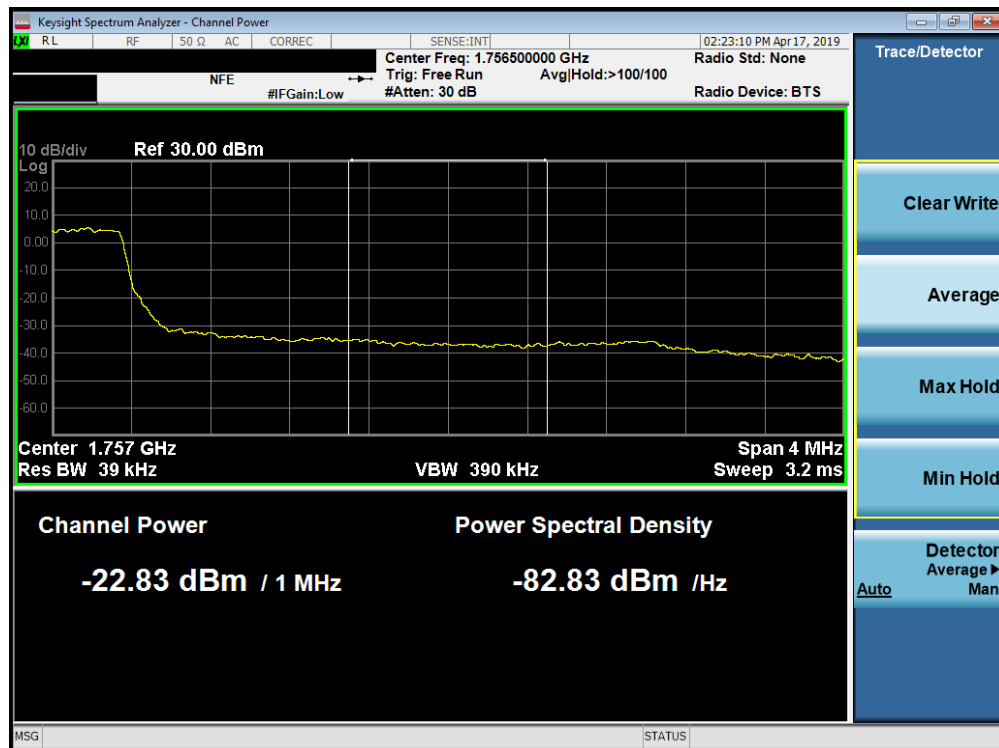


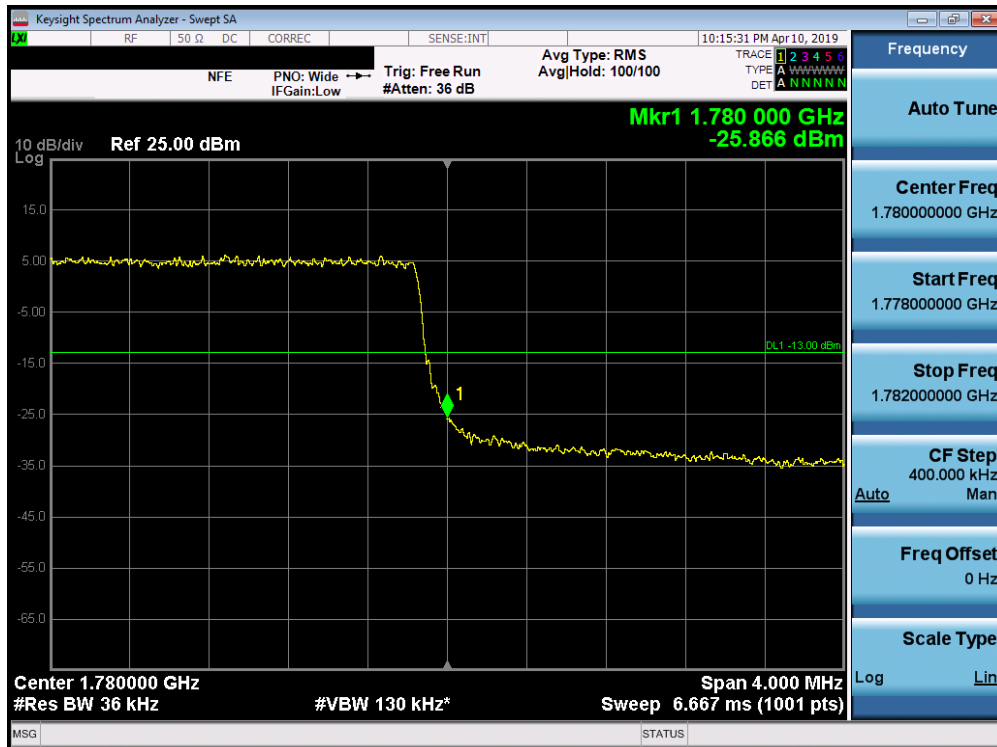


Plot 7-108. Upper Band Edge Plot (Band 4 - 3.0MHz QPSK - Full RB Configuration)

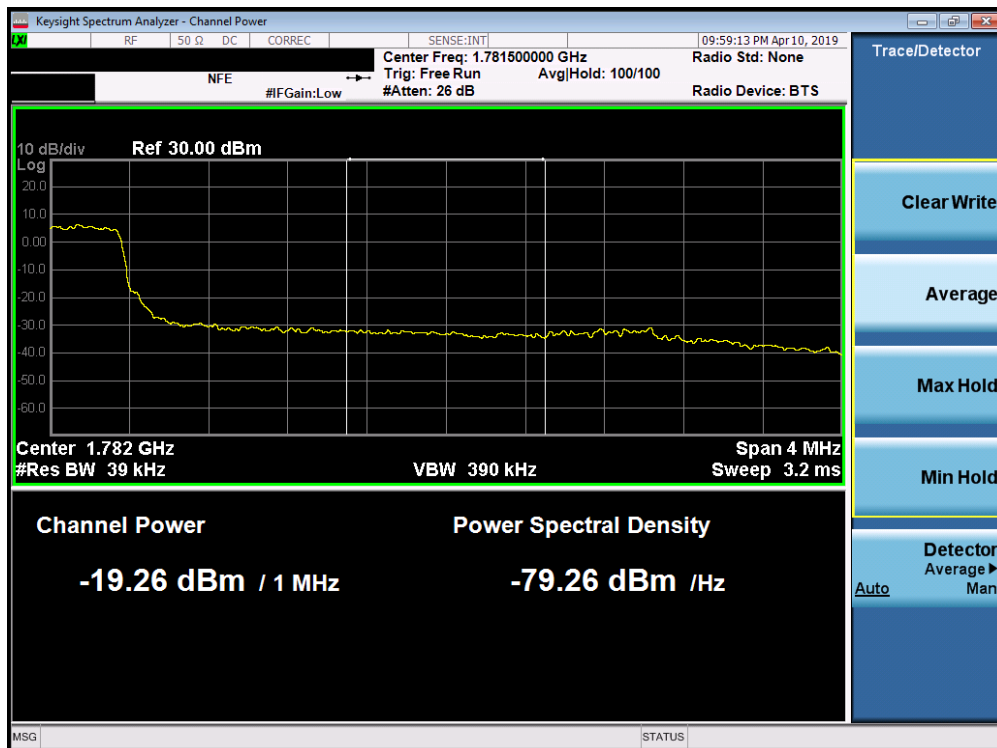


Plot 7-109. Upper Extended Band Edge Plot (Band 4 - 3.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFQ720CS	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1903280046-03-R1-ZNF	Test Dates: 3/28 - 4/18/2019	EUT Type: Portable Handset		Page 76 of 149

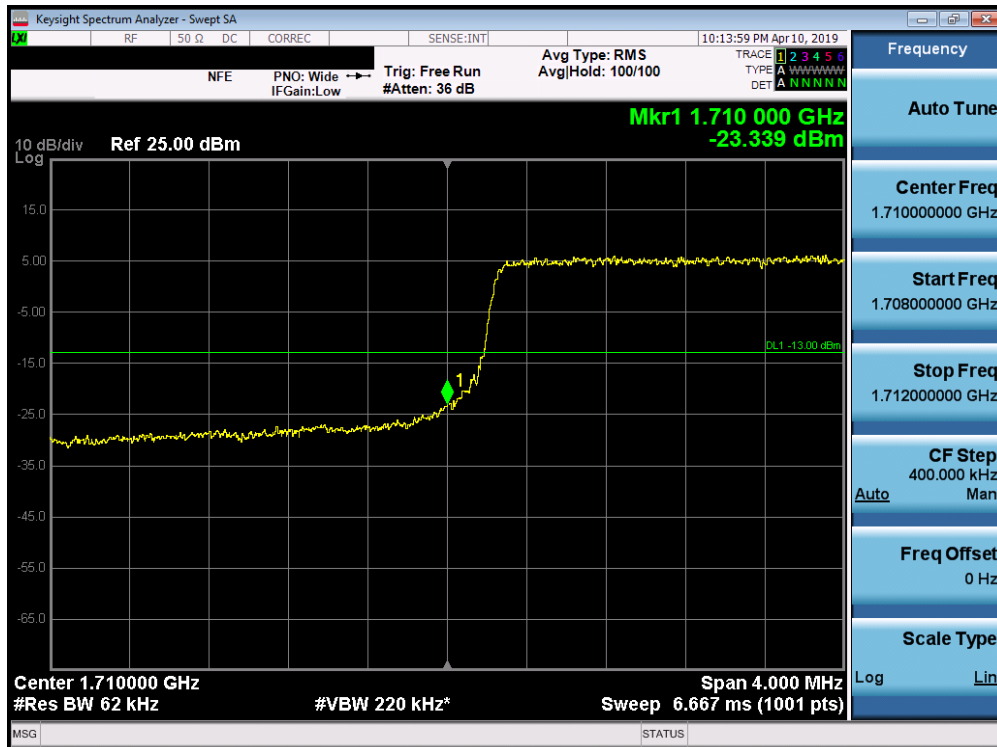


Plot 7-110. Upper Band Edge Plot (Band 66 - 3.0MHz QPSK - Full RB Configuration)

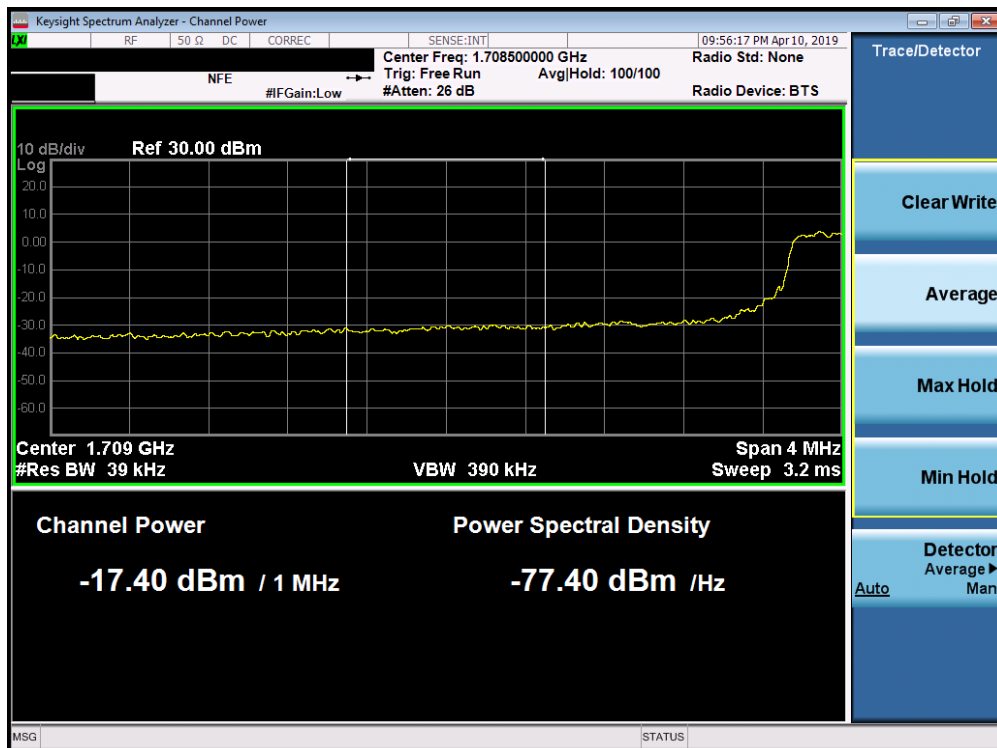


Plot 7-111. Upper Extended Band Edge Plot (Band 66 - 3.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFQ720CS	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1903280046-03-R1.ZNF	Test Dates: 3/28 - 4/18/2019	EUT Type: Portable Handset		Page 77 of 149

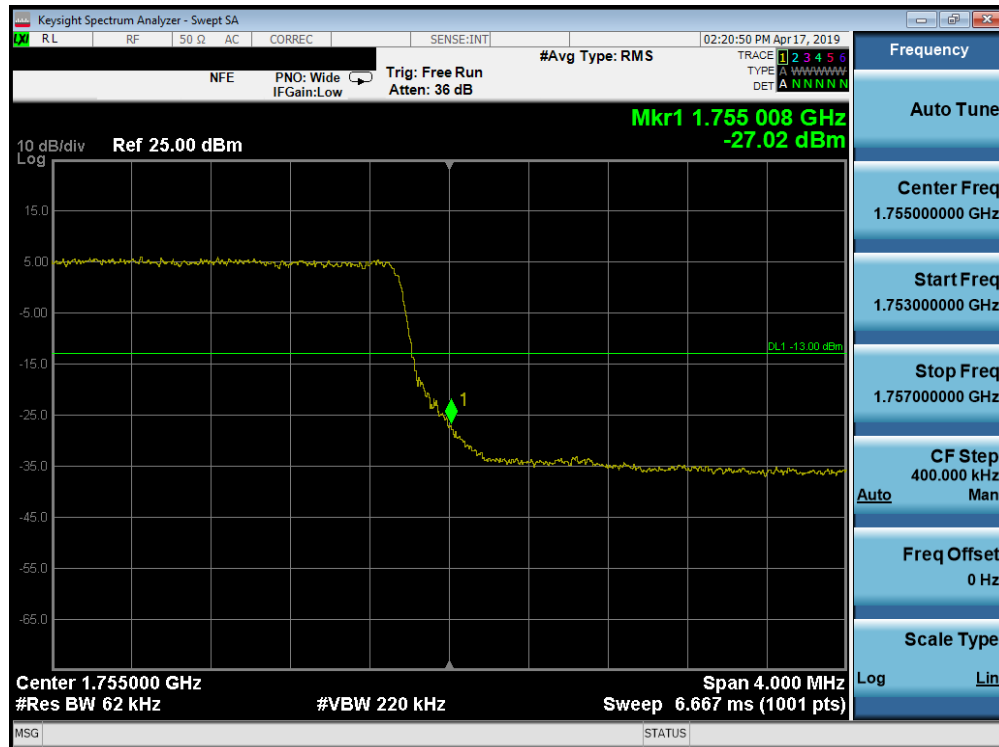


Plot 7-112. Lower Band Edge Plot (Band 66/4 - 5.0MHz QPSK - Full RB Configuration)

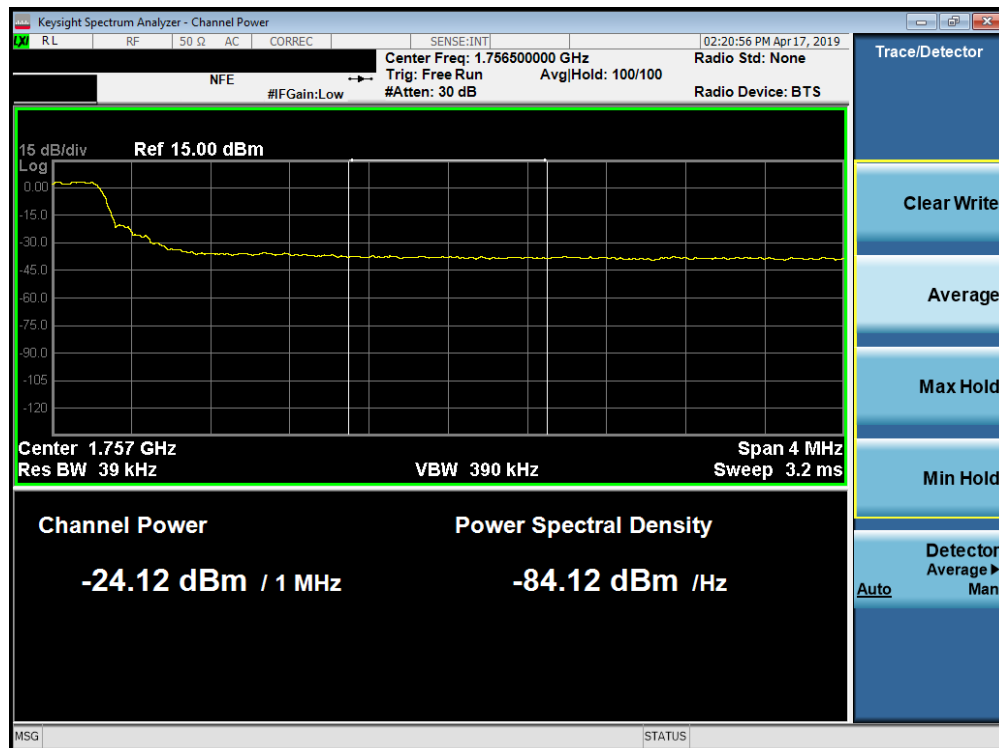


Plot 7-113. Lower Extended Band Edge Plot (Band 66/4 - 5.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFQ720CS	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1903280046-03-R1.ZNF	Test Dates: 3/28 - 4/18/2019	EUT Type: Portable Handset		Page 78 of 149

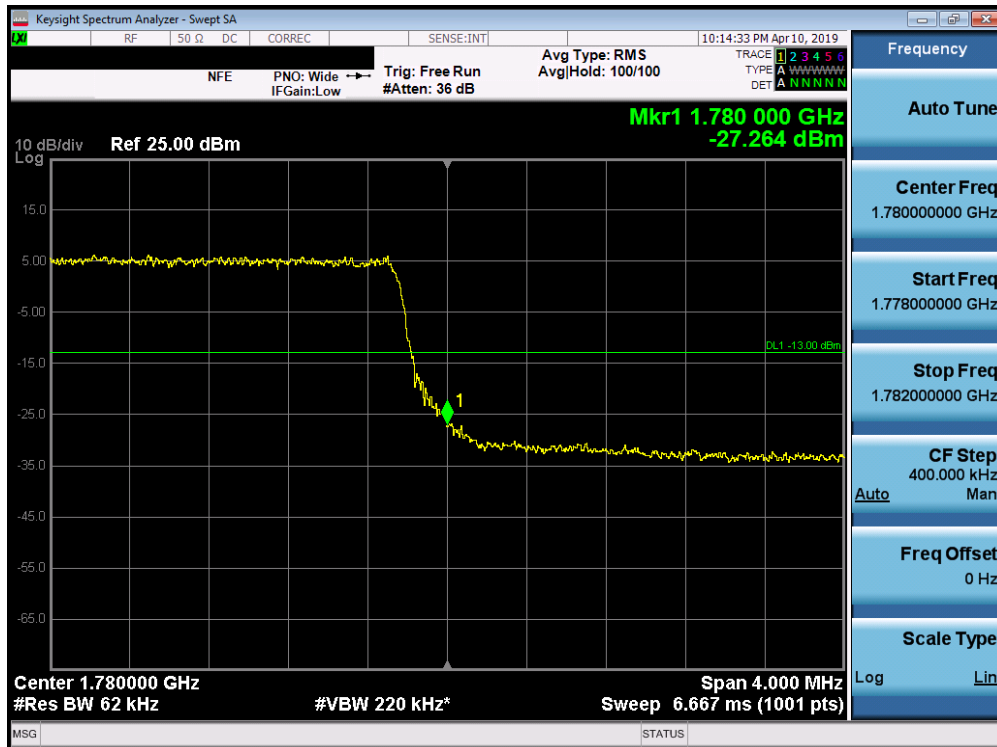


Plot 7-114. Upper Band Edge Plot (Band 4 - 5.0MHz QPSK - Full RB Configuration)

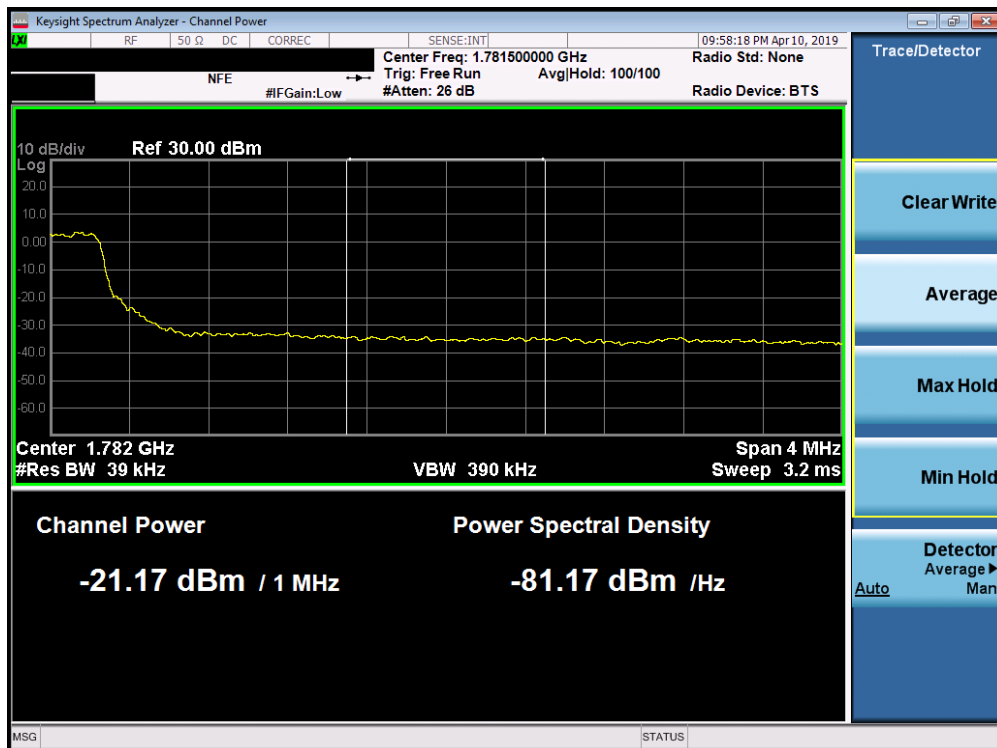


Plot 7-115. Upper Extended Band Edge Plot (Band 4 - 5.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFQ720CS	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1903280046-03-R1.ZNF	Test Dates: 3/28 - 4/18/2019	EUT Type: Portable Handset		Page 79 of 149

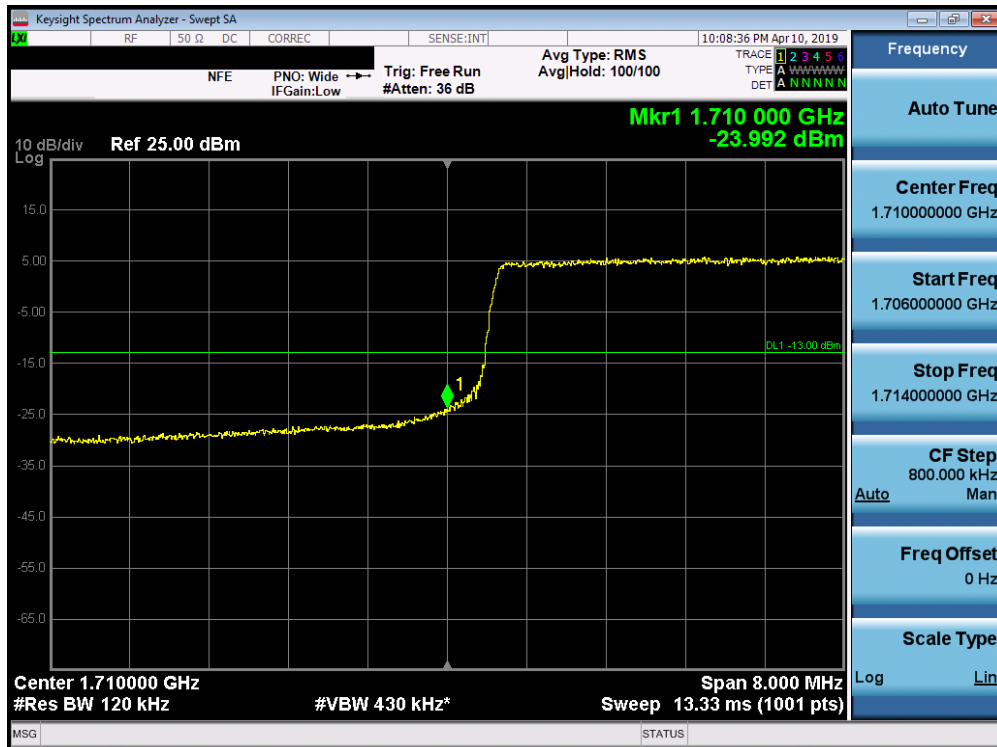


Plot 7-116. Upper Band Edge Plot (Band 66 - 5.0MHz QPSK - Full RB Configuration)

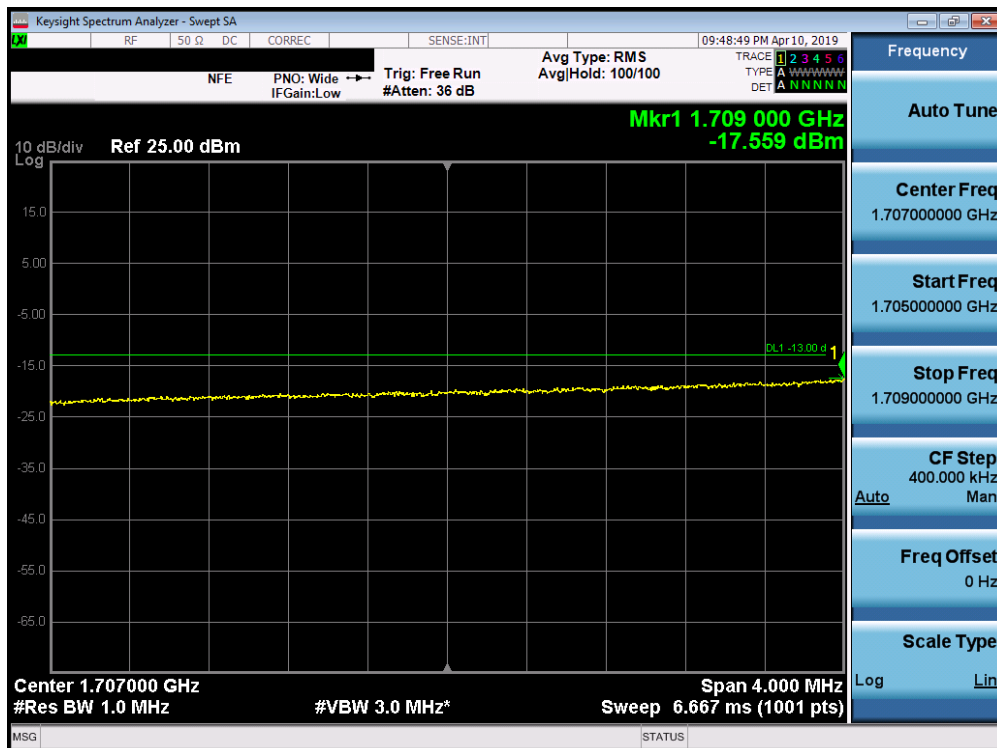


Plot 7-117. Upper Extended Band Edge Plot (Band 66 - 5.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFQ720CS	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1903280046-03-R1.ZNF	Test Dates: 3/28 - 4/18/2019	EUT Type: Portable Handset		Page 80 of 149

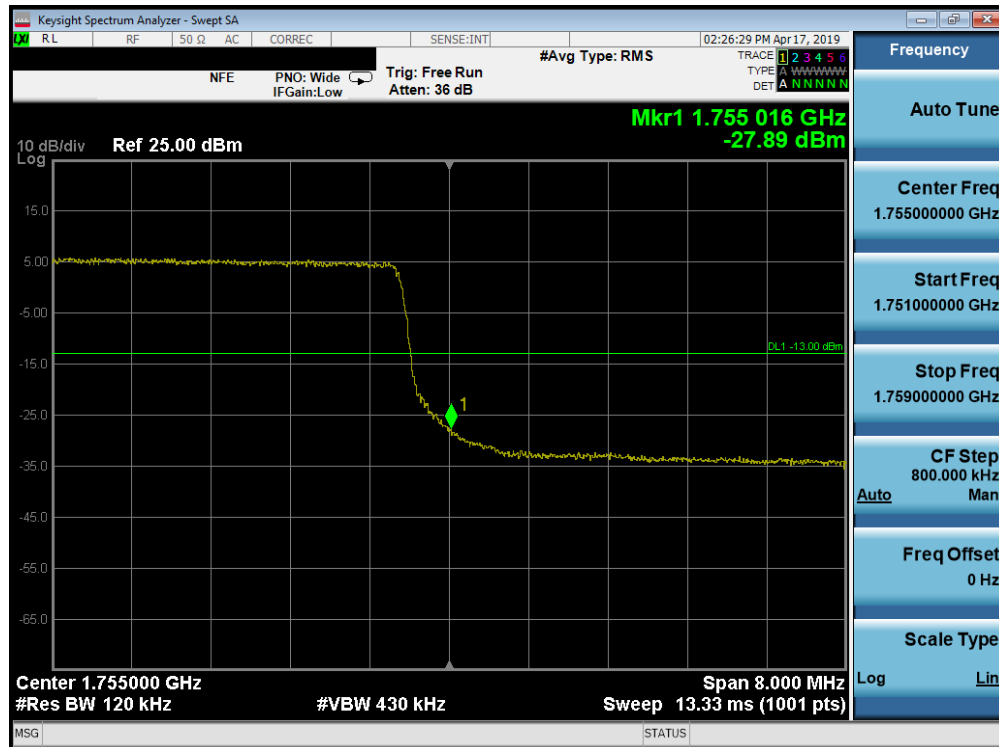


Plot 7-118. Lower Band Edge Plot (Band 66/4 - 10.0MHz QPSK - Full RB Configuration)

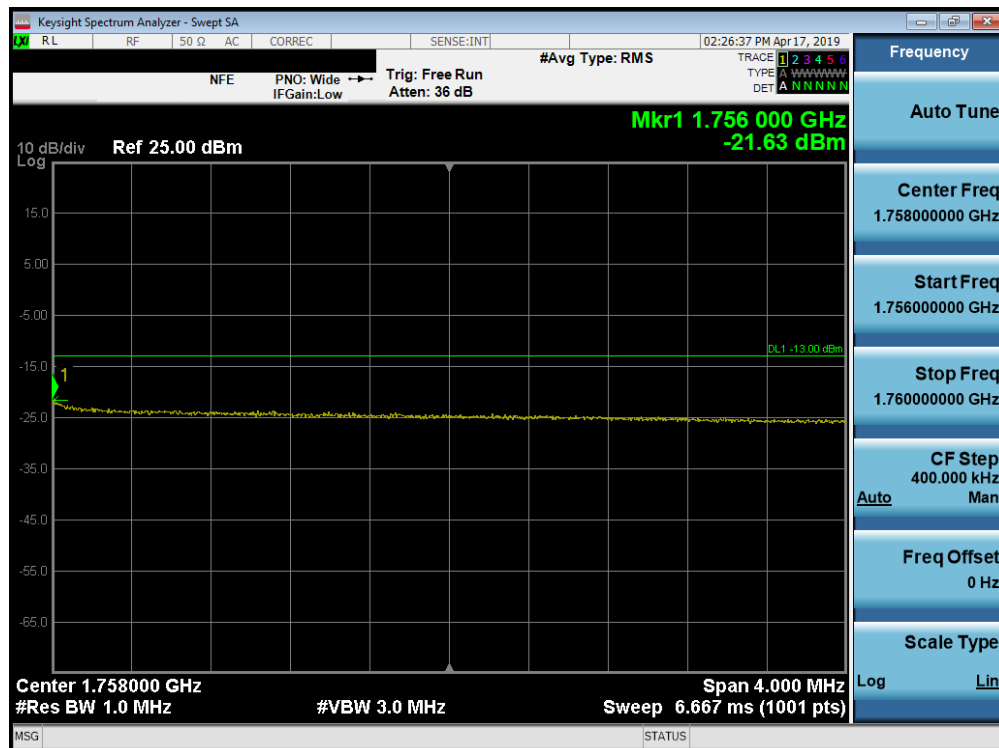


Plot 7-119. Lower Extended Band Edge Plot (Band 66/4 - 10.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFQ720CS	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1903280046-03-R1.ZNF	Test Dates: 3/28 - 4/18/2019	EUT Type: Portable Handset		Page 81 of 149

