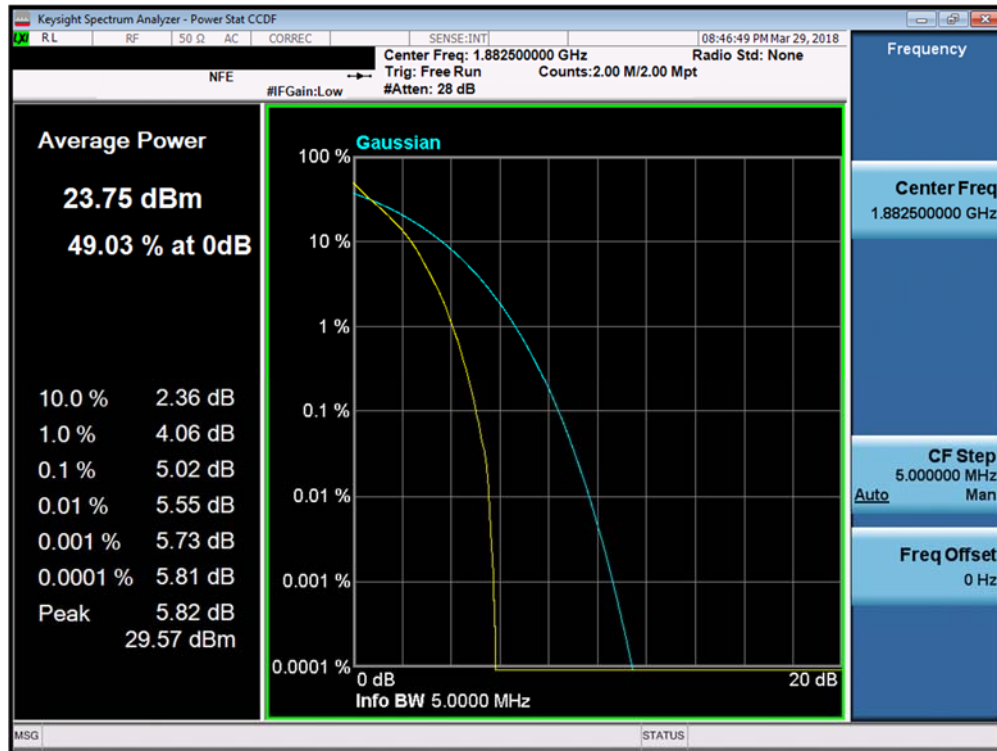
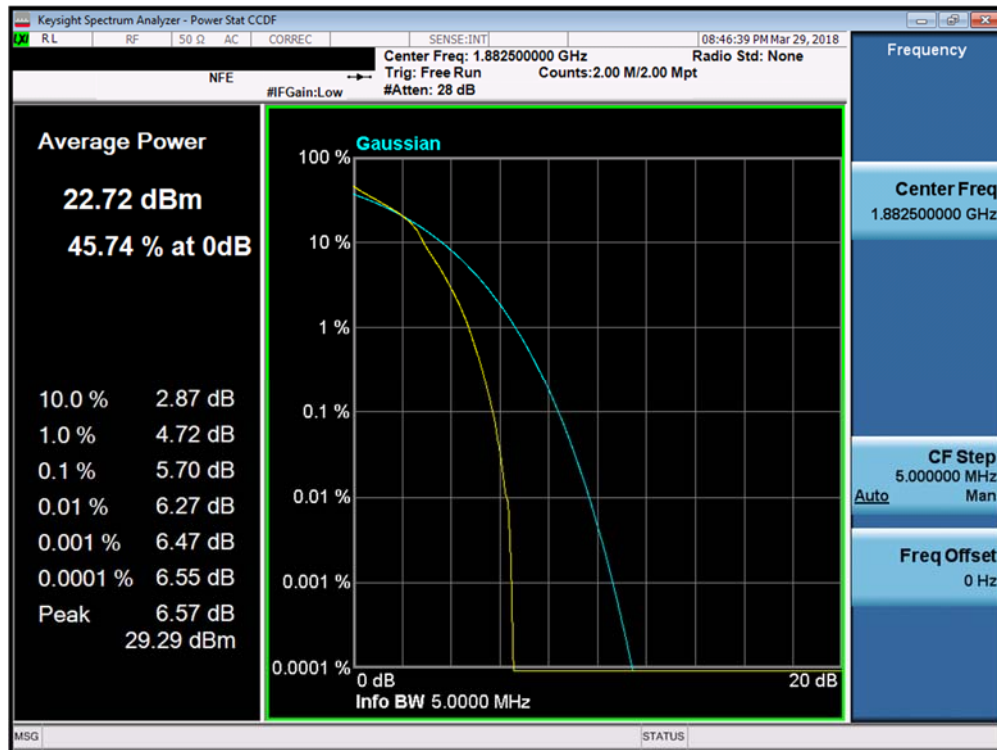


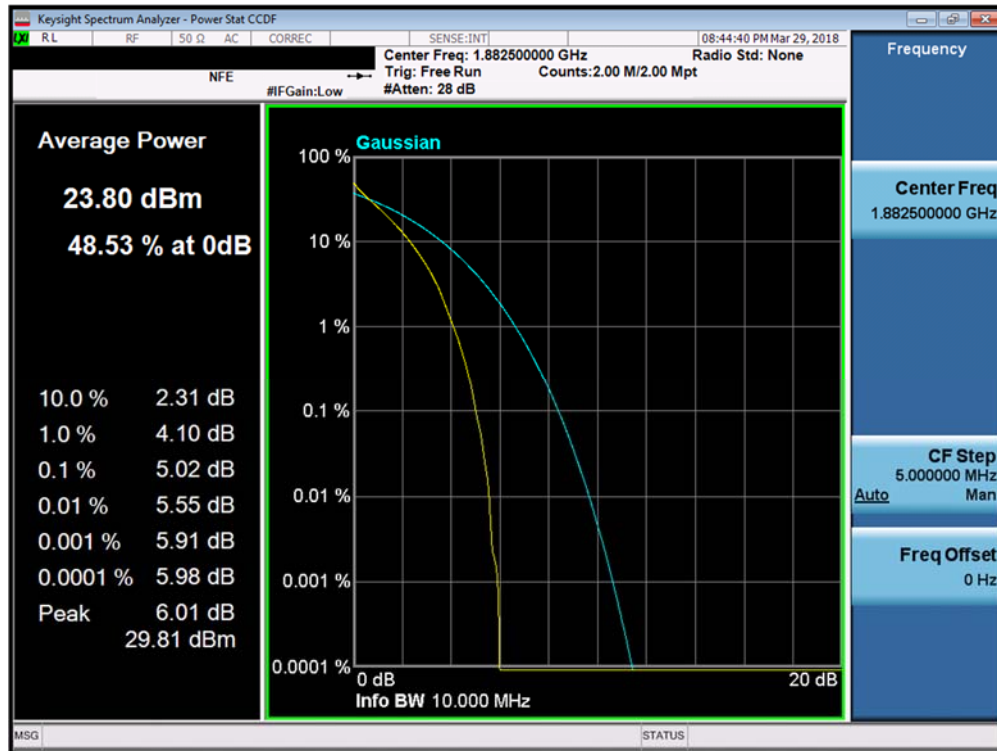


Plot 7-229. PAR Plot (Band 25/2 - 5.0MHz QPSK - Full RB Configuration)

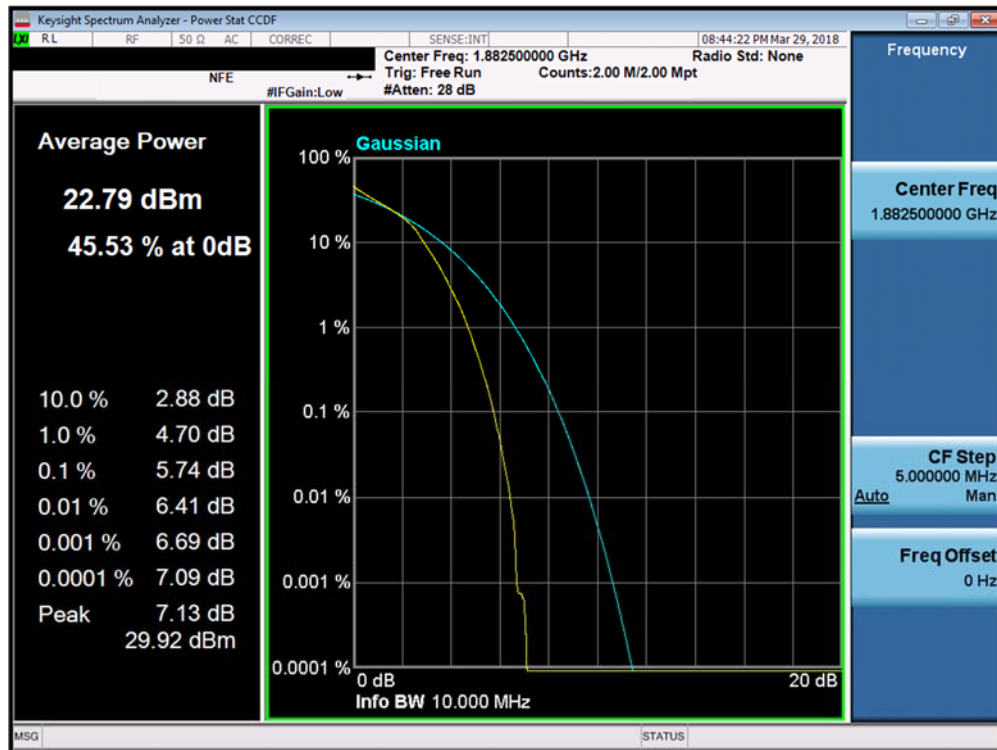


Plot 7-230. PAR Plot (Band 25/2 - 5.0MHz 16-QAM - Full RB Configuration)

FCC ID: ZNFQ710AL	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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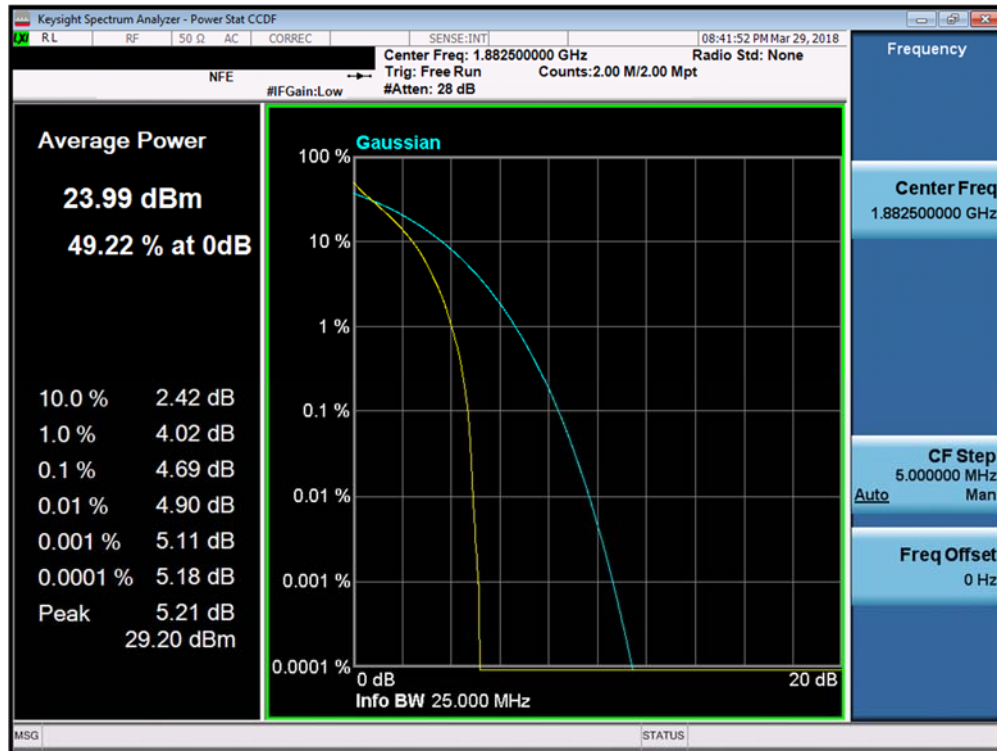


Plot 7-231. PAR Plot (Band 25/2 - 10.0MHz QPSK - Full RB Configuration)

