

#### 7.4 Band Edge Emissions at Antenna Terminal §2.1051 §22.917(a) §24.238(a) §27.53(g) §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<sub>10</sub>(P<sub>IWatts1</sub>), 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 > 3 x RBW
- 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**

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(g) for operations in the 698-746 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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Keysight Spec	trum Analyzer - Sv	vept SA									
L <mark>XI</mark> RL	RF 50 S	2 DC C	CORREC	SEN	ISE:INT	#Avg Typ	ALIGN AUTO e: RMS	01:40:55 P	M Oct 31, 2016	F	requency
10 dB/div	Ref 25.00	NFE dBm	PNO: Wide 😱	Atten: 36	dB		Mk	r1 697.9 -31.	068 MHz 26 dBm		Auto Tune
15.0							)	, marine and a second s	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	69	<b>Center Freq</b> 8.000000 MHz
-5.00										69	Start Freq 6.000000 MHz
-15.0					1					70	Stop Freq 0.000000 MHz
-35.0			marian	North Contraction	r <sup>a</sup>					<u>Auto</u>	<b>CF Step</b> 400.000 kHz Man
-45.0	more donte	······································									Freq Offset 0 Hz
-65.0											Scale Type
Center 698 #Res BW 1	3.000 MHz 100 kHz		#VBW	300 kHz			Sweep :	Span 4 2.000 ms (	.000 MHz 1001 pts)	Log	Lin
MSG							STATU	s			

Plot 7-77. Lower Band Edge Plot (Band 12 – 1.4MHz QPSK – RB Size 6)



Plot 7-78. Upper Band Edge Plot (Band 12 – 1.4MHz QPSK – RB Size 6)

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🔤 Ke	ysight Spec	trum Anal	yzer - Swep	ot SA									
l <b>,XI</b> R	L	RF	50 Ω	DC CC	RREC	SEI	SE:INT	#Ava Tvp	ALIGN AUTO	01:52:54 P	M Oct 31, 2016	F	requency
			١	IFE P IF	NO: Wide Gain:Low	Trig: Free Atten: 36	e Run i dB		M	TY D			Auto Tune
10 dE Log	3/div	Ref 2	5.00 d	Bm						-31.	68 dBm		
15.0												69	<b>Center Freq</b> B.000000 MHz
5.00										former	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		
-5.00										/		69	Start Freq 6.000000 MHz
-15.0											DL1 -13.00 dBm		Oton From
-25.0												70	0.000000 MHz
25.0		~~~,,	᠆ᡒᡐᡡᡗᡃᡨᠬᡯᠬ	᠁ᡔ᠆ᠬᠰᠩᠬᠩ	www	, worman	mmm	warden and	and the second				CF Step
-33.0	and the second	ww										<u>Auto</u>	400.000 kHz Man
-40.0													Freq Offset
-55.U													0 Hz
-65.0													Scale Type
Cen	ter 69	3.000 1	MHz						_	Span 4	.000 MHz	Log	Lin
#Re	SBW	00 KH	Z		#VBN	300 kHz			sweep	2.000 ms	(1001 pts)		
MSG									STAT	US			

Plot 7-79. Lower Band Edge Plot (Band 12 – 3.0MHz QPSK – RB Size 15)



Plot 7-80. Upper Band Edge Plot (Band 12 – 3.0MHz QPSK – RB Size 15)

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<b>l,XI</b> RI	L	RF	50 \$	2 DC	CORRI	EC	SE	NSE:INT	#Ava	ALIGN A	UTO	01:54:28 P	M Oct 31, 2016	F	requency
				NFE	PN0 IFGa	:Wide 🕞 in:Low	Trig: Fre Atten: 3	e Run 6 dB		, jpc. rune	-	TYI Di			Auto Tuno
10 dE	3/div	Ref	25.00	dBm							Mk	r1 697.9 -33.	936 MHz 92 dBm		Auto Tune
15.0								Ĭ							Center Freq
5.00														69	8.000000 MHZ
5.00														69	Start Freq
-5.00													DL1 -13.00 dBm		
-15.0											. N			70	Stop Freq 0.000000 MHz
-25.0							•	1			ſ				CE Step
-35.0	~~~~	~~~	ᠬ᠕᠆ᠬ᠕	~~~~		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~								<u>Auto</u>	400.000 kHz Man
-45.0															Erog Offect
-55.0															0 Hz
-65.0															Scale Type
Cen	ter 69	3.000	MHz									Span 4	.000 MHz	Log	Lin
#Res	s BW	100 k	Hz			#VBW	/ 300 kHz			Swee	р 2	.000 ms (	(1001 pts)		
MSG										s	STATUS	5			

Plot 7-81. Lower Band Edge Plot (Band 12 – 5.0MHz QPSK – RB Size 25)



Plot 7-82. Upper Band Edge Plot (Band 12 – 5.0MHz QPSK – RB Size 25)

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Keysight Spe	ctrum Analyzer - S	wept SA								_	
L <mark>XI</mark> RL	RF 50	Ω DC C	ORREC	SEN	SE:INT	#Ava Tvp	ALIGN AUTO	05:37:41 P	M Oct 28, 2016	F	requency
		NFE	PNO: Wide 🖵 FGain:Low	Trig: Free Atten: 36	e Run i dB			TYF DE			
10 dB/div	Ref 25.00	dBm					Mk	r1 697.7 -37.	′60 MHz 46 dBm		Auto Tune
15.0										69	<b>Center Freq</b> 8.000000 MHz
-5.00							man	n mayor	whether and the	69	<b>Start Freq</b> 4.000000 MHz
-15.0									DL1 -13.00 dBm	70	Stop Freq 2.000000 MHz
-35.0	at has the free most growth	montant	monorenmen	1	uhunger	, Muyul				<u>Auto</u>	<b>CF Step</b> 800.000 kHz Man
-45.0											Freq Offset 0 Hz
-65.0											Scale Type
Center 69 #Res BW	8.000 MHz 100 kHz		#VBW	300 kHz			Sweep 4	Span 8 1.000 ms (	.000 MHz 1001 pts)	Log	Lin
MSG							STATU	s			

Plot 7-83. Lower Band Edge Plot (Band 12 – 10.0MHz QPSK – RB Size 50)



Plot 7-84. Upper Band Edge Plot (Band 12 – 10.0MHz QPSK – RB Size 50)

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🔤 Keysigh	t Spectrum Analyzer - S	Swept SA									
L <b>XI</b> RL	RF 50	Ω DC CC	ORREC	SEI	NSE:INT	#Ava Tvp	ALIGN AUTO	02:01:17 P	M Oct 31, 2016	F	requency
		NFE F If	NO: Wide 🕞 Gain:Low	Trig: Free Atten: 36	e Run 6 dB		MI	kr1 824.0			Auto Tune
10 dB/di	Ref 25.00	dBm						-18.	92 abm		
15.0					يوسر	-		~		824	<b>Center Freq</b> 4.000000 MHz
5.00											
-5.00										82:	Start Freq 2.000000 MHz
					/				DL1 -13.00 dBm		
-15.0					1			X		820	<b>Stop Freq</b> 5.000000 MHz
-25.0			www.	www.ww				here and the second sec	portunity of		CF Step
-45.0	hand the second	Martland and a start	V <sup>V</sup>							<u>Auto</u>	400.000 kHz Man
~~	рл — — — — — — — — — — — — — — — — — — —										Fred Offset
-55.0											0 Hz
~~~~											
-65.0											Scale Type
Center	824.000 MHz						_	Span 4	.000 MHz	Log	<u>Lin</u>
#Res B	W 100 KHZ		#VBW	300 kHz			sweep	2.000 ms (	1001 pts)		
MSG							STATU	US			

Plot 7-85. Lower Band Edge Plot (Band 5 – 1.4MHz QPSK – RB Size 6)



Plot 7-86. Upper Band Edge Plot (Band 5 – 1.4MHz QPSK – RB Size 6)

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Ke	ysight Spe	trum Ana	lyzer - Swej	pt SA									_	
l <b>,XI</b> R	L	RF	50 Ω	DC	CORREC		SEN	ISE:INT	#Ava Tvr	ALIGN AUTO	02:02:31 P	M Oct 31, 2016	F	requency
			1	NFE	PNO: Wid IFGain:Lo	e 🖵 w	Trig: Free Atten: 36	Run dB			TY D			Auto Tune
10 dE Log	3/div	Ref 2	5.00 d	Bm							-20.	27 dBm		
15.0													82	Center Freq
5.00								and the second s		-	www.			4.000000 11112
-5.00													82	Start Freq 2.000000 MHz
-3.00								/				DL1 -13.00 dBm		
-15.0								1					82	Stop Freq 6.000000 MHz
-25.0					A. Alara	www	harmont							CE Stan
-35.0	an a	W	~~~	and a cover a									<u>Auto</u>	400.000 kHz Man
-45.0														Freq Offset
-55.0														0 Hz
-65.0														Scale Type
Cen	ter 824	1.000	MHz								Span 4	.000 MHz	Log	Lin
#Re	s BW 1	100 kH	IZ		#	/BW 3	00 kHz			Sweep	2.000 ms	(1001 pts)		
MSG										STAT	US			

Plot 7-87. Lower Band Edge Plot (Band 5 – 3.0MHz QPSK – RB Size 15)



Plot 7-88. Upper Band Edge Plot (Band 5 – 3.0MHz QPSK – RB Size 15)

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<b>l,XI</b> RI	L	RF	50 \$	2 DC	CORR	EC	SE	NSE:INT	#Ava Tv	ALIGN AUTO	02:03:49 F	M Oct 31, 2016	F	requency
				NFE	PNC IFGa	D:Wide G	Trig: Fre Atten: 3	e Run 6 dB			עד ם			
10 dE	3/div	Ref	25.00	dBm						M	kr1 823.9 -25	988 MHz 23 dBm		Auto Tune
15.0								Ĭ						Center Freq
15.0													82	4.000000 MHz
