

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 - 7/23/2020 Test Site/Location: PCTEST Lab. Columbia, MD, USA Test Report Serial No.: 1M2006290101-01.XIA

FCC ID: XIA-CFW2182 APPLICANT: Netcomm Wireless Limited Application Type: Certification

Model:	CFW-2182
EUT Type:	Outdoor 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

			EI	RP		
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	0.172	22.35	4M54G7D	QPSK
LTE Band 48	96	3552.5 - 3697.5	0.178	22.51	4M51W7D	16QAM
LTE Band 48	96	3552.5 - 3697.5	0.173	22.37	4M52W7D	64QAM
LTE Band 48	96	3555 - 3695	0.191	22.80	9M00G7D	QPSK
LTE Band 48	96	3555 - 3695	0.187	22.71	8M99W7D	16QAM
LTE Band 48	96	3555 - 3695	0.176	22.45	9M02W7D	64QAM
LTE Band 48	96	3557.5 - 3692.5	0.173	22.39	13M5G7D	QPSK
LTE Band 48	96	3557.5 - 3692.5	0.138	21.40	13M5W7D	16QAM
LTE Band 48	96	3557.5 - 3692.5	0.172	22.36	13M5W7D	64QAM
LTE Band 48	96	3560 - 3690	0.195	22.90	18M0G7D	QPSK
LTE Band 48	96	3560 - 3690	0.191	22.82	18M0W7D	16QAM
LTE Band 48	96	3560 - 3690	0.175	22.43	17M9W7D	64QAM

EUT Overview (LTE B48)

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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 Outdoor LTE Router FCC ID: XIA-CFW2182**. 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.: 00266, 00274, 00290

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
-	LTx1	Licensed Transmitter Cable Set	6/4/2019	Annual	6/4/2020	LTx1
-	LTx2	Licensed Transmitter Cable Set	10/30/2019	Annual	10/30/2020	LTx2
Agilent	N9038A	MXE EMI Receiver	7/17/2019	Annual	7/17/2020	MY51210133
Agilent	N9030A	PXA Signal Analyzer (44GHz)	6/12/2019	Annual	6/12/2020	MY52350166
Com-Power	AL-130	9kHz - 30MHz Loop Antenna	10/10/2019	Biennial	10/10/2021	121034
Espec	ESX-2CA	Environmental Chamber	6/13/2019	Annual	6/13/2020	17620
ETS Lindgren	3164-08	Quad Ridge Horn Antenna	2/22/2019	Biennial	2/22/2021	128338
Mini Circuits	TVA-11-422	RF Power Amp	N/A		QA1317001	
Mini Circuits	PWR-SEN-4GHS	USB Power Sensor	4/19/2019	Annual	4/19/2020	11401010036
Mini-Circuits	SSG-4000HP	Synthesized Signal Generator	N/A		11403100002	
Rohde & Schwarz	CMW500	Radio Communication Tester		N/A		100976
Rohde & Schwarz	ESU26	EMI Test Receiver (26.5GHz)	6/5/2019	Annual	6/5/2020	100342
Rohde & Schwarz	ESU40	EMI Test Receiver (40GHz)	9/23/2019	Annual	9/23/2020	100348
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	7/11/2019	Annual	7/11/2020	102134
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	7/8/2019	Annual	7/8/2020	102133
Sunol	DRH-118	Horn Antenna (1-18GHz)	10/3/2019	Biennial	10/3/2021	A050307
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	4/19/2018	Biennial	4/19/2020	A051107
Sunol	DRH-118	Horn Antenna (1-18 GHz)	8/27/2019	Biennial	8/27/2021	A042511

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-CFW2182

Mode(s): <u>LTE</u>

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
2.1051 96.41(e)	-13 dBm/Mhz at frequencies within 0-10MHz of channel edge Out of Band Emissions -25 dBm/MHz at frequencies greater than 10MHz above and below channel edge -40 dBm/MHz at frequencies below 3530 MHz and above 3720 MHz		PASS	Section 7.3, 7.4	
96.41(g)	Peak-Average Ratio	< 13 dB	CONDUCTED	PASS	Section 7.6
96.41(e)	Uplink Carrier Aggregation Out of Band Emissions	-13 dBm/Mhz at frequencies within 0-10MHz of channel edge -25 dBm/MHz at frequencies greater than 10MHz above and below channel edge -40 dBm/MHz at frequencies below 3530 MHz and above 3720 MHz		PASS	Section 7.6
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		PASS	Section 7.8
96.41(e)	Uplink Carrier Aggregation	Undesirable emissions must meet the limits detailed in 96.41(e)	RADIATED	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.

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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

Keysight Spectrum Analyzer - O	ccupied BW				
LXI RE 50 S	Ω AC CORREC	SENSE:INT	ALIGN AUTO	11:19:28 AM Apr 14, 202 Radio Std: None	Trace/Detector
	NFE	+++ Trig: Free Run	Avg Hold:>100/100	Rualo Sta. Hone	
	#IFGain:Low	#Atten: 36 dB		Radio Device: BTS	_
10 dB/div Ref 40.0	00 dBm				
100 Jan 100 Ja					
20.0					Clear Write
10.0	~~~~	www.www.	mmny		
0.00					
10.00			N N		Average
-10.0	66 o A.		100		Average
-20.0 pmpmlmmm	M Pr Carry R		M & March	mohn man	A
-30.0					
-40.0					Max Hold
-50.0					
Center 3 625000 GHz				Snan 12 50 MH	7
Res BW 120 kHz		#VBW 390	kHz	Sweep 1 m	S Min Hold
					Minitiona
Occupied Band	dwidth	Total I	ower 30.	1 dBm	
	4.5359	ЛНz			Detector
					Peak►
Transmit Freq Er	rror -5.41	1 kHz % of O	BW Power 9	9.00 %	Auto <u>Man</u>
x dB Bandwidth	4.923	SMHz xdB	-26	.00 dB	
MSG			STATU	JS	

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

Keysight Spectrum Analyzer - O	ccupied BW									
(X) RL RF 50 Ω	2 AC CO	RREC	SEN	ISE:INT	0000 CH-	ALIGN AUTO	11:20:39 A	M Apr 14, 2020	Trac	e/Detector
	NEE		, Trig: Free	eq: 3.62500 Run	Avg Hol	d: 83/100	Radio Stu	. None		
	#IF	Gain:Low	#Atten: 30	6 dB			Radio Dev	vice: BTS		
10 dB/div Ref 40.0)0 dBm									
Log										
30.0										Clear Write
20.0			o-A 04	- 0 . 0 0	10					
10.0		1			Server . Con					
0.00										
-10.0		<u> </u>				<u>ل</u>				Average
-20.0	. A And	4				10.0.0	А			
-30 Amming hallow	A-AMA PLO 4.					an hand	Mer have and	Vmm		
40.0										
-40.0										Max Hold
-5U.U										
Center 3.625000 GHz	:				· · · · ·		Span 1	2.50 MHz		
Res BW 120 kHz			#VB	W 390 k	Hz		Swe	eep 1 ms		Min Hold
Occupied Band	dwidth			Total P	ower	28.	3 dBm			
	4.51	11 M	Z							Detector
										Peak▶
Transmit Freq Er	ror	-3.998	(Hz	% of OE	3W Pow	ver 9	9.00 %		Auto	<u>Man</u>
x dB Bandwidth		4.900 M	Hz	x dB		-26	.00 dB			
MSG						STATU	JS			

