

7.4 Band Edge Emissions at Antenna Terminal §2.1051 §22.917(a) §24.238(a) §27.53(c) §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 v01r02 - 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 \geq 1% of the emission bandwidth
- 4. VBW \geq 3 x RBW
- 5. Detector = RMS
- 6. Number of sweep points \geq 2 x 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.

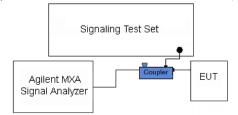


Figure 7-3. Test Instrument & Measurement Setup

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

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



Plot 7-67. Lower Band Edge Plot (Band 13 – 5.0MHz QPSK – RB Size 25)



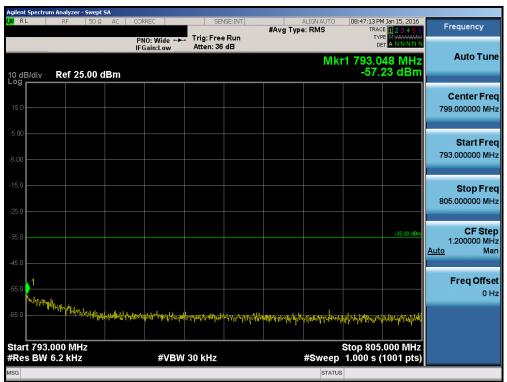
Plot 7-68. Lower Emission Mask Edge Plot (Band 13 – 5.0MHz QPSK – RB Size 25)

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Plot 7-69. Upper Band Edge Plot (Band 13 – 5.0MHz QPSK – RB Size 25)



Plot 7-70. Upper Emission Mask Edge Plot (Band 13 – 5.0MHz QPSK – RB Size 25)

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Plot 7-71. Lower Band Edge Plot (Band 13 – 10.0MHz QPSK – RB Size 50)



Plot 7-72. Lower Emission Mask Edge Plot (Band 13 – 10.0MHz QPSK – RB Size 50)

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Plot 7-73. Upper Band Edge Plot (Band 13 – 10.0MHz QPSK – RB Size 50)



Plot 7-74. Upper Emission Mask Edge Plot (Band 13 – 10.0MHz QPSK – RB Size 50)

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Plot 7-75. Lower Band Edge Plot (Band 5 – 1.4MHz QPSK – RB Size 6)



Plot 7-76. Upper Band Edge Plot (Band 5 – 1.4MHz QPSK – RB Size 6)

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	um Analyzer - Swept SA					
LX/RL	RF 50Ω AC	CORREC	SENSE:INT	ALIGNAUTO #Avg Type: RMS	02:10:02 PM Jan 29, 2016 TRACE 1 2 3 4 5 6	Frequency
		PNO: Wide գ IFGain:Low	Trig: Free Run Atten: 36 dB	Mk	DET A N N N N N	Auto Tune
10 dB/div Log	Ref 25.00 dBm				r1 824.000 MHz -20.54 dBm	
15.0						Center Freq 824.000000 MHz
5.00						
-5.00						Start Freq 822.000000 MHz
-15.0			1		-13.00 dBm	Stop Freq
-25.0						826.000000 MHz
-35.0		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~~			CF Step 400.000 kHz
-45.0						Auto Man
-55.0						Freq Offset
-65.0						0112
Contor Of					Spop 4 000 Mile	
#Res BW	24.000 MHz ' 100 kHz	#VBW	300 kHz	Sweep 1	Span 4.000 MHz .000 ms (1001 pts)	
MSG				STATUS	3	

Plot 7-77. Lower Band Edge Plot (Band 5 – 3.0MHz QPSK – RB Size 15)



Plot 7-78. Upper Band Edge Plot (Band 5 – 3.0MHz QPSK – RB Size 15)

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Plot 7-79. Lower Band Edge Plot (Band 5 – 5.0MHz QPSK – RB Size 25)



Plot 7-80. Upper Band Edge Plot (Band 5 – 5.0MHz QPSK – RB Size 25)

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Plot 7-81. Lower Band Edge Plot (Band 5 – 10.0MHz QPSK – RB Size 50)



Plot 7-82. Upper Band Edge Plot (Band 5 – 10.0MHz QPSK – RB Size 50)

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Plot 7-83. Lower Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 6)



Plot 7-84. Lower Extended Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 6)

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Plot 7-85. Upper Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 6)



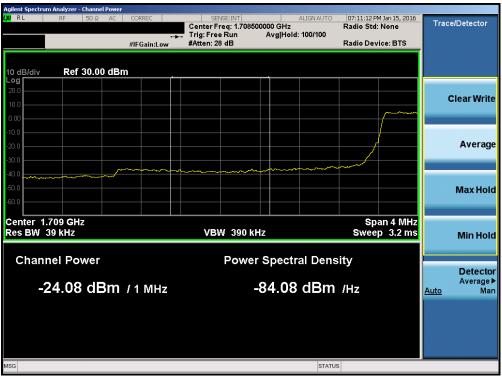
Plot 7-86. Upper Extended Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 6)

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Plot 7-87. Lower Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)



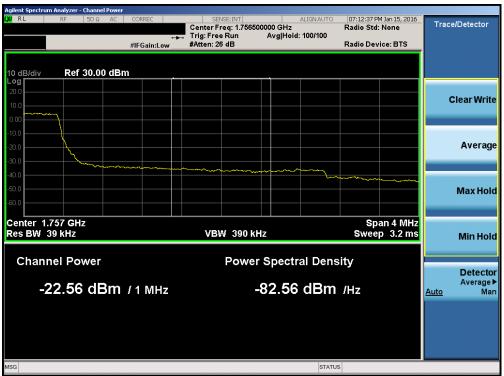
Plot 7-88. Lower Extended Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)

FCC ID: ZNFVS425		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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		m Analyzer - Sv									
l xi R	L	RF	50Ω AC	CORREC	SEM	ISE:INT	#Avg Typ	ALIGNAUTO		4 Jan 15, 2016 E 1 2 3 4 5 6	Frequency
				PNO: Wide 😱 IFGain:Low	Trig: Free Atten: 36		ming typ		TYF De		
10 di Log	B/div	Ref 25.0	0 dBm					Mkr1	1.755 0 -27.9	00 GHz 91 dBm	Auto Tune
15.0											Center Freq 1.755000000 GHz
5.00 -5.00	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~~~	~~~~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~						-13.00 dBm	Start Freq 1.753000000 GHz
-15.0 -25.0						1				-13.00 dBm	Stop Freq 1.757000000 GHz
-35.0						h	mon	hormon	m	warm	CF Step 400.000 kHz <u>Auto</u> Man
-45.0 -55.0											Freq Offset 0 Hz
-65.0											
		755000 G 30 kHz	Hz	#VBW	91 kHz			Sweep 5	Span 4 .533 ms (.000 MHz 1001 pts)	
MSG								STATUS	;		

Plot 7-89. Upper Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)



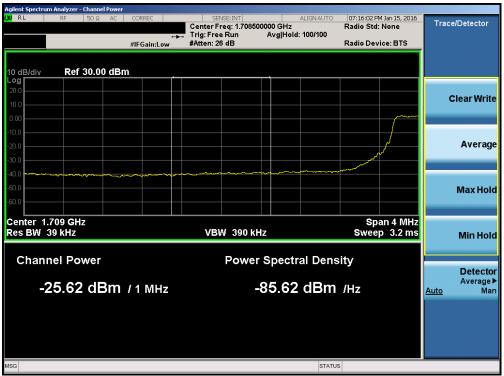
Plot 7-90. Upper Extended Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)

FCC ID: ZNFVS425		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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Plot 7-91. Lower Band Edge Plot (Band 4 – 5.0MHz QPSK – RB Size 25)



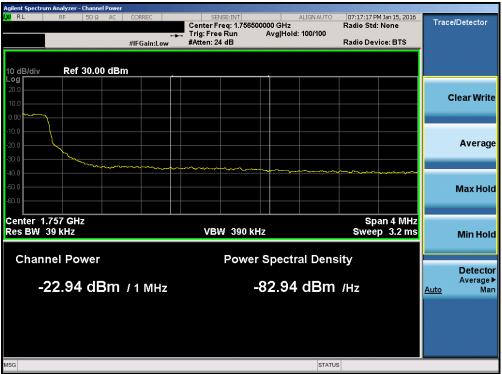
Plot 7-92. Lower Extended Band Edge Plot (Band 4 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFVS425		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 4 – 5.0MHz QPSK – RB Size 25)



Plot 7-94. Upper Extended Band Edge Plot (Band 4 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFVS425		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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Plot 7-95. Lower Band Edge Plot (Band 4 – 10.0MHz QPSK – RB Size 50)

Agilent Spectru		Swept SA									
L <mark>XI</mark> RL	RF	50 Ω AC	CORREC		SE:INT	#Avg Typ	ALIGNAUTO e: RMS	TRACI	Jan 15, 2016	Fre	quency
			PNO: Fast ↔ IFGain:Low	Atten: 36							Auto Tune
10 dB/div Log	Ref 25.	00 dBm					Mkr1	1.708 9 -25.0	92 GHz)9 dBm		Auto Tune
											enter Freq
15.0										1.707	000000 GHz
5.00											Start Freq
-5.00										1.705	000000 GHz
-15.0									-13.00 dBm		Stop Freq
									1	1.709	000000 GHz
-25.0	uningen gangen ge	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	and the advertision	๛แหละสะบุ๛รรรงจะค	ก _า ยและสาวการการป	vletownersange	he for a law to go and a	-	and and a start and a start and a start		CF Step
-35.0										Auto	400.000 kHz Man
-45.0										Auto	IVICIT
-55.0										F	req Offset 0 Hz
-65.0											0 112
0.0310											
Center 1. #Res BW			#\/B)	N 3.0 MHz			Sween_1	Span 4. .000 ms (′	000 MHz		
#RES DW			#VD	9.0 WINZ			Sweep		roo r pis)		

Plot 7-96. Lower Extended Band Edge Plot (Band 4 – 10.0MHz QPSK – RB Size 50)

