

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 $43 + \log_{10}(P_{[Watts]})$, 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

Test Setup

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

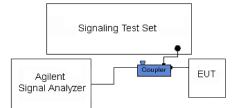


Figure 7-3. Test Instrument & Measurement Setup

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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www.www.com.com.com.com.com.com.com.com.com.com					
ΧΙ RL RF 50 Ω Α(PNO: Wide 🗔	SENSE:INT Trig: Free Run Atten: 36 dB	#Avg Type: RMS	04:02:22 PM Jun 16, 2017 TRACE 1 2 3 4 5 6 TYPE A WWWWW DET A N N N N N	Frequency
10 dB/div Ref 25.00 dBn	IFGain:Low	Atten: 36 dB	Mk	r1 698.000 MHz -33.28 dBm	Auto Tune
15.0					Center Freq 698.000000 MHz
-5.00					Start Freq 696.000000 MHz
-15.0				DL1 -13.00 dBm	Stop Freq 700.000000 MHz
-35.0	~~~~~				CF Step 400.000 kHz <u>Auto</u> Mar
-45.0	und -				Freq Offse 0 Hz
-65.0					Scale Type
Center 698.000 MHz #Res BW 100 kHz	#VBW	300 kHz	Sweep	Span 4.000 MHz 1.000 ms (1001 pts)	Log <u>Lin</u>
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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	ectrum Analyzer - S										
RL	RF 50	Ω AC	CORREC		SE:INT	#Avg Type	e: RMS	TRAC	M Jun 16, 2017 CE 1 2 3 4 5 6 PE A WWWWW T A N N N N N	F	requency
	Ref 25.00	dBm	IFGain:Low	Atten: 36			Mk	r1 716.1	16 MHz 74 dBm		Auto Tun
0 dB/div og	Rel 25.00	авт									Center Fre B.100000 MH
5.00										71	Start Fre 5.100000 MH
15.0	*	~~~~							DL1 -13.00 dBm	72	Stop Fre 0.100000 MH
45.0		hon	-	www.						<u>Auto</u>	CF Ste 400.000 k⊢ Ma
55.0					~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~				FreqOffso 0 ⊦
65.0											Scale Typ
enter 71 Res BW	8.100 MHz 100 kHz		#VBV	/ 300 kHz		ę	Sweep 1	Span 4 .000 ms (.000 MHz (1001 pts)	Log	Li
G							STATUS	3			

Plot 7-79. Upper Extended Band Edge Plot (Band 12 – 1.4MHz QPSK – RB Size 6)



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

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RF 50	Ω AC					#Avg Typ	e:RMS	TRAC	E 1 2 3 4 5 6	F	requency
		IFGain:Lo									Auto Tune
Ref 25.00	dBm						Mk	(r1 716.0 -19.	00 MHz 88 dBm		Auto Tune
										(Center Freq
										710	5.000000 MHz
		~~~~~									Start Fred
										714	1.000000 MHz
									DL1 -13.00 dBm		
					1						Stop Fred
										718	3.000000 MHz
						~~~~~			~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		CF Step
										<u>Auto</u>	400.000 kHz Mar
											Freq Offse
											Scale Type
			(D) 1 2(00 kU-			Curoon	Span 4		Log	Lin
TOU KHZ		#	/BW 30						1001 pts)		
	Ref 25.00	Ref 25.00 dBm	Ref 50 Ω AC CORREC PNO: Wid IFGain:Lo Ref 25.00 dBm	Ref 50 Ω AC CORREC PNO: Wide PRO: Wide PRO: Wide IFGain:Low IFGain:Low	RF 50 Ω AC CORREC SET PNO: Wide Trig: Free Trig: Free Ref 25.00 dBm	Ref 25.00 dBm	RF 50 Ω AC CORREC SENSE:INT #Avg Type PNO: Wide IFGain:Low Trig: Free Run Atten: 36 dB #avg Type Ref 25.00 dBm	RF 50 \Omega CORREC SENSE:INT PNO: Wide Trig: Free Run #Avg Type: RMS Ref 25.00 dBm Image: Constant of the sense sens sense sense sense sense sense s	RF 50 \ \ \ \ \ \ \ \ \ \ \ \ \ CORREC SENSE:INT #Avg Type: RMS Track PNO: Wide IFGain:Low Trig: Free Run Atten: 36 dB #Way Type: RMS Track Ref 25.00 dBm	RF 50 12 AC CORREC SENSE:INT (03:59:20 PM) un 16, 2017 PNO: Wide Trig: Free Run #Avg Type: RMS Trace 23:45 to Ref 25.00 dBm IFGain:Low Trig: Free Run -19.88 dBm Mikr1 716.000 MHz -19.88 dBm 0 -19.83 dBm 0 -19.00 dBm 0 -19.00 MHz	RF 50 Ω AC CORREC SENSE:INT 03:59:20 PMJun 16, 2017 F PNO: Wide Trig: Free Run Atten: 36 dB Trig: Free Run Atten: 36 dB Mkr1 716.0000 MHz -19,88 dBm 716 Ref 25.00 dBm -19,88 dBm -19,88 dBm -19,78 dBm 716 00159/20 PMJun 16,2017 Trig: Free Run Atten: 36 dB 01159/20 PMJun 16,2017 716 01159/20 PMJun 16,2017 Trig: Free Run Atten: 36 dB 01170/2000 01170/2000 01170/2000 01159/20 PMJun 16,2017 Trig: Free Run Atten: 36 dB Mkr1 716.0000 MHz 01170/2000 01170/2000 01170/2000 01150/20 PMJun 16,2017 Trig: Free Run Atten: 36 dB 01170/2000 01170/2000 01170/2000 01170/2000 01170/2000 01170/2000 01170/2000 01170/2000 01170/2000 01170/2000 01170/2000 01170/2000 01170/2000 01170/2000 01170/2000 01170/2000 01170/2000 01170/2000 01170/2000 01170/2000 01170/2000 01170/2000 01170/2000 01170/2000 01170/2000 01170/2000 01170/2000 01170/2000 01170/2000 <td< td=""></td<>

Plot 7-81. Upper Band Edge Plot (Band 12 – 3.0MHz QPSK – RB Size 15)



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

FCC ID: ZNFUN220		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager		
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	ectrum Analyz											_	
XI RL	RF	50 Ω	AC	CORREC	ide 🕟	Trig: Fr		#Avg Ty	pe: RMS	TRA	PM Jun 16, 2017 CE 1 2 3 4 5 6 (PE A WWWWW DET A NNNN	F	requency
10 dB/div Log	Ref 25	.00 dE	3m	IFGain:L	ow	Atten:	36 dB		M	(r1 716.)	028 MHz .89 dBm		Auto Tune
15.0													Center Fre 5.000000 MH
5.00											DL1 -13.00 dBm	714	Start Fre 4.000000 M⊦
25.0												718	Stop Fre 3.000000 MH
45.0							·~~	~~~~~		~~~~~	~~~~ <u>~</u>	<u>Auto</u>	CF Ste 400.000 kH Ma
55.0													Freq Offs 0 I
65.0													Scale Typ
Center 71 Res BW	6.000 M 100 kHz	Hz		#	¢VBW	300 kH	z		Sweep	Span 4 1.000 ms	4.000 MHz (1001 pts)	Log	Li
ISG									STATU	JS			

Plot 7-83. Upper Band Edge Plot (Band 12 – 5.0MHz QPSK – RB Size 25)



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

FCC ID: ZNFUN220		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager		
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	ectrum Analyzer						
X/RL	RF	50Ω AC	CORREC	SENSE:INT	#Avg Type: RMS	03:54:13 PM Jun 16, 2017 TRACE 1 2 3 4 5 6	Frequency
			PNO: Wide G	Trig: Free Run Atten: 36 dB			
10 dB/div Log	Ref 25.0	0 dBm			MI	kr1 716.000 MHz -30.10 dBm	Auto Tune
15.0							Center Fred 716.000000 MH;
-5.00			~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~				Start Free 712.000000 MH
-15.0				1-		DL1 -13.00 dBm	Stop Free 720.000000 MH
-35.0					≏୶୶୕୷ୢଽଽ୷୶ୖୖୖୖୖୖୖ୕୷୷ଢ଼ୡ୷୷୷୶		CF Ste 800.000 kH <u>Auto</u> Ma
-45.0							Freq Offse 0 H
-65.0							Scale Type
Center 71 #Res BW	6.000 MH 100 kHz	Z	#VBW	300 kHz	Sweep	Span 8.000 MHz 1.000 ms (1001 pts)	Log <u>Lir</u>
MSG					STAT		

Plot 7-85. Upper Band Edge Plot (Band 12 – 10.0MHz QPSK – RB Size 50)



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

FCC ID: ZNFUN220		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager		
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	pectrum Analyze												
