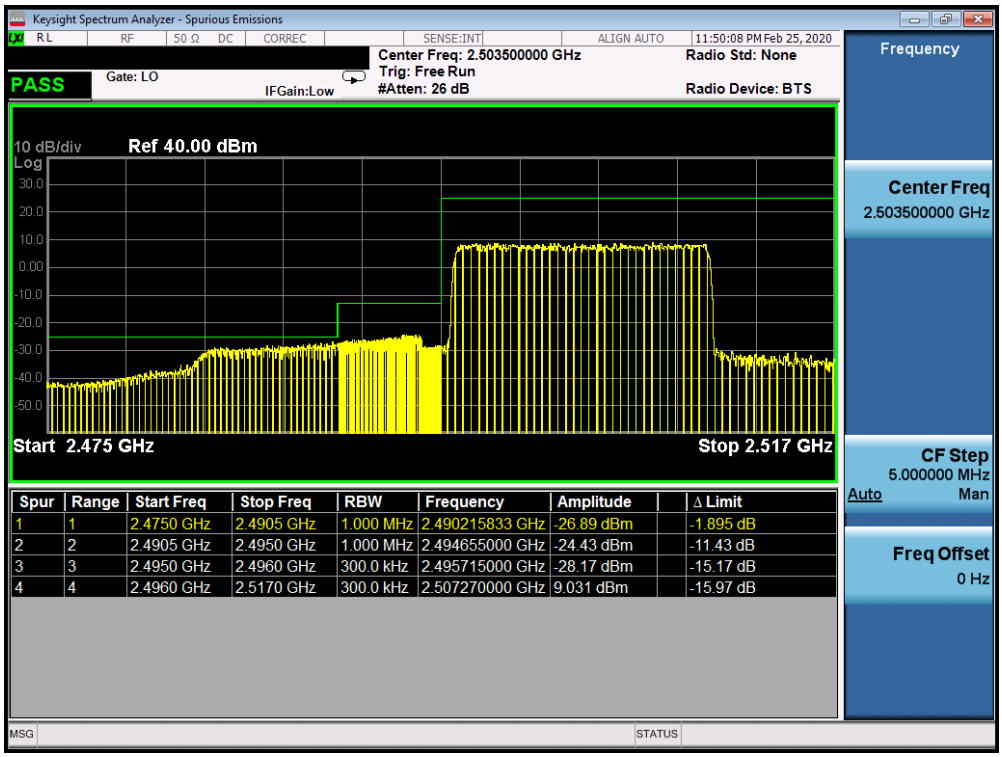
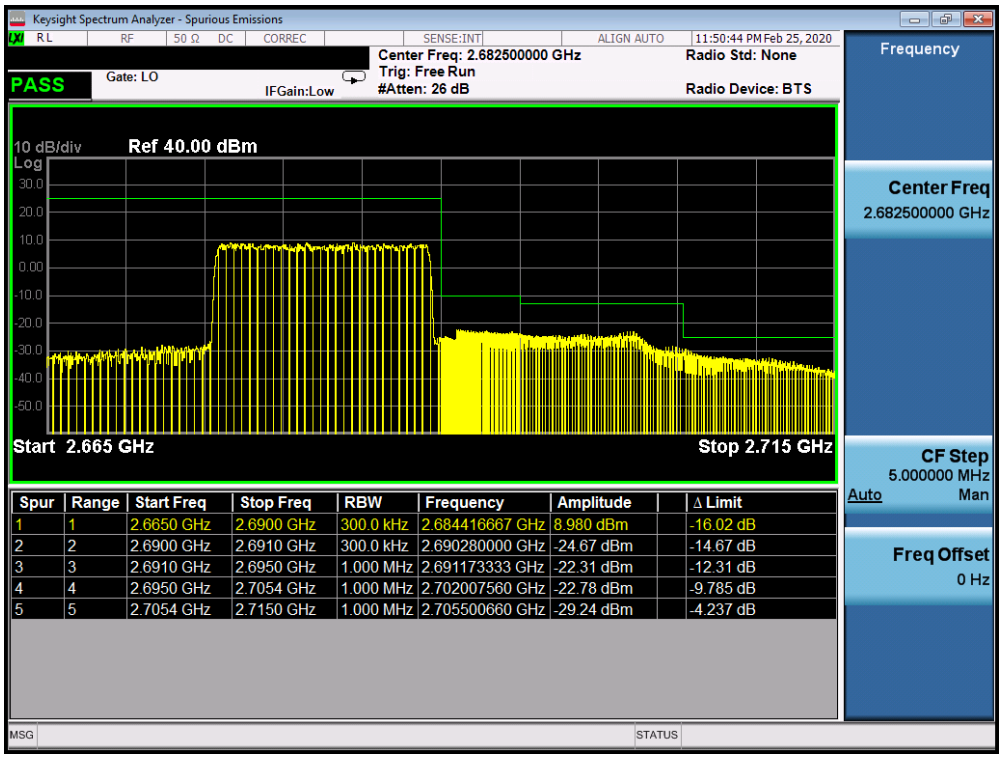



| Spur | Range | Start Freq | Stop Freq | RBW | Frequency | Amplitude | Δ Limit |
|---|---|---|---|---|---|---|---|
| 1 | 1 | 2.4750 GHz | 2.4905 GHz | 1.000 MHz | 2.490215833 GHz | -26.89 dBm | -1.895 dB |
| 2 | 2 | 2.4905 GHz | 2.4950 GHz | 1.000 MHz | 2.494655000 GHz | -24.43 dBm | -11.43 dB |
| 3 | 3 | 2.4950 GHz | 2.4960 GHz | 300.0 kHz | 2.495715000 GHz | -28.17 dBm | -15.17 dB |
| 4 | 4 | 2.4960 GHz | 2.5170 GHz | 300.0 kHz | 2.507270000 GHz | 9.031 dBm | -15.97 dB |

**Plot 7-273. Lower ACP Plot at 2496 MHz (Band 41 PC2 - 15.0MHz QPSK - Full RB Configuration)**




| Spur | Range | Start Freq | Stop Freq | RBW | Frequency | Amplitude | Δ Limit |
|---|---|---|---|---|---|---|---|
| 1 | 1 | 2.6650 GHz | 2.6900 GHz | 300.0 kHz | 2.684416667 GHz | 8.980 dBm | -16.02 dB |
| 2 | 2 | 2.6900 GHz | 2.6910 GHz | 300.0 kHz | 2.690280000 GHz | -24.67 dBm | -14.67 dB |
| 3 | 3 | 2.6910 GHz | 2.6950 GHz | 1.000 MHz | 2.691173333 GHz | -22.31 dBm | -12.31 dB |
| 4 | 4 | 2.6950 GHz | 2.7054 GHz | 1.000 MHz | 2.702007560 GHz | -22.78 dBm | -9.785 dB |
| 5 | 5 | 2.7054 GHz | 2.7150 GHz | 1.000 MHz | 2.705500660 GHz | -29.24 dBm | -4.237 dB |

**Plot 7-274. Upper ACP Plot (Band 41 PC2 - 15.0MHz QPSK - Full RB Configuration)**



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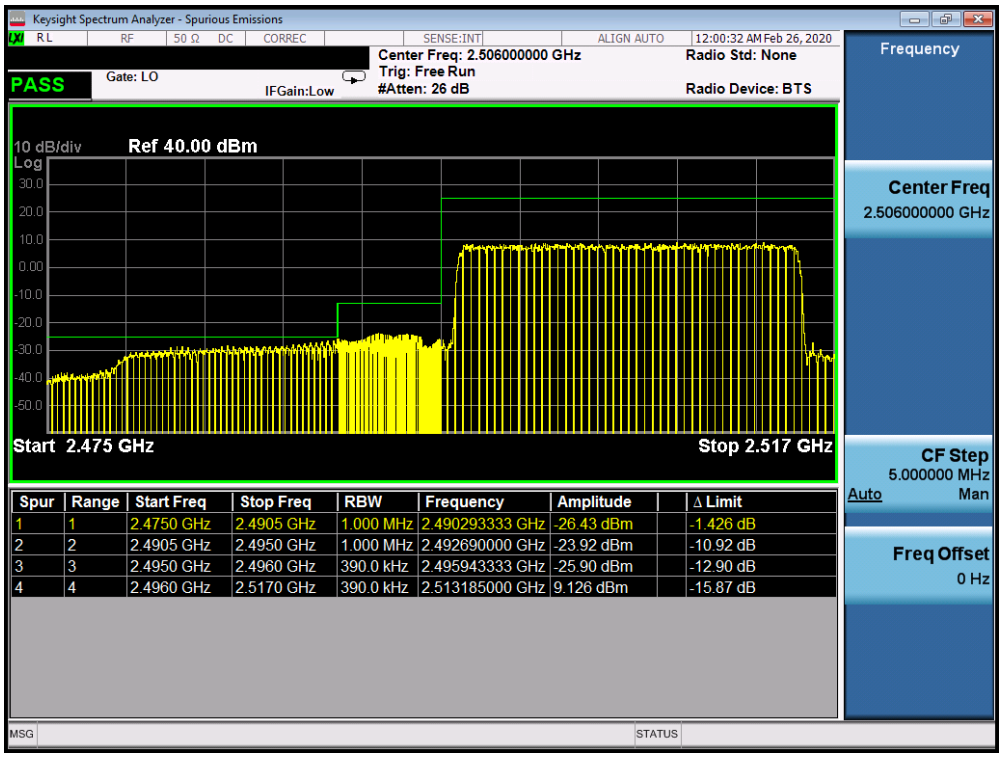
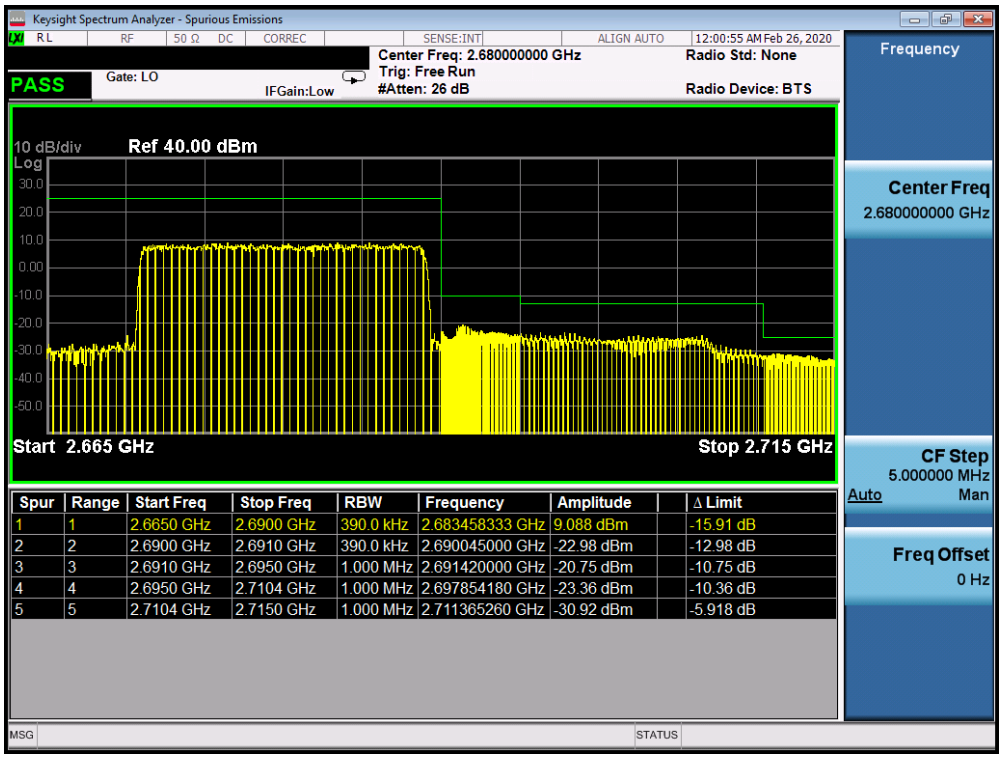



| Spur | Range | Start Freq | Stop Freq | RBW | Frequency | Amplitude | | Δ Limit |
|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 2.4750 GHz | 2.4905 GHz | 1.000 MHz | 2.490293333 GHz | -26.43 dBm | | -1.426 dB |
| 2 | 2 | 2.4905 GHz | 2.4950 GHz | 1.000 MHz | 2.492690000 GHz | -23.92 dBm | | -10.92 dB |
| 3 | 3 | 2.4950 GHz | 2.4960 GHz | 390.0 kHz | 2.495943333 GHz | -25.90 dBm | | -12.90 dB |
| 4 | 4 | 2.4960 GHz | 2.5170 GHz | 390.0 kHz | 2.513185000 GHz | 9.126 dBm | | -15.87 dB |

**Plot 7-275. Lower ACP Plot at 2496 MHz (Band 41 PC2 - 20.0MHz QPSK - Full RB Configuration)**




| Spur | Range | Start Freq | Stop Freq | RBW | Frequency | Amplitude | | Δ Limit |
|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 2.6650 GHz | 2.6900 GHz | 390.0 kHz | 2.683458333 GHz | 9.088 dBm | | -15.91 dB |
| 2 | 2 | 2.6900 GHz | 2.6910 GHz | 390.0 kHz | 2.690045000 GHz | -22.98 dBm | | -12.98 dB |
| 3 | 3 | 2.6910 GHz | 2.6950 GHz | 1.000 MHz | 2.691420000 GHz | -20.75 dBm | | -10.75 dB |
| 4 | 4 | 2.6950 GHz | 2.7104 GHz | 1.000 MHz | 2.697854180 GHz | -23.36 dBm | | -10.36 dB |
| 5 | 5 | 2.7104 GHz | 2.7150 GHz | 1.000 MHz | 2.711365260 GHz | -30.92 dBm | | -5.918 dB |

**Plot 7-276. Upper ACP Plot (Band 41 PC2 - 20.0MHz QPSK - Full RB Configuration)**



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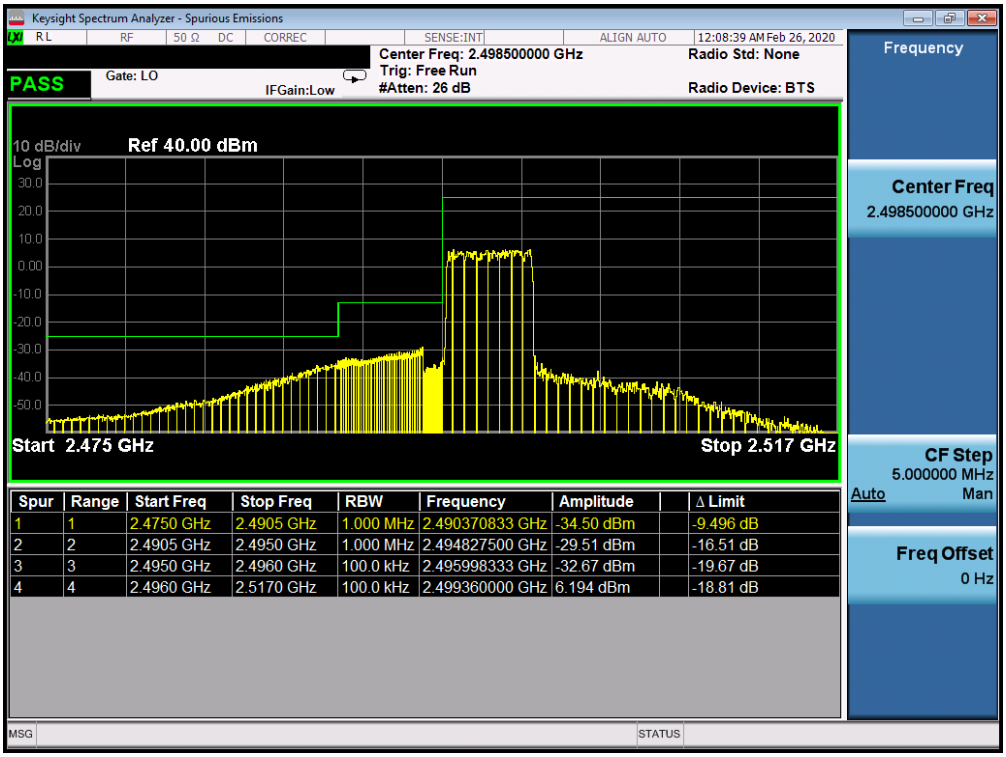
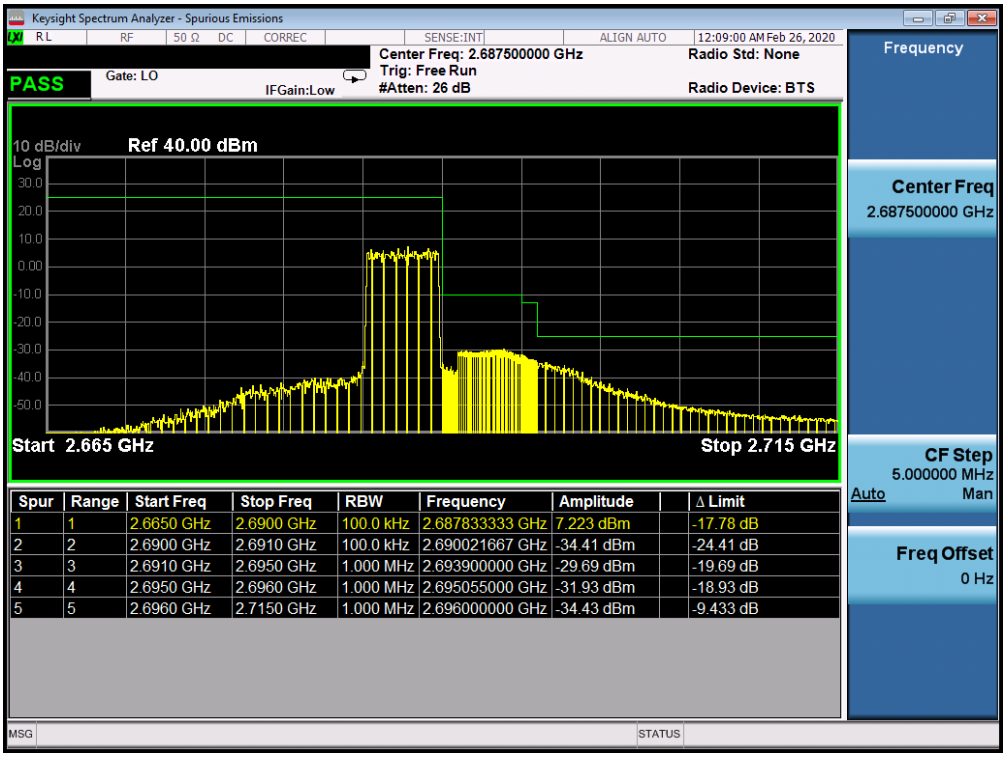
## Band 41 PC3




| Spur | Range | Start Freq | Stop Freq | RBW | Frequency | Amplitude | Δ Limit |
|---|---|---|---|---|---|---|---|
| 1 | 1 | 2.4750 GHz | 2.4905 GHz | 1.000 MHz | 2.490370833 GHz | -34.50 dBm | -9.496 dB |
| 2 | 2 | 2.4905 GHz | 2.4950 GHz | 1.000 MHz | 2.494827500 GHz | -29.51 dBm | -16.51 dB |
| 3 | 3 | 2.4950 GHz | 2.4960 GHz | 100.0 kHz | 2.495998333 GHz | -32.67 dBm | -19.67 dB |
| 4 | 4 | 2.4960 GHz | 2.5170 GHz | 100.0 kHz | 2.499360000 GHz | 6.194 dBm | -18.81 dB |

**Plot 7-277. Lower ACP Plot at 2496 MHz (Band 41 PC3 - 5.0MHz QPSK - Full RB Configuration)**




| Spur | Range | Start Freq | Stop Freq | RBW | Frequency | Amplitude | Δ Limit |
|---|---|---|---|---|---|---|---|
| 1 | 1 | 2.6650 GHz | 2.6900 GHz | 100.0 kHz | 2.687833333 GHz | 7.223 dBm | -17.78 dB |
| 2 | 2 | 2.6900 GHz | 2.6910 GHz | 100.0 kHz | 2.690021667 GHz | -34.41 dBm | -24.41 dB |
| 3 | 3 | 2.6910 GHz | 2.6950 GHz | 1.000 MHz | 2.693900000 GHz | -29.69 dBm | -19.69 dB |
| 4 | 4 | 2.6950 GHz | 2.6960 GHz | 1.000 MHz | 2.695055000 GHz | -31.93 dBm | -18.93 dB |
| 5 | 5 | 2.6960 GHz | 2.7150 GHz | 1.000 MHz | 2.696000000 GHz | -34.43 dBm | -9.433 dB |

**Plot 7-278. Upper ACP Plot (Band 41 PC3 - 5.0MHz QPSK - Full RB Configuration)**



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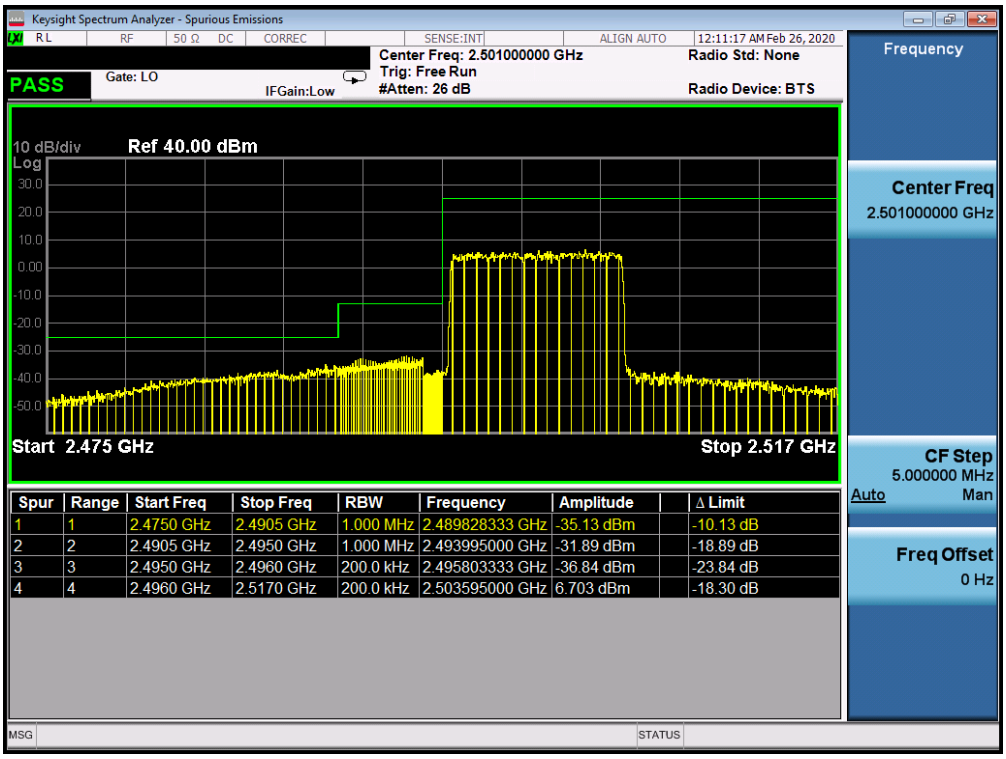
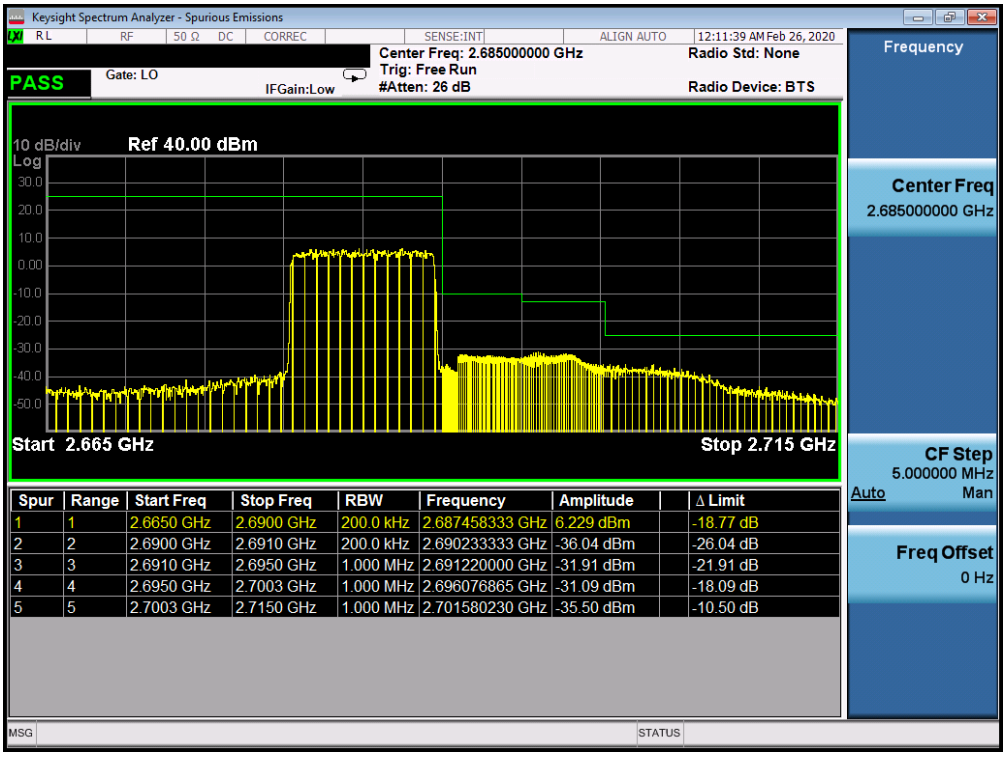



| Spur | Range | Start Freq | Stop Freq | RBW | Frequency | Amplitude | Δ Limit |
|---|---|---|---|---|---|---|---|
| 1 | 1 | 2.4750 GHz | 2.4905 GHz | 1.000 MHz | 2.489828333 GHz | -35.13 dBm | -10.13 dB |
| 2 | 2 | 2.4905 GHz | 2.4950 GHz | 1.000 MHz | 2.493995000 GHz | -31.89 dBm | -18.89 dB |
| 3 | 3 | 2.4950 GHz | 2.4960 GHz | 200.0 kHz | 2.495803333 GHz | -36.84 dBm | -23.84 dB |
| 4 | 4 | 2.4960 GHz | 2.5170 GHz | 200.0 kHz | 2.503595000 GHz | 6.703 dBm | -18.30 dB |

**Plot 7-279. Lower ACP Plot at 2496 MHz (Band 41 PC3 - 10.0MHz QPSK - Full RB Configuration)**




| Spur | Range | Start Freq | Stop Freq | RBW | Frequency | Amplitude | Δ Limit |
|---|---|---|---|---|---|---|---|
| 1 | 1 | 2.6650 GHz | 2.6900 GHz | 200.0 kHz | 2.687458333 GHz | 6.229 dBm | -18.77 dB |
| 2 | 2 | 2.6900 GHz | 2.6910 GHz | 200.0 kHz | 2.690233333 GHz | -36.04 dBm | -26.04 dB |
| 3 | 3 | 2.6910 GHz | 2.6950 GHz | 1.000 MHz | 2.691220000 GHz | -31.91 dBm | -21.91 dB |
| 4 | 4 | 2.6950 GHz | 2.7003 GHz | 1.000 MHz | 2.696076865 GHz | -31.09 dBm | -18.09 dB |
| 5 | 5 | 2.7003 GHz | 2.7150 GHz | 1.000 MHz | 2.701580230 GHz | -35.50 dBm | -10.50 dB |

**Plot 7-280. Upper ACP Plot (Band 41 PC3 - 10.0MHz QPSK - Full RB Configuration)**



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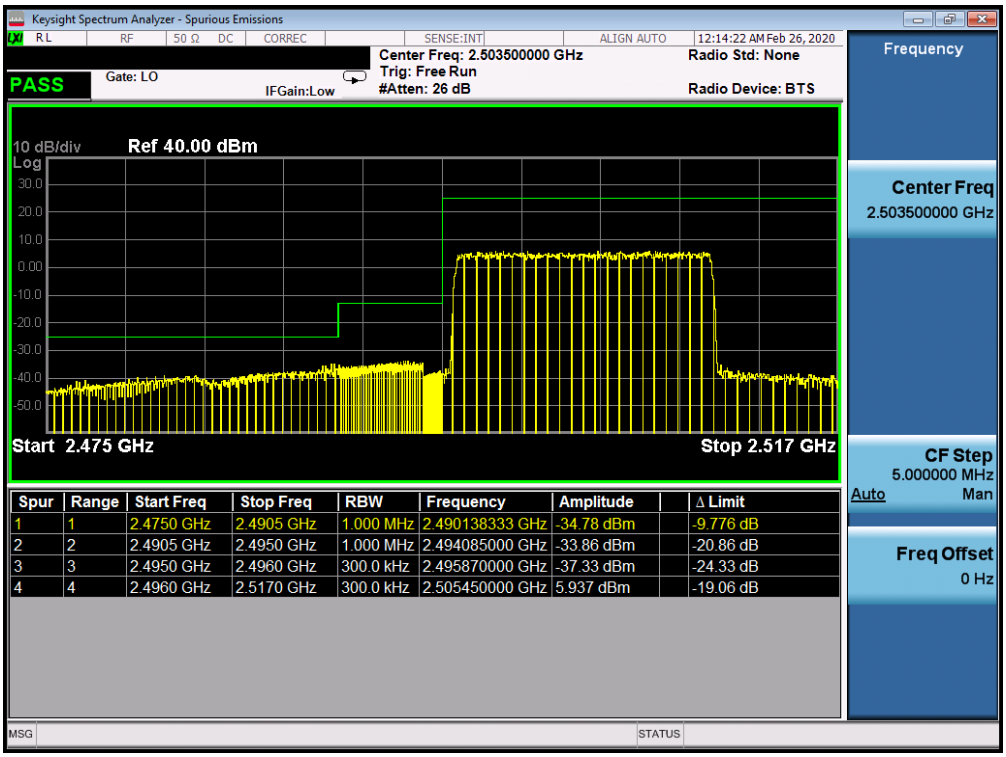
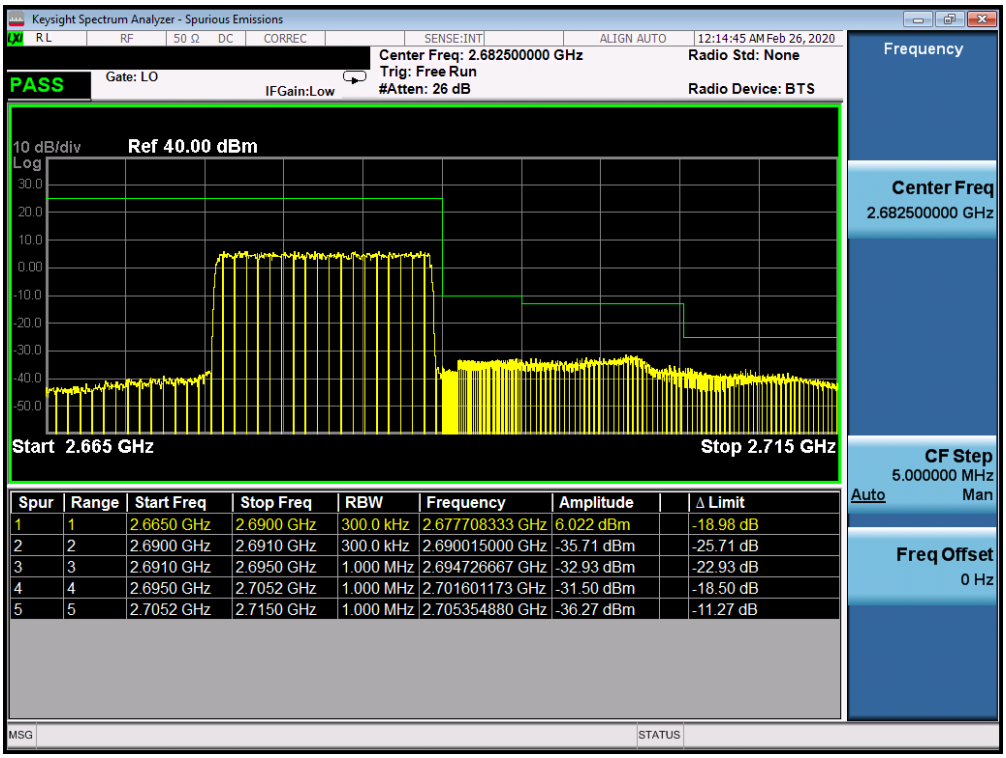



| Spur | Range | Start Freq | Stop Freq | RBW | Frequency | Amplitude | Δ Limit |
|---|---|---|---|---|---|---|---|
| 1 | 1 | 2.4750 GHz | 2.4905 GHz | 1.000 MHz | 2.490138333 GHz | -34.78 dBm | -9.776 dB |
| 2 | 2 | 2.4905 GHz | 2.4950 GHz | 1.000 MHz | 2.494085000 GHz | -33.86 dBm | -20.86 dB |
| 3 | 3 | 2.4950 GHz | 2.4960 GHz | 300.0 kHz | 2.495870000 GHz | -37.33 dBm | -24.33 dB |
| 4 | 4 | 2.4960 GHz | 2.5170 GHz | 300.0 kHz | 2.505450000 GHz | 5.937 dBm | -19.06 dB |

**Plot 7-281. Lower ACP Plot at 2496 MHz (Band 41 PC3 - 15.0MHz QPSK - Full RB Configuration)**




| Spur | Range | Start Freq | Stop Freq | RBW | Frequency | Amplitude | Δ Limit |
|---|---|---|---|---|---|---|---|
| 1 | 1 | 2.6650 GHz | 2.6900 GHz | 300.0 kHz | 2.677708333 GHz | 6.022 dBm | -18.98 dB |
| 2 | 2 | 2.6900 GHz | 2.6910 GHz | 300.0 kHz | 2.690015000 GHz | -35.71 dBm | -25.71 dB |
| 3 | 3 | 2.6910 GHz | 2.6950 GHz | 1.000 MHz | 2.694726667 GHz | -32.93 dBm | -22.93 dB |
| 4 | 4 | 2.6950 GHz | 2.7052 GHz | 1.000 MHz | 2.701601173 GHz | -31.50 dBm | -18.50 dB |
| 5 | 5 | 2.7052 GHz | 2.7150 GHz | 1.000 MHz | 2.705354880 GHz | -36.27 dBm | -11.27 dB |

**Plot 7-282. Upper ACP Plot (Band 41 PC3 - 15.0MHz QPSK - Full RB Configuration)**



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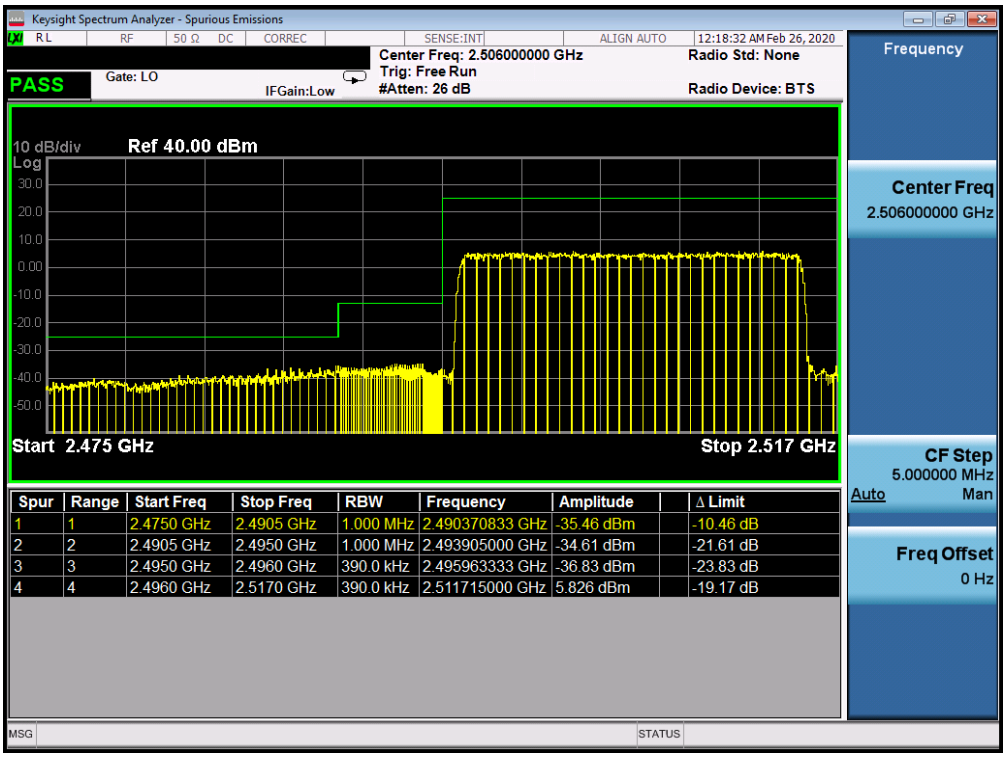
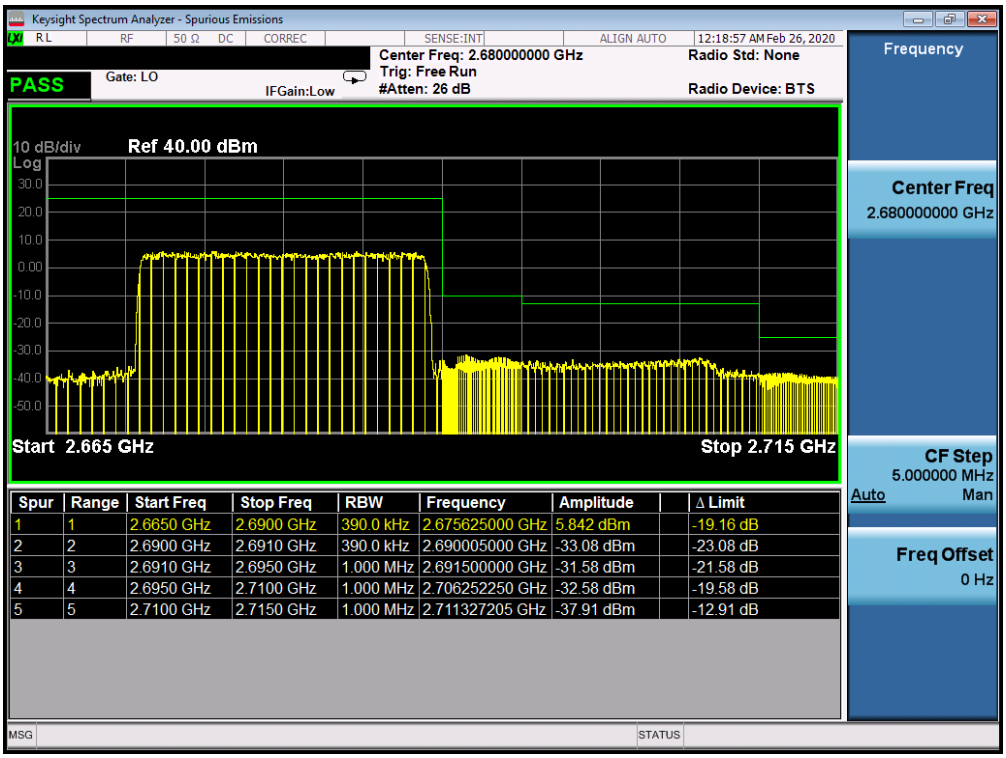



**Plot 7-283. Lower ACP Plot at 2496 MHz (Band 41 PC3 - 20.0MHz QPSK - Full RB Configuration)**




**Plot 7-284. Upper ACP Plot (Band 41 PC3 - 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 ≥ 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. For burst transmissions, the spectrum analyzer is set to use an internal "RF Burst" trigger that is synced with an incoming pulse and the measurement interval is set to less than the duration of the "on time" of one burst to ensure that energy is only captured during a time in which the transmitter is operating at maximum power

**Test Setup**

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

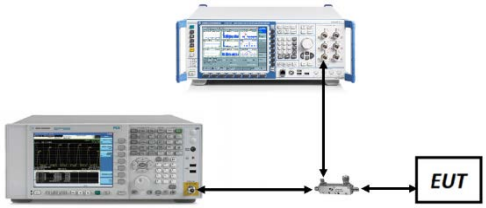


**Figure 7-4. Test Instrument & Measurement Setup**

**Test Notes**

None.