FCC ID: ZNFVS425		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 4 – 10.0MHz QPSK – RB Size 50)

	m Analyzer - Sw										
LX/ RL	RF 5	ΟΩ AC	CORREC PNO: Fast ↔	SENSE		#Avg Type	ALIGNAUTO E: RMS	TRAC	1 Jan 15, 2016 E <mark>1 2 3 4 5 6</mark> E A WWWWW	Fre	quency
10 dB/div Log	Ref 25.0	0 dBm	PNU: Fast 🕶 IFGain:Low	Atten: 36 dE			Mkr1	DE 1.756 0	ANNNN		Auto Tune
15.0											enter Freq 000000 GHz
-5.00									-13.00 dBm		Start Freq 000000 GHz
-15.0	Madapart (M	hybringen	Hram Majora Jana Ja		Aggett And Stone	ለቀቅየፈንግረት ሲካል	ang tar they do a subscript of the	of and my the magnetic	material	1.760	Stop Freq 000000 GHz
-35.0										<u>Auto</u>	CF Step 400.000 kHz Mar
-55.0										F	r eq Offse 0 Hz
	758000 GI	lz						Span 4	.000 MHz		
#Res BW	1.0 MHz		#VBV	V 3.0 MHz			Sweep 1	.000 ms (1001 pts)		

Plot 7-98. Upper Extended Band Edge Plot (Band 4 – 10.0MHz QPSK – RB Size 50)

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Plot 7-99. Lower Band Edge Plot (Band 4 – 15.0MHz QPSK – RB Size 75)

	Spectrum Analyzer	- Swept SA									
L XI RL	RF	50Ω AC	CORREC		Bun	#Avg Typ	ALIGNAUTO e: RMS	TRAC	I Jan 15, 2016 E 1 2 3 4 5 6 E A WATAWATA	Fr	equency
			IFGain:Low	Atten: 36			Mkr1	1.708 9	88 GHz		Auto Tune
10 dBi Log n	/div Ref 2	5.00 dBm						-28.0	60 dBm		
15.0 -											enter Freq 000000 GHz
5.00 - -5.00 -										1.705	Start Freq 6000000 GHz
-15.0 -									-13.00 dBm	1.709	Stop Freq 0000000 GHz
-35.0 -	- Yon-2007-4000-400-400-400	****	eynsstafenderhynnylandfor	prestante southing	n, napata kan kan kan kan kan kan kan kan kan ka	Lee Berlymfren March	A. 9449984 (1499994449944	gen frikkskonpissone		<u>Auto</u>	CF Step 400.000 kHz Man
-45.0 -										F	F req Offset 0 Hz
-65.0 -											
	er 1.707000 BW 1.0 MH		#VBW	3.0 MHz			Sweep 1	Span 4. .000 ms (*	000 MHz 1001 pts)		
MSG							STATUS	6			

Plot 7-100. Lower Extended Band Edge Plot (Band 4 – 15.0MHz QPSK – RB Size 75)

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Plot 7-101. Upper Band Edge Plot (Band 4 – 15.0MHz QPSK – RB Size 75)

	ım Analyzer - Swept SA											
X/RL	RF 50 Ω	AC	CORREC		Trig: Fre		#Avg Ty	ALIGNAUTO pe: RMS	TRAC	4 Jan 15, 2016 E <mark>1 2 3 4 5 6</mark>	Fr	equency
			PNO: Fa	ast ⊶⊷ .ow	Atten: 30							
10 dB/div Log	Ref 25.00 dE	3m						Mkr1	1.756 0 -23.	72 GHz 77 dBm		Auto Tune
											c	enter Freq
15.0											1.758	3000000 GHz
5.00												Start Fred
-5.00											1.75	5000000 GHz
15.0										-13.00 dBm		04 a
♦ ¹											1.760	Stop Fred
25.0 1	ana ang ang ang ang ang ang ang ang ang	حل والاغذ وحري			run and an	and and an and a second se	an the source of	angoldheatasoloranganan	and the second states	੶ ⅃ ՠֈ֎ֈՠֈՠՠֈ _ՠ ՠֈ		05.04
35.0											Auto	CF Step 400.000 kHz Mar
45.0											Auto	Widi
-55.0											I	Freq Offset
cc 0												JH
-65.0												
Center 1. #Res BW	758000 GHz				3.0 MHz			Sweep 1	Span 4	.000 MHz		
			#	PAIDAN	3.0 MH2			Sweep 1		TOOT PLS)		

Plot 7-102. Upper Extended Band Edge Plot (Band 4 – 15.0MHz QPSK – RB Size 75)

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		n Analyzer - Sw									
l <mark>,XI</mark> R	L	RF 5	OΩ AC	CORREC	SENSE	INT	#Avg Type	ALIGN AUTO e: RMS	TRAC	4 Jan 15, 2016 E <mark>1 2 3 4 5 6</mark>	Frequency
				PNO: Fast 🗣 IFGain:Low	Trig: Free R Atten: 36 dE	un 3		Mkr1	1.709 9		Auto Tune
10 di Log	B/div	Ref 25.0	0 dBm						-34.	50 dBm	
15.0											Center Freq 1.710000000 GHz
						for the second s	mytre more		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	A Mangaron and Managoro	Start Freq 1.702000000 GHz
										-13.00 dBm	Stop Freq 1.718000000 GHz
-35.0	V	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	-	wwwwww	har on any million	"N					CF Step 1.600000 MHz <u>Auto</u> Man
											Freq Offset 0 Hz
		10000 GI 200 kHz	lz	#VBN	/ 620 kHz			Sweep 1	Span 1 .000 ms (6.00 MHz 1001 pts)	
MSG								STATUS			
		-+ 7 40		David F	alas Dist	(D	-1.4	0.08411-			100)

Plot 7-103. Lower Band Edge Plot (Band 4 – 20.0MHz QPSK – RB Size 100)

Agilent Spectru										
(XVI RL	RF	50Ω AC	CORREC			#Avg Ty	ALIGNAUTO	TYPE	123456 A WARAAAAAA	Frequency
10 dB/div	Ref 25	.00 dBm	PNO: Fas IFGain:Lo				Mkr1	DET	ANNNNN	Auto Tune
15.0										Center Freq 1.707000000 GHz
-5.00									-13.00 dBm	Start Freq 1.705000000 GHz
-15.0						1				Stop Freq 1.709000000 GHz
-35.0	Jan Part and Part of the second se	1944 January 1994 1996	Neeraan							CF Step 400.000 kHz <u>Auto</u> Man
-55.0										Freq Offset 0 Hz
-65.0 Center 1.				(B)((2 0 MH			Europa d	Span 4.0	000 MHz	
#Res BW			#1	/BW 3.0 MH	2		Sweep	.000 ms (1	oor pis)	

Plot 7-104. Lower Extended Band Edge Plot (Band 4 – 20.0MHz QPSK – RB Size 100)

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Plot 7-105. Upper Band Edge Plot (Band 4 – 20.0MHz QPSK – RB Size 100)

PN0: Fast Trig: Free Run Rtten: 36 dB #Avg Type: RMS Trace 2.3.4 50 (FRACE Frequency Mkr1 1.756 024 GHz Mkr1 1.756 024 GHz Auto Tune 10 dB/div Ref 25.00 dBm -24.79 dBm Center Freq 150 Image: Start Freq Image: Start Freq Image: Start Freq 500 Image: Start Freq Image: Start Freq Image: Start Freq 500 Image: Start Freq Image: Start Freq Image: Start Freq 500 Image: Start Freq Image: Start Freq Image: Start Freq 500 Image: Start Freq Image: Start Freq Image: Start Freq 500 Image: Start Freq Image: Start Freq Image: Start Freq 150 Image: Start Freq Image: Start Freq Image: Start Freq 150 Image: Start Freq Image: Start Freq Image: Start Freq 150 Image: Start Freq Image: Start Freq Image: Start Freq 150 Image: Start Freq Image: Start Freq Image: Start Freq 150 Image: Start Freq Image: Start Freq Image: Start Freq 150 Image: Start Freq Image: Start Freq		ım Analyzer - Sı									
Internation Atten: 36 dB Det ANNUM Mkr1 1.756 024 GHz -24.79 dBm Atto Tune 10 dB/div Ref 25.00 dBm -24.79 dBm 150 -24.79 dBm	L XI RL	RF	50Ω AC	CORREC				ALIGNAUTO e: RMS	TRACE	123456 A WARAWAY	Frequency
150 Center Freq 150 Start Freq 500	10 dB/div	Ref 25.0	00 dBm					Mkr1	1.756 0	24 GHz	Auto Tune
Start Freq Start Freq 1.75600000 GHz Start Freq 1.75600000 GHz Start Freq 1.75600000 GHz Center 1.758000 GHz #VBW 3.0 MHz WBW 3.0 MHz Sweep 1.000 ms (1001 pts)	15.0										
1100 1	-5.00									40.00 /5-	
3300 3300 3300 400,000 kHz 450 400,000 kHz 400,000 kHz 550 550 550 650 100 100 650 100 100 650 100 100 650 100 100 650 100 100 650 100 100 650 100 100 650 100 100 650 100 100 650 100 100 650 100 100 650 100 100 650 100 100 650 100 100 650 100 100 650 100 100 650 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100	-15.0 -25.0	And the second	and a second second	لى مەرەپىرىكى بىرىكى	Viliango-ganilation	~~~~	April francestration	Save Berther South	າວງາມັງການສາຍເຫຼັງແມ່ນສູມກູມັງ		
-550 -550	-35.0										400.000 kH
Center 1.758000 GHz Span 4.000 MHz #Res BW 1.0 MHz #VBW 3.0 MHz Sweep 1.000 ms (1001 pts)	-55.0										
			Hz						Span 4.	000 MHz	
		1.0 MHz		#VBW	3.0 MHz					1001 pts)	

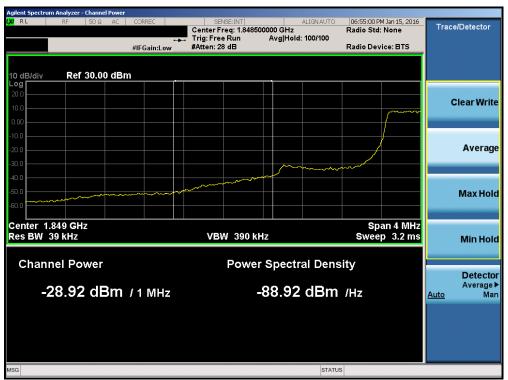
Plot 7-106. Upper Extended Band Edge Plot (Band 4 – 20.0MHz QPSK – RB Size 100)

FCC ID: ZNFVS425		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
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Plot 7-107. Lower Band Edge Plot (Band 2 – 1.4MHz QPSK – RB Size 6)



Plot 7-108. Lower Extended Band Edge Plot (Band 2 – 1.4MHz QPSK – RB Size 6)

FCC ID: ZNFVS425		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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Plot 7-109. Upper Band Edge Plot (Band 2 – 1.4MHz QPSK – RB Size 6)



