

Band Edge Emissions at Antenna Terminal 7.4 §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 + log₁₀(P_{IWatts1}), where P is the transmitter power in Watts.

Test Procedure Used

KDB 971168 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
- 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
- VBW > 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.

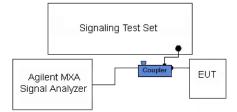


Figure 7-3. Test Instrument & Measurement Setup

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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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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RL	RF	50 Ω	AC	CORREC		SE	INSE:INT		ALIGN AUTO	03:05:45 PM	4Dec 10, 2015	Frequency
				PNO: 1 IFGain	Nide 🖵) Trig: Fre Atten: 3		#Avg Ty	ype: RMS	TYF	E 2 3 4 5 6 E A WATAWA A N N N N N	Frequency
) dB/div	Ref 25	.00 dl	Bm						Mkı	1 697.7 -34.	44 MHz 05 dBm	Auto Ti
5.0												Center F 698.000000 r
												Start F 696.000000 1
5.0									~		-13.00 dBm	Stop F 700.000000 r
5.0	~~~~~	~~~	~~~	~~~~	~~~~~ <u>~~~</u>	1		~~~~	~~~~~			CF S 400.000 <u>Auto</u>
i.o												Freq Off
	8.000 M	IHz								Span 4	.000 MHz	
Res BW	51 KHZ				#VBW	150 kHz	4		Sweep 2		1001 pts)	

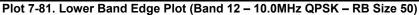
Plot 7-79. Lower Band Edge Plot (Band 12 – 5.0MHz QPSK – RB Size 25)



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(IRL	RF 50 Ω			0771-107				00.50.50.0	10 10 0015	-	
		AC	CORREC	SENSE	#	Avg Type	ALIGNAUTO E: RMS	TRAC	MDec 10, 2015 CE 1 2 3 4 5 6 PE A WATAWAY	F	requency
0 dB/div	Ref 25.00	dBm	IFGain:Low	Atten: 36 d			Mki		00 MHz 08 dBm		Auto Tune
15.0											Center Fre 3.000000 MH
5.00							and a second	wwww		694	Start Fre 4.000000 MH
25.0									-13.00 dBm	702	Stop Fre 2.000000 M⊦
35.0	war war war and	and	and the second and	mare and the second second	Magadeen and all	<i>д</i> ч '				<u>Auto</u>	CF Ste 800.000 kH Ma
5.0											Freq Offs 0 F
	8.000 MHz							Span 8	.000 MHz		
Res BW	100 kHz		#VBW	/ 300 kHz			Sweep 4	.000 ms (1001 pts)		





Plot 7-82. Upper Band Edge Plot (Band 12 – 10.0MHz QPSK – RB Size 50)

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Plot 7-83. Lower Band Edge Plot (Band 5 – 1.4MHz QPSK – RB Size 6)



Plot 7-84. Lower Extended Band Edge Plot (Band 5 – 1.4MHz QPSK – RB Size 6)

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Agilent Spectru	m Analyzer - Swept S RF 50 Ω			05				10.55.00.01	10 10 0015		
LAU RL	RF 50 Ω	AC CORR			ISE:INT	#Avg Typ	ALIGN AUTO e: RMS	TRAC	ADec 10, 2015 CE 1 2 3 4 5 6 PE A WATAVAL	Free	quency
		PN0 IFG): Wide 🖵 ain:Low	Trig: Free Atten: 36				DE			
10 dB/div Log	Ref 25.00 di	Bm					Mk	r1 849.0 -30.2	00 MHz 40 dBm		Auto Tune
											enter Freq
15.0										849.0	00000 MHz
5.00	<u>A</u>	hor war	hund	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~							Start Freq
-5.00										847.0	00000 MHz
-15.0									-13.00 dBm		Stop Freq
-25.0					1						000000 MHz
				X							CF Step
-35.0	wmmm				have	many				4 <u>Auto</u>	00.000 kHz Man
-45.0						hoge here	han .			_	
-55.0										FI	r eq Offset 0 Hz
-65.0											
Center 84 #Res BW	9.000 MHz 13 kHz		#VBW	39 kHz			Sweep s	9.533 ms (.000 MHz 1001 pts)		
MSG							STATU				

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



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

FCC ID: ZNFL81AL		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager			
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	ım Analyzer - Swept SA			-		
LXI RL	RF 50 Ω A	AC CORREC	SENSE:INT	ALIGNAUTO #Avg Type: RMS	12:49:42 PMDec 10, 2015 TRACE 1 2 3 4 5 6	Frequency
		PNO: Wide 🖵 IFGain:Low	Trig: Free Run Atten: 36 dB		DET A NNNN	
				Mk	r1 824.000 MHz	Auto Tune
10 dB/div Log	Ref 25.00 dBr	m			r1 824.000 MHz -29.541 dBm	
						Center Freq
15.0						824.000000 MHz
5.00				~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	hor have	Start Freq
					, in the second s	Start Freq 822.000000 MHz
-5.00						
-15.0					-13.00 dBm	Oton From
						Stop Freq 826.000000 MHz
-25.0			<u>i</u>			020.000000 Millin
						CF Step
-35.0						400.000 kHz
-45.0			~~~			<u>Auto</u> Man
-#0.0						
-55.0						Freq Offset 0 Hz
						0 H2
-65.0						
	24.000 MHz			_	Span 4.000 MHz	
#Res BW	30 kHz	#VBW	91 kHz		2.000 ms (1001 pts)	
MSG				STATU	IS	

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



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

FCC ID: ZNFL81AL		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager			
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	trum Analyzer - Swept SA					
L <mark>XI</mark> RL	RF 50 Ω AC	CORREC	SENSE:INT	ALIGNAUTO #Avg Type: RMS	12:50:50 PMDec 10, 2015 TRACE 1 2 3 4 5 6	Frequency
		PNO: Wide 🧊	Trig: Free Run Atten: 36 dB		DET A NNNN	
				M	r1 849.000 MHz	Auto Tune
10 dB/div Log	Ref 25.00 dBm				-27.56 dBm	
						Center Freq
15.0						849.000000 MHz
5.00		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~~			Start Freq
-5.00						847.000000 MHz
-5.00						
-15.0					-13.00 dBm	Stop Freq
			h .			851.000000 MHz
-25.0			\			
			\square			CF Step
-35.0			~~~~		m	400.000 kHz Auto Man
-45.0						Man
						Freq Offset
-55.0						0 Hz
-65.0						
	849.000 MHz № 30 kHz	#\/R\M	91 kHz	Sween	Span 4.000 MHz 2.000 ms (1001 pts)	
MSG		#VDVV	91 MIZ	statu		
				0000		

Plot 7-89. Upper Band Edge Plot (Band 5 – 3.0MHz QPSK – RB Size 15)



Plot 7-90. Upper Extended Band Edge Plot (Band 5 – Band 5 – 3.0MHz QPSK – RB Size 15)

FCC ID: ZNFL81AL		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager			
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	ectrum Analyzer - Swept SA			T		
(X) RL	RF 50 Ω AC	CORREC	SENSE:INT	ALIGN AUTO #Avg Type: RMS	TRACE 1 2 3 4 5 6	Frequency
		PNO: Wide 🖵 IFGain:Low	Trig: Free Run Atten: 36 dB	• //		Auto Turro
10 dB/d Log	iv Ref 25.00 dBm			M	kr1 824.000 MHz -29.138 dBm	Auto Tune
15.0 —						Center Freq 824.000000 MHz
-5.00						Start Freq 822.000000 MHz
-15.0			1^		-13.00 dBm	Stop Freq 826.000000 MHz
-35.0	n m m					CF Step 400.000 kHz <u>Auto</u> Man
-45.0						Freq Offset 0 Hz
-65.0						
Center #Res E	r 824.000 MHz 3W 51 kHz	#VBW	150 kHz	Sweep	Span 4.000 MHz 2.000 ms (1001 pts)	
MSG				STAT	rus	

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



Plot 7-92. Lower Extended Band Edge Plot (Band 5 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFL81AL		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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	rum Analyzer - Swept SA					
L <mark>XI</mark> RL	RF 50 Ω A(C CORREC	SENSE:INT	ALIGNAUTO #Avg Type: RMS	12:45:36 PMDec 10, 2015 TRACE 1 2 3 4 5 6	Frequency
		PNO: Wide 🖵 IFGain:Low	Trig: Free Run Atten: 36 dB		TYPE A WARAWAN DET A N N N N N	
		IFGain:Low	Atten: 00 4D	Mk	r1 849.000 MHz	Auto Tune
10 dB/div	Ref 25.00 dBn	n		IVIN	-27.58 dBm	
						Center Freq
15.0						849.000000 MHz
5.00						
5.00	·····	^	~			Start Freq
-5.00						847.000000 MHz
-3.88						
-15.0					-13.00 dBm	Stop Freq
						51.00000 MHz
-25.0			1			001.000000 Mil 12
			Ye.			OF Otom
-35.0			- Voor	Acad Co. 0		CF Step 400.000 kHz
				t sto structure	m	<u>Auto</u> Man
-45.0						
						Freq Offset
-55.0						0 Hz
-65.0						
-65.0						
	49.000 MHz		450 1.11-		Span 4.000 MHz	
#Res BW	5T KHZ	#VBW	150 kHz	-	2.000 ms (1001 pts)	
MSG				STATU	S	

Plot 7-93. Upper Band Edge Plot (Band 5 – 5.0MHz QPSK – RB Size 25)



Plot 7-94. Upper Extended Band Edge Plot (Band 5 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFL81AL		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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	m Analyzer - Swept SA							
L <mark>XI</mark> RL	RF 50Ω AC	CORREC	SENSE:INT	#Avg Typ	ALIGNAUTO e: RMS		4Dec 10, 2015 E 1 2 3 4 5 6 E A WARAN	Frequency
		PNO: Wide 🖵 IFGain:Low	Trig: Free Run Atten: 36 dB		Mkr	DE		Auto Tune
10 dB/div Log	Ref 25.00 dBm					-32.	00 MHz 83 dBm	
15.0								Center Freq 824.000000 MHz
-5.00				Marian	han an a	y way and a second s	Marchart	Start Freq 820.000000 MHz
-15.0			/				-13.00 dBm	Stop Freq 828.000000 MHz
-25.0								CF Step 800.000 kHz
-45.0 7000 700	and the second	nament and the second	mand the					<u>Auto</u> Man
-55.0								Freq Offset 0 Hz
-65.0								
Center 82 #Res BW	4.000 MHz 100 kHz	#VBW	300 kHz		Sweep 4	Span 8 .000 ms (.000 MHz 1001 pts)	
MSG					STATUS			

Plot 7-95. Lower Band Edge Plot (Band 5 – 10.0MHz QPSK – RB Size 50)



Plot 7-96. Upper Band Edge Plot (Band 5 – 10.0MHz QPSK – RB Size 50)

FCC ID: ZNFL81AL		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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Plot 7-97. Lower Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 6)



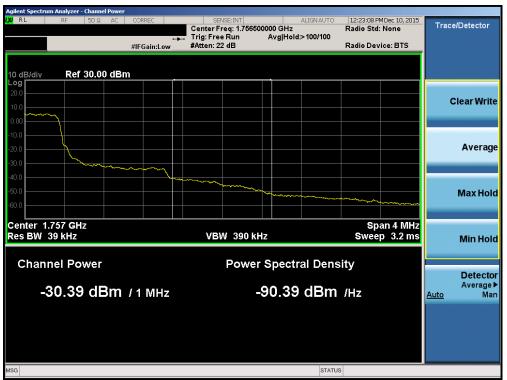
Plot 7-98. Lower Extended Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 6)

FCC ID: ZNFL81AL		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager		
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Plot 7-99. Upper Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 6)



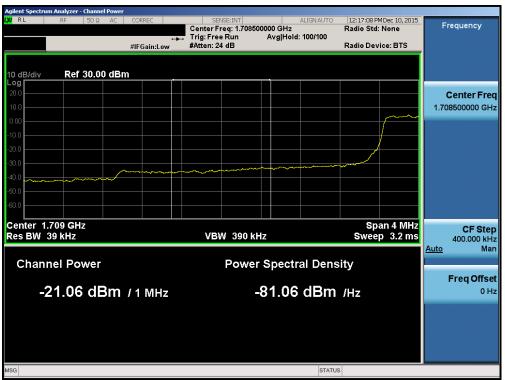
Plot 7-100. Upper Extended Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 6)