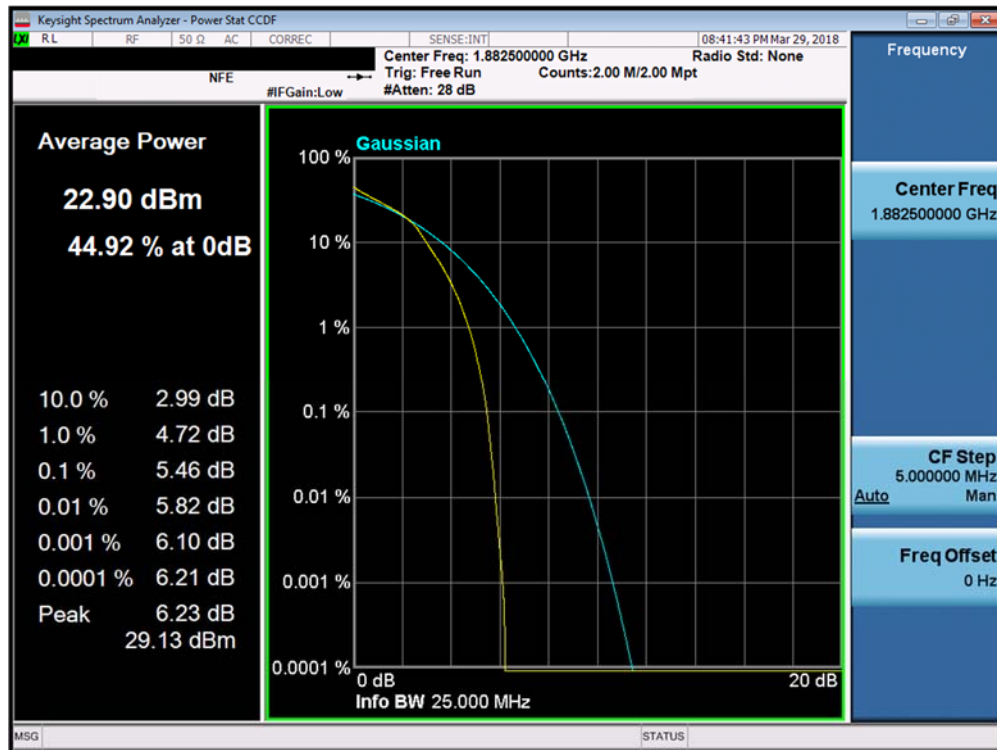


Plot 7-232. PAR Plot (Band 25/2 - 10.0MHz 16-QAM - Full RB Configuration)

FCC ID: ZNFQ710AL	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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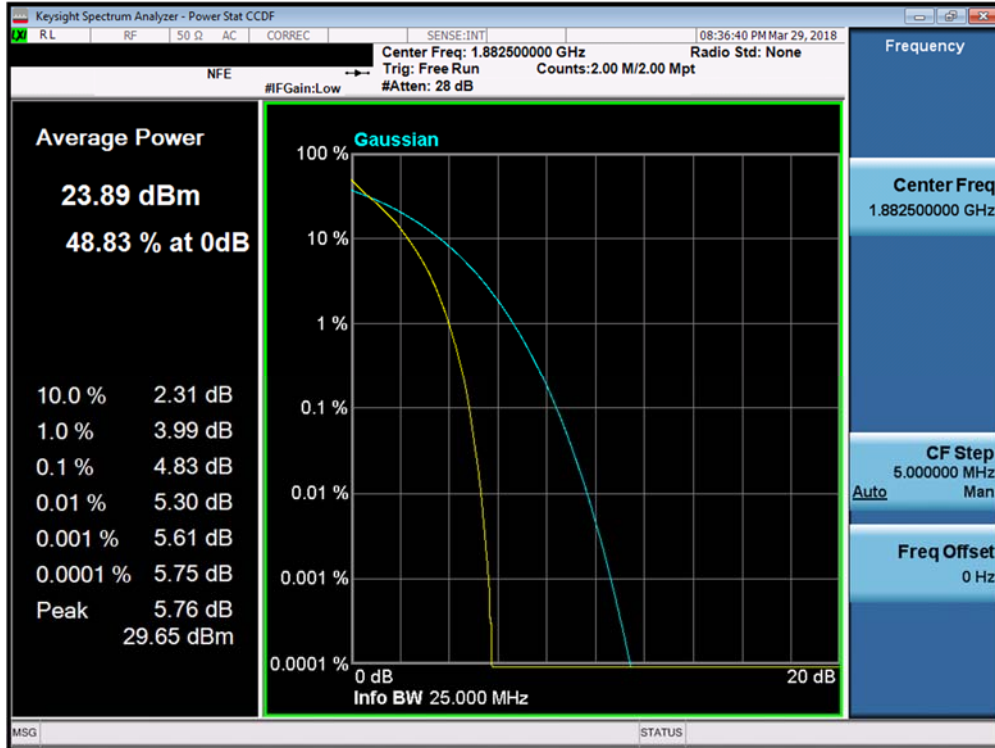


Plot 7-233. PAR Plot (Band 25/2 - 15.0MHz QPSK - Full RB Configuration)

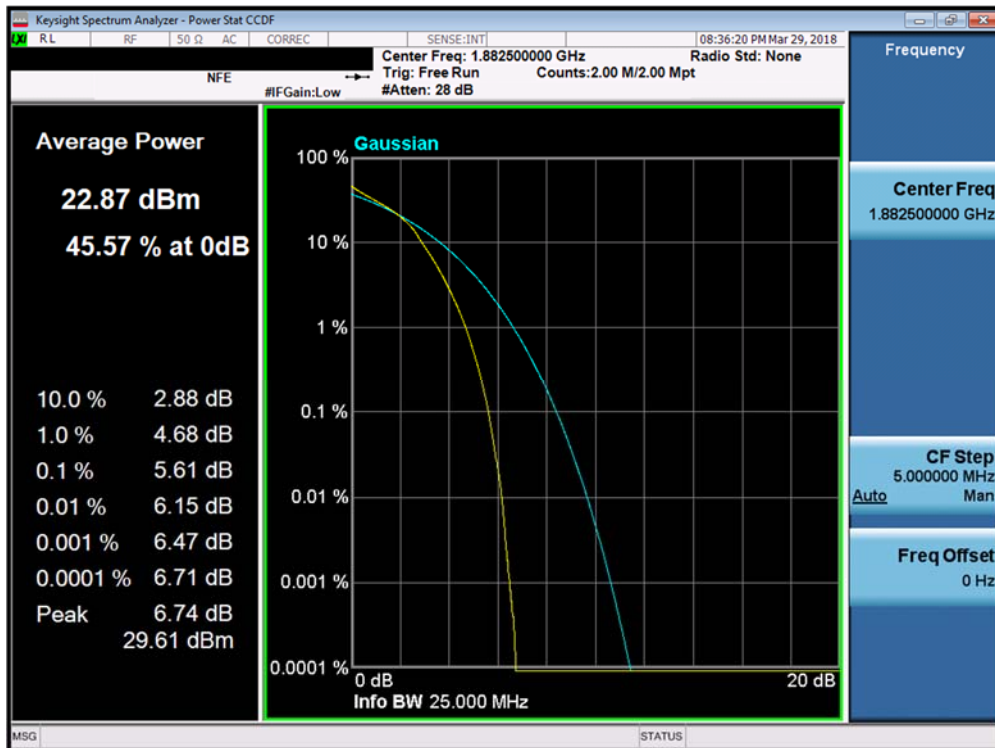


Plot 7-234. PAR Plot (Band 25/2 - 15.0MHz 16-QAM - Full RB Configuration)

FCC ID: ZNFQ710AL	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1804240083-03-R1.ZNF	Test Dates: 3/22-5/17/2018	EUT Type: Portable Handset		Page 140 of 179



Plot 7-235. PAR Plot (Band 25/2 - 20.0MHz QPSK - Full RB Configuration)



Plot 7-236. PAR Plot (Band 25/2 - 20.0MHz 16-QAM - Full RB Configuration)

FCC ID: ZNFQ710AL	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1804240083-03-R1.ZNF	Test Dates: 3/22-5/17/2018	EUT Type: Portable Handset		Page 141 of 179

7.6 Additional Maximum Power Reduction (A-MPR) §2.1046

Test Overview

A-MPR is implemented in this device when operating at Power Class 2 in LTE Band 41 per the A-MPR specification in 3GPP TS 36.101. The conducted powers are shown herein to cover the different A-MPR levels specified in the standard. Measurement equipment was set up with triggering/gating on the spectrum analyzer such that powers were measured only during the on-time of the signal.

Test Procedure Used

KDB 971168 D01 v03r01 – Section 5.2.2

Test Settings

1. Span = 2 x OBW to 3 x OBW
2. RBW = 1% to 5% of the OBW
3. Number of measurement points in sweep $\geq 2 \times \text{span} / \text{RBW}$
4. Sweep = auto-couple (less than transmission burst duration)
5. Detector = RMS (power)
6. Trigger was set to enable power measurements only on full power bursts
7. Trace was allowed to stabilize
8. Spectrum analyzer's "Channel Power" function was used to compute the power by integrating the spectrum across the OBW of the signal

Test Setup

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

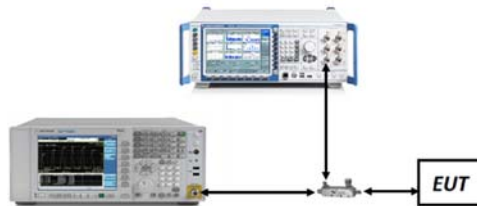


Figure 7-5. Test Instrument & Measurement Setup

Test Notes

None.

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Test Case	NS	MCC	MNC	Channel BW [MHz]	Channel Number	Channel Frequency [MHz]	Modulation	RB Size	RB Offset	MPR [dB]	A-MPR [dB]	Measured Power [dBm]
1	04	312	530	5	39675	2498.5	QPSK	1	0	0	≤ 3	24.20
2							16-QAM			≤ 1		22.75
3				5	39675	2498.5	QPSK	1	9	0	0	27.24
4							16-QAM			≤ 1		25.78
5				10	39700	2501	QPSK	1	0	0	≤ 5	19.18
6							16-QAM	1	0	≤ 1		18.34
7				10	39700	2501	QPSK	20	0	0	≤ 2	23.99
8							16-QAM	20	0	≤ 1		22.98
9				10	39700	2501	QPSK	50	0	0	≤ 3	23.49
10							16-QAM	50	0	≤ 1		22.41
11				10	39700	2501	QPSK	25	20	0	≤ 1	25.11
12							16-QAM	25	20	≤ 1		24.07
13				10	39700	2501	QPSK	1	36	0	0	27.14
14							16-QAM	1	36	≤ 1		26.44
15				15	39725	2503.5	QPSK	1	0	0	≤ 5	19.15
16							16-QAM	1	0	≤ 1		18.67
17				15	39725	2503.5	QPSK	20	0	0	≤ 2	24.03
18							16-QAM	20	0	≤ 1		23.06
19				15	39725	2503.5	QPSK	75	0	0	≤ 4	22.05
20							16-QAM	75	0	≤ 1		21.12
21				15	39725	2503.5	QPSK	50	15	0	≤ 3	23.01
22							16-QAM	50	15	≤ 1		22.14
23				15	39725	2503.5	QPSK	1	60	0	0	27.19
24							16-QAM	1	60	≤ 1		26.69
25				20	39750	2506	QPSK	1	0	0	≤ 5	18.27
26							16-QAM	1	0	≤ 1		17.40
27				20	39750	2506	QPSK	20	0	0	≤ 2	22.11
28							16-QAM	20	0	≤ 1		21.09
29				20	39750	2506	QPSK	100	0	0	≤ 4	22.02
30							16-QAM	100	0	≤ 1		21.14
31				20	39750	2506	QPSK	75	24	0	≤ 3	23.18
32							16-QAM	75	24	≤ 1		22.17
33				20	39750	2506	QPSK	1	77	0	0	27.28
34							16-QAM	1	77	≤ 1		26.26
35	04	311	490	5	39675	2498.5	QPSK	1	0	0	≤ 3	24.14
36							16-QAM			≤ 1		22.76
37	01	001	01	5	39675	2498.5	QPSK	1	0	0	0	26.27
38							16-QAM			≤ 1		25.85

