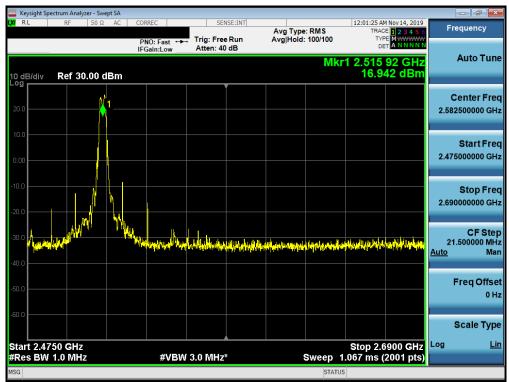


	ysight Spec		·										- 0 ×
XI R	L	RF	50 Ω	AC	CORREC		NSE:INT	#Avg Typ	e: RMS	TRAC	MNov 13, 2019 E 1 2 3 4 5 6 E M WWWW	Fre	equency
					PNO: Fast ↔ IFGain:Low	Atten: 30				D			
	3/div	Ref 2	0.00 d	Bm					Μ	kr1 2.46 -32.	9 0 GHz 82 dBm		Auto Tun
Log							Ĭ					с	enter Fre
10.0													2500000 GH
0.00													
													Start Fre
-10.0												30	.000000 MH
20.0													Stop Fre
											DL1 -25.00 dBm 1	2.475	5000000 Gł
-30.0													
-40.0									a la m	La Barra Laborata	and an induction of	244	CF Ste
-50.0	darthay	والزوائه	مبالاما					nan sa ka ka ka na ka ka ka ka Ana ka ka ka na ka		In balling A promo	a data ka ka babak	Auto	Ma
-50.0													
-60.0	<u> </u>											, r	req Offs ⁼ ۱۱
70.0													
												:	Scale Typ
Star	t 0.030	GHz								Stop 2	.475 GHz	Log	L
#Re	s BW 1	.0 MI	IZ		#VBV	V 3.0 MHz			Sweep	3.260 ms (4891 pts)		
ISG									STAT	US			

Plot 7-318. Conducted Spurious Plot (Band 41 (PC3) – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Low Channel)



Plot 7-319. Conducted Spurious Plot (Band 41 (PC3) - 20.0MHz QPSK - PCC 1/99 SCC 1/0 - Low Channel)

FCC ID: ZNFL455DL		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 190 of 250
1M1910280174-03-R2.ZNF	10/28 - 11/26/209	Portable Handset		Page 189 of 250
© 2019 PCTEST Engineering Labora	atory. Inc.	•		V 9.0 02/01/2019



	pectrum Analy											
L <mark>XI</mark> RL	RF	50 Ω	AC C	DRREC		NSE:INT	#Avg Typ	e: RMS	т	0 PM Nov 13, 2019 RACE 1 2 3 4 5 6	Fred	luency
				PNO:Fast ↔ FGain:Low	Trig: Free Atten: 30							
								Μ	kr1 14.7	47 5 GHz	A	uto Tune
10 dB/div	Ref 20).00 dl	Bm						-3	0.85 dBm		
						Ĭ					Ce	nter Fred
10.0												00000 GH
0.00											5	Start Free
-10.0												00000 GH
10.0												
-20.0											9	Stop Fred
										DL1 -25.00 dPm		00000 GHz
-30.0									ى مىلات	and the state of the state		
-40.0		أهالك وراقي	u,	and the second	ull adjuta at pach	المالية ووريقي	an a	n an an an an Anna an A Anna an Anna an A	ann a sa ta mhaile ann ann ann ann ann ann ann ann ann an	and the second		CF Step
a an	n an	and sold a	and the state of the	an a the part of the state of the	and also selected as a set	فيأفع فالزيداناس	an a	a na shafadi i na sa			1.2285 Auto	00000 GH: Mar
-50.0												
											Fr	eq Offse
-60.0												0 Hz
-70.0												
											S	cale Type
Start 2.7	15 GHz								Stop	15.000 GHz	Log	Lir
#Res BV	V 1.0 MH	z		#VBW	/ 3.0 MHz		s	weep	24.57 ms	(24571 pts)		
MSG								STA	ATUS			

Plot 7-320. Conducted Spurious Plot (Band 41 (PC3) - 20.0MHz QPSK - PCC 1/99 SCC 1/0 - Low Channel)



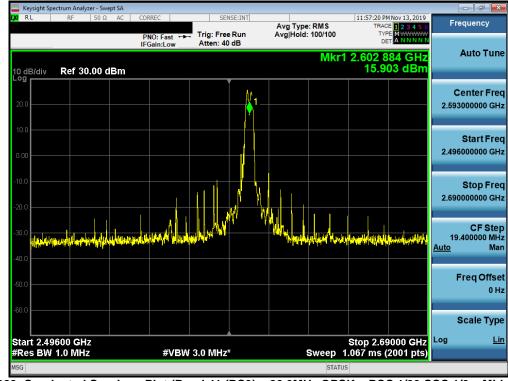
Plot 7-321. Conducted Spurious Plot (Band 41 (PC3) – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Low Channel)

FCC ID: ZNFL455DL		MEASUREMENT REPORT (CERTIFICATION)	🕑 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 100 of 250
1M1910280174-03-R2.ZNF	10/28 - 11/26/209	Portable Handset		Page 190 of 250
© 2019 PCTEST Engineering Labora	V 9.0 02/01/2019			



	ectrum Analyz		t SA									_	
L <mark>XI</mark> RL	RF	50 Ω	AC	CORREC			NSE:INT	#Avg T	ype: RMS	TRA	M Nov 13, 2019 CE 1 2 3 4 5 6	Fi	equency
				PNO: F IFGain:	ast ↔	Trig: Fre Atten: 3				די ב			
				ii Gain.						Mkr1 2.36	8 5 GHz		Auto Tune
10 dB/div	Ref 20	.00 di	3m							-38	53 dBm		
							Ĭ						Contor Erog
10.0													Center Freq 3000000 GHz
												1.20	
0.00													04
												3(Start Freq 0.000000 MHz
-10.0													
-20.0													
											DL1 -25.00 dBm	2 40	Stop Freq 6000000 GHz
-30.0												2.49	0000000 GH2
											♦ ¹		CF Step
-40.0				and.		a second dital	وتقتل أرزيان	L Installing and a light for	and the state of the state of the	in the state of the second			600000 MHz
	diama di ka					line fills of the American	instal and the state of the sta	Line to be play to shall be	التوافلادة فألدام بالرديدا	i an		<u>Auto</u>	Man
-30.0													
-60.0													Freq Offset 0 Hz
													0 H2
-70.0													
													Scale Type
Start 0.03										Stop 2	2.496 GHz	Log	<u>Lin</u>
#Res BW	1.0 MHz				#VBW	3.0 MHz				3.288 ms	(4933 pts)		
MSG									STA	TUS			

Plot 7-322. Conducted Spurious Plot (Band 41 (PC3) - 20.0MHz QPSK - PCC 1/99 SCC 1/0 - Mid Channel)



Plot 7-323. Conducted Spurious Plot (Band 41 (PC3) – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Mid Channel)

FCC ID: ZNFL455DL		MEASUREMENT REPORT (CERTIFICATION)	🕑 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 101 of 250
1M1910280174-03-R2.ZNF	10/28 - 11/26/209	Portable Handset		Page 191 of 250
© 2019 PCTEST Engineering Labora	tory. Inc.			V 9.0 02/01/2019



	ectrum Analyz		t SA											
LXI RL	RF	50 Ω	AC	CORREC			NSE:INT	#Avg T	ype: RMS		TRA	MNov 13, 2019 CE 1 2 3 4 5 6	F	requency
				PNO: Fa		Trig: Fre Atten: 30					נו			
									N	lkr1	14.87	3 0 GHz		Auto Tune
10 dB/div Log	Ref 20	.00 dE	Зm								-30	.49 dBm		
3							Ĭ							Center Freq
10.0													8.84	5000000 GHz
0.00														
0.00														Start Freq
-10.0													2.69	0000000 GHz
22.0														
-20.0												DL1 -25.00 dr	45.00	Stop Freq 0000000 GHz
-30.0													15.00	10000000 GHZ
				فلقأ بالترميدان	dist	. ا		n an	r dan hiji kan kanat	ryoholu	and the second s	Play of States and States		CF Step
-40.0	alla Alla anti di alla alla a	a periode parte 	installed a fi	unin in the second	la fisika ang	ulin ihne dent	and and a state	w. All a standard all and			anga anga a kuluta			1000000 GHz
-50.0	nd settering.												<u>Auto</u>	Man
														Freq Offset
-60.0														0 Hz
-70.0														
														Scale Type
Start 2.69	0 GHz										Stop 1	5.000 GHz	Log	<u>Lin</u>
#Res BW				#	VBW	3.0 MHz			Sweep	24.6	62 ms (1	24621 pts)		
MSG									ST	ATUS				

Plot 7-324. Conducted Spurious Plot (Band 41 (PC3) - 20.0MHz QPSK - PCC 1/99 SCC 1/0 - Mid Channel)



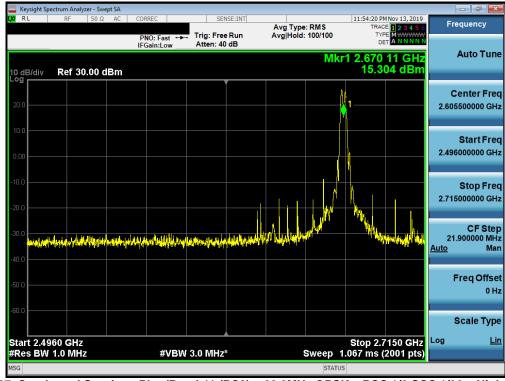
Plot 7-325. Conducted Spurious Plot (Band 41 (PC3) – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Mid Channel)

FCC ID: ZNFL455DL		MEASUREMENT REPORT (CERTIFICATION)	🕑 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 102 of 250
1M1910280174-03-R2.ZNF	10/28 - 11/26/209	Portable Handset		Page 192 of 250
© 2019 PCTEST Engineering Labora	atory. Inc.	•		V 9.0 02/01/2019



	Spectrum Analy:											
KN RL	RF	50 Ω	AC CO	RREC	SEI	NSE:INT	#Avg Typ	e: RMS		MNov 13, 2019	Fre	quency
				NO:Fast 🔸	. Trig: Free Atten: 30				TYP	PE M WWWWW ET A N N N N N		
				Gam.cow	/	48		Μ	kr1 2.38	1 5 GHz		Auto Tune
10 dB/div	Ref 20	.00 dE	3m						-37.	63 dBm		
											с С	enter Fred
10.0												000000 GHz
0.00												
												Start Freq 000000 MHz
-10.0												
-20.0												044 m E
										DL1 -25.00 dBm	2 496	Stop Frec 000000 GHz
-30.0										. 1	2.430	000000 GH
										• •		CF Step
-40.0				at is a casa cach		and the second second second second	and the Local Court	an the first				600000 MHz
-50.0	المعلم ويرائد جواري ال مريد محكمة ومحكم					فالمارية ليسابع والمراف		فللاصل المشالك ال			<u>Auto</u>	Man
30.0												
-60.0											F	req Offset 0 Hz
												0 112
-70.0												Scale Type
Start 0.0				40 (D14					Stop 2	.496 GHz	Log	Lin
	V 1.0 MHz			#VBW	3.0 MHz				3.288 ms (4933 pts)		
MSG								STAT	05			

Plot 7-326. Conducted Spurious Plot (Band 41 (PC3) – 20.0MHz QPSK – PCC 1/0 SCC 1/99 – High Channel)



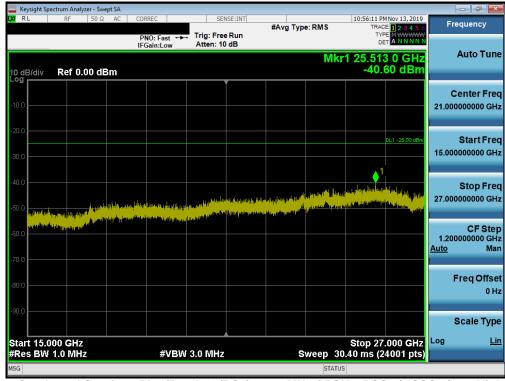
Plot 7-327. Conducted Spurious Plot (Band 41 (PC3) – 20.0MHz QPSK – PCC 1/0 SCC 1/99 – High Channel)

FCC ID: ZNFL455DL		MEASUREMENT REPORT (CERTIFICATION)	🔁 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga 102 of 250
1M1910280174-03-R2.ZNF	10/28 - 11/26/209	Portable Handset		Page 193 of 250
© 2019 PCTEST Engineering Labora	V 9.0 02/01/2019			



		nalyzer - Swe	ept SA									e X
XI RL	RF	50 Ω	AC	CORREC PNO: Fast		e Run	#Avg Typ	e:RMS	TRA	PM Nov 13, 2019 CE 1 2 3 4 5 6 PE M WWWWW ET A N N N N N	Frequer	псу
10 dB/div	Ref	20.00 d	Bm	IFGain:Low	Atten: 3	0 dB		Μ	kr1 14.74		Auto	Tune
10.0											Cente 8.8575000	
-10.0											Star 2.7150000	rtFree 00 GH
-20.0										DL1 -25,00 d ^a m	Sto 15.0000000	р Fre 00 GH
-40.0	llyyy ¹¹ raj or Storo th blan	a a a constant a const A constant a	an an taint	talje _{no mo} tifeti kiniste natione nativeti state	n din selati na kana ka pana ka Na ka pana ka p	n ya kanang sa kana Ya mata kana kata ang ka	par ann an thainn phraing pr	a gilang tangka da manang tangga ta	a landi setet lana ayadan te 1994 - Angel Salayan ayadan te		C 1.2285000 <u>Auto</u>	F Stej 00 GH Ma
-60.0											Freq	Offse 0 H
-70.0	715 GH	z							Stop 1	5.000 GHz		e Type <u>Lii</u>
#Res B	V 1.0 N	IHz		#VE	W 3.0 MHz		S	weep	24.57 ms (2	24571 pts)		
MSG								STA	TUS			

Plot 7-328. Conducted Spurious Plot (Band 41 (PC3) - 20.0MHz QPSK - PCC 1/0 SCC 1/99 - High Channel)



Plot 7-329. Conducted Spurious Plot (Band 41 (PC3) – 20.0MHz QPSK – PCC 1/0 SCC 1/99 – High Channel)

FCC ID: ZNFL455DL		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager				
Test Report S/N:	Test Dates:	EUT Type:		Dogo 104 of 250				
1M1910280174-03-R2.ZNF	10/28 - 11/26/209	Portable Handset		Page 194 of 250				
© 2019 PCTEST Engineering Laboratory, Inc.								



