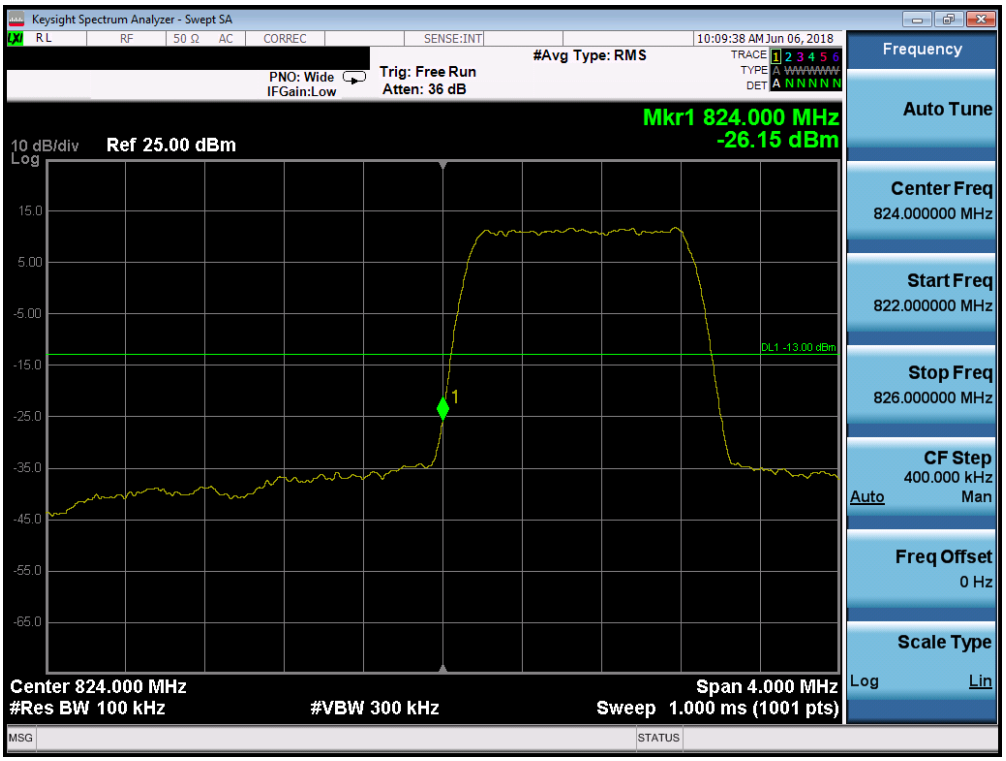
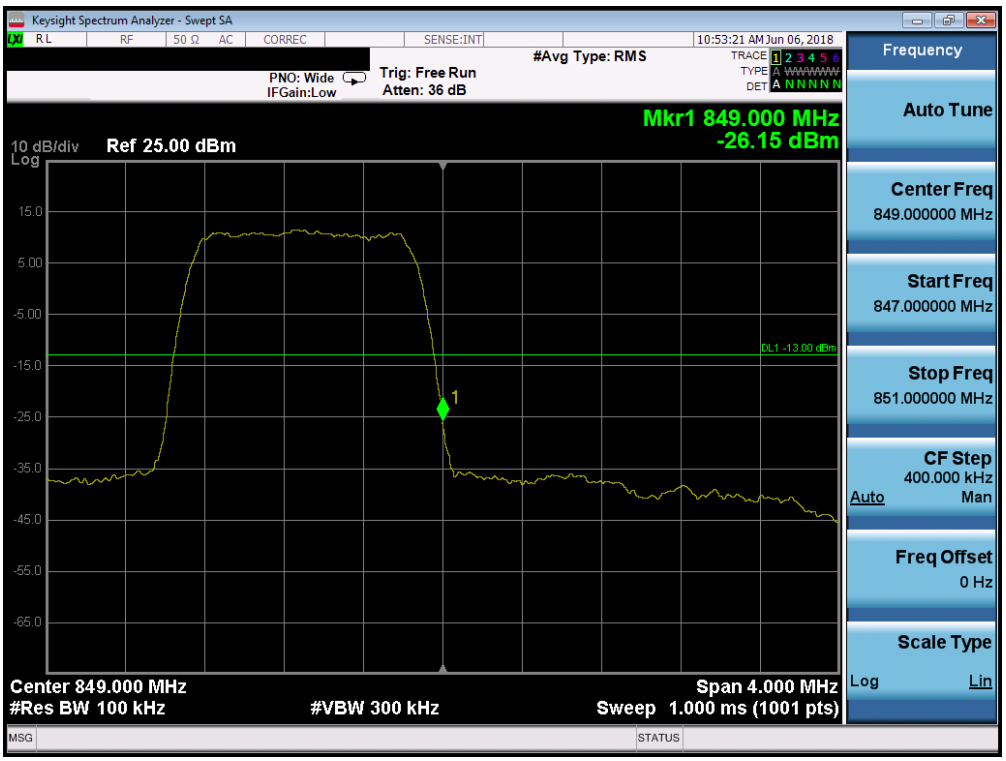
Band 5



Plot 7-106. Lower Band Edge Plot (Band 5 - 1.4MHz QPSK - Full RB Configuration)



Plot 7-107. Upper Band Edge Plot (Band 5 - 1.4MHz QPSK - Full RB Configuration)

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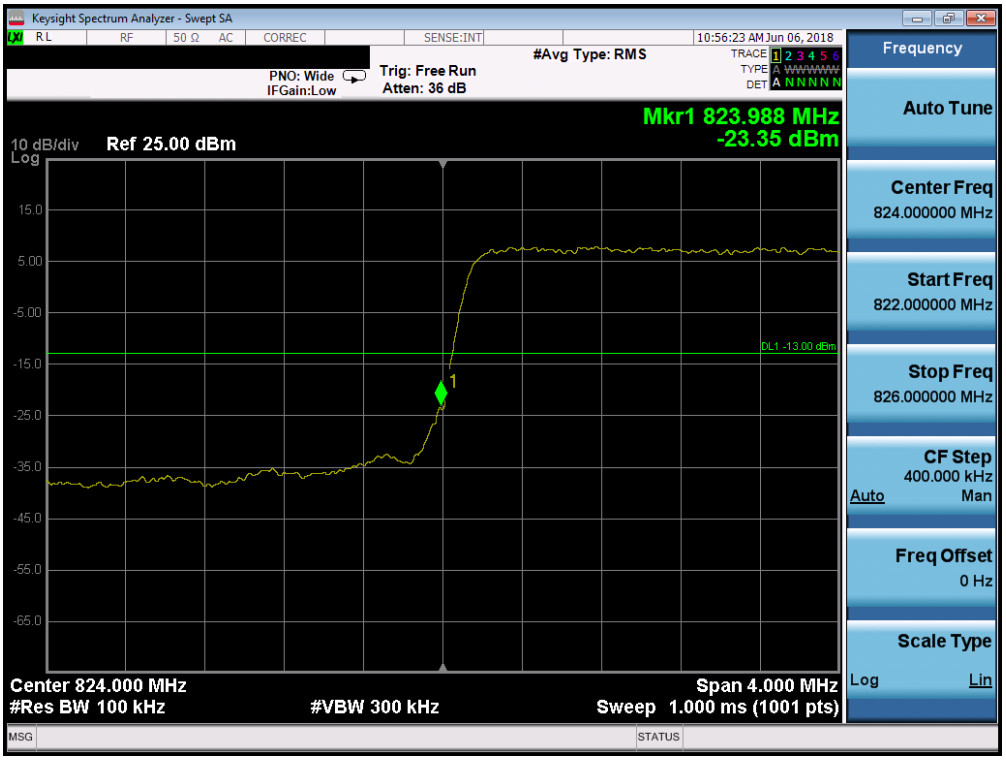

Plot 7-108. Lower Band Edge Plot (Band 5 - 3.0MHz QPSK - Full RB Configuration)

Plot 7-109. Upper Band Edge Plot (Band 5 - 3.0MHz QPSK - Full RB Configuration)

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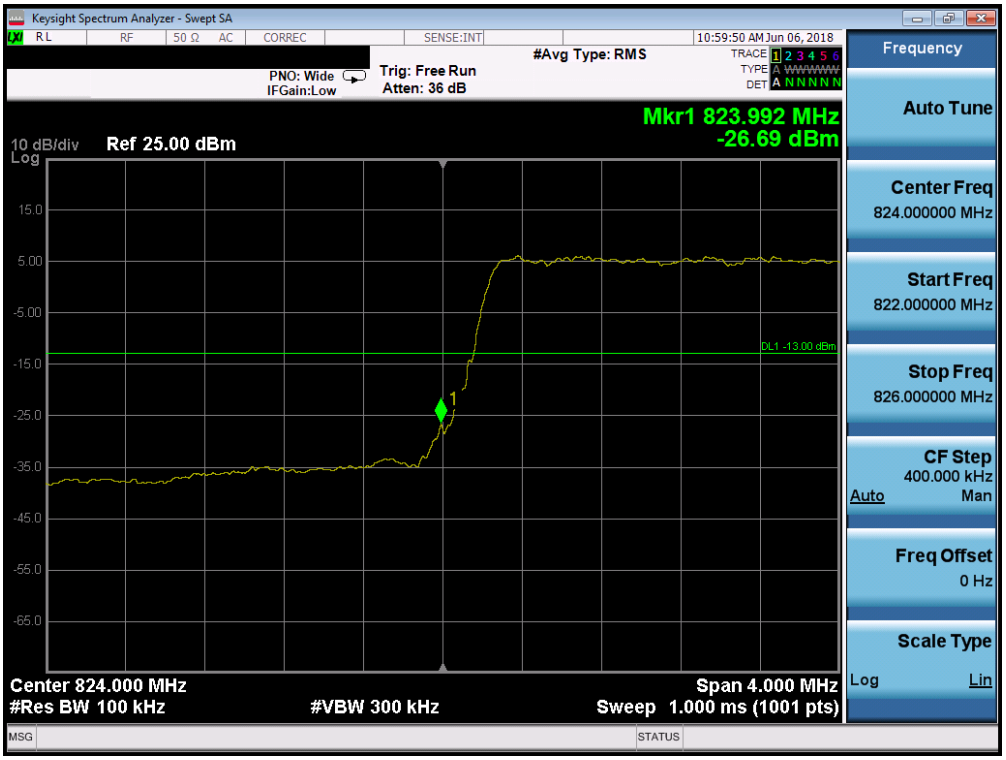
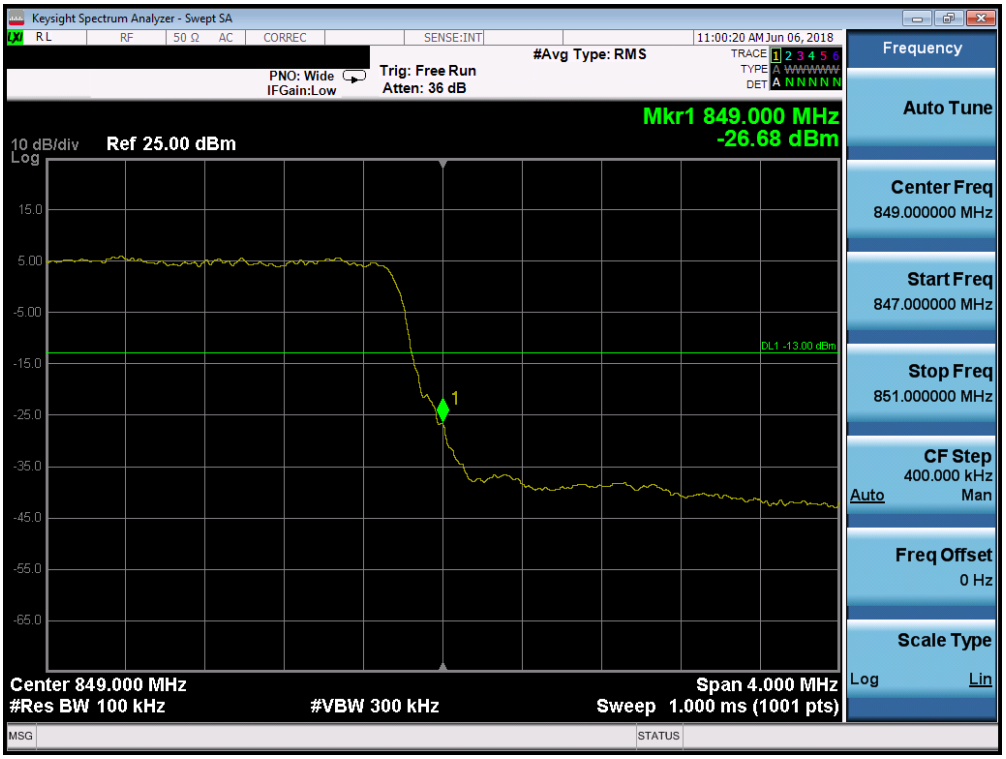


Plot 7-110. Lower Band Edge Plot (Band 5 - 5.0MHz QPSK - Full RB Configuration)



Plot 7-111. Upper Band Edge Plot (Band 5 - 5.0MHz QPSK - Full RB Configuration)

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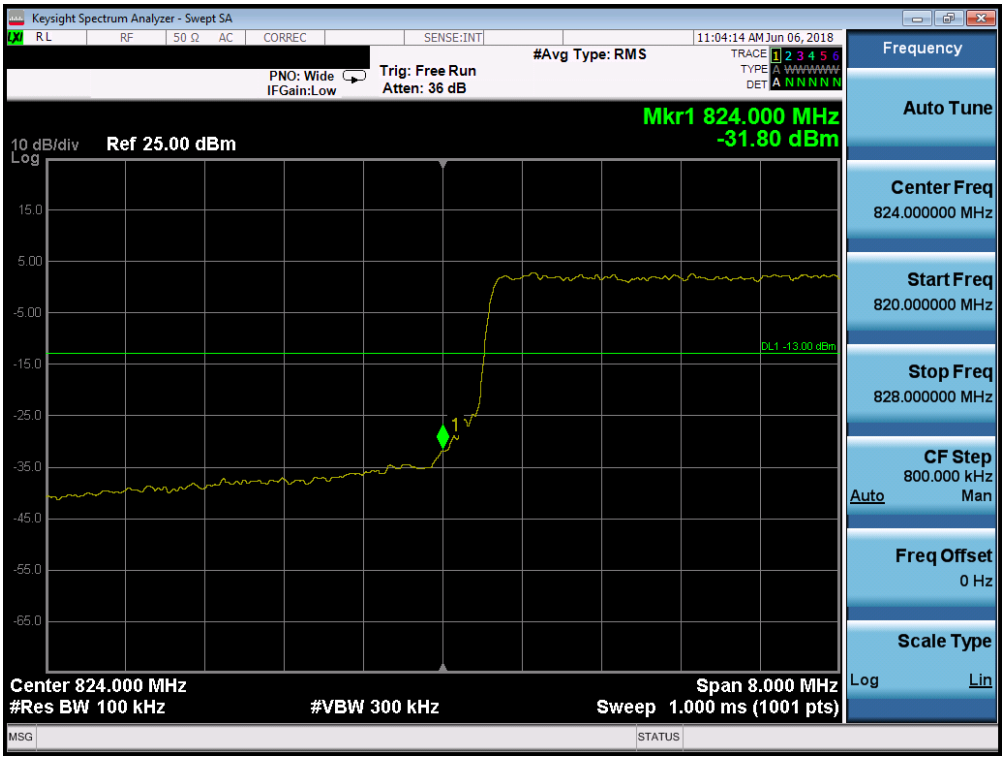

Plot 7-112. Lower Band Edge Plot (Band 5 - 10.0MHz QPSK - Full RB Configuration)

Plot 7-113. Upper Band Edge Plot (Band 5 - 10.0MHz QPSK - Full RB Configuration)

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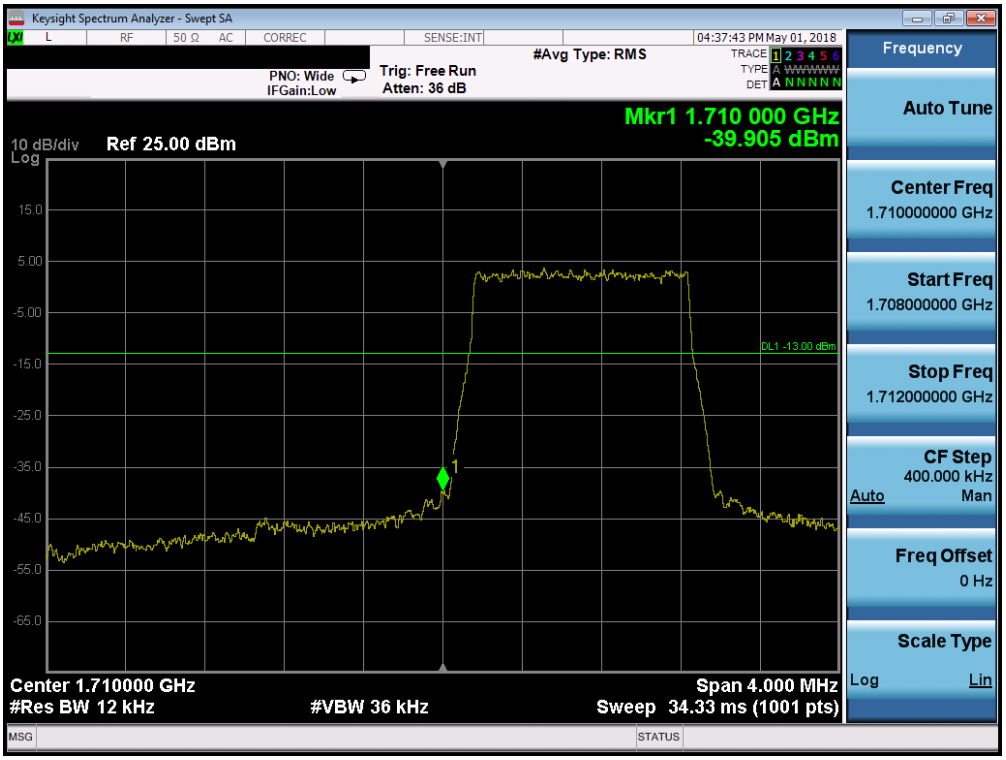
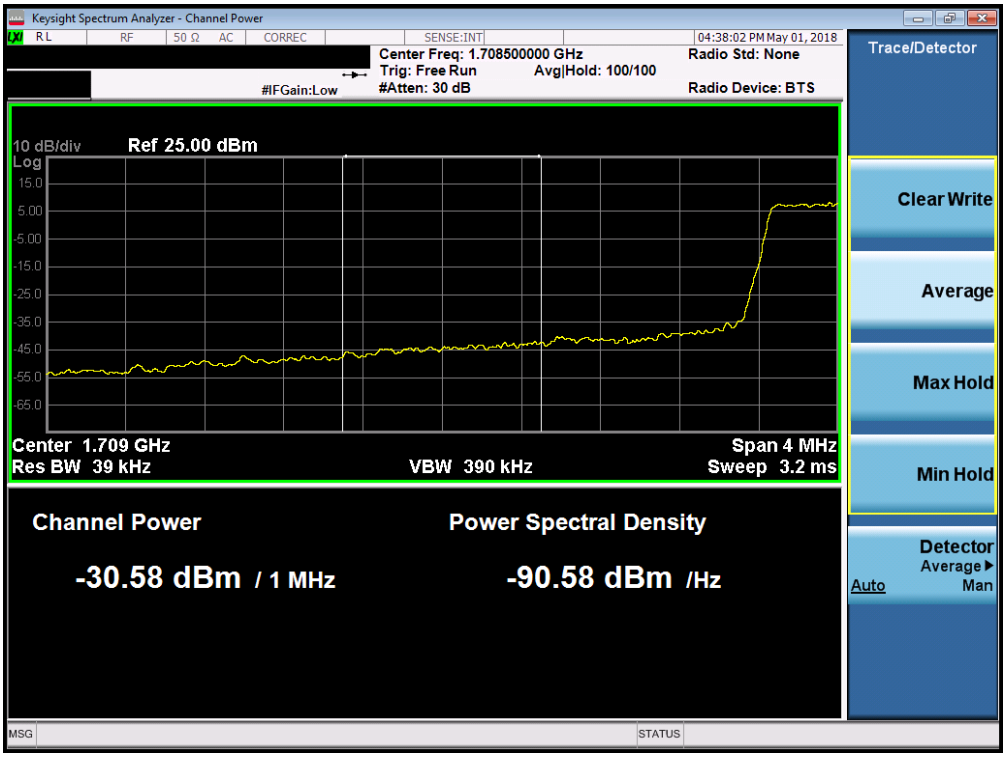
Band 66/4



Plot 7-114. Lower Band Edge Plot (Band 66/4 - 1.4MHz QPSK - Full RB Configuration)



Plot 7-115. Lower Extended Band Edge Plot (Band 66/4 - 1.4MHz QPSK - Full RB Configuration)

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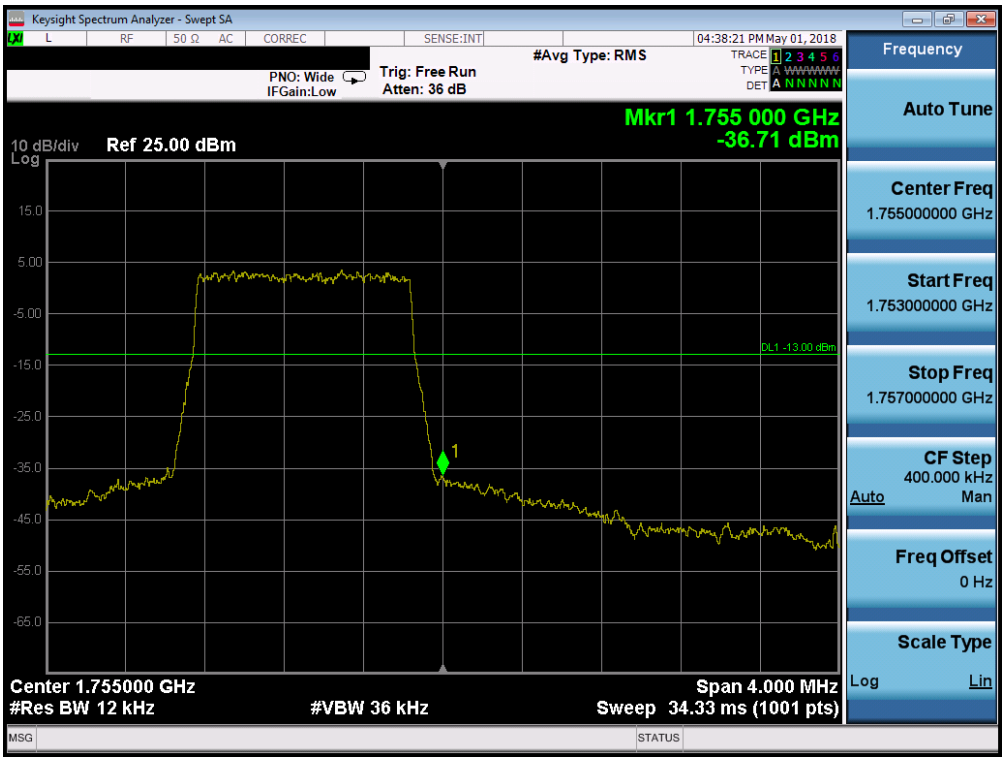
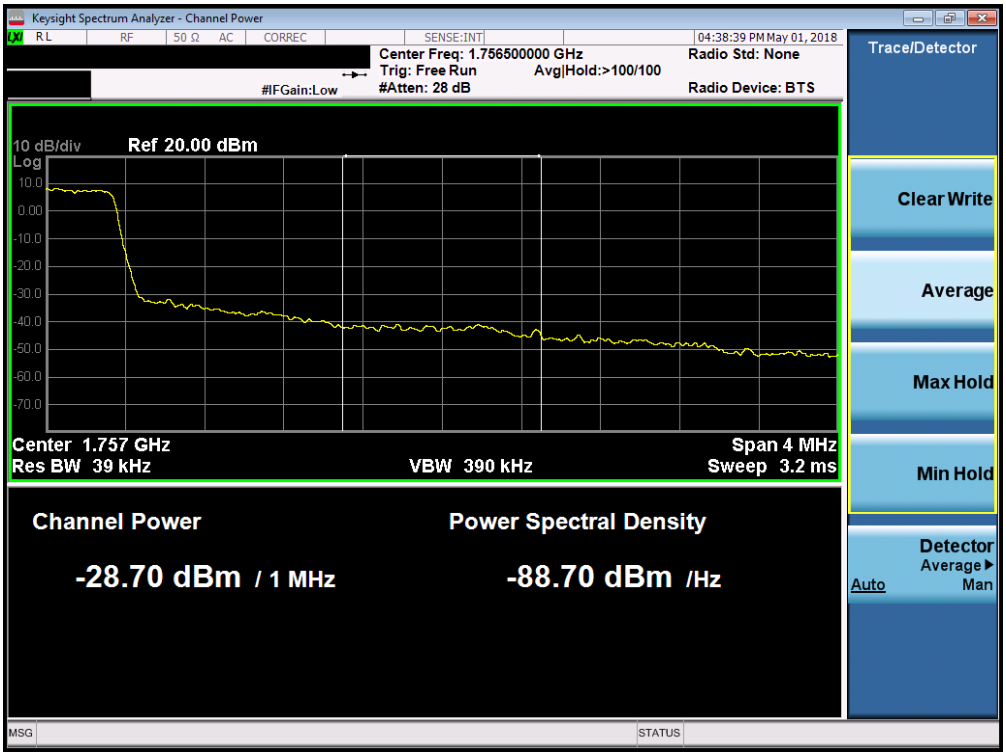


Plot 7-116. Upper Band Edge Plot (Band 4 - 1.4MHz QPSK - Full RB Configuration)



Plot 7-117. Upper Extended Band Edge Plot (Band 4 - 1.4MHz QPSK - Full RB Configuration)

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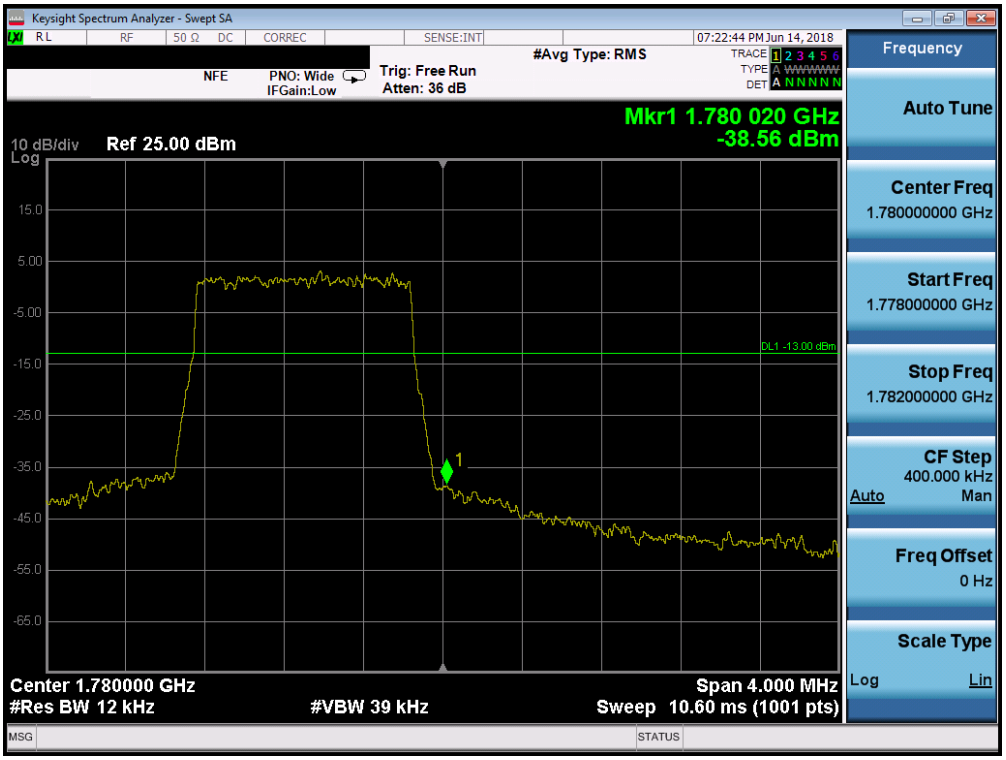
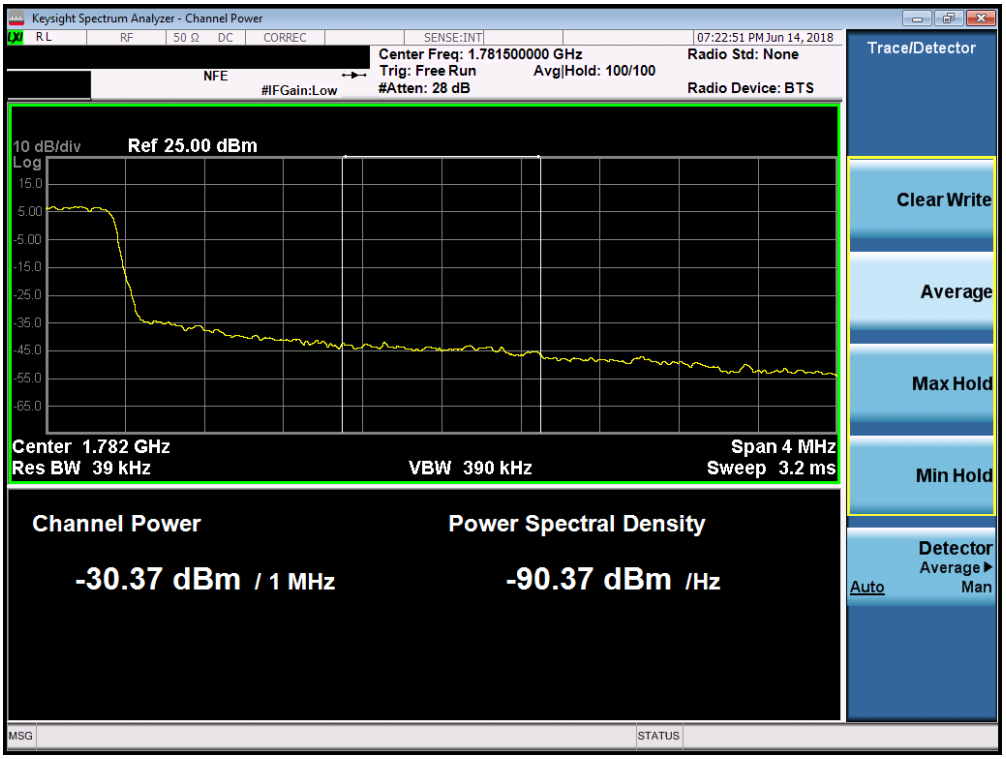


Plot 7-118. Upper Band Edge Plot (Band 66 - 1.4MHz QPSK - Full RB Configuration)



Plot 7-119. Upper Extended Band Edge Plot (Band 66 - 1.4MHz QPSK - Full RB Configuration)

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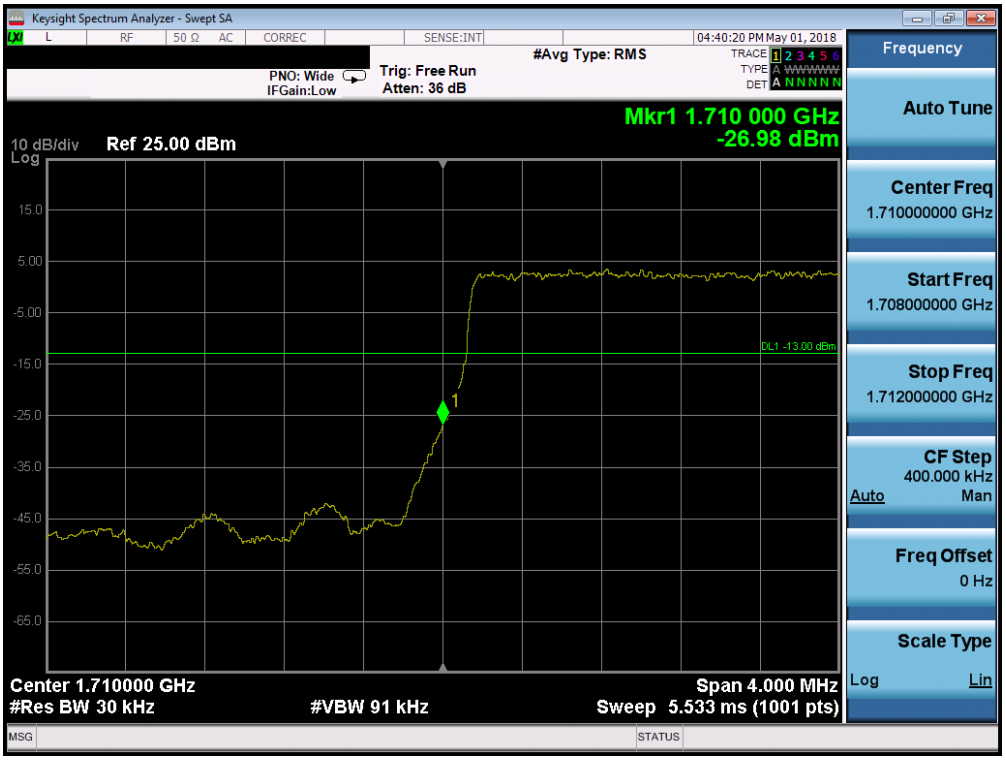
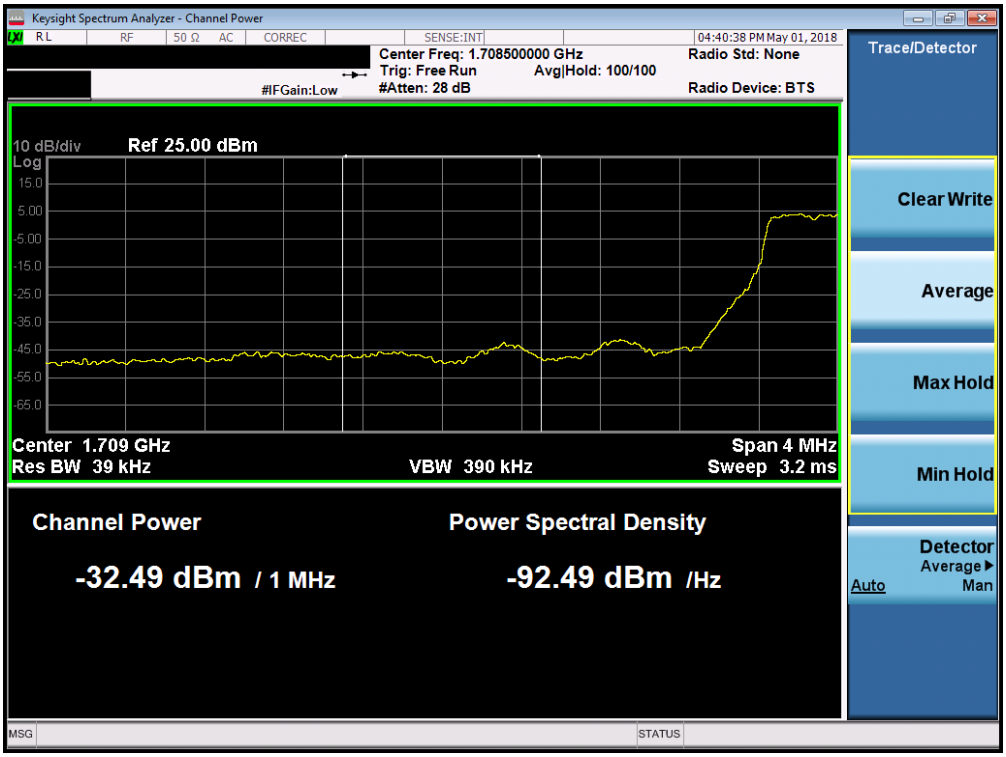


Plot 7-120. Lower Band Edge Plot (Band 66/4 - 3.0MHz QPSK - Full RB Configuration)



Plot 7-121. Lower Extended Band Edge Plot (Band 66/4 - 3.0MHz QPSK - Full RB Configuration)

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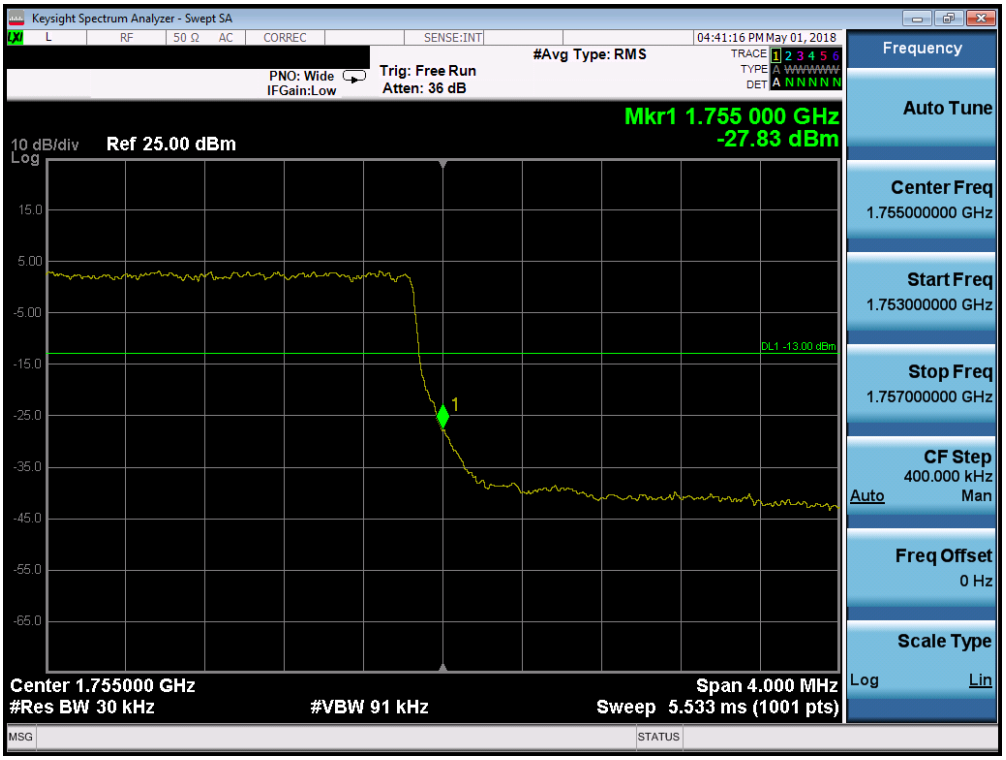
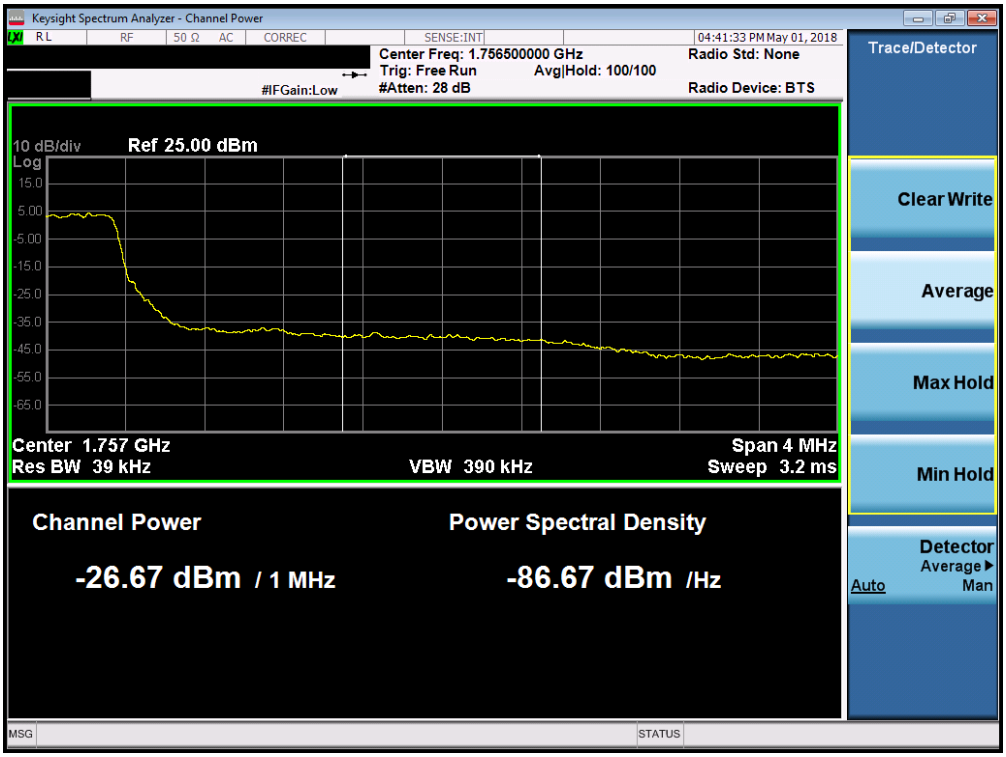


Plot 7-122. Upper Band Edge Plot (Band 4 - 3.0MHz QPSK - Full RB Configuration)



Plot 7-123. Upper Extended Band Edge Plot (Band 4 - 3.0MHz QPSK - Full RB Configuration)