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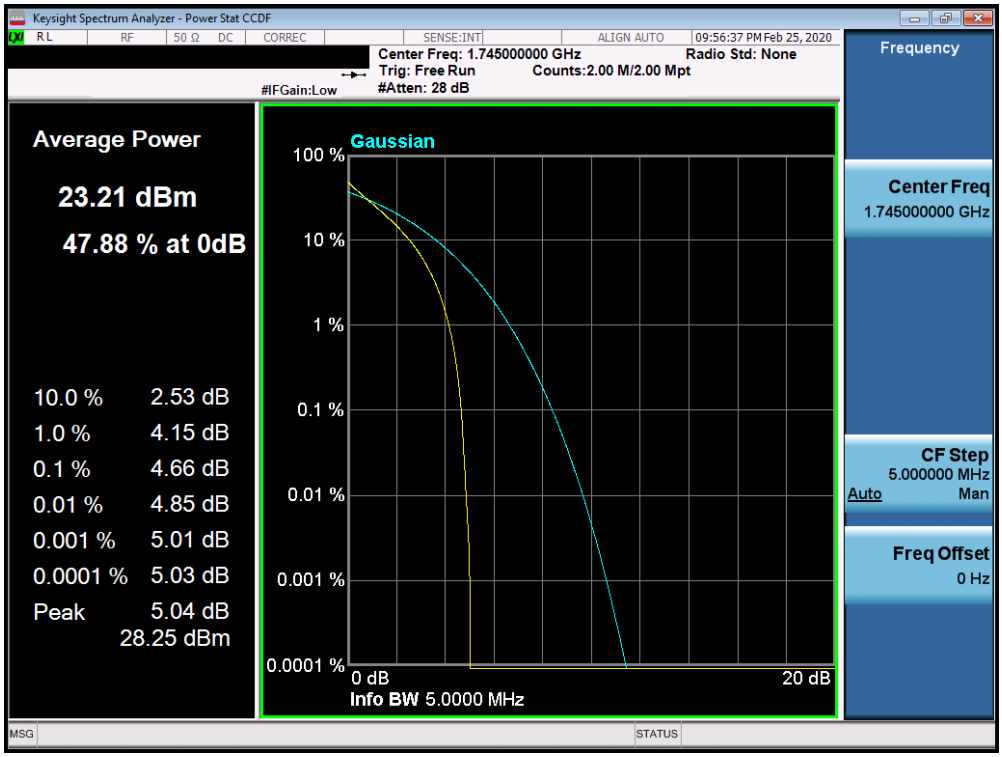
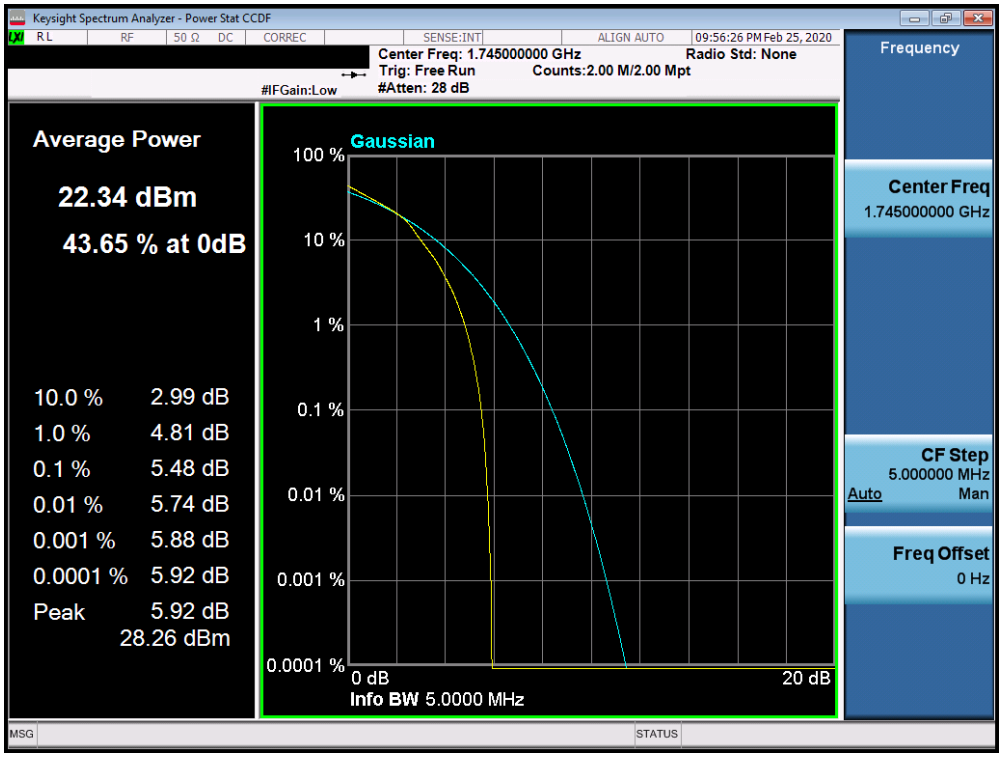
## Band 66/4




**Plot 7-285. PAR Plot (Band 66/4- 1.4MHz QPSK - Full RB Configuration)**




**Plot 7-286. PAR Plot (Band 66/4- 1.4MHz 16-QAM - Full RB Configuration)**

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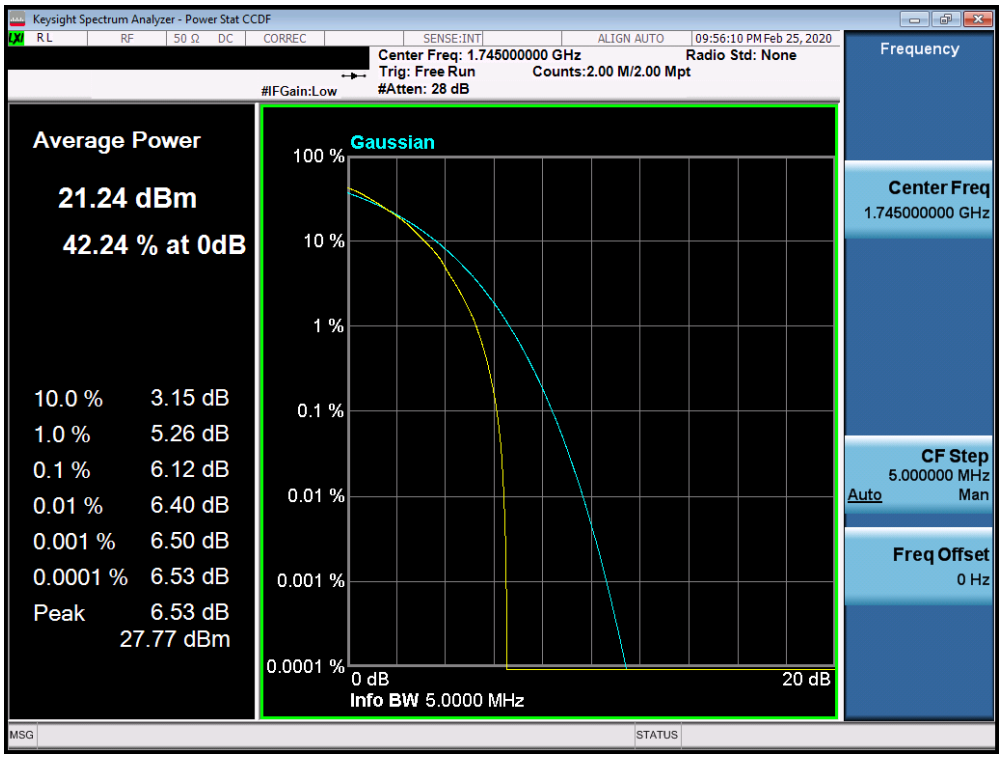
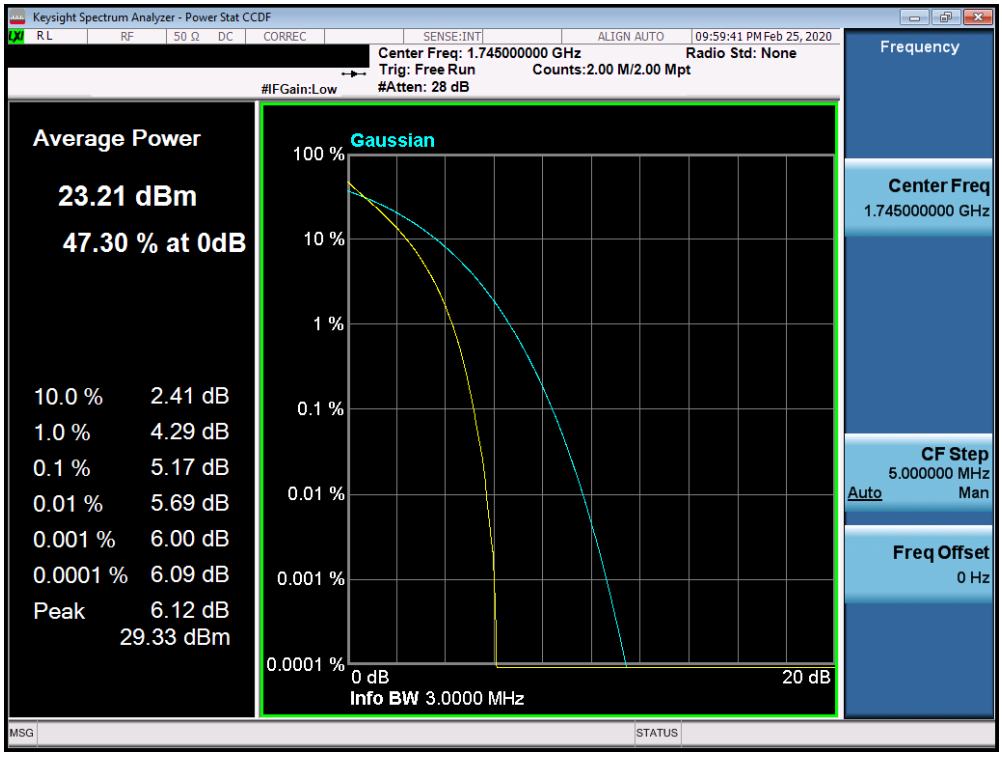



**Plot 7-287. PAR Plot (Band 66/4- 1.4MHz 64-QAM - Full RB Configuration)**




**Plot 7-288. PAR Plot (Band 66/4- 3.0MHz QPSK - Full RB Configuration)**



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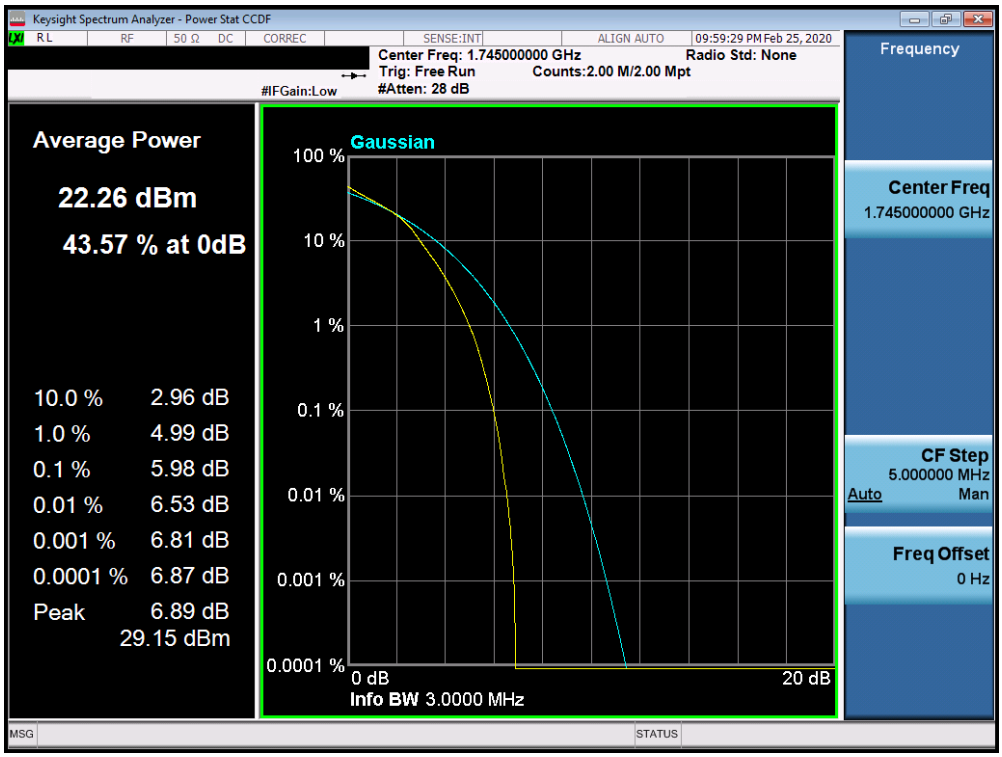
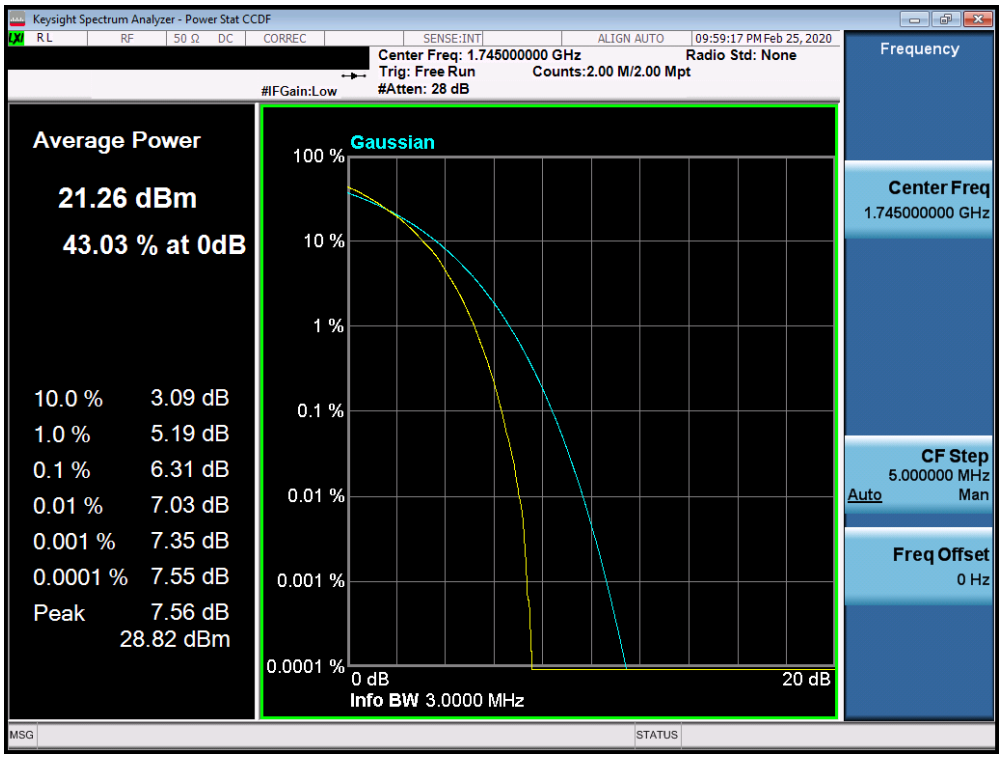



**Plot 7-289. PAR Plot (Band 66/4- 3.0MHz 16-QAM - Full RB Configuration)**




**Plot 7-290. PAR Plot (Band 66/4- 3.0MHz 64-QAM - Full RB Configuration)**



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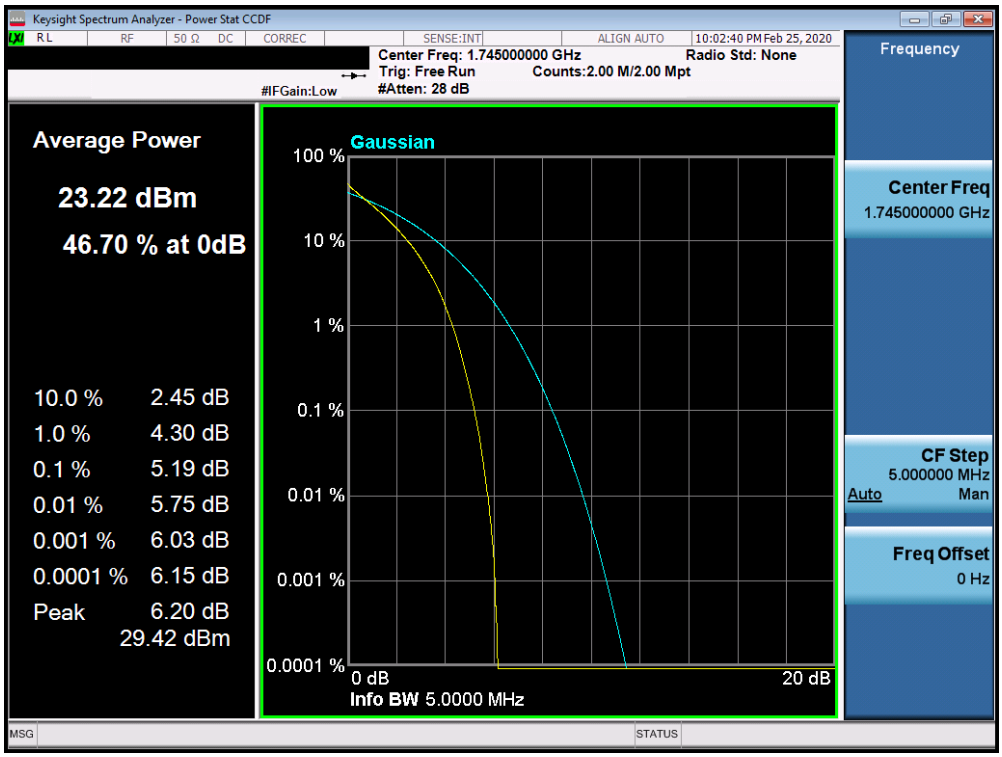
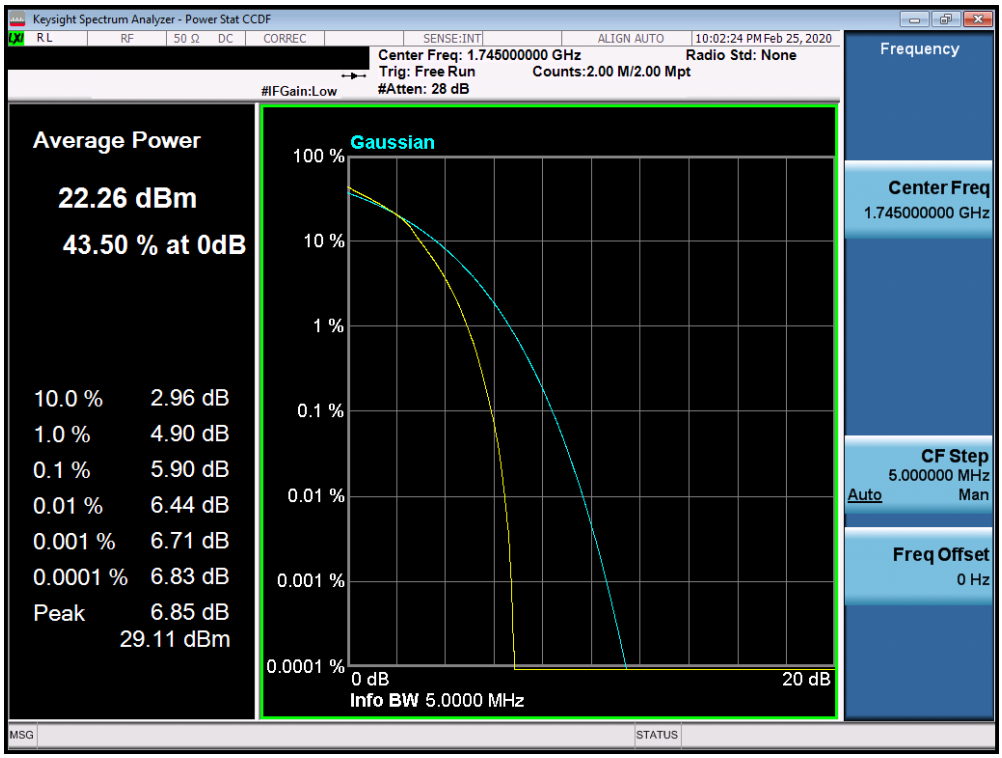



**Plot 7-291. PAR Plot (Band 66/4- 5.0MHz QPSK - Full RB Configuration)**




**Plot 7-292. PAR Plot (Band 66/4- 5.0MHz 16-QAM - Full RB Configuration)**



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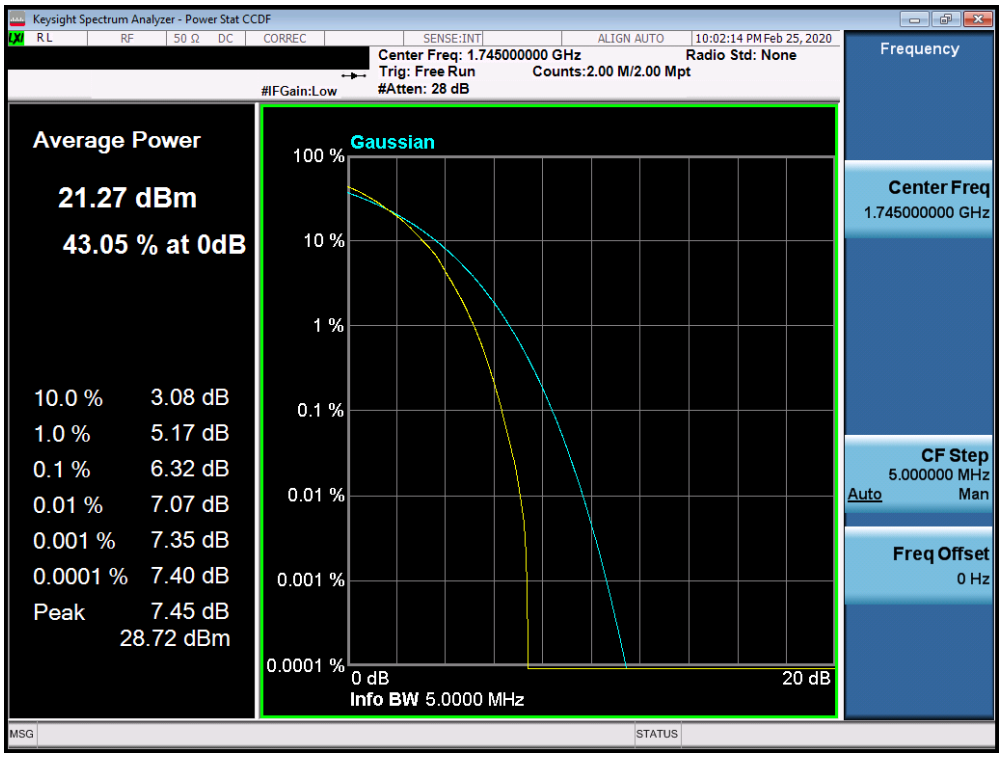
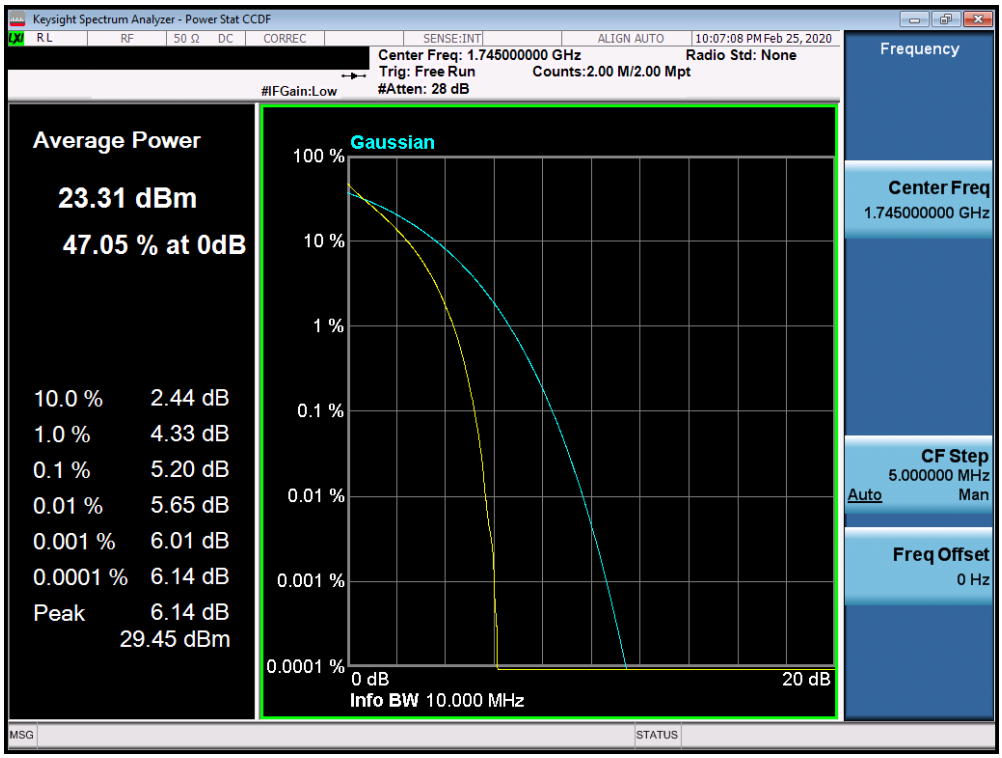



**Plot 7-293. PAR Plot (Band 66/4- 5.0MHz 64-QAM - Full RB Configuration)**




**Plot 7-294. PAR Plot (Band 66/4- 10.0MHz QPSK - Full RB Configuration)**



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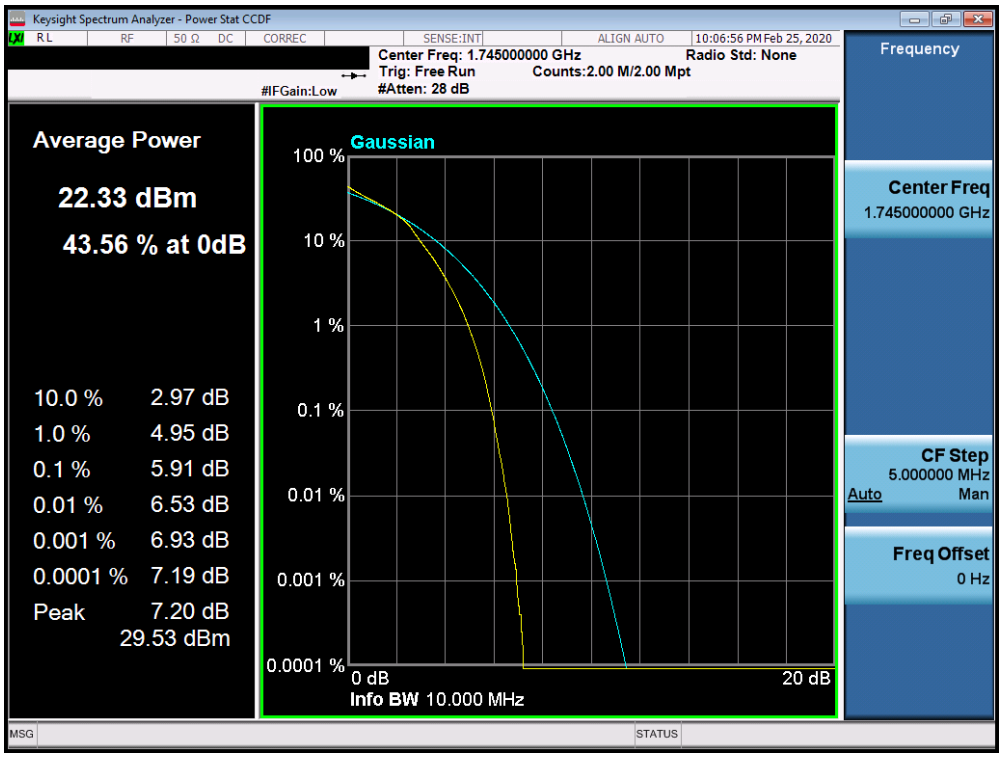
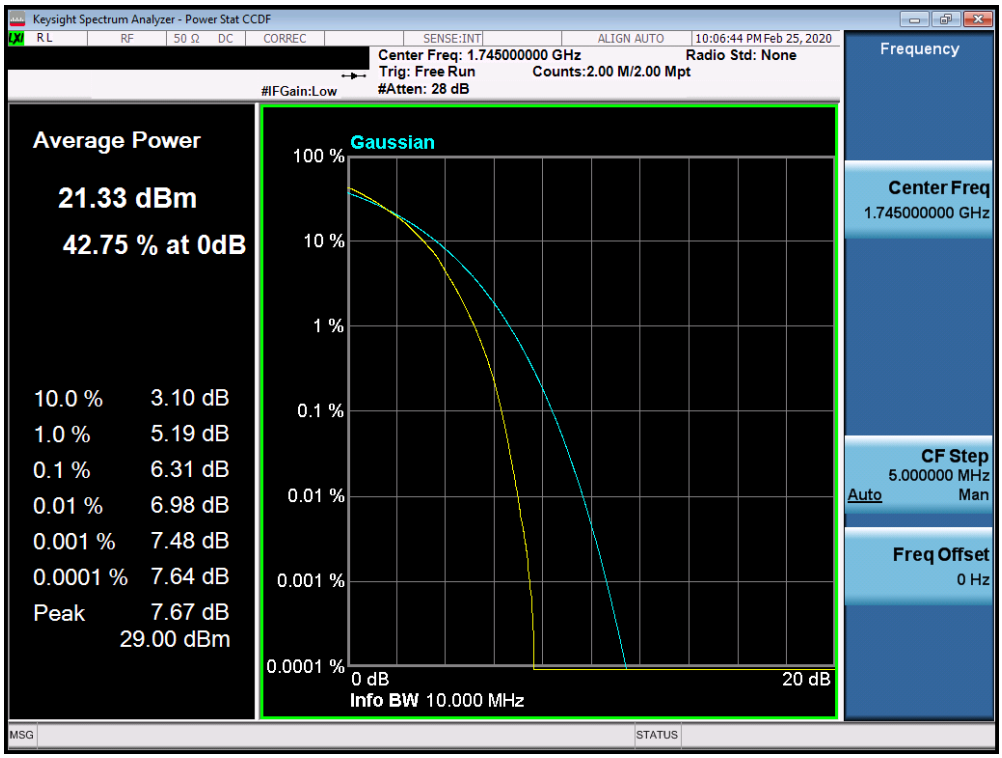



