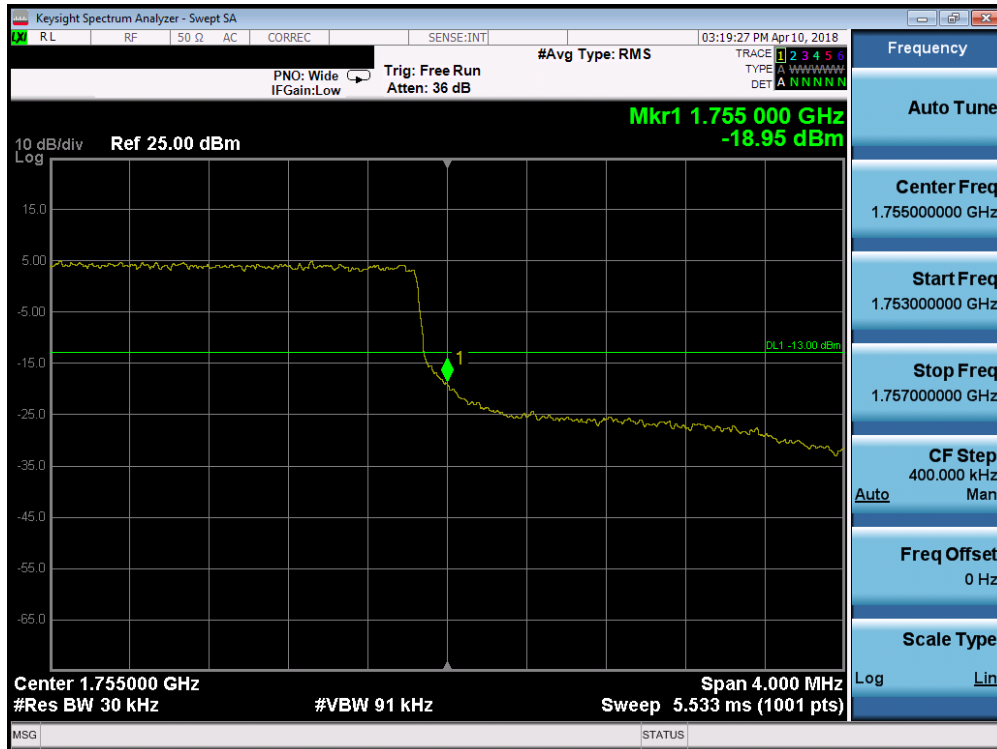


Plot 7-104. Lower Band Edge Plot (Band 4 - 3.0MHz QPSK - Full RB Configuration)

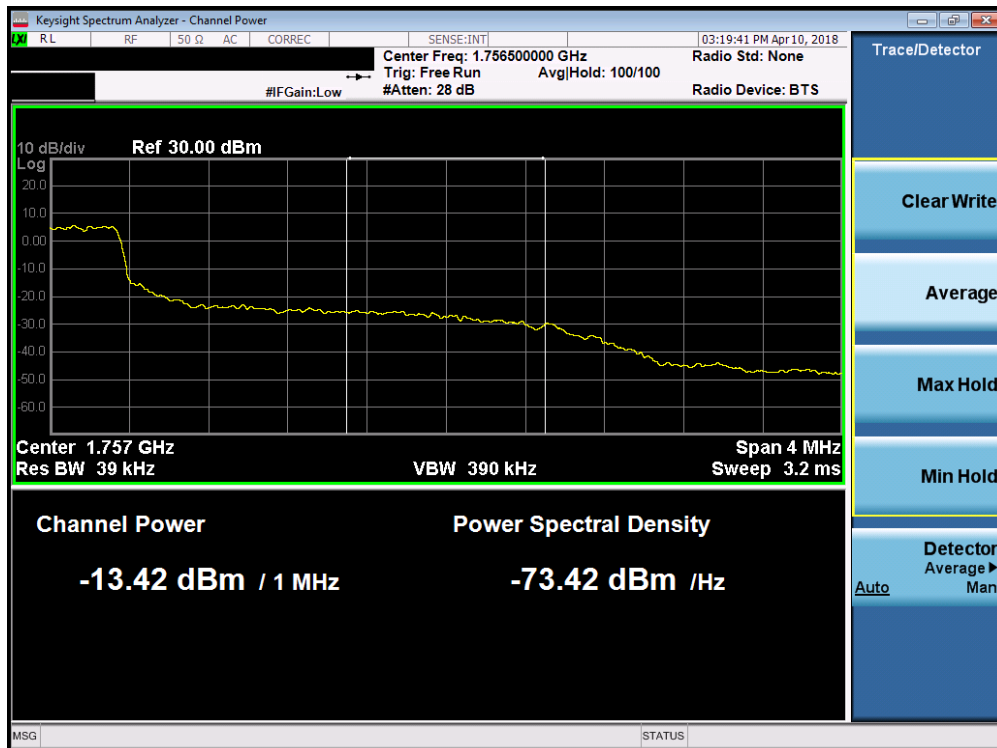


Plot 7-105. Lower Extended Band Edge Plot (Band 4 - 3.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1803280056-03.ZNF	Test Dates: 3/28-5/2/2018	EUT Type: Portable Handset		Page 73 of 136

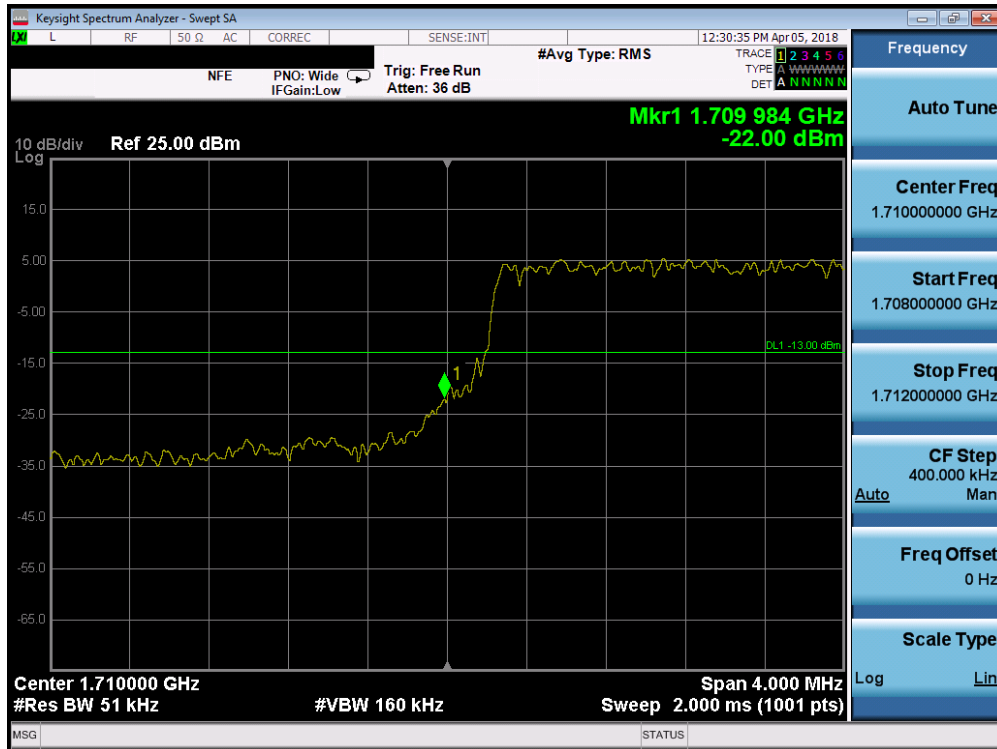


Plot 7-106. Upper Band Edge Plot (Band 4 - 3.0MHz QPSK - Full RB Configuration)

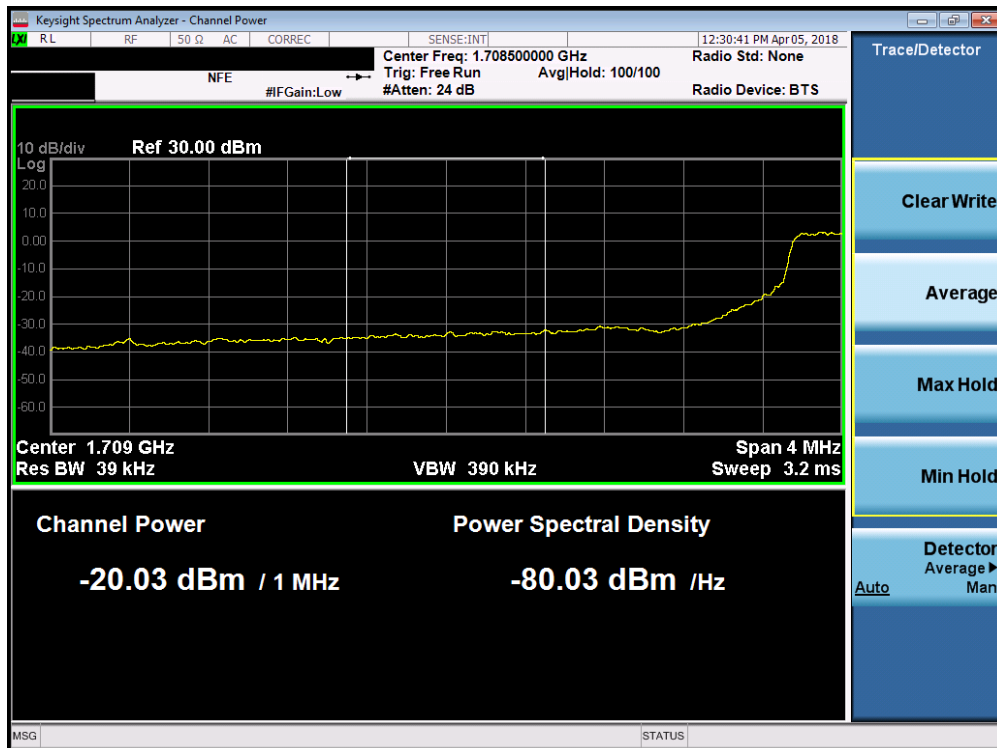


Plot 7-107. Upper Extended Band Edge Plot (Band 4 - 3.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1803280056-03.ZNF	Test Dates: 3/28-5/2/2018	EUT Type: Portable Handset		Page 74 of 136

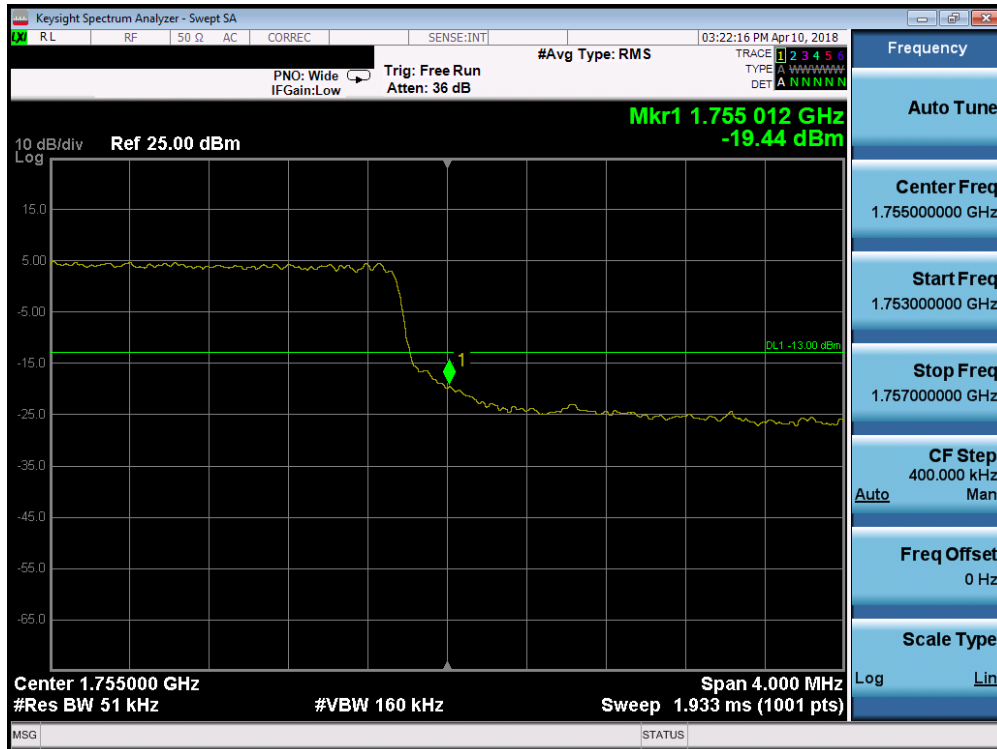


Plot 7-108. Lower Band Edge Plot (Band 4 - 5.0MHz QPSK - Full RB Configuration)

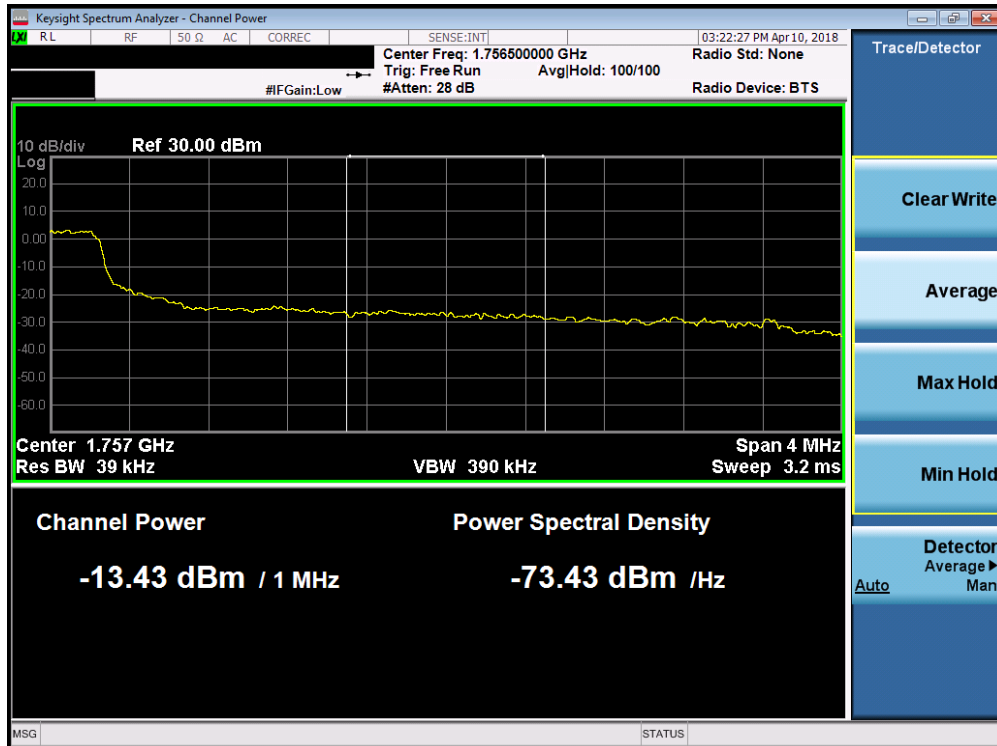


Plot 7-109. Lower Extended Band Edge Plot (Band 4 - 5.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1803280056-03.ZNF	Test Dates: 3/28-5/2/2018	EUT Type: Portable Handset		Page 75 of 136

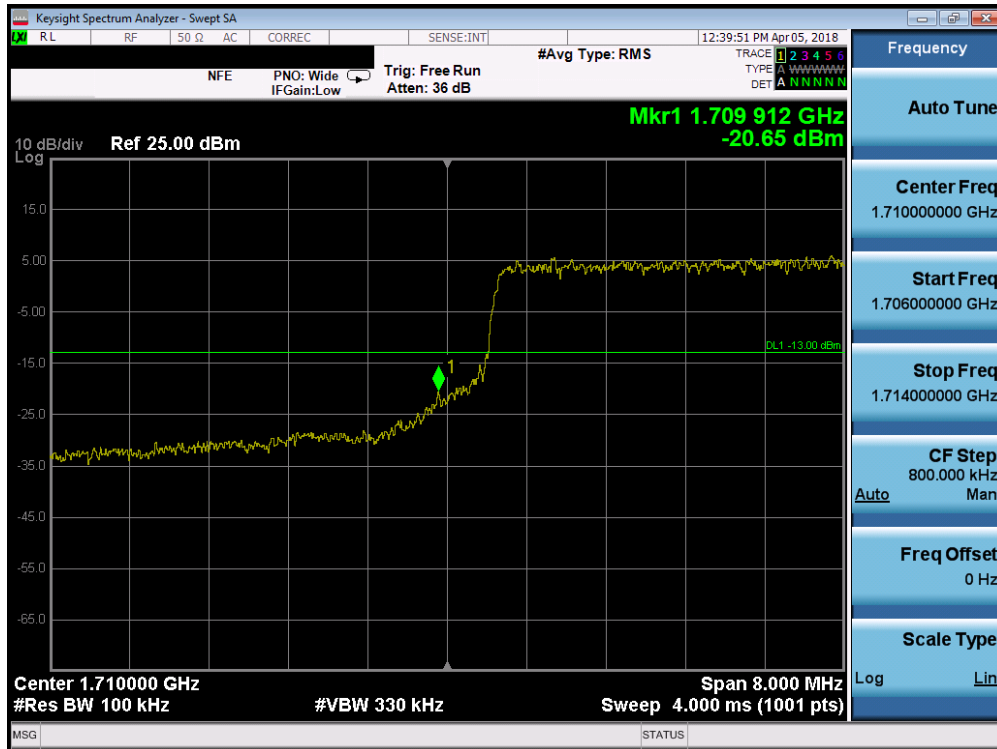


Plot 7-110. Upper Band Edge Plot (Band 4 - 5.0MHz QPSK - Full RB Configuration)

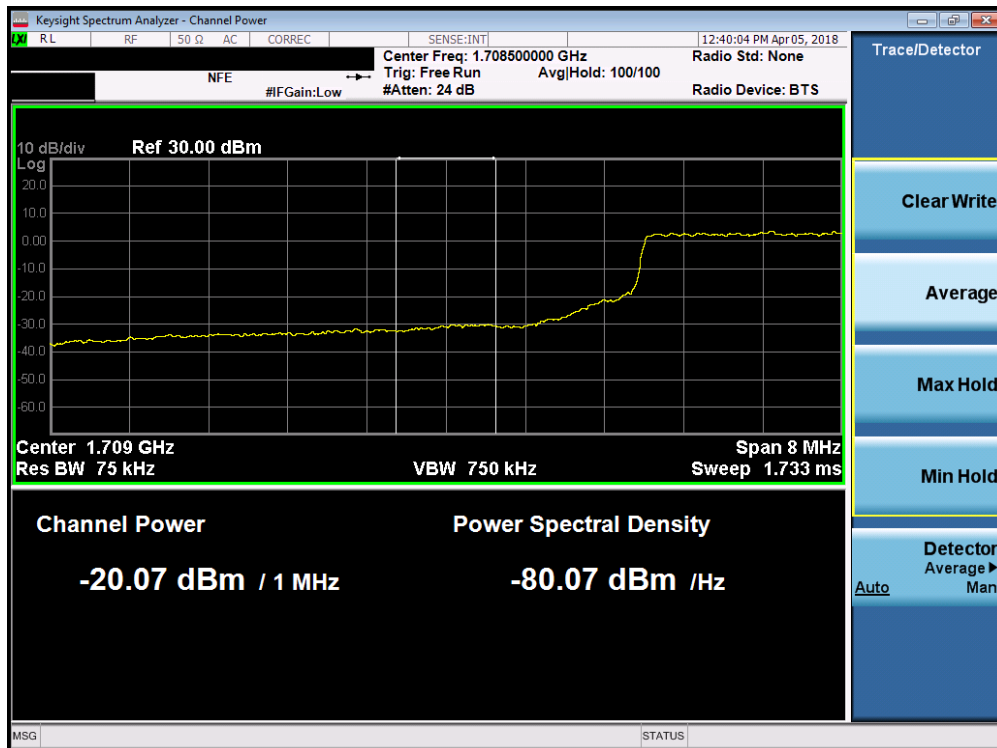


Plot 7-111. Upper Extended Band Edge Plot (Band 4 - 5.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1803280056-03.ZNF	Test Dates: 3/28-5/2/2018	EUT Type: Portable Handset		Page 76 of 136

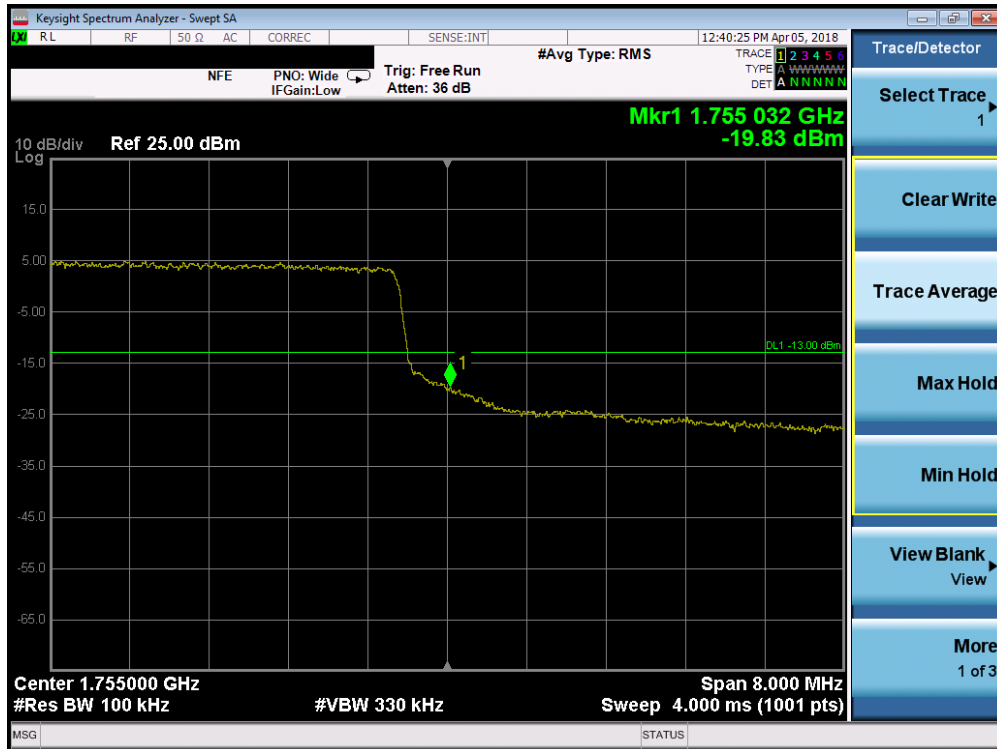


Plot 7-112. Lower Band Edge Plot (Band 4 - 10.0MHz QPSK - Full RB Configuration)

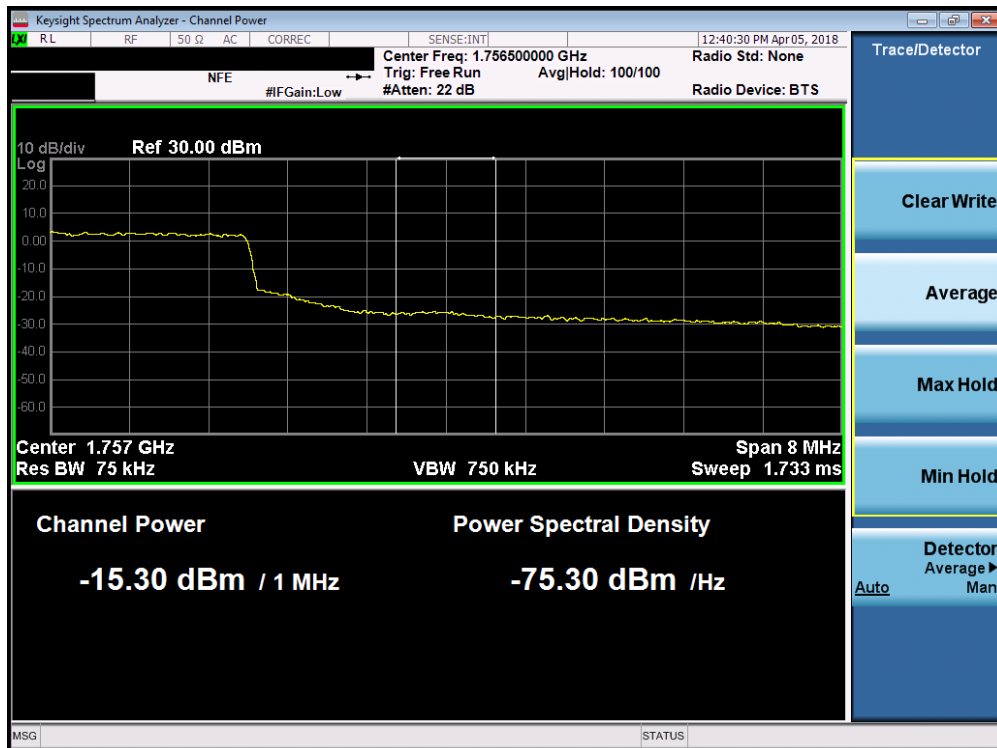


Plot 7-113. Lower Extended Band Edge Plot (Band 4 - 10.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFQ710CS	<b>MEASUREMENT REPORT (CERTIFICATION)</b>			Approved by: Quality Manager
Test Report S/N: 1M1803280056-03.ZNF	Test Dates: 3/28-5/2/2018	EUT Type: Portable Handset		Page 77 of 136

