

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

<u>Test Setup</u>

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

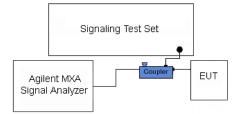


Figure 7-3. Test Instrument & Measurement Setup

Test Notes

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

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

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



Plot 7-90. Lower Band Edge Plot (Band 12 – 1.4MHz QPSK – RB Size 6)

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Plot 7-91. Upper Band Edge Plot (Band 12 – 1.4MHz QPSK – RB Size 6)



Plot 7-92. Upper Extended Band Edge Plot (Band 12 – 1.4MHz QPSK – RB Size 6)

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SG											STAT	US			

Plot 7-93. Lower Band Edge Plot (Band 12 – 3.0MHz QPSK – RB Size 15)



Plot 7-94. Upper Band Edge Plot (Band 12 – 3.0MHz QPSK – RB Size 15)

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	pectrum Analyz											
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ISG								STATU				

Plot 7-95. Upper Extended Band Edge Plot (Band 12 – 3.0MHz QPSK – RB Size 15)



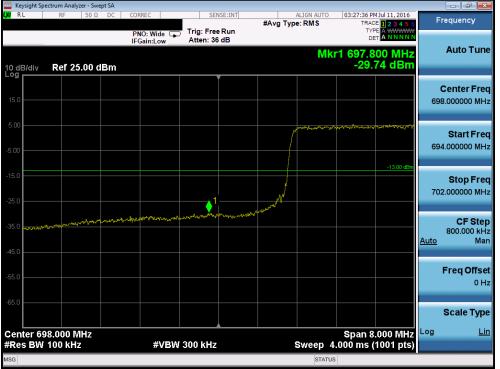
Plot 7-96. Lower Band Edge Plot (Band 12/17 - 5.0MHz QPSK - RB Size 25)

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Keysight Spectrum Anal R L RF	yzer - Swept SA 50 Ω DC	CORREC	SENSE:INT	ALIGN AUTO	03:34:12 PM Jul 11, 2016	
		PNO: Wide ⊂ IFGain:Low	Trig: Free Run Atten: 36 dB	#Avg Type: RMS	TRACE 1 2 3 4 5 6 TYPE A WWWW DET A NNNNN	Frequency
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.00						Start Fr 714.000000 M
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G				STAT	JS	

	Plot 7-97. Upper Band Edge Plot (Band 12/17 – 5.0MHz QPSK – RB Size 25)
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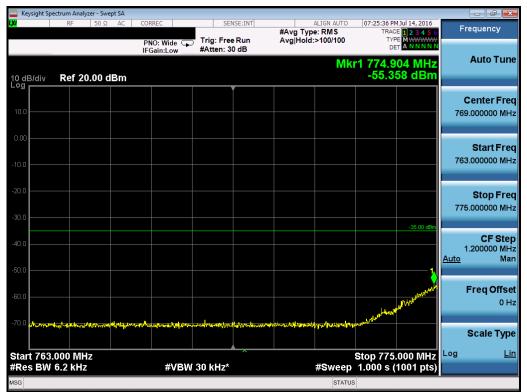
Plot 7-98. Lower Band Edge Plot (Band 12/17 - 10.0MHz QPSK - RB Size 50)

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Keysight Spectrum Analyzer - Swept SA				
U RL RF 50Ω DC	CORREC SENSE:	#Avg Type: RMS	03:28:27 PM Jul 11, 2016 TRACE 1 2 3 4 5 6 TYPE A *****	Frequency
0 dB/div Ref 25.00 dBm	PNO: Wide 🖵 Trig: Free Ro IFGain:Low Atten: 36 dE	3	kr1 716.008 MHz -24.55 dBm	Auto Tur
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enter 716.000 MHz Res BW 100 kHz	#VBW 300 kHz	Sweep	Span 8.000 MHz 4.000 ms (1001 pts)	Log <u>L</u>
SG		STAT	US	

Plot 7-99. Upper Band Edge Plot (Band 12/17 - 10.0MHz QPSK - RB Size 50)



Plot 7-100. Lower Emission Mask Plot (Band 13 – 5.0MHz QPSK – RB Size 25)

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Keysight Spectrum Analyzer - Swept SA				- đ <b>-</b>
RF 50Ω AC	CORREC SENSE:INT	ALIGN AUTO #Avg Type: RMS	07:16:28 PM Jul 14, 2016 TRACE <b>1 2 3 4 5 6</b>	Frequency
10 dB/div Ref 20.00 dBm	PNO: Wide ++- Trig: Free Run IFGain:Low #Atten: 30 dB	Avg Hold: 100/100	r1 777.000 MHz -29.117 dBm	Auto Tun
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10.0			-13.00 dBm	Start Fre 775.000000 MH
30.0	N. L			<b>Stop Fro</b> 779.000000 Mi
40.0	~~~~~			CF Ste 400.000 kl <u>Auto</u> M
50.0				Freq Offs
70.0				Scale Typ
Center 777.000 MHz Res BW 51 kHz	#VBW 160 kHz*	Sweep 1	Span 4.000 MHz .933 ms (1001 pts)	Log <u>L</u>
SG		STATU	S	

Plot 7-101. Lower Band Edge Plot (Band 13 – 5.0MHz QPSK – RB Size 25)



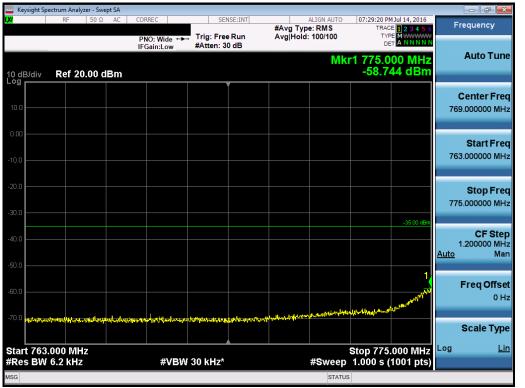
Plot 7-102. Upper Band Edge Plot (Band 13 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFVS995		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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Keysight Species	ctrum Analyze	r - Swept SA										
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SG								STATUS				

Plot 7-103. Upper Emission Mask Plot (Band 13 – 5.0MHz QPSK – RB Size 25)



Plot 7-104. Lower Emission Mask Plot (Band 13 – 10.0MHz QPSK – RB Size 50)

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Plot 7-105. Lower Band Edge Plot (Band 13 – 10.0MHz QPSK – RB Size 50)



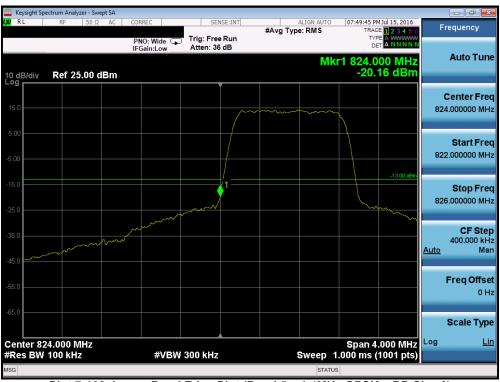
Plot 7-106. Upper Band Edge Plot (Band 13 – 10.0MHz QPSK – RB Size 50)

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Keysight Specific Specific Control Sp	ectrum Analyz		it SA										
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Start 793. #Res BW		z			#VBW	30 kHz	:		#Sween	Stop 805	.000 MHz 1001 pts)	Log	Lir
ISG						0.0011112			STATUS		neer proj		

Plot 7-107. Upper Emission Mask Plot (Band 13 – 10.0MHz QPSK – RB Size 50)



Plot 7-108. Lower Band Edge Plot (Band 5 – 1.4MHz QPSK – RB Size 6)

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	pectrum Analyzer - S										
K, RL	RF 50	Ω AC	CORREC		SE:INT	#Avg Typ	ALIGN AUTO e: RMS	TRAC	M Jul 15, 2016	F	requency
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5.00		/									Start Free
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											Scale Typ
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	/ 100 kHz		#VBW	/ 300 kHz				1.000 ms (	1001 pts)		
ASG							STATU	s			

Plot 7-109. Upper Band Edge Plot (Band 5 – 1.4MHz QPSK – RB Size 6)



Plot 7-110. Lower Band Edge Plot (Band 5 – 3.0MHz QPSK – RB Size 15)

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Keysight Sp	pectrum Analyzer - Sw	ept SA									
L <mark>XI</mark> RL	RF 50 Ω	AC (	CORREC	SEN	ISE:INT	#Avg Typ	ALIGN AUTO		M Jul 15, 2016 E <b>1 2 3 4 5 6</b>	F	requency
			PNO: Wide 🖵 IFGain:Low	Trig: Free Atten: 36		#118 Jp		TYF DE			Auto Tune
10 dB/div Log	Ref 25.00	dBm					MK	r1 849.0 -17.	00 MHz 77 dBm		Auto Tune
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-65.0											0 H:
											Scale Type
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MSG			<i></i>	000 AT12			STATUS		loor proj		

Plot 7-111. Upper Band Edge Plot (Band 5 – 3.0MHz QPSK – RB Size 15)



Plot 7-112. Lower Band Edge Plot (Band 5 – 5.0MHz QPSK – RB Size 25)

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Plot 7-113. Upper Band Edge Plot (Band 5 – 5.0MHz QPSK – RB Size 25)



Plot 7-114. Lower Band Edge Plot (Band 5 – 10.0MHz QPSK – RB Size 50)

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	pectrum Analyze										
I <mark>XI</mark> RL	RF	50 Ω AC	CORREC		ISE:INT	#Avg Typ	ALIGN AUTO e: RMS	TRAC	4 Jul 15, 2016 E 1 2 3 4 5 6	F	requency
10 dB/div	Ref 25.0	00 dBm	PNO: Wide 🕞 IFGain:Low	Trig: Free Atten: 36			Mk	r1 849.0	00 MHz 44 dBm		Auto Tune
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-35.0						·····	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	······	······	<u>Auto</u>	CF Ste 800.000 k⊢ Ma
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-65.0											Scale Typ
	49.000 MH V 100 kHz	IZ	#VBW	/ 300 kHz			Sweep 1	Span 8 .000 ms (.000 MHz 1001 pts)	Log	Li
MSG							STATUS				

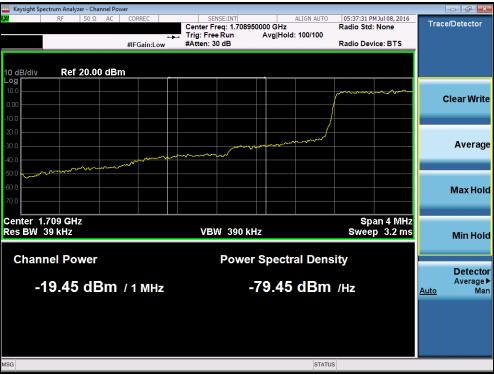
Plot 7-115. Upper Band Edge Plot (Band 5 – 10.0MHz QPSK – RB Size 50)



Plot 7-116. Lower Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 6)

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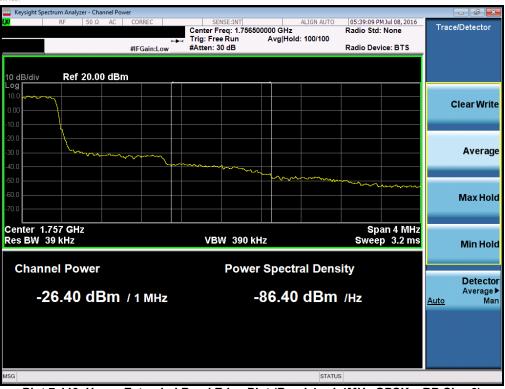




Plot 7-118. Upper Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 6)

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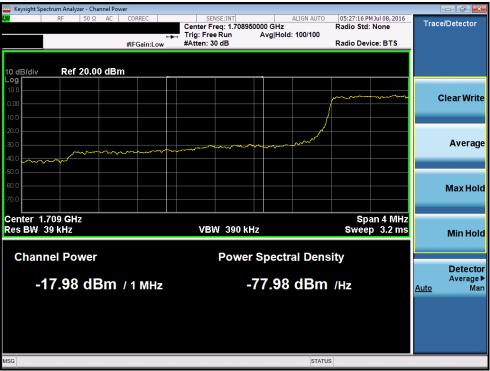
Plot 7-119. Upper Extended Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 6)



Plot 7-120. Lower Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)

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Plot 7-121. Lower Extended Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)



