

Keysight S	pectrum Analyzer - Swept SA	4					
<mark>l,XI</mark> RL	RF 50 Ω A0	C CORREC	SENSE:INT	ALIGN ALIGN	AUTO 07:44:06 P S TRA	M Dec 29, 2016	Frequency
	_	PNO: Fast 😱 IFGain:Low	Trig: Free Run Atten: 30 dB	• //	Mkr1 1.84		Auto Tune
10 dB/div	Ref 20.00 dBn	n			-47.	04 dBm	
10.0							Center Freq 940.000000 MHz
-10.0						DL1 -13.00 dBm	Start Freq 30.000000 MHz
-20.0							<b>Stop Freq</b> 1.850000000 GHz
-40.0			na e stand de la reda una caracteria	and the second	Angeleur dele some be delle dele some be	1	CF Step 182.000000 MHz <u>Auto</u> Man
-60.0							<b>Freq Offset</b> 0 Hz
-70.0							Scale Type
Start 0.0	300 GHz	#\/B\M	3.0 MHz	Swa	Stop 1.	8500 GHz	Log <u>Lin</u>
MSG		#VBW	5.0 WINZ	Swet	STATUS	(outripts)	

Plot 7-118. Conducted Spurious Plot (Band 2/25 – 20.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)



Plot 7-119. Conducted Spurious Plot (Band 2/25 – 20.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)

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L <mark>XI</mark> RL		RF	50 Ω	AC (	CORREC		SEI	NSE:INT	#Avg Ty	ALIGN AU	JTO	07:44:19 PI TRAC	HDec 29, 2016	Fred	uency
10 dB/d	div	Ref 0.0	00 dB	m	PNO: F IFGain:	ast 🖵 Low	Trig: Free Atten: 10	e Run ) dB		N	/kr1	16.96 -54.	5 5 GHz 96 dBm	A	uto Tune
-10.0													DL1 -13.00 dBm	<b>Ce</b> 15.0000	<b>nter Freq</b> 00000 GHz
-20.0														<b>\$</b> 10.0000	Start Freq 00000 GHz
-40.0 -										1				<b>\$</b> 20.0000	<b>Stop Freq</b> 00000 GHz
-60.0	al of the line		la dy data i		l								l pole que tra de la como de como altras de pole libra de planetes ple	1.0000 <u>Auto</u>	<b>CF Step</b> 00000 GHz Man
-80.0														Fr	e <b>q Offset</b> 0 Hz
-30.0														S	cale Type
Start 1 #Res B	10.00 BW 1	0 GHz	4			#VBW	3.0 MHz			Sweep	25.3	Stop 20 3 ms (2	.000 GHz 0001 pts)	Log	LIN
MSG										ST	TATUS				

Plot 7-120. Conducted Spurious Plot (Band 2/25 – 20.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)



Plot 7-121. Conducted Spurious Plot (Band 2/25 – 20.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)

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Key:	/sight Spe	ctrum Analyze	- Swept SA										- F ×
<b>lxi</b> Rl	-	RF	50 Ω AC	COR	REC	SEI	NSE:INT	#Ava Tvr	ALIGN AUT	0 07:46:15 P TRA	M Dec 29, 2016	Fre	equency
10 dB	3/div	Ref 20.0	00 dBm	PN IFC	IO: Fast 🕞	Trig: Free Atten: 30	e Run ) dB		N	/lkr1 7.58 -36.	5 0 GHz 76 dBm		Auto Tune
10.0 -												C 5.958	<b>enter Freq</b> 000000 GHz
0.00 -											DL1 -13.00 dBm	1.916	Start Freq
-20.0 - -30.0 -									1			10.000	Stop Freq 000000 GHz
-40.0 -50.0					n finites a statistica and		en gestister Mensfelden ander Gestister Statistister ander	t and the second se			a for successful the provident of the formation of the providence	808. <u>Auto</u>	<b>CF Step</b> 400000 MHz Man
-60.0 -												F	F <b>req Offset</b> 0 Hz
70.0												s Log	Scale Type
start #Res	5 BW	o GHZ 1.0 MHZ			#VBW	3.0 MHz			weep	Stop 10 14.01 ms (*	16169 pts)	209	
MSG									STA	TUS			

Plot 7-122. Conducted Spurious Plot (Band 2/25 – 20.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)



Plot 7-123. Conducted Spurious Plot (Band 2/25 – 20.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)

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<b>l,XI</b> RI	L	RF	50 Ω	AC	CORREC		SEN	NSE:INT	#Avg	ALIGN A	UTO	07:46:21 P	M Dec 29, 2016	Frequ	ency
10 dE	3/div	Ref 0	.00 dE	3m	PNO: F IFGain:I	ast 😱 Low	Atten: 10	dB			Mkr	1 16.98 -54.	6 0 GHz 58 dBm	Au	to Tune
-10.0													DL1 -13.00 dBm	Cen 15.000000	<b>ter Freq</b> 0000 GHz
-20.0 -30.0														St 10.000000	<b>art Freq</b> 0000 GHz
-40.0 -50.0										1_				<b>St</b> 20.000000	<b>op Freq</b> 0000 GHz
-60.0 -70.0				eriegen is believen de geographie de la company de geographie de la company de			an franciska se bila se	alah aya arafa Alah ya aya arafa	alle e se en esta la la facto Regenerative e se esta la factoria de		<mark>. 19</mark> . a k	Start plant. Copyresses		1.000000 <u>Auto</u>	CF Step 0000 GHz Man
-80.0														Fre	<b>q Offset</b> 0 Hz
-90.0														Sca	ale Type
Star #Res	t 10.0 s BW	00 GHz 1.0 MH	z			#VBW	3.0 MHz			Sweep	25	Stop 20 .33 ms (2	.000 GHz 20001 pts)	Log	Lin
MSG										9	STATUS				

Plot 7-124. Conducted Spurious Plot (Band 2/25 – 20.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)



Plot 7-125. Conducted Spurious Plot (Band 30 – 10.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)

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L <mark>XI</mark> RL	RF 50	Ω AC	CORREC	SEI	NSE:INT	#Avg Typ	ALIGN AUTO e: RMS	06:50:33 P TRAC	M Dec 29, 2016	Frequency
10 dB/div	Ref 0.00	dBm	PNO: Fast IFGain:Low	Trig: Free #Atten: 1	e Run 0 dB		N	۲۷۱ DI Ikr1 4.61 -47.	<sup>™</sup> A NNNNN 1 5 GHz 11 dBm	Auto Tu
-10.0										<b>Center Fr</b> 8.682500000 G
-20.0										<b>Start Fr</b> 2.365000000 G
-40.0		1							DL1 -40.00 dBm	<b>Stop Fr</b> 15.000000000 G
-60.0	<u> </u>									<b>CF St</b> 1.263500000 G <u>Auto</u> M
-80.0										Freq Offs 0
Start 2.36	5 GHz		43 / P.14					Stop 15	.000 GHz	Scale Ty
#Res BW	1.0 WHZ		#VBW	3.0 MHZ		S	weep	25.27 ms (2 rus	5271 pts)	

Plot 7-126. Conducted Spurious Plot (Band 30 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)



Plot 7-127. Conducted Spurious Plot (Band 30 – 10.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)

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Keysight Spectrum Analyzer - Swept SA	А				
<b>LX/ RL </b> RF 50 Ω A	C CORREC	SENSE:INT	ALIGN AUTO #Avg Type: RMS	07:14:46 PM Dec 29, 2016 TRACE 1 2 3 4 5 6	Frequency
10 dB/div Ref 20.00 dBr	PNO: Fast CP I IFGain:Low	Atten: 30 dB	Mł	cr1 2.445 5 GHz -46.55 dBm	Auto Tune
10.0					Center Freq 1.252500000 GHz
-10.0					Start Freq 30.000000 MHz
-20.0				DL1 -25.00 dBm	<b>Stop Freq</b> 2.475000000 GHz
-40.0		ng ana di sa ng dan si na ng dan sa ng da			<b>CF Step</b> 244.500000 MHz <u>Auto</u> Man
-60.0					Freq Offset 0 Hz
Start 0.030 GHz #Res BW 1.0 MHz	#VBW 3	0 MHz	Sween 3	Stop 2.475 GHz	Scale Type
MSG	<i>"</i> <b>1 2 A 1 0</b> .		STATU	s	

Plot 7-128. Conducted Spurious Plot (Band 7 – 20.0MHz QPSK – RB Size 1, RB Offset 0– Low Channel)



Plot 7-129. Conducted Spurious Plot (Band 7 – 20.0MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)

FCC ID: ZNFH871	G		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
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L <mark>XI</mark> RL	RF 50 Ω	AC	CORREC	SE	NSE:INT	#Ava T	ALIGN AUT	0 07:15:01 P	MDec 29, 2016	Frequ	iency
10 dB/div	Ref 0.00 d	Bm	PNO: Fast IFGain:Low	Trig: Fre Atten: 10	e Run ) dB		M	۲۷۱ مار kr1 25.43 -50.	3 0 GHz 96 dBm	Αι	ito Tune
-10.0										Cen 21.00000	i <b>ter Freq</b> 0000 GHz
-20.0									DL1 -25.00 dBm	<b>S1</b> 15.00000	a <b>rt Freq</b> 0000 GHz
-40.0								1		<b>S</b> 1 27.00000	o <b>p Freq</b> 0000 GHz
-60.0										1.20000 <u>Auto</u>	<b>CF Step</b> 0000 GHz Man
-80.0										Fre	<b>q Offset</b> 0 Hz
-90.0										Sc	ale Type
Start 15.0 #Res BW	00 GHz 1.0 MHz		#VE	3W 3.0 MHz			Sweep	Stop 27 30.40 ms (2	.000 GHz 4001 pts)	Log	Lin
MSG							STA	TUS			

Plot 7-130. Conducted Spurious Plot (Band 7 – 20.0MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)



Plot 7-131. Conducted Spurious Plot (Band 7 – 20.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)

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l <b>,XI</b> RI		RF	50 Ω	AC	CORRE	C	SE	NSE:INT	#Avg	ALIGN AU Type: RMS	JTO	07:14:16 P	M Dec 29, 2016 DE 1 2 3 4 5 6	F	requency
10 dE	3/div	Ref 2	20.00 d	Bm	PNO IFGai	:Fast ⊊ in:Low	Trig: Fre Atten: 30	e Run ) dB			Mk	r1 2.57 -30.	0 5 GHz 33 dBm		Auto Tune
10.0														8.7	Center Fred 85000000 GHz
0.00 -10.0														2.5	Start Fred 70000000 GH2
-20.0 -30.0	1												DL1 -25.00 dBm	15.0	<b>Stop Fred</b> 00000000 GH2
-40.0 -50.0											angen og die b	a finite contraction of the		1.24 <u>Auto</u>	CF Step 43000000 GH2 Mar
-60.0															Freq Offset 0 Hz
-70.0														Log	Scale Type
star #Res	t 2.57 s BW	0 GHZ 1.0 MH	Iz			#VBM	/ 3.0 MHz			Sweep	24	Stop 15 .86 ms <u> (2</u>	.000 GHz 4861 pts)	LUg	
MSG										S	TATUS				

Plot 7-132. Conducted Spurious Plot (Band 7 – 20.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)



Plot 7-133. Conducted Spurious Plot (Band 7 – 20.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)

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Keysig	ht Spect	rum Analyz	er - Swep	ot SA										_	
L <mark>XI</mark> RL		RF	50 Ω	AC	CORR	EC		SENSE:INT	#Av	a Type	ALIGN AUTO	07:15:30 TRA	PM Dec 29, 2016	F	requency
<u>1</u> 0 dB/d	liv	Ref 20	.00 dl	Bm	PNC IFGa	): Fast     ⊊ in:Low	Trig: F Atten:	ree Run 30 dB			М	۳ kr1 2.48 -46	0 5 GHz 32 dBm		Auto Tune
10.0														1.20	Center Freq 65000000 GHz
-10.00														3	Start Freq 0.000000 MHz
-20.0													DL1 -25.00 dBm	2.50	Stop Freq
-40.0		Mining and a state of the state		Ny quality and a second						dar oler der die die state	r symphosik fra training fra	the state of the s	1	24 <u>Auto</u>	CF Step 7.000000 MHz Man
-60.0															Freq Offset 0 Hz
-70.0	0.000											Oton		Log	Scale Type
#Res E	5.030 BW <u>1.</u>	Gнz .0 MHz				#VB\	V 3.0 MH	z		ş	Sweep	3.293 ms	2.500 GHZ (4941 p <u>ts)</u>		
MSG											STATU	JS			

Plot 7-134. Conducted Spurious Plot (Band 7 – 20.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)



Plot 7-135. Conducted Spurious Plot (Band 7 – 20.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)

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<b>lxi</b> RL		RF	50 Ω	AC	CORREC		SEI	VSE:INT	#Avg Typ	ALIGN AUTO e: RMS	07:15:46 P TRAC	MDec 29, 2016	F	requency
10 dB/d	div	Ref	0.00 dl	Bm	PNO: Fa IFGain:Lo	st 🖵 ow	Atten: 10	) dB		Mk	r1 26.21 -51.	5 5 GHz 18 dBm		Auto Tune
-10.0													21.00	<b>Center Freq</b> 00000000 GHz
-20.0												DL1 -25.00 dBm	15.00	Start Freq 00000000 GHz
-40.0 -													27.00	Stop Freq 00000000 GHz
-60.0													1.20 <u>Auto</u>	<b>CF Step</b> 00000000 GHz Man
-80.0														Freq Offset 0 Hz
-90.0														Scale Type
Start #Res	15.0 BW	00 GI 1.0 N	lz Hz		#	VBW	3.0 MHz		s	weep 3	Stop 27 30.40 ms (2	.000 GHz 4001 pts)	Log	Lin
MSG										STAT	US			

Plot 7-136. Conducted Spurious Plot (Band 7 – 20.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)

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# 7.4 Band Edge Emissions at Antenna Terminal §2.1051 §22.917(a) §24.238(a) §27.53(c) §27.53(g) §27.53(h) §27.53(m) §27.53(a.4)

## **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 30 is > 43 + 10log10 (P[Watts] at 2300-2305MHz & 2345-2360MHz, > 55 + 10log10 (P[Watts]) at 2320-2324MHz & 2341-2345MHz, > 61 + 10log10 (P[Watts]) at 2324-2328MHz & 2337-2341MHz, > 67 + 10log10 (P[Watts]) at 2288-2292MHz & 2328-2337MHz, and > 70 + 10log10 (P[Watts]) at frequencies < 2288MHz & >2365MHz.

# The minimum permissible attenuation level for Band 7 and 41 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 > 1% of the emission bandwidth
- 4. VBW > 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 7-3. Test Instrument & Measurement Setup

## <u>Test Notes</u>

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

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

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

Per 27.53(a)(5) in the 1 MHz bands immediately outside and adjacent to the channel blocks at 2305, 2310, 2315, 2320, 2345, 2350, 2355, and 2360 MHz, a resolution bandwidth of at least 1 percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e., 1 MHz). 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 emissions are attenuated at least 26 dB below the transmitter power.

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.

