

## 7.4 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 for Band 7 is as noted in the Test Notes on the following page.

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

#### Test Procedure Used

KDB 971168 D01 v02r02 - Section 6.0

### **Test Settings**

- 1. Start and stop frequency were set such that the band edge would be placed in the center of the plot
- 2. Span was set large enough so as to capture all out of band emissions near the band edge
- 3. RBW  $\geq$  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

#### <u>Test Setup</u>

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

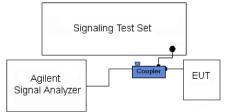


Figure 7-3. Test Instrument & Measurement Setup

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#### 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.

Per 27.53(m) for operations in the BRS/EBS bands, the attenuation factor shall be not less than 40 + 10 log (P) dB on all frequencies between the channel edge and 5 megahertz from the channel edge, 43 + 10 log (P) dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth. In addition, the attenuation factor shall not be less that 43 + 10 log (P) dB on all frequencies between 2490.5 MHz and 2496 MHz and 55 + 10 log (P) dB at or below 2490.5 MHz.



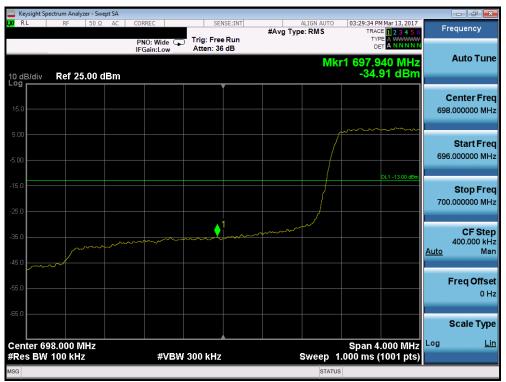
Plot 7-94. Lower Band Edge Plot (Band 12 – 1.4MHz QPSK – RB Size 6)

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Plot 7-95. Upper Band Edge Plot (Band 12 – 1.4MHz QPSK – RB Size 6)



Plot 7-96. Lower Band Edge Plot (Band 12 – 3.0MHz QPSK – RB Size 15)

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PNO: Wide Trig: Free Run IFGain:Low Trig: Free Run Atten: 36 dB Mkr1 716,0000 MHz -20,46 dBm -20,46 dBm -20,		ectrum Analyz		4									
Mkr1 716.000 MHz         Auto T           0 dB/div         Ref 25.00 dBm         -20.46 dBm         Center F           150         -         -         -         -         Center F           150         -         -         -         -         -         Center F           150         -         -         -         -         -         -         Center F           150         -	RL	RF	50 Ω AC	PN	IO: Wide 🗔	Trig: Fre	e Run	#Avg Typ		TRAC	<b>1 2 3 4 5 6</b>	Fr	equency
Center F 716.00000 500 500 500 500 500 500 500 500 5		Ref 25	.00 dBn		ain:Low	Atten: 5			Mk	r1 716.0	00 MHz		Auto Tur
500         0         0         0         0         0         1			~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~	~~~~								Center Fre 6.000000 M⊦
5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0												714	<b>Start Fre</b> .000000 MH
3.0     400.000       5.0     Freq Of       5.0     Sol							1				DL1 -13.00 dBm	718	<b>Stop Fre</b> .000000 MH
5.0 Freq Of 5.0 Scale T enter 716.000 MHz Span 4.000 MHz										·	~	<u>Auto</u>	CF Ste 400.000 kl M
enter 716.000 MHz Span 4.000 MHz													Freq Offs 0
													Scale Typ
					#VBV	V 300 kHz			Sweep	Span 4. 1.000 ms (		Log	L

Plot 7-97. Upper Band Edge Plot (Band 12 – 3.0MHz QPSK – RB Size 15)



Plot 7-98. Lower Band Edge Plot (Band 12 – 5.0MHz QPSK – RB Size 25)

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	ectrum Analyzer	- Swept SA									
XI RL	RF	50 Ω AC	PNO: Wid	e 💭 Trig: Fre		#Avg Typ	ALIGN AUTO De: RMS	TRAC	1 Mar 13, 2017 E 1 2 3 4 5 6 E A WWWWW T A N N N N N	Fi	requency
10 dB/div	Ref 25.0	)0 dBm	il damico				Mk	r1 716.0 -26.(	20 MHz 01 dBm		Auto Tune
15.0											Center Freq 5.000000 MHz
5.00		<u></u>	<u> </u>							714	Start Fred 1.000000 MH2
-15.0					1				DL1 -13.00 dBm	718	Stop Fred 3.000000 MH;
35.0						·····		·····	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	<u>Auto</u>	CF Step 400.000 kH Mar
55.0											Freq Offse 0 H
-65.0											Scale Type
Center 71 #Res BW	6.000 MH 100 kHz	Z	#\	/BW 300 kHz			Sweep 1	Span 4. .000 ms (	000 MHz 1001 pts)	Log	Lin
ISG							STATUS	3			

Plot 7-99. Upper Band Edge Plot (Band 12 – 5.0MHz QPSK – RB Size 25)



Plot 7-100. Lower Band Edge Plot (Band 12 – 10.0MHz QPSK – RB Size 50)

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	trum Analyzer - S								
XV RL	RF 50 9	Ω AC	CORREC PNO: Wide	SENSE:	#Av	ALIGN AUTO g Type: RMS	03:20:36 PM Mar 13 TRACE 1 2 TYPE A W DET A N	3456	Frequency
10 dB/div Log	Ref 25.00	dBm	IFGain:Low	Atten: 36 dB		Mk	r1 716.016 I -31.02 c	MHz	Auto Tune
15.0									Center Free 716.000000 MH
5.00		~~~~~					DL1 -13		Start Fre 712.000000 MH
.15.0									Stop Fre 720.000000 M⊦
45.0						men man	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~~ <u>A</u>	<b>CF Ste</b> 800.000 kH <u>uto</u> Ma
55.0									Freq Offs 0 F
65.0									Scale Typ
Center 716 Res BW 1	.000 MHz 00 kHz		#VB	W 300 kHz		Sweep 1	Span 8.000 .000 ms (1001	MHz L pts)	og <u>Li</u>
ISG						STATUS			

Plot 7-101. Upper Band Edge Plot (Band 12 – 10.0MHz QPSK – RB Size 50)



Plot 7-102. Lower Band Edge Plot (Band 5 – 1.4MHz QPSK – RB Size 6)

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	ectrum Analyzer -	Swept SA									
K RL	RF 50	Ω AC	CORREC PNO: Wide			#Avg Ty	ALIGN AUTO pe: RMS	TYPE	Mar 13, 2017           1 2 3 4 5 6           A WWWWW           A N N N N N	Fr	requency
I0 dB/div	Ref 25.0	) dBm					Mk	r1 849.00 -20.3	00 MHz 0 dBm		Auto Tun
15.0				~~~~	• 						Center Fre 9.000000 MH
5.00									N 4 40 00 UD-	847	Start Fre 7.000000 MH
25.0					1				0L1 -13.00 dBm	851	Stop Fre 1.000000 M⊢
35.0					hong		1. 		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	<u>Auto</u>	CF Ste 400.000 kH Ma
55.0											Freq Offs 0 H
65.0											Scale Typ
enter 84 Res BW	19.000 MHz 100 kHz	2	#VB	W 300 kHz			Sweep 1	Span 4. .000 ms (1	000 MHz 001 pts)	Log	L
SG							STATUS	5			

Plot 7-103. Upper Band Edge Plot (Band 5 – 1.4MHz QPSK – RB Size 6)



Plot 7-104. Lower Band Edge Plot (Band 5 – 3.0MHz QPSK – RB Size 15)

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	ectrum Analyze											
<mark>X/</mark> RL	RF	50 Ω AC	CORREC PNO: W IFGain:		Trig: Free Atten: 36		#Avg Typ	ALIGN AUTO	TRAC	4 Mar 13, 2017 E 1 2 3 4 5 6 E A WWWW A N N N N N	F	requency
10 dB/div	Ref 25.	00 dBm	iii dainii					Mk	r1 849.0 -20.	00 MHz 11 dBm		Auto Tune
15.0			~~~~~		~~							Center Fre 9.000000 MH
5.00											84	Start Fre 7.000000 MH
25.0						1				DL1 -13.00 dBm	85	Stop Fre 1.000000 MH
45.0						h				n, mon	<u>Auto</u>	CF Ste 400.000 kH Ma
55.0												Freq Offs 0 ⊦
65.0												Scale Typ
Center 84 Res BW	9.000 M 100 kHz	Hz		#VBW 3	300 kHz			Sweep 1	Span 4 .000 ms (	.000 MHz 1001 pts)	Log	L
SG								STATUS	3			

Plot 7-105. Upper Band Edge Plot (Band 5 – 3.0MHz QPSK – RB Size 15)



Plot 7-106. Lower Band Edge Plot (Band 5 – 5.0MHz QPSK – RB Size 25)

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Keysight Spectrum Analyzer - Swept SA				- 6 <b>-</b>
RL RF 50 Ω AC	CORREC SENSE:I PNO: Wide Trig: Free Ru IFGain:Low Atten: 36 dB	#Avg Type: RMS	03:10:04 PM Mar 13, 2017 TRACE 1 2 3 4 5 6 TYPE A WWWW DET A N N N N N	Frequency
dB/div Ref 25.00 dBm	I Guineow	Mk	r1 849.000 MHz -25.633 dBm	Auto Tun
5.0				Center Fre 849.000000 M⊦
				Start Fre 847.000000 Mi
5.0			DL1 -13.00 dBm	<b>Stop Fr</b> 851.000000 Mi
5.0			······	<b>CF St</b> e 400.000 k <u>Auto</u> M
5.0				Freq Offs 0
5.0				Scale Ty
enter 849.000 MHz Res BW 100 kHz	#VBW 300 kHz	Sweep	Span 4.000 MHz 1.000 ms (1001 pts)	Log <u>L</u>

Plot 7-107. Upper Band Edge Plot (Band 5 – 5.0MHz QPSK – RB Size 25)



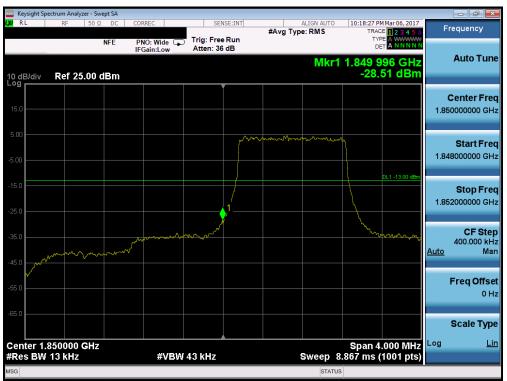
Plot 7-108. Lower Band Edge Plot (Band 5 – 10.0MHz QPSK – RB Size 50)

FCC ID: ZNFV530		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager		
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	ectrum Analyzei										
LXI RL	RF	50 Ω AC	CORREC	SEN	SE:INT	#Avg Typ	ALIGN AUTO e: RMS	03:15:25 PI TRAC	Mar 13, 2017	F	requency
			PNO: Wide G	Trig: Free Atten: 36		• //			E 1 2 3 4 5 6 E A WWWW T A NNNNN		A
10 dB/div Log	Ref 25.0	00 dBm					Mki	1 849.0 -31.:	00 MHz 20 dBm		Auto Tune
209				Ĭ							Center Freq
15.0										84	9.000000 MHz
5.00		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~							Start Freq
-5.00										84	5.000000 MHz
									DL1 -13.00 dBm		
-15.0										85	Stop Freq 3.000000 MHz
-25.0				h	1						
-35.0				۷i	Mar Mar						CF Step 800.000 kHz
-45.0								~~~~~	~~~~~~	<u>Auto</u>	Man
											Freq Offset
-55.0											0 Hz
-65.0											Scale Type
										Log	
Center 84 #Res BW		Z	#VBW	300 kHz			Sweep 1	Span 8 .000 ms (	.000 MHz 1001 pts)	LUg	Lin
MSG							STATUS				

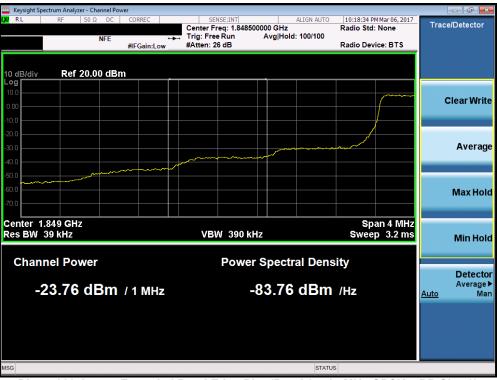
Plot 7-109. Upper Band Edge Plot (Band 5 – 10.0MHz QPSK – RB Size 50)



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

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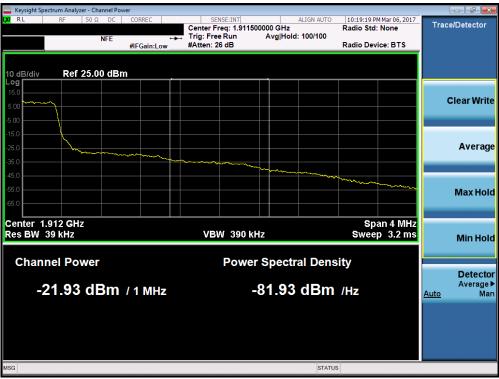
Plot 7-111. Lower Extended Band Edge Plot (Band 2 – 1.4MHz QPSK – RB Size 6)



Plot 7-112. Upper Band Edge Plot (Band 2 – 1.4MHz QPSK – RB Size 6)

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Plot 7-113. Upper Extended Band Edge Plot (Band 2 – 1.4MHz QPSK – RB Size 6)



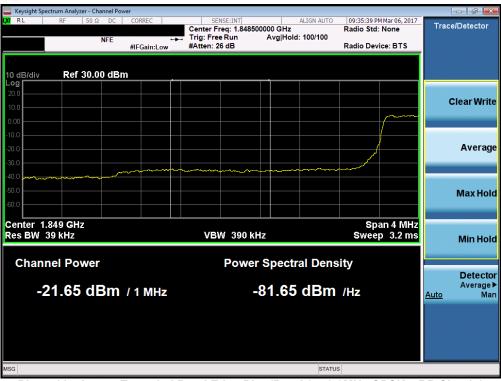
Plot 7-114. Lower Band Edge Plot (Band 2 – 3.0MHz QPSK – RB Size 15)

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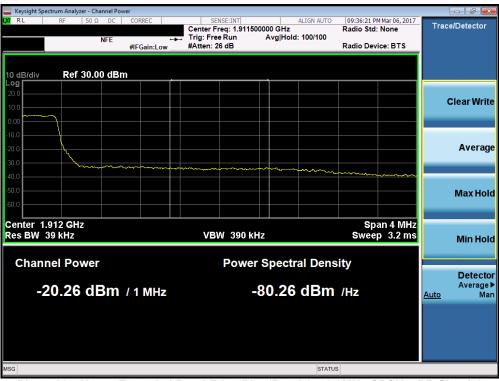
Plot 7-115. Lower Extended Band Edge Plot (Band 2 – 3.0MHz QPSK – RB Size 15)



