

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

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.

The minimum permissible attenuation level for Band 7 is > $43 + 10\log_{10} (P[Watts])$ at channel edges and > $55 + 10\log_{10} (P[Watts])$ at 5.5 MHz away and beyond channel edges.

Test Procedure Used

KDB 971168 v02r02 - Section 6.0

Test Settings

- 1. Start and stop frequency were set such that the band edge would be placed in the center of the plot
- 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 <u>></u> 3 x RBW
- 5. Detector = RMS
- 6. Number of sweep points $\geq 2 \times \text{Span/RBW}$
- 7. Trace mode = trace average for continuous emissions, max hold for pulse emissions
- 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.

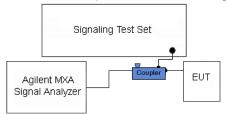


Figure 6-3. Test Instrument & Measurement Setup

Test Notes

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

Per 27.53(g) for operations in the 698-746 MHz band, in the 100 kHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least 30 kHz may be employed to demonstrate compliance with the out-of-band emissions limit.

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R L	m Analyzer - Si RF	Wept SA 50 Ω AC	CORRE	C	CE	NSE:INT		ALIGN AUTO	02:20:22 0	M Mar 24, 2015		
KL.	INF	JU X AC	PNO	: Wide 🖵 in:Low		e Run	#Avg Ty		TRAC	MMa 24, 2013 CE 1 2 3 4 5 6 PE MWWWWWW ET A N N N N N	Freq	uency
0 dB/div	Ref 25.0	0 dBm	IFGa	In:Low	Atten: or			Mk		96 MHz 22 dBm	A	uto Tun
15.0									m	~~~~~		nter Fre 10000 MH
5.00												tart Fre 10000 M⊦
25.0										-13.00 dBm		top Fre 0000 M⊦
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5.0	Mar mar and a second	uttoni (ning tong tong tong tong tong tong tong to									Fr	e q Offs 0 I
enter 69 Res BW	8.000 MH	Z		#\/D\\	39 kHz			#C1110	Span 4	.000 MHz (1001 pts)		
	JU KHZ			#4044	J9 KHZ			#Sweep	1.000 S ((100 r pis)		

Plot 6-94. Lower Band Edge Plot (Band 12 – 1.4MHz QPSK – RB Size 6)



Plot 6-95. Lower Extended Band Edge Plot (Band 12 – 1.4MHz QPSK – RB Size 6)

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Plot 6-96. Upper Band Edge Plot (Band 12 – 1.4MHz QPSK – RB Size 6)



Plot 6-97. Upper Extended Band Edge Plot (Band 12 – 1.4MHz QPSK – RB Size 6)

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Plot 6-98. Lower Band Edge Plot (Band 12 – 3.0MHz QPSK – RB Size 15)



Plot 6-99. Lower Extended Band Edge Plot (Band 12 – 3.0MHz QPSK – RB Size 15)

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Plot 6-100. Upper Band Edge Plot (Band 12 – 3.0MHz QPSK – RB Size 15)



Plot 6-101. Upper Extended Band Edge Plot (Band 12 – 3.0MHz QPSK – RB Size 15)

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Plot 6-102. Lower Band Edge Plot (Band 12 – 5.0MHz QPSK – RB Size 25)

Agilent Spectru											
LXU RL	RF	50 Ω AC	CORREC	SENS	E:INT	#Avg Type	ALIGN AUTO	TRAC	4 Mar 24, 2015 E 1 2 3 4 5 6	Fr	equency
			PNO: Wide ↔↔ IFGain:Low	Trig: Free Atten: 36 d		•		TYF De			
			IPGall.LUW	Theen. oo e			Mk	1 697 8	12 MHz		Auto Tune
10 dB/div Log	Ref 25	.00 dBm						-25.	34 dBm		
										c	enter Freq
15.0											.900000 MHz
5.00											
5.00											Start Freq
-5.00										693	.900000 MHz
									-13.00 dBm		
-15.0											Stop Freq
-25.0									↓	697	.900000 MHz
-25.0							and a second		wentere e briefer		
-35.0				and the second							CF Step 400.000 kHz
										<u>Auto</u>	Man
-45.0											
-55.0										I	req Offset
											0 Hz
-65.0											
Center 69								Span 4	.000 MHz		
#Res BW	100 kHz		#VBW	300 kHz					1001 pts)		
MSG							STATUS	8			

Plot 6-103. Lower Extended Band Edge Plot (Band 12 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFH636		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	💽 LG	Reviewed by: Quality Manager	
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#Ava Type: RMS TRACE	Mar 24, 2015 1 2 3 4 5 6 Frequency
PNO: Wide C Trig: Free Run TYP IFGain:Low Atten: 36 dB DE	
Mkr1 716.00 10 dB/div Ref 25.00 dBm -25.1	08 MHz Auto Tune
10 dB/div Ref 25.00 dBm -25.1	7 dBm
	Center Freq
15.0	716.000000 MHz
	Start Freq
-500	714.000000 MHz
-15.0	-13.00 dBm Stop Freq
	718.000000 MHz
-25.0	
-35.0	CF Step
	400.000 kHz Auto Man
-45.0	<u>Field</u>
	Freq Offset
-55.0	0 Hz
-65.0	
-0.0	
Center 716.000 MHz Span 4. #Res BW 51 kHz #VBW 150 kHz #Sweep 1.000 s (*	1001 mHz
MSG	

Plot 6-104. Upper Band Edge Plot (Band 12 – 5.0MHz QPSK – RB Size 25)

Agilent Spectru		wept SA										
LXU RL	RF	50Ω AC	PNO: V	Vide 🔸	Trig: Free		#Avg Typ	ALIGNAUTO e: RMS	TRAC	Mar 24, 2015 E 1 2 3 4 5 6 E M M N N N N A N N N N N	Fi	requency
10 dB/div Log	Ref 25.0	00 dBm	IFGain	Low	Atten: 36	dB		Mk	r1 716.1	00 MHz 98 dBm		Auto Tune
15.0												Center Freq 3.100000 MHz
-5.00										-13.00 dBm	716	Start Freq 5.100000 MHz
-15.0 1 -25.0										-13.00 0001	720	Stop Freq 0.100000 MHz
-35.0					~~~***********************************	an a			Annon Later April Theorem	n	<u>Auto</u>	CF Step 400.000 kHz Man
-55.0												Freq Offset 0 Hz
-65.0		łz _							Span 4	.000 MHz 1001 pts)		
#Res BW	100 kHz			#VBW	300 kHz			#Sweep	1	1001 pts)		

Plot 6-105. Upper Extended Band Edge Plot (Band 12 – 5.0MHz QPSK – RB Size 25)

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Plot 6-106. Lower Band Edge Plot (Band 12 – 10.0MHz QPSK – RB Size 50)



Plot 6-107. Upper Band Edge Plot (Band 12 – 10.0MHz QPSK – RB Size 50)

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



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

FCC ID: ZNFH636		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	💽 LG	Reviewed by: Quality Manager			
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Plot 6-110. Upper Band Edge Plot (Band 5 – 1.4MHz QPSK – RB Size 6)



Plot 6-111. Upper Extended Band Edge Plot (Band 5 – 1.4MHz QPSK – RB Size 6)

FCC ID: ZNFH636		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	💽 LG	Reviewed by: Quality Manager			
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		Analyzer - Swep										
l xi Ri	L	RF 50 \$	AC CO	DRREC		ISE:INT	#Avg Typ	ALIGNAUTO	TRAC	M Mar 20, 2015 E <mark>1 2 3 4 5 6</mark>	F	requency
			I	PNO: Wide 🖵 FGain:Low	Trig: Free Atten: 36				TYI Di			
				Call.20W				Mk	1 824 0	00 MHz		Auto Tune
10 dE	3/div	Ref 25.00	dBm						-25.9	00 MHz 10 dBm		
Log												
												Center Freq
15.0											82	4.000000 MHz
5.00												
3.00												Start Freq
-5.00						1					82	2.000000 MHz
										-13.00 dBm		
-15.0						1				-13.00 dBm		Stop Freq
						1					82	6.000000 MHz
-25.0												
		the company	man mon		manned							CF Step
-35.0	معاممتهم كعير	and a second and a s										400.000 kHz
											<u>Auto</u>	Man
-45.0												
-55.0												Freq Offset
												0 Hz
-65.0												
0.00									Oner-4			
	ter 824 s BW (1.000 MHz 30 kHz		#VBM	91 kHz			#Sween	Span 4	.000 MHz 1001 pts)		
MSG								STATUS				
								011100				

Plot 6-112. Lower Band Edge Plot (Band 5 – 3.0MHz QPSK – RB Size 15)



Plot 6-113. Lower Extended Band Edge Plot (Band 5 – 3.0MHz QPSK – RB Size 15)

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Plot 6-114. Upper Band Edge Plot (Band 5 – 3.0MHz QPSK – RB Size 15)



Plot 6-115. Upper Extended Band Edge Plot (Band 5 – Band 5 – 3.0MHz QPSK – RB Size 15)

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Plot 6-116. Lower Band Edge Plot (Band 5 – 5.0MHz QPSK – RB Size 25)

PNO: Wide Trig: Free Run Atten: 36 dB #Avg Type: RMS Trace B 34 store Frequency 0 dB/div Ref 25.00 dBm -29.43 dBm -29.44 dBm -29.44 dBm -	Agilent Spectru													
PNO: Wide	X/RL	RF	50 Ω .	AC	CORREC		SE	NSE:INT	#Aug T	ALIGNAUTO			F	Frequency
Mkr1 823.000 MHz Auto Tu 0 gB/div Ref 25.00 dBm -29.43 dBm Center Fr 150					PNO: Wi	de ↔			morg i	ibe: I ano	TYI	PE M WATAWAT		
Wirk T 823.0000 Wirkz -29.43 dBm -29.43 dBm -150 -100 -100 -100 -100 -100 -100 -100 -100 -100 -100 -100 -1100 -1100 -1100 -1100 -1100 -1100 -1100 -1100 -1100 -1100 -1100 <					IFGain:L	ow	Atten: 30	5 dB						
Cog Center Fr 150										Mk	r1 823.0	00 MHz		Auto Tune
150 Image: Conter Fr 500 Image: Conter Fr 600 Image: Conter Fr 600 Image: Conter Fr 600 Image: Conter Fr 600 Image: Conter <tr< td=""><td>10 dB/div</td><td>Ref 25</td><td>5.00 dB</td><td>m</td><td></td><td></td><td></td><td></td><td></td><td></td><td>-29.</td><td>43 dBm</td><td></td><td></td></tr<>	10 dB/div	Ref 25	5.00 dB	m							-29.	43 dBm		
150 821.00000 M 500 Start Fr 500 1300 den -150 -1300 den -250 -1300 den -360 -1300 den -450 -1300 den -400 den -1300 den<														0
500	15.0													
-5.00 -13.00 dem Start Fr -15.0 -13.00 dem -13.00 dem -25.0 -13.00 dem -13.00 dem -35.0 -13.00 dem -13.00 dem -56.0 -13.00 dem -13.00 dem	15.0												82	21.000000 MHz
-5.00 -13.00 dem Start Fr -15.0 -13.00 dem -13.00 dem -25.0 -13.00 dem -13.00 dem -35.0 -13.00 dem -13.00 dem -56.0 -13.00 dem -13.00 dem	F 00													
-500 -1300000 M 150 -1300000 M 250 -1300000 M 350 -1100000 M 4500 -1100000 M 4500 -1100000 M 4500 -1100000 M 4500 -11000000 M 4500 -1100000 M 4000.0000 M -110000 M 4000.000 M -110000 M 4000000 M -	5.00													Start Freq
-5.00													81	
-150 -150 -150 -150 -150 1 Stop Fr 823,00000 M -250 -150 -150 -150 -150 -150 1	-5.00													13.000000 Mil 12
250 1<												-13.00 dBm		
250 1 823.00000 M 350 CF St 400.000 k 450 1 1 650 1 1 650 1 1	-15.0													Stop Freq
-35.0 -45.0 -65.0 -75.0 -75.0 -75.0 -75.0 -75.0 -75.0 -75.0 -75.0 -75.0 -7													82	3.000000 MHz
-35.0 -400.000 k -45.0 -400.000 k -65.0 -65.0 -65.0 -65.0	-25.0											1 <mark>/</mark>		
-35.0 -400.000 k -45.0 -400.000 k -65.0 -65.0 -65.0 -65.0														05.00
45.0 Auto Muto Muto <th< td=""><td>-35.0</td><td></td><td></td><td>,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>400.000 kHz</td></th<>	-35.0			,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,										400.000 kHz
65.0 Freq Offs 66.0 1													Auto	Man
-55.0	-45.0													
-55.0														
	-55.0													
														0 Hz
	-65.0													
Center 821.000 MHz Span 4.000 MHz											Span 4	.000 MHz		
Center 821.000 MHz Span 4.000 MHz #Res BW 100 kHz #VBW 300 kHz #Sweep 3.000 s (1001 pts)	#Res BW	100 kHz	z		#	VBW :	300 kHz	1		#Sweep	3.000 s (1001 pts)		
ASG STATUS	MSG									STATUS	6			