XVI RL	RF	50 Ω	AC	CORREC	: Wide 🕞		e Run	#Avg Typ	e: RMS	TRA	PM Jun 14, 2017 CE 1 2 3 4 5 6 PE A WWWWW ET A NNNN	F	requency
10 dB/div	Ref 25.	00 d	Bm	IFGair	n:Low	Atten: 3			Mk	r1 849.0	000 MHz 03 dBm		Auto Tune
15.0				~~~~		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~							Center Freq 9.000000 MHz
-5.00							1				DL1 -13.00 dBm	84	Start Freq 7.000000 MHz
-15.0		/						hanny			UL1 -13.00 dBm	85	Stop Fred 1.000000 MH;
-35.0								~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	h have	······	~~~~~	<u>Auto</u>	CF Step 400.000 kH Mar
-55.0													Freq Offse 0 H:
-65.0													Scale Type
	49.000 MI V 100 kHz	ΙZ			#VBW	300 kHz			Sweep 1	Span 4 .000 ms	l.000 MHz (1001 pts)	Log	Lin
MSG									STATU	5			

Plot 7-87. Upper Band Edge Plot (Band 5 – 1.4MHz QPSK – RB Size 6)



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

FCC ID: ZNFUN220		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
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Plot 7-89. Upper Band Edge Plot (Band 5 – 3.0MHz QPSK – RB Size 15)



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

FCC ID: ZNFUN220		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
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	ectrum Analyzer -							
LXI RL	RF 5	0Ω AC	CORREC	SENSE:INT	#Avg Type	e: RMS	07:28:19 PM Jun 14, 2017 TRACE 1 2 3 4 5 6 TYPE A WWWW DET A NNNNN	Frequency
10 dB/div Log	Ref 25.0	0 dBm	IFGain:Low	Atten: 36 dB		Mkr*	1 849.020 MHz -23.52 dBm	Auto Tune
15.0								Center Freq 849.000000 MHz
-5.00							DL1 -13.00 dBm	Start Freq 847.000000 MHz
-15.0				1				Stop Freq 851.000000 MHz
-35.0								CF Step 400.000 kHz <u>Auto</u> Man
-55.0								Freq Offset 0 Hz
-65.0								Scale Type
Center 84 #Res BW		2	#VBW	/ 300 kHz	\$	Sweep 1.0	Span 4.000 MHz 000 ms (1001 pts)	Log <u>Lin</u>
MSG						STATUS		

Plot 7-91. Upper Band Edge Plot (Band 5 – 5.0MHz QPSK – RB Size 25)



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

FCC ID: ZNFUN220		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
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	ectrum Analyzer - Swep										
XI RL	RF 50 Ω		PNO: Wide		NSE:INT	#Avg Typ	e: RMS	TRAC	I Jun 14, 2017 E 1 2 3 4 5 6 E A WWWWW T A N N N N N	F	requency
10 dB/div	Ref 25.00 d		IFGain:Low	Atten: 36	6 dB		Mk	r1 849.0			Auto Tune
15.0											Center Fred 9.000000 MH
-5.00	~~~~ <u>~</u> ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~~~							DL1 -13.00 dBm	84	Start Free
-15.0					.1—					853	Stop Fre 3.000000 MH
45.0						·····		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	<u>Auto</u>	CF Ste 800.000 kH Ma
55.0											Freq Offse 0 ⊦
65.0											Scale Typ
Center 84 #Res BW	9.000 MHz 100 kHz		#VB\	V 300 kHz			Sweep ′	Span 8 1.000 ms (.000 MHz 1001 pts)	Log	Li
MSG							STATU	IS			

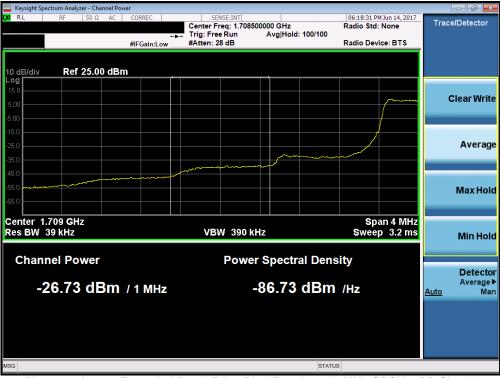
Plot 7-93. Upper Band Edge Plot (Band 5 – 10.0MHz QPSK – RB Size 50)



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

FCC ID: ZNFUN220		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
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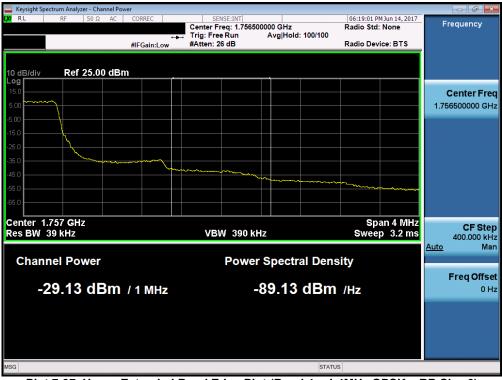
Plot 7-95. Lower Extended Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 6)



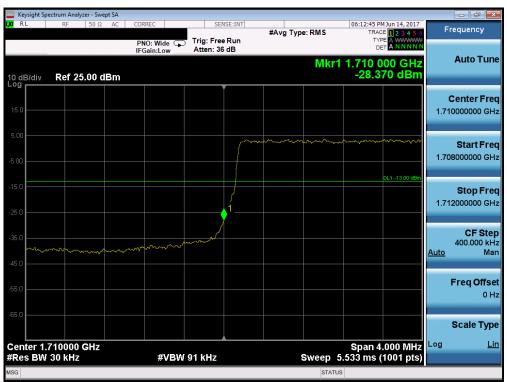
Plot 7-96. Upper Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 6)

FCC ID: ZNFUN220	PCTEST	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
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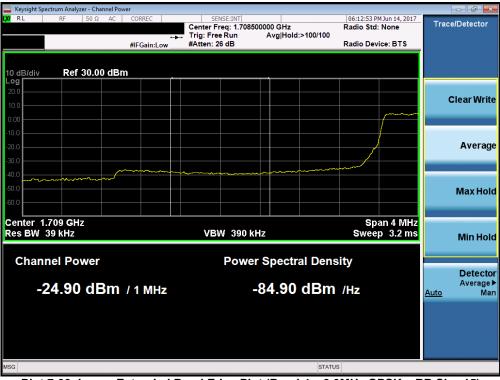
Plot 7-97. Upper Extended Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 6)



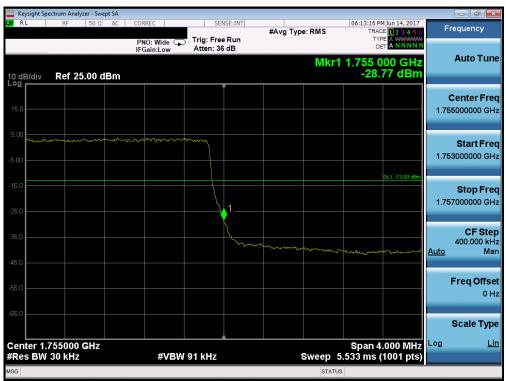
Plot 7-98. Lower Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)

FCC ID: ZNFUN220		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
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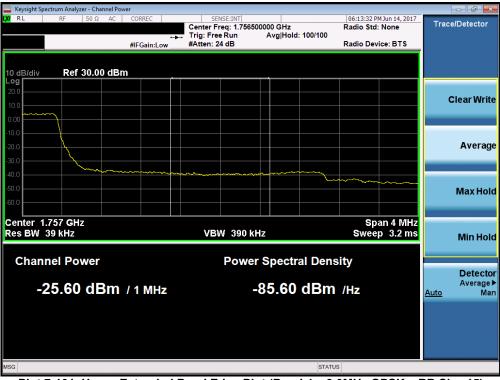
Plot 7-99. Lower Extended Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)



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

FCC ID: ZNFUN220		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
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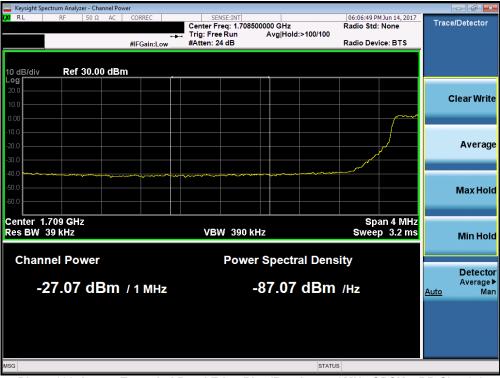
Plot 7-101. Upper Extended Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)



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

FCC ID: ZNFUN220	PCTEST	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
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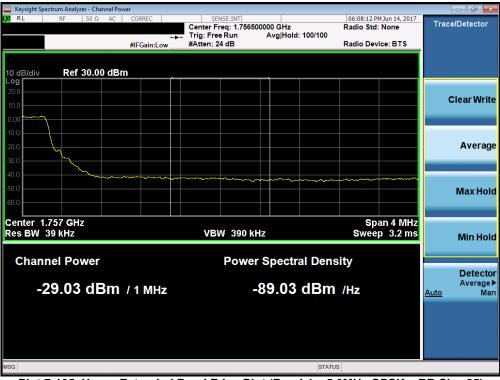
Plot 7-103. Lower Extended Band Edge Plot (Band 4 – 5.0MHz QPSK – RB Size 25)



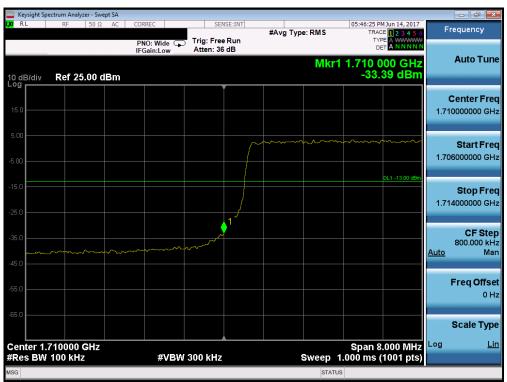
Plot 7-104. Upper Band Edge Plot (Band 4 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFUN220		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
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Plot 7-105. Upper Extended Band Edge Plot (Band 4 – 5.0MHz QPSK – RB Size 25)



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

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	ctrum Analyzer	- Swept SA						
X/RL	RF	50Ω AC	CORREC	SENSE	#Avg Ty	ype: RMS	05:47:02 PM Jun 14, 2017 TRACE 1 2 3 4 5 6 TYPE A WWWWW	Frequency
10 dB/div Log	Ref 25.0	10 dBm	IFGain:Low	Atten: 36 di	3	Mkr1	1.709 000 GHz -25.48 dBm	Auto Tune
15.0								Center Fred 1.707000000 GHz
-5.00								Start Fred 1.705000000 GH:
-15.0							DL1 -13.00 dBm	Stop Fred 1.709000000 GHz
35.0	en med de sue de la constant de la c			Aper				CF Stej 400.000 kH <u>Auto</u> Mar
55.0								Freq Offse 0 H
-65.0								Scale Type
Center 1.7 #Res BW		Hz	#VB	W 3.0 MHz		Sweep 1	Span 4.000 MHz .000 ms (1001 pts)	Log <u>Lir</u>
ISG						STATUS	3	

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



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

FCC ID: ZNFUN220		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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	ctrum Analyzer										
X/RL	RF 5	0Ω AC	CORREC	SEN	SE:INT	#Avg Typ	e: RMS	TRAC	1 Jun 14, 2017 E 1 2 3 4 5 6	F	requency
			PNO: Fast ++ IFGain:Low	Trig: Free Atten: 36		•		TYF			• • • •
10 dB/div Log	Ref 25.0	0 dBm					Mkr1	1.756 0 -26.	00 GHz 67 dBm		Auto Tune
15.0											Center Freq 8000000 GHz
-5.00										1.75	Start Fred 6000000 GHz
-15.0									DL1 -13.00 dBm	1.76	Stop Fred
-35.0	Myrad Art Stranger	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	Marault-military-yang-		ᡣᡏᡮᡃᡭᡃᠫᡊᡧᡘᡁᢑᡊᢑᡢ	and all and all all all all all all all all all al	(Anathenetiya) Anathenetiya	Thelin may apply in the second second	Bygfyligen, planta, mbyr	<u>Auto</u>	CF Step 400.000 kH Mar