**Plot 7-295. PAR Plot (Band 66/4- 10.0MHz 16-QAM - Full RB Configuration)**




**Plot 7-296. PAR Plot (Band 66/4- 10.0MHz 64-QAM - Full RB Configuration)**



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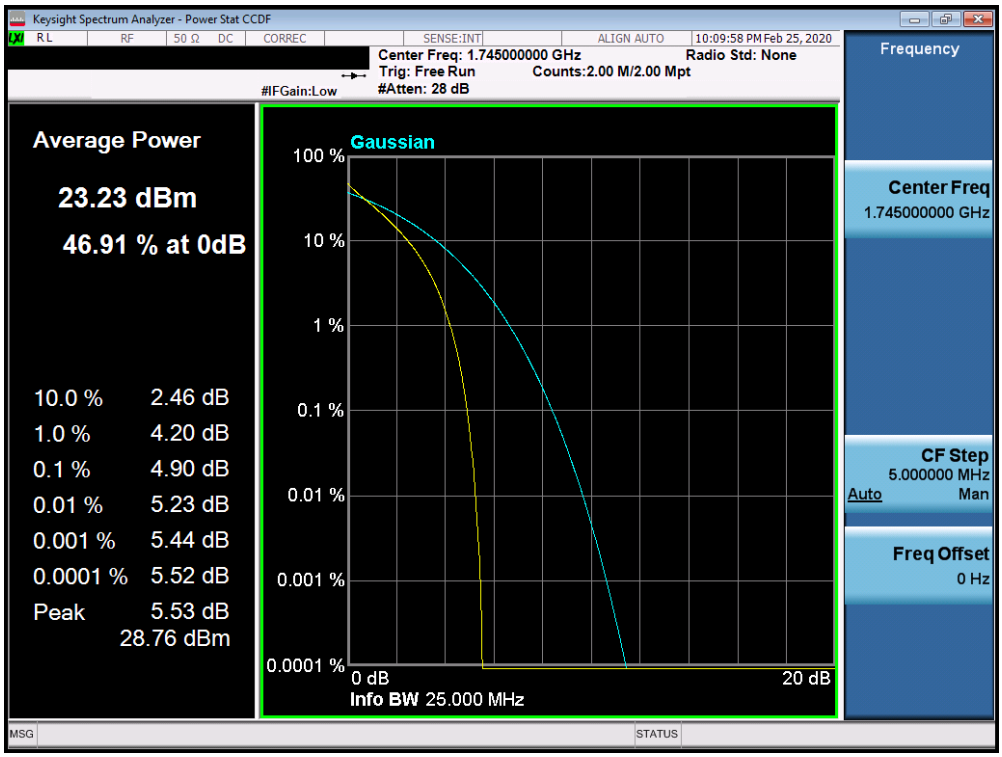
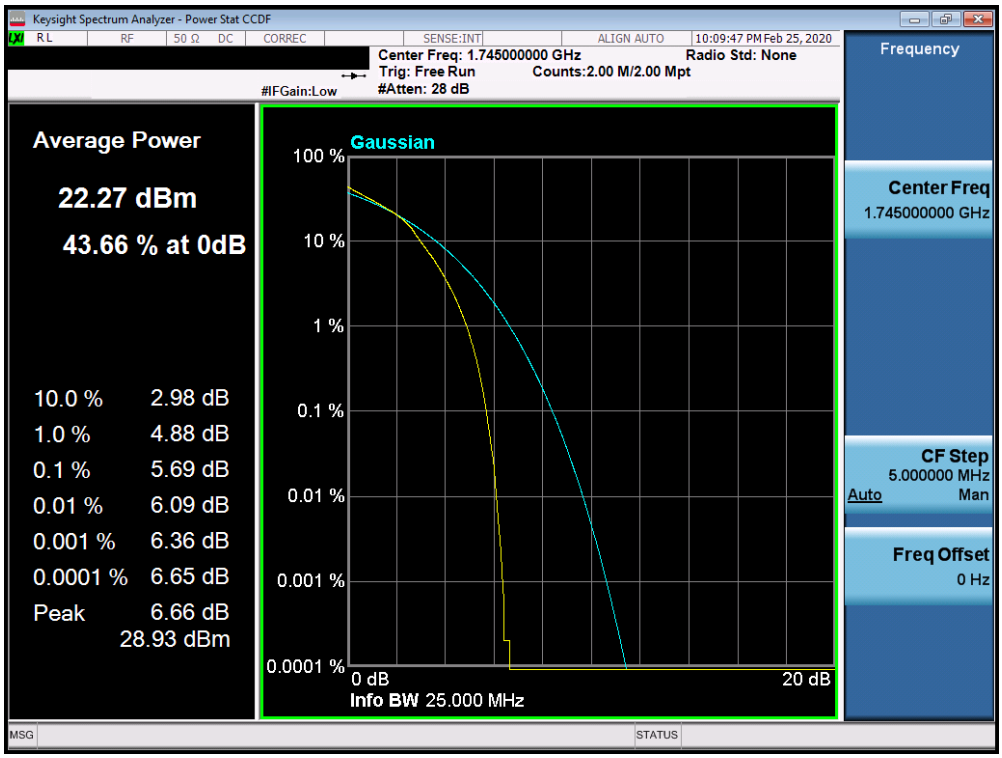



**Plot 7-297. PAR Plot (Band 66/4- 15.0MHz QPSK - Full RB Configuration)**




**Plot 7-298. PAR Plot (Band 66/4- 15.0MHz 16-QAM - Full RB Configuration)**



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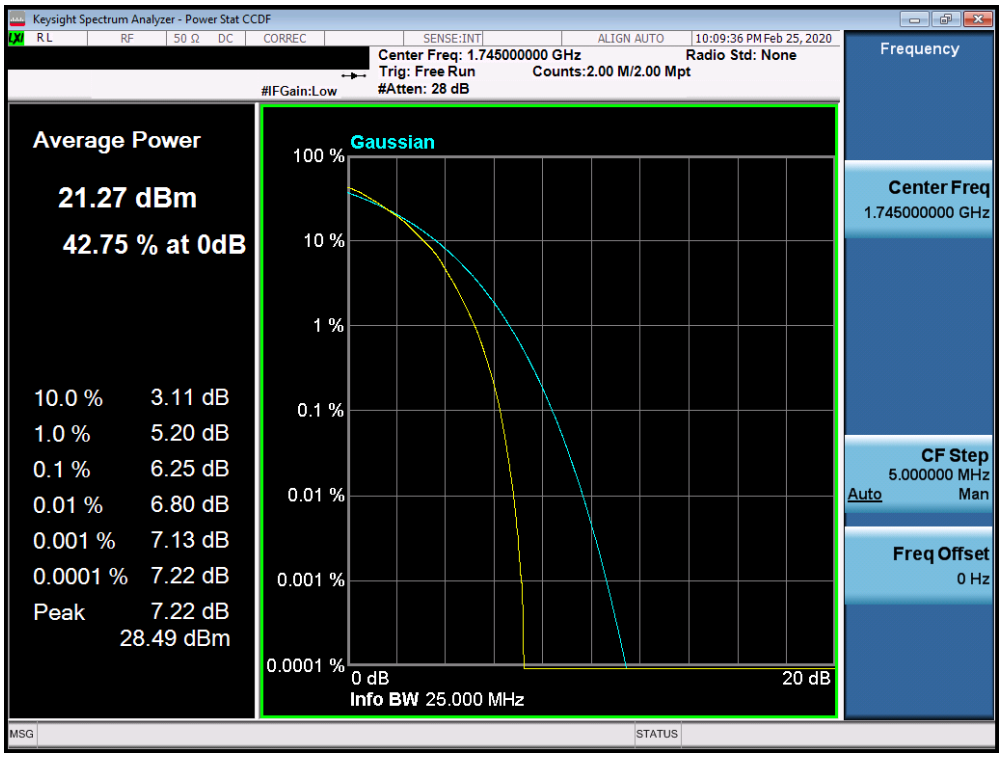
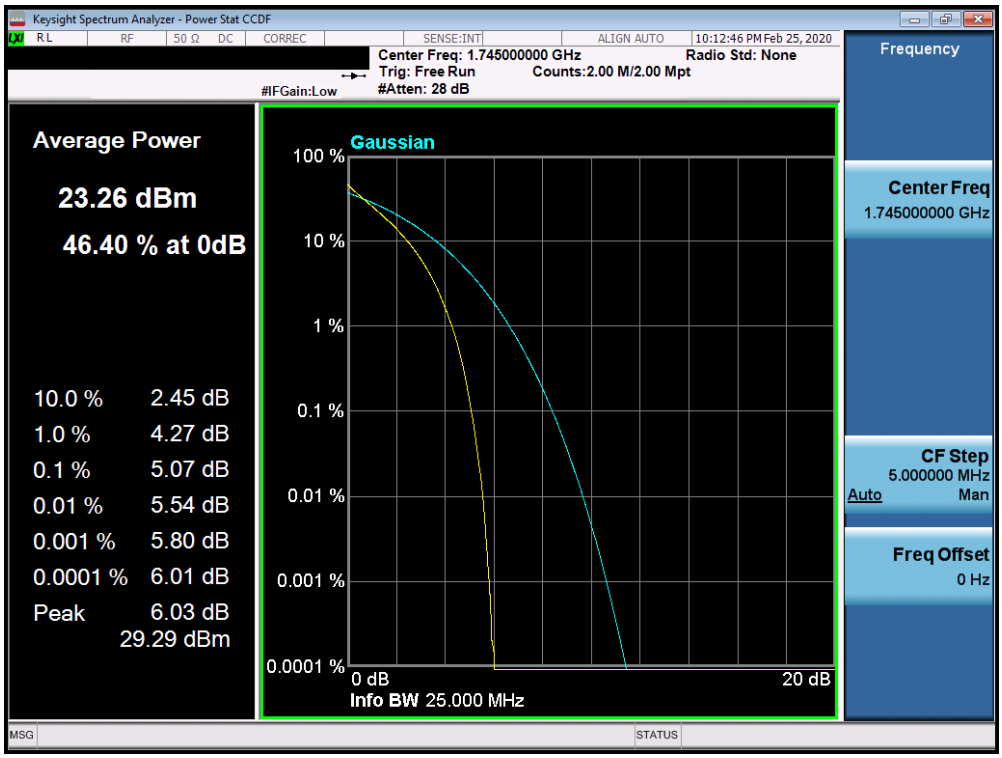



**Plot 7-299. PAR Plot (Band 66/4- 15.0MHz 64-QAM - Full RB Configuration)**




**Plot 7-300. PAR Plot (Band 66/4- 20.0MHz QPSK - Full RB Configuration)**



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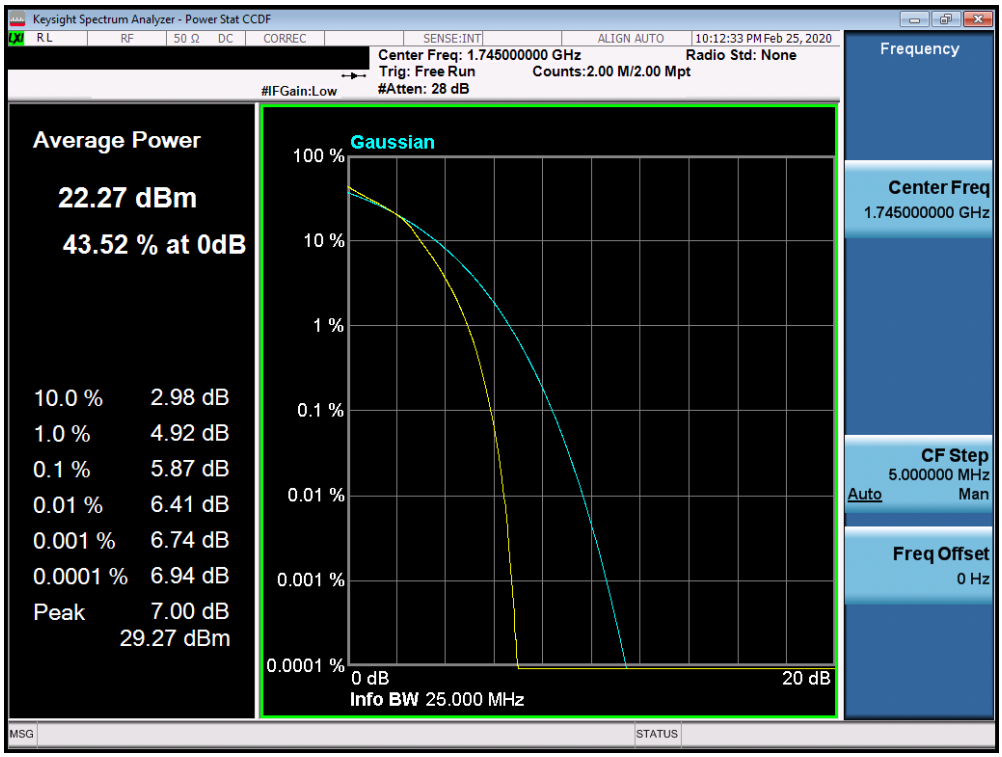
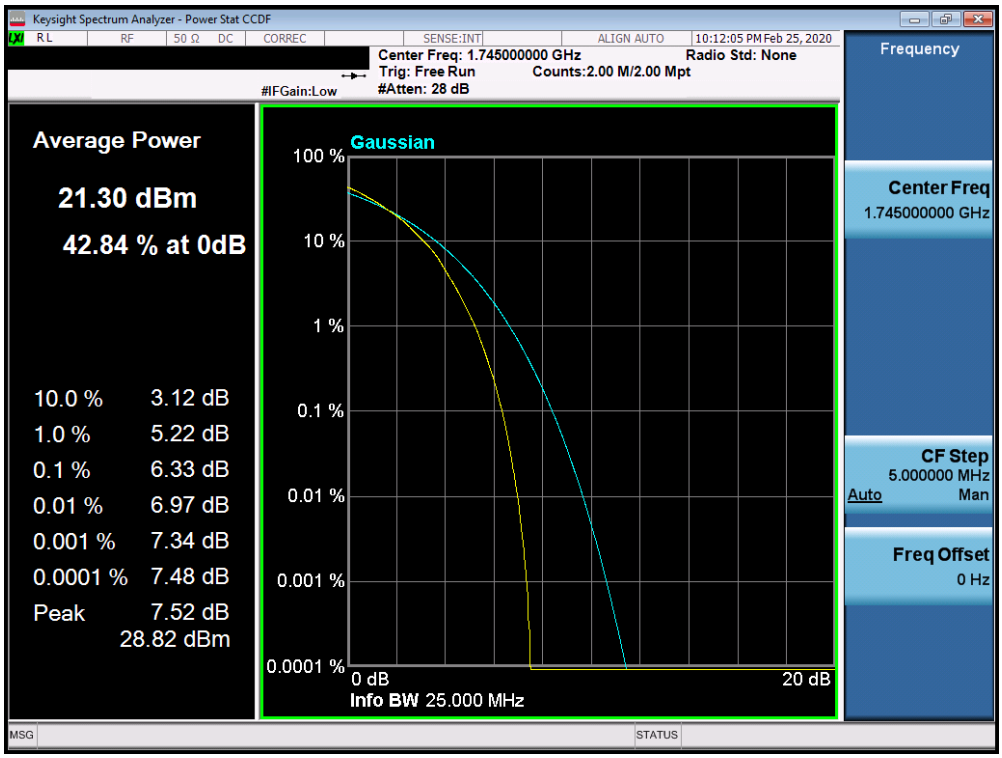



**Plot 7-301. PAR Plot (Band 66/4- 20.0MHz 16-QAM - Full RB Configuration)**




**Plot 7-302. PAR Plot (Band 66/4- 20.0MHz 64-QAM - Full RB Configuration)**



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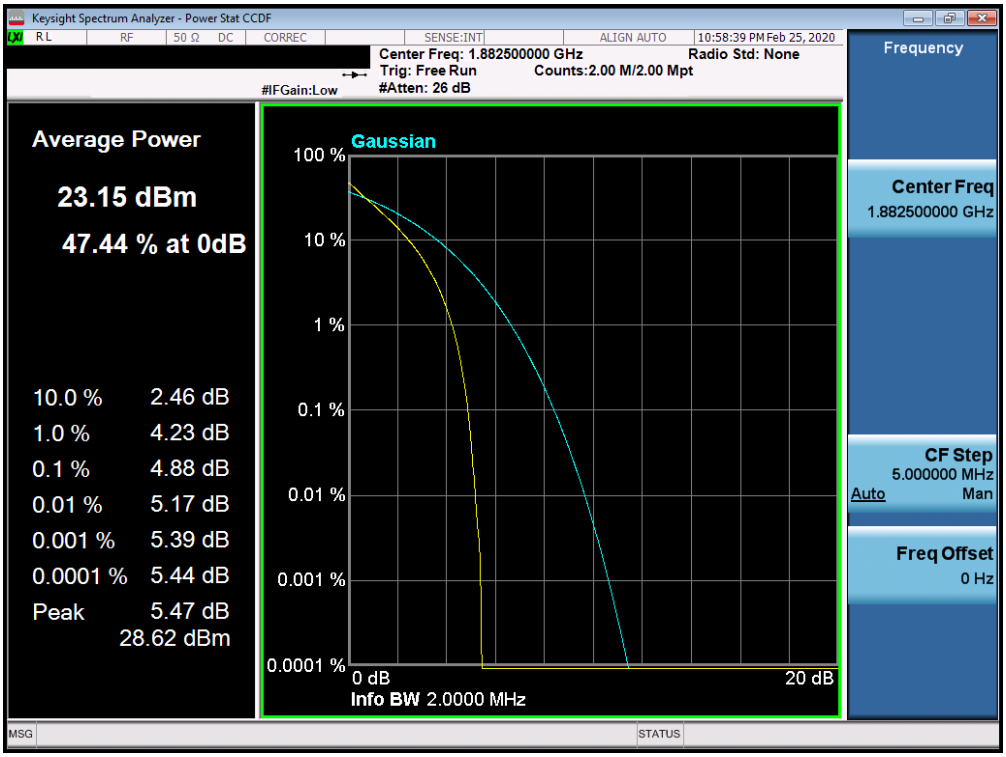
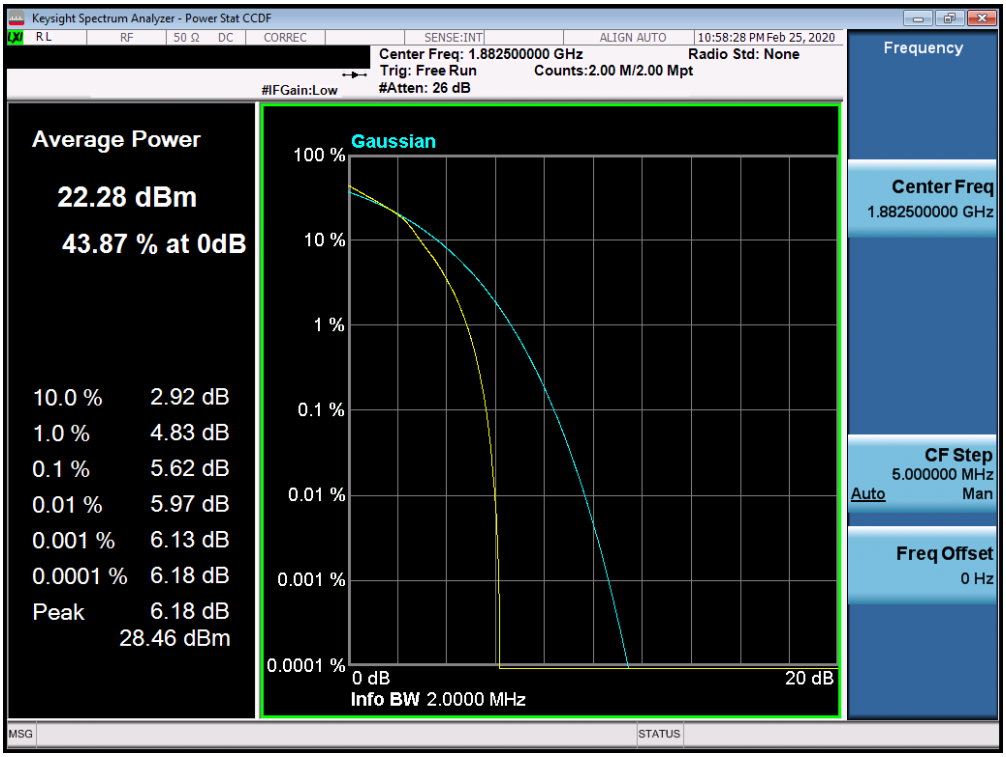
## Band 25/2




**Plot 7-303. PAR Plot (Band 25/2- 1.4MHz QPSK - Full RB Configuration)**




**Plot 7-304. PAR Plot (Band 25/2- 1.4MHz 16-QAM - Full RB Configuration)**



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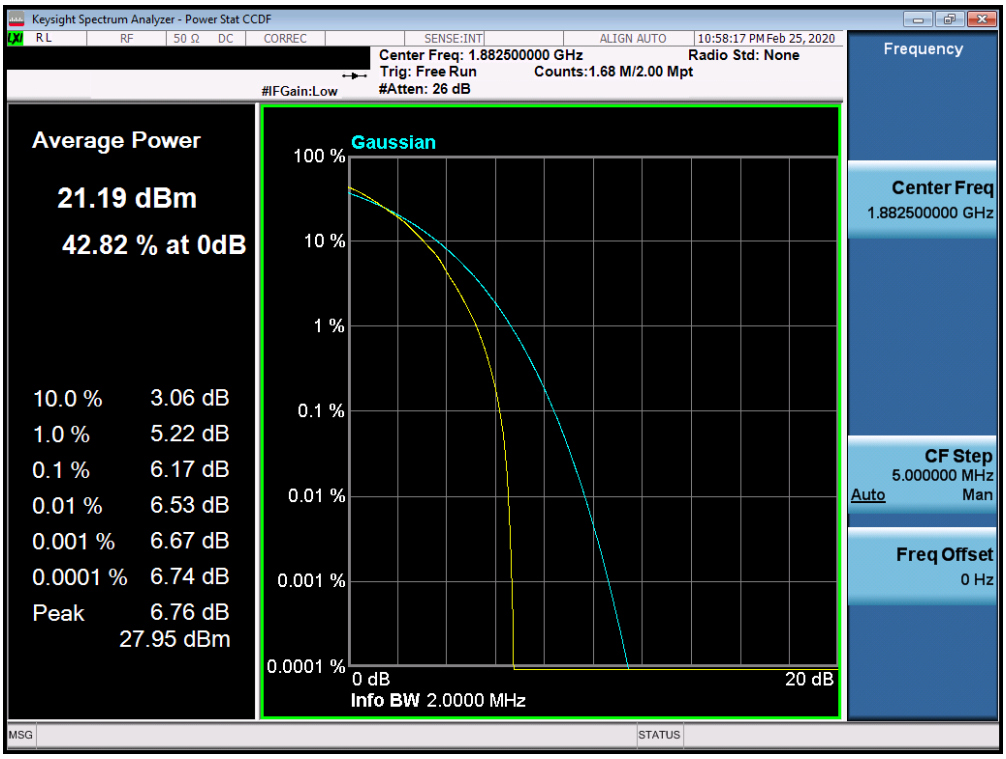
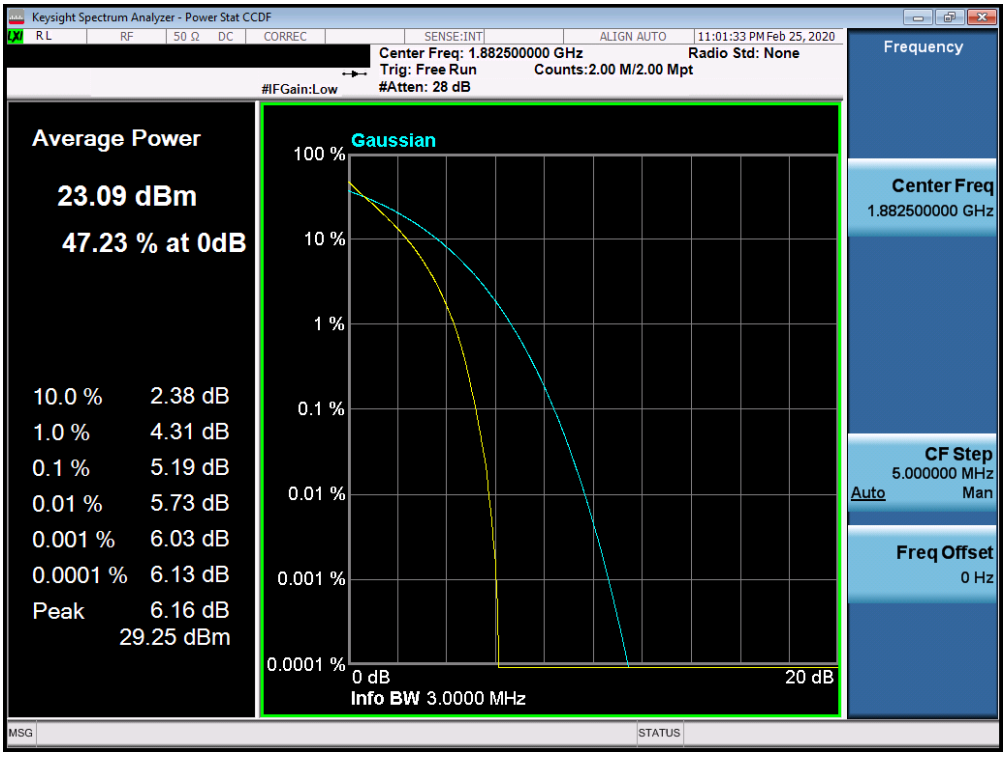



**Plot 7-305. PAR Plot (Band 25/2- 1.4MHz 64-QAM - Full RB Configuration)**




**Plot 7-306. PAR Plot (Band 25/2- 3.0MHz QPSK - Full RB Configuration)**



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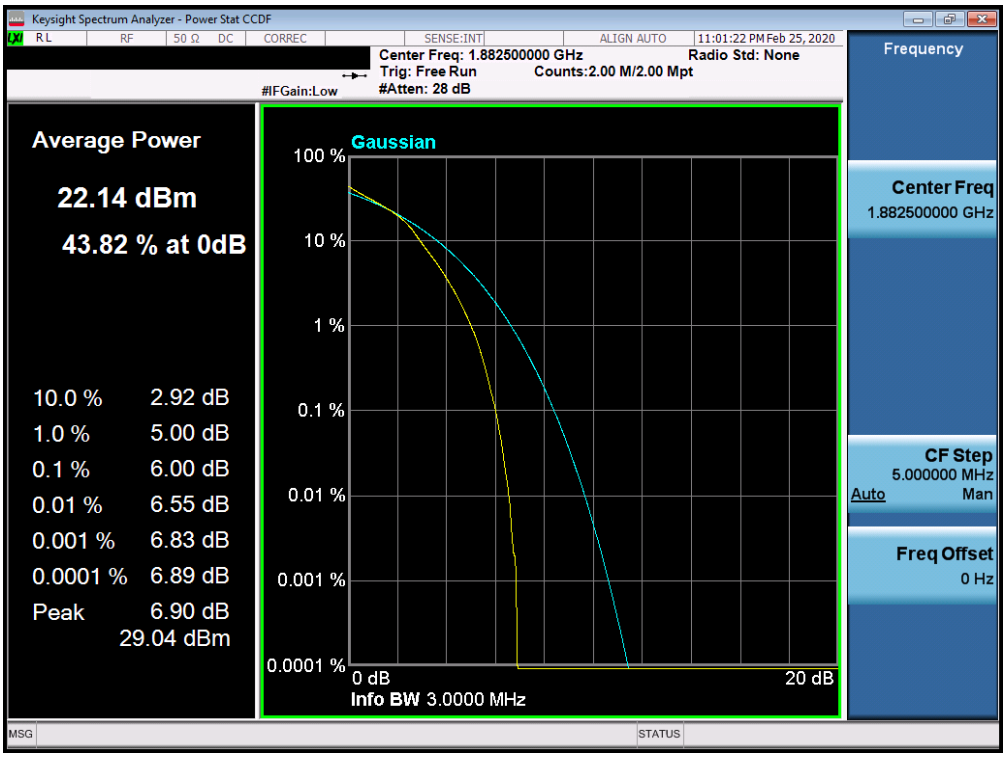
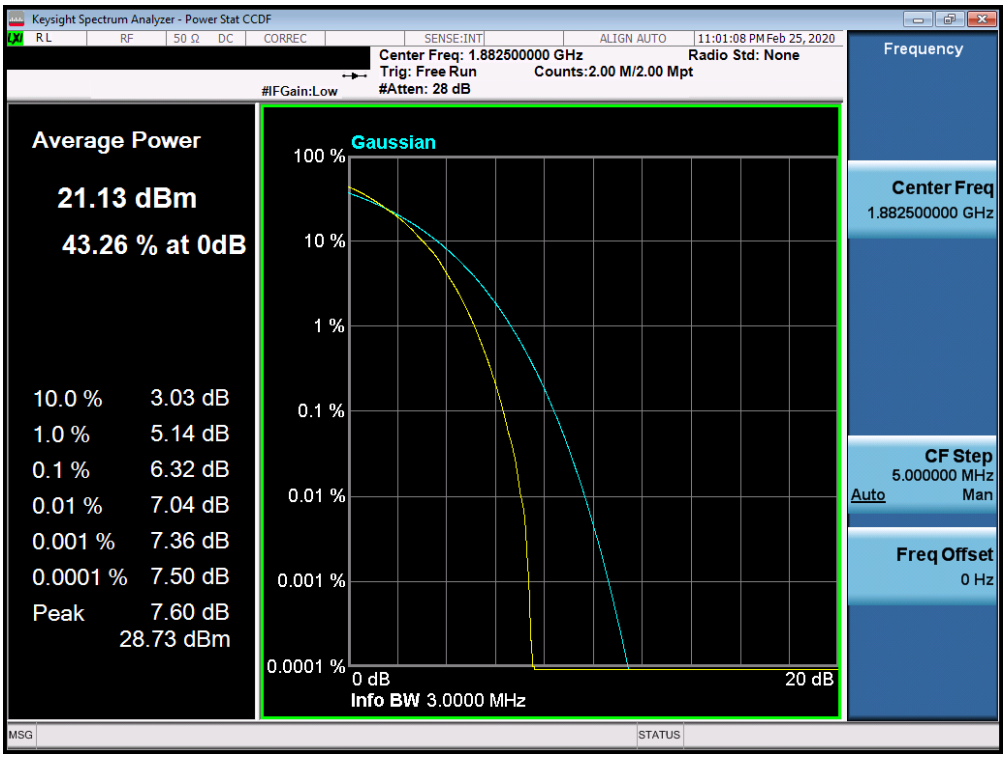



**Plot 7-307. PAR Plot (Band 25/2- 3.0MHz 16-QAM - Full RB Configuration)**




**Plot 7-308. PAR Plot (Band 25/2- 3.0MHz 64-QAM - Full RB Configuration)**



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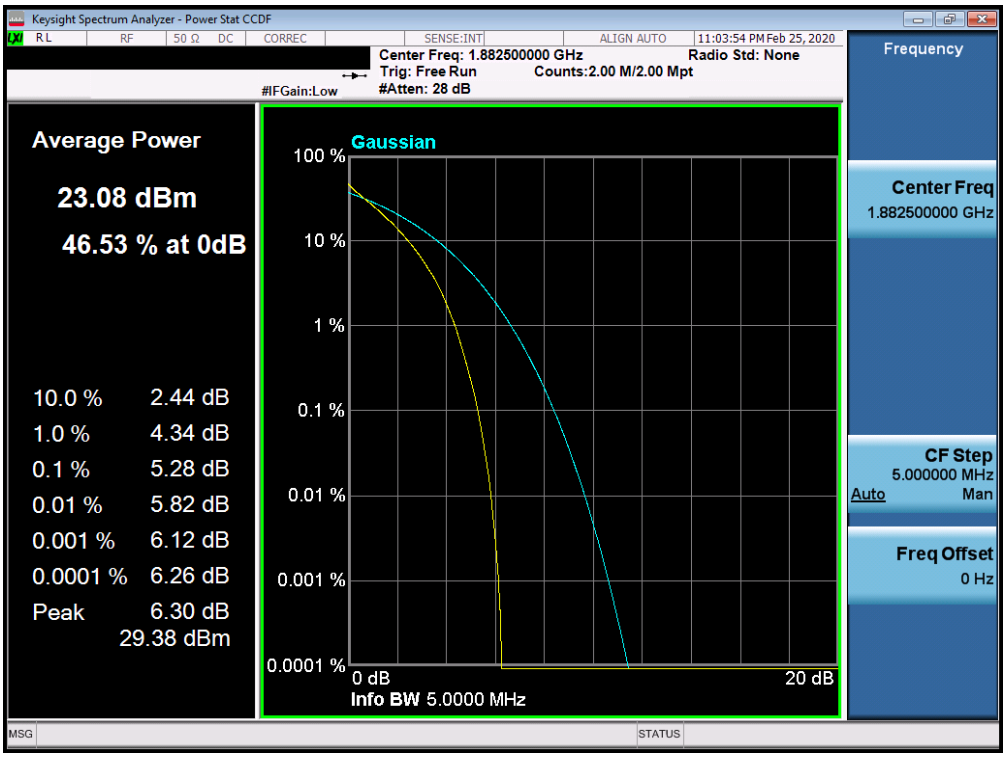
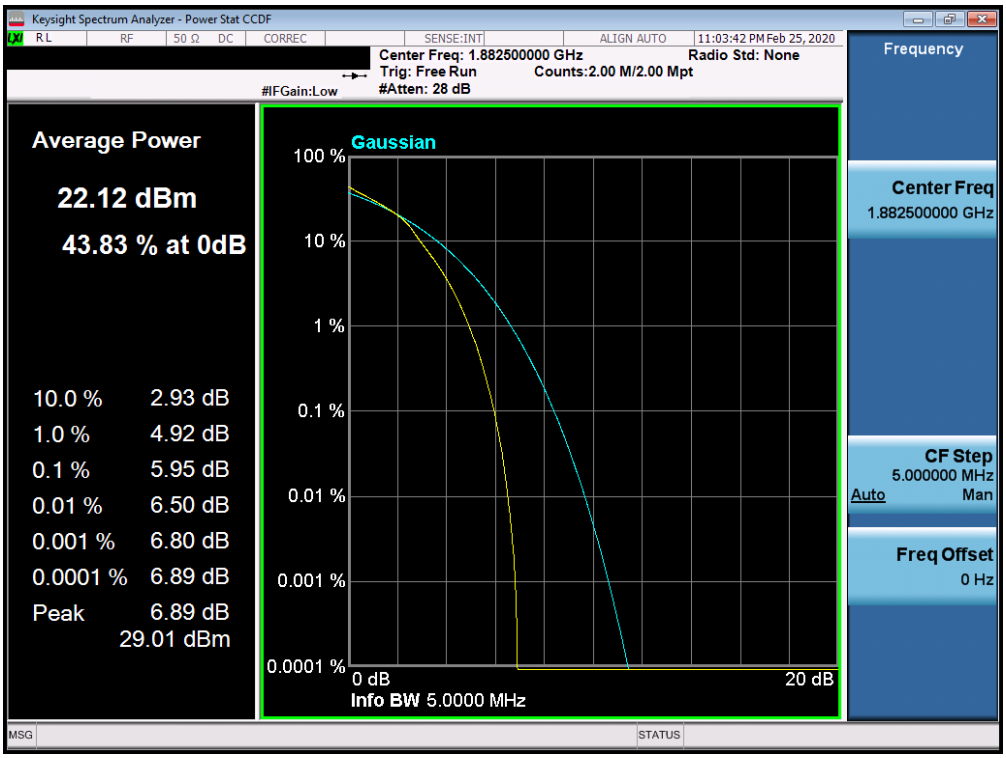



