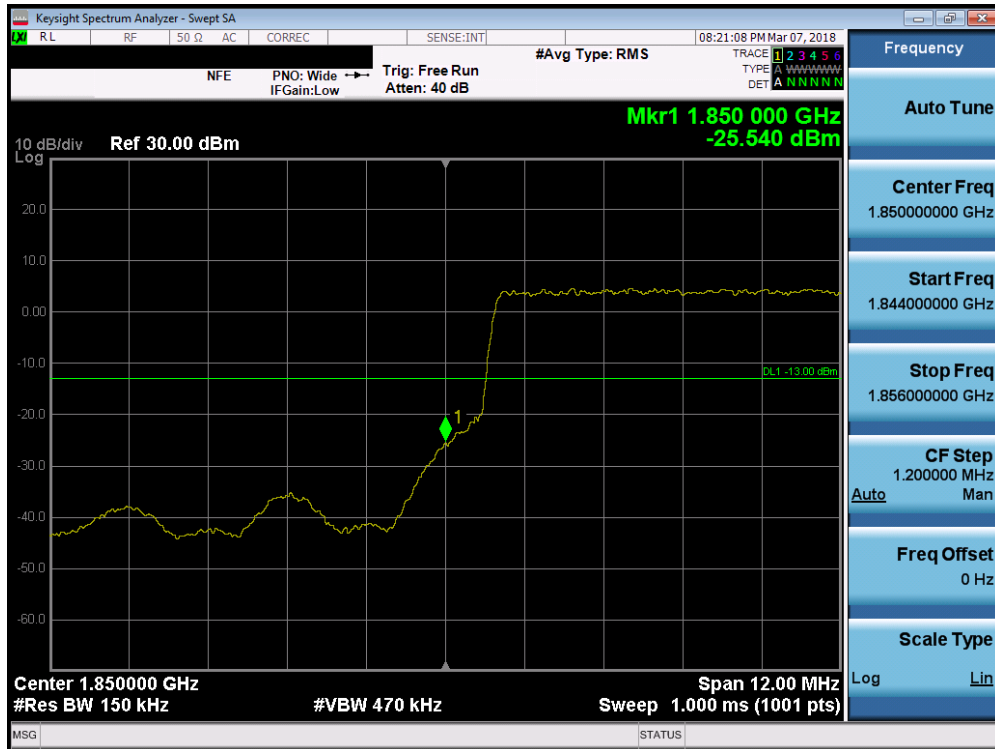
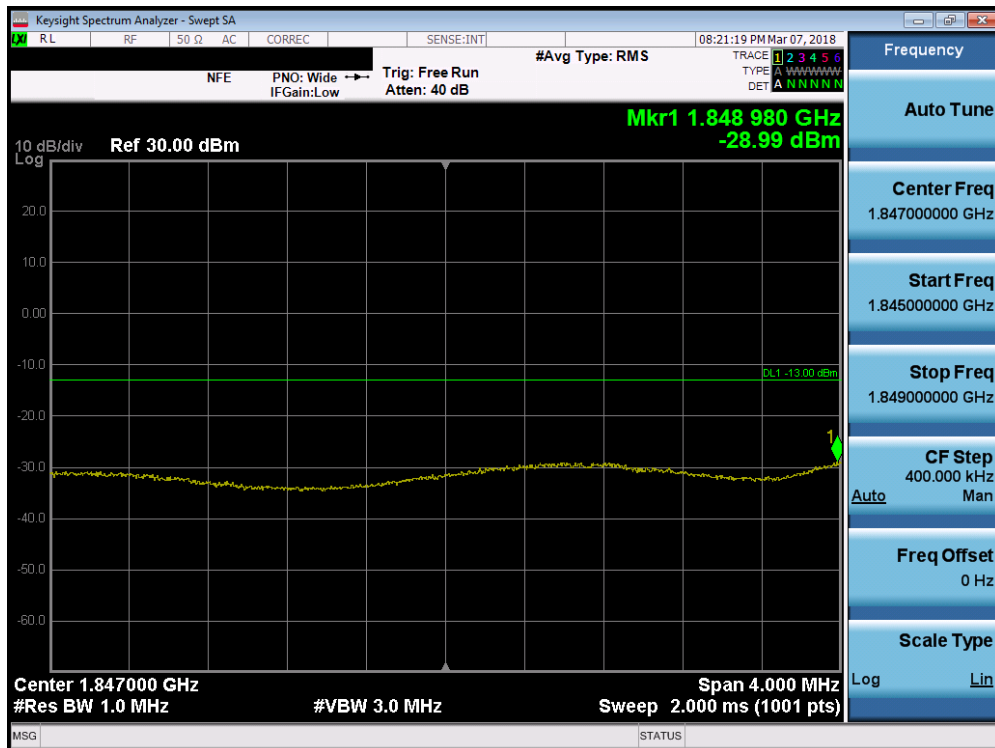




Plot 7-220. Lower Band Edge Plot (Band 2 - 15.0MHz QPSK - Full RB Configuration)

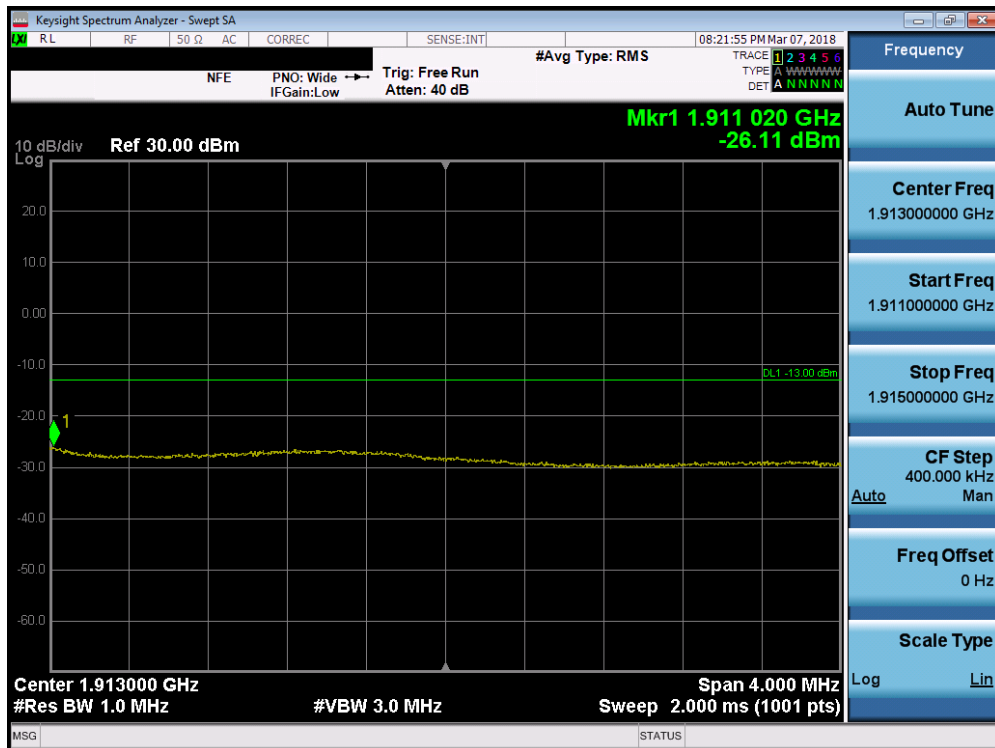


Plot 7-221. Lower Extended Band Edge Plot (Band 2 - 15.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFL713DL	MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
Test Report S/N: 1M1803050034-05.ZNF	Test Dates: 3/7/2018 - 4/2/2018	EUT Type: Portable Handset		Page 131 of 180

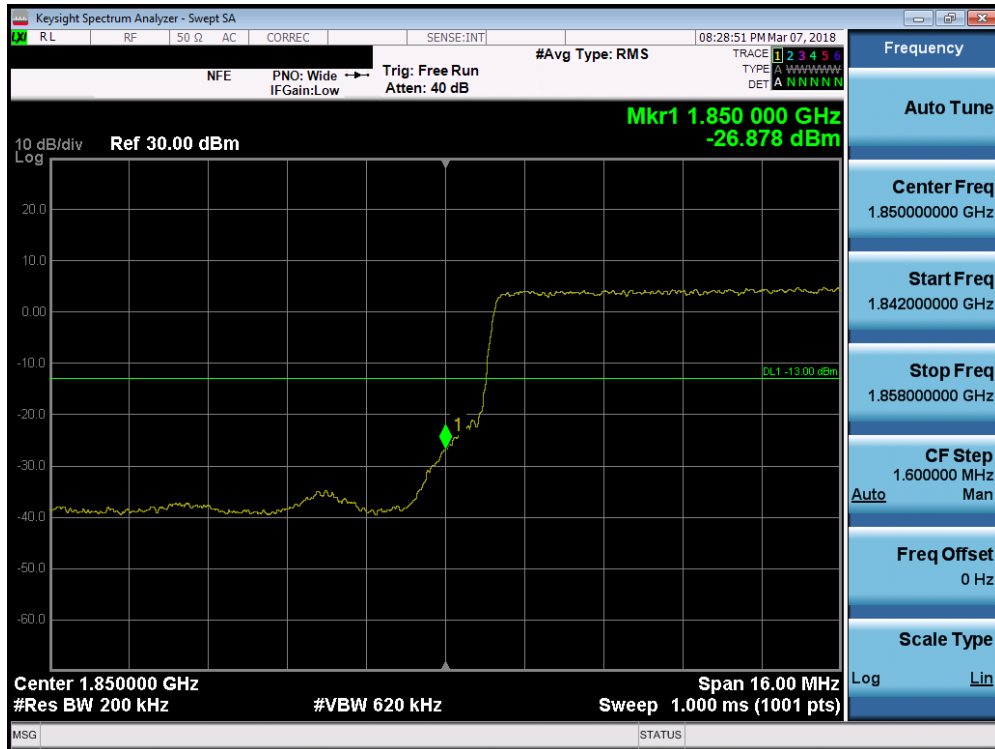


Plot 7-222. Upper Band Edge Plot (Band 2 - 15.0MHz QPSK - Full RB Configuration)

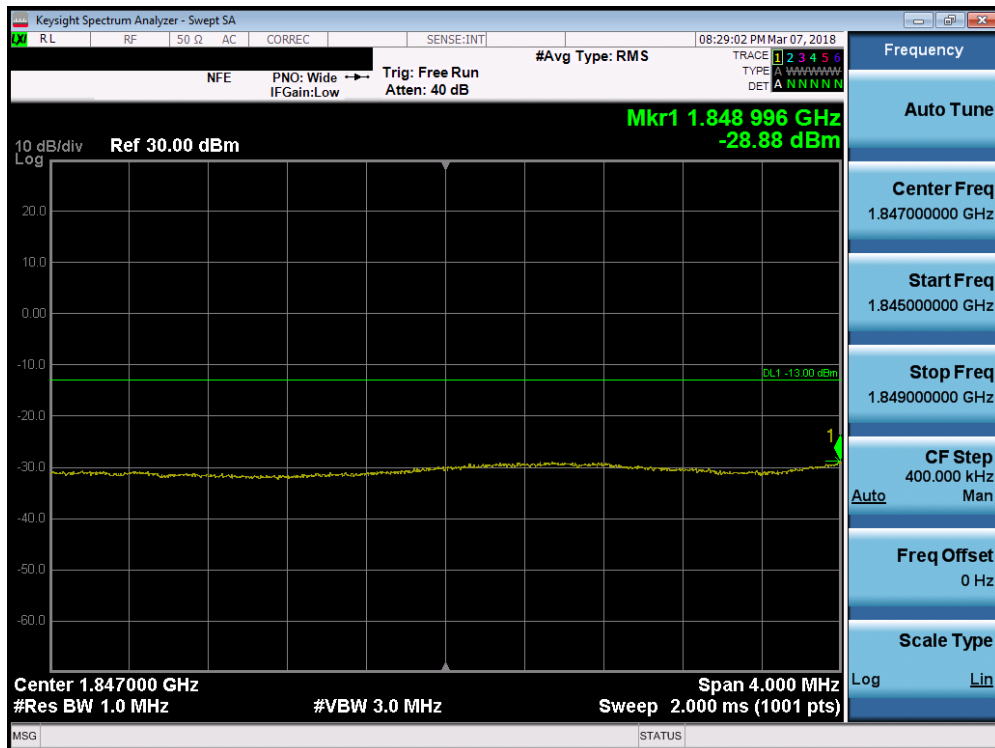


Plot 7-223. Upper Extended Band Edge Plot (Band 2 - 15.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFL713DL	MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
Test Report S/N: 1M1803050034-05.ZNF	Test Dates: 3/7/2018 - 4/2/2018	EUT Type: Portable Handset		Page 132 of 180



Plot 7-224. Lower Band Edge Plot (Band 2 - 20.0MHz QPSK - Full RB Configuration)

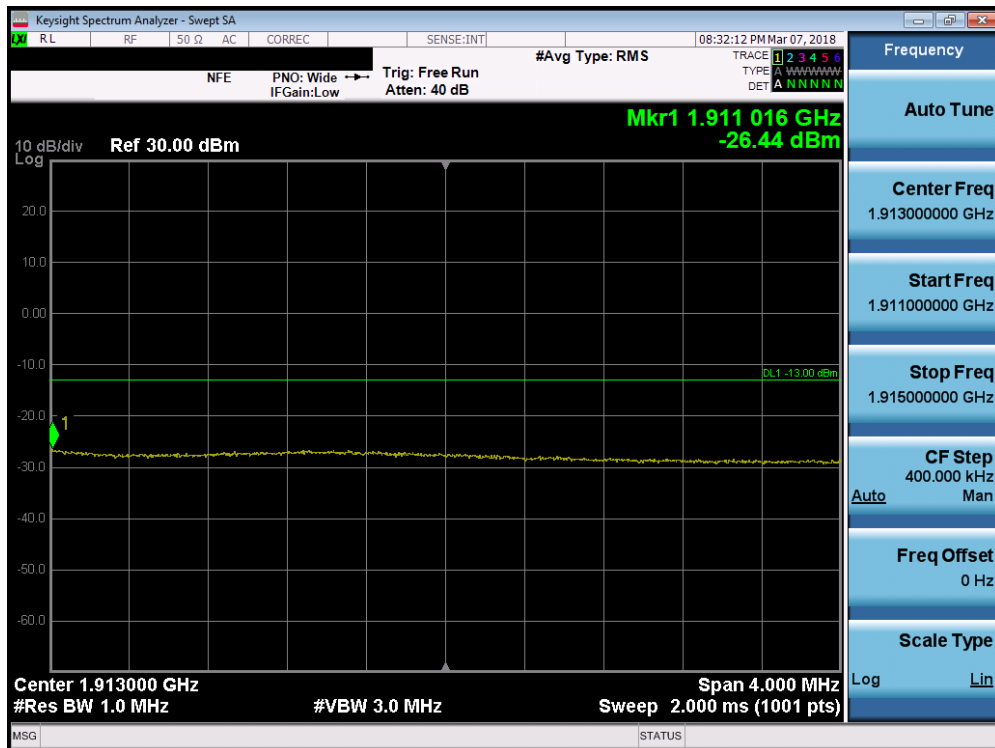


Plot 7-225. Lower Extended Band Edge Plot (Band 2 - 20.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFL713DL	 MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
Test Report S/N: 1M1803050034-05.ZNF	Test Dates: 3/7/2018 - 4/2/2018	EUT Type: Portable Handset		Page 133 of 180



Plot 7-226. Upper Band Edge Plot (Band 2 - 20.0MHz QPSK - Full RB Configuration)



Plot 7-227. Upper Extended Band Edge Plot (Band 2 - 20.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFL713DL	MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
Test Report S/N: 1M1803050034-05.ZNF	Test Dates: 3/7/2018 - 4/2/2018	EUT Type: Portable Handset		Page 134 of 180