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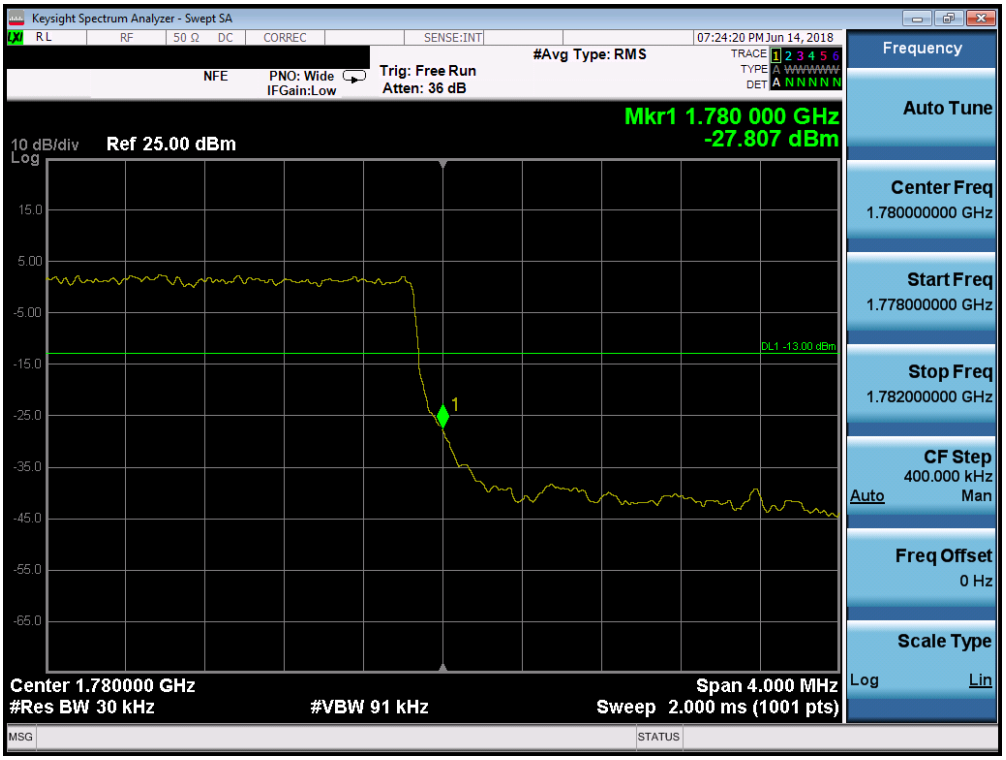
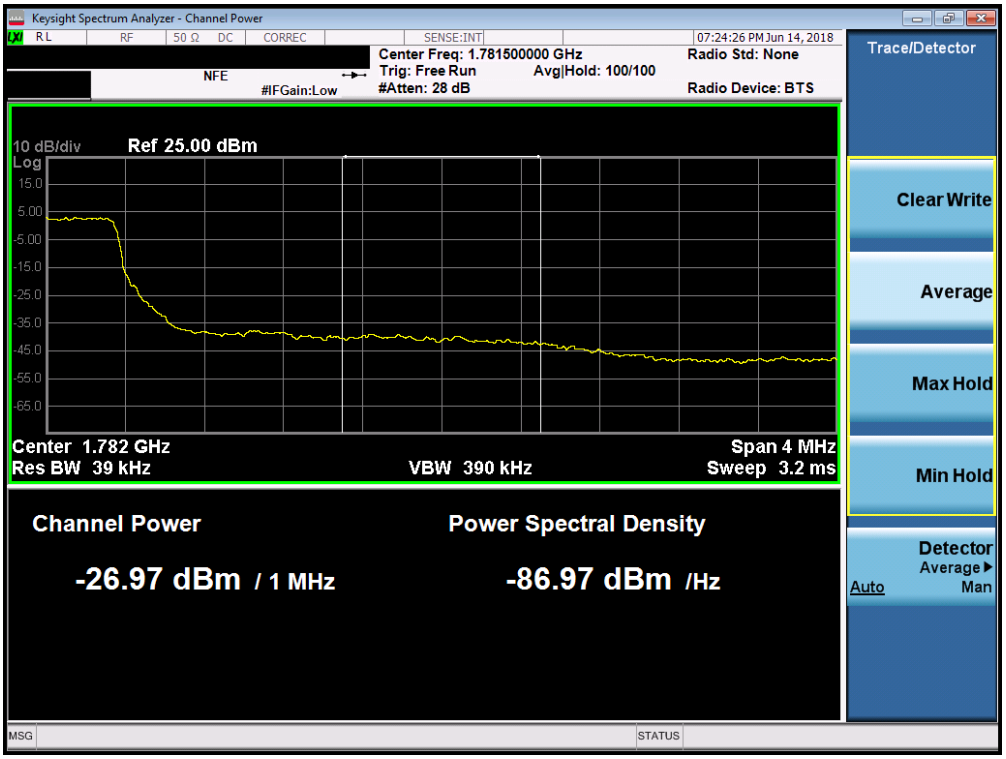


Plot 7-124. Upper Band Edge Plot (Band 66 - 3.0MHz QPSK - Full RB Configuration)



Plot 7-125. Upper Extended Band Edge Plot (Band 66 - 3.0MHz QPSK - Full RB Configuration)

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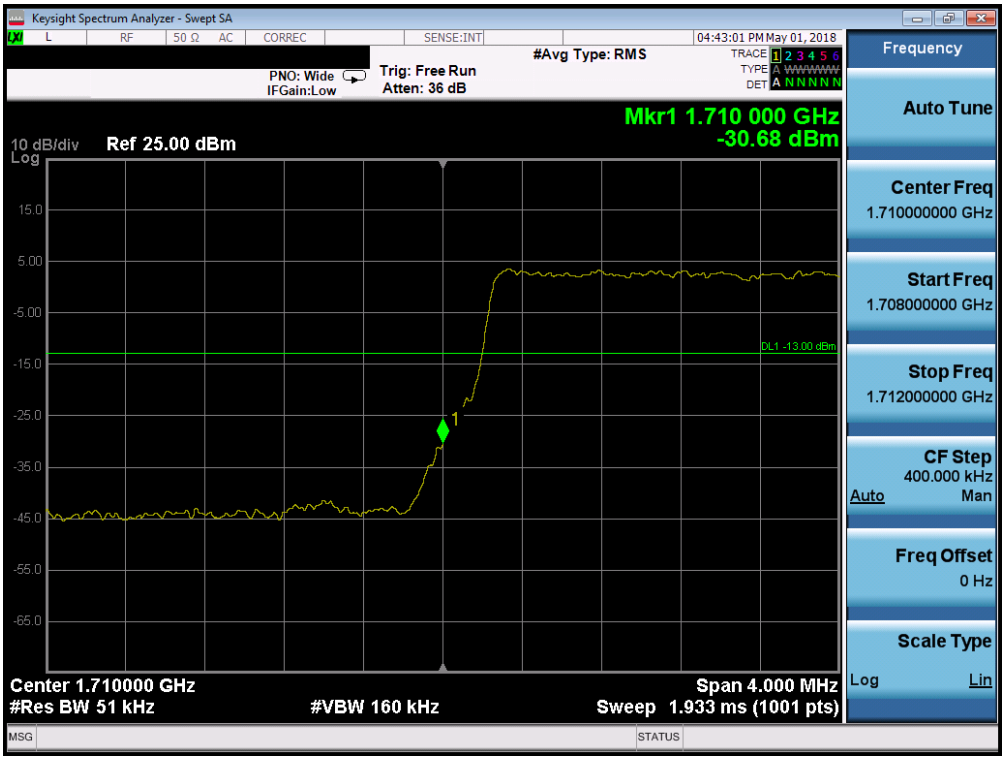
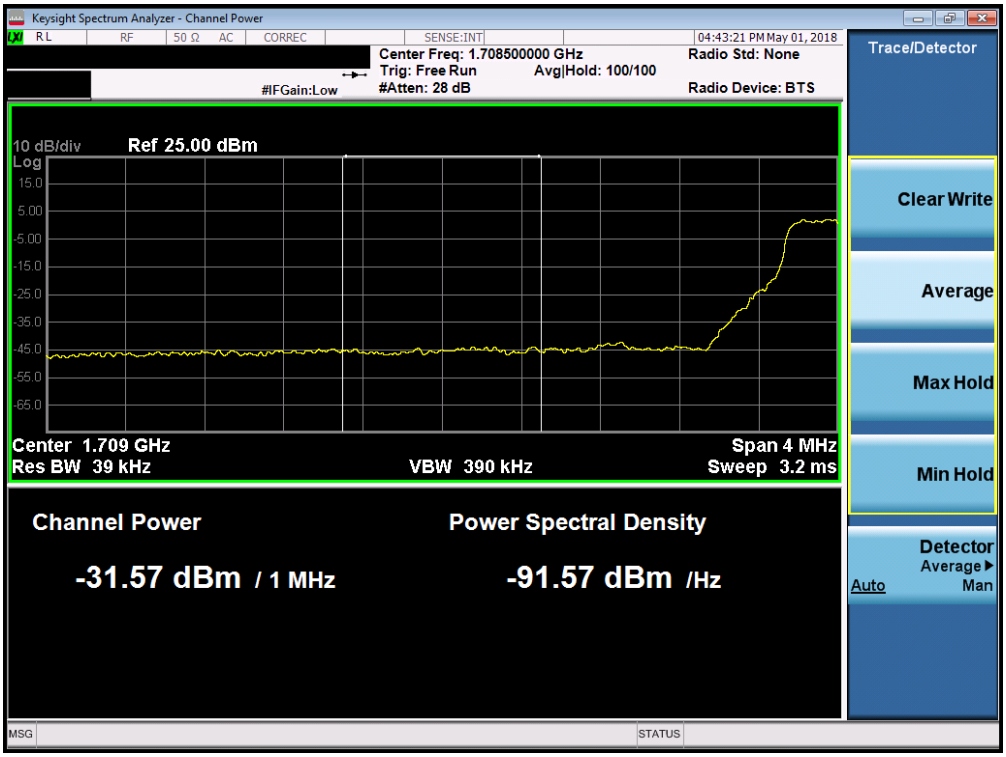


Plot 7-126. Lower Band Edge Plot (Band 66/4 - 5.0MHz QPSK - Full RB Configuration)



Plot 7-127. Lower Extended Band Edge Plot (Band 66/4 - 5.0MHz QPSK - Full RB Configuration)

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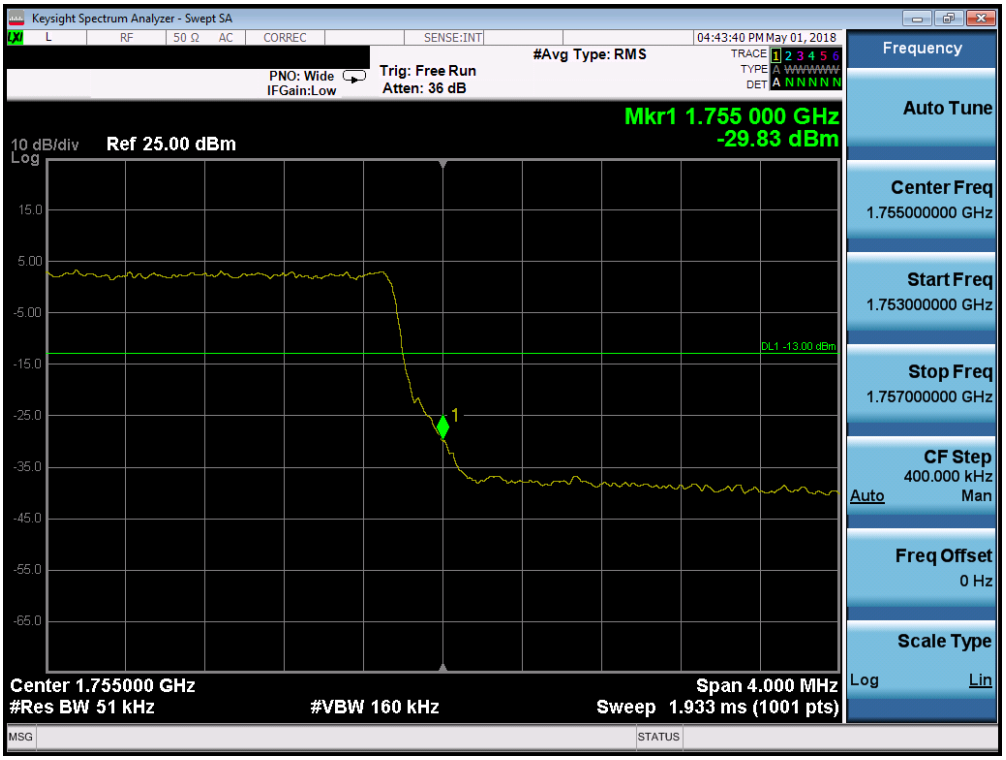
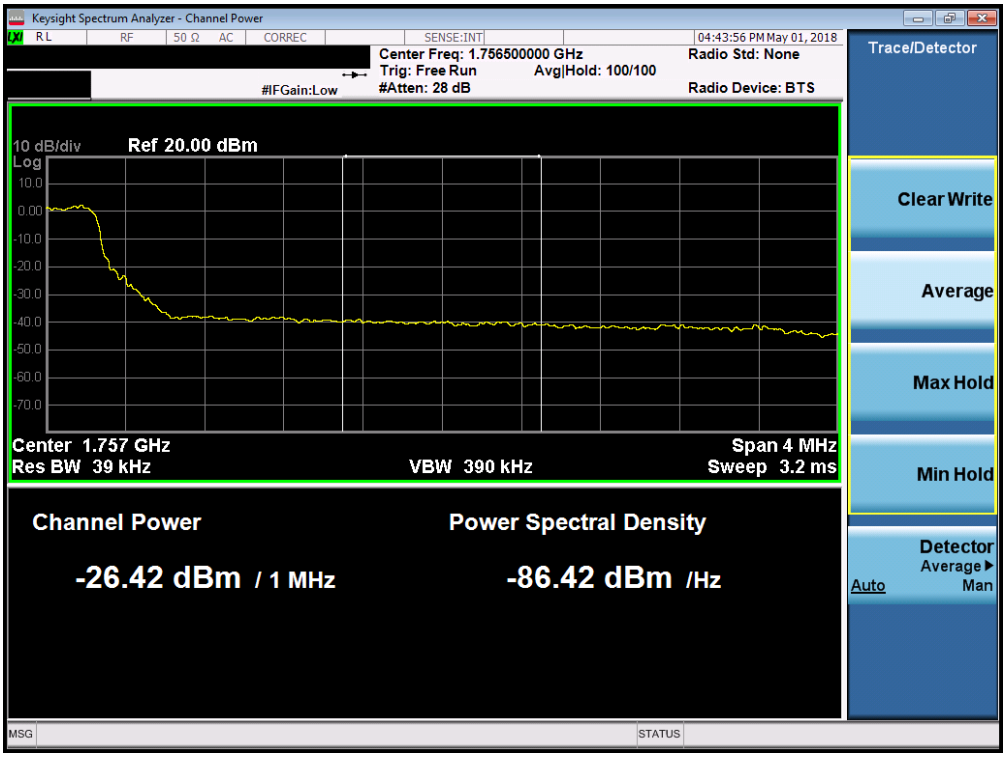


Plot 7-128. Upper Band Edge Plot (Band 4 - 5.0MHz QPSK - Full RB Configuration)



Plot 7-129. Upper Extended Band Edge Plot (Band 4 - 5.0MHz QPSK - Full RB Configuration)

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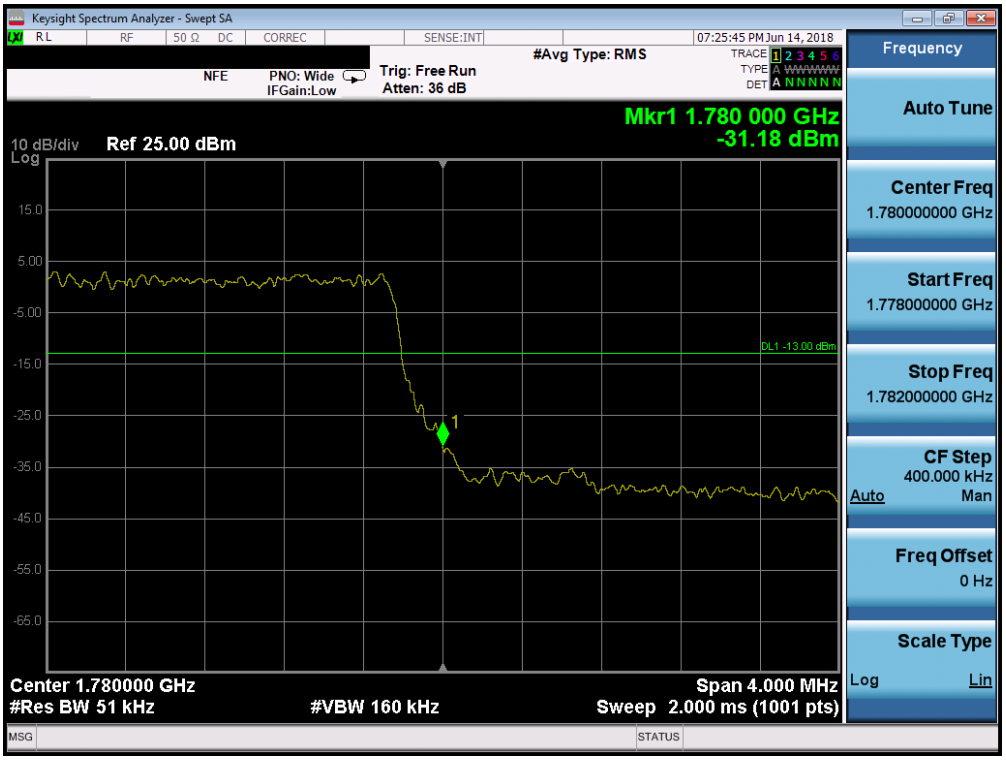
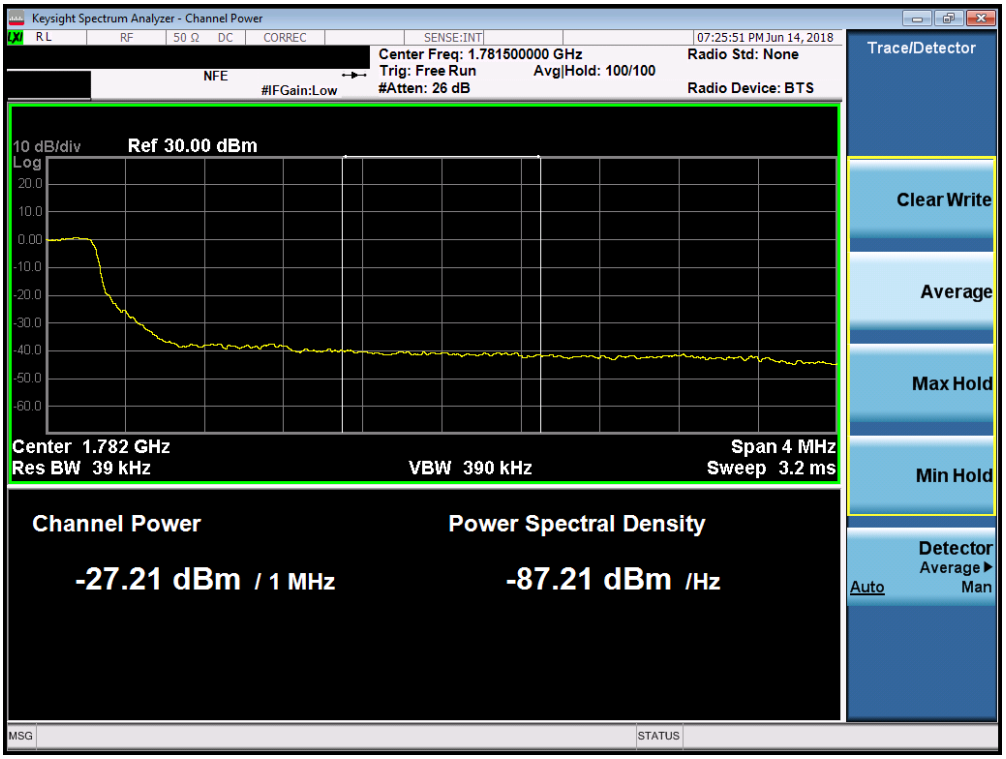


Plot 7-130. Upper Band Edge Plot (Band 66 - 5.0MHz QPSK - Full RB Configuration)



Plot 7-131. Upper Extended Band Edge Plot (Band 66 - 5.0MHz QPSK - Full RB Configuration)

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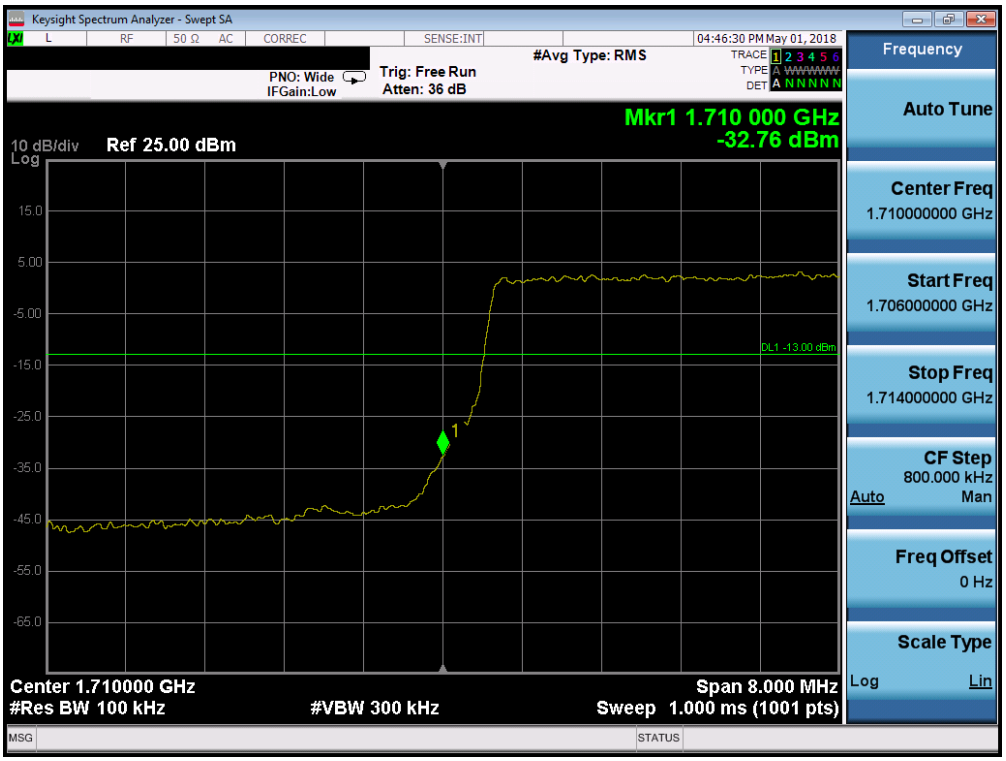
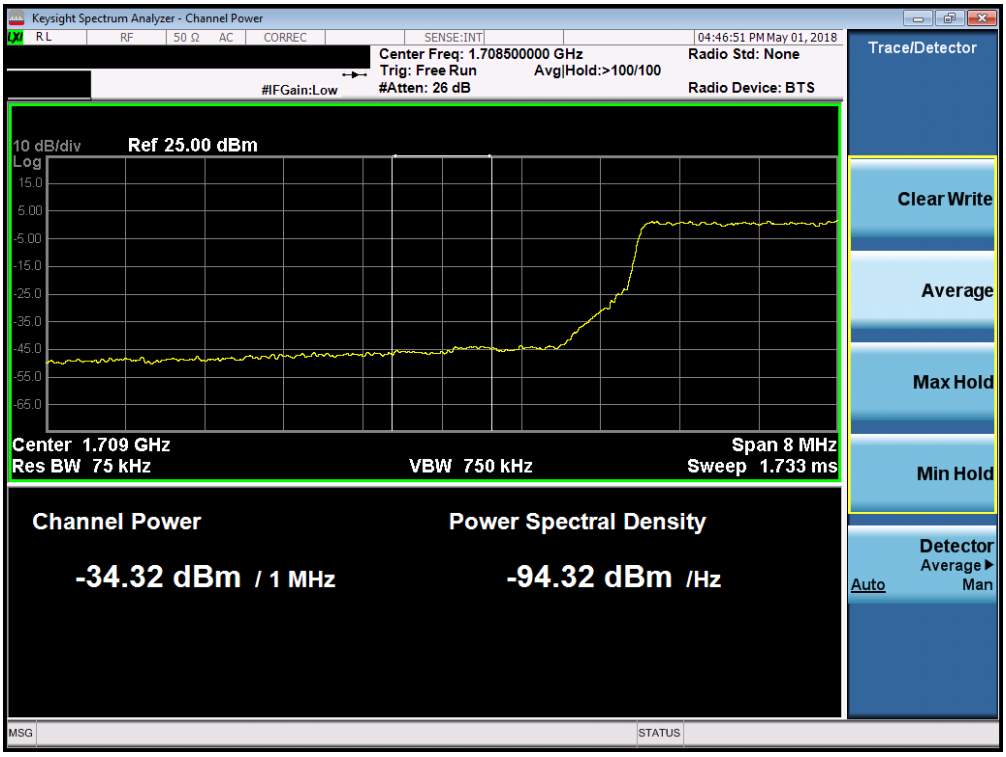


Plot 7-132. Lower Band Edge Plot (Band 66/4 - 10.0MHz QPSK - Full RB Configuration)



Plot 7-133. Lower Extended Band Edge Plot (Band 66/4 - 10.0MHz QPSK - Full RB Configuration)

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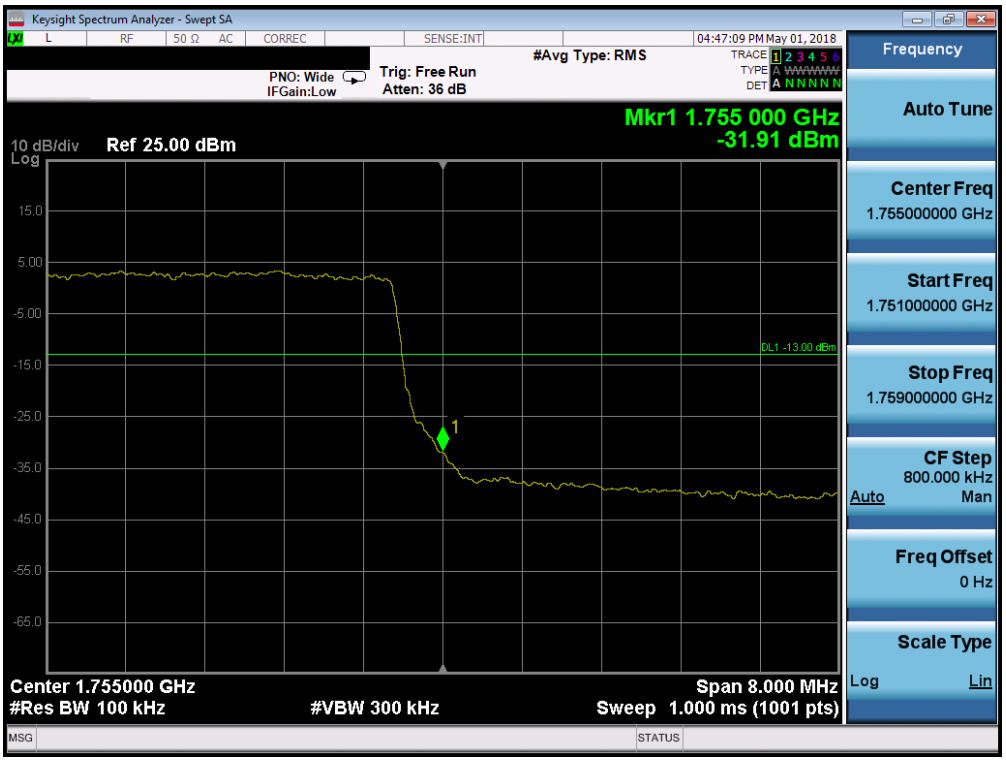
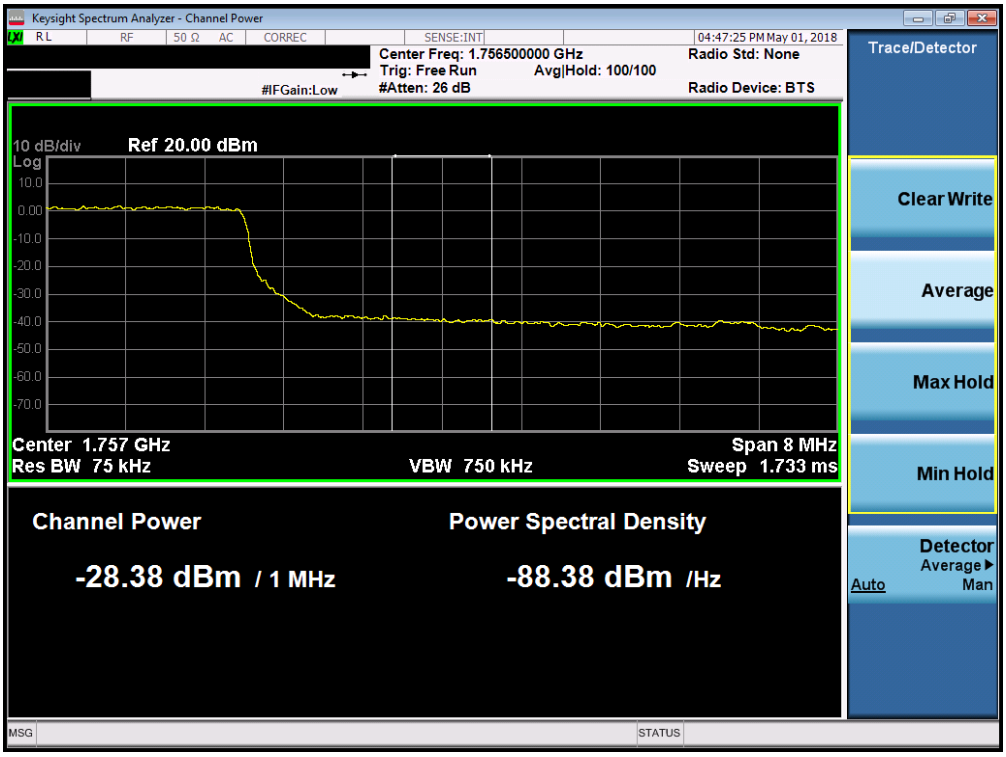


Plot 7-134. Upper Band Edge Plot (Band 4 - 10.0MHz QPSK - Full RB Configuration)



Plot 7-135. Upper Extended Band Edge Plot (Band 4 - 10.0MHz QPSK - Full RB Configuration)

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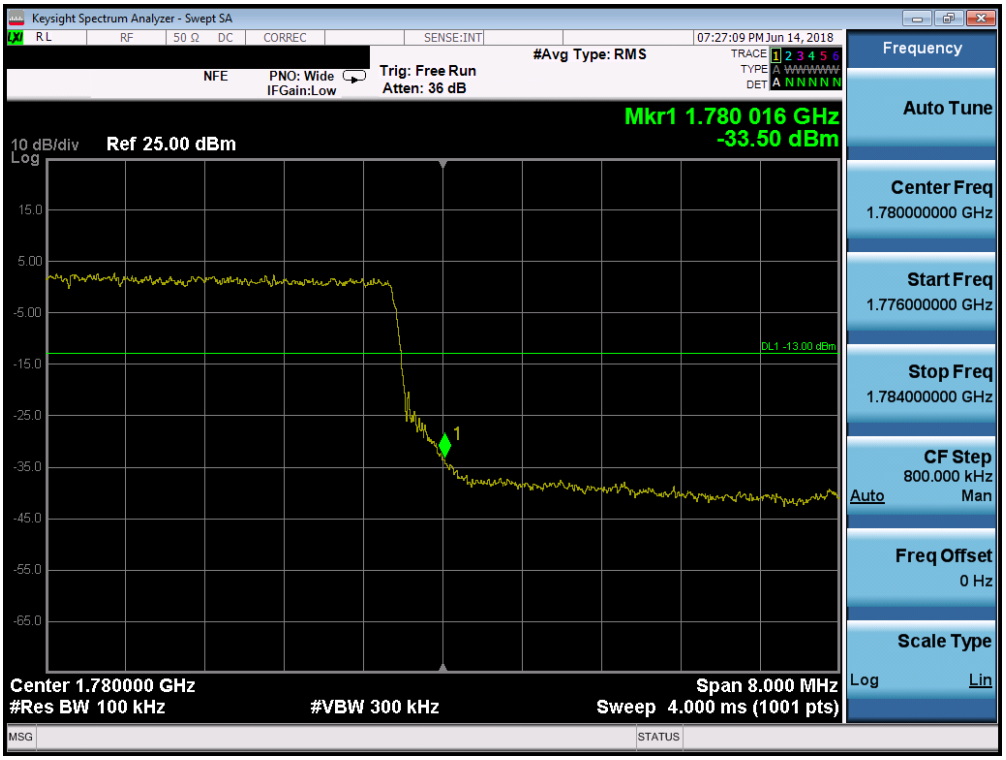
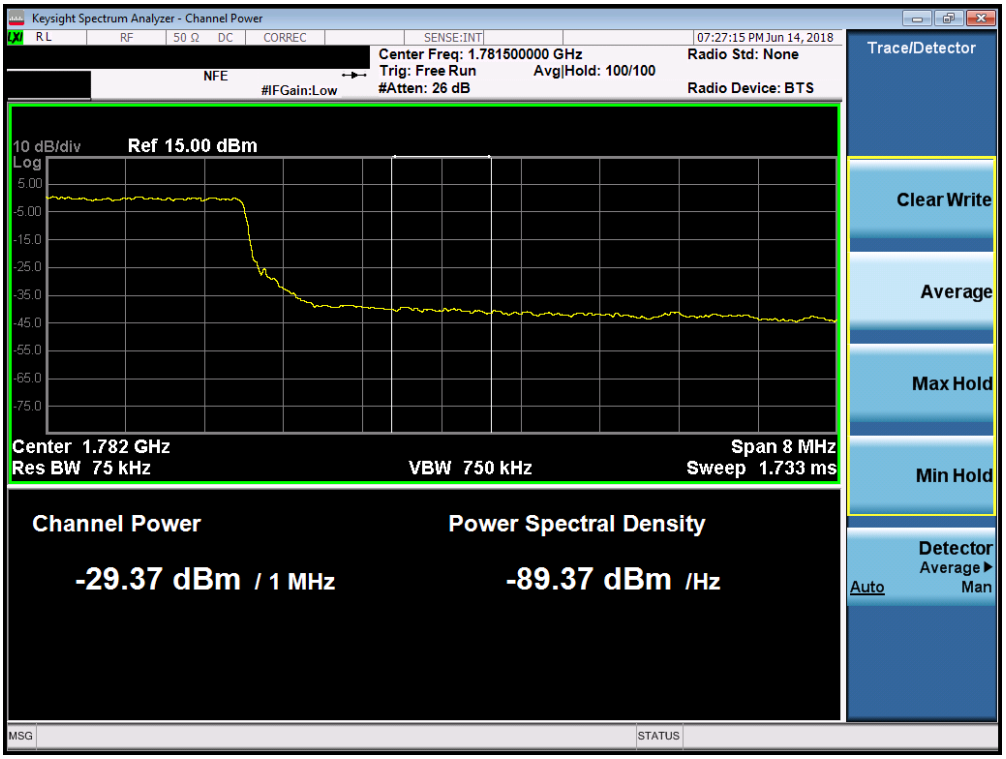


Plot 7-136. Upper Band Edge Plot (Band 66 - 10.0MHz QPSK - Full RB Configuration)



Plot 7-137. Upper Extended Band Edge Plot (Band 66 - 10.0MHz QPSK - Full RB Configuration)

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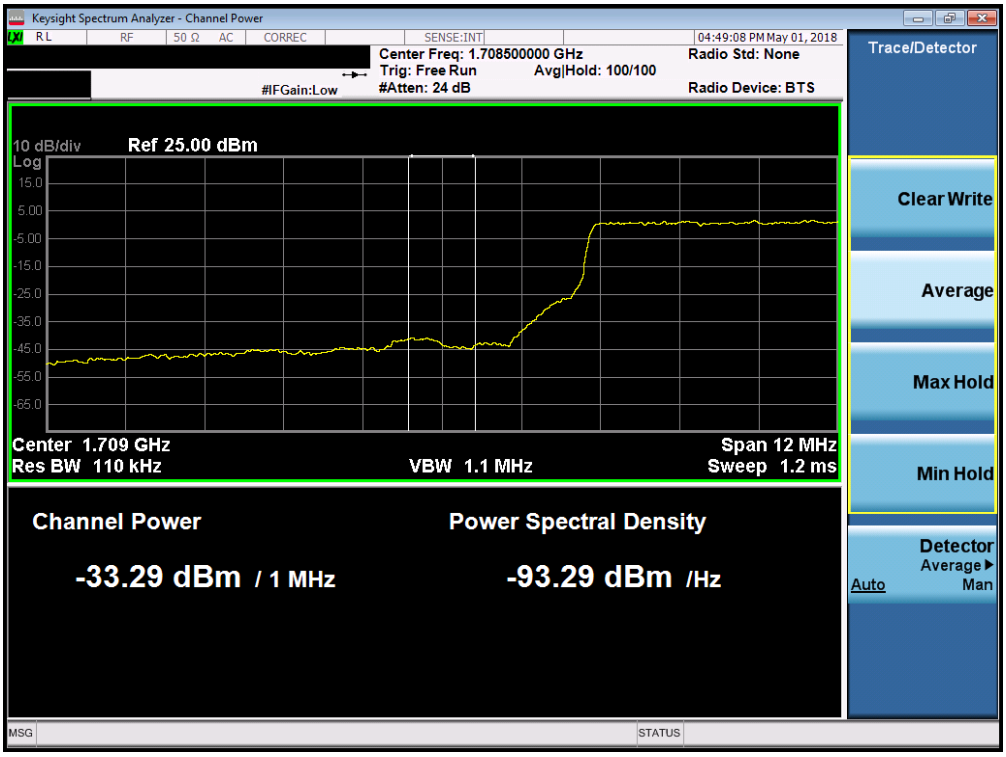
Plot 7-138. Lower Band Edge Plot (Band 66/4 - 15.0MHz QPSK - Full RB Configuration)



Plot 7-139. Lower Extended Band Edge Plot (Band 66/4 - 15.0MHz QPSK - Full RB Configuration)

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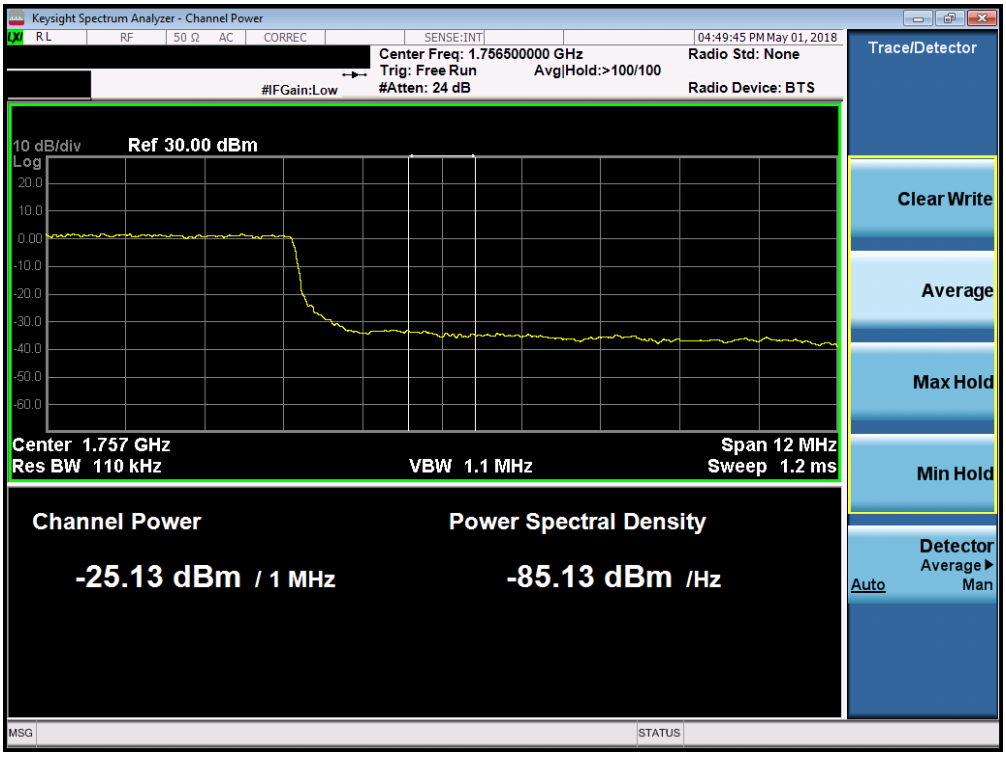
Plot 7-140. Upper Band Edge Plot (Band 4 - 15.0MHz QPSK - Full RB Configuration)



Plot 7-141. Upper Extended Band Edge Plot (Band 4 - 15.0MHz QPSK - Full RB Configuration)