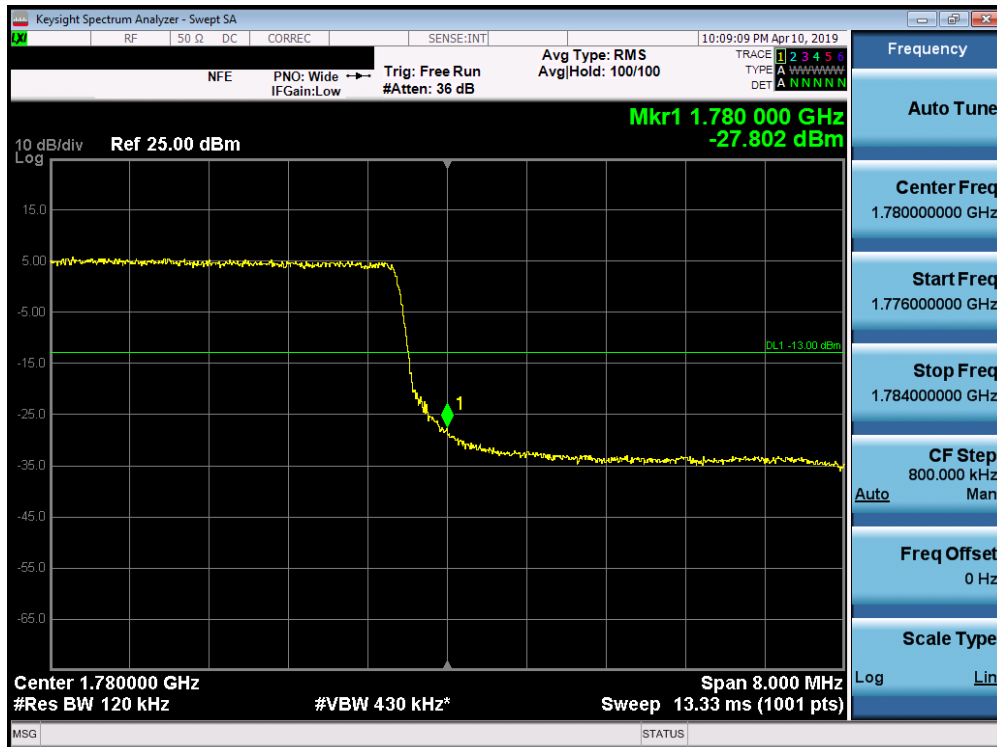


Plot 7-120. Upper Band Edge Plot (Band 4 - 10.0MHz QPSK - Full RB Configuration)

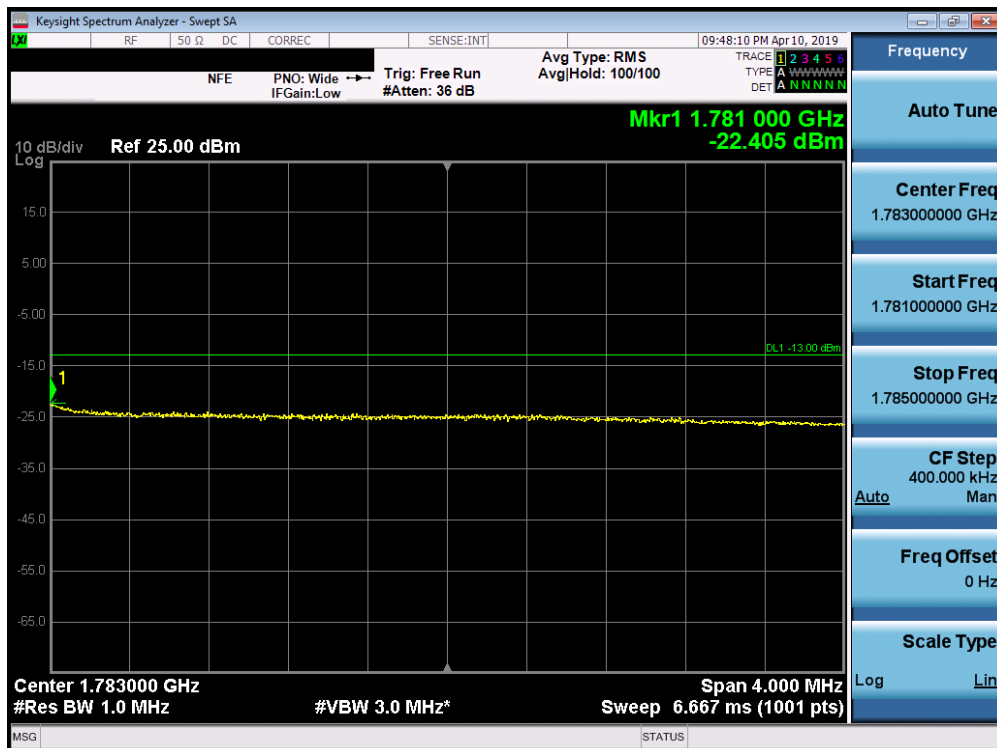


Plot 7-121. Upper Extended Band Edge Plot (Band 4 - 10.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFQ720CS	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1903280046-03-R1.ZNF	Test Dates: 3/28 - 4/18/2019	EUT Type: Portable Handset		Page 82 of 149

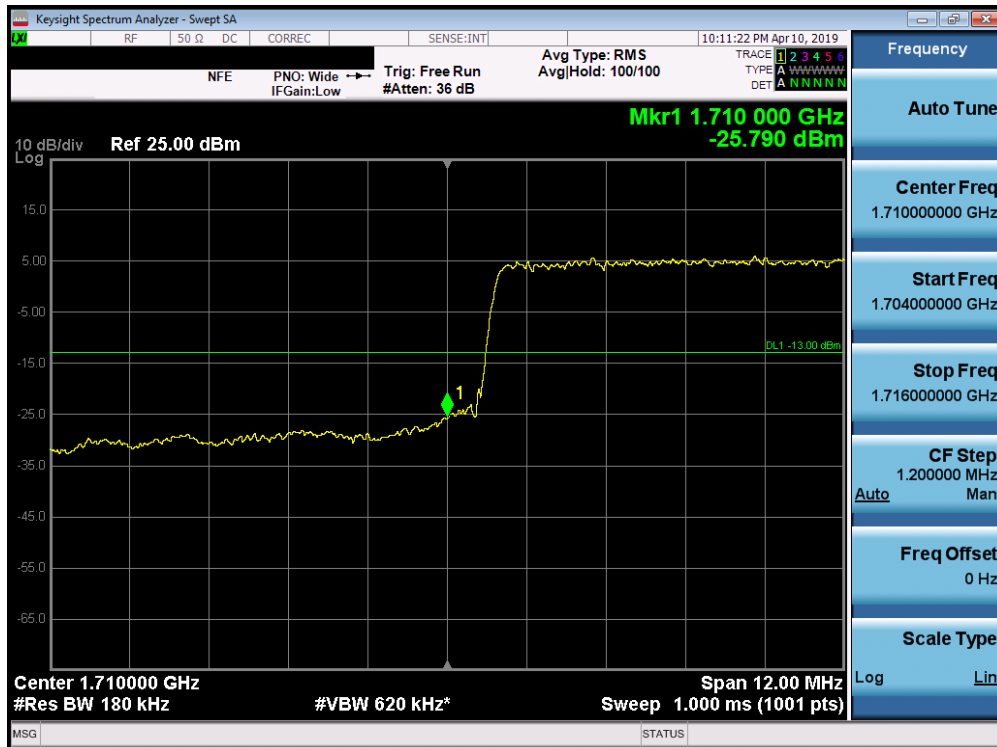


Plot 7-122. Upper Band Edge Plot (Band 66 - 10.0MHz QPSK - Full RB Configuration)

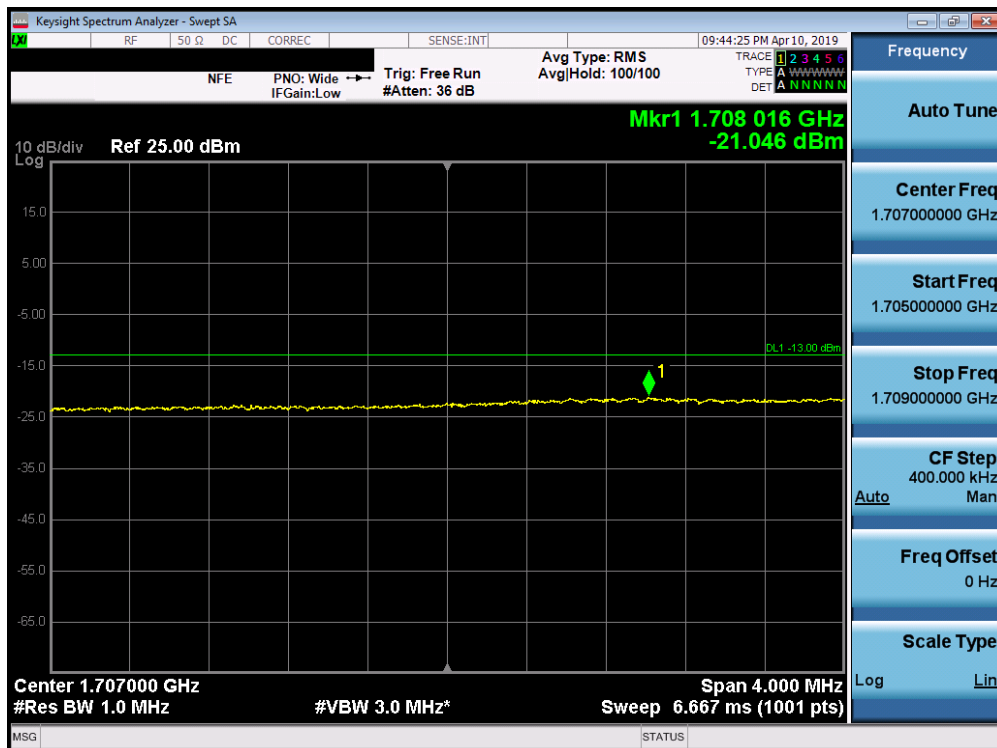


Plot 7-123. Upper Extended Band Edge Plot (Band 66 - 10.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFQ720CS	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1903280046-03-R1-ZNF	Test Dates: 3/28 - 4/18/2019	EUT Type: Portable Handset		Page 83 of 149

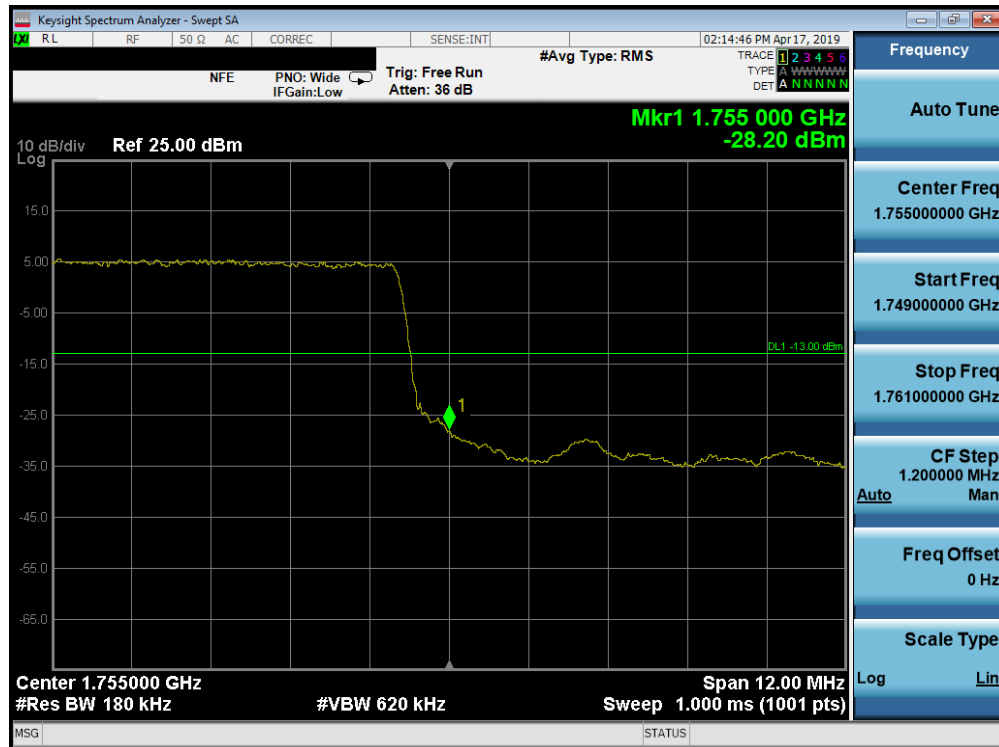


Plot 7-124. Lower Band Edge Plot (Band 66/4 - 15.0MHz QPSK - Full RB Configuration)

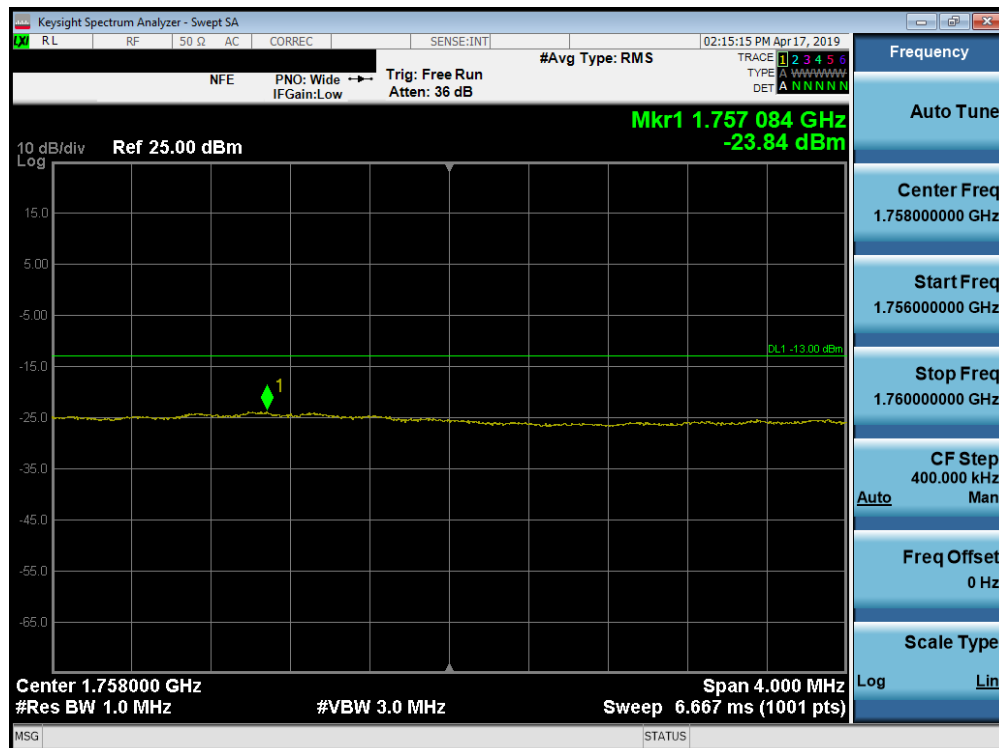


Plot 7-125. Lower Extended Band Edge Plot (Band 66/4 - 15.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFQ720CS	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1903280046-03-R1.ZNF	Test Dates: 3/28 - 4/18/2019	EUT Type: Portable Handset		Page 84 of 149

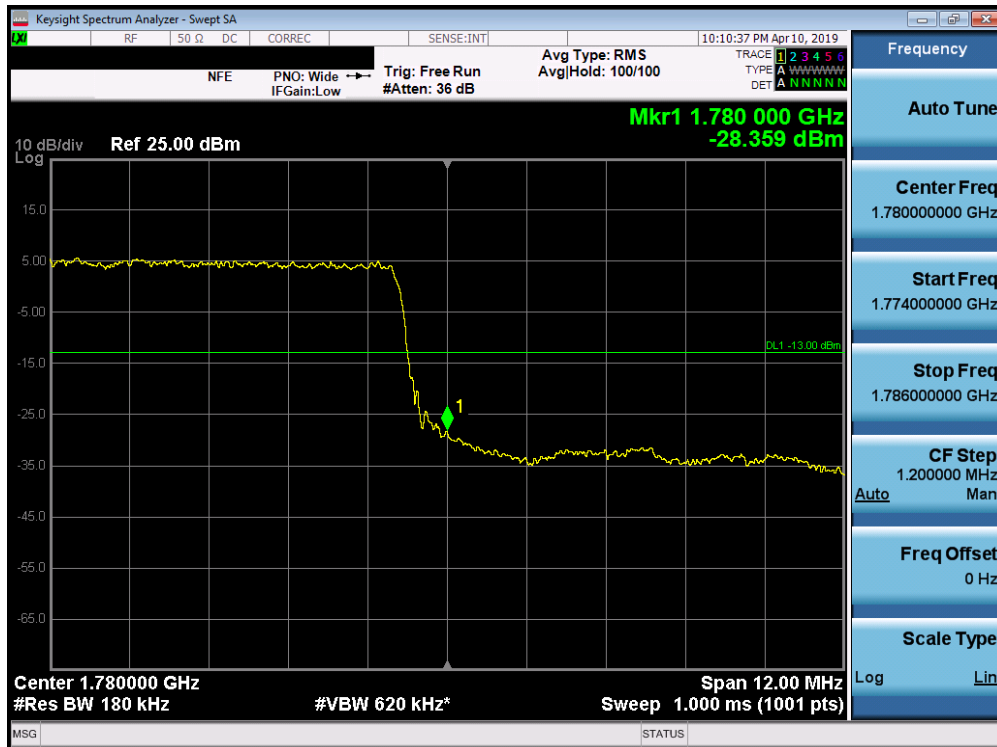


Plot 7-126. Upper Band Edge Plot (Band 4 - 15.0MHz QPSK - Full RB Configuration)



Plot 7-127. Upper Extended Band Edge Plot (Band 4 - 15.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFQ720CS	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1903280046-03-R1.ZNF	Test Dates: 3/28 - 4/18/2019	EUT Type: Portable Handset		Page 85 of 149

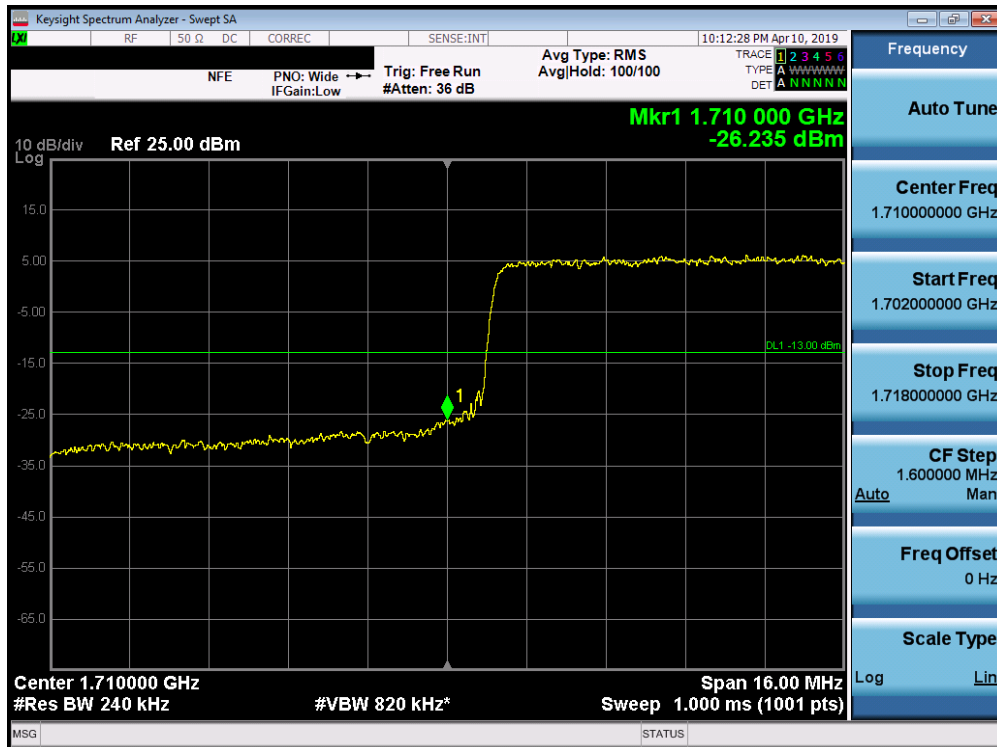


Plot 7-128. Upper Band Edge Plot (Band 66 - 15.0MHz QPSK - Full RB Configuration)

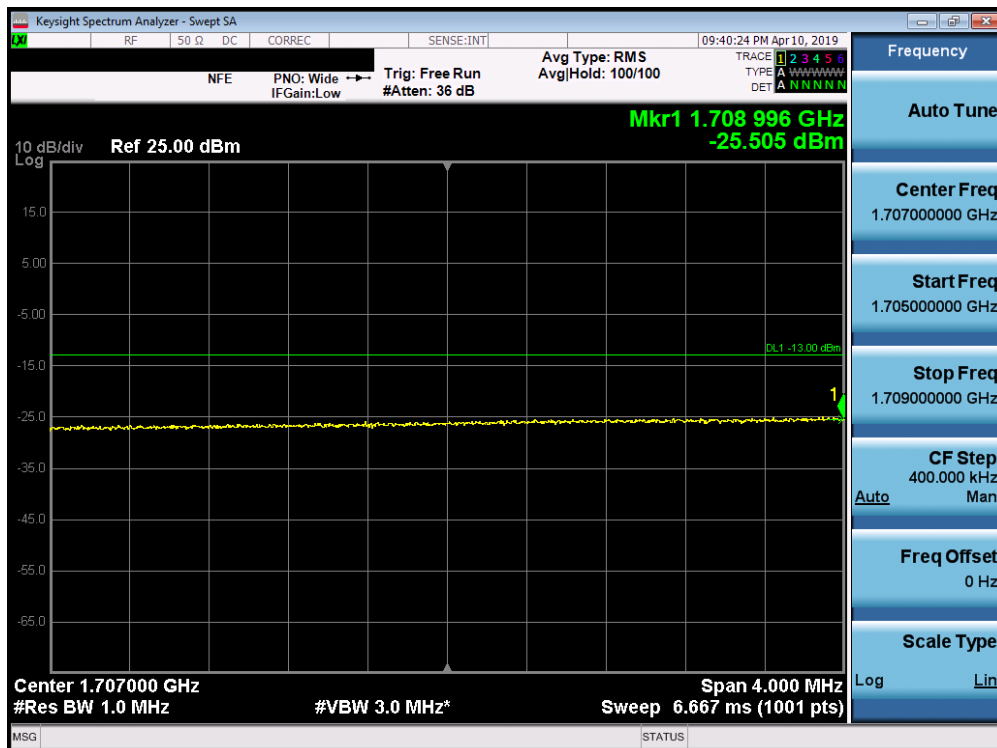


Plot 7-129. Upper Extended Band Edge Plot (Band 66 - 15.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFQ720CS	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1903280046-03-R1.ZNF	Test Dates: 3/28 - 4/18/2019	EUT Type: Portable Handset		Page 86 of 149

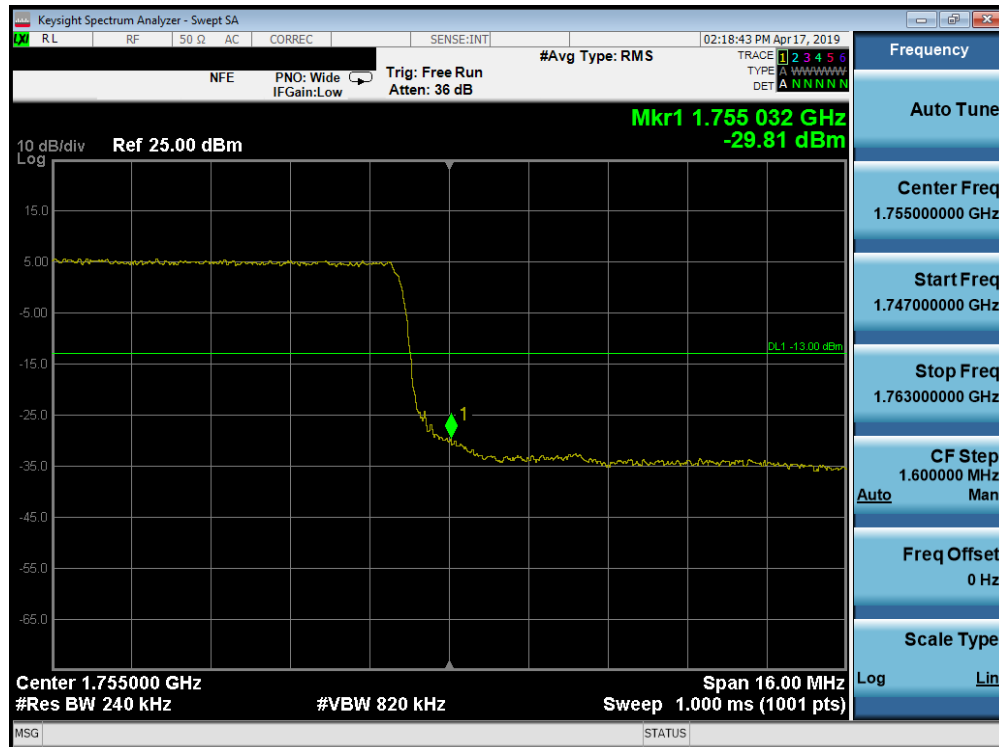


Plot 7-130. Lower Band Edge Plot (Band 66/4 - 20.0MHz QPSK - Full RB Configuration)

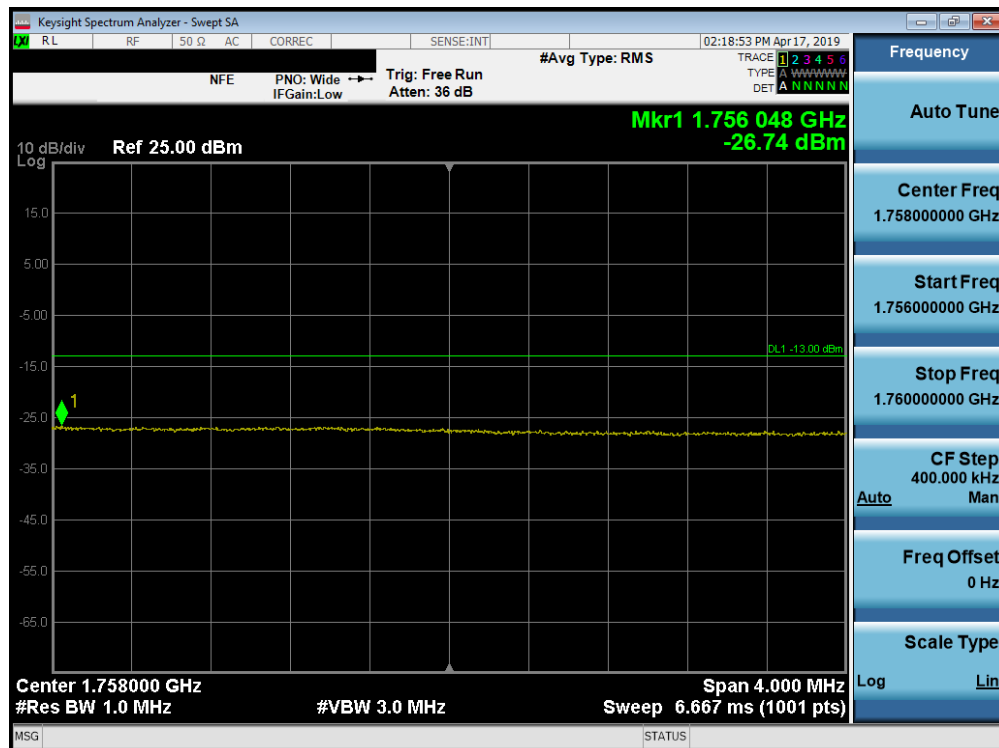


Plot 7-131. Lower Extended Band Edge Plot (Band 66/4 - 20.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFQ720CS	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1903280046-03-R1.ZNF	Test Dates: 3/28 - 4/18/2019	EUT Type: Portable Handset		Page 87 of 149



Plot 7-132. Upper Band Edge Plot (Band 4 - 20.0MHz QPSK - Full RB Configuration)

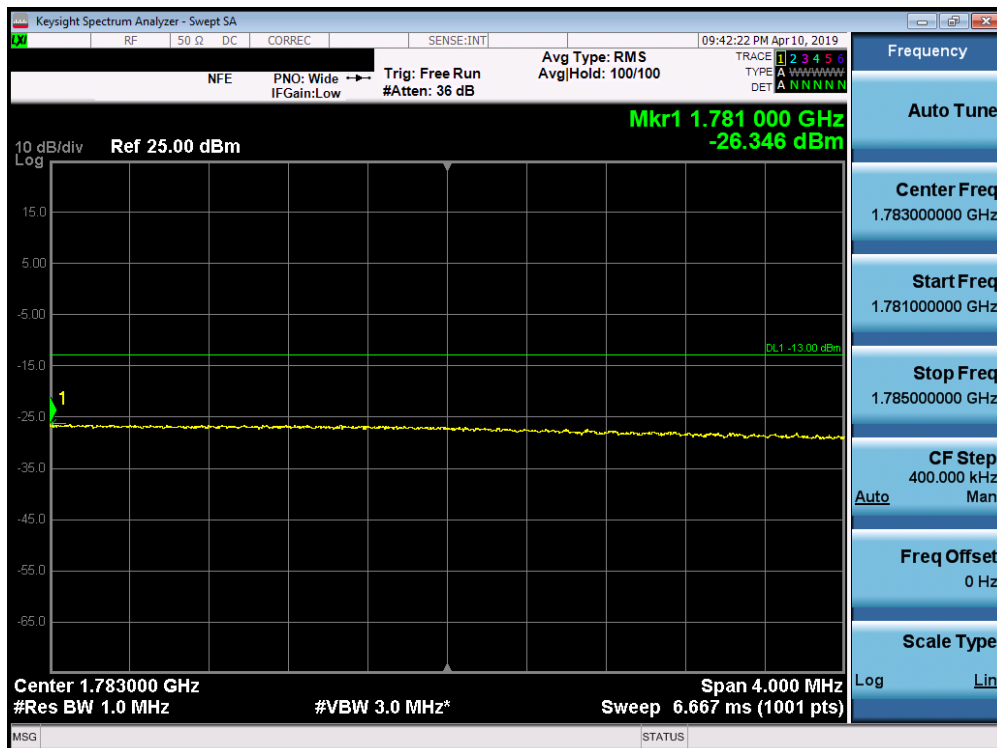


Plot 7-133. Upper Extended Band Edge Plot (Band 4 - 20.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFQ720CS	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1903280046-03-R1.ZNF	Test Dates: 3/28 - 4/18/2019	EUT Type: Portable Handset		Page 88 of 149



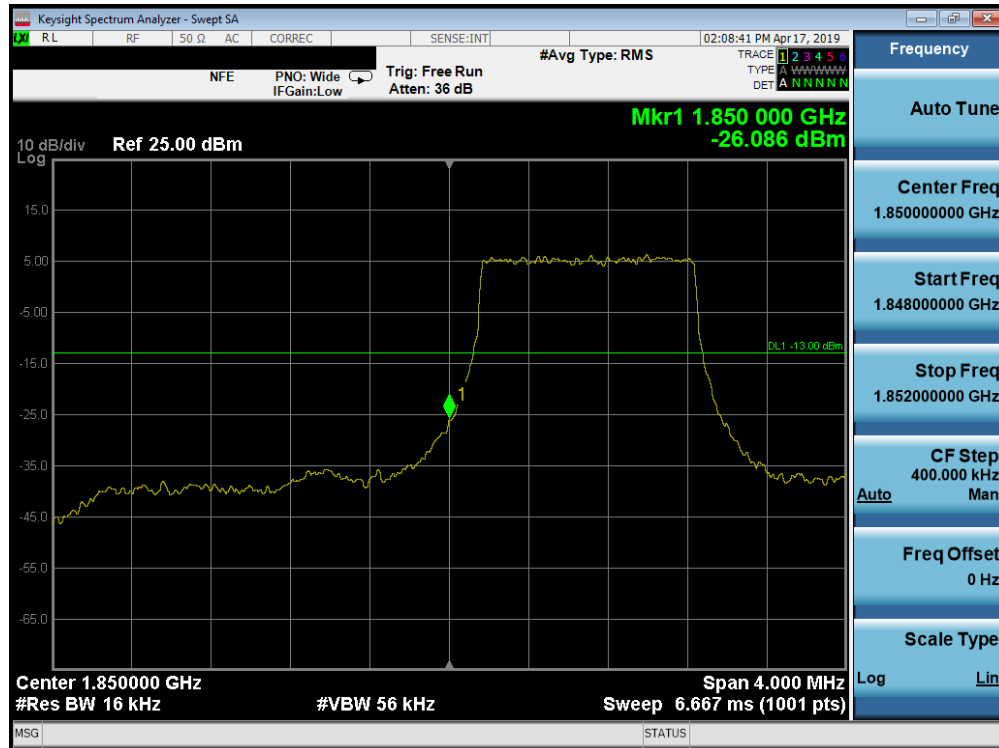
Plot 7-134. Upper Band Edge Plot (Band 66 - 20.0MHz QPSK - Full RB Configuration)