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 v03 – Section 5.7.1

Test Settings

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

Test Setup

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

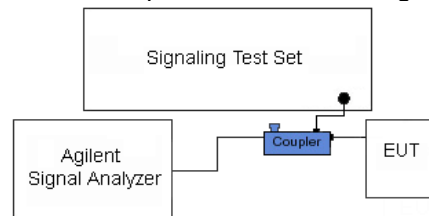


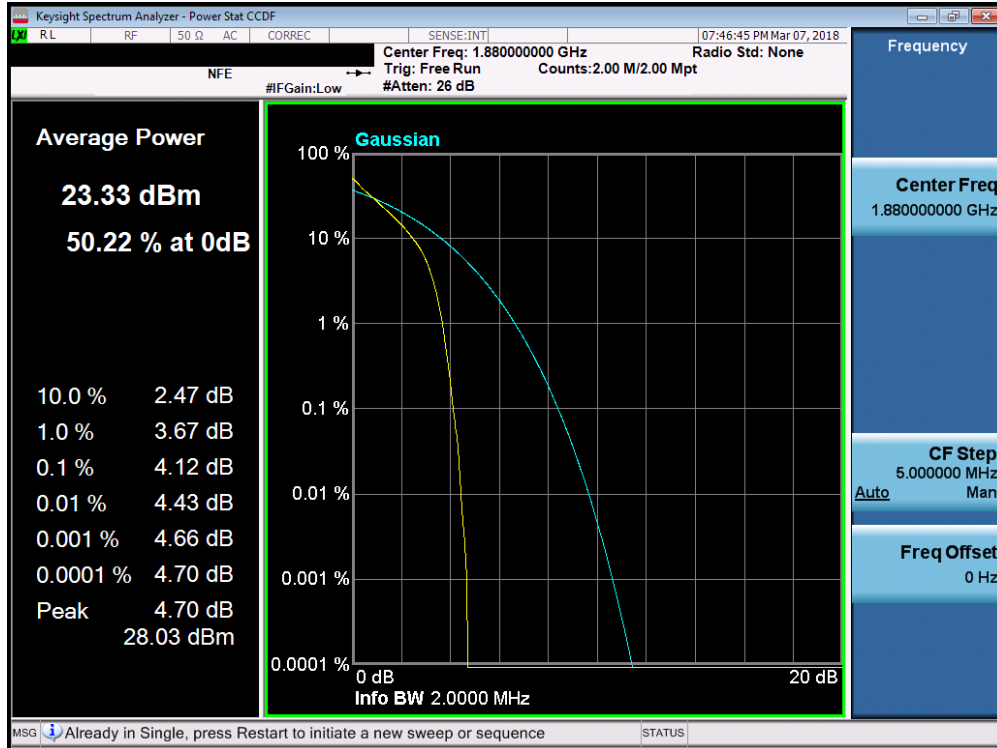
Figure 7-4. Test Instrument & Measurement Setup

Test Notes

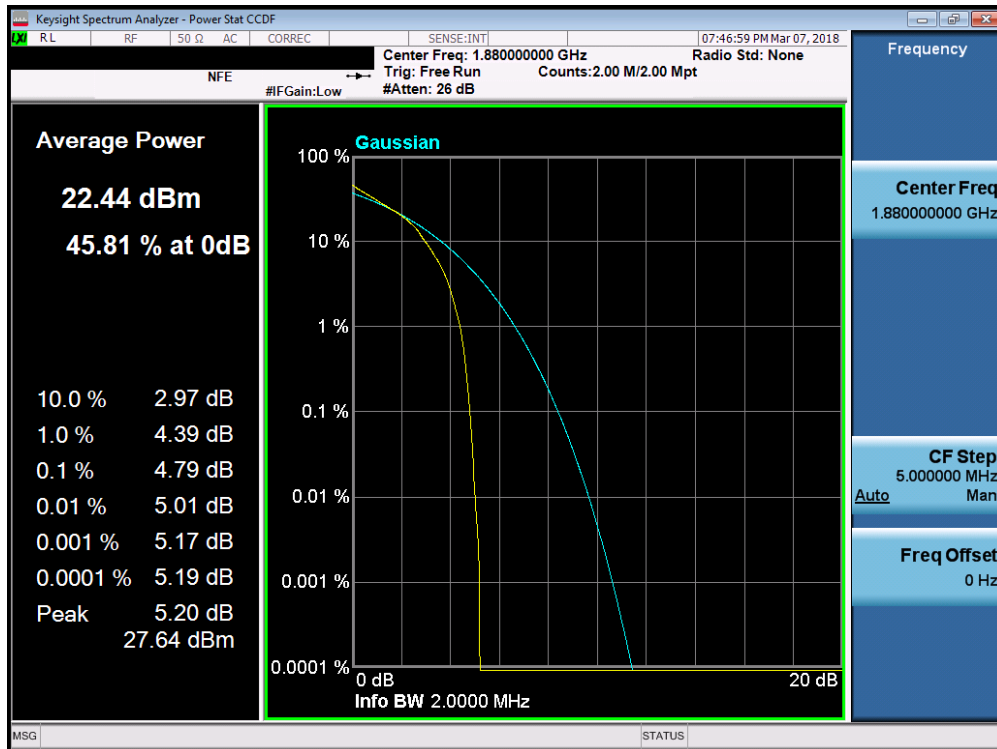
None.

FCC ID: ZNFL713DL	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1803050034-05.ZNF	Test Dates: 3/7/2018 - 4/2/2018	EUT Type: Portable Handset	Page 135 of 180

Band 2

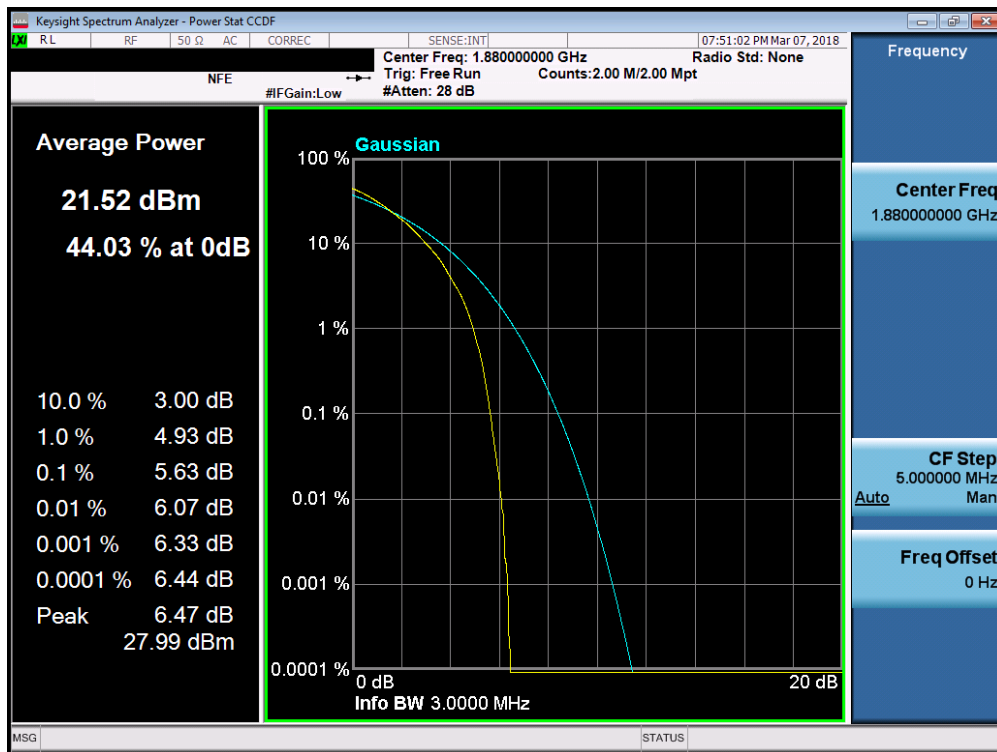
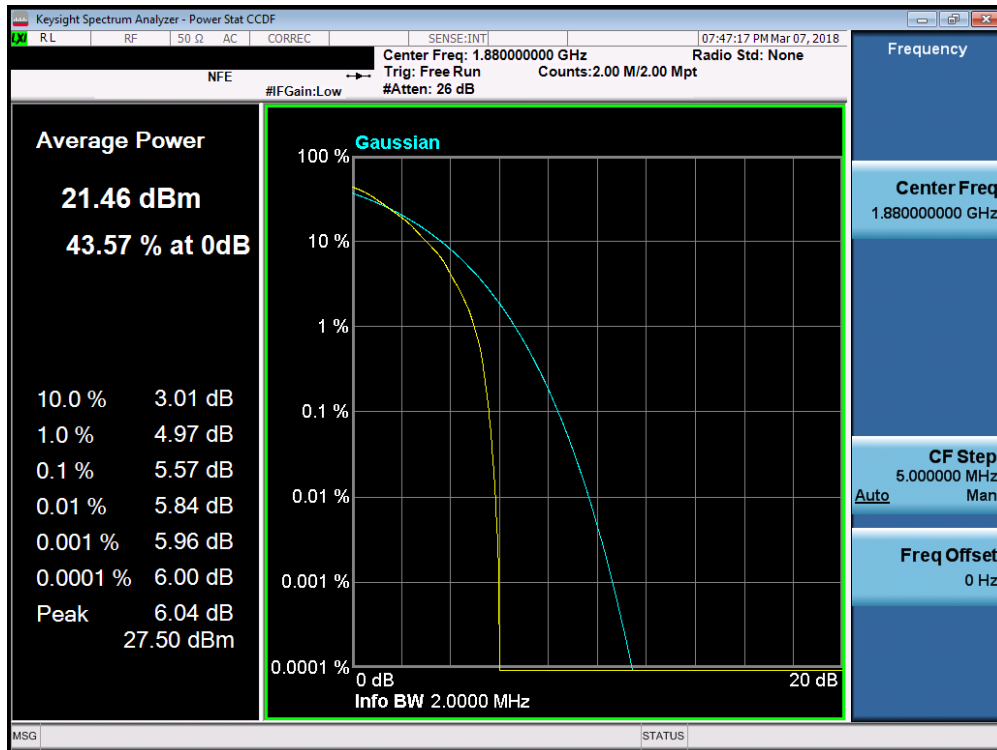


Plot 7-228. PAR Plot (Band 2 - 1.4MHz QPSK - Full RB Configuration)

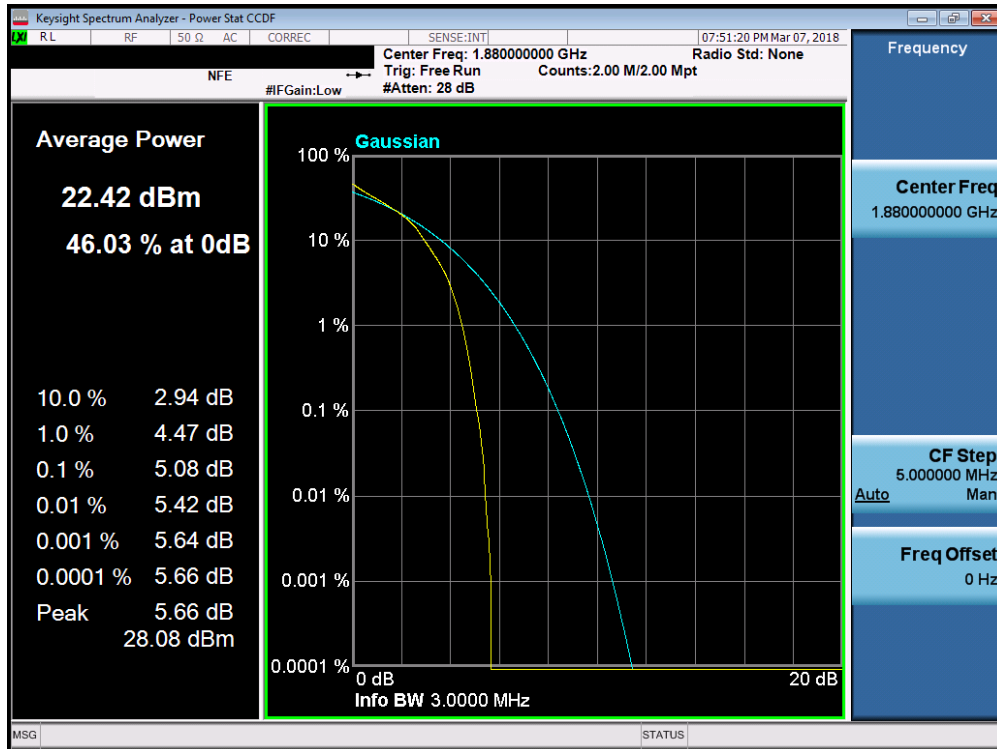


Plot 7-229. PAR Plot (Band 2 - 1.4MHz 16-QAM - Full RB Configuration)

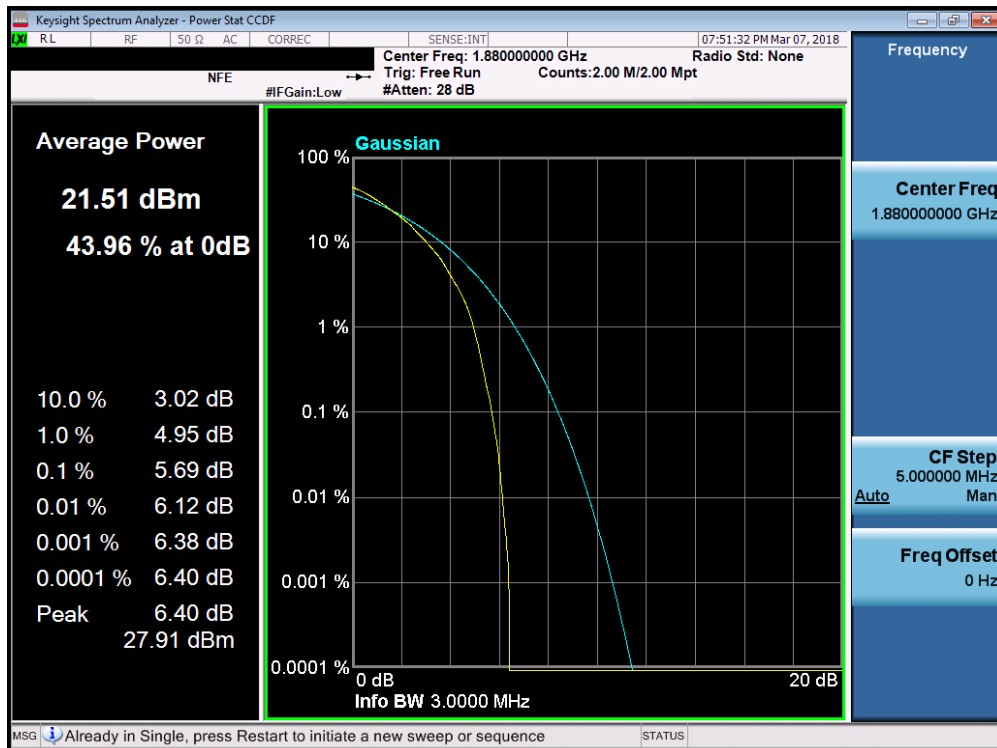
FCC ID: ZNLF713DL	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1803050034-05.ZNF	Test Dates: 3/7/2018 - 4/2/2018	EUT Type: Portable Handset	Page 136 of 180



FCC ID: ZNFL713DL	MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
Test Report S/N: 1M1803050034-05.ZNF	Test Dates: 3/7/2018 - 4/2/2018	EUT Type: Portable Handset		Page 137 of 180

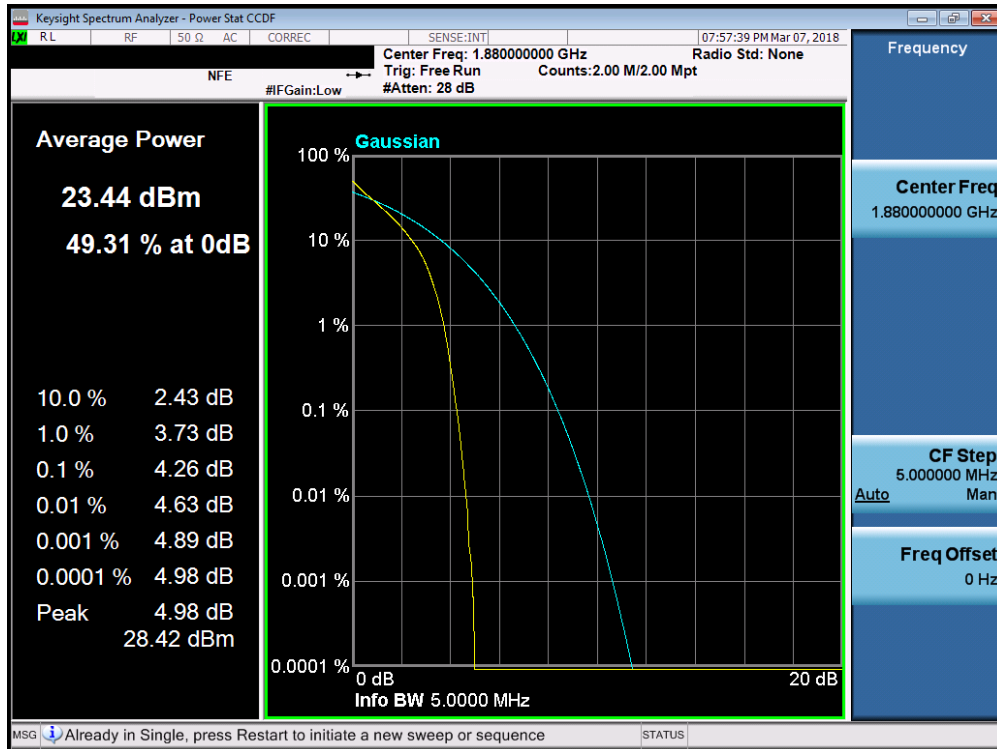


Plot 7-232. PAR Plot (Band 2 - 3.0MHz 16-QAM - Full RB Configuration)