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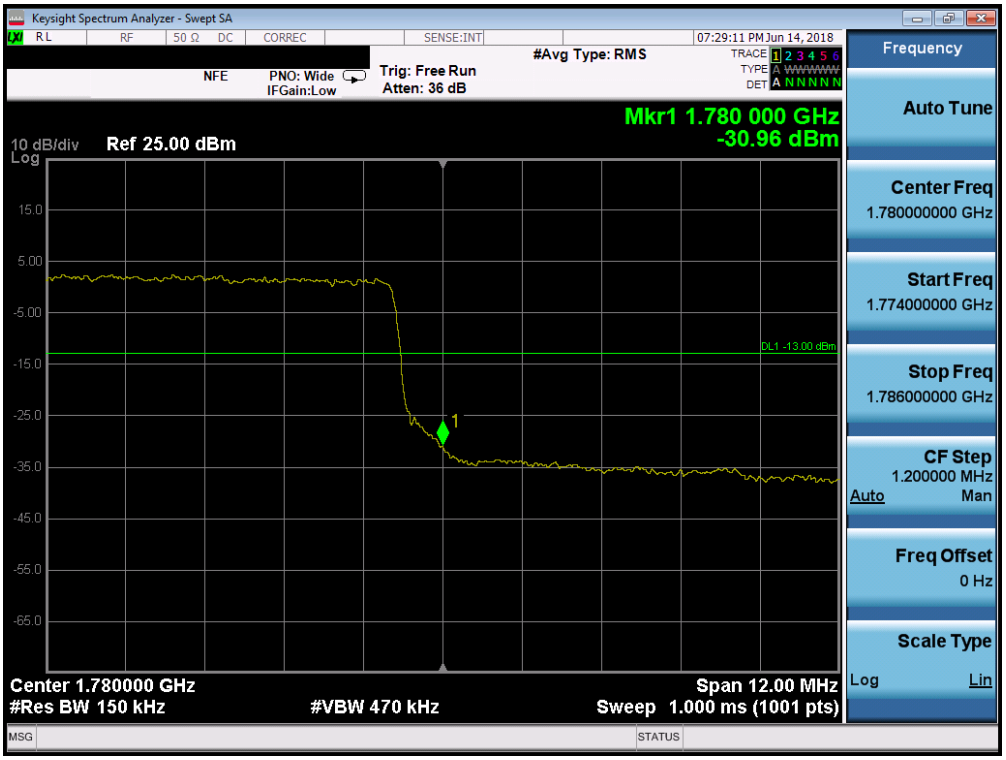
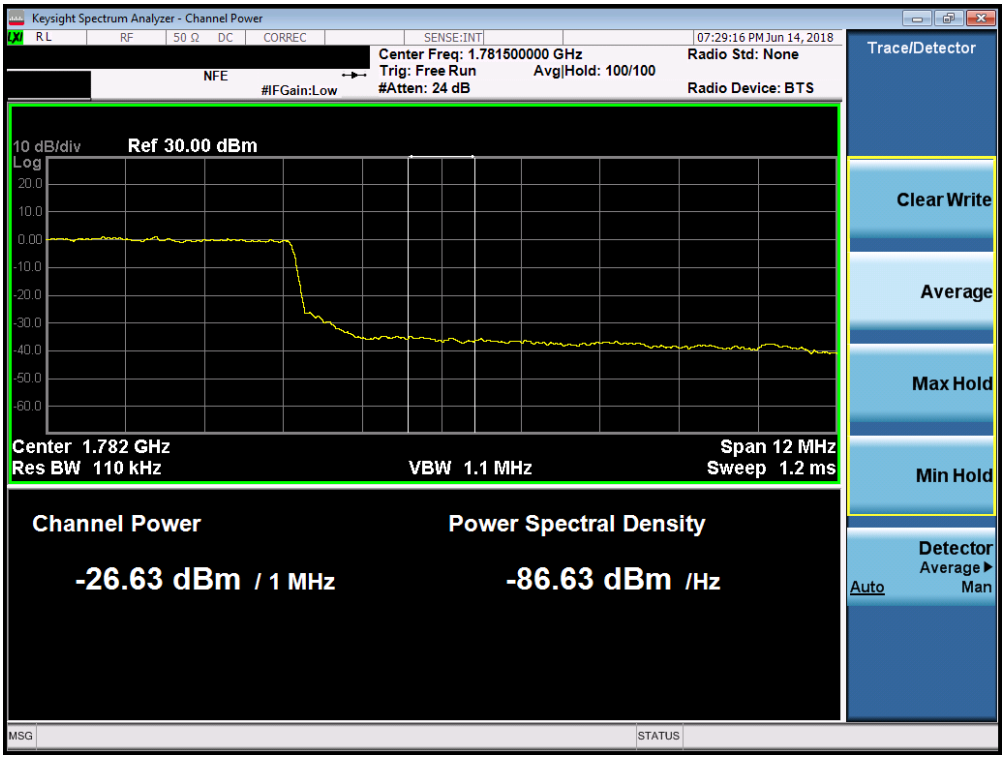


Plot 7-142. Upper Band Edge Plot (Band 66 - 15.0MHz QPSK - Full RB Configuration)



Plot 7-143. Upper Extended Band Edge Plot (Band 66 - 15.0MHz QPSK - Full RB Configuration)

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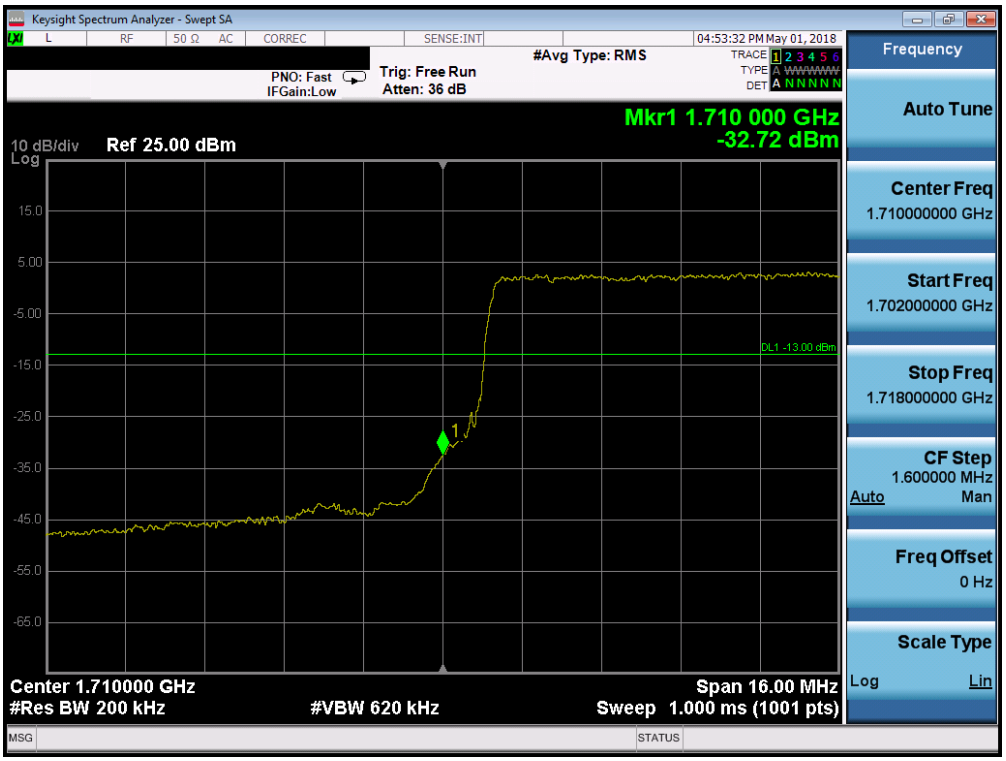
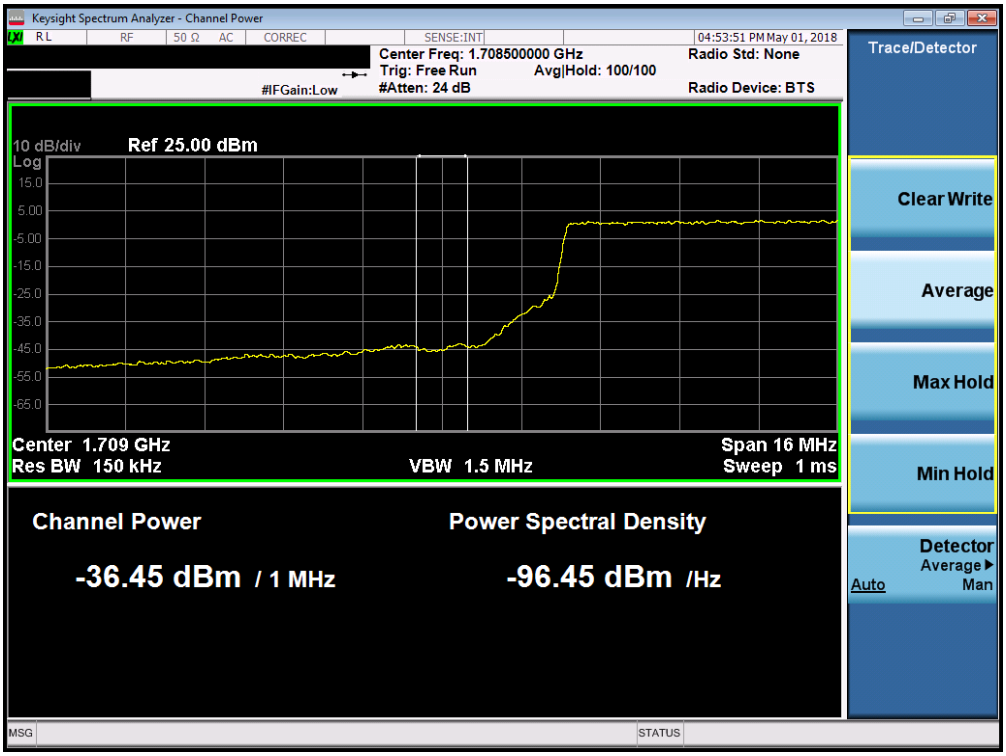


Plot 7-144. Lower Band Edge Plot (Band 66/4 - 20.0MHz QPSK - Full RB Configuration)



Plot 7-145. Lower Extended Band Edge Plot (Band 66/4 - 20.0MHz QPSK - Full RB Configuration)

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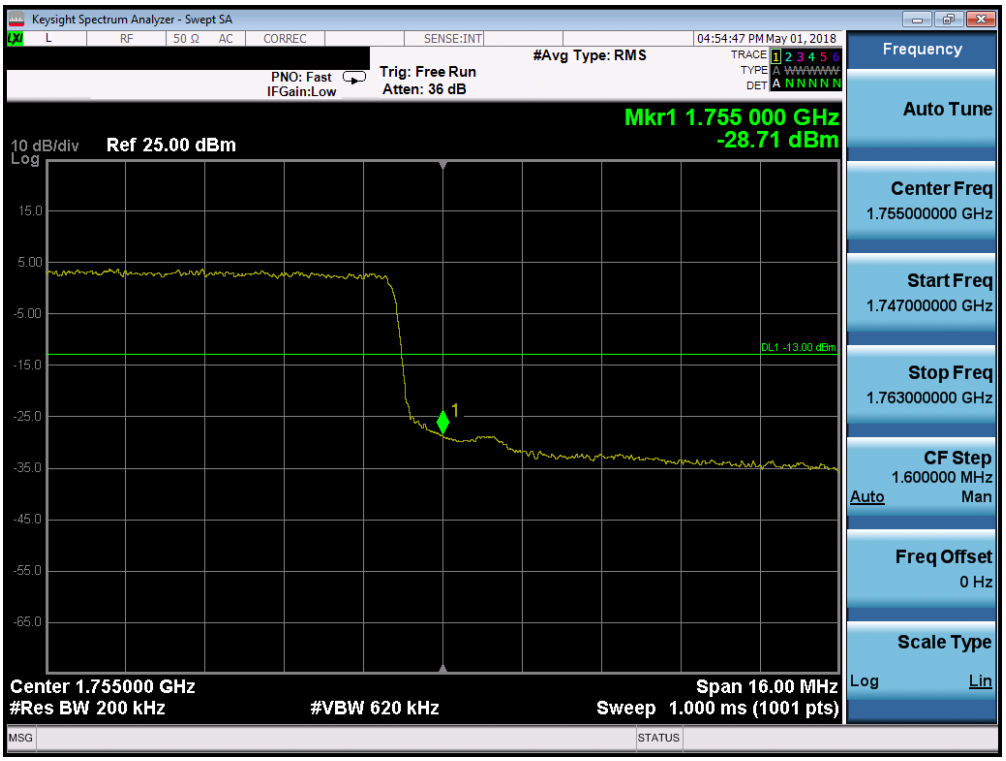
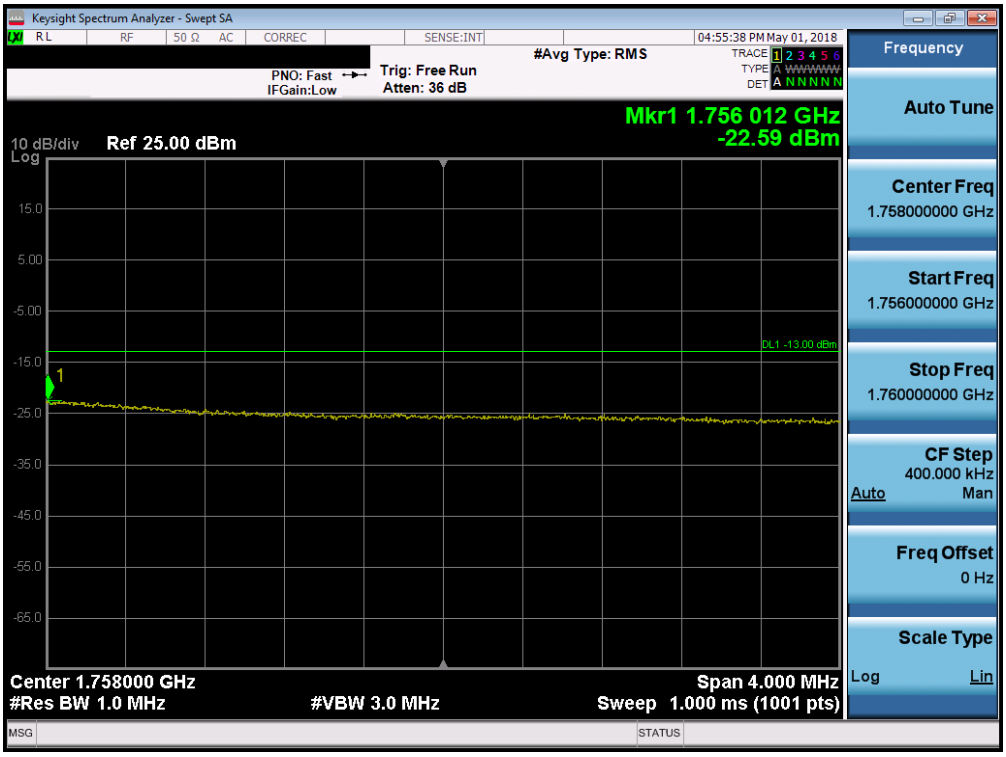


Plot 7-146. Upper Band Edge Plot (Band 4 - 20.0MHz QPSK - Full RB Configuration)



Plot 7-147. Upper Extended Band Edge Plot (Band 4 - 20.0MHz QPSK - Full RB Configuration)

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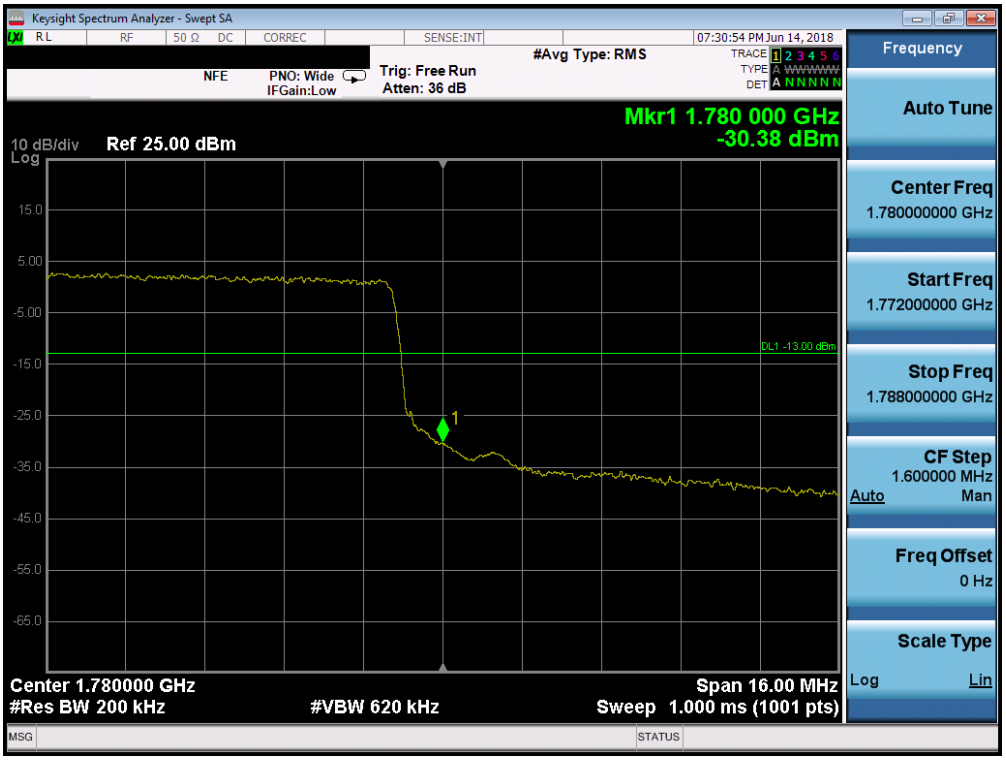
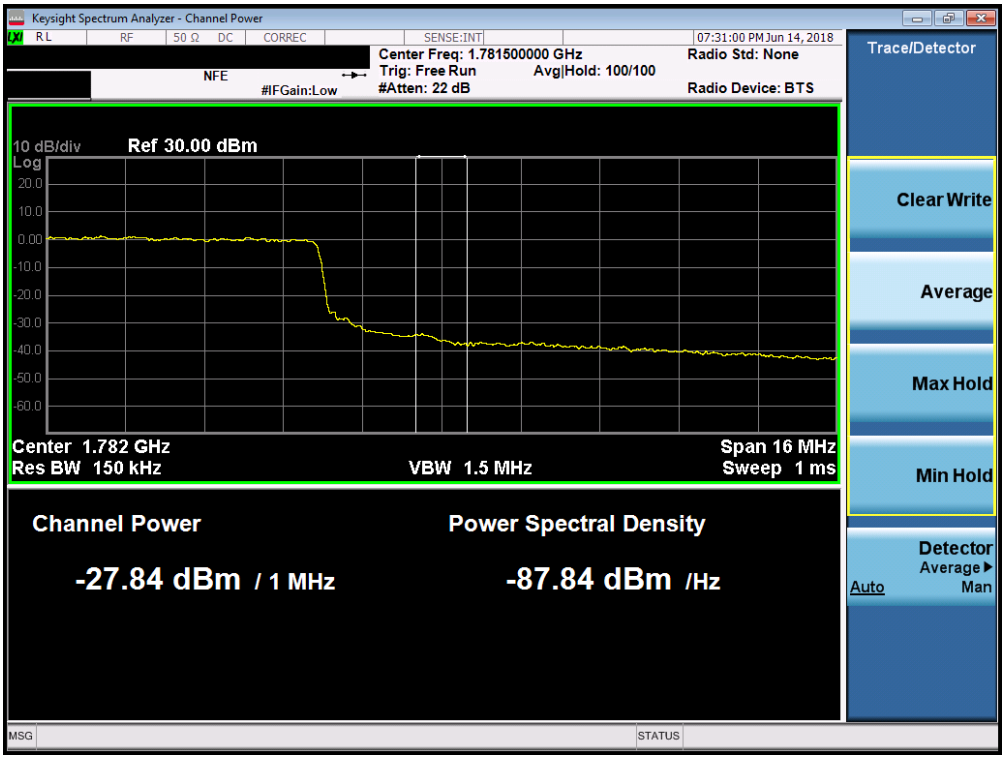


Plot 7-148. Upper Band Edge Plot (Band 66 - 20.0MHz QPSK - Full RB Configuration)



Plot 7-149. Upper Extended Band Edge Plot (Band 66 - 20.0MHz QPSK - Full RB Configuration)

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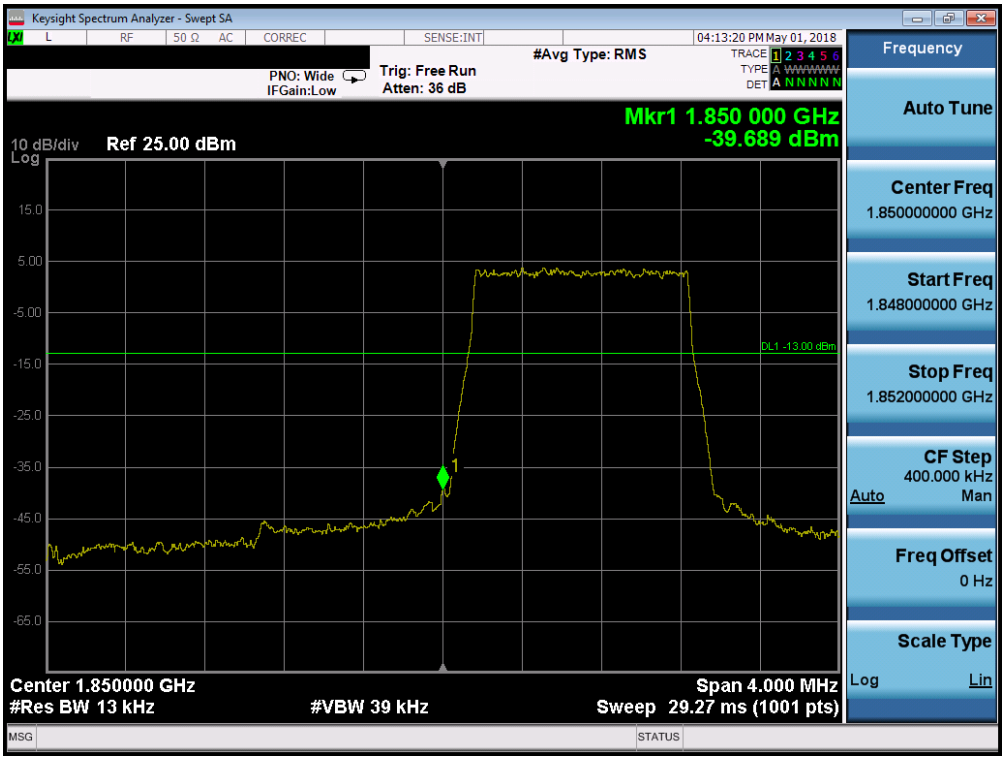
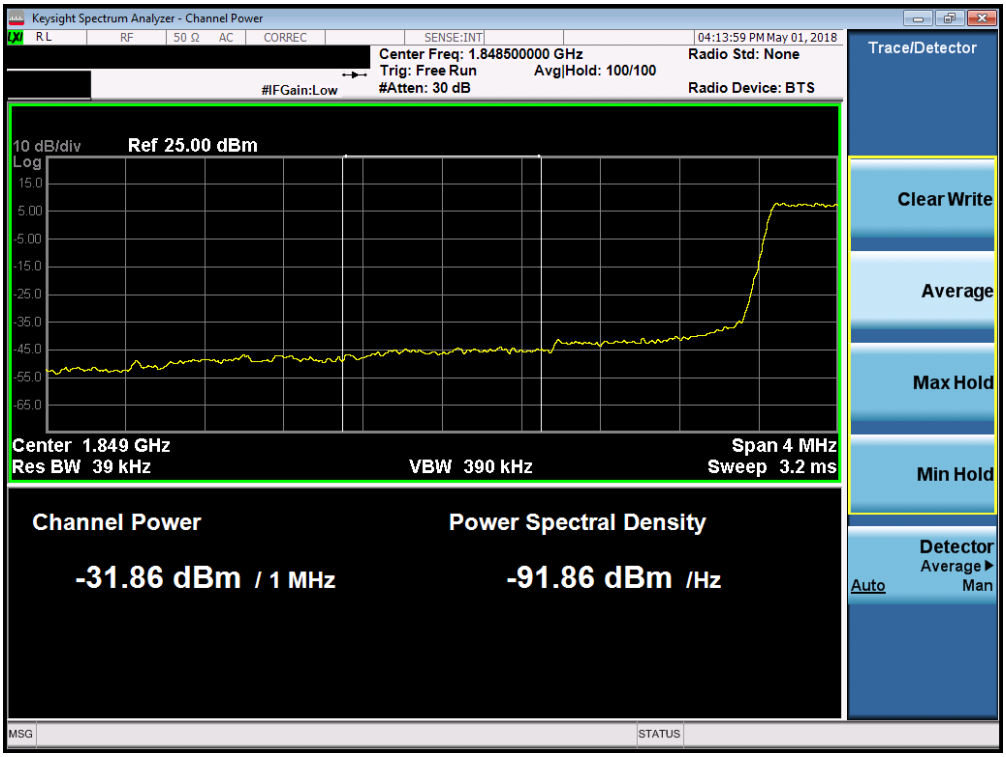
Band 2



Plot 7-150. Lower Band Edge Plot (Band 2 - 1.4MHz QPSK - Full RB Configuration)



Plot 7-151. Lower Extended Band Edge Plot (Band 2 - 1.4MHz QPSK - Full RB Configuration)

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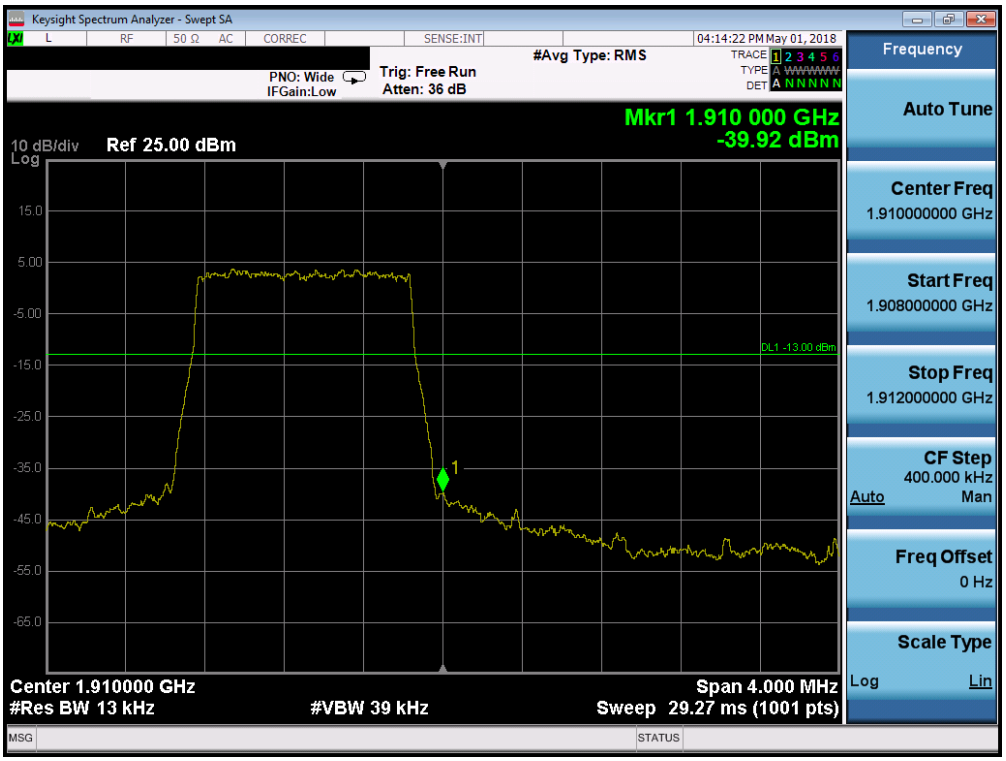
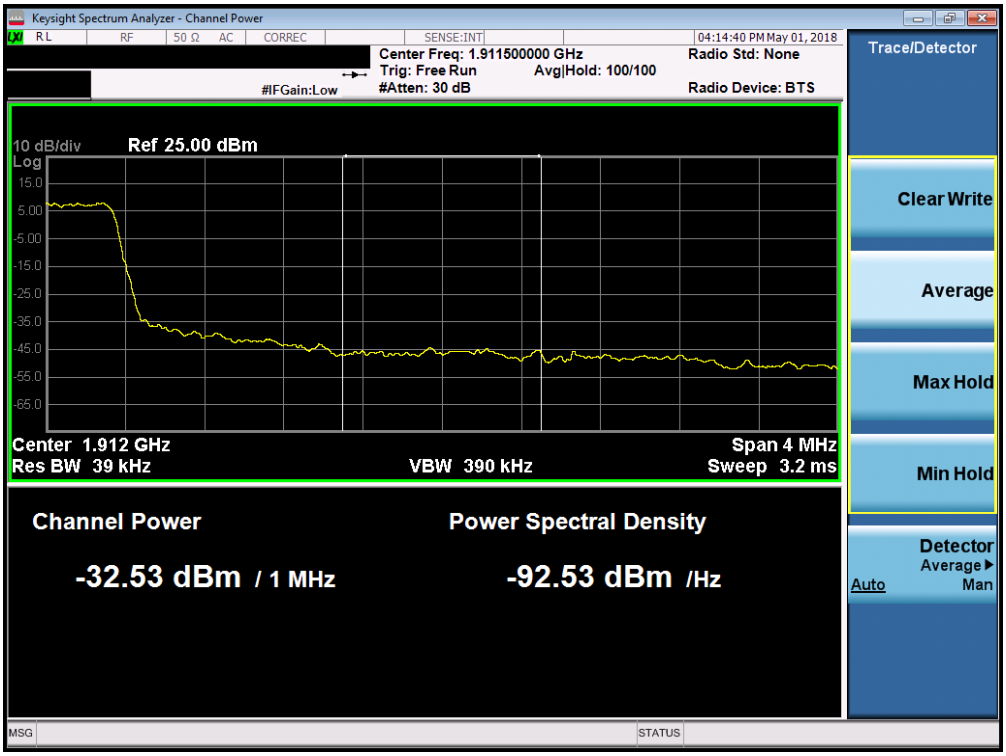


Plot 7-152. Upper Band Edge Plot (Band 2 - 1.4MHz QPSK - Full RB Configuration)



Plot 7-153. Upper Extended Band Edge Plot (Band 2 - 1.4MHz QPSK - Full RB Configuration)

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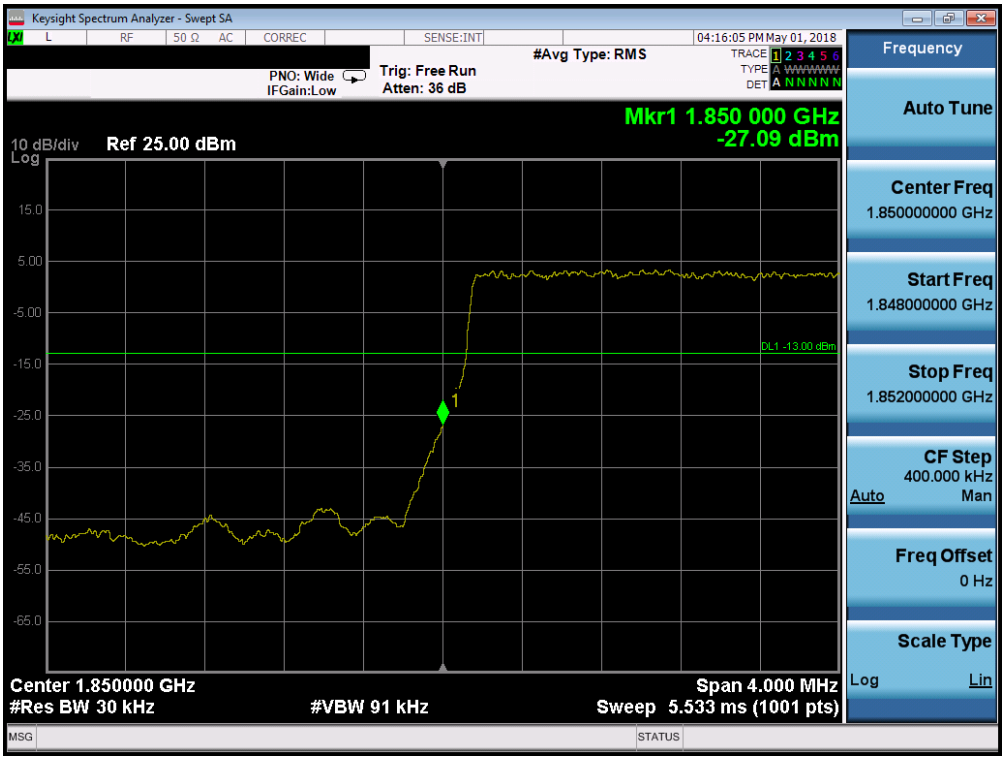
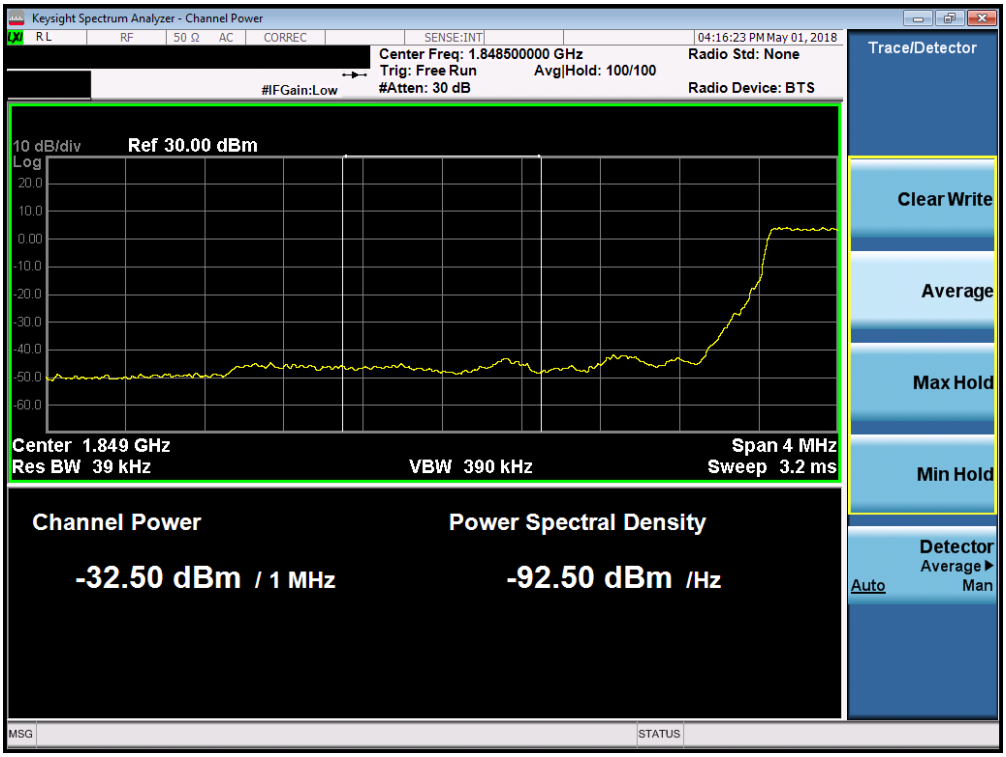


Plot 7-154. Lower Band Edge Plot (Band 2 - 3.0MHz QPSK - Full RB Configuration)



Plot 7-155. Lower Extended Band Edge Plot (Band 2 - 3.0MHz QPSK - Full RB Configuration)

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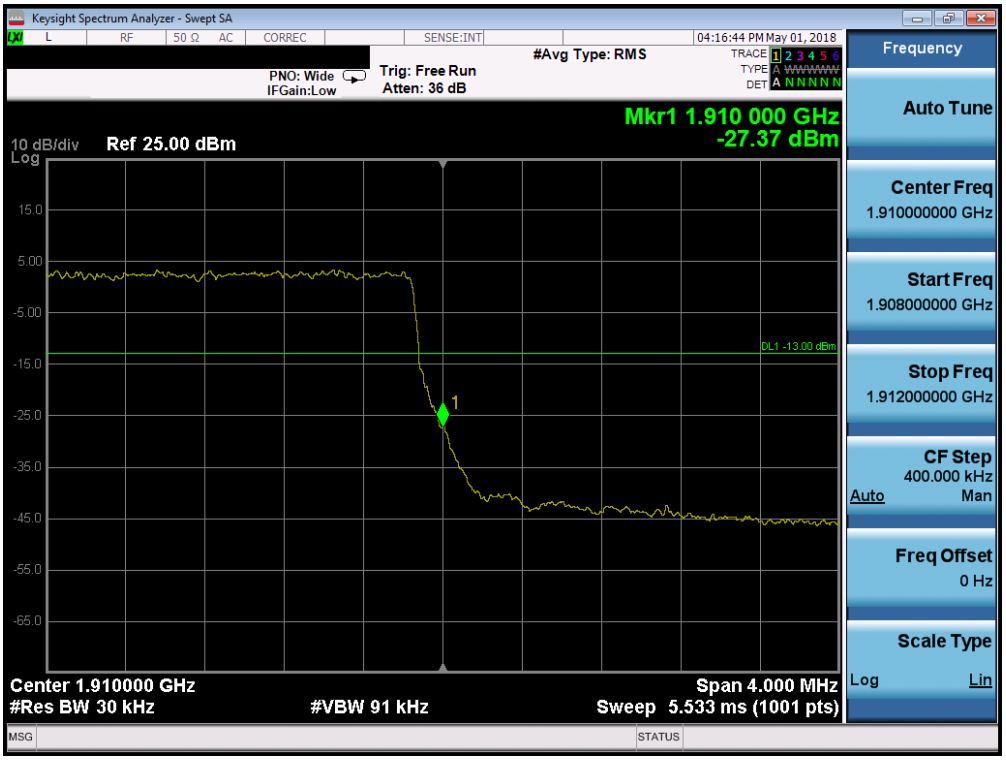
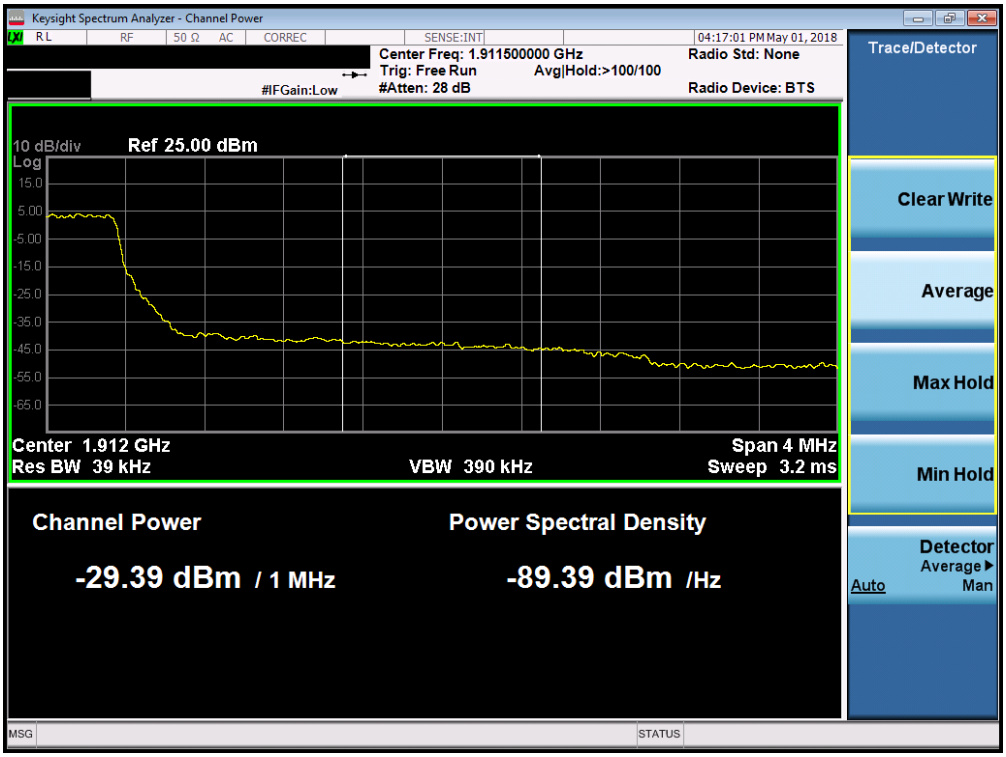


Plot 7-156. Upper Band Edge Plot (Band 2 - 3.0MHz QPSK - Full RB Configuration)



Plot 7-157. Upper Extended Band Edge Plot (Band 2 - 3.0MHz QPSK - Full RB Configuration)