Plot 6-117. Lower Extended Band Edge Plot (Band 5 – 5.0MHz QPSK – RB Size 25)

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		n Analyzer -										
IXI RL		RF	50Ω AC	CORREC	SEN	ISE:INT	#Avg Typ	ALIGN AUTO		4 Mar 23, 2015 E <mark>1 2 3 4 5 6</mark>	F	requency
				PNO: Wide 🖵 IFGain:Low	Trig: Free Atten: 36		***** 3 • ¥F		TYF DE			Auto Tune
10 dB Log r	3/div	Ref 25	.00 dBm					Mk	r1 849.0 -26.1	00 MHz 32 dBm		Auto Tune
15.0 -												Center Freq 9.000000 MHz
5.00 -5.00	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~			**************************************							84	Start Freq 7.000000 MHz
-15.0 -						1				-13.00 dBm	85	Stop Freq 1.000000 MHz
-35.0 -						Marian .			and the second	terre there are an	<u>Auto</u>	CF Step 400.000 kHz Man
-45.0 -55.0												Freq Offset 0 Hz
-65.0 -												
Cent #Res	ter 84 s BW	9.000 M 51 kHz	Hz	#VBW	/ 150 kHz			#Sweep	Span 4 1.000 s (.000 MHz 1001 pts)		
MSG								STATU	3			

Plot 6-118. Upper Band Edge Plot (Band 5 – 5.0MHz QPSK – RB Size 25)



Plot 6-119. Upper Extended Band Edge Plot (Band 5 – 5.0MHz QPSK – RB Size 25)

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Plot 6-120. Lower Band Edge Plot (Band 5 – 10.0MHz QPSK – RB Size 50)



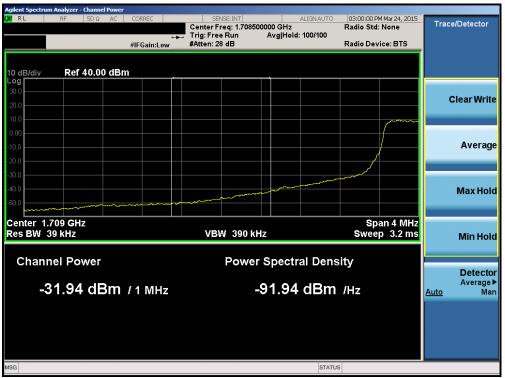
Plot 6-121. Upper Band Edge Plot (Band 5 – 10.0MHz QPSK – RB Size 50)

FCC ID: ZNFH636		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	💽 LG	Reviewed by: Quality Manager		
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Plot 6-122. Lower Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 6)



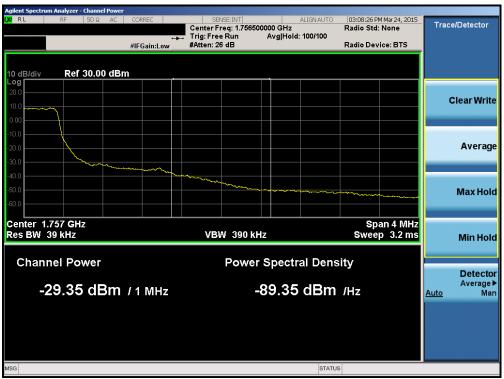
Plot 6-123. Lower Extended Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 6)

FCC ID: ZNFH636		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	💽 LG	Reviewed by: Quality Manager
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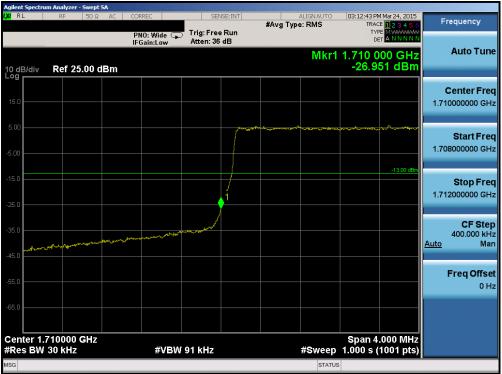
Plot 6-124. Upper Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 6)



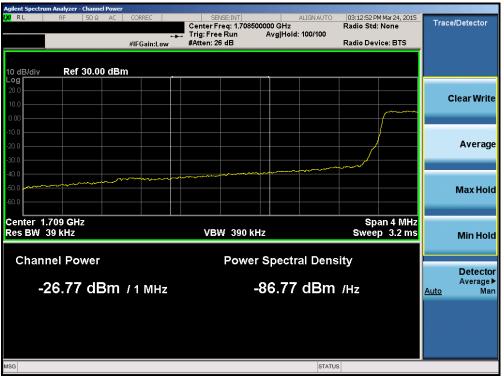
Plot 6-125. Upper Extended Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 6)

FCC ID: ZNFH636		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	💽 LG	Reviewed by: Quality Manager			
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Plot 6-126. Lower Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)



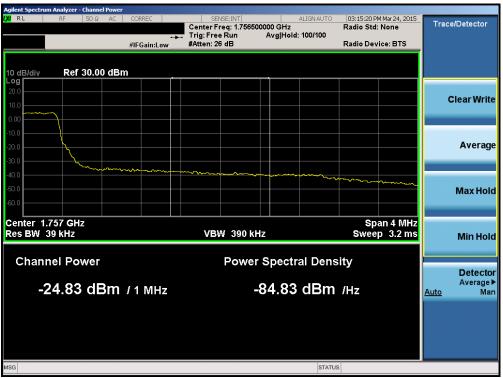
Plot 6-127. Lower Extended Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)

FCC ID: ZNFH636		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	💽 LG	Reviewed by: Quality Manager
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	rum Analyzer - Swept S									
L <mark>XI</mark> RL	RF 50 Ω	AC CC	ORREC	SEI	ISE:INT	#Avg Typ	ALIGNAUTO		4 Mar 24, 2015 E 1 2 3 4 5 6	Frequency
	_		NO: Wide 😱 Gain:Low	Trig: Free Atten: 36				TYF DE		
10 dB/div Log	Ref 25.00 dl	Bm					Mkr1	1.755 0 -25.	04 GHz 72 dBm	Auto Tune
15.0										Center Freq 1.755000000 GHz
-5.00	and a second and a second s		m to the second s						-13.00 dBm	Start Freq 1.753000000 GHz
-15.0					1					Stop Freq 1.757000000 GHz
-35.0					Law and the second seco	and the second states of the s	and the manders the sec		(f ^{ano} sner ^{ation} theory).	CF Step 400.000 kHz <u>Auto</u> Man
-55.0										Freq Offset 0 Hz
-65.0	.755000 GHz							Snan 4	.000 MHz	
#Res BV			#VBW	91 kHz			#Sweep	1.000 s (1001 pts)	
MSG							STATUS			

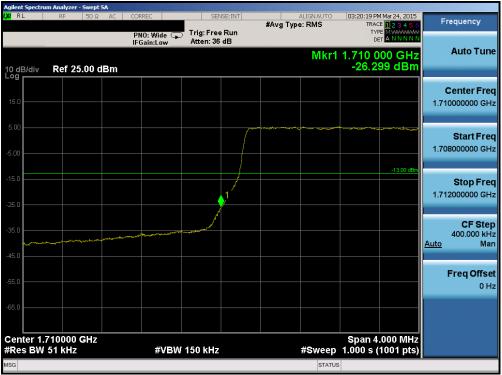
Plot 6-128. Upper Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)



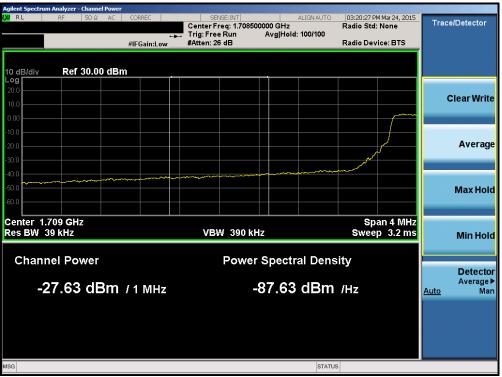
Plot 6-129. Upper Extended Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)

FCC ID: ZNFH636		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	💽 LG	Reviewed by: Quality Manager
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Plot 6-130. Lower Band Edge Plot (Band 4 – 5.0MHz QPSK – RB Size 25)



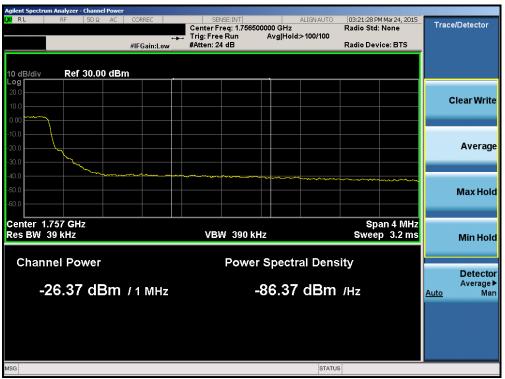
Plot 6-131. Lower Extended Band Edge Plot (Band 4 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFH636		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	💽 LG	Reviewed by: Quality Manager
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Plot 6-132. Upper Band Edge Plot (Band 4 – 5.0MHz QPSK – RB Size 25)



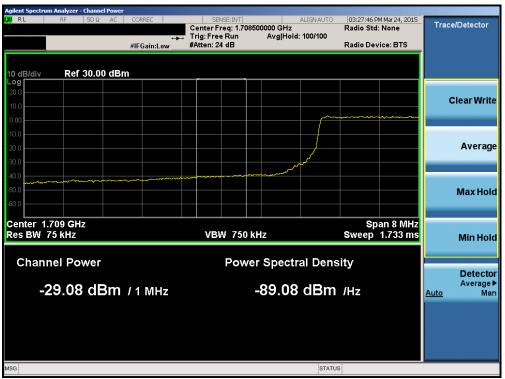
Plot 6-133. Upper Extended Band Edge Plot (Band 4 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFH636		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	💽 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 91 of 129
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Plot 6-134. Lower Band Edge Plot (Band 4 – 10.0MHz QPSK – RB Size 50)



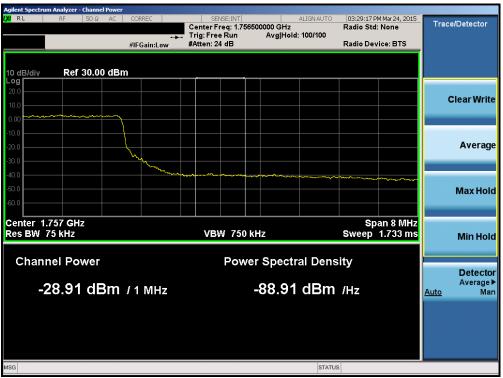
Plot 6-135. Lower Extended Band Edge Plot (Band 4 – 10.0MHz QPSK – RB Size 50)

FCC ID: ZNFH636		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	💽 LG	Reviewed by: Quality Manager
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Plot 6-136. Upper Band Edge Plot (Band 4 – 10.0MHz QPSK – RB Size 50)



