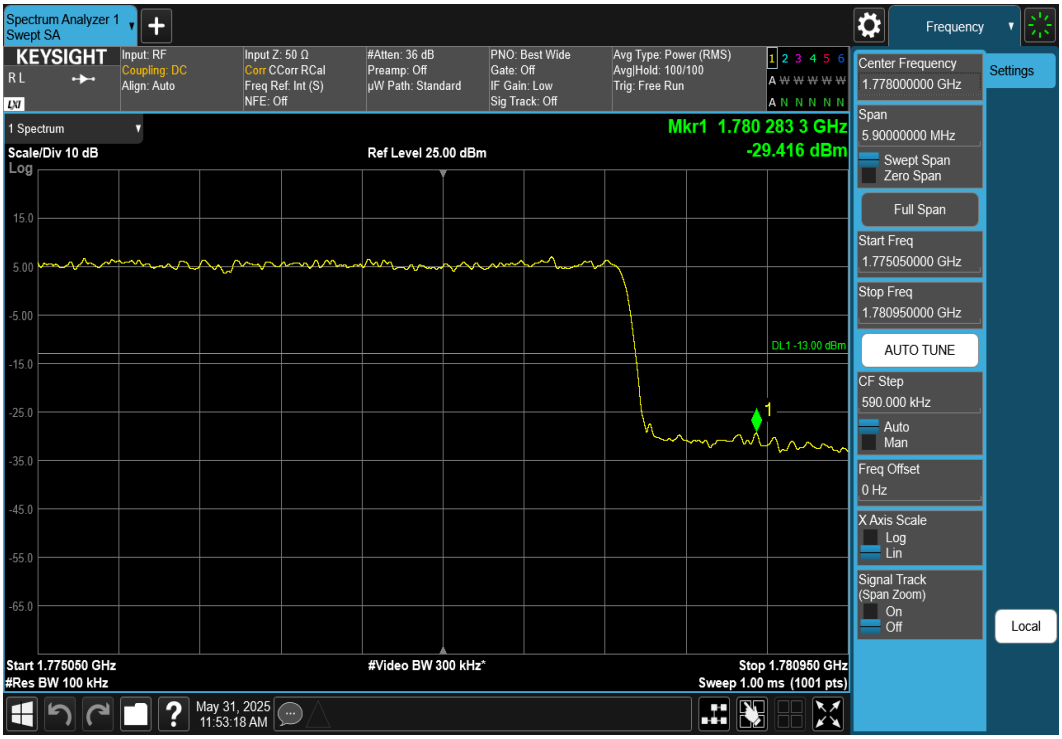
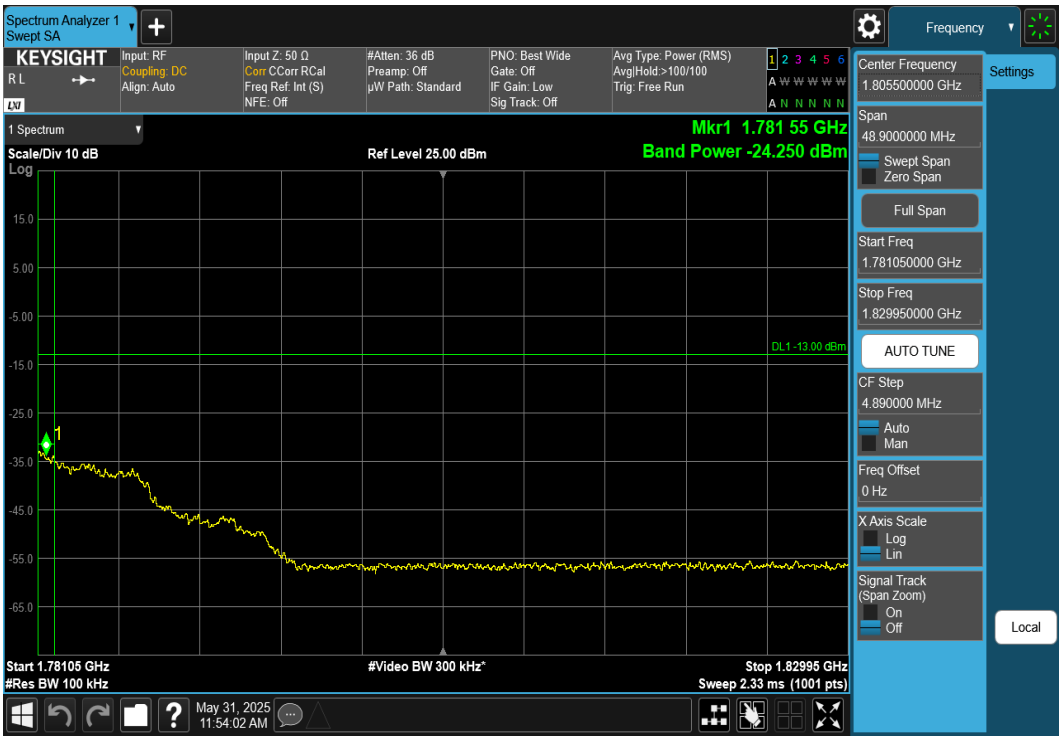
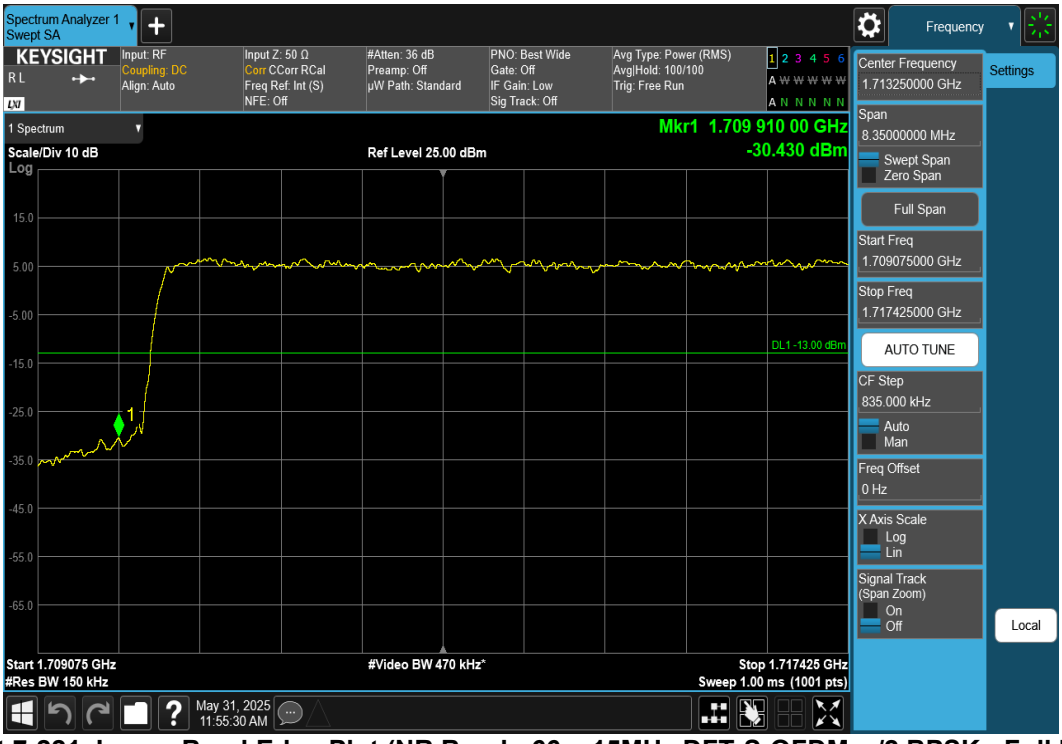