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LXIRL RF 50Ω AC	CORREC	SENSE:INT		IGN AUTO	05:59:36 PM E TRACE	Dec 29, 2016	Fr	equency
	PNO: Wide Trig: F IFGain:Low Atten:	ree Run 36 dB		Mkr	TYPE DET			Auto Tune
10 dB/div Ref 25.00 dBm	1				-35.6	0 dBm		
15.0				/	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		<b>C</b> 698	<b>enter Freq</b> .000000 MHz
-5.00							696	Start Freq .000000 MHz
-15.0						L1 -13.00 dBm	700	<b>Stop Freq</b> .000000 MHz
-35.0	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		~~~~				<u>Auto</u>	<b>CF Step</b> 400.000 kHz Man
-45.0							I	<b>Freq Offset</b> 0 Hz
-65.0								Scale Type
Center 698.000 MHz #Res BW 100 kHz	#VBW 300 ki	łz	s	weep 1	Span 4.0 .000 ms (1	000 MHz 001 pts)	Log	Lin
MSG				STATUS				

Plot 7-137. Lower Band Edge Plot (Band 12/17 – 1.4MHz QPSK – RB Size 6)



Plot 7-138. Upper Band Edge Plot (Band 12/17 – 1.4MHz QPSK – RB Size 6)

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LXI RL RF 50Ω AC	CORREC SENSE:	INT ALIGN AUTO #Avg Type: RMS	06:16:17 PM Dec 29, 2016 TRACE 1 2 3 4 5 6	Frequency
10 dB/div Ref 25.00 dBm	PNO: Wide Trig: Free Ru IFGain:Low Atten: 36 dB	in B M	kr1 696.536 MHz -33.22 dBm	Auto Tune
15.0			Junio	Center Freq 698.000000 MHz
-5.00				Start Freq 696.000000 MHz
-15.0			UL1 -13.00 dem	<b>Stop Freq</b> 700.000000 MHz
-35.0		n n n n n n n n n n n n n n n n n n n		CF Step 400.000 kHz <u>Auto</u> Man
-55.0				<b>Freq Offset</b> 0 Hz
-65.0				Scale Type
Center 698.000 MHz #Res BW 100 kHz	#VBW 300 kHz	Sweep	Span 4.000 MHz 1.000 ms (1001 pts)	
MSG		STAT	us	

Plot 7-139. Lower Band Edge Plot (Band 12/17 - 3.0MHz QPSK - RB Size 15)



Plot 7-140. Upper Band Edge Plot (Band 12/17 – 3.0MHz QPSK – RB Size 15)

FCC ID: ZNFH871	G		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:		Test Dates:	EUT Type:		Dogo 00 of 196
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🔤 Kej	ysight Spec	trum Analyzer -	Swept SA									_	
l <mark>,XI</mark> R	L	RF 5	Ω AC	CORREC		SEI	NSE:INT	#Ava Tv	ALIGN AUT	06:25:10 P TRA	M Dec 29, 2016	F	requency
				PNO: W IFGain:I	/ide 🖵 Low	Trig: Fre Atten: 36	e Run 6 dB			TY D			Auto Tupo
10 de	3/div	Ref 25.0	0 dBm						M	kr1 697.8 -30.	20 MHz 42 dBm		Auto Tune
15.0							Ĭ						Center Freq
13.0												69	8.000000 MHz
5.00												60	Start Freq
-5.00										1	DL1 -13.00 dBm	09	8.000000 MH2
-15.0										<i>,</i>		70	Stop Freq 0.000000 MHz
-25.0						1- 1-		~~~~~	~~~~				
-35.0	~~~~	m			·····	(+- °						<u>Auto</u>	CF Step 400.000 kHz Man
-45.0													
-55.0													Freq Offset 0 Hz
-65.0													
												1.00	
Cen #Re	ter 698 s BW 1	3.000 MH2 100 kHz	2		#VBW	300 kHz			Sweep	Span 4 1.000 ms	.000 MHz (1001 pts)	Log	
MSG									STA	TUS			

Plot 7-141. Lower Band Edge Plot (Band 12/17 - 5.0MHz QPSK - RB Size 25)



Plot 7-142. Upper Band Edge Plot (Band 12/17 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFH871	G		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:		Test Dates:	EUT Type:		Dage 01 of 196
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Keysight Specific Keysight	ectrum Analyzer - Sv	vept SA									
I,XI RL	RF 50 S	2 AC	CORREC	SE	NSE:INT	#Ava Tvr	ALIGN AUTO	06:33:59 P	M Dec 29, 2016	F	requency
			PNO: Wide C IFGain:Low	Trig: Fre Atten: 30	e Run 6 dB	#7 ( <b>8</b> ) }					Auto Tune
10 dB/div Log	Ref 25.00	dBm			•			-27.	75 dBm		
15.0										69	Center Freq
5.00											
-5.00										694	Start Freq 4.000000 MHz
15.00									DL1 -13.00 dBm		
-15.0					.1					70:	Stop Freq 2.000000 MHz
-25.0	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		~~~~~								CE Sten
-35.0										<u>Auto</u>	800.000 kHz Man
-45.0											
-55.0											o Hz
-65.0											Scale Type
Center <u>69</u>	8.000 MHz							Span 8	.000 MHz	Log	Lin
#Res BW	100 kHz		#VB	W 300 kHz			Sweep	1.000 ms (	(1001 pts)		
MSG							STATU	JS			

Plot 7-143. Lower Band Edge Plot (Band 12/17 - 10.0MHz QPSK - RB Size 50) Keysight Spectrum Analyzer - Swept SA K RL ALIGN AUTO 06:35:20 PM Dec 29, 2016 50 Ω AC Frequency TRACE 1 2 3 4 5 6 TYPE A WWWW DET A NNNNN #Avg Type: RMS PNO: Wide Trig: Free Run IFGain:Low Atten: 36 dB Mkr1 716.000 MHz -24.34 dBm Auto Tune 10 dB/div Log Ref 25.00 dBm **Center Freq** 716.000000 MHz Start Freq 712.000000 MHz Stop Freq 1 720.000000 MHz CF Step 800.000 kHz <u>Auto</u> Man **Freq Offset** 0 Hz Scale Type Span 8.000 MHz Sweep 1.000 ms (1001 pts) Center 716.000 MHz #Res BW 100 kHz <u>Lin</u> #VBW 300 kHz MSG

Plot 7-144. Upper Band Edge Plot (Band 12/17 – 10.0MHz QPSK – RB Size 50)

FCC ID: ZNFH871	G		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N:		Test Dates:	EUT Type:		Dogo 02 of 196
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Keysight Spectrum Analyzer - Swept SA						
LX/ RL RF 50 Ω AC	CORREC SE	NSE:INT #Ava Tv	ALIGN AUTO	05:47:29 PM Dec 29, 2016 TRACE 2 3 4 5	Fr	requency
	PNO: Wide Trig: Fre	e Run		TYPE A WWWW	¥	
	IFGain:Low Atten: 30		8.41	cm4 777 000 MUU		Auto Tune
40 dB/dive Dof 25 00 dBm			IVIP	-25 92 dBn		
Log		▼		20.02 4011		
					(	Center Freq
15.0					777	7.000000 MHz
5.00						Start Fred
					775	Start Freq
-5.00						
45.0		- /		DL1 -13.00 dBr		
- 15.0		d d				Stop Freq
25.0		1			779	9.000000 MHz
-20.0						
-35.0	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~					CF Step
					Auto	400.000 kHz Man
-45.0					Auto	marr
						<b>F</b> === <b>OH</b> ==+
-55.0						Freq Offiset
						UHZ
-65.0						
						Scale Type
Cepter 777 000 MHz				Spap 4 000 MH	Log	Lin
#Res BW 100 kHz	#VBW 300 kHz		Sweep	1.000 ms (1001 pts		
MSG			STATU	JS		

Plot 7-145. Lower Band Edge Plot (Band 13 – 5.0MHz QPSK – RB Size 25)



Plot 7-146. Lower Emission Mask Edge Plot (Band 13 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFH871	G		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:		Test Dates:	EUT Type:		Degra 02 of 196
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Keysight Sp	ectrum Analyzer - Swept SA								_	
l <b>XI</b> RL	RF 50 Ω AC	CORREC	SEI	NSE:INT	#Ava Tvp	ALIGN AUTO	05:48:02 PI	M Dec 29, 2016	F	requency
		PNO: Wide 🖵	Trig: Free	Run			TYP			
		IFGain:Low	Atten: 30	ub		MI	rf 707 0			Auto Tune
10 dB/div	Ref 25.00 dBm						-22.	80 dBm		
Log			<u> </u>							
										Center Freq
15.0									78	7.000000 MHz
5.00			$\sim$							
0.00										Start Freq
-5.00									78	5.000000 MHz
								DL1 -13.00 dBm		
-15.0			<u> </u>	1						Stop Freq
			) V	<b>)</b>					78	9.000000 MHz
-25.0				m	m	·····	~~~~~			
95.0							~~~~	$\sim$		CF Step
-35.0									Auto	400.000 kHz
-45.0									Auto	Warr
										<b>F</b> === 0ff==+
-55.0										
										0112
-65.0										
										scale Type
Center 78	37.000 MHz						Span 4	.000 MHz	Log	Lin
#Res BW	100 kHz	#VBW	300 kHz			Sweep	1.000 ms (	1001 pts)		
MSG						STATU	JS			

Plot 7-147. Upper Band Edge Plot (Band 13 – 5.0MHz QPSK – RB Size 25)



Plot 7-148. Upper Emission Mask Edge Plot (Band 13 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFH871	G		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:		Test Dates:	EUT Type:		Dage 04 of 196
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🔤 Keysight Spectrum Analyzer - Swept SA								
LXI RL RF 50Ω AC	CORREC	ENSE:INT		IGN AUTO	05:51:16 PM TRACE	Dec 29, 2016	Fr	equency
10 d⊡/div. Bef 25.00 dBm	PNO: Wide Trig: Fr IFGain:Low Atten:	ee Run 36 dB		Mkr	TYPE DE1 1 777.0 -27.0	00 MHz		Auto Tune
							<b>C</b> 777	<b>Center Freq</b> .000000 MHz
-5.00				~~~~	·····	DL1 -13.00 dBm	773	Start Freq .000000 MHz
-15.0		1					781	Stop Freq .000000 MHz
-35.0							<u>Auto</u>	<b>CF Step</b> 800.000 kHz Man
-55.0								Freq Offset 0 Hz
							Log	Scale Type
#Res BW 100 kHz	#VBW 300 kH	z	S	weep 1.0	span 8. 000 ms (1	000 MHz 001 pts)	209	<u></u>
MSG				STATUS				

Plot 7-149. Lower Band Edge Plot (Band 13 – 10.0MHz QPSK – RB Size 50)



Plot 7-150. Lower Emission Mask Edge Plot (Band 13 – 10.0MHz QPSK – RB Size 50)

FCC ID: ZNFH871	G		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:		Test Dates:	EUT Type:		Dage OF of 196
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Keysight	t Spectrum Analyzer - Swept S	A				
LXI RL	RF 50 Ω 4	AC CORREC	SENSE:INT	ALIGN A	UTO 05:51:47 PM Dec 29, 2016 TRACE 2 2 4 5	Frequency
		PNO: Wide 😱	Trig: Free Run	mitig type: this		
		IFGain:Low	Atten: 36 dB		Mired 202 000 Mills	Auto Tune
					-30 63 dBm	
	V Rei 25.00 dBi					
						Center Freq
15.0						787.000000 MHz
5.00	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~			Start Fred
z 00						783.000000 MHz
-3.00						
-15.0					DL1 -13.00 dBm	
						Stop Freq
-25.0			<u> </u>			791.000000 MHZ
			Y.			
-35.0						CF Step
					~~~~~	Auto Man
-45.0					- month	
						Freg Offset
-55.0						• 0 Hz
-65.0						Scale Type
Center	787.000 MHz	<i>"</i> .			Span 8.000 MHz	Log <u>Lin</u>
#Res B	W 100 KHz	#VBW	300 kHz	Swee	ep 1.000 ms (1001 pts)	
MSG				S	STATUS	

Plot 7-151. Upper Band Edge Plot (Band 13 – 10.0MHz QPSK – RB Size 50)



Plot 7-152. Upper Emission Mask Edge Plot (Band 13 – 10.0MHz QPSK – RB Size 50)

FCC ID: ZNFH871	G		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
Test Report S/N:		Test Dates:	EUT Type:		Dogo 06 of 196	
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WRL   RF   SD 9: AC   CORREC   SENSE:INT   ALIGN AUTO   04:39:55 PMDec 29:2016   Frequency     PNO: Wide Tig: Free Run IFGain:Low   Trig: Free Run Atten: 36 dB   Mikr1 824.0000 MHz -21.64 dBm   Auto Tune     0 dB/div   Ref 25.00 dBm   -21.64 dBm   Center Freq 824.00000 MHz     500   -21.64 dBm   -21.64 dBm   Start Freq 822.00000 MHz     500   -250   -250   -250   -250     550   -250   -250   -250   -250     550   -250   -250   -250   -250     550   -250   -250   -250   -250     550   -250   -250   -250   -250     550   -250   -250   -250   -250     550   -250   -250   -250   -250     550   -250   -250   -250   -250   -250     550   -250   -250   -250   -250   -250     550   -250   -250   -250   -250   -250     550   -250   -250   -250   -250   -250	🔤 Keysight Sp	ectrum Analyzer - Swe	ept SA									
PNO: Wide Free Run Atter: 38 dB   Trig: Free Run Atter: 38 dB   Mkr1 824.000 MHz 2.4000 MHz 2.21.64 dBm     10 dB/div   Ref 25.00 dBm   -21.64 dBm   -21.64 dBm     10 dB/div   Ref 25.00 dBm   -21.64 dBm   -21.64 dBm     10 dB/div   Ref 25.00 dBm   -21.64 dBm   -21.64 dBm     10 dB/div   Ref 25.00 dBm   -21.64 dBm   -21.64 dBm     10 dB/div   Ref 25.00 dBm   -21.64 dBm   -21.64 dBm     10 dB/div   Ref 25.00 dBm   -21.64 dBm   -21.64 dBm     10 dB/div   Ref 25.00 dBm   -21.64 dBm   -21.64 dBm     10 dB/div   Ref 25.00 dBm   -21.100 dBm   -21.00000 MHz     10 dB/div   -21.100 dBm   -21.100 dBm   -21.100 dBm     10 dB/div   -21.100 dBm   -21.100 dBm   -21.100 dBm     10 dB/div   -21.100 dBm   -21.100 dBm   -21.100 dBm     10 dB/div   -21.000 dBm   -21.100 dBm   -21.100 dBm     10 dB/div   -21.000 dBm   -21.100 dBm   -21.000 dBm     250   -21.000 dBm   -21.000 dBm   -21.000 dBm     250   -21.000 dBm   -21.000 dBm   -21.000 dBm	LXI RL	RF 50 Ω	AC CC	ORREC	SE	NSE:INT	#Ava Tvp	ALIGN AUTO e: RMS	04:39:55 P	M Dec 29, 2016	F	requency
Log     Center Freq       150     Center Freq       500     Start Freq       500     0.1.1300.000       150     0.1.1300.000       150     0.1.1300.000       150     0.1.1300.000       150     0.1.1300.000       150     0.1.1300.000       150     0.1.1300.000       150     0.1.1300.000       150     0.1.1300.000       150     0.1.1300.000       150     0.1.1300.000       150     0.1.1300.000       150     0.1.1300.000       150     0.1.1300.000       150     0.1.1300.000       150     0.1.1300.000       1450     0.1.1300.000       1450     0.1.1300.000       1450     0.1.1300.000       1450     0.1.1300.000       1450     0.1.1300.000       1450     0.1.1300.000       150     0.1.1300.000       1450     0.1.1300.000       1450     0.1.1300.000       1450     0.1.1300.000	10 dB/div	Ref 25.00 c	۴ ۱۶	PNO: Wide 🕞 FGain:Low	Trig: Free Atten: 36	e Run 5 dB		M	۲۲ م kr1 824.0 -21.	000 MHz 64 dBm		Auto Tune
5.00   Start Freq     5.00   DL1-13.00 dem     15.0   DL1-13.00 dem     25.0   Stop Freq     35.0   CF Step     45.0   Man     55.0   Scale Type     65.0   Scale Type	15.0										82	<b>Center Freq</b> 4.000000 MHz
-15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0   -15.0 <td< td=""><td>-5.00</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>011-13.00 dBm</td><td>82</td><td>Start Freq 2.000000 MHz</td></td<>	-5.00									011-13.00 dBm	82	Start Freq 2.000000 MHz
350 CF Step   450 Man   550 Freq Offset   660 Scale Type	-15.0					1					82	Stop Freq 6.000000 MHz
-55.0 Freq Offset -65.0 Scale Type	-35.0	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	un l								<u>Auto</u>	<b>CF Step</b> 400.000 kHz Man
850 Scale Time	-55.0											Freq Offset 0 Hz
	-65.0										1.00	Scale Type
Center 824,000 MHz Span 4.000 MHz Span 4.000 MHz Log Lin #Res BW 100 kHz #V/BW 300 kHz Sween 1.000 ms /1001 pts)	Center 82 #Res BW	24.000 MHz		#\/B\A	( 300 kHz			Sween	Span 4	.000 MHz	Log	Lin
where here a status	MSG	TOO KI12		#VDV	1 300 KH2			STAT		roor pis)		



