

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

Test Overview

All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

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

Test Procedure Used

KDB 971168 D01 v02r02 - Section 6.0

Test Settings

- 1. Start and stop frequency were set such that the band edge would be placed in the center of the plot
- 2. Span was set large enough so as to capture all out of band emissions near the band edge
- 3. RBW > 1% of the emission bandwidth
- 4. VBW <u>></u> 3 x RBW
- 5. Detector = RMS
- 6. Number of sweep points $\geq 2 \times \text{Span/RBW}$
- 7. Trace mode = trace average
- 8. Sweep time = auto couple
- 9. The trace was allowed to stabilize

<u>Test Setup</u>

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

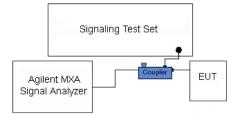


Figure 7-3. Test Instrument & Measurement Setup

Test Notes

Per 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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RL	m Analyzer - Swept SA RF 50 Ω AC	CORREC	SENSE:INT		ALIGN AUTO	03:38:23 PM Feb 03,	2016
	in joose rie	PNO: Wide 😱 IFGain:Low	Trig: Free Run Atten: 36 dB	#Avg Typ		TRACE 1 2 3 TYPE A WW DET A N N	456 Frequency
0 dB/div	Ref 25.00 dBm	IFGalfi:Luw	Atten. oo ub		Mkı	1 697.980 M -38.05 di	Hz Auto Tun Bm
15.0							Center Fre 698.000000 MH
5.00							Start Fre 696.000000 MH
25.0						-13.0	0 dBm Stop Fre 700.000000 MH
15.0		a way and	man 1 mm	whener Aune	-west ^{-ex}		CF Ste 400.000 kł <u>Auto</u> Ma
5.0 Am	Low Manager Market						Freq Offs 0 I
	98.000 MHz					Span 4.000 M	ЛНZ
Res BW	30 KHz	#VBW 9	91 KHZ			.600 ms (1001	pts)
SG					STATUS		

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



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

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



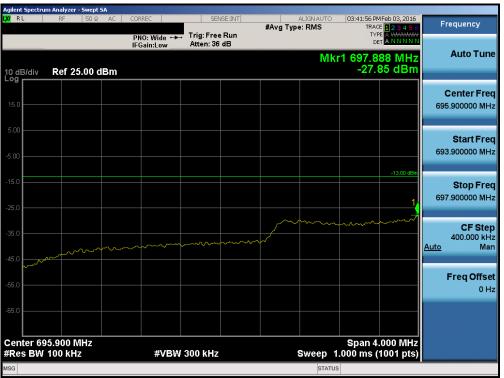
Plot 7-80. Upper Extended Band Edge Plot (Band 12 – 1.4MHz QPSK – RB Size 6)

FCC ID: ZNFK425		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:		EUT Type:		Daga EE of 100
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Plot 7-81. Lower Band Edge Plot (Band 12 – 3.0MHz QPSK – RB Size 15)



Plot 7-82. Lower Extended Band Edge Plot (Band 12 – 3.0MHz QPSK – RB Size 15)

FCC ID: ZNFK425	FCC Pt.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga EG of 100
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		alyzer - Swept									
l <mark>XI</mark> RL		RF 50 Ω	AC CO	RREC	SEA	ISE:INT	#Avg Typ	ALIGNAUTO e: RMS	TRAC	4Feb 03, 2016 E 1 2 3 4 5 6	Frequency
				NO: Wide 🖵 Gain:Low	Trig: Free Atten: 36		•		TYF DE		Auto Tune
10 dB/	'div R	ef 25.00 (lBm					IVIKI	-30.	08 MHz 00 dBm	
15.0											Center Freq 716.000000 MHz
5.00	www.mww	m	hull	m	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~						Start Freq 714.000000 MHz
-15.0										-13.00 dBm	Stop Freq
-25.0 —						1					718.000000 MHz CF Step
-35.0 -						- Marine	Monun	armen i	har		400.000 kHz <u>Auto</u> Man
-55.0											Freq Offset 0 Hz
-65.0											
	er 716.0 BW 30	00 MHz kHz		#VBW	91 kHz			Sweep 6	Span 4 .133 ms (.000 MHz 1001 pts)	
MSG								STATUS			

Plot 7-83. Upper Band Edge Plot (Band 12 – 3.0MHz QPSK – RB Size 15)



Plot 7-84. Upper Extended Band Edge Plot (Band 12 – 3.0MHz QPSK – RB Size 15)

FCC ID: ZNFK425	FCC Pt.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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Agilent Spectru LXI RL	m Analyzer - Swept SA					
L <mark>XI</mark> RL	RF 50 Ω AC	C CORREC	SENSE:INT	ALIGN AU #Avg Type: RMS	TRACE 1 2 3 4 5 (Frequency
		PNO: Wide 🖵 IFGain:Low	Trig: Free Run Atten: 36 dB		TYPE A WWWWW DET A N N N N N	
10 dB/div	Ref 25.00 dBn	n		Γ	4 Mkr1 697.948 MHz -31.19 dBm	Auto Tune
15.0						Center Freq 698.000000 MHz
-5.00						Start Freq 696.000000 MHz
-15.0					-13.00 dBm	Stop Freq 700.000000 MHz
-35.0 -45.0						CF Step 400.000 kHz <u>Auto</u> Man
-55.0						Freq Offset 0 Hz
	8.000 MHz				Span 4.000 MHz	
#Res BW	51 kHz	#VBW	150 kHz		p 2.200 ms (1001 pts) ratus	
MSG				51	4105	

Plot 7-85. Lower Band Edge Plot (Band 12 – 5.0MHz QPSK – RB Size 25)



Plot 7-86. Lower Extended Band Edge Plot (Band 12 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFK425	FCC P	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager	
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	um Analyzer - Swept SA	-				
LXI RL	RF 50 Ω AC	CORREC	SENSE:INT	ALIGNAUTO #Avg Type: RMS	03:45:11 PMFeb 03, 2016 TRACE 1 2 3 4 5 6	Frequency
		PNO: Wide 🖵 IFGain:Low	Trig: Free Run Atten: 36 dB	•	DET A NNNNN	Auto Tune
10 dB/div	Ref 25.00 dBm			Mk	r1 716.024 MHz -30.36 dBm	Auto Tune
15.0						Center Freq 716.000000 MHz
-5.00		~~~~~	\sim		-13.00 dBm	Start Freq 714.000000 MHz
-15.0					-1.3.00 dBm	Stop Freq 718.000000 MHz
-35.0			- Minor	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	CF Step 400.000 kHz <u>Auto</u> Man
-45.0						Freq Offset 0 Hz
-65.0						
Center 7 #Res BW	16.000 MHz 51 kHz	#VBW	150 kHz	Sweep 2	Span 4.000 MHz 2.200 ms (1001 pts)	
MSG				STATU	S	

Plot 7-87. Upper Band Edge Plot (Band 12 – 5.0MHz QPSK – RB Size 25)

	m Analyzer - Swepl											
L <mark>XI</mark> RL	RF 50 S	2 AC	CORREC		SEN	ISE:INT	#Ava Ti	ALIGNAUTO	03:45:18 PM TRAC	4Feb 03, 2016	Fre	quency
			PNO: Wid IFGain:Lo		Trig: Free Atten: 36					E 123456 E A WWWWW A NNNNN		
10 dB/div Log	Ref 25.00	dBm						Mk	r1 716.1 -30.	00 MHz 87 dBm		luto Tune
15.0												enter Freq 00000 MHz
-5.00												Start Freq 00000 MHz
-15.0										-13.00 dBm		Stop Freq 00000 MHz
-35.0	~~~ <u>~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~</u>		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~~~	~~~~			~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	mmm		Auto	CF Step 00.000 kHz Man
-45.0											F	r eq Offset 0 Hz
-65.0												
Center 71 #Res BW	8.100 MHz 100 kHz		#\	/BW 3	300 kHz			Sweep	9 Span 1.000 ms (.000 MHz 1001 pts)		
MSG								STATU	s			

Plot 7-88. Upper Extended Band Edge Plot (Band 12 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFK425		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:		Dogo 50 of 100		
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	n Analyzer - Swept Sf										
LX/RL	RF 50 Ω	AC CC	DRREC	SEN	ISE:INT	#Avg Typ	ALIGNAUTO e: RMS	TRAC	AFeb 03, 2016	F	requency
		P IF	NO: Wide 🔾 Gain:Low	Trig: Free Atten: 36		•		TYF De			Auto Tune
10 dB/div	Ref 25.00 dE	3m					MKI	1 697.9 -31.0	84 MHZ 63 dBm		Auto Func
15.0											Center Freq 3.000000 MHz
										698	3.000000 MHZ
5.00							~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		\sim	60	Start Freq 4.000000 MHz
-5.00									-13.00 dBm	09	
-15.0										70'	Stop Freq 2.000000 MHz
-25.0					1					10.	
-35.0	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		~~~~~	w~~~~~						CF Step 800.000 kHz
-45.0										<u>Auto</u>	Man
-55.0											Freq Offset 0 Hz
-65.0											0112
Center 69 #Res BW	8.000 MHz 100 kHz		#VBW	/ 300 kHz			Sweep 1	Span 8 .200 ms (.000 MHz 1001 pts)		
MSG							STATUS				

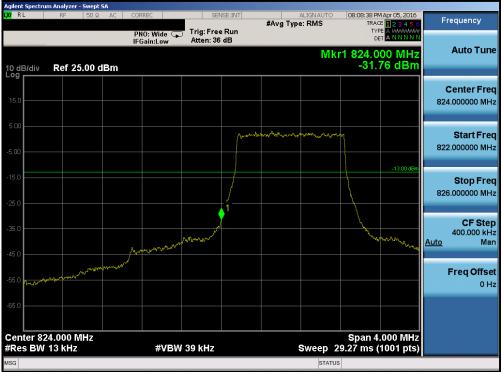
Plot 7-89. Lower Band Edge Plot (Band 12 – 10.0MHz QPSK – RB Size 50)



Plot 7-90. Upper Band Edge Plot (Band 12 – 10.0MHz QPSK – RB Size 50)

FCC ID: ZNFK425	FCC Pt.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager	
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Plot 7-91. Lower Band Edge Plot (Band 5 – 1.4MHz QPSK – RB Size 6)

Agilent Spectrum												
XI RL	RF	50 Ω	AC	CORREC		Trig: Free	#Avg Typ	e: RMS	TRA	M Apr 05, 2016 CE 1 2 3 4 5 6 PE A WANNAN DET A N N N N N	Fre	quency
I0 dB/div	Ref 25	00 dE	Rm	IFGain:L		Atten: 36		Mk	r1 822.9	992 MHz 59 dBm		Auto Tune
		.00 42										enter Fre 000000 MH
5.00											819.	Start Fre 000000 MH
25.0										-13.00 dBm	823.	Stop Fre 000000 мн
35.0										1	<u>Auto</u>	CF Ste 400.000 kH Ma
15.0 55.0 	~~	~~~~	<u>~~~</u> ~		~~~~~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~				F	F req Offs e 0 H
65.0												
Center 82′ Res BW				#	VBW	300 kHz		Sweep	Span 4 1.000 ms	1.000 MHz (1001 pts)		
SG								STATU	JS			