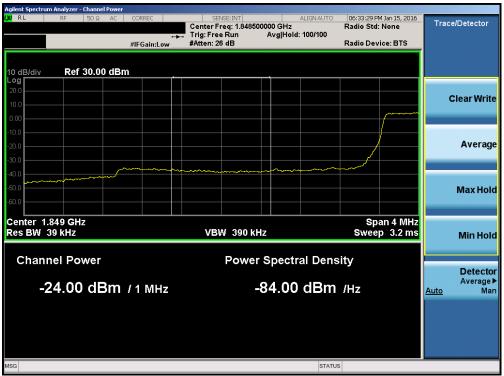
Plot 7-110. Upper Extended Band Edge Plot (Band 2 – 1.4MHz QPSK – RB Size 6)

FCC ID: ZNFVS425		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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Plot 7-111. Lower Band Edge Plot (Band 2 – 3.0MHz QPSK – RB Size 15)



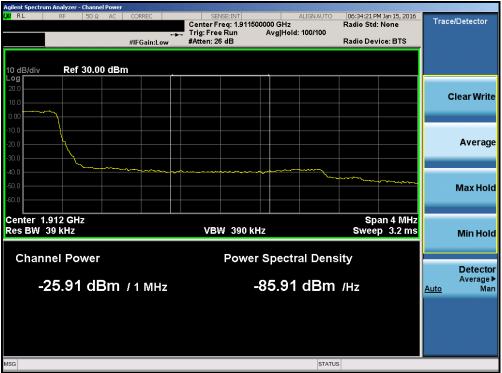
Plot 7-112. Lower Extended Band Edge Plot (Band 2 – 3.0MHz QPSK – RB Size 15)

FCC ID: ZNFVS425		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
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Plot 7-113. Upper Band Edge Plot (Band 2 – 3.0MHz QPSK – RB Size 15)



Plot 7-114. Upper Extended Band Edge Plot (Band 2 – 3.0MHz QPSK – RB Size 15)

FCC ID: ZNFVS425		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	💽 LG	Reviewed by: Quality Manager
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Plot 7-115. Lower Band Edge Plot (Band 2 – 5.0MHz QPSK – RB Size 25)



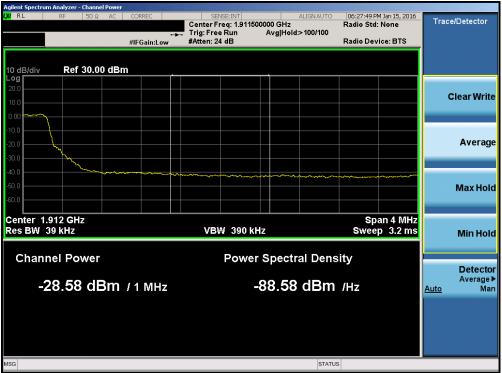
Plot 7-116. Lower Extended Band Edge Plot (Band 2 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFVS425		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	💽 LG	Reviewed by: Quality Manager
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Plot 7-117. Upper Band Edge Plot (Band 2 – 5.0MHz QPSK – RB Size 25)



Plot 7-118. Upper Extended Band Edge Plot (Band 2 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFVS425		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dece 74 of 110
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	m Analyzer - Swept SA				1		
LXI RL	RF 50Ω AC	CORREC	SENSE:INT	ALIGN/ #Avg Type: RM		4 Jan 15, 2016 E 1 2 3 4 5 6 PE A WWWWW	Frequency
		PNO: Wide 🆵 IFGain:Low	Trig: Free Run Atten: 36 dB		DE	TANNNN	Auto Tune
10 dB/div Log	Ref 25.00 dBm				1kr1 1.850 0 -31.6:	22 dBm	
15.0							Center Freq 1.85000000 GHz
-5.00				~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		~~~~	Start Freq 1.846000000 GHz
-15.0			1.			-13.00 dBm	Stop Freq 1.854000000 GHz
-35.0		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~~				CF Step 800.000 kHz <u>Auto</u> Man
-45.0							Freq Offset 0 Hz
-65.0							
Center 1. #Res BW	850000 GHz 100 kHz	#VBW	300 kHz	Swe	Span 8 ep 1.000 ms (.000 MHz 1001 pts)	
MSG					STATUS		

Plot 7-119. Lower Band Edge Plot (Band 2 – 10.0MHz QPSK – RB Size 50)

Agilent Spectru		wept SA									
LX/RL	RF !	50Ω AC	CORREC	SEN	ISE:INT	#Avg Typ	ALIGNAUTO e: RMS	TRAC	1 Jan 15, 2016 E 1 2 3 4 5 6	Fr	equency
			PNO: Fast +++	Trig: Free Atten: 36				TYF	E A WARAWAY T A N N N N N		
			II Gam.cow				Mkr1	1.849 0	00 GHz		Auto Tune
10 dB/div Log	Ref 25.0	00 dBm						-23.	34 dBm		
										C	Center Freq
15.0											7000000 GHz
5.00											
5.00											Start Freq
-5.00										1.84	5000000 GHz
									-13.00 dBm		
-15.0									1,		Stop Freq
-25.0									the strength of the	1.84	9000000 GHz
	******	had and a second for the second second	alad an	an a	بمريساتين مريمهم	the way to be	une of the out of the part of the the	and the second sec			
-35.0											CF Step 400.000 kHz
45.0										<u>Auto</u>	Man
-45.0											
-55.0											Freq Offset 0 Hz
											0 H2
-65.0											
Center 1.		Hz	#\/B\M	3.0 MHz			Sween 1	Span 4	.000 MHz		
	1.0 10112		#9099	5.0 19112			status	-	roor pts)		
#Res BW	1.0 MHz		#VBW	3.0 MHz				.000 ms (1001 pts)		

Plot 7-120. Lower Extended Band Edge Plot (Band 2 – 10.0MHz QPSK – RB Size 50)

FCC ID: ZNFVS425		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager					
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PNO: WideTrig: Free Run Atten: 36 dB Trig: Free Run Atten: 36 dB Trig: Free Run Atten: 36 dB Mkr1 1.910 000 GHz 10 dB/dlv Ref 25.00 dBm		ectrum Analyzer - Swept SA								
PR0: Wide Trig: Free Run Atten: 36 dB Mkr1 1.910 000 GHz Auto Tune 10 dB/div Ref 25.00 dBm -34.36 dBm Center Free 150 -34.36 dBm -34.36 dBm 1.91000000 GHz 500 -300 dBm -300 dBm -34.36 dBm 500 -300 dBm -300 dBm -300 dBm -34.36 dBm 500 -300 dBm -300 dBm -300 dBm -300 dBm 500 -300 dBm -300 dBm -300 dBm -300 dBm -500 -300 dBm -300 dBm -300 dBm -300 dBm -500 -300 dBm -300 dBm -300 dBm -300 dBm -500 -300 dBm -300 dBm -300 dBm -300 dBm -500 -300 dBm -300 dBm -300 dBm -300 dBm -500 -300 dBm -300 dBm -300 dBm -300 dBm -300 dBm -500 -300 dBm -300 dBm -300 dBm -300 dBm -300 dBm -300 dBm -500 -300 dBm -300 dBm -300 dBm -300 dBm -300 dBm -300 dBm -500 -300 dBm <t< td=""><td>(XI) RL</td><td>RF 50 Ω AC</td><td>CORREC</td><td>SENS</td><td>E:INT </td><td></td><td></td><td>TRAC</td><td>E 1 2 3 4 5 6</td><td>Frequency</td></t<>	(XI) RL	RF 50 Ω AC	CORREC	SENS	E:INT			TRAC	E 1 2 3 4 5 6	Frequency
Inclusion Mikr1 1.910 000 GHz -34.36 dBm Auto Tune 100			PNO: Wide 🖵			•		TYP	E A MANAMA	
WRT 1.910000 GH2 GB/div Ref 25.00 dBm -34.36 dBm Gamma Gamma Gamma Gamma Gamma Gamma Gamma Gamma Gam			IFGain:Low	Atten. 30 C			Miland			Auto Tune
Log 150 150 150 150 150 150 150 150							IVIKE	-34	00 GHZ 36 dBm	
150 500 500 500 500 500 500 500		Ref 25.00 dBm						-04.		
500 500 500 500 500 500 500 500										Center Fred
Start Free 500 1300 des -150 -1300 des -250 -1100 -350 -1100 -500 -1100 -500 -1100 -500 -1100 -500 -1100 -500 -1100 -500 -1100 -500 -1100 -500 -1100 -500 -1100 -500 -1100 -500 -1100 -500 -11000000 -500 -11000000 -500 -11000000 -500 -11000000 -500 -11000000 -500 -11000000 -500 -11000000 -500 -11000000 -500 -11000000 -500 -11000000 -500 -110000000 -500 -110000000 -500 -1100000000000000000000000000000000000	15.0									1.91000000 GHz
Start Free 500 1300 des -150 -1300 des -250 -1100 -350 -1100 -500 -1100 -500 -1100 -500 -1100 -500 -1100 -500 -1100 -500 -1100 -500 -1100 -500 -1100 -500 -1100 -500 -1100 -500 -1100 -500 -11000000 -500 -11000000 -500 -11000000 -500 -11000000 -500 -11000000 -500 -11000000 -500 -11000000 -500 -11000000 -500 -11000000 -500 -11000000 -500 -110000000 -500 -110000000 -500 -1100000000000000000000000000000000000										
-500 -500	5.00									
-5:00 -13:00 dm -13:00 dm Stop Free -15:00 -10 -10 -10 -10 -5:00 -11 -11 -11 -11 -11 -35:00 -11		- marine	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~							
150 Stop Free 250 1 350 1 350 1 450 1 550 1 650 1 650 1 Center 1.910000 GHz #VBW 300 kHz Sweep 1.000 ms (1001 pts)	-5.00									1.906000000 GHz
250 350 1									-13.00 dBm	
-250 1.91400000 GHz -360 1.91400000 GHz -550 -550 -650 -650 Center 1.910000 GHz #VBW 300 kHz Sweep 1.000 ms (1001 pts)	-15.0									Stop Fred
-35.0 -5										1.914000000 GHz
-35.0 -36.0 Auto 800.000 kHz -45.0 -45.0 -45.0 -45.0 -45.0 -55.0 -55.0 -55.0 -55.0 -55.0 -65.0 -55.0 -55.0 -55.0 -55.0 -65.0 -55.0 -55.0 -55.0 -55.0 -65.0 -55.0 -55.0 -55.0 -55.0 -65.0 -55.0 -55.0 -55.0 -55.0 -65.0 -55.0 -55.0 -55.0 -55.0 -65.0 -55.0 -55.0 -55.0 -55.0 -65.0 -55.0 -55.0 -55.0 -55.0 -65.0 -55.0 -55.0 -55.0 -55.0 -65.0 -55.0 -55.0 -55.0 -55.0 -65.0 -55.0 -55.0 -55.0 -55.0 -65.0 -55.0 -55.0 -55.0 -55.0 -65.0 -55.0 -55.0 -55.0 -55.0 -65.0 -55.0 -55.0 -55.0 -55.0 -65.0 -55.0 -55.0	-25.0			— \ +						
-35.0 -36.0 Auto 800.000 kHz -45.0 -45.0 -45.0 -45.0 -45.0 -55.0 -55.0 -55.0 -55.0 -55.0 -65.0 -55.0 -55.0 -55.0 -55.0 -65.0 -55.0 -55.0 -55.0 -55.0 -65.0 -55.0 -55.0 -55.0 -55.0 -65.0 -55.0 -55.0 -55.0 -55.0 -65.0 -55.0 -55.0 -55.0 -55.0 -65.0 -55.0 -55.0 -55.0 -55.0 -65.0 -55.0 -55.0 -55.0 -55.0 -65.0 -55.0 -55.0 -55.0 -55.0 -65.0 -55.0 -55.0 -55.0 -55.0 -65.0 -55.0 -55.0 -55.0 -55.0 -65.0 -55.0 -55.0 -55.0 -55.0 -65.0 -55.0 -55.0 -55.0 -55.0 -65.0 -55.0 -55.0 -55.0 -55.0 -65.0 -55.0 -55.0				√_\	1					CE Sten
.46.0	-35.0			L	5					800.000 kHz
-55.0 -55.0 -65.0 -65.0 Center 1.910000 GHz #Res BW 100 kHz #VBW 300 kHz Sweep 1.000 ms (1001 pts)					\sim	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~			<u>Auto</u> Mar
-550 -550	-45.0									
-550 -550										Freq Offset
Center 1.910000 GHz #Res BW 100 kHz #VBW 300 kHz Sweep 1.000 ms (1001 pts)	-55.0									0 Hz
Center 1.910000 GHz #Res BW 100 kHz #VBW 300 kHz Sweep 1.000 ms (1001 pts)										
#Res BW 100 kHz	-65.0									
#Res BW 100 kHz										
#Res BW 100 kHz	Cente	r 1.910000 GHz						Span 8	.000 MHz	
			#VBW	300 kHz			Sweep 1	.000 ms (1001 pts)	
STATUS	MSG						STATUS	;		