Table 7-3. A-MPR Conducted Power Measurements

FCC ID: ZNFQ710AL		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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7.7 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. For signals with burst transmission, the signal analyzer's "time domain power" measurement capability is used
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". Trigger is set to enable triggering only on full power bursts with the sweep time set less than or equal to the transmission burst duration
8. The integration bandwidth was roughly set equal to the measured OBW of the signal for signals with continuous operation. For signals with burst transmission, the "gating" function was enabled to ensure that measurements are performed during times in which the transmitter is operating at its maximum power
9. Trace mode = trace averaging (RMS) over 100 sweeps
10. The trace was allowed to stabilize

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Test Setup

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

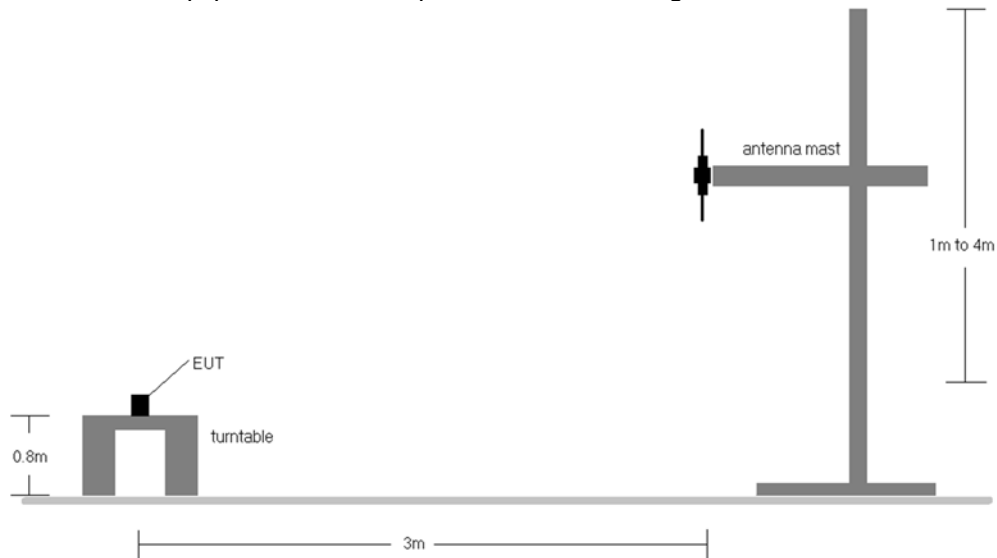


Figure 7-6. Radiated Test Setup <1GHz

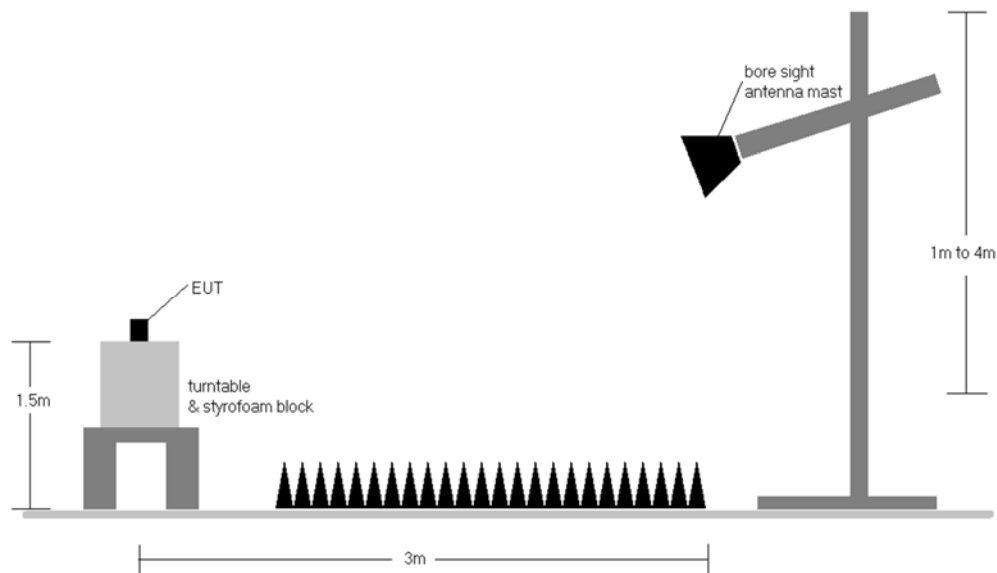


Figure 7-7. Radiated Test Setup >1GHz

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: ZNFQ710AL		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
699.70	1.4	QPSK	V	150	147	1 / 5	19.25	1.10	18.20	0.066	34.77	-16.57	20.35	0.108	36.99	-16.64
707.50	1.4	QPSK	V	150	59	1 / 0	19.26	1.13	18.24	0.067	34.77	-16.53	20.39	0.109	36.99	-16.60
715.30	1.4	QPSK	V	150	137	1 / 5	19.82	1.16	18.83	0.076	34.77	-15.94	20.98	0.125	36.99	-16.01
715.30	1.4	16-QAM	V	150	137	1 / 5	18.86	1.16	17.87	0.061	34.77	-16.90	20.02	0.100	36.99	-16.97
700.50	3	QPSK	V	150	138	1 / 14	19.30	1.10	18.25	0.067	34.77	-16.52	20.40	0.110	36.99	-16.59
707.50	3	QPSK	V	150	61	1 / 14	19.46	1.13	18.44	0.070	34.77	-16.33	20.59	0.115	36.99	-16.40
714.50	3	QPSK	V	150	105	1 / 14	19.78	1.16	18.79	0.076	34.77	-15.98	20.94	0.124	36.99	-16.05
714.50	3	16-QAM	V	150	105	1 / 14	18.96	1.16	17.97	0.063	34.77	-16.80	20.12	0.103	36.99	-16.87

Table 7-4. ERP/EIRP 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]
701.50	5	QPSK	V	150	103	1 / 24	19.46	1.11	18.42	0.069	34.77	-16.36	20.57	0.114	36.99	-16.42
707.50	5	QPSK	V	150	30	1 / 24	19.50	1.13	18.48	0.070	34.77	-16.29	20.63	0.116	36.99	-16.36
713.50	5	QPSK	V	150	92	1 / 24	19.89	1.15	18.89	0.078	34.77	-15.88	21.04	0.127	36.99	-15.95
713.50	5	16-QAM	V	150	92	1 / 24	18.90	1.15	17.90	0.062	34.77	-16.87	20.05	0.101	36.99	-16.94
704.00	10	QPSK	V	150	102	1 / 49	19.64	1.12	18.61	0.073	34.77	-16.16	20.76	0.119	36.99	-16.23
707.50	10	QPSK	V	150	90	1 / 49	19.84	1.13	18.82	0.076	34.77	-15.95	20.97	0.125	36.99	-16.02
711.00	10	QPSK	V	150	144	1 / 49	19.86	1.14	18.85	0.077	34.77	-15.92	21.00	0.126	36.99	-15.99
711.00	10	16-QAM	V	150	144	1 / 49	18.97	1.14	17.96	0.063	34.77	-16.81	20.11	0.103	36.99	-16.88
713.50	5	QPSK	H	150	271	1 / 24	18.06	1.15	17.06	0.051	34.77	-17.71	19.21	0.083	36.99	-17.78

Table 7-5. ERP/EIRP 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	V	150	137	1 / 24	19.08	1.32	18.25	0.067	34.77	-16.52	20.40	0.110	36.99	-16.59
782.00	5	QPSK	V	150	116	1 / 24	18.96	1.33	18.14	0.065	34.77	-16.63	20.29	0.107	36.99	-16.70
784.50	5	QPSK	V	150	134	1 / 24	19.03	1.34	18.22	0.066	34.77	-16.55	20.37	0.109	36.99	-16.62
779.50	5	16-QAM	V	150	137	1 / 24	18.00	1.32	17.17	0.052	34.77	-17.60	19.32	0.085	36.99	-17.67
782.00	10	QPSK	V	150	129	1 / 49	19.19	1.33	18.37	0.069	34.77	-16.40	20.52	0.113	36.99	-16.47
782.00	10	16-QAM	V	150	129	1 / 49	18.13	1.33	17.31	0.054	34.77	-17.46	19.46	0.088	36.99	-17.53
782.00	10	QPSK	H	150	301	1 / 49	16.90	1.33	16.08	0.041	34.77	-18.69	18.23	0.067	36.99	-18.76

Table 7-6. ERP/EIRP Data (Band 13)

FCC ID: ZNFQ710AL	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
824.70	1.4	QPSK	H	150	77	1 / 5	18.81	1.50	18.16	0.065	38.45	-20.29	20.31	0.107	40.61	-20.30
836.50	1.4	QPSK	H	150	98	1 / 0	18.83	1.50	18.18	0.066	38.45	-20.27	20.33	0.108	40.61	-20.28
848.30	1.4	QPSK	H	150	142	1 / 0	17.94	1.50	17.29	0.054	38.45	-21.16	19.44	0.088	40.61	-21.17
836.50	1.4	16-QAM	H	150	98	1 / 0	17.97	1.50	17.32	0.054	38.45	-21.13	19.47	0.089	40.61	-21.14
825.50	3	QPSK	H	150	79	1 / 14	18.93	1.50	18.28	0.067	38.45	-20.17	20.43	0.110	40.61	-20.18
836.50	3	QPSK	H	150	83	1 / 0	19.01	1.50	18.36	0.069	38.45	-20.09	20.51	0.112	40.61	-20.10
847.50	3	QPSK	H	150	116	1 / 14	18.04	1.50	17.39	0.055	38.45	-21.06	19.54	0.090	40.61	-21.07
836.50	3	16-QAM	H	150	83	1 / 0	17.96	1.50	17.31	0.054	38.45	-21.14	19.46	0.088	40.61	-21.15
826.50	5	QPSK	H	150	69	1 / 0	18.75	1.50	18.10	0.065	38.45	-20.35	20.25	0.106	40.61	-20.36
836.50	5	QPSK	H	150	81	1 / 0	18.79	1.50	18.14	0.065	38.45	-20.31	20.29	0.107	40.61	-20.32
846.50	5	QPSK	H	150	93	1 / 0	18.20	1.50	17.55	0.057	38.45	-20.90	19.70	0.093	40.61	-20.91
836.50	5	16-QAM	H	150	81	1 / 0	17.75	1.50	17.10	0.051	38.45	-21.35	19.25	0.084	40.61	-21.36
829.00	10	QPSK	H	150	67	1 / 49	19.28	1.50	18.63	0.073	38.45	-19.82	20.78	0.120	40.61	-19.83
836.50	10	QPSK	H	150	77	1 / 0	18.83	1.50	18.18	0.066	38.45	-20.27	20.33	0.108	40.61	-20.28
844.00	10	QPSK	H	150	93	1 / 0	18.74	1.50	18.09	0.064	38.45	-20.36	20.24	0.106	40.61	-20.37
829.00	10	16-QAM	H	150	67	1 / 49	18.33	1.50	17.68	0.059	38.45	-20.77	19.83	0.096	40.61	-20.78
829.00	10	QPSK	V	150	13	1 / 49	18.13	1.50	17.48	0.056	38.45	-20.97	19.63	0.092	40.61	-20.98

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

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
831.50	15	QPSK	H	150	76	1 / 0	19.03	1.50	18.38	0.069	38.45	-20.07	20.53	0.113	40.61	-20.08
836.50	15	QPSK	H	150	125	1 / 0	19.26	1.50	18.61	0.073	38.45	-19.84	20.76	0.119	40.61	-19.85
841.50	15	QPSK	H	150	115	1 / 0	19.25	1.50	18.60	0.072	38.45	-19.85	20.75	0.119	40.61	-19.86
836.50	15	16-QAM	H	150	125	1 / 0	18.15	1.50	17.50	0.056	38.45	-20.95	19.65	0.092	40.61	-20.96

Table 7-8. ERP/EIRP Data (Band 26)