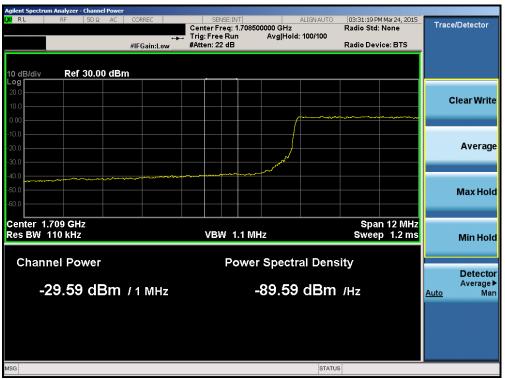
Plot 6-137. Upper Extended Band Edge Plot (Band 4 – 10.0MHz QPSK – RB Size 50)

FCC ID: ZNFH636		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	💽 LG	Reviewed by: Quality Manager
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Plot 6-138. Lower Band Edge Plot (Band 4 – 15.0MHz QPSK – RB Size 75)



Plot 6-139. Lower Extended Band Edge Plot (Band 4 – 15.0MHz QPSK – RB Size 75)

FCC ID: ZNFH636		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	💽 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dego 94 of 129
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Plot 6-140. Upper Band Edge Plot (Band 4 – 15.0MHz QPSK – RB Size 75)



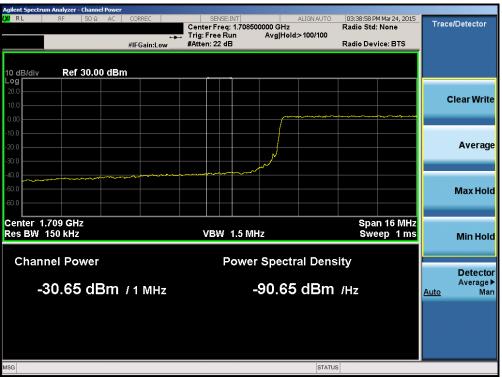
Plot 6-141. Upper Extended Band Edge Plot (Band 4 – 15.0MHz QPSK – RB Size 75)

FCC ID: ZNFH636		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	💽 LG	Reviewed by: Quality Manager
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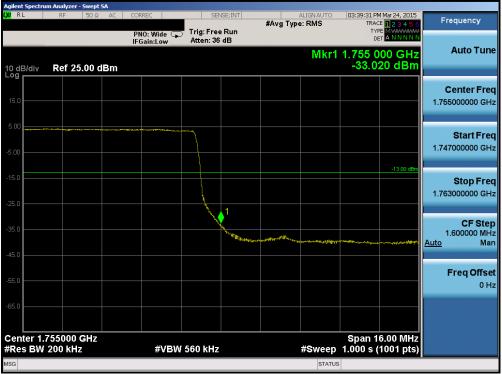
Plot 6-142. Lower Band Edge Plot (Band 4 – 20.0MHz QPSK – RB Size 100)



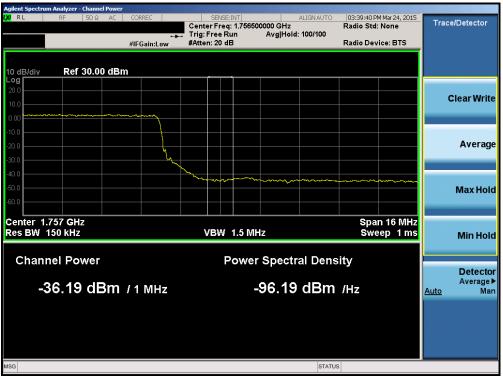
Plot 6-143. Lower Extended Band Edge Plot (Band 4 – 20.0MHz QPSK – RB Size 100)

FCC ID: ZNFH636		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	💽 LG	Reviewed by: Quality Manager
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Plot 6-144. Upper Band Edge Plot (Band 4 – 20.0MHz QPSK – RB Size 100)



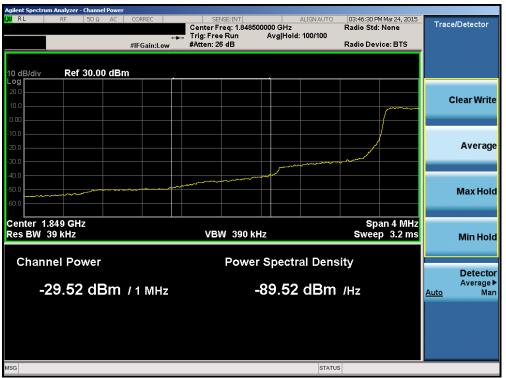
Plot 6-145. Upper Extended Band Edge Plot (Band 4 – 20.0MHz QPSK – RB Size 100)

FCC ID: ZNFH636		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 129
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Plot 6-146. Lower Band Edge Plot (Band 2 – 1.4MHz QPSK – RB Size 6)



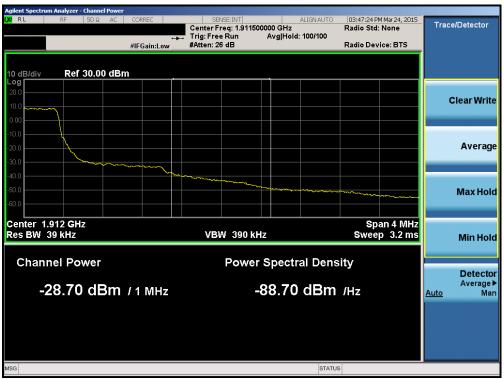
Plot 6-147. Lower Extended Band Edge Plot (Band 2 – 1.4MHz QPSK – RB Size 6)

FCC ID: ZNFH636		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	💽 LG	Reviewed by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dego 99 of 129	
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Plot 6-148. Upper Band Edge Plot (Band 2 – 1.4MHz QPSK – RB Size 6)



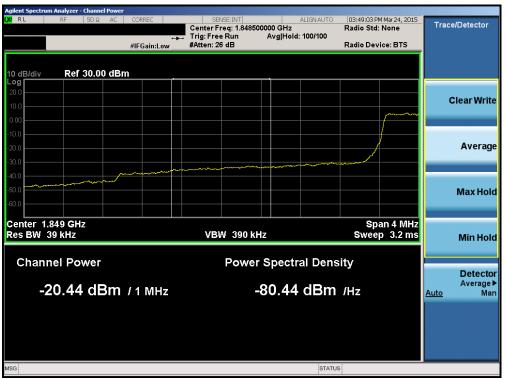
Plot 6-149. Upper Extended Band Edge Plot (Band 2 – 1.4MHz QPSK – RB Size 6)

FCC ID: ZNFH636		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	💽 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 90 of 129
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Plot 6-150. Lower Band Edge Plot (Band 2 – 3.0MHz QPSK – RB Size 15)



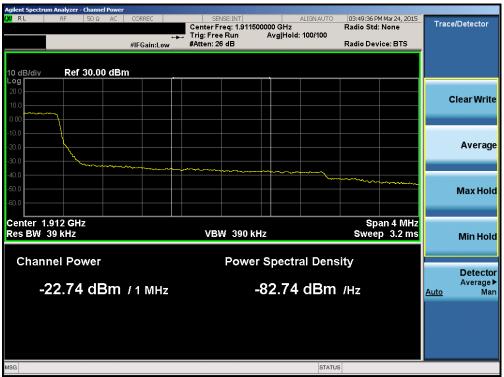
Plot 6-151. Lower Extended Band Edge Plot (Band 2 – 3.0MHz QPSK – RB Size 15)

FCC ID: ZNFH636		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	💽 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 00 of 129
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Plot 6-152. Upper Band Edge Plot (Band 2 – 3.0MHz QPSK – RB Size 15)



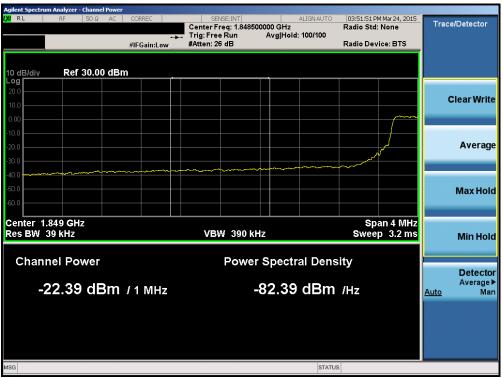
Plot 6-153. Upper Extended Band Edge Plot (Band 2 – 3.0MHz QPSK – RB Size 15)

FCC ID: ZNFH636		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	💽 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 01 of 129
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Plot 6-154. Lower Band Edge Plot (Band 2 – 5.0MHz QPSK – RB Size 25)



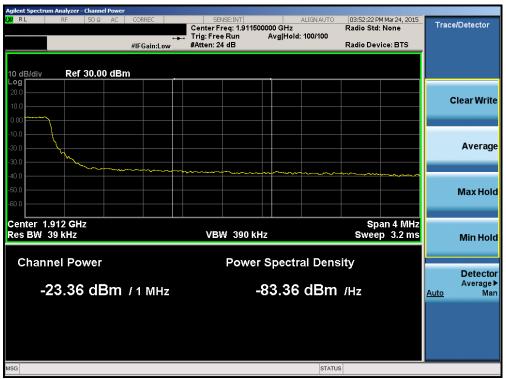
Plot 6-155. Lower Extended Band Edge Plot (Band 2 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFH636		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	💽 LG	Reviewed by: Quality Manager
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Plot 6-156. Upper Band Edge Plot (Band 2 – 5.0MHz QPSK – RB Size 25)



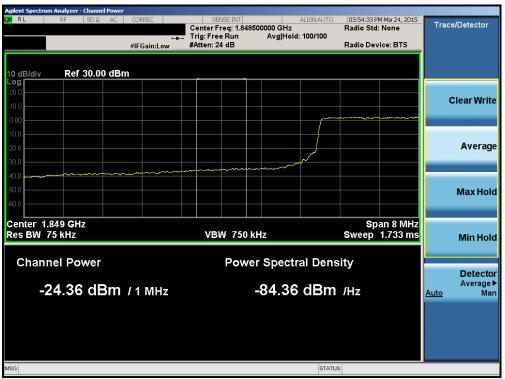
Plot 6-157. Upper Extended Band Edge Plot (Band 2 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFH636		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	💽 LG	Reviewed by: Quality Manager
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Plot 6-158. Lower Band Edge Plot (Band 2 – 10.0MHz QPSK – RB Size 50)



Plot 6-159. Lower Extended Band Edge Plot (Band 2 – 10.0MHz QPSK – RB Size 50)

FCC ID: ZNFH636		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	💽 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 04 of 129
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Plot 6-160. Upper Band Edge Plot (Band 2 – 10.0MHz QPSK – RB Size 50)



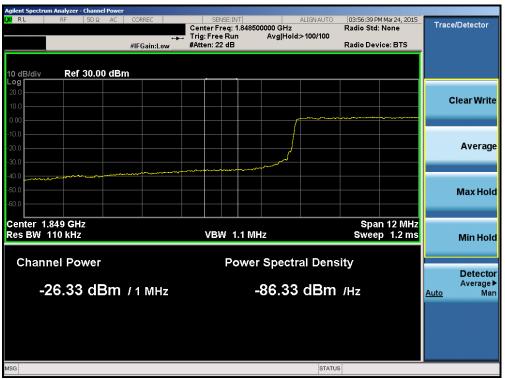
Plot 6-161. Upper Extended Band Edge Plot (Band 2 – 10.0MHz QPSK – RB Size 50)

FCC ID: ZNFH636		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	💽 LG	Reviewed by: Quality Manager
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Plot 6-162. Lower Band Edge Plot (Band 2 – 15.0MHz QPSK – RB Size 75)



Plot 6-163. Lower Extended Band Edge Plot (Band 2 – 15.0MHz QPSK – RB Size 75)

FCC ID: ZNFH636		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	💽 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 06 of 129
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Plot 6-164. Upper Band Edge Plot (Band 2 – 15.0MHz QPSK – RB Size 75)