**Plot 7-218. Upper Band Edge Plot (NR Band n66 – 10MHz DFT-S-OFDM π/2 BPSK - Full RB)**

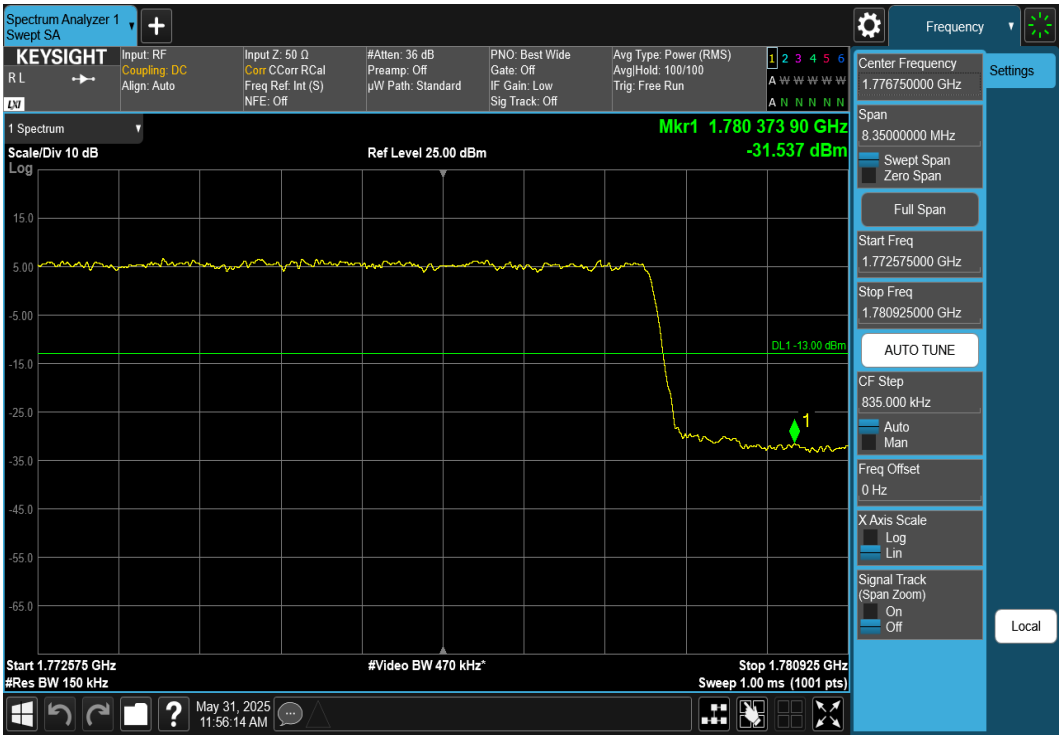



**Plot 7-219. Upper Extended Band Edge Plot (NR Band n66 – 10MHz DFT-S-OFDM π/2 BPSK - Full RB)**

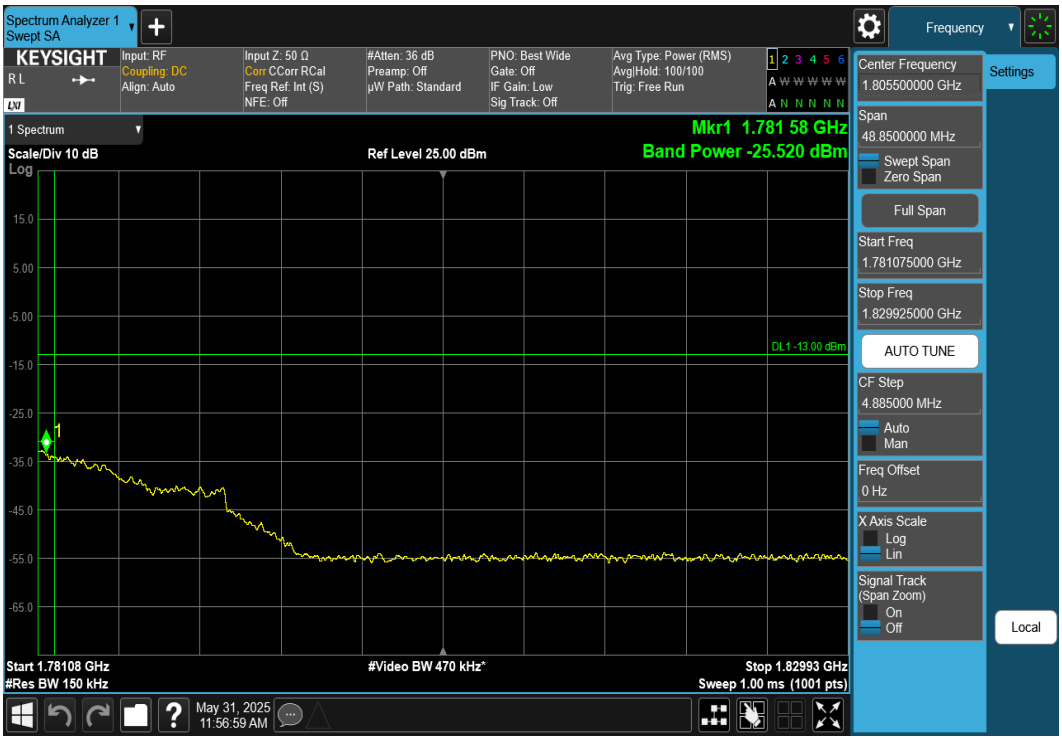

**Plot 7-220. Lower Extended Band Edge Plot (NR Band n66 – 15MHz DFT-S-OFDM π/2 BPSK - Full RB)**




**Plot 7-221. Lower Band Edge Plot (NR Band n66 – 15MHz DFT-S-OFDM π/2 BPSK - Full RB)**

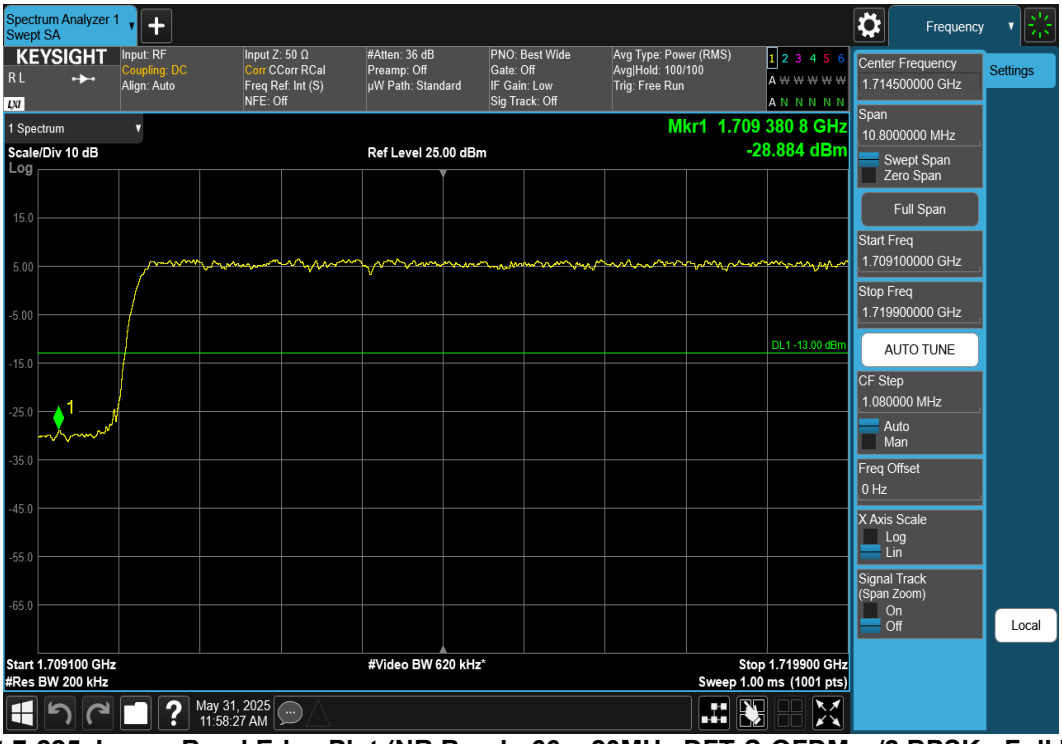



**Plot 7-222. Upper Band Edge Plot (NR Band n66 – 15MHz DFT -OFDM π/2 BPSK - Full RB)**

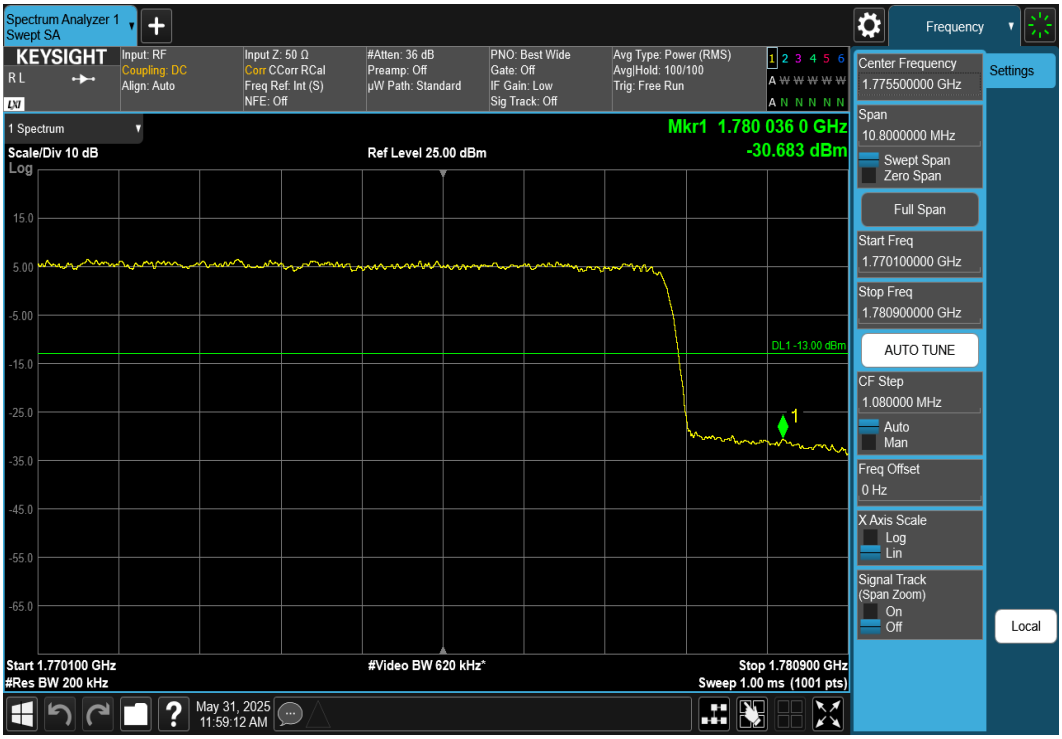



**Plot 7-223. Upper Extended Band Edge Plot (NR Band n66 – 15MHz DFT-S-OFDM π/2 BPSK - Full RB)**

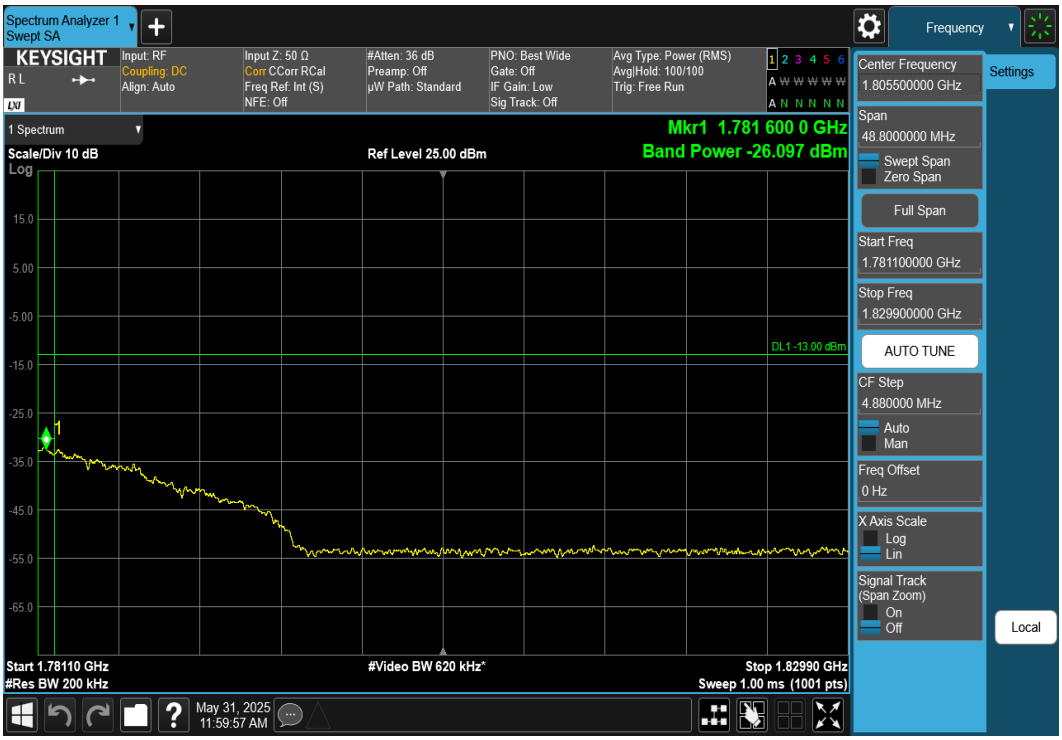

**Plot 7-224. Lower Extended Band Edge Plot (NR Band n66 – 20MHz DFT-S-OFDM π/2 BPSK - Full RB)**




**Plot 7-225. Lower Band Edge Plot (NR Band n66 – 20MHz DFT-S-OFDM π/2 BPSK - Full RB)**




**Plot 7-226. Upper Band Edge Plot (NR Band n66 – 20MHz DFT-S-OFDM π/2 BPSK - Full RB)**



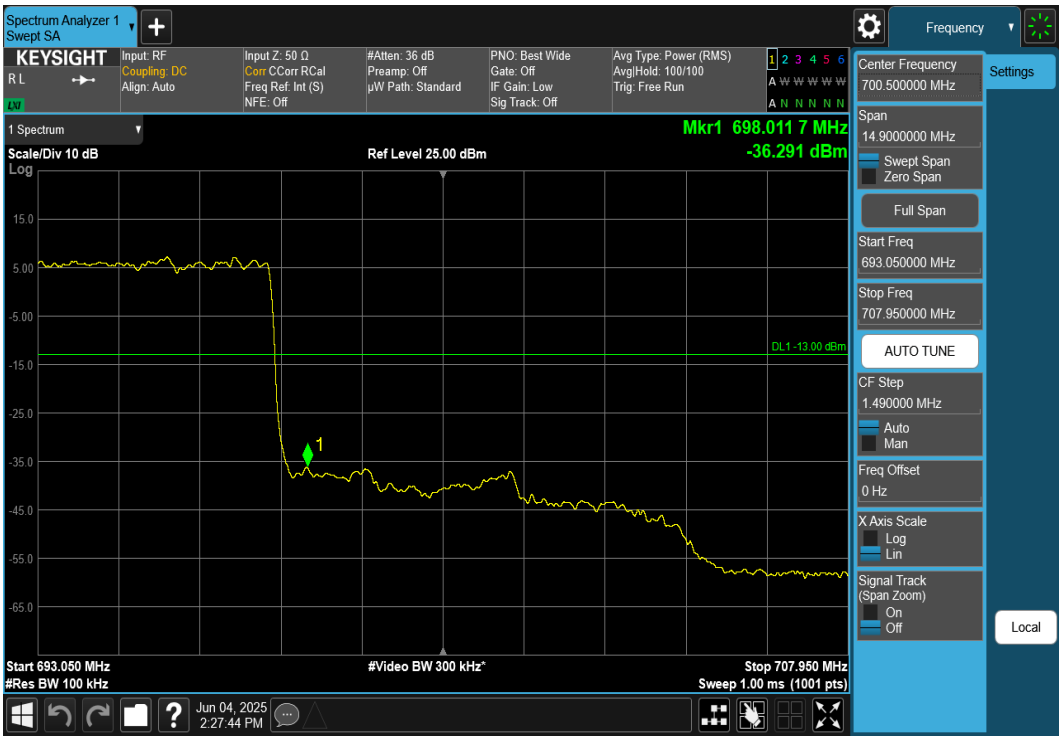

**Plot 7-227. Upper Extended Band Edge Plot (NR Band n66 – 20MHz DFT-S-OFDM π/2 BPSK - Full RB)**

## NR Band n71


**Plot 7-228. Lower Band Edge Plot (NR Band n71 – 5MHz DFT-S-OFDM π/2 BPSK - Full RB)**


**Plot 7-229. Upper Band Edge Plot (NR Band n71 – 5MHz DFT-S-OFDM π/2 BPSK - Full RB)**


**Plot 7-230. Lower Band Edge Plot (NR Band n71 – 10MHz DFT-S-OFDM π/2 BPSK - Full RB)**

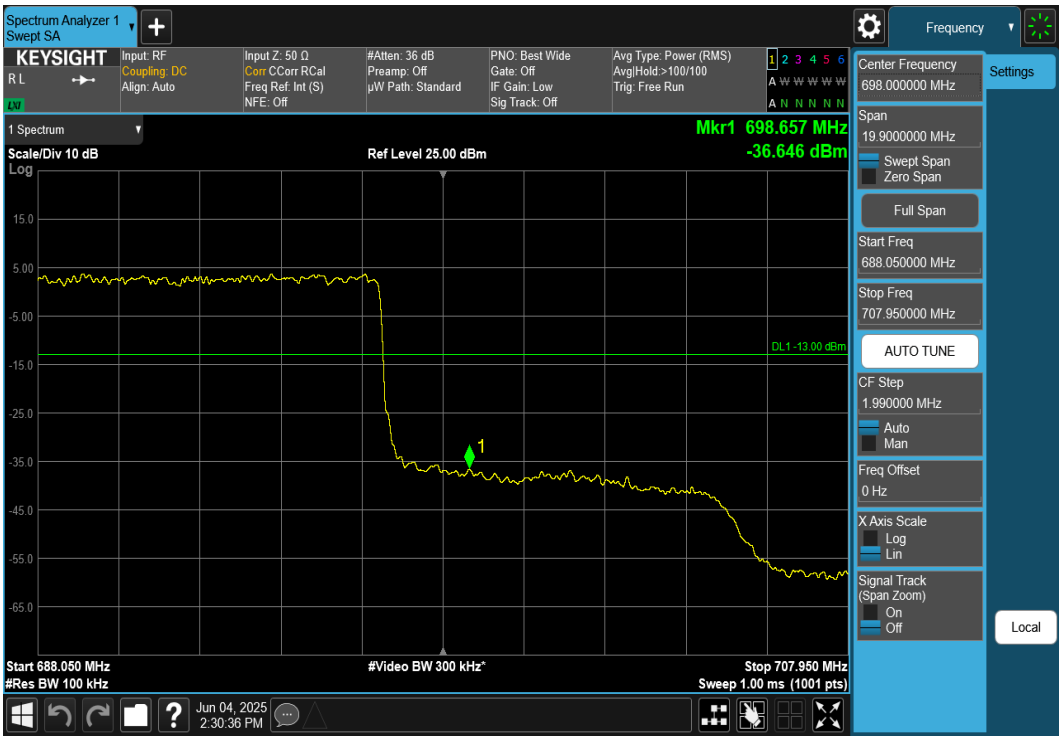



