

7.4 Band Edge Emissions at Antenna Terminal §2.1051 §22.917(a) §24.238(a) §27.53(c) §27.53(h)

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

Test Procedure Used

KDB 971168 D01 v02r02 - 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

<u>Test Setup</u>

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

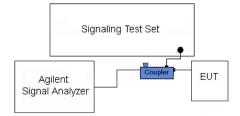


Figure 7-3. Test Instrument & Measurement Setup

Test Notes

Per 22.917(b) 24.238(a) 27.53(h) in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed to demonstrate compliance with the out-of-band emissions limit. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emission are attenuated at least 26 dB below the transmitter power.

Per 27.53(c.5) for operations in the 776-788 MHz band, in the 100 kHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least 30 kHz may be employed to demonstrate compliance with the out-of-band emissions limit.

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For all plots showing emissions in the 763 – 775MHz and 793 – 805MHz band, the FCC limit per 27.53(c.4) is $65 + 10log_{10}(P) = -35dBm$ in a 6.25kHz bandwidth.



Plot 7-73. Lower Band Edge Plot (Band 13 – 5.0MHz QPSK – RB Size 25)

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	ectrum Analyzer -	Swept SA					
XI RL	RF 5	0Ω DC	CORREC PNO: Wide	SENSE:INT	ALIGN AUTO #Avg Type: RMS	11:02:58 PM Dec 28, 2016 TRACE 1 2 3 4 5 6 TYPE DET A N N N N	Frequency
10 dB/div	Ref 25.0	0 dBm	I Guilleon		M	kr1 774.856 MHz -59.24 dBm	Auto Tune
15.0							Center Fred 769.000000 MHz
-5.00							Start Free 763.000000 MH:
-15.0							Stop Free 775.000000 MH:
-35.0						DL1 -35.00 dBm	CF Step 1.200000 MH <u>Auto</u> Mar
-55.0						therefore and	Freq Offse 0 H
-65.0		_{เป็นเ} จะทุกรุ่งรู้กะ	norden two does not referen	there you have been all for the second	surangebyflationargenerations	stop 775.000 MHz	Scale Type
#Res BW			#VBW	30 kHz		o 1.000 s (1001 pts)	
ISG					STAT	US	

Plot 7-74. Lower Emission Mask Edge Plot (Band 13 – 5.0MHz QPSK – RB Size 25)



Plot 7-75. Upper Band Edge Plot (Band 13 – 5.0MHz QPSK – RB Size 25)

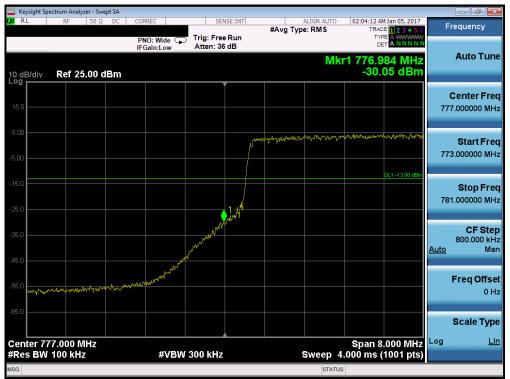
FCC ID: ZNFUS110	FCC P						
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	ectrum Analyzer - S										- 6 -
RL	RF 50	Ω DC	CORREC PNO: Wide			#Avg Typ	ALIGN AUTO e: RMS	TRACE	Dec 28, 2016	Fre	equency
0 dB/div	Ref 25.00) dBm	in Gameon				Mkı	r1 793.3 -65.3	00 MHz 30 dBm		Auto Tun
15.0											enter Fre 000000 M⊦
5.00											Start Fre
5.0										805.	Stop Fre
5.0									DL1 -35.00 dBm	1.: <u>Auto</u>	CF Ste 200000 MI M
5.0										F	req Offs 0
i5.0 logn generalis		÷,AggeVitta,dal	ะแกะประสารใจเป็นของสาร	ariipuvur ihtayka	anne de feire	est for the second s					Scale Typ
tart 793. Res BW	000 MHz 6.2 kHz		#VBW	/ 30 kHz			#Sweep	Stop 805. 1.000 s (1	000 10112	Log	Ĺ
G							STATUS				

Plot 7-76. Upper Emission Mask Edge Plot (Band 13 – 5.0MHz QPSK – RB Size 25)



Plot 7-77. Lower Band Edge Plot (Band 13 – 10.0MHz QPSK – RB Size 50)

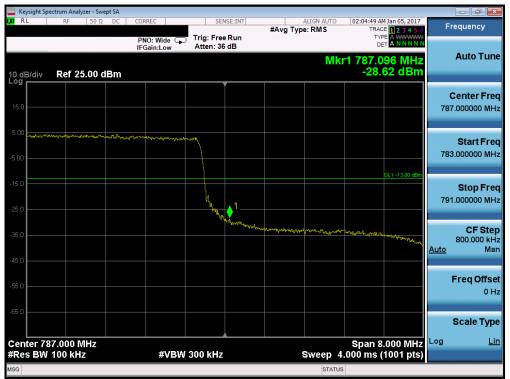
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🔤 Keysight Spe	ectrum Analyze	r - Swept S	A										
LVU RL	RF	50Ω D	PI	RREC		SEN Frig: Free Atten: 36		#Avg Typ	ALIGN AUTO e: RMS	TRAC	1 Jan 05, 2017 E 1 2 3 4 5 6 E M WWWWW T A N N N N N	F	requency
10 dB/div	Ref 25.	00 dBr		Gain:Low		Atten: 30	dB		Mki	1 774.7 -63.4	48 MHz 47 dBm		Auto Tune
15.0													Center Fred 9.000000 MH:
-5.00												76	Start Free 3.000000 MH
-15.0												77	Stop Free 5.000000 MH
-35.0											DL1 -35.00 dBm	<u>Auto</u>	CF Ste 1.200000 MH Ma
-55.0											\		Freq Offse 0 H
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Start 763. #Res BW				#VE	BW 30	0 kHz			#Sweep	Stop 775 1.000 s (.000 MHz 1001 pts)	Log	Li
ISG									STATUS				

Plot 7-78. Lower Emission Mask Edge Plot (Band 13 – 10.0MHz QPSK – RB Size 50)



Plot 7-79. Upper Band Edge Plot (Band 13 – 10.0MHz QPSK – RB Size 50)

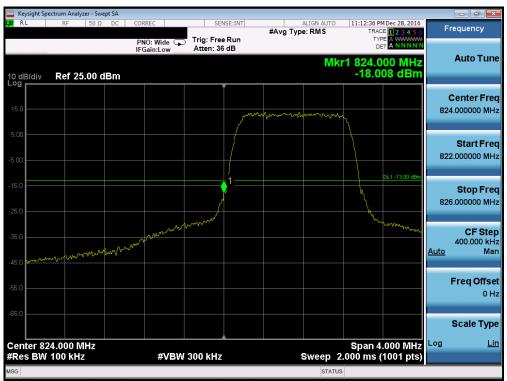
FCC ID: ZNFUS110	FCC P	Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager			
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🔤 Keysight Spe	ectrum Analyzer -	Swept SA									
LXU RL	RF 50		ORREC	Trig: Free		#Avg Typ	ALIGN AUTO e: RMS	TRAC	1 Jan 05, 2017 E 1 2 3 4 5 6 E M WWWWW T A N N N N N	F	requency
10 dB/div	Ref 25.00		IFGain:Low	Atten: 36	a a B		Mki	1 800.0	44 MHz 68 dBm		Auto Tune
15.0											Center Free 9.000000 MH
-5.00										793	Start Free 3.000000 MH
-15.0										80	Stop Fre 5.000000 MH
-35.0									DL1 -35.00 dBm	<u>Auto</u>	CF Ste 1.200000 MH Ma
-55.0						1					Freq Offse 0 H
-65.0	hand water	uningentralinghageru	and the second states of the s	unutranger	any Munny	Handhartebus	«haynayan <mark>alladya</mark> h	yuhahikanatha	olpheniorhppul		Scale Typ
Start 793. #Res BW			#VBW	30 kHz			#Sweep	Stop 805 1.000 s (.000 MHz 1001 pts)	Log	<u>Li</u>
ISG							STATUS				

Plot 7-80. Upper Emission Mask Edge Plot (Band 13 – 10.0MHz QPSK – RB Size 50)



Plot 7-81. Lower Band Edge Plot (Band 5 – 1.4MHz QPSK – RB Size 6)

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Keysight Spectrur								1			- P
LXU RL	RF 50 Ω		ORREC		NSE:INT	#Avg Typ	ALIGN AUTO	TRAC	M Dec 28, 2016 E 1 2 3 4 5 6 E A WWWWW	F	requency
10 dB/div R	ef 25.00 d	I	PNO: Wide Ģ FGain:Low	Atten: 36			Mk	r <mark>1 849.0</mark>	00 MHz 71 dBm		Auto Tune
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5.00										84	Start Fre 7.000000 M⊦
25.0					1				DL1 -13.00 dBm	85	Stop Fre 1.000000 M⊦
35.0	- Martin				how h	hormony	munture	mmy	h	<u>Auto</u>	CF Ste 400.000 kH Ma
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Center 849.0 #Res BW 10			#VBV	V 300 kHz			Sweep_2	Span 4 .000 m <u>s (</u>	.000 MHz 1001 pts)	Log	Li
MSG							STATUS				

Plot 7-82. Upper Band Edge Plot (Band 5 – 1.4MHz QPSK – RB Size 6)



Plot 7-83. Lower Band Edge Plot (Band 5 – 3.0MHz QPSK – RB Size 15)

FCC ID: ZNFUS110		Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager			
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	ectrum Analyzei							
XU RL	RF	50Ω DC	CORREC PNO: Wide	Trig: Free Run Atten: 36 dB	#Avg Ty	ALIGN AUTO pe: RMS	11:21:37 PM Dec 28, 2016 TRACE 1 2 3 4 5 6 TYPE A WWWW DET A N N N N	Frequency
10 dB/div	Ref 25.0	00 dBm	IFGain:Low	Atten: 30 dB		Mk	r1 849.000 MHz -20.24 dBm	Auto Tune
15.0	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	mmm	umvahavara	·····				Center Free 849.000000 MH
5.00							DL1 -13.00 dBm	Start Fre 847.000000 MH
-15.0								Stop Fre 851.000000 MH
45.0					March March	mahum	Wine and the second	CF Ste 400.000 kH <u>Auto</u> Ma
55.0								Freq Offs 0 H
65.0								Scale Typ
	49.000 MH 100 kHz	Z	#VBW	300 kHz		Sweep 2	Span 4.000 MHz .000 ms (1001 pts)	Log <u>Li</u>
SG						STATUS	3	

Plot 7-84. Upper Band Edge Plot (Band 5 – 3.0MHz QPSK – RB Size 15)



Plot 7-85. Lower Band Edge Plot (Band 5 – 5.0MHz QPSK – RB Size 25)