Plot 7-154. Upper Band Edge Plot (Band 5 – 1.4MHz QPSK – RB Size 6)

FCC ID: ZNFH871	G		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
Test Report S/N:		Test Dates:	EUT Type:		Dogo 07 of 196	
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- Keysig	ght Spea	trum A	nalyzer - S	wept SA												
L <mark>XI</mark> RL		RF	50	Ω AC	COR	REC		SE	NSE:INT	#45		ALIGN AUTO	04:54:08	PM Dec 29, 2016	F	requency
					PN	O: Wide	Ģ	Trig: Fre	e Run		9 999		т			
					IFG	ain:Low	v	Atten. 3	545			М	kr1 824	000 MHz		Auto Tune
10 dB/e	div	Ref	25.00	dBm									-19	.86 dBm		
									Ĭ							Contor From
15.0															82	4 000000 MHz
									~	m		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~				
5.00																Otort Ener
															82	2 000000 MHz
-5.00									1						- OL	2.000000 1111 12
-15 0									$1'_{1} =$					DL1 -13.00 dBm		
									<b>?</b>						02	
-25.0								f <sup>/</sup>							02	0.000000 1411 12
																CE Sten
-35.0						~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		_^								400.000 kHz
45.0		~~~~													<u>Auto</u>	Man
40.0																
-55.0																Freq Offset
																UHZ
-65.0																
																Scale Type
Cente	r 824	1.00	) MHz									_	Span	4.000 MHz	Log	Lin
#Res	BW '	100	(Hz			#V	BW	300 kHz				Sweep	1.000 ms	(1001 pts)		
MSG												STAT	US			

Plot 7-155. Lower Band Edge Plot (Band 5 – 3.0MHz QPSK – RB Size 15) ALIGN AUTO 04:54:27 PM Dec 29, 2016 Frequency TRACE 1 2 3 4 5 6 TYPE A WWWW DET A NNNN #Avg Type: RMS PNO: Wide Trig: Free Run IFGain:Low Atten: 36 dB Auto Tune Mkr1 849.000 MHz -17.41 dBm 10 dB/div Log Ref 25.00 dBm **Center Freq** 849.000000 MHz Start Freq 847.000000 MHz Stop Freq 851.000000 MHz CF Step 400.000 kHz <u>Auto</u> Man **Freq Offset** 0 Hz Scale Type Span 4.000 MHz Sweep 1.000 ms (1001 pts) Center 849.000 MHz #Res BW 100 kHz <u>Lin</u> #VBW 300 kHz MSG

Plot 7-156. Upper Band Edge Plot (Band 5 – 3.0MHz QPSK – RB Size 15)

FCC ID: ZNFH871	G		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:		Test Dates:	EUT Type:		Degre 00 of 196
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Keysight S	Spectrum Analyzer - Swept SA									
l <mark>XI</mark> RL	RF 50 Ω AC	CORREC	SEN	ISE:INT	#Ανα Τνο	ALIGN AUTO	04:59:06 P	M Dec 29, 2016	F	requency
		PNO: Wide 🖵 IFGain:Low	Trig: Free Atten: 36	Run dB		e. 10110	TYI			
10 dB/div	Ref 25.00 dBm					M	kr1 824.0 -26.	00 MHz 90 dBm		Auto Tune
15.0				~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~				824	Center Freq 4.000000 MHz
-5.00									822	Start Freq 2.000000 MHz
-15.0				1				DE1 -13.00 dBm	826	Stop Freq 5.000000 MHz
-35.0	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		June						<u>Auto</u>	<b>CF Step</b> 400.000 kHz Man
-55.0										Freq Offset 0 Hz
-85.0										Scale Type
Center 8	324.000 MHz						Span 4	.000 MHz	Log	Lin
#Res BV	V 100 KHŻ	#VBW	300 kHz			sweep	1.000 ms (	1001 pts)		
MSG						STAT	US			

Plot 7-157. Lower Band Edge Plot (Band 5 – 5.0MHz QPSK – RB Size 25)



Plot 7-158. Upper Band Edge Plot (Band 5 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFH871	G		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:		Test Dates:	EUT Type:		Degre 00 of 196
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Keysight Sp	ectrum Analyzer - Sw	ept SA									
L <mark>XI</mark> RL	RF 50 Ω	AC CO	RREC	SEI	NSE:INT	#Ava Tvp		05:05:08 P	Dec 29, 2016	F	requency
		P IF	NO: Wide 🕞 Gain:Low	Trig: Free Atten: 36	e Run 6 dB	****¥	M	TYF DE ( <b>r1 823.9</b>			Auto Tune
10 dB/div	Ref 25.00 c	1Bm						-30.	47 dBm		
15.0										82/	<b>Center Freq</b> 4.000000 MHz
5.00					$\int$			~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		820	Start Freq 0.000000 MHz
-15.0									DL1 -13.00 dBm	000	Stop Freq
-25.0					17					820	CF Step
-35.0	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~									<u>Auto</u>	800.000 kHz Man
-55.0											Freq Offset 0 Hz
-65.0											Scale Type
Center 82	4.000 MHz							Span 8	.000 MHz	Log	Lin
#Res BW	100 kHz		#VBW	300 kHz			Sweep	1.000 ms (	1001 pts)		
MSG							STATU	JS			

Plot 7-159. Lower Band Edge Plot (Band 5 – 10.0MHz QPSK – RB Size 50) Keysight Spectrum Analyzer - Swept SA R RL RF 50 Q AC CORREC SENSE:INT ALIGN AUTO 05:07:40 PM Dec 29, 2016 PNO: Wide Frequency MKcr1 8/49 400 MHz MKcr1 8/49 400 MHz



Plot 7-160. Upper Band Edge Plot (Band 5 – 10.0MHz QPSK – RB Size 50)

FCC ID: ZNFH871	G		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:		Test Dates:	EUT Type:		Degra 100 of 196
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Plot 7-161. Lower Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 6)



Plot 7-162. Lower Extended Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 6)

FCC ID: ZNFH871	6		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N:		Test Dates:	EUT Type:		Degra 101 of 196
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Plot 7-163. Upper Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 6)



Plot 7-164. Upper Extended Band Edge Plot (Band 4 – 1.4MHz QPSK – RB Size 6)

FCC ID: ZNFH871	G		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕑 LG	Approved by: Quality Manager
Test Report S/N:		Test Dates:	EUT Type:		Degra 100 of 196
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🦲 Keysight Spectrum Analyzer - Swept SA							×
LXI RL RF 50Ω DC	CORREC	SENSE:IN	IT #Ava	ALIGN AUTO	03:17:16 AM Jan 05, 2017 TRACE 1 2 3 4 5	Frequency	
	PNO: Wide 😱 IFGain:Low	Trig: Free Run Atten: 36 dB	יייי <i>יי</i> ו	Mkr		Auto Tu	une
10 dB/div Ref 25.00 dBm					-26.356 dBm		
15.0						Center F 1.710000000 (	<b>req</b> GHz
-5.00			pom Con	m m	~/~~~/\/~~~	Start F 1.708000000 0	<b>req</b> GHz
-15.0					DL1 -13.00 dBn	<b>Stop F</b> 1.712000000 (	<b>req</b> GHz
-35.0	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~				CF St 400.000 <u>Auto</u>	<b>tep</b> kHz Man
-45.0						Freq Off C	f <b>set</b> ) Hz
-65.0						Scale Ty	уре
Center 1.710000 GHz #Res BW 30 kHz	#VBW 9	1 kHz		Sweep	Span 4.000 MHz 2.000 ms (1001 pts	Log	Lin
MSG	<i>" • D</i> H •			STAT	us		

Plot 7-165. Lower Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)



Plot 7-166. Lower Extended Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)

FCC ID: ZNFH871			FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
Test Report S/N:	est Report S/N: Test Dates: EUT Type:			Dega 102 of 196		
1M1701180032-03-R3.ZNF		12/27/2016 - 2/15/2017	Portable Handset		Page 103 01 186	
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Keysight	Spectrum Analyzer - Swe	pt SA									
L <mark>XI</mark> RL	RF 50 Ω	DC CO	RREC	SE	NSE:INT	#Ava Tvi	ALIGN AUTO	03:17:42 A	M Jan 05, 2017	F	requency
		P IF	NO: Wide 🕞 Gain:Low	Trig: Fre Atten: 3	e Run 8 dB		56.1415	TYI			
10 dB/div	Ref 25.00 d	Bm					Mkr	1 1.755 ( -27.	000 GHz 24 dBm		Auto Tune
15.0										4.75	Center Freq
5.00										1.75	5000000 GH2
5.00	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		·····~	$\sim$						1.75	Start Freq
-5.00									DL1 -13.00 dBm		
-15.0					1					1.75	Stop Freq
-25.0											CE Stan
-35.0					- m	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	·······	m	m	<u>Auto</u>	400.000 kHz Man
-45.0											Freq Offset
-55.0											0 Hz
-65.0											Scale Type
Center '	1.755000 GHz							Span 4	.000 MHz	Log	Lin
#Res BV	V 30 kHz		#VBW	91 kHz			Sweep	2.000 ms	(1001 pts)		
MSG							STAT	us			

Plot 7-167. Upper Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)



Plot 7-168. Upper Extended Band Edge Plot (Band 4 – 3.0MHz QPSK – RB Size 15)

FCC ID: ZNFH871	G		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N: 1M1701180032-03-R3.ZNF		Test Dates:	EUT Type:		Dega 104 of 196
		12/27/2016 - 2/15/2017	Portable Handset		Page 104 01 186
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Keysight Spectrum Analyzer - Swept SA					
LX RL RF 50Ω AC	CORREC SET	NSE:INT #Avo	ALIGN AUTO	08:21:16 PM Dec 29, 2016	Frequency
10 dB/div Ref 25.00 dBm	PNO: Wide Trig: Free IFGain:Low Atten: 36	e Run 8 dB	Mkr1	1.710 000 GHz -30.46 dBm	Auto Tune
15.0					Center Freq 1.710000000 GHz
-5.00					<b>Start Freq</b> 1.708000000 GHz
-25.0		1			<b>Stop Freq</b> 1.712000000 GHz
-35.0					<b>CF Step</b> 400.000 kHz <u>Auto</u> Man
-55.0					<b>Freq Offset</b> 0 Hz
-65.0					Scale Type
Center 1.710000 GHz #Res BW 51 kHz	#VBW 150 kHz		Sweep	Span 4.000 MHz 1.933 ms (1001 pts)	Log <u>Lin</u>
MSG			STATU	s	

Plot 7-169. Lower Band Edge Plot (Band 4/66 - 5.0MHz QPSK - RB Size 25)



Plot 7-170. Lower Extended Band Edge Plot (Band 4/66 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFH871			FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1701180032-03-R3.ZNF		Test Dates:	EUT Type:		Dogo 105 of 196
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🔤 Keysight Spectrum Analyzer - Swept SA	
X RL RF 50 Ω AC CORREC SENSE:INT ALIGN AUTO 08:23:40 PM Dec 29, 2016	Frequency
PNO: Wide Trig: Free Run IFGain:Low Atten: 36 dB DET ANNNN	
Mkr1 1.780 000 GHz       10 dB/div     Ref 25.00 dBm     -31.15 dBm	Auto Tune
	Center Freq 1.78000000 GHz
5.00	<b>Start Freq</b> 1.778000000 GHz
-25.0	<b>Stop Freq</b> 1.782000000 GHz
-35.0	<b>CF Step</b> 400.000 kHz <u>Auto</u> Man
-55.0	Freq Offset 0 Hz
-65.0	Scale Type
Center 1.780000 GHz Span 4.000 MHz #Res BW 51 kHz #VBW 150 kHz Sweep 1.933 ms (1001 pts)	Log <u>Lin</u>

Plot 7-171. Upper Band Edge Plot (Band 4/66 – 5.0MHz QPSK – RB Size 25)



Plot 7-172. Upper Extended Band Edge Plot (Band 4/66 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFH871			FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N: 1M1701180032-03-R3.ZNF		Test Dates:	EUT Type:		Dega 106 of 196
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🔤 Keysight Spe	ctrum Analyzer - Swept S	A					
I,XI RL	RF 50 Ω A	AC CORREC	SENSE:II	ντ #Δι	ALIGN AUTO	08:26:30 PM Dec 29, 2016	Frequency
10 dBldiv	Ref 25.00 dB	PNO: Wide 🖵 IFGain:Low	Trig: Free Ru Atten: 36 dB	n	Mkr	1 1.710 000 GHz -32.78 dBm	Auto Tune
15.0							Center Freq 1.710000000 GHz
-5.00					· · · · · · · · · · · · · · · · · · ·	DI 1.13.00 dBm	<b>Start Freq</b> 1.706000000 GHz
-15.0			1/				<b>Stop Freq</b> 1.714000000 GHz
-35.0	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		~~~~				CF Step 800.000 kHz <u>Auto</u> Man
-55.0							<b>Freq Offset</b> 0 Hz
Center 17	10000 GHz					Span 8 000 MHz	Scale Type
#Res BW	100 kHz	#VBW	300 kHz		Sweep	1.000 ms (1001 pts)	
MSG					STAT	us	

Plot 7-173. Lower Band Edge Plot (Band 4/66 - 10.0MHz QPSK - RB Size 50)



Plot 7-174. Lower Extended Band Edge Plot (Band 4/66 – 10.0MHz QPSK – RB Size 50)

FCC ID: ZNFH871			FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N: 1M1701180032-03-R3.ZNF		Test Dates:	EUT Type:		Degre 107 of 196
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	ectrum Analyzer - Swept	t SA									
L <mark>XI</mark> RL	RF 50 Ω	AC COR	REC	SEI	SE:INT	#Ava Tvr		08:27:00 P	M Dec 29, 2016	F	requency
		PN	O: Wide 🖵 Gain:Low	Trig: Free Atten: 36	e Run i dB	#AV9 191	Je. KWS	TYI			
10 dB/div	Ref 25.00 dE	Зm					Mkr	1 1.780 0 -30.	000 GHz 45 dBm		Auto Tune
15.0										( 1.78	<b>Center Freq</b> 0000000 GHz
5.00	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~							1.77	Start Freq 6000000 GHz
-15.0									DL1 -13.00 dBm	1.78	<b>Stop Freq</b> 4000000 GHz
-35.0					·	<u> </u>			~~~~~	<u>Auto</u>	<b>CF Step</b> 800.000 kHz Man
-55.0											Freq Offset 0 Hz
-65.0											Scale Type
Center 1.	780000 GHz							Span 8	.000 MHz	Log	<u>Lin</u>
#Res BW	100 KHz		#VBW	300 kHz			Sweep	1.000 ms (	1001 pts)		
MSG							STAT	US			