SENSE:INT 10:48:36 PM Nov 13, 2019 Center Freq: 2.50600000 GHz Radio Std: None Trig: Free Run #Atten: 26 dB Radio Device: BTS	Center Fr		= 50 Ω AC	C-t	ASS
		Bm	Ref 40.00 dl	3/div	10 dB/
Center 2.50600000					- og 30.0 - 20.0 -
					0.00 - 10.0 - 20.0 -
				t 2.475 G	40.0 50.0
Stop 2.55 GHz CF 5.00000			ΠZ	L 2.475 G	Start
RBW Frequency Amplitude ALimit Auto	RBW Fr	Stop Freq	Start Freq	Range	Spur
1.000 MHz 2.479159167 GHz -34.62 dBm -9.623 dB					1
1.000 MHz 2.490635000 GHz -34.59 dB -21.59 dB Freq C					2
390.0 kHz 2.495633333 GHz -37.65 dBm -24.65 dB					3
390.0 kHz 2.502210000 GHz 1.972 dBm -23.03 dB	90.0 kHz 2.5	2.5500 GHz	2.4960 GHz	4	4
STATUS					ISG

Table 7-330. Lower ACP Plot (Band 41 (PC3) QPSK – PCC:20 MHz SCC:20 MHz – Full RB)

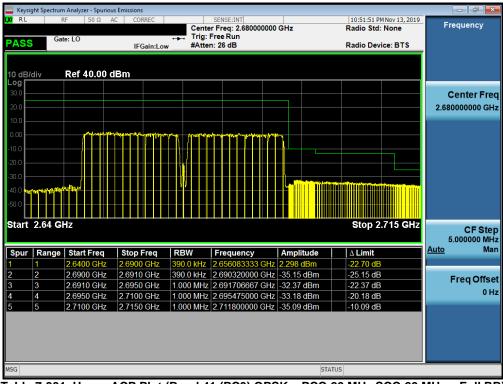


Table 7-331. Upper ACP Plot (Band 41 (PC3) QPSK – PCC:20 MHz SCC:20 MHz – Full RB)

FCC ID: ZNFL455DL		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 105 of 250
1M1910280174-03-R2.ZNF	10/28 - 11/26/209	Portable Handset		Page 195 of 250
© 2019 PCTEST Engineering Labora	atory. Inc.	·		V 9.0 02/01/2019



Uplink CA Configuration B41 (PC2)

				PCC							SCC				Power
Power State	PCC Band	PCC Bandwidth [MHz]	PCC (UL) Channel	PCC (UL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	SCC Band	SCC Bandwidth [MHz]	SCC (UL) Channel	SCC (UL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	ULCA Tx.Power (dBm)
Max	LTE B41	20	39750	2506	QPSK	1	99	LTE B41	20	39948	2525.8	QPSK	1	0	25.28
Max	LTE B41	20	40620	2593	QPSK	1	99	LTE B41	20	40818	2612.8	QPSK	1	0	25.52
Max	LTE B41	20	41490	2680	QPSK	1	0	LTE B41	20	41292	2660.2	QPSK	1	99	25.22

Table 7-6. Conducted Powers (B41 (PC2) - 20MHz + 20MHz Channel Bandwidth - PCC/SCC: 1RB)

				PCC							SCC				Power
Power State	PCC Band	PCC Bandwidth [MHz]	PCC (UL) Channel	PCC (UL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	SCC Band	SCC Bandwidth [MHz]	SCC (UL) Channel	Frequency	Modulation	PCC UL# RB	PCC UL RB Offset	ULCA Tx.Power (dBm)
Max	LTE B41	20	40620	2593	QPSK	100	0	LTE B41	20	40818	2612.8	QPSK	100	0	23.50
Max	LTE B41	20	40620	2593	16-QAM	100	0	LTE B41	20	40818	2612.8	16-QAM	100	0	22.52
Max	LTE B41	20	40620	2593	64-QAM	100	0	LTE B41	20	40818	2612.8	64-QAM	100	0	22.44

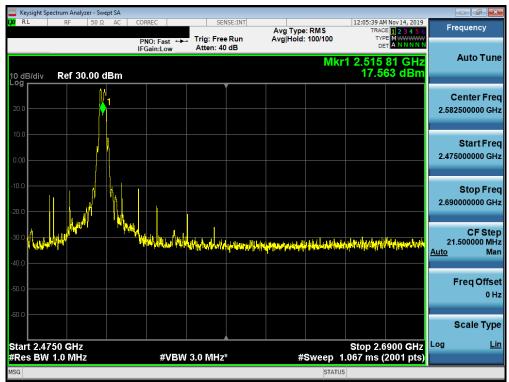
Table 7-7. Conducted Powers (B41 (PC2) with Various Combinations for 20MHz + 20MHz Channel Bandwidth)

FCC ID: ZNFL455DL		MEASUREMENT REPORT (CERTIFICATION)	🔁 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 100 of 250
1M1910280174-03-R2.ZNF	10/28 - 11/26/209	Portable Handset		Page 196 of 250
© 2019 PCTEST Engineering Labora	tory. Inc.	·		V 9.0 02/01/2019



Keysight Spectrum Analyze	r - Swept SA 50 Ω AC	CORREC	SENSE:INT		11:08:26 PM Nov 13, 2019	
	JUSZ AC	PNO: Fast ++	Tain Face Due	#Avg Type: RMS	TRACE 1 2 3 4 5 6 TYPE MWWWWW DET A NNNNN	Frequency
10 dB/div Ref 20.	00 dBm	IFGain:Low	Atten: 30 dB	N	lkr1 2.475 0 GHz -35.06 dBm	Auto Tun
10.0						Center Fre 1.252500000 GH
-10.0						Start Fre 30.000000 M⊦
-20.0					DL1 -25.00 dBm	Stop Fre 2.475000000 GH
-40.0		ter fan de ser flit útsterne sein	le a different johan er forskalt den anten hit Anten provinser forskalt for som provinser	han har an	n, kanana da kata kata kata kata kata kata kata	CF Ste 244.500000 MH <u>Auto</u> Ma
60.0						Freq Offs 0 I
-70.0						Scale Typ
Start 0.030 GHz #Res BW 1.0 MHz		#VBW	3.0 MHz	Sweep	Stop 2.475 GHz 3.260 ms (4891 pts)	Log <u>L</u>
MSG				STAT		

Plot 7-332. Conducted Spurious Plot (Band 41 (PC2) – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Low Channel)



Plot 7-333. Conducted Spurious Plot (Band 41 (PC2) - 20.0MHz QPSK - PCC 1/99 SCC 1/0 - Low Channel)

FCC ID: ZNFL455DL		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 107 of 250
1M1910280174-03-R2.ZNF	10/28 - 11/26/209	Portable Handset		Page 197 of 250
© 2019 PCTEST Engineering Labora	atory. Inc.			V 9.0 02/01/2019



	ctrum Analyzer - Sv	vept SA								-	d X
L <mark>XI</mark> RL	RF 50 S	2 AC CC	DRREC	SEI	NSE:INT	#Avg Typ	e: RMS		M Nov 13, 2019 CE 1 2 3 4 5 6	Freque	ency
			PNO:Fast ↔ Gain:Low	, Trig: Free Atten: 30				T	PE MWWWWW ET ANNNNN		
			-Gain:Low	Atten. st	U GB		М	kr1 14.67		Aut	o Tune
10 dB/div	Ref 20.00	dBm						-30	67 dBm		_
)	Í						-
10.0										Cent 8.845000	er Freq
10.0										8.845000	000 GHZ
0.00											
											art Freq
-10.0										2.690000	000 GHz
-20.0									DL1 -25.00 d ^m -		op Freq
-30.0										15.000000	000 GHz
							الم السر ال	golandi, Aliana gildania	Lan And International Street		
-40.0	al and the strategy of the state of the stat		al _{be} gildes by abo	he first the second	en provinsional	an <mark>Angel (1911) (</mark> 1919) Tanang (1911)		and the life of the second		C 1.231000	F Step
and the second second		la piteras de la fateladad	a painte de la	a na sana ang sa	فيع اللطفينا إذار والمدالي م	(Instrumption of	, maile el			Auto	Man
-50.0											
										Fred	Offset
-60.0											0 Hz
-70.0											
										Sca	Іе Туре
Start 2.69								Stop 44	5 000 CH-	Log	Lin
#Res BW	1.0 MHz		#VBW	/ 3.0 MHz		s	weep	24.62 ms (2	7.000 GUIZ		
MSG								TUS			

Plot 7-334. Conducted Spurious Plot (Band 41 (PC2) - 20.0MHz QPSK - PCC 1/99 SCC 1/0 - Low Channel)



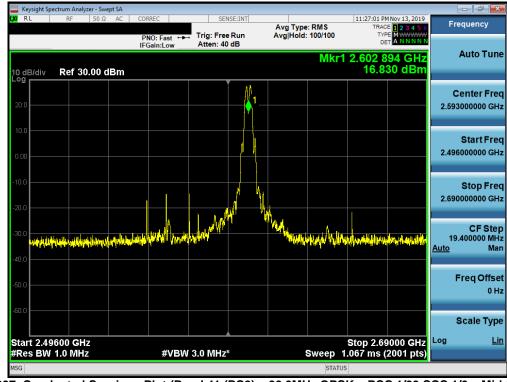
Plot 7-335. Conducted Spurious Plot (Band 41 (PC2) – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Low Channel)

FCC ID: ZNFL455DL		MEASUREMENT REPORT (CERTIFICATION)	🕑 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 109 of 250
1M1910280174-03-R2.ZNF	10/28 - 11/26/209	Portable Handset		Page 198 of 250
© 2019 PCTEST Engineering Labora	atory. Inc.	·		V 9.0 02/01/2019



🔤 Keysight Spectrum A	nalyzer - Swept S	A									
lxi rl RF	50 Ω A	C CORRE	C	SEN	ISE:INT	#Avg Typ	e: RMS		MNov 13, 2019	Fre	quency
			Fast 🔸	Trig: Free Atten: 30				TY			
		IFGai	n:Low	Atten: 30	ab		M	kr1 2.27			Auto Tune
10 dB/div Ref	20.00 dBr	m					IVI		4 5 GHZ 15 dBm		
	20.00 001										
										С	enter Freq
10.0										1.263	000000 GHz
0.00											
0.00											Start Freq
-10.0										30.	000000 MHz
-20.0											Stop Freq
									DL1 -25.00 dBm		000000 GHz
-30.0									<u>^1</u>		
											CF Step
-40.0					ورالتليل وريابا وي	i and the state	and the first of the last	गभू विकास का			600000 MHz
-50,0		International International			Baker, pillance	ل التقول العام المناطق من ا	التعقر معافدته وطعرا	n ff fræti. men for som		<u>Auto</u>	Man
30.0											
-60.0										F	req Offset
											0 Hz
-70.0											
										S	scale Type
Start 0.030 GH	z							Stop 2	.496 GHz	Log	<u>Lin</u>
#Res BW 1.0 N			#VBW	3.0 MHz			Sweep	3.288 ms (4933 pts)		
MSG							STATI	JS			

Plot 7-336. Conducted Spurious Plot (Band 41 (PC2) - 20.0MHz QPSK - PCC 1/99 SCC 1/0 - Mid Channel)



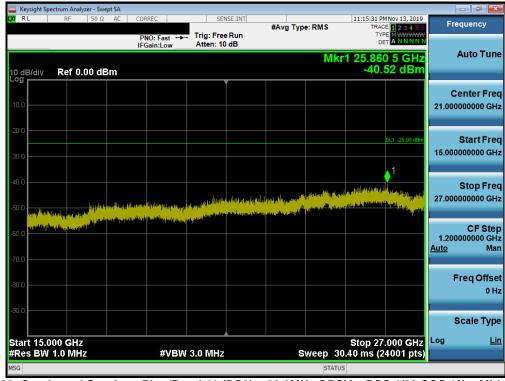
Plot 7-337. Conducted Spurious Plot (Band 41 (PC2) - 20.0MHz QPSK - PCC 1/99 SCC 1/0 - Mid Channel)