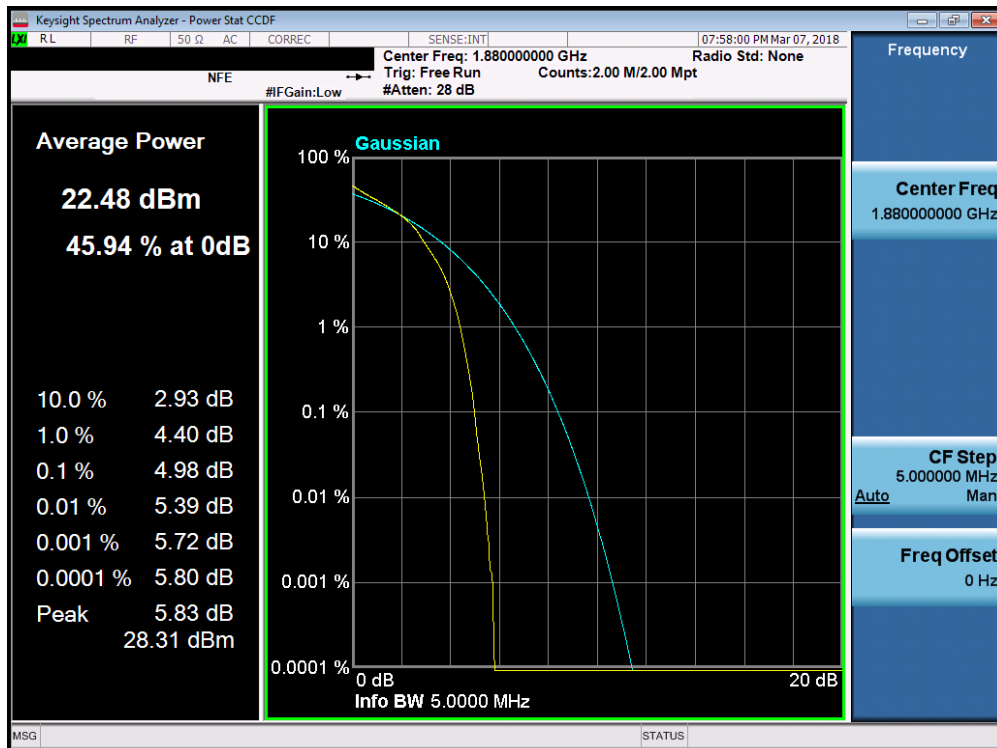


Plot 7-233. PAR Plot (Band 2 - 3.0MHz 64-QAM - Full RB Configuration)

FCC ID: ZNFL713DL	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1803050034-05.ZNF	Test Dates: 3/7/2018 - 4/2/2018	EUT Type: Portable Handset	Page 138 of 180

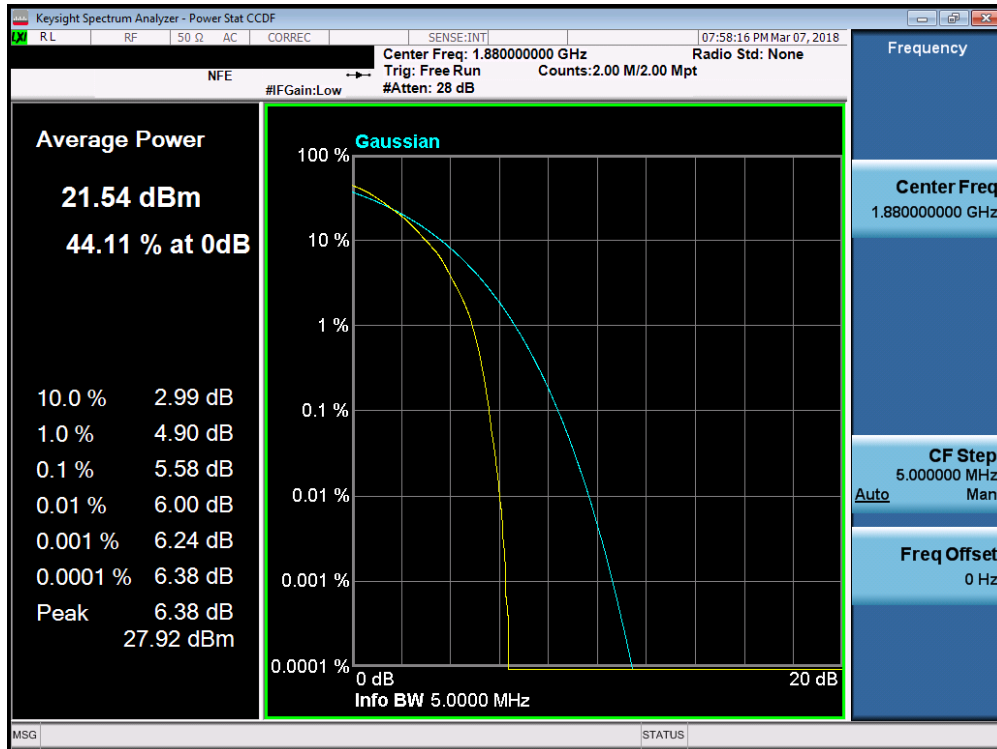


Plot 7-234. PAR Plot (Band 2 - 5.0MHz QPSK - Full RB Configuration)

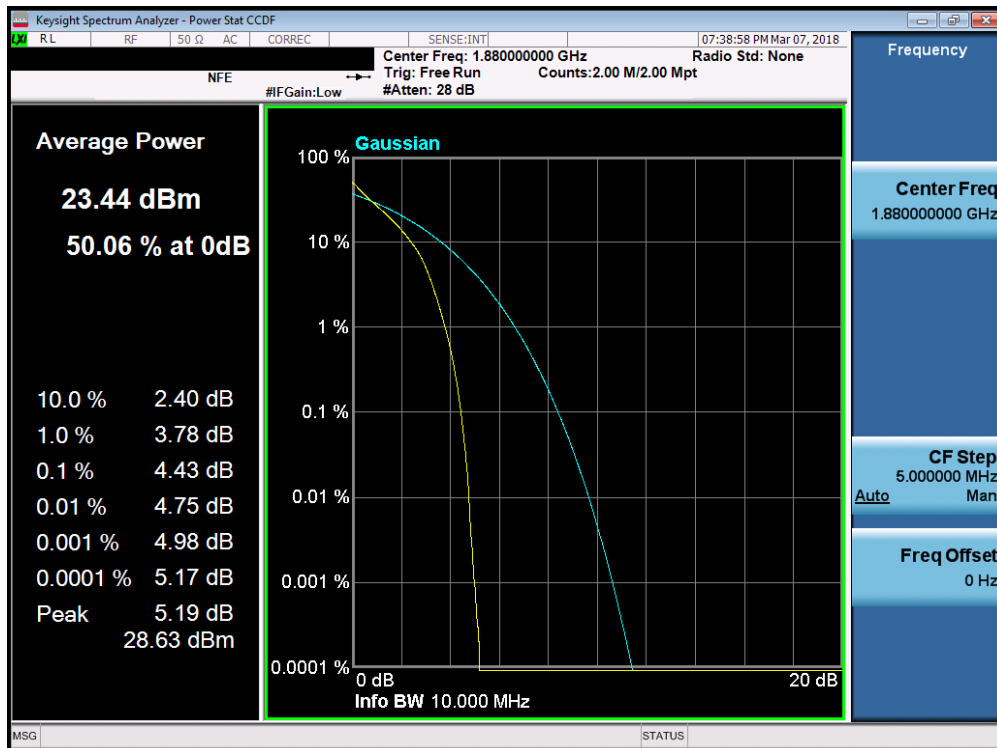


Plot 7-235. PAR Plot (Band 2 - 5.0MHz 16-QAM - Full RB Configuration)

FCC ID: ZNLF713DL	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1803050034-05.ZNF	Test Dates: 3/7/2018 - 4/2/2018	EUT Type: Portable Handset	Page 139 of 180

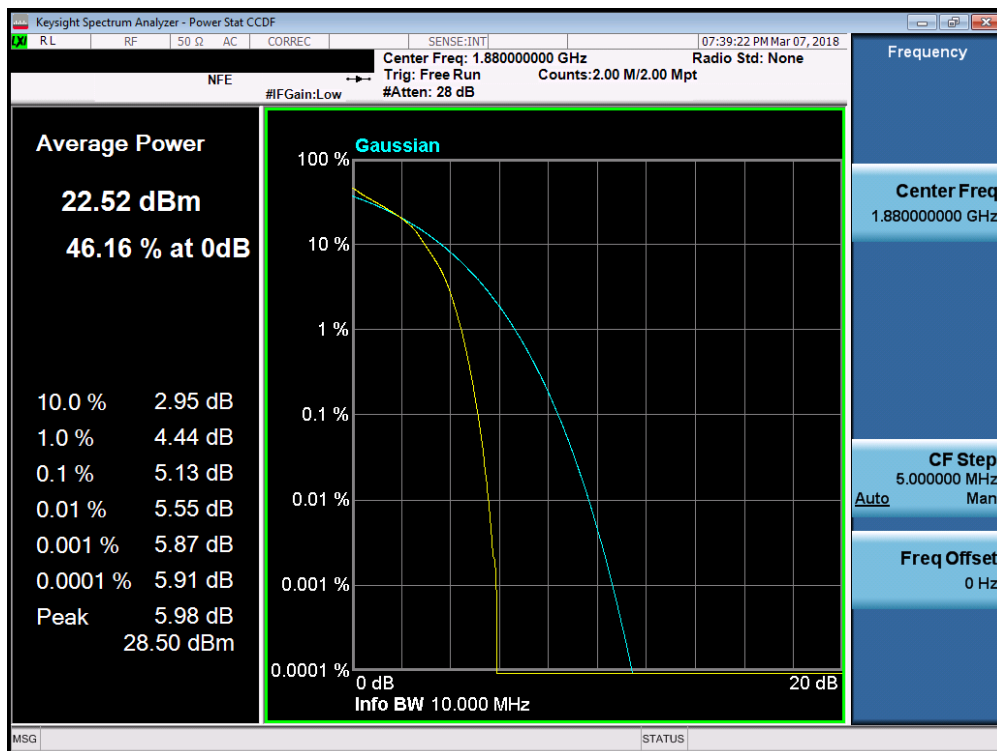


Plot 7-236. PAR Plot (Band 2 - 5.0MHz 64-QAM - Full RB Configuration)

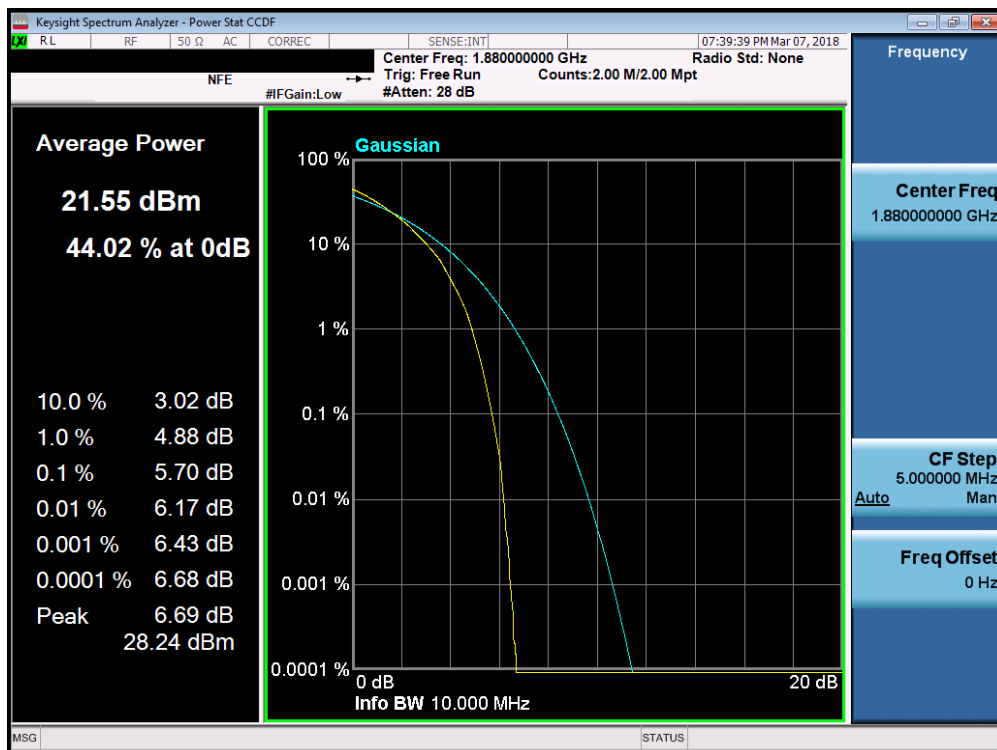


Plot 7-237. PAR Plot (Band 2 - 10.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFL713DL	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1803050034-05.ZNF	Test Dates: 3/7/2018 - 4/2/2018	EUT Type: Portable Handset	Page 140 of 180

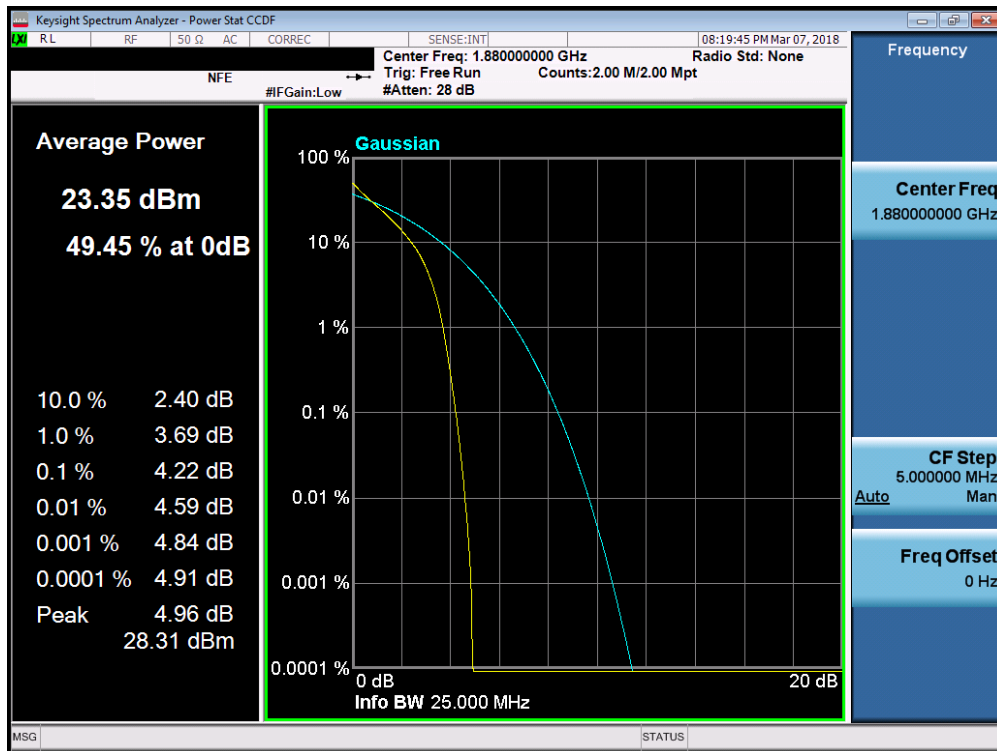


Plot 7-238. PAR Plot (Band 2 - 10.0MHz 16-QAM - Full RB Configuration)

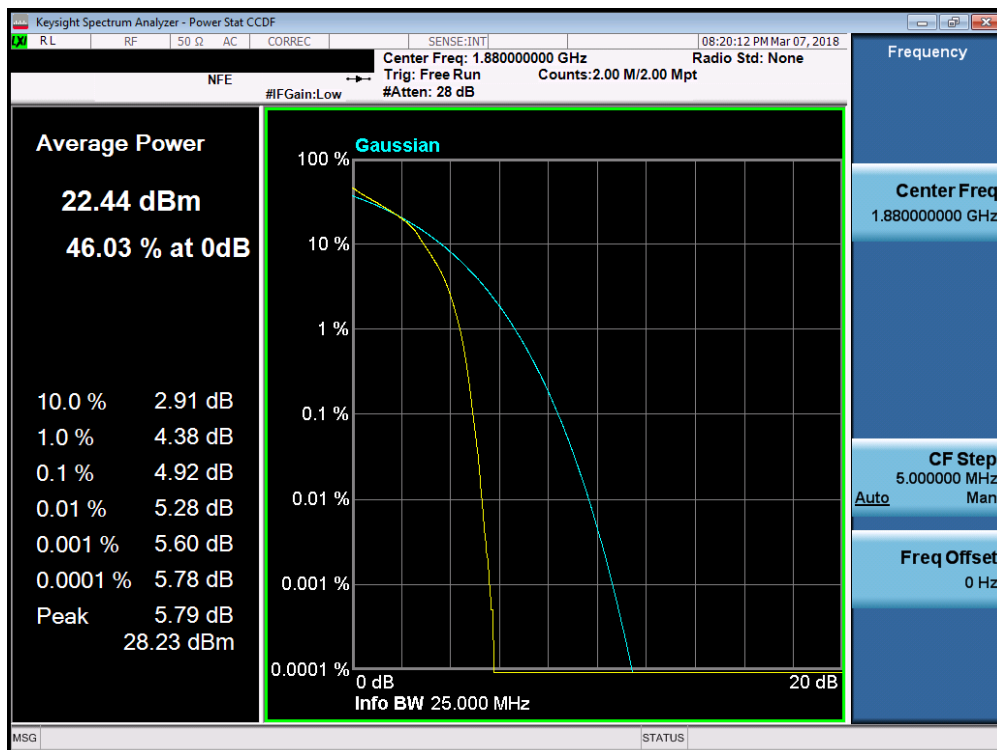


Plot 7-239. PAR Plot (Band 2 - 10.0MHz 64-QAM - Full RB Configuration)