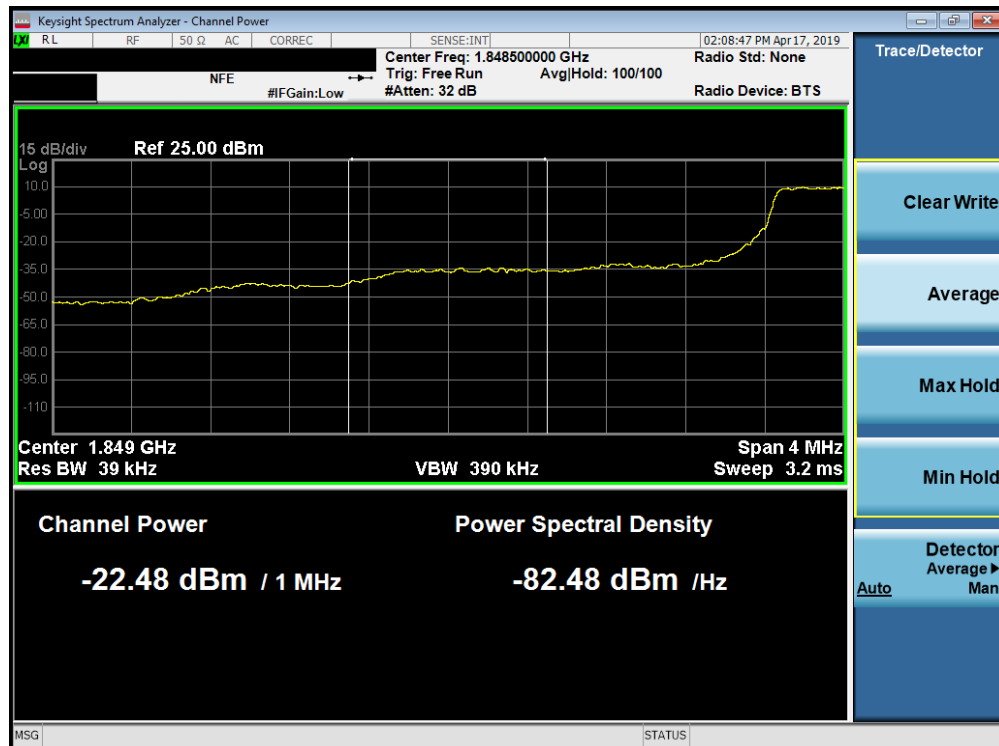
Plot 7-135. Upper Extended Band Edge Plot (Band 66 - 20.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFQ720CS	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1903280046-03-R1.ZNF	Test Dates: 3/28 - 4/18/2019	EUT Type: Portable Handset		Page 89 of 149

Band 2

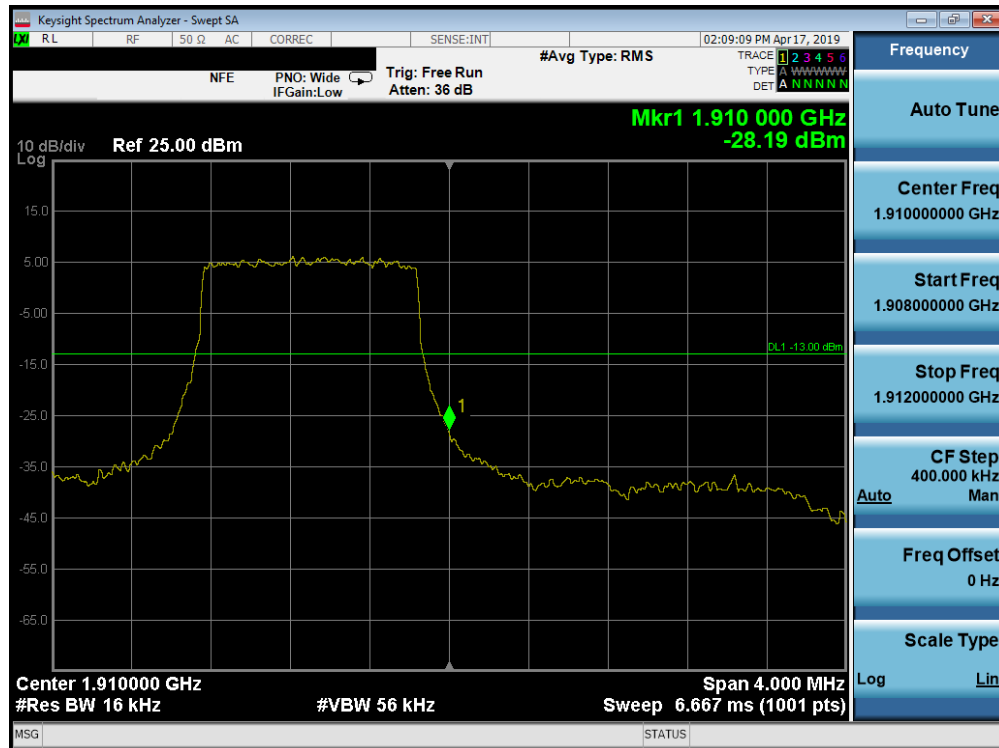


Plot 7-136. Lower Band Edge Plot (Band 2 - 1.4MHz QPSK - Full RB Configuration)

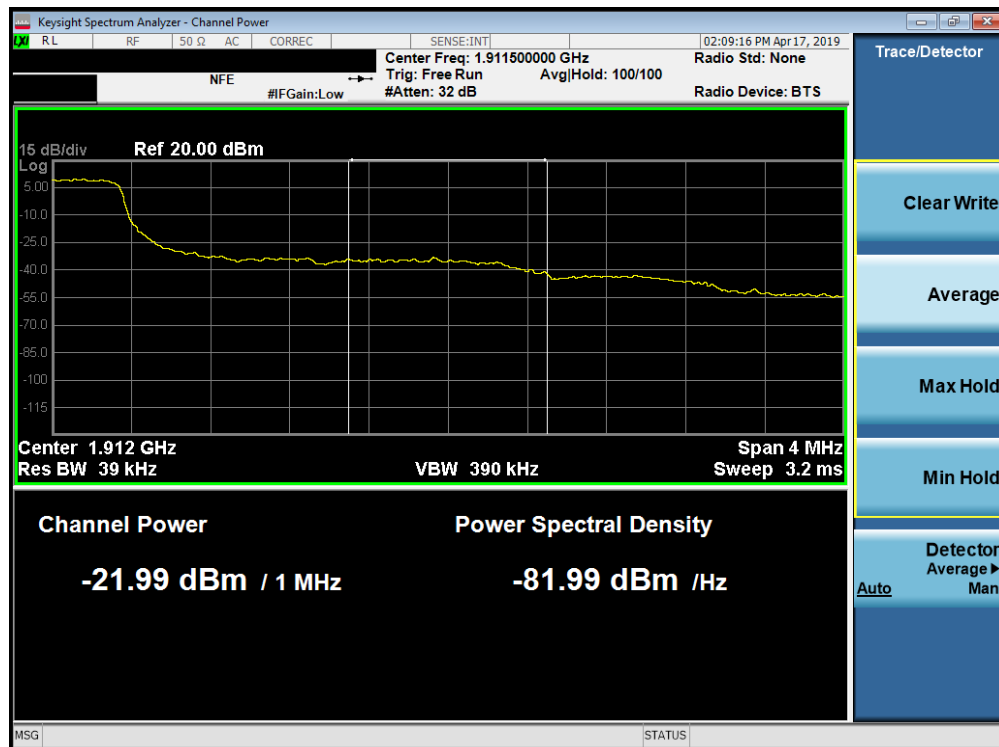


Plot 7-137. Lower Extended Band Edge Plot (Band 2 - 1.4MHz QPSK - Full RB Configuration)

FCC ID: ZNFQ720CS	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1903280046-03-R1-ZNF	Test Dates: 3/28 - 4/18/2019	EUT Type: Portable Handset		Page 90 of 149

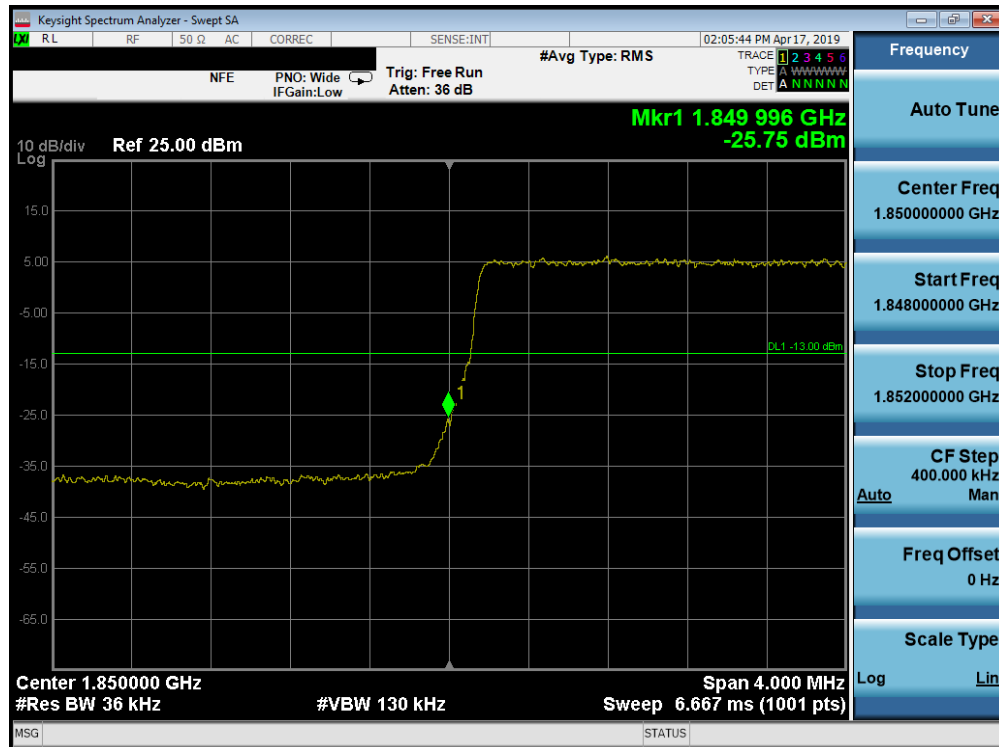


Plot 7-138. Upper Band Edge Plot (Band 2 - 1.4MHz QPSK - Full RB Configuration)

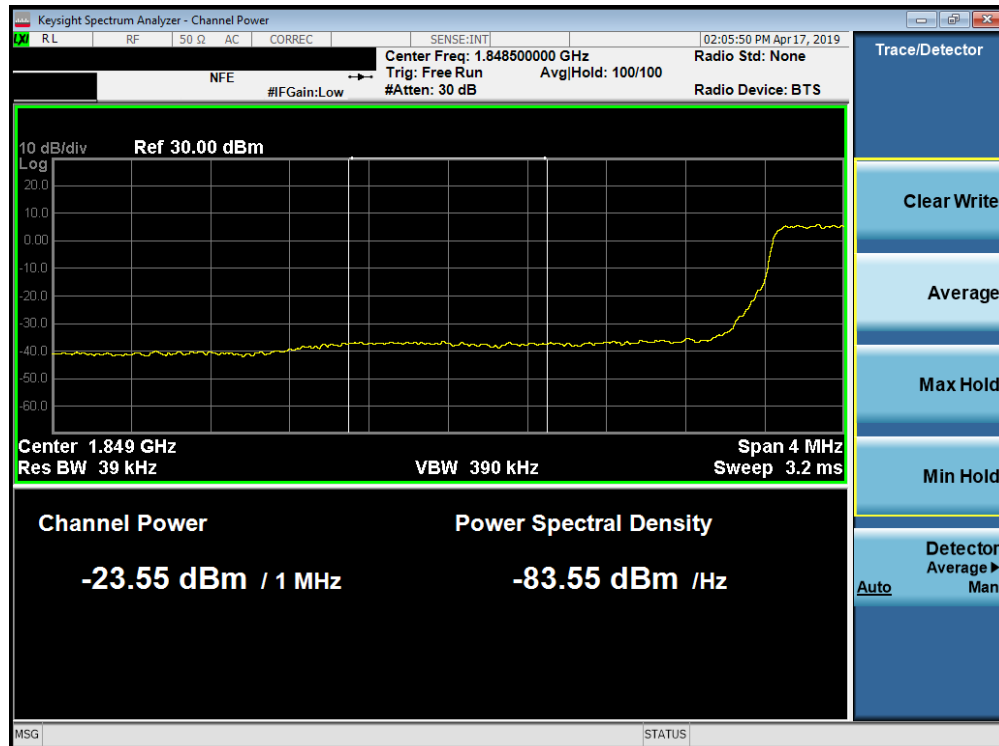


Plot 7-139. Upper Extended Band Edge Plot (Band 2 - 1.4MHz QPSK - Full RB Configuration)

FCC ID: ZNFQ720CS	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1903280046-03-R1.ZNF	Test Dates: 3/28 - 4/18/2019	EUT Type: Portable Handset		Page 91 of 149

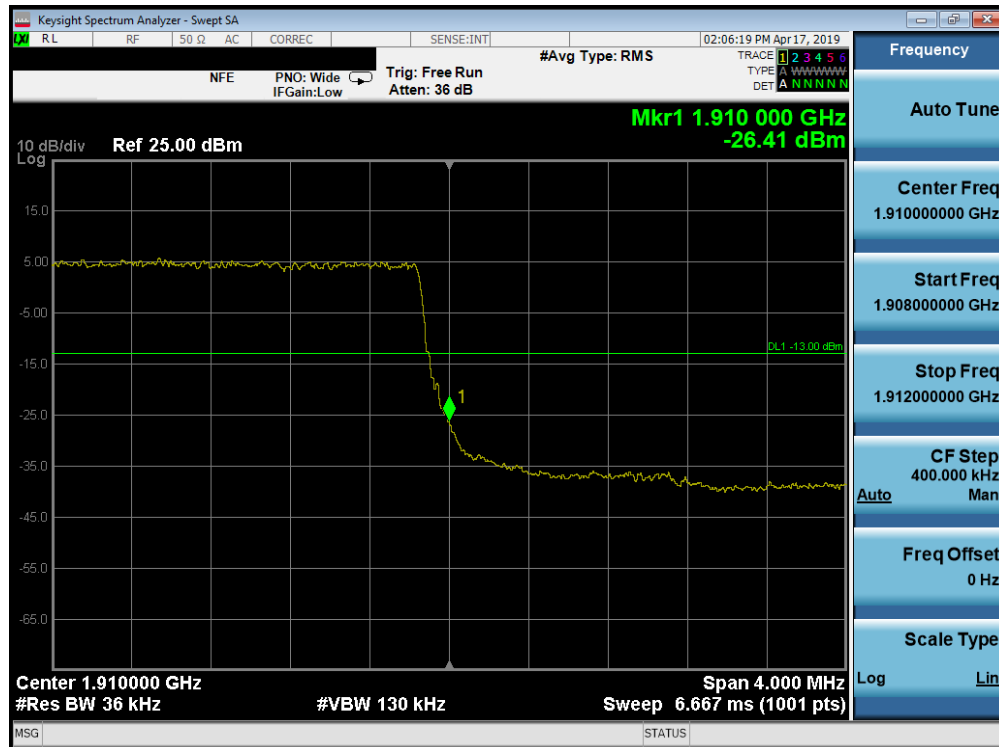


Plot 7-140. Lower Band Edge Plot (Band 2 - 3.0MHz QPSK - Full RB Configuration)

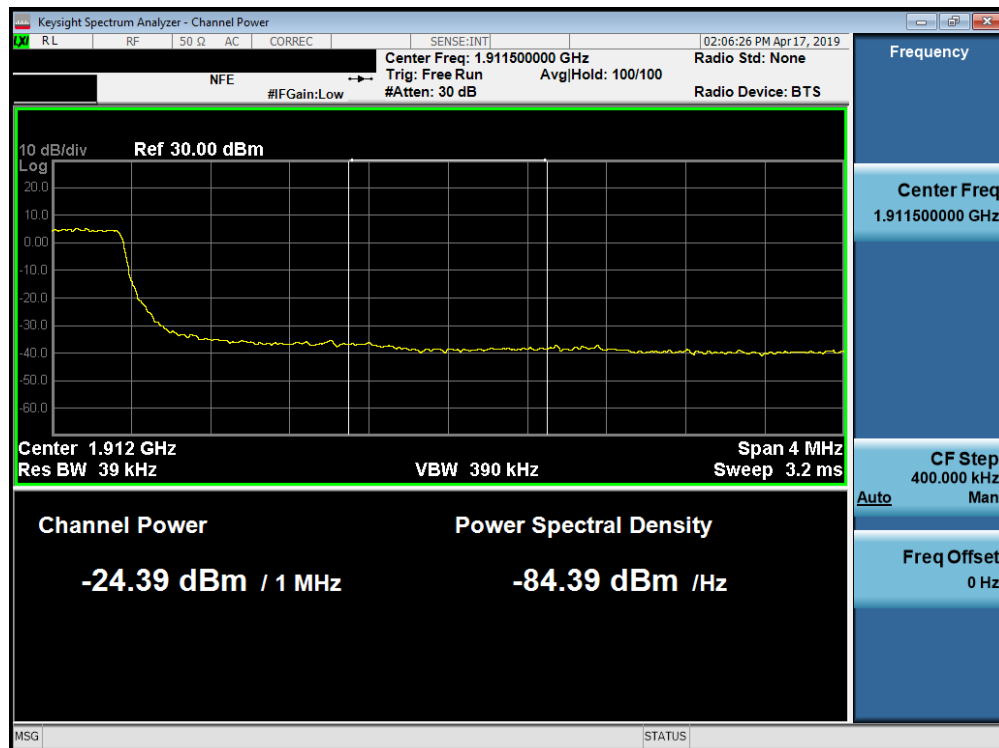


Plot 7-141. Lower Extended Band Edge Plot (Band 2 - 3.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFQ720CS	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1903280046-03-R1-ZNF	Test Dates: 3/28 - 4/18/2019	EUT Type: Portable Handset		Page 92 of 149

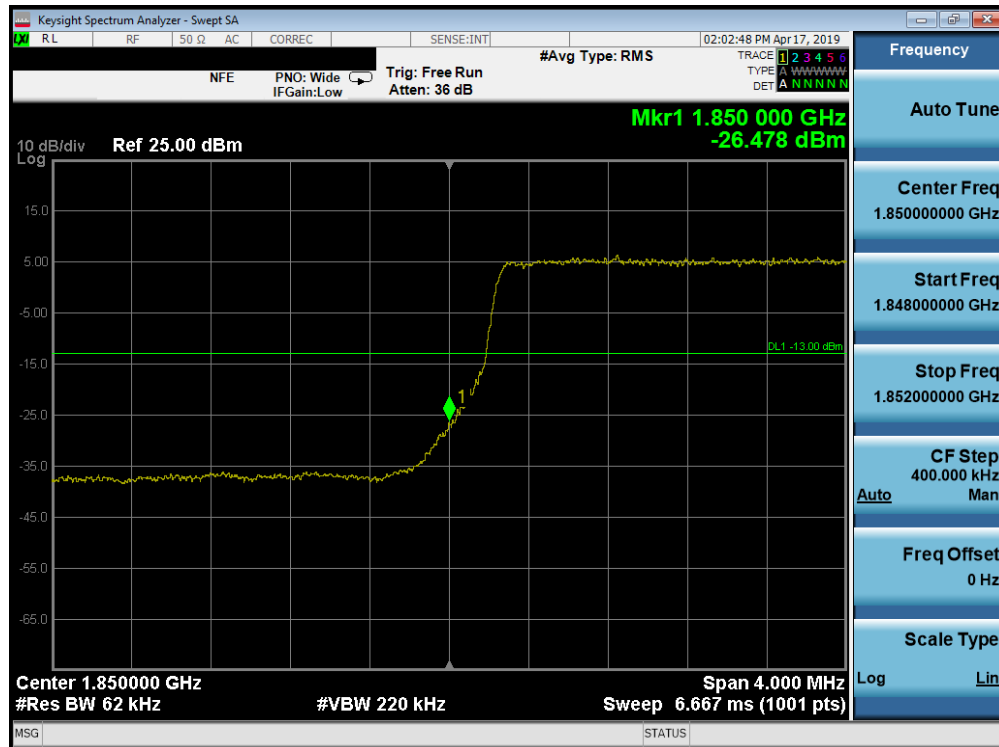


Plot 7-142. Upper Band Edge Plot (Band 2 - 3.0MHz QPSK - Full RB Configuration)

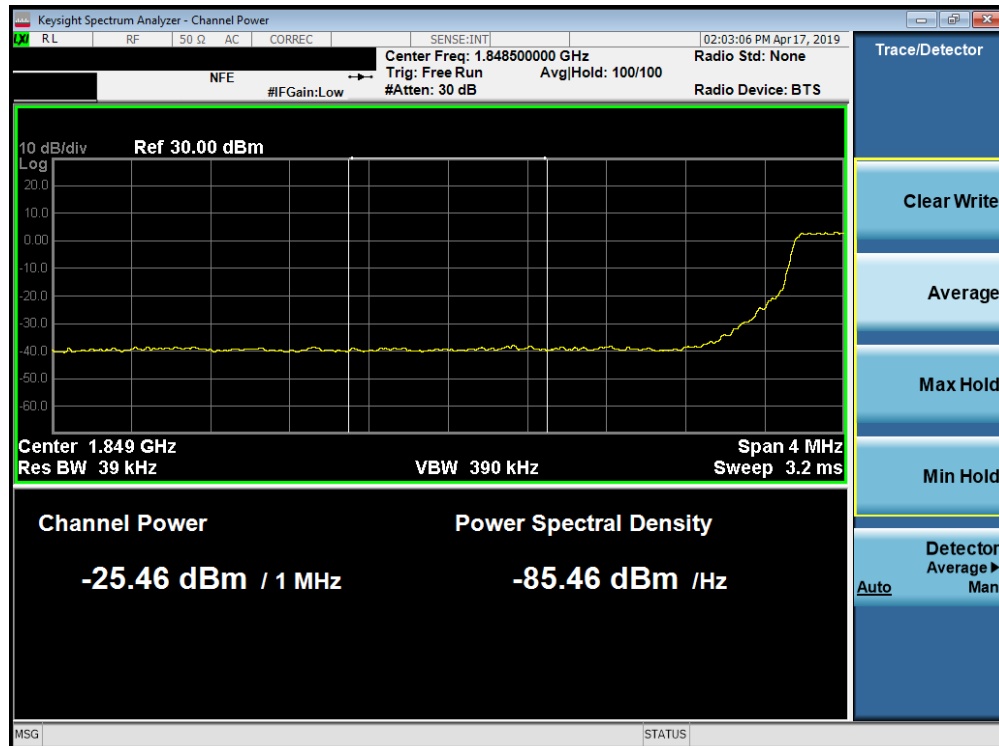


Plot 7-143. Upper Extended Band Edge Plot (Band 2 - 3.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFQ720CS	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1903280046-03-R1-ZNF	Test Dates: 3/28 - 4/18/2019	EUT Type: Portable Handset		Page 93 of 149

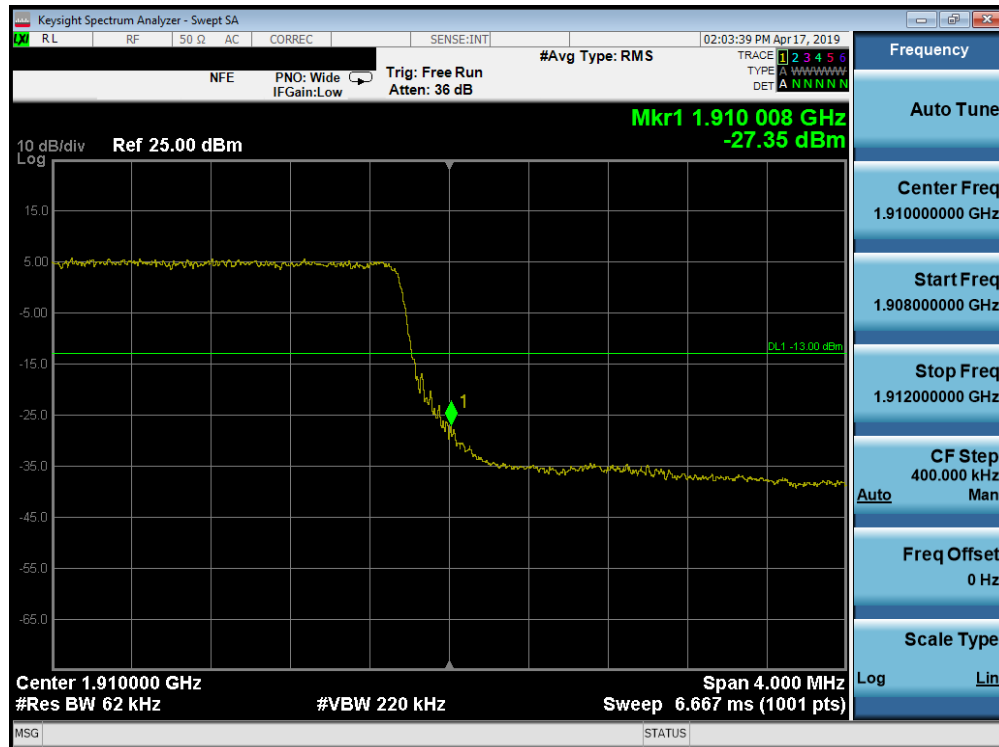


Plot 7-144. Lower Band Edge Plot (Band 2 - 5.0MHz QPSK - Full RB Configuration)

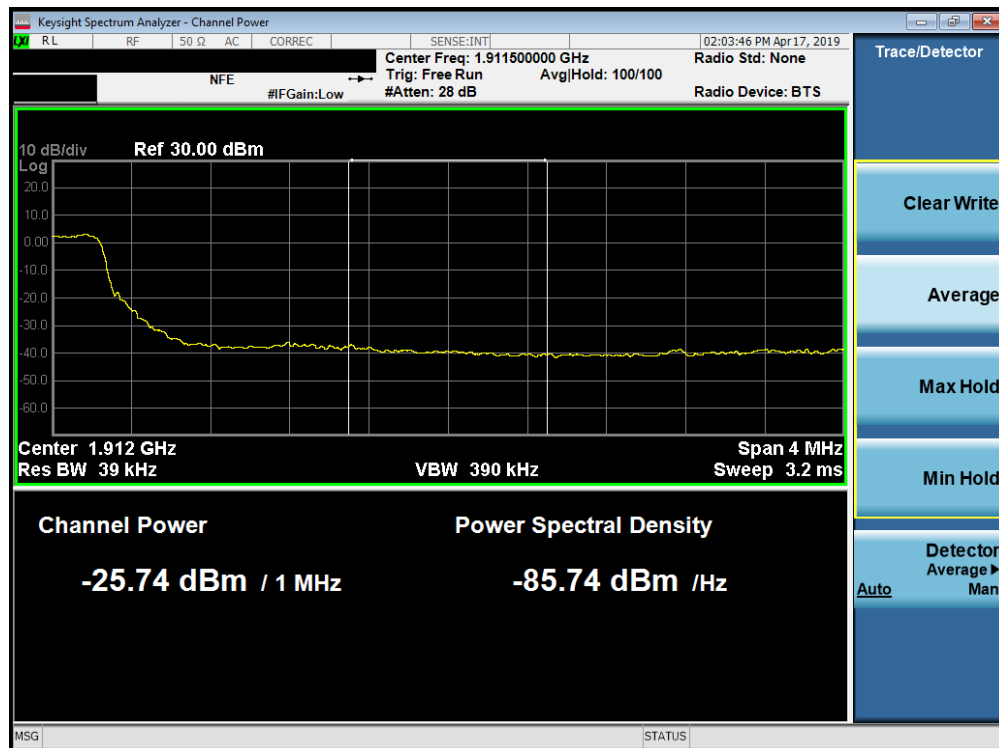


Plot 7-145. Lower Extended Band Edge Plot (Band 2 - 5.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFQ720CS	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1903280046-03-R1-ZNF	Test Dates: 3/28 - 4/18/2019	EUT Type: Portable Handset		Page 94 of 149

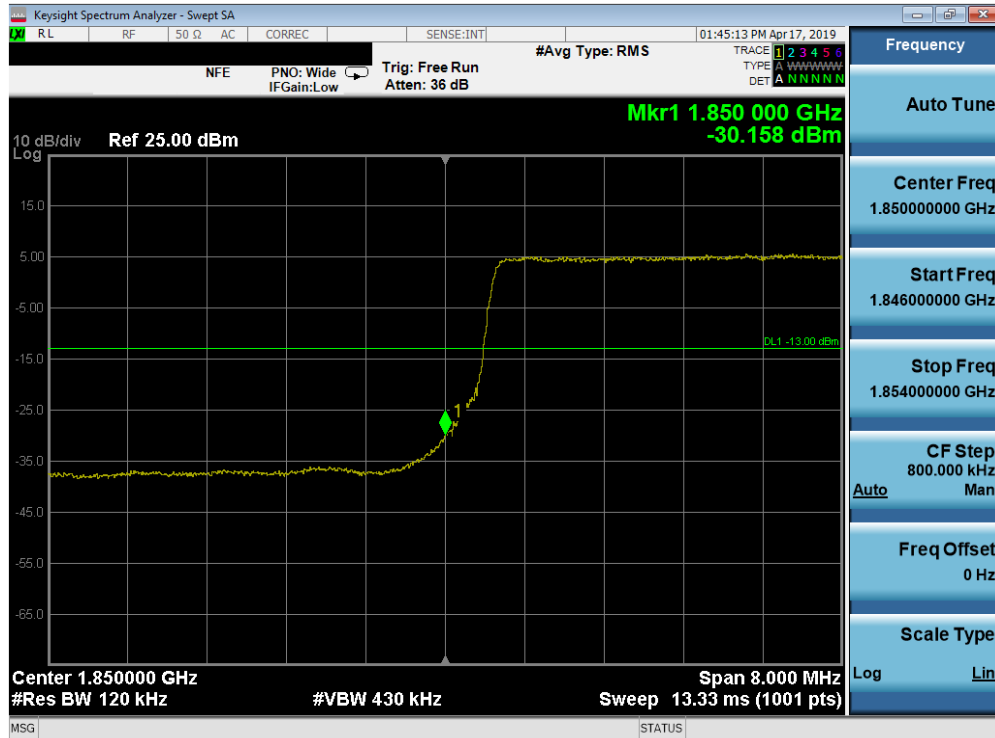


Plot 7-146. Upper Band Edge Plot (Band 2 - 5.0MHz QPSK - Full RB Configuration)

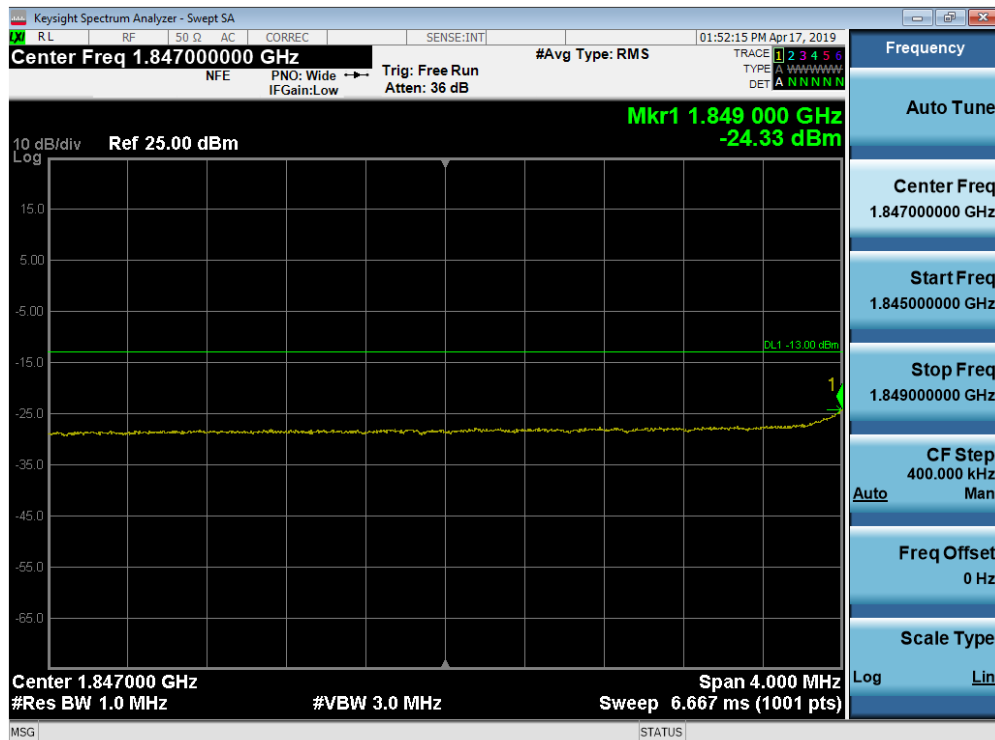


Plot 7-147. Upper Extended Band Edge Plot (Band 2 - 5.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFQ720CS	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1903280046-03-R1-ZNF	Test Dates: 3/28 - 4/18/2019	EUT Type: Portable Handset		Page 95 of 149