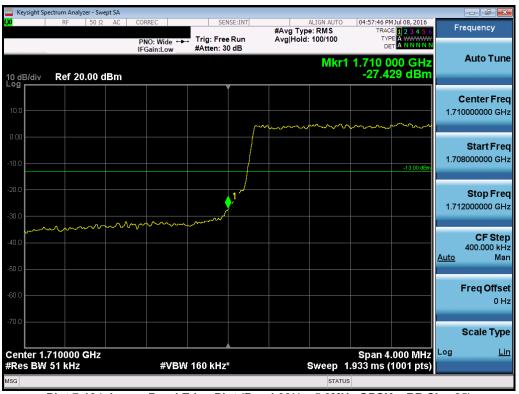
Plot 7-122. Upper Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)

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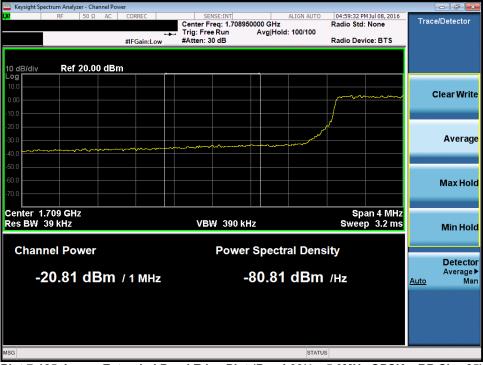
Plot 7-123. Upper Extended Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)



Plot 7-124. Lower Band Edge Plot (Band 66/4 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFVS995		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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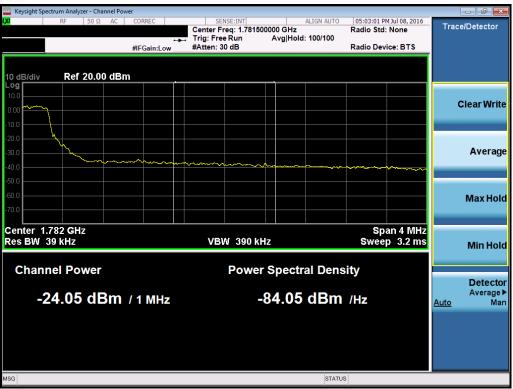
Plot 7-125. Lower Extended Band Edge Plot (Band 66/4 – 5.0MHz QPSK – RB Size 25)



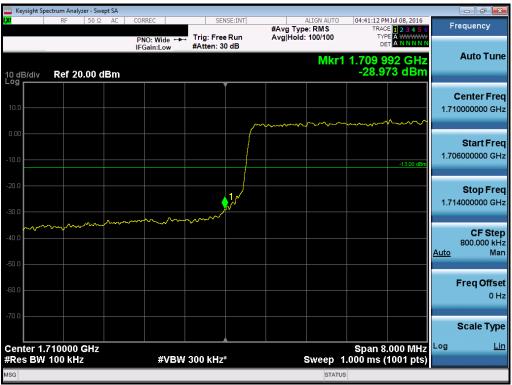
Plot 7-126. Upper Band Edge Plot (Band 66 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFVS995		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕑 LG	Reviewed by: Quality Manager
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Plot 7-127. Upper Extended Band Edge Plot (Band 66 – 5.0MHz QPSK – RB Size 25)



Plot 7-128. Lower Band Edge Plot (Band 66/4 – 10.0MHz QPSK – RB Size 50)

FCC ID: ZNFVS995		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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Keysight Spe	ectrum Analyzer -	Swept SA					
L <mark>XI</mark>	RF 50	Ω AC	CORREC	SENSE:INT	ALIGN AUTO #Avg Type: RMS	04:41:39 PM Jul 08, 2016 TRACE 1 2 3 4 5 6	Frequency
			PNO: Fast ↔→→ IFGain:Low	Trig: Free Run #Atten: 30 dB	Avg Hold: 100/100	DET A NNNN	
					Mkr1	1.709 000 GHz	Auto Tune
10 dB/div Log	Ref 20.00) dBm				-21.116 dBm	
							Center Freq
10.0							1.707000000 GHz
0.00							
0.00							Start Freq
-10.0						-13.00 dBm	1.705000000 GHz
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-20.0			and the second state of th	والإدرية والمالية والمعالية والمعالية والمعالية والمعالية والمعالية والمعالية والمعالية والمعالية والمعالية وال	AND THE REAL PROPERTY OF THE R	water and and and a state	Stop Freq
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00.0							Ener Offerst
-60.0							Freq Offset 0 Hz
-70.0							Scale Type
							Log Lin
Center 1.7 #Res BW	707000 GH 1.0 MHz	Z	#VBW	3.0 MHz*	Sweep 1	Span 4.000 MHz .000 ms (1001 pts)	
MSG					STATU		





Plot 7-130. Upper Band Edge Plot (Band 66 – 10.0MHz QPSK – RB Size 50)

FCC ID: ZNFVS995		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕑 LG	Reviewed by: Quality Manager
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🔤 Keysight	Spectrum Analyze	r - Swept SA									
LXI	RF	50 Ω AC	CORREC	SE	NSE:INT	#Avg Typ	ALIGN AUTO		M Jul 08, 2016 CE <mark>1 2 3 4 5 6</mark>	F	requency
			PNO: Fas IFGain:Lo			Avg Hold:	: 100/100	TYF DE			Auto Tune
10 dB/div	Ref 20.	00 dBm					Mkr1	1.781 0 -22.7	00 GHz 28 dBm		Auto Tune
Log					Ĭ						Center Freq
10.0										1.78	3000000 GHz
0.00											Start Freq
-10.0									-13.00 dBm	1.78	1000000 GHz
-20.0											Stop Freq
-30.0	La Palitic Internet Contraction	www.winalywys	margan	๛๚๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛	mmelling	herrymous	who was allowed	white warder ware	l mark was have a long	1.78	5000000 GHz
											CF Step
-40.0										<u>Auto</u>	400.000 kHz Man
-50.0											
-60.0											Freq Offset 0 Hz
-70.0											
											Scale Type
	1.783000 G N 1.0 MHz	Hz	#\	/BW 3.0 MHz	*		Sweep 1	59 Span 1.000 m <u>s (</u>	.000 MHz 1001 pts)	Log	<u>Lin</u>
MSG							STATU	S			

Plot 7-131. Upper Extended Band Edge Plot (Band 66 – 10.0MHz QPSK – RB Size 50)



Plot 7-132. Lower Band Edge Plot (Band 66/4 – 15.0MHz QPSK – RB Size 75)

FCC ID: ZNFVS995		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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Keysight Spe	ectrum Analyzer - Swept	SA									
	RF 50 Ω		EC D:Fast ↔→ ain:Low			#Avg Typ Avg Hold		TRAC	MJul 08, 2016 E 1 2 3 4 5 6 PE A WWWW T A N N N N N	F	requency
dB/div	Ref 20.00 dB		ain:Low	#Atten: St			Mkr1	1.708 9	48 GHz 50 dBm		Auto Tur
											Center Fre
0.0									-13.00 dBm	1.70	Start Fr 05000000 G
0.0 •••••••		a, Paymond of a part of Lagorst	u-Afreithiansty Agric	₽₽₽ <mark>₽₽₽₽₽₽₽₽₽₽₽</mark> ₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽	www.elsyster	an a	enersymmetry	a source and a source of	- A A A A A A A A A A A A A A A A A A A	1.70	Stop Fr 09000000 G
).0										<u>Auto</u>	CF St 400.000 k M
).0											Freq Offs 0
anter 17	707000 GHz							Snan 4	.000 MHz	Log	Scale Ty
	1.0 MHz		#VBW	3.0 MHz*			Sweep 1	.000 m <u>s (</u>	1001 pts)		
G							STATUS			-	

Plot 7-133. Lower Extended Band Edge Plot (Band 66/4 - 15MHz QPSK - RB Size 75)



Plot 7-134. Upper Band Edge Plot (Band 66 - 15.0MHz QPSK - RB Size 75)

FCC ID: ZNFVS995		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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🔤 Keysight Spe	ctrum Analyze	r - Swept S	A										
L <mark>XI</mark>	RF	50 Ω A	AC (CORREC		SEI	NSE:INT	#Avg Ty	ALIGN AUTO		4 Jul 08, 2016 E 1 2 3 4 5 6	F	requency
				PNO: Fa IFGain:L		Trig: Free #Atten: 3			1: 100/100	TYF DE			Auto Tune
10 dB/div Log	Ref 20.	00 dBr	m						Mkr1	1.781 0 -24.2	16 GHz 35 dBm		Auto Tune
10.0													Center Freq 3000000 GHz
-10.0											-13.00 dBm	1.78	Start Freq 1000000 GHz
-20.0 1 -30.0	~~~,116-y117+**	all the second	بىدىنچەر مەر	rent de rente	nyalgun 200 jayoon	⊷ſ≈∿∽¦t _{ertet} ue	and all and a second second	waynaadalaafa	politique de Mariadape	⁹ ## [#] #}#17µ*#31-8¥ ⁶ /1/1	A. matter and the	1.78	Stop Freq 5000000 GHz
-40.0												<u>Auto</u>	CF Step 400.000 kHz Man
-60.0													Freq Offset 0 Hz
-70.0													Scale Type
Center 1.7 #Res BW		Hz		#	VBW	3.0 MHz	*		Sweep 1	Span 4	.000 MHz 1001 pts)	Log	Lin
MSG	1.0 141112			"		0.0 141112			STATU		ree r pts)		
									01110				

Plot 7-135. Upper Extended Band Edge Plot (Band 66 – 15.0MHz QPSK – RB Size 75)



Plot 7-136. Lower Band Edge Plot (Band 66/4 – 15.0MHz QPSK – RB Size 75)

FCC ID: ZNFVS995		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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Plot 7-137. Lower Extended Band Edge Plot (Band 66/4 - 15MHz QPSK – RB Size 75)



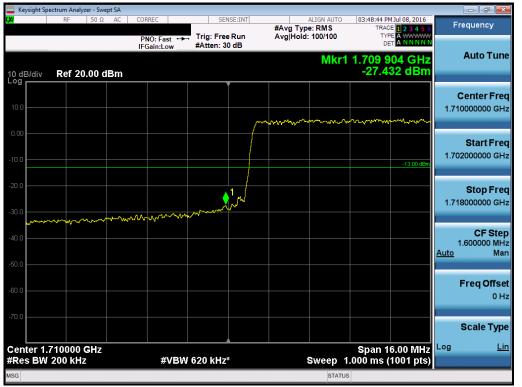
Plot 7-138. Upper Band Edge Plot (Band 66 – 15.0MHz QPSK – RB Size 75)

FCC ID: ZNFVS995		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	Reviewed by: Quality Manager
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🔤 Keysight Sp	ectrum Analyz	er - Swep	t SA										
LXI	RF	50 Ω	AC	CORREC		SEN	ISE:INT	#Avg Ty	ALIGN AUTO		MJul 08, 2016	F	requency
				PNO: Fa IFGain:L		Trig: Free #Atten: 3			d: 100/100	TYF DE			
10 dB/div Log	Ref 20	.00 dE	Зm						Mkr1	1.781 0	16 GHz 35 dBm		Auto Tune
10.0													Center Freq 33000000 GHz
-10.0											-13.00 dBm	1.78	Start Freq 31000000 GHz
-20.0 1	¥ ¹ +****************************	م البالي الم		where the read	ngalan san sayan	⊷∕≈∿°∳ <i>⊌∕и</i> нини	₩₩₩ ₽₽₩ ₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽	an a	ontheorie worklyin	**************************************	A. market and the	1.78	Stop Freq 35000000 GHz
-40.0												<u>Auto</u>	CF Step 400.000 kHz Man
-60.0													Freq Offset 0 Hz
-70.0													Scale Type
Center 1. #Res BW				#	VBW	3.0 MHz	*		Sweep 1	Span 4 .000 ms (.000 MHz 1001 pts)	Log	<u>Lin</u>
MSG									STATUS	5			

Plot 7-139. Upper Extended Band Edge Plot (Band 66 – 15.0MHz QPSK – RB Size 75)



Plot 7-140. Lower Band Edge Plot (Band 66/4 – 20.0MHz QPSK – RB Size 100)