FCC ID: ZNFL713DL	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1803050034-05.ZNF	Test Dates: 3/7/2018 - 4/2/2018	EUT Type: Portable Handset		Page 141 of 180

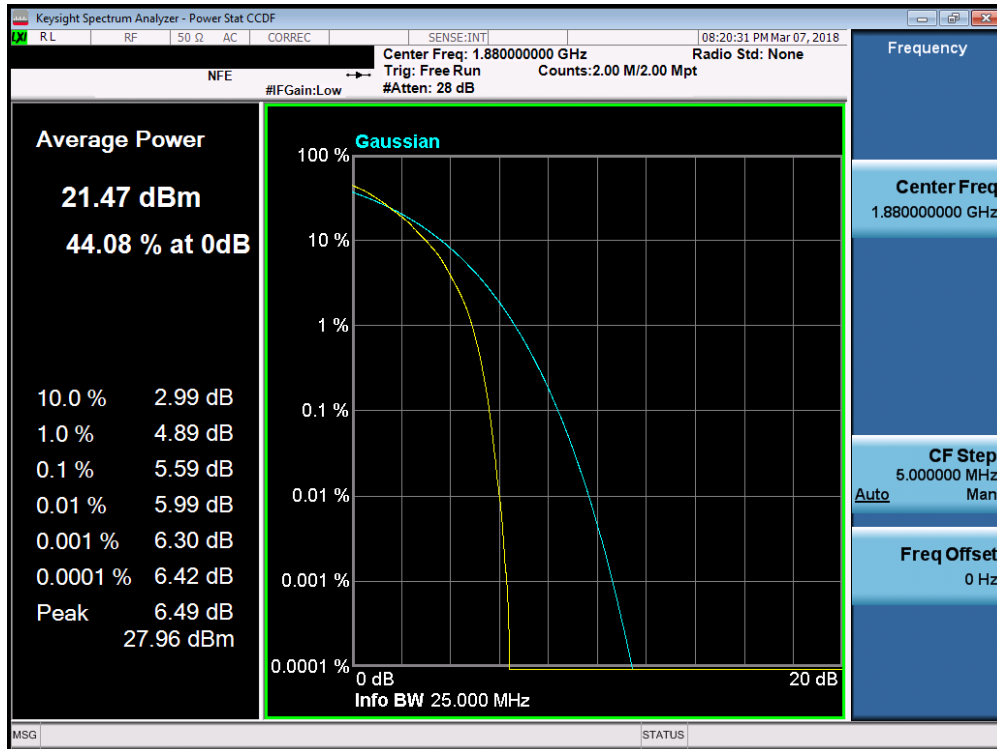


Plot 7-240. PAR Plot (Band 2 - 15.0MHz QPSK - Full RB Configuration)

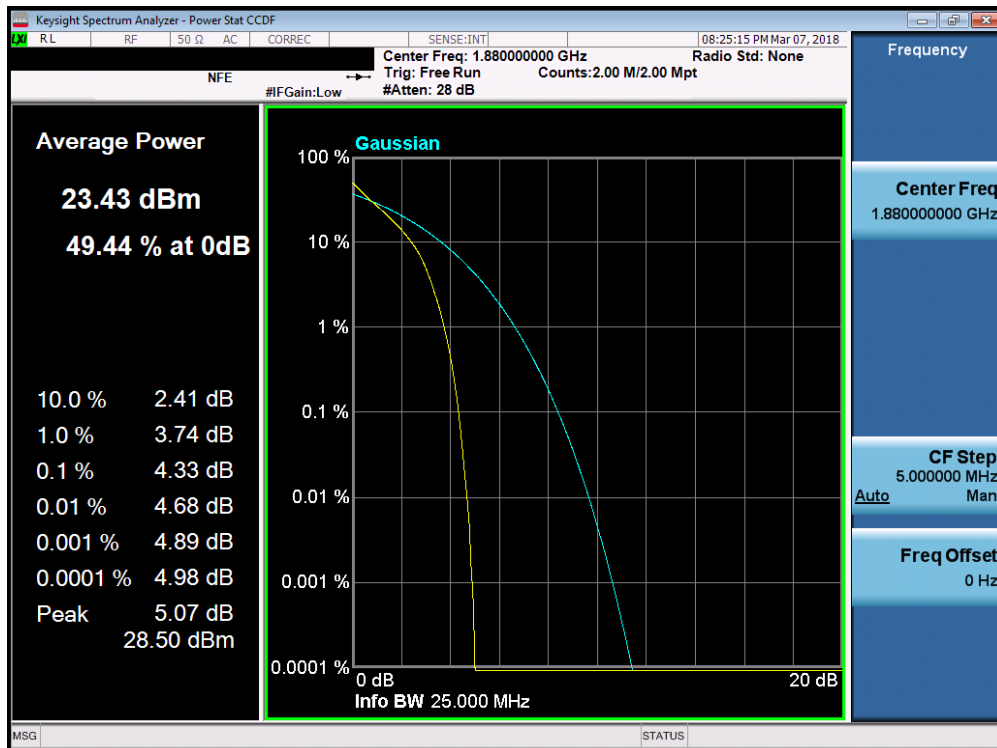


Plot 7-241. PAR Plot (Band 2 - 15.0MHz 16-QAM - Full RB Configuration)

FCC ID: ZNLF713DL	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1803050034-05.ZNF	Test Dates: 3/7/2018 - 4/2/2018	EUT Type: Portable Handset	Page 142 of 180

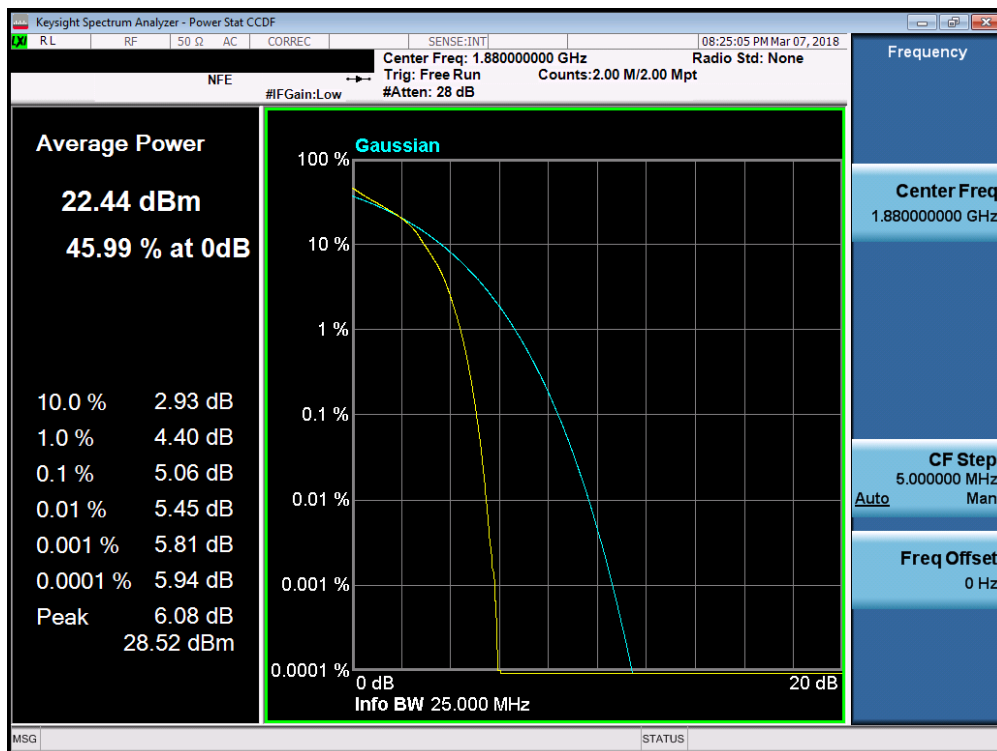


Plot 7-242. PAR Plot (Band 2 - 15.0MHz 64-QAM - Full RB Configuration)

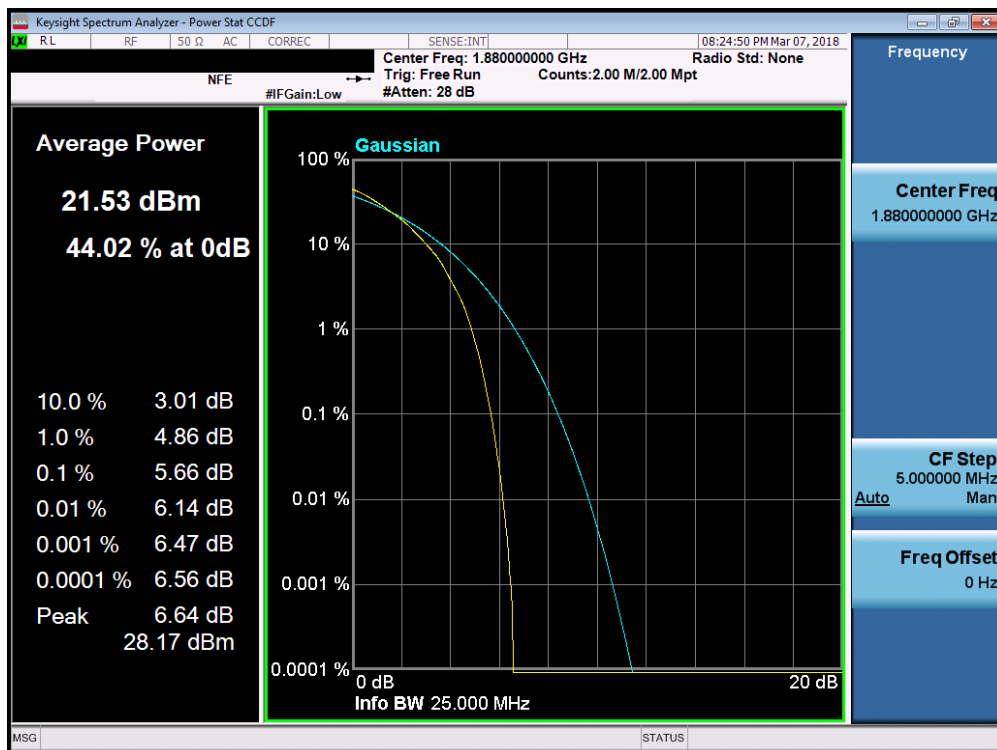


Plot 7-243. PAR Plot (Band 2 - 20.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFL713DL	MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
Test Report S/N: 1M1803050034-05.ZNF	Test Dates: 3/7/2018 - 4/2/2018	EUT Type: Portable Handset		Page 143 of 180



Plot 7-244. PAR Plot (Band 2 - 20.0MHz 16-QAM - Full RB Configuration)



Plot 7-245. PAR Plot (Band 2 - 20.0MHz 64-QAM - Full RB Configuration)

FCC ID: ZNFL713DL	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1803050034-05.ZNF	Test Dates: 3/7/2018 - 4/2/2018	EUT Type: Portable Handset	Page 144 of 180

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 v03 – 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: ZNFL713DL	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
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Test Setup

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

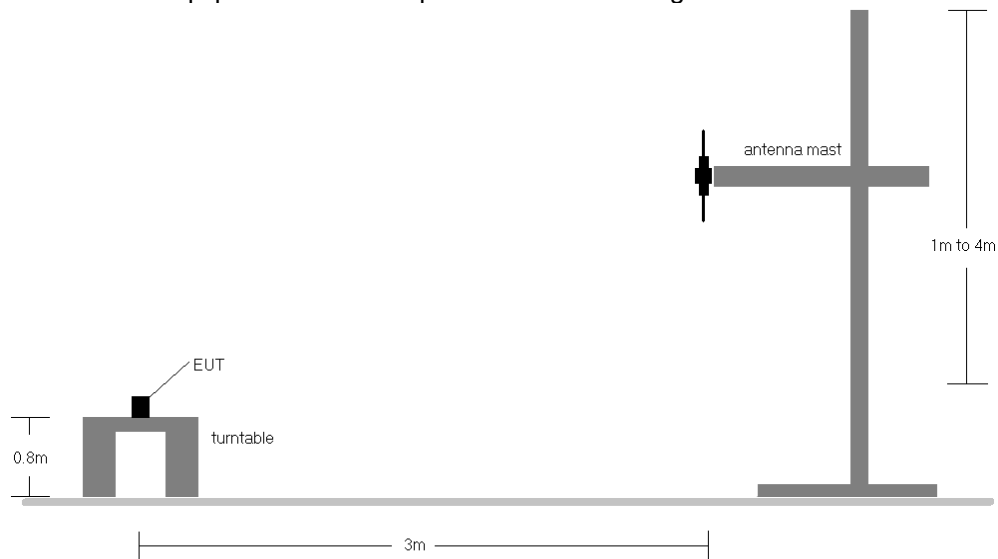


Figure 7-5. Radiated Test Setup <1GHz

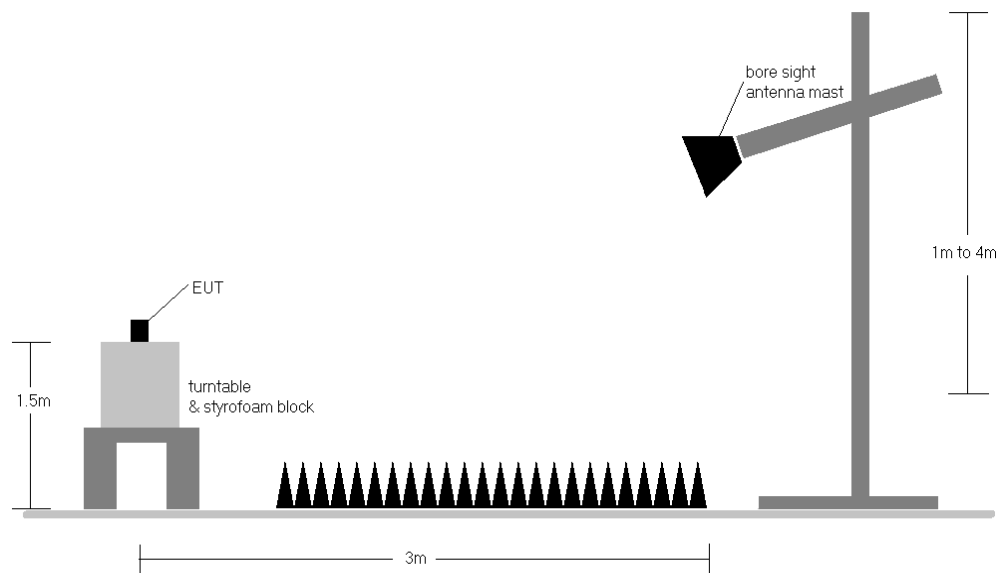


Figure 7-6. Radiated Test Setup >1GHz

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: ZNFL713DL	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1803050034-05.ZNF	Test Dates: 3/7/2018 - 4/2/2018	EUT Type: Portable Handset	Page 146 of 180

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	H	150	350	1 / 24	20.91	1.10	19.86	0.097	34.77	-14.91
680.50	5	QPSK	H	150	350	1 / 24	21.48	1.10	20.43	0.110	34.77	-14.34
695.50	5	QPSK	H	150	351	1 / 24	21.95	1.10	20.90	0.123	34.77	-13.87
695.50	5	16-QAM	H	150	351	1 / 24	21.50	1.10	20.45	0.111	34.77	-14.32
695.50	5	64-QAM	H	150	351	1 / 24	20.28	1.10	19.23	0.084	34.77	-15.54
668.00	10	QPSK	H	150	352	1 / 49	21.54	1.10	20.49	0.112	34.77	-14.28
680.50	10	QPSK	H	150	353	1 / 49	21.96	1.10	20.91	0.123	34.77	-13.86
693.00	10	QPSK	H	150	351	1 / 49	22.84	1.10	21.79	0.151	34.77	-12.98
693.00	10	16-QAM	H	150	351	1 / 49	22.39	1.10	21.34	0.136	34.77	-13.43
693.00	10	64-QAM	H	150	351	1 / 49	22.05	1.10	21.00	0.126	34.77	-13.77
670.50	15	QPSK	H	150	351	1 / 74	20.62	1.10	19.57	0.091	34.77	-15.20
680.50	15	QPSK	H	150	352	1 / 74	21.41	1.10	20.36	0.109	34.77	-14.41
690.50	15	QPSK	H	150	351	1 / 74	21.25	1.10	20.20	0.105	34.77	-14.57
680.50	15	16-QAM	H	150	352	1 / 74	20.97	1.10	19.92	0.098	34.77	-14.85
680.50	15	64-QAM	H	150	352	1 / 74	20.00	1.10	18.95	0.079	34.77	-15.82
673.00	20	QPSK	H	150	355	1 / 99	21.60	1.10	20.55	0.114	34.77	-14.22
680.50	20	QPSK	H	150	355	1 / 99	21.82	1.10	20.77	0.119	34.77	-14.00
688.00	20	QPSK	H	150	355	1 / 99	22.04	1.10	20.99	0.126	34.77	-13.78
673.00	20	16-QAM	H	150	355	1 / 99	21.32	1.10	20.27	0.106	34.77	-14.50
673.00	20	64-QAM	H	150	355	1 / 99	20.25	1.10	19.20	0.083	34.77	-15.57
693.00	10	QPSK	V	150	38	1 / 49	22.53	1.10	21.48	0.141	34.77	-13.29