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X/RL	RF	50 Ω DC	PNC	:Wide 🗔	Trig: Free		#Avg Typ	ALIGN AUTO e: RMS	TRAC	1 Dec 28, 2016 E 1 2 3 4 5 6 E A WWWW A N N N N N	F	requency
10 dB/div	Ref 25.	00 dBm		in:Low	Atten: 36	dB		Mk	r1 849.0	00 MHz 19 dBm		Auto Tune
15.0												Center Fre 9.000000 MH
5.00			~~~~~~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~						DL1 -13.00 dBm	84	Start Fre 7.000000 MH
-15.0						1				DET -13.00 (1941	85	Stop Fre 1.000000 MH
35.0						Wy Jon Mary	wwwwww	an war from	www.	hander	<u>Auto</u>	CF Ste 400.000 k⊢ Ma
45.0 55.0												Freq Offs 0 H
65.0												Scale Typ
	9.000 MI 100 kHz	Hz		#VBW	300 kHz			Sweep 2	Span 4 .000 ms (.000 MHz 1001 pts)	Log	Li
ISG								STATUS				

Plot 7-86. Upper Band Edge Plot (Band 5 – 5.0MHz QPSK – RB Size 25)



Plot 7-87. Lower Band Edge Plot (Band 5 – 10.0MHz QPSK – RB Size 50)

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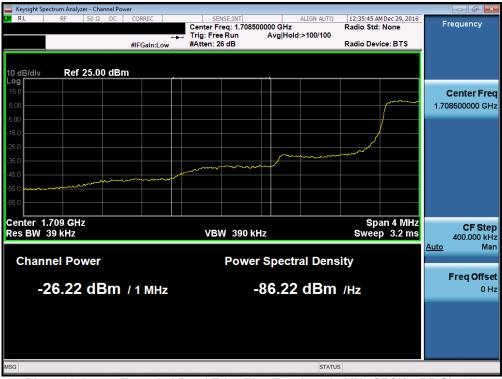
Plot 7-88. Upper Band Edge Plot (Band 5 – 10.0MHz QPSK – RB Size 50)



Plot 7-89. Lower Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 6)

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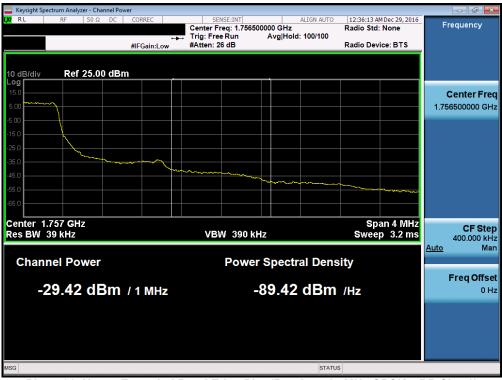
Plot 7-90. Lower Extended Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 6)



Plot 7-91. Upper Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 6)

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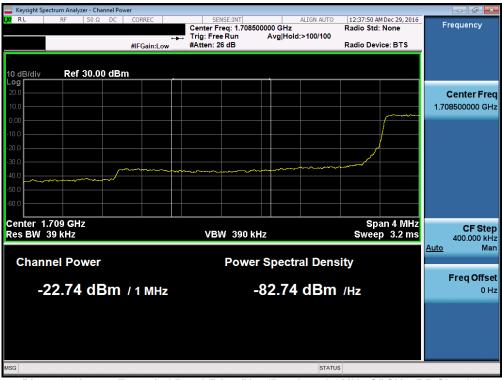
Plot 7-92. Upper Extended Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 6)



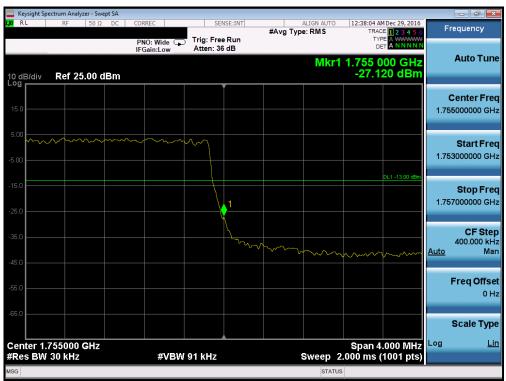
Plot 7-93. Lower Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)

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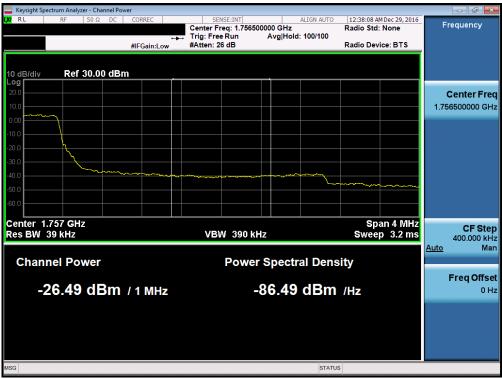
Plot 7-94. Lower Extended Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)



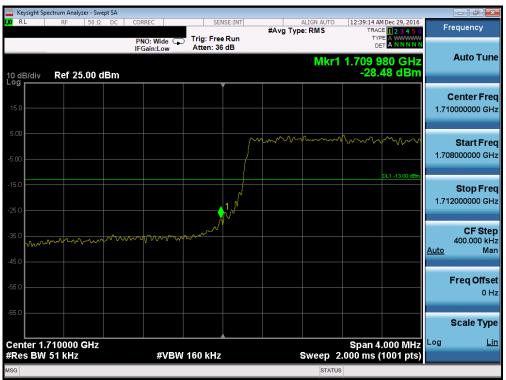
Plot 7-95. Upper Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)

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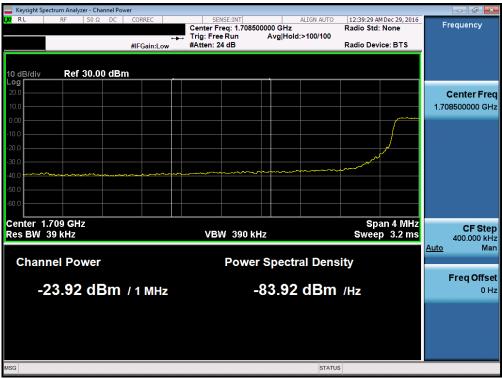
Plot 7-96. Upper Extended Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)



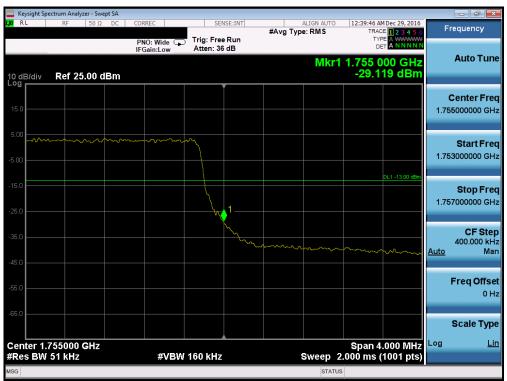
Plot 7-97. Lower Band Edge Plot (Band 4 – 5.0MHz QPSK – RB Size 25)

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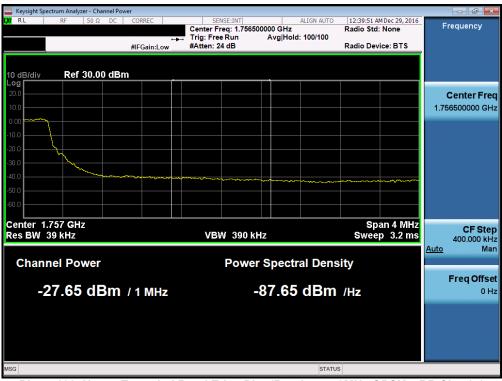
Plot 7-98. Lower Extended Band Edge Plot (Band 4 – 5.0MHz QPSK – RB Size 25)



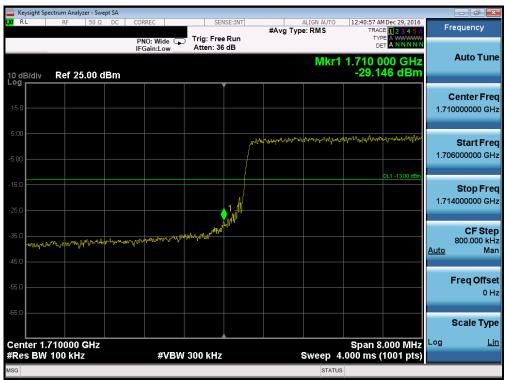
Plot 7-99. Upper Band Edge Plot (Band 4 – 5.0MHz QPSK – RB Size 25)

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Plot 7-100. Upper Extended Band Edge Plot (Band 4 – 5.0MHz QPSK – RB Size 25)



Plot 7-101. Lower Band Edge Plot (Band 4 – 10.0MHz QPSK – RB Size 50)

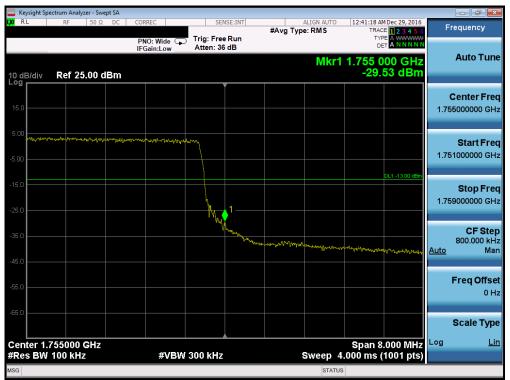
FCC ID: ZNFUS110	FCC P	t. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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	um Analyzer - Sw										- 6
RL	RF 50 Ω	DC	CORREC PNO: Wide ↔ IFGain:Low			#Avg Typ	ALIGN AUTO De: RMS	TRAC	M Dec 29, 2016 E 1 2 3 4 5 6 PE A WWWWW T A N N N N N	F	requency
0 dB/div	Ref 25.00 d	dBm	IPGam.Low	Auton of			Mkr1	1.709 0 -23.	00 GHz 01 dBm		Auto Tun
15.0											Center Fre 7000000 G⊦
.00										1.70	Start Fre
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5.0											Freq Offs 0
5.0										1.00	Scale Ty
enter 1.70 Res BW 1.	7000 GHz 0 MHz		#VBI	V 3.0 MHz			Sweep 2	Span 4 2.000 ms (.000 MHz 1001 pts)	Log	L
G							STATU	s			

Plot 7-102. Lower Extended Band Edge Plot (Band 4 – 10.0MHz QPSK – RB Size 50)



Plot 7-103. Upper Band Edge Plot (Band 4 – 10.0MHz QPSK – RB Size 50)

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	ectrum Analyzer - S										
X/RL	RF 50 9	Ω DC	CORREC PNO: Wide ++			#Avg Typ	ALIGN AUTO e: RMS	TRAC	M Dec 29, 2016 CE 1 2 3 4 5 6 PE A WWWW T A N N N N N	F	requency
10 dB/div Log	Ref 25.00	dBm	I Guilleow				Mkr1	1.756 0 -24.)16 GHz 98 dBm		Auto Tune
15.0											Center Fred 8000000 GH:
5.00										1.75	Start Free 6000000 GH
-15.0 -25.0									DL1 -13.00 dBm	1.76	Stop Free 0000000 GH
35.0	www.sell.whisper/wyter	watter of the Bear	entrice of the second	^{A, ME} YEL, AND A	₩U∽#₽d™vyyK_₩Å~	hand and a second s	and the second and the	hy align of the second stages	₩~#4¥₩3+4\$484\$926	<u>Auto</u>	CF Stej 400.000 kH Mar
55.0											Freq Offse 0 H
65.0											Scale Typ
	758000 GHz 1.0 MHz		#VBW	3.0 MHz			Sweep 2	Span 4 2.000 ms (.000 MHz 1001 pts)	Log	<u>Lir</u>
ISG							STATU	S			

