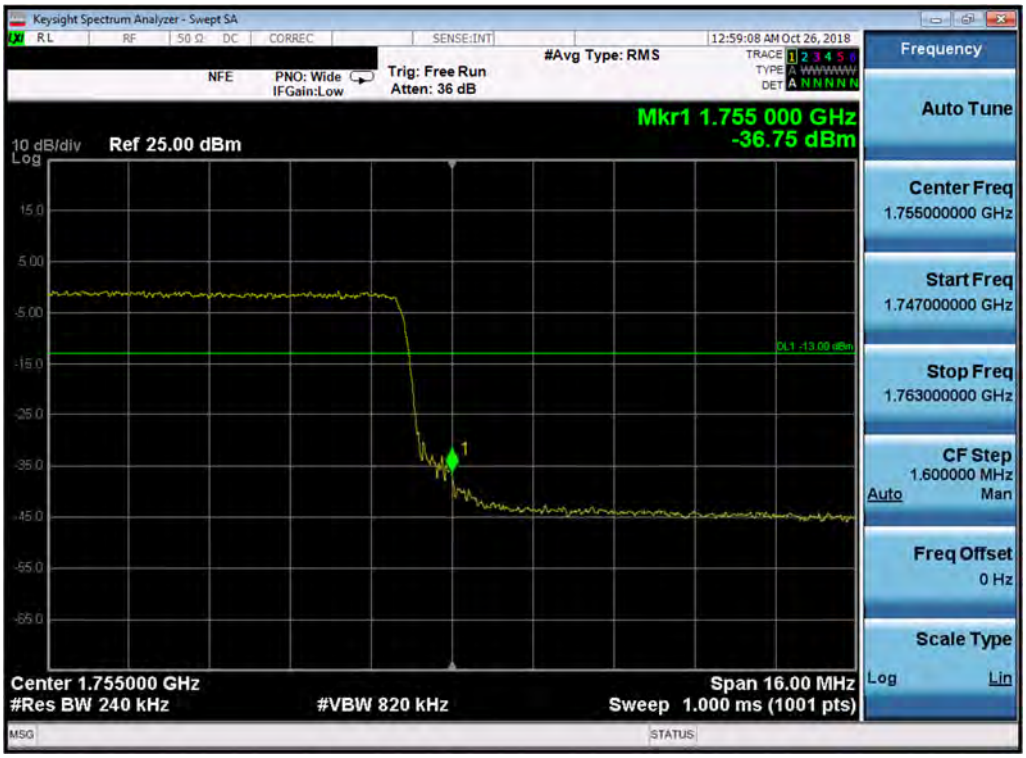
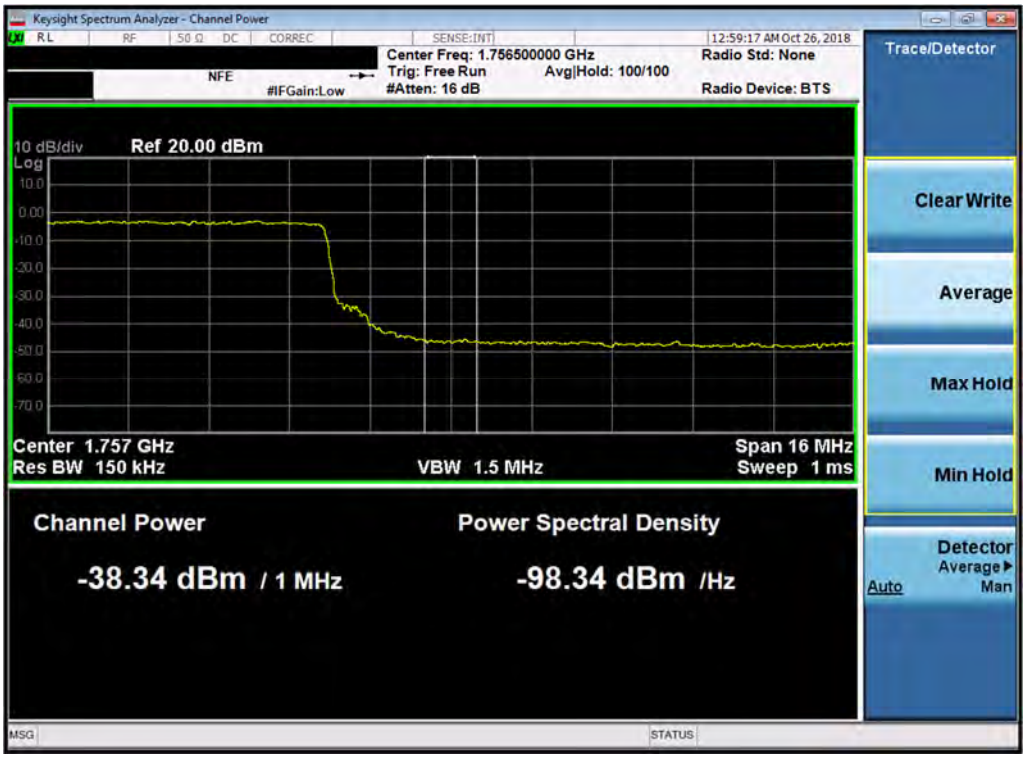