**Plot 7-309. PAR Plot (Band 25/2- 5.0MHz QPSK - Full RB Configuration)**




**Plot 7-310. PAR Plot (Band 25/2- 5.0MHz 16-QAM - Full RB Configuration)**



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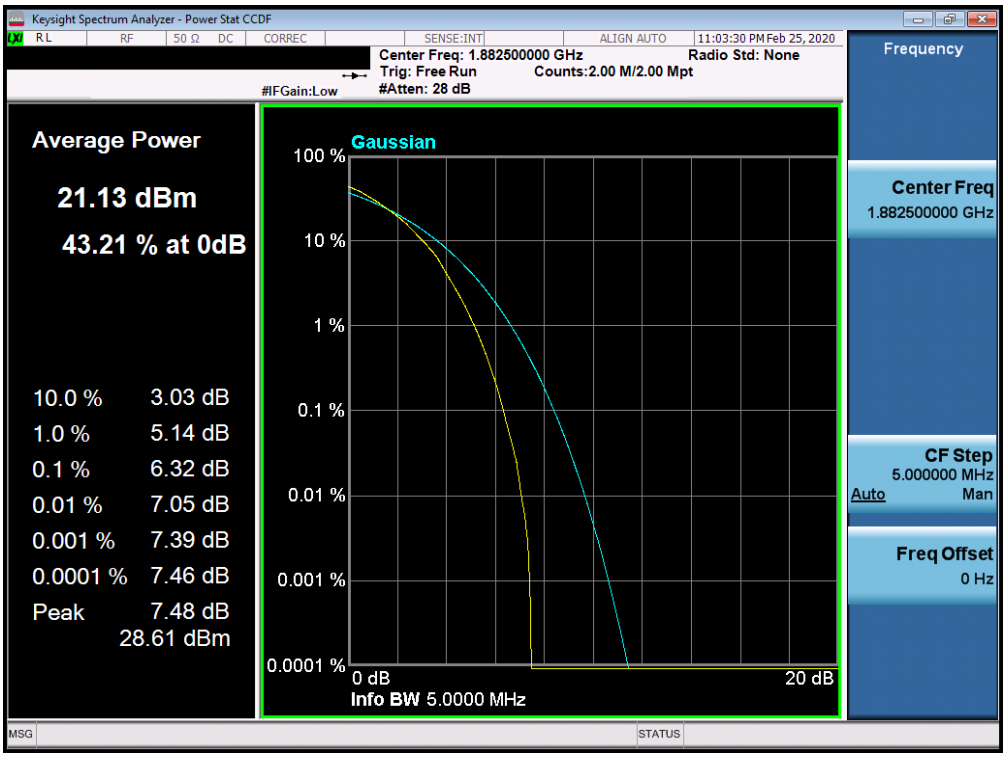
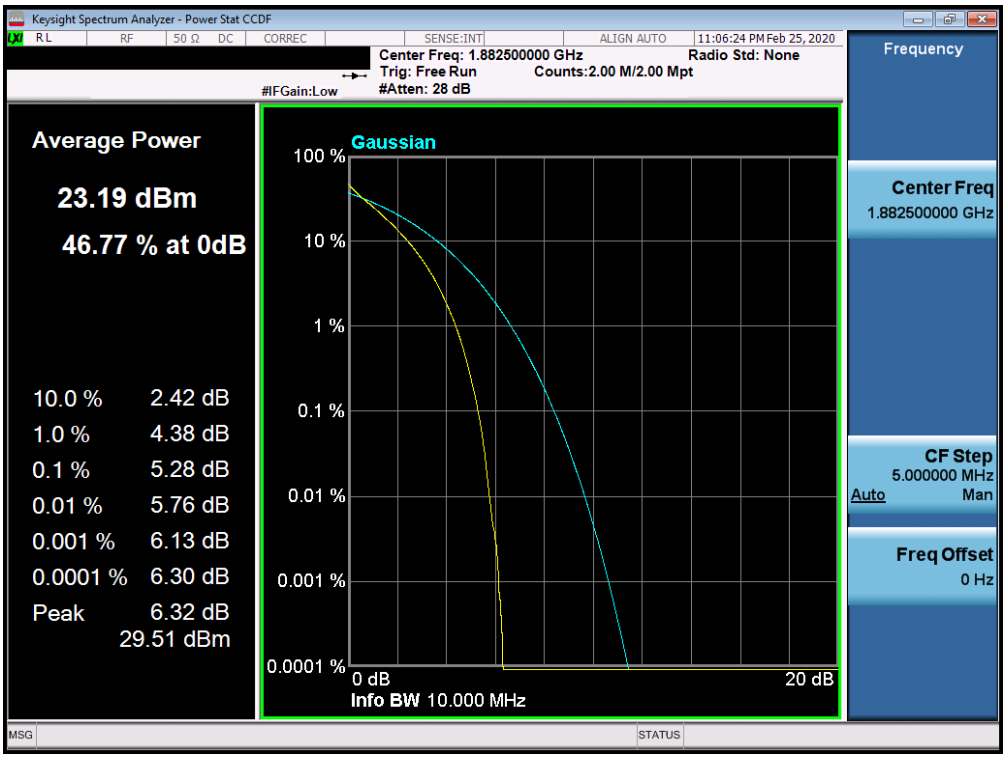



**Plot 7-311. PAR Plot (Band 25/2- 5.0MHz 64-QAM - Full RB Configuration)**




**Plot 7-312. PAR Plot (Band 25/2- 10.0MHz QPSK - Full RB Configuration)**



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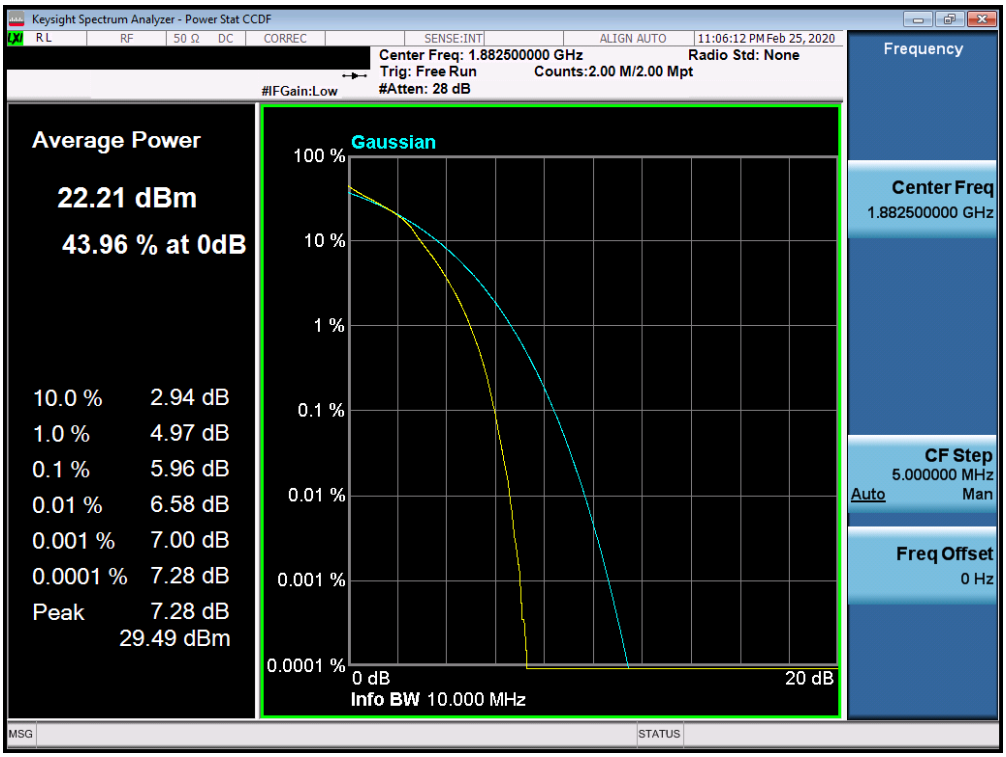
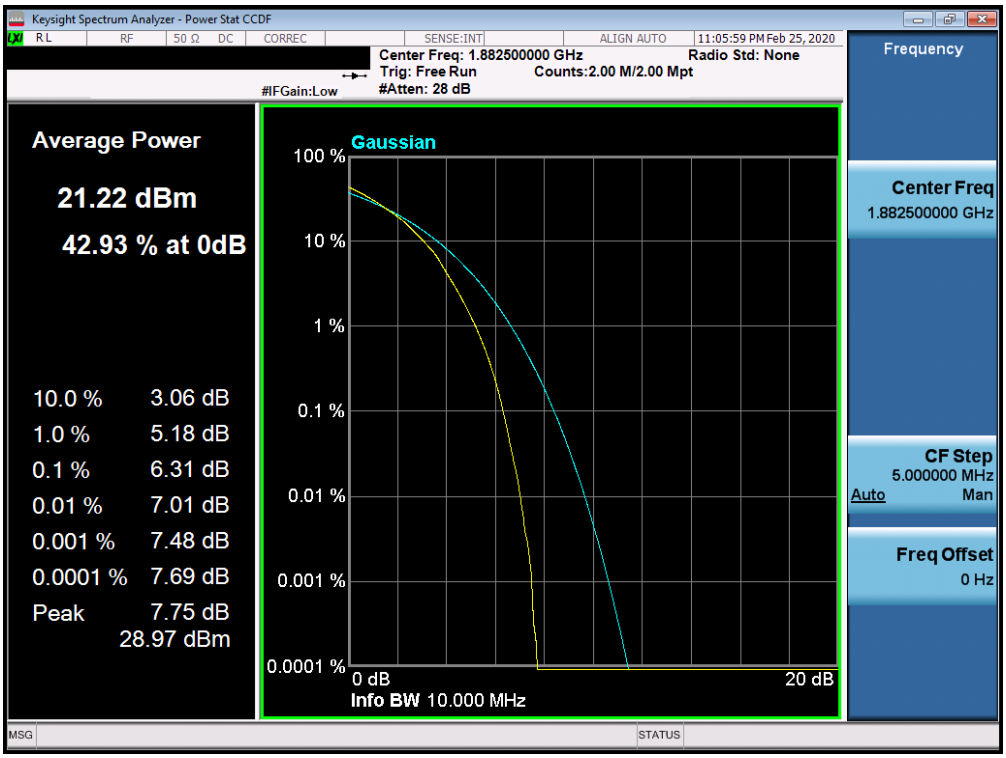



**Plot 7-313. PAR Plot (Band 25/2- 10.0MHz 16-QAM - Full RB Configuration)**




**Plot 7-314. PAR Plot (Band 25/2- 10.0MHz 64-QAM - Full RB Configuration)**



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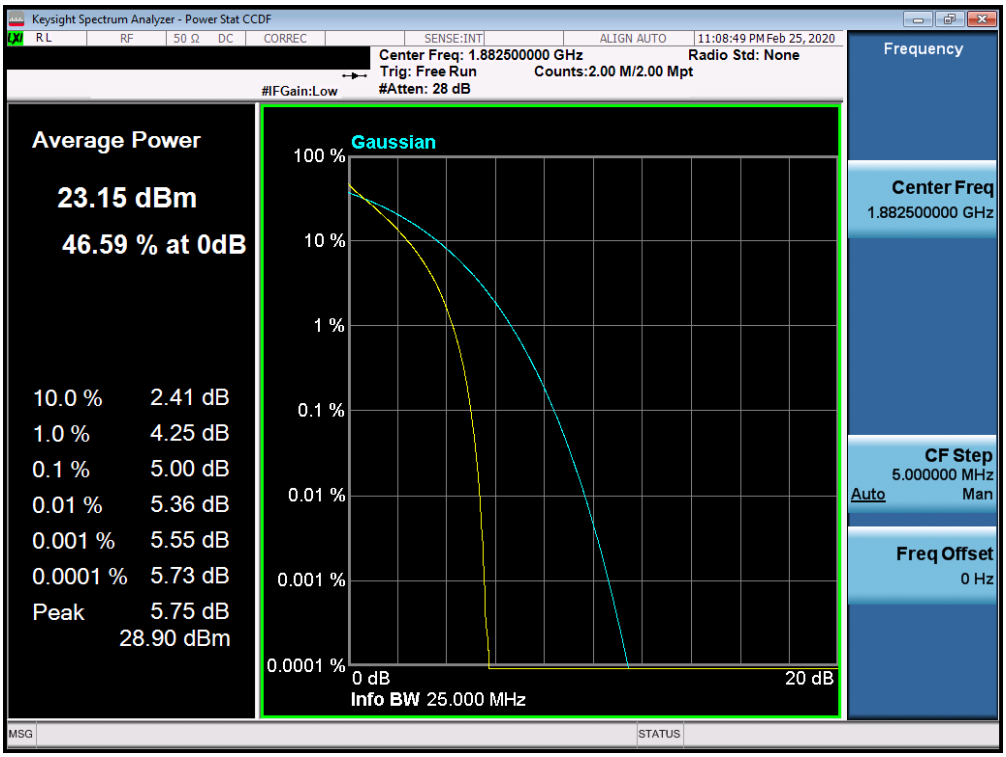
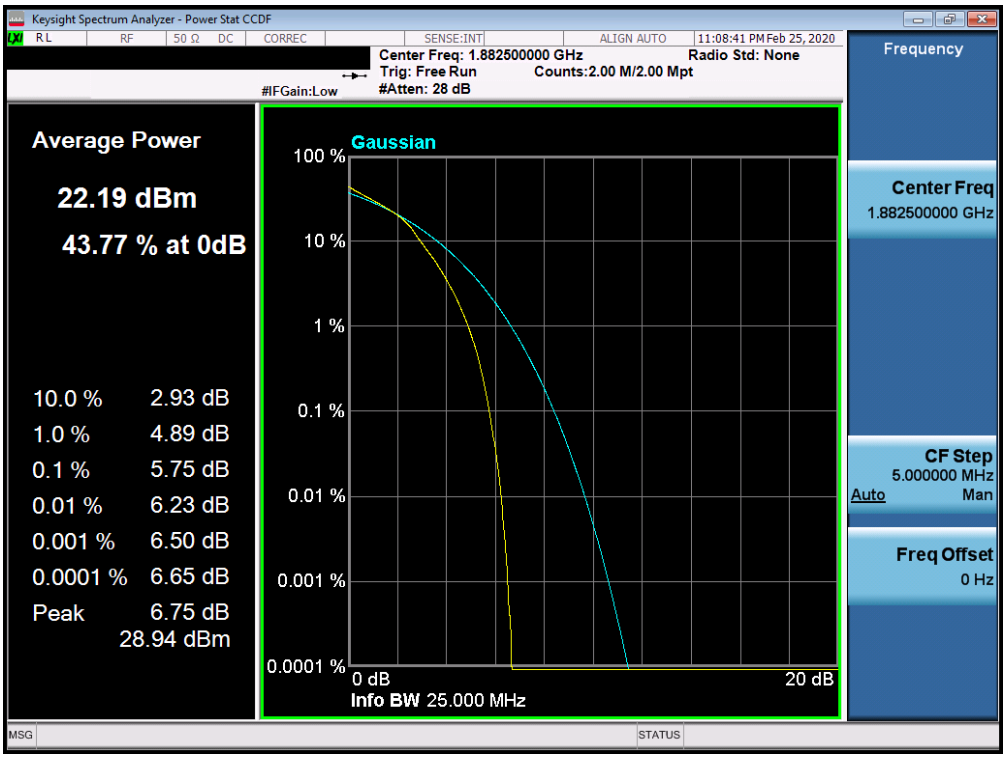



**Plot 7-315. PAR Plot (Band 25/2- 15.0MHz QPSK - Full RB Configuration)**




**Plot 7-316. PAR Plot (Band 25/2- 15.0MHz 16-QAM - Full RB Configuration)**



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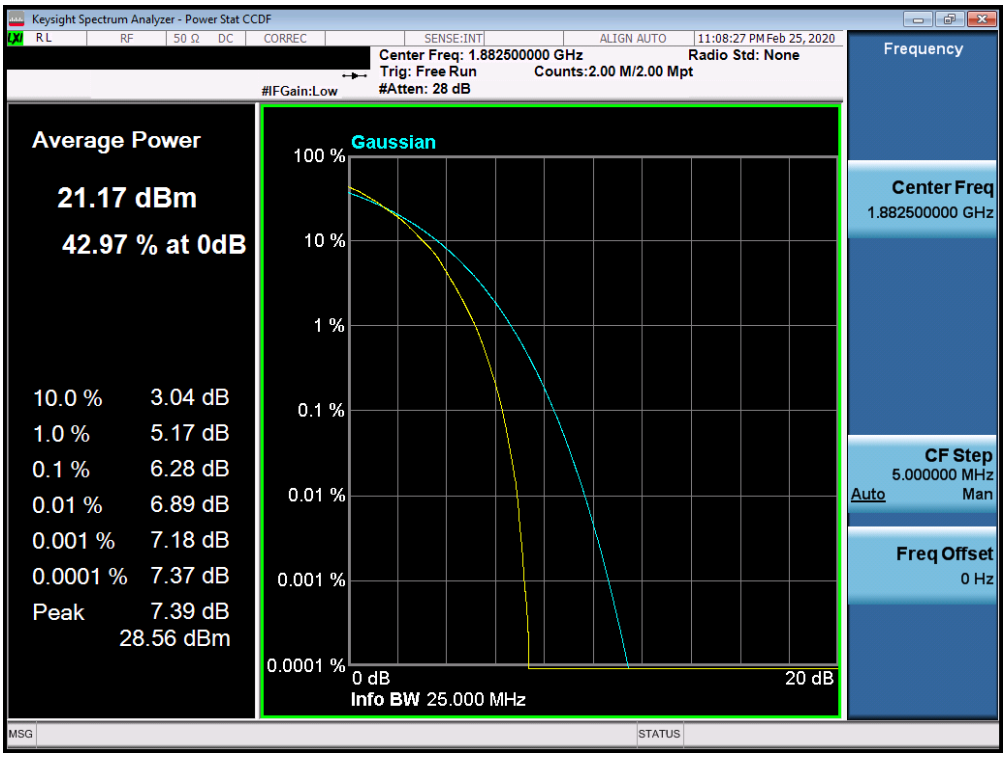
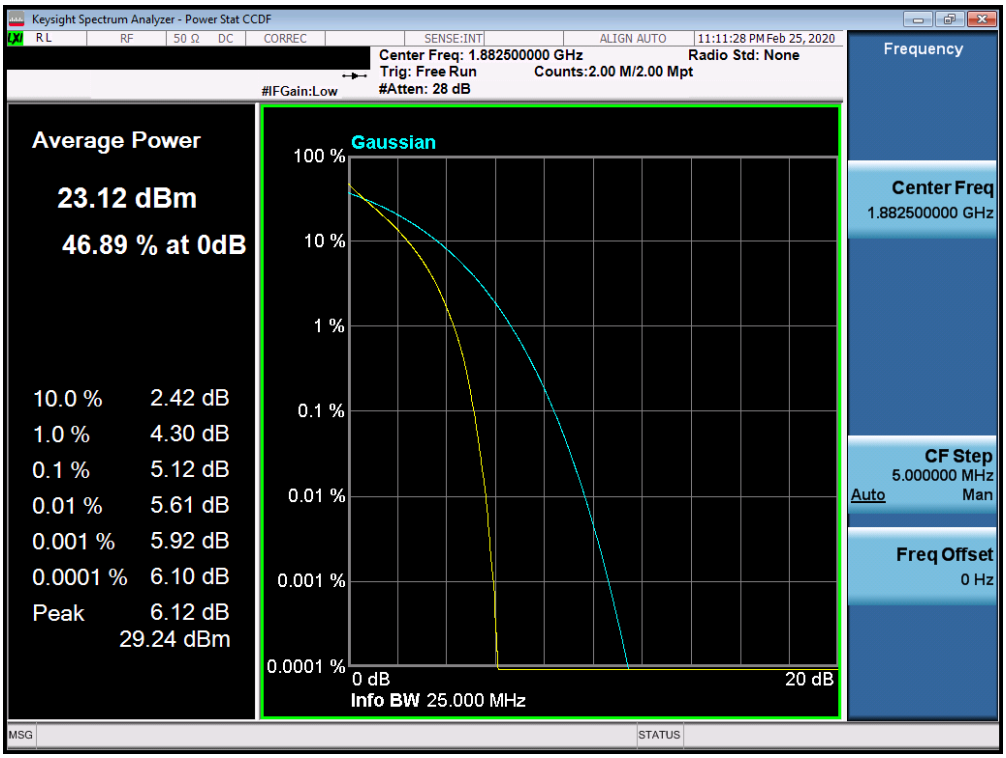



**Plot 7-317. PAR Plot (Band 25/2- 15.0MHz 64-QAM - Full RB Configuration)**




**Plot 7-318. PAR Plot (Band 25/2- 20.0MHz QPSK - Full RB Configuration)**



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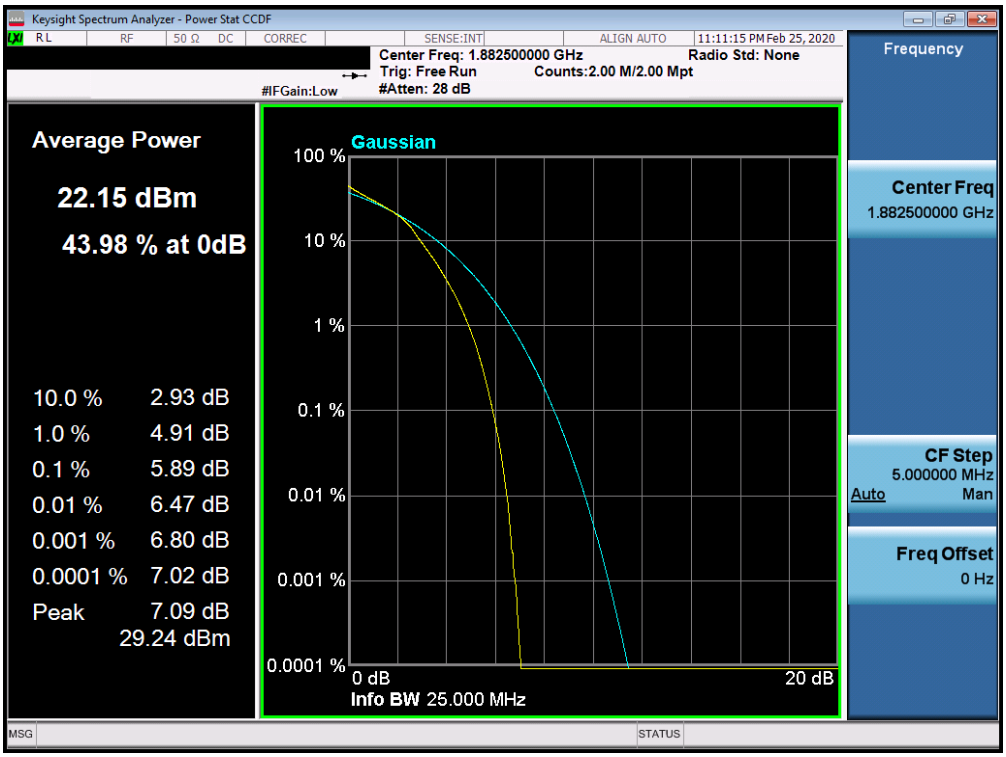
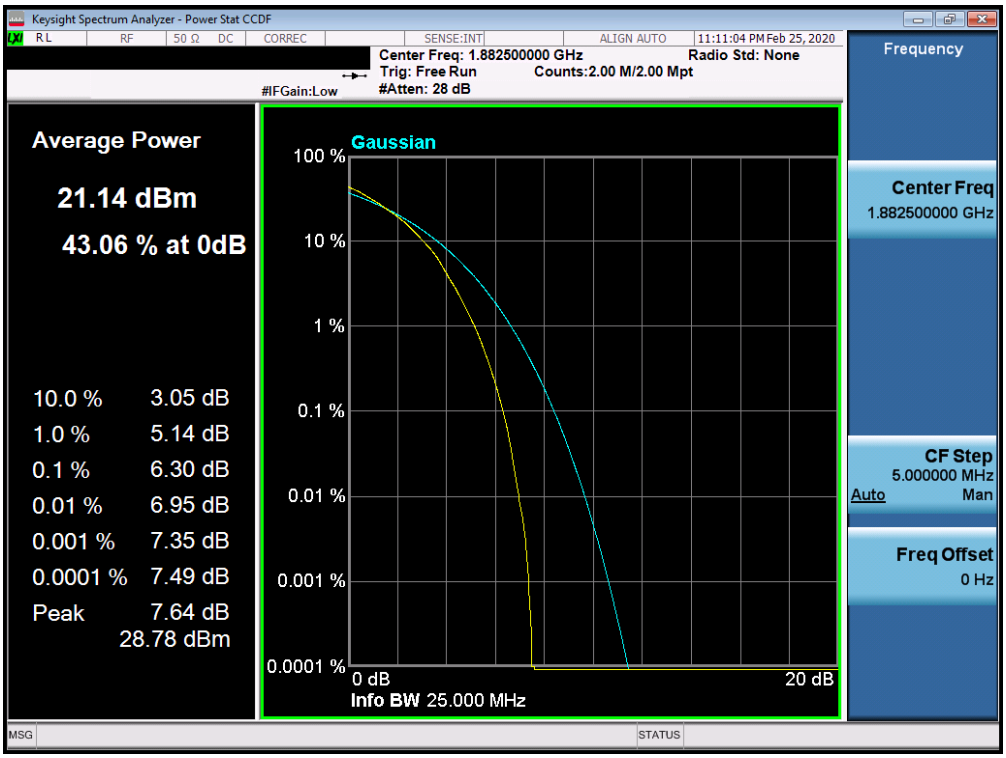



**Plot 7-319. PAR Plot (Band 25/2- 20.0MHz 16-QAM - Full RB Configuration)**




**Plot 7-320. PAR Plot (Band 25/2- 20.0MHz 64-QAM - Full RB Configuration)**



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## 7.6 Uplink Carrier Aggregation
**§27.53(m)**

**Test Overview**

The EUT is set up to transmit two contiguous LTE channels. The power level of both carriers and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10th harmonic. All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

***For Band 41, the minimum permissible attenuation level of any spurious emission is 55 + 10 $\log_{10}(P_{[Watts]})$.***

**Test Procedure Used**

KDB 971168 D01 v03r01 – Section 6.0

**Test Settings**

1. Start frequency was set to 30MHz and stop frequency was set to at least 10 * the fundamental frequency (separated into at least two plots per channel)
2. Detector = RMS
3. Trace mode = trace average for continuous emissions, max hold for pulse emissions
4. Sweep time = auto couple
5. The trace was allowed to stabilize
6. Please see test notes below for RBW and VBW settings

**Test Setup**

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

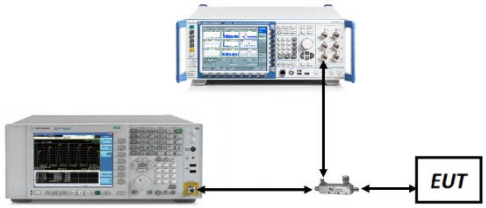


**Figure 7-5. Test Instrument & Measurement Setup**



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## Test Notes

1. Uplink carrier aggregation is only supported in this EUT while operating in Power Class 2 and 3.

2. Conducted power and spurious emissions measurements were evaluated for the two contiguous channels using various combinations of RB size, RB offset, modulation, and channel bandwidth. Channel bandwidth data is shown in the tables below based only on the channel bandwidths that were supported in this device. The worst case (highest) powers were found while operating with QPSK modulation, as shown in Table 7-503 and 7-504 below, with both carriers set to transmit using 1RB.

3. Compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater for frequencies less than 1 GHz and 1 MHz or greater for frequencies greater than 1 GHz. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.



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# Uplink CA Configuration B41 (PC3)

| Power State | PCC | | | | | | | SCC | | | | | | | Power |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | PCC Band | PCC Bandwidth [MHz] | PCC (UL) Channel | PCC (UL) Frequency [MHz] | Modulation | PCC UL# RB | PCC UL RB Offset | SCC Band | SCC Bandwidth [MHz] | SCC (UL) Channel | SCC (UL) Frequency [MHz] | Modulation | PCC UL# RB | PCC UL RB Offset | ULCA Tx.Power (dBm) |
| Max | LTE B41 | 20 | 39750 | 2506 | QPSK | 1 | 99 | LTE B41 | 20 | 39948 | 2525.8 | QPSK | 1 | 0 | 22.81 |
| Max | LTE B41 | 20 | 40620 | 2593 | QPSK | 1 | 99 | LTE B41 | 20 | 40818 | 2612.8 | QPSK | 1 | 0 | 22.53 |
| Max | LTE B41 | 20 | 41490 | 2680 | QPSK | 1 | 0 | LTE B41 | 20 | 41292 | 2660.2 | QPSK | 1 | 99 | **23.40** |

**Table 7-3. Conducted Powers (B41 (PC3) – 20MHz + 20MHz Channel Bandwidth - PCC/SCC: 1RB)**

| Power State | PCC | | | | | | | SCC | | | | | | | Power |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | PCC Band | PCC Bandwidth [MHz] | PCC (UL) Channel | PCC (UL) Frequency [MHz] | Modulation | PCC UL# RB | PCC UL RB Offset | SCC Band | SCC Bandwidth [MHz] | SCC (UL) Channel | SCC (UL) Frequency [MHz] | Modulation | PCC UL# RB | PCC UL RB Offset | ULCA Tx.Power (dBm) |
| Max | LTE B41 | 20 | 41490 | 2680 | QPSK | 1 | 0 | LTE B41 | 20 | 41292 | 2660.2 | QPSK | 100 | 0 | 22.36 |
| Max | LTE B41 | 20 | 41490 | 2680 | 16-QAM | 1 | 0 | LTE B41 | 20 | 41292 | 2660.2 | 16-QAM | 100 | 0 | 21.40 |
| Max | LTE B41 | 20 | 41490 | 2680 | 64-QAM | 1 | 0 | LTE B41 | 20 | 41292 | 2660.2 | 64-QAM | 100 | 0 | 20.60 |

**Table 7-4. Conducted Powers (B41 (PC3) with Various Combinations for 20MHz + 20MHz Channel Bandwidth)**



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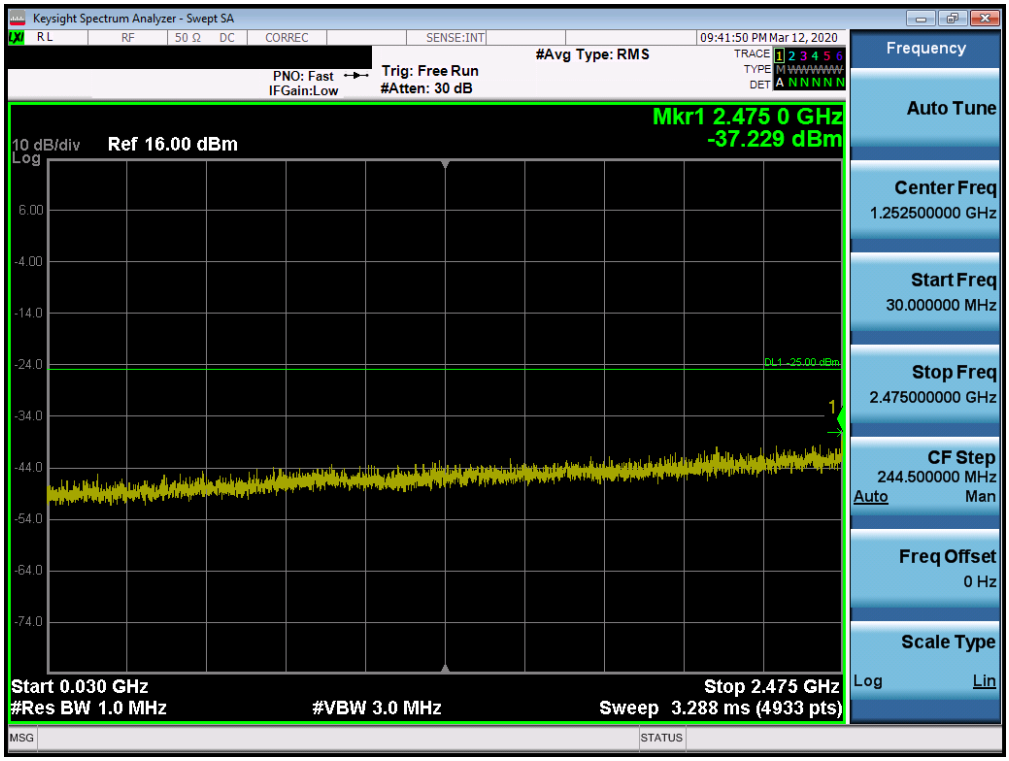
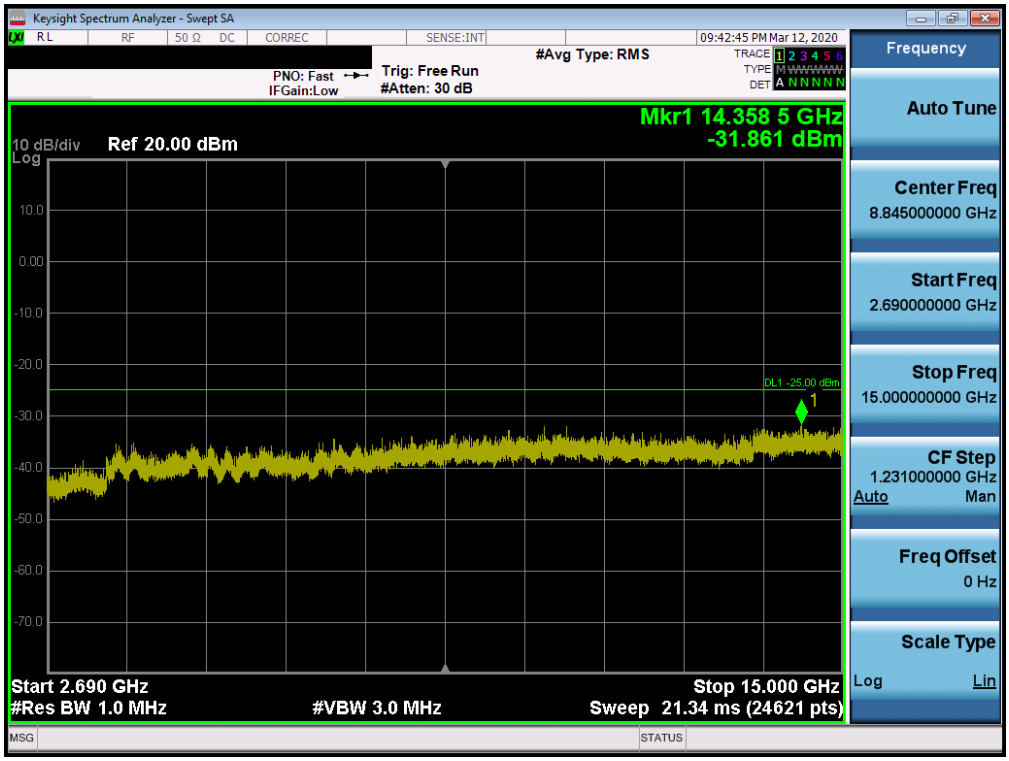



**Plot 7-321. Conducted Spurious Plot (Band 41 (PC3) – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Low Channel)**




**Plot 7-322. Conducted Spurious Plot (Band 41 (PC3) – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Low Channel)**