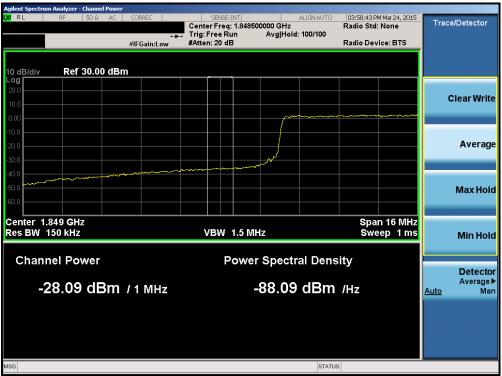
Plot 6-165. Upper Extended Band Edge Plot (Band 2 – 15.0MHz QPSK – RB Size 75)

FCC ID: ZNFH636		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	💽 LG	Reviewed by: Quality Manager
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Plot 6-166. Lower Band Edge Plot (Band 2 – 20.0MHz QPSK – RB Size 100)



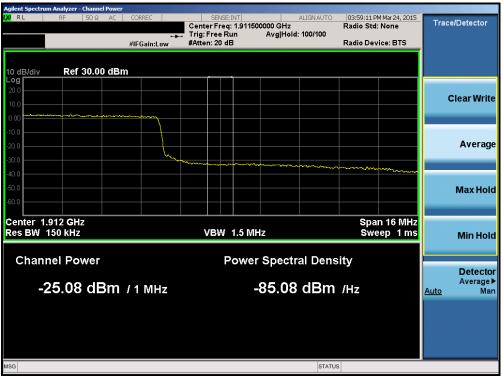
Plot 6-167. Lower Extended Band Edge Plot (Band 2 – 20.0MHz QPSK – RB Size 100)

FCC ID: ZNFH636		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	💽 LG	Reviewed by: Quality Manager
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Plot 6-168. Upper Band Edge Plot (Band 2 – 20.0MHz QPSK – RB Size 100)



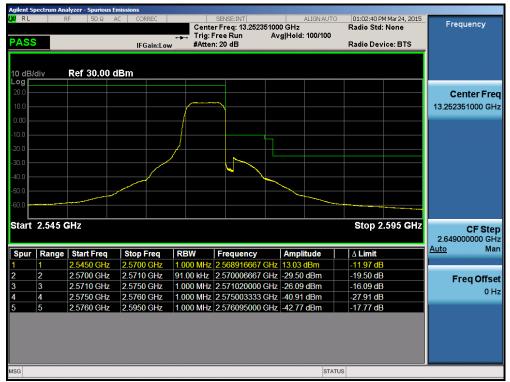
Plot 6-169. Upper Extended Band Edge Plot (Band 2 – 20.0MHz QPSK – RB Size 100)

FCC ID: ZNFH636		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	💽 LG	Reviewed by: Quality Manager
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<mark>k/</mark> RL		a <mark>lyzer - Spurio</mark> F 50 Ω	AC	CORREC			SENSE:IN	Т		ALIGN AUTO	01:01:4:	1 PM Mar 24, 2015	_
								3.2523510			Radio S	td: None	Frequency
ASS							Free Run n:20 dB	A 1	vg Hold	100/100	De die D	evice: BTS	
				IFGain:	_0W	#Atte	n: 20 aB				Radio D	evice: B15	
0 dB/	div	Ref 39.0	0 dBn	n									
-og 🗖													
29.0													Center Fre
19.0													13.252351000 GH
9.00 L													
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21.0													
31.0									hum				
41.0					-				<u> </u>	and a start of the			
51.0													
Start	2.475 0	GHz									Stop	2.525 GHz	CF Ste
													2.649000000 GH
_									1				Auto Ma
Spur	Range	Start Free		top Freq		RBW	Freque		Ampl		∆ Limit		
	1	2.4750 GH		4940 GHz		.000 MHz					-15.18		
2	2	2.4940 GH		4960 GHz		.000 MHz					-18.43		Freq Offse
3	3	2.4960 GH		4990 GHz		.000 MHz					-11.43		он
<u> </u>	4	2.4990 GH		5000 GHz		1.00 kHz					-18.03		
5	5	2.5000 GH	z 2.	5250 GHz	z 2	240.0 kHz	2.50441	6667 GHz	7.719	dBm	-17.28	dB	
-			_	_	_		_		_	STATU			
SG													

Plot 6-170. Lower ACP Plot (Band 7 – 5.0MHz QPSK – RB Size 25)



Plot 6-171. Upper ACP Plot (Band 7 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFH636		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	💽 LG	Reviewed by: Quality Manager
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Agilent Spectri <mark>XI</mark> RL	RF	50 Ω		RREC		SENSE:INT			ALIGN AUTO		PM Mar 24, 2015	Attenu	ation
Mech At	ten 22	2 dB				er Freq: 2.535 Free Run			100/100	Radio Sto	l: None	Allenu	allon
PASS			IF	Gain:Low		n: 22 dB	~~	giriora.	100/100	Radio De	vice: BTS	Med	h Atten
													22 dB
10 dB/div	R	ef 30.00	dBm										
Log													
20.0													
10.0													
0.00													
						ſ		1					
-10.0								1					
-20.0													
-30.0						1/			~~~~				
-40.0													
										~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	- marken	Adju	st Atten
-50.0												-	Ain Clip
-60.0												1011	nin onp
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Start 2.4	ii o Gr	Z								Stop /	2.525 GHz		
Cour Do		start Freq	Stop	Ere e	RBW	Frequency		Ampli	ituda	∆ Limit			
Spur Ra		4750 GHz	2.490			2.49031916				-14.86 dl	•		
2 2		4905 GHz	2.490			2.49031910				-14.80 d			
3 3		4960 GHz	2.499			2.49865000				-15.44 d		Mech Att	
4 4		4990 GHz	2.500			2.49999666				-19.51 d		<u>2 dB</u>	10 dB
5 5		5000 GHz	_			2.50933333				-20.19 d			
					1								
												Max N	
												-10.	
MSG									STATU	s			

Plot 6-172. Lower ACP Plot (Band 7 – 10.0MHz QPSK – RB Size 50)



Plot 6-173. Upper ACP Plot (Band 7 – 10.0MHz QPSK – RB Size 50)

FCC ID: ZNFH636		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	💽 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 101 of 129
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Agilent S XI RL		alyzer - Spurio					05105.00	-			01.15.00		
KL.	1	F 50 Ω	AC	CORREC		Cente	SENSE:IN er Freg: 2		00 GHz	ALIGN AUTO	Radio St	PM Mar 24, 2015	Frequency
DAOC					- <b>-</b>	Trig:	Free Run			: 100/100			
PASS	<u> </u>			IFGain:L	ow	#Atte	n: 20 dB				Radio De	evice: BTS	
10 dB/	div	Ref 30.0	0 dBm	1									
Log													
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-10.0													
-20.0													
-30.0											L.		
40.0			- /										
-50.0													
-60.0													
∟ Start	2.475 (	247									Ston	2.525 GHz	
ອເລາ ເ	2.473	9112									atop	2.525 GHZ	CF St 5.000000 M
									_				<u>Auto</u> M
Spur	Range			top Freq	RB		Freque			litude	∆ Limit		<u>//dto</u>
1	1	2.4750 GH		1905 GHz			2.49042				-9.034 c		
2	2	2.4905 GH		1960 GHz			2.49598				-16.86 c		Freq Offs
3	3	2.4960 GH		1990 GHz			2.49891				-17.38 0		0
4 5	4	2.4990 GH		5000 GHz			2.49996				-19.95 0		
C	5	2.5000 GH	1Z Z.S	5250 GHz	240	.U KHZ	2.51379	1007 GH	Z   3.133	abm	-21.87 c	10	
ISG										STATU	JS		
_		Plot 6-					1 (D		45.4		DOI	PR Sizo	75)

Plot 6-174. Lower ACP Plot (Band 7 – 15.0MHz QPSK – RB Size 75)



Plot 6-175. Upper ACP Plot (Band 7 – 15.0MHz QPSK – RB Size 75)

FCC ID: ZNFH636		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	💽 LG	Reviewed by: Quality Manager
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Agilent Sp XI R L	ectrum Ana	lyzer - Spurio F 50 Ω	AC	CORREC			SENSE:INT			ALIGN AUTO	01-21-1	2 PM Mar 24, 2015	-	
		.   JU 32	AC	CORREC		Cente	er Freg: 2.			ALIGNAOTO		td: None	Frequency	<b>y</b>
PASS					+		Free Run	A	/g Hold:	: 100/100				
-455				IFGain:L	ow	#Atter	n:20 dB				Radio D	evice: BTS		
10 dB/o	div	Ref 40.0	0 dBm	<b>`</b>										
30.0													Center I	Fre
20.0													2.535000000	
													2.00000000	UT I
10.0														
0.00														
-10.0														
-20.0														
- H-														
-30.0														
-40.0														
-50.0														
00.0														
Start	2.475 0	Hz									Stop	2.525 GHz	05.0	24
													CF \$ 5.000000	
_					_				1				Auto	Mar
Spur	Range	Start Free		top Freq	RE		Freque		Ampl		∆ Limi			
1	1	2.4750 GH		1905 GHz			2.49021				-8.538			
2	2	2.4905 GH		1960 GHz			2.49589				-16.65		Freq Of	ffse
3	3	2.4960 GH		1990 GHz			2.49867				-18.71			0 H;
4	4	2.4990 GH		5000 GHz			2.49993				-21.05			
5	5	2.5000 GH	z 2.5	5250 GHz	240	0.0 kHz	2.51304	1667 GHz	1.943	dBm	-23.06	dB		
ISG		_	_		_	_			_	STATU	IS			
30										STATU				

Plot 6-176. Lower ACP Plot (Band 7 – 20.0MHz QPSK – RB Size 100)



Plot 6-177. Upper ACP Plot (Band 7 – 20.0MHz QPSK – RB Size 100)

FCC ID: ZNFH636		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	💽 LG	Reviewed by: Quality Manager
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## 6.5 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 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.

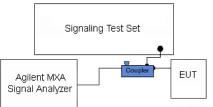


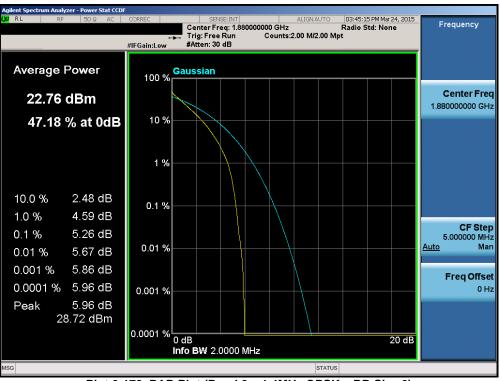
Figure 6-4. Test Instrument & Measurement Setup

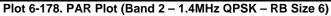
## Test Notes

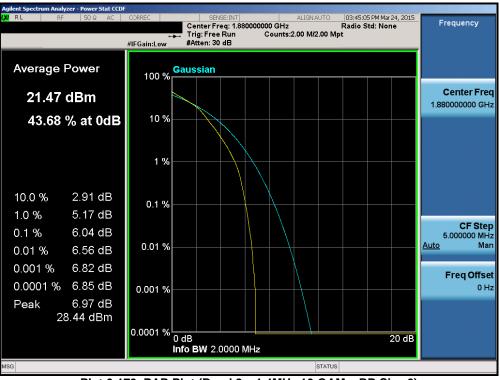
None.