Plot 7-92. Lower Extended Band Edge Plot (Band 5 – 1.4MHz QPSK – RB Size 6)

FCC ID: ZNFK425	FCC Pt.	22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager	
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Plot 7-93. Upper Band Edge Plot (Band 5 – 1.4MHz QPSK – RB Size 6)



Plot 7-94. Upper Extended Band Edge Plot (Band 5 – 1.4MHz QPSK – RB Size 6)

FCC ID: ZNFK425	FCC Pt.	22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dogo 62 of 102	
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Agilent Spectrum Analyzer - Swept SA	1		1		
(X) RL RF 50 Ω AC	CORREC	SENSE:INT	ALIGNAUTO #Avg Type: RMS	08:23:20 PM Apr 05, 2016 TRACE 1 2 3 4 5 6	Frequency
		g: Free Run :en: 36 dB		r1 824.000 MHz -27.97 dBm	Auto Tune
10 dB/div Ref 25.00 dBm				-27.97 0.611	
15.0					Center Freq 824.000000 MHz
-5.00			www.www.www.	nyumme fun anna	Start Freq 822.000000 MHz
-15.0		1		-13.00 dBm	Stop Freq 826.000000 MHz
-45.0	mann	Not the second s			CF Step 400.000 kHz <u>Auto</u> Man
-45.0					Freq Offset 0 Hz
-65.0					
Center 824.000 MHz #Res BW 30 kHz	#VBW 911	kHz	Sweep	Span 4.000 MHz 5.533 ms (1001 pts)	
MSG			STATU		

Plot 7-95. Lower Band Edge Plot (Band 5 – 3.0MHz QPSK – RB Size 15)



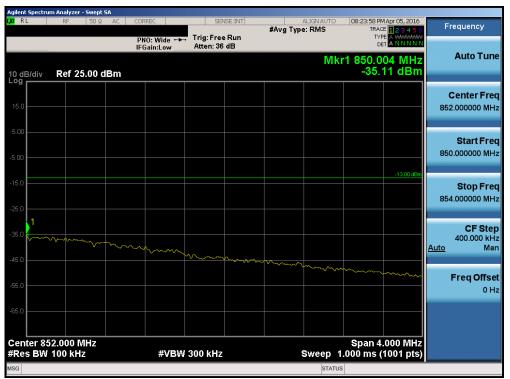
Plot 7-96. Lower Extended Band Edge Plot (Band 5 – 3.0MHz QPSK – RB Size 15)

FCC ID: ZNFK425	FCC Pt.	22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager	
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Plot 7-97. Upper Band Edge Plot (Band 5 – 3.0MHz QPSK – RB Size 15)



Plot 7-98. Upper Extended Band Edge Plot (Band 5 – Band 5 – 3.0MHz QPSK – RB Size 15)

FCC ID: ZNFK425	FCC Pt.	22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	💽 LG	Reviewed by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Daga 64 of 100	
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	m Analyzer - Swept SA						-		
LXU RL	RF 50Ω AC	CORREC	SEN	ISE:INT	#Avg Type	ALIGNAUTO e: RMS		Apr 05, 2016	Frequency
10 dB/div	Ref 25.00 dBm	PNO: Wide 🖵 IFGain:Low	Trig: Free Atten: 36			Mkı	TYP		Auto Tun
15.0									Center Fre 824.000000 MH
-5.00					·/			-13.00 dBm	Start Fre 822.000000 MH
-15.0				1					Stop Fre 826.000000 MH
-35.0	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	han have been ha	<u>,</u>					CF Ste 400.000 kH <u>Auto</u> Ma
-45.0									Freq Offse
-65.0									
Center 82 #Res BW	4.000 MHz 51 kHz	#VBW	150 kHz			Sweep 1	Span 4 .933 ms (.000 MHz 1001 pts)	
MSG						STATUS	;		

Plot 7-99. Lower Band Edge Plot (Band 5 – 5.0MHz QPSK – RB Size 25)



Plot 7-100. Lower Extended Band Edge Plot (Band 5 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFK425	FCC Pt.	22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	💽 LG	Reviewed by: Quality Manager	
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Plot 7-101. Upper Band Edge Plot (Band 5 – 5.0MHz QPSK – RB Size 25)



Plot 7-102. Upper Extended Band Edge Plot (Band 5 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFK425	FCC Pt.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Daga 66 of 100	
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Plot 7-103. Lower Band Edge Plot (Band 5 – 10.0MHz QPSK – RB Size 50)



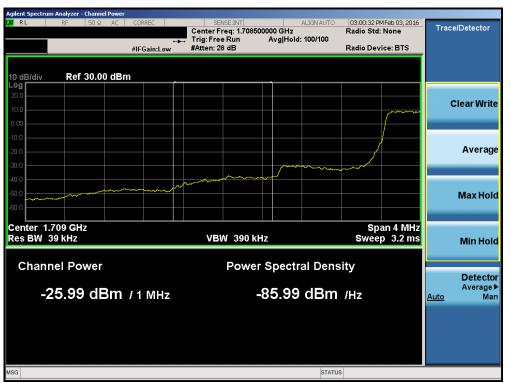
Plot 7-104. Upper Band Edge Plot (Band 5 – 10.0MHz QPSK – RB Size 50)

FCC ID: ZNFK425	FCC Pt.	22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	💽 LG	Reviewed by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dece 67 of 100	
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Plot 7-105. Lower Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 6)



Plot 7-106. Lower Extended Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 6)

FCC ID: ZNFK425	FCC Pt.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga 69 of 100
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Plot 7-107. Upper Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 6)



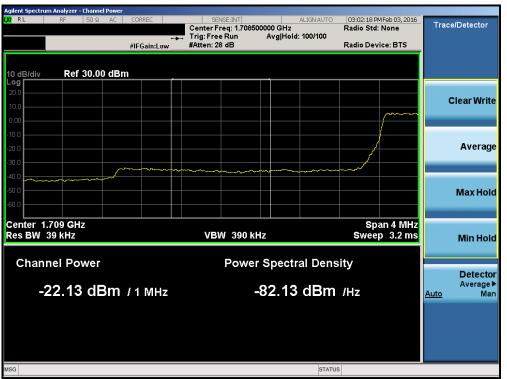
Plot 7-108. Upper Extended Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 6)

FCC ID: ZNFK425	FCC Pt.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga 60 of 100
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Agilent Spectru <mark>(XI</mark> RL	ım Analyzer - Swept S									
KL	RF 50 Ω	AC COR	REL		ISE:INT	#Avg Typ	ALIGNAUTO e: RMS		MFeb 03, 2016 CE 1 2 3 4 5 6 PE A WWWWW	Frequency
		PN	IO: Wide 🖵 Gain:Low	Trig: Free Atten: 36				TYI Di	ET A N N N N N	
		ire	Jam.Low				Mkr1	1 709 0	96 GHz	Auto Tune
10 dB/div	Ref 25.00 d	Bm						-28.	13 dBm	
	1101 20.00 0									
										Center Freq
15.0										1.71000000 GHz
5.00					m	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	m	mm	www	Start Freq
										1.708000000 GHz
-5.00										
-15.0									-13.00 dBm	
-13.0					5					Stop Freq
-25.0					í					1.712000000 GHz
20.0				,	1					
-35.0			mann	2.2.7.7						CF Step 400.000 kHz
w w	man man and	Vranner w	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~~~~~						Auto Man
-45.0										
										Freq Offset
-55.0										0 Hz
-65.0										
Center 1.	710000 GHz							Span 4	.000 MHz	
#Res BW			#VBW	91 kHz			Sweep 6	.133 ms (1001 pts)	
MSG							STATUS			

Plot 7-109. Lower Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)



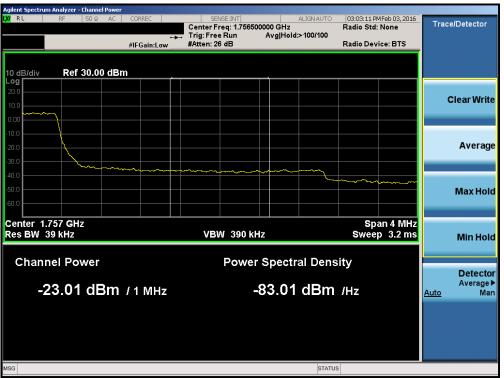
Plot 7-110. Lower Extended Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)

FCC ID: ZNFK425	FCC Pt.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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	ectrum Analyzer - Swept SA							
L <mark>XI</mark> RL	RF 50 Ω AC	CORREC	SENSE		ALIGNAUT	TRA	MFeb 03, 2016	Frequency
		PNO: Wide 🖵 IFGain:Low	Trig: Free R Atten: 36 dB			TY	PE A WINIMAN ET A N N N N N	
		IFGain:Low	Atten. oo u		ML	-1 1 755 (Auto Tune
10 dB/di	iv Ref 25.00 dBm				IVIN	r1 1.755 (-27.6	52 dBm	
	Rei 25.00 ubiii							
								Center Freq
15.0								1.755000000 GHz
5.00	von symmetry	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	my					Start Freq
								1.753000000 GHz
-5.00								1.755000000 GHz
							-13.00 dBm	
-15.0								Stop Freq
			1					1.757000000 GHz
-25.0								
-35.0			Z	<u>.</u>				CF Step
-35.0				- mark	man man	mm	m	400.000 kHz Auto Man
-45.0								<u>Auto</u> Man
40.0								
-55.0								Freq Offset
								0 Hz
-65.0								
	1.755000 GHz W 30 kHz	#\/B\M	91 kHz		Sweep	Span 4 6.133 ms (.000 MHz	
	994-50 KH2	#0000	31 K112				(ioo i pis)	
MSG					517	TUS		

Plot 7-111. Upper Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)



Plot 7-112. Upper Extended Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)

FCC ID: ZNFK425	FCC Pt.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 71 of 100
0Y1604040679.ZNF	2/3-3/30/2016, 4/5/2016, 4/20/2016	, 4/20/2016 Portable Handset		Page 71 of 122
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Plot 7-113. Lower Band Edge Plot (Band 4 – 5.0MHz QPSK – RB Size 25)



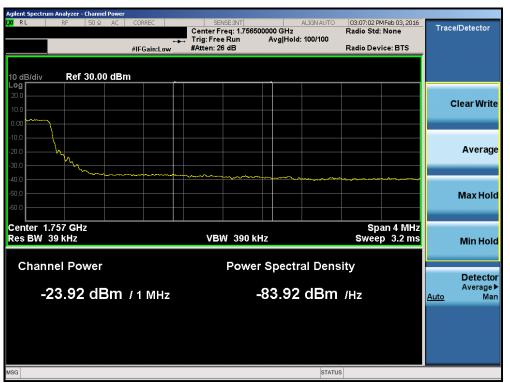
Plot 7-114. Lower Extended Band Edge Plot (Band 4 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFK425	FCC Pt.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 72 of 102
0Y1604040679.ZNF	2/3-3/30/2016, 4/5/2016, 4/20/2016	Portable Handset		Page 72 of 122
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Plot 7-115. Upper Band Edge Plot (Band 4 – 5.0MHz QPSK – RB Size 25)



