHz 3 6310 GHz	RBW 1.000 MHz 2000 KHz 2000 KHz 2000 KHz 1.000 MHz	Frequency 3.609800000 GHz 3.618940000 GHz 3.619996667 GHz 3.62255000 GHz 3.630026667 GHz	Amplitude -38.77 dBm -27.97 dBm -31.29 dBm 6.067 dBm -30.53 dBm -27.67 dBm	Stop 3.67 GHz Δ Limit -13.77 dB -14.97 dB -18.29 dB -18.93 dB -17.53 dB	5.00000 MH Auto Ma
50.0 60.0 4 Start Spur 2 3 4 5	Range 1 2 3 4 5 6	1 z 3.5800 GHz 3.6100 GHz 3.6100 GHz 3.6200 GHz 3.6300 GHz 3.6300 GHz 3.6310 GHz	Stop Freq 3 6100 GHz 3 6190 GHz 3 6200 GHz 3 6300 GHz 3 6300 GHz 3 6400 GHz 3 6400 GHz	RBW 1.000 MHz 2000 KHz 2000 KHz 2000 KHz 1.000 MHz	Frequency 3.609800000 GHz 3.619996667 GHz 3.630226667 GHz 3.630226667 GHz 3.630226667 GHz 3.63020667 GHz	Amplitude -38.77 dBm -27.97 dBm -31.29 dBm 6.067 dBm -30.53 dBm -27.67 dBm	Stop 3.67 GHz Δ Limit -13.77 dB -14.97 dB -18.29 dB -18.93 dB -17.53 dB -14.67 dB	5.000000 MH

Plot 7-50. Mid Channel Edge Plot (Band 48 - 10.0MHz QPSK - Full RB Configuration)



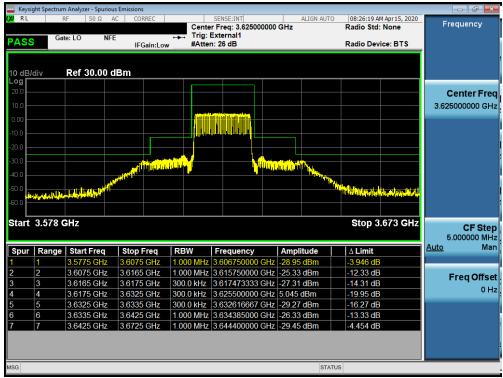
Plot 7-51. Upper Channel Edge Plot (Band 48 - 10.0MHz QPSK - Full RB Configuration)

FCC ID: XIA-CFW2172	PCTEST [®] Proud to be part of [®] element	MEASUREMENT REPORT (CERTIFICATION)	eless Approved by: Quality Manager
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RL	6-4	F 50 Ω	AC CC	ORREC			SENSE:INT er Freq: 3.625 External1	5000000		ALIGN AUT		26:19 AN io Std:	Apr 15, 2020	D F	Frequency
PASS	SGat	e:LO N		Gain:Lo			n: 26 dB				Rad	io Devi	ce: BTS		
10 dB/	/div	Ref 30.00	dBm												
- og 20.0 10.0														3.6	Center Fre
0.00															
10.0]]	, bir sei of set us. In the s								
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50.0 60.0	3.578 G												673 GH		
6U.U E	3.578 G	Hz	Stop		RBV	v	Frequency		Amplit		S				5.000000 MH
50.0 60.0	3.578 G	Hz	Stop	Freq	RBV		Frequency 3.60675000	/	Amplit	tude	Si A L	op 3.		2	5.000000 MH
50.0 60.0 Start Spur 1	3.578 G Range	GHz Start Freq	Stop 3.607	Freq 5 GHz	RBV) MHz		/)0 GHz	Ampli -28.95	tude dBm	Si 3.9	iop 3. imit		2	5.000000 MH Ma
50.0 60.0 Start	3.578 G Range 1 2	Hz Start Freq 3.5775 GHz	Stop 3.607	Freq 5 GHz 5 GHz	RBV 1.000) MHz) MHz	3.60675000	/ 00 GHz 00 GHz	Amplii -28.95 -25.33	tude dBm dBm	Si <u>A</u> L <u>-3.9</u> <u>-12</u>	imit 46 dB		2	5.000000 MH Ma
50.0 60.0 Start Spur	3.578 G Range 1 2 3	Start Freq 3.5775 GHz 3.6075 GHz	Stop 3.607	Freq 5 GHz 5 GHz 5 GHz	RBV 1.000) <mark>MHz</mark>) MHz) kHz	3.60675000 3.61575000	/ 00 GHz 00 GHz 33 GHz	Amplif -28.95 -25.33 -27.31	tude dBm dBm dBm	S Δ L -3.9 -12 -14	imit 46 dB 33 dB		2	5.000000 MH Ma
50.0 4 60.0 5 Start Spur 2 3 4	3.578 G Range 1 2 3 4	GHz 3.5775 GHz 3.6075 GHz 3.6165 GHz	Stop 3.607 3.616 3.617	Freq 5 GHz 5 GHz 5 GHz 5 GHz 5 GHz	RBV 1.000 300.0 300.0) MHz) MHz) kHz) kHz	3.60675000 3.61575000 3.61747333	/ 00 GHz 00 GHz 33 GHz 00 GHz	Amplii -28.95 -25.33 -27.31 5.045 c	tude dBm dBm dBm iBm	S -3.9 -12 -14 -19	imit 46 dB 33 dB 31 dB		2	5.000000 MH Ma
50.0 60.0 Start Start 2 3 4 5	3.578 G Range 1 2 3 4 5	SHz 3.5775 GHz 3.6075 GHz 3.6165 GHz 3.6175 GHz	Stop 3.607 3.616 3.617 3.632 3.632	Freq 5 GHz 5 GHz 5 GHz 5 GHz 5 GHz	RBV 1.000 1.000 300.0 300.0 300.0) MHz) MHz) kHz) kHz) kHz	3.60675000 3.61575000 3.61747333 3.62550000	/ 00 GHz 00 GHz 33 GHz 00 GHz 57 GHz	Amplii -28.95 -25.33 -27.31 5.045 c -29.27	tude dBm dBm dBm jBm dBm	S Δ L -3.9 -12 -14 -19 -16	imit 46 dB 33 dB 31 dB 95 dB		2	5.000000 MH Ma Freq Offse
50.0 60.0 Start Start 2 3 4 5	3.578 G Range 1 2 3 4 5 6	SHz Start Freq 3.5775 GHz 3.6075 GHz 3.6165 GHz 3.6175 GHz 3.6325 GHz	Stop 3.607 3.616 3.617 3.632 3.632	Freq 5 GHz 5 GHz 5 GHz 5 GHz 5 GHz 5 GHz 5 GHz	RBV 1.000 300.0 300.0 300.0 1.000) MHz) MHz) kHz) kHz) kHz) kHz) MHz	3.60675000 3.61575000 3.61747333 3.62550000 3.63261666	y 00 GHz 00 GHz 33 GHz 00 GHz 57 GHz 00 GHz	Amplit -28.95 -25.33 -27.31 5.045 c -29.27 -26.33	tude dBm dBm dBm dBm dBm dBm dBm	S ΔL -3.9 -12 -14 -19 -16 -13	imit 46 dB 33 dB 31 dB 95 dB 27 dB		2	5.000000 MH Ma
50.0 60.0	3.578 G Range 1 2 3 4 5 6	SHz Start Freq 3.5775 GHz 3.6075 GHz 3.6165 GHz 3.6175 GHz 3.6325 GHz 3.6335 GHz	Stop 3.607 3.616 3.617 3.632 3.633 3.632 3.633	Freq 5 GHz 5 GHz 5 GHz 5 GHz 5 GHz 5 GHz 5 GHz	RBV 1.000 300.0 300.0 300.0 1.000) MHz) MHz) kHz) kHz) kHz) kHz) MHz	3.60675000 3.61575000 3.61747333 3.62550000 3.63261660 3.63438500	y 00 GHz 00 GHz 33 GHz 00 GHz 57 GHz 00 GHz	Amplit -28.95 -25.33 -27.31 5.045 c -29.27 -26.33	tude dBm dBm dBm dBm dBm dBm dBm	S ΔL -3.9 -12 -14 -19 -16 -13	imit 46 dB 33 dB 31 dB 95 dB 27 dB 33 dB		2	CF Ste 5.000000 MH Ma Freq Offse 0 H

Plot 7-52. Lower Channel Edge Plot (Band 48 - 15.0MHz QPSK - Full RB Configuration)