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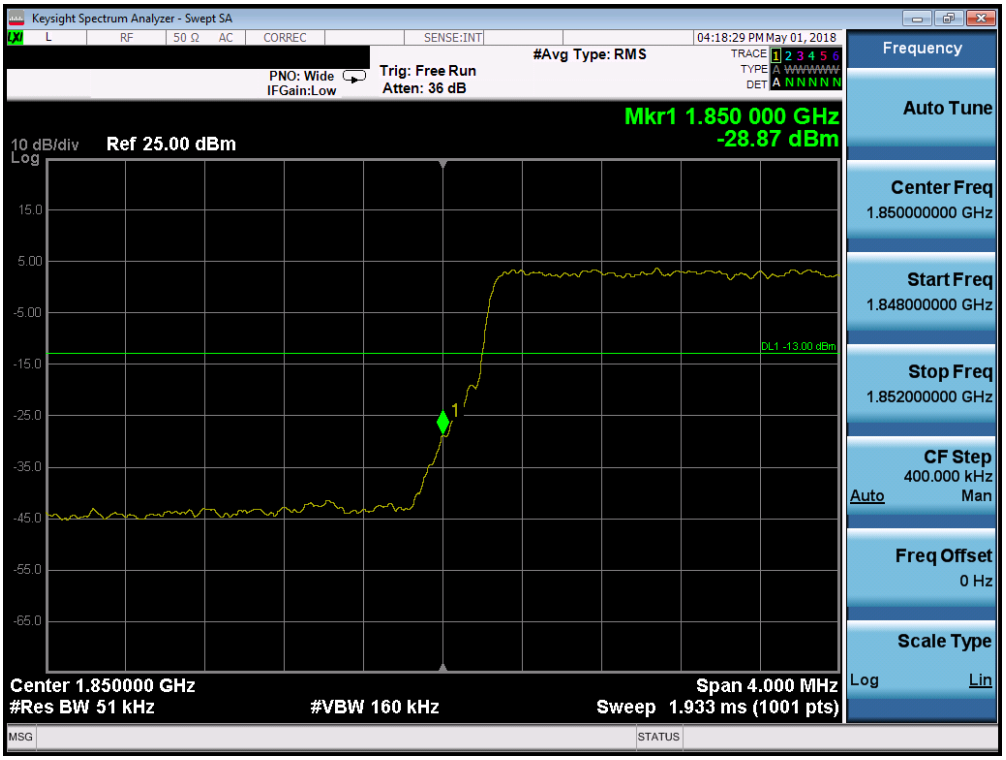
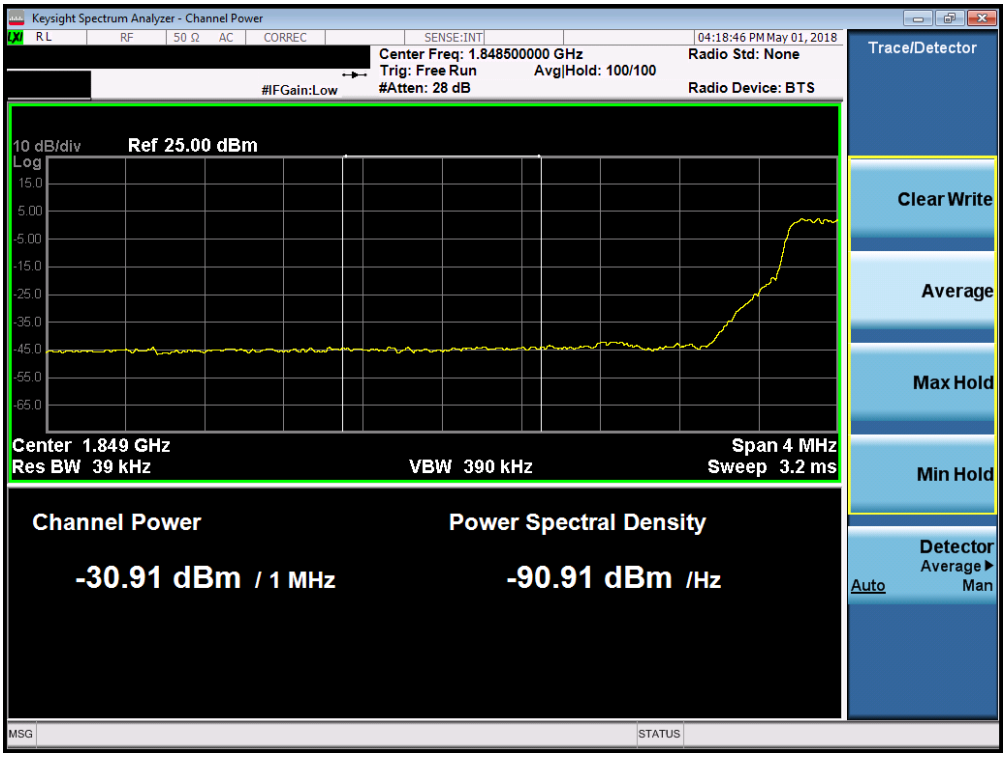


Plot 7-158. Lower Band Edge Plot (Band 2 - 5.0MHz QPSK - Full RB Configuration)



Plot 7-159. Lower Extended Band Edge Plot (Band 2 - 5.0MHz QPSK - Full RB Configuration)

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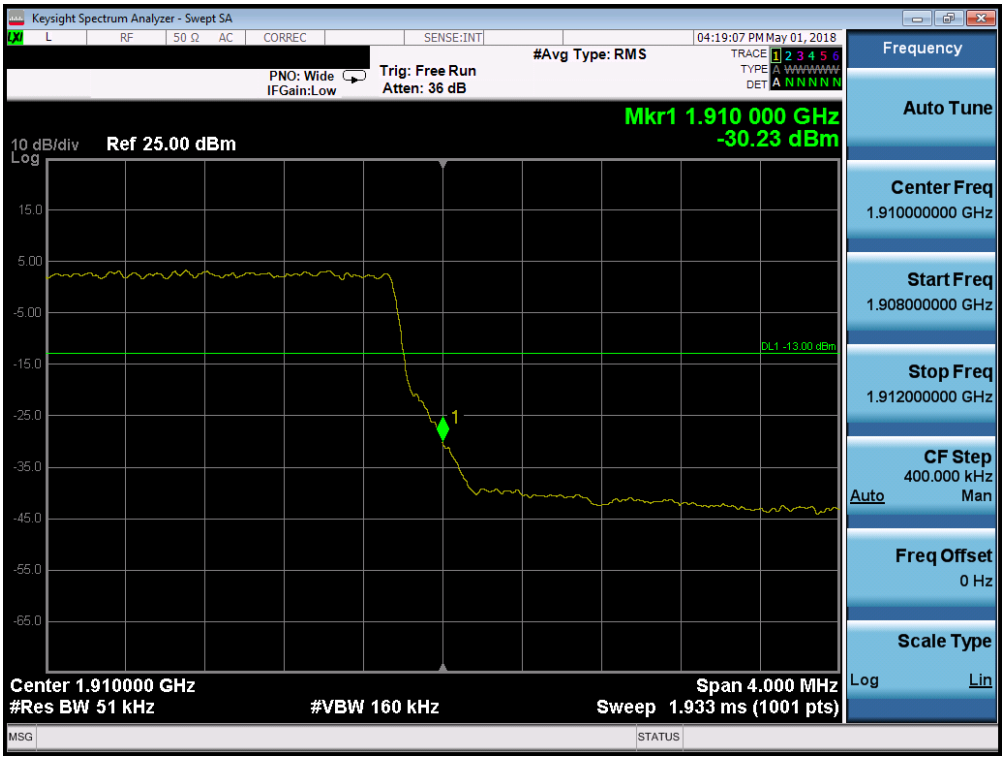
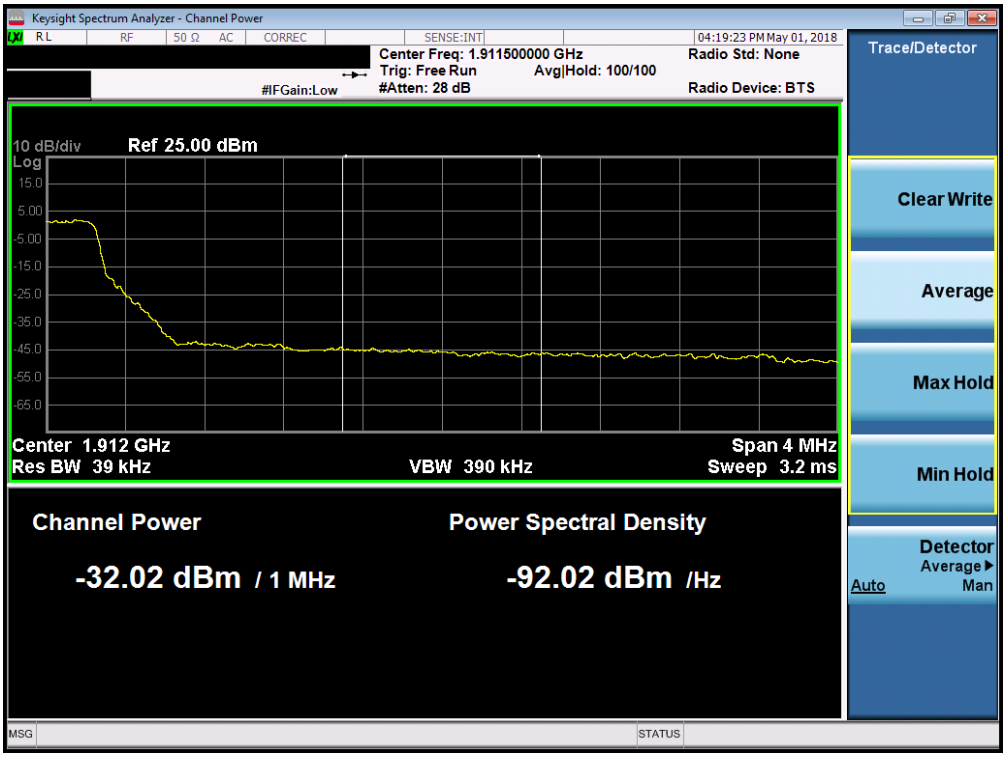


Plot 7-160. Upper Band Edge Plot (Band 2 - 5.0MHz QPSK - Full RB Configuration)



Plot 7-161. Upper Extended Band Edge Plot (Band 2 - 5.0MHz QPSK - Full RB Configuration)

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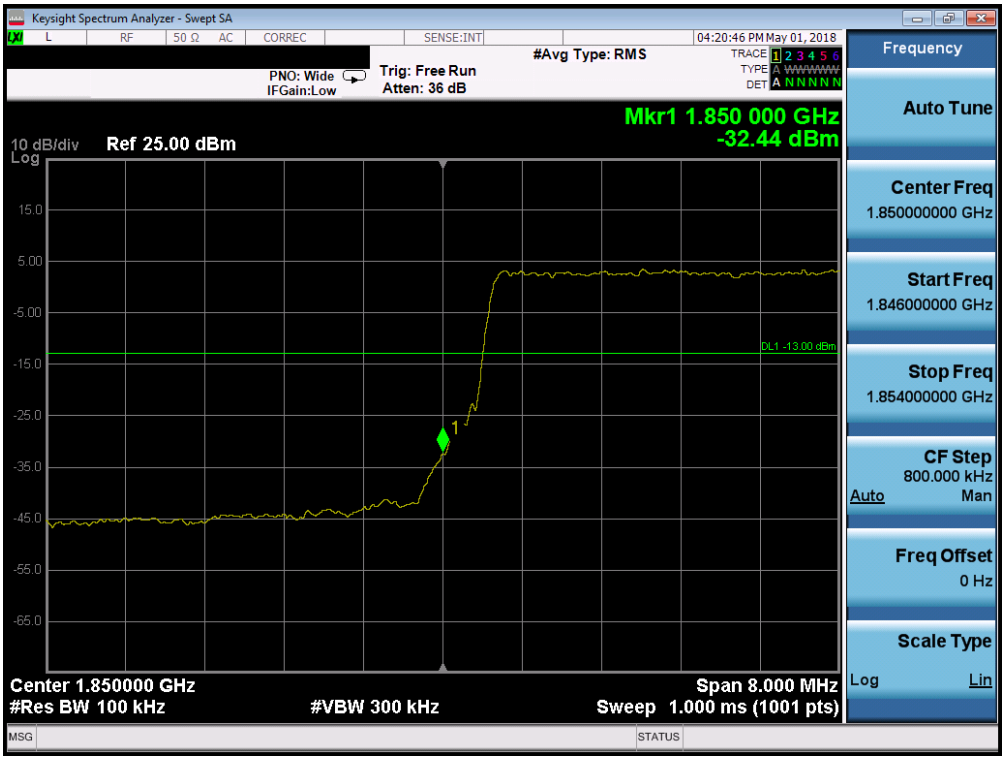
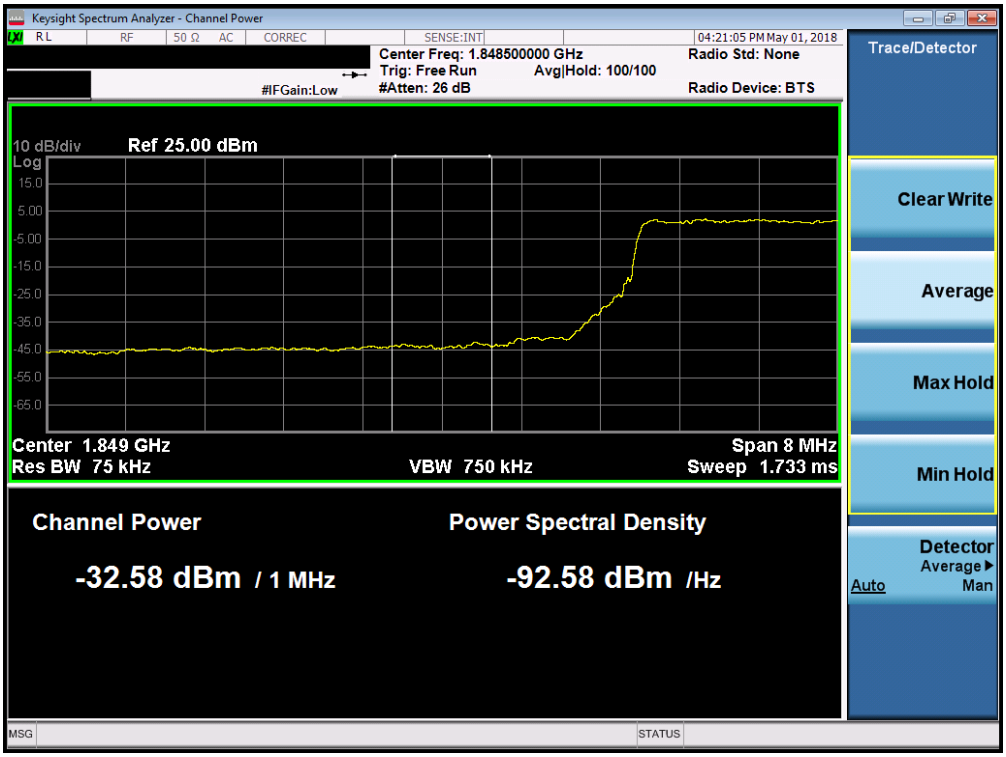


Plot 7-162. Lower Band Edge Plot (Band 2 - 10.0MHz QPSK - Full RB Configuration)



Plot 7-163. Lower Extended Band Edge Plot (Band 2 - 10.0MHz QPSK - Full RB Configuration)

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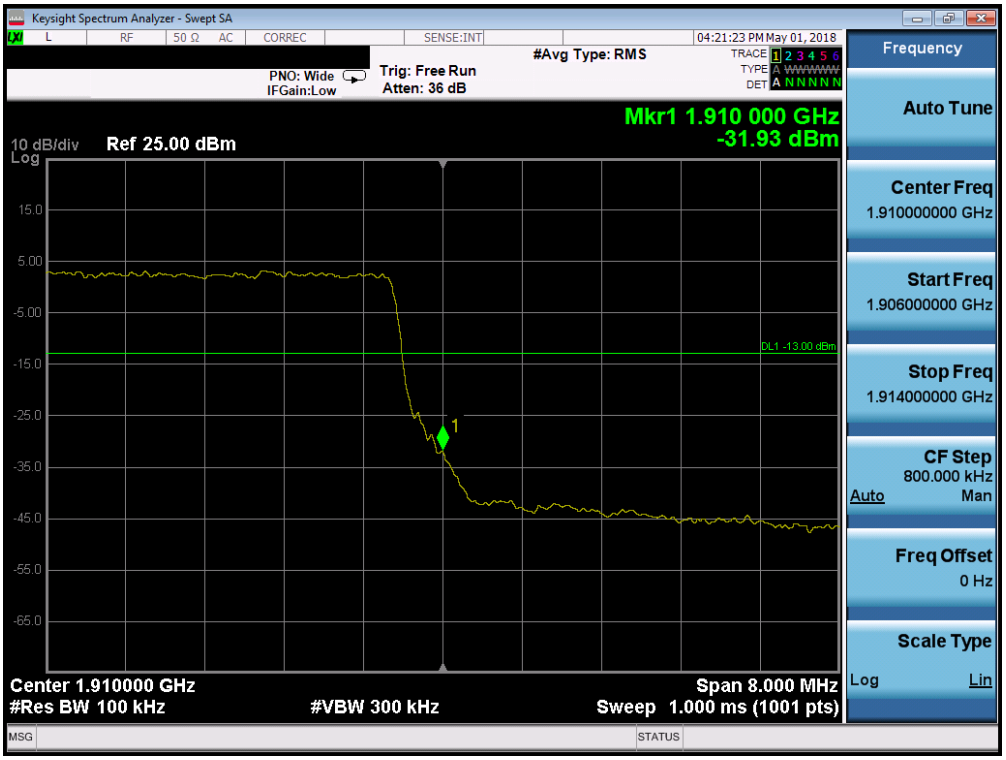
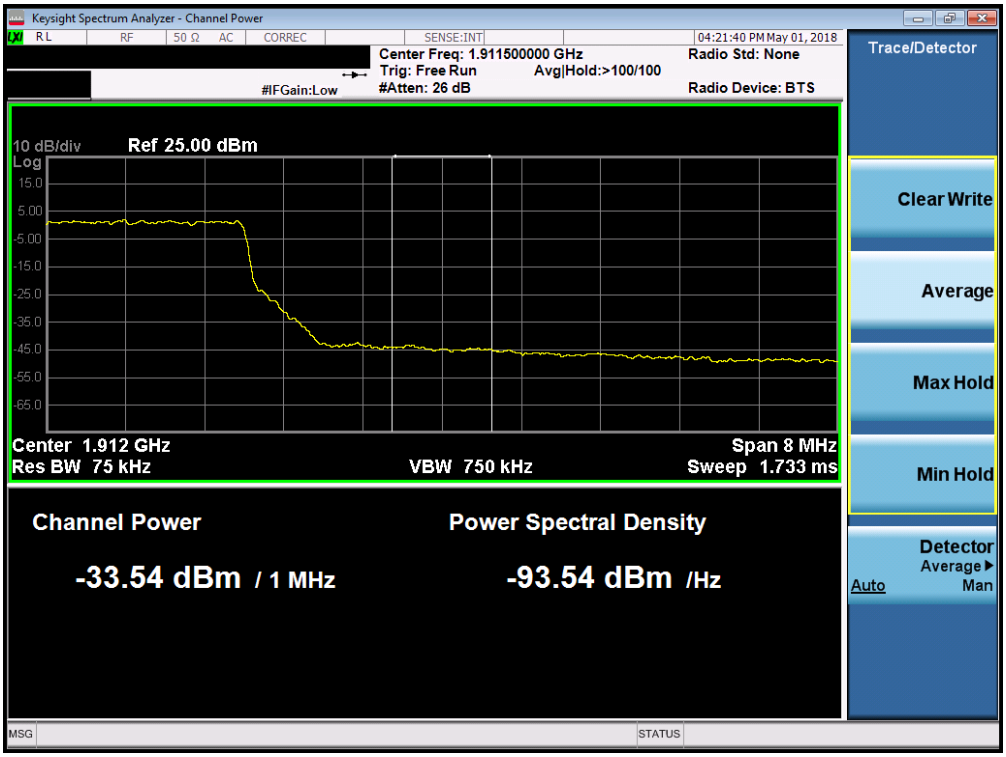


Plot 7-164. Upper Band Edge Plot (Band 2 - 10.0MHz QPSK - Full RB Configuration)



Plot 7-165. Upper Extended Band Edge Plot (Band 2 - 10.0MHz QPSK - Full RB Configuration)

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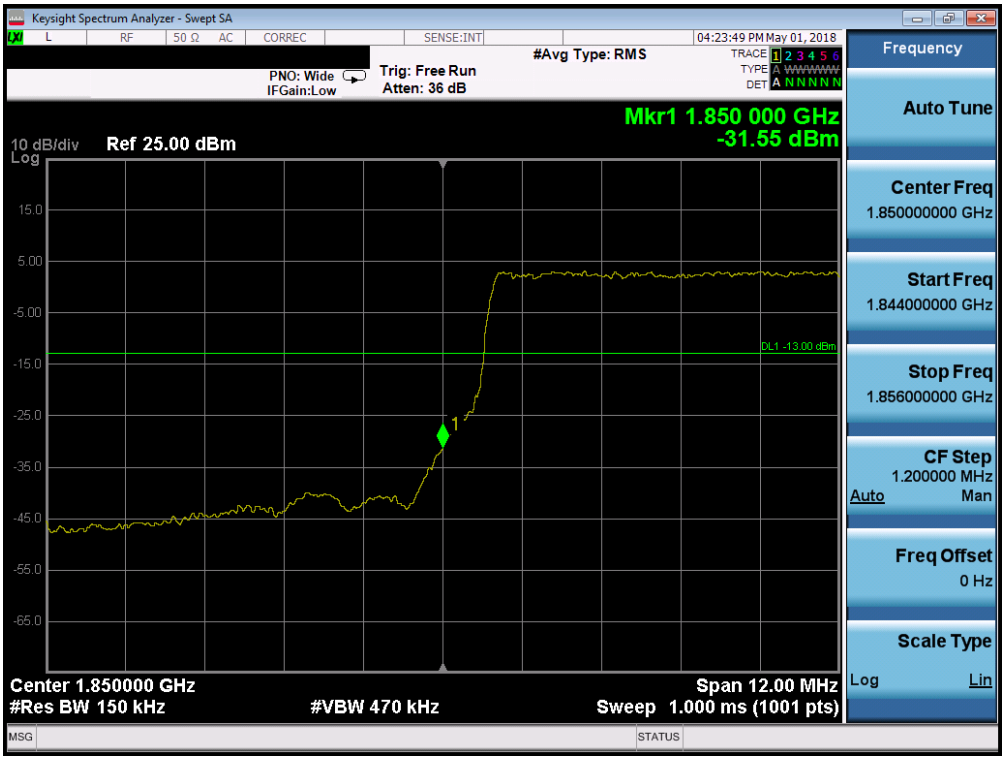
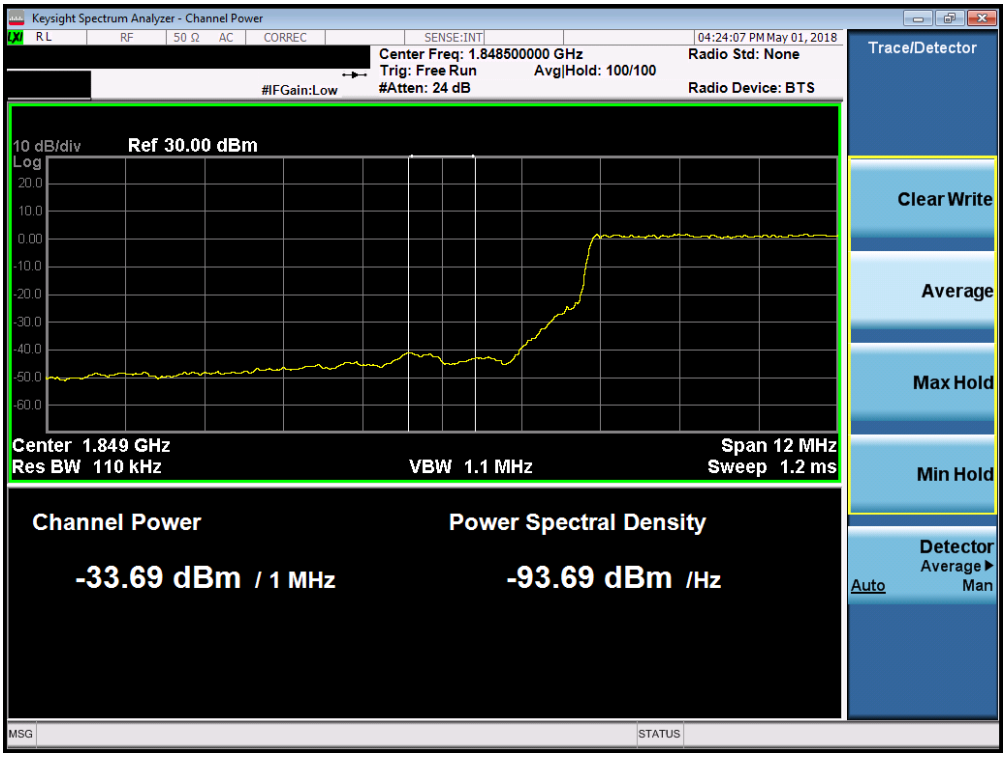


Plot 7-166. Lower Band Edge Plot (Band 2 - 15.0MHz QPSK - Full RB Configuration)



Plot 7-167. Lower Extended Band Edge Plot (Band 2 - 15.0MHz QPSK - Full RB Configuration)

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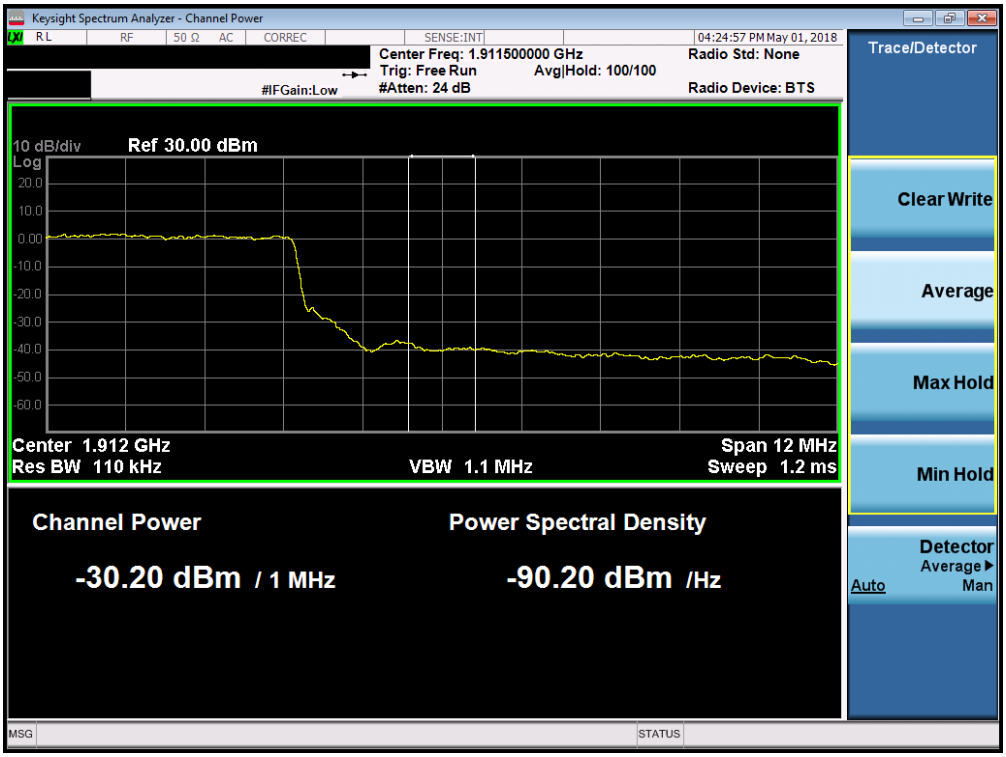
Plot 7-168. Upper Band Edge Plot (Band 2 - 15.0MHz QPSK - Full RB Configuration)



Plot 7-169. Upper Extended Band Edge Plot (Band 2 - 15.0MHz QPSK - Full RB Configuration)

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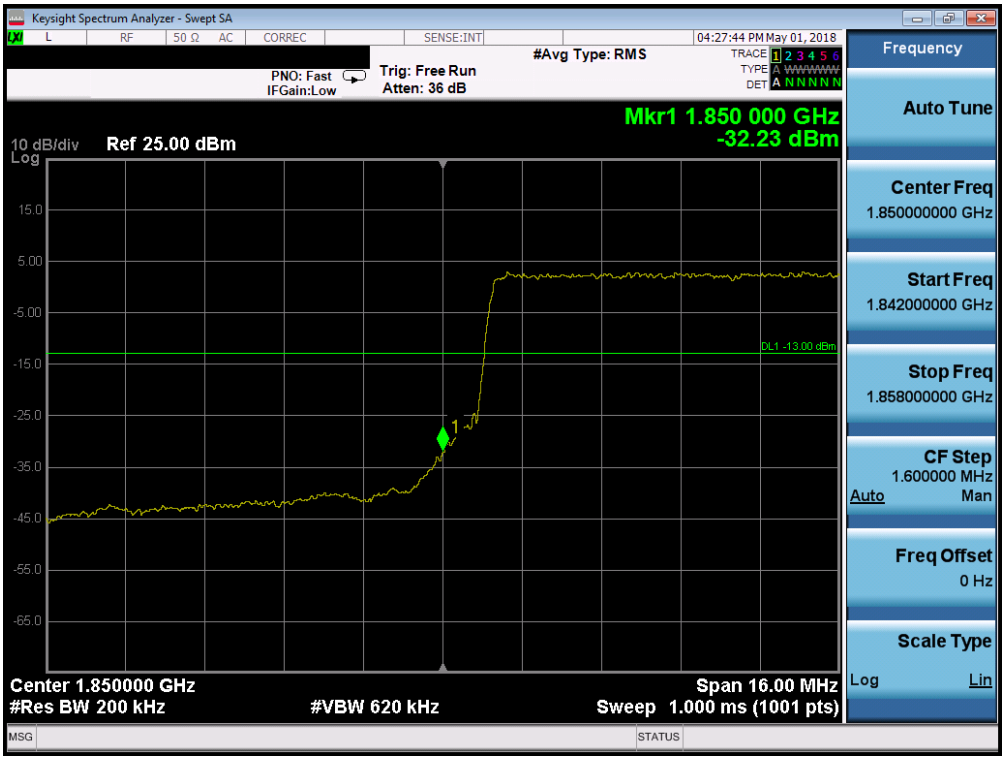
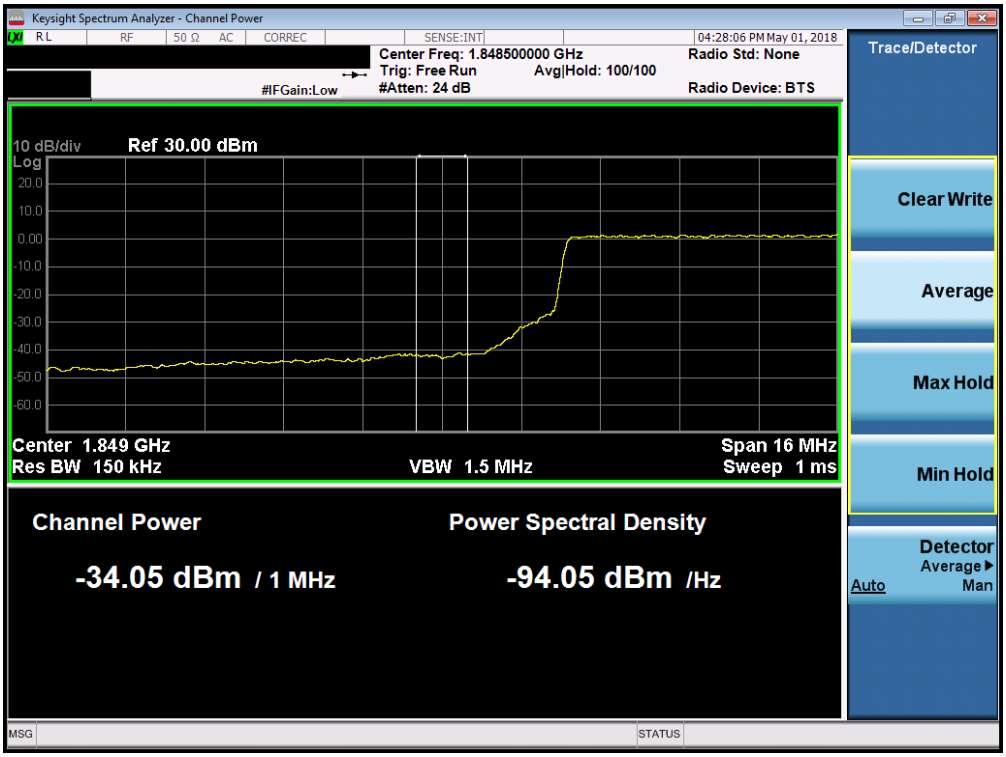


Plot 7-170. Lower Band Edge Plot (Band 2 - 20.0MHz QPSK - Full RB Configuration)



Plot 7-171. Lower Extended Band Edge Plot (Band 2 - 20.0MHz QPSK - Full RB Configuration)

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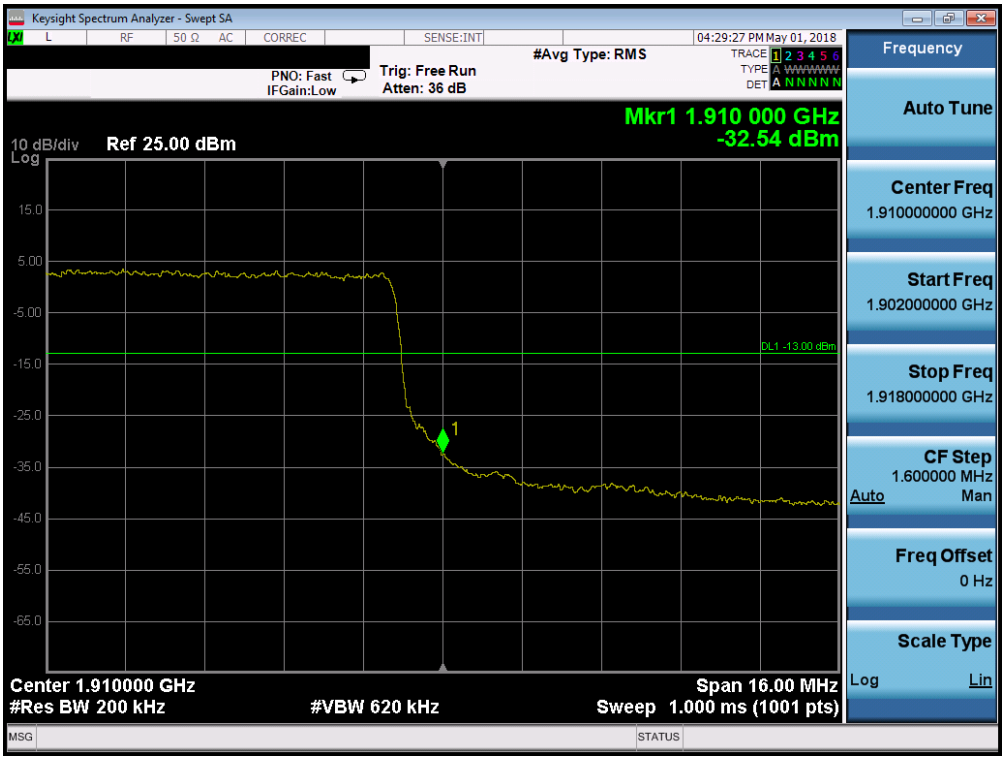
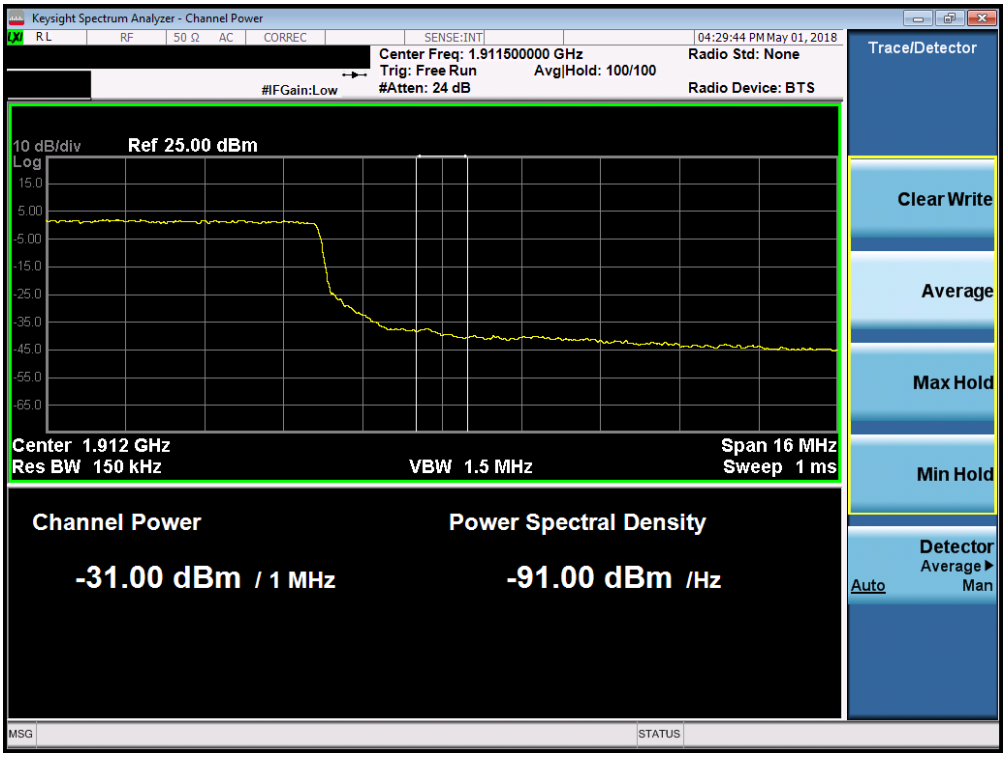


Plot 7-172. Upper Band Edge Plot (Band 2 - 20.0MHz QPSK - Full RB Configuration)



Plot 7-173. Upper Extended Band Edge Plot (Band 2 - 20.0MHz QPSK - Full RB Configuration)

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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.

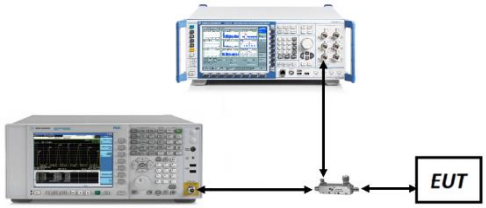

Figure 7-4. Test Instrument & Measurement Setup

Test Notes

None.