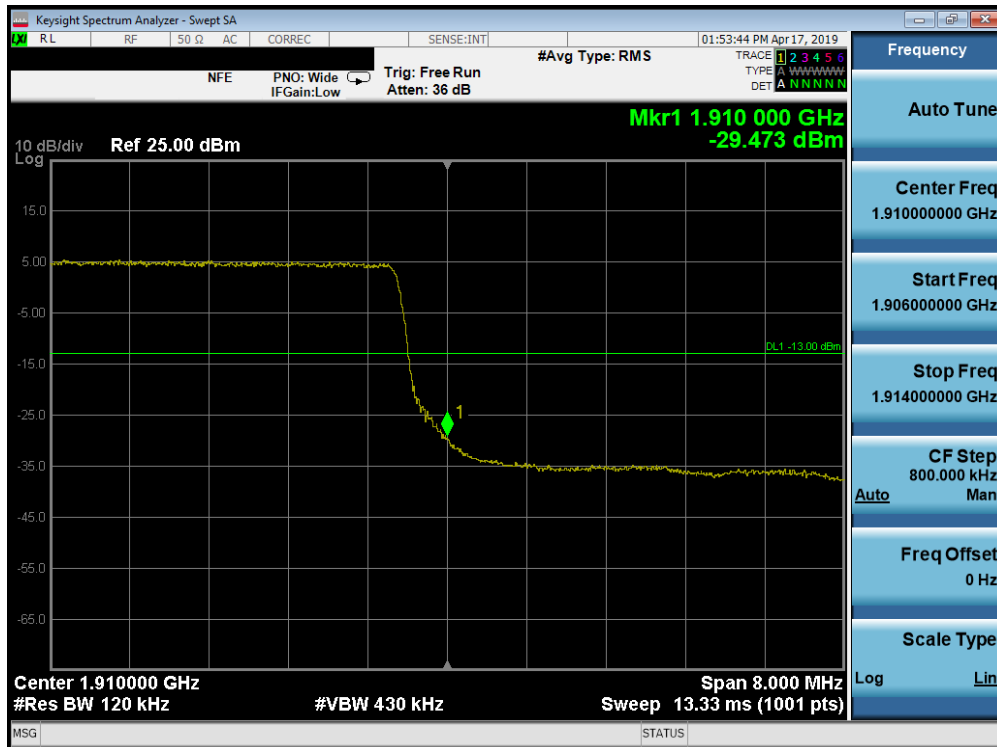


Plot 7-148. Lower Band Edge Plot (Band 2 - 10.0MHz QPSK - Full RB Configuration)

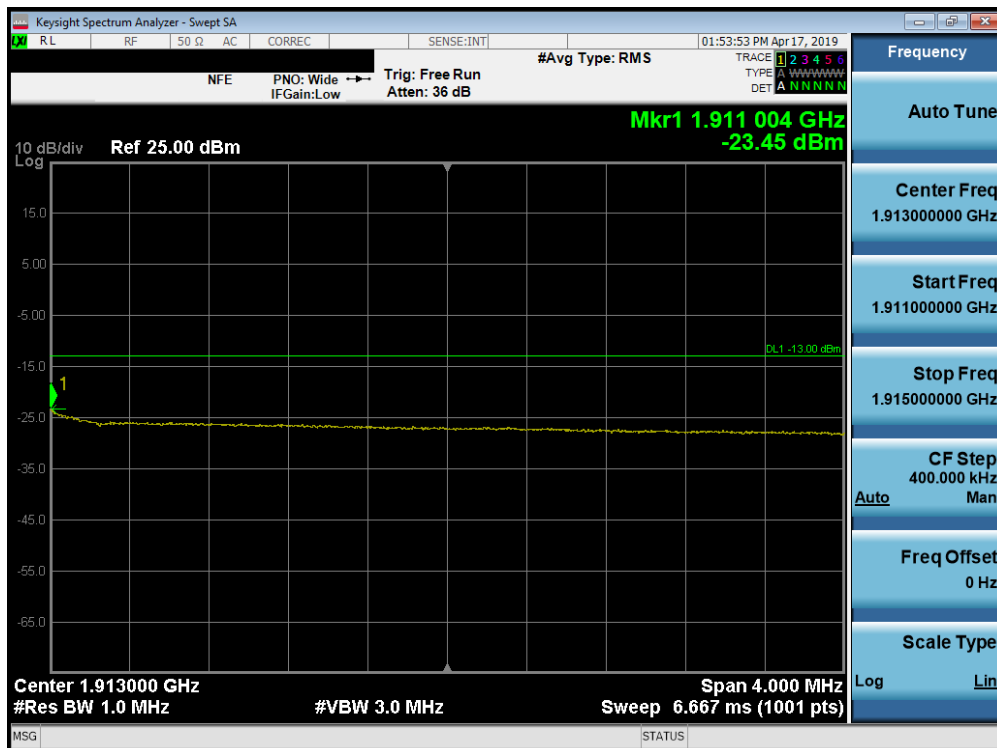


Plot 7-149. Lower Extended Band Edge Plot (Band 2 - 10.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFQ720CS	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1903280046-03-R1.ZNF	Test Dates: 3/28 - 4/18/2019	EUT Type: Portable Handset		Page 96 of 149

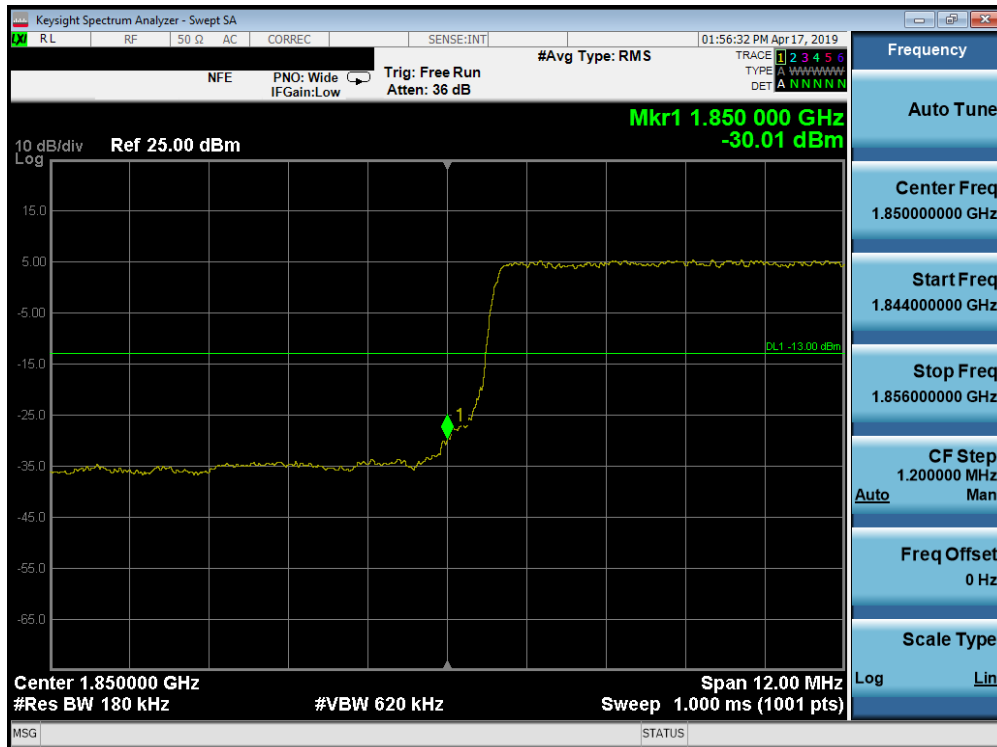


Plot 7-150. Upper Band Edge Plot (Band 2 - 10.0MHz QPSK - Full RB Configuration)

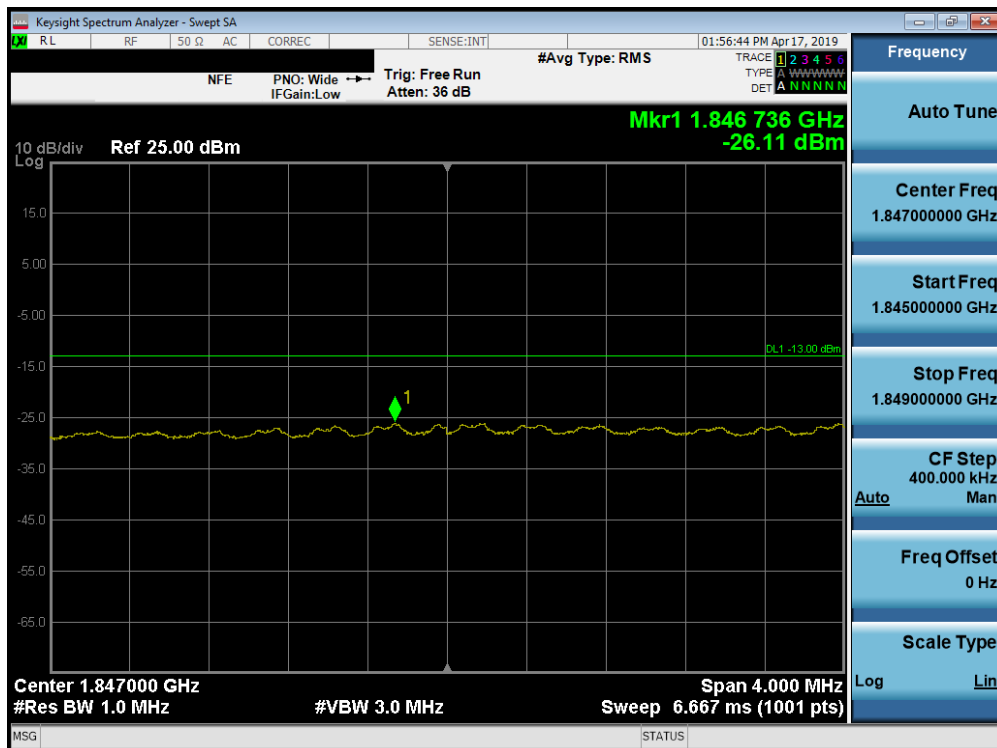


Plot 7-151. Upper Extended Band Edge Plot (Band 2 - 10.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFQ720CS	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1903280046-03-R1.ZNF	Test Dates: 3/28 - 4/18/2019	EUT Type: Portable Handset		Page 97 of 149

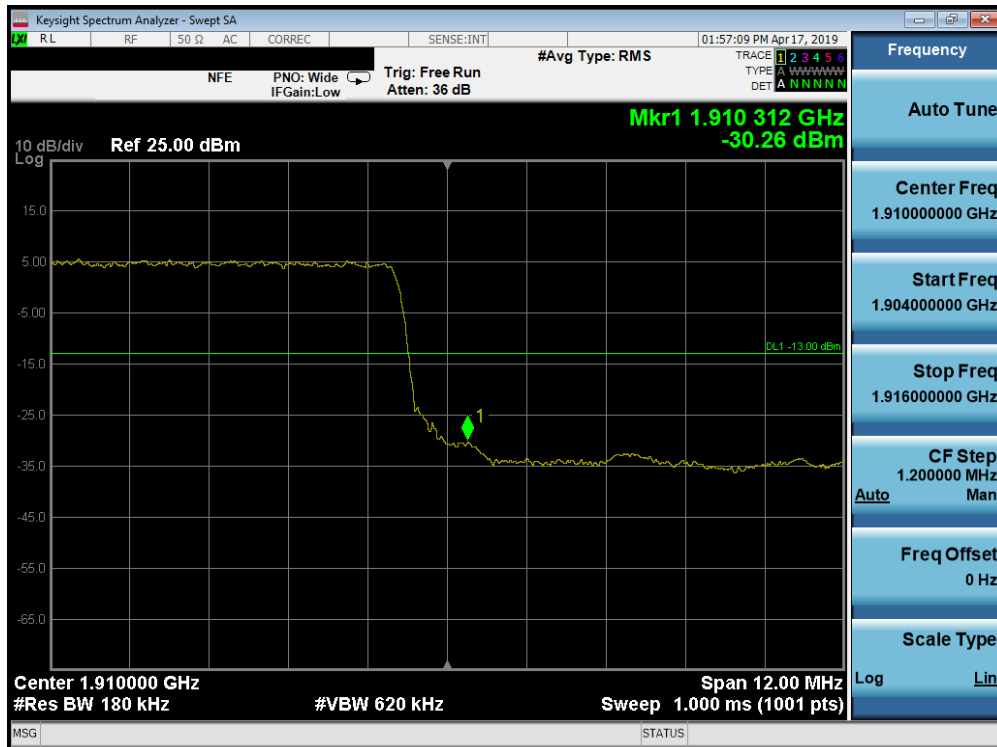


Plot 7-152. Lower Band Edge Plot (Band 2 - 15.0MHz QPSK - Full RB Configuration)

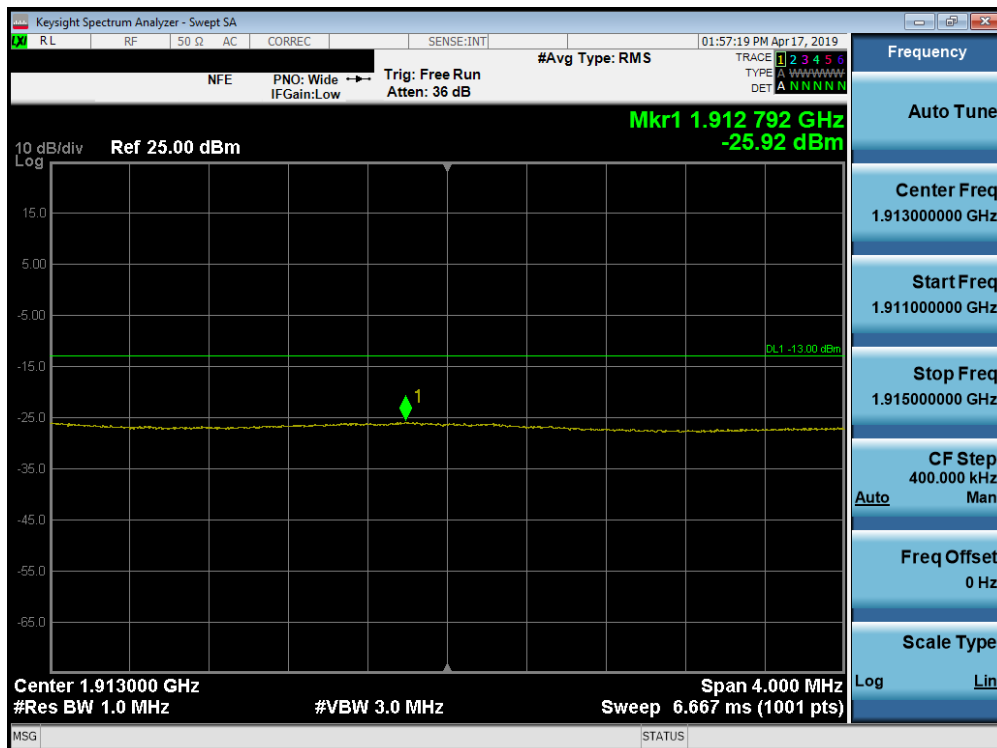


Plot 7-153. Lower Extended Band Edge Plot (Band 2 - 15.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFQ720CS	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1903280046-03-R1.ZNF	Test Dates: 3/28 - 4/18/2019	EUT Type: Portable Handset		Page 98 of 149

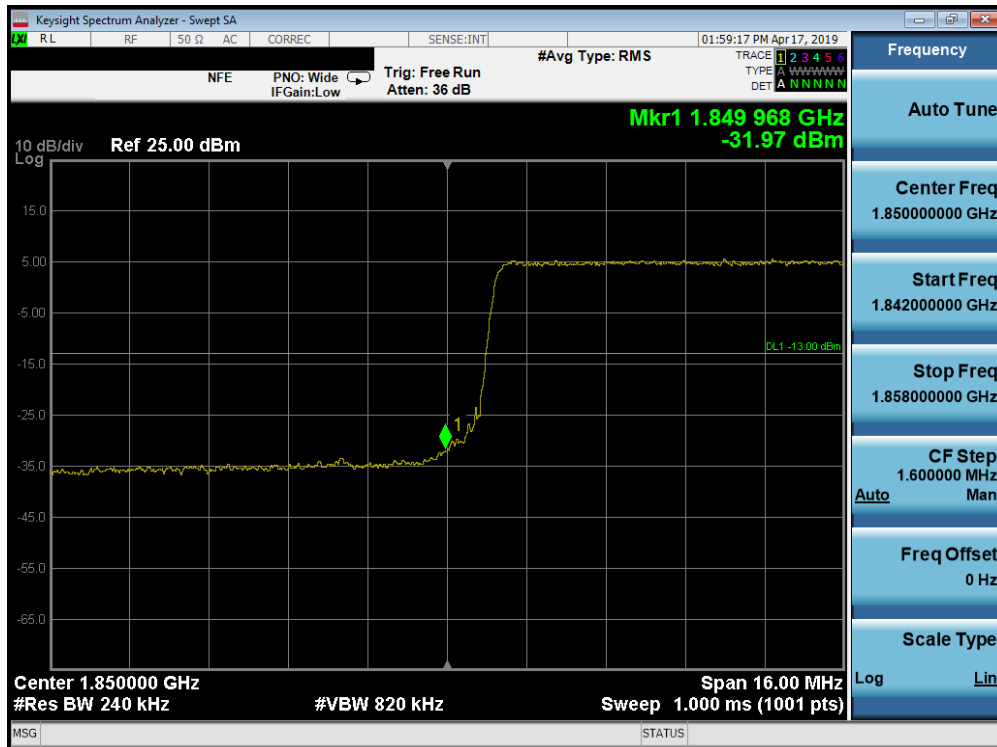


Plot 7-154. Upper Band Edge Plot (Band 2 - 15.0MHz QPSK - Full RB Configuration)

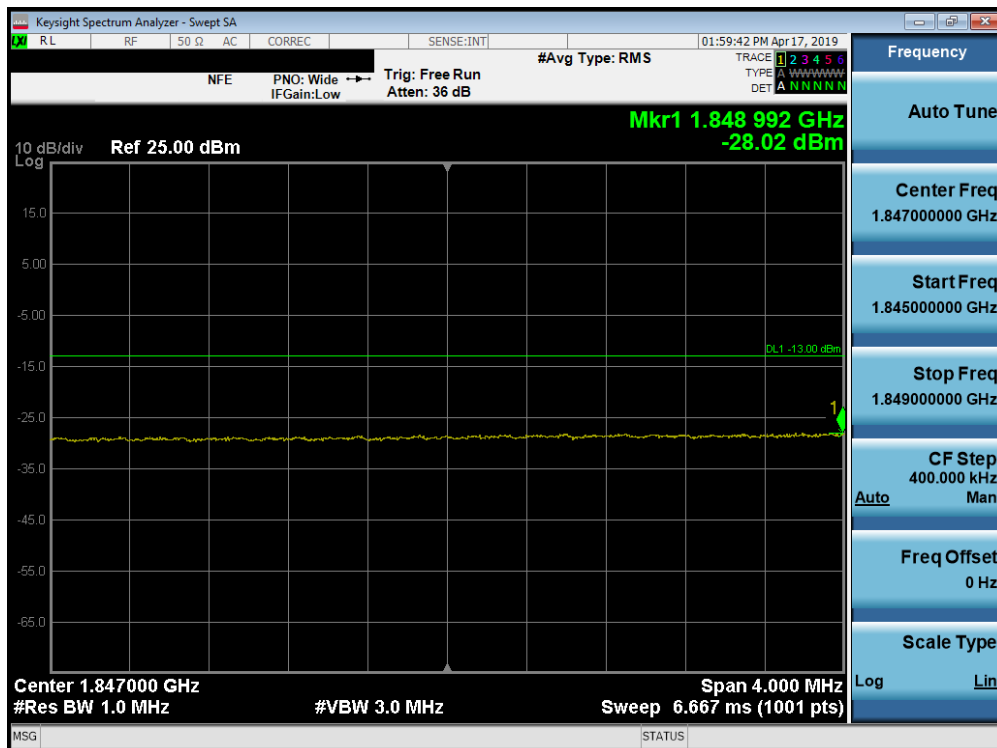


Plot 7-155. Upper Extended Band Edge Plot (Band 2 - 15.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFQ720CS	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1903280046-03-R1.ZNF	Test Dates: 3/28 - 4/18/2019	EUT Type: Portable Handset		Page 99 of 149

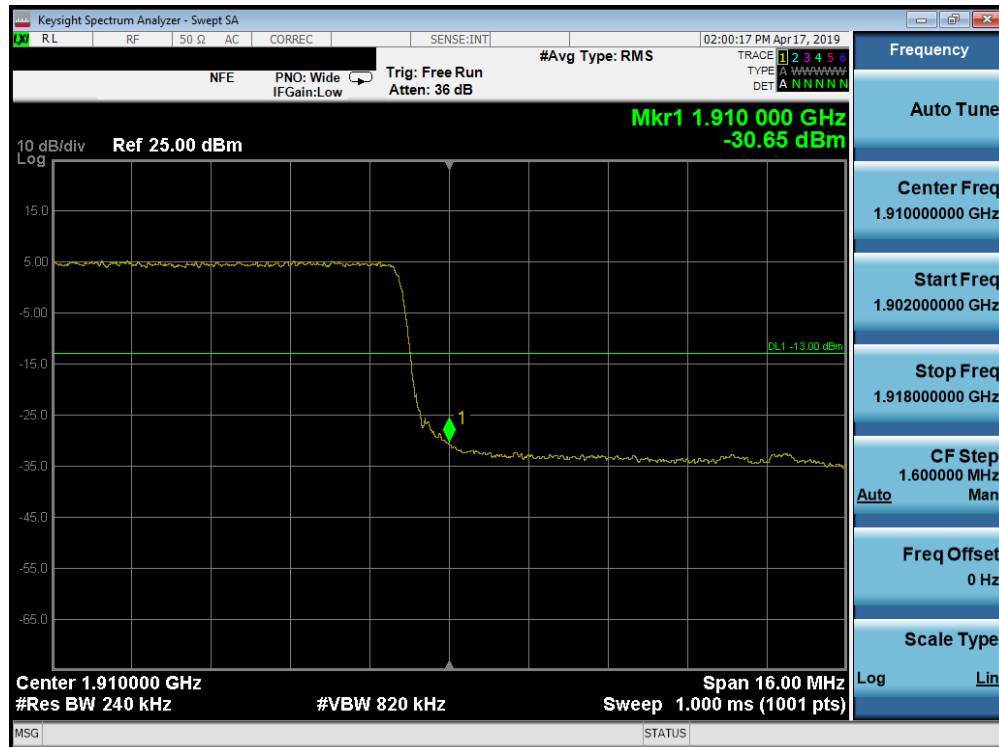


Plot 7-156. Lower Band Edge Plot (Band 2 - 20.0MHz QPSK - Full RB Configuration)

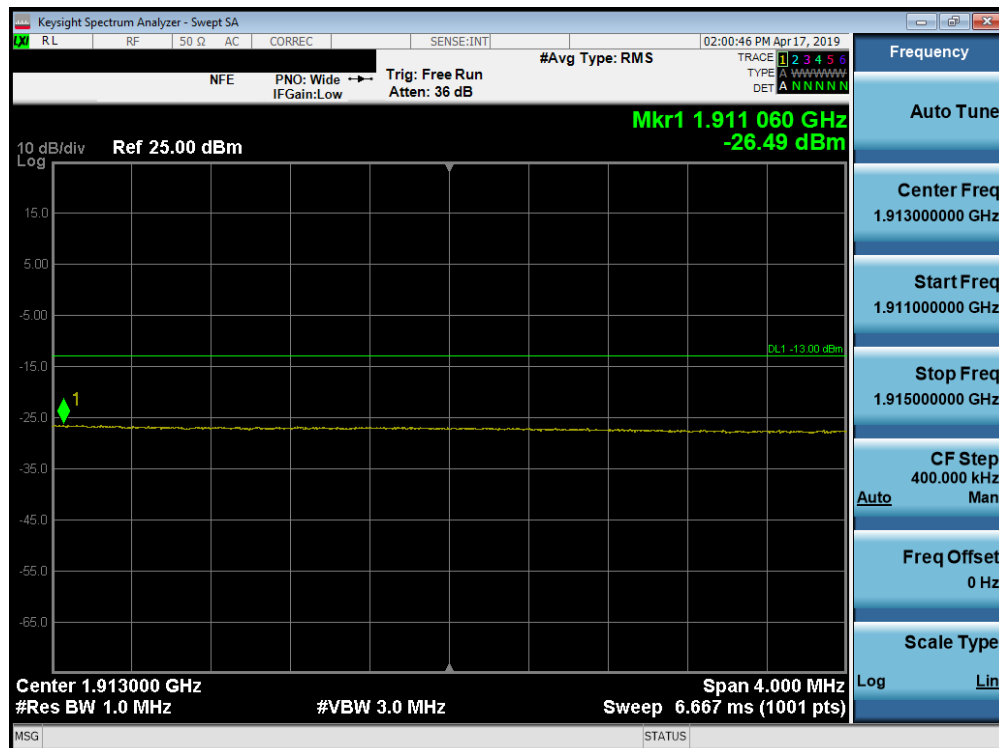


Plot 7-157. Lower Extended Band Edge Plot (Band 2 - 20.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFQ720CS	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1903280046-03-R1.ZNF	Test Dates: 3/28 - 4/18/2019	EUT Type: Portable Handset		Page 100 of 149



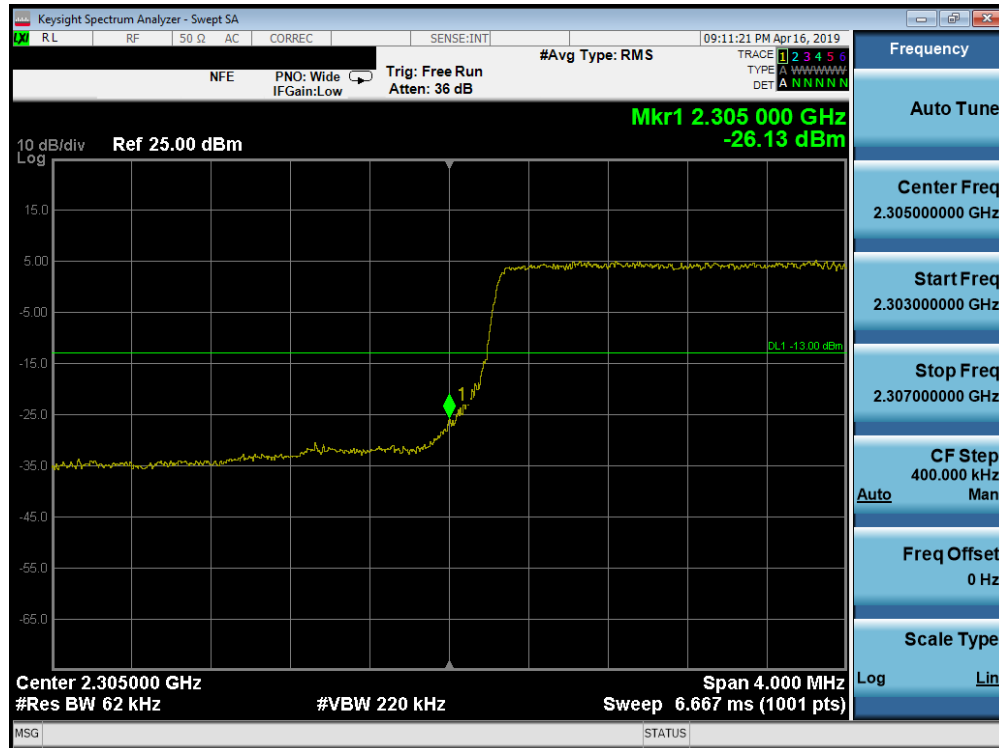
Plot 7-158. Upper Band Edge Plot (Band 2 - 20.0MHz QPSK - Full RB Configuration)



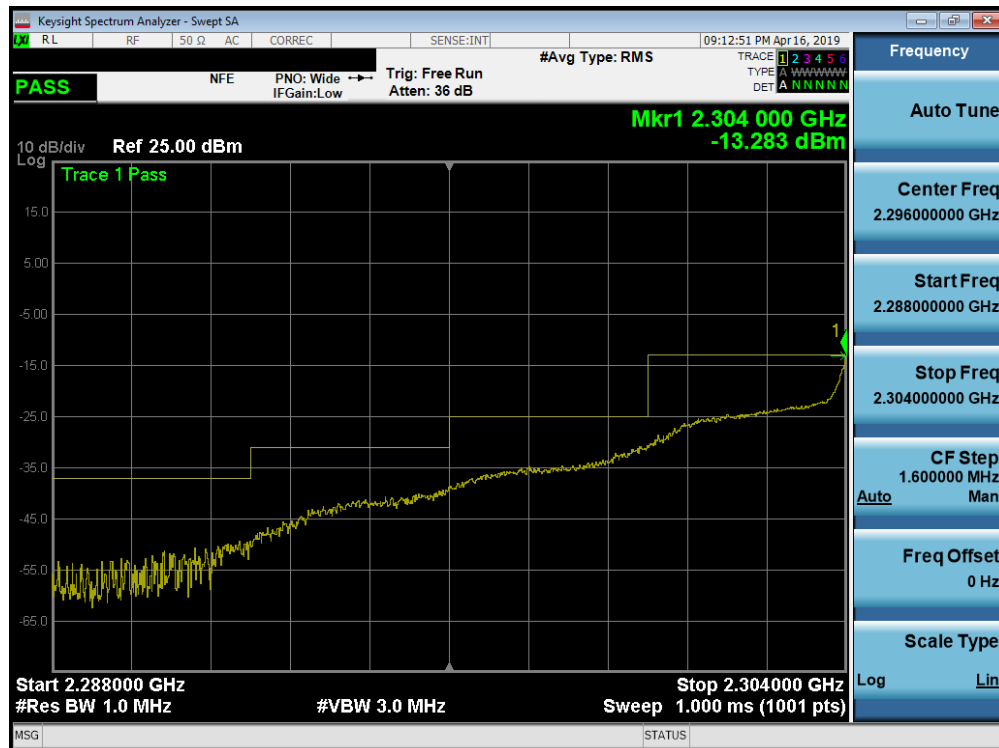
Plot 7-159. Upper Extended Band Edge Plot (Band 2 - 20.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFQ720CS	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1903280046-03-R1.ZNF	Test Dates: 3/28 - 4/18/2019	EUT Type: Portable Handset		Page 101 of 149

Band 30

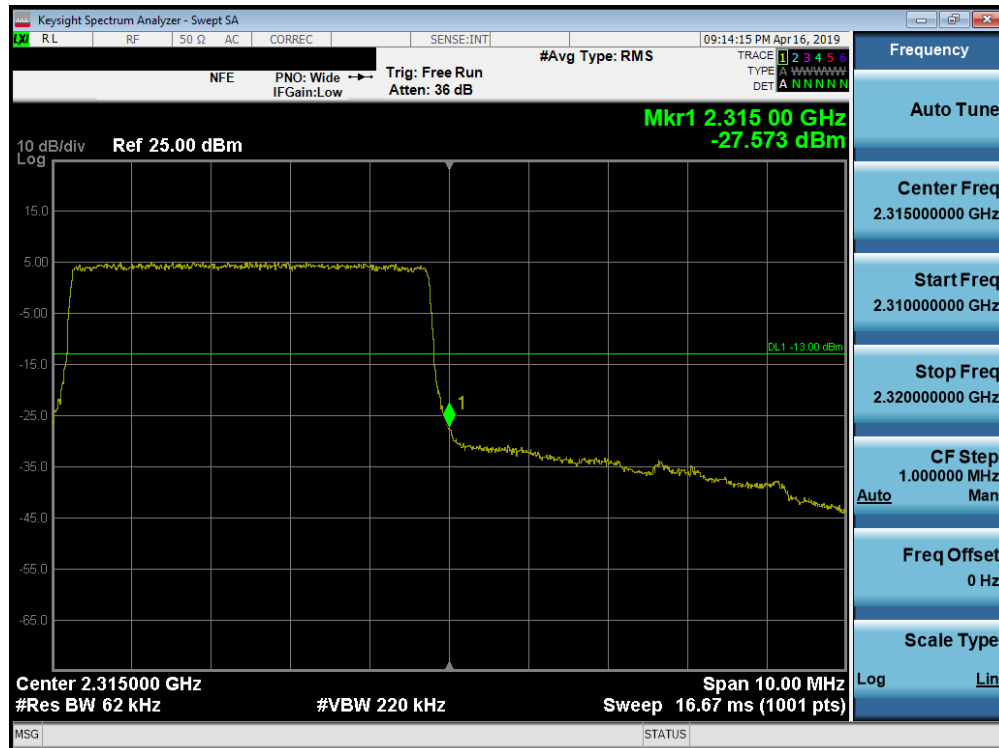


Plot 7-160. Lower Band Edge Plot (Band 30 - 5.0MHz QPSK - Full RB Configuration)