5.00								<pre> {</pre>	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	acyted ( a start		Start Freq
-5.00												DI 1 -13 00 dBm	82	2.000000 MHZ
-15.0								11						Stop Freq
-25.0							ا ا						82	6.000000 MHZ
-35.0		nwat	www.how		~~~~~		www.							<b>CF Step</b> 400.000 kHz
-45.0													<u>Auto</u>	Man
-55.0														Freq Offset
-65 በ														UHZ
														Scale Type
Cent #De	ter 824	1.000	MHz			#\/B\	( 200 kH=			Swoon	Span 4	.000 MHz	Log	Lin
#Re	SEW	TOUR	ΠZ			#vBv	7 300 KH2			Sweep	2.000 ms	(1001 pts)		
Mod		_								314				

Plot 7-89. Lower Band Edge Plot (Band 5 – 5.0MHz QPSK – RB Size 25)



Plot 7-90. Upper Band Edge Plot (Band 5 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFM210		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🔁 LG	Reviewed by: Quality Manager				
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🔤 Keysight Spectrum Anal	yzer - Swept SA									
LXI RL RF	50Ω DC C	ORREC	SEN	ISE:INT	#Ava Tvp	ALIGN AUTO	02:05:03 PI TRAC	4 Oct 31, 2016	F	requency
	NFE I	PNO: Wide 😱 FGain:Low	Trig: Free Atten: 36	Run dB		Mk	TYF DE 1 823.9 -31	92 MHz		Auto Tune
	5.00 dBm								82	Center Freq 4.000000 MHz
-5.00				- Comp	n-n-	agen an faar y f	haven jake dare	DI 1. 12.00 dBm	820	Start Freq 0.000000 MHz
-15.0				1.1					82	Stop Freq 3.000000 MHz
-35.0	phasen and get	Conferment and	all WWW. And	AP'					<u>Auto</u>	CF Step 800.000 kHz Man
-55.0										Freq Offset 0 Hz
Cepter 824 000 P	MHz						Snan 8	000 MHz	Log	Scale Type
#Res BW 100 kH	Z	#VBW	300 kHz			Sweep 4	.000 ms (	1001 pts)		
MSG						STATUS				

Plot 7-91. Lower Band Edge Plot (Band 5 – 10.0MHz QPSK – RB Size 50)



Plot 7-92. Upper Band Edge Plot (Band 5 – 10.0MHz QPSK – RB Size 50)

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🔤 Keysight Spe	ectrum Analyzer - S	wept SA									
l <mark>,XI</mark>	RF 50	Ω DC	CORREC	SEI	NSE:INT	#Ava Tvp	ALIGN AUTO	07:39:31 P	M Oct 27, 2016	F	requency
		NFE	PNO: Wide	Trig: Fre	e Run			TY			
			IFGain:Low	Atten: 40	) dB						
							Mkr	1 1.709 9	996 GHZ		Auto Tune
10 dB/div Log	Ref 30.00	dBm						-20.	ээ авш		
					Ĭ						Center Fred
20.0										1.71	0000000 GHz
10.0											
					~~~~~~	man	-land	<u>^</u>			Start Freq
0.00										1.70	8000000 GHz
-10.0									DL1 -13.00 dBm		Stop Freg
										1.71	2000000 GHz
-20.0				<u> </u>	1						
					1			2			OF Oton
-30.0				1 martin por				- Van	hom a		400.000 kHz
			1 mm mm	4					1 m	<u>Auto</u>	Man
-40.0	man	wow	<u>v</u>								
mon											Freg Offset
-50.0											0 Hz
-60.0											
											scale Type
Center 1.7	710000 GH	z						Span 4	.000 MHz	Log	Lin
#Res BW	13 kHz		#VBV	V 43 kHz			Sweep	8.867 ms	(1001 pts)		
MSG							STAT	rus			

Plot 7-93. Lower Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 6)



Plot 7-94. Lower Extended Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 6)

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🔤 Keysight Spectrum Analyzer - Sw	vept SA							
נ <mark>או</mark> RF 50 ג	2 DC CORREC	SE	NSE:INT	#Ava Type	RMS	07:49:50 PM	Oct 27, 2016	Frequency
	NFE PNO: IFGain	Wide Trig: Fre Atten: 4	e Run 0 dB			TYP DE		
10 dB/div Ref 30.00	dBm				Mkr1	1.755 0 -27.9	36 GHz 92 dBm	Auto Tune
			Ĭ					Center Freq
20.0								1.755000000 GHz
10.0	-	mmm.						Start Freq
0.00								1.753000000 GHZ
-10.0							DL1 -13.00 dBm	Stop Freq
-20.0			<b>▲</b> 1					1.757000000 GHz
-30.0			mathe					<b>CF Step</b> 400.000 kHz
-40.0				-hurmon	~~			<u>Auto</u> Man
-50.0					hann	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	mm	Freq Offset
							<u> </u>	0 Hz
-60.0								Scale Type
Center 1.755000 GHz #Res BM 13 kHz		#VBW 43 kHz			ween 9	Span 4.	000 MHz	Log <u>Lin</u>
MSG		// EMERGIANIZ			STATUS	loon mo (	no or proj	

Plot 7-95. Upper Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 6)



Plot 7-96. Upper Extended Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 6)

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🧱 Keysight Spectrum Analyzer - Swept SA				
LXI RF 50 Ω DC	CORREC S	ENSE:INT #Ava Tvp	ALIGN AUTO 07:56:46 PM	Frequency
NFE	PNO: Wide Trig: Fr IFGain:Low Atten: 4	ee Run 40 dB	TYP	
10 dB/div Ref 30.00 dBm	1		Mkr1 1.709 9 -26.2	88 GHz  Auto Tune    26 dBm
20.0				Center Freq 1.710000000 GHz
0.00			······································	<b>Start Freq</b> 1.708000000 GHz
-10.0				0L1-1300 cen 1.712000000 GHz
-30.0	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~			CF Step 400.000 kHz <u>Auto</u> Man
-50.0				Freq Offset 0 Hz
-60.0				Scale Type
Center 1.710000 GHz #Res BW 30 kHz	#VBW 91 kHz		Span 4. Sweep 2.000 ms (	.000 MHz L <sup>og</sup> Lin 1001 pts)
MSG			STATUS	

Plot 7-97. Lower Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)



Plot 7-98. Lower Extended Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)

FCC ID: ZNFM210		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager					
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Keysight Speed	ctrum Analyzer - Swej	pt SA									
L <mark>XI</mark>	RF 50 Ω	DC CC	DRREC	SEI	NSE:INT	#Ava Tv	ALIGN AUTO	07:59:11 P	MOct 27, 2016	F	requency
	1	NFE P If	NO: Wide ↔→ Gain:Low	Trig: Free Atten: 40	e Run ) dB	#/( <b>v</b> g / y	perior	TY			
10 dB/div	Ref 30.00 d	Bm					Mkı	1 1.755 ( -25.	08 GHz 86 dBm		Auto Tune
20.0										1.75	<b>Center Freq</b> 5000000 GHz
10.0	·	~~~~		~~						1.75	Start Freq 3000000 GHz
-10.0									DL1 -13.00 dBm	1.75	Stop Freq 7000000 GHz
-30.0				4	1	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		<u>Auto</u>	<b>CF Step</b> 400.000 kHz Man
-40.0											Freq Offset 0 Hz
-60.0											Scale Type
Center 1.7 #Res BW	55000 GHz 30 kHz		#VBW	91 kHz			Sween	Span 4	.000 MHz (1001 pts)	Log	Lin
MSG				6 T 1112			STAT	rus	noter proj		

Plot 7-99. Upper Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)



Plot 7-100. Upper Extended Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)

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🛄 Keysight Spe	ectrum Analyzer - S	Swept SA									
<mark>LXI</mark>	RF 50	ΩDC	CORREC	SEI	NSE:INT	#Avg Tvp	ALIGN AUTO	08:07:40 PI	M Oct 27, 2016	F	requency
		NFE	PNO: Wide 🖵 IFGain:Low	Trig: Free Atten: 40	e Run ) dB			TYF Df			
10 dB/div	Ref 30.00	dBm					Mkr	1 1.709 9 -25.	96 dBm		Auto Tune
											Center Freq
20.0										1.71	0000000 GHz
10.0					~^			······	n		Start Freq
0.00						10 V				1.70	8000000 GHz
-10.0									DL1 -13.00 dBm		Stop Freq
-20.0					1					1.71	2000000 GHz
-30.0			0 00 00-000-000		<mark>ہ</mark>						CF Step
-40.0	m have	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	· //· // · · · · · · · · · · · · · · ·							<u>Auto</u>	400.000 KHZ Man
-40.0											Freq Offset
-50.0											0 Hz
-60.0											Scale Type
Center 1.7	710000 GH	z						Span 4	.000 MHz	Log	Lin
#Res BW	51 kHz		#VBW	160 kHz			Sweep	2.000 ms (	1001 pts)		
MSG							STATU	JS			

Plot 7-101. Lower Band Edge Plot (Band 4 – 5.0MHz QPSK – RB Size 25)



Plot 7-102. Lower Extended Band Edge Plot (Band 4 – 5.0MHz QPSK – RB Size 25)

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Keysight	Spectrum Analyzer - S	wept SA									