Table 7-3. ERP Data (Band 71)

FCC ID: ZNFL713DL	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1803050034-05-ZNF	Test Dates: 3/7/2018 - 4/2/2018	EUT Type: Portable Handset	Page 147 of 180

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	150	100	3 / 2	20.44	1.10	19.39	0.087	34.77	-15.38	21.54	0.143	36.99	-15.45
707.50	1.4	QPSK	V	150	105	3 / 2	21.03	1.13	20.01	0.100	34.77	-14.76	22.16	0.164	36.99	-14.83
715.30	1.4	QPSK	V	150	104	3 / 2	21.12	1.16	20.13	0.103	34.77	-14.64	22.28	0.169	36.99	-14.71
715.30	1.4	16-QAM	V	150	104	3 / 2	20.79	1.16	19.80	0.096	34.77	-14.97	21.95	0.157	36.99	-15.04
715.30	1.4	64-QAM	V	150	104	3 / 2	19.90	1.16	18.91	0.078	34.77	-15.86	21.06	0.128	36.99	-15.93
700.50	3	QPSK	V	150	105	1 / 14	20.54	1.10	19.49	0.089	34.77	-15.28	21.64	0.146	36.99	-15.35
707.50	3	QPSK	V	150	103	1 / 14	21.30	1.13	20.28	0.107	34.77	-14.49	22.43	0.175	36.99	-14.56
714.50	3	QPSK	V	150	100	1 / 14	21.42	1.16	20.43	0.110	34.77	-14.34	22.58	0.181	36.99	-14.41
707.50	3	16-QAM	V	150	103	1 / 14	20.64	1.13	19.62	0.092	34.77	-15.15	21.77	0.150	36.99	-15.22
714.50	3	64-QAM	V	150	100	1 / 14	20.00	1.16	19.01	0.080	34.77	-15.76	21.16	0.131	36.99	-15.83
701.50	5	QPSK	V	150	97	1 / 24	20.86	1.11	19.82	0.096	34.77	-14.96	21.97	0.157	36.99	-15.02
707.50	5	QPSK	V	150	106	1 / 24	21.25	1.13	20.23	0.105	34.77	-14.54	22.38	0.173	36.99	-14.61
713.50	5	QPSK	V	150	105	1 / 24	21.66	1.15	20.66	0.117	34.77	-14.11	22.81	0.191	36.99	-14.18
713.50	5	16-QAM	V	150	105	1 / 24	20.46	1.15	19.46	0.088	34.77	-15.31	21.61	0.145	36.99	-15.38
707.50	5	64-QAM	V	150	106	1 / 24	19.79	1.13	18.77	0.075	34.77	-16.00	20.92	0.124	36.99	-16.07
704.00	10	QPSK	V	150	106	1 / 0	20.75	1.12	19.72	0.094	34.77	-15.05	21.87	0.154	36.99	-15.12
707.50	10	QPSK	V	150	105	1 / 0	21.49	1.13	20.47	0.111	34.77	-14.30	22.62	0.183	36.99	-14.37
711.00	10	QPSK	V	150	105	1 / 0	21.13	1.14	20.12	0.103	34.77	-14.65	22.27	0.169	36.99	-14.72
711.00	10	16-QAM	V	150	105	1 / 0	20.71	1.14	19.70	0.093	34.77	-15.07	21.85	0.153	36.99	-15.14
711.00	10	64-QAM	V	150	105	1 / 0	19.86	1.14	18.85	0.077	34.77	-15.92	21.00	0.126	36.99	-15.99
713.50	5	QPSK	H	150	86	1 / 24	20.12	1.15	19.12	0.082	34.77	-15.65	21.27	0.134	36.99	-15.72

Table 7-4. 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	V	150	115	1 / 0	21.02	1.32	20.19	0.104	34.77	-14.58	22.34	0.171	36.99	-14.65
782.00	5	QPSK	V	150	117	1 / 0	20.84	1.33	20.02	0.100	34.77	-14.75	22.17	0.165	36.99	-14.82
784.50	5	QPSK	V	150	114	1 / 0	20.93	1.34	20.12	0.103	34.77	-14.65	22.27	0.169	36.99	-14.72
779.50	5	16-QAM	V	150	115	1 / 0	20.84	1.32	20.01	0.100	34.77	-14.76	22.16	0.164	36.99	-14.83
782.00	5	64-QAM	V	150	117	1 / 0	19.58	1.33	18.76	0.075	34.77	-16.01	20.91	0.123	36.99	-16.08
782.00	10	QPSK	V	150	130	1 / 0	20.80	1.33	19.98	0.100	34.77	-14.79	22.13	0.163	36.99	-14.86
782.00	10	16-QAM	V	150	130	1 / 0	20.19	1.33	19.37	0.086	34.77	-15.40	21.52	0.142	36.99	-15.47
782.00	10	64-QAM	V	150	130	1 / 0	19.08	1.33	18.26	0.067	34.77	-16.51	20.41	0.110	36.99	-16.58
779.50	5	QPSK	H	150	77	1 / 0	20.90	1.32	20.07	0.102	34.77	-14.70	22.22	0.167	36.99	-14.77

Table 7-5. ERP Data (Band 13)

FCC ID: ZNFL713DL	 MEASUREMENT REPORT (CERTIFICATION) 				Approved by: Quality Manager
Test Report S/N: 1M1803050034-05.ZNF	Test Dates: 3/7/2018 - 4/2/2018	EUT Type: Portable Handset			Page 148 of 180

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	150	100	1 / 0	19.10	1.50	18.45	0.070	38.45	-20.00	20.60	0.115	40.61	-20.01
836.50	1.4	QPSK	V	150	101	1 / 0	18.39	1.50	17.74	0.059	38.45	-20.71	19.89	0.097	40.61	-20.72
848.30	1.4	QPSK	V	150	101	1 / 0	18.03	1.50	17.38	0.055	38.45	-21.07	19.53	0.090	40.61	-21.08
824.70	1.4	16-QAM	V	150	100	1 / 0	18.34	1.50	17.69	0.059	38.45	-20.76	19.84	0.096	40.61	-20.77
824.70	1.4	64-QAM	V	150	100	1 / 0	17.59	1.50	16.94	0.049	38.45	-21.51	19.09	0.081	40.61	-21.52
825.50	3	QPSK	V	150	105	1 / 0	19.18	1.50	18.53	0.071	38.45	-19.92	20.68	0.117	40.61	-19.93
836.50	3	QPSK	V	150	107	1 / 0	18.32	1.50	17.67	0.058	38.45	-20.78	19.82	0.096	40.61	-20.79
847.50	3	QPSK	V	150	103	1 / 0	17.91	1.50	17.26	0.053	38.45	-21.19	19.41	0.087	40.61	-21.20
825.50	3	16-QAM	V	150	105	1 / 0	18.67	1.50	18.02	0.063	38.45	-20.43	20.17	0.104	40.61	-20.44
825.50	3	64-QAM	V	150	105	1 / 0	17.75	1.50	17.10	0.051	38.45	-21.35	19.25	0.084	40.61	-21.36
826.50	5	QPSK	V	150	105	1 / 0	19.07	1.50	18.42	0.070	38.45	-20.03	20.57	0.114	40.61	-20.04
836.50	5	QPSK	V	150	107	1 / 0	18.45	1.50	17.80	0.060	38.45	-20.65	19.95	0.099	40.61	-20.66
846.50	5	QPSK	V	150	105	1 / 0	17.18	1.50	16.53	0.045	38.45	-21.92	18.68	0.074	40.61	-21.93
826.50	5	16-QAM	V	150	105	1 / 0	18.01	1.50	17.36	0.054	38.45	-21.09	19.51	0.089	40.61	-21.10
826.50	5	64-QAM	V	150	105	1 / 0	17.08	1.50	16.43	0.044	38.45	-22.02	18.58	0.072	40.61	-22.03
829.00	10	QPSK	V	150	94	1 / 0	19.53	1.50	18.88	0.077	38.45	-19.57	21.03	0.127	40.61	-19.58
836.50	10	QPSK	V	150	95	1 / 0	18.89	1.50	18.24	0.067	38.45	-20.21	20.39	0.109	40.61	-20.22
844.00	10	QPSK	V	150	96	1 / 0	18.28	1.50	17.63	0.058	38.45	-20.82	19.78	0.095	40.61	-20.83
829.00	10	16-QAM	V	150	94	1 / 0	18.52	1.50	17.87	0.061	38.45	-20.58	20.02	0.100	40.61	-20.59
829.00	10	64-QAM	V	150	94	1 / 0	17.50	1.50	16.85	0.048	38.45	-21.60	19.00	0.079	40.61	-21.61
829.00	10	QPSK	H	150	0	1 / 0	15.81	1.50	15.16	0.033	38.45	-23.29	17.31	0.054	40.61	-23.30

Table 7-6. ERP Data (Band 5)

FCC ID: ZNFL713DL	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1803050034-05.ZNF	Test Dates: 3/7/2018 - 4/2/2018	EUT Type: Portable Handset	Page 149 of 180

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	150	352	1 / 5	18.09	5.56	23.65	0.232	30.00	-6.35
1745.00	1.4	QPSK	H	150	353	1 / 5	18.97	5.32	24.29	0.269	30.00	-5.71
1779.30	1.4	QPSK	H	150	352	1 / 5	19.46	5.09	24.55	0.285	30.00	-5.45
1779.30	1.4	16-QAM	H	150	352	1 / 5	18.53	5.09	23.62	0.230	30.00	-6.38
1779.30	1.4	64-QAM	H	150	352	1 / 5	17.86	5.09	22.95	0.197	30.00	-7.05
1711.50	3	QPSK	H	150	350	1 / 14	18.50	5.55	24.05	0.254	30.00	-5.95
1745.00	3	QPSK	H	150	353	1 / 14	19.16	5.32	24.48	0.281	30.00	-5.52
1778.50	3	QPSK	H	150	355	1 / 14	19.77	5.10	24.87	0.307	30.00	-5.13
1778.50	3	16-QAM	H	150	355	1 / 14	18.81	5.10	23.91	0.246	30.00	-6.09
1778.50	3	64-QAM	H	150	355	1 / 14	18.04	5.10	23.14	0.206	30.00	-6.86
1712.50	5	QPSK	H	150	352	1 / 24	18.93	5.55	24.48	0.280	30.00	-5.52
1745.00	5	QPSK	H	150	350	1 / 24	19.48	5.32	24.80	0.302	30.00	-5.20
1777.50	5	QPSK	H	150	355	1 / 24	19.93	5.10	25.03	0.319	30.00	-4.97
1777.50	5	16-QAM	H	150	355	1 / 24	19.01	5.10	24.11	0.258	30.00	-5.89
1777.50	5	64-QAM	H	150	355	1 / 24	18.30	5.10	23.40	0.219	30.00	-6.60
1715.00	10	QPSK	H	150	355	1 / 49	19.54	5.53	25.07	0.321	30.00	-4.93
1745.00	10	QPSK	H	150	350	1 / 49	19.73	5.32	25.05	0.320	30.00	-4.95
1775.00	10	QPSK	H	150	352	1 / 49	20.19	5.12	25.31	0.340	30.00	-4.69
1775.00	10	16-QAM	H	150	352	1 / 49	19.31	5.12	24.43	0.277	30.00	-5.57
1775.00	10	64-QAM	H	150	352	1 / 49	18.56	5.12	23.68	0.233	30.00	-6.32
1717.50	15	QPSK	H	150	350	1 / 74	19.08	5.51	24.59	0.288	30.00	-5.41
1745.00	15	QPSK	H	150	350	1 / 74	19.66	5.32	24.98	0.315	30.00	-5.02
1772.50	15	QPSK	H	150	352	1 / 74	19.83	5.14	24.97	0.314	30.00	-5.03
1745.00	15	16-QAM	H	150	350	1 / 74	18.72	5.32	24.04	0.254	30.00	-5.96
1745.00	15	64-QAM	H	150	350	1 / 74	17.71	5.32	23.03	0.201	30.00	-6.97
1720.00	20	QPSK	H	150	353	1 / 99	19.22	5.49	24.71	0.296	30.00	-5.29
1745.00	20	QPSK	H	150	353	1 / 99	19.80	5.32	25.12	0.325	30.00	-4.88
1770.00	20	QPSK	H	150	350	1 / 99	20.21	5.15	25.36	0.344	30.00	-4.64
1745.00	20	16-QAM	H	150	353	1 / 99	19.15	5.32	24.47	0.280	30.00	-5.53
1745.00	20	64-QAM	H	150	353	1 / 99	18.13	5.32	23.45	0.221	30.00	-6.55
1770.00	20	QPSK	V	150	137	1 / 99	15.28	5.00	20.28	0.107	30.00	-9.72

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

FCC ID: ZNLF713DL	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1803050034-05.ZNF	Test Dates: 3/7/2018 - 4/2/2018	EUT Type: Portable Handset	Page 150 of 180

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	150	5	1 / 0	19.99	4.82	24.81	0.303	33.01	-8.20
1880.00	1.4	QPSK	H	150	3	1 / 0	19.89	4.74	24.63	0.290	33.01	-8.38
1909.30	1.4	QPSK	H	150	6	1 / 0	18.87	4.68	23.55	0.227	33.01	-9.46
1850.70	1.4	16-QAM	H	150	5	1 / 0	19.36	4.82	24.18	0.262	33.01	-8.83
1850.70	1.4	64-QAM	H	150	5	1 / 0	18.86	4.82	23.68	0.233	33.01	-9.33
1851.50	3	QPSK	H	150	8	1 / 0	20.27	4.82	25.09	0.323	33.01	-7.92
1880.00	3	QPSK	H	150	10	1 / 0	20.31	4.74	25.05	0.320	33.01	-7.96
1908.50	3	QPSK	H	150	10	1 / 0	19.20	4.68	23.88	0.244	33.01	-9.13
1851.50	3	16-QAM	H	150	8	1 / 0	19.57	4.82	24.39	0.275	33.01	-8.62
1851.50	3	64-QAM	H	150	8	1 / 0	18.90	4.82	23.72	0.235	33.01	-9.29
1852.50	5	QPSK	H	150	350	1 / 0	19.47	4.81	24.28	0.268	33.01	-8.73
1880.00	5	QPSK	H	150	356	1 / 0	20.06	4.74	24.80	0.302	33.01	-8.21
1907.50	5	QPSK	H	150	356	1 / 0	18.97	4.68	23.65	0.232	33.01	-9.36
1852.50	5	16-QAM	H	150	350	1 / 0	19.79	4.81	24.60	0.289	33.01	-8.41
1852.50	5	64-QAM	H	150	350	1 / 0	18.93	4.81	23.74	0.237	33.01	-9.27
1855.00	10	QPSK	H	150	6	1 / 0	20.51	4.81	25.32	0.340	33.01	-7.69
1880.00	10	QPSK	H	150	6	1 / 0	20.61	4.74	25.35	0.343	33.01	-7.66
1905.00	10	QPSK	H	150	4	1 / 0	19.78	4.68	24.46	0.280	33.01	-8.55
1880.00	10	16-QAM	H	150	6	1 / 0	19.56	4.74	24.30	0.269	33.01	-8.71
1880.00	10	64-QAM	H	150	6	1 / 0	18.70	4.74	23.44	0.221	33.01	-9.57
1857.50	15	QPSK	H	150	7	1 / 0	20.99	4.80	25.79	0.379	33.01	-7.22
1880.00	15	QPSK	H	150	10	1 / 0	21.08	4.74	25.82	0.382	33.01	-7.19
1902.50	15	QPSK	H	150	8	1 / 0	19.98	4.69	24.67	0.293	33.01	-8.34
1880.00	15	16-QAM	H	150	10	1 / 0	20.07	4.74	24.81	0.303	33.01	-8.20
1880.00	15	64-QAM	H	150	10	1 / 0	19.22	4.74	23.96	0.249	33.01	-9.05
1860.00	20	QPSK	H	150	8	1 / 0	20.87	4.79	25.66	0.368	33.01	-7.35
1880.00	20	QPSK	H	150	10	1 / 0	21.15	4.74	25.89	0.388	33.01	-7.12
1900.00	20	QPSK	H	150	11	1 / 0	20.02	4.69	24.71	0.296	33.01	-8.30
1880.00	20	16-QAM	H	150	10	1 / 0	19.92	4.74	24.66	0.292	33.01	-8.35
1860.00	20	64-QAM	H	150	8	1 / 0	19.83	4.79	24.62	0.290	33.01	-8.39
1880.00	20	QPSK	V	150	279	1 / 0	20.14	4.84	24.98	0.315	33.01	-8.03