FCC ID: ZNFL81AL		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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Agilent Spectrum Analyze		500055	051				10.10 53.01	10 10 0015		
LXI RL RF	50Ω AC 1	CORREC		ISE:INT	#Avg Type	ALIGNAUTO e: RMS	TRAC	4Dec 10, 2015 E 1 2 3 4 5 6	Frequency	/
		PNO: Wide 🖵 IFGain:Low	Trig: Free Atten: 36				TYP			
10 dB/div Ref 2	25.00 dBm					Mkr1	1.709 9 -26.	96 GHz 85 dBm	Auto T	une
15.0									Center F 1.710000000	
-5.00					~~~~~	~~~	·····	~~~~~	Start F 1.708000000	
-15.0				1				-13.00 dBm	Stop F 1.712000000	
-35.0	m	V	~~~						CF S 400.000 <u>Auto</u>	
-55.0									Freq Of	f fset 0 Hz
-65.0										
Center 1.71000 #Res BW 30 kH		#VBW	91 kHz			Sweep 2	Span 4 .000 ms (.000 MHz 1001 pts)		
MSG						STATUS				

Plot 7-101. Lower Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)



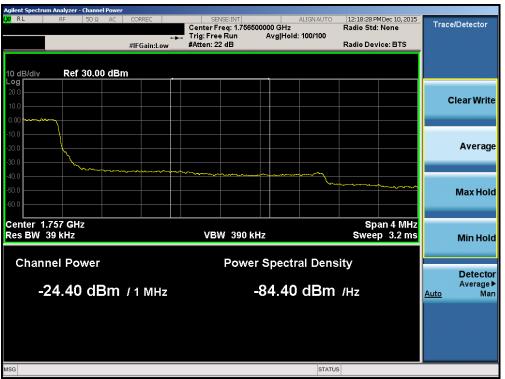
Plot 7-102. Lower Extended Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)