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

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Keysight Spectrum Analyzer - Occ	upied BW						-	
<mark>ι XI</mark> RL RF 50 Ω	AC CORR	EC S Center	ENSE:INT Freq: 3.625000000 GH	ALIGN AUTO	11:20:20 AM Radio Std: 1	Apr 14, 2020 None	Trace	Detector
	NFE #IFGa	ain:Low #Atten:	36 dB	1010: 100/100	Radio Devic	e: BTS		
10 dB/div Ref 30.00	0 dBm							
20.0								
10.0		mmmmm	M. Marine	¬			C	lear Write
0.00	/	1						
-10.0	. /			A B				
-20.0	wh has			ham	Mr. M.	mandal		Average
-30.0								
-40.0								
-50.0								Max Hold
-80.0								
Center 3.625000 GHz					Span 12	.50 MHz		
Res BW 120 KHZ		#V	BW 390 KHZ		Swee	p 1 ms		Min Hold
Occupied Band	width		Total Power	28.2	2 dBm			
	4.524	0 MHz						Detector
Tranomit Eros Err		4 420 kH=			00.9/		Auto	Peak ► Mon
	01	-1.439 KHZ		wei se	.00 %		Auto	IMAII
x dB Bandwidth		4.913 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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🔤 Keysig	ht Spectrum Anal	lyzer - Occ	upied BV	V										
LXI RL	RF	50 Ω	AC	CORRE	C	-	SENSE:INT		ALIGN	I AUTO	10:17:07 A	M Apr 14, 2020	Trac	e/Detector
						Center Trig: F	Freq: 3.6250 ree Run	AvalHo	ld: 82/1	00	Radio Std:	None		
			NFE	#IFGa	in:Low	#Atten:	36 dB				Radio Dev	ice: BTS		
10 dB/c	div Ref	f 40.00	0 dBn	n										
30.0														
20.0														Clear Write
20.0					one doe o	ha mill a los	which are like	MYL MANULL I						
10.0				4		· W · WY	ola maddatailatt	1.00.0 · · V.M.						
0.00														
-10.0 —				<u>}</u>					1					Average
-20.0 —				n N					h					
-30.0 🏧	whyphingh	an JLAM	mmey w	NNW .					· vihari	(Norshord)	www.hoveland	᠕ᢉᢂᡊᡒ᠊ᠬᡢ᠋ᡰᡅᠼᡘᡃ		
-40 0														
70.0														Max Hold
-30.0														
Cente	r 3.62500 (GHz									Span 2	5.00 MHz		
Res B	W 240 kH	Z				#\	/BW 7501	kHz			Swe	ep 1 ms		Min Hold
														Minifiend
Oc	cupied E	Band	widt	h			Total F	ower		27.8	dBm			
			8	987	'8 M	Hz								Detector
			υ.	001		112								Peak►
Tra	nsmit Fre	eq Err	or		7.515	kHz	% of O	BW Pov	ver	99	.00 %		Auto	<u>Man</u>
y d	R Randwi	idth		c	784	MHz	v dB			-26 (00 dB			
	B Bullawi	aun				1112	A GD			-20.0				
MSG										STATUS				

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-CFW2182	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
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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-CFW2182	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
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🔤 Keysight Spectrum Analyzer - Occupie	ed BW						
ΙΧ΄ RL RF 50Ω A		SENSE:INT Center Freq: 3.625000000 G Trig: Free Run Avg	ALIGN AUTO Hz Hold: 100/100	08:17:46 AM / Radio Std: N	Apr 15, 2020 Ione	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	-Malinara and a second	4 <u> </u>				
-10.0							Average
20.0 may hour man And	mmunul		howellow	-hannan march	Winner		
-40.0							
-50.0						N	
Center 3 62500 GHz				Snan 37	50 MHz		
Res BW 360 kHz		#VBW 1.1 MHz		Swee	p 1 ms	r	Min Hold
Occupied Bandwi	idth	Total Power	26.9	∂ dBm			
·	13.450 MH	Z					Detector
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-CFW2182	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	RREC SI	ENSE:INT	ALIGN AUTO	11:15:41 A	M Apr 14, 2020	Trac	e/Detector
NFE	Trig: Fr	ee Run Avg Hol	d: 91/100	Raulo Stu	. None		
#IF	Gain:Low #Atten:	36 dB		Radio Dev	rice: BTS		
10 dB/div Ref 40.00 dBm							
20.0						(Clear Write
20.0	My Marth Bally Ar Row	Manhaman					
10.0			1				
0.00							Avorago
-10.0							Average
-20.0 minter and provide rain for the all ward with	r		" And Showstore	the way have a	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		Swe	ep 1 ms		Min Hold
							Milling
Occupied Bandwidth		Total Power	28.6	i dBm			
17.9	954 MHz						Detector
	500.11						Peak▶
I ransmit 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-CFW2182	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	reless	Approved by: Quality Manager	
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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.

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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-CFW2182	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	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)

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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-CFW2182	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	ss Approved by: Quality Manager
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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-CFW2182	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
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🔤 Key	/sight Spe	trum A	nalyzer - Sw	ept SA										
l XI RI	L	RF	50 Ω	DC	CORREC		SEN	ISE:INT	#Ava Tvp	e PMS	09:43:52 /	AM Apr 16, 2020	F	requency
					PNO: Fa	ist 🛶	Trig: Free	Run	Avg Hold	: 100/100	T			
					IFGain:L	ow	#Atten: 6	dB						
										MKr	1 3.743	451 GHZ		Auto Tune
10 dE	3/div	Ref	-4.00 d	Bm							-52.4	54 U BIII		
							Ì							Center Freg
-14.0													3.76	5000000 GHz
-24.0														
														Start Freq
-34.0													3.72	0000000 GHz
												DL1 -40.00 dBm		
-44.0					-									Stop Freq
					•'								3.81	0000000 GHz
-54.0	المراجع الم	al m.	ada at state o	الم الم	يقبله الرقر ومطا	ية متقارية	Lauthe address	اور براہ ایر اور ا	أنفا المعرفية	ور المراجعة الم	والمرادة فيسجعها	and the last of a sole		
	ilin, ainiilin	-dulte	والمرابقة والمراد	al a files	in the start the start	, uittaa r	a littate stations	Harle Jula as t	la lini gun an la salah	lidd y dd rafaid	- appropriate la	a sa ang san bana ba		CF Step
-64.0													9	9.000000 MHz
710													<u>Auto</u>	Man
-74.0														
-84.0														Freq Offset
-04.0														0 Hz
-94 N														
														Scale Type
													1.00	Lin
Star #Do	t 3.720		SHZ		+	N/D/M	2.0 840-2			Curoon	Stop 3.8	1000 GHz	Log	Lin
#Re	5 6 9 9	.0 10	ΠZ		#	VDW	3.0 WHZ			Sweep	1.400 ms	(7001 pts)		
MSG										STAT	US			

