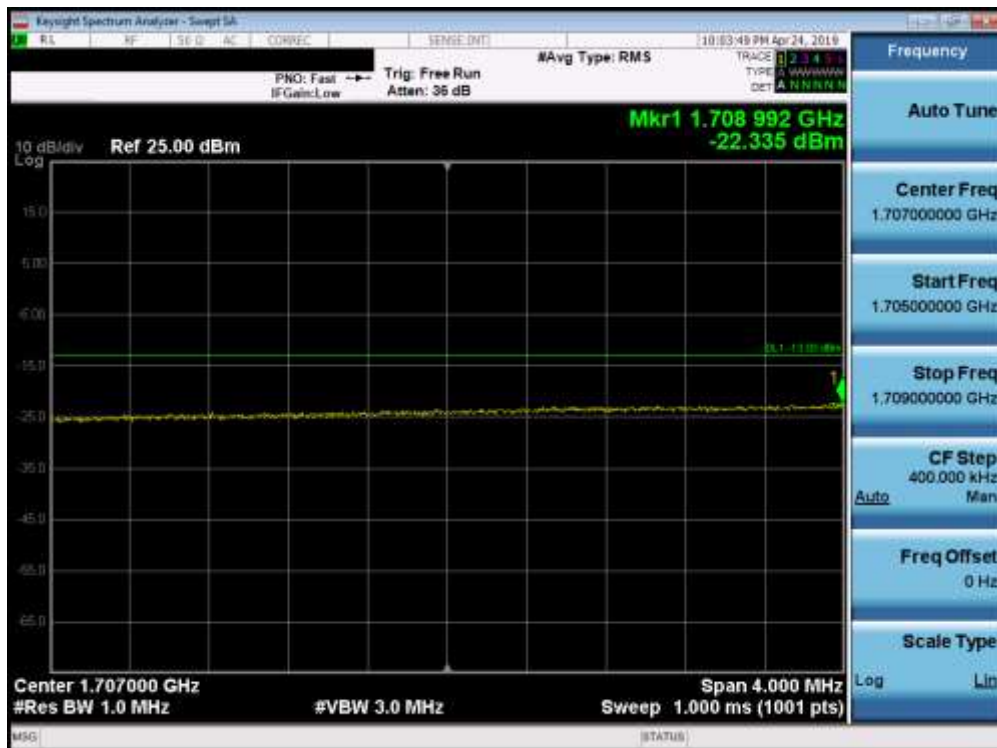




Plot 7-168. Lower Band Edge Plot (Band 66/4 - 20.0MHz QPSK - Full RB Configuration)

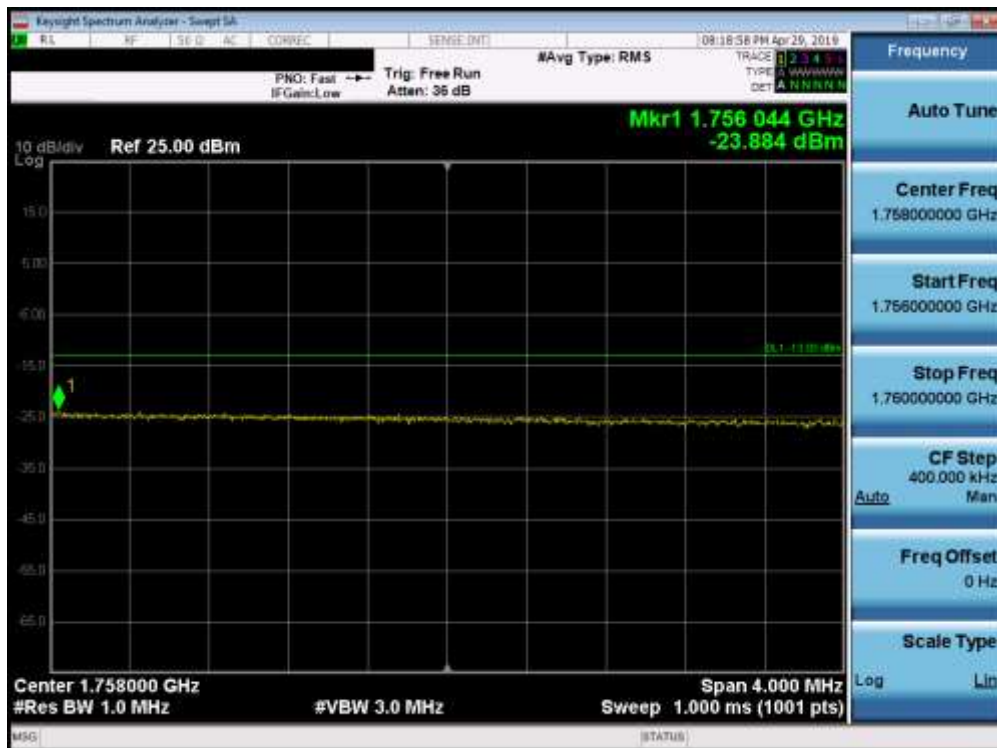


Plot 7-169. Lower Extended Band Edge Plot (Band 66/4 - 20.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFL322DL		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1904080057-03-R4-ZNF	Test Dates: 4/8 - 5/3/2019	EUT Type: Portable Handset		Page 105 of 160



Plot 7-170. Upper Band Edge Plot (Band 4 - 20.0MHz QPSK - Full RB Configuration)

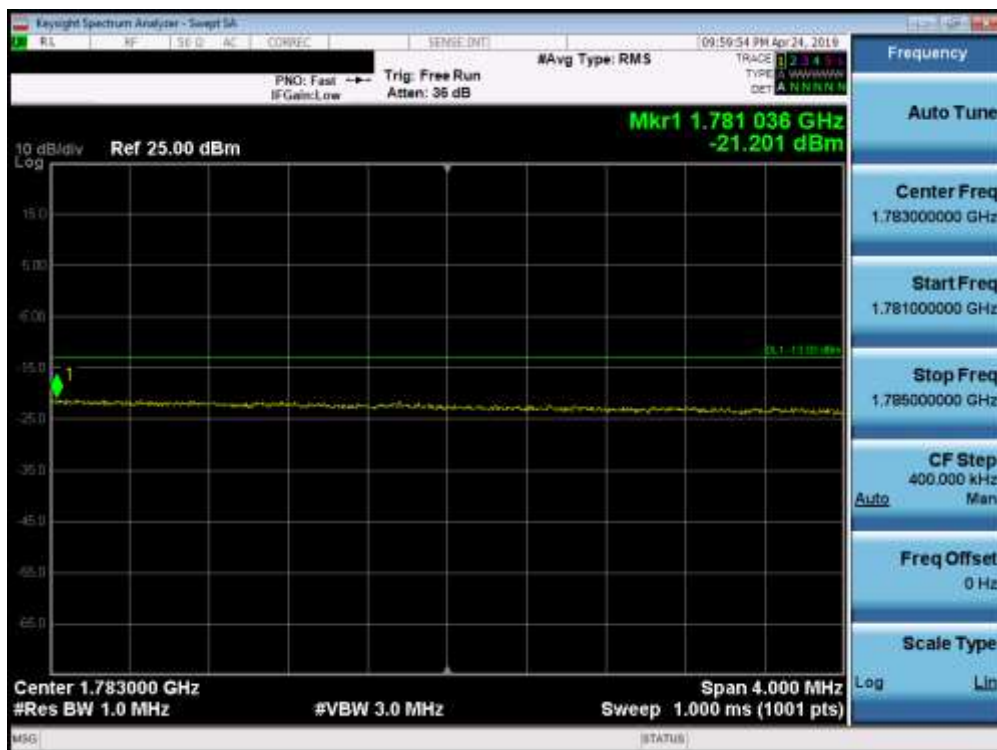


Plot 7-171. Upper Extended Band Edge Plot (Band 4 - 20.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFL322DL	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1904080057-03-R4-ZNF	Test Dates: 4/8 - 5/3/2019	EUT Type: Portable Handset		Page 106 of 160



Plot 7-172. Upper Band Edge Plot (Band 66 - 20.0MHz QPSK - Full RB Configuration)



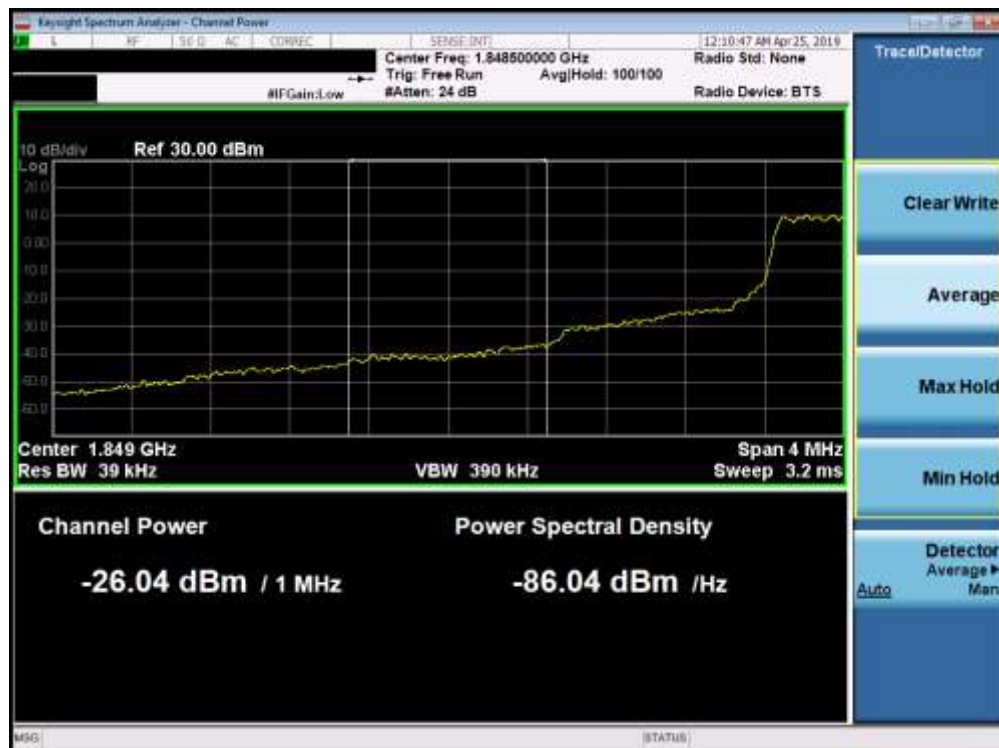
Plot 7-173. Upper Extended Band Edge Plot (Band 66 - 20.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFL322DL	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1904080057-03-R4-ZNF	Test Dates: 4/8 - 5/3/2019	EUT Type: Portable Handset		Page 107 of 160

Band 2



Plot 7-174. Lower Band Edge Plot (Band 2 - 1.4MHz QPSK - Full RB Configuration)

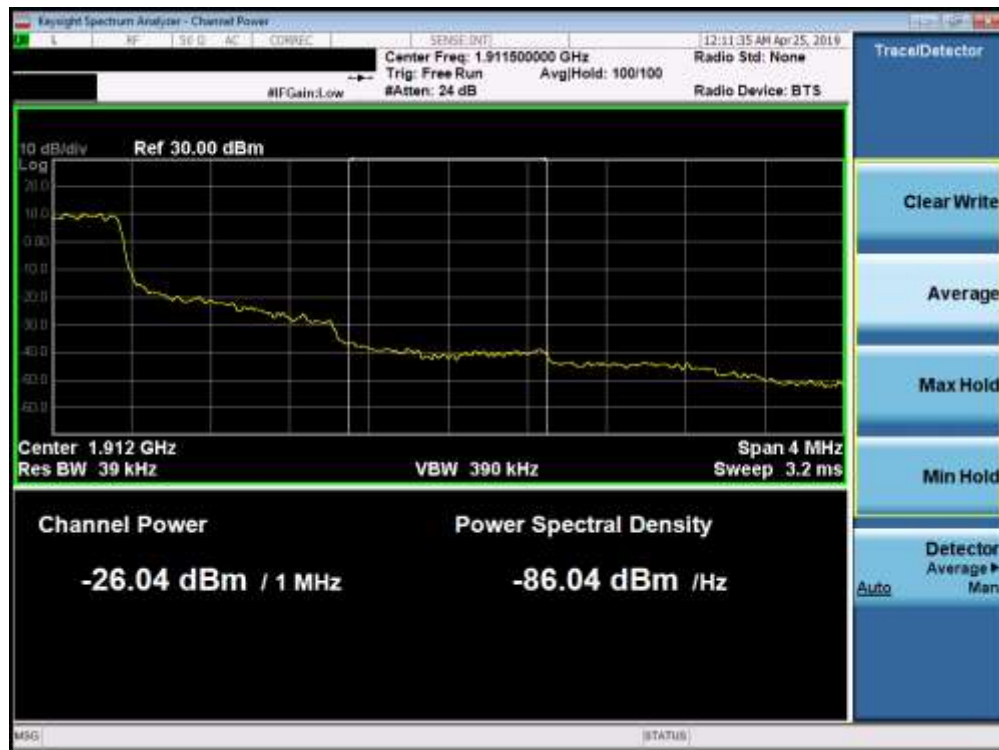


Plot 7-175. Lower Extended Band Edge Plot (Band 2 - 1.4MHz QPSK - Full RB Configuration)

FCC ID: ZNFL322DL	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1904080057-03-R4-ZNF	Test Dates: 4/8 - 5/3/2019	EUT Type: Portable Handset		Page 108 of 160



Plot 7-176. Upper Band Edge Plot (Band 2 - 1.4MHz QPSK - Full RB Configuration)

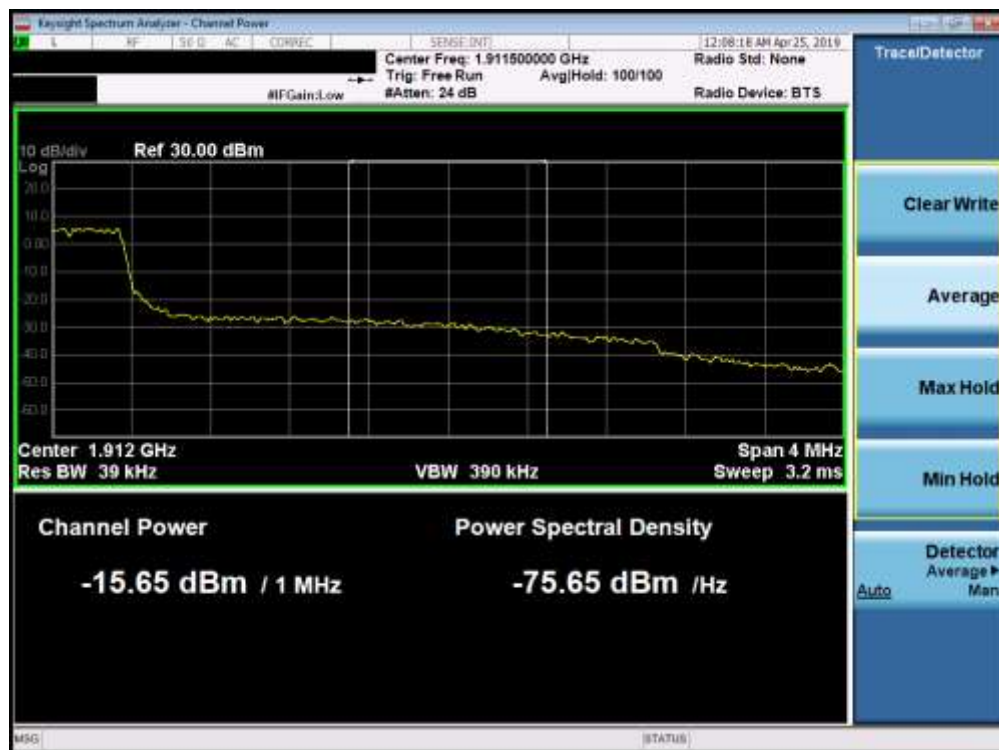


Plot 7-177. Upper Extended Band Edge Plot (Band 2 - 1.4MHz QPSK - Full RB Configuration)

FCC ID: ZNFL322DL	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1904080057-03-R4-ZNF	Test Dates: 4/8 - 5/3/2019	EUT Type: Portable Handset		Page 109 of 160

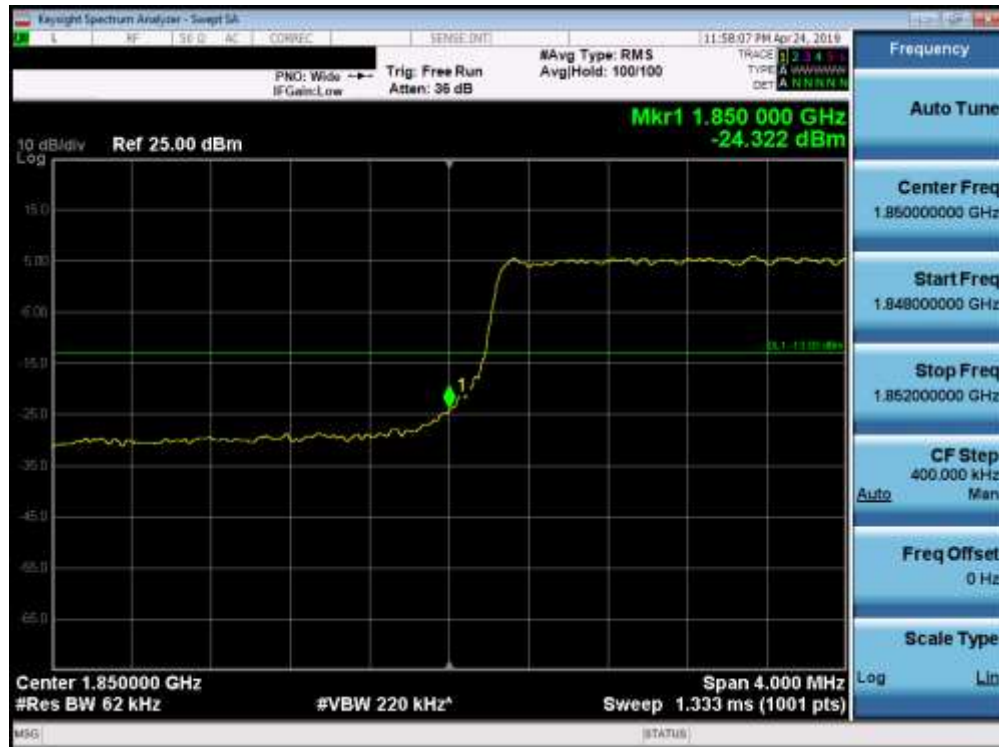


Plot 7-180. Upper Band Edge Plot (Band 2 - 3.0MHz QPSK - Full RB Configuration)