Plot 7-121. Upper Band Edge Plot (Band 2 – 10.0MHz QPSK – RB Size 50)

		alyzer - Sw	ept SA											
LXI RL		RF 5	iOΩ AC	COP	RREC		SEI	ISE:INT	#Avg Typ			4 Jan 15, 2016 E <mark>1 2 3 4 5 6</mark>	Fre	quency
				PI IFC	NO: Fas Gain:Lo	t⊶⊷ w	Trig: Free Atten: 36		word the	e. Railo	TYF			
10 dB/c	div R	ef 25.0	0 dBm	1						Mkr1	1.911 0 -26.	04 GHz 07 dBm		Auto Tune
15.0 —														e nter Freq 000000 GHz
-5.00														Start Freq 000000 GHz
-15.0												-13.00 dBm		Stop Freq 000000 GHz
-35.0	Webber of the second	an a	where are an		- Altres	promitis	nthutnykykykyn	whahleesing oge	et.en.geligitegene opensoonen	t-philosharpe-icens	a frankanga da panganana	nd have a grown of the day	Auto	CF Step 400.000 kHz Man
-55.0 —													F	req Offset 0 Hz
-65.0 —														
	r 1.913 BW 1.0	000 GI MHz	lz		#\	/BW	3.0 MHz			Sweep 1	Span 4 .000 ms (.000 MHz 1001 pts)		
MSG										STATU	3			

Plot 7-122. Upper Extended Band Edge Plot (Band 2 – 10.0MHz QPSK – RB Size 50)

FCC ID: ZNFVS425		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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Plot 7-123. Lower Band Edge Plot (Band 2 - 15.0MHz QPSK - RB Size 75)

		n Analyzer	- Swept S	A										
l <mark>,XI</mark> RI	L	RF	50 Ω	AC	CORREC		SE	ISE:INT	#Avg Typ	ALIGNAUTO		4 Jan 15, 2016 E <mark>1 2 3 4 5 6</mark>	F	requency
					PNO: F	ast ⊶⊷	Trig: Fre		#Avg iyp	e. AMD	TY			
					IFGain:		Atten: 36	dB						A
										Mkr1	1.848 0	28 GHz		Auto Tune
	B/div	Ref 2	5.00 d	Bm							-24.	19 dBm		
Log														
15.0														Center Freq
15.0													1.84	17000000 GHz
5.00														
5.00														Start Freq
													1.84	5000000 GHz
-5.00														
												-13.00 dBm		
-15.0										4				Stop Freq
										♦'			1.84	19000000 GHz
-25.0				work-word		mo	mon mon	when	Al martin and the state of the	and the second	And the second second	لي و رس الرس ال ^{الع} مان و رسي		
	-tongularia	A STATUS OF A STATUS	Andread	Mad - 1- Obs.										CF Step
-35.0														400.000 kHz
													<u>Auto</u>	Man
-45.0	<u> </u>													
														Freq Offset
-55.0														0 Hz
-65.0														
Con	L	347000	244								Enon 4			
		1.0 MH				#VRW	3.0 MHz			Sween 1	- Spari 4 .000 ms (.000 MHz 1001 pts)		
MSG										STATUS		100 P (0.5)		
Mag										STATUS	,			

Plot 7-124. Lower Extended Band Edge Plot (Band 2 – 15.0MHz QPSK – RB Size 75)

FCC ID: ZNFVS425		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	Reviewed by: Quality Manager						
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WRL RF 50 Q AC CORREC SENSE:INT ALIGNAUTO D1:22:37 PM Jan 15, 2016 Frequence PN0: Wide Trig: Free Run #Avg Type: RMS TRACE 2 3 4 5 6 Frequence 10 dB/div Ref 25.00 dBm -32.57 dBm -32.57 dBm -32.57 dBm -3100000 500	1
PNO: Wide Trig: Free Run Atten: 36 dB Trig: Free Run Det Trig: Free Run Det Auto 10 dB/div Ref 25.00 dBm .32.57 dBm Auto 15 0 .32.57 dBm .31.000 .31.000 5 00 .30.000 .31.000 .31.000 .31.000 5 00 .30.000 .31.000 .31.000 .31.000 .31.000 5 00 .30.000 .31.0000 .31.0000 .31.0000 <td></td>	
Incluite Mkr1 1.910 000 GHz Auto 10 dB/div Ref 25.00 dBm Center 1.91000000 15.0 Image: Start 1.910 000 GHz Start 1.91000000 Start 1.91000000 5.00 Image: Start 1.9000000 Start 1.9000000 Start 1.9000000	
INIT 1.510 000 GH2 O dB/div Ref 25.00 dBm Start Center 15.0 Start 5.00 Start 5.00 Start 5.00 Start	une
Log 15.0 5.00 	
150 1.9100000 500 1.9100000 500 1.9100000 500 1.9100000	
5.00 Start 5.00 Start 1.90400000	Freq
-5:00 Start	
-5:00 Start	
-5.00	
-13.00 dBm	GHz
-15.0 Stop	Freq
1.91600000	
-25.0	_
	Step
-35.0 1.20000	
Auto	Man
-45.0	
Freq C	ffset
-55.0	0 Hz
-65.0	
Center 1.910000 GHz Span 12.00 MHz	
#Res BW 150 kHz #VBW 470 kHz Sweep 1.000 ms (1001 pts)	
MSG STATUS	

Plot 7-125. Upper Band Edge Plot (Band 2 – 15.0MHz QPSK – RB Size 75)

Agilent Spectru	ım Analyzer - 9	5wept SA										
LXIRL	RF	50 Ω AC	CORREC	_	SEN		#Avg Typ	ALIGNAUTO e: RMS	TRAC	4 Jan 15, 2016 E <mark>1 2 3 4 5 6</mark>	Frequenc	:y
			PNO: Fas IFGain:Lo		Atten: 36						Auto ⁻	Tune
10 dB/div Log	Ref 25.	00 dBm						MKr1	1.911 0 -30.4	28 GHz 43 dBm	Huito	rune
15.0											Center 1.91300000	
-5.00											Start 1.911000000	
-15.0										-13.00 dBm	Stop 1.91500000	
-35.0	مەرەم يەمىرىلەر <mark>مۇرىيەت</mark> س	and the state of the	anti-general colorige	Mr. Made of Surgery	ى _ل ەرىمىرىمىر	the second second	and an entering and an and an and an	an a	an a	e-rationarie-sector	CF 400.00 <u>Auto</u>	Step 0 kHz Man
-45.0											Freq O	Offset 0 Hz
-65.0												
Center 1. #Res BW			#\	/BW 3.	0 MHz			Sweep 1	Span 4 .000 m <u>s (</u>	.000 MHz 1001 pts)		
MSG								STATUS	6			

Plot 7-126. Upper Extended Band Edge Plot (Band 2 – 15.0MHz QPSK – RB Size 75)

FCC ID: ZNFVS425		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager					
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Plot 7-127. Lower Band Edge Plot (Band 2 – 20.0MHz QPSK – RB Size 100)

		n Analyzer												
l XI RI	L	RF	50 Ω	AC	CORREC		SEI	VSE:INT	#Avg Ty			4 Jan 15, 2016 E <mark>1 2 3 4 5 6</mark>	Fr	requency
					PNO: F IFGain:I	ast ↔ .ow_	Trig: Fre Atten: 36		HOY & I Y	ve. rano	TY			
10 dE Log	B/div	Ref 2	5.00 d	Bm						Mkr1	1.848 6 -25.	44 GHz 74 dBm		Auto Tune
15.0														Center Freq 7000000 GHz
5.00 -5.00												-13.00 dBm	1.84	Start Freq 5000000 GHz
-15.0 -25.0							4 d	her Earth Adventure	M. Marchan warman		م م م م م م م م م م م م م م	1 1	1.84	Stop Freq 9000000 GHz
	1H-hash(hjr	-84-jun (p., -3)(in	urlsey with		ana ta di katari								Auto	CF Step 400.000 kHz Man
														Freq Offset 0 Hz
		847000 1.0 MH			3	¢VB₩	3.0 MHz			Sweep 1	Span 4 .000 ms (.000 MHz 1001 pts)		
MSG										STATU	5			