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-CFW2182	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	ss Quality Manager
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🔤 Keysight Spectrum Analyzer - Swep	ot SA				
LXI RE 50 Ω	DC CORREC	SENSE:INT	#Avg Type: RMS	07:50:52 AM Apr 16, 2020 TRACE 1 2 3 4 5 6	Frequency
Gate: LO	PNO: Fast ↔ IFGain:Low	#Atten: 20 dB	MI	kr1 10.652 8 GHz -43.940 dBm	Auto Tune
-14.0					Center Freq 9.425000000 GHz
-34.0			▲ 1	DL1 -40.00 dBm	Start Freq 3.85000000 GHz
-44.0					Stop Freq 15.00000000 GHz
-64.0					CF Step 1.115000000 GHz <u>Auto</u> Man
-84.0					Freq Offset 0 Hz
Start 3.850 GHz				Stop 15.000 GHz	Scale Type
#Res BW 1.0 MHz	#VBW 3	0.0 MHz*	Sweep	112.7 ms (22841 pts) ^{rus}	Log <u>Lin</u>

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-CFW2182	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-CFW2182	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	ss Approved by: Quality Manager
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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-CFW2182	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	ss 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-CFW2182	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
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Keysight Sp	ectrum Analyzer - Swej	pt SA				
IXI RL	RF 50 Ω	DC CORREC	SENSE:INT	ALIGN AUTO	08:31:44 AM May 15, 2020	Frequency
		PNO: Wide +	Trig: Free Run	#Avg Type: RMS Avg Hold: 100/100	TYPE MWWWWW DET A N N N N N	· requeries
		IFGain:Low	#Atten: 22 dB	Mket 2	654 245 7 CH-	Auto Tune
		150		IVIKI I S	-41 904 dBm	
	Rei 0.00 ab		•			
						Center Freq
-10.0						3.65000000 GHz
-20.0						
					DL1 -25.00 dBm	Start Freq
-30.0						3.645000000 GHZ
				▲ 1		
-40.0						Stop Freq
<mark>n fi an fin</mark>	ditte a data operate di basara	litte mittele adet over d	and the first of the standard o		hant a lease call be made at the a	3.655000000 GHz
-50.0	ى <u>بىلى بەر بىلىكى لىكتى بىلىرىك ، مەلار بە</u> مە	an an an ann an an an an an an an an an	and the second secon		ار من المراجع بين المراجع بعد من المراجع بين المراجع بين ما يوارد المراجع المراجع المراجع المراجع الم	
						CF Step
-6U.U						1.000000 MHz
70.0						<u>Auto</u> Man
-70.0						
-80.0						Freq Offset
						0 Hz
-90.0						
						Scale Type
						Log Lin
#Pes BM	1 0 MHz	#\/R	M 3 0 MHz*	Sween	Stop 3.055000 GHz	
	1.0 10112	<i>"</i> VD	W 5.0 MI12	Sweep		
MSG				STATU		

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-CFW2182	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	s Approved by: Quality Manager	
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🔤 Keysight Sp	oectrum Analyzer - Sw	ept SA								
L <mark>X/</mark> RL	RF 50 Ω	DC COF	RREC	SEN	ISE:INT	#Avg Typ	e: RMS	10:18:55 Al TRAC	M Apr 16, 2020	Frequency
	_	PI IF(NO: Fast ↔↔ Gain:Low	Trig: Peri #Atten: 6	odic dB	Avg Hold:	100/100	3.891 2	57 GHz	Auto Tune
10 dB/div	Ref -4.00 d	IBm						-40.3	59 dBm	
-14.0										Center Freq 3.810000000 GHz
-24.0									1 DL1 -40,00 dBm	Start Freq 3.720000000 GHz
-44.0										Stop Freq 3.900000000 GHz
-64.0	n talitar karda baddilart.	<u>h dan di pilanta</u> p	ulany Ukay	vi na filon de la fin	ntitil <mark>himili</mark> da	an a		hetnikathertyj	niiliy intija	CF Step 3.614987000 GHz Auto <u>Man</u>
-84.0										Freq Offset 0 Hz
-94.0										Scale Type
Start 3.7	2000 GHz		#\/D\/	2 0 MU-2			Burgon 1	Stop 3.90	0000 GHz	Log <u>Lin</u>
#Res BW	390 KHZ		#VDVV	2.0 19182			Sweep 1	.400 MS (roorpts)	
Mag							STATUS			

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-CFW2182	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	S Quality Manager				
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🔤 Key	sight Spec	trum Ar	nalyzer - Sw	ept SA										
LXI RL		RF	50 Ω	DC	CORREC		SEN	ISE:INT	#Ava Tvp	e RMS	01:14:49	PM Apr 15, 2020	F	requency
					PNO: Fa	ast ↔→	Trig: Free	Run	Avg Hold:	100/100) T			
					IFGain:L	.0W	#Atten: 10				lend 00 2			Auto Tune
10 dE	//div	Ref	-4.00 d	Bm						IV	-49.	867 dBm		
							· · · · ·							Contor From
-14.0													21.00	0000000 GHz
													21.00	000000000112
-24.0														04-4F
													15.00	Start Freq
-34.0												DI 4 40.00 dBm	10.00	0000000 0112
-44 0												DE1 -40.00 GBM		
												·	27.00	Stop Freq
-54.0						ale restate a state of the stat	a fatti da ya da shafa i ya	a series a series de la series d	a la di na manga a la la	and the state		kal olga fillia i anda.	27.00	0000000 GH2
	d en der Gale	a philippik	in the sector of	appendia ta Min National Angel	nakoki tertetete Nakoki tertetete	on the star	ailadik matangali na	and a shell a start	all a straight a strai		CONTRACTOR OF THE OWNER			CE Stop
-64.0													1.20	0000000 GHz
74.0													<u>Auto</u>	Man
-74.0														
-84.0														Freq Offset
														0 Hz
-94.0														
														Scale Type
Star	: 15.00	00 GH	łz	1					1		Stop 2	7.000 GHz	Log	Lin
#Res	BW 1	1.0 M	Hz		#	¢VB₩	3.0 MHz*	;	S	weep	20.80 ms	(24001 pts)		
MSG										ST	ATUS			

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-CFW2182	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	s Approved by: Quality Manager	
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🔤 Kej	ysight Spec	ctrum An	alyzer - Swe	ept SA										
l XI R	L	RF	50 Ω	DC	CORREC		SEN	ISE:INT	#Ava Type	ALIGN AUT	0 08:39:38 / TRA	AM May 15, 2020	F	requency
					PNO: Fa IFGain:L	ast ↔ ow	Trig: Free #Atten: 12	Run 2 dB	Avg Hold:	100/100	T) [
10 dE	3/div	Ref	0.00 dE	Зm						M	kr1 3.423 -50.5	50 GHz 518 dBm		Auto Tune
-10.0													1.78	Center Freq 10000000 GHz
													3(Start Freq 0.000000 MHz
												DL1 -40.00 dBm	3.53	Stop Freq 10000000 GHz
		a ili sa alifi Rayan alifi	dis distant Registeren	olipi ya win Alipi ya win		n dan fan di Geografia	din han alkalı. İn generaliya pete	la se la facto di la facto di la seconda br>Nata seconda di la seconda d	agilan a tabla al la Maria ang ang ang ang ang ang ang ang ang an	an la think a Marin an Anna		a han baran a bahada an	350 <u>Auto</u>	CF Step 0.000000 MHz Man
														Freq Offset 0 Hz
														Scale Type
Star #Re:	t30 M sBW 1	Hz 1.0 M	Hz		#	VBW	3.0 MHz'	¢.	S	weep	: Stop) 4.667 ms	3.530 GHz 70001 pts)	Log	Lin
MSG										STA	TUS			