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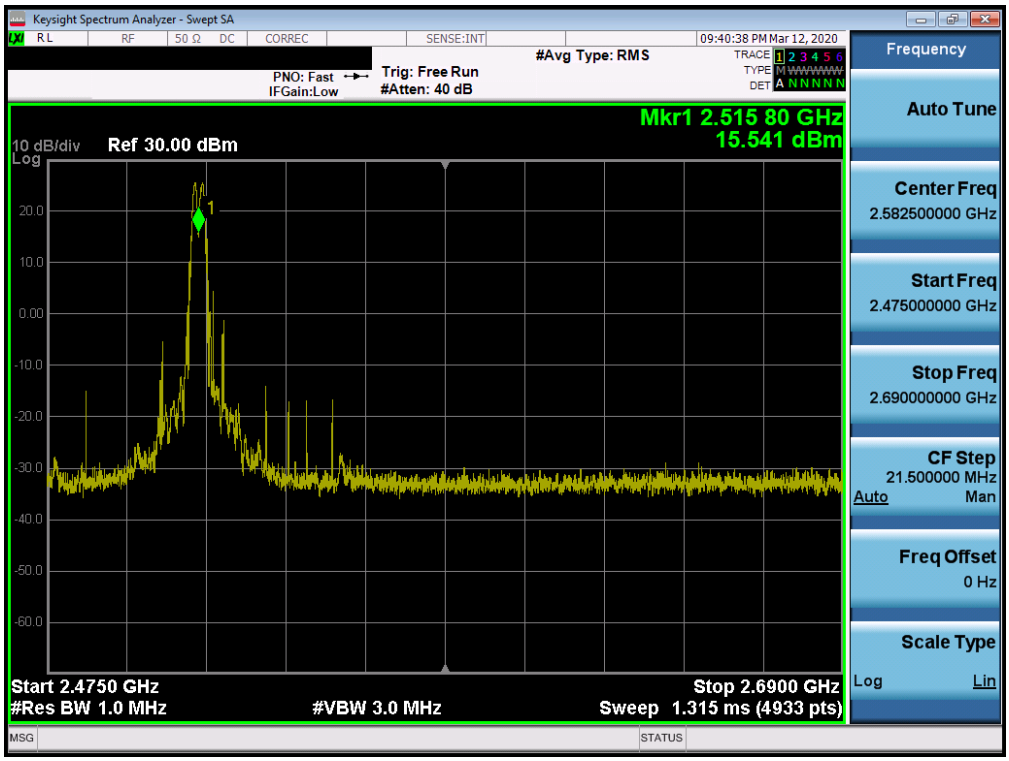
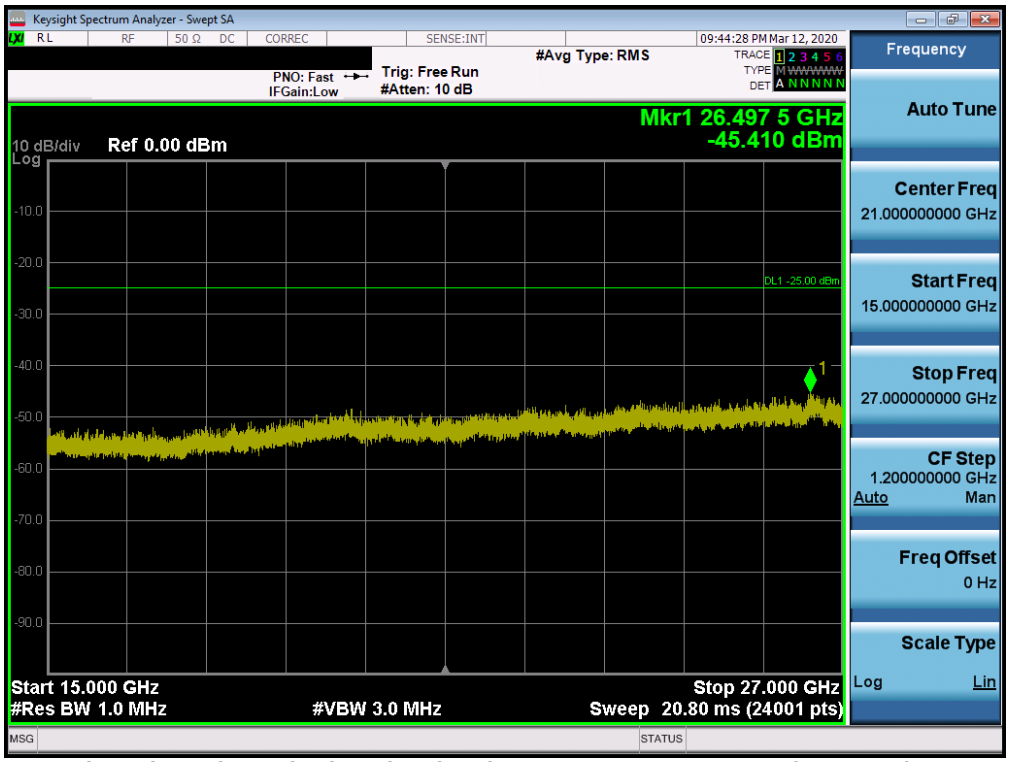



**Plot 7-323. Conducted Spurious Plot (Band 41 (PC3) – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Low Channel)**




**Plot 7-324. Conducted Spurious Plot (Band 41 (PC3) – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Low Channel)**



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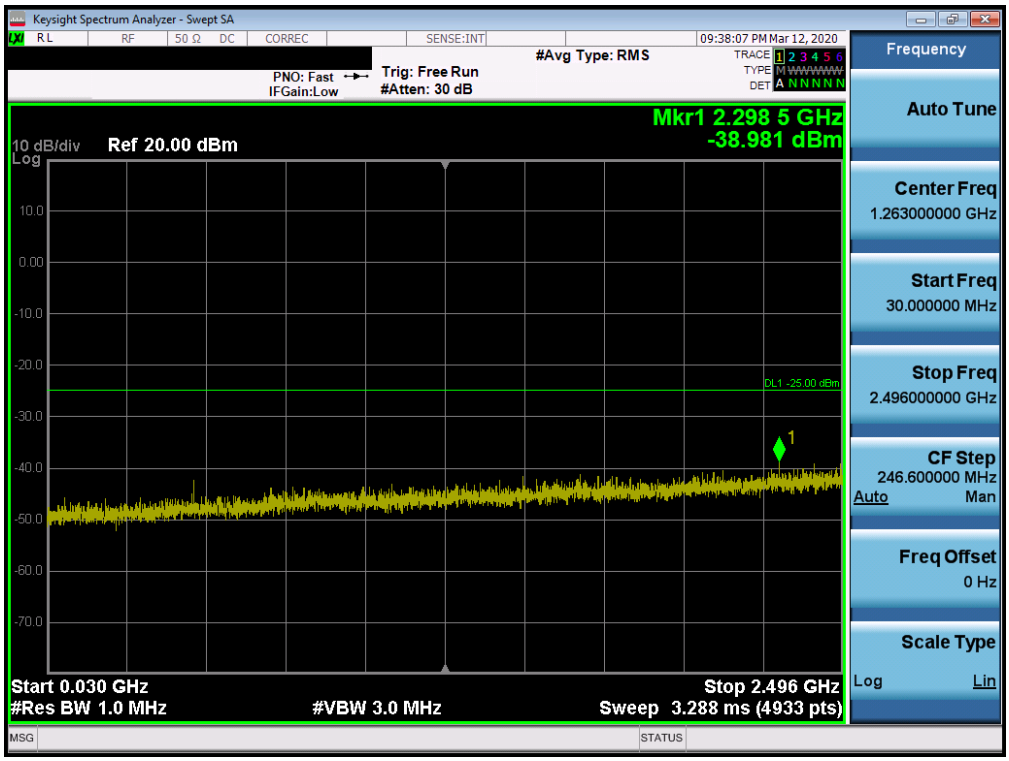
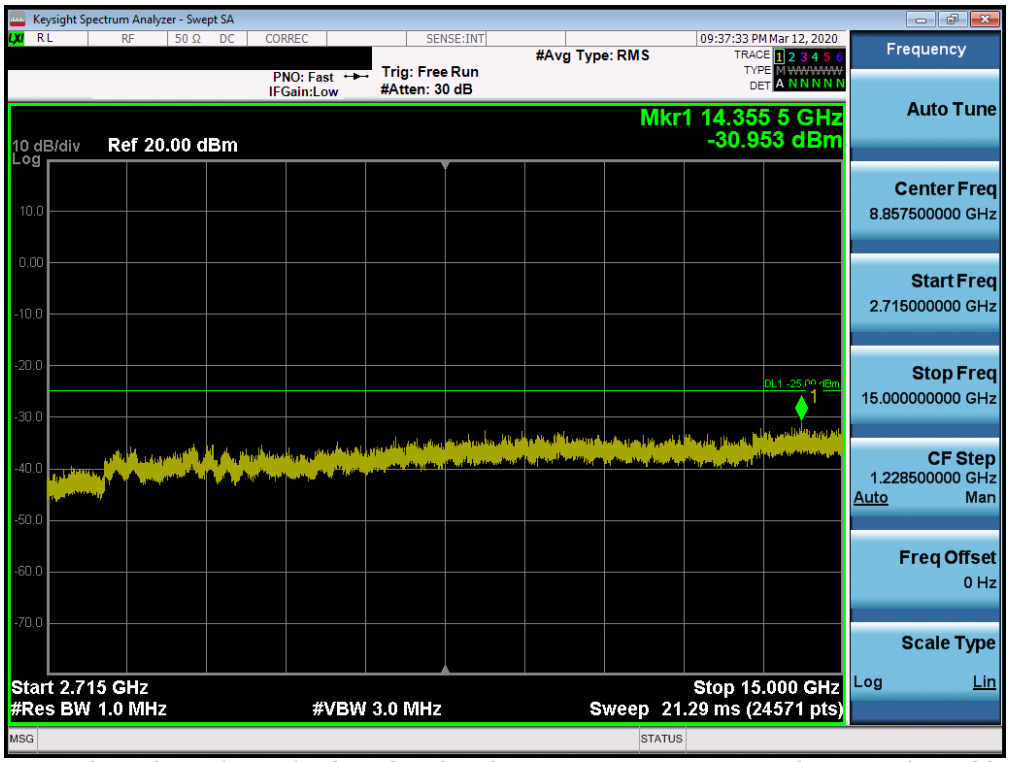



**Plot 7-325. Conducted Spurious Plot (Band 41 (PC3) – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Mid Channel)**




**Plot 7-326. Conducted Spurious Plot (Band 41 (PC3) – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Mid Channel)**



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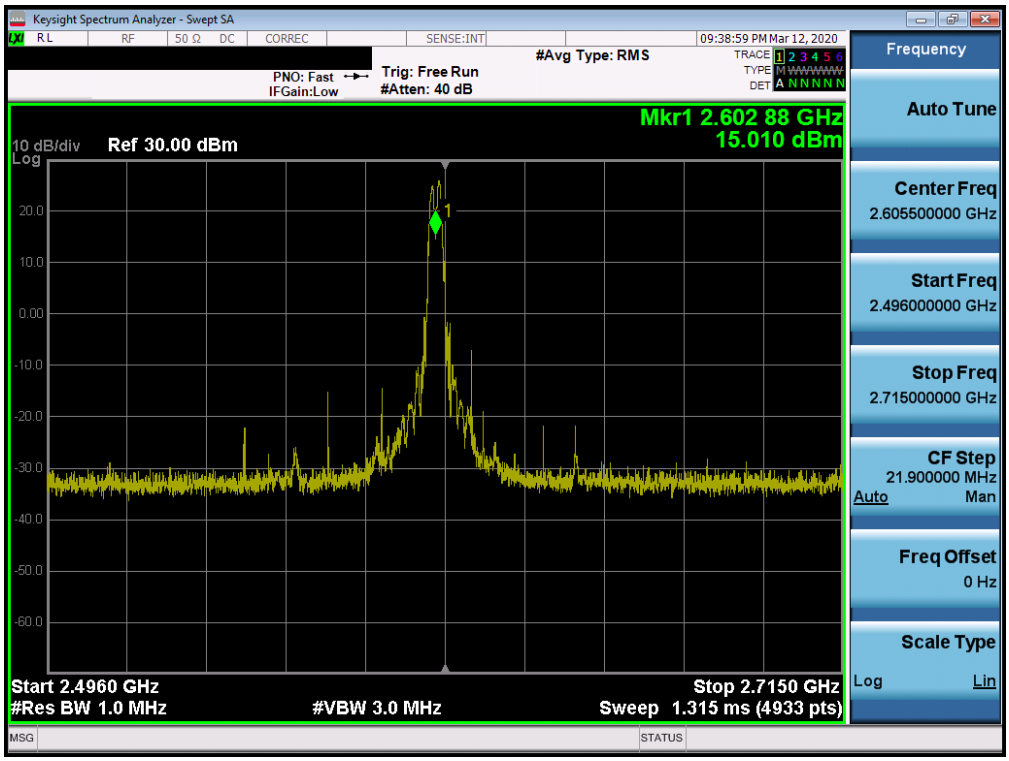
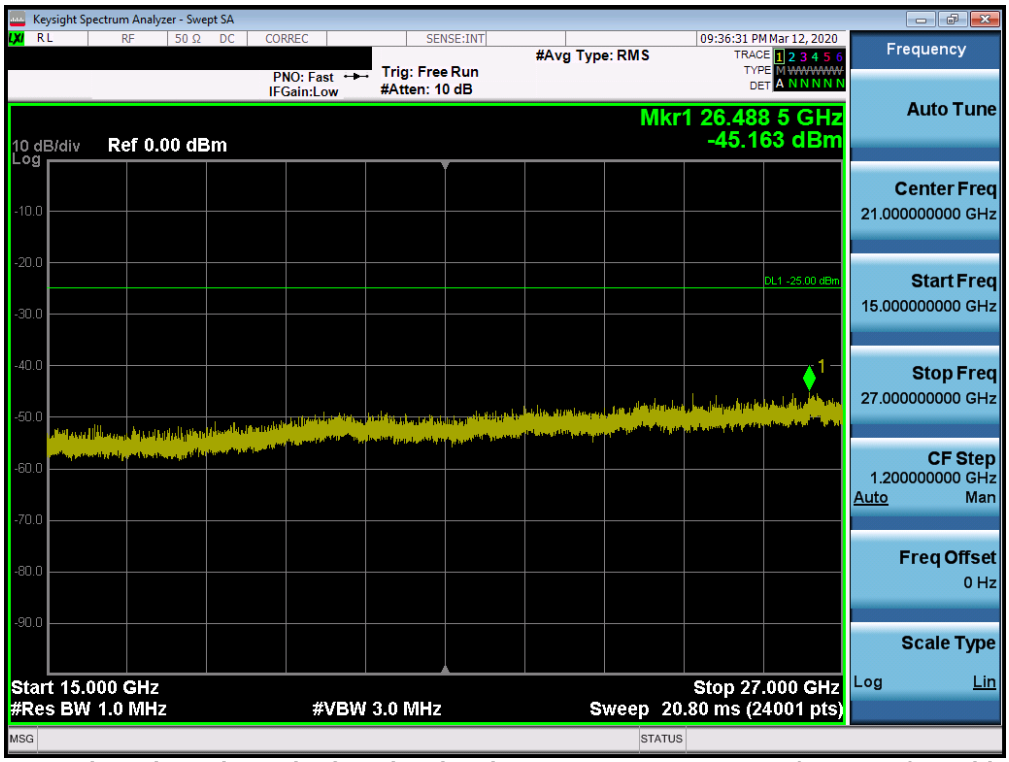



**Plot 7-327. Conducted Spurious Plot (Band 41 (PC3) – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Mid Channel)**




**Plot 7-328. Conducted Spurious Plot (Band 41 (PC3) – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Mid Channel)**



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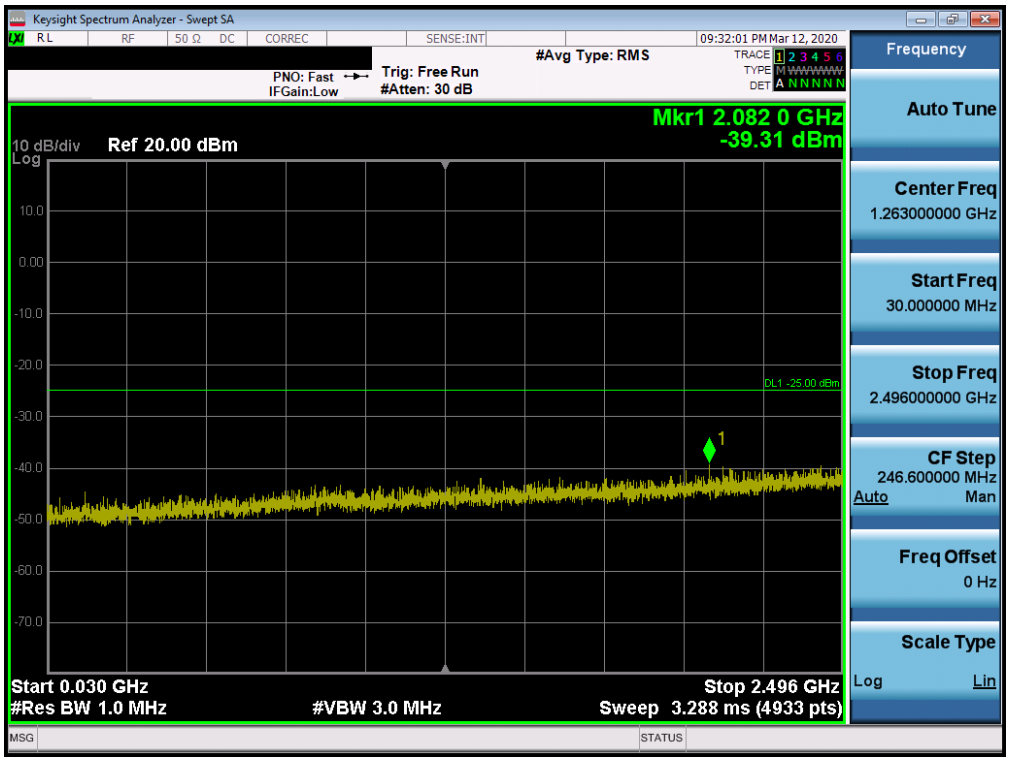
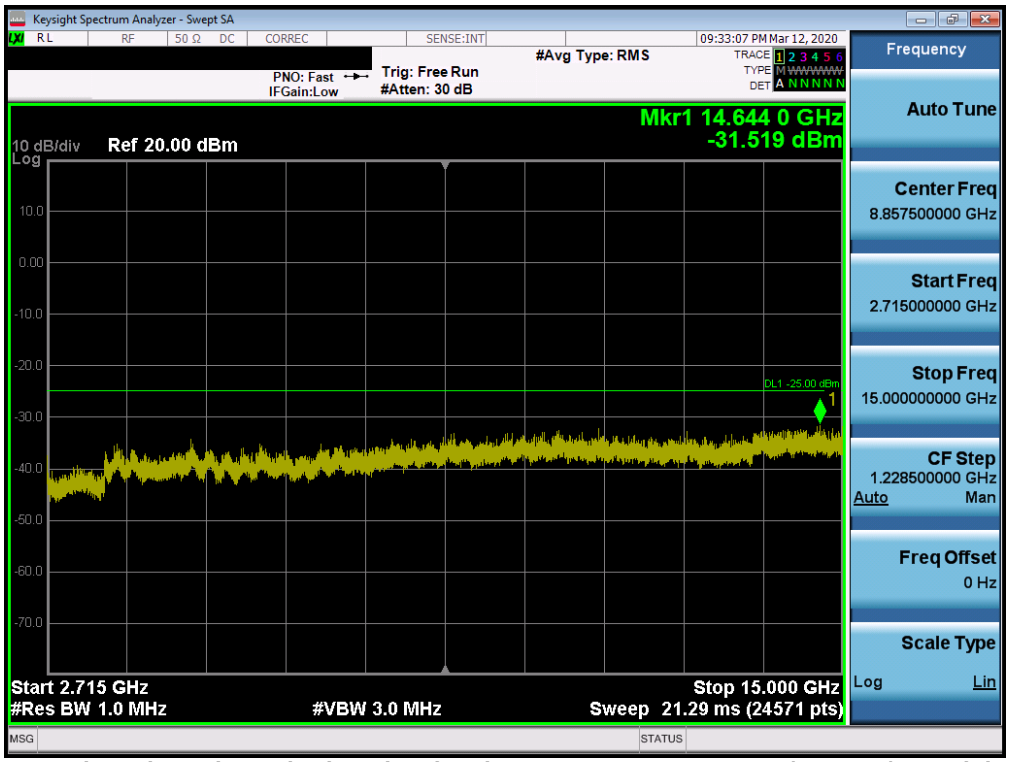



**Plot 7-329. Conducted Spurious Plot (Band 41 (PC3) – 20.0MHz QPSK – PCC 1/0 SCC 1/99 – High Channel)**




**Plot 7-330. Conducted Spurious Plot (Band 41 (PC3) – 20.0MHz QPSK – PCC 1/0 SCC 1/99 – High Channel)**



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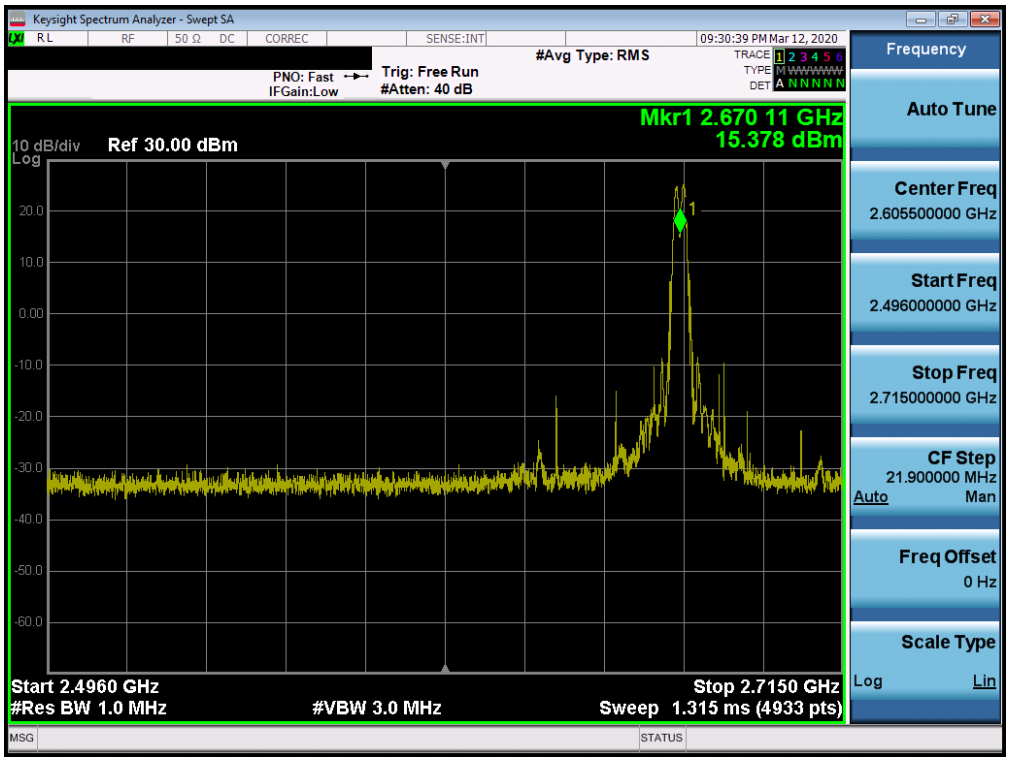
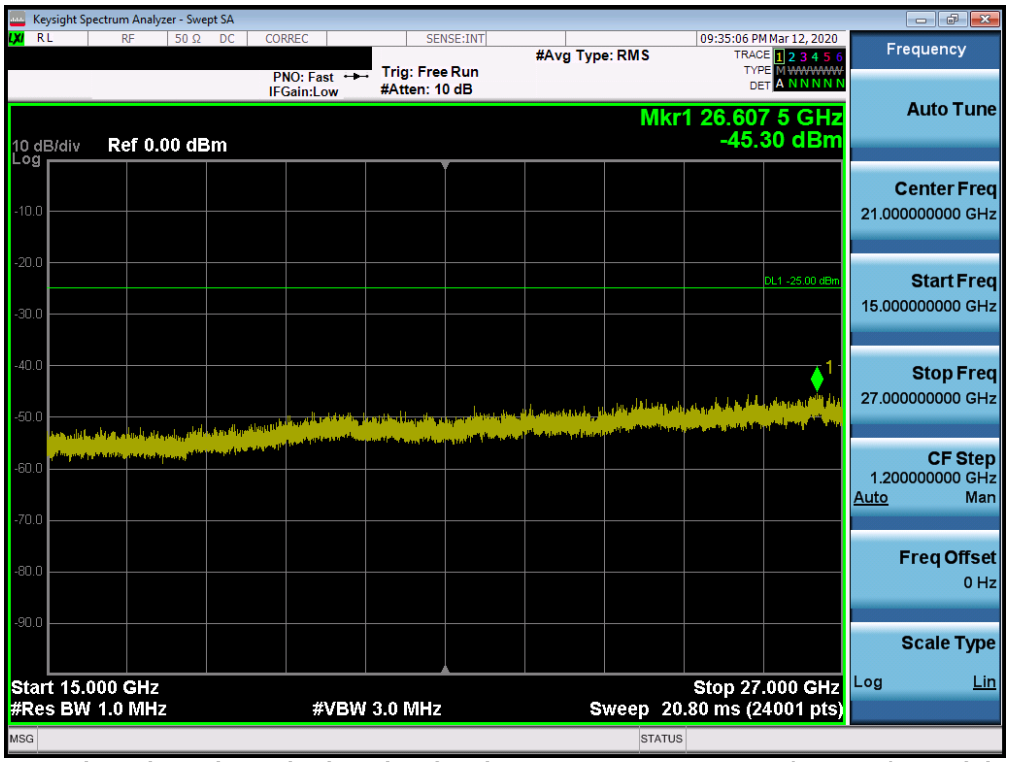



**Plot 7-331. Conducted Spurious Plot (Band 41 (PC3) – 20.0MHz QPSK – PCC 1/0 SCC 1/99 – High Channel)**




**Plot 7-332. Conducted Spurious Plot (Band 41 (PC3) – 20.0MHz QPSK – PCC 1/0 SCC 1/99 – High Channel)**



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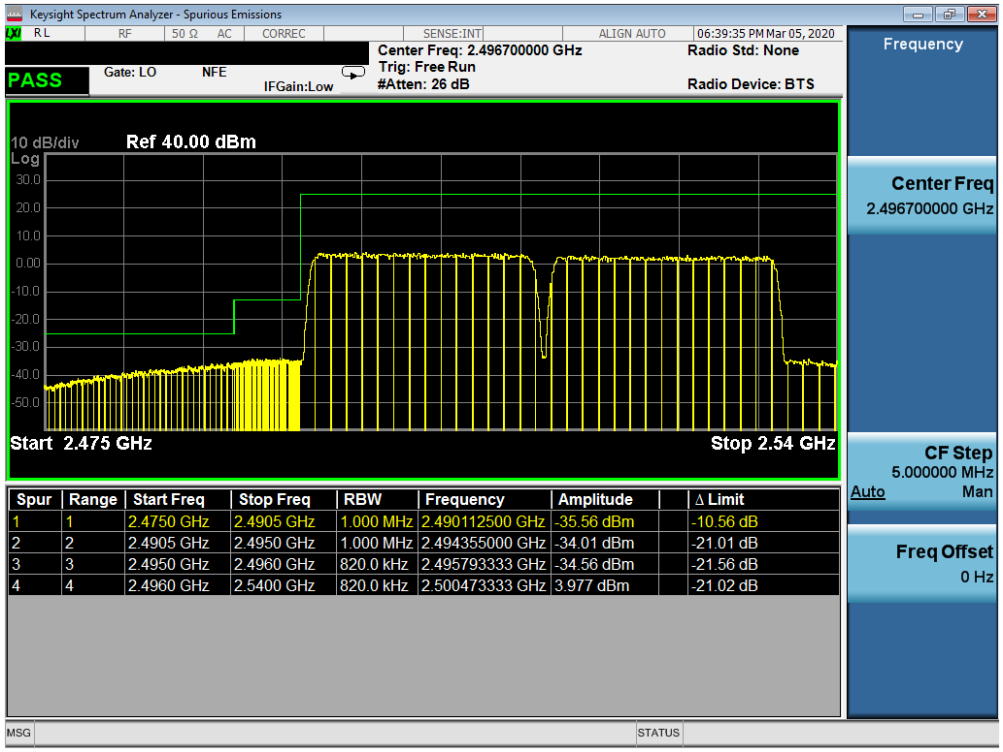
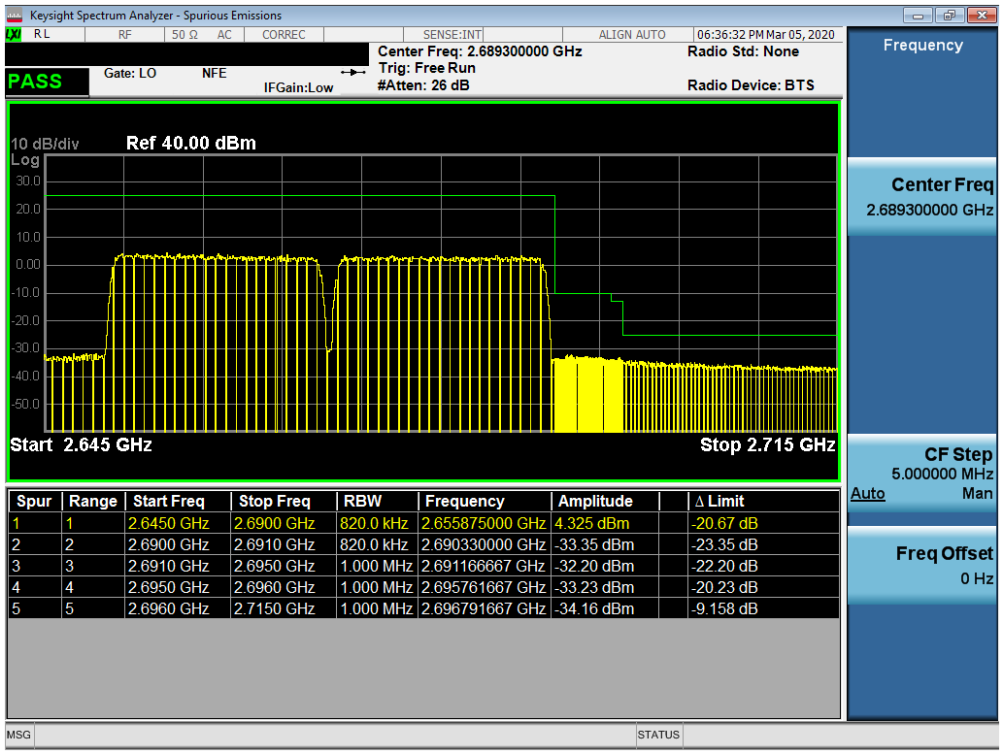



| Spur | Range | Start Freq | Stop Freq | RBW | Frequency | Amplitude | | Δ Limit |
|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 2.4750 GHz | 2.4905 GHz | 1.000 MHz | 2.490112500 GHz | -35.56 dBm | | -10.56 dB |
| 2 | 2 | 2.4905 GHz | 2.4950 GHz | 1.000 MHz | 2.494355000 GHz | -34.01 dBm | | -21.01 dB |
| 3 | 3 | 2.4950 GHz | 2.4960 GHz | 820.0 kHz | 2.495793333 GHz | -34.56 dBm | | -21.56 dB |
| 4 | 4 | 2.4960 GHz | 2.5400 GHz | 820.0 kHz | 2.500473333 GHz | 3.977 dBm | | -21.02 dB |

**Table 7-333. Lower ACP Plot (Band 41 (PC3) QPSK – PCC:20 MHz SCC:20 MHz – Full RB)**




| Spur | Range | Start Freq | Stop Freq | RBW | Frequency | Amplitude | | Δ Limit |
|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 2.6450 GHz | 2.6900 GHz | 820.0 kHz | 2.655875000 GHz | 4.325 dBm | | -20.67 dB |
| 2 | 2 | 2.6900 GHz | 2.6910 GHz | 820.0 kHz | 2.690330000 GHz | -33.35 dBm | | -23.35 dB |
| 3 | 3 | 2.6910 GHz | 2.6950 GHz | 1.000 MHz | 2.691166667 GHz | -32.20 dBm | | -22.20 dB |
| 4 | 4 | 2.6950 GHz | 2.6960 GHz | 1.000 MHz | 2.695761667 GHz | -33.23 dBm | | -20.23 dB |
| 5 | 5 | 2.6960 GHz | 2.7150 GHz | 1.000 MHz | 2.696791667 GHz | -34.16 dBm | | -9.158 dB |

**Table 7-334. Upper ACP Plot (Band 41 (PC3) QPSK – PCC:20 MHz SCC:20 MHz – Full RB)**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# Uplink CA Configuration B41 (PC2)

| Power State | PCC | | | | | | | SCC | | | | | | | Power |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | PCC Band | PCC Bandwidth [MHz] | PCC (UL) Channel | PCC (UL) Frequency [MHz] | Modulation | PCC UL# RB | PCC UL RB Offset | SCC Band | SCC Bandwidth [MHz] | SCC (UL) Channel | SCC (UL) Frequency [MHz] | Modulation | PCC UL# RB | PCC UL RB Offset | ULCA Tx.Power (dBm) |
| Max | LTE B41 | 20 | 39750 | 2506 | QPSK | 1 | 99 | LTE B41 | 20 | 39948 | 2525.8 | QPSK | 1 | 0 | 25.52 |
| Max | LTE B41 | 20 | 40620 | 2593 | QPSK | 1 | 99 | LTE B41 | 20 | 40818 | 2612.8 | QPSK | 1 | 0 | **25.63** |
| Max | LTE B41 | 20 | 41490 | 2680 | QPSK | 1 | 0 | LTE B41 | 20 | 41292 | 2660.2 | QPSK | 1 | 99 | 26.10 |

**Table 7-5. Conducted Powers (B41 (PC2) - 20MHz + 20MHz Channel Bandwidth - PCC/SCC: 1RB)**

| Power State | PCC | | | | | | | SCC | | | | | | | Power |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | PCC Band | PCC Bandwidth [MHz] | PCC (UL) Channel | PCC (UL) Frequency [MHz] | Modulation | PCC UL# RB | PCC UL RB Offset | SCC Band | SCC Bandwidth [MHz] | SCC (UL) Channel | SCC (UL) Frequency [MHz] | Modulation | PCC UL# RB | PCC UL RB Offset | ULCA Tx.Power (dBm) |
| Max | LTE B41 | 20 | 41490 | 2680 | QPSK | 100 | 0 | LTE B41 | 20 | 41292 | 2660.2 | QPSK | 100 | 0 | 24.53 |
| Max | LTE B41 | 20 | 41490 | 2680 | 16-QAM | 100 | 0 | LTE B41 | 20 | 41292 | 2660.2 | 16-QAM | 100 | 0 | 23.90 |
| Max | LTE B41 | 20 | 41490 | 2680 | 64-QAM | 100 | 0 | LTE B41 | 20 | 41292 | 2660.2 | 64-QAM | 100 | 0 | 22.68 |