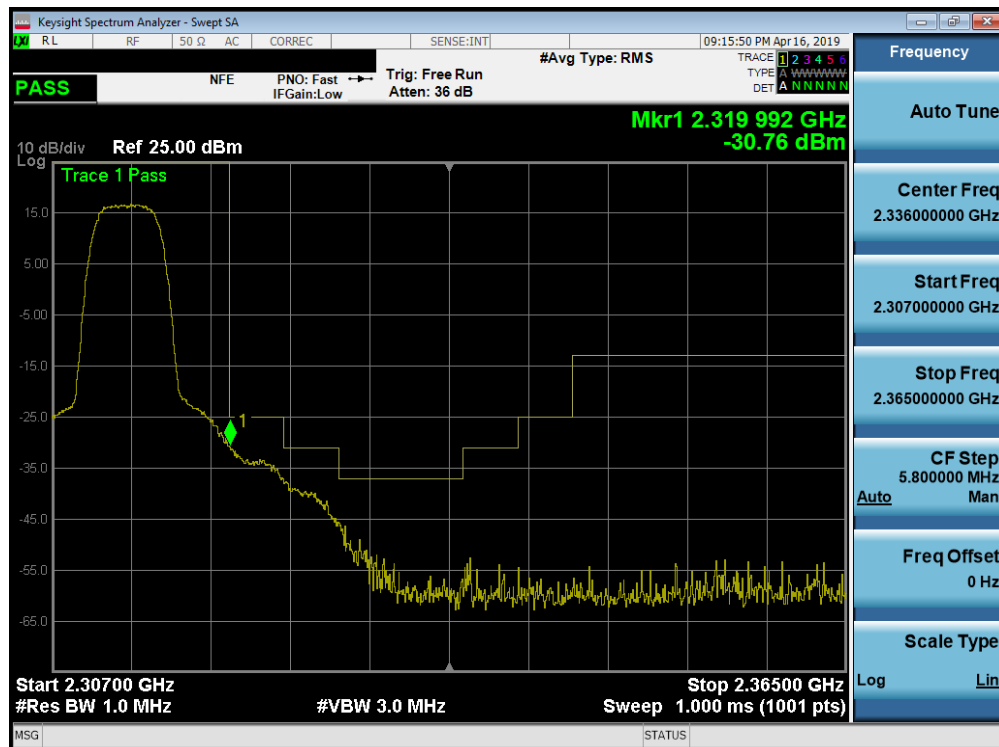


Plot 7-161. Lower Extended Band Edge Plot (Band 30 - 5.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFQ720CS	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1903280046-03-R1.ZNF	Test Dates: 3/28 - 4/18/2019	EUT Type: Portable Handset		Page 102 of 149

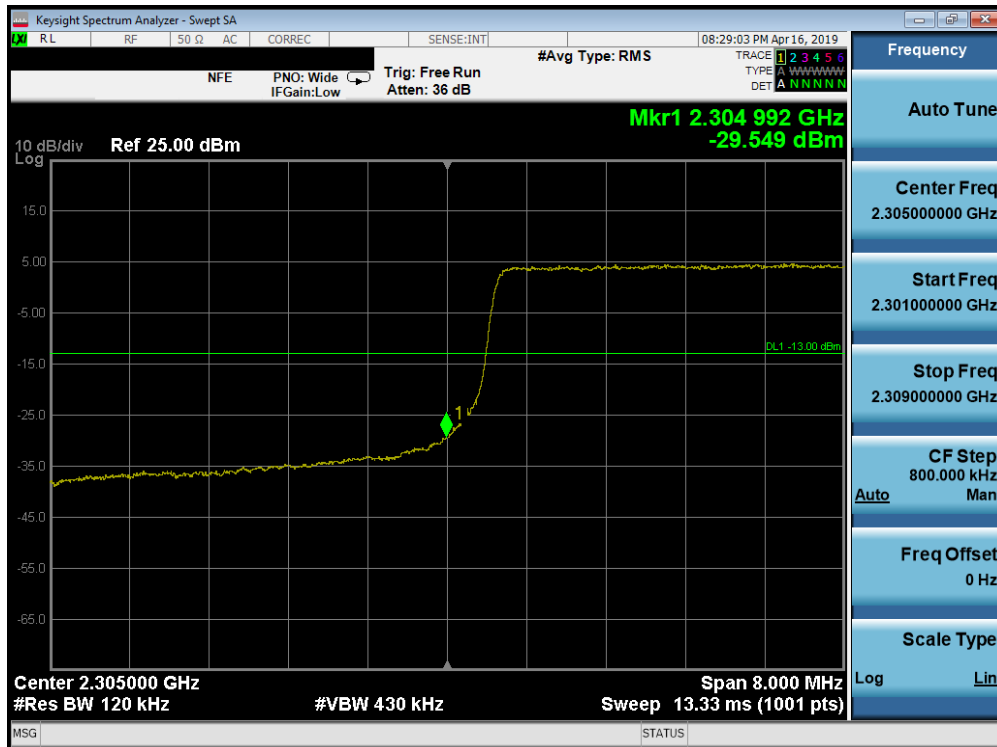


Plot 7-162. Upper Band Edge Plot (Band 30 - 5.0MHz QPSK - Full RB Configuration)



Plot 7-163. Upper Extended Band Edge Plot (Band 30 - 5.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFQ720CS	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1903280046-03-R1.ZNF	Test Dates: 3/28 - 4/18/2019	EUT Type: Portable Handset		Page 103 of 149

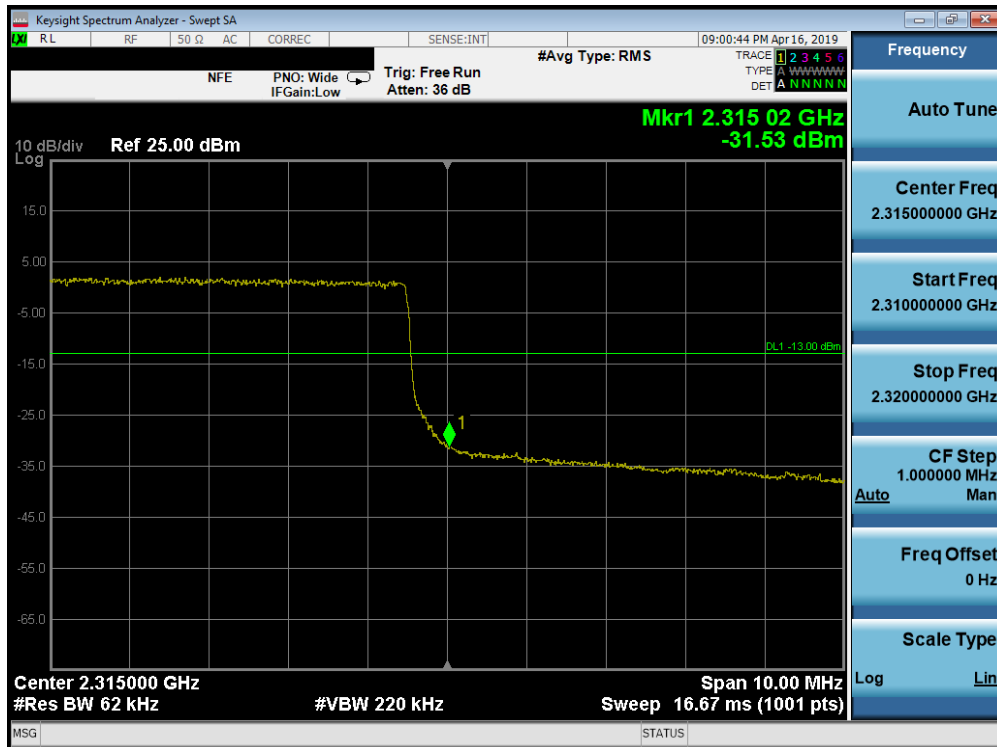


Plot 7-164. Lower Band Edge Plot (Band 30 - 10.0MHz QPSK - Full RB Configuration)

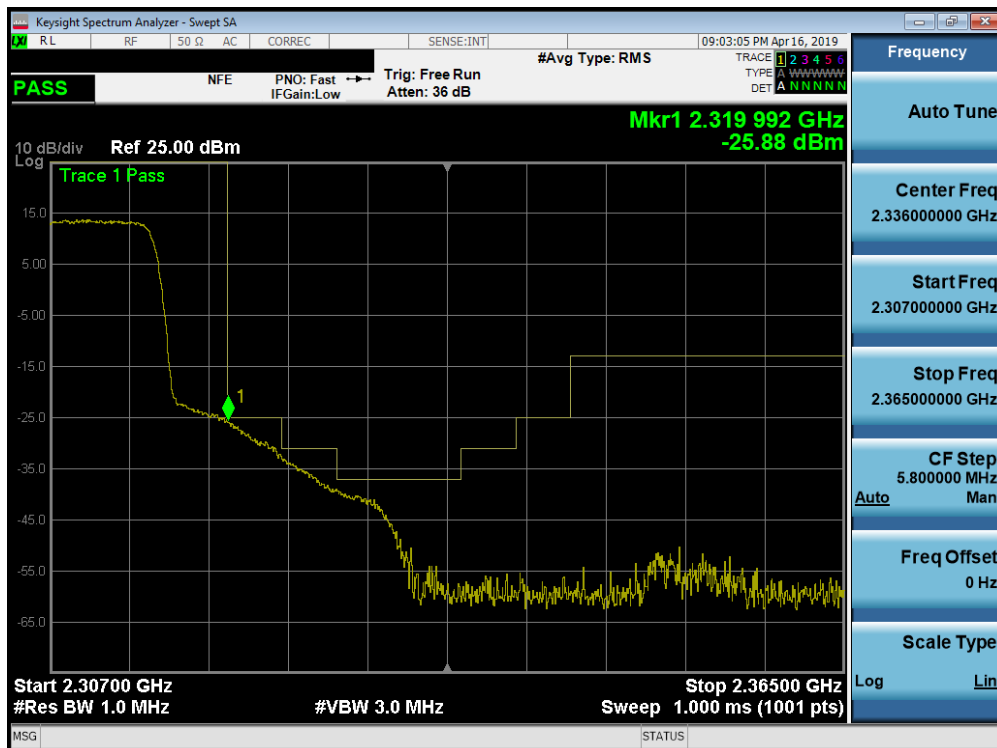


Plot 7-165. Lower Extended Band Edge Plot (Band 30 - 10.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFQ720CS	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1903280046-03-R1.ZNF	Test Dates: 3/28 - 4/18/2019	EUT Type: Portable Handset		Page 104 of 149



Plot 7-166. Upper Band Edge Plot (Band 30 - 10.0MHz QPSK - Full RB Configuration)



Plot 7-167. Upper Extended Band Edge Plot (Band 30 - 10.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFQ720CS	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1903280046-03-R1.ZNF	Test Dates: 3/28 - 4/18/2019	EUT Type: Portable Handset		Page 105 of 149

7.5 Peak-Average Ratio

Test Overview

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

Test Procedure Used

KDB 971168 D01 v03r01 – Section 5.7.1

Test Settings

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

Test Setup

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

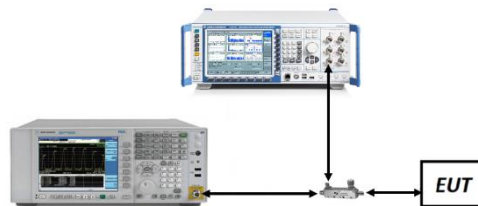


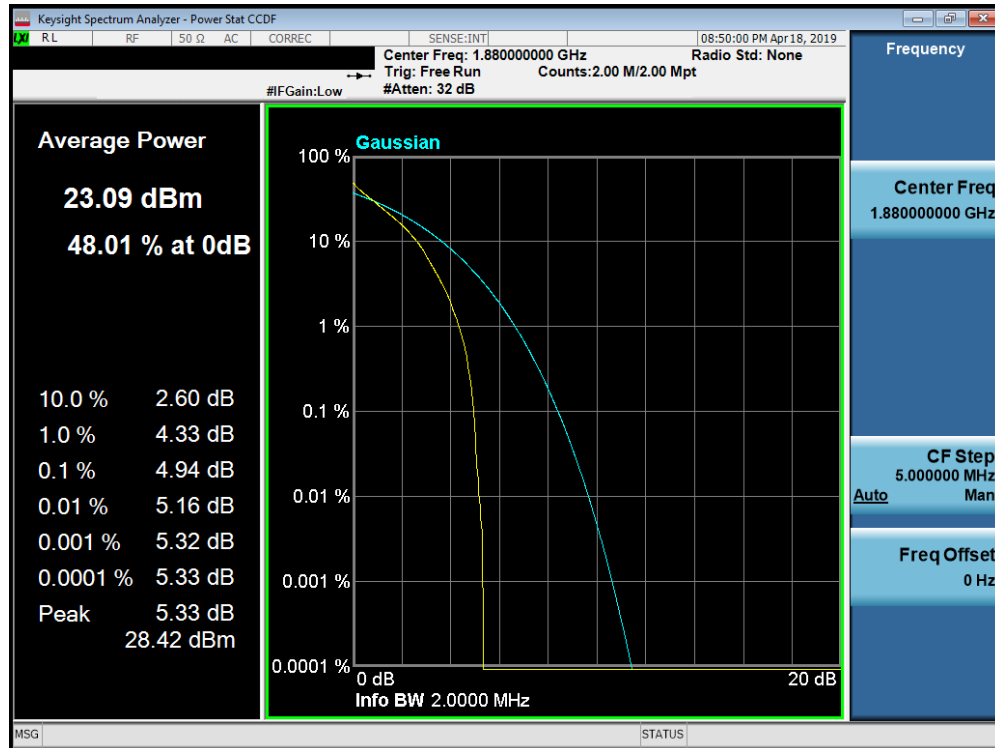
Figure 7-4. Test Instrument & Measurement Setup

Test Notes

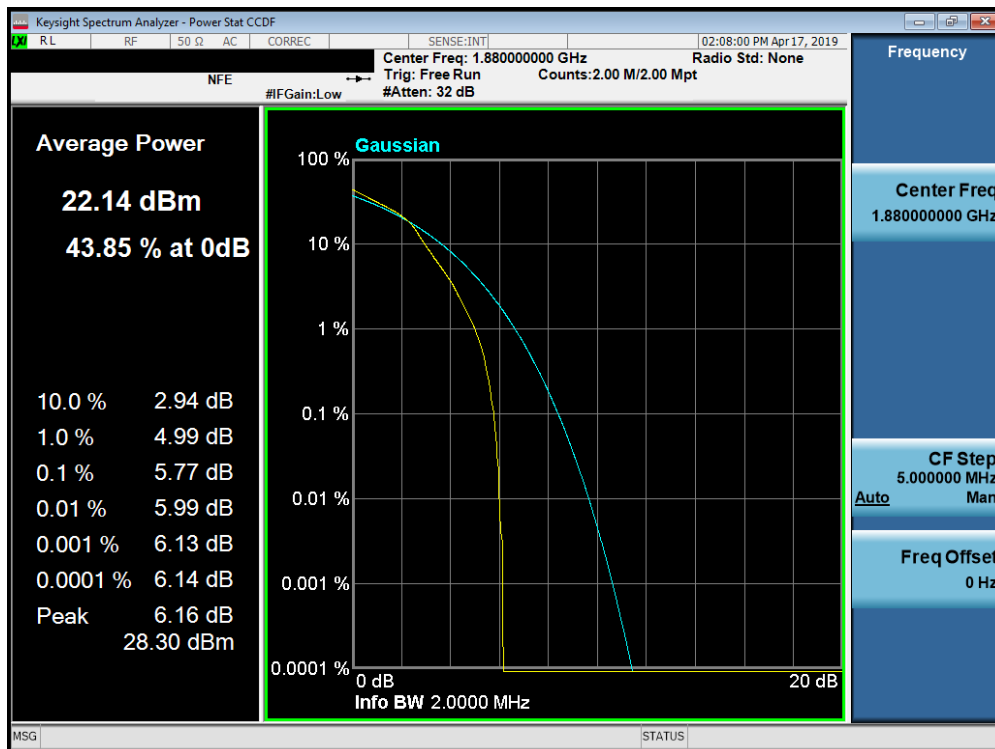
None.

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1903280046-03-R1.ZNF	Test Dates: 3/28 - 4/18/2019	EUT Type: Portable Handset		Page 106 of 149

Band 2

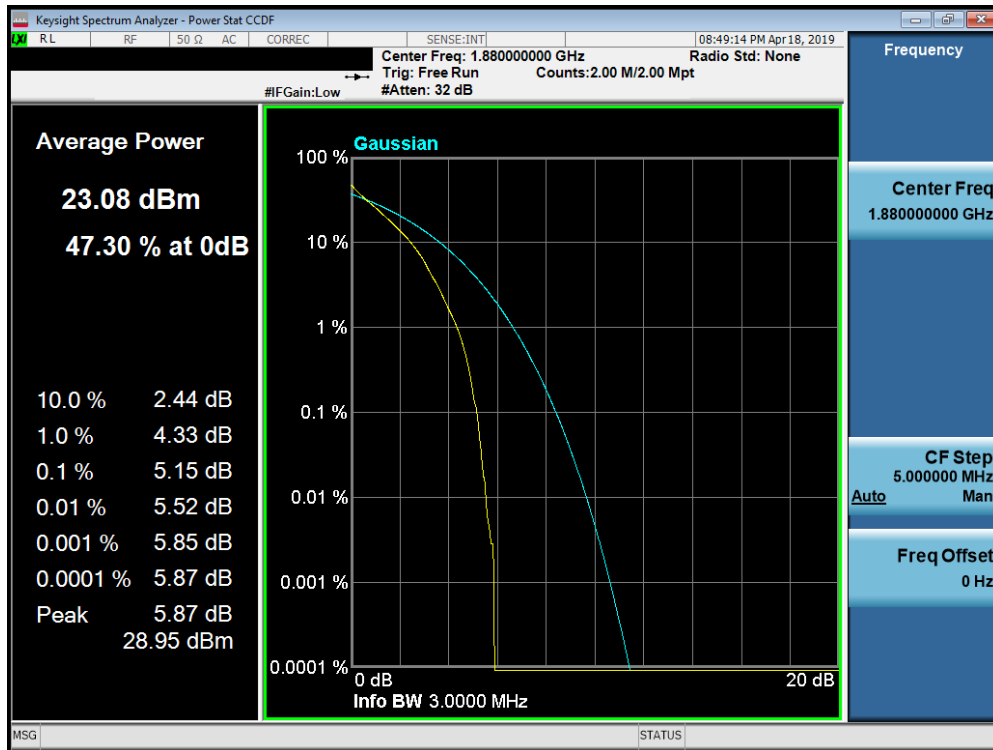


Plot 7-168. PAR Plot (Band 2 - 1.4MHz QPSK - Full RB Configuration)

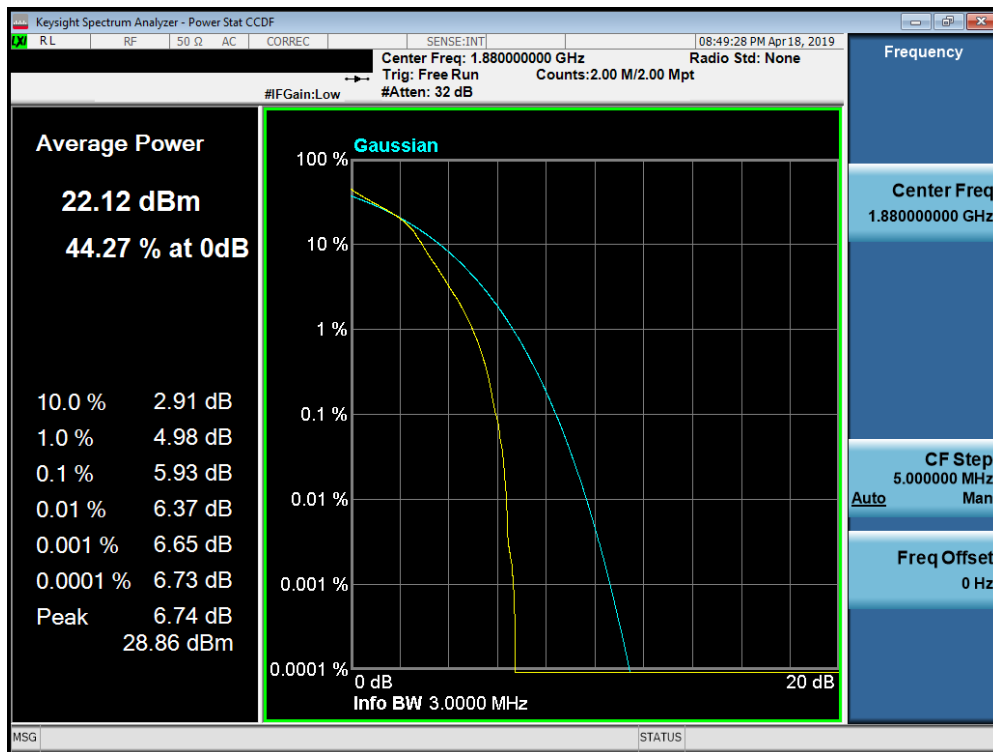


Plot 7-169. PAR Plot (Band 2 - 1.4MHz 16-QAM - Full RB Configuration)

FCC ID: ZNFQ720CS	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1903280046-03-R1.ZNF	Test Dates: 3/28 - 4/18/2019	EUT Type: Portable Handset		Page 107 of 149

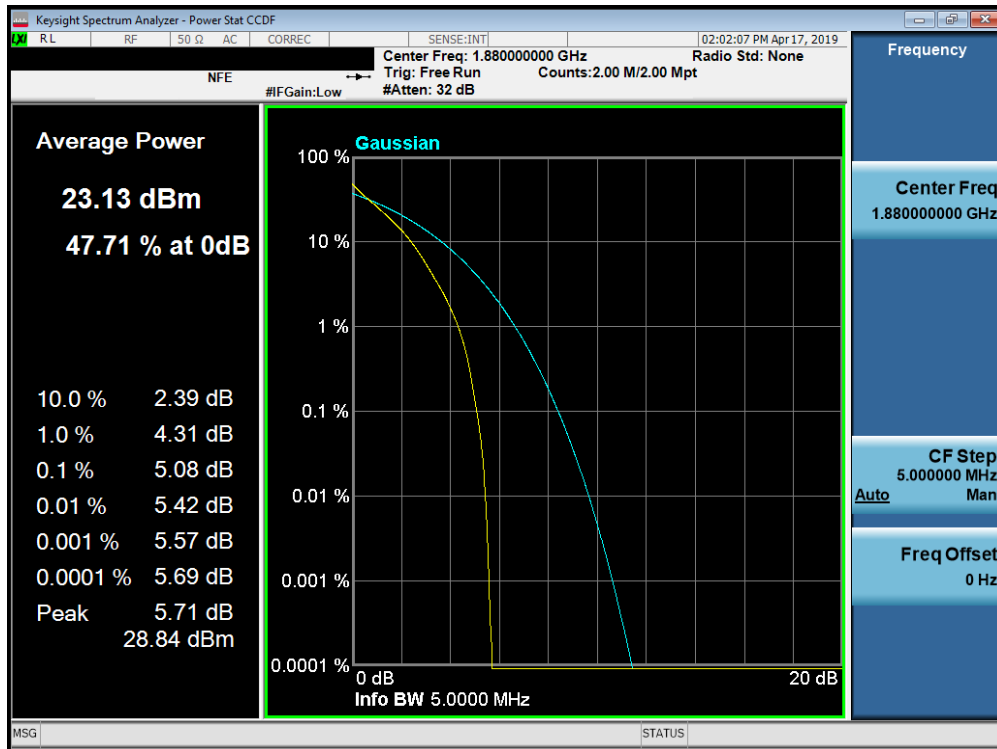


Plot 7-170. PAR Plot (Band 2 - 3.0MHz QPSK - Full RB Configuration)

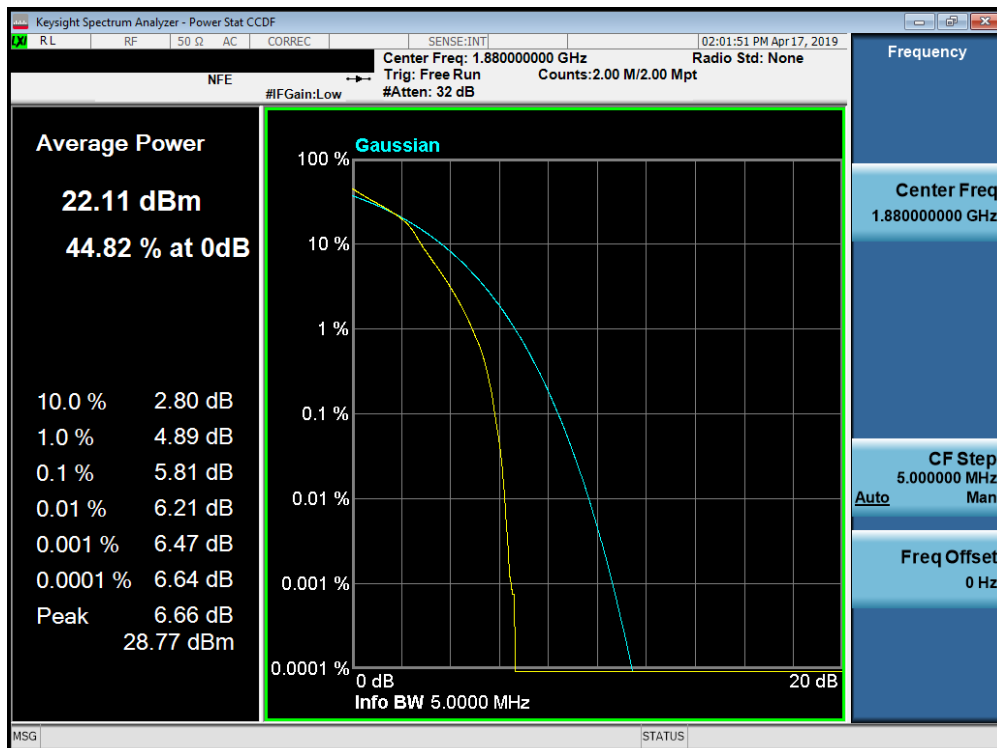


Plot 7-171. PAR Plot (Band 2 - 3.0MHz 16-QAM - Full RB Configuration)

FCC ID: ZNFQ720CS	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1903280046-03-R1.ZNF	Test Dates: 3/28 - 4/18/2019	EUT Type: Portable Handset		Page 108 of 149

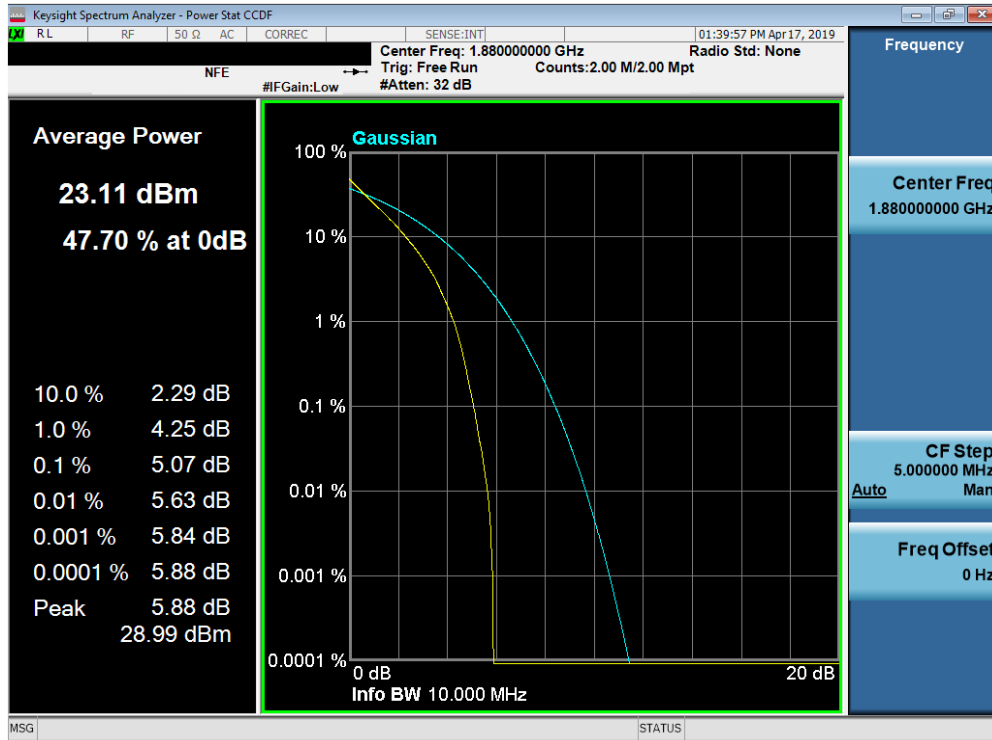


Plot 7-172. PAR Plot (Band 2 - 5.0MHz QPSK - Full RB Configuration)

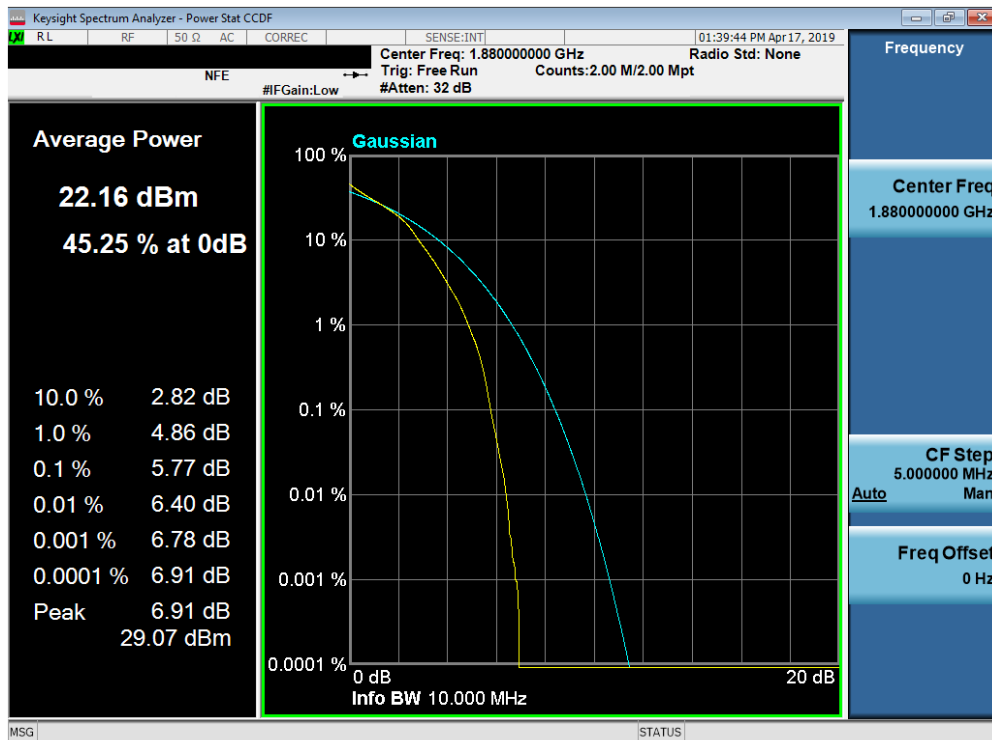


Plot 7-173. PAR Plot (Band 2 - 5.0MHz 16-QAM - Full RB Configuration)

FCC ID: ZNFQ720CS	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1903280046-03-R1.ZNF	Test Dates: 3/28 - 4/18/2019	EUT Type: Portable Handset	Page 109 of 149