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-CFW2182	PCTEST 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-CFW2182	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	s Approved by: Quality Manager					
Test Report S/N:	Test Dates:	EUT Type:	Dage 22 of 76					
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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-CFW2182	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	s Approved by: Quality Manager				
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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-CFW2182	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager					
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🔤 Keysight Spe	ectrum Analyzer - Swept S	A				- • •
LXI RL	RF 50 Ω 1	DC CORREC	SENSE:INT	#Avg Type: RMS	08:10:49 AM Apr 16, 2020 TRACE 1 2 3 4 5 6	Frequency
	Gate: LO	PNO: Fast +++	#Atten: 6 dB	Avg Hold: 100/100		
10 dB/div	Ref -4.00 dBr	n		N	lkr1 38.963 0 GHz -49.383 dBm	Auto Tune
			Ĭ			Center Freq
-14.0						33.500000000 GHz
-24.0						Start Freq
-34.0					DL1 -40.00 dBm	27.000000000 GHz
-44.0					1	Stop Freq
-54.0						40.000000000 GHz
-64.0						CF Step 1.30000000 GHz
-74.0						<u>Auto</u> Man
-84.0						Freq Offset
-94.0						0 Hz
						Scale Type
Start 27.0 #Res BW	000 GHz 1.0 MHz	#VBW	3.0 MHz*	Sweep	Stop 40.000 GHz 260.0 ms (26001 pts)	Log <u>Lin</u>
MSG				ST	ATUS	

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

FCC ID: XIA-CFW2182	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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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 \geq 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

FCC ID: XIA-CFW2182	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	S Approved by: Quality Manager	
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Band 48

🔤 Keys	ight Spectrum	n Analyzer - Spurio	us Emissions					
I,XI RL	F	RF 50 Ω	AC CORREC	Cente Trig: F	SENSE:INT r Freq: 3.552500000 Free Run	GHz	11:29:53 AM Apr 15, 2020 Radio Std: None	Frequency
PASS		le. LO	IFGain:Low	, #Atter	n: 26 dB		Radio Device: BTS	
10 dB.	div	Ref 30.00 (dBm					
Log								
20.0								Center Freq
10.0					inf Mile			3.552500000 GHz
0.00								
-10.0								
-20.0								l
-30.0								:
-500.0								
-40.0				~	- · · · · · · · · · · · · · · · · · · ·			
-50.0 😁	energi Virditmander							l
-60.0								:
start	3.51 G	HZ					Stop 3.595 GHZ	CF Step 5.000000 MHz
Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	∆ Limit	<u>Auto</u> Man
1	1	3.5100 GHz	3.5300 GHz	1.000 MHz	3.528900000 GHz	-48.08 dBm	-8.083 dB	
2	2	3.5300 GHz	3.5400 GHz	1.000 MHz	3.539800000 GHz	-45.69 dBm	-20.69 dB	Fred Offset
3	3	3.5400 GHz	3.5490 GHz	1.000 MHz	3.549000000 GHz	-24.15 dBm	-11.15 dB	
4	4	3.5490 GHz	3.5500 GHz	100.0 kHz	3.549996667 GHz	-27.61 dBm	-14.61 dB	
5	5	3.5500 GHz	3.5550 GHz	100.0 kHz	3.554208333 GHz	13.05 dBm	-11.95 dB	
6	6	3.5550 GHz	3.5560 GHz	100.0 kHz	3.555018333 GHz	-26.52 dBm	-13.52 dB	
	1	3.5560 GHz	3.5650 GHz	1.000 MHz	3.556030000 GHz	-24.04 dBm	-11.04 dB	
8	Ø	5.5050 GHZ	3:5950 GHZ	1.000 MHZ	5.50620000 GHZ	-45.59 dBm	-20.59 dB	
MSG						STA	TUS	
MSG						STAT		

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-CFW2182	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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🔤 Keys	ight Spectrur	n Analyzer - S	Spurious E	missions					
L <mark>XI</mark> RL		RF 50	Ω AC	CORREC	Conto	SENSE:INT	ALIGN AUTO	11:34:05 AM Apr 15, 2020	Frequency
	G	te: LO			Trig:	External1	GHZ	Radio Std: None	
PAS	s °			IFGain:Lov	v #Atter	n: 26 dB		Radio Device: BTS	
10 dB	Idiv	Ref 30	00 dB	m					
Log	- Million								
20.0									Center Freq
10.0						1 du			3.697500000 GHz
0.00									
10.0						4.0			
-10.0				[
-20.0									
-30.0									
-40.0									
-50.0	بوارو تحد مالند او ماروم	****	****			<u> </u>			
60.0									
-00.0									
Star	3.655	GHz						Stop 3.74 GHz	05.04.0
									5 00000 MHz
Sour	Range	Start Er	eg	Stop Freg	RBW	Frequency	Amplitude	A Limit	<u>Auto</u> Man
1	1	3.6550 (GHz :	3 6850 GHz	1.000 MHz	3 683700000 GHz	-44.53 dBm	-19.53 dB	
2	2	3.6850 0	GHz 3	3.6940 GHz	1.000 MHz	3.694000000 GHz	-26.73 dBm	-13.73 dB	Exam Official
3	3	3.6940 0	GHz :	3.6950 GHz	100.0 kHz	3.694998333 GHz	-29.45 dBm	-16.45 dB	Frequise
4	4	3.6950 0	GHz :	3.7000 GHz	100.0 kHz	3.696058333 GHz	12.50 dBm	-12.50 dB	0 Hz
5	5	3.7000 0	GHz (3.7010 GHz	100.0 kHz	3.700013333 GHz	-30.08 dBm	-17.08 dB	
6	6	3.7010 0	GHz :	3.7100 GHz	1.000 MHz	3.701015000 GHz	-26.91 dBm	-13.91 dB	
7	7	3.7100 0	GHz (3.7200 GHz	1.000 MHz	3.710583333 GHz	-44.60 dBm	-19.60 dB	
8	8	3.7200 0	GHz 🔅	3.7400 GHz	1.000 MHz	3.720433333 GHz	-45.82 dBm	-5.822 dB	
MSC			_				TATS	311	
Mod							STAT		

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-CFW2182	PCTEST Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
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🔤 Keys	ight Specti	um Analyzer - Spuri	ous Emissions					
L <mark>XI</mark> RL		RF 50 Ω	AC CORREC	Conto	SENSE:INT	ALIGN AUT	D 11:00:34 AM Apr 15, 2020	Frequency
		Sate: LO N	FF	Trig:	Free Run	0 012	Radio Stu. None	
PAS	s	5410.20	IFGain:Lov	v 🔭 #Atter	1: 26 dB		Radio Device: BTS	
10 dB	/div	Ref 30.00	dBm					
20 0								O antan Fran
20.0								CenterFreq
10.0					Lauthanny stipster			3.625000000 GHz
0.00								
-10.0								
-20.0					Inter Market			
30.0								:
10.0					with the			
-40.0 -				,		A DINA .		
-50.0		in the second	1			and the second second	and and a state of a st	
-60.0 🖗	orgenistrumba	And some the second states	APPA AND AND A				n a malanyalan akalangka jalangka jala	:
	0.50						et 0 07 et l-	
start	3.58	GHZ					Stop 3.67 GHZ	CF Step 5.000000 MHz
Spur	Rang	e Start Freg	Stop Freg	RBW	Frequency	Amplitude	∆ Limit	<u>Auto</u> Man
1	1	3.5800 GHz	3.6100 GHz	1.000 MHz	3.609800000 GH	z -38.77 dBm	-13.77 dB	
2	2	3.6100 GHz	3.6190 GHz	1.000 MHz	3.618940000 GH	z -27.97 dBm	-14.97 dB	Eron Offect
3	3	3.6190 GHz	3.6200 GHz	200.0 kHz	3.619996667 GH	z -31.29 dBm	-18.29 dB	Frequise
4	4	3.6200 GHz	3.6300 GHz	200.0 kHz	3.622550000 GH	z 6.067 dBm	-18.93 dB	UHZ
5	5	3.6300 GHz	3.6310 GHz	200.0 kHz	3.630026667 GH	z -30.53 dBm	-17.53 dB	
6	6	3.6310 GHz	3.6400 GHz	1.000 MHz	3.631210000 GH	z -27.67 dBm	-14.67 dB	
7	7	3.6400 GHz	3.6700 GHz	1.000 MHz	3.640100000 GH	z -38.91 dBm	-13.91 dB	
MSG	_					STA	TUS	