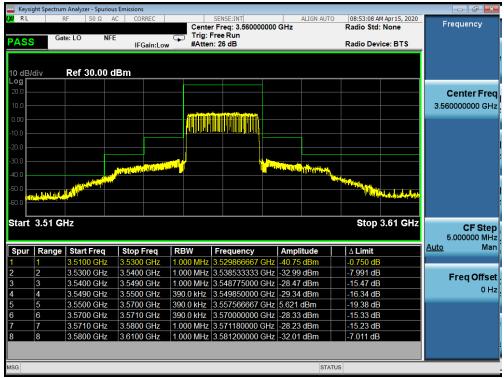
Plot 7-53. Mid Channel Edge Plot (Band 48 - 15.0MHz QPSK - Full RB Configuration)

FCC ID: XIA-CFW2172	PCTEST° Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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RL			AC NFE	CORREC			SENSE:INT er Freq: 3.6925000 Free Run		SN AUTO	08:44:37 A	AM Apr 15, 2020 I: None	Fr	equency
ASS		e: LO r	IFC.	IFGain:L			n: 26 dB			Radio Dev	vice: BTS	-	
0 dB/ og Г	/div	Ref 30.00	dBm										
20.0 10.0													Center Free 2500000 GH
0.0													
10.0 - 10.0 -				, North		·/	_	tentinii					
0.0			My any man		, jul, du la			and the state of the	P. P. Contraction	an tu			
	rek,ça <mark>ya</mark> keye tikeye		1 ALL ALL ALL ALL ALL ALL ALL ALL ALL AL		, j , j , j , j , j , j , j , j , j , j			tanın çin diliniy		ⁿ ikis, ikas,	ilija ju tradi ljedi		
i0.0 <mark>///</mark> i0.0	3.645 C		for the second s								3.74 GHz		
i0.0 <mark>///</mark> i0.0		GHz		op Freq		SW.	Frequency	Amplitud					CF Ste 5.000000 MH Ma
io.o	3.645 C	GHz	Sto		RE	3W		Amplitud	le	Stop	3.74 GHz	E	5.000000 MH
io.o	3.645 C	GHz Start Freq	Stc z 3.67	op Freq	RE z 1.0	3W 00 MHz	Frequency	Amplitud	de sm	Stop	3.74 GHz	E <u>Auto</u>	5.000000 MH Ma
io.o io.o itart Spur	3.645 C	GHZ Start Freq 3.6450 GHZ	Stc z 3.67 z 3.68	op Freq 750 GHz	RE z 1.0 z 300	3W 00 MHz 00 MHz 0.0 KHz	Frequency 3.674250000 GH 3.683340000 GH 3.684856667 GH	Amplitud tz -28.27 dBi tz -25.89 dBi tz -28.58 dBi	de im im im	Stop	3.74 GHz	E <u>Auto</u>	5.000000 MH Ma Freq Offse
io.o io.o start Spur	3.645 C	SHz Start Freq 3.6450 GHz 3.6750 GHz	Stc z 3.67 z 3.68 z 3.68	op Freq 750 GHz 840 GHz	RE z 1.0 z 300	3W 00 MHz 00 MHz 0.0 KHz	Frequency 3.674250000 GH 3.683340000 GH	Amplitud tz -28.27 dBi tz -25.89 dBi tz -28.58 dBi	de im im im	Stop ∆ Limit -3.271 dE -12.89 dE	3.74 GHz	E <u>Auto</u>	5.000000 M⊢ Ma Freq Offse
io.o io.o start Spur	3.645 C	SHz Start Freq 3.6450 GHz 3.6750 GHz 3.6840 GHz	Stc z 3.67 z 3.68 z 3.68 z 3.70	op Freq 750 GHz 840 GHz 850 GHz	RE z 1.0 z 300 z 300	3W 00 MHz 00 MHz 0.0 kHz 0.0 kHz	Frequency 3.674250000 GH 3.683340000 GH 3.684856667 GH	Amplitud dz -28.27 dBi dz -25.89 dBi dz -28.58 dBi dz -28.58 dBi dz 5.290 dBn	de Sm Sm Sm Sm Sm Sm	Stop	3.74 GHz	E <u>Auto</u>	5.000000 M⊢ Ma Freq Offse
io.o	3.645 C	Start Freq 3.6450 GHz 3.6750 GHz 3.6840 GHz 3.6850 GHz	Sto z 3.67 z 3.68 z 3.68 z 3.70 z 3.70 z 3.70	50 Freq 750 GHz 840 GHz 850 GHz 000 GHz	RE z 1.0 z 1.0 z 300	3W 00 MHz 00 MHz 0.0 KHz 0.0 KHz 0.0 KHz 0.0 KHz 0.0 MHz	Frequency 3.674250000 Gł 3.683340000 Gł 3.684856667 Gł 3.689075000 Gł 3.700005000 Gł 3.700230000 Gł	Amplitud tz -28.27 dBi tz -25.89 dBi tz -28.58 dBi tz 5.290 dBi tz 5.290 dBi tz -26.70 dBi	de m im im im im im im	Stop △ Limit -3.271 dF -12.89 dF -15.58 dF -19.71 dF	3.74 GHz	E <u>Auto</u>	5.000000 MH Ma
io.o	3.645 C	Start Freq 3.6450 GHZ 3.6750 GHZ 3.6840 GHZ 3.6850 GHZ 3.7000 GHZ	Sta z 3.66 z 3.68 z 3.68 z 3.70 z 3.70 z 3.71	5p Freq 750 GHz 840 GHz 850 GHz 000 GHz 010 GHz	RE z 1.0 z 1.0 z 300	3W 00 MHz 00 MHz 0.0 KHz 0.0 KHz 0.0 KHz 0.0 KHz 0.0 MHz	Frequency 3.674250000 Gł 3.683340000 Gł 3.684856667 Gł 3.689075000 Gł 3.700005000 Gł	Amplitud tz -28.27 dBi tz -25.89 dBi tz -28.58 dBi tz 5.290 dBi tz 5.290 dBi tz -26.70 dBi	de m im im im im im im	Stop △ Limit -3.271 df -12.89 df -15.58 df -19.71 df -16.00 df	3.74 GHz	E <u>Auto</u>	5.000000 MH Ma Freq Offse
io.o	3.645 C	SHz Start Freq 3.6450 GHz 3.6850 GHz 3.6850 GHz 3.7000 GHz 3.7000 GHz 3.7010 GHz	Sto z 3.67 z 3.68 z 3.68 z 3.70 z 3.70 z 3.71 z 3.72	op Freq 750 GHz 840 GHz 850 GHz 000 GHz 010 GHz 100 GHz	RE z 1.0 z 300 z 300 z 300 z 300 z 1.0 z 1.0 z 1.0 z 1.0 z 1.0 z 1.0	BW 00 MHz 00 MHz 0.0 KHz 0.0 KHz 0.0 KHz 0.0 KHz 00 MHz 00 MHz	Frequency 3.674250000 Gł 3.683340000 Gł 3.684856667 Gł 3.689075000 Gł 3.700005000 Gł 3.700230000 Gł	Amplitud tz -28.27 dBi tz -25.89 dBi tz -28.58 dBi tz -290 dBi tz -29.00 dBi tz -28.17 dBi	de im im im im im im	Stop	3.74 GHz 3.374 GHz 3.3 3.3 3.3 3.3 3.3 3.3 3.3 3.3 3.3 3.	E <u>Auto</u>	5.000000 M⊢ Ma Freq Offse

Plot 7-54. Upper Channel Edge Plot (Band 48 - 15.0MHz QPSK - Full RB Configuration)



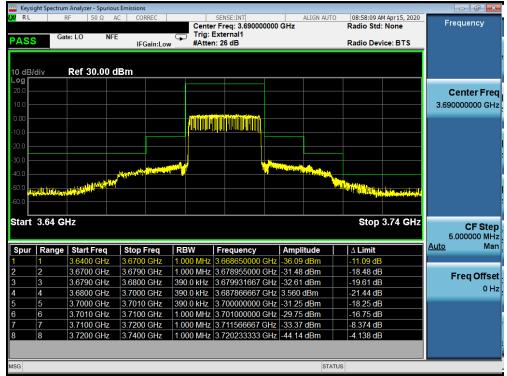
Plot 7-55. Lower Channel Edge Plot (Band 48 - 20.0MHz QPSK - Full RB Configuration)