Plot 7-104. Upper Extended Band Edge Plot (Band 4 – 10.0MHz QPSK – RB Size 50)



Plot 7-105. Lower Band Edge Plot (Band 4 – 15.0MHz QPSK – RB Size 75)

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	ectrum Analyzer - Sw										
X/RL	RF 50 Ω	DC	CORREC PNO: Wide ↔ IFGain:Low		Run	#Avg Ty	ALIGN AUTO pe: RMS	TRAC	M Dec 29, 2016 CE 1 2 3 4 5 6 PE A WWWW T A N N N N N	F	requency
10 dB/div	Ref 25.00 (dBm	II Gam.Low				Mkr	1 1.708 5 -27.	524 GHz 86 dBm		Auto Tun
15.0											Center Fre 7000000 GH
5.00										1.70	Start Fre 5000000 GH
25.0									DL1 -13.00 dBm	1.70	Stop Fre 9000000 G⊦
15.0	เน _ย งงูญ _ี ญ _{ัตระ} จารุณที่จะของ	Marina		an nan indihe	harden aller all		ale on Levin al Marine	an a	64/18/19/19/19/19/19/19/19/19/19/19/19/19/19/	<u>Auto</u>	CF Ste 400.000 kH Ma
55.0											Freq Offs 0 F
65.0										1.00	Scale Typ
Res BW	707000 GHz 1.0 MHz		#VBW	3.0 MHz				2.000 ms (.000 MHz 1001 pts)	Log	Li
SG							STATU	JS			

Plot 7-106. Lower Extended Band Edge Plot (Band 4 – 15.0MHz QPSK – RB Size 75)



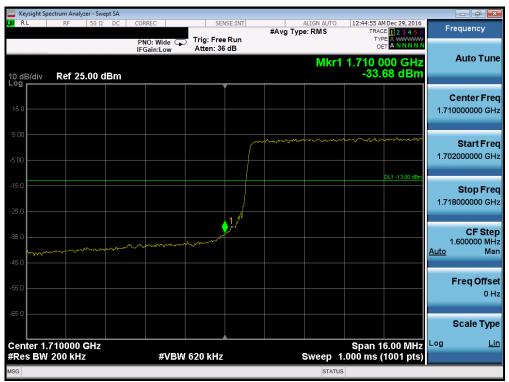
Plot 7-107. Upper Band Edge Plot (Band 4 – 15.0MHz QPSK – RB Size 75)

FCC ID: ZNFUS110		Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Daga 70 of 116	
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Keysight Spectrum Analyzer - Swep	ot SA				
X RL RF 50 Ω		SENSE:INT	ALIGN AUTO #Avg Type: RMS	12:42:48 AM Dec 29, 2016 TRACE 1 2 3 4 5 6 TYPE A WWWW DET A N N N N N	Frequency
10 dB/div Ref 25.00 dl	il Gameon	1. 00 0B	Mkr1	1.756 020 GHz -28.16 dBm	Auto Tune
15.0					Center Freq 1.758000000 GHz
-5.00					Start Freq 1.756000000 GHz
-15.0				DL1 -13.00 dBm	Stop Freq 1.760000000 GHz
-45.0	au-Andre-Makaanshau-Adrindu-Adriphopad-ado,Ukaong	~~##~~~ [}] ??#¥^/m ₂ .e _{#81}	**************************************	frittenen frankreger en stren og sam der	CF Step 400.000 kHz <u>Auto</u> Mar
-55.0					Freq Offsel 0 Hz
-65.0 Center 1.758000 GHz				Span 4.000 MHz	Scale Type
#Res BW 1.0 MHz	#VBW 3.0 N	1Hz	Sweep 2.	000 ms (1001 pts)	

Plot 7-108. Upper Extended Band Edge Plot (Band 4 – 15.0MHz QPSK – RB Size 75)



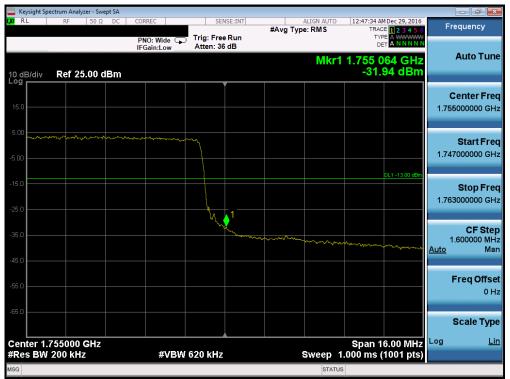
Plot 7-109. Lower Band Edge Plot (Band 4 – 20.0MHz QPSK – RB Size 100)

FCC ID: ZNFUS110		Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Daga 71 of 116	
0Y1612232004.ZNF	12/27/2016 - 1/4/2017, 1/26/2017	Portable Handset		Page 71 of 116	
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	ectrum Analyzer - Sv	vept SA									
L <mark>XI</mark> RL	RF 50 Ω	2 DC	CORREC PNO: Wide ↔ IFGain:Low			#Avg Typ	ALIGN AUTO e: RMS	TRAC	M Dec 29, 2016 CE 1 2 3 4 5 6 PE A WWWWW A N N N N N	F	requency
10 dB/div Log	Ref 25.00	dBm	IPGall.LOW	, tach. oc			Mkr1	1.708 9 -29.	44 GHz 06 dBm		Auto Tune
15.0											Center Freq 7000000 GHz
-5.00										1.70	Start Freq 5000000 GHz
-15.0									DL1 -13.00 dBm	1.70	Stop Freq 9000000 GHz
-35.0	4 <u>พะอะ</u> มีปลุ <i>มสมม</i> ายที่ท	y-art-ht ^{ra} istika	and the second	al minute and a second	hawaya ya	and an	Annen an	Jesister Andrew (State	and an and a second	<u>Auto</u>	CF Step 400.000 kHz Man
-55.0											Freq Offsel 0 Hz
-65.0											Scale Type
Center 1. #Res BW	707000 GHz 1.0 MHz		#VBV	/ 3.0 MHz			Sweep 2	Span 4 .000 ms (.000 MHz 1001 pts)	Log	<u>Lin</u>
MSG							STATUS	3			

Plot 7-110. Lower Extended Band Edge Plot (Band 4 – 20.0MHz QPSK – RB Size 100)



Plot 7-111. Upper Band Edge Plot (Band 4 – 20.0MHz QPSK – RB Size 100)

FCC ID: ZNFUS110		Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Daga 70 of 116	
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	ectrum Analyzer -	Swept SA									
LXU RL	RF 50	Ω DC	CORREC PNO: Wide ↔			#Avg Typ	ALIGN AUTO e: RMS	TRAC	1 Dec 29, 2016 E 1 2 3 4 5 6 E A WWWW T A N N N N N	F	requency
10 dB/div	Ref 25.00) dBm	IFGain:Low	Atten: 30	dB		Mkr1	1.756 0	48 GHz 15 dBm		Auto Tune
15.0											Center Freq 8000000 GHz
-5.00										1.75	Start Freq 6000000 GHz
-15.0									DL1 -13.00 dBm	1.76	Stop Freq 0000000 GHz
-35.0			64999490-Production	J#~~_~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	***********	United the major system for the	****	Arinadayaya Amerika	AND A CALLER	<u>Auto</u>	CF Step 400.000 kHz Mar
-55.0											Freq Offset 0 Hz
-65.0											Scale Type
Center 1. #Res BW	758000 GH 1.0 MHz	Z	#VBV	V 3.0 MHz			Sweep 2	Span 4 .000 ms (.000 MHz 1001 pts)	Log	Lin
MSG							STATUS	3			

Plot 7-112. Upper Extended Band Edge Plot (Band 4 – 20.0MHz QPSK – RB Size 100)

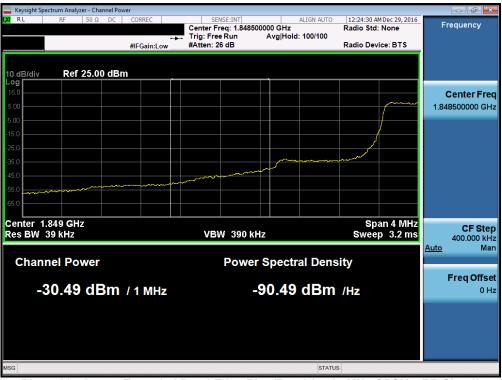


Plot 7-113. Lower Band Edge Plot (Band 2 – 1.4MHz QPSK – RB Size 6)

FCC ID: ZNFUS110	FCC P			Approved by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:		Dega 72 of 116		
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Plot 7-114. Lower Extended Band Edge Plot (Band 2 – 1.4MHz QPSK – RB Size 6)

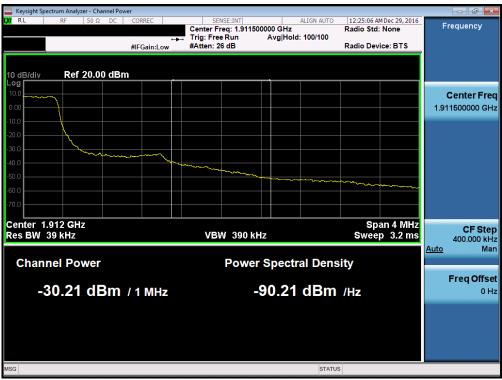


Plot 7-115. Upper Band Edge Plot (Band 2 – 1.4MHz QPSK – RB Size 6)

FCC ID: ZNFUS110	FCC P	(OEDTIELOATION)		Approved by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:		Dego 74 of 116		
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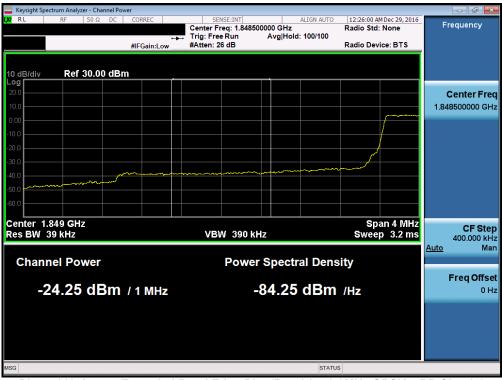
Plot 7-116. Upper Extended Band Edge Plot (Band 2 – 1.4MHz QPSK – RB Size 6)



Plot 7-117. Lower Band Edge Plot (Band 2 – 3.0MHz QPSK – RB Size 15)

FCC ID: ZNFUS110		Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	💽 LG	Approved by: Quality Manager				
Test Report S/N:	Test Dates:	EUT Type:		Dego 75 of 116				
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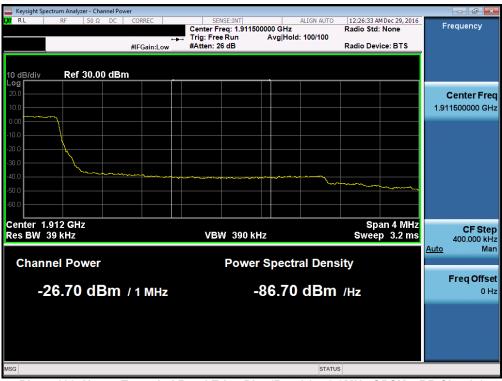
Plot 7-118. Lower Extended Band Edge Plot (Band 2 – 3.0MHz QPSK – RB Size 15)



Plot 7-119. Upper Band Edge Plot (Band 2 – 3.0MHz QPSK – RB Size 15)