FCC ID: ZNFVS995		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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Keysight Spec	ctrum Analyzer - Sw	vept SA									
LXI	RF 50 ភ	2 AC	CORREC PNO: Fast IFGain:Lov		SENSE:INT	#Avg Typ Avg Hold		TRACI	Jul 08, 2016 1 2 3 4 5 6 A WWWWW A NNNN	F	requency
10 dB/div	Ref 20.00	dBm					Mkr1	1.708 8 -23.5	40 GHz 92 dBm		Auto Tune
10.0											Center Freq 07000000 GHz
-10.0									-13.00 dBm	1.70	Start Freq 5000000 GHz
-20.0	a dallalar tuar t _a n a lugi murtu		www.	9	๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛	م) معا ^ر المدر معمد ال ^{ور و} مراجع	~] { ~}~~ ⁽ ₀ ~}~/ ₁ ~/ ₁ ~/ ₂ ~/ ₂ ~/	harmalmenter	1_ 	1.70	Stop Freq
-40.0										<u>Auto</u>	CF Step 400.000 kHz Mar
-60.0											Freq Offset 0 Hz
-70.0											Scale Type
Center 1.7 #Res BW 1	07000 GHz 1.0 MHz		#V	'BW 3.0 MI	Hz*		Sweep 1	Span 4. 1.000 ms (′		Log	Lin
ISG							STATU	S			

Plot 7-141. Lower Extended Band Edge Plot (Band 66/4 - 20MHz QPSK – RB Size 100)



Plot 7-142. Upper Band Edge Plot (Band 66 – 20.0MHz QPSK – RB Size 100)

FCC ID: ZNFVS995		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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Keysight Spectrum Analyzer								
XI RF :	50 Ω AC CORI	REC	SENSE:INT	#Avg Type	ALIGN AUTO e: RMS	03:54:31 PM Jul 0 TRACE 1 2	3456	Frequency
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0 dB/div Ref 20.0	00 dBm				Mkr1	1.781 204 -28.836	GHz dBm	Auto Tur
-og			Ĭ					Center Fre
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10.0							3.00 dBm	.781000000 G
							3.00 dbin	
20.0							1	Stop Fr .785000000 G
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40.0								CF Ste 400.000 k
50.0							Aut	to M
								Freq Offs
50.0								0
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Center 1.783000 G	U-7					Span 4.000		
Res BW 1.0 MHz	12	#VBW 3.0 M	Hz*	9	Sweep 1	5pan 4.000 .000 ms (100	1 pts)	
SG					STATUS			

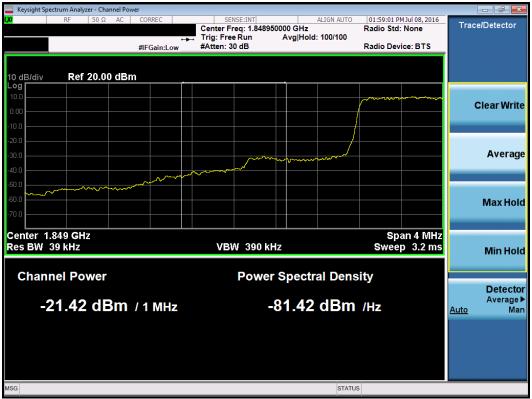
Plot 7-143. Upper Extended Band Edge Plot (Band 66 – 20.0MHz QPSK – RB Size 100)



Plot 7-144. Lower Band Edge Plot (Band 2/25 – 1.4MHz QPSK – RB Size 6)

FCC ID: ZNFVS995		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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Plot 7-146. Upper Band Edge Plot (Band 2/25 – 1.4MHz QPSK – RB Size 6)

FCC ID: ZNFVS995		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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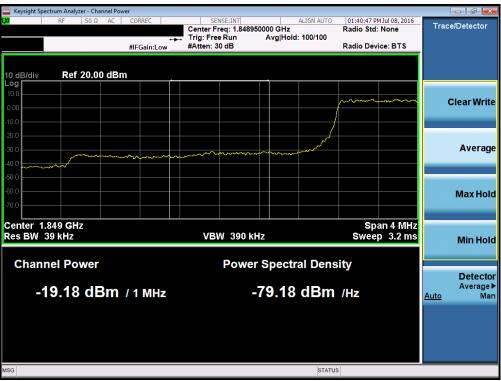
Plot 7-147. Upper Extended Band Edge Plot (Band 2/25 – 1.4MHz QPSK – RB Size 6)



Plot 7-148. Lower Band Edge Plot (Band 2/25 – 3.0MHz QPSK – RB Size 15)

FCC ID: ZNFVS995		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager	
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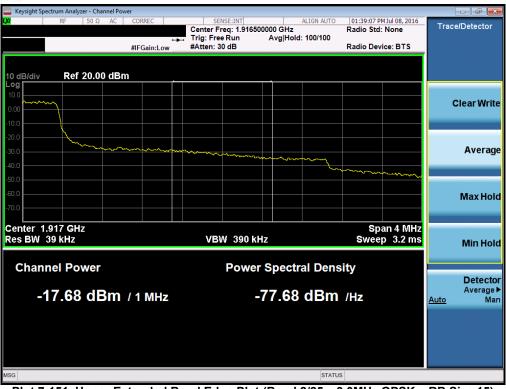
Plot 7-149. Lower Extended Band Edge Plot (Band 2/25 – 3.0MHz QPSK – RB Size 15)



Plot 7-150. Upper Band Edge Plot (Band 2/25 – 3.0MHz QPSK – RB Size 15)

FCC ID: ZNFVS995		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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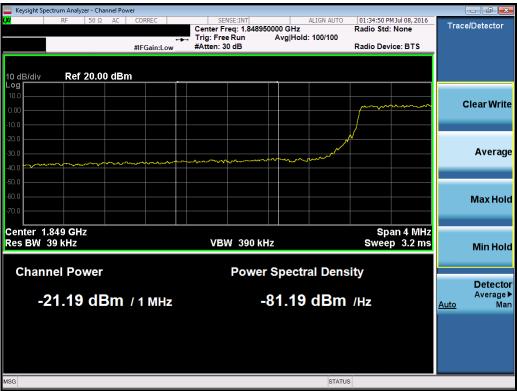




Plot 7-152. Lower Band Edge Plot (Band 2/25 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFVS995		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dego 02 of 144	
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Plot 7-153. Lower Extended Band Edge Plot (Band 2/25 – 5.0MHz QPSK – RB Size 25)



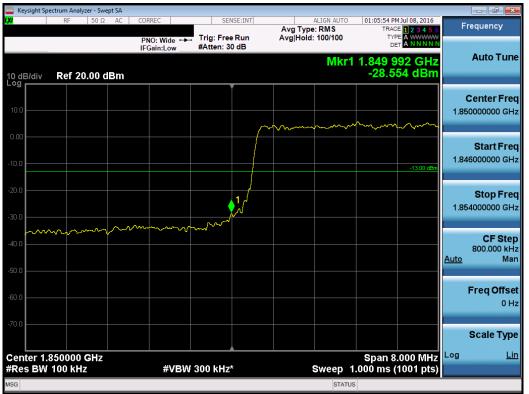
Plot 7-154. Upper Band Edge Plot (Band 2/25 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFVS995		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dego 04 of 144	
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Plot 7-155. Upper Extended Band Edge Plot (Band 2/25 – 5.0MHz QPSK – RB Size 25)

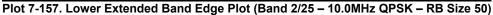


Plot 7-156. Lower Band Edge Plot (Band 2/25 – 10.0MHz QPSK – RB Size 50)

FCC ID: ZNFVS995		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)				Reviewed by: Quality Manager
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									S	Scale Typ
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) dB/div	Ref 20	.00 dBm				WIKI	-21.43	1 dBm		
			IFGain:Low	#Atten: 30	dB	Mkr	1 1.849 00			Auto Tu
			PNO: Fast +	🛶 Trig: Free F	Run Avg	g Type: RMS j Hold: 100/100	TYPE	1 2 3 4 5 6 A WWWWW A N N N N N		querrey
	ectrum Analyz RF	50 Ω AC	CORREC	SENS	E:INT	ALIGN AUTO	01:06:43 PM J		Ere	quency





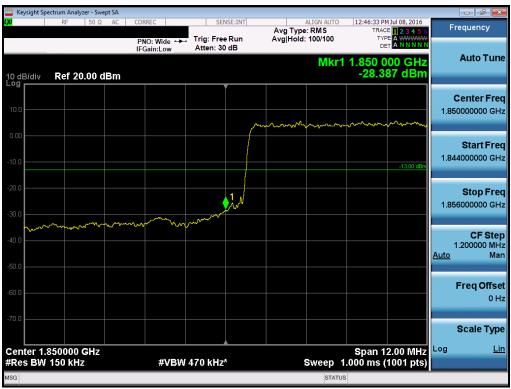
Plot 7-158. Upper Band Edge Plot (Band 2/25 – 10.0MHz QPSK – RB Size 50)

FCC ID: ZNFVS995		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager	
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Keysight Spectrum Analyzer - Swept SA							(- đ <mark>-</mark> ×
	CORREC	SENSE:INT	Avg Type:		01:08:03 PM	Jul 08, 2016		BW
Video BW 3.0 MHz	PNO: Fast ↔→ Trig: F IFGain:Low #Atten	ree Run : 30 dB	Avg Hold:		TYP	A WWWWW A NNNN N		Res BW
10 dB/div Ref 20.00 dBm				Mkr1	1.915 0	08 GHz dBm	Auto	1.0 MHz <u>Man</u>
10.0								Video BW 3.0 MHz
							Auto	<u>Mai</u>
0.00							VBW	:3dB RBV 0.
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Center 1.918000 GHz #Res BW 1.0 MHz	#VBW 3.0 MH	Iz*	s	weep 1	Span 4. 000 ms (′	000 MHz 1001 pts)		
ISG				STATUS				

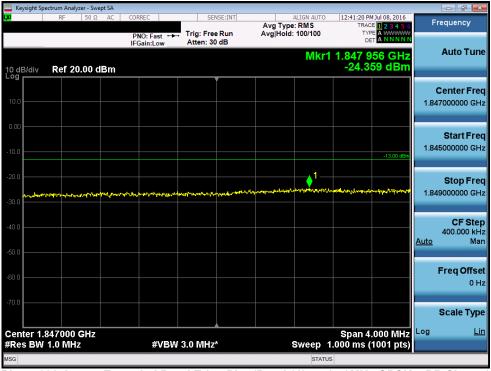
Plot 7-159. Upper Extended Band Edge Plot (Band 2/25 – 10.0MHz QPSK – RB Size 50)



Plot 7-160. Lower Band Edge Plot (Band 2/25 – 15.0MHz QPSK – RB Size 75)

FCC ID: ZNFVS995		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕑 LG	Reviewed by: Quality Manager
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Plot 7-161. Lower Extended Band Edge Plot (Band 2/25 – 15.0MHz QPSK – RB Size 75)



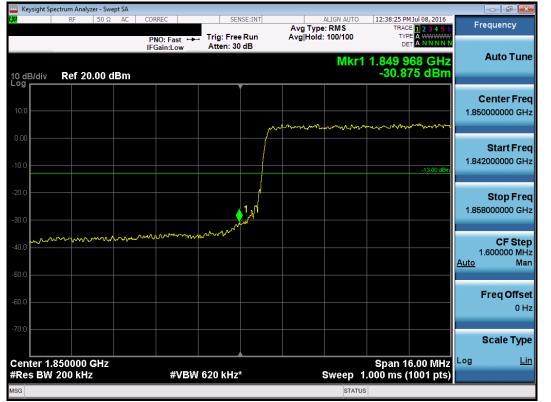
Plot 7-162. Upper Band Edge Plot (Band 2/25 – 15.0MHz QPSK – RB Size 75)

FCC ID: ZNFVS995		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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incysigne s		zer - Swept SA										
	RF	50 Ω AC	C COR	REC		NSE:INT	Avg Type		TRA	PM Jul 08, 2016 CE 1 2 3 4 5 6	F	requency
				IO: Fast ↔ Sain:Low	Atten: 3		Avg Hold					Auto Tui
0 dB/div og	Ref 20	.00 dBn	n					Mkr1	1.916 -26.0	484 GHz)29 dBm		Auto Tu
10.0												Center Fre
0.00											1.9	18000000 G
											1.91	Start Fr 6000000 G
0.0										-13.00 dBm		
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0.0	.918000 / 1.0 MHz	GHz			• 40,00000000000000000000000000000000000				Span	4.000 MHz (1001 pts)	<u>Auto</u>	CF Sta 400.000 k M Freq Offs 0