FCC ID: XIA-CFW2172	PCTEST Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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RL	6-4	F 50 Ω		ORREC			ENSE:INT Freq: 3.62500 ee Run	0000		ALIGN AUTO	08:50:51 Radio Ste	AM Apr 15, 2020 d: None	Freque	ency
AS	Gat	e: LO	NFE	FGain:Lo		#Atten:					Radio De	vice: BTS		
0 dB. .og Г	/div	Ref 30.00) dBm											
20.0 - 10.0 -													Cent 3.625000	t er Fre 000 GH
0.00 - 10.0 -														
20.0 - 30.0 -			ATTACA		nu ku d					an internation				
40.0 - 50.0 - 50.0 -	aladhariki faalla	A Contraction of the second										Willightspecture		
⊾ Start	3.575 G	GHz									Stop	3.675 GHz		CF Ste 000 M⊦
Spur	Range	Start Freq	Stop	Freq	RBV	/	Frequency		Ampli	itude	∆ Limit		<u>Auto</u>	Ma
	1	3.5750 GH	z 3.605	60 GHz	1.000	MHz 3	.604800000	GHz	-31.36	dBm	-6.357 d	В		
	2	3.6050 GH	z 3.614	0 GHz	1.000	MHz 3	.613235000	GHz	-28.32	dBm	-15.32 d	B	Ero	q Offs
	3	3.6140 GH	z 3.615	60 GHz	390.0	kHz 3	.614990000	GHz	-28.95	dBm	-15.95 d	В	Fier	
	4	3.6150 GH	z 3.635	60 GHz	390.0	kHz 3	.624033333	GHz	5.042	dBm	-19.96 d	B		01
	5	3.6350 GH	z 3.636	60 GHz	390.0	kHz 3	.635030000	GHz	-30.01	dBm	-17.01 d	B		
	6	3.6360 GH	z 3.645	60 GHz	1.000	MHz 3	.636165000	GHz	-29.87	dBm	-16.87 d	B		
;			2 2 6 7 6	i0 GHz	1 000	MHz 3	.649650000	GHz	-31.85	dBm	-6.853 d	В		
)) /	-	3.6450 GH	2 3.07	0 0112										
	-	3.6450 GH	2 3.07											

Plot 7-56. Mid Channel Edge Plot (Band 48 - 20.0MHz QPSK - Full RB Configuration)



Plot 7-57. Upper Channel Edge Plot (Band 48 - 20.0MHz QPSK - Full RB Configuration)

FCC ID: XIA-CFW2172	PCTEST [®] Proud to be part of [®] element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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7.5 Peak-Average Ratio

<u>§96.41(g)</u>

Test Overview

A peak to average ratio measurement is performed at the conducted port of the EUT. The spectrum analyzers Complementary Cumulative Distribution Function (CCDF) measurement profile is used to determine the largest deviation between the average and the peak power of the EUT in a given bandwidth. The CCDF curve shows how much time the peak waveform spends at or above a given average power level. The percent of time the signal spends at or above the level defines the probability for that particular power level.

Test Procedure Used

KDB 971168 D01 v03r01 - Section 5.7

Test Settings

- 1. The signal analyzer's CCDF measurement profile is enabled
- 2. Frequency = carrier center frequency
- 3. Measurement BW ≥ OBW or specified reference bandwidth
- 4. The signal analyzer was set to collect two million samples to generate the CCDF curve
- 5. The measurement interval was set depending on the type of signal analyzed.
- 6. An RF-Burst triggering method ensured measurement in the on time of the signal.

Test Setup

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

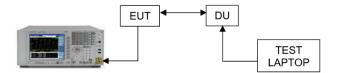


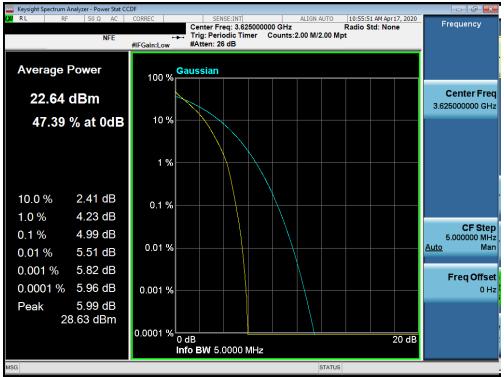
Figure 7-4. Test Instrument & Measurement Setup

Test Notes

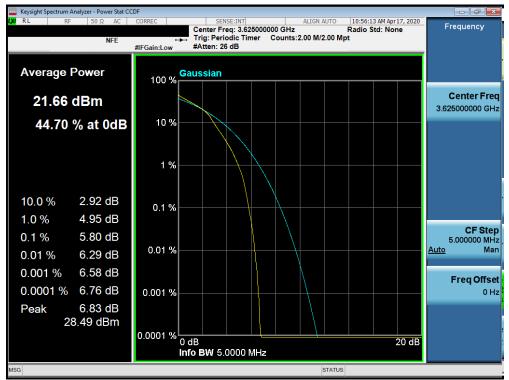
None

FCC ID: XIA-CFW2172	PCTEST Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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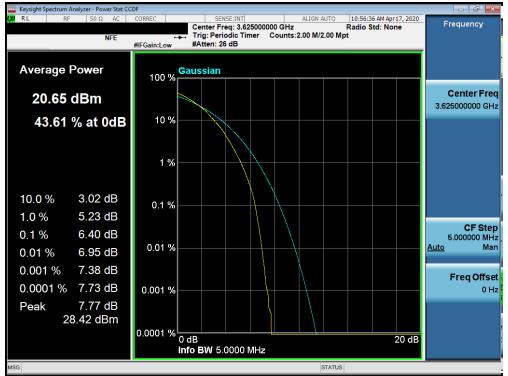




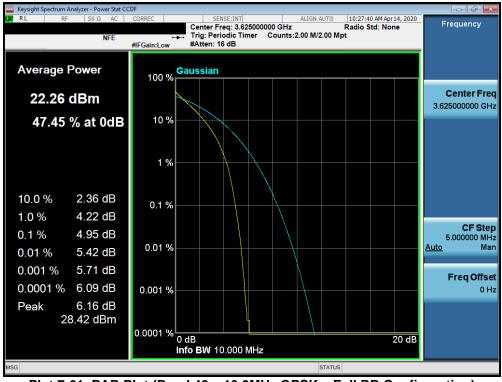
Plot 7-59. PAR Plot (Band 48 – 5.0MHz 16-QAM – Full RB Configuration)

FCC ID: XIA-CFW2172	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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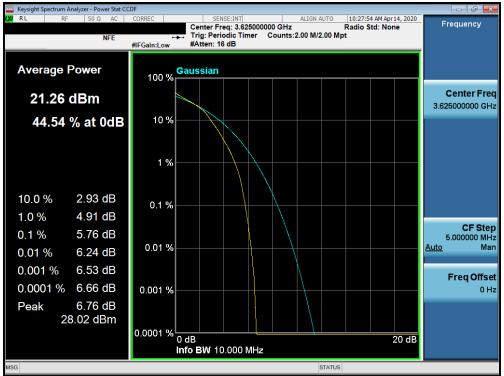




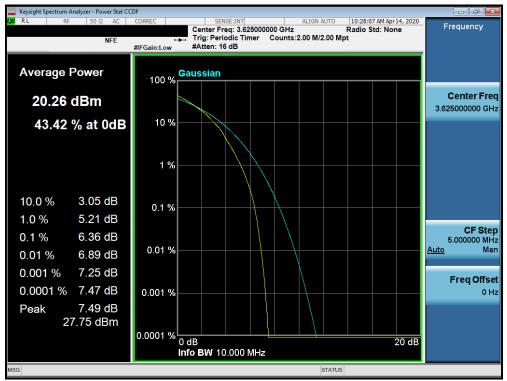
Plot 7-61. PAR Plot (Band 48 – 10.0MHz QPSK – Full RB Configuration)

FCC ID: XIA-CFW2172	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
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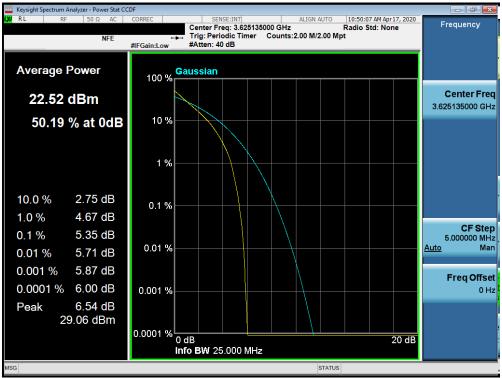
Plot 7-62. PAR Plot (Band 48 – 10.0MHz 16-QAM – Full RB Configuration)