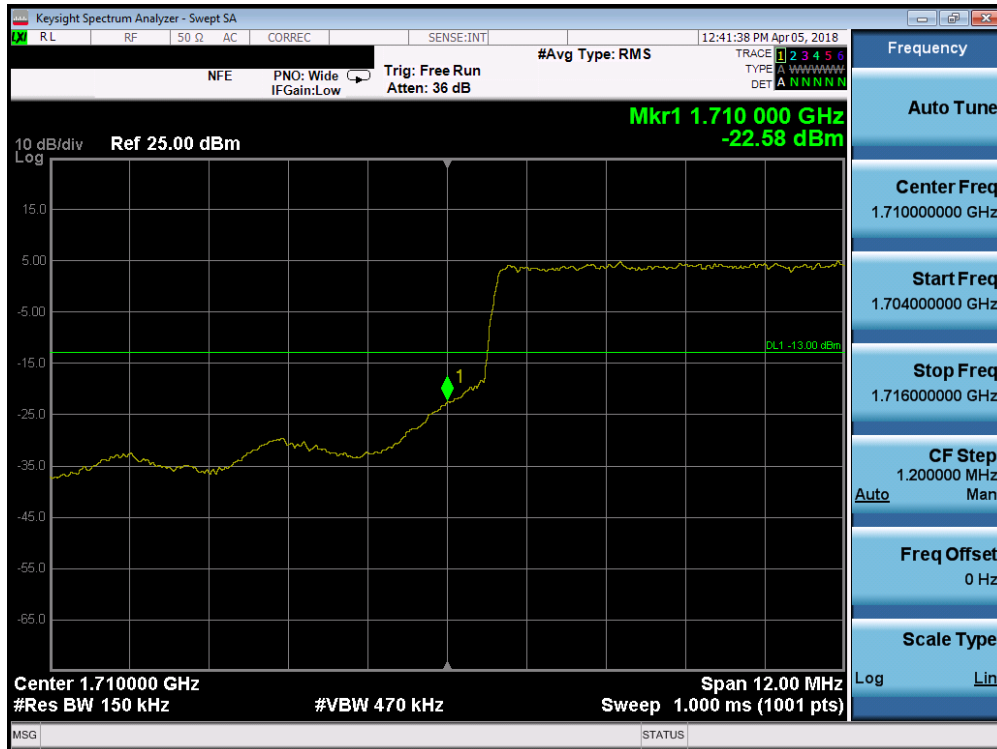


Plot 7-114. Upper Band Edge Plot (Band 4 - 10.0MHz QPSK - Full RB Configuration)

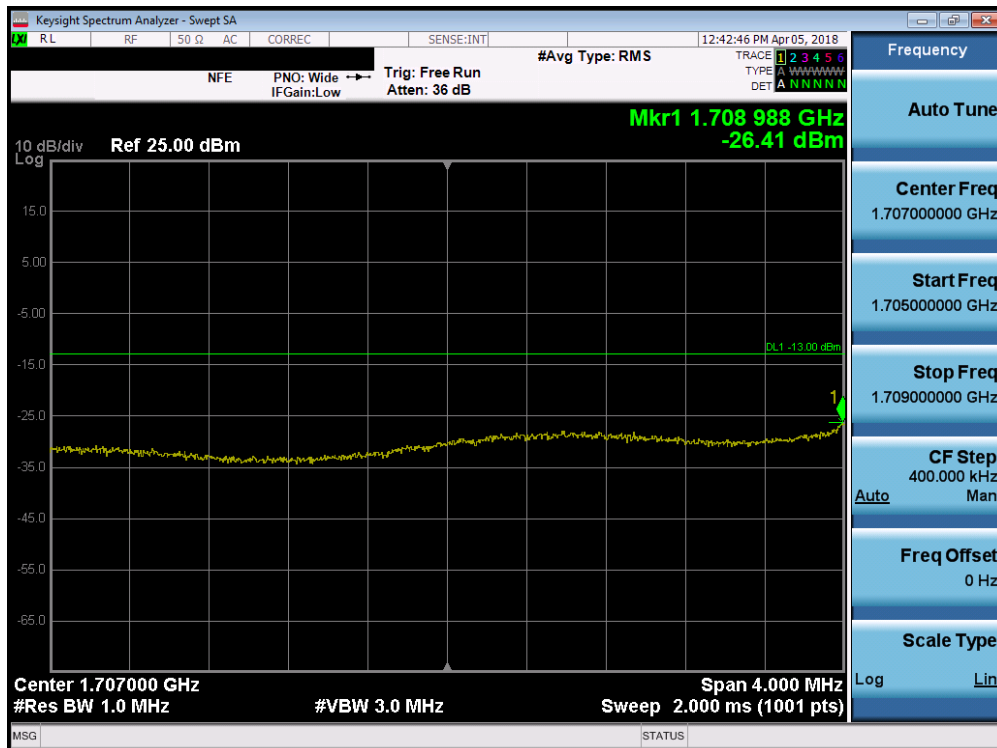


Plot 7-115. Upper Extended Band Edge Plot (Band 4 - 10.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFQ710CS	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1803280056-03.ZNF	Test Dates: 3/28-5/2/2018	EUT Type: Portable Handset		Page 78 of 136

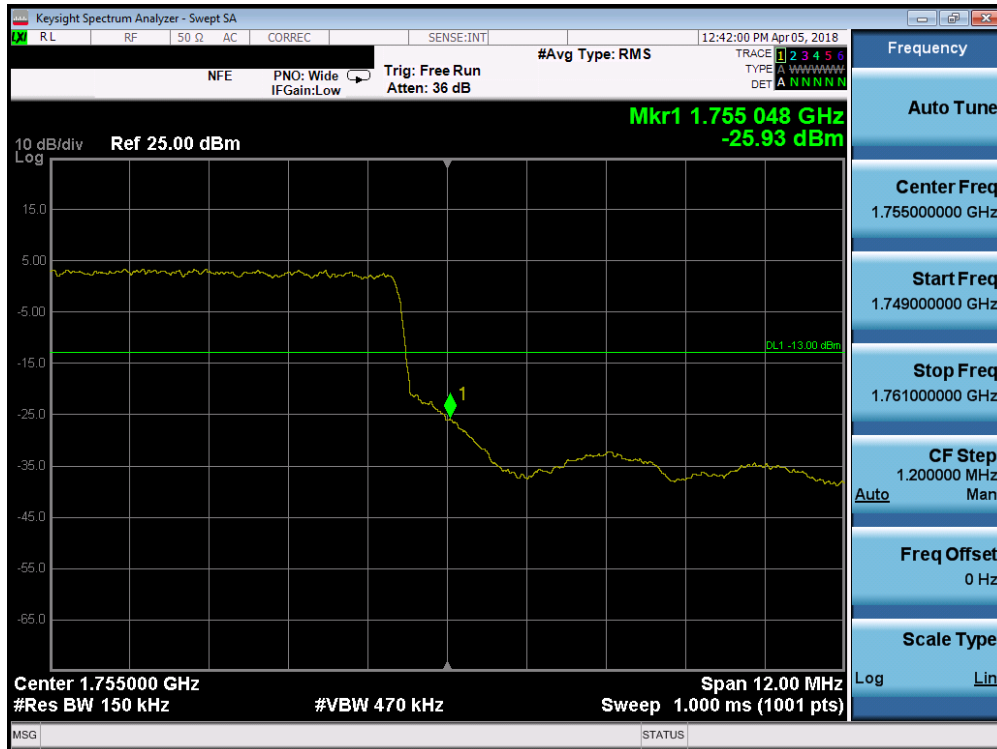


Plot 7-116. Lower Band Edge Plot (Band 4 - 15.0MHz QPSK - Full RB Configuration)

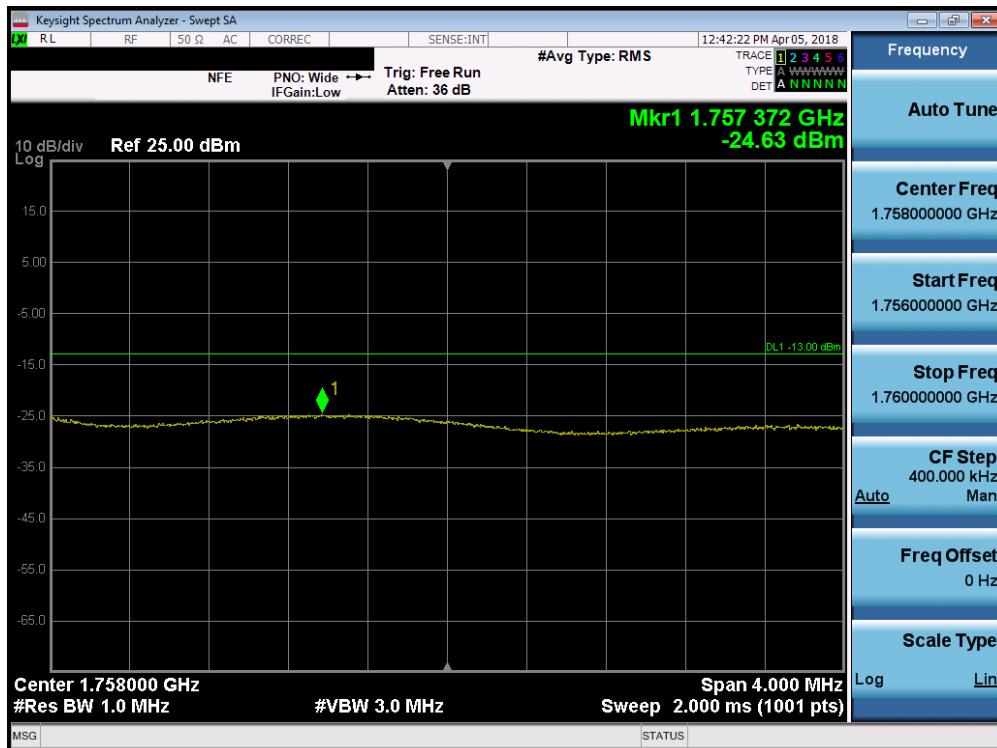


Plot 7-117. Lower Extended Band Edge Plot (Band 4 - 15.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFQ710CS			MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1803280056-03.ZNF	Test Dates: 3/28-5/2/2018	EUT Type: Portable Handset	Page 79 of 136		



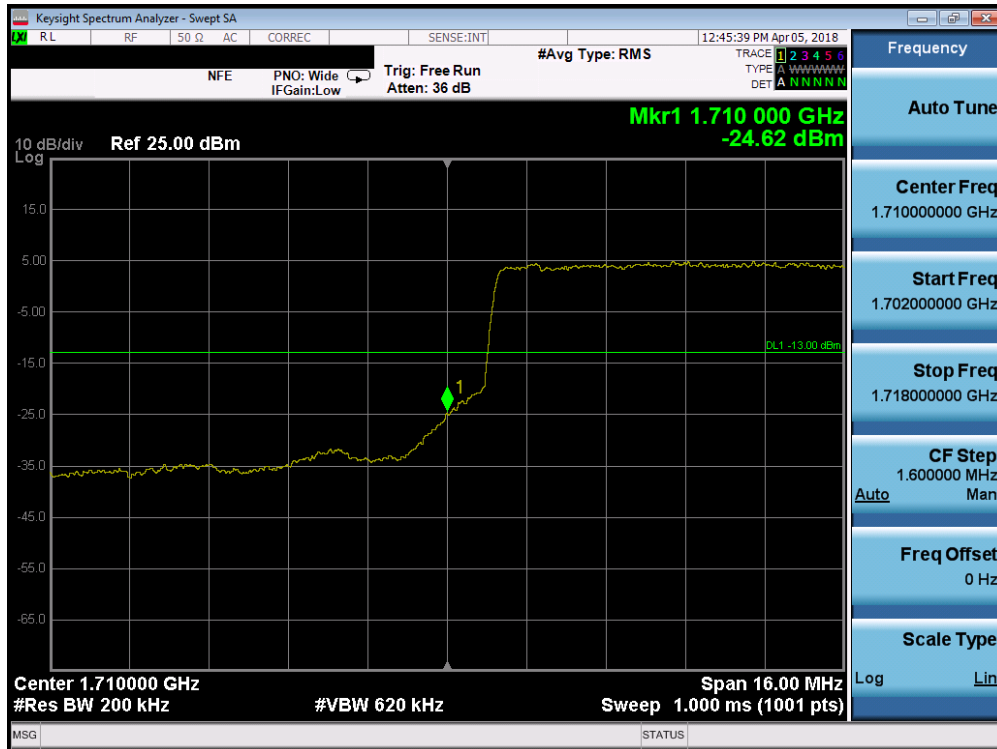
Plot 7-118. Upper Band Edge Plot (Band 4 - 15.0MHz QPSK - Full RB Configuration)



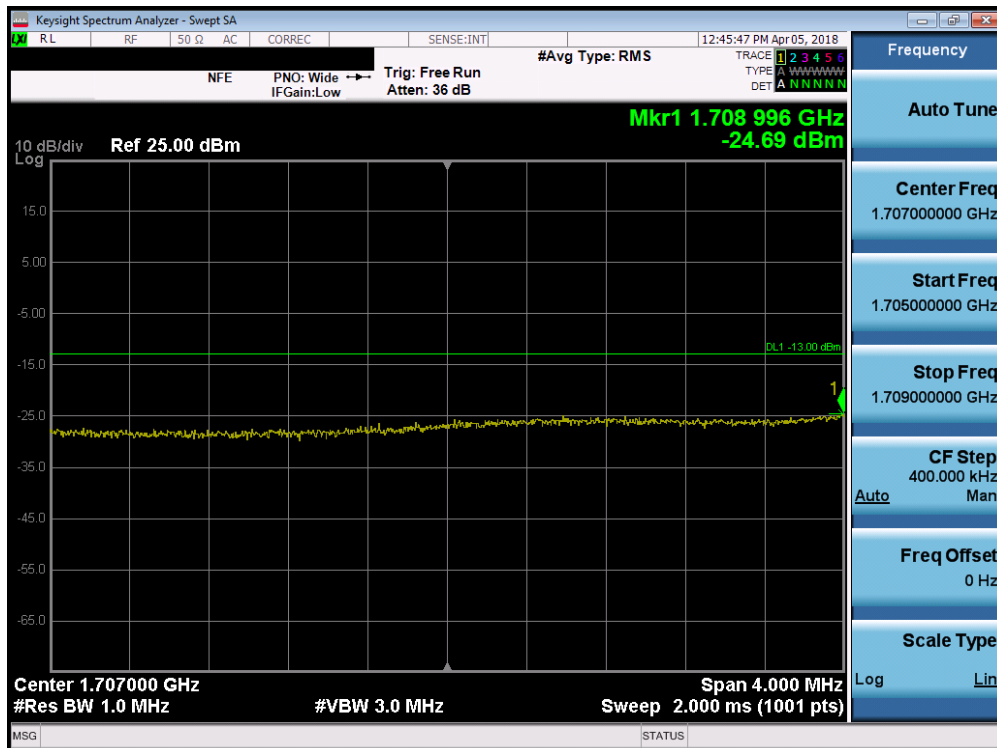
Plot 7-119. Upper Extended Band Edge Plot (Band 4 - 15.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1803280056-03.ZNF	Test Dates: 3/28-5/2/2018	EUT Type: Portable Handset		Page 80 of 136



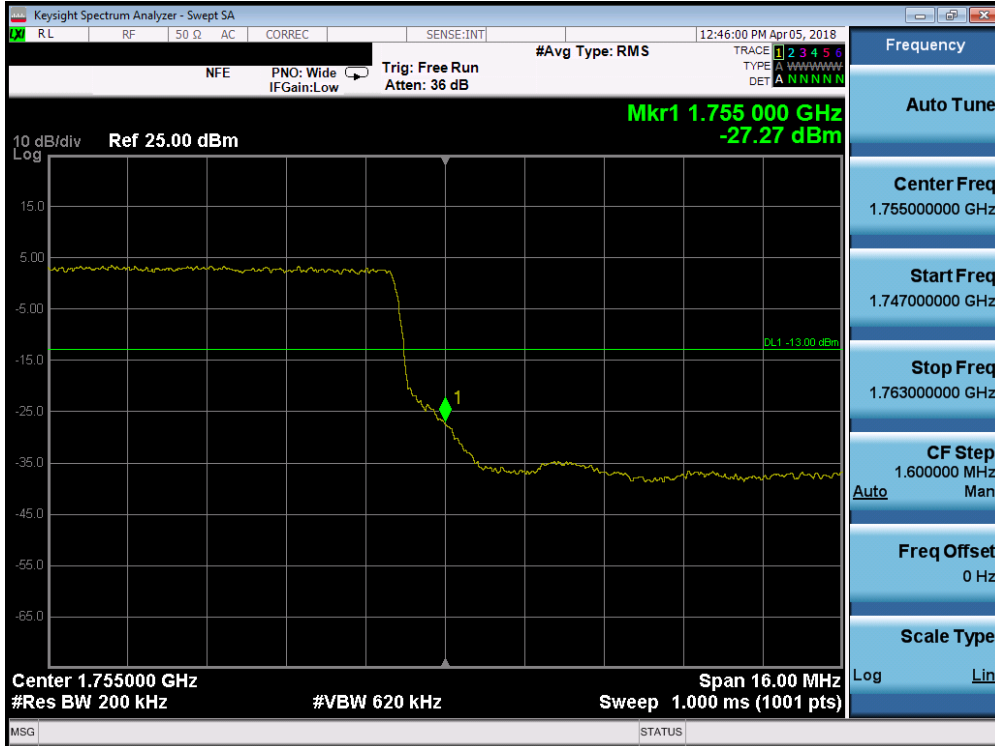


Plot 7-120. Lower Band Edge Plot (Band 4 - 20.0MHz QPSK - Full RB Configuration)

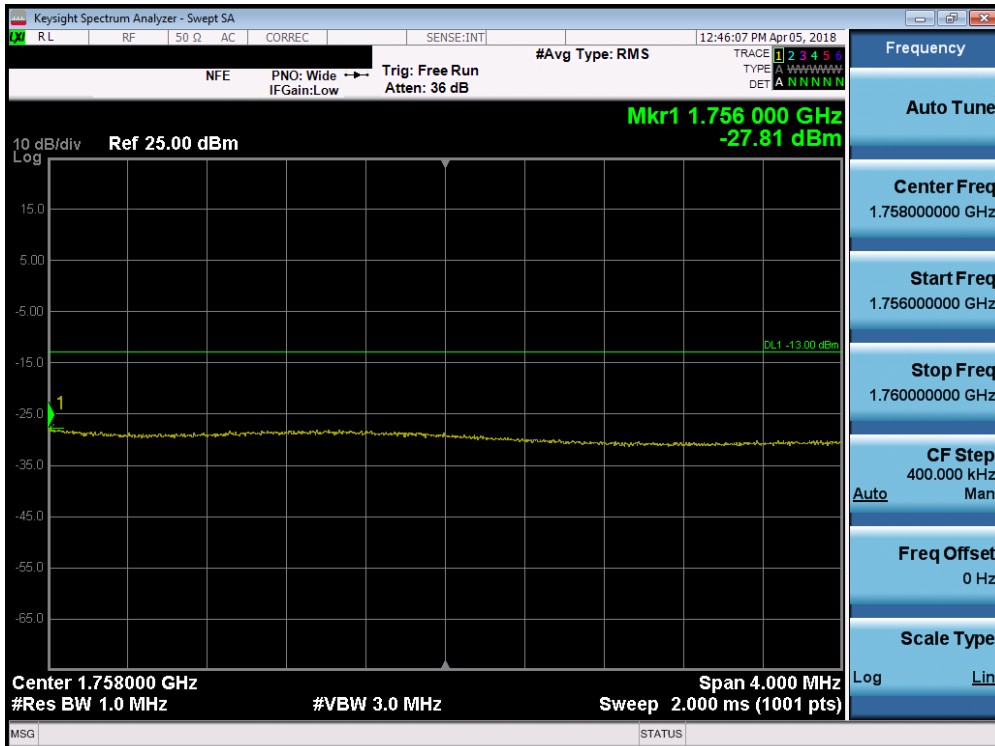


Plot 7-121. Lower Extended Band Edge Plot (Band 4 - 20.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFQ710CS			MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1803280056-03.ZNF	Test Dates: 3/28-5/2/2018	EUT Type: Portable Handset	Page 81 of 136		



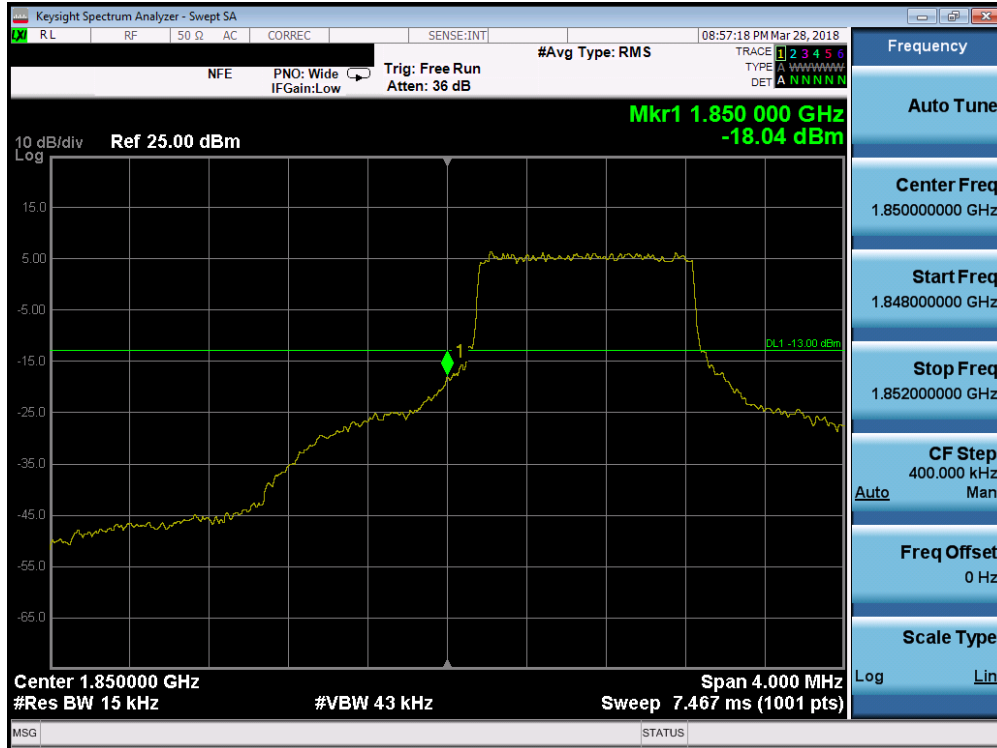
Plot 7-122. Upper Band Edge Plot (Band 4 - 20.0MHz QPSK - Full RB Configuration)



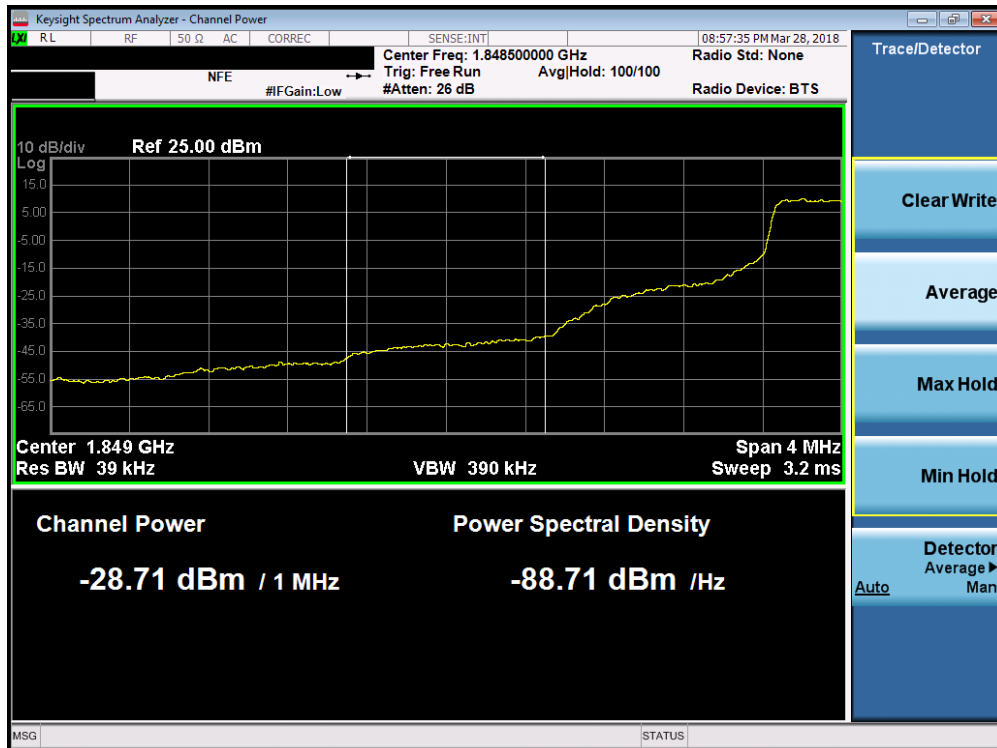
Plot 7-123. Upper Extended Band Edge Plot (Band 4 - 20.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFQ710CS			MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1803280056-03.ZNF	Test Dates: 3/28-5/2/2018	EUT Type: Portable Handset	Page 82 of 136		