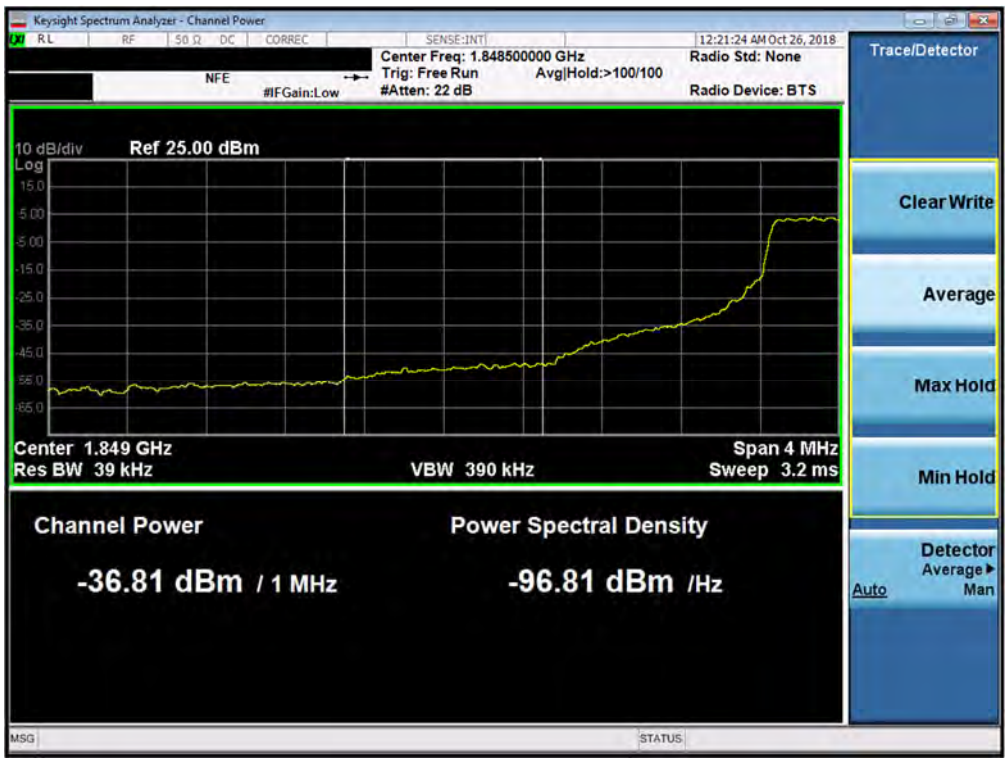

**Plot 7-132. Upper Band Edge Plot (Band 4 - 20.0MHz QPSK - Full RB Configuration)**




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

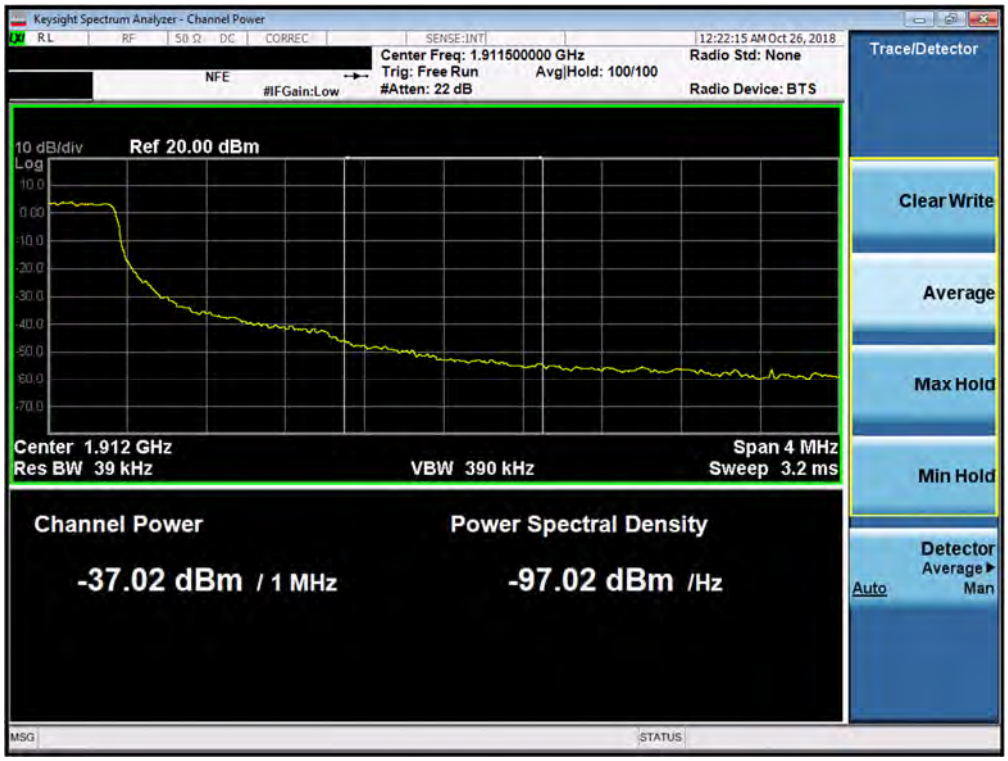
## Band 2


**Plot 7-134. Lower Band Edge Plot (Band 2 – 1.4MHz QPSK - Full RB Configuration)**



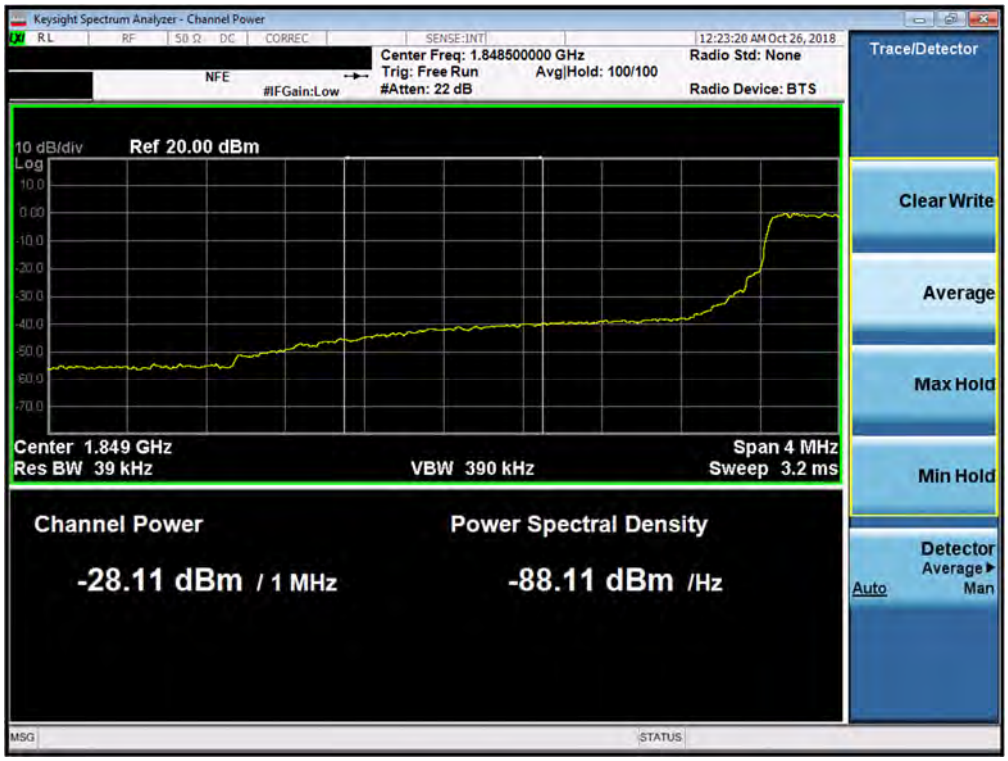

**Plot 7-135. Lower Extended Band Edge Plot (Band 2 – 1.4MHz QPSK - Full RB Configuration)**


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



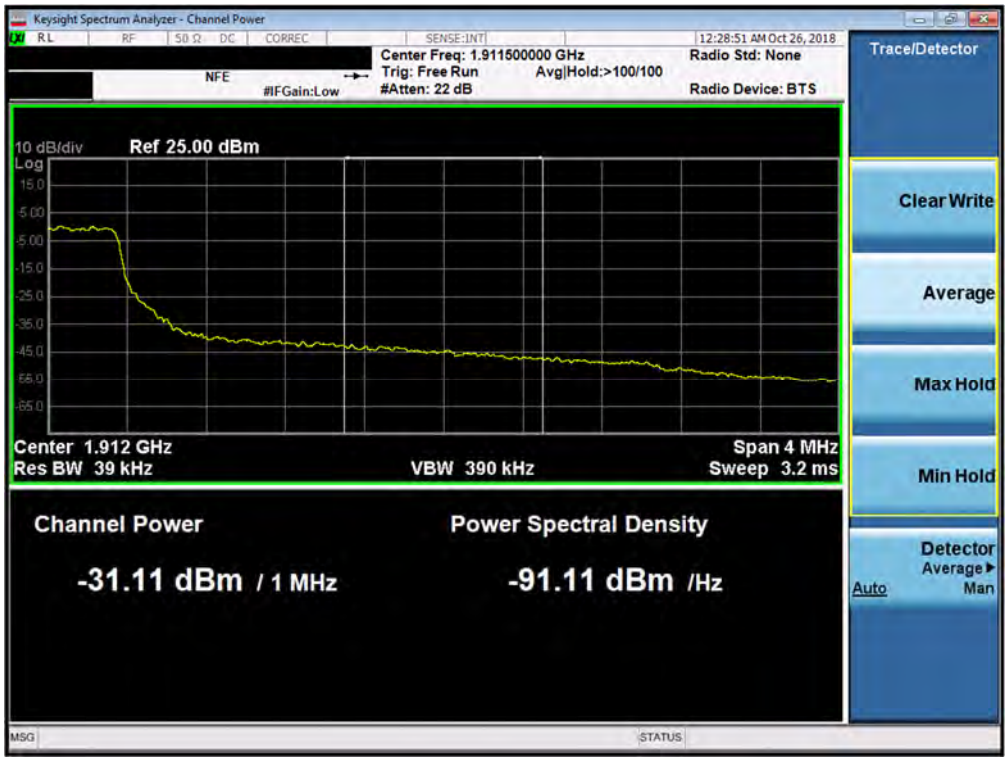

**Plot 7-137. Upper Extended Band Edge Plot (Band 2 – 1.4MHz QPSK - Full RB Configuration)**


**Plot 7-138. Lower Band Edge Plot (Band 2 –3.0MHz QPSK - Full RB Configuration)**

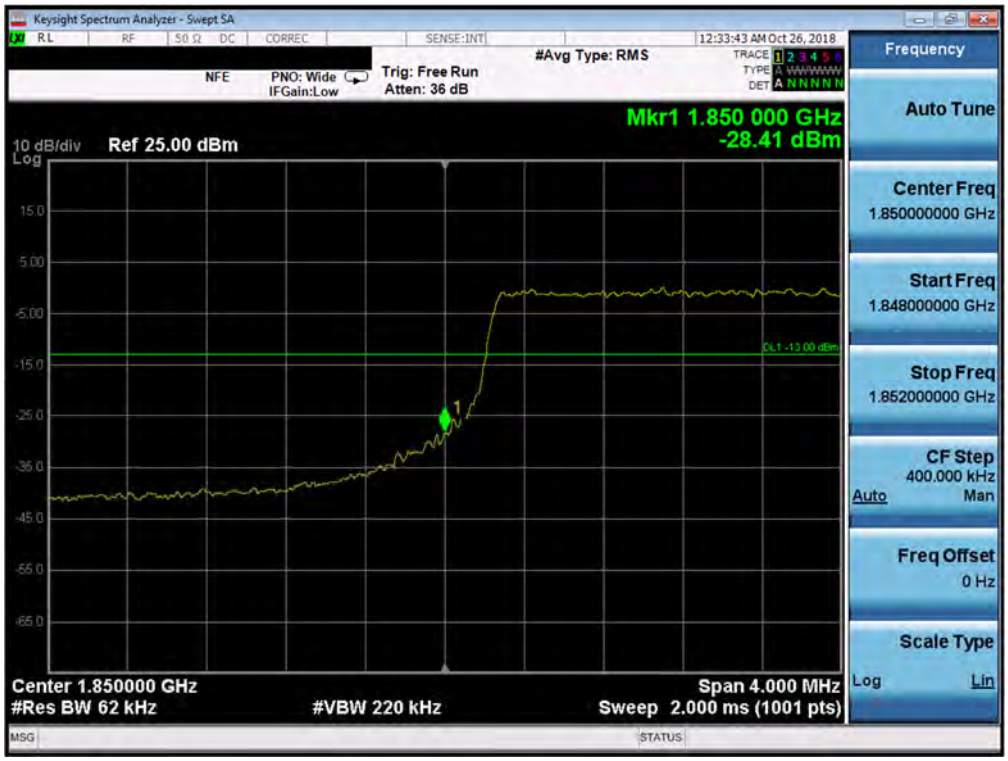



**Plot 7-139. Lower Extended Band Edge Plot (Band 2 – 3.0MHz QPSK - Full RB Configuration)**

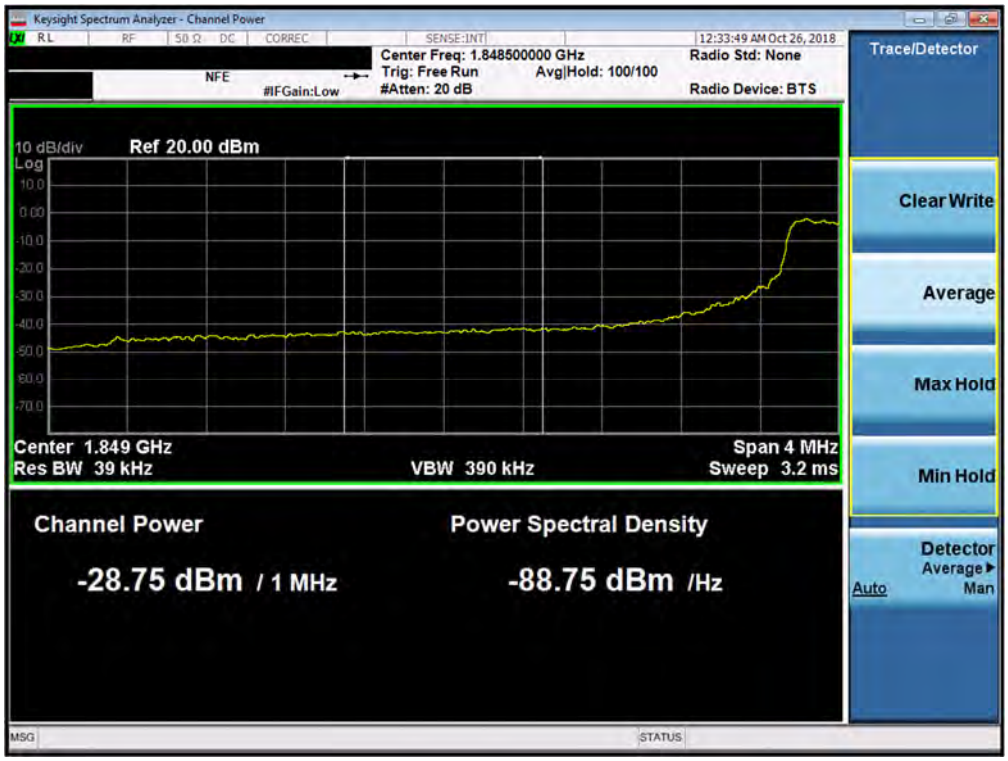

**Plot 7-140. Upper Band Edge Plot (Band 2 - 3.0MHz QPSK - Full RB Configuration)**




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

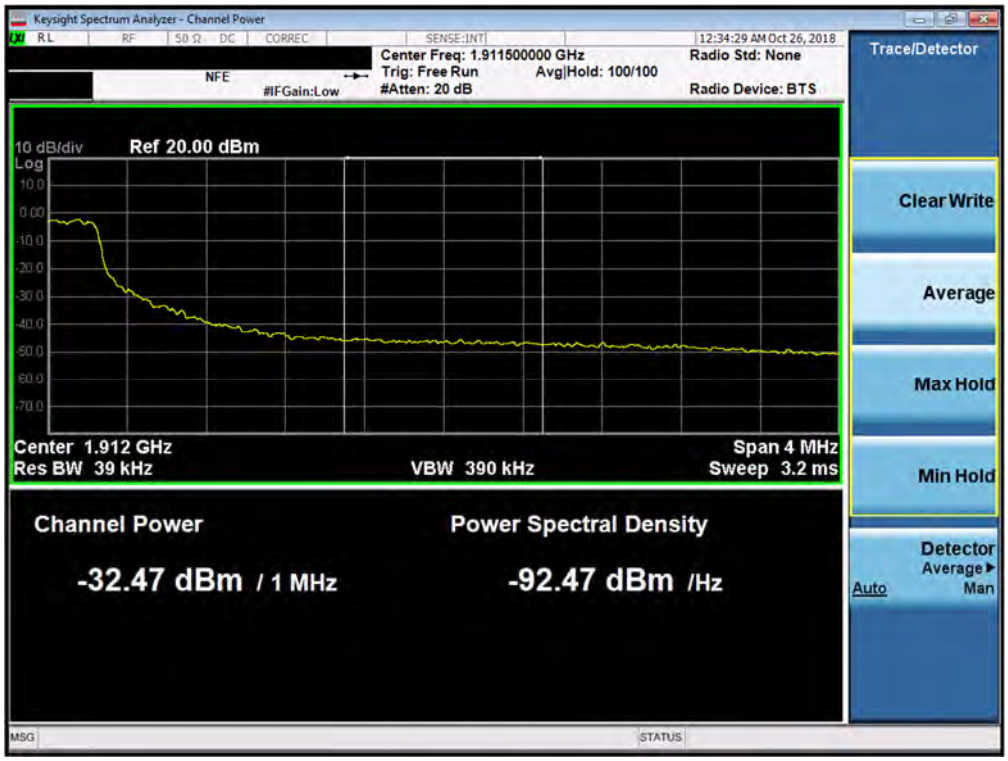



**Plot 7-142. Lower Band Edge Plot (Band 2 – 5.0MHz QPSK - Full RB Configuration)**

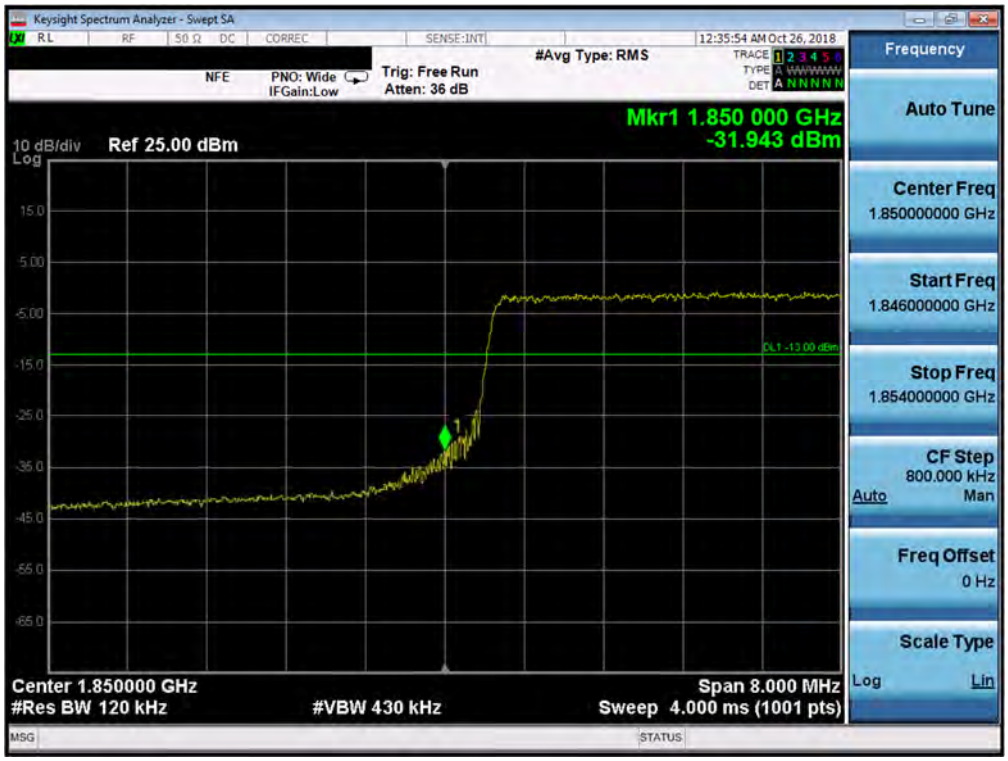



**Plot 7-143. Lower Extended Band Edge Plot (Band 2 – 5.0MHz QPSK - Full RB Configuration)**

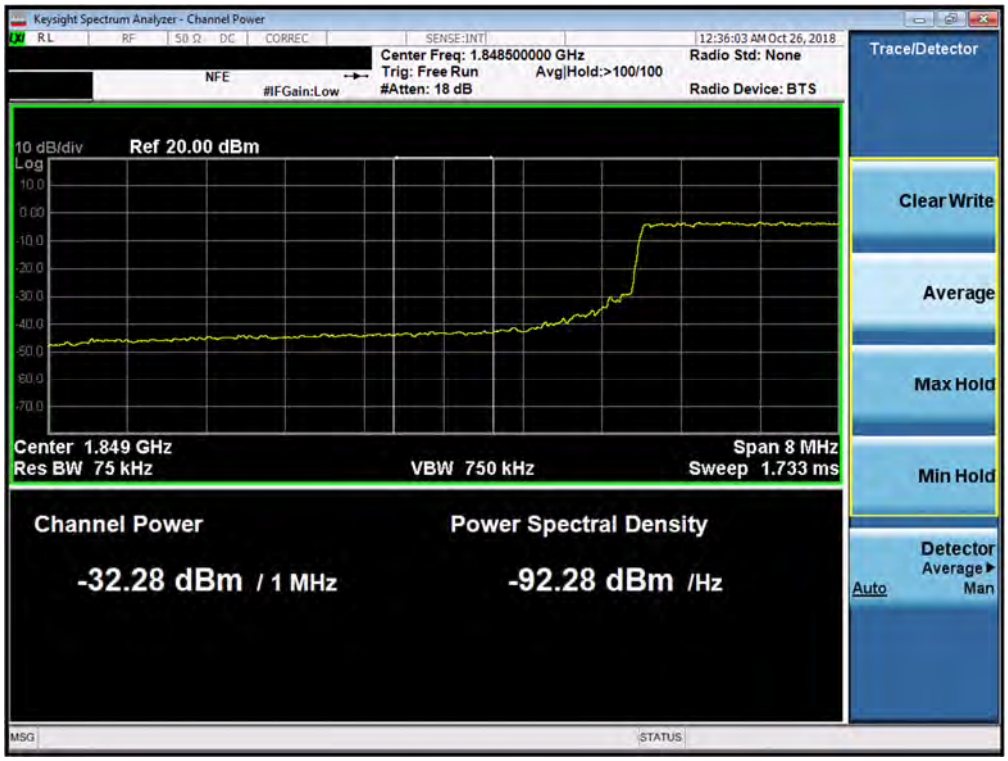

**Plot 7-144. Upper Band Edge Plot (Band 2 - 5.0MHz QPSK - Full RB Configuration)**




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

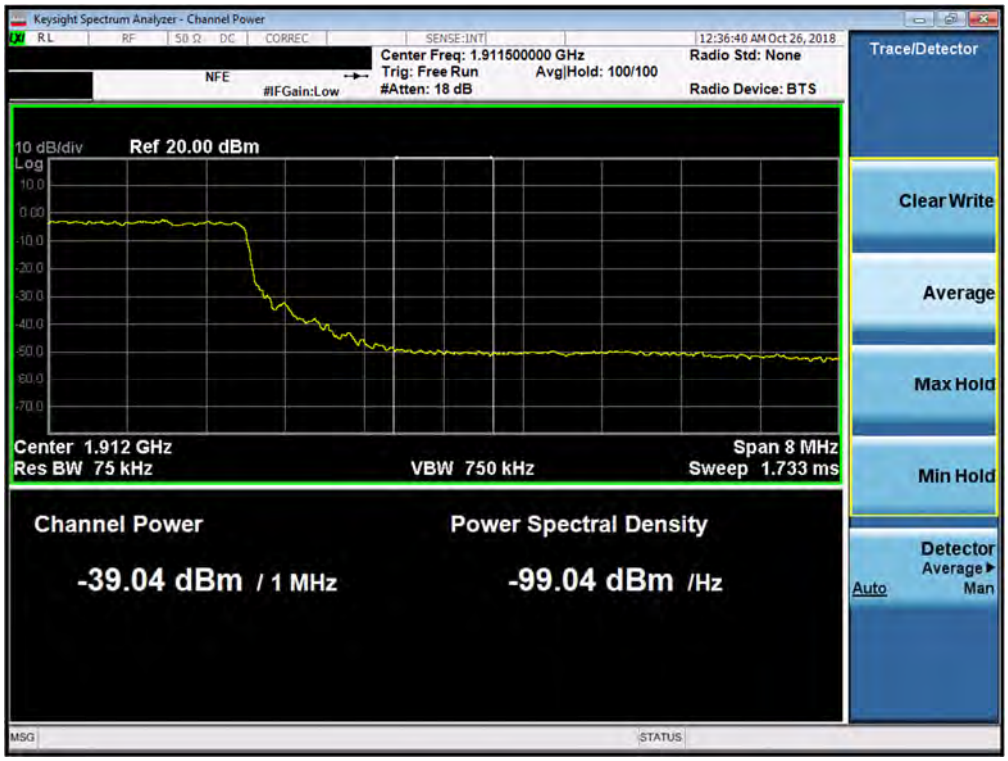



**Plot 7-146. Lower Band Edge Plot (Band 2 –10.0MHz QPSK - Full RB Configuration)**



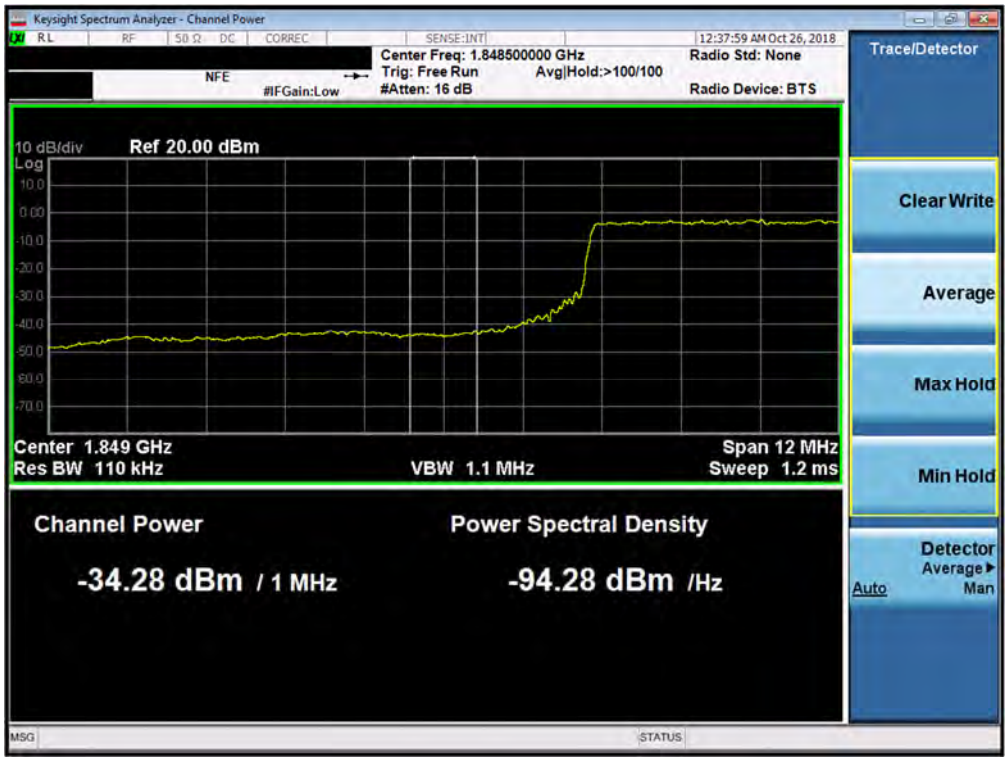

**Plot 7-147. Lower Extended Band Edge Plot (Band 2 – 10.0MHz QPSK - Full RB Configuration)**


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



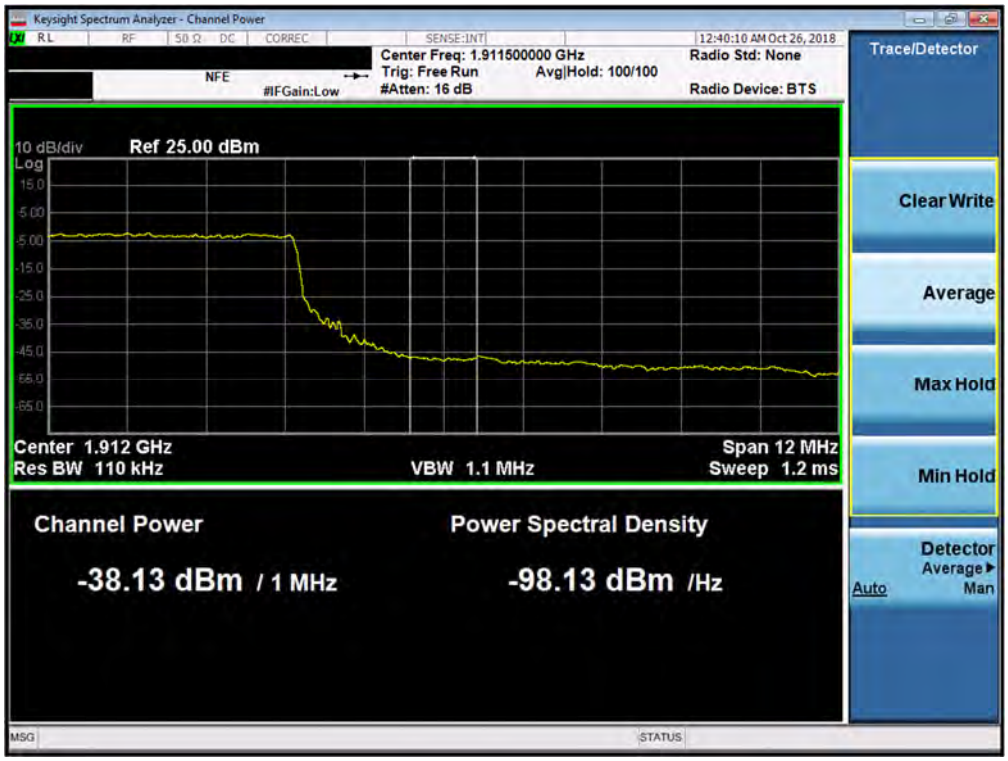

**Plot 7-149. Upper Extended Band Edge Plot (Band 2 – 10.0MHz QPSK - Full RB Configuration)**


**Plot 7-150. Lower Band Edge Plot (Band 2 –15.0MHz QPSK - Full RB Configuration)**

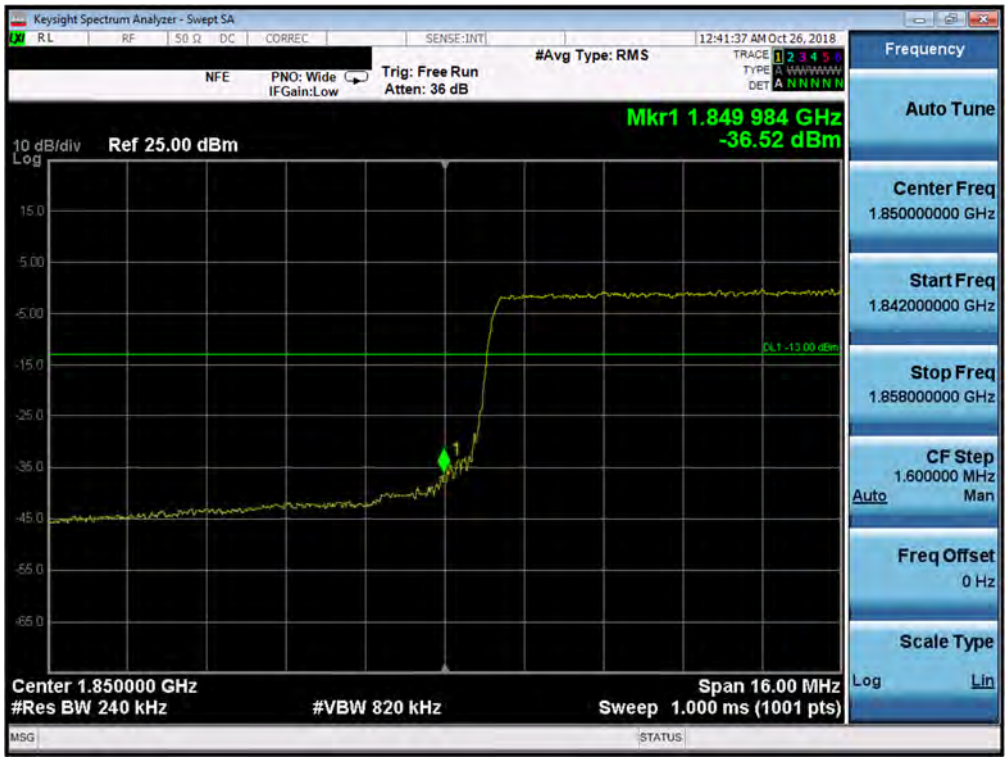



**Plot 7-151. Lower Extended Band Edge Plot (Band 2 – 15.0MHz QPSK - Full RB Configuration)**

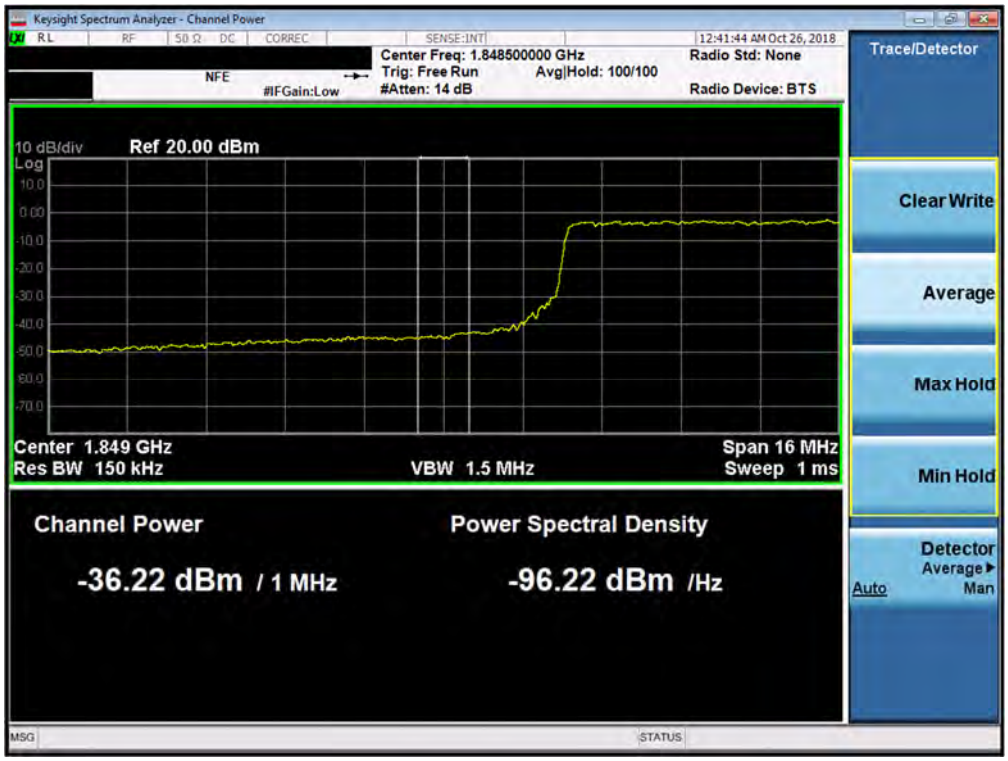

**Plot 7-152. Upper Band Edge Plot (Band 2 - 15.0MHz QPSK - Full RB Configuration)**




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

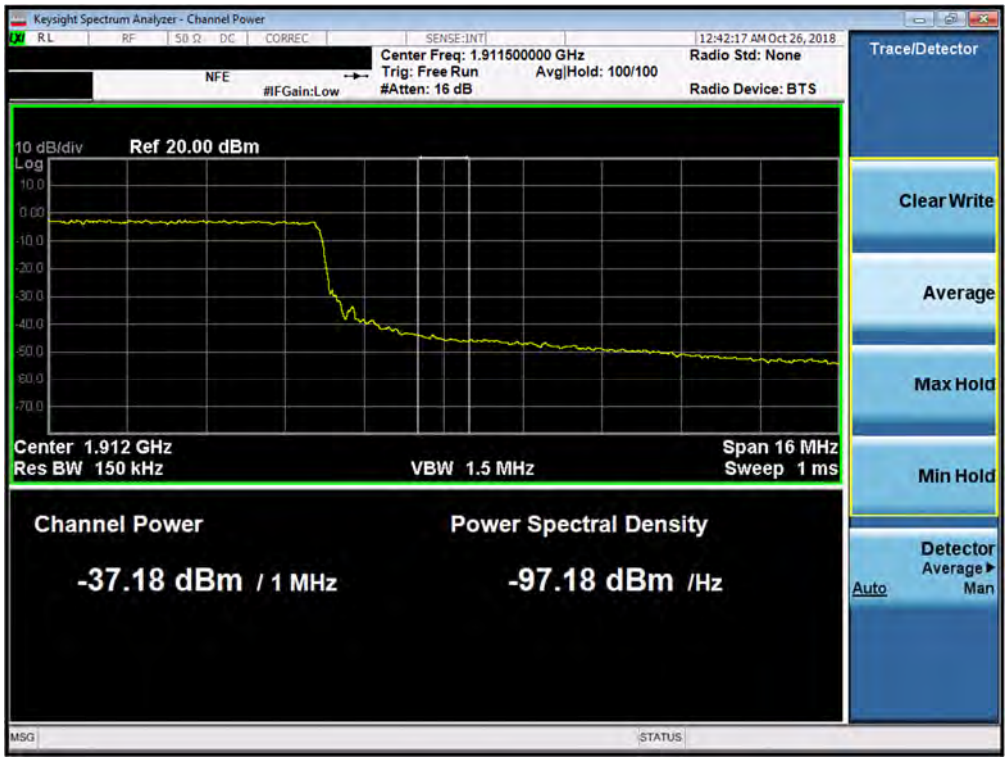



**Plot 7-154. Lower Band Edge Plot (Band 2 – 20.0MHz QPSK - Full RB Configuration)**



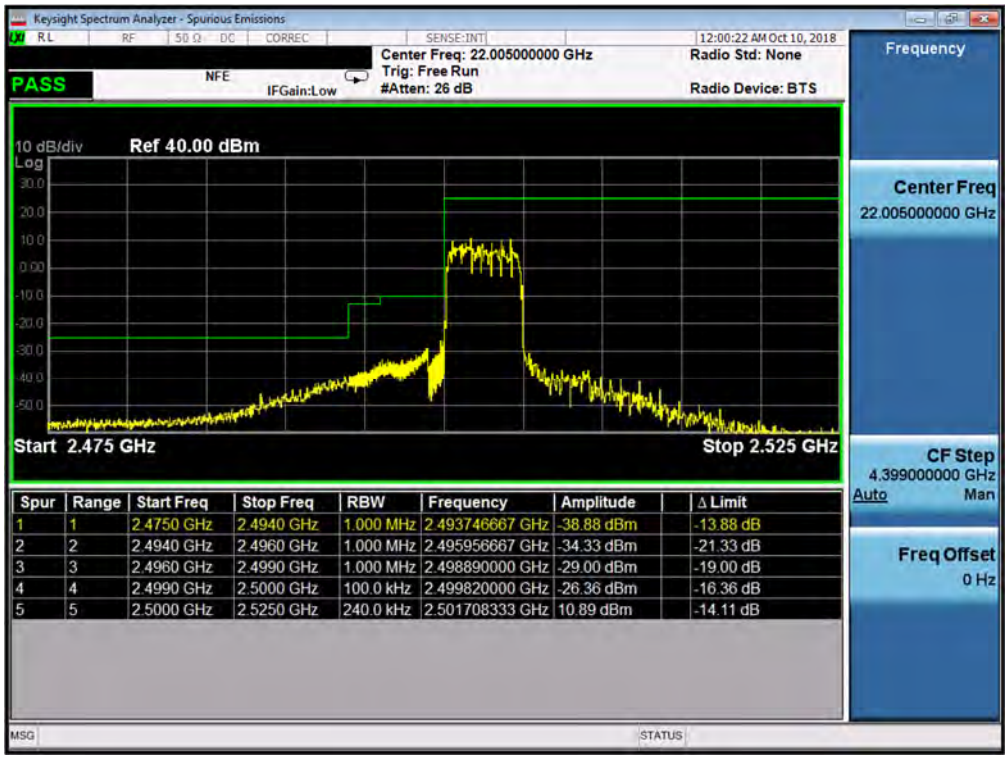

**Plot 7-155. Lower Extended Band Edge Plot (Band 2 – 20.0MHz QPSK - Full RB Configuration)**


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



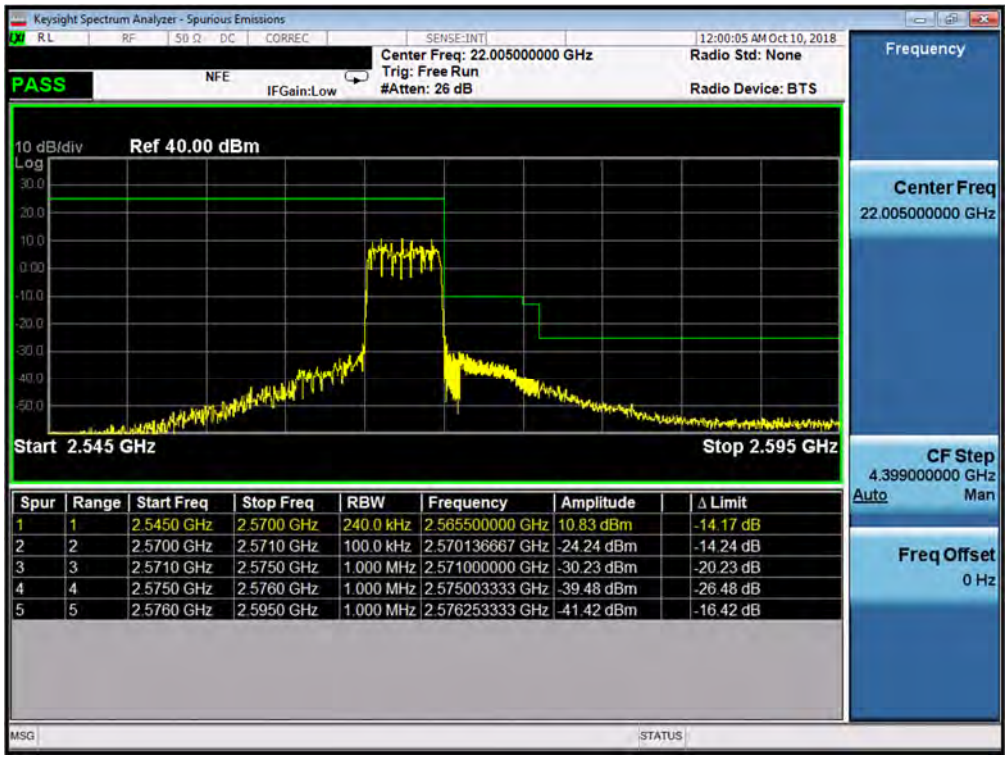

**Plot 7-157. Upper Extended Band Edge Plot (Band 2 – 20.0MHz QPSK - Full RB Configuration)**

## Band 7



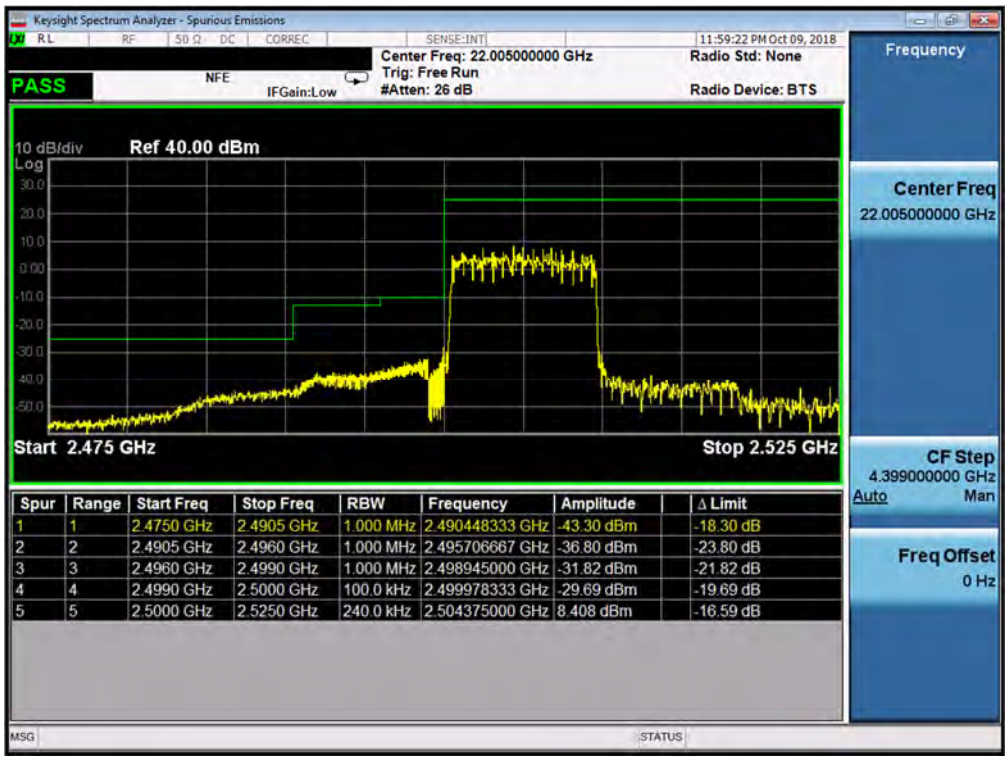

| Spur | Range | Start Freq | Stop Freq | RBW | Frequency | Amplitude | Δ Limit |
|---|---|---|---|---|---|---|---|
| 1 | 1 | 2.4750 GHz | 2.4940 GHz | 1.000 MHz | 2.493746667 GHz | -38.88 dBm | -13.88 dB |
| 2 | 2 | 2.4940 GHz | 2.4960 GHz | 1.000 MHz | 2.495956667 GHz | -34.33 dBm | -21.33 dB |
| 3 | 3 | 2.4960 GHz | 2.4990 GHz | 1.000 MHz | 2.498890000 GHz | -29.00 dBm | -19.00 dB |
| 4 | 4 | 2.4990 GHz | 2.5000 GHz | 100.0 kHz | 2.499820000 GHz | -26.36 dBm | -16.36 dB |
| 5 | 5 | 2.5000 GHz | 2.5250 GHz | 240.0 kHz | 2.501708333 GHz | 10.89 dBm | -14.11 dB |