Plot 7-175. Upper Band Edge Plot (Band 4/66 - 10.0MHz QPSK - RB Size 50)



Plot 7-176. Upper Extended Band Edge Plot (Band 4/66 – 10.0MHz QPSK – RB Size 50)

FCC ID: ZNFH871			FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N: 1M1701180032-03-R3.ZNF		Test Dates:	EUT Type:		Degra 100 of 196
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🔤 Keysight Spectrum Analyzer - Swept SA					- đ <b>-</b>
LXI RL RF 50Ω DC	CORREC SET	NSE:INT #Av	ALIGN AUTO	05:21:38 PM Dec 30, 2016 TRACE 2 3 4 5 6	Frequency
	PNO: Wide Trig: Free IFGain:Low Atten: 36	e Run 6 dB	Mkr1		Auto Tune
10 dB/div Ref 25.00 dBm				-35.31 dBm	
15.0					Center Freq 1.710000000 GHz
-5.00			han the test of the second	· ····································	<b>Start Freq</b> 1.704000000 GHz
-15.0				DL1 -13.00 dBm	<b>Stop Freq</b> 1.716000000 GHz
-35.0		1			<b>CF Step</b> 1.200000 MHz <u>Auto</u> Man
-65.0					<b>Freq Offset</b> 0 Hz
-65.0					Scale Type
Center 1.710000 GHz #Res BW 150 kHz	#\/B\\/ 470 kHz		Sween	Span 12.00 MHz	Log <u>Lin</u>
MSG	# 0 DV 47 0 KH2		STATU	s	

Plot 7-177. Lower Band Edge Plot (Band 4/66 - 15.0MHz QPSK - RB Size 75)



Plot 7-178. Lower Extended Band Edge Plot (Band 4/66 – 15.0MHz QPSK – RB Size 75)

FCC ID: ZNFH871			FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
Test Report S/N:		Test Dates:	EUT Type:		Degra 100 of 196	
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Keysight Sp	pectrum Analyzer - Swept SA									
l <b>XI</b> RL	RF 50 Ω DC	CORREC	SEN	ISE:INT	#Ava Tva	ALIGN AUTO	05:22:06 PM	1Dec 30, 2016	Fr	equency
		PNO: Wide 😱 IFGain:Low	Trig: Free Atten: 36	e Run i dB		Mkr	TYP DE			Auto Tune
10 dB/div Log	Ref 25.00 dBm						-28.4	44 dBm		
15.0									<b>C</b> 1 78	Center Freq
5.00									1.76	000000 0112
5.00	man have the provided of the second sec	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	$\sim$						1 77	Start Freq
-5.00								DL1 -13.00 dBm		
-15.0									1.78	Stop Freq
-25.0			- V	1.	ne more	·····	~~~~	Mor		
-35.0									1 Auto	CF Step .200000 MHz
-45.0									Auto	Wan
-55.0									I	F <b>req Offset</b> 0 Hz
-65.0										
										Scale Type
Center 1	.780000 GHz	#\/D\W	470 1/1-			Ouveen	Span 1	2.00 MHz	Log	Lin
#Res BW	150 KHZ	#vBW	470 KHZ			Sweep	1.000 ms (	roor pts)		
MSG						STAT	US			

Plot 7-179. Upper Band Edge Plot (Band 4/66 – 15.0MHz QPSK – RB Size 75)



Plot 7-180. Upper Extended Band Edge Plot (Band 4/66 – 15.0MHz QPSK – RB Size 75)

FCC ID: ZNFH871			FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:		Test Dates:	EUT Type:		Degra 110 of 196
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Keysight Spect	trum Analyzer - Swept	SA					
L <mark>XI</mark> RL	RF 50 Ω I	DC CORREC	SENSE:INT	#Ava Tvp	ALIGN AUTO	05:26:15 PM Dec 30, 2016	Frequency
		PNO: Wide 🕞 IFGain:Low	Trig: Free Run Atten: 36 dB	4(1 B1)	Mkr1		Auto Tune
10 dB/div	Ref 25.00 dB	m				-32.07 dBm	
15.0							Center Freq 1.710000000 GHz
5.00							
-5.00						- Company - California Alexandro	<b>Start Freq</b> 1.702000000 GHz
45.0						DL1 -13.00 dBm	
-15.0							<b>Stop Freq</b> 1.718000000 GHz
							CE Stop
-35.0	m	Marine and a start of the second					1.600000 MHz <u>Auto</u> Man
							Freg Offset
-55.0							0 Hz
-65.0							Coole Trans
							Scale Type
Center 1.7 #Res BW 2	10000 GHz 200 kHz	#VBW	620 kHz		Sweep	Span 16.00 MHz .000 ms (1001 pts)	Log <u>Lin</u>
MSG					STATU	s	

Plot 7-181. Lower Band Edge Plot (Band 4/66 – 20.0MHz QPSK – RB Size 100)



Plot 7-182. Lower Extended Band Edge Plot (Band 4/66 – 20.0MHz QPSK – RB Size 100)

FCC ID: ZNFH871			FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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- Keysig	ght Spectrum A	nalyzer - Swe	pt SA											
L <mark>XI</mark> RL	RF	50 Ω	DC	CORREC		SEI	NSE:INT	#Avr	ALIG	IN AUTO	05:27:13 P	M Dec 30, 2016	F	requency
				PNO: W	/ide ⊂ Low	Trig: Free Atten: 36	e Run 6 dB		g type.to		TY			
10 dB/d	liv Ref	25.00 d	Bm							Mkr1	1.780 4 -25.	100 GHz 17 dBm		Auto Tune
15.0													1.78	<b>Center Freq</b> 80000000 GHz
5.00		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		~~~~~							DI 4, 12:00 dBm	1.77	Start Freq 2000000 GHz
-15.0						- Andrew -	1						1.78	<b>Stop Freq</b> 88000000 GHz
-35.0										~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		April 1 million and a	<u>Auto</u>	<b>CF Step</b> 1.600000 MHz Man
-55.0 —														Freq Offset 0 Hz
-65.0 —														Scale Type
Center	r 1.78000	0 GHz									Span 1	6.00 MHz	Log	<u>Lin</u>
#Res	BW 200 H	Hz		3	#VBW	620 kHz			Sw	eep 1	.000 ms	(1001 pts)		
MSG										STATUS	3			

Plot 7-183. Upper Band Edge Plot (Band 4/66 – 20.0MHz QPSK – RB Size 100)



Plot 7-184. Upper Extended Band Edge Plot (Band 4/66 – 20.0MHz QPSK – RB Size 100)

FCC ID: ZNFH871			FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
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12/26/2016


🔤 Keysight Spectrum Analyzer - Swept S	Â				
<b>LXU</b> RL RF 50Ω A	AC CORREC SEI	NSE:INT #Avg	ALIGN AUTO Type: RMS	07:28:47 PM Dec 29, 2016 TRACE 1 2 3 4 5 6	Frequency
10 dB/div Ref 25.00 dB	PNO: Wide Trig: Free IFGain:Low Atten: 36	e Run 6 dB	Mkr1	1.850 000 GHz -38.527 dBm	Auto Tune
15.0					Center Freq 1.85000000 GHz
-5.00			an the second	DL1 -13 00 dBm	<b>Start Freq</b> 1.848000000 GHz
-15.0					<b>Stop Freq</b> 1.852000000 GHz
-35.0		, 1		homeway	CF Step 400.000 kHz <u>Auto</u> Man
-55.0 And Marine Automatic	Vanua and a start and a start a				Freq Offset 0 Hz
-85.0					Scale Type
Center 1.850000 GHz #Res BW 13 kHz	#VBW 39 kHz		Sweep 2	Span 4.000 MHz 9.27 ms (1001 pts)	Log <u>Lin</u>
MSG			STATUS		

Plot 7-185. Lower Band Edge Plot (Band 2/25 – 1.4MHz QPSK – RB Size 6)



Plot 7-186. Lower Extended Band Edge Plot (Band 2/25 – 1.4MHz QPSK – RB Size 6)

FCC ID: ZNFH871	C ID: ZNFH871		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	.G	Approved by: Quality Manager
Test Report S/N: 1M1701180032-03-R3.ZNF		Test Dates:	EUT Type:		Dogo 112 of 196
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Plot 7-187. Upper Band Edge Plot (Band 2/25 – 1.4MHz QPSK – RB Size 6)



Plot 7-188. Upper Extended Band Edge Plot (Band 2/25 – 1.4MHz QPSK – RB Size 6)

FCC ID: ZNFH871	G		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:		Test Dates:	EUT Type:		Degra 114 of 196
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🧱 Keysight Spe	ectrum Analyzer - Swept SA									
LXI RL	RF 50 Ω AC	CORREC	SENS	E:INT	#Avg Typ	ALIGN AUTO	07:31:10 P	Dec 29, 2016	F	requency
		PNO: Wide 😱 IFGain:Low	Trig: Free Atten: 36	Run dB		Mkr1	TYF DE 1.850 (			Auto Tune
10 dB/div	Ref 25.00 dBm						-26.	81 dBm		
15.0									( 1.85	<b>Center Freq</b> 0000000 GHz
5.00					~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~ <u>~</u> ~~~~~~	······	www.www.	1.94	Start Freq
-5.00								DL1 -13.00 dBm	1.84	800000 GH2
-25.0				1					1.85	Stop Freq 2000000 GHz
-35.0			~~						<u>Auto</u>	<b>CF Step</b> 400.000 kHz Man
-45.0	······································	Marine and a start of the start								Freq Offset 0 Hz
-65.0										Scale Type
Center 1.8 #Res BW	850000 GHz 30 kHz	#VBW 9	91 kHz			Sweep (	Span 4 5.533 ms (	.000 MHz 1001 pts)	Log	Lin
MSG						STATU	s			

Plot 7-189. Lower Band Edge Plot (Band 2/25 – 3.0MHz QPSK – RB Size 15)



Plot 7-190. Lower Extended Band Edge Plot (Band 2/25 – 3.0MHz QPSK – RB Size 15)

FCC ID: ZNFH871	CC ID: ZNFH871		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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Keysight S	pectrum Analyzer - Swep	ot SA									
L <mark>XI</mark> RL	RF 50 Ω	AC COR	REC	SE	NSE:INT	#Ava Tva	ALIGN AUTO	07:31:32 P	M Dec 29, 2016	F	requency
	_	PN IFG	O: Wide 😱 Sain:Low	Trig: Fre Atten: 3	e Run ∂dB	#///g / yp		TYF			Auto Tuno
10 dB/div	Ref 25.00 dl	Bm					Mkr	1 1.915 0 -24.	12 GHz 69 dBm		Auto Tune
15.0					Ĭ					4.04	Center Freq
5.00										1.91	5000000 GHZ
0.00 <b>Magar</b>	m. Mining	h-man h	m.m.							1.91	Start Freq
-5.00									DL1 -13.00 dBm		
-15.0				l	1					1.91	Stop Freq 7000000 GHz
-25.0					and the second	www.	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	www		CE Stop
-35.0										<u>Auto</u>	400.000 kHz Man
-45.0											
-55.0											Freq Offset 0 Hz
-65.0											
										Log	
Center 1 #Res BW	.915000 GHz 130 kHz		#VBW	91 kHz			Sween	Span 4 5 533 ms (	.000 MHz 1001 nts)	LUg	<u></u>
MSG			<i></i>	UT KITZ			STATU	JS	ree proj		

Plot 7-191. Upper Band Edge Plot (Band 2/25 – 3.0MHz QPSK – RB Size 15)



Plot 7-192. Upper Extended Band Edge Plot (Band 2/25 – 3.0MHz QPSK – RB Size 15)

FCC ID: ZNFH871	G		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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Keysight Spectrum Analyzer - Swept SA				- F -
LXI RL RF 50Ω AC	CORREC SEI	NSE:INT #Ava Tvp	ALIGN AUTO 07:33:00 P e: RMS TRAC	PM Dec 29, 2016 Frequency
	PNO: Wide Trig: Free IFGain:Low Atten: 36	e Run S dB	TY D	
10 dB/div Ref 25.00 dBm			Mkr1 1.850 ( -30.	.51 dBm
15.0				Center Fre 1.850000000 GH
-5.00				Start Fre 1.848000000 GH
-15.0		1		Stop Fre 1.852000000 GH
-35.0				СF Ste 400.000 кн <u>Auto</u> Ма
-55.0				Freq Offse 0 H
-65.0				Scale Typ
Center 1.850000 GHz #Res BW 51 kHz	#VBW 150 kHz		Span 4 Sweep 1.933 ms	1.000 MHz Log Li (1001 pts)
MSG			STATUS	

Plot 7-193. Lower Band Edge Plot (Band 2/25 – 5.0MHz QPSK – RB Size 25)



Plot 7-194. Lower Extended Band Edge Plot (Band 2/25 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFH871	G		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕑 LG	Approved by: Quality Manager
Test Report S/N: 1M1701180032-03-R3.ZNF		Test Dates:	EUT Type:		Dogo 117 of 196
		12/27/2016 - 2/15/2017	Portable Handset		Page 117 01 100
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🔤 Keysight Sp	ectrum Analyzer - Swept S	A								
I,XI RL	RF 50 Ω A	C CORREC	SEI	NSE:INT	#Ava Tva	ALIGN AUTO	07:33:27 P	M Dec 29, 2016	F	requency
		PNO: Wide 🖵	Trig: Fre	Run			TY			
		IFGain:Low	Atten: 36	aB			4 4 045 0			Auto Tune
	D-6 05 00 JD.					WIKI	1 1.915 U -24	04 GHZ 93 dBm		
	Ref 25.00 dBr	n	,,				-2-4.			
										Center Freq
15.0									1.91	5000000 GHz
5.00	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	·····	~~~~							Start From
			}						1.91	3000000 GHz
-5.00									1.01	000000000112
15.0								DL1 -13.00 dBm		
-15.0				1						Stop Freq
-25.0			ل کر م	<u>\</u>					1.91	7000000 GHz
20.0				~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	harm		$\sim$	$\sim\sim\sim$		
-35.0										CF Step
									Auto	400.000 KHZ Man
-45.0										
										Fred Offset
-55.0										0 Hz
										0 THE
-65.0										
										scale Type
Center 1.	915000 GHz						Span 4	.000 MHz	Log	Lin
#Res BW	51 kHz	#VBW	150 kHz			Sweep	1.933 ms (	1001 pts)		
MSG						STAT	US			

Plot 7-195. Upper Band Edge Plot (Band 2/25 – 5.0MHz QPSK – RB Size 25)



Plot 7-196. Upper Extended Band Edge Plot (Band 2/25 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFH871	CC ID: ZNFH871		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:		Test Dates:	EUT Type:		Dega 110 of 106
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🔤 Keysight Spe	ectrum Analyzer - Sw	/ept SA									
L <mark>XI</mark> RL	RF 50 Ω	AC C	ORREC	SE	NSE:INT	#Ava Tvr	ALIGN AUTO	07:40:27 PI	M Dec 29, 2016	F	requency
		I	PNO: Wide C IFGain:Low	Trig: Fre Atten: 30	e Run 8 dB	#AV8 13F	Mkr	TYF DE 1 1.850 0			Auto Tune
10 dB/div	Ref 25.00	dBm						-32.	00 dBm		
15.0										1.85	<b>Center Freq</b> 60000000 GHz
5.00						han the second		un ann ann ann ann ann ann ann ann ann a	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	1.84	Start Freq 6000000 GHz
-15.0									DL1 -13.00 dBm	1.85	Stop Freq
-25.0		~~~~~	~~~~~~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	1,*					Auto	CF Step 800.000 kHz Man
-45.0											Freq Offset 0 Hz
-65.0											Scale Type
Center 1.8 #Res BW	850000 GHz 100 kHz		#VB	W 300 kHz			Sweep	Span 8	.000 MHz 1001 pts)	Log	Lin
MSG							STAT	US			