FCC ID: ZNFUS110		Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager					
Test Report S/N:	Test Dates:	EUT Type:		Dega 76 of 116					
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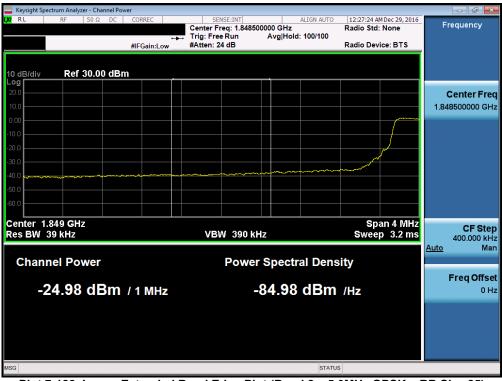
Plot 7-120. Upper Extended Band Edge Plot (Band 2 – 3.0MHz QPSK – RB Size 15)



Plot 7-121. Lower Band Edge Plot (Band 2 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFUS110		Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager				
Test Report S/N:	Test Dates:	EUT Type:		Dego 77 of 116				
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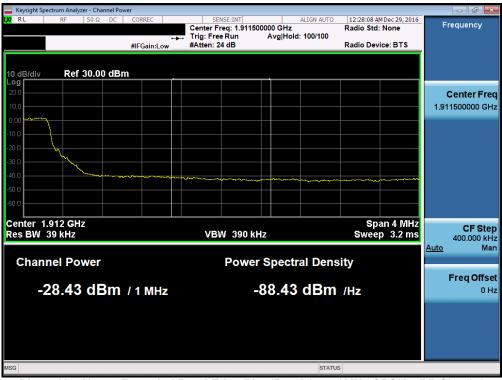
Plot 7-122. Lower Extended Band Edge Plot (Band 2 – 5.0MHz QPSK – RB Size 25)



Plot 7-123. Upper Band Edge Plot (Band 2 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFUS110	FCC P	t. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager				
Test Report S/N:	Test Dates:	EUT Type:		Daga 79 of 116				
0Y1612232004.ZNF 12/27/2016 - 1/4/2017, 1/26/201		Portable Handset		Page 78 of 116				
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Plot 7-124. Upper Extended Band Edge Plot (Band 2 – 5.0MHz QPSK – RB Size 25)



Plot 7-125. Lower Band Edge Plot (Band 2 – 10.0MHz QPSK – RB Size 50)

FCC ID: ZNFUS110	FCC P	t. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager					
Test Report S/N:	Test Dates:	EUT Type:		Daga 70 of 116					
0Y1612232004.ZNF 12/27/2016 - 1/4/2017, 1/26/2017		Portable Handset		Page 79 of 116					
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	ectrum Analyzer - S	wept SA									
XU RL	RF 50	ΩDC	CORREC PNO: Wide			#Avg Typ	ALIGN AUTO e: RMS	TYPE	Dec 29, 2016 1 2 3 4 5 6 A A N N	Fi	requency
10 dB/div	Ref 25.00	dBm					Mkr1	1.848 98 -22.2	30 GHz 4 dBm		Auto Tune
15.0											Center Freq 7000000 GHz
5.00										1.84	Start Fred 5000000 GHz
25.0				مىلى ئىرىكى بىرىكى ب	and a second second	ر مارچه در استار کردارد. مراجع در مربع استار می		D	L1 -13.00 dBm	1.84	Stop Fred 9000000 GH:
35.0										<u>Auto</u>	CF Stej 400.000 kH Mar
55.0											Freq Offse 0 H
-65.0											Scale Type
	847000 GH2 1.0 MHz	Z	#VBW	/ 3.0 MHz			Sweep 2	Span 4.0 2.000 ms (1	200 1911 12	Log	Lin
SG							STATUS	5			

Plot 7-126. Lower Extended Band Edge Plot (Band 2 – 10.0MHz QPSK – RB Size 50)



Plot 7-127. Upper Band Edge Plot (Band 2 – 10.0MHz QPSK – RB Size 50)

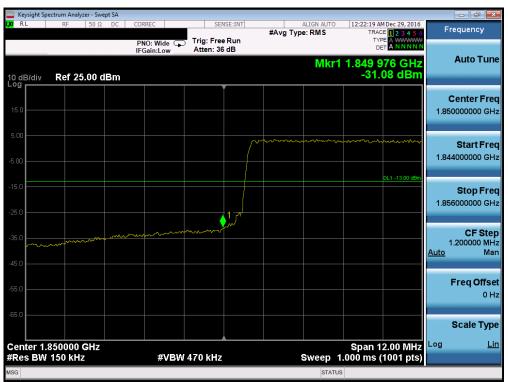
FCC ID: ZNFUS110		Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager				
Test Report S/N:	Test Dates:	EUT Type:		Dega 90 of 116				
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	ectrum Analyzer - Swe	pt SA									
LXU RL	RF 50 Ω		REC O:Wide ↔ ain:Low			#Avg Typ	ALIGN AUTO e: RMS	TRAC	M Dec 29, 2016 E 1 2 3 4 5 6 PE A M N N N N	F	requency
10 dB/div Log	Ref 25.00 d		am:Low	Atten: 00			Mkr1	1.911 0 -26.	20 GHz 48 dBm		Auto Tune
15.0											Center Freq 3000000 GHz
-5.00										1.91	Start Freq 1000000 GHz
-15.0									DL1 -13.00 dBm	1.91	Stop Freq 5000000 GHz
-35.0	utury, the second s	يوريد المراجع ا المراجع المراجع المراجع المراجع المراجع	manikana papagan kadi	ntenadiostikijamani	^a ntregationation	pplannan	alwyy,roganjak	ugouridhean gealtair	yfenerskaat fan de f	<u>Auto</u>	CF Step 400.000 kH Mar
-45.0											Freq Offse 0 H;
-65.0											Scale Type
Center 1. #Res BW	913000 GHz 1.0 MHz		#VBW	3.0 MHz			Sweep 2	Span 4 2.000 ms (.000 MHz 1001 pts)	Log	Lin
MSG							STATU	s			

Plot 7-128. Upper Extended Band Edge Plot (Band 2 – 10.0MHz QPSK – RB Size 50)



Plot 7-129. Lower Band Edge Plot (Band 2 – 15.0MHz QPSK – RB Size 75)

FCC ID: ZNFUS110	FCC P	t. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager				
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	ectrum Analyzer -										
<mark>XI</mark> RL	RF 5	0Ω DC	CORREC PNO: Wide + IFGain:Low			#Avg Typ	ALIGN AUTO e: RMS	TRACE	Dec 29, 2016	F	requency
10 dB/div Log	Ref 25.0	0 dBm					Mkr1	1.848 9 -24.0	88 GHz)8 dBm		Auto Tune
15.0											Center Fred 7000000 GH2
5.00										1.84	Start Free 5000000 GH:
-15.0			J. Marco State of Same State (1979)	-	Journal and set	And and the second second			DL1 -13.00 dBm 1	1.84	Stop Fred 9000000 GH;
35.0	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1									<u>Auto</u>	CF Stej 400.000 kH Mar
55.0											Freq Offse 0 H
-65.0											Scale Type
Center 1. #Res BW	847000 GH 1.0 MHz	lz	#VB	W 3.0 MHz			Sweep 2	Span 4. 2.000 ms (′	000 10112	Log	Lir
SG							STATUS	5			

Plot 7-130. Lower Extended Band Edge Plot (Band 2 – 15.0MHz QPSK – RB Size 75)



Plot 7-131. Upper Band Edge Plot (Band 2 – 15.0MHz QPSK – RB Size 75)

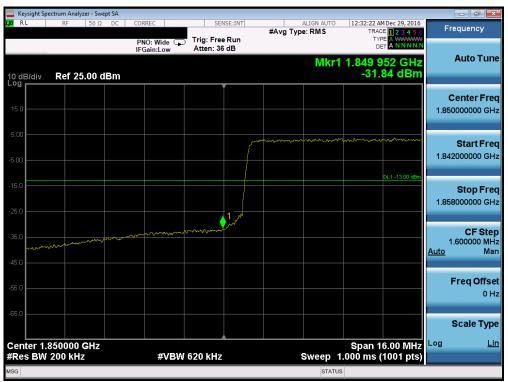
FCC ID: ZNFUS110		Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager				
Test Report S/N:	Test Dates:	EUT Type:		Daga 92 of 116				
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	ectrum Analyzer - Sv										
XU RL	RF 50 S	DC	CORREC PNO: Wide ↔ IFGain:Low			#Avg Typ	ALIGN AUTO e: RMS	TRAC	M Dec 29, 2016 DE 1 2 3 4 5 6 PE A WWWWW ET A N N N N N	F	requency
10 dB/div _og	Ref 25.00	dBm					Mkr1	1.911 (-31.)08 GHz 89 dBm		Auto Tune
15.0											Center Free 3000000 GH
5.00										1.91	Start Fre 1000000 GH
25.0									DL1 -13.00 dBm	1.91	Stop Fre 5000000 G⊦
35.0 	ann na sana ann ann ann ann ann ann ann	neranata	and Palant day and a free of the sector of	abaada ayaa ayaa ayaa ayaa ayaa ayaa aya	ومتعموه والمرجو	and and a state of the state of	and Way of Marken	al angel and a second	tton waran waa	<u>Auto</u>	CF Ste 400.000 kH Ma
55.0											Freq Offs 0 H
65.0	913000 GHz							Spap 4	.000 MHz	Log	Scale Typ
	1.0 MHz		#VBV	V 3.0 MHz			Sweep 2	.000 ms ((1001 pts)		
SG							STATUS	5			

Plot 7-132. Upper Extended Band Edge Plot (Band 2 – 15.0MHz QPSK – RB Size 75)



Plot 7-133. Lower Band Edge Plot (Band 2 – 20.0MHz QPSK – RB Size 100)

FCC ID: ZNFUS110	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		🕒 LG	Approved by: Quality Manager
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PNO: Wide Trig: Free Run Arten: 36 dB #Avg Type: RMS Trace Type: RMS Trace Type: RMS Trace Type: RMS Trace Type: RMS Auto Tun 0 dB/div Ref 25.00 dBm Center Free 18400000 GH Center Free 18400000 GH Center Free 18400000 GH Start Free 184000000 GH Start Free 18400000 GH Start Free 184000000 GH Start Free 184000000 GH <td< th=""><th></th><th>ectrum Analyzer - Swi</th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th></td<>		ectrum Analyzer - Swi										
NKKT 1.848 904 GHZ Center Fre -25.09 dBm -25.09 dBm -25.09 dBm	XU RL	RF 50 Ω	DC	CORREC PNO: Wide	Trig: Fre	e Run			TRACE	1 2 3 4 5 6 A WWWWW	F	requency
150 Image: Center Free 500 Image: Center Free 500 Image: Center Free 500 Image: Center Free 160 Image: Center Free 150 Image: Center Free 160 Image: Center Free 160 Image: Center Free 160 Image: Center Free 160 Image: Center Free 1845000000 GH Image: Center Free 1845000000 GH Image: Center Free 184500000 GH Image: Center Free 18450000 GH Image: Center Free 1845000 GHZ Image: Center Free 1845000 GH Image: Center Free 1845000 GH Image: Center Free 1845000	10 dB/div	Ref 25.00 c	lBm					Mkr1	1.848 96 -25.0	9 dBm		Auto Tune
500 Start Fre 150 L1 - 1300 dBH 250 L1 - 1300 dBH 350	15.0											
150 Stop Fre 250 Stop Fre 360 CF Ste 450 Ma 550 Freq Offse 650 Freq Offse 650 Stap Freq Offse 660 Stap Freq Offse 610 Stap Freq Offse 611 Stap Freq Offse 621 Stap Freq Offse 631 Stap Freq Offse 641 Stap Freq Offse 642 Stap Freq Offse 643 Stap Freq Offse	5.00										1.84	Start Free 5000000 GH:
450 450 550 550 550 550 550 550	-15.0			un base open general frequencies	مىلى ھەر روپىر بىرى بىرى بىرى بىرى بىرى بىرى بىرى ب	himper at a first and	alager Harry Personal and Inter	and the splitter of the station	D Carlos and the second	L1 -13.00 dBm	1.84	Stop Fred 9000000 GH:
S50 Conter 1.847000 GHz Span 4.000 MHz	45.0										<u>Auto</u>	CF Stej 400.000 kH Ma
Center 1.847000 GHz Scale Typ	55.0											Freq Offse 0 H
Senter 1.847 000 GHZ Span 4.000 WHZ	-65.0											Scale Type
				#VE	SW 3.0 MHz			Sweep 2	Span 4.0 2.000 ms (1	200 1911 12	Log	Lir