**Band 2**



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

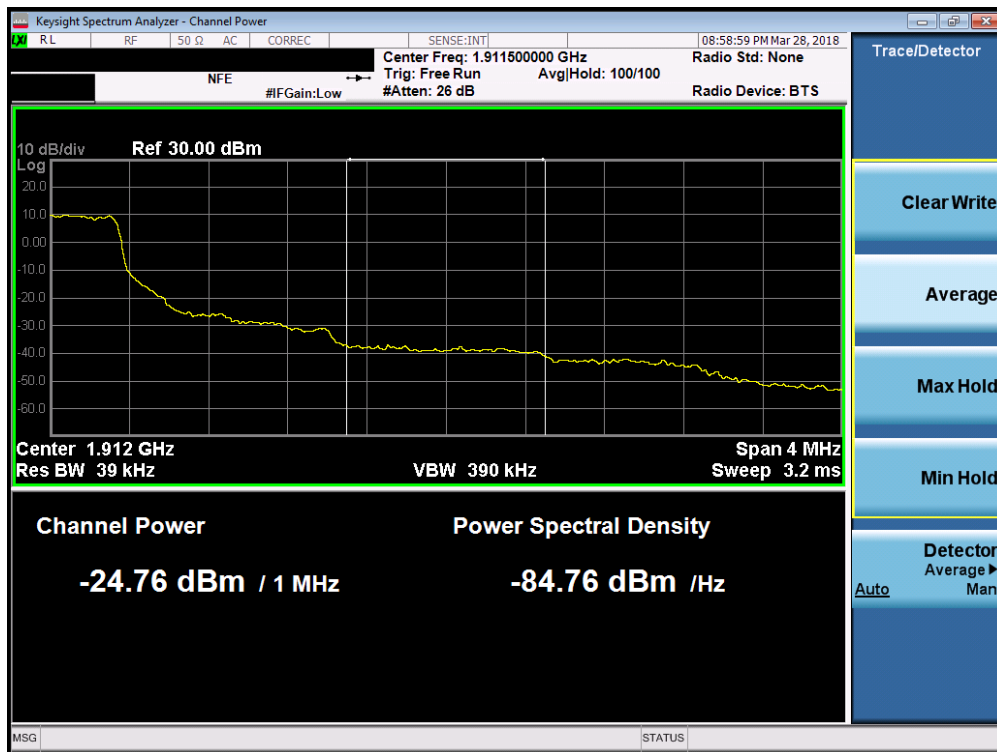


**Plot 7-125. Lower Extended Band Edge Plot (Band 2 - 1.4MHz QPSK - Full RB Configuration)**

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1803280056-03.ZNF	Test Dates: 3/28-5/2/2018	EUT Type: Portable Handset		Page 83 of 136

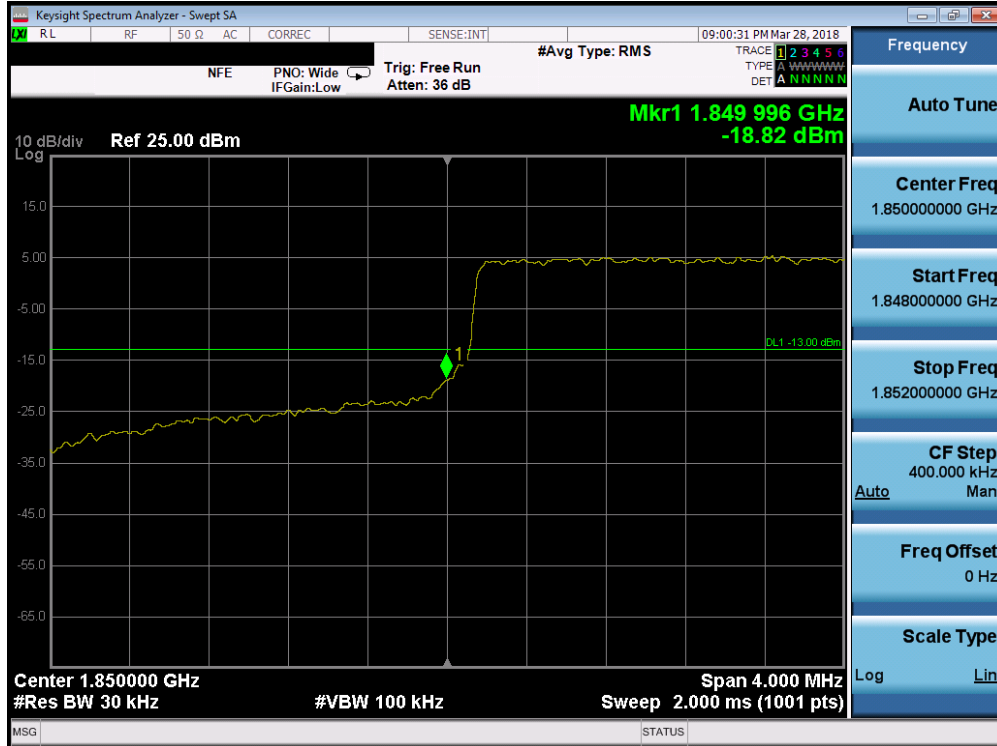


Plot 7-126. Upper Band Edge Plot (Band 2 - 1.4MHz QPSK - Full RB Configuration)

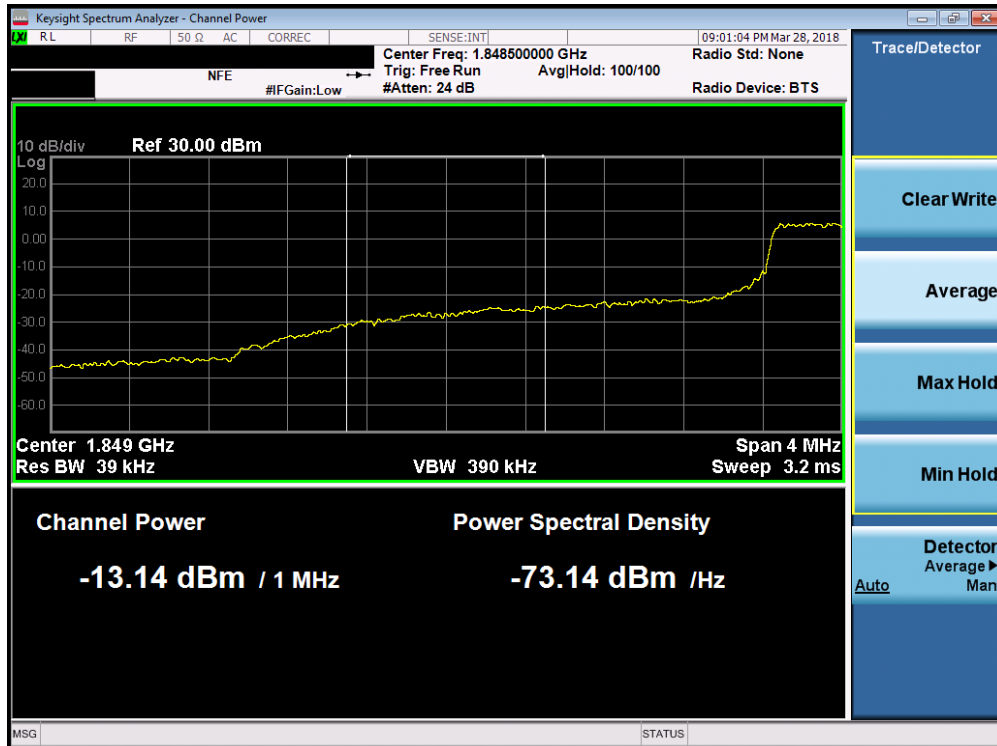


Plot 7-127. Upper Extended Band Edge Plot (Band 2 - 1.4MHz QPSK - Full RB Configuration)

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1803280056-03.ZNF	Test Dates: 3/28-5/2/2018	EUT Type: Portable Handset		Page 84 of 136

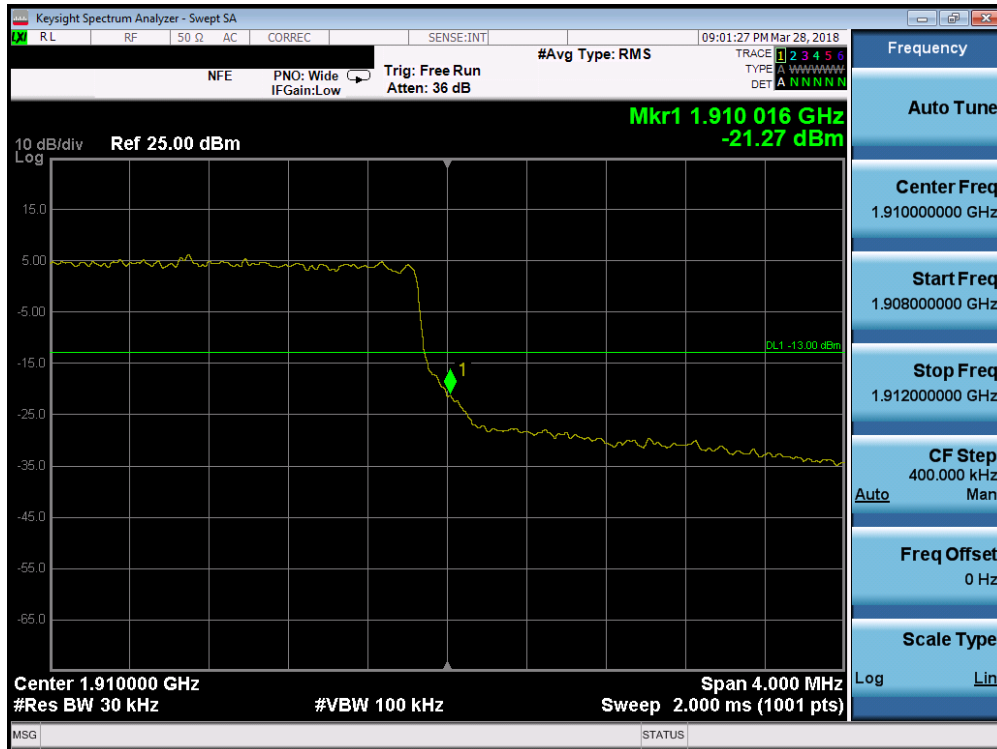


Plot 7-128. Lower Band Edge Plot (Band 2 - 3.0MHz QPSK - Full RB Configuration)

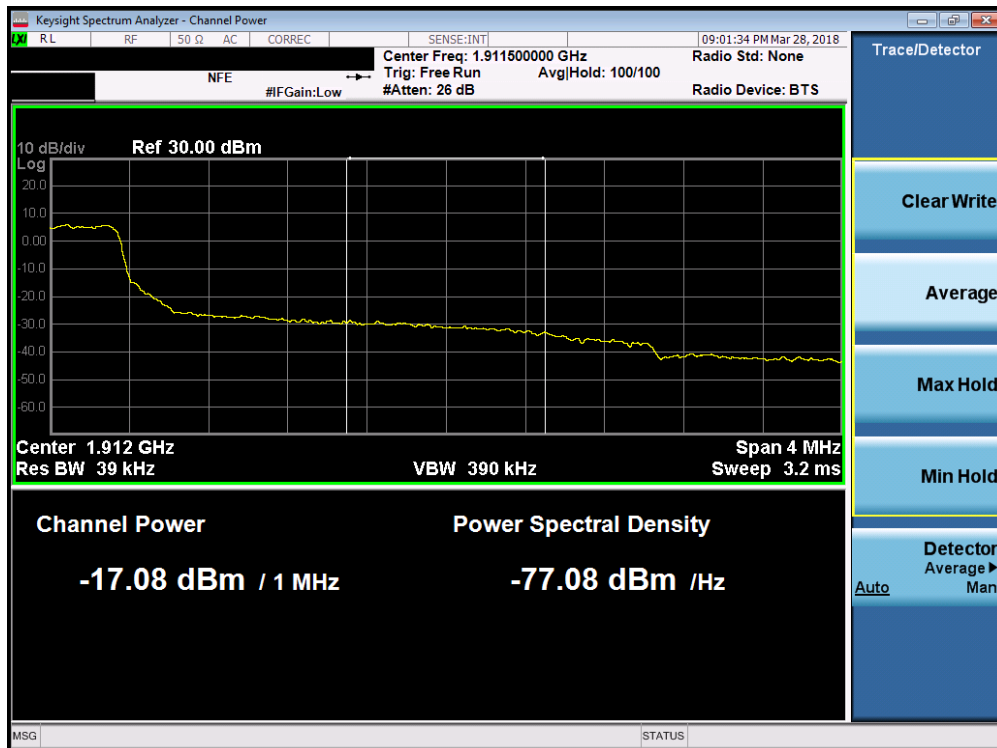


Plot 7-129. Lower Extended Band Edge Plot (Band 2 - 3.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1803280056-03.ZNF	Test Dates: 3/28-5/2/2018	EUT Type: Portable Handset		Page 85 of 136

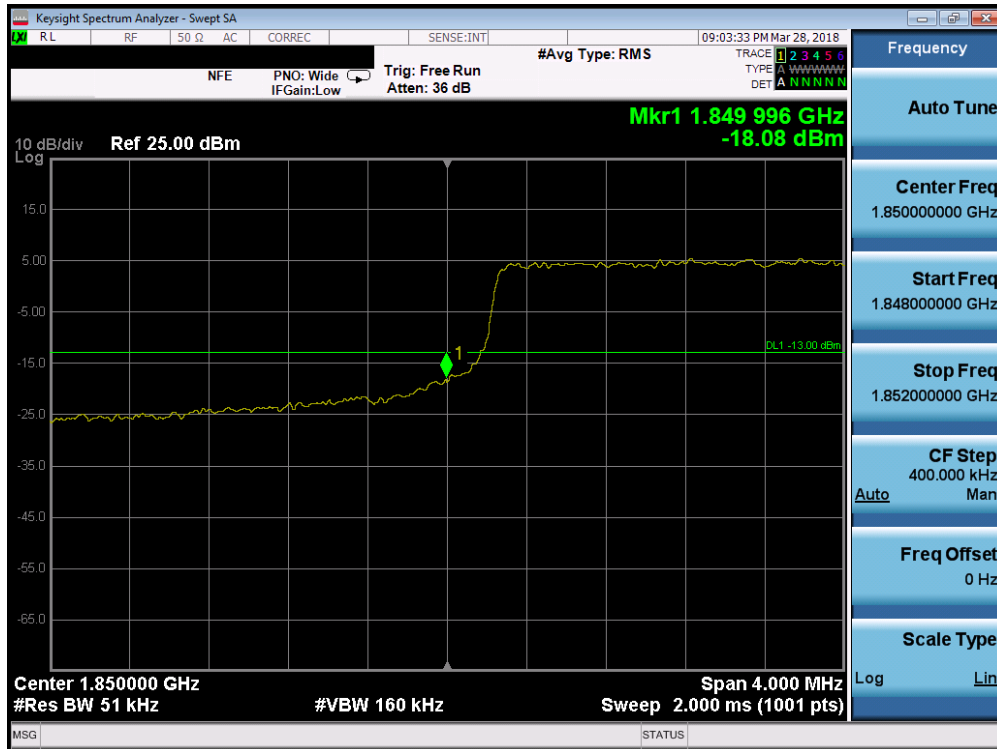


Plot 7-130. Upper Band Edge Plot (Band 2 - 3.0MHz QPSK - Full RB Configuration)

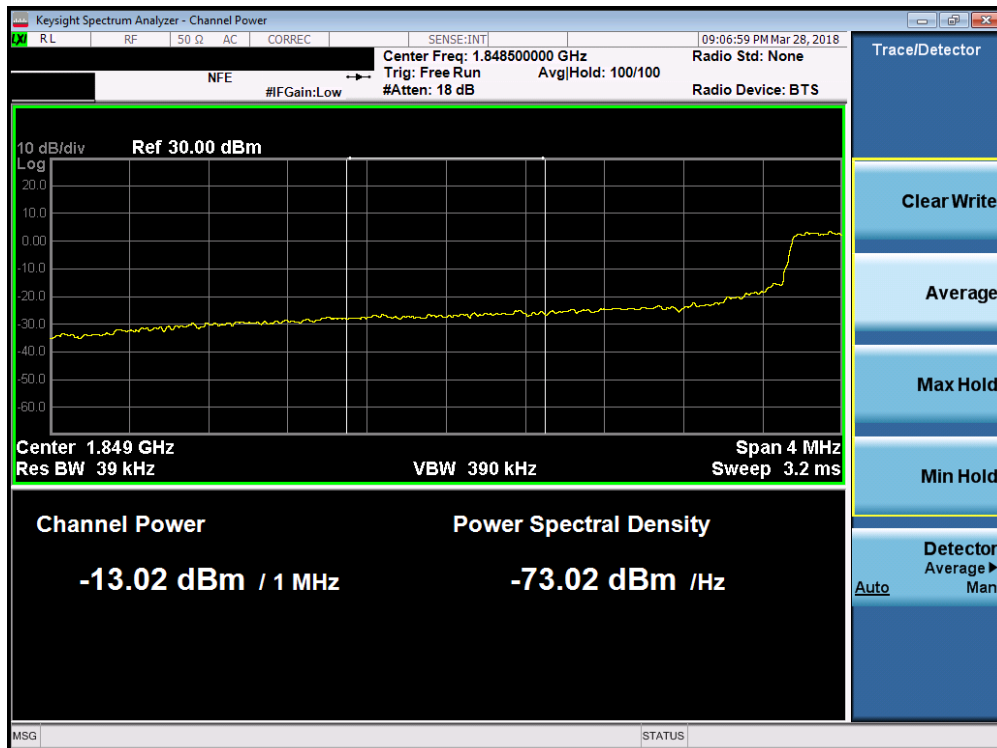


Plot 7-131. Upper Extended Band Edge Plot (Band 2 - 3.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1803280056-03.ZNF	Test Dates: 3/28-5/2/2018	EUT Type: Portable Handset		Page 86 of 136



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

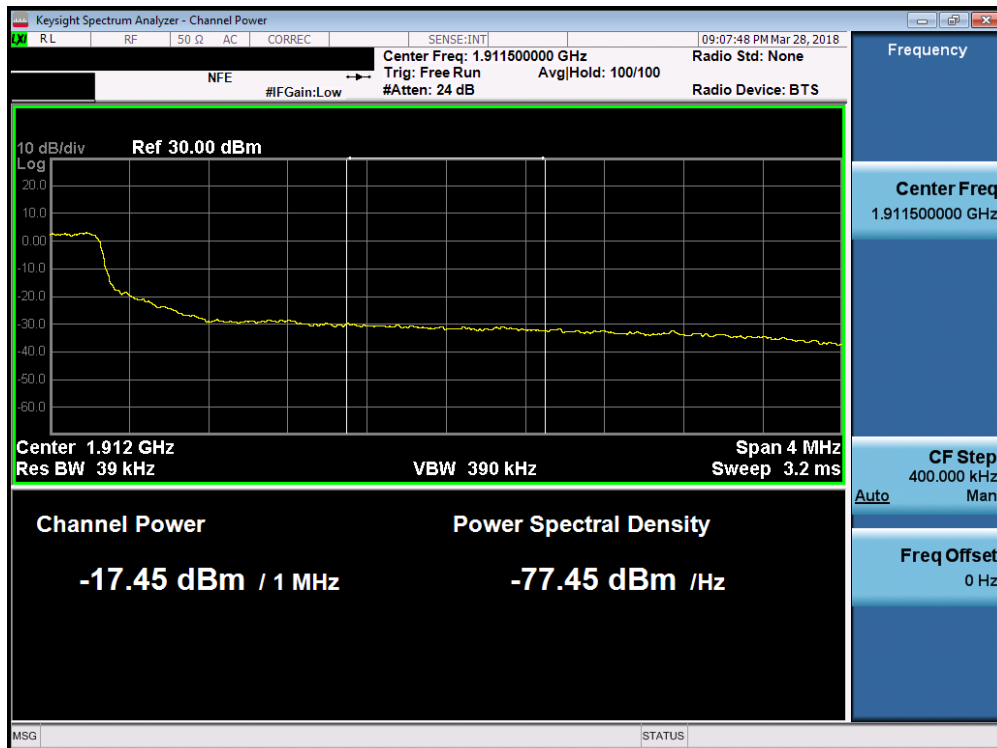


Plot 7-133. Lower Extended Band Edge Plot (Band 2 - 5.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFQ710CS			MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1803280056-03.ZNF	Test Dates: 3/28-5/2/2018	EUT Type: Portable Handset	Page 87 of 136		



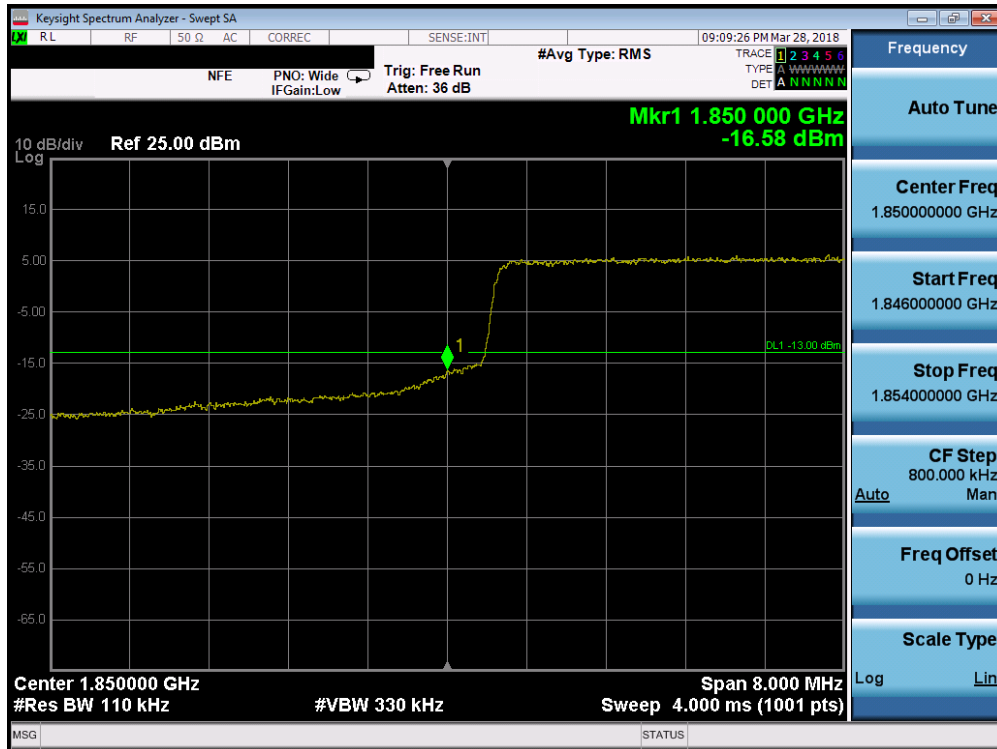
Plot 7-134. Upper Band Edge Plot (Band 2 - 5.0MHz QPSK - Full RB Configuration)



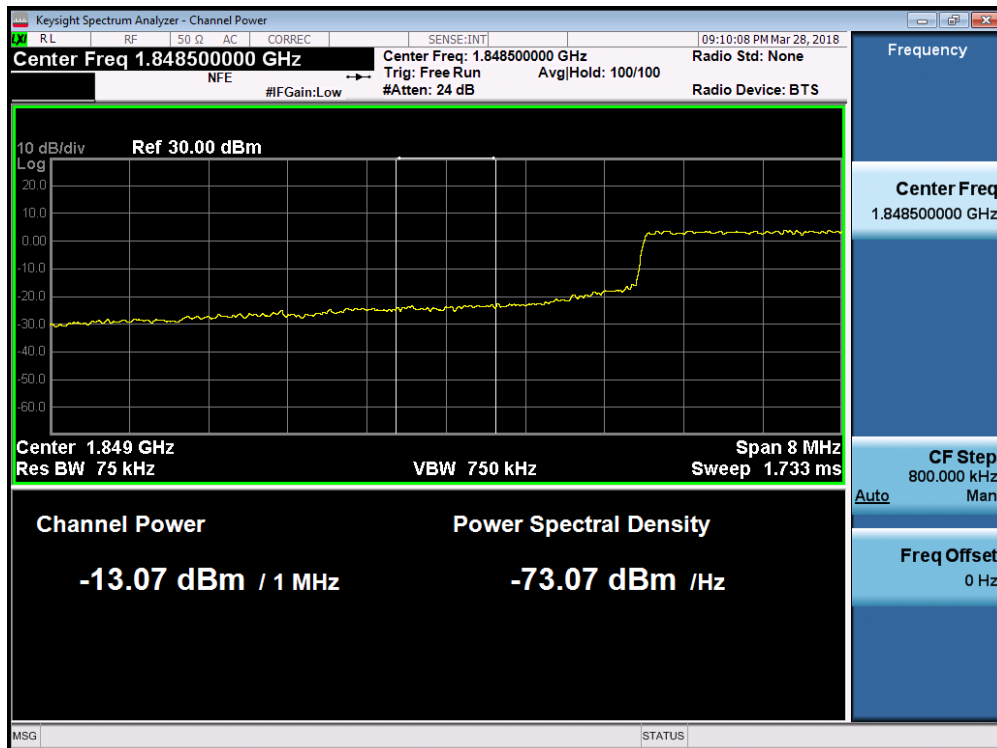
Plot 7-135. Upper Extended Band Edge Plot (Band 2 - 5.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFQ710CS	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1803280056-03.ZNF	Test Dates: 3/28-5/2/2018	EUT Type: Portable Handset		Page 88 of 136





