

weysight Spectrum Analyzer - Swept SA									
LX/ RL RF 50 Ω AC	CORREC	SEN	SE:INT	#Avg Type	e: RMS	02:25:41 PI TRAC	M Jan 30, 2020	F	requency
	PNO: Wide ↔ IFGain:Low	Trig: Free Atten: 36	Run dB	0,1	Mkr				Auto Tune
10 dB/div Ref 25.00 dBm					IVINI	-27.	73 dBm		
15 0								1 71	Center Freq
5.00			- 11			- Mannon	·······	1.7	Internet in the second s
5.00								170	Start Freq
-5.00							DL1 -13.00 dBm	1.70	400000 GH2
-15.0								1 71	Stop Freq
-25.0	Van	~~~~	1 <u>[</u> ~						
-35.0								Auto	CF Step 1.200000 MHz Map
-45.0								Auto	Ivian
-55.0									Freq Offset 0 Hz
-65.0									
									Scale Type
Center 1.710000 GHz	41/014/	000 kU-				Span 1	2.00 MHz	Log	Lin
MSG	#VBVV	820 KHZ			SWeep	s	TOUT pts)		

Plot 7-116. Lower Band Edge Plot (Band 4 - 15.0MHz QPSK - Full RB Configuration)



Plot 7-117. Lower Extended Band Edge Plot (Band 4 - 15.0MHz QPSK - Full RB Configuration)

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🔤 Keysight Sp	ectrum Analyzer - Swept SA									
L <mark>XI</mark> RL	RF 50 Ω AC	CORREC	SEN	ISE:INT	#Avg Typ	e: RMS	02:24:59 PI TRAC	MJan 30, 2020 E 1 2 3 4 5 6	F	requency
		PNO: Wide ↔ IFGain:Low	Atten: 36	Run dB		Miced				Auto Tune
10 dB/div Log	Ref 25.00 dBm						-29.	95 dBm		
15.0										Center Freq
13.0									1.73	55000000 GHZ
5.00										Start Freq
-5.00									1.74	19000000 GHz
-15.0								DE1 -13.00 dbm		Stop Freq
-25.0			Vier	1-					1.70	51000000 GHz
-35.0			· ···//	umm	m	m	Murrow www.	mayn		CF Step
-45.0									<u>Auto</u>	Man
55 0										Freq Offset
-33.0										0 Hz
-65.0										Scale Type
Center 1.	755000 GHz						Span 1	2.00 MHz	Log	Lin
#Res BW	240 kHz	#VBW	820 kHz			Sweep 1	.000 ms (1001 pts)		
MSG						STATUS	5			

Plot 7-118. Upper Band Edge Plot (Band 4 - 15.0MHz QPSK - Full RB Configuration)



Plot 7-119. Upper Extended Band Edge Plot (Band 4 - 15.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFK300AM	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
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🔤 Keysight Spe	ctrum Analyzer - S	wept SA									
LX/ RL	RF 50	Ω AC	CORREC	SEI	NSE:INT	#Ava Tvp	e: RMS	02:22:15 P	MJan 30, 2020	F	requency
			PNO: Wide ↔ IFGain:Low	Trig: Free Atten: 36	e Run 6 dB	0,1		TY			
10 dB/div	Ref 25.00	dBm					Mkr	1 1.708 6 -32.	56 GHz 08 dBm		Auto Tune
											Center Freq
15.0										1.7	10000000 GHz
5.00					m			and a state of the	al and a second s		Start Freq
-5.00										1.70	02000000 GHz
-15.0									DL1 -13.00 dBm		Stop Freq
-25.0				<u> </u>						1.7	18000000 GHz
-35.0 -35.0		Ame	mummer	mann	weet						CF Step
-45.0										<u>Auto</u>	Man
											Freq Offset
-55.0											0 Hz
-65.0											Scale Type
Center 1 7	10000 CH	,						Snan 1	6 00 MHz	Log	Lin
#Res BW	240 kHz		#VBW	/ 820 kHz			Sweep	1.000 ms	1001 pt <u>s)</u>		
MSG							STATU	JS			

Plot 7-120. Lower Band Edge Plot (Band 4 - 20.0MHz QPSK - Full RB Configuration)



Plot 7-121. Lower Extended Band Edge Plot (Band 4 - 20.0MHz QPSK - Full RB Configuration)

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Keysight Spectrum Analyzer - Swept SA								
LX/ RL RF 50Ω AC	CORREC	SENSE	E:INT #Ava Tvp	e: RMS	02:23:41 PM TRAC	Jan 30, 2020	F	requency
	PNO: Wide ↔ 1 IFGain:Low	Trig: Free R Atten: 36 di	Run IB		TYP DE			A
10 dB/div Ref 25.00 dBm				Mkr1	1.755 0 -32.04	00 GHz 40 dBm		Auto Tune
15.0							1.75	Center Freq 55000000 GHz
5.00 magazar and an and a factor of a factor of the factor	and and the second s						1.74	Start Freq 7000000 GHz
-15.0						DL1 -13.00 dBm	1.76	Stop Freq 53000000 GHz
-35.0		1 1 1 1 1	1 <u> </u>	Maglyaning and and and	ᠰᡟᢛᡘᠣᡗᡐ᠕ᠰ᠇ᠰᡅᡡ	harring	<u>Auto</u>	CF Step 1.600000 MHz Man
-45.0								Freq Offset
-65.0								0 Hz
								Scale Type
Center 1.755000 GHz #Res BW 240 kHz	#VBW 8:	20 kHz		Sweep 1.	Span 10 .000 ms ('	6.00 MHz 1001 pts)	Log	Lin

Plot 7-122. Upper Band Edge Plot (Band 4 - 20.0MHz QPSK - Full RB Configuration)



Plot 7-123. Upper Extended Band Edge Plot (Band 4 - 20.0MHz QPSK - Full RB Configuration)

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Band 2



Plot 7-124. Lower Band Edge Plot (Band 2 - 1.4MHz QPSK - Full RB Configuration)



Plot 7-125. Lower Extended Band Edge Plot (Band 2 - 1.4MHz QPSK - Full RB Configuration)

FCC ID: ZNFK300AM	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
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🔤 Ke	ysight Spea	trum Analyzer	- Swept SA									
l xi R	L	RF	50 Ω DC	CORREC	SEI	NSE:INT	#Avg Typ	e: RMS	05:46:47 P	M Feb 05, 2020 E 1 2 3 4 5 6	F	requency
			NFE	PNO: Wide 🕞 IFGain:Low	Trig: Free Atten: 36	e Run 6 dB			TYI Di			
10 dE Loa	3/div	Ref 25.0	0 dBm					Mkr1	1.910 (-26.	00 GHz 38 dBm		Auto Tune
15.0											1.91	Center Freq 0000000 GHz
5.00 -5.00										014_13.00.dBm	1.90	Start Freq 08000000 GHz
-15.0 -25.0						1					1.91	Stop Freq 2000000 GHz
-35.0	www					oor the	and a start	hand	way	and the second s	<u>Auto</u>	CF Step 400.000 kHz Man
-40.0												Freq Offset 0 Hz
-65.0												Scale Type
Cen #Re	ter 1.9 s BW	10000 G 6 kHz	Hz	#VBW	/ 56 kHz			Sweep 6	Span 4 .667 ms (.000 MHz 1001 pts)	Log	Lin
MSG								STATUS	6			