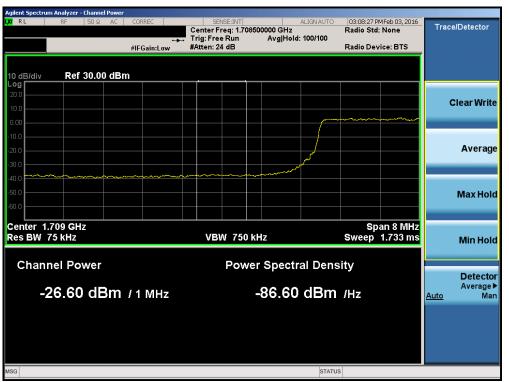
Plot 7-116. Upper Extended Band Edge Plot (Band 4 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFK425	FCC Pt.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dego 72 of 100
0Y1604040679.ZNF	2/3-3/30/2016, 4/5/2016, 4/20/2016	Portable Handset		Page 73 of 122
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	oectrum Analyzei							
lxi RL	RF	50 Ω AC	CORREC	SENSE:INT	ALIGN #Avg Type: RM	AUTU U3:U8:22 F I S TRA	MFeb 03, 2016 CE <mark>1 2 3 4 5 6</mark> (PE A WWWWW	Frequency
			PNO: Wide 🖵 IFGain:Low	Trig: Free Run Atten: 36 dB		TY	PE A WATAWAYA	
			IFGall.LUW	Attent to up	Λ	/lkr1 1.709 s	84 GHz	Auto Tune
10 dB/	dio Ref 2	5.00 dBm				-30.	56 dBm	
		5.00 UDIII						
								Center Freq
15.0								1.710000000 GHz
5.00				ſ		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	Start Freq
								1.706000000 GHz
-5.00								
-15.0							-13.00 dBm	
-15.0								Stop Freq
-25.0								1.714000000 GHz
-23.0				↓ 1 1				
-35.0								CF Step
~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	m						800.000 kHz Auto Man
-45.0								
								Freq Offset
-55.0								0 Hz
								0112
-65.0								
Cente	r 1.710000	GH7				Span 2	3.000 MHz	
	BW 100 kH		#VBW	300 kHz	Swe	ep 1.200 ms	(1001 pt <u>s</u>)	
MSG						STATUS		

Plot 7-117. Lower Band Edge Plot (Band 4 – 10.0MHz QPSK – RB Size 50)



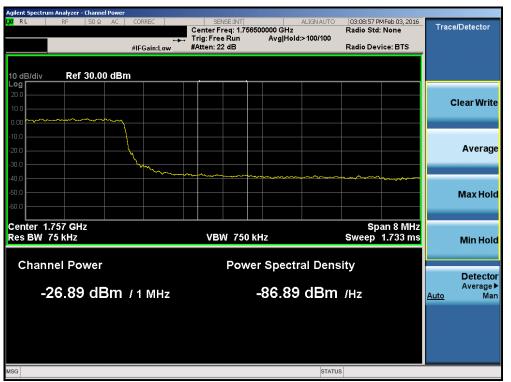
Plot 7-118. Lower Extended Band Edge Plot (Band 4 – 10.0MHz QPSK – RB Size 50)

FCC ID: ZNFK425	FCC Pt.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga 74 of 100
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Plot 7-119. Upper Band Edge Plot (Band 4 – 10.0MHz QPSK – RB Size 50)



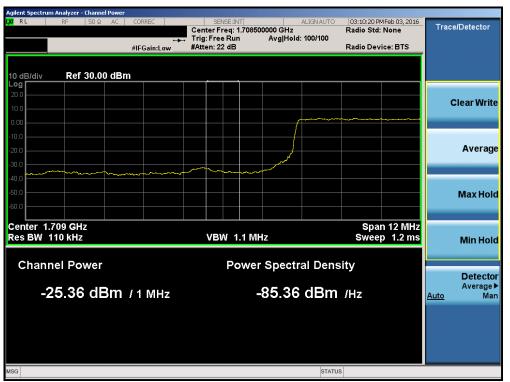
Plot 7-120. Upper Extended Band Edge Plot (Band 4 – 10.0MHz QPSK – RB Size 50)

FCC ID: ZNFK425	FCC Pt.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dego 75 of 100
0Y1604040679.ZNF	2/3-3/30/2016, 4/5/2016, 4/20/2016	4/20/2016 Portable Handset		Page 75 of 122
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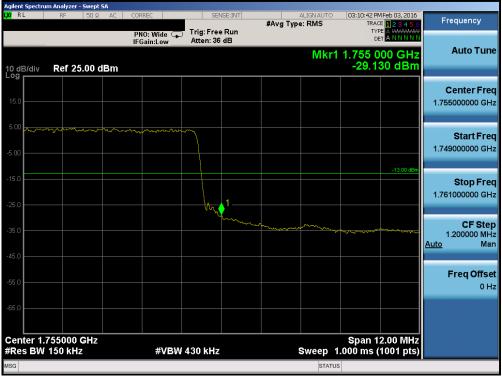
Plot 7-121. Lower Band Edge Plot (Band 4 – 15.0MHz QPSK – RB Size 75)



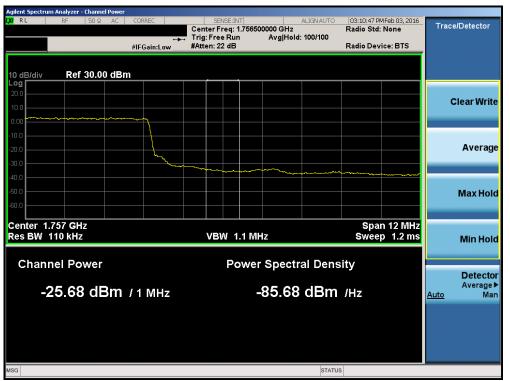
Plot 7-122. Lower Extended Band Edge Plot (Band 4 – 15.0MHz QPSK – RB Size 75)

FCC ID: ZNFK425	FCC Pt.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 76 of 100
0Y1604040679.ZNF	2/3-3/30/2016, 4/5/2016, 4/20/2016	4/20/2016 Portable Handset		Page 76 of 122
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Plot 7-123. Upper Band Edge Plot (Band 4 – 15.0MHz QPSK – RB Size 75)



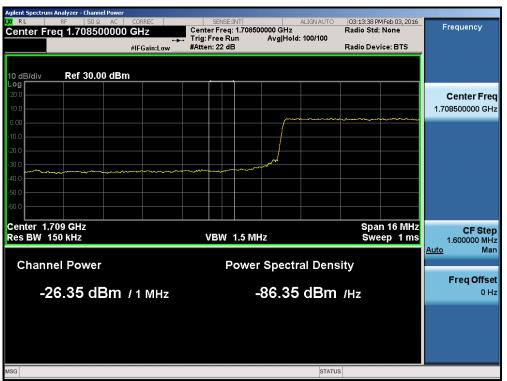
Plot 7-124. Upper Extended Band Edge Plot (Band 4 – 15.0MHz QPSK – RB Size 75)

FCC ID: ZNFK425	FCC P	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:		Dego 77 of 100		
0Y1604040679.ZNF	2/3-3/30/2016, 4/5/2016, 4/20/2016	Portable Handset		Page 77 of 122		
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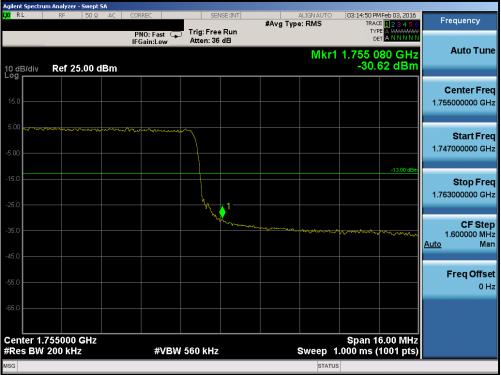
Plot 7-125. Lower Band Edge Plot (Band 4 – 20.0MHz QPSK – RB Size 100)



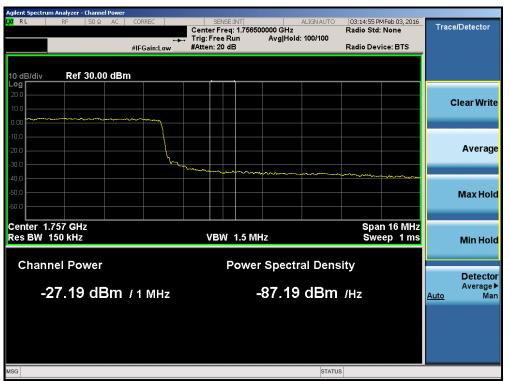
Plot 7-126. Lower Extended Band Edge Plot (Band 4 – 20.0MHz QPSK – RB Size 100)

FCC ID: ZNFK425	FCC Pt.	22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	💽 LG	Reviewed by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:		Daga 79 of 100		
0Y1604040679.ZNF	2/3-3/30/2016, 4/5/2016, 4/20/2016	Portable Handset		Page 78 of 122		
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Plot 7-127. Upper Band Edge Plot (Band 4 – 20.0MHz QPSK – RB Size 100)



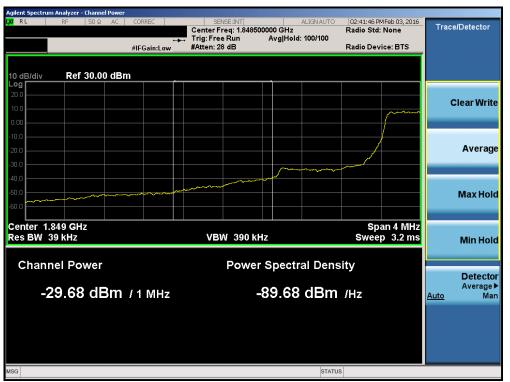
Plot 7-128. Upper Extended Band Edge Plot (Band 4 – 20.0MHz QPSK – RB Size 100)

FCC ID: ZNFK425	FCC Pt.	22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:		Page 79 of 122		
0Y1604040679.ZNF	2/3-3/30/2016, 4/5/2016, 4/20/2016	6, 4/20/2016 Portable Handset				
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Plot 7-129. Lower Band Edge Plot (Band 2 – 1.4MHz QPSK – RB Size 6)



Plot 7-130. Lower Extended Band Edge Plot (Band 2 – 1.4MHz QPSK – RB Size 6)

FCC ID: ZNFK425	FCC Pt.	22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	💽 LG	Reviewed by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:		Daga 90 of 100		
0Y1604040679.ZNF	2/3-3/30/2016, 4/5/2016, 4/20/2016	Portable Handset		Page 80 of 122		
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Plot 7-131. Upper Band Edge Plot (Band 2 – 1.4MHz QPSK – RB Size 6)



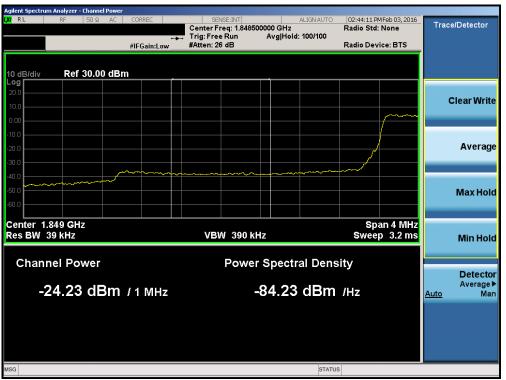
Plot 7-132. Upper Extended Band Edge Plot (Band 2 – 1.4MHz QPSK – RB Size 6)