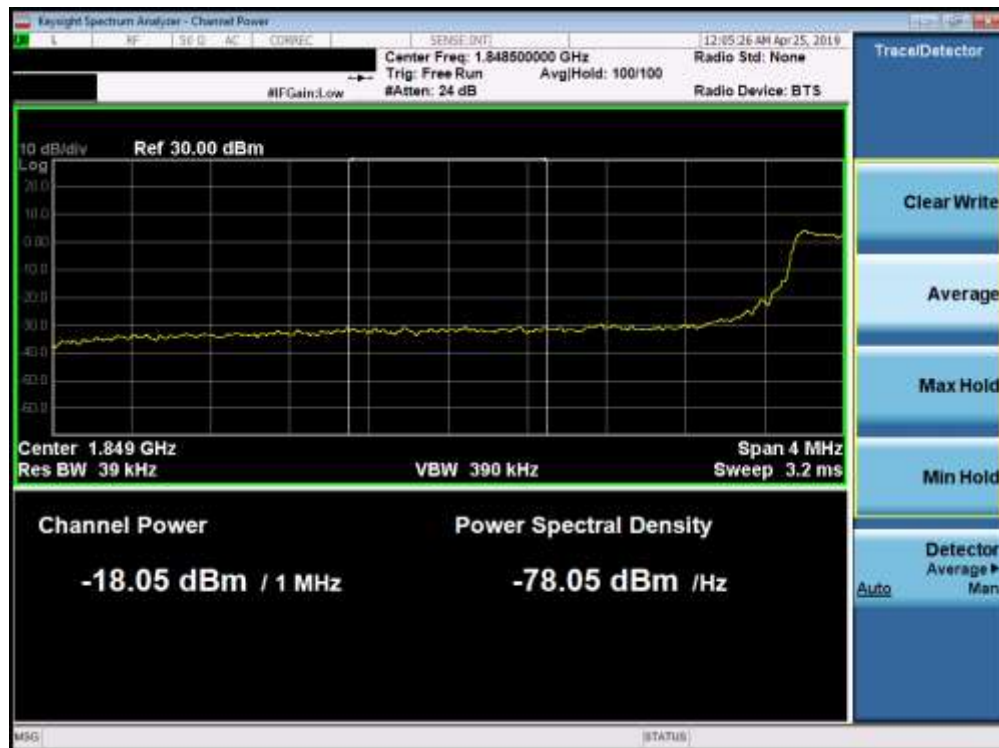


Plot 7-181. Upper Extended Band Edge Plot (Band 2 - 3.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFL322DL	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1904080057-03-R4.ZNF	Test Dates: 4/8 - 5/3/2019	EUT Type: Portable Handset		Page 111 of 160

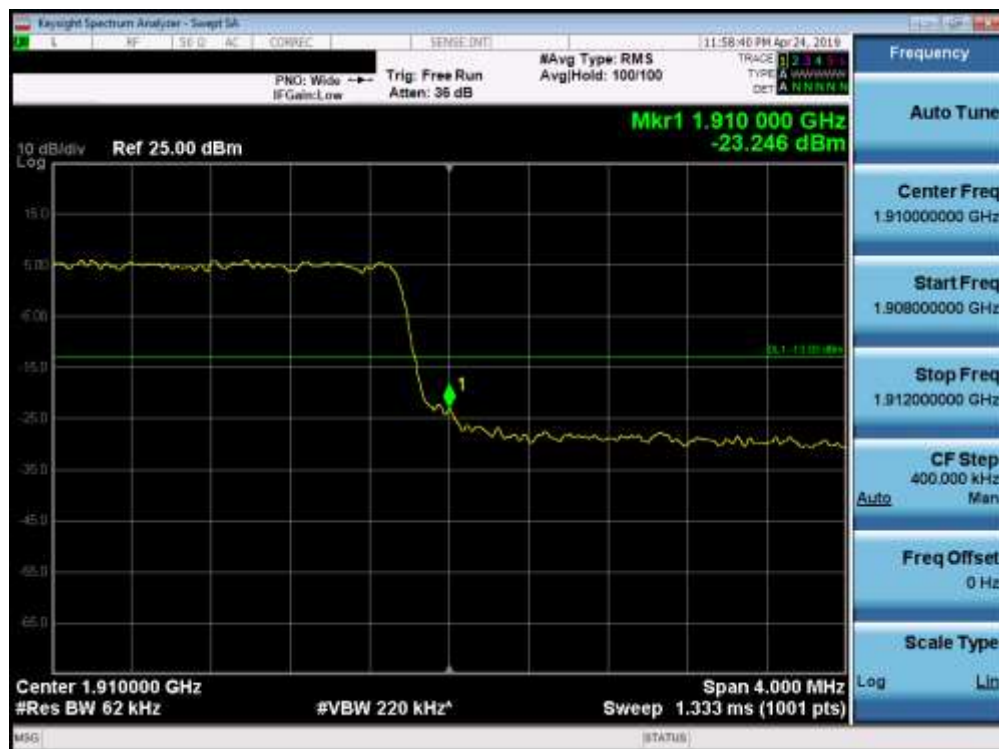


Plot 7-182. Lower Band Edge Plot (Band 2 - 5.0MHz QPSK - Full RB Configuration)

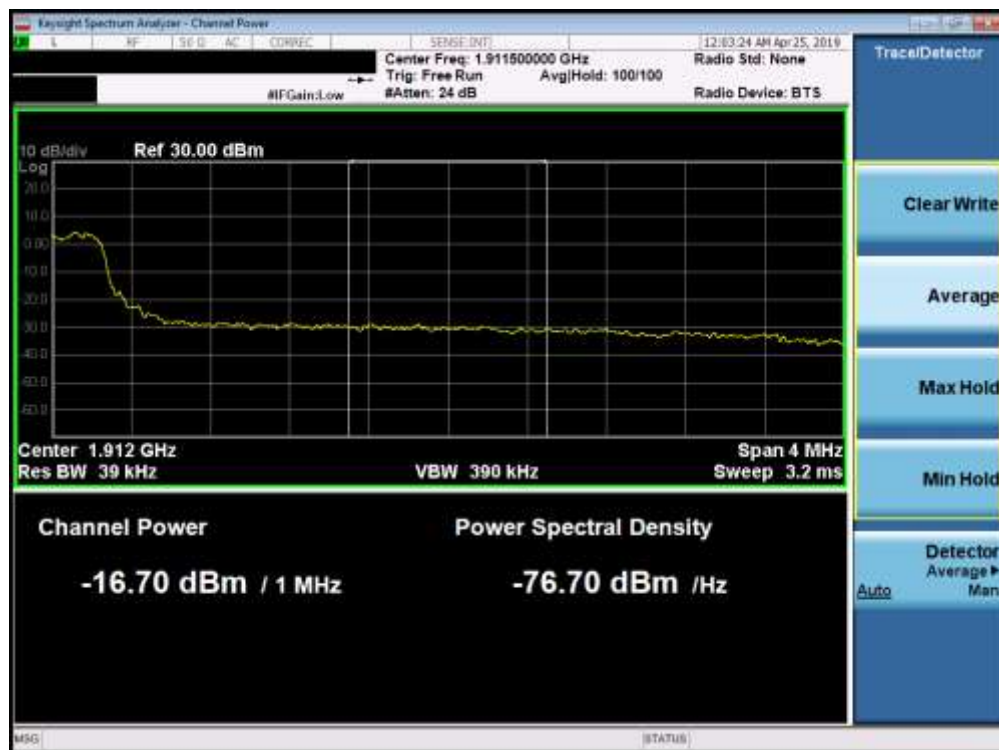


Plot 7-183. Lower Extended Band Edge Plot (Band 2 - 5.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFL322DL	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1904080057-03-R4-ZNF	Test Dates: 4/8 - 5/3/2019	EUT Type: Portable Handset		Page 112 of 160

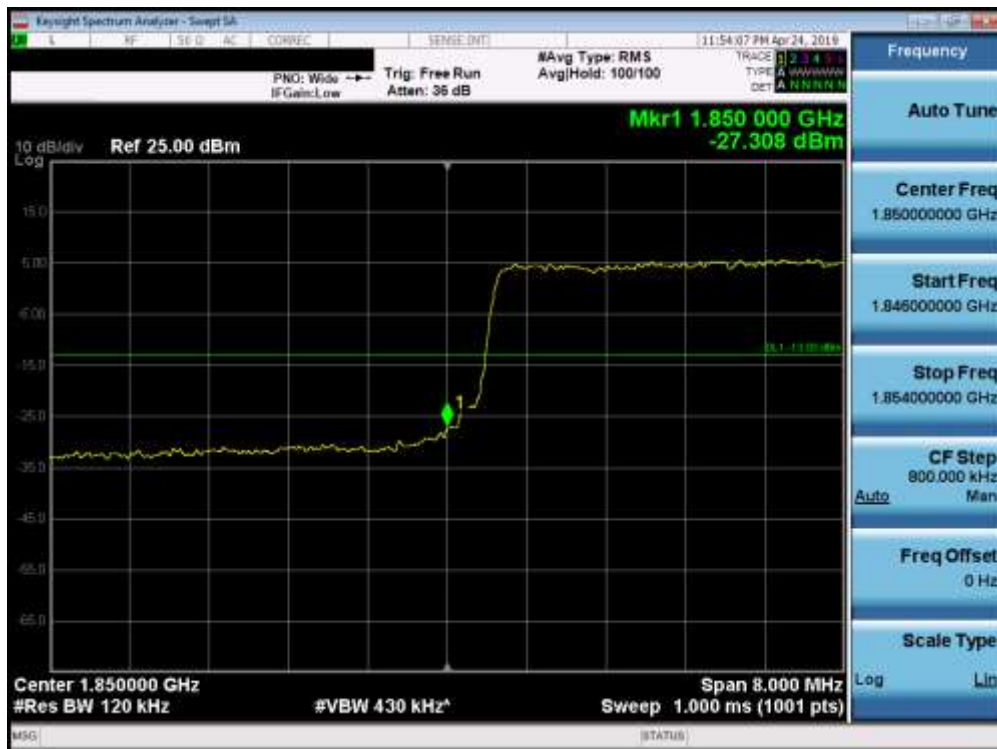


Plot 7-184. Upper Band Edge Plot (Band 2 - 5.0MHz QPSK - Full RB Configuration)

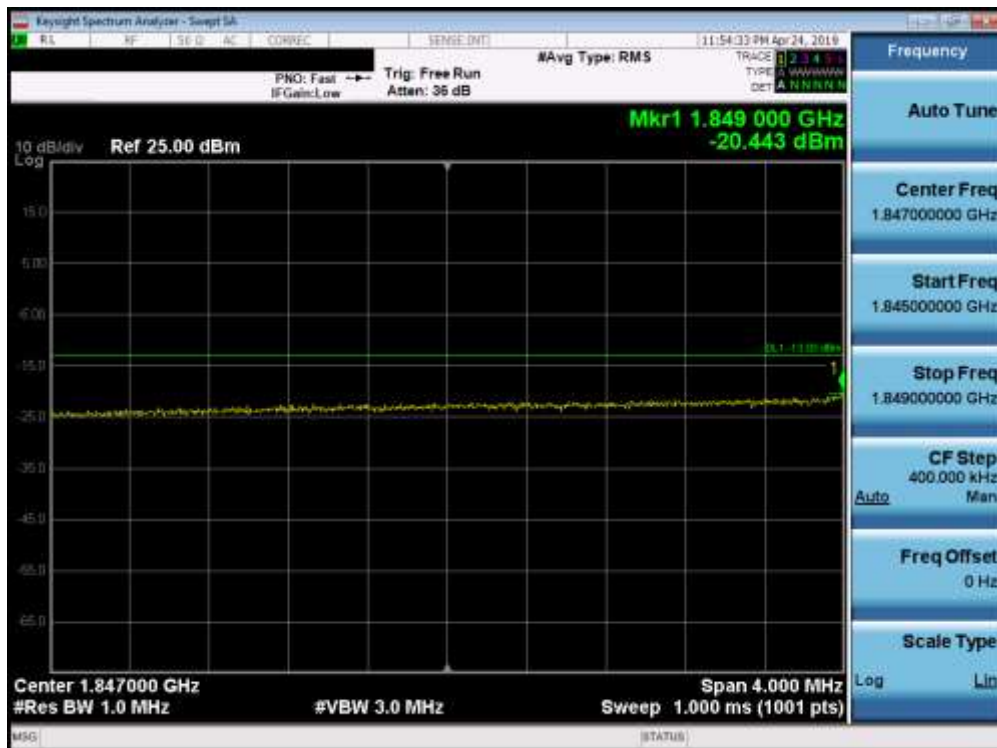


Plot 7-185. Upper Extended Band Edge Plot (Band 2 - 5.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFL322DL	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1904080057-03-R4.ZNF	Test Dates: 4/8 - 5/3/2019	EUT Type: Portable Handset		Page 113 of 160

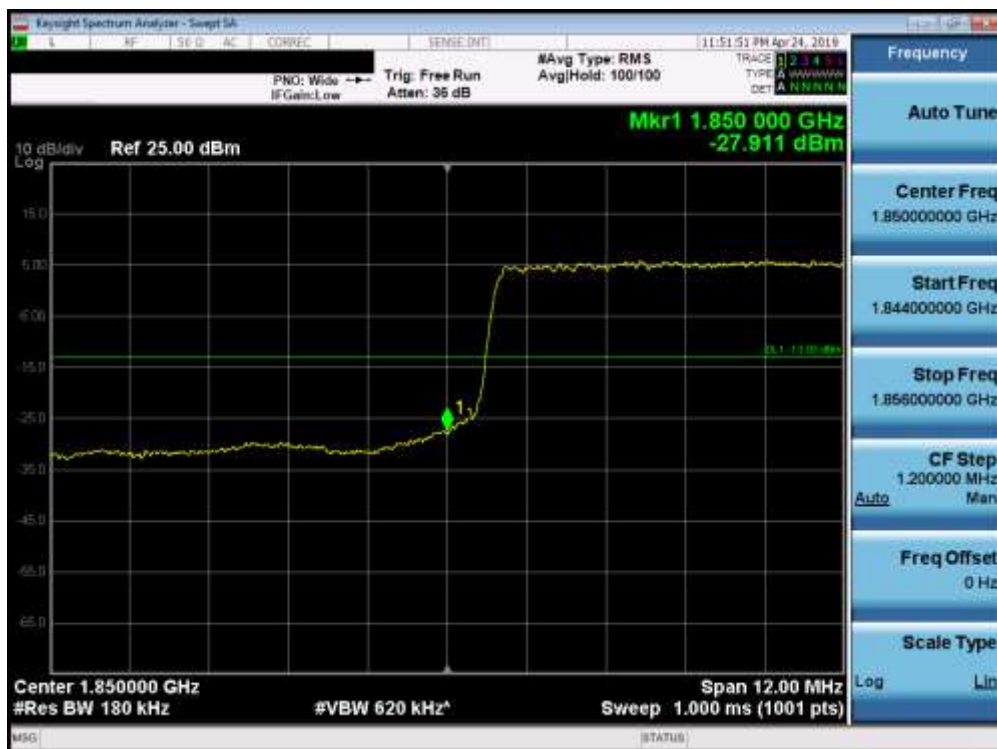


Plot 7-186. Lower Band Edge Plot (Band 2 - 10.0MHz QPSK - Full RB Configuration)

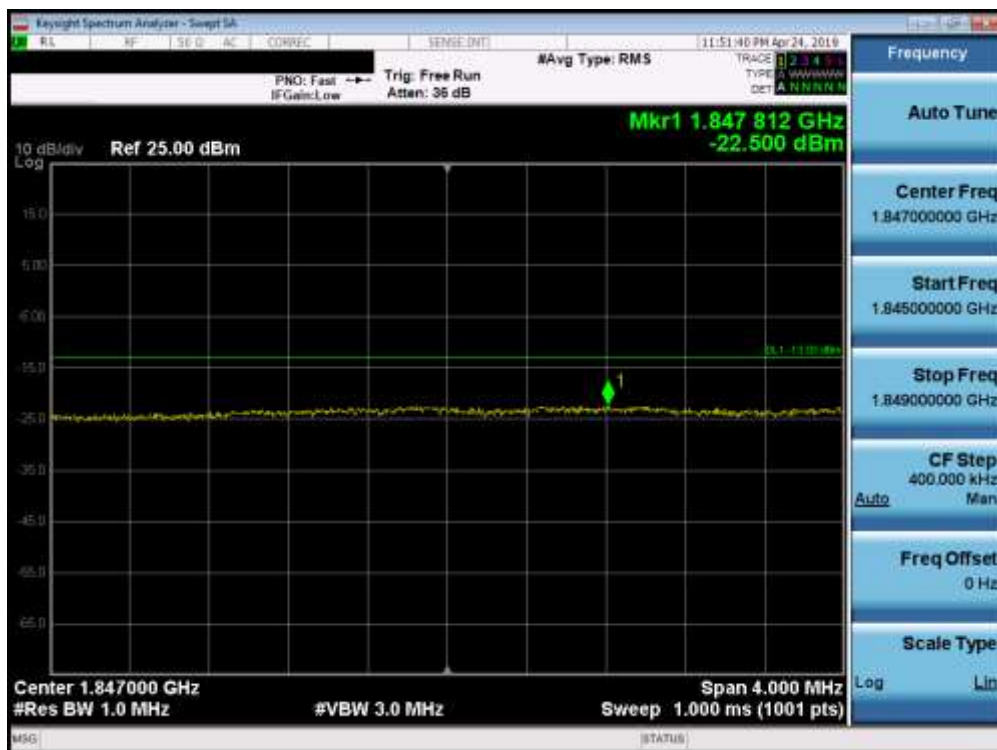


Plot 7-187. Lower Extended Band Edge Plot (Band 2 - 10.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFL322DL	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1904080057-03-R4.ZNF	Test Dates: 4/8 - 5/3/2019	EUT Type: Portable Handset		Page 114 of 160



Plot 7-190. Lower Band Edge Plot (Band 2 - 15.0MHz QPSK - Full RB Configuration)