Plot 7-126. Upper Band Edge Plot (Band 2 - 1.4MHz QPSK - Full RB Configuration)



Plot 7-127. Upper Extended Band Edge Plot (Band 2 - 1.4MHz QPSK - Full RB Configuration)

FCC ID: ZNFK300AM	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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🔤 Keysight Spec	trum Analyzer - Sw	vept SA									
LXI RL	RF 50 S	2 DC	CORREC	SEN	ISE:INT	#Avg Typ	e: RMS	05:42:48 PI	4 Feb 05, 2020 E 1 2 3 4 5 6	F	requency
		NFE	PNO: Wide IFGain:Low	Atten: 36	dB			DE	ANNNN		
10 dB/div Log	Ref 25.00	dBm					Mkr1	1.850 0 -30.	00 GHz 82 dBm		Auto Tune
15.0										(1.85	Center Freq 0000000 GHz
-5.00						an and an	₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩	hyon yanan di da tangan yang yang yang yang yang yang yang	0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,	1.84	Start Freq 8000000 GHz
-15.0					1				DET -13.00 dBm	1.85	Stop Freq 2000000 GHz
-35.0	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	Vannanaa	Jon Walter and Martin	-,~~,~~,~~,~~,~~,~~,~~,~~,~~,~~,~~,~~,~~						<u>Auto</u>	CF Step 400.000 kHz Man
-55.0											Freq Offset 0 Hz
-65.0								0.000	000 8414	Log	Scale Type
#Res BW	50000 GHZ 36 kHz		#VBW	120 kHz			Sweep 6	span 4 .667 m <u>s (</u>	.000 MHZ 1001 pts)	Log	<u></u>
MSG							STATUS				

Plot 7-128. Lower Band Edge Plot (Band 2 - 3.0MHz QPSK - Full RB Configuration)



Plot 7-129. Lower Extended Band Edge Plot (Band 2 - 3.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFK300AM	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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Keysight Sp	ectrum Analyzer - S	wept SA									
LXI RL	RF 50	Ω DC	CORREC	SEN	ISE:INT	#Avg Typ	e: RMS	05:43:27 P	M Feb 05, 2020 E 1 2 3 4 5 6	F	requency
10 dB/div	Ref 25.00	NFE dBm	PNO: Wide IFGain:Low	Atten: 36	dB		Mkr1	1.910 3 -28.	16 GHz 31 dBm		Auto Tune
15.0										(1.91	Center Freq 0000000 GHz
-5.00									DL1 -13.00 dBm	1.90	Start Freq 8000000 GHz
-15.0					\$ ¹					1.91	Stop Freq 2000000 GHz
-35.0					~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	hallow	Martha	n www.www.ww	munn	Auto	CF Step 400.000 kHz Man
-55.0											Freq Offset 0 Hz
-65.0	010000 CH-							Snan	000 MHz	Log	Scale Type Lin
#Res BW	36 kHz		#VBW	120 kHz			Sweep_6	5 span 4 5.667 ms (1001 pts)		
MSG							STATU	s			

Plot 7-130. Upper Band Edge Plot (Band 2 - 3.0MHz QPSK - Full RB Configuration)



Plot 7-131. Upper Extended Band Edge Plot (Band 2 - 3.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFK300AM	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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🔤 Keysight Spec	trum Analyzer - Sv	vept SA									
LXI RL	RF 50 \$	DC	CORREC	SEN	NSE:INT	#Avg Typ	e: RMS	05:31:39 PI TRAC	4 Feb 05, 2020 E 1 2 3 4 5 6	F	requency
		NFE	PNO: Wide IFGain:Low	Atten: 36	dB			DE	ANNNN		A
10 dB/div Log	Ref 25.00	dBm					Mkr1	1.849 9 -30.	96 GHz 35 dBm		Auto Tune
15.0										(1.85	Center Freq 0000000 GHz
-5.00						***********************	ayan yaya an an an Ayadiya a		011.12.00 dBm	1.84	Start Freq 8000000 GHz
-15.0					1					1.85	Stop Freq 2000000 GHz
-35.0	ver from and and	and the state of the	and the second secon	- Andrew and the						<u>Auto</u>	CF Step 400.000 kHz Man
-45.0											Freq Offset 0 Hz
-65.0										Log	Scale Type
Center 1.8 #Res BW 0	50000 GHz 2 kHz		#VBW	200 kHz			Sweep 6	Span 4 .667 m <u>s (</u>	.000 MHz 1001 pt <u>s)</u>	Log	LIN
MSG							STATUS				

Plot 7-132. Lower Band Edge Plot (Band 2 - 5.0MHz QPSK - Full RB Configuration)



Plot 7-133. Lower Extended Band Edge Plot (Band 2 - 5.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFK300AM	<u> PCTEST</u>	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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🔤 Keysight Spe	ctrum Analyzer - S	wept SA									
L <mark>XI</mark> RL	RF 50	Ω DC	CORREC	SEN	ISE:INT	#Avg Typ	e: RMS	05:34:06 P	M Feb 05, 2020 E 1 2 3 4 5 6	F	requency
		NFE	PNO: Wide 🖵 IFGain:Low	Trig: Free Atten: 36	Run dB			TYI Di			
10 dB/div	Ref 25.00	dBm					Mkr1	1.910 (-28.4	00 GHz 04 dBm		Auto Tune
15.0										1.91	Center Freq 0000000 GHz
-5.00	,	level of the second							DI 4 12 00 dBm	1.90	Start Freq 8000000 GHz
-15.0				h	1					1.91	Stop Freq 2000000 GHz
-35.0					per many front from	Al-Ynskerttrafyfan	and the second	tonetherson	Warningallanda	<u>Auto</u>	CF Step 400.000 kHz Man
-45.0											Freq Offset 0 Hz
-65.0											Scale Type
Center 1.9 #Res BW	10000 GHz 62 kHz	<u> </u>	#VBW	200 kHz			Sweep 6	Span 4 .667 ms (.000 MHz 1001 pts)	Log	Lin
MSG							STATUS	3			

Plot 7-134. Upper Band Edge Plot (Band 2 - 5.0MHz QPSK - Full RB Configuration)