-55.0											Freq Offse 0 H
-65.0											Scale Type
Center 1.7		lz						Span 4	2000 10112	Log	Lir
#Res BW	1.0 MHz		#VBV	/ 3.0 MHz					1001 pts)		
SG							STATUS				

Plot 7-109. Upper Extended Band Edge Plot (Band 4 – 10.0MHz QPSK – RB Size 50)



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

FCC ID: ZNFUN220		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dego 71 of 119
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🔤 Keysight Spectrum Analyzer - S						
XIRL RF 50	Ω AC CORR):Fast ↔ Tri	SENSE:INT	#Avg Type: RMS	05:56:04 PM Jun 14, 2017 TRACE 1 2 3 4 5 6 TYPE A WWWWW DET A NNNNN	Frequency
10 dB/div Ref 25.00	IFGa	in:Low At	ten: 36 dB	Mkr1	1.708 980 GHz -30.24 dBm	Auto Tune
15.0						Center Free 1.707000000 GH:
5.00					DL1 -13.00 dBm	Start Free 1.705000000 GH:
25.0						Stop Free 1.709000000 GH
45.0		t _{enne} nt-ten ^{ten} tenent				CF Ste 400.000 kH <u>Auto</u> Ma
56.0						Freq Offso 0 ⊦
						Scale Type
Center 1.707000 GHz #Res BW 1.0 MHz		#VBW 3.0	MHz	Sweep 1	Span 4.000 MHz .000 ms (1001 pts)	Log <u>Lir</u>
ISG				STATUS	3	

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



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

FCC ID: ZNFUN220		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 70 of 110
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	ectrum Analyzer - Sw										
X/RL	RF 50 Ω	AC	CORREC	SE	NSE:INT	#Avg Typ	e: RMS	05:56:38 PI TRAC	4 Jun 14, 2017	F	requency
			PNO: Fast + IFGain:Low	Trig: Fre Atten: 36					E 1 2 3 4 5 6 E A WWWWW A NNNNN		
10 dB/div Log	Ref 25.00	dBm					Mkr1	1.756 0 -31.	16 GHz 53 dBm		Auto Tune
					Í						Center Fred
15.0										1.75	8000000 GH:
5.00											Start Free
-5.00										1.75	6000000 GH
15.0									DL1 -13.00 dBm		Stop Free
-25.0										1.76	0000000 GH
-		1877 Sugar - Aug 1889	and and the forther ways	A.T. Phillips Alexandrow Marcoland							CF Step
-35.0						an an Alina an An Alina an An An		**************************************		<u>Auto</u>	400.000 kH: Mar
45.0											
-55.0											Freq Offse 0 Ha
65.0											
											Scale Type
Center 1.3 #Res BW	758000 GHz		#\/R	W 3.0 MHz			Sween 1	Span 4	.000 MHz 1001 pts)	Log	<u>Lir</u>
ISG	1.0 10112		#00	W 5.0 WI12			STATUS		roor pisj		

Plot 7-113. Upper Extended Band Edge Plot (Band 4 – 15.0MHz QPSK – RB Size 75)



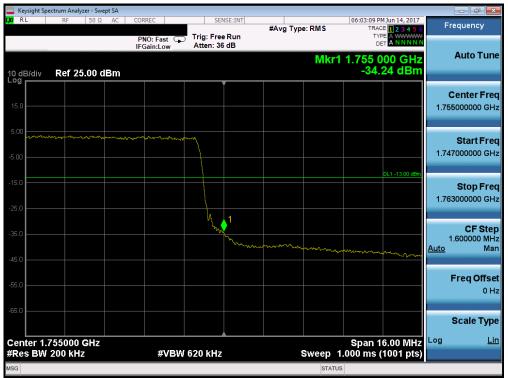
Plot 7-114. Lower Band Edge Plot (Band 4 – 20.0MHz QPSK – RB Size 100)

FCC ID: ZNFUN220		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager						
Test Report S/N:	Test Dates:	EUT Type:		Dego 72 of 119						
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	oectrum Analyzer -	Swept SA						
X/RL	RF 50	Ω AC	CORREC	SENSE	#Avg	J Type: RMS	06:02:54 PM Jun 14, 2017 TRACE 1 2 3 4 5 TYPE A WWWW DET A NNNN	Frequency
10 dB/div	Ref 25.00) dBm	IFGain:Low	Atten: 36 dl		Mkr	DET A NNNN 1 1.708 848 GHz -31.71 dBn	Auto Tune
15.0								Center Frec 1.707000000 GHz
-5.00								Start Fred 1.705000000 GH:
-15.0							DL1 -13.00 dBn	Stop Fred 1.709000000 GH;
-35.0	^~1e11~1e11e1	anter a state of the	\		nhabhtion_faoith	-1949-ray Browniewschaufer		CF Step 400.000 kH <u>Auto</u> Mar
55.0								Freq Offse 0 H
-65.0								Scale Type
	.707000 GH 1.0 MHz	Z	#VBM	/ 3.0 MHz		Sweep	Span 4.000 MH: 1.000 ms (1001 pts	Log <u>Lin</u>
MSG						STATU	JS	

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



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

FCC ID: ZNFUN220		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dego 74 of 119
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	ctrum Analyzer -										
X/RL	RF 50	Ω AC	CORREC	SEI	ISE:INT	#Avg Type	e: RMS	06:03:19 PI TRAC	M Jun 14, 2017	F	requency
			PNO: Fast ← IFGain:Low	Trig: Free Atten: 36		0 //			E 1 2 3 4 5 6 E A WWWW A NNNNN		A. 4. 7.
10 dB/div Log	Ref 25.00) dBm					Mkr1	1.756 0 -31.	12 GHz 91 dBm		Auto Tune
15.0											Center Freq 88000000 GHz
-5.00									DL1 -13.00 dBm	1.75	Start Freq 66000000 GHz
-15.0										1.76	Stop Freq 0000000 GHz
-35.0	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	produced produce	u Antonia antonio antoni	man and a start	Refuge-LDP3-075a-	neð per hannaldaler er dru	Werthouse Commission	างเสียงมัญใหญ่ใ _{ช่วง} างค่ารัฐจ	999 ⁹⁹⁹ 9999999999	<u>Auto</u>	CF Step 400.000 kHz Mar
-55.0											Freq Offset 0 Hz
-65.0											Scale Type
	58000 GH	z						Span 4	.000 10112	Log	<u>Lin</u>
#Res BW	1.0 MHz		#VB	W 3.0 MHz				1.000 ms (1001 pts)		
SG							STATU	s			

Plot 7-117. Upper Extended Band Edge Plot (Band 4 – 20.0MHz QPSK – RB Size 100)

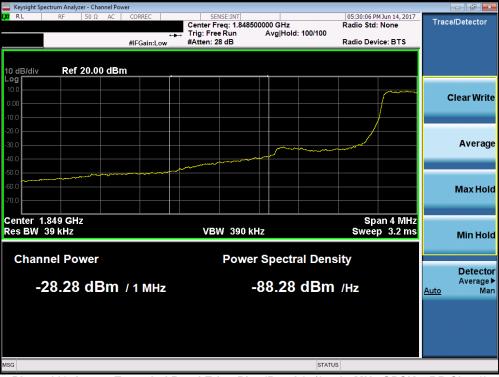


Plot 7-118. Lower Band Edge Plot (Band 25/2 – 1.4MHz QPSK – RB Size 6)

FCC ID: ZNFUN220		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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Plot 7-119. Lower Extended Band Edge Plot (Band 25/2 - 1.4MHz QPSK - RB Size 6)



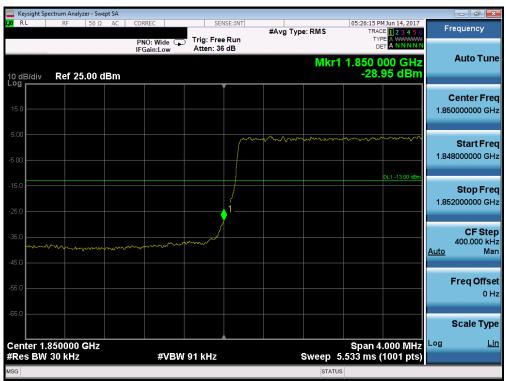
Plot 7-120. Upper Band Edge Plot (Band 25/2 – 1.4MHz QPSK – RB Size 6)

FCC ID: ZNFUN220		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga 76 of 119
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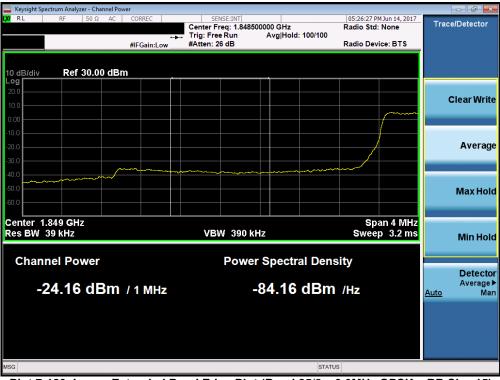
Plot 7-121. Upper Extended Band Edge Plot (Band 25/2 – 1.4MHz QPSK – RB Size 6)



Plot 7-122. Lower Band Edge Plot (Band 25/2 – 3.0MHz QPSK – RB Size 15)

FCC ID: ZNFUN220	PCTEST	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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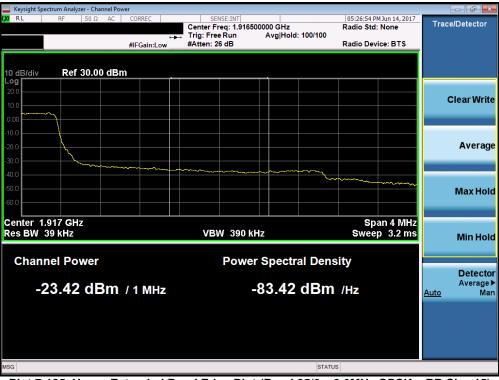
Plot 7-123. Lower Extended Band Edge Plot (Band 25/2 – 3.0MHz QPSK – RB Size 15)



Plot 7-124. Upper Band Edge Plot (Band 25/2 – 3.0MHz QPSK – RB Size 15)

FCC ID: ZNFUN220	PCTEST	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga 70 of 110
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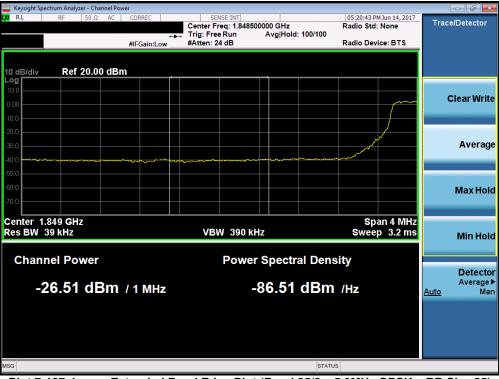
Plot 7-125. Upper Extended Band Edge Plot (Band 25/2 – 3.0MHz QPSK – RB Size 15)



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

FCC ID: ZNFUN220		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga 70 of 119
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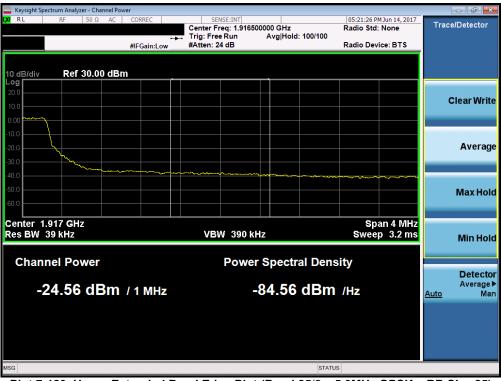
Plot 7-127. Lower Extended Band Edge Plot (Band 25/2 – 5.0MHz QPSK – RB Size 25)



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