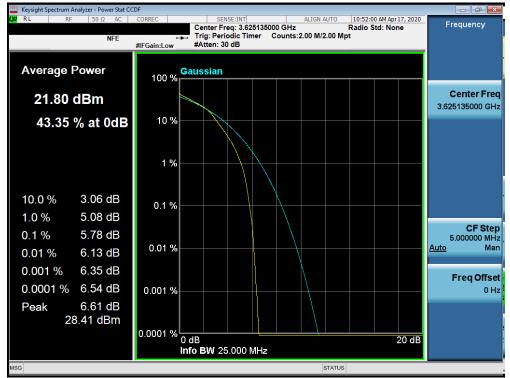
Plot 7-63. PAR Plot (Band 48 – 10.0MHz 64-QAM – Full RB Configuration)

FCC ID: XIA-CFW2172	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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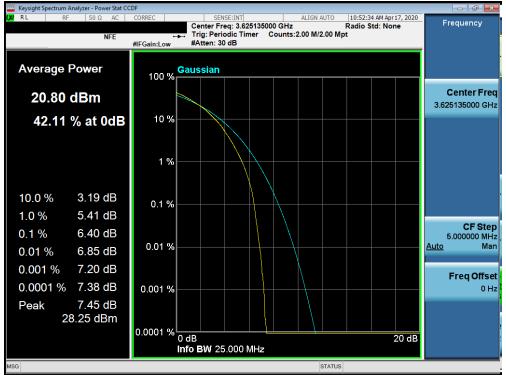
Plot 7-64. PAR Plot (Band 48 – 15.0MHz QPSK – Full RB Configuration)



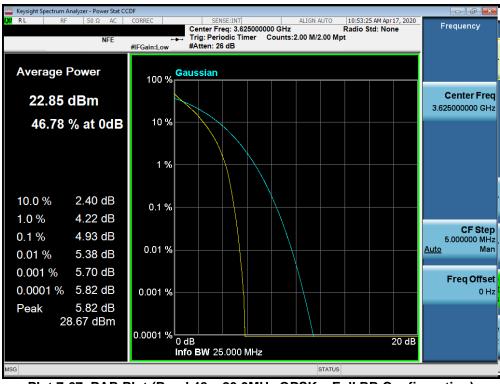
Plot 7-65. PAR Plot (Band 48 – 15.0MHz 16-QAM – Full RB Configuration)

FCC ID: XIA-CFW2172	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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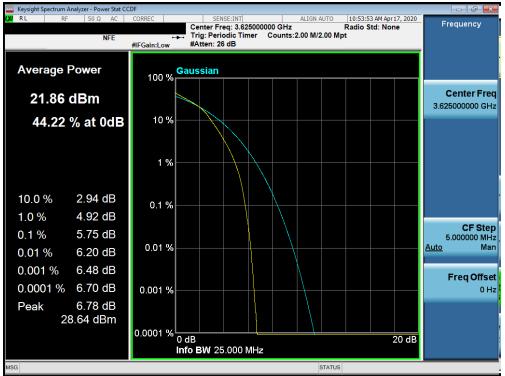
Plot 7-66. PAR Plot (Band 48 – 15.0MHz 64-QAM – Full RB Configuration)



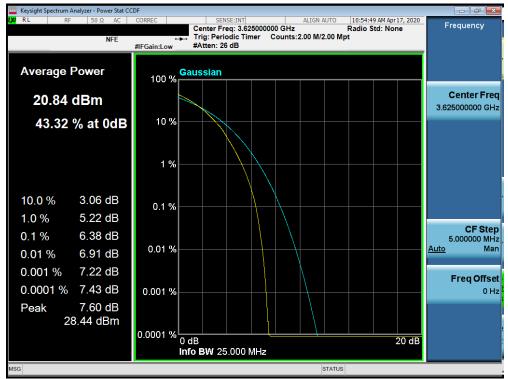
Plot 7-67. PAR Plot (Band 48 – 20.0MHz QPSK – Full RB Configuration)

FCC ID: XIA-CFW2172	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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Plot 7-68. PAR Plot (Band 48 – 20.0MHz 16-QAM – Full RB Configuration)



Plot 7-69. PAR Plot (Band 48 – 20.0MHz 64-QAM – Full RB Configuration)

FCC ID: XIA-CFW2172	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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7.6 Uplink Carrier Aggregation §96.41(e)

Test Overview

The EUT is set up to transmit two contiguous LTE channels. The power level of both carriers 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 its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

The conducted power of any emission outside the fundamental emission (whether in or outside of the authorized band) shall not exceed -13 dBm/MHz within 0-10 megahertz above the upper SAS-assigned channel edge and within 0-10 megahertz below the lower SAS-assigned channel edge. At all frequencies greater than 10 megahertz above the upper SAS assigned channel edge and less than 10 MHz below the lower SAS assigned channel edge, the conducted power of any emission shall not exceed -25 dBm/MHz.

The conducted power of any emissions below 3530 MHz or above 3720 MHz shall not exceed -40 dBm/Mhz.

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 at least 10 * the fundamental frequency (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.

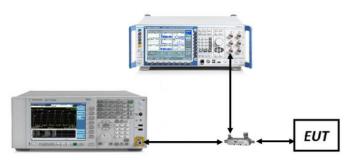


Figure 7-5. Test Instrument & Measurement Setup

FCC ID: XIA-CFW2172	Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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Test Notes

- Conducted power and spurious emissions measurements were evaluated for the two contiguous channels. Various combinations of RB size, RB offset, modulation, and channel bandwidth were investigated, however the worst case configuration is full RB configuration in 20MHz BW mode. Please see below for this data.
- 2. Compliance with the conducted spurious emissions limits is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater for frequencies less than 1 GHz and 1 MHz or greater for frequencies greater than 1 GHz. 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.

	PCC								SCC						Power	
Combination	PCC Band	PCC Bandwidth [MHz]	PCC (UL/DL) Channel	PCC (UL/DL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	SCC Band	SCC Bandwidth [MHz]	SCC (UL/DL) Channel	SCC (UL/DL) Frequency [MHz]	Modulatio n	SCC UL# RB	SCC UL RB Offset	LTE Tx.Power with UL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)
CA_48C	LTE B48	20	55340	3560.0	QPSK	100	0	LTE B48	20	55538	3579.8	QPSK	100	0	5.73	8.14
CA_48C	LTE B48	20	55773	3603.3	QPSK	100	0	LTE B48	20	55575	3583.5	QPSK	100	0	5.70	8.18
CA_48C	LTE B48	20	56207	3646.7	QPSK	100	0	LTE B48	20	56009	3626.9	QPSK	100	0	5.78	8.12
CA_48C	LTE B48	20	56640	3690.0	QPSK	100	0	LTE B48	20	56442	3670.2	QPSK	100	0	5.33	7.84

 Table 7-3. Conducted Powers (B48 ULCA with Various Channels of 20MHz Channel Bandwidth)

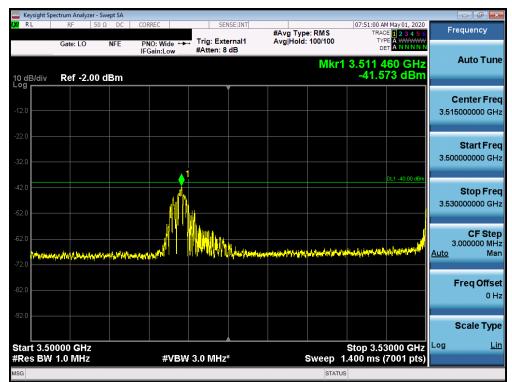
Note: As shown in tune up document, full RB case is worst case configuration (max power).