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-CFW2182	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
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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-CFW2182	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:	Dage 41 of 76	
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Key	sight Spect	rum Analyzer -	Spurious	Emissions	;											
l <mark>,XI</mark> RL		RF 5	0Ω AC	COF	RREC		S	ENSE:INT	50000	011-	ALIGN AUT		8:44:37 A	M Apr 15, 2020		Frequency
		Cato: LO	NEE				Center Trig: Fr	ee Run	200000	GHZ		Ra	adio Sta	None		, , , , , , , , , , , , , , , , , , , ,
PAS	S	Gate: LO	NFC	IFC	Gain:Lo	w	#Atten:	26 dB				Ra	adio Dev	ice: BTS		
10 dE	3/div	Ref 30).00 d	Bm												
Log									7							
20.0																Center Freq
10.0															3.	692500000 GHz
0.00							an that									
10.0																
-10.0																
-20.0																
-30.0					i with	h h			fin te		h					ŀ
-40.0									. China	ام الرابية إيرانيا ال						
-50.0			e land									The second	he are			
-30.0	A THE SALES	uluy- <mark>a</mark> nd dan haliku ti										и .		i in the state of the state		
-60.0 -																ŀ
Start	2 64												Ston	2 74 CHz		
Stail		J GI12											Stop	J.74 GHZ		CF Step
																5.000000 MHz
Spur	Rang	ge Start F	req	Stop	Freq	RBW	/	requency	/	Ampl	itude	Δ	Limit		Auto	<u>o</u> wan
1	1	3.6450	GHz	3.6750) GHz	1.000	MHz 3	.67425000)0 GHz	-28.27	′ dBm	-3	3.271 dE	}		
2	2	3.6750	GHz	3.6840) GHz	1.000	MHz 3	.68334000)0 GHz	-25.89	dBm	-1	2.89 dE	3		Freg Offset
3	3	3.6840	GHz	3.6850) GHz	300.0	kHz 3	.68485666	67 GHz	-28.58	dBm	-1	5.58 dE	}		0 47
4	4	3.6850	GHz	3.7000) GHz	300.0	kHz 3	.68907500)0 GHz	5.290	dBm	-1	9.71 dE	3		0112
5	5	3.7000	GHz	3.7010) GHz	300.0	kHz 3	.70000500	00 GHz	-29.00) dBm	-1	6.00 dE	3		
6	6	3.7010	GHz	3.7100) GHz	1.000	MHz 3	.70223000	00 GHz	-26.70) dBm	-1	3.70 dE	3		
7	7	3.7100	GHz	3.7200) GHz	1.000	MHz 3	71156666	67 GHz	-28.17	dBm	-3	3.173 dE	3		
8	8	3.7200	GHz	3.7400) GHz	1.000	MHz 3	.72003333	33 GHz	-44.86	dBm	-4	.859 dE			
MEG	_		_	_	_		_		_	_	074	TUR			-	
MSG											STA	4105				

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-CFW2182	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	S Quality Manager	
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Keys	ight Spectru	m Analyzer - Spuri	ous Emissions					- ē X
l,XI RL	6	RF 50Ω	AC CORREC	Cente	SENSE:INT r Freq: 3.62500000 Free Run	ALIGN AUT	0 08:50:51 AM Apr 15, 2020 Radio Std: None	Frequency
PAS	S G	ite. LO N	IFGain:Low	, 🎽 #Atter	n: 26 dB		Radio Device: BTS	
10 dB	/div	Ref 30.00	dBm					
Log								
20.0								Center Freq
10.0				a ser be alle table				3.625000000 GHz
0.00								
-10.0				<u> </u>	nathria (Carl Cat Carl			
-20.0					<u> </u>			
-30.0								:
-40.0			A THE REAL PROPERTY.		<u>"</u>	A STATEMENT OF A STATEMENT		
50.0							a state of the sta	
-30.0	ale signal from						T T V V V V V V V V V V V V V V V V V V	
-6U.U -								·
Start	3.575	GHz					Stop 3.675 GHz	CF Step 5.000000 MHz
Spur	Range	Start Freg	Stop Freq	RBW	Frequency	Amplitude	∆ Limit	<u>Auto</u> Man
1	1	3.5750 GHz	3.6050 GHz	1.000 MHz	3.604800000 GH	z -31.36 dBm	-6.357 dB	
2	2	3.6050 GHz	3.6140 GHz	1.000 MHz	3.613235000 GH	z -28.32 dBm	-15.32 dB	Fred Offset
3	3	3.6140 GHz	3.6150 GHz	390.0 kHz	3.614990000 GH	z -28.95 dBm	-15.95 dB	
4	4	3.6150 GHz	3.6350 GHz	390.0 kHz	3.624033333 GH	z 5.042 dBm	-19.96 dB	0 H2
5	5	3.6350 GHz	3.6360 GHz	390.0 kHz	3.635030000 GH	z -30.01 dBm	-17.01 dB	
6	6	3.6360 GHz	3.6450 GHz	1.000 MHz	3.636165000 GH	z -29.87 dBm	-16.87 dB	
7	7	3.6450 GHz	3.6750 GHz	1.000 MHz	3.649650000 GH	z -31.85 dBm	-6.853 dB	
MSG						STA	TUS	

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-CFW2182	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
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7.5 Peak-Average Ratio §96.41(g)

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 \geq 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-CFW2182	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	ess Approved by: Quality Manager
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Plot 7-58. PAR Plot (Band 48 – 5.0MHz QPSK – Full RB Configuration)



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

FCC ID: XIA-CFW2182	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-CFW2182	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-CFW2182	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-CFW2182	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-CFW2182	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-CFW2182	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

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Test Notes

- Conducted power and spurious emissions measurements were evaluated for the two contiguous channels using various combinations of RB size, RB offset, modulation, and channel bandwidth. Channel bandwidth data is shown in the tables below based only on the channel bandwidths that were supported in this device. The worst case (highest) powers were found while operating with QPSK modulation, as shown in Table 7-3 and 7-4 below, with both carriers set to transmit using 1RB.
- 2. 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.