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

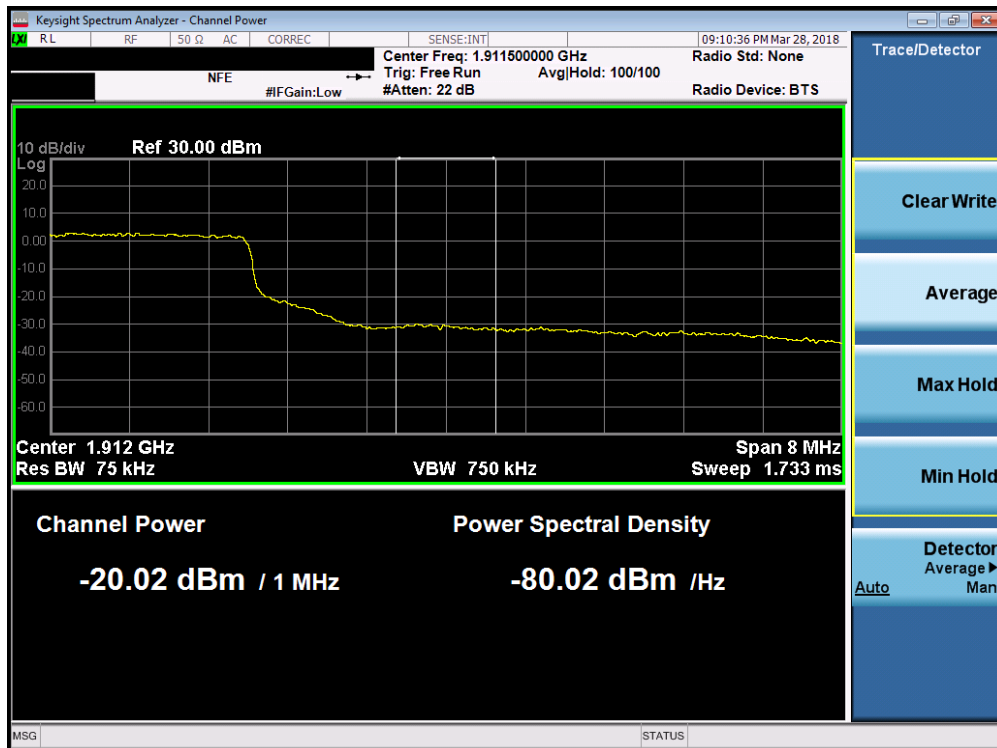


Plot 7-137. Lower Extended Band Edge Plot (Band 2 - 10.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFQ710CS	<b>MEASUREMENT REPORT (CERTIFICATION)</b>			Approved by: Quality Manager
Test Report S/N: 1M1803280056-03.ZNF	Test Dates: 3/28-5/2/2018	EUT Type: Portable Handset		Page 89 of 136

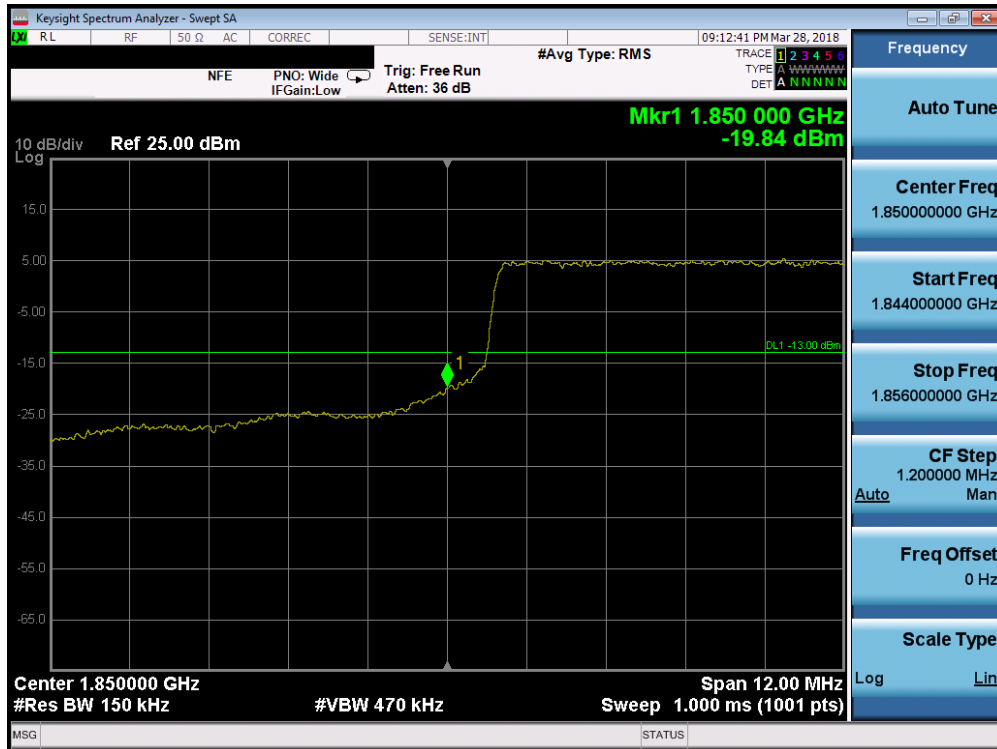


Plot 7-138. Upper Band Edge Plot (Band 2 - 10.0MHz QPSK - Full RB Configuration)

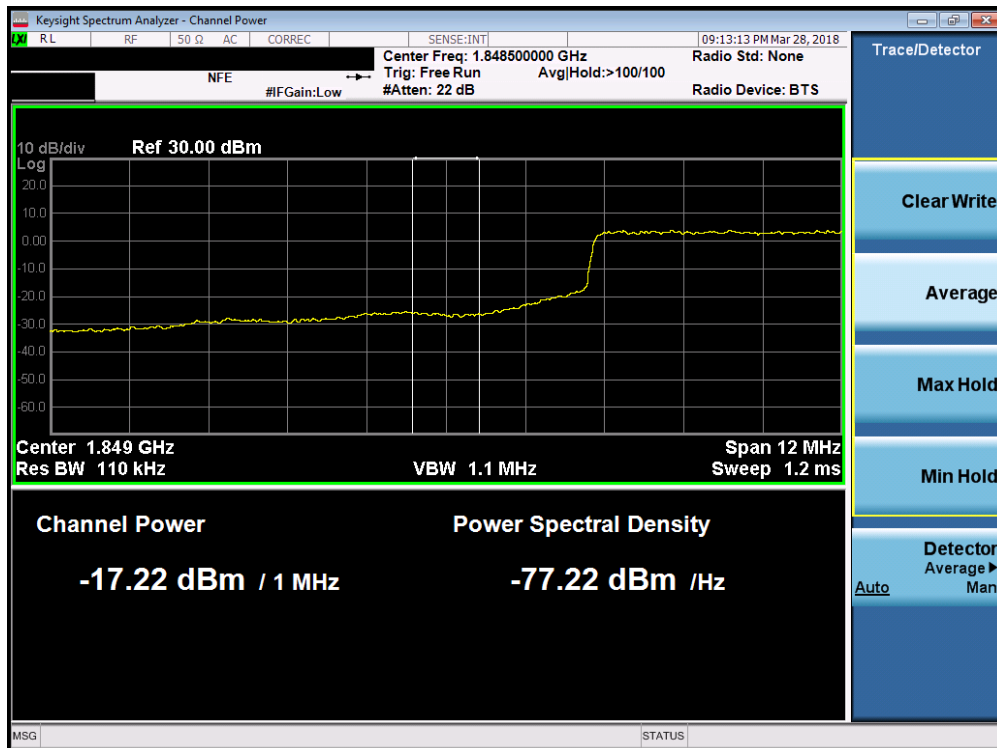


Plot 7-139. Upper Extended Band Edge Plot (Band 2 - 10.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1803280056-03.ZNF	Test Dates: 3/28-5/2/2018	EUT Type: Portable Handset		Page 90 of 136

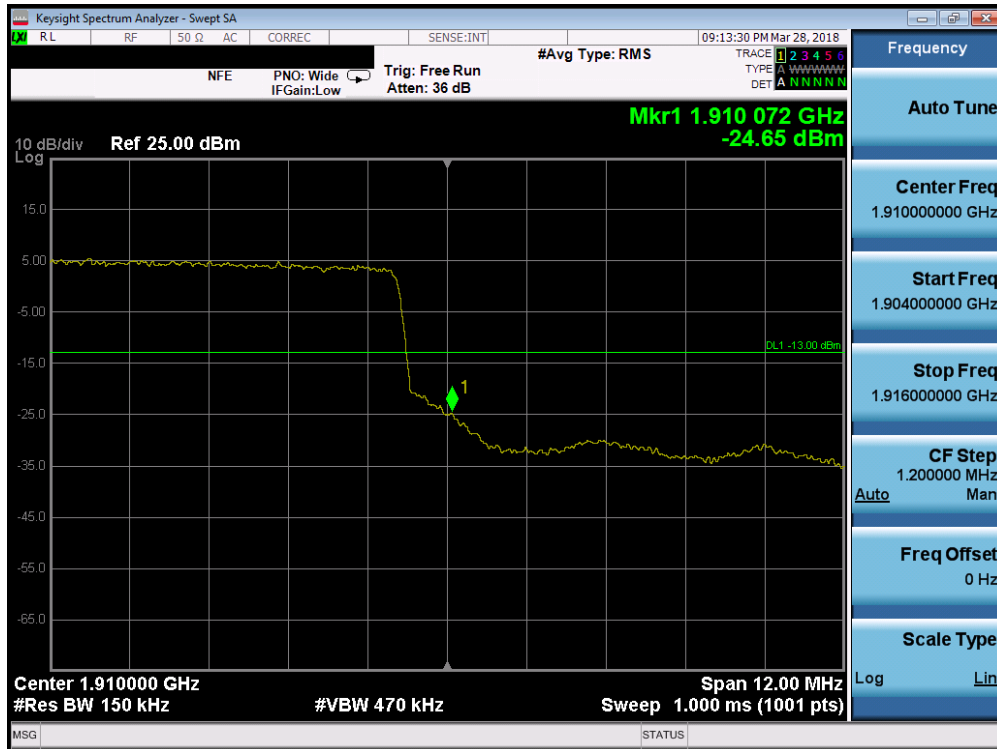


Plot 7-140. Lower Band Edge Plot (Band 2 - 15.0MHz QPSK - Full RB Configuration)

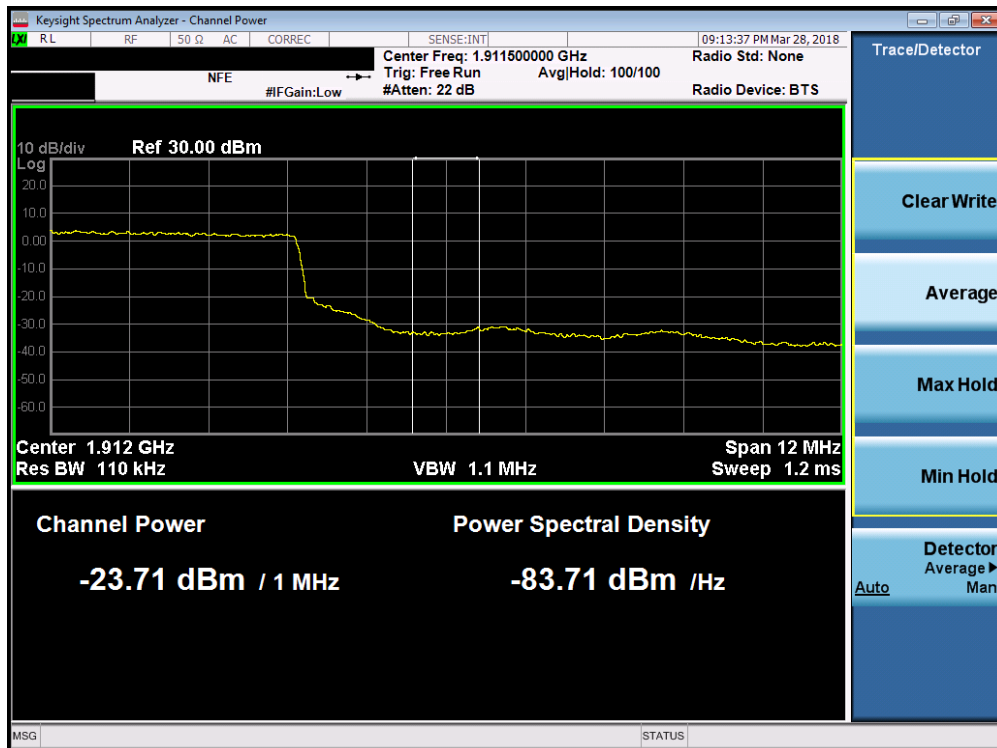


Plot 7-141. Lower Extended Band Edge Plot (Band 2 - 15.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1803280056-03.ZNF	Test Dates: 3/28-5/2/2018	EUT Type: Portable Handset		Page 91 of 136

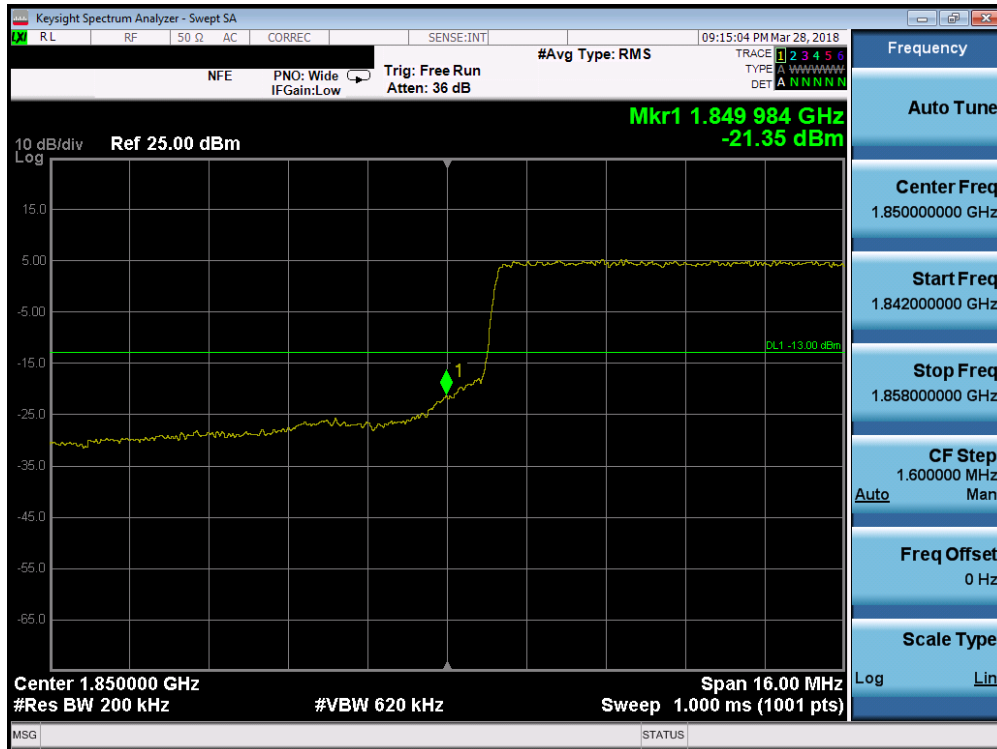


Plot 7-142. Upper Band Edge Plot (Band 2 - 15.0MHz QPSK - Full RB Configuration)

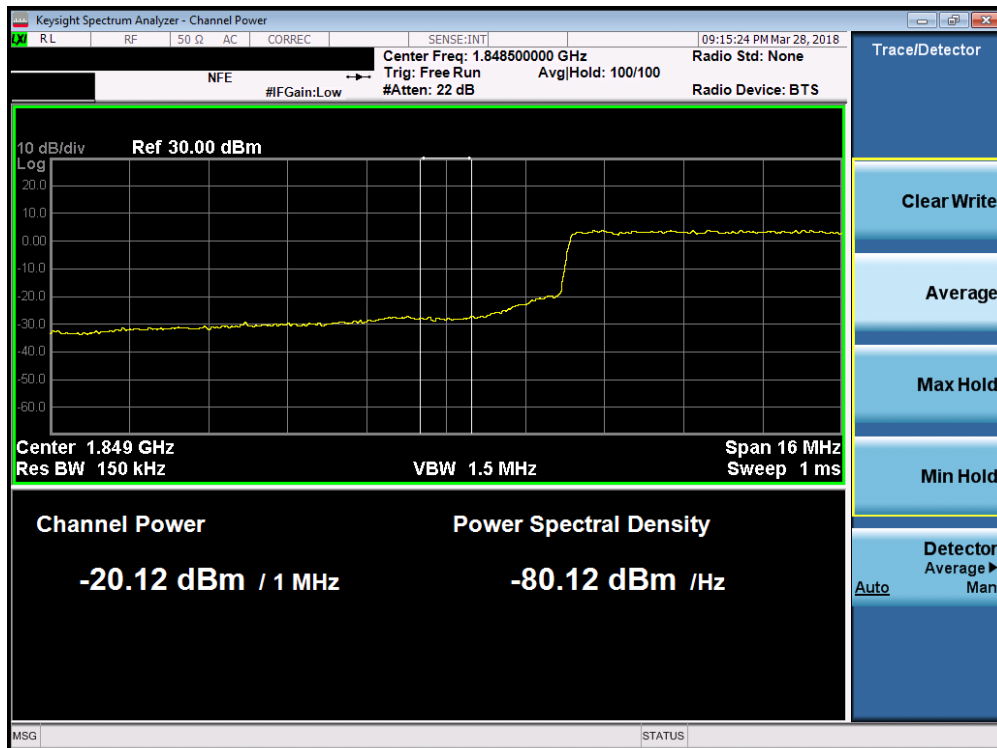


Plot 7-143. Upper Extended Band Edge Plot (Band 2 - 15.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFQ710CS	 <b>MEASUREMENT REPORT (CERTIFICATION)</b>			Approved by: Quality Manager
Test Report S/N: 1M1803280056-03.ZNF	Test Dates: 3/28-5/2/2018	EUT Type: Portable Handset	Page 92 of 136	

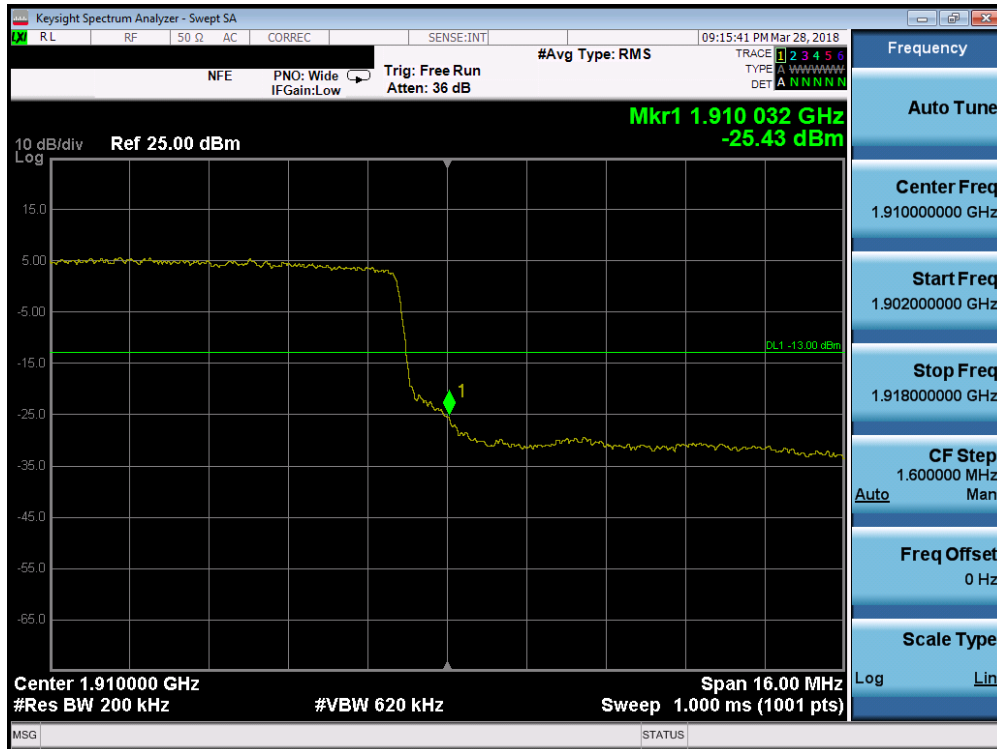


Plot 7-144. Lower Band Edge Plot (Band 2 - 20.0MHz QPSK - Full RB Configuration)

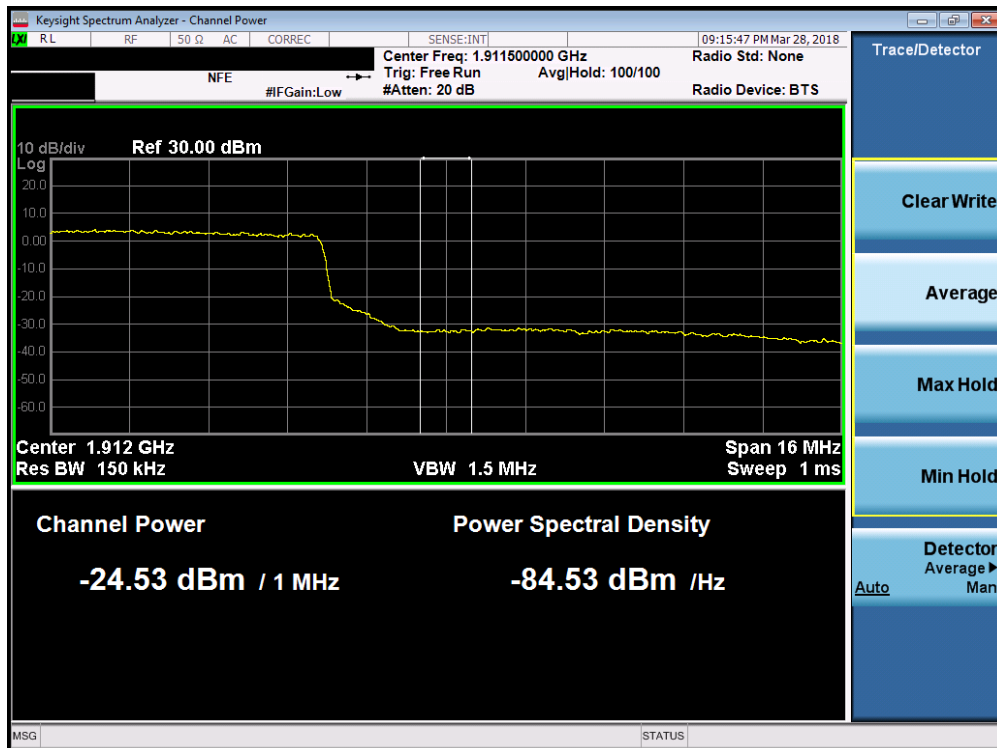


Plot 7-145. Lower Extended Band Edge Plot (Band 2 - 20.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1803280056-03.ZNF	Test Dates: 3/28-5/2/2018	EUT Type: Portable Handset		Page 93 of 136



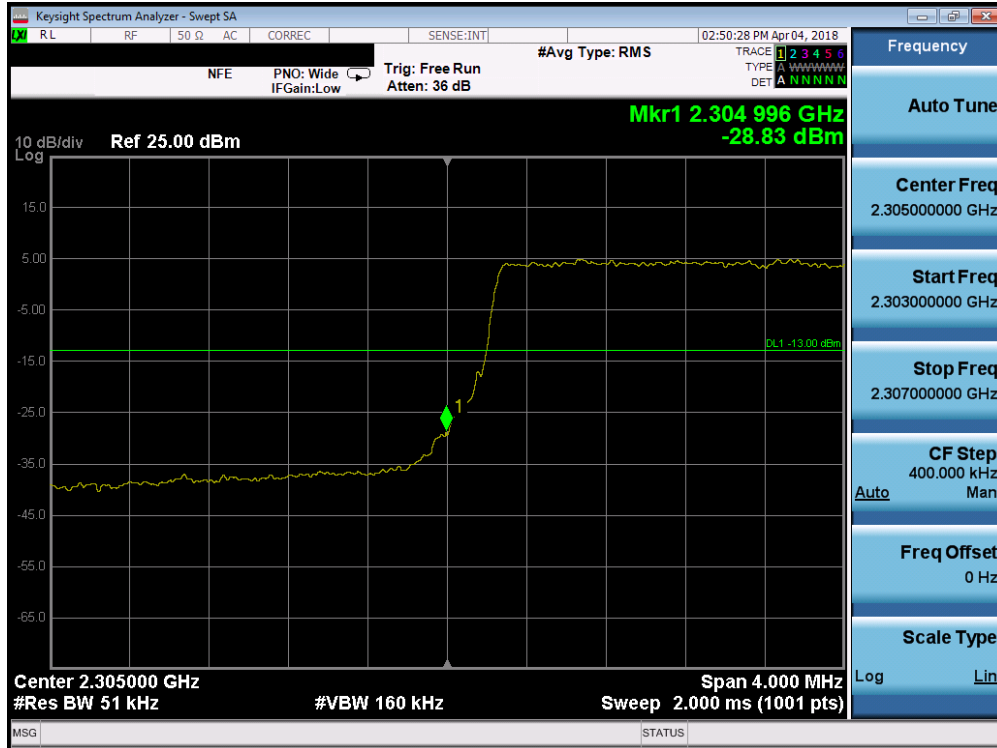
Plot 7-146. Upper Band Edge Plot (Band 2 - 20.0MHz QPSK - Full RB Configuration)