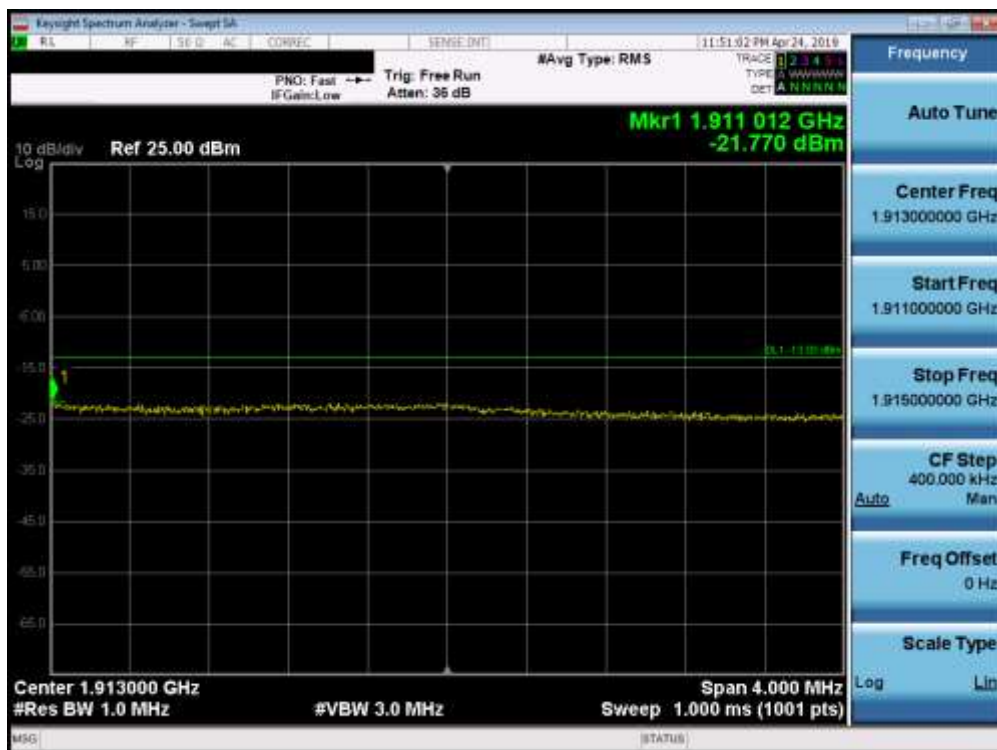


Plot 7-191. Lower Extended Band Edge Plot (Band 2 - 15.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFL322DL	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1904080057-03-R4.ZNF	Test Dates: 4/8 - 5/3/2019	EUT Type: Portable Handset		Page 116 of 160

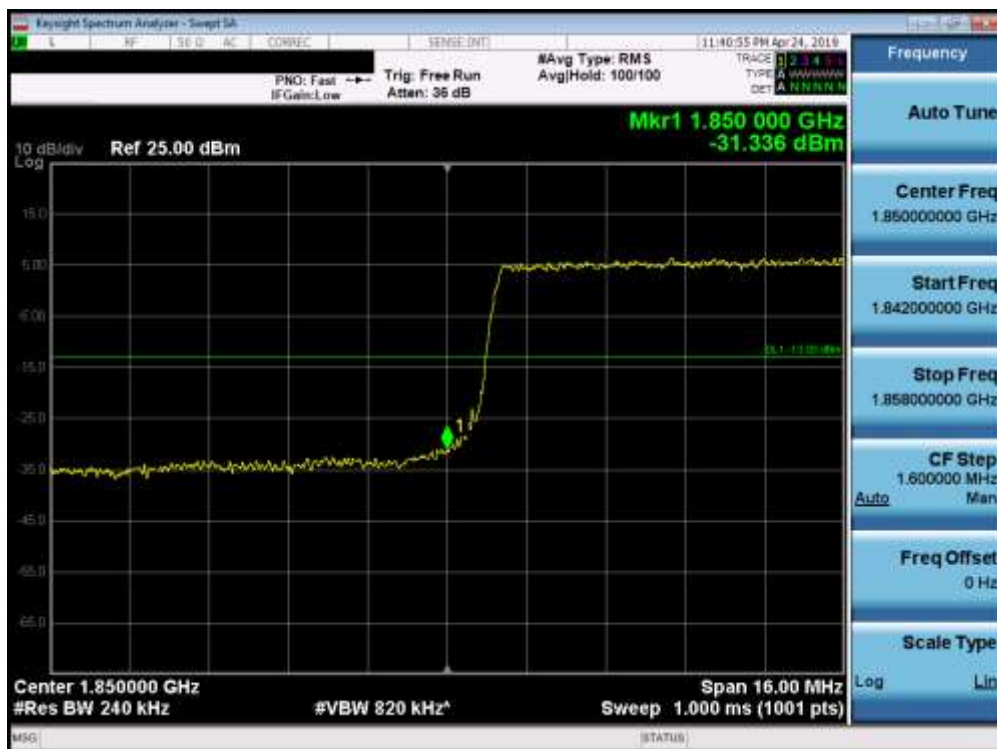


Plot 7-192. Upper Band Edge Plot (Band 2 - 15.0MHz QPSK - Full RB Configuration)

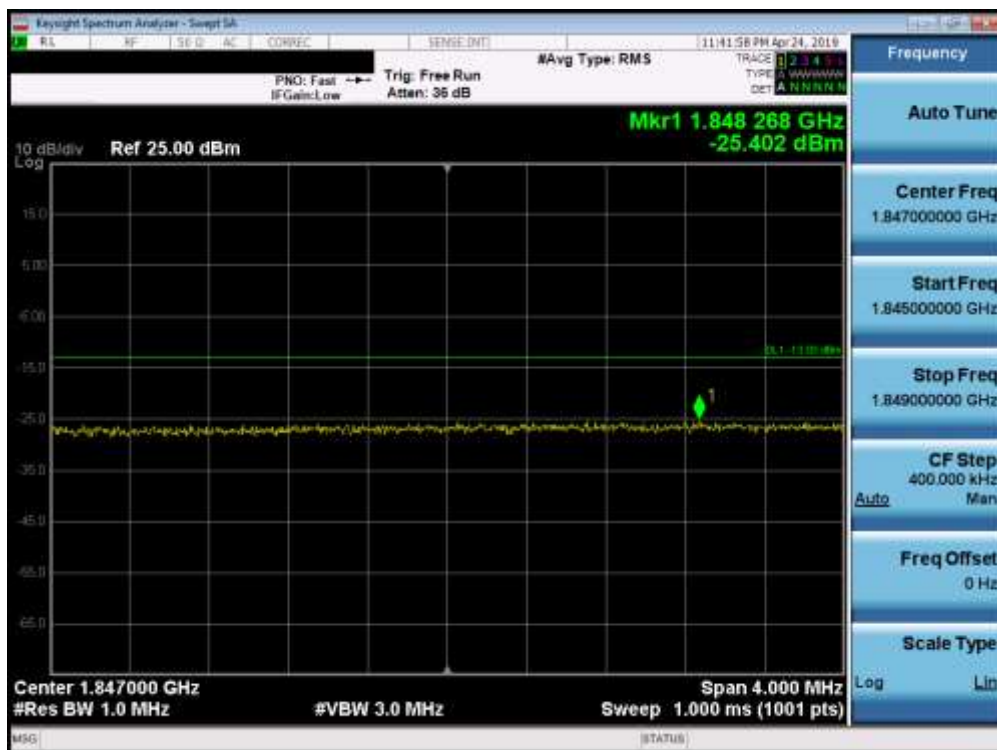


Plot 7-193. Upper Extended Band Edge Plot (Band 2 - 15.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFL322DL	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1904080057-03-R4.ZNF	Test Dates: 4/8 - 5/3/2019	EUT Type: Portable Handset		Page 117 of 160



Plot 7-194. Lower Band Edge Plot (Band 2 - 20.0MHz QPSK - Full RB Configuration)

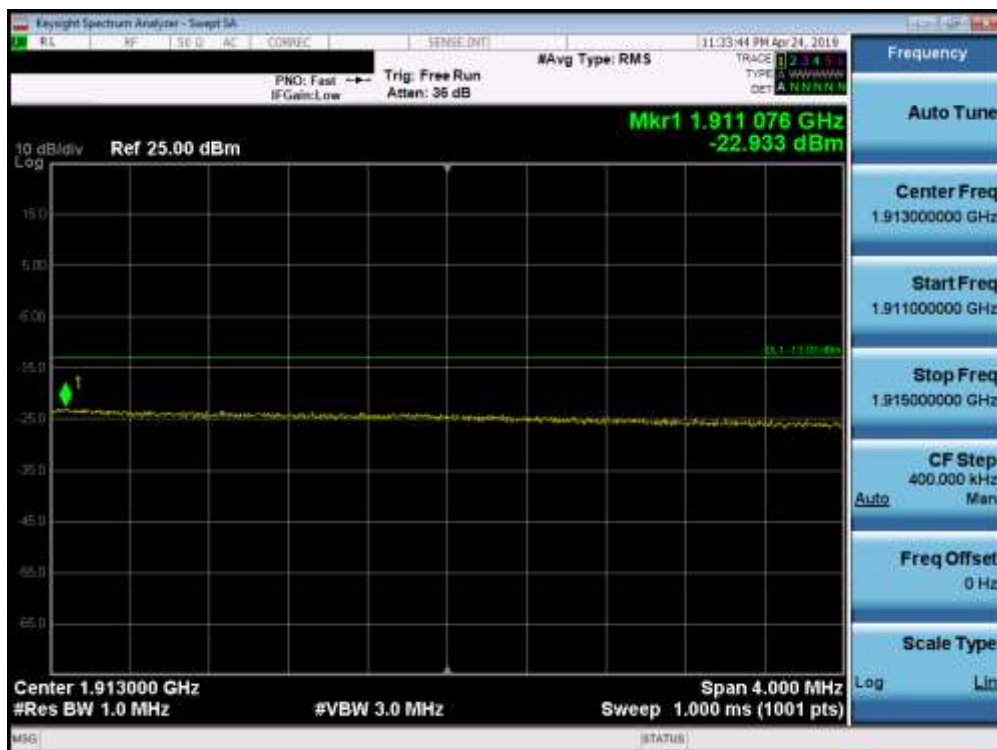


Plot 7-195. Lower Extended Band Edge Plot (Band 2 - 20.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFL322DL		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1904080057-03-R4.ZNF	Test Dates: 4/8 - 5/3/2019	EUT Type: Portable Handset		Page 118 of 160



Plot 7-196. Upper Band Edge Plot (Band 2 - 20.0MHz QPSK - Full RB Configuration)



Plot 7-197. Upper Extended Band Edge Plot (Band 2 - 20.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFL322DL	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1904080057-03-R4.ZNF	Test Dates: 4/8 - 5/3/2019	EUT Type: Portable Handset		Page 119 of 160

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 $\geq$ 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.



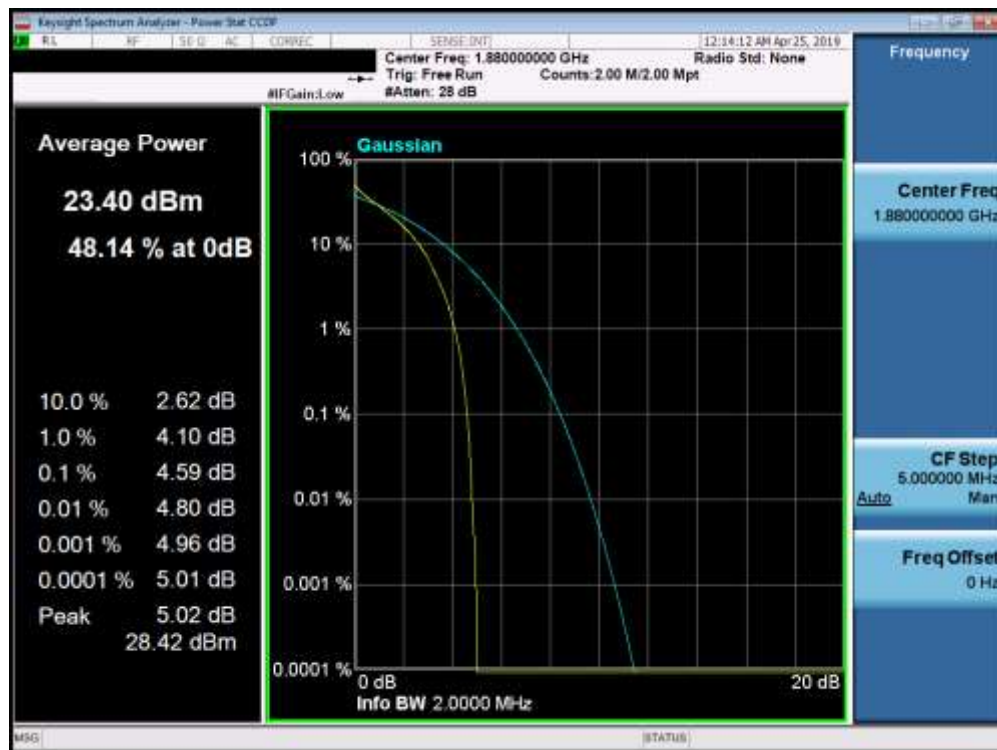
Figure 7-4. Test Instrument & Measurement Setup

Test Notes

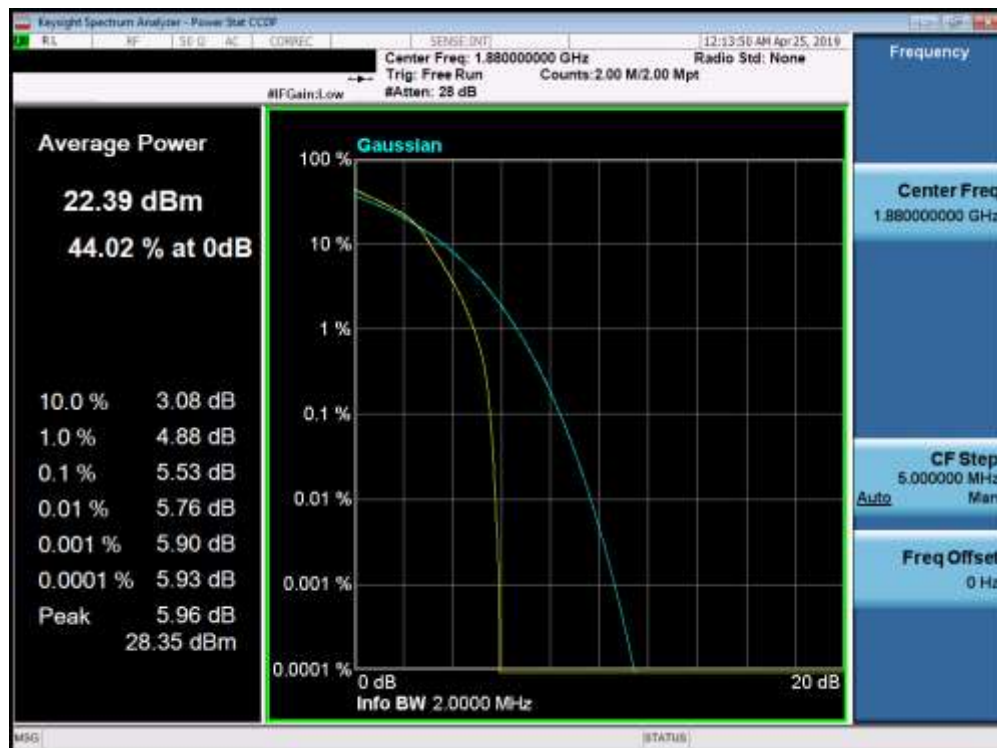
None.

FCC ID: ZNFL322DL	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1904080057-03-R4.ZNF	Test Dates: 4/8 - 5/3/2019	EUT Type: Portable Handset		Page 120 of 160

Band 2

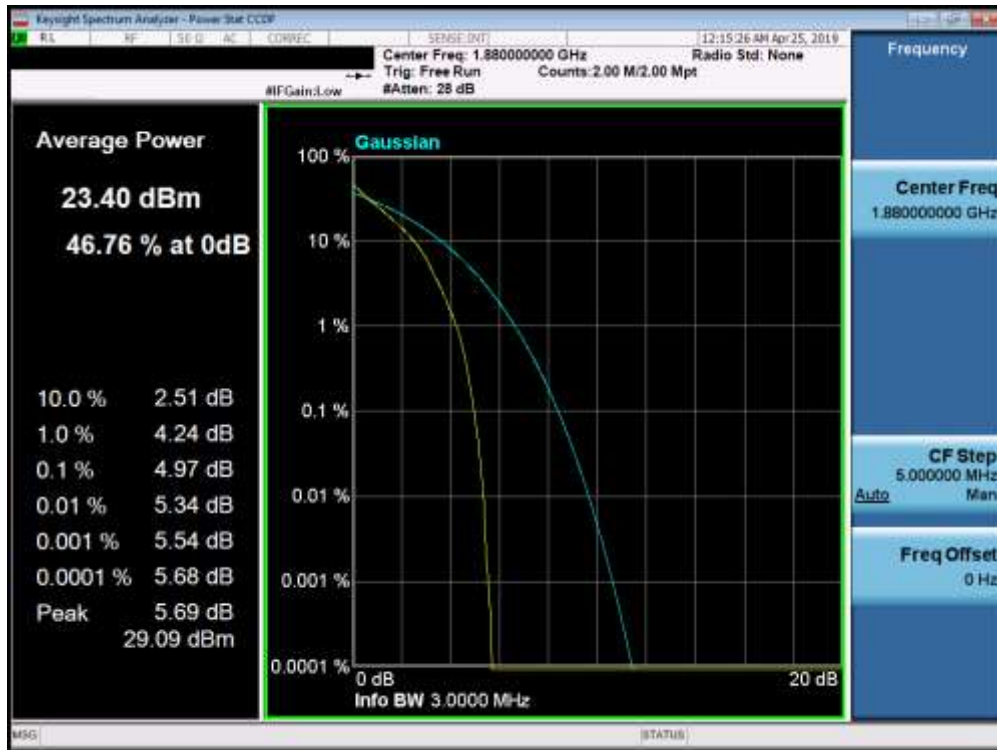


Plot 7-198. PAR Plot (Band 2 - 1.4MHz QPSK - Full RB Configuration)