L <mark>XI</mark>	RF 50	Ω DC	CORREC	SE	NSE:INT	#Ava	ALIGN AUT	0 08:10:01 P	M Oct 27, 2016	F	requency
		NFE	PNO: Wide	😱 Trig: Fre	e Run		ype. Kino	TY	PE A WWWW		
			IFGain:Low	Atten: 40	) dB			U			
							Mk	r1 1.755 (	)24 GHz		Auto Tune
10 dB/div	Ref 30.00	dBm						-26.	oa arm		
					Ť						Contor From
20.0										1 75	5000000 GHz
										1.75	5000000 GHZ
10.0											
											Start Freq
0.00		$\sim$		~~~~						1.75	53000000 GHz
-10.0											Oton Erog
									DL1 -13.00 dBm	4 75	Stop Freq
-20.0				by						1.78	57000000 GHZ
				- L	<u>♦</u> '						
-30.0					m	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~					CF Step
								Mar Mar		Auto	400.000 KHZ Man
-40.0										Maro	Marr
											-
-50.0											Freq Offset
											0 Hz
-60.0											
											Scale Type
	4 755000 011									Log	Lin
Center #Pec Bi	1.755000 GH	Z	#\/				Sween	Span 4	.000 MHz	209	
#Res Di			# V L				Sweep	2.000 1115	(1001 pts)		
MSG							STA	TUS			

Plot 7-103. Upper Band Edge Plot (Band 4 – 5.0MHz QPSK – RB Size 25)



Plot 7-104. Upper Extended Band Edge Plot (Band 4 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFM210		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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Keysigł	ht Spectrum A	nalyzer - Sw	ept SA										
L <mark>XI</mark>	RF	50 Ω	DC CO	ORREC	SEI	NSE:INT		#Avg Tvi	ALIGN AUTO	08:13:15 F	M Oct 27, 2016	F	requency
			NFE F	PNO: Wide 🕞 FGain:Low	Trig: Free Atten: 40	e Run 0 dB				די ם			
10 dB/di	iv Ref	30.00 c	IBm						Mkr	1 1.709 9	984 GHz 90 dBm		Auto Tune
						Ĭ							Center Freq
20.0												1.7	10000000 GHz
10.0							m A (		a manufacture	Mary Mary Mary and a factor	mm		Start Freq
0.00												1.70	6000000 GHZ
-10.0							1				DL1 -13.00 dBm		Stop Freq
-20.0												1.7*	4000000 GHz
-30.0					a martin	1 √'							CF Step 800.000 kHz
-40.0	and a second	hander and a start and a st	mon	and a second second								<u>Auto</u>	Man
-50.0													Freq Offset
													0 Hz
-60:0													Scale Type
Center	1.7100	00 GHz								Span 8	3.000 MHz	Log	Lin
#Res E	3W 100 I	(Hz		#VBV	/ 300 kHz				Sweep	4.000 ms	(1001 pts)		
MSG									STAT	US			

Plot 7-105. Lower Band Edge Plot (Band 4 – 10.0MHz QPSK – RB Size 50)



Plot 7-106. Lower Extended Band Edge Plot (Band 4 – 10.0MHz QPSK – RB Size 50)

FCC ID: ZNFM210		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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Keysight Sp	ectrum Analyzer -	Swept SA									
<mark>I,XI</mark>	RF 50	ΩDC	CORREC	SE	NSE:INT	#Ava Tv	ALIGN AUTO	08:15:48 P	M Oct 27, 2016	Fi	requency
		NFE	PNO: Wide G	Trig: Fre Atten: 40	e Run ) dB	#AV9 19	pe. Rivis	TYF	PE A WWWWW ET A NNNNN		
10 dB/div	Ref 30.00	) dBm					Mkr	1 1.755 0 -28.	08 GHz 01 dBm		Auto Tune
20.0										( 1.75	<b>Center Freq</b> 5000000 GHz
0.00	water management	ang the second	and the second second	mtern						1.75	Start Freq 1000000 GHz
-10.0					1				DL1 -13.00 dBm	1.75	<b>Stop Freq</b> 9000000 GHz
-30.0				and the second s	horn	an show and an and	Mar Martin	Mungaputh	mmun	Auto	CF Step 800.000 kHz Man
-50.0											Freq Offset 0 Hz
-60.0											Scale Type
Center 1.	755000 GH	Z	#\/B)	M 300 KHZ			Sween	Span 8	.000 MHz	Log	Lin
WRC DW	TOU KHZ		#VD	N 300 KHZ			Sweep	4.000 IIIS (	(100 Fpts)		
Mod							STAR				

Plot 7-107. Upper Band Edge Plot (Band 4 – 10.0MHz QPSK – RB Size 50)



Plot 7-108. Upper Extended Band Edge Plot (Band 4 – 10.0MHz QPSK – RB Size 50)

FCC ID: ZNFM210		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🔁 LG	Reviewed by: Quality Manager
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🔤 Keysight Sp	ectrum Analyzer - S	Swept SA									- 7 ×
L <mark>XI</mark>	RF 50	Ω DC (	CORREC	SEI	NSE:INT	#Avg T	ALIGN AUTO	08:19:00 PM Oct 2 TRACE 1 2	7,2016	Fre	quency
	_	NFE	PNO: Wide G	Trig: Free Atten: 40	e Run ) dB				N N N N		
10 dB/div	Ref 30.00	) dBm					Mkr	1 1.709 856 -28.99 c	GHz IBm		Auto Tune
20.0					ľ					<b>C</b> (	enter Freq
10.0										1.7 10	00000 0112
0.00					ſ	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		~~~~	1.704	<b>Start Freq</b> 000000 GHz
-10.0										_	Stop Frog
-20.0								DL1 -1.	3.00 aBm	1.716	000000 GHz
-30.0					1						CF Step
-40.0	m									Auto	Man
-50.0										F	req Offset
-60.0											0 Hz
										S	cale Type
Center 1.	710000 GH	Z	#\/B\A	470 647			Sween	Span 12.00	MHz	Log	Lin
MSG	150 KHZ		#VDV	470 KHZ			stat	is	r prs)		

Plot 7-109. Lower Band Edge Plot (Band 4 – 15.0MHz QPSK – RB Size 75)



Plot 7-110. Lower Extended Band Edge Plot (Band 4 – 15.0MHz QPSK – RB Size 75)

FCC ID: ZNFM210		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕑 LG	Reviewed by: Quality Manager
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aaa K	eysight Sp	ectrum A	nalyzer - Sv	vept SA											
<mark>LXI</mark>		RF	50 \$	2 DC	CORRE	C		SENSE:INT	#	Ανα Τνρ	ALIGN AUTO e: RMS	08:22:07 F	M Oct 27, 2016	F	requency
				NFE	PNO: IFGai	Wide G	Trig: F Atten:	ree Run 40 dB				T) E			
10 c	dB/div	Ref	30.00	dBm							Mkr	1 1.755 -27	024 GHz .74 dBm		Auto Tune
20.0	·													1.7	<b>Center Freq</b> 55000000 GHz
10.0		~~~~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	ᠰᡙᡊᢦ᠇ᡘ <sup>ᠮ</sup> ᢇ	-4							1.74	Start Freq 19000000 GHz
-10.0													DL1 -13.00 dBm	1.70	<b>Stop Freq</b> 31000000 GHz
-30.0								N Longo	<u>~~~~</u> w	<i>م</i> مر میں	and the second s	~~~~~	hormon	<u>Auto</u>	<b>CF Step</b> 1.200000 MHz Man
-50.0															Freq Offset 0 Hz
-60.0															Scale Type
Cer	nter 1.	75500	0 GHz			-43 (5)	470 14	-			<b>.</b>	Span '	12.00 MHz	Log	Lin
#Re	es BW	150 K	ΠZ			#VBV	V 470 KH	12			sweep	1.000 ms	(1001 pts)		
MSG											STATU	JS			

Plot 7-111. Upper Band Edge Plot (Band 4 – 15.0MHz QPSK – RB Size 75)



Plot 7-112. Upper Extended Band Edge Plot (Band 4 – 15.0MHz QPSK – RB Size 75)

FCC ID: ZNFM210		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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🔤 Ke	eysight Spe	ctrum Ar	nalyzer - Sw	ept SA												
L <mark>XI</mark>		RF	50 Ω	DC	CORRE	EC	SE	NSE:INT	-	#Ava T	ALIGN AU	ITO	08:34:14 P	M Oct 27, 2016	F	requency
				NFE	PNO IFGa	): Wide  Ģ in:Low	Trig: Fre Atten: 40	e Run ) dB			Jperraite		TY D			
10 d Log	B/div	Ref	30.00	dBm							M	kr1	1.709 § -31.	968 GHz 62 dBm		Auto Tune
20.0	)							<b>`</b>							1.7	<b>Center Freq</b> 10000000 GHz
10.0 0.00									~~~	yo,	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~		v~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	1.7	Start Freq 02000000 GHz
-10.0 -20.0														DL1 -13.00 dBm	1.7	<b>Stop Freq</b> 18000000 GHz
-30.0 -40.0		~~~~~~	مىلارىمىسى	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~~	where we we want	- warden war	مر مر							<u>Auto</u>	<b>CF Step</b> 1.600000 MHz Man
-50.0																Freq Offset 0 Hz
-60.0																Scale Type
Cen #Po	nter 1.7	1000	0 GHz			#\/D\/	1 620 VH-				Swoor	. 1	Span 1	6.00 MHz	Log	Lin
#Re	SDW	200 K	112			#VDV	V 020 KH2				Sweet		.000 ms	(1001 pts)		
MSG											ST	ATUS	·			

Plot 7-113. Lower Band Edge Plot (Band 4 – 20.0MHz QPSK – RB Size 100)