FCC ID: ZNFL455DL		MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga 100 of 250
1M1910280174-03-R2.ZNF	10/28 - 11/26/209	Portable Handset		Page 199 of 250
© 2019 PCTEST Engineering Labora	tory. Inc.			V 9.0 02/01/2019



	ectrum Analyzer	- Swept SA									d X
LXI RL	RF	50Ω AC	CORREC		NSE:INT	#Avg Typ	e: RMS	т	4 PM Nov 13, 2019 RACE 1 2 3 4 5 6	Frequen	псу
			PNO: Fast ++ IFGain:Low	, Trig: Free Atten: 30							
			in Gamicow				Μ	kr1 14.7	42 0 GHz	Auto	Tune
10 dB/div	Ref 20.0)0 dBm						-3	0.97 dBm		
				Ì						Cente	r Fred
10.0										8.8450000	
0.00										Star	tFreq
-10.0										2.69000000	
-10.0											
-20.0										Stor	p Freq
									DL1 -25.00 dPm	15.00000000	
-30.0											
-40.0		التقريبيان وفرا	and weather the first of the former of the	and the design of the latest	and the second second	al characterization of the second s	Prop I Block	Contraction (1) Solids	ninga janga sa		F Step
All the to de to		ر الأنسالية يعرين	and a second strain of the second	and the second second	and the second states of the second	a an dan dalam dalam New York (New York (Ne	and a light had	et and he same a		1.2310000 Auto	00 GHz Man
-50.0	n										
										Freq	Offset
-60.0											0 Hz
-70.0											
										Scale	е Туре
Start 2.69	0 GHz			<u> </u>				Stop	15.000 GHz	Log	Lin
#Res BW			#VBW	/ 3.0 MHz		S	weep	24.62 ms	(24621 pts)		
MSG							ST/	ATUS			

Plot 7-338. Conducted Spurious Plot (Band 41 (PC2) - 20.0MHz QPSK - PCC 1/99 SCC 1/0 - Mid Channel)



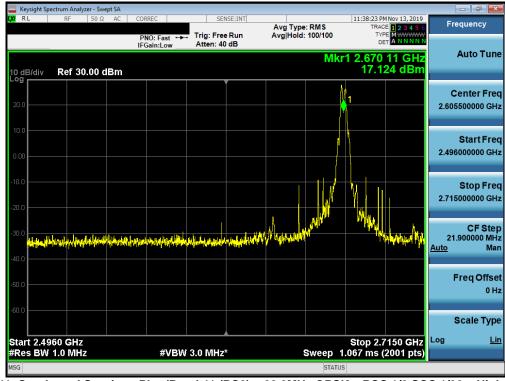
Plot 7-339. Conducted Spurious Plot (Band 41 (PC2) – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Mid Channel)

FCC ID: ZNFL455DL		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 200 of 250
1M1910280174-03-R2.ZNF	10/28 - 11/26/209	Portable Handset		Page 200 of 250
© 2019 PCTEST Engineering Labora	atory. Inc.	·		V 9.0 02/01/2019



	trum Analyzer - Sw	/ept SA									
lxi rl	RF 50 Ω	AC C	ORREC	SEN	ISE:INT	#Avg Typ	e: RMS	TRA	M Nov 13, 2019 CE 1 2 3 4 5 6	Freque	ncy
			PNO: Fast ↔ FGain:Low	. Trig: Free Atten: 30				TY	PE MWWWWW ET A NNNNN		
			FGain:Low	Atten: 00			N	lkr1 2.33	8 0 GH7	Aut	o Tune
10 dB/div Log	Ref 20.00	dBm						-39.	09 dBm		
)						Cent	er Freq
10.0										1.2630000	
0.00										Sta	rt Freq
-10.0											000 MHz
-10.0											
-20.0										Sto	p Freq
									DL1 -25.00 dBm	2.4960000	
-30.0									. 1		
-40.0									l ∳ ¹		F Step
-40.0	الالالية وطلالا		Leavelder to Lea	advant i sti kalt	الأسخا والتنبع	a da kasa a ka da			allenties entre service Allenties entre service	246.6000 Auto	000 MHz Man
-50.0 -50.0		الأفتدار والاروها وال	di Andulia dalla di at	an hai ji kiki katala	م يوند الارتيانية ال	line					Marr
										Fred	Offset
-60.0											0 Hz
-70.0											
										Scal	е Туре
Start 0.030								Oton 1	2.496 GHz	Log	Lin
#Res BW 1			#VBW	3.0 MHz			Sweep	3.288 ms ((4933 pts)		<u>em</u>
MSG							STAT				

Plot 7-340. Conducted Spurious Plot (Band 41 (PC2) – 20.0MHz QPSK – PCC 1/0 SCC 1/99 – High Channel)



Plot 7-341. Conducted Spurious Plot (Band 41 (PC2) - 20.0MHz QPSK - PCC 1/0 SCC 1/99 - High Channel)

FCC ID: ZNFL455DL		MEASUREMENT REPORT (CERTIFICATION)	🔁 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga 201 of 250
1M1910280174-03-R2.ZNF	10/28 - 11/26/209	Portable Handset		Page 201 of 250
© 2019 PCTEST Engineering Labora	atory. Inc.			V 9.0 02/01/2019



	ectrum Analyze									- F	×
LXI RL	RF	50 Ω AC	CORREC		NSE:INT	#Avg Typ	e: RMS	TRA	M Nov 13, 2019 CE 1 2 3 4 5 6	Frequency	
			PNO: Fast ↔ IFGain:Low	Trig: Free Atten: 30				TY D	ET A N N N N N		
							М	kr1 14.61	5 5 GHz	Auto Tu	Ine
10 dB/div Log	Ref 20.	00 dBm						-31.	17 dBm		
9					Í					Center F	req
10.0										8.857500000	GHz
0.00											
0.00										Start Fi	
-10.0										2.715000000 0	GHz
-20.0									DL1 -25.00 dBm	Stop Fi	
-30.0										15.000000000	энz
			متواط والمحمور والمواري	alate tetra a matri	أراله برمير الر	, and the second second	alas delastas		Lings South Association	CF St	ten
-40.0 mp.16"ph	all all house a little	a national a second a	and the state of the state of the state	n ang san akina na sa	and the second	, and a subsection of the	المعار والمريان	n dini ni king pangahiti kina		1.228500000 0	GHİZ
-50.0 h^{allin}	No. Marine provide	alle and the first first statements								<u>Auto</u> N	Man
										Freq Off	set
-60.0) Hz
-70.0											
										Scale Ty	/pe
Start 2.71	15 GHz							Stop 15	.000 GHz	Log	Lin
#Res BW			#VBV	V 3.0 MHz		S	weep	24.57 ms (2	24571 pts)		
MSG							STA	TUS			

Plot 7-342. Conducted Spurious Plot (Band 41 (PC2) - 20.0MHz QPSK - PCC 1/0 SCC 1/99 - High Channel)



Plot 7-343. Conducted Spurious Plot (Band 41 (PC2) – 20.0MHz QPSK – PCC 1/0 SCC 1/99 – High Channel)

FCC ID: ZNFL455DL		MEASUREMENT REPORT (CERTIFICATION)	🕑 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga 202 of 250
1M1910280174-03-R2.ZNF	10/28 - 11/26/209	Portable Handset		Page 202 of 250
© 2019 PCTEST Engineering Labora	atory, Inc.	·		V 9.0 02/01/2019



	ectrum Analyzer - Spu						- d ×
PASS	RF 50 Ω Gate: LO	NFE	Trig:	SENSE:INT er Freq: 2.506000000 Free Run en: 26 dB	GHz	05:55:18 PM Nov 14, 2019 Radio Std: None Radio Device: BTS	Frequency
PASS		IFGain:L	ow #Atte	en: 26 dB		Radio Device: BTS	
10 dB/div	Ref 40.0	0 dBm					
Log	Kei 40.00						
30.0							Center Freq
20.0							2.506000000 GHz
10.0							
0.00			ጓ ጦ ጦ ጦ ሶ	1 m m m m m m	MUUUU	ነካበጠጠጠ	
-10.0							
-20.0							
-30.0	INTERNETE DE LE CONTRACE			*		1	
-40.0							
-50.0							
Start 2.4	75 GHz					Stop 2.541 GHz	CF Step
							5.000000 MHz
Spur Ra	nge Start Fred	Stop Freq	RBW	Frequency	Amplitude	∆ Limit	<u>Auto</u> Man
1 1	2.4750 GH	z 2.4905 GHz		2.487735833 GHz		-2.915 dB	
2 2	2.4905 GH			2.493815000 GHz		-14.33 dB	Freq Offset
3 3	2.4950 GH			2.495193333 GHz		-52.11 dB	0 Hz
4 4	2.4960 GH	z 2.5410 GHz	390.0 kHz	2.497500000 GHz	4.580 dBm	-20.42 dB	0112
					STAT		

Table 7-344. Lower ACP Plot (Band 41 (PC2) QPSK - PCC:20 MHz SCC:20 MHz - Full RB)

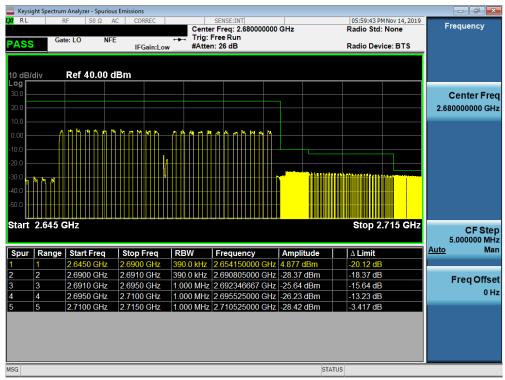


Table 7-345. Upper ACP Plot (Band 41 (PC2) QPSK – PCC:20 MHz SCC:20 MHz – Full RB)

FCC ID: ZNFL455DL		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga 202 of 250
1M1910280174-03-R2.ZNF	10/28 - 11/26/209	Portable Handset		Page 203 of 250
© 2019 PCTEST Engineering Labora	tory. Inc.	·		V 9.0 02/01/2019



7.8 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 \geq 3 x RBW
- 4. Span = 1.5 times the OBW
- 5. No. of sweep points \geq 2 x span / RBW
- 6. Detector = RMS
- 7. Trigger is set to "free run" for signals with continuous operation with the sweep times set to "auto".
- 8. The integration bandwidth was roughly set equal to the measured OBW of the signal for signals with continuous operation.
- 9. Trace mode = trace averaging (RMS) over 100 sweeps
- 10. The trace was allowed to stabilize

FCC ID: ZNFL455DL		MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 204 of 250
1M1910280174-03-R2.ZNF	10/28 - 11/26/209	Portable Handset		Page 204 of 250
© 2019 PCTEST Engineering Labora	tory. Inc.	·		V 9.0 02/01/2019



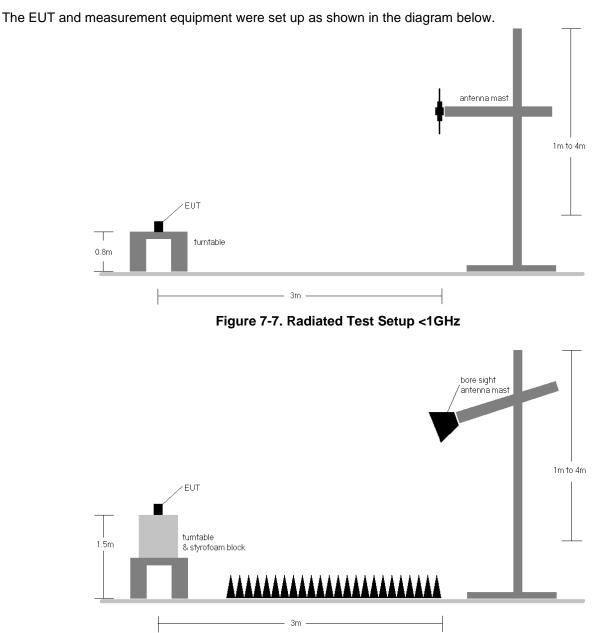


Figure 7-8. Radiated Test Setup >1GHz

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.

FCC ID: ZNFL455DL		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 205 of 250
1M1910280174-03-R2.ZNF	10/28 - 11/26/209	Portable Handset	Page 205 of 250
© 2019 PCTEST Engineering Labora			V 9.0 02/01/2019

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]
665.50	5	QPSK	н	142	97	1 / 24	18.62	2.90	19.37	0.086	34.77	-15.40
680.50	5	QPSK	н	143	94	1 / 24	17.84	3.20	18.89	0.077	34.77	-15.88
695.50	5	QPSK	н	144	96	1 / 0	18.51	3.30	19.66	0.092	34.77	-15.11
695.50	5	16-QAM	н	144	96	1 / 0	18.17	3.30	19.32	0.086	34.77	-15.45
695.50	5	64-QAM	Н	144	96	1 / 0	17.11	3.30	18.26	0.067	34.77	-16.51
668.00	10	QPSK	Н	139	91	1 / 49	18.53	2.90	19.28	0.085	34.77	-15.49
680.50	10	QPSK	Н	141	92	1 / 49	17.66	3.20	18.71	0.074	34.77	-16.06
693.00	10	QPSK	Н	140	94	1 / 0	18.49	3.30	19.64	0.092	34.77	-15.13
693.00	10	16-QAM	Н	140	94	1 / 0	17.97	3.30	19.12	0.082	34.77	-15.65
693.00	10	64-QAM	н	140	94	1 / 0	17.05	3.30	18.20	0.066	34.77	-16.57
670.50	15	QPSK	Н	140	95	1 / 74	18.40	3.00	19.25	0.084	34.77	-15.52
680.50	15	QPSK	Н	141	92	1 / 74	17.96	3.20	19.01	0.080	34.77	-15.76
690.50	15	QPSK	Н	139	94	1 / 0	18.30	3.30	19.45	0.088	34.77	-15.32
690.50	15	16-QAM	н	139	94	1 / 0	17.59	3.30	18.74	0.075	34.77	-16.03
690.50	15	64-QAM	н	139	94	1 / 0	16.59	3.30	17.74	0.059	34.77	-17.03
673.00	20	QPSK	Н	138	93	1 / 99	18.33	3.10	19.28	0.085	34.77	-15.49
680.50	20	QPSK	Н	137	98	1 / 99	17.89	3.20	18.94	0.078	34.77	-15.83
688.00	20	QPSK	Н	138	92	1 / 0	18.23	3.30	19.38	0.087	34.77	-15.39
688.00	20	16-QAM	Н	138	92	1 / 0	17.54	3.30	18.69	0.074	34.77	-16.08
688.00	20	64-QAM	Н	138	92	1 / 0	16.56	3.30	17.71	0.059	34.77	-17.06
695.50	5	QPSK	V	185	322	1 / 99	16.92	4.40	19.17	0.083	34.77	-15.60