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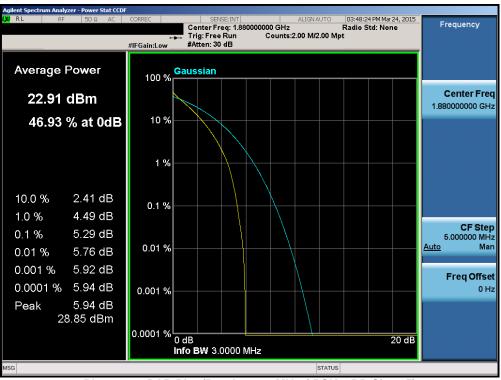


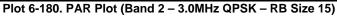


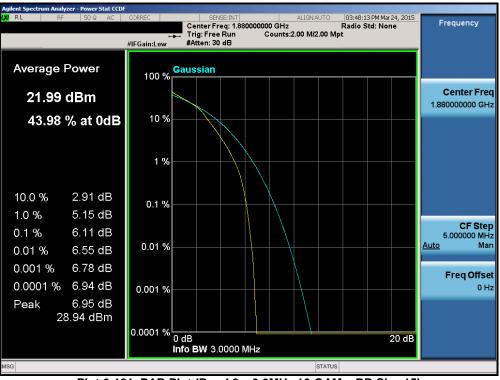
Plot 6-179. PAR Plot (Band 2 – 1.4MHz 16-QAM – RB Size 6)

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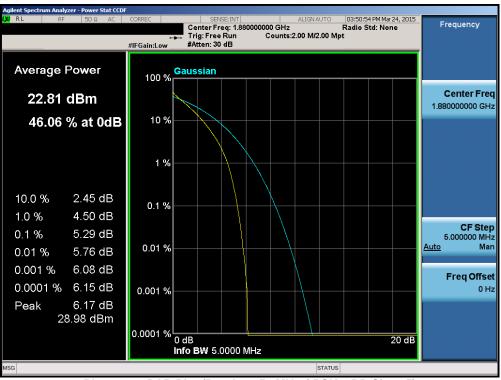


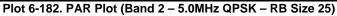


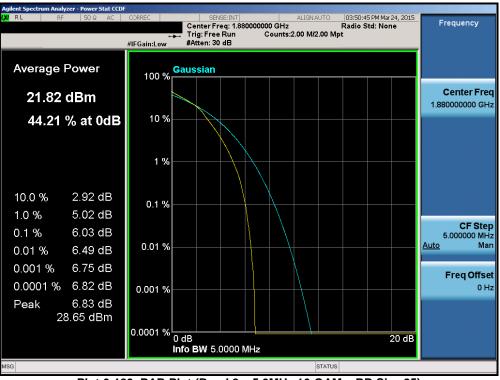
Plot 6-181. PAR Plot (Band 2 - 3.0MHz 16-QAM - RB Size 15)

FCC ID: ZNFH636		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	💽 LG	Reviewed by: Quality Manager	
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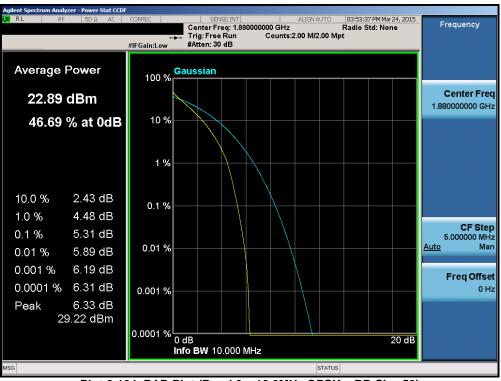


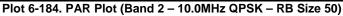


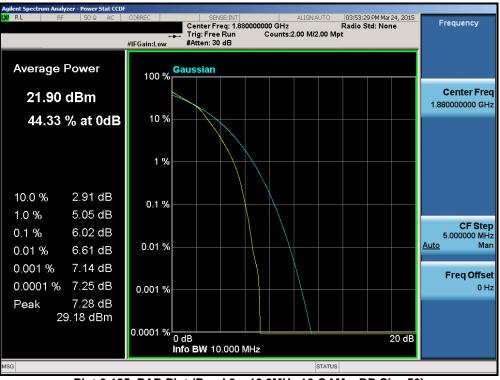
Plot 6-183. PAR Plot (Band 2 - 5.0MHz 16-QAM - RB Size 25)

FCC ID: ZNFH636		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	💽 LG	Reviewed by: Quality Manager
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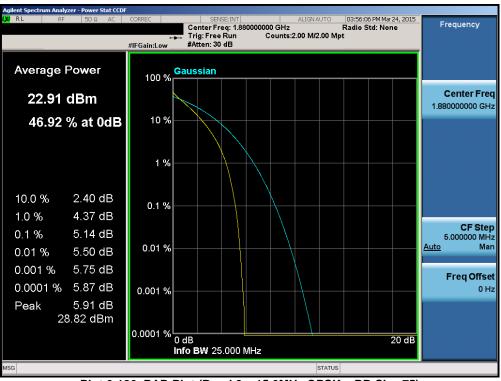


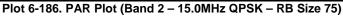


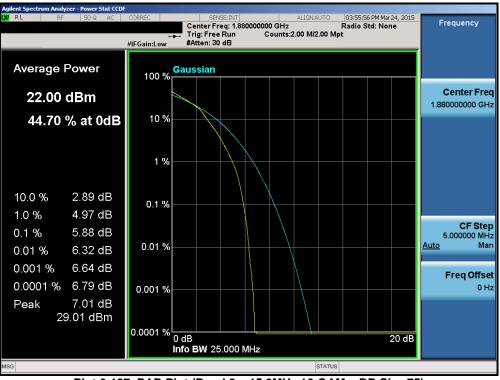
Plot 6-185. PAR Plot (Band 2 - 10.0MHz 16-QAM - RB Size 50)

FCC ID: ZNFH636		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	💽 LG	Reviewed by: Quality Manager
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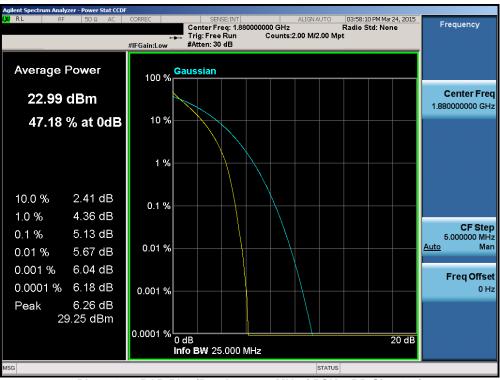


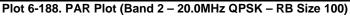


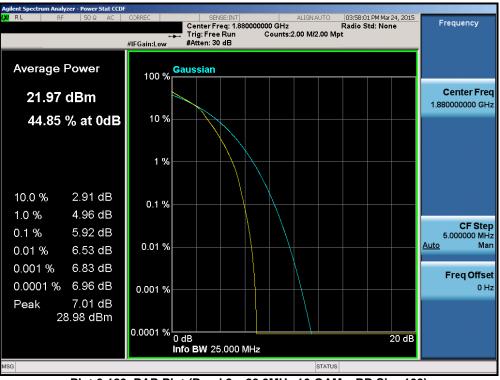
Plot 6-187. PAR Plot (Band 2 - 15.0MHz 16-QAM - RB Size 75)

FCC ID: ZNFH636		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	💽 LG	Reviewed by: Quality Manager		
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Plot 6-189. PAR Plot (Band 2 - 20.0MHz 16-QAM - RB Size 100)

FCC ID: ZNFH636		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Reviewed by: Quality Manager
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## 6.6 Radiated Power (ERP/EIRP) §22.913(a.2) §24.232(c.2) §27.50(h.2) §27.50(c.10) §27.50(d.4)

### **Test Overview**

Effective Radiated Power (ERP) and Equivalent Isotropic Radiated Power (EIRP) measurements are performed using the substitution method described in ANSI/TIA-603-C-2004 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using vertically polarized tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically polarized broadband horn antennas. All measurements are performed as RMS average measurements while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

### Test Procedures Used

KDB 971168 v02r02 - Section 5.2.1

ANSI/TIA-603-C-2004 – Section 2.2.17

### Test Settings

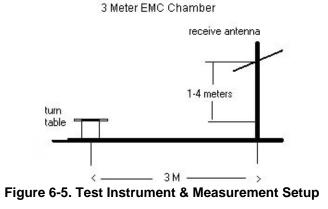
- 1. Radiated power measurements are performed using the signal analyzer's "channel power" measurement capability for signals with continuous operation.
- 2. RBW = 1 5% of the expected OBW, not to exceed 1MHz
- 3. VBW  $\ge$  3 x RBW
- 4. Span = 1.5 times the OBW
- 5. No. of sweep points > 2 x span / 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: ZNFH636		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	💽 LG	Reviewed by: Quality Manager	
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## Test Setup

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



### 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.	Battery	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBd]	Ant. Pol. [H/V]	ERP [dBm]	ERP Limit [dBm]	Margin [dB]
699.70	1.4	QPSK	Standard	3 / 2	17.84	2.71	V	20.55	34.77	-14.22
707.50	1.4	QPSK	Standard	3 / 2	18.02	2.71	V	20.73	34.77	-14.04
715.30	1.4	QPSK	Standard	3 / 2	17.46	2.71	V	20.17	34.77	-14.60
699.70	1.4	16-QAM	Standard	3 / 2	17.43	2.71	V	20.14	34.77	-14.63
707.50	1.4	16-QAM	Standard	3 / 2	17.49	2.71	V	20.20	34.77	-14.57
715.30	1.4	16-QAM	Standard	3 / 2	16.67	2.71	V	19.38	34.77	-15.39
700.50	3	QPSK	Standard	8 / 4	17.35	2.71	V	20.06	34.77	-14.71
707.50	3	QPSK	Standard	8 / 4	17.57	2.71	V	20.28	34.77	-14.49
714.50	3	QPSK	Standard	1 / 0	17.14	2.71	V	19.85	34.77	-14.92
700.50	3	16-QAM	Standard	8 / 4	16.59	2.71	V	19.30	34.77	-15.47
707.50	3	16-QAM	Standard	8 / 4	16.44	2.71	V	19.15	34.77	-15.62
714.50	3	16-QAM	Standard	1 / 0	16.45	2.71	V	19.16	34.77	-15.61
701.50	5	QPSK	Standard	1 / 24	17.90	2.71	V	20.61	34.77	-14.16
707.50	5	QPSK	Standard	1 / 0	17.98	2.71	V	20.69	34.77	-14.08
713.50	5	QPSK	Standard	1 / 0	17.72	2.71	V	20.43	34.77	-14.34
701.50	5	16-QAM	Standard	1 / 24	17.00	2.71	V	19.71	34.77	-15.06
707.50	5	16-QAM	Standard	1 / 0	17.32	2.71	V	20.03	34.77	-14.74
713.50	5	16-QAM	Standard	1 / 0	16.51	2.71	V	19.22	34.77	-15.55
704.00	10	QPSK	Standard	1 / 49	18.20	2.71	V	20.91	34.77	-13.86
707.50	10	QPSK	Standard	1/0	18.17	2.71	V	20.88	34.77	-13.89
711.00	10	QPSK	Standard	1/0	18.12	2.71	V	20.83	34.77	-13.94
704.00	10	16-QAM	Standard	1 / 49	17.51	2.71	V	20.22	34.77	-14.55
707.50	10	16-QAM	Standard	1/0	17.28	2.71	V	19.99	34.77	-14.78
711.00	10	16-QAM	Standard	1/0	17.56	2.71	V	20.27	34.77	-14.50

Table 6-2. ERP Data (Band 12)

FCC ID: ZNFH636		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	💽 LG	Reviewed by: Quality Manager	
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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Battery	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBd]	Ant. Pol. [H/V]	ERP [dBm]	ERP Limit [dBm]	Margin [dB]
824.70	1.4	QPSK	Standard	3 / 2	16.63	3.06	V	19.69	38.45	-18.76
836.50	1.4	QPSK	Standard	3 / 2	15.18	3.15	V	18.33	38.45	-20.13
848.30	1.4	QPSK	Standard	3 / 2	11.93	3.23	V	15.16	38.45	-23.29
824.70	1.4	16-QAM	Standard	3 / 2	15.51	3.06	V	18.57	38.45	-19.88
836.50	1.4	16-QAM	Standard	3 / 2	14.11	3.15	V	17.26	38.45	-21.20
848.30	1.4	16-QAM	Standard	3 / 2	10.99	3.23	V	14.22	38.45	-24.23
825.50	3	QPSK	Standard	1 / 14	15.96	3.06	V	19.02	38.45	-19.43
836.50	3	QPSK	Standard	1 / 0	14.78	3.15	V	17.93	38.45	-20.53
847.50	3	QPSK	Standard	1 / 0	11.97	3.23	V	15.20	38.45	-23.25
825.50	3	16-QAM	Standard	1 / 14	14.11	3.06	V	17.17	38.45	-21.28
836.50	3	16-QAM	Standard	1 / 0	14.14	3.15	V	17.29	38.45	-21.17
847.50	3	16-QAM	Standard	1 / 0	10.81	3.23	V	14.04	38.45	-24.41
826.50	5	QPSK	Standard	1 / 0	16.00	3.06	V	19.06	38.45	-19.39
836.50	5	QPSK	Standard	1 / 0	15.44	3.15	V	18.59	38.45	-19.87
846.50	5	QPSK	Standard	1 / 0	13.04	3.23	V	16.27	38.45	-22.18
826.50	5	16-QAM	Standard	1 / 0	14.30	3.06	V	17.36	38.45	-21.09
836.50	5	16-QAM	Standard	1 / 0	13.91	3.15	V	17.06	38.45	-21.40
846.50	5	16-QAM	Standard	1 / 0	11.27	3.23	V	14.50	38.45	-23.95
829.00	10	QPSK	Standard	1/0	16.71	3.06	V	19.77	38.45	-18.68
836.50	10	QPSK	Standard	1/0	16.00	3.15	V	19.15	38.45	-19.31
844.00	10	QPSK	Standard	1/0	14.45	3.23	V	17.68	38.45	-20.77
829.00	10	16-QAM	Standard	1/0	14.73	3.06	V	17.79	38.45	-20.66
836.50	10	16-QAM	Standard	1/0	14.79	3.15	V	17.94	38.45	-20.52
844.00	10	16-QAM	Standard	1/0	13.20	3.23	V	16.43	38.45	-22.02