FCC ID: ZNFQ710AL		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
1710.70	1.4	QPSK	H	150	11	1 / 0	18.59	5.56	24.15	0.260	30.00	-5.85
1732.50	1.4	QPSK	H	150	22	1 / 0	18.07	5.41	23.48	0.223	30.00	-6.52
1754.30	1.4	QPSK	H	150	32	1 / 0	17.68	5.26	22.94	0.197	30.00	-7.06
1710.70	1.4	16-QAM	H	150	11	1 / 0	17.99	5.56	23.55	0.226	30.00	-6.45
1711.50	3	QPSK	H	150	39	1 / 0	18.69	5.55	24.24	0.266	30.00	-5.76
1732.50	3	QPSK	H	150	28	1 / 14	18.13	5.41	23.54	0.226	30.00	-6.46
1753.50	3	QPSK	H	150	40	1 / 0	17.68	5.26	22.94	0.197	30.00	-7.06
1711.50	3	16-QAM	H	150	39	1 / 0	17.95	5.55	23.50	0.224	30.00	-6.50
1712.50	5	QPSK	H	150	16	1 / 0	18.84	5.55	24.39	0.274	30.00	-5.61
1732.50	5	QPSK	H	150	351	1 / 0	18.16	5.41	23.57	0.227	30.00	-6.43
1752.50	5	QPSK	H	150	4	1 / 0	17.83	5.27	23.10	0.204	30.00	-6.90
1712.50	5	16-QAM	H	150	16	1 / 0	17.91	5.55	23.46	0.222	30.00	-6.54
1715.00	10	QPSK	H	150	10	1 / 0	18.83	5.53	24.36	0.273	30.00	-5.64
1732.50	10	QPSK	H	150	346	1 / 0	18.52	5.41	23.93	0.247	30.00	-6.07
1750.00	10	QPSK	H	150	356	1 / 49	17.83	5.29	23.12	0.205	30.00	-6.88
1715.00	10	16-QAM	H	150	10	1 / 0	18.06	5.53	23.59	0.228	30.00	-6.41
1717.50	15	QPSK	H	150	41	1 / 0	18.81	5.51	24.32	0.270	30.00	-5.68
1732.50	15	QPSK	H	150	21	1 / 74	18.23	5.41	23.64	0.231	30.00	-6.36
1747.50	15	QPSK	H	150	358	1 / 0	18.05	5.31	23.36	0.217	30.00	-6.64
1717.50	15	16-QAM	H	150	41	1 / 0	17.92	5.51	23.43	0.220	30.00	-6.57
1720.00	20	QPSK	H	150	27	1 / 0	18.47	5.49	23.96	0.249	30.00	-6.04
1732.50	20	QPSK	H	150	15	1 / 0	18.10	5.41	23.51	0.224	30.00	-6.49
1745.00	20	QPSK	H	150	17	1 / 0	17.94	5.32	23.26	0.212	30.00	-6.74
1720.00	20	16-QAM	H	150	27	1 / 0	17.77	5.49	23.26	0.212	30.00	-6.74
1712.50	5	QPSK	V	150	114	1 / 0	16.03	5.55	21.58	0.144	30.00	-8.42

Table 7-9. EIRP Data (Band 4)

FCC ID: ZNFQ710AL	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1804240083-03-R1.ZNF	Test Dates: 3/22-5/17/2018	EUT Type: Portable Handset	Page 148 of 179

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
1850.70	1.4	QPSK	V	150	23	1 / 5	16.02	4.82	20.84	0.121	33.01	-12.17
1882.50	1.4	QPSK	V	150	355	1 / 5	15.24	4.73	19.97	0.099	33.01	-13.04
1914.30	1.4	QPSK	V	150	3	1 / 5	15.69	4.68	20.37	0.109	33.01	-12.64
1850.70	1.4	16-QAM	V	150	23	1 / 5	14.95	4.82	19.77	0.095	33.01	-13.24
1851.50	3	QPSK	V	150	358	1 / 0	16.03	4.82	20.85	0.121	33.01	-12.16
1882.50	3	QPSK	V	150	6	1 / 14	15.51	4.73	20.24	0.106	33.01	-12.77
1913.50	3	QPSK	V	150	10	1 / 14	15.77	4.68	20.45	0.111	33.01	-12.56
1851.50	3	16-QAM	V	150	358	1 / 0	15.05	4.82	19.87	0.097	33.01	-13.14
1852.50	5	QPSK	V	150	8	1 / 0	15.57	4.81	20.38	0.109	33.01	-12.63
1882.50	5	QPSK	V	150	8	1 / 0	15.08	4.73	19.81	0.096	33.01	-13.20
1912.50	5	QPSK	V	150	355	1 / 0	15.27	4.68	19.95	0.099	33.01	-13.06
1852.50	5	16-QAM	V	150	8	1 / 0	14.64	4.81	19.45	0.088	33.01	-13.56
1855.00	10	QPSK	V	150	358	1 / 0	15.54	4.81	20.35	0.108	33.01	-12.66
1882.50	10	QPSK	V	150	6	1 / 0	14.95	4.73	19.68	0.093	33.01	-13.33
1910.00	10	QPSK	V	150	8	1 / 0	15.34	4.68	20.02	0.100	33.01	-12.99
1855.00	10	16-QAM	V	150	358	1 / 0	14.75	4.81	19.56	0.090	33.01	-13.45
1857.50	15	QPSK	V	150	355	1 / 0	15.83	4.80	20.63	0.116	33.01	-12.38
1882.50	15	QPSK	V	150	6	1 / 0	15.45	4.73	20.18	0.104	33.01	-12.83
1907.50	15	QPSK	V	150	1	1 / 74	15.47	4.68	20.15	0.104	33.01	-12.86
1857.50	15	16-QAM	V	150	355	1 / 0	15.18	4.80	19.98	0.100	33.01	-13.03
1860.00	20	QPSK	V	150	354	1 / 0	16.36	4.79	21.15	0.130	33.01	-11.86
1882.50	20	QPSK	V	150	352	1 / 0	16.35	4.73	21.08	0.128	33.01	-11.93
1905.00	20	QPSK	V	150	353	1 / 99	15.93	4.68	20.61	0.115	33.01	-12.40
1882.50	20	16-QAM	V	150	352	1 / 0	14.97	4.73	19.70	0.093	33.01	-13.31
1860.00	20	QPSK	H	150	141	1 / 0	16.15	4.73	20.88	0.123	33.01	-12.13

Table 7-10. EIRP Data (Band 25/2)

FCC ID: ZNFQ710AL	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1804240083-03-R1.ZNF	Test Dates: 3/22-5/17/2018	EUT Type: Portable Handset	Page 149 of 179

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]
2502.50	5	QPSK	V	150	219	1 / 0	18.59	5.74	24.33	0.271	33.01	-8.68
2593.00	5	QPSK	V	150	205	1 / 0	18.31	6.07	24.38	0.274	33.01	-8.63
2687.50	5	QPSK	V	150	213	1 / 0	17.02	6.48	23.50	0.224	33.01	-9.51
2502.50	5	16-QAM	V	150	219	1 / 0	17.94	5.74	23.68	0.233	33.01	-9.33
2505.00	10	QPSK	V	150	220	1 / 0	18.80	5.75	24.55	0.285	33.01	-8.46
2593.00	10	QPSK	V	150	200	1 / 0	18.53	6.07	24.60	0.289	33.01	-8.41
2685.00	10	QPSK	V	150	214	1 / 0	17.35	6.47	23.82	0.241	33.01	-9.19
2593.00	10	16-QAM	V	150	200	1 / 0	18.29	6.07	24.36	0.273	33.01	-8.65
2507.50	15	QPSK	V	150	223	1 / 0	18.51	5.76	24.27	0.267	33.01	-8.74
2593.00	15	QPSK	V	150	215	1 / 0	18.78	6.07	24.85	0.306	33.01	-8.16
2682.50	15	QPSK	V	150	214	1 / 74	18.21	6.46	24.67	0.293	33.01	-8.34
2593.00	15	16-QAM	V	150	215	1 / 0	18.30	6.07	24.37	0.274	33.01	-8.64
2510.00	20	QPSK	V	350	219	1 / 99	18.60	5.77	24.37	0.273	33.01	-8.64
2593.00	20	QPSK	V	357	195	1 / 0	18.96	6.07	25.03	0.319	33.01	-7.98
2680.00	20	QPSK	V	357	212	1 / 99	17.67	6.45	24.12	0.258	33.01	-8.89
2593.00	20	16-QAM	V	357	195	1 / 0	17.76	6.07	23.83	0.242	33.01	-9.18
2593.00	20	QPSK	H	150	317	1 / 0	18.38	6.07	24.45	0.279	33.01	-8.56

Table 7-11. EIRP Data (Band 41 PC2)

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]
2510.00	20	QPSK	V	357	195	1 / 0	17.29	5.77	23.06	0.202	33.01	-9.95
2510.00	20	16-QAM	V	357	195	1 / 0	16.21	5.77	21.98	0.158	33.01	-11.03

Table 7-12. EIRP Data (Band 41 PC3)

FCC ID: ZNFQ710AL	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1804240083-03-R1.ZNF	Test Dates: 3/22-5/17/2018	EUT Type: Portable Handset	
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7.8 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: ZNFQ710AL		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.

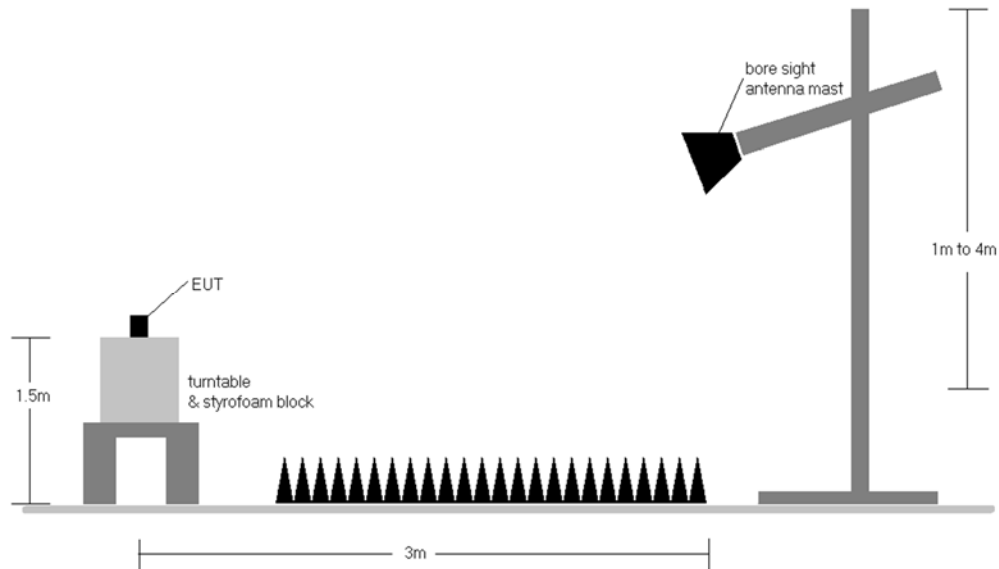


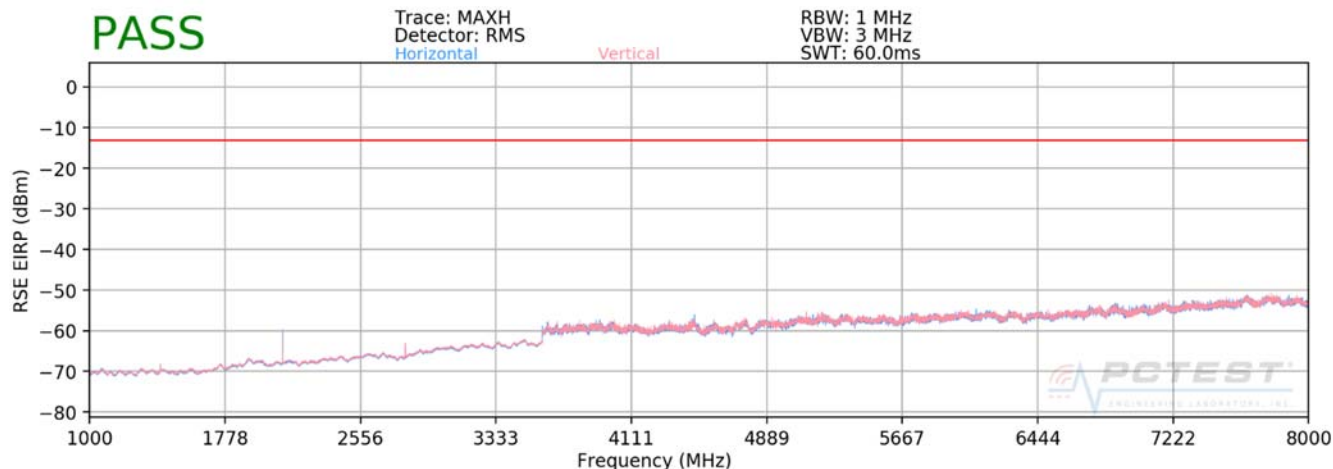
Figure 7-8. Test Instrument & Measurement Setup