Plot 7-116. Upper Band Edge Plot (Band 2 – 3.0MHz QPSK – RB Size 15)

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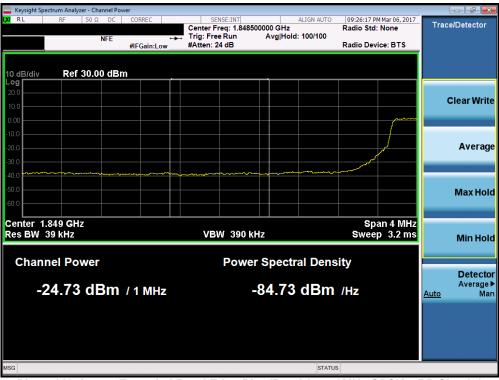
Plot 7-117. Upper Extended Band Edge Plot (Band 2 – 3.0MHz QPSK – RB Size 15)



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

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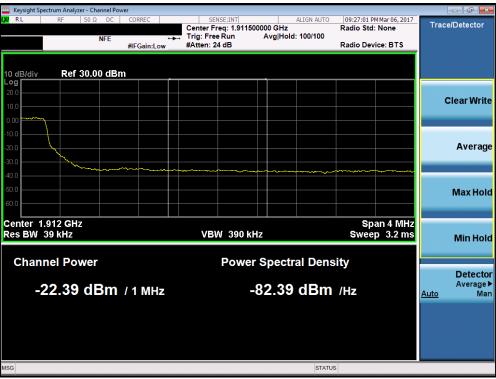
Plot 7-119. Lower Extended Band Edge Plot (Band 2 – 5.0MHz QPSK – RB Size 25)



Plot 7-120. Upper Band Edge Plot (Band 2 – 5.0MHz QPSK – RB Size 25)

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Plot 7-121. Upper Extended Band Edge Plot (Band 2 – 5.0MHz QPSK – RB Size 25)



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

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	ctrum Analy:	ter - Swept SA								- 6 <b>-</b> ×
XI RL	RF	50 Ω DC	CORREC	SEI	SE:INT		ALIGN AUTO	09:17:14 PM Mar 06		Frequency
		NFE	PNO: Wide ← IFGain:Low	► Trig: Free Atten: 36		#Avg Ty	pe: RMS	TRACE 1 2 3 TYPE A WA DET A N	wwww	
10 dB/div	Ref 25	.00 dBm					Mkr'	1.849 000 0 -24.27 d	GHZ Bm	Auto Tune
15.0										Center Free 1.847000000 GH
5.00										<b>Start Fre</b> 1.845000000 GH
25.0					a solar too offer a	- the next Armeth (*****	مريد المحمد المريد المري	DL1-13	1	<b>Stop Fre</b> 1.849000000 GH
45.0									Au	<b>CF Ste</b> 400.000 kH <u>to</u> Ma
55.0										Freq Offse 0 ⊦
65.0										Scale Typ
Center 1.8 #Res BW			#VBI	N 3.0 MHz			Sweep :	Span 4.000 2.000 ms (1001	MHz <sup>Lo</sup> pts)	g <u>Lii</u>
ISG							STATU	IS		

Plot 7-123. Lower Extended Band Edge Plot (Band 2 – 10.0MHz QPSK – RB Size 50)



Plot 7-124. Upper Band Edge Plot (Band 2 – 10.0MHz QPSK – RB Size 50)

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	ctrum Analy	zer - Swept SA								
X/RL	RF	50 Ω DC	CORREC		SENSE:INT	#A.u., T.	ALIGN AUTO	09:18:09 PM Mar 06, 201		requency
		NFE	PNO: Wid IFGain:Lo		g: Free Run en: 36 dB	#Avg Ty	ype. Rivis	TRACE 12345 TYPE A WWWW DET A NNNN		
10 dB/div Log	Ref 2	5.00 dBm					Mkr1	1.911 000 GH -22.76 dBr	n	Auto Tune
15.0										Center Fred 13000000 GH2
-5.00										Start Fred 11000000 GH:
15.0 1 25.0	999000 augus gus	1-1-1-1-1	TOPO POP Ju Paulos	- f. California and a factor	the same white and	to man destrongen (physer),		DL1 -13.00 dB		<b>Stop Fred</b> 15000000 GH
45.0									Auto	CF Stej 400.000 kH Ma
55.0										Freq Offse 0 H
65.0										Scale Typ
Center 1.9 #Res BW			#\	/BW 3.0	MHz		Sweep 2	Span 4.000 MH 2.000 ms (1001 pts	z Log 5)	Lir
//SG							STATU	3		

Plot 7-125. Upper Extended Band Edge Plot (Band 2 – 10.0MHz QPSK – RB Size 50)



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

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01/09/2016



Keysight Spectrum	Analyzer - Swe	ept SA										
XIRL R	F 50 Ω	DC	CORREC		SE	NSE:INT		ALIGN AUTO	09:08:48 PM M		E	requency
		NFE	PNO: Wie IFGain:Lo		Trig: Fre Atten: 3		#Avg Ty	/pe: RMS	TYPE	23456 WWWWWW NNNNN	-	
I0 dB/div Re	f 25.00 d	Bm						Mkr1	1.848 54 -26.66	8 GHz 6 dBm		Auto Tune
15.0												Center Free 7000000 GH
5.00											1.84	<b>Start Fre</b> 5000000 GH
25.0										-13.00 dBm	1.84	<b>Stop Fre</b> 9000000 G⊦
15.0	anga -la Ana ang ta kan panganan										<u>Auto</u>	<b>CF Ste</b> 400.000 kH Ma
55.0												Freq Offs 0 ⊦
65.0												Scale Typ
Center 1.8470 Res BW 1.0			#	VBW :	3.0 MHz	2		Sweep 2	Span 4.0 2.000 ms (10	00 IVII 12 I	Log	Li
ISG								STATU	5			

Plot 7-127. Lower Extended Band Edge Plot (Band 2 – 15.0MHz QPSK – RB Size 75)



Plot 7-128. Upper Band Edge Plot (Band 2 – 15.0MHz QPSK – RB Size 75)

FCC ID: ZNFV530		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 92 of 152
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		NFE		NO: Wid Gain:Lo		Trig: Fr Atten:				D			
10 dB/div Log	Ref 2	5.00 dBr							Mkr1	1.911 ( -25.	)16 GHz 07 dBm		Auto Tune
15.0													Center Freq 13000000 GHz
-5.00												1.91	Start Fred 1000000 GHz
-15.0 -25.0			-		The Table of State	Methods a sub-standing	****	1.054 <sup>3</sup> <sup>2</sup> 9 <sub>10</sub> /m <sup>2</sup> ,64.443.55a.440	all starts man statuteday		DL1 -13.00 dBm	1.91	Stop Fred 15000000 GH;
-35.0											NU (1999-99) - 1999-99 	<u>Auto</u>	CF Step 400.000 kH Mar
-55.0													Freq Offse 0 Hi
-65.0													Scale Type
Center 1. #Res BW						3.0 MH				Span 4	.000 MHz (1001 pts)	Log	Lir

Plot 7-129. Upper Extended Band Edge Plot (Band 2 – 15.0MHz QPSK – RB Size 75)



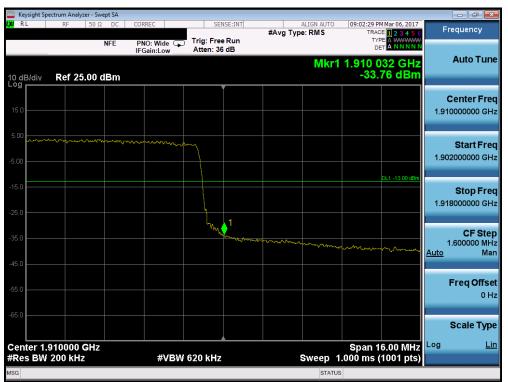
Plot 7-130. Lower Band Edge Plot (Band 2 – 20.0MHz QPSK – RB Size 100)

FCC ID: ZNFV530		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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🔤 Keysight Spe											
LXI RL	RF	50 Ω DC	CORREC	SEN	SE:INT	#Avg Typ	ALIGN AUTO	09:01:48 PM	Mar 06, 2017	F	requency
		NFE	PNO: Wide • IFGain:Low	Trig: Free Atten: 36		#Avg iy	Je. KINIS	TYPE	A WWWWW A NNNNN		
10 dB/div Log	Ref 25.	00 dBm					Mkr1	1.848 95 -27.9	66 GHz 0 dBm		Auto Tune
15.0											<b>Center Freq</b> 17000000 GHz
-5.00										1.84	Start Freq
-15.0								D	L1 -13.00 dBm	1.84	Stop Freq
-35.0	Waaraha ah Walaya ya	<u></u>		and a stand and	laga - may n. (t. et an ing file of an	1.defermentes	eg lafta fa mañ de paregan y an ar	,,		Auto	CF Step 400.000 kHz Man
-45.0											
-55.0											Freq Offset 0 Hz
-65.0											Scale Type
Center 1.8 #Res BW		Hz	#VB	W 3.0 MHz			Sweep 2	Span 4.0 .000 ms (1	)00 MHz 001 pts)	Log	Lin
MSG							STATUS				

Plot 7-131. Lower Extended Band Edge Plot (Band 2 – 20.0MHz QPSK – RB Size 100)



Plot 7-132. Upper Band Edge Plot (Band 2 – 20.0MHz QPSK – RB Size 100)

FCC ID: ZNFV530		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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Keysight Spe											
L <mark>XV</mark> RL	RF	50 Ω DC NFE	CORREC PNO: Wide IFGain:Lov	- Trig: Fi		#Avg Typ	ALIGN AUTO De: RMS	09:02:43 PM Ma TRACE TYPE DET	ar 06, 2017 2 3 4 5 6 WWWWW NNNNN		equency
10 dB/div Log	Ref 25	.00 dBm					Mkr1	1.911 00 -27.92	B GHz dBm		Auto Tune
15.0					<u> </u>						<b>Center Freq</b> 3000000 GHz
-5.00										1.91′	Start Freq 1000000 GHz
-15.0								DL1	-13.00 dBm	1.91	<b>Stop Fred</b> 5000000 GH;
-35.0		galan and an and a galant stand	**************************************	чриет фта и стори и сто	6	and the and the second s				<u>Auto</u>	CF Step 400.000 kH: Mar
-55.0										I	Freq Offse 0 Hi
-65.0										:	Scale Type
Center 1.9 #Res BW			#\	/BW 3.0 MH	z		Sweep 2	Span 4.00 2.000 ms (10	20 1911 12 1	Log	Lin
//SG							STATU	S			

Plot 7-133. Upper Extended Band Edge Plot (Band 2 – 20.0MHz QPSK – RB Size 100)

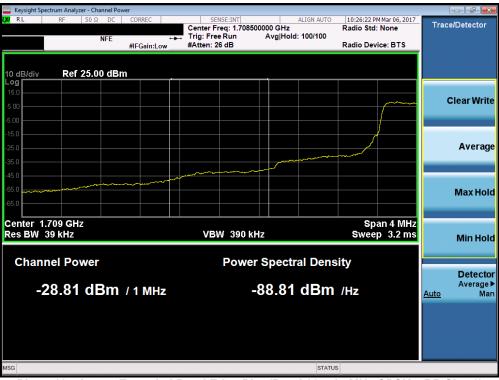


Plot 7-134. Lower Band Edge Plot (Band 66 – 1.4MHz QPSK – RB Size 6)

FCC ID: ZNFV530		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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Plot 7-135. Lower Extended Band Edge Plot (Band 66 – 1.4MHz QPSK – RB Size 6)



Plot 7-136. Upper Band Edge Plot (Band 66 – 1.4MHz QPSK – RB Size 6)

FCC ID: ZNFV530	PCTEST	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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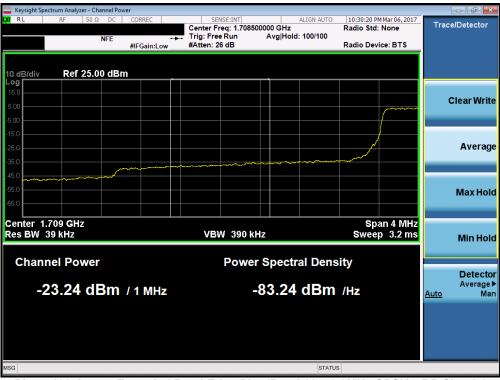
Plot 7-137. Upper Extended Band Edge Plot (Band 66 – 1.4MHz QPSK – RB Size 6)



Plot 7-138. Lower Band Edge Plot (Band 66 – 3.0MHz QPSK – RB Size 15)

FCC ID: ZNFV530	CALEST	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dogo 97 of 152	
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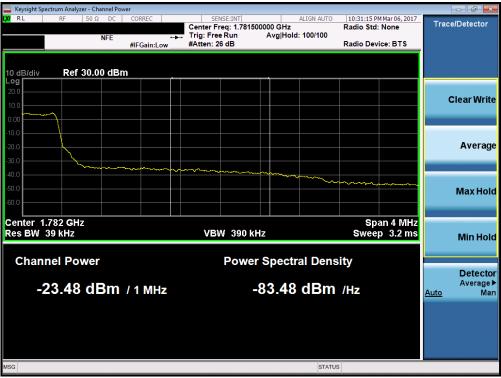
Plot 7-139. Lower Extended Band Edge Plot (Band 66 – 3.0MHz QPSK – RB Size 15)



Plot 7-140. Upper Band Edge Plot (Band 66 – 3.0MHz QPSK – RB Size 15)

FCC ID: ZNFV530	CALEST	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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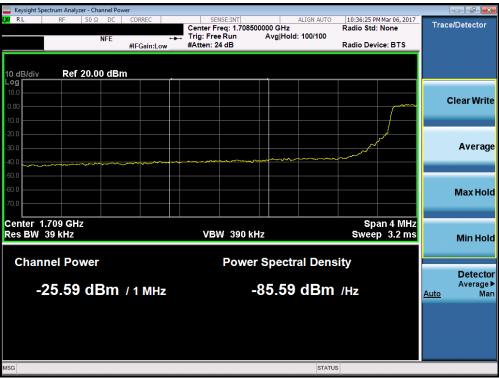
Plot 7-141. Upper Extended Band Edge Plot (Band 66 – 3.0MHz QPSK – RB Size 15)



Plot 7-142. Lower Band Edge Plot (Band 66 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFV530	PCTEST	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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Plot 7-143. Lower Extended Band Edge Plot (Band 66 – 5.0MHz QPSK – RB Size 25)