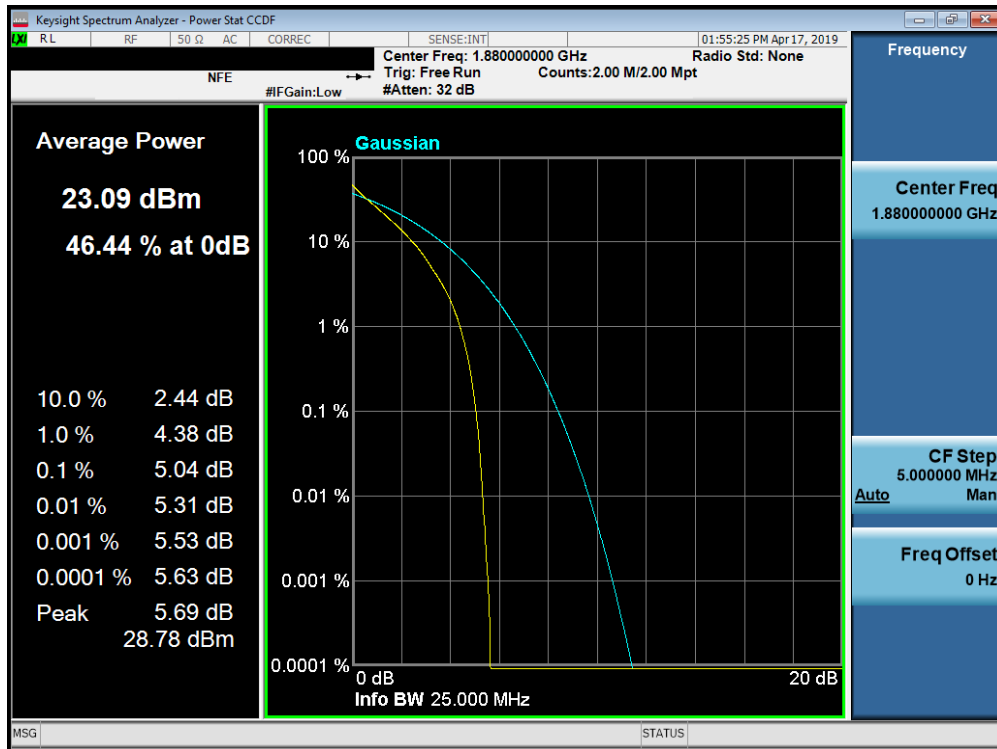


Plot 7-174. PAR Plot (Band 2 - 10.0MHz QPSK - Full RB Configuration)

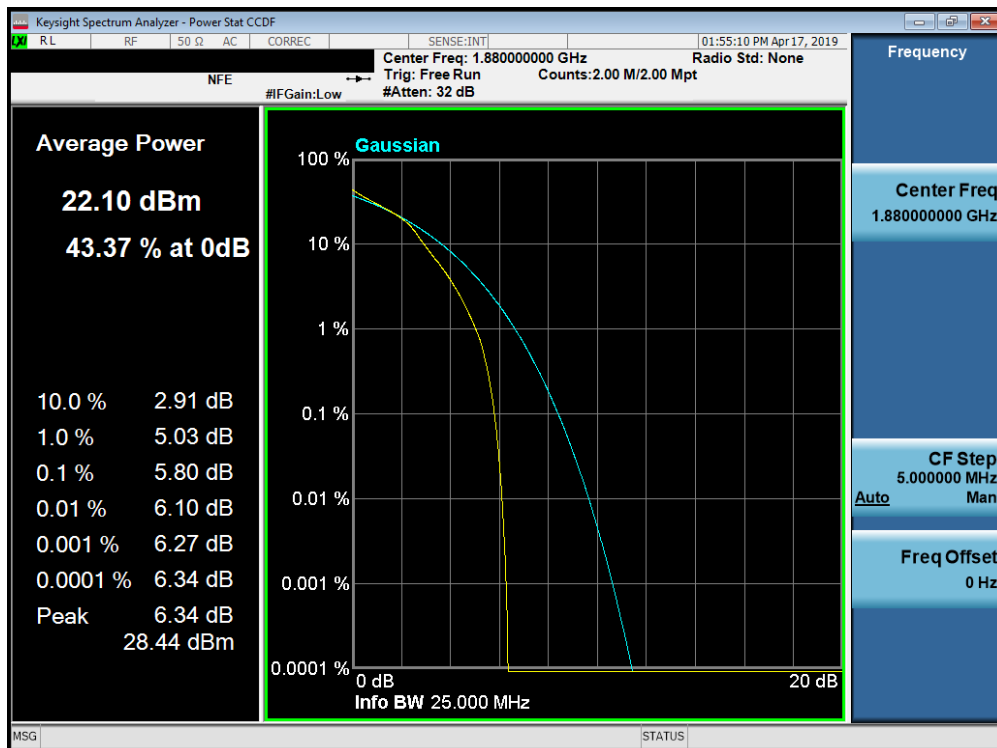


Plot 7-175. PAR Plot (Band 2 - 10.0MHz 16-QAM - Full RB Configuration)

FCC ID: ZNFQ720CS	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1903280046-03-R1.ZNF	Test Dates: 3/28 - 4/18/2019	EUT Type: Portable Handset		Page 110 of 149

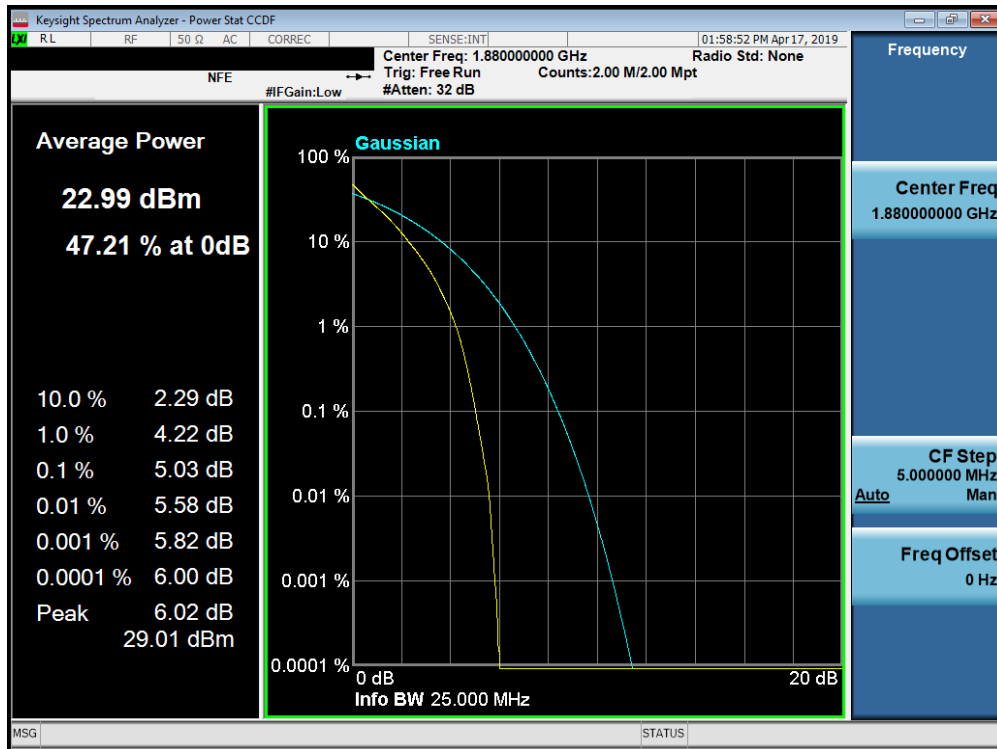


Plot 7-176. PAR Plot (Band 2 - 15.0MHz QPSK - Full RB Configuration)

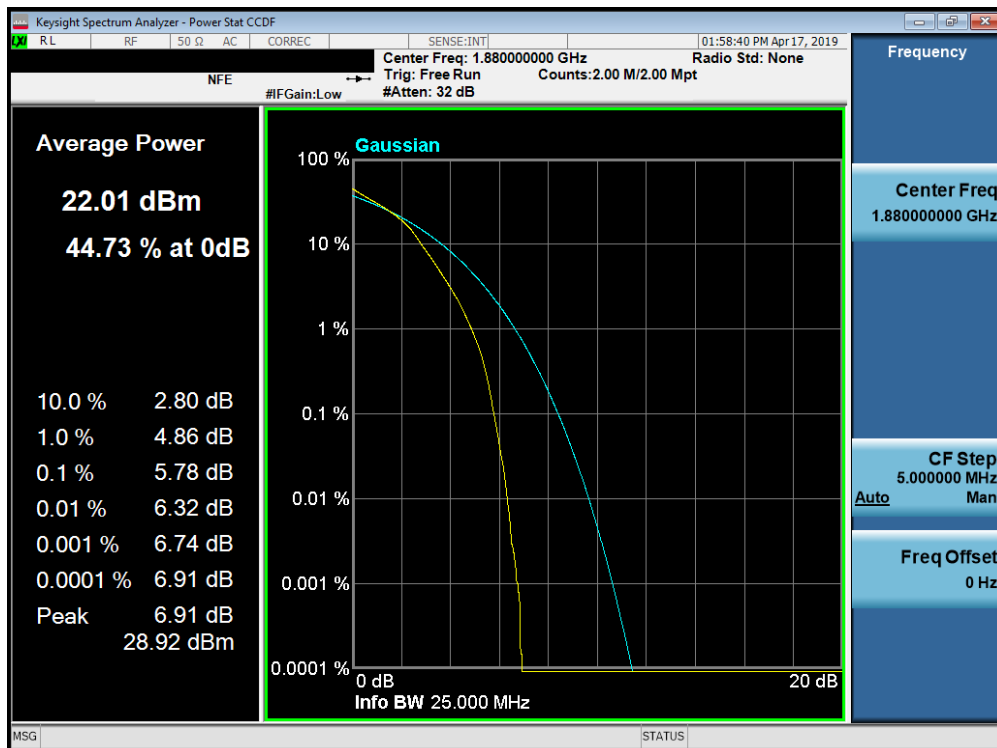


Plot 7-177. PAR Plot (Band 2 - 15.0MHz 16-QAM - Full RB Configuration)

FCC ID: ZNFQ720CS	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1903280046-03-R1.ZNF	Test Dates: 3/28 - 4/18/2019	EUT Type: Portable Handset		Page 111 of 149



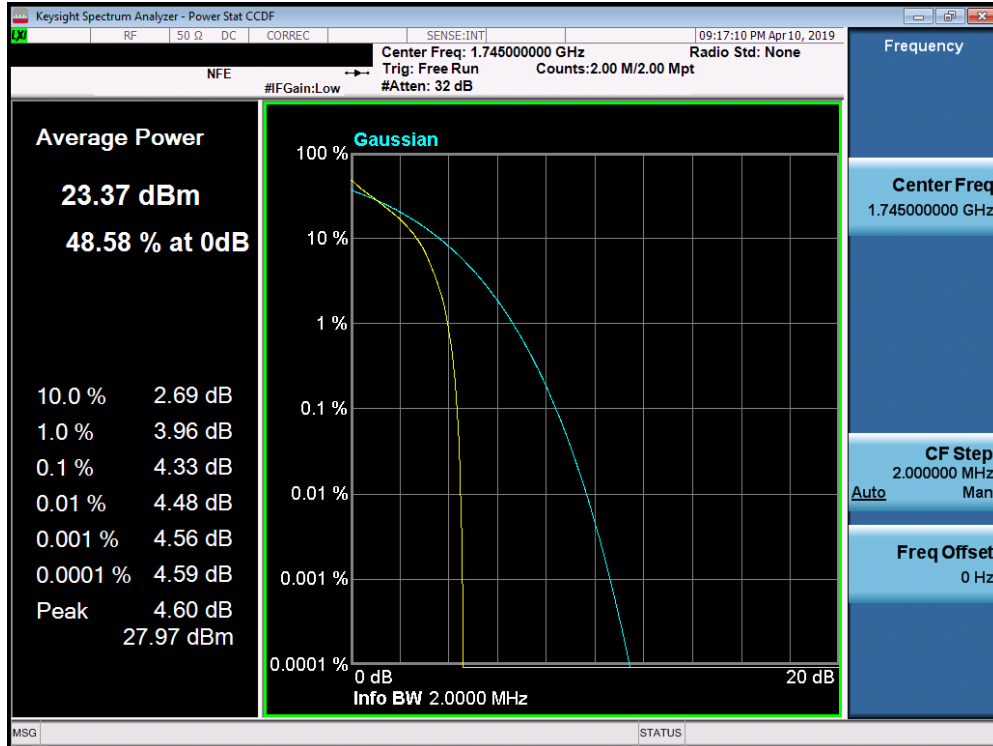
Plot 7-178. PAR Plot (Band 2 - 20.0MHz QPSK - Full RB Configuration)



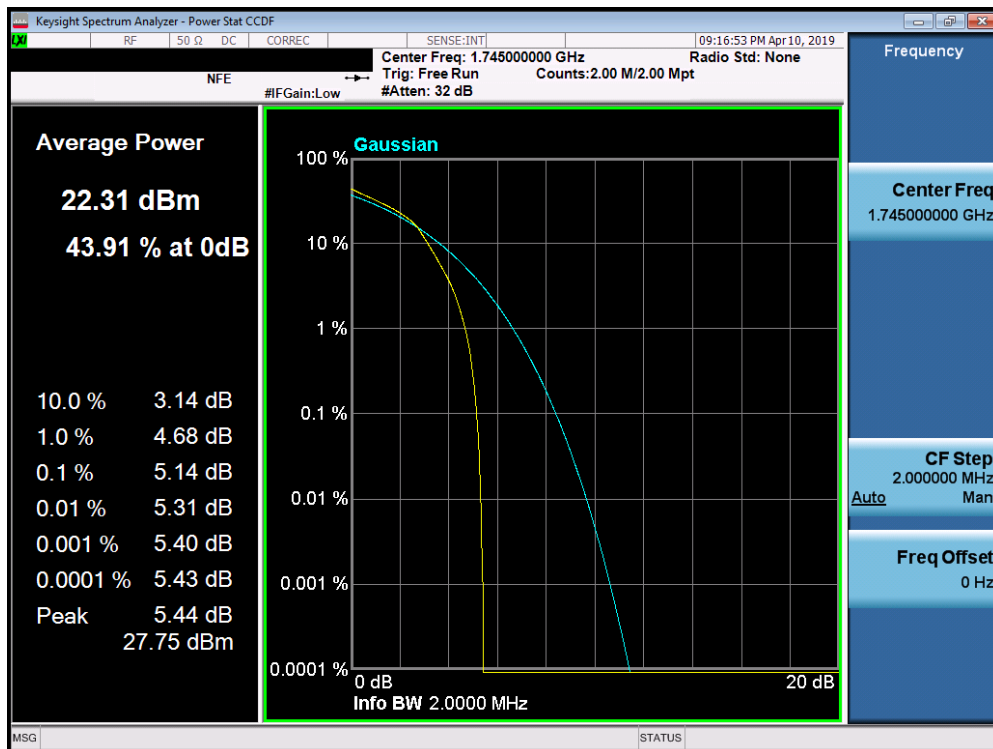
Plot 7-179. PAR Plot (Band 2 - 20.0MHz 16-QAM - Full RB Configuration)

FCC ID: ZNFQ720CS	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1903280046-03-R1.ZNF	Test Dates: 3/28 - 4/18/2019	EUT Type: Portable Handset		Page 112 of 149

Band 66/4

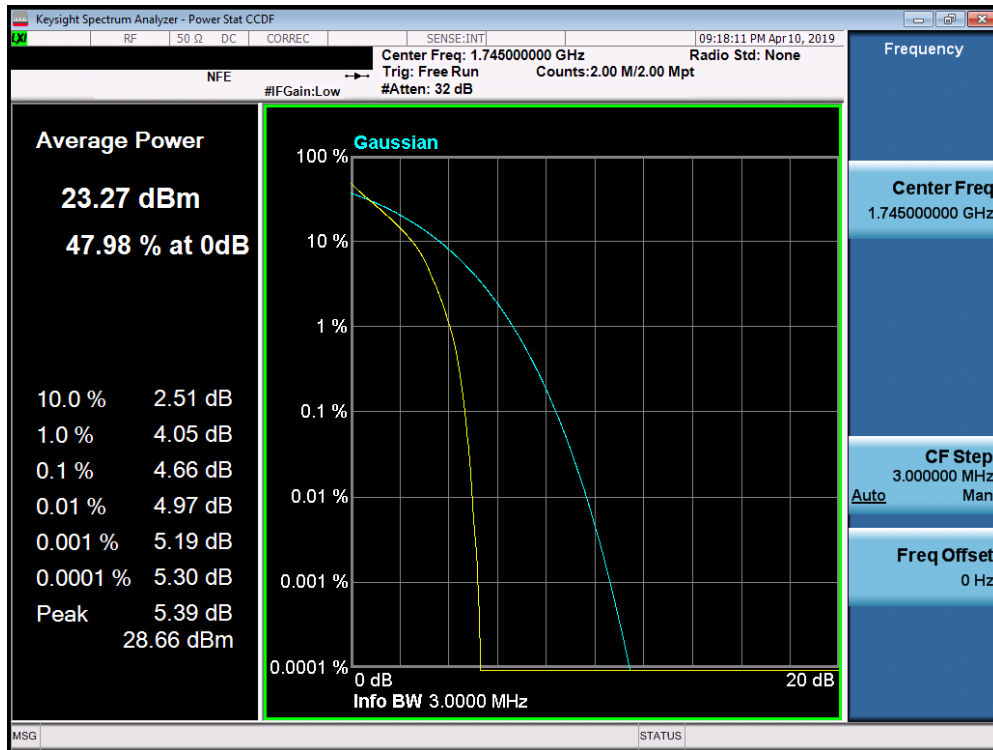


Plot 7-180. PAR Plot (Band 66/4 - 1.4MHz QPSK - Full RB Configuration)

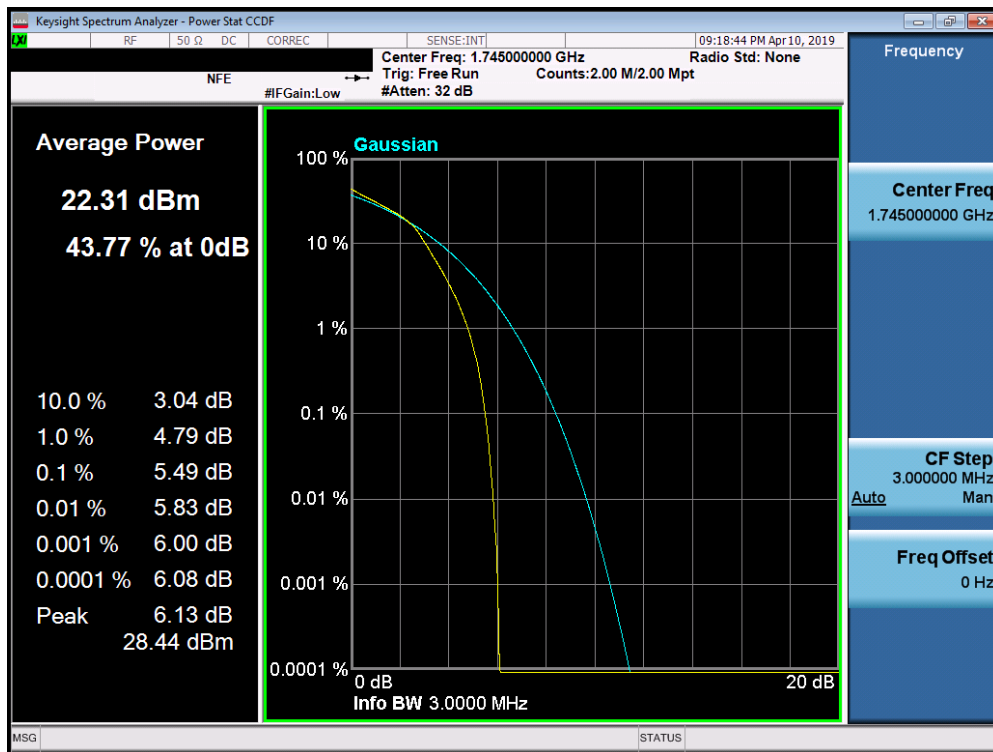


Plot 7-181. PAR Plot (Band 66/4 - 1.4MHz 16-QAM - Full RB Configuration)

FCC ID: ZNFQ720CS	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1903280046-03-R1.ZNF	Test Dates: 3/28 - 4/18/2019	EUT Type: Portable Handset		Page 113 of 149

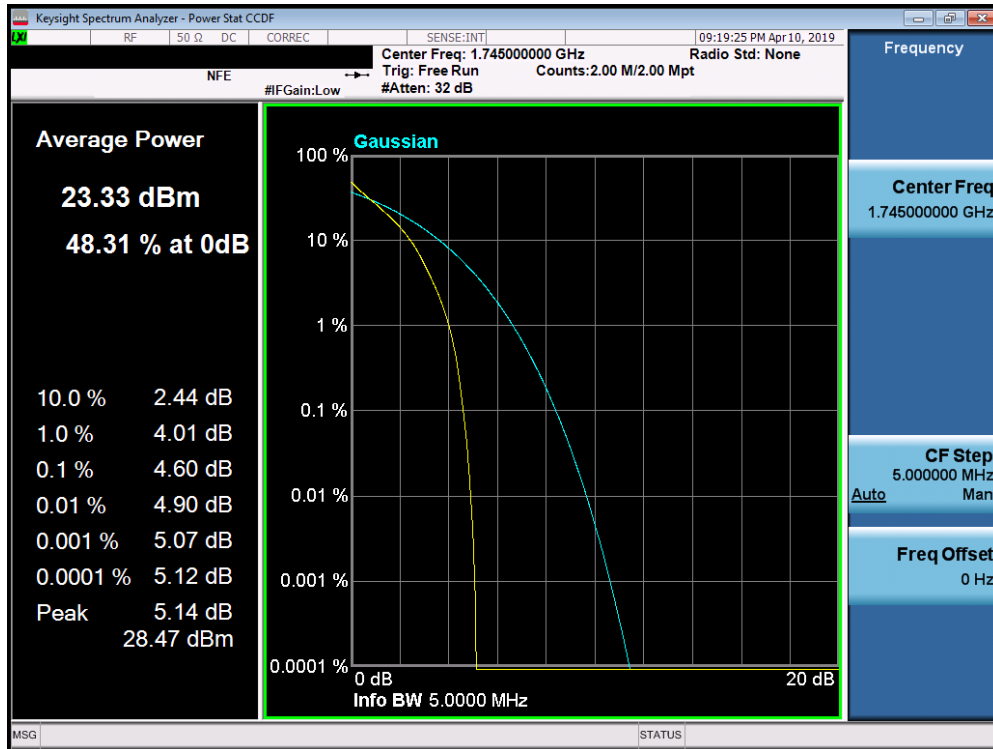


Plot 7-182. PAR Plot (Band 66/4 - 3.0MHz QPSK - Full RB Configuration)

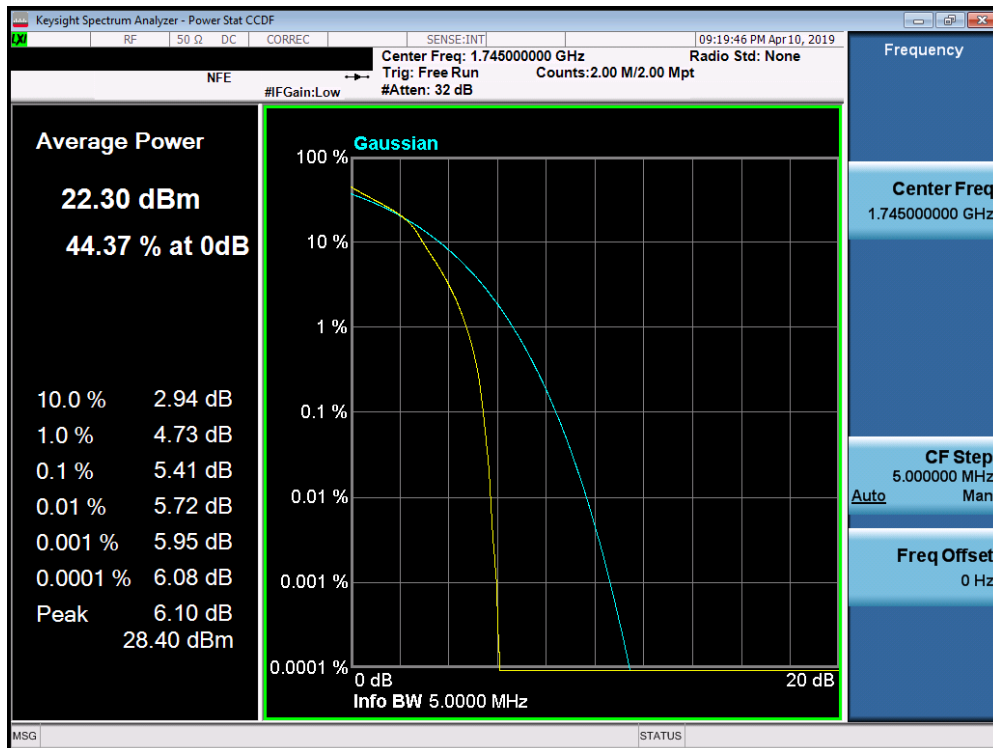


Plot 7-183. PAR Plot (Band 66/4 - 3.0MHz 16-QAM - Full RB Configuration)

FCC ID: ZNFQ720CS	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1903280046-03-R1.ZNF	Test Dates: 3/28 - 4/18/2019	EUT Type: Portable Handset		Page 114 of 149

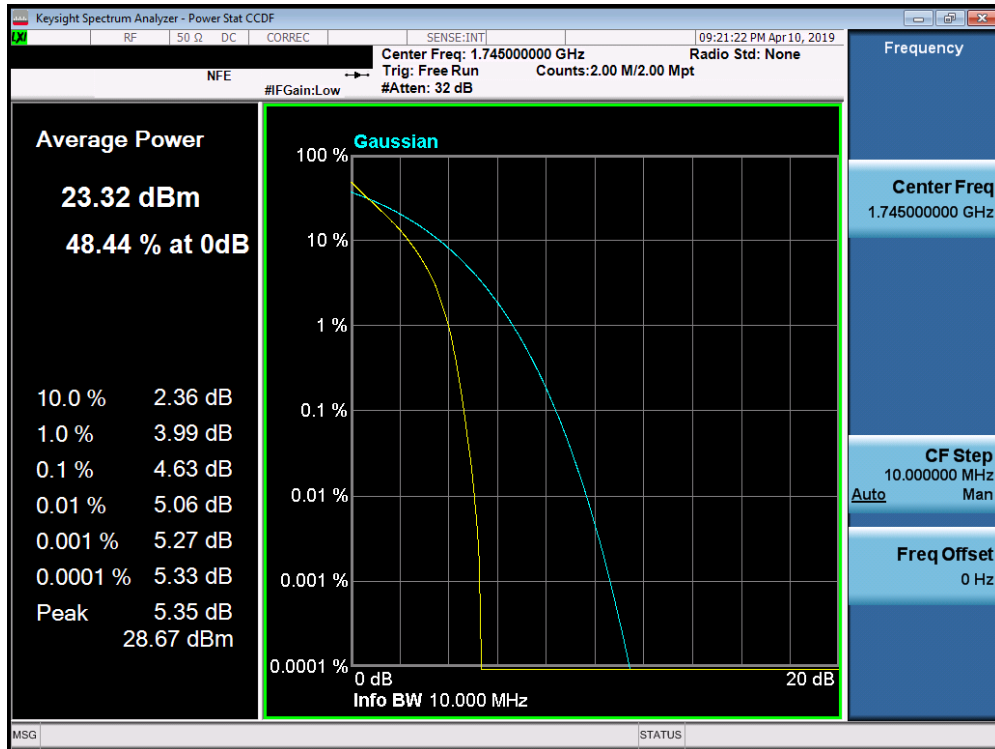


Plot 7-184. PAR Plot (Band 66/4 - 5.0MHz QPSK - Full RB Configuration)

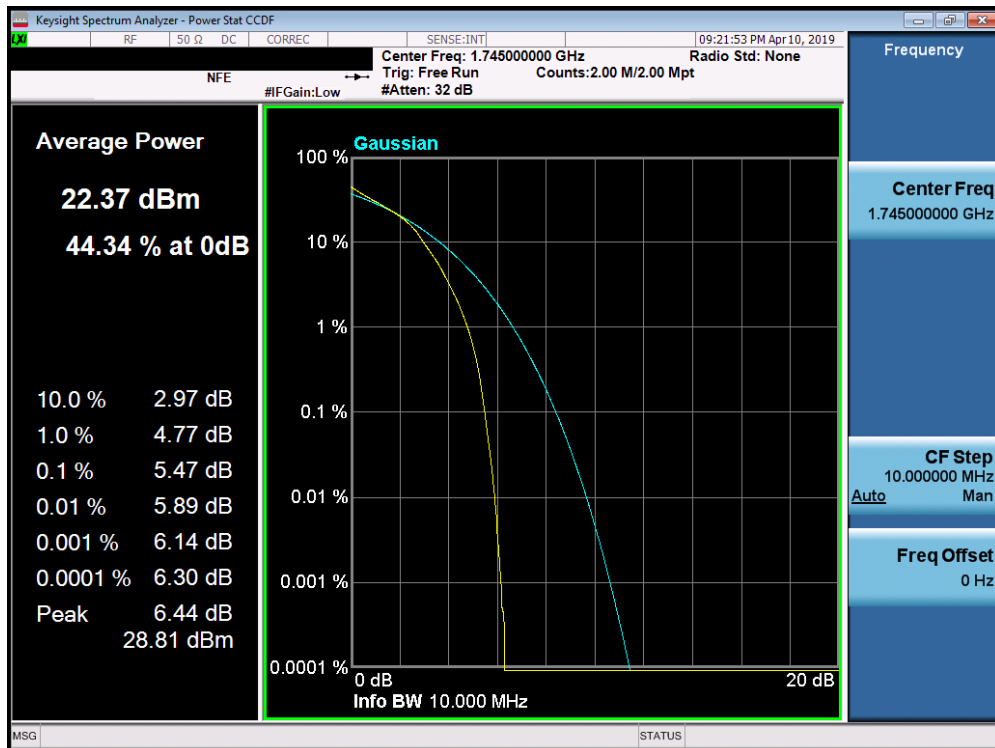


Plot 7-185. PAR Plot (Band 66/4 - 5.0MHz 16-QAM - Full RB Configuration)

FCC ID: ZNFQ720CS	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1903280046-03-R1.ZNF	Test Dates: 3/28 - 4/18/2019	EUT Type: Portable Handset		Page 115 of 149

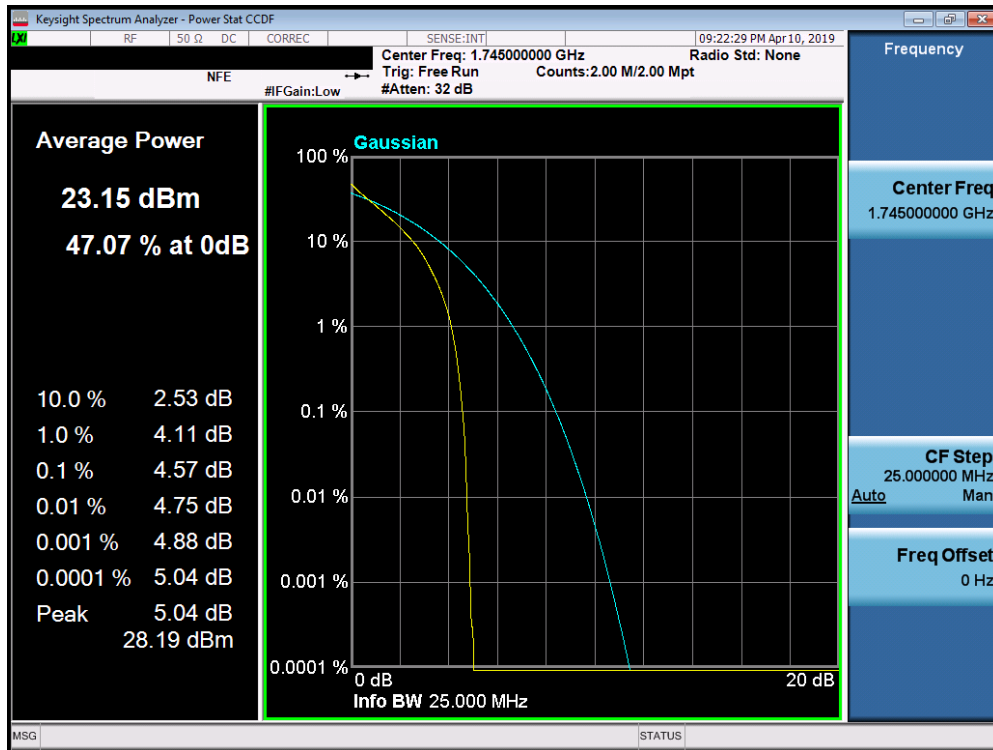


Plot 7-186. PAR Plot (Band 66/4 - 10.0MHz QPSK - Full RB Configuration)