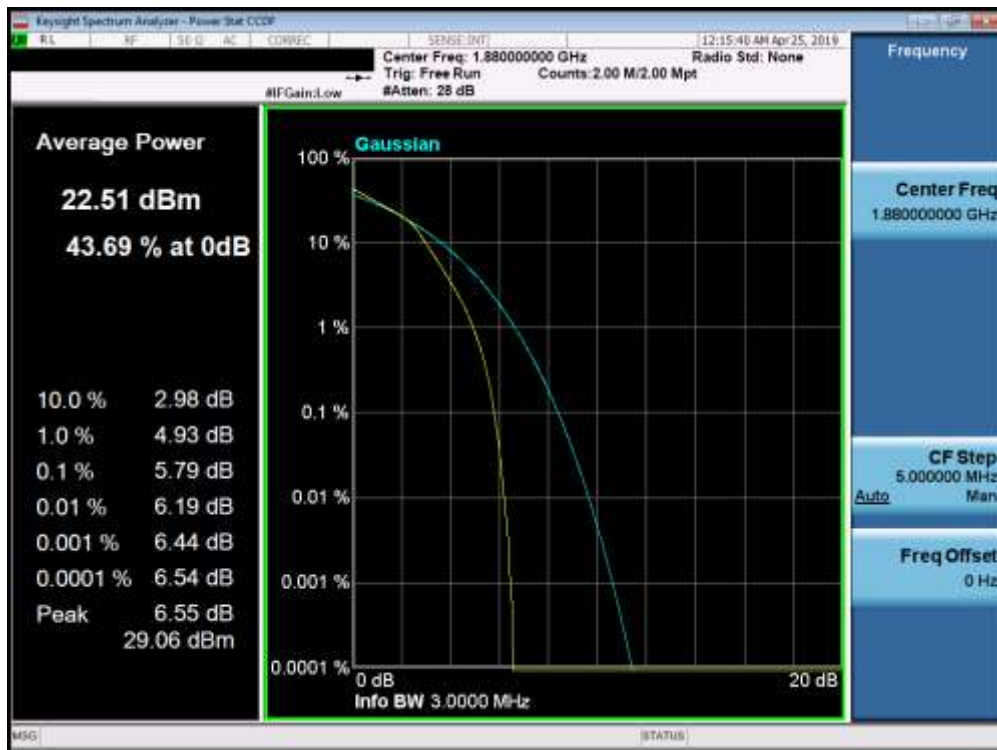


Plot 7-199. PAR Plot (Band 2 - 1.4MHz 16-QAM - Full RB Configuration)

FCC ID: ZNFL322DL	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1904080057-03-R4-ZNF	Test Dates: 4/8 - 5/3/2019	EUT Type: Portable Handset		Page 121 of 160

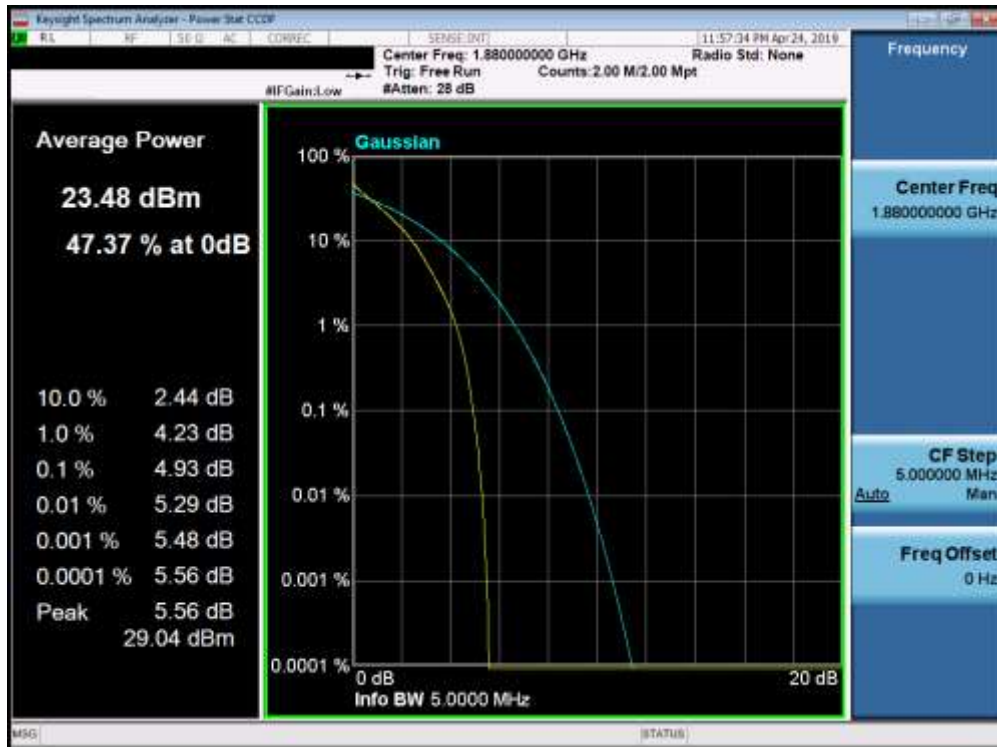


Plot 7-200. PAR Plot (Band 2 - 3.0MHz QPSK - Full RB Configuration)

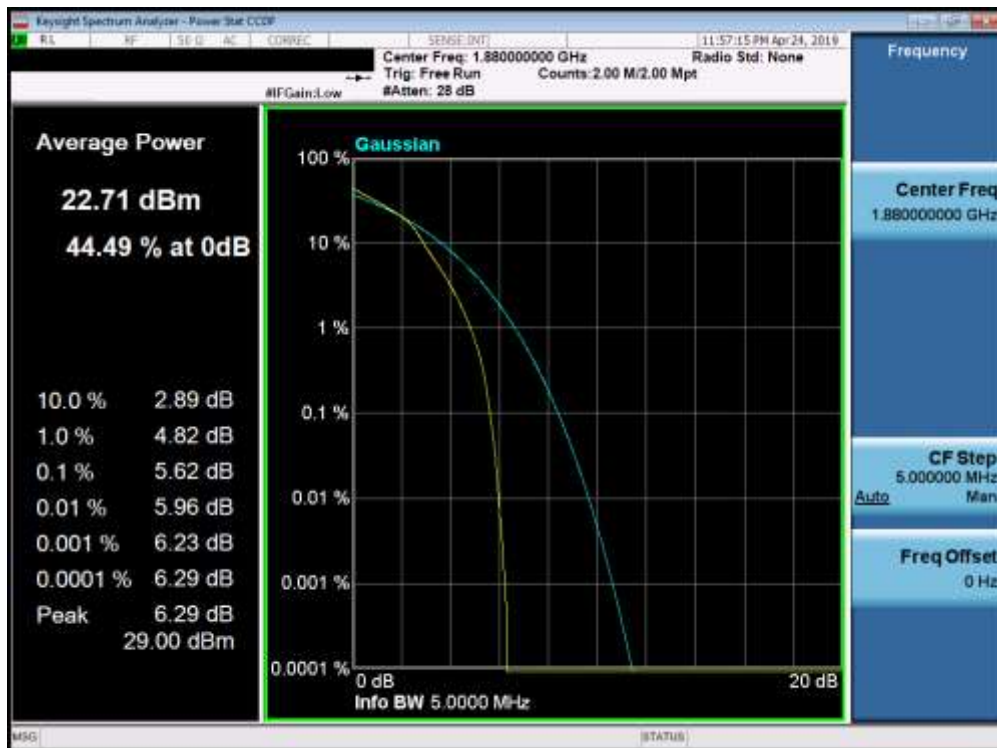


Plot 7-201. PAR Plot (Band 2 - 3.0MHz 16-QAM - Full RB Configuration)

FCC ID: ZNFL322DL	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1904080057-03-R4-ZNF	Test Dates: 4/8 - 5/3/2019	EUT Type: Portable Handset	Page 122 of 160

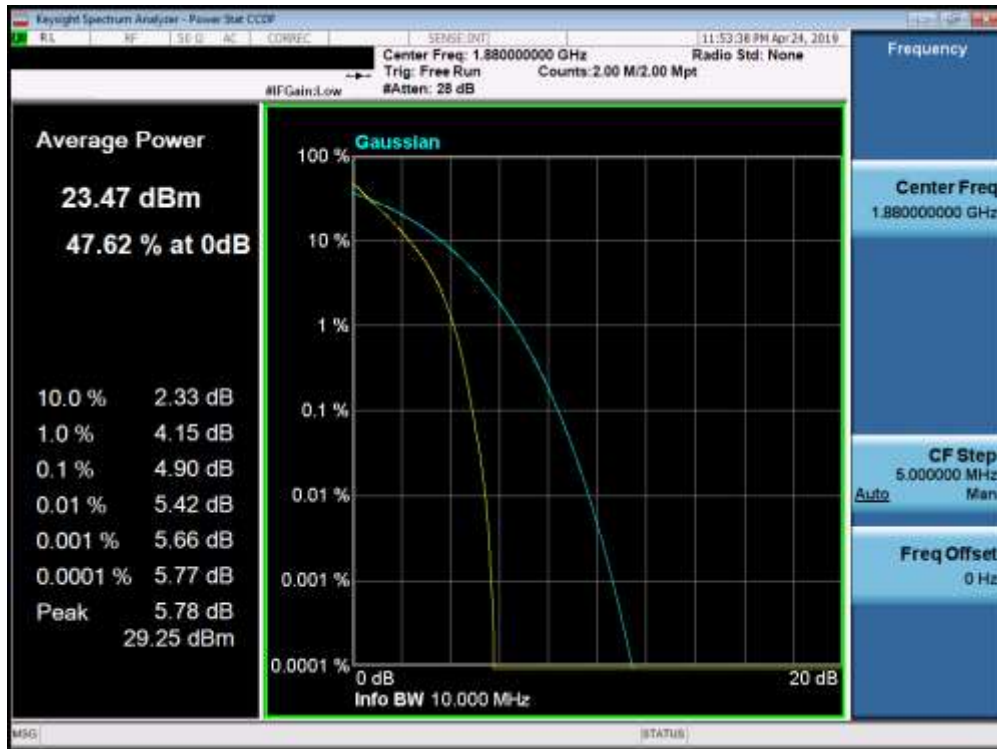


Plot 7-202. PAR Plot (Band 2 - 5.0MHz QPSK - Full RB Configuration)

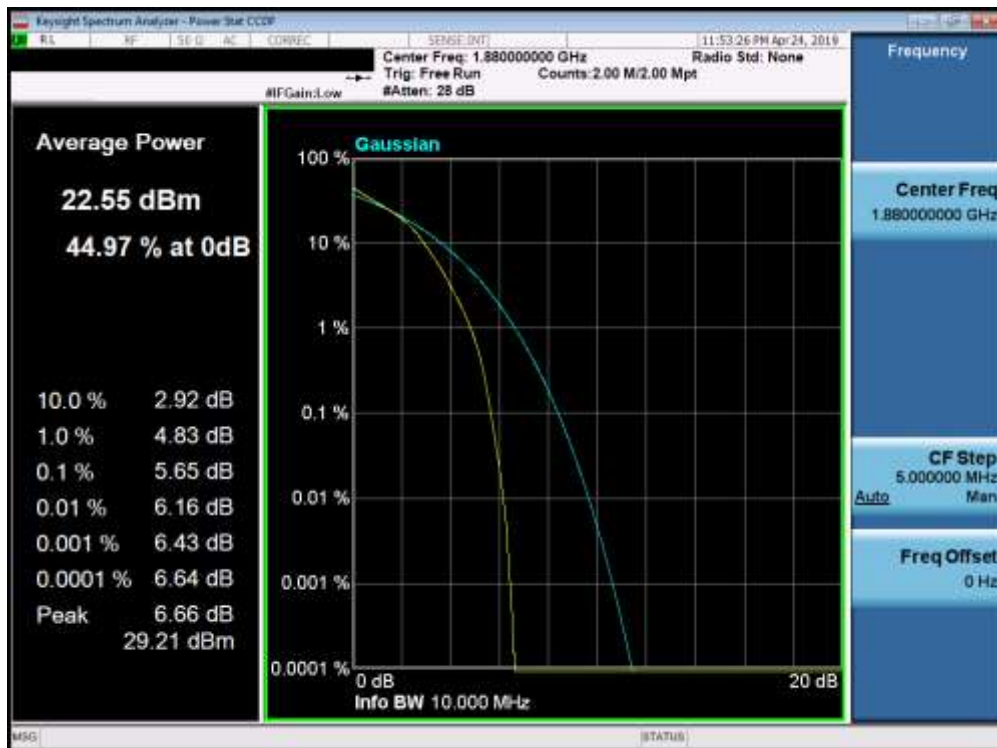


Plot 7-203. PAR Plot (Band 2 - 5.0MHz 16-QAM - Full RB Configuration)

FCC ID: ZNFL322DL	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1904080057-03-R4-ZNF	Test Dates: 4/8 - 5/3/2019	EUT Type: Portable Handset	Page 123 of 160

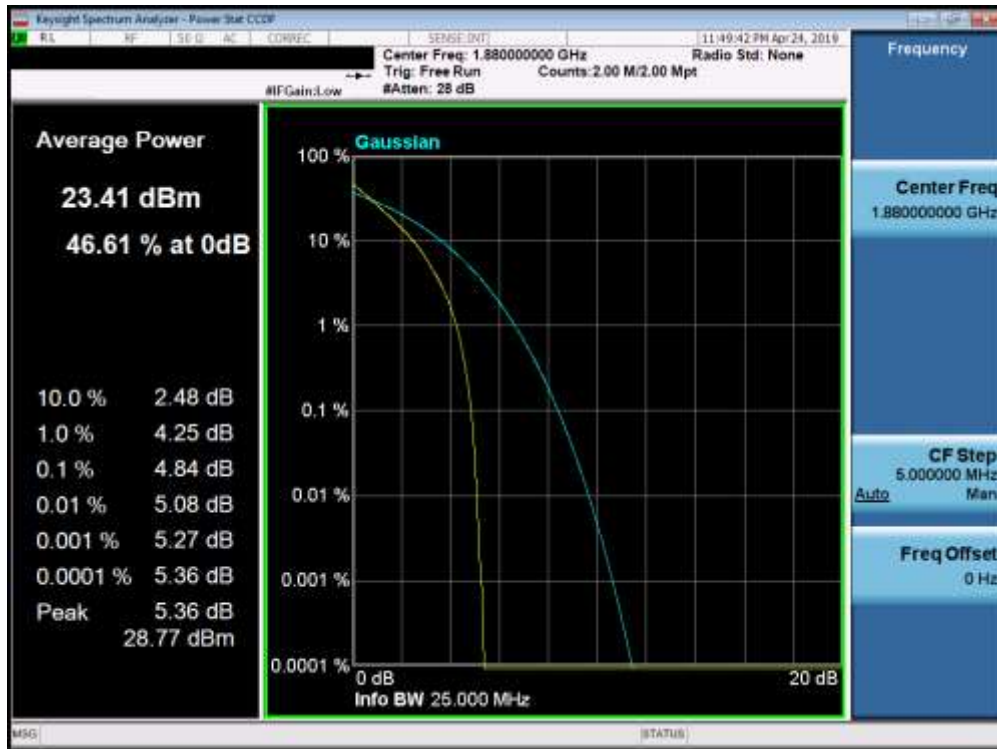


Plot 7-204. PAR Plot (Band 2 - 10.0MHz QPSK - Full RB Configuration)

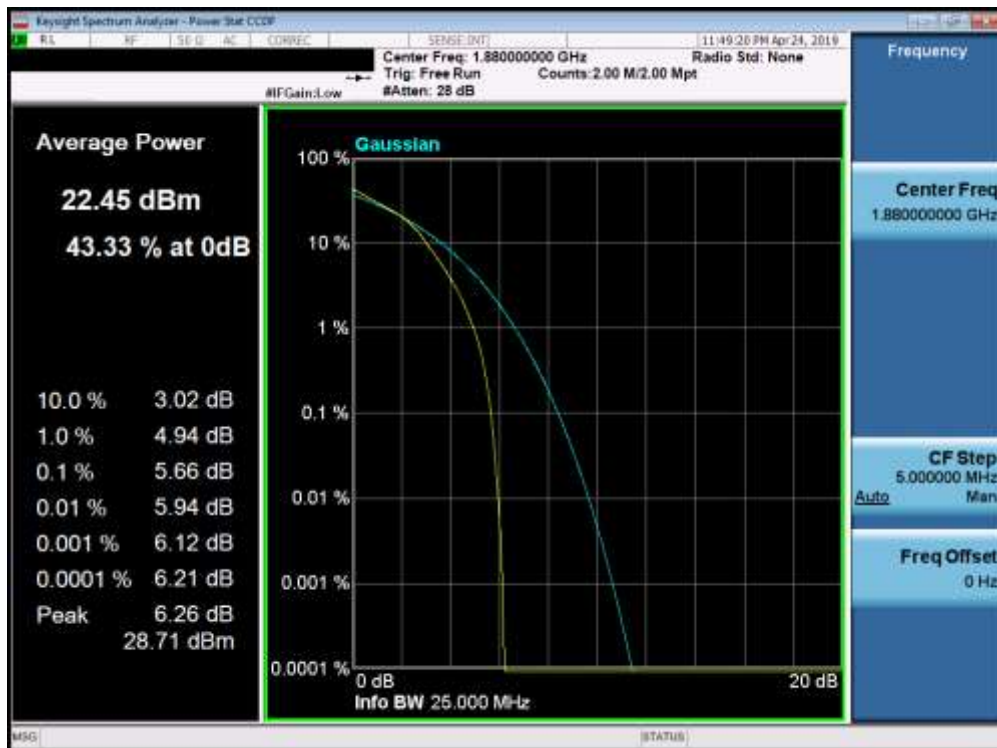


Plot 7-205. PAR Plot (Band 2 - 10.0MHz 16-QAM - Full RB Configuration)

FCC ID: ZNFL322DL	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1904080057-03-R4-ZNF	Test Dates: 4/8 - 5/3/2019	EUT Type: Portable Handset	Page 124 of 160