Plot 7-114. Lower Extended Band Edge Plot (Band 4 – 20.0MHz QPSK – RB Size 100)

FCC ID: ZNFM210		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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With the second seco	- Keys	ight Spect	rum Analy	zer - Swep	ot SA												
NFE      PNO: Wide Colling: Free Run Atten: 40 dB      Mikr1 1.755 032 GHz Information (100 mm)      Auto Tune        10 dB/div      Ref 30.00 dBm      -28.78 dBm      Center Freq        10 dB/div      Ref 30.00 dBm      -28.78 dBm      Center Freq        10 dB/div      Ref 30.00 dBm      -28.78 dBm      Center Freq        10 dB/div      Ref 30.00 dBm      -28.78 dBm      Center Freq        10 dB/div      Ref 30.00 dBm      -28.78 dBm      Start Freq        10 dB/div      Ref 30.00 dBm      -28.78 dBm      Start Freq        10 dB/div      Ref 30.00 dBm      -28.78 dBm      Start Freq        10 dB/div      -28.78 dBm      -28.78 dBm      Start Freq        10 dB/div      -28.78 dBm      -28.78 dBm      -28.78 dBm        10 dB/div      -28.78 dBm      -28.78 dBm      -28.78 dBm        10 dB/div      -28.78 dBm      -28.78 dBm      -28.78 dBm        20 dB/div      -28.78 dBm      -28.78 dBm      -28.78 dBm	L <mark>XI</mark>		RF	50 Ω	DC	CORREC			SEN	SE:INT	#A	/a Tvp	ALIGN AUTO	08:37:08	B PM Oct 27, 2016	F	requency
Mkr1 1.755 032 GHz        Auto Tune          10 dB/div        Ref 30.00 dBm        -28.78 dBm        Center Freq          20 0				Ν	IFE	PNO: IFGain	Wide G	Trig Atte	: Free en: 40	Run dB		.916					
200        Center Freq          100        1.75500000 GHz          100        0.1.130000 GHz          100        0.1.1300000 GHz          100        0.1.111000000 GHz          100 <th>10 dBa</th> <th>/div</th> <th>Ref 30</th> <th>0.00 di</th> <th>Bm</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th>Mkr</th> <th>1 1.755 -28</th> <th>032 GHz 3.78 dBm</th> <th></th> <th>Auto Tune</th>	10 dBa	/div	Ref 30	0.00 di	Bm								Mkr	1 1.755 -28	032 GHz 3.78 dBm		Auto Tune
100      Start Freq        100      0L1-1300 dem        1000      0L	20.0 -															1.7	<b>Center Freq</b> 55000000 GHz
100    0L1-13.00 dem    Stop Freq      200    0L1-13.00 dem    CF Step      300    0L1-13.00 dem    CF Step      400    0L1-13.00 dem    CF Step      500    0L1-13.00 dem    Freq Offset      600    0L1-13.00 dem    Status      600    0L1-13.00 dem    Status      600    0L1-13.00 dem    Status      700    0L1-13.00 dem    Status	10.0 - 0.00 -	or, markan	~~~~	~~~~	~~~~~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	ᡁᢇᡔᡅᡐᡨᠥᠰᢦ	~~~~								1.7	Start Freq 47000000 GHz
30.0 40.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0 50.0	-10.0 -20.0									1					DL1 -13.00 dBm	1.7	Stop Freq 63000000 GHz
-50.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -60.0 -70.0 -70.0 -70.0 -70.0 -70.0 -70.0 -70.0 -70.0 -70.0 -70.0 -70.0 -70.0 -70.0 -70.0 -70.0 -70.0 -70.0 -70.0 -70.0 -70.0 -70.0 -70.0 -7	-30.0 -								Lun.	- Contraction	www.	ᡝᠰᢆᡧ᠕		mmm	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	Auto	<b>CF Step</b> 1.600000 MHz Man
Center 1.755000 GHz #Res BW 200 kHz #VBW 620 kHz Sweep 1.000 ms (1001 pts)	-50.0 -																Freq Offset 0 Hz
Center 1.755000 GHz        Span 16.00 MHz        Log        Ln          #Res BW 200 kHz        #VBW 620 kHz        Sweep 1.000 ms (1001 pts)        Instants	-60.0															1.00	Scale Type
MSG SWEEP FOOTHS (TOT PLS)	Cente #Pes	er 1.75	5000 ·	GHz			#\/B)	M 620	kHz				Sween	Span 1 000 میں	16.00 MHz	Log	Lin
ALL	MSG	Dvv Z					#VDV	020	MH2				STAT	IN THE REAL PROPERTY IN	s (noon pis)		

Plot 7-115. Upper Band Edge Plot (Band 4 – 20.0MHz QPSK – RB Size 100)



Plot 7-116. Upper Extended Band Edge Plot (Band 4 – 20.0MHz QPSK – RB Size 100)

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🔤 Keysight Sp	ectrum Analyzer - Sv	vept SA									
IXI T	RF 50 \$	2 AC CO	RREC	SEI	NSE:INT	#Ava Tvp	ALIGN AUTO	10:22:27 P	M Oct 25, 2016	F	requency
		P IF	NO: Wide 🕞 Gain:Low	Trig: Free Atten: 32	e Run 2 dB		Mkr	1 1.849 9	92 GHz		Auto Tune
10 dB/div	Ref 22.00	dBm						-30.	46 aBm		
12.0										1.85	<b>Center Freq</b> 60000000 GHz
2.00					min	her have been and	all and the state of the state	<b>~~</b>			Otort Error
-8.00										1.84	Start Freq
									DL1 -13.00 dBm		
-18.0					1					1.85	Stop Freq 2000000 GHz
-28.0				ſ				- North			CE Stan
-38.0	~	mmmm	an ward and	man				^	and the second	<u>Auto</u>	400.000 kHz Man
manud	wwww										_
-58.0											Freq Offset 0 Hz
-68.0											
											Scale Type
Center 1.	850000 GHz							Span 4	.000 MHz	Log	Lin
#Res BW	13 kHz		#VBW	43 kHz			Sweep	29.07 ms	(1001 pts)		
MSG							STATU	JS			

Plot 7-117. Lower Band Edge Plot (Band 2 – 1.4MHz QPSK – RB Size 6)



Plot 7-118. Lower Extended Band Edge Plot (Band 2 – 1.4MHz QPSK – RB Size 6)

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🛄 Key	ysight Spe	ctrum Analyzer	- Swept	SA											
l <mark>,XI</mark>	T	RF	50 Ω	AC CO	ORREC		-	SENSE:INT	#Avr		LIGN AUTO	10:16:57	7 PM Oct 25, 2016	F	requency
				F	PNO: Wi FGain:L	de ↔ ow	. Trig: F Atten:	ree Run 32 dB		g type					
10 dE	3/div	Ref 22.0	0 dE	Sm							Mkr	1 1.910 -29	016 GHz 9.73 dBm		Auto Tune
12.0								<u> </u>						1.91	Center Freq
2.00			_r~	hutena	m	᠕᠕ᡊᠿ᠆ᢏᢧ	many								
-8.00														1.90	Start Freq 08000000 GHz
-18.0			]										DL1 -13.00 dBm		Stop Erog
-28.0			ŕ				``	1						1.91	2000000 GHz
-38.0	Mar M	m. Confrance						www.	ver man	mar an a	- ^				CF Step
48.0											m	man		<u>Auto</u>	400.000 kHz Man
-40.0													Marken Shareshing		Freq Offset
-58.0															0 Hz
-68.0															Scale Type
Cent #Ro	ter 1.9	10000 G	Hz								woon	Span	4.000 MHz	Log	Lin
MSG	5-DW	IJ KHZ			#		43 KH2			5	STATI	IS IS	s (1001 pts)		
	_										SIAR				

Plot 7-119. Upper Band Edge Plot (Band 2 – 1.4MHz QPSK – RB Size 6)



Plot 7-120. Upper Extended Band Edge Plot (Band 2 – 1.4MHz QPSK – RB Size 6)

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Keysigh	ht Spectrum Analy	zer - Swept SA									
l <b>x</b> i t	RF	50 Ω AC	CORREC	SEI	NSE:INT	#Ava Tvp	ALIGN AUTO	10:26:12 P	4 Oct 25, 2016	F	requency
			PNO: Wide 🖵 IFGain:Low	Trig: Free Atten: 32	e Run 2 dB		Mkr	TYF DE 1 1.849 9			Auto Tune
10 dB/di	iv Ref 22	2.00 dBm						-28.	15 dBm		
12.0										1.85	<b>Center Freq</b> 50000000 GHz
2.00					m	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	·····	· ····································	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		01
-8.00										1.84	Start Freq 18000000 GHz
-18.0									DL1 -13.00 dBm		Stop Freq
-28.0					1					1.85	2000000 GHz
-38.0		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	Jung Munder An	~~~~^/							CF Step
-48.0										<u>Auto</u>	Man
-58.0											Freq Offset
-68.0											0 HZ
											Scale Type
Center #Res E	r 1.850000 3W 30 kHz	GHz	#VBW	91 kHz			Sweep	Span 4 5.533 ms (	.000 MHz 1001 pts)	Log	Lin
MSG							STATU	JS			

Plot 7-121. Lower Band Edge Plot (Band 2 – 3.0MHz QPSK – RB Size 15)



Plot 7-122. Lower Extended Band Edge Plot (Band 2 – 3.0MHz QPSK – RB Size 15)