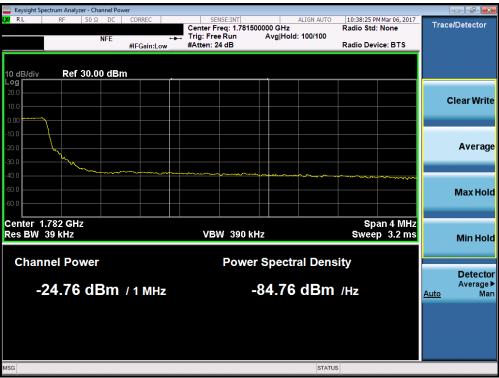


Plot 7-144. Upper Band Edge Plot (Band 66 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFV530	PCTEST	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dego 00 of 152
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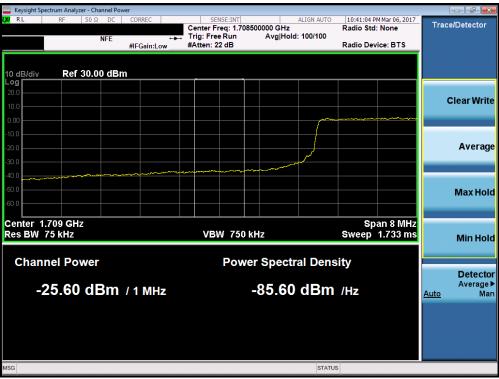
Plot 7-145. Upper Extended Band Edge Plot (Band 66 – 5.0MHz QPSK – RB Size 25)



Plot 7-146. Lower Band Edge Plot (Band 66 – 10.0MHz QPSK – RB Size 50)

FCC ID: ZNFV530		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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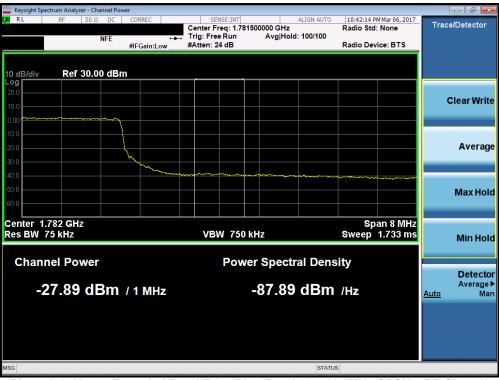
Plot 7-147. Lower Extended Band Edge Plot (Band 66 – 10.0MHz QPSK – RB Size 50)



Plot 7-148. Upper Band Edge Plot (Band 66 – 10.0MHz QPSK – RB Size 50)

FCC ID: ZNFV530	PCTEST	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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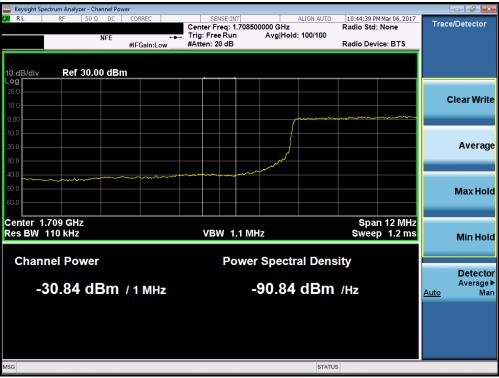
Plot 7-149. Upper Extended Band Edge Plot (Band 66 – 10.0MHz QPSK – RB Size 50)



Plot 7-150. Lower Band Edge Plot (Band 66 – 15.0MHz QPSK – RB Size 75)

FCC ID: ZNFV530		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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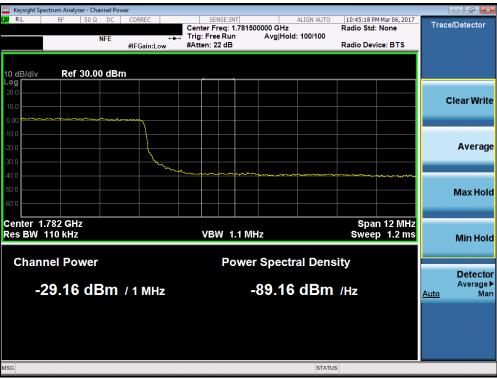
Plot 7-151. Lower Extended Band Edge Plot (Band 66 – 15.0MHz QPSK – RB Size 75)



Plot 7-152. Upper Band Edge Plot (Band 66 – 15.0MHz QPSK – RB Size 75)

FCC ID: ZNFV530	CALEST.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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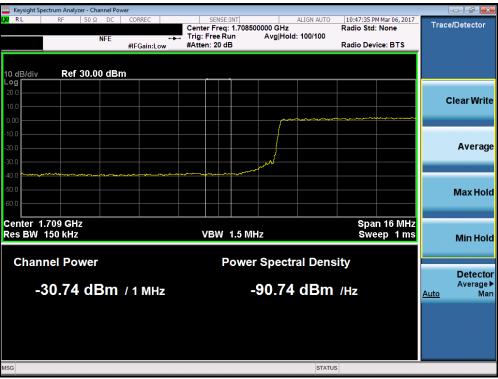
Plot 7-153. Upper Extended Band Edge Plot (Band 66 – 15.0MHz QPSK – RB Size 75)



Plot 7-154. Lower Band Edge Plot (Band 66 – 20.0MHz QPSK – RB Size 100)

FCC ID: ZNFV530		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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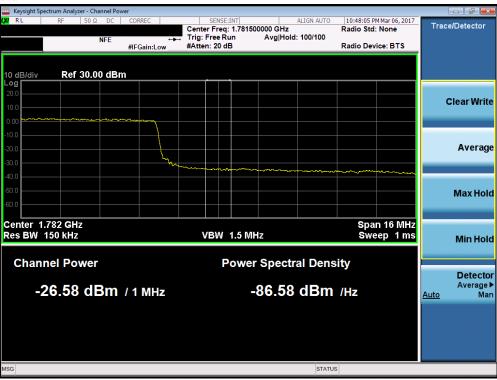
Plot 7-155. Lower Extended Band Edge Plot (Band 66 – 20.0MHz QPSK – RB Size 100)



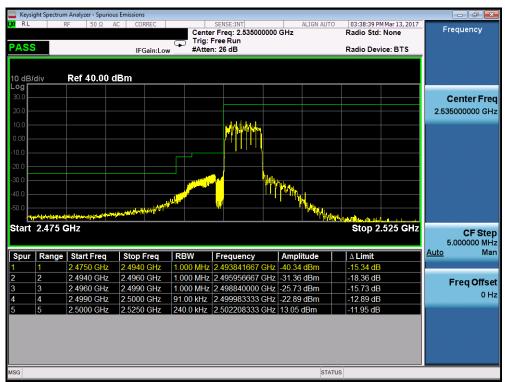
Plot 7-156. Upper Band Edge Plot (Band 66 – 20.0MHz QPSK – RB Size 100)

FCC ID: ZNFV530	PCTEST	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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Plot 7-157. Upper Extended Band Edge Plot (Band 66 – 20.0MHz QPSK – RB Size 100)



Plot 7-158. Lower ACP Plot (Band 7 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFV530		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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		Analyzer - Spur										d X
PASS		¢F   50 Ω		CORREC	Trig:	SENSE:INT er Freq: 2.53500 Free Run en: 26 dB	00000 GH	ALIGN AUT	Radio	04 PM Mar 13, 2017 Std: None Device: BTS	Frequer	псу
10 dB/c Log <b>F</b>	div	Ref 40.00	dBm									
30.0 — 20.0 —											Cente 2.5350000	
10.0 0.00					provingi 							
-10.0 — -20.0 —					had.	. <b>h</b> a						
-30.0			and the state	Not the second			M. Marke					
÷**	2.545 C							Participation of the second	Stop	o 2.595 GHz	<b>C</b> 5.0000	F Step
Spur	Range	Start Freq	Sto	p Freq	RBW	Frequency	A	mplitude	∆ Lim	it	<u>Auto</u>	Mar
1	1	2.5450 GHz	2.57	00 GHz	1.000 MHz	2.568375000	GHz 15	5.56 dBm	-9.438	dB		
2	2	2.5700 GHz		10 GHz		2.570035000			-11.17		Freq	Offset
3	3	2.5710 GHz		50 GHz		2.571133333			-11.15			0 Hz
4	4	2.5750 GHz		60 GHz		2.575051667			-23.58			5112
5	5	2.5760 GHz	2.59	50 GHz	1.000 MHz	2.576031667	GHŻ  -4	1.96 dBm	-16.96	dB		
/ISG	_			_				STA	TUS			

Plot 7-159. Upper ACP Plot (Band 7 – 5.0MHz QPSK – RB Size 25)



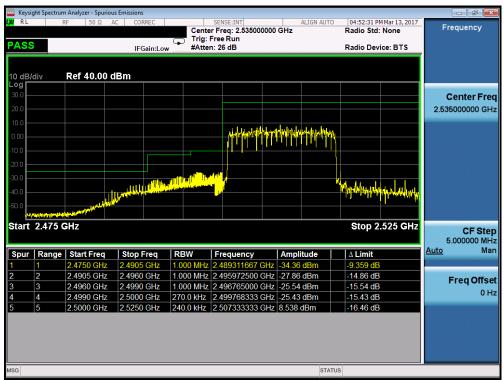
Plot 7-160. Lower ACP Plot (Band 7 – 10.0MHz QPSK – RB Size 50)

FCC ID: ZNFV530	CALEST	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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L	F	n Analyzer - Spur F 50 Ω	ious Emissions AC CORREC		SENSE:INT Freq: 21.0000000 Free Run	ALIGN AUTO	03:53:54 PM Mar 13, 2017 Radio Std: None	Frequency
ASS			IFGain:L		n: 26 dB		Radio Device: BTS	
0 dB/c	div	Ref 40.00	dBm					
30.0								Center Fre
20.0								21.000000000 GH
10.0				hand warden w	rin			
).00								
0.0								
20.0								
80.0		1.004	ritin and					
		Math Party				The second se		
La A	where the state	174			1. P	and the second se		
50.0							and the second states and the second states in	
tart	2.545 C	Hz					Stop 2.595 GHz	CF Ste 1.20000000 GF
Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	∆ Limit	Auto Ma
<u> </u>	1	2.5450 GHz			2.564833333 GH		-11.76 dB	
	2	2.5700 GHz			2.570090000 GH		-12.89 dB	Freq Offs
	3	2.5710 GHz			2.571380000 GH		-11.78 dB	01
	4	2.5750 GHz			2.575099300 GH		-13.88 dB	01
,	5	2.5790 GHz	2.5950 GHz	1.000 MHz	2.579025427 GH	z -39.77 dBm	-14.77 dB	
5	0	2.5790 GHZ	2.3950 GHZ	T.000 MH2	2:379023427 GH	2 -39.77 dBm	-14. <i>11</i> dB	
G	_	_				STAT	rus	

Plot 7-161. Upper ACP Plot (Band 7 – 10.0MHz QPSK – RB Size 50)



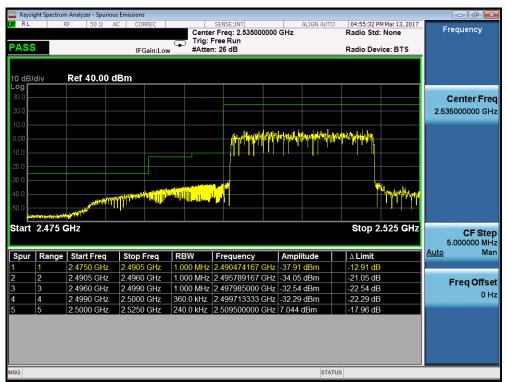
Plot 7-162. Lower ACP Plot (Band 7 – 15.0MHz QPSK – RB Size 75)

FCC ID: ZNFV530		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
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Keysight S	pectrum Ri	Analyzer - Sp 50 Ω			RREC			SEN	SE:INT			ALIGN AU	ТО	04:53:09 P	M Mar 13, 2017		
PASS	ļ			IF	Gain:Lo		Cente Trig: I #Atter	Free		00000	GHz			Radio Std Radio Dev		F	requency
0 dB/div og		Ref 40.(	00 dl	Зm													
0.0																	Center Fre
0.0			f war		Ar-see free faith		May yan an a	* <b>%</b> 1									
		a halalalasal															
0.0														Harry Harry	When the second		
tart 2.	545 G	iHz													.595 GHz		CF Ste 5.000000 MI
pur   R	ange	Start Fre	q	Stop	Freq	RB	W	Fre	quency		Ampl	itude		∆ Limit		<u>Auto</u>	Ma
1		2.5450 GI	Ηz	2.5700	) GHz	1.00	0 MHz	2.5	6262500	0 GHz	11.74	dBm		-13.26 dE			
2		2.5700 GI	Ηz	2.5710	) GHz	270	0 kHz	2.5	7025666	7 GHz	-23.51	dBm		-13.51 dE	3		Freq Offs
3		2.5710 G	Ιz	2.5750	) GHz	1.00	0 MHz	2.5	7252000	0 GHz	-23.71	dBm		-13.71 dE	3		01
4		2.5750 G		2.5834					7540542					-13.05 dE			01
5		2.5834 G	ΗZ	2.5950	) GHz	1.00	0 MHz	2.5	3360088	7 GHz	-34.07	dBm		-9.073 dE	3		
			Ιz		GHz	1.00 1.00	0 MHz 0 MHz	2.5 2.5	7252000	0 GHz 0 GHz	-23.71 -26.05	dBm dBm			}		
												ST	ATUS				

Plot 7-163. Upper ACP Plot (Band 7 – 15.0MHz QPSK – RB Size 75)



Plot 7-164. Lower ACP Plot (Band 7 – 20.0MHz QPSK – RB Size 100)

FCC ID: ZNFV530		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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	rum Analyzer - Spuriou					1	
X RL PASS	RF 50 Ω	AC CORREC	Trig: F	SENSE:INT r Freq: 2.535000000 Free Run h: 26 dB	GHz	04:55:57 PM Mar 13, 2017 Radio Std: None Radio Device: BTS	Frequency
10 dB/div	Ref 40.00 d	dBm					
20.0							Center Fred 2.535000000 GHz
10.0	pologica de como	ግያት አሳሳ (የዚዮቆጥቆት አሳሌ ካር አሳሌ ካራ አሳ	allythe the following of the second	<b>N</b>			
-20.0							
-40.0					<sup>ĸĸ</sup> ŦŶĬĊŢĊĸĊĊŎŎŎŎŎŎŎŎŎŎŎŎŎŎŎŎŎŎŎŎŎŎŎŎŎŎŎŎŎŎŎŎŎ		
Start 2.545	5 GHz					Stop 2.595 GHz	CF Step 5.000000 MH
Spur Rang	ge   Start Freq	Stop Freq	RBW	Frequency	Amplitude	∆ Limit	
1 1	2.5450 GHz	2.5700 GHz	1.000 MHz	2.562541667 GHz	10.22 dBm	-14.78 dB	
1 1 2 2	2.5450 GHz 2.5700 GHz	2.5700 GHz 2.5710 GHz	1.000 MHz 360.0 kHz	2.562541667 GHz 2.570030000 GHz	10.22 dBm -29.08 dBm	-14.78 dB -19.08 dB	<u>Auto</u> Mar
1 1 2 2 3 3	2.5450 GHz 2.5700 GHz 2.5710 GHz	2.5700 GHz 2.5710 GHz 2.5750 GHz	1.000 MHz 360.0 kHz 1.000 MHz	2.562541667 GHz 2.570030000 GHz 2.572306667 GHz	10.22 dBm -29.08 dBm -28.53 dBm	-14.78 dB -19.08 dB -18.53 dB	Auto Mar Freq Offse
1         1           2         2           3         3           4         4	2.5450 GHz 2.5700 GHz 2.5710 GHz 2.5750 GHz	2.5700 GHz 2.5710 GHz 2.5750 GHz 2.5879 GHz	1.000 MHz 360.0 kHz 1.000 MHz 1.000 MHz	2.562541667 GHz 2.570030000 GHz 2.572306667 GHz 2.575581985 GHz	10.22 dBm -29.08 dBm -28.53 dBm -31.04 dBm	-14.78 dB -19.08 dB -18.53 dB -18.04 dB	
1 1 2 2 3 3	2.5450 GHz 2.5700 GHz 2.5710 GHz	2.5700 GHz 2.5710 GHz 2.5750 GHz	1.000 MHz 360.0 kHz 1.000 MHz 1.000 MHz	2.562541667 GHz 2.570030000 GHz 2.572306667 GHz	10.22 dBm -29.08 dBm -28.53 dBm -31.04 dBm	-14.78 dB -19.08 dB -18.53 dB	Auto Mar Freq Offse
1 1 2 2 3 3 4 4	2.5450 GHz 2.5700 GHz 2.5710 GHz 2.5750 GHz	2.5700 GHz 2.5710 GHz 2.5750 GHz 2.5879 GHz	1.000 MHz 360.0 kHz 1.000 MHz 1.000 MHz	2.562541667 GHz 2.570030000 GHz 2.572306667 GHz 2.575581985 GHz	10.22 dBm -29.08 dBm -28.53 dBm -31.04 dBm	-14.78 dB -19.08 dB -18.53 dB -18.04 dB	Auto Mar Freq Offse