Table 6-3. ERP Data (Band 5)

FCC ID: ZNFH636		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	💽 LG	Reviewed by: Quality Manager
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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Battery	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	Ant. Pol. [H/V]	EIRP [dBm]	EIRP Limit [dBm]	Margin [dB]
1710.70	1.4	QPSK	Standard	3/2	15.34	9.29	V	24.63	30.00	-5.37
1732.50	1.4	QPSK	Standard	3 / 2	14.94	9.34	V	24.28	30.00	-5.72
1754.30	1.4	QPSK	Standard	3 / 2	14.46	9.38	V	23.84	30.00	-6.16
1710.70	1.4	16-QAM	Standard	3 / 2	14.21	9.29	V	23.50	30.00	-6.50
1732.50	1.4	16-QAM	Standard	3/2	14.00	9.34	V	23.34	30.00	-6.66
1754.30	1.4	16-QAM	Standard	3/2	13.05	9.38	V	22.43	30.00	-7.57
1711.50	3	QPSK	Standard	1/0	14.77	9.29	V	24.06	30.00	-5.94
1732.50	3	QPSK	Standard	1/0	14.48	9.34	V	23.82	30.00	-6.18
1753.50	3	QPSK	Standard	1 / 0	13.72	9.38	V	23.10	30.00	-6.90
1711.50	3	16-QAM	Standard	1 / 0	13.04	9.29	V	22.33	30.00	-7.67
1732.50	3	16-QAM	Standard	1 / 0	12.75	9.34	V	22.09	30.00	-7.91
1753.50	3	16-QAM	Standard	1/0	12.87	9.38	V	22.25	30.00	-7.75
1712.50	5	QPSK	Standard	1 / 24	14.86	9.29	V	24.15	30.00	-5.85
1732.50	5	QPSK	Standard	1 / 0	14.74	9.34	V	24.08	30.00	-5.92
1752.50	5	QPSK	Standard	1 / 24	14.29	9.38	V	23.67	30.00	-6.33
1712.50	5	16-QAM	Standard	1 / 24	13.34	9.29	V	22.63	30.00	-7.37
1732.50	5	16-QAM	Standard	1 / 0	13.20	9.34	V	22.54	30.00	-7.46
1752.50	5	16-QAM	Standard	1 / 24	12.85	9.38	V	22.23	30.00	-7.77
1715.00	10	QPSK	Standard	1 / 0	15.31	9.29	V	24.60	30.00	-5.40
1732.50	10	QPSK	Standard	1/0	15.12	9.34	V	24.46	30.00	-5.54
1750.00	10	QPSK	Standard	1 / 49	14.37	9.38	V	23.75	30.00	-6.25
1715.00	10	16-QAM	Standard	1 / 0	14.04	9.29	V	23.33	30.00	-6.67
1732.50	10	16-QAM	Standard	1 / 0	13.85	9.34	V	23.19	30.00	-6.81
1750.00	10	16-QAM	Standard	1 / 49	13.75	9.38	V	23.13	30.00	-6.87
1717.50	15	QPSK	Standard	1 / 0	15.47	9.29	V	24.76	30.00	-5.24
1732.50	15	QPSK	Standard	1 / 0	15.70	9.34	V	25.04	30.00	-4.96
1747.50	15	QPSK	Standard	1 / 74	15.00	9.38	V	24.38	30.00	-5.62
1717.50	15	16-QAM	Standard	1/0	14.18	9.29	V	23.47	30.00	-6.53
1732.50	15	16-QAM	Standard	1/0	14.13	9.34	V	23.47	30.00	-6.53
1747.50	15	16-QAM	Standard	1 / 74	13.56	9.38	V	22.94	30.00	-7.06
1720.00	20	QPSK	Standard	1/0	15.32	9.29	V	24.61	30.00	-5.39
1732.50	20	QPSK	Standard	1/0	15.57	9.34	V	24.91	30.00	-5.09
1745.00	20	QPSK	Standard	1 / 99	14.29	9.38	V	23.67	30.00	-6.33
1720.00	20	16-QAM	Standard	1/0	14.42	9.29	V	23.71	30.00	-6.29
1732.50	20	16-QAM	Standard	1/0	13.78	9.34	V	23.12	30.00	-6.88
1745.00	20	16-QAM	Standard	1 / 99	13.61	9.38	V	22.99	30.00	-7.01

## Table 6-4. EIRP Data (Band 4)

FCC ID: ZNFH636		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	💽 LG	Reviewed by: Quality Manager
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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Battery	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	Ant. Pol. [H/V]	EIRP [dBm]	EIRP Limit [dBm]	Margin [dB]
1850.70	1.4	QPSK	Standard	3 / 2	10.21	9.37	V	19.58	33.01	-13.43
1880.00	1.4	QPSK	Standard	3 / 2	12.92	9.33	V	22.25	33.01	-10.76
1909.30	1.4	QPSK	Standard	3 / 2	12.45	9.29	V	21.74	33.01	-11.27
1850.70	1.4	16-QAM	Standard	3 / 2	8.85	9.37	V	18.22	33.01	-14.79
1880.00	1.4	16-QAM	Standard	3 / 2	11.87	9.33	V	21.20	33.01	-11.81
1909.30	1.4	16-QAM	Standard	3 / 2	11.53	9.29	V	20.82	33.01	-12.19
1851.50	3	QPSK	Standard	1 / 0	9.42	9.37	V	18.79	33.01	-14.22
1880.00	3	QPSK	Standard	1 / 0	12.54	9.33	V	21.87	33.01	-11.14
1908.50	3	QPSK	Standard	1 / 0	11.87	9.29	V	21.16	33.01	-11.85
1851.50	3	16-QAM	Standard	1 / 0	8.05	9.37	V	17.42	33.01	-15.59
1880.00	3	16-QAM	Standard	1 / 0	11.57	9.33	V	20.90	33.01	-12.11
1908.50	3	16-QAM	Standard	1 / 0	11.13	9.29	V	20.42	33.01	-12.59
1852.50	5	QPSK	Standard	1 / 0	10.09	9.37	V	19.46	33.01	-13.55
1880.00	5	QPSK	Standard	1 / 24	12.74	9.33	V	22.07	33.01	-10.94
1907.50	5	QPSK	Standard	1 / 0	12.43	9.29	V	21.72	33.01	-11.29
1852.50	5	16-QAM	Standard	1 / 0	8.47	9.37	V	17.84	33.01	-15.17
1880.00	5	16-QAM	Standard	1 / 24	11.85	9.33	V	21.18	33.01	-11.83
1907.50	5	16-QAM	Standard	1 / 0	11.08	9.29	V	20.37	33.01	-12.64
1855.00	10	QPSK	Standard	1 / 49	10.56	9.37	V	19.93	33.01	-13.08
1880.00	10	QPSK	Standard	1 / 49	13.21	9.33	V	22.54	33.01	-10.47
1905.00	10	QPSK	Standard	1 / 0	12.63	9.29	V	21.92	33.01	-11.09
1855.00	10	16-QAM	Standard	1 / 49	9.21	9.37	V	18.58	33.01	-14.43
1880.00	10	16-QAM	Standard	1 / 49	11.47	9.33	V	20.80	33.01	-12.21
1905.00	10	16-QAM	Standard	1 / 0	11.28	9.29	V	20.57	33.01	-12.44
1857.50	15	QPSK	Standard	1 / 74	11.94	9.37	V	21.31	33.01	-11.70
1880.00	15	QPSK	Standard	1 / 74	12.95	9.33	V	22.28	33.01	-10.73
1902.50	15	QPSK	Standard	1 / 74	12.48	9.29	V	21.77	33.01	-11.24
1857.50	15	16-QAM	Standard	1 / 74	10.38	9.37	V	19.75	33.01	-13.26
1880.00	15	16-QAM	Standard	1 / 74	11.25	9.33	v	20.58	33.01	-12.43
1902.50	15	16-QAM	Standard	1 / 74	11.91	9.29	v	21.20	33.01	-11.81
1860.00	20	QPSK	Standard	1 / 99	12.36	9.37	V	21.73	33.01	-11.28
1880.00	20	QPSK	Standard	1 / 99	12.73	9.33	v	22.06	33.01	-10.95
1900.00	20	QPSK	Standard	1 / 99	12.51	9.29	v	21.80	33.01	-11.21
1860.00	20	16-QAM	Standard	1 / 99	11.45	9.37	v	20.82	33.01	-12.19
1880.00	20	16-QAM	Standard	1 / 99	11.69	9.33	v	21.02	33.01	-11.99
1900.00	20	16-QAM	Standard	1 / 99	11.43	9.29	V	20.72	33.01	-12.29

Table 6-5. EIRP Data (Band 2)

FCC ID: ZNFH636		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	💽 LG	Reviewed by: Quality Manager
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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Battery	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	Ant. Pol. [H/V]	EIRP [dBm]	EIRP Limit [dBm]	Margin [dB]
2502.50	5	QPSK	Standard	1 / 0	9.99	9.09	V	19.08	33.01	-13.93
2535.00	5	QPSK	Standard	1 / 0	9.97	8.89	V	18.86	33.01	-14.15
2567.50	5	QPSK	Standard	1 / 0	10.92	8.70	V	19.62	33.01	-13.39
2502.50	5	16-QAM	Standard	1 / 0	8.41	9.09	V	17.50	33.01	-15.51
2535.00	5	16-QAM	Standard	1 / 0	8.33	8.89	V	17.22	33.01	-15.79
2567.50	5	16-QAM	Standard	1 / 0	9.39	8.70	V	18.09	33.01	-14.92
2505.00	10	QPSK	Standard	1 / 0	10.11	9.09	V	19.20	33.01	-13.81
2535.00	10	QPSK	Standard	1 / 49	10.63	8.89	V	19.52	33.01	-13.49
2565.00	10	QPSK	Standard	1 / 49	11.00	8.70	V	19.70	33.01	-13.31
2505.00	10	16-QAM	Standard	1 / 0	9.00	9.09	V	18.09	33.01	-14.92
2535.00	10	16-QAM	Standard	1 / 49	9.19	8.89	V	18.08	33.01	-14.93
2565.00	10	16-QAM	Standard	1 / 49	10.04	8.70	V	18.74	33.01	-14.27
2507.50	15	QPSK	Standard	1 / 74	10.32	9.09	V	19.41	33.01	-13.60
2535.00	15	QPSK	Standard	1 / 74	10.64	8.89	V	19.53	33.01	-13.48
2562.50	15	QPSK	Standard	1 / 0	11.21	8.70	V	19.91	33.01	-13.10
2507.50	15	16-QAM	Standard	1 / 74	9.71	9.09	V	18.80	33.01	-14.21
2535.00	15	16-QAM	Standard	1 / 74	8.72	8.89	V	17.61	33.01	-15.40
2562.50	15	16-QAM	Standard	1 / 74	9.75	8.70	V	18.45	33.01	-14.56
2510.00	20	QPSK	Standard	1 / 99	10.95	9.09	V	20.04	33.01	-12.97
2535.00	20	QPSK	Standard	1 / 99	10.44	8.89	V	19.33	33.01	-13.68
2560.00	20	QPSK	Standard	1/0	11.21	8.70	V	19.91	33.01	-13.10
2510.00	20	16-QAM	Standard	1 / 99	9.40	9.09	V	18.49	33.01	-14.52
2535.00	20	16-QAM	Standard	1 / 99	8.95	8.89	V	17.84	33.01	-15.17
2560.00	20	16-QAM	Standard	1 / 99	9.68	8.70	V	18.38	33.01	-14.63

Table 6-6. EIRP Data (Band 7)

FCC ID: ZNFH636		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	💽 LG	Reviewed by: Quality Manager
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## 6.7 Radiated Spurious Emissions Measurements §2.1053 §22.917(a) §24.238(a) §27.53(g) §27.53(h) §27.53(m)

### **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 v02r02 - Section 5.8

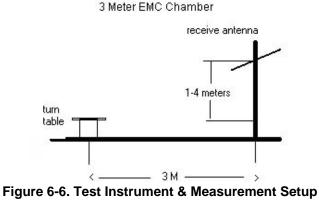
ANSI/TIA-603-C-2004 – Section 2.2.12

### **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

## Test Setup

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



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#### 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.