**Table 7-6. Conducted Powers (B41 (PC2) with Various Combinations for 20MHz + 20MHz Channel Bandwidth)**



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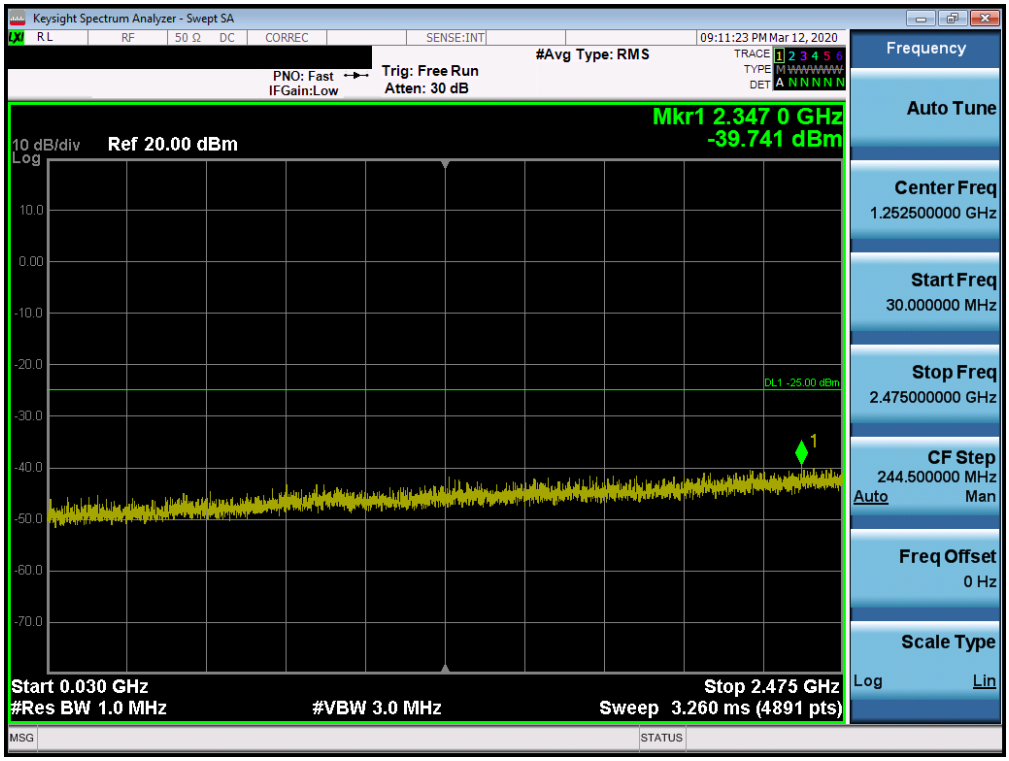
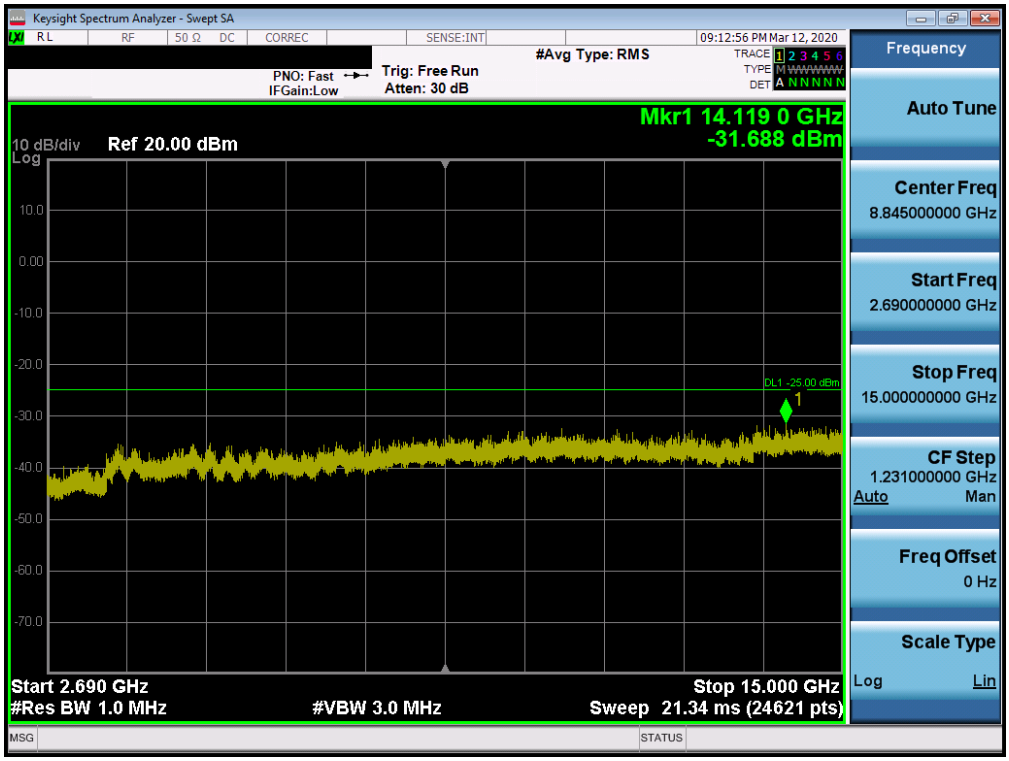



**Plot 7-335. Conducted Spurious Plot (Band 41 (PC2) – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Low Channel)**




**Plot 7-336. Conducted Spurious Plot (Band 41 (PC2) – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Low Channel)**



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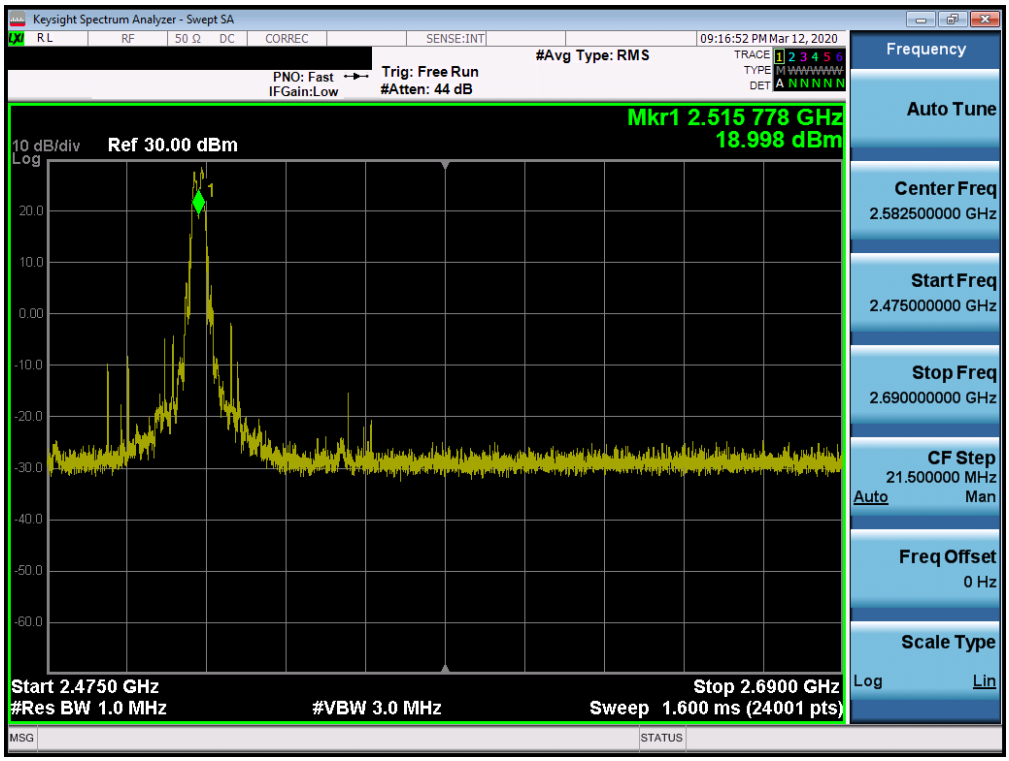
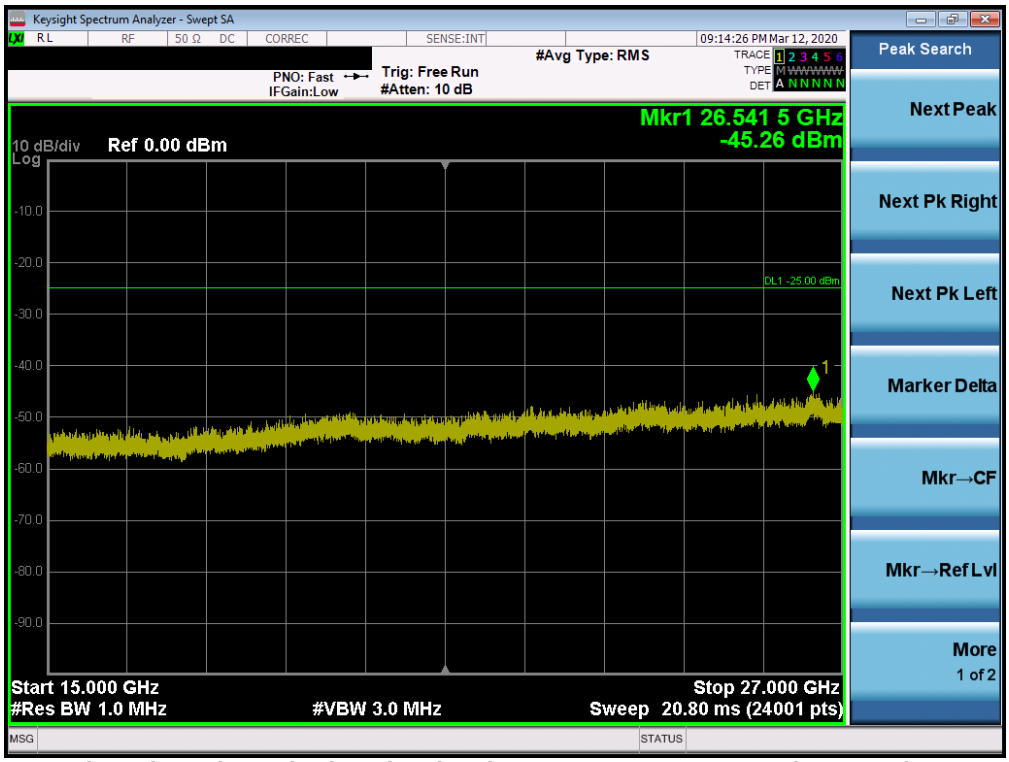



**Plot 7-337. Conducted Spurious Plot (Band 41 (PC2) – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Low Channel)**




**Plot 7-338. Conducted Spurious Plot (Band 41 (PC2) – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Low Channel)**



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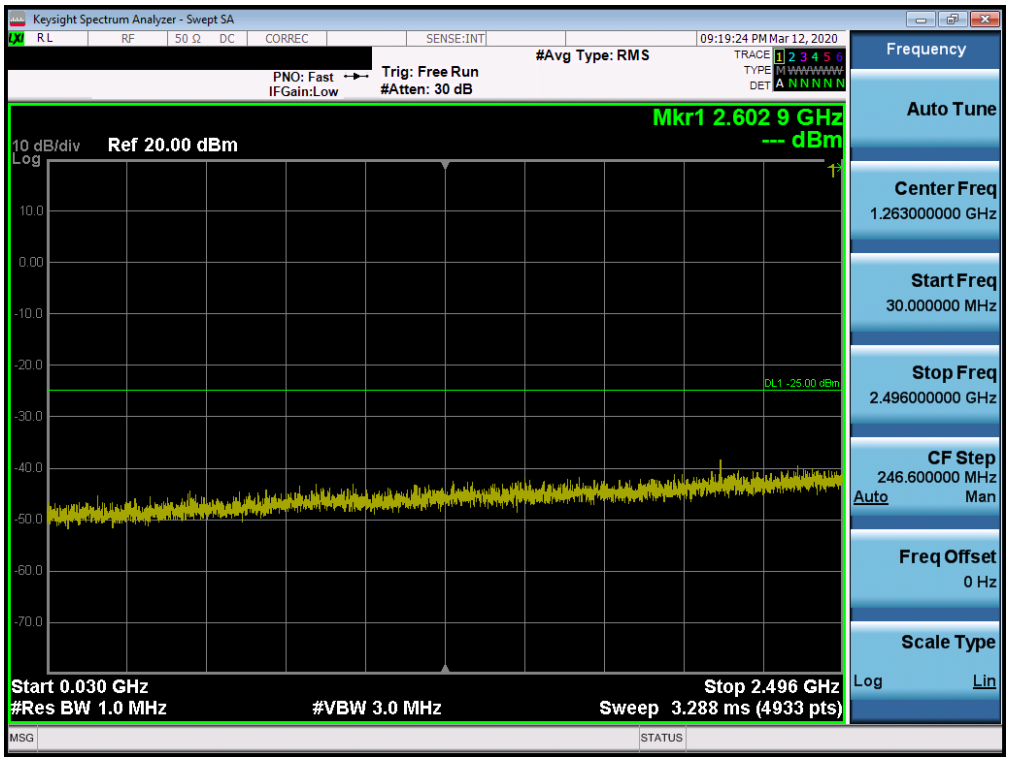
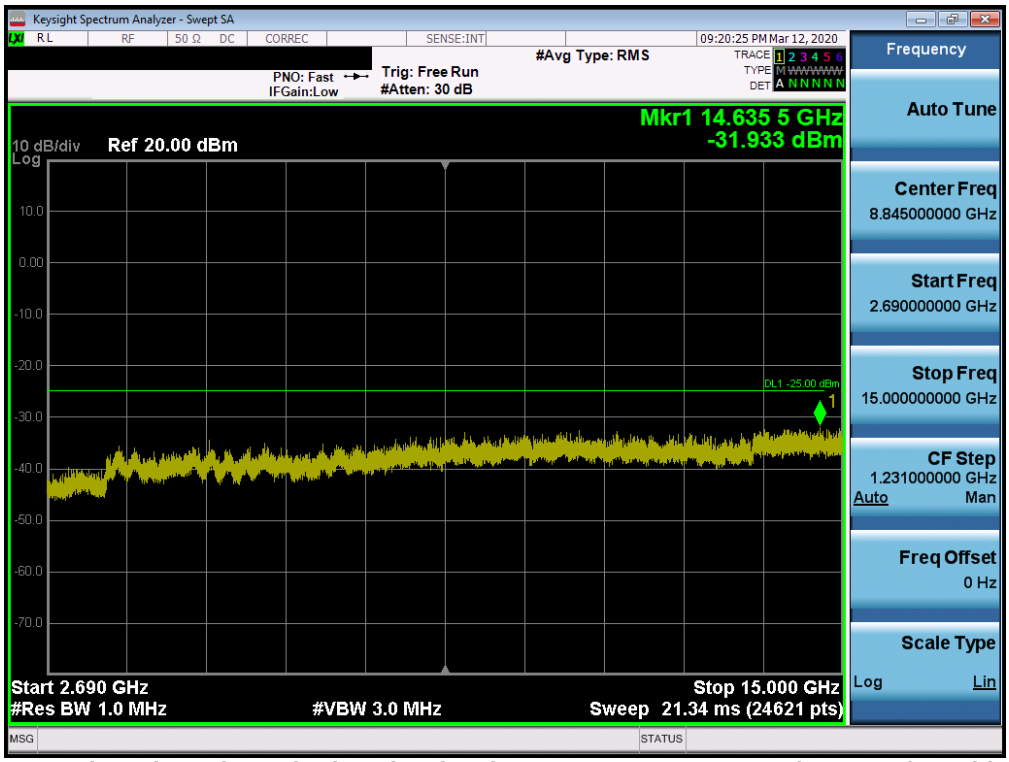



**Plot 7-339. Conducted Spurious Plot (Band 41 (PC2) – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Mid Channel)**




**Plot 7-340. Conducted Spurious Plot (Band 41 (PC2) – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Mid Channel)**



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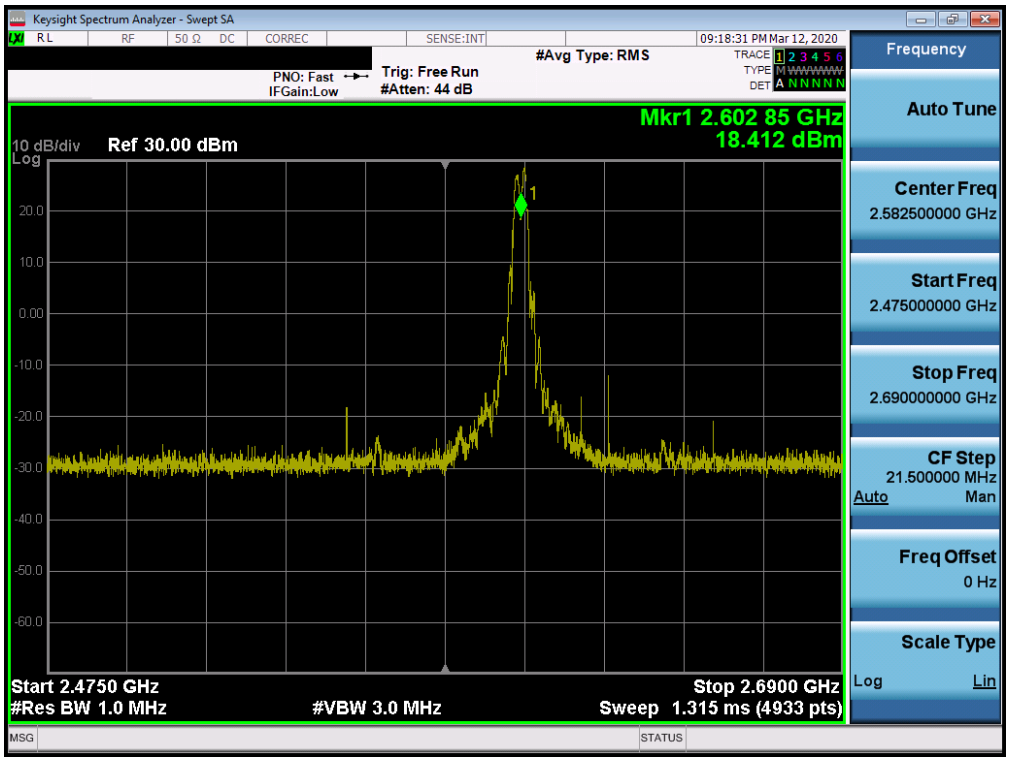
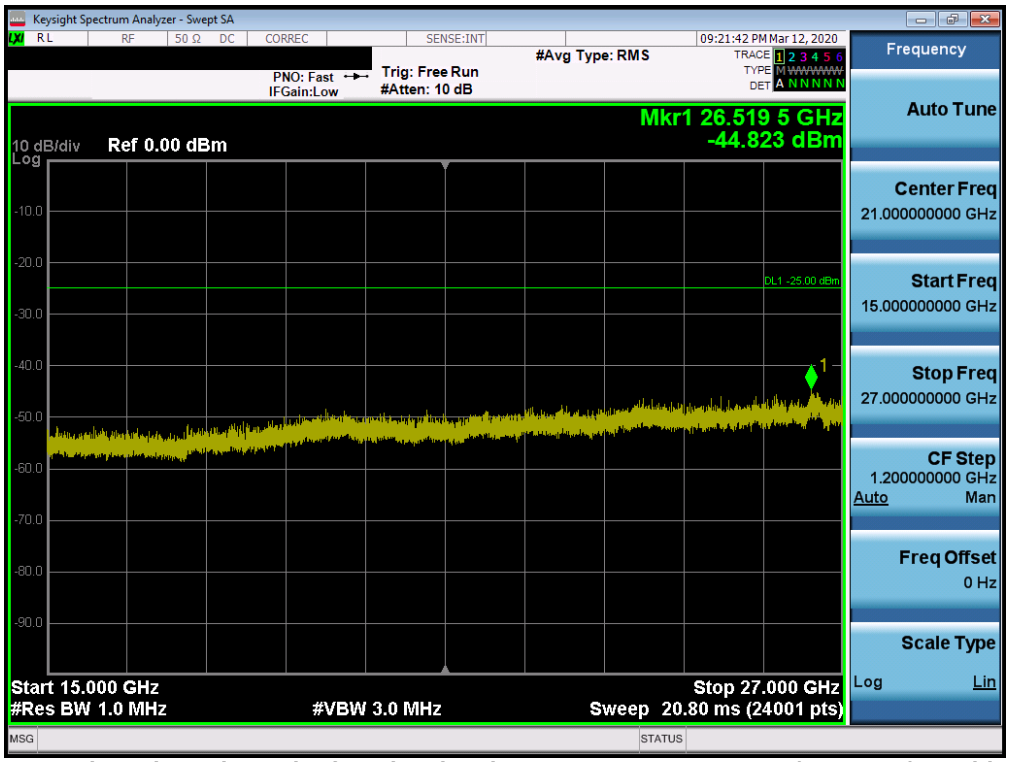



**Plot 7-341. Conducted Spurious Plot (Band 41 (PC2) – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Mid Channel)**




**Plot 7-342. Conducted Spurious Plot (Band 41 (PC2) – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Mid Channel)**



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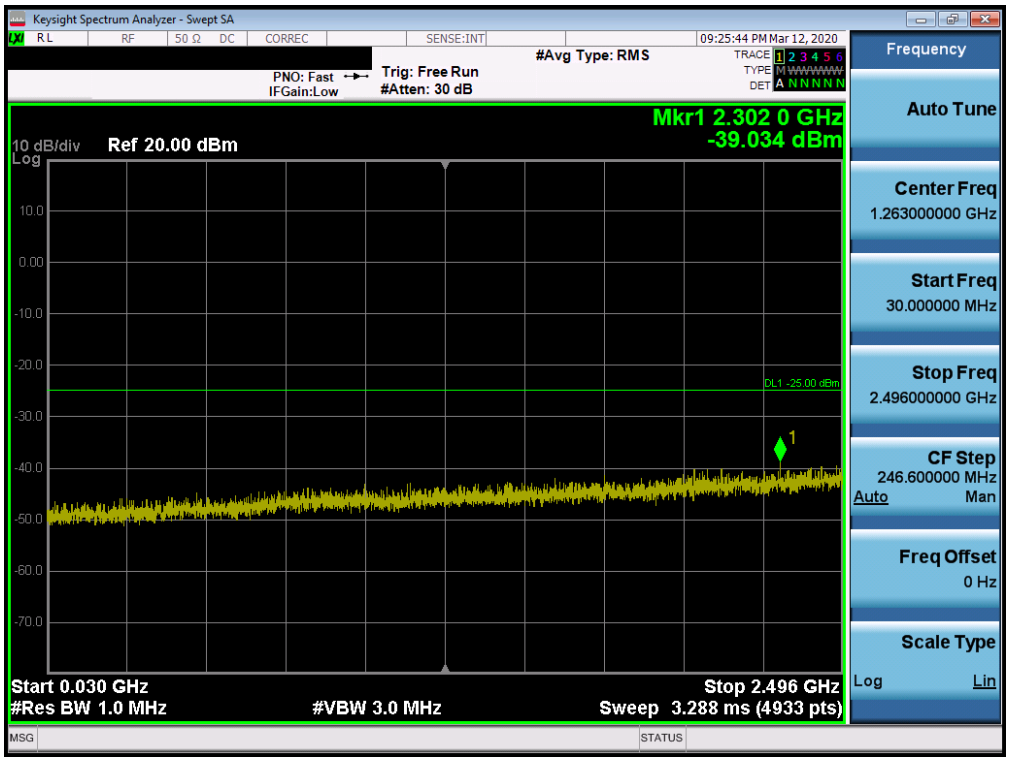
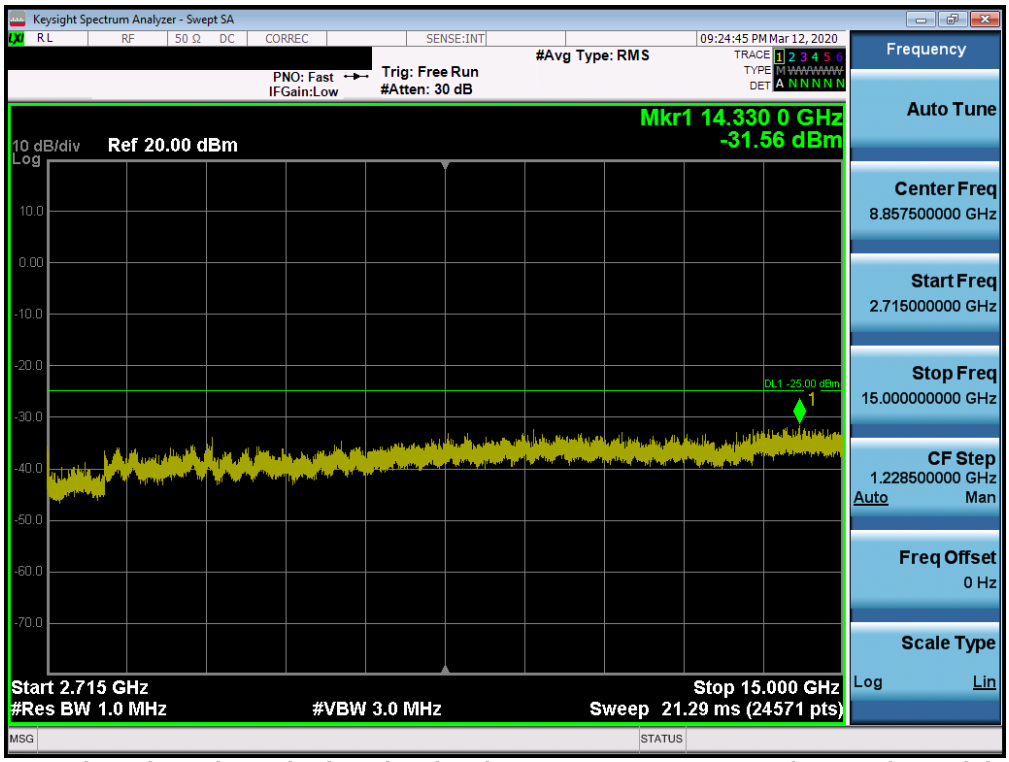



**Plot 7-343. Conducted Spurious Plot (Band 41 (PC2) – 20.0MHz QPSK – PCC 1/0 SCC 1/99 – High Channel)**




**Plot 7-344. Conducted Spurious Plot (Band 41 (PC2) – 20.0MHz QPSK – PCC 1/0 SCC 1/99 – High Channel)**



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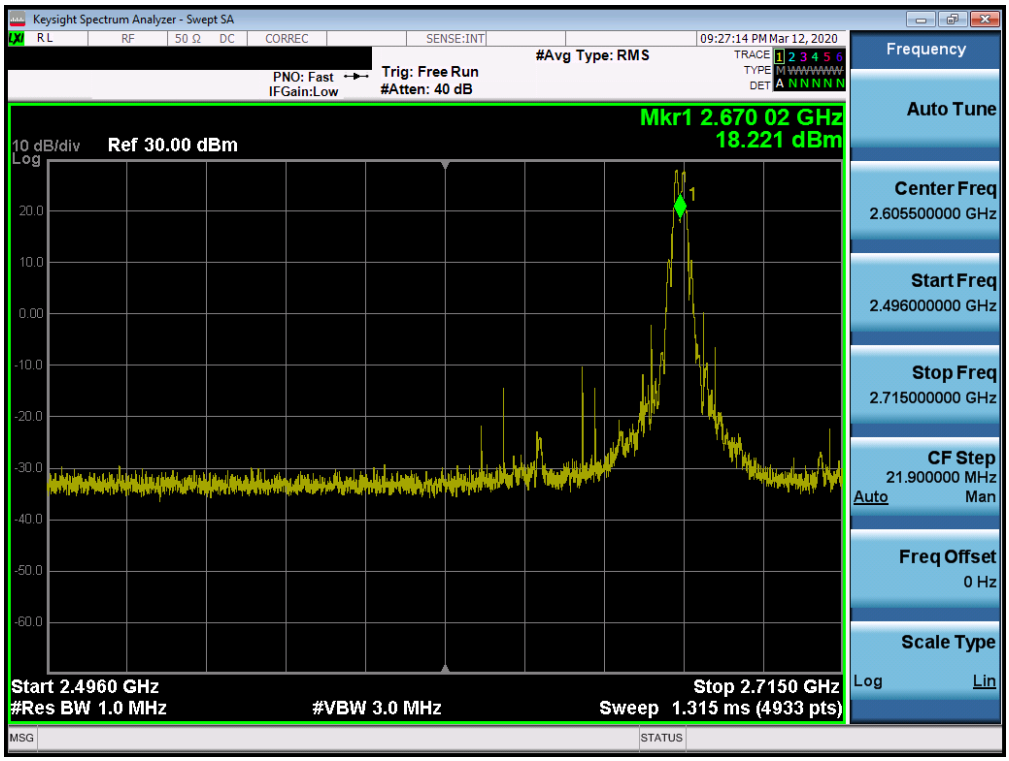
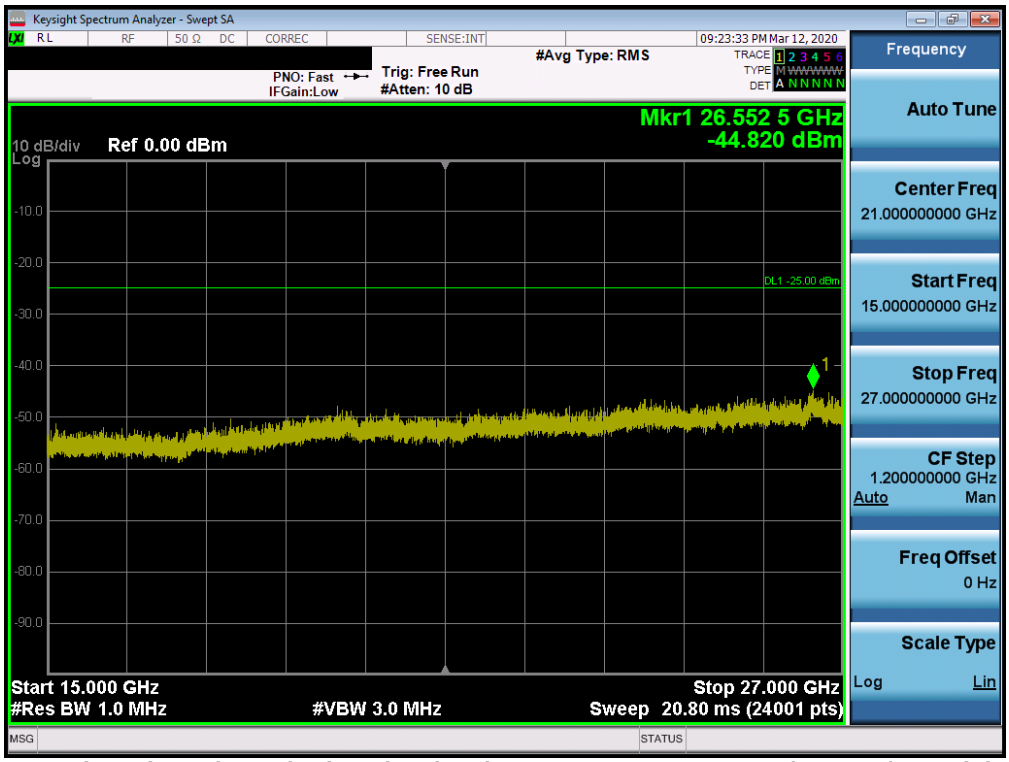



**Plot 7-345. Conducted Spurious Plot (Band 41 (PC2) – 20.0MHz QPSK – PCC 1/0 SCC 1/99 – High Channel)**




**Plot 7-346. Conducted Spurious Plot (Band 41 (PC2) – 20.0MHz QPSK – PCC 1/0 SCC 1/99 – High Channel)**



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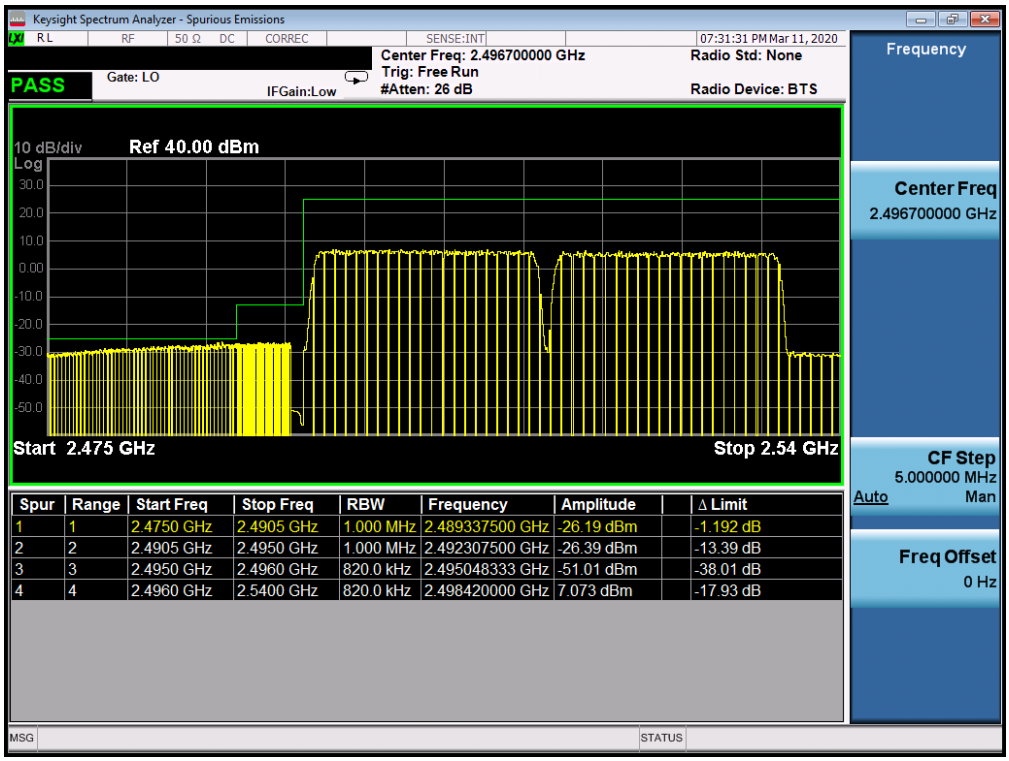
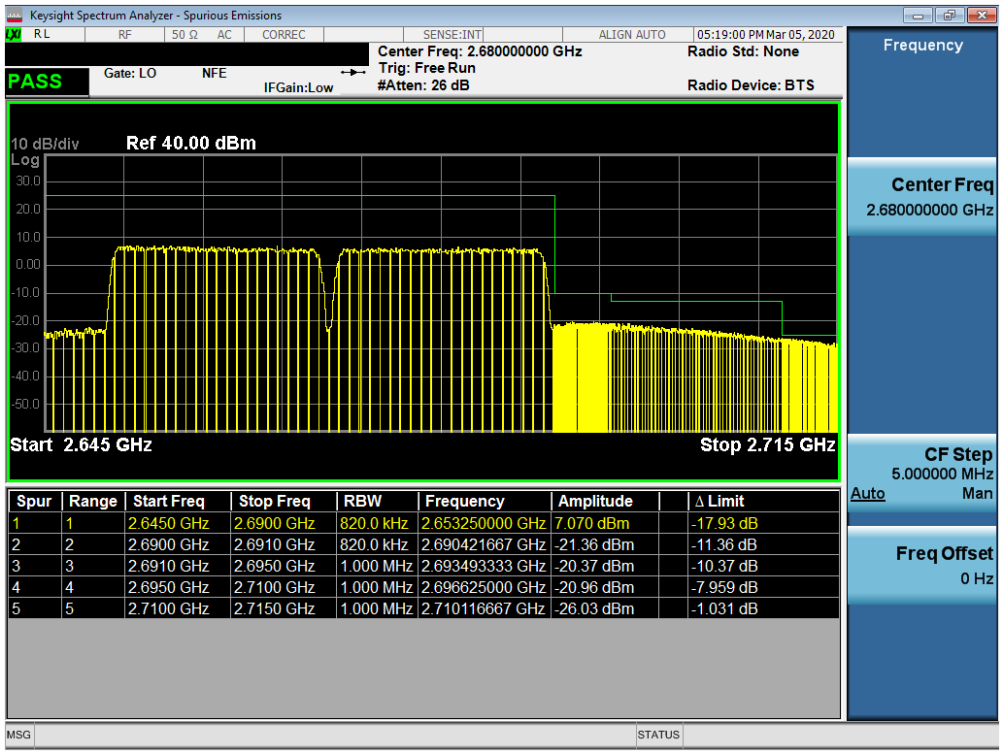



| Spur | Range | Start Freq | Stop Freq | RBW | Frequency | Amplitude | Δ Limit |
|---|---|---|---|---|---|---|---|
| 1 | 1 | 2.4750 GHz | 2.4905 GHz | 1.000 MHz | 2.489337500 GHz | -26.19 dBm | -1.192 dB |
| 2 | 2 | 2.4905 GHz | 2.4950 GHz | 1.000 MHz | 2.492307500 GHz | -26.39 dBm | -13.39 dB |
| 3 | 3 | 2.4950 GHz | 2.4960 GHz | 820.0 kHz | 2.495048333 GHz | -51.01 dBm | -38.01 dB |
| 4 | 4 | 2.4960 GHz | 2.5400 GHz | 820.0 kHz | 2.498420000 GHz | 7.073 dBm | -17.93 dB |

**Table 7-347. Lower ACP Plot (Band 41 (PC2) QPSK – PCC:20 MHz SCC:20 MHz – Full RB)**




| Spur | Range | Start Freq | Stop Freq | RBW | Frequency | Amplitude | Δ Limit |
|---|---|---|---|---|---|---|---|
| 1 | 1 | 2.6450 GHz | 2.6900 GHz | 820.0 kHz | 2.653250000 GHz | 7.070 dBm | -17.93 dB |
| 2 | 2 | 2.6900 GHz | 2.6910 GHz | 820.0 kHz | 2.690421667 GHz | -21.36 dBm | -11.36 dB |
| 3 | 3 | 2.6910 GHz | 2.6950 GHz | 1.000 MHz | 2.693493333 GHz | -20.37 dBm | -10.37 dB |
| 4 | 4 | 2.6950 GHz | 2.7100 GHz | 1.000 MHz | 2.696625000 GHz | -20.96 dBm | -7.959 dB |
| 5 | 5 | 2.7100 GHz | 2.7150 GHz | 1.000 MHz | 2.710116667 GHz | -26.03 dBm | -1.031 dB |

**Table 7-348. Upper ACP Plot (Band 41 (PC2) QPSK – PCC:20 MHz SCC:20 MHz – Full RB)**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## 7.7 Radiated Power (ERP/EIRP)

**Test Overview**

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

**Test Procedures Used**

KDB 971168 D01 v03r01 – Section 5.2.1

ANSI/TIA-603-E-2016 – Section 2.2.17

**Test Settings**

1. Radiated power measurements are performed using the signal analyzer's "channel power" measurement capability for signals with continuous operation. For signals with burst transmission, the signal analyzer's "time domain power" measurement capability is used
2. RBW = 1 – 5% of the expected OBW, not to exceed 1MHz
3. VBW ≥ 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



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## Test Setup

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

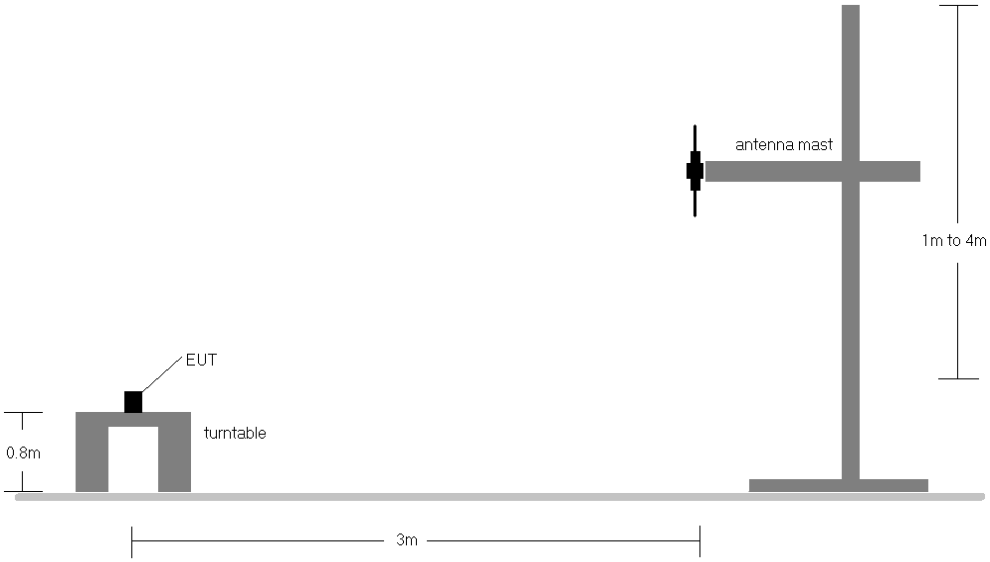


**Figure 7-6. Radiated Test Setup <1GHz**

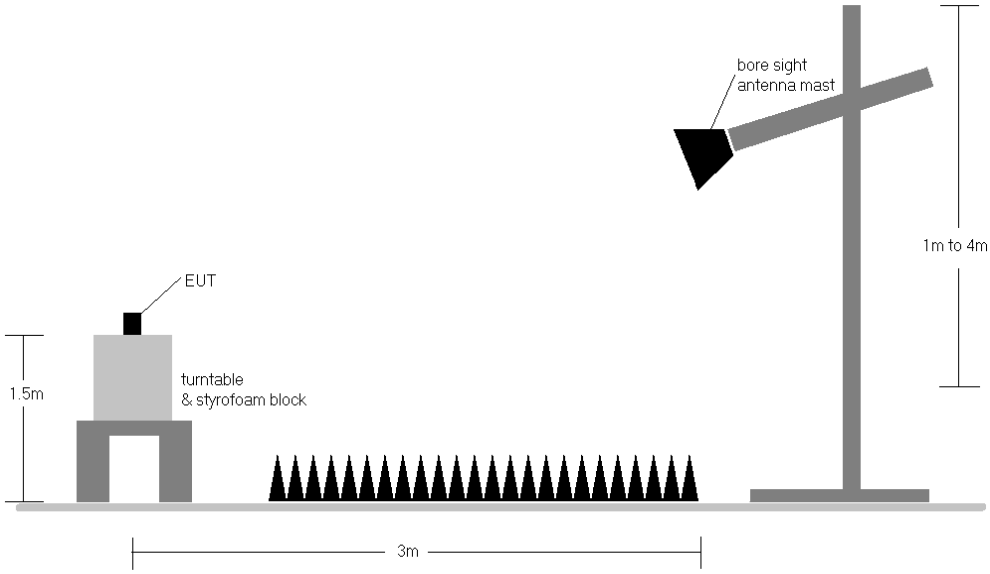


**Figure 7-7. Radiated Test Setup >1GHz**

## Test Notes

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

2) This unit was tested with its standard battery.