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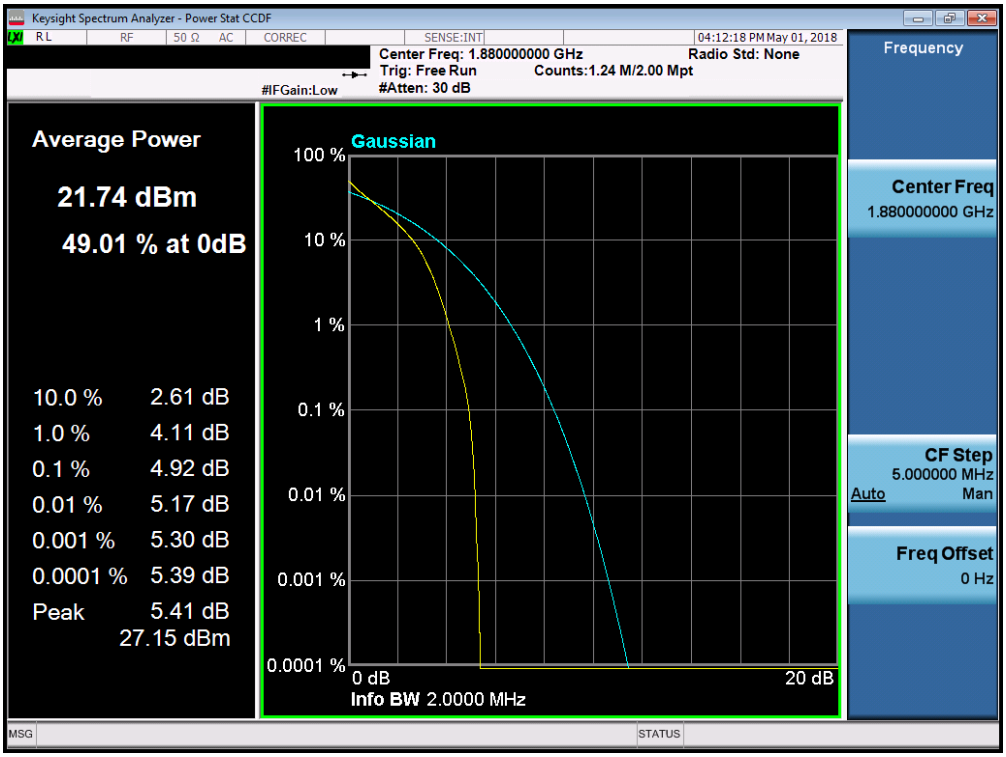
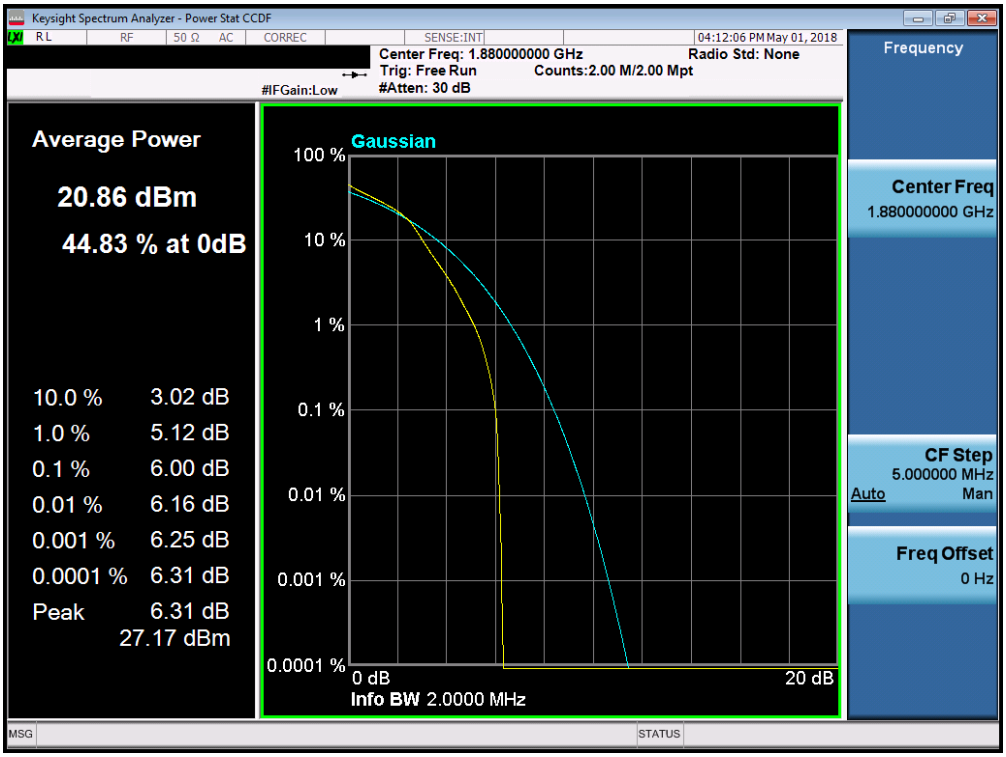
Band 2



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



Plot 7-175. PAR Plot (Band 2 - 1.4MHz 16-QAM - Full RB Configuration)

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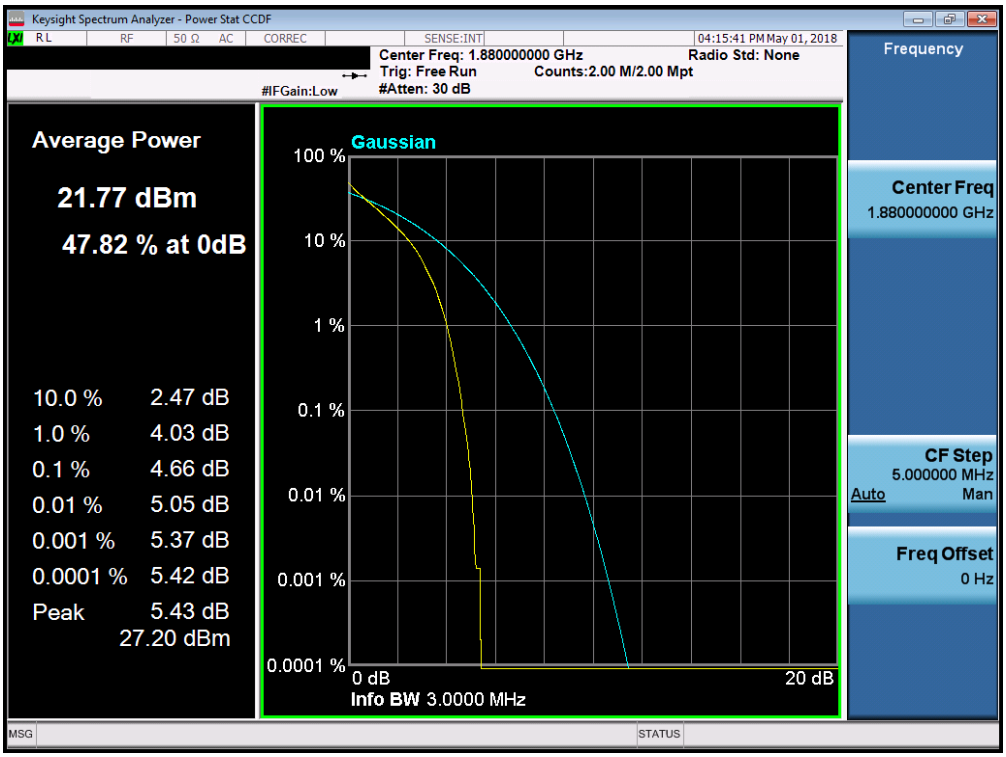
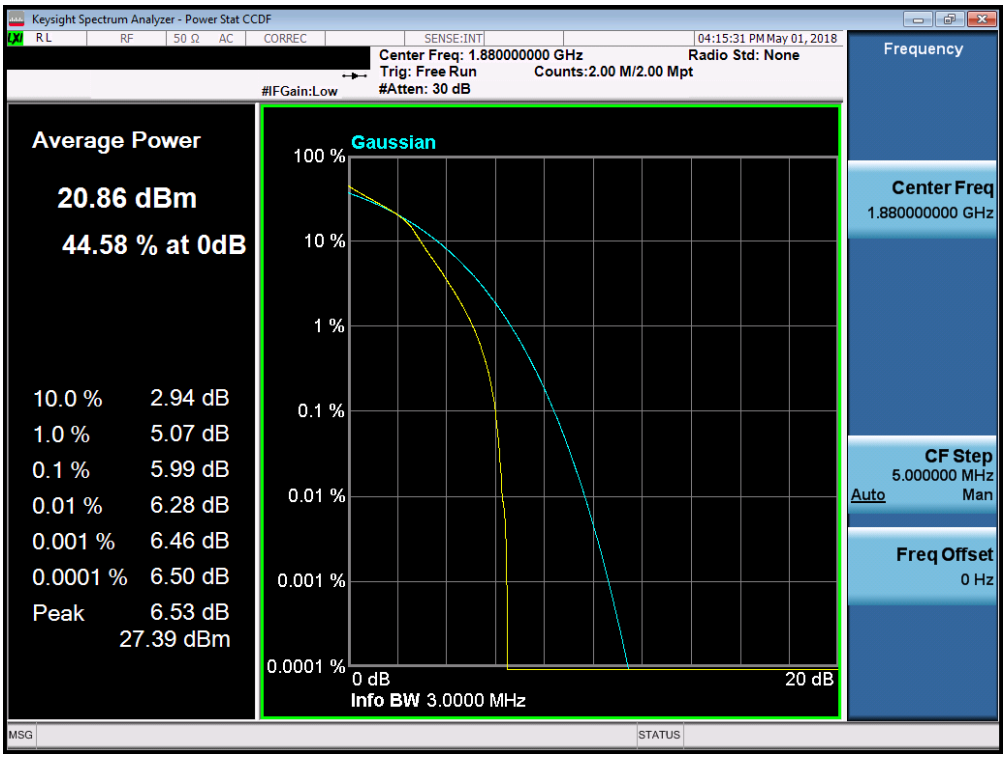


Plot 7-176. PAR Plot (Band 2 - 3.0MHz QPSK - Full RB Configuration)



Plot 7-177. PAR Plot (Band 2 - 3.0MHz 16-QAM - Full RB Configuration)

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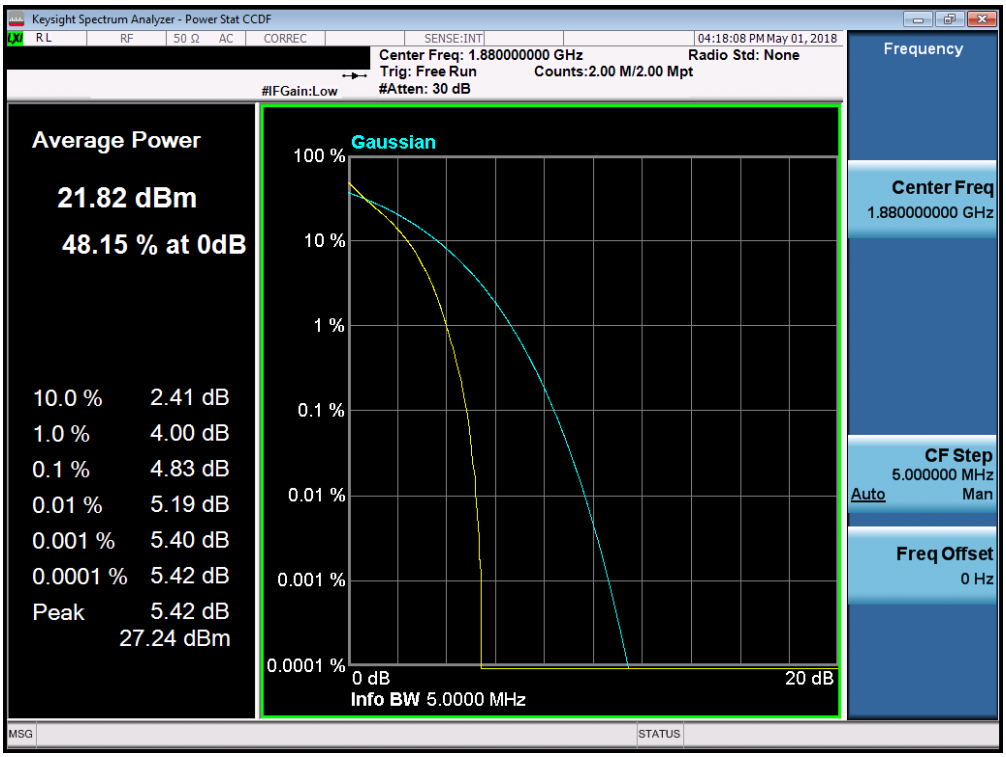
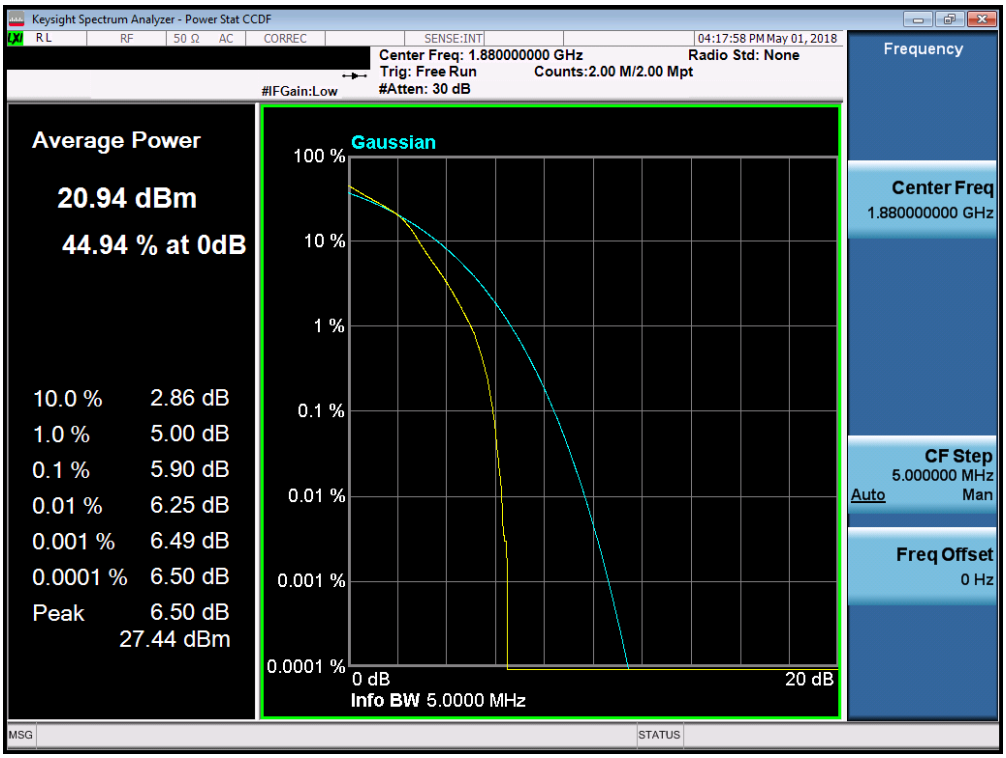


Plot 7-178. PAR Plot (Band 2 - 5.0MHz QPSK - Full RB Configuration)



Plot 7-179. PAR Plot (Band 2 - 5.0MHz 16-QAM - Full RB Configuration)

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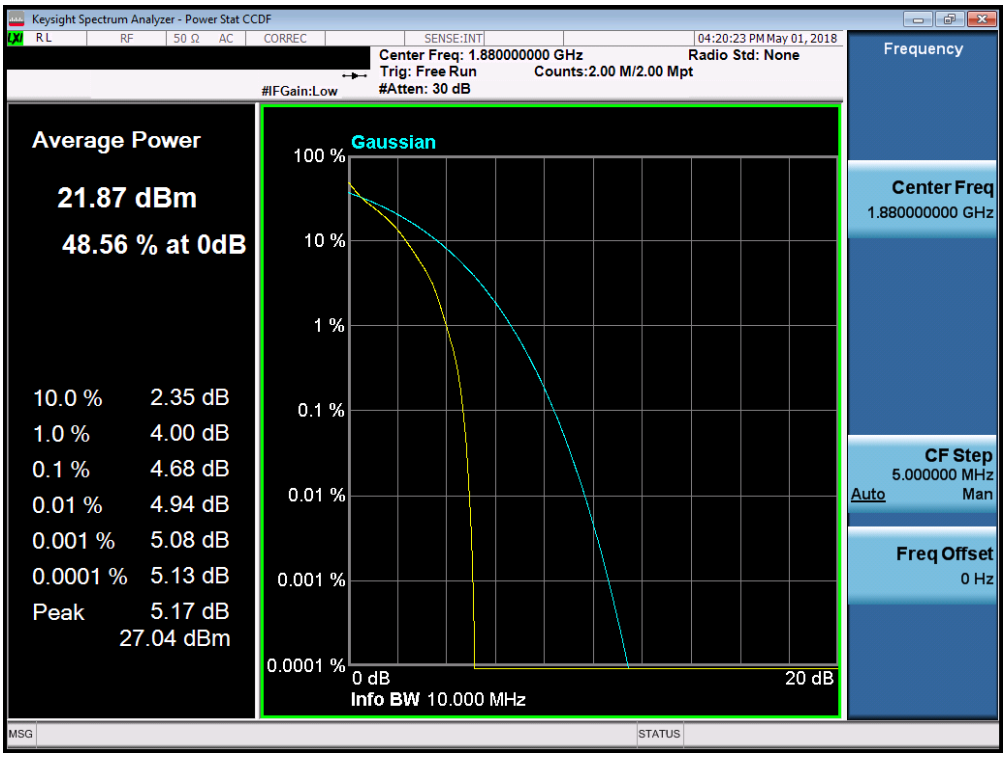
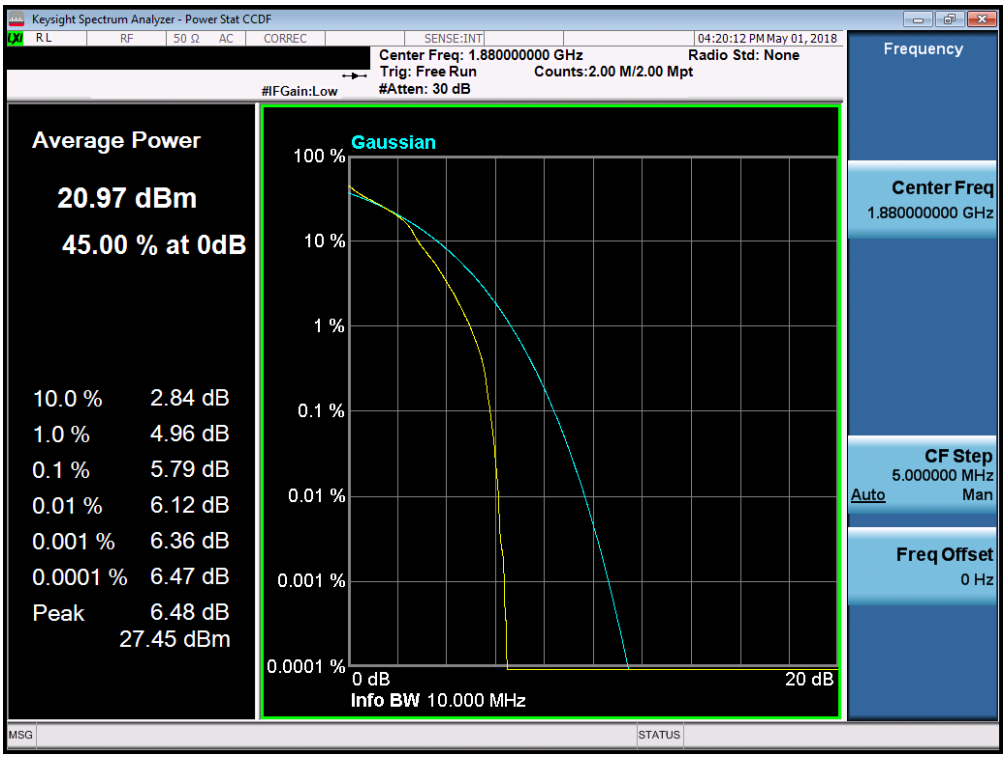


Plot 7-180. PAR Plot (Band 2 - 10.0MHz QPSK - Full RB Configuration)



Plot 7-181. PAR Plot (Band 2 - 10.0MHz 16-QAM - Full RB Configuration)

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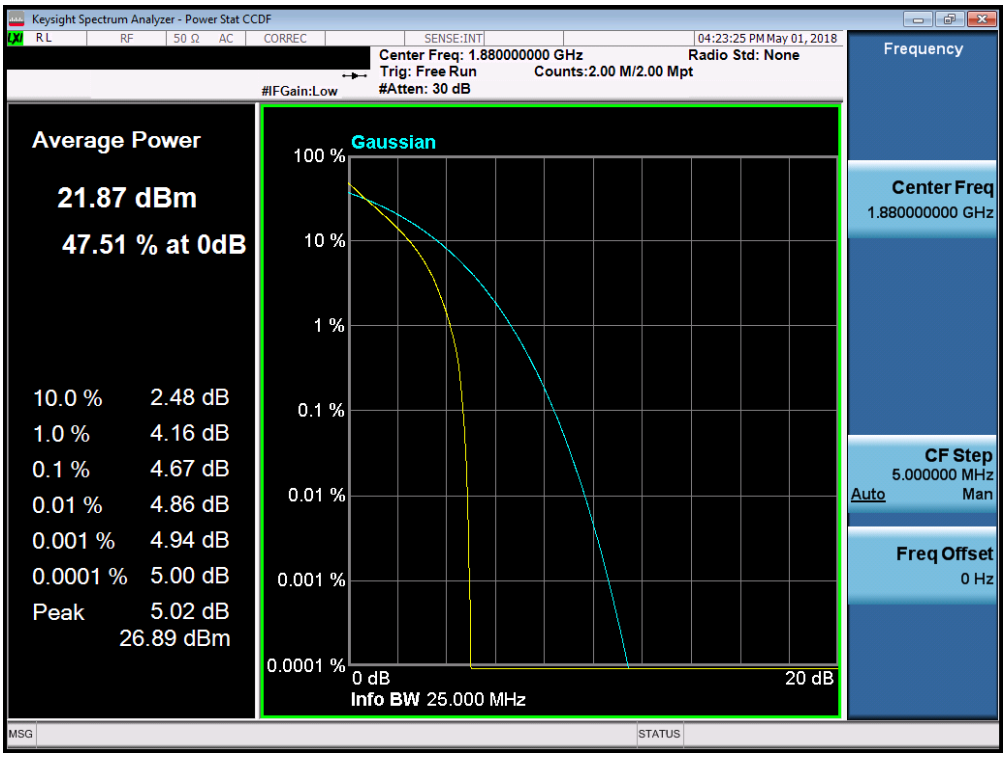
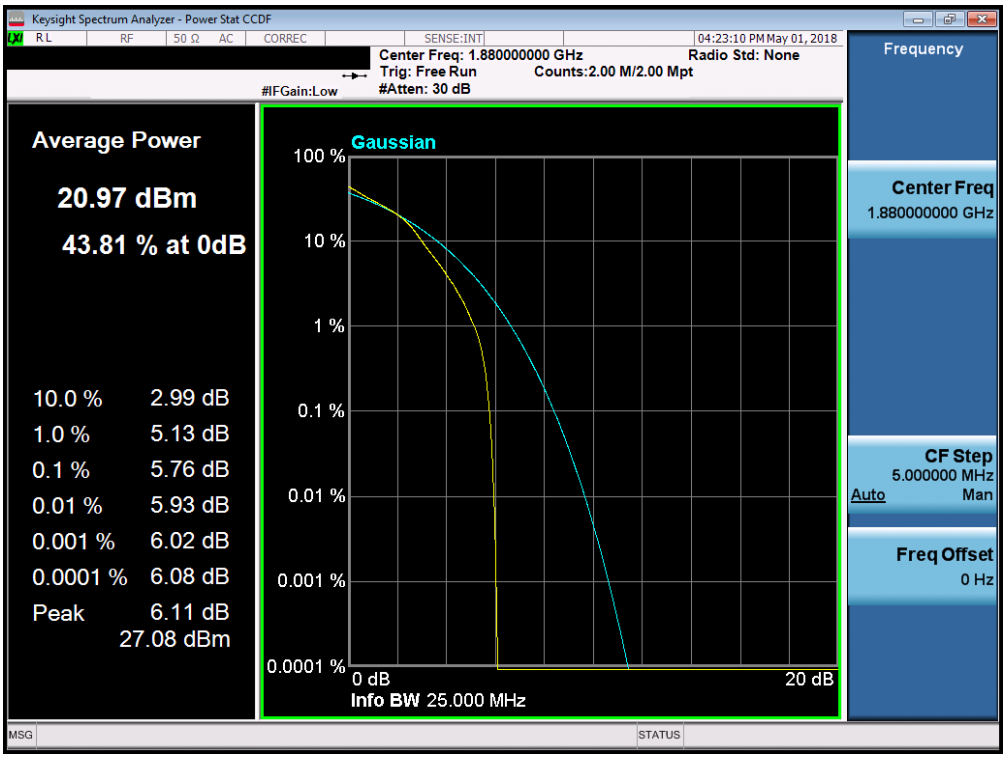


Plot 7-182. PAR Plot (Band 2 - 15.0MHz QPSK - Full RB Configuration)



Plot 7-183. PAR Plot (Band 2 - 15.0MHz 16-QAM - Full RB Configuration)

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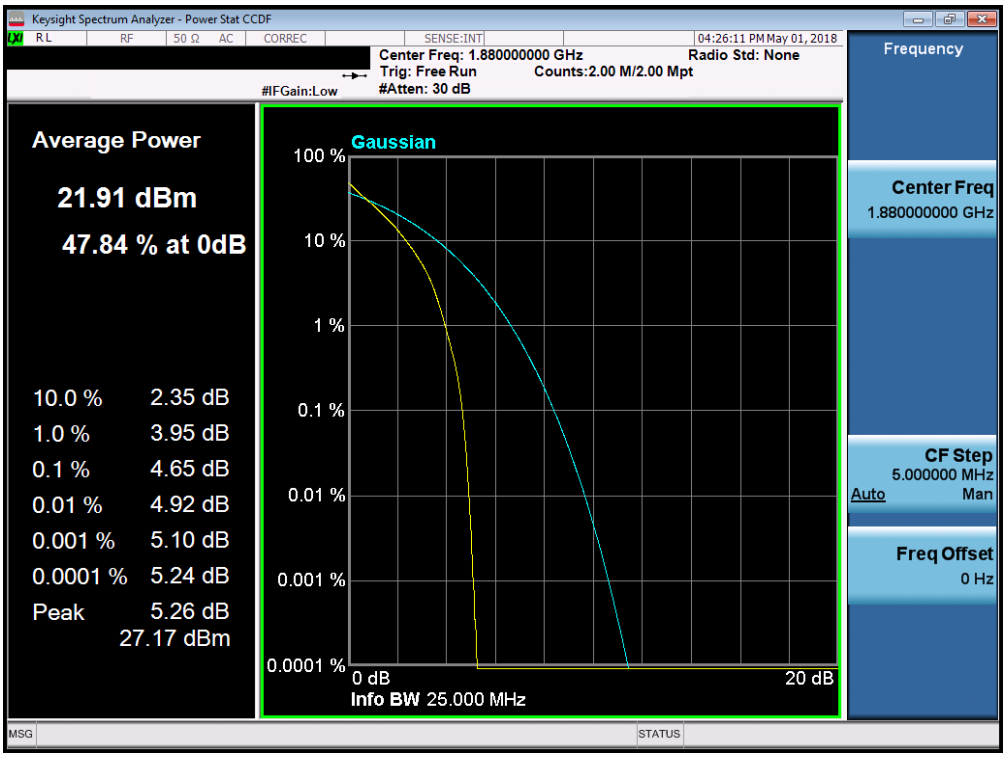
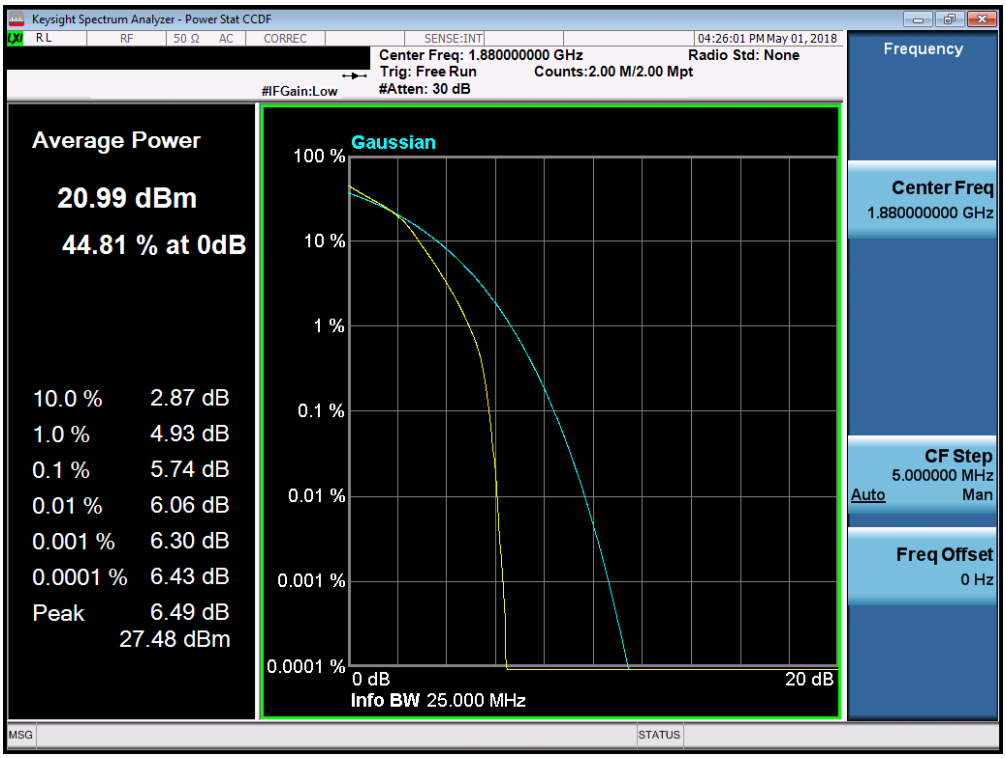


Plot 7-184. PAR Plot (Band 2 - 20.0MHz QPSK - Full RB Configuration)



Plot 7-185. PAR Plot (Band 2 - 20.0MHz 16-QAM - Full RB Configuration)

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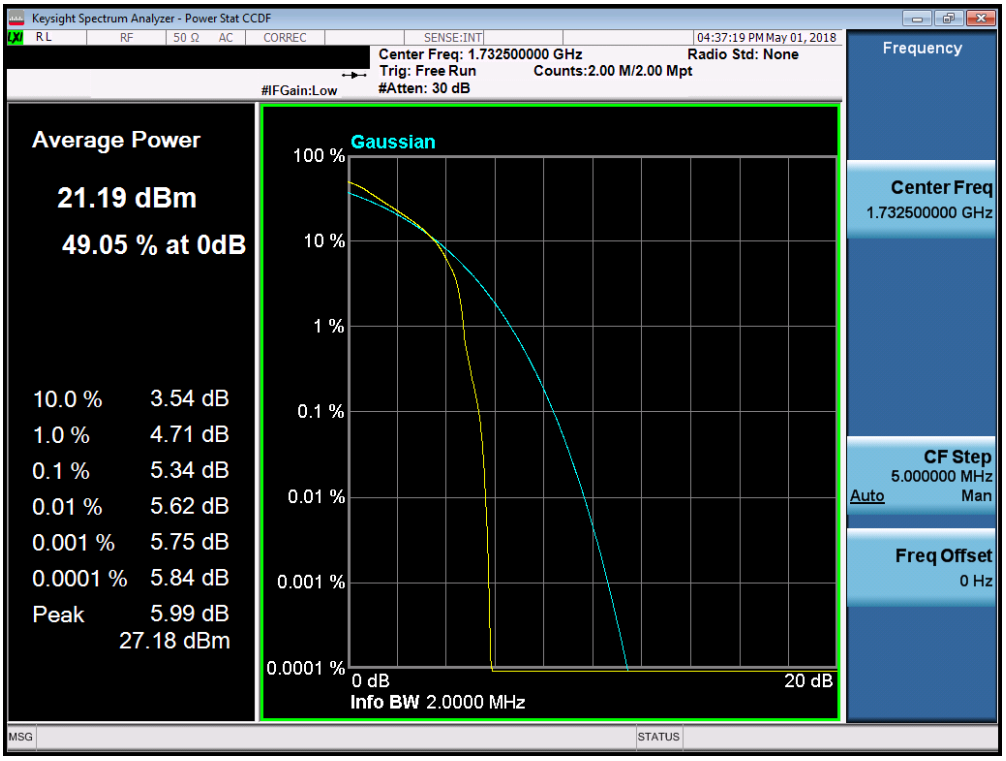
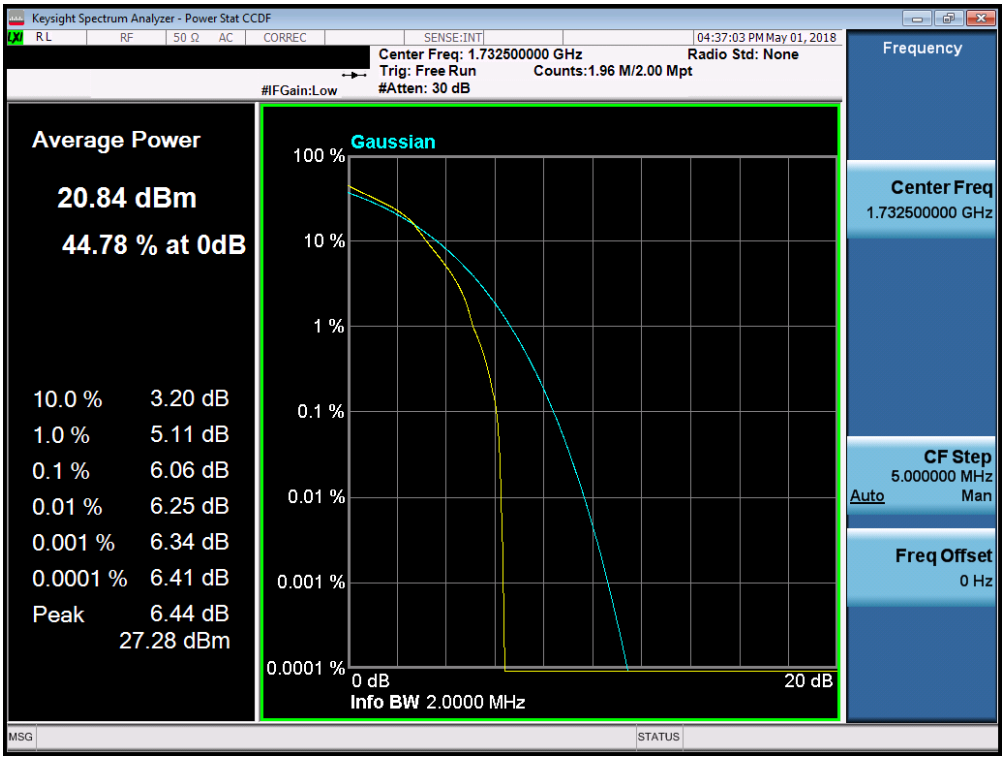
Band 66/4



Plot 7-186. PAR Plot (Band 66/4 - 1.4MHz QPSK - Full RB Configuration)



Plot 7-187. PAR Plot (Band 66/4 - 1.4MHz 16-QAM - Full RB Configuration)

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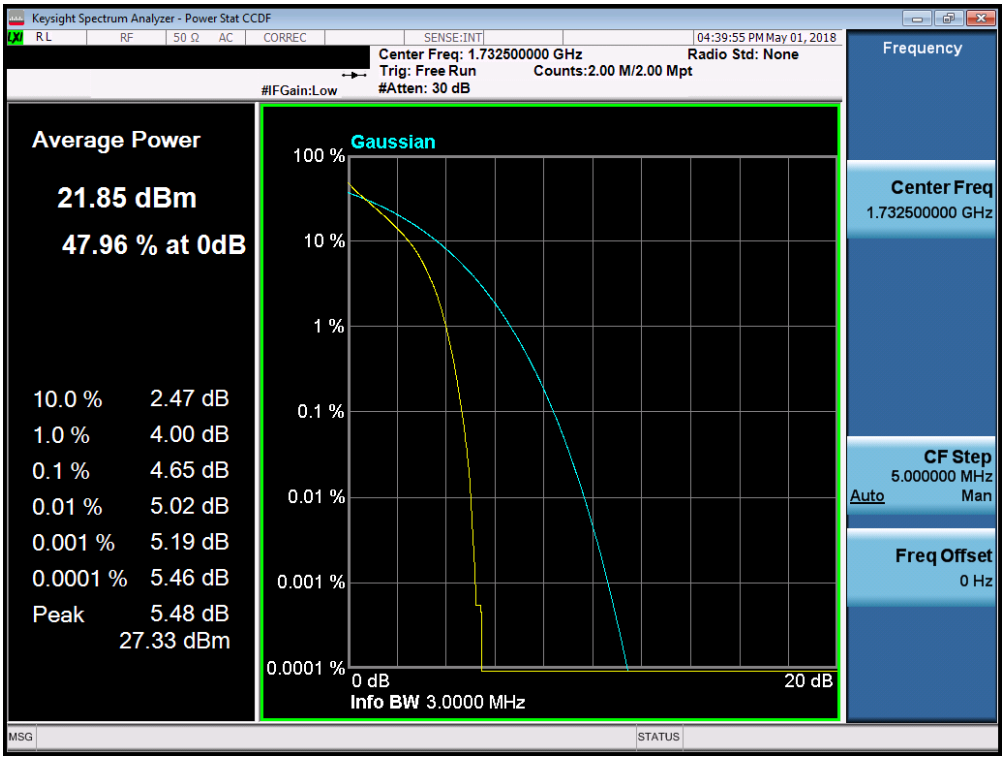
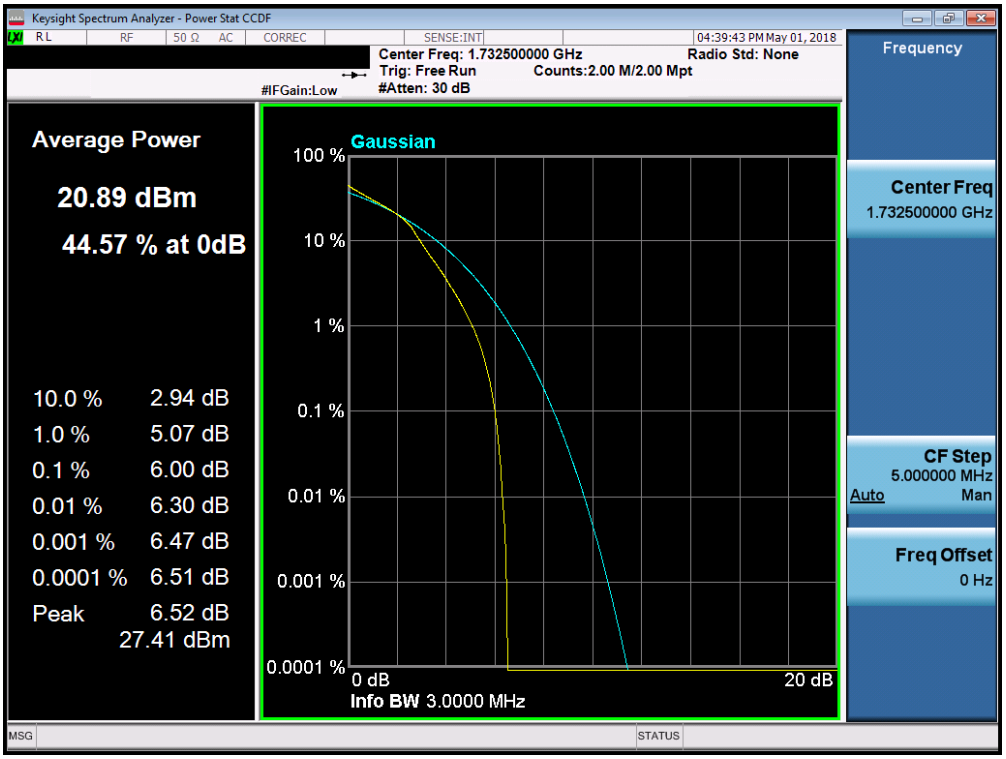


Plot 7-188. PAR Plot (Band 66/4 - 3.0MHz QPSK - Full RB Configuration)



Plot 7-189. PAR Plot (Band 66/4 - 3.0MHz 16-QAM - Full RB Configuration)

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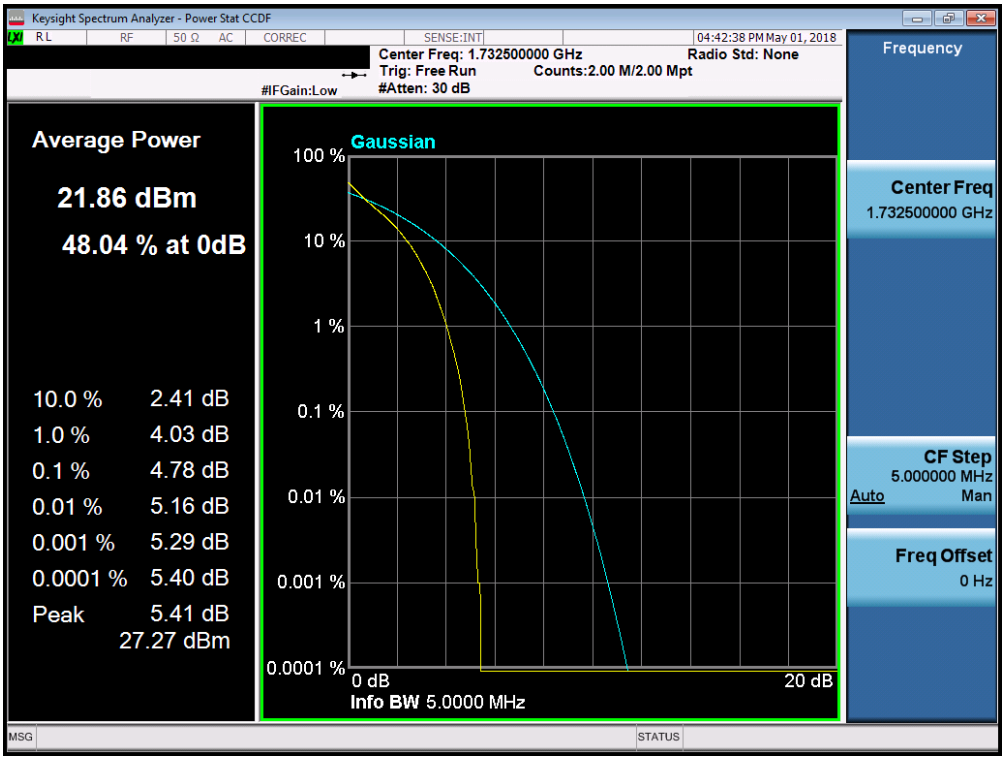
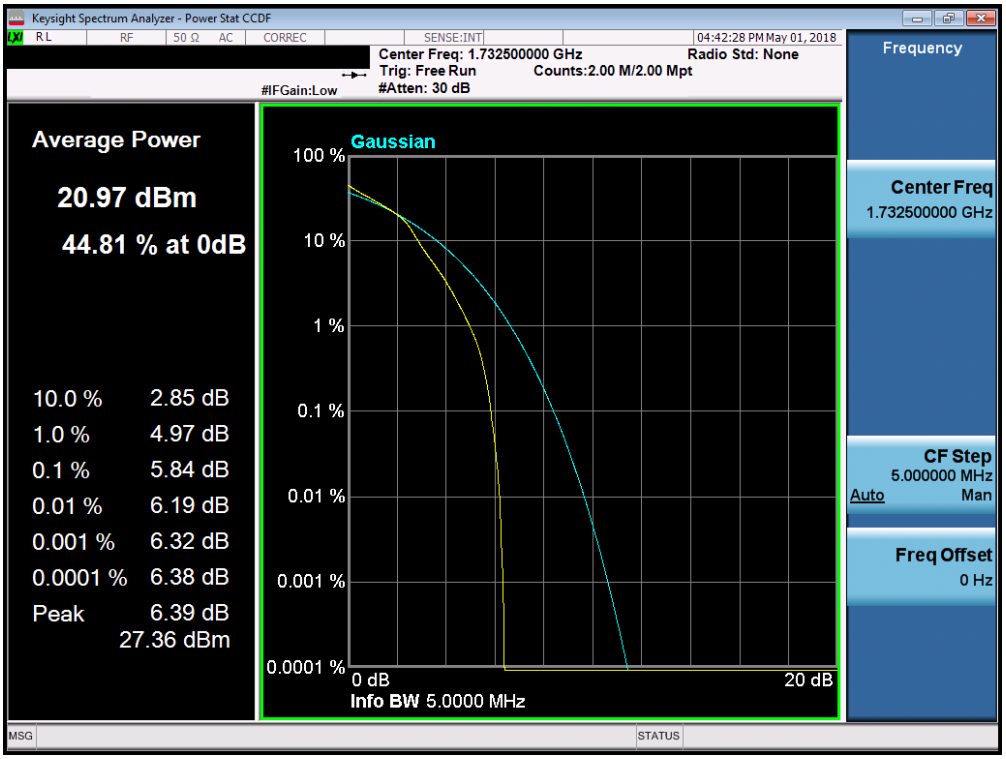