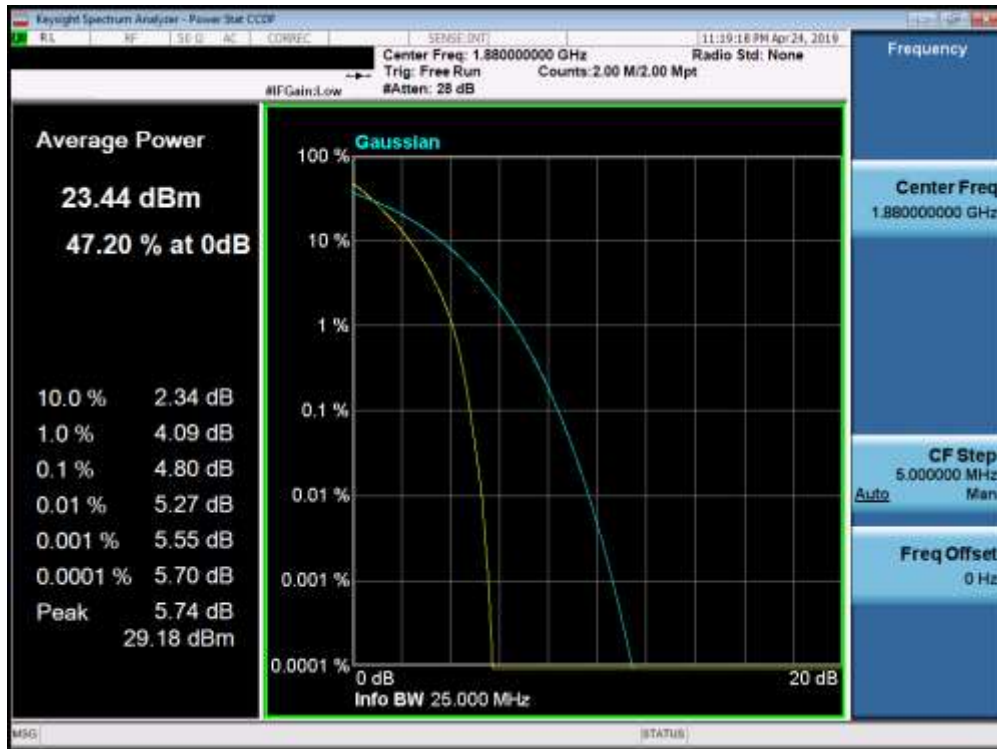


Plot 7-206. PAR Plot (Band 2 - 15.0MHz QPSK - Full RB Configuration)

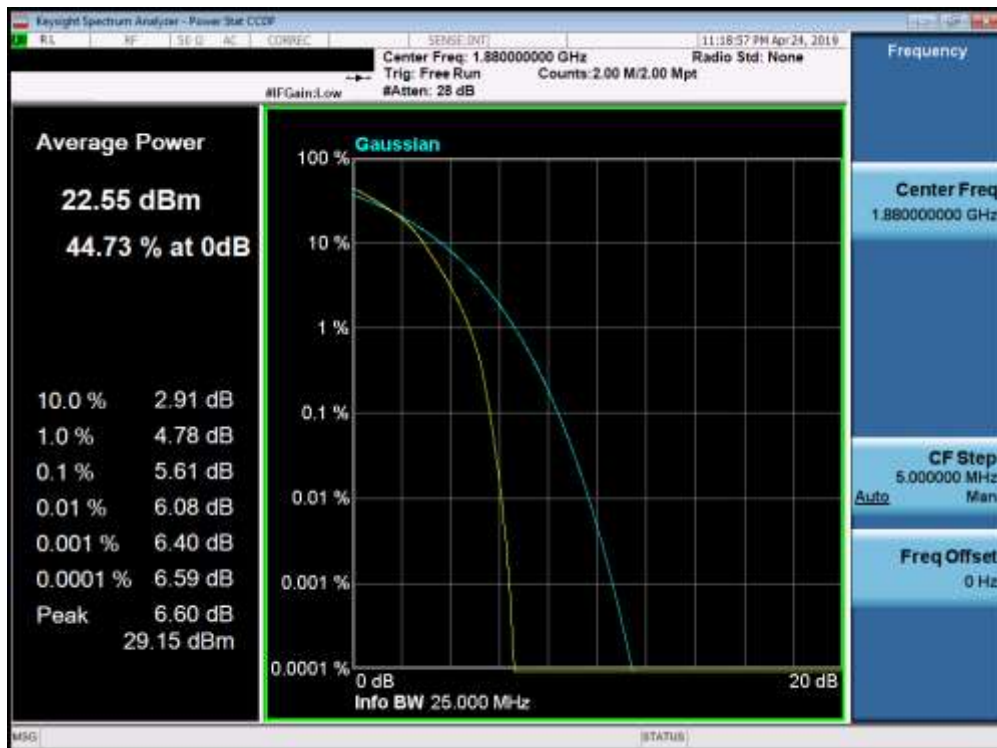


Plot 7-207. PAR Plot (Band 2 - 15.0MHz 16-QAM - Full RB Configuration)

FCC ID: ZNFL322DL	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1904080057-03-R4-ZNF	Test Dates: 4/8 - 5/3/2019	EUT Type: Portable Handset		Page 125 of 160



Plot 7-208. PAR Plot (Band 2 - 20.0MHz QPSK - Full RB Configuration)



Plot 7-209. PAR Plot (Band 2 - 20.0MHz 16-QAM - Full RB Configuration)

FCC ID: ZNFL322DL	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1904080057-03-R4-ZNF	Test Dates: 4/8 - 5/3/2019	EUT Type: Portable Handset	Page 126 of 160

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 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 $\geq 3 \times$ RBW
4. Span = 1.5 times the OBW
5. No. of sweep points $\geq 2 \times$ 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: ZNFL322DL		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1904080057-03-R4.ZNF	Test Dates: 4/8 - 5/3/2019	EUT Type: Portable Handset		Page 127 of 160

Test Setup

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

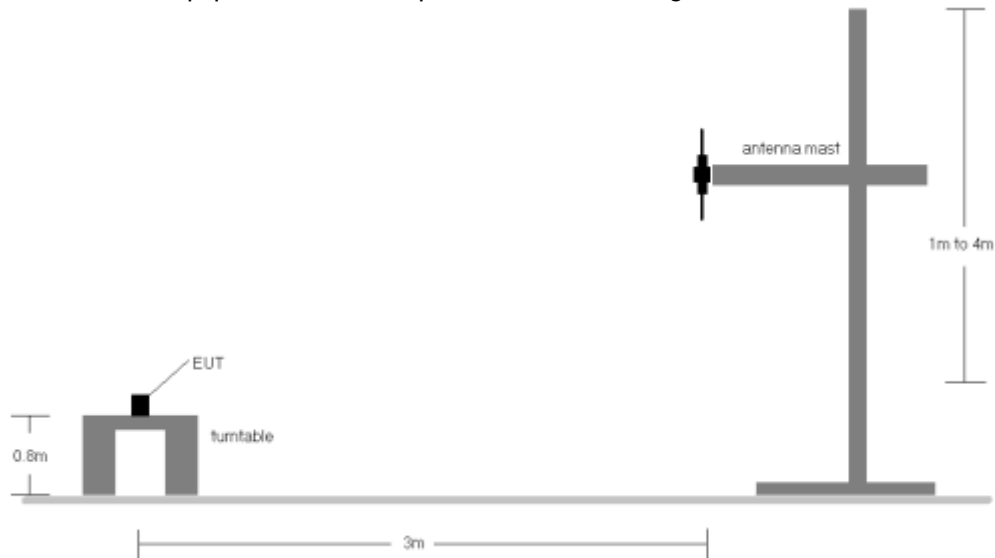


Figure 7-5. Radiated Test Setup <1GHz

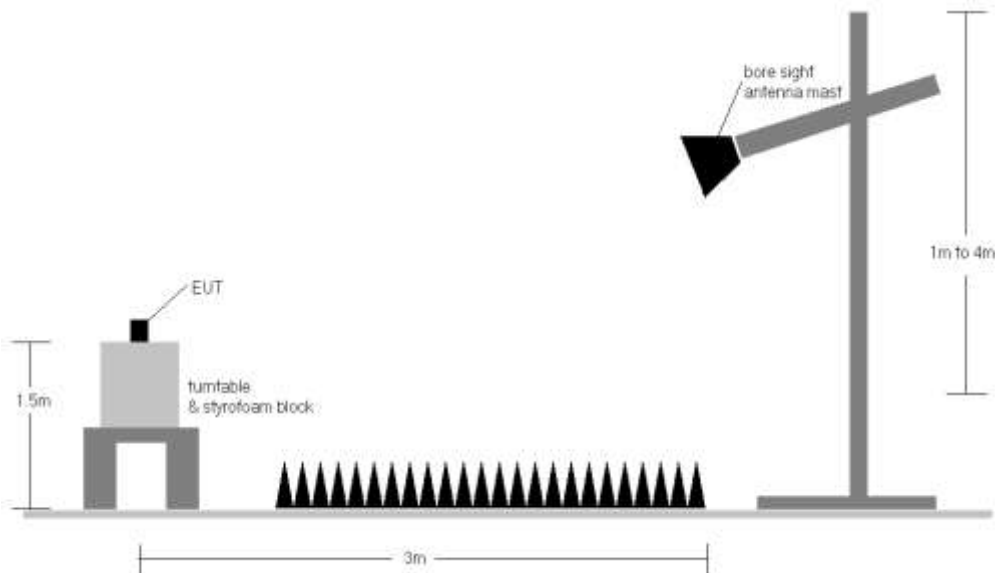


Figure 7-6. Radiated Test Setup >1GHz

Test Notes

- 1) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the tables below.
- 2) This unit was tested with its standard battery.

FCC ID: ZNFL322DL	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1904080057-03-R4.ZNF	Test Dates: 4/8 - 5/3/2019	EUT Type: Portable Handset		Page 128 of 160

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	V	258	201	1 / 24	14.94	3.75	16.54	0.045	34.77	-18.23
680.50	5	QPSK	V	270	202	1 / 24	14.55	4.20	16.60	0.046	34.77	-18.17
695.50	5	QPSK	V	188	305	1 / 0	14.28	4.50	16.63	0.046	34.77	-18.14
665.50	5	16-QAM	V	258	201	1 / 24	13.75	3.75	15.35	0.034	34.77	-19.42
668.00	10	QPSK	V	258	201	1 / 49	15.30	3.80	16.95	0.050	34.77	-17.82
680.50	10	QPSK	V	270	202	1 / 49	14.78	4.20	16.83	0.048	34.77	-17.94
693.00	10	QPSK	V	188	305	1 / 0	14.46	4.40	16.71	0.047	34.77	-18.06
668.00	10	16-QAM	V	258	201	1 / 49	14.25	3.80	15.90	0.039	34.77	-18.87
670.50	15	QPSK	V	258	201	1 / 74	15.30	3.90	17.05	0.051	34.77	-17.72
680.50	15	QPSK	V	270	202	1 / 74	14.55	4.20	16.60	0.046	34.77	-18.17
690.50	15	QPSK	V	188	305	1 / 0	15.48	4.40	17.73	0.059	34.77	-17.04
690.50	15	16-QAM	V	188	305	1 / 0	14.18	4.40	16.43	0.044	34.77	-18.34
673.00	20	QPSK	V	258	201	1 / 99	15.45	4.00	17.30	0.054	34.77	-17.47
680.50	20	QPSK	V	270	202	1 / 99	14.80	4.20	16.85	0.048	34.77	-17.92
688.00	20	QPSK	V	188	305	1 / 0	15.73	4.40	17.98	0.063	34.77	-16.79
673.00	20	16-QAM	V	258	201	1 / 99	14.70	4.00	16.55	0.045	34.77	-18.22
688.00	20	QPSK	H	101	291	1 / 0	10.02	3.20	11.07	0.013	34.77	-23.70

Table 7-3. ERP Data (Band 71)

FCC ID: ZNFL322DL	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1904080057-03-R4.ZNF	Test Dates: 4/8 - 5/3/2019	EUT Type: Portable Handset	Page 129 of 160

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	H	177	287	1 / 5	14.57	5.14	17.56	0.057	34.77	-17.21	19.71	0.094	36.99	-17.28
707.50	1.4	QPSK	H	177	277	1 / 5	14.58	5.19	17.62	0.058	34.77	-17.15	19.77	0.095	36.99	-17.22
715.30	1.4	QPSK	H	179	287	1 / 5	14.50	5.26	17.61	0.058	34.77	-17.16	19.76	0.095	36.99	-17.23
715.30	1.4	16-QAM	H	179	287	1 / 5	13.50	5.26	16.61	0.046	34.77	-18.16	18.76	0.075	36.99	-18.23
700.50	3	QPSK	H	177	287	1 / 14	14.18	5.14	17.17	0.052	34.77	-17.60	19.32	0.086	36.99	-17.67
707.50	3	QPSK	H	177	277	1 / 14	14.58	5.19	17.62	0.058	34.77	-17.15	19.77	0.095	36.99	-17.22
714.50	3	QPSK	H	179	287	1 / 14	14.03	5.25	17.13	0.052	34.77	-17.64	19.28	0.085	36.99	-17.71
707.50	3	16-QAM	H	177	277	1 / 14	13.52	5.19	16.56	0.045	34.77	-18.21	18.71	0.074	36.99	-18.28
701.50	5	QPSK	H	177	287	1 / 24	14.61	5.15	17.61	0.058	34.77	-17.16	19.76	0.095	36.99	-17.23
707.50	5	QPSK	H	177	277	1 / 24	14.48	5.19	17.52	0.056	34.77	-17.25	19.67	0.093	36.99	-17.32
713.50	5	QPSK	H	179	287	1 / 24	14.22	5.24	17.31	0.054	34.77	-17.46	19.46	0.088	36.99	-17.53
707.50	5	16-QAM	H	177	277	1 / 24	13.52	5.19	16.56	0.045	34.77	-18.21	18.71	0.074	36.99	-18.28
704.00	10	QPSK	H	177	287	1 / 49	13.79	5.17	16.81	0.048	34.77	-17.96	18.96	0.079	36.99	-18.03
707.50	10	QPSK	H	177	277	1 / 49	14.46	5.19	17.50	0.056	34.77	-17.27	19.65	0.092	36.99	-17.34
711.00	10	QPSK	H	179	287	1 / 49	14.46	5.22	17.53	0.057	34.77	-17.24	19.68	0.093	36.99	-17.31
711.00	10	16-QAM	H	179	287	1 / 49	13.51	5.22	16.58	0.046	34.77	-18.19	18.73	0.075	36.99	-18.26
711.00	10	QPSK	V	158	162	1 / 49	13.42	5.49	16.76	0.047	34.77	-18.01	18.91	0.078	36.99	-18.08

Table 7-4. ERP Data (Band 12/17)

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	H	253	174	1 / 24	15.71	6.09	19.65	0.092	34.77	-15.12	21.80	0.151	36.99	-15.19
782.00	5	QPSK	H	253	174	1 / 24	15.58	6.13	19.56	0.090	34.77	-15.21	21.71	0.148	36.99	-15.28
784.50	5	QPSK	H	253	174	1 / 24	15.32	6.18	19.35	0.086	34.77	-15.42	21.50	0.141	36.99	-15.49
782.00	5	16-QAM	H	253	174	1 / 24	14.10	6.13	18.08	0.064	34.77	-16.69	20.23	0.105	36.99	-16.76
782.00	10	QPSK	H	253	174	1 / 49	15.47	6.13	19.45	0.088	34.77	-15.32	21.60	0.145	36.99	-15.38
782.00	10	16-QAM	H	253	174	1 / 49	14.51	6.13	18.49	0.071	34.77	-16.28	20.64	0.116	36.99	-16.34
779.50	5	QPSK	V	138	233	1 / 24	11.16	6.46	15.47	0.035	34.77	-19.30	17.62	0.058	36.99	-19.37

Table 7-5. ERP Data (Band 13)

FCC ID: ZNFL322DL	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1904080057-03-R4.ZNF	Test Dates: 4/8 - 5/3/2019	EUT Type: Portable Handset	Page 130 of 160

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	V	230	332	1 / 5	14.44	6.30	18.59	0.072	38.45	-19.86	20.74	0.119	40.61	-19.87
836.50	1.4	QPSK	V	237	332	1 / 0	14.56	6.40	18.81	0.076	38.45	-19.64	20.96	0.125	40.61	-19.65
848.30	1.4	QPSK	V	230	333	1 / 0	14.11	6.50	18.46	0.070	38.45	-19.99	20.61	0.115	40.61	-20.00
836.50	1.4	16-QAM	V	237	332	1 / 0	13.62	6.40	17.87	0.061	38.45	-20.58	20.02	0.100	40.61	-20.59
825.50	3	QPSK	V	230	332	1 / 14	14.50	6.30	18.65	0.073	38.45	-19.80	20.80	0.120	40.61	-19.81
836.50	3	QPSK	V	237	332	1 / 0	14.48	6.40	18.73	0.075	38.45	-19.72	20.88	0.122	40.61	-19.73
847.50	3	QPSK	V	230	333	1 / 0	14.25	6.50	18.60	0.072	38.45	-19.85	20.75	0.119	40.61	-19.86
825.50	3	16-QAM	V	230	332	1 / 14	13.45	6.30	17.60	0.058	38.45	-20.85	19.75	0.094	40.61	-20.86
826.50	5	QPSK	V	230	332	1 / 24	14.48	6.30	18.63	0.073	38.45	-19.82	20.78	0.120	40.61	-19.83
836.50	5	QPSK	V	237	332	1 / 0	14.19	6.40	18.44	0.070	38.45	-20.01	20.59	0.115	40.61	-20.02
846.50	5	QPSK	V	230	333	1 / 0	14.52	6.50	18.87	0.077	38.45	-19.58	21.02	0.126	40.61	-19.59
846.50	5	16-QAM	V	230	333	1 / 0	12.95	6.50	17.30	0.054	38.45	-21.15	19.45	0.088	40.61	-21.16
829.00	10	QPSK	V	230	332	1 / 49	14.37	6.30	18.52	0.071	38.45	-19.93	20.67	0.117	40.61	-19.94
836.50	10	QPSK	V	237	332	1 / 0	14.52	6.40	18.77	0.075	38.45	-19.68	20.92	0.124	40.61	-19.69
844.00	10	QPSK	V	230	333	1 / 0	13.99	6.40	18.24	0.067	38.45	-20.21	20.39	0.109	40.61	-20.22
836.50	10	16-QAM	V	237	332	1 / 0	13.77	6.40	18.02	0.063	38.45	-20.43	20.17	0.104	40.61	-20.44
846.50	5	QPSK	H	142	298	1 / 0	15.58	7.08	20.51	0.112	38.45	-17.94	22.66	0.185	40.61	-17.95

Table 7-6. ERP Data (Band 5)

FCC ID: ZNFL322DL	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1904080057-03-R4.ZNF	Test Dates: 4/8 - 5/3/2019	EUT Type: Portable Handset	Page 131 of 160