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: ZNFQ710AL		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1804240083-03-R1.ZNF	Test Dates: 3/22-5/17/2018	EUT Type: Portable Handset		Page 152 of 179

Band 12/17



Plot 7-237. Radiated Spurious Plot above 1GHz (Band 12/17)

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	H	110	204	-72.21	7.94	-64.27	-51.3
2104.50	H	112	210	-64.07	8.90	-55.17	-42.2
2806.00	H	173	209	-76.11	10.07	-66.04	-53.0
3507.50	H	-	-	-73.55	9.67	-63.88	-50.9

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

FCC ID: ZNFQ710AL	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
Test Report S/N: 1M1804240083-03-R1.ZNF	Test Dates: 3/22-5/17/2018	EUT Type: Portable Handset			Page 153 of 179

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	H	153	188	-75.00	8.09	-66.91	-53.9
2122.50	H	113	215	-60.96	8.88	-52.08	-39.1
2830.00	H	222	206	-73.92	10.13	-63.79	-50.8
3537.50	H	-	-	-73.67	9.69	-63.98	-51.0
4245.00	H	-	-	-72.44	10.48	-61.96	-49.0

Table 7-14. Radiated Spurious Data (Band 12/17 – Mid Channel)

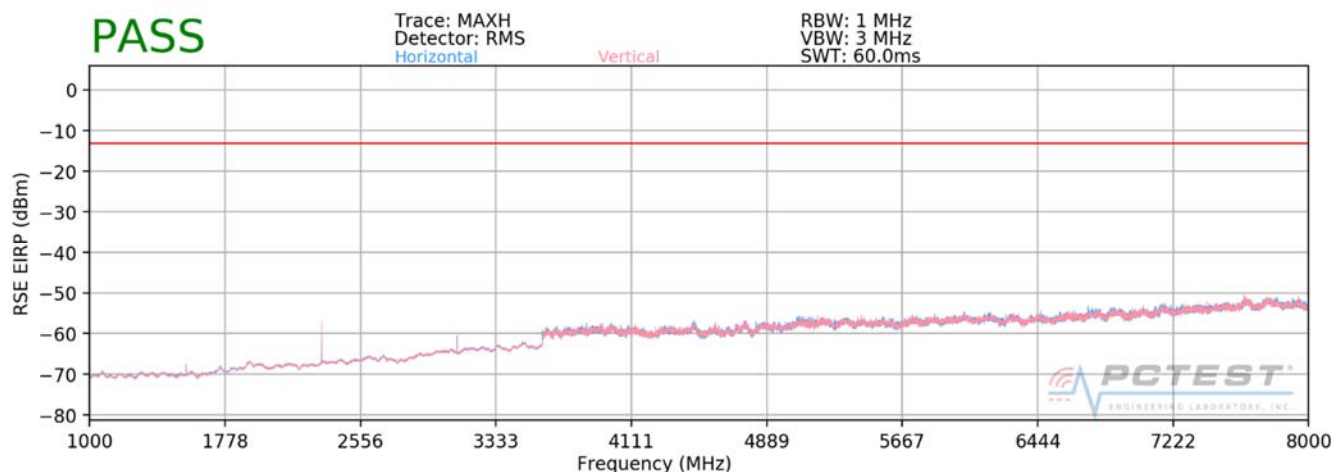
OPERATING FREQUENCY: 713.50 MHz
 CHANNEL: 23155
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.0 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

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	H	152	220	-76.60	8.23	-68.37	-55.4
2140.50	H	148	205	-62.42	8.86	-53.56	-40.6
2854.00	H	180	190	-76.62	10.18	-66.44	-53.4
3567.50	H	-	-	-73.44	9.75	-63.69	-50.7

Table 7-15. Radiated Spurious Data (Band 12/17 – High Channel)

FCC ID: ZNFQ710AL		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1804240083-03-R1.ZNF	Test Dates: 3/22-5/17/2018	EUT Type: Portable Handset		Page 154 of 179

Band 13



Plot 7-238. Radiated Spurious Plot above 1GHz (Band 13)

OPERATING FREQUENCY: 782.00 MHz

CHANNEL: 23230

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]
2346.00	H	347	343	-70.64	9.49	-61.15	-48.2
3128.00	H	154	0	-69.07	9.53	-59.54	-46.5
3910.00	H	149	12	-66.23	9.09	-57.14	-44.1
4692.00	H	-	-	-73.35	11.35	-62.00	-49.0

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

FCC ID: ZNFQ710AL	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1804240083-03-R1.ZNF	Test Dates: 3/22-5/17/2018	EUT Type: Portable Handset		Page 155 of 179

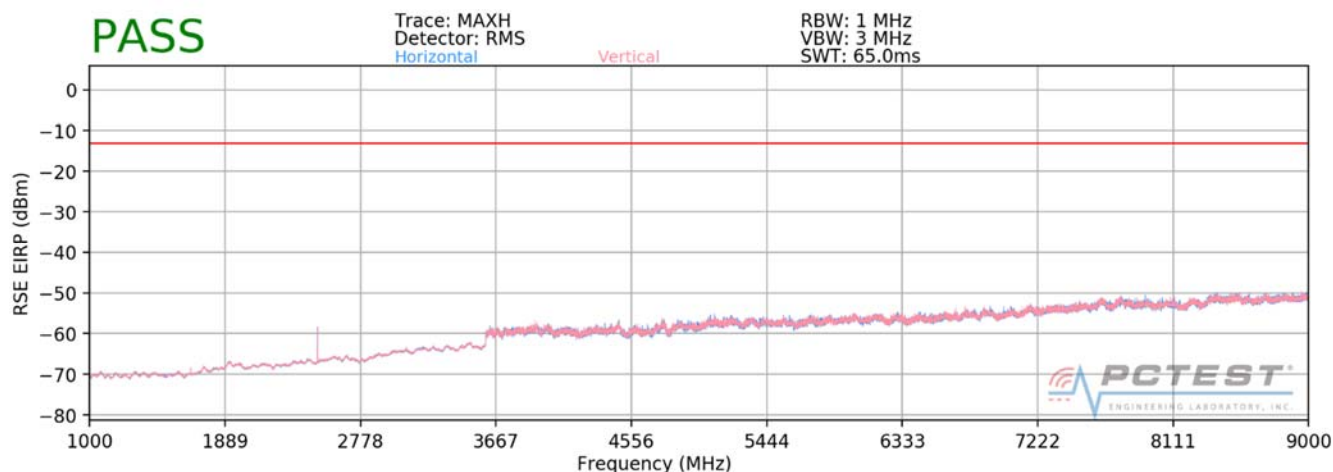
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	10.00	MHz
DISTANCE:	3	meters
NARROWBAND EMISSION LIMIT:	-50	dBm
WIDEBAND EMISSION LIMIT:	-40	dBm/MHz

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]
1564.00	H	177	13	-78.29	8.73	-69.56	-29.6

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

FCC ID: ZNFQ710AL		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1804240083-03-R1.ZNF	Test Dates: 3/22-5/17/2018	EUT Type: Portable Handset		Page 156 of 179

Band 26/5



Plot 7-239. Radiated Spurious Plot above 1GHz (Band 26/5)

OPERATING FREQUENCY: 829.00 MHz
CHANNEL: 26840
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	145	307	-79.27	8.96	-70.31	-57.3
2487.00	V	109	314	-65.34	9.13	-56.21	-43.2
3316.00	V	376	4	-70.62	9.36	-61.25	-48.3
4145.00	V	-	-	-72.45	9.95	-62.50	-49.5
4974.00	V	-	-	-72.84	11.22	-61.62	-48.6
5803.00	V	100	22	-70.78	11.36	-59.42	-46.4
6632.00	V	-	-	-68.15	11.17	-56.98	-44.0
7461.00	V	329	21	-63.00	10.90	-52.10	-39.1
8290.00	V	400	2	-66.13	11.77	-54.35	-41.4

Table 7-18. Radiated Spurious Data (Band 26/5 – Low Channel)

FCC ID: ZNFQ710AL	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1804240083-03-R1.ZNF	Test Dates: 3/22-5/17/2018	EUT Type: Portable Handset		Page 157 of 179

OPERATING FREQUENCY: 836.50 MHz
 CHANNEL: 26915
 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	115	19	-76.35	8.85	-67.50	-54.5
2509.50	V	104	22	-64.91	9.17	-55.74	-42.7
3346.00	V	400	17	-72.27	9.36	-62.91	-49.9
4182.50	V	-	-	-71.84	10.19	-61.65	-48.6
5019.00	V	-	-	-72.57	11.10	-61.47	-48.5
5855.50	V	109	20	-70.53	11.32	-59.20	-46.2
6692.00	V	-	-	-67.99	10.94	-57.06	-44.1
7528.50	V	100	4	-64.36	11.05	-53.31	-40.3
8365.00	V	104	1	-65.77	11.76	-54.01	-41.0

Table 7-19. Radiated Spurious Data (Band 26/5 – Mid Channel)

FCC ID: ZNFQ710AL	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1804240083-03-R1.ZNF	Test Dates: 3/22-5/17/2018	EUT Type: Portable Handset	Page 158 of 179

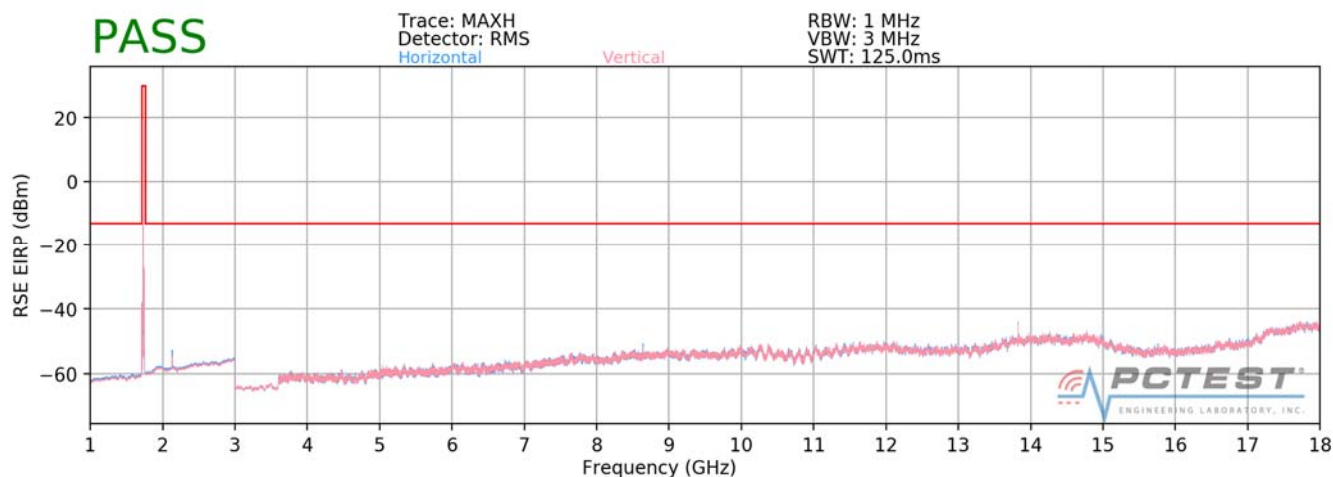
OPERATING FREQUENCY: 844.00 MHz
 CHANNEL: 26990
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10.0 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

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	109	302	-77.15	8.74	-68.41	-55.4
2532.00	V	104	96	-68.92	9.24	-59.69	-46.7
3376.00	V	400	22	-71.17	9.42	-61.75	-48.8
4220.00	V	-	-	-72.97	10.38	-62.59	-49.6
5064.00	V	-	-	-72.15	10.92	-61.23	-48.2
5908.00	V	100	19	-69.12	11.25	-57.87	-44.9
6752.00	V	-	-	-67.18	10.82	-56.37	-43.4
7596.00	V	397	29	-64.70	11.20	-53.49	-40.5
8440.00	V	366	1	-65.50	11.71	-53.79	-40.8

Table 7-20. Radiated Spurious Data (Band 26/5 – High Channel)

FCC ID: ZNFQ710AL		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1804240083-03-R1.ZNF	Test Dates: 3/22-5/17/2018	EUT Type: Portable Handset		Page 159 of 179

Band 4



Plot 7-240. Radiated Spurious Plot above 1GHz (Band 4)