Table 7-8. ERP Data (Band 71)

FCC ID: ZNFL455DL		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 206 of 250
1M1910280174-03-R2.ZNF	10/28 - 11/26/209	Portable Handset		Page 206 of 250
© 2019 PCTEST Engineering Labora	tory. Inc.			V 9.0 02/01/2019

PCT	PCTEST															
ENGINEERING L	ABORATORY, INC.															
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]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
699.70	1.4	QPSK	V	162	320	1/0	20.55	4.50	22.90	0.195	34.77	-11.87	25.05	0.320	36.99	-11.94
707.50	1.4	QPSK	V	171	311	1/0	20.39	4.60	22.84	0.192	34.77	-11.93	24.99	0.316	36.99	-12.00
715.30	1.4	QPSK	V	154	328	1/0	20.38	4.63	22.86	0.193	34.77	-11.91	25.01	0.317	36.99	-11.98
699.70	1.4	16-QAM	V	162	320	1/0	19.65	4.50	22.00	0.158	34.77	-12.77	24.15	0.260	36.99	-12.84
699.70	1.4	64-QAM	V	162	320	1/0	18.45	4.50	20.80	0.120	34.77	-13.97	22.95	0.197	36.99	-14.04
700.50	3	QPSK	V	164	318	1/0	20.25	4.55	22.65	0.184	34.77	-12.12	24.80	0.302	36.99	-12.19
707.50	3	QPSK	V	175	308	1/0	20.31	4.60	22.76	0.189	34.77	-12.01	24.91	0.310	36.99	-12.08
714.50	3	QPSK	V	156	330	1/0	20.35	4.60	22.80	0.191	34.77	-11.97	24.95	0.313	36.99	-12.04
714.50	3	16-QAM	V	156	330	1/0	19.49	4.60	21.94	0.156	34.77	-12.83	24.09	0.256	36.99	-12.90
714.50	3	64-QAM	V	156	330	1/0	18.55	4.60	21.00	0.126	34.77	-13.77	23.15	0.207	36.99	-13.84
701.50	5	QPSK	V	172	321	1/0	20.34	4.60	22.79	0.190	34.77	-11.98	24.94	0.312	36.99	-12.05
707.50	5	QPSK	V	178	310	1/0	20.42	4.60	22.87	0.194	34.77	-11.90	25.02	0.318	36.99	-11.97
713.50	5	QPSK	V	153	328	1/0	20.33	4.60	22.78	0.190	34.77	-11.99	24.93	0.311	36.99	-12.06
707.50	5	16-QAM	V	178	310	1/0	19.57	4.60	22.02	0.159	34.77	-12.75	24.17	0.261	36.99	-12.82
707.50	5	64-QAM	V	178	310	1/0	18.53	4.60	20.98	0.125	34.77	-13.79	23.13	0.206	36.99	-13.86
704.00	10	QPSK	V	168	319	1/0	18.37	4.50	20.72	0.118	34.77	-14.05	22.87	0.194	36.99	-14.12
707.50	10	QPSK	V	179	306	1/0	17.54	4.60	19.99	0.100	34.77	-14.78	22.14	0.164	36.99	-14.85
711.00	10	QPSK	V	154	326	1/0	17.52	4.60	19.97	0.099	34.77	-14.80	22.12	0.163	36.99	-14.87
704.00	10	16-QAM	V	168	319	1/0	17.43	4.50	19.78	0.095	34.77	-14.99	21.93	0.156	36.99	-15.06
704.00	10	64-QAM	V	168	319	1/0	16.10	4.50	18.45	0.070	34.77	-16.32	20.60	0.115	36.99	-16.39
699.70	1.4	QPSK	н	278	158	1/0	17.81	3.50	19.16	0.082	34.77	-15.61	21.31	0.135	36.99	-15.68

Table 7-9. ERP Data (Band 12)

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]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
779.50	5	QPSK	н	241	304	1 / 0	16.68	5.80	20.33	0.108	34.77	-14.44	22.48	0.177	36.99	-14.51
782.00	5	QPSK	н	250	303	1 / 0	16.23	5.80	19.88	0.097	34.77	-14.89	22.03	0.160	36.99	-14.96
784.50	5	QPSK	н	237	302	1/0	16.76	5.90	20.51	0.112	34.77	-14.26	22.66	0.185	36.99	-14.33
784.50	5	16-QAM	н	237	302	1/0	16.07	5.90	19.82	0.096	34.77	-14.95	21.97	0.157	36.99	-15.02
784.50	5	64-QAM	н	237	302	1/0	14.84	5.90	18.59	0.072	34.77	-16.18	20.74	0.119	36.99	-16.25
782.00	10	QPSK	н	261	285	1/0	16.36	5.80	20.01	0.100	34.77	-14.76	22.16	0.164	36.99	-14.83
782.00	10	16-QAM	н	261	285	1 / 0	15.83	5.80	19.48	0.089	34.77	-15.29	21.63	0.146	36.99	-15.36
782.00	10	64-QAM	н	261	285	1/0	14.76	5.80	18.41	0.069	34.77	-16.36	20.56	0.114	36.99	-16.43
784.50	5	QPSK	۷	141	151	1/0	15.13	5.80	18.78	0.076	34.77	-15.99	20.93	0.124	36.99	-16.06

Table 7-10. ERP Data (Band 13)

FCC ID: ZNFL455DL		MEASUREMENT REPORT (CERTIFICATION)	🕞 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 207 of 250
1M1910280174-03-R2.ZNF	10/28 - 11/26/209	Portable Handset		Page 207 of 250
© 2019 PCTEST Engineering Labora	atory. Inc.			V 9.0 02/01/2019

PCT																
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]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
824.70	1.4	QPSK	н	204	160	1/5	18.25	6.70	22.80	0.191	38.45	-15.65	24.95	0.313	40.61	-15.66
836.50	1.4	QPSK	н	210	158	1/0	17.86	6.70	22.41	0.174	38.45	-16.04	24.56	0.286	40.61	-16.05
848.30	1.4	QPSK	н	202	166	1/0	17.96	6.70	22.51	0.178	38.45	-15.94	24.66	0.292	40.61	-15.95
824.70	1.4	16-QAM	Н	204	160	1/5	17.19	6.70	21.74	0.149	38.45	-16.71	23.89	0.245	40.61	-16.72
824.70	1.4	64-QAM	н	204	160	1/5	16.45	6.70	21.00	0.126	38.45	-17.45	23.15	0.207	40.61	-17.46
825.50	3	QPSK	н	198	159	1 / 14	18.12	6.70	22.67	0.185	38.45	-15.78	24.82	0.303	40.61	-15.79
836.50	3	QPSK	н	204	162	1/0	17.98	6.70	22.53	0.179	38.45	-15.92	24.68	0.294	40.61	-15.93
847.50	3	QPSK	н	209	168	1/0	18.12	6.65	22.62	0.183	38.45	-15.83	24.77	0.300	40.61	-15.84
825.50	3	16-QAM	н	198	159	1 / 14	17.31	6.70	21.86	0.153	38.45	-16.59	24.01	0.252	40.61	-16.60
825.50	3	64-QAM	н	198	159	1 / 14	16.34	6.70	20.89	0.123	38.45	-17.56	23.04	0.201	40.61	-17.57
826.50	5	QPSK	н	202	162	1 / 24	18.16	6.70	22.71	0.187	38.45	-15.74	24.86	0.306	40.61	-15.75
836.50	5	QPSK	н	207	160	1/0	18.21	6.70	22.76	0.189	38.45	-15.69	24.91	0.310	40.61	-15.70
846.50	5	QPSK	н	204	164	1/0	18.35	6.60	22.80	0.191	38.45	-15.65	24.95	0.313	40.61	-15.66
846.50	5	16-QAM	н	204	164	1/0	17.49	6.60	21.94	0.156	38.45	-16.51	24.09	0.256	40.61	-16.52
846.50	5	64-QAM	н	204	164	1/0	16.55	6.60	21.00	0.126	38.45	-17.45	23.15	0.207	40.61	-17.46
829.00	10	QPSK	н	211	157	1 / 49	18.23	6.70	22.78	0.190	38.45	-15.67	24.93	0.311	40.61	-15.68
836.50	10	QPSK	н	206	161	1/0	18.32	6.70	22.87	0.194	38.45	-15.58	25.02	0.318	40.61	-15.59
844.00	10	QPSK	н	208	159	1/0	18.33	6.60	22.78	0.190	38.45	-15.67	24.93	0.311	40.61	-15.68
844.00	10	16-QAM	н	208	159	1/0	17.59	6.60	22.04	0.160	38.45	-16.41	24.19	0.262	40.61	-16.42
844.00	10	64-QAM	н	208	159	1/0	16.58	6.60	21.03	0.127	38.45	-17.42	23.18	0.208	40.61	-17.43
836.50	10	QPSK	V	115	4	1/0	13.45	6.70	18.00	0.063	38.45	-20.45	20.15	0.104	40.61	-20.46

Table 7-11. ERP Data (Band 26/5)

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]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
831.50	15	QPSK	н	209	160	1 / 74	14.09	6.70	18.64	0.073	38.45	-19.81	20.79	0.120	40.61	-19.82
836.50	15	QPSK	н	205	161	1 / 0	14.19	6.70	18.74	0.075	38.45	-19.71	20.89	0.123	40.61	-19.72
841.50	15	QPSK	н	205	162	1/0	14.63	6.60	19.08	0.081	38.45	-19.37	21.23	0.133	40.61	-19.38
841.50	15	16-QAM	н	205	162	1/0	13.64	6.60	18.09	0.064	38.45	-20.36	20.24	0.106	40.61	-20.37
841.50	15	64-QAM	н	205	162	1/0	12.79	6.60	17.24	0.053	38.45	-21.21	19.39	0.087	40.61	-21.22

Table 7-12. ERP Da ta (Band 26)

FCC ID: ZNFL455DL		MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 200 of 250
1M1910280174-03-R2.ZNF	10/28 - 11/26/209	Portable Handset		Page 208 of 250
© 2019 PCTEST Engineering Labora	tory. Inc.			V 9.0 02/01/2019

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]	EIRI Limi [dBn
1710.70	1.4	QPSK	н	140	27	1 / 0	15.02	9.44	24.46	0.279	30.0
1745.00	1.4	QPSK	Н	142	30	1 / 0	15.13	9.23	24.36	0.273	30.0
1779.30	1.4	QPSK	Н	117	25	1 / 5	15.04	9.26	24.30	0.269	30.0
1710.70	1.4	16-QAM	н	140	27	1 / 0	14.08	9.44	23.52	0.225	30.0
1710.70	1.4	64-QAM	Н	140	27	1 / 0	13.08	9.44	22.52	0.179	30.0
1711.50	3	QPSK	н	136	31	1 / 0	15.06	9.44	24.50	0.282	30.0
1745.00	3	QPSK	Н	133	32	1 / 0	15.03	9.23	24.26	0.267	30.0
1778.50	3	QPSK	Н	111	29	1 / 14	15.05	9.26	24.31	0.270	30.0
1711.50	3	16-QAM	Н	136	31	1 / 0	14.15	9.44	23.59	0.228	30.0
1711.50	3	64-QAM	Н	136	31	1 / 0	13.17	9.44	22.61	0.182	30.0
1712.50	5	QPSK	Н	138	28	1 / 0	15.16	9.43	24.59	0.288	30.
1745.00	5	QPSK	н	146	29	1 / 0	14.93	9.23	24.16	0.261	30.
1777.50	5	QPSK	Н	114	27	1 / 24	15.09	9.26	24.35	0.272	30.
1712.50	5	16-QAM	н	138	28	1 / 0	14.29	9.43	23.72	0.236	30.
1712.50	5	64-QAM	н	138	28	1 / 0	13.17	9.43	22.60	0.182	30.
1715.00	10	QPSK	Н	142	33	1 / 0	15.22	9.42	24.64	0.291	30.
1745.00	10	QPSK	н	141	29	1 / 0	15.03	9.23	24.26	0.267	30.
1775.00	10	QPSK	н	117	33	1 / 49	15.02	9.25	24.27	0.267	30.
1715.00	10	16-QAM	н	142	33	1 / 0	14.10	9.42	23.52	0.225	30.
1715.00	10	64-QAM	н	142	33	1 / 0	12.83	9.42	22.25	0.168	30.
1717.50	15	QPSK	н	150	31	1 / 0	15.10	9.40	24.50	0.282	30.
1745.00	15	QPSK	н	135	25	1 / 0	15.12	9.23	24.35	0.272	30.
1772.50	15	QPSK	н	110	31	1 / 74	15.08	9.25	24.33	0.271	30.
1717.50	15	16-QAM	н	150	31	1 / 0	14.08	9.40	23.48	0.223	30.
1717.50	15	64-QAM	н	150	31	1 / 0	12.86	9.40	22.26	0.168	30.
1720.00	20	QPSK	Н	147	29	1/0	14.46	9.38	23.84	0.242	30.
1745.00	20	QPSK	Н	131	20	1/0	13.48	9.23	22.71	0.187	30.
1770.00	20	QPSK	н	106	35	1 / 99	13.91	9.24	23.15	0.207	30.
	1		1	1	1	1				1	

Margin

[dB]

-5.54

-5.64

-5.70

-6.48

-7.48

-5.50

-5.74

-5.69

-6.41

-7.39

-5.41

-5.84

-5.65

-6.28

-7.40

-5.36

-5.74

-5.73

-6.48

-7.75

-5.50

-5.65

-5.67

-6.52 -7.74

-6.16

-7.29

-6.85

-7.40

-8.32

-7.20

Table 7-13. ERP Data (Band 66/4)

1/0

1/0

1/0

13.22

12.30

13.57

9.38

9.38

9.23

22.60

21.68

22.80

0.182

0.147

0.191

30.00

30.00

30.00

FCC ID: ZNFL455DL		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 200 of 250
1M1910280174-03-R2.ZNF	10/28 - 11/26/209	Portable Handset		Page 209 of 250
© 2019 PCTEST Engineering Labora	V 9.0 02/01/2019			

20

20

10

16-QAM

64-QAM

QPSK

н

Н

V

147

147

121

29

29

59

1720.00

1720.00

1715.00

(cel	PCTEST
	ENGINEERING LABORATORY, INC.