Plot 7-128. Lower Extended Band Edge Plot (Band 2 – 20.0MHz QPSK – RB Size 100)

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	trum Analyzer - Swept SA								
(X/RL	RF 50 Ω A	C CORREC	SEN	SE:INT	#Avg Type	ALIGNAUTO e: RMS		4 Jan 15, 2016 E <mark>1 2 3 4 5 6</mark>	Frequency
		PNO: Fast 😱 IFGain:Low	Trig: Free Atten: 36				TYP		
10 dB/div	Ref 25.00 dBn	n				Mkr1	1.910 0 -36.	48 GHz 05 dBm	Auto Tune
15.0									Center Freq 1.910000000 GHz
-5.00		unumun	~					-13.00 dBm	Start Freq 1.902000000 GHz
-15.0								-13.00 dBm	Stop Freq 1.918000000 GHz
-35.0			Mun	1	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	munan		~~~~	CF Step 1.600000 MHz <u>Auto</u> Man
-45.0									Freq Offset 0 Hz
-65.0									
	1.910000 GHz № 200 kHz	#VBW	620 kHz			Sweep 1	Span 1 .000 ms (6.00 MHz 1001 pts)	
MSG						STATUS			

Plot 7-129. Upper Band Edge Plot (Band 2 – 20.0MHz QPSK – RB Size 100)

	m Analyzer - Swept SA					
LXI RL	RF 50Ω AC	CORREC	SENSE:INT	ALIGNAUTO #Avg Type: RMS	06:18:46 PM Jan 15, 2016 TRACE 1 2 3 4 5 6	Frequency
		PNO: Fast ↔→ IFGain:Low	Trig: Free Run Atten: 36 dB		TYPE A WARMAN DET A N N N N N	
10 dB/div Log	Ref 25.00 dBm			Mkr1	1.911 048 GHz -33.36 dBm	Auto Tune
15.0						Center Freq 1.913000000 GHz
-5.00						Start Freq 1.911000000 GHz
-15.0					-13.00 dBm	Stop Freq 1.915000000 GHz
-35.0	alantan ang tang tang tang tang tang tang	Manathanan ang ang ang ang ang ang ang ang ang	and the second second second second second	galangener and the second	an a	CF Step 400.000 kHz <u>Auto</u> Man
-45.0						Freq Offset 0 Hz
-65.0						
Center 1. #Res BW	913000 GHz 1.0 MHz	#VBW	3.0 MHz	Sweep 1	Span 4.000 MHz .000 ms (1001 pts)	
MSG				STATUS	3	

Plot 7-130. Upper Extended Band Edge Plot (Band 2 – 20.0MHz QPSK – RB Size 100)

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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 v01r02 - Section 5.7.1

Test Settings

- 1. The signal analyzer's CCDF measurement profile is enabled
- 2. Frequency = carrier center frequency
- 3. Measurement BW > Emission bandwidth of signal
- 4. The signal analyzer was set to collect one million samples to generate the CCDF curve
- 5. The measurement interval was set depending on the type of signal analyzed. For continuous signals (>98% duty cycle), the measurement interval was set to 1ms.

Test Setup

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

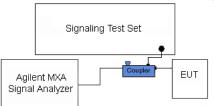


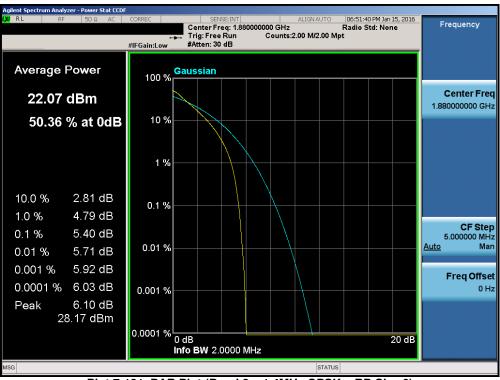
Figure 7-4. Test Instrument & Measurement Setup

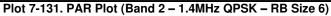
Test Notes

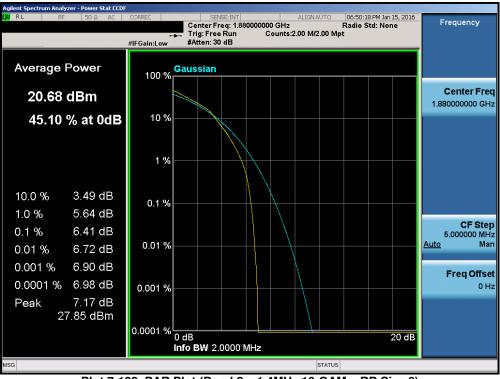
None.

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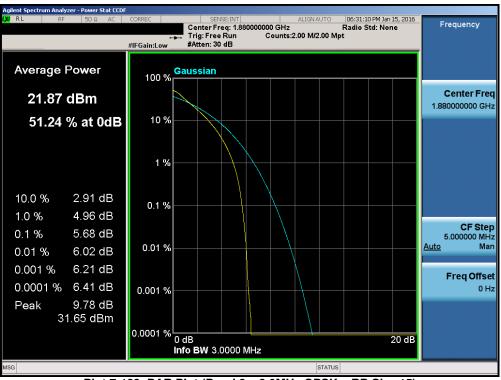


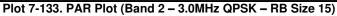


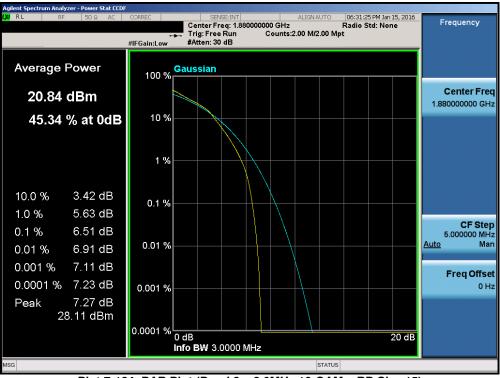
Plot 7-132. PAR Plot (Band 2 – 1.4MHz 16-QAM – RB Size 6)

FCC ID: ZNFVS425		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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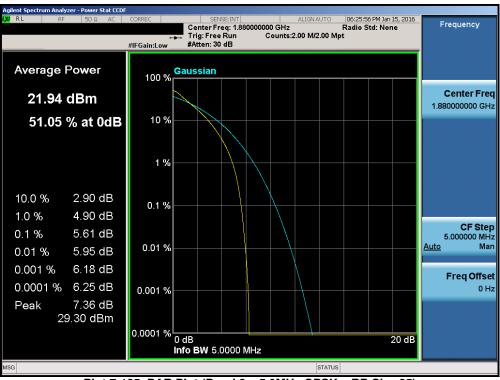


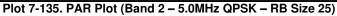


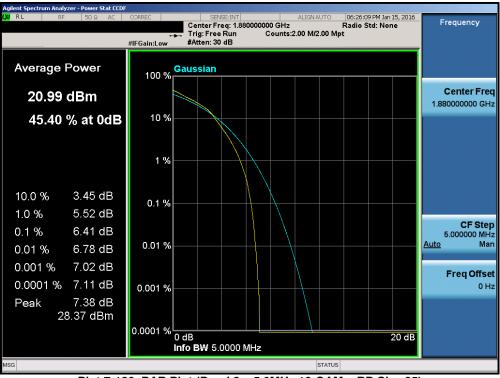
Plot 7-134. PAR Plot (Band 2 - 3.0MHz 16-QAM - RB Size 15)

FCC ID: ZNFVS425		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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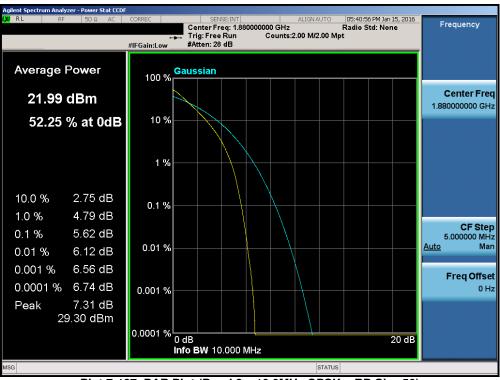


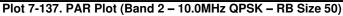


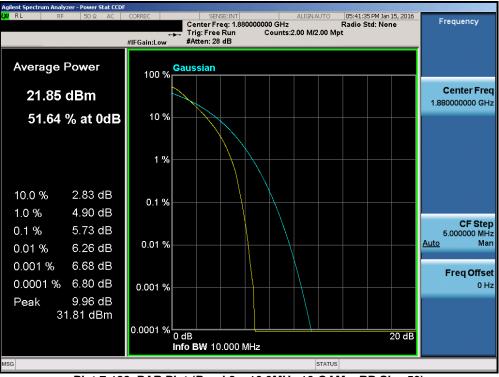
Plot 7-136. PAR Plot (Band 2 - 5.0MHz 16-QAM - RB Size 25)

FCC ID: ZNFVS425		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager		
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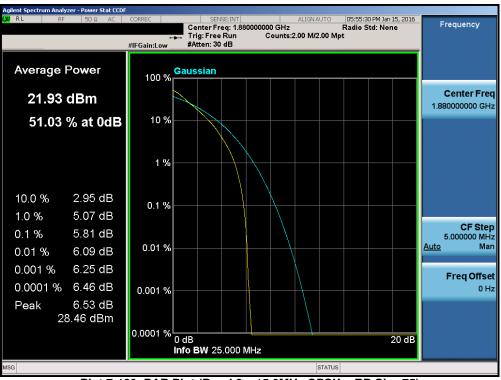


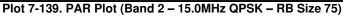


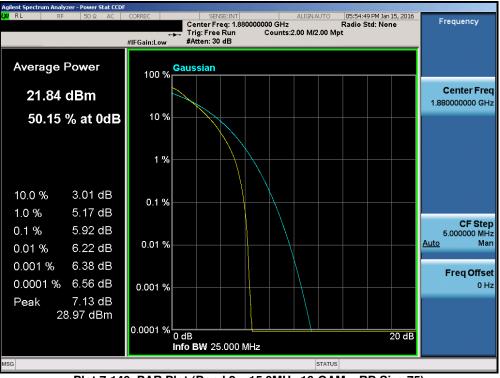
Plot 7-138. PAR Plot (Band 2 - 10.0MHz 16-QAM - RB Size 50)