Plot 7-165. Upper ACP Plot (Band 7 – 20.0MHz QPSK – RB Size 100)

FCC ID: ZNFV530	PCTEST	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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# 7.5 Peak-Average Ratio §24.232(d)

# **Test Overview**

A peak to average ratio measurement is performed at the conducted port of the EUT. The spectrum analyzers Complementary Cumulative Distribution Function (CCDF) measurement profile is used to determine the largest deviation between the average and the peak power of the EUT in a given bandwidth. The CCDF curve shows how much time the peak waveform spends at or above a given average power level. The percent of time the signal spends at or above the level defines the probability for that particular power level.

# Test Procedure Used

KDB 971168 D01 v02r02 - Section 5.7.1

# Test Settings

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

# Test Setup

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

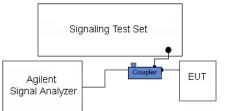


Figure 7-4. Test Instrument & Measurement Setup

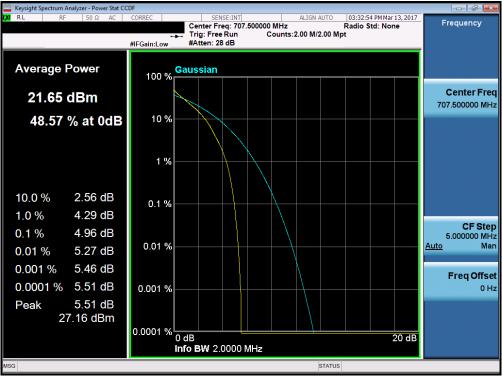
# Test Notes

None.

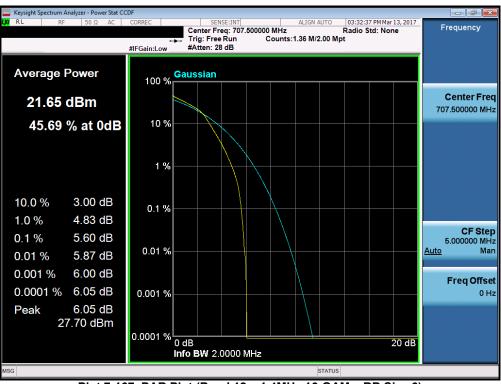
FCC ID: ZNFV530	PCTEST	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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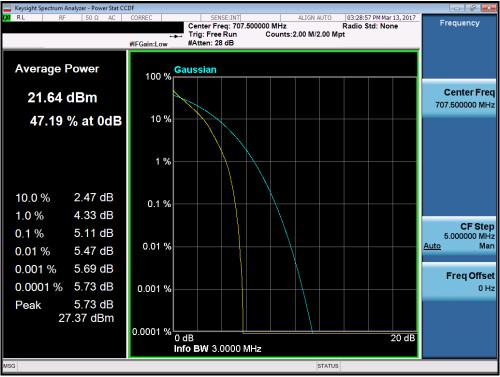
Plot 7-166. PAR Plot (Band 12 – 1.4MHz QPSK – RB Size 6)

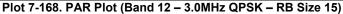


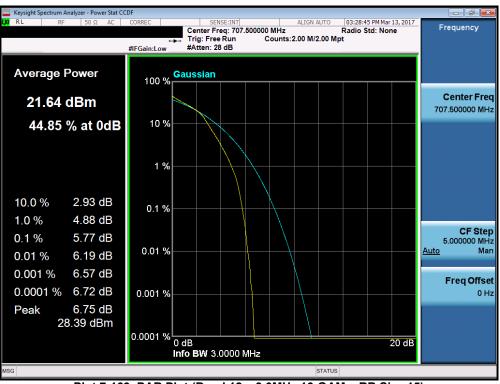
Plot 7-167. PAR Plot (Band 12 - 1.4MHz 16-QAM - RB Size 6)

FCC ID: ZNFV530		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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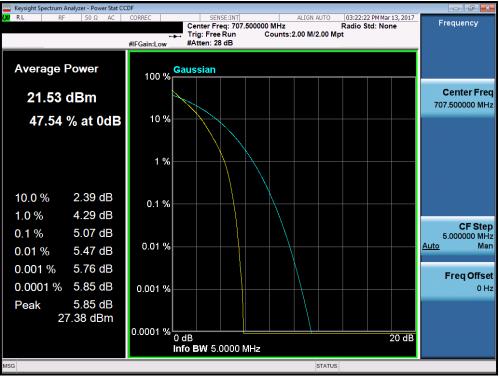


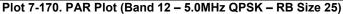


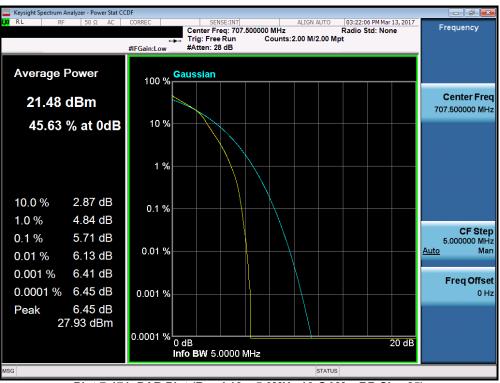
Plot 7-169. PAR Plot (Band 12 - 3.0MHz 16-QAM - RB Size 15)

FCC ID: ZNFV530		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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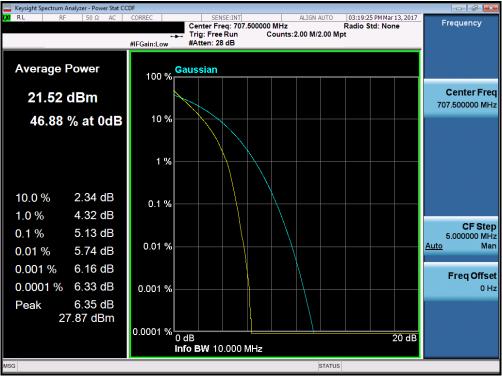




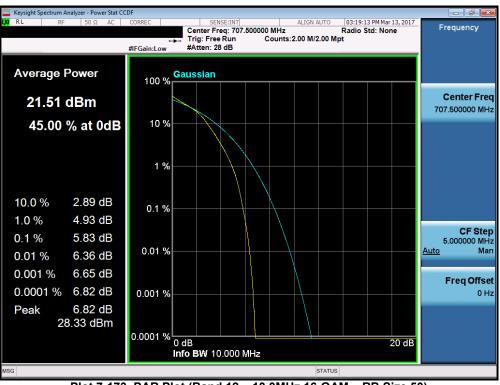
Plot 7-171. PAR Plot (Band 12 - 5.0MHz 16-QAM - RB Size 25)

FCC ID: ZNFV530		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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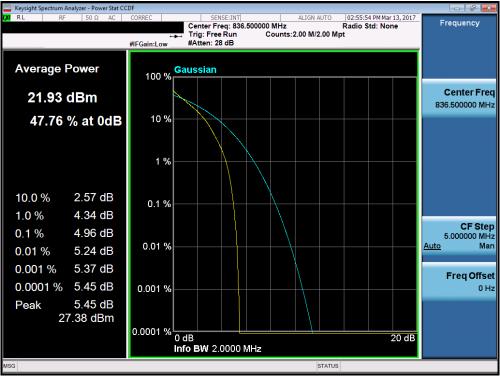
Plot 7-172. PAR Plot (Band 12 - 10.0MHz QPSK - RB Size 50)

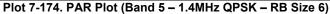


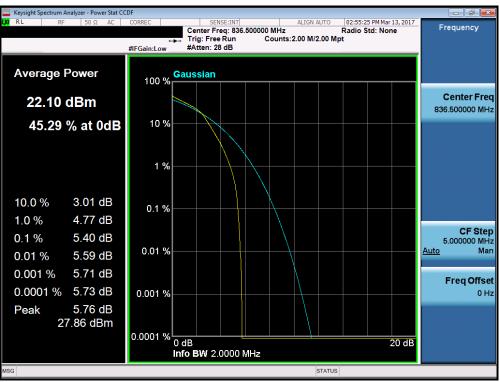
Plot 7-173. PAR Plot (Band 12 - 10.0MHz 16-QAM - RB Size 50)

FCC ID: ZNFV530		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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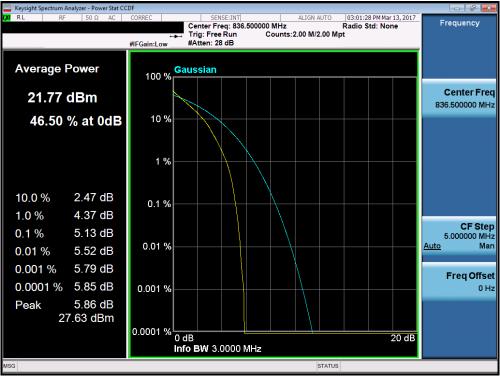


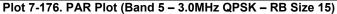


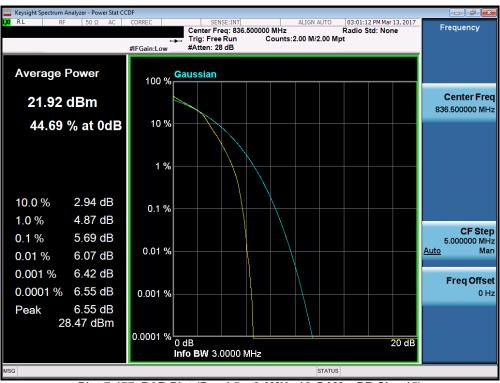
Plot 7-175. PAR Plot (Band 5 – 1.4MHz 16-QAM – RB Size 6)

FCC ID: ZNFV530		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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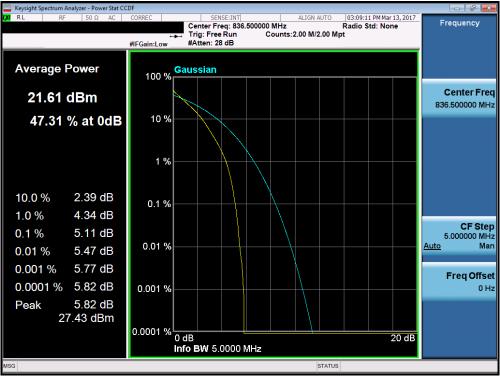


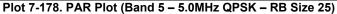


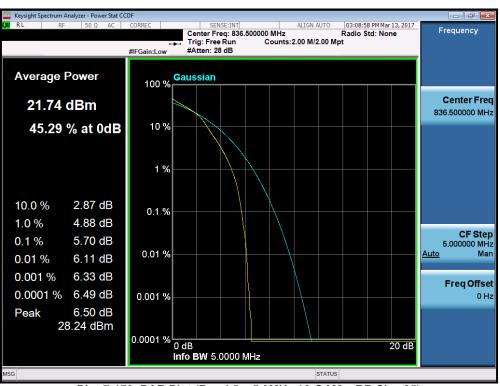
Plot 7-177. PAR Plot (Band 5 - 3.0MHz 16-QAM - RB Size 15)

FCC ID: ZNFV530		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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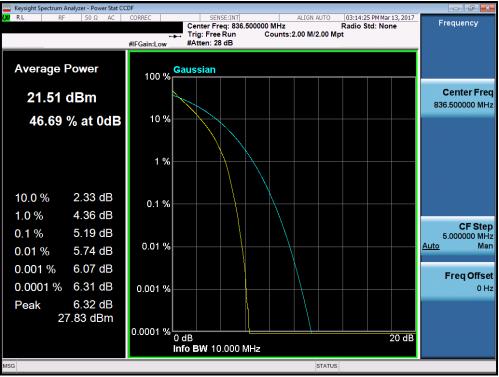




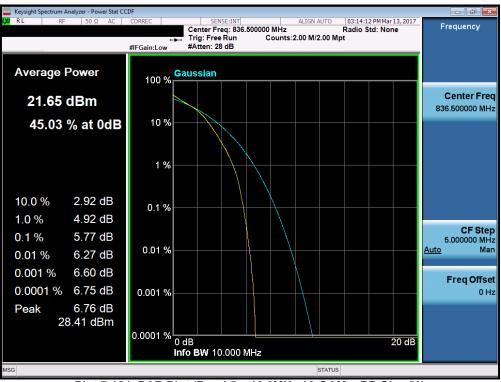
Plot 7-179. PAR Plot (Band 5 - 5.0MHz 16-QAM - RB Size 25)

FCC ID: ZNFV530	CALEST	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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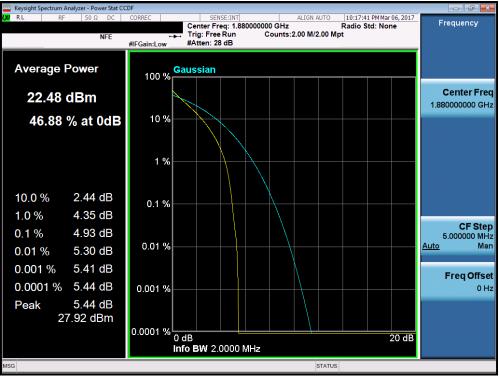