Plot 7-197. Lower Band Edge Plot (Band 2/25 - 10.0MHz QPSK - RB Size 50)



Plot 7-198. Lower Extended Band Edge Plot (Band 2/25 – 10.0MHz QPSK – RB Size 50)

FCC ID: ZNFH871			FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:		Test Dates:	EUT Type:		Degra 110 of 196
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	(eysight Sp	ectrum A	Analyzer - Sv	vept SA											
<mark>LXI</mark> I	RL	RF	50 9	2 AC	CORREC			SENSE:INT	#A\	/a Typ	ALIGN AUTO	07:40:49 F	M Dec 29, 2016	F	requency
					PNO: IFGain	Wide 🕞	Trig: F	ree Run 36 dB		91.9		T) E			Auto Tuno
10 0	dB/div	Ref	25.00	dBm							Mkr	1 1.915 -28	008 GHz 28 dBm		AutoTune
151	,													1.0	Center Freq
5.0														1.9	15000000 GH2
5.0		~~~~	~~~~~		~~~~		$\sim$							1.9 <sup>,</sup>	Start Freq
-3.00													DL1 -13.00 dBm		
-15.0								. 1						1.9 <sup>,</sup>	Stop Freq 19000000 GHz
-25.1								n	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	$\sim \sim \sim$	·····				CF Step
-35.0														<u>Auto</u>	800.000 kHz Man
-43.0															Freq Offset
-55.0															0 Hz
-65.0															Scale Type
Ce	nter 1.	9150	00 GHz									Span	3.000 MHz	Log	Lin
#Re	es BW	100	kHz			#VBW	/ 300 k	Ηz			Sweep	1.000 ms	(1001 pts)		
MSG											STATU	IS			

Plot 7-199. Upper Band Edge Plot (Band 2/25 - 10.0MHz QPSK - RB Size 50)



Plot 7-200. Upper Extended Band Edge Plot (Band 2/25 – 10.0MHz QPSK – RB Size 50)

FCC ID: ZNFH871	FCC ID: ZNFH871		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:		Test Dates:	EUT Type:		Degra 100 of 196
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🛄 Keysight Spectrum Analyzer - Swep	pt SA					
L <mark>X/</mark> RL RF 50 Ω	AC CORREC	SENSE:IN	τ #Δνα Τ	ALIGN AUTO	07:42:34 PM Dec 29, 2016	Frequency
	PNO: Wide G	Trig: Free Run Atten: 36 dB	#A¥9 1	Mkr	1.849 988 GHz	Auto Tune
						Center Freq 1.85000000 GHz
-5.00					Di 1 -13 00 dBm	<b>Start Freq</b> 1.844000000 GHz
-15.0		1.74				<b>Stop Freq</b> 1.856000000 GHz
-35.0	tur har and the second s					CF Step 1.200000 MHz <u>Auto</u> Man
-55.0						Freq Offset 0 Hz
-65.0						Scale Type
Center 1.850000 GHz #Res BW 150 kHz	#VBW	470 kHz		Sweep	Span 12.00 MHz 1.000 ms (1001 pts)	
MSG				STATU	IS	

Plot 7-201. Lower Band Edge Plot (Band 2/25 - 15.0MHz QPSK - RB Size 75)



Plot 7-202. Lower Extended Band Edge Plot (Band 2/25 – 15.0MHz QPSK – RB Size 75)

FCC ID: ZNFH871	FCC ID: ZNFH871		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:		Test Dates:	EUT Type:		Degra 101 of 196
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Keysight Sp	ectrum Analyzer - Swept SA									
L <mark>XI</mark> RL	RF 50 Ω AC	CORREC	SEI	NSE:INT	#Ava Tvp	ALIGN AUTO	07:42:56 PM TRACI	Dec 29, 2016	_ Fr	requency
		PNO: Wide 🕞	Trig: Fre	Run			TYP			
		IFGain:Low	Atten: 36	dB						Auto Tune
	B-60500-18					MKL	11.9150	84 GHZ		
10 dB/div Log	Ref 25.00 dBm		,			1	-01.0			
									(	Center Freq
15.0									1.91	5000000 GHz
5.00	mmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmm	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	·~~~							Otort Eron
									1 90	
-5.00									1.50	5000000 GHZ
								DL1 -13.00 dBm		
-15.0										Stop Freq
25.0									1.92	1000000 GHz
-20.0			No.	<b>▲</b> 1						
-35.0			~	· · · · · · · · · · · · · · · · · · ·			200-00			CF Step
00.0								~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	Auto 1	.200000 MHz
-45.0									Auto	Widiri
-55.0										
										0 112
-65.0										
										Scale Type
Center 1	915000 GHz						Span 1	2.00 MHz	Log	Lin
#Res BW	150 kHz	#VBW	470 kHz			Sweep	1.000 ms (	1001 pts)		
MSG						STATU	JS			

Plot 7-203. Upper Band Edge Plot (Band 2/25 – 15.0MHz QPSK – RB Size 75)



Plot 7-204. Upper Extended Band Edge Plot (Band 2/25 – 15.0MHz QPSK – RB Size 75)

FCC ID: ZNFH871	FCC ID: ZNFH871		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:		Test Dates:	EUT Type:		Degra 100 of 196
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Ke	eysight Spe	ctrum Ar	alyzer - Sw	ept SA												_	
<b>l,Xi</b> R	L	RF	50 Ω	AC	CORR	EC		SENS	E:INT		#Ava ]	ALI Type: F	GN AUTO	07:45:47 TR	PM Dec 29, 2016	F	requency
					PNC	D: Fast C	Trig	Free	Run			.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		т			
					IFGa	in:Low _	Απε	en: 36 0	ав				Miland	4.040			Auto Tune
10 -1	Dista	Def		d Data									WIKE	-29	968 GHZ		
Log	Bialy	Rei	25.00 0														
																	<b>Center Freq</b>
15.0	<u> </u>															1.8	50000000 GHz
5.00										m	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	m	and so and	mm	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		Start Fred
										1						1.8	42000000 GHz
-5.00									-								
-15.0									[						DL1 -13.00 dBm		
-10.0																	Stop Freq
-25.0									1							1.8	58000000 GHZ
							سر ا		~~~								
-35.0	m	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	$\sim$	·····	~~~~~	Arran Marine	nw										CF Step
																<u>Auto</u>	Man
-45.0	<u> </u>																
																	Freg Offset
-55.0																	0 Hz
0.5.0																	
-65.0																	Scale Type
																	201.5 T Jp0
Cen	ter 1.	35000	0 GHz											Span	16.00 MHz	Log	Lin
#Re	sBW	200 k	Hz			#VB	W 620	кНz				S۷	/eep	.000 ms	(1001 pts)		
MSG													STATU	s			

Plot 7-205. Lower Band Edge Plot (Band 2/25 – 20.0MHz QPSK – RB Size 100)



Plot 7-206. Lower Extended Band Edge Plot (Band 2/25 – 20.0MHz QPSK – RB Size 100)

FCC ID: ZNFH871	FCC ID: ZNFH871		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N:		Test Dates:	EUT Type:		Dogo 122 of 196
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🔤 Kej	ysight Spe	ectrum A	nalyzer - Sv	vept SA											
<b>lxi</b> R	L	RF	50 9	AC	CORREC	:		SENSE:INT	#Av			07:46:29 F	M Dec 29, 2016	F	requency
					PNO:	Fast 🕞	Trig: F	ree Run	#/\V	g type.	RMS	T			
					IFGain	:Low	Atten	: 36 dB				L			
											Mkr	1 1.915	064 GHz		Auto Tune
10 dE Log	3/div	Ref	25.00	dBm								-25.	50 abm		
								Ť							Center Freg
15.0														1.91	15000000 GHz
5.00	and and a	1	~~~^^	w ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	-	~~~/~	· ····								
	í l														Start Freq
-5.00	<u> </u>													1.90	07000000 GHz
													DL1 -13.00 dBm		
-15.0							+								Stop Freq
								1						1.92	23000000 GHz
-25.0							<u> </u>	mon	man,						
											Mar March	mannan			CE Sten
-35.0															1.600000 MHz
														<u>Auto</u>	Man
-45.0															
55.0															Freq Offset
-55.0															0 Hz
65.0															
-03.0															Scale Type
Cen	ter 1.	9150	00 GHz									Span '	6.00 MHz	Log	Lin
#Re	s BW	200	(HZ			#VBV	v 620 ki	IZ		S	weep	1.000 ms	(1001 pts)		
MSG											STATU	IS			

Plot 7-207. Upper Band Edge Plot (Band 2/25 – 20.0MHz QPSK – RB Size 100)



Plot 7-208. Upper Extended Band Edge Plot (Band 2/25 – 20.0MHz QPSK – RB Size 100)