**Plot 7-231. Upper Band Edge Plot (NR Band n71 – 10MHz DFT-S-OFDM π/2 BPSK - Full RB)**


**Plot 7-232. Lower Band Edge Plot (NR Band n71 – 15MHz DFT-S-OFDM π/2 BPSK - Full RB)**


**Plot 7-233. Upper Band Edge Plot (NR Band n71 – 15MHz DFT-S-OFDM π/2 BPSK - Full RB)**


**Plot 7-234. Lower Band Edge Plot (NR Band n71 – 20MHz DFT-S-OFDM π/2 BPSK - Full RB)**

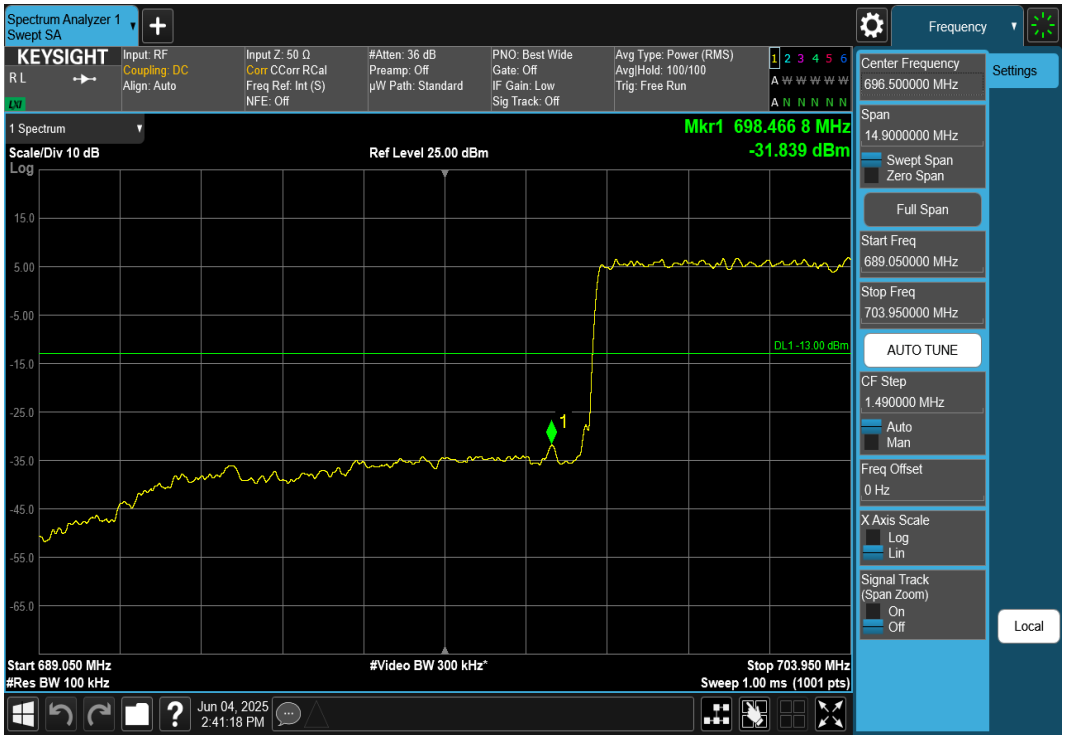



**Plot 7-235. Upper Band Edge Plot (NR Band n71 – 20MHz DFT-S-OFDM π/2 BPSK - Full RB)**

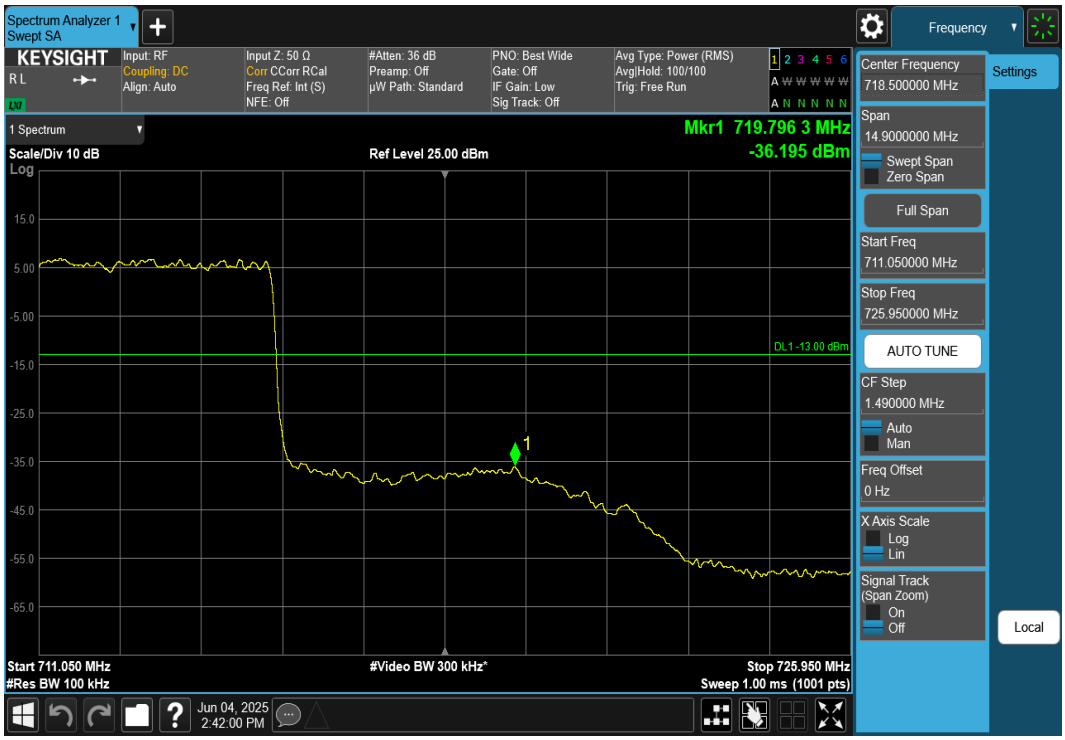
## NR Band n12


**Plot 7-236. Lower Band Edge Plot (NR Band n12 – 5MHz DFT-S-OFDM π/2 BPSK - Full RB)**


**Plot 7-237. Upper Band Edge Plot (NR Band n12 – 5MHz DFT-S-OFDM π/2 BPSK - Full RB)**




**Plot 7-238. Lower Band Edge Plot (NR Band n12 – 10MHz DFT-S-OFDM π/2 BPSK - Full RB)**




**Plot 7-239. Upper Band Edge Plot (NR Band n12 – 10MHz DFT-S-OFDM π/2 BPSK - Full RB)**


**Plot 7-240. Lower Band Edge Plot (NR Band n12 – 15MHz DFT-S-OFDM π/2 BPSK - Full RB)**


**Plot 7-241. Upper Band Edge Plot (NR Band n12 – 15MHz DFT-S-OFDM π/2 BPSK - Full RB)**

## 7.5 Peak-Average Ratio

**§27.50(d)(5)**

### 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.

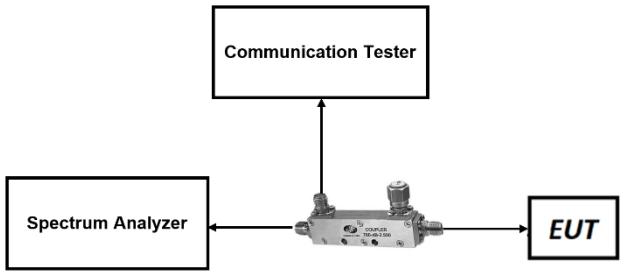



**Figure 7-7. LTE Test Instrument & Measurement Setup**

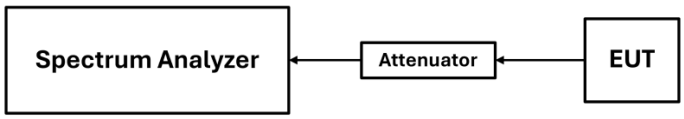
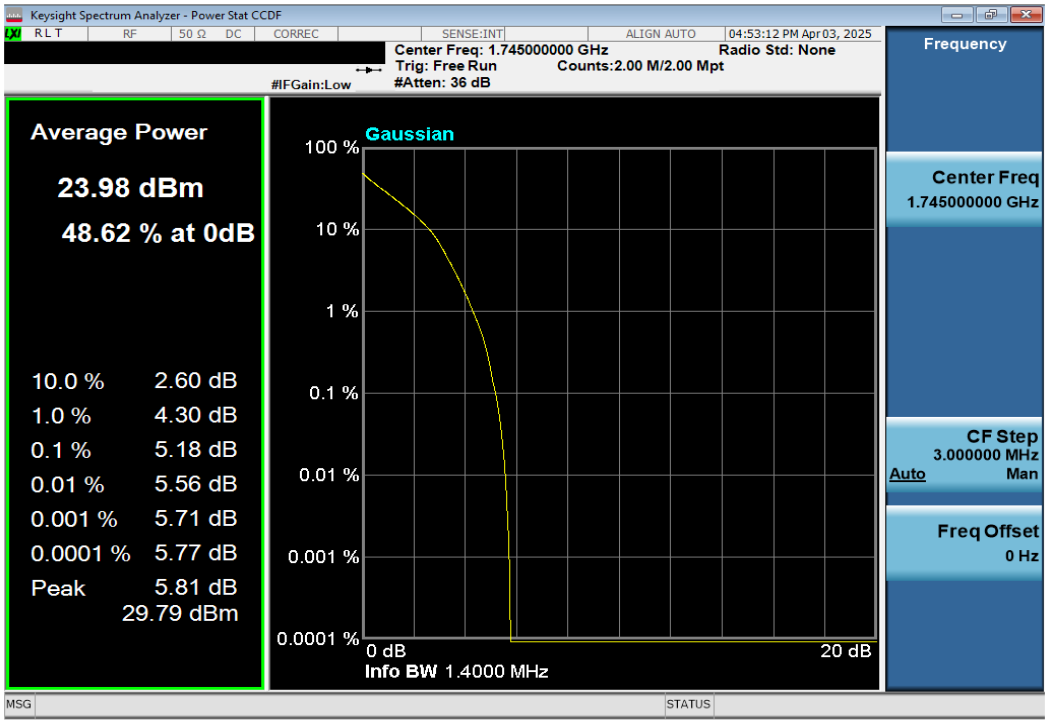



**Figure 7-8. FR1 Test Instrument & Measurement Setup**

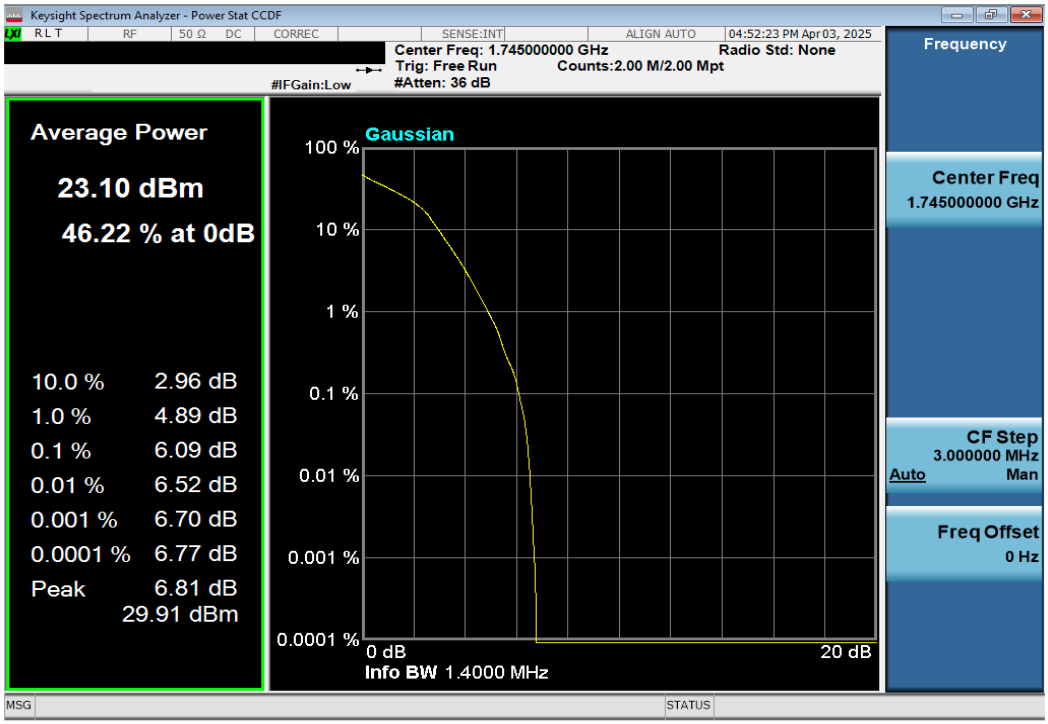
## Test Notes

None.