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	H	234	22	1 / 5	14.25	9.63	23.88	0.244	30.00	-6.12
1745.00	1.4	QPSK	H	182	28	1 / 0	14.47	9.49	23.96	0.249	30.00	-6.04
1779.30	1.4	QPSK	H	224	19	1 / 0	14.96	9.35	24.31	0.270	30.00	-5.69
1779.30	1.4	16-QAM	H	224	19	1 / 0	14.65	9.35	24.00	0.251	30.00	-6.00
1711.50	3	QPSK	H	234	22	1 / 14	14.27	9.62	23.89	0.245	30.00	-6.11
1745.00	3	QPSK	H	182	28	1 / 0	14.57	9.49	24.06	0.255	30.00	-5.94
1778.50	3	QPSK	H	224	19	1 / 0	15.08	9.35	24.43	0.277	30.00	-5.57
1778.50	3	16-QAM	H	224	19	1 / 0	14.66	9.35	24.01	0.252	30.00	-5.99
1712.50	5	QPSK	H	234	22	1 / 24	14.26	9.62	23.88	0.244	30.00	-6.12
1745.00	5	QPSK	H	182	28	1 / 0	14.57	9.49	24.06	0.255	30.00	-5.94
1777.50	5	QPSK	H	224	19	1 / 0	15.04	9.36	24.40	0.275	30.00	-5.60
1777.50	5	16-QAM	H	224	19	1 / 0	14.62	9.36	23.98	0.250	30.00	-6.02
1715.00	10	QPSK	H	234	22	1 / 49	14.28	9.61	23.89	0.245	30.00	-6.11
1745.00	10	QPSK	H	182	28	1 / 0	14.57	9.49	24.06	0.255	30.00	-5.94
1775.00	10	QPSK	H	224	19	1 / 0	14.84	9.37	24.21	0.264	30.00	-5.79
1775.00	10	16-QAM	H	224	19	1 / 0	14.70	9.37	24.07	0.255	30.00	-5.93
1717.50	15	QPSK	H	234	22	1 / 74	14.12	9.60	23.72	0.236	30.00	-6.28
1745.00	15	QPSK	H	182	28	1 / 0	14.30	9.49	23.79	0.239	30.00	-6.21
1772.50	15	QPSK	H	224	19	1 / 0	14.93	9.38	24.31	0.270	30.00	-5.69
1772.50	15	16-QAM	H	224	19	1 / 0	14.72	9.38	24.10	0.257	30.00	-5.90
1720.00	20	QPSK	H	234	22	1 / 99	14.30	9.59	23.89	0.245	30.00	-6.11
1745.00	20	QPSK	H	182	28	1 / 0	14.55	9.49	24.04	0.253	30.00	-5.96
1770.00	20	QPSK	H	224	19	1 / 0	14.92	9.39	24.31	0.270	30.00	-5.69
1770.00	20	16-QAM	H	224	19	1 / 0	14.27	9.39	23.66	0.232	30.00	-6.34
1778.50	3	QPSK	V	100	120	1 / 0	12.87	9.38	22.25	0.168	30.00	-7.75

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

FCC ID: ZNFL322DL	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1904080057-03-R4.ZNF	Test Dates: 4/8 - 5/3/2019	EUT Type: Portable Handset	Page 132 of 160

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	H	108	19	1 / 5	14.23	9.07	23.30	0.214	33.01	-9.71
1880.00	1.4	QPSK	H	110	17	1 / 0	14.62	9.15	23.77	0.238	33.01	-9.24
1909.30	1.4	QPSK	H	118	31	1 / 0	14.09	9.27	23.36	0.217	33.01	-9.65
1880.00	1.4	16-QAM	H	110	17	1 / 0	13.91	9.15	23.06	0.202	33.01	-9.95
1851.50	3	QPSK	H	108	19	1 / 14	14.46	9.07	23.53	0.225	33.01	-9.48
1880.00	3	QPSK	H	110	17	1 / 0	14.67	9.15	23.82	0.241	33.01	-9.19
1908.50	3	QPSK	H	118	31	1 / 0	13.97	9.26	23.23	0.210	33.01	-9.78
1880.00	3	16-QAM	H	110	17	1 / 0	13.92	9.15	23.07	0.203	33.01	-9.94
1852.50	5	QPSK	H	108	19	1 / 24	14.27	9.07	23.34	0.216	33.01	-9.67
1880.00	5	QPSK	H	110	17	1 / 0	14.54	9.15	23.69	0.234	33.01	-9.32
1907.50	5	QPSK	H	118	31	1 / 0	13.90	9.26	23.16	0.207	33.01	-9.85
1880.00	5	16-QAM	H	110	17	1 / 0	13.30	9.15	22.45	0.176	33.01	-10.56
1855.00	10	QPSK	H	108	19	1 / 49	14.37	9.08	23.45	0.221	33.01	-9.56
1880.00	10	QPSK	H	110	17	1 / 0	14.65	9.15	23.80	0.240	33.01	-9.21
1905.00	10	QPSK	H	118	31	1 / 0	13.97	9.24	23.21	0.209	33.01	-9.80
1880.00	10	16-QAM	H	110	17	1 / 0	14.02	9.15	23.17	0.207	33.01	-9.84
1857.50	15	QPSK	H	108	19	1 / 74	14.56	9.08	23.64	0.231	33.01	-9.37
1880.00	15	QPSK	H	110	17	1 / 0	14.63	9.15	23.78	0.239	33.01	-9.23
1902.50	15	QPSK	H	118	31	1 / 0	14.06	9.22	23.28	0.213	33.01	-9.73
1880.00	15	16-QAM	H	110	17	1 / 0	14.02	9.15	23.17	0.207	33.01	-9.84
1860.00	20	QPSK	H	108	19	1 / 99	14.52	9.09	23.61	0.230	33.01	-9.40
1880.00	20	QPSK	H	110	17	1 / 0	14.80	9.15	23.95	0.248	33.01	-9.06
1900.00	20	QPSK	H	118	31	1 / 0	14.26	9.20	23.46	0.222	33.01	-9.55
1880.00	20	16-QAM	H	110	17	1 / 0	13.75	9.15	22.90	0.195	33.01	-10.11
1880.00	20	QPSK	V	12	59	1 / 0	14.64	9.09	23.73	0.236	33.01	-9.28

Table 7-8. EIRP Data (Band 2)

FCC ID: ZNFL322DL	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1904080057-03-R4.ZNF	Test Dates: 4/8 - 5/3/2019	EUT Type: Portable Handset	Page 133 of 160

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

FCC ID: ZNFL322DL		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1904080057-03-R4.ZNF	Test Dates: 4/8 - 5/3/2019	EUT Type: Portable Handset		Page 134 of 160

Test Setup

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

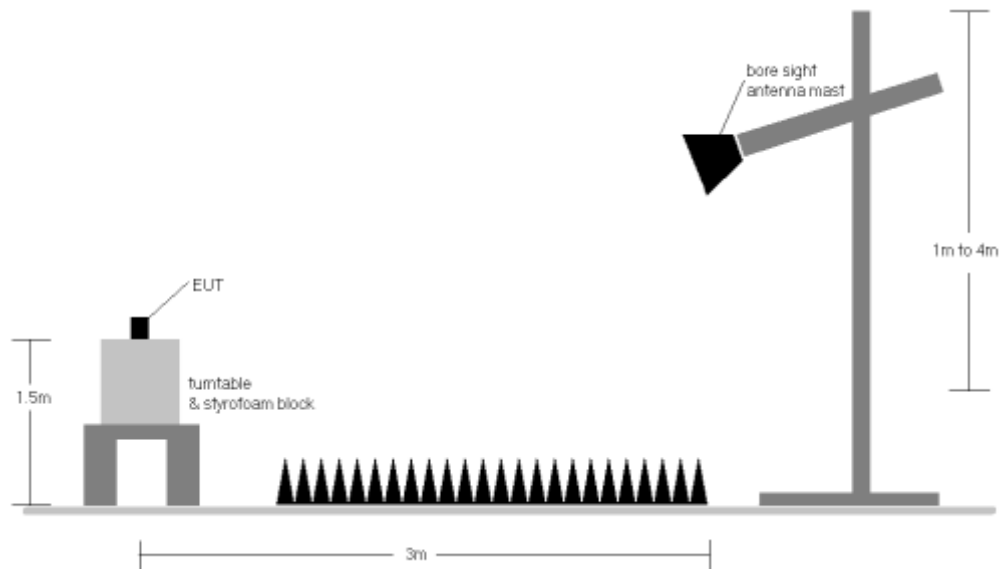


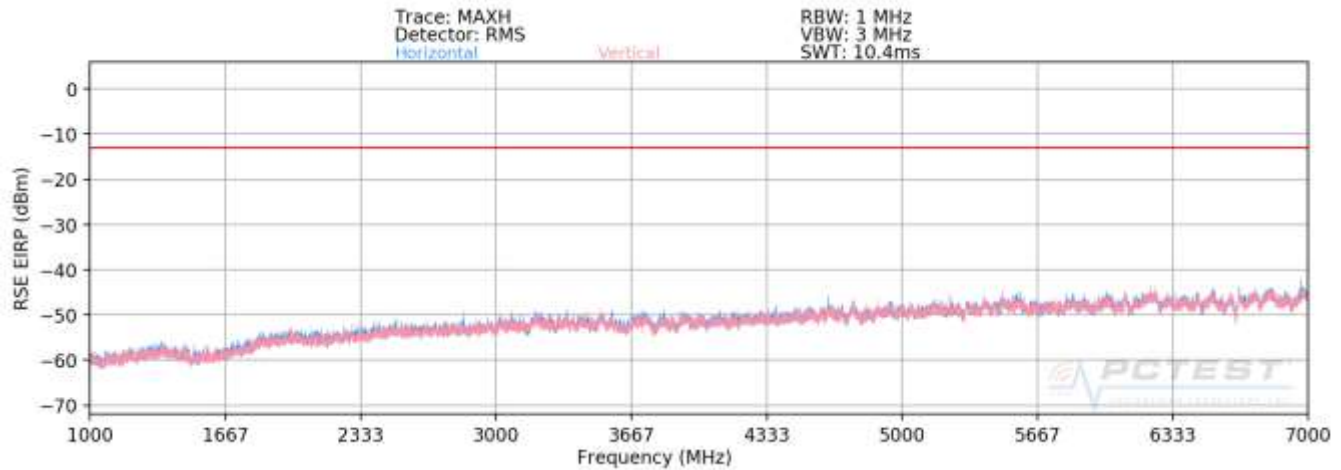
Figure 7-7. Test Instrument & Measurement Setup

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.

FCC ID: ZNFL322DL	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1904080057-03-R4.ZNF	Test Dates: 4/8 - 5/3/2019	EUT Type: Portable Handset	Page 135 of 160

Band 71



Plot 7-210. 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	V	392	235	-78.67	9.18	-69.48	-56.5
2019.00	V	151	88	-71.23	9.52	-61.70	-48.7
2692.00	V	-	-	-77.13	7.95	-69.17	-56.2
3365.00	V	-	-	-75.20	8.71	-66.49	-53.5

Table 7-9. Radiated Spurious Data (Band 71 – Low Channel)

FCC ID: ZNFL322DL		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1904080057-03-R4.ZNF	Test Dates: 4/8 - 5/3/2019	EUT Type: Portable Handset		Page 136 of 160

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	V	355	298	-79.83	9.05	-70.77	-57.8
2041.50	V	400	266	-70.02	9.40	-60.63	-47.6
2722.00	V	-	-	-76.36	8.09	-68.27	-55.3
3402.50	V	-	-	-75.08	8.90	-66.17	-53.2

Table 7-10. Radiated Spurious Data (Band 71 – Mid Channel)

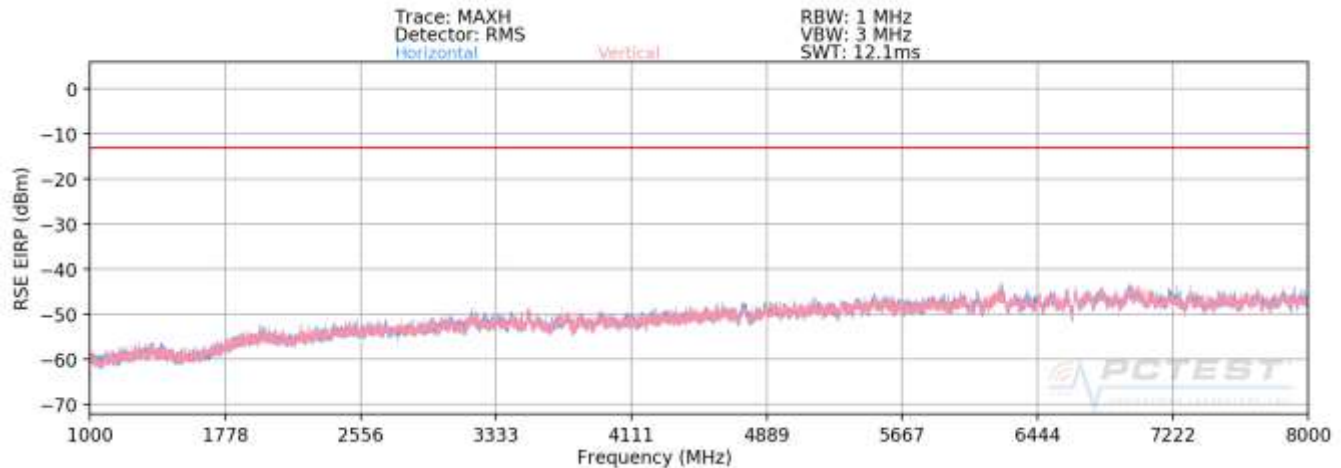
OPERATING FREQUENCY: 688.00 MHz
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 20.0 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

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]
1376.00	V	398	223	-80.68	8.89	-71.79	-58.8
2064.00	V	118	86	-73.10	9.22	-63.87	-50.9
2752.00	V	-	-	-77.01	8.22	-68.79	-55.8
3440.00	V	-	-	-76.73	9.14	-67.59	-54.6

Table 7-11. Radiated Spurious Data (Band 71 – High Channel)

FCC ID: ZNFL322DL			MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1904080057-03-R4.ZNF	Test Dates: 4/8 - 5/3/2019	EUT Type: Portable Handset			Page 137 of 160

Band 12



Plot 7-211. Radiated Spurious Plot above 1GHz (Band 12)

OPERATING FREQUENCY: 699.70 MHz
 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]
1399.40	H	234	36	-77.75	8.65	-69.10	-56.1
2099.10	H	383	140	-72.12	8.91	-63.21	-50.2
2798.80	H	-	-	-72.82	8.17	-64.65	-51.6
3498.50	H	-	-	-71.58	9.16	-62.42	-49.4

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

FCC ID: ZNFL322DL	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1904080057-03-R4.ZNF	Test Dates: 4/8 - 5/3/2019	EUT Type: Portable Handset		Page 138 of 160

OPERATING FREQUENCY: 707.50 MHz
 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]
1415.00	H	383	120	-78.40	8.63	-69.77	-56.8
2122.50	H	381	142	-71.80	8.92	-62.88	-49.9
2830.00	H	-	-	-72.51	8.05	-64.47	-51.5
3537.50	H	-	-	-70.04	8.84	-61.20	-48.2

Table 7-13. Radiated Spurious Data (Band 12 – Mid Channel)

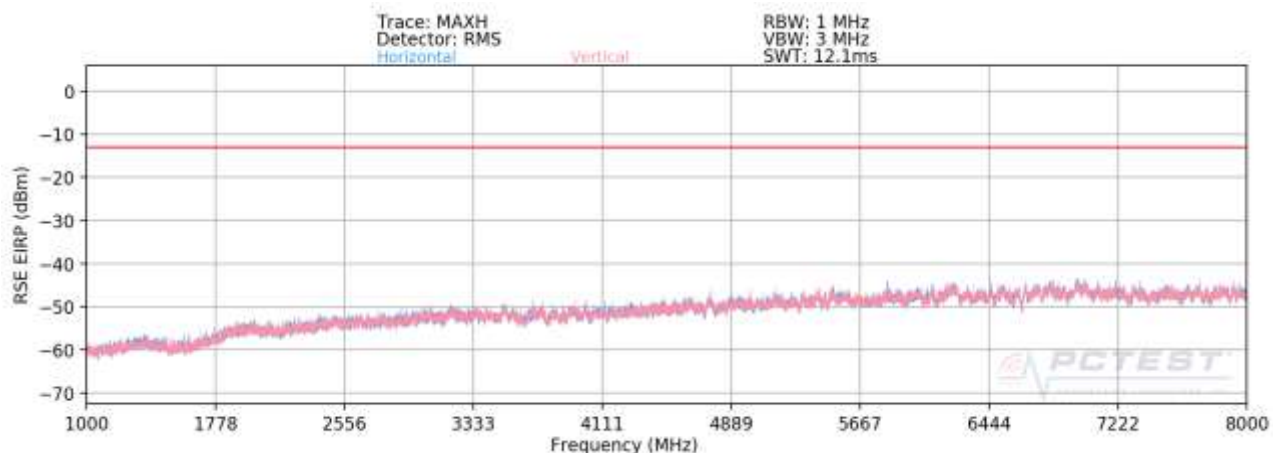
OPERATING FREQUENCY: 715.30 MHz
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 1.4 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

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]
1430.60	H	117	49	-78.29	8.61	-69.68	-56.7
2145.90	H	379	136	-71.53	8.94	-62.59	-49.6
2861.20	H	-	-	-72.09	7.90	-64.18	-51.2
3576.50	H	-	-	-69.55	8.50	-61.05	-48.1

Table 7-14. Radiated Spurious Data (Band 12 – High Channel)

FCC ID: ZNFL322DL		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1904080057-03-R4.ZNF	Test Dates: 4/8 - 5/3/2019	EUT Type: Portable Handset		Page 139 of 160

Band 13



Plot 7-212. Radiated Spurious Plot above 1GHz (Band 13)

OPERATING FREQUENCY: 782.00 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]
2346.00	V	147	301	-70.54	8.76	-61.78	-48.8
3128.00	V	-	-	-71.84	8.42	-63.42	-50.4
3910.00	V	-	-	-71.54	8.79	-62.76	-49.8