Plot 7-163. Upper Extended Band Edge Plot (Band 2/25 – 15.0MHz QPSK – RB Size 75)



Plot 7-164. Lower Band Edge Plot (Band 2/25 – 20.0MHz QPSK – RB Size 100)

FCC ID: ZNFVS995		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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Keysight Spectrum Analyzer - Swept SA				
<b>Χ</b> RF 50 Ω AC	CORREC SENSE:INT	Avg Type: RMS	12:39:55 PM Jul 08, 2016 TRACE 1 2 3 4 5 6	Frequency
	PNO: Fast +++ Trig: Free Run IFGain:Low Atten: 30 dB	Avg Hold: 100/100		
10 dB/div Ref 20.00 dBm		Mkr1	1.847 844 GHz -27.221 dBm	Auto Tune
10.0				Center Fre 1.847000000 GH
-10.0			-13.00 dBm	Start Fre 1.845000000 GH
-20.0	uphane martin server and the server server	heyer-aller proved from the state of the	halanenenenenenenenenen	<b>Stop Fre</b> 1.849000000 GH
40.0				CF Ste 400.000 kH <u>Auto</u> Ma
60.0				Freq Offs 0 F
70.0				Scale Typ
Center 1.847000 GHz #Res BW 1.0 MHz	#VBW 3.0 MHz*	Sweep	Span 4.000 MHz .000 ms (1001 pts)	Log <u>Li</u>
MSG		STATU	3	

Keysight Spectrum Analyzer - Swept SA 12:30:09 PMJul 08, 2016 TRACE 1 2 3 4 5 6 TYPE A WWWW DET A N N N N ALIGN AUTO Avg Type: RMS Avg|Hold: 100/100 Frequency Trig: Free Run PNO: Fast ↔→ IFGain:Low #Atten: 30 dB Auto Tune Mkr1 1.915 032 GHz -31.529 dBm 10 dB/div Log Ref 20.00 dBm **Center Freq** 1.915000000 GHz Start Freq 1.907000000 GHz -13.00 d Stop Freq 1.923000000 GHz 1 CF Step 1.600000 MHz ww Man <u>Auto</u> **Freq Offset** 0 Hz Scale Type Span 16.00 MHz Log Sweep 1.000 ms (1001 pts) Center 1.915000 GHz #Res BW 200 kHz Lin #VBW 620 kHz* SG STATUS Plot 7-166. Upper Band Edge Plot (Band 2/25 – 20.0MHz QPSK – RB Size 100)

Plot 7-165. Lower Extended Band Edge Plot (Band 2/25 – 20.0MHz QPSK – RB Size 100)

FCC ID: ZNFVS995		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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Keysight Spectrum Analyzer -					
RF 50	Ω AC CORREC	SENSE:INT	ALIGN AUTO Avg Type: RMS	12:34:15 PM Jul 08, 2016 TRACE 1 2 3 4 5 6	Peak Search
	PNO: Fast ↔→→ IFGain:Low	Trig: Free Run #Atten: 30 dB	Avg Hold: 100/100	TYPE A WWWWW DET A NNNNN	
0 dB/div Ref 20.00	) dBm		Mkr1	1.916 252 GHz -29.542 dBm	NextPea
10.0					Next Pk Rigl
0.00				-13.00 dBm	Next Pk Le
	Mindel allocation of the Association				Marker De
0.0	htendlasselleringgalandsjondjoneljeteljetergerygg	and the second of the second	1984-sensitivespectration (secondary of the	Anglases and for the for the former of factories a	Mkr→(
0.0					Mkr→RefL
enter 1.918000 GH				Span 4.000 MHz	<b>М</b> а 1 о
Res BW 1.0 MHz		3.0 MHz*	Sweep 1	.000 ms (1001 pts)	
G			STATUS		

Plot 7-167. Upper Extended Band Edge Plot (Band 2/25 – 20.0MHz QPSK – RB Size 100)

FCC ID: ZNFVS995		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.

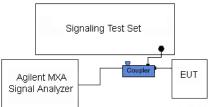


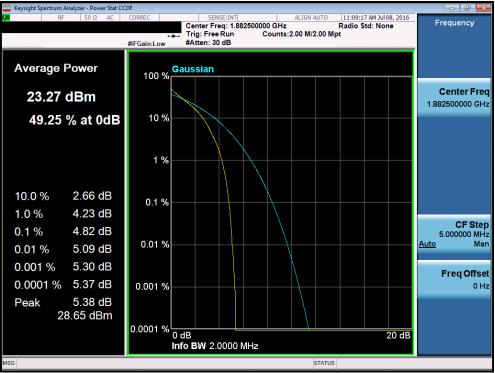
Figure 7-4. Test Instrument & Measurement Setup

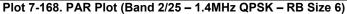
#### Test Notes

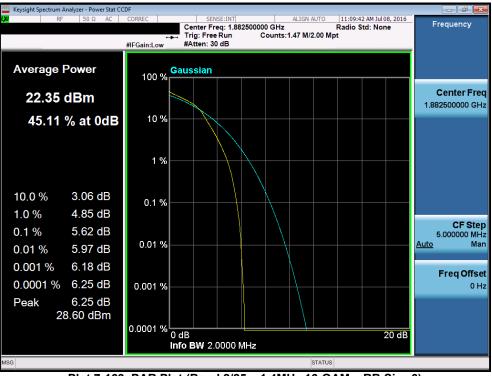
None.

FCC ID: ZNFVS995		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕑 LG	Reviewed by: Quality Manager
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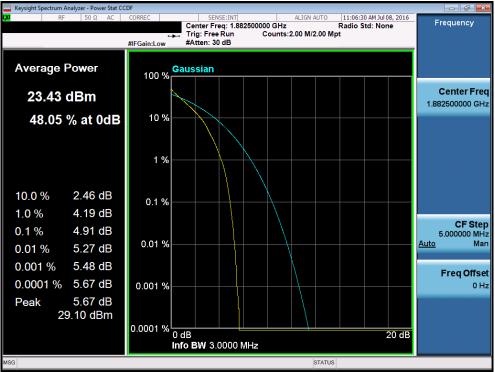




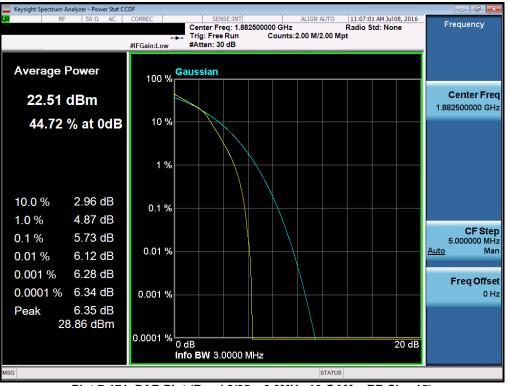
Plot 7-169. PAR Plot (Band 2/25 – 1.4MHz 16-QAM – RB Size 6)

FCC ID: ZNFVS995		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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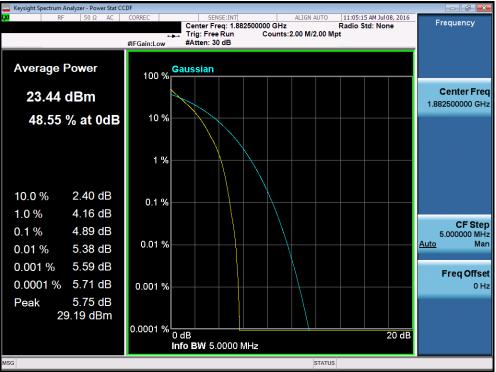
Plot 7-170. PAR Plot (Band 2/25 - 3.0MHz QPSK - RB Size 15)



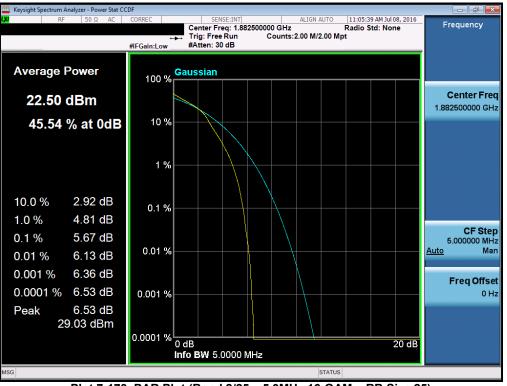
Plot 7-171. PAR Plot (Band 2/25 - 3.0MHz 16-QAM - RB Size 15)

FCC ID: ZNFVS995		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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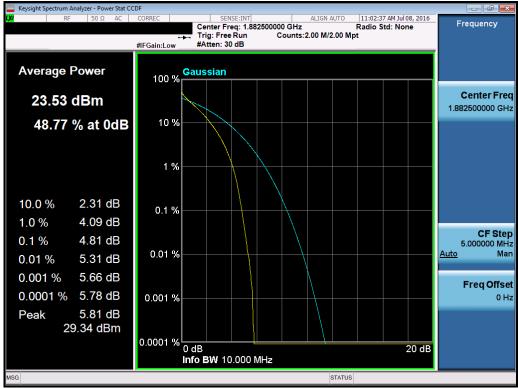
Plot 7-172. PAR Plot (Band 2/25 - 5.0MHz QPSK - RB Size 25)



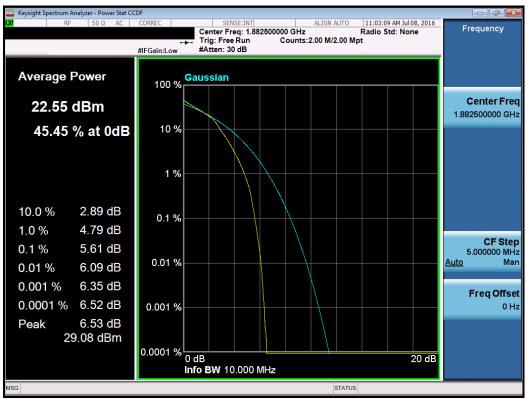
Plot 7-173. PAR Plot (Band 2/25 - 5.0MHz 16-QAM - RB Size 25)

FCC ID: ZNFVS995		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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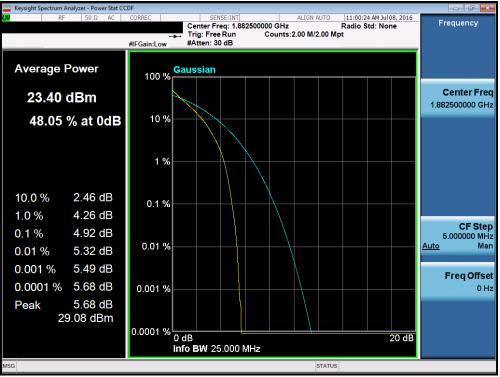
Plot 7-174. PAR Plot (Band 2/25 - 10.0MHz QPSK - RB Size 50)

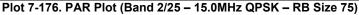


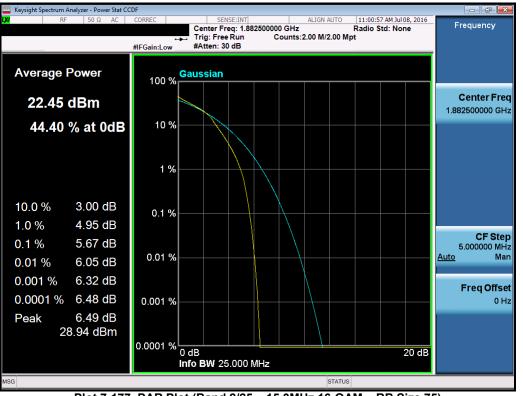
Plot 7-175. PAR Plot (Band 2/25 - 10.0MHz 16-QAM - RB Size 50)

FCC ID: ZNFVS995		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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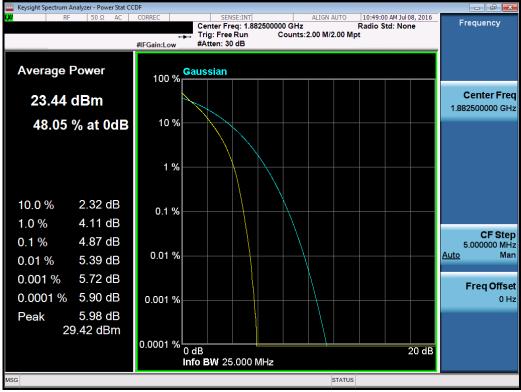




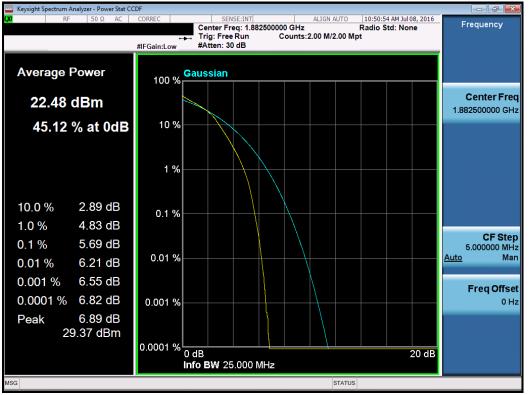
Plot 7-177. PAR Plot (Band 2/25 - 15.0MHz 16-QAM - RB Size 75)

FCC ID: ZNFVS995		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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Plot 7-178. PAR Plot (Band 2/25 - 20.0MHz QPSK - RB Size 100)



Plot 7-179. PAR Plot (Band 2/25 - 20.0MHz 16-QAM - RB Size 100)

FCC ID: ZNFVS995		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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## 7.6 Radiated Power (ERP/EIRP) §22.913(a.2) §24.232(c.2) §27.50(b.10) §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 > 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.