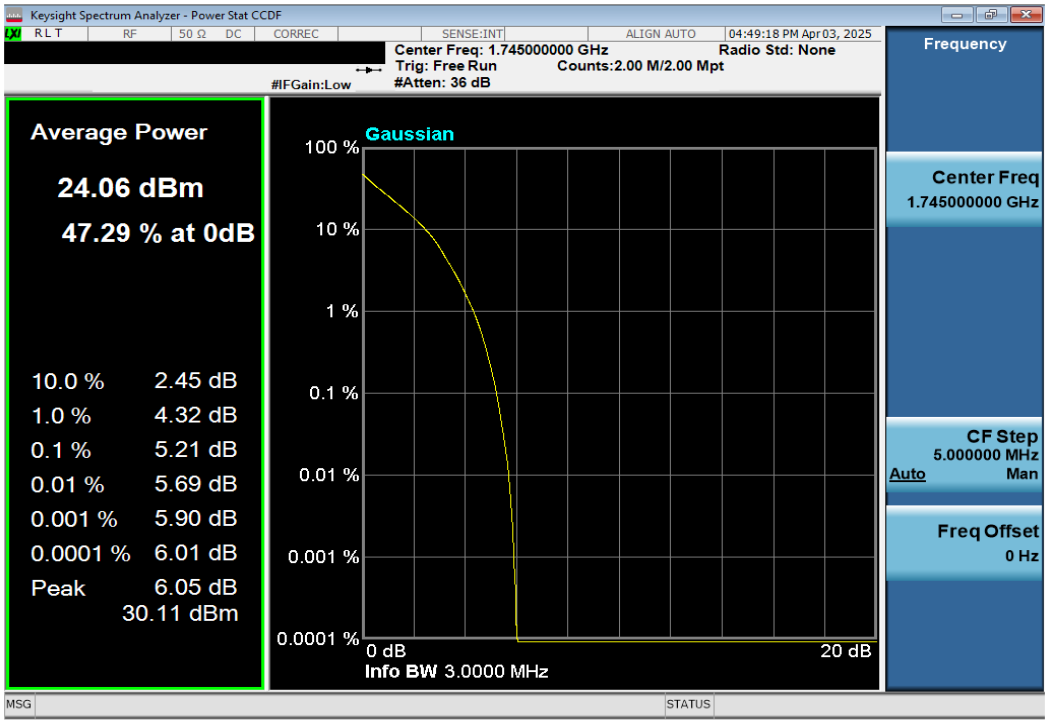
## LTE Band 66



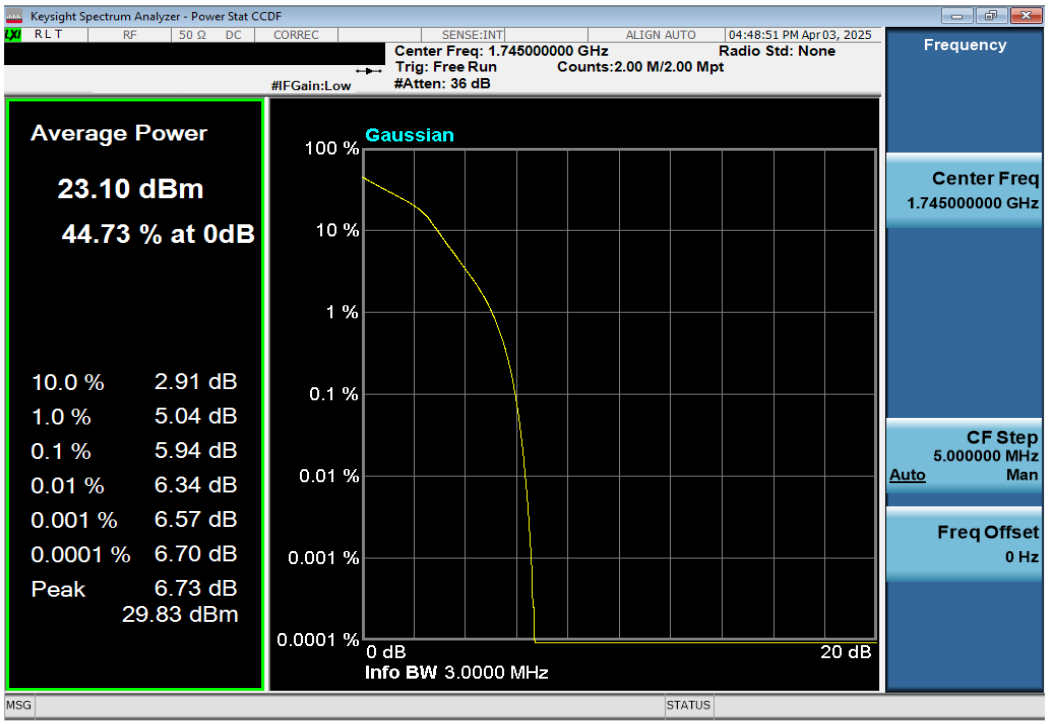

**Plot 7-242. PAR Plot (LTE Band 66 - 1.4MHz QPSK - Full RB)**



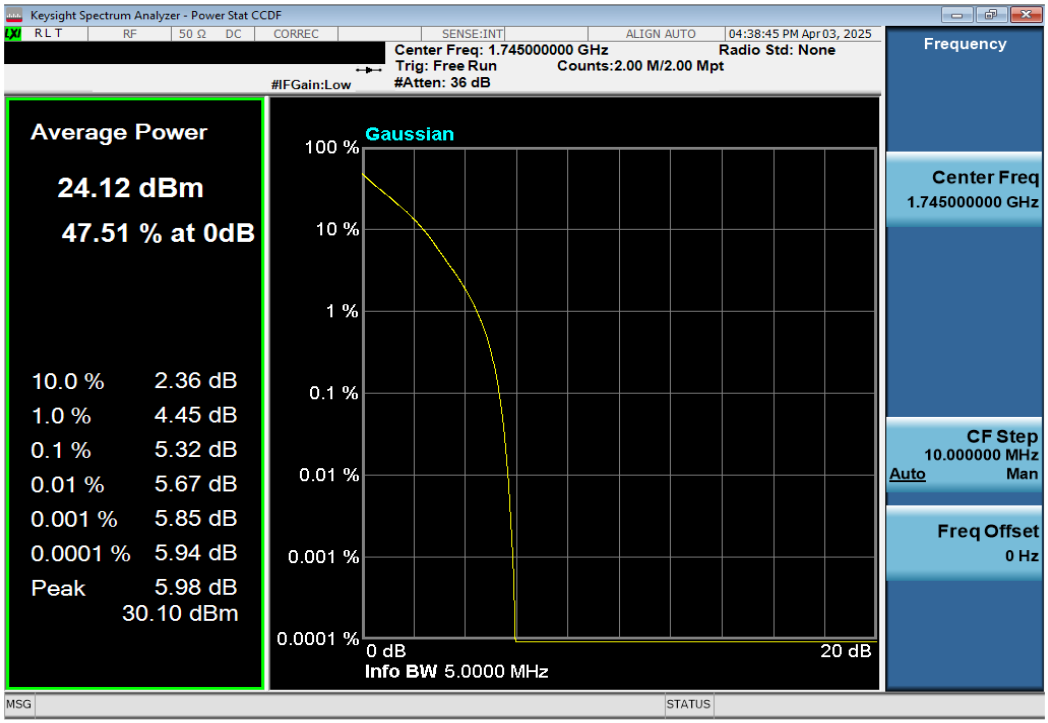

**Plot 7-243. PAR Plot (LTE Band 66 - 1.4MHz 16-QAM - Full RB)**



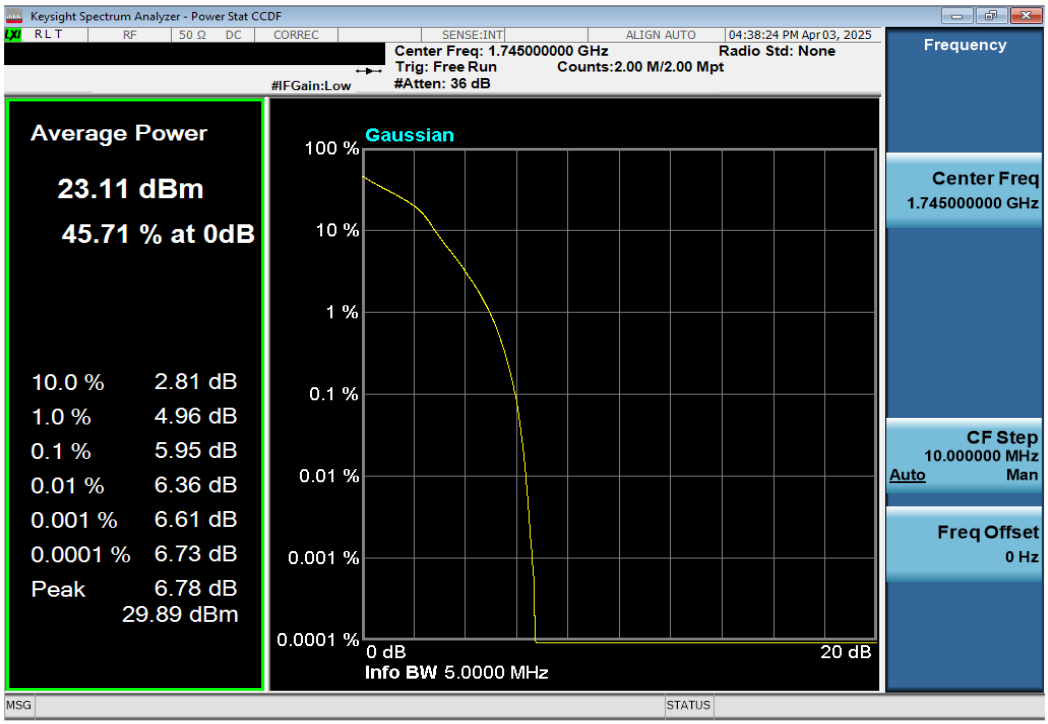

**Plot 7-244. PAR Plot (LTE Band 66 - 3MHz QPSK - Full RB)**



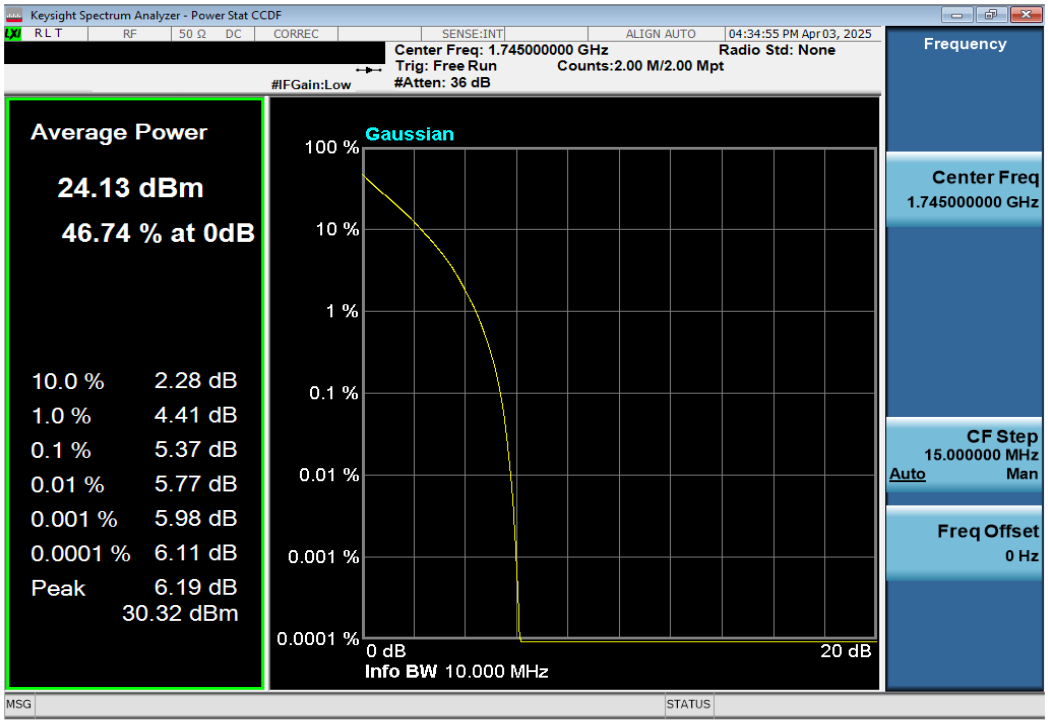

**Plot 7-245. PAR Plot (LTE Band 66 - 3MHz 16-QAM - Full RB)**



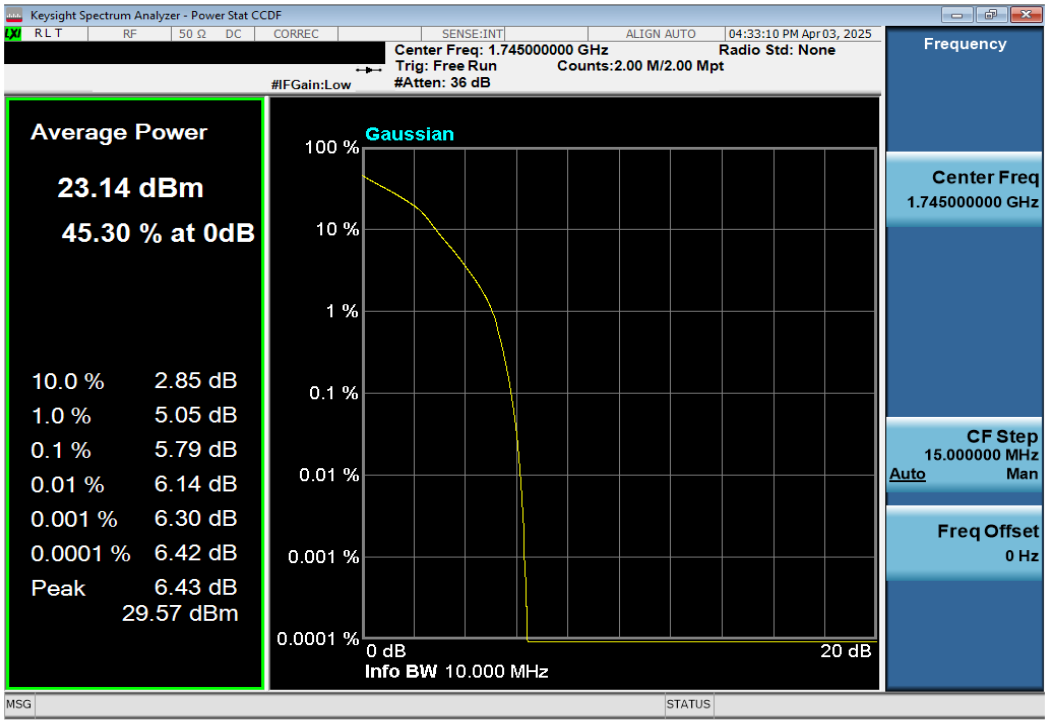

**Plot 7-246. PAR Plot (LTE Band 66 - 5MHz QPSK - Full RB)**



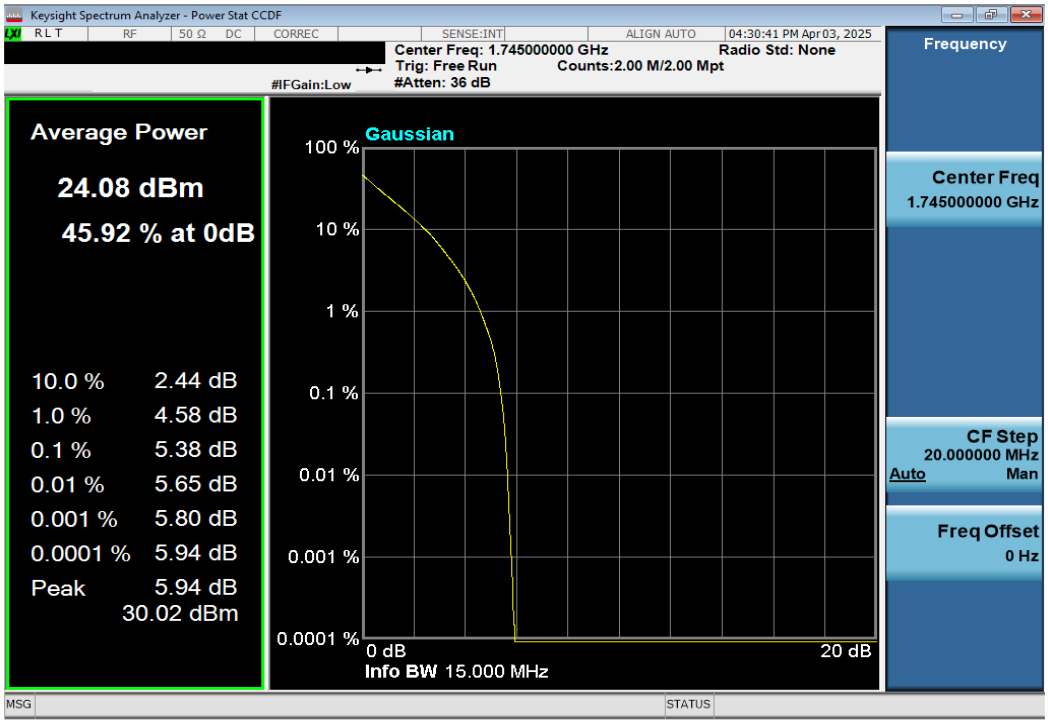

**Plot 7-247. PAR Plot (LTE Band 66 - 5MHz 16-QAM - Full RB)**



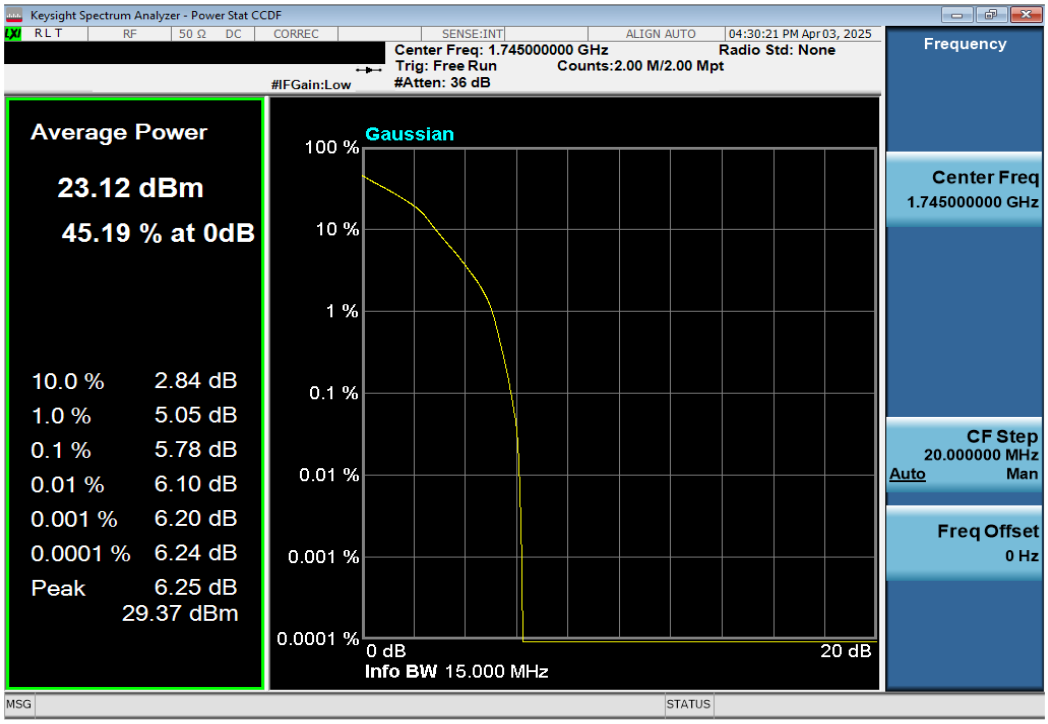