Plot 7-135. Upper Extended Band Edge Plot (Band 2 - 5.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFK300AM	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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🔤 Keysight Spe	ctrum Analyzer - S	wept SA									
CXU RL	RF 50	ΩDC	CORREC	SEN	NSE:INT	#Avg Typ	e: RMS	05:24:48 PI TRAC	MFeb 05, 2020	Fi	requency
10 dB/div	Ref 25.00	NFE dBm	PNO: Wide G	Atten: 36	dB		Mkr1	1.850 0 -32.4	00 GHz 22 dBm		Auto Tune
15.0										(1.85	Center Freq 0000000 GHz
-5.00								with the part of t	DL1 -13.00 dBm	1.84	Start Freq 6000000 GHz
-15.0					1/					1.85	Stop Freq 4000000 GHz
-35.0	an - and the a the factor of the fac	dect and the clarks	ىرى ئەلەر تەرىخە ئەرىغى بىرىيە بىرىكى يېچىچى بىرى سەرە ئەلەر ئەرىخە ئەرىغان ئەرىخە ئ	Anna an						<u>Auto</u>	CF Step 800.000 kHz Man
-55.0											Freq Offset 0 Hz
Center 1.8	50000 GHz	2		,				Span 8	.000 MHz	Log	Scale Type <u>Lin</u>
#Res BW	120 kHz		#VBW	430 kHz			Sweep 1	3.33 ms (1001 pts)		
MSG							STATUS				

Plot 7-136. Lower Band Edge Plot (Band 2 - 10.0MHz QPSK - Full RB Configuration)



Plot 7-137. Lower Extended Band Edge Plot (Band 2 - 10.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFK300AM	<u> PCTEST</u>	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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🔤 Keysight Spe	ctrum Analyzer - Si	wept SA									
LXI RL	RF 50 9	DC	CORREC	SEN	ISE:INT	#Avg Typ	e: RMS	05:27:12 PI TRAC	MFeb 05, 2020	F	requency
		NFE	PNO: Wide 🖵 IFGain:Low	Trig: Free Atten: 36	dB			TYF			
10 dB/div	Ref 25.00	dBm					Mkr1	1.910 0 -29.9	00 GHz 80 dBm		Auto Tune
15.0										1.91	Center Freq 0000000 GHz
-5.00	**************************************	ng da an								1.90	Start Freq 6000000 GHz
-15.0					.1				DE1 -13.00 dBm	1.91	Stop Freq 4000000 GHz
-35.0				³ η ₁ ,	4.095.52000-0200 ⁰ 000-0200	www.www.www.ww	waren an	(nen)heinen diebenen)	and the space of the second	<u>Auto</u>	CF Step 800.000 kHz Man
-45.0											Freq Offset 0 Hz
-65.0											Scale Type
Center 1.9 #Res BW	10000 GHz 120 kHz		#VBW	430 kHz			Sweep 1	Span 8 3.33 ms (.000 MHz 1001 pts)	Log	Lin
MSG							STATUS	5			

Plot 7-138. Upper Band Edge Plot (Band 2 - 10.0MHz QPSK - Full RB Configuration)



Plot 7-139. Upper Extended Band Edge Plot (Band 2 - 10.0MHz QPSK - Full RB Configuration)

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🔤 Key	ysight Spec	trum Ana	lyzer - Swe	pt SA									
l,XI RI	L	RF	50 Ω	DC	CORREC	SE	NSE:INT	#Ava Tvp	e RMS	05:17:46 PI TRAC	4 Feb 05, 2020	Fr	equency
				NFE	PNO: Wide	Trig: Fre	e Run			TYP			
					IFGain:Low	Atten: 3	6 dB						
				_					MKĽ	1 1.849 9	88 GHZ		Auto Fullo
10 dE Log I	3/div	Ref 2	5.00 d	Bm						-30.4	Ja uBili		
												c	Center Frea
15.0												1.85	0000000 GHz
5.00							مسمر	- mar -	- anno				
													Start Freq
-5.00												1.84	4000000 GHz
											DL1 -13.00 dBm		
-15.0													Stop Freq
												1.85	6000000 GHz
-25.0							1						
	_		m and a	~~~~	mm	man	San and						CE Sten
-35.0	- m		(V U.									1	.200000 MHz
												<u>Auto</u>	Man
-45.0													
													Freq Offset
-55.0													0 Hz
05.0													
-65.U													Scale Type
Cen	ter 1.8	50000	GHz							Span 1	2.00 MHz	Log	<u>Lin</u>
#Res	sBW	80 kH	Z		#V	BW 620 kHz			Sweep	1.000 ms (1001 pts)		
MSG									STATU	IS			

Plot 7-140. Lower Band Edge Plot (Band 2 - 15.0MHz QPSK - Full RB Configuration)



Plot 7-141. Lower Extended Band Edge Plot (Band 2 - 15.0MHz QPSK - Full RB Configuration)

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🔤 Keysight Spe	ctrum Analyzer - S	vept SA									
L XI RL	RF 50 9	DC DC	CORREC	SEN	ISE:INT	#Avg Typ	e: RMS	05:19:53 PM TRAC	4 Feb 05, 2020 E 1 2 3 4 5 6	Fi	requency
		NFE	PNO: Wide 🖵 IFGain:Low	Atten: 36	dB			TYF DE			
10 dB/div	Ref 25.00	dBm					Mkr1	1.910 3 -26.9	72 GHz 91 dBm		Auto Tune
15.0										(1.91	Center Freq 0000000 GHz
-5.00		of an and a set of the	······							1.90	Start Freq 4000000 GHz
-15.0					↓ ¹				DL1 -13.00 dBm	1.91	Stop Freq 6000000 GHz
-35.0						- Andrews			mm	, <u>Auto</u>	CF Step I.200000 MHz Man
-45.0											Freq Offset 0 Hz
-65.0											Scale Type
Center 1.9 #Res BW	10000 GHz 180 kHz		#VBW	620 kHz			Sweep 1	Span 1 1.000 ms (2.00 MHz 1001 pts)	Log	Lin
MSG							STATU	S			

Plot 7-142. Upper Band Edge Plot (Band 2 - 15.0MHz QPSK - Full RB Configuration)



Plot 7-143. Upper Extended Band Edge Plot (Band 2 - 15.0MHz QPSK - Full RB Configuration)

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🔤 Keysight Spe	ctrum Analyzer - Sv	vept SA								
LXI RL	RF 50 \$	DC DC	CORREC	SEN	NSE:INT	#Avg Typ	e: RMS	04:51:35 PM TRACI	Feb 05, 2020	Frequency
		NFE	PNO: Wide 🖵 IFGain:Low	Atten: 36	e Run 6 dB			DE	ANNNN	
10 dB/div	Ref 25.00	dBm					Mkr1	1.849 9 -32.0	36 GHz)4 dBm	Auto Tune
15.0										Center Freq 1.85000000 GHz
-5.00						al have the second and a second s				Start Freq 1.842000000 GHz
-15.0									JL1 -13.00 dBm	Stop Freq 1.858000000 GHz
-35.0	ty may a share app	anter and the second	and	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	wall					CF Step 1.600000 MHz <u>Auto</u> Man
-45.0										Freq Offset 0 Hz
-65.0										Scale Type
Center 1.8 #Res BW	240 kHz		#VBW	820 kHz			Sweep_1	Span 10 1.000 ms (*	5.00 MHz 1001 pts)	
MSG							STATU	s		