FCC ID: ZNFUN220	PCTEST	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga 90 of 119
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Plot 7-129. Upper Extended Band Edge Plot (Band 25/2 – 5.0MHz QPSK – RB Size 25)



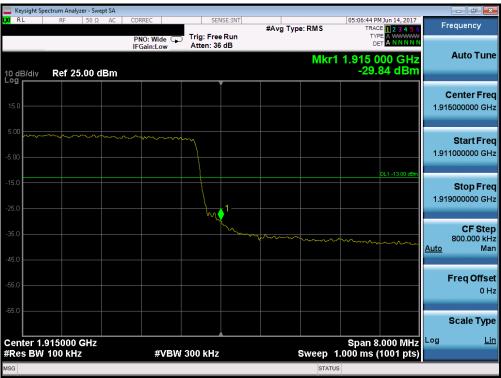
Plot 7-130. Lower Band Edge Plot (Band 25/2 – 10.0MHz QPSK – RB Size 50)

FCC ID: ZNFUN220		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 01 of 110
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	ectrum Analy											
X/RL	RF	50 Ω A		ORREC		SEI	#Avg Typ	e: RMS	TRAC	MJun 14, 2017 CE 1 2 3 4 5 6 PE A T A N N N N N	F	requency
10 dB/div	Ref 25	i.00 dBr	IF	Gain:Lo		Atten: 36		Mkr′	1.849 0			Auto Tune
15.0												Center Fred 47000000 GH2
-5.00											1.84	Start Fred 45000000 GH:
-15.0							a constitution proversional provide		and a grade and a filling of the opposite of t	DL1 -13.00 dBm 1	1.84	Stop Fre 19000000 GH
35.0			iderestate men		مريد مريد مريد مريد مريد مريد مريد مريد						<u>Auto</u>	CF Stej 400.000 kH Mar
55.0												Freq Offse 0 H
-65.0												Scale Type
Center 1. #Res BW				#`	VBW :	3.0 MHz		Sweep	Span 4 1.000 ms (.000 MHz 1001 pts)	Log	Lin
ASG								STATU	IS			

Plot 7-131. Lower Extended Band Edge Plot (Band 25/2 – 10.0MHz QPSK – RB Size 50)



Plot 7-132. Upper Band Edge Plot (Band 25/2 – 10.0MHz QPSK – RB Size 50)

FCC ID: ZNFUN220		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dege 92 of 119
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	pectrum Analyzer - S	wept SA									- 0 ×
X/RL	RF 50	Ω AC	CORREC		Bun	#Avg Type	: RMS	TRAC	MJun 14, 2017 E 1 2 3 4 5 6	Fr	equency
10 dB/div Log	Ref 25.00	dBm	PNO: Fast ↔ IFGain:Low	Atten: 36			Mkr1	1.916 0	100 GHz 88 dBm		Auto Tune
15.0											Center Freq 3000000 GHz
-5.00										1.910	Start Fred
-15.0 1 -25.0	٣٩٩٩٢٠٤٢	Mulinegenerat	A.F. A. Marray S. A. A. B. Mall (M.	Valuet Marine	d				DL1 -13.00 dBm	1.920	Stop Fred
-35.0							na ann an ann an ann ann ann ann ann an		ng unat segment de	<u>Auto</u>	CF Step 400.000 kHz Mar
.55.0										ľ	F req Offse 0 H:
-65.0											Scale Type
	.918000 GH; / 1.0 MHz	z	#VBM	/ 3.0 MHz		\$	Sweep ′	Span 4 1.000 ms (.000 MHz 1001 pts)	Log	Lin
MSG							STATU	s			

Plot 7-133. Upper Extended Band Edge Plot (Band 25/2 – 10.0MHz QPSK – RB Size 50)



Plot 7-134. Lower Band Edge Plot (Band 25/2 – 15.0MHz QPSK – RB Size 75)

FCC ID: ZNFUN220		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dege 92 of 119
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	ctrum Analyzer										
XI RL	RF	50 Ω AC	CORREC PNO: Fast	Trig: Free		#Avg Type	e:RMS	TRA	PM Jun 14, 2017 ACE 1 2 3 4 5 6 APE A WWWWW DET A NNNN	F	requency
10 dB/div Log	Ref 25.0)0 dBm	IFGain:Low	Atten: 36	dB		Mkr1	1.848	232 GHz .41 dBm		Auto Tune
15.0											Center Freq 7000000 GHz
-5.00									DL1 -13.00 dBm	1.84	Start Free 5000000 GH:
-25.0				201400-00 10-00 10-00 10-00 10-00 10-00 10-00 10-00 10-00 10-00 10-00 10-00 10-00 10-00 10-00 10-00 10-00 10-00			and and the off office from the office of th	1		1.84	Stop Fred 9000000 GH:
-35.0										<u>Auto</u>	CF Step 400.000 kH Ma
55.0 <u> </u>											Freq Offse 0 H
-05.0											Scale Type
Center 1.3 #Res BW		Hz	#V	BW 3.0 MHz		ę	Sweep 1	Span 4 1.000 ms	4.000 MHz (1001 pts)	Log	Lir
MSG							STATU	s			

Plot 7-135. Lower Extended Band Edge Plot (Band 25/2 – 15.0MHz QPSK – RB Size 75)



Plot 7-136. Upper Band Edge Plot (Band 25/2 – 15.0MHz QPSK – RB Size 75)

FCC ID: ZNFUN220		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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	ectrum Analyzer - S	Swept SA						
L <mark>X/</mark> RL	RF 50	Ω AC	CORREC	SENSE	#Avg T	ype: RMS	05:12:42 PM Jun 14, 2017 TRACE 1 2 3 4 5 6	Frequency
			PNO: Fast ↔ IFGain:Low	Trig: Free R Atten: 36 dl		Mkr1	1.916 096 GHz	
10 dB/div Log	Ref 25.00	dBm					-27.95 dBm	
15.0								Center Freq 1.918000000 GHz
-5.00								Start Freq 1.916000000 GHz
-15.0							DL1 -13.00 dBm	Stop Fred 1.920000000 GHz
35.0 45.0	Alergeogen Alergeogen Alergeogen	r=1-8-m-ve196162	rywisod Arrine, engledywerdy	an a	-Antonio antone anto	and the second	สารางที่สารารุกรรณ์ และรู้สาราสุรสิราช _{าตร} เก _ร า	CF Step 400.000 kH <u>Auto</u> Mar
-55.0								Freq Offse 0 Hi
-65.0								Scale Type
	918000 GH 1.0 MHz	Z	#VBM	/ 3.0 MHz		Sweep ′	Span 4.000 MHz 1.000 ms (1001 pts)	Log <u>Lin</u>
MSG						STATU	s	

Plot 7-137. Upper Extended Band Edge Plot (Band 25/2 – 15.0MHz QPSK – RB Size 75)



Plot 7-138. Lower Band Edge Plot (Band 25/2 – 20.0MHz QPSK – RB Size 100)

FCC ID: ZNFUN220		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
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	ctrum Analyzer -									_	
X/RL	RF 5	0Ω AC	CORREC PNO: Fas		SENSE:INT	#Avg Type	RMS	TRAC	MJun 14, 2017 DE 1 2 3 4 5 6 PE A	F	requency
10 dB/div Log	Ref 25.0	0 dBm	IFGain:Lo				Mkr1	1.847 6	12 GHz 36 dBm		Auto Tune
15.0											Center Fred 7000000 GH;
-5.00									DL1 -13.00 dBm	1.84	Start Free 5000000 GH:
-15.0						1			DL1 -1.3.00 dBm	1.84	Stop Free 9000000 GH
35.0 	ragegereiteren, halferen		4	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			ng βanangan ang ang ang ang ang ang ang ang			<u>Auto</u>	CF Ste 400.000 kH Ma
55.0											Freq Offse 0 H
-65.0											Scale Type
Center 1.8 #Res BW	347000 GH 1.0 MHz	lz	#\	/BW 3.0 MH	z	s	Sweep 1	Span 4 .000 ms (.000 MHz (1001 pts)	Log	Lir
MSG							STATU	5			

Plot 7-139. Lower Extended Band Edge Plot (Band 25/2 – 20.0MHz QPSK – RB Size 100)



Plot 7-140. Upper Band Edge Plot (Band 25/2 – 20.0MHz QPSK – RB Size 100)

FCC ID: ZNFUN220		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
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Center 10 dB/div Ref 25.00 dBm -29.44 dBm 150 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 500 50	o Tun
IFGain:Low Atten: 36 dB Def Extension Mikr1 1.916 060 GHz -29.44 dBm -29.44 dBm 0 dB/div Ref 25.00 dBm -29.44 dBm -29.44 dBm 150 - - - - - - - 150 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -	
Image: State in the state i	r Fre
5.0 0 0.1-1300 dBm 5ta 5.0 0 0.1-1300 dBm 5ta 5.0 0 0.1-1300 dBm 5ta 5.0 0 0.1-1300 dBm 5ta 1.9200000	
5.0 Sto 1.9200000	rt Fre
	p Fr 00 GI
	F Ste 000 kl Mi
5.0 Freq	Offs 0
enter 1 918000 GHz Span 4 000 MHz Log	e Typ
enter 1.918000 GHz Span 4.000 MHz Log Res BW 1.0 MHz #VBW 3.0 MHz Sweep 1.000 ms (1001 pts)	

Plot 7-141. Upper Extended Band Edge Plot (Band 25/2 – 20.0MHz QPSK – RB Size 100)

	FCC ID: ZNFUN220		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.