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

FCC ID: ZNFQ710CS	 <b>MEASUREMENT REPORT (CERTIFICATION)</b> 		Approved by: Quality Manager
Test Report S/N: 1M1803280056-03.ZNF	Test Dates: 3/28-5/2/2018	EUT Type: Portable Handset	Page 94 of 136

**Band 30**



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



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

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1803280056-03.ZNF	Test Dates: 3/28-5/2/2018	EUT Type: Portable Handset		Page 95 of 136



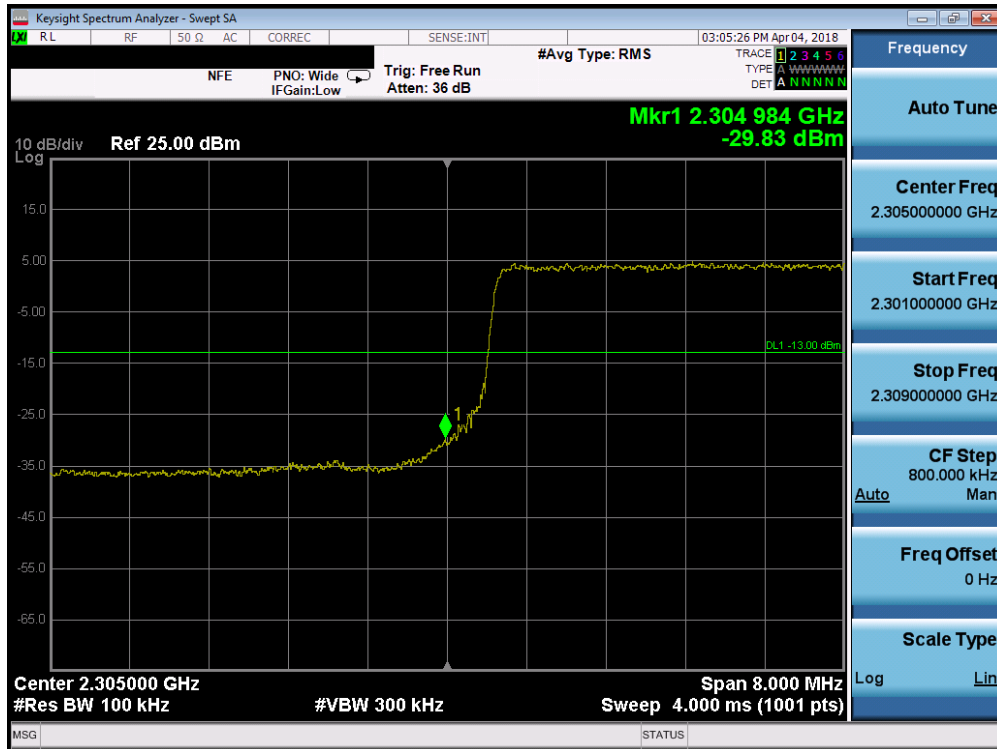
Plot 7-150. Upper Band Edge Plot (Band 30 - 5.0MHz QPSK - Full RB Configuration)



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

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1803280056-03.ZNF	Test Dates: 3/28-5/2/2018	EUT Type: Portable Handset		Page 96 of 136



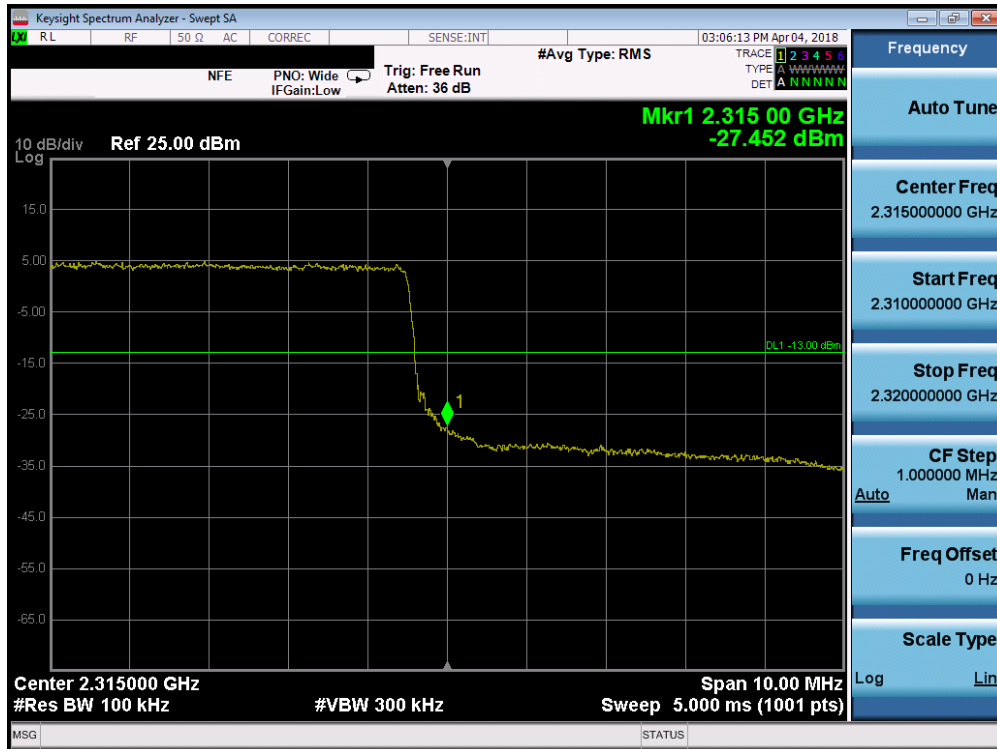


Plot 7-152. Lower Band Edge Plot (Band 30 - 10.0MHz QPSK - Full RB Configuration)



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

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1803280056-03.ZNF	Test Dates: 3/28-5/2/2018	EUT Type: Portable Handset		Page 97 of 136



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



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

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1803280056-03.ZNF	Test Dates: 3/28-5/2/2018	EUT Type: Portable Handset		Page 98 of 136

## 7.5 Peak-Average Ratio

### Test Overview

A peak to average ratio measurement is performed at the conducted port of the EUT. The spectrum analyzers Complementary Cumulative Distribution Function (CCDF) measurement profile is used to determine the largest deviation between the average and the peak power of the EUT in a given bandwidth. The CCDF curve shows how much time the peak waveform spends at or above a given average power level. The percent of time the signal spends at or above the level defines the probability for that particular power level.

### Test Procedure Used

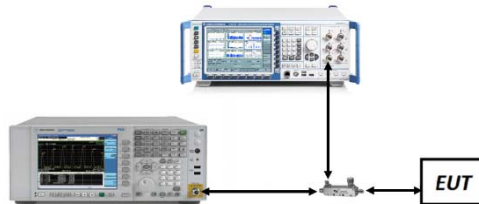
KDB 971168 D01 v03r01 – Section 5.7.1

### Test Settings

1. The signal analyzer’s CCDF measurement profile is enabled
2. Frequency = carrier center frequency
3. Measurement BW > 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.



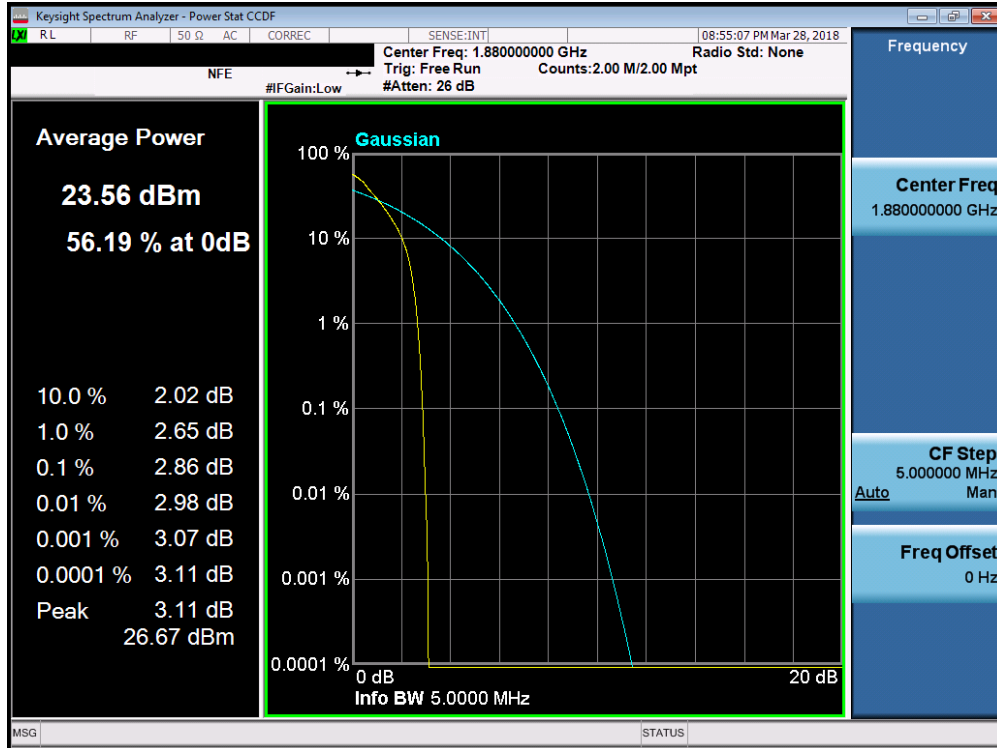
**Figure 7-4. Test Instrument & Measurement Setup**

### Test Notes

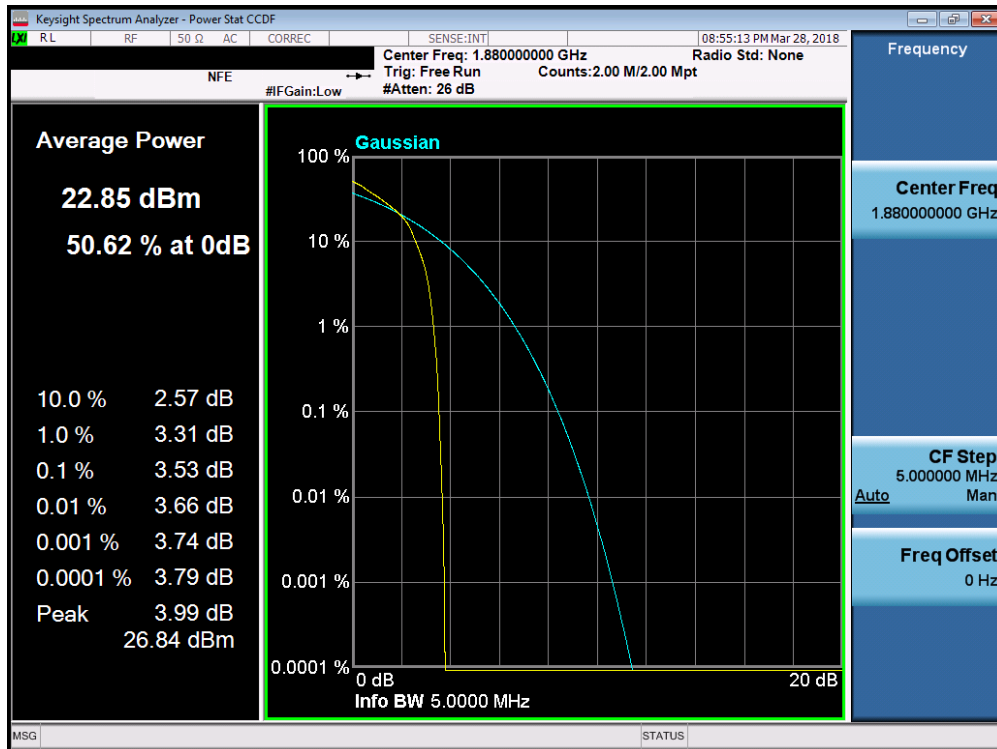
None.

FCC ID: ZNFQ710CS	 <b>MEASUREMENT REPORT (CERTIFICATION)</b> 		<b>Approved by:</b> Quality Manager
<b>Test Report S/N:</b> 1M1803280056-03.ZNF	<b>Test Dates:</b> 3/28-5/2/2018	<b>EUT Type:</b> Portable Handset	Page 99 of 136

## Band 2

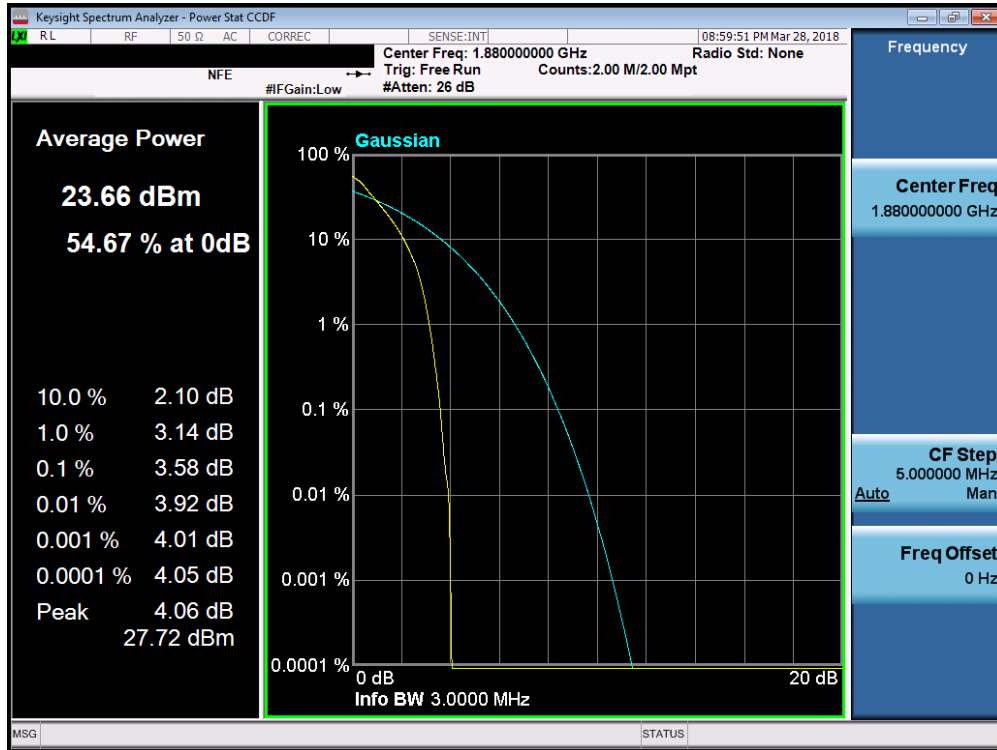


Plot 7-156. PAR Plot (Band 2 - 1.4MHz QPSK - Full RB Configuration)

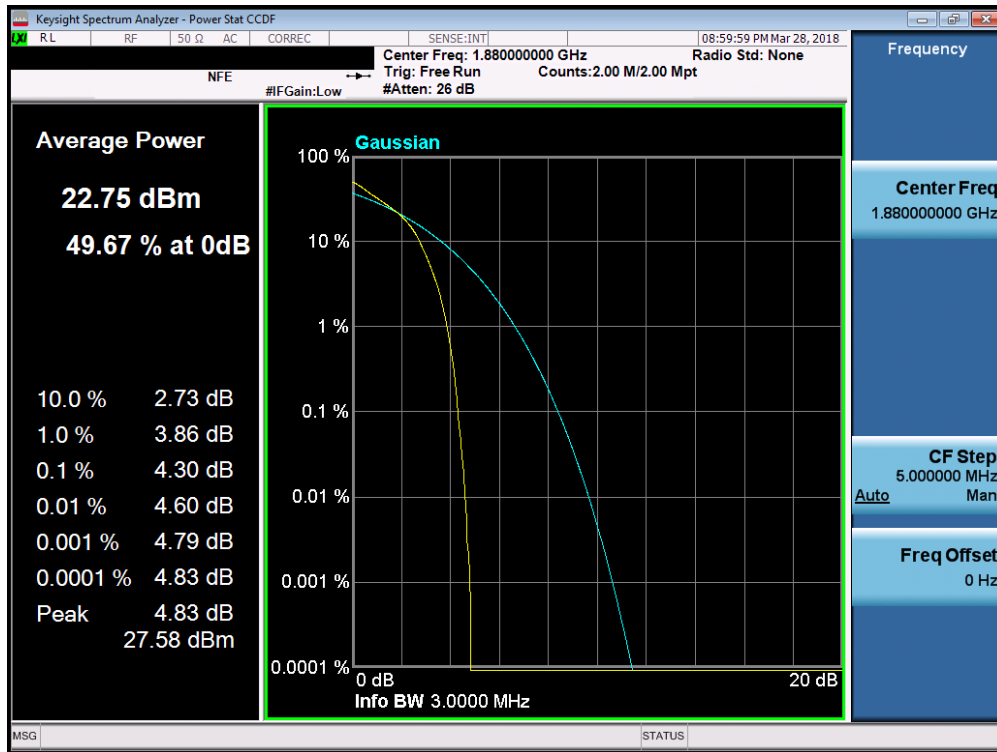


Plot 7-157. PAR Plot (Band 2 - 1.4MHz 16-QAM - Full RB Configuration)

FCC ID: ZNFQ710CS	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1803280056-03.ZNF	Test Dates: 3/28-5/2/2018	EUT Type: Portable Handset		Page 100 of 136

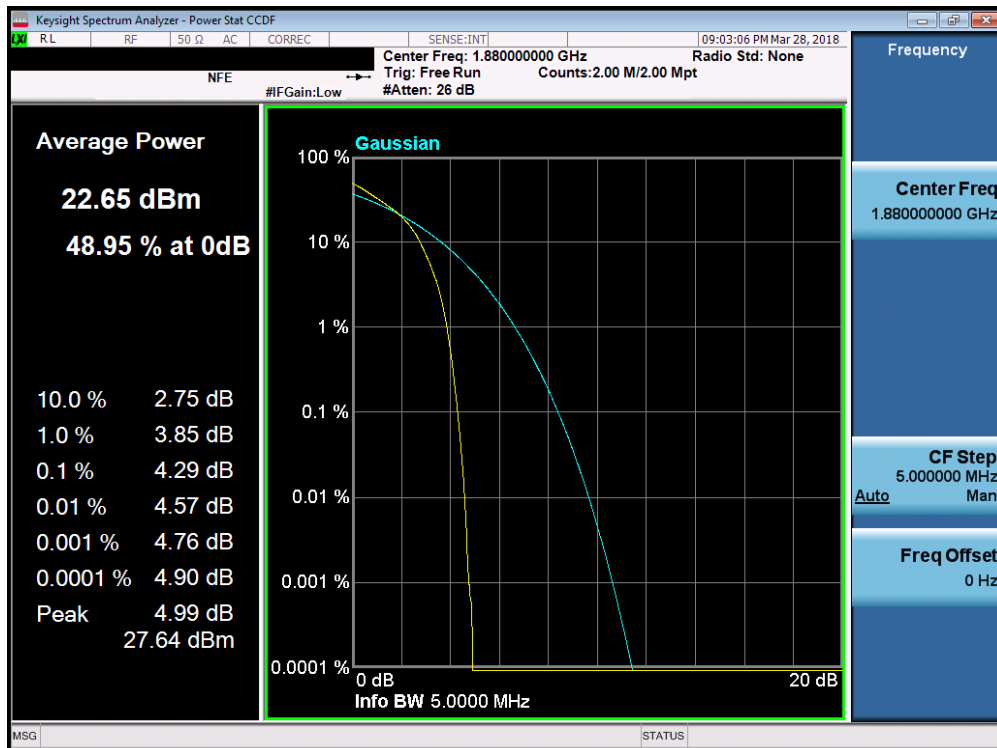
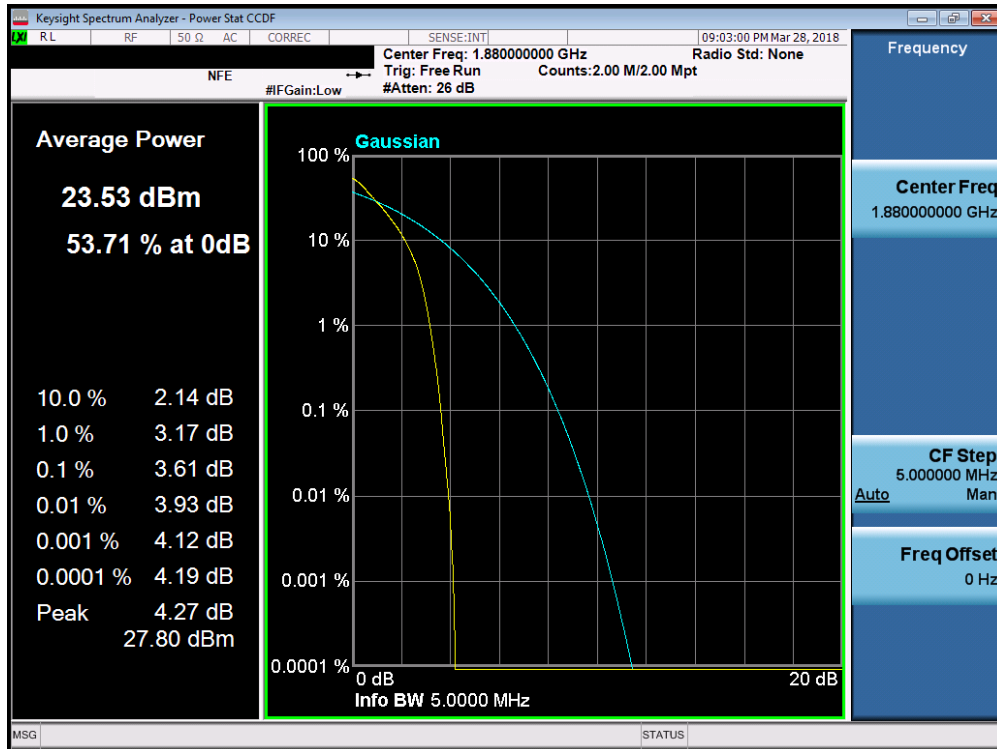


Plot 7-158. PAR Plot (Band 2 - 3.0MHz QPSK - Full RB Configuration)

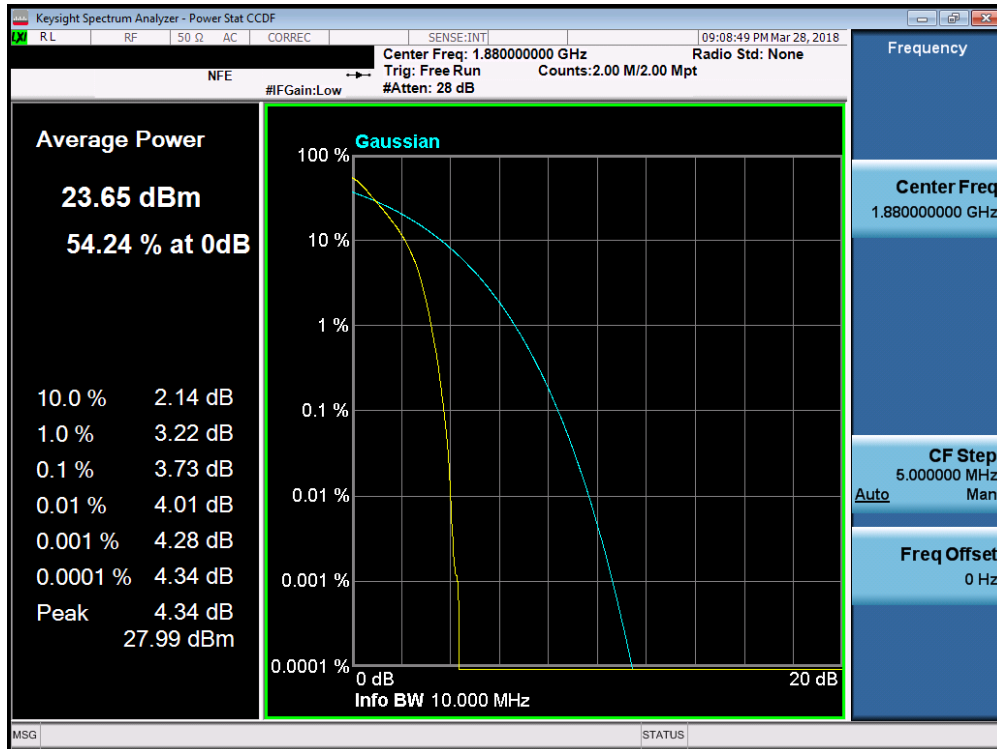


Plot 7-159. PAR Plot (Band 2 - 3.0MHz 16-QAM - Full RB Configuration)