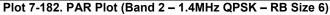


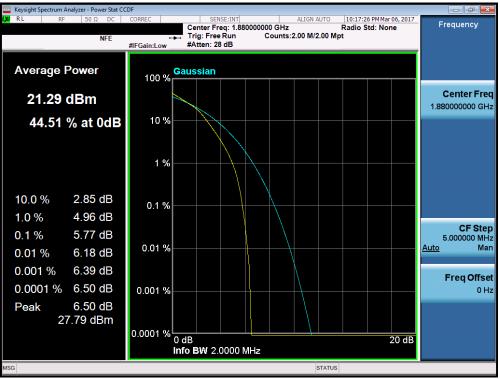
Plot 7-181. PAR Plot (Band 5 - 10.0MHz 16-QAM - RB Size 50)

FCC ID: ZNFV530		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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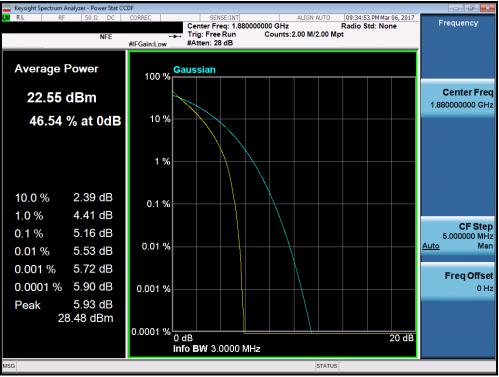


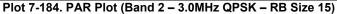


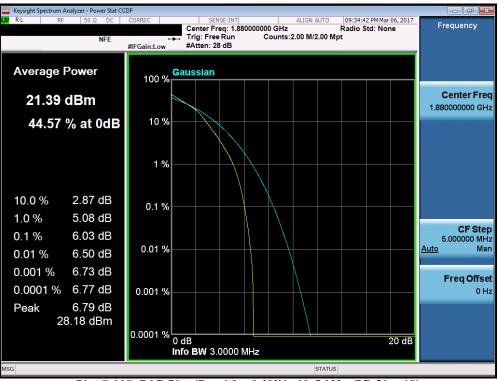
Plot 7-183. PAR Plot (Band 2 – 1.4MHz 16-QAM – RB Size 6)

FCC ID: ZNFV530	CALEST	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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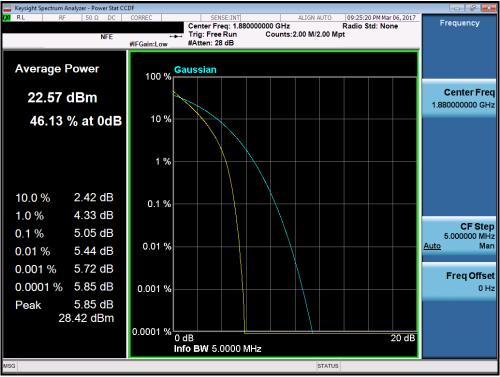


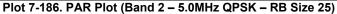


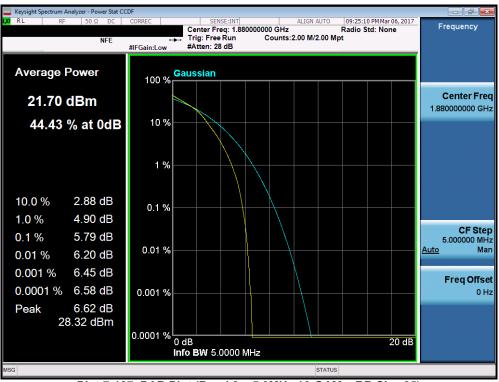
Plot 7-185. PAR Plot (Band 2 - 3.0MHz 16-QAM - RB Size 15)

FCC ID: ZNFV530		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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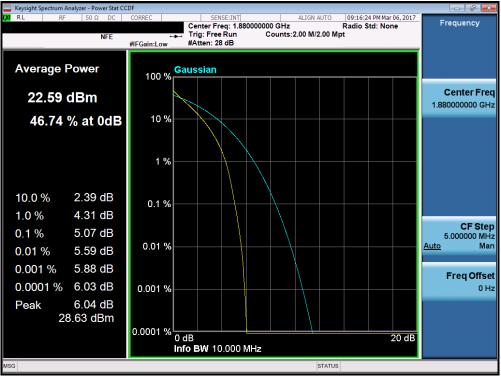




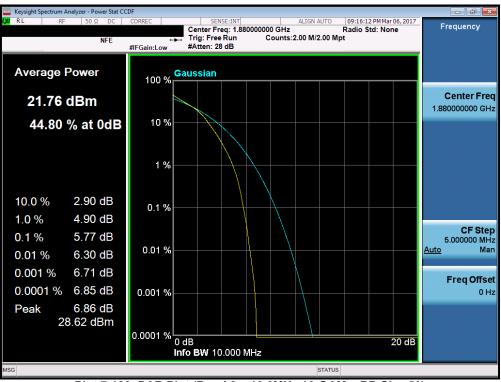
Plot 7-187. PAR Plot (Band 2 - 5.0MHz 16-QAM - RB Size 25)

FCC ID: ZNFV530		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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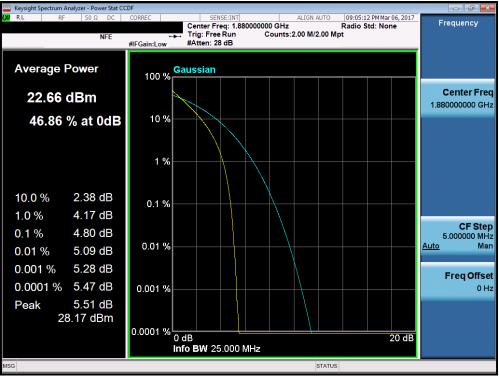




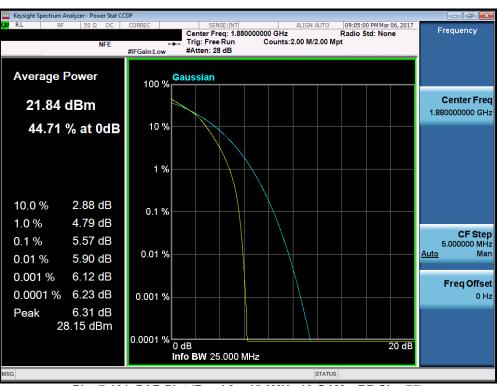
Plot 7-189. PAR Plot (Band 2 - 10.0MHz 16-QAM - RB Size 50)

FCC ID: ZNFV530		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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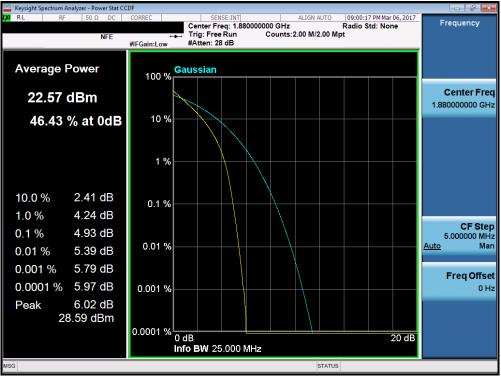


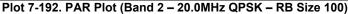


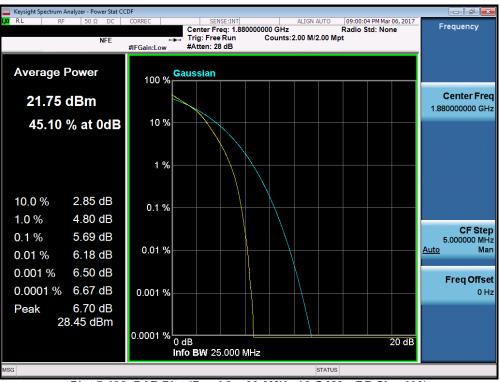
Plot 7-191. PAR Plot (Band 2 - 15.0MHz 16-QAM - RB Size 75)

FCC ID: ZNFV530		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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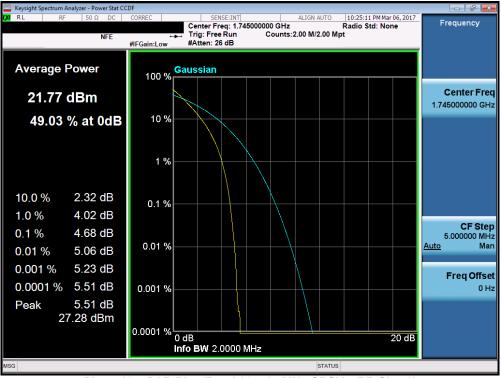




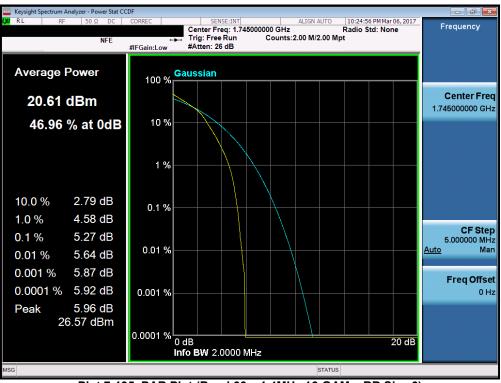
Plot 7-193. PAR Plot (Band 2 - 20.0MHz 16-QAM - RB Size 100)

FCC ID: ZNFV530		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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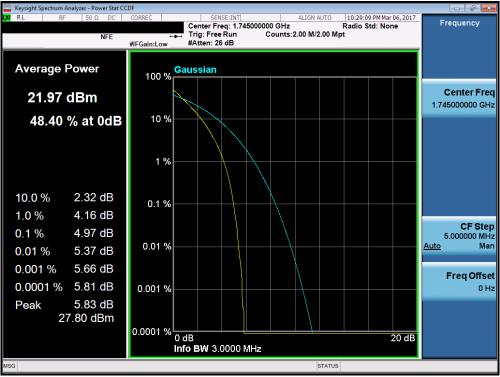
Plot 7-194. PAR Plot (Band 66 – 1.4MHz QPSK – RB Size 6)

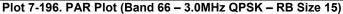


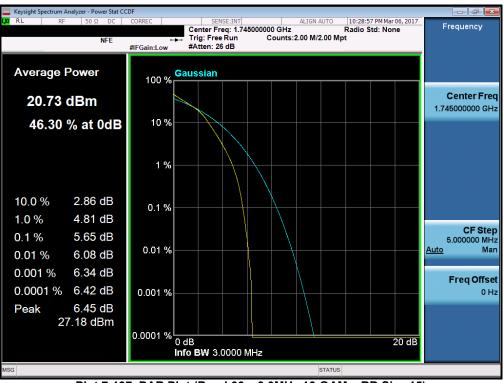
Plot 7-195. PAR Plot (Band 66 - 1.4MHz 16-QAM - RB Size 6)

FCC ID: ZNFV530		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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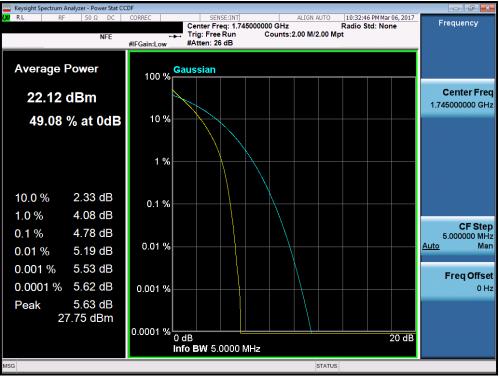


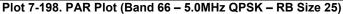


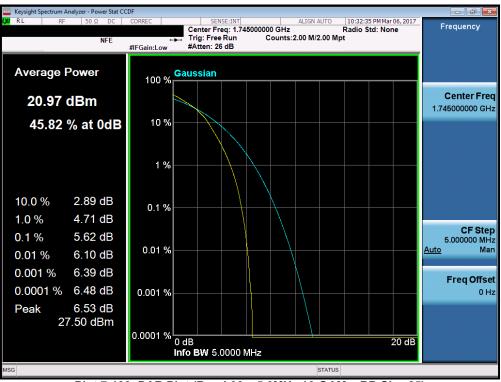
Plot 7-197. PAR Plot (Band 66 - 3.0MHz 16-QAM - RB Size 15)

FCC ID: ZNFV530		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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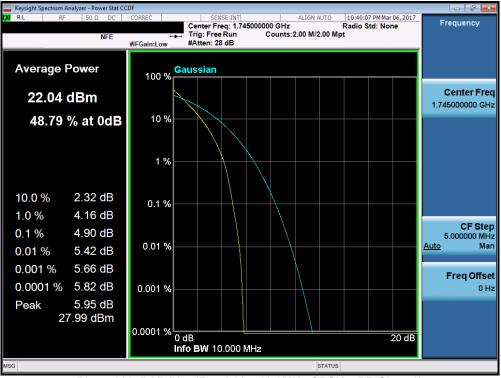




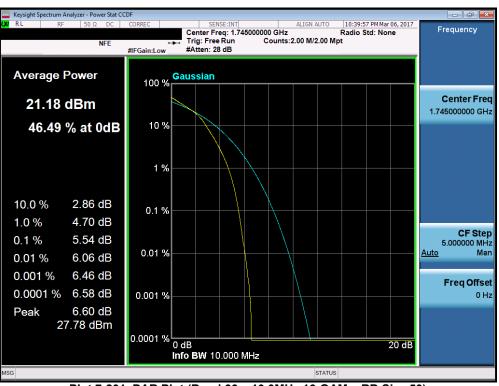
Plot 7-199. PAR Plot (Band 66 - 5.0MHz 16-QAM - RB Size 25)

FCC ID: ZNFV530		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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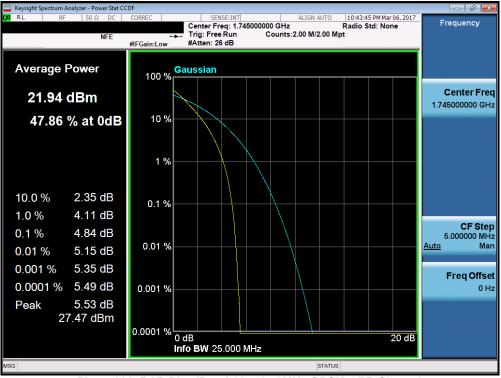
Plot 7-200. PAR Plot (Band 66 - 10.0MHz QPSK - RB Size 50)



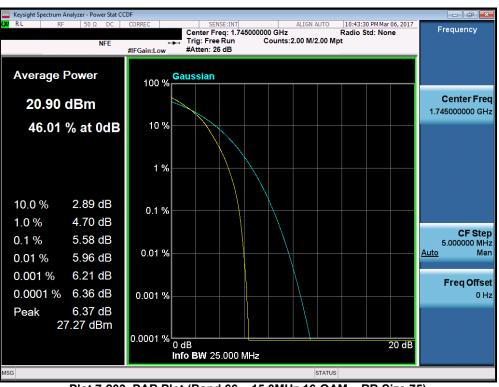
Plot 7-201. PAR Plot (Band 66 - 10.0MHz 16-QAM - RB Size 50)