FCC ID: ZNFH871	FCC ID: ZNFH871		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:		Test Dates:	EUT Type:		Dogo 124 of 196
1M1701180032-03-R3.ZM	١F	12/27/2016 - 2/15/2017	Portable Handset		Page 124 01 100
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Keysight Sp	ectrum Analyzer - Sw	ept SA									
LXI RL	RF 50 Ω	AC CO	RREC	SEN	ISE:INT	#Avg Tvp	ALIGN AUTO	06:39:07 P	MDec 29, 2016	F	equency
		Р	NO: Wide 🖵	Trig: Free	Run			TY			
		IF	Gain:Low	Atten: 36	dB		Milen	4 0 204 0	00.011-		Auto Tune
10 dB/div	Ref 25.00 d	lBm					WIKE	-31.	20 dBm		
				Ì							
15.0										0.20	Center Freq
15.0										2.30	5000000 GHZ
5.00						~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	$\sim\sim\sim\sim$	~			
											Start Freq
-5.00										2.30	3000000 GHz
									DL1 -13.00 dBm		
-15.0											Stop Freq
.25.0					5					2.30	7000000 GHz
20.0					7						
-35.0											CF Step
			~~~~~	$\sim$						<u>Auto</u>	Man
-45.0											
<i></i>											Freq Offset
-55.0											0 Hz
-65.0											
											Scale Type
Center 2	305000 CHz							Snap 4	000 MHz	Log	Lin
#Res BW	51 kHz		#VBW	150 kHz			Sweep	1.933 ms (	1001 pt <u>s)</u>		
MSG							STATU	JS			

Plot 7-209. Lower Band Edge Plot (Band 30 – 5.0MHz QPSK – RB Size 25)



Plot 7-210. Lower Extended Band Edge Plot (Band 30 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFH871	G		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager		
Test Report S/N: 1M1701180032-03-R3.ZNF		Test Dates:	EUT Type:		Dega 125 of 196		
		12/27/2016 - 2/15/2017	Portable Handset	andset			
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E Keys	sight Spec	trum Ana	ılyzer - Sw	ept SA									
l <mark>xi</mark> RL		RF	50 Ω	AC	CORREC	SE	NSE:INT	#Avg Typ	ALIGN AUTO e: RMS	) 06:42:42 P TRAC	M Dec 29, 2016	F	requency
PAS	S				PNO: Fast IFGain:Low	Trig: Fre Atten: 3	e Run 6 dB	• //		TY D			
10 dB	/div	Ref 2	25.00 (	dBm					Mkr	1 2.291 9 -42.	975 GHz 81 dBm		Auto Tune
15.0 -	Trace	1 Pas	S									2.29	<b>Center Freq</b> 95500000 GHz
5.00 -5.00 -												2.28	<b>Start Freq</b> 38000000 GHz
-15.0 -												2.30	<b>Stop Freq</b> 03000000 GHz
-35.0	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~0~000000		1		Manufaller	enternity-square	مەرىلەر مەرىمەر مەرىمەر	and and a start of the start of	and the second	<u>Auto</u>	<b>CF Step</b> 1.500000 MHz Man
-45.0 -													Freq Offset 0 Hz
-65.0													Scale Type
Start #Res	2.288	3000 Q	GHZ		#VF	3W 3 0 MHz			Sween	Stop 2.30	3000 GHz (1001 pts)	Log	Lin
MSG									STAT	US	(1001 pits)		

Plot 7-211. Lower Extended Band Edge Plot (Band 30 – 5.0MHz QPSK – RB Size 25)



Plot 7-212. Upper Band Edge Plot (Band 30 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFH871	6		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager		
Test Report S/N: 1M1701180032-03-R3.ZNF		Test Dates:	EUT Type:		Degra 106 of 106		
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Keysight S	pectrum Analyzer - Sw	vept SA									- ē 🔀
L <mark>XI</mark> RL	RF 50 S	2 AC C	ORREC	SEN	ISE:INT	#Ava Tvp	ALIGN AUTO	06:48:51 PM	1Dec 29, 2016	F	requency
PASS		1	PNO: Fast ↔↔ FGain:Low	Trig: Free Atten: 36	Run dB			TYP DE	E A WWWWW T A N N N N N		
10 dB/div	Ref 25.00	dBm					Mkr	1 2.328 0 -43.4	54 GHz 46 dBm		Auto Tune
15.0 Trac	ce 1 Pass									2.33	<b>Center Freq</b> 66000000 GHz
5.00										2.30	<b>Start Freq</b> 07000000 GHz
-15.0										2.36	<b>Stop Freq</b> 5000000 GHz
-35.0				undage and the angle of the first fill	~~~~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		المراجع والمراجع والم	and the appropriate of the	Auto	<b>CF Step</b> 5.800000 MHz Man
-45.0											Freq Offset 0 Hz
-65.0										log	Scale Type
Start 2.3 #Res BW	0700 GHz 1.0 MHz		#VBW	3.0 MHz			Sweep	Stop 2.36 1.000 ms (	500 GHz 1001 pts)	LUg	
MSG							STATL	IS			

Plot 7-213. Upper Extended Band Edge Plot (Band 30 – 5.0MHz QPSK – RB Size 25)



Plot 7-214. Lower Band Edge Plot (Band 30 – 10.0MHz QPSK – RB Size 50)

FCC ID: ZNFH871	6		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager		
Test Report S/N:		Test Dates:	EUT Type:		Dega 107 of 196		
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(X RL RF 50 Ω AC CORREC SENSE:INT ALIGN AUTO 06:51:43 PM Dec 29, 2016 #Avg Type: RMS TRACE 12:34 5 G	Frequency
PASS PNO: Fast Trig: Free Run TYPE A WAYNAWAY IFGain:Low Atten: 36 dB DET A NNNNN	
Mkr1 2.299 952 GHz   10 dB/div Ref 25.00 dBm -26.39 dBm	Auto Tune
Trace 1 Pass	Center Freq
500	2.230000000 0112
-5.00	<b>Start Freq</b> 2.288000000 GHz
-15.0	Stop Freg
-25.0	2.304000000 GHz
-35.0	<b>CF Step</b> 1.600000 MHz
-45.0	<u>Auto</u> Man
-55.0	Freq Offset 0 Hz
-66.0	
	Scale Type
Start 2.288000 GHz Stop 2.304000 GHz	Log <u>Lin</u>
#Res BW 1.0 WH2 #VBW 3.0 WH2 Sweep 1.000 ms (1001 pts)	

Plot 7-215. Lower Extended Band Edge Plot (Band 30 – 10.0MHz QPSK – RB Size 50)



Plot 7-216. Upper Band Edge Plot (Band 30 – 10.0MHz QPSK – RB Size 50)

FCC ID: ZNFH871	C.		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
Test Report S/N: 1M1701180032-03-R3.ZNF		Test Dates:	EUT Type:		Degra 100 of 100	
		12/27/2016 - 2/15/2017	Portable Handset	Page 128 01 186		
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🔤 Key	/sight Spe	ctrum Analy	zer - Swept	t SA										
I,XI RI	-	RF	50 Ω	AC	CORREC		SEN	ISE:INT	#Ava T	ALIGN AUTO	06:53:40 P	M Dec 29, 2016	F	requency
PAS	S				PNO: Fa IFGain:Lo	ist ↔→ ow	Trig: Free Atten: 36	Run dB	#A¥8 :	ype. Kino	TY D			
10 dE	3/div	Ref 25	i.00 dE	3m						Mkr	1 2.320 1 -26.	l08 GHz 63 dBm		Auto Tune
15.0	Trace	e 1 Pass											2.33	<b>Center Freq</b> 16000000 GHz
5.00 -5.00													2.30	Start Freq 07000000 GHz
-15.0 -25.0			-	1									2.36	<b>Stop Freq</b> 5000000 GHz
-35.0				a dan a da d	K								Auto	<b>CF Step</b> 5.800000 MHz Man
-45.0 -55.0							مىلىدىن بىرىمىر بىرىمى تىرىمىر بىرىمىر							Freq Offset 0 Hz
-65.0														Scale Type
Star #Per	t 2.30	700 GH	z		#	VRM	3.0 MHz			Sween	Stop 2.3	6500 GHz	Log	<u>Lin</u>
MSG	, EVV	NO IVIIIA				V 200	0.0 10112			STAT	us	(reor pts)		

Plot 7-217. Upper Extended Band Edge Plot (Band 30 - 10.0MHz QPSK - RB Size 50)



Plot 7-218. Lower ACP Plot (Band 7 – 5.0MHz QPSK – RB Size 25)

FCC ID: ZNFH871	G		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager		
Test Report S/N: 1M1701180032-03-R3.ZNF		Test Dates:	EUT Type:		Dega 100 of 196		
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Plot 7-219. Upper ACP Plot (Band 7 – 5.0MHz QPSK – RB Size 25)



Plot 7-220. Lower ACP Plot (Band 7 – 10.0MHz QPSK – RB Size 50)

FCC ID: ZNFH871	4		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N: 1M1701180032-03-R3.ZNF		Test Dates:	EUT Type:		Degra 120 of 196
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Plot 7-221. Upper ACP Plot (Band 7 – 10.0MHz QPSK – RB Size 50)



Plot 7-222. Lower ACP Plot (Band 7 – 15.0MHz QPSK – RB Size 75)

FCC ID: ZNFH871	6		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
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Plot 7-223. Upper ACP Plot (Band 7 – 15.0MHz QPSK – RB Size 75)



Plot 7-224. Lower ACP Plot (Band 7 – 20.0MHz QPSK – RB Size 100)

FCC ID: ZNFH871	G		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕑 LG	Approved by: Quality Manager		
Test Report S/N:		Test Dates:	EUT Type:		Degra 122 of 196		
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Kevs	ight Spectrum	n Analyzer - Sp	urious Emi	ssions					
IXI RL	F	¥F 50 Ω	AC	CORREC	Cente	SENSE:INT Fr Freq: 21.00000000	ALIGN AUTO	07:15:57 PM Dec 29, 2016 Radio Std: None	Frequency
PAS	S			IFGain:Low	, 🗭 ing: #Atte	n: 26 dB		Radio Device: BTS	
10 dB Log <b>F</b>	/div	Ref 40.0	0 dBm	1					_
30.0									Center Freq
10.0					L. L. Lineda				21.00000000 GH2
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-10.0									
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-30.0 🐇	habutertertert								
-40.0						- On the state	and the second		
-50.0									
Start	2.545 (	GHz						Stop 2.595 GHz	<b>CF Step</b> 1.20000000 GHz
Spur	Range	Start Fre	q St	top Freq	RBW	Frequency	Amplitude	∆ Limit	<u>Auto</u> Man
1	1	2.5450 GH	lz 2.5	5700 GHz	1.000 MHz	2.561708333 GHz	11.01 dBm	-13.99 dB	
2	2	2.5700 GH	lz 2.5	5710 GHz	360.0 kHz	2.570891667 GHz	: -25.75 dBm	-15.75 dB	Freg Offset
3	3	2.5710 GF	Iz 2.5	5750 GHz	1.000 MHz	2.571066667 GHz	-25.06 dBm	-15.06 dB	0 Hz
4	4	2.5750 GF	1Z 2.5	5050 GHZ	1.000 MHZ	2.583726293 GHz	-30.82 dBm	-17.82 dB	
MSG	5	2.3660 GI	12 2.5	3930 GHZ	1.000 WH2		STAT	-13.17 db	

Plot 7-225. Upper ACP Plot (Band 7 – 20.0MHz QPSK – RB Size 100)

FCC ID: ZNFH871		<b>ST</b>	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: ZNFH871	6		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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Plot 7-226. PAR Plot (Band 2/25 – 1.4MHz QPSK – RB Size 6)



Plot 7-227. PAR Plot (Band 2/25 - 1.4MHz 16-QAM - RB Size 6)

FCC ID: ZNFH871	G		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
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Plot 7-228. PAR Plot (Band 2/25 - 1.4MHz 64-QAM - RB Size 6)



Plot 7-229. PAR Plot (Band 2/25 - 3.0MHz QPSK - RB Size 15)

FCC ID: ZNFH871	4		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
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Plot 7-230. PAR Plot (Band 2/25 - 3.0MHz 16-QAM - RB Size 15)



Plot 7-231. PAR Plot (Band 2/25 - 3.0MHz 64-QAM - RB Size 15)

FCC ID: ZNFH871	G		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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Plot 7-232. PAR Plot (Band 2/25 - 5.0MHz QPSK - RB Size 25)



Plot 7-233. PAR Plot (Band 2/25 - 5.0MHz 16-QAM - RB Size 25)

FCC ID: ZNFH871	6		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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Plot 7-234. PAR Plot (Band 2/25 - 5.0MHz 64-QAM - RB Size 25)



Plot 7-235. PAR Plot (Band 2/25 - 10.0MHz QPSK - RB Size 50)

FCC ID: ZNFH871	6		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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Plot 7-236. PAR Plot (Band 2/25 - 10.0MHz 16-QAM - RB Size 50)



Plot 7-237. PAR Plot (Band 2/25 - 10.0MHz 64-QAM - RB Size 50)

FCC ID: ZNFH871	G		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
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Plot 7-238. PAR Plot (Band 2/25 - 15.0MHz QPSK - RB Size 75)



Plot 7-239. PAR Plot (Band 2/25 - 15.0MHz 16-QAM - RB Size 75)

FCC ID: ZNFH871	G		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
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Plot 7-240. PAR Plot (Band 2/25 - 15.0MHz 64-QAM - RB Size 75)



Plot 7-241. PAR Plot (Band 2/25 - 20.0MHz QPSK - RB Size 100)

FCC ID: ZNFH871	G		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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Plot 7-242. PAR Plot (Band 2/25 - 20.0MHz 16-QAM - RB Size 100)



Plot 7-243. PAR Plot (Band 2/25 - 20.0MHz 64-QAM - RB Size 100)

FCC ID: ZNFH871	6		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
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# 7.6 Radiated Power (ERP/EIRP) §22.913(a.2) §24.232(c.2) §27.50(h.2) §27.50(b.10) §27.50(c.10) §27.50(d.4) §27.50(a.3)

### 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]	Positione r Azimuth [degree]	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	301	168	1 / 5	14.45	2.48	16.93	34.77	-17.84
707.50	1.4	QPSK	Н	292	193	3 / 2	15.79	2.56	18.35	34.77	-16.42
715.30	1.4	QPSK	н	312	190	1 / 0	15.01	2.60	17.61	34.77	-17.17
707.50	1.4	16-QAM	н	292	193	3 / 2	14.88	2.56	17.44	34.77	-17.33
707.50	1.4	64-QAM	н	292	193	3 / 2	13.85	2.56	16.41	34.77	-18.36
700.50	3	QPSK	н	290	188	1 / 14	15.02	2.48	17.50	34.77	-17.27
707.50	3	QPSK	н	292	196	1 / 14	15.88	2.56	18.44	34.77	-16.33
714.50	3	QPSK	н	273	212	1 / 0	15.12	2.60	17.72	34.77	-17.05
707.50	3	16-QAM	н	292	196	1 / 14	15.07	2.56	17.63	34.77	-17.14
707.50	3	64-QAM	н	292	196	1 / 14	13.90	2.56	16.46	34.77	-18.31

Table 7-2. ERP Data (Band 12)

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Positione r Azimuth [degree]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBd]	ERP [dBm]	ERP Limit [dBm]	Margin [dB]
701.50	5	QPSK	н	263	168	1 / 24	15.54	2.49	18.03	34.77	-16.74
707.50	5	QPSK	н	292	197	1 / 24	16.17	2.56	18.73	34.77	-16.04
713.50	5	QPSK	н	304	206	1 / 0	15.84	2.60	18.44	34.77	-16.33
707.50	5	16-QAM	н	292	197	1 / 24	15.43	2.56	17.99	34.77	-16.78
707.50	5	64-QAM	н	292	197	1 / 24	14.22	2.56	16.78	34.77	-17.99
704.00	10	QPSK	н	292	188	1 / 49	15.58	2.51	18.09	34.77	-16.68
707.50	10	QPSK	н	290	197	1 / 49	16.10	2.56	18.66	34.77	-16.11
711.00	10	QPSK	н	290	167	1 / 0	15.81	2.60	18.41	34.77	-16.37
711.00	10	16-QAM	н	290	167	1 / 0	14.87	2.60	17.47	34.77	-17.31
707.50	10	64-QAM	н	290	197	1 / 49	14.09	2.56	16.65	34.77	-18.12
707.50	5	QPSK	V	131	92	1 / 0	14.50	2.99	17.49	34.77	-17.28
707.50	5 (WCP)	QPSK	н	286	165	1 / 24	15.14	2.56	17.70	34.77	-17.07

Table 7-3. ERP Data (Band 12/17)

FCC ID: ZNFH871	G		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]	Positione r Azimuth [degree]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBd]	ERP [dBm]	ERP Limit [dBm]	Margin [dB]
779.50	5	QPSK	н	169	202	1 / 24	13.38	2.47	15.85	34.77	-18.92
782.00	5	QPSK	н	136	281	1 / 0	13.60	2.54	16.14	34.77	-18.63
784.50	5	QPSK	н	240	176	1 / 0	13.32	2.63	15.95	34.77	-18.82
782.00	5	16-QAM	н	136	281	1 / 0	12.97	2.54	15.51	34.77	-19.26
782.00	5	64-QAM	н	136	281	1 / 0	11.65	2.54	14.19	34.77	-20.58
782.00	10	QPSK	н	238	180	1 / 0	13.52	2.54	16.06	34.77	-18.71