Plot 7-134. Lower Extended Band Edge Plot (Band 2 – 20.0MHz QPSK – RB Size 100)



Plot 7-135. Upper Band Edge Plot (Band 2 – 20.0MHz QPSK – RB Size 100)

FCC ID: ZNFUS110	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		🕒 LG	Approved by: Quality Manager
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Keysight Spectrum Analyzer - Swept SA				
XIRL RF 50Ω DC	PNO: Wide + Trig: Free R IEGain: I ow Atten: 36 dl	#Avg Type: RMS un	12:33:17 AM Dec 29, 2016 TRACE 1 2 3 4 5 6 TYPE A WWWW DET A N N N N N	Frequency
10 dB/div Ref 25.00 dBm	IFGain:Low Atten: 36 di		1.911 044 GHz -34.14 dBm	Auto Tune
15.0				Center Freq 1.913000000 GHz
-5.00				Start Fred 1.911000000 GHz
-15.0			DL1 -13.00 dBm	Stop Fred 1.915000000 GHz
-35.0	Conversional Standing Standard Standard Standard Standards Standard Standard Standard Standard Standard Standard	જીરિવિદ્યાં નુવ્યુ જેવે અને તે છે. તે તે અને તે છે છે છે છે છે છે છે. તે તે અને તે તે છે છે છે છે છે છે છે છે છે આ બાદ	ศพระนะ _{เคร} ารเกาะในประชาณาปูญ	CF Step 400.000 kHz <u>Auto</u> Mar
55.0				Freq Offse 0 H:
-65.0				Scale Type
Center 1.913000 GHz #Res BW 1.0 MHz	#VBW 3.0 MHz	Sweep 2	Span 4.000 MHz 2.000 ms (1001 pts)	Log <u>Lir</u>
ISG		STATU	S	

Plot 7-136. Upper Extended Band Edge Plot (Band 2 – 20.0MHz QPSK – RB Size 100)

FCC ID: ZNFUS110	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		🕒 LG	Approved by: Quality Manager	
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7.5 Peak-Average Ratio §24.232(d)

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 v02r02 - Section 5.7.1

Test Settings

- 1. The signal analyzer's CCDF measurement profile is enabled
- 2. Frequency = carrier center frequency
- 3. Measurement BW > Emission bandwidth of signal
- 4. The signal analyzer was set to collect one million samples to generate the CCDF curve
- 5. The measurement interval was set depending on the type of signal analyzed. For continuous signals (>98% duty cycle), the measurement interval was set to 1ms.

Test Setup

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

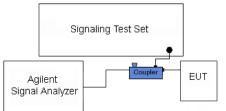


Figure 7-4. Test Instrument & Measurement Setup

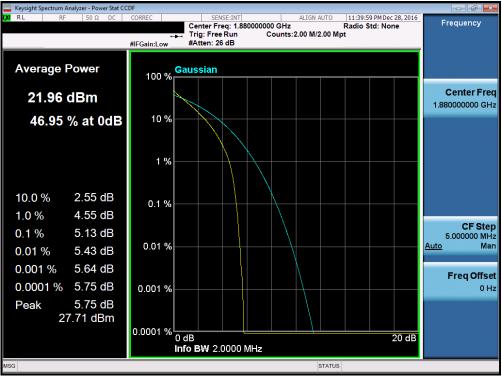
Test Notes

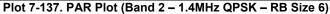
None.

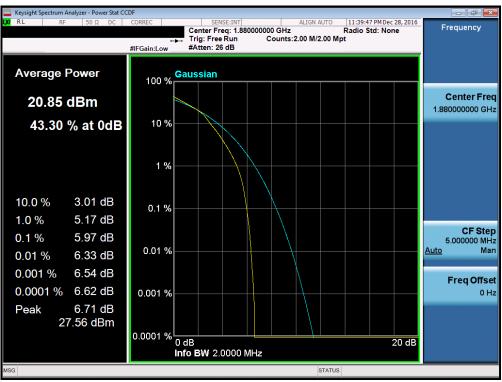
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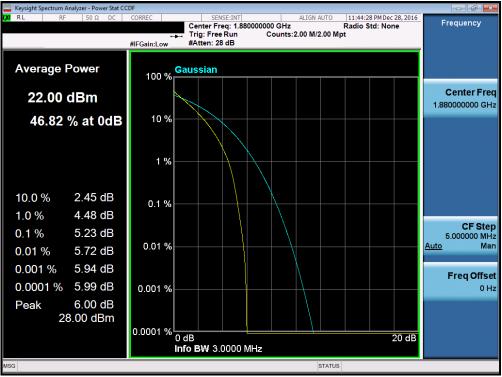


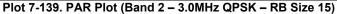


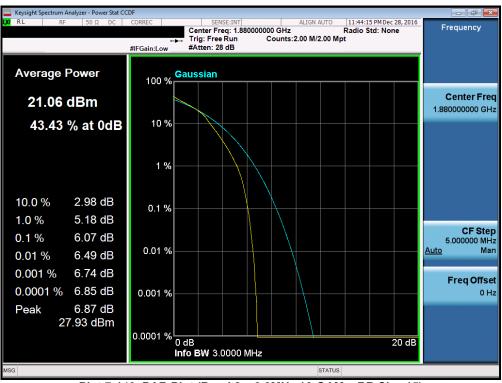
Plot 7-138. PAR Plot (Band 2 – 1.4MHz 16-QAM – RB Size 6)

FCC ID: ZNFUS110	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		🕒 LG	Approved by: Quality Manager
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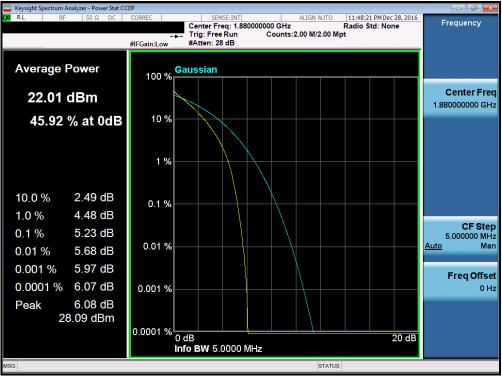


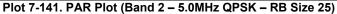


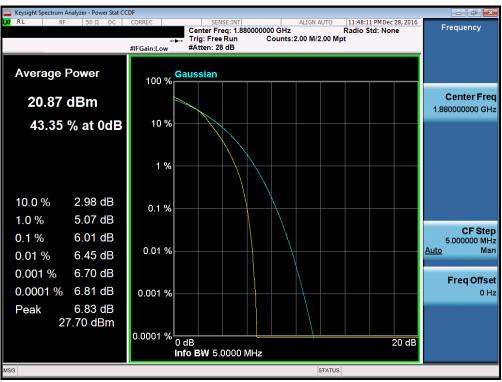
Plot 7-140. PAR Plot (Band 2 - 3.0MHz 16-QAM - RB Size 15)

FCC ID: ZNFUS110		t. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
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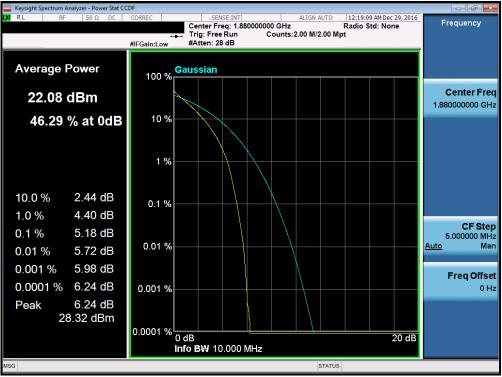


Plot 7-142. PAR Plot (Band 2 - 5.0MHz 16-QAM - RB Size 25)

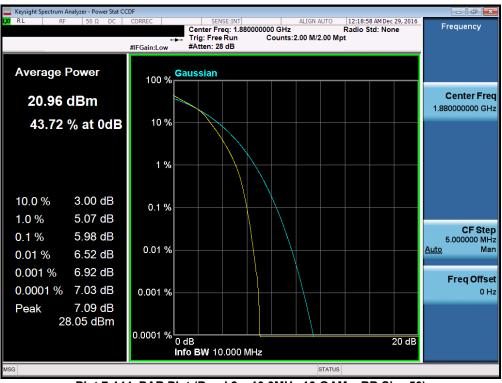
FCC ID: ZNFUS110		Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dega 90 of 116	
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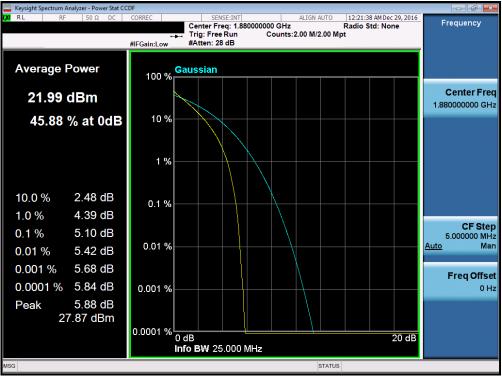


Plot 7-144. PAR Plot (Band 2 - 10.0MHz 16-QAM - RB Size 50)

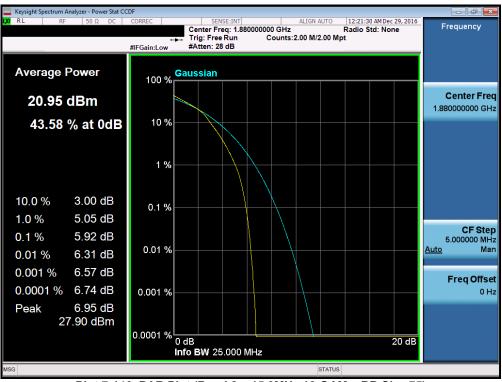
FCC ID: ZNFUS110	FCC P	t. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Daga 00 of 116	
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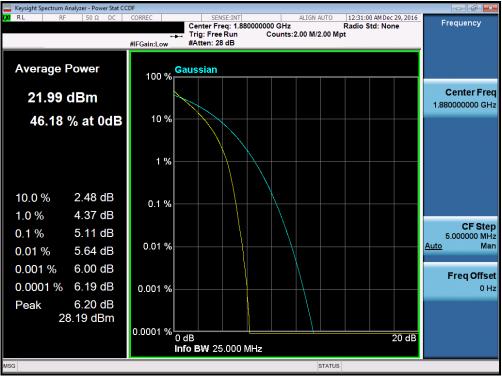