FCC ID: ZNFM210		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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Keysig	ght Spe	ctrum Ai	nalyzer - Sv	vept SA														
<b>l,XI</b> T		RF	50 \$	2 AC	CORR	EC		9	SENSE:IN	П	#Avg ]	ALIG	N AUTO	10:35:5 T	8 PM O	ct 25, 2016	F	requency
					PN0 IFGa	D: Wide ain:Low	Ģ	Trig: Fi Atten:	ree Rur 32 dB	ı		.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			TYPE DET			
10 dB/d	div	Ref	22.00	dBm									Mkr	1 1.910 -2	) 02 8.83	0 GHz 3 dBm		Auto Tune
12.0																	1.91	<b>Center Freq</b> 10000000 GHz
2.00	<u>_~</u> ~		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~~	~~~	~~~ <sub>~~~</sub>	<u>v</u> uvin	~~~									1.90	<b>Start Freq</b> 08000000 GHz
-18.0									1							1 -13.00 dBm	1.91	<b>Stop Freq</b> 12000000 GHz
-28.0										~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~~~^	~~~	www	<u>~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~</u>	- 40000	munum	<u>Auto</u>	<b>CF Step</b> 400.000 kHz Man
-48.0																		Freq Offset 0 Hz
-68.0																		Scale Type
Cente	r 1.9	1000	0 GHz											Spar	n 4.0	00 MHz	Log	Lin
#Res	BW	30 kH	Z			#VE	BW 9	91 kHz				Sw	eep	5.533 m	s (10	001 pts)		
MSG													STAT	US				

Plot 7-123. Upper Band Edge Plot (Band 2 – 3.0MHz QPSK – RB Size 15)



Plot 7-124. Upper Extended Band Edge Plot (Band 2 – 3.0MHz QPSK – RB Size 15)

FCC ID: ZNFM210		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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Keys	sight Spec	trum An	alyzer - Sw	ept SA												
L <mark>XI</mark>	T	RF	50 Ω	AC	CORR	EC		SE	NSE:INT	#/		ALIGN AUTO	) 10:44:4 T	8 PM Oct 25, 2016	F	requency
					PNC IFGa	): Wide ain:Low	Ŧ	Trig: Fre Atten: 3	e Run 2 dB		wg ryp					Auto Tune
10 dB	/div	Ref 2	22.00	dBm								Mkr	1 1.849	988 GHz 0.61 dBm		Auto Tune
12.0									ľ						1.0	Center Freq
2.0										A		~~~~~	<u>~~</u> ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		1.0	5000000 GH2
2.00															1.8	Start Freq 48000000 GHz
-8.00 -														DL1 -13.00 dBm		
-18.0 -									1						1.8	Stop Freq
-28.0 -								 ~								
-38.0	<b>~~~~</b>	$\cdots$	~~~~	~~~~~	~~~~	^_	~~~	~~~~							Auto	CF Step 400.000 kHz Man
-48.0 -															<u>Mato</u>	man
-58.0 -																Freq Offset 0 Hz
-68.0																Ocela Tress
															Log	Scale Type
Cent #Res	er 1.8 BW :	5000 51 kH	J GHZ Z			#VE	SW '	160 kHz				Sweep	Spar 1.933 m	r 4.000 MHz s (1001 pts)	Log	<u></u>
MSG												STAT	US			

Plot 7-125. Lower Band Edge Plot (Band 2 – 5.0MHz QPSK – RB Size 25)



Plot 7-126. Lower Extended Band Edge Plot (Band 2 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFM210		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕑 LG	Reviewed by: Quality Manager						
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🔤 Keys	sight Spe	ctrum An	alyzer - Swe	ept SA										
L <mark>XI</mark>	T	RF	50 Ω	AC	CORREC		SEI	NSE:INT	#Ava Tvi	ALIGN AUTO	) 10:50:13 P TRA	M Oct 25, 2016	F	requency
					PNO: W IFGain:L	ide ⊊ ₋ow	Trig: Free Atten: 32	e Run 2 dB			TY D			
10 dB	/div	Ref∶	22.00 c	IBm						Mkr	1 1.910 ( -31.	)12 GHz 39 dBm		Auto Tune
12.0 -													1.91	<b>Center Freq</b> 10000000 GHz
2.00 -	~~~~				······							DL1 -13.00 dBm	1.90	Start Freq 08000000 GHz
-18.0 - -28.0 -							- h	1					1.91	Stop Freq 2000000 GHz
-38.0 -								~~~~~	<u> </u>	<u></u>	·····	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	<u>Auto</u>	CF Step 400.000 kHz Man
-58.0 -														Freq Offset 0 Hz
-68.0														Scale Type
Cent	er 1.9	1000	0 GHz								Span 4	.000 MHz	Log	Lin
#Res	BW	51 KH	Z		7	¢γΒ₩	160 kHz			Sweep	1.933 ms	(1001 pts)		
MSG										STAT	US			

Plot 7-127. Upper Band Edge Plot (Band 2 – 5.0MHz QPSK – RB Size 25)



Plot 7-128. Upper Extended Band Edge Plot (Band 2 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFM210		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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Keysig	ght Spectru	ım Analyz	er - Swe	pt SA											
<b>l,XI</b> T		RF	50 Ω	AC	CORREC		SE	NSE:INT	#Av/		ALIGN AUTO	10:56:36 F	M Oct 25, 2016	F	requency
					PNO: W IFGain:	/ide ⊂ <mark>,</mark> Low	Trig: Fre Atten: 3	e Run 2 dB		g typ		T) E			Auto Tuno
10 dB/c	div .	lef 22.	.00 d	Bm							Mkr	1 1.849 -32	976 GHz 46 dBm		Auto Tune
12.0								Ĭ						1.85	Center Freq
2.00 —										~~~~	<u>~~~~</u> ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~			1.00	00000000000
-8.00														1.84	Start Freq 6000000 GHz
-18.0													DL1 -13.00 dBm		Ston Freq
-28.0 —								1						1.85	54000000 GHz
-38.0 —								<b>/</b>							CF Step
-48.0 —			~~~~											<u>Auto</u>	Man
-58.0 —															Freq Offset
-68.0 —															0 H2
															Scale Type
Cente	r 1.85	0000	SHz			#\/B\4	200 64-				Swoon	Span a	3.000 MHz	Log	Lin
#Res	BW 10	U KHZ				#VBW	300 KH2				sweep	1.000 ms	(1001 pts)		
MSG											STATU	15			

Plot 7-129. Lower Band Edge Plot (Band 2 – 10.0MHz QPSK – RB Size 50)



Plot 7-130. Lower Extended Band Edge Plot (Band 2 – 10.0MHz QPSK – RB Size 50)

FCC ID: ZNFM210		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🔁 LG	Reviewed by: Quality Manager
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K	(eysight Sp	ectrum Anal	yzer - Swe	pt SA									_	
L <mark>XI</mark>	T	RF	50 Ω	AC	CORREC		SE	NSE:INT	#Ava Tv	ALIGN AUTO	11:00:01 F	M Oct 25, 2016	F	requency
					PNO: W IFGain:	/ide 🖵 Low	Trig: Fre Atten: 32	e Run 2 dB			רד ם			Auto Tupo
10 0	dB/div	Ref 2	2.00 d	Bm						Mkr	1 1.910 -29	032 GHz 85 dBm		Auto Tulle
12.1	•												1.9 <sup>,</sup>	<b>Center Freq</b> 10000000 GHz
2.0	· <u> </u>	~~~~^	~~~~	<u> </u>		~~~~~	~							Start Freq
-8.00												DL1 -13.00 dBm	1.90	06000000 GHz
-18.0								. 1					1.9 <sup>,</sup>	Stop Freq
-28.0							⁄_	- 		·····	~~~~~			CE Stop
-38.0													<u>Auto</u>	800.000 kHz Man
-40.0														Freq Offset
-68.0														0 Hz
														Scale Type
Cei	nter 1.	910000	GHz								Span 8	.000 MHz	Log	Lin
#Re	es BW	100 kH	Z			#VBW	300 kHz			Sweep	1.000 ms	(1001 pts)		
MSG										STAT	US			

Plot 7-131. Upper Band Edge Plot (Band 2 – 10.0MHz QPSK – RB Size 50)



Plot 7-132. Upper Extended Band Edge Plot (Band 2 – 10.0MHz QPSK – RB Size 50)

FCC ID: ZNFM210		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🔁 LG	Reviewed by: Quality Manager
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🔤 Keysi	ight Spec	trum Analy	zer - Swe	pt SA											
<mark>LXI</mark> 1	T	RF	50 Ω	AC	CORREC		SEI	NSE:INT	#Avr			11:04:26	PM Oct 25, 2016	F	requency
					PNO: V IFGain:	Vide 🖵 Low	Trig: Fre Atten: 3	e Run 2 dB		Jiype		т			A
10 dB/	div	Ref 22	2.00 d	Bm							Mkr	1 1.849 -32	976 GHz .91 dBm		Auto Tune
12.0								ľ						1.85	Center Freq
2.00 —									~~~~~	<u>^</u>	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		
-8.00 —														1.84	Start Freq 44000000 GHz
-18.0													DL1 -13.00 dBm		Stop Fred
-28.0 —								1						1.85	56000000 GHz
-38.0				^	~~~~~	A	and the second	<mark>)</mark> r							CF Step
-48.0	Mur,		V	~~~~										<u>Auto</u>	1.200000 MHZ Man
-58.0 —															Freq Offset