FCC ID: ZNFK425	FCC Pt.	22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:		Daga 91 of 100		
0Y1604040679.ZNF	2/3-3/30/2016, 4/5/2016, 4/20/2016	Portable Handset		Page 81 of 122		
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	m Analyzer - Swept SA						_			
LXU RL	RF 50Ω AC	CORREC	SENS	E:INT	#Avg Type	ALIGN AUTO e: RMS		4Feb 03, 2016 E <mark>1 2 3 4 5 6</mark>	F	requency
		PNO: Wide 🖵 IFGain:Low	Trig: Free Atten: 36 d				TYF De			
10 dB/div Log	Ref 25.00 dBm	1				Mkr1	1.850 0 -27.4	00 GHz 45 dBm		Auto Tune
15.0										Center Freq 0000000 GHz
-5.00				Mun	hydrogenet	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	- Contract	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	1.84	Start Freq 8000000 GHz
-15.0				1				-13.00 dBm	1.85	Stop Freq 2000000 GHz
-35.0	m.m.m.m.		www						<u>Auto</u>	CF Step 400.000 kHz Man
-45.0										Freq Offset 0 Hz
-65.0										
Center 1. #Res BW	850000 GHz 30 kHz	#VBW	91 kHz			Sweep 6	Span 4 .133 ms (.000 MHz 1001 pts)		
MSG						STATUS				

Plot 7-133. Lower Band Edge Plot (Band 2 – 3.0MHz QPSK – RB Size 15)



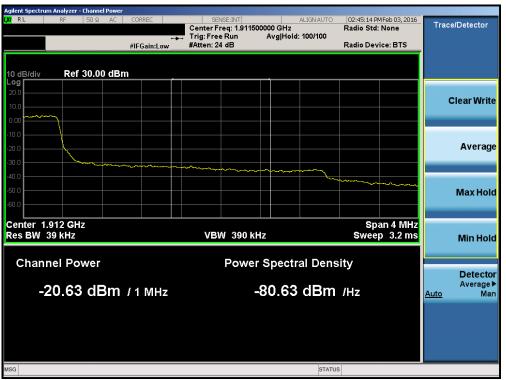
Plot 7-134. Lower Extended Band Edge Plot (Band 2 – 3.0MHz QPSK – RB Size 15)

FCC ID: ZNFK425	FCC Pt.	22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:		Dego 92 of 122		
0Y1604040679.ZNF	2/3-3/30/2016, 4/5/2016, 4/20/2016	Portable Handset		Page 82 of 122		
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			- Swept SA										
l <mark>XI</mark> RL	L	RF	50 Ω .	AC C	ORREC		SEI	VSE:INT	#Δυσ."	ALIGN AUTC Type: RMS		5 PM Feb 03, 2016 RACE 1 2 3 4 5 6	Frequency
					PNO: Wie FGain:Lo		Trig: Fre Atten: 36		#Avg				
10 dE Log i	B/div	Ref 2	5.00 dB	m						Mkr	1 1.910 -2	000 GHz 7.81 dBm	Auto Tune
15.0													Center Freq 1.910000000 GHz
5.00 -5.00		~~~~	mm	h.nn	m	~~~~~	m					-13.00 dBm	Start Freq 1.908000000 GHz
-15.0 -25.0								1				-13.00 (101)	Stop Freq 1.912000000 GHz
-35.0 -45.0								March March		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		Munnal	CF Step 400.000 kHz <u>Auto</u> Man
-45.0													Freq Offset 0 Hz
-65.0													
		10000 30 kHz	GHz		#	VBW	91 kHz			Sweep	Span 6.133 m	4.000 MHz s (1001 pts)	
MSG										STAT	US		

Plot 7-135. Upper Band Edge Plot (Band 2 – 3.0MHz QPSK – RB Size 15)



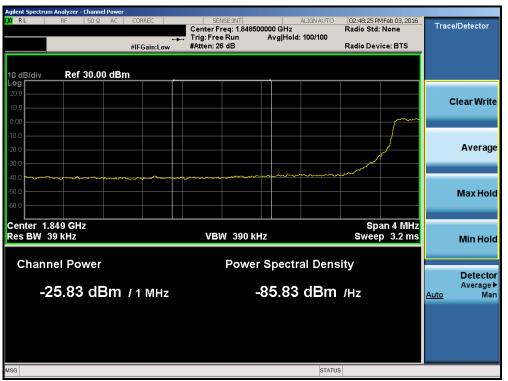
Plot 7-136. Upper Extended Band Edge Plot (Band 2 – 3.0MHz QPSK – RB Size 15)

FCC ID: ZNFK425	FCC Pt.	22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:		Dego 92 of 100		
0Y1604040679.ZNF	2/3-3/30/2016, 4/5/2016, 4/20/2016	Portable Handset		Page 83 of 122		
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Plot 7-137. Lower Band Edge Plot (Band 2 – 5.0MHz QPSK – RB Size 25)



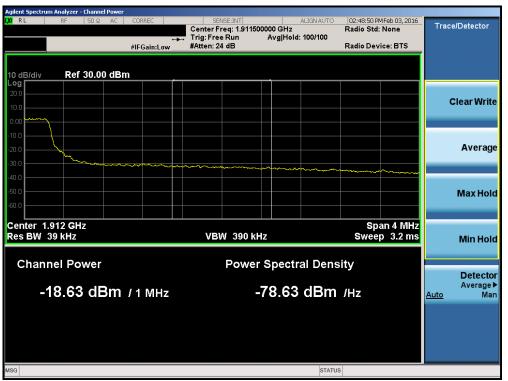
Plot 7-138. Lower Extended Band Edge Plot (Band 2 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFK425	FCC Pt.	22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:		Dega 94 of 100		
0Y1604040679.ZNF	2/3-3/30/2016, 4/5/2016, 4/20/2016	Portable Handset		Page 84 of 122		
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	pectrum Analyzer - Swept S#				_		_		
l <mark>XI</mark> RL	RF 50 Ω	AC CORREC	SEN	SE:INT	#Avg Type	ALIGN AUTO e: RMS		4Feb 03, 2016 E <mark>1 2 3 4 5 6</mark> E A WARAN	Frequency
		PNO: Wide 🖵 IFGain:Low	Trig: Free Atten: 36				DE		
10 dB/	div Ref 25.00 dE	3m				Mkr1	1.910 0 -25.0	00 GHz 61 dBm	Auto Tune
15.0									Center Freq 1.91000000 GHz
-5.00									Start Freq 1.908000000 GHz
-15.0				1				-13.00 dBm	Stop Freq 1.912000000 GHz
-25.0				~~~~		~~~~~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~~~~	CF Step 400.000 kHz <u>Auto</u> Man
-45.0									Freq Offset
-65.0									0 Hz
#Res	er 1.910000 GHz BW 51 kHz	#VBW	150 kHz				.200 ms (.000 MHz 1001 pts)	
MSG						STATUS	6		

Plot 7-139. Upper Band Edge Plot (Band 2 – 5.0MHz QPSK – RB Size 25)



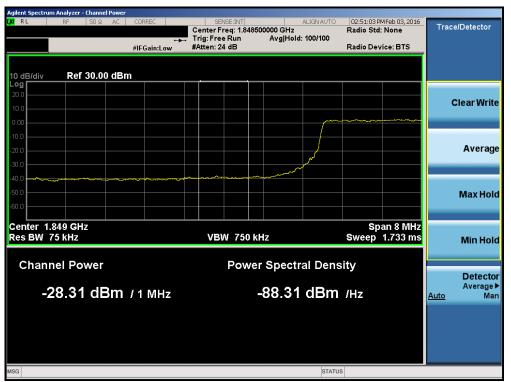
Plot 7-140. Upper Extended Band Edge Plot (Band 2 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFK425	FCC Pt.	22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:		Dage 05 of 100		
0Y1604040679.ZNF	2/3-3/30/2016, 4/5/2016, 4/20/2016	Portable Handset		Page 85 of 122		
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Plot 7-141. Lower Band Edge Plot (Band 2 – 10.0MHz QPSK – RB Size 50)



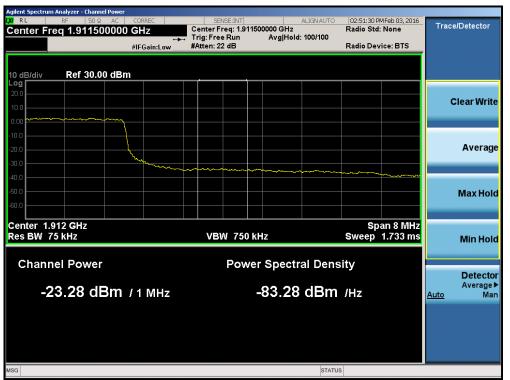
Plot 7-142. Lower Extended Band Edge Plot (Band 2 – 10.0MHz QPSK – RB Size 50)

FCC ID: ZNFK425	FCC Pt.	22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga 96 of 100
0Y1604040679.ZNF	2/3-3/30/2016, 4/5/2016, 4/20/2016	Portable Handset		Page 86 of 122
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Plot 7-143. Upper Band Edge Plot (Band 2 – 10.0MHz QPSK – RB Size 50)



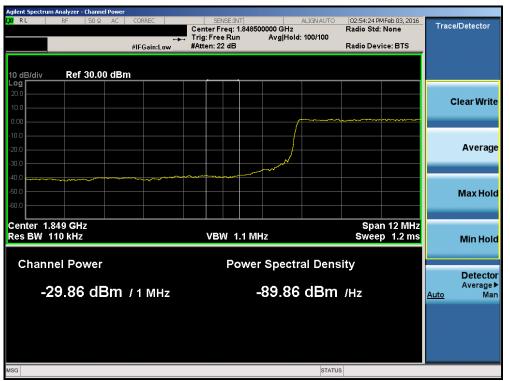
Plot 7-144. Upper Extended Band Edge Plot (Band 2 – 10.0MHz QPSK – RB Size 50)

FCC ID: ZNFK425	FCC Pt.	22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dege 97 of 100
0Y1604040679.ZNF	2/3-3/30/2016, 4/5/2016, 4/20/2016	Portable Handset		Page 87 of 122
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Plot 7-145. Lower Band Edge Plot (Band 2 – 15.0MHz QPSK – RB Size 75)



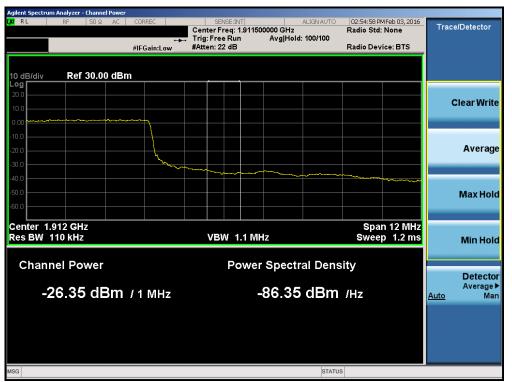
Plot 7-146. Lower Extended Band Edge Plot (Band 2 – 15.0MHz QPSK – RB Size 75)

FCC ID: ZNFK425	FCC Pt.	22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga 99 of 100
0Y1604040679.ZNF	2/3-3/30/2016, 4/5/2016, 4/20/2016	Portable Handset		Page 88 of 122
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Plot 7-147. Upper Band Edge Plot (Band 2 – 15.0MHz QPSK – RB Size 75)