OPERATING FREQUENCY: 1712.50 MHz

CHANNEL: 19975

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]
3425.00	H	-	-	-72.36	10.81	-61.54	-48.5
5137.50	H	-	-	-70.73	11.77	-58.96	-46.0
6850.00	H	-	-	-64.42	10.34	-54.09	-41.1
8562.50	H	113	327	-61.52	10.71	-50.81	-37.8
10275.00	H	-	-	-60.03	11.91	-48.12	-35.1

Table 7-21. Radiated Spurious Data (Band 4 – Low Channel)

FCC ID: ZNFQ710AL	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1804240083-03-R1.ZNF	Test Dates: 3/22-5/17/2018	EUT Type: Portable Handset		Page 160 of 179

OPERATING FREQUENCY: 1732.50 MHz
CHANNEL: 20175
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]
3465.00	H	-	-	-71.54	10.83	-60.71	-47.7
5197.50	H	-	-	-69.32	11.79	-57.54	-44.5
6930.00	H	333	36	-63.06	10.29	-52.76	-39.8
8662.50	H	115	322	-59.97	10.45	-49.52	-36.5
10395.00	H	-	-	-60.24	11.98	-48.26	-35.3

Table 7-22. Radiated Spurious Data (Band 4 – Mid Channel)

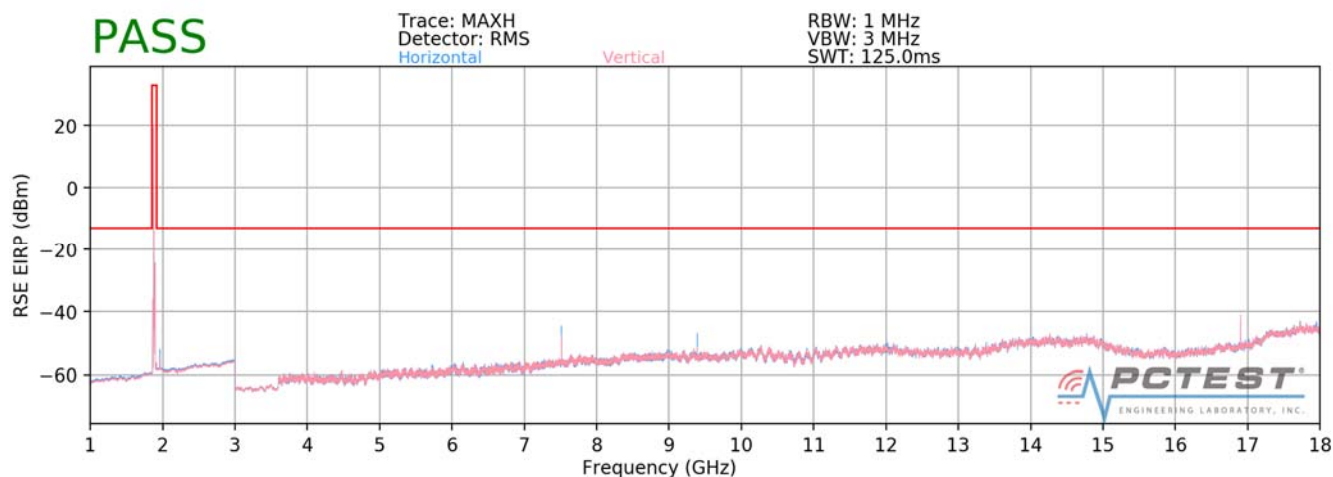
OPERATING FREQUENCY: 1752.50 MHz
CHANNEL: 20375
MODULATION SIGNAL: QPSK
BANDWIDTH: 5.0 MHz
DISTANCE: 3 meters
LIMIT: -13 dBm

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]
3505.00	H	-	-	-71.72	10.86	-60.86	-47.9
5257.50	H	-	-	-70.84	11.83	-59.01	-46.0
7010.00	H	337	39	-61.15	10.33	-50.82	-37.8
8762.50	H	346	75	-57.57	10.37	-47.20	-34.2
10515.00	H	230	63	-59.25	12.03	-47.22	-34.2

Table 7-23. Radiated Spurious Data (Band 4 – High Channel)

FCC ID: ZNFQ710AL		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1804240083-03-R1.ZNF	Test Dates: 3/22-5/17/2018	EUT Type: Portable Handset		Page 161 of 179

Band 25/2



Plot 7-241. Radiated Spurious Plot above 1GHz (Band 25/2)

OPERATING FREQUENCY: 1860.00 MHz
CHANNEL: 26140
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	110	31	-63.26	10.54	-52.72	-39.7
5580.00	H	386	221	-66.93	11.63	-55.30	-42.3
7440.00	H	340	212	-56.12	10.20	-45.92	-32.9
9300.00	H	270	130	-57.55	11.05	-46.51	-33.5
11160.00	H	380	128	-63.01	12.74	-50.26	-37.3
13020.00	H	-	-	-60.60	13.02	-47.58	-34.6

Table 7-24. Radiated Spurious Data (Band 25/2 – Low Channel)

FCC ID: ZNFQ710AL	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1804240083-03-R1.ZNF	Test Dates: 3/22-5/17/2018	EUT Type: Portable Handset		Page 162 of 179

OPERATING FREQUENCY: 1882.50 MHz
 CHANNEL: 26365
 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]
3765.00	H	284	152	-68.79	10.45	-58.34	-45.3
5647.50	H	365	210	-65.32	11.64	-53.68	-40.7
7530.00	H	302	216	-54.50	10.36	-44.14	-31.1
9412.50	H	261	135	-58.52	11.10	-47.41	-34.4
11295.00	H	-	-	-61.62	12.73	-48.90	-35.9
13177.50	H	177	154	-60.80	12.89	-47.92	-34.9
15060.00	H	-	-	-61.93	15.03	-46.90	-33.9

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

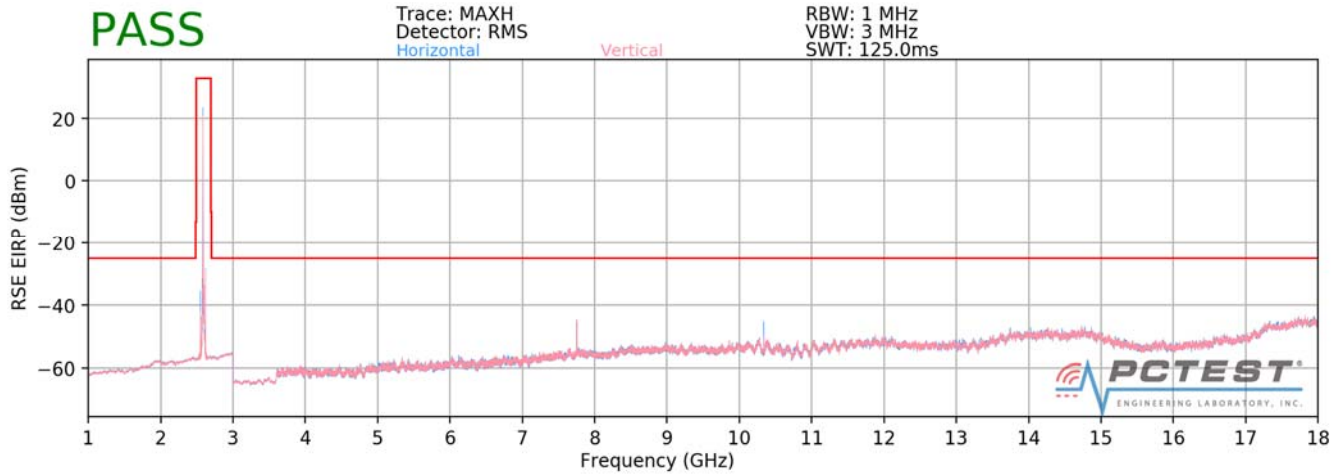
OPERATING FREQUENCY: 1905.00 MHz
 CHANNEL: 26590
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 20.0 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3810.00	H	339	170	-68.99	10.40	-58.59	-45.6
5715.00	H	400	190	-65.93	11.62	-54.30	-41.3
7620.00	H	226	200	-55.26	10.52	-44.74	-31.7
9525.00	H	259	217	-58.97	11.36	-47.61	-34.6
11430.00	H	-	-	-62.29	12.68	-49.60	-36.6
13335.00	H	296	148	-58.59	12.77	-45.82	-32.8
15240.00	H	-	-	-62.42	15.37	-47.05	-34.0

Table 7-26. Radiated Spurious Data (Band 25/2 – High Channel)

FCC ID: ZNFQ710AL		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1804240083-03-R1.ZNF	Test Dates: 3/22-5/17/2018	EUT Type: Portable Handset		Page 163 of 179

Band 41 PC2



Plot 7-242. Radiated Spurious Plot 1GHz - 18GHz (Band 41 PC2)

OPERATING FREQUENCY: 2510.00 MHz

CHANNEL: 39790

MODULATION SIGNAL: QPSK

BANDWIDTH: 20.0 MHz

DISTANCE: 3 meters

LIMIT: -25 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
5020.00	H	381	342	-67.52	11.55	-55.97	-31.0
7530.00	H	314	37	-46.71	10.36	-36.35	-11.4
10040.00	H	242	40	-56.39	11.58	-44.81	-19.8
12550.00	H	-	-	-60.87	13.60	-47.26	-22.3

Table 7-27. Radiated Spurious Data (Band 41 PC2 – Low Channel)

FCC ID: ZNFQ710AL	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
Test Report S/N: 1M1804240083-03-R1.ZNF	Test Dates: 3/22-5/17/2018	EUT Type: Portable Handset			Page 164 of 179

OPERATING FREQUENCY: 2593.00 MHz
CHANNEL: 40620
MODULATION SIGNAL: QPSK
BANDWIDTH: 20.0 MHz
DISTANCE: 3 meters
LIMIT: -25 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
5186.00	H	372	345	-66.62	11.79	-54.83	-29.8
7779.00	H	332	35	-48.36	10.95	-37.41	-12.4
10372.00	H	275	34	-50.57	11.98	-38.59	-13.6
12965.00	H	-	-	-59.33	13.14	-46.19	-21.2

Table 7-28. Radiated Spurious Data (Band 41 PC2 – Mid Channel)

OPERATING FREQUENCY: 2680.00 MHz
CHANNEL: 41490
MODULATION SIGNAL: QPSK
BANDWIDTH: 20.0 MHz
DISTANCE: 3 meters
LIMIT: -25 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
5360.00	H	310	302	-67.76	11.73	-56.03	-31.0
8040.00	H	322	37	-51.76	11.09	-40.67	-15.7
10720.00	H	303	42	-57.76	12.14	-45.63	-20.6
13400.00	H	-	-	-59.69	12.65	-47.05	-22.0

Table 7-29. Radiated Spurious Data (Band 41 PC2 – High Channel)

FCC ID: ZNFQ710AL		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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7.9 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: ZNFQ710AL		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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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	+ 20 (Ref)	707,500,049	49	0.0000069
100 %		- 30	707,499,988	-12	-0.0000017
100 %		- 20	707,500,045	45	0.0000064
100 %		- 10	707,500,001	1	0.0000001
100 %		0	707,499,827	-173	-0.0000245
100 %		+ 10	707,500,344	344	0.0000486
100 %		+ 20	707,500,060	60	0.0000085
100 %		+ 30	707,500,117	117	0.0000165
100 %		+ 40	707,500,033	33	0.0000047
100 %		+ 50	707,500,096	96	0.0000136
BATT. ENDPOINT	3.45	+ 20	707,499,792	-208	-0.0000294

Table 7-30. 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: ZNFQ710AL	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1804240083-03-R1.ZNF	Test Dates: 3/22-5/17/2018	EUT Type: Portable Handset	Page 167 of 179