-68.0 —															0 Hz
															Scale Type
Cente	er 1.8	50000	GHz			#\/R\M	170 kHz				ween	Span	12.00 MHz	Log	Lin
MSG	E)WW	50 KH				~VVV	470 KHZ				STATI	is	(Toor pis)		
Mod											STATE				

Plot 7-133. Lower Band Edge Plot (Band 2 – 15.0MHz QPSK – RB Size 75)



Plot 7-134. Lower Extended Band Edge Plot (Band 2 – 15.0MHz QPSK – RB Size 75)

FCC ID: ZNFM210		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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🛄 Keysig	ght Spectrum A	nalyzer - Swe	pt SA										
<b>l,XI</b> T	RF	50 Ω	AC	CORREC		SEN	ISE:INT	#Ava Ty	ALIGN AUTO	) 11:07:51 F	M Oct 25, 2016	F	requency
				PNO: Wi IFGain:L	ide 🖵 .ow	Trig: Free Atten: 32	e Run ! dB	#/ ( <b>1</b> 8 1)	pertaine	ΤΥ E			Auto Tuno
10 dB/c	div Ref	22.00 d	Bm						Mkr	1 1.848	920 GHz dBm		Auto Tune
12.0												1.9 <sup>,</sup>	<b>Center Freq</b> 10000000 GHz
-8.00		<u>~~~~~~</u> ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~			*_*						DL1 -13.00 dBm	1.90	Start Freq 04000000 GHz
-18.0 -28.0						h	~~~~~					1.9'	Stop Freq 16000000 GHz
-38.0											m	<u>Auto</u>	<b>CF Step</b> 1.200000 MHz Man
-58.0													Freq Offset 0 Hz
-68.0													Scale Type
Cente	r 1.9100	0 GHz		4	4) (D)M	470 643			Swoon	Span '	2.00 MHz	Log	Lin
#Res	5W 150 I			#	FV DVV	47 U KHZ			sweep	1.000 ms	(1001 pts)		
MSG									STAT	05			

Plot 7-135. Upper Band Edge Plot (Band 2 – 15.0MHz QPSK – RB Size 75)



Plot 7-136. Upper Extended Band Edge Plot (Band 2 – 15.0MHz QPSK – RB Size 75)

FCC ID: ZNFM210		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🔁 LG	Reviewed by: Quality Manager
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W    T    RF    50 Ω    AC    CORREC    SENSE:INT    ALIGN AUTO    11:11:25 PM Oct 25, 2016      PNO: Fast    Free Run IFGain:Low    Trig: Free Run Atten: 32 dB    #Avg Type: RMS    Trace    12:34 5 6    Frequency	
PNO: Fast Free Run Atten: 32 dB Trig: Free Run Atten: 32 dB Trie ANNNNN DET ANNNNN DET ANNNNN DET ANNNNN DET ANNNNN Atten: 32 dB Atto Tu	
IFGain:Low Atten: 32 dB DETAINING Auto Tu Mkr1 1.849 968 GHz Auto Tu	
Mkr1 1.849 968 GHz Auto T	
	Ine
10 dB/div Ref 22.00 dBm -34.45 dBm	
Center F	req
1.85000000 0	GHz
2.00 Start F	rea
1842000000	GHz
-5.00 Dt -1300 ePm	
-18.0 Stop F	req
1.858000000	GHz
-28.0	
	ten
1.60000 1	MHz
Auto	Man
-48.0	
Freq Off	set
-58.0	) Hz
-68.0	
Scale IV	ype
Center 1,850000 GHz Span 16.00 MHz Log	Lin
#Res BW 200 kHz #VBW 620 kHz Sweep 1.000 ms (1001 pts)	
MSG	

Plot 7-137. Lower Band Edge Plot (Band 2 – 20.0MHz QPSK – RB Size 100)



Plot 7-138. Lower Extended Band Edge Plot (Band 2 – 20.0MHz QPSK – RB Size 100)

FCC ID: ZNFM210		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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Keysight S	Spectrum Analyzer - Swept SA									
<b>lxi</b> T	RF 50 Ω AC	CORREC	SEN	ISE:INT	#Ava Tvp	ALIGN AUTO	11:14:02 P	M Oct 25, 2016	F	requency
		PNO: Fast 😱	Trig: Free Atten: 32	Run dB			TYI Di			
10 dB/div	Ref 22.00 dBm					Mkr	1 1.910 ( -31.	064 GHz 00 dBm		Auto Tune
12.0									1.91	<b>Center Freq</b> 0000000 GHz
2.00 <b>~~~~</b>		and the part of th	~~~					DL1 -13.00 dBm	1.90	Start Freq 2000000 GHz
-18.0				1					1.91	<b>Stop Freq</b> 8000000 GHz
-38.0			- Un	-		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	www.ww	And the second	<u>Auto</u>	<b>CF Step</b> 1.600000 MHz Man
-58.0										<b>Freq Offset</b> 0 Hz
-68.0										Scale Type
Center 1	.910000 GHz					_	Span 1	6.00 MHz	Log	Lin
#Res BW	200 KHz	#VBW	620 kHz			sweep	1.000 ms (	1001 pts)		
MSG						STATU	JS			

Plot 7-139. Upper Band Edge Plot (Band 2 – 20.0MHz QPSK – RB Size 100)



Plot 7-140. Upper Extended Band Edge Plot (Band 2 – 20.0MHz QPSK – RB Size 100)

FCC ID: ZNFM210		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🔁 LG	Reviewed 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 7-141. PAR Plot (Band 2 – 1.4MHz QPSK – RB Size 6)



Plot 7-142. PAR Plot (Band 2 – 1.4MHz 16-QAM – RB Size 6)

FCC ID: ZNFM210		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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Plot 7-143. PAR Plot (Band 2 – 3.0MHz QPSK – RB Size 15)



Plot 7-144. PAR Plot (Band 2 – 3.0MHz 16-QAM – RB Size 15)

FCC ID: ZNFM210		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕑 LG	Reviewed by: Quality Manager
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Plot 7-145. PAR Plot (Band 2 – 5.0MHz QPSK – RB Size 25)



Plot 7-146. PAR Plot (Band 2 - 5.0MHz 16-QAM - RB Size 25)

FCC ID: ZNFM210		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🔁 LG	Reviewed by: Quality Manager
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Plot 7-147. PAR Plot (Band 2 – 10.0MHz QPSK – RB Size 50)



Plot 7-148. PAR Plot (Band 2 – 10.0MHz 16-QAM – RB Size 50)

FCC ID: ZNFM210		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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Plot 7-149. PAR Plot (Band 2 – 15.0MHz QPSK – RB Size 75)



Plot 7-150. PAR Plot (Band 2 – 15.0MHz 16-QAM – RB Size 75)

FCC ID: ZNFM210		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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Plot 7-151. PAR Plot (Band 2 – 20.0MHz QPSK – RB Size 100)



Plot 7-152. 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(c.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  $\geq$  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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## Test Setup

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]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBd]	ERP [dBm]	ERP Limit [dBm]	Margin [dB]
699.70	1.4	QPSK	н	262	331	1 / 0	15.37	2.12	17.49	34.77	-17.28
707.50	1.4	QPSK	н	262	331	1 / 5	15.83	2.31	18.14	34.77	-16.63
715.30	1.4	QPSK	н	262	331	1 / 0	15.46	2.52	17.98	34.77	-16.79
699.70	1.4	16-QAM	н	262	331	1 / 0	13.92	2.12	16.04	34.77	-18.73
707.50	1.4	16-QAM	н	262	331	1 / 5	14.33	2.31	16.64	34.77	-18.13
715.30	1.4	16-QAM	н	262	331	1 / 0	14.16	2.52	16.68	34.77	-18.09
700.50	3	QPSK	н	262	350	1 / 14	16.59	2.12	18.71	34.77	-16.06
707.50	3	QPSK	н	262	350	1 / 14	16.76	2.31	19.07	34.77	-15.70
714.50	3	QPSK	н	262	350	1 / 0	16.63	2.50	19.13	34.77	-15.64
700.50	3	16-QAM	н	262	350	1 / 14	15.40	2.12	17.52	34.77	-17.25
707.50	3	16-QAM	н	262	350	1 / 14	15.27	2.31	17.58	34.77	-17.19
714.50	3	16-QAM	н	262	350	1 / 0	15.84	2.50	18.34	34.77	-16.43
701.50	5	QPSK	н	265	345	1 / 24	17.06	2.15	19.21	34.77	-15.56
707.50	5	QPSK	н	262	345	1 / 24	17.35	2.31	19.66	34.77	-15.11
713.50	5	QPSK	н	262	345	1 / 0	17.16	2.48	19.64	34.77	-15.14
701.50	5	16-QAM	н	265	345	1 / 24	15.62	2.15	17.77	34.77	-17.00
707.50	5	16-QAM	н	262	345	1 / 24	16.24	2.31	18.55	34.77	-16.22
713.50	5	16-QAM	н	262	345	1 / 0	15.71	2.48	18.19	34.77	-16.59
704.00	10	QPSK	н	263	350	1 / 49	17.39	2.22	19.61	34.77	-15.17
707.50	10	QPSK	н	263	350	1 / 0	17.19	2.31	19.50	34.77	-15.27
711.00	10	QPSK	н	263	350	1 / 0	17.60	2.41	20.01	34.77	-14.76
704.00	10	16-QAM	н	263	350	1 / 49	15.77	2.22	17.99	34.77	-16.79
707.50	10	16-QAM	н	263	350	1 / 0	16.08	2.31	18.39	34.77	-16.38
711.00	10	16-QAM	н	263	350	1 / 0	16.62	2.41	19.03	34.77	-15.74