FCC ID: ZNFVS425		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕑 LG	Reviewed by: Quality Manager
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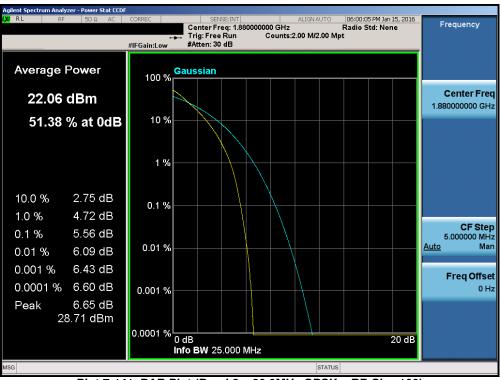


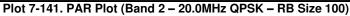


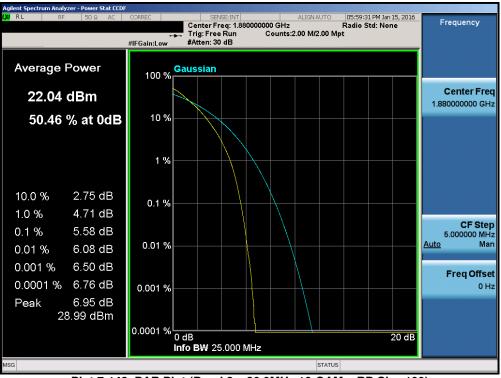
Plot 7-140. PAR Plot (Band 2 – 15.0MHz 16-QAM – RB Size 75)

FCC ID: ZNFVS425		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	💽 LG	Reviewed by: Quality Manager
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Plot 7-142. PAR Plot (Band 2 – 20.0MHz 16-QAM – RB Size 100)

FCC ID: ZNFVS425		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	💽 LG	Reviewed by: Quality Manager
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7.6 Radiated Power (ERP/EIRP) §22.913(a.2) §24.232(c.2) §27.50(b.10) §27.50(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 D01 v01r02 - 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.

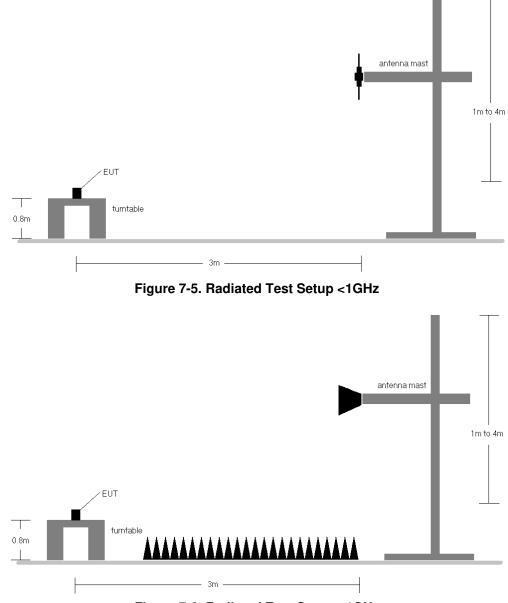


Figure 7-6. Radiated Test Setup >1GHz

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 [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBd]	ERP [dBm]	ERP Limit [dBm]	Margin [dB]
779.50	5	QPSK	V	112	60	1 / 0	14.28	2.47	16.75	34.77	-18.02
782.00	5	QPSK	V	115	67	1 / 0	14.32	2.51	16.83	34.77	-17.94
784.50	5	QPSK	V	120	65	1 / 0	14.29	2.56	16.85	34.77	-17.92
779.50	5	16QAM	V	112	60	1 / 0	14.12	2.47	16.59	34.77	-18.18
782.00	5	16QAM	V	115	67	1 / 0	14.24	2.51	16.75	34.77	-18.02
784.50	5	16QAM	V	120	65	1 / 0	14.17	2.56	16.73	34.77	-18.04
782.00	10	QPSK	V	112	71	1 / 0	13.85	2.51	16.36	34.77	-18.41
782.00	10	16QAM	V	112	71	1 / 0	13.79	2.51	16.30	34.77	-18.47

Table 7-2. ERP Data (Band 13)

FCC ID: ZNFVS425		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕑 LG	Reviewed by: Quality Manager		
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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBd]	ERP [dBm]	ERP Limit [dBm]	Margin [dB]
824.70	1.4	QPSK	v	130	90	1 / 0	12.22	2.98	15.20	38.45	-23.25
836.50	1.4	QPSK	v	134	95	1 / 0	13.54	3.04	16.58	38.45	-21.87
848.30	1.4	QPSK	v	140	110	1 / 0	14.13	3.10	17.23	38.45	-21.22
824.70	1.4	16-QAM	v	130	90	1 / 0	12.09	2.98	15.07	38.45	-23.38
836.50	1.4	16-QAM	v	134	95	1 / 0	13.51	3.04	16.55	38.45	-21.90
848.30	1.4	16-QAM	v	140	110	1 / 0	14.03	3.10	17.13	38.45	-21.32
825.50	3	QPSK	v	139	98	1 / 0	11.65	2.98	14.63	38.45	-23.82
836.50	3	QPSK	v	140	100	1 / 0	13.38	3.04	16.42	38.45	-22.03
847.50	3	QPSK	v	145	105	1 / 0	15.22	3.10	18.32	38.45	-20.13
825.50	3	16-QAM	v	139	98	1 / 0	11.60	2.98	14.58	38.45	-23.87
836.50	3	16-QAM	v	140	100	1 / 0	13.37	3.04	16.41	38.45	-22.04
847.50	3	16-QAM	v	145	105	1 / 0	15.10	3.10	18.20	38.45	-20.25
826.50	5	QPSK	v	120	90	1 / 0	12.12	2.99	15.11	38.45	-23.34
836.50	5	QPSK	v	127	100	1 / 0	13.78	3.04	16.82	38.45	-21.63
846.50	5	QPSK	v	132	110	1 / 0	14.31	3.09	17.40	38.45	-21.05
826.50	5	16-QAM	v	120	90	1 / 0	12.06	2.99	15.05	38.45	-23.40
836.50	5	16-QAM	v	127	100	1 / 0	13.69	3.04	16.73	38.45	-21.72
846.50	5	16-QAM	V	132	110	1 / 0	14.22	3.09	17.31	38.45	-21.14
829.00	10	QPSK	v	220	150	1 / 0	11.97	3.00	14.97	38.45	-23.48
836.50	10	QPSK	v	228	148	1 / 0	12.01	3.04	15.05	38.45	-23.40
844.00	10	QPSK	v	250	145	1 / 0	10.44	3.08	13.52	38.45	-24.93
829.00	10	16-QAM	v	220	150	1 / 0	11.90	3.00	14.90	38.45	-23.55
836.50	10	16-QAM	V	228	148	1 / 0	11.92	3.04	14.96	38.45	-23.49
844.00	10	16-QAM	v	250	145	1 / 0	10.35	3.08	13.43	38.45	-25.02

Table 7-3. ERP Data (Band 5)

FCC ID: ZNFVS425		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	v	101	111	3 / 2	11.97	9.28	21.25	30.00	-8.75
1732.50	1.4	QPSK	v	110	118	1 / 0	12.65	9.00	21.65	30.00	-8.35
1754.30	1.4	QPSK	v	105	274	3 / 2	12.28	8.72	21.00	30.00	-9.00
1710.70	1.4	16-QAM	v	101	111	3 / 2	11.10	9.28	20.38	30.00	-9.62
1732.50	1.4	16-QAM	v	110	118	1 / 0	11.82	9.00	20.82	30.00	-9.18
1754.30	1.4	16-QAM	v	105	274	3 / 2	11.43	8.72	20.15	30.00	-9.85
1711.50	3	QPSK	v	101	273	1 / 0	12.36	9.27	21.63	30.00	-8.37
1732.50	3	QPSK	v	100	271	1 / 0	13.19	9.00	22.19	30.00	-7.81
1753.50	3	QPSK	v	105	273	1 / 0	11.80	8.73	20.53	30.00	-9.47
1711.50	3	16-QAM	v	101	273	1 / 0	11.48	9.27	20.75	30.00	-9.25
1732.50	3	16-QAM	v	100	271	1 / 0	12.22	9.00	21.22	30.00	-8.78
1753.50	3	16-QAM	v	105	273	1 / 0	11.06	8.73	19.79	30.00	-10.21
1712.50	5	QPSK	v	101	273	1 / 0	12.38	9.26	21.64	30.00	-8.36
1732.50	5	QPSK	v	100	273	1 / 0	12.78	9.00	21.78	30.00	-8.22
1752.50	5	QPSK	v	101	273	1 / 0	12.00	8.74	20.74	30.00	-9.26
1712.50	5	16-QAM	v	101	273	1 / 0	11.00	9.26	20.26	30.00	-9.74
1732.50	5	16-QAM	v	100	273	1 / 0	11.94	9.00	20.94	30.00	-9.06
1752.50	5	16-QAM	v	101	273	1 / 0	11.55	8.74	20.29	30.00	-9.71
1715.00	10	QPSK	v	101	272	1 / 0	12.91	9.22	22.13	30.00	-7.87
1732.50	10	QPSK	v	101	272	1 / 0	13.39	9.00	22.39	30.00	-7.61
1750.00	10	QPSK	v	101	272	1 / 0	12.78	8.77	21.55	30.00	-8.45
1715.00	10	16-QAM	v	101	272	1 / 0	12.20	9.22	21.42	30.00	-8.58
1732.50	10	16-QAM	v	101	272	1 / 0	12.47	9.00	21.47	30.00	-8.53
1750.00	10	16-QAM	v	101	272	1 / 0	12.19	8.77	20.96	30.00	-9.04
1717.50	15	QPSK	v	110	82	1 / 0	10.99	9.19	20.18	30.00	-9.82
1732.50	15	QPSK	v	110	82	1 / 0	12.34	9.00	21.34	30.00	-8.66
1747.50	15	QPSK	v	110	82	1 / 0	12.75	8.80	21.55	30.00	-8.45
1717.50	15	16-QAM	v	110	82	1 / 0	10.11	9.19	19.30	30.00	-10.70
1732.50	15	16-QAM	v	110	82	1 / 0	11.79	9.00	20.79	30.00	-9.21
1747.50	15	16-QAM	v	110	82	1 / 0	12.12	8.80	20.92	30.00	-9.08
1720.00	20	QPSK	v	107	85	1 / 0	10.58	9.16	19.74	30.00	-10.26
1732.50	20	QPSK	v	107	85	1 / 0	11.77	9.00	20.77	30.00	-9.23
1745.00	20	QPSK	v	107	85	1 / 0	12.33	8.83	21.16	30.00	-8.84
1720.00	20	16-QAM	v	107	85	1 / 0	9.78	9.16	18.94	30.00	-11.06
1732.50	20	16-QAM	v	107	85	1 / 0	11.28	9.00	20.28	30.00	-9.72
1745.00	20	16-QAM	v	107	85	1 / 0	11.89	8.83	20.72	30.00	-9.28