FCC ID: ZNFL81AL		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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	ım Analyzer - Swept SA							
L <mark>XI</mark> RL	RF 50Ω AC	CORREC	SENSE:INT	Al #Avg Type:	LIGN AUTO	TRAC	4Dec 10, 2015 E 1 2 3 4 5 6	Frequency
		PNO: Wide 😱 IFGain:Low	Trig: Free Run Atten: 36 dB	•		TYF		
		IFGain:Low	Atten: 30 dB		Miked	1 755 0	00 GHz	Auto Tune
	Ref 25.00 dBm				WINT	-30	18 dBm	
10 dB/div	Rel 25.00 dBill							
								Center Freq
15.0								1.755000000 GHz
5.00								Start Freq
~~~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~							1.753000000 GHz
-5.00								1.755000000 GHz
							-13.00 dBm	
-15.0								Stop Freq
-25.0								1.757000000 GHz
-25.0								
-35.0								CF Step
55.0			~~~		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	h		400.000 kHz Auto Man
-45.0								<u>Auto</u> marr
								E
-55.0								Freq Offset 0 Hz
								0 H2
-65.0								
Center 1	755000 GHz					Snan /	.000 MHz	
#Res BW	30 kHz	#VBW	91 kHz	s	weep 2	.000 ms (	1001 pts)	
MSG					STATUS			

Plot 7-103. Upper Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)



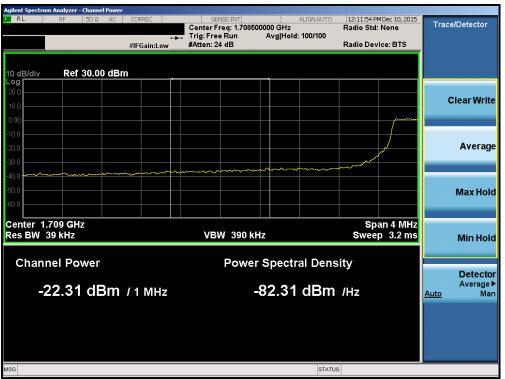
Plot 7-104. Upper Extended Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)

FCC ID: ZNFL81AL		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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	n Analyzer - Swept SA					
L <mark>XI</mark> RL	RF 50Ω A	AC CORREC	SENSE:INT	#Avg Type: RMS	12:09:34 PMDec 10, 2015 TRACE 1 2 3 4 5 6	Frequency
		PNO: Wide 🖵 IFGain:Low	Trig: Free Run Atten: 36 dB		TYPE A WARAWAY DET A N N N N N	Auto Turro
10 dB/div Log	Ref 25.00 dBi	m		Mkr1	1.709 988 GHz -28.40 dBm	Auto Tune
15.0						Center Freq 1.710000000 GHz
-5.00			~~			Start Freq 1.708000000 GHz
-15.0			1.		-13.00 dBm	<b>Stop Freq</b> 1.712000000 GHz
-35.0	ran way and					<b>CF Step</b> 400.000 kHz <u>Auto</u> Man
-55.0						<b>Freq Offset</b> 0 Hz
-65.0	210000 CH-				Open 4 000 Mile	
#Res BW	710000 GHz 51 kHz	#VBW	150 kHz		Span 4.000 MHz .000 ms (1001 pts)	
MSG				STATUS		

Plot 7-105. Lower Band Edge Plot (Band 4 – 5.0MHz QPSK – RB Size 25)



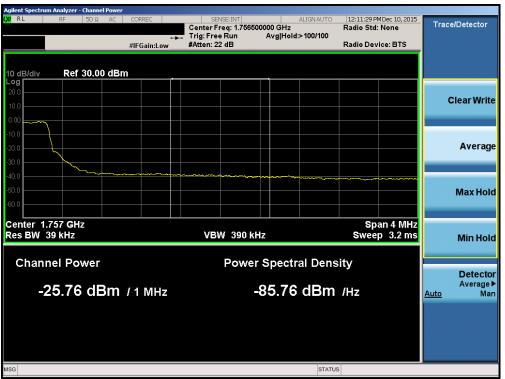
Plot 7-106. Lower Extended Band Edge Plot (Band 4 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFL81AL		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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	ım Analyzer - Swept SA					
LXI RL	RF 50Ω AC	CORREC	SENSE:INT	ALIGN AUTO #Avg Type: RMS	12:11:03 PM Dec 10, 2015 TRACE 1 2 3 4 5 6 TYPE A WWWWW	Frequency
		PNO: Wide 🖵 IFGain:Low	Trig: Free Run Atten: 36 dB		DET A NNNN	
10 dB/div Log	Ref 25.00 dBm			Mkr1	1.755 000 GHz -30.45 dBm	Auto Tune
15.0						Center Freq 1.755000000 GHz
-5.00	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~			<b>Start Freq</b> 1.753000000 GHz
-15.0					-13.00 dBm	<b>Stop Freq</b> 1.757000000 GHz
-35.0				m		CF Step 400.000 kHz <u>Auto</u> Man
-45.0						<b>Freq Offset</b> 0 Hz
-65.0						
Center 1. #Res BW	755000 GHz 51 kHz	#VBW	150 kHz	Sweep 2	Span 4.000 MHz 2.000 ms (1001 pts)	
MSG				STATUS	3	

Plot 7-107. Upper Band Edge Plot (Band 4 – 5.0MHz QPSK – RB Size 25)



Plot 7-108. Upper Extended Band Edge Plot (Band 4 – 5.0MHz QPSK – RB Size 25)

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PHO: Wide Wide Wide Wide Wide Wide Wide Wide		m Analyzer - Swept SA					
IFGeinition       Atten: 36 dB       Def MUNUM         Mkr1 1.709 976 GHz -29.76 dBm       -29.76 dBm       -29.76 dBm         0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0 <t< td=""><td>LX/ RL</td><td>RF 50Ω AC</td><td>CORREC</td><td>SENSE:INT</td><td>ALIGNAUTO #Avg Type: RMS</td><td>12:04:11 PM Dec 10, 2015 TRACE 1 2 3 4 5 6</td><td>Frequency</td></t<>	LX/ RL	RF 50Ω AC	CORREC	SENSE:INT	ALIGNAUTO #Avg Type: RMS	12:04:11 PM Dec 10, 2015 TRACE 1 2 3 4 5 6	Frequency
0.0 dB/div       Ref 25.00 dBm       -29.76 dBm         10.0       10.0       10.0       10.0         10.0       10.0       10.0       10.0         10.0       10.0       10.0       10.0         10.0       10.0       10.0       10.0         10.0       10.0       10.0       10.0         10.0       10.0       10.0       10.0         10.0       10.0       10.0       10.0         10.0       10.0       10.0       10.0         10.0       10.0       10.0       10.0         10.0       10.0       10.0       10.0         10.0       10.0       10.0       10.0         10.0       10.0       10.0       10.0         10.0       10.0       10.0       10.0         10.0       10.0       10.0       10.0         10.0       10.0       10.0       10.0         10.0       10.0       10.0       10.0         10.0       10.0       10.0       10.0         10.0       10.0       10.0       10.0         10.0       10.0       10.0       10.0         10.0       10.0				Trig: Free Run Atten: 36 dB	•	DET A N N N N N	Auto Tune
15.0       1.71000000 GHz         5.00       1.7100000 GHz         5.00       1.7100000 GHz         5.00       1.710000 GHz	10 dB/div Log	Ref 25.00 dBm				-29.76 dBm	
5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00 5.00	15.0						Center Freq 1.710000000 GHz
15.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0	-5.00			//***	- Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manumumanan Manu	man and a second	Start Freq 1.706000000 GHz
35.0       400.000 kHz         45.0       400.000 kHz         55.0       500         55.0       500         55.0       500         55.0       500         55.0       500         55.0       500         55.0       500         55.0       500         55.0       500         55.0       500         55.0       500         55.0       500         55.0       500         55.0       500         55.0       500         55.0       500         55.0       500         55.0       500         55.0       500         55.0       500         55.0       500         55.0       500         55.0       500         55.0       500         55.0       500         55.0       500         55.0       500         500       500         500       500         500       500         500       500         500       500         500       500	-15.0			1 #		-13.00 dBm	<b>Stop Freq</b> 1.714000000 GHz
56.0 56.0 56.0 Center 1.710000 GHz rRes BW 100 kHz #VBW 300 kHz Sweep 4.000 ms (1001 pts) Freq Offset 0 Hz Sweep 4.000 ms (1001 pts)		ar you want why want and	مەرىپىيە يەرىكەر بەرىكەر يەرىپىيەر بەرىپىيەر بەرىپىرىيەر بەرىپىرىيەر بەرىپىرىيەر بەرىپىرىيەر بەرىپىر	parter and			CF Step 800.000 kHz <u>Auto</u> Man
Center 1.710000 GHz Span 8.000 MHz Res BW 100 kHz #VBW 300 kHz Sweep 4.000 ms (1001 pts)	-55.0						<b>Freq Offset</b> 0 Hz
rRes BW 100 kHz #VBW 300 kHz Sweep 4.000 ms (1001 pts)	-65.0	710000 GHz				Span 8.000 MHz	
			#VBW	300 kHz	Sweep 4	.000 ms (1001 pts)	

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



Plot 7-110. Lower Extended Band Edge Plot (Band 4 – 10.0MHz QPSK – RB Size 50)

FCC ID: ZNFL81AL		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager	
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	m Analyzer - Swept							-		
LXI RL	RF 50 Ω	AC C	ORREC	SEP	ISE:INT	#Avg Typ	ALIGNAUTO	TRAC	4Dec 10, 2015 E <b>1 2 3 4 5 6</b>	Frequency
			PNO: Wide 🖵 IFGain:Low	Trig: Free Atten: 36				TYF		
10 dB/div Log	Ref 25.00 c	dBm					Mkr1	1.755 0 -32.	08 GHz 39 dBm	Auto Tune
15.0										Center Freq 1.755000000 GHz
5.00 -5.00	Wernerstand Charlenser	and the second sec	manponchera.	un l					-13.00 dBm	Start Freq 1.751000000 GHz
-15.0					4				-13.00 dbm	<b>Stop Fred</b> 1.759000000 GHz
-35.0				J. J	W Marada Magaraga	honnallan	marite National Street		the second s	CF Step 800.000 kHz <u>Auto</u> Man
-55.0										Freq Offse 0 H;
-65.0	755000 GHz							Chon 9		
#Res BW			#VBW	300 kHz			Sweep 4	span 8 .000 ms (	.000 MHz 1001 pts)	
MSG							STATUS	6		

Plot 7-111. Upper Band Edge Plot (Band 4 – 10.0MHz QPSK – RB Size 50)



Plot 7-112. Upper Extended Band Edge Plot (Band 4 – 10.0MHz QPSK – RB Size 50)

FCC ID: ZNFL81AL		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:		Page 71 of 118		
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	m Analyzer - Swept SA					
L <mark>XI</mark> RL	RF 50Ω AC	CORREC	SENSE:INT	ALIGNAUTO #Avg Type: RMS	11:58:56 AM Dec 10, 2015 TRACE 1 2 3 4 5 6	Frequency
		PNO: Wide 🖵 IFGain:Low	Trig: Free Run Atten: 36 dB	- <i></i>	TRACE 123456 TYPE A WANNAW DET A NNNNN	Auto Tune
10 dB/div Log	Ref 25.00 dBm			Mkr1	1.709 820 GHz -30.84 dBm	Auto Tune
15.0						Center Freq 1.710000000 GHz
-5.00				~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		Start Freq 1.704000000 GHz
-15.0					-13.00 dBm	<b>Stop Freq</b> 1.716000000 GHz
-35.0						<b>CF Step</b> 1.200000 MHz <u>Auto</u> Man
-45.0						Freq Offset 0 Hz
-65.0	740000 041-				Onon 12.00 Mila	
#Res BW	710000 GHz 150 kHz	#VBW	430 kHz	Sweep 1	Span 12.00 MHz .000 ms (1001 pts)	
MSG				STATUS	3	

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



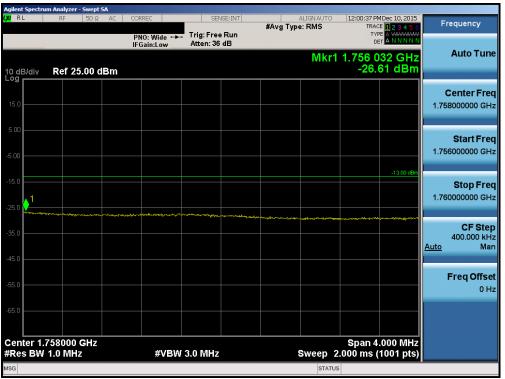
Plot 7-114. Lower Extended Band Edge Plot (Band 4 – 15.0MHz QPSK – RB Size 75)

FCC ID: ZNFL81AL		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager		
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	m Analyzer - Swept !									
LXI RL	RF 50 Ω	AC CC	RREC	SE	ISE:INT	#Avg Typ	ALIGNAUTO	TRAC	4Dec 10, 2015 E <b>1 2 3 4 5 6</b>	Frequency
			NO: Wide 硦 Gain:Low	Trig: Free Atten: 36				TYP		
10 dB/div Log	Ref 25.00 d	Bm					Mkr1	1.755 0 -31.4	00 GHz 36 dBm	Auto Tune
15.0										Center Freq 1.755000000 GHz
-5.00		L	non providence de la	~						<b>Start Freq</b> 1.749000000 GHz
-15.0					1				-13.00 dBm	<b>Stop Freq</b> 1.761000000 GHz
-35.0				har		Mary and Mark	and the second	han an a	and the second	CF Step 1.200000 MHz <u>Auto</u> Man
-55.0										Freq Offset 0 Hz
-65.0										
Center 1. #Res BW	755000 GHz 150 kHz		#VBW	430 kHz			Sweep 1	Span 1 .000 ms (	2.00 MHz 1001 pts)	
MSG							STATUS	5		

Plot 7-115. Upper Band Edge Plot (Band 4 – 15.0MHz QPSK – RB Size 75)



Plot 7-116. Upper Extended Band Edge Plot (Band 4 – 15.0MHz QPSK – RB Size 75)

FCC ID: ZNFL81AL		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:		Dogo 72 of 119		
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Agilent Spectru	m Analyzer - Swept SA					
L <mark>XO</mark> RL	RF 50 Ω AC	CORREC	SENSE:INT	ALIGN AUTO #Avg Type: RMS	11:45:51 AM Dec 10, 2015 TRACE 1 2 3 4 5 6 TYPE A WWWWW	Frequency
		PNO: Wide 🧔 IFGain:Low	Trig: Free Run Atten: 36 dB		DET A N N N N	
		II Gam.cow		Mkr1	1.709 968 GHz	Auto Tune
10 dB/div	Ref 25.00 dBm				-31.45 dBm	
						Center Freq
15.0						1.710000000 GHz
5.00				~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	hanne manne	Start Freq
						1.702000000 GHz
-5.00						
-15.0					-13.00 dBm	Oton Enor
						<b>Stop Freq</b> 1.718000000 GHz
-25.0			1			
			a marked			CF Step
-35.0		Www.marcon and and and and and and and and and an	a provide a second de la constance			1.600000 MHz
-45.0						<u>Auto</u> Man
						Ener Office
-55.0						Freq Offset 0 Hz
						0112
-65.0						
	10000 GHz				Span 16.00 MHz	
#Res BW	200 KHZ	#VBW	560 kHz	-	.000 ms (1001 pts)	
MSG				STATUS	5	

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

Agilent Spectru											
LXI RL	RF	50 Ω AC	CORREC	SEM	ISE:INT	#Avg Typ	ALIGN AUTO	TRAC	M Dec 10, 2015	F	requency
			PNO: Wide ↔	, Trig: Free Atten: 36				TY	PE A WARAWAR ET A N N N N N		
			IFGain:Low	Atten: 36	dB						Auto Tune
							WIKT	1.708 8	96 GHz 45 dBm		/ are rano
10 dB/div Log	Ref 25.	oo dBm						-20.	45 UDIII		
											Center Freq
15.0											7000000 GHz
5.00											
											Start Freq
-5.00										1.70	5000000 GHz
									-13.00 dBm		
-15.0											Stop Freq
									1,	1.70	9000000 GHz
-25.0				manup		and the second	1 marshare	and the second second	a margaget and a martine		
and the state of the	หาสะบบ _า ระบบ _า รงบาสุด	Tella de Tel de Andre	workytelanay-yildra	والمرار وحايل يسترقه ال	and the second						CF Step
-35.0											400.000 kHz
										<u>Auto</u>	Man
-45.0											
											Freq Offset
-55.0											0 Hz
-65.0											
-00.0											
Center 1.		Hz						Span 4	.000 MHz		
#Res BW	1.0 MHz		#VBV	/ 3.0 MHz			Sweep 2	.000 ms (	(1001 pts)		
MSG							STATUS	\$			

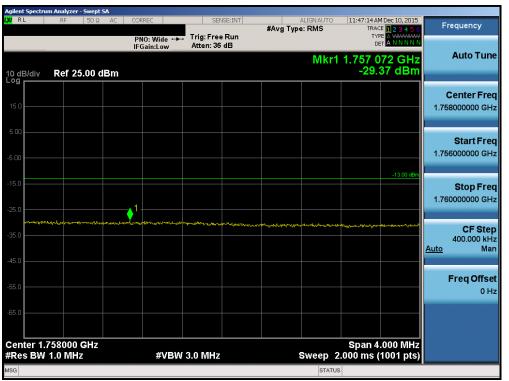
Plot 7-118. Lower Extended Band Edge Plot (Band 4 – 20.0MHz QPSK – RB Size 100)

FCC ID: ZNFL81AL		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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	ectrum Analyzer - Swept SA								
L <mark>XI</mark> RL	RF 50 Ω AC	CORREC		E:INT	#Avg Typ	ALIGN AUTO e: RMS	TRAC	4 Dec 10, 2015 E <b>1 2 3 4 5 6</b>	Frequency
		PNO: Wide 😱 IFGain:Low	Trig: Free Atten: 36 d				TY		
		IFGain:Low	Atten: 00 t	.0		Miked	1 755 0	00 GHz	Auto Tune
10 dB/d	liv Ref 25.00 dBm					IVINI	-33.	80 dBm	
	AV REI 23.00 UBIII								
									Center Freq
15.0									1.755000000 GHz
5.00									Start Freq
~	man have a second	mon							1.747000000 GHz
-5.00									1.147000000 0112
								-13.00 dBm	
-15.0									Stop Freq
									1.763000000 GHz
-25.0			100	1					
-35.0			and the second						CF Step
-35.0				~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	mann	mm	mm	m	1.600000 MHz Auto Man
-45.0									Auto Mari
40.0									
-55.0									Freq Offset
									0 Hz
-65.0									
	r 1.755000 GHz BW 200 kHz	#\/B\M	560 kHz			Sween 1	Span 1	6.00 MHz 1001 pts)	
	5W 200 KH2	#VDVV	500 KHZ					roo r pis)	
MSG						STATUS			

Plot 7-119. Upper Band Edge Plot (Band 4 – 20.0MHz QPSK – RB Size 100)



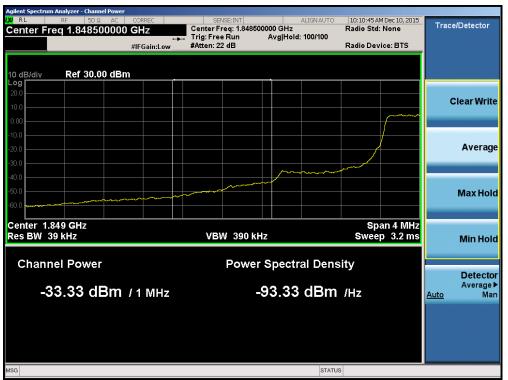
Plot 7-120. Upper Extended Band Edge Plot (Band 4 – 20.0MHz QPSK – RB Size 100)

FCC ID: ZNFL81AL		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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Plot 7-121. Lower Band Edge Plot (Band 2 – 1.4MHz QPSK – RB Size 6)



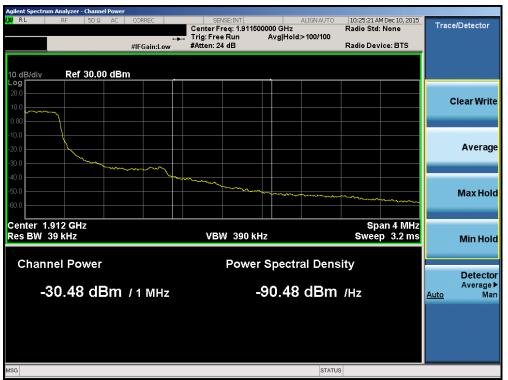
Plot 7-122. Lower Extended Band Edge Plot (Band 2 – 1.4MHz QPSK – RB Size 6)

FCC ID: ZNFL81AL		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dogo 76 of 110	
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Plot 7-123. Upper Band Edge Plot (Band 2 – 1.4MHz QPSK – RB Size 6)



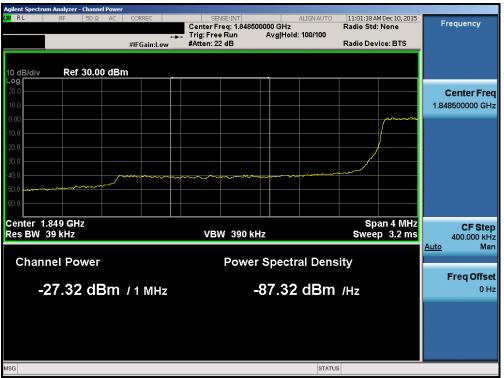
Plot 7-124. Upper Extended Band Edge Plot (Band 2 – 1.4MHz QPSK – RB Size 6)

FCC ID: ZNFL81AL		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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	n Analyzer - Swept S/					_					
LX/RL	RF 50 Ω	AC COR	REC	SEN	ISE:INT	#Avg Typ	ALIGNAUTO e: RMS		M Dec 10, 2015 CE 1 2 3 4 5 6 PE A WWWWWW	F	requency
		PN IFG	O: Wide 😱 ain:Low	) Trig: Free Atten: 36			Mkr1	DI	96 GHz		Auto Tune
10 dB/div ^{Log} r	Ref 25.00 di	3m						-30.	74 dBm		
15.0											Center Freq
5.00											
					$\sim$		~~~~			1.84	Start Freq
-5.00									-13.00 dBm		
-15.0										1.85	Stop Freq
-25.0					,í						
-35.0											CF Step 400.000 kHz
-45.0	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~~~	~~~~~							<u>Auto</u>	Man
-55.0											Freq Offset 0 Hz
-65.0											UTIL
Center 1. #Res BW	50000 GHz 30 kHz		#VBW	91 kHz			Sweep 2	Span 4 .000 ms (	.000 MHz 1001 pts)		
MSG							STATUS				

Plot 7-125. Lower Band Edge Plot (Band 2 – 3.0MHz QPSK – RB Size 15)



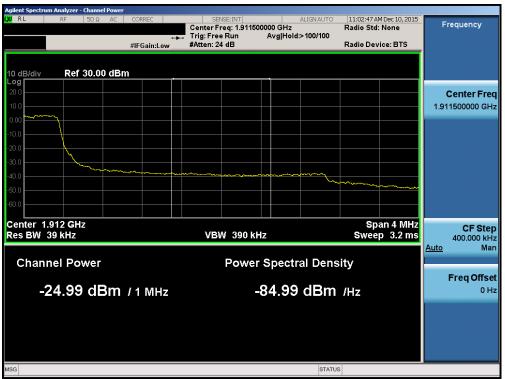
Plot 7-126. Lower Extended Band Edge Plot (Band 2 – 3.0MHz QPSK – RB Size 15)

FCC ID: ZNFL81AL		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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	ım Analyzer - Swept SA					
LX/ RL	RF 50Ω A	AC CORREC	SENSE:INT	ALIGNAUTO #Avg Type: RMS	11:02:40 AM Dec 10, 2015 TRACE 1 2 3 4 5 6	Frequency
		PNO: Wide 🖵 IFGain:Low	Trig: Free Run Atten: 36 dB		DET A WARNAW	Auto Tune
10 dB/div Log	Ref 25.00 dBr	m		Mkr1	1.910 000 GHz -28.257 dBm	Auto Tune
15.0						Center Freq 1.91000000 GHz
-5.00	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~			Start Freq 1.908000000 GHz
-15.0			1		-13.00 dBm	<b>Stop Freq</b> 1.912000000 GHz
-35.0				······································	h	<b>CF Step</b> 400.000 kHz <u>Auto</u> Man
-45.0						Freq Offset 0 Hz
-65.0						
Center 1. #Res BW	910000 GHz 30 kHz	#VBW	91 kHz	Sweep 2	Span 4.000 MHz .000 ms (1001 pts)	
MSG				STATUS	3	

Plot 7-127. Upper Band Edge Plot (Band 2 – 3.0MHz QPSK – RB Size 15)



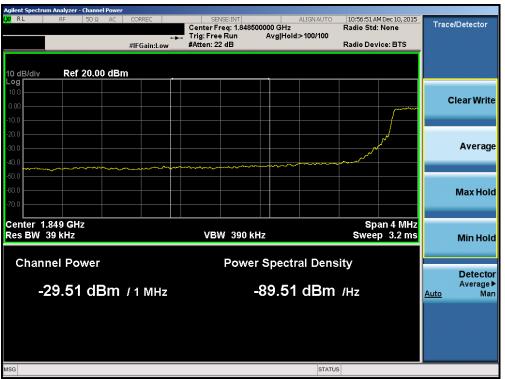
Plot 7-128. Upper Extended Band Edge Plot (Band 2 – 3.0MHz QPSK – RB Size 15)

FCC ID: ZNFL81AL		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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	m Analyzer - Swept SA					
L <mark>X/</mark> RL	RF 50Ω AC	CORREC	SENSE:INT	ALIGNAUTO #Avg Type: RMS	10:52:59 AM Dec 10, 2015 TRACE 1 2 3 4 5 6 TYPE A WWWW	Frequency
		PNO: Wide 🖵 IFGain:Low	Trig: Free Run Atten: 36 dB		DET A WATALAW	
		II Gam.Low		Mkr1	1.850 000 GHz	Auto Tune
10 dB/div Log	Ref 25.00 dBm				-32.62 dBm	
						Center Freq
15.0						1.85000000 GHz
5.00						Start Freq
						1.848000000 GHz
-5.00						
-15.0					-13.00 dBm	
10.0						<b>Stop Freq</b> 1.852000000 GHz
-25.0						1.852000000 GH2
						CF Step
-35.0						400.000 kHz
~~~~		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~				<u>Auto</u> Man
-45.0						
-55.0						Freq Offset
						0 Hz
-65.0						
Center 1	350000 GHz				Span 4.000 MHz	
#Res BW	51 kHz	#VBW	150 kHz	Sweep 2	2.000 ms (1001 pts)	
MSG				STATU		
					1	