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

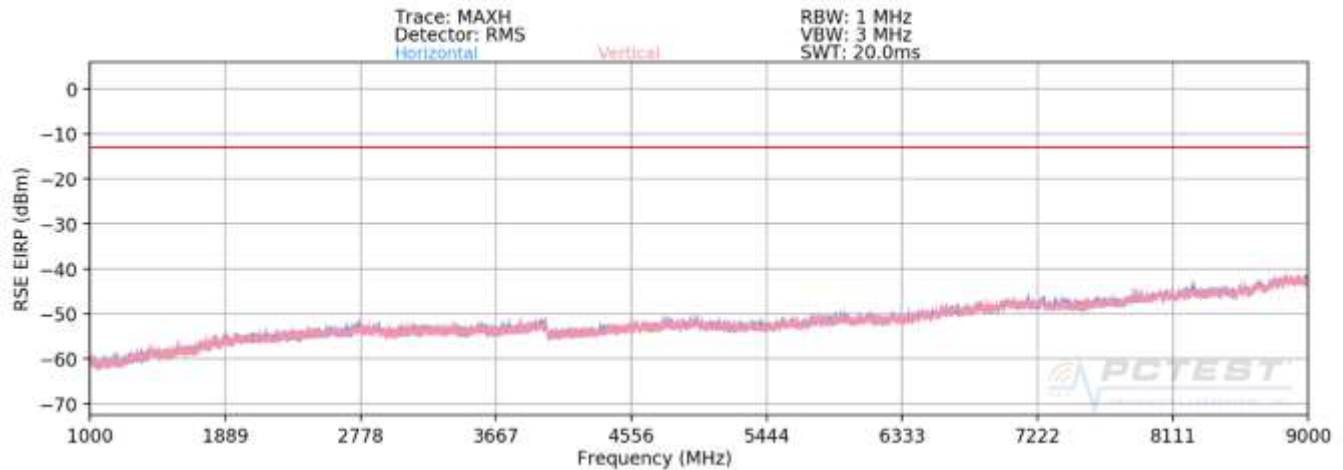
MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.00 MHz
 DISTANCE: 3 meters
 NARROWBAND EMISSION LIMIT: -50 dBm
 WIDEBAND EMISSION LIMIT: -40 dBm/MHz

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	V	-	-	-79.18	8.73	-70.45	-30.4

Table 7-16. Radiated Spurious Data (Band 13 – 1559-1610MHz Band)

FCC ID: ZNFL322DL	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1904080057-03-R4.ZNF	Test Dates: 4/8 - 5/3/2019	EUT Type: Portable Handset	Page 140 of 160

Band 5



Plot 7-213. Radiated Spurious Plot above 1GHz (Band 5)

OPERATING FREQUENCY: 826.50 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]
1653.00	H	207	174	-78.60	9.48	-69.12	-56.1
2479.50	H	-	-	-74.41	8.43	-65.98	-53.0
3306.00	H	-	-	-71.26	8.19	-63.07	-50.1

Table 7-17. Radiated Spurious Data (Band 5 – Low Channel)

FCC ID: ZNFL322DL	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1904080057-03-R4.ZNF	Test Dates: 4/8 - 5/3/2019	EUT Type: Portable Handset		Page 141 of 160

OPERATING FREQUENCY: 836.50 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]
1673.00	H	178	176	-78.35	9.56	-68.79	-55.8
2509.50	H	-	-	-74.24	8.33	-65.91	-52.9
3346.00	H	-	-	-71.30	8.59	-62.71	-49.7

Table 7-18. Radiated Spurious Data (Band 5 – Mid Channel)

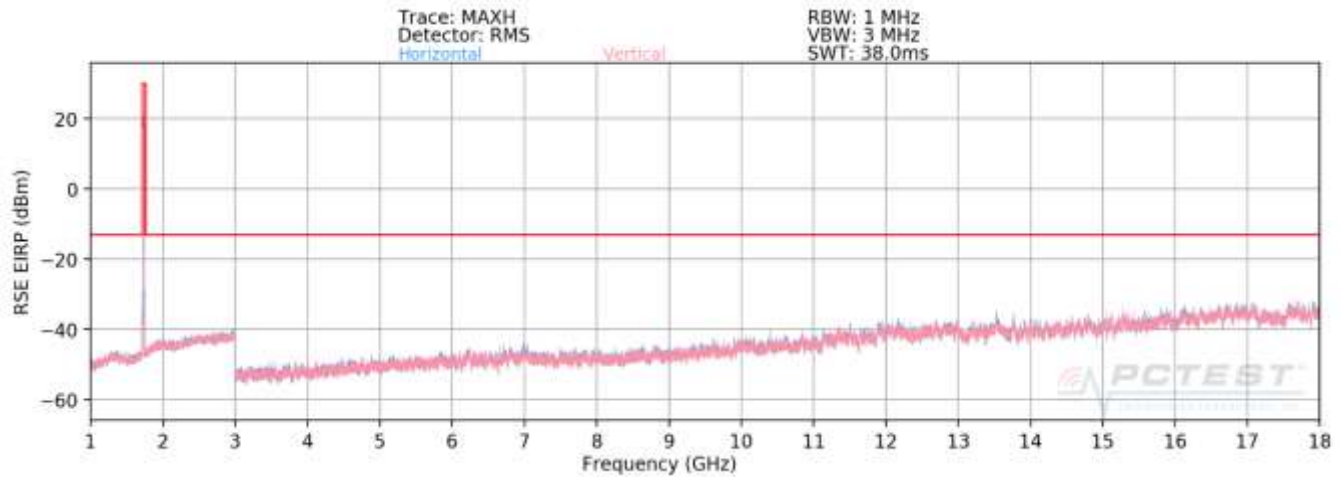
OPERATING FREQUENCY: 846.50 MHz
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.0 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

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]
1693.00	H	128	172	-77.41	9.64	-67.76	-54.8
2539.50	H	-	-	-73.35	8.28	-65.08	-52.1
3386.00	H	-	-	-72.50	8.82	-63.68	-50.7

Table 7-19. Radiated Spurious Data (Band 5 – High Channel)

FCC ID: ZNFL322DL	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1904080057-03-R4.ZNF	Test Dates: 4/8 - 5/3/2019	EUT Type: Portable Handset	Page 142 of 160

Band 66/4



Plot 7-214. Radiated Spurious Plot above 1GHz (Band 66/4)

OPERATING FREQUENCY: 1720.00 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	H	111	135	-62.79	9.14	-53.64	-40.6
5160.00	H	-	-	-76.07	12.59	-63.48	-50.5
6880.00	H	-	-	-72.34	10.47	-61.87	-48.9

Table 7-20. Radiated Spurious Data (Band 66/4 – Low Channel)

FCC ID: ZNFL322DL	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1904080057-03-R4.ZNF	Test Dates: 4/8 - 5/3/2019	EUT Type: Portable Handset		Page 143 of 160

OPERATING FREQUENCY: 1745.00 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]
3490.00	H	113	25	-66.22	9.16	-57.06	-44.1
5235.00	H	127	288	-77.44	12.92	-64.51	-51.5
6980.00	H	-	-	-72.79	10.18	-62.61	-49.6
8725.00	H	-	-	-70.84	11.36	-59.48	-46.5

Table 7-21. Radiated Spurious Data (Band 66/4 – Mid Channel)

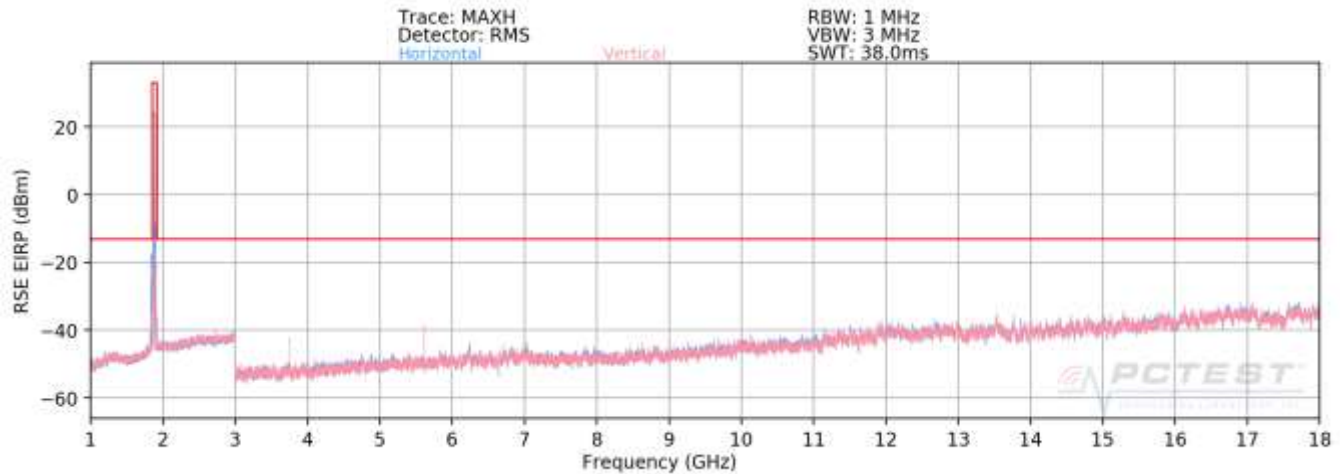
OPERATING FREQUENCY: 1770.00 MHz
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 20.0 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

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]
3540.00	H	400	338	-70.89	8.82	-62.07	-49.1
5310.00	H	-	-	-76.54	13.10	-63.44	-50.4
7080.00	H	-	-	-71.64	10.06	-61.58	-48.6

Table 7-22. Radiated Spurious Data (Band 66/4 – High Channel)

FCC ID: ZNFL322DL		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1904080057-03-R4.ZNF	Test Dates: 4/8 - 5/3/2019	EUT Type: Portable Handset		Page 144 of 160

Band 2



Plot 7-215. Radiated Spurious Plot above 1GHz (Band 2)

OPERATING FREQUENCY: 1860.00 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	H	111	115	-61.93	8.87	-53.06	-40.1
5580.00	H	111	296	-72.60	13.05	-59.55	-46.5
7440.00	H	-	-	-69.29	10.47	-58.82	-45.8
9300.00	H	-	-	-65.73	9.32	-56.42	-43.4

Table 7-23. Radiated Spurious Data (Band 2 – Low Channel)

FCC ID: ZNFL322DL		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1904080057-03-R4.ZNF	Test Dates: 4/8 - 5/3/2019	EUT Type: Portable Handset		Page 145 of 160

OPERATING FREQUENCY: 1880.00 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]
3760.00	H	365	121	-60.22	9.14	-51.08	-38.1
5640.00	H	113	237	-68.61	13.14	-55.48	-42.5
7520.00	H	-	-	-69.00	10.65	-58.35	-45.4
9400.00	H	-	-	-64.50	8.84	-55.65	-42.7

Table 7-24. Radiated Spurious Data (Band 2 – Mid Channel)

OPERATING FREQUENCY: 1900.00 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]
3800.00	H	395	118	-64.07	9.27	-54.80	-41.8
5700.00	H	112	326	-70.49	13.13	-57.36	-44.4
7600.00	H	-	-	-69.24	10.74	-58.50	-45.5
9500.00	H	-	-	-64.09	8.01	-56.08	-43.1

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

FCC ID: ZNFL322DL		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1904080057-03-R4.ZNF	Test Dates: 4/8 - 5/3/2019	EUT Type: Portable Handset		Page 146 of 160

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

FCC ID: ZNFL322DL	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1904080057-03-R4.ZNF	Test Dates: 4/8 - 5/3/2019	EUT Type: Portable Handset	Page 147 of 160

Band 71 Frequency Stability Measurements

OPERATING FREQUENCY: 680,500,000 Hz
 CHANNEL: 133297
 REFERENCE VOLTAGE: 3.85 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	- 30	680,499,856	-144	-0.0000212
100 %		- 20	680,499,913	-87	-0.0000128
100 %		- 10	680,499,884	-116	-0.0000170
100 %		0	680,500,051	51	0.0000075
100 %		+ 10	680,500,008	8	0.0000012
100 %		+ 20	680,500,004	4	0.0000006
100 %		+ 30	680,499,949	-51	-0.0000075
100 %		+ 40	680,500,153	153	0.0000225
100 %		+ 50	680,500,181	181	0.0000266
85 %		+ 20	680,500,145	145	0.0000213
BATT. ENDPOINT	3.20	+ 20	680,499,982	-18	-0.0000026

Table 7-26. Frequency Stability Data (Band 71)

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: ZNFL322DL	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1904080057-03-R4.ZNF	Test Dates: 4/8 - 5/3/2019	EUT Type: Portable Handset	Page 148 of 160

Band 71 Frequency Stability Measurements

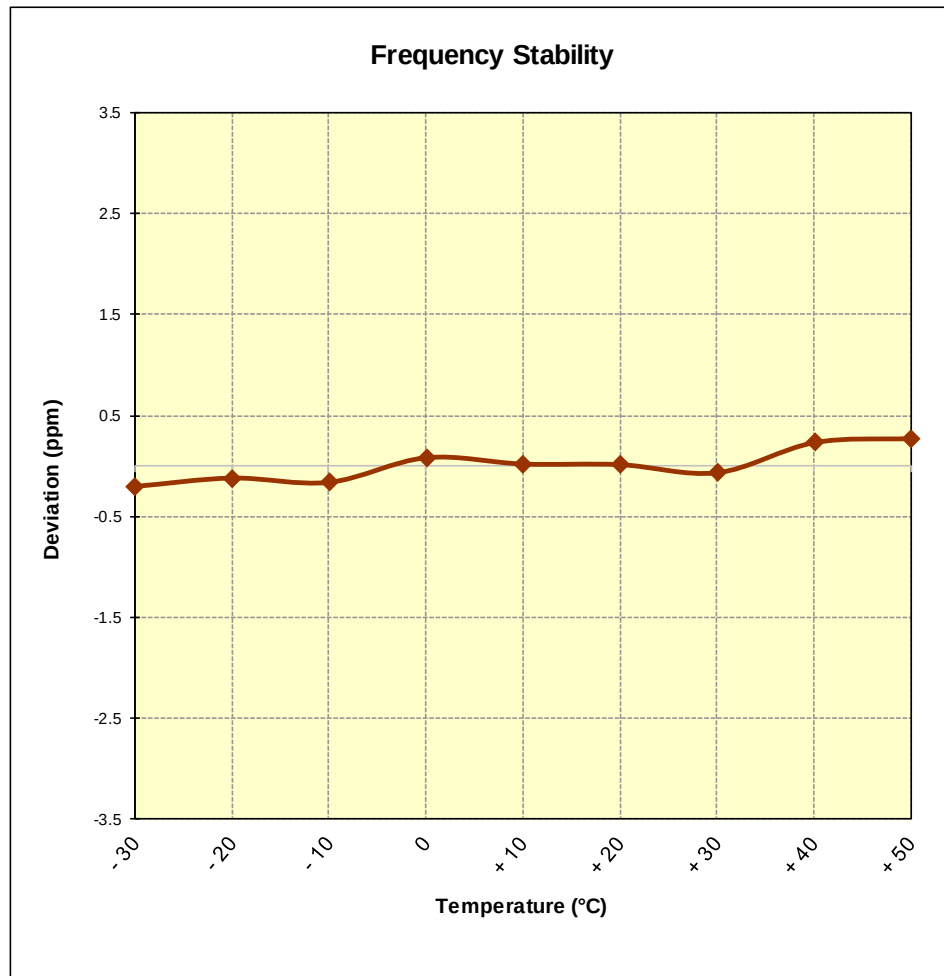


Figure 7-8. Frequency Stability Graph (Band 71)

FCC ID: ZNFL322DL		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1904080057-03-R4.ZNF	Test Dates: 4/8 - 5/3/2019	EUT Type: Portable Handset		Page 149 of 160

Band 12/17 Frequency Stability Measurements

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

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	- 30	707,500,170	170	0.0000240
100 %		- 20	707,499,950	-50	-0.0000071
100 %		- 10	707,499,963	-37	-0.0000052
100 %		0	707,499,818	-182	-0.0000257
100 %		+ 10	707,499,890	-110	-0.0000155
100 %		+ 20	707,500,023	23	0.0000033
100 %		+ 30	707,499,935	-65	-0.0000092
100 %		+ 40	707,500,007	7	0.0000010
100 %		+ 50	707,499,949	-51	-0.0000072
BATT. ENDPOINT	3.20	+ 20	707,500,181	181	0.0000256

Table 7-27. Frequency Stability Data (Band 12/17)

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: ZNFL322DL	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1904080057-03-R4.ZNF	Test Dates: 4/8 - 5/3/2019	EUT Type: Portable Handset	Page 150 of 160

Band 12/17 Frequency Stability Measurements

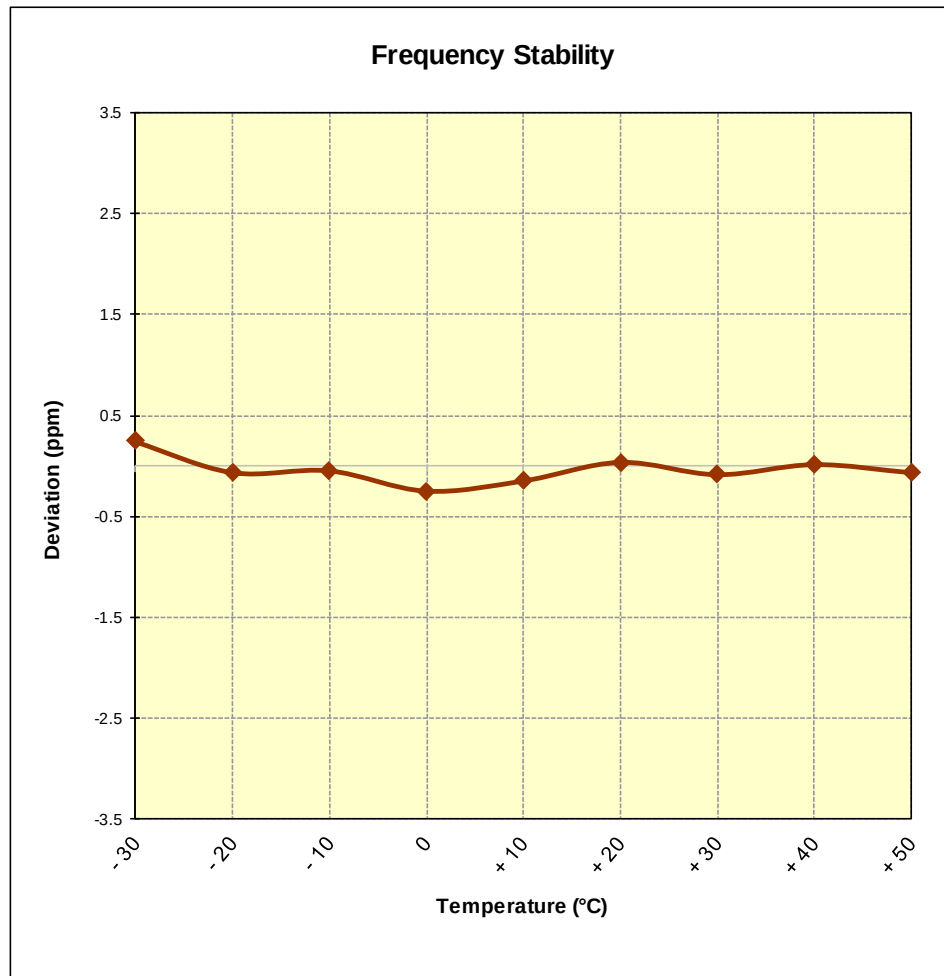


Figure 7-9. Frequency Stability Graph (Band 12/17)