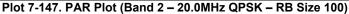


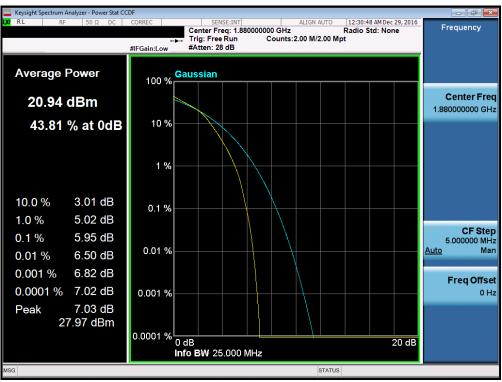
Plot 7-146. PAR Plot (Band 2 - 15.0MHz 16-QAM - RB Size 75)

FCC ID: ZNFUS110	FCC P	t. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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Plot 7-148. PAR Plot (Band 2 - 20.0MHz 16-QAM - RB Size 100)

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7.6 Radiated Power (ERP/EIRP) §22.913(a.2) §24.232(c.2) §27.50(b.10) §27.50(d.4)

Test Overview

Effective Radiated Power (ERP) and Equivalent Isotropic Radiated Power (EIRP) 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 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 v02r02 - Section 5.2.1

ANSI/TIA-603-D-2010 - Section 2.2.17

Test Settings

- 1. Radiated power measurements are performed using the signal analyzer's "channel power" measurement capability for signals with continuous operation.
- 2. RBW = 1 5% of the expected OBW, not to exceed 1MHz
- 3. VBW \geq 3 x RBW
- 4. Span = 1.5 times the OBW
- 5. No. of sweep points > 2 x span / RBW
- 6. Detector = RMS
- 7. Trigger is set to "free run" for signals with continuous operation with the sweep times set to "auto".
- 8. The integration bandwidth was roughly set equal to the measured OBW of the signal for signals with continuous operation.
- 9. Trace mode = trace averaging (RMS) over 100 sweeps
- 10. The trace was allowed to stabilize

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<u>Test Setup</u>

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

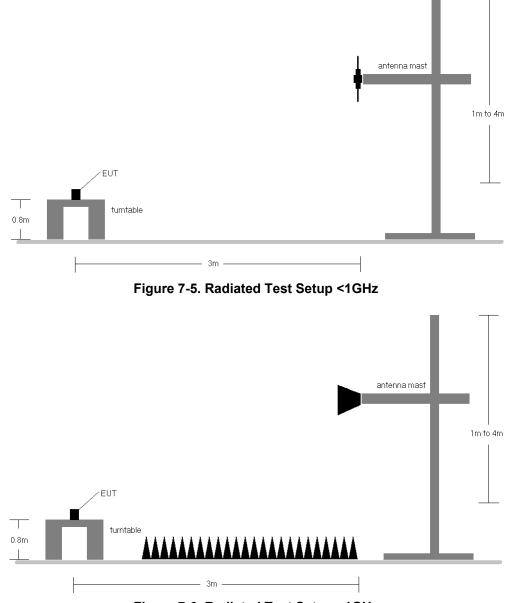


Figure 7-6. Radiated Test Setup >1GHz

Test Notes

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

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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Positioner Azimuth [degree]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBd]	ERP [dBm]	ERP Limit [dBm]	Margin [dB]
779.50	5	QPSK	н	186	92	1 / 24	20.97	-0.83	20.14	34.77	-14.63
782.00	5	QPSK	н	191	89	1 / 0	21.06	-0.82	20.24	34.77	-14.53
784.50	5	QPSK	н	191	80	1 / 0	21.02	-0.81	20.21	34.77	-14.56
779.50	5	16QAM	н	186	92	1 / 24	20.36	-0.83	19.53	34.77	-15.24
782.00	5	16QAM	н	191	89	1 / 0	20.50	-0.82	19.68	34.77	-15.09
784.50	5	16QAM	н	191	80	1 / 0	20.32	-0.81	19.51	34.77	-15.26
782.00	10	QPSK	н	0	280	1 / 49	21.10	-0.82	20.28	34.77	-14.49
782.00	10	16QAM	н	0	280	1 / 49	20.16	-0.82	19.34	34.77	-15.43
782.00	10	QPSK	V	0	38	1/0	20.29	-0.82	19.47	34.77	-15.30

Table 7-2. ERP Data (Band 13)

FCC ID: ZNFUS110		Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager			
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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Positioner Azimuth [degree]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBd]	ERP [dBm]	ERP Limit [dBm]	Margin [dB]
824.70	1.4	QPSK	Н	5	73	3 / 2	20.97	-0.65	20.32	38.45	-18.13
836.50	1.4	QPSK	Н	0	70	1 / 5	21.58	-0.65	20.93	38.45	-17.52
848.30	1.4	QPSK	Н	0	69	3 / 2	21.53	-0.65	20.88	38.45	-17.57
824.70	1.4	16-QAM	Н	5	73	3 / 2	20.07	-0.65	19.42	38.45	-19.03
836.50	1.4	16-QAM	Н	0	70	1 / 5	20.20	-0.65	19.55	38.45	-18.90
848.30	1.4	16-QAM	Н	0	69	3 / 2	20.19	-0.65	19.54	38.45	-18.91
825.50	3	QPSK	Н	0	82	1 / 14	20.89	-0.65	20.24	38.45	-18.21
836.50	3	QPSK	Н	0	73	1 / 14	21.62	-0.65	20.97	38.45	-17.48
847.50	3	QPSK	Н	0	75	1 / 0	21.48	-0.65	20.83	38.45	-17.62
825.50	3	16-QAM	Н	0	82	1 / 14	20.12	-0.65	19.47	38.45	-18.98
836.50	3	16-QAM	Н	0	73	1 / 14	20.81	-0.65	20.16	38.45	-18.29
847.50	3	16-QAM	Н	0	75	1 / 0	20.83	-0.65	20.18	38.45	-18.27
826.50	5	QPSK	Н	0	80	1 / 24	20.94	-0.65	20.29	38.45	-18.16
836.50	5	QPSK	Н	0	76	1 / 24	21.38	-0.65	20.73	38.45	-17.72
846.50	5	QPSK	Н	0	71	1 / 0	21.80	-0.65	21.15	38.45	-17.30
826.50	5	16-QAM	Н	0	80	1 / 24	20.29	-0.65	19.64	38.45	-18.81
836.50	5	16-QAM	Н	0	76	1 / 24	20.72	-0.65	20.07	38.45	-18.38
846.50	5	16-QAM	Н	0	71	1 / 0	21.20	-0.65	20.55	38.45	-17.90
829.00	10	QPSK	Н	0	75	1 / 49	21.23	-0.65	20.58	38.45	-17.87
836.50	10	QPSK	н	0	75	1 / 49	21.84	-0.65	21.19	38.45	-17.26
844.00	10	QPSK	н	0	70	1/0	21.57	-0.65	20.92	38.45	-17.53
829.00	10	16-QAM	н	0	75	1 / 49	20.30	-0.65	19.65	38.45	-18.80
836.50	10	16-QAM	н	0	75	1 / 49	20.84	-0.65	20.19	38.45	-18.26
844.00	10	16-QAM	Н	0	70	1/0	20.61	-0.65	19.96	38.45	-18.49
836.50	10	QPSK	V	73	39	1 / 0	20.17	-0.65	19.52	38.45	-18.93

Table 7-3. ERP Data (Band 5)

FCC ID: ZNFUS110		Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP Limit [dBm]	Margin [dB]
1710.70	1.4	QPSK	н	342	0	3 / 2	18.68	5.56	24.24	30.00	-5.76
1732.50	1.4	QPSK	н	348	0	3 / 2	18.47	5.41	23.88	30.00	-6.12
1754.30	1.4	QPSK	н	348	0	3 / 2	18.37	5.26	23.63	30.00	-6.37
1710.70	1.4	16-QAM	н	342	0	3 / 2	17.70	5.56	23.26	30.00	-6.74
1732.50	1.4	16-QAM	н	348	0	3 / 2	17.38	5.41	22.79	30.00	-7.21
1754.30	1.4	16-QAM	н	348	0	3 / 2	17.13	5.26	22.39	30.00	-7.61
1711.50	3	QPSK	н	322	0	1 / 14	18.73	5.55	24.28	30.00	-5.72
1732.50	3	QPSK	н	331	35	1 / 0	18.32	5.41	23.73	30.00	-6.27
1753.50	3	QPSK	н	322	0	1 / 0	17.89	5.26	23.15	30.00	-6.85
1711.50	3	16-QAM	н	322	0	1 / 14	17.94	5.55	23.49	30.00	-6.51
1732.50	3	16-QAM	н	331	35	1 / 0	17.63	5.41	23.04	30.00	-6.96
1753.50	3	16-QAM	н	322	0	1 / 0	17.57	5.26	22.83	30.00	-7.17
1712.50	5	QPSK	н	341	0	1 / 0	18.62	5.55	24.17	30.00	-5.83
1732.50	5	QPSK	н	348	0	1 / 0	18.63	5.41	24.04	30.00	-5.96
1752.50	5	QPSK	н	355	0	1 / 0	17.94	5.27	23.21	30.00	-6.79
1712.50	5	16-QAM	н	341	0	1 / 0	18.04	5.55	23.59	30.00	-6.41
1732.50	5	16-QAM	н	348	0	1 / 0	17.87	5.41	23.28	30.00	-6.72
1752.50	5	16-QAM	н	355	0	1 / 0	17.25	5.27	22.52	30.00	-7.48
1715.00	10	QPSK	н	349	0	1 / 0	18.74	5.53	24.27	30.00	-5.73
1732.50	10	QPSK	н	345	0	1 / 0	18.49	5.41	23.90	30.00	-6.10
1750.00	10	QPSK	н	341	0	1 / 0	17.89	5.29	23.18	30.00	-6.82
1715.00	10	16-QAM	н	349	0	1 / 0	17.86	5.53	23.39	30.00	-6.61
1732.50	10	16-QAM	н	345	0	1 / 0	17.39	5.41	22.80	30.00	-7.20
1750.00	10	16-QAM	н	341	0	1 / 0	17.26	5.29	22.55	30.00	-7.45
1717.50	15	QPSK	н	345	0	1/0	18.77	5.51	24.28	30.00	-5.72
1732.50	15	QPSK	н	337	5	1/0	18.46	5.41	23.87	30.00	-6.13
1747.50	15	QPSK	н	341	0	1/0	18.14	5.31	23.45	30.00	-6.55
1717.50	15	16-QAM	н	345	0	1 / 0	17.75	5.51	23.26	30.00	-6.74
1732.50	15	16-QAM	н	337	5	1/0	17.77	5.41	23.18	30.00	-6.82
1747.50	15	16-QAM	н	341	0	1 / 74	16.48	5.31	21.79	30.00	-8.21
1720.00	20	QPSK	н	0	15	1/0	18.62	5.49	24.11	30.00	-5.89
1732.50	20	QPSK	н	0	0	1/0	18.35	5.41	23.76	30.00	-6.24
1745.00	20	QPSK	н	0	0	1/0	18.08	5.32	23.40	30.00	-6.60
1720.00	20	16-QAM	н	0	15	1/0	17.97	5.49	23.46	30.00	-6.54
1732.50	20	16-QAM	н	0	0	1/0	17.69	5.41	23.10	30.00	-6.90
			н	0	0		17.37	5.32	22.69	30.00	-7.31
1745.00	20	16-QAM		0	0	1/0	17.37	J.JZ	22.00	30.00	-7.51