711.00	10	QPSK	V	166	202	1 / 74	13.90	2.96	16.86	34.77	-17.91

Table 7-2. ERP Data (Band 12)

FCC ID: ZNFM210		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕑 LG	Reviewed 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 [dBd]	ERP [dBm]	ERP Limit [dBm]	Margin [dB]
824.70	1.4	QPSK	V	141	350	1 / 0	13.73	5.01	18.74	38.45	-19.71
836.50	1.4	QPSK	V	141	350	1 / 0	12.26	5.16	17.42	38.45	-21.03
848.30	1.4	QPSK	V	141	350	1 / 5	11.47	5.30	16.77	38.45	-21.68
824.70	1.4	16-QAM	V	141	350	1 / 0	12.37	5.01	17.38	38.45	-21.07
836.50	1.4	16-QAM	V	141	350	1 / 5	9.84	5.16	15.00	38.45	-23.45
848.30	1.4	16-QAM	V	141	350	1 / 5	10.84	5.30	16.14	38.45	-22.31
825.50	3	QPSK	V	133	342	1 / 0	13.93	5.02	18.95	38.45	-19.50
836.50	3	QPSK	V	141	350	1 / 0	12.23	5.16	17.39	38.45	-21.06
847.50	3	QPSK	V	141	350	1 / 0	11.29	5.29	16.58	38.45	-21.87
825.50	3	16-QAM	V	133	342	1 / 0	12.54	5.02	17.56	38.45	-20.89
836.50	3	16-QAM	V	141	350	1 / 0	10.63	5.16	15.79	38.45	-22.66
847.50	3	16-QAM	V	141	350	1 / 0	10.16	5.29	15.45	38.45	-23.00
826.50	5	QPSK	V	130	328	1 / 0	14.79	5.03	19.82	38.45	-18.63
836.50	5	QPSK	V	130	328	1 / 0	13.30	5.16	18.46	38.45	-19.99
846.50	5	QPSK	V	130	328	1 / 0	12.17	5.28	17.45	38.45	-21.00
826.50	5	16-QAM	V	130	328	1 / 0	13.28	5.03	18.31	38.45	-20.14
836.50	5	16-QAM	V	130	328	1 / 0	11.17	5.16	16.33	38.45	-22.12
846.50	5	16-QAM	V	130	328	1 / 0	10.94	5.28	16.22	38.45	-22.23
829.00	10	QPSK	V	134	300	1 / 0	14.39	5.06	19.45	38.45	-19.00
836.50	10	QPSK	V	134	300	1 / 0	13.36	5.16	18.52	38.45	-19.93
844.00	10	QPSK	V	134	300	1 / 0	12.78	5.25	18.03	38.45	-20.42
829.00	10	16-QAM	V	134	300	1/0	13.36	5.06	18.42	38.45	-20.03
836.50	10	16-QAM	V	134	300	1/0	12.13	5.16	17.29	38.45	-21.16
844.00	10	16-QAM	V	134	300	1/0	11.66	5.25	16.91	38.45	-21.54
826.50	5	QPSK	н	209	9	1/0	13.87	4.95	18.82	38.45	-19.63

Table 7-3. ERP Data (Band 5)

FCC ID: ZNFM210		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed 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	233	298	3/2	14.15	9.66	23.81	30.00	-6.19
1732.50	1.4	QPSK	н	299	289	1 / 5	15.42	9.61	25.03	30.00	-4.97
1754.30	1.4	QPSK	н	293	290	3/2	14.82	9.57	24.39	30.00	-5.61
1710.70	1.4	16-QAM	н	233	298	3/2	13.12	9.66	22.78	30.00	-7.22
1732.50	1.4	16-QAM	н	299	289	1 / 5	14.34	9.61	23.95	30.00	-6.05
1754.30	1.4	16-QAM	н	293	290	3/2	13.72	9.57	23.29	30.00	-6.71
1711.50	3	QPSK	н	235	296	1 / 14	14.52	9.65	24.17	30.00	-5.83
1732.50	3	QPSK	н	297	298	1 / 0	15.15	9.61	24.76	30.00	-5.24
1753.50	3	QPSK	н	222	282	1 / 14	14.26	9.57	23.83	30.00	-6.17
1711.50	3	16-QAM	н	235	296	1 / 14	13.73	9.65	23.38	30.00	-6.62
1732.50	3	16-QAM	н	297	298	1 / 0	14.23	9.61	23.84	30.00	-6.16
1753.50	3	16-QAM	н	222	282	1 / 14	13.53	9.57	23.10	30.00	-6.90
1712.50	5	QPSK	н	296	117	1 / 24	14.61	9.65	24.26	30.00	-5.74
1732.50	5	QPSK	н	299	110	1 / 0	15.42	9.61	25.03	30.00	-4.97
1752.50	5	QPSK	н	293	109	1 / 0	15.27	9.57	24.84	30.00	-5.16
1712.50	5	16-QAM	н	296	117	1 / 24	13.30	9.65	22.95	30.00	-7.05
1732.50	5	16-QAM	н	299	110	1 / 0	14.37	9.61	23.98	30.00	-6.02
1752.50	5	16-QAM	н	293	109	1 / 0	14.00	9.57	23.57	30.00	-6.43
1715.00	10	QPSK	н	235	293	1 / 0	14.19	9.65	23.84	30.00	-6.16
1732.50	10	QPSK	н	298	295	1 / 0	15.45	9.61	25.06	30.00	-4.94
1750.00	10	QPSK	н	222	283	1 / 49	14.17	9.58	23.75	30.00	-6.25
1715.00	10	16-QAM	н	235	293	1 / 0	13.53	9.65	23.18	30.00	-6.82
1732.50	10	16-QAM	н	298	295	1 / 0	13.95	9.61	23.56	30.00	-6.44
1750.00	10	16-QAM	н	222	283	1 / 49	13.09	9.58	22.67	30.00	-7.33
1717.50	15	QPSK	н	297	293	1 / 74	14.43	9.64	24.07	30.00	-5.93
1732.50	15	QPSK	н	297	292	1 / 0	14.86	9.61	24.47	30.00	-5.53
1747.50	15	QPSK	н	297	292	1 / 0	14.74	9.58	24.32	30.00	-5.68
1717.50	15	16-QAM	Н	297	293	1 / 74	13.78	9.64	23.42	30.00	-6.58
1732.50	15	16-QAM	н	297	292	1 / 0	13.69	9.61	23.30	30.00	-6.70
1747.50	15	16-QAM	Н	297	292	1 / 0	13.61	9.58	23.19	30.00	-6.81
1720.00	20	QPSK	н	297	297	1 / 99	14.95	9.64	24.59	30.00	-5.41
1732.50	20	QPSK	н	301	297	1 / 99	15.30	9.61	24.91	30.00	-5.09
1745.00	20	QPSK	н	300	292	1/0	15.13	9.59	24.72	30.00	-5.28
1720.00	20	16-QAM	н	297	297	1 / 99	14.18	9.64	23.82	30.00	-6.18
1732.50	20	16-QAM	н	301	297	1 / 99	14.37	9.61	23.98	30.00	-6.02
1745.00	20	16-QAM	н	300	292	1/0	13.97	9.59	23.56	30.00	-6.44
1732.50	10	QPSK	V	101	148	1/0	13.31	9.53	22.84	30.00	-7.16

## Table 7-4. EIRP Data (Band 4)

FCC ID: ZNFM210		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	💽 LG	Reviewed 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	106	27	3/2	14.89	9.35	24.24	33.01	-8.77
1880.00	1.4	QPSK	н	103	23	3/2	15.24	9.27	24.51	33.01	-8.50
1909.30	1.4	QPSK	н	103	26	3/2	12.41	9.25	21.66	33.01	-11.35
1850.70	1.4	16-QAM	н	106	27	3/2	14.86	9.35	24.21	33.01	-8.80
1880.00	1.4	16-QAM	н	103	23	3/2	14.35	9.27	23.62	33.01	-9.39
1909.30	1.4	16-QAM	н	103	26	3/2	11.67	9.25	20.92	33.01	-12.09
1851.50	3	QPSK	н	103	28	1 / 14	15.00	9.35	24.35	33.01	-8.66
1880.00	3	QPSK	н	101	26	1 / 14	14.64	9.27	23.91	33.01	-9.10
1908.50	3	QPSK	н	103	28	1 / 0	12.97	9.25	22.22	33.01	-10.79
1851.50	3	16-QAM	н	103	28	1 / 14	14.14	9.35	23.49	33.01	-9.52
1880.00	3	16-QAM	н	101	26	1 / 14	13.88	9.27	23.15	33.01	-9.86
1908.50	3	16-QAM	н	103	28	1 / 0	12.24	9.25	21.49	33.01	-11.52
1852.50	5	QPSK	н	263	115	1 / 0	15.32	9.34	24.66	33.01	-8.35
1880.00	5	QPSK	н	259	115	1 / 0	14.15	9.27	23.42	33.01	-9.59
1907.50	5	QPSK	н	254	107	1 / 0	13.61	9.24	22.85	33.01	-10.16
1852.50	5	16-QAM	н	263	115	1 / 0	14.48	9.34	23.82	33.01	-9.19
1880.00	5	16-QAM	н	259	115	1 / 0	13.50	9.27	22.77	33.01	-10.24
1907.50	5	16-QAM	н	254	107	1 / 0	12.93	9.24	22.17	33.01	-10.84
1855.00	10	QPSK	н	109	104	1 / 49	15.40	9.34	24.74	33.01	-8.27
1880.00	10	QPSK	н	150	108	1 / 0	15.29	9.27	24.56	33.01	-8.45
1905.00	10	QPSK	н	100	108	1 / 0	13.89	9.24	23.13	33.01	-9.88
1855.00	10	16-QAM	н	109	104	1 / 49	14.63	9.34	23.97	33.01	-9.04
1880.00	10	16-QAM	н	150	108	1 / 0	14.52	9.27	23.79	33.01	-9.22
1905.00	10	16-QAM	н	100	108	1 / 0	13.13	9.24	22.37	33.01	-10.64
1857.50	15	QPSK	н	110	96	1 / 74	14.00	9.33	23.33	33.01	-9.68
1880.00	15	QPSK	н	103	108	1 / 0	14.56	9.27	23.83	33.01	-9.18
1902.50	15	QPSK	н	100	111	1 / 0	13.05	9.23	22.28	33.01	-10.73
1857.50	15	16-QAM	н	110	96	1 / 74	13.25	9.33	22.58	33.01	-10.43
1880.00	15	16-QAM	н	103	108	1 / 0	13.80	9.27	23.07	33.01	-9.94
1902.50	15	16-QAM	н	100	111	1 / 0	12.28	9.23	21.51	33.01	-11.50
1860.00	20	QPSK	н	100	107	1 / 99	14.78	9.32	24.10	33.01	-8.91
1880.00	20	QPSK	н	103	108	1 / 0	14.29	9.27	23.56	33.01	-9.45
1900.00	20	QPSK	н	100	115	100 / 0	13.09	9.22	22.31	33.01	-10.70
1860.00	20	16-QAM	н	100	107	1 / 99	14.05	9.32	23.37	33.01	-9.64
1880.00	20	16-QAM	н	103	108	1/0	13.61	9.27	22.88	33.01	-10.13
1900.00	20	16-QAM	н	100	115	100 / 0	12.18	9.22	21.40	33.01	-11.61
1855.00	10	QPSK	۷	100	96	1 / 99	14.10	9.22	23.32	33.01	-9.69

### Table 7-5. EIRP Data (Band 2)

	FCC ID: ZNFM210		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	💽 LG	Reviewed by: Quality Manager	
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## 7.7 Radiated Spurious Emissions Measurements §2.1053 §22.917(a) §24.238(a) §27.53(g) §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 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]