FCC ID: ZNFV530		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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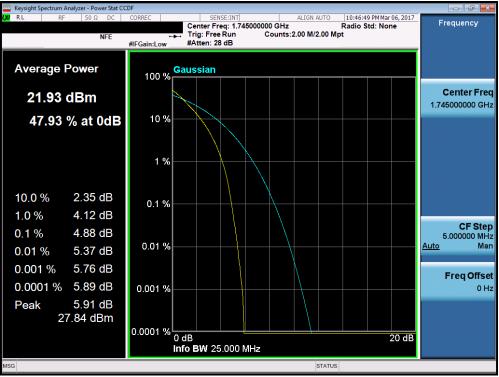
Plot 7-202. PAR Plot (Band 66 - 15.0MHz QPSK - RB Size 75)

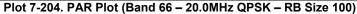


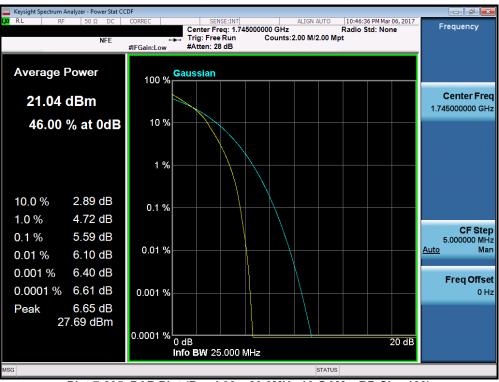
Plot 7-203. PAR Plot (Band 66 - 15.0MHz 16-QAM - RB Size 75)

FCC ID: ZNFV530		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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Plot 7-205. PAR Plot (Band 66 - 20.0MHz 16-QAM - RB Size 100)

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# 7.6 Radiated Power (ERP/EIRP) §22.913(a.2) §24.232(c.2) §27.50(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-D-2010 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using vertically and horizontally polarized tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically and horizontally polarized broadband horn antennas. All measurements are performed as RMS average measurements while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

#### Test Procedures Used

KDB 971168 D01 v02r02 - Section 5.2.1

ANSI/TIA-603-D-2010 - Section 2.2.17

#### Test Settings

- 1. Radiated power measurements are performed using the signal analyzer's "channel power" measurement capability for signals with continuous operation.
- 2. RBW = 1 5% of the expected OBW, not to exceed 1MHz
- 3. VBW  $\ge$  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

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# <u>Test Setup</u>

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

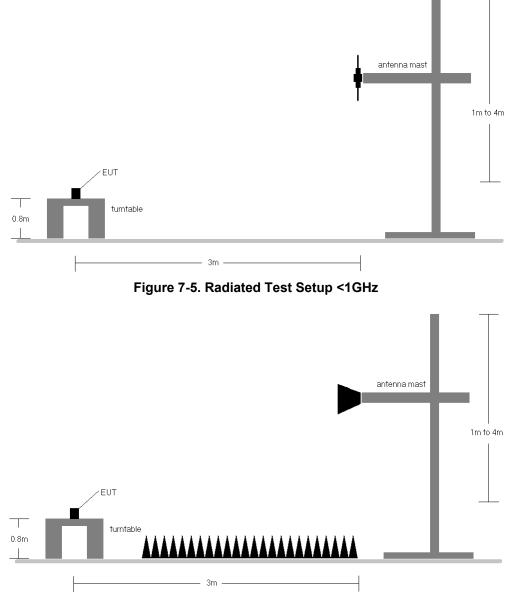


Figure 7-6. Radiated Test Setup >1GHz

#### **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]
699.70	1.4	QPSK	Н	147	159	1 / 3	16.94	2.48	19.42	34.77	-15.35
707.50	1.4	QPSK	Н	145	151	1 / 3	17.06	2.56	19.62	34.77	-15.15
715.30	1.4	QPSK	Н	289	146	1 / 3	18.14	2.60	20.74	34.77	-14.04
699.70	1.4	16-QAM	Н	147	159	1 / 3	16.13	2.48	18.61	34.77	-16.16
707.50	1.4	16-QAM	Н	145	151	1 / 3	16.20	2.56	18.76	34.77	-16.01
715.30	1.4	16-QAM	Н	289	146	1 / 3	17.34	2.60	19.94	34.77	-14.84
700.50	3	QPSK	Н	147	159	1 / 7	17.33	2.48	19.81	34.77	-14.96
707.50	3	QPSK	Н	145	151	1 / 14	17.36	2.56	19.92	34.77	-14.85
714.50	3	QPSK	Н	289	146	1 / 7	18.01	2.60	20.61	34.77	-14.16
700.50	3	16-QAM	Н	147	159	1 / 7	16.48	2.48	18.96	34.77	-15.81
707.50	3	16-QAM	Н	145	151	1 / 14	16.53	2.56	19.09	34.77	-15.68
714.50	3	16-QAM	Н	289	146	1 / 7	17.23	2.60	19.83	34.77	-14.94
701.50	5	QPSK	Н	147	159	1 / 12	17.49	2.49	19.98	34.77	-14.79
707.50	5	QPSK	Н	145	151	1 / 24	17.59	2.56	20.15	34.77	-14.62
713.50	5	QPSK	Н	289	146	1 / 12	18.22	2.60	20.82	34.77	-13.95
701.50	5	16-QAM	Н	147	159	1 / 12	16.71	2.49	19.20	34.77	-15.57
707.50	5	16-QAM	Н	145	151	1 / 24	16.73	2.56	19.29	34.77	-15.48
713.50	5	16-QAM	Н	289	146	1 / 12	17.49	2.60	20.09	34.77	-14.68
704.00	10	QPSK	Н	147	159	1 / 25	17.35	2.51	19.86	34.77	-14.91
707.50	10	QPSK	Н	145	151	1 / 25	17.33	2.56	19.89	34.77	-14.88
711.00	10	QPSK	Н	289	146	1 / 25	17.91	2.60	20.51	34.77	-14.27
704.00	10	16-QAM	Н	147	159	1 / 25	16.62	2.51	19.13	34.77	-15.64
707.50	10	16-QAM	Н	145	151	1 / 25	16.56	2.56	19.12	34.77	-15.65
711.00	10	16-QAM	Н	289	146	1 / 25	17.18	2.60	19.78	34.77	-15.00
713.50	5	QPSK	V	300	286	1/0	15.54	2.60	18.14	34.77	-16.63
713.50	5 (Sound Pack)	QPSK	Н	271	150	1/0	18.06	2.60	20.66	34.77	-14.11

Table 7-2. ERP Data (Band 12)

FCC ID: ZNFV530		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBd]	ERP [dBm]	ERP Limit [dBm]	Margin [dB]
824.70	1.4	QPSK	Н	219	157	1 / 0	16.83	5.51	22.34	38.45	-16.11
836.50	1.4	QPSK	Н	204	161	1 / 0	18.28	5.14	23.42	38.45	-15.03
848.30	1.4	QPSK	Н	206	161	1 / 0	17.69	4.68	22.37	38.45	-16.08
824.70	1.4	16-QAM	Н	219	157	1 / 0	15.82	5.51	21.33	38.45	-17.12
836.50	1.4	16-QAM	Н	204	161	1 / 0	17.17	5.14	22.31	38.45	-16.14
848.30	1.4	16-QAM	Н	206	161	1 / 0	16.89	4.68	21.57	38.45	-16.88
825.50	3	QPSK	Н	219	157	1 / 0	16.99	5.52	22.51	38.45	-15.94
836.50	3	QPSK	Н	204	161	1 / 0	18.47	5.14	23.61	38.45	-14.84
847.50	3	QPSK	Н	206	161	1 / 0	17.80	4.67	22.47	38.45	-15.98
825.50	3	16-QAM	Н	219	157	1 / 0	15.70	5.52	21.22	38.45	-17.23
836.50	3	16-QAM	Н	204	161	1 / 0	17.36	5.14	22.50	38.45	-15.95
847.50	3	16-QAM	Н	206	161	1 / 0	16.41	4.67	21.08	38.45	-17.37
826.50	5	QPSK	Н	219	157	1 / 12	16.87	5.51	22.38	38.45	-16.07
836.50	5	QPSK	Н	204	161	1 / 12	18.52	5.14	23.66	38.45	-14.79
846.50	5	QPSK	Н	206	161	1 / 12	17.85	4.66	22.51	38.45	-15.94
826.50	5	16-QAM	Н	219	157	1 / 12	15.43	5.51	20.94	38.45	-17.51
836.50	5	16-QAM	Н	204	161	1 / 12	17.06	5.14	22.20	38.45	-16.25
846.50	5	16-QAM	н	206	161	1 / 12	16.26	4.66	20.92	38.45	-17.53
829.00	10	QPSK	Н	219	157	1 / 25	17.67	5.49	23.16	38.45	-15.29
836.50	10	QPSK	Н	204	161	1 / 25	17.93	5.14	23.07	38.45	-15.38
844.00	10	QPSK	Н	206	161	1 / 0	17.77	4.70	22.47	38.45	-15.98
829.00	10	16-QAM	Н	219	157	1 / 25	16.72	5.49	22.21	38.45	-16.24
836.50	10	16-QAM	Н	204	161	1 / 25	17.11	5.14	22.25	38.45	-16.20
844.00	10	16-QAM	Н	206	161	1/0	16.97	4.70	21.67	38.45	-16.78
836.50	5	QPSK	V	304	199	1/0	15.51	5.14	20.65	38.45	-17.80
836.50	5 (Sound Pack)	QPSK	Н	217	150	1/0	18.42	5.14	23.56	38.45	-14.89

Table 7-3. ERP Data (Band 5)

FCC ID: ZNFV530		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP Limit [dBm]	Margin [dB]
1710.70	1.4	QPSK	н	100	335	1/0	16.59	9.62	26.21	30.00	-3.79
1745.00	1.4	QPSK	н	100	336	1 / 0	17.28	9.43	26.71	30.00	-3.29
1779.30	1.4	QPSK	н	100	327	1 / 0	16.60	9.25	25.85	30.00	-4.15
1710.70	1.4	16-QAM	н	100	335	1/0	15.68	9.62	25.30	30.00	-4.70
1745.00	1.4	16-QAM	н	100	336	1/0	16.30	9.43	25.73	30.00	-4.27
1779.30	1.4	16-QAM	н	100	327	1/0	15.86	9.25	25.11	30.00	-4.89
1711.50	3	QPSK	н	100	335	1 / 7	16.79	9.62	26.41	30.00	-3.59
1745.00	3	QPSK	н	100	336	1 / 7	17.43	9.43	26.86	30.00	-3.14
1778.50	3	QPSK	н	100	327	1/0	16.67	9.26	25.93	30.00	-4.07
1711.50	3	16-QAM	н	100	335	1 / 7	15.86	9.62	25.48	30.00	-4.52
1745.00	3	16-QAM	н	100	336	1 / 7	16.25	9.43	25.68	30.00	-4.32
1778.50	3	16-QAM	н	100	327	1 / 0	15.38	9.26	24.64	30.00	-5.36
1712.50	5	QPSK	н	100	335	1/0	16.70	9.61	26.31	30.00	-3.69
1745.00	5	QPSK	н	100	336	1 / 0	17.09	9.43	26.52	30.00	-3.48
1777.50	5	QPSK	н	100	327	1 / 0	16.61	9.26	25.87	30.00	-4.13
1712.50	5	16-QAM	н	100	335	1 / 0	15.98	9.61	25.59	30.00	-4.41
1745.00	5	16-QAM	н	100	336	1 / 0	16.35	9.43	25.78	30.00	-4.22
1777.50	5	16-QAM	н	100	327	1 / 0	15.81	9.26	25.07	30.00	-4.93
1715.00	10	QPSK	н	100	335	1/0	16.63	9.60	26.23	30.00	-3.77
1745.00	10	QPSK	н	100	336	1/0	17.14	9.43	26.57	30.00	-3.43
1775.00	10	QPSK	н	100	327	1 / 0	16.56	9.28	25.84	30.00	-4.16
1715.00	10	16-QAM	н	100	335	1/0	15.41	9.60	25.01	30.00	-4.99
1745.00	10	16-QAM	н	100	336	1/0	15.92	9.43	25.35	30.00	-4.65
1775.00	10	16-QAM	н	100	327	1/0	15.56	9.28	24.84	30.00	-5.16
1717.50	15	QPSK	н	100	335	1 / 0	16.78	9.58	26.36	30.00	-3.64
1745.00	15	QPSK	н	100	336	1 / 0	16.82	9.43	26.25	30.00	-3.75
1772.50	15	QPSK	н	100	327	1 / 0	16.91	9.29	26.20	30.00	-3.80
1717.50	15	16-QAM	н	100	335	1/0	15.49	9.58	25.07	30.00	-4.93
1745.00	15	16-QAM	н	100	336	1/0	15.44	9.43	24.87	30.00	-5.13
1772.50	15	16-QAM	Н	100	327	1/0	15.70	9.29	24.99	30.00	-5.01
1720.00	20	QPSK	н	100	335	1 / 50	16.83	9.57	26.40	30.00	-3.60
1745.00	20	QPSK	Н	100	336	1 / 50	16.87	9.43	26.30	30.00	-3.70
1770.00	20	QPSK	н	100	327	1/0	16.99	9.30	26.29	30.00	-3.71
1720.00	20	16-QAM	н	100	335	1 / 50	15.60	9.57	25.17	30.00	-4.83
1745.00	20	16-QAM	Н	100	336	1 / 50	15.58	9.43	25.01	30.00	-4.99
1770.00	20	16-QAM	Н	100	327	1/0	15.76	9.30	25.06	30.00	-4.94
1745.00	3	QPSK	V	233	227	1/0	14.59	9.43	24.02	30.00	-5.98
1745.00	3 (Sound Pack)	QPSK	н	100	338	1/0	17.23	9.43	26.66	30.00	-3.34
			Tah	مار 7_4	FIRP	Data (E	and 66	3		1	J