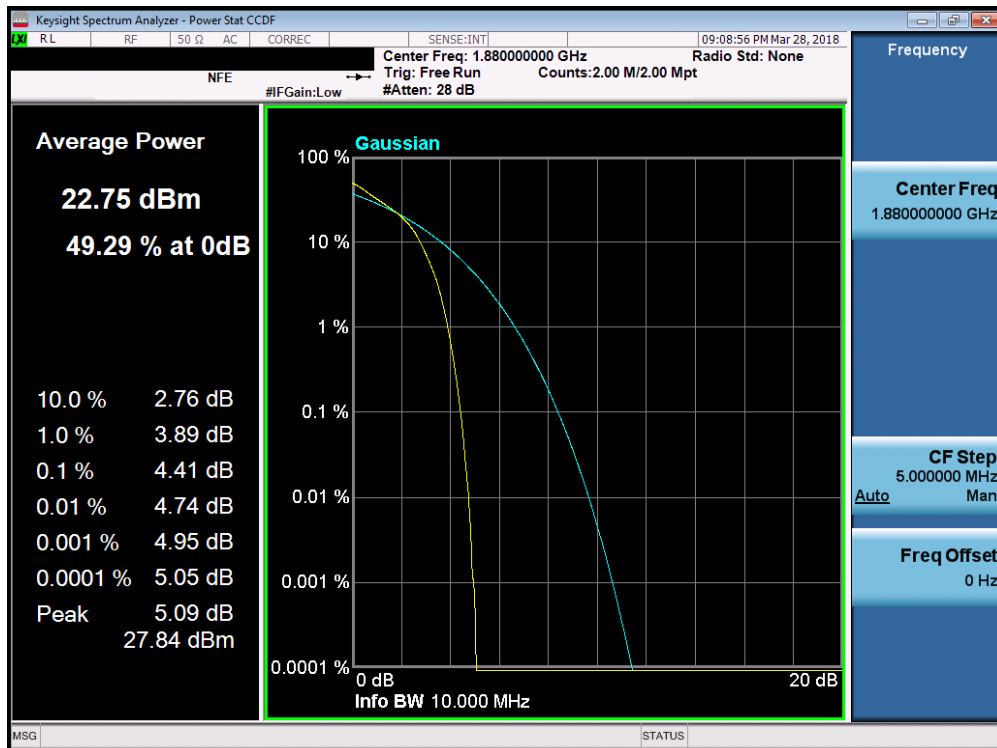
FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1803280056-03.ZNF	Test Dates: 3/28-5/2/2018	EUT Type: Portable Handset		Page 101 of 136



FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1803280056-03.ZNF	Test Dates: 3/28-5/2/2018	EUT Type: Portable Handset		Page 102 of 136

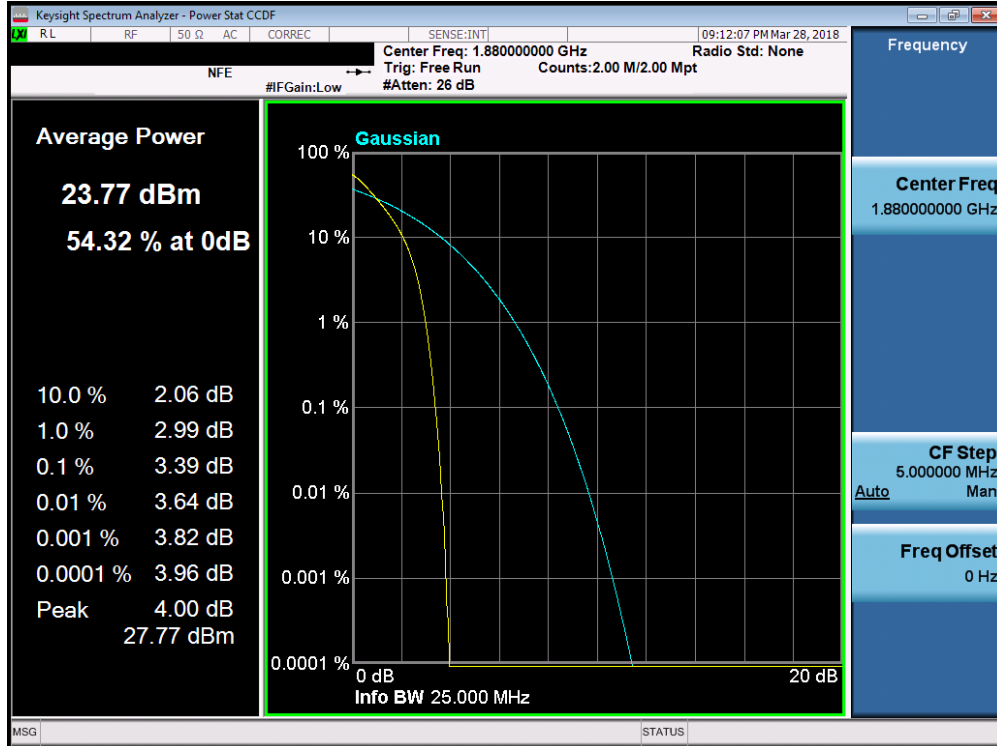


Plot 7-162. PAR Plot (Band 2 - 10.0MHz QPSK - Full RB Configuration)

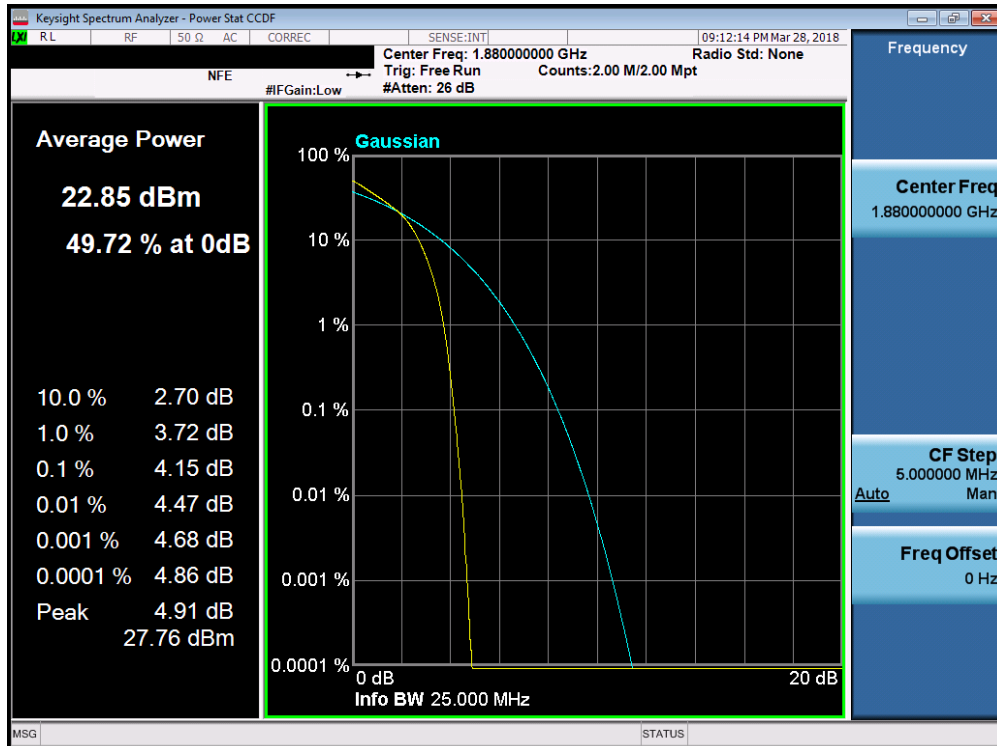


Plot 7-163. PAR Plot (Band 2 - 10.0MHz 16-QAM - Full RB Configuration)

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1803280056-03.ZNF	Test Dates: 3/28-5/2/2018	EUT Type: Portable Handset		Page 103 of 136



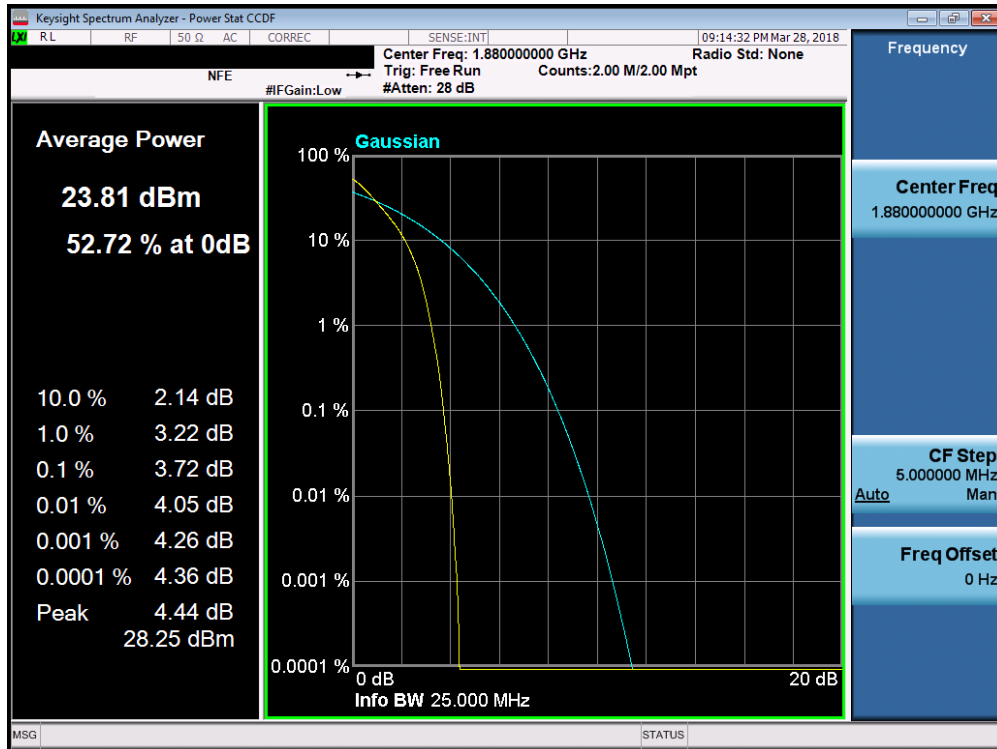
Plot 7-164. PAR Plot (Band 2 - 15.0MHz QPSK - Full RB Configuration)



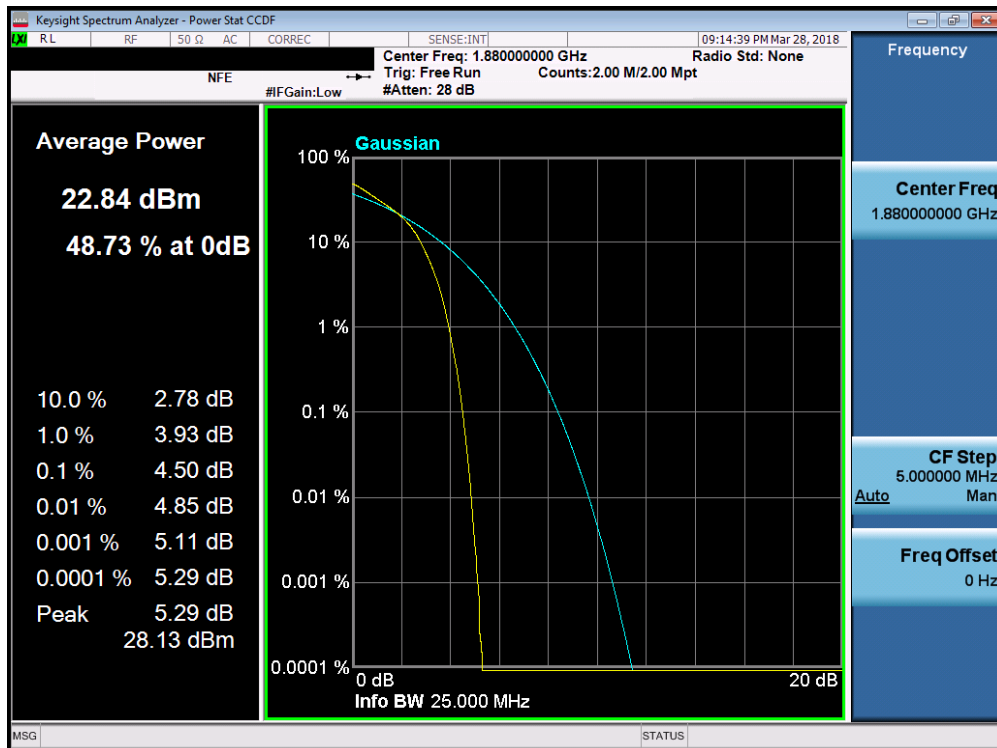
Plot 7-165. PAR Plot (Band 2 - 15.0MHz 16-QAM - Full RB Configuration)

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1803280056-03.ZNF	Test Dates: 3/28-5/2/2018	EUT Type: Portable Handset		Page 104 of 136





Plot 7-166. PAR Plot (Band 2 - 20.0MHz QPSK - Full RB Configuration)



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

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1803280056-03.ZNF	Test Dates: 3/28-5/2/2018	EUT Type: Portable Handset		Page 105 of 136

## 7.6 Radiated Power (ERP/EIRP)

### Test Overview

Effective Radiated Power (ERP) and Equivalent Isotropic Radiated Power (EIRP) measurements are performed using the substitution method described in ANSI/TIA-603-E-2016 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using vertically and horizontally polarized tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically and horizontally polarized broadband horn antennas. All measurements are performed as RMS average measurements while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

### Test Procedures Used

KDB 971168 D01 v03r01 – Section 5.2.1

ANSI/TIA-603-E-2016 – Section 2.2.17

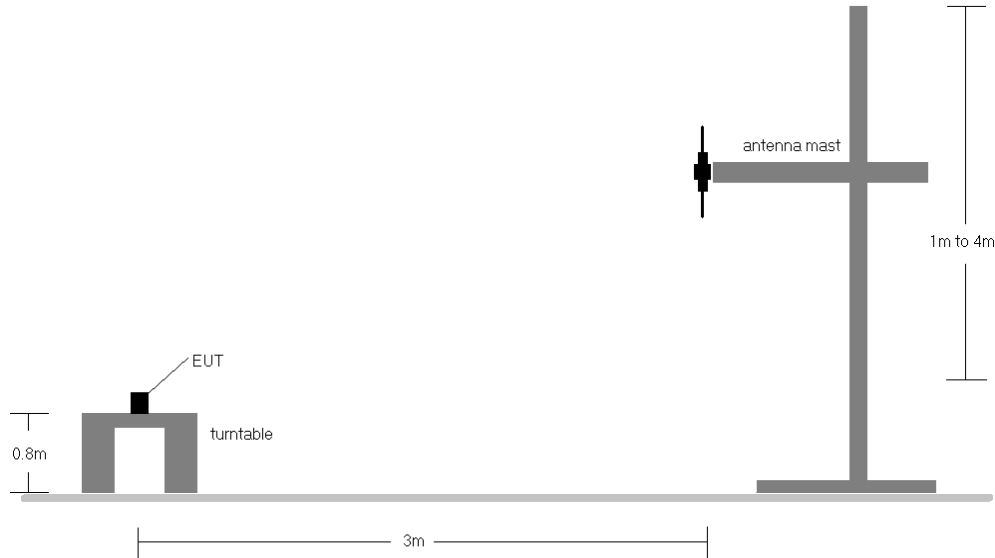
### Test Settings

1. Radiated power measurements are performed using the signal analyzer’s “channel power” measurement capability for signals with continuous operation.
2. RBW = 1 – 5% of the expected OBW, not to exceed 1MHz
3. VBW  $\geq$  3 x RBW
4. Span = 1.5 times the OBW
5. No. of sweep points  $\geq$  2 x span / RBW
6. Detector = RMS
7. Trigger is set to “free run” for signals with continuous operation with the sweep times set to “auto”.
8. The integration bandwidth was roughly set equal to the measured OBW of the signal for signals with continuous operation.
9. Trace mode = trace averaging (RMS) over 100 sweeps
10. The trace was allowed to stabilize

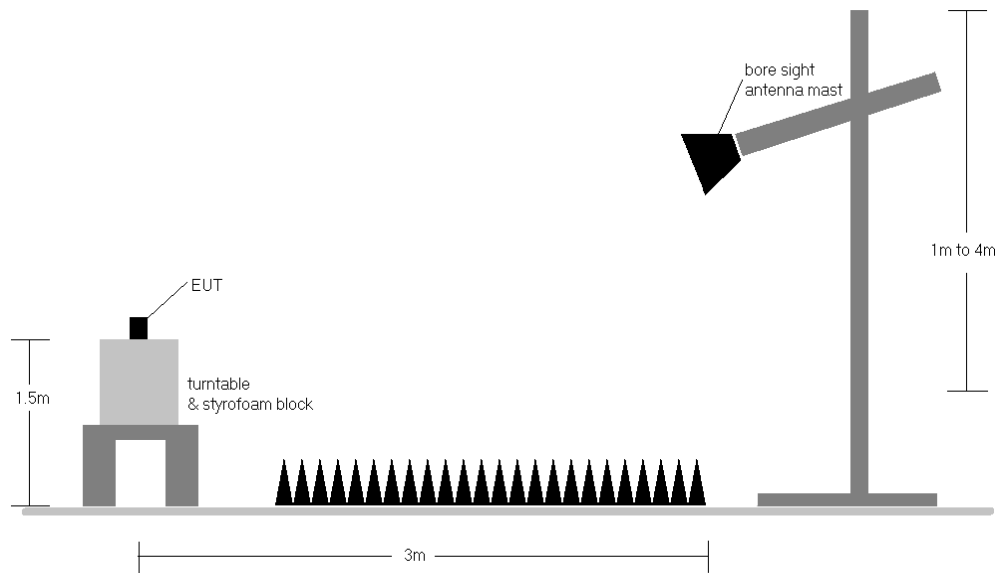
FCC ID: ZNFQ710CS	 <b>MEASUREMENT REPORT (CERTIFICATION)</b> 		<b>Approved by:</b> Quality Manager
<b>Test Report S/N:</b> 1M1803280056-03.ZNF	<b>Test Dates:</b> 3/28-5/2/2018	<b>EUT Type:</b> Portable Handset	Page 106 of 136

**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: ZNFQ710CS	<b>MEASUREMENT REPORT (CERTIFICATION)</b>		Approved by: Quality Manager
Test Report S/N: 1M1803280056-03.ZNF	Test Dates: 3/28-5/2/2018	EUT Type: Portable Handset	Page 107 of 136

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
699.70	1.4	QPSK	H	150	346	1 / 0	17.97	1.10	16.92	0.049	34.77	-17.85
707.50	1.4	QPSK	H	150	346	1 / 0	18.04	1.13	17.02	0.050	34.77	-17.75
715.30	1.4	QPSK	H	150	346	1 / 0	18.94	1.16	<b>17.95</b>	0.062	34.77	-16.82
699.70	1.4	16-QAM	H	150	346	1 / 0	16.91	1.10	15.86	0.039	34.77	-18.91
707.50	1.4	16-QAM	H	150	346	1 / 0	17.44	1.13	16.42	0.044	34.77	-18.35
715.30	1.4	16-QAM	H	150	346	1 / 0	17.95	1.16	<b>16.96</b>	0.050	34.77	-17.81
700.50	3	QPSK	H	150	344	1 / 0	17.73	1.10	16.68	0.047	34.77	-18.09
707.50	3	QPSK	H	150	344	1 / 0	18.06	1.13	17.04	0.051	34.77	-17.73
714.50	3	QPSK	H	150	344	1 / 0	19.00	1.16	<b>18.01</b>	<b>0.063</b>	34.77	-16.76
700.50	3	16-QAM	H	150	344	1 / 0	16.86	1.10	15.81	0.038	34.77	-18.96
707.50	3	16-QAM	H	150	344	1 / 0	17.45	1.13	16.43	0.044	34.77	-18.34
714.50	3	16-QAM	H	150	344	1 / 0	17.95	1.16	<b>16.96</b>	0.050	34.77	-17.81
701.50	5	QPSK	H	150	346	1 / 0	17.97	1.11	16.93	0.049	34.77	-17.85
707.50	5	QPSK	H	150	346	1 / 0	18.20	1.13	17.18	0.052	34.77	-17.59
713.50	5	QPSK	H	150	346	1 / 0	18.61	1.15	<b>17.61</b>	0.058	34.77	-17.16
701.50	5	16-QAM	H	150	346	1 / 0	16.69	1.11	15.65	0.037	34.77	-19.13
707.50	5	16-QAM	H	150	346	1 / 0	17.12	1.13	16.10	0.041	34.77	-18.67
713.50	5	16-QAM	H	150	346	1 / 0	17.74	1.15	<b>16.74</b>	0.047	34.77	-18.03
704.00	10	QPSK	H	150	328	1 / 49	17.88	1.12	16.85	0.048	34.77	-17.92
707.50	10	QPSK	H	150	328	1 / 49	18.07	1.13	<b>17.05</b>	0.051	34.77	-17.72
711.00	10	QPSK	H	150	328	1 / 49	17.96	1.14	16.95	0.050	34.77	-17.82
704.00	10	16-QAM	H	150	328	1 / 49	17.00	1.12	15.97	0.040	34.77	-18.80
707.50	10	16-QAM	H	150	328	1 / 49	17.14	1.13	<b>16.12</b>	0.041	34.77	-18.65
711.00	10	16-QAM	H	150	328	1 / 49	16.99	1.14	15.98	0.040	34.77	-18.79
714.50	3	QPSK	V	150	174	1 / 74	18.10	1.16	17.11	0.051	34.77	-17.66

Table 7-3. ERP Data (Band 12)

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1803280056-03.ZNF	Test Dates: 3/28-5/2/2018	EUT Type: Portable Handset	Page 108 of 136	

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
824.70	1.4	QPSK	H	150	90	1 / 0	21.38	1.50	<b>20.73</b>	0.118	38.45	-17.72
836.50	1.4	QPSK	H	150	96	1 / 0	21.10	1.50	20.45	0.111	38.45	-18.00
848.30	1.4	QPSK	H	150	88	1 / 0	20.77	1.50	20.12	0.103	38.45	-18.33
824.70	1.4	16-QAM	H	150	90	1 / 0	21.51	1.50	<b>20.86</b>	0.122	38.45	-17.59
836.50	1.4	16-QAM	H	150	96	1 / 0	19.99	1.50	19.34	0.086	38.45	-19.11
848.30	1.4	16-QAM	H	150	88	1 / 0	19.74	1.50	19.09	0.081	38.45	-19.36
825.50	3	QPSK	H	150	98	1 / 0	21.33	1.50	<b>20.68</b>	0.117	38.45	-17.77
836.50	3	QPSK	H	150	90	1 / 0	21.05	1.50	20.40	0.110	38.45	-18.05
847.50	3	QPSK	H	150	99	1 / 0	20.79	1.50	20.14	0.103	38.45	-18.31
825.50	3	16-QAM	H	150	98	1 / 0	20.20	1.50	<b>19.55</b>	0.090	38.45	-18.90
836.50	3	16-QAM	H	150	90	1 / 0	20.01	1.50	19.36	0.086	38.45	-19.09
847.50	3	16-QAM	H	150	99	1 / 0	19.82	1.50	19.17	0.083	38.45	-19.28
826.50	5	QPSK	H	150	82	1 / 0	21.26	1.50	<b>20.61</b>	0.115	38.45	-17.84
836.50	5	QPSK	H	150	84	1 / 0	21.20	1.50	20.55	0.114	38.45	-17.90
846.50	5	QPSK	H	150	84	1 / 0	20.81	1.50	20.16	0.104	38.45	-18.29
826.50	5	16-QAM	H	150	82	1 / 0	20.35	1.50	<b>19.70</b>	0.093	38.45	-18.75
836.50	5	16-QAM	H	150	84	1 / 0	20.30	1.50	19.65	0.092	38.45	-18.80
846.50	5	16-QAM	H	150	84	1 / 0	20.19	1.50	19.54	0.090	38.45	-18.91
829.00	10	QPSK	H	150	104	1 / 0	21.60	1.50	<b>20.95</b>	<b>0.124</b>	38.45	-17.50
836.50	10	QPSK	H	150	92	1 / 0	21.49	1.50	20.84	0.121	38.45	-17.61
844.00	10	QPSK	H	150	102	1 / 0	20.88	1.50	20.23	0.105	38.45	-18.22
829.00	10	16-QAM	H	150	104	1 / 0	20.78	1.50	<b>20.13</b>	0.103	38.45	-18.32
836.50	10	16-QAM	H	150	92	1 / 0	20.61	1.50	19.96	0.099	38.45	-18.49
844.00	10	16-QAM	H	150	102	1 / 0	20.30	1.50	19.65	0.092	38.45	-18.80
829.00	10	QPSK	V	150	3	1 / 0	18.66	1.50	18.01	0.063	38.45	-20.44

Table 7-4. ERP Data (Band 5)

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1803280056-03.ZNF	Test Dates: 3/28-5/2/2018	EUT Type: Portable Handset	Page 109 of 136	