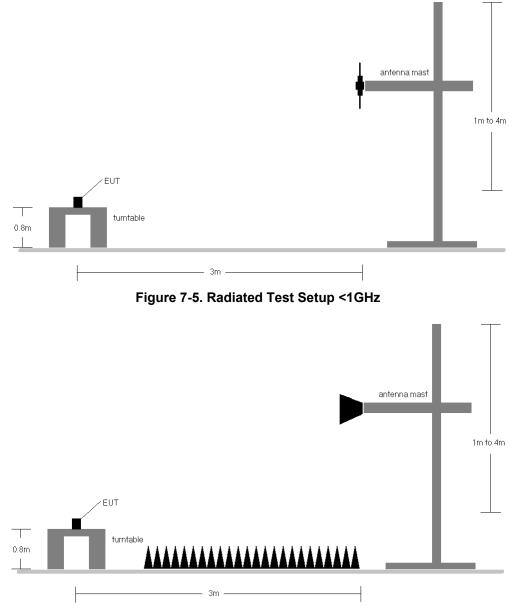


Figure 7-6. Radiated Test Setup >1GHz

#### 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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# 7.6.1 Antenna-1 Radiated Power (ERP/EIRP)

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	271	3	3 / 2	15.45	2.12	17.57	34.77	-17.20
707.50	1.4	QPSK	Н	255	0	3 / 2	16.27	2.31	18.58	34.77	-16.19
715.30	1.4	QPSK	Н	259	0	3 / 2	16.76	2.52	19.28	34.77	-15.49
699.70	1.4	16-QAM	н	271	3	3 / 2	14.33	2.12	16.45	34.77	-18.32
707.50	1.4	16-QAM	н	255	0	3 / 2	15.20	2.31	17.51	34.77	-17.26
715.30	1.4	16-QAM	Н	259	0	3 / 2	15.67	2.52	18.19	34.77	-16.58
700.50	3	QPSK	Н	274	3	1 / 14	16.47	2.12	18.59	34.77	-16.18
707.50	3	QPSK	н	256	350	1 / 14	16.80	2.31	19.11	34.77	-15.66
714.50	3	QPSK	н	255	3	1 / 0	17.23	2.50	19.73	34.77	-15.04
700.50	3	16-QAM	н	274	3	1 / 14	15.52	2.12	17.64	34.77	-17.13
707.50	3	16-QAM	Н	256	350	1 / 14	15.86	2.31	18.17	34.77	-16.60
714.50	3	16-QAM	Н	255	3	1 / 0	16.37	2.50	18.87	34.77	-15.90
701.50	5	QPSK	Н	275	4	1 / 24	16.59	2.15	18.74	34.77	-16.03
707.50	5	QPSK	Н	282	0	1 / 0	16.77	2.31	19.08	34.77	-15.69
713.50	5	QPSK	Н	259	0	1 / 0	17.48	2.48	19.96	34.77	-14.82
701.50	5	16-QAM	Н	275	4	1 / 24	15.72	2.15	17.87	34.77	-16.90
707.50	5	16-QAM	н	282	0	1 / 0	15.96	2.31	18.27	34.77	-16.50
713.50	5	16-QAM	н	259	0	1 / 0	16.56	2.48	19.04	34.77	-15.74
704.00	10	QPSK	Н	284	182	1 / 49	16.42	2.22	18.64	34.77	-16.14
707.50	10	QPSK	н	279	178	1 / 0	17.01	2.31	19.32	34.77	-15.45
711.00	10	QPSK	н	256	192	1 / 49	16.24	2.41	18.65	34.77	-16.12
704.00	10	16-QAM	н	284	182	1 / 49	15.49	2.22	17.71	34.77	-17.07
707.50	10	16-QAM	н	279	178	1 / 0	16.09	2.31	18.40	34.77	-16.37
711.00	10	16-QAM	н	256	192	1 / 49	15.43	2.41	17.84	34.77	-16.93
713.50	5	QPSK	V	100	0	1 / 0	16.55	2.48	19.03	34.77	-15.75

Table 7-2. ERP Data (Band 12/17)

FCC ID: ZNFVS995		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]
779.50	5	QPSK	н	235	317	1 / 0	15.46	4.19	19.65	34.77	-15.12
782.00	5	QPSK	н	242	307	1 / 0	15.48	4.25	19.73	34.77	-15.04
784.50	5	QPSK	н	218	310	1 / 24	15.53	4.32	19.85	34.77	-14.92
779.50	5	16QAM	н	235	317	1 / 0	14.54	4.19	18.73	34.77	-16.04
782.00	5	16QAM	н	242	307	1 / 0	14.74	4.25	18.99	34.77	-15.78
784.50	5	16QAM	н	218	310	1 / 24	14.60	4.32	18.92	34.77	-15.85
782.00	10	QPSK	н	238	312	1 / 0	15.16	4.25	19.41	34.77	-15.36
782.00	10	16QAM	н	238	312	1 / 0	14.43	4.25	18.68	34.77	-16.09
784.50	5	QPSK	V	117	135	1/0	14.15	4.32	18.47	34.77	-16.30

Table 7-3. ERP Data (Band 13)

FCC ID: ZNFVS995		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	Н	226	313	3 / 2	14.69	5.01	19.70	38.45	-18.75
836.50	1.4	QPSK	н	358	313	3 / 2	14.36	5.16	19.52	38.45	-18.93
848.30	1.4	QPSK	н	206	311	3 / 2	13.76	5.30	19.06	38.45	-19.39
824.70	1.4	16-QAM	Н	226	313	3 / 2	13.68	5.01	18.69	38.45	-19.76
836.50	1.4	16-QAM	Н	358	313	3 / 2	13.30	5.16	18.46	38.45	-19.99
848.30	1.4	16-QAM	н	206	311	3 / 2	12.52	5.30	17.82	38.45	-20.63
825.50	3	QPSK	Н	223	319	1 / 14	14.92	5.02	19.94	38.45	-18.51
836.50	3	QPSK	н	186	356	1 / 14	14.24	5.16	19.40	38.45	-19.05
847.50	3	QPSK	н	358	189	1 / 0	13.99	5.29	19.28	38.45	-19.17
825.50	3	16-QAM	н	223	319	1 / 14	13.96	5.02	18.98	38.45	-19.47
836.50	3	16-QAM	Н	186	356	1 / 14	13.20	5.16	18.36	38.45	-20.09
847.50	3	16-QAM	н	358	189	1 / 0	13.07	5.29	18.36	38.45	-20.09
826.50	5	QPSK	Н	221	316	1 / 0	14.41	5.03	19.44	38.45	-19.01
836.50	5	QPSK	н	356	180	1 / 24	13.32	5.16	18.48	38.45	-19.97
846.50	5	QPSK	н	358	183	1 / 0	13.41	5.28	18.69	38.45	-19.76
826.50	5	16-QAM	н	221	316	1 / 0	13.49	5.03	18.52	38.45	-19.93
836.50	5	16-QAM	н	356	180	1 / 24	12.41	5.16	17.57	38.45	-20.88
846.50	5	16-QAM	н	358	183	1 / 0	12.54	5.28	17.82	38.45	-20.63
829.00	10	QPSK	н	186	184	1 / 0	14.64	5.06	19.70	38.45	-18.75
836.50	10	QPSK	н	188	181	1 / 0	14.29	5.16	19.45	38.45	-19.00
844.00	10	QPSK	н	188	179	1 / 0	13.30	5.25	18.55	38.45	-19.90
829.00	10	16-QAM	н	186	184	1/0	13.76	5.06	18.82	38.45	-19.63
836.50	10	16-QAM	н	188	181	1/0	13.36	5.16	18.52	38.45	-19.93
844.00	10	16-QAM	н	188	179	1/0	12.37	5.25	17.62	38.45	-20.83
825.50	3	QPSK	V	149	346	1 / 74	13.03	5.02	18.05	38.45	-20.40

Table 7-4. ERP Data (Band 5)

FCC ID: ZNFVS995		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 112 of 144
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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	188	214	1/3	13.75	9.66	23.41	30.00	-6.59
1732.50	1.4	QPSK	н	222	225	1/3	12.20	9.61	21.81	30.00	-8.19
1754.30	1.4	QPSK	н	176	217	1/3	13.79	9.57	23.36	30.00	-6.64
1710.70	1.4	16-QAM	н	188	214	1/3	12.07	9.66	21.73	30.00	-8.27
1732.50	1.4	16-QAM	н	222	225	1/3	10.80	9.61	20.41	30.00	-9.59
1754.30	1.4	16-QAM	н	176	217	1/3	12.64	9.57	22.21	30.00	-7.79
1711.50	3	QPSK	н	190	211	1 / 0	13.65	9.65	23.30	30.00	-6.70
1732.50	3	QPSK	н	109	206	1 / 7	12.85	9.61	22.46	30.00	-7.54
1753.50	3	QPSK	н	180	218	1 / 7	13.79	9.57	23.36	30.00	-6.64
1711.50	3	16-QAM	н	190	211	1 / 0	12.30	9.65	21.95	30.00	-8.05
1732.50	3	16-QAM	н	109	206	1 / 7	11.65	9.61	21.26	30.00	-8.74
1753.50	3	16-QAM	н	180	218	1 / 7	12.29	9.57	21.86	30.00	-8.14
1712.50	5	QPSK	н	255	321	1 / 0	11.55	9.65	21.20	30.00	-8.80
1745.00	5	QPSK	н	176	325	1 / 0	12.92	9.59	22.51	30.00	-7.49
1777.50	5	QPSK	н	100	212	1 / 0	13.02	9.53	22.55	30.00	-7.45
1712.50	5	16-QAM	н	255	321	1 / 0	10.48	9.65	20.13	30.00	-9.87
1745.00	5	16-QAM	н	176	325	1 / 0	11.69	9.59	21.28	30.00	-8.72
1777.50	5	16-QAM	н	100	212	1 / 0	11.74	9.53	21.27	30.00	-8.73
1715.00	10	QPSK	н	113	230	1 / 0	12.23	9.65	21.88	30.00	-8.12
1745.00	10	QPSK	н	174	212	1 / 49	13.62	9.59	23.21	30.00	-6.79
1775.00	10	QPSK	н	100	214	1 / 0	13.18	9.53	22.71	30.00	-7.29
1715.00	10	16-QAM	н	113	230	1 / 0	10.98	9.65	20.63	30.00	-9.37
1745.00	10	16-QAM	н	174	212	1 / 49	12.57	9.59	22.16	30.00	-7.84
1775.00	10	16-QAM	н	100	214	1 / 0	11.96	9.53	21.49	30.00	-8.51
1717.50	15	QPSK	н	113	223	1 / 0	13.33	9.64	22.97	30.00	-7.03
1745.00	15	QPSK	н	230	204	1 / 74	13.38	9.59	22.97	30.00	-7.03
1772.50	15	QPSK	н	100	217	1 / 74	13.09	9.54	22.63	30.00	-7.37
1717.50	15	16-QAM	н	113	223	1/0	11.39	9.64	21.03	30.00	-8.97
1745.00	15	16-QAM	н	230	204	1 / 74	12.02	9.59	21.61	30.00	-8.39
1772.50	15	16-QAM	н	100	217	1 / 74	11.70	9.54	21.24	30.00	-8.76
1720.00	20	QPSK	н	189	216	1/0	12.74	9.64	22.38	30.00	-7.62
1745.00	20	QPSK	н	121	223	1/0	14.21	9.59	23.80	30.00	-6.20
1770.00	20	QPSK	н	182	217	1/0	12.87	9.54	22.41	30.00	-7.59
1720.00	20	16-QAM	н	189	216	1/0	12.20	9.64	21.84	30.00	-8.16
1745.00	20	16-QAM	н	121	223	1/0	13.49	9.59	23.08	30.00	-6.92
1770.00	20	16-QAM	н	182	217	1/0	11.67	9.54	21.21	30.00	-8.79
1745.00	20	QPSK	v	180	13	1/0	13.41	9.59	23.00	30.00	-7.00
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Table 7-5. EIRP Data (Band 66/4)