Table 7-8. EIRP Data (Band 2)

FCC ID: ZNLF713DL	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1803050034-05.ZNF	Test Dates: 3/7/2018 - 4/2/2018	EUT Type: Portable Handset	Page 151 of 180

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 v03 – 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: ZNFL713DL	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
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Test Setup

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

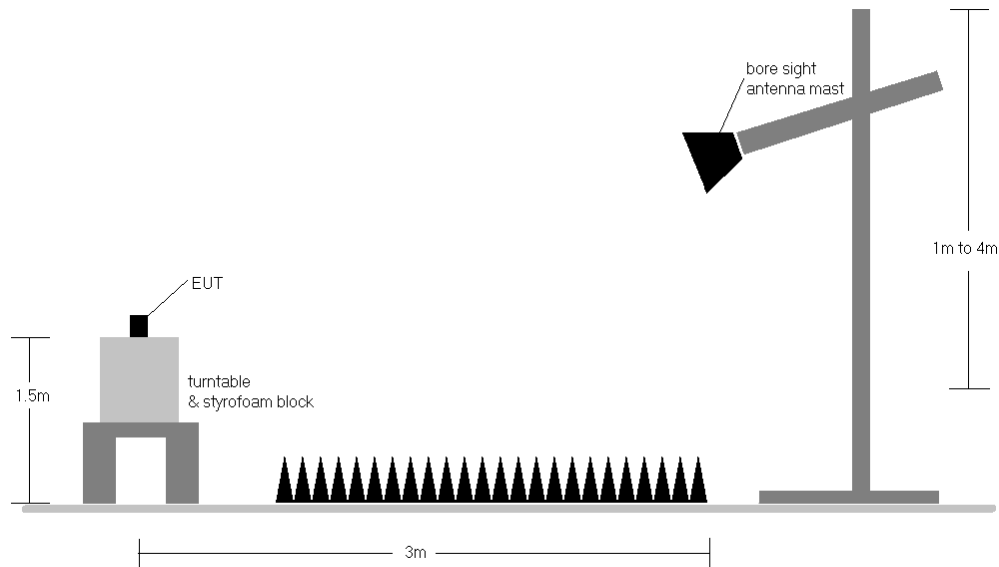


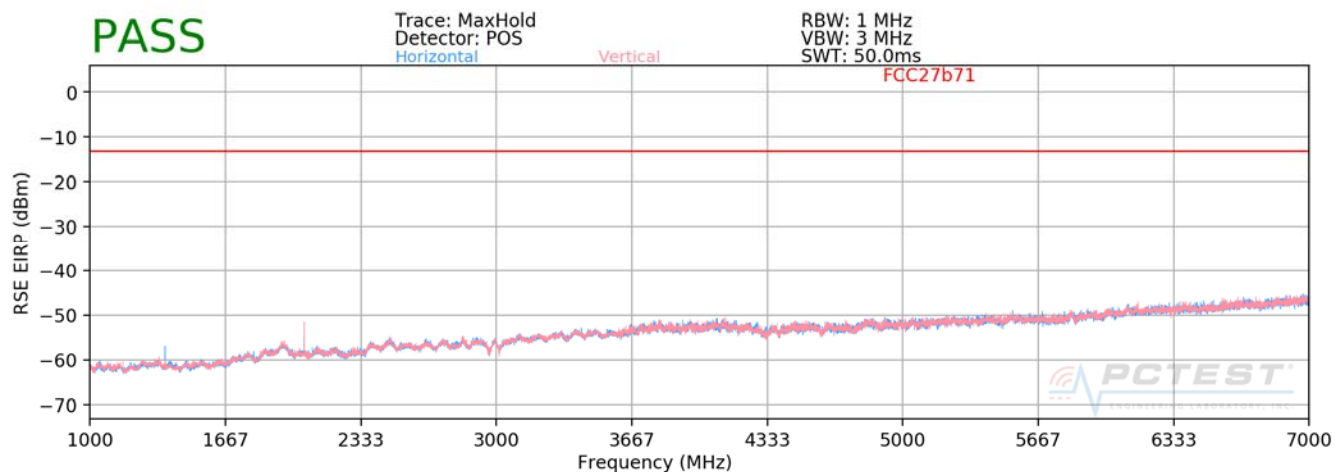
Figure 7-7. Test Instrument & Measurement Setup

Test Notes

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

FCC ID: ZNFL713DL	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
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Band 71



Plot 7-246. Radiated Spurious Plot above 1GHz (Band 71)

OPERATING FREQUENCY: 668.00 MHz

CHANNEL: 133172

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]
1336.00	H	175	186	-65.15	7.94	-57.21	-44.2
2004.00	H	208	111	-67.37	8.53	-58.84	-45.8
2672.00	H	-	-	-75.67	9.46	-66.22	-53.2
3340.00	H	-	-	-73.65	9.36	-64.29	-51.3

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

FCC ID: ZNFL713DL	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1803050034-05.ZNF	Test Dates: 3/7/2018 - 4/2/2018	EUT Type: Portable Handset	Page 154 of 180

OPERATING FREQUENCY: 680.50 MHz
 CHANNEL: 133297
 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]
1361.00	H	109	191	-69.15	8.00	-61.15	-48.2
2041.50	H	140	126	-63.61	8.75	-54.86	-41.9
2722.00	H	-	-	-75.28	9.73	-65.55	-52.5
3402.50	H	-	-	-73.34	9.48	-63.86	-50.9

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

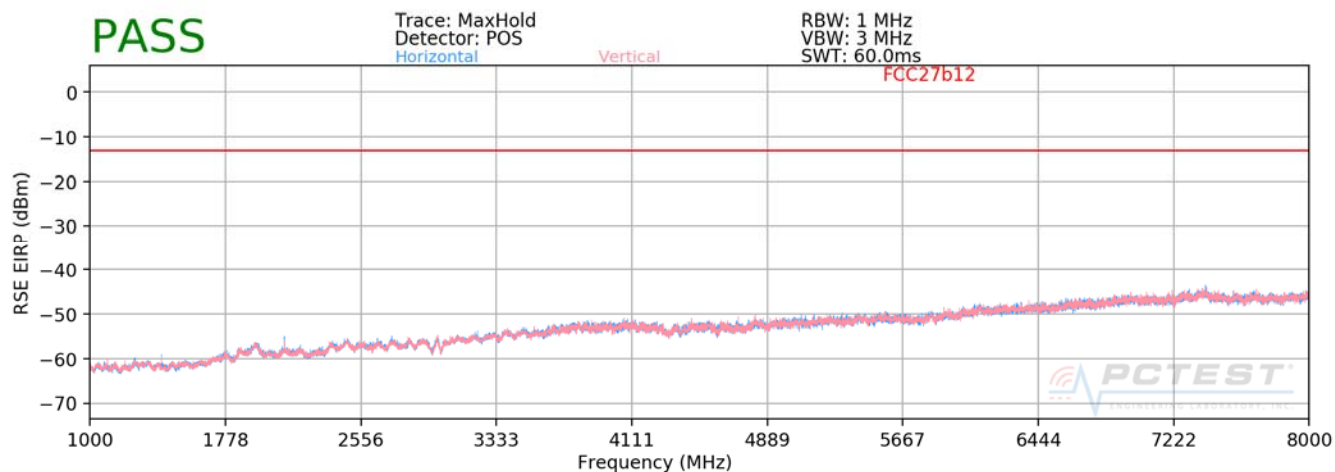
OPERATING FREQUENCY: 693.00 MHz
 CHANNEL: 133422
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10.0 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

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]
1386.00	H	283	214	-66.98	7.94	-59.04	-46.0
2079.00	H	146	237	-59.31	8.86	-50.45	-37.4
2772.00	H	-	-	-76.33	9.96	-66.36	-53.4
3465.00	H	-	-	-72.76	9.59	-63.17	-50.2

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

FCC ID: ZNFL713DL	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1803050034-05.ZNF	Test Dates: 3/7/2018 - 4/2/2018	EUT Type: Portable Handset	Page 155 of 180

Band 12



Plot 7-247. Radiated Spurious Plot above 1GHz (Band 12)

OPERATING FREQUENCY: 701.50 MHz

CHANNEL: 23035

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	V	100	240	-77.11	8.35	-68.76	-55.8
2104.50	V	112	351	-73.32	8.99	-64.33	-51.3
2806.00	V	-	-	-73.36	10.05	-63.31	-50.3
3507.50	V	-	-	-70.28	9.65	-60.63	-47.6

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

FCC ID: ZNFL713DL	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1803050034-05.ZNF	Test Dates: 3/7/2018 - 4/2/2018	EUT Type: Portable Handset	Page 156 of 180

OPERATING FREQUENCY: 707.50 MHz
 CHANNEL: 23095
 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	V	172	258	-75.58	8.41	-67.17	-54.2
2122.50	V	199	162	-60.09	8.95	-51.15	-38.1
2830.00	V	-	-	-72.53	10.11	-62.42	-49.4
3537.50	V	-	-	-70.65	9.72	-60.93	-47.9

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

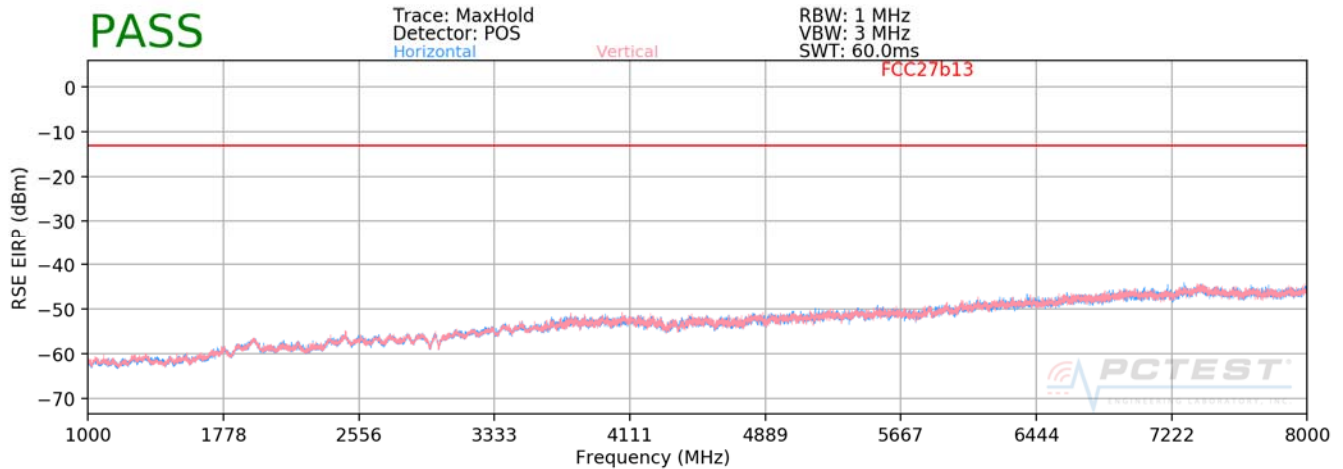
OPERATING FREQUENCY: 713.50 MHz
 CHANNEL: 23155
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.0 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

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	V	172	299	-74.61	8.46	-66.15	-53.2
2140.50	V	270	203	-64.32	8.91	-55.41	-42.4
2854.00	V	-	-	-73.39	10.17	-63.23	-50.2
3567.50	V	-	-	-70.15	9.78	-60.38	-47.4

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

FCC ID: ZNFL713DL	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1803050034-05.ZNF	Test Dates: 3/7/2018 - 4/2/2018	EUT Type: Portable Handset	Page 157 of 180

Band 13



Plot 7-248. Radiated Spurious Plot above 1GHz (Band 13)

OPERATING FREQUENCY: 779.50 MHz
CHANNEL: 23205
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	V	385	183	-56.98	9.48	-47.50	-34.5
3118.00	V	-	-	-73.97	9.62	-64.36	-51.4
3897.50	V	-	-	-69.72	9.10	-60.63	-47.6

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

FCC ID: ZNFL713DL	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1803050034-05.ZNF	Test Dates: 3/7/2018 - 4/2/2018	EUT Type: Portable Handset		Page 158 of 180

OPERATING FREQUENCY: 782.00 MHz
 CHANNEL: 23230
 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	326	8	-62.90	9.45	-53.45	-40.4
3128.00	V	-	-	-74.13	9.59	-64.54	-51.5
3910.00	V	-	-	-70.14	9.13	-61.01	-48.0

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

OPERATING FREQUENCY: 784.50 MHz
 CHANNEL: 23255
 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]
2353.50	V	333	184	-64.16	9.42	-54.75	-41.7
3138.00	V	-	-	-73.88	9.56	-64.32	-51.3
3922.50	V	-	-	-69.89	9.17	-60.73	-47.7

Table 7-17. Radiated Spurious Data (Band 13 – High Channel)

FCC ID: ZNFL713DL	 MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
Test Report S/N: 1M1803050034-05.ZNF	Test Dates: 3/7/2018 - 4/2/2018	EUT Type: Portable Handset		Page 159 of 180

MODULATION SIGNAL: QPSK

BANDWIDTH: 5.00 MHz

DISTANCE: 3 meters

NARROWBAND EMISSION LIMIT: -50 dBm

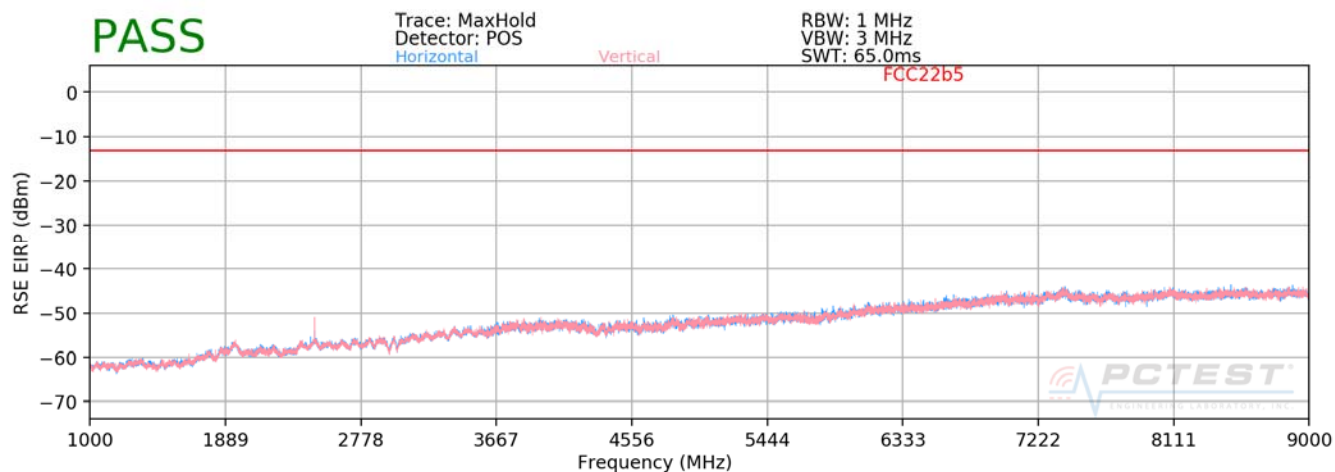
WIDEBAND EMISSION LIMIT: -40 dBm/MHz

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	341	123	-78.42	8.79	-69.62	-29.6
1564.00	V	355	25	-78.23	8.83	-69.40	-29.4
1569.00	V	121	229	-78.57	8.86	-69.71	-29.7

Table 7-18. Radiated Spurious Data (Band 13 – 1559-1610MHz Band)

FCC ID: ZNFL713DL	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1803050034-05.ZNF	Test Dates: 3/7/2018 - 4/2/2018	EUT Type: Portable Handset	Page 160 of 180

Band 5



Plot 7-249. Radiated Spurious Plot above 1GHz (Band 5)

OPERATING FREQUENCY: 829.00 MHz
CHANNEL: 20450
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	208	180	-74.99	8.80	-66.19	-53.2
2487.00	V	242	323	-65.03	9.21	-55.82	-42.8
3316.00	V	-	-	-69.92	9.40	-60.52	-47.5
4145.00	V	-	-	-69.38	10.02	-59.36	-46.4

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

FCC ID: ZNFL713DL	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1803050034-05.ZNF	Test Dates: 3/7/2018 - 4/2/2018	EUT Type: Portable Handset	Page 161 of 180