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	338	1 / 0	18.08	5.56	<b>23.64</b>	0.231	30.00	-6.36
1732.50	1.4	QPSK	H	150	340	1 / 0	17.83	5.41	23.24	0.211	30.00	-6.76
1754.30	1.4	QPSK	H	150	346	1 / 0	17.49	5.26	22.75	0.188	30.00	-7.25
1710.70	1.4	16-QAM	H	150	338	1 / 0	16.64	5.56	22.20	0.166	30.00	-7.80
1732.50	1.4	16-QAM	H	150	340	1 / 0	17.05	5.41	<b>22.46</b>	0.176	30.00	-7.54
1754.30	1.4	16-QAM	H	150	346	1 / 0	16.77	5.26	22.03	0.160	30.00	-7.97
1711.50	3	QPSK	H	150	339	1 / 0	18.27	5.55	<b>23.82</b>	0.241	30.00	-6.18
1732.50	3	QPSK	H	150	345	1 / 0	17.64	5.41	23.05	0.202	30.00	-6.95
1753.50	3	QPSK	H	150	341	1 / 0	17.69	5.26	22.95	0.197	30.00	-7.05
1711.50	3	16-QAM	H	150	339	1 / 0	17.48	5.55	<b>23.03</b>	0.201	30.00	-6.97
1732.50	3	16-QAM	H	150	345	1 / 0	16.71	5.41	22.12	0.163	30.00	-7.88
1753.50	3	16-QAM	H	150	341	1 / 0	16.81	5.26	22.07	0.161	30.00	-7.93
1712.50	5	QPSK	H	150	341	1 / 0	18.18	5.55	<b>23.73</b>	0.236	30.00	-6.27
1732.50	5	QPSK	H	150	346	1 / 0	17.73	5.41	23.14	0.206	30.00	-6.86
1752.50	5	QPSK	H	150	335	1 / 0	17.44	5.27	22.71	0.187	30.00	-7.29
1712.50	5	16-QAM	H	150	341	1 / 0	16.87	5.55	<b>22.42</b>	0.174	30.00	-7.58
1732.50	5	16-QAM	H	150	346	1 / 0	16.85	5.41	22.26	0.168	30.00	-7.74
1752.50	5	16-QAM	H	150	335	1 / 0	16.78	5.27	22.05	0.160	30.00	-7.95
1715.00	10	QPSK	H	150	337	1 / 49	18.52	5.53	<b>24.05</b>	<b>0.254</b>	30.00	-5.95
1732.50	10	QPSK	H	150	336	1 / 49	18.24	5.41	23.65	0.232	30.00	-6.35
1750.00	10	QPSK	H	150	342	1 / 49	17.93	5.29	23.22	0.210	30.00	-6.78
1715.00	10	16-QAM	H	150	337	1 / 49	17.66	5.53	<b>23.19</b>	0.208	30.00	-6.81
1732.50	10	16-QAM	H	150	336	1 / 49	17.34	5.41	22.75	0.188	30.00	-7.25
1750.00	10	16-QAM	H	150	342	1 / 49	16.81	5.29	22.10	0.162	30.00	-7.90
1717.50	15	QPSK	H	150	342	1 / 0	18.03	5.51	<b>23.54</b>	0.226	30.00	-6.46
1732.50	15	QPSK	H	150	340	1 / 0	17.97	5.41	23.38	0.218	30.00	-6.62
1747.50	15	QPSK	H	150	355	1 / 0	17.18	5.31	22.49	0.177	30.00	-7.51
1717.50	15	16-QAM	H	150	342	1 / 0	16.79	5.51	22.30	0.170	30.00	-7.70
1732.50	15	16-QAM	H	150	340	1 / 0	17.05	5.41	<b>22.46</b>	0.176	30.00	-7.54
1747.50	15	16-QAM	H	150	355	1 / 0	16.48	5.31	21.79	0.151	30.00	-8.21
1720.00	20	QPSK	H	150	345	1 / 0	17.69	5.49	23.18	0.208	30.00	-6.82
1732.50	20	QPSK	H	150	343	1 / 0	18.04	5.41	<b>23.45</b>	0.221	30.00	-6.55
1745.00	20	QPSK	H	150	341	1 / 0	17.65	5.32	22.97	0.198	30.00	-7.03
1720.00	20	16-QAM	H	150	345	1 / 0	16.62	5.49	22.11	0.163	30.00	-7.89
1732.50	20	16-QAM	H	150	343	1 / 0	16.90	5.41	<b>22.31</b>	0.170	30.00	-7.69
1745.00	20	16-QAM	H	150	341	1 / 0	16.33	5.32	21.65	0.146	30.00	-8.35
1715.00	10	QPSK	V	150	298	1 / 99	14.86	5.60	20.46	0.111	30.00	-9.54

**Table 7-5. EIRP Data (Band 4)**

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1803280056-03.ZNF	Test Dates: 3/28-5/2/2018	EUT Type: Portable Handset		Page 110 of 136

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	306	1 / 5	18.96	4.79	23.75	0.237	33.01	-9.26
1880.00	1.4	QPSK	V	150	304	1 / 5	19.18	4.84	24.02	0.253	33.01	-8.99
1909.30	1.4	QPSK	V	150	304	1 / 5	19.63	4.86	<b>24.49</b>	0.281	33.01	-8.52
1850.70	1.4	16-QAM	V	150	306	1 / 5	18.08	4.79	22.87	0.193	33.01	-10.14
1880.00	1.4	16-QAM	V	150	304	1 / 5	18.47	4.84	23.31	0.215	33.01	-9.70
1909.30	1.4	16-QAM	V	150	304	1 / 5	18.86	4.86	<b>23.72</b>	0.236	33.01	-9.29
1851.50	3	QPSK	V	150	304	1 / 0	19.06	4.79	23.85	0.243	33.01	-9.16
1880.00	3	QPSK	V	150	302	1 / 0	19.21	4.84	24.05	0.254	33.01	-8.96
1908.50	3	QPSK	V	150	305	1 / 0	19.96	4.86	<b>24.82</b>	0.304	33.01	-8.19
1851.50	3	16-QAM	V	150	304	1 / 0	18.36	4.79	23.15	0.206	33.01	-9.86
1880.00	3	16-QAM	V	150	302	1 / 0	18.39	4.84	23.23	0.211	33.01	-9.78
1908.50	3	16-QAM	V	150	305	1 / 0	18.82	4.86	<b>23.68</b>	0.234	33.01	-9.33
1852.50	5	QPSK	V	150	304	1 / 24	19.39	4.79	24.18	0.262	33.01	-8.83
1880.00	5	QPSK	V	150	306	1 / 24	19.40	4.84	24.24	0.266	33.01	-8.77
1907.50	5	QPSK	V	150	306	1 / 24	19.63	4.87	<b>24.50</b>	0.282	33.01	-8.51
1852.50	5	16-QAM	V	150	304	1 / 24	18.33	4.79	23.12	0.205	33.01	-9.89
1880.00	5	16-QAM	V	150	306	1 / 24	18.34	4.84	23.18	0.208	33.01	-9.83
1907.50	5	16-QAM	V	150	306	1 / 24	18.73	4.87	<b>23.60</b>	0.229	33.01	-9.41
1855.00	10	QPSK	V	150	304	1 / 0	19.21	4.80	24.01	0.251	33.01	-9.00
1880.00	10	QPSK	V	150	306	1 / 0	19.60	4.84	24.44	0.278	33.01	-8.57
1905.00	10	QPSK	V	150	306	1 / 0	19.86	4.87	<b>24.73</b>	0.297	33.01	-8.28
1855.00	10	16-QAM	V	150	304	1 / 0	18.36	4.80	23.16	0.207	33.01	-9.85
1880.00	10	16-QAM	V	150	306	1 / 0	18.71	4.84	23.55	0.227	33.01	-9.46
1905.00	10	16-QAM	V	150	306	1 / 0	18.90	4.87	<b>23.77</b>	0.238	33.01	-9.24
1857.50	15	QPSK	V	150	306	1 / 74	19.59	4.80	24.39	0.275	33.01	-8.62
1880.00	15	QPSK	V	150	304	1 / 74	19.87	4.84	24.71	0.296	33.01	-8.30
1902.50	15	QPSK	V	150	308	1 / 74	19.86	4.88	<b>24.74</b>	0.298	33.01	-8.27
1857.50	15	16-QAM	V	150	306	1 / 74	18.68	4.80	23.48	0.223	33.01	-9.53
1880.00	15	16-QAM	V	150	304	1 / 74	18.85	4.84	23.69	0.234	33.01	-9.32
1902.50	15	16-QAM	V	150	308	1 / 74	18.99	4.88	<b>23.87</b>	0.244	33.01	-9.14
1860.00	20	QPSK	V	150	304	1 / 99	19.45	4.81	24.26	0.266	33.01	-8.76
1880.00	20	QPSK	V	150	306	1 / 99	19.75	4.84	24.59	0.288	33.01	-8.42
1900.00	20	QPSK	V	150	305	1 / 99	19.94	4.88	<b>24.82</b>	<b>0.304</b>	33.01	-8.19
1860.00	20	16-QAM	V	150	304	1 / 99	18.53	4.81	23.34	0.216	33.01	-9.68
1880.00	20	16-QAM	V	150	306	1 / 99	18.44	4.84	23.28	0.213	33.01	-9.73
1900.00	20	16-QAM	V	150	305	1 / 99	18.81	4.88	<b>23.69</b>	0.234	33.01	-9.32
1900.00	20	QPSK	H	150	202	1 / 0	18.02	4.68	22.70	0.186	33.01	-10.31

**Table 7-6. EIRP Data (Band 2)**

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1803280056-03.ZNF	Test Dates: 3/28-5/2/2018	EUT Type: Portable Handset		Page 111 of 136

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
2307.50	5	QPSK	H	150	350	1 / 0	16.49	5.56	22.05	0.160	23.98	-1.93
2312.50	5	QPSK	H	150	350	1 / 0	16.59	5.59	<b>22.18</b>	0.165	23.98	-1.80
2307.50	5	16-QAM	H	150	350	1 / 0	16.37	5.56	21.93	0.156	23.98	-2.05
2312.50	5	16-QAM	H	150	350	1 / 0	15.51	5.59	<b>21.10</b>	0.129	23.98	-2.88
2310.00	10	QPSK	H	150	354	1 / 0	16.25	5.57	<b>21.82</b>	0.152	23.98	-2.16
2310.00	10	16-QAM	H	150	354	1 / 0	15.38	5.57	<b>20.95</b>	0.125	23.98	-3.03
2312.50	5	QPSK	V	150	322	100 / 0	13.58	5.74	19.32	0.086	23.98	-4.66

**Table 7-7. EIRP Data (Band 30)**

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1803280056-03.ZNF	Test Dates: 3/28-5/2/2018	EUT Type: Portable Handset	Page 112 of 136	



## 7.7 Radiated Spurious Emissions Measurements

### Test Overview

Radiated spurious emissions measurements are performed using the substitution method described in ANSI/TIA-603-E-2016 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using vertically and horizontally polarized tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically and horizontally polarized broadband horn antennas.

### Test Procedures Used

KDB 971168 D01 v03r01 – Section 5.8

ANSI/TIA-603-E-2016 – Section 2.2.12

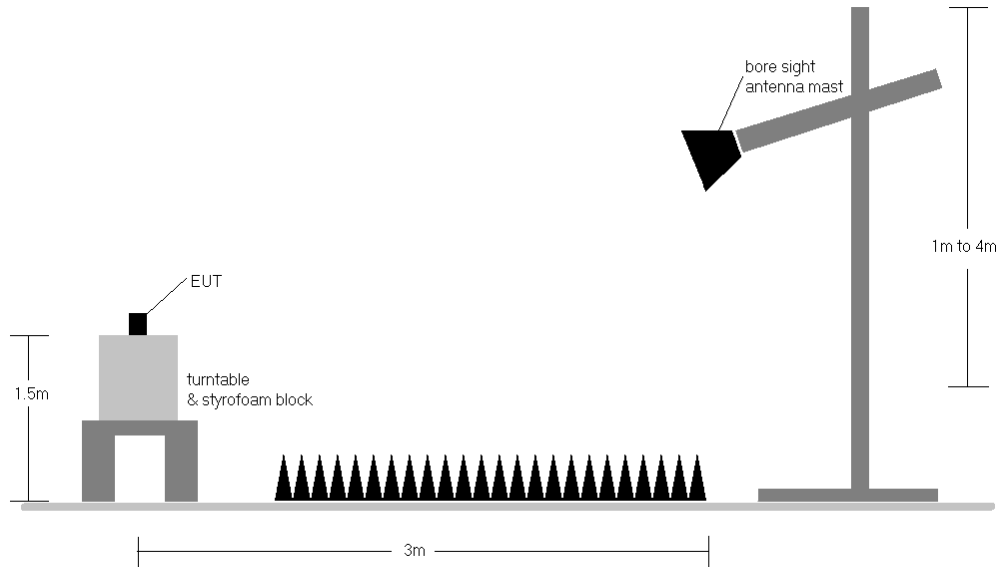
### Test Settings

1. RBW = 100kHz for emissions below 1GHz and 1MHz for emissions above 1GHz
2. VBW  $\geq$  3 x RBW
3. Span = 1.5 times the OBW
4. No. of sweep points  $\geq$  2 x span / RBW
5. Detector = RMS
6. Trace mode = Average (Max Hold for pulsed emissions)
7. The trace was allowed to stabilize

FCC ID: ZNFQ710CS	 <b>MEASUREMENT REPORT (CERTIFICATION)</b> 		Approved by: Quality Manager
Test Report S/N: 1M1803280056-03.ZNF	Test Dates: 3/28-5/2/2018	EUT Type: Portable Handset	Page 113 of 136

**Test Setup**

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



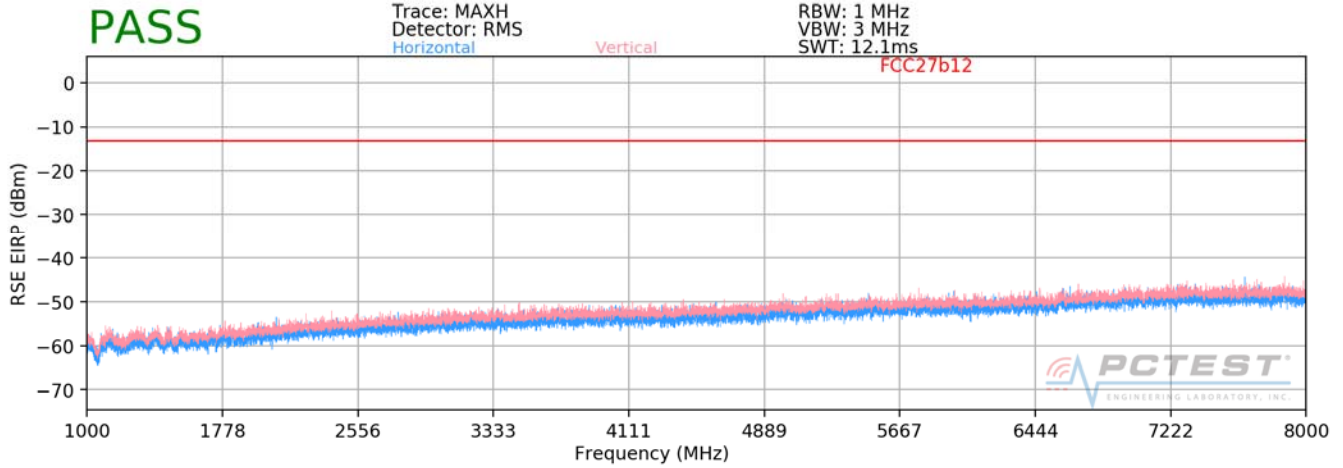
**Figure 7-7. Test Instrument & Measurement Setup**

**Test Notes**

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

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**Band 12**



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

OPERATING FREQUENCY: 700.50 MHz  
 CHANNEL: 23025  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 3.0 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]
1401.00	H	150	101	-67.98	4.37	-63.61	-50.6
2101.50	H	150	171	-67.97	5.26	-62.71	-49.7
2802.00	H	-	-	-67.46	6.98	-60.48	-47.5

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

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1803280056-03.ZNF	Test Dates: 3/28-5/2/2018	EUT Type: Portable Handset		Page 115 of 136

OPERATING FREQUENCY: 707.50 MHz  
 CHANNEL: 23095  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 3.0 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	150	101	-67.99	4.56	-63.43	-50.4
2122.50	H	150	171	-63.41	5.31	-58.10	-45.1
2830.00	H	-	-	-67.73	7.02	-60.72	-47.7

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

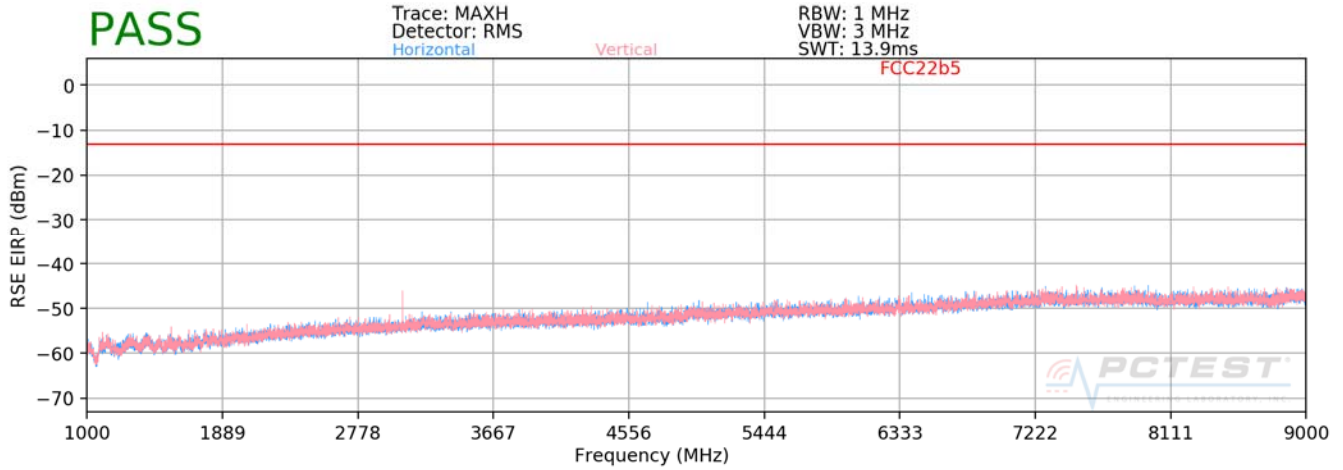
OPERATING FREQUENCY: 714.50 MHz  
 CHANNEL: 23165  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 3.0 MHz  
 DISTANCE: 3 meters  
 LIMIT: -13 dBm

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]
1429.00	H	-	-	-69.85	4.75	-65.10	-52.1
2143.50	H	-	-	-67.54	5.35	-62.19	-49.2
2858.00	H	-	-	-67.02	7.06	-59.97	-47.0

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

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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**Band 5**



**Plot 7-169. 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	H	-	-	-69.77	5.78	-63.99	-51.0
2487.00	H	-	-	-67.28	5.73	-61.55	-48.6
3316.00	H	-	-	-67.86	7.87	-59.99	-47.0

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

FCC ID: ZNFQ710CS			MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1803280056-03.ZNF	Test Dates: 3/28-5/2/2018	EUT Type: Portable Handset	Page 117 of 136		

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	H	-	-	-70.14	5.73	-64.41	-51.4
2509.50	H	-	-	-67.13	5.77	-61.37	-48.4
3346.00	H	-	-	-67.55	7.91	-59.64	-46.6

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

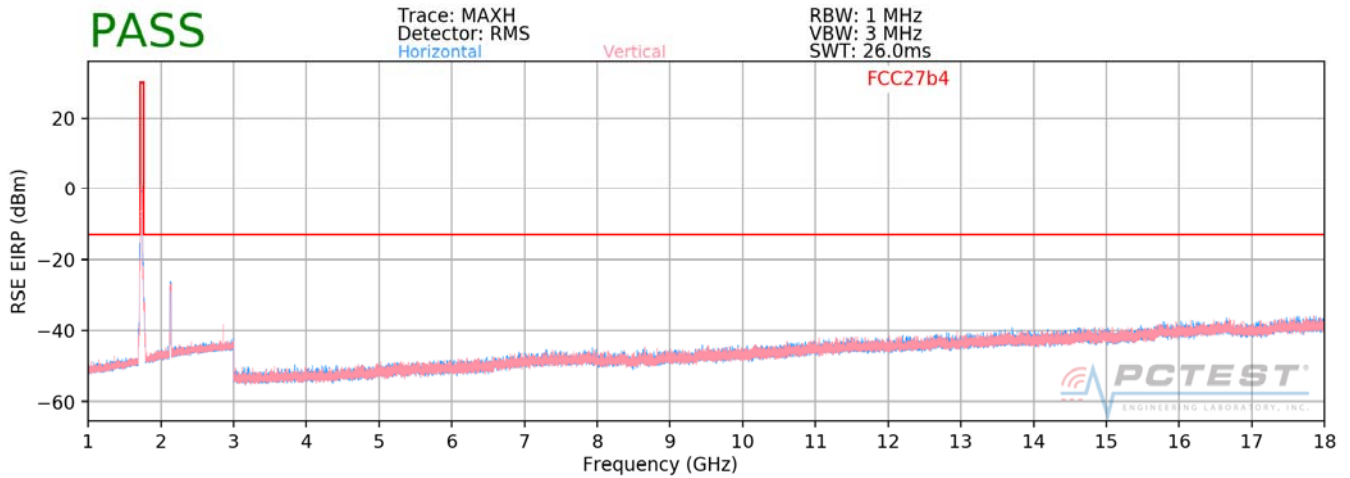
OPERATING FREQUENCY: 844.00 MHz  
 CHANNEL: 20600  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 10.0 MHz  
 DISTANCE: 3 meters  
 LIMIT: -13 dBm

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	H	-	-	-70.52	5.67	-64.85	-51.8
2532.00	H	-	-	-67.69	5.85	-61.84	-48.8
3376.00	H	-	-	-67.31	7.94	-59.37	-46.4

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

FCC ID: ZNFQ710CS			MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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### Band 4



**Plot 7-170. Radiated Spurious Plot above 1GHz (Band 4)**

OPERATING FREQUENCY: 1715.00 MHz  
 CHANNEL: 20000  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 10.0 MHz  
 DISTANCE: 3 meters  
 LIMIT: -13 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3430.00	H	150	0	-54.17	8.14	-46.03	-33.0
5145.00	H	-	-	-68.00	10.24	-57.76	-44.8

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

FCC ID: ZNFQ710CS			MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1803280056-03.ZNF	Test Dates: 3/28-5/2/2018	EUT Type: Portable Handset	Page 119 of 136		

OPERATING FREQUENCY: 1732.50 MHz  
 CHANNEL: 20175  
 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]
3465.00	H	150	0	-61.11	8.33	-52.79	-39.8
5197.50	H	-	-	-66.99	10.27	-56.72	-43.7

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

OPERATING FREQUENCY: 1750.00 MHz  
 CHANNEL: 20350  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 10.0 MHz  
 DISTANCE: 3 meters  
 LIMIT: -13 dBm

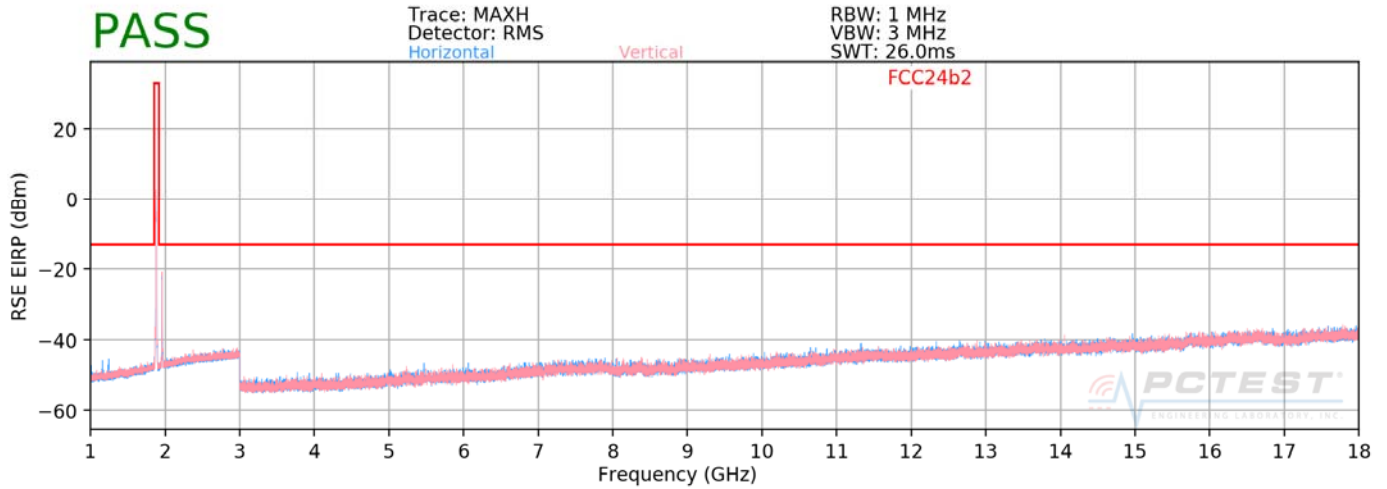
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3500.00	H	150	260	-54.96	8.52	-46.44	-33.4
5250.00	H	-	-	-67.11	10.29	-56.82	-43.8

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

FCC ID: ZNFQ710CS			MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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## Band 2



**Plot 7-171. 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	150	0	-57.14	8.35	-48.79	-35.8
5580.00	H	-	-	-68.32	10.57	-57.75	-44.7

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

FCC ID: ZNFQ710CS			MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1803280056-03.ZNF	Test Dates: 3/28-5/2/2018	EUT Type: Portable Handset	Page 121 of 136		