FCC ID: ZNFVS995		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 114 of 144
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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	111	191	1 / 0	13.56	9.35	22.91	33.01	-10.10
1882.50	1.4	QPSK	н	100	195	1/3	12.94	9.27	22.21	33.01	-10.80
1914.30	1.4	QPSK	н	107	188	1 / 3	12.86	9.26	22.12	33.01	-10.89
1850.70	1.4	16-QAM	н	111	191	1 / 0	12.43	9.35	21.78	33.01	-11.23
1882.50	1.4	16-QAM	н	100	195	1/3	11.87	9.27	21.14	33.01	-11.87
1914.30	1.4	16-QAM	н	107	188	1/3	11.62	9.26	20.88	33.01	-12.13
1851.50	3	QPSK	н	100	187	1 / 7	14.41	9.35	23.76	33.01	-9.25
1882.50	3	QPSK	н	100	194	1 / 7	12.43	9.27	21.70	33.01	-11.31
1913.50	3	QPSK	н	100	189	1 / 7	12.45	9.26	21.71	33.01	-11.30
1851.50	3	16-QAM	н	100	187	1 / 7	12.61	9.35	21.96	33.01	-11.05
1882.50	3	16-QAM	н	100	194	1 / 7	11.06	9.27	20.33	33.01	-12.68
1913.50	3	16-QAM	н	100	189	1 / 7	11.08	9.26	20.34	33.01	-12.67
1852.50	5	QPSK	н	100	188	1 / 12	14.33	9.34	23.67	33.01	-9.34
1882.50	5	QPSK	н	100	196	1 / 12	12.42	9.27	21.69	33.01	-11.32
1912.50	5	QPSK	н	100	195	1 / 12	12.39	9.26	21.65	33.01	-11.36
1852.50	5	16-QAM	н	100	188	1 / 12	12.88	9.34	22.22	33.01	-10.79
1882.50	5	16-QAM	н	100	196	1 / 12	10.96	9.27	20.23	33.01	-12.78
1912.50	5	16-QAM	н	100	195	1 / 12	11.25	9.26	20.51	33.01	-12.50
1855.00	10	QPSK	н	100	100	1 / 0	12.89	9.34	22.23	33.01	-10.78
1882.50	10	QPSK	н	100	93	1 / 49	12.18	9.27	21.45	33.01	-11.56
1910.00	10	QPSK	н	285	107	1 / 0	11.36	9.25	20.61	33.01	-12.40
1855.00	10	16-QAM	н	100	100	1 / 0	11.56	9.34	20.90	33.01	-12.11
1882.50	10	16-QAM	н	100	93	1 / 49	10.78	9.27	20.05	33.01	-12.96
1910.00	10	16-QAM	н	285	107	1 / 0	9.90	9.25	19.15	33.01	-13.86
1857.50	15	QPSK	н	100	100	1 / 0	13.69	9.33	23.02	33.01	-9.99
1882.50	15	QPSK	н	100	91	1 / 74	12.08	9.27	21.35	33.01	-11.66
1907.50	15	QPSK	н	284	104	1 / 74	11.65	9.24	20.89	33.01	-12.12
1857.50	15	16-QAM	н	100	100	1/0	11.81	9.33	21.14	33.01	-11.87
1882.50	15	16-QAM	н	100	91	1 / 74	10.98	9.27	20.25	33.01	-12.76
1907.50	15	16-QAM	н	284	104	1 / 74	10.18	9.24	19.42	33.01	-13.59
1860.00	20	QPSK	н	100	104	1/0	12.59	9.32	21.91	33.01	-11.10
1882.50	20	QPSK	н	100	92	1/0	12.05	9.27	21.32	33.01	-11.69
1905.00	20	QPSK	н	180	93	1 / 99	12.47	9.24	21.71	33.01	-11.30
1860.00	20	16-QAM	н	100	104	1/0	11.25	9.32	20.57	33.01	-12.44
1882.50	20	16-QAM	н	100	92	1/0	10.95	9.27	20.22	33.01	-12.79
1905.00	20	16-QAM	н	180	93	1 / 99	11.42	9.24	20.66	33.01	-12.35
1851.50	3	QPSK	v	118	5	1 / 99	12.99	9.35	22.34	33.01	-10.67
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Table 7-6. EIRP Data (Band 2/25)

FCC ID: ZNFVS995		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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## 7.6.2 Antenna-2 Radiated Power (ERP/EIRP)

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	360	1 / 5	11.39	2.31	13.70	34.77	-21.07
707.50	1.4	QPSK	Н	240	10	3 / 2	12.68	2.31	14.99	34.77	-19.78
715.30	1.4	QPSK	Н	200	220	1 / 0	10.65	2.52	13.17	34.77	-21.60
699.70	1.4	16-QAM	н	262	360	1 / 5	10.49	2.31	12.80	34.77	-21.97
707.50	1.4	16-QAM	н	240	10	1 / 0	11.62	2.31	13.93	34.77	-20.84
715.30	1.4	16-QAM	н	200	220	1 / 0	9.65	2.52	12.17	34.77	-22.60
700.50	3	QPSK	Н	223	13	1 / 14	11.63	2.12	13.75	34.77	-21.02
707.50	3	QPSK	н	238	11	1 / 14	12.48	2.31	14.79	34.77	-19.98
714.50	3	QPSK	н	223	13	1 / 0	12.57	2.50	15.07	34.77	-19.70
700.50	3	16-QAM	н	223	13	1 / 14	10.71	2.12	12.83	34.77	-21.94
707.50	3	16-QAM	Н	238	11	1 / 14	11.50	2.31	13.81	34.77	-20.96
714.50	3	16-QAM	н	223	13	1 / 0	11.68	2.50	14.18	34.77	-20.59
701.50	5	QPSK	Н	140	100	1 / 24	12.12	2.15	14.27	34.77	-20.50
707.50	5	QPSK	н	234	0	1 / 24	12.70	2.31	15.01	34.77	-19.76
713.50	5	QPSK	н	245	90	1 / 0	12.74	2.48	15.22	34.77	-19.56
701.50	5	16-QAM	н	140	100	1 / 24	11.29	2.15	13.44	34.77	-21.33
707.50	5	16-QAM	н	234	0	1 / 24	11.88	2.31	14.19	34.77	-20.58
713.50	5	16-QAM	н	245	90	1 / 0	11.91	2.48	14.39	34.77	-20.39
704.00	10	QPSK	Н	200	129	1 / 49	12.44	2.22	14.66	34.77	-20.12
707.50	10	QPSK	н	224	100	1 / 49	12.48	2.31	14.79	34.77	-19.98
711.00	10	QPSK	н	230	250	1 / 0	12.37	2.41	14.78	34.77	-19.99
704.00	10	16-QAM	н	200	129	1 / 49	11.49	2.22	13.71	34.77	-21.07
707.50	10	16-QAM	н	224	100	1 / 49	11.60	2.31	13.91	34.77	-20.86
711.00	10	16-QAM	Н	230	250	1 / 0	11.47	2.41	13.88	34.77	-20.89
713.50	5	QPSK	V	167	223	1 / 0	12.66	2.48	15.14	34.77	-19.64

Table 7-7. ERP Data (Band 12)

FCC ID: ZNFVS995		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]
779.50	5	QPSK	н	200	122	1 / 0	11.21	4.19	15.40	34.77	-19.37
782.00	5	QPSK	н	223	161	1 / 24	11.04	4.25	15.29	34.77	-19.48
784.50	5	QPSK	н	100	250	1 / 0	11.21	4.32	15.53	34.77	-19.24
779.50	5	16QAM	н	200	122	1 / 0	9.95	4.19	14.14	34.77	-20.63
782.00	5	16QAM	н	223	161	1 / 24	10.17	4.25	14.42	34.77	-20.35
784.50	5	16QAM	н	100	250	1 / 0	10.07	4.32	14.39	34.77	-20.38
782.00	10	QPSK	Н	220	190	1 / 49	10.66	4.25	14.91	34.77	-19.86
782.00	10	16QAM	н	220	190	1 / 49	9.69	4.25	13.94	34.77	-20.83
784.50	5	QPSK	V	100	59	1 / 74	8.34	4.32	12.66	34.77	-22.11

Table 7-8. ERP Data (Band 13)

FCC ID: ZNFVS995		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	Н	122	150	1 / 0	6.46	5.01	11.47	38.45	-26.98
836.50	1.4	QPSK	н	200	190	1 / 5	5.94	5.16	11.10	38.45	-27.35
848.30	1.4	QPSK	н	150	210	1 / 5	5.95	5.30	11.25	38.45	-27.20
824.70	1.4	16-QAM	н	122	150	1 / 0	5.52	5.01	10.53	38.45	-27.92
836.50	1.4	16-QAM	н	200	190	1 / 0	4.97	5.16	10.13	38.45	-28.32
848.30	1.4	16-QAM	н	150	210	1 / 5	4.93	5.30	10.23	38.45	-28.22
825.50	3	QPSK	Н	120	200	1 / 0	5.94	5.02	10.96	38.45	-27.49
836.50	3	QPSK	н	187	153	1 / 0	5.51	5.16	10.67	38.45	-27.78
847.50	3	QPSK	н	321	158	1 / 0	4.50	5.29	9.79	38.45	-28.66
825.50	3	16-QAM	Н	120	200	1 / 14	4.89	5.02	9.91	38.45	-28.54
836.50	3	16-QAM	н	187	153	1 / 0	5.01	5.16	10.17	38.45	-28.28
847.50	3	16-QAM	н	321	158	1 / 14	3.53	5.29	8.82	38.45	-29.63
826.50	5	QPSK	Н	192	100	1 / 0	6.16	5.03	11.19	38.45	-27.26
836.50	5	QPSK	н	315	152	1 / 24	5.40	5.16	10.56	38.45	-27.89
846.50	5	QPSK	Н	205	162	1 / 0	4.95	5.28	10.23	38.45	-28.22
826.50	5	16-QAM	н	192	100	1 / 0	5.27	5.03	10.30	38.45	-28.15
836.50	5	16-QAM	н	315	152	1 / 24	4.40	5.16	9.56	38.45	-28.89
846.50	5	16-QAM	н	205	162	1 / 0	3.93	5.28	9.21	38.45	-29.24
829.00	10	QPSK	Н	120	200	1 / 0	5.86	5.06	10.92	38.45	-27.53
836.50	10	QPSK	н	182	148	1/0	5.85	5.16	11.01	38.45	-27.44
844.00	10	QPSK	н	125	225	1/0	5.28	5.25	10.53	38.45	-27.92
829.00	10	16-QAM	н	120	200	1 / 0	4.89	5.06	9.95	38.45	-28.50
836.50	10	16-QAM	н	182	148	1 / 0	4.90	5.16	10.06	38.45	-28.39
844.00	10	16-QAM	Н	125	225	1 / 0	4.36	5.25	9.61	38.45	-28.84
824.70	1.4	QPSK	V	123	283	1 / 0	2.83	5.01	7.84	38.45	-30.61

Table 7-9. ERP Data (Band 5)

FCC ID: ZNFVS995		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(c) §27.53(f) §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 tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically and horizontally polarized tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically and horizontally polarized broadband horn antennas. All measurements are performed as peak measurements while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