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Band 48

	PCC								SCC				Power		
Power State	PCC Band	PCC Bandwidth [MHz]	PCC (UL) Channel	PCC (UL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	SCC Band	SCC Bandwidth [MHz]	SCC (UL) Channel	SCC (UL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	ULCA Tx.Power (dBm)
Max	LTE B48	5	55265	3552.5	QPSK	1	0	LTE B48	20	55382	3564.2	QPSK	1	0	12.05
Max	LTE B48	10	55290	3555	QPSK	1	0	LTE B48	20	55434	3569.4	QPSK	1	0	11.32
Max	LTE B48	15	55315	3557.5	QPSK	1	0	LTE B48	20	55486	3574.6	QPSK	1	0	12.09
Max	LTE B48	20	55340	3560	QPSK	1	0	LTE B48	20	55538	3579.8	QPSK	1	0	11.91
Max	LTE B48	5	55990	3625	QPSK	1	0	LTE B48	20	56107	3636.7	QPSK	1	0	11.58
Max	LTE B48	10	55990	3625	QPSK	1	0	LTE B48	20	56134	3639.4	QPSK	1	0	10.62
Max	LTE B48	15	55990	3625	QPSK	1	0	LTE B48	20	56161	3642.1	QPSK	1	0	11.87
Max	LTE B48	20	55990	3625	QPSK	1	0	LTE B48	20	56188	3644.8	QPSK	1	0	12.00
Max	LTE B48	20	56640	3690	QPSK	1	0	LTE B48	5	56523	3678.3	QPSK	1	0	10.61
Max	LTE B48	20	56640	3690	QPSK	1	0	LTE B48	10	56496	3675.6	QPSK	1	0	10.25
Max	LTE B48	20	56640	3690	QPSK	1	0	LTE B48	15	56469	3672.9	QPSK	1	0	10.78
Max	LTE B48	20	56640	3690	QPSK	1	0	LTE B48	20	56442	3670.2	QPSK	1	0	10.05

Table 7-3. Conducted Powers (B48 – Left Carrier: RB Size 1 Offset 0 Right Carrier: RB Size 1 Offset 0)

	PCC							SCC					Power		
Power State	PCC Band	PCC Bandwidth [MHz]	PCC (UL) Channel	PCC (UL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	SCC Band	SCC Bandwidth [MHz]	SCC (UL) Channel	SCC (UL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	ULCA Tx.Power (dBm)
Max	LTE B48	20	55340	3560	QPSK	1	0	LTE B48	20	55538	3579.8	QPSK	1	0	12.45
Max	LTE B48	20	55340	3560	QPSK	1	99	LTE B48	20	55538	3579.8	QPSK	1	99	11.90
Max	LTE B48	20	55340	3560	QPSK	1	0	LTE B48	20	55538	3579.8	QPSK	1	99	11.68
Max	LTE B48	20	55340	3560	QPSK	1	50	LTE B48	20	55538	3579.8	QPSK	1	50	11.75
Max	LTE B48	20	55340	3560	QPSK	1	99	LTE B48	20	55538	3579.8	QPSK	1	0	11.53
Max	LTE B48	20	55340	3560	QPSK	100	0	LTE B48	20	55142	3540.2	QPSK	100	0	11.90
Max	LTE B48	20	55340	3560	16-QAM	100	0	LTE B48	20	55142	3540.2	16-QAM	100	0	11.86
Max	LTE B48	20	55340	3560	64-QAM	100	0	LTE B48	20	55142	3540.2	64-QAM	100	0	12.09

Table 7-4. Conducted Powers (B48 with Various Combinations for 20MHz Channel Bandwidth)

FCC ID: XIA-CFW2182	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	s Approved by: Quality Manager	
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🔐 Keysight Spectrum Analyzer - Swept SA	
μ RF 50 Ω CORREC SENSE:INT 07:39:59 AM May 01, 2020 #Avg Type: RMS TRACE 3:33:59 AM May 01, 2020	Frequency
NFE PNO: Fast Trig: Free Run Avg Hold: 100/100 TYPE North Annu PET ANNININ IFGain:Low #Atten: 14 dB DET ANNININ	
10 dB/div Ref 4.00 dBm -49.904 dBm	Auto I une
-6.00	Center Freq 1.765000000 GHz
-26.0	Start Freq 30.000000 MHz
-36.0 DL1 -40.00 dBm	Stop Freq 3.500000000 GHz
	CF Step 347.000000 MHz to Man
	Freg Offset
-76.0	0 Hz
	Scale Type
Start 30 MHz Stop 3.500 GHz #Res BW 1.0 MHz #VBW 3.0 MHz* Sweep 4.667 ms (7001 pts)	g <u>Lin</u>

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)

FCC ID: XIA-CFW2182	PCTEST Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
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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-CFW2182	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)

Ke	sight Spectrum	n Analyzer - Swe	ept SA									
lxi R	L R	F 50 Ω	DC	CORREC	SET	NSE:INT	#Avg Typ	e: RMS	08:05:24 A TRAC	M May 01, 2020 CE 1 2 3 4 5 6 PE M	F	requency
	Gat	te: LO		IFGain:Low	#Atten: 2	0 dB	Avginoid	.= 100/100	D			
10 dl	B/div Re	ef -2.00 d	Bm					Mkr1	3.590 45 -30.6	1 4 GHz 59 dBm		Auto Tune
-12.0										DL1-13.00 dBm	3.60	Center Freq 00000000 GHz
-22.0 -32.0											3.59	Start Freq
-42.0 -52.0		alamada una symbol Maria paga ang sa	ing Managari Panganan Jawa	ha in hai in filo na sita ha Na in hai in tha tha na sita ha	المانين (معرفه المقرم المقرم مراجع ومعرف رويند من مراجع	a an		ala ki siya	tu t		3.61	Stop Freq 0000000 GHz
-62.0 -72.0											<u>Auto</u>	CF Step 2.000000 MHz Man
-82.0												Freq Offset 0 Hz
-92.0												Scale Type
Star	t 3.59000	GHz							Stop 3.6	1000 GHz	Log	Lin
#Re	s BW 1.0	MHz		#VB۱	A 3.0 MHz	*		Sweep	1.400 ms ((7001 pts)		
MSG								STAT	US			

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

FCC ID: XIA-CFW2182	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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Keysight Spee	trum Analyzer - Sw	rept SA						- # *
LXI RL	RF 50 Ω	DC CORREC	SENSE	INT #Avg	Type: RMS	08:08:08 AM May 0 TRACE 1 2	1, 2020 3 4 5 6	Frequency
	Gate: LO	PNO: Fast G	5 Trig: Free R #Atten: 20 d	∖un Avg H IB	lold:>100/100	DET A N	NNNN	
10 dB/div	Ref -2.00 d	IBm			Mkr	1 3.610 629 -44.439 c	GHz IBm	Auto Tune
-12.0								Center Freq 3.665000000 GHz
-22.0						DL1 -2	5.00 dBm	Start Freq 3.61000000 GHz
-42.0 1	titi dan katalaan ti	t de feigne de la secte de la de la secte de la se La secte de la s	te a filia a seco de secolo secolo de se A secolo de	aray di Noona kipali parilak kanadi Aliya kinaka jarawa ka dawa di di ka	la stática di súla a suitana maine da contra da contra da	an allan da hairai da alimina		Stop Freq 3.720000000 GHz
-62.0							A	CF Step 11.000000 MHz . <u>uto</u> Man
-72.0								Freq Offset 0 Hz
-92.0								Scale Type
Start 3.610 #Res BW	900 GHz 1.0 MHz	#VBM	V 3.0 MHz*		Sweep	Stop 3.72000 1.400 ms (700	GHz I pts)	og <u>Lin</u>
MSG					STAT	US		