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		ctrum Ana	lyzer - Swe	pt SA									
l xi r	L	RF	50 Ω	DC NFE	CORREC PNO: Fa	ast ++	Trig: Fre #Atten: 1		#Avg Typ Avg Hold		TRAC	M May 01, 2020 E 1 2 3 4 5 6 E M WWWWW A N N N N N	Frequency
10 di Log	3/div	Ref 4	.00 dE	im.	IFGam:L	.ow	#Atten: 1	400		M	kr1 3.24 -49.9	3 7 GHz 04 dBm	Auto Tun
-6.00													Center Fre 1.765000000 G⊦
													Start Fre 30.000000 M⊦
												DL1 -40.00 dBm	Stop Fre 3.500000000 G⊦
		di shin si kin			des de seten	n an tao ing ta Ng tao ing tao i	de la forder a badela general de la dela	l dha an	nda ay katang di Katada Mangang ang akang di Katagaran Pangang di Katagaran Pangang di Katagaran Pangang di Katagaran Pangang di Katag Mangang di Katagaran Pangang di Katagaran Pangang di Katagaran Pangang di Katagaran Pangang di Katagaran Pangan	a (Printer and Andrea (Printer) Printer and Printer (Printer)			CF Ste 347.000000 MH <u>Auto</u> Ma
	ing a state of the	<u>podar</u> , moži i	and <u>Constant</u>										Freq Offse 0 ⊢
													Scale Typ
	t 30 IV sBW	IHZ 1.0 MH	z		#	¢VB₩	3.0 MHz	*		Sweep 4	Stop 3 1.667 ms (.500 GHz 7001 pts)	Log <u>L</u>
MSG										STATU	s		

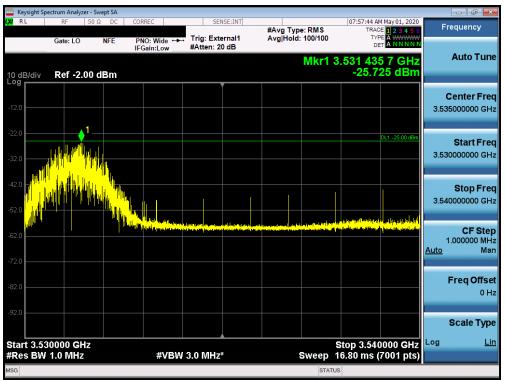
Plot 7-70. Conducted Spurious Plot (Band 48 – 20.0MHz QPSK – Left Carrier 1/0 Right Carrier 1/0 – Low Channel)



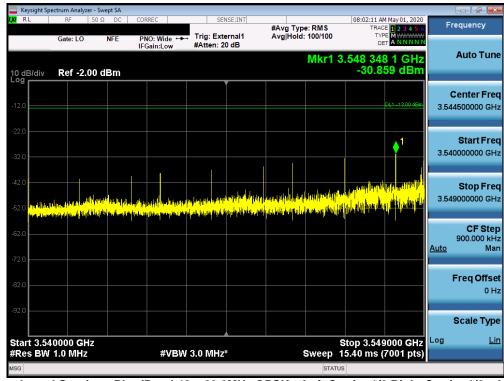
Plot 7-71. Conducted Spurious Plot (Band 48 – 20.0MHz QPSK – Left Carrier 1/0 Right Carrier 1/0 – Low Channel)

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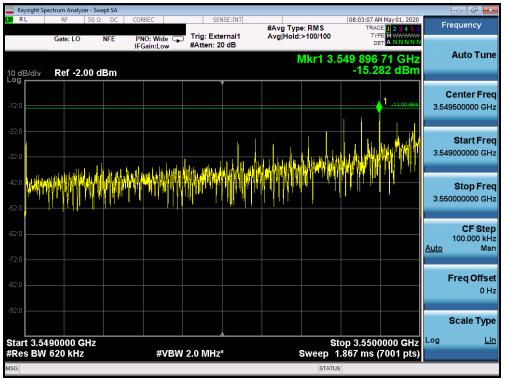
Plot 7-72. Conducted Spurious Plot (Band 48 – 20.0MHz QPSK – Left Carrier 1/0 Right Carrier 1/0 – Low Channel)



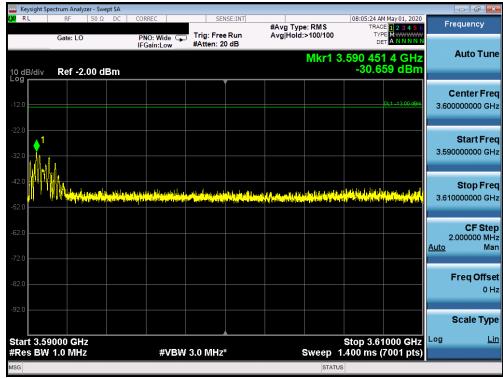
Plot 7-73. Conducted Spurious Plot (Band 48 – 20.0MHz QPSK – Left Carrier 1/0 Right Carrier 1/0 – Low Channel)

FCC ID: XIA-CFW2172	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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Plot 7-74. Conducted Spurious Plot (Band 48 – 20.0MHz QPSK – Left Carrier 1/0 Right Carrier 1/0 – Low Channel)



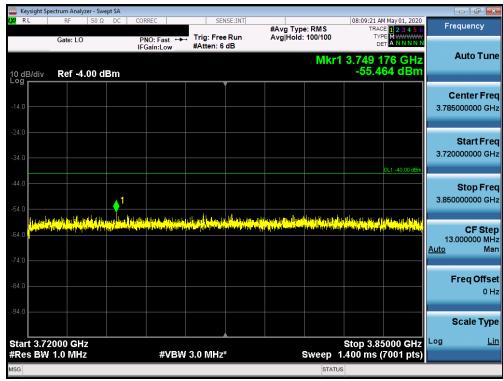
Plot 7-75. Conducted Spurious Plot (Band 48 – 20.0MHz QPSK – Left Carrier 1/0 Right Carrier 1/0 – Low Channel)

FCC ID: XIA-CFW2172	PCTEST Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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	ght Spectrum Analyzer - Sv					
LXI RL	RF 50 S	2 DC CORREC	SENSE:INT	#Avg Type: RMS	08:08:08 AM May 01, 2020 TRACE 1 2 3 4 5 6	Frequency
	Gate: LO	PNO: Fast G IFGain:Low	Trig: Free Run #Atten: 20 dB	Avg Hold:>100/100	TYPE MWWW DET ANNNNN	Auto Tune
10 dB/ ^{Log} Г	div Ref -2.00 d	dBm			-44.439 dBm	
43.0						Center Freq
-12.0						3.665000000 GHz
-22.0					DL1 -25.00 dBm	Start Freq
-32.0						3.610000000 GHz
	1					
-42.0	he hundered as the bit word	la biston tarono non tra bisto d'armo o rente a	of the surface states of the second states of the second states of the second states of the second states of the	und to star post of a bound of the first of the start of the	a dad da humida din da an an harita	Stop Freq 3.72000000 GHz
-52.0	elevelet des fabri et statisticken og h	ي المراجعة عن المانية من الم المراجع الم المراجع (المحاطية) من المراجع (المحاطية) من	n in statistical, asta bistoria, inva	an a suid an ann an Anna an An An Anna an Anna	مريح والمراجع والمراجع والمحار والمحار والمحار والمحار والمحار	3.72000000 GH2
-62.0 —						CF Step
						11.000000 MHz <u>Auto</u> Man
-72.0						
-82.0 —						Freq Offset 0 Hz
-92.0						
						Scale Type
	3.61000 GHz				Stop 3.7 2000 GHZ	Log <u>Lin</u>
	BW 1.0 MHz	#VBW	3.0 MHz*	-	1.400 ms (7001 pts)	
MSG				STATU	S	

Plot 7-76. Conducted Spurious Plot (Band 48 – 20.0MHz QPSK – Left Carrier 1/0 Right Carrier 1/0 – Low Channel)



Plot 7-77. Conducted Spurious Plot (Band 48 – 20.0MHz QPSK – Left Carrier 1/0 Right Carrier 1/0 – Low Channel)

FCC ID: XIA-CFW2172	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
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	ectrum Analyze										
LX/RL	RF	50 Ω DC	CORREC	SE	NSE:INT	#Avg Typ	e: RMS	TRAC	May 01, 2020	Fr	equency
	Gate: LO		PNO: Fast ↔ IFGain:Low	Trig: Fre #Atten: 2		Avg Hold	: 100/100	TYP			
			I Guillieow				M	kr1 3.85	8 4 GHz		Auto Tune
10 dB/div	Ref -4.0	0 dBm						-40.1	33 dBm		
					Ĭ						Center Freq
-14.0											5000000 GHz
-24.0											Start Freq
										3.85	0000000 GHz
-34.0 -1									DL1 -40.00 dBm		
-44.0											Stop Freq
	And the state	ر بيار والم هو	المربية والارتقال وال	والمعادية والمراجع	and the state of the	distant in a	والمادين المعتر والخريرة	and the states of the		15.00	0000000 GHz
-54.0		<u> </u>	Carl March 1990	a na sta a tha an	and the second	an dika sebuah sebua	a della solla solla solla a				
											CF Step
-64.0											5000000 GHz Man
-74.0										<u>Auto</u>	Widit
											Freq Offset
-84.0											0 Hz
-94.0											Scale Type
										Log	
Start 3.85 #Res BW			#VB	V 3.0 MHz	*	s	weep 1	Stop 15 12.0 ms (2	.000 0112	LUg	Lin
MSG							STAT		ree r proj		