Plot 7-190. PAR Plot (Band 66/4 - 5.0MHz QPSK - Full RB Configuration)



Plot 7-191. PAR Plot (Band 66/4 - 5.0MHz 16-QAM - Full RB Configuration)

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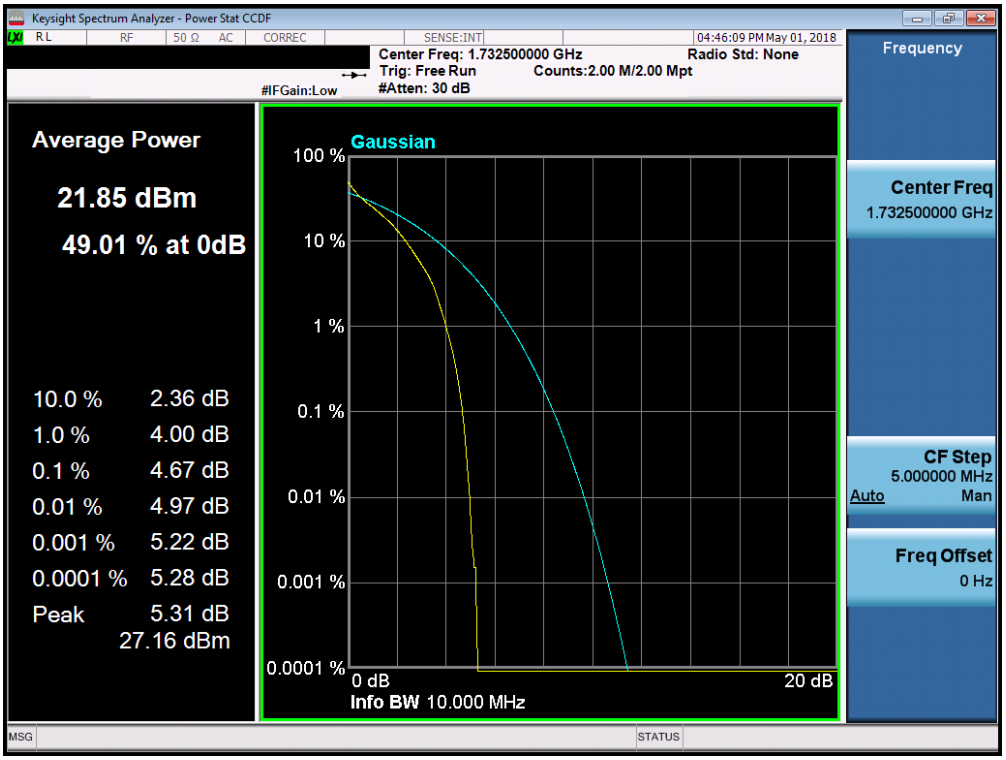
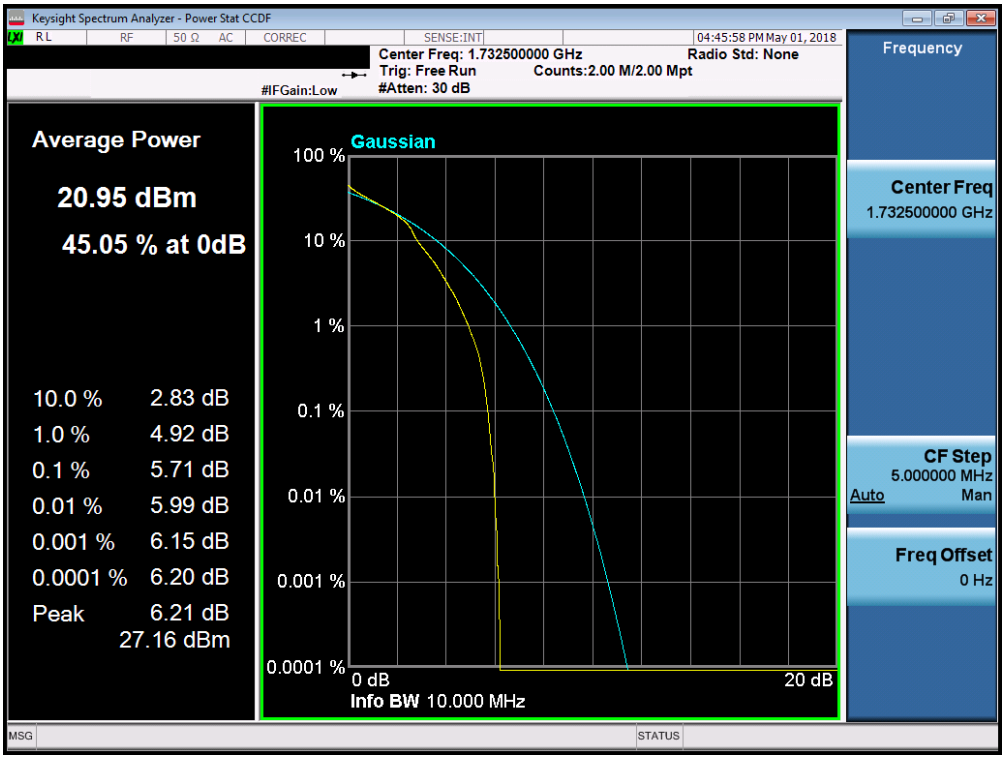


Plot 7-192. PAR Plot (Band 66/4 - 10.0MHz QPSK - Full RB Configuration)



Plot 7-193. PAR Plot (Band 66/4 - 10.0MHz 16-QAM - Full RB Configuration)

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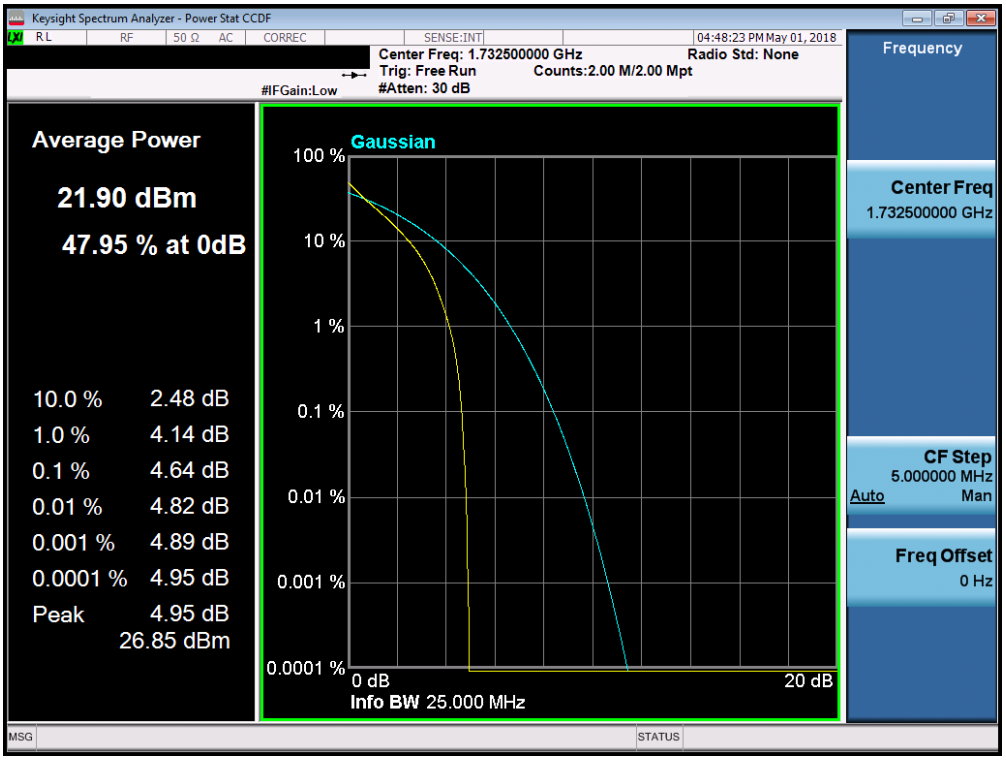
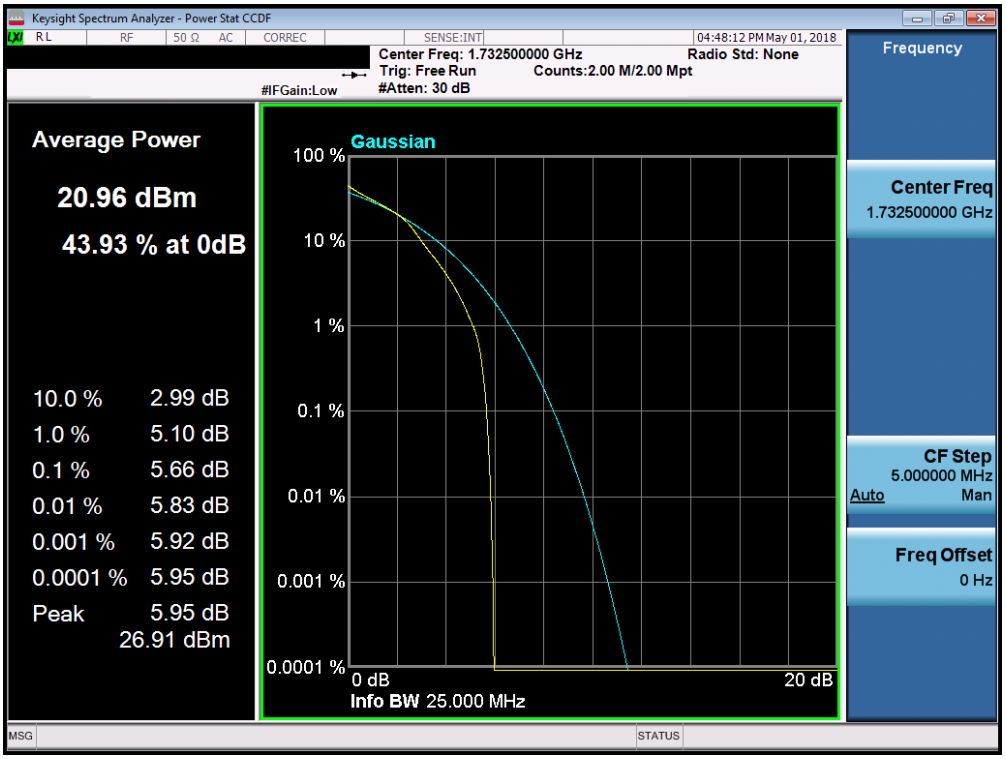


Plot 7-194. PAR Plot (Band 66/4 - 15.0MHz QPSK - Full RB Configuration)



Plot 7-195. PAR Plot (Band 66/4 - 15.0MHz 16-QAM - Full RB Configuration)

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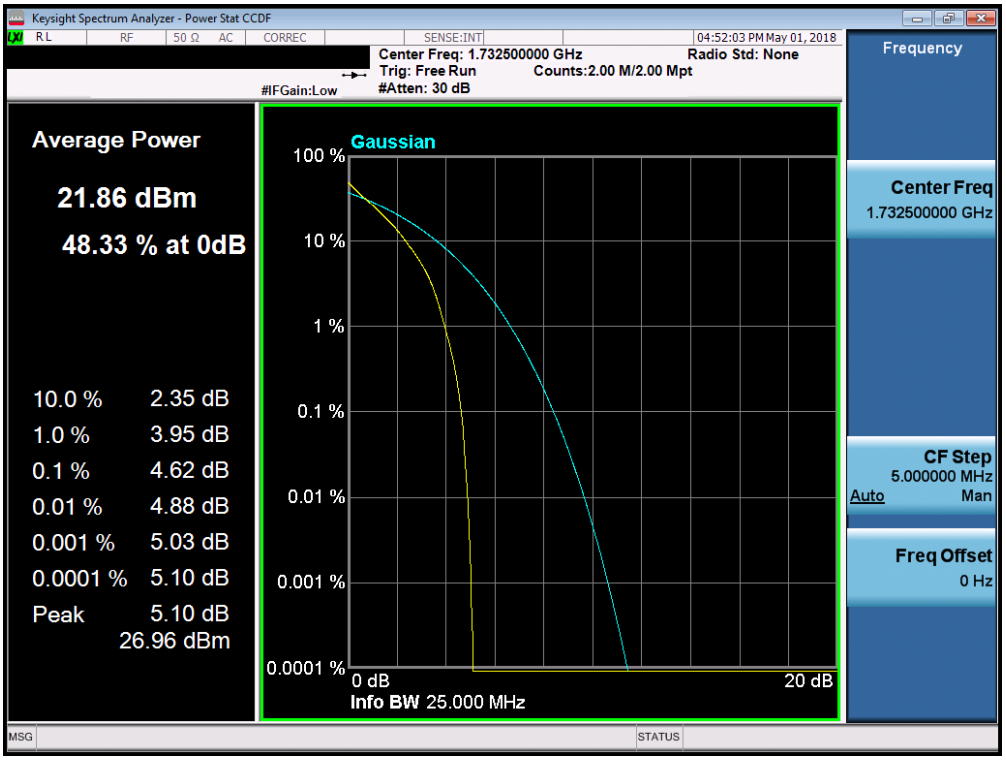
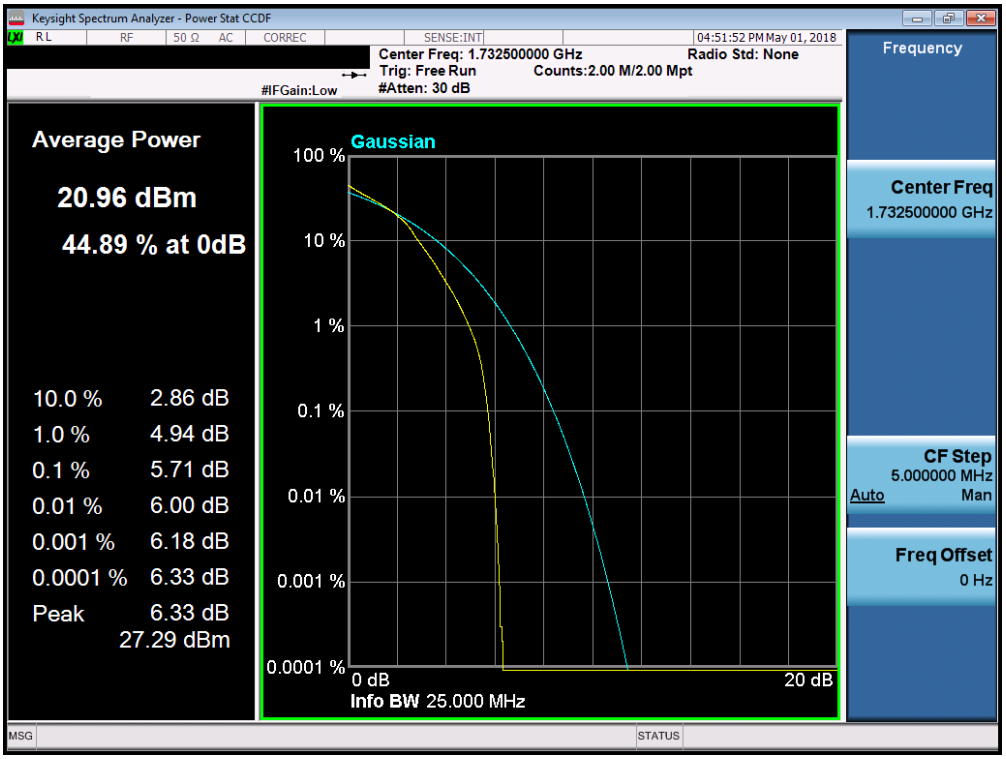


Plot 7-196. PAR Plot (Band 66/4 - 20.0MHz QPSK - Full RB Configuration)



Plot 7-197. PAR Plot (Band 66/4- 20.0MHz 16-QAM - Full RB Configuration)

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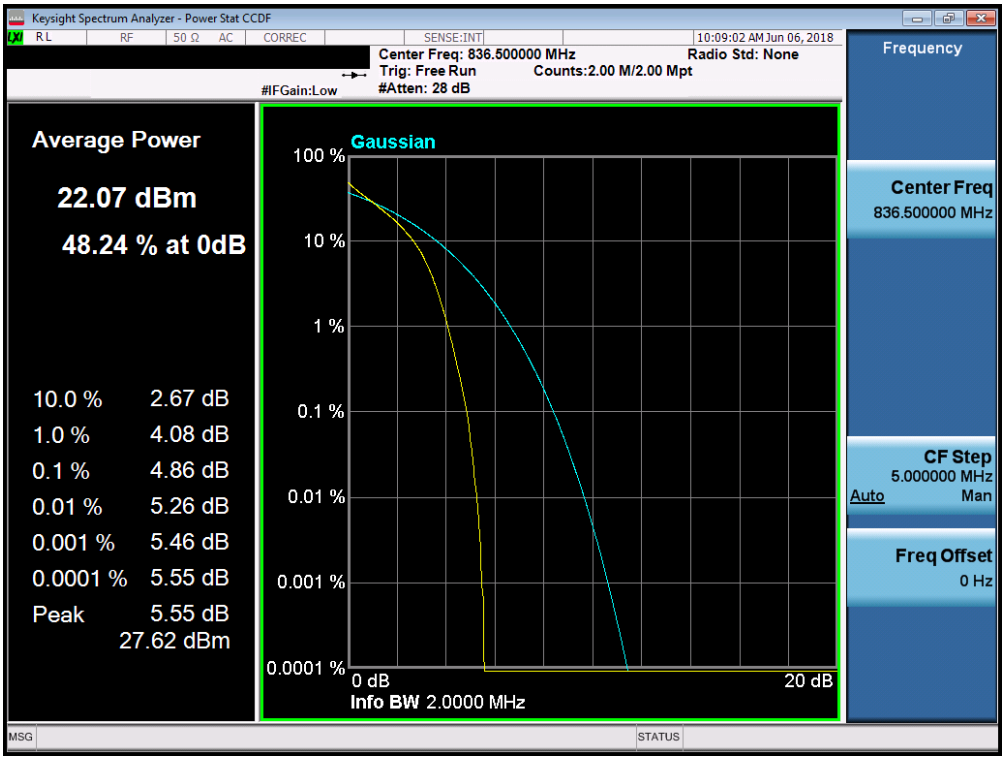
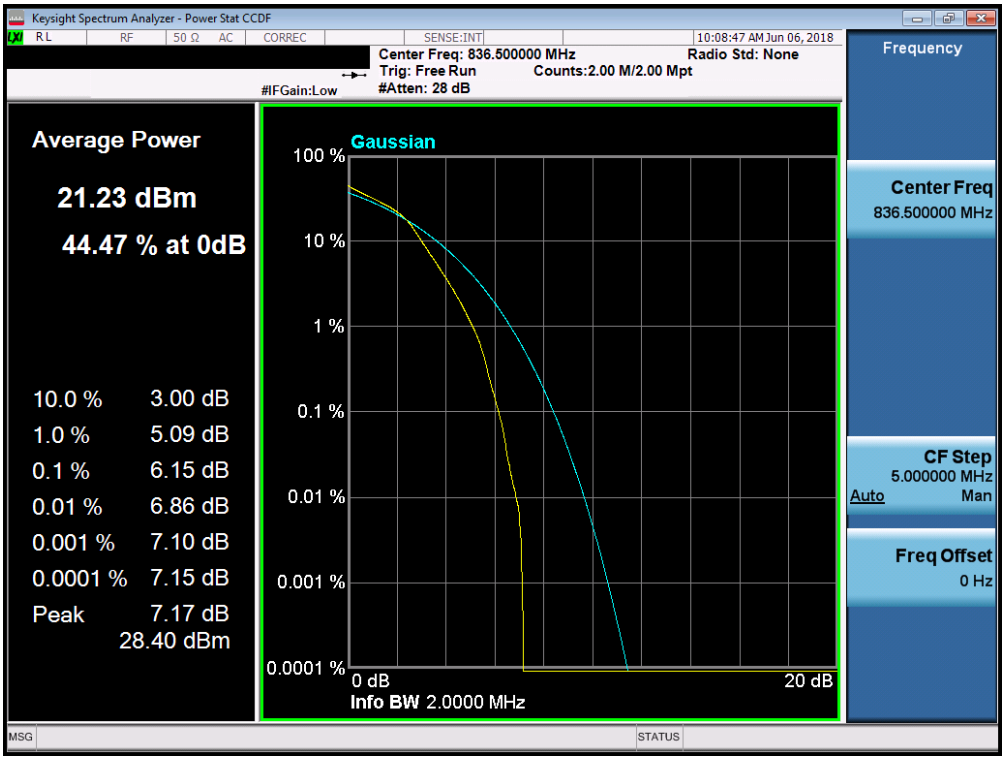
Band 5



Plot 7-198. PAR Plot (Band 5 - 1.4MHz QPSK - Full RB Configuration)



Plot 7-199. PAR Plot (Band 5 - 1.4MHz 16-QAM - Full RB Configuration)

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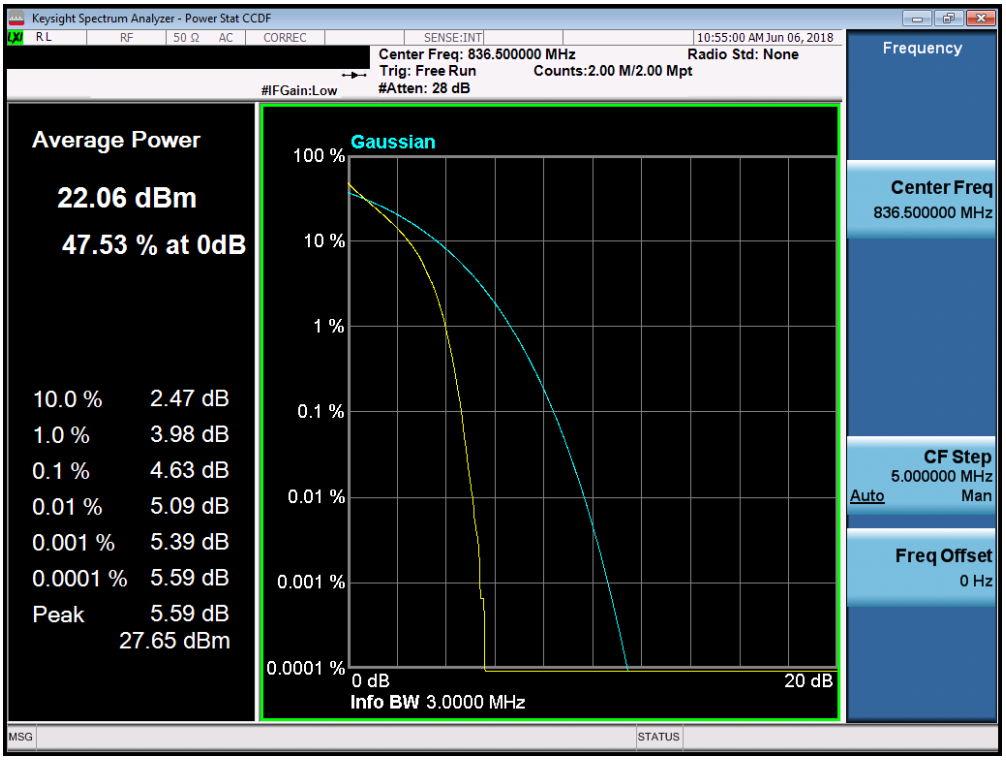
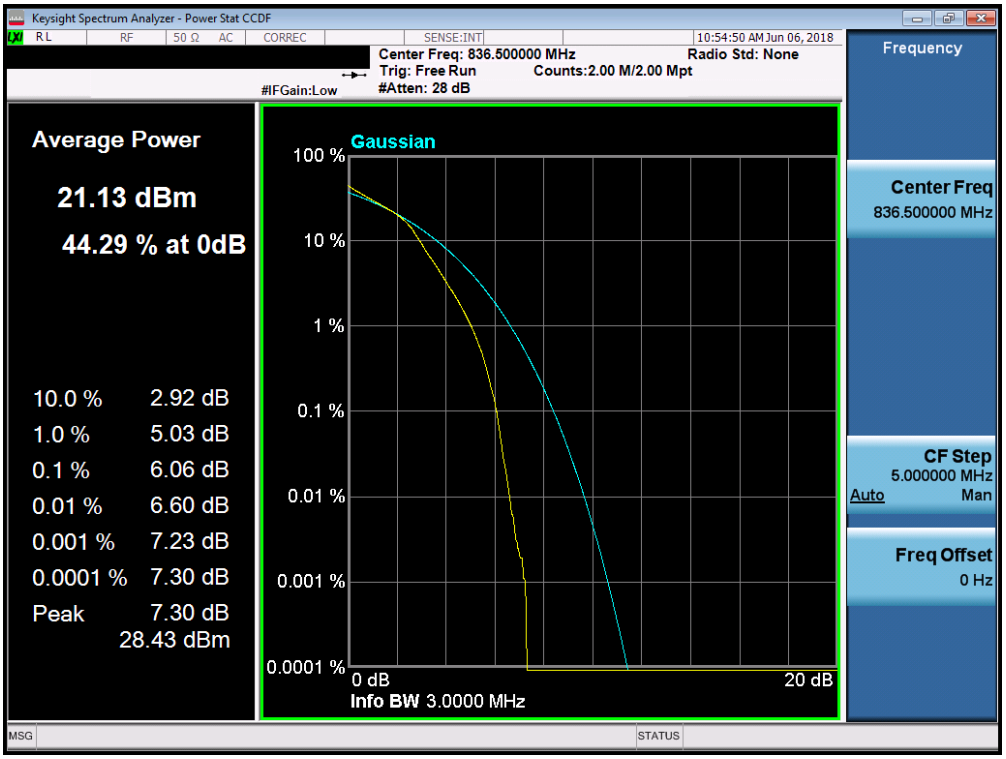


Plot 7-200. PAR Plot (Band 5 - 3.0MHz QPSK - Full RB Configuration)



Plot 7-201. PAR Plot (Band 5 - 3.0MHz 16-QAM - Full RB Configuration)

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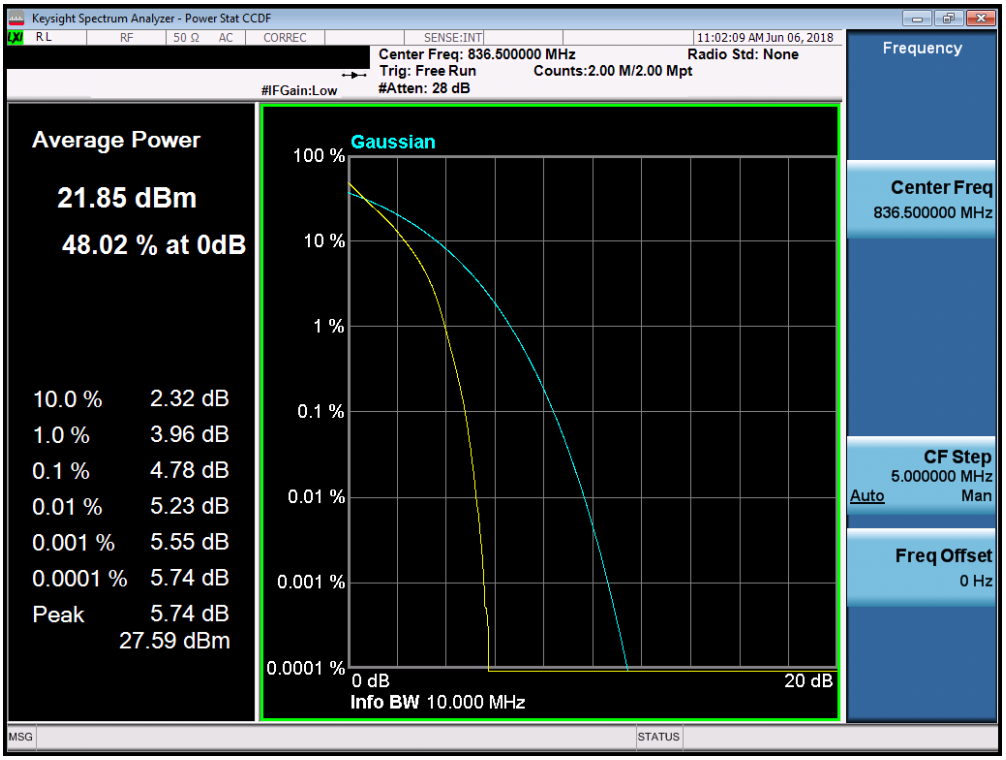
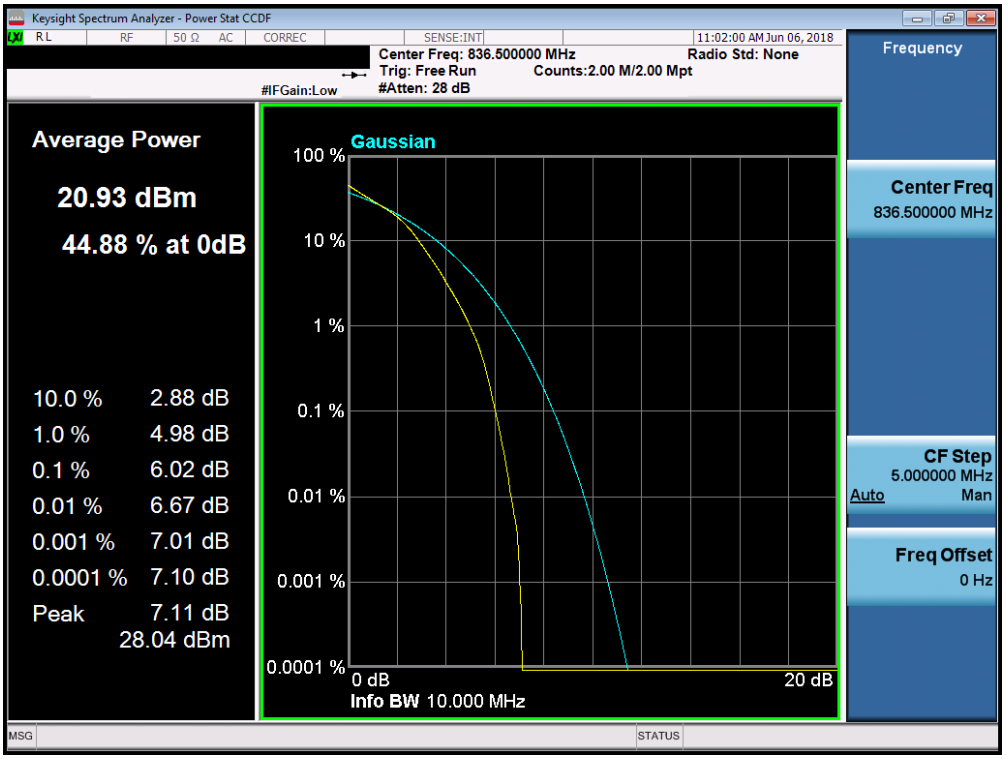


Plot 7-202. PAR Plot (Band 5 - 10.0MHz QPSK - Full RB Configuration)



Plot 7-203. PAR Plot (Band 5 - 10.0MHz 16-QAM - Full RB Configuration)

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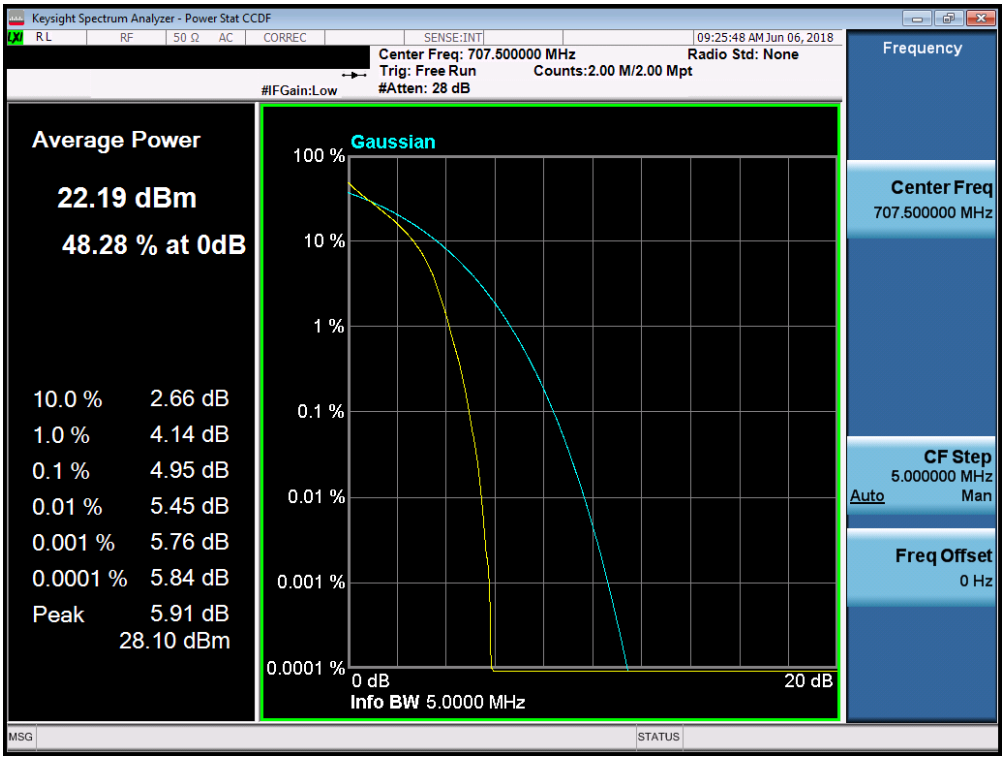
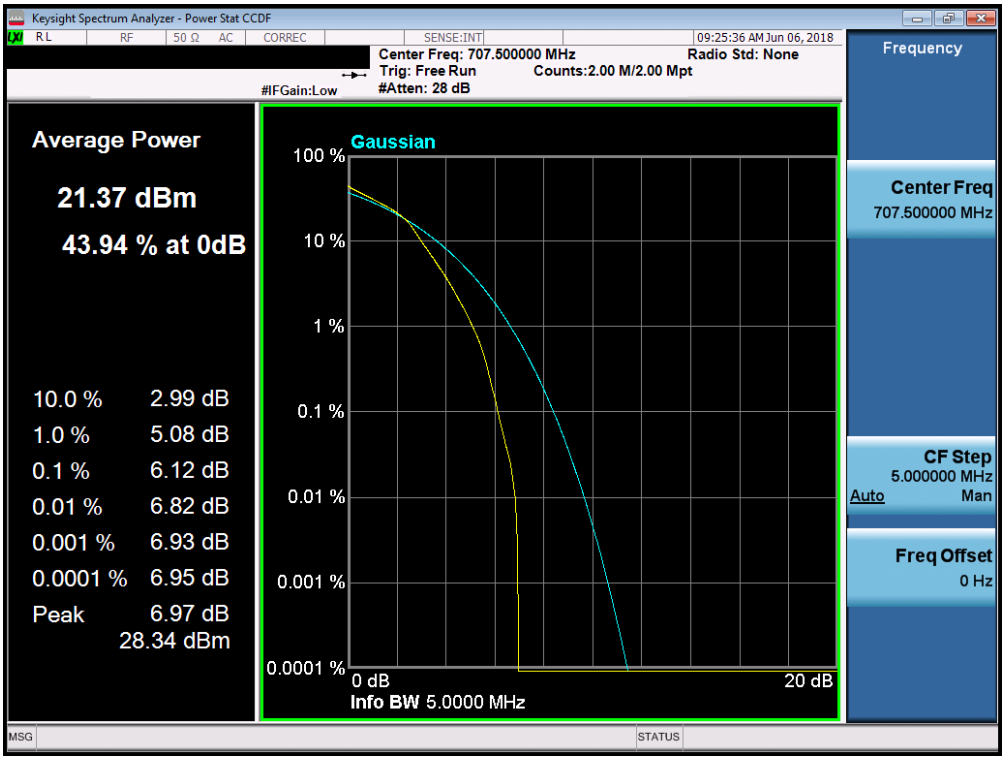
Band 12



Plot 7-204. PAR Plot (Band 12 - 1.4MHz QPSK - Full RB Configuration)



Plot 7-205. PAR Plot (Band 12 - 1.4MHz 16-QAM - Full RB Configuration)

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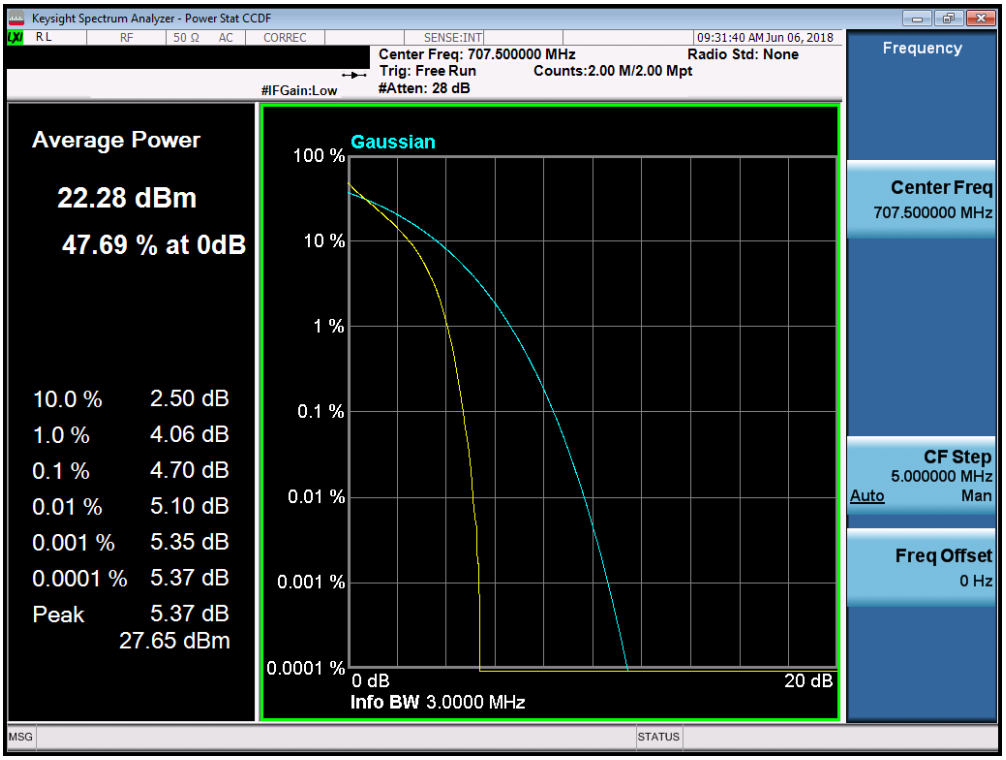
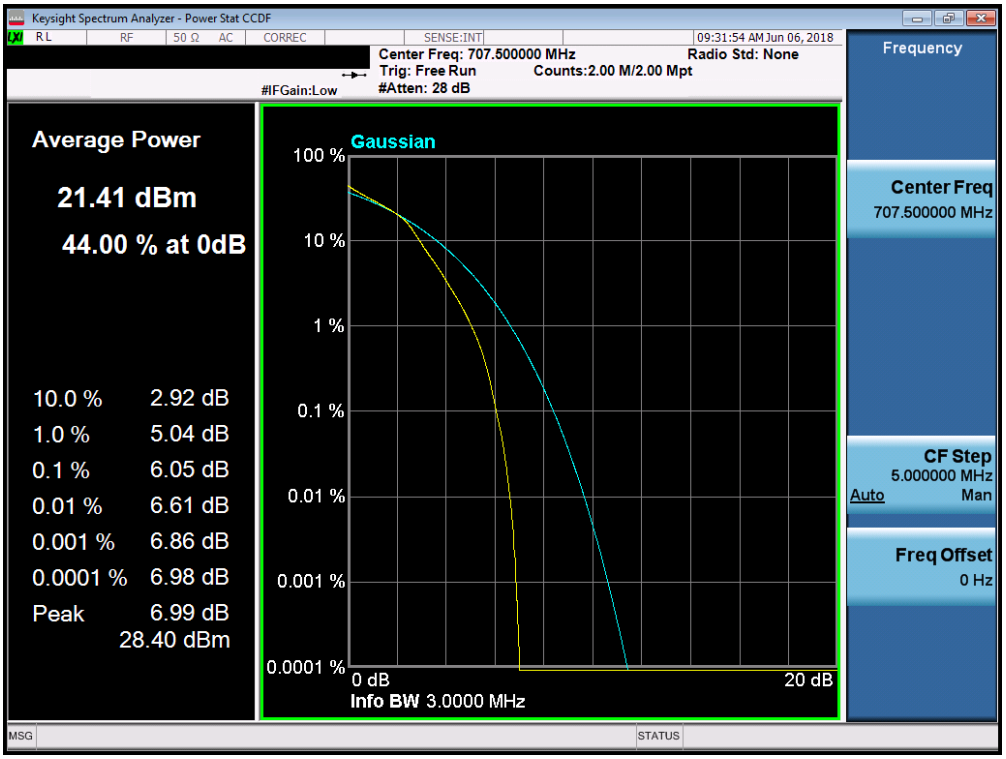