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-CFW2182	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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🔤 Keysight Spe	ectrum Analy	/zer - Swep	t SA									
L <mark>XI</mark> RL	RF	50 Ω	DC CO	RREC	SEI	NSE:INT	#Avg Typ	e: RMS	08:17:22 A	M May 01, 2020 DE 1 2 3 4 5 6	F	requency
	Gate: LO	00 10	P	NO: Fast ↔ Gain:Low	#Atten: 2	0 dB	Avginoid	100/100	/kr1 3.85 -40 1	8 4 GHz		Auto Tune
-14.0	Kei -4										9.42	Center Freq 5000000 GHz
-34.0										DL1 -40.00 dBm	3.85	Start Freq 0000000 GHz
-44.0	<u></u>	~~ *		lites de cateros							15.00	Stop Freq 0000000 GHz
-64.0											1.11 <u>Auto</u>	CF Step 5000000 GHz Man
-84.0												Freq Offset 0 Hz
Start 3.85	0 GHz								Stop 15	.000 GHz	Log	Scale Type Lin
#Res BW	1.0 MH	z		#VB\	W 3.0 MHz	*	S	weep	112.0 ms (2	4001 pts)		
MSG								STAT	TUS			

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-CFW2182	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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🔤 Keysight Spe	ectrum Analyzer - Swe	ept SA								
LXI RL	RF 50 Ω	DC CORREC	SEN	SE:INT	#Avg Typ	ALIGN AUT e: RMS	08:58:38 A	M May 15, 2020	Fr	requency
		PNO: Fast ↔ IFGain:Low	 Trig: Free #Atten: 6 	Run dB	Avg Hold:	100/100) TYI Di			
						М	kr1 36.98	2 0 GHz		Auto Tune
10 dB/div Log	Ref 0.00 dE	3m					-43.0	24 dBm		
									(Center Freq
-10.0									33.50	0000000 GHz
-20.0										
										Start Freq
-30.0									27.00	0000000 GHz
-40 0							1	DL1 -40.00 dBm		
					ويعاربنا والأربي ومحرور والم	a parameter	a martine production	And In Contraction	40.00	Stop Freq 0000000 GHz
-50.0 -50.0	and the stand of the	dentri di dentri di sedi			A state of the second second	لاي ند_{ر عربي} ا	Contract Statistics of the second statistics o	(Marada a sala sala sala sala sala sala sala		
-60.0	and a second									CF Step
00.0									1.30 <u>Auto</u>	0000000 GHz Man
-70.0										
-80.0										Freq Offset
-00.0										0 Hz
-90.0										O la Trance
										Scale Type
Start 27.0	00 GHz	<i>4</i>) (D) (J)	0.0 8411-1		~		Stop 40	.000 GHz	Log	Lin
#Res BW	1.0 MHZ	#VBW	3.0 WIHZ		S	weep	22.53 ms (2	ooor pts)		
MSG						ST/	ATUS			

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-CFW2182	PCTEST Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
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🔤 Keysi	ight Spectrur	n Analyzer - Spuri	ous Emissions					
L <mark>XI</mark> RL		RF 50 Ω	DC CORREC		SENSE:INT		09:17:59 AM May 01, 2020	Frequency
				Cente	r Freq: 3.6250000 External1	00 GHZ	Radio Std: None	. requeiney
PASS	Ga	te: LO	IFGain:Lov	#Atter	n: 26 dB		Radio Device: BTS	
10 dB/	/div	Ref 30.00	dBm					
20.0								
20.0								Center Freq
10.0								3.625000000 GHz
0.00								
-10.0					Th monthermore	****		
20.0				and street				
-20.0								
-30.0								
-40.0					<u> </u>			
-50.0								
	a second s							
-60.0								
Start	2 50 C						Stop 3 69 CHz	
Start	3.35 G	112					Stop 3.08 GHz	CF Step
								5.000000 MHz
Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	△ Limit	<u>Auto</u> Man
1	1	3.5900 GHz	3.6050 GHz	1.000 MHz	3.604225000 GH	Iz -49.32 dBm	-24.32 dB	
2	2	3.6050 GHz	3.6140 GHz	1.000 MHz	3.611270000 GH	Iz -48.29 dBm	-35.29 dB	Fred Offset
3	3	3.6140 GHz	3.6150 GHz	820.0 kHz	3.614975000 GH	Iz -47.83 dBm	-72.83 dB	
4	4	3.6150 GHz	3.6550 GHz	820.0 kHz	3.628400000 GH	lz -6.740 dBm	-31.74 dB	0 Hz
5	5	3.6550 GHz	3.6560 GHz	820.0 kHz	3.655056667 GH	Iz -48.84 dBm	-73.84 dB	
6	6	3.6560 GHz	3.6650 GHz	1.000 MHz	3.656510000 GH	lz -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	
MSG						ST	ATUS	

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

🔤 Key	sight Spectr	um Analy	zer - Spur	ious Emi	ssions											
I,XI RL		RF	50 Ω	DC	CORRE	C	Cente	SEN er Fr	vse:INT eq: 3.69000	0000	GHz		09:30:19 Radio St	AM May 01, 2020 d: None		Frequency
PAS	S	Gate: LO			IFGair	⊂ n:Low	#Atte	Free n: 2	e Run 6 dB				Radio De	evice: BTS		
10 dE	3/div	Ref	30.00	dBm												
Log 20.01																Contor From
10.0																3 69000000 GHz
0.00																5.69000000 GH2
10.00				440 - 180 N		and the second										
20.0				Anten	יון וויי	mmp	()'''''''	11,1								
-20.0																
-30,0																
-40.0																
-50.0		****												an a that is an a state of the second		
-60.01																
Star	t 3.64 (GHz											Sto	3.74 GHz		CF Step
																5.000000 MHz
Spu	r Rang	e Stai	rt Freq	S	op Fre	q F	RBW	Fr	equency		Ampli	tude	∆ Limit		<u>Αι</u>	<u>uto</u> Man
1	1	3.64	00 GHz	3.6	500 G	Hz 1	.000 MHz	3.6	42300000	GHz	-51.57	dBm	-26.57 c	B		
2	2	3.65	00 GHz	3.6	590 G	Hz 1	000 MHz	3.6	58985000	GHz	-51.48	dBm	-38.48 c	IB		Freg Offset
3	3	3.65	90 GHz	3.6	600 G	Hz 8	20.0 kHz	3.6	59900000	GHz	-50.82	dBm	-37.82 c	B		0 Hz
4	4	3.66	00 GHz	3.7	000 G	Hz 8	20.0 kHz	3.6	87066667	GHz	-6.823	dBm	-31.82 c	B		0112
5	5	3.70	00 GHz	3.1	010 G	Hz 8	20.0 kHz	3.7	00008333	GHZ	-48.17	dBm	-35.17 c	B		
6	6	3.70	10 GHz	3.7	100 G	Hz 1	000 MHz	3.7	09505000	GHz	-50.44	dBm	-37.44 c	B		
/	/	3.71	00 GHz	3.1	200 G	Hz 1.	.000 MHz	3.7	16316667	GHz	-50.37	dBm	-25.37 c	B		
8	8	3.72	00 GHz	3.1	400 G	HZ 1.	.000 MHz	3.7	24166667	GHZ	-50.25	dBm	-10.25 c	B		
MSG								-		-		STATU	JS			

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)

<u>990.41(D)</u>

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 an Power Over Ethernet (POE) power source.
- 3) The worst case EIRP shown in the section below is found with LTE operating in the RB configuration listed.