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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] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 665.50 | 5 | QPSK | V | 182 | 333 | 1 / 12 | 14.23 | 3.75 | **17.98** | **0.063** | 34.77 | -16.79 |
| 680.50 | 5 | QPSK | V | 199 | 351 | 1 / 12 | 13.67 | 4.20 | 17.87 | 0.061 | 34.77 | -16.90 |
| 695.50 | 5 | QPSK | V | 201 | 325 | 1 / 12 | 13.47 | 4.50 | 17.97 | 0.063 | 34.77 | -16.80 |
| 665.50 | 5 | 16-QAM | V | 182 | 333 | 1 / 12 | 13.52 | 3.75 | **17.27** | 0.053 | 34.77 | -17.50 |
| 665.50 | 5 | 64-QAM | V | 182 | 333 | 1 / 12 | 12.24 | 3.75 | **15.99** | 0.040 | 34.77 | -18.78 |
| 668.00 | 10 | QPSK | V | 166 | 288 | 1 / 25 | 14.13 | 3.80 | **17.93** | 0.062 | 34.77 | -16.84 |
| 680.50 | 10 | QPSK | V | 192 | 305 | 1 / 25 | 13.62 | 4.20 | 17.82 | 0.061 | 34.77 | -16.95 |
| 693.00 | 10 | QPSK | V | 190 | 330 | 1 / 25 | 13.45 | 4.40 | 17.85 | 0.061 | 34.77 | -16.92 |
| 668.00 | 10 | 16-QAM | V | 166 | 288 | 1 / 25 | 13.38 | 3.80 | **17.18** | 0.052 | 34.77 | -17.59 |
| 668.00 | 10 | 64-QAM | V | 166 | 288 | 1 / 25 | 12.10 | 3.80 | **15.90** | 0.039 | 34.77 | -18.87 |
| 670.50 | 15 | QPSK | V | 170 | 278 | 1 / 0 | 13.69 | 3.90 | 17.59 | 0.057 | 34.77 | -17.18 |
| 680.50 | 15 | QPSK | V | 166 | 311 | 1 / 36 | 13.50 | 4.20 | **17.70** | 0.059 | 34.77 | -17.07 |
| 690.50 | 15 | QPSK | V | 180 | 306 | 1 / 36 | 13.14 | 4.40 | 17.54 | 0.057 | 34.77 | -17.23 |
| 680.50 | 15 | 16-QAM | V | 166 | 311 | 1 / 36 | 12.92 | 4.20 | **17.12** | 0.052 | 34.77 | -17.65 |
| 680.50 | 15 | 64-QAM | V | 166 | 311 | 1 / 36 | 11.76 | 4.20 | **15.96** | 0.039 | 34.77 | -18.81 |
| 673.00 | 20 | QPSK | V | 179 | 343 | 1 / 50 | 15.64 | 4.00 | 17.49 | 0.056 | 34.77 | -17.28 |
| 680.50 | 20 | QPSK | V | 185 | 347 | 1 / 50 | 15.83 | 4.20 | 17.88 | 0.061 | 34.77 | -16.89 |
| 688.00 | 20 | QPSK | V | 194 | 337 | 1 / 50 | 15.65 | 4.40 | **17.90** | 0.062 | 34.77 | -16.87 |
| 688.00 | 20 | 16-QAM | V | 194 | 337 | 1 / 50 | 14.55 | 4.40 | **16.80** | 0.048 | 34.77 | -17.97 |
| 688.00 | 20 | 64-QAM | V | 194 | 337 | 1 / 50 | 13.48 | 4.40 | **15.73** | 0.037 | 34.77 | -19.04 |
| 665.50 | 5 | QPSK | H | 142 | 67 | 1 / 50 | 15.51 | 4.20 | 17.56 | 0.057 | 34.77 | -17.21 |

**Table 7-7. ERP Data (Band 71)**



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| Frequency [MHz] | Channel Bandwidth [MHz] | Mod. | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | RB Size/Offset | Substitute Level [dBm] | Ant. Gain [dBi] | ERP [dBm] | ERP [Watts] | ERP Limit [dBm] | Margin [dB] | EIRP [dBm] | EIRP [Watts] | EIRP Limit [dBm] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 699.70 | 1.4 | QPSK | V | 162 | 177 | 1 / 2 | 13.22 | 4.50 | 15.57 | 0.036 | 34.77 | -19.20 | 17.72 | 0.059 | 36.99 | -19.27 |
| 707.50 | 1.4 | QPSK | V | 172 | 174 | 1 / 2 | 13.05 | 4.60 | 15.50 | 0.035 | 34.77 | -19.27 | 17.65 | 0.058 | 36.99 | -19.34 |
| 715.30 | 1.4 | QPSK | V | 182 | 183 | 1 / 2 | 13.16 | 4.63 | **15.64** | 0.037 | 34.77 | -19.13 | **17.79** | 0.060 | 36.99 | -19.20 |
| 715.30 | 1.4 | 16-QAM | V | 182 | 183 | 1 / 2 | 11.92 | 4.63 | **14.40** | 0.028 | 34.77 | -20.37 | **16.55** | 0.045 | 36.99 | -20.44 |
| 715.30 | 1.4 | 64-QAM | V | 182 | 183 | 1 / 2 | 11.44 | 4.63 | **13.92** | 0.025 | 34.77 | -20.85 | **16.07** | 0.040 | 36.99 | -20.92 |
| 700.50 | 3 | QPSK | V | 170 | 169 | 1 / 7 | 13.26 | 4.55 | 15.66 | 0.037 | 34.77 | -19.11 | 17.81 | 0.060 | 36.99 | -19.18 |
| 707.50 | 3 | QPSK | V | 169 | 166 | 1 / 7 | 13.17 | 4.60 | 15.62 | 0.036 | 34.77 | -19.15 | 17.77 | 0.060 | 36.99 | -19.22 |
| 714.50 | 3 | QPSK | V | 179 | 149 | 1 / 7 | 13.24 | 4.60 | **15.69** | 0.037 | 34.77 | -19.08 | **17.84** | 0.061 | 36.99 | -19.15 |
| 707.50 | 3 | 16-QAM | V | 169 | 166 | 1 / 7 | 13.17 | 4.60 | **15.62** | 0.036 | 34.77 | -19.15 | **17.77** | 0.060 | 36.99 | -19.22 |
| 707.50 | 3 | 64-QAM | V | 169 | 166 | 1 / 7 | 12.52 | 4.60 | **14.97** | 0.031 | 34.77 | -19.80 | **17.12** | 0.052 | 36.99 | -19.87 |
| 701.50 | 5 | QPSK | V | 160 | 177 | 1 / 12 | 13.37 | 4.60 | **15.82** | 0.038 | 34.77 | -18.95 | **17.97** | 0.063 | 36.99 | -19.02 |
| 707.50 | 5 | QPSK | V | 174 | 160 | 1 / 12 | 13.34 | 4.60 | 15.79 | 0.038 | 34.77 | -18.98 | 17.94 | 0.062 | 36.99 | -19.05 |
| 713.50 | 5 | QPSK | V | 174 | 177 | 1 / 12 | 13.29 | 4.60 | 15.74 | 0.037 | 34.77 | -19.03 | 17.89 | 0.062 | 36.99 | -19.10 |
| 713.50 | 5 | 16-QAM | V | 174 | 177 | 1 / 12 | 13.29 | 4.60 | **15.74** | 0.037 | 34.77 | -19.03 | **17.89** | 0.062 | 36.99 | -19.10 |
| 713.50 | 5 | 64-QAM | V | 174 | 177 | 1 / 12 | 12.29 | 4.60 | **14.74** | 0.030 | 34.77 | -20.03 | **16.89** | 0.049 | 36.99 | -20.10 |
| 704.00 | 10 | QPSK | V | 163 | 180 | 1 / 49 | 15.39 | 4.50 | 17.74 | 0.059 | 34.77 | -17.03 | 19.89 | 0.097 | 36.99 | -17.10 |
| 707.50 | 10 | QPSK | V | 174 | 166 | 1 / 49 | 15.66 | 4.60 | 18.11 | 0.065 | 34.77 | -16.66 | 20.26 | 0.106 | 36.99 | -16.73 |
| 711.00 | 10 | QPSK | V | 174 | 177 | 1 / 49 | 16.32 | 4.60 | **18.77** | **0.075** | 34.77 | -16.00 | **20.92** | **0.124** | 36.99 | -16.07 |
| 711.00 | 10 | 16-QAM | V | 174 | 177 | 1 / 49 | 15.07 | 4.60 | **17.52** | 0.056 | 34.77 | -17.25 | **19.67** | 0.093 | 36.99 | -17.32 |
| 711.00 | 10 | 64-QAM | V | 174 | 177 | 1 / 49 | 13.86 | 4.60 | **16.31** | 0.043 | 34.77 | -18.46 | **18.46** | 0.070 | 36.99 | -18.53 |
| 711.00 | 10 | QPSK | H | 150 | 256 | 1 / 49 | 16.17 | 4.60 | 18.62 | 0.073 | 34.77 | -16.15 | 20.77 | 0.119 | 36.99 | -16.22 |

**Table 7-8. 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 | 157 | 240 | 1 / 12 | 14.62 | 5.70 | 18.17 | 0.066 | 34.77 | -16.60 | 20.32 | 0.108 | 36.99 | -16.67 |
| 782.00 | 5 | QPSK | V | 163 | 244 | 1 / 12 | 14.70 | 5.80 | **18.35** | 0.068 | 34.77 | -16.42 | **20.50** | 0.112 | 36.99 | -16.49 |
| 784.50 | 5 | QPSK | V | 162 | 250 | 1 / 12 | 14.46 | 5.80 | 18.11 | 0.065 | 34.77 | -16.66 | 20.26 | 0.106 | 36.99 | -16.73 |
| 782.00 | 5 | 16-QAM | V | 163 | 244 | 1 / 12 | 13.91 | 5.80 | **17.56** | 0.057 | 34.77 | -17.21 | **19.71** | 0.094 | 36.99 | -17.28 |
| 782.00 | 5 | 64-QAM | V | 163 | 244 | 1 / 12 | 12.83 | 5.80 | **16.48** | 0.044 | 34.77 | -18.29 | **18.63** | 0.073 | 36.99 | -18.36 |
| 782.00 | 10 | QPSK | V | 160 | 238 | 1 / 0 | 14.89 | 5.80 | **18.54** | **0.071** | 34.77 | -16.23 | **20.69** | **0.117** | 36.99 | -16.30 |
| 782.00 | 10 | 16-QAM | V | 160 | 238 | 1 / 0 | 13.67 | 5.80 | **17.32** | 0.054 | 34.77 | -17.45 | **19.47** | 0.089 | 36.99 | -17.52 |
| 782.00 | 10 | 64-QAM | V | 160 | 238 | 1 / 0 | 12.57 | 5.80 | **16.22** | 0.042 | 34.77 | -18.55 | **18.37** | 0.069 | 36.99 | -18.62 |
| 782.00 | 10 | QPSK | H | 226 | 344 | 1 / 0 | 12.79 | 5.80 | 16.44 | 0.044 | 34.77 | -18.33 | 18.59 | 0.072 | 36.99 | -18.40 |

**Table 7-9. 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 | 142 | 210 | 1 / 2 | 14.64 | 6.30 | 18.79 | 0.076 | 38.45 | -19.66 | 20.94 | 0.124 | 40.61 | -19.67 |
| 836.50 | 1.4 | QPSK | V | 146 | 222 | 1 / 2 | 14.54 | 6.40 | 18.79 | 0.076 | 38.45 | -19.66 | 20.94 | 0.124 | 40.61 | -19.67 |
| 848.30 | 1.4 | QPSK | V | 139 | 201 | 1 / 2 | 14.47 | 6.50 | **18.82** | 0.076 | 38.45 | -19.63 | **20.97** | 0.125 | 40.61 | -19.64 |
| 848.30 | 1.4 | 16-QAM | V | 139 | 201 | 1 / 2 | 13.60 | 6.50 | **17.95** | 0.062 | 38.45 | -20.50 | **20.10** | 0.102 | 40.61 | -20.51 |
| 848.30 | 1.4 | 64-QAM | V | 139 | 201 | 1 / 2 | 12.33 | 6.50 | **16.68** | 0.047 | 38.45 | -21.77 | **18.83** | 0.076 | 40.61 | -21.78 |
| 825.50 | 3 | QPSK | V | 142 | 211 | 1 / 7 | 14.56 | 6.30 | 18.71 | 0.074 | 38.45 | -19.74 | 20.86 | 0.122 | 40.61 | -19.75 |
| 836.50 | 3 | QPSK | V | 147 | 222 | 1 / 7 | 14.52 | 6.40 | **18.77** | 0.075 | 38.45 | -19.68 | **20.92** | 0.124 | 40.61 | -19.69 |
| 847.50 | 3 | QPSK | V | 147 | 230 | 1 / 7 | 14.34 | 6.50 | 18.69 | 0.074 | 38.45 | -19.76 | 20.84 | 0.121 | 40.61 | -19.77 |
| 836.50 | 3 | 16-QAM | V | 147 | 222 | 1 / 7 | 13.67 | 6.40 | **17.92** | 0.062 | 38.45 | -20.53 | **20.07** | 0.102 | 40.61 | -20.54 |
| 836.50 | 3 | 64-QAM | V | 147 | 222 | 1 / 7 | 12.75 | 6.40 | **17.00** | 0.050 | 38.45 | -21.45 | **19.15** | 0.082 | 40.61 | -21.46 |
| 826.50 | 5 | QPSK | V | 151 | 221 | 1 / 12 | 14.64 | 6.30 | 18.79 | 0.076 | 38.45 | -19.66 | 20.94 | 0.124 | 40.61 | -19.67 |
| 836.50 | 5 | QPSK | V | 143 | 231 | 1 / 12 | 14.54 | 6.40 | 18.79 | 0.076 | 38.45 | -19.66 | 20.94 | 0.124 | 40.61 | -19.67 |
| 846.50 | 5 | QPSK | V | 147 | 189 | 1 / 12 | 14.55 | 6.50 | **18.90** | 0.078 | 38.45 | -19.55 | **21.05** | 0.127 | 40.61 | -19.56 |
| 846.50 | 5 | 16-QAM | V | 147 | 189 | 1 / 12 | 13.58 | 6.50 | **17.93** | 0.062 | 38.45 | -20.52 | **20.08** | 0.102 | 40.61 | -20.53 |
| 846.50 | 5 | 64-QAM | V | 147 | 189 | 1 / 12 | 12.60 | 6.50 | **16.95** | 0.050 | 38.45 | -21.50 | **19.10** | 0.081 | 40.61 | -21.51 |
| 829.00 | 10 | QPSK | V | 142 | 211 | 1 / 25 | 14.63 | 6.30 | 18.78 | 0.076 | 38.45 | -19.67 | 20.93 | 0.124 | 40.61 | -19.68 |
| 836.50 | 10 | QPSK | V | 144 | 214 | 1 / 25 | 14.51 | 6.40 | 18.76 | 0.075 | 38.45 | -19.69 | 20.91 | 0.123 | 40.61 | -19.70 |
| 844.00 | 10 | QPSK | V | 163 | 201 | 1 / 25 | 14.65 | 6.40 | **18.90** | 0.078 | 38.45 | -19.55 | **21.05** | 0.127 | 40.61 | -19.56 |
| 844.00 | 10 | 16-QAM | V | 163 | 201 | 1 / 25 | 13.69 | 6.40 | **17.94** | 0.062 | 38.45 | -20.51 | **20.09** | 0.102 | 40.61 | -20.52 |
| 844.00 | 10 | 64-QAM | V | 163 | 201 | 1 / 25 | 12.54 | 6.40 | **16.79** | 0.048 | 38.45 | -21.66 | **18.94** | 0.078 | 40.61 | -21.67 |

**Table 7-10. ERP Data (Band 26/5)**

| Frequency [MHz] | Channel Bandwidth [MHz] | Mod. | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | RB Size/Offset | Substitute Level [dBm] | Ant. Gain [dBi] | ERP [dBm] | ERP [Watts] | ERP Limit [dBm] | Margin [dB] | EIRP [dBm] | EIRP [Watts] | EIRP Limit [dBm] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 831.50 | 15 | QPSK | V | 136 | 205 | 1 / 36 | 14.72 | 6.35 | **18.92** | **0.078** | 38.45 | -19.53 | **21.07** | **0.128** | 40.61 | -19.54 |
| 836.50 | 15 | QPSK | V | 139 | 218 | 1 / 36 | 14.57 | 6.40 | 18.82 | 0.076 | 38.45 | -19.63 | 20.97 | 0.125 | 40.61 | -19.64 |
| 841.50 | 15 | QPSK | V | 141 | 196 | 1 / 0 | 14.55 | 6.40 | 18.80 | 0.076 | 38.45 | -19.65 | 20.95 | 0.124 | 40.61 | -19.66 |
| 831.50 | 15 | 16-QAM | V | 136 | 205 | 1 / 36 | 13.56 | 6.35 | **17.76** | 0.060 | 38.45 | -20.69 | **19.91** | 0.098 | 40.61 | -20.70 |
| 831.50 | 15 | 64-QAM | V | 136 | 205 | 1 / 36 | 12.63 | 6.35 | **16.83** | 0.048 | 38.45 | -21.62 | **18.98** | 0.079 | 40.61 | -21.63 |
| 831.50 | 15 | QPSK | H | 202 | 172 | 1 / 36 | 12.84 | 6.40 | 17.09 | 0.051 | 38.45 | -21.36 | 19.24 | 0.084 | 40.61 | -21.37 |

**Table 7-11. ERP Data (Band 26)**



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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 | V | 171 | 151 | 1 / 2 | 12.49 | 9.35 | **21.84** | 0.153 | 30.00 | -8.16 |
| 1745.00 | 1.4 | QPSK | V | 222 | 146 | 1 / 2 | 12.72 | 9.11 | 21.83 | 0.152 | 30.00 | -8.17 |
| 1779.30 | 1.4 | QPSK | V | 241 | 134 | 1 / 2 | 12.62 | 9.17 | 21.79 | 0.151 | 30.00 | -8.21 |
| 1710.70 | 1.4 | 16-QAM | V | 171 | 151 | 1 / 2 | 11.20 | 9.35 | **20.55** | 0.114 | 30.00 | -9.45 |
| 1710.70 | 1.4 | 64-QAM | V | 171 | 151 | 1 / 2 | 10.45 | 9.35 | **19.80** | 0.095 | 30.00 | -10.20 |
| 1711.50 | 3 | QPSK | V | 174 | 156 | 1 / 7 | 12.49 | 9.34 | 21.83 | 0.152 | 30.00 | -8.17 |
| 1745.00 | 3 | QPSK | V | 222 | 164 | 1 / 7 | 12.75 | 9.11 | **21.86** | 0.153 | 30.00 | -8.14 |
| 1778.50 | 3 | QPSK | V | 241 | 134 | 1 / 7 | 12.63 | 9.17 | 21.80 | 0.151 | 30.00 | -8.20 |
| 1745.00 | 3 | 16-QAM | V | 222 | 164 | 1 / 7 | 11.56 | 9.11 | **20.67** | 0.117 | 30.00 | -9.33 |
| 1745.00 | 3 | 64-QAM | V | 222 | 164 | 1 / 7 | 10.83 | 9.11 | **19.94** | 0.099 | 30.00 | -10.06 |
| 1712.50 | 5 | QPSK | V | 174 | 156 | 1 / 12 | 12.44 | 9.34 | 21.78 | 0.151 | 30.00 | -8.22 |
| 1745.00 | 5 | QPSK | V | 220 | 146 | 1 / 12 | 12.76 | 9.11 | **21.87** | 0.154 | 30.00 | -8.13 |
| 1777.50 | 5 | QPSK | V | 241 | 139 | 1 / 12 | 12.54 | 9.16 | 21.70 | 0.148 | 30.00 | -8.30 |
| 1745.00 | 5 | 16-QAM | V | 220 | 146 | 1 / 12 | 11.74 | 9.11 | **20.85** | 0.122 | 30.00 | -9.15 |
| 1745.00 | 5 | 64-QAM | V | 220 | 146 | 1 / 12 | 10.69 | 9.11 | **19.80** | 0.095 | 30.00 | -10.20 |
| 1715.00 | 10 | QPSK | V | 149 | 156 | 1 / 25 | 12.36 | 9.32 | 21.68 | 0.147 | 30.00 | -8.32 |
| 1745.00 | 10 | QPSK | V | 205 | 150 | 1 / 25 | 12.76 | 9.11 | 21.87 | 0.154 | 30.00 | -8.13 |
| 1775.00 | 10 | QPSK | V | 247 | 156 | 1 / 25 | 12.72 | 9.16 | **21.88** | 0.154 | 30.00 | -8.12 |
| 1775.00 | 10 | 16-QAM | V | 247 | 156 | 1 / 25 | 11.64 | 9.16 | **20.80** | 0.120 | 30.00 | -9.20 |
| 1775.00 | 10 | 64-QAM | V | 247 | 156 | 1 / 25 | 10.59 | 9.16 | **19.75** | 0.094 | 30.00 | -10.25 |
| 1717.50 | 15 | QPSK | V | 172 | 156 | 1 / 36 | 12.58 | 9.30 | **21.88** | 0.154 | 30.00 | -8.12 |
| 1745.00 | 15 | QPSK | V | 219 | 142 | 1 / 36 | 12.71 | 9.11 | 21.82 | 0.152 | 30.00 | -8.18 |
| 1772.50 | 15 | QPSK | V | 246 | 162 | 1 / 36 | 12.63 | 9.15 | 21.78 | 0.151 | 30.00 | -8.22 |
| 1717.50 | 15 | 16-QAM | V | 172 | 156 | 1 / 36 | 11.42 | 9.30 | **20.72** | 0.118 | 30.00 | -9.28 |
| 1717.50 | 15 | 64-QAM | V | 172 | 156 | 1 / 36 | 10.41 | 9.30 | **19.71** | 0.094 | 30.00 | -10.29 |
| 1720.00 | 20 | QPSK | V | 175 | 145 | 1 / 50 | 12.07 | 9.28 | 21.35 | 0.137 | 30.00 | -8.65 |
| 1745.00 | 20 | QPSK | V | 213 | 141 | 1 / 50 | 12.80 | 9.11 | **21.91** | **0.155** | 30.00 | -8.09 |
| 1770.00 | 20 | QPSK | V | 262 | 138 | 1 / 50 | 12.35 | 9.14 | 21.49 | 0.141 | 30.00 | -8.51 |
| 1745.00 | 20 | 16-QAM | V | 213 | 141 | 1 / 50 | 11.82 | 9.11 | **20.93** | 0.124 | 30.00 | -9.07 |
| 1745.00 | 20 | 64-QAM | V | 213 | 141 | 1 / 50 | 10.80 | 9.11 | **19.91** | 0.098 | 30.00 | -10.09 |
| 1745.00 | 20 | QPSK | H | 100 | 343 | 1 / 50 | 12.56 | 9.11 | 21.67 | 0.147 | 30.00 | -8.33 |

**Table 7-12. 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 | H | 130 | 151 | 1 / 2 | 13.18 | 9.48 | **22.66** | 0.185 | 33.01 | -10.35 |
| 1882.50 | 1.4 | QPSK | H | 166 | 322 | 1 / 2 | 12.61 | 9.94 | 22.55 | 0.180 | 33.01 | -10.46 |
| 1914.30 | 1.4 | QPSK | H | 149 | 310 | 1 / 2 | 12.36 | 10.29 | 22.65 | 0.184 | 33.01 | -10.36 |
| 1850.70 | 1.4 | 16-QAM | H | 130 | 151 | 1 / 2 | 12.30 | 9.48 | **21.78** | 0.151 | 33.01 | -11.23 |
| 1850.70 | 1.4 | 64-QAM | H | 130 | 151 | 1 / 2 | 11.29 | 9.48 | **20.77** | 0.119 | 33.01 | -12.24 |
| 1851.50 | 3 | QPSK | H | 123 | 152 | 1 / 14 | 13.18 | 9.50 | **22.68** | 0.185 | 33.01 | -10.33 |
| 1882.50 | 3 | QPSK | H | 166 | 309 | 1 / 7 | 12.70 | 9.94 | 22.64 | 0.184 | 33.01 | -10.37 |
| 1913.50 | 3 | QPSK | H | 152 | 214 | 1 / 7 | 12.36 | 10.29 | 22.65 | 0.184 | 33.01 | -10.36 |
| 1851.50 | 3 | 16-QAM | H | 123 | 152 | 1 / 14 | 12.34 | 9.50 | **21.84** | 0.153 | 33.01 | -11.17 |
| 1851.50 | 3 | 64-QAM | H | 123 | 152 | 1 / 14 | 11.31 | 9.50 | **20.81** | 0.121 | 33.01 | -12.20 |
| 1852.50 | 5 | QPSK | H | 126 | 222 | 1 / 12 | 13.01 | 9.51 | 22.52 | 0.179 | 33.01 | -10.49 |
| 1882.50 | 5 | QPSK | H | 156 | 307 | 1 / 12 | 12.78 | 9.94 | **22.72** | 0.187 | 33.01 | -10.29 |
| 1912.50 | 5 | QPSK | H | 147 | 321 | 1 / 24 | 12.31 | 10.28 | 22.59 | 0.182 | 33.01 | -10.42 |
| 1882.50 | 5 | 16-QAM | H | 156 | 307 | 1 / 12 | 11.83 | 9.94 | **21.77** | 0.150 | 33.01 | -11.24 |
| 1882.50 | 5 | 64-QAM | H | 156 | 307 | 1 / 12 | 10.90 | 9.94 | **20.84** | 0.121 | 33.01 | -12.17 |
| 1855.00 | 10 | QPSK | H | 145 | 214 | 1 / 25 | 13.17 | 9.55 | **22.72** | 0.187 | 33.01 | -10.29 |
| 1882.50 | 10 | QPSK | H | 156 | 322 | 1 / 0 | 12.68 | 9.94 | 22.62 | 0.183 | 33.01 | -10.39 |
| 1910.00 | 10 | QPSK | H | 149 | 324 | 1 / 25 | 12.42 | 10.26 | 22.68 | 0.185 | 33.01 | -10.33 |
| 1855.00 | 10 | 16-QAM | H | 145 | 214 | 1 / 25 | 12.21 | 9.55 | **21.76** | 0.150 | 33.01 | -11.25 |
| 1855.00 | 10 | 64-QAM | H | 145 | 214 | 1 / 25 | 11.28 | 9.55 | **20.83** | 0.121 | 33.01 | -12.18 |
| 1857.50 | 15 | QPSK | H | 124 | 159 | 1 / 36 | 20.56 | 9.58 | 22.71 | 0.187 | 33.01 | -10.30 |
| 1882.50 | 15 | QPSK | H | 148 | 326 | 1 / 36 | 20.48 | 9.94 | 22.63 | 0.183 | 33.01 | -10.38 |
| 1907.50 | 15 | QPSK | H | 149 | 222 | 1 / 36 | 20.57 | 10.24 | **22.72** | 0.187 | 33.01 | -10.29 |
| 1907.50 | 15 | 16-QAM | H | 149 | 222 | 1 / 36 | 19.69 | 10.24 | **21.84** | 0.153 | 33.01 | -11.17 |
| 1907.50 | 15 | 64-QAM | H | 149 | 222 | 1 / 36 | 18.70 | 10.24 | **20.85** | 0.122 | 33.01 | -12.16 |
| 1860.00 | 20 | QPSK | H | 120 | 146 | 1 / 0 | 13.11 | 9.62 | **22.73** | **0.187** | 33.01 | -10.28 |
| 1882.50 | 20 | QPSK | H | 155 | 310 | 1 / 50 | 12.64 | 9.94 | 22.58 | 0.181 | 33.01 | -10.44 |
| 1905.00 | 20 | QPSK | H | 153 | 308 | 1 / 50 | 12.42 | 10.22 | 22.64 | 0.184 | 33.01 | -10.37 |
| 1860.00 | 20 | 16-QAM | H | 120 | 146 | 1 / 0 | 11.76 | 9.62 | 21.38 | 0.137 | 33.01 | -11.63 |
| 1860.00 | 20 | 64-QAM | H | 120 | 146 | 1 / 0 | 10.89 | 9.62 | **20.51** | 0.112 | 33.01 | -12.50 |
| 1860.00 | 20 | QPSK | V | 107 | 147 | 1 / 0 | 12.18 | 9.94 | 22.12 | 0.163 | 33.01 | -10.90 |

**Table 7-13. EIRP Data (Band 25/2)**




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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] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2498.50 | 5 | QPSK | H | 162 | 42 | 1 / 12 | 16.53 | 9.43 | **25.96** | 0.394 | 33.01 | -7.05 |
| 2593.00 | 5 | QPSK | H | 132 | 32 | 1 / 12 | 16.19 | 9.55 | 25.74 | 0.375 | 33.01 | -7.27 |
| 2687.50 | 5 | QPSK | H | 114 | 43 | 1 / 12 | 16.00 | 9.82 | 25.82 | 0.382 | 33.01 | -7.19 |
| 2498.50 | 5 | 16-QAM | H | 162 | 42 | 1 / 12 | 15.69 | 9.43 | **25.12** | 0.325 | 33.01 | -7.89 |
| 2498.50 | 5 | 64-QAM | H | 162 | 42 | 1 / 12 | 14.59 | 9.43 | **24.02** | 0.252 | 33.01 | -8.99 |
| 2501.00 | 10 | QPSK | H | 162 | 44 | 1 / 25 | 16.63 | 9.43 | **26.06** | 0.404 | 33.01 | -6.95 |
| 2593.00 | 10 | QPSK | H | 134 | 31 | 1 / 25 | 16.30 | 9.55 | 25.85 | 0.385 | 33.01 | -7.16 |
| 2685.00 | 10 | QPSK | H | 116 | 40 | 1 / 27 | 16.10 | 9.82 | 25.92 | 0.391 | 33.01 | -7.09 |
| 2501.00 | 10 | 16-QAM | H | 162 | 44 | 1 / 25 | 15.86 | 9.43 | **25.29** | 0.338 | 33.01 | -7.72 |
| 2501.00 | 10 | 64-QAM | H | 162 | 44 | 1 / 25 | 14.63 | 9.43 | **24.06** | 0.255 | 33.01 | -8.95 |
| 2503.50 | 15 | QPSK | H | 169 | 44 | 1 / 36 | 16.42 | 9.43 | **25.85** | 0.385 | 33.01 | -7.16 |
| 2593.00 | 15 | QPSK | H | 133 | 42 | 1 / 36 | 16.17 | 9.55 | 25.72 | 0.373 | 33.01 | -7.29 |
| 2682.50 | 15 | QPSK | H | 128 | 46 | 1 / 36 | 16.01 | 9.83 | 25.84 | 0.384 | 33.01 | -7.17 |
| 2503.50 | 15 | 16-QAM | H | 169 | 44 | 1 / 36 | 15.65 | 9.43 | **25.08** | 0.322 | 33.01 | -7.93 |
| 2503.50 | 15 | 64-QAM | H | 169 | 44 | 1 / 36 | 14.42 | 9.43 | **23.85** | 0.243 | 33.01 | -9.16 |
| 2506.00 | 20 | QPSK | H | 158 | 37 | 1 / 50 | 16.66 | 9.42 | **26.08** | **0.406** | 33.01 | -6.93 |
| 2593.00 | 20 | QPSK | H | 126 | 30 | 1 / 0 | 16.36 | 9.55 | 25.91 | 0.390 | 33.01 | -7.10 |
| 2680.00 | 20 | QPSK | H | 104 | 32 | 1 / 0 | 15.14 | 9.83 | 24.97 | 0.314 | 33.01 | -8.04 |
| 2593.00 | 20 | 16-QAM | H | 126 | 30 | 1 / 0 | 15.67 | 9.55 | **25.22** | 0.333 | 33.01 | -7.79 |
| 2506.00 | 20 | 64-QAM | H | 158 | 37 | 1 / 50 | 15.09 | 9.42 | **24.51** | 0.283 | 33.01 | -8.50 |
| 2506.00 | 20 | QPSK | V | 112 | 322 | 1 / 50 | 14.02 | 9.42 | 23.44 | 0.221 | 33.01 | -9.57 |