782.00	10	16-QAM	н	238	180	1 / 0	12.75	2.54	15.29	34.77	-19.48
782.00	10	64-QAM	н	238	180	1 / 0	11.58	2.54	14.12	34.77	-20.65
782.00	5	QPSK	V	149	262	1 / 0	12.05	3.92	15.97	34.77	-18.80
782.00	5 (WCP)	QPSK	н	200	137	1 / 0	12.61	2.54	15.15	34.77	-19.62

Table 7-4. ERP Data (Band 13)

FCC ID: ZNFH871	4		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]	Positione r Azimuth [degree]	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	200	179	1 / 0	14.14	5.51	19.65	38.45	-18.80
836.50	1.4	QPSK	н	206	274	3 / 2	14.01	5.14	19.15	38.45	-19.30
848.30	1.4	QPSK	н	211	261	1 / 0	13.41	4.68	18.09	38.45	-20.36
824.70	1.4	16-QAM	н	200	179	1 / 0	13.28	5.51	18.79	38.45	-19.66
824.70	1.4	64-QAM	н	200	179	1 / 0	12.10	5.51	17.61	38.45	-20.84
825.50	3	QPSK	н	190	311	1 / 14	14.08	5.52	19.60	38.45	-18.85
836.50	3	QPSK	н	208	284	1 / 14	14.04	5.14	19.18	38.45	-19.27
847.50	3	QPSK	н	200	293	1 / 0	13.61	4.67	18.28	38.45	-20.17
825.50	3	16-QAM	н	190	311	1 / 14	13.25	5.52	18.77	38.45	-19.68
825.50	3	64-QAM	н	190	311	1 / 14	12.06	5.52	17.58	38.45	-20.87
826.50	5	QPSK	н	200	259	1 / 24	14.82	5.51	20.33	38.45	-18.12
836.50	5	QPSK	н	208	276	1 / 0	14.28	5.14	19.42	38.45	-19.03
846.50	5	QPSK	н	211	231	1 / 24	13.60	4.66	18.26	38.45	-20.19
826.50	5	16-QAM	н	200	259	1 / 24	14.05	5.51	19.56	38.45	-18.89
826.50	5	64-QAM	н	200	259	1 / 24	12.79	5.51	18.30	38.45	-20.15
829.00	10	QPSK	н	201	242	1 / 49	13.99	5.49	19.48	38.45	-18.97
836.50	10	QPSK	н	208	267	1 / 0	14.29	5.14	19.43	38.45	-19.02
844.00	10	QPSK	н	223	250	1 / 0	13.75	4.70	18.45	38.45	-20.00
829.00	10	16-QAM	н	201	242	1 / 49	13.18	5.49	18.67	38.45	-19.78
829.00	10	64-QAM	н	201	242	1 / 49	11.27	5.49	16.76	38.45	-21.69
826.50	5	QPSK	V	112	192	1/0	12.89	5.34	18.23	38.45	-20.22
826.50	5 (WCP)	QPSK	н	200	197	1/0	12.48	5.51	17.99	38.45	-20.46

Table 7-5. ERP Data (Band 5)

FCC ID: ZNFH871	1		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]	Positione r Azimuth [degree]	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	15	206	3/2	17.08	5.56	22.64	30.00	-7.36
1745.00	1.4	QPSK	н	22	206	3/2	17.33	5.32	22.65	30.00	-7.35
1779.30	1.4	QPSK	н	18	200	3/2	16.44	5.09	21.53	30.00	-8.47
1745.00	1.4	16-QAM	н	22	206	3 / 2	16.35	5.32	21.67	30.00	-8.33
1745.00	1.4	64-QAM	н	22	206	3 / 2	15.34	5.32	20.66	30.00	-9.34
1711.50	3	QPSK	н	20	199	1 / 0	17.09	5.55	22.64	30.00	-7.36
1745.00	3	QPSK	н	20	196	1 / 0	17.53	5.32	22.85	30.00	-7.15
1778.50	3	QPSK	н	29	203	1 / 0	16.70	5.10	21.80	30.00	-8.20
1745.00	3	16-QAM	н	20	196	1 / 0	16.62	5.32	21.94	30.00	-8.06
1745.00	3	64-QAM	Н	20	196	1 / 0	15.56	5.32	20.88	30.00	-9.12
1712.50	5	QPSK	н	25	211	1 / 24	17.48	5.55	23.03	30.00	-6.97
1745.00	5	QPSK	н	20	200	1 / 0	17.95	5.32	23.27	30.00	-6.73
1777.50	5	QPSK	н	20	214	1 / 0	17.21	5.10	22.31	30.00	-7.69
1745.00	5	16-QAM	н	20	200	1 / 0	17.02	5.32	22.34	30.00	-7.66
1745.00	5	64-QAM	н	20	200	1 / 0	15.99	5.32	21.31	30.00	-8.69
1715.00	10	QPSK	н	12	219	1 / 49	17.38	5.53	22.91	30.00	-7.09
1745.00	10	QPSK	н	19	211	1 / 49	17.62	5.32	22.94	30.00	-7.06
1775.00	10	QPSK	Н	12	207	1 / 0	17.00	5.12	22.12	30.00	-7.88
1745.00	10	16-QAM	н	19	211	1 / 49	16.68	5.32	22.00	30.00	-8.00
1745.00	10	64-QAM	н	19	211	1 / 49	15.62	5.32	20.94	30.00	-9.06
1717.50	15	QPSK	н	20	200	1 / 74	17.57	5.51	23.08	30.00	-6.92
1745.00	15	QPSK	н	5	206	1 / 0	17.79	5.32	23.11	30.00	-6.89
1772.50	15	QPSK	н	16	216	1 / 0	17.32	5.14	22.46	30.00	-7.54
1745.00	15	16-QAM	н	5	206	1 / 0	16.59	5.32	21.91	30.00	-8.09
1745.00	15	64-QAM	н	5	206	1 / 0	15.85	5.32	21.17	30.00	-8.83
1720.00	20	QPSK	н	3	206	1 / 99	18.03	5.49	23.52	30.00	-6.48
1745.00	20	QPSK	н	0	199	1 / 0	18.29	5.32	23.61	30.00	-6.39
1770.00	20	QPSK	н	10	201	1/0	17.66	5.15	22.81	30.00	-7.19
1745.00	20	16-QAM	н	0	199	1/0	17.37	5.32	22.69	30.00	-7.31
1745.00	20	64-QAM	н	0	199	1/0	16.27	5.32	21.59	30.00	-8.41
1745.00	20	QPSK	V	86	110	1/0	16.34	5.27	21.61	30.00	-8.39
1745.00	20 (WCP)	QPSK	н	11	221	1/0	17.69	5.32	23.01	30.00	-6.99

### Table 7-6. EIRP Data (Band 4/66)

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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Positione r Azimuth [degree]	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	0	210	1 / 0	18.59	4.82	23.41	33.01	-9.60
1882.50	1.4	QPSK	н	0	218	3 / 2	18.27	4.73	23.00	33.01	-10.01
1914.30	1.4	QPSK	н	0	225	3 / 2	18.08	4.68	22.76	33.01	-10.25
1850.70	1.4	16-QAM	Н	0	210	1 / 0	17.72	4.82	22.54	33.01	-10.47
1850.70	1.4	64-QAM	Н	0	210	1 / 0	16.56	4.82	21.38	33.01	-11.63
1851.50	3	QPSK	Н	0	219	1 / 0	18.66	4.82	23.48	33.01	-9.53
1882.50	3	QPSK	Н	0	217	1 / 0	18.19	4.73	22.92	33.01	-10.09
1913.50	3	QPSK	Н	0	217	1 / 0	18.13	4.68	22.81	33.01	-10.20
1851.50	3	16-QAM	н	0	219	1 / 0	17.69	4.82	22.51	33.01	-10.50
1851.50	3	64-QAM	Н	0	219	1 / 0	16.61	4.82	21.43	33.01	-11.58
1852.50	5	QPSK	Н	0	215	1 / 0	19.03	4.81	23.84	33.01	-9.17
1882.50	5	QPSK	н	0	220	1 / 0	18.69	4.73	23.42	33.01	-9.59
1912.50	5	QPSK	н	0	217	1 / 0	18.51	4.68	23.19	33.01	-9.82
1852.50	5	16-QAM	н	0	215	1 / 0	18.15	4.81	22.96	33.01	-10.05
1852.50	5	64-QAM	н	0	215	1 / 0	16.71	4.81	21.52	33.01	-11.49
1855.00	10	QPSK	Н	0	221	1 / 0	18.72	4.81	23.53	33.01	-9.48
1882.50	10	QPSK	Н	0	215	1 / 0	18.37	4.73	23.10	33.01	-9.91
1910.00	10	QPSK	Н	5	218	1 / 0	18.33	4.68	23.01	33.01	-10.00
1855.00	10	16-QAM	Н	0	221	1 / 0	17.75	4.81	22.56	33.01	-10.45
1855.00	10	64-QAM	Н	0	221	1 / 0	16.70	4.81	21.51	33.01	-11.50
1857.50	15	QPSK	Н	2	220	1 / 74	18.86	4.80	23.66	33.01	-9.35
1882.50	15	QPSK	Н	9	220	1 / 74	18.64	4.73	23.37	33.01	-9.64
1907.50	15	QPSK	Н	4	213	1 / 74	18.35	4.68	23.03	33.01	-9.98
1857.50	15	16-QAM	Н	2	220	1 / 74	17.99	4.80	22.79	33.01	-10.22
1857.50	15	64-QAM	Н	2	220	1 / 74	16.83	4.80	21.63	33.01	-11.38
1860.00	20	QPSK	Н	0	218	1 / 99	18.90	4.79	23.69	33.01	-9.32
1882.50	20	QPSK	н	0	226	1 / 99	18.82	4.73	23.55	33.01	-9.46
1905.00	20	QPSK	Н	6	220	1 / 0	18.36	4.68	23.04	33.01	-9.97
1860.00	20	16-QAM	Н	0	218	1 / 99	17.95	4.79	22.74	33.01	-10.27
1860.00	20	64-QAM	Н	0	218	1 / 99	16.85	4.79	21.64	33.01	-11.37
1852.50	5	QPSK	V	92	134	1/0	17.99	4.79	22.78	33.01	-10.23
1852.50	5 (WCP)	QPSK	Н	0	215	1/0	18.23	4.81	23.04	33.01	-9.97

### Table 7-7. EIRP Data (Band 2/25)

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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Positione r Azimuth [degree]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP Limit [dBm]	Margin [dB]
2307.50	5	QPSK	н	331	342	1 / 24	12.21	5.74	17.95	23.98	-6.03
2310.00	5	QPSK	Н	340	333	1 / 0	12.16	5.74	17.90	23.98	-6.08
2312.50	5	QPSK	Н	340	336	1 / 0	12.20	5.74	17.94	23.98	-6.04
2307.50	5	16-QAM	Н	331	342	1 / 24	11.17	5.74	16.91	23.98	-7.07
2307.50	5	64-QAM	н	331	342	1 / 24	10.23	5.74	15.97	23.98	-8.01
2310.00	10	QPSK	н	347	340	1 / 49	12.27	5.74	18.01	23.98	-5.97
2310.00	10	16-QAM	н	347	340	1 / 49	11.36	5.74	17.10	23.98	-6.88
2310.00	10	64-QAM	н	347	340	1 / 49	10.32	5.74	16.06	23.98	-7.92
2310.00	10	QPSK	V	154	34	1 / 99	11.37	4.79	16.16	23.98	-7.82
2310.00	10 (WCP)	QPSK	Н	351	348	1 / 99	11.94	4.81	16.75	23.98	-7.23

Table 7-8. EIRP Data (Band 30)

FCC ID: ZNFH871	4		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]	Positione r Azimuth [degree]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP Limit [dBm]	Margin [dB]
2502.50	5	QPSK	н	4	201	1 / 0	12.72	5.74	18.46	33.01	-14.55
2535.00	5	QPSK	н	2	190	1 / 0	12.02	5.86	17.88	33.01	-15.13
2567.50	5	QPSK	н	5	209	1 / 0	11.45	5.98	17.43	33.01	-15.58
2502.50	5	16-QAM	н	4	201	1 / 0	11.77	5.74	17.51	33.01	-15.50
2502.50	5	64-QAM	н	4	201	1 / 0	10.73	5.74	16.47	33.01	-16.54
2505.00	10	QPSK	н	0	199	1 / 0	12.48	5.75	18.23	33.01	-14.78
2535.00	10	QPSK	н	0	192	1 / 0	11.99	5.86	17.85	33.01	-15.16
2565.00	10	QPSK	н	10	213	1 / 0	11.50	5.97	17.47	33.01	-15.54
2505.00	10	16-QAM	н	0	199	1 / 0	11.53	5.75	17.28	33.01	-15.73
2505.00	10	64-QAM	н	0	199	1 / 0	10.49	5.75	16.24	33.01	-16.77
2507.50	15	QPSK	н	11	187	1 / 0	12.69	5.76	18.45	33.01	-14.56
2535.00	15	QPSK	н	6	191	1 / 0	12.19	5.86	18.05	33.01	-14.96
2562.50	15	QPSK	н	0	190	1 / 0	11.58	5.96	17.54	33.01	-15.47
2507.50	15	16-QAM	н	11	187	1 / 0	11.73	5.76	17.49	33.01	-15.52
2507.50	15	64-QAM	н	11	187	1 / 0	10.22	5.76	15.98	33.01	-17.03
2510.00	20	QPSK	н	0	211	1 / 0	12.82	5.77	18.59	33.01	-14.42
2535.00	20	QPSK	н	0	189	1 / 0	11.39	5.86	17.25	33.01	-15.76
2560.00	20	QPSK	н	0	190	1 / 99	10.33	5.95	16.28	33.01	-16.73
2510.00	20	16-QAM	н	0	211	1 / 0	11.92	5.77	17.69	33.01	-15.32
2510.00	20	64-QAM	н	0	211	1 / 0	10.79	5.77	16.56	33.01	-16.45
2510.00	20	QPSK	V	43	311	1/0	10.29	5.66	15.95	33.01	-17.06
2510.00	20 (WCP)	QPSK	н	0	200	1 / 0	11.83	5.77	17.60	33.01	-15.41

Table 7-9. EIRP Data (Band 7)

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### 7.7 Radiated Spurious Emissions Measurements §2.1053 §22.917(a) §24.238(a) §27.53(c) §27.53(f) §27.53(g) §27.53(h) §27.53(m) §27.53(a.4)

#### 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 tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically and horizontally polarized tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically and horizontally polarized broadband horn antennas. All measurements are performed as peak measurements while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

#### Test Procedures Used

KDB 971168 D01 v02r02 - Section 5.8

ANSI/TIA-603-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

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Figure 7-7. Test Instrument & Measurement Setup

#### Test Notes

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

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Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1403.00	Н	114	181	-62.83	5.92	-56.91	74.9
2104.50	Н	117	212	-57.93	6.80	-51.13	69.2
2806.00	Н	-	-	-72.04	8.12	-63.92	82.0

Table 7-10. Radiated Spurious Data (Band 12/17 – 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	100	205	-65.89	5.96	-59.92	78.7
2122.50	Н	103	178	-62.97	6.84	-56.13	74.9
2830.00	Н	-	-	-71.79	8.13	-63.65	82.4

Table 7-11. Radiated Spurious Data (Band 12/17 – Mid Channel)

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Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1427.00	Н	141	183	-65.39	6.01	-59.39	77.8
2140.50	Н	143	178	-59.26	6.89	-52.37	70.8
2854.00	Н	-	-	-72.01	8.15	-63.86	82.3

Table 7-12. Radiated Spurious Data (Band 12/17 – 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]
1415.00	Н	101	191	-67.61	5.96	-61.64	79.3
2122.50	Н	109	182	-60.16	6.84	-53.32	71.0
2830.00	Н	-	-	-74.14	8.13	-66.00	83.7

Table 7-13. Radiated Spurious Data with WCP (Band 12/17 – High Channel)

FCC ID: ZNFH871	6		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]
2338.50	Н	101	167	-70.23	7.01	-63.22	79.1
3118.00	Н	-	-	-71.14	7.23	-63.91	79.8

Table 7-14. Radiated Spurious Data (Band 13 – Low Channel)

OPERATING FREQUENCY:	782	2.00	MHz
CHANNEL:	232	230	-
MEASURED OUTPUT POWER:	16.14	dBm =	0.041 W
MODULATION SIGNAL:	QPSK	_	
BANDWIDTH:	5.0	MHz	
DISTANCE:	3	meters	
LIMIT:	43 + 10 log <sub>10</sub> (W) =	29.14	dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
2346.00	H	104	164	-67.90	7.00	-60.90	77.0
3128.00	Н	-	-	-68.99	7.21	-61.78	77.9

Table 7-15. Radiated Spurious Data (Band 13 – Mid Channel)

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Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
2353.50	Н	101	167	-67.13	6.99	-60.15	76.1
3138.00	Н	-	-	-68.91	7.20	-61.71	77.7

Table 7-16. Radiated Spurious Data (Band 13 – High Channel)

MODULATION SIGNAL:	QPSK	_
BANDWIDTH:	5.00	MHz
DISTANCE:	3	meters
NARROWBAND EMISSION LIMIT:	-50	dBm
WIDEBAND EMISSION LIMIT:	-40	dBm/MHz
•		-

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	Margin [dB]
1559.00	Н	112	210	-63.55	6.40	-57.15	-17.2
1564.00	Н	110	182	-63.89	6.41	-57.48	-17.5
1569.00	Н	103	189	-65.18	6.42	-58.76	-18.8

Table 7-17. Radiated Spurious Data (Band 13 – 1559-1610MHz Band)

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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]
2346.00	Н	103	171	-70.14	7.00	-63.14	78.3
3128.00	Н	-	-	-69.06	7.21	-61.85	77.0

Table 7-18. Radiated Spurious Data with WCP (Band 13 – Mid Channel)

MODULATION SIGNAL:	QPSK	
BANDWIDTH:	5.00	MHz
DISTANCE:	3	meters
NARROWBAND EMISSION LIMIT:	-50	dBm
WIDEBAND EMISSION LIMIT:	-40	dBm/MHz
		-

I	Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	Margin [dB]
	1564.00	н	114	257	-66.20	6.41	-59.79	-19.8

Table 7-19. Radiated Spurious Data with WCP (Band 13 – 1559-1610MHz Band)

FCC ID: ZNFH871			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]
1653.00	Н	100	223	-56.23	6.28	-49.95	70.3
2479.50	Н	106	201	-55.49	6.84	-48.65	69.0
3306.00	Н	136	191	-66.99	7.14	-59.85	80.2
4132.50	Н	119	127	-68.15	7.74	-60.41	80.7
4959.00	Н	-	-	-69.20	9.11	-60.09	80.4
5785.50	Н	-	-	-67.66	9.30	-58.37	78.7

Table 7-20. Radiated Spurious Data (Band 5 – Low Channel)

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

836.50 MHz 20525 19.42 dBm 0.088 W = QPSK 5.0 MHz 3 meters LIMIT: 43 + 10 log<sub>10</sub> (W) = 32.42 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1673.00	Н	100	214	-56.63	6.21	-50.42	69.8
2509.50	Н	101	354	-56.36	6.86	-49.51	68.9
3346.00	Н	234	230	-67.94	7.26	-60.68	80.1
4182.50	Н	-	-	-68.24	8.07	-60.17	79.6

Table 7-21. Radiated Spurious Data (Band 5 – Mid Channel)

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Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1693.00	Н	100	301	-59.94	6.14	-53.80	72.1
2539.50	Н	106	201	-54.58	6.95	-47.63	65.9
3386.00	Н	136	191	-66.45	7.38	-59.07	77.3