Plot 7-129. Lower Band Edge Plot (Band 2 – 5.0MHz QPSK – RB Size 25)



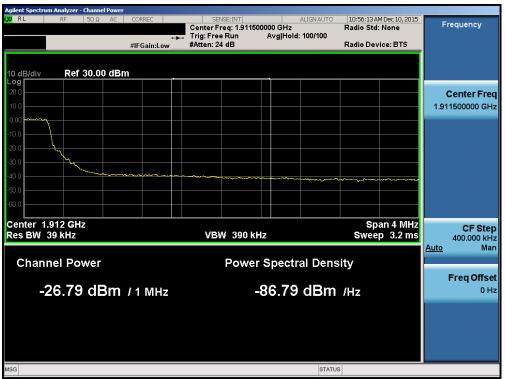
Plot 7-130. Lower Extended Band Edge Plot (Band 2 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFL81AL		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dama 00 of 110	
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	m Analyzer - Swept SA			1		
LXU RL	RF 50Ω AC	CORREC	SENSE:INT	ALIGNAUTO #Avg Type: RMS	10:55:36 AM Dec 10, 2015 TRACE 1 2 3 4 5 6	Frequency
		PNO: Wide 😱 IFGain:Low	Trig: Free Run Atten: 36 dB		TYPE A WARAWA	
		IFGain:Low	Atten: 00 dB	Mke	1 910 000 CH-	Auto Tune
10 dB/div	Ref 25.00 dBm			IVINI	1.910 000 GHz -29.189 dBm	
	Rel 23.00 uBill					
						Center Freq
15.0						1.91000000 GHz
5.00		m				Start Freq
			~			1.908000000 GHz
-5.00						1.500000000000112
					-13.00 dBm	
-15.0						Stop Freq
05.0						1.912000000 GHz
-25.0						
-35.0			M			CF Step
-33.0			~~~	······	man and a	400.000 kHz Auto Man
-45.0						Adto Mari
-55.0						Freq Offset
						0 Hz
-65.0						
Contor 1					Chan 4 000 MHz	
#Res BW	910000 GHz 51 kHz	#VBW	150 kHz	Sweep	Span 4.000 MHz 2.000 ms (1001 pts)	
MSG		<i>"</i> •• D A		STATU		
				STATE		

Plot 7-131. Upper Band Edge Plot (Band 2 – 5.0MHz QPSK – RB Size 25)



Plot 7-132. Upper Extended Band Edge Plot (Band 2 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFL81AL		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dama 04 of 140	
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Agilent Spectru	n Analyzer - Swept S/										
L <mark>AI</mark> RL	RF 50 Ω	AC CORR	EL		ISE:INT	#Av;	ALIGN AUTO		M Dec 10, 2015 CE 1 2 3 4 5 6 PE A WWWWW	F	requency
		PNO): Wide 😱 ain:Low	Trig: Free Atten: 36				TYI Di	ET A NNNNN		
		100					Mkr1	1 850 0	00 GHz		Auto Tune
10 dB/div Log	Ref 25.00 dE	Зm						-34.	62 dBm		
											Center Freq
15.0											0000000 GHz
5.00											Otort Eron
						monen	 www.wearned	LUwy Common	obs way me	1.8/	Start Freq 6000000 GHz
-5.00										1.0-	0000000000112
-15.0									-13.00 dBm		
-15.8										1 05	Stop Freq 4000000 GHz
-25.0										1.80	4000000 GHZ
					1						05.044
-35.0				, A	Lan Lan						CF Step 800.000 kHz
		hour harris	manne	Josepher March						<u>Auto</u>	Man
-45.0	man production of the second s										
-55.0											Freq Offset
-55.0											0 Hz
-65.0											
Center 4	350000 GHz							Enan 9	.000 MHz		
#Res BW			#VBW	300 kHz			Sweep 4	opan 8. .000 m <u>s (</u>	1001 pts)		
MSG							STATUS				

Plot 7-133. Lower Band Edge Plot (Band 2 – 10.0MHz QPSK – RB Size 50)

	m Analyzer - Swept SA					
LXI RL	RF 50 Ω AC	CORREC	SENSE:INT	ALIGNAUTO #Avg Type: RMS	10:46:18 AM Dec 10, 2015 TRACE 1 2 3 4 5 6	Frequency
		PNO: Wide 🔸 IFGain:Low	Trig: Free Run Atten: 36 dB		TYPE A WARNAW DET A N N N N N	
10 dB/div Log	Ref 25.00 dBm			Mkr1	1.849 000 GHz -28.25 dBm	Auto Tune
15.0						Center Freq 1.847000000 GHz
						1.847000000 GHz
5.00						Start Freq 1.845000000 GHz
-5.00					-13.00 dBm	1.843000000 GHZ
-15.0						Stop Freq 1.849000000 GHz
-25.0					1	
-35.0	a and a constant of the second se	no de la del combre de la compañía d	yarrataypasaying alabatiyar (harrino)	ang na nang na gana nang nang nang nang	ala yan farfan da yan da y	CF Step 400.000 kHz <u>Auto</u> Man
-45.0						Ere # Offe et
-55.0						Freq Offset 0 Hz
-65.0						
Center 1.3 #Res BW	847000 GHz 1.0 MHz	#VBW :	3.0 MHz	Sweep 2	Span 4.000 MHz .000 ms (1001 pts)	
MSG				STATUS		

Plot 7-134. Lower Extended Band Edge Plot (Band 2 – 10.0MHz QPSK – RB Size 50)

FCC ID: ZNFL81AL		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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Agilent Spectru	m Analyzer - Swept SA	5 CODD56	051.0				10 17 10 1	10 10 0015	
L <mark>AU</mark> RL	RF 50 Ω A	C CORREC		SE:INT	#Avg Type	ALIGNAUTO e: RMS	TRAC	4 Dec 10, 2015 E 1 2 3 4 5 6	Frequency
		PNO: Wide 🖵 IFGain:Low	Trig: Free Atten: 36				I YE		
		II OGINIZOV				Mkr1	1.910 0	00 GHz	Auto Tune
10 dB/div	Ref 25.00 dBr	n					-32.2	00 GHz 85 dBm	
									Center Freq
15.0									1.910000000 GHz
5.00	munan	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~							Otort Eror
		to the output definition and have of	~~~						Start Freq 1.906000000 GHz
-5.00									
-15.0								-13.00 dBm	
									Stop Freq 1.914000000 GHz
-25.0				1					1.514000000 0112
			-14 ₄						CF Step
-35.0				marine marya	herrorelagen	Andre et a s			800.000 kHz
-45.0						1 404	an and a second	manna	<u>Auto</u> Man
*43.0									
-55.0									Freq Offset 0 Hz
									0112
-65.0									
	910000 GHz						Span 8	.000 MHz	
#Res BW	100 kHz	#VBW	300 kHz					1001 pts)	
MSG						STATUS	;		

Plot 7-135. Upper Band Edge Plot (Band 2 – 10.0MHz QPSK – RB Size 50)



Plot 7-136. Upper Extended Band Edge Plot (Band 2 – 10.0MHz QPSK – RB Size 50)