**Plot 7-158. Lower ACP Plot (Band 7 - 5.0MHz QPSK - RB Size 25)**

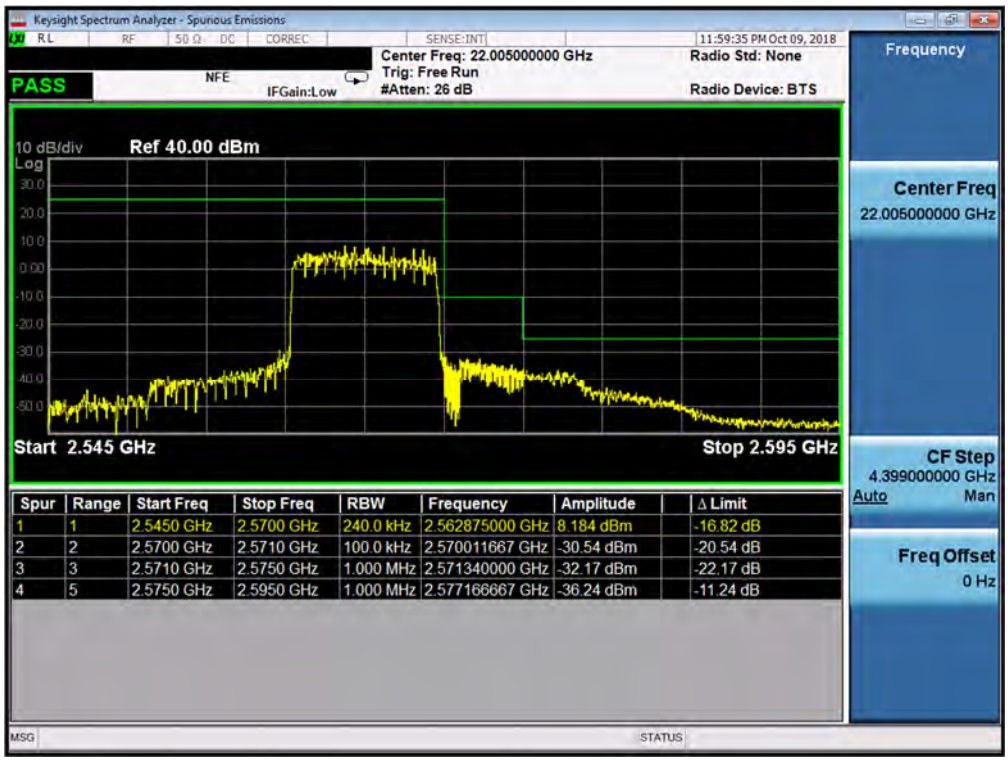



| Spur | Range | Start Freq | Stop Freq | RBW | Frequency | Amplitude | Δ Limit |
|---|---|---|---|---|---|---|---|
| 1 | 1 | 2.5450 GHz | 2.5700 GHz | 240.0 kHz | 2.565500000 GHz | 10.83 dBm | -14.17 dB |
| 2 | 2 | 2.5700 GHz | 2.5710 GHz | 100.0 kHz | 2.570136667 GHz | -24.24 dBm | -14.24 dB |
| 3 | 3 | 2.5710 GHz | 2.5750 GHz | 1.000 MHz | 2.571000000 GHz | -30.23 dBm | -20.23 dB |
| 4 | 4 | 2.5750 GHz | 2.5760 GHz | 1.000 MHz | 2.575003333 GHz | -39.48 dBm | -26.48 dB |
| 5 | 5 | 2.5760 GHz | 2.5950 GHz | 1.000 MHz | 2.576253333 GHz | -41.42 dBm | -16.42 dB |

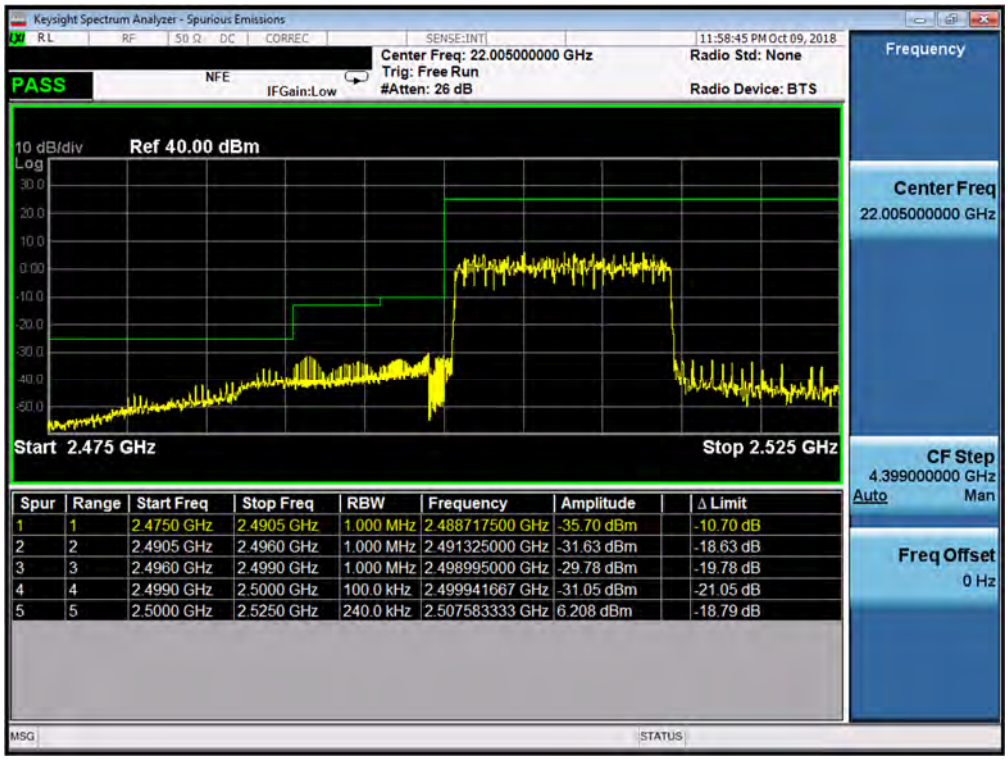
**Plot 7-159. Upper ACP Plot (Band 7 - 5.0MHz QPSK - RB Size 25)**



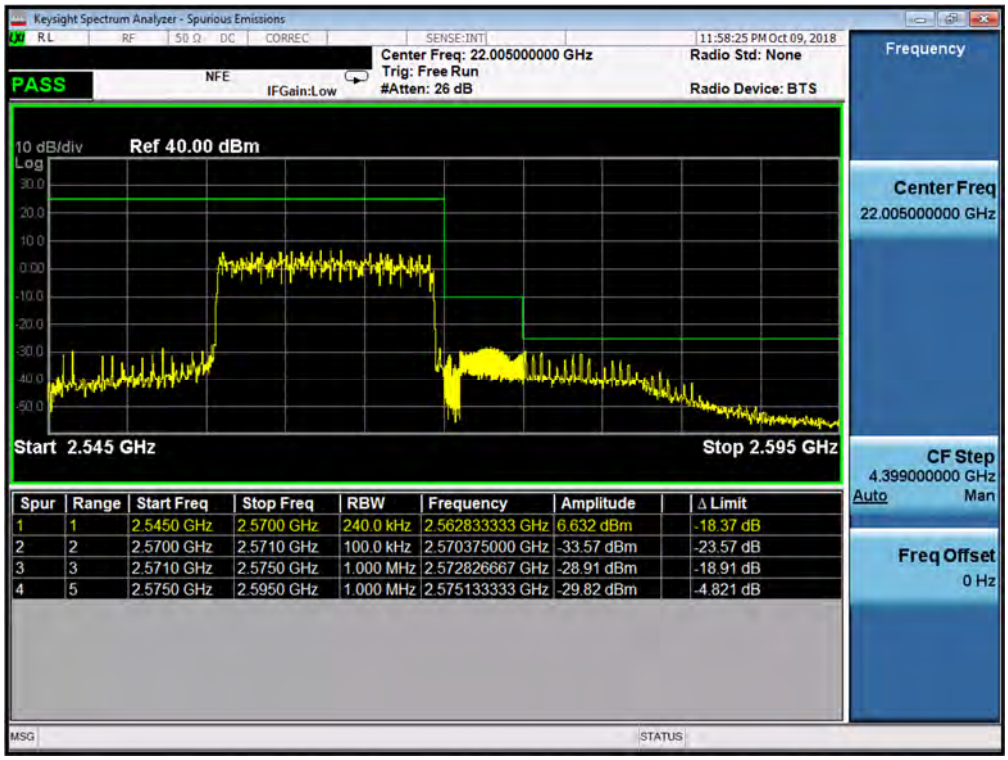

**Plot 7-160. Lower ACP Plot (Band 7 - 10.0MHz QPSK - RB Size 50)**



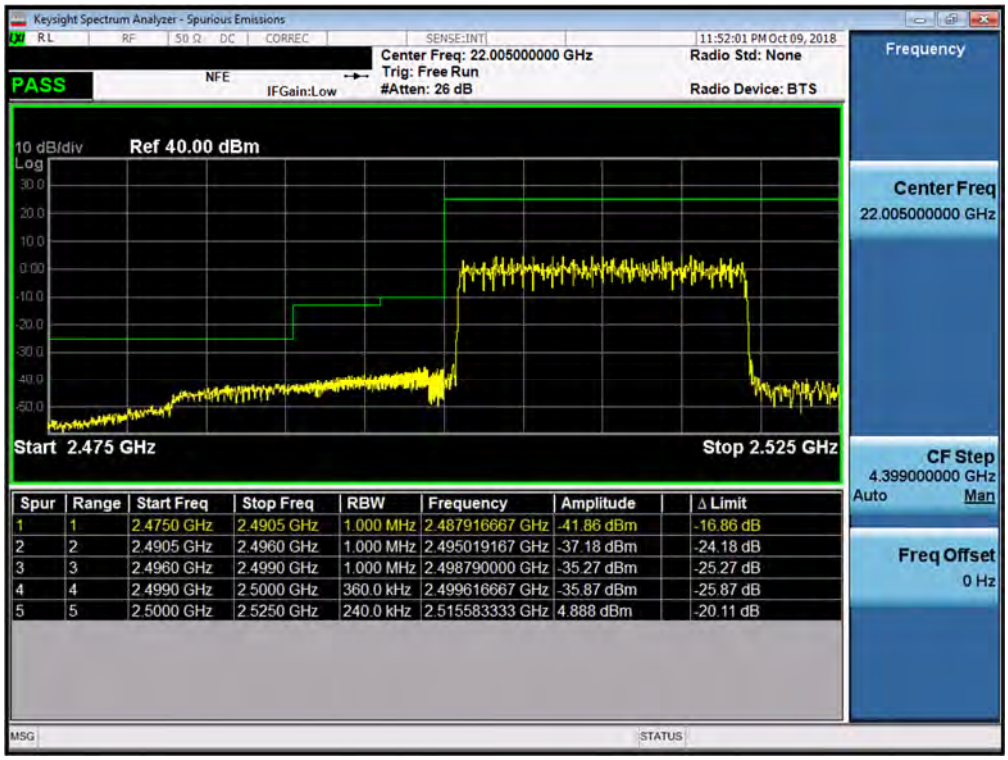

**Plot 7-161. Upper ACP Plot (Band 7 - 10.0MHz QPSK - RB Size 50)**




**Plot 7-162. Lower ACP Plot (Band 7 - 15.0MHz QPSK - RB Size 75)**

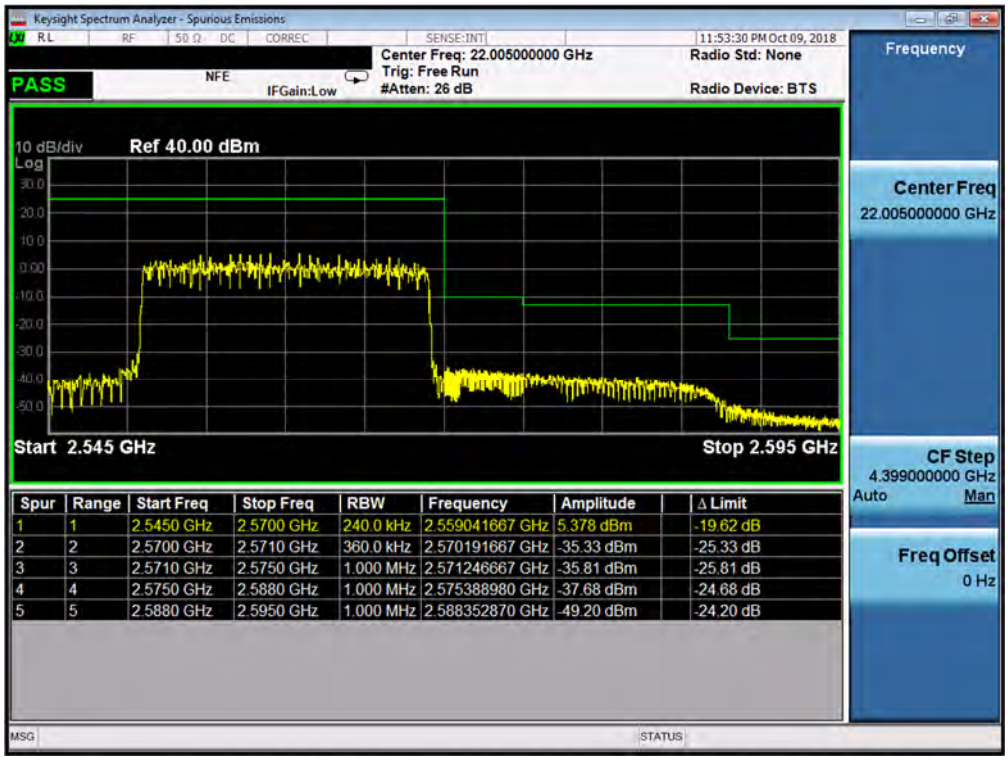



**Plot 7-163. Upper ACP Plot (Band 7 - 15.0MHz QPSK - RB Size 75)**




| Spur | Range | Start Freq | Stop Freq | RBW | Frequency | Amplitude | Δ Limit |
|---|---|---|---|---|---|---|---|
| 1 | 1 | 2.4750 GHz | 2.4905 GHz | 1.000 MHz | 2.487916667 GHz | -41.86 dBm | -16.86 dB |
| 2 | 2 | 2.4905 GHz | 2.4960 GHz | 1.000 MHz | 2.495019167 GHz | -37.18 dBm | -24.18 dB |
| 3 | 3 | 2.4960 GHz | 2.4990 GHz | 1.000 MHz | 2.498790000 GHz | -35.27 dBm | -25.27 dB |
| 4 | 4 | 2.4990 GHz | 2.5000 GHz | 360.0 kHz | 2.499616667 GHz | -35.87 dBm | -25.87 dB |
| 5 | 5 | 2.5000 GHz | 2.5250 GHz | 240.0 kHz | 2.515583333 GHz | 4.888 dBm | -20.11 dB |

**Plot 7-164. Lower ACP Plot (Band 7 - 20.0MHz QPSK - RB Size 100)**




| Spur | Range | Start Freq | Stop Freq | RBW | Frequency | Amplitude | Δ Limit |
|---|---|---|---|---|---|---|---|
| 1 | 1 | 2.5450 GHz | 2.5700 GHz | 240.0 kHz | 2.559041667 GHz | 5.378 dBm | -19.62 dB |
| 2 | 2 | 2.5700 GHz | 2.5710 GHz | 360.0 kHz | 2.570191667 GHz | -35.33 dBm | -25.33 dB |
| 3 | 3 | 2.5710 GHz | 2.5750 GHz | 1.000 MHz | 2.571246667 GHz | -35.81 dBm | -25.81 dB |
| 4 | 4 | 2.5750 GHz | 2.5880 GHz | 1.000 MHz | 2.575388980 GHz | -37.68 dBm | -24.68 dB |
| 5 | 5 | 2.5880 GHz | 2.5950 GHz | 1.000 MHz | 2.588352870 GHz | -49.20 dBm | -24.20 dB |

**Plot 7-165. Upper ACP Plot (Band 7 - 20.0MHz QPSK - RB Size 100)**

## 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 ≥ 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**

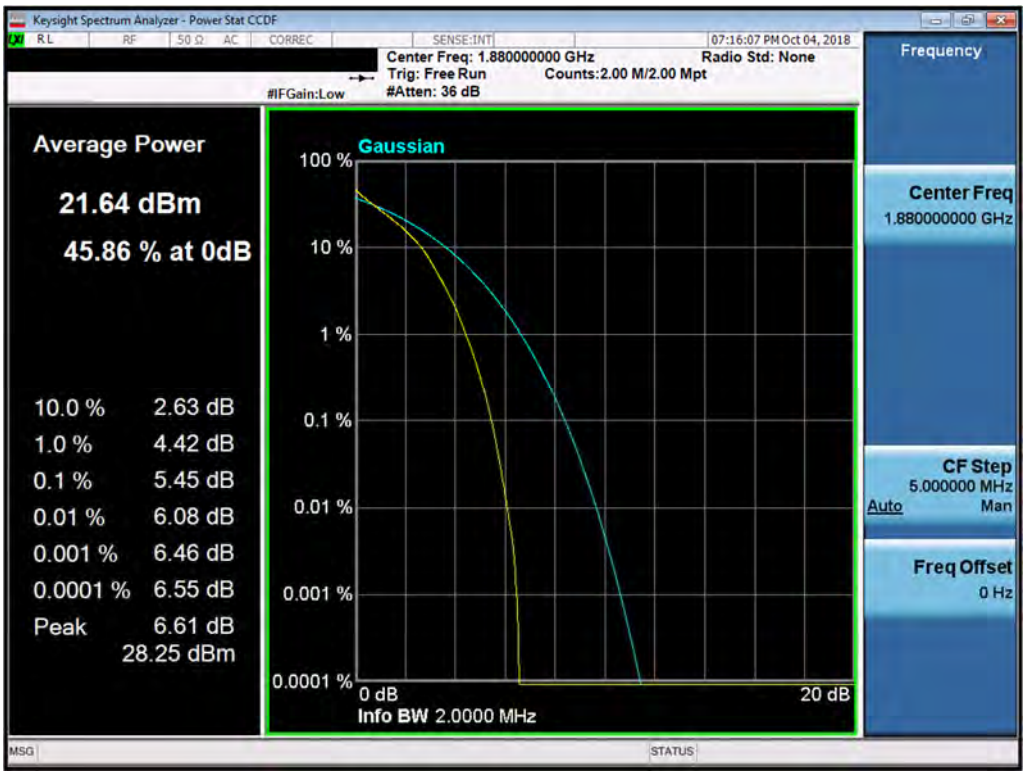
The EUT and measurement equipment were set up as shown in the diagram below.


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

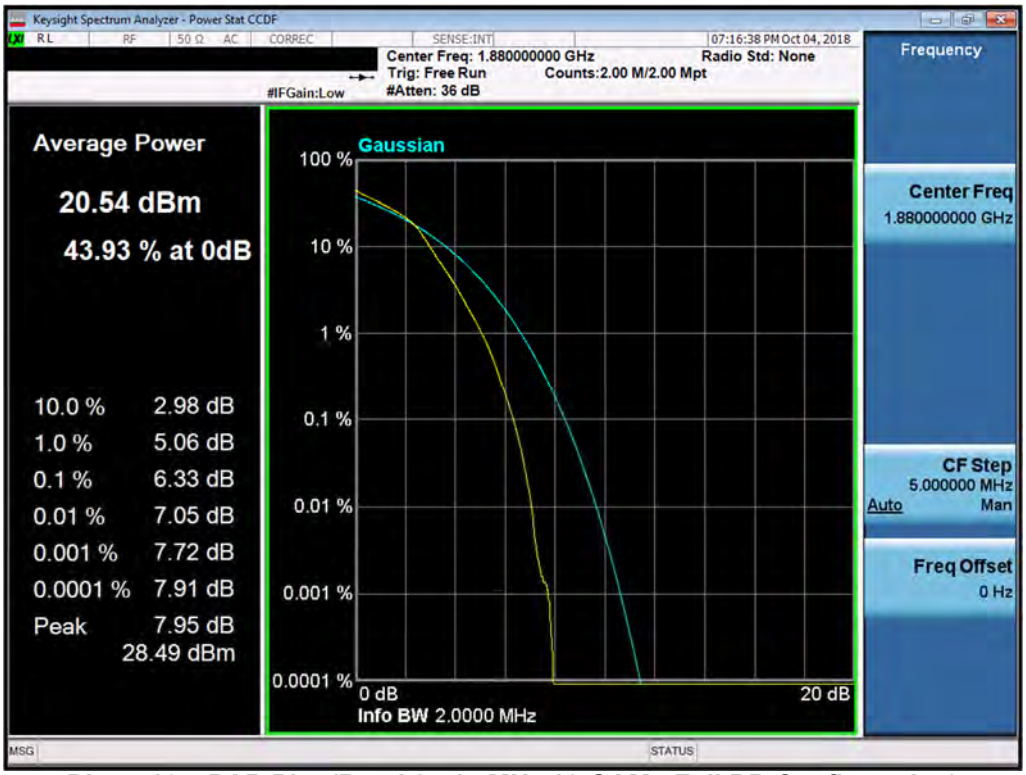
**Test Notes**

None.