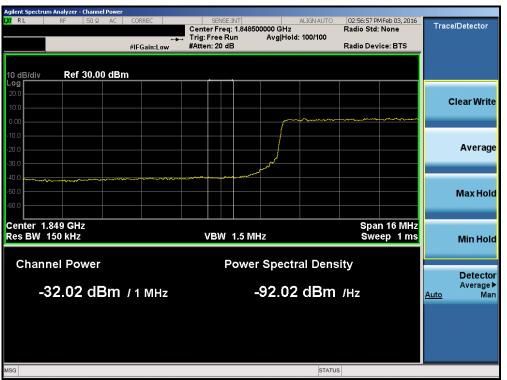
Plot 7-148. Upper Extended Band Edge Plot (Band 2 – 15.0MHz QPSK – RB Size 75)

FCC ID: ZNFK425	FCC Pt.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 90 of 100
0Y1604040679.ZNF	2/3-3/30/2016, 4/5/2016, 4/20/2016	Portable Handset		Page 89 of 122
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	ipectrum Anal										
LXI RL	RF	50 Ω	AC	CORREC		SE:INT	#Avg Typ	ALIGNAUTO e: RMS	02:56:51 P	MFeb 03, 2016 CE 1 2 3 4 5 6 PE A WWWWW	Frequency
				PNO: Fast 🖵	Trig: Free Atten: 36	Run dB			TY D	ET A N N N N N	
				IFGalliLUW	Haten. 00	48		Mkr1	1 9/9 0	52 GHz	Auto Tune
10 dB/	Mio Doi	f 25.00 (dBm						-34.	56 dBm	
		1 23.00 (
											Center Freq
15.0											1.85000000 GHz
5.00						~~~	,	manon	www.	······	Start Freq
											1.842000000 GHz
-5.00											
										-13.00 dBm	
-15.0						1					Stop Freq
-25.0						р					1.858000000 GHz
-23.0						1					
-35.0						N.					CF Step
	v	wenner	m	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	man						1.600000 MHz Auto Man
-45.0											
											Freq Offset
-55.0											0 Hz
											0112
-65.0											
Cente	er 1.8500	00 GHz							Span 1	6.00 MHz	
	BW 200			#VBW	560 kHz			Sweep 1	.000 ms (1001 pts)	
MSG								STATUS			

Plot 7-149. Lower Band Edge Plot (Band 2 – 20.0MHz QPSK – RB Size 100)



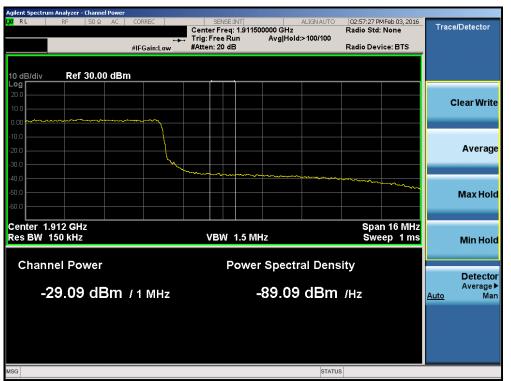
Plot 7-150. Lower Extended Band Edge Plot (Band 2 – 20.0MHz QPSK – RB Size 100)

FCC ID: ZNFK425	FCC Pt.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 00 of 122
0Y1604040679.ZNF	2/3-3/30/2016, 4/5/2016, 4/20/2016	Portable Handset		Page 90 of 122
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Plot 7-151. Upper Band Edge Plot (Band 2 – 20.0MHz QPSK – RB Size 100)



Plot 7-152. Upper Extended Band Edge Plot (Band 2 – 20.0MHz QPSK – RB Size 100)

FCC ID: ZNFK425	FCC Pt.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dego 01 of 100
0Y1604040679.ZNF	2/3-3/30/2016, 4/5/2016, 4/20/2016	Portable Handset		Page 91 of 122
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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.

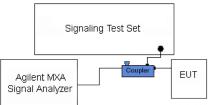


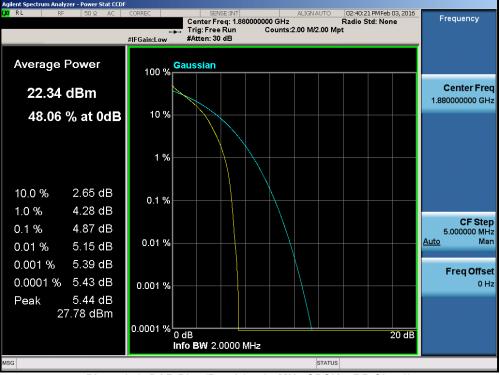
Figure 7-4. Test Instrument & Measurement Setup

Test Notes

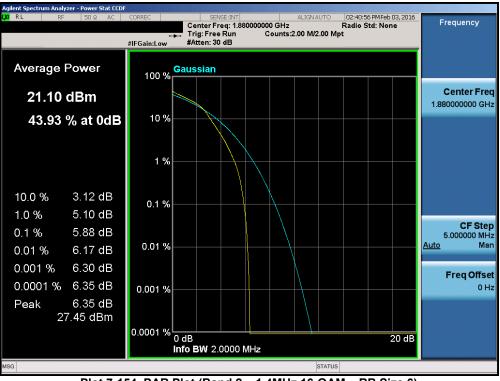
None.

FCC ID: ZNFK425	FCC Pt.	22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dogo 02 of 122	
0Y1604040679.ZNF	2/3-3/30/2016, 4/5/2016, 4/20/2016	Portable Handset		Page 92 of 122	
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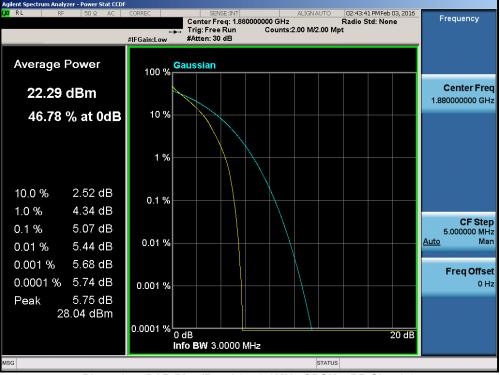
Plot 7-153. PAR Plot (Band 2 – 1.4MHz QPSK – RB Size 6)



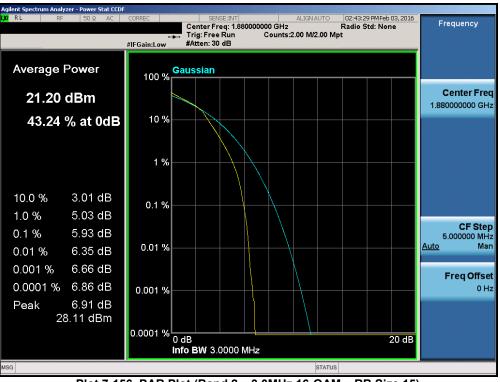
Plot 7-154. PAR Plot (Band 2 – 1.4MHz 16-QAM – RB Size 6)

FCC ID: ZNFK425	FCC	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dego 02 of 122	
0Y1604040679.ZNF	2/3-3/30/2016, 4/5/2016, 4/20/2016	Portable Handset		Page 93 of 122	
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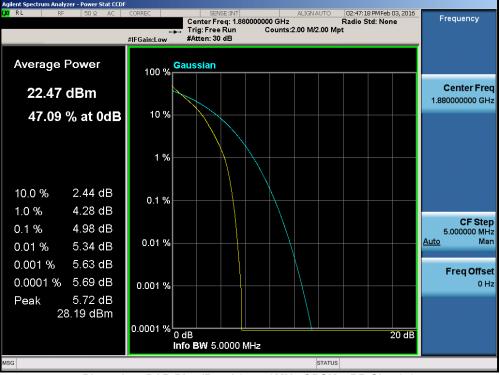
Plot 7-155. PAR Plot (Band 2 – 3.0MHz QPSK – RB Size 15)

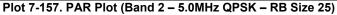


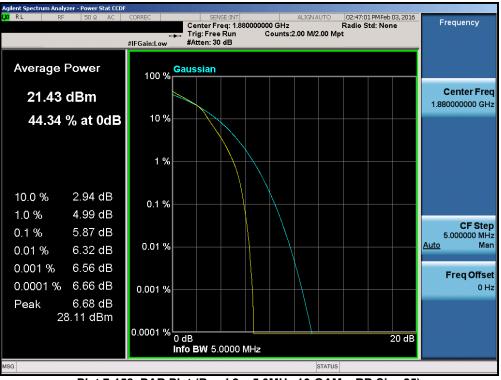
Plot 7-156. PAR Plot (Band 2 - 3.0MHz 16-QAM - RB Size 15)

FCC ID: ZNFK425	FCC Pt.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager	
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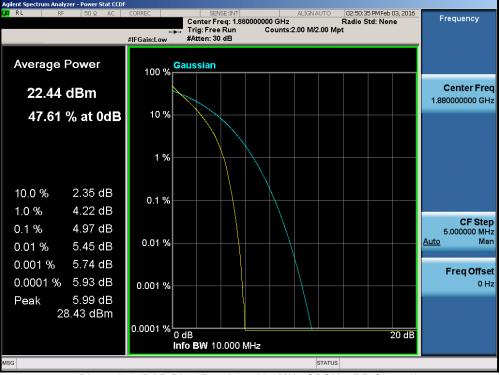


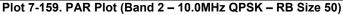


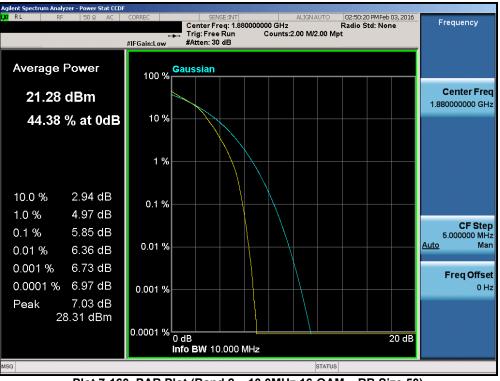
Plot 7-158. PAR Plot (Band 2 - 5.0MHz 16-QAM - RB Size 25)

FCC ID: ZNFK425	FCC Pt.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage OF of 100	
0Y1604040679.ZNF	2/3-3/30/2016, 4/5/2016, 4/20/2016	Portable Handset		Page 95 of 122	
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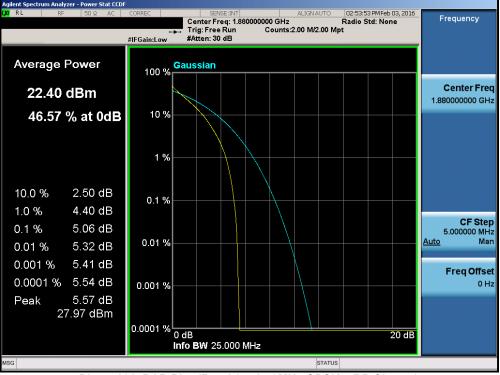