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	V	141	50	1 / 5	14.75	9.88	24.63	0.290	33.01	-8.38
1882.50	1.4	QPSK	V	120	51	1 / 0	14.58	10.12	24.70	0.295	33.01	-8.31
1914.30	1.4	QPSK	V	137	62	1 / 0	14.37	10.34	24.71	0.295	33.01	-8.30
1914.30	1.4	16-QAM	V	137	62	1 / 0	13.30	10.34	23.64	0.231	33.01	-9.37
1914.30	1.4	64-QAM	V	137	62	1 / 0	12.37	10.34	22.71	0.186	33.01	-10.30
1851.50	3	QPSK	V	144	48	1 / 14	14.58	9.88	24.46	0.279	33.01	-8.55
1882.50	3	QPSK	V	127	56	1 / 0	14.29	10.12	24.41	0.276	33.01	-8.60
1913.50	3	QPSK	V	133	65	1 / 0	14.42	10.33	24.75	0.299	33.01	-8.26
1913.50	3	16-QAM	V	133	65	1 / 0	13.41	10.33	23.74	0.237	33.01	-9.27
1913.50	3	64-QAM	V	133	65	1 / 0	12.22	10.33	22.55	0.180	33.01	-10.46
1852.50	5	QPSK	V	140	52	1 / 24	14.57	9.89	24.46	0.279	33.01	-8.55
1882.50	5	QPSK	V	122	55	1 / 0	14.52	10.12	24.64	0.291	33.01	-8.37
1912.50	5	QPSK	V	131	68	1 / 0	14.38	10.33	24.71	0.296	33.01	-8.30
1912.50	5	16-QAM	V	131	68	1 / 0	13.41	10.33	23.74	0.236	33.01	-9.27
1912.50	5	64-QAM	V	131	68	1 / 0	12.39	10.33	22.72	0.187	33.01	-10.29
1855.00	10	QPSK	V	137	56	1 / 49	14.75	9.91	24.66	0.292	33.01	-8.35
1882.50	10	QPSK	V	125	57	1 / 0	14.45	10.12	24.57	0.287	33.01	-8.44
1910.00	10	QPSK	V	133	73	1 / 0	14.39	10.31	24.70	0.295	33.01	-8.31
1910.00	10	16-QAM	V	133	73	1 / 0	13.42	10.31	23.73	0.236	33.01	-9.28
1910.00	10	64-QAM	V	133	73	1 / 0	12.34	10.31	22.65	0.184	33.01	-10.36
1857.50	15	QPSK	V	142	54	1 / 74	14.54	9.93	24.47	0.280	33.01	-8.54
1882.50	15	QPSK	V	126	58	1 / 0	14.38	10.12	24.50	0.282	33.01	-8.51
1907.50	15	QPSK	V	135	71	1 / 0	14.25	10.30	24.55	0.285	33.01	-8.46
1907.50	15	16-QAM	V	135	71	1 / 0	13.35	10.30	23.65	0.232	33.01	-9.36
1907.50	15	64-QAM	V	135	71	1 / 0	12.27	10.30	22.57	0.181	33.01	-10.44
1860.00	20	QPSK	V	139	56	1 / 99	14.78	9.95	24.73	0.297	33.01	-8.28
1882.50	20	QPSK	V	124	55	1/0	15.43	10.12	25.55	0.359	33.01	-7.46
1905.00	20	QPSK	V	137	69	1/0	13.97	10.28	24.25	0.266	33.01	-8.76
1882.50	20	16-QAM	V	124	55	1 / 0	14.69	10.12	24.81	0.303	33.01	-8.20
1882.50	20	64-QAM	V	124	55	1 / 0	13.89	10.12	24.01	0.252	33.01	-9.00
1882.50	20	QPSK	н	102	365	1/0	15.01	10.12	25.13	0.326	33.01	-7.88

Table 7-14. ERP Data (Band 25/2)

FCC ID: ZNFL455DL		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Daga 210 of 250
1M1910280174-03-R2.ZNF	10/28 - 11/26/209	Portable Handset	Page 210 of 250

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]
2498.50	5	QPSK	V	102	65	1 / 24	13.77	9.40	23.17	0.208	33.01	-9.84
2593.00	5	QPSK	V	104	102	1 / 24	14.02	9.56	23.58	0.228	33.01	-9.43
2687.50	5	QPSK	V	103	134	1 / 24	14.01	9.69	23.70	0.234	33.01	-9.31
2687.50	5	16-QAM	V	103	134	1 / 24	12.63	9.69	22.32	0.170	33.01	-10.69
2687.50	5	64-QAM	V	103	134	1 / 24	12.08	9.69	21.77	0.150	33.01	-11.24
2501.00	10	QPSK	V	102	67	1 / 49	13.77	9.40	23.17	0.207	33.01	-9.84
2593.00	10	QPSK	V	105	103	1 / 49	14.06	9.56	23.62	0.230	33.01	-9.39
2685.00	10	QPSK	V	104	137	1 / 49	14.04	9.68	23.72	0.236	33.01	-9.29
2685.00	10	16-QAM	V	104	137	1 / 49	12.66	9.68	22.34	0.172	33.01	-10.67
2685.00	10	64-QAM	V	104	137	1 / 49	11.90	9.68	21.58	0.144	33.01	-11.43
2503.50	15	QPSK	V	103	67	1 / 74	13.68	9.39	23.07	0.203	33.01	-9.94
2593.00	15	QPSK	V	104	104	1 / 74	13.91	9.56	23.47	0.222	33.01	-9.54
2682.50	15	QPSK	V	102	139	1 / 74	14.02	9.68	23.70	0.235	33.01	-9.31
2682.50	15	16-QAM	V	102	139	1 / 74	13.05	9.68	22.73	0.188	33.01	-10.28
2682.50	15	64-QAM	V	102	139	1 / 74	12.48	9.68	22.16	0.165	33.01	-10.85
2506.00	20	QPSK	V	104	65	1 / 99	13.62	9.39	23.01	0.200	33.01	-10.00
2593.00	20	QPSK	V	104	107	1 / 99	13.79	9.56	23.35	0.216	33.01	-9.66
2680.00	20	QPSK	V	104	136	1 / 99	13.91	9.68	23.59	0.229	33.01	-9.42
2680.00	20	16-QAM	V	104	136	1 / 99	12.99	9.68	22.67	0.185	33.01	-10.34
2680.00	20	64-QAM	V	104	136	1 / 99	11.94	9.68	21.62	0.145	33.01	-11.39
2685.00	10	QPSK	Н	131	12	1 / 49	12.75	9.94	22.69	0.186	33.01	-10.32

Table 7-15. ERP Data (Band 41 – PC2)

FCC ID: ZNFL455DL		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dogo 211 of 250
1M1910280174-03-R2.ZNF	10/28 - 11/26/209	Portable Handset	Page 211 of 250
© 2019 PCTEST Engineering Labora	V 9.0 02/01/2019		



7.9 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 \geq 3 x RBW
- 3. Span = 1.5 times the OBW
- 4. No. of sweep points \geq 2 x span / RBW
- 5. Detector = RMS
- 6. Trace mode = Average (Max Hold for pulsed emissions)
- 7. The trace was allowed to stabilize

FCC ID: ZNFL455DL		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 212 of 250
1M1910280174-03-R2.ZNF	10/28 - 11/26/209	Portable Handset	le Handset	
© 2019 PCTEST Engineering Labora	V 9.0 02/01/2019			



EUT turntable 8. styrofoam block

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

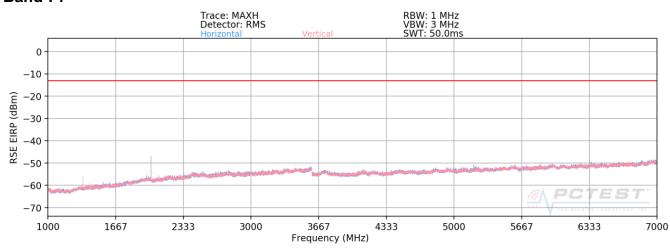
Figure 7-9. Test Instrument & Measurement Setup

Test Notes

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

FCC ID: ZNFL455DL		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Daga 212 of 250	
1M1910280174-03-R2.ZNF	10/28 - 11/26/209	209 Portable Handset		Page 213 of 250	
© 2019 PCTEST Engineering Laboratory, Inc.					





Plot 7-346. Radiated Spurious Plot above 1GHz (Band 71)

OPERATING FREQUENCY:	673.00	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]
1346.00	Н	105	332	-65.63	3.15	-62.48	-49.5
2019.00	Н	146	325	-55.94	3.52	-52.42	-39.4
2692.00	Н	-	-	-67.17	4.77	-62.40	-49.4
3365.00	Н	-	-	-66.58	6.00	-60.58	-47.6

Table 7-16. Radiated Spurious Data (Band 71 – Low Channel)

FCC ID: ZNFL455DL		MEASUREMENT REPORT (CERTIFICATION)	🕑 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 214 of 250
1M1910280174-03-R2.ZNF	10/28 - 11/26/209	11/26/209 Portable Handset		Page 214 of 250
© 2019 PCTEST Engineering Labora	V 9.0 02/01/2019			



OPERATING FREQUENCY:	680).50 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]
1361.00	Н	104	333	-67.18	3.04	-64.13	-51.1
2041.50	Н	138	331	-52.82	3.49	-49.34	-36.3
2722.00	Н	-	-	-67.18	4.83	-62.35	-49.3
3402.50	Н	-	-	-67.75	6.16	-61.59	-48.6

Table 7-17. Radiated Spurious Data (Band 71 – Mid Channel)

68	8.00 M	IHz
QPSK	_	
20.0	MHz	
3	meters	
-13	dBm	
	QPSK 20.0 3	QPSK 20.0 MHz 3 meters

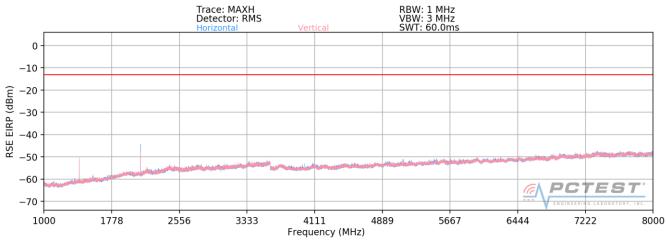
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1376.00	Н	119	337	-65.28	2.88	-62.40	-49.4
2064.00	Н	124	323	-51.34	3.50	-47.84	-34.8
2752.00	Н	-	-	-67.22	4.88	-62.34	-49.3
3440.00	Н	-	-	-67.70	6.22	-61.49	-48.5

Table 7-18. Radiated Spurious Data (Band 71 – High Channel)

FCC ID: ZNFL455DL		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 245 of 250
1M1910280174-03-R2.ZNF	10/28 - 11/26/209	Portable Handset	Page 215 of 250
© 2019 PCTEST Engineering Labora	V 9.0 02/01/2019		









OPERATING FREQUENCY:	70	1.50 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]
1403.00	Н	144	40	-61.00	2.71	-58.29	-45.3
2104.50	Н	101	135	-58.17	3.57	-54.60	-41.6
2806.00	Н	-	-	-67.60	4.98	-62.62	-49.6
3507.50	Н	-	-	-67.96	6.33	-61.63	-48.6

Table 7-19. Radiated Spurious Data (Band 12 – Low Channel)

FCC ID: ZNFL455DL		MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 246 of 250
1M1910280174-03-R2.ZNF	10/28 - 11/26/209	Portable Handset		Page 216 of 250
© 2019 PCTEST Engineering Labora	atory. Inc.	•		V 9.0 02/01/2019



OPERATING FREQUENCY:		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]
1415.00	Н	158	44	-60.30	2.80	-57.50	-44.5
2122.50	Н	109	136	-57.83	3.57	-54.26	-41.3
2830.00	Н	-	-	-67.77	5.02	-62.75	-49.8
3537.50	Н	-	-	-67.71	6.31	-61.41	-48.4

Table 7-20. Radiated Spurious Data (Band 12 – Mid Channel)

OPERATING FREQUENCY:	71	3.50	MHz
MODULATION SIGNAL:	QPSK	_	
BANDWIDTH:	5.0	MHz	
DISTANCE:	3	meters	
LIMIT:	-13	dBm	

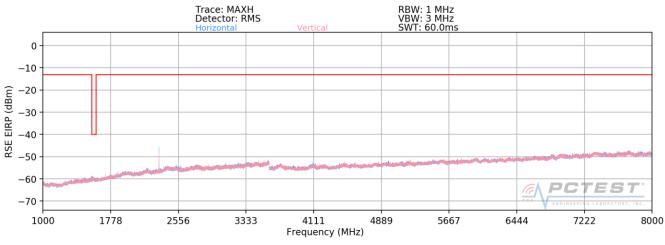
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1427.00	Н	152	41	-60.18	2.88	-57.29	-44.3
2140.50	Н	124	138	-57.78	3.58	-54.20	-41.2
2854.00	Н	-	-	-67.57	5.07	-62.50	-49.5
3567.50	Н	-	-	-67.33	6.31	-61.02	-48.0

Table 7-21. Radiated Spurious Data (Band 12 – High Channel)

FCC ID: ZNFL455DL		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 217 of 250
1M1910280174-03-R2.ZNF	10/28 - 11/26/209	Portable Handset	set	
© 2019 PCTEST Engineering Labora	atory. Inc.	•		V 9.0 02/01/2019







Plot 7-348. Radiated Spurious Plot above 1GHz (Band 13)

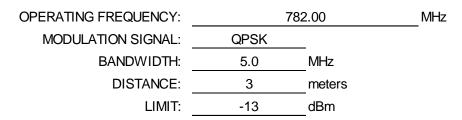
OPERATING FREQUENCY:	779	9.50	MHz
MODULATION SIGNAL:	QPSK	_	
BANDWIDTH:	5.0	MHz	
DISTANCE:	3	meters	
LIMIT:	-13	dBm	

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]
2338.50	Н	138	38	-52.34	3.99	-48.35	-35.3
3118.00	Н	-	-	-67.23	5.37	-61.86	-48.9
3897.50	Н	102	13	-65.60	7.06	-58.54	-45.5
4677.00	Н	-	-	-68.72	8.34	-60.38	-47.4
5456.50	Н	-	-	-68.22	8.73	-59.49	-46.5

Table 7-22. Radiated Spurious Data (Band 13 – Low Channel)

FCC ID: ZNFL455DL		MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager			
Test Report S/N:	Test Dates:	EUT Type:		Dage 210 of 250			
1M1910280174-03-R2.ZNF	10/28 - 11/26/209	Portable Handset		Page 218 of 250			
© 2019 PCTEST Engineering Labora	© 2019 PCTEST Engineering Laboratory. Inc.						