1408.00	Н	100	249	-56.87	2.45	-54.42	74.0
2112.00	Н	260	340	-52.83	3.44	-49.39	69.0
2816.00	Н	-	-	-65.93	4.80	-61.13	80.7

Table 7-6. Radiated Spurious Data (Band 12 – 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]
1415.00	Н	100	211	-60.23	2.54	-57.69	77.2
2122.50	Н	119	325	-53.88	3.42	-50.46	70.0
2830.00	Н	-	-	-66.03	4.85	-61.18	80.7

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

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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]
1422.00	Н	100	309	-58.65	2.63	-56.01	76.0
2133.00	Н	119	324	-55.89	3.39	-52.49	72.5
2844.00	Н	-	-	-65.71	4.91	-60.81	80.8

Table 7-8. Radiated Spurious Data (Band 12 – High 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]
1653.00	Н	112	5	-57.20	3.62	-53.58	73.4
2479.50	Н	240	7	-52.97	3.56	-49.41	69.2
3306.00	Н	-	-	-65.42	5.83	-59.59	79.4

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

FCC ID: ZNFM210		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed 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]
1673.00	Н	117	253	-64.33	3.52	-60.81	79.3
2509.50	Н	238	366	-52.33	3.59	-48.74	67.2
3346.00	Н	-	-	-65.26	5.87	-59.39	77.9

Table 7-10. Radiated Spurious Data (Band 5 – Mid 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]
1693.00	Н	107	12	-60.25	3.42	-56.83	74.3
2539.50	Н	240	37	-53.83	3.72	-50.11	67.6
3386.00	Н	-	-	-65.34	5.91	-59.43	76.9

Table 7-11. Radiated Spurious Data (Band 5 – High Channel)

FCC ID: ZNFM210		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕑 LG	Reviewed 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 [dBi]	Spurious Emission Level [dBm]	[dBc]
3430.00	Н	247	320	-69.50	9.87	-59.63	83.5
5145.00	Н	245	18	-66.53	10.75	-55.78	79.6
6860.00	Н	-	-	-65.34	11.68	-53.66	77.5

Table 7-12. Radiated Spurious Data (Band 4 – 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]
3465.00	Н	180	276	-68.05	9.91	-58.13	83.2
5197.50	Н	100	158	-64.56	10.75	-53.82	78.9
6930.00	Н	-	-	-64.93	11.76	-53.17	78.2

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

FCC ID: ZNFM210		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed 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 [dBi]	Spurious Emission Level [dBm]	[dBc]
3500.00	Н	169	335	-68.49	9.95	-58.54	82.3
5250.00	Н	161	261	-64.73	10.71	-54.01	77.8
7000.00	Н	-	-	-65.08	11.84	-53.24	77.0

Table 7-14. Radiated Spurious Data (Band 4 – High 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]
3710.00	Н	105	214	-60.03	8.79	-51.25	76.0
5565.00	Н	100	212	-62.71	10.47	-52.24	77.0
7420.00	Н	166	140	-64.52	11.96	-52.57	77.3
9275.00	Н	-	-	-63.51	13.19	-50.32	75.1

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

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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]
3760.00	Н	100	223	-60.84	8.72	-52.12	76.7
5640.00	Н	100	165	-62.37	10.61	-51.76	76.3
7520.00	Н	100	135	-62.88	12.03	-50.85	75.4
9400.00	Н	-	-	-63.48	13.27	-50.21	74.8

Table 7-16. Radiated Spurious Data (Band 2 – 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]
3810.00	Н	147	190	-64.61	8.64	-55.97	79.1
5715.00	Н	101	173	-62.36	10.65	-51.72	74.8
7620.00	Н	101	132	-63.04	12.16	-50.88	74.0
9525.00	Н	-	-	-63.59	13.29	-50.30	73.4

Table 7-17. Radiated Spurious Data (Band 2 – High Channel)

FCC ID: ZNFM210		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🔁 LG	Reviewed 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:

- 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 22, the frequency stability of the transmitter shall be maintained within  $\pm 0.00025\%$  ( $\pm 2.5$  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 12 Frequency Stability Measurements §2.1055 §27.54

OPERATING FREQUENCY:	707,500,000	Hz
CHANNEL:	23790	_
REFERENCE VOLTAGE:	3.85	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	707,499,672	-328	-0.0000464
100 %		- 30	707,499,797	-203	-0.0000287
100 %		- 20	707,499,989	-11	-0.0000016
100 %		- 10	707,499,871	-129	-0.0000182
100 %		0	707,499,784	-216	-0.0000305
100 %		+ 10	707,499,826	-174	-0.0000246
100 %		+ 20	707,500,104	104	0.0000147
100 %		+ 30	707,499,938	-62	-0.0000088
100 %		+ 40	707,500,325	325	0.0000459
100 %		+ 50	707,499,859	-141	-0.0000199
BATT. ENDPOINT	3.45	+ 20	707,499,983	-17	-0.0000024

Table 7-18. Frequency Stability Data (Band 12)

## 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 12 Frequency Stability Measurements §2.1055 §27.54



Figure 7-8. Frequency Stability Graph (Band 12)

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# Band 5 Frequency Stability Measurements §2.1055 §22.355

OPERATING FREQUENCY:	836,500,000	Hz
CHANNEL:	20525	
REFERENCE VOLTAGE:	3.85	VDC
<b>DEVIATION LIMIT:</b>	± 0.00025 % or 2.5 ppm	

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	836,499,809	-191	-0.0000228
100 %		- 30	836,499,700	-300	-0.0000359
100 %		- 20	836,499,913	-87	-0.0000104
100 %		- 10	836,500,248	248	0.0000296
100 %		0	836,500,435	435	0.0000520
100 %		+ 10	836,499,708	-292	-0.0000349
100 %		+ 20	836,499,955	-45	-0.0000054
100 %		+ 30	836,499,954	-46	-0.0000055
100 %		+ 40	836,499,816	-184	-0.0000220
100 %		+ 50	836,500,118	118	0.0000141
BATT. ENDPOINT	3.45	+ 20	836,499,993	-7	-0.0000008

Table 7-19. Frequency Stability Data (Band 5)

## 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 5 Frequency Stability Measurements §2.1055 §22.355



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

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# Band 4 Frequency Stability Measurements §2.1055 §§27.54

OPERATING FREQUENCY:	1,732,500,000	Hz
CHANNEL:	20175	_
REFERENCE VOLTAGE:	3.85	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	1,732,499,747	-253	-0.0000146
100 %		- 30	1,732,499,956	-44	-0.0000025
100 %		- 20	1,732,500,332	332	0.0000192
100 %		- 10	1,732,499,929	-71	-0.0000041
100 %		0	1,732,499,929	-71	-0.0000041
100 %		+ 10	1,732,499,774	-226	-0.0000130
100 %		+ 20	1,732,500,109	109	0.0000063
100 %		+ 30	1,732,500,044	44	0.0000025
100 %		+ 40	1,732,500,119	119	0.0000069
100 %		+ 50	1,732,499,785	-215	-0.0000124
BATT. ENDPOINT	3.45	+ 20	1,732,499,859	-141	-0.0000081

Table 7-20. 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:	3.85	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	1,879,999,802	-198	-0.0000105
100 %		- 30	1,880,000,060	60	0.0000032
100 %		- 20	1,880,000,312	312	0.0000166
100 %		- 10	1,879,999,993	-7	-0.0000004
100 %		0	1,880,000,064	64	0.0000034
100 %		+ 10	1,879,999,887	-113	-0.0000060
100 %		+ 20	1,880,000,448	448	0.0000238
100 %		+ 30	1,880,000,010	10	0.0000005
100 %		+ 40	1,879,999,956	-44	-0.0000023
100 %		+ 50	1,879,999,982	-18	-0.0000010
BATT. ENDPOINT	3.45	+ 20	1,879,999,994	-6	-0.0000003

Table 7-21. 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.

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## Band 2 Frequency Stability Measurements §2.1055 §24.235



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: ZNFM210 complies with all the requirements of Parts 22, 24, & 27 of the FCC rules for LTE operation only.

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