Table 7-4. EIRP Data (Band 4)

FCC ID: ZNFVS425		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	💽 LG	Reviewed by: Quality Manager
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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP Limit [dBm]	Margin [dB]
1850.70	1.4	QPSK	v	176	113	3 / 2	10.54	8.34	18.88	33.01	-14.13
1880.00	1.4	QPSK	v	206	87	3 / 2	11.41	8.46	19.87	33.01	-13.14
1909.30	1.4	QPSK	v	213	85	6 / 0	9.67	8.64	18.31	33.01	-14.70
1850.70	1.4	16-QAM	v	176	113	3 / 2	9.33	8.34	17.67	33.01	-15.34
1880.00	1.4	16-QAM	v	206	87	3 / 2	10.52	8.46	18.98	33.01	-14.03
1909.30	1.4	16-QAM	v	213	85	6 / 0	8.69	8.64	17.33	33.01	-15.68
1851.50	3	QPSK	v	174	113	1 / 14	10.54	8.35	18.89	33.01	-14.12
1880.00	3	QPSK	v	203	84	1 / 14	10.96	8.46	19.42	33.01	-13.59
1908.50	3	QPSK	v	213	73	1 / 14	10.01	8.63	18.64	33.01	-14.37
1851.50	3	16-QAM	v	174	113	1 / 14	9.68	8.35	18.03	33.01	-14.98
1880.00	3	16-QAM	v	203	84	1 / 14	10.15	8.46	18.61	33.01	-14.40
1908.50	3	16-QAM	v	213	73	1 / 14	7.97	8.63	16.60	33.01	-16.41
1852.50	5	QPSK	v	100	109	1 / 24	10.13	8.35	18.48	33.01	-14.53
1880.00	5	QPSK	v	206	93	12 / 6	10.71	8.46	19.17	33.01	-13.84
1907.50	5	QPSK	v	100	28	1 / 24	8.27	8.62	16.89	33.01	-16.12
1852.50	5	16-QAM	v	100	109	1 / 24	8.99	8.35	17.34	33.01	-15.67
1880.00	5	16-QAM	v	206	93	12 / 6	9.86	8.46	18.32	33.01	-14.69
1907.50	5	16-QAM	v	100	28	1 / 24	7.69	8.62	16.31	33.01	-16.70
1855.00	10	QPSK	v	110	85	1 / 0	10.76	8.36	19.12	33.01	-13.89
1880.00	10	QPSK	v	107	106	1 / 0	11.96	8.46	20.42	33.01	-12.59
1905.00	10	QPSK	v	100	124	1 / 0	11.03	8.59	19.62	33.01	-13.39
1855.00	10	16-QAM	v	110	85	1 / 0	10.27	8.36	18.63	33.01	-14.38
1880.00	10	16-QAM	v	107	106	1 / 0	11.26	8.46	19.72	33.01	-13.29
1905.00	10	16-QAM	v	100	124	1 / 0	10.47	8.59	19.06	33.01	-13.95
1857.50	15	QPSK	v	110	94	1 / 0	11.08	8.37	19.45	33.01	-13.56
1880.00	15	QPSK	v	168	106	1 / 0	11.15	8.46	19.61	33.01	-13.40
1902.50	15	QPSK	v	117	100	1 / 0	11.16	8.56	19.72	33.01	-13.29
1857.50	15	16-QAM	v	110	94	1 / 0	10.67	8.37	19.04	33.01	-13.97
1880.00	15	16-QAM	v	168	106	1 / 0	10.57	8.46	19.03	33.01	-13.98
1902.50	15	16-QAM	v	117	100	1 / 0	11.41	8.56	19.97	33.01	-13.04
1860.00	20	QPSK	v	110	94	1 / 0	11.55	8.38	19.93	33.01	-13.08
1880.00	20	QPSK	v	168	106	1 / 0	10.47	8.46	18.93	33.01	-14.08
1900.00	20	QPSK	v	117	100	1 / 0	10.88	8.53	19.41	33.01	-13.60
1860.00	20	16-QAM	v	110	94	1 / 0	10.69	8.38	19.07	33.01	-13.94
1880.00	20	16-QAM	v	168	106	1 / 0	10.05	8.46	18.51	33.01	-14.50
1900.00	20	16-QAM	v	117	100	1 / 0	9.95	8.53	18.48	33.01	-14.53

Table 7-5. EIRP Data (Band 2)

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7.7 Radiated Spurious Emissions Measurements §2.1053 §22.917(a) §24.238(a) §27.53(c) §27.53(f) §27.53(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 D01 v01r02 - 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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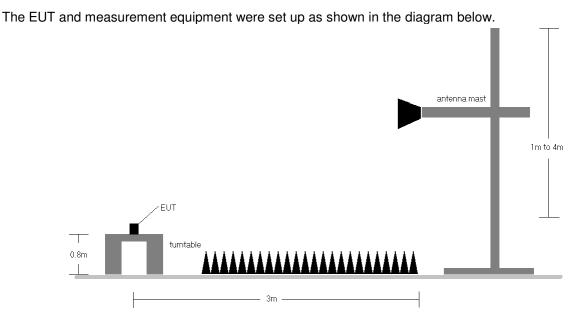


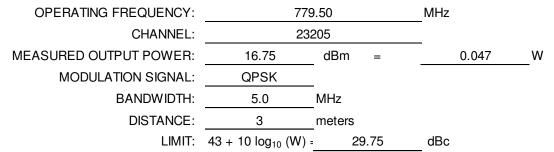
Figure 7-7. Test Instrument & Measurement Setup

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.

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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]
2338.50	Н	110	367	-63.70	7.28	-56.42	73.2
3118.00	Н	-	-	-62.96	7.25	-55.70	72.5

Table 7-6. Radiated Spurious Data (Band 13 – Low Channel)

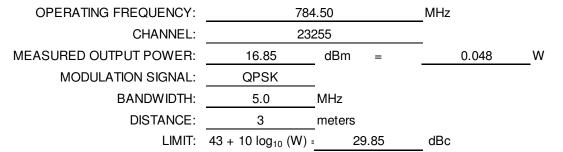
OPERATING FREQUENCY:	782	2.00	MHz
CHANNEL:	232	230	_
MEASURED OUTPUT POWER:	16.83	dBm =	0.048 W
MODULATION SIGNAL:	QPSK		
BANDWIDTH:	5.0	MHz	
DISTANCE:	3	meters	
LIMIT:	43 + 10 log ₁₀ (W) =	29.83	dBc

Frequency [MHz]	Ant. Pol. [H/V]	Height	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
2346.00	Н	-	-	-63.46	7.26	-56.20	73.0

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

FCC ID: ZNFVS425		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager			
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Frequency [MHz]	Ant. Pol. [H/V]	Height	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
2353.50	Н	-	-	-63.67	7.25	-56.42	73.3

Table 7-8. Radiated Spurious Data (Band 13 – High Channel)

QPSK

-40

dBm/MHz

BANDWIDTH:	5.00	- MHz
DISTANCE:	3	meters
IISSION LIMIT:	-50	dBm

NARROWBAND EMISSION LIMIT:

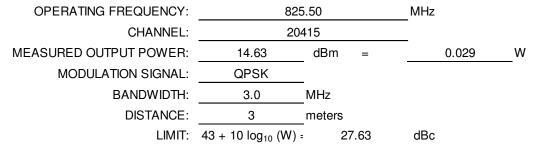
WIDEBAND EMISSION LIMIT:

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	Margin [dB]
1559.00	Н	112	120	-64.87	6.42	-58.45	-18.5
1564.00	Н	110	345	-65.20	6.44	-58.76	-18.8
1569.00	Н	145	220	-64.53	6.46	-58.07	-18.1

Table 7-9. Radiated Spurious Data (Band 13 – 1559-1610MHz Band)

FCC ID: ZNFVS425		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]
1651.00	Н	120	194	-64.88	6.56	-58.32	73.0
2476.50	Н	-	-	-63.11	7.31	-55.81	70.4

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

OPERATING FREQUENCY:	836	6.50	MHz
CHANNEL:	20	525	_
MEASURED OUTPUT POWER:	16.42	dBm =	0.044 W
MODULATION SIGNAL:	QPSK	_	
BANDWIDTH:	3.0	MHz	
DISTANCE:	3	meters	
LIMIT:	43 + 10 log ₁₀ (W) =	29.42	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]
1673.00	Н	112	205	-62.95	6.55	-56.40	72.8
2509.50	Н	-	-	-62.68	7.34	-55.33	71.8

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

FCC ID: ZNFVS425		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🔁 LG	Reviewed by: Quality Manager		
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OPERATING FREQUENCY:	847	7.50	N	ЛНz	
CHANNEL:	20	635			
MEASURED OUTPUT POWER:	18.32	dBm =		0.068	W
MODULATION SIGNAL:	QPSK	_			
BANDWIDTH:	3.0	MHz			
DISTANCE:	3	meters			
LIMIT:	43 + 10 log ₁₀ (W)	31.32		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]
1695.00	Н	350	205	-63.30	6.55	-56.75	75.1
2542.50	Н	-	-	-62.72	7.36	-55.36	73.7

Table 7-12. Radiated Spurious Data (Band 5 – High Channel)

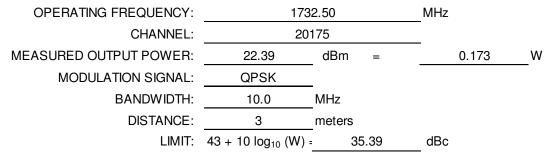
OPERATING FREQUENCY:	171	5.00	MHz
CHANNEL:	200	000	_
MEASURED OUTPUT POWER:	22.13	dBm =	0.163 W
MODULATION SIGNAL:	QPSK		
BANDWIDTH:	10.0	MHz	
DISTANCE:	3	meters	
LIMIT:	43 + 10 log ₁₀ (W) =	35.13	dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3430.00	Н	100	290	-54.25	9.69	-44.56	66.7
5145.00	Н	120	110	-51.53	10.67	-40.86	63.0
6860.00	Н	130	165	-45.96	11.74	-34.22	56.4
8575.00	Н	329	245	-39.95	11.05	-28.90	51.0
10290.00	Н	-	-	-43.71	12.29	-31.43	53.6