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]
2346.00	Н	115	44	-51.87	4.00	-47.86	-34.9
3128.00	Н	-	-	-67.27	5.38	-61.88	-48.9
3910.00	Н	101	13	-65.82	7.09	-58.73	-45.7
4692.00	Н	-	-	-68.57	8.37	-60.20	-47.2
5474.00	Н	-	-	-67.83	8.73	-59.10	-46.1

Table 7-23. Radiated Spurious Data (Band 13 – Mid Channel)

OPERATING FREQUENCY:784.50MHzMODULATION 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]
2353.50	Н	112	38	-51.94	4.02	-47.92	-34.9
3138.00	Н	-	-	-67.11	5.40	-61.71	-48.7
3922.50	Н	100	17	-65.11	7.13	-57.98	-45.0
4707.00	Н	-	-	-69.21	8.39	-60.81	-47.8
5491.50	Н	-	-	-67.75	8.74	-59.02	-46.0

Table 7-24. Radiated Spurious Data (Band 13 – High Channel)

FCC ID: ZNFL455DL		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 210 of 250
1M1910280174-03-R2.ZNF	10/28 - 11/26/209	Portable Handset		Page 219 of 250
© 2019 PCTEST Engineering Labora	atory Inc	•		V 9 0 02/01/2019



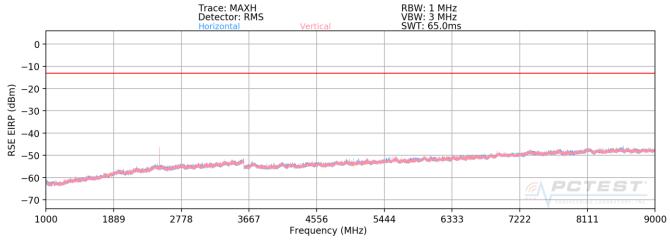
MODULATION SIGNAL:	QPSK	_
BANDWIDTH:	5.00	MHz
DISTANCE:	3	meters
NARROW BAND EMISSION LIMIT:	-50	dBm
WIDEBAND EMISSION LIMIT:	-40	dBm/MHz

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1559.00	Н	181	309	-73.93	8.51	-65.41	-25.4
1564.00	Н	185	309	-73.74	8.53	-65.21	-25.2
1569.00	н	184	307	-74.09	8.55	-65.54	-25.5

Table 7-25. Radiated Spurious Data (Band 13 – 1559-1610MHz Band)

FCC ID: ZNFL455DL		MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dega 220 of 250	
1M1910280174-03-R2.ZNF	10/28 - 11/26/209	09 Portable Handset		Page 220 of 250	
© 2019 PCTEST Engineering Labora	V 9.0 02/01/2019				





Plot 7-349. Radiated Spurious Plot above 1GHz (Band 26)

OPERATING FREQUENCY:	829.00		
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]
1658.00	V	137	150	-60.82	3.61	-57.20	-44.2
2487.00	V	259	277	-44.07	4.26	-39.81	-26.8
3316.00	V	-	-	-67.15	5.86	-61.29	-48.3
4145.00	V	228	283	-67.10	7.68	-59.42	-46.4
4974.00	V	-	-	-69.13	8.56	-60.57	-47.6
5803.00	V	-	-	-68.05	8.87	-59.18	-46.2

Table 7-26. Radiated Spurious Data (Band 26/5 - Low Channel)

FCC ID: ZNFL455DL		MEASUREMENT REPORT (CERTIFICATION)	🔁 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 221 of 250
1M1910280174-03-R2.ZNF	10/28 - 11/26/209	Portable Handset	Page Page	
© 2019 PCTEST Engineering Labora	V 9.0 02/01/2019			



OPERATING FREQUENCY:	836	6.50	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]
1673.00	V	126	141	-60.07	3.62	-56.45	-43.5
2509.50	V	259	278	-44.66	4.33	-40.33	-27.3
3346.00	V	-	-	-66.88	5.92	-60.96	-48.0
4182.50	V	215	279	-66.40	7.69	-58.71	-45.7
5019.00	V	-	-	-69.70	8.56	-61.13	-48.1
5855.50	V	-	-	-67.73	8.87	-58.86	-45.9

Table 7-27. Radiated Spurious Data (Band 26/5 - Mid Channel)

QPSK

10.0

844.00

MHz

MHz

OPERATING FREQUENCY:

MODULATION SIGNAL:

BANDWIDTH:

DISTANCE: 3 meters

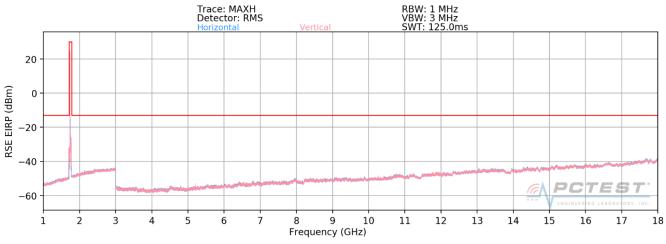
LIMIT: _____dBm

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]
1688.00	V	123	144	-63.29	3.62	-59.67	-46.7
2532.00	V	253	282	-47.55	4.42	-43.13	-30.1
3376.00	V	-	-	-66.98	6.00	-60.98	-48.0
4220.00	V	202	273	-66.31	7.72	-58.59	-45.6
5064.00	V	-	-	-69.27	8.56	-60.71	-47.7
5908.00	V	-	-	-68.35	8.90	-59.45	-46.5

Table 7-28. Radiated Spurious Data (Band 26/5 – High Channel)

FCC ID: ZNFL455DL		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 222 of 250
1M1910280174-03-R2.ZNF	10/28 - 11/26/209	Portable Handset		Page 222 of 250
© 2019 PCTEST Engineering Labora	V 9.0 02/01/2019			





Plot 7-350. Radiated Spurious Plot above 1GHz (Band 66/4)

OPERATING FREQUENCY:	171	5.00	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]
3430.00	Н	158	48	-58.29	6.22	-52.07	-39.1
5145.00	Н	-	-	-64.08	8.68	-55.41	-42.4

 Table 7-29. Radiated Spurious Data (Band 66/4 – Low Channel)

FCC ID: ZNFL455DL		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 222 of 250
1M1910280174-03-R2.ZNF	10/28 - 11/26/209	Portable Handset	Page 223 of 250
© 2019 PCTEST Engineering Labora	V 9.0 02/01/2019		



OPERATING FREQUENCY:	174	5.00	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]
3490.00	Н	163	151	-60.66	6.32	-54.34	-41.3
5235.00	Н	104	315	-54.76	8.71	-46.05	-33.1
6980.00	н	-	-	-61.75	8.74	-53.02	-40.0

Table 7-30. Radiated Spurious Data (Band 66/4 – Mid Channel)

OPERATING FREQUENCY:

PERATING FREQUENCT.

1775.00 QPSK

MHz

MHz

MODULATION SIGNAL:

BANDWIDTH: 10.0 DISTANCE: 3

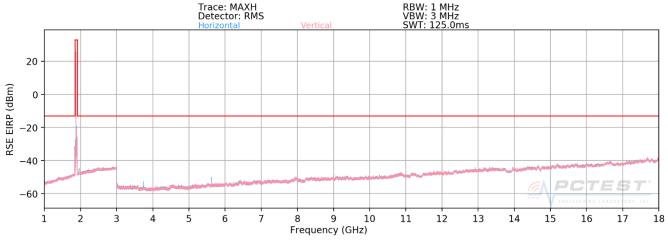
LIMIT: -13 dBm

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]
3550.00	Н	112	154	-62.44	6.31	-56.13	-43.1
5325.00	Н	-	-	-64.57	8.74	-55.83	-42.8

Table 7-31. Radiated Spurious Data (Band 66/4 – High Channel)

FCC ID: ZNFL455DL		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 224 of 250
1M1910280174-03-R2.ZNF	10/28 - 11/26/209	Portable Handset	Page 224 of 250
© 2019 PCTEST Engineering Labora	V 9.0 02/01/2019		







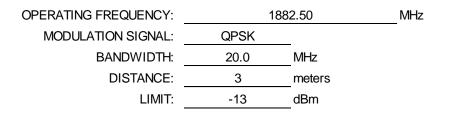
OPERATING FREQUENCY:	186	60.00	MHz
MODULATION SIGNAL:	QPSK	_	
BANDWIDTH:	20.0	MHz	
DISTANCE:	3	meters	
LIMIT:	-13	dBm	

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]
3720.00	V	142	105	-64.35	6.58	-57.77	-44.8
5580.00	V	101	138	-59.80	8.74	-51.07	-38.1
7440.00	V	-	-	-61.07	8.41	-52.65	-39.7

Table 7-32. Radiated Spurious Data (Band 25/2 – Low Channel)

FCC ID: ZNFL455DL		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Baga 225 of 250
1M1910280174-03-R2.ZNF	10/28 - 11/26/209	Portable Handset	Page 225 of 250
© 2019 PCTEST Engineering Labora	V 9.0 02/01/2019		





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]
3765.00	V	148	61	-64.42	6.70	-57.73	-44.7
5647.50	V	107	131	-55.81	8.83	-46.98	-34.0
7530.00	V	-	-	-61.40	8.46	-52.95	-39.9

Table 7-33. Radiated Spurious Data (Band 25/2 – Mid Channel)

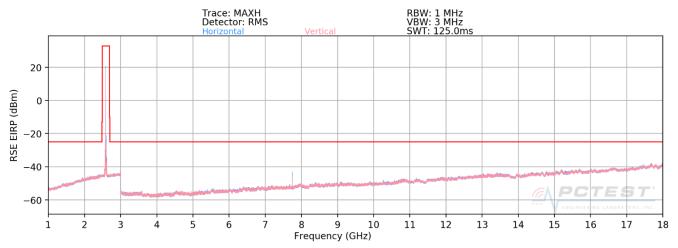
OPERATING FREQUENCY:	190	5.00	MHz
MODULATION SIGNAL:	QPSK		
BANDWIDTH:	20.0	MHz	
DISTANCE:	3	meters	
LIMIT:	-13	dBm	

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]
3810.00	V	119	258	-64.62	6.94	-57.68	-44.7
5715.00	V	196	84	-61.18	8.77	-52.42	-39.4
7620.00	V	-	-	-59.59	8.51	-51.08	-38.1

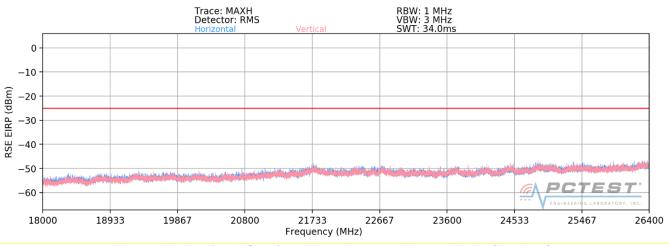
Table 7-34. Radiated Spurious Data (Band 25/2 – High Channel)

FCC ID: ZNFL455DL		MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 226 of 250
1M1910280174-03-R2.ZNF	10/28 - 11/26/209	Portable Handset		
© 2019 PCTEST Engineering Labora	V 9.0 02/01/2019			





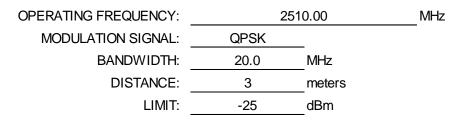




Plot 7-353. Radiated Spurious Plot above 18GHz - 26.5GHz (Band 41)

FCC ID: ZNFL455DL		MEASUREMENT REPORT (CERTIFICATION)	🔁 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 227 of 250
1M1910280174-03-R2.ZNF	10/28 - 11/26/209	Portable Handset		Page 227 of 250
© 2019 PCTEST Engineering Labora	V 9.0 02/01/2019			





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]
5020.00	Н	101	25	-54.61	8.56	-46.04	-21.0
7530.00	Н	325	293	-45.32	8.46	-36.87	-11.9
10040.00	Н	149	304	-57.30	9.85	-47.44	-22.4
12550.00	Н	-	-	-54.85	9.06	-45.79	-20.8
15060.00	Н	-	-	-50.87	8.74	-42.13	-17.1