FCC ID: ZNFL81AL		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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Agilent Spectru	m Analyzer - Swept SA					
LXI RL	RF 50Ω A	AC CORREC	SENSE:INT	ALIGNAUTO #Avg Type: RMS	10:39:08 AM Dec 10, 2015 TRACE 1 2 3 4 5 6	Frequency
		PNO: Wide 😱 IFGain:Low	Trig: Free Run Atten: 36 dB		DET A N N N N	
		II Gain.cow		Mkr1	1 850 000 GHz	Auto Tune
10 dB/div Log	Ref 25.00 dB	m			1.850 000 GHz -37.09 dBm	
209						Center Freq
15.0						1.850000000 GHz
5.00						
				mmmmmm	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	Start Freq
-5.00						1.844000000 GHz
					-13.00 dBm	
-15.0						Stop Freq
05.0						1.856000000 GHz
-25.0			لہ			
-35.0			1 2			CF Step
33.0		~~~~~	armon of			1.200000 MHz Auto Man
-45.0	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	man man	~~~~			<u>rato</u> mari
						Eron Offect
-55.0						Freq Offset 0 Hz
						0112
-65.0						
Center 1.	350000 GHz				Span 12.00 MHz	
#Res BW		#VBW	430 kHz	Sweep 1	.000 ms (1001 pts)	
MSG				STATUS	3	

Plot 7-137. Lower Band Edge Plot (Band 2 – 15.0MHz QPSK – RB Size 75)



Plot 7-138. Lower Extended Band Edge Plot (Band 2 – 15.0MHz QPSK – RB Size 75)

FCC ID: ZNFL81AL		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager	
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	ım Analyzer - Swept SA								
L <mark>XI</mark> RL	RF 50Ω AC	CORREC	SENSE		#Avg Type	ERMS	TRAC	4 Dec 10, 2015 E 1 2 3 4 5 6	Frequency
		PNO: Wide 😱 IFGain:Low	Trig: Free R Atten: 36 dE	un			TYF		
		IFGain:Low	Atten. oo u			Mkr4	1 010 0		Auto Tune
10 dB/div	Ref 25.00 dBm						-33.	00 GHz 04 dBm	
15.0									Center Freq
15.0									1.91000000 GHz
5.00									
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~						Start Freq
-5.00									1.904000000 GHz
								-13.00 dBm	
-15.0								-13.00 (IDM	Stop Freq
									1.916000000 GHz
-25.0									
			ر 🔨 ۲						CF Step
-35.0			- North Contraction of the second sec	and the second s	~~~				1.200000 MHz
				- mark	and L	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	mm	m	<u>Auto</u> Man
-45.0									
									Freq Offset
-55.0									0 Hz
0.5 0									
-65.0									
	910000 GHz	10.7					Span 1	2.00 MHz	
#Res BW	150 kHz	#VBW	430 kHz			-		1001 pts)	
MSG						STATUS			

Plot 7-139. Upper Band Edge Plot (Band 2 – 15.0MHz QPSK – RB Size 75)



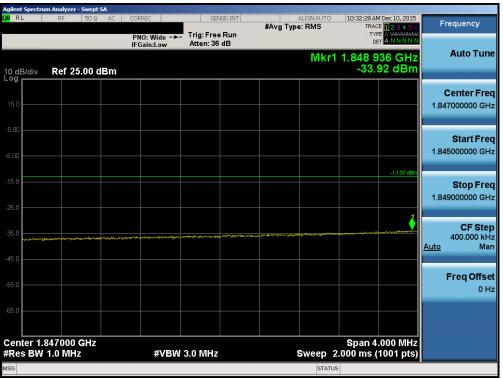
Plot 7-140. Upper Extended Band Edge Plot (Band 2 – 15.0MHz QPSK – RB Size 75)

FCC ID: ZNFL81AL		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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Agilent Spectrum Analyzer - Swept SA						
(X/ RL	RF 50 Ω AC	CORREC	SENSE:INT	ALIGNAUTO #Avg Type: RMS	10:32:04 AM Dec 10, 2015 TRACE 1 2 3 4 5 6 TYPE A WWWW	Frequency
		PNO: Wide 😱 IFGain:Low	Trig: Free Run Atten: 36 dB		DET A N N N N	
		IFGall.LUW	Fateri. 00 uB	Mket	1.850 000 GHz	Auto Tune
10 dB/div Log	Ref 25.00 dBm				-37.72 dBm	
- ² 9						Center Freq
15.0						1.85000000 GHz
5.00						
				man man	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	Start Freq
-5.00						1.842000000 GHz
					-13.00 dBm	
-15.0						Stop Freq
						1.858000000 GHz
-25.0						
			1 6			CF Step
-35.0			2.0			1.600000 MHz
-45.0	co character		man man			<u>Auto</u> Man
-40.0	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~					
-55.0						Freq Offset
						0 Hz
-65.0						
Center 1.3 #Res BW	350000 GHz	#VRM	560 kHz	Sween	Span 16.00 MHz .000 ms (1001 pts)	
MSG	200 MH2		500 KHZ	Statu	1	
mod				STATU		

Plot 7-141. Lower Band Edge Plot (Band 2 – 20.0MHz QPSK – RB Size 100)



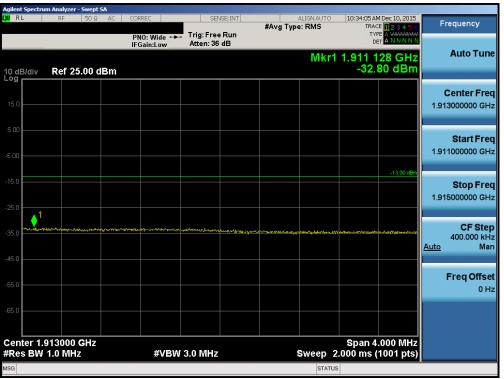
Plot 7-142. Lower Extended Band Edge Plot (Band 2 – 20.0MHz QPSK – RB Size 100)

FCC ID: ZNFL81AL		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager	
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Agilent Spectrum Analyzer - Swept SA							
LXU RL	RF 50 Ω AC	CORREC	SENSE:I		ALIGNAUTO g Type: RMS	10:33:52 AM Dec 10, 2015 TRACE 1 2 3 4 5 6	Frequency
		PNO: Wide 🧊 IFGain:Low	Trig: Free Ru Atten: 36 dB			DET A NNNN	
10 dB/div Log	Ref 25.00 dBm	n			Mkr1	1.910 000 GHz -36.25 dBm	Auto Tune
15.0							Center Freq 1.910000000 GHz
-5.00	h h h h h h h h h h h h h h h h h h h	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~			-13.00 dBm	<b>Start Freq</b> 1.902000000 GHz
-15.0						-13.00 dom	<b>Stop Freq</b> 1.918000000 GHz
-35.0			"~ _V 1	m	mm	and and a second and	CF Step 1.600000 MHz <u>Auto</u> Man
-55.0							Freq Offset 0 Hz
-65.0							
Center 1.9 #Res BW	910000 GHz 200 kHz	#VBW	560 kHz		Sweep 1	Span 16.00 MHz .000 ms (1001 pts)	
MSG					STATUS		

Plot 7-143. Upper Band Edge Plot (Band 2 – 20.0MHz QPSK – RB Size 100)



Plot 7-144. Upper Extended Band Edge Plot (Band 2 – 20.0MHz QPSK – RB Size 100)

FCC ID: ZNFL81AL		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager	
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# 7.5 Peak-Average Ratio

# 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 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.

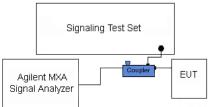


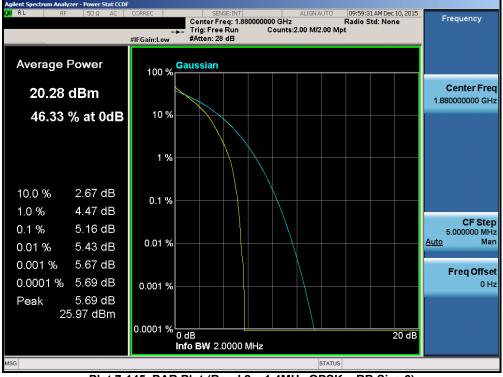
Figure 7-4. Test Instrument & Measurement Setup

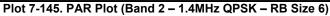
# Test Notes

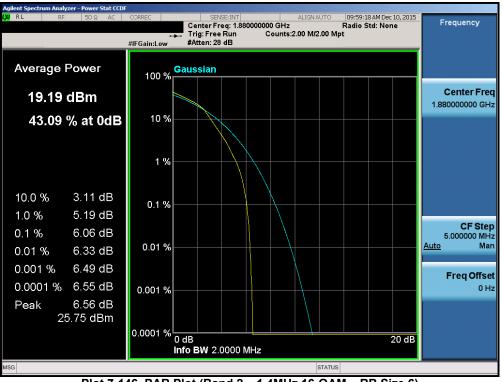
None.

FCC ID: ZNFL81AL		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager	
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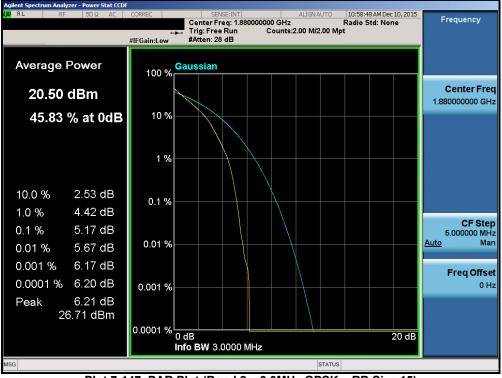


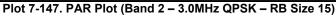


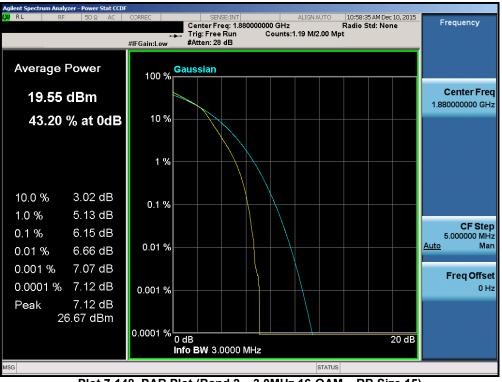
Plot 7-146. PAR Plot (Band 2 – 1.4MHz 16-QAM – RB Size 6)

FCC ID: ZNFL81AL		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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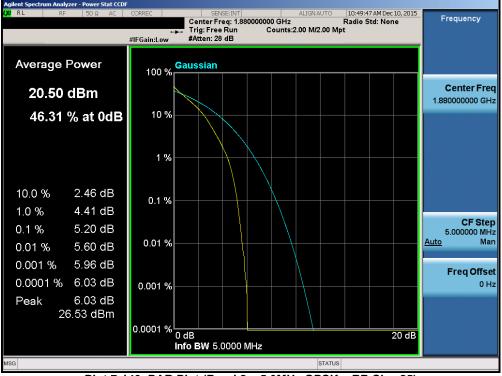


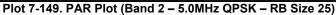


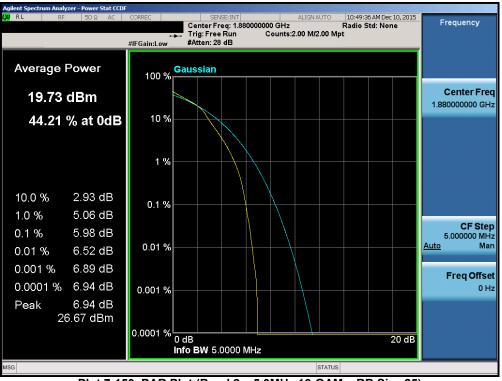
Plot 7-148. PAR Plot (Band 2 - 3.0MHz 16-QAM - RB Size 15)

FCC ID: ZNFL81AL		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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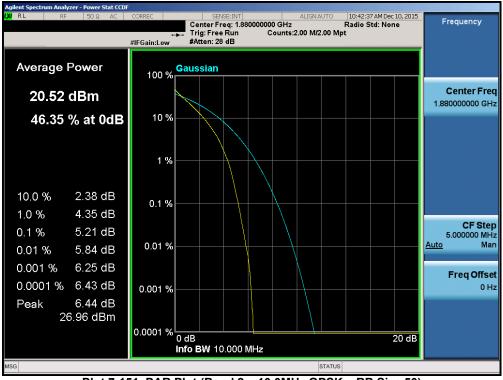