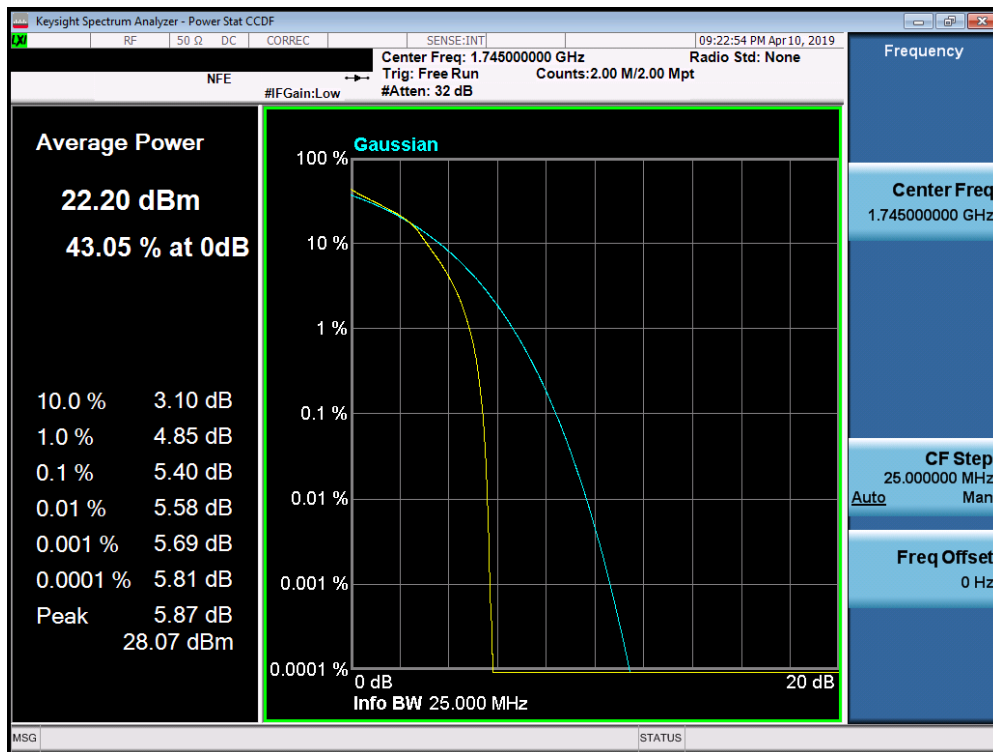


Plot 7-187. PAR Plot (Band 66/4 - 10.0MHz 16-QAM - Full RB Configuration)

FCC ID: ZNFQ720CS	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1903280046-03-R1.ZNF	Test Dates: 3/28 - 4/18/2019	EUT Type: Portable Handset		Page 116 of 149

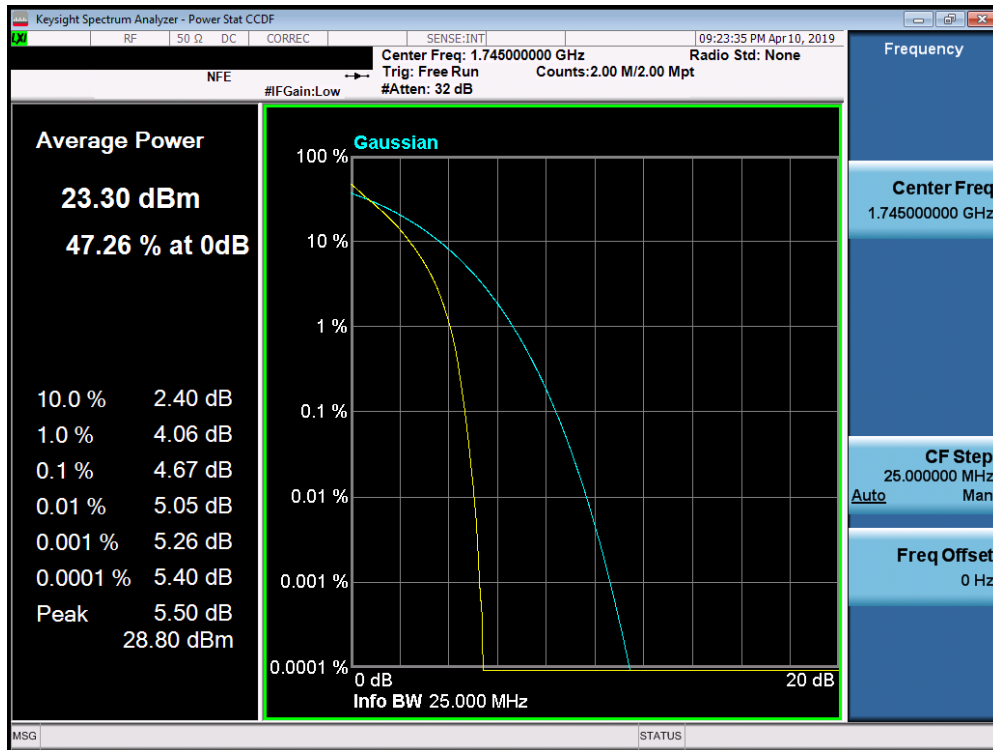


Plot 7-188. PAR Plot (Band 66/4 - 15.0MHz QPSK - Full RB Configuration)

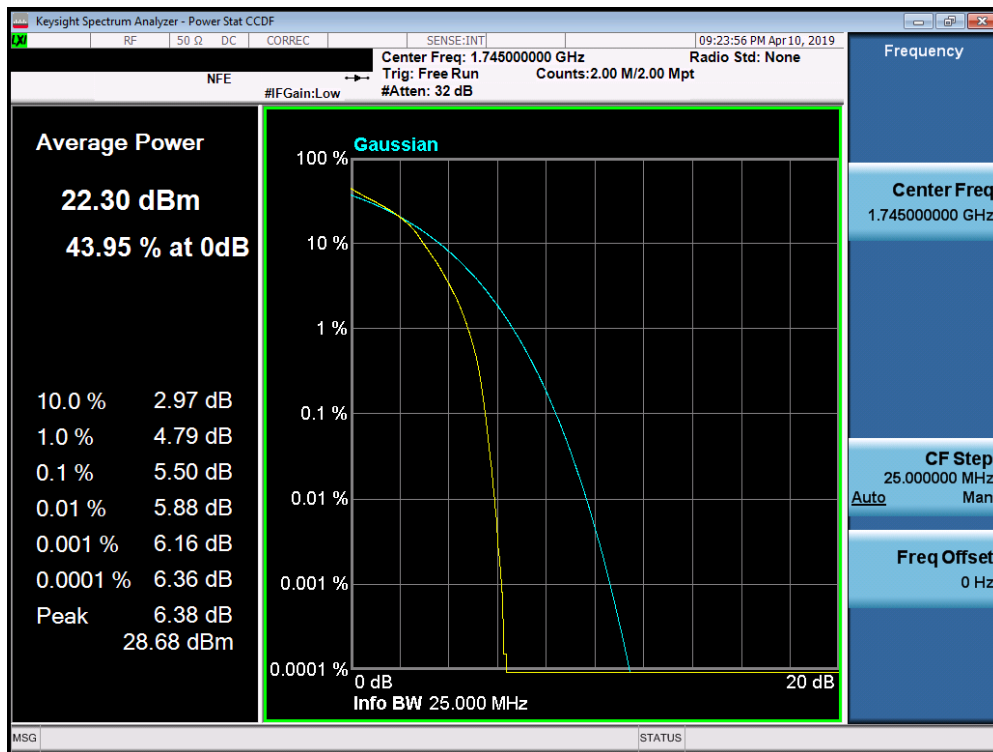


Plot 7-189. PAR Plot (Band 66/4 - 15.0MHz 16-QAM - Full RB Configuration)

FCC ID: ZNFQ720CS	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1903280046-03-R1.ZNF	Test Dates: 3/28 - 4/18/2019	EUT Type: Portable Handset		Page 117 of 149



Plot 7-190. PAR Plot (Band 66/4 - 20.0MHz QPSK - Full RB Configuration)



Plot 7-191. PAR Plot (Band 66/4 - 20.0MHz 16-QAM - Full RB Configuration)

FCC ID: ZNFQ720CS	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1903280046-03-R1.ZNF	Test Dates: 3/28 - 4/18/2019	EUT Type: Portable Handset		Page 118 of 149

7.6 Radiated Power (ERP/EIRP)

Test Overview

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

Test Procedures Used

KDB 971168 D01 v03r01 – Section 5.2.1

ANSI/TIA-603-E-2016 – Section 2.2.17

Test Settings

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

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1903280046-03-R1.ZNF	Test Dates: 3/28 - 4/18/2019	EUT Type: Portable Handset		Page 119 of 149

Test Setup

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

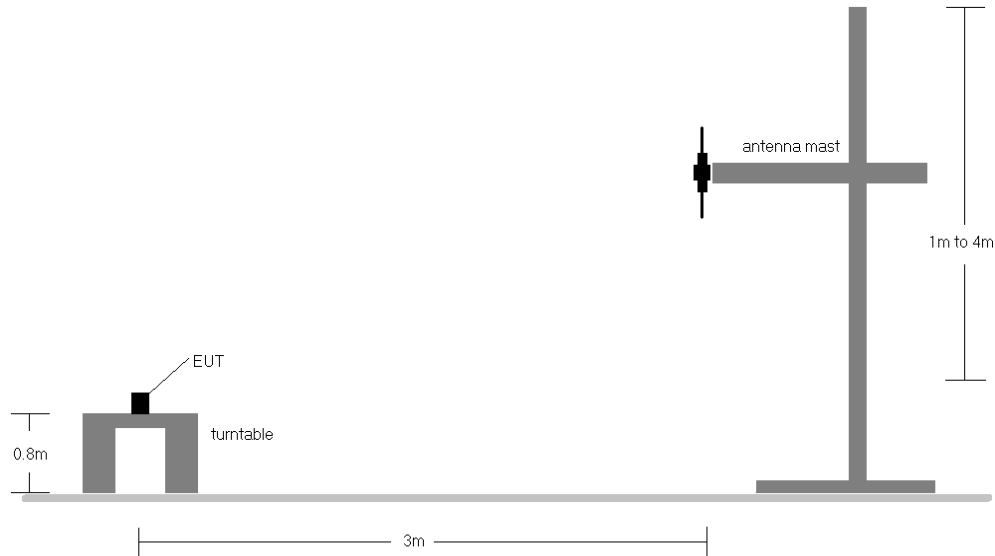


Figure 7-5. Radiated Test Setup <1GHz

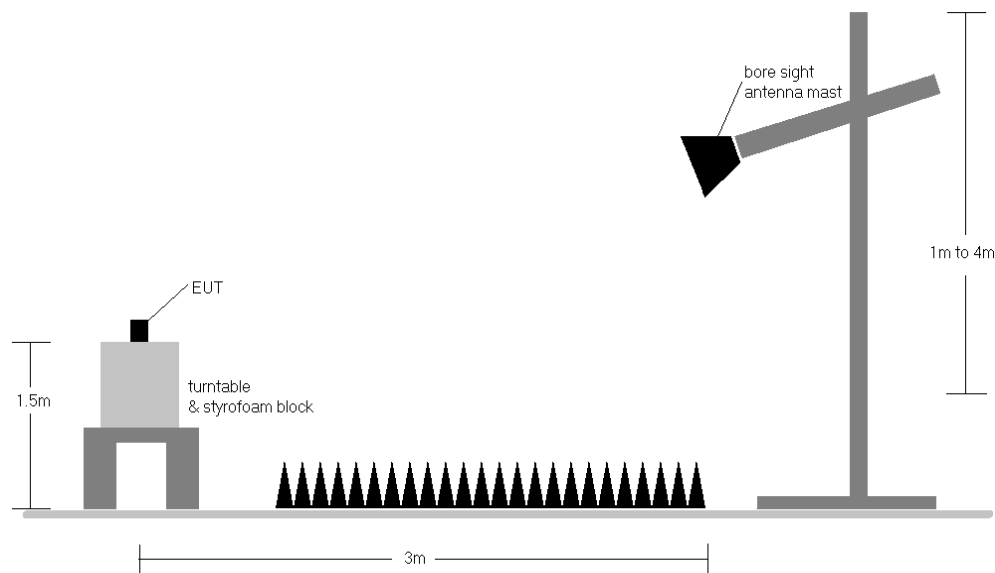


Figure 7-6. Radiated Test Setup >1GHz

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: ZNFQ720CS	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1903280046-03-R1.ZNF	Test Dates: 3/28 - 4/18/2019	EUT Type: Portable Handset		Page 120 of 149

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
699.70	1.4	QPSK	H	290	275	1 / 0	14.26	5.14	17.25	0.053	34.77	-17.52	19.40	0.087	36.99	-17.59
707.50	1.4	QPSK	H	300	285	1 / 0	14.44	5.19	17.48	0.056	34.77	-17.29	19.63	0.092	36.99	-17.36
715.30	1.4	QPSK	H	302	292	1 / 0	14.56	5.26	17.67	0.058	34.77	-17.11	19.82	0.096	36.99	-17.17
715.30	1.4	16-QAM	H	302	292	1 / 0	14.06	5.26	17.17	0.052	34.77	-17.61	19.32	0.085	36.99	-17.67
700.50	3	QPSK	H	295	280	1 / 0	14.13	5.14	17.12	0.052	34.77	-17.65	19.27	0.085	36.99	-17.72
707.50	3	QPSK	H	310	290	1 / 0	14.34	5.19	17.38	0.055	34.77	-17.39	19.53	0.090	36.99	-17.46
714.50	3	QPSK	H	312	295	1 / 0	14.50	5.25	17.60	0.058	34.77	-17.17	19.75	0.094	36.99	-17.24
714.50	3	16-QAM	H	312	295	1 / 0	13.96	5.25	17.06	0.051	34.77	-17.71	19.21	0.083	36.99	-17.78
701.50	5	QPSK	H	299	285	1 / 0	14.06	5.15	17.06	0.051	34.77	-17.71	19.21	0.083	36.99	-17.78
707.50	5	QPSK	H	308	295	1 / 0	14.39	5.19	17.43	0.055	34.77	-17.34	19.58	0.091	36.99	-17.41
713.50	5	QPSK	H	305	299	1 / 0	14.56	5.24	17.65	0.058	34.77	-17.12	19.80	0.096	36.99	-17.19
713.50	5	16-QAM	H	305	299	1 / 0	14.31	5.24	17.40	0.055	34.77	-17.37	19.55	0.090	36.99	-17.44
704.00	10	QPSK	H	297	273	1 / 0	13.21	5.17	16.23	0.042	34.77	-18.54	18.38	0.069	36.99	-18.61
707.50	10	QPSK	H	294	277	1 / 0	14.49	5.19	17.53	0.057	34.77	-17.24	19.68	0.093	36.99	-17.31
711.00	10	QPSK	H	298	277	1 / 0	14.68	5.22	17.75	0.060	34.77	-17.02	19.90	0.098	36.99	-17.09
711.00	10	16-QAM	H	298	277	1 / 0	14.26	5.22	17.33	0.054	34.77	-17.44	19.48	0.089	36.99	-17.51
711.00	10	QPSK	V	140	254	1 / 0	13.18	5.22	16.25	0.042	34.77	-18.52	18.40	0.069	36.99	-18.59

Table 7-3. ERP Data (Band 12)

FCC ID: ZNFQ720CS	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1903280046-03-R1.ZNF	Test Dates: 3/28 - 4/18/2019	EUT Type: Portable Handset	Page 121 of 149

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	130	290	1 / 0	12.02	6.89	16.76	0.047	38.45	-21.69	18.91	0.078	40.61	-21.70
836.50	1.4	QPSK	H	142	285	1 / 0	11.82	7.08	16.75	0.047	38.45	-21.70	18.90	0.078	40.61	-21.70
848.30	1.4	QPSK	H	125	292	1 / 0	11.62	7.28	16.75	0.047	38.45	-21.70	18.90	0.078	40.61	-21.71
824.70	1.4	16-QAM	H	130	290	1 / 0	11.77	6.89	16.51	0.045	38.45	-21.94	18.66	0.073	40.61	-21.95
825.50	3	QPSK	H	135	295	1 / 0	12.07	6.90	16.82	0.048	38.45	-21.63	18.97	0.079	40.61	-21.64
836.50	3	QPSK	H	145	292	1 / 0	11.80	7.08	16.73	0.047	38.45	-21.72	18.88	0.077	40.61	-21.72
847.50	3	QPSK	H	136	295	1 / 0	11.57	7.26	16.68	0.047	38.45	-21.77	18.83	0.076	40.61	-21.77
825.50	3	16-QAM	H	135	295	1 / 0	11.73	6.90	16.48	0.044	38.45	-21.97	18.63	0.073	40.61	-21.98
826.50	5	QPSK	H	142	297	1 / 0	11.95	6.92	16.72	0.047	38.45	-21.73	18.87	0.077	40.61	-21.74
836.50	5	QPSK	H	150	298	1 / 0	11.74	7.08	16.67	0.046	38.45	-21.78	18.82	0.076	40.61	-21.78
846.50	5	QPSK	H	142	310	1 / 0	11.52	7.25	16.62	0.046	38.45	-21.83	18.77	0.075	40.61	-21.84
826.50	5	16-QAM	H	142	297	1 / 0	11.58	6.92	16.35	0.043	38.45	-22.10	18.50	0.071	40.61	-22.11
829.00	10	QPSK	H	133	276	1 / 0	11.94	6.96	16.75	0.047	38.45	-21.70	18.90	0.078	40.61	-21.71
836.50	10	QPSK	H	138	274	1 / 0	11.76	7.08	16.69	0.047	38.45	-21.76	18.84	0.077	40.61	-21.76
844.00	10	QPSK	H	123	277	1 / 0	10.97	7.21	16.03	0.040	38.45	-22.42	18.18	0.066	40.61	-22.43
829.00	10	16-QAM	H	133	276	1 / 0	11.69	6.96	16.50	0.045	38.45	-21.95	18.65	0.073	40.61	-21.96
836.50	10	QPSK	V	133	241	1 / 0	11.66	7.08	16.59	0.046	38.45	-21.86	18.74	0.075	40.61	-21.86

Table 7-4. ERP Data (Band 5)

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1903280046-03-R1.ZNF	Test Dates: 3/28 - 4/18/2019	EUT Type: Portable Handset		Page 122 of 149

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	V	149	52	1 / 5	9.50	9.63	19.13	0.082	30.00	-10.87
1745.00	1.4	QPSK	V	153	48	1 / 5	8.42	9.49	17.91	0.062	30.00	-12.09
1779.30	1.4	QPSK	V	164	43	1 / 5	7.70	9.35	17.05	0.051	30.00	-12.95
1710.70	1.4	16-QAM	V	149	52	1 / 5	9.34	9.63	18.97	0.079	30.00	-11.03
1711.50	3	QPSK	V	152	50	1 / 14	9.44	9.62	19.06	0.081	30.00	-10.94
1745.00	3	QPSK	V	138	37	1 / 14	10.35	9.49	19.84	0.096	30.00	-10.16
1778.50	3	QPSK	V	167	36	1 / 14	8.50	9.35	17.85	0.061	30.00	-12.15
1745.00	3	16-QAM	V	138	37	1 / 14	10.17	9.49	19.66	0.092	30.00	-10.34
1712.50	5	QPSK	V	127	61	1 / 24	9.13	9.62	18.75	0.075	30.00	-11.25
1745.00	5	QPSK	V	123	47	1 / 24	9.70	9.49	19.19	0.083	30.00	-10.81
1777.50	5	QPSK	V	138	33	1 / 24	10.24	9.36	19.60	0.091	30.00	-10.40
1777.50	5	16-QAM	V	138	33	1 / 24	10.10	9.36	19.46	0.088	30.00	-10.54
1715.00	10	QPSK	V	128	53	1 / 49	10.20	9.61	19.81	0.096	30.00	-10.19
1745.00	10	QPSK	V	142	39	1 / 49	10.81	9.49	20.30	0.107	30.00	-9.70
1775.00	10	QPSK	V	128	68	1 / 49	10.10	9.37	19.47	0.088	30.00	-10.53
1745.00	10	16-QAM	V	142	39	1 / 49	10.57	9.49	20.06	0.101	30.00	-9.94
1717.50	15	QPSK	V	149	64	1 / 74	8.92	9.60	18.52	0.071	30.00	-11.48
1745.00	15	QPSK	V	143	54	1 / 74	10.40	9.49	19.89	0.097	30.00	-10.11
1772.50	15	QPSK	V	134	73	1 / 74	9.52	9.38	18.90	0.078	30.00	-11.10
1745.00	15	16-QAM	V	143	54	1 / 74	10.14	9.49	19.63	0.092	30.00	-10.37
1720.00	20	QPSK	V	121	52	1 / 99	9.62	9.59	19.21	0.083	30.00	-10.79
1745.00	20	QPSK	V	123	53	1 / 99	9.53	9.49	19.02	0.080	30.00	-10.98
1770.00	20	QPSK	V	124	67	1 / 99	10.28	9.39	19.67	0.093	30.00	-10.33
1770.00	20	16-QAM	V	124	67	1 / 99	9.92	9.39	19.31	0.085	30.00	-10.69
1745.00	10	QPSK	H	120	75	10.81	10.29	9.49	19.78	0.095	30.00	-10.22

Table 7-5. EIRP Data (Band 66/4)

FCC ID: ZNFQ720CS	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1903280046-03-R1.ZNF	Test Dates: 3/28 - 4/18/2019	EUT Type: Portable Handset	Page 123 of 149

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
1850.70	1.4	QPSK	H	110	10	1 / 5	12.20	9.07	21.27	0.134	33.01	-11.75
1880.00	1.4	QPSK	H	120	7	1 / 5	11.60	9.15	20.75	0.119	33.01	-12.26
1909.30	1.4	QPSK	H	127	10	1 / 5	11.45	9.27	20.72	0.118	33.01	-12.29
1850.70	1.4	16-QAM	H	110	10	1 / 5	11.90	9.07	20.97	0.125	33.01	-12.05
1851.50	3	QPSK	H	115	12	1 / 14	12.14	9.07	21.21	0.132	33.01	-11.80
1880.00	3	QPSK	H	135	15	1 / 14	11.53	9.15	20.68	0.117	33.01	-12.33
1908.50	3	QPSK	H	130	9	1 / 14	11.35	9.26	20.61	0.115	33.01	-12.40
1851.50	3	16-QAM	H	115	12	1 / 14	11.93	9.07	21.00	0.126	33.01	-12.01
1852.50	5	QPSK	H	120	20	1 / 24	12.08	9.07	21.15	0.130	33.01	-11.86
1880.00	5	QPSK	H	127	27	1 / 24	11.46	9.15	20.61	0.115	33.01	-12.40
1907.50	5	QPSK	H	140	15	1 / 24	11.23	9.26	20.49	0.112	33.01	-12.52
1852.50	5	16-QAM	H	120	20	1 / 24	11.83	9.07	20.90	0.123	33.01	-12.11
1855.00	10	QPSK	H	135	30	1 / 49	12.00	9.08	21.08	0.128	33.01	-11.93
1880.00	10	QPSK	H	125	35	1 / 49	11.33	9.15	20.48	0.112	33.01	-12.53
1905.00	10	QPSK	H	145	22	1 / 49	11.30	9.24	20.54	0.113	33.01	-12.47
1855.00	10	16-QAM	H	135	30	1 / 49	11.70	9.08	20.78	0.120	33.01	-12.23
1857.50	15	QPSK	H	142	37	1 / 74	11.90	9.08	20.98	0.125	33.01	-12.03
1880.00	15	QPSK	H	132	40	1 / 74	11.12	9.15	20.27	0.106	33.01	-12.74
1902.50	15	QPSK	H	147	28	1 / 74	11.20	9.22	20.42	0.110	33.01	-12.59
1857.50	15	16-QAM	H	142	37	1 / 74	11.63	9.08	20.71	0.118	33.01	-12.30
1860.00	20	QPSK	H	108	4	1 / 99	12.27	9.09	21.36	0.137	33.01	-11.65
1880.00	20	QPSK	H	113	359	1 / 99	13.20	9.15	22.35	0.172	33.01	-10.66
1900.00	20	QPSK	H	113	4	1 / 99	11.76	9.20	20.96	0.125	33.01	-12.05
1880.00	20	16-QAM	H	113	359	1 / 99	13.10	9.15	22.25	0.168	33.01	-10.76
1880.00	20	QPSK	V	100	169	13.20	12.07	9.15	21.22	0.132	33.01	-11.79

Table 7-6. EIRP Data (Band 2)

FCC ID: ZNFQ720CS	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1903280046-03-R1.ZNF	Test Dates: 3/28 - 4/18/2019	EUT Type: Portable Handset	Page 124 of 149

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	153	161	1 / 12	10.14	8.71	18.85	0.077	23.98	-5.13
2312.50	5	QPSK	H	117	164	1 / 12	10.23	8.71	18.94	0.078	23.98	-5.04
2312.50	5	16-QAM	H	117	164	1 / 12	10.07	8.71	18.78	0.076	23.98	-5.20
2310.00	10	QPSK	H	123	158	1 / 0	9.30	8.71	18.01	0.063	23.98	-5.97
2310.00	10	16-QAM	H	123	158	1 / 0	9.18	8.71	17.89	0.062	23.98	-6.09
2312.50	5	QPSK	V	144	312	1 / 12	9.75	8.69	18.44	0.070	23.98	-5.54

Table 7-7. EIRP Data (Band 30)

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1903280046-03-R1.ZNF	Test Dates: 3/28 - 4/18/2019	EUT Type: Portable Handset		Page 125 of 149

7.7 Radiated Spurious Emissions Measurements

Test Overview

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

Test Procedures Used

KDB 971168 D01 v03r01 – Section 5.8

ANSI/TIA-603-E-2016 – Section 2.2.12

Test Settings

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

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1903280046-03-R1.ZNF	Test Dates: 3/28 - 4/18/2019	EUT Type: Portable Handset		Page 126 of 149

Test Setup

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

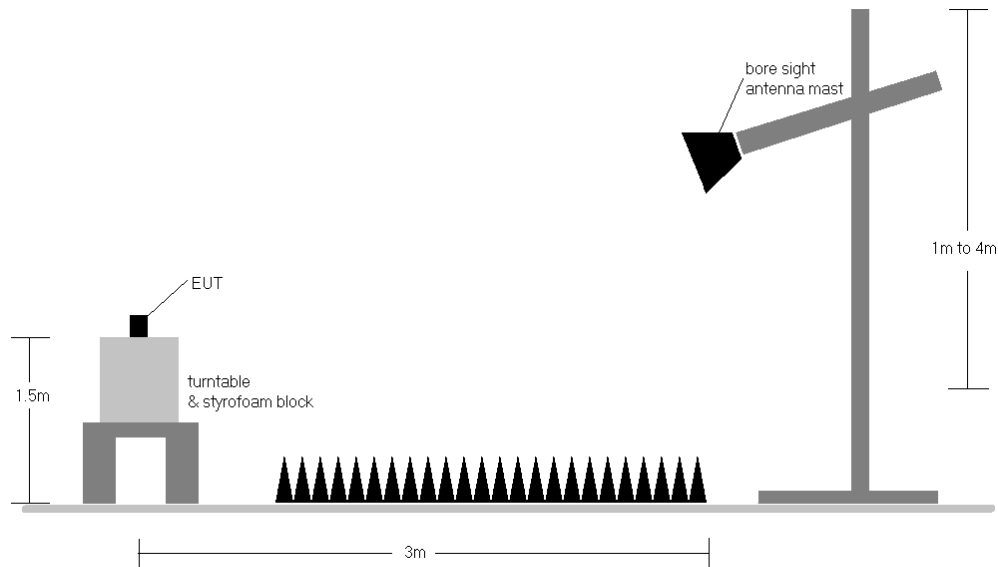


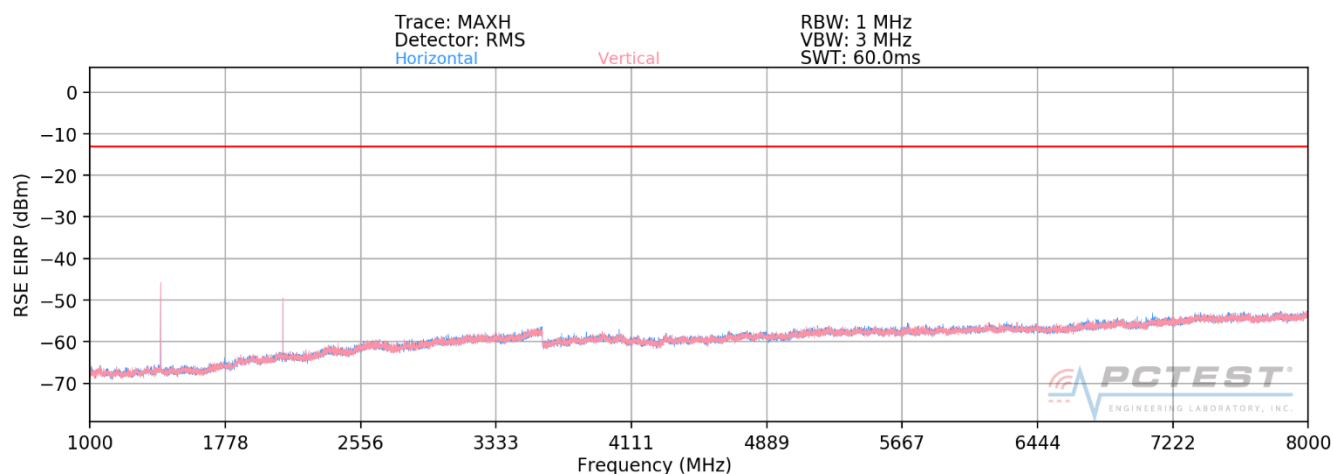
Figure 7-7. Test Instrument & Measurement Setup

Test Notes

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

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1903280046-03-R1.ZNF	Test Dates: 3/28 - 4/18/2019	EUT Type: Portable Handset		Page 127 of 149

Band 12



Plot 7-192. Radiated Spurious Plot above 1GHz (Band 12)

OPERATING FREQUENCY: 704.00 MHz

MODULATION SIGNAL: QPSK

BANDWIDTH: 10.0 MHz

DISTANCE: 3 meters

LIMIT: -13 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1408.00	H	137	219	-69.11	7.54	-61.57	-48.6
2112.00	H	145	200	-59.05	8.85	-50.20	-37.2
2816.00	H	-	-	-74.78	10.12	-64.66	-51.7

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

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1903280046-03-R1.ZNF	Test Dates: 3/28 - 4/18/2019	EUT Type: Portable Handset		Page 128 of 149

OPERATING FREQUENCY: 707.50 MHz
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10.0 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1415.00	H	137	219	-69.68	7.63	-62.04	-49.0
2122.50	H	150	317	-69.53	8.86	-60.67	-47.7
2830.00	H	-	-	-74.87	10.10	-64.78	-51.8

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

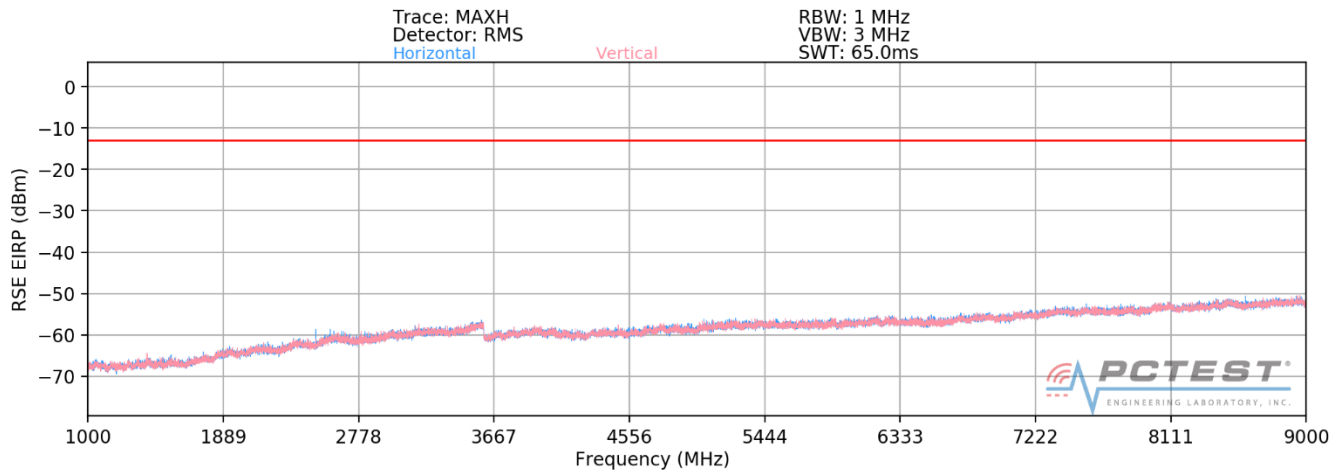
OPERATING FREQUENCY: 711.00 MHz
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10.0 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1422.00	H	141	209	-70.57	7.72	-62.85	-49.8
2133.00	H	146	200	-58.51	8.87	-49.64	-36.6
2844.00	H	-	-	-74.85	10.07	-64.78	-51.8