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

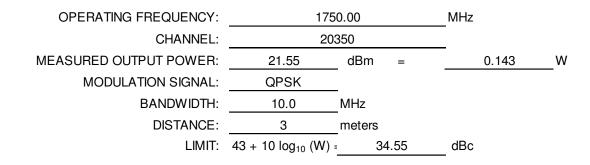
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Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3465.00	Н	110	300	-59.96	9.71	-50.25	72.6
5197.50	Н	139	105	-55.78	10.59	-45.19	67.6
6930.00	Н	145	174	-47.06	11.75	-35.31	57.7
8662.50	Н	300	100	-40.49	11.06	-29.43	51.8
10395.00	Н	-	-	-51.53	12.37	-39.16	61.5

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

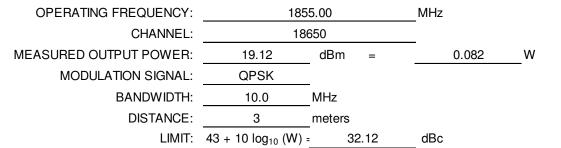


Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3500.00	Н	105	255	-58.22	9.73	-48.50	70.0
5250.00	Н	139	110	-55.26	10.63	-44.62	66.2
7000.00	Н	150	205	-39.73	11.76	-27.98	49.5
8750.00	Н	275	129	-39.61	11.02	-28.59	50.1
10500.00	Н	-	-	-49.18	12.48	-36.71	58.3
12250.00	Н	-	-	-48.75	13.04	-35.71	57.3

Table 7-15. Radiated Spurious Data (Band 4 – High Channel)

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Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3710.00	Н	110	287	-55.56	8.40	-47.17	66.3
5565.00	Н	-	-	-56.23	10.57	-45.66	64.8

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

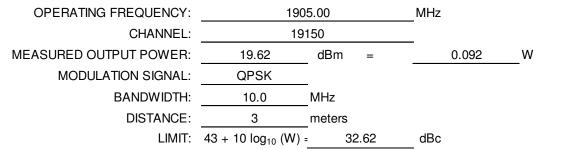
OPERATING FREQUENCY:	188	0.00	MHz
CHANNEL:	189	900	_
MEASURED OUTPUT POWER:	20.42	dBm =	0.110 W
MODULATION SIGNAL:	QPSK		
BANDWIDTH:	10.0	MHz	
DISTANCE:	3	meters	
LIMIT:	43 + 10 log ₁₀ (W) =	33.42	_ dBc

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]
3760.00	Н	120	230	-54.05	8.38	-45.66	66.1
5640.00	Н	-	-	-48.63	10.70	-37.93	58.3
7520.00	Н	-	-	-54.62	12.10	-42.51	62.9
9400.00	Н	-	-	-55.07	13.19	-41.88	62.3

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

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Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3810.00	Н	145	286	-55.85	8.40	-47.46	67.1
5715.00	Н	-	-	-53.36	10.76	-42.60	62.2
7620.00	Н	-	-	-52.89	12.21	-40.68	60.3
9525.00	Н	-	-	-54.11	13.19	-40.93	60.5

Table 7-18. Radiated Spurious Data (Band 2 – High Channel)

FCC ID: ZNFVS425		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 $\pm 0.00025\%$ (± 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 13 Frequency Stability Measurements §2.1055 §27.54

OPERATING FREQUENCY:	782,000,000	Hz
CHANNEL:	23230	_
REFERENCE VOLTAGE:	3.80	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	781,999,871	-129	-0.0000165
100 %		- 30	781,999,818	-182	-0.0000232
100 %		- 20	781,999,849	-151	-0.0000194
100 %		- 10	781,999,972	-28	-0.0000036
100 %		0	781,999,846	-154	-0.0000197
100 %		+ 10	781,999,815	-185	-0.0000237
100 %		+ 20	781,999,863	-137	-0.0000175
100 %		+ 30	781,999,899	-101	-0.0000129
100 %		+ 40	781,999,850	-150	-0.0000191
100 %		+ 50	781,999,998	-2	-0.0000002
BATT. ENDPOINT	3.40	+ 20	781,999,875	-125	-0.0000160

Table 7-19. Frequency Stability Data (Band 13)

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 13 Frequency Stability Measurements §2.1055 §27.54

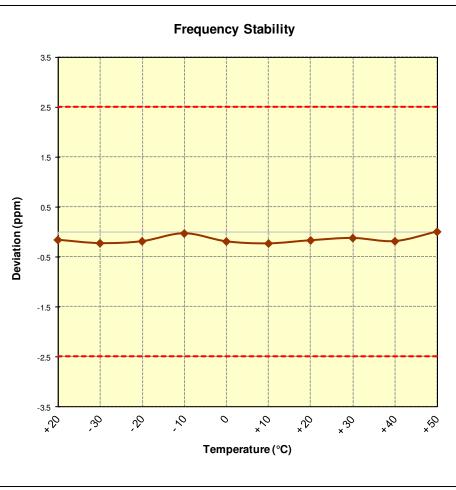


Figure 7-8. Frequency Stability Graph (Band 13)

FCC ID: ZNFVS425		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:	3.80	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)	836,499,938	-62	-0.0000075
100 %		- 30	836,499,895	-105	-0.0000125
100 %		- 20	836,499,900	-100	-0.0000120
100 %		- 10	836,499,830	-170	-0.0000203
100 %		0	836,500,000	0	0.0000000
100 %		+ 10	836,499,869	-131	-0.0000156
100 %		+ 20	836,499,987	-13	-0.0000015
100 %		+ 30	836,499,904	-96	-0.0000115
100 %		+ 40	836,499,821	-179	-0.0000214
100 %		+ 50	836,499,891	-109	-0.0000130
BATT. ENDPOINT	3.40	+ 20	836,499,861	-139	-0.0000166

Table 7-20. Frequency Stability Data (Band 5)

FCC ID: ZNFVS425		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 100 of 110
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Band 5 Frequency Stability Measurements §2.1055 §22.355

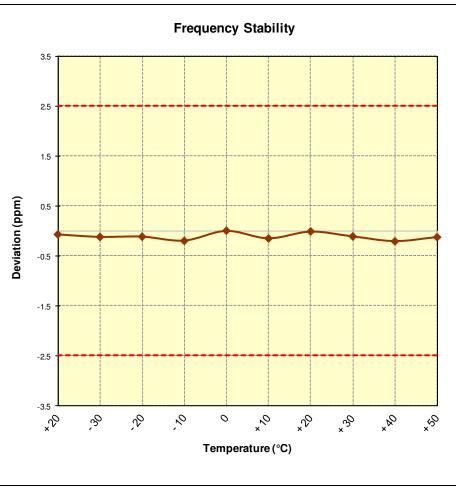


Figure 7-9. Frequency Stability Graph (Band 5)

FCC ID: ZNFVS425		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dece 107 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:	3.80	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	1,732,499,969	-31	-0.0000018
100 %		- 30	1,732,499,833	-167	-0.0000097
100 %		- 20	1,732,499,868	-132	-0.0000076
100 %		- 10	1,732,499,972	-28	-0.0000016
100 %		0	1,732,499,832	-168	-0.0000097
100 %		+ 10	1,732,499,822	-178	-0.0000103
100 %		+ 20	1,732,499,840	-160	-0.0000093
100 %		+ 30	1,732,499,962	-38	-0.0000022
100 %		+ 40	1,732,499,994	-6	-0.0000004
100 %		+ 50	1,732,499,974	-26	-0.0000015
BATT. ENDPOINT	3.40	+ 20	1,732,499,898	-102	-0.0000059

Table 7-21. 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: ZNFVS425		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

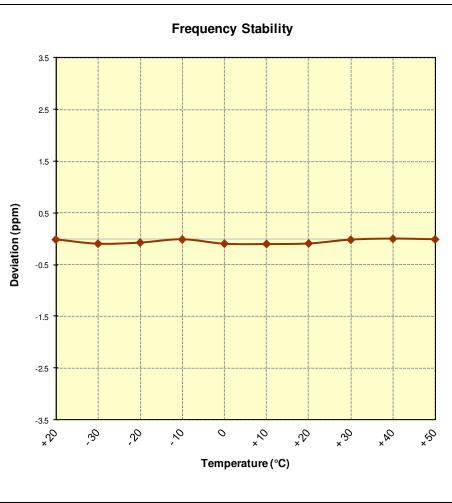


Figure 7-10. Frequency Stability Graph (Band 4)

FCC ID: ZNFVS425		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	💽 LG	Reviewed by: Quality Manager
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Band 2 Frequency Stability Measurements §2.1055 §24.235

OPERATING FREQUENCY:	1,880,000,000	Hz
CHANNEL:	18900	_
REFERENCE VOLTAGE:	3.80	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	1,879,999,869	-131	-0.0000070
100 %		- 30	1,879,999,978	-22	-0.0000012
100 %		- 20	1,879,999,827	-173	-0.0000092
100 %		- 10	1,879,999,876	-124	-0.0000066
100 %		0	1,879,999,834	-166	-0.0000088
100 %		+ 10	1,879,999,866	-134	-0.0000071
100 %		+ 20	1,879,999,856	-144	-0.0000077
100 %		+ 30	1,879,999,947	-53	-0.0000028
100 %		+ 40	1,879,999,926	-74	-0.0000039
100 %		+ 50	1,879,999,862	-138	-0.0000073
BATT. ENDPOINT	3.40	+ 20	1,879,999,934	-66	-0.0000035

 Table 7-22. 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: ZNFVS425		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕑 LG	Reviewed by: Quality Manager
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Band 2 Frequency Stability Measurements §2.1055 §24.235

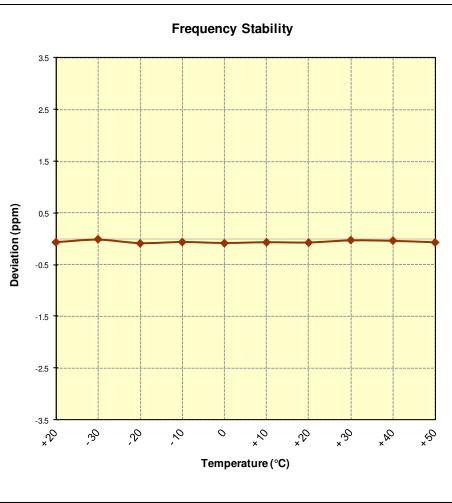


Figure 7-11. Frequency Stability Graph (Band 2)

FCC ID: ZNFVS425		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	💽 LG	Reviewed by: Quality Manager
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8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **LGE Portable Handset FCC ID: ZNFVS425** complies with all the requirements of Parts 22, 24, & 27 of the FCC rules for LTE operation only.

FCC ID: ZNFVS425		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	💽 LG	Reviewed by: Quality Manager
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