**Plot 7-248. PAR Plot (LTE Band 66 - 10MHz QPSK - Full RB)**



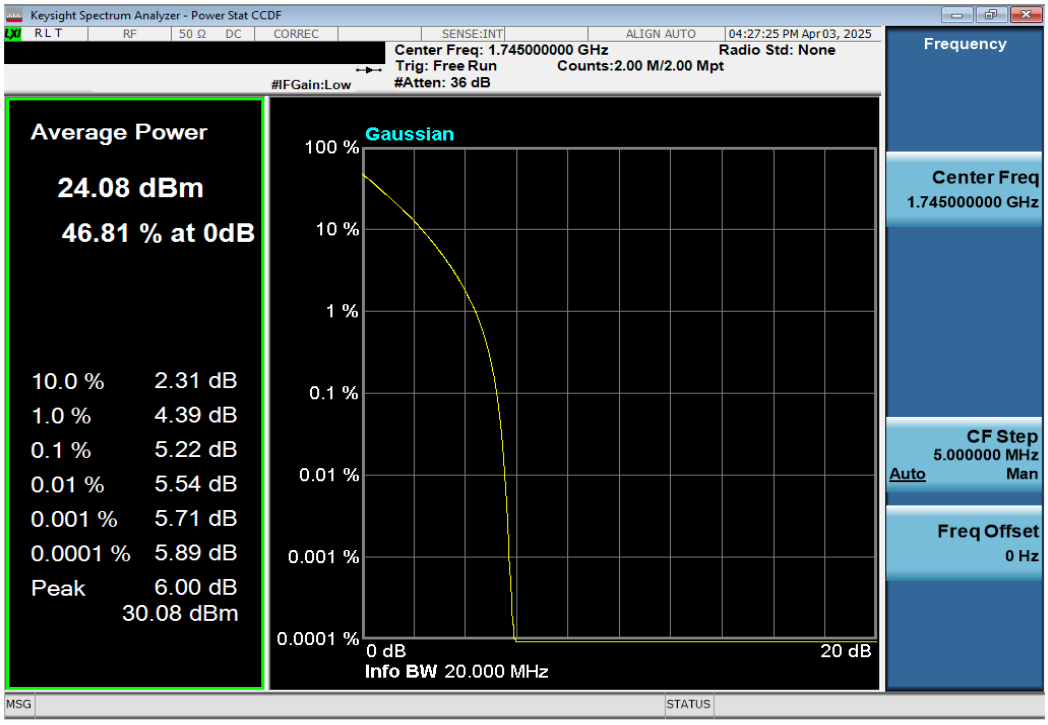

**Plot 7-249. PAR Plot (LTE Band 66 - 10MHz 16-QAM - Full RB)**



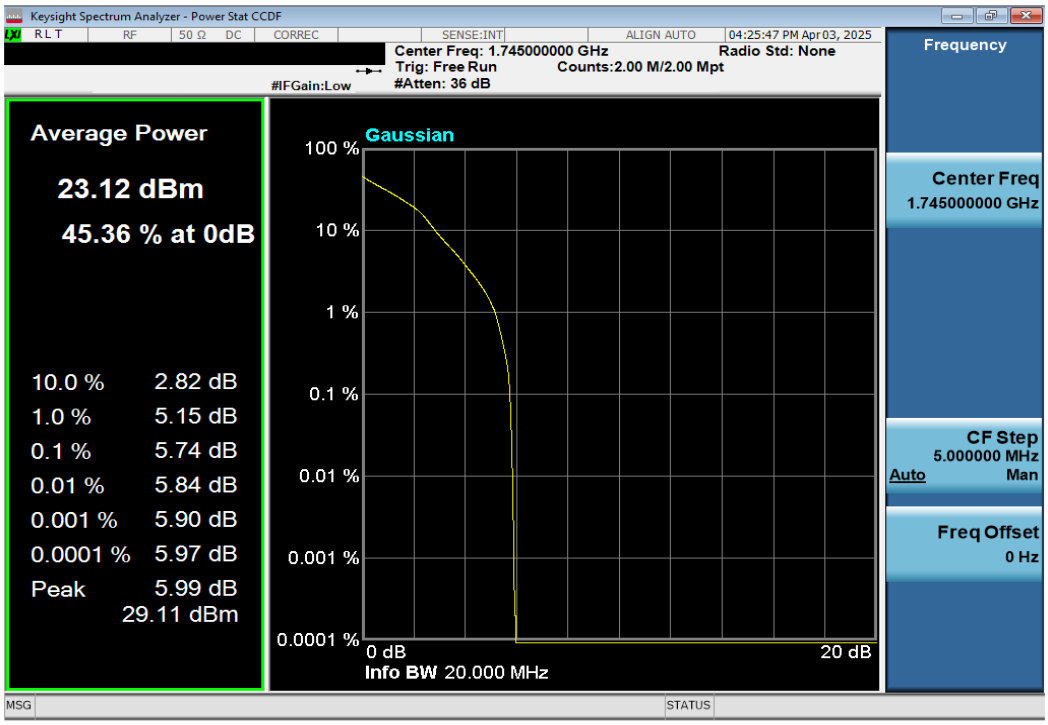

**Plot 7-250. PAR Plot (LTE Band 66 - 15MHz QPSK - Full RB)**




**Plot 7-251. PAR Plot (LTE Band 66 - 15MHz 16-QAM - Full RB)**

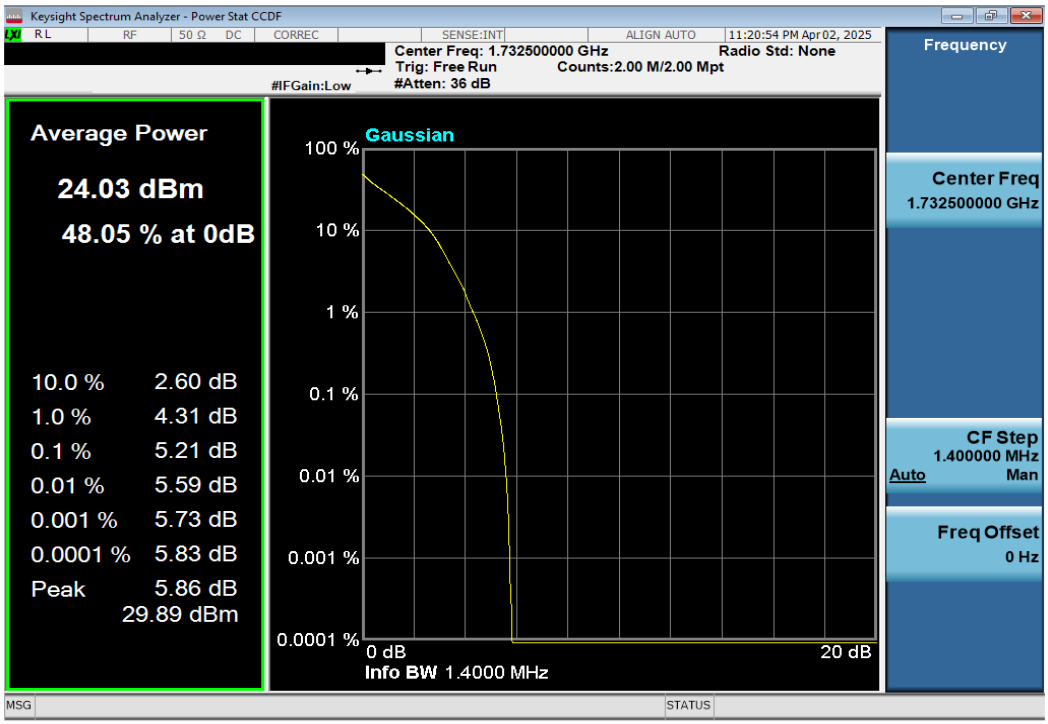



**Plot 7-252. PAR Plot (LTE Band 66 - 20MHz QPSK - Full RB)**

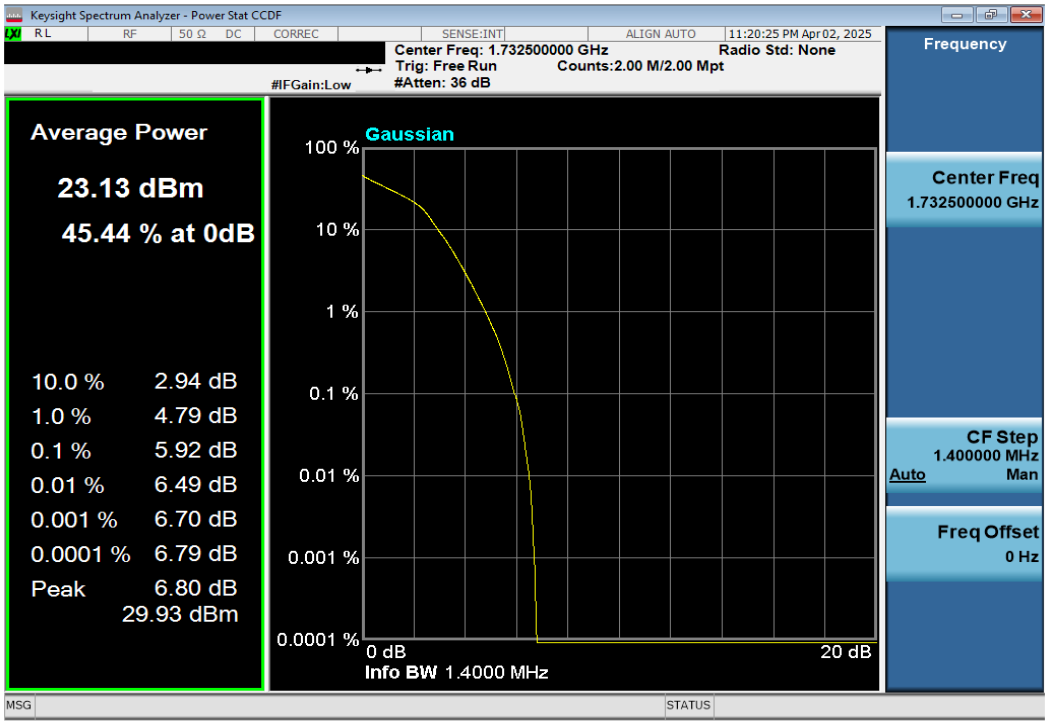



**Plot 7-253. PAR Plot (LTE Band 66 - 20MHz 16-QAM - Full RB)**

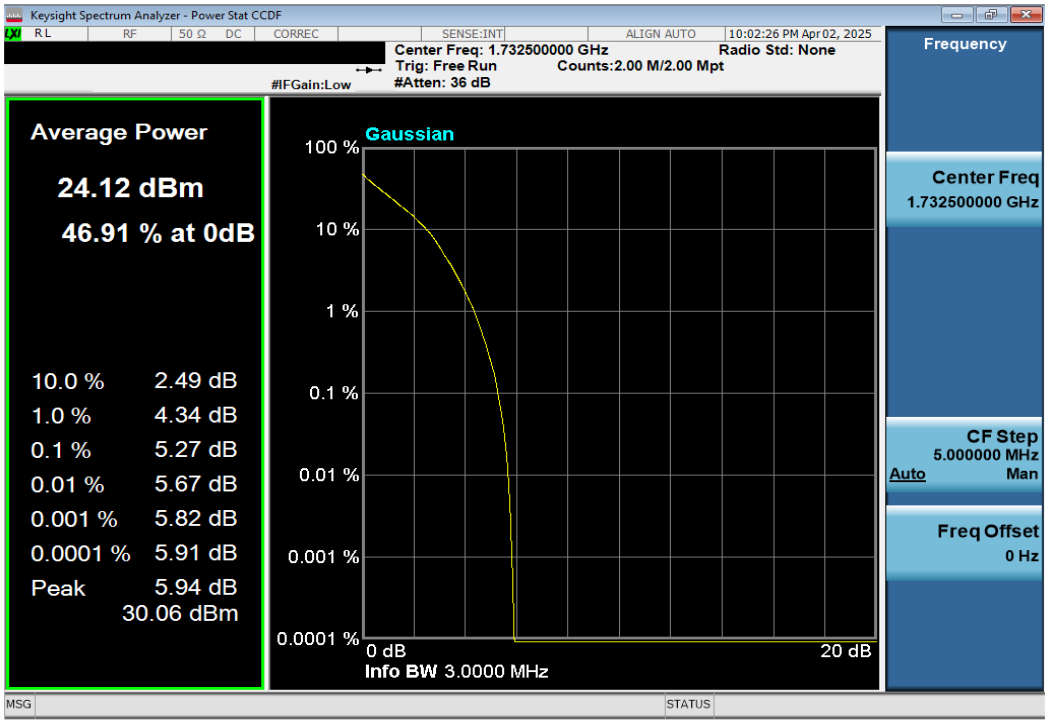
## LTE Band 4



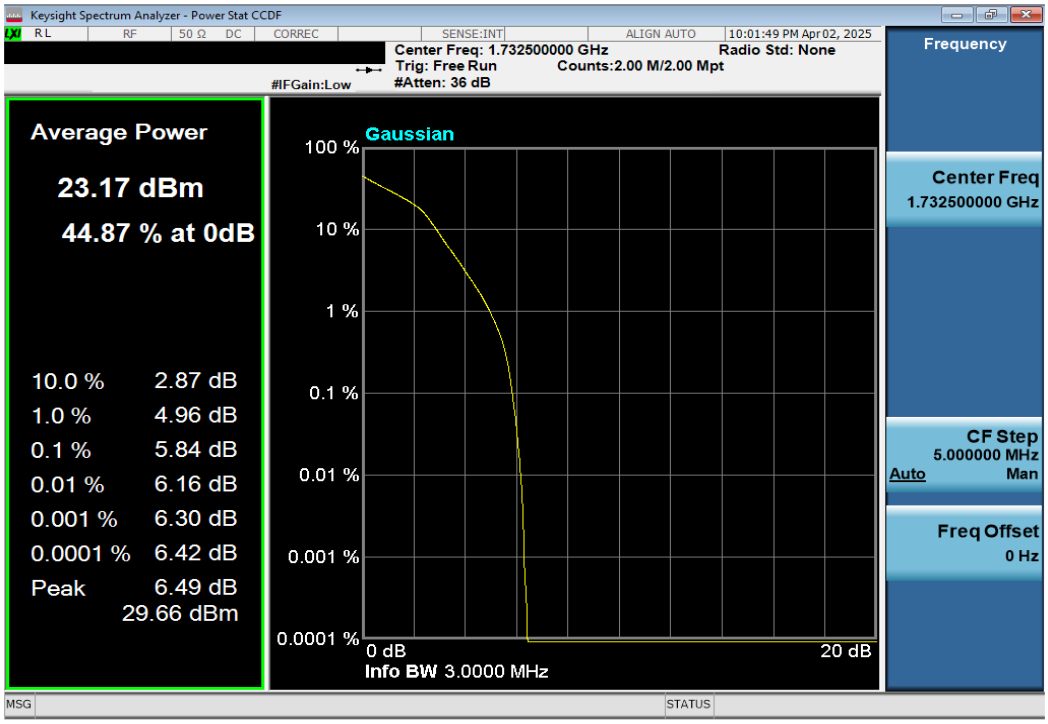