Plot 7-78. Conducted Spurious Plot (Band 48 – 20.0MHz QPSK – Left Carrier 1/0 Right Carrier 1/0 – Low Channel)



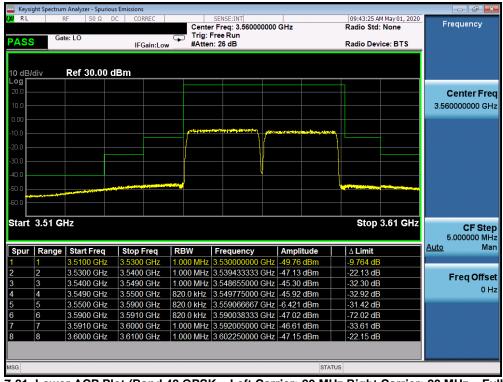
Plot 7-79. Conducted Spurious Plot (Band 48 – 20.0MHz QPSK – Left Carrier 1/0 Right Carrier 1/0 – Low Channel)

FCC ID: XIA-CFW2172	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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	ectrum Analyzer - Swe						
LX/RL	RF 50 Ω	DC CORREC	SEN	SE:INT #/	ALIGN AUTO Avg Type: RMS	TRACE 1 2 3 4 5 (Frequency
		PNO: Fast IFGain:Low	Trig: Free #Atten: 6		vg Hold: 100/100		Auto Tune
10 dB/div Log	Ref 0.00 dE	3m	_			-43.024 dBm	
-10.0							Center Freq 33.500000000 GHz
-20.0							Start Freq 27.000000000 GHz
-40.0	hand before in the out of the	رو با <mark>ل</mark> ار و المحمد الم	ر. الديرادية بوريد إلاالي ال	la da di la casa da da di da di da di da di da di da		1 DL1 -40.00 dBm mall for the shift of the start of the s	Stop Freq 40.00000000 GHz
-60.0				C. Side of the state of the sta			CF Step 1.30000000 GHz <u>Auto</u> Man
-70.0							Freq Offset 0 Hz
-90.0							Scale Type
Start 27.0 #Res BW		#VE	W 3.0 MHz*		Sweep 2	Stop 40.000 GHz 2.53 ms (26001 pts)	Log <u>Lin</u>
MSG					STAT		

Plot 7-80. Conducted Spurious Plot (Band 48 – 20.0MHz QPSK – Left Carrier 1/0 Right Carrier 1/0 – Low Channel)



Plot 7-81. Lower ACP Plot (Band 48 QPSK – Left Carrier: 20 MHz Right Carrier: 20 MHz – Full RB)

FCC ID: XIA-CFW2172	PCTEST* Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION) RetCommWireless	Approved by: Quality Manager
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C RL	F	n Analyzer - Spuni RF 50 Ω te: LO			SENSE:INT r Freq: 3.62500000 External1	00 GHz	09:17:59 Ar Radio Std:	May 01, 2020 None	Frequency
PASS	S	le: LO	IFGain:L	· · · · · ·	n: 26 dB		Radio Dev	ice: BTS	
10 dB.	/div	Ref 30.00	dBm						
Log 20.0									O and an East
									Center Free
10.0									3.625000000 GH
0.00									
10.0			at the	The second s	ייורדידייזידין און				
				and the street		ammudi —			
-20.0									
30.0					— <mark>] </mark> ———————————————————————————————————				
40.0					<u>\</u>				
50.0									
<mark> </mark> "						Contraction of the second		1946/1946-1966-1969	
-60.0									
Start	3.59 GI	HZ					Stop	3.68 GHz	CF Stej 5.000000 MH
Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	∆ Limit		<u>Auto</u> Ma
1	1	3.5900 GHz	3.6050 GHz	1.000 MHz	3.604225000 GH	z -49.32 dBm	-24.32 dB		
2	2	3.6050 GHz	3.6140 GHz	1.000 MHz	3.611270000 GH	z -48.29 dBm	-35.29 dB		Freq Offse
3	3	3.6140 GHz	3.6150 GHz	820.0 kHz	3.614975000 GH	lz -47.83 dBm	-72.83 dB		
4	4	3.6150 GHz	3.6550 GHz	820.0 kHz	3.628400000 GH	Iz -6.740 dBm	-31.74 dB		0 H
5	5	3.6550 GHz	3.6560 GHz	820.0 kHz	3.655056667 GH	z -48.84 dBm	-73.84 dB		
6	6	3.6560 GHz	3.6650 GHz	1.000 MHz	3.656510000 GH	Iz -49.38 dBm	-36.38 dB		
7	7	3.6650 GHz	3.6800 GHz	1.000 MHz	3.668525000 GH	lz -50.97 dBm	-25.97 dB		

Plot 7-82. Mid ACP Plot (Band 48 QPSK – Left Carrier: 20 MHz Right Carrier: 20 MHz – Full RB)

Reysig RL	R	a Analyzer - Spurie F 50 Ω e: LO	DC CORREC	Trig: F	SENSE:INT Freq: 3.69000000 Free Run I: 26 dB	0 GHz	09:30:19 AM May 01, 2020 Radio Std: None Radio Device: BTS	Frequency
0 dB/	div	Ref 30.00	dBm					
- og 20.0								Center Fre 3.690000000 GH
10.0								
30.0 - 40.0 - 50.0 -								
^{60.0} Start	3.64 GI	Hz					Stop 3.74 GHz	CF Ste
Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	∆ Limit	5.000000 MH <u>Auto</u> Ma
	1	3.6400 GHz			3.642300000 GH		-26.57 dB	
	2	3.6500 GHz			3.658985000 GH		-38.48 dB	F O #_
	3	3.6590 GHz			3.659900000 GH		-37.82 dB	Freq Offs
	4	3.6600 GHz			3.687066667 GH		-31.82 dB	01
	5	3.7000 GHz	3.7010 GHz	820.0 kHz	3.700008333 GH	2 -48.17 dBm	-35.17 dB	
	6	3.7010 GHz	3.7100 GHz	1.000 MHz	3.709505000 GH	z -50.44 dBm	-37.44 dB	
;	7	3.7100 GHz	3.7200 GHz	1.000 MHz	3.716316667 GH	z -50.37 dBm	-25.37 dB	
) /	'		2 7400 011-	1 000 MHz	3.724166667 GH	z -50.25 dBm	-10.25 dB	
	8	3.7200 GHz	3.7400 GHz	1.000 10112				

Plot 7-83. Upper ACP Plot (Band 48 QPSK – Left Carrier: 20 MHz Right Carrier: 20 MHz – Full RB)

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7.7 Radiated Power (EIRP) §96.41(b)

300141(67

Test Overview

Equivalent Isotropic Radiated Power (EIRP) measurements are performed using the method described in KDB 971168. All measurements are performed as RMS average measurements while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

Test Procedures Used

KDB 971168 D01 v03r01 - Section 5.2.1

Test Settings

The relevant equation for determining the ERP or EIRP from the conducted RF output power measured is:

ERP/EIRP = PMeas - LC + GT

Where:

ERP/EIRP = effective or equivalent radiated power, respectively (expressed in the same units as PMeas, typically dBW or dBm)

PMeas = measured transmitter output power or PSD, in dBW or dBm

LC = signal attenuation in the connecting cable between the transmitter and antenna in dB

GT = gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP)

Test Setup

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



Figure 7-6. ERP/EIRP Measurement Setup

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Test Notes

- 1) The worst case emissions are reported with the EUT modulations, RB sizes and offsets, and channel bandwidth configurations shown in the tables below.
- 2) This unit was tested while powered by POE injector.
- 3) The worst case EIRP shown in the section below is found with LTE operating in the RB configuration listed.
- 4) *Highest full channel bandwidth conducted power was found in the 20MHz BW with 100RBs. This configuration was shown to comply with EIRP limit of 23dBm/10MHz by scaling to 10MHz BW by a factor of 10*log(OBW/10MHz), where the OBW is the occupied bandwidth of the 20MHz BW signal with 100RBs.