**Table 7-14. EIRP Data (Band 41 – PC2)**




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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] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2498.50 | 5 | QPSK | H | 171 | 25 | 1 / 12 | 13.61 | 9.43 | **23.04** | 0.201 | 33.01 | -9.97 |
| 2593.00 | 5 | QPSK | H | 149 | 34 | 1 / 12 | 13.45 | 9.55 | 23.00 | 0.200 | 33.01 | -10.01 |
| 2687.50 | 5 | QPSK | H | 119 | 33 | 1 / 12 | 13.19 | 9.82 | 23.01 | 0.200 | 33.01 | -10.00 |
| 2498.50 | 5 | 16-QAM | H | 171 | 25 | 1 / 12 | 12.66 | 9.43 | **22.09** | 0.162 | 33.01 | -10.92 |
| 2498.50 | 5 | 64-QAM | H | 171 | 25 | 1 / 12 | 11.40 | 9.43 | **20.83** | 0.121 | 33.01 | -12.18 |
| 2501.00 | 10 | QPSK | H | 167 | 33 | 1 / 25 | 13.57 | 9.43 | **23.00** | 0.200 | 33.01 | -10.01 |
| 2593.00 | 10 | QPSK | H | 146 | 27 | 1 / 25 | 13.20 | 9.55 | 22.75 | 0.188 | 33.01 | -10.26 |
| 2685.00 | 10 | QPSK | H | 116 | 44 | 1 / 25 | 13.15 | 9.82 | 22.97 | 0.198 | 33.01 | -10.04 |
| 2501.00 | 10 | 16-QAM | H | 167 | 33 | 1 / 25 | 12.47 | 9.43 | **21.90** | 0.155 | 33.01 | -11.11 |
| 2501.00 | 10 | 64-QAM | H | 167 | 33 | 1 / 25 | 11.28 | 9.43 | **20.71** | 0.118 | 33.01 | -12.30 |
| 2503.50 | 15 | QPSK | H | 172 | 41 | 1 / 36 | 13.60 | 9.43 | **23.03** | 0.201 | 33.01 | -9.98 |
| 2593.00 | 15 | QPSK | H | 138 | 36 | 1 / 36 | 13.27 | 9.55 | 22.82 | 0.191 | 33.01 | -10.19 |
| 2682.50 | 15 | QPSK | H | 118 | 14 | 1 / 36 | 13.12 | 9.83 | 22.95 | 0.197 | 33.01 | -10.06 |
| 2503.50 | 15 | 16-QAM | H | 172 | 41 | 1 / 36 | 12.55 | 9.43 | **21.98** | 0.158 | 33.01 | -11.03 |
| 2503.50 | 15 | 64-QAM | H | 172 | 41 | 1 / 36 | 11.28 | 9.43 | **20.71** | 0.118 | 33.01 | -12.30 |
| 2506.00 | 20 | QPSK | H | 170 | 23 | 1 / 0 | 13.72 | 9.42 | 23.14 | 0.206 | 33.01 | -9.87 |
| 2593.00 | 20 | QPSK | H | 123 | 33 | 1 / 0 | 13.61 | 9.55 | **23.16** | **0.207** | 33.01 | -9.85 |
| 2680.00 | 20 | QPSK | H | 107 | 27 | 1 / 0 | 12.45 | 9.83 | 22.28 | 0.169 | 33.01 | -10.73 |
| 2593.00 | 20 | 16-QAM | H | 123 | 33 | 1 / 0 | 12.98 | 9.55 | **22.53** | 0.179 | 33.01 | -10.48 |
| 2593.00 | 20 | 64-QAM | H | 123 | 33 | 1 / 0 | 12.09 | 9.55 | **21.64** | 0.146 | 33.01 | -11.37 |
| 2593.00 | 20 | QPSK | V | 118 | 320 | 1 / 0 | 13.56 | 9.55 | 23.11 | 0.205 | 33.01 | -9.90 |

**Table 7-15. EIRP Data (Band 41 – PC3)**




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## 7.8 Radiated Spurious Emissions Measurements

**Test Overview**

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

**Test Procedures Used**

KDB 971168 D01 v03r01 – Section 5.8

ANSI/TIA-603-E-2016 – Section 2.2.12

**Test Settings**

1. RBW = 100kHz for emissions below 1GHz and 1MHz for emissions above 1GHz
2. VBW ≥ 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.

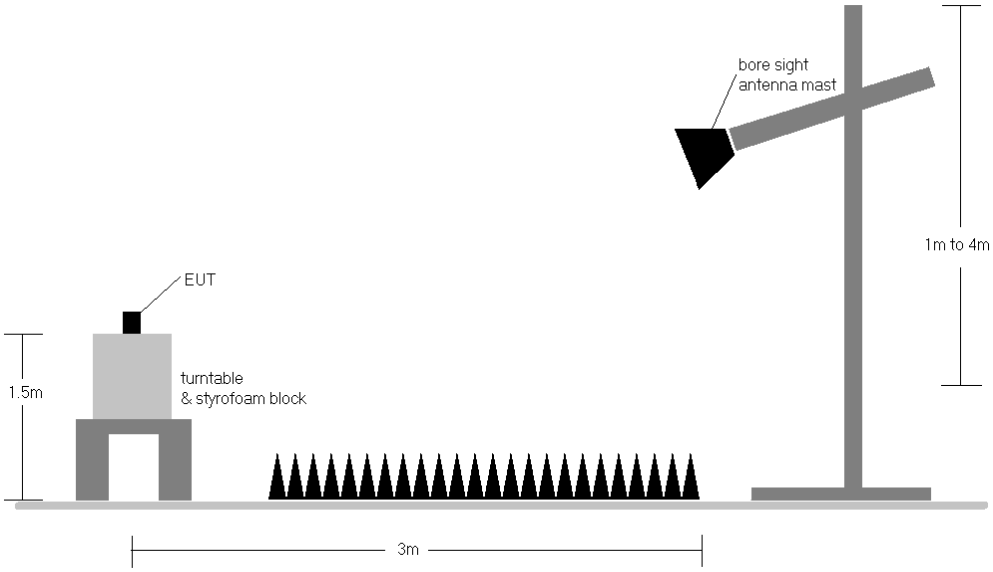


**Figure 7-8. Test Instrument & Measurement Setup**

## Test Notes

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

2) This unit was tested with its standard battery.

3) The spectrum is measured from 9kHz to the 10th harmonic of the fundamental frequency of the transmitter. The worst-case emissions are reported.

4) Emissions below 18GHz were measured at a 3 meter test distance while emissions above 18GHz were measured at a 1 meter test distance with the application of a distance correction factor.

5) The "-" shown in the following RSE tables are used to denote a noise floor measurement.




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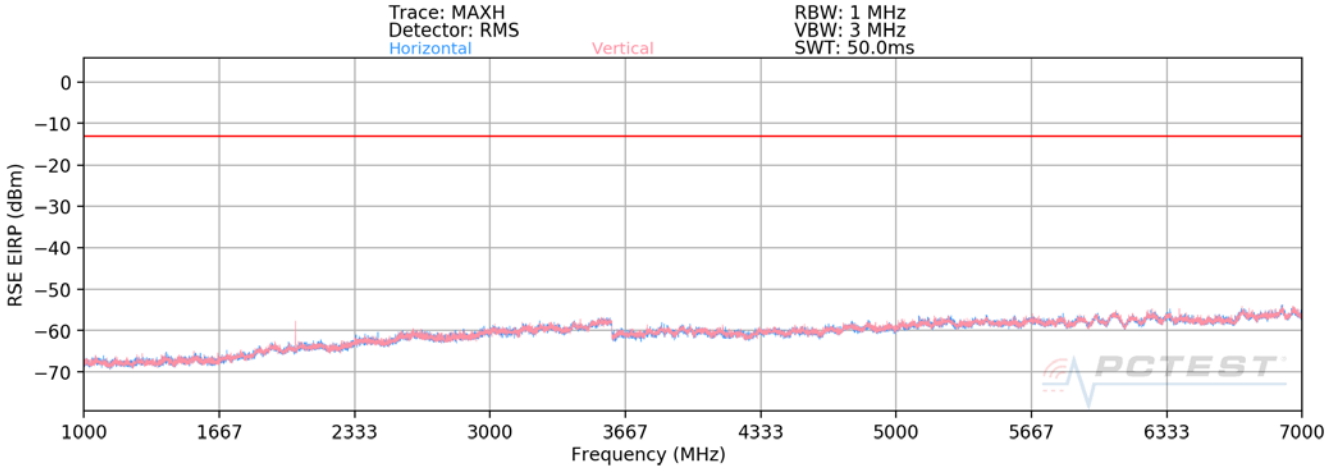
## Band 71




**Plot 7-349. Radiated Spurious Plot above 1GHz (Band 71)**

| | | |
|---|---|---|
| OPERATING FREQUENCY: | 673.00 | MHz |
| MODULATION SIGNAL: | QPSK | |
| BANDWIDTH: | 20.0 | MHz |
| DISTANCE: | 3 | meters |
| LIMIT: | -13 | dBm |

| Frequency [MHz] | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Level at Antenna Terminals [dBm] | Substitute Antenna Gain [dBi] | Spurious Emission Level [dBm] | Margin [dB] |
|---|---|---|---|---|---|---|---|
| 1346.00 | H | 186 | 43 | -72.11 | 7.50 | -64.61 | -51.6 |
| 2019.00 | H | 160 | 351 | -67.63 | 8.71 | -58.91 | -45.9 |
| 2692.00 | H | - | - | -69.29 | 10.02 | -59.27 | -46.3 |
| 3365.00 | H | - | - | -68.15 | 9.69 | -58.46 | -45.5 |
| 4038.00 | H | - | - | -71.79 | 9.87 | -61.91 | -48.9 |

**Table 7-16. Radiated Spurious Data (Band 71 – Low Channel)**

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| | | |
|---|---|---|
| OPERATING FREQUENCY: | 680.50 | MHz |
| MODULATION SIGNAL: | QPSK | |
| BANDWIDTH: | 20.0 | MHz |
| DISTANCE: | 3 | meters |
| LIMIT: | -13 | dBm |

| Frequency [MHz] | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Level at Antenna Terminals [dBm] | Substitute Antenna Gain [dBi] | Spurious Emission Level [dBm] | Margin [dB] |
|---|---|---|---|---|---|---|---|
| 1361.00 | H | - | - | -73.49 | 7.51 | -65.97 | -53.0 |
| 2041.50 | H | 184 | 182 | -65.17 | 8.79 | -56.37 | -43.4 |
| 2722.00 | H | - | - | -70.76 | 10.11 | -60.65 | -47.7 |
| 3402.50 | H | - | - | -67.23 | 9.83 | -57.40 | -44.4 |
| 4083.00 | H | - | - | -72.28 | 10.08 | -62.20 | -49.2 |

**Table 7-17. Radiated Spurious Data (Band 71 – Mid Channel)**

| | | |
|---|---|---|
| OPERATING FREQUENCY: | 688.00 | MHz |
| MODULATION SIGNAL: | QPSK | |
| BANDWIDTH: | 20.0 | MHz |
| DISTANCE: | 3 | meters |
| LIMIT: | -13 | dBm |

| Frequency [MHz] | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Level at Antenna Terminals [dBm] | Substitute Antenna Gain [dBi] | Spurious Emission Level [dBm] | Margin [dB] |
|---|---|---|---|---|---|---|---|
| 1376.00 | H | - | - | -72.83 | 7.49 | -65.33 | -52.3 |
| 2064.00 | H | 195 | 110 | -69.26 | 8.83 | -60.42 | -47.4 |
| 2752.00 | H | - | - | -70.41 | 10.20 | -60.21 | -47.2 |
| 3440.00 | H | - | - | -67.03 | 9.87 | -57.16 | -44.2 |
| 4128.00 | H | - | - | -72.20 | 10.21 | -61.98 | -49.0 |

**Table 7-18. Radiated Spurious Data (Band 71 – High Channel)**



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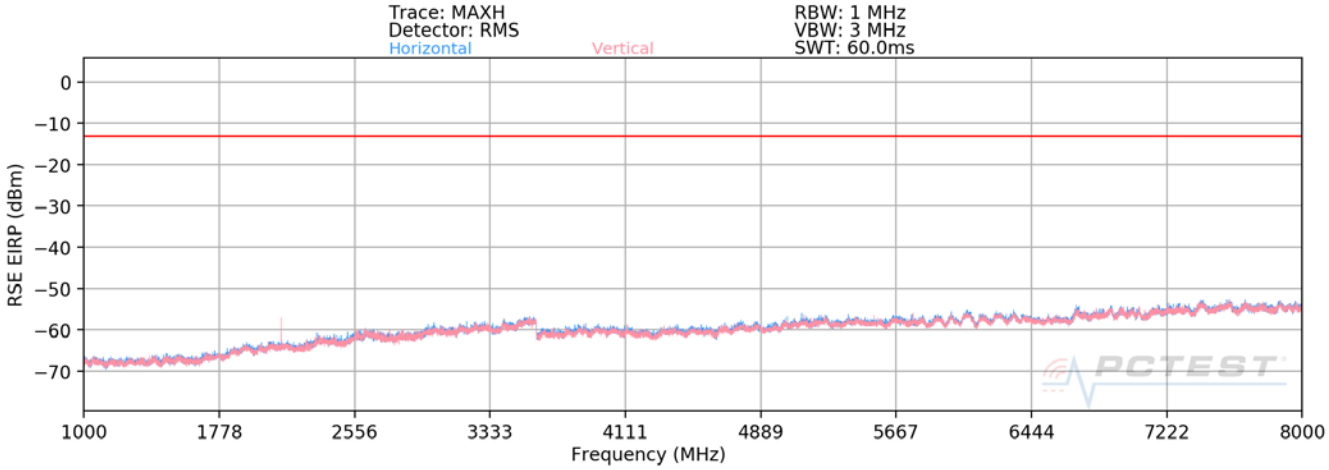
## Band 12




**Plot 7-350. Radiated Spurious Plot above 1GHz (Band 12)**

| | | |
|---|---|---|
| OPERATING FREQUENCY: | 704.00 | MHz |
| MODULATION SIGNAL: | QPSK | |
| BANDWIDTH: | 10.0 | MHz |
| DISTANCE: | 3 | meters |
| LIMIT: | -13 | dBm |

| Frequency [MHz] | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Level at Antenna Terminals [dBm] | Substitute Antenna Gain [dBi] | Spurious Emission Level [dBm] | Margin [dB] |
|---|---|---|---|---|---|---|---|
| 1408.00 | V | - | - | -72.42 | 7.57 | -64.85 | -51.9 |
| 2112.00 | V | 400 | 93 | -62.26 | 8.88 | -53.38 | -40.4 |
| 2816.00 | V | - | - | -69.25 | 10.15 | -59.10 | -46.1 |
| 3520.00 | V | - | - | -66.41 | 9.94 | -56.47 | -43.5 |
| 4224.00 | V | - | - | -72.61 | 10.53 | -62.08 | -49.1 |

**Table 7-19. Radiated Spurious Data (Band 12 – Low Channel)**

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

| Frequency [MHz] | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Level at Antenna Terminals [dBm] | Substitute Antenna Gain [dBi] | Spurious Emission Level [dBm] | Margin [dB] |
|---|---|---|---|---|---|---|---|
| 1415.00 | V | - | - | -72.01 | 7.66 | -64.35 | -51.4 |
| 2122.50 | V | 400 | 98 | -61.48 | 8.89 | -52.59 | -39.6 |
| 2830.00 | V | - | - | -75.02 | 10.12 | -64.89 | -51.9 |
| 3537.50 | V | - | - | -65.25 | 9.93 | -55.32 | -42.3 |
| 4245.00 | V | - | - | -72.10 | 10.61 | -61.49 | -48.5 |

**Table 7-20. Radiated Spurious Data (Band 12 – Mid Channel)**

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

| Frequency [MHz] | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Level at Antenna Terminals [dBm] | Substitute Antenna Gain [dBi] | Spurious Emission Level [dBm] | Margin [dB] |
|---|---|---|---|---|---|---|---|
| 1422.00 | V | - | - | -72.94 | 7.75 | -65.19 | -52.2 |
| 2133.00 | V | 267 | 347 | -65.76 | 8.90 | -56.86 | -43.9 |
| 2844.00 | V | - | - | -69.02 | 10.10 | -58.92 | -45.9 |
| 3555.00 | V | - | - | -65.35 | 9.92 | -55.42 | -42.4 |
| 4266.00 | V | - | - | -73.36 | 10.68 | -62.68 | -49.7 |

**Table 7-21. Radiated Spurious Data (Band 12 – High Channel)**



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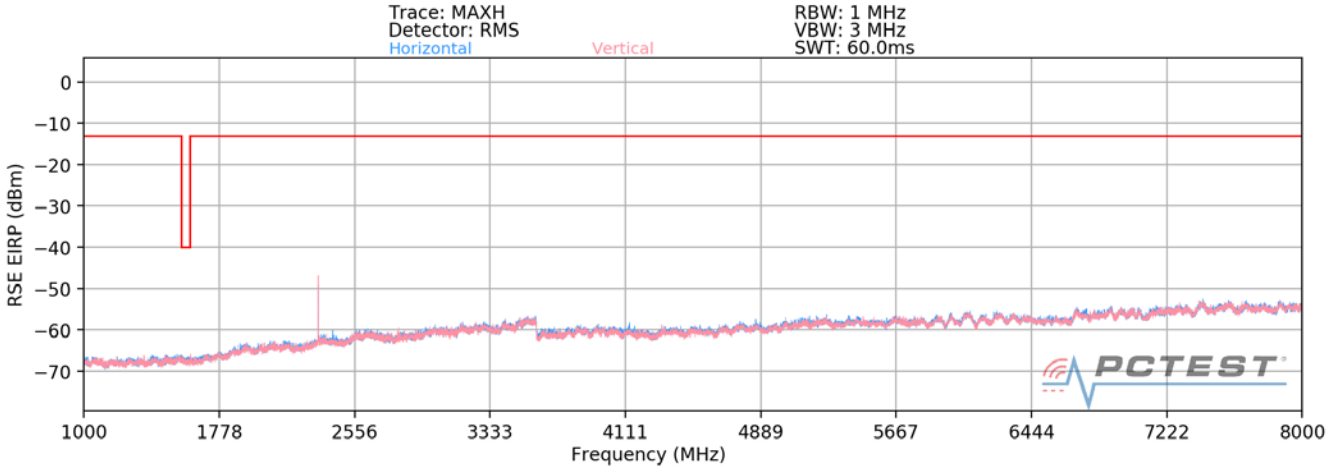
## Band 13




**Plot 7-351. Radiated Spurious Plot above 1GHz (Band 13)**

| | | |
|---|---|---|
| OPERATING FREQUENCY: | 782.00 | MHz |
| MODULATION SIGNAL: | QPSK | |
| BANDWIDTH: | 10.0 | MHz |
| DISTANCE: | 3 | meters |
| LIMIT: | -13 | dBm |

| Frequency [MHz] | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Level at Antenna Terminals [dBm] | Substitute Antenna Gain [dBi] | Spurious Emission Level [dBm] | Margin [dB] |
|---|---|---|---|---|---|---|---|
| 2346.00 | V | 299 | 84 | -69.64 | 9.46 | -60.18 | -47.2 |
| 3128.00 | V | 314 | 78 | -52.79 | 9.37 | -43.42 | -30.4 |
| 3910.00 | V | - | - | -64.89 | 9.40 | -55.49 | -42.5 |
| 4692.00 | V | - | - | -71.94 | 10.96 | -60.97 | -48.0 |
| 5474.00 | V | - | - | -70.41 | 10.83 | -59.58 | -46.6 |

**Table 7-22. Radiated Spurious Data (Band 13 – Mid Channel)**

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

| Frequency [MHz] | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Level at Antenna Terminals [dBm] | Substitute Antenna Gain [dBi] | Spurious Emission Level [dBm] | Margin [dB] |
|---|---|---|---|---|---|---|---|
| 1564.00 | V | - | - | -73.20 | 8.56 | -64.64 | -24.6 |

**Table 7-23. Radiated Spurious Data (Band 13 – 1559-1610MHz Band)**




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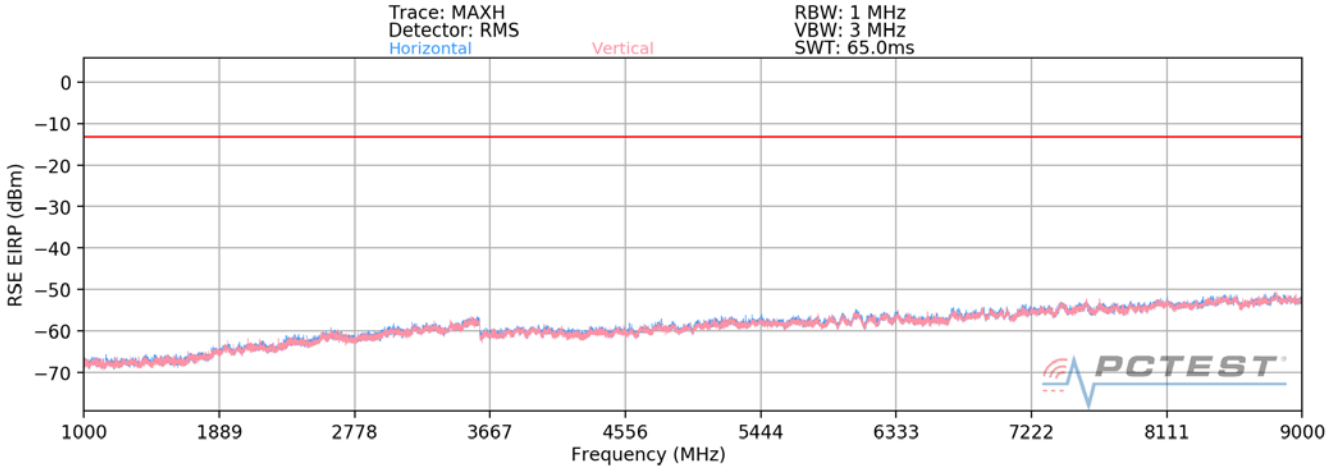
## Band 26




**Plot 7-352. Radiated Spurious Plot above 1GHz (Band 26)**

| | | |
|---|---|---|
| OPERATING FREQUENCY: | 831.50 | MHz |
| 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] |
|---|---|---|---|---|---|---|---|
| 1663.00 | V | 400 | 84 | -71.63 | 8.98 | -62.65 | -49.6 |
| 2494.50 | V | - | - | -70.55 | 9.76 | -60.79 | -47.8 |
| 3326.00 | V | - | - | -66.82 | 9.62 | -57.20 | -44.2 |
| 4157.50 | V | - | - | -72.23 | 10.28 | -61.95 | -48.9 |

**Table 7-24. Radiated Spurious Data (Band 26 – Low Channel)**

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| | | |
|---|---|---|
| OPERATING FREQUENCY: | 836.50 | MHz |
| 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] |
|---|---|---|---|---|---|---|---|
| 1673.00 | V | 390 | 85 | -70.46 | 8.98 | -61.48 | -48.5 |
| 2509.50 | V | - | - | -69.31 | 9.78 | -59.53 | -46.5 |
| 3346.00 | V | - | - | -67.09 | 9.63 | -57.46 | -44.5 |
| 4182.50 | V | - | - | -72.66 | 10.37 | -62.29 | -49.3 |
| 5019.00 | V | - | - | -70.97 | 10.91 | -60.06 | -47.1 |

**Table 7-25. Radiated Spurious Data (Band 26 – Mid Channel)**

| | | |
|---|---|---|
| OPERATING FREQUENCY: | 841.50 | MHz |
| 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] |
|---|---|---|---|---|---|---|---|
| 1683.00 | V | 394 | 139 | -72.11 | 8.98 | -63.13 | -50.1 |
| 2524.50 | V | - | - | -69.48 | 9.78 | -59.70 | -46.7 |
| 3366.00 | V | - | - | -67.74 | 9.70 | -58.04 | -45.0 |
| 4207.50 | V | - | - | -72.42 | 10.47 | -61.96 | -49.0 |

**Table 7-26. Radiated Spurious Data (Band 26 – High Channel)**



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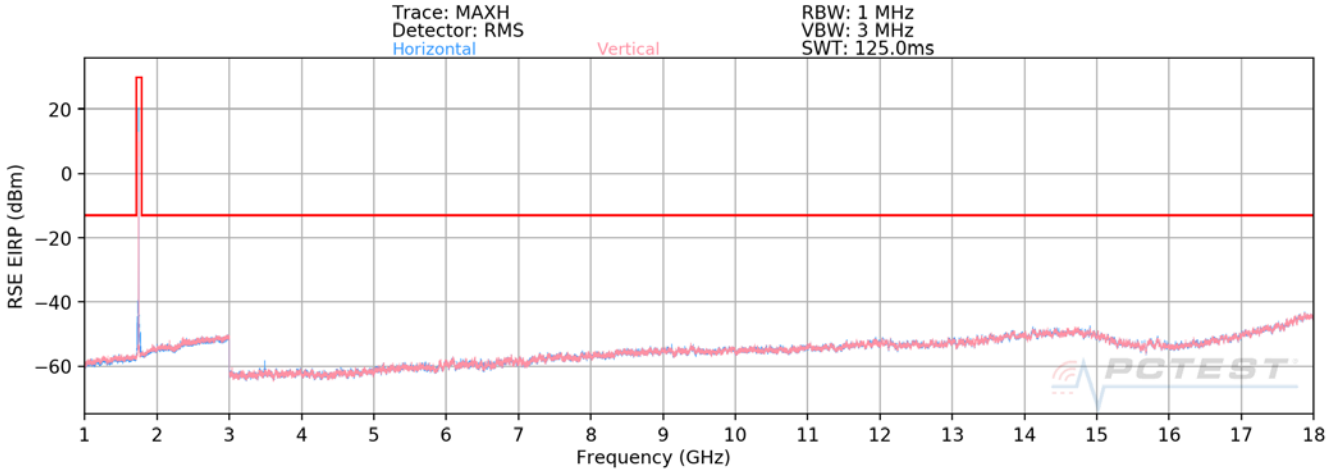
## Band 66/4




**Plot 7-353. Radiated Spurious Plot above 1GHz (Band 66/4)**

| | | |
|---|---|---|
| OPERATING FREQUENCY: | 1720.00 | MHz |
| MODULATION SIGNAL: | QPSK | |
| BANDWIDTH: | 20.0 | MHz |
| DISTANCE: | 3 | meters |
| LIMIT: | -13 | dBm |

| Frequency [MHz] | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Level at Antenna Terminals [dBm] | Substitute Antenna Gain [dBi] | Spurious Emission Level [dBm] | Margin [dB] |
|---|---|---|---|---|---|---|---|
| 3440.00 | H | 396 | 134 | -62.26 | 6.22 | -56.04 | -43.0 |
| 5160.00 | H | - | - | -66.84 | 8.68 | -58.17 | -45.2 |
| 6880.00 | H | - | - | -65.11 | 8.76 | -56.35 | -43.4 |
| 8600.00 | H | - | - | -63.97 | 9.17 | -54.79 | -41.8 |

**Table 7-27. Radiated Spurious Data (Band 66/4 – Low Channel)**

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| | | |
|---|---|---|
| OPERATING FREQUENCY: | 1745.00 | MHz |
| MODULATION SIGNAL: | QPSK | |
| BANDWIDTH: | 20.0 | MHz |
| DISTANCE: | 3 | meters |
| LIMIT: | -13 | dBm |

| Frequency [MHz] | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Level at Antenna Terminals [dBm] | Substitute Antenna Gain [dBi] | Spurious Emission Level [dBm] | Margin [dB] |
|---|---|---|---|---|---|---|---|
| 3490.00 | H | 295 | 91 | -61.01 | 6.32 | -54.68 | -41.7 |
| 5235.00 | H | - | - | -67.57 | 8.71 | -58.86 | -45.9 |
| 6980.00 | H | 144 | 268 | -63.03 | 8.74 | -54.30 | -41.3 |
| 8725.00 | H | - | - | -63.55 | 9.42 | -54.13 | -41.1 |
| 10470.00 | H | 118 | 89 | -57.43 | 9.62 | -47.81 | -34.8 |
| 12215.00 | H | - | - | -60.64 | 9.09 | -51.55 | -38.6 |

**Table 7-28. Radiated Spurious Data (Band 66/4 – Mid Channel)**

| | | |
|---|---|---|
| OPERATING FREQUENCY: | 1770.00 | MHz |
| MODULATION SIGNAL: | QPSK | |
| BANDWIDTH: | 20.0 | MHz |
| DISTANCE: | 3 | meters |
| LIMIT: | -13 | dBm |

| Frequency [MHz] | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Level at Antenna Terminals [dBm] | Substitute Antenna Gain [dBi] | Spurious Emission Level [dBm] | Margin [dB] |
|---|---|---|---|---|---|---|---|
| 3540.00 | H | 398 | 141 | -61.19 | 6.31 | -54.88 | -41.9 |
| 5310.00 | H | - | - | -67.57 | 8.74 | -58.83 | -45.8 |
| 7080.00 | H | 119 | 266 | -61.92 | 8.66 | -53.25 | -40.3 |
| 8850.00 | H | - | - | -63.31 | 9.53 | -53.78 | -40.8 |
| 10620.00 | H | 114 | 87 | -58.12 | 9.50 | -48.62 | -35.6 |
| 12390.00 | H | - | - | -60.29 | 9.12 | -51.16 | -38.2 |

**Table 7-29. Radiated Spurious Data (Band 66/4 – High Channel)**



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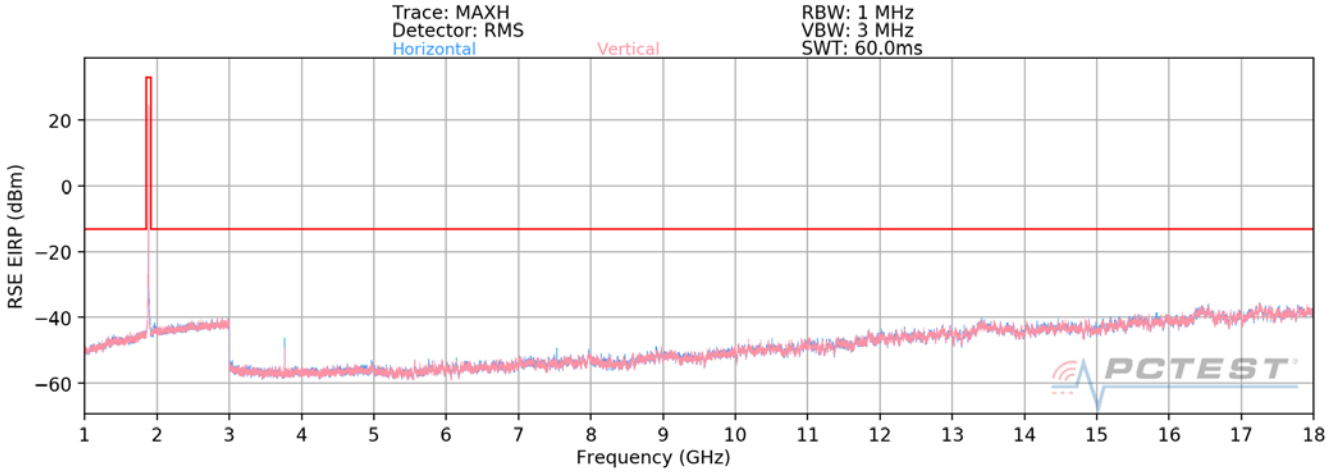
## Band 25/2




**Plot 7-354. Radiated Spurious Plot above 1GHz (Band 25/2)**

| | | |
|---|---|---|
| OPERATING FREQUENCY: | 1860.00 | MHz |
| MODULATION SIGNAL: | QPSK | |
| BANDWIDTH: | 20.0 | MHz |
| DISTANCE: | 3 | meters |
| LIMIT: | -13 | dBm |

| Frequency [MHz] | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Level at Antenna Terminals [dBm] | Substitute Antenna Gain [dBi] | Spurious Emission Level [dBm] | Margin [dB] |
|---|---|---|---|---|---|---|---|
| 3720.00 | H | 123 | 142 | -51.63 | 6.90 | -44.73 | -31.7 |
| 5580.00 | H | - | - | -58.27 | 9.06 | -49.20 | -36.2 |
| 7440.00 | H | - | - | -57.01 | 9.26 | -47.74 | -34.7 |
| 9300.00 | H | - | - | -55.27 | 9.40 | -45.87 | -32.9 |
| 11160.00 | H | - | - | -53.24 | 9.46 | -43.78 | -30.8 |

**Table 7-30. Radiated Spurious Data (Band 25/2 – Low Channel)**

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| | | |
|---|---|---|
| OPERATING FREQUENCY: | 1882.50 | MHz |
| MODULATION SIGNAL: | QPSK | |
| BANDWIDTH: | 20.0 | MHz |
| DISTANCE: | 3 | meters |
| LIMIT: | -13 | dBm |

| Frequency [MHz] | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Level at Antenna Terminals [dBm] | Substitute Antenna Gain [dBi] | Spurious Emission Level [dBm] | Margin [dB] |
|---|---|---|---|---|---|---|---|
| 3765.00 | H | 112 | 16 | -49.22 | 6.94 | -42.27 | -29.3 |
| 5647.50 | H | - | - | -59.94 | 9.17 | -50.77 | -37.8 |
| 7530.00 | H | 299 | 110 | -56.65 | 9.31 | -47.34 | -34.3 |
| 9412.50 | H | - | - | -55.46 | 9.50 | -45.96 | -33.0 |
| 11295.00 | H | - | - | -49.95 | 9.49 | -40.47 | -27.5 |

**Table 7-31. Radiated Spurious Data (Band 25/2 – Mid Channel)**

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

| Frequency [MHz] | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Level at Antenna Terminals [dBm] | Substitute Antenna Gain [dBi] | Spurious Emission Level [dBm] | Margin [dB] |
|---|---|---|---|---|---|---|---|
| 3810.00 | H | 101 | 150 | -51.34 | 7.07 | -44.27 | -31.3 |
| 5715.00 | H | - | - | -59.67 | 9.04 | -50.63 | -37.6 |
| 7620.00 | H | - | - | -56.37 | 9.27 | -47.10 | -34.1 |
| 9525.00 | H | - | - | -55.73 | 9.46 | -46.27 | -33.3 |
| 11430.00 | H | - | - | -50.21 | 9.49 | -40.72 | -27.7 |

**Table 7-32. Radiated Spurious Data (Band 25/2 – High Channel)**



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