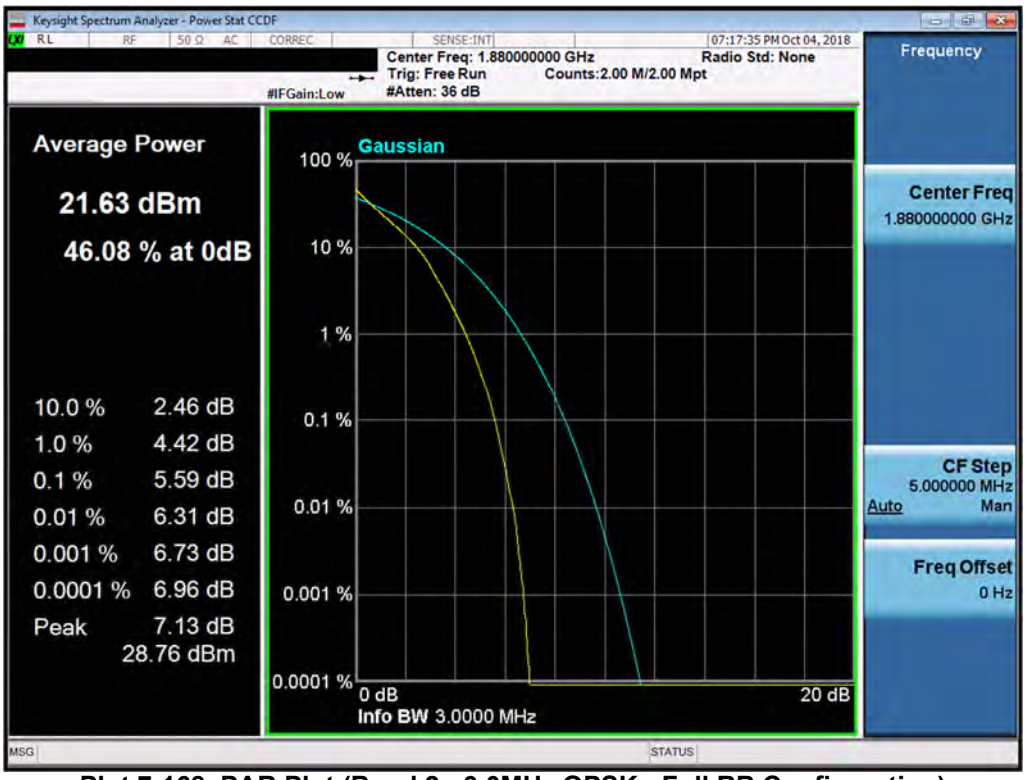
## Band 2



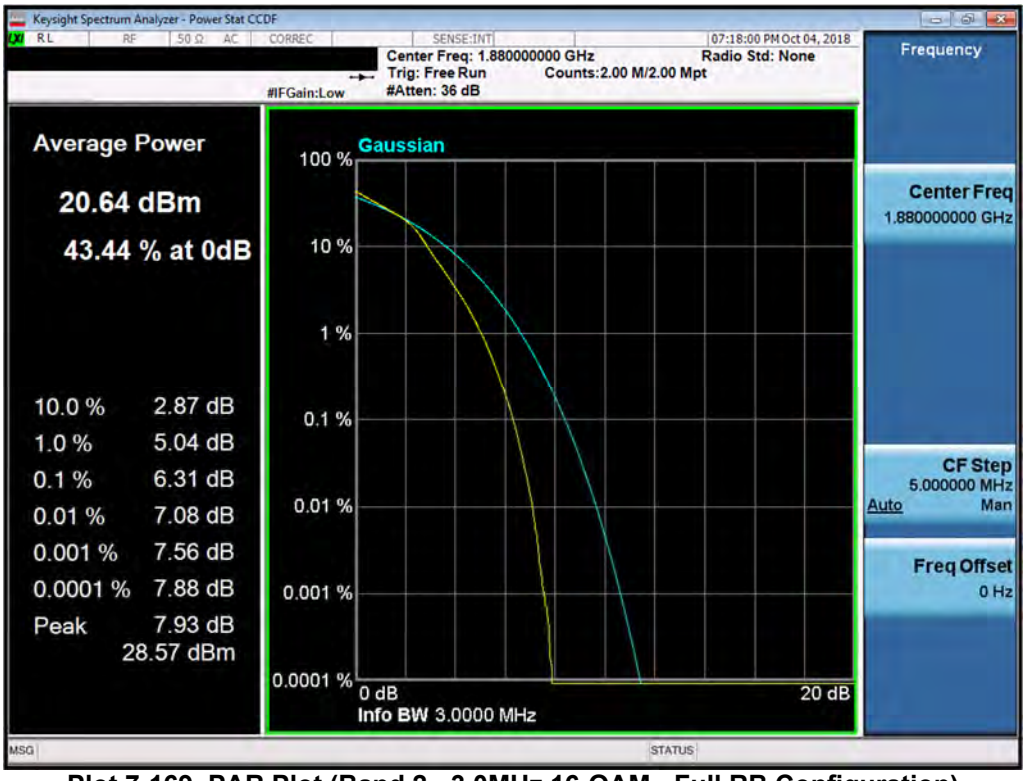

**Plot 7-166. PAR Plot (Band 2 - 1.4MHz QPSK - Full RB Configuration)**



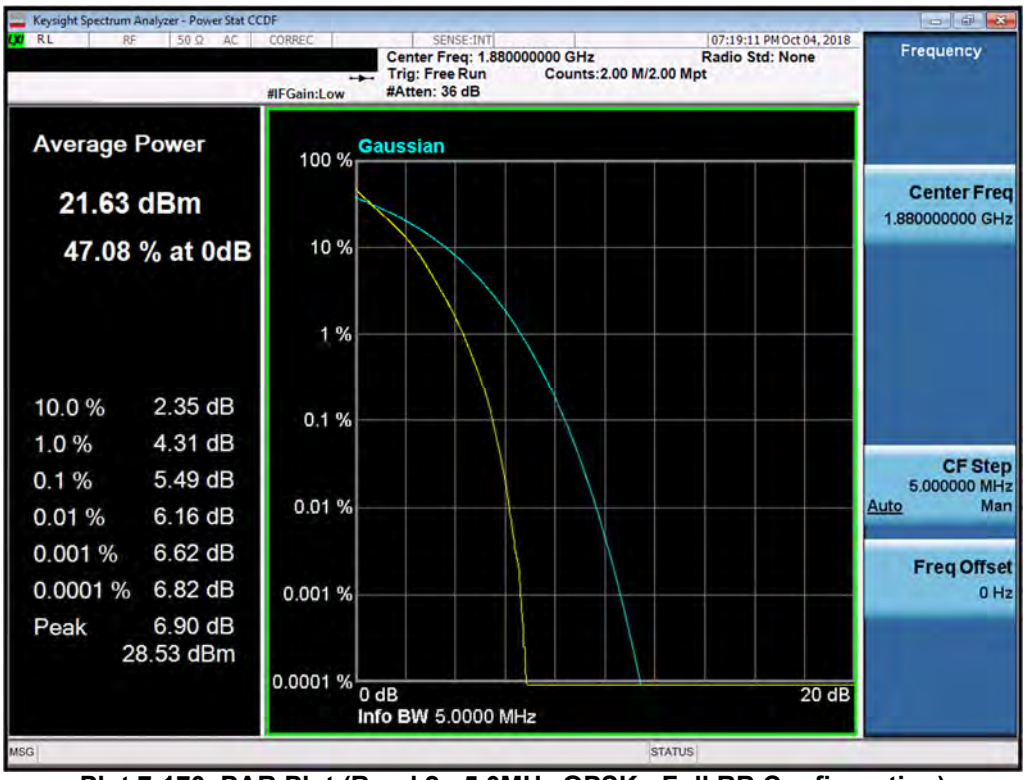

**Plot 7-167. PAR Plot (Band 2 - 1.4MHz 16-QAM - Full RB Configuration)**



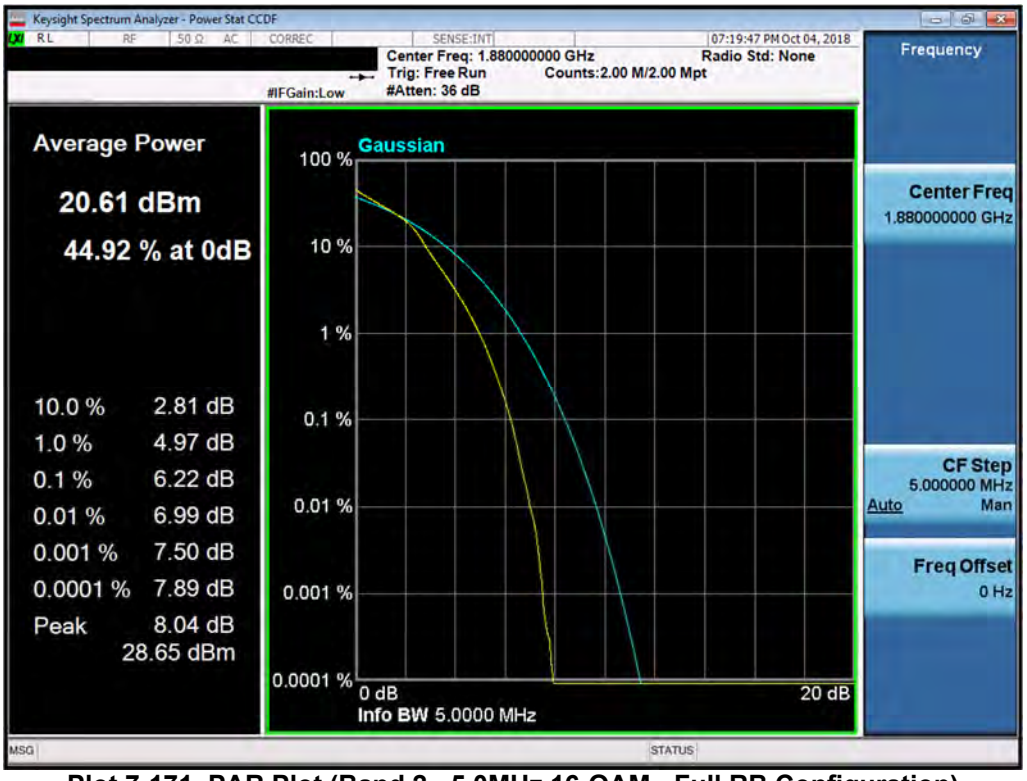

**Plot 7-168. PAR Plot (Band 2 - 3.0MHz QPSK - Full RB Configuration)**



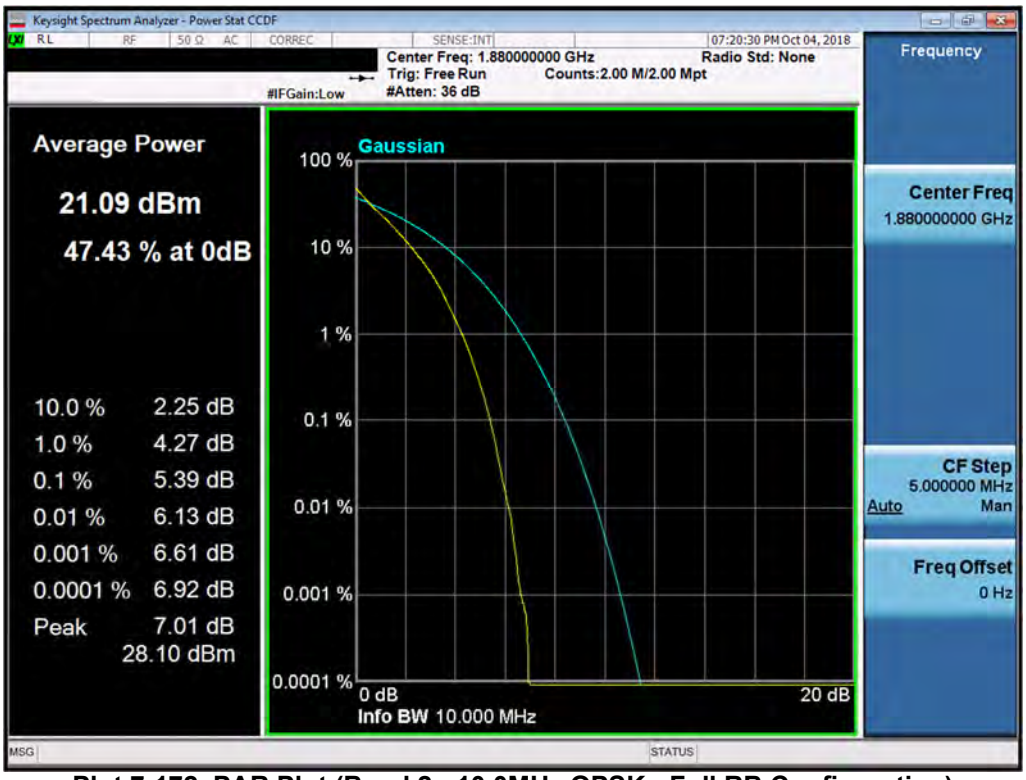

**Plot 7-169. PAR Plot (Band 2 - 3.0MHz 16-QAM - Full RB Configuration)**



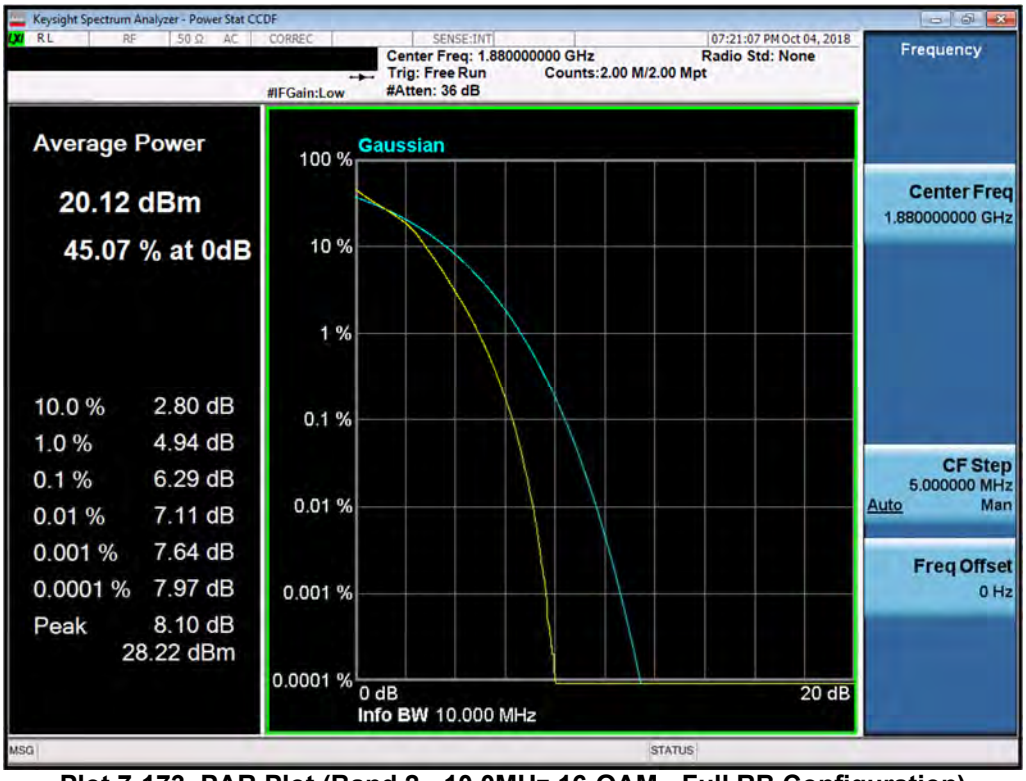

**Plot 7-170. PAR Plot (Band 2 - 5.0MHz QPSK - Full RB Configuration)**



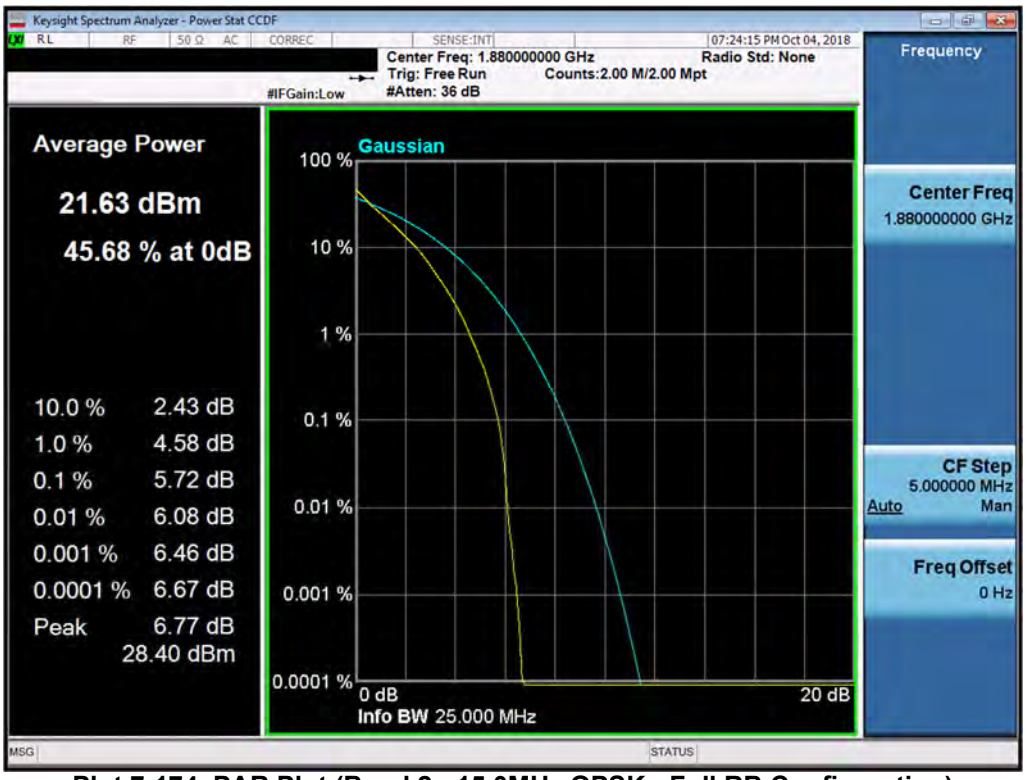

**Plot 7-171. PAR Plot (Band 2 - 5.0MHz 16-QAM - Full RB Configuration)**



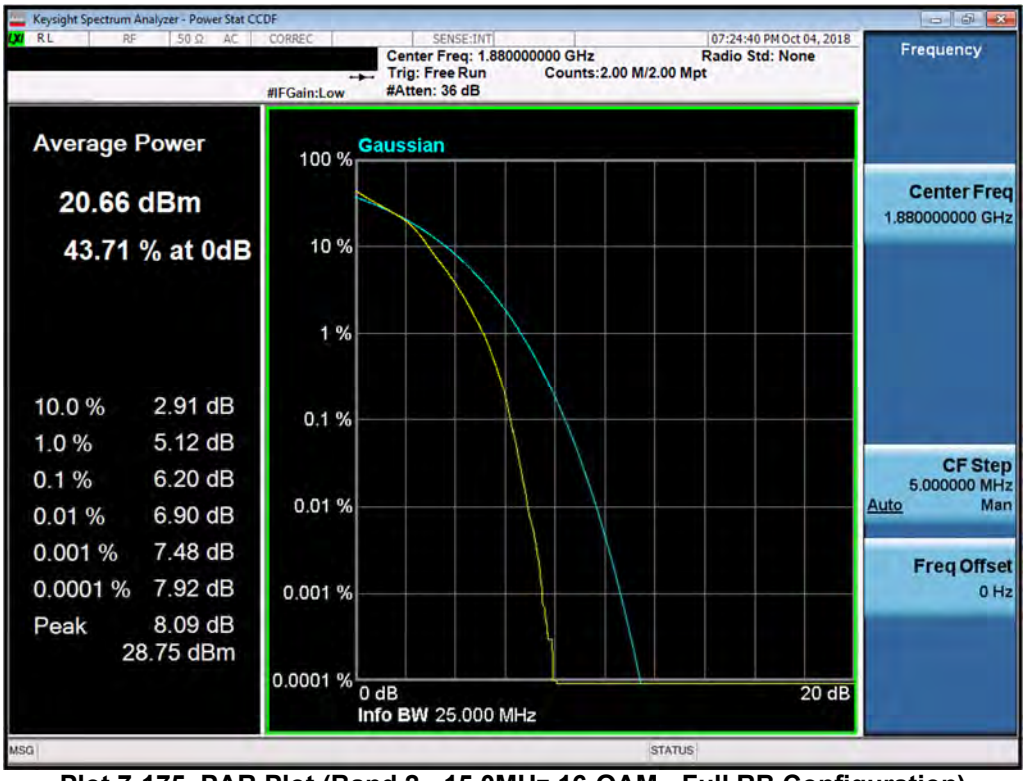

**Plot 7-172. PAR Plot (Band 2 - 10.0MHz QPSK - Full RB Configuration)**



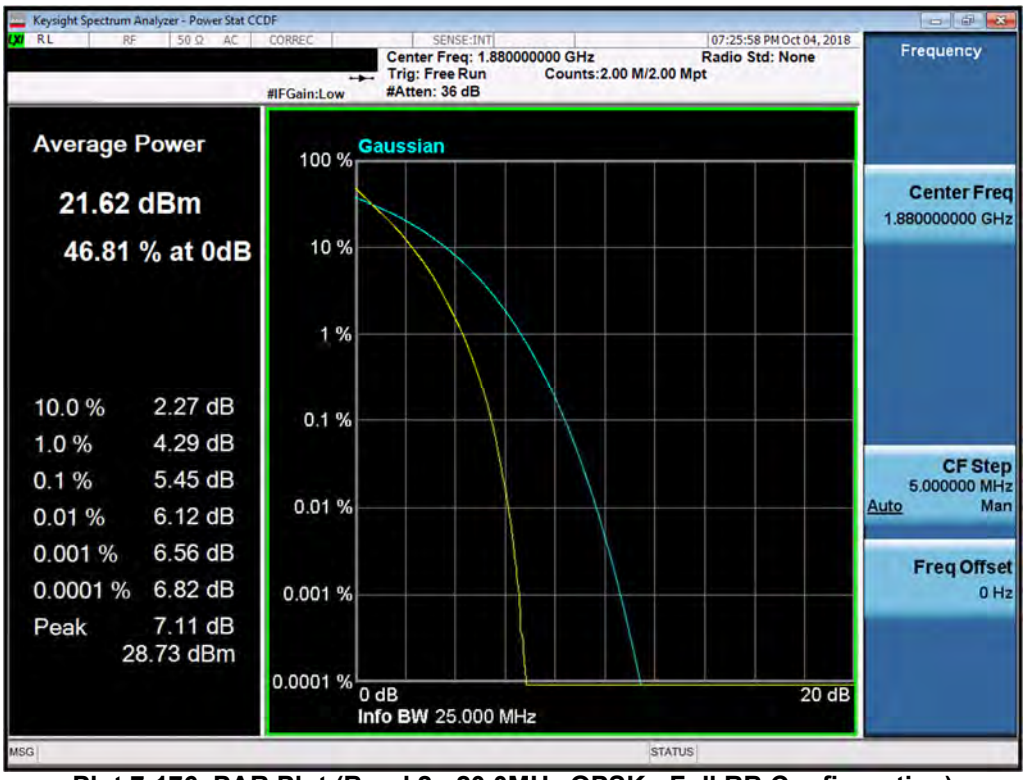

**Plot 7-173. PAR Plot (Band 2 - 10.0MHz 16-QAM - Full RB Configuration)**



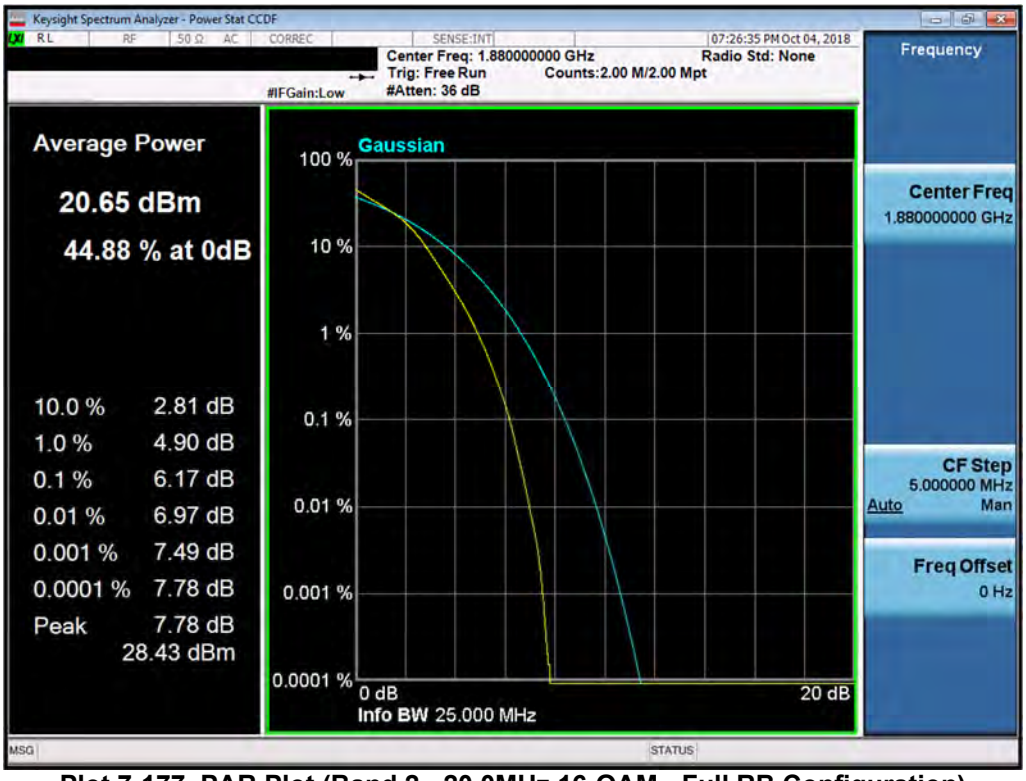

**Plot 7-174. PAR Plot (Band 2 - 15.0MHz QPSK - Full RB Configuration)**




**Plot 7-175. PAR Plot (Band 2 - 15.0MHz 16-QAM - Full RB Configuration)**

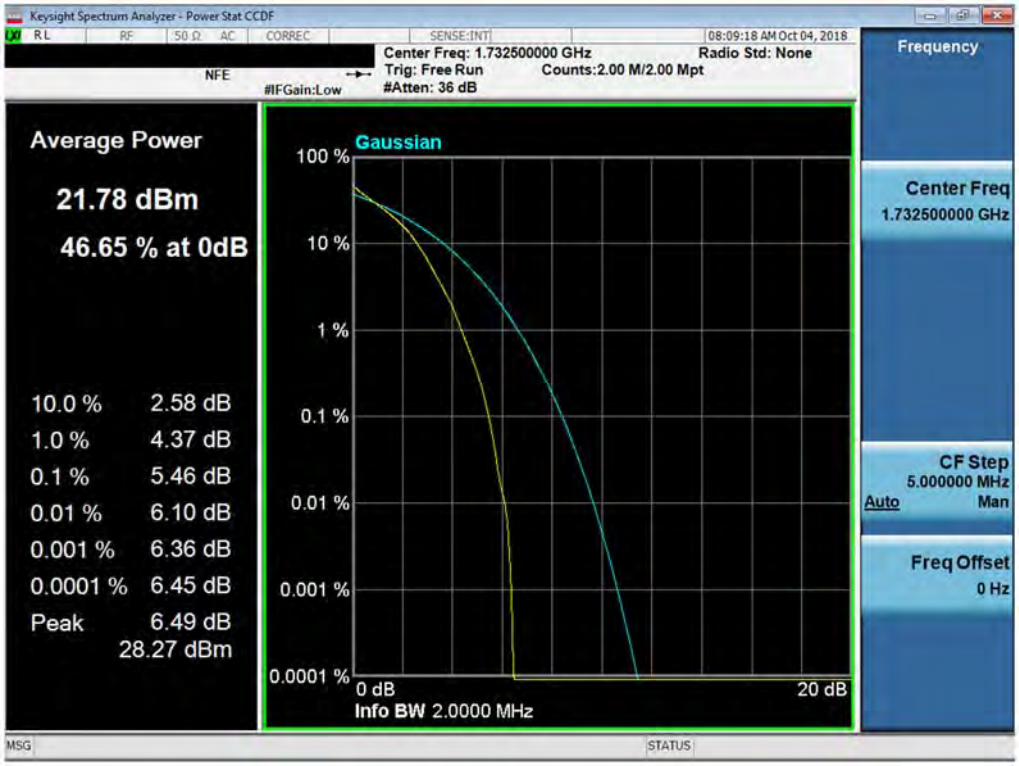



**Plot 7-176. PAR Plot (Band 2 - 20.0MHz QPSK - Full RB Configuration)**

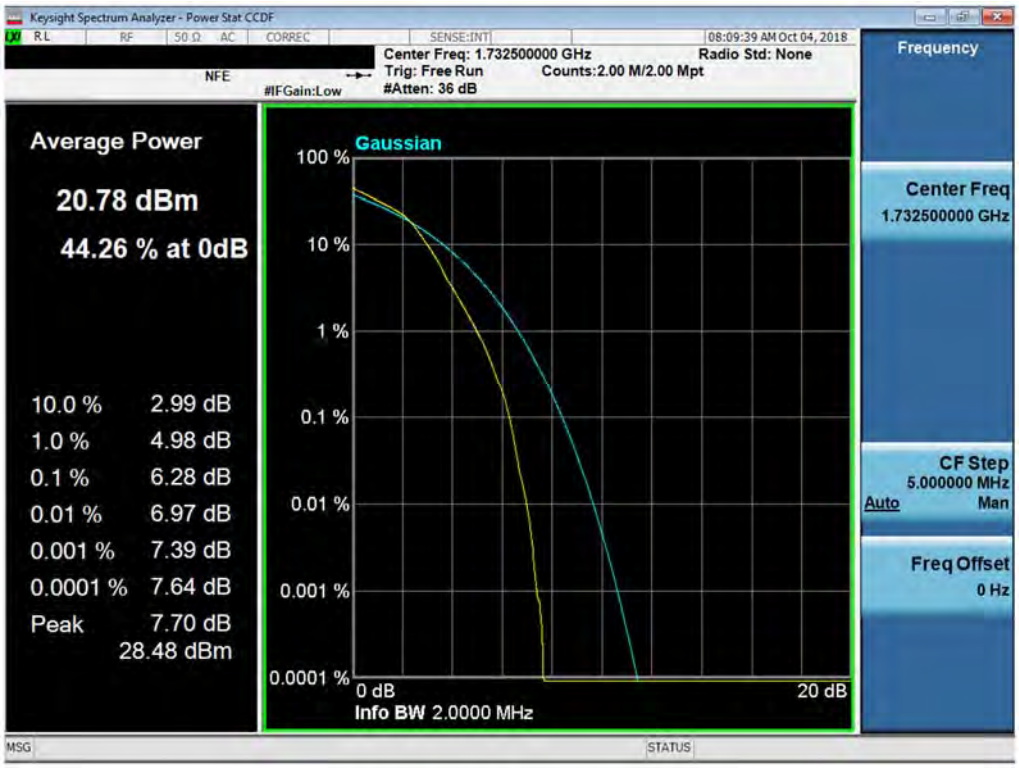



**Plot 7-177. PAR Plot (Band 2 - 20.0MHz 16-QAM - Full RB Configuration)**

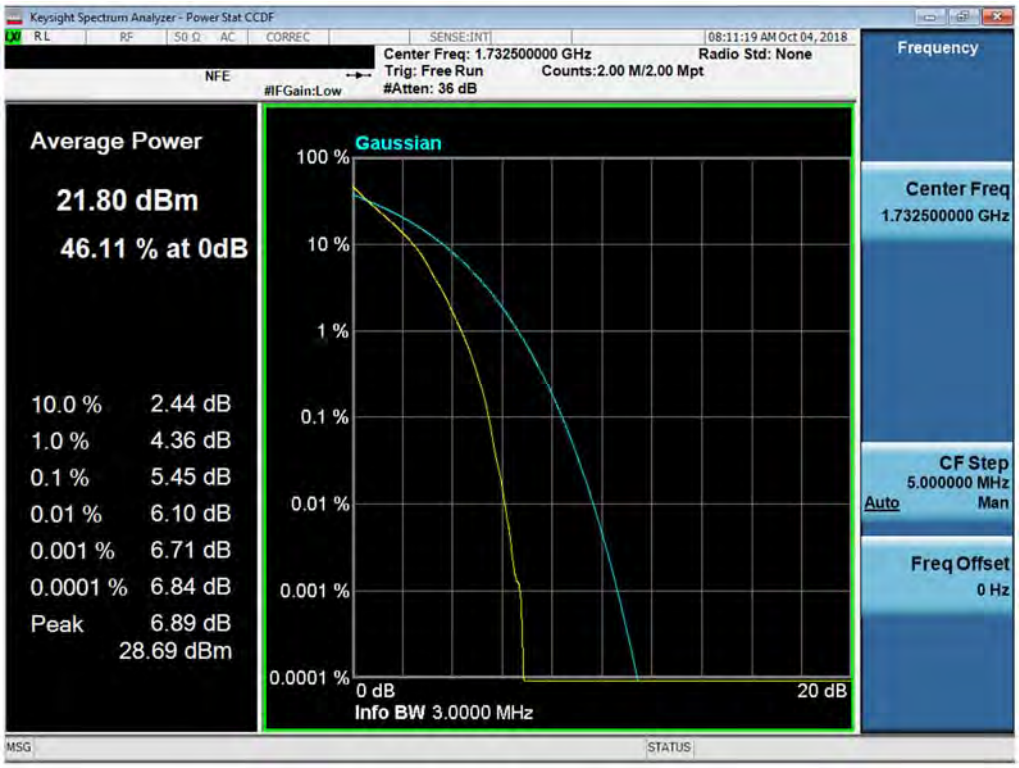
## Band 4



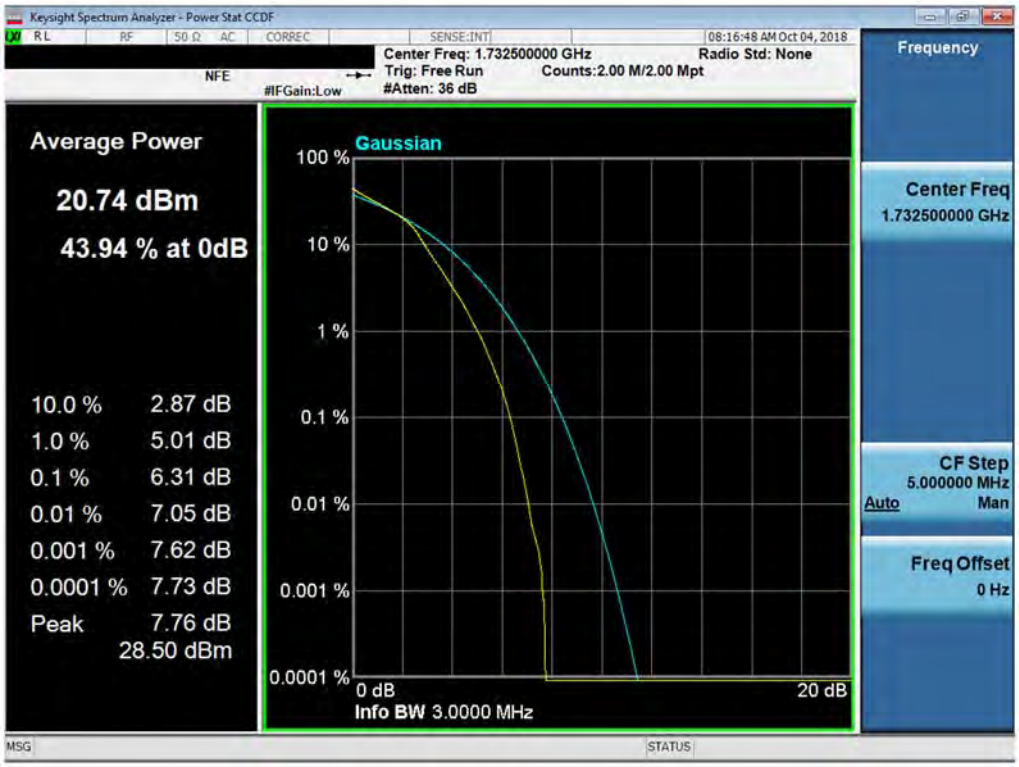

**Plot 7-178. PAR Plot (Band 4 - 1.4MHz QPSK - Full RB Configuration)**



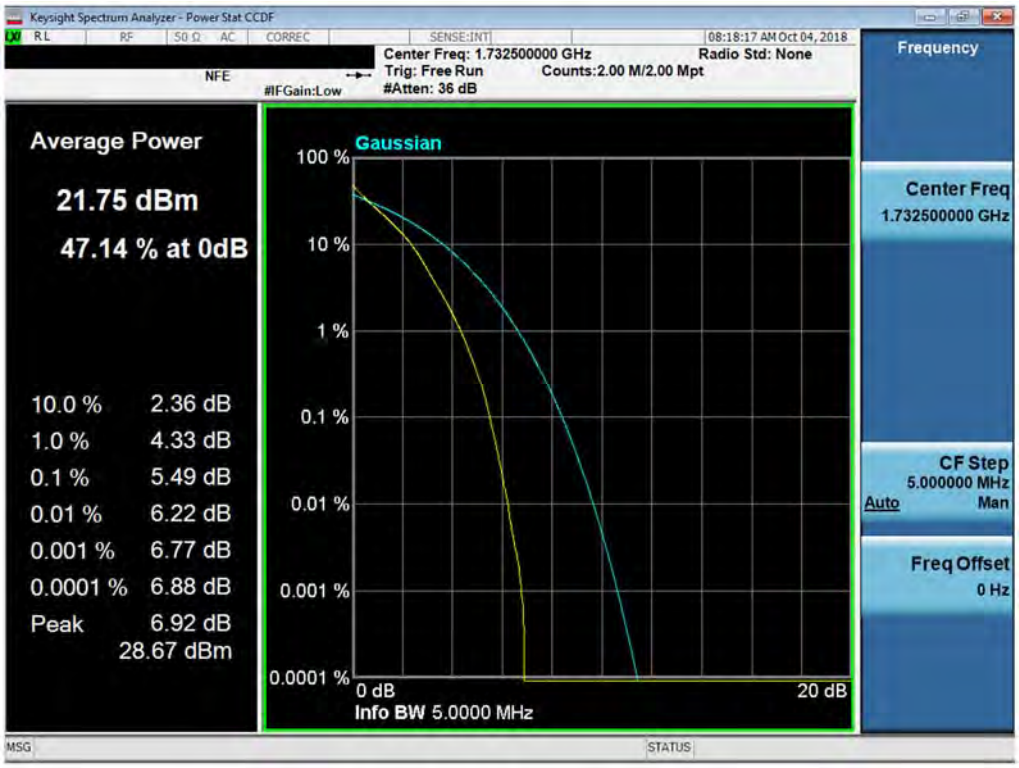

**Plot 7-179. PAR Plot (Band 4 - 1.4MHz 16-QAM - Full RB Configuration)**



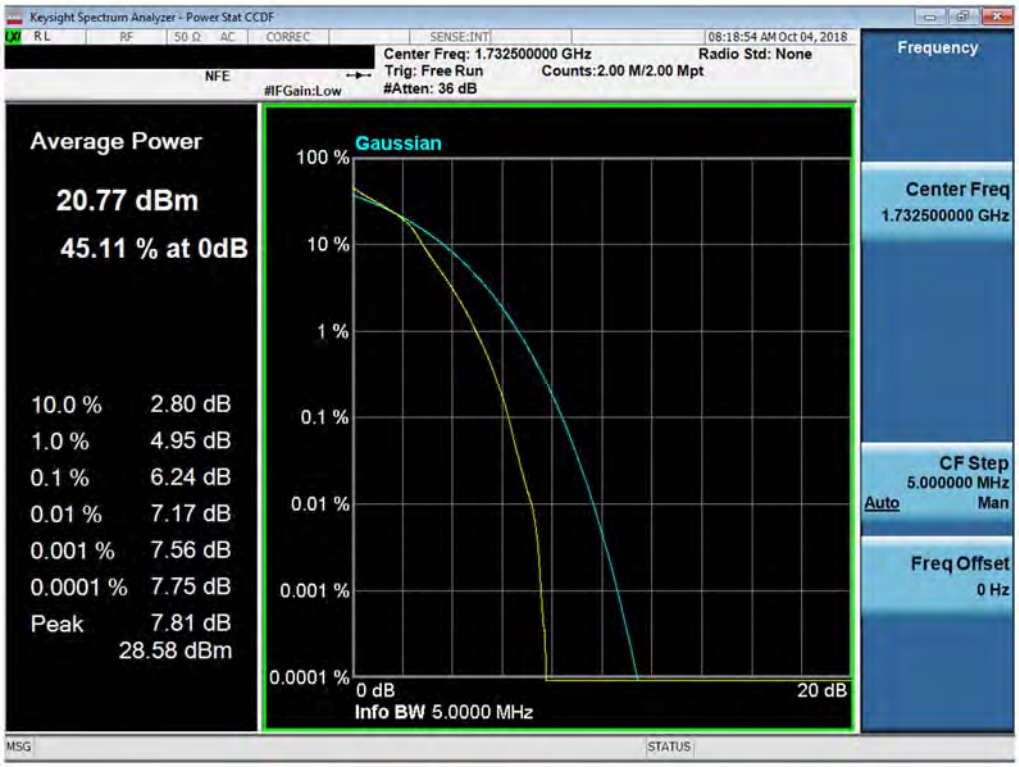

**Plot 7-180. PAR Plot (Band 4 - 3.0MHz QPSK - Full RB Configuration)**



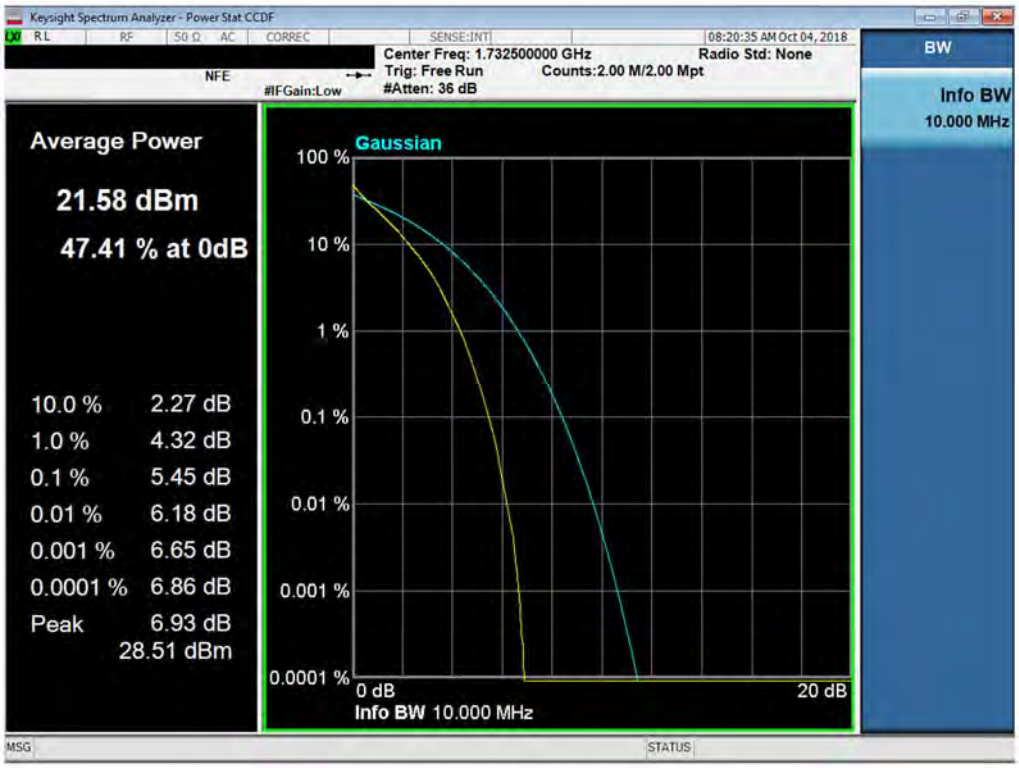

**Plot 7-181. PAR Plot (Band 4 - 3.0MHz 16-QAM - Full RB Configuration)**



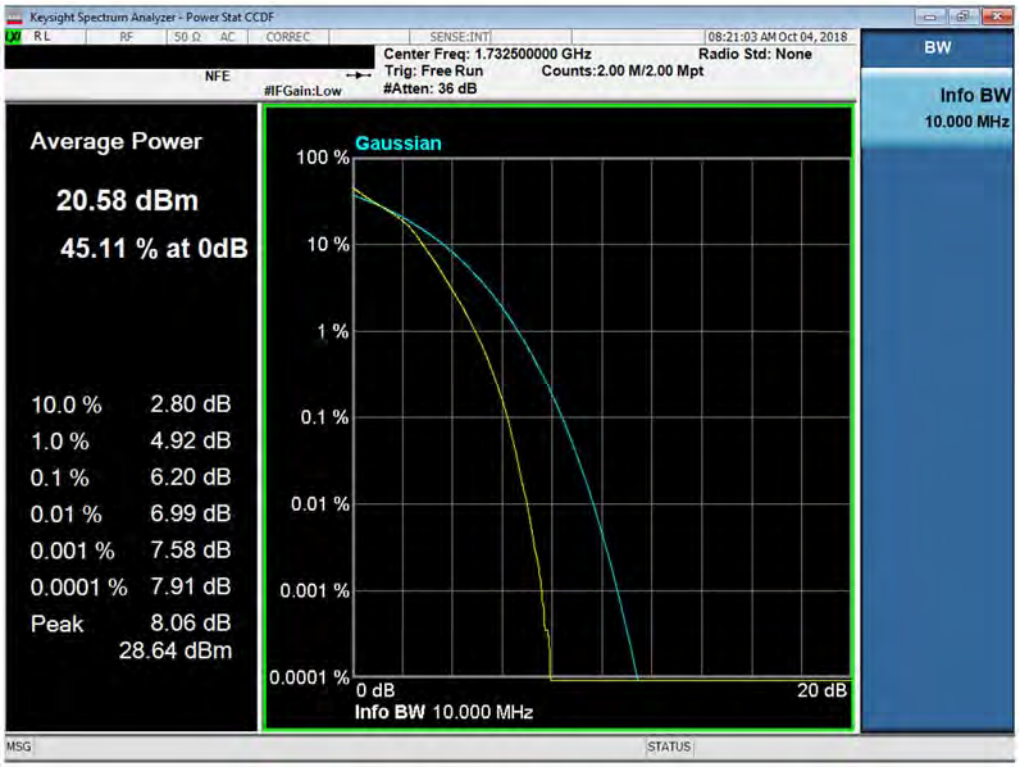

**Plot 7-182. PAR Plot (Band 4 - 5.0MHz QPSK - Full RB Configuration)**



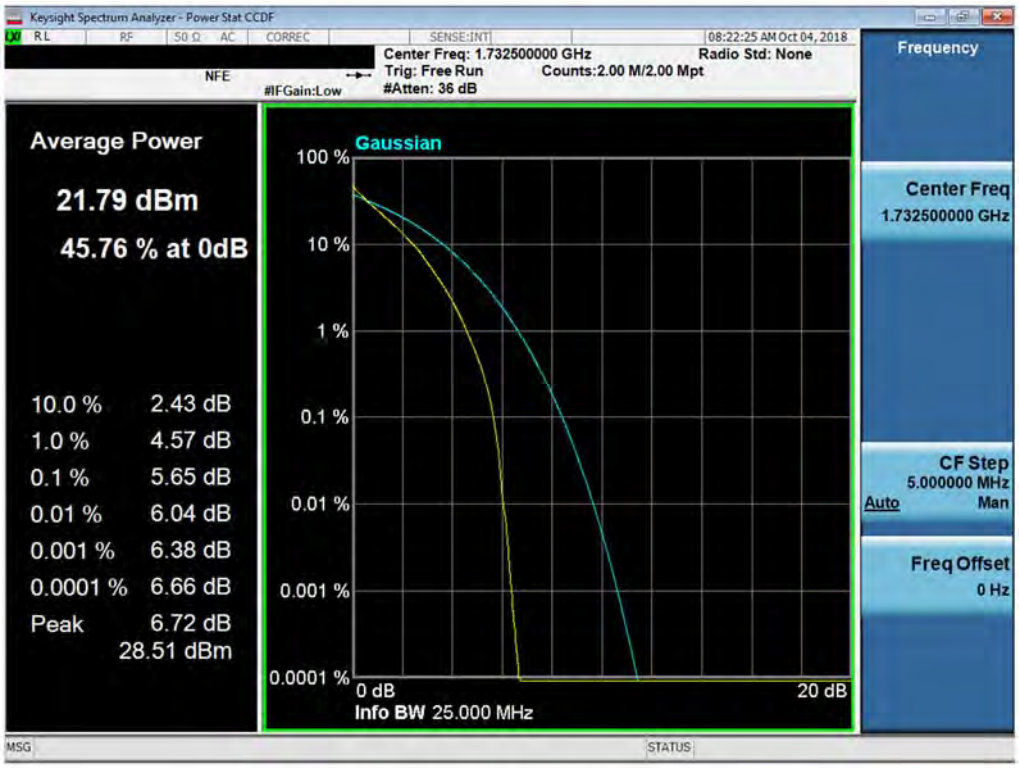

**Plot 7-183. PAR Plot (Band 4 - 5.0MHz 16-QAM - Full RB Configuration)**



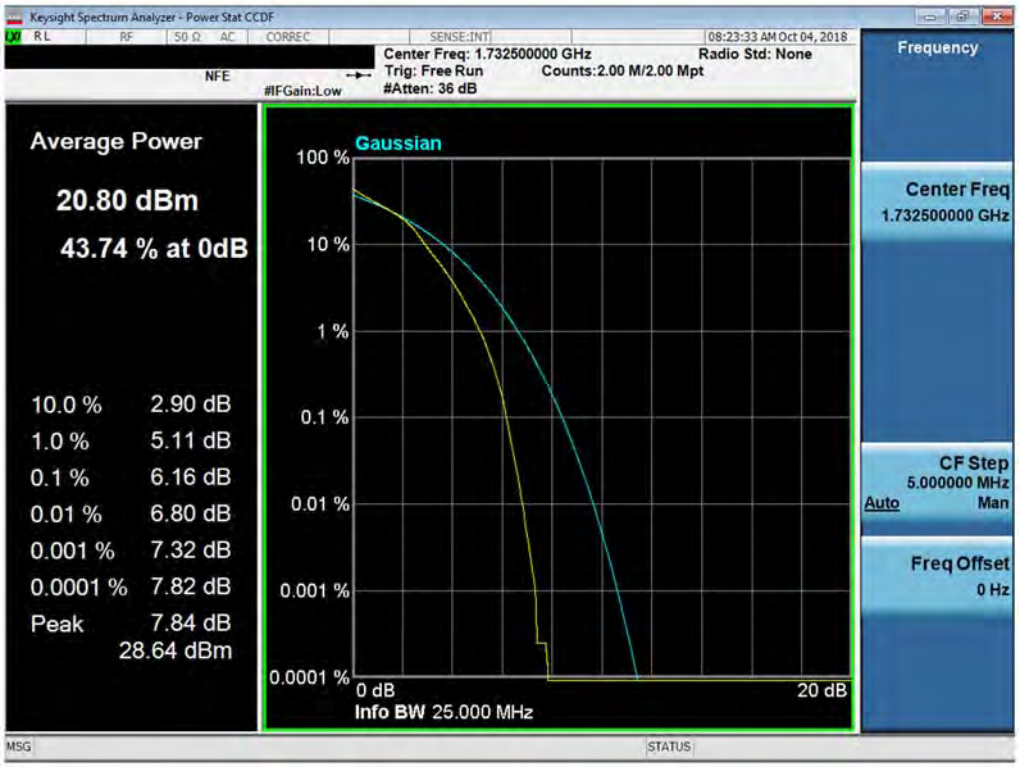

**Plot 7-184. PAR Plot (Band 4 - 10.0MHz QPSK - Full RB Configuration)**



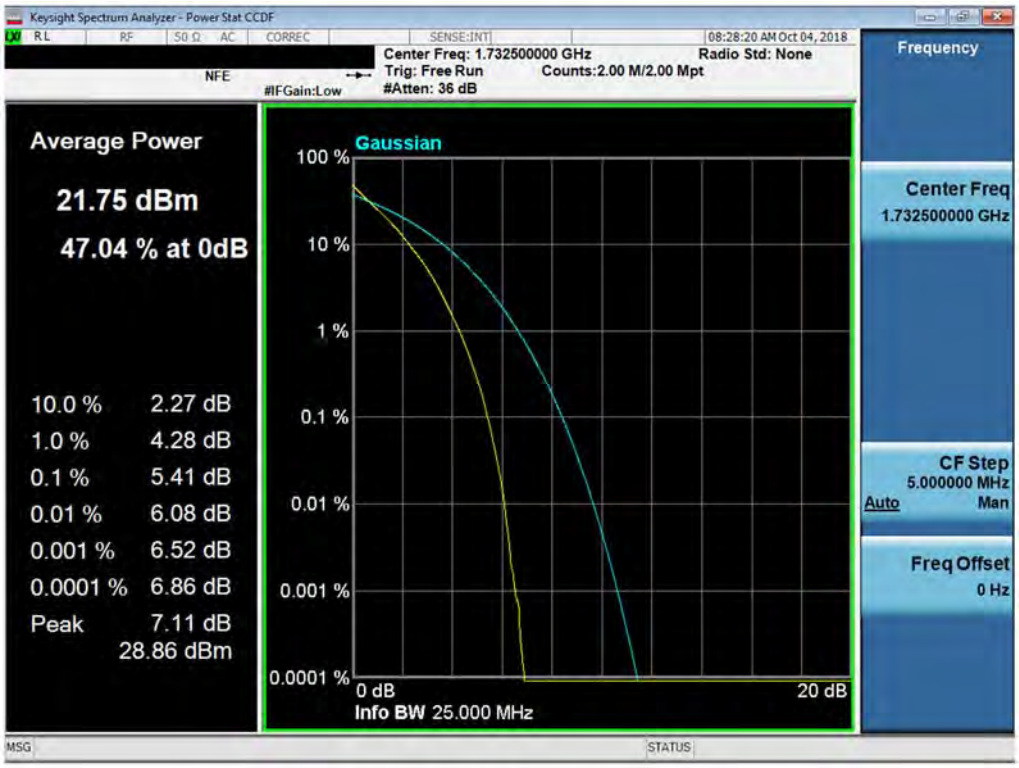

**Plot 7-185. PAR Plot (Band 4 - 10.0MHz 16-QAM - Full RB Configuration)**



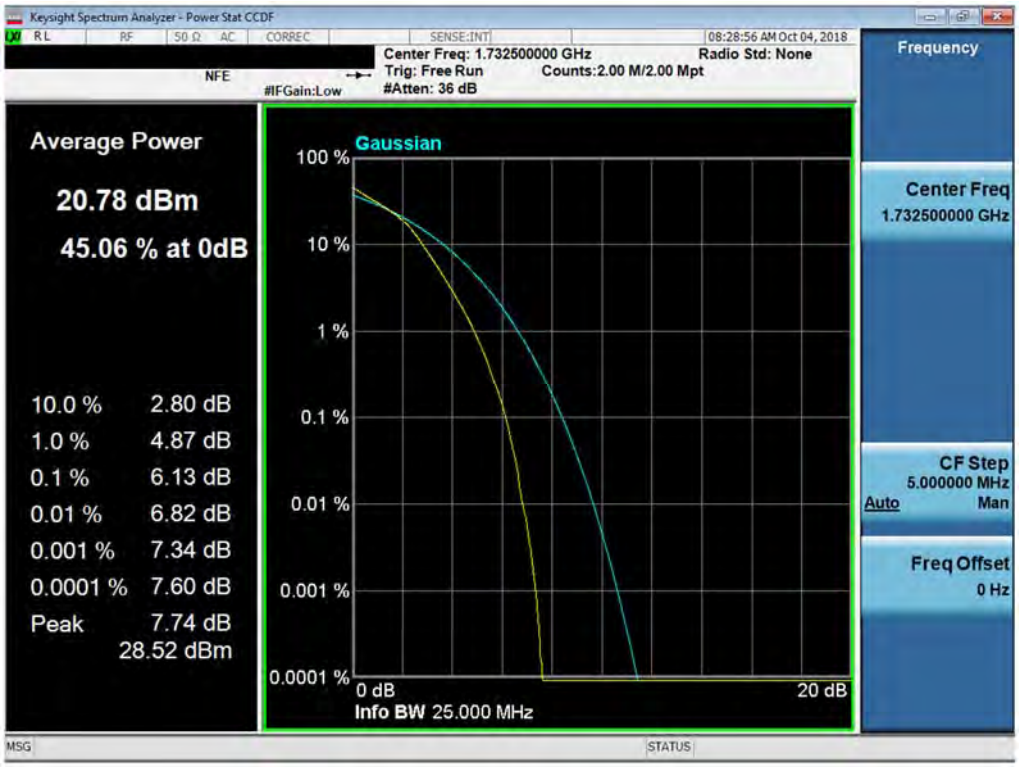

**Plot 7-186. PAR Plot (Band 4 - 15.0MHz QPSK - Full RB Configuration)**




**Plot 7-187. PAR Plot (Band 4 - 15.0MHz 16-QAM - Full RB Configuration)**




**Plot 7-188. PAR Plot (Band 4 - 20.0MHz QPSK - Full RB Configuration)**




**Plot 7-189. PAR Plot (Band 4 - 20.0MHz 16-QAM - Full RB Configuration)**

## 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

**Test Settings**

1. Radiated power measurements are performed using the signal analyzer's "channel power" measurement capability for signals with continuous operation. For signals with burst transmission, the signal analyzer's "time domain power" measurement capability is used
2. RBW = 1 – 5% of the expected OBW, not to exceed 1MHz
3. VBW ≥ 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". Trigger is set to enable triggering only on full power bursts with the sweep time set less than or equal to the transmission burst duration
8. The integration bandwidth was roughly set equal to the measured OBW of the signal for signals with continuous operation. For signals with burst transmission, the "gating" function was enabled to ensure that measurements are performed during times in which the transmitter is operating at its maximum power
9. Trace mode = trace averaging (RMS) over 100 sweeps
10. The trace was allowed to stabilize

## Test Setup

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

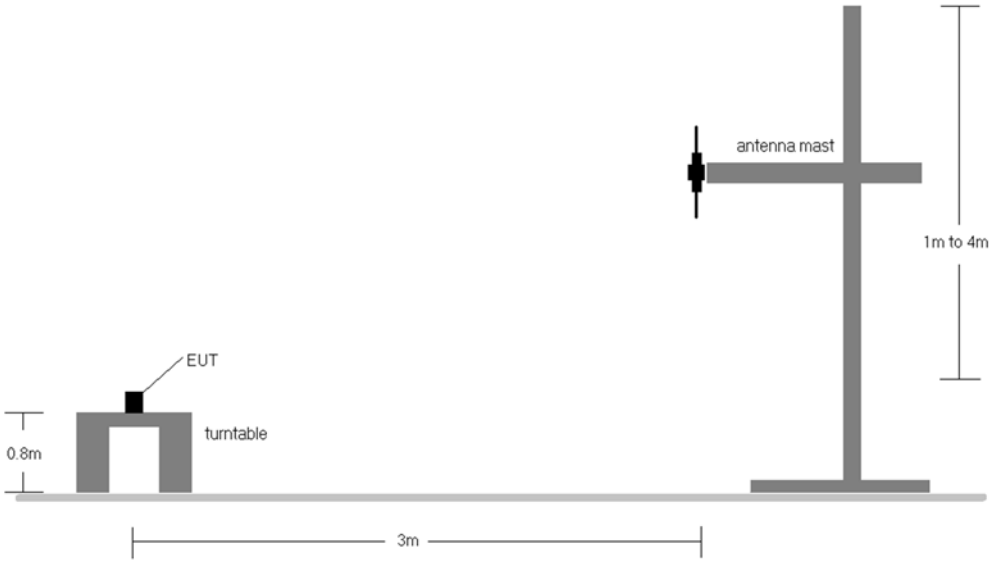



**Figure 7-5. Radiated Test Setup <1GHz**

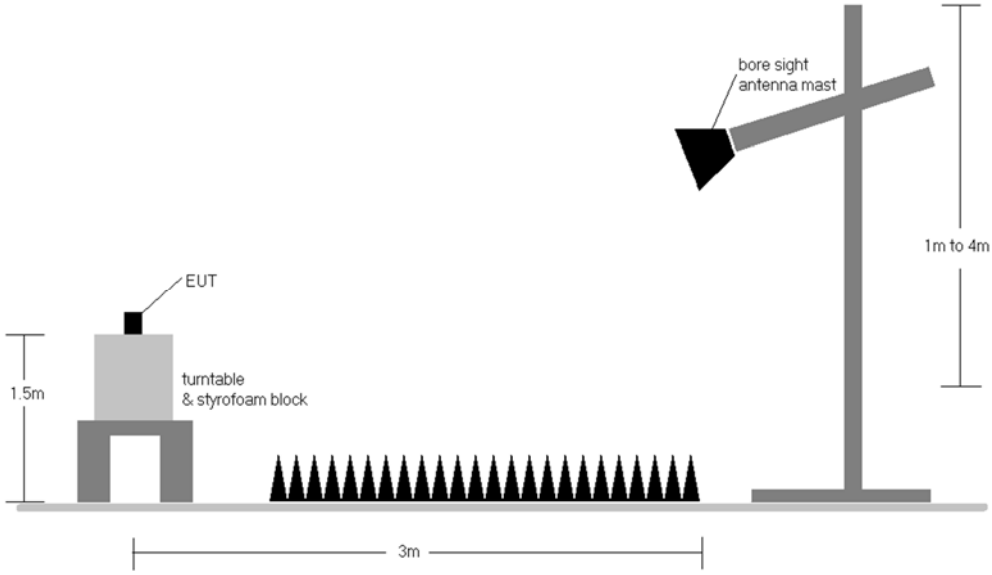



**Figure 7-6. Radiated Test Setup >1GHz**

## 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 | 3 | 1 / 0 | 18.74 | 1.10 | **17.69** | 0.059 | 34.77 | -17.08 | **19.84** | 0.096 | 36.99 | -17.15 |
| 707.50 | 1.4 | QPSK | H | 150 | 12 | 1 / 0 | 17.81 | 1.13 | 16.79 | 0.048 | 34.77 | -17.98 | 18.94 | 0.078 | 36.99 | -18.05 |
| 715.30 | 1.4 | QPSK | H | 150 | 356 | 1 / 5 | 18.36 | 1.16 | 17.37 | 0.055 | 34.77 | -17.40 | 19.52 | 0.090 | 36.99 | -17.47 |
| 699.70 | 1.4 | 16-QAM | H | 150 | 3 | 1 / 0 | 16.62 | 1.10 | **15.57** | 0.036 | 34.77 | -19.20 | **17.72** | 0.059 | 36.99 | -19.27 |