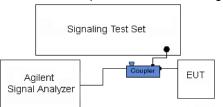


Figure 7-4. Test Instrument & Measurement Setup

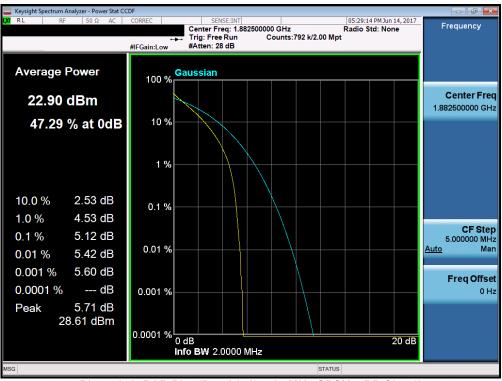
Test Notes

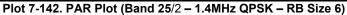
None.

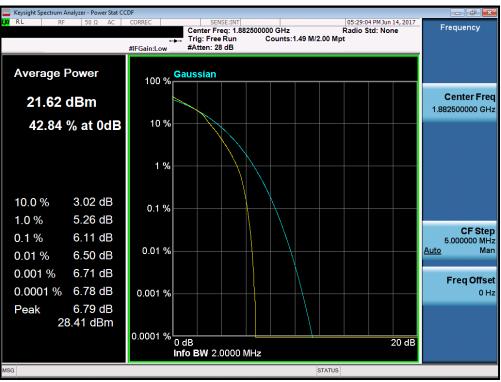
FCC ID: ZNFUN220		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dama 00 af 440	
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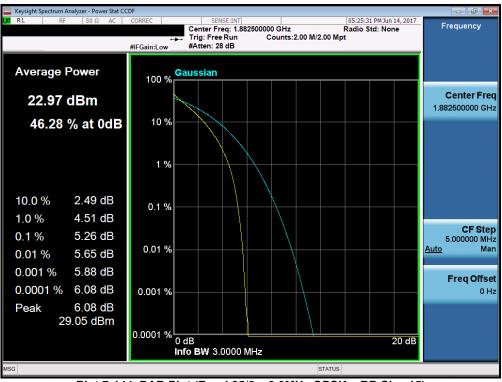




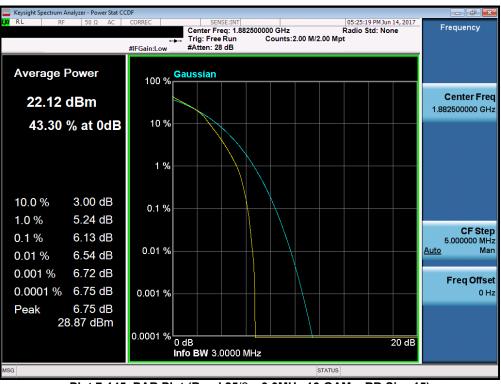
Plot 7-143. PAR Plot (Band 25/2 - 1.4MHz 16-QAM - RB Size 6)

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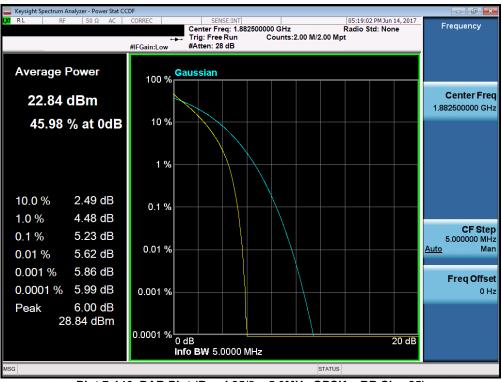
Plot 7-144. PAR Plot (Band 25/2 - 3.0MHz QPSK - RB Size 15)



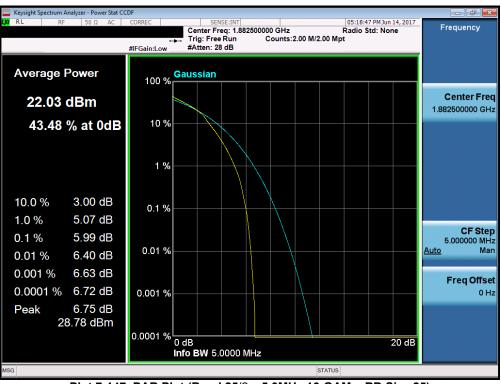
Plot 7-145. PAR Plot (Band 25/2 - 3.0MHz 16-QAM - RB Size 15)

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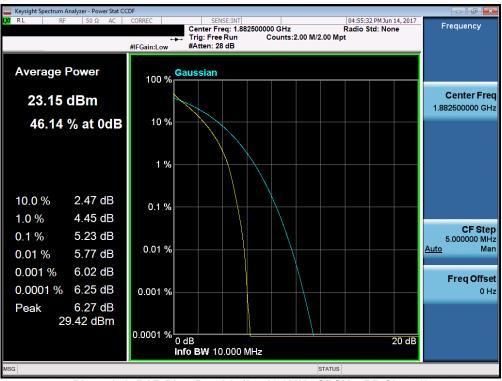
Plot 7-146. PAR Plot (Band 25/2 - 5.0MHz QPSK - RB Size 25)

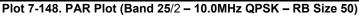


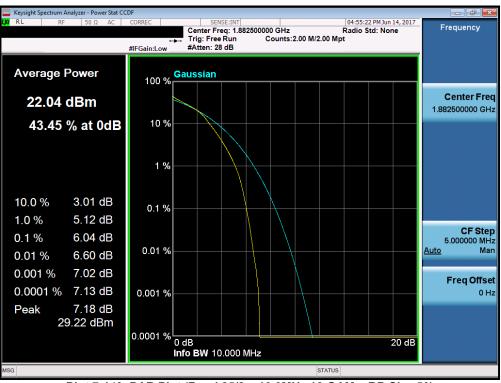
Plot 7-147. PAR Plot (Band 25/2 - 5.0MHz 16-QAM - RB Size 25)

FCC ID: ZNFUN220		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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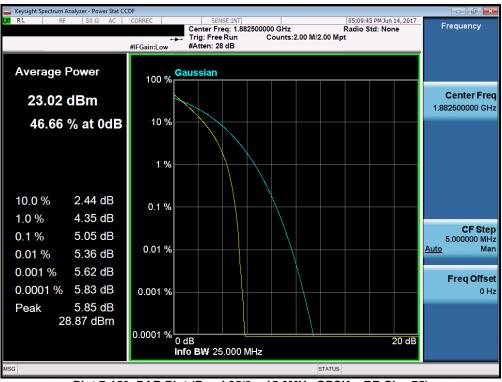




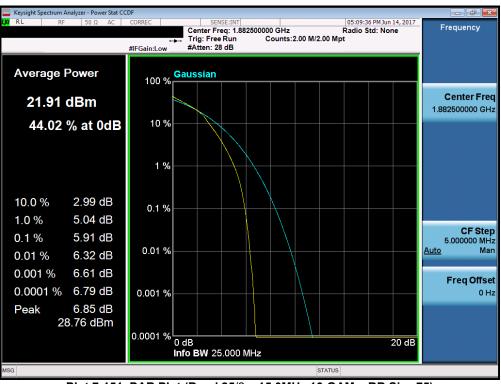
Plot 7-149. PAR Plot (Band 25/2 - 10.0MHz 16-QAM - RB Size 50)

FCC ID: ZNFUN220		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕑 LG	Approved by: Quality Manager
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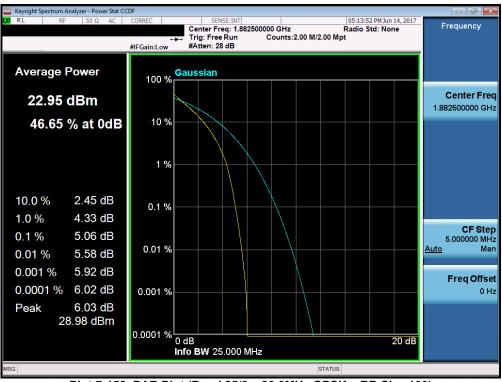
Plot 7-150. PAR Plot (Band 25/2 – 15.0MHz QPSK – RB Size 75)



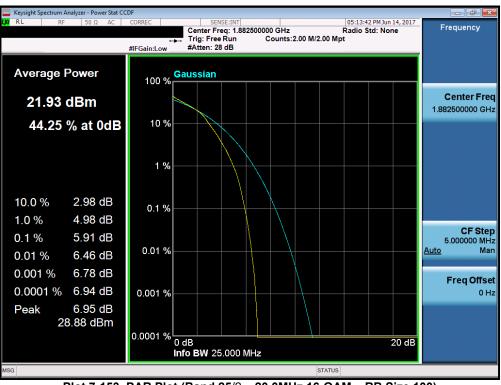
Plot 7-151. PAR Plot (Band 25/2 - 15.0MHz 16-QAM - RB Size 75)

FCC ID: ZNFUN220		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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Plot 7-152. PAR Plot (Band 25/2 - 20.0MHz QPSK - RB Size 100)



Plot 7-153. PAR Plot (Band 25/2 - 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 \ge 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.