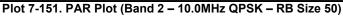


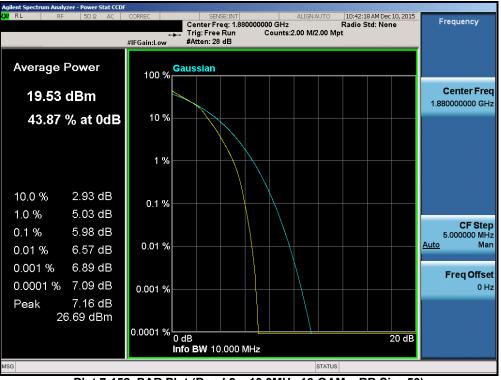
Plot 7-150. PAR Plot (Band 2 - 5.0MHz 16-QAM - RB Size 25)

FCC ID: ZNFL81AL		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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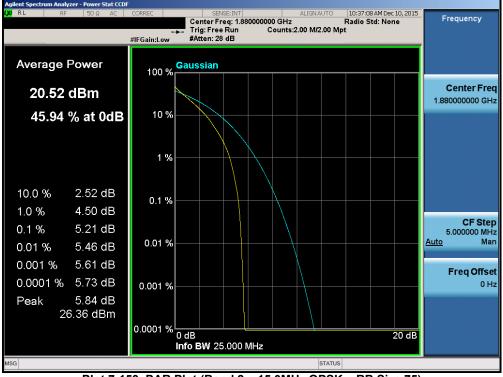




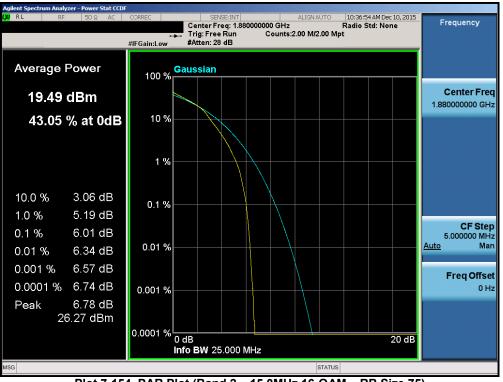
Plot 7-152. PAR Plot (Band 2 - 10.0MHz 16-QAM - RB Size 50)

FCC ID: ZNFL81AL		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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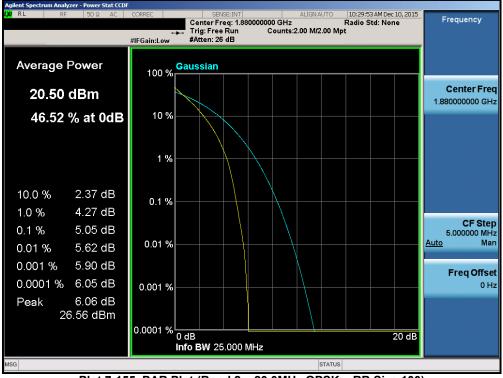
Plot 7-153. PAR Plot (Band 2 – 15.0MHz QPSK – RB Size 75)

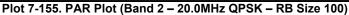


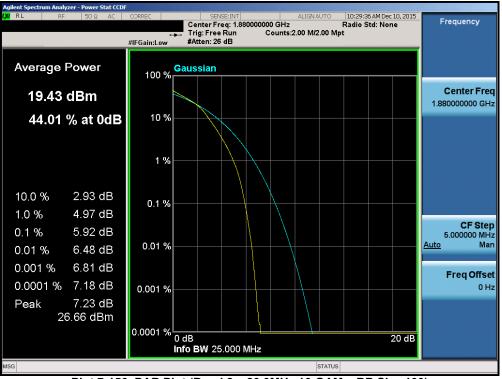
Plot 7-154. PAR Plot (Band 2 - 15.0MHz 16-QAM - RB Size 75)

FCC ID: ZNFL81AL		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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Plot 7-156. PAR Plot (Band 2 - 20.0MHz 16-QAM - RB Size 100)

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

#### **Test Overview**

Effective Radiated Power (ERP) and Equivalent Isotropic Radiated Power (EIRP) measurements are performed using the substitution method described in ANSI/TIA-603-C-2004 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using vertically polarized tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically 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 v02r02 – Section 5.2.1

ANSI/TIA-603-C-2004 - Section 2.2.17

#### Test Settings

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

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#### Test Setup

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

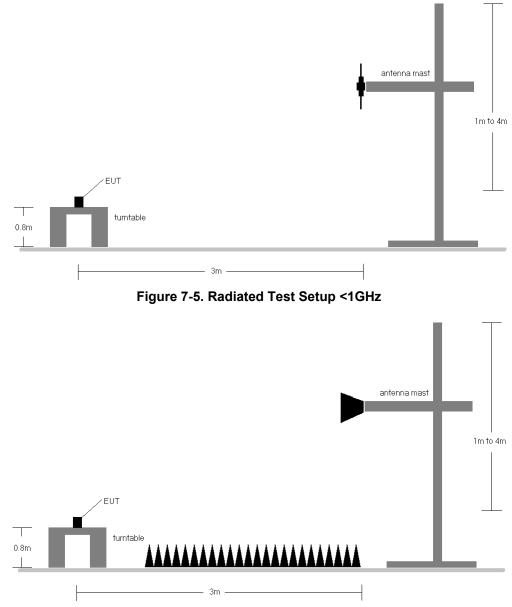


Figure 7-6. Radiated Test Setup >1GHz

#### Test Notes

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

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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBd]	ERP [dBm]	ERP Limit [dBm]	Margin [dB]
699.70	1.4	QPSK	V	1.00	90	1 / 0	19.42	-0.95	18.47	34.77	-16.30
707.50	1.4	QPSK	V	1.60	76	1 / 0	19.72	-0.98	18.74	34.77	-16.03
715.30	1.4	QPSK	V	1.60	140	1 / 0	19.98	-1.01	18.97	34.77	-15.80
699.70	1.4	16-QAM	V	1.00	90	1 / 0	18.57	-0.95	17.62	34.77	-17.15
707.50	1.4	16-QAM	V	1.60	76	1 / 0	19.37	-0.98	18.39	34.77	-16.38
715.30	1.4	16-QAM	V	1.60	140	1 / 0	19.19	-1.01	18.18	34.77	-16.59
700.50	3	QPSK	V	1.00	115	1 / 0	19.40	-0.95	18.45	34.77	-16.32
707.50	3	QPSK	V	1.60	108	1 / 0	19.83	-0.98	18.85	34.77	-15.92
714.50	3	QPSK	V	1.60	108	1 / 0	20.33	-1.01	19.32	34.77	-15.45
700.50	3	16-QAM	V	1.00	115	1 / 0	19.02	-0.95	18.07	34.77	-16.70
707.50	3	16-QAM	V	1.60	108	1 / 0	18.75	-0.98	17.77	34.77	-17.00
714.50	3	16-QAM	V	1.60	108	1 / 0	19.55	-1.01	18.54	34.77	-16.23
701.50	5	QPSK	V	1.00	95	1 / 0	19.22	-0.96	18.26	34.77	-16.51
707.50	5	QPSK	V	1.60	60	1 / 0	19.35	-0.98	18.37	34.77	-16.40
713.50	5	QPSK	V	1.00	108	1 / 0	18.66	-1.00	17.66	34.77	-17.12
701.50	5	16-QAM	V	1.00	95	1 / 0	18.24	-0.96	17.28	34.77	-17.49
707.50	5	16-QAM	V	1.60	60	1 / 0	18.65	-0.98	17.67	34.77	-17.10
713.50	5	16-QAM	V	1.00	108	1 / 0	17.81	-1.00	16.81	34.77	-17.97
704.00	10	QPSK	V	1.00	60	1 / 0	19.47	-0.97	18.50	34.77	-16.27
707.50	10	QPSK	V	1.00	124	1 / 0	19.28	-0.98	18.30	34.77	-16.47
711.00	10	QPSK	V	1.70	70	1/0	19.71	-0.99	18.72	34.77	-16.06
704.00	10	16-QAM	V	1.00	60	1 / 0	18.53	-0.97	17.56	34.77	-17.21
707.50	10	16-QAM	V	1.00	124	1 / 0	18.63	-0.98	17.65	34.77	-17.12
711.00	10	16-QAM	V	1.70	70	1 / 0	19.01	-0.99	18.02	34.77	-16.76

Table 7-2. ERP Data (Band 12)

FCC ID: ZNFL81AL		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	<b>Reviewed by:</b> Quality Manager
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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBd]	ERP [dBm]	ERP Limit [dBm]	Margin [dB]
824.70	1.4	QPSK	V	1.36	340	1 / 0	20.48	-1.65	18.83	38.45	-19.62
836.50	1.4	QPSK	V	1.37	75	1 / 0	21.44	-1.74	19.70	38.45	-18.75
848.30	1.4	QPSK	V	1.39	15	1 / 0	19.80	-1.84	17.96	38.45	-20.49
824.70	1.4	16-QAM	V	1.36	340	1 / 0	19.76	-1.65	18.11	38.45	-20.34
836.50	1.4	16-QAM	V	1.37	75	1 / 0	20.64	-1.74	18.90	38.45	-19.55
848.30	1.4	16-QAM	V	1.39	15	1 / 0	19.12	-1.84	17.28	38.45	-21.17
825.50	3	QPSK	V	1.40	340	1 / 0	20.46	-1.65	18.81	38.45	-19.65
836.50	3	QPSK	V	1.39	350	1 / 0	21.42	-1.74	19.68	38.45	-18.77
847.50	3	QPSK	V	1.41	60	1 / 0	20.47	-1.83	18.64	38.45	-19.81
825.50	3	16-QAM	V	1.40	340	1 / 0	19.87	-1.65	18.22	38.45	-20.24
836.50	3	16-QAM	V	1.39	350	1 / 0	21.15	-1.74	19.41	38.45	-19.04
847.50	3	16-QAM	V	1.41	60	1 / 0	19.55	-1.83	17.72	38.45	-20.73
826.50	5	QPSK	V	1.39	10	1 / 0	20.32	-1.66	18.66	38.45	-19.79
836.50	5	QPSK	V	1.39	10	1 / 0	21.07	-1.74	19.33	38.45	-19.12
846.50	5	QPSK	V	1.40	10	1 / 0	20.43	-1.82	18.61	38.45	-19.84
826.50	5	16-QAM	V	1.39	10	1 / 0	19.12	-1.66	17.46	38.45	-20.99
836.50	5	16-QAM	V	1.39	10	1 / 0	20.12	-1.74	18.38	38.45	-20.07
846.50	5	16-QAM	V	1.40	10	1 / 0	19.87	-1.82	18.05	38.45	-20.40
829.00	10	QPSK	V	1.39	350	1 / 0	20.80	-1.68	19.12	38.45	-19.33
836.50	10	QPSK	V	1.37	350	1 / 0	20.98	-1.74	19.24	38.45	-19.21
844.00	10	QPSK	V	1.38	350	1 / 0	21.43	-1.80	19.63	38.45	-18.82
829.00	10	16-QAM	V	1.39	350	1 / 0	20.01	-1.68	18.33	38.45	-20.12
836.50	10	16-QAM	V	1.37	350	1/0	19.87	-1.74	18.13	38.45	-20.32
844.00	10	16-QAM	V	1.38	355	1 / 0	20.23	-1.80	18.43	38.45	-20.02

Table 7-3. ERP Data (Band 5)