#### Table 7-4. EIRP Data (Band 66)

FCC ID: ZNFV530	PCTEST	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved 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	н	100	331	1 / 0	17.31	9.12	26.43	33.01	-6.58
1880.00	1.4	QPSK	н	100	329	1 / 0	16.50	9.10	25.60	33.01	-7.41
1909.30	1.4	QPSK	н	100	327	1 / 0	15.99	9.16	25.15	33.01	-7.86
1850.70	1.4	16-QAM	н	100	331	1/0	16.58	9.12	25.70	33.01	-7.31
1880.00	1.4	16-QAM	н	100	329	1/0	15.89	9.10	24.99	33.01	-8.02
1909.30	1.4	16-QAM	н	100	327	1 / 0	15.22	9.16	24.38	33.01	-8.63
1851.50	3	QPSK	н	100	331	1 / 0	17.25	9.12	26.37	33.01	-6.64
1880.00	3	QPSK	н	100	329	1 / 0	16.62	9.10	25.72	33.01	-7.29
1908.50	3	QPSK	н	100	327	1 / 0	16.16	9.15	25.31	33.01	-7.70
1851.50	3	16-QAM	н	100	331	1/0	16.53	9.12	25.65	33.01	-7.36
1880.00	3	16-QAM	н	100	329	1/0	15.87	9.10	24.97	33.01	-8.04
1908.50	3	16-QAM	н	100	327	1/0	15.38	9.15	24.53	33.01	-8.48
1852.50	5	QPSK	н	100	331	1/0	17.76	9.12	26.88	33.01	-6.13
1880.00	5	QPSK	н	100	329	1 / 0	17.12	9.10	26.22	33.01	-6.79
1907.50	5	QPSK	н	100	327	1 / 0	16.42	9.15	25.57	33.01	-7.44
1852.50	5	16-QAM	н	100	331	1/0	16.74	9.12	25.86	33.01	-7.15
1880.00	5	16-QAM	н	100	329	1/0	15.95	9.10	25.05	33.01	-7.96
1907.50	5	16-QAM	н	100	327	1/0	15.03	9.15	24.18	33.01	-8.83
1855.00	10	QPSK	н	100	331	1 / 0	17.72	9.12	26.84	33.01	-6.17
1880.00	10	QPSK	н	100	329	1 / 0	17.24	9.10	26.34	33.01	-6.67
1905.00	10	QPSK	н	100	327	1 / 0	16.51	9.13	25.64	33.01	-7.37
1855.00	10	16-QAM	н	100	331	1/0	17.07	9.12	26.19	33.01	-6.82
1880.00	10	16-QAM	н	100	329	1/0	16.49	9.10	25.59	33.01	-7.42
1905.00	10	16-QAM	н	100	327	1/0	15.85	9.13	24.98	33.01	-8.03
1857.50	15	QPSK	н	100	331	1 / 37	17.89	9.11	27.00	33.01	-6.01
1880.00	15	QPSK	н	100	329	1/0	17.29	9.10	26.39	33.01	-6.62
1902.50	15	QPSK	н	100	327	1/0	16.29	9.11	25.40	33.01	-7.61
1857.50	15	16-QAM	н	100	331	1 / 37	16.98	9.11	26.09	33.01	-6.92
1880.00	15	16-QAM	н	100	329	1/0	16.20	9.10	25.30	33.01	-7.71
1902.50	15	16-QAM	н	100	327	1/0	15.09	9.11	24.20	33.01	-8.81
1860.00	20	QPSK	н	100	331	1/0	17.80	9.11	26.91	33.01	-6.10
1880.00	20	QPSK	н	100	329	1/0	17.35	9.10	26.45	33.01	-6.56
1900.00	20	QPSK	н	100	327	1/0	16.39	9.09	25.48	33.01	-7.53
1860.00	20	16-QAM	н	100	331	1/0	17.11	9.11	26.22	33.01	-6.79
1880.00	20	16-QAM	н	100	329	1/0	16.64	9.10	25.74	33.01	-7.27
1900.00	20	16-QAM	н	100	327	1/0	15.47	9.09	24.56	33.01	-8.45
1857.50	15	QPSK	V	114	29	1/0	14.71	9.11	23.82	33.01	-9.19
1857.50	15	QPSK	ч	100	317	1/0	15.83	9.11	24.94	33.01	-8.07
	(Sound Pack)	Q. 011				Data (E		0.11	2	00.01	0.01

#### Table 7-5. EIRP Data (Band 2)

FCC ID: ZNFV530	PCTEST	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved 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]
2502.50	5	QPSK	Н	120	29	1 / 24	10.90	8.42	19.32	33.01	-13.69
2535.00	5	QPSK	н	115	32	1 / 0	12.62	8.50	21.12	33.01	-11.89
2567.50	5	QPSK	Н	114	30	1 / 0	12.99	8.59	21.58	33.01	-11.43
2502.50	5	16-QAM	Н	120	29	1 / 24	9.46	8.42	17.88	33.01	-15.13
2535.00	5	16-QAM	Н	115	32	1 / 0	11.08	8.50	19.58	33.01	-13.43
2567.50	5	16-QAM	Н	114	30	1 / 0	11.19	8.59	19.78	33.01	-13.23
2505.00	10	QPSK	н	120	29	1 / 49	11.66	8.42	20.08	33.01	-12.93
2535.00	10	QPSK	н	115	32	1 / 0	12.35	8.50	20.85	33.01	-12.16
2565.00	10	QPSK	н	114	30	1 / 0	12.81	8.58	21.39	33.01	-11.62
2505.00	10	16-QAM	Н	120	29	1 / 49	10.09	8.42	18.51	33.01	-14.50
2535.00	10	16-QAM	Н	115	32	1 / 0	10.90	8.50	19.40	33.01	-13.61
2565.00	10	16-QAM	н	114	30	1 / 0	11.39	8.58	19.97	33.01	-13.04
2507.50	15	QPSK	Н	120	29	1 / 0	11.03	8.43	19.46	33.01	-13.55
2535.00	15	QPSK	Н	115	32	1 / 0	12.16	8.50	20.66	33.01	-12.35
2562.50	15	QPSK	Н	114	30	1 / 0	12.53	8.57	21.10	33.01	-11.91
2507.50	15	16-QAM	Н	120	29	1 / 0	9.57	8.43	18.00	33.01	-15.01
2535.00	15	16-QAM	Н	115	32	1 / 0	10.86	8.50	19.36	33.01	-13.65
2562.50	15	16-QAM	Н	114	30	1 / 0	11.01	8.57	19.58	33.01	-13.43
2510.00	20	QPSK	Н	120	29	1 / 0	12.44	8.44	20.88	33.01	-12.13
2535.00	20	QPSK	Н	115	32	1 / 0	9.24	8.50	17.74	33.01	-15.27
2560.00	20	QPSK	Н	114	30	1 / 0	10.76	8.57	19.33	33.01	-13.68
2510.00	20	16-QAM	Н	120	29	1/0	11.12	8.44	19.56	33.01	-13.45
2535.00	20	16-QAM	н	115	32	1/0	9.96	8.50	18.46	33.01	-14.55
2560.00	20	16-QAM	н	114	30	1/0	9.89	8.57	18.46	33.01	-14.55
2567.50	5	QPSK	V	199	207	1/0	10.54	8.59	19.13	33.01	-13.88
2567.50	5 (Sound Pack)	QPSK	н	120	33	1 / 0	12.57	8.59	21.16	33.01	-11.85

Table 7-6. EIRP Data (Band 7)

FCC ID: ZNFV530		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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# 7.7 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-D-2010 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using vertically and horizontally polarized tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically and horizontally polarized broadband horn antennas. All measurements are performed as peak measurements while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

#### **Test Procedures Used**

KDB 971168 D01 v02r02 - Section 5.8

ANSI/TIA-603-D-2010 - Section 2.2.12

#### Test Settings

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

FCC ID: ZNFV530	PCTEST	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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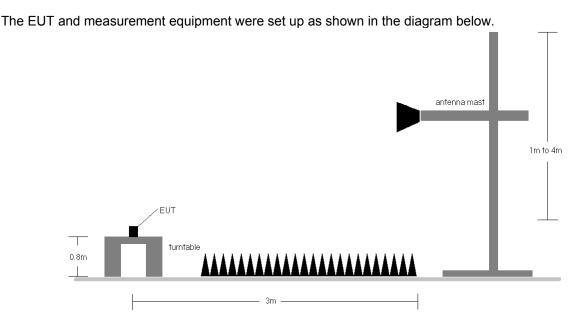


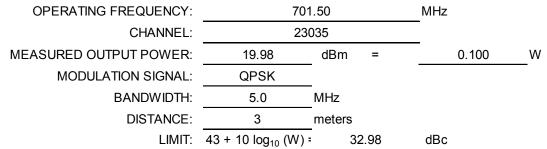
Figure 7-7. Test Instrument & Measurement Setup

# Test Notes

- 1) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the tables below.
- 2) This unit was tested with its standard battery.
- 3) The spectrum is measured from 9kHz to the 10th harmonic of the fundamental frequency of the transmitter. The worst-case emissions are reported.
- 4) Emissions below 18GHz were measured at a 3 meter test distance while emissions above 18GHz were measured at a 1 meter test distance with the application of a distance correction factor.
- 5) The "-" shown in the following RSE tables are used to denote a noise floor measurement.

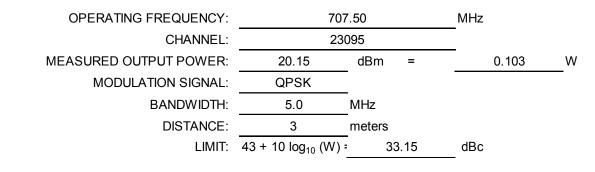
FCC ID: ZNFV530		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1403.00	Н	-	-	-63.83	5.60	-58.23	78.2
2104.50	Н	110	12	-61.49	6.67	-54.82	74.8
2806.00	Н	-	-	-61.91	7.92	-53.99	74.0

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



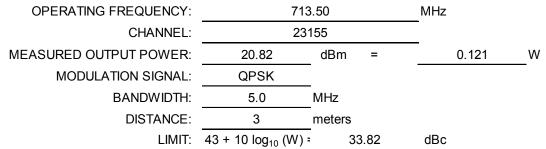
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1415.00	Н	-	-	-64.79	5.69	-59.10	79.2
2122.50	Н	110	10	-60.60	6.75	-53.86	74.0
2830.00	Н	-	-	-61.96	7.90	-54.06	74.2

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

FCC ID: ZNFV530		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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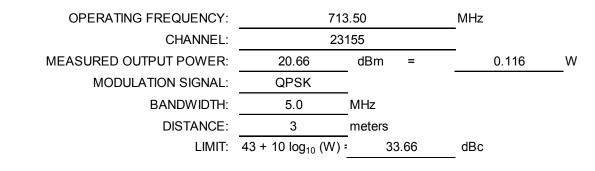
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Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1427.00	Н	-	-	-64.56	5.79	-58.77	79.6
2140.50	Н	110	12	-61.44	6.82	-54.62	75.4
2854.00	Н	-	-	-61.51	7.88	-53.63	74.5

Table 7-9. Radiated Spurious Data (Band 12 – High Channel)



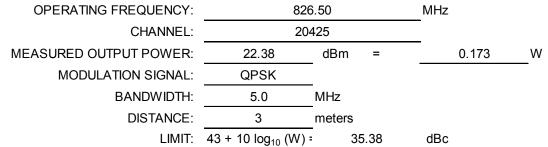
Frequency [MHz]	Ant. Pol. [H/V]	Height	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1427.00	Н	-	-	-65.37	5.79	-59.58	80.2
2140.50	Н	136	110	-62.47	6.82	-55.65	76.3
2854.00	Н	-	-	-62.59	7.88	-54.71	75.4

Table 7-10. Radiated Spurious Data with Sound Pack (Band 12 – High Channel)

FCC ID: ZNFV530		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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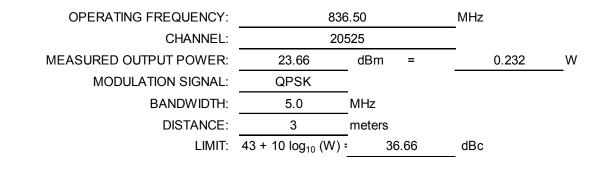
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Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1653.00	Н	110	356	-64.48	6.70	-57.78	80.2
2479.50	Н	110	170	-62.32	7.54	-54.78	77.2
3306.00	Н	-	-	-58.25	7.38	-50.87	73.2

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



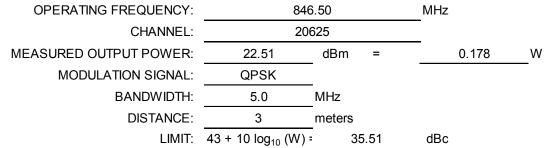
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1673.00	Н	110	350	-63.92	6.70	-57.22	80.9
2509.50	Н	110	166	-61.12	7.63	-53.49	77.2
3346.00	Н	-	-	-58.60	7.51	-51.09	74.7

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

FCC ID: ZNFV530		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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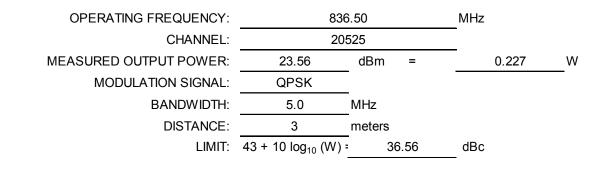
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Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1693.00	Н	110	162	-62.26	6.70	-55.57	78.1
2539.50	Н	139	165	-61.39	7.60	-53.79	76.3
3386.00	Н	-	-	-58.69	7.65	-51.04	73.6

Table 7-13. Radiated Spurious Data (Band 5 – High Channel)



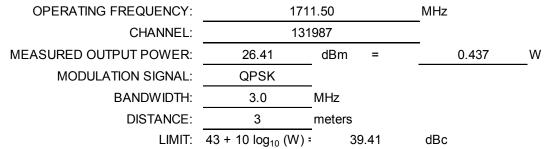
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1673.00	Н	110	170	-63.92	6.70	-57.22	80.8
2509.50	Н	144	161	-60.66	7.63	-53.03	76.6
3346.00	Н	-	-	-58.94	7.51	-51.43	75.0

Table 7-14. Radiated Spurious Data with Sound Pack (Band 5 – Mid Channel)

FCC ID: ZNFV530		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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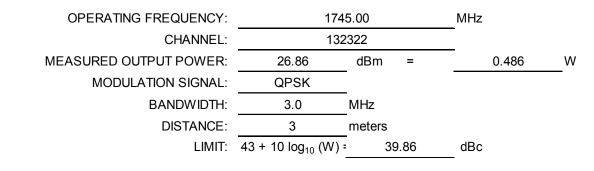
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Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3423.00	Н	117	355	-59.22	9.87	-49.35	75.8
5134.50	Н	113	5	-56.55	10.76	-45.80	72.2
6846.00	Н	112	18	-49.00	11.67	-37.33	63.7

Table 7-15. Radiated Spurious Data (Band 66 – Low Channel)



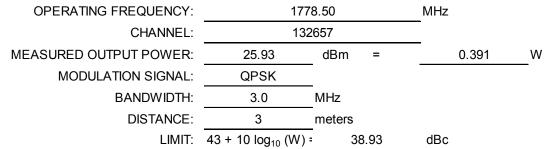
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3490.00	Н	116	355	-58.66	9.94	-48.72	75.6
5235.00	Н	119	12	-55.47	10.72	-44.74	71.6
6980.00	Н	110	10	-49.02	11.82	-37.20	64.1

Table 7-16. Radiated Spurious Data (Band 66 – Mid Channel)

FCC ID: ZNFV530		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
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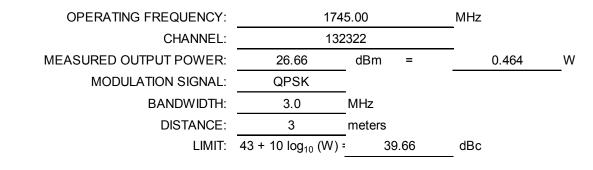
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Frequency [MHz]	Ant. Pol. [H/V]	Height	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3557.00	Н	113	2	-58.41	9.96	-48.45	74.4
5335.50	Н	120	17	-55.17	10.72	-44.45	70.4
7114.00	Н	110	2	-49.30	11.73	-37.57	63.5

Table 7-17. Radiated Spurious Data (Band 66 – High Channel)