#### **Test Procedures Used**

KDB 971168 D01 v02r02 - Section 5.8

ANSI/TIA-603-D-2010 – Section 2.2.12

#### Test Settings

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

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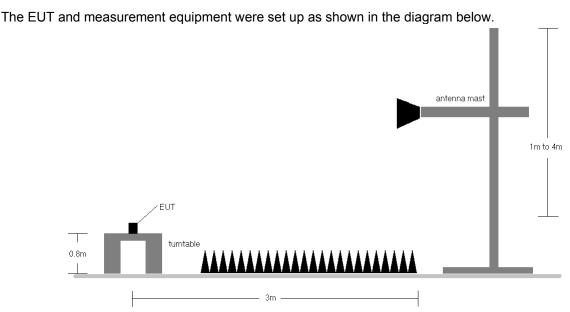


Figure 7-7. Test Instrument & Measurement Setup

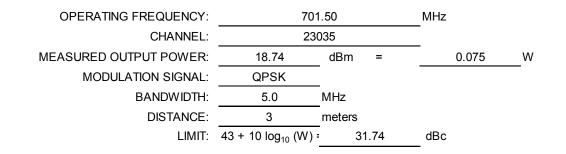
#### Test Notes

- 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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## 7.7.1 Antenna-1 Radiated Spurious Emissions Measurements



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	-	-	-57.84	2.39	-55.45	74.2
2104.50	Н	110	131	-51.70	3.46	-48.24	67.0
2806.00	Н	-	-	-55.75	4.76	-50.99	69.7

Table 7-10. Radiated Spurious Data (Band 12/17 – Low Channel)

OPERATING FREQUENCY:	707	<b>.</b> 50	MHz
CHANNEL:	230	095	_
MEASURED OUTPUT POWER:	19.08	dBm =	0.081 W
MODULATION SIGNAL:	QPSK		
BANDWIDTH:	5.0	MHz	
DISTANCE:	3	meters	
LIMIT:	43 + 10 log ₁₀ (W) =	32.08	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]
1415.00	Н	-	-	-58.29	2.54	-55.74	74.8
2122.50	Н	122	132	-50.97	3.42	-47.55	66.6
2830.00	Н	-	-	-55.12	4.85	-50.27	69.4

Table 7-11. Radiated Spurious Data (Band 12/17 – Mid Channel)

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OPERATING FREQUENCY:	713	3.50	MHz
CHANNEL:	23	155	
MEASURED OUTPUT POWER:	19.96	dBm =	0.099 W
MODULATION SIGNAL:	QPSK		
BANDWIDTH:	5.0	MHz	
DISTANCE:	3	meters	
LIMIT:	43 + 10 log ₁₀ (W)	32.96	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]
1427.00	Н	-	-	-58.03	2.70	-55.34	75.3
2140.50	Н	112	108	-52.43	3.38	-49.05	69.0
2854.00	Н	-	-	-55.85	4.95	-50.91	70.9

Table 7-12. Radiated Spurious Data (Band 12/17 – High Channel)

OPERATING FREQUENCY:	782	2.00	MHz
CHANNEL:	232	230	
MEASURED OUTPUT POWER:	19.41	dBm =	0.087 W
MODULATION SIGNAL:	QPSK		
BANDWIDTH:	10.0	MHz	
DISTANCE:	3	meters	
LIMIT:	43 + 10 log ₁₀ (W) =	32.41	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]
2346.00	Н	-	-	-56.54	3.63	-52.91	72.3
3128.00	Н	-	-	-55.89	4.95	-50.94	70.3
3910.00	Н	-	-	-55.77	6.55	-49.22	68.6

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

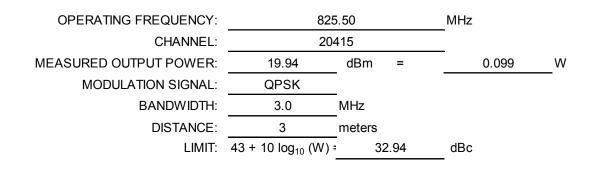
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MODULATION SIGNAL:	QPSK	_
BANDWIDTH:	5.00	MHz
DISTANCE:	3	meters
NARROWBAND EMISSION LIMIT:	-50	dBm
WIDEBAND EMISSION LIMIT:	-40	dBm/MHz

Frequency [MHz]	Ant. Pol. [H/V]	Height	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	Margin [dB]
1564.00	Н	120	130	-65.93	6.57	-59.36	-19.4

Table 7-14. Radiated Spurious Data (Band 13 – 1559-1610MHz Band)

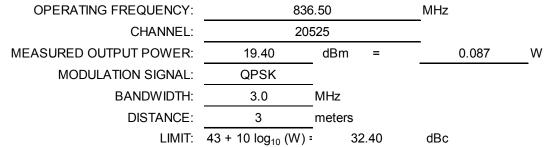


[MHz]	Ant. Pol. [H/V]	Height	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1651.00	Н	-	-	-59.04	3.63	-55.40	75.3

Table 7-15. Radiated Spurious Data (Band 5 – Low Channel)

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Frequency [MHz]	Ant. Pol. [H/V]	Height	Turntable Azimuth [degree]		Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1673.00	Н	-	-	-58.40	3.52	-54.88	74.3

Table 7-16. Radiated Spurious Data (Band 5 – Mid Channel)

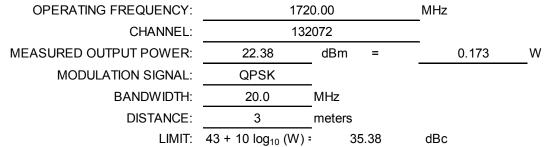
OPERATING FREQUENCY:	847	MHz	
CHANNEL:	206	_	
MEASURED OUTPUT POWER:	19.28	dBm =	0.085 W
MODULATION SIGNAL:	QPSK		
BANDWIDTH:	3.0	MHz	
DISTANCE:	3	meters	
LIMIT:	43 + 10 log ₁₀ (W) =	32.28	dBc

Frequency [MHz]	Ant. Pol. [H/V]	Height	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1695.00	Н	205	287	-55.89	3.41	-52.49	71.8
2542.50	Н	-	-	-54.22	3.73	-50.49	69.8

Table 7-17. Radiated Spurious Data (Band 5 – High Channel)

FCC ID: ZNFVS995		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]
3440.00	Н	-	-	-55.71	8.19	-47.53	69.9
5160.00	Н	-	-	-54.23	10.38	-43.85	66.2

Table 7-18. Radiated Spurious Data (Band 66/4 – Low Channel)

OPERATING FREQUENCY:	174	MHz	
CHANNEL:	132	122	_
MEASURED OUTPUT POWER:	23.80	dBm =	0.240 W
MODULATION SIGNAL:	QPSK		
BANDWIDTH:	20.0	MHz	
DISTANCE:	3	meters	
LIMIT:	43 + 10 log ₁₀ (W) =	36.80	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]
3490.00	Н	100	212	-49.32	8.33	-40.99	64.8
5235.00	Н	-	-	-54.19	10.38	-43.82	67.6

Table 7-19. Radiated Spurious Data (Band 66/4 – Mid Channel)

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OPERATING FREQUENCY:	177	MHz	
CHANNEL:	132	2572	_
MEASURED OUTPUT POWER:	22.41	dBm =	0.174 W
MODULATION SIGNAL:	QPSK	_	
BANDWIDTH:	20.0	MHz	
DISTANCE:	3	meters	
LIMIT:	43 + 10 log ₁₀ (W) =	35.41	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]
3540.00	Н	-	-	-55.13	8.42	-46.72	69.1
5310.00	Н	-	-	-55.16	10.32	-44.84	67.3

Table 7-20. Radiated Spurious Data (Band 66 – High Channel)

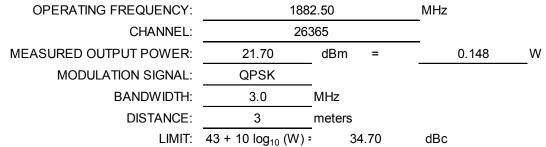
OPERATING FREQUENCY:	185	1.50	MHz
CHANNEL:	260	)55	
MEASURED OUTPUT POWER:	23.76	dBm =	0.238 W
MODULATION SIGNAL:	QPSK		
BANDWIDTH:	3.0	MHz	
DISTANCE:	3	meters	
LIMIT:	43 + 10 log ₁₀ (W) =	36.76	dBc

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]
3703.00	Н	110	250	-53.59	8.41	-45.18	68.9
5554.50	Н	125	200	-53.11	10.52	-42.59	66.3
7406.00	Н	-	-	-53.45	12.01	-41.44	65.2

Table 7-21. Radiated Spurious Data (Band 2/25 – Low Channel)

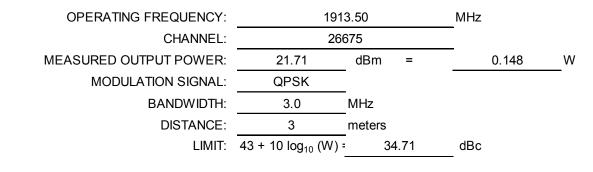
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Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3765.00	Н	232	142	-49.71	8.66	-41.05	62.8
5647.50	Н	106	132	-55.46	10.62	-44.84	66.5
7530.00	Н	-	-	-52.65	12.06	-40.59	62.3

Table 7-22. Radiated Spurious Data (Band 2/25 – Mid Channel)



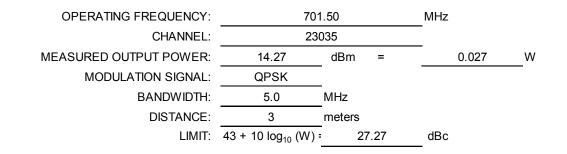
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3827.00	Н	110	200	-55.76	8.76	-47.01	68.7
5740.50	Н	122	250	-55.11	10.73	-44.38	66.1
7654.00	Н	-	-	-53.21	12.18	-41.04	62.7

Table 7-23. Radiated Spurious Data (Band 2/25 – High Channel)

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## 7.7.2 Antenna-2 Radiated Spurious Emissions Measurements



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	100	218	-25.58	2.39	-23.19	37.5
2104.50	Н	-	-	-28.61	3.46	-25.15	39.4
2806.00	Н	-	-	-27.18	4.76	-22.42	36.7

Table 7-24. Radiated Spurious Data (Band 12 – Low Channel)

OPERATING FREQUENCY:	707	.50	MHz
CHANNEL:	230	)95	_
MEASURED OUTPUT POWER:	15.01	dBm =	0.032 W
MODULATION SIGNAL:	QPSK		
BANDWIDTH:	5.0	MHz	
DISTANCE:	3	meters	
LIMIT:	43 + 10 log ₁₀ (W) =	28.01	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]
1415.00	Н	140	153	-27.90	2.54	-25.36	40.4
2122.50	Н	247	287	-28.34	3.42	-24.92	39.9

Table 7-25. Radiated Spurious Data (Band 12 – Mid Channel)

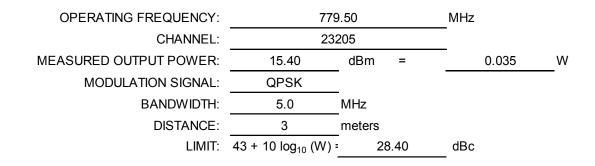
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OPERATING FREQUENCY:	713	3.50	MHz
CHANNEL:	23	155	_
MEASURED OUTPUT POWER:	15.22	dBm =	0.033 W
MODULATION SIGNAL:	QPSK		
BANDWIDTH:	5.0	MHz	
DISTANCE:	3	meters	
LIMIT:	43 + 10 log ₁₀ (W) =	28.22	dBc

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]
1427.00	Н	136	205	-27.74	2.70	-25.04	40.3
2140.50	Н	-	-	-28.40	3.38	-25.02	40.2

Table 7-26. Radiated Spurious Data (Band 12 – High Channel)

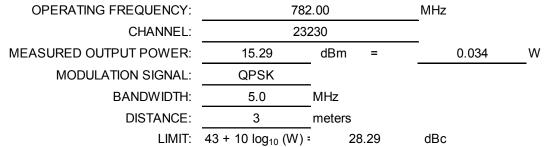


Frequency [MHz]	Ant. Pol. [H/V]	Height	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
2338.50	Н	-	-	-58.05	3.64	-54.41	69.8
3118.00	Н	100	142	-56.38	4.98	-51.39	66.8

Table 7-27. Radiated Spurious Data (Band 13 – Low Channel)

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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]
2346.00	Н	-	-	-56.53	3.63	-52.90	68.2
3128.00	Н	100	347	-53.61	4.95	-48.66	64.0

Table 7-28. Radiated Spurious Data (Band 13 – Mid Channel)