OPERATING FREQUENCY:	704.	00	MHz
CHANNEL:	2306	60	
MEASURED OUTPUT POWER:	20.91	dBm =	0.123 W
MODULATION SIGNAL:	QPSK		
BANDWIDTH:	10.0	MHz	
DISTANCE:	3	meters	
LIMIT:	43 + 10 log ₁₀ (W) =	33.91	dBc

Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	[dBc]
1408.00	-54.31	5.69	-48.62	Н	69.5
2112.00	-63.92	6.67	-57.24	Н	78.2
2816.00	-64.56	7.82	-56.74	Н	77.6
3520.00	-61.87	7.58	-54.28	Н	75.2
4224.00	-60.32	8.33	-51.99	Н	72.9
4928.00	-60.08	8.72	-51.35	Н	72.3
5632.00	-58.67	8.86	-49.81	Н	70.7
6336.00	-57.66	9.49	-48.17	Н	69.1
7040.00	-55.74	9.60	-46.14	Н	67.1
7744.00	-54.08	9.07	-45.01	Н	65.9

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

FCC ID: ZNFH636		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	💽 LG	Reviewed by: Quality Manager
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OPERATING FREQUENCY:	707.50		MHz
CHANNEL:	2309	95	
MEASURED OUTPUT POWER:	20.88	dBm =	0.122 W
MODULATION SIGNAL:	QPSK		
BANDWIDTH:	10.0	MHz	
DISTANCE:	3	meters	
LIMIT:	43 + 10 log ₁₀ (W) =	33.88	dBc

Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	[dBc]
1415.00	-51.48	5.73	-45.75	Н	66.6
2122.50	-61.54	6.73	-54.81	Н	75.7
2830.00	-61.45	7.80	-53.65	Н	74.5
3537.50	-61.91	7.59	-54.32	Н	75.2

Table 6-8. Radiated Spurious Data (Band 12 – Mid Channel)

OPERATING FREQUENCY:	711.	00	MHz
CHANNEL:	2313	30	_
MEASURED OUTPUT POWER:	20.83	dBm =	0.121 W
MODULATION SIGNAL:	QPSK		
BANDWIDTH:	10.0	MHz	
DISTANCE:	3	meters	
LIMIT:	43 + 10 log ₁₀ (W) =	33.83	dBc

Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	[dBc]
1422.00	-55.81	5.77	-50.04	Н	70.9
2133.00	-63.96	6.79	-57.17	Н	78.0
2844.00	-65.01	7.78	-57.23	Н	78.1

Table 6-9. Radiated Spurious Data (Band 12 – High Channel)

FCC ID: ZNFH636		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	💽 LG	Reviewed by: Quality Manager	
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OPERATING FREQUENCY:	829.00		MHz
CHANNEL:	204	50	
MEASURED OUTPUT POWER:	19.77	dBm =	0.095 W
MODULATION SIGNAL:	QPSK	_	
BANDWIDTH:	10.0	MHz	
DISTANCE:	3	meters	
LIMIT:	43 + 10 log ₁₀ (W) =	32.77	dBc

Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	[dBc]
1658.00	-40.87	6.56	-34.31	Н	54.1
2487.00	-64.40	7.32	-57.08	Н	76.8
3316.00	-62.36	7.39	-54.96	Н	74.7

Table 6-10. Radiated Spurious Data (Band 5 – Low Channel)

OPERATING FREQUENCY:	836.50		MHz
CHANNEL:	2052	25	_
MEASURED OUTPUT POWER:	19.15	dBm =	0.082 W
MODULATION SIGNAL:	QPSK		
BANDWIDTH:	10.0	MHz	
DISTANCE:	3	meters	
LIMIT:	43 + 10 log ₁₀ (W) =	32.15	dBc

Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	[dBc]
1673.00	-41.72	6.55	-35.17	Н	54.3
2509.50	-63.06	7.34	-55.72	Н	74.9
3346.00	-62.55	7.44	-55.11	Н	74.3

Table 6-11. Radiated Spurious Data (Band 5 – Mid Channel)

FCC ID: ZNFH636		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	💽 LG	Reviewed by: Quality Manager	
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OPERATING FREQUENCY:	844.00		MHz
CHANNEL:	2060	00	
MEASURED OUTPUT POWER:	17.68	dBm =	0.059 W
MODULATION SIGNAL:	QPSK	_	
BANDWIDTH:	10.0	MHz	
DISTANCE:	3	meters	
LIMIT:	43 + 10 log ₁₀ (W) =	30.68	dBc

Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	[dBc]
1688.00	-33.09	6.55	-26.54	Н	44.2
2532.00	-65.02	7.35	-57.66	Н	75.3
3376.00	-62.95	7.48	-55.46	Н	73.1

Table 6-12. Radiated Spurious Data (Band 5 – High Channel)

OPERATING FREQUENCY:	1717.50		MHz
CHANNEL:	20025		_
MEASURED OUTPUT POWER:	24.76	dBm =	0.300 W
MODULATION SIGNAL:	QPSK		
BANDWIDTH:	15.0	MHz	
DISTANCE:	3	meters	
LIMIT:	43 + 10 log ₁₀ (W) =	37.76	dBc

Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	[dBc]
3435.00	-51.80	9.69	-42.11	Н	66.9
5152.50	-57.93	10.65	-47.27	Н	72.0
6870.00	-57.29	11.74	-45.55	Н	70.3
8587.50	-53.22	11.04	-42.17	Н	66.9
10305.00	-53.64	12.30	-41.34	Н	66.1

Table 6-13. Radiated Spurious Data (Band 4 – Low Channel)

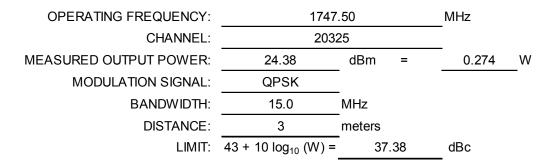
FCC ID: ZNFH636		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	💽 LG	Reviewed by: Quality Manager
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OPERATING FREQUENCY:	1732.50		MHz
CHANNEL:	201	_	
MEASURED OUTPUT POWER:	25.04	dBm =	0.319 W
MODULATION SIGNAL:	QPSK	_	
BANDWIDTH:	15.0	MHz	
DISTANCE:	3	meters	
LIMIT:	43 + 10 log ₁₀ (W) =	38.04	dBc

Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	[dBc]
3465.00	-50.09	9.71	-40.38	Н	65.4
5197.50	-58.19	10.59	-47.61	Н	72.6
6930.00	-57.68	11.75	-45.93	Н	71.0
8662.50	-52.66	11.06	-41.60	Н	66.6
10395.00	-53.95	12.37	-41.57	Н	66.6

Table 6-14. Radiated Spurious Data (Band 4 – Mid Channel)

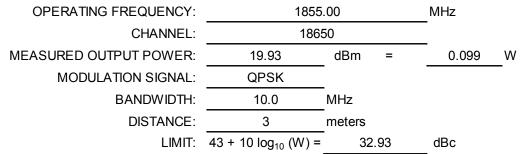


Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	[dBc]			
3495.00	-51.90	9.72	-42.18	Н	66.6			
5242.50	-59.18	10.62	-48.56	Н	72.9			
6990.00	-58.93	11.76	-47.17	Н	71.6			
8737.50	-54.44	11.03	-43.41	Н	67.8			
10485.00	-52.89	12.46	-40.43	Н	64.8			
12232.50	-53.26	13.03	-40.24	Н	64.6			
13980.00	-47.76	11.52	-36.25	Н	60.6			
<u> </u>	hla 6-15 Dadiat	Table 6-15. Radiated Spurious Data (Band 4 – High Channel)						

Table 6-15. Radiated Spurious Data (Band 4 – High Channel)

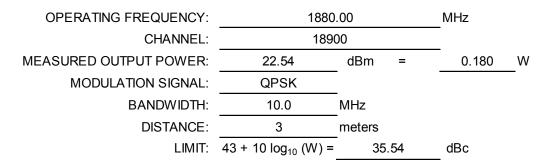
FCC ID: ZNFH636		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕑 LG	Reviewed by: Quality Manager
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Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	[dBc]
3710.00	-50.98	9.41	-41.57	Н	61.5
5565.00	-58.62	10.82	-47.80	Н	67.7
7420.00	-53.31	10.74	-42.58	Н	62.5
9275.00	-53.31	11.59	-41.72	Н	61.7

Table 6-16. Radiated Spurious Data (Band 2 – Low Channel)



Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	[dBc]
3760.00	-51.16	9.28	-41.87	Н	64.4
5640.00	-58.70	11.03	-47.67	Н	70.2
7520.00	-53.18	10.97	-42.21	Н	64.8
9400.00	-53.14	11.53	-41.61	Н	64.2

Table 6-17. Radiated Spurious Data (Band 2 – Mid Channel)

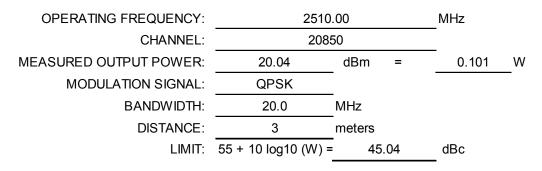
FCC ID: ZNFH636		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	💽 LG	Reviewed by: Quality Manager
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OPERATING FREQUENCY:	1905.00		MHz
CHANNEL:	1915	50	
MEASURED OUTPUT POWER:	21.92	dBm =	0.156 W
MODULATION SIGNAL:	QPSK	_	
BANDWIDTH:	10.0	MHz	
DISTANCE:	3	meters	
LIMIT:	43 + 10 log ₁₀ (W) =	34.92	dBc

Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	[dBc]
3810.00	-49.31	9.19	-40.13	Н	62.1
5715.00	-58.78	11.26	-47.52	Н	69.4
7620.00	-56.41	11.16	-45.25	Н	67.2
9525.00	-54.19	11.76	-42.43	Н	64.4
11430.00	-53.07	12.73	-40.34	Н	62.3
13335.00	-49.89	12.51	-37.38	Н	59.3

Table 6-18. Radiated Spurious Data (Band 2 – High Channel)



Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	[dBc]
5020.00	-50.68	10.91	-39.77	V	59.8
7530.00	-57.41	10.99	-46.42	V	66.5
10040.00	-50.09	12.06	-38.03	V	58.1
12550.00	-53.49	13.55	-39.94	V	60.0
15060.00	-51.83	13.63	-38.20	V	58.2
17570.00	-43.73	11.44	-32.28	V	52.3
20080.00	-68.66	15.88	-52.78	V	72.8

Table 6-19. Radiated Spurious Data (Band 7 – Low Channel)