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	RB Size/Offset	Conducted Power [dBm/10MHz]	Ant. Gain [dBi]	EIRP [dBm/10MHz]	EIRP [Watts/10MHz]	EIRP Limit [dBm/10MHz]	Margin [dB]
3552.50	5	QPSK	12/6	5.65	14.70	20.35	0.108	23.00	-2.65
3625.00	5	QPSK	12/0	5.59	14.70	20.29	0.107	23.00	-2.71
3697.50	5	QPSK	1 / 0	5.31	14.70	20.01	0.100	23.00	-2.99
3552.50	5	16-QAM	1 / 0	5.66	14.70	20.36	0.109	23.00	-2.64
3552.50	5	64-QAM	1 / 0	5.70	14.70	20.40	0.110	23.00	-2.60
3555.00	10	QPSK	1 / 0	5.74	14.70	20.44	0.111	23.00	-2.56
3625.00	10	QPSK	1 / 0	5.71	14.70	20.41	0.110	23.00	-2.59
3695.00	10	QPSK	1 / 0	5.42	14.70	20.12	0.103	23.00	-2.88
3555.00	10	16-QAM	1 / 0	5.67	14.70	20.37	0.109	23.00	-2.63
3555.00	10	64-QAM	1 / 0	5.83	14.70	20.53	0.113	23.00	-2.47
3557.50	15	QPSK	1 / 0	5.79	14.70	20.49	0.112	23.00	-2.51
3625.00	15	QPSK	1 / 0	5.73	14.70	20.43	0.110	23.00	-2.57
3692.50	15	QPSK	1 / 0	5.45	14.70	20.15	0.104	23.00	-2.85
3557.50	15	16-QAM	1 / 0	5.77	14.70	20.47	0.111	23.00	-2.53
3557.50	15	64-QAM	1 / 0	5.90	14.70	20.60	0.115	23.00	-2.40
3560.00	20	QPSK	1 / 0	5.74	14.70	20.44	0.111	23.00	-2.56
3625.00	20	QPSK	1 / 0	5.81	14.70	20.51	0.112	23.00	-2.49
3690.00	20	QPSK	1 / 0	5.50	14.70	20.20	0.105	23.00	-2.80
3625.00	20	QPSK	100 / 0*	5.62	14.70	20.32	0.108	23.00	-2.68
3560.00	20	16-QAM	1 / 0	5.85	14.70	20.55	0.114	23.00	-2.45
3560.00	20	64-QAM	1 / 0	5.86	14.70	20.56	0.114	23.00	-2.44

Table 7-4. LTE Band 48 EIRP Data

FCC ID: XIA-CFW2172	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	RB Size/Offset	Conducted Power [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP [Watts]
3625.00	5	QPSK	25 / 0	5.61	14.70	20.31	0.107
3625.00	5	16-QAM	25 / 0	5.65	14.70	20.35	0.108
3625.00	5	64-QAM	25 / 0	5.63	14.70	20.33	0.108
3625.00	10	QPSK	50 / 0	5.72	14.70	20.42	0.110
3625.00	10	16-QAM	50 / 0	5.73	14.70	20.43	0.110
3625.00	10	64-QAM	50 / 0	5.72	14.70	20.42	0.110
3625.00	15	QPSK	75 / 0	6.70	14.70	21.40	0.138
3625.00	15	16-QAM	75 / 0	6.71	14.70	21.41	0.138
3625.00	15	64-QAM	75 / 0	6.71	14.70	21.41	0.138
3625.00	20	QPSK	100 / 0	8.17	14.70	22.87	0.194
3625.00	20	16-QAM	100 / 0	8.16	14.70	22.86	0.193
3625.00	20	64-QAM	100 / 0	8.17	14.70	22.87	0.194

Table 7-5. LTE Band 48 Full Channel BW EIRP Data

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7.8 Radiated Spurious Emissions Measurements

§2.1053 §96.41(e)

Test Overview

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

Test Procedures Used

KDB 971168 D01 v03r01 - Section 5.8

ANSI/TIA-603-E-2016 - Section 2.2.12

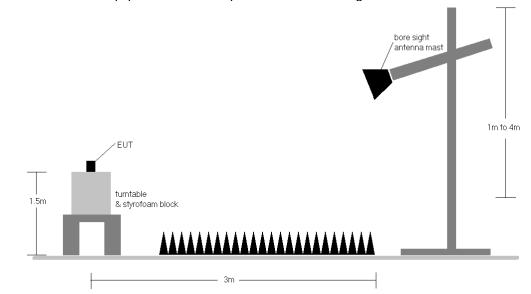
Test Settings

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

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Test Setup



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

Figure 7-7. Test Instrument & Measurement Setup

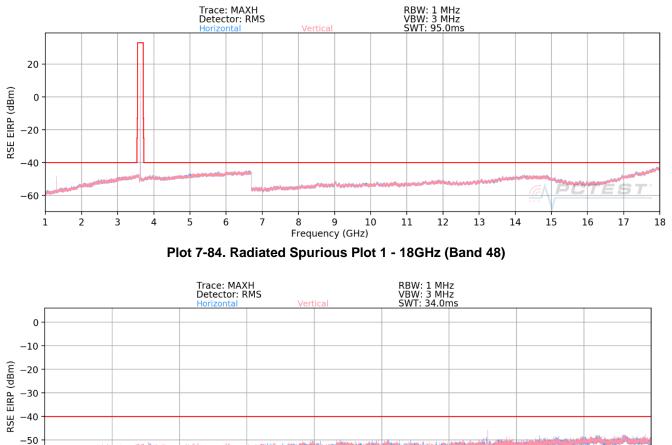
Test Notes

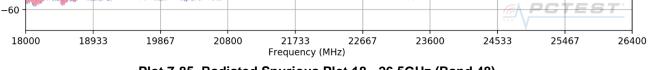
- 1) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case emissions are reported with the EUT modulations, RB sizes and offsets, and channel bandwidth configurations shown in the tables below.
- 2) This unit was tested while powered by POE injector.
- 3) The spectrum is measured from 9kHz to the 10th harmonic of the fundamental frequency of the transmitter. The worst-case emissions are reported.
- 4) 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.
- 5) The "-" shown in the following RSE tables are used to denote a noise floor measurement.

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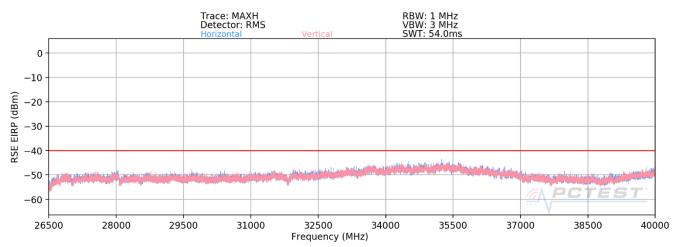












Plot 7-86. Radiated Spurious Plot 26.5 - 40GHz (Band 48)

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Sample #:	/00349		
Bandwidth (MHz):	10		
Frequency (MHz):	3555.0		
Modulation Signal:	QPSK		
RB Config (Size / Offset):	1/25		
Detector / Trace Mode:	RMS / Max Ho		
RBW / VBW:	1MHz/3MHz		

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]
1241.0	V	-	-	-71.49	-6.68	28.83	-66.43	-40.00	-26.43
7110.0	V	-	-	-77.77	9.18	38.41	-56.84	-40.00	-16.84
10665.0	V	-	-	-79.53	13.23	40.70	-54.56	-40.00	-14.56
14220.0	V	-	-	-79.41	17.04	44.63	-50.63	-40.00	-10.63
17775.0	V	-	-	-80.22	22.35	49.13	-46.13	-40.00	-6.13

Table 7-6. Radiated Spurious Data (Band 48 – Low Channel)

Sample #:	/00349		
Bandwidth (MHz):	10		
Frequency (MHz):	3625.0		
Modulation Signal:	QPSK		
RB Config (Size / Offset):	1 / 25		
Detector / Trace Mode:	RMS / Max Ho		
RBW / VBW:	1MHz/3MHz		

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]
1320.0	V	-	-	-71.90	-6.00	29.10	-66.16	-40.00	-26.16
7250.0	V	-	-	-76.98	9.19	39.21	-56.05	-40.00	-16.05
10875.0	V	-	-	-78.87	12.27	40.40	-54.85	-40.00	-14.85
14500.0	V	-	-	-79.62	17.48	44.86	-50.40	-40.00	-10.40

Table 7-7. Radiated Spurious Data (Band 48 – Mid Channel)