OPERATING FREQUENCY:	784	1.50	MHz
CHANNEL:	232	255	_
MEASURED OUTPUT POWER:	15.53	dBm =	0.036 W
MODULATION SIGNAL:	QPSK	-	
BANDWIDTH:	5.0	MHz	
DISTANCE:	3	meters	
LIMIT:	43 + 10 log ₁₀ (W) =	28.53	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]
2353.50	Н	-	-	-56.55	3.63	-52.92	68.4
3138.00	Н	100	146	-52.28	4.92	-47.36	62.9

Table 7-29. Radiated Spurious Data (Band 13 – High Channel)

FCC ID: ZNFVS995		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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MODULATION SIGNAL:	QPSK	
BANDWIDTH:	5.00	MHz
DISTANCE:	3	meters
NARROWBAND EMISSION LIMIT:	-50	dBm
WIDEBAND EMISSION LIMIT:	-40	dBm/MHz

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]	Margin [dB]
1559.00	Н	120	221	-66.40	6.55	-59.85	-19.8
1564.00	Н	110	122	-65.43	6.57	-58.86	-18.9
1569.00	Н	102	160	-65.64	6.59	-59.06	-19.1

Table 7-30. Radiated Spurious Data (Band 13 – 1559-1610MHz Band)

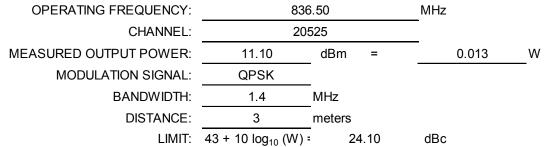
OPERATING FREQUENCY:	824	.70	MHz
CHANNEL:	204	_	
MEASURED OUTPUT POWER:	11.47	dBm =	0.014 W
MODULATION SIGNAL:	QPSK		
BANDWIDTH:	1.4	MHz	
DISTANCE:	3	meters	
LIMIT:	43 + 10 log ₁₀ (W) =	24.47	dBc

Frequency [MHz]	Ant. Pol. [H/V]	Height	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1649.40	Н	-	-	-54.54	6.25	-48.29	59.8
2474.90	Н	100	128	-49.72	7.45	-42.27	53.7
3300.40	Н	-	-	-53.00	8.21	-44.79	56.3

Table 7-31. Radiated Spurious Data (Band 5 – Low Channel)

FCC ID: ZNFVS995		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	110	150	-55.12	6.51	-48.62	59.7
2509.50	Н	122	200	-50.81	7.40	-43.42	54.5
3346.00	Н	-	-	-52.74	8.27	-44.48	55.6

Table 7-32. Radiated Spurious Data (Band 5 – Mid Channel)

OPERATING FREQUENCY:	848	3.30	MHz
CHANNEL:	206	643	
MEASURED OUTPUT POWER:	11.25	dBm =	0.013 W
MODULATION SIGNAL:	QPSK		
BANDWIDTH:	1.4	MHz	
DISTANCE:	3	meters	
LIMIT:	43 + 10 log ₁₀ (W) =	24.25	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]
1696.60	Н	-	-	-55.18	6.60	-48.57	59.8
2544.10	Н	207	360	-52.75	7.42	-45.33	56.6
3391.60	Н	-	-	-53.91	8.33	-45.58	56.8

Table 7-33. Radiated Spurious Data (Band 5 – High Channel)

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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)	707,499,919	-81	-0.0000115
100 %		- 30	707,499,848	-152	-0.0000215
100 %		- 20	707,499,847	-153	-0.0000216
100 %		- 10	707,499,979	-21	-0.0000029
100 %		0	707,499,985	-15	-0.0000022
100 %		+ 10	707,499,970	-30	-0.0000043
100 %		+ 20	707,499,993	-7	-0.0000009
100 %		+ 30	707,499,885	-115	-0.0000163
100 %		+ 40	707,499,984	-16	-0.0000023
100 %		+ 50	707,499,993	-7	-0.0000009
BATT. ENDPOINT	3.45	+ 20	707,499,892	-108	-0.0000153

Table 7-34. Frequency Stability Data (Band 12/17)

FCC ID: ZNFVS995		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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### Band 12 Frequency Stability Measurements §2.1055 §27.54

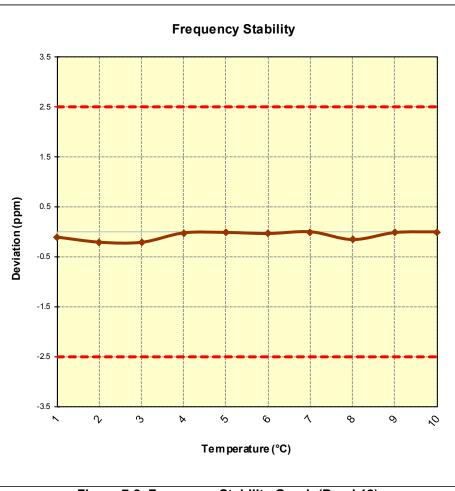


Figure 7-8. Frequency Stability Graph (Band 12)

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# Band 13 Frequency Stability Measurements §2.1055 §27.54

OPERATING FREQUENCY:	782,000,000	Hz
CHANNEL:	23230	_
REFERENCE VOLTAGE:	3.85	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	781,999,958	-42	-0.0000053
100 %		- 30	781,999,862	-138	-0.0000176
100 %		- 20	781,999,888	-112	-0.0000143
100 %		- 10	781,999,988	-12	-0.0000016
100 %		0	781,999,998	-2	-0.0000003
100 %		+ 10	781,999,927	-73	-0.0000093
100 %		+ 20	781,999,886	-114	-0.0000146
100 %		+ 30	781,999,883	-117	-0.0000150
100 %		+ 40	781,999,873	-127	-0.0000162
100 %		+ 50	781,999,875	-125	-0.0000160
BATT. ENDPOINT	3.45	+ 20	781,999,827	-173	-0.0000222

Table 7-35. Frequency Stability Data (Band 13)

FCC ID: ZNFVS995		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager	
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### Band 13 Frequency Stability Measurements §2.1055 §27.54

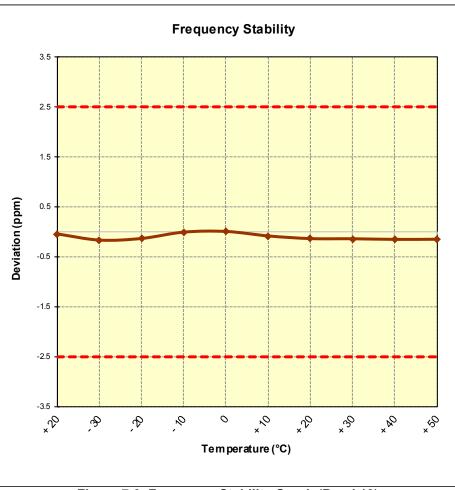


Figure 7-9. Frequency Stability Graph (Band 13)

FCC ID: ZNFVS995		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager	
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### Band 5 Frequency Stability Measurements §22.1055 §22.355

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

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	836,499,954	-46	-0.0000055
100 %		- 30	836,499,988	-12	-0.0000015
100 %		- 20	836,499,846	-154	-0.0000184
100 %		- 10	836,499,834	-166	-0.0000198
100 %		0	836,499,906	-94	-0.0000113
100 %		+ 10	836,499,882	-118	-0.0000141
100 %		+ 20	836,499,821	-179	-0.0000213
100 %		+ 30	836,499,934	-66	-0.0000079
100 %		+ 40	836,499,819	-181	-0.0000217
100 %		+ 50	836,499,991	-9	-0.0000011
BATT. ENDPOINT	3.45	+ 20	836,499,816	-184	-0.0000220

Table 7-36. Frequency Stability Data (Band 5)

FCC ID: ZNFVS995		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager	
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### Band 5 Frequency Stability Measurements §2.1055 §22.355

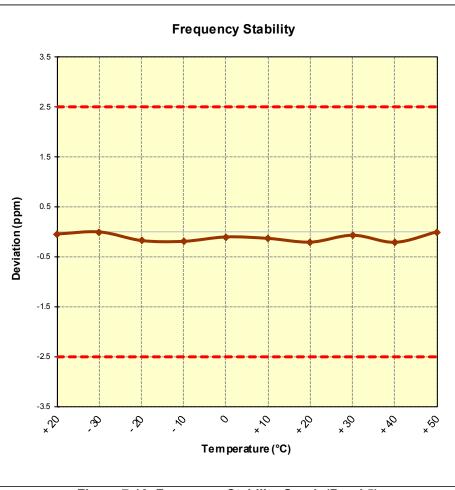


Figure 7-10. Frequency Stability Graph (Band 5)

FCC ID: ZNFVS995		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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## Band 66 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)	1,732,499,852	-148	-0.0000085
100 %		- 30	1,732,499,834	-166	-0.0000096
100 %		- 20	1,732,499,963	-37	-0.0000022
100 %		- 10	1,732,499,980	-20	-0.0000012
100 %		0	1,732,499,870	-130	-0.0000075
100 %		+ 10	1,732,499,929	-71	-0.0000041
100 %		+ 20	1,732,499,935	-65	-0.0000037
100 %		+ 30	1,732,499,898	-102	-0.0000059
100 %		+ 40	1,732,499,846	-154	-0.0000089
100 %		+ 50	1,732,499,881	-119	-0.0000069
BATT. ENDPOINT	3.45	+ 20	1,732,499,980	-20	-0.0000012

Table 7-37. Frequency Stability Data (Band 4/66)

#### 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

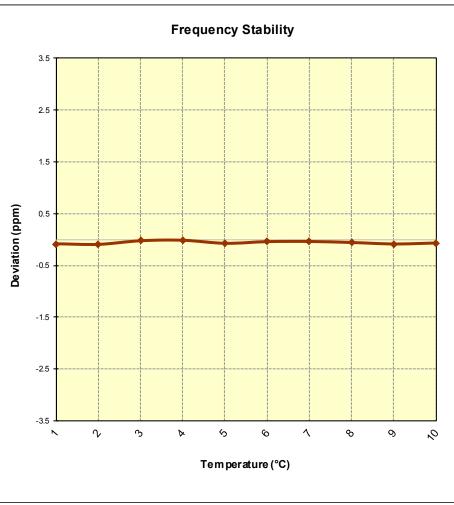


Figure 7-11. Frequency Stability Graph (Band 66)

FCC ID: ZNFVS995		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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### Band 25 Frequency Stability Measurements §2.1055 §24.235

OPERATING FREQUENCY:	1,882,500,000	Hz
CHANNEL:	26365	_
REFERENCE VOLTAGE:	3.85	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	1,882,499,891	-109	-0.0000058
100 %		- 30	1,882,499,828	-172	-0.0000091
100 %		- 20	1,882,499,821	-179	-0.0000095
100 %		- 10	1,882,499,852	-148	-0.0000079
100 %		0	1,882,499,830	-170	-0.0000090
100 %		+ 10	1,882,499,820	-180	-0.0000096
100 %		+ 20	1,882,499,921	-79	-0.0000042
100 %		+ 30	1,882,499,821	-179	-0.0000095
100 %		+ 40	1,882,499,932	-68	-0.0000036
100 %		+ 50	1,882,499,926	-74	-0.0000039
BATT. ENDPOINT	3.45	+ 20	1,882,499,822	-178	-0.0000094

Table 7-38. Frequency Stability Data (Band 2/25)

#### 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 25 Frequency Stability Measurements §2.1055 §24.235

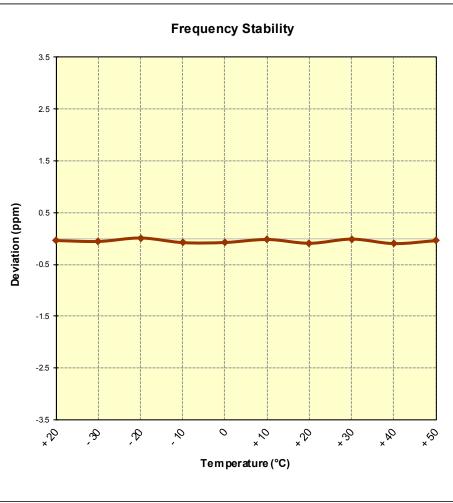


Figure 7-12. Frequency Stability Graph (Band 25)

FCC ID: ZNFVS995		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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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: ZNFVS995 complies with all the requirements of Parts 22, 24, & 27 of the FCC rules for LTE operation only.

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