Plot 7-206. PAR Plot (Band 12 - 3.0MHz QPSK - Full RB Configuration)



Plot 7-207. PAR Plot (Band 12 - 3.0MHz 16-QAM - Full RB Configuration)

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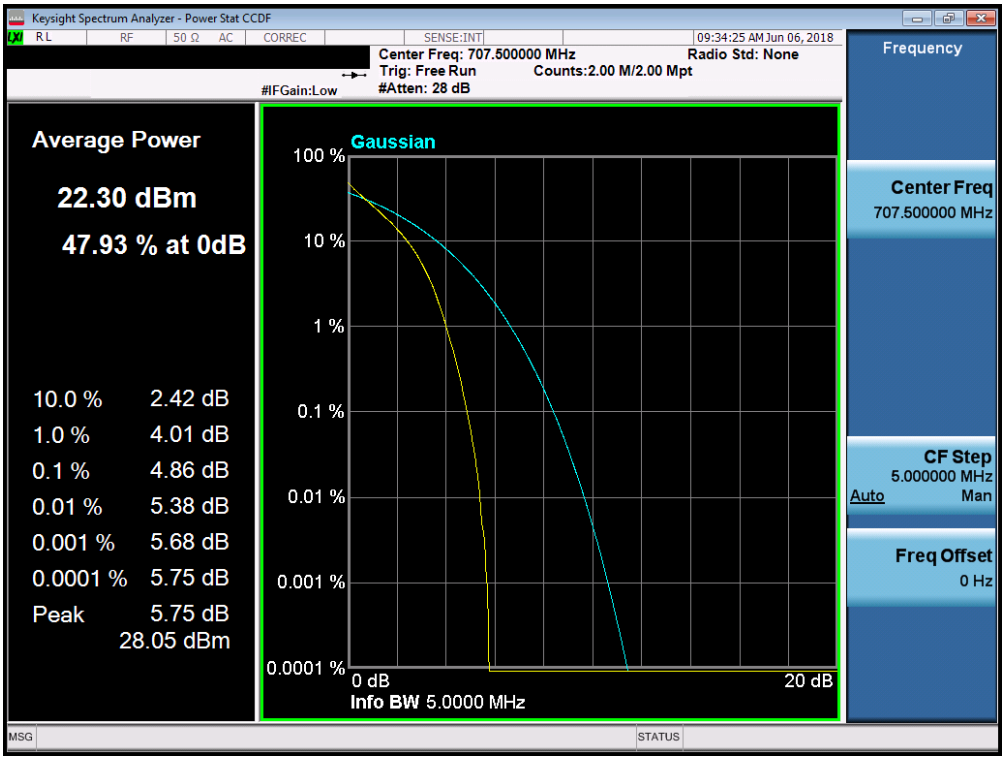
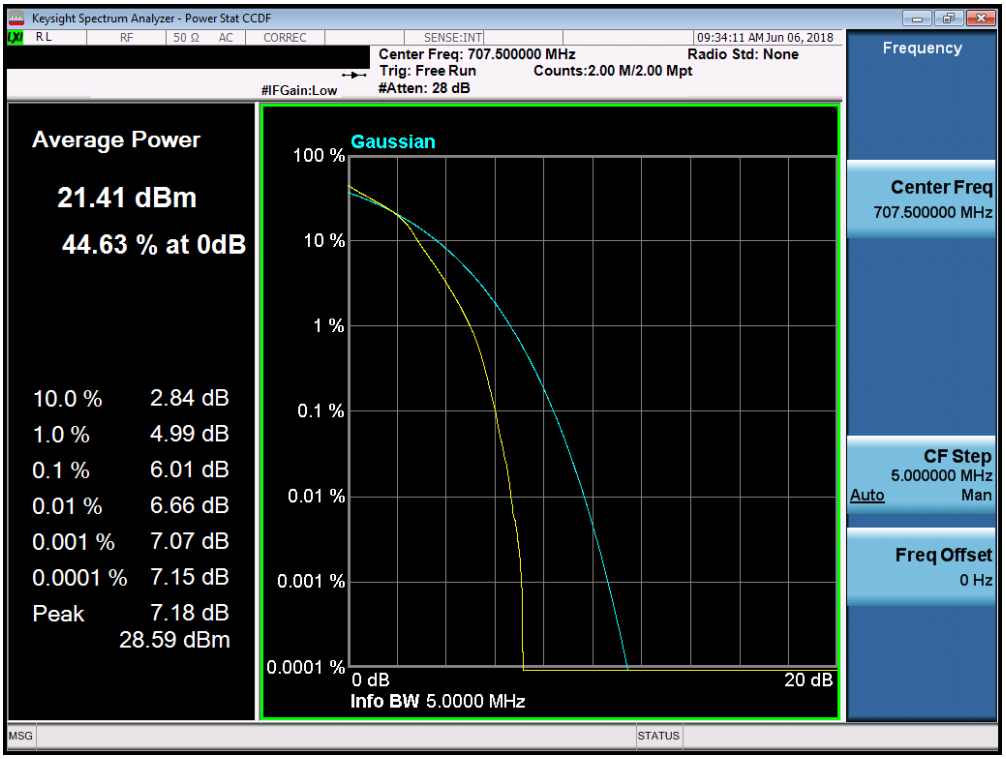


Plot 7-208. PAR Plot (Band 12 - 5.0MHz QPSK - Full RB Configuration)



Plot 7-209. PAR Plot (Band 12 - 5.0MHz 16-QAM - Full RB Configuration)

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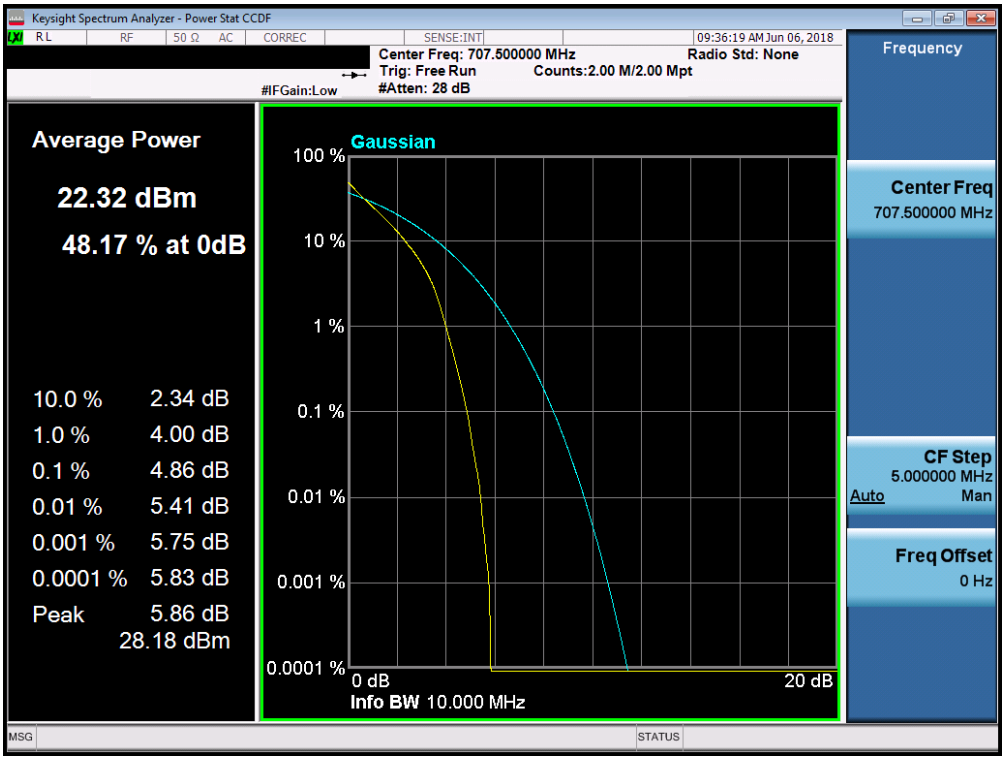
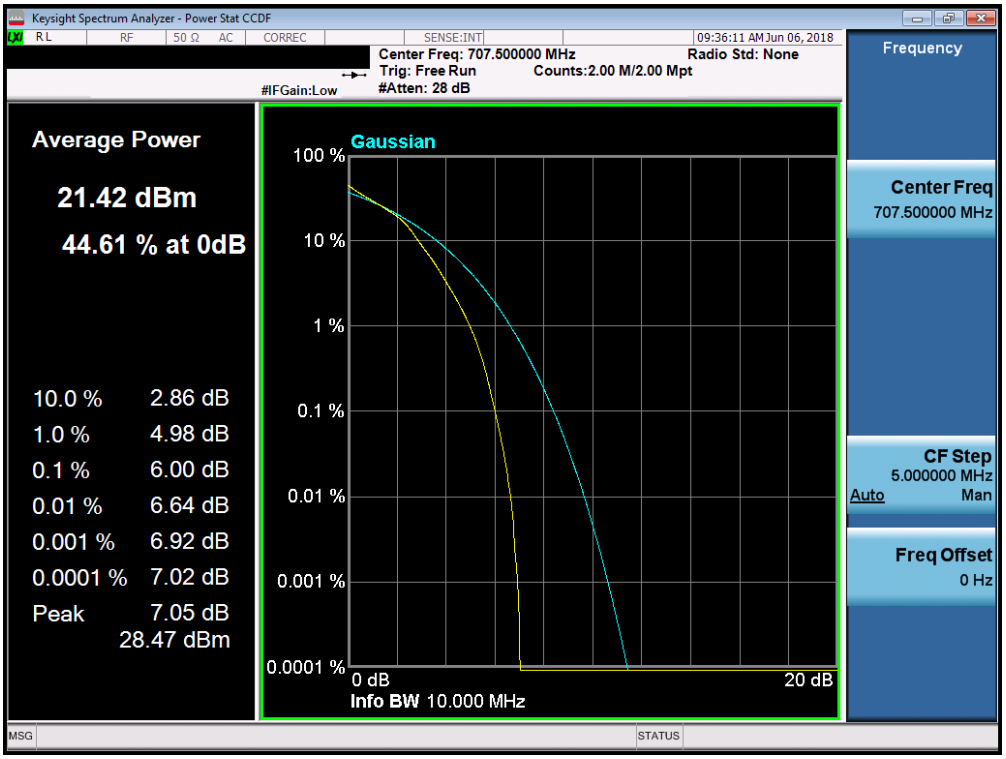


Plot 7-210. PAR Plot (Band 12 - 10.0MHz QPSK - Full RB Configuration)



Plot 7-211. PAR Plot (Band 12 - 10.0MHz 16-QAM - Full RB Configuration)

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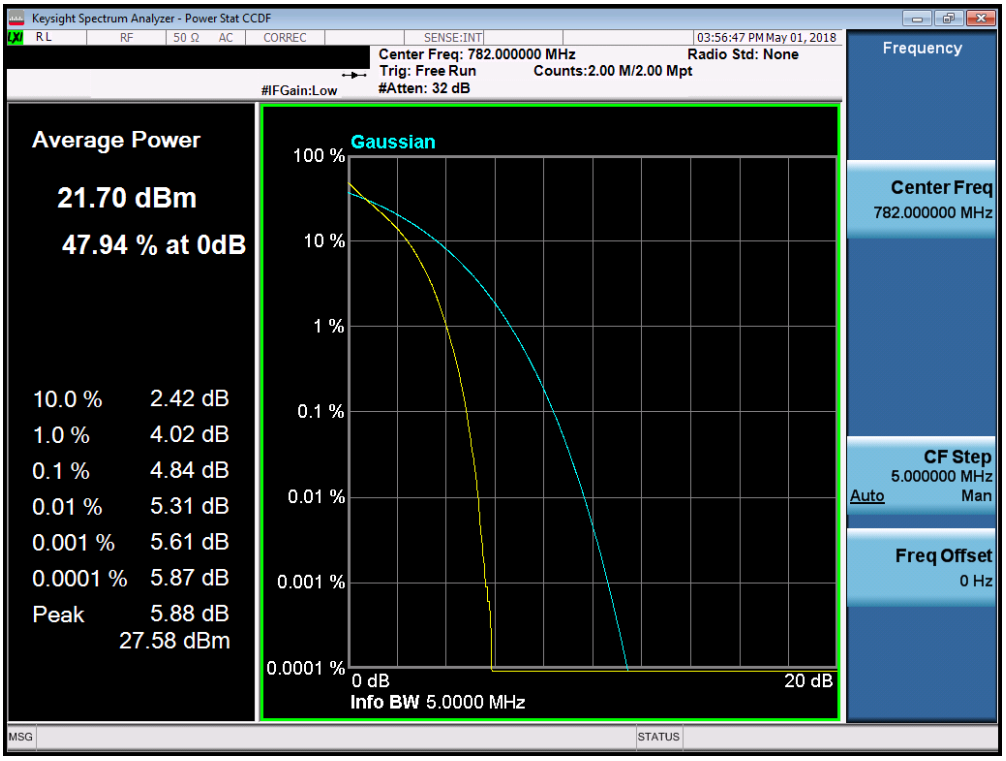
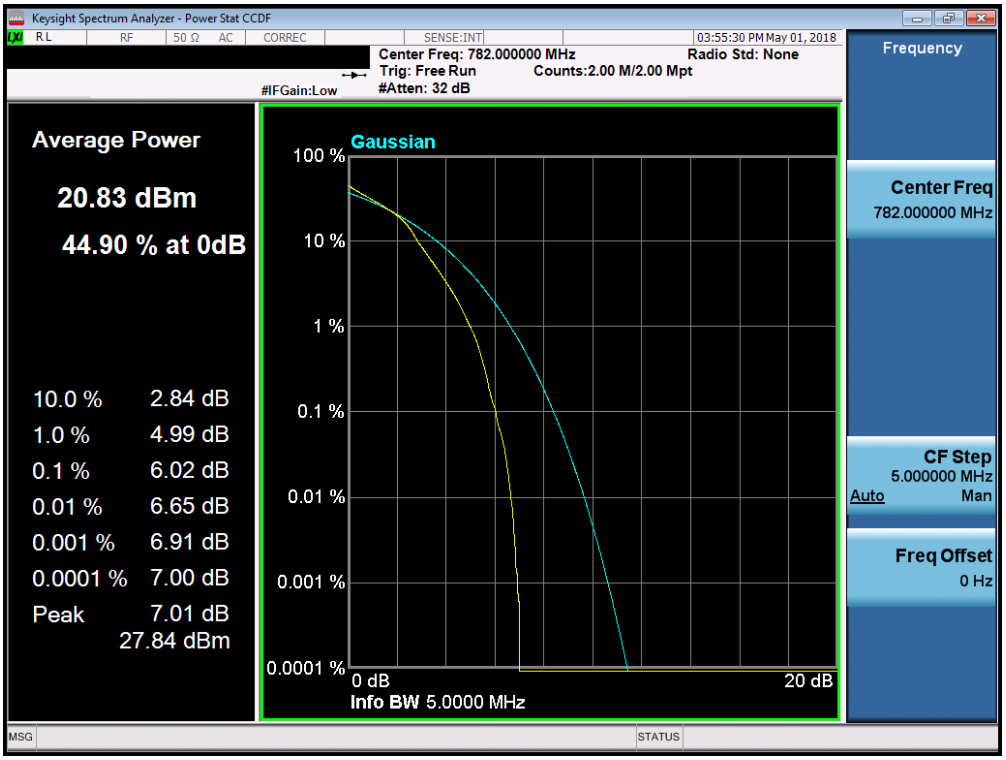
Band 13



Plot 7-212. PAR Plot (Band 13 – 5.0MHz QPSK - Full RB Configuration)



Plot 7-213. PAR Plot (Band 13 – 5.0MHz 16-QAM - Full RB Configuration)

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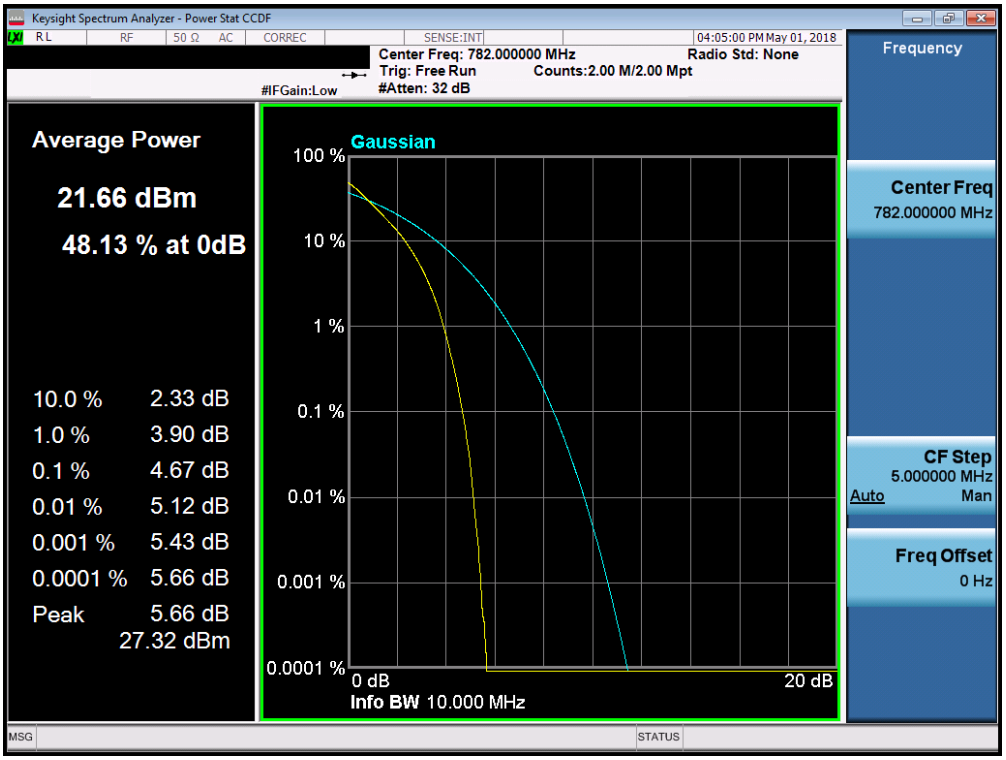
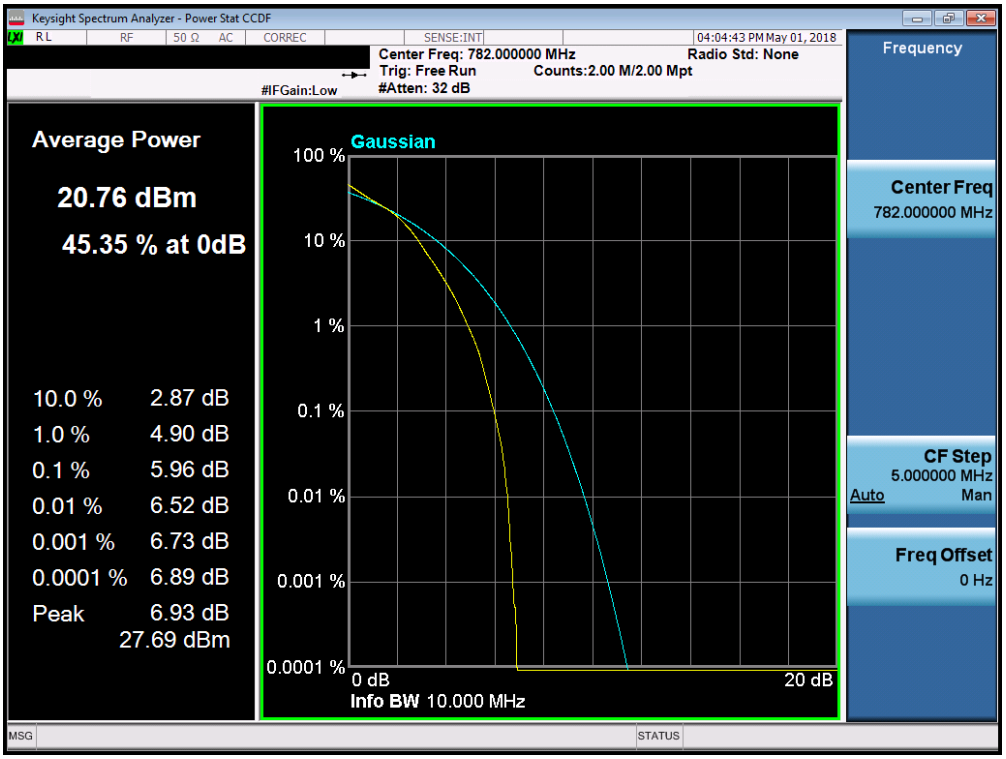


Plot 7-214. PAR Plot (Band 13 - 10.0MHz QPSK - Full RB Configuration)



Plot 7-215. PAR Plot (Band 13 – 10 .0MHz 16-QAM - Full RB Configuration)

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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 ≥ 3 x RBW
4. Span = 1.5 times the OBW
5. No. of sweep points ≥ 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

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Test Setup

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

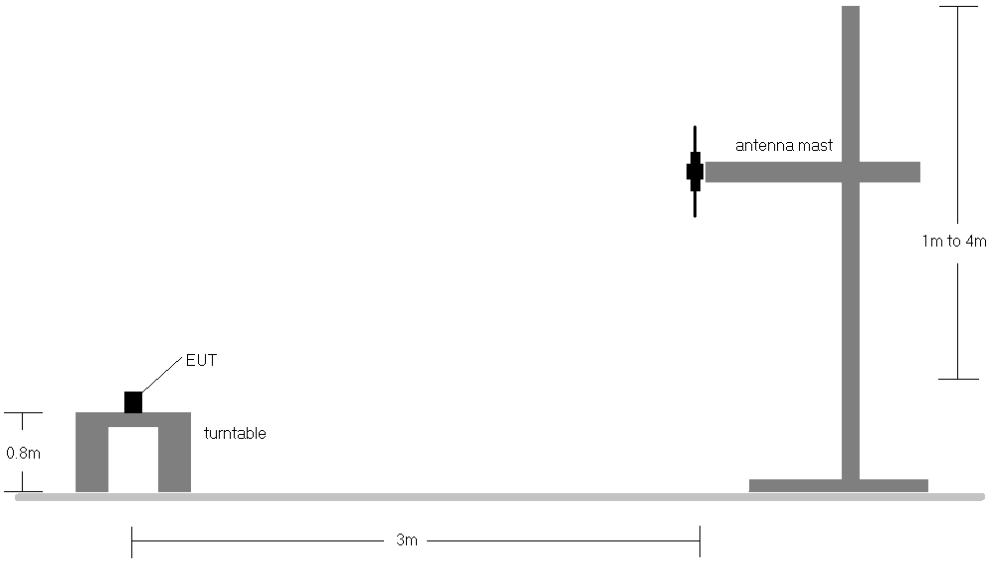

Figure 7-5. Radiated Test Setup <1GHz

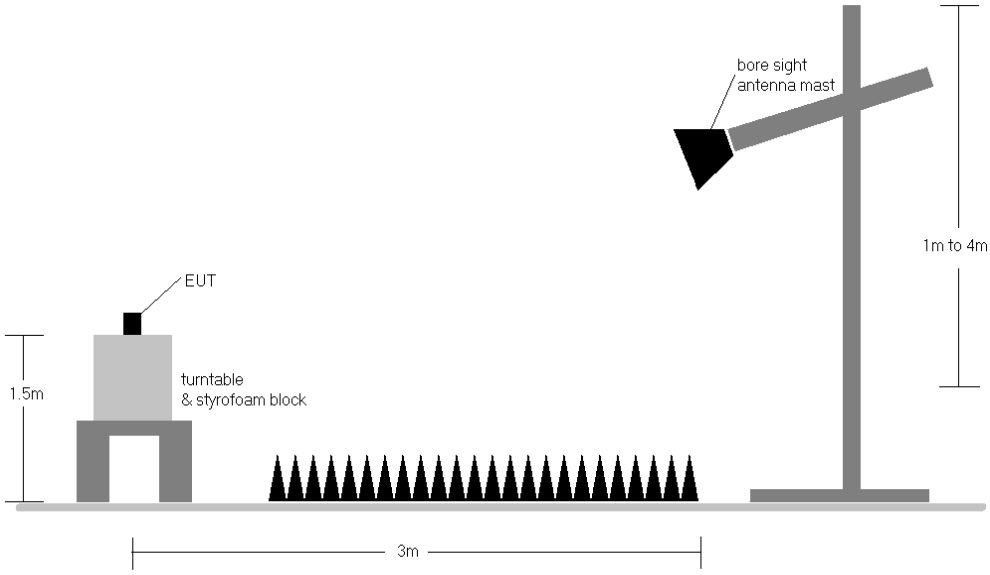

Figure 7-6. Radiated Test Setup >1GHz

Test Notes

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

2) This unit was tested with its standard battery.

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7.6.1 Radiated Power (ERP/EIRP)

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	150	262	1 / 5	19.94	1.10	18.89	0.077	34.77	-15.88	21.04	0.127	36.99	-15.95
707.50	1.4	QPSK	H	150	262	1 / 5	20.02	1.13	**19.00**	0.079	34.77	-15.77	**21.15**	0.130	36.99	-15.84
715.30	1.4	QPSK	H	150	262	1 / 0	19.71	1.16	18.72	0.075	34.77	-16.05	20.87	0.122	36.99	-16.12
699.70	1.4	16-QAM	H	150	262	1 / 5	19.87	1.10	**18.82**	0.076	34.77	-15.95	**20.97**	0.125	36.99	-16.02
707.50	1.4	16-QAM	H	150	262	1 / 5	19.10	1.13	18.08	0.064	34.77	-16.69	20.23	0.105	36.99	-16.76
715.30	1.4	16-QAM	H	150	262	1 / 0	19.66	1.16	18.67	0.074	34.77	-16.10	20.82	0.121	36.99	-16.17
700.50	3	QPSK	H	150	269	1 / 14	20.03	1.10	18.98	0.079	34.77	-15.79	21.13	0.130	36.99	-15.86
707.50	3	QPSK	H	150	258	1 / 0	20.01	1.13	**18.99**	0.079	34.77	-15.78	**21.14**	0.130	36.99	-15.85
714.50	3	QPSK	H	150	269	1 / 0	19.81	1.16	18.82	0.076	34.77	-15.95	20.97	0.125	36.99	-16.02
700.50	3	16-QAM	H	150	269	1 / 14	19.31	1.10	**18.26**	0.067	34.77	-16.51	**20.41**	0.110	36.99	-16.58
707.50	3	16-QAM	H	150	258	1 / 0	19.22	1.13	18.20	0.066	34.77	-16.57	20.35	0.108	36.99	-16.64
714.50	3	16-QAM	H	150	269	1 / 0	19.03	1.16	18.04	0.064	34.77	-16.73	20.19	0.104	36.99	-16.80
701.50	5	QPSK	H	150	254	1 / 0	20.65	1.11	**19.61**	0.091	34.77	-15.17	**21.76**	0.150	36.99	-15.23
707.50	5	QPSK	H	150	250	1 / 0	20.20	1.13	19.18	0.083	34.77	-15.59	21.33	0.136	36.99	-15.66
713.50	5	QPSK	H	150	254	1 / 24	19.77	1.15	18.77	0.075	34.77	-16.00	20.92	0.124	36.99	-16.07
701.50	5	16-QAM	H	150	254	1 / 0	19.64	1.11	**18.60**	0.072	34.77	-16.18	**20.75**	0.119	36.99	-16.24
707.50	5	16-QAM	H	150	250	1 / 0	19.48	1.13	18.46	0.070	34.77	-16.31	20.61	0.115	36.99	-16.38
713.50	5	16-QAM	H	150	254	1 / 24	19.04	1.15	18.04	0.064	34.77	-16.73	20.19	0.105	36.99	-16.80
704.00	10	QPSK	H	150	265	1 / 0	20.35	1.12	**19.32**	0.085	34.77	-15.45	**21.47**	0.140	36.99	-15.52
707.50	10	QPSK	H	150	265	1 / 0	20.24	1.13	19.22	0.084	34.77	-15.55	21.37	0.137	36.99	-15.62
711.00	10	QPSK	H	150	265	1 / 0	20.25	1.14	19.24	0.084	34.77	-15.53	21.39	0.138	36.99	-15.60
704.00	10	16-QAM	H	150	265	1 / 0	19.40	1.12	18.37	0.069	34.77	-16.40	20.52	0.113	36.99	-16.47
707.50	10	16-QAM	H	150	265	1 / 0	19.52	1.13	**18.50**	0.071	34.77	-16.27	**20.65**	0.116	36.99	-16.34
711.00	10	16-QAM	H	150	265	1 / 0	19.36	1.14	18.35	0.068	34.77	-16.42	20.50	0.112	36.99	-16.49
701.50	5	QPSK	V	150	254	1 / 0	19.63	1.11	18.59	0.072	34.77	-16.19	20.74	0.118	36.99	-16.25
701.50	5	QPSK	H	150	0	1 / 0	18.42	1.11	17.38	0.055	34.77	-17.39	19.53	0.090	36.99	-17.46

Table 7-3. ERP Data (Band 12)

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
779.50	5	QPSK	V	150	100	1 / 24	18.76	1.32	17.93	0.062	34.77	-16.84	20.08	0.102	36.99	-16.91
782.00	5	QPSK	V	150	100	1 / 0	18.64	1.33	17.82	0.061	34.77	-16.95	19.97	0.099	36.99	-17.02
784.50	5	QPSK	V	150	100	1 / 0	19.01	1.34	**18.20**	**0.066**	34.77	-16.57	**20.35**	**0.108**	36.99	-16.64
779.50	5	16-QAM	V	150	100	1 / 24	17.59	1.32	16.76	0.047	34.77	-18.01	18.91	0.078	36.99	-18.08
782.00	5	16-QAM	V	150	100	1 / 0	17.33	1.33	16.51	0.045	34.77	-18.26	18.66	0.073	36.99	-18.33
784.50	5	16-QAM	V	150	100	1 / 0	17.69	1.34	**16.88**	0.049	34.77	-17.89	**19.03**	0.080	36.99	-17.96
782.00	10	QPSK	V	150	79	1 / 0	18.87	1.33	**18.05**	0.064	34.77	-16.72	**20.20**	0.105	36.99	-16.79
782.00	10	16-QAM	V	150	79	1 / 0	17.66	1.33	**16.84**	0.048	34.77	-17.93	**18.99**	0.079	36.99	-18.00
784.50	5	QPSK	H	150	179	1 / 0	15.48	1.34	14.67	0.029	34.77	-20.10	16.82	0.048	36.99	-20.17
784.50	5 (L-Battery)	QPSK	V	150	186	1 / 0	17.95	1.34	17.14	0.052	34.77	-17.63	19.29	0.085	36.99	-17.70

Table 7-4. ERP Data (Band 13)

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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
824.70	1.4	QPSK	V	150	296	1 / 5	20.42	1.50	19.77	0.095	38.45	-18.68	21.92	0.156	40.61	-18.69
836.50	1.4	QPSK	V	150	296	1 / 5	20.86	1.50	**20.21**	**0.105**	38.45	-18.24	**22.36**	**0.172**	40.61	-18.25
848.30	1.4	QPSK	V	150	296	1 / 5	20.19	1.50	19.54	0.090	38.45	-18.91	21.69	0.148	40.61	-18.92
824.70	1.4	16-QAM	V	150	296	1 / 5	19.68	1.50	19.03	0.080	38.45	-19.42	21.18	0.131	40.61	-19.43
836.50	1.4	16-QAM	V	150	296	1 / 5	20.00	1.50	**19.35**	0.086	38.45	-19.10	**21.50**	0.141	40.61	-19.11
848.30	1.4	16-QAM	V	150	296	1 / 5	19.36	1.50	18.71	0.074	38.45	-19.74	20.86	0.122	40.61	-19.75
825.50	3	QPSK	V	150	304	1 / 14	20.23	1.50	19.58	0.091	38.45	-18.87	21.73	0.149	40.61	-18.88
836.50	3	QPSK	V	150	304	1 / 14	20.78	1.50	**20.13**	0.103	38.45	-18.32	**22.28**	0.169	40.61	-18.33
847.50	3	QPSK	V	150	304	1 / 14	20.18	1.50	19.53	0.090	38.45	-18.92	21.68	0.147	40.61	-18.93
825.50	3	16-QAM	V	150	304	1 / 14	19.56	1.50	18.91	0.078	38.45	-19.54	21.06	0.128	40.61	-19.55
836.50	3	16-QAM	V	150	304	1 / 14	19.76	1.50	**19.11**	0.081	38.45	-19.34	**21.26**	0.134	40.61	-19.35
847.50	3	16-QAM	V	150	304	1 / 14	19.40	1.50	18.75	0.075	38.45	-19.70	20.90	0.123	40.61	-19.71
826.50	5	QPSK	V	150	295	1 / 24	20.26	1.50	19.61	0.091	38.45	-18.84	21.76	0.150	40.61	-18.85
836.50	5	QPSK	V	150	295	1 / 0	20.54	1.50	19.89	0.097	38.45	-18.56	22.04	0.160	40.61	-18.57
846.50	5	QPSK	V	150	295	1 / 0	20.67	1.50	**20.02**	0.100	38.45	-18.43	**22.17**	0.165	40.61	-18.44
826.50	5	16-QAM	V	150	295	1 / 24	19.53	1.50	18.88	0.077	38.45	-19.57	21.03	0.127	40.61	-19.58
836.50	5	16-QAM	V	150	295	1 / 0	19.68	1.50	19.03	0.080	38.45	-19.42	21.18	0.131	40.61	-19.43
846.50	5	16-QAM	V	150	295	1 / 0	20.16	1.50	**19.51**	0.089	38.45	-18.94	**21.66**	0.147	40.61	-18.95
829.00	10	QPSK	V	150	300	1 / 49	20.42	1.50	19.77	0.095	38.45	-18.68	21.92	0.156	40.61	-18.69
836.50	10	QPSK	V	150	300	1 / 49	20.59	1.50	19.94	0.099	38.45	-18.51	22.09	0.162	40.61	-18.52
844.00	10	QPSK	V	150	300	1 / 0	20.71	1.50	**20.06**	0.101	38.45	-18.39	**22.21**	0.166	40.61	-18.40
829.00	10	16-QAM	V	150	300	1 / 49	19.62	1.50	18.97	0.079	38.45	-19.48	21.12	0.129	40.61	-19.49
836.50	10	16-QAM	V	150	300	1 / 49	19.89	1.50	**19.24**	0.084	38.45	-19.21	**21.39**	0.138	40.61	-19.22
844.00	10	16-QAM	V	150	300	1 / 0	19.78	1.50	19.13	0.082	38.45	-19.32	21.28	0.134	40.61	-19.33
836.50	1.4	QPSK	H	150	195	1 / 5	18.72	1.50	18.07	0.064	38.45	-20.38	20.22	0.105	40.61	-20.39
836.50	1.4 (L-Battery)	QPSK	V	150	171	1 / 5	17.75	1.50	17.10	0.051	38.45	-21.35	19.25	0.084	40.61	-21.36

Table 7-5. ERP Data (Band 5)

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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
1710.70	1.4	QPSK	H	150	96	1 / 0	18.84	5.56	24.40	0.275	30.00	-5.60
1732.50	1.4	QPSK	H	150	96	1 / 5	19.27	5.41	**24.68**	0.294	30.00	-5.32
1754.30	1.4	QPSK	H	150	96	1 / 0	18.96	5.26	24.22	0.264	30.00	-5.78
1710.70	1.4	16-QAM	H	150	96	1 / 0	17.73	5.56	23.29	0.213	30.00	-6.71
1732.50	1.4	16-QAM	H	150	96	1 / 5	18.52	5.41	**23.93**	0.247	30.00	-6.07
1754.30	1.4	16-QAM	H	150	96	1 / 5	17.73	5.26	22.99	0.199	30.00	-7.01
1711.50	3	QPSK	H	150	103	1 / 14	18.69	5.55	24.24	0.266	30.00	-5.76
1732.50	3	QPSK	H	150	103	1 / 0	19.30	5.41	24.71	0.296	30.00	-5.29
1753.50	3	QPSK	H	150	103	1 / 0	20.07	5.26	**25.33**	0.342	30.00	-4.67
1711.50	3	16-QAM	H	150	103	1 / 14	18.08	5.55	23.63	0.231	30.00	-6.37
1732.50	3	16-QAM	H	150	103	1 / 14	18.57	5.41	23.98	0.250	30.00	-6.02
1753.50	3	16-QAM	H	150	103	1 / 0	19.34	5.26	**24.60**	0.289	30.00	-5.40
1712.50	5	QPSK	H	150	71	1 / 24	19.31	5.55	**24.86**	0.306	30.00	-5.14
1732.50	5	QPSK	H	150	96	1 / 0	19.03	5.41	24.44	0.278	30.00	-5.56
1752.50	5	QPSK	H	150	71	1 / 0	19.26	5.27	24.53	0.284	30.00	-5.47
1712.50	5	16-QAM	H	150	71	1 / 24	18.37	5.55	**23.92**	0.246	30.00	-6.08
1732.50	5	16-QAM	H	150	96	1 / 0	18.31	5.41	23.72	0.235	30.00	-6.28
1752.50	5	16-QAM	H	150	71	1 / 24	18.21	5.27	23.48	0.223	30.00	-6.52
1715.00	10	QPSK	H	150	83	1 / 49	18.74	5.53	24.27	0.267	30.00	-5.73
1732.50	10	QPSK	H	150	83	1 / 0	19.15	5.41	24.56	0.286	30.00	-5.44
1750.00	10	QPSK	H	150	83	1 / 49	19.65	5.29	**24.94**	0.312	30.00	-5.06
1715.00	10	16-QAM	H	150	83	1 / 49	17.82	5.53	23.35	0.216	30.00	-6.65
1732.50	10	16-QAM	H	150	83	1 / 49	18.33	5.41	**23.74**	0.236	30.00	-6.26
1750.00	10	16-QAM	H	150	83	1 / 49	17.94	5.29	23.23	0.210	30.00	-6.77
1717.50	15	QPSK	H	150	269	1 / 0	19.06	5.51	24.57	0.286	30.00	-5.43
1732.50	15	QPSK	H	150	269	1 / 74	19.25	5.41	**24.66**	0.292	30.00	-5.34
1747.50	15	QPSK	H	150	269	1 / 74	19.28	5.31	24.59	0.287	30.00	-5.41
1717.50	15	16-QAM	H	150	269	1 / 74	18.04	5.51	23.55	0.227	30.00	-6.45
1732.50	15	16-QAM	H	150	269	1 / 74	18.35	5.41	**23.76**	0.238	30.00	-6.24
1747.50	15	16-QAM	H	150	269	1 / 74	18.36	5.31	23.67	0.233	30.00	-6.33
1720.00	20	QPSK	H	150	258	1 / 99	19.72	5.49	25.21	0.332	30.00	-4.79
1732.50	20	QPSK	H	150	258	1 / 99	19.65	5.41	25.06	0.320	30.00	-4.94
1745.00	20	QPSK	H	150	258	1 / 0	20.02	5.32	**25.34**	0.342	30.00	-4.66
1720.00	20	16-QAM	H	150	258	1 / 99	18.97	5.49	**24.46**	0.279	30.00	-5.54
1732.50	20	16-QAM	H	150	258	1 / 99	18.88	5.41	24.29	0.268	30.00	-5.71
1745.00	20	16-QAM	H	150	258	1 / 99	18.27	5.32	23.59	0.229	30.00	-6.41
1745.00	20	QPSK	V	150	2	1 / 0	18.22	5.32	23.54	0.226	30.00	-6.46
1745.00	20 (L-Battery)	QPSK	H	150	54	1 / 0	18.91	5.32	24.23	0.265	30.00	-5.77

Table 7-6. EIRP Data (Band 66/4)