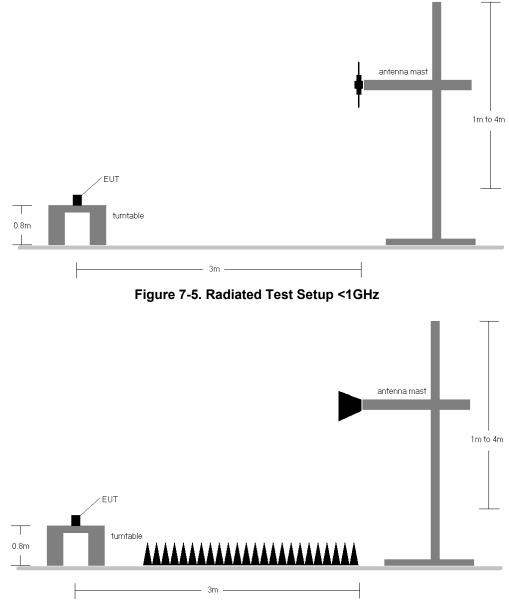


Figure 7-6. Radiated Test Setup >1GHz

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	280	0	1 / 0	18.47	2.48	20.95	34.77	-13.82
707.50	1.4	QPSK	Н	287	211	1 / 0	19.19	2.56	21.75	34.77	-13.02
715.30	1.4	QPSK	Н	290	194	1 / 0	18.89	2.60	21.49	34.77	-13.29
699.70	1.4	16-QAM	н	280	0	1 / 0	17.07	2.48	19.55	34.77	-15.22
707.50	1.4	16-QAM	н	287	211	1 / 0	17.89	2.56	20.45	34.77	-14.32
715.30	1.4	16-QAM	н	290	194	1 / 0	17.89	2.60	20.49	34.77	-14.29
700.50	3	QPSK	Н	280	356	1 / 0	18.71	2.48	21.19	34.77	-13.58
707.50	3	QPSK	Н	285	204	1 / 0	19.52	2.56	22.08	34.77	-12.69
714.50	3	QPSK	Н	292	207	1 / 0	19.19	2.60	21.79	34.77	-12.98
700.50	3	16-QAM	Н	280	356	1 / 0	17.55	2.48	20.03	34.77	-14.74
707.50	3	16-QAM	Н	285	204	1 / 0	18.39	2.56	20.95	34.77	-13.82
714.50	3	16-QAM	Н	292	207	1 / 0	18.29	2.60	20.89	34.77	-13.88
701.50	5	QPSK	Н	280	0	1 / 0	19.44	2.49	21.93	34.77	-12.84
707.50	5	QPSK	Н	285	207	1 / 0	20.19	2.56	22.75	34.77	-12.02
713.50	5	QPSK	Н	287	204	1 / 0	19.99	2.60	22.59	34.77	-12.18
701.50	5	16-QAM	Н	280	0	1 / 0	18.17	2.49	20.66	34.77	-14.11
707.50	5	16-QAM	н	285	207	1 / 0	19.12	2.56	21.68	34.77	-13.09
713.50	5	16-QAM	н	287	204	1 / 0	18.89	2.60	21.49	34.77	-13.28
704.00	10	QPSK	Н	285	352	1 / 0	18.72	2.51	21.23	34.77	-13.54
707.50	10	QPSK	н	285	347	1/0	19.29	2.56	21.85	34.77	-12.92
711.00	10	QPSK	н	287	209	1/0	20.10	2.60	22.70	34.77	-12.08
704.00	10	16-QAM	н	285	352	1/0	17.54	2.51	20.05	34.77	-14.72
707.50	10	16-QAM	н	285	347	1/0	18.09	2.56	20.65	34.77	-14.12
711.00	10	16-QAM	н	287	209	1/0	18.93	2.60	21.53	34.77	-13.25
707.50	5	QPSK	V	147	143	1/0	13.35	2.99	16.34	34.77	-18.43

Table 7-2. ERP Data (Band 12)

FCC ID: ZNFUN220		FCC 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 [dBd]	ERP [dBm]	ERP Limit [dBm]	Margin [dB]
824.70	1.4	QPSK	н	150	26	3 / 2	22.45	-0.65	21.80	38.45	-16.65
836.50	1.4	QPSK	н	150	19	3 / 2	22.65	-0.65	22.00	38.45	-16.45
848.30	1.4	QPSK	н	150	22	3 / 2	22.66	-0.65	22.01	38.45	-16.44
824.70	1.4	16-QAM	н	150	26	3 / 2	21.45	-0.65	20.80	38.45	-17.65
836.50	1.4	16-QAM	н	150	19	3 / 2	21.88	-0.65	21.23	38.45	-17.22
848.30	1.4	16-QAM	н	150	22	3 / 2	21.88	-0.65	21.23	38.45	-17.22
825.50	3	QPSK	н	150	23	1 / 0	22.59	-0.65	21.94	38.45	-16.51
836.50	3	QPSK	н	150	21	1 / 0	22.75	-0.65	22.10	38.45	-16.35
847.50	3	QPSK	н	150	22	1 / 0	22.76	-0.65	22.11	38.45	-16.34
825.50	3	16-QAM	н	150	23	1 / 0	21.49	-0.65	20.84	38.45	-17.61
836.50	3	16-QAM	н	150	21	1 / 0	22.12	-0.65	21.47	38.45	-16.98
847.50	3	16-QAM	н	150	22	1 / 0	22.13	-0.65	21.48	38.45	-16.97
826.50	5	QPSK	н	150	23	1 / 0	22.41	-0.65	21.76	38.45	-16.69
836.50	5	QPSK	Н	150	19	1 / 0	22.65	-0.65	22.00	38.45	-16.45
846.50	5	QPSK	н	150	20	1 / 0	22.66	-0.65	22.01	38.45	-16.44
826.50	5	16-QAM	н	150	23	1 / 0	21.71	-0.65	21.06	38.45	-17.39
836.50	5	16-QAM	н	150	19	1 / 0	21.98	-0.65	21.33	38.45	-17.12
846.50	5	16-QAM	н	150	20	1 / 24	22.05	-0.65	21.40	38.45	-17.05
829.00	10	QPSK	н	150	18	1 / 49	22.80	-0.65	22.15	38.45	-16.30
836.50	10	QPSK	н	150	20	1/0	21.78	-0.65	21.13	38.45	-17.32
844.00	10	QPSK	н	150	24	1/0	23.00	-0.65	22.35	38.45	-16.10
829.00	10	16-QAM	н	150	18	1 / 49	22.16	-0.65	21.51	38.45	-16.94
836.50	10	16-QAM	н	150	20	1 / 0	21.15	-0.65	20.50	38.45	-17.95
844.00	10	16-QAM	н	150	24	1 / 0	22.03	-0.65	21.38	38.45	-17.07
844.00	10	QPSK	V	150	46	1/0	21.13	-0.65	20.48	38.45	-17.97

Table 7-3. ERP Data (Band 5)

FCC ID: ZNFUN220		FCC 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	v	150	352	3/2	18.84	5.65	24.49	30.00	-5.51
1732.50	1.4	QPSK	V	150	344	3/2	18.12	5.41	23.53	30.00	-6.47
1754.30	1.4	QPSK	v	150	347	3/2	18.77	5.17	23.94	30.00	-6.06
1710.70	1.4	16-QAM	v	150	352	3/2	17.74	5.65	23.39	30.00	-6.61
1732.50	1.4	16-QAM	v	150	344	1 / 0	17.44	5.41	22.85	30.00	-7.15
1754.30	1.4	16-QAM	v	150	347	3/2	17.67	5.17	22.84	30.00	-7.16
1711.50	3	QPSK	v	150	348	1 / 14	18.57	5.64	24.21	30.00	-5.79
1732.50	3	QPSK	v	150	348	1 / 0	18.43	5.41	23.84	30.00	-6.16
1753.50	3	QPSK	v	150	345	1 / 14	18.32	5.18	23.50	30.00	-6.50
1711.50	3	16-QAM	v	150	348	1 / 14	17.28	5.64	22.92	30.00	-7.08
1732.50	3	16-QAM	v	150	348	1/0	17.65	5.41	23.06	30.00	-6.94
1753.50	3	16-QAM	v	150	345	1 / 14	17.39	5.18	22.57	30.00	-7.43
1712.50	5	QPSK	v	150	343	1/0	18.01	5.63	23.64	30.00	-6.36
1732.50	5	QPSK	v	150	347	1/0	18.13	5.41	23.54	30.00	-6.46
1752.50	5	QPSK	v	150	348	1/0	18.60	5.19	23.79	30.00	-6.21
1712.50	5	16-QAM	v	150	343	1/0	17.32	5.63	22.95	30.00	-7.05
1732.50	5	16-QAM	v	150	347	1 / 24	17.64	5.41	23.05	30.00	-6.95
1752.50	5	16-QAM	v	150	348	1/0	17.81	5.19	23.00	30.00	-7.00
1715.00	10	QPSK	v	150	343	1 / 49	17.94	5.60	23.54	30.00	-6.46
1732.50	10	QPSK	v	150	246	1/0	18.26	5.41	23.67	30.00	-6.33
1750.00	10	QPSK	v	150	344	1/0	18.34	5.22	23.56	30.00	-6.44
1715.00	10	16-QAM	v	150	343	1 / 49	17.03	5.60	22.63	30.00	-7.37
1732.50	10	16-QAM	v	150	246	1 / 49	17.27	5.41	22.68	30.00	-7.32
1750.00	10	16-QAM	v	150	344	1/0	17.87	5.22	23.09	30.00	-6.91
1717.50	15	QPSK	v	150	346	1 / 74	18.40	5.57	23.97	30.00	-6.03
1732.50	15	QPSK	v	150	344	1/0	18.09	5.41	23.50	30.00	-6.50
1747.50	15	QPSK	v	150	346	1/0	18.08	5.24	23.32	30.00	-6.68
1717.50	15	16-QAM	v	150	346	1 / 74	17.54	5.57	23.11	30.00	-6.89
1732.50	15	16-QAM	v	150	344	1/0	17.45	5.41	22.86	30.00	-7.14
1747.50	15	16-QAM	v	150	346	1/0	17.85	5.24	23.09	30.00	-6.91
1720.00	20	QPSK	v	150	243	1/0	17.48	5.54	23.02	30.00	-6.98
1732.50	20	QPSK	v	150	347	1/0	18.80	5.41	24.21	30.00	-5.79
1745.00	20	QPSK	v	150	344	1/0	18.35	5.27	23.62	30.00	-6.38
1720.00	20	16-QAM	v	150	243	1/0	16.57	5.54	22.11	30.00	-7.89
1732.50	20	16-QAM	v	150	347	1/0	17.77	5.41	23.18	30.00	-6.82
		16.04M	v	150	344	1/0	17.36	5.27	22.63	30.00	-7.37
1745.00	20	16-QAM	v	100	011	170	17.50	0.27	22.00	00.00	-1.51

Table 7-4. EIRP Data (Band 4)

FCC ID: ZNFUN220	PCTEST	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	100	312	1 / 0	12.02	9.12	21.14	33.01	-11.87
1882.50	1.4	QPSK	н	105	291	1 / 0	11.38	9.10	20.48	33.01	-12.53
1914.30	1.4	QPSK	н	103	300	1 / 0	11.19	9.20	20.39	33.01	-12.62
1850.70	1.4	16-QAM	н	100	312	1 / 0	10.74	9.12	19.86	33.01	-13.15