OPERATING FREQUENCY: 836.50 MHz
 CHANNEL: 20525
 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	104	308	-75.14	8.71	-66.43	-53.4
2509.50	V	270	337	-68.25	9.24	-59.01	-46.0
3346.00	V	-	-	-70.58	9.34	-61.24	-48.2
4182.50	V	-	-	-69.19	10.25	-58.94	-45.9

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

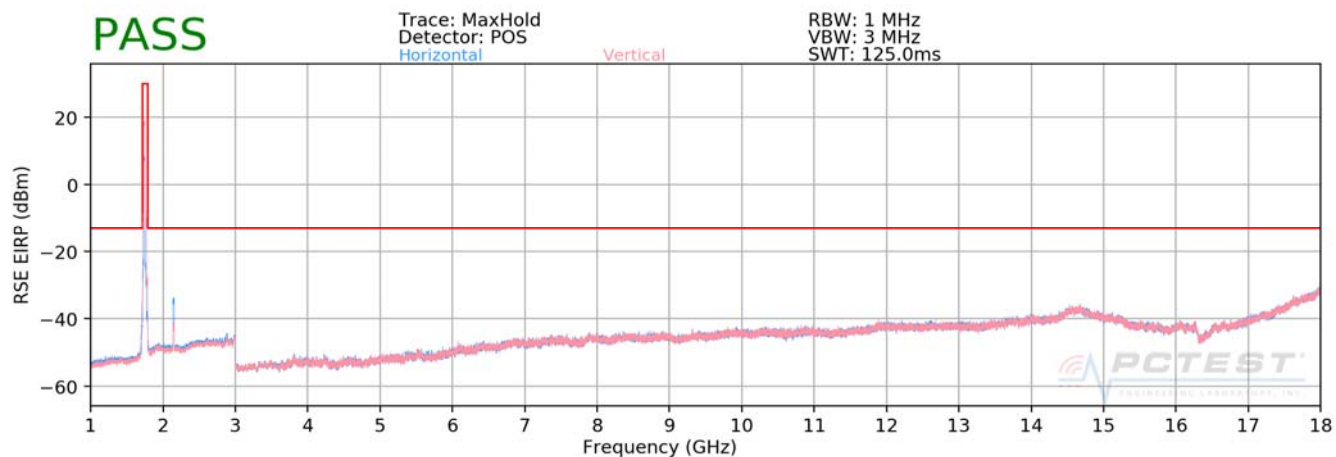
OPERATING FREQUENCY: 844.00 MHz
 CHANNEL: 20600
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10.0 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

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]
1688.00	V	104	326	-75.53	8.61	-66.92	-53.9
2532.00	V	147	112	-66.47	9.21	-57.25	-44.3
3376.00	V	-	-	-69.83	9.40	-60.43	-47.4
4220.00	V	-	-	-69.99	10.41	-59.58	-46.6

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

FCC ID: ZNFL713DL	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1803050034-05.ZNF	Test Dates: 3/7/2018 - 4/2/2018	EUT Type: Portable Handset	Page 162 of 180

Band 66/4



Plot 7-250. Radiated Spurious Plot above 1GHz (Band 66)

OPERATING FREQUENCY: 1720.00 MHz

CHANNEL: 132072

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	104	324	-56.01	9.54	-46.47	-33.5
5160.00	H	109	240	-66.98	10.79	-56.18	-43.2
6880.00	H	-	-	-63.22	10.86	-52.37	-39.4
8600.00	H	-	-	-63.10	11.69	-51.41	-38.4

Table 7-22. Radiated Spurious Data (Band 66 – Low Channel)

FCC ID: ZNFL713DL	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1803050034-05.ZNF	Test Dates: 3/7/2018 - 4/2/2018	EUT Type: Portable Handset	Page 163 of 180

OPERATING FREQUENCY: 1745.00 MHz
 CHANNEL: 132322
 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	118	317	-60.82	9.65	-51.17	-38.2
5235.00	H	341	241	-67.79	10.93	-56.86	-43.9
6980.00	H	-	-	-63.85	10.96	-52.89	-39.9
8725.00	H	-	-	-63.18	11.83	-51.35	-38.4

Table 7-23. Radiated Spurious Data (Band 66 – Mid Channel)

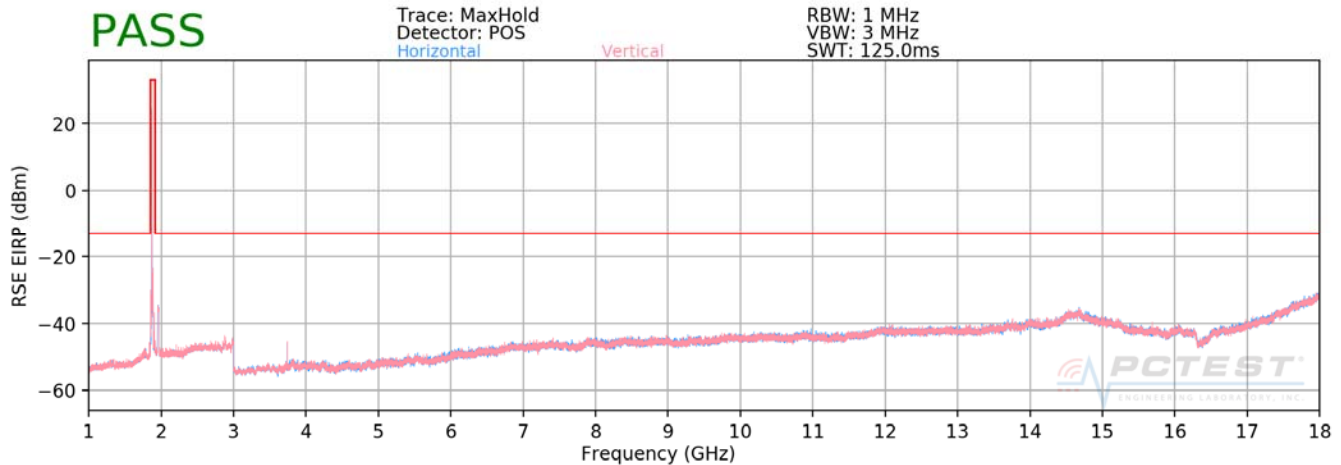
OPERATING FREQUENCY: 1770.00 MHz
 CHANNEL: 132572
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 20.0 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

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	113	305	-57.10	9.69	-47.40	-34.4
5310.00	H	121	158	-68.03	10.97	-57.07	-44.1
7080.00	H	-	-	-64.01	11.01	-53.00	-40.0
8850.00	H	-	-	-62.91	11.95	-50.96	-38.0

Table 7-24. Radiated Spurious Data (Band 66 – High Channel)

FCC ID: ZNFL713DL	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1803050034-05.ZNF	Test Dates: 3/7/2018 - 4/2/2018	EUT Type: Portable Handset	Page 164 of 180

Band 2



Plot 7-251. Radiated Spurious Plot above 1GHz (Band 2)

OPERATING FREQUENCY: 1860.00 MHz

CHANNEL: 18700

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	125	225	-58.15	9.66	-48.49	-35.5
5580.00	H	104	209	-65.98	11.03	-54.95	-41.9
7440.00	H	-	-	-63.08	10.86	-52.22	-39.2
9300.00	H	-	-	-63.37	12.29	-51.08	-38.1

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

FCC ID: ZNFL713DL	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1803050034-05.ZNF	Test Dates: 3/7/2018 - 4/2/2018	EUT Type: Portable Handset	Page 165 of 180

OPERATING FREQUENCY: 1880.00 MHz
 CHANNEL: 18900
 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	125	235	-55.29	9.50	-45.79	-32.8
5640.00	H	113	212	-66.93	11.16	-55.77	-42.8
7520.00	H	-	-	-63.52	11.03	-52.49	-39.5
9400.00	H	-	-	-62.89	12.19	-50.70	-37.7
11280.00	H	-	-	-63.18	13.15	-50.03	-37.0

Table 7-26. Radiated Spurious Data (Band 2 – Mid Channel)

OPERATING FREQUENCY: 1900.00 MHz
 CHANNEL: 19100
 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	109	229	-59.26	9.35	-49.91	-36.9
5700.00	H	115	215	-67.89	11.30	-56.60	-43.6
7600.00	H	-	-	-63.74	11.21	-52.52	-39.5
9500.00	H	-	-	-62.89	12.20	-50.69	-37.7

Table 7-27. Radiated Spurious Data (Band 2 – High Channel)

FCC ID: ZNFL713DL	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
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7.8 Frequency Stability / Temperature Variation

Test Overview and Limit

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

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

For Part 22, the frequency stability of the transmitter shall be maintained within $\pm 0.00025\%$ (± 2.5 ppm) of the center frequency. For Part 24, Part 27, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

Test Procedure Used

ANSI/TIA-603-E-2016

Test Settings

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

Test Setup

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

Test Notes

None

FCC ID: ZNFL713DL	 MEASUREMENT REPORT (CERTIFICATION)		 Approved by: Quality Manager
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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	+ 20 (Ref)	680,500,029	29	0.0000043
100 %		- 30	680,499,848	-152	-0.0000223
100 %		- 20	680,500,236	236	0.0000347
100 %		- 10	680,499,883	-117	-0.0000172
100 %		0	680,500,170	170	0.0000250
100 %		+ 10	680,499,647	-353	-0.0000519
100 %		+ 20	680,499,806	-194	-0.0000285
100 %		+ 30	680,500,106	106	0.0000156
100 %		+ 40	680,499,989	-11	-0.0000016
100 %		+ 50	680,499,805	-195	-0.0000287
85 %	3.27	+ 20	680,499,751	-249	-0.0000366
BATT. ENDPOINT	3.45	+ 20	680,500,301	301	0.0000442

Table 7-28. 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: ZNFL713DL	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
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Band 71 Frequency Stability Measurements

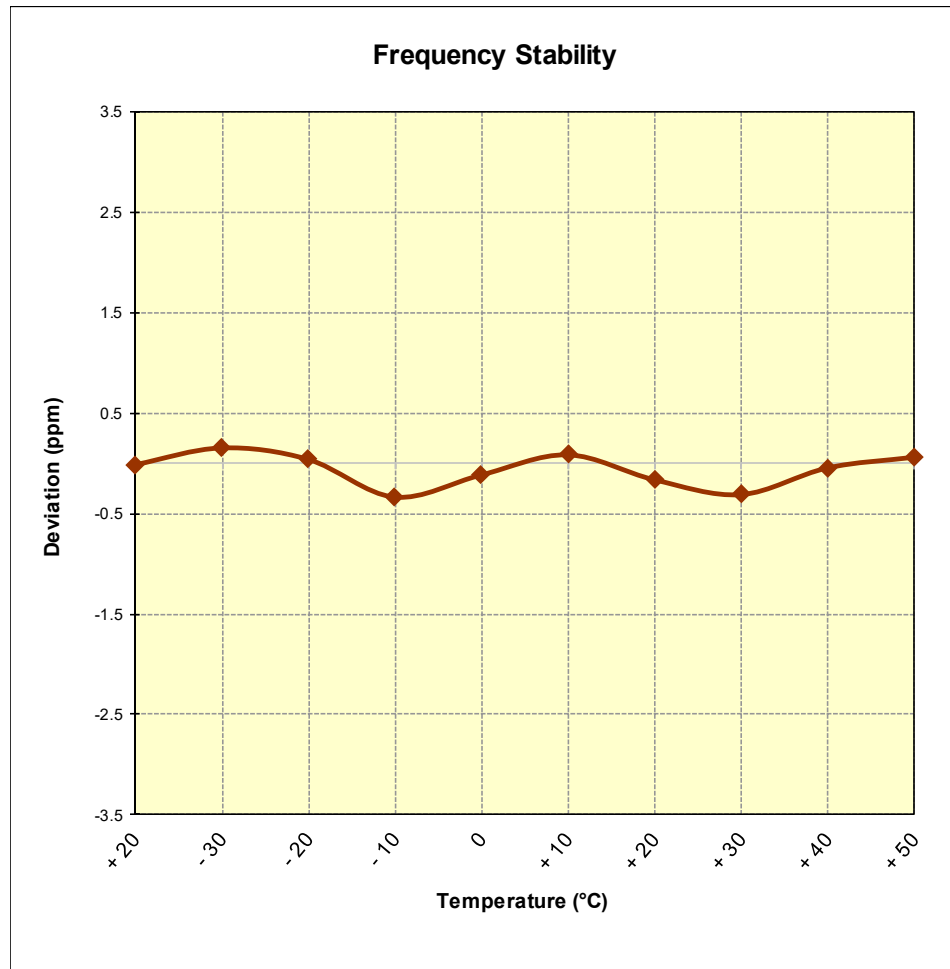


Figure 7-8. Frequency Stability Graph (Band 71)

FCC ID: ZNFL713DL	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1803050034-05.ZNF	Test Dates: 3/7/2018 - 4/2/2018	EUT Type: Portable Handset	Page 169 of 180

Band 12 Frequency Stability Measurements

OPERATING FREQUENCY: 707,500,000 Hz
 CHANNEL: 23095
 REFERENCE VOLTAGE: 3.85 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	707,500,129	129	0.0000182
100 %		- 30	707,500,062	62	0.0000088
100 %		- 20	707,500,019	19	0.0000027
100 %		- 10	707,500,124	124	0.0000175
100 %		0	707,499,994	-6	-0.0000008
100 %		+ 10	707,499,672	-328	-0.0000464
100 %		+ 20	707,499,848	-152	-0.0000215
100 %		+ 30	707,500,125	125	0.0000177
100 %		+ 40	707,500,325	325	0.0000459
100 %		+ 50	707,499,623	-377	-0.0000533
85 %	3.27	+ 20	707,499,677	-323	-0.0000457
BATT. ENDPOINT	3.45	+ 20	707,500,060	60	0.0000085

Table 7-29. Frequency Stability Data (Band 12)

Note:

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

FCC ID: ZNFL713DL	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1803050034-05.ZNF	Test Dates: 3/7/2018 - 4/2/2018	EUT Type: Portable Handset	Page 170 of 180

Band 12 Frequency Stability Measurements

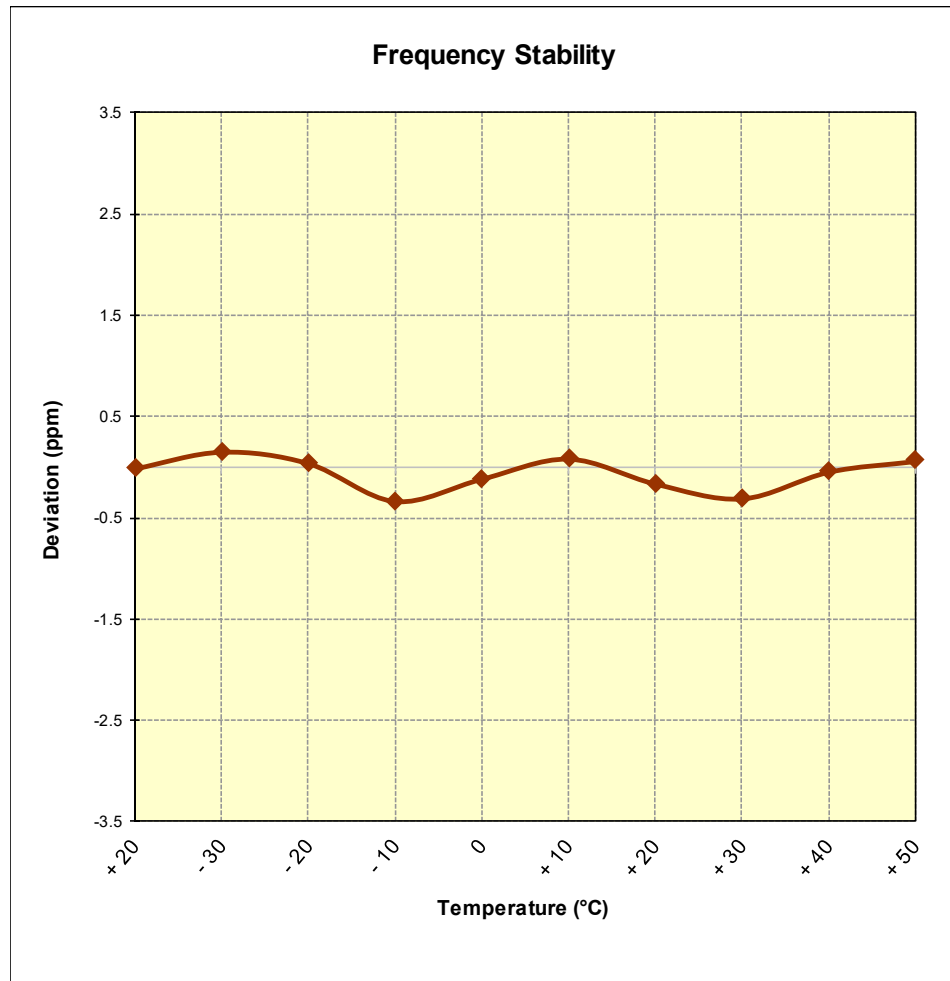


Figure 7-9. Frequency Stability Graph (Band 12)