**Plot 7-254. PAR Plot (LTE Band 4 - 1.4MHz QPSK - Full RB)**



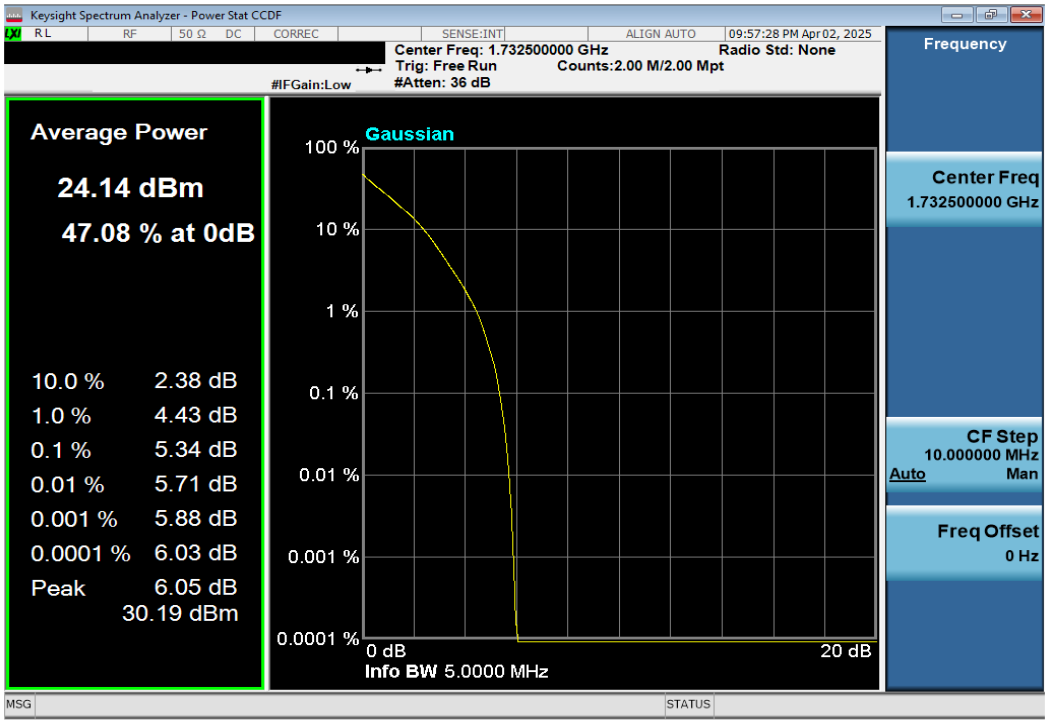

**Plot 7-255. PAR Plot (LTE Band 4 - 1.4MHz 16-QAM - Full RB)**



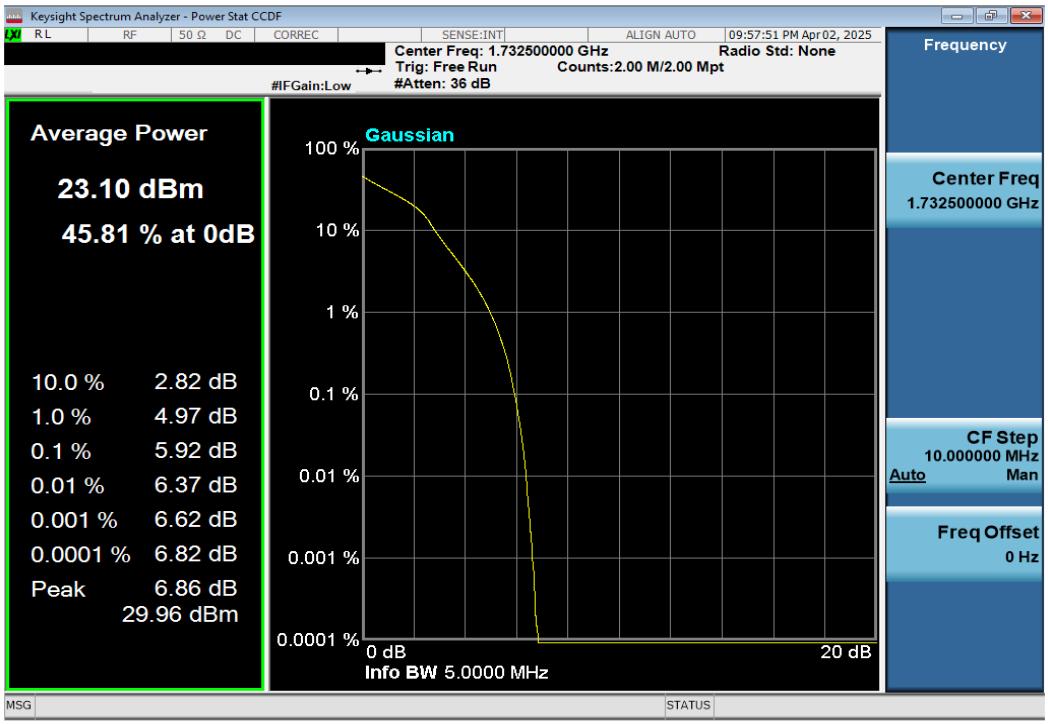

**Plot 7-256. PAR Plot (LTE Band 4 - 3MHz QPSK - Full RB)**



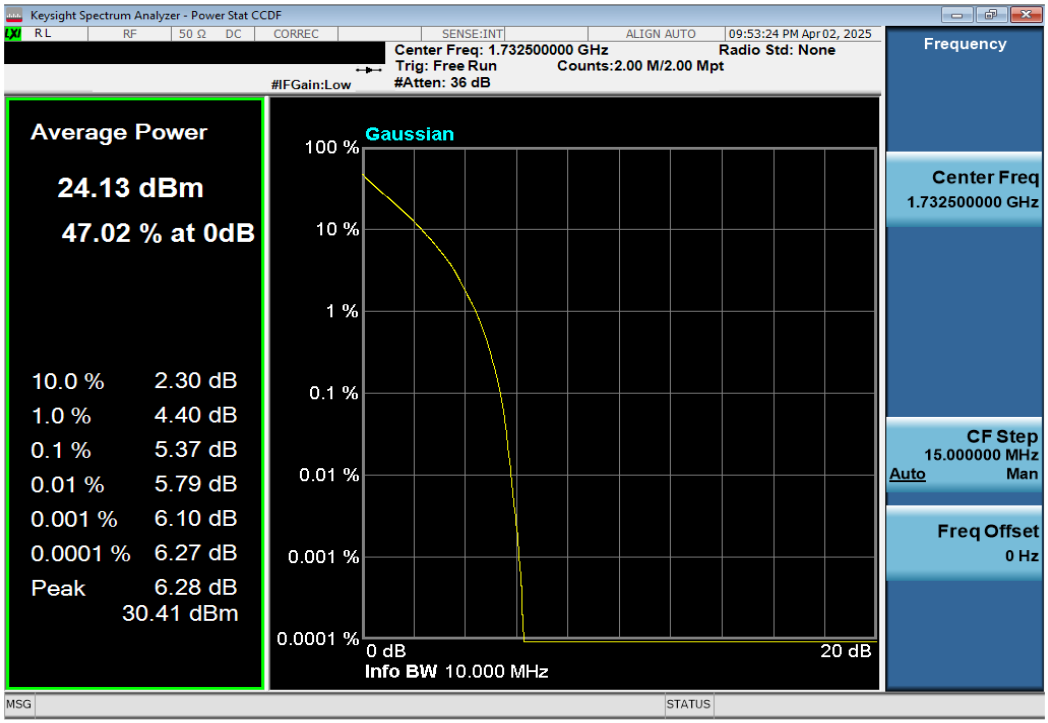

**Plot 7-257. PAR Plot (LTE Band 4 - 3MHz 16-QAM - Full RB)**



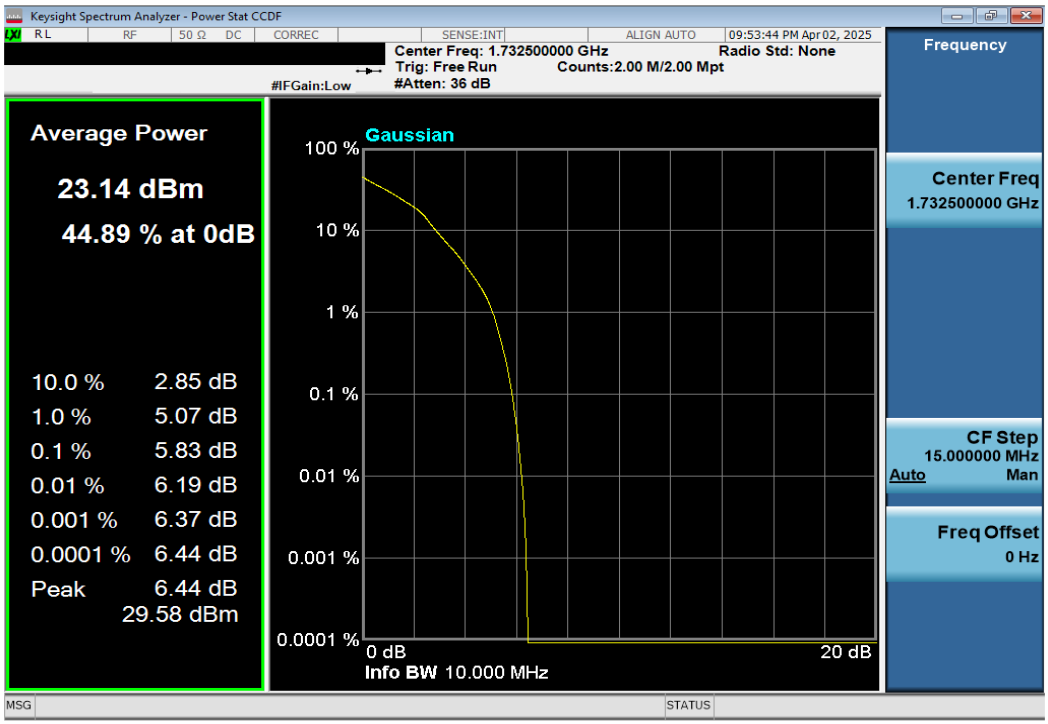

**Plot 7-258. PAR Plot (LTE Band 4 - 5MHz QPSK - Full RB)**



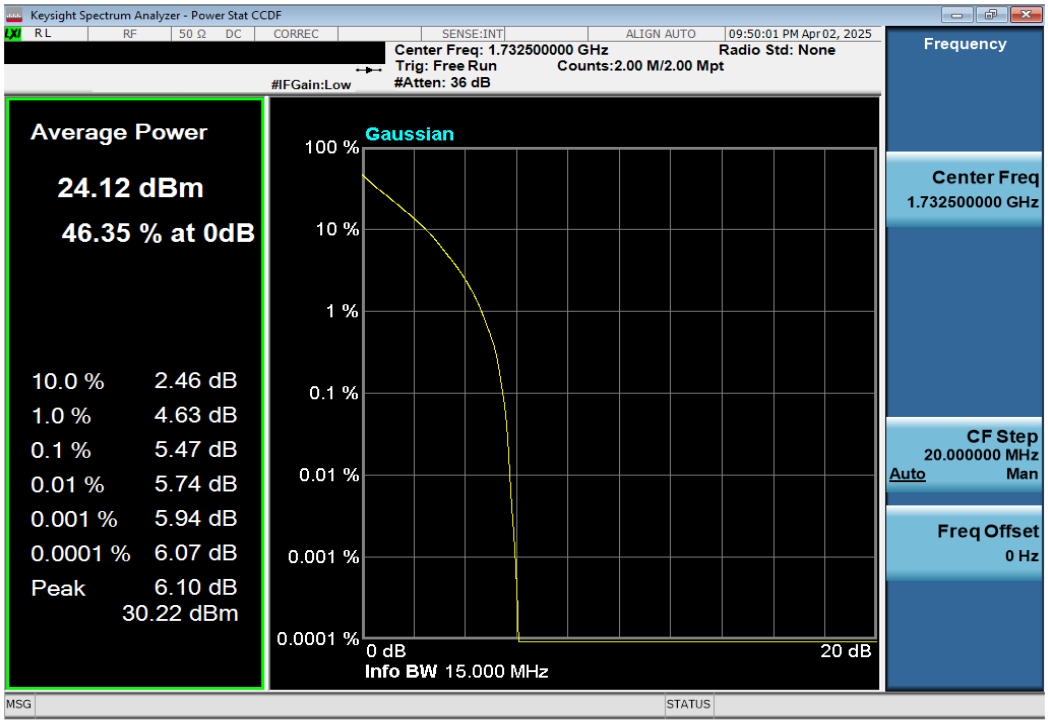

**Plot 7-259. PAR Plot (LTE Band 4 - 5MHz 16-QAM - Full RB)**



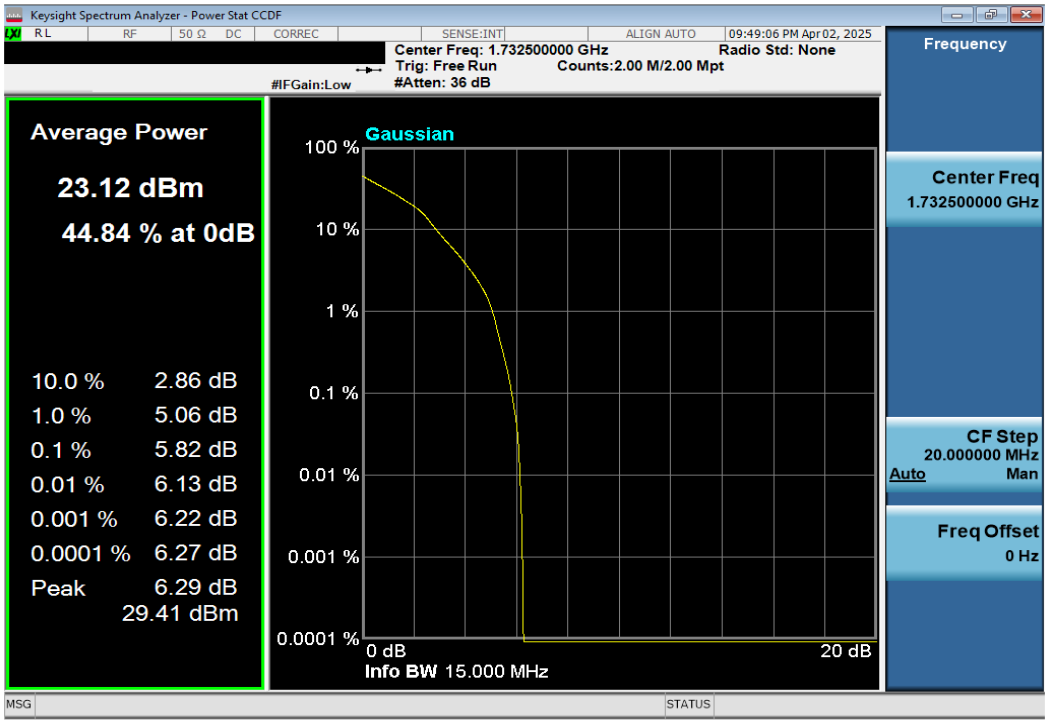

**Plot 7-260. PAR Plot (LTE Band 4 - 10MHz QPSK - Full RB)**



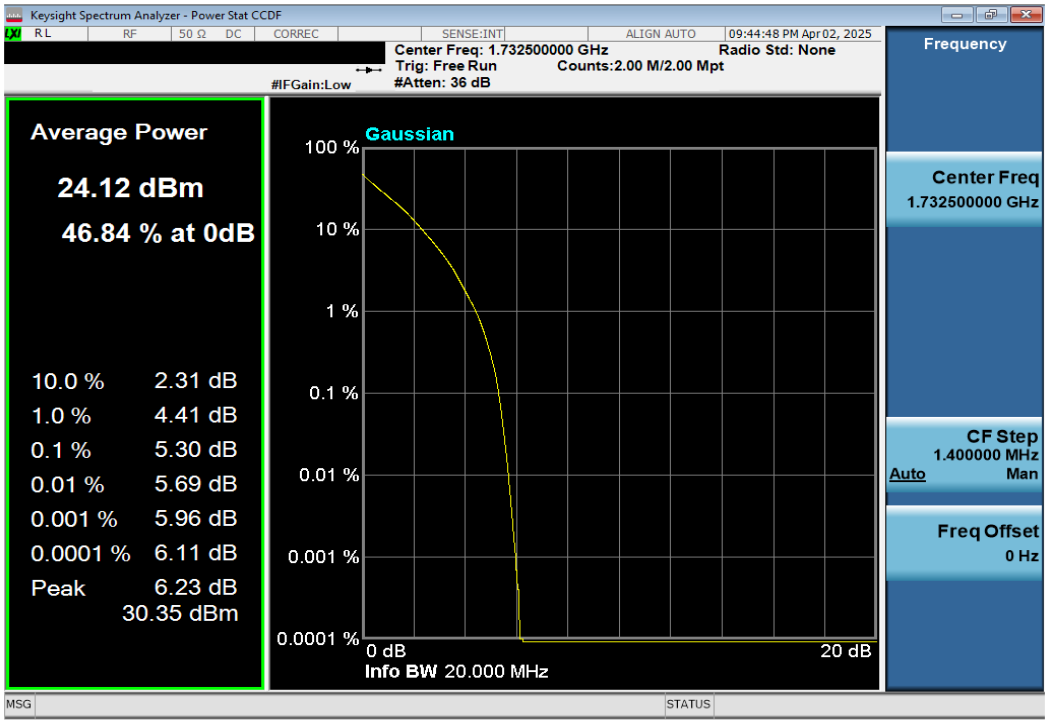