1882.50	1.4	16-QAM	н	105	291	1 / 0	10.94	9.10	20.04	33.01	-12.97
1914.30	1.4	16-QAM	н	103	300	1 / 0	10.34	9.20	19.54	33.01	-13.47
1851.50	3	QPSK	н	100	295	1 / 0	11.94	9.12	21.06	33.01	-11.95
1882.50	3	QPSK	н	103	181	1/0	11.38	9.10	20.48	33.01	-12.53
1913.50	3	QPSK	н	112	233	1 / 0	11.53	9.19	20.72	33.01	-12.29
1851.50	3	16-QAM	н	100	295	1/0	10.94	9.12	20.06	33.01	-12.95
1882.50	3	16-QAM	н	103	181	1/0	10.84	9.10	19.94	33.01	-13.07
1913.50	3	16-QAM	н	112	233	1 / 0	10.64	9.19	19.83	33.01	-13.18
1852.50	5	QPSK	н	100	290	1 / 24	12.89	9.12	22.01	33.01	-11.00
1882.50	5	QPSK	н	105	289	1 / 0	12.62	9.10	21.72	33.01	-11.29
1912.50	5	QPSK	н	103	293	1 / 0	12.62	9.18	21.80	33.01	-11.21
1852.50	5	16-QAM	н	100	290	1 / 24	11.79	9.12	20.91	33.01	-12.10
1882.50	5	16-QAM	н	105	289	1 / 0	11.43	9.10	20.53	33.01	-12.48
1912.50	5	16-QAM	н	103	293	1 / 0	11.44	9.18	20.62	33.01	-12.39
1855.00	10	QPSK	н	110	287	1 / 0	12.94	9.12	22.06	33.01	-10.95
1882.50	10	QPSK	н	107	285	1 / 0	13.19	9.10	22.29	33.01	-10.72
1910.00	10	QPSK	н	100	286	1 / 49	12.28	9.16	21.44	33.01	-11.57
1855.00	10	16-QAM	н	110	287	1 / 0	11.89	9.12	21.01	33.01	-12.00
1882.50	10	16-QAM	н	107	285	1 / 0	11.94	9.10	21.04	33.01	-11.97
1910.00	10	16-QAM	н	100	286	1 / 49	11.52	9.16	20.68	33.01	-12.33
1857.50	15	QPSK	н	100	290	1 / 0	13.17	9.11	22.28	33.01	-10.73
1882.50	15	QPSK	н	105	294	1 / 0	12.84	9.10	21.94	33.01	-11.07
1907.50	15	QPSK	н	100	290	1 / 74	12.33	9.15	21.48	33.01	-11.53
1857.50	15	16-QAM	н	100	290	1/0	12.24	9.11	21.35	33.01	-11.66
1882.50	15	16-QAM	н	105	294	1/0	11.90	9.10	21.00	33.01	-12.01
1907.50	15	16-QAM	н	100	290	1 / 74	11.34	9.15	20.49	33.01	-12.52
1860.00	20	QPSK	н	103	286	1 / 99	13.34	9.11	22.45	33.01	-10.56
1882.50	20	QPSK	н	110	288	1/0	12.73	9.10	21.83	33.01	-11.18
1905.00	20	QPSK	н	101	290	1/0	13.00	9.13	22.13	33.01	-10.88
1860.00	20	16-QAM	н	103	286	1 / 99	11.74	9.11	20.85	33.01	-12.16
1882.50	20	16-QAM	н	110	288	1/0	11.69	9.10	20.79	33.01	-12.22
1905.00	20	16-QAM	н	101	290	1/0	12.04	9.13	21.17	33.01	-11.84
1860.00	20	QPSK	V	110	112	1/0	12.69	8.98	21.67	33.01	-11.34

Table 7-5. EIRP Data (Band 25/2)

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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.

Test Procedures Used

KDB 971168 D01 v02r02 - Section 5.8

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

Test Settings

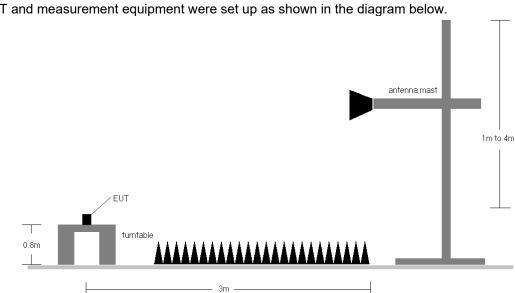
- 1. RBW = 100kHz for emissions below 1GHz and 1MHz for emissions above 1GHz
- 2. VBW \geq 3 x RBW
- 3. Span = 1.5 times the OBW
- 4. No. of sweep points \geq 2 x span / RBW
- 5. Detector = RMS
- 6. Trace mode = Average (Max Hold for pulsed emissions)
- 7. The trace was allowed to stabilize

FCC ID: ZNFUN220		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager		
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The EUT and measurement equipment were set up as shown in the diagram below.

Figure 7-7. Test Instrument & Measurement Setup

Test Notes

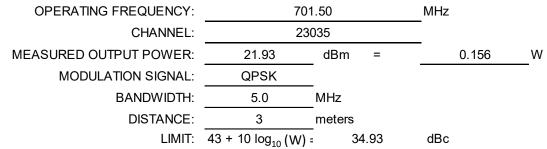
- 1) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the tables below.
- 2) This unit was tested with 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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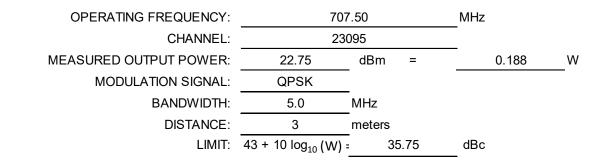
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Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1403.00	Н	103	310	-50.48	5.92	-44.56	66.5
2104.50	Н	114	121	-65.80	6.80	-59.00	80.9
2806.00	Н	101	281	-70.16	8.12	-62.04	84.0

Table 7-6. Radiated Spurious Data (Band 12 – Low Channel)



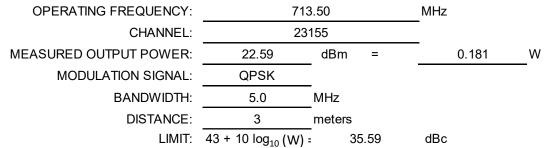
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1415.00	Н	100	303	-48.49	5.96	-42.52	65.3
2122.50	Н	124	103	-62.41	6.84	-55.56	78.3
2830.00	Н	-	-	-72.24	8.13	-64.11	86.9

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

FCC ID: ZNFUN220		FCC 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]
1427.00	Н	101	306	-54.81	6.01	-48.80	71.4
2140.50	Н	117	86	-61.70	6.89	-54.81	77.4
2854.00	Н	105	282	-69.59	8.15	-61.44	84.0
3567.50	Н	161	84	-66.15	7.84	-58.31	80.9
4281.00	Н	166	146	-66.90	8.56	-58.33	80.9
4994.50	Н	-	-	-68.05	9.05	-59.00	81.6

Table 7-8. Radiated Spurious Data (Band 12 – High Channel)

OPERATING FREQUENCY: CHANNEL: MEASURED OUTPUT POWER: MODULATION SIGNAL: BANDWIDTH: DISTANCE:

829.00 MHz 20450 22.15 dBm 0.164 W = **QPSK** 10.0 MHz 3 meters LIMIT: 43 + 10 log₁₀ (W) = 35.15 dBc

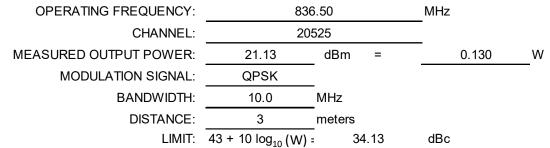
Frequency [MHz]	Ant. Pol. [H/V]	Height	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1658.00	Н	127	226	-71.95	6.26	-65.68	87.8
2487.00	Н	-	-	-71.40	6.84	-64.56	86.7

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

FCC ID: ZNFUN220	PCTEST	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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Frequency [MHz]	Ant. Pol. [H/V]	Height	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1673.00	Н	114	300	-62.20	6.21	-55.99	77.1
2509.50	Н	-	-	-71.27	6.86	-64.41	85.5

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

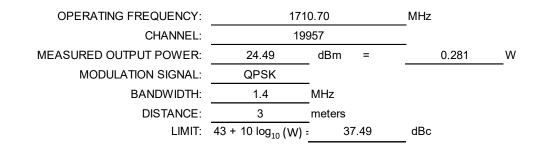
OPERATING FREQUENCY:	844	1.00	MHz
CHANNEL:	200	600	_
MEASURED OUTPUT POWER:	22.35	dBm =	0.172 W
MODULATION SIGNAL:	QPSK	_	
BANDWIDTH:	10.0	MHz	
DISTANCE:	3	meters	
LIMIT:	43 + 10 log ₁₀ (W) =	35.35	dBc
			-

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	108	5	-69.31	6.15	-63.16	85.5
2532.00	Н	103	258	-70.78	6.93	-63.86	86.2
3376.00	Н	-	-	-69.00	7.35	-61.65	84.0

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

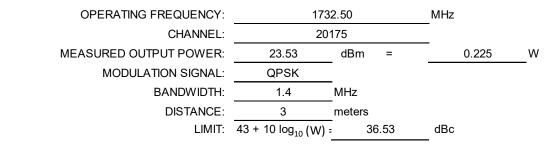
FCC ID: ZNFUN220		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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	Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
ſ	3421.40	Н	100	286	-60.09	9.86	-50.22	74.7
ĺ	5132.10	Н	100	166	-66.33	10.76	-55.57	80.1
	6842.80	Н	-	-	-62.37	11.66	-50.71	75.2

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



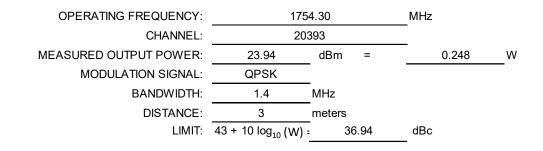