| 700.50 | 3 | QPSK | H | 150 | 350 | 1 / 0 | 18.75 | 1.10 | **17.70** | 0.059 | 34.77 | -17.07 | **19.85** | 0.097 | 36.99 | -17.14 |
| 707.50 | 3 | QPSK | H | 150 | 6 | 1 / 0 | 17.94 | 1.13 | 16.92 | 0.049 | 34.77 | -17.85 | 19.07 | 0.081 | 36.99 | -17.92 |
| 714.50 | 3 | QPSK | H | 150 | 350 | 1 / 0 | 18.46 | 1.16 | 17.47 | 0.056 | 34.77 | -17.30 | 19.62 | 0.092 | 36.99 | -17.37 |
| 700.50 | 3 | 16-QAM | H | 150 | 350 | 1 / 0 | 16.73 | 1.10 | **15.68** | 0.037 | 34.77 | -19.09 | **17.83** | 0.061 | 36.99 | -19.16 |
| 701.50 | 5 | QPSK | H | 150 | 356 | 1 / 0 | 19.05 | 1.11 | **18.01** | **0.063** | 34.77 | -16.77 | **20.16** | **0.104** | 36.99 | -16.83 |
| 707.50 | 5 | QPSK | H | 150 | 23 | 1 / 0 | 17.81 | 1.13 | 16.79 | 0.048 | 34.77 | -17.98 | 18.94 | 0.078 | 36.99 | -18.05 |
| 713.50 | 5 | QPSK | H | 150 | 356 | 1 / 0 | 18.79 | 1.15 | 17.79 | 0.060 | 34.77 | -16.98 | 19.94 | 0.099 | 36.99 | -17.05 |
| 701.50 | 5 | 16-QAM | H | 150 | 356 | 1 / 0 | 16.68 | 1.11 | **15.64** | 0.037 | 34.77 | -19.14 | **17.79** | 0.060 | 36.99 | -19.20 |
| 704.00 | 10 | QPSK | H | 150 | 357 | 1 / 0 | 18.71 | 1.12 | **17.68** | 0.059 | 34.77 | -17.09 | **19.83** | 0.096 | 36.99 | -17.16 |
| 707.50 | 10 | QPSK | H | 150 | 5 | 1 / 0 | 18.27 | 1.13 | 17.25 | 0.053 | 34.77 | -17.52 | 19.40 | 0.087 | 36.99 | -17.59 |
| 711.00 | 10 | QPSK | H | 150 | 358 | 1 / 0 | 18.65 | 1.14 | 17.64 | 0.058 | 34.77 | -17.13 | 19.79 | 0.095 | 36.99 | -17.20 |
| 704.00 | 10 | 16-QAM | H | 150 | 357 | 1 / 0 | 16.63 | 1.12 | **15.60** | 0.036 | 34.77 | -19.17 | **17.75** | 0.060 | 36.99 | -19.24 |
| 701.50 | 5 | QPSK | V | 150 | 351 | 1 / 0 | 18.42 | 1.13 | 17.40 | 0.055 | 34.77 | -17.37 | 19.55 | 0.090 | 36.99 | -17.44 |

**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] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 824.70 | 1.4 | QPSK | V | 150 | 356 | 1 / 5 | 22.57 | 1.50 | **21.92** | 0.156 | 38.45 | -16.53 | **24.07** | 0.255 | 40.61 | -16.54 |
| 836.50 | 1.4 | QPSK | V | 150 | 2 | 1 / 5 | 22.40 | 1.50 | 21.75 | 0.150 | 38.45 | -16.70 | 23.90 | 0.246 | 40.61 | -16.71 |
| 848.30 | 1.4 | QPSK | V | 150 | 3 | 1 / 0 | 22.06 | 1.50 | 21.41 | 0.138 | 38.45 | -17.04 | 23.56 | 0.227 | 40.61 | -17.05 |
| 824.70 | 1.4 | 16-QAM | V | 150 | 356 | 1 / 5 | 20.50 | 1.50 | **19.85** | 0.097 | 38.45 | -18.60 | **22.00** | 0.158 | 40.61 | -18.61 |
| 825.50 | 3 | QPSK | V | 150 | 350 | 1 / 14 | 14.92 | 1.50 | 14.27 | 0.027 | 38.45 | -24.18 | 16.42 | 0.044 | 40.61 | -24.19 |
| 836.50 | 3 | QPSK | V | 150 | 356 | 1 / 14 | 22.44 | 1.50 | **21.79** | 0.151 | 38.45 | -16.66 | **23.94** | 0.248 | 40.61 | -16.67 |
| 847.50 | 3 | QPSK | V | 150 | 358 | 1 / 0 | 21.66 | 1.50 | 21.01 | 0.126 | 38.45 | -17.44 | 23.16 | 0.207 | 40.61 | -17.45 |
| 825.50 | 3 | 16-QAM | V | 150 | 350 | 1 / 14 | 20.55 | 1.50 | **19.90** | 0.098 | 38.45 | -18.55 | **22.05** | 0.160 | 40.61 | -18.56 |
| 826.50 | 5 | QPSK | V | 150 | 355 | 1 / 24 | 22.76 | 1.50 | **22.11** | **0.163** | 38.45 | -16.34 | **24.26** | **0.267** | 40.61 | -16.35 |
| 836.50 | 5 | QPSK | V | 150 | 354 | 1 / 24 | 22.60 | 1.50 | 21.95 | 0.157 | 38.45 | -16.50 | 24.10 | 0.257 | 40.61 | -16.51 |
| 846.50 | 5 | QPSK | V | 150 | 354 | 1 / 24 | 22.57 | 1.50 | 21.92 | 0.156 | 38.45 | -16.53 | 24.07 | 0.255 | 40.61 | -16.54 |
| 826.50 | 5 | 16-QAM | V | 150 | 355 | 1 / 24 | 20.83 | 1.50 | **20.18** | 0.104 | 38.45 | -18.27 | **22.33** | 0.171 | 40.61 | -18.28 |
| 829.00 | 10 | QPSK | V | 150 | 347 | 1 / 49 | 22.74 | 1.50 | **22.09** | 0.162 | 38.45 | -16.36 | **24.24** | 0.266 | 40.61 | -16.37 |
| 836.50 | 10 | QPSK | V | 150 | 359 | 1 / 0 | 22.60 | 1.50 | 21.95 | 0.157 | 38.45 | -16.50 | 24.10 | 0.257 | 40.61 | -16.51 |
| 844.00 | 10 | QPSK | V | 150 | 356 | 1 / 0 | 22.72 | 1.50 | 22.07 | 0.161 | 38.45 | -16.38 | 24.22 | 0.264 | 40.61 | -16.39 |
| 829.00 | 10 | 16-QAM | V | 150 | 347 | 1 / 49 | 20.83 | 1.50 | **20.18** | 0.104 | 38.45 | -18.27 | **22.33** | 0.171 | 40.61 | -18.28 |
| 826.50 | 5 | QPSK | H | 150 | 79 | 1 / 24 | 18.77 | 1.50 | 18.12 | 0.065 | 38.45 | -20.33 | 20.27 | 0.106 | 40.61 | -20.34 |

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

| Frequency [MHz] | Channel Bandwidth [MHz] | Mod. | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | RB Size/Offset | Substitute Level [dBm] | Ant. Gain [dBi] | EIRP [dBm] | EIRP [Watts] | EIRP Limit [dBm] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1710.70 | 1.4 | QPSK | H | 150 | 150 | 1 / 0 | 17.27 | 5.56 | **22.83** | 0.192 | 30.00 | -7.17 |
| 1732.50 | 1.4 | QPSK | H | 150 | 262 | 1 / 0 | 16.93 | 5.41 | 22.34 | 0.171 | 30.00 | -7.66 |
| 1754.30 | 1.4 | QPSK | H | 150 | 350 | 1 / 5 | 16.46 | 5.26 | 21.72 | 0.149 | 30.00 | -8.28 |