Band 12/17 Frequency Stability Measurements

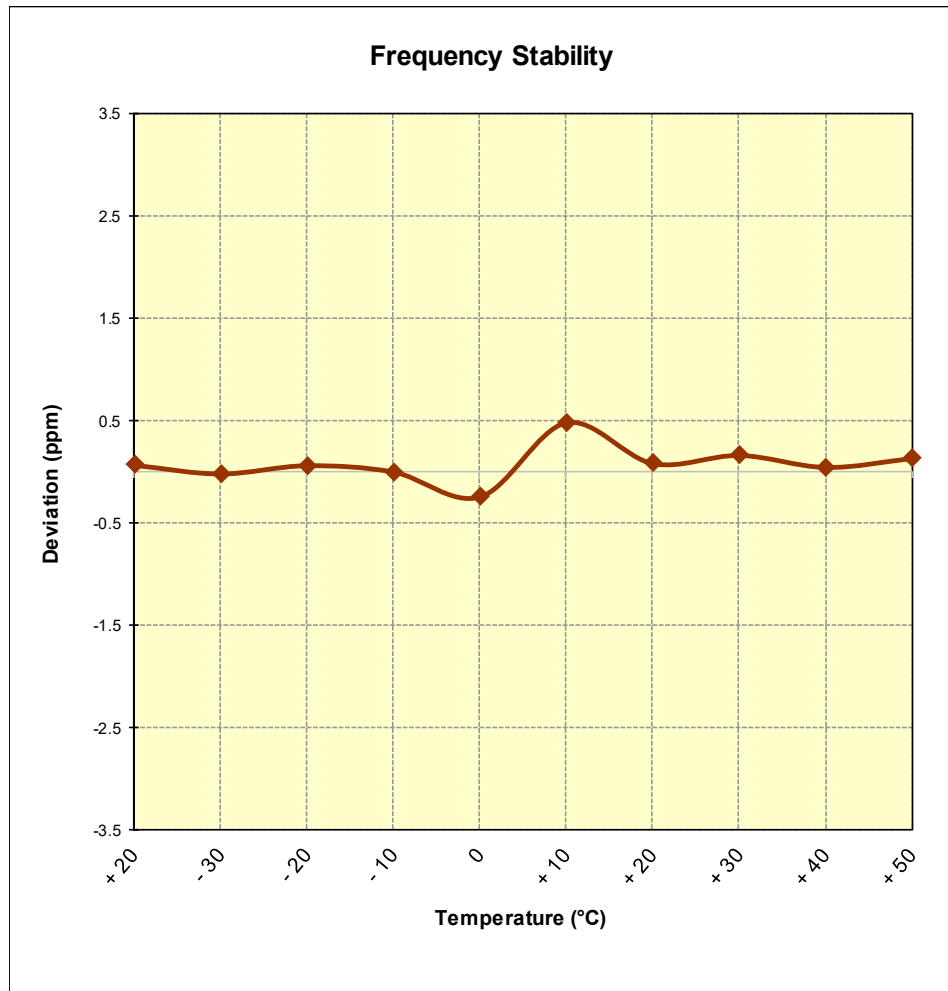


Figure 7-9. Frequency Stability Graph (Band 12/17)

FCC ID: ZNFQ710AL		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1804240083-03-R1.ZNF	Test Dates: 3/22-5/17/2018	EUT Type: Portable Handset		Page 168 of 179

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)	782,000,147	147	0.0000188
100 %		- 30	781,999,911	-89	-0.0000114
100 %		- 20	782,000,094	94	0.0000120
100 %		- 10	781,999,729	-271	-0.0000347
100 %		0	781,999,853	-147	-0.0000188
100 %		+ 10	781,999,930	-70	-0.0000090
100 %		+ 20	782,000,016	16	0.0000020
100 %		+ 30	781,999,937	-63	-0.0000081
100 %		+ 40	781,999,934	-66	-0.0000084
100 %		+ 50	782,000,192	192	0.0000246
BATT. ENDPOINT	3.45	+ 20	781,999,861	-139	-0.0000178

Table 7-31. 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: ZNFQ710AL	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1804240083-03-R1.ZNF	Test Dates: 3/22-5/17/2018	EUT Type: Portable Handset	Page 169 of 179

Band 13 Frequency Stability Measurements

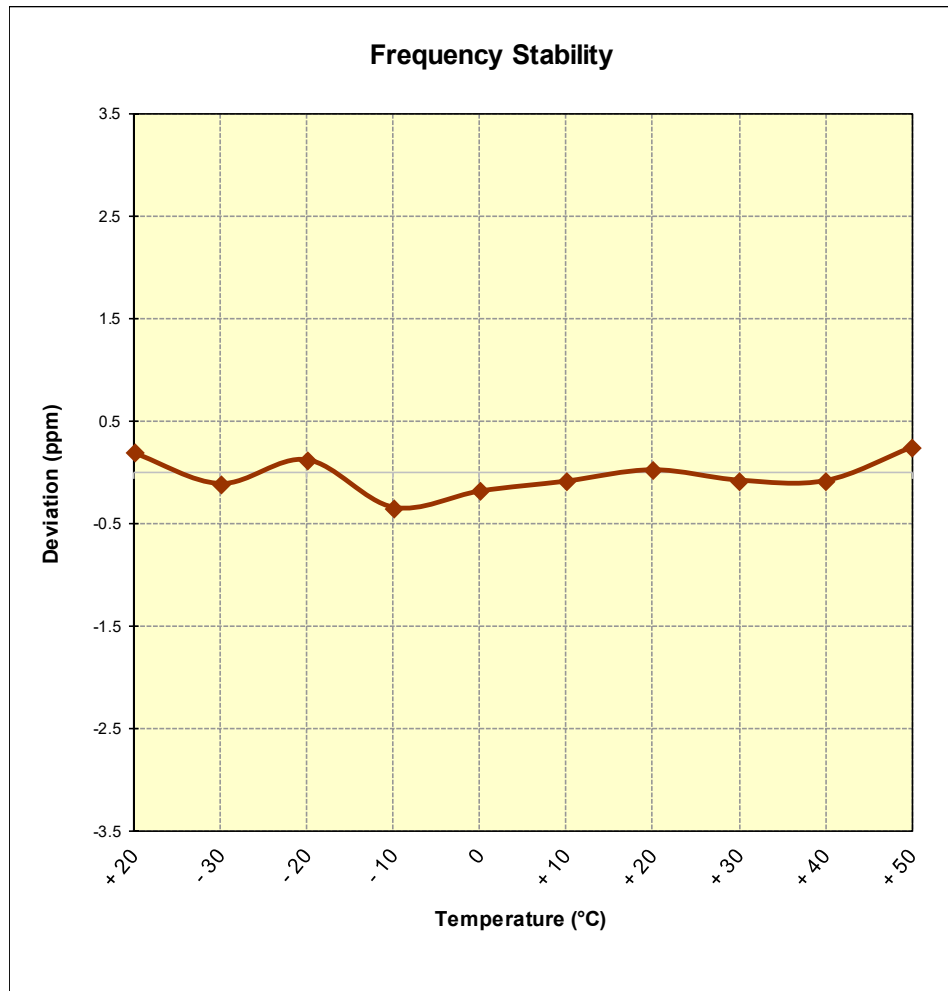


Figure 7-10. Frequency Stability Graph (Band 13)

FCC ID: ZNFQ710AL	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1804240083-03-R1.ZNF	Test Dates: 3/22-5/17/2018	EUT Type: Portable Handset	Page 170 of 179

Band 26/5 Frequency Stability Measurements

OPERATING FREQUENCY: 831,500,000 Hz
 CHANNEL: 26865
 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)	831,499,916	-84	-0.0000101
100 %		- 30	831,499,850	-150	-0.0000180
100 %		- 20	831,500,257	257	0.0000309
100 %		- 10	831,499,998	-2	-0.0000002
100 %		0	831,499,925	-75	-0.0000090
100 %		+ 10	831,500,118	118	0.0000142
100 %		+ 20	831,500,147	147	0.0000177
100 %		+ 30	831,500,039	39	0.0000047
100 %		+ 40	831,499,933	-67	-0.0000081
100 %		+ 50	831,500,013	13	0.0000016
BATT. ENDPOINT	3.45	+ 20	831,500,147	147	0.0000177

Table 7-32. Frequency Stability Data (Band 26/5)

FCC ID: ZNFQ710AL		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1804240083-03-R1.ZNF	Test Dates: 3/22-5/17/2018	EUT Type: Portable Handset		Page 171 of 179

Band 26/5 Frequency Stability Measurements

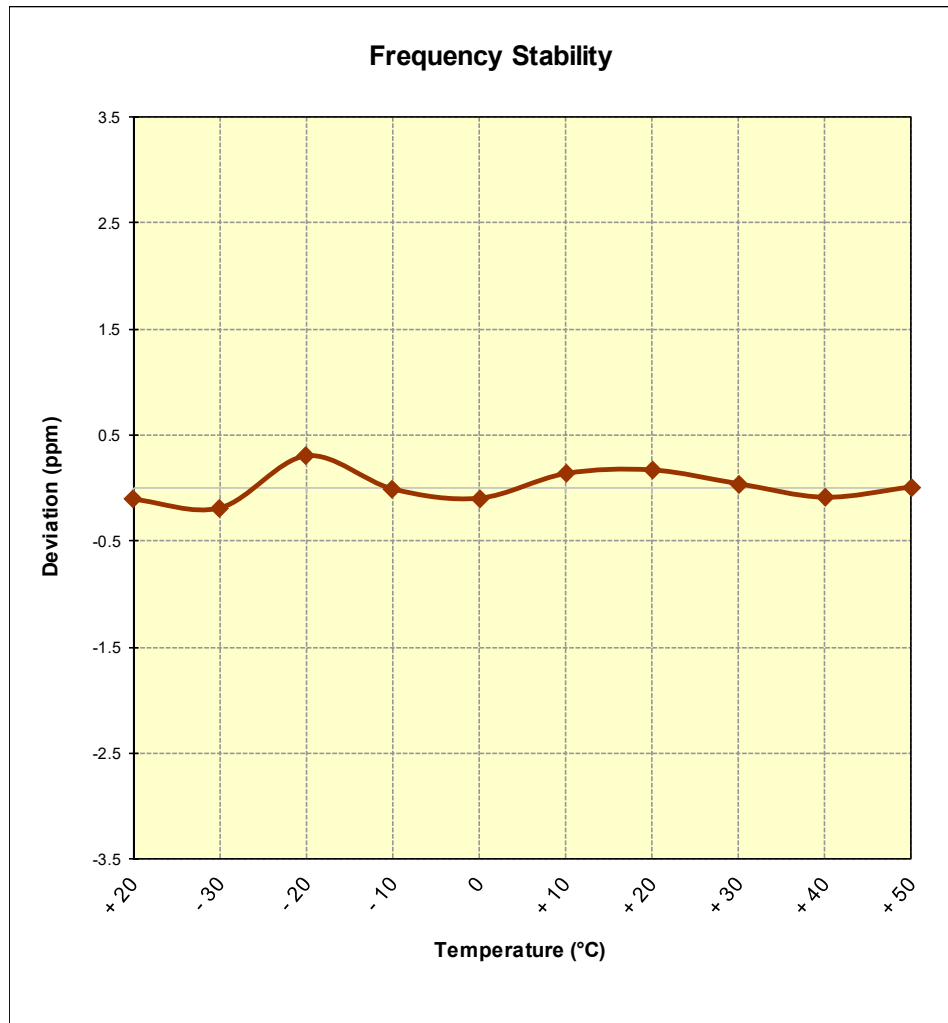


Figure 7-11. Frequency Stability Graph (Band 26/5)

FCC ID: ZNFQ710AL		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1804240083-03-R1.ZNF	Test Dates: 3/22-5/17/2018	EUT Type: Portable Handset		Page 172 of 179

Band 4 Frequency Stability Measurements

OPERATING FREQUENCY: 1,732,500,000 Hz
 CHANNEL: 20175
 REFERENCE VOLTAGE: 3.85 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	1,732,500,190	190	0.0000110
100 %		- 30	1,732,500,077	77	0.0000044
100 %		- 20	1,732,500,210	210	0.0000121
100 %		- 10	1,732,499,819	-181	-0.0000104
100 %		0	1,732,500,117	117	0.0000068
100 %		+ 10	1,732,499,743	-257	-0.0000148
100 %		+ 20	1,732,500,008	8	0.0000005
100 %		+ 30	1,732,499,862	-138	-0.0000080
100 %		+ 40	1,732,500,069	69	0.0000040
100 %		+ 50	1,732,499,639	-361	-0.0000208
BATT. ENDPOINT	3.45	+ 20	1,732,500,231	231	0.0000133

Table 7-33. Frequency Stability Data (Band 4)

Note:

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

FCC ID: ZNFQ710AL	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1804240083-03-R1.ZNF	Test Dates: 3/22-5/17/2018	EUT Type: Portable Handset	Page 173 of 179