FCC ID: ZNFH636		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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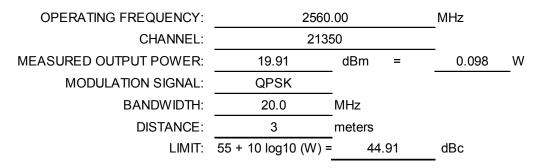
EST Engineering Laboratory, Ir



OPERATING FREQUENCY:	2535	MHz	
CHANNEL:	211		
MEASURED OUTPUT POWER:	19.33	dBm =	0.086 W
MODULATION SIGNAL:	QPSK	_	
BANDWIDTH:	20.0	MHz	
DISTANCE:	3	meters	
LIMIT:	55 + 10 log10 (W) :	= 44.33	dBc

Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	[dBc]
5070.00	-47.25	10.80	-36.45	V	55.8
7605.00	-57.00	11.13	-45.87	V	65.2
10140.00	-51.82	12.14	-39.69	V	59.0
12675.00	-54.53	13.72	-40.81	V	60.1
15210.00	-56.28	14.43	-41.85	V	61.2
17745.00	-41.04	9.90	-31.14	V	50.5
20280.00	-68.57	15.99	-52.58	V	71.9

Table 6-20. Radiated Spurious Data (Band 7 – Mid Channel)



Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	[dBc]
5120.00	-45.15	10.71	-34.44	V	54.4
7680.00	-53.13	11.21	-41.92	V	61.8
10240.00	-53.12	12.24	-40.89	V	60.8
12800.00	-54.21	13.58	-40.63	V	60.5
15360.00	-57.17	15.38	-41.78	V	61.7

Table 6-21. Radiated Spurious Data (Band 7 – High Channel)

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## 6.8 Frequency Stability / Temperature Variation §2.1055 §22.355 §24.235 §27.54

#### **Test Overview and Limit**

Frequency stability testing is performed in accordance with the guidelines of ANSI/TIA-603-C-2004. The frequency stability of the transmitter is measured by:

- a.) **Temperature:** The temperature is varied from -30°C to +50°C in 10°C increments using an environmental chamber.
- b.) **Primary Supply Voltage:** The primary supply voltage is varied from 85% to 115% of the nominal value for non hand-carried battery and AC powered equipment. For hand-carried, battery-powered equipment, primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacturer.

For Part 22, the frequency stability of the transmitter shall be maintained within  $\pm 0.00025\%$  ( $\pm 2.5$  ppm) of the center frequency. For Part 24 and Part 27, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

#### Test Procedure Used

ANSI/TIA-603-C-2004

#### Test Settings

- 1. The carrier frequency of the transmitter is measured at room temperature (20°C to provide a reference).
- 2. The equipment is turned on in a "standby" condition for fifteen minutes before applying power to the transmitter. Measurement of the carrier frequency of the transmitter is made within one minute after applying power to the transmitter.
- 3. Frequency measurements are made at 10°C intervals ranging from -30°C to +50°C. A period of at least one half-hour is provided to allow stabilization of the equipment at each temperature level.

#### Test Setup

The EUT was connected via an RF cable to a spectrum analyzer with the EUT placed inside an environmental chamber.

#### Test Notes

None

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# Band 12 Frequency Stability Measurements §2.1055 §27.54

OPERATING FREQUENCY:	707,500,000	Hz
CHANNEL:	23790	-
REFERENCE VOLTAGE:	3.85	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	707,499,752	-248	-0.0000351
100 %		- 30	707,499,716	-284	-0.0000401
100 %		- 20	707,499,904	-96	-0.0000136
100 %		- 10	707,499,828	-172	-0.0000243
100 %		0	707,500,202	202	0.0000286
100 %		+ 10	707,499,827	-173	-0.0000245
100 %		+ 20	707,500,296	296	0.0000418
100 %		+ 30	707,500,019	19	0.0000027
100 %		+ 40	707,500,256	256	0.0000362
100 %		+ 50	707,500,428	428	0.0000605
BATT. ENDPOINT	3.45	+ 20	707,500,013	13	0.0000018

Table 6-22. 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

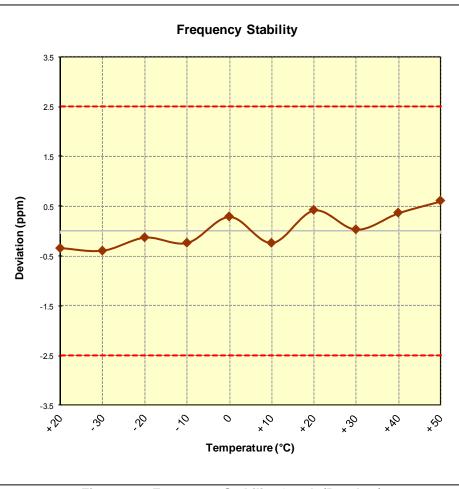


Figure 6-7. Frequency Stability Graph (Band 12) Band 5 Frequency Stability Measurements §2.1055 §22.355

FCC ID: ZNFH636		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	💽 LG	Reviewed by: Quality Manager	
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OPERATING FREQUENCY:	836,500,000	Hz
CHANNEL:	20525	_
REFERENCE VOLTAGE:	3.85	VDC
DEVIATION LIMIT:	± 0.00025 % or 2.5 ppm	

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	836,500,279	279	0.0000334
100 %		- 30	836,499,975	-25	-0.0000030
100 %		- 20	836,499,969	-31	-0.0000037
100 %		- 10	836,499,671	-329	-0.0000393
100 %		0	836,500,286	286	0.0000342
100 %		+ 10	836,499,788	-212	-0.0000253
100 %		+ 20	836,500,215	215	0.0000257
100 %		+ 30	836,499,860	-140	-0.0000167
100 %		+ 40	836,500,028	28	0.0000033
100 %		+ 50	836,500,086	86	0.0000103
BATT. ENDPOINT	3.45	+ 20	836,500,401	401	0.0000479

Table 6-23. Frequency Stability Data (Band 5)

FCC ID: ZNFH636		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

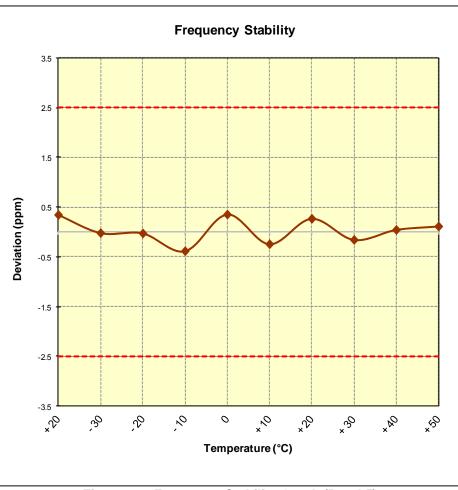


Figure 6-8. Frequency Stability Graph (Band 5)

FCC ID: ZNFH636		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:	3.85	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	1,732,499,736	-264	-0.0000152
100 %		- 30	1,732,499,904	-96	-0.0000055
100 %		- 20	1,732,500,012	12	0.000007
100 %		- 10	1,732,500,200	200	0.0000115
100 %		0	1,732,499,881	-119	-0.0000069
100 %		+ 10	1,732,499,947	-53	-0.0000031
100 %		+ 20	1,732,500,060	60	0.0000035
100 %		+ 30	1,732,500,156	156	0.0000090
100 %		+ 40	1,732,499,745	-255	-0.0000147
100 %		+ 50	1,732,499,903	-97	-0.0000056
BATT. ENDPOINT	3.45	+ 20	1,732,499,943	-57	-0.0000033

Table 6-24. 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: ZNFH636		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

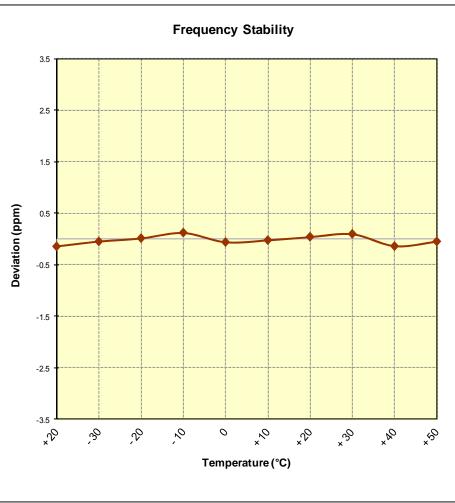


Figure 6-9. Frequency Stability Graph (Band 4)

FCC ID: ZNFH636		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:	3.85	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	1,880,000,186	186	0.0000099
100 %		- 30	1,880,000,093	93	0.0000049
100 %		- 20	1,879,999,775	-225	-0.0000120
100 %		- 10	1,880,000,445	445	0.0000237
100 %		0	1,880,000,152	152	0.0000081
100 %		+ 10	1,880,000,145	145	0.0000077
100 %		+ 20	1,879,999,819	-181	-0.0000096
100 %		+ 30	1,880,000,026	26	0.0000014
100 %		+ 40	1,879,999,937	-63	-0.0000034
100 %		+ 50	1,879,999,963	-37	-0.0000020
BATT. ENDPOINT	3.45	+ 20	1,880,000,066	66	0.0000035

Table 6-25. 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: ZNFH636		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

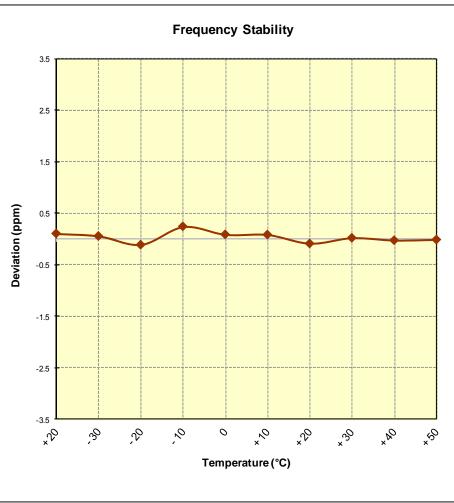


Figure 6-10. Frequency Stability Graph (Band 2)

FCC ID: ZNFH636		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	💽 LG	Reviewed by: Quality Manager
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## Band 7 Frequency Stability Measurements §2.1055 §27.54

OPERATING FREQUENCY:	2,535,000,000	Hz
CHANNEL:	21100	_
REFERENCE VOLTAGE:	3.85	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	2,534,999,952	-48	-0.0000019
100 %		- 30	2,534,999,779	-221	-0.0000087
100 %		- 20	2,535,000,012	12	0.0000005
100 %		- 10	2,534,999,977	-23	-0.0000009
100 %		0	2,535,000,178	178	0.0000070
100 %		+ 10	2,535,000,151	151	0.0000060
100 %		+ 20	2,534,999,756	-244	-0.0000096
100 %		+ 30	2,535,000,422	422	0.0000166
100 %		+ 40	2,535,000,210	210	0.0000083
100 %		+ 50	2,535,000,348	348	0.0000137
BATT. ENDPOINT	3.45	+ 20	2,534,999,724	-276	-0.0000109

Table 6-26. Frequency Stability Data (Band 7)

## 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: ZNFH636		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	💽 LG	Reviewed by: Quality Manager
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## Band 7 Frequency Stability Measurements §2.1055 §27.54

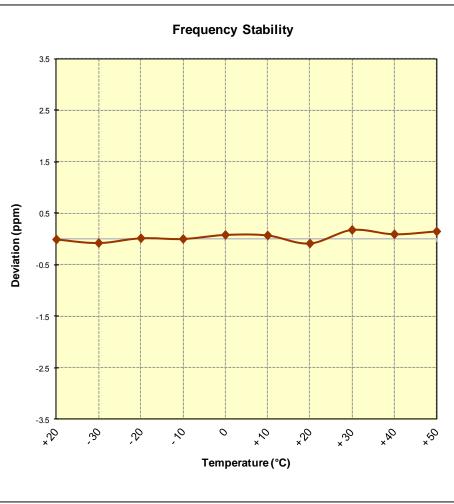


Figure 6-11. Frequency Stability Graph (Band 7)

FCC ID: ZNFH636		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	💽 LG	Reviewed by: Quality Manager	
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#### 7.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the LG Portable Handset FCC ID: ZNFH636 complies with all the requirements of Parts 22, 24, & 27 of the FCC rules for LTE operation only.

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