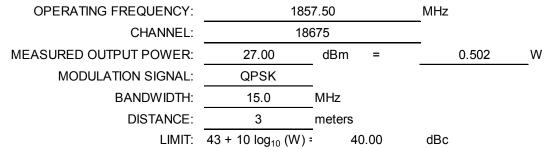
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3490.00	Н	125	15	-58.70	9.94	-48.76	75.4
5235.00	Н	121	15	-55.80	10.72	-45.07	71.7
6980.00	Н	112	22	-50.01	11.82	-38.19	64.9

Table 7-18. Radiated Spurious Data with Sound Pack (Band 66 – Mid Channel)

FCC ID: ZNFV530		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager		
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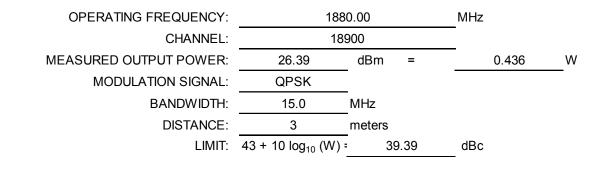
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Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3715.00	Н	110	359	-55.89	9.49	-46.40	73.4
5572.50	Н	110	4	-55.79	11.08	-44.71	71.7
7430.00	Н	110	355	-46.86	10.98	-35.88	62.9

Table 7-19. Radiated Spurious Data (Band 2 – Low Channel)



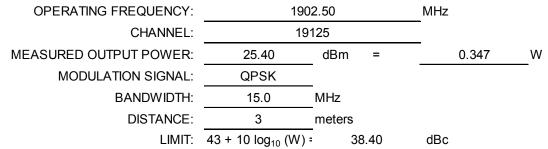
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3760.00	Н	114	2	-55.13	9.39	-45.75	72.1
5640.00	Н	114	357	-55.85	11.22	-44.63	71.0
7520.00	Н	110	350	-46.39	11.10	-35.28	61.7

Table 7-20. Radiated Spurious Data (Band 2 – Mid Channel)

FCC ID: ZNFV530		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager		
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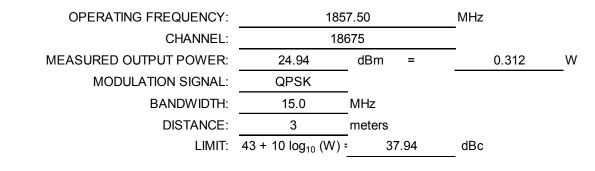
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Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3805.00	Н	115	359	-54.96	9.30	-45.66	71.1
5707.50	Н	110	3	-55.26	11.31	-43.96	69.4
7610.00	Н	110	3	-46.68	11.30	-35.38	60.8

Table 7-21. Radiated Spurious Data (Band 2 – High Channel)



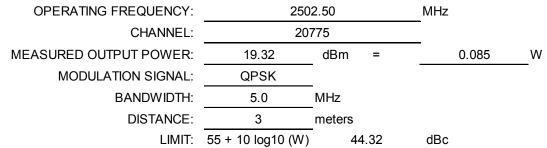
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3715.00	Н	110	196	-56.47	9.49	-46.98	71.9
5572.50	Н	110	47	-54.07	11.08	-42.99	67.9
7430.00	Н	110	49	-47.54	10.98	-36.56	61.5

Table 7-22. Radiated Spurious Data with Sound Pack (Band 2 – Low Channel)

FCC ID: ZNFV530	PCTEST	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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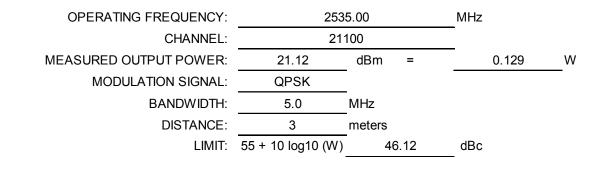
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Frequency [MHz]	Ant. Pol. [H/V]	Height	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
5005.00	Н	117	33	-53.03	11.18	-41.85	61.2
7507.50	Н	118	27	-48.91	11.18	-37.74	57.1
10010.00	Н	-	-	-57.23	12.56	-44.67	64.0

Table 7-23. Radiated Spurious Data (Band 7 – Low Channel)



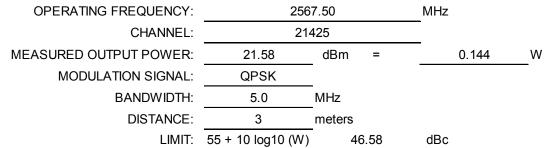
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
5070.00	Н	124	22	-52.82	11.04	-41.78	62.9
7605.00	Н	118	28	-49.45	11.47	-37.97	59.1
10140.00	Н	-	-	-56.85	12.67	-44.18	65.3

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

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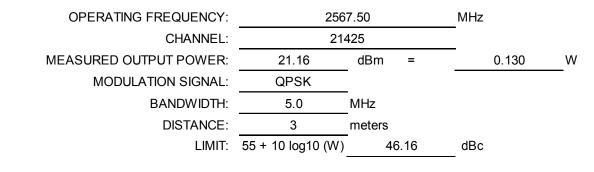
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Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
5135.00	Н	110	39	-51.93	10.92	-41.01	62.6
7702.50	Н	110	40	-51.38	11.56	-39.82	61.4
10270.00	Н	-	-	-57.98	12.75	-45.23	66.8

Table 7-25. Radiated Spurious Data (Band 7 – High 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]
5135.00	Н	107	31	-51.46	10.92	-40.54	61.7
7702.50	Н	105	33	-51.29	11.56	-39.73	60.9
10270.00	Н	-	-	-57.90	12.75	-45.15	66.3

Table 7-26. Radiated Spurious Data with Sound Pack (Band 7 – High Channel)

FCC ID: ZNFV530	PCTEST	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved 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-D-2010. The frequency stability of the transmitter is measured by:

- Temperature: The temperature is varied from -30°C to +50°C in 10°C increments using an a.) environmental chamber.
- Primary Supply Voltage: The primary supply voltage is varied from 85% to 115% of the nominal b.) 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 ±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-D-2010

#### Test Settings

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

#### Test Setup

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

#### Test Notes

None

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## Band 12 Frequency Stability Measurements §2.1055 §27.54

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

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	707,499,919	-81	-0.0000114
100 %		- 30	707,499,728	-272	-0.0000384
100 %		- 20	707,500,108	108	0.0000153
100 %		- 10	707,499,816	-184	-0.0000260
100 %		0	707,500,021	21	0.0000030
100 %		+ 10	707,499,693	-307	-0.0000434
100 %		+ 20	707,500,140	140	0.0000198
100 %		+ 30	707,499,622	-378	-0.0000534
100 %		+ 40	707,499,930	-70	-0.0000099
100 %		+ 50	707,499,976	-24	-0.0000034
BATT. ENDPOINT	3.45	+ 20	707,499,882	-118	-0.0000167

Table 7-27. Frequency Stability Data (Band 12)

FCC ID: ZNFV530	PCTEST	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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### Band 12 Frequency Stability Measurements §2.1055 §27.54

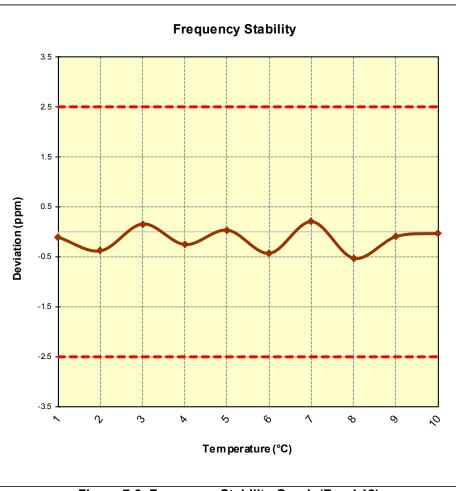


Figure 7-8. Frequency Stability Graph (Band 12)

FCC ID: ZNFV530		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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### Band 5 Frequency Stability Measurements §2.1055 §22.355

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

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	836,499,896	-104	-0.0000124
100 %		- 30	836,500,131	131	0.0000157
100 %		- 20	836,500,078	78	0.0000093
100 %		- 10	836,499,768	-232	-0.0000277
100 %		0	836,500,264	264	0.0000316
100 %		+ 10	836,499,798	-202	-0.0000241
100 %		+ 20	836,499,959	-41	-0.0000049
100 %		+ 30	836,499,910	-90	-0.0000108
100 %		+ 40	836,500,041	41	0.0000049
100 %		+ 50	836,499,984	-16	-0.0000019
BATT. ENDPOINT	3.45	+ 20	836,500,091	91	0.0000109

Table 7-28. Frequency Stability Data (Band 5)

FCC ID: ZNFV530		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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### Band 5 Frequency Stability Measurements §2.1055 §22.355

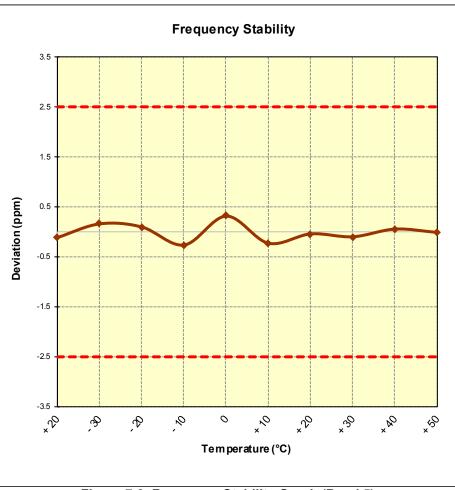


Figure 7-9. Frequency Stability Graph (Band 5)

FCC ID: ZNFV530		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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# Band 2 Frequency Stability Measurements §2.1055 §§27.54

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

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	1,879,999,943	-57	-0.0000030
100 %		- 30	1,879,999,904	-96	-0.0000051
100 %		- 20	1,880,000,059	59	0.0000031
100 %		- 10	1,880,000,067	67	0.0000036
100 %		0	1,879,999,963	-37	-0.0000020
100 %		+ 10	1,880,000,306	306	0.0000163
100 %		+ 20	1,880,000,065	65	0.0000035
100 %		+ 30	1,880,000,009	9	0.0000005
100 %		+ 40	1,880,000,033	33	0.0000018
100 %		+ 50	1,880,000,217	217	0.0000115
85 %	3.27	+ 20	1,879,999,861	-139	-0.0000074
BATT. ENDPOINT	3.45	+ 20	1,879,999,945	-55	-0.0000029

 Table 7-29. Frequency Stability Data (Band 2)

#### Note:

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

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### Band 2 Frequency Stability Measurements §2.1055 §§27.54

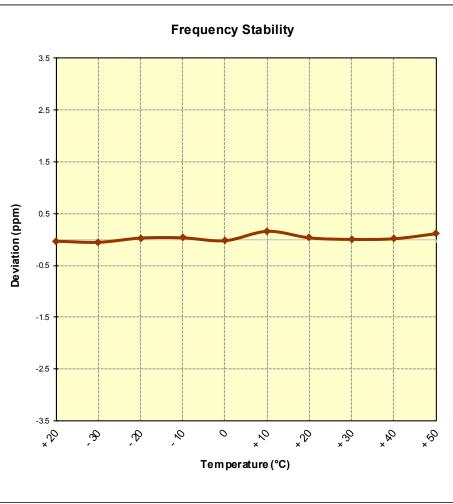


Figure 7-10. Frequency Stability Graph (Band 2)

FCC ID: ZNFV530		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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# Band 66 Frequency Stability Measurements §2.1055 §§27.54

OPERATING FREQUENCY:	1,745,000,000	Hz
CHANNEL:	132322	
REFERENCE VOLTAGE:	3.85	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	1,744,999,658	-342	-0.0000196
100 %		- 30	1,745,000,125	125	0.0000072
100 %		- 20	1,744,999,738	-262	-0.0000150
100 %		- 10	1,745,000,237	237	0.0000136
100 %		0	1,745,000,327	327	0.0000187
100 %		+ 10	1,745,000,077	77	0.0000044
100 %		+ 20	1,745,000,190	190	0.0000109
100 %		+ 30	1,744,999,933	-67	-0.000038
100 %		+ 40	1,745,000,361	361	0.0000207
100 %		+ 50	1,744,999,807	-193	-0.0000111
BATT. ENDPOINT	3.45	+ 20	1,744,999,947	-53	-0.0000030

Table 7-30. Frequency Stability Data (Band 66)

#### Note:

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

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### Band 66 Frequency Stability Measurements §2.1055 §§27.54

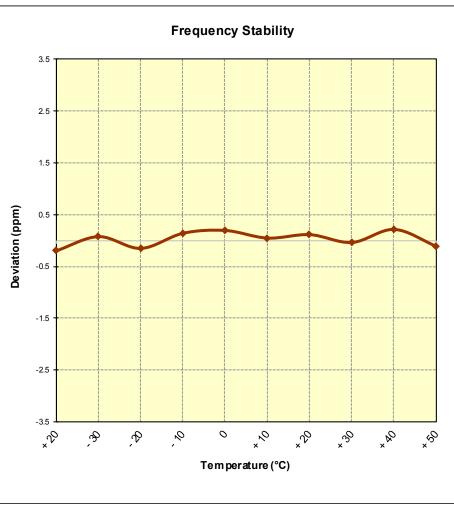


Figure 7-11. Frequency Stability Graph (Band 66)

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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)	2,534,999,825	-175	-0.0000069
100 %		- 30	2,534,999,958	-42	-0.0000017
100 %		- 20	2,535,000,308	308	0.0000121
100 %		- 10	2,535,000,079	79	0.0000031
100 %		0	2,534,999,961	-39	-0.0000015
100 %		+ 10	2,534,999,923	-77	-0.0000030
100 %		+ 20	2,535,000,236	236	0.0000093
100 %		+ 30	2,534,999,893	-107	-0.0000042
100 %		+ 40	2,534,999,981	-19	-0.0000007
100 %		+ 50	2,534,999,982	-18	-0.0000007
BATT. ENDPOINT	3.45	+ 20	2,534,999,798	-202	-0.0000080

Table 7-31. 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.

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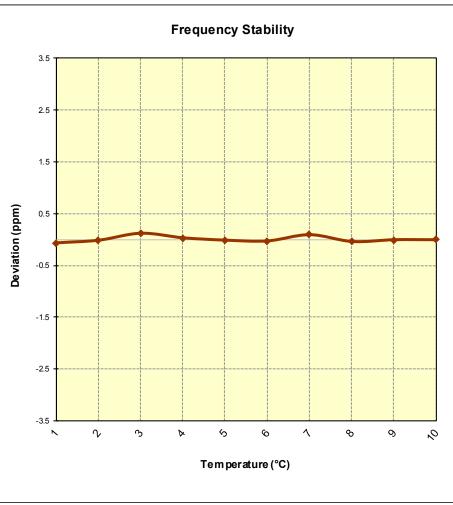


Figure 7-12. Frequency Stability Graph (Band 7)

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#### 8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **LG Portable Tablet FCC ID: ZNFV530** complies with all the requirements of Parts 22, 24, & 27 of the FCC rules for LTE operation only.

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