FCC ID: ZNFL322DL	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1904080057-03-R4.ZNF	Test Dates: 4/8 - 5/3/2019	EUT Type: Portable Handset	Page 151 of 160

Band 13 Frequency Stability Measurements

OPERATING FREQUENCY: 782,000,000 Hz
 CHANNEL: 23230
 REFERENCE VOLTAGE: 3.85 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	- 30	782,000,459	459	0.0000587
100 %		- 20	782,000,262	262	0.0000335
100 %		- 10	781,999,988	-12	-0.0000015
100 %		0	782,000,283	283	0.0000362
100 %		+ 10	781,999,994	-6	-0.0000008
100 %		+ 20	781,999,888	-112	-0.0000143
100 %		+ 30	781,999,942	-58	-0.0000074
100 %		+ 40	782,000,133	133	0.0000170
100 %		+ 50	782,000,189	189	0.0000242
BATT. ENDPOINT	3.20	+ 20	781,999,966	-34	-0.0000043

Table 7-28. Frequency Stability Data (Band 13)

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: ZNFL322DL	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1904080057-03-R4.ZNF	Test Dates: 4/8 - 5/3/2019	EUT Type: Portable Handset	Page 152 of 160

Band 13 Frequency Stability Measurements

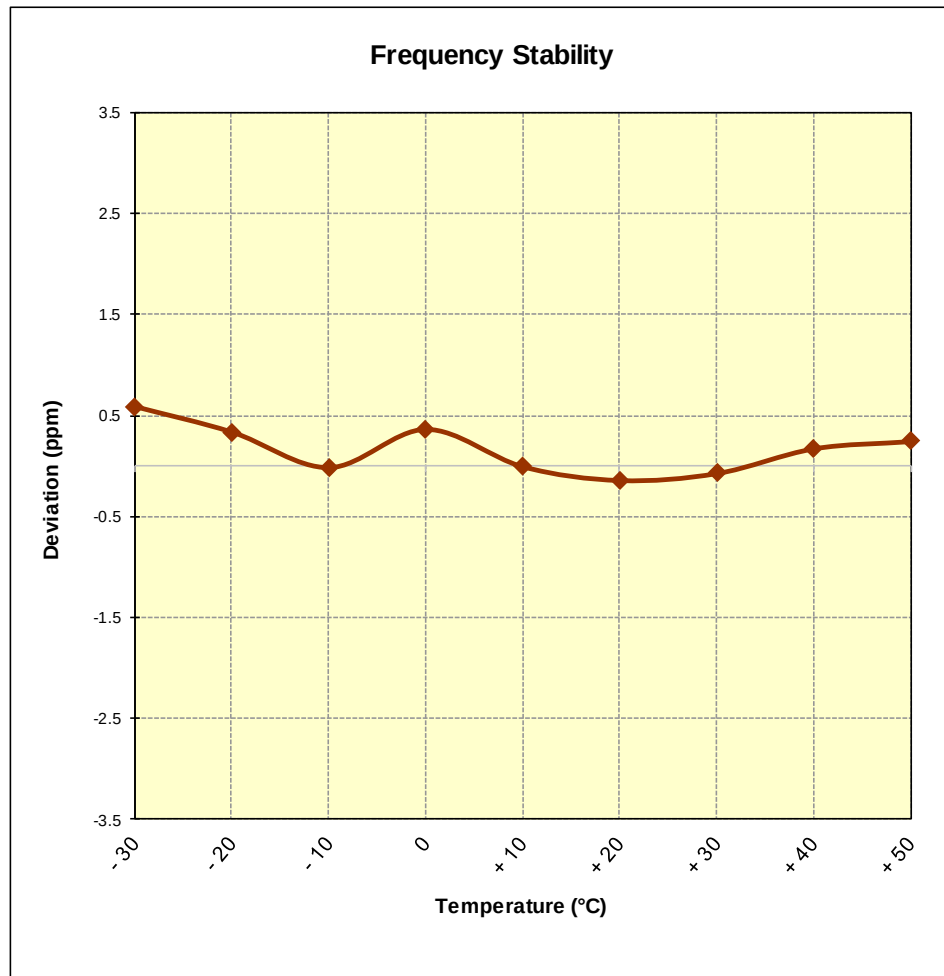


Figure 7-10. Frequency Stability Graph (Band 13)

FCC ID: ZNFL322DL	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1904080057-03-R4.ZNF	Test Dates: 4/8 - 5/3/2019	EUT Type: Portable Handset	Page 153 of 160

Band 5 Frequency Stability Measurements

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

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	- 30	836,499,755	-245	-0.0000293
100 %		- 20	836,499,630	-370	-0.0000442
100 %		- 10	836,500,011	11	0.0000013
100 %		0	836,500,237	237	0.0000283
100 %		+ 10	836,499,684	-316	-0.0000378
100 %		+ 20	836,500,262	262	0.0000313
100 %		+ 30	836,499,968	-32	-0.0000038
100 %		+ 40	836,499,917	-83	-0.0000099
100 %		+ 50	836,499,948	-52	-0.0000062
BATT. ENDPOINT	3.20	+ 20	836,499,977	-23	-0.0000027

Table 7-29. Frequency Stability Data (Band 5)

FCC ID: ZNFL322DL	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1904080057-03-R4.ZNF	Test Dates: 4/8 - 5/3/2019	EUT Type: Portable Handset	Page 154 of 160

Band 5 Frequency Stability Measurements

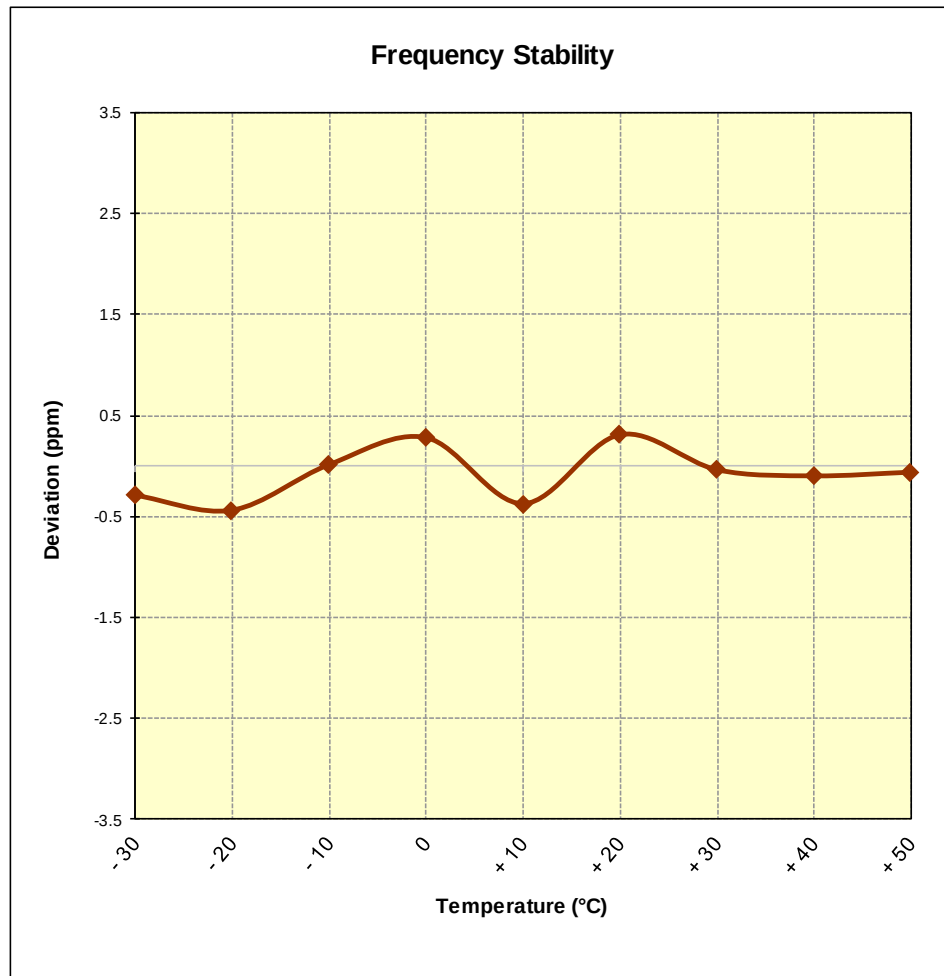


Figure 7-11. Frequency Stability Graph (Band 5)

FCC ID: ZNFL322DL	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1904080057-03-R4.ZNF	Test Dates: 4/8 - 5/3/2019	EUT Type: Portable Handset	Page 155 of 160

Band 66/4 Frequency Stability Measurements

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

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	- 30	1,745,000,045	45	0.0000026
100 %		- 20	1,744,999,906	-94	-0.0000054
100 %		- 10	1,745,000,277	277	0.0000159
100 %		0	1,744,999,972	-28	-0.0000016
100 %		+ 10	1,744,999,713	-287	-0.0000164
100 %		+ 20	1,744,999,873	-127	-0.0000073
100 %		+ 30	1,744,999,985	-15	-0.0000009
100 %		+ 40	1,745,000,104	104	0.0000060
100 %		+ 50	1,745,000,160	160	0.0000092
BATT. ENDPOINT	3.20	+ 20	1,744,999,806	-194	-0.0000111

Table 7-30. 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: ZNFL322DL	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1904080057-03-R4.ZNF	Test Dates: 4/8 - 5/3/2019	EUT Type: Portable Handset	Page 156 of 160

Band 66/4 Frequency Stability Measurements

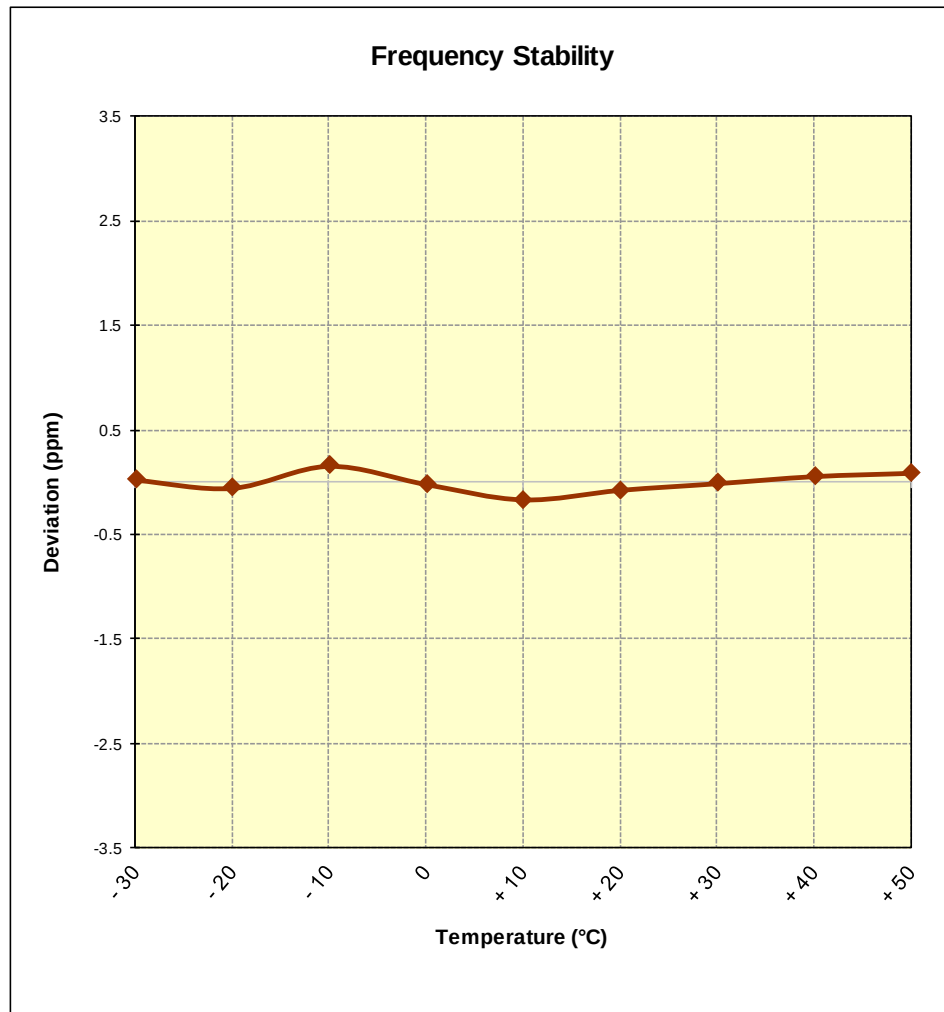


Figure 7-12. Frequency Stability Graph (Band 66/4)

FCC ID: ZNFL322DL	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1904080057-03-R4.ZNF	Test Dates: 4/8 - 5/3/2019	EUT Type: Portable Handset	Page 157 of 160

Band 2 Frequency Stability Measurements

OPERATING FREQUENCY: 1,880,000,000 Hz
 CHANNEL: 18900
 REFERENCE VOLTAGE: 3.85 VDC
 DEVIATION LIMIT: ± 0.00025 % or 2.5 ppm

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	- 30	1,880,000,362	362	0.0000193
100 %		- 20	1,879,999,677	-323	-0.0000172
100 %		- 10	1,880,000,426	426	0.0000227
100 %		0	1,880,000,068	68	0.0000036
100 %		+ 10	1,880,000,269	269	0.0000143
100 %		+ 20	1,880,000,306	306	0.0000163
100 %		+ 30	1,879,999,698	-302	-0.0000161
100 %		+ 40	1,880,000,269	269	0.0000143
100 %		+ 50	1,880,000,329	329	0.0000175
BATT. ENDPOINT	3.20	+ 20	1,879,999,809	-191	-0.0000102

Table 7-31. Frequency Stability Data (Band 2)

FCC ID: ZNFL322DL	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1904080057-03-R4.ZNF	Test Dates: 4/8 - 5/3/2019	EUT Type: Portable Handset	Page 158 of 160

Band 2 Frequency Stability Measurements

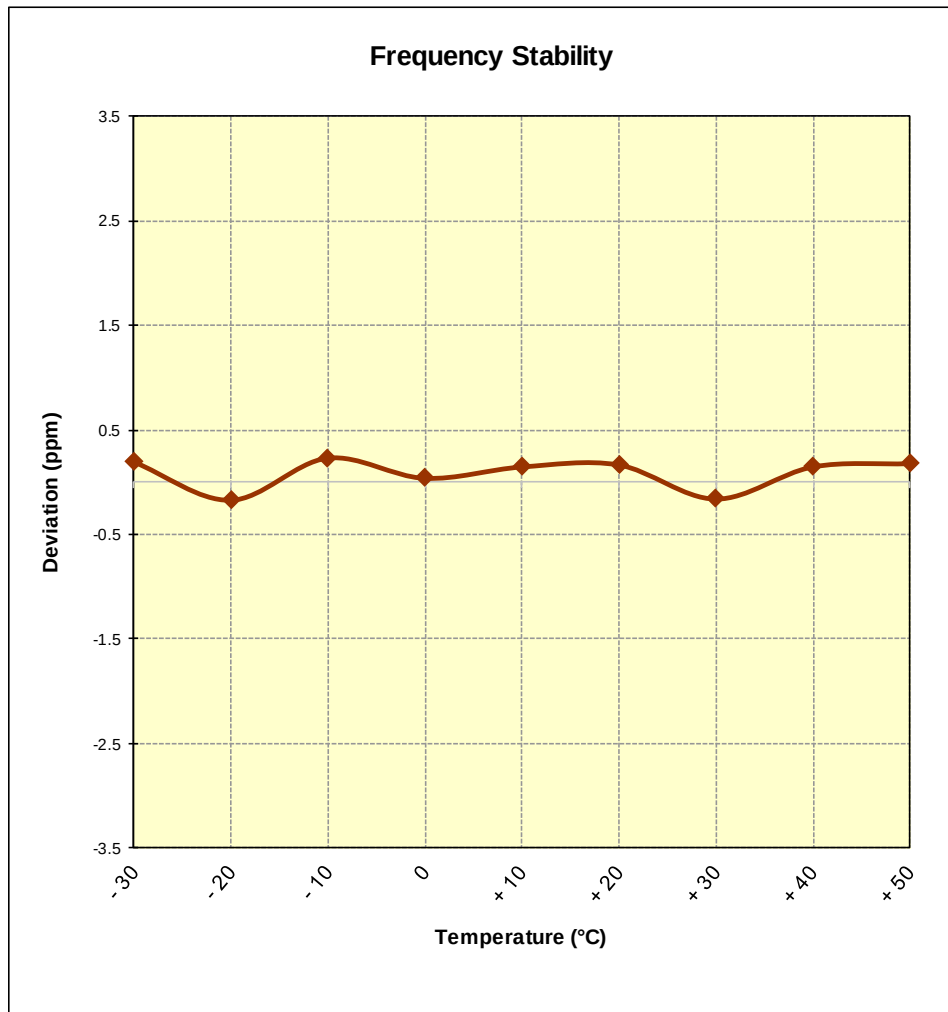


Figure 7-13. Frequency Stability Graph (Band 2)

FCC ID: ZNFL322DL		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1904080057-03-R4.ZNF	Test Dates: 4/8 - 5/3/2019	EUT Type: Portable Handset		Page 159 of 160

8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **LG Portable Handset FCC ID: ZNFL322DL** complies with all the requirements of Part 22, 24, & 27 of the FCC Rules for LTE operation only.

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Test Report S/N: 1M1904080057-03-R4.ZNF	Test Dates: 4/8 - 5/3/2019	EUT Type: Portable Handset		Page 160 of 160