Table 7-4. EIRP Data (Band 4)

FCC ID: ZNFUS110		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP Limit [dBm]	Margin [dB]
1850.70	1.4	QPSK	н	0	0	1 / 5	19.13	4.82	23.95	33.01	-9.06
1880.00	1.4	QPSK	н	0	0	3 / 2	17.80	4.74	22.54	33.01	-10.47
1909.30	1.4	QPSK	н	0	0	3 / 2	17.22	4.68	21.90	33.01	-11.11
1850.70	1.4	16-QAM	н	0	0	1 / 5	18.04	4.82	22.86	33.01	-10.15
1880.00	1.4	16-QAM	н	0	0	3 / 2	16.73	4.74	21.47	33.01	-11.54
1909.30	1.4	16-QAM	н	0	0	3 / 2	16.06	4.68	20.74	33.01	-12.27
1851.50	3	QPSK	н	0	349	1 / 0	18.99	4.82	23.81	33.01	-9.20
1880.00	3	QPSK	н	0	0	1 / 14	17.53	4.74	22.27	33.01	-10.74
1908.50	3	QPSK	н	0	0	1 / 14	16.90	4.68	21.58	33.01	-11.43
1851.50	3	16-QAM	н	0	349	1 / 0	18.18	4.82	23.00	33.01	-10.01
1880.00	3	16-QAM	н	0	0	1 / 0	16.80	4.74	21.54	33.01	-11.47
1908.50	3	16-QAM	н	0	0	1 / 14	16.15	4.68	20.83	33.01	-12.18
1852.50	5	QPSK	н	0	3	1 / 24	18.89	4.81	23.70	33.01	-9.31
1880.00	5	QPSK	н	0	355	1 / 0	17.54	4.74	22.28	33.01	-10.73
1907.50	5	QPSK	н	0	0	1 / 24	16.91	4.68	21.59	33.01	-11.42
1852.50	5	16-QAM	н	0	3	1 / 24	18.06	4.81	22.87	33.01	-10.14
1880.00	5	16-QAM	н	0	355	1 / 24	16.41	4.74	21.15	33.01	-11.86
1907.50	5	16-QAM	н	0	0	1 / 24	15.97	4.68	20.65	33.01	-12.36
1855.00	10	QPSK	н	0	349	1 / 0	18.96	4.81	23.77	33.01	-9.24
1880.00	10	QPSK	н	0	7	1 / 0	17.75	4.74	22.49	33.01	-10.52
1905.00	10	QPSK	н	356	0	1 / 49	16.75	4.68	21.43	33.01	-11.58
1855.00	10	16-QAM	н	0	349	1/0	18.05	4.81	22.86	33.01	-10.15
1880.00	10	16-QAM	н	0	7	1 / 0	16.90	4.74	21.64	33.01	-11.37
1905.00	10	16-QAM	н	356	0	1 / 49	15.95	4.68	20.63	33.01	-12.38
1857.50	15	QPSK	н	0	9	1/0	19.01	4.80	23.81	33.01	-9.20
1880.00	15	QPSK	н	0	0	1/0	17.92	4.74	22.66	33.01	-10.35
1902.50	15	QPSK	н	0	0	1 / 0	16.91	4.69	21.60	33.01	-11.41
1857.50	15	16-QAM	н	0	9	1 / 0	18.26	4.80	23.06	33.01	-9.95
1880.00	15	16-QAM	н	0	0	1 / 0	17.20	4.74	21.94	33.01	-11.07
1902.50	15	16-QAM	н	0	0	1 / 0	16.10	4.69	20.79	33.01	-12.22
1860.00	20	QPSK	н	355	7	1/0	19.07	4.79	23.86	33.01	-9.15
1880.00	20	QPSK	н	0	10	1/0	18.09	4.74	22.83	33.01	-10.18
1900.00	20	QPSK	н	0	0	1/0	17.03	4.69	21.72	33.01	-11.29
1860.00	20	16-QAM	н	355	7	1/0	18.17	4.79	22.96	33.01	-10.05
1880.00	20	16-QAM	н	0	10	1/0	17.61	4.74	22.35	33.01	-10.66
1900.00	20	16-QAM	н	0	0	1/0	16.36	4.69	21.05	33.01	-11.96
	1.4	QPSK	v	0	159	1/0	17.33	4.79	22.12	33.01	-10.89

Table 7-5. EIRP Data (Band 2)

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7.7 Radiated Spurious Emissions Measurements §2.1053 §22.917(a) §24.238(a) §27.53(c) §27.53(f) §27.53(h)

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 tuned dipole antennas. Measurements on signals operating above 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 \geq 3 x RBW
- 3. Span = 1.5 times the OBW
- 4. No. of sweep points > 2 x span / RBW
- 5. Detector = RMS
- 6. Trace mode = Average (Max Hold for pulsed emissions)
- 7. The trace was allowed to stabilize

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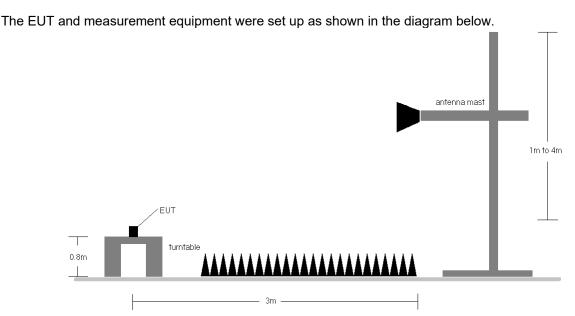


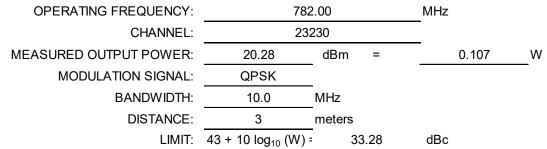
Figure 7-7. Test Instrument & Measurement Setup

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 positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the tables below.
- 2) This unit was tested with its standard battery.
- 3) 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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Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
2346.00	Н	-	-	-62.99	6.80	-56.19	76.5
3128.00	Н	-	-	-59.82	6.88	-52.94	73.2
3910.00	Н	-	-	-56.71	7.05	-49.66	69.9

Table 7-6. Radiated Spurious Data (Band 13 – Mid Channel)

MODULATION SIGNAL:	QPSK	
BANDWIDTH:	10.00	MHz
DISTANCE:	3	meters
NARROWBAND EMISSION LIMIT:	-50	dBm
WIDEBAND EMISSION LIMIT:	-40	dBm/MHz
		_

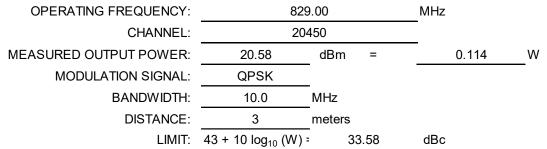
Frequency [MHz]	Ant. Pol. [H/V]	Height	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	Margin [dB]
1564.00	Н	-	-	-66.69	6.50	-60.18	-20.2

Table 7-7. Radiated Spurious Data (Band 13 – 1559-1610MHz Band)

FCC ID: ZNFUS110		Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager		
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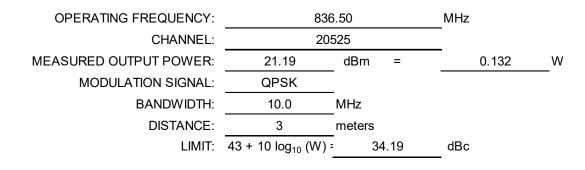
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Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1658.00	Н	151	100	-60.31	6.21	-54.10	74.7
2487.00	Н	-	-	-61.09	6.61	-54.48	75.1
3316.00	Н	-	-	-58.49	7.04	-51.45	72.0
4145.00	Н	-	-	-58.43	7.83	-50.60	71.2

Table 7-8. Radiated Spurious Data (Band 5 – Low Channel)



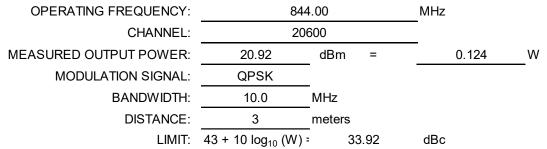
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1673.00	Н	156	100	-60.46	6.13	-54.33	75.5
2509.50	Н	-	-	-61.73	6.64	-55.09	76.3
3346.00	Н	-	-	-59.27	7.14	-52.13	73.3
4182.50	Н	-	-	-58.02	8.06	-49.96	71.2

Table 7-9. Radiated Spurious Data (Band 5 – Mid Channel)

FCC ID: ZNFUS110		Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager			
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Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1688.00	Н	144	100	-59.71	6.05	-53.65	74.6
2532.00	Н	-	-	-61.42	6.70	-54.72	75.6
3376.00	Н	-	-	-58.48	7.24	-51.24	72.2
4220.00	Н	-	-	-58.73	8.25	-50.48	71.4

Table 7-10. Radiated Spurious Data (Band 5 – High Channel)

OPERATING FREQUENCY:	171	1.50	MHz
CHANNEL:	199	965	_
MEASURED OUTPUT POWER:	24.28	dBm =	0.268 W
MODULATION SIGNAL:	QPSK		
BANDWIDTH:	3.0	MHz	
DISTANCE:	3	meters	
LIMIT:	43 + 10 log ₁₀ (W) =	37.28	dBc

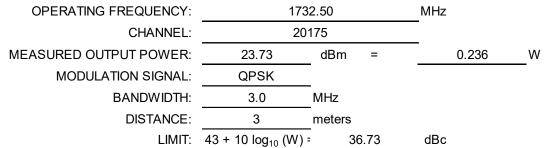
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3423.00	Н	294	100	-48.45	9.57	-38.88	63.2
5134.50	Н	124	100	-54.91	11.01	-43.90	68.2
6846.00	Н	-	-	-52.75	10.77	-41.98	66.3
8557.50	Н	-	-	-49.65	11.34	-38.31	62.6
10269.00	Н	-	-	-50.60	12.54	-38.06	62.3

 Table 7-11. Radiated Spurious Data (Band 4 – Low Channel)

FCC ID: ZNFUS110		Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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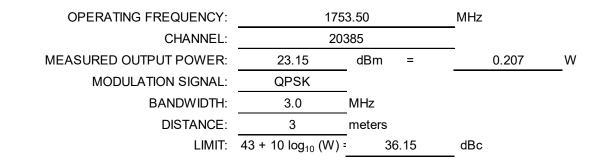
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Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3465.00	Н	330	104	-48.08	9.64	-38.44	62.2
5197.50	Н	98	100	-54.77	10.98	-43.79	67.5
6930.00	Н	-	-	-52.37	10.85	-41.52	65.2
8662.50	Н	-	-	-50.76	11.53	-39.23	63.0
10395.00	Н	-	-	-50.44	12.58	-37.86	61.6