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	150	0	-67.26	8.46	-58.80	-45.8
5640.00	H	-	-	-68.15	10.60	-57.55	-44.6

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

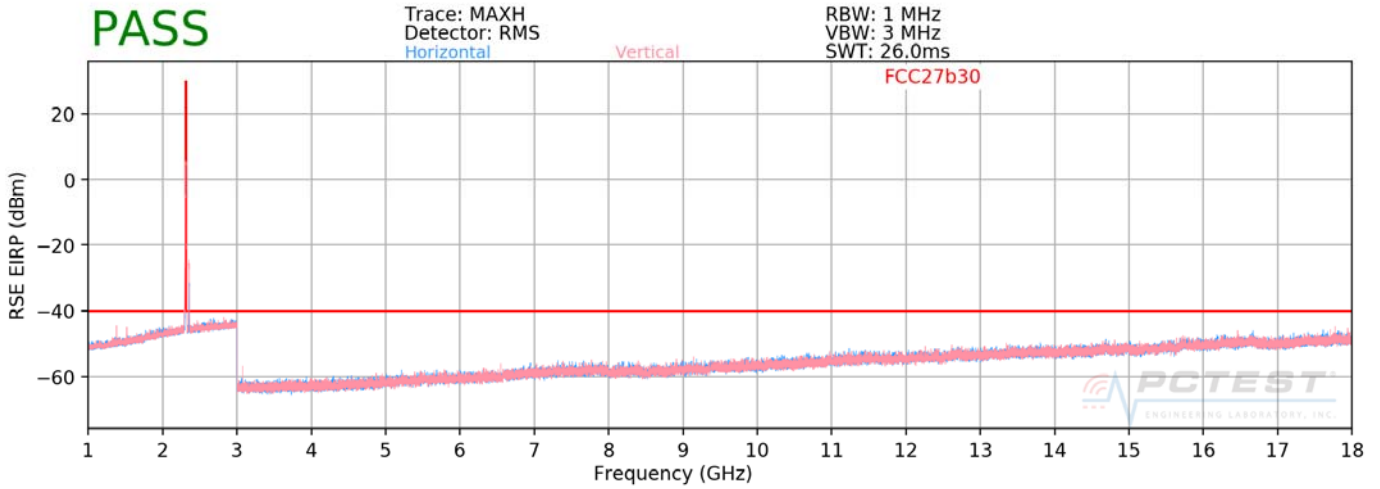
OPERATING FREQUENCY: 1900.00 MHz  
 CHANNEL: 19100  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 20.0 MHz  
 DISTANCE: 3 meters  
 LIMIT: -13 dBm

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	150	260	-65.14	8.56	-56.58	-43.6
5700.00	H	-	-	-67.06	10.59	-56.48	-43.5

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

FCC ID: ZNFQ710CS			MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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### Band 30



**Plot 7-172. Radiated Spurious Plot 1GHz - 18GHz (Band 30)**

OPERATING FREQUENCY: 2307.50 MHz  
 CHANNEL: 27685  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 5.0 MHz  
 DISTANCE: 3 meters  
 LIMIT: -40 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
4615.00	H	-	-	-68.70	9.41	-59.29	-19.3
6922.50	H	150	305	-62.97	11.41	-51.55	-11.6
9230.00	H	-	-	-70.46	13.41	-57.06	-17.1

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

FCC ID: ZNFQ710CS			MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1803280056-03.ZNF	Test Dates: 3/28-5/2/2018	EUT Type: Portable Handset			Page 123 of 136

OPERATING FREQUENCY: 2312.50 MHz  
 CHANNEL: 27735  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 5.0 MHz  
 DISTANCE: 3 meters  
 LIMIT: -40 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
4625.00	H	-	-	-67.26	9.43	-57.83	-17.8
6937.50	H	150	334	-65.90	11.43	-54.48	-14.5
9250.00	H	-	-	-70.81	13.41	-57.40	-17.4

Table 7-21. Radiated Spurious Data (Band 30 – High Channel)

FCC ID: ZNFQ710CS			MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1803280056-03.ZNF	Test Dates: 3/28-5/2/2018	EUT Type: Portable Handset			Page 124 of 136

## 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 ±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: ZNFQ710CS	 <b>MEASUREMENT REPORT (CERTIFICATION)</b> 		<b>Approved by:</b> Quality Manager
<b>Test Report S/N:</b> 1M1803280056-03.ZNF	<b>Test Dates:</b> 3/28-5/2/2018	<b>EUT Type:</b> Portable Handset	Page 125 of 136

## Band 12 Frequency Stability Measurements

OPERATING FREQUENCY: 707,500,000 Hz  
 CHANNEL: 23790  
 REFERENCE VOLTAGE: 3.80 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	707,499,790	-210	-0.0000297
100 %		- 30	707,500,006	6	0.0000008
100 %		- 20	707,499,943	-57	-0.0000081
100 %		- 10	707,499,660	-340	-0.0000481
100 %		0	707,500,277	277	0.0000392
100 %		+ 10	707,499,664	-336	-0.0000475
100 %		+ 20	707,499,960	-40	-0.0000057
100 %		+ 30	707,500,113	113	0.0000160
100 %		+ 40	707,499,948	-52	-0.0000073
100 %		+ 50	707,500,028	28	0.0000040
BATT. ENDPOINT		3.40	+ 20	707,500,339	339

**Table 7-22. Frequency Stability Data (Band 12)**

**Note:**

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

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## Band 12 Frequency Stability Measurements

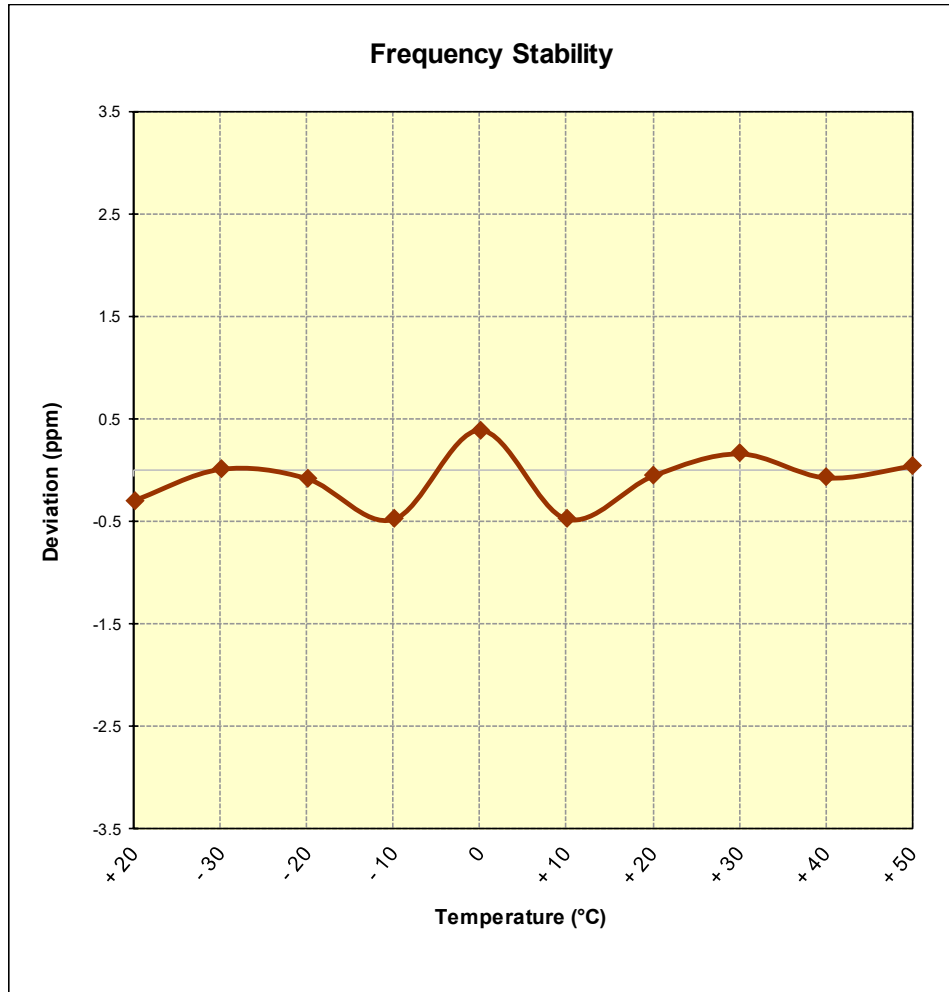


Figure 7-8. Frequency Stability Graph (Band 12)

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1803280056-03.ZNF	Test Dates: 3/28-5/2/2018	EUT Type: Portable Handset		Page 127 of 136

## Band 5 Frequency Stability Measurements

OPERATING FREQUENCY: 836,500,000 Hz  
 CHANNEL: 20525  
 REFERENCE VOLTAGE: 3.80 VDC  
 DEVIATION LIMIT: ± 0.00025 % or 2.5 ppm

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	836,500,091	91	0.0000109
100 %		- 30	836,499,866	-134	-0.0000160
100 %		- 20	836,500,059	59	0.0000071
100 %		- 10	836,500,099	99	0.0000118
100 %		0	836,500,239	239	0.0000286
100 %		+ 10	836,500,065	65	0.0000078
100 %		+ 20	836,500,068	68	0.0000081
100 %		+ 30	836,500,272	272	0.0000325
100 %		+ 40	836,500,333	333	0.0000398
100 %		+ 50	836,500,015	15	0.0000018
BATT. ENDPOINT		3.40	+ 20	836,499,946	-54

Table 7-23. Frequency Stability Data (Band 5)

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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## Band 5 Frequency Stability Measurements

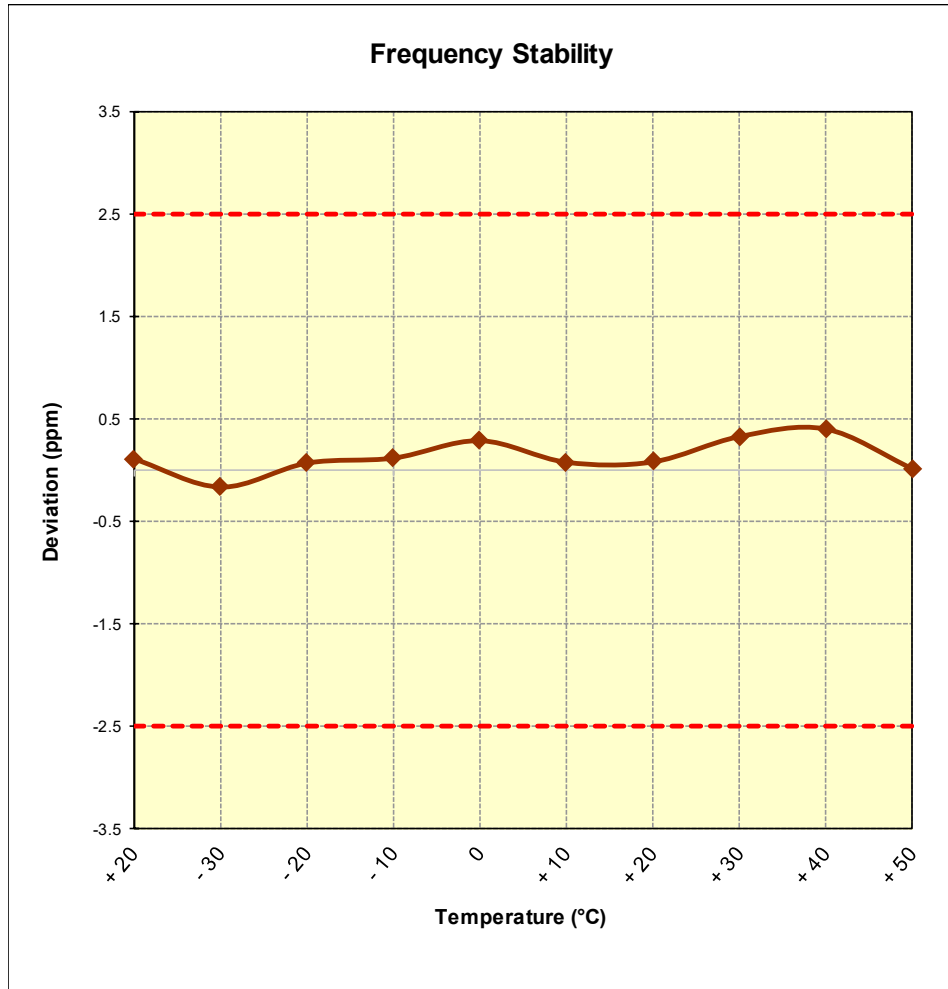


Figure 7-9. Frequency Stability Graph (Band 5)

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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## Band 4 Frequency Stability Measurements

OPERATING FREQUENCY: 1,732,500,000 Hz  
 CHANNEL: 20175  
 REFERENCE VOLTAGE: 3.80 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	1,732,499,862	-138	-0.0000080
100 %		- 30	1,732,499,705	-295	-0.0000170
100 %		- 20	1,732,499,634	-366	-0.0000211
100 %		- 10	1,732,500,240	240	0.0000139
100 %		0	1,732,500,204	204	0.0000118
100 %		+ 10	1,732,499,927	-73	-0.0000042
100 %		+ 20	1,732,500,047	47	0.0000027
100 %		+ 30	1,732,500,011	11	0.0000006
100 %		+ 40	1,732,500,254	254	0.0000147
100 %		+ 50	1,732,499,969	-31	-0.0000018
BATT. ENDPOINT		3.40	+ 20	1,732,500,005	5

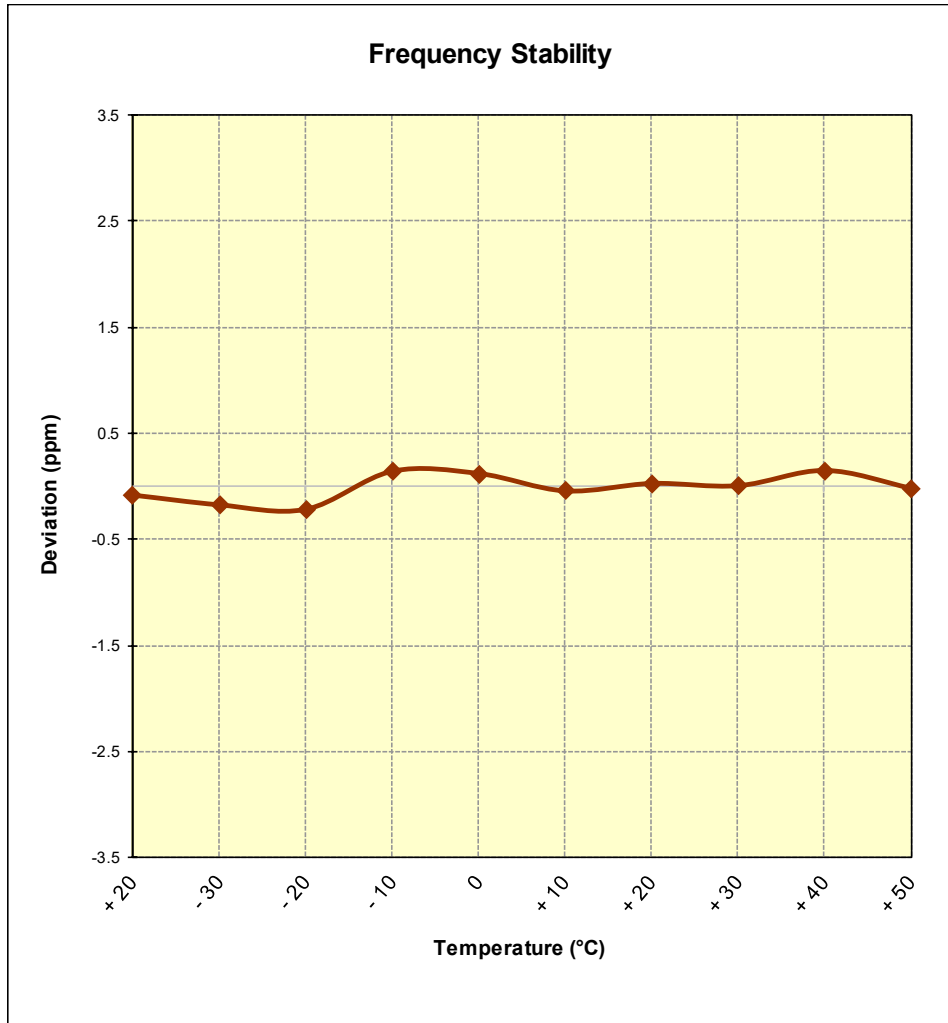
Table 7-24. Frequency Stability Data (Band 4)

**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: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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### Band 4 Frequency Stability Measurements



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

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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## Band 2 Frequency Stability Measurements

OPERATING FREQUENCY: 1,880,000,000 Hz  
 CHANNEL: 18900  
 REFERENCE VOLTAGE: 3.80 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	1,879,999,733	-267	-0.0000142
100 %		- 30	1,879,999,660	-340	-0.0000181
100 %		- 20	1,879,999,905	-95	-0.0000051
100 %		- 10	1,880,000,057	57	0.0000030
100 %		0	1,880,000,243	243	0.0000129
100 %		+ 10	1,880,000,296	296	0.0000157
100 %		+ 20	1,880,000,038	38	0.0000020
100 %		+ 30	1,880,000,146	146	0.0000078
100 %		+ 40	1,880,000,074	74	0.0000039
100 %		+ 50	1,879,999,671	-329	-0.0000175
BATT. ENDPOINT		3.40	+ 20	1,880,000,124	124

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

**Note:**

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

FCC ID: ZNFQ710CS	 <b>MEASUREMENT REPORT (CERTIFICATION)</b> 		Approved by: Quality Manager
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## Band 2 Frequency Stability Measurements

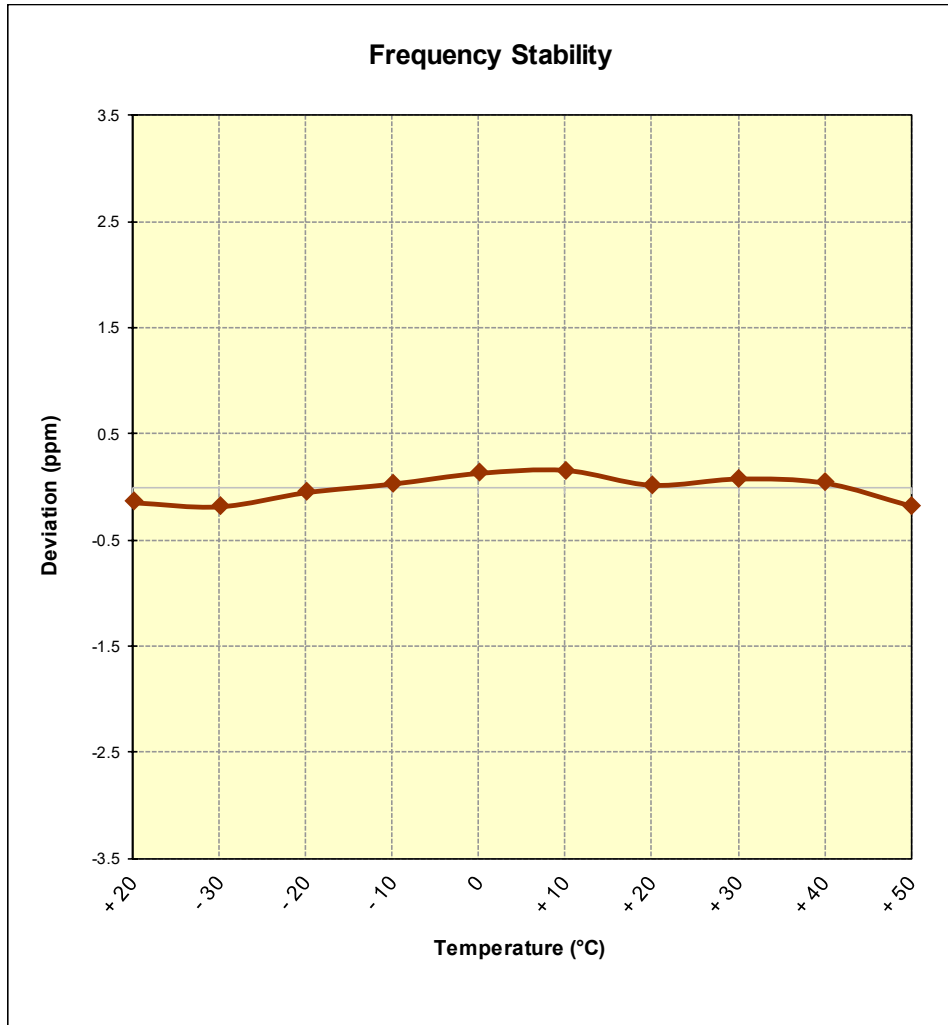


Figure 7-11. Frequency Stability Graph (Band 2)

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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## Band 30 Frequency Stability Measurements

OPERATING FREQUENCY: 2,310,000,000 Hz  
 CHANNEL: 27710  
 REFERENCE VOLTAGE: 3.80 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	2,309,999,961	-39	-0.0000017
100 %		- 30	2,310,000,083	83	0.0000036
100 %		- 20	2,309,999,823	-177	-0.0000077
100 %		- 10	2,309,999,888	-112	-0.0000048
100 %		0	2,310,000,126	126	0.0000055
100 %		+ 10	2,310,000,239	239	0.0000103
100 %		+ 20	2,309,999,760	-240	-0.0000104
100 %		+ 30	2,310,000,361	361	0.0000156
100 %		+ 40	2,309,999,980	-20	-0.0000009
100 %		+ 50	2,309,999,965	-35	-0.0000015
BATT. ENDPOINT		3.40	+ 20	2,309,999,823	-177

Table 7-26. Frequency Stability Data (Band 30)

**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: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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## Band 30 Frequency Stability Measurements

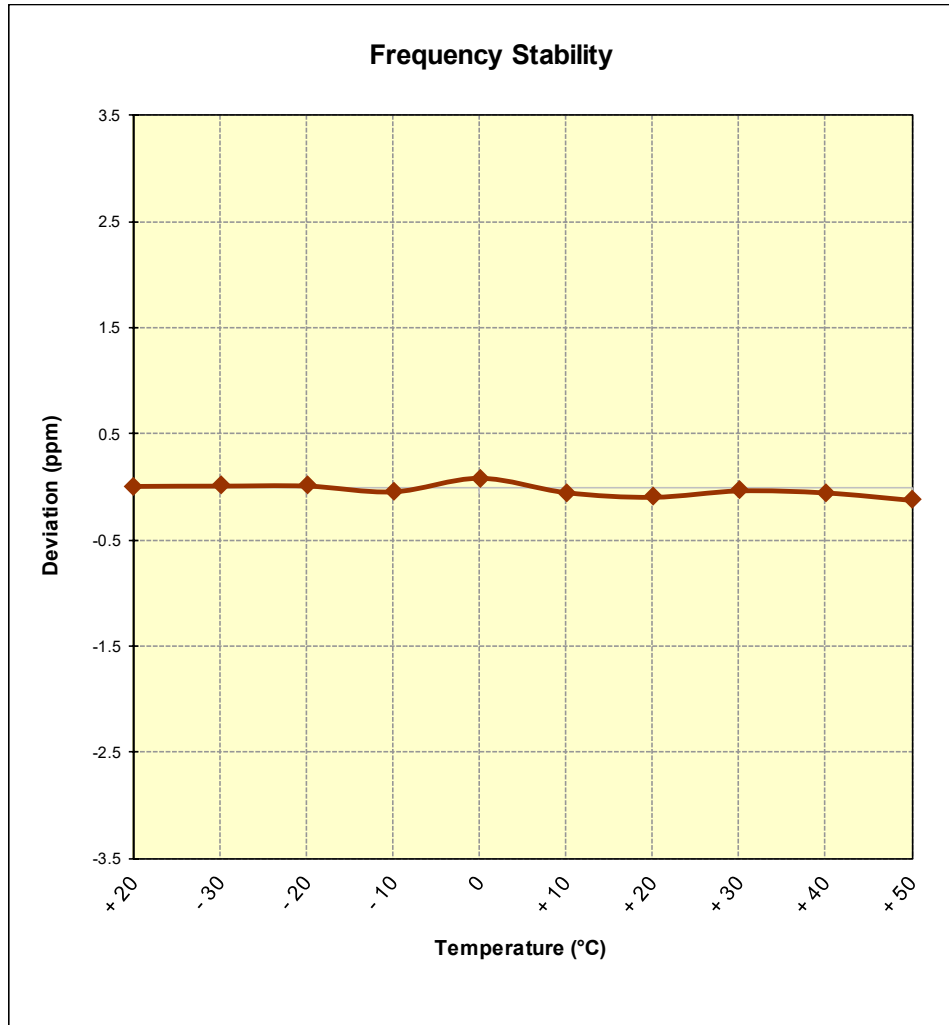


Figure 7-12. Frequency Stability Graph (Band 30)

FCC ID: ZNFQ710CS		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:ZNFQ710CS** complies with all the requirements of Part 22, 24, & 27 of the FCC Rules for LTE operation only.

FCC ID: ZNFQ710CS		<b>MEASUREMENT REPORT (CERTIFICATION)</b>		<b>Approved by:</b> Quality Manager
<b>Test Report S/N:</b> 1M1803280056-03.ZNF	<b>Test Dates:</b> 3/28-5/2/2018	<b>EUT Type:</b> Portable Handset		Page 136 of 136