Plot 7-144. Lower Band Edge Plot (Band 2 - 20.0MHz QPSK - Full RB Configuration)



Plot 7-145. Lower Extended Band Edge Plot (Band 2 - 20.0MHz QPSK - Full RB Configuration)

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🔤 Keysight Sp	ectrum Analyzer - S	wept SA								
LXI RL	RF 50	DC	CORREC	SEN	SE:INT	#Avg Typ	e: RMS	04:54:42 PM TRAC	4Feb 05, 2020 E 1 2 3 4 5 6	Frequency
		NFE	PNO: Wide 🖵 IFGain:Low	Atten: 36	e Run 6 dB			DE	ANNNN	
10 dB/div	Ref 25.00	dBm					Mkr1	1.910 0 -30.	32 GHz 74 dBm	Auto Tune
15.0										Center Freq 1.910000000 GHz
-5.00		per Colonatoria							DI 1 13.00 dBm	Start Freq 1.902000000 GHz
-15.0					. 1					Stop Freq 1.918000000 GHz
-35.0				ng ha		en e	w	×~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	h and the state of	CF Step 1.600000 MHz <u>Auto</u> Man
-55.0										Freq Offset 0 Hz
-65.0										Scale Type
Center 1. #Res BW	910000 GHz 240 kHz		#VBW	820 kHz			Sweep 1	Span 1 .000 ms (6.00 MHz 1001 pts)	
MSG							STATUS	s		

Plot 7-146. Upper Band Edge Plot (Band 2 - 20.0MHz QPSK - Full RB Configuration)



Plot 7-147. Upper Extended Band Edge Plot (Band 2 - 20.0MHz QPSK - Full RB Configuration)

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Band 30



Plot 7-148. Lower Band Edge Plot (Band 30 - 5.0MHz QPSK - Full RB Configuration)



Plot 7-149. Lower Extended Band Edge Plot (Band 30 - 5.0MHz QPSK - Full RB Configuration)

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🔤 Keysight Spe	ctrum Analyzer - Sv	vept SA									- d ×
L <mark>XI</mark> RL	RF 50 Ω	2 AC	CORREC	SEI	ISE:INT	#Avg Typ	e: RMS	12:19:12 PI TRAC	4 Jan 30, 2020	F	requency
10 dB/div	Ref 25.00	dBm	PNO: Wide ↔ IFGain:Low	Trig: Free Atten: 36	e Run dB	• 7.	Mki	r1 2.315 -27.	01 GHz 52 dBm		Auto Tune
15.0										2.31	Center Freq I5000000 GHz
-5.00		5-909-40 - 2009-64 - 2009-64 	4+++++++++++++++++++++++++++++++++++++							2.31	Start Freq 10000000 GHz
-15.0					1				DL1 -13.00 dBm	2.32	Stop Freq 20000000 GHz
-35.0					m march we	and and marked	and the second sec	and and the standard of the	hourses	<u>Auto</u>	CF Step 1.000000 MHz Man
-55.0											Freq Offset 0 Hz
-65.0											Scale Type
Center 2.3	62 kHz		#VBV	200 kHz			Sween	Span 1 16 67 ms (0.00 MHz 1001 pts)	Log	Lin
MSG				200 1112			STATU	s	ree (pas)		

Plot 7-150. Upper Band Edge Plot (Band 30 - 5.0MHz QPSK - Full RB Configuration)



Plot 7-151. Upper Extended Band Edge Plot (Band 30 - 5.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFK300AM	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	🔁 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Daga 04 of 124	
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Keysight Spectrum Analyzer - Swept SA				
(X) RL RF 50Ω AC	CORREC SE	AVg Typ	12:03:03 PM e: RMS TRAC	IJan 30, 2020 2 3 4 5 6 Frequency
10 dB/div Ref 25.00 dBm	IFGain:Low Atten: 3	6 dB	Mkr1 2.304 8 -32.3	Auto Tune 88 dBm
15.0				Center Freq 2.305000000 GHz
-5.00			ารให้สหกรรมการที่งที่มีที่มีหมายสุขังสองสุข	Start Freq 2.301000000 GHz
-15.0		1		Stop Freq 2.309000000 GHz
-35.0	an	herder ^{an}		CF Step 800.000 kHz <u>Auto</u> Man
-55.0				Freq Offset 0 Hz
-65.0				Scale Type
#Res BW 62 kHz	#VBW 220 kHz		Span 8. Sweep 13.33 ms (*	1001 pts)

Plot 7-152. Lower Band Edge Plot (Band 30 - 10.0MHz QPSK - Full RB Configuration)



Plot 7-153. Lower Extended Band Edge Plot (Band 30 - 10.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFK300AM	<u> PCTEST</u>	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
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Keysight Spectrum Analyzer - Swept SA					
LXIRL RF 50Ω AC	CORREC	SENSE:INT	#Avg Type: RMS	12:04:14 PM Jan 30, 2020 TRACE 1 2 3 4 5 6	Frequency
10 dB/div Ref 25.00 dBm	PNO: Wide 🖵 Trig: IFGain:Low Atter	Free Run I: 36 dB	Mkr	1 2.315 08 GHz -31.90 dBm	Auto Tune
15.0					Center Freq 2.315000000 GHz
5.00	Knjikelje for Hadrier annen fan der anter			DL1 -13 00 dEm	Start Freq 2.310000000 GHz
-15.0					Stop Freq 2.32000000 GHz
-35.0			lan-kanan nyangah di gunan-dar	and production and an and and and and and and and and	CF Step 1.000000 MHz <u>Auto</u> Man
-55.0					Freq Offset 0 Hz
-65.0					Scale Type
Center 2.315000 GHz #Res BW 62 kHz	#VBW 220 k	Hz	Sweep 1	Span 10.00 MHz 6.67 ms (1001 pts)	Log <u>Lin</u>

Plot 7-154. Upper Band Edge Plot (Band 30- 10.0MHz QPSK - Full RB Configuration)



Plot 7-155. Upper Extended Band Edge Plot (Band 30 - 10.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFK300AM	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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7.5 Peak-Average Ratio

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 v03r01 - Section 5.7.1

Test Settings

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

Test Setup

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



Figure 7-4. Test Instrument & Measurement Setup

Test Notes

None.