FCC ID: ZNFL713DL	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1803050034-05.ZNF	Test Dates: 3/7/2018 - 4/2/2018	EUT Type: Portable Handset	Page 171 of 180

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	+ 20 (Ref)	781,999,703	-297	-0.0000380
100 %		- 30	782,000,107	107	0.0000137
100 %		- 20	782,000,281	281	0.0000359
100 %		- 10	782,000,209	209	0.0000267
100 %		0	781,999,710	-290	-0.0000371
100 %		+ 10	781,999,621	-379	-0.0000485
100 %		+ 20	782,000,015	15	0.0000019
100 %		+ 30	782,000,321	321	0.0000410
100 %		+ 40	782,000,090	90	0.0000115
100 %		+ 50	782,000,312	312	0.0000399
85 %	3.27	+ 20	782,000,003	3	0.0000004
BATT. ENDPOINT	3.45	+ 20	782,000,099	99	0.0000127

Table 7-30. 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: ZNFL713DL	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
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Band 13 Frequency Stability Measurements

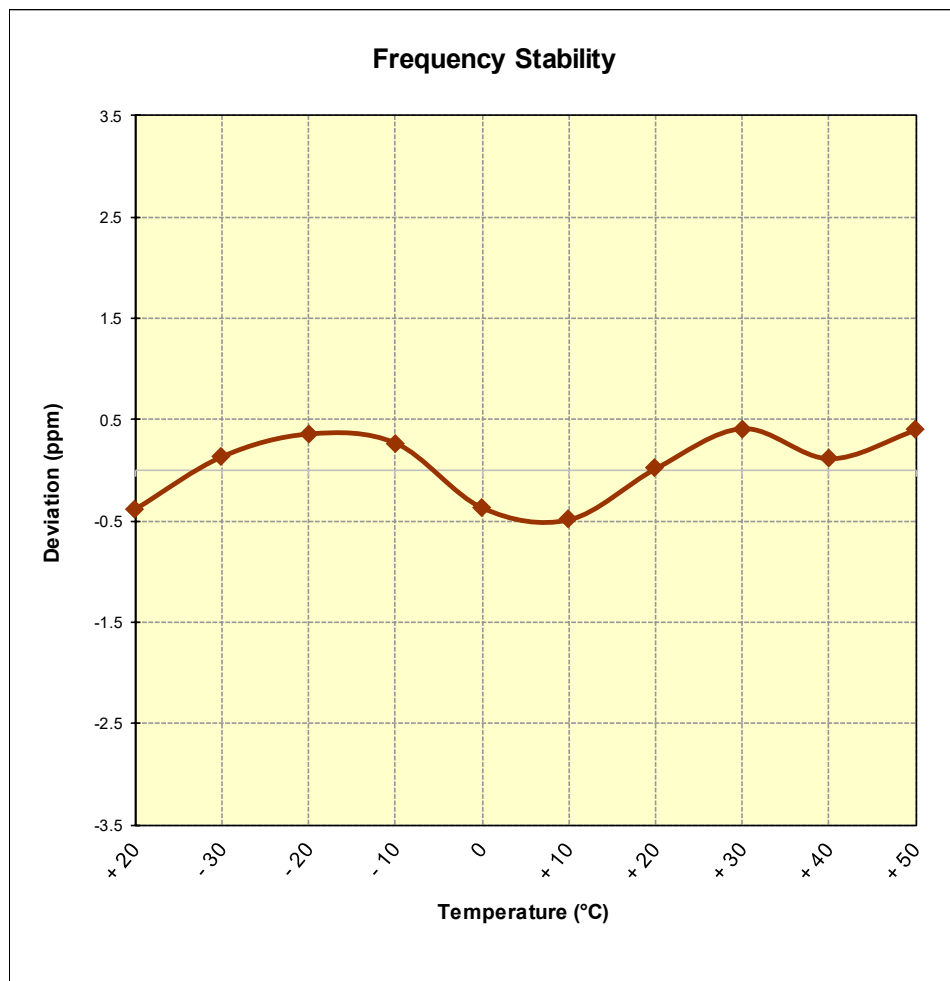


Figure 7-10. Frequency Stability Graph (Band 13)

FCC ID: ZNFL713DL	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1803050034-05.ZNF	Test Dates: 3/7/2018 - 4/2/2018	EUT Type: Portable Handset	Page 173 of 180

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	+ 20 (Ref)	836,499,838	-162	-0.0000194
100 %		- 30	836,499,840	-160	-0.0000191
100 %		- 20	836,500,055	55	0.0000066
100 %		- 10	836,499,876	-124	-0.0000148
100 %		0	836,500,056	56	0.0000067
100 %		+ 10	836,499,912	-88	-0.0000105
100 %		+ 20	836,499,780	-220	-0.0000263
100 %		+ 30	836,499,922	-78	-0.0000093
100 %		+ 40	836,499,679	-321	-0.0000384
100 %		+ 50	836,500,013	13	0.0000016
85 %	3.27	+ 20	836,500,053	53	0.0000063
BATT. ENDPOINT	3.45	+ 20	836,499,905	-95	-0.0000114

Table 7-31. Frequency Stability Data (Band 5)

FCC ID: ZNFL713DL	 MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
Test Report S/N: 1M1803050034-05.ZNF	Test Dates: 3/7/2018 - 4/2/2018	EUT Type: Portable Handset		Page 174 of 180

Band 5 Frequency Stability Measurements

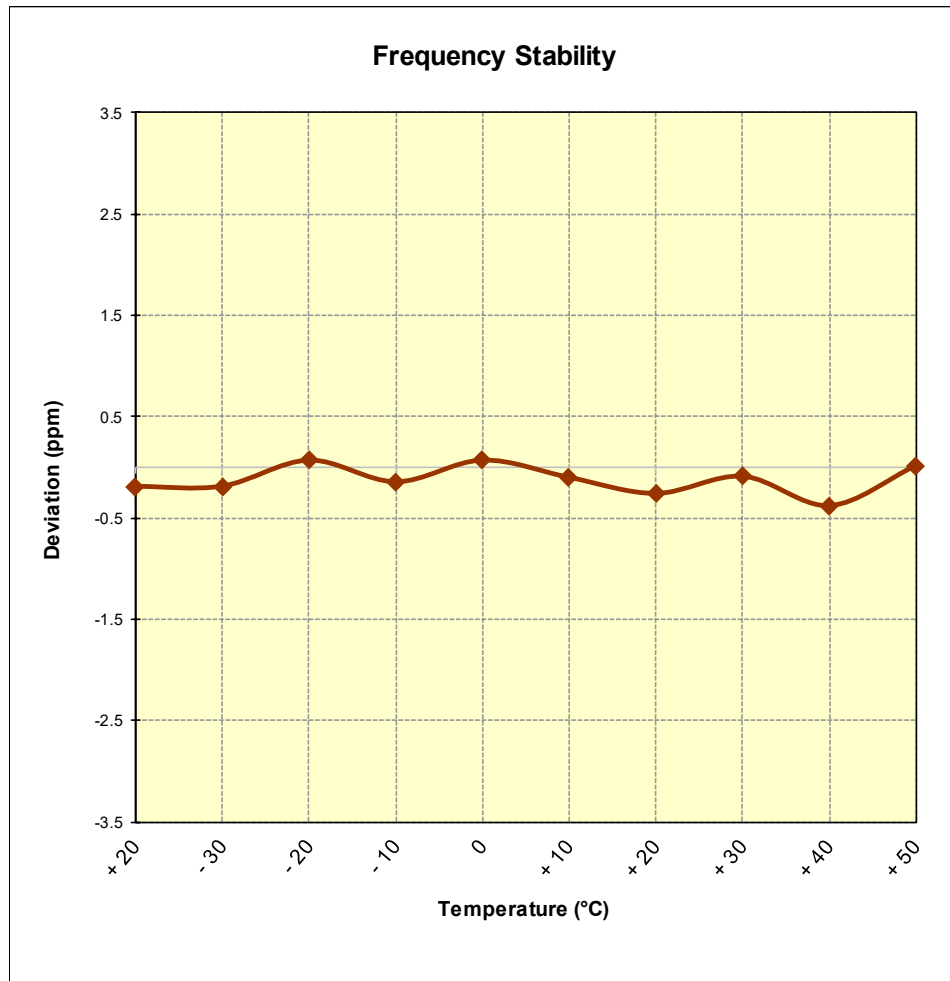


Figure 7-11. Frequency Stability Graph (Band 5)

FCC ID: ZNFL713DL	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1803050034-05.ZNF	Test Dates: 3/7/2018 - 4/2/2018	EUT Type: Portable Handset	Page 175 of 180

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	+ 20 (Ref)	1,744,999,963	-37	-0.0000021
100 %		- 30	1,745,000,038	38	0.0000022
100 %		- 20	1,745,000,067	67	0.0000038
100 %		- 10	1,744,999,995	-5	-0.0000003
100 %		0	1,744,999,779	-221	-0.0000127
100 %		+ 10	1,745,000,053	53	0.0000030
100 %		+ 20	1,744,999,879	-121	-0.0000069
100 %		+ 30	1,745,000,089	89	0.0000051
100 %		+ 40	1,744,999,870	-130	-0.0000074
100 %		+ 50	1,745,000,052	52	0.0000030
85 %		+ 20	1,744,999,951	-49	-0.0000028
BATT. ENDPOINT	3.45	+ 20	1,745,000,302	302	0.0000173

Table 7-32. Frequency Stability Data (Band 66)

Note:

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

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Band 66 Frequency Stability Measurements

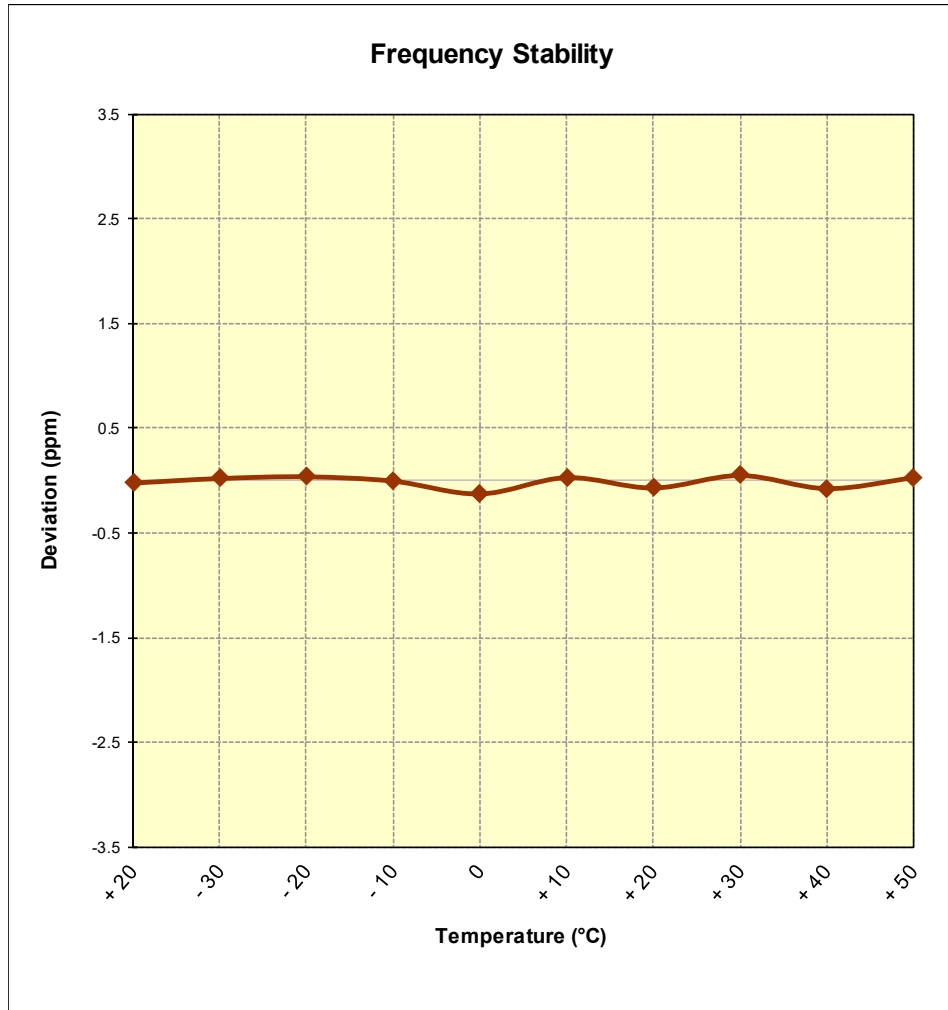


Figure 7-12. Frequency Stability Graph (Band 66)

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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	+ 20 (Ref)	1,880,000,454	454	0.0000241
100 %		- 30	1,880,000,002	2	0.0000001
100 %		- 20	1,879,999,808	-192	-0.0000102
100 %		- 10	1,880,000,253	253	0.0000135
100 %		0	1,880,000,020	20	0.0000011
100 %		+ 10	1,879,999,871	-129	-0.0000069
100 %		+ 20	1,880,000,004	4	0.0000002
100 %		+ 30	1,880,000,003	3	0.0000002
100 %		+ 40	1,880,000,180	180	0.0000096
100 %		+ 50	1,879,999,974	-26	-0.0000014
85 %	3.27	+ 20	1,879,999,666	-334	-0.0000178
BATT. ENDPOINT	3.45	+ 20	1,879,999,933	-67	-0.0000036

Table 7-33. Frequency Stability Data (Band 2)

FCC ID: ZNFL713DL	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
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Band 2 Frequency Stability Measurements

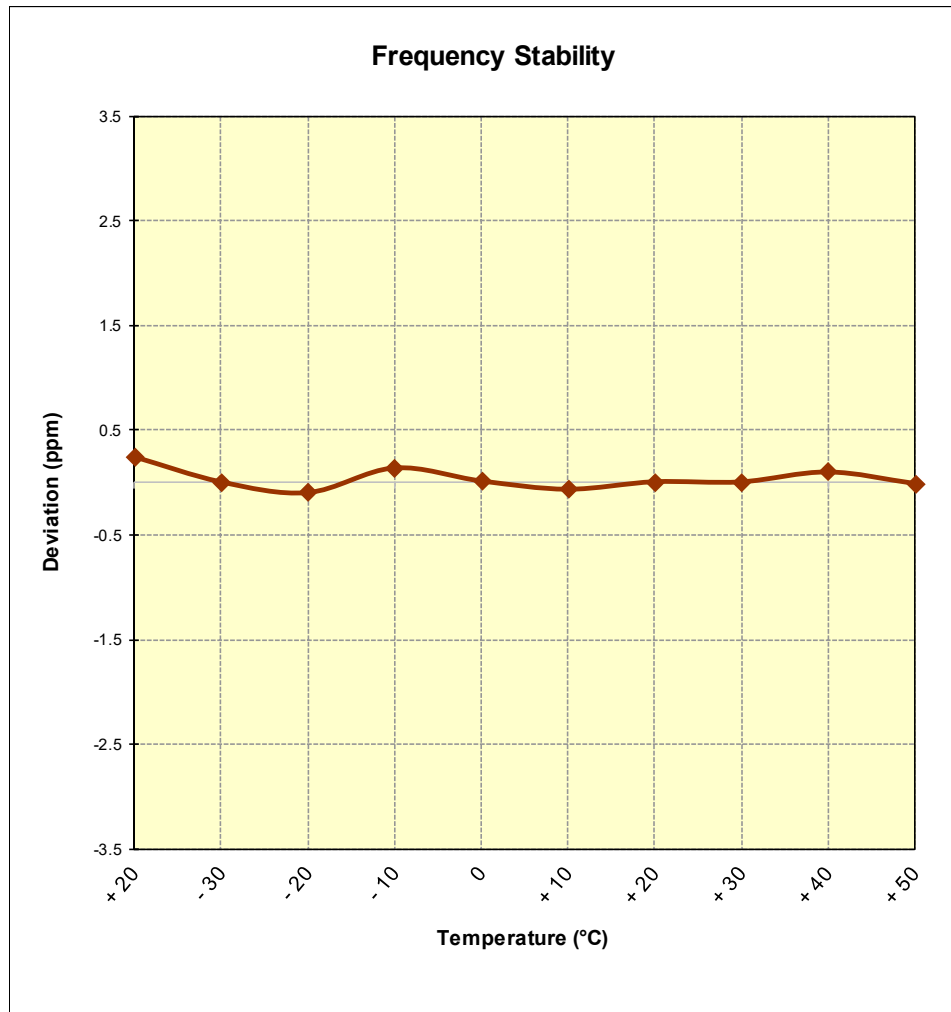


Figure 7-13. Frequency Stability Graph (Band 2)

FCC ID: ZNFL713DL	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
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8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **LG Portable Handset FCC ID: ZNFL713DL** complies with all the requirements of Part 22, 24, & 27 of the FCC Rules for LTE operation only.

FCC ID: ZNFL713DL	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
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