FCC ID: ZNFL81AL		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 [m]	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	1.44	185	1/0	12.79	8.23	21.02	30.00	-8.98
1732.50	1.4	QPSK	V	1.07	340	1 / 0	15.36	8.18	23.54	30.00	-6.46
1754.30	1.4	QPSK	V	1.40	230	1 / 0	12.62	8.12	20.74	30.00	-9.26
1710.70	1.4	16-QAM	V	1.44	185	1 / 0	11.99	8.23	20.22	30.00	-9.78
1732.50	1.4	16-QAM	V	1.07	340	1/0	14.42	8.18	22.60	30.00	-7.40
1754.30	1.4	16-QAM	V	1.40	230	1 / 0	11.77	8.12	19.89	30.00	-10.11
1711.50	3	QPSK	V	1.39	233	1 / 0	12.84	8.23	21.07	30.00	-8.93
1732.50	3	QPSK	V	1.40	60	1 / 0	13.99	8.18	22.17	30.00	-7.83
1753.50	3	QPSK	V	1.33	76	1 / 0	13.65	8.12	21.77	30.00	-8.23
1711.50	3	16-QAM	V	1.39	233	1 / 0	12.10	8.23	20.33	30.00	-9.67
1732.50	3	16-QAM	V	1.40	60	1 / 0	13.27	8.18	21.45	30.00	-8.55
1753.50	3	16-QAM	V	1.33	76	1 / 0	12.74	8.12	20.86	30.00	-9.14
1712.50	5	QPSK	V	1.35	320	1 / 0	12.73	8.23	20.96	30.00	-9.04
1732.50	5	QPSK	V	1.37	313	1 / 0	13.79	8.18	21.97	30.00	-8.03
1752.50	5	QPSK	V	1.02	308	1 / 0	14.18	8.13	22.31	30.00	-7.69
1712.50	5	16-QAM	V	1.35	320	1 / 0	11.60	8.23	19.83	30.00	-10.17
1732.50	5	16-QAM	V	1.37	313	1 / 0	12.42	8.18	20.60	30.00	-9.40
1752.50	5	16-QAM	V	1.02	308	1 / 0	13.61	8.13	21.74	30.00	-8.26
1715.00	10	QPSK	V	1.32	330	1 / 0	14.51	8.22	22.73	30.00	-7.27
1732.50	10	QPSK	V	1.33	70	1 / 0	13.14	8.18	21.32	30.00	-8.68
1750.00	10	QPSK	V	1.10	200	1 / 0	14.27	8.13	22.40	30.00	-7.60
1715.00	10	16-QAM	V	1.32	330	1 / 0	12.76	8.22	20.98	30.00	-9.02
1732.50	10	16-QAM	V	1.33	70	1 / 0	12.25	8.18	20.43	30.00	-9.57
1750.00	10	16-QAM	V	1.10	200	1 / 0	13.23	8.13	21.36	30.00	-8.64
1717.50	15	QPSK	V	1.09	93	1 / 0	14.33	8.22	22.55	30.00	-7.45
1732.50	15	QPSK	V	1.04	240	1 / 0	13.02	8.18	21.20	30.00	-8.80
1747.50	15	QPSK	V	1.06	202	1 / 0	13.47	8.14	21.61	30.00	-8.39
1717.50	15	16-QAM	V	1.09	93	1 / 0	13.50	8.22	21.72	30.00	-8.28
1732.50	15	16-QAM	V	1.04	240	1 / 0	12.63	8.18	20.81	30.00	-9.19
1747.50	15	16-QAM	V	1.06	202	1/0	12.89	8.14	21.03	30.00	-8.97
1720.00	20	QPSK	V	1.06	95	1/0	14.25	8.21	22.46	30.00	-7.54
1732.50	20	QPSK	V	1.05	249	1/0	13.38	8.18	21.56	30.00	-8.44
1745.00	20	QPSK	V	1.08	251	1/0	13.54	8.15	21.69	30.00	-8.31
1720.00	20	16-QAM	V	1.06	95	1/0	13.47	8.21	21.68	30.00	-8.32
1732.50	20	16-QAM	V	1.05	249	1/0	11.98	8.18	20.16	30.00	-9.84
1745.00	20	16-QAM	V	1.08	251	1/0	12.62	8.15	20.77	30.00	-9.23

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

FCC ID: ZNFL81AL		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 [m]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP Limit [dBm]	Margin [dB]
1850.70	1.4	QPSK	V	1.92	150	1/0	9.95	7.99	17.94	33.01	-15.07
1880.00	1.4	QPSK	v	1.75	160	1 / 0	11.41	7.98	19.39	33.01	-13.63
1909.30	1.4	QPSK	V	1.45	144	1 / 0	10.40	8.04	18.44	33.01	-14.57
1850.70	1.4	16-QAM	v	1.92	150	1/0	9.37	7.99	17.36	33.01	-15.65
1880.00	1.4	16-QAM	v	1.75	160	1 / 0	10.76	7.98	18.74	33.01	-14.28
1909.30	1.4	16-QAM	V	1.45	144	1/0	9.89	8.04	17.93	33.01	-15.08
1851.50	3	QPSK	V	1.92	156	1/0	9.96	7.99	17.95	33.01	-15.06
1880.00	3	QPSK	V	1.85	185	1 / 0	6.69	7.98	14.67	33.01	-18.35
1908.50	3	QPSK	V	1.83	150	1 / 0	10.78	8.03	18.81	33.01	-14.20
1851.50	3	16-QAM	V	1.92	156	1 / 0	9.25	7.99	17.24	33.01	-15.77
1880.00	3	16-QAM	V	1.85	185	1/0	5.72	7.98	13.70	33.01	-19.32
1908.50	3	16-QAM	V	1.83	150	1/0	9.89	8.03	17.92	33.01	-15.09
1852.50	5	QPSK	V	1.93	10	1/0	9.29	7.99	17.28	33.01	-15.73
1880.00	5	QPSK	v	1.83	342	1 / 0	10.03	7.98	18.01	33.01	-15.01
1907.50	5	QPSK	V	1.11	10	1 / 0	8.18	8.02	16.20	33.01	-16.81
1852.50	5	16-QAM	v	1.93	10	1 / 0	8.10	7.99	16.09	33.01	-16.92
1880.00	5	16-QAM	v	1.83	342	1/0	8.94	7.98	16.92	33.01	-16.10
1907.50	5	16-QAM	v	1.11	10	1 / 0	7.68	8.02	15.70	33.01	-17.31
1855.00	10	QPSK	V	1.50	10	1 / 0	8.76	7.99	16.75	33.01	-16.26
1880.00	10	QPSK	V	1.41	340	1 / 0	10.39	7.98	18.37	33.01	-14.65
1905.00	10	QPSK	V	1.44	326	1/0	8.94	8.00	16.94	33.01	-16.07
1855.00	10	16-QAM	v	1.50	10	1 / 0	7.94	7.99	15.93	33.01	-17.08
1880.00	10	16-QAM	v	1.41	340	1 / 0	9.79	7.98	17.77	33.01	-15.25
1905.00	10	16-QAM	v	1.44	326	1/0	7.75	8.00	15.75	33.01	-17.26
1857.50	15	QPSK	V	1.50	333	1 / 0	8.62	7.98	16.60	33.01	-16.41
1880.00	15	QPSK	v	1.46	340	1 / 0	9.97	7.98	17.95	33.01	-15.07
1902.50	15	QPSK	V	1.82	333	1 / 0	10.29	7.99	18.28	33.01	-14.73
1857.50	15	16-QAM	v	1.50	333	1/0	7.64	7.98	15.62	33.01	-17.39
1880.00	15	16-QAM	v	1.46	340	1/0	9.23	7.98	17.21	33.01	-15.81
1902.50	15	16-QAM	v	1.82	333	1/0	10.10	7.99	18.09	33.01	-14.92
1860.00	20	QPSK	v	1.53	330	1/0	9.32	7.98	17.30	33.01	-15.71
1880.00	20	QPSK	v	1.84	10	1/0	11.86	7.98	19.84	33.01	-13.18
1900.00	20	QPSK	v	1.83	330	1/0	9.44	7.97	17.41	33.01	-15.60
1860.00	20	16-QAM	V	1.53	330	1/0	8.29	7.98	16.27	33.01	-16.74
1880.00	20	16-QAM	v	1.18	80	1/0	11.14	7.98	19.12	33.01	-13.90
1900.00	20	16-QAM	v	1.83	330	1/0	8.08	7.97	16.05	33.01	-16.96

Table 7-5. EIRP Data (Band 2)

FCC ID: ZNFL81AL		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 100 of 119
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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-C-2004 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using vertically and horizontally polarized tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically and horizontally polarized broadband horn antennas. All measurements are performed as peak measurements while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

#### Test Procedures Used

KDB 971168 v02r02 - Section 5.8

ANSI/TIA-603-C-2004 – Section 2.2.12

#### Test Settings

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

FCC ID: ZNFL81AL		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 101 of 119
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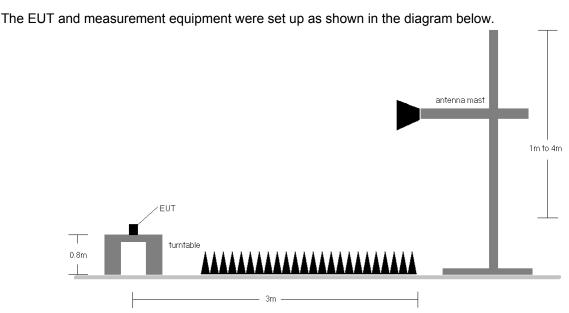


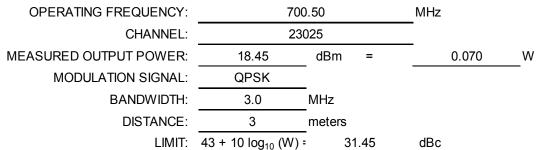
Figure 7-7. Test Instrument & Measurement Setup

#### 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.

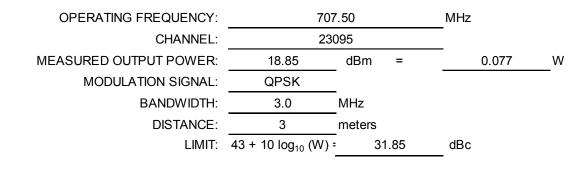
FCC ID: ZNFL81AL		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1401.00	Н	1.30	5	-58.57	6.19	-52.38	70.8
2101.50	Н	1.32	350	-62.49	6.76	-55.73	74.2
2802.00	Н	-	-	-61.40	8.03	-53.38	71.8

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



Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1415.00	Н	1.29	5	-63.25	6.23	-57.02	75.9
2122.50	Н	-	-	-62.33	6.80	-55.53	74.4

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

FCC ID: ZNFL81AL		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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OPERATING FREQUENCY:	714	MHz	
CHANNEL:	23	165	
MEASURED OUTPUT POWER:	19.32	dBm =	0.086 W
MODULATION SIGNAL:	QPSK	_	
BANDWIDTH:	3.0	MHz	
DISTANCE:	3	meters	
LIMIT:	43 + 10 log ₁₀ (W) =	32.32	dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1429.00	Н	1.37	350	-62.96	6.27	-56.69	76.0
2143.50	Н	-	-	-62.57	6.84	-55.73	75.0

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

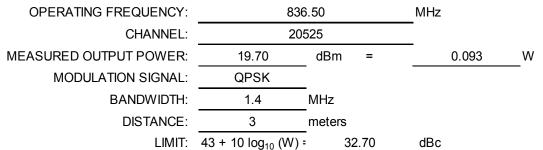
OPERATING FREQUENCY:	824	1.70	MHz
CHANNEL:	204	407	_
MEASURED OUTPUT POWER:	18.83	dBm =	0.076 W
MODULATION SIGNAL:	QPSK	_	
BANDWIDTH:	1.4	MHz	
DISTANCE:	3	meters	
LIMIT:	43 + 10 log ₁₀ (W) =	31.83	dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1649.40	Н	1.30	212	-54.48	6.25	-48.23	67.1
2474.10	Н	1.40	230	-60.69	6.61	-54.08	72.9
3298.80	Н	-	-	-57.82	6.99	-50.83	69.7

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

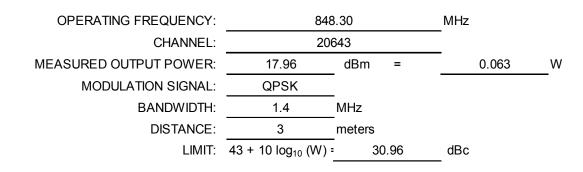
FCC ID: ZNFL81AL		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager	
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F	requency [MHz]	Ant. Pol. [H/V]	Height	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
	1673.00	Н	1.36	196	-55.40	6.13	-49.27	69.0
Γ	2509.50	Н	1.60	201	-59.09	6.64	-52.45	72.1
	3346.00	Н	-	-	-57.59	7.14	-50.45	70.1