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Band 2







Plot 7-157. PAR Plot (Band 2 - 1.4MHz 16-QAM - Full RB Configuration)

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Plot 7-159. PAR Plot (Band 2 - 3.0MHz 16-QAM - Full RB Configuration)

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Plot 7-161. PAR Plot (Band 2 - 5.0MHz 16-QAM - Full RB Configuration)

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Plot 7-163. PAR Plot (Band 2 - 10.0MHz 16-QAM - Full RB Configuration)

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Plot 7-165. PAR Plot (Band 2 - 15.0MHz 16-QAM - Full RB Configuration)

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Plot 7-167. PAR Plot (Band 2 - 20.0MHz 16-QAM - Full RB Configuration)

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7.6 Radiated Power (ERP/EIRP)

Test Overview

Effective Radiated Power (ERP) and Equivalent Isotropic Radiated Power (EIRP) measurements are performed using the substitution method described in ANSI/TIA-603-E-2016 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 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 v03r01 - Section 5.2.1

ANSI/TIA-603-E-2016 - 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 \geq 2 x span / RBW
- 6. Detector = RMS
- 7. Trigger is set to "free run" for signals with continuous operation with the sweep times set to "auto".
- 8. The integration bandwidth was roughly set equal to the measured OBW of the signal for signals with continuous operation.
- 9. Trace mode = trace averaging (RMS) over 100 sweeps
- 10. The trace was allowed to stabilize

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Test Setup



Figure 7-6. Radiated Test Setup >1GHz

3m

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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e: 1/	PCTEST St Dates: 12/2020 - 02/14/2020 fied no part of this report of	PCTEST MEASUREMENT REPORT (CERTIFICATION) Image: Comparison st Dates: EUT Type: 12/2020 - 02/14/2020 Portable Handset					



Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
699.70	1.4	QPSK	V	168	53	1 / 2	17.95	4.50	20.30	0.107	34.77	-14.47
707.50	1.4	QPSK	V	164	47	1 / 2	18.00	4.60	20.45	0.111	34.77	-14.32
715.30	1.4	QPSK	V	168	58	1 / 2	17.98	4.63	20.46	0.111	34.77	-14.31
715.30	1.4	16-QAM	V	168	58	1 / 2	16.66	4.63	19.14	0.082	34.77	-15.63
700.50	3	QPSK	V	168	53	1 / 7	18.09	4.55	20.49	0.112	34.77	-14.28
707.50	3	QPSK	V	164	47	1 / 7	18.19	4.60	20.64	0.116	34.77	-14.13
714.50	3	QPSK	V	168	58	1 / 7	17.93	4.60	20.38	0.109	34.77	-14.39
707.50	3	16-QAM	V	164	47	1 / 7	17.07	4.60	19.52	0.090	34.77	-15.25
701.50	5	QPSK	V	168	53	1 / 12	17.73	4.60	20.18	0.104	34.77	-14.59
707.50	5	QPSK	V	164	47	1 / 12	17.89	4.60	20.34	0.108	34.77	-14.43
713.50	5	QPSK	V	168	58	1 / 12	17.80	4.60	20.25	0.106	34.77	-14.52
707.50	5	16-QAM	V	164	47	1 / 12	16.81	4.60	19.26	0.084	34.77	-15.51
704.00	10	QPSK	V	168	53	1 / 25	17.99	4.50	20.34	0.108	34.77	-14.43
707.50	10	QPSK	V	164	47	1 / 0	17.84	4.60	20.29	0.107	34.77	-14.48
711.00	10	QPSK	V	168	58	1 / 0	17.67	4.60	20.12	0.103	34.77	-14.65
704.00	10	16-QAM	V	168	53	1 / 25	17.04	4.50	19.39	0.087	34.77	-15.38
707.50	3	QPSK	Н	153	69	1 / 7	16.32	3.50	17.67	0.058	34.77	-17.10

Table 7-3. ERP Data (Band 12)

FCC ID: ZNFK300AM	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
824.70	1.4	QPSK	Н	205	286	1 / 2	14.72	6.70	19.27	0.085	38.45	-19.18
836.50	1.4	QPSK	Н	203	293	1 / 2	14.32	6.70	18.87	0.077	38.45	-19.58
848.30	1.4	QPSK	Н	205	279	1 / 0	13.87	6.70	18.42	0.070	38.45	-20.03
824.70	1.4	16-QAM	Н	205	286	1 / 2	14.15	6.70	18.70	0.074	38.45	-19.75
825.50	3	QPSK	Н	205	286	1 / 7	14.81	6.70	19.36	0.086	38.45	-19.09
836.50	3	QPSK	Н	203	293	1 / 7	14.23	6.70	18.78	0.076	38.45	-19.67
847.50	3	QPSK	Н	205	279	1 / 7	13.93	6.65	18.43	0.070	38.45	-20.02
825.50	3	16-QAM	Н	205	286	8 / 4	14.18	6.70	18.73	0.075	38.45	-19.72
826.50	5	QPSK	Н	205	286	1 / 12	14.82	6.70	19.37	0.086	38.45	-19.08
836.50	5	QPSK	Н	203	293	1 / 12	14.39	6.70	18.94	0.078	38.45	-19.51
846.50	5	QPSK	Н	205	279	1 / 12	14.07	6.60	18.52	0.071	38.45	-19.93
826.50	5	16-QAM	Н	205	286	12 / 6	13.79	6.70	18.34	0.068	38.45	-20.11
829.00	10	QPSK	Н	205	286	1 / 25	14.59	6.70	19.14	0.082	38.45	-19.31
836.50	10	QPSK	Н	203	293	1 / 0	14.26	6.70	18.81	0.076	38.45	-19.64
844.00	10	QPSK	Н	205	279	1 / 0	13.89	6.60	18.34	0.068	38.45	-20.11
829.00	10	16-QAM	Н	205	286	1 / 25	13.58	6.70	18.13	0.065	38.45	-20.32
826.50	5	QPSK	V	133	246	1 / 12	14.48	6.30	18.63	0.073	38.45	-19.82

Table 7-4. ERP Data (Band 5)