Table 7-35. Radiated Spurious Data (Band 41 (PC2) – Low Channel)

OPERATING FREQUENCY:2593.00MHzMODULATION SIGNAL:QPSKBANDWIDTH:20.0MHzDISTANCE:3metersLIMIT:-25dBm

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]
5186.00	Н	101	15	-57.92	8.70	-49.22	-24.2
7779.00	Н	325	301	-46.22	8.69	-37.53	-12.5
10372.00	Н	157	299	-56.28	9.62	-46.65	-21.7
12965.00	Н	-	-	-54.00	8.99	-45.01	-20.0
15558.00	Н	-	-	-50.35	8.32	-42.03	-17.0

Table 7-36. Radiated Spurious Data (Band 41 (PC2) – Mid Channel)

FCC ID: ZNFL455DL		MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 220 of 250
1M1910280174-03-R2.ZNF	10/28 - 11/26/209	209 Portable Handset		Page 228 of 250
© 2019 PCTEST Engineering Labora	atory Inc			V 9 0 02/01/2019



OPERATING FREQUENCY:	268	0.00	MHz
MODULATION SIGNAL:	QPSK	_	
BANDWIDTH:	20.0	MHz	
DISTANCE:	3	meters	
LIMIT:	-25	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]
5360.00	Н	101	14	-55.34	8.70	-46.64	-21.6
8040.00	Н	321	305	-47.95	8.95	-38.99	-14.0
10720.00	Н	155	291	-54.01	9.32	-44.69	-19.7
13400.00	Н	-	-	-53.18	8.77	-44.40	-19.4
16080.00	Н	-	-	-49.56	8.01	-41.55	-16.6

Table 7-37. Radiated Spurious Data (Band 41 (PC2) – High Channel)

FCC ID: ZNFL455DL		MEASUREMENT REPORT (CERTIFICATION)	🕞 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga 220 of 250
1M1910280174-03-R2.ZNF	10/28 – 11/26/209 Portable Handset			Page 229 of 250
© 2019 PCTEST Engineering Labora	V 9 0 02/01/2019			



7.10 Uplink Carrier Aggregation Radiated Measurements §2.1053, §27.53(m)

Test Overview

Radiated spurious emissions measurements are performed using the substitution method described in ANSI/TIA-603-D-2010 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using vertically and horizontally polarized tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically and horizontally polarized broadband horn antennas. All measurements are performed as peak measurements while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

Test Procedures Used

KDB 971168 D01 v02r02 - Section 5.8

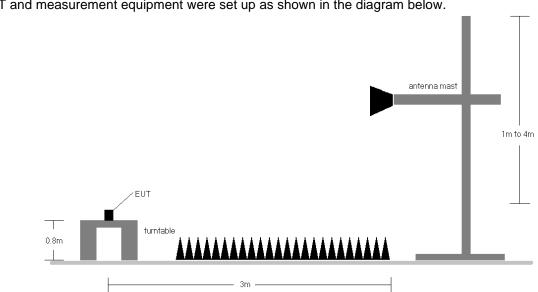
ANSI/TIA-603-D-2010 - Section 2.2.12

Test Settings

- 1. RBW = 100kHz for emissions below 1GHz and 1MHz for emissions above 1GHz
- 2. VBW \geq 3 x RBW
- 3. No. of sweep points > 2 x span / RBW
- 4. Detector = RMS
- 5. Trace mode = trace average for continuous emissions, max hold for pulse emissions
- 6. The trace was allowed to stabilize

FCC ID: ZNFL455DL		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Daga 220 of 250	
1M1910280174-03-R2.ZNF	10/28 - 11/26/209	28 – 11/26/209 Portable Handset		Page 230 of 250	
© 2019 PCTEST Engineering Labora	V 9.0 02/01/2019				





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

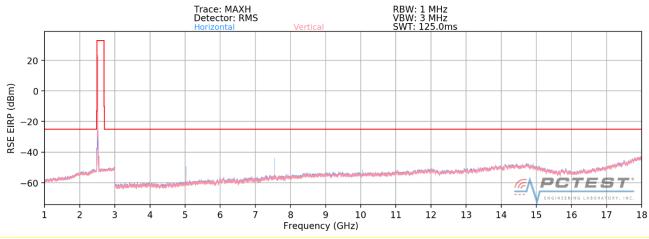
Figure 7-10. Test Instrument & Measurement Setup

Test Notes

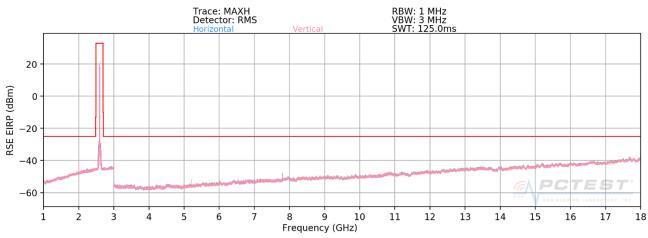
- 1) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the tables below.
- 2) This unit was tested with its standard battery.
- Radiated spurious emissions measurements were evaluated for the two contiguous channels using various combinations of RB size, RB offset, modulation, and channel bandwidth. The worst case (highest) emissions were found while operating with QPSK modulation with both carriers set to transmit using 1RB.
- 4) The spectrum is measured from 9kHz to the 10th harmonic of the fundamental frequency of the transmitter. The worst-case emissions are reported.
- 5) 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.
- 6) No significant emissions were found as a result of two uplink carriers operating contiguously.

FCC ID: ZNFL455DL		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dago 221 of 250	
1M1910280174-03-R2.ZNF	10/28 - 11/26/209	Portable Handset		Page 231 of 250	
© 2019 PCTEST Engineering Labora	atory Inc.			V 9 0 02/01/2019	

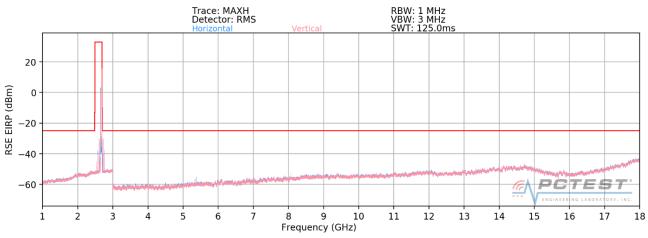




Plot 7-354. Radiated Spurious Plot 1GHz - 18GHz (ULCA Band 41 (PC2) Low Channel – PCC/SCC: 1RB)



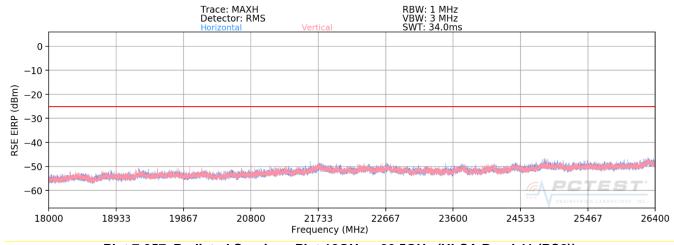
Plot 7-355. Radiated Spurious Plot 1GHz - 18GHz (ULCA Band 41 (PC2) Mid Channel – PCC/SCC: 1RB)

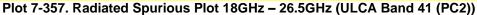


Plot 7-356. Radiated Spurious Plot 1GHz - 18GHz (ULCA Band 41 (PC2) High Channel – PCC/SCC: 1RB)

FCC ID: ZNFL455DL		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 222 of 250	
1M1910280174-03-R2.ZNF	10/28 – 11/26/209 Portable Handset			Page 232 of 250	
© 2019 PCTEST Engineering Labora	V 9.0 02/01/2019				







OPERATING FREQUENCY (PCC):	25	06.00	MHz
OPERATING FREQUENCY (SCC):	25	25.80	MHz
CHANNEL (PCC):	39	9750	
CHANNEL (SCC):	39	9948	
MODULATION SIGNAL:	QPSK		
BANDWIDTH:	20.0	MHz	
DISTANCE:	3	meters	
LIMIT:	-25	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]
5012.00	V	100	127	-58.33	8.56	-49.77	-24.8
7518.00	V	104	102	-49.28	8.49	-40.79	-15.8
10024.00	V	112	271	-55.37	9.85	-45.52	-20.5
12530.00	V	-	-	-54.91	9.07	-45.84	-20.8
15036.00	V	-	-	-51.86	8.77	-43.09	-18.1

Plot 7-38. Radiated Spurious Data (ULCA B41 (PC2) PCC: RB 1 Offset 99, SCC: RB 1 Offset 0 - Low Channel)

FCC ID: ZNFL455DL		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 222 of 250
1M1910280174-03-R2.ZNF	10/28 – 11/26/209 Portable Handset			Page 233 of 250
© 2019 PCTEST Engineering Labora	atory. Inc.			V 9.0 02/01/2019



OPERATING FREQUENCY (PCC):	259	93.00	MHz
OPERATING FREQUENCY (SCC):	2612.80		MHz
CHANNEL (PCC):	40620		
CHANNEL (SCC):	40)818	
MODULATION SIGNAL:	QPSK		
BANDWIDTH:	20.0	MHz	
DISTANCE:	3	meters	
LIMIT:	-25	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]
5186.00	V	115	136	-60.62	8.70	-51.92	-26.9
7779.00	V	101	101	-48.85	8.69	-40.16	-15.2
10372.00	V	102	268	-56.75	9.62	-47.12	-22.1
12965.00	V	-	-	-53.97	8.99	-44.98	-20.0
15558.00	V	-	-	-50.59	8.32	-42.27	-17.3

Plot 7-39. Radiated Spurious Data (ULCA B41 (PC2) PCC: RB 1 Offset 99, SCC: RB 1 Offset 0 - Mid Channel)

OPERATING FREQUENCY (PCC):	268	0.00	MHz
OPERATING FREQUENCY (SCC):	266	60.20	MHz
CHANNEL (PCC):	41	490	
CHANNEL (SCC):	41	292	
MODULATION SIGNAL:	QPSK	_	
BANDWIDTH:	20.0	MHz	
DISTANCE:	3	meters	
LIMIT:	-25	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]
5360.00	V	207	195	-62.45	8.70	-53.75	-28.8
8040.00	V	103	140	-55.79	8.95	-46.83	-21.8
10720.00	V	-	-	-57.07	9.32	-47.75	-22.8
13400.00	V	-	-	-53.39	8.77	-44.61	-19.6

Plot 7-40. Radiated Spurious Data (ULCA B41 (PC2) PCC: RB 1 Offset 0, SCC: RB 1 Offset 99 - High Channel)

FCC ID: ZNFL455DL		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga 224 of 250
1M1910280174-03-R2.ZNF	10/28 - 11/26/209	Portable Handset		Page 234 of 250
2019 PCTEST Engineering Laboratory Inc				V 9 0 02/01/2019



7.11 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

FCC ID: ZNFL455DL		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 225 of 250
1M1910280174-03-R2.ZNF	10/28 - 11/26/209	Portable Handset		Page 235 of 250
2019 PCTEST Engineering Laboratory. Inc.				V 9.0 02/01/2019



Band 71 Frequency Stability Measurements

OPERATING FREQUENCY:	680,500,000	Hz
CHANNEL:	133372	
REFERENCE VOLTAGE:	4.25	VDC

VOLTAGE (%)	POWER (VDC)	ТЕМР (°С)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.25	- 30	680,500,158	158	0.0000232
100 %		- 20	680,500,155	155	0.0000228
100 %		- 10	680,500,016	16	0.0000024
100 %		0	680,499,720	-280	-0.0000411
100 %		+ 10	680,500,090	90	0.0000132
100 %		+ 20	680,499,667	-333	-0.0000489
100 %		+ 30	680,499,916	-84	-0.0000123
100 %		+ 40	680,499,874	-126	-0.0000185
100 %		+ 50	680,500,140	140	0.0000206
BATT. ENDPOINT	2.78	+ 20	680,499,882	-118	-0.0000173

Table 7-41. Frequency Stability Data (Band 71)

FCC ID: ZNFL455DL		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dogo 226 of 250
1M1910280174-03-R2.ZNF	10/28 - 11/26/209	Portable Handset	Page 236 of 250
© 2019 PCTEST Engineering Labora	V 9.0 02/01/2019		





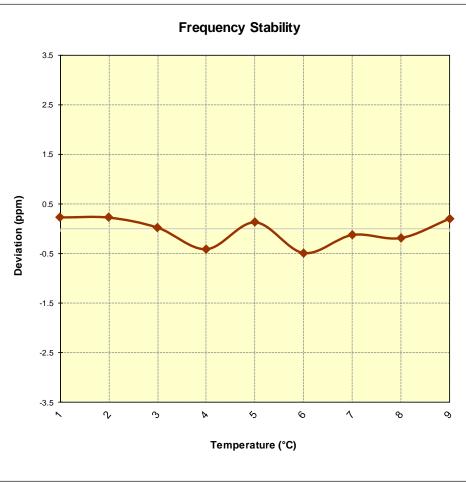


Figure 7-11. Frequency Stability Graph (Band 71)

FCC ID: ZNFL455DL		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 227 of 250
1M1910280174-03-R2.ZNF	10/28 - 11/26/209	Portable Handset	Page 237 of 250
© 2019 PCTEST Engineering Labora	V 9.0 02/01/2019		



Band 12 Frequency Stability Measurements

OPERATING FREQUENCY:707,500,000HzCHANNEL:23790REFERENCE VOLTAGE:4.25VDC

VOLTAGE (%)	POWER (VDC)	ТЕМР (°С)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.25	- 30	707,499,979	-21	-0.000030
100 %		- 20	707,499,942	-58	-0.000082
100 %		- 10	707,499,883	-117	-0.0000165
100 %		0	707,499,921	-79	-0.0000112
100 %		+ 10	707,500,066	66	0.000093
100 %		+ 20	707,500,054	54	0.0000076
100 %		+ 30	707,499,822	-178	-0.0000252
100 %		+ 40	707,499,833	-167	-0.0000236
100 %		+ 50	707,499,587	-413	-0.0000584
BATT. ENDPOINT	2.78	+ 20	707,499,922	-78	-0.0000110