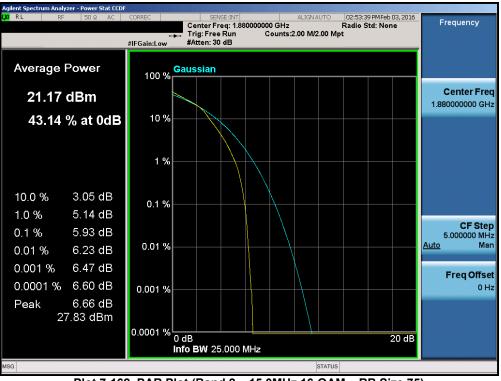
Plot 7-160. PAR Plot (Band 2 - 10.0MHz 16-QAM - RB Size 50)

FCC ID: ZNFK425	FCC Pt.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Daga 06 of 100	
0Y1604040679.ZNF	2/3-3/30/2016, 4/5/2016, 4/20/2016	Portable Handset		Page 96 of 122	
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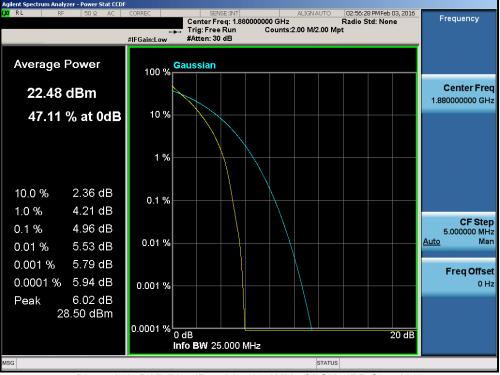
Plot 7-161. PAR Plot (Band 2 – 15.0MHz QPSK – RB Size 75)

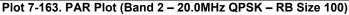


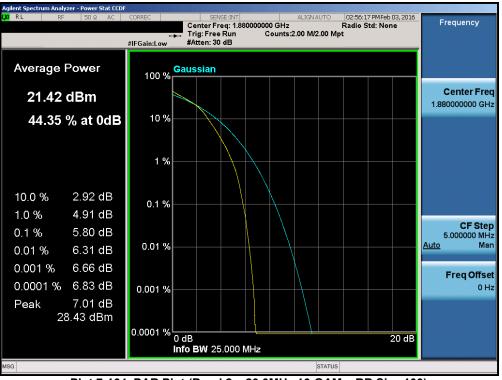
Plot 7-162. PAR Plot (Band 2 - 15.0MHz 16-QAM - RB Size 75)

FCC ID: ZNFK425	FCC Pt.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dego 07 of 100	
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Plot 7-164. PAR Plot (Band 2 – 20.0MHz 16-QAM – RB Size 100)

FCC ID: ZNFK425	FCC Pt.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 09 of 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 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-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 > 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

FCC ID: ZNFK425	FCC Pt.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager	
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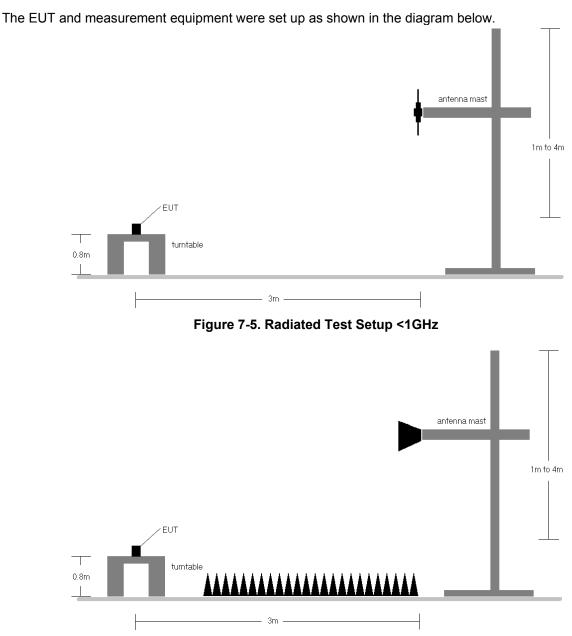


Figure 7-6. Radiated Test Setup >1GHz

Test Notes

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

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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBd]	ERP [dBm]	ERP Limit [dBm]	Margin [dB]
699.70	1.4	QPSK	Н	234	0	1 / 5	16.94	2.88	19.82	34.77	-14.95
707.50	1.4	QPSK	н	234	0	1 / 5	16.94	2.88	19.82	34.77	-14.95
715.30	1.4	QPSK	н	234	0	1 / 0	16.39	3.06	19.45	34.77	-15.32
699.70	1.4	16-QAM	н	234	0	1 / 5	15.91	2.88	18.79	34.77	-15.98
707.50	1.4	16-QAM	н	234	0	1 / 0	15.90	2.88	18.78	34.77	-15.99
715.30	1.4	16-QAM	н	234	0	1 / 0	15.81	3.06	18.87	34.77	-15.90
700.50	3	QPSK	Н	234	258	1 / 14	17.06	2.72	19.78	34.77	-14.99
707.50	3	QPSK	н	234	258	1 / 0	16.81	2.88	19.69	34.77	-15.08
714.50	3	QPSK	н	234	258	1 / 0	16.42	3.04	19.46	34.77	-15.31
700.50	3	16-QAM	н	234	258	1 / 14	16.01	2.72	18.73	34.77	-16.04
707.50	3	16-QAM	н	234	258	1 / 0	15.84	2.88	18.72	34.77	-16.05
714.50	3	16-QAM	Н	234	258	1 / 0	15.94	3.04	18.98	34.77	-15.79
701.50	5	QPSK	Н	234	351	1 / 24	16.67	2.75	19.42	34.77	-15.35
707.50	5	QPSK	н	234	351	1 / 0	16.96	2.88	19.84	34.77	-14.93
713.50	5	QPSK	н	234	351	1 / 0	17.18	3.02	20.20	34.77	-14.57
701.50	5	16-QAM	н	234	351	1 / 24	15.64	2.75	18.39	34.77	-16.38
707.50	5	16-QAM	н	234	351	1 / 24	15.46	2.88	18.34	34.77	-16.43
713.50	5	16-QAM	н	234	351	1 / 0	16.14	3.02	19.16	34.77	-15.61
704.00	10	QPSK	Н	234	2	1 / 49	16.39	2.80	19.19	34.77	-15.58
707.50	10	QPSK	н	234	2	1 / 49	17.04	2.88	19.92	34.77	-14.85
711.00	10	QPSK	н	234	2	1/0	16.48	2.96	19.44	34.77	-15.33
704.00	10	16-QAM	н	234	2	1 / 49	15.73	2.80	18.53	34.77	-16.24
707.50	10	16-QAM	н	234	2	1 / 49	16.41	2.88	19.29	34.77	-15.48
711.00	10	16-QAM	н	234	2	1 / 49	15.75	2.96	18.71	34.77	-16.06

Table 7-2. ERP Data (Band 12)

FCC ID: ZNFK425	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 102			
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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	3.31	270	3/2	15.09	4.95	20.04	38.45	-18.42
836.50	1.4	QPSK	н	3.38	249	1 / 0	15.07	5.00	20.07	38.45	-18.38
848.30	1.4	QPSK	н	3.40	262	1 / 0	13.21	5.05	18.26	38.45	-20.19
824.70	1.4	16-QAM	н	3.31	270	3/2	14.02	4.95	18.97	38.45	-19.49
836.50	1.4	16-QAM	н	3.38	249	1 / 0	13.92	5.00	18.92	38.45	-19.53
848.30	1.4	16-QAM	Н	3.40	262	1/0	12.06	5.05	17.11	38.45	-21.34
825.50	3	QPSK	Н	3.29	259	1 / 14	15.22	4.95	20.17	38.45	-18.28
836.50	3	QPSK	н	3.36	253	1 / 0	15.34	5.00	20.34	38.45	-18.11
847.50	3	QPSK	н	3.37	260	1 / 0	13.60	5.05	18.65	38.45	-19.80
825.50	3	16-QAM	н	3.29	259	1 / 14	14.29	4.95	19.24	38.45	-19.21
836.50	3	16-QAM	н	3.36	253	1 / 0	14.22	5.00	19.22	38.45	-19.23
847.50	3	16-QAM	н	3.37	260	1 / 0	12.57	5.05	17.62	38.45	-20.83
826.50	5	QPSK	Н	3.33	266	1 / 24	15.43	4.95	20.38	38.45	-18.07
836.50	5	QPSK	н	3.33	266	1 / 0	15.31	5.00	20.31	38.45	-18.14
846.50	5	QPSK	н	3.34	262	1 / 0	14.00	5.04	19.04	38.45	-19.41
826.50	5	16-QAM	н	3.33	266	1 / 24	14.39	4.95	19.34	38.45	-19.11
836.50	5	16-QAM	н	3.33	266	1 / 0	14.25	5.00	19.25	38.45	-19.20
846.50	5	16-QAM	Н	3.34	262	1 / 0	12.74	5.04	17.78	38.45	-20.67
829.00	10	QPSK	Н	3.36	259	1 / 49	15.31	4.96	20.27	38.45	-18.18
836.50	10	QPSK	н	3.17	258	1/0	14.89	5.00	19.89	38.45	-18.56
844.00	10	QPSK	Н	3.19	268	1/0	14.79	5.03	19.82	38.45	-18.63
829.00	10	16-QAM	Н	3.36	259	1 / 49	14.07	4.96	19.03	38.45	-19.42
836.50	10	16-QAM	н	3.17	258	1/0	13.72	5.00	18.72	38.45	-19.73
844.00	10	16-QAM	н	3.19	268	1 / 0	13.66	5.03	18.69	38.45	-19.76

Table 7-3. ERP Data (Band 5)