| 1710.70 | 1.4 | 16-QAM | H | 150 | 150 | 1 / 0 | 15.33 | 5.56 | **20.89** | 0.123 | 30.00 | -9.11 |
| 1711.50 | 3 | QPSK | H | 150 | 350 | 1 / 0 | 17.41 | 5.55 | **22.96** | **0.198** | 30.00 | -7.04 |
| 1732.50 | 3 | QPSK | H | 150 | 263 | 1 / 0 | 17.02 | 5.41 | 22.43 | 0.175 | 30.00 | -7.57 |
| 1753.50 | 3 | QPSK | H | 150 | 356 | 1 / 14 | 16.60 | 5.26 | 21.86 | 0.154 | 30.00 | -8.14 |
| 1711.50 | 3 | 16-QAM | H | 150 | 350 | 1 / 0 | 15.25 | 5.55 | **20.80** | 0.120 | 30.00 | -9.20 |
| 1712.50 | 5 | QPSK | H | 150 | 348 | 1 / 0 | 17.19 | 5.55 | **22.74** | 0.188 | 30.00 | -7.26 |
| 1732.50 | 5 | QPSK | H | 150 | 359 | 1 / 0 | 16.89 | 5.41 | 22.30 | 0.170 | 30.00 | -7.70 |
| 1752.50 | 5 | QPSK | H | 150 | 351 | 1 / 24 | 16.84 | 5.27 | 22.11 | 0.163 | 30.00 | -7.89 |
| 1712.50 | 5 | 16-QAM | H | 150 | 348 | 1 / 0 | 15.41 | 5.55 | **20.96** | 0.125 | 30.00 | -9.04 |
| 1715.00 | 10 | QPSK | H | 150 | 6 | 1 / 0 | 17.30 | 5.53 | **22.83** | 0.192 | 30.00 | -7.17 |
| 1732.50 | 10 | QPSK | H | 150 | 349 | 1 / 0 | 17.05 | 5.41 | 22.46 | 0.176 | 30.00 | -7.54 |
| 1750.00 | 10 | QPSK | H | 150 | 359 | 1 / 0 | 16.76 | 5.29 | 22.05 | 0.160 | 30.00 | -7.95 |
| 1715.00 | 10 | 16-QAM | H | 150 | 6 | 1 / 0 | 14.99 | 5.53 | **20.52** | 0.113 | 30.00 | -9.48 |
| 1717.50 | 15 | QPSK | H | 150 | 3 | 1 / 0 | 17.33 | 5.51 | **22.84** | 0.192 | 30.00 | -7.16 |
| 1732.50 | 15 | QPSK | H | 150 | 352 | 1 / 0 | 17.14 | 5.41 | 22.55 | 0.180 | 30.00 | -7.45 |
| 1747.50 | 15 | QPSK | H | 150 | 356 | 1 / 0 | 16.82 | 5.31 | 22.13 | 0.163 | 30.00 | -7.87 |
| 1717.50 | 15 | 16-QAM | H | 150 | 3 | 1 / 0 | 15.04 | 5.51 | **20.55** | 0.114 | 30.00 | -9.45 |
| 1720.00 | 20 | QPSK | H | 150 | 358 | 1 / 0 | 17.07 | 5.49 | **22.56** | 0.180 | 30.00 | -7.44 |
| 1732.50 | 20 | QPSK | H | 150 | 346 | 1 / 0 | 17.14 | 5.41 | 22.55 | 0.180 | 30.00 | -7.45 |
| 1745.00 | 20 | QPSK | H | 150 | 354 | 1 / 0 | 17.03 | 5.32 | 22.35 | 0.172 | 30.00 | -7.65 |
| 1732.50 | 20 | 16-QAM | H | 150 | 346 | 1 / 0 | 15.11 | 5.41 | **20.52** | 0.113 | 30.00 | -9.48 |
| 1711.50 | 3 | QPSK | V | 150 | 352 | 1 / 0 | 14.64 | 5.55 | 20.19 | 0.105 | 30.00 | -9.81 |

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

| 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 | 358 | 1 / 0 | 18.11 | 4.82 | **22.93** | 0.196 | 33.01 | -10.08 |
| 1880.00 | 1.4 | QPSK | V | 150 | 353 | 1 / 0 | 15.58 | 4.74 | 20.32 | 0.108 | 33.01 | -12.69 |
| 1909.30 | 1.4 | QPSK | V | 150 | 359 | 1 / 0 | 14.72 | 4.68 | 19.40 | 0.087 | 33.01 | -13.61 |
| 1850.70 | 1.4 | 16-QAM | V | 150 | 358 | 1 / 0 | 16.82 | 4.82 | **21.64** | 0.146 | 33.01 | -11.37 |
| 1851.50 | 3 | QPSK | V | 150 | 9 | 1 / 0 | 18.45 | 4.82 | **23.27** | **0.212** | 33.01 | -9.74 |
| 1880.00 | 3 | QPSK | V | 150 | 350 | 1 / 0 | 15.69 | 4.74 | 20.43 | 0.110 | 33.01 | -12.58 |
| 1908.50 | 3 | QPSK | V | 150 | 355 | 1 / 0 | 14.86 | 4.68 | 19.54 | 0.090 | 33.01 | -13.47 |
| 1851.50 | 3 | 16-QAM | V | 150 | 9 | 1 / 0 | 16.87 | 4.82 | **21.69** | 0.147 | 33.01 | -11.32 |
| 1852.50 | 5 | QPSK | V | 150 | 4 | 1 / 0 | 18.24 | 4.81 | **23.05** | 0.202 | 33.01 | -9.96 |
| 1880.00 | 5 | QPSK | V | 150 | 356 | 1 / 0 | 15.91 | 4.74 | 20.65 | 0.116 | 33.01 | -12.36 |
| 1907.50 | 5 | QPSK | V | 150 | 358 | 1 / 0 | 14.84 | 4.68 | 19.52 | 0.090 | 33.01 | -13.49 |
| 1852.50 | 5 | 16-QAM | V | 150 | 4 | 1 / 0 | 16.58 | 4.81 | **21.39** | 0.138 | 33.01 | -11.62 |
| 1855.00 | 10 | QPSK | V | 150 | 10 | 1 / 0 | 18.13 | 4.81 | **22.94** | 0.197 | 33.01 | -10.07 |
| 1880.00 | 10 | QPSK | V | 150 | 358 | 1 / 0 | 16.24 | 4.74 | 20.98 | 0.125 | 33.01 | -12.03 |
| 1905.00 | 10 | QPSK | V | 150 | 0 | 1 / 0 | 14.96 | 4.68 | 19.64 | 0.092 | 33.01 | -13.37 |
| 1855.00 | 10 | 16-QAM | V | 150 | 10 | 1 / 0 | 16.54 | 4.81 | **21.35** | 0.136 | 33.01 | -11.66 |
| 1857.50 | 15 | QPSK | V | 150 | 5 | 1 / 0 | 18.25 | 4.80 | **23.05** | 0.202 | 33.01 | -9.96 |
| 1880.00 | 15 | QPSK | V | 150 | 356 | 1 / 0 | 16.59 | 4.74 | 21.33 | 0.136 | 33.01 | -11.68 |
| 1902.50 | 15 | QPSK | V | 150 | 3 | 1 / 0 | 15.54 | 4.69 | 20.23 | 0.105 | 33.01 | -12.78 |
| 1857.50 | 15 | 16-QAM | V | 150 | 5 | 1 / 0 | 16.05 | 4.80 | **20.85** | 0.122 | 33.01 | -12.16 |
| 1860.00 | 20 | QPSK | V | 150 | 8 | 1 / 0 | 17.99 | 4.79 | **22.78** | 0.190 | 33.01 | -10.23 |
| 1880.00 | 20 | QPSK | V | 150 | 350 | 1 / 0 | 16.63 | 4.74 | 21.37 | 0.137 | 33.01 | -11.64 |
| 1900.00 | 20 | QPSK | V | 150 | 352 | 1 / 0 | 15.44 | 4.69 | 20.13 | 0.103 | 33.01 | -12.88 |
| 1860.00 | 20 | 16-QAM | V | 150 | 8 | 1 / 0 | 16.36 | 4.79 | **21.15** | 0.130 | 33.01 | -11.86 |
| 1851.50 | 3 | QPSK | H | 150 | 357 | 1 / 0 | 17.54 | 4.82 | 22.36 | 0.172 | 33.01 | -10.65 |