FCC ID: ZNFK300AM	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
1710.70	1.4	QPSK	Н	109	329	1 / 5	11.40	9.44	20.84	0.121	30.00	-9.16
1732.50	1.4	QPSK	Н	172	319	1 / 5	11.44	9.31	20.75	0.119	30.00	-9.25
1754.30	1.4	QPSK	Н	224	323	1 / 2	11.52	9.21	20.73	0.118	30.00	-9.27
1710.70	1.4	16-QAM	Н	109	329	1 / 5	10.41	9.44	19.85	0.097	30.00	-10.15
1711.50	3	QPSK	Н	109	329	1 / 7	11.42	9.44	20.85	0.122	30.00	-9.15
1732.50	3	QPSK	Н	172	319	1 / 7	11.39	9.31	20.70	0.117	30.00	-9.30
1753.50	3	QPSK	Н	224	323	1 / 14	11.55	9.21	20.76	0.119	30.00	-9.24
1711.50	3	16-QAM	Н	109	329	1 / 7	10.66	9.44	20.09	0.102	30.00	-9.91
1712.50	5	QPSK	Н	109	329	1 / 12	11.51	9.43	20.94	0.124	30.00	-9.06
1732.50	5	QPSK	н	172	319	1 / 24	11.42	9.31	20.73	0.118	30.00	-9.27
1752.50	5	QPSK	н	224	323	1 / 12	11.60	9.21	20.80	0.120	30.00	-9.20
1712.50	5	16-QAM	н	109	329	1 / 12	10.67	9.43	20.10	0.102	30.00	-9.90
1715.00	10	QPSK	Н	109	329	1 / 25	11.49	9.42	20.90	0.123	30.00	-9.10
1732.50	10	QPSK	Н	172	319	1 / 25	11.47	9.31	20.78	0.120	30.00	-9.22
1750.00	10	QPSK	Н	224	323	1 / 25	11.52	9.20	20.72	0.118	30.00	-9.28
1715.00	10	16-QAM	Н	109	329	1 / 25	10.69	9.42	20.11	0.102	30.00	-9.89
1717.50	15	QPSK	Н	109	329	1 / 36	11.35	9.40	20.75	0.119	30.00	-9.25
1732.50	15	QPSK	Н	172	319	1 / 74	11.34	9.31	20.65	0.116	30.00	-9.35
1747.50	15	QPSK	Н	224	323	1 / 0	11.52	9.22	20.73	0.118	30.00	-9.27
1717.50	15	16-QAM	Н	109	329	1 / 36	10.69	9.40	20.09	0.102	30.00	-9.91
1720.00	20	QPSK	Н	109	329	1 / 50	11.58	9.38	20.96	0.125	30.00	-9.04
1732.50	20	QPSK	Н	172	319	1/0	11.24	9.31	20.55	0.113	30.00	-9.45
1745.00	20	QPSK	Н	224	323	1 / 50	11.69	9.23	20.92	0.124	30.00	-9.08
1720.00	20	16-QAM	Н	109	329	1 / 50	10.68	9.38	20.06	0.102	30.00	-9.94
1720.00	20	QPSK	V	141	309	1 / 50	11.33	9.34	20.67	0.117	30.00	-9.33

Table 7-5. EIRP Data (Band 4)

FCC ID: ZNFK300AM	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
1850.70	1.4	QPSK	Н	126	355	1 / 2	12.81	9.48	22.30	0.170	33.01	-10.71
1880.00	1.4	QPSK	Н	155	351	1 / 2	12.03	9.90	21.93	0.156	33.01	-11.08
1909.30	1.4	QPSK	Н	161	341	1 / 5	12.31	10.25	22.56	0.180	33.01	-10.45
1909.30	1.4	16-QAM	Н	161	341	1 / 5	11.28	10.25	21.53	0.142	33.01	-11.48
1851.50	3	QPSK	Н	126	355	1 / 7	12.73	9.50	22.23	0.167	33.01	-10.78
1880.00	3	QPSK	Н	155	351	1 / 7	11.96	9.90	21.86	0.153	33.01	-11.15
1908.50	3	QPSK	Н	161	341	1 / 7	12.08	10.25	22.33	0.171	33.01	-10.68
1908.50	3	16-QAM	Н	161	341	1 / 7	11.30	10.25	21.55	0.143	33.01	-11.46
1852.50	5	QPSK	Н	126	355	1 / 12	12.74	9.51	22.25	0.168	33.01	-10.76
1880.00	5	QPSK	Н	155	351	1 / 12	11.96	9.90	21.86	0.153	33.01	-11.15
1907.50	5	QPSK	Н	161	341	1 / 12	12.12	10.24	22.36	0.172	33.01	-10.65
1907.50	5	16-QAM	Н	161	341	1 / 12	11.29	10.24	21.53	0.142	33.01	-11.48
1855.00	10	QPSK	Н	126	355	1 / 25	12.68	9.55	22.23	0.167	33.01	-10.78
1880.00	10	QPSK	Н	155	351	1 / 25	11.97	9.90	21.87	0.154	33.01	-11.14
1905.00	10	QPSK	Н	161	341	1 / 25	12.27	10.22	22.49	0.177	33.01	-10.52
1905.00	10	16-QAM	Н	161	341	1 / 25	11.45	10.22	21.67	0.147	33.01	-11.34
1857.50	15	QPSK	Н	126	355	1 / 36	12.50	9.58	22.08	0.161	33.01	-10.93
1880.00	15	QPSK	Н	155	351	1 / 36	11.76	9.90	21.66	0.147	33.01	-11.35
1902.50	15	QPSK	Н	161	341	1 / 36	12.17	10.20	22.37	0.173	33.01	-10.64
1902.50	15	16-QAM	Н	161	341	1 / 36	11.44	10.20	21.64	0.146	33.01	-11.37
1860.00	20	QPSK	Н	126	355	1 / 0	12.52	9.62	22.14	0.164	33.01	-10.87
1880.00	20	QPSK	Н	155	351	1 / 0	11.79	9.90	21.69	0.148	33.01	-11.32
1900.00	20	QPSK	Н	161	341	1 / 50	12.27	10.18	22.45	0.176	33.01	-10.56
1900.00	20	16-QAM	Н	161	341	1 / 50	11.40	10.18	21.58	0.144	33.01	-11.43
1909.30	1.4	QPSK	V	102	58	1 / 5	11.44	10.26	21.70	0.148	33.01	-11.31

Table 7-6. EIRP Data (Band 2)

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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
2307.50	5	QPSK	V	135	276	1 / 12	12.14	10.23	22.37	0.173	23.98	-1.61
2312.50	5	QPSK	V	135	276	1 / 24	11.89	10.21	22.10	0.162	23.98	-1.88
2307.50	5	16-QAM	V	135	276	1 / 12	11.42	10.23	21.65	0.146	23.98	-2.33
2310.00	10	QPSK	V	135	276	1 / 25	12.22	10.22	22.44	0.175	23.98	-1.54
2310.00	10	16-QAM	V	135	276	1 / 25	11.27	10.22	21.49	0.141	23.98	-2.49
2310.00	10	QPSK	Н	117	189	1 / 25	10.41	10.31	20.72	0.118	23.98	-3.26

Table 7-7. EIRP Data (Band 30)

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7.7 Radiated Spurious Emissions Measurements

Test Overview

Radiated spurious emissions measurements are performed using the substitution method described in ANSI/TIA-603-E-2016 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.