FCC ID: ZNFK425	FCC Pt.	22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP Limit [dBm]	Margin [dB]
1710.70	1.4	QPSK	н	110	197	1 / 0	12.39	9.67	22.06	30.00	-7.94
1732.50	1.4	QPSK	н	110	197	1 / 0	13.02	9.53	22.55	30.00	-7.45
1754.30	1.4	QPSK	н	110	197	1/0	12.63	9.39	22.02	30.00	-7.98
1710.70	1.4	16-QAM	н	110	197	1/5	11.67	9.67	21.34	30.00	-8.66
1732.50	1.4	16-QAM	н	110	197	1 / 0	12.15	9.53	21.68	30.00	-8.32
1754.30	1.4	16-QAM	н	110	197	1/0	11.90	9.39	21.29	30.00	-8.71
1711.50	3	QPSK	н	110	197	1/0	12.45	9.67	22.12	30.00	-7.88
1732.50	3	QPSK	н	110	197	1/0	13.11	9.53	22.64	30.00	-7.36
1753.50	3	QPSK	н	110	197	1/0	12.83	9.40	22.23	30.00	-7.77
1711.50	3	16-QAM	н	110	197	1 / 0	11.70	9.67	21.37	30.00	-8.63
1732.50	3	16-QAM	н	110	197	1 / 0	12.32	9.53	21.85	30.00	-8.15
1753.50	3	16-QAM	н	110	197	1 / 0	11.85	9.40	21.25	30.00	-8.75
1712.50	5	QPSK	н	112	201	1 / 0	12.46	9.66	22.12	30.00	-7.88
1732.50	5	QPSK	н	112	201	1 / 0	12.89	9.53	22.42	30.00	-7.58
1752.50	5	QPSK	н	112	201	1 / 0	13.08	9.40	22.48	30.00	-7.52
1712.50	5	16-QAM	н	112	201	1 / 0	11.47	9.66	21.13	30.00	-8.87
1732.50	5	16-QAM	н	112	201	1 / 0	12.24	9.53	21.77	30.00	-8.23
1752.50	5	16-QAM	н	112	201	1 / 0	12.01	9.40	21.41	30.00	-8.59
1715.00	10	QPSK	н	114	272	1 / 0	14.06	9.64	23.70	30.00	-6.30
1732.50	10	QPSK	н	114	272	1 / 0	12.91	9.53	22.44	30.00	-7.56
1750.00	10	QPSK	н	114	272	1 / 0	13.85	9.42	23.27	30.00	-6.73
1715.00	10	16-QAM	н	114	272	1 / 0	13.19	9.64	22.83	30.00	-7.17
1732.50	10	16-QAM	н	114	272	1 / 0	12.37	9.53	21.90	30.00	-8.10
1750.00	10	16-QAM	н	114	272	1 / 0	13.61	9.42	23.03	30.00	-6.97
1717.50	15	QPSK	н	110	267	1 / 0	13.85	9.63	23.48	30.00	-6.52
1732.50	15	QPSK	н	110	267	1 / 74	14.15	9.53	23.68	30.00	-6.32
1747.50	15	QPSK	н	110	267	1 / 0	14.44	9.43	23.87	30.00	-6.13
1717.50	15	16-QAM	н	110	267	1 / 74	13.16	9.63	22.79	30.00	-7.21
1732.50	15	16-QAM	н	110	267	1 / 0	13.52	9.53	23.05	30.00	-6.95
1747.50	15	16-QAM	н	110	267	1/0	13.35	9.43	22.78	30.00	-7.22
1720.00	20	QPSK	н	221	173	1 / 99	13.69	9.61	23.30	30.00	-6.70
1732.50	20	QPSK	н	221	173	1 / 99	13.18	9.53	22.71	30.00	-7.29
1745.00	20	QPSK	н	221	173	1/0	13.80	9.45	23.25	30.00	-6.75
1720.00	20	16-QAM	н	221	173	1 / 99	12.87	9.61	22.48	30.00	-7.52
1732.50	20	16-QAM	н	221	173	1/0	12.73	9.53	22.26	30.00	-7.74
1745.00	20	16-QAM	н	221	173	1/0	13.19	9.45	22.64	30.00	-7.36

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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	246	289	1/5	12.58	9.21	21.79	33.01	-11.22
1880.00	1.4	QPSK	н	246	289	3/2	14.09	9.27	23.36	33.01	-9.65
1909.30	1.4	QPSK	н	246	289	1/5	13.56	9.36	22.92	33.01	-10.09
1850.70	1.4	16-QAM	н	246	289	1/5	11.94	9.21	21.15	33.01	-11.86
1880.00	1.4	16-QAM	н	246	289	1/5	13.13	9.27	22.40	33.01	-10.61
1909.30	1.4	16-QAM	н	246	289	1/5	13.04	9.36	22.40	33.01	-10.61
1851.50	3	QPSK	н	251	288	1 / 14	13.10	9.21	22.31	33.01	-10.70
1880.00	3	QPSK	н	251	288	1 / 14	14.15	9.27	23.42	33.01	-9.59
1908.50	3	QPSK	н	251	288	1 / 14	13.78	9.36	23.14	33.01	-9.87
1851.50	3	16-QAM	н	251	288	1 / 14	12.33	9.21	21.54	33.01	-11.47
1880.00	3	16-QAM	н	251	288	1 / 14	13.26	9.27	22.53	33.01	-10.48
1908.50	3	16-QAM	н	251	288	1 / 14	12.80	9.36	22.16	33.01	-10.85
1852.50	5	QPSK	н	250	274	1 / 24	12.32	9.22	21.54	33.01	-11.47
1880.00	5	QPSK	н	250	274	1 / 24	13.74	9.27	23.01	33.01	-10.00
1907.50	5	QPSK	н	250	274	1 / 24	13.47	9.35	22.82	33.01	-10.19
1852.50	5	16-QAM	н	250	274	1 / 0	12.22	9.22	21.44	33.01	-11.57
1880.00	5	16-QAM	н	250	274	1 / 24	12.64	9.27	21.91	33.01	-11.10
1907.50	5	16-QAM	н	250	274	1 / 24	12.61	9.35	21.96	33.01	-11.05
1855.00	10	QPSK	н	256	262	1 / 49	13.24	9.22	22.46	33.01	-10.55
1880.00	10	QPSK	н	256	262	1 / 49	13.36	9.27	22.63	33.01	-10.38
1905.00	10	QPSK	н	256	262	1 / 49	13.41	9.34	22.75	33.01	-10.26
1855.00	10	16-QAM	н	256	262	1 / 49	12.39	9.22	21.61	33.01	-11.40
1880.00	10	16-QAM	н	256	262	1 / 0	12.78	9.27	22.05	33.01	-10.96
1905.00	10	16-QAM	н	256	262	1 / 49	12.43	9.34	21.77	33.01	-11.24
1857.50	15	QPSK	н	247	126	1 / 74	13.18	9.23	22.41	33.01	-10.60
1880.00	15	QPSK	н	247	126	1 / 74	12.94	9.27	22.21	33.01	-10.80
1902.50	15	QPSK	н	247	126	1 / 74	11.77	9.33	21.10	33.01	-11.91
1857.50	15	16-QAM	н	247	126	1 / 74	12.44	9.23	21.67	33.01	-11.34
1880.00	15	16-QAM	н	247	126	1 / 74	11.87	9.27	21.14	33.01	-11.87
1902.50	15	16-QAM	н	247	126	1 / 74	11.14	9.33	20.47	33.01	-12.54
1860.00	20	QPSK	н	261	246	1 / 99	13.10	9.23	22.33	33.01	-10.68
1880.00	20	QPSK	н	261	246	1/0	12.78	9.27	22.05	33.01	-10.96
1900.00	20	QPSK	н	261	246	1 / 99	11.64	9.31	20.95	33.01	-12.06
1860.00	20	16-QAM	н	261	246	1 / 99	12.20	9.23	21.43	33.01	-11.58
1880.00	20	16-QAM	н	261	246	1/0	12.12	9.27	21.39	33.01	-11.62
1900.00	20	16-QAM	н	261	246	1 / 99	10.62	9.31	19.93	33.01	-13.08

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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 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-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 x span / RBW
- 5. Detector = Peak
- 6. Trace mode = max hold
- 7. The trace was allowed to stabilize

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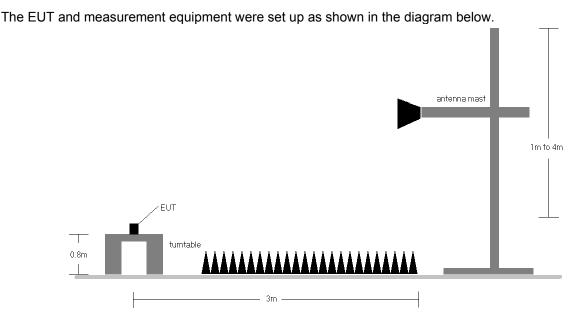


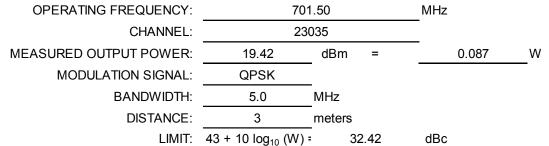
Figure 7-7. Test Instrument & Measurement Setup

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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Frequency [MHz]	Ant. Pol. [H/V]	Height	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1403.00	Н	-	-	-56.62	2.43	-54.19	73.6
2104.50	Н	-	-	-54.71	2.95	-51.76	71.2

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

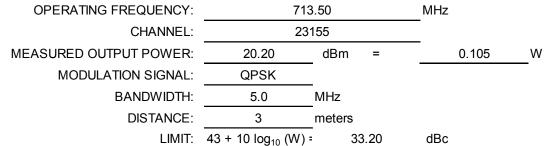
OPERATING FREQUENCY:	707	.50	MHz
CHANNEL:	230)95	
MEASURED OUTPUT POWER:	19.84	dBm =	0.096 W
MODULATION SIGNAL:	QPSK		
BANDWIDTH:	5.0	MHz	
DISTANCE:	3	meters	
LIMIT:	43 + 10 log ₁₀ (W) =	32.84	dBc

Frequency [MHz]	Ant. Pol. [H/V]	Height	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1415.00	Н	-	-	-56.43	2.59	-53.85	73.7
2122.50	Н	-	-	-53.98	3.02	-50.97	70.8

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

FCC ID: ZNFK425	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]
1427.00	Н	-	-	-56.86	2.74	-54.12	74.3
2140.50	Н	-	-	-54.20	3.08	-51.12	71.3

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

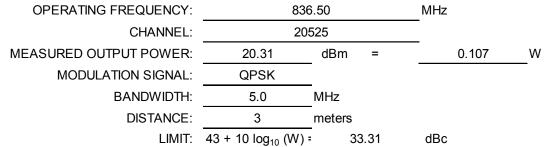
OPERATING FREQUENCY:	826	6.50	MHz
CHANNEL:	204	425	
MEASURED OUTPUT POWER:	20.38	dBm =	0.109 W
MODULATION SIGNAL:	QPSK	_	
BANDWIDTH:	5.0	MHz	
DISTANCE:	3	meters	
LIMIT:	43 + 10 log ₁₀ (W) =	33.38	dBc

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]
1653.00	Н	-	-	-59.17	3.60	-55.57	76.0
2479.50	Н	-	-	-56.30	3.57	-52.73	73.1
3306.00	Н	-	-	-57.18	5.68	-51.50	71.9

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

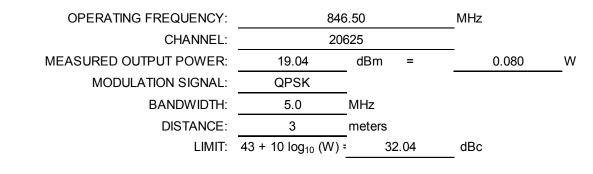
FCC ID: ZNFK425	FCC Pt. :	22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager		
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Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1673.00	Н	-	-	-58.18	3.53	-54.65	75.0
2509.50	Н	-	-	-55.65	3.57	-52.08	72.4
3346.00	Н	-	-	-57.30	5.78	-51.52	71.8

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

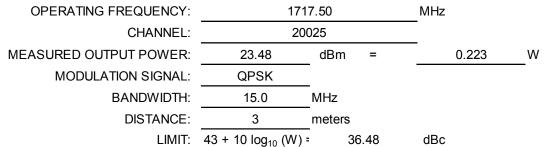


Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1693.00	Н	-	-	-59.27	3.46	-55.81	74.9
2539.50	Н	-	-	-56.70	3.63	-53.07	72.1
3386.00	Н	-	-	-57.29	5.89	-51.40	70.4

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

FCC ID: ZNFK425	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]
3435.00	Н	204	172	-54.05	8.20	-45.85	69.3
5152.50	Н	174	186	-43.40	10.30	-33.10	56.6
6870.00	Н	149	21	-44.81	11.43	-33.38	56.9
8587.50	Н	169	236	-51.08	13.03	-38.05	61.5
10305.00	Н	141	214	-47.14	13.24	-33.91	57.4
12022.50	Н	-	-	-51.18	13.12	-38.07	61.5