4232.50	Н	119	127	-68.23	8.34	-59.89	78.2
5079.00	Н	-	-	-67.32	8.87	-58.46	76.7
5925.50	Н	-	-	-66.64	9.26	-57.37	75.6

Table 7-22. Radiated Spurious Data (Band 5 – High Channel)

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

826.50 MHz 20425 17.99 dBm 0.063 W = QPSK 5.0 MHz 3 meters LIMIT: 43 + 10 log<sub>10</sub> (W) = 30.99 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1653.00	Н	100	211	-56.89	6.28	-50.61	68.6
2479.50	Н	100	352	-58.06	6.84	-51.22	69.2
3306.00	Н	100	226	-67.04	7.14	-59.90	77.9
4132.50	Н	-	-	-68.19	7.74	-60.45	78.4

Table 7-23. Radiated Spurious Data with WCP (Band 5 – Low Channel)

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Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3440.00	Н	-	-	-69.06	9.70	-59.37	82.9
5160.00	Н	176	36	-64.05	10.87	-53.17	76.7
6880.00	Н	-	-	-60.30	10.80	-49.50	73.0

Table 7-24. Radiated Spurious Data (Band 4/66 – 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	-	-	-69.20	9.85	-59.35	83.0
5235.00	Н	175	20	-62.75	10.88	-51.88	75.5
6980.00	Н	-	-	-60.68	11.00	-49.68	73.3

Table 7-25. Radiated Spurious Data (Band 4/66 – Mid Channel)

FCC ID: ZNFH871	(c		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 [dBi]	Spurious Emission Level [dBm]	[dBc]
3540.00	Н	-	-	-69.45	9.95	-59.51	82.3
5310.00	Н	100	350	-64.00	11.02	-52.99	75.8
7080.00	Н	-	-	-61.28	11.12	-50.16	73.0

Table 7-26. Radiated Spurious Data (Band 4/66 – 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	152	355	-68.87	9.85	-59.02	82.0
5235.00	Н	152	16	-64.58	10.88	-53.71	76.7
6980.00	Н	-	-	-60.71	11.00	-49.71	72.7

Table 7-27. Radiated Spurious Data with WCP (Band 4/66 – Mid Channel)

FCC ID: ZNFH871	G		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 [dBi]	Spurious Emission Level [dBm]	[dBc]
3705.00	Н	103	142	-65.55	10.01	-55.54	79.4
5557.50	Н	103	168	-60.86	11.20	-49.66	73.5
7410.00	Н	-	-	-60.33	10.88	-49.45	73.3
9262.50	Н	-	-	-59.92	12.36	-47.56	71.4

Table 7-28. Radiated Spurious Data (Band 2/25 – Low Channel)

OPERATING FREQUENCY:	188	2.50		MHz		
CHANNEL:	26365					
MEASURED OUTPUT POWER:	23.42	dBm	=	0.	.220	W
MODULATION SIGNAL:	QPSK					
BANDWIDTH:	5.0	MHz				
DISTANCE:	3	meters				
LIMIT:	43 + 10 log <sub>10</sub> (W) =	36	6.42	dBc		

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3765.00	Н	100	143	-64.39	9.76	-54.63	78.0
5647.50	Н	101	288	-59.68	11.36	-48.32	71.7
7530.00	Н	-	-	-61.15	11.25	-49.90	73.3
9412.50	Н	-	-	-58.79	12.31	-46.48	69.9

Table 7-29. Radiated Spurious Data (Band 2/25 – Mid Channel)

FCC ID: ZNFH871	G		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 [dBi]	Spurious Emission Level [dBm]	[dBc]
3825.00	Н	100	222	-64.41	9.54	-54.87	78.1
5737.50	Н	103	342	-58.22	11.44	-46.79	70.0
7650.00	Н	-	-	-61.01	11.51	-49.50	72.7
9562.50	Н	-	-	-58.92	12.40	-46.52	69.7

Table 7-30. Radiated Spurious Data (Band 2/25 – High Channel)

OPERATING FREQUENCY:	185	2.50	MHz	
CHANNEL:	260			
MEASURED OUTPUT POWER:	23.04	dBm =	0.202	W
MODULATION SIGNAL:	QPSK			
BANDWIDTH:	5.0	MHz		
DISTANCE:	3	meters		
LIMIT:	43 + 10 log <sub>10</sub> (W) =	36.04	dBc	

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3705.00	Н	101	136	-60.01	10.01	-50.00	73.0
5557.50	Н	103	130	-61.67	11.20	-50.47	73.5
7410.00	Н	-	-	-60.43	10.88	-49.55	72.6
9262.50	Н	-	-	-59.87	12.36	-47.51	70.6

Table 7-31. Radiated Spurious Data with WCP (Band 2/25 – Low Channel)

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Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
4620.00	Н	100	310	-67.57	11.33	-56.23	74.2
6930.00	Н	-	-	-59.84	10.89	-48.96	67.0
9240.00	Н	-	-	-57.91	12.38	-45.52	63.5
11550.00	Н	_	-	-57.94	13.40	-44.54	62.5

Table 7-32. Radiated Spurious Data (Band 30 – Mid Channel)

	MHz	0.00	23	OPERATING FREQUENCY:
		065	26	CHANNEL:
0.063 W	=	dBm	18.01	MEASURED OUTPUT POWER:
		_	QPSK	MODULATION SIGNAL:
		MHz	10.0	BANDWIDTH:
		meters	3	DISTANCE:
		dBm	-40.00	LIMIT:
		-		

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]
4620.00	н	103	186	-63.70	10.01	-53.69	13.7
6930.00	Н	101	220	-62.55	11.20	-51.35	11.4
9240.00	Н	-	-	-60.86	10.88	-49.98	10.0
11550.00	Н	-	-	-61.22	12.36	-48.86	8.9

Table 7-33. Radiated Spurious Data with WCP (Band 30 – Mid Channel)

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Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
5020.00	Н	110	241	-65.48	11.15	-54.33	72.9
7530.00	Н	-	-	-60.37	11.25	-49.12	67.7
10040.00	Н	-	-	-59.04	12.59	-46.45	65.0

Table 7-34. 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	110	260	-66.03	11.04	-54.99	72.2
7605.00	Н	-	-	-60.36	11.47	-48.89	66.1
10140.00	H	-	-	-59.17	12.67	-46.50	63.8

Table 7-35. Radiated Spurious Data (Band 7 – Mid Channel)

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Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
5120.00	Н	110	209	-64.36	10.94	-53.42	69.7
7680.00	Н	110	170	-56.31	11.54	-44.77	61.1
10240.00	Н	-	-	-59.08	12.74	-46.34	62.6

Table 7-36. 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]
5020.00	Н	104	359	-57.89	11.15	-46.74	64.3
7530.00	Н	127	80	-59.74	11.25	-48.49	66.1
10040.00	Н	128	202	-58.17	12.59	-45.58	63.2
12550.00	Н	-	-	-56.43	13.10	-43.33	60.9

Table 7-37. Radiated Spurious Data with WCP (Band 7 – Mid Channel)

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

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

Frequency stability testing is performed in accordance with the guidelines of ANSI/TIA-603-D-2010. 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-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.
- 3. Frequency measurements are made at 10°C intervals ranging from -30°C to +50°C. A period of at least one half-hour is provided to allow stabilization of the equipment at each temperature level.

#### Test Setup

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

#### Test Notes

None

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### Band 12 Frequency Stability Measurements §2.1055 §27.54

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

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	707,499,733	-267	-0.0000377
100 %		- 30	707,499,926	-74	-0.0000105
100 %		- 20	707,499,958	-42	-0.0000059
100 %		- 10	707,499,879	-121	-0.0000171
100 %		0	707,499,857	-143	-0.0000202
100 %		+ 10	707,499,890	-110	-0.0000155
100 %		+ 20	707,499,532	-468	-0.0000661
100 %		+ 30	707,500,030	30	0.0000042
100 %		+ 40	707,499,924	-76	-0.0000107
100 %		+ 50	707,499,975	-25	-0.0000035
BATT. ENDPOINT	3.40	+ 20	707,500,170	170	0.0000240

Table 7-38. Frequency Stability Data (Band 12)

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### Band 12 Frequency Stability Measurements §2.1055 §27.54



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

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### Band 13 Frequency Stability Measurements §2.1055 §27.54

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

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	781,999,980	-20	-0.0000026
100 %		- 30	781,999,828	-172	-0.0000220
100 %		- 20	781,999,943	-57	-0.0000073
100 %		- 10	781,999,869	-131	-0.0000168
100 %		0	781,999,882	-118	-0.0000151
100 %		+ 10	782,000,311	311	0.0000398
100 %		+ 20	782,000,319	319	0.0000408
100 %		+ 30	782,000,115	115	0.0000147
100 %		+ 40	781,999,834	-166	-0.0000212
100 %		+ 50	782,000,230	230	0.0000294
BATT. ENDPOINT	3.40	+ 20	781,999,900	-100	-0.0000128

 Table 7-39. Frequency Stability Data (Band 13)

FCC ID: ZNFH871	G		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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### **Band 13 Frequency Stability Measurements** <u>§2.1055 §27.54</u>



Figure 7-9. Frequency Stability Graph (Band 13)

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### Band 5 Frequency Stability Measurements §2.1055 §22.355

OPERATING FREQUENCY:	836,500,000	Hz
CHANNEL:	20525	_
REFERENCE VOLTAGE:	3.80	VDC
DEVIATION LIMIT:	± 0.00025 % or 2.5 ppm	

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	836,500,040	40	0.0000048
100 %		- 30	836,499,659	-341	-0.0000408
100 %		- 20	836,499,975	-25	-0.0000030
100 %		- 10	836,499,756	-244	-0.0000292
100 %		0	836,499,872	-128	-0.0000153
100 %		+ 10	836,500,236	236	0.0000282
100 %		+ 20	836,500,021	21	0.0000025
100 %		+ 30	836,499,764	-236	-0.0000282
100 %		+ 40	836,499,566	-434	-0.0000519
100 %		+ 50	836,500,150	150	0.0000179
BATT. ENDPOINT	3.40	+ 20	836,500,117	117	0.0000140

Table 7-40. Frequency Stability Data (Band 5)

FCC ID: ZNFH871		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 7-10. Frequency Stability Graph (Band 5)

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# Band 4 Frequency Stability Measurements §2.1055 §§27.54

OPERATING FREQUENCY:	1,732,500,000	Hz
CHANNEL:	20175	_
REFERENCE VOLTAGE:	3.80	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	1,732,500,210	210	0.0000121
100 %		- 30	1,732,499,943	-57	-0.0000033
100 %		- 20	1,732,499,791	-209	-0.0000121
100 %		- 10	1,732,500,167	167	0.0000096
100 %		0	1,732,500,274	274	0.0000158
100 %		+ 10	1,732,499,613	-387	-0.0000223
100 %		+ 20	1,732,499,933	-67	-0.0000039
100 %		+ 30	1,732,500,222	222	0.0000128
100 %		+ 40	1,732,499,998	-2	-0.0000001
100 %		+ 50	1,732,499,841	-159	-0.0000092
BATT. ENDPOINT	3.40	+ 20	1,732,500,242	242	0.0000140

Table 7-41. Frequency Stability Data (Band 4)

### Note:

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

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



Figure 7-11. Frequency Stability Graph (Band 4)

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# Band 4/66 Frequency Stability Measurements §2.1055 §§27.54

OPERATING FREQUENCY:	1,745,000,000	Hz
CHANNEL:	132322	-
REFERENCE VOLTAGE:	3.80	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	1,744,999,720	-280	-0.0000160
100 %		- 30	1,744,999,684	-316	-0.0000181
100 %		- 20	1,744,999,922	-78	-0.0000045
100 %		- 10	1,745,000,208	208	0.0000119
100 %		0	1,744,999,825	-175	-0.0000100
100 %		+ 10	1,745,000,029	29	0.0000017
100 %		+ 20	1,745,000,299	299	0.0000171
100 %		+ 30	1,745,000,144	144	0.0000083
100 %		+ 40	1,744,999,640	-360	-0.0000206
100 %		+ 50	1,745,000,092	92	0.0000053
BATT. ENDPOINT	3.40	+ 20	1,744,999,723	-277	-0.0000159

Table 7-42. 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 7-12. Frequency Stability Graph (Band 66)

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### Band 25 Frequency Stability Measurements §2.1055 §24.235

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

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	1,879,999,877	-123	-0.0000065
100 %		- 30	1,879,999,725	-275	-0.0000146
100 %		- 20	1,880,000,075	75	0.0000040
100 %		- 10	1,880,000,159	159	0.0000085
100 %		0	1,880,000,024	24	0.0000013
100 %		+ 10	1,880,000,047	47	0.0000025
100 %		+ 20	1,880,000,346	346	0.0000184
100 %		+ 30	1,879,999,682	-318	-0.0000169
100 %		+ 40	1,879,999,965	-35	-0.0000019
100 %		+ 50	1,880,000,142	142	0.0000076
BATT. ENDPOINT	3.40	+ 20	1,879,999,994	-6	-0.0000003

Table 7-43. Frequency Stability Data (Band 25)

### 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 25 Frequency Stability Measurements §2.1055 §24.235



Figure 7-13. Frequency Stability Graph (Band 25)

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# Band 30 Frequency Stability Measurements §2.1055 §24.235

OPERATING FREQUENCY:	2,310,000,000	Hz
CHANNEL:	27710	_
REFERENCE VOLTAGE:	3.80	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	2,309,999,963	-37	-0.0000016
100 %		- 30	2,310,000,295	295	0.0000128
100 %		- 20	2,309,999,774	-226	-0.0000098
100 %		- 10	2,310,000,239	239	0.0000103
100 %		0	2,309,999,902	-98	-0.0000042
100 %		+ 10	2,309,999,854	-146	-0.0000063
100 %		+ 20	2,309,999,962	-38	-0.0000016
100 %		+ 30	2,309,999,722	-278	-0.0000120
100 %		+ 40	2,309,999,914	-86	-0.0000037
100 %		+ 50	2,309,999,990	-10	-0.0000004
BATT. ENDPOINT	3.40	+ 20	2,310,000,070	70	0.0000030

Table 7-44. Frequency Stability Data (Band 30)

#### 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 30 Frequency Stability Measurements §2.1055 §24.235



Figure 7-14. Frequency Stability Graph (Band 30)

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### Band 7 Frequency Stability Measurements §2.1055 §27.54

OPERATING FREQUENCY:	2,535,000,000	Hz	
CHANNEL:	21100	_	
REFERENCE VOLTAGE:	3.80	VDC	

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	2,535,000,043	43	0.0000017
100 %		- 30	2,535,000,039	39	0.0000015
100 %		- 20	2,535,000,316	316	0.0000125
100 %		- 10	2,535,000,241	241	0.0000095
100 %		0	2,535,000,050	50	0.0000020
100 %		+ 10	2,535,000,056	56	0.0000022
100 %		+ 20	2,535,000,151	151	0.0000060
100 %		+ 30	2,534,999,975	-25	-0.0000010
100 %		+ 40	2,535,000,030	30	0.0000012
100 %		+ 50	2,535,000,027	27	0.0000011
BATT. ENDPOINT	3.40	+ 20	2,534,999,987	-13	-0.0000005

Table 7-45. 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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## Band 7 Frequency Stability Measurements §2.1055 §27.54



Figure 7-15. Frequency Stability Graph (Band 7)

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## CONCLUSION 8.0

The data collected relate only to the item(s) tested and show that the LG Portable Handset FCC ID: ZNFH871 complies with all the requirements of Parts 22, 24, & 27 of the FCC rules for LTE operation only.

FCC ID: ZNFH871		FCC Pt. 22, 24, & 27 LTE MEASURE (CERTIFICATION)		Approved by: Quality Manager
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