Table 7-42. Frequency Stability Data (Band 12)

FCC ID: ZNFL455DL		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 220 of 250
1M1910280174-03-R2.ZNF	10/28 - 11/26/209	Portable Handset		Page 238 of 250
2019 PCTEST Engineering Laboratory, Inc.				V 9.0 02/01/2019





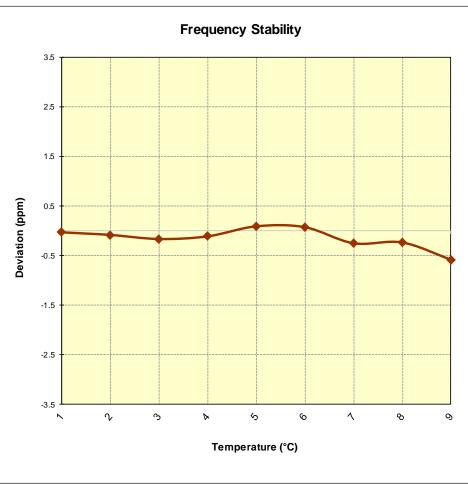


Figure 7-12. Frequency Stability Graph (Band 12)

FCC ID: ZNFL455DL		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Daga 220 of 250
1M1910280174-03-R2.ZNF	10/28 - 11/26/209	Portable Handset	Page 239 of 250
© 2019 PCTEST Engineering Labora	V 9.0 02/01/2019		



Band 13 Frequency Stability Measurements

OPERATING FREQUENCY:782,000,000HzCHANNEL:23230REFERENCE VOLTAGE:4.25VDC

VOLTAGE (%)	POWER (VDC)	ТЕМР (°С)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.25	- 30	781,999,961	-39	-0.0000050
100 %		- 20	782,000,082	82	0.0000105
100 %		- 10	782,000,220	220	0.0000281
100 %		0	782,000,095	95	0.0000121
100 %		+ 10	781,999,817	-183	-0.0000234
100 %		+ 20	782,000,316	316	0.0000404
100 %		+ 30	781,999,979	-21	-0.0000027
100 %		+ 40	782,000,009	9	0.0000012
100 %		+ 50	782,000,328	328	0.0000419
BATT. ENDPOINT	2.78	+ 20	781,999,816	-184	-0.0000235

Table 7-43. Frequency Stability Data (Band 13)

FCC ID: ZNFL455DL		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 240 of 250
1M1910280174-03-R2.ZNF	10/28 - 11/26/209	Portable Handset	Page 240 of 250
© 2019 PCTEST Engineering Labora	V 9.0 02/01/2019		





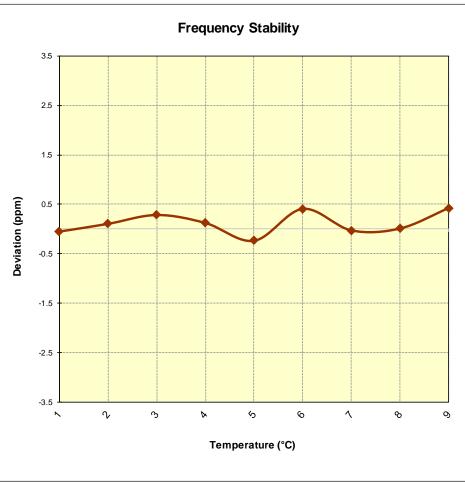


Figure 7-13. Frequency Stability Graph (Band 13)

FCC ID: ZNFL455DL		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 244 of 250
1M1910280174-03-R2.ZNF	10/28 - 11/26/209	Portable Handset	Page 241 of 250
© 2019 PCTEST Engineering Labora	V 9.0 02/01/2019		



Band 26/5 Frequency Stability Measurements

OPERATING FREQUENCY:	831,500,000	Hz
CHANNEL:	26865	
REFERENCE VOLTAGE:	4.25	VDC
DEVIATION LIMIT:	± 0.00025 % or 2.5 ppm	

VOLTAGE (%)	POWER (VDC)	ТЕМР (°С)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.25	- 30	831,499,973	-27	-0.000032
100 %		- 20	831,500,024	24	0.0000029
100 %		- 10	831,500,117	117	0.0000141
100 %		0	831,499,965	-35	-0.0000042
100 %		+ 10	831,500,161	161	0.0000194
100 %		+ 20	831,500,113	113	0.0000136
100 %		+ 30	831,499,967	-33	-0.0000040
100 %		+ 40	831,500,089	89	0.0000107
100 %		+ 50	831,499,920	-80	-0.000096
BATT. ENDPOINT	2.78	+ 20	831,500,076	76	0.0000091

Table 7-44. Frequency Stability Data (Band 26/5)

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.

FCC ID: ZNFL455DL		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 242 of 250
1M1910280174-03-R2.ZNF	10/28 - 11/26/209	Portable Handset		Page 242 of 250
2019 PCTEST Engineering Laboratory, Inc.				V 9.0 02/01/2019



Band 26/5 Frequency Stability Measurements

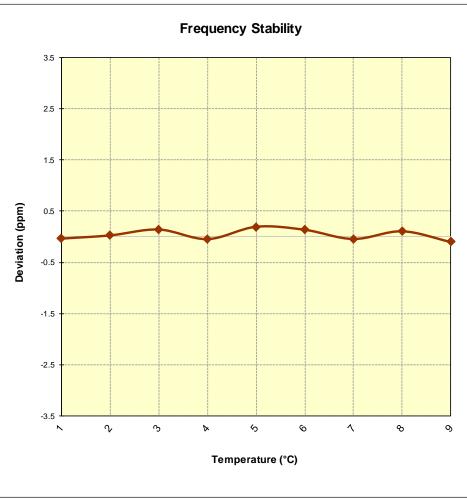


Figure 7-14. Frequency Stability Graph (Band 26/5)

FCC ID: ZNFL455DL		MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga 242 of 250
1M1910280174-03-R2.ZNF	10/28 - 11/26/209	Portable Handset		Page 243 of 250
© 2019 PCTEST Engineering Laboratory, Inc.				V 9.0 02/01/2019



Band 66/4 Frequency Stability Measurements

OPERATING FREQUENCY:	1,745,000,000	Hz
CHANNEL:	132322	_
REFERENCE VOLTAGE:	4.25	VDC

VOLTAGE (%)	POWER (VDC)	ТЕМР (°С)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.25	- 30	1,745,000,124	124	0.0000071
100 %		- 20	1,744,999,958	-42	-0.0000024
100 %		- 10	1,745,000,247	247	0.0000142
100 %		0	1,745,000,340	340	0.0000195
100 %		+ 10	1,744,999,928	-72	-0.0000041
100 %		+ 20	1,744,999,986	-14	-0.0000008
100 %		+ 30	1,745,000,362	362	0.0000207
100 %		+ 40	1,745,000,242	242	0.0000139
100 %		+ 50	1,744,999,959	-41	-0.0000023
BATT. ENDPOINT	2.78	+ 20	1,744,999,690	-310	-0.0000178

Table 7-45. Frequency Stability Data (Band 66/4)

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.

FCC ID: ZNFL455DL		MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 244 of 250
1M1910280174-03-R2.ZNF	10/28 - 11/26/209	Portable Handset		Page 244 of 250
2019 PCTEST Engineering Laboratory, Inc.				V 9.0 02/01/2019



Band 66/4 Frequency Stability Measurements

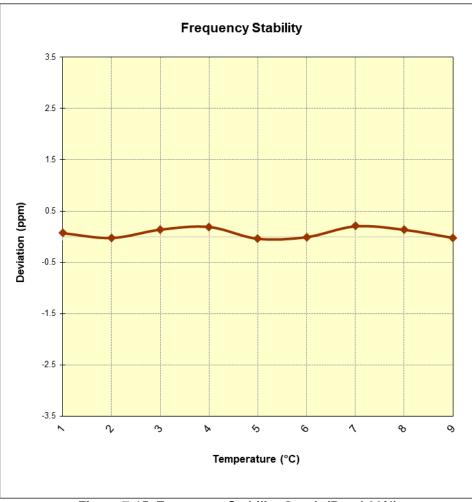


Figure 7-15. Frequency Stability Graph (Band 66/4)

FCC ID: ZNFL455DL		MEASUREMENT REPORT (CERTIFICATION)	🕞 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 245 of 250
1M1910280174-03-R2.ZNF	10/28 - 11/26/209	Portable Handset		Page 245 of 250
0 2019 PCTEST Engineering Laboratory, Inc.				V 9.0 02/01/2019



Band 25/2 Frequency Stability Measurements

OPERATING FREQUENCY:	1,882,500,000	Hz
CHANNEL:	26365	-
REFERENCE VOLTAGE:	4.25	VDC

VOLTAGE (%)	POWER (VDC)	ТЕМР (°С)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.25	- 30	1,882,500,378	378	0.0000201
100 %		- 20	1,882,499,907	-93	-0.0000049
100 %		- 10	1,882,500,228	228	0.0000121
100 %		0	1,882,499,559	-441	-0.0000234
100 %		+ 10	1,882,499,729	-271	-0.0000144
100 %		+ 20	1,882,500,096	96	0.0000051
100 %		+ 30	1,882,499,905	-95	-0.0000050
100 %		+ 40	1,882,499,851	-149	-0.0000079
100 %		+ 50	1,882,499,633	-367	-0.0000195
BATT. ENDPOINT	2.78	+ 20	1,882,500,244	244	0.0000130

Table 7-46. Frequency Stability Data (Band 25/2)

Note:

Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain 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.

FCC ID: ZNFL455DL		MEASUREMENT REPORT (CERTIFICATION)	🔁 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 246 of 250
1M1910280174-03-R2.ZNF	10/28 - 11/26/209	Portable Handset		Page 246 of 250
2019 PCTEST Engineering Laboratory, Inc.				V 9.0 02/01/2019





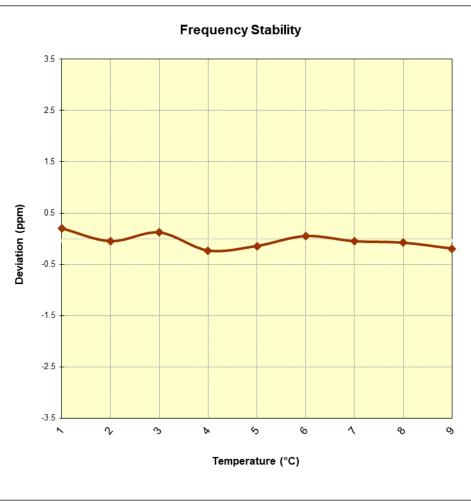


Figure 7-16. Frequency Stability Graph (Band 25/2)

FCC ID: ZNFL455DL		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dago 247 of 250
1M1910280174-03-R2.ZNF	10/28 - 11/26/209	Portable Handset	Page 247 of 250
© 2019 PCTEST Engineering Labora	V 9.0 02/01/2019		



Band 41 Frequency Stability Measurements

OPERATING FREQUENCY:	2,593,000,000	Hz
CHANNEL:	40620	_
REFERENCE VOLTAGE:	4.25	VDC

VOLTAGE (%)	POWER (VDC)	ТЕМР (°С)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.25	- 30	2,593,000,229	229	0.000088
100 %		- 20	2,593,000,040	40	0.0000015
100 %		- 10	2,592,999,897	-103	-0.0000040
100 %		0	2,593,000,229	229	0.000088
100 %		+ 10	2,593,000,069	69	0.0000027
100 %		+ 20	2,592,999,906	-94	-0.0000036
100 %		+ 30	2,592,999,999	-1	0.0000000
100 %		+ 40	2,593,000,160	160	0.0000062
100 %		+ 50	2,593,000,358	358	0.0000138
BATT. ENDPOINT	2.78	+ 20	2,593,000,229	229	0.000088

Table 7-47. Frequency Stability Data (Band 41)

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.

FCC ID: ZNFL455DL		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Page 248 of 250	
1M1910280174-03-R2.ZNF	10/28 - 11/26/209	Portable Handset			
© 2019 PCTEST Engineering Laboratory, Inc.			V 9.0 02/01/2019		





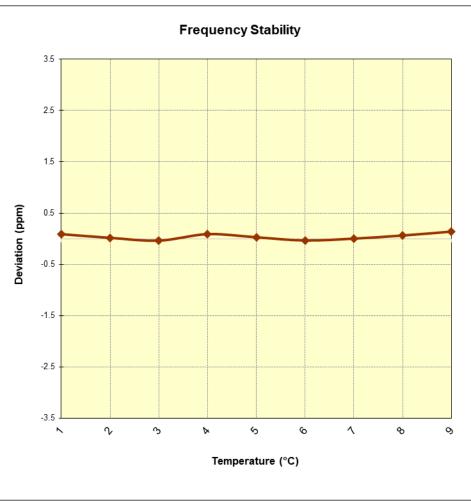


Figure 7-17. Frequency Stability Graph (Band 41)

FCC ID: ZNFL455DL		MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Page 249 of 250	
1M1910280174-03-R2.ZNF	10/28 - 11/26/209	Portable Handset			
© 2019 PCTEST Engineering Laboratory, Inc.			V 9.0 02/01/2019		



8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **LG Portable Handset FCC ID: ZNFL455DL** complies with all the requirements of Part 22, 24, & 27 of the FCC Rules for LTE operation only.

FCC ID: ZNFL455DL		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Page 250 of 250	
1M1910280174-03-R2.ZNF	10/28 - 11/26/209	Portable Handset			
© 2019 PCTEST Engineering Laboratory, Inc.			V 9.0 02/01/2019		