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3465.00	Н	285	100	-59.95	9.91	-50.04	73.6
5197.50	Н	-	-	-66.91	10.75	-56.16	79.7

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

FCC ID: ZNFUN220		FCC 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 [dBi]	Spurious Emission Level [dBm]	[dBc]
3508.60	Н	166	287	-64.10	9.95	-54.14	78.1
5262.90	Н	-	-	-66.37	10.71	-55.66	79.6

Table 7-14. Radiated Spurious Data (Band 4 – High Channel)

OPERATING FREQUENCY:	186	0.00	MHz
CHANNEL:	26	140	_
MEASURED OUTPUT POWER:	22.45	dBm =	0.176 W
MODULATION SIGNAL:	QPSK		
BANDWIDTH:	20.0	MHz	
DISTANCE:	3	meters	
LIMIT:	43 + 10 log ₁₀ (W) =	35.45	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]
3720.00	Н	-	-	-68.72	9.48	-59.24	81.7

Table 7-15. Radiated Spurious Data (Band 25/2 – Low Channel)

FCC ID: ZNFUN220		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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OPERATING FREQUENCY:	188	2.50	MHz
CHANNEL:	263	365	_
MEASURED OUTPUT POWER:	21.83	dBm =	0.152 W
MODULATION SIGNAL:	QPSK		
BANDWIDTH:	20.0	MHz	
DISTANCE:	3	meters	
LIMIT:	43 + 10 log ₁₀ (W) =	34.83	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]
3765.00	Н	-	-	-68.56	9.37	-59.19	81.0

Table 7-16. Radiated Spurious Data (Band 25/2 – Mid Channel)

OPERATING FREQUENCY:	190	5.00	MHz
CHANNEL:	265	590	_
MEASURED OUTPUT POWER:	22.13	dBm =	0.163 W
MODULATION SIGNAL:	QPSK		
BANDWIDTH:	20.0	MHz	
DISTANCE:	3	meters	
LIMIT:	43 + 10 log ₁₀ (W) =	35.13	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]
3810.00	Н	-	-	-68.22	9.31	-58.92	81.0

Table 7-17. Radiated Spurious Data (Band 25/2 – High Channel)

FCC ID: ZNFUN220		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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Frequency Stability / Temperature Variation 7.8 §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

FCC ID: ZNFUN220		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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Band 12 Frequency Stability Measurements §2.1055 §27.54

OPERATING FREQUENCY:	707,500,000	Hz
CHANNEL:	23790	
REFERENCE VOLTAGE:	3.80	VDC

VOLTAGE (%)	POWER (VDC)	ТЕМР ([°] С)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	707,499,917	-83	-0.0000117
100 %		- 30	707,499,908	-92	-0.0000131
100 %		- 20	707,499,923	-77	-0.0000109
100 %		- 10	707,499,904	-96	-0.0000135
100 %		0	707,499,928	-72	-0.0000102
100 %		+ 10	707,499,949	-51	-0.0000072
100 %		+ 20	707,499,942	-58	-0.0000082
100 %		+ 30	707,499,803	-197	-0.0000279
100 %		+ 40	707,499,901	-99	-0.0000139
100 %		+ 50	707,499,890	-110	-0.0000156
BATT. ENDPOINT	3.40	+ 20	707,499,885	-115	-0.0000163

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

FCC ID: ZNFUN220	PCTEST	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
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Band 12 Frequency Stability Measurements §2.1055 §27.54

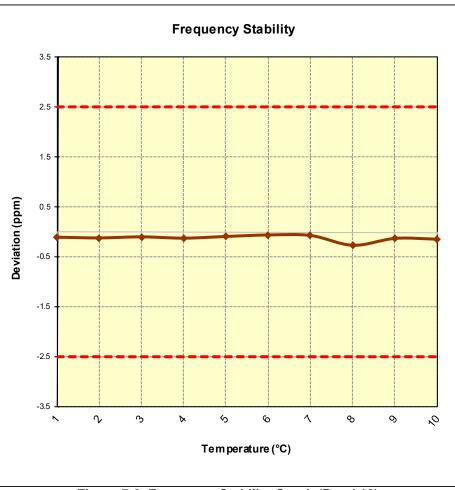


Figure 7-8. Frequency Stability Graph (Band 12)

FCC ID: ZNFUN220		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

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

VOLTAGE (%)	POWER (VDC)	ТЕМР (°С)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	836,499,901	-99	-0.0000118
100 %		- 30	836,499,856	-144	-0.0000172
100 %		- 20	836,499,923	-77	-0.0000092
100 %		- 10	836,499,920	-80	-0.0000095
100 %		0	836,499,875	-125	-0.0000150
100 %		+ 10	836,499,988	-12	-0.0000014
100 %		+ 20	836,499,831	-169	-0.0000202
100 %		+ 30	836,499,835	-165	-0.0000197
100 %		+ 40	836,499,921	-79	-0.0000095
100 %		+ 50	836,499,804	-196	-0.0000235
BATT. ENDPOINT	3.40	+ 20	836,499,883	-117	-0.0000139

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

FCC ID: ZNFUN220		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

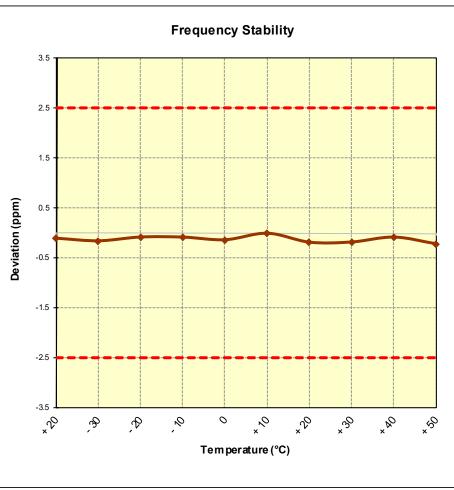


Figure 7-9. Frequency Stability Graph (Band 5)

FCC ID: ZNFUN220		FCC 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)	ТЕМР (°С)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	1,732,499,846	-154	-0.0000089
100 %		- 30	1,732,499,822	-178	-0.0000103
100 %		- 20	1,732,499,959	-41	-0.0000024
100 %		- 10	1,732,499,855	-145	-0.0000084
100 %		0	1,732,499,885	-115	-0.0000067
100 %		+ 10	1,732,499,815	-185	-0.0000107
100 %		+ 20	1,732,499,953	-47	-0.0000027
100 %		+ 30	1,732,499,878	-122	-0.0000070
100 %		+ 40	1,732,499,818	-182	-0.0000105
100 %		+ 50	1,732,499,903	-97	-0.0000056
BATT. ENDPOINT	3.40	+ 20	1,732,499,923	-77	-0.0000045

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

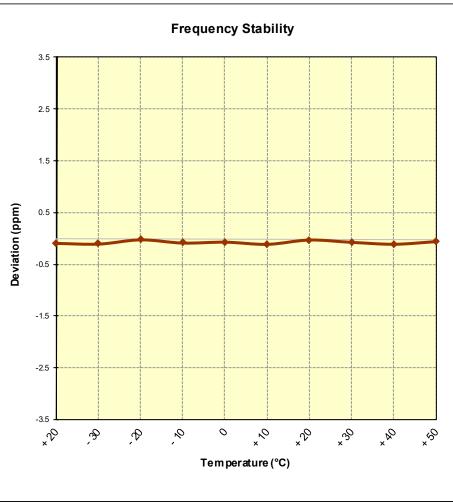


Figure 7-10. Frequency Stability Graph (Band 4)

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Band 25/2 Frequency Stability Measurements §2.1055 §24.235

OPERATING FREQUENCY:	1,882,500,000	Hz
CHANNEL:	26365	_
REFERENCE VOLTAGE:	3.80	VDC

VOLTAGE (%)	POWER (VDC)	ТЕМР ([°] С)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	1,882,499,969	-31	-0.0000016
100 %		- 30	1,882,499,953	-47	-0.0000025
100 %		- 20	1,882,499,880	-120	-0.0000064
100 %		- 10	1,882,499,846	-154	-0.0000082
100 %		0	1,882,499,925	-75	-0.0000040
100 %		+ 10	1,882,499,929	-71	-0.0000038
100 %		+ 20	1,882,499,901	-99	-0.0000053
100 %		+ 30	1,882,499,956	-44	-0.0000023
100 %		+ 40	1,882,499,969	-31	-0.0000017
100 %		+ 50	1,882,499,939	-61	-0.0000032
BATT. ENDPOINT	3.40	+ 20	1,882,499,909	-91	-0.0000048

Table 7-21. Frequency Stability Data (Band 25/2)

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: ZNFUN220		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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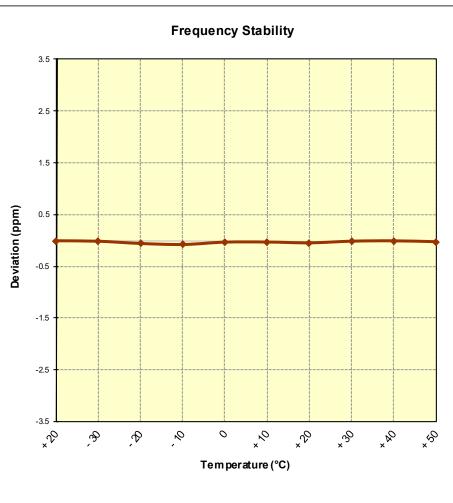


Figure 7-11. Frequency Stability Graph (Band 25/2)

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8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the LGE Portable Handset FCC ID: ZNFUN220 complies with all the requirements of Parts 22, 24, & 27 of the FCC rules for LTE operation only.

FCC ID: ZNFUN220		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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