Band 4 Frequency Stability Measurements

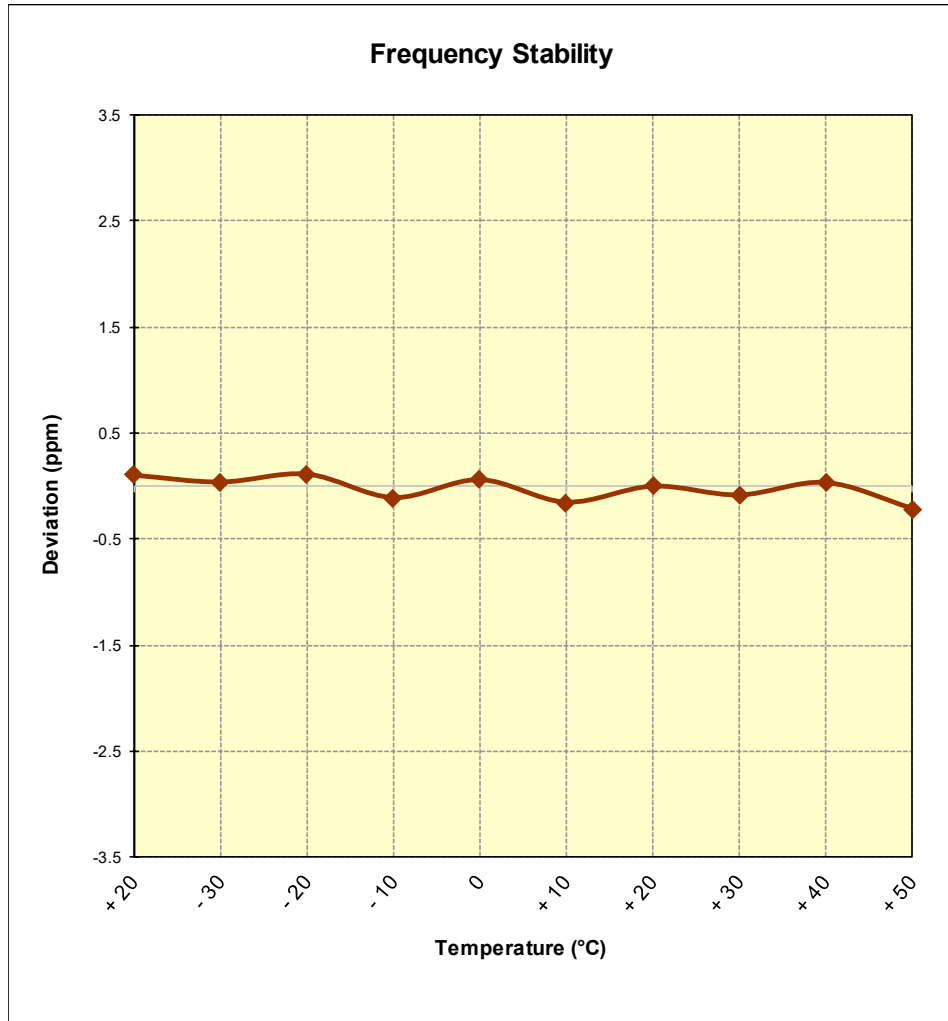


Figure 7-12. Frequency Stability Graph (Band 4)

FCC ID: ZNFQ710AL	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1804240083-03-R1.ZNF	Test Dates: 3/22-5/17/2018	EUT Type: Portable Handset	Page 174 of 179

Band 25/2 Frequency Stability Measurements

OPERATING FREQUENCY: 1,882,500,000 Hz

CHANNEL: 26365

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)	1,882,499,835	-165	-0.0000088
100 %		- 30	1,882,500,188	188	0.0000100
100 %		- 20	1,882,500,089	89	0.0000047
100 %		- 10	1,882,499,995	-5	-0.0000003
100 %		0	1,882,500,064	64	0.0000034
100 %		+ 10	1,882,500,141	141	0.0000075
100 %		+ 20	1,882,499,852	-148	-0.0000079
100 %		+ 30	1,882,500,120	120	0.0000064
100 %		+ 40	1,882,500,000	0	0.0000000
100 %		+ 50	1,882,499,772	-228	-0.0000121
BATT. ENDPOINT	3.45	+ 20	1,882,500,012	12	0.0000006

Table 7-34. Frequency Stability Data (Band 25/2)

FCC ID: ZNFQ710AL	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1804240083-03-R1.ZNF	Test Dates: 3/22-5/17/2018	EUT Type: Portable Handset	Page 175 of 179

Band 25/2 Frequency Stability Measurements

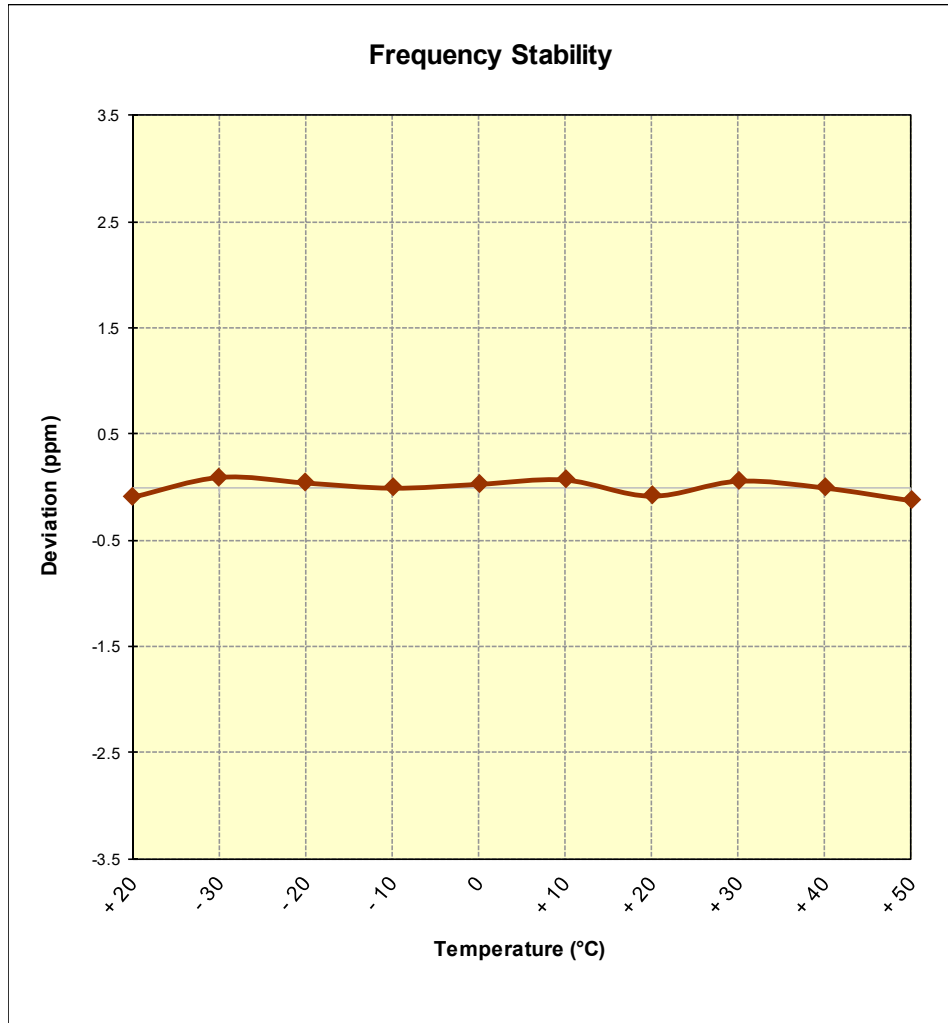


Figure 7-13. Frequency Stability Graph (Band 25/2)

FCC ID: ZNFQ710AL	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1804240083-03-R1.ZNF	Test Dates: 3/22-5/17/2018	EUT Type: Portable Handset	Page 176 of 179	

Band 41 Frequency Stability Measurements

OPERATING FREQUENCY: 2,593,000,000 Hz
 CHANNEL: 40620
 REFERENCE VOLTAGE: 3.85 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	2,592,999,978	-22	-0.0000008
100 %		- 30	2,593,000,353	353	0.0000136
100 %		- 20	2,592,999,883	-117	-0.0000045
100 %		- 10	2,593,000,170	170	0.0000066
100 %		0	2,592,999,874	-126	-0.0000049
100 %		+ 10	2,592,999,982	-18	-0.0000007
100 %		+ 20	2,592,999,833	-167	-0.0000064
100 %		+ 30	2,593,000,042	42	0.0000016
100 %		+ 40	2,593,000,048	48	0.0000019
100 %		+ 50	2,592,999,840	-160	-0.0000062
BATT. ENDPOINT	3.45	+ 20	2,593,000,009	9	0.0000003

Table 7-35. Frequency Stability Data (Band 41)

Note:

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

FCC ID: ZNFQ710AL	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1804240083-03-R1.ZNF	Test Dates: 3/22-5/17/2018	EUT Type: Portable Handset	Page 177 of 179

Band 41 Frequency Stability Measurements

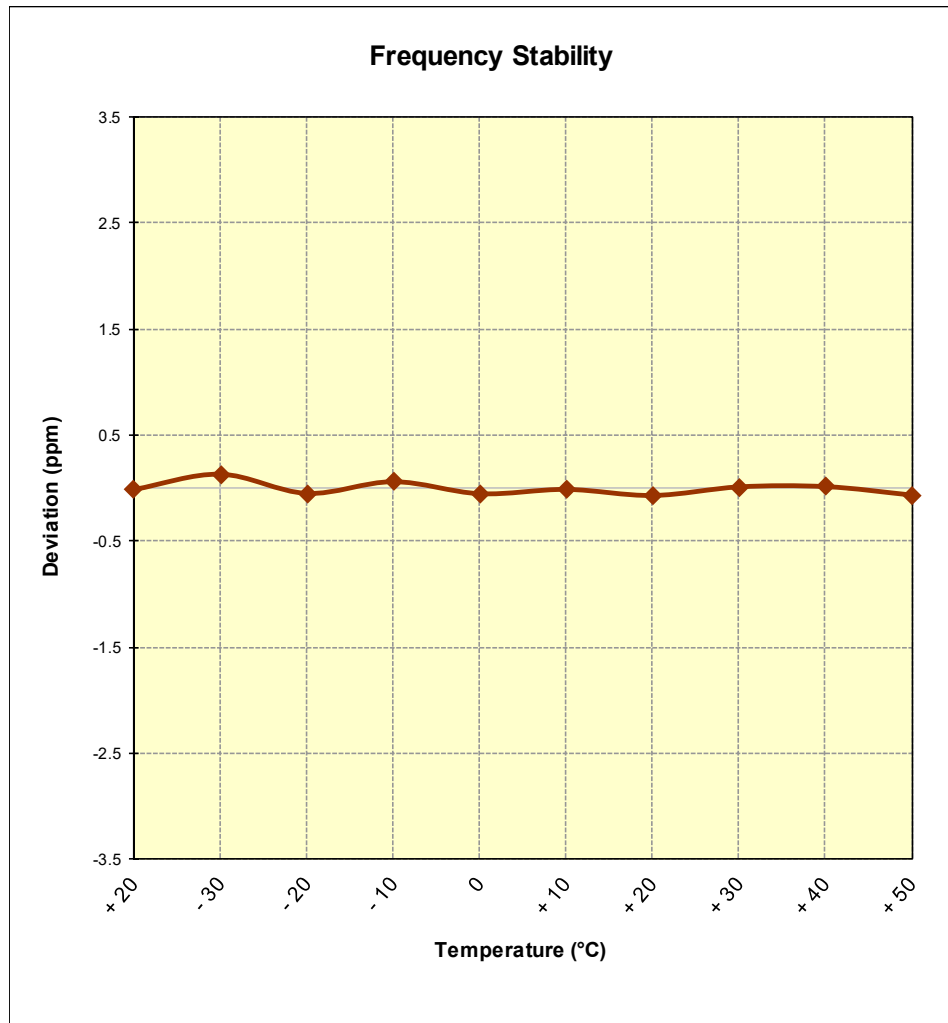


Figure 7-14. Frequency Stability Graph (Band 41)

FCC ID: ZNFQ710AL	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1804240083-03-R1.ZNF	Test Dates: 3/22-5/17/2018	EUT Type: Portable Handset		Page 178 of 179

8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **LG Portable Handset FCC ID: ZNFQ710AL** complies with all the requirements of Part 22, 24, & 27 of the FCC Rules for LTE operation only.

FCC ID: ZNFQ710AL		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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