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

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

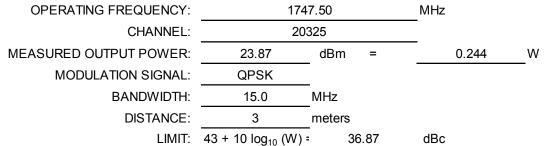
1732.50 MHz 20175 dBm 0.233 23.68 = W QPSK 15.0 MHz 3 meters LIMIT: 43 + 10 log₁₀ (W) = 36.68 dBc

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]
3465.00	Н	224	157	-53.00	8.29	-44.72	68.4
5197.50	Н	158	200	-41.61	10.35	-31.26	54.9
6930.00	Н	158	29	-42.83	11.49	-31.35	55.0
8662.50	Н	152	219	-50.11	13.02	-37.09	60.8
10395.00	Н	152	198	-46.36	13.16	-33.20	56.9
12127.50	Н	-	-	-49.34	13.10	-36.23	59.9

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

FCC ID: ZNFK425	FCC Pt	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		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]
3495.00	Н	229	143	-53.28	8.37	-44.91	68.8
5242.50	Н	178	181	-42.06	10.35	-31.71	55.6
6990.00	Н	175	44	-44.82	11.53	-33.28	57.2
8737.50	Н	145	219	-52.29	13.02	-39.27	63.1
10485.00	Н	151	184	-48.26	13.05	-35.21	59.1
12232.50	Н	-	-	-50.32	13.14	-37.18	61.1

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

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

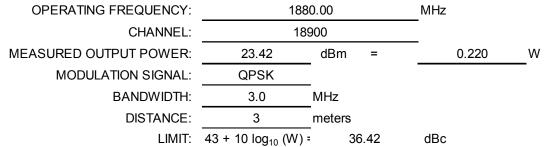
1851.50 MHz 18615 22.31 dBm = 0.170 W QPSK 3.0 MHz 3 meters LIMIT: 43 + 10 log₁₀ (W) = 35.31 dBc

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	216	327	-49.38	8.40	-40.99	63.3
5554.50	Н	112	325	-42.06	10.57	-31.49	53.8
7406.00	Н	103	238	-37.89	12.06	-25.83	48.1
9257.50	Н	113	25	-46.69	13.22	-33.48	55.8
11109.00	Н	113	256	-41.40	13.25	-28.15	50.5

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

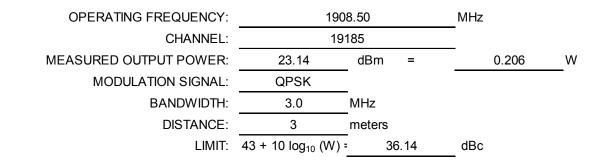
FCC ID: ZNFK425	FCC Pt.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3760.00	Н	206	321	-48.16	8.38	-39.77	63.2
5640.00	Н	110	320	-42.00	10.70	-31.30	54.7
7520.00	Н	108	233	-38.73	12.10	-26.62	50.0
9400.00	Н	106	38	-49.33	13.19	-36.14	59.6
11280.00	Н	110	269	-44.00	13.31	-30.69	54.1

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



Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3817.00	Н	215	322	-48.13	8.40	-39.74	62.9
5725.50	Н	114	329	-42.47	10.76	-31.71	54.9
7634.00	Н	111	242	-39.51	12.21	-27.30	50.4
9542.50	Н	111	35	-46.11	13.19	-32.93	56.1
11451.00	Н	95	265	-42.08	13.33	-28.75	51.9

Table 7-17. Radiated Spurious Data (Band 2 – 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-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 $\pm 0.00025\%$ (± 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

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Band 12 Frequency Stability Measurements §2.1055 §27.54

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

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	707,500,114	114	0.0000161
100 %		- 30	707,499,913	-87	-0.0000123
100 %		- 20	707,500,119	119	0.0000168
100 %		- 10	707,500,149	149	0.0000211
100 %		0	707,500,023	23	0.0000033
100 %		+ 10	707,500,016	16	0.0000023
100 %		+ 20	707,500,030	30	0.0000042
100 %		+ 30	707,499,891	-109	-0.0000154
100 %		+ 40	707,500,054	54	0.0000076
100 %		+ 50	707,500,107	107	0.0000151
BATT. ENDPOINT	3.40	+ 20	707,499,914	-86	-0.0000122

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

Note:

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

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Band 12 Frequency Stability Measurements §2.1055 §27.54

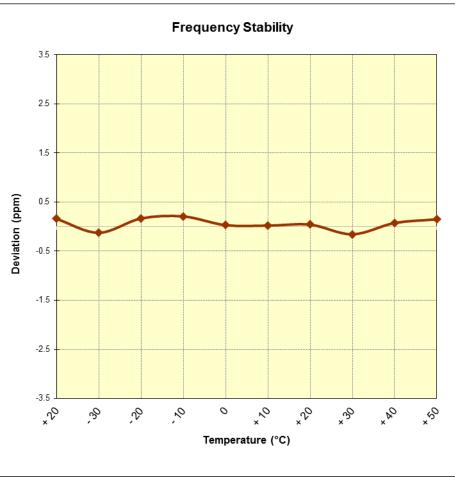


Figure 7-8. Frequency Stability Graph (Band 12)

FCC ID: ZNFK425	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:	3.80	VDC
DEVIATION LIMIT:	± 0.00025 % or 2.5 ppm	_

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	836,499,906	-94	-0.0000112
100 %		- 30	836,499,996	-4	-0.0000005
100 %		- 20	836,500,025	25	0.0000030
100 %		- 10	836,499,512	-488	-0.0000583
100 %		0	836,499,844	-156	-0.0000186
100 %		+ 10	836,500,129	129	0.0000154
100 %		+ 20	836,500,013	13	0.0000016
100 %		+ 30	836,499,972	-28	-0.0000033
100 %		+ 40	836,499,710	-290	-0.0000347
100 %		+ 50	836,499,866	-134	-0.0000160
BATT. ENDPOINT	3.40	+ 20	836,500,006	6	0.0000007

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

FCC ID: ZNFK425	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

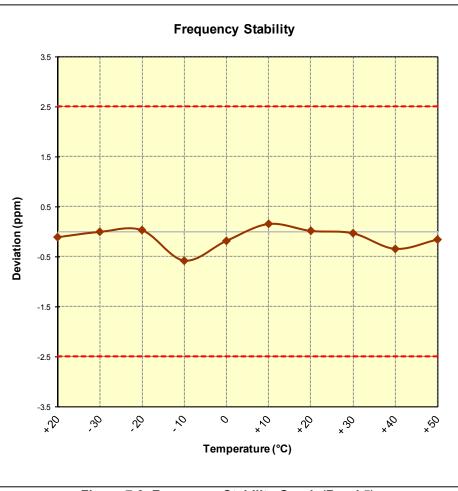


Figure 7-9. Frequency Stability Graph (Band 5)

FCC ID: ZNFK425	FCC Pt.	22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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Band 4 Frequency Stability Measurements §2.1055 §§27.54

OPERATING FREQUENCY:	1,732,500,000	Hz
CHANNEL:	20175	
REFERENCE VOLTAGE:	3.8	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	1,732,499,951	-49	-0.0000028
100 %		- 30	1,732,499,862	-138	-0.0000080
100 %		- 20	1,732,499,956	-44	-0.0000025
100 %		- 10	1,732,499,865	-135	-0.0000078
100 %		0	1,732,499,895	-105	-0.0000061
100 %		+ 10	1,732,500,025	25	0.0000014
100 %		+ 20	1,732,500,105	105	0.0000061
100 %		+ 30	1,732,500,145	145	0.0000084
100 %		+ 40	1,732,500,030	30	0.0000017
100 %		+ 50	1,732,499,977	-23	-0.0000013
BATT. ENDPOINT	3.40	+ 20	1,732,499,968	-32	-0.0000018

 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.

FCC ID: ZNFK425	FCC Pt.	22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dego 119 of 100
0Y1604040679.ZNF	2/3-3/30/2016, 4/5/2016, 4/20/2016	Portable Handset		Page 118 of 122
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Band 4 Frequency Stability Measurements §2.1055 §§27.54

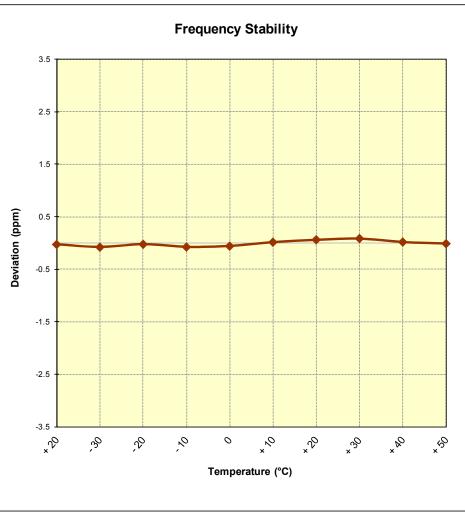


Figure 7-10. Frequency Stability Graph (Band 4)

FCC ID: ZNFK425	FCC Pt.	22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dego 110 of 100
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Band 2 Frequency Stability Measurements §2.1055 §24.235

OPERATING FREQUENCY:	1,880,000,000	Hz
CHANNEL:	18900	-
REFERENCE VOLTAGE:	3.8	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	1,880,000,129	129	0.0000069
100 %		- 30	1,879,999,938	-62	-0.0000033
100 %		- 20	1,879,999,878	-122	-0.0000065
100 %		- 10	1,880,000,134	134	0.0000071
100 %		0	1,880,000,129	129	0.0000069
100 %		+ 10	1,880,000,103	103	0.0000055
100 %		+ 20	1,879,999,976	-24	-0.0000013
100 %		+ 30	1,879,999,873	-127	-0.0000068
100 %		+ 40	1,879,999,859	-141	-0.0000075
100 %		+ 50	1,879,999,959	-41	-0.0000022
BATT. ENDPOINT	3.40	+ 20	1,880,000,095	95	0.0000051

 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.

FCC ID: ZNFK425	FCC Pt.	22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Reviewed by: Quality Manager
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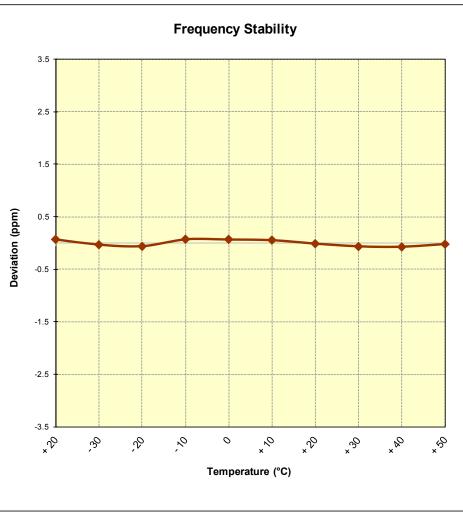


Figure 7-11. Frequency Stability Graph (Band 2)

FCC ID: ZNFK425	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 **LG Portable Handset FCC ID: ZNFK425** complies with all the requirements of Parts 22, 24, & 27 of the FCC rules for LTE operation only.

FCC ID: ZNFK425	FCC Pt.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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