Test Procedures Used

KDB 971168 D01 v03r01 - Section 5.8

ANSI/TIA-603-E-2016 - Section 2.2.12

Test Settings

- 1. RBW = 100kHz for emissions below 1GHz and 1MHz for emissions above 1GHz
- 2. VBW \ge 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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Test Setup



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

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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Band 12



Plot 7-168. Radiated Spurious Plot above 1GHz (Band 12)

OPERATING FREQUENCY:	70	4.00	MHz
MODULATION SIGNAL:	QPSK	_	
BANDWIDTH:	10.0	MHz	
DISTANCE:	3	meters	
LIMIT:	-13	dBm	

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]	Margin [dB]
1408.00	Н	-	-	-68.69	2.30	-66.38	-53.4
2112.00	Н	102	189	-61.23	3.12	-58.10	-45.1
2816.00	Н	-	-	-67.63	4.82	-62.81	-49.8
3520.00	Н	-	-	-69.60	6.48	-63.12	-50.1

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

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OPERATING FREQUENCY:707.50MHzMODULATION SIGNAL:QPSKBANDWIDTH:10.0MHzDISTANCE:3metersLIMIT:-13dBm

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]	Margin [dB]
1415.00	Н	-	-	-68.58	2.39	-66.19	-53.2
2122.50	Н	143	181	-60.63	3.14	-57.49	-44.5
2830.00	Н	-	-	-67.77	4.87	-62.90	-49.9
3537.50	Н	-	-	-68.58	6.45	-62.13	-49.1

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

OPERATING FREQUENCY:711.00MHzMODULATION SIGNAL:QPSKBANDWIDTH:10.0MHzDISTANCE:3metersLIMIT:-13dBm

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]	Margin [dB]
1422.00	Н	-	-	-68.56	2.53	-66.04	-53.0
2133.00	Н	107	193	-62.20	3.11	-59.09	-46.1
2844.00	Н	-	-	-68.01	4.91	-63.10	-50.1
3555.00	Н	-	-	-67.65	6.46	-61.20	-48.2

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

FCC ID: ZNFK300AM	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	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]	Margin [dB]
1653.00	Н	-	-	-68.77	3.12	-65.65	-52.7
2479.50	Н	170	177	-65.16	3.87	-61.29	-48.3
3306.00	Н	-	-	-68.12	6.01	-62.11	-49.1
4132.50	Н	-	-	-70.04	7.77	-62.27	-49.3

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

FCC ID: ZNFK300AM	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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OPERATING FREQUENCY:836.50MHzMODULATION SIGNAL:QPSKBANDWIDTH:5.0MHzDISTANCE:3metersLIMIT:-13dBm

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]	Margin [dB]
1673.00	Н	-	-	-68.70	3.10	-65.60	-52.6
2509.50	Н	103	37	-66.57	4.02	-62.55	-49.6
3346.00	Н	-	-	-68.36	6.03	-62.34	-49.3
4182.50	Н	-	-	-69.60	7.79	-61.81	-48.8

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

OPERATING FREQUENCY:	846	6.50 N	MHz
MODULATION SIGNAL:	QPSK		
BANDWIDTH:	5.0	MHz	
DISTANCE:	3	meters	
LIMIT:	-13	dBm	

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]	Margin [dB]
1693.00	Н	-	-	-69.24	3.18	-66.06	-53.1
2539.50	Н	133	172	-66.44	4.10	-62.34	-49.3
3386.00	Н	-	-	-67.89	6.15	-61.74	-48.7
4232.50	Н	-	-	-69.35	7.88	-61.47	-48.5

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

FCC ID: ZNFK300AM	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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OPERATING FREQUENCY:	172	20.00	MHz
MODULATION SIGNAL:	QPSK	_	
BANDWIDTH:	20.0	MHz	
DISTANCE:	3	meters	
LIMIT:	-13	_dBm	

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]	Margin [dB]
3440.00	Н	107	131	-61.04	6.22	-54.82	-41.8
5160.00	Н	321	31	-67.21	8.68	-58.54	-45.5
6880.00	Н	122	49	-63.28	8.76	-54.52	-41.5
8600.00	Н	-	-	-65.80	9.17	-56.63	-43.6
10320.00	Н	107	48	-62.25	9.64	-52.61	-39.6
12040.00	Н	-	-	-61.43	9.23	-52.20	-39.2
13760.00	Н	-	-	-60.13	9.01	-51.12	-38.1

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

FCC ID: ZNFK300AM	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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OPERATING FREQUENCY:1732.50MHzMODULATION SIGNAL:QPSKBANDWIDTH:20.0MHzDISTANCE:3metersLIMIT:-13dBm

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]	Margin [dB]
3465.00	Н	118	127	-61.65	6.27	-55.38	-42.4
5197.50	Н	-	-	-69.65	8.71	-60.94	-47.9
6930.00	Н	136	44	-62.14	8.72	-53.42	-40.4
8662.50	Н	-	-	-65.13	9.27	-55.86	-42.9
10395.00	Н	266	33	-61.21	9.61	-51.60	-38.6
12127.50	Н	-	-	-61.32	9.16	-52.16	-39.2
13860.00	Н	-	-	-60.24	9.00	-51.25	-38.2

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

QPSK

20.0

1745.00

MHz

MHz

OPERATING FREQUENCY:

MODULATION SIGNAL:

BANDWIDTH: _____ DISTANCE:

TANCE: <u>3</u> meters LIMIT: -13 dBm

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]	Margin [dB]
3490.00	Н	102	133	-61.20	6.32	-54.88	-41.9
5235.00	Н	243	9	-67.59	8.71	-58.88	-45.9
6980.00	Н	286	49	-62.20	8.74	-53.47	-40.5
8725.00	Н	-	-	-65.99	9.42	-56.58	-43.6
10470.00	Н	101	19	-63.25	9.62	-53.63	-40.6
12215.00	Н	-	-	-61.17	9.09	-52.08	-39.1
13960.00	Н	-	-	-59.75	8.90	-50.84	-37.8

Table 7-16. Radiated Spurious Data (Band 4 – High Channel)

FCC ID: ZNFK300AM	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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OPERATING FREQUENCY:	1850.70		
MODULATION SIGNAL:	QPSK	_	
BANDWIDTH:	1.4	MHz	
DISTANCE:	3	meters	
LIMIT:	-13	dBm	

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]	Margin [dB]
3701.40	Н	129	148	-65.47	6.58	-58.89	-45.9
5552.10	Н	344	207	-67.98	8.74	-59.25	-46.2
7402.80	Н	100	4	-59.35	8.41	-50.93	-37.9
9253.50	Н	-	-	-64.98	9.33	-55.65	-42.7
11104.20	Н	273	296	-57.92	9.32	-48.60	-35.6
12954.90	Н	-	-	-59.60	8.96	-50.64	-37.6
14805.60	Н	-	-	-58.37	8.67	-49.70	-36.7

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

FCC ID: ZNFK300AM	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	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]	Margin [dB]
3760.00	Н	102	341	-64.19	6.67	-57.52	-44.5
5640.00	Н	112	357	-67.63	8.81	-58.82	-45.8
7520.00	Н	226	4	-58.64	8.48	-50.16	-37.2
9400.00	Н	-	-	-65.00	9.32	-55.68	-42.7
11280.00	Н	245	287	-56.39	9.24	-47.16	-34.2
13160.00	Н	199	95	-59.34	9.07	-50.27	-37.3
15040.00	Н	-	-	-58.13	8.77	-49.37	-36.4
16920.00	Н	-	-	-57.19	8.03	-49.16	-36.2

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

QPSK

OPERATING FREQUENCY:

MHz

1909.30

MODULATION SIGNAL:

BANDWIDTH:

1.4 MHz DISTANCE: 3 meters

LIMIT: -13 dBm

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]	Margin [dB]
3818.60	Н	112	356	-67.56	6.87	-60.68	-47.7
5727.90	Н	122	352	-67.20	8.76	-58.43	-45.4
7637.20	Н	237	356	-60.12	8.47	-51.65	-38.6
9546.50	Н	-	-	-65.10	9.37	-55.73	-42.7
11455.80	Н	163	76	-61.17	9.23	-51.94	-38.9
13365.10	Н	-	-	-59.98	8.93	-51.05	-38.0
15274.40	Н	-	-	-56.60	8.49	-48.11	-35.1

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

FCC ID: ZNFK300AM	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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Plot 7-173. Radiated Spurious Plot above 18GHz (Band 30)

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OPERATING FREQUENCY:	231	0.00 MHz
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	10.0	MHz
DISTANCE:	3	meters
LIMIT:	-40	dBm

	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]	Margin [dB]
l	4620.00	Н	101	344	-60.61	8.42	-52.19	-12.2
	6930.00	Н	-	-	-67.65	9.38	-58.26	-18.3
ſ	9240.00	Н	-	-	-63.78	9.46	-54.32	-14.3

Table 7-20. Radiated Spurious Data (Band 30 – Mid Channel)

FCC ID: ZNFK300AM	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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7.8 Frequency Stability / Temperature Variation

Test Overview and Limit

Frequency stability testing is performed in accordance with the guidelines of ANSI/TIA-603-E-2016. The frequency stability of the transmitter is measured by:

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

For Part 22, the frequency stability of the transmitter shall be maintained within $\pm 0.00025\%$ (± 2.5 ppm) of the center frequency. For Part 24, 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-E-2016

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

OPERATING FREQUENCY:	707,500,000	Hz
CHANNEL:	23790	
REFERENCE VOLTAGE:	4.34	VDC

VOLTAGE (%)	POWER (VDC)	ТЕМР (°С)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.34	- 30	707,500,049	49	0.0000069
100 %		- 20	707,500,146	146	0.0000206
100 %		- 10	707,500,064	64	0.0000090
100 %		0	707,499,654	-346	-0.0000489
100 %		+ 10	707,499,902	-98	-0.0000139
100 %		+ 20	707,500,047	47	0.0000066
100 %		+ 30	707,500,045	45	0.0000064
100 %		+ 40	707,500,016	16	0.0000023
100 %		+ 50	707,499,856	-144	-0.0000204
BATT. ENDPOINT	3.29	+ 20	707,499,807	-193	-0.0000273

Table 7-21. Frequency Stability Data (Band 12)

Note:

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

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Band 12 Frequency Stability Measurements

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

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Band 5 Frequency Stability Measurements

 OPERATING FREQUENCY:
 836,500,000
 Hz

 CHANNEL:
 20525

 REFERENCE VOLTAGE:
 4.34
 VDC

 DEVIATION LIMIT:
 ± 0.00025 % or 2.5 ppm

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.34	- 30	836,500,249	249	0.0000298
100 %		- 20	836,499,738	-262	-0.0000313
100 %		- 10	836,500,000	0	0.0000000
100 %		0	836,500,056	56	0.0000067
100 %		+ 10	836,499,990	-10	-0.0000012
100 %		+ 20	836,500,016	16	0.0000019
100 %		+ 30	836,499,956	-44	-0.0000053
100 %		+ 40	836,500,202	202	0.0000241
100 %		+ 50	836,499,790	-210	-0.0000251
BATT. ENDPOINT	3.29	+ 20	836,499,901	-99	-0.0000118

Table 7-22. Frequency Stability Data (Band 5)

FCC ID: ZNFK300AM	<u> PCTEST</u>	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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Figure 7-9. Frequency Stability Graph (Band 5)

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Band 4 Frequency Stability Measurements

OPERATING FREQUENCY:	1,732,500,000	Hz
CHANNEL:	20175	-
REFERENCE VOLTAGE:	4.34	VDC

VOLTAGE (%)	POWER (VDC)	ТЕМР (°С)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.34	- 30	1,732,500,001	1	0.0000001
100 %		- 20	1,732,499,742	-258	-0.0000149
100 %		- 10	1,732,499,869	-131	-0.0000076
100 %		0	1,732,499,894	-106	-0.0000061
100 %		+ 10	1,732,500,055	55	0.0000032
100 %		+ 20	1,732,499,742	-258	-0.0000149
100 %		+ 30	1,732,500,219	219	0.0000126
100 %		+ 40	1,732,499,666	-334	-0.0000193
100 %		+ 50	1,732,499,994	-6	-0.000003
BATT. ENDPOINT	3.29	+ 20	1,732,500,068	68	0.0000039

Table 7-23. 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 in-band when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

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

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Band 2 Frequency Stability Measurements

 OPERATING FREQUENCY:
 1,880,000,000
 Hz

 CHANNEL:
 18900
 Hz

 REFERENCE VOLTAGE:
 4.34
 VDC

 DEVIATION LIMIT:
 ± 0.00025 % or 2.5 ppm
 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.34	- 30	1,879,999,785	-215	-0.0000114
100 %		- 20	1,880,000,052	52	0.0000028
100 %		- 10	1,880,000,046	46	0.0000024
100 %		0	1,879,999,724	-276	-0.0000147
100 %		+ 10	1,880,000,342	342	0.0000182
100 %		+ 20	1,879,999,996	-4	-0.0000002
100 %		+ 30	1,879,999,796	-204	-0.0000109
100 %		+ 40	1,879,999,658	-342	-0.0000182
100 %		+ 50	1,879,999,904	-96	-0.0000051
BATT. ENDPOINT	3.29	+ 20	1,880,000,061	61	0.000032

Table 7-24. Frequency Stability Data (Band 2)

FCC ID: ZNFK300AM	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
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Figure 7-11. Frequency Stability Graph (Band 2)

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Band 30 Frequency Stability Measurements

 OPERATING FREQUENCY:
 2,310,000,000
 Hz

 CHANNEL:
 27710

 REFERENCE VOLTAGE:
 4.34
 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.34	- 30	2,309,999,957	-43	-0.0000019
100 %		- 20	2,310,000,078	78	0.0000034
100 %		- 10	2,310,000,078	78	0.0000034
100 %		0	2,310,000,168	168	0.0000073
100 %		+ 10	2,310,000,437	437	0.0000189
100 %		+ 20	2,309,999,974	-26	-0.0000011
100 %		+ 30	2,309,999,563	-437	-0.0000189
100 %		+ 40	2,310,000,032	32	0.0000014
100 %		+ 50	2,310,000,284	284	0.0000123
BATT. ENDPOINT	3.29	+ 20	2,310,000,121	121	0.0000052

Table 7-25. Frequency Stability Data (Band 30)

FCC ID: ZNFK300AM	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
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Band 30 Frequency Stability Measurements



Figure 7-12. Frequency Stability Graph (Band 30)

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8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the LG Portable Handset FCC ID: ZNFK300AM complies with all the requirements of Part 22, 24, & 27 of the FCC Rules for LTE operation only.

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