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

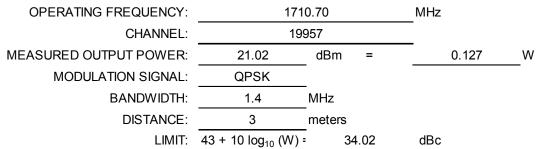


Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1696.60	Н	1.32	5	-48.03	6.01	-42.02	60.0
2544.90	Н	1.80	350	-50.91	6.74	-44.17	62.1
3393.20	Н	1.61	260	-50.03	7.29	-42.74	60.7
4241.50	Н	-	-	-67.88	8.34	-59.54	77.5

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

FCC ID: ZNFL81AL		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 [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3421.40	Н	1.42	266	-40.58	9.52	-31.05	52.1
5132.10	Н	1.60	255	-54.66	11.03	-43.63	64.6
6842.80	Н	1.30	260	-45.11	10.74	-34.37	55.4
8553.50	Н	1.80	350	-51.81	11.27	-40.54	61.6
10264.20	Н	-	-	-49.77	12.51	-37.27	58.3

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

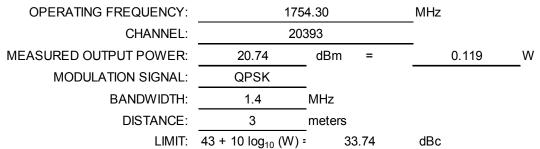
OPERATING FREQUENCY:	173	2.50	MHz
CHANNEL:	201	175	_
MEASURED OUTPUT POWER:	23.54	dBm =	0.226 W
MODULATION SIGNAL:	QPSK		
BANDWIDTH:	1.4	MHz	
DISTANCE:	3	meters	
LIMIT:	43 + 10 log ₁₀ (W) =	36.54	dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3465.00	Н	1.40	137	-42.87	9.64	-33.22	56.8
5197.50	Н	1.30	130	-54.94	10.98	-43.96	67.5
6930.00	Н	1.40	260	-47.66	10.85	-36.81	60.3
8662.50	Н	1.60	350	-52.71	11.53	-41.18	64.7
10395.00	Н	-	-	-49.30	12.58	-36.72	60.3

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

FCC ID: ZNFL81AL		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 [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3508.60	Н	1.30	197	-46.15	9.76	-36.39	57.1
5262.90	Н	1.27	160	-55.31	11.06	-44.25	65.0
7017.20	Н	1.40	260	-46.73	11.01	-35.71	56.5
8771.50	Н	-	-	-54.04	11.74	-42.30	63.0

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

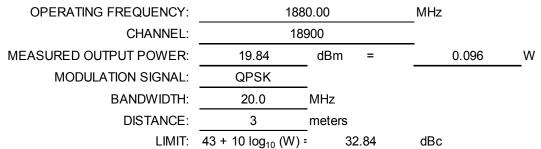
**OPERATING FREQUENCY:** 1855.00 MHz CHANNEL: 18700 MEASURED OUTPUT POWER: W 17.30 dBm 0.054 = MODULATION SIGNAL: **QPSK** BANDWIDTH: 20.0 MHz DISTANCE: 3 meters LIMIT: 43 + 10 log₁₀ (W) = 30.30 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3710.00	Н	1.30	5	-54.01	9.87	-44.14	61.4
5565.00	Н	1.61	5	-55.54	11.18	-44.36	61.7
7420.00	Н	1.27	350	-46.86	10.85	-36.02	53.3
9275.00	Н	-	-	-58.51	12.29	-46.22	63.5

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

FCC ID: ZNFL81AL		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 [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3760.00	Н	1.20	55	-54.75	9.63	-45.12	65.0
5640.00	Н	1.37	5	-55.67	11.29	-44.38	64.2
7520.00	Н	1.62	350	-47.10	11.12	-35.98	55.8
9400.00	Н	-	-	-55.82	12.28	-43.54	63.4

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

**OPERATING FREQUENCY:** 1900.00 MHz CHANNEL: 19100 MEASURED OUTPUT POWER: 17.41 W dBm 0.055 = MODULATION SIGNAL: **QPSK** BANDWIDTH: 20.0 MHz DISTANCE: 3 meters LIMIT: 43 + 10 log₁₀ (W) = 30.41 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3800.00	Н	1.30	258	-50.38	9.44	-40.93	58.3
5700.00	Н	1.70	260	-54.96	11.37	-43.59	61.0
7600.00	Н	1.60	5	-43.53	11.32	-32.22	49.6
9500.00	Н	-	-	-52.97	12.39	-40.58	58.0

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

FCC ID: ZNFL81AL	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		🕒 LG	Reviewed by: Quality Manager	
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### 7.8 Frequency Stability / Temperature Variation §2.1055 §22.355 §24.235 §27.54

#### Test Overview and Limit

Frequency stability testing is performed in accordance with the guidelines of ANSI/TIA-603-C-2004. 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-C-2004

#### 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: ZNFL81AL		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

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)	707,499,856	-144	-0.0000204
100 %		- 30	707,499,828	-172	-0.0000243
100 %		- 20	707,499,870	-130	-0.0000184
100 %		- 10	707,499,875	-125	-0.0000177
100 %		0	707,499,832	-168	-0.0000237
100 %		+ 10	707,499,796	-204	-0.0000288
100 %		+ 20	707,499,856	-144	-0.0000204
100 %		+ 30	707,499,851	-149	-0.0000211
100 %		+ 40	707,499,793	-207	-0.0000293
100 %		+ 50	707,499,784	-216	-0.0000305
BATT. ENDPOINT	3.45	+ 20	707,499,767	-233	-0.0000329

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

#### Note:

Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain inband when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

FCC ID: ZNFL81AL		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

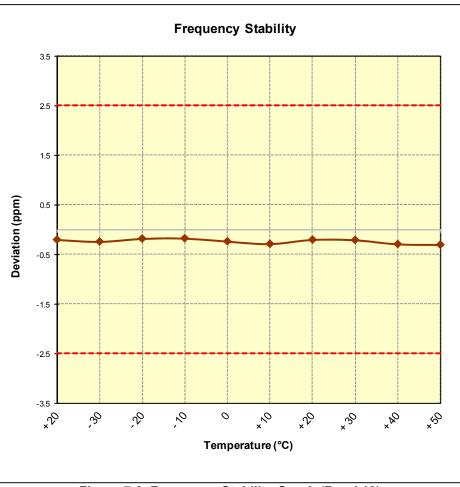


Figure 7-8. Frequency Stability Graph (Band 12)

FCC ID: ZNFL81AL		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

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)	836,499,827	-173	-0.0000207
100 %		- 30	836,499,880	-120	-0.0000143
100 %		- 20	836,499,881	-119	-0.0000142
100 %		- 10	836,500,112	112	0.0000134
100 %		0	836,499,804	-196	-0.0000234
100 %		+ 10	836,499,793	-207	-0.0000247
100 %		+ 20	836,499,827	-173	-0.0000207
100 %		+ 30	836,499,838	-162	-0.0000194
100 %		+ 40	836,499,772	-228	-0.0000273
100 %		+ 50	836,499,766	-234	-0.0000280
BATT. ENDPOINT	3.45	+ 20	836,499,743	-257	-0.0000307

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

FCC ID: ZNFL81AL		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

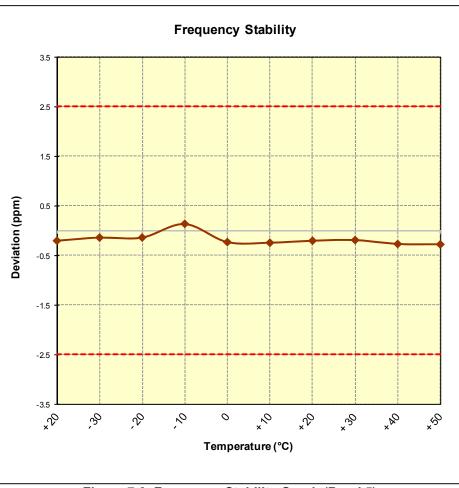


Figure 7-9. Frequency Stability Graph (Band 5)

FCC ID: ZNFL81AL		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	<b>Reviewed by:</b> Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 112 of 110
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# Band 4 Frequency Stability Measurements §2.1055 §§27.54

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

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	1,732,499,799	-201	-0.0000116
100 %		- 30	1,732,499,812	-188	-0.0000109
100 %		- 20	1,732,499,807	-193	-0.0000111
100 %		- 10	1,732,499,818	-182	-0.0000105
100 %		0	1,732,499,810	-190	-0.0000110
100 %		+ 10	1,732,499,779	-221	-0.0000128
100 %		+ 20	1,732,499,799	-201	-0.0000116
100 %		+ 30	1,732,499,783	-217	-0.0000125
100 %		+ 40	1,732,499,772	-228	-0.0000132
100 %		+ 50	1,732,499,803	-197	-0.0000114
BATT. ENDPOINT	3.45	+ 20	1,732,499,756	-244	-0.0000141

 Table 7-20. Frequency Stability Data (Band 4)

#### Note:

Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain inband when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

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### Band 4 Frequency Stability Measurements §2.1055 §§27.54

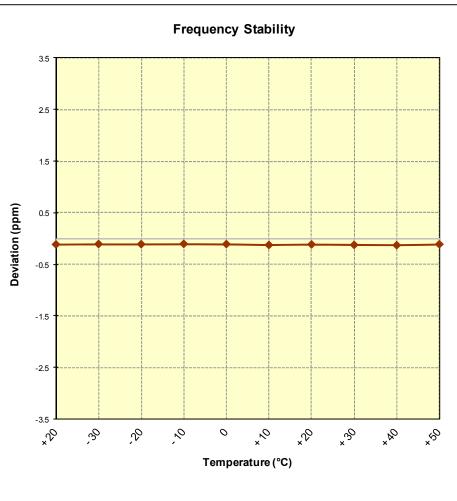


Figure 7-10. Frequency Stability Graph (Band 4)

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## Band 2 Frequency Stability Measurements §2.1055 §24.235

OPERATING FREQUENCY:	1,880,000,000	Hz
CHANNEL:	18900	
REFERENCE VOLTAGE:	3.85	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	1,879,999,812	-188	-0.0000100
100 %		- 30	1,879,999,846	-154	-0.0000082
100 %		- 20	1,880,000,135	135	0.0000072
100 %		- 10	1,879,999,815	-185	-0.0000098
100 %		0	1,879,999,789	-211	-0.0000112
100 %		+ 10	1,879,999,837	-163	-0.0000087
100 %		+ 20	1,879,999,812	-188	-0.0000100
100 %		+ 30	1,879,999,792	-208	-0.0000111
100 %		+ 40	1,879,999,782	-218	-0.0000116
100 %		+ 50	1,879,999,761	-239	-0.0000127
BATT. ENDPOINT	3.45	+ 20	1,879,999,745	-255	-0.0000136

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

#### Note:

Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain inband when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

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### Band 2 Frequency Stability Measurements §2.1055 §24.235

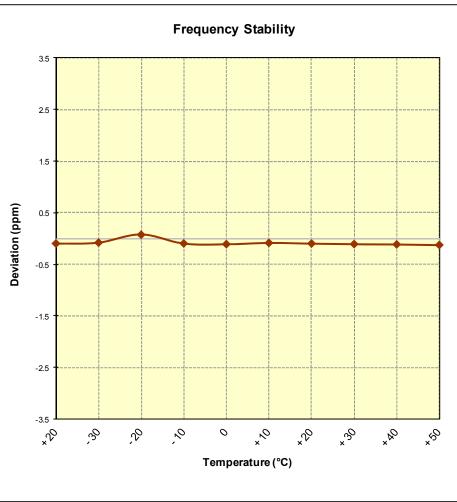


Figure 7-11. Frequency Stability Graph (Band 2)

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### 8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **LG Portable Handset FCC ID: ZNFL81AL** complies with all the requirements of Parts 22, 24, & 27 of the FCC rules for LTE operation only.

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