**Plot 7-261. PAR Plot (LTE Band 4 - 10MHz 16-QAM - Full RB)**



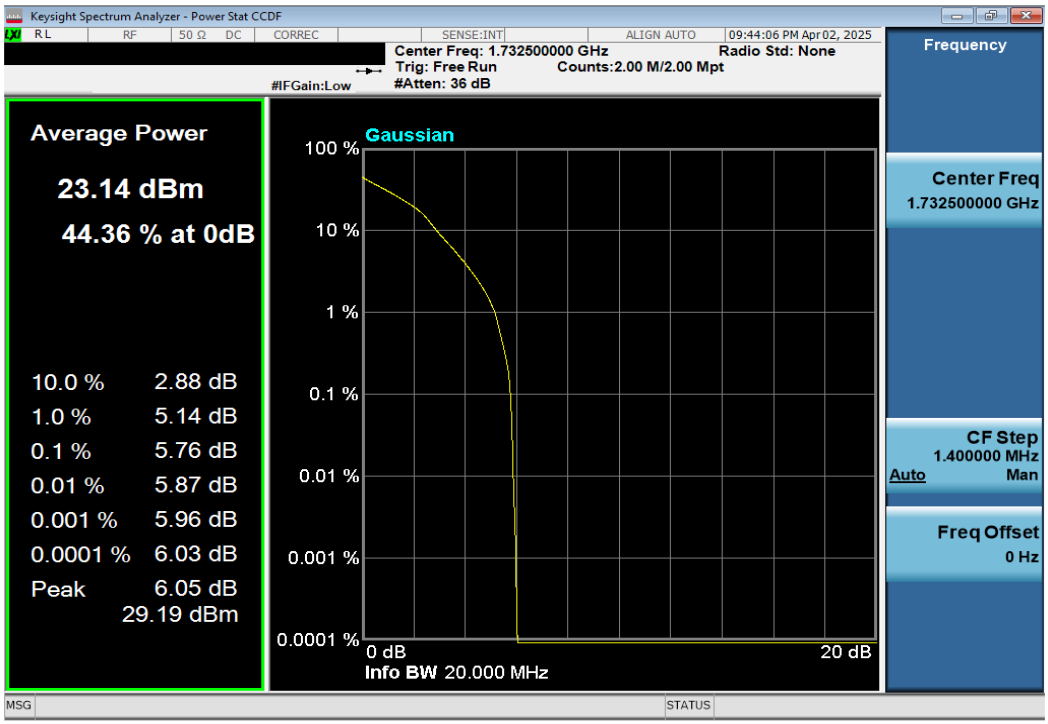

**Plot 7-262. PAR Plot (LTE Band 4 - 15MHz QPSK - Full RB)**




**Plot 7-263. PAR Plot (LTE Band 4 - 15MHz 16-QAM - Full RB)**

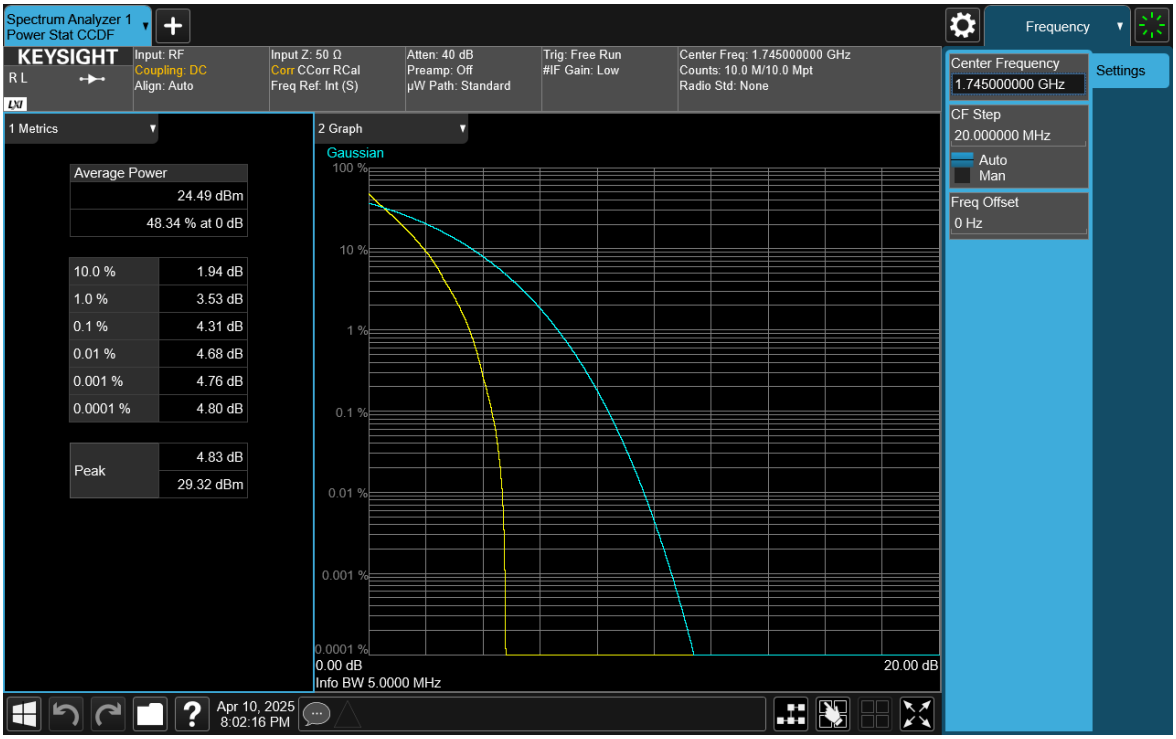



**Plot 7-264. PAR Plot (LTE Band 4 - 20MHz QPSK - Full RB)**

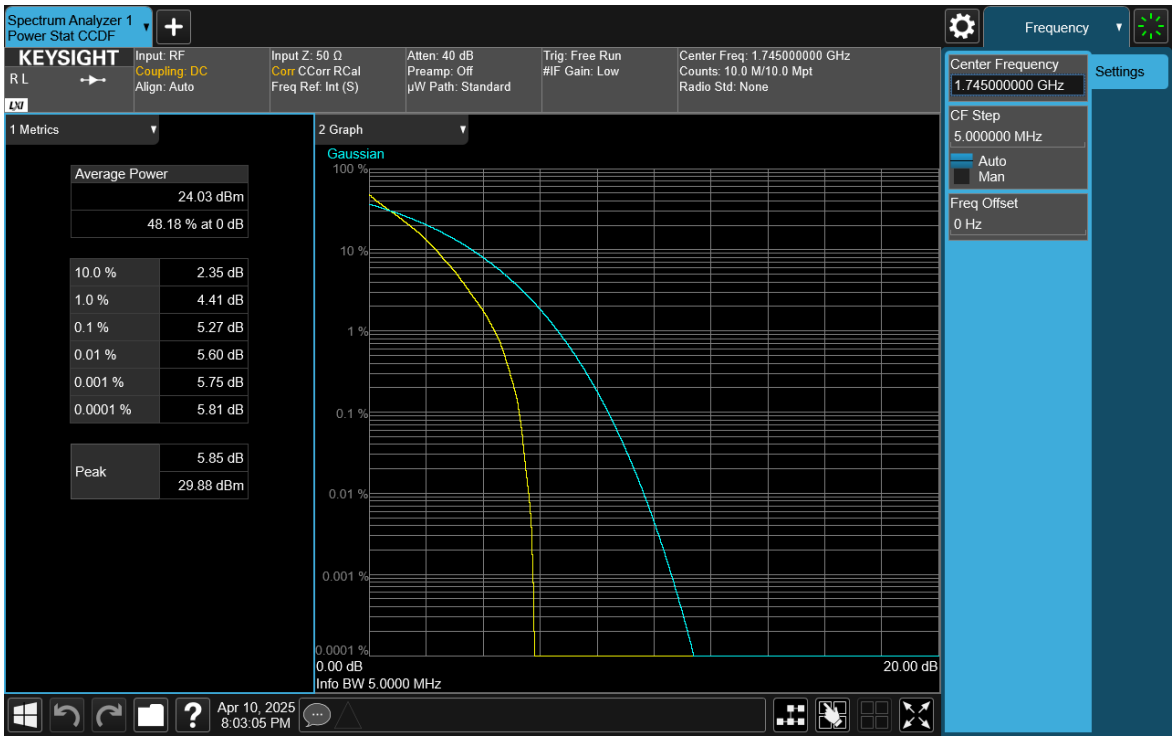



**Plot 7-265. PAR Plot (LTE Band 4 - 20MHz 16-QAM - Full RB)**

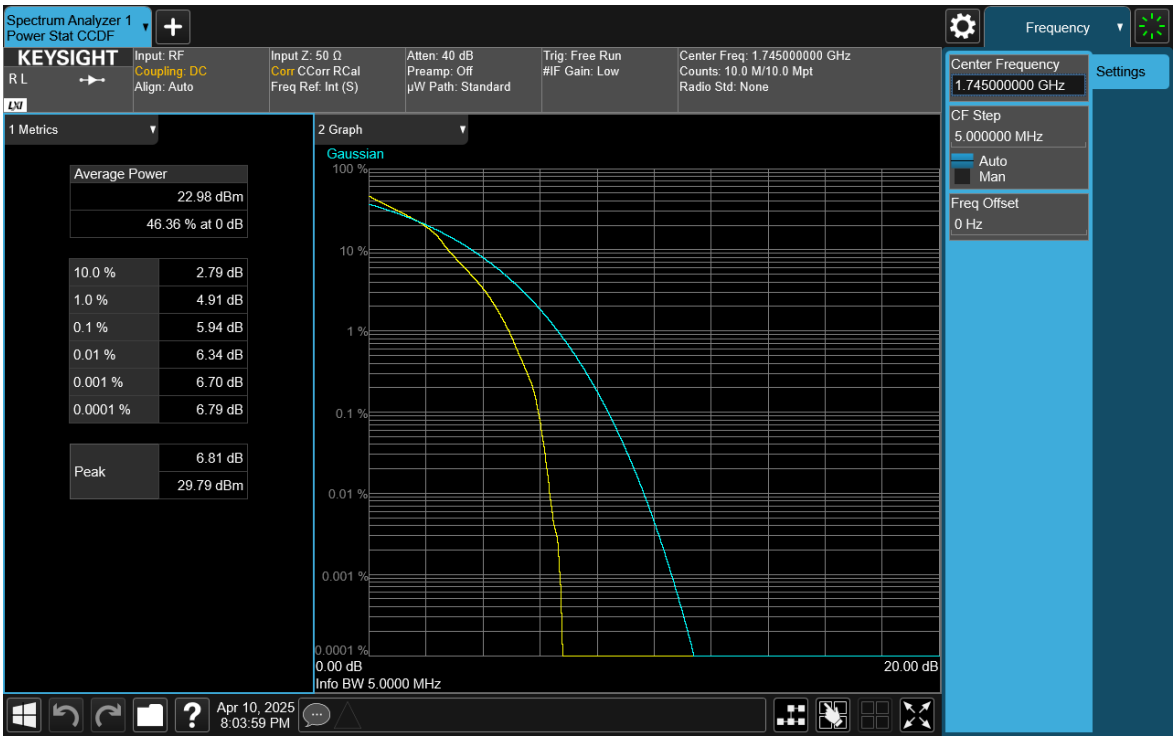
## NR Band n66



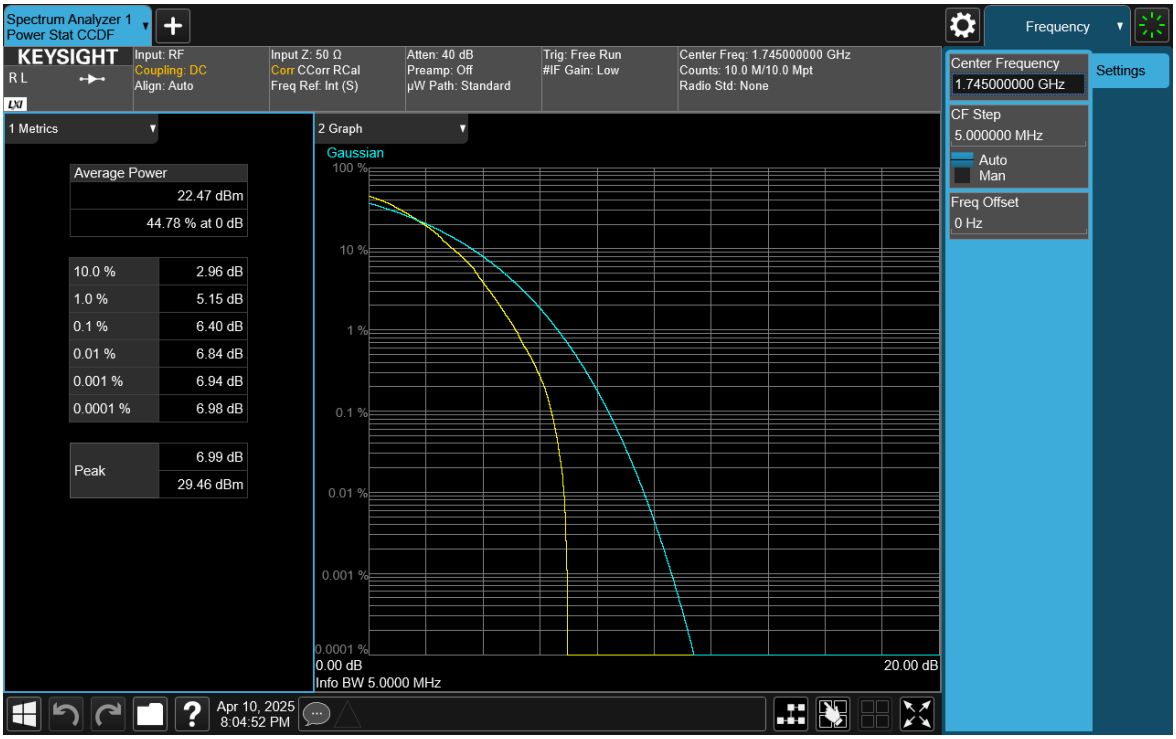

**Plot 7-266. PAR Plot (NR Band n66 - 5MHz DFT-s-OFDM π/2 BPSK - Full RB)**



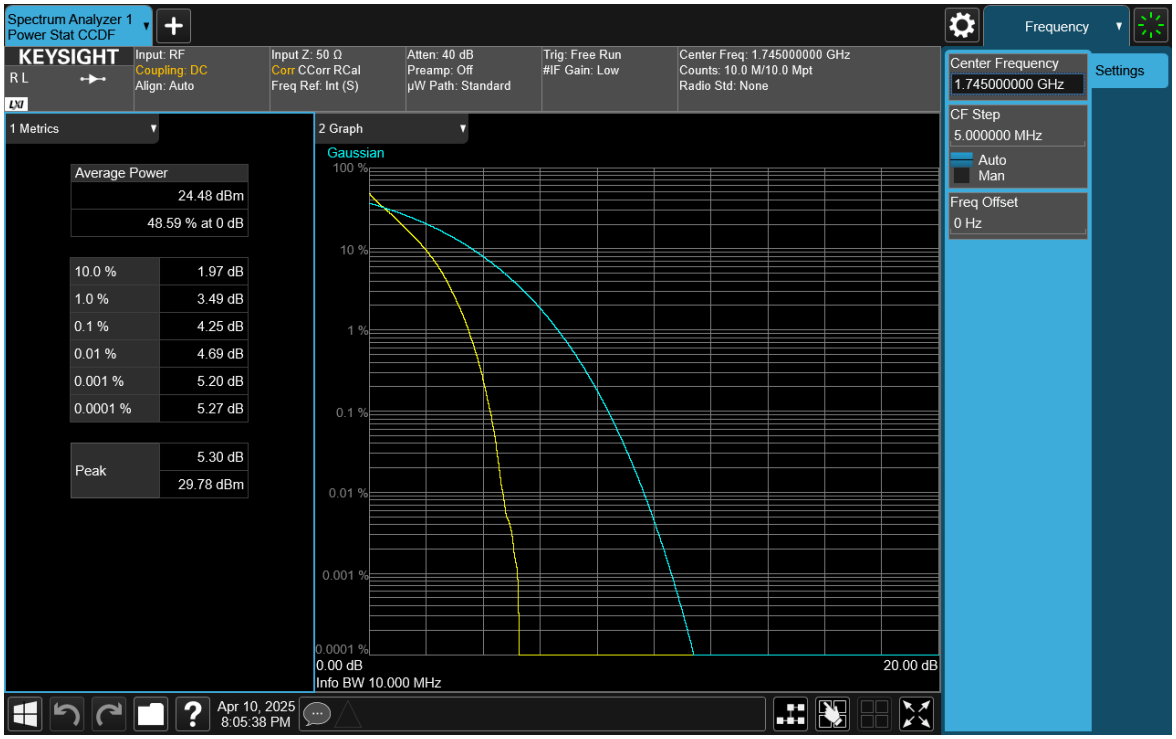

**Plot 7-267. PAR Plot (NR Band n66 - 5MHz DFT-s-OFDM QPSK - Full RB)**



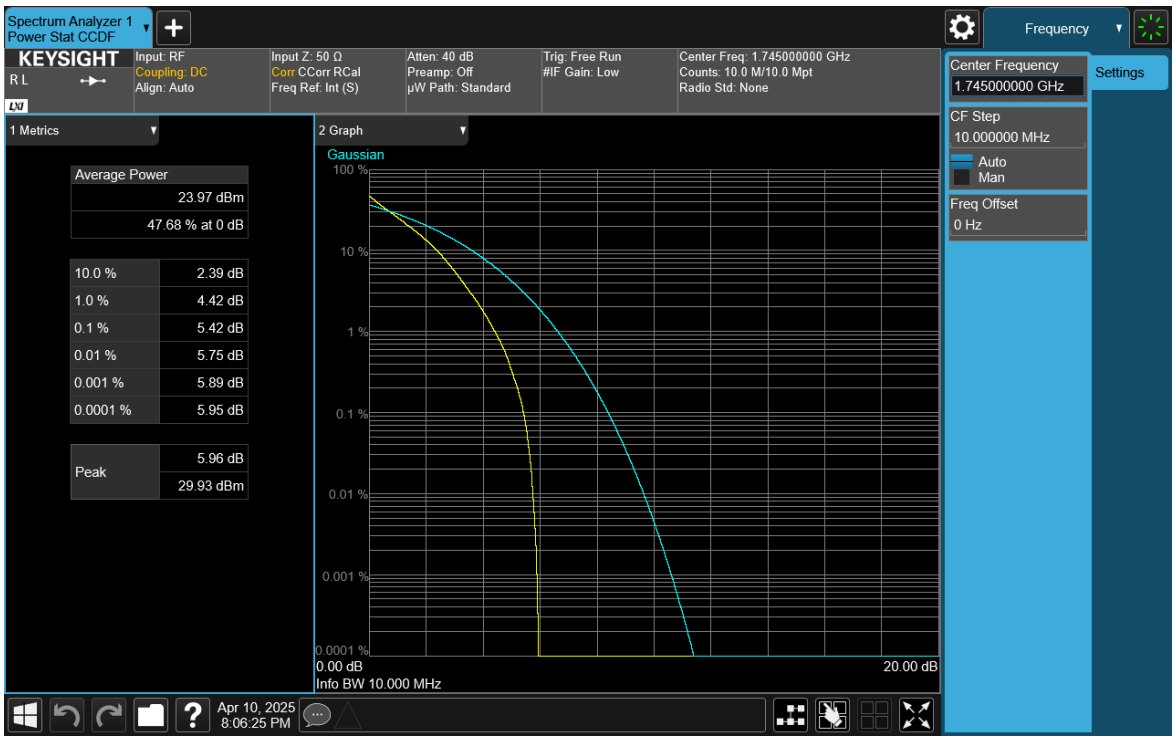