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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
1850.70	1.4	QPSK	V	150	167	1 / 0	20.49	3.69	24.18	0.262	33.01	-8.83
1880.00	1.4	QPSK	V	150	168	1 / 0	20.67	3.63	**24.30**	0.269	33.01	-8.71
1909.30	1.4	QPSK	V	150	167	1 / 0	20.12	3.57	23.69	0.234	33.01	-9.32
1850.70	1.4	16-QAM	V	150	167	1 / 0	19.58	3.69	23.27	0.212	33.01	-9.74
1880.00	1.4	16-QAM	V	150	168	1 / 5	19.64	3.63	**23.27**	0.212	33.01	-9.74
1909.30	1.4	16-QAM	V	150	167	1 / 0	19.22	3.57	22.79	0.190	33.01	-10.22
1851.50	3	QPSK	V	150	183	1 / 0	21.15	3.69	**24.84**	0.305	33.01	-8.17
1880.00	3	QPSK	V	150	183	1 / 14	20.91	3.63	24.54	0.285	33.01	-8.47
1908.50	3	QPSK	V	150	183	1 / 0	20.79	3.58	24.37	0.273	33.01	-8.64
1851.50	3	16-QAM	V	150	183	1 / 0	20.26	3.69	**23.95**	0.248	33.01	-9.06
1880.00	3	16-QAM	V	150	183	1 / 14	19.91	3.63	23.54	0.226	33.01	-9.47
1908.50	3	16-QAM	V	150	183	1 / 0	19.87	3.58	23.45	0.221	33.01	-9.56
1852.50	5	QPSK	V	150	265	1 / 24	20.89	3.69	**24.58**	0.287	33.01	-8.43
1880.00	5	QPSK	V	150	265	1 / 24	20.82	3.63	24.45	0.279	33.01	-8.56
1907.50	5	QPSK	V	150	265	1 / 0	20.40	3.58	23.98	0.250	33.01	-9.03
1852.50	5	16-QAM	V	150	265	1 / 24	19.55	3.69	**23.24**	0.211	33.01	-9.77
1880.00	5	16-QAM	V	150	265	1 / 24	19.59	3.63	23.22	0.210	33.01	-9.79
1907.50	5	16-QAM	V	150	265	1 / 0	19.15	3.58	22.73	0.187	33.01	-10.28
1855.00	10	QPSK	V	150	96	1 / 49	19.99	3.68	**23.67**	0.233	33.01	-9.34
1880.00	10	QPSK	V	150	96	1 / 49	19.86	3.63	23.49	0.223	33.01	-9.52
1905.00	10	QPSK	V	150	96	1 / 0	19.61	3.58	23.19	0.209	33.01	-9.82
1855.00	10	16-QAM	V	150	96	1 / 49	18.91	3.68	**22.59**	0.182	33.01	-10.42
1880.00	10	16-QAM	V	150	96	1 / 49	18.68	3.63	22.31	0.170	33.01	-10.70
1905.00	10	16-QAM	V	150	96	1 / 0	18.56	3.58	22.14	0.164	33.01	-10.87
1857.50	15	QPSK	V	150	84	1 / 74	19.77	3.68	23.45	0.221	33.01	-9.56
1880.00	15	QPSK	V	150	84	1 / 74	19.91	3.63	**23.54**	0.226	33.01	-9.47
1902.50	15	QPSK	V	150	84	1 / 0	19.37	3.59	22.96	0.198	33.01	-10.05
1857.50	15	16-QAM	V	150	84	1 / 74	18.99	3.68	**22.67**	0.185	33.01	-10.34
1880.00	15	16-QAM	V	150	84	1 / 74	18.64	3.63	22.27	0.169	33.01	-10.74
1902.50	15	16-QAM	V	150	84	1 / 74	18.08	3.59	21.67	0.147	33.01	-11.34
1860.00	20	QPSK	V	150	83	1 / 99	20.00	3.67	**23.67**	0.233	33.01	-9.34
1880.00	20	QPSK	V	150	83	1 / 0	19.81	3.63	23.44	0.221	33.01	-9.57
1900.00	20	QPSK	V	150	83	1 / 0	19.55	3.59	23.14	0.206	33.01	-9.87
1860.00	20	16-QAM	V	150	83	1 / 99	18.70	3.67	22.37	0.173	33.01	-10.64
1880.00	20	16-QAM	V	150	83	1 / 0	18.85	3.63	**22.48**	0.177	33.01	-10.53
1900.00	20	16-QAM	V	150	83	1 / 0	18.71	3.59	22.30	0.170	33.01	-10.71
1851.50	3	QPSK	H	150	171	1 / 0	20.57	3.69	24.26	0.267	33.01	-8.75
1851.50	3 (L-Battery)	QPSK	H	150	175	1 / 0	19.53	3.69	23.22	0.210	33.01	-9.79

Table 7-7. EIRP Data (Band 2)

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

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Test Setup

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

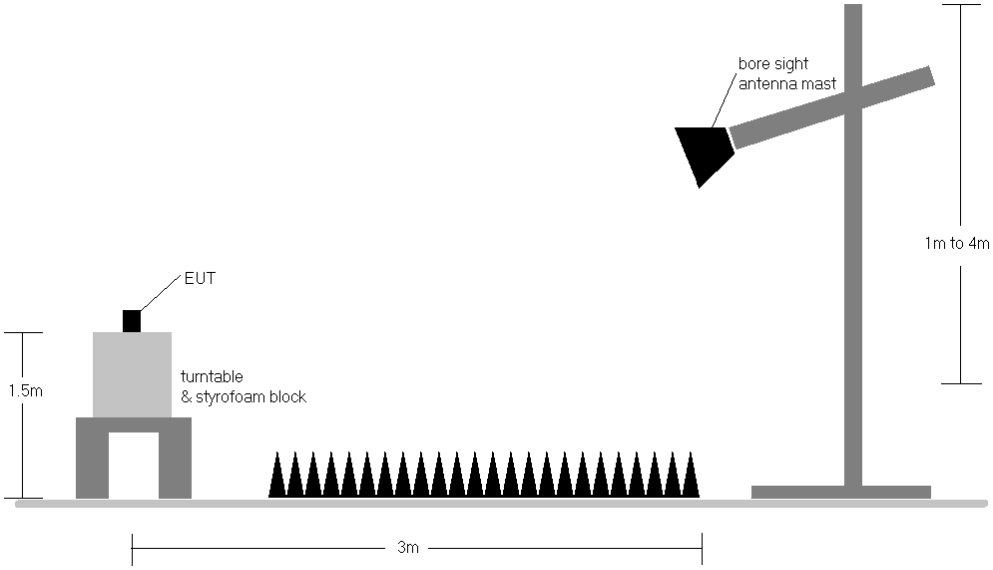

Figure 7-7. Test Instrument & Measurement Setup

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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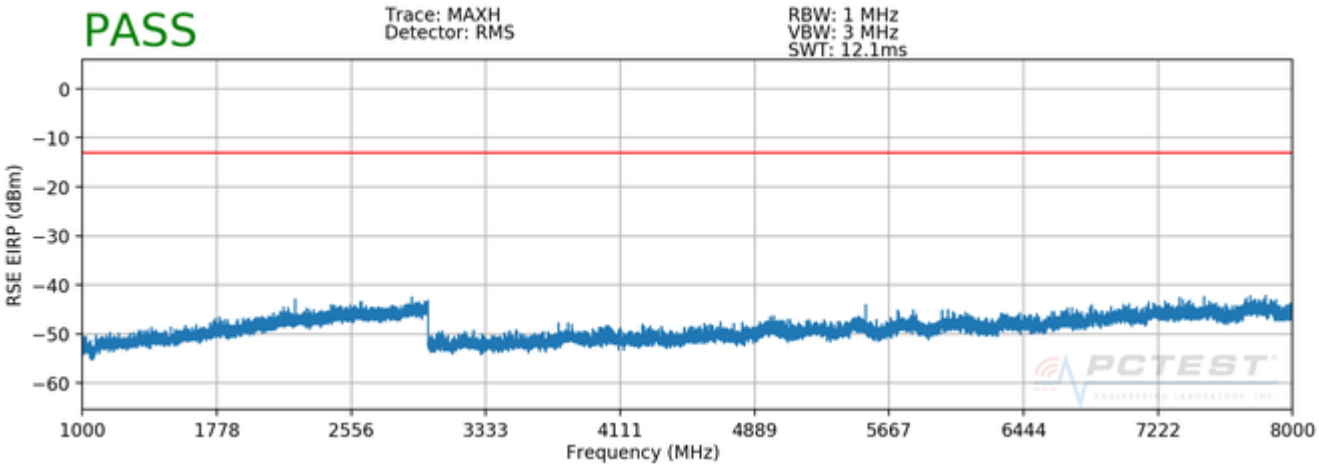
7.7.1 Radiated Spurious Emissions Measurements

Band 12



Plot 7-216. Radiated Spurious Plot above 1GHz (Band 12)

OPERATING FREQUENCY:	701.50	MHz
CHANNEL:	23035	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	5.0	MHz
DISTANCE:	3	meters
LIMIT:	-13	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1403.00	H	157	154	-58.30	3.80	-54.50	-41.5
2104.50	H	-	-	-62.18	4.80	-57.38	-44.4

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

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OPERATING FREQUENCY:	707.50	MHz
CHANNEL:	23095	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	5.0	MHz
DISTANCE:	3	meters
LIMIT:	-13	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1415.00	H	113	178	-57.59	3.90	-53.68	-40.7
2122.50	H	-	-	-61.97	4.78	-57.19	-44.2

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

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

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1427.00	H	-	-	-62.62	4.01	-58.61	-45.6
2140.50	H	-	-	-62.29	4.77	-57.52	-44.5

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

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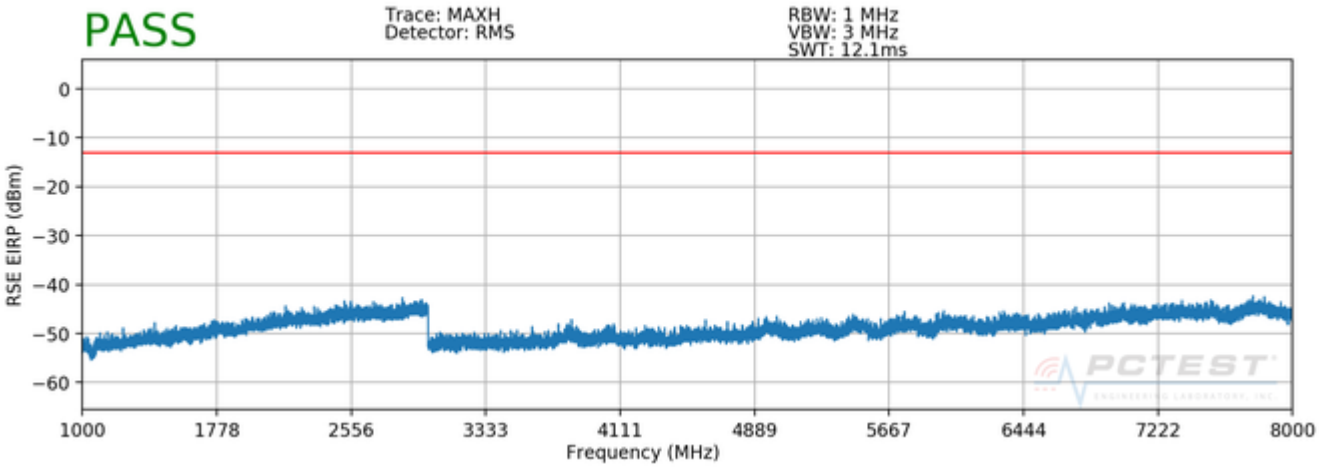
Band 13



Plot 7-217. Radiated Spurious Plot above 1GHz (Band 13)

OPERATING FREQUENCY:	779.50	MHz
CHANNEL:	23205	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	5.0	MHz
DISTANCE:	3	meters
LIMIT:	-13	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
2338.50	H	-	-	-49.99	4.86	-45.13	-32.1
3118.00	H	-	-	-49.89	5.99	-43.90	-30.9

Table 7-11. Radiated Spurious Data (Band 13 – Low Channel)

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OPERATING FREQUENCY:	782.00	MHz
CHANNEL:	23230	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	5.0	MHz
DISTANCE:	3	meters
LIMIT:	-13	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
2346.00	H	-	-	-55.36	6.02	-49.34	-36.3

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

OPERATING FREQUENCY:	784.50	MHz
CHANNEL:	23255	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	5.0	MHz
DISTANCE:	3	meters
LIMIT:	-13	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
2353.50	H	-	-	-51.82	6.05	-45.78	-32.8

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

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

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1559.00	H	-	-	-53.41	4.86	-48.55	-8.5
1564.00	H	150	315	-56.24	4.88	-51.36	-11.4
1569.00	H	-	-	-53.24	4.90	-48.34	-8.3

Table 7-14. Radiated Spurious Data (Band 13 – 1559-1610MHz Band)

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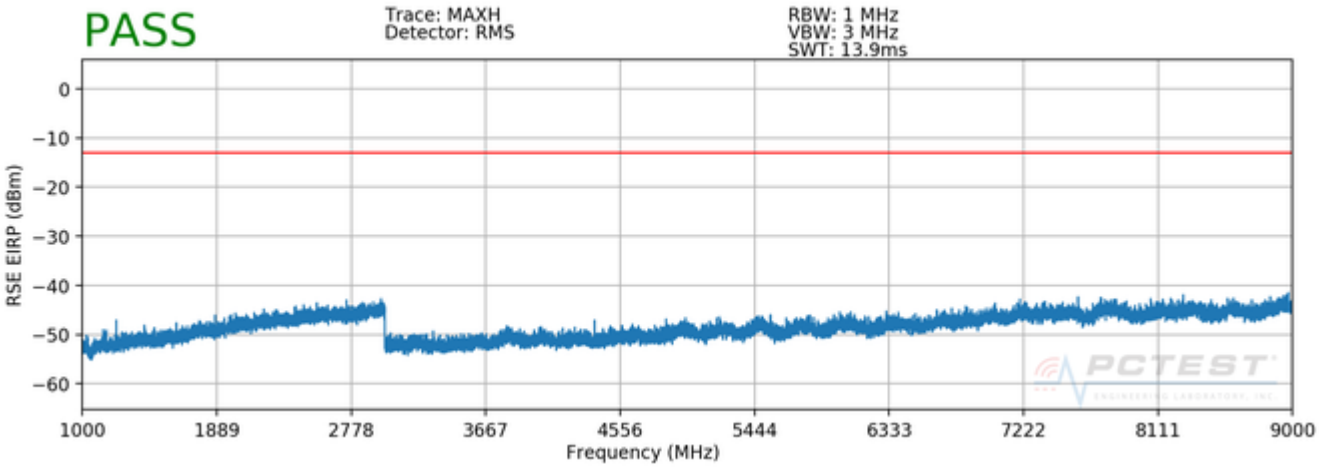
Band 5



Plot 7-218. Radiated Spurious Plot above 1GHz (Band 5)

OPERATING FREQUENCY:	824.70	MHz
CHANNEL:	20407	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	1.4	MHz
DISTANCE:	3	meters
LIMIT:	-13	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1649.40	H	-	-	-59.32	4.81	-54.50	-41.5
2474.10	H	-	-	-56.31	4.99	-51.32	-38.3

Table 7-15. Radiated Spurious Data (Band 5 – Low Channel)

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OPERATING FREQUENCY:	836.50	MHz
CHANNEL:	20525	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	1.4	MHz
DISTANCE:	3	meters
LIMIT:	-13	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1673.00	H	-	-	-59.32	4.86	-54.46	-41.5
2509.50	H	-	-	-55.47	5.10	-50.37	-37.4

Table 7-16. Radiated Spurious Data (Band 5 – Mid Channel)

OPERATING FREQUENCY:	848.30	MHz
CHANNEL:	20643	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	1.4	MHz
DISTANCE:	3	meters
LIMIT:	-13	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1696.60	H	-	-	-59.80	4.91	-54.89	-41.9
2544.90	H	-	-	-57.18	5.27	-51.91	-38.9

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

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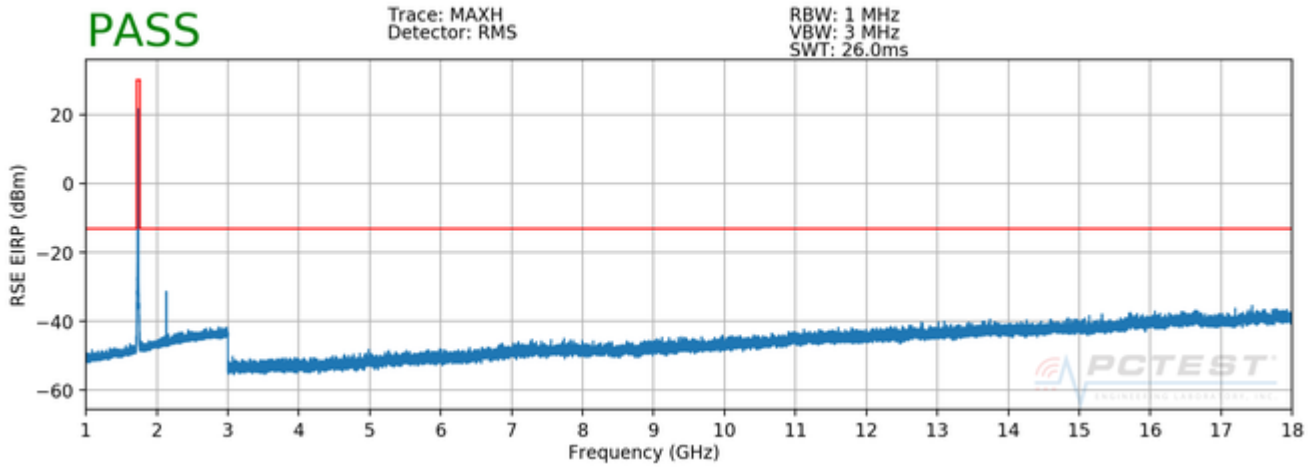
Band 66/4



Plot 7-219. Radiated Spurious Plot above 1GHz (Band 66/4)

OPERATING FREQUENCY:	1717.50	MHz
CHANNEL:	132047	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	15.0	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]
3435.00	H	-	-	-43.25	6.61	-36.64	-23.6
5152.50	H	-	-	-39.85	8.58	-31.27	-18.3

Table 7-18. Radiated Spurious Data (Band 66/4 – Low Channel)

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OPERATING FREQUENCY:	1745.00	MHz
CHANNEL:	132322	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	15.0	MHz
DISTANCE:	3	meters
LIMIT:	-13	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3490.00	H	-	-	-42.22	6.65	-35.57	-22.6
5235.00	H	-	-	-37.17	8.61	-28.56	-15.6

Table 7-19. Radiated Spurious Data (Band 66/4 – Mid Channel)

OPERATING FREQUENCY:	1772.50	MHz
CHANNEL:	132597	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	15.0	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]
3545.00	H	-	-	-42.38	6.68	-35.69	-22.7
5317.50	H	-	-	-38.54	8.62	-29.92	-16.9

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

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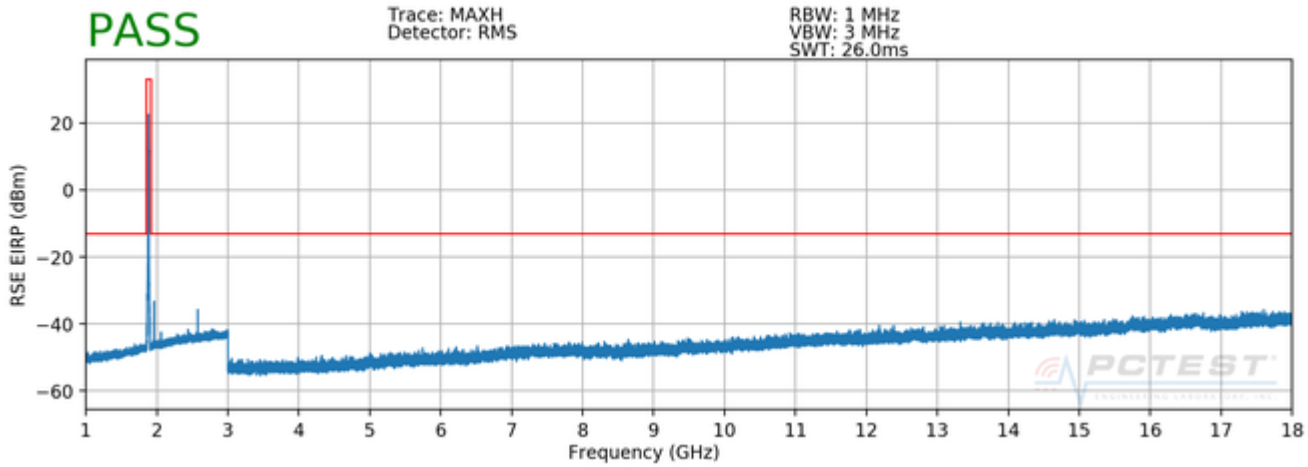
Band 2



Plot 7-220. Radiated Spurious Plot above 1GHz (Band 2)

OPERATING FREQUENCY:	1851.50	MHz
CHANNEL:	18615	
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]
3703.00	H	-	-	-41.12	6.76	-34.36	-21.4
5554.50	H	-	-	-39.04	8.44	-30.61	-17.6

Table 7-21. Radiated Spurious Data (Band 2 – Low Channel)

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OPERATING FREQUENCY:	1880.00	MHz
CHANNEL:	18900	
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]
3760.00	H	-	-	-39.29	6.84	-32.45	-19.5
5640.00	H	-	-	-40.12	8.52	-31.60	-18.6
7520.00	H	-	-	-35.17	8.44	-26.72	-13.7

Table 7-22. Radiated Spurious Data (Band 2 – Mid Channel)

OPERATING FREQUENCY:	1908.50	MHz
CHANNEL:	19185	
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]
3817.00	H	-	-	-38.20	6.99	-31.21	-18.2
5725.50	H	-	-	-38.94	8.58	-30.37	-17.4

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

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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 ±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: 3.80 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	707,500,093	93	0.0000131
100 %		- 30	707,499,946	-54	-0.0000076
100 %		- 20	707,499,896	-104	-0.0000147
100 %		- 10	707,500,088	88	0.0000124
100 %		0	707,500,128	128	0.0000181
100 %		+ 10	707,500,147	147	0.0000208
100 %		+ 20	707,499,896	-104	-0.0000147
100 %		+ 30	707,499,930	-70	-0.0000099
100 %		+ 40	707,499,883	-117	-0.0000165
100 %		+ 50	707,499,922	-78	-0.0000110
BATT. ENDPOINT	3.40	+ 20	707,499,917	-83	-0.0000117

Table 7-24. 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

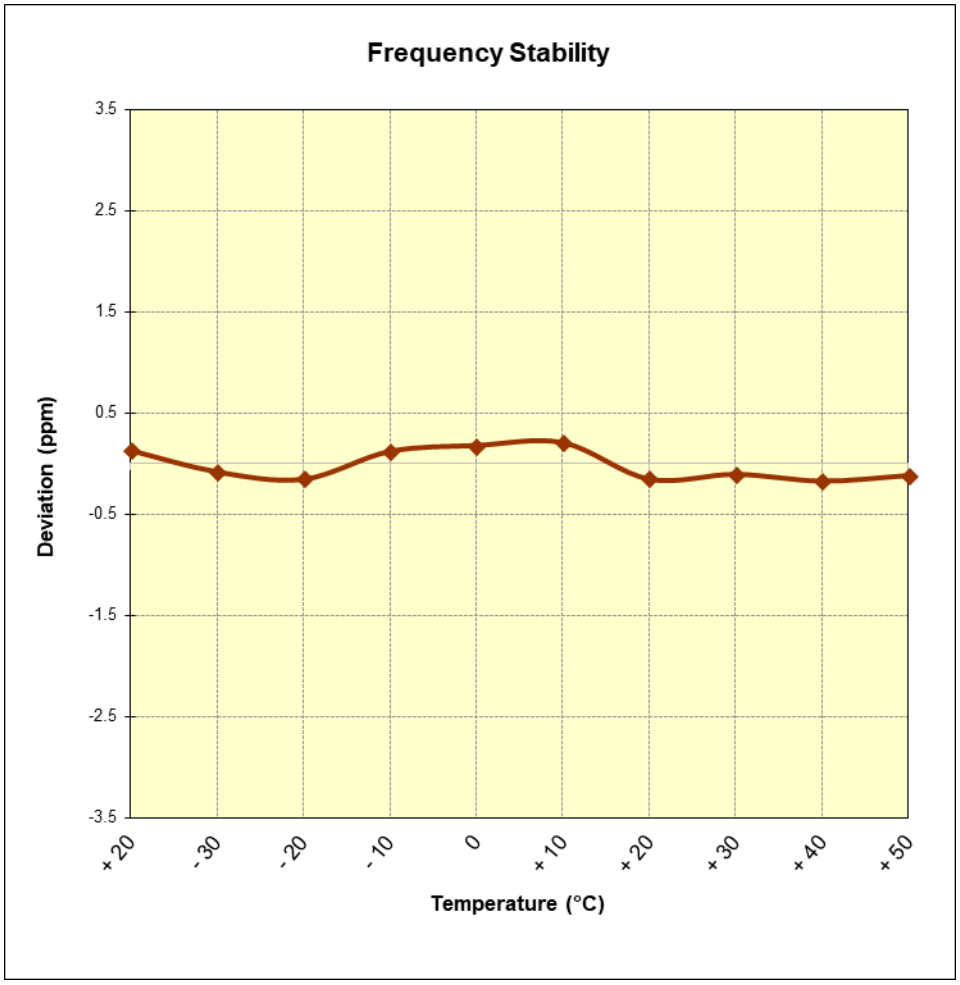

Figure 7-8. Frequency Stability Graph (Band 12)

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Band 13 Frequency Stability Measurements

OPERATING FREQUENCY: 782,000,000 Hz

CHANNEL: 23230

REFERENCE VOLTAGE: 3.80 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	781,999,852	-148	-0.0000189
100 %		- 30	781,999,957	-43	-0.0000055
100 %		- 20	781,999,934	-66	-0.0000084
100 %		- 10	782,000,011	11	0.0000014
100 %		0	781,999,896	-104	-0.0000133
100 %		+ 10	782,000,023	23	0.0000029
100 %		+ 20	781,999,949	-51	-0.0000065
100 %		+ 30	782,000,140	140	0.0000179
100 %		+ 40	781,999,898	-102	-0.0000130
100 %		+ 50	781,999,877	-123	-0.0000157
BATT. ENDPOINT	3.40	+ 20	782,000,126	126	0.0000161

Table 7-25. Frequency Stability Data (Band 13)

Note:

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

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Band 13 Frequency Stability Measurements

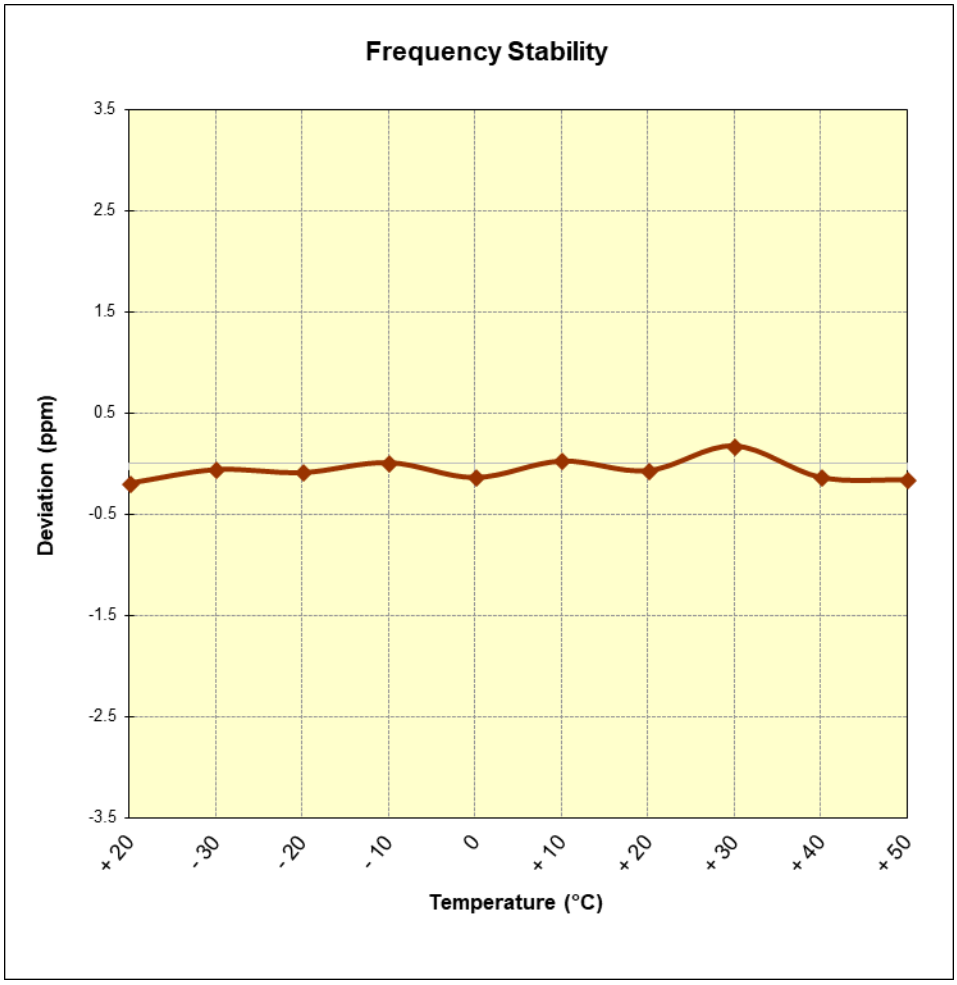

Figure 7-9. Frequency Stability Graph (Band 13)

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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)	836,499,961	-39	-0.0000047
100 %		- 30	836,500,133	133	0.0000159
100 %		- 20	836,500,150	150	0.0000179
100 %		- 10	836,500,022	22	0.0000026
100 %		0	836,500,028	28	0.0000033
100 %		+ 10	836,500,117	117	0.0000140
100 %		+ 20	836,499,864	-136	-0.0000163
100 %		+ 30	836,500,113	113	0.0000135
100 %		+ 40	836,499,904	-96	-0.0000115
100 %		+ 50	836,499,994	-6	-0.0000007
BATT. ENDPOINT	3.40	+ 20	836,500,068	68	0.0000081

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

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Band 5 Frequency Stability Measurements

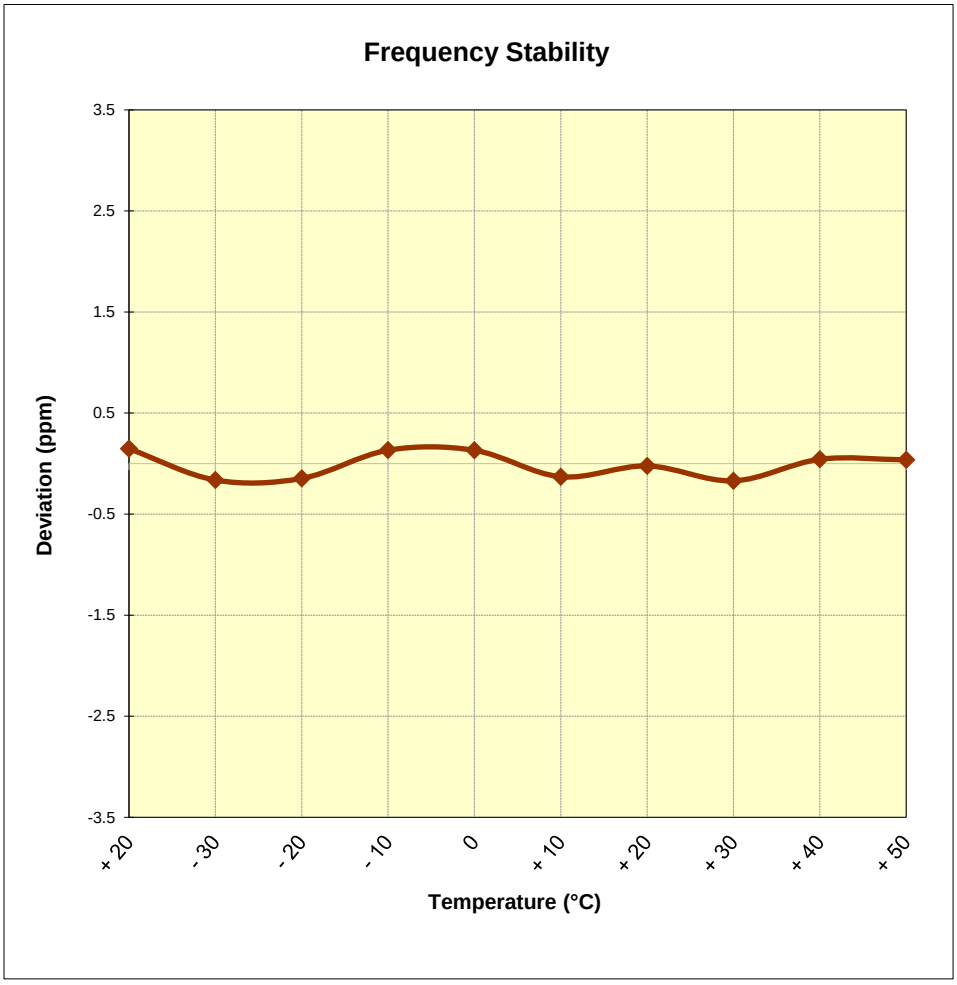

Figure 7-10. Frequency Stability Graph (Band 5)

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Band 66/4 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)	1,732,500,023	23	0.0000013
100 %		- 30	1,732,500,059	59	0.0000034
100 %		- 20	1,732,500,014	14	0.0000008
100 %		- 10	1,732,500,130	130	0.0000075
100 %		0	1,732,499,855	-145	-0.0000084
100 %		+ 10	1,732,499,858	-142	-0.0000082
100 %		+ 20	1,732,500,107	107	0.0000062
100 %		+ 30	1,732,500,041	41	0.0000024
100 %		+ 40	1,732,500,060	60	0.0000035
100 %		+ 50	1,732,499,920	-80	-0.0000046
BATT. ENDPOINT	3.40	+ 20	1,732,499,981	-19	-0.0000011

Table 7-27. 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.

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Band 66/4 Frequency Stability Measurements

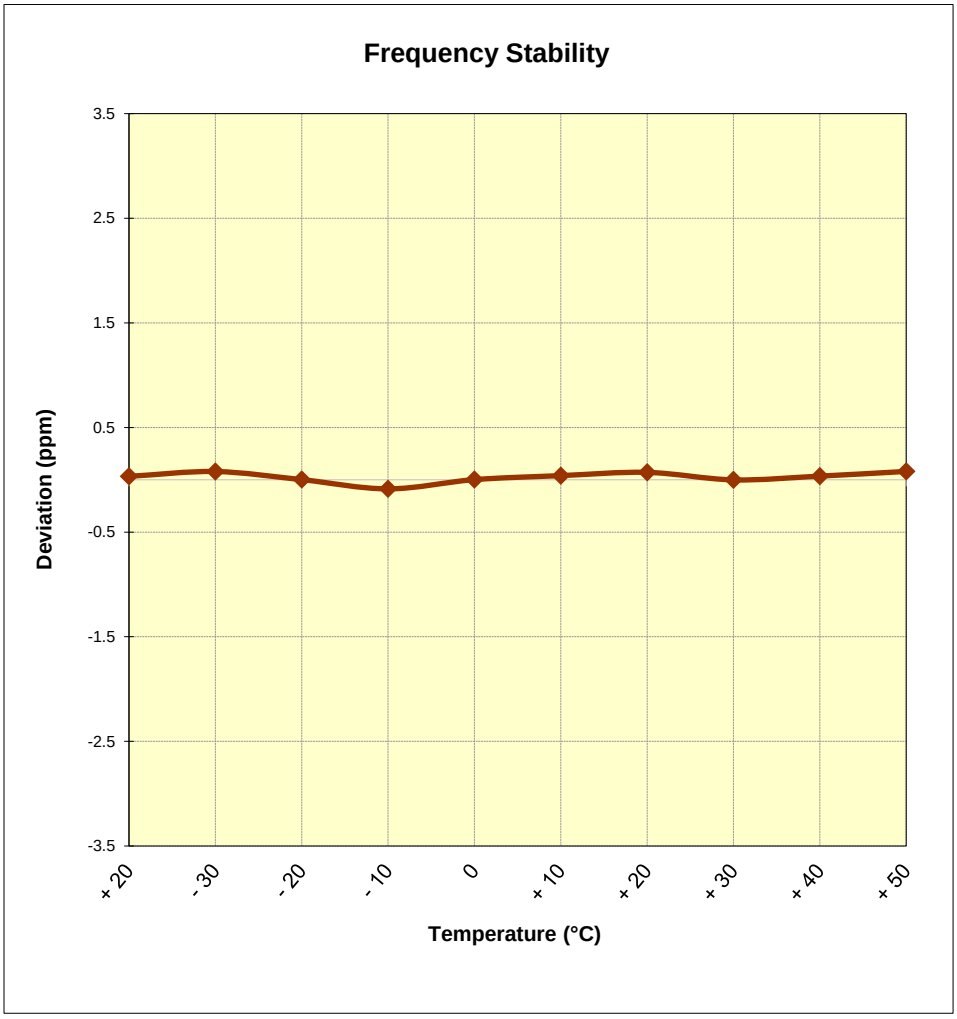

Figure 7-11. Frequency Stability Graph (Band 66/4)

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Band 2 Frequency Stability Measurements

OPERATING FREQUENCY:	1,880,000,000	Hz
CHANNEL:	18900	
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)	1,880,000,061	61	0.0000032
100 %		- 30	1,880,000,080	80	0.0000043
100 %		- 20	1,880,000,064	64	0.0000034
100 %		- 10	1,880,000,044	44	0.0000023
100 %		0	1,880,000,133	133	0.0000071
100 %		+ 10	1,880,000,083	83	0.0000044
100 %		+ 20	1,879,999,920	-80	-0.0000043
100 %		+ 30	1,879,999,867	-133	-0.0000071
100 %		+ 40	1,880,000,048	48	0.0000026
100 %		+ 50	1,879,999,945	-55	-0.0000029
BATT. ENDPOINT	3.40	+ 20	1,880,000,021	21	0.0000011

Table 7-28. Frequency Stability Data (Band 2)

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Band 2 Frequency Stability Measurements

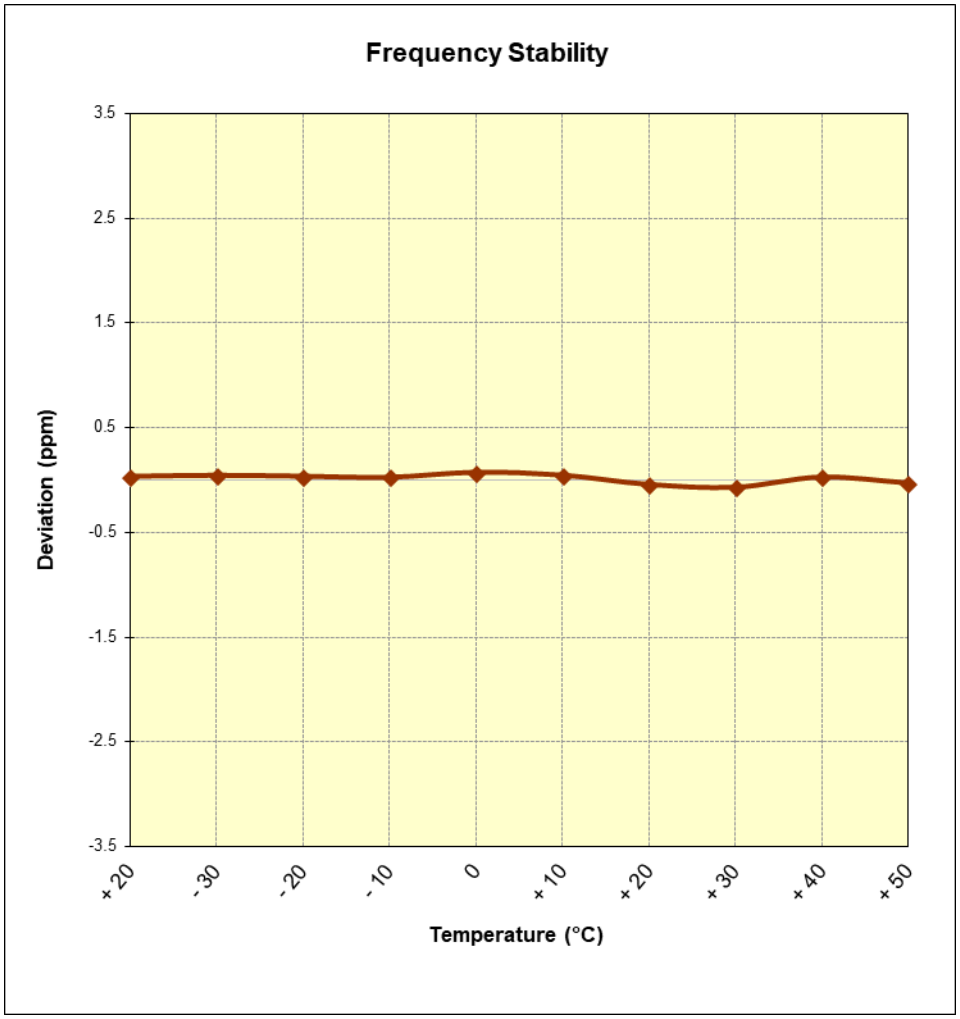

Figure 7-12. Frequency Stability Graph (Band 2)

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8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **Panasonic Portable Handset FCC ID: ACJFZN1D** complies with all the requirements of Part 22, 24, & 27 of the FCC Rules and RSS-130, RSS-132, RSS-133, RSS-139 of the Innovation, Science and Economic Development Canada rules for LTE operation only.

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