		Turntable	Analyzer	 Field	EIRP Spurious	 ĺ
RBW / VBW:	1MHz/3MHz					
Detector / Trace Mode:	RMS / Max Ho					
RB Config (Size / Offset):	1 / 25					
Modulation Signal:	QPSK					
Frequency (MHz):	3695.0					
Bandwidth (MHz):	10					
Sample #:	/00349					

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]
1381.0	V	-	-	-71.62	-5.90	29.48	-65.78	-40.00	-25.78
7390.0	V	-	-	-78.04	9.58	38.54	-56.72	-40.00	-16.72
11085.0	V	-	-	-79.16	12.37	40.21	-55.05	-40.00	-15.05
14780.0	V	-	-	-79.51	17.87	45.36	-49.90	-40.00	-9.90

Table 7-8. Radiated Spurious Data (Band 48 – High Channel)

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7.9 Uplink Carrier Aggregation Radiated Measurements

§2.1053, §96.41(e)

Test Overview

Radiated spurious emissions measurements are performed using the substitution method described in ANSI/TIA-603-D-2010 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 peak measurements while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

Test Procedures Used

KDB 971168 D01 v02r02 - Section 5.8

ANSI/TIA-603-D-2010 - Section 2.2.12

Test Settings

- 1. RBW = 100kHz for emissions below 1GHz and 1MHz for emissions above 1GHz
- 2. VBW \ge 3 x RBW
- 3. No. of sweep points > 2 x span / RBW
- 4. Detector = RMS
- 5. Trace mode = trace average for continuous emissions, max hold for pulse emissions
- 6. The trace was allowed to stabilize

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Test Setup

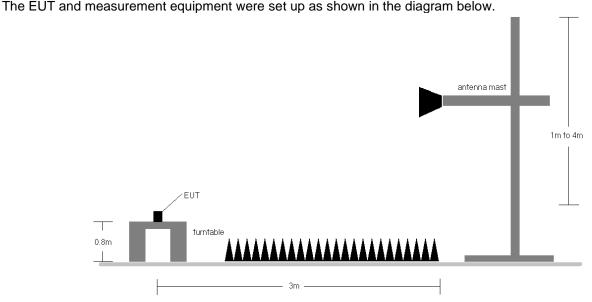


Figure 7-8. Test Instrument & Measurement Setup

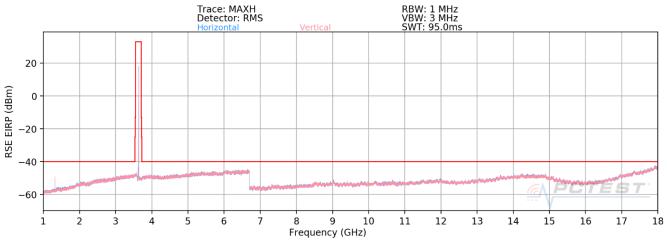
Test Notes

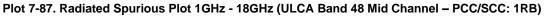
- 1) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the tables below.
- 2) This unit was tested while powered by POE injector.
- 3) Radiated spurious emissions measurements were evaluated for the two contiguous channels using various combinations of RB size, RB offset, modulation, and channel bandwidth. The worst case (highest) emissions were found while operating with QPSK modulation with both carriers set to transmit using 1RB.
- 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) No significant emissions were found as a result of two uplink carriers operating contiguously.

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ULCA Band 48





Sample #:	/00349	1							
Mode:	ULCA 48C	1							
PCC Frequency (MHz):	3560.0	1							
SCC Frequency (MHz):	3579.8								
Bandwidth (MHz):	20 + 20								
Modulation Signal:	QPSK								
Detector / Trace Mode:	RMS / MaxH								
RBW / VBW:	1MHz/3MHz	J							
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]
-	Ant. Pol.	Antenna	Azimuth	Level	-	Strength	Emission Level		-
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Azimuth [degree]	Level [dBm]	[dB/m]	Strength [dBµV/m]	Emission Level [dBm]	[dBm]	[dB]
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm] -	Azimuth [degree] -	Level [dBm] -71.43	[dB/m] -6.57	Strength [dBµV/m] 29.00	Emission Level [dBm] -66.26	[dBm] -40.00	[dB] -26.26
Frequency [MHz] 1255.5 7120.0	Ant. Pol. [H/V] V	Antenna Height [cm] -	Azimuth [degree] -	Level [dBm] -71.43 -77.98	[dB/m] -6.57 9.06	Strength [dBμV/m] 29.00 38.08	Emission Level [dBm] -66.26 -57.18	[dBm] -40.00 -40.00	[dB] -26.26 -17.18

 17800.0
 V
 80.82
 22.48
 48.66

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Sample #:	/00349
Mode:	ULCA 48C
PCC Frequency (MHz):	3625.0
SCC Frequency (MHz):	3644.8
Bandwidth (MHz):	20 + 20
Modulation Signal:	QPSK
Detector / Trace Mode:	RMS / MaxH
RBW / VBW:	1MHz/3MHz

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]
1320.5	V	-	-	-71.45	-5.97	29.58	-65.68	-40.00	-25.68
7250.0	V	-	-	-77.96	9.19	38.23	-57.03	-40.00	-17.03
10875.0	V	-	-	-79.26	12.27	40.01	-55.24	-40.00	-15.24
14500.0	V	-	-	-80.09	17.48	44.39	-50.87	-40.00	-10.87

Plot 7-10. Radiated Spurious Data (ULCA BAND 48 PCC: RB 1 Offset 99, SCC: RB 1 Offset 0 - Mid Channel)

Sample #:	/00349
Mode:	ULCA 48C
PCC Frequency (MHz):	3690.0
SCC Frequency (MHz):	3670.2
Bandwidth (MHz):	20 + 20
Modulation Signal:	QPSK
Detector / Trace Mode:	RMS / MaxH
RBW / VBW:	1MHz/3MHz

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]
1366.0	V	-	-	-71.94	-6.15	28.91	-66.35	-40.00	-26.35
7380.0	V	-	-	-78.22	9.71	38.49	-56.77	-40.00	-16.77
11070.0	V	-	-	-79.46	12.38	39.92	-55.34	-40.00	-15.34
14760.0	V	-	-	-80.73	18.35	44.62	-50.63	-40.00	-10.63

Plot 7-11. Radiated Spurious Data (ULCA BAND 48 PCC: RB 1 Offset 0, SCC: RB 1 Offset 99 - High Channel)

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7.10 Frequency Stability / Temperature Variation

<u>§2.1055</u>

Test Overview and Limit

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

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

For Part 96, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

Test Procedure Used

ANSI/TIA-603-E-2016

Test Settings

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

Test Setup

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

Test Notes

None

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Band 48 Frequency Stability Measurements

OPERATING FREQUENCY:	3,625,000,000	Hz
CHANNEL:	55990	_
REFERENCE VOLTAGE:	48.00	VDC

VOLTAGE (%)	POWER (VDC)	ТЕМР ([°] С)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	48.00	- 30	3,624,999,824	-176	-0.0000049
100 %		- 20	3,625,000,010	10	0.000003
100 %		- 10	3,624,999,960	-40	-0.0000011
100 %		0	3,624,999,951	-49	-0.0000014
100 %		+ 10	3,625,000,320	320	0.0000088
100 %		+ 20	3,624,999,894	-106	-0.0000029
100 %		+ 30	3,624,999,724	-276	-0.0000076
100 %		+ 40	3,625,000,122	122	0.0000034
100 %		+ 50	3,625,000,200	200	0.0000055

Table 7-12. Frequency Stability Data (Band 48)

Note:

Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

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Band 48 Frequency Stability Measurements

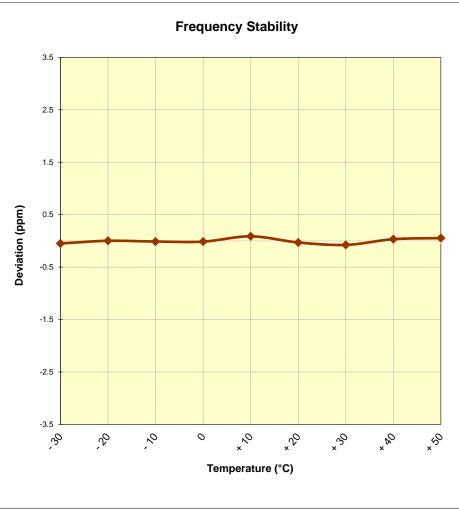


Figure 7-9. Frequency Stability Graph (Band 48)

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8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **Netcomm Handheld LTE Router FCC ID: XIA-CFW2172** complies with all of the requirements of Part 96 of the FCC Rules for LTE operation only.

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