**Plot 7-268. PAR Plot (NR Band n66 - 5MHz DFT-s-OFDM 16-QAM - Full RB)**



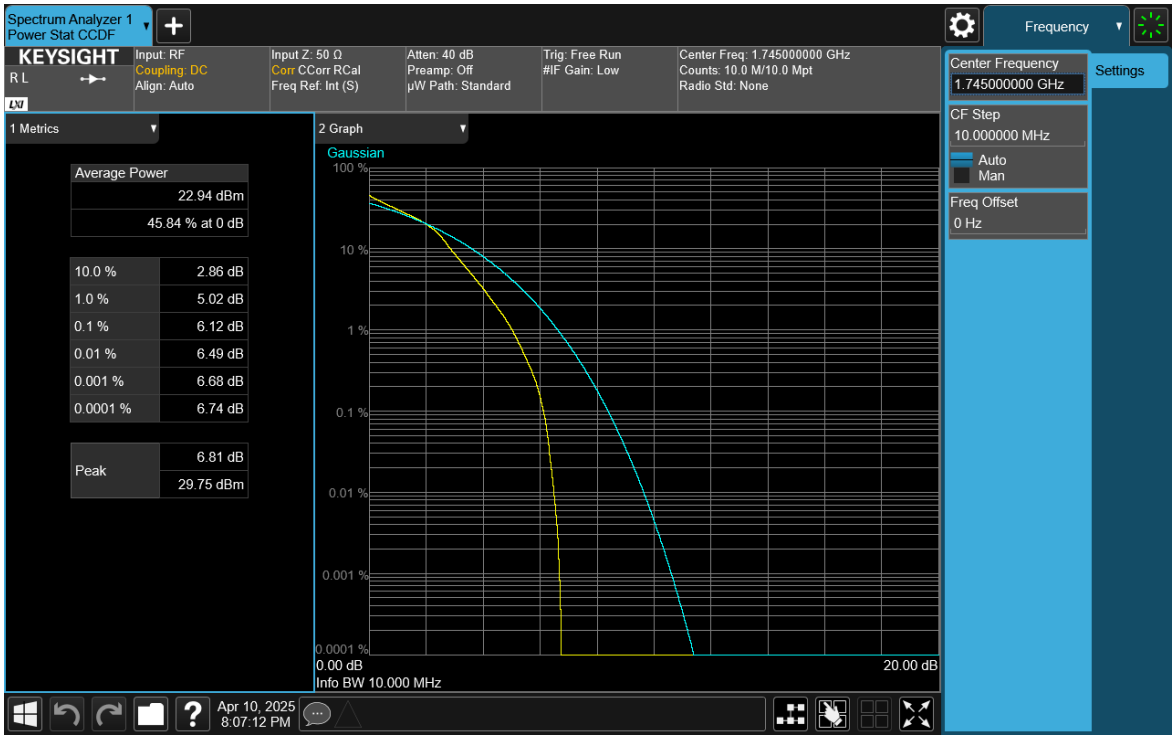

**Plot 7-269. PAR Plot (NR Band n66 - 5MHz DFT-s-OFDM 64-QAM - Full RB)**



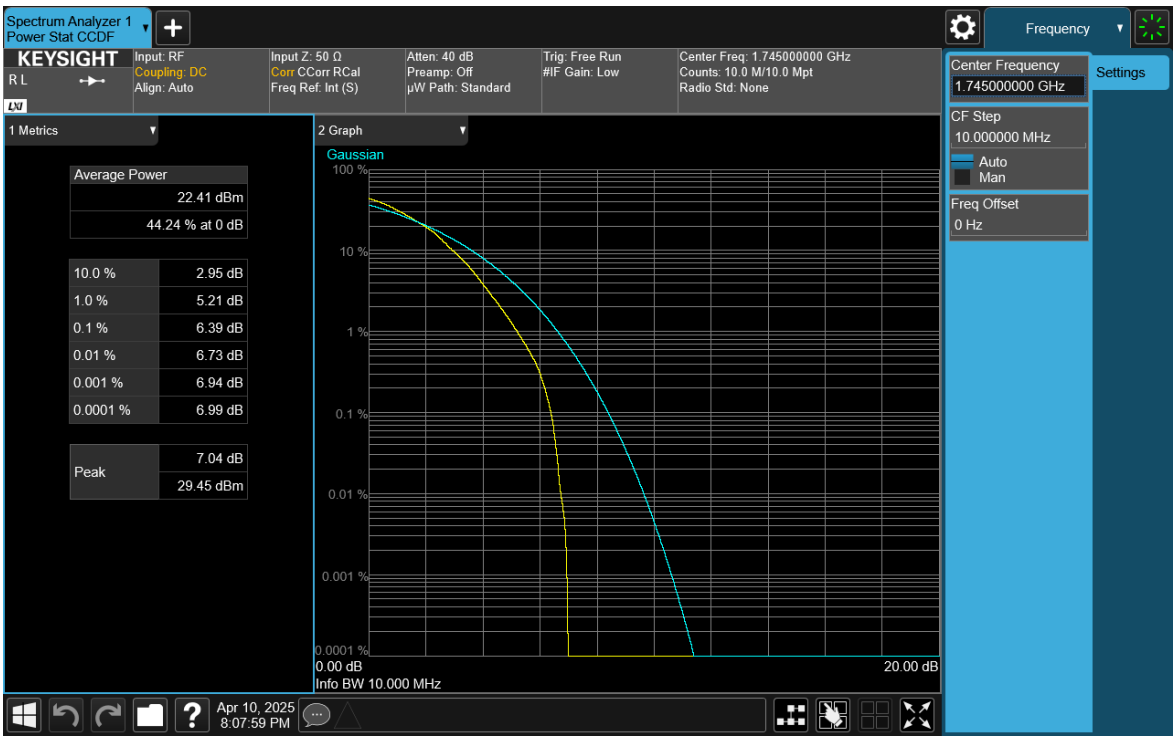

**Plot 7-270. PAR Plot (NR Band n66 - 10MHz DFT-s-OFDM π/2 BPSK - Full RB)**



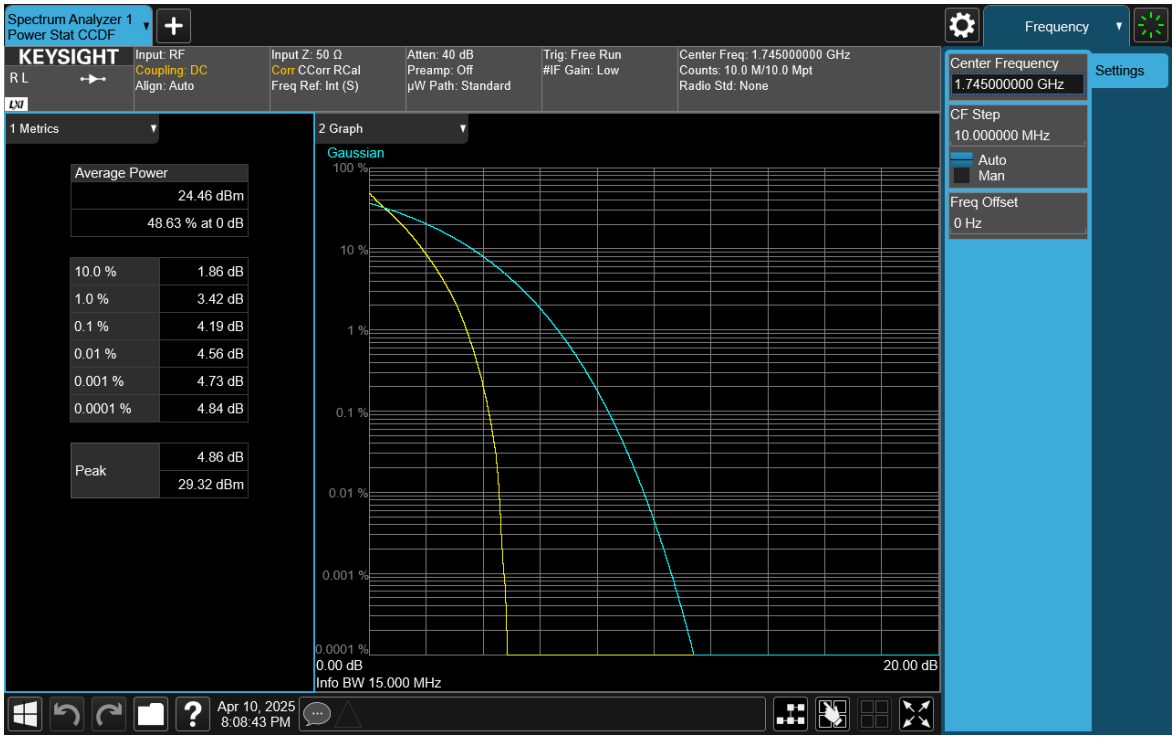

**Plot 7-271. PAR Plot (NR Band n66 - 10MHz DFT-s-OFDM QPSK - Full RB)**



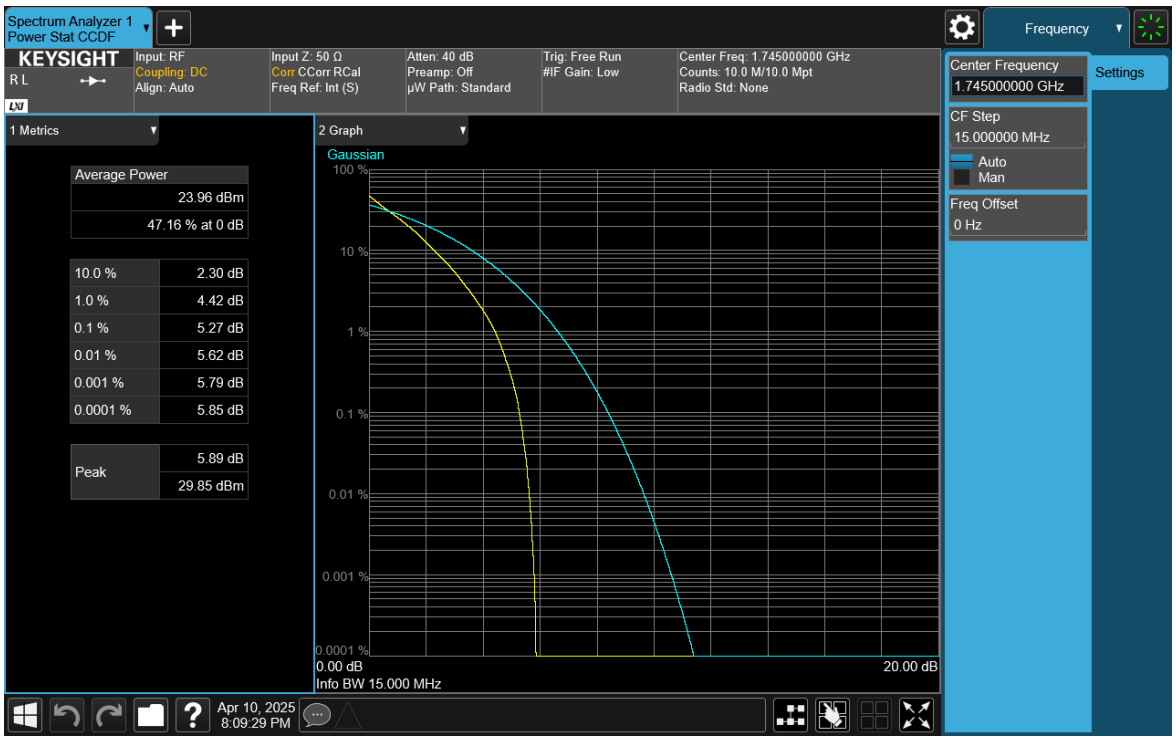

**Plot 7-272. PAR Plot (NR Band n66 - 10MHz DFT-s-OFDM 16-QAM - Full RB)**



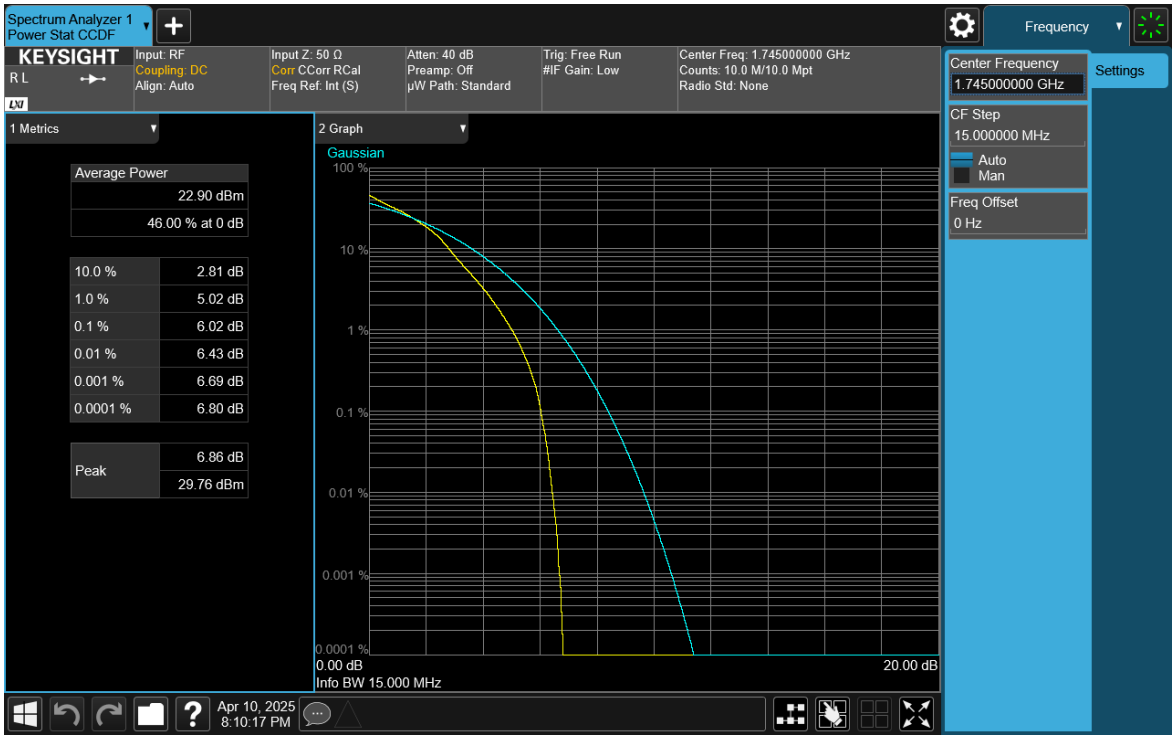

**Plot 7-273. PAR Plot (NR Band n66 - 10MHz DFT-s-OFDM 64-QAM - Full RB)**