Table 7-12. Radiated Spurious Data (Band 4 – Mid Channel)



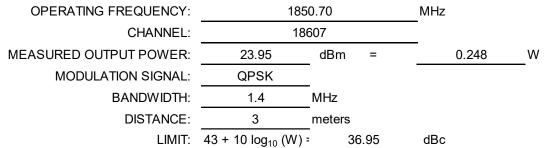
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3507.00	Н	311	100	-47.10	9.71	-37.39	60.5
5260.50	Н	120	100	-54.07	11.03	-43.04	66.2
7014.00	Н	-	-	-51.74	10.95	-40.78	63.9
8767.50	Н	-	-	-50.70	11.68	-39.02	62.2
10521.00	Н	-	-	-49.36	12.57	-36.80	60.0

Table 7-13. Radiated Spurious Data (Band 4 – High Channel)

FCC ID: ZNFUS110		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager		
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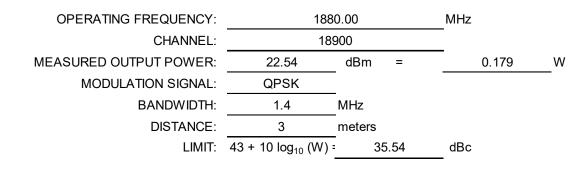
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Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3701.40	Н	285	137	-51.08	9.82	-41.26	65.2
5552.10	Н	-	-	-56.52	11.20	-45.31	69.3
7402.80	Н	-	-	-51.65	10.90	-40.74	64.7
9253.50	Н	-	-	-51.92	12.27	-39.65	63.6

Table 7-14. Radiated Spurious Data (Band 2 – Low Channel)



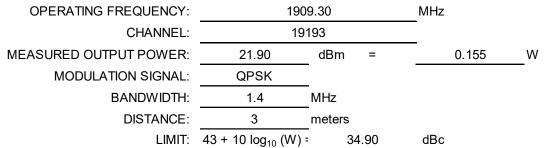
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3760.00	Н	296	145	-51.64	9.63	-42.01	64.6
5640.00	Н	-	-	-55.90	11.29	-44.61	67.2
7520.00	Н	-	-	-51.26	11.12	-40.14	62.7
9400.00	Н	-	-	-52.15	12.28	-39.87	62.4

Table 7-15. Radiated Spurious Data (Band 2 – Mid Channel)

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Frequency [MHz]	Ant. Pol. [H/V]	Height	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3818.60	Н	296	145	-50.10	9.44	-40.65	62.6
5727.90	Н	-	-	-55.84	11.37	-44.47	66.4
7637.20	Н	-	-	-51.84	11.32	-40.53	62.4
9546.50	Н	-	-	-52.13	12.39	-39.74	61.6

Table 7-16. Radiated Spurious Data (Band 2 – High Channel)

FCC ID: ZNFUS110		Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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7.8 Frequency Stability / Temperature Variation §2.1055 §22.355 §24.235 §27.54

Test Overview and Limit

Frequency stability testing is performed in accordance with the guidelines of ANSI/TIA-603-D-2010. The frequency stability of the transmitter is measured by:

- Temperature: The temperature is varied from -30°C to +50°C in 10°C increments using an a.) environmental chamber.
- Primary Supply Voltage: The primary supply voltage is varied from 85% to 115% of the nominal b.) 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 22, the frequency stability of the transmitter shall be maintained within ±0.00025% (±2.5 ppm) of the center frequency. For Part 24 and Part 27, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

Test Procedure Used

ANSI/TIA-603-D-2010

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 13 Frequency Stability Measurements §2.1055 §27.54

OPERATING FREQUENCY:	782,000,000	Hz
CHANNEL:	23230	
REFERENCE VOLTAGE:	3.80	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	782,000,304	304	0.0000389
100 %		- 30	781,999,986	-14	-0.0000018
100 %		- 20	781,999,749	-251	-0.0000321
100 %		- 10	782,000,034	34	0.0000043
100 %		0	781,999,876	-124	-0.0000159
100 %		+ 10	782,000,001	1	0.0000001
100 %		+ 20	782,000,081	81	0.0000104
100 %		+ 30	781,999,630	-370	-0.0000473
100 %		+ 40	781,999,915	-85	-0.0000109
100 %		+ 50	781,999,848	-152	-0.0000194
BATT. ENDPOINT	3.40	+ 20	782,000,200	200	0.0000256

 Table 7-17. Frequency Stability Data (Band 13)

FCC ID: ZNFUS110	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		🕒 LG	Approved by: Quality Manager
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Band 13 Frequency Stability Measurements §2.1055 §27.54

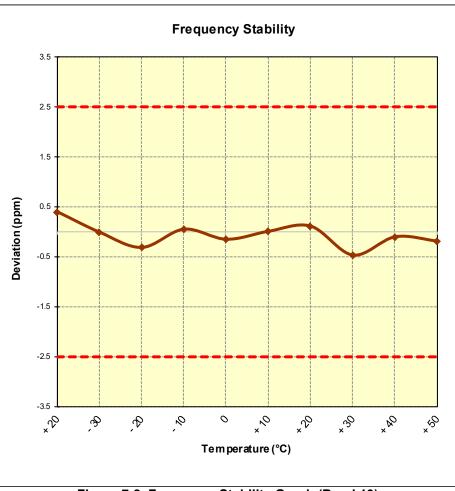


Figure 7-8. Frequency Stability Graph (Band 13)

FCC ID: ZNFUS110		Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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Band 5 Frequency Stability Measurements §2.1055 §22.355

OPERATING FREQUENCY:	836,500,000	Hz
CHANNEL:	20525	_
REFERENCE VOLTAGE:	3.80	VDC
DEVIATION LIMIT:	± 0.00025 % or 2.5 ppm	_

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	836,500,353	353	0.0000422
100 %		- 30	836,500,290	290	0.0000347
100 %		- 20	836,499,801	-199	-0.0000238
100 %		- 10	836,499,952	-48	-0.0000057
100 %		0	836,499,956	-44	-0.0000053
100 %		+ 10	836,499,879	-121	-0.0000145
100 %		+ 20	836,500,044	44	0.0000053
100 %		+ 30	836,499,854	-146	-0.0000175
100 %		+ 40	836,499,938	-62	-0.0000074
100 %		+ 50	836,499,950	-50	-0.0000060
BATT. ENDPOINT	3.40	+ 20	836,500,235	235	0.0000281

Table 7-18. Frequency Stability Data (Band 5)

FCC ID: ZNFUS110	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		🕒 LG	Approved by: Quality Manager
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Band 5 Frequency Stability Measurements §2.1055 §22.355

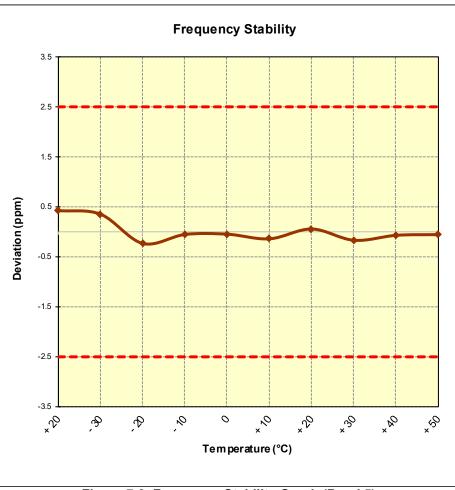


Figure 7-9. Frequency Stability Graph (Band 5)

FCC ID: ZNFUS110		Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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Band 4 Frequency Stability Measurements §2.1055 §§27.54

OPERATING FREQUENCY:	1,732,500,000	Hz
CHANNEL:	20175	
REFERENCE VOLTAGE:	3.80	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	1,732,500,346	346	0.0000200
100 %		- 30	1,732,499,813	-187	-0.0000108
100 %		- 20	1,732,499,873	-127	-0.0000073
100 %		- 10	1,732,500,065	65	0.0000038
100 %		0	1,732,499,758	-242	-0.0000140
100 %		+ 10	1,732,499,986	-14	-0.0000008
100 %		+ 20	1,732,500,305	305	0.0000176
100 %		+ 30	1,732,499,961	-39	-0.0000023
100 %		+ 40	1,732,500,303	303	0.0000175
100 %		+ 50	1,732,500,012	12	0.0000007
BATT. ENDPOINT	3.40	+ 20	1,732,499,844	-156	-0.0000090

 Table 7-19. Frequency Stability Data (Band 4)

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 inband 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 4 Frequency Stability Measurements §2.1055 §§27.54

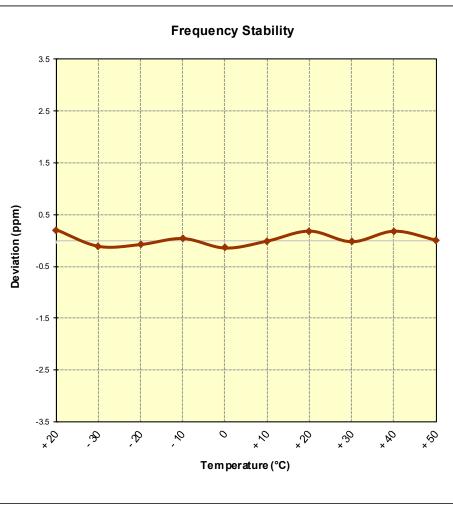


Figure 7-10. Frequency Stability Graph (Band 4)

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Band 2 Frequency Stability Measurements §2.1055 §24.235

OPERATING FREQUENCY:	1,880,000,000	Hz
CHANNEL:	18900	_
REFERENCE VOLTAGE:	3.80	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	1,880,000,011	11	0.0000006
100 %		- 30	1,879,999,887	-113	-0.0000060
100 %		- 20	1,879,999,984	-16	-0.0000009
100 %		- 10	1,880,000,064	64	0.0000034
100 %		0	1,879,999,676	-324	-0.0000172
100 %		+ 10	1,879,999,952	-48	-0.0000026
100 %		+ 20	1,880,000,100	100	0.0000053
100 %		+ 30	1,879,999,953	-47	-0.0000025
100 %		+ 40	1,879,999,800	-200	-0.0000106
100 %		+ 50	1,879,999,671	-329	-0.0000175
BATT. ENDPOINT	3.40	+ 20	1,879,999,942	-58	-0.0000031

 Table 7-20. Frequency Stability Data (Band 2)

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 inband 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.

FCC ID: ZNFUS110	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		🕒 LG	Approved by: Quality Manager	
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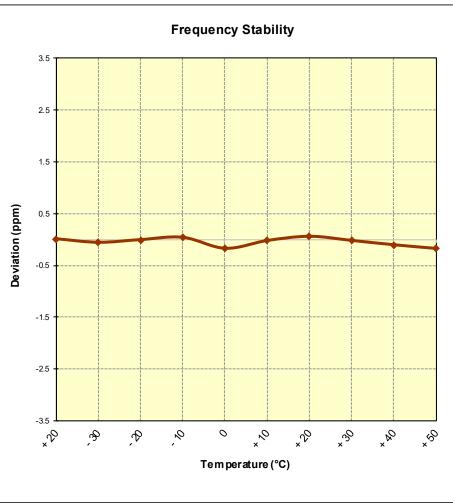


Figure 7-11. Frequency Stability Graph (Band 2)

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8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **LG Portable Handset FCC ID: ZNFUS110** complies with all the requirements of Parts 22, 24, & 27 of the FCC rules for LTE operation only.

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