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

| Frequency [MHz] | Channel Bandwidth [MHz] | Mod. | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | RB Size/Offset | Substitute Level [dBm] | Ant. Gain [dBi] | EIRP [dBm] | EIRP [Watts] | EIRP Limit [dBm] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2502.50 | 5 | QPSK | H | 150 | 129 | 1 / 24 | 17.41 | 5.74 | 23.15 | 0.207 | 33.01 | -9.86 |
| 2535.00 | 5 | QPSK | H | 150 | 126 | 1 / 24 | 18.03 | 5.86 | 23.89 | 0.245 | 33.01 | -9.12 |
| 2567.50 | 5 | QPSK | H | 150 | 113 | 1 / 0 | 18.00 | 5.98 | **23.98** | 0.250 | 33.01 | -9.03 |
| 2535.00 | 5 | 16-QAM | H | 150 | 126 | 1 / 24 | 16.96 | 5.86 | **22.82** | 0.191 | 33.01 | -10.19 |
| 2505.00 | 10 | QPSK | H | 150 | 352 | 1 / 49 | 17.48 | 5.75 | 23.23 | 0.210 | 33.01 | -9.78 |
| 2535.00 | 10 | QPSK | H | 150 | 120 | 1 / 0 | 17.78 | 5.86 | 23.64 | 0.231 | 33.01 | -9.37 |
| 2565.00 | 10 | QPSK | H | 150 | 115 | 1 / 0 | 17.89 | 5.97 | **23.86** | 0.243 | 33.01 | -9.15 |
| 2565.00 | 10 | 16-QAM | H | 150 | 115 | 1 / 0 | 16.91 | 5.97 | **22.88** | 0.194 | 33.01 | -10.13 |
| 2507.50 | 15 | QPSK | H | 150 | 139 | 1 / 74 | 17.93 | 5.76 | 23.69 | 0.234 | 33.01 | -9.32 |
| 2535.00 | 15 | QPSK | H | 150 | 123 | 1 / 74 | 18.14 | 5.86 | **24.00** | 0.251 | 33.01 | -9.01 |
| 2562.50 | 15 | QPSK | H | 150 | 120 | 1 / 0 | 17.74 | 5.96 | 23.70 | 0.235 | 33.01 | -9.31 |
| 2535.00 | 15 | 16-QAM | H | 150 | 123 | 1 / 74 | 17.03 | 5.86 | **22.89** | 0.195 | 33.01 | -10.12 |
| 2510.00 | 20 | QPSK | H | 150 | 129 | 1 / 99 | 17.59 | 5.77 | 23.36 | 0.217 | 33.01 | -9.65 |
| 2535.00 | 20 | QPSK | H | 150 | 115 | 1 / 99 | 18.16 | 5.86 | **24.02** | **0.252** | 33.01 | -8.99 |
| 2560.00 | 20 | QPSK | H | 150 | 239 | 1 / 0 | 17.83 | 5.95 | 23.78 | 0.239 | 33.01 | -9.23 |
| 2535.00 | 20 | 16-QAM | H | 150 | 115 | 1 / 99 | 16.91 | 5.86 | **22.77** | 0.189 | 33.01 | -10.24 |
| 2535.00 | 20 | QPSK | V | 150 | 38 | 1 / 99 | 11.26 | 5.86 | 17.12 | 0.052 | 33.01 | -15.89 |

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

## 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

## Test Setup

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

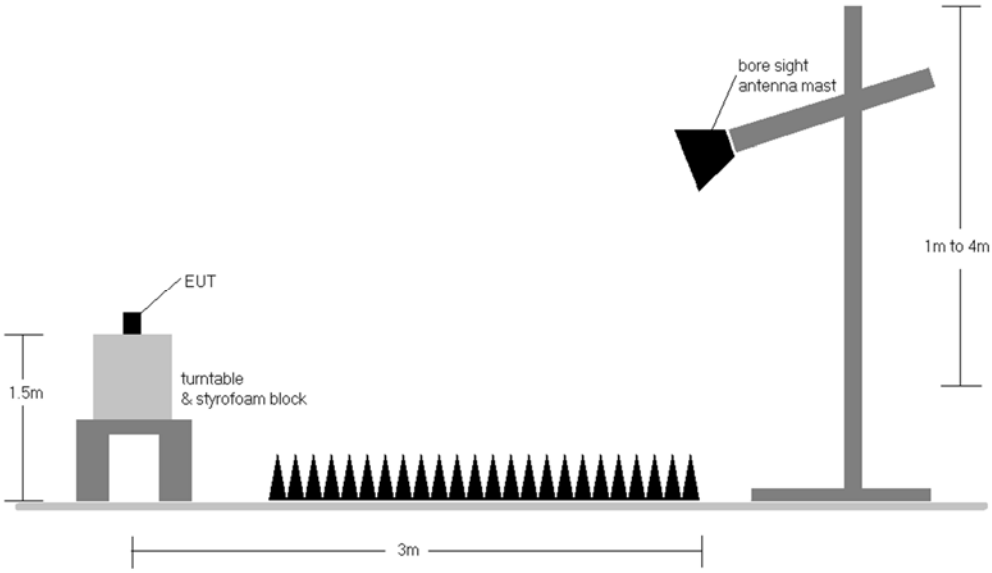



**Figure 7-7. Test Instrument & Measurement Setup**

## 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.

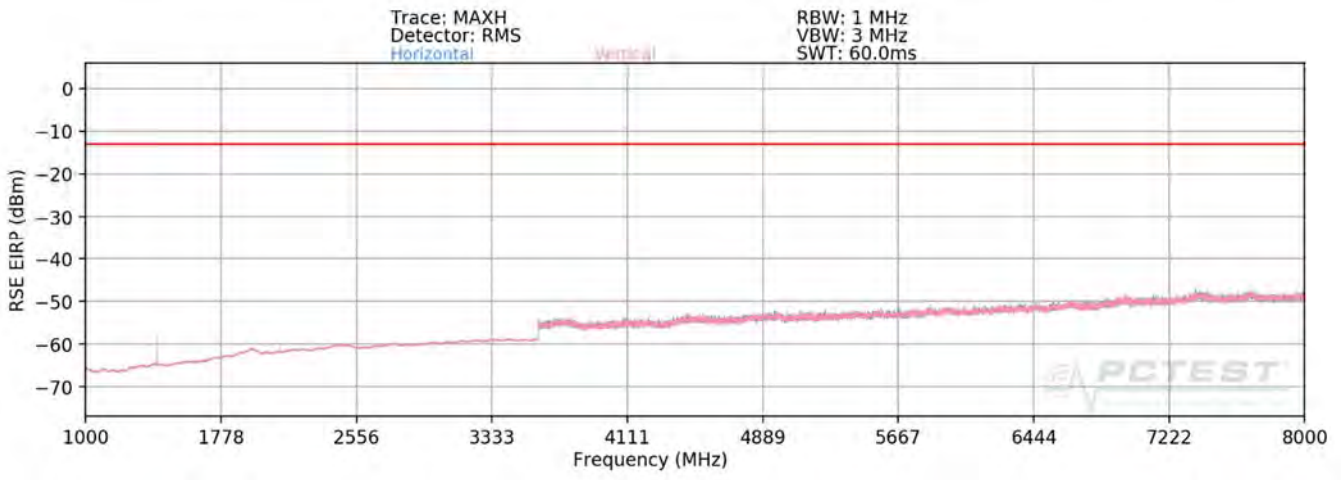
2) This unit was tested with its standard battery.

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.

## Band 12




**Plot 7-190. 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 | 224 | 149 | -71.95 | 4.39 | -67.55 | -54.6 |
| 2104.50 | H | 109 | 169 | -66.95 | 5.27 | -61.69 | -48.7 |
| 2806.00 | H | - | - | -74.99 | 6.98 | -68.01 | -55.0 |

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

| | | |
|---|---|---|
| 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 | 112 | 208 | -72.64 | 4.56 | -68.08 | -55.1 |
| 2122.50 | H | 110 | 128 | -64.74 | 5.31 | -59.43 | -46.4 |
| 2830.00 | H | 392 | 169 | -74.25 | 7.02 | -67.24 | -54.2 |
| 3537.50 | H | - | - | -73.31 | 8.52 | -64.79 | -51.8 |

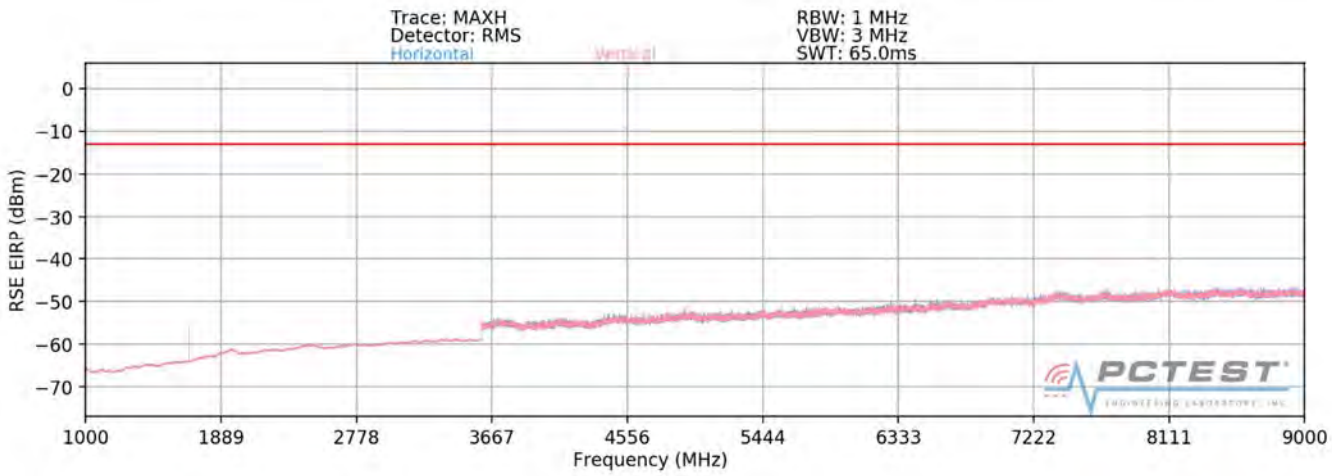
**Table 7-9. Radiated Spurious Data (Band 12 – Mid Channel)**

| | | |
|---|---|---|
| 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 | 394 | 132 | -73.89 | 4.72 | -69.17 | -56.2 |
| 2140.50 | H | 248 | 120 | -63.83 | 5.35 | -58.48 | -45.5 |
| 2854.00 | H | - | - | -74.21 | 7.05 | -67.16 | -54.2 |

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

## Band 5




**Plot 7-191. Radiated Spurious Plot above 1GHz (Band 5)**

| | | |
|---|---|---|
| OPERATING FREQUENCY: | 826.50 | MHz |
| CHANNEL: | 20425 | |
| 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] |
|---|---|---|---|---|---|---|---|
| 1653.00 | H | 264 | 166 | -64.10 | 3.61 | -60.50 | -47.5 |
| 2479.50 | H | 359 | 350 | -65.30 | 4.23 | -61.07 | -48.1 |
| 3306.00 | H | - | - | -67.28 | 5.80 | -61.48 | -48.5 |

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

| | | |
|---|---|---|
| OPERATING FREQUENCY: | 836.50 | MHz |
| CHANNEL: | 20525 | |
| 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] |
|---|---|---|---|---|---|---|---|
| 1673.00 | H | 136 | 346 | -61.87 | 3.62 | -58.25 | -45.3 |
| 2509.50 | H | 109 | 140 | -66.16 | 4.33 | -61.83 | -48.8 |
| 3346.00 | H | - | - | -66.82 | 5.92 | -60.90 | -47.9 |

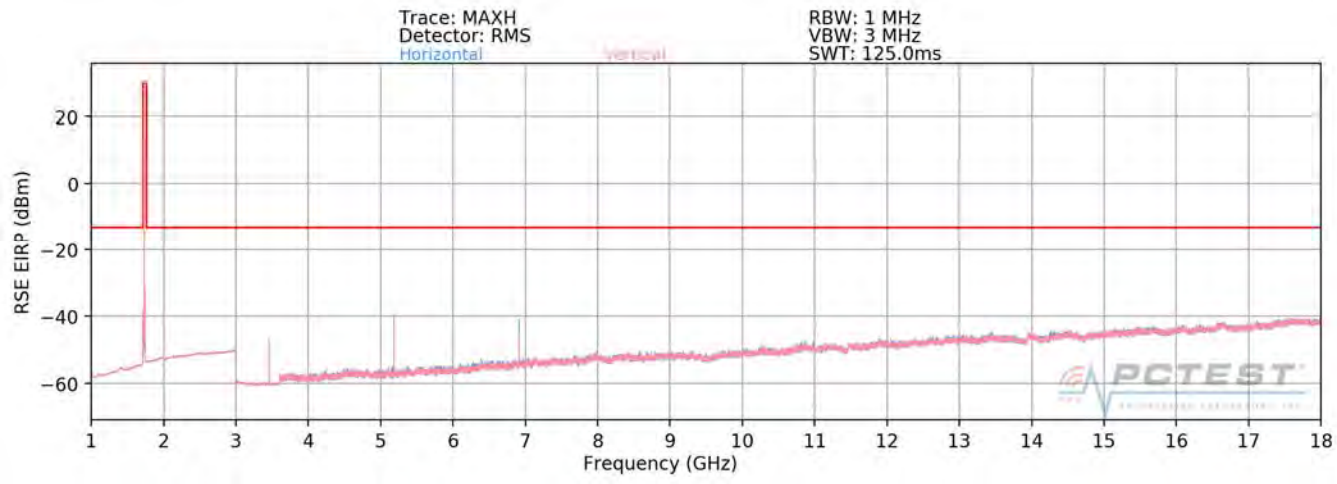
**Table 7-12. Radiated Spurious Data (Band 5 – Mid Channel)**

| | | |
|---|---|---|
| OPERATING FREQUENCY: | 846.50 | MHz |
| CHANNEL: | 20625 | |
| 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] |
|---|---|---|---|---|---|---|---|
| 1693.00 | H | 101 | 21 | -57.38 | 3.63 | -53.75 | -40.7 |
| 2539.50 | H | 196 | 326 | -66.31 | 4.52 | -61.79 | -48.8 |

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

## Band 4




**Plot 7-192. Radiated Spurious Plot above 1GHz (Band 4)**

| | | |
|---|---|---|
| OPERATING FREQUENCY: | 1711.50 | MHz |
| CHANNEL: | 19965 | |
| 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] |
|---|---|---|---|---|---|---|---|
| 3423.00 | V | 159 | 315 | -46.83 | 6.20 | -40.63 | -27.6 |
| 5134.50 | V | 192 | 13 | -52.65 | 8.66 | -43.99 | -31.0 |
| 6846.00 | V | 362 | 21 | -51.43 | 8.77 | -42.65 | -29.7 |
| 8557.50 | V | 127 | 2 | -66.29 | 9.12 | -57.16 | -44.2 |
| 10269.00 | V | 168 | 73 | -60.93 | 9.64 | -51.30 | -38.3 |
| 11980.50 | V | - | - | -62.57 | 9.30 | -53.27 | -40.3 |
| 13692.00 | V | - | - | -62.07 | 9.02 | -53.04 | -40.0 |

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

| | | |
|---|---|---|
| OPERATING FREQUENCY: | 1732.50 | MHz |
| CHANNEL: | 20175 | |
| 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] |
|---|---|---|---|---|---|---|---|
| 3465.00 | V | 208 | 329 | -51.74 | 6.27 | -45.47 | -32.5 |
| 5197.50 | V | 169 | 11 | -49.53 | 8.71 | -40.82 | -27.8 |
| 6930.00 | V | 286 | 3 | -52.02 | 8.72 | -43.31 | -30.3 |
| 8662.50 | V | 166 | 364 | -66.63 | 9.27 | -57.36 | -44.4 |
| 10395.00 | V | 167 | 82 | -62.93 | 9.61 | -53.32 | -40.3 |
| 12127.50 | V | - | - | -63.79 | 9.16 | -54.63 | -41.6 |
| 13860.00 | V | - | - | -61.13 | 9.00 | -52.13 | -39.1 |

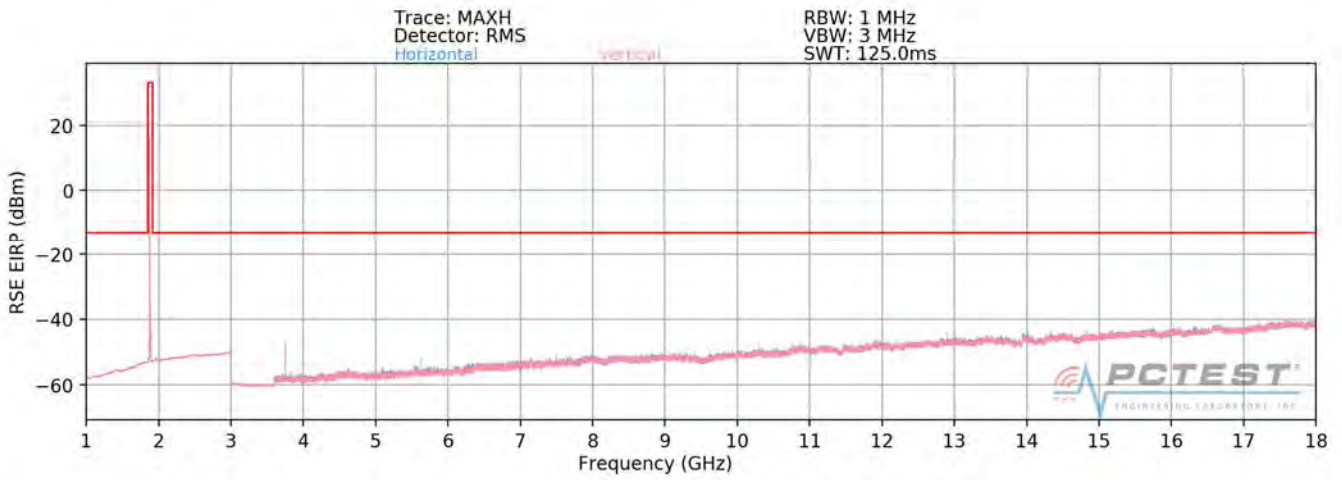
**Table 7-15. Radiated Spurious Data (Band 4 – Mid Channel)**

| | | |
|---|---|---|
| OPERATING FREQUENCY: | 1753.50 | MHz |
| CHANNEL: | 20385 | |
| 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] |
|---|---|---|---|---|---|---|---|
| 3507.00 | V | 223 | 323 | -54.71 | 6.34 | -48.36 | -35.4 |
| 5260.50 | V | 204 | 3 | -52.20 | 8.72 | -43.48 | -30.5 |
| 7014.00 | V | 333 | 8 | -53.29 | 8.75 | -44.54 | -31.5 |
| 8767.50 | V | 152 | 358 | -66.48 | 9.49 | -56.98 | -44.0 |
| 10521.00 | V | 370 | 14 | -63.95 | 9.61 | -54.34 | -41.3 |
| 12274.50 | V | - | - | -62.96 | 9.08 | -53.88 | -40.9 |
| 14028.00 | V | - | - | -61.95 | 8.90 | -53.05 | -40.1 |

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

## Band 2




**Plot 7-193. 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 | V | 124 | 129 | -56.27 | 6.56 | -49.70 | -36.7 |
| 5554.50 | V | 118 | 345 | -54.62 | 8.72 | -45.90 | -32.9 |
| 7406.00 | V | 342 | 18 | -61.82 | 8.41 | -53.41 | -40.4 |
| 9257.50 | V | - | - | -67.77 | 9.45 | -58.32 | -45.3 |
| 11109.00 | V | - | - | -65.60 | 9.31 | -56.29 | -43.3 |

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

| | | |
|---|---|---|
| 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 | V | 122 | 131 | -56.34 | 6.67 | -49.67 | -36.7 |
| 5640.00 | V | 123 | 347 | -60.43 | 8.81 | -51.62 | -38.6 |
| 7520.00 | V | 336 | 14 | -64.14 | 8.48 | -55.66 | -42.7 |
| 9400.00 | V | - | - | -66.52 | 9.32 | -57.20 | -44.2 |
| 11280.00 | V | - | - | -64.98 | 9.24 | -55.74 | -42.7 |

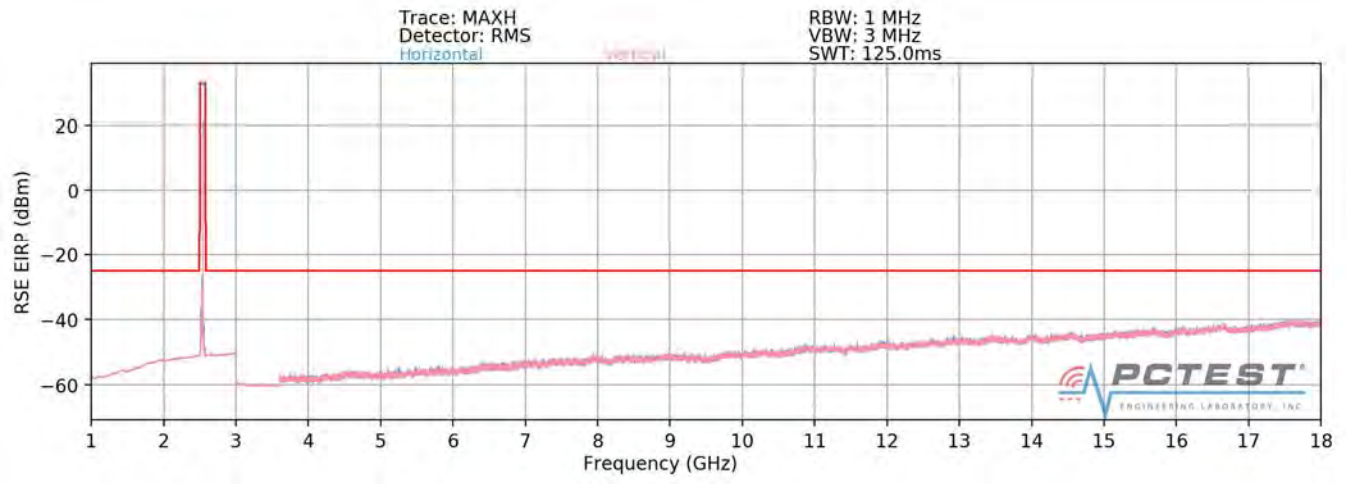
**Table 7-18. Radiated Spurious Data (Band 2 – Mid Channel)**

| | | |
|---|---|---|
| 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 | V | 143 | 128 | -56.56 | 6.98 | -49.58 | -36.6 |
| 5725.50 | V | 350 | 350 | -56.38 | 8.77 | -47.61 | -34.6 |
| 7634.00 | V | 330 | 272 | -65.99 | 8.53 | -57.46 | -44.5 |
| 9542.50 | V | 135 | 84 | -65.54 | 9.42 | -56.12 | -43.1 |
| 11451.00 | V | - | - | -64.30 | 9.17 | -55.13 | -42.1 |
| 13359.50 | V | - | - | -63.04 | 8.87 | -54.17 | -41.2 |

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

## Band 7




**Plot 7-194. Radiated Spurious Plot above 1GHz (Band 7)**

| | | |
|---|---|---|
| OPERATING FREQUENCY: | 2510.00 | MHz |
| CHANNEL: | 20850 | |
| MODULATION SIGNAL: | QPSK | |
| BANDWIDTH: | 20.0 | MHz |
| DISTANCE: | 3 | meters |
| LIMIT: | -25 | dBm |

| Frequency [MHz] | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Level at Antenna Terminals [dBm] | Substitute Antenna Gain [dBi] | Spurious Emission Level [dBm] | Margin [dB] |
|---|---|---|---|---|---|---|---|
| 5020.00 | H | 108 | 344 | -57.86 | 8.56 | -49.30 | -24.3 |
| 7530.00 | H | 277 | 18 | -58.35 | 8.46 | -49.89 | -24.9 |
| 10040.00 | H | 277 | 359 | -56.24 | 9.85 | -46.39 | -21.4 |
| 12550.00 | H | - | - | -59.48 | 9.06 | -50.43 | -25.4 |

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

| | | |
|---|---|---|
| OPERATING FREQUENCY: | 2535.00 | MHz |
| CHANNEL: | 21100 | |
| MODULATION SIGNAL: | QPSK | |
| BANDWIDTH: | 20.0 | MHz |
| DISTANCE: | 3 | meters |
| LIMIT: | -25 | dBm |

| Frequency [MHz] | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Level at Antenna Terminals [dBm] | Substitute Antenna Gain [dBi] | Spurious Emission Level [dBm] | Margin [dB] |
|---|---|---|---|---|---|---|---|
| 5070.00 | H | 115 | 42 | -58.56 | 8.60 | -49.96 | -25.0 |
| 7605.00 | H | 222 | 19 | -60.65 | 8.48 | -52.16 | -27.2 |
| 10140.00 | H | 245 | 350 | -56.32 | 9.78 | -46.54 | -21.5 |
| 12675.00 | H | - | - | -59.02 | 9.08 | -49.94 | -24.9 |
| 25350.00 | V | - | - | -66.98 | 12.03 | -54.95 | -29.9 |