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

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1903280046-03-R1.ZNF	Test Dates: 3/28 - 4/18/2019	EUT Type: Portable Handset		Page 129 of 149

Band 5



Plot 7-193. Radiated Spurious Plot above 1GHz (Band 5)

OPERATING FREQUENCY: 829.00 MHz
MODULATION SIGNAL: QPSK
BANDWIDTH: 10.0 MHz
DISTANCE: 3 meters
LIMIT: -13 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1658.00	H	157	216	-74.04	8.95	-65.09	-52.1
2487.00	H	165	200	-67.98	9.70	-58.28	-45.3
3316.00	H	-	-	-72.36	9.59	-62.77	-49.8

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

FCC ID: ZNFQ720CS	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1903280046-03-R1.ZNF	Test Dates: 3/28 - 4/18/2019	EUT Type: Portable Handset		Page 130 of 149

OPERATING FREQUENCY: 836.50 MHz
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10.0 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1673.00	H	115	237	-74.06	8.95	-65.11	-52.1
2509.50	H	170	233	-70.41	9.75	-60.66	-47.7
3346.00	H	-	-	-72.09	9.60	-62.48	-49.5

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

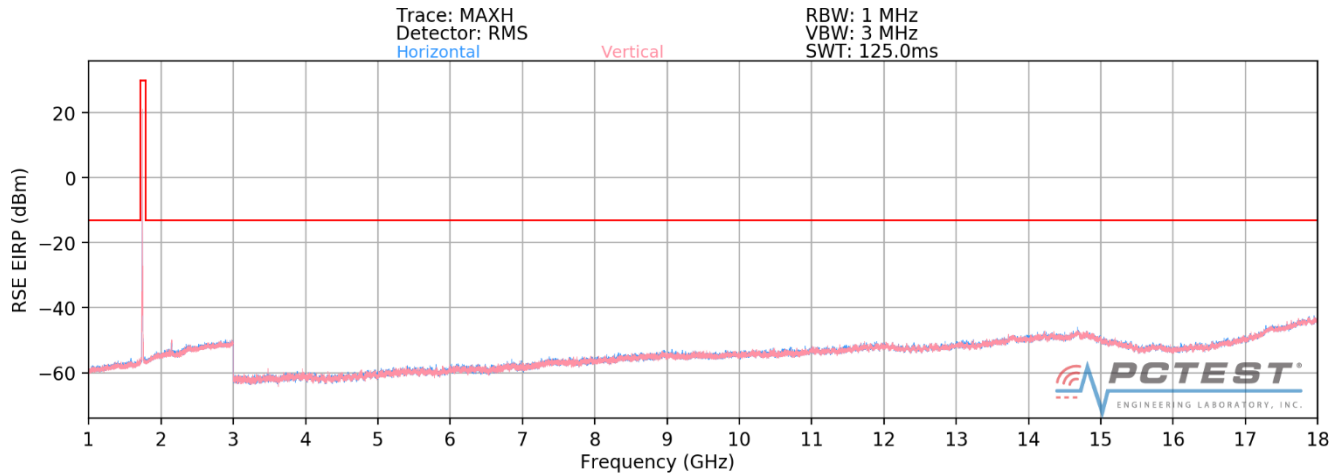
OPERATING FREQUENCY: 844.00 MHz
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10.0 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1688.00	H	140	222	-74.35	8.95	-65.39	-52.4
2532.00	H	155	225	-66.36	9.75	-56.61	-43.6
3376.00	H	-	-	-72.56	9.71	-62.86	-49.9

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

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1903280046-03-R1.ZNF	Test Dates: 3/28 - 4/18/2019	EUT Type: Portable Handset		Page 131 of 149

Band 66/4



Plot 7-194. Radiated Spurious Plot above 1GHz (Band 66/4)

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

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3430.00	V	112	300	-69.23	9.83	-59.40	-46.4
5145.00	V	200	117	-70.53	10.69	-59.84	-46.8
6860.00	V	-	-	-70.60	11.65	-58.95	-45.9

Table 7-14. Radiated Spurious Data (Band 66/4 – Low Channel)

FCC ID: ZNFQ720CS	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1903280046-03-R1.ZNF	Test Dates: 3/28 - 4/18/2019	EUT Type: Portable Handset		Page 132 of 149

OPERATING FREQUENCY: 1745.00 MHz
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10.0 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3490.00	V	113	353	-69.30	9.91	-59.39	-46.4
5235.00	V	113	353	-71.47	10.73	-60.73	-47.7
6980.00	V	-	-	-71.55	11.82	-59.72	-46.7

Table 7-15. Radiated Spurious Data (Band 66/4 – Mid Channel)

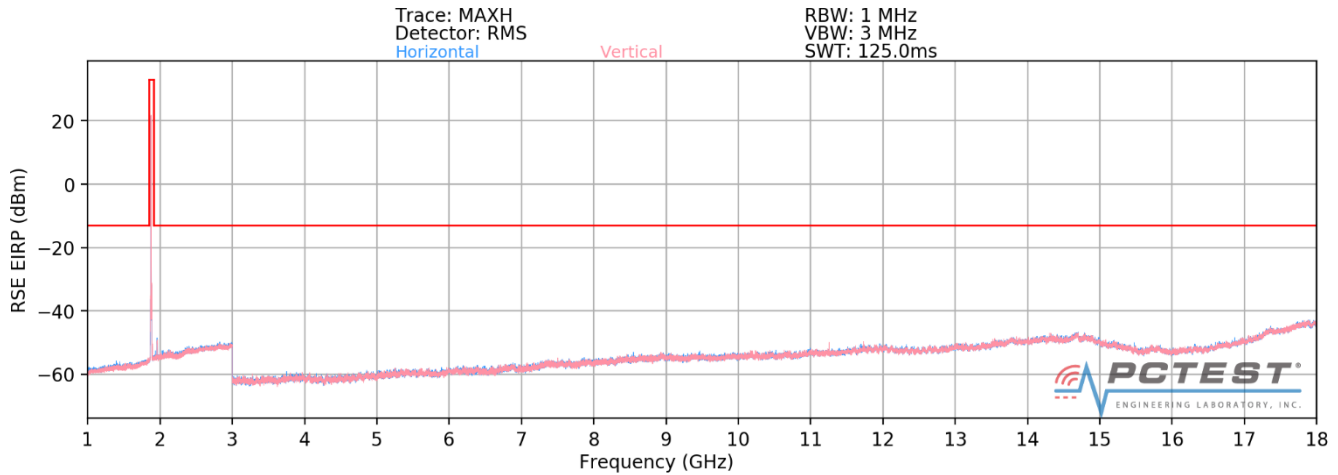
OPERATING FREQUENCY: 1775.00 MHz
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10.0 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3550.00	V	113	353	-70.12	9.89	-60.23	-47.2
5325.00	V	120	225	-71.90	10.69	-61.20	-48.2
7100.00	V	175	205	-69.91	11.75	-58.16	-45.2
8875.00	V	-	-	-66.92	11.02	-55.90	-42.9

Table 7-16. Radiated Spurious Data (Band 66/4 – High Channel)

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1903280046-03-R1.ZNF	Test Dates: 3/28 - 4/18/2019	EUT Type: Portable Handset		Page 133 of 149

Band 2



Plot 7-195. Radiated Spurious Plot above 1GHz (Band 2)

OPERATING FREQUENCY: 1860.00 MHz

MODULATION SIGNAL: QPSK

BANDWIDTH: 20.0 MHz

DISTANCE: 3 meters

LIMIT: -13 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3720.00	V	398	33	-70.97	9.51	-61.46	-48.5
5580.00	V	350	150	-71.83	10.99	-60.85	-47.8
7440.00	V	112	205	-66.97	10.99	-55.98	-43.0
9300.00	V	-	-	-67.51	11.61	-55.90	-42.9

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

FCC ID: ZNFQ720CS	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1903280046-03-R1.ZNF	Test Dates: 3/28 - 4/18/2019	EUT Type: Portable Handset		Page 134 of 149

OPERATING FREQUENCY: 1880.00 MHz
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 20.0 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3760.00	V	114	122	-71.43	9.37	-62.06	-49.1
5640.00	V	-	-	-72.08	11.17	-60.92	-47.9

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

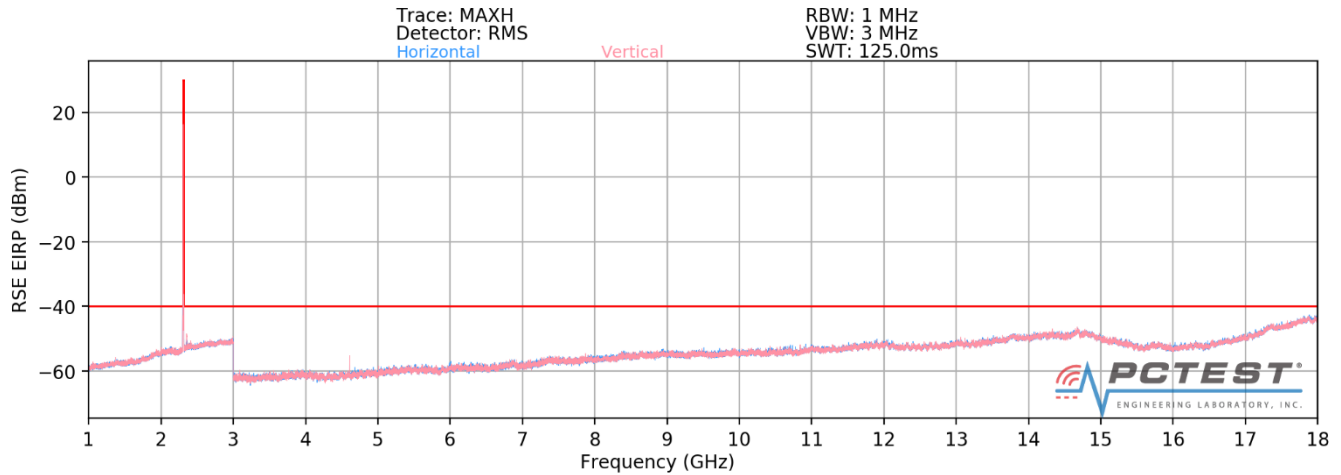
OPERATING FREQUENCY: 1900.00 MHz
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 20.0 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3800.00	V	115	235	-67.67	9.28	-58.39	-45.4
5700.00	V	120	275	-72.04	11.31	-60.73	-47.7
7600.00	V	-	-	-69.26	11.24	-58.03	-45.0

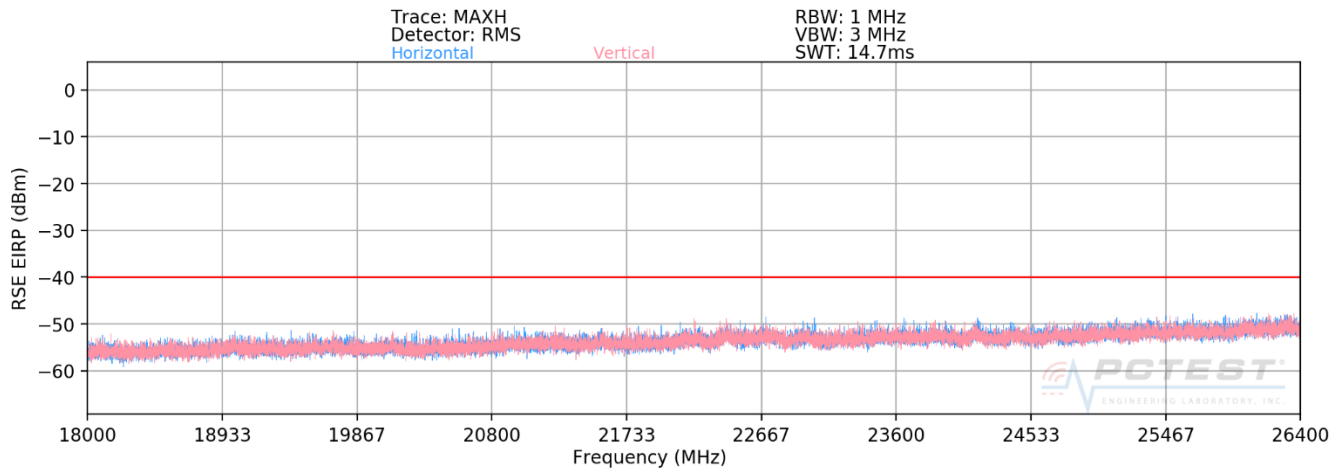
Table 7-19. Radiated Spurious Data (Band 2 – High Channel)

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Band 30



Plot 7-196. Radiated Spurious Plot 1GHz - 18GHz (Band 30)



Plot 7-197. Radiated Spurious Plot 18GHz - 26.5GHz (Band 30)

FCC ID: ZNFQ720CS	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M1903280046-03-R1.ZNF	Test Dates: 3/28 - 4/18/2019	EUT Type: Portable Handset		Page 136 of 149

OPERATING FREQUENCY: 2307.50 MHz
 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	V	136	338	-65.22	10.91	-54.30	-14.3
6922.50	V	-	-	-70.30	11.73	-58.57	-18.6
9230.00	V	-	-	-65.75	11.61	-54.14	-14.1

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

OPERATING FREQUENCY: 2312.50 MHz
 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	V	157	334	-62.97	10.92	-52.05	-12.0
6937.50	V	-	-	-70.30	11.75	-58.55	-18.6
9250.00	V	180	338	-64.51	11.63	-52.88	-12.9
11562.50	V	-	-	-65.20	12.71	-52.49	-12.5
13875.00	V	-	-	-60.43	11.98	-48.45	-8.4

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

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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7.8 Frequency Stability / Temperature Variation

Test Overview and Limit

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

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

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

Test Procedure Used

ANSI/TIA-603-E-2016

Test Settings

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

Test Setup

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

Test Notes

None

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Band 12 Frequency Stability Measurements

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

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	- 30	707,500,143	143	0.0000202
100 %		- 20	707,499,932	-68	-0.0000096
100 %		- 10	707,500,001	1	0.0000001
100 %		0	707,500,024	24	0.0000034
100 %		+ 10	707,499,930	-70	-0.0000099
100 %		+ 20	707,499,987	-13	-0.0000018
100 %		+ 30	707,499,742	-258	-0.0000365
100 %		+ 40	707,500,174	174	0.0000246
100 %		+ 50	707,500,227	227	0.0000321
BATT. ENDPOINT	3.40	+ 20	707,500,117	117	0.0000165

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.

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Band 12 Frequency Stability Measurements

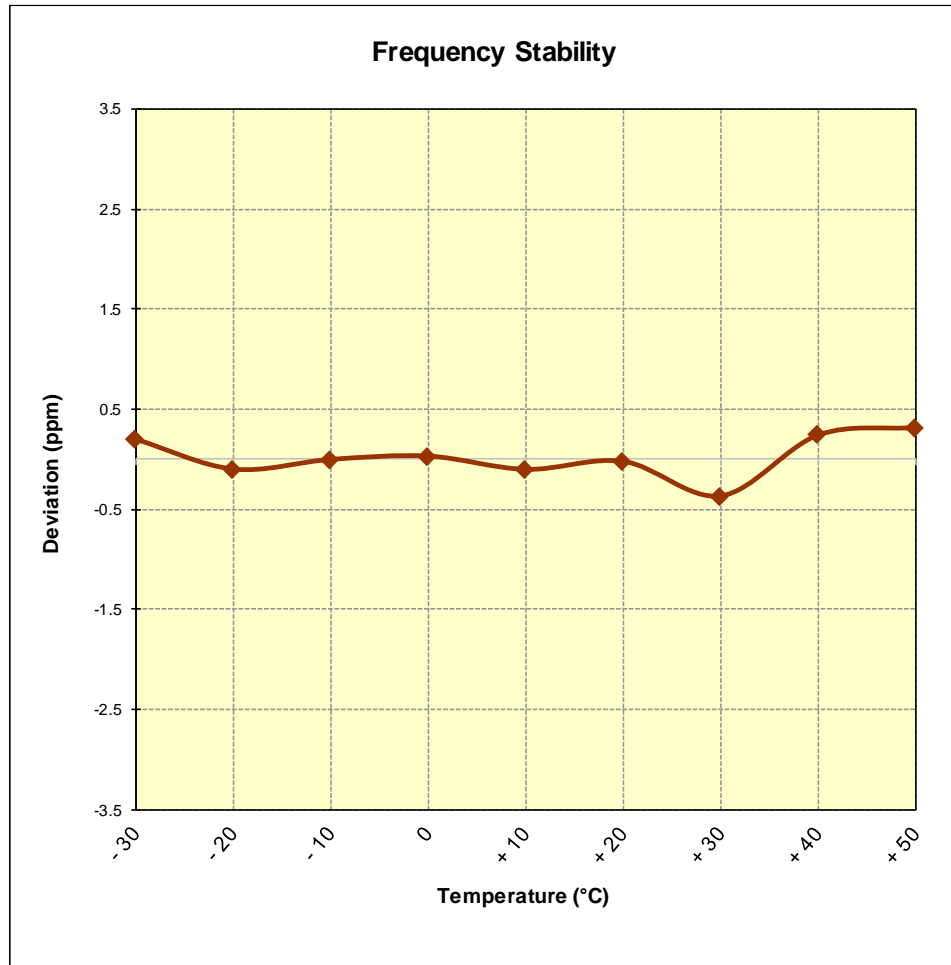


Figure 7-8. Frequency Stability Graph (Band 12)

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Band 5 Frequency Stability Measurements

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

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	- 30	836,499,829	-171	-0.0000204
100 %		- 20	836,500,093	93	0.0000111
100 %		- 10	836,499,982	-18	-0.0000022
100 %		0	836,499,937	-63	-0.0000075
100 %		+ 10	836,500,005	5	0.0000006
100 %		+ 20	836,499,983	-17	-0.0000020
100 %		+ 30	836,500,014	14	0.0000017
100 %		+ 40	836,500,016	16	0.0000019
100 %		+ 50	836,499,875	-125	-0.0000149
BATT. ENDPOINT	3.40	+ 20	836,500,140	140	0.0000167

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

FCC ID: ZNFQ720CS	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
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Band 5 Frequency Stability Measurements

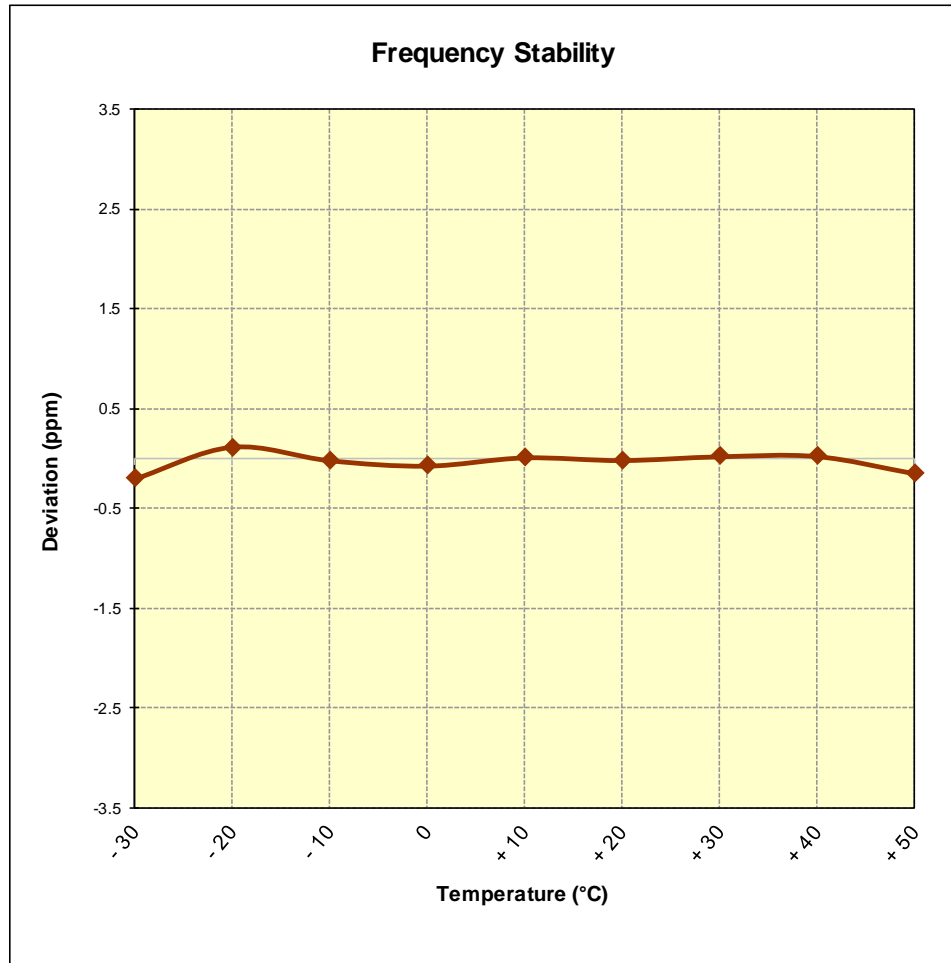


Figure 7-9. Frequency Stability Graph (Band 5)

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Band 66/4 Frequency Stability Measurements

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

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	- 30	1,745,000,047	47	0.0000027
100 %		- 20	1,744,999,756	-244	-0.0000140
100 %		- 10	1,745,000,170	170	0.0000097
100 %		0	1,745,000,177	177	0.0000101
100 %		+ 10	1,745,000,190	190	0.0000109
100 %		+ 20	1,745,000,146	146	0.0000084
100 %		+ 30	1,744,999,913	-87	-0.0000050
100 %		+ 40	1,744,999,997	-3	-0.0000002
100 %		+ 50	1,745,000,257	257	0.0000147
BATT. ENDPOINT	3.40	+ 20	1,744,999,617	-383	-0.0000219

Table 7-24. Frequency Stability Data (Band 66/4)

Note:

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

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Band 66/4 Frequency Stability Measurements

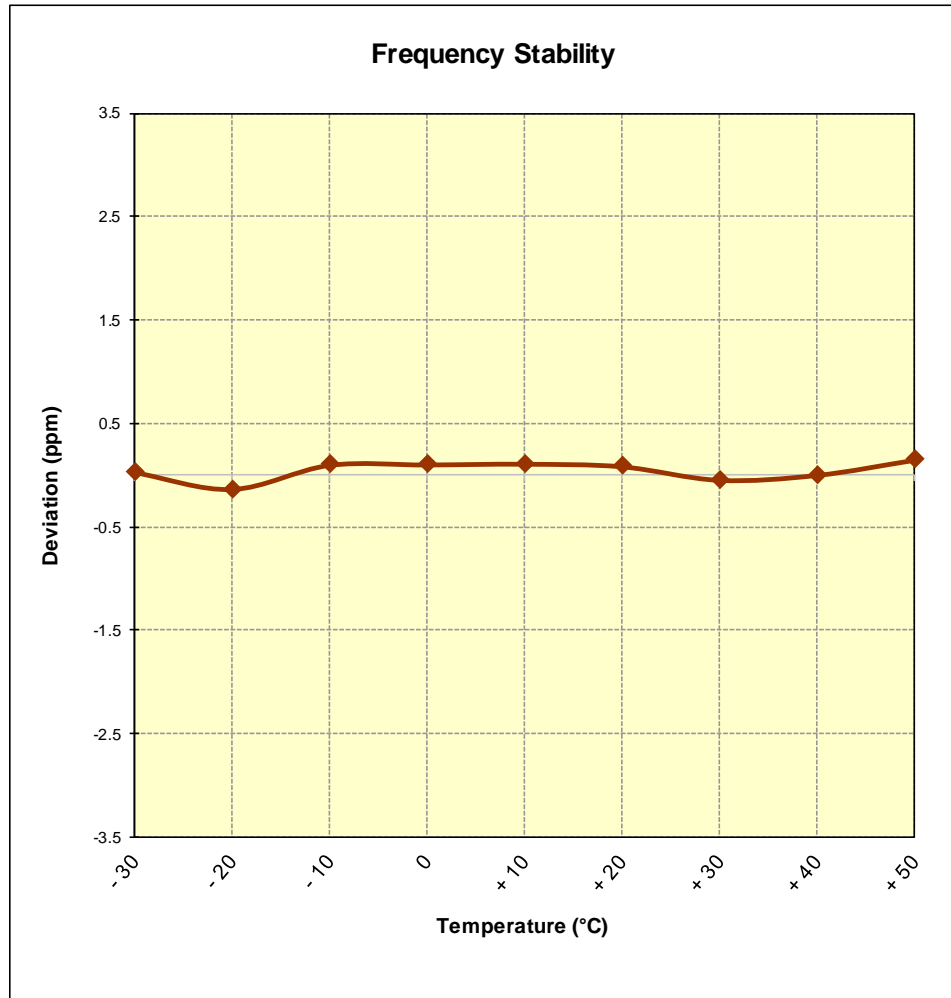


Figure 7-10. Frequency Stability Graph (Band 66/4)

FCC ID: ZNFQ720CS		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: 3.85 VDC
 DEVIATION LIMIT: ± 0.00025 % or 2.5 ppm

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	- 30	1,880,000,039	39	0.0000021
100 %		- 20	1,880,000,110	110	0.0000059
100 %		- 10	1,879,999,873	-127	-0.0000068
100 %		0	1,879,999,658	-342	-0.0000182
100 %		+ 10	1,879,999,788	-212	-0.0000113
100 %		+ 20	1,880,000,178	178	0.0000095
100 %		+ 30	1,880,000,052	52	0.0000028
100 %		+ 40	1,880,000,015	15	0.0000008
100 %		+ 50	1,879,999,933	-67	-0.0000036
BATT. ENDPOINT	3.40	+ 20	1,879,999,930	-70	-0.0000037

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

FCC ID: ZNFQ720CS	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
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Band 2 Frequency Stability Measurements

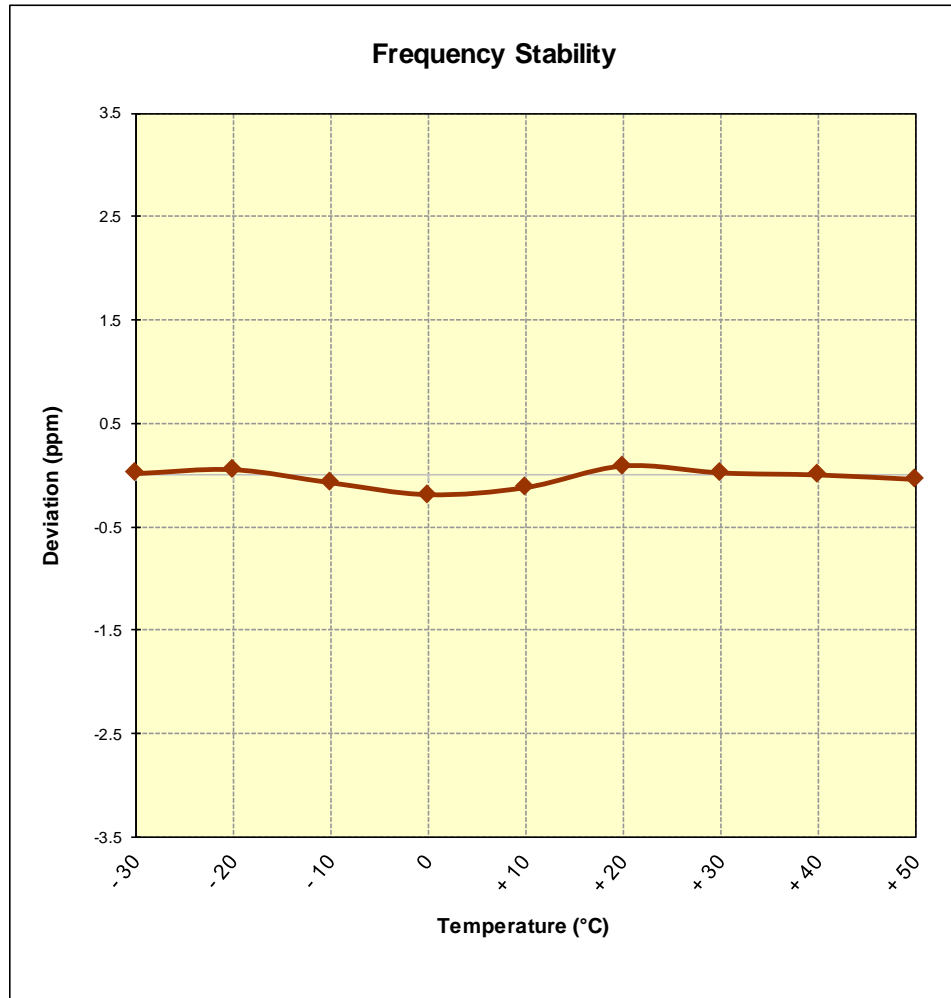


Figure 7-11. Frequency Stability Graph (Band 2)

FCC ID: ZNFQ720CS		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: 3.85 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	- 30	2,310,000,141	141	0.0000061
100 %		- 20	2,309,999,973	-27	-0.0000012
100 %		- 10	2,310,000,043	43	0.0000019
100 %		0	2,310,000,006	6	0.0000003
100 %		+ 10	2,310,000,023	23	0.0000010
100 %		+ 20	2,309,999,723	-277	-0.0000120
100 %		+ 30	2,309,999,927	-73	-0.0000032
100 %		+ 40	2,309,999,769	-231	-0.0000100
100 %		+ 50	2,310,000,349	349	0.0000151
BATT. ENDPOINT	3.40	+ 20	2,309,999,953	-47	-0.0000020

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: ZNFQ720CS	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
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Band 30 Frequency Stability Measurements

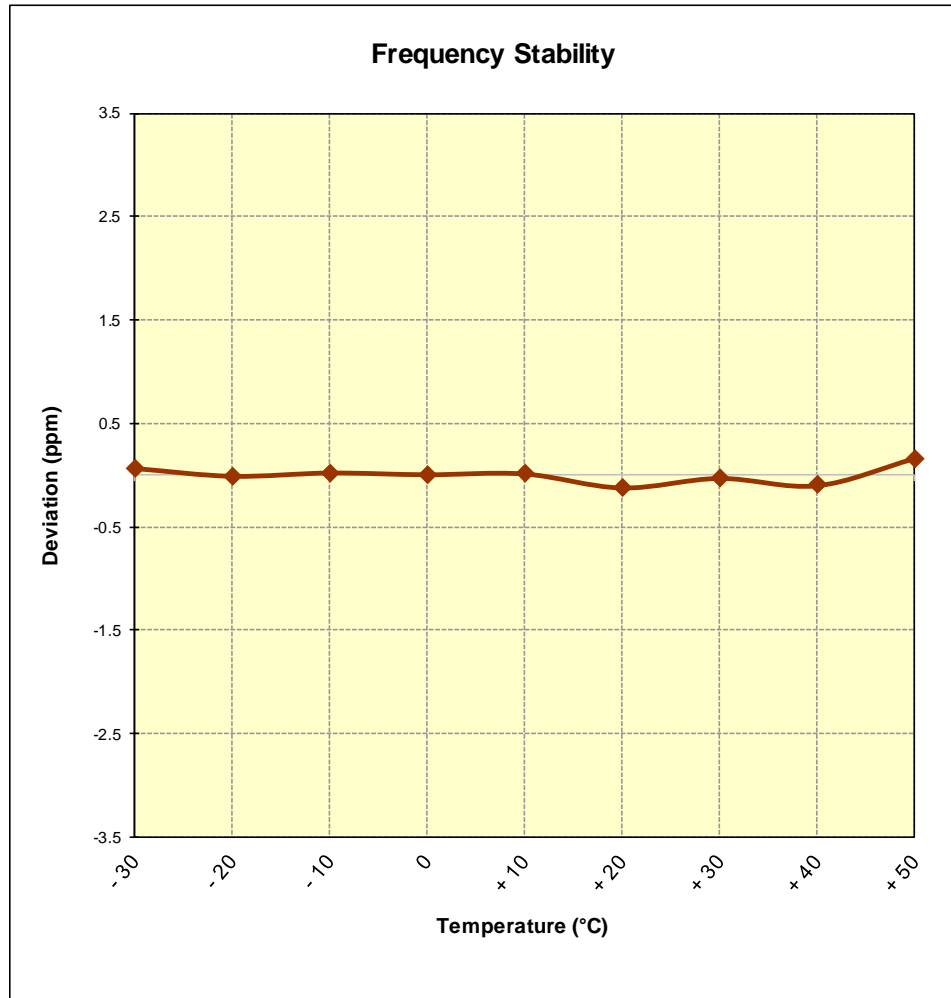


Figure 7-12. Frequency Stability Graph (Band 30)

FCC ID: ZNFQ720CS		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: ZNFQ720CS** complies with all the requirements of Part 22, 24, & 27 of the FCC Rules for LTE operation only.

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1903280046-03-R1.ZNF	Test Dates: 3/28 - 4/18/2019	EUT Type: Portable Handset		Page 149 of 149