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	25 / 0	4.85	17.50	22.35	0.172	23.00	-0.65
3625.00	5	QPSK	25 / 0	4.85	17.50	22.35	0.172	23.00	-0.65
3697.50	5	QPSK	25 / 0	3.76	17.50	21.26	0.134	23.00	-1.74
3552.50	5	16-QAM	25 / 0	5.01	17.50	22.51	0.178	23.00	-0.49
3552.50	5	64-QAM	25 / 0	4.87	17.50	22.37	0.173	23.00	-0.63
3555.00	10	QPSK	1 / 0	5.30	17.50	22.80	0.191	23.00	-0.20
3625.00	10	QPSK	1 / 0	4.80	17.50	22.30	0.170	23.00	-0.70
3695.00	10	QPSK	1 / 0	4.64	17.50	22.14	0.164	23.00	-0.86
3555.00	10	16-QAM	1 / 0	5.21	17.50	22.71	0.187	23.00	-0.29
3555.00	10	64-QAM	1 / 0	4.95	17.50	22.45	0.176	23.00	-0.55
3557.50	15	QPSK	36 / 18	4.89	17.50	22.39	0.173	23.00	-0.61
3625.00	15	QPSK	36 / 18	4.75	17.50	22.25	0.168	23.00	-0.75
3692.50	15	QPSK	36 / 18	4.12	17.50	21.62	0.145	23.00	-1.38
3557.50	15	16-QAM	36 / 18	3.90	17.50	21.40	0.138	23.00	-1.60
3557.50	15	64-QAM	36 / 18	4.86	17.50	22.36	0.172	23.00	-0.64
3560.00	20	QPSK	1 / 0	5.23	17.50	22.73	0.187	23.00	-0.27
3625.00	20	QPSK	1 / 0	5.40	17.50	22.90	0.195	23.00	-0.10
3690.00	20	QPSK	1 / 0	5.30	17.50	22.80	0.191	23.00	-0.20
3560.00	20	16-QAM	1 / 0	5.32	17.50	22.82	0.191	23.00	-0.18
3560.00	20	64-QAM	1 / 0	4.93	17.50	22.43	0.175	23.00	-0.57

Table 7-5. LTE Band 48 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 an Power Over Ethernet (POE) power source.
- 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)

Note:

The emission that is above the limit for plot 7-120 was investigated using a notch filter (Sangshin Cavity Filter, Model NF3625), and the result is given below

1. Noise floor for emission around 1300 MHz

Operating Frequency [MHz]	Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3555.00	1236.24	Н	-	-	-81.78	6.87	-74.91	-34.9
3625.00	1306.30	Н	-	-	-81.51	7.25	-74.27	-34.3
3695.00	1376.60	Н	-	-	-81.88	7.49	-74.39	-34.4

2. Before and after the LTE Band 48 frequency band were found out to be passing the limit.

Operating Frequency [MHz]	Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3555.00	3413.46	Н	205	3	-72.14	9.84	-62.29	-22.3
3555.00	3687.80	Н	-	-	-121.08	9.68	-111.39	-71.4
3625.00	3483.60	Н	213	1	-71.16	9.93	-61.22	-21.2
3625.00	3758.17	Н	201	7	-66.27	9.40	-56.87	-16.9
3695.00	3553.13	Н	-	-	-112.75	9.92	-102.83	-62.8
3695.00	3828.14	Н	195	6	-65.05	9.34	-55.71	-15.7

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OPERATING FREQUENCY:	355	5.00	MHz
CHANNEL:	30	625	
MODULATION SIGNAL:	QPSK	_	
BANDWIDTH:	10.0	MHz	
DISTANCE:	3	meters	
LIMIT:	-40	dBm	

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
7110.00	Н	396	252	-63.81	11.76	-52.05	-12.1
10665.00	Н	154	52	-56.76	12.61	-44.15	-4.2
14220.00	Н	-	-	-57.64	11.41	-46.23	-6.2

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

MHz

OPERATING FREQUENCY:3625.00MODULATION SIGNAL:QPSKBANDWIDTH:10.0DISTANCE:3LIMIT:-40dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
7250.00	Н	380	247	-62.84	11.35	-51.49	-11.5
10875.00	Н	153	51	-55.74	12.77	-42.97	-3.0
14500.00	Н	-	-	-61.58	11.64	-49.93	-9.9

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

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OPERATING FREQUENCY:	369	5.00 MHz
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	10.0	MHz
DISTANCE:	3	meters
LIMIT:	-40	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
7390.00	Н	388	349	-63.72	10.98	-52.73	-12.7
11085.00	Н	237	73	-53.74	12.78	-40.96	-1.0
14780.00	Н	-	-	-60.21	12.15	-48.06	-8.1

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 an Power Over Ethernet (POE) power source.
- 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



Plot 7-87. Radiated Spurious Plot 1GHz - 18GHz (ULCA Band 48 Mid Channel – PCC/SCC: 1RB)

OPERATING FREQUENCY (PCC):	356	0.00	MHz
OPERATING FREQUENCY (SCC):	357	9.80	MHz
CHANNEL (PCC):	55	340	
CHANNEL (SCC):	55	538	
MODULATION SIGNAL:	QPSK	_	
BANDWIDTH:	20.0	MHz	
DISTANCE:	3	meters	
LIMIT:	-40	dBm	

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
7120.00	Н	400	349	-69.32	11.71	-57.62	-17.6
10680.00	Н	379	285	-64.65	12.55	-52.10	-12.1
14240.00	Н	-	-	-60.02	11.35	-48.66	-8.7
17800.00	Н	-	-	-53.25	10.01	-43.24	-3.2

Plot 7-9. Radiated Spurious Data (ULCA BAND 48 PCC: RB 1 Offset 99, SCC: RB 1 Offset 0 - Low Channel)

FCC ID: XIA-CFW2182	PCTEST Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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OPERATING FREQUENCY (PCC):	362	5.00	MHz
OPERATING FREQUENCY (SCC):	364	4.80	MHz
CHANNEL (PCC):	55	990	
CHANNEL (SCC):	56	188	
MODULATION SIGNAL:	QPSK		
BANDWIDTH:	20.0	MHz	
DISTANCE:	3	meters	
LIMIT:	-40	dBm	

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
7250.00	Н	-	-	-67.26	11.32	-55.94	-15.9
10875.00	Н	130	283	-65.51	12.71	-52.80	-12.8
14500.00	н	-	-	-59.78	11.61	-48.16	-8.2

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

OPERATING FREQUENCY (PCC):	369	0.00	MHz
OPERATING FREQUENCY (SCC):	367	0.20	MHz
CHANNEL (PCC):	56	640	_
CHANNEL (SCC):	56	442	_
MODULATION SIGNAL:	QPSK		_
BANDWIDTH:	20.0	MHz	
DISTANCE:	3	meters	
LIMIT:	-40	dBm	

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
7380.00	Н	400	343	-66.42	10.96	-55.47	-15.5
11070.00	Н	400	298	-66.94	12.72	-54.22	-14.2
14760.00	Н	-	-	-61.64	12.02	-49.61	-9.6

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	0.0000003
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 Outdoor LTE Router FCC ID: XIA-CFW2182** complies with all of the requirements of Part 96 of the FCC Rules for LTE operation only.

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