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

| | | |
|---|---|---|
| OPERATING FREQUENCY: | 2560.00 | MHz |
| CHANNEL: | 21350 | |
| MODULATION SIGNAL: | QPSK | |
| BANDWIDTH: | 20.0 | MHz |
| DISTANCE: | 3 | meters |
| LIMIT: | -25 | dBm |

| Frequency [MHz] | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Level at Antenna Terminals [dBm] | Substitute Antenna Gain [dBi] | Spurious Emission Level [dBm] | Margin [dB] |
|---|---|---|---|---|---|---|---|
| 5120.00 | H | 106 | 151 | -58.45 | 8.66 | -49.79 | -24.8 |
| 7680.00 | H | 263 | 329 | -59.13 | 8.58 | -50.55 | -25.6 |
| 10240.00 | H | 223 | 342 | -54.09 | 9.65 | -44.43 | -19.4 |
| 12800.00 | H | - | - | -58.54 | 9.07 | -49.47 | -24.5 |

**Table 7-22. Radiated Spurious Data (Band 7 – High Channel)**

## 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

## Band 12 Frequency Stability Measurements

| | | |
|---|---|---|
| OPERATING FREQUENCY: | 707,500,000 | Hz |
| CHANNEL: | 23790 | |
| REFERENCE VOLTAGE: | 4.21 | VDC |

| VOLTAGE (%) | POWER (VDC) | TEMP (°C) | FREQUENCY (Hz) | Freq. Dev. (Hz) | Deviation (%) |
|---|---|---|---|---|---|
| 100 % | 4.21 | + 20 (Ref) | 707,499,938 | -62 | -0.0000088 |
| 100 % | | - 30 | 707,500,339 | 339 | 0.0000479 |
| 100 % | | - 20 | 707,500,042 | 42 | 0.0000059 |
| 100 % | | - 10 | 707,500,058 | 58 | 0.0000082 |
| 100 % | | 0 | 707,500,117 | 117 | 0.0000165 |
| 100 % | | + 10 | 707,499,568 | -432 | -0.0000611 |
| 100 % | | + 20 | 707,499,984 | -16 | -0.0000023 |
| 100 % | | + 30 | 707,500,329 | 329 | 0.0000465 |
| 100 % | | + 40 | 707,499,892 | -108 | -0.0000153 |
| 100 % | | + 50 | 707,499,895 | -105 | -0.0000148 |
| BATT. ENDPOINT | 3.62 | + 20 | 707,499,901 | -99 | -0.0000140 |

**Table 7-23. 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.

## Band 12 Frequency Stability Measurements

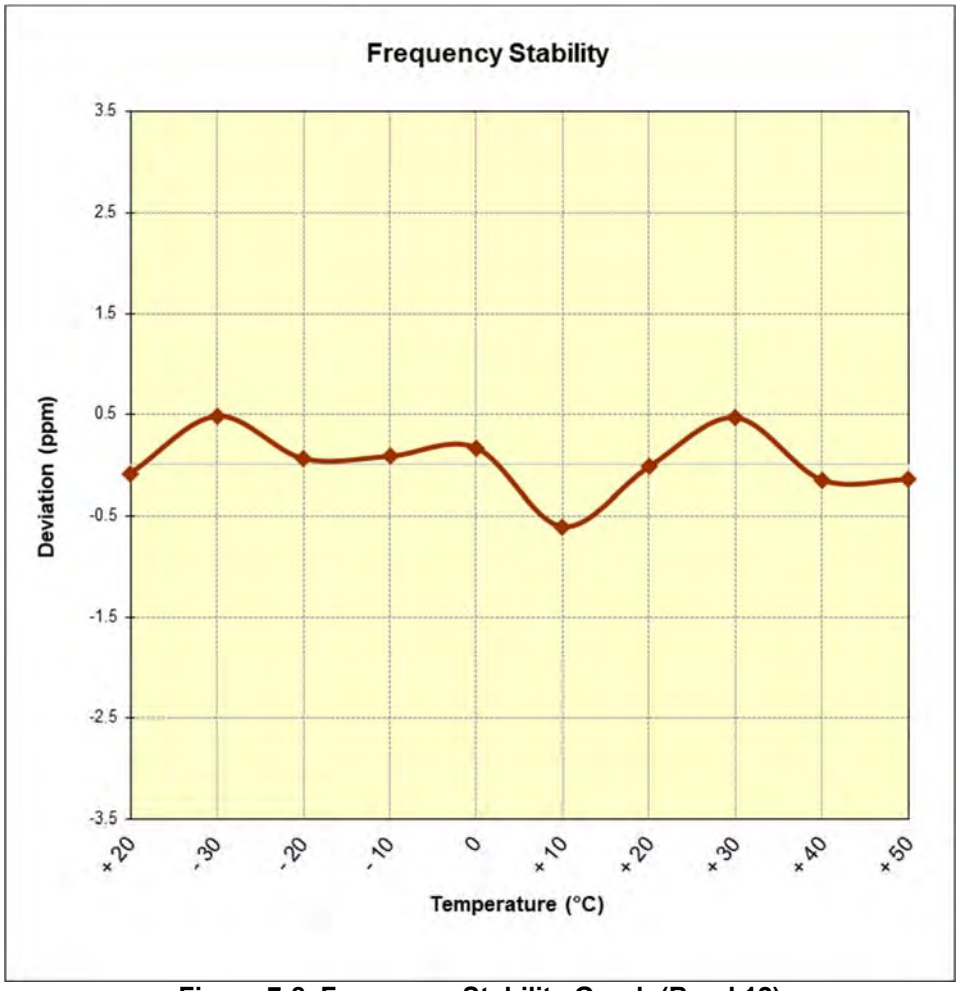



**Figure 7-8. Frequency Stability Graph (Band 12)**

## Band 5 Frequency Stability Measurements

| | | |
|---|---|---|
| OPERATING FREQUENCY: | 836,500,000 | Hz |
| CHANNEL: | 20525 | |
| REFERENCE VOLTAGE: | 4.21 | VDC |
| DEVIATION LIMIT: | ± 0.00025 % or 2.5 ppm | |

| VOLTAGE (%) | POWER (VDC) | TEMP (°C) | FREQUENCY (Hz) | Freq. Dev. (Hz) | Deviation (%) |
|---|---|---|---|---|---|
| 100 % | 4.21 | + 20 (Ref) | 836,499,761 | -239 | -0.0000286 |
| 100 % | | - 30 | 836,500,399 | 399 | 0.0000477 |
| 100 % | | - 20 | 836,500,094 | 94 | 0.0000112 |
| 100 % | | - 10 | 836,500,256 | 256 | 0.0000306 |
| 100 % | | 0 | 836,500,022 | 22 | 0.0000026 |
| 100 % | | + 10 | 836,499,933 | -67 | -0.0000080 |
| 100 % | | + 20 | 836,500,060 | 60 | 0.0000072 |
| 100 % | | + 30 | 836,500,277 | 277 | 0.0000331 |
| 100 % | | + 40 | 836,499,839 | -161 | -0.0000192 |
| 100 % | | + 50 | 836,499,762 | -238 | -0.0000285 |
| BATT. ENDPOINT | 3.62 | + 20 | 836,500,005 | 5 | 0.0000006 |

**Table 7-24. Frequency Stability Data (Band 5)**

## Band 5 Frequency Stability Measurements

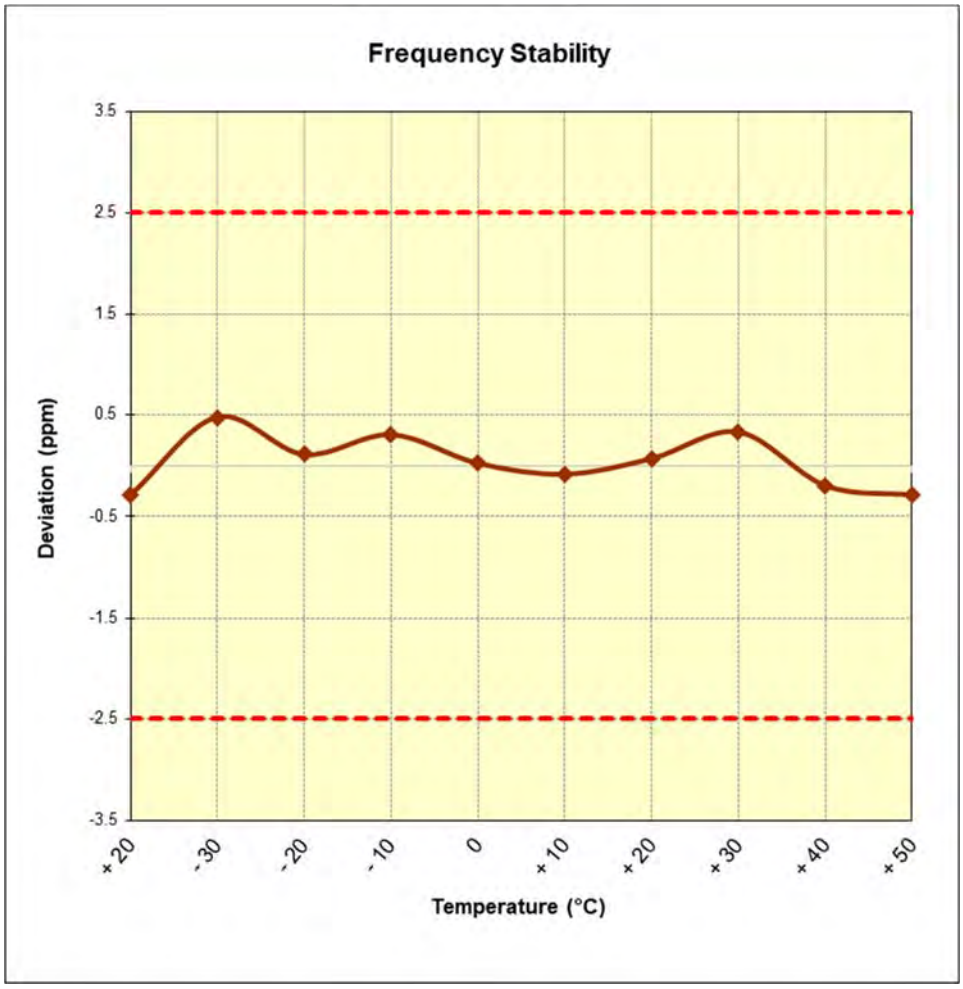



**Figure 7-9. Frequency Stability Graph (Band 5)**

## Band 4 Frequency Stability Measurements

| | | |
|---|---|---|
| OPERATING FREQUENCY: | 1,732,500,000 | Hz |
| CHANNEL: | 20175 | |
| REFERENCE VOLTAGE: | 4.21 | VDC |

| VOLTAGE (%) | POWER (VDC) | TEMP (°C) | FREQUENCY (Hz) | Freq. Dev. (Hz) | Deviation (%) |
|---|---|---|---|---|---|
| 100 % | 4.21 | + 20 (Ref) | 1,732,500,202 | 202 | 0.0000117 |
| 100 % | | - 30 | 1,732,499,997 | -3 | -0.0000002 |
| 100 % | | - 20 | 1,732,500,226 | 226 | 0.0000130 |
| 100 % | | - 10 | 1,732,500,306 | 306 | 0.0000177 |
| 100 % | | 0 | 1,732,500,027 | 27 | 0.0000016 |
| 100 % | | + 10 | 1,732,499,671 | -329 | -0.0000190 |
| 100 % | | + 20 | 1,732,500,288 | 288 | 0.0000166 |
| 100 % | | + 30 | 1,732,499,991 | -9 | -0.0000005 |
| 100 % | | + 40 | 1,732,500,299 | 299 | 0.0000173 |
| 100 % | | + 50 | 1,732,499,953 | -47 | -0.0000027 |
| BATT. ENDPOINT | 3.62 | + 20 | 1,732,499,744 | -256 | -0.0000148 |

**Table 7-25. Frequency Stability Data (Band 4)**

**Note:**

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

## Band 4 Frequency Stability Measurements

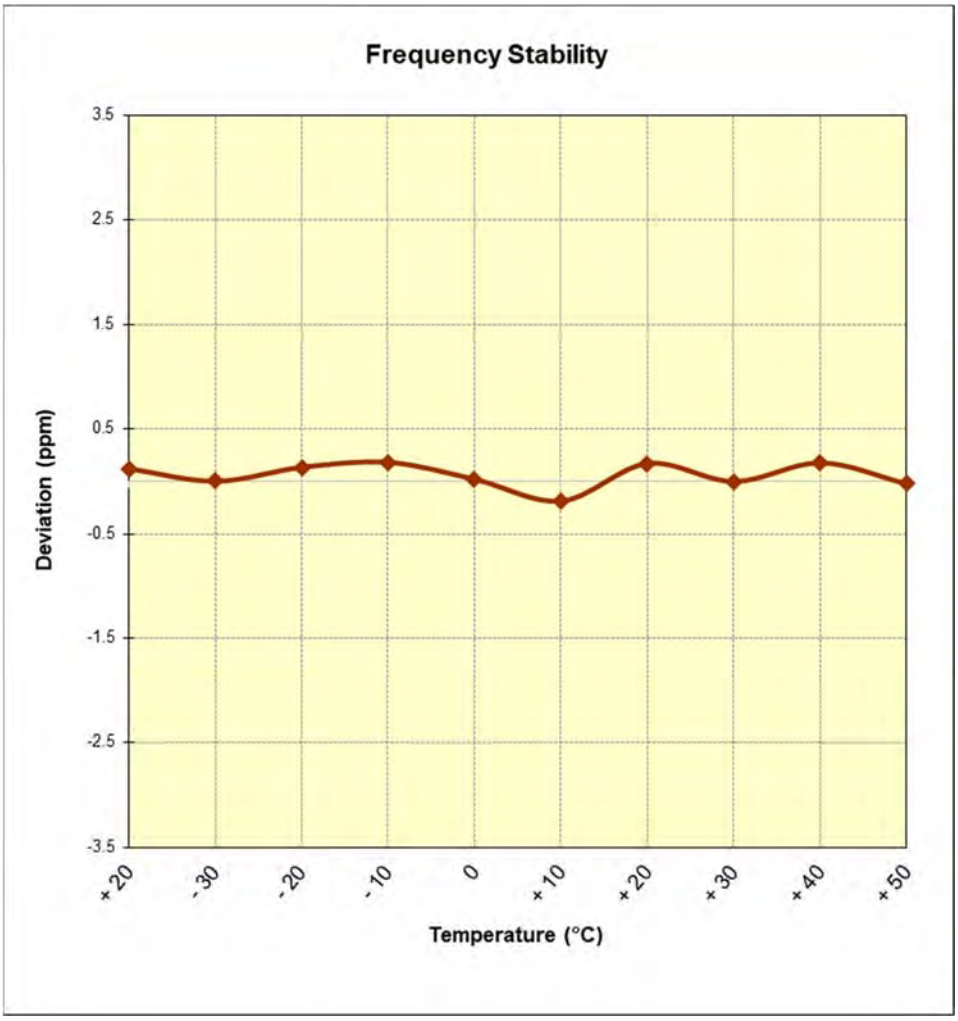



**Figure 7-10. Frequency Stability Graph (Band 4)**

## Band 2 Frequency Stability Measurements

| | | |
|---|---|---|
| OPERATING FREQUENCY: | 1,880,000,000 | Hz |
| CHANNEL: | 18900 | |
| REFERENCE VOLTAGE: | 4.21 | VDC |
| DEVIATION LIMIT: | ± 0.00025 % or 2.5 ppm | |

| VOLTAGE (%) | POWER (VDC) | TEMP (°C) | FREQUENCY (Hz) | Freq. Dev. (Hz) | Deviation (%) |
|---|---|---|---|---|---|
| 100 % | 4.21 | + 20 (Ref) | 1,879,999,621 | -379 | -0.0000202 |
| 100 % | | - 30 | 1,880,000,018 | 18 | 0.0000010 |
| 100 % | | - 20 | 1,879,999,857 | -143 | -0.0000076 |
| 100 % | | - 10 | 1,879,999,961 | -39 | -0.0000021 |
| 100 % | | 0 | 1,879,999,873 | -127 | -0.0000068 |
| 100 % | | + 10 | 1,879,999,944 | -56 | -0.0000030 |
| 100 % | | + 20 | 1,880,000,206 | 206 | 0.0000110 |
| 100 % | | + 30 | 1,879,999,887 | -113 | -0.0000060 |
| 100 % | | + 40 | 1,879,999,811 | -189 | -0.0000101 |
| 100 % | | + 50 | 1,879,999,888 | -112 | -0.0000060 |
| BATT. ENDPOINT | 3.62 | + 20 | 1,880,000,014 | 14 | 0.0000007 |

**Table 7-26. Frequency Stability Data (Band 2)**

.

## Band 2 Frequency Stability Measurements

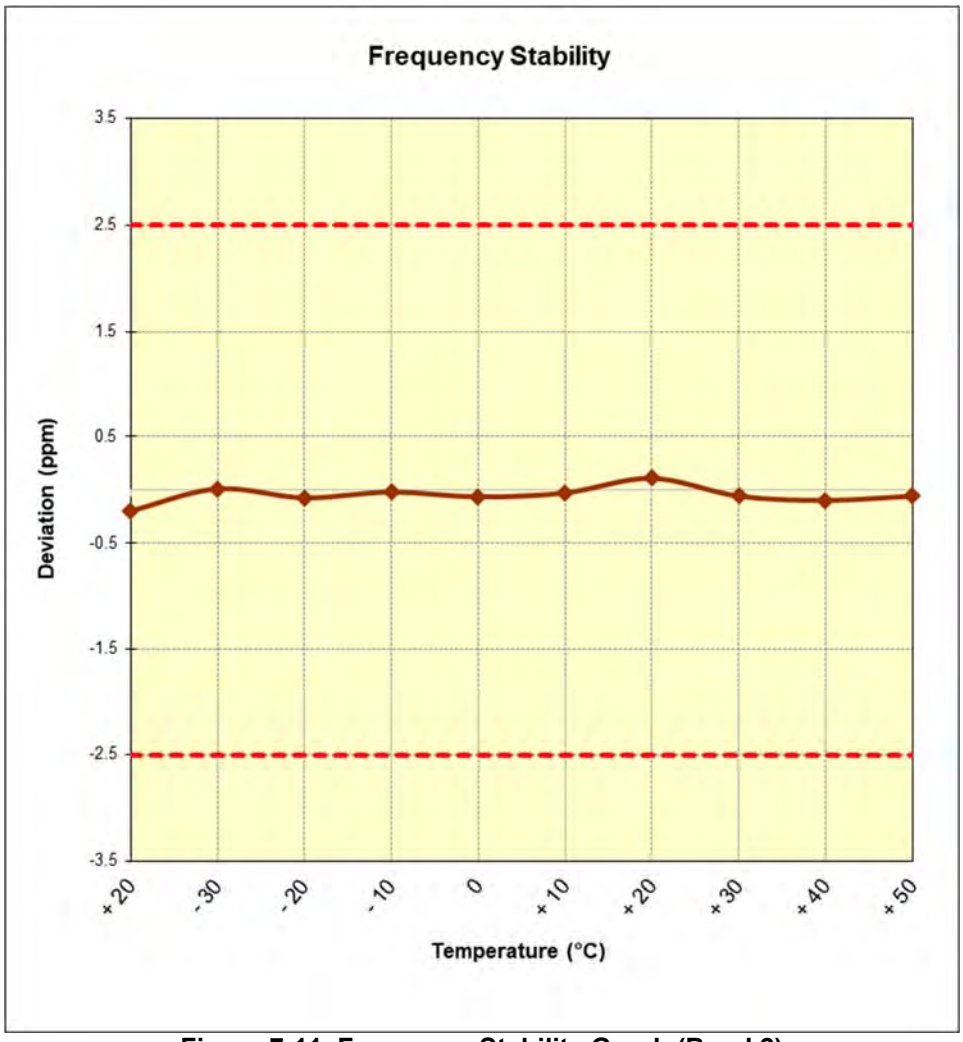



**Figure 7-11. Frequency Stability Graph (Band 2)**

## Band 7 Frequency Stability Measurements

| | | |
|---|---|---|
| OPERATING FREQUENCY: | 2,535,000,000 | Hz |
| CHANNEL: | 21100 | |
| REFERENCE VOLTAGE: | 4.21 | VDC |

| VOLTAGE (%) | POWER (VDC) | TEMP (°C) | FREQUENCY (Hz) | Freq. Dev. (Hz) | Deviation (%) |
|---|---|---|---|---|---|
| 100 % | 4.21 | + 20 (Ref) | 2,534,999,697 | -303 | -0.0000120 |
| 100 % | | - 30 | 2,534,999,806 | -194 | -0.0000077 |
| 100 % | | - 20 | 2,535,000,164 | 164 | 0.0000065 |
| 100 % | | - 10 | 2,535,000,208 | 208 | 0.0000082 |
| 100 % | | 0 | 2,534,999,857 | -143 | -0.0000056 |
| 100 % | | + 10 | 2,535,000,307 | 307 | 0.0000121 |
| 100 % | | + 20 | 2,535,000,008 | 8 | 0.0000003 |
| 100 % | | + 30 | 2,534,999,990 | -10 | -0.0000004 |
| 100 % | | + 40 | 2,535,000,286 | 286 | 0.0000113 |
| 100 % | | + 50 | 2,534,999,849 | -151 | -0.0000060 |
| BATT. ENDPOINT | 3.62 | + 20 | 2,534,999,675 | -325 | -0.0000128 |

**Table 7-27. Frequency Stability Data (Band 7)**

**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.

## Band 7 Frequency Stability Measurements

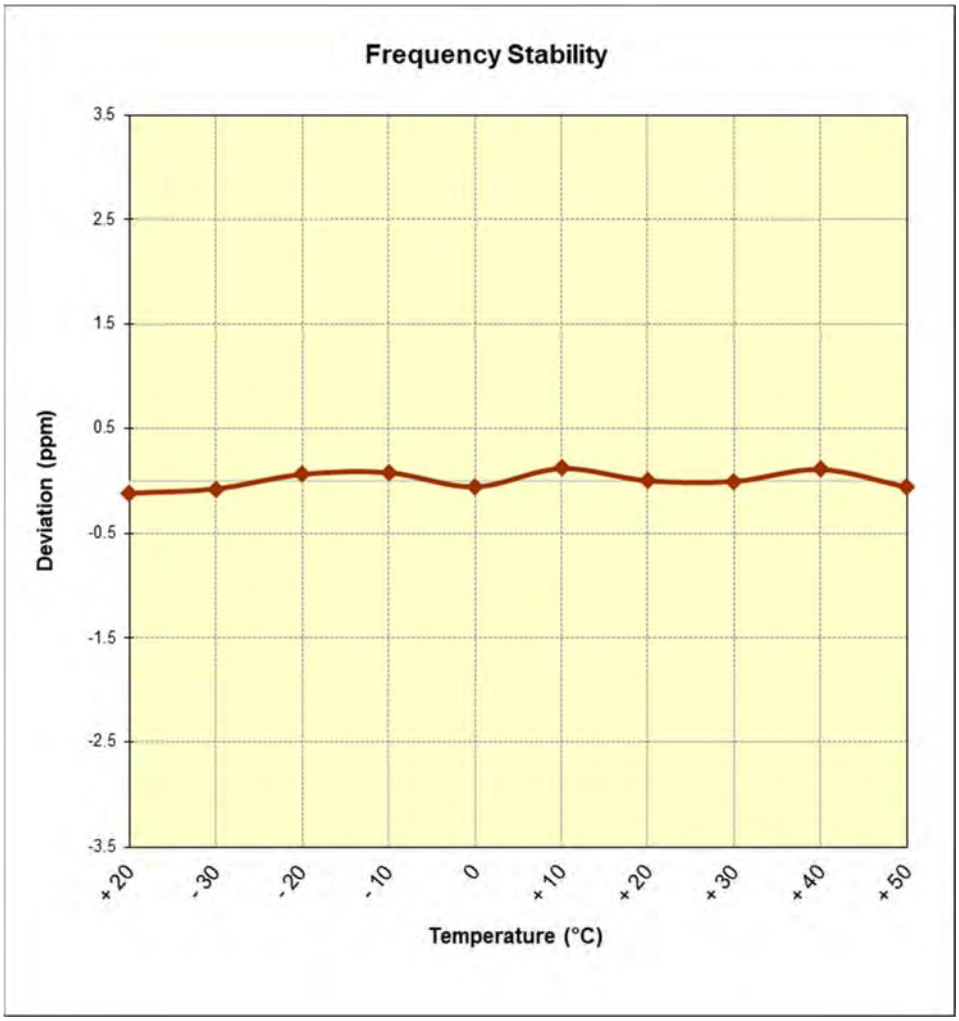



**Figure 7-12. Frequency Stability Graph (Band 7)**

# 8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **Samsung Portable Handset FCC ID: A3LSMJ260AZ** complies with all the requirements of Part 22, 24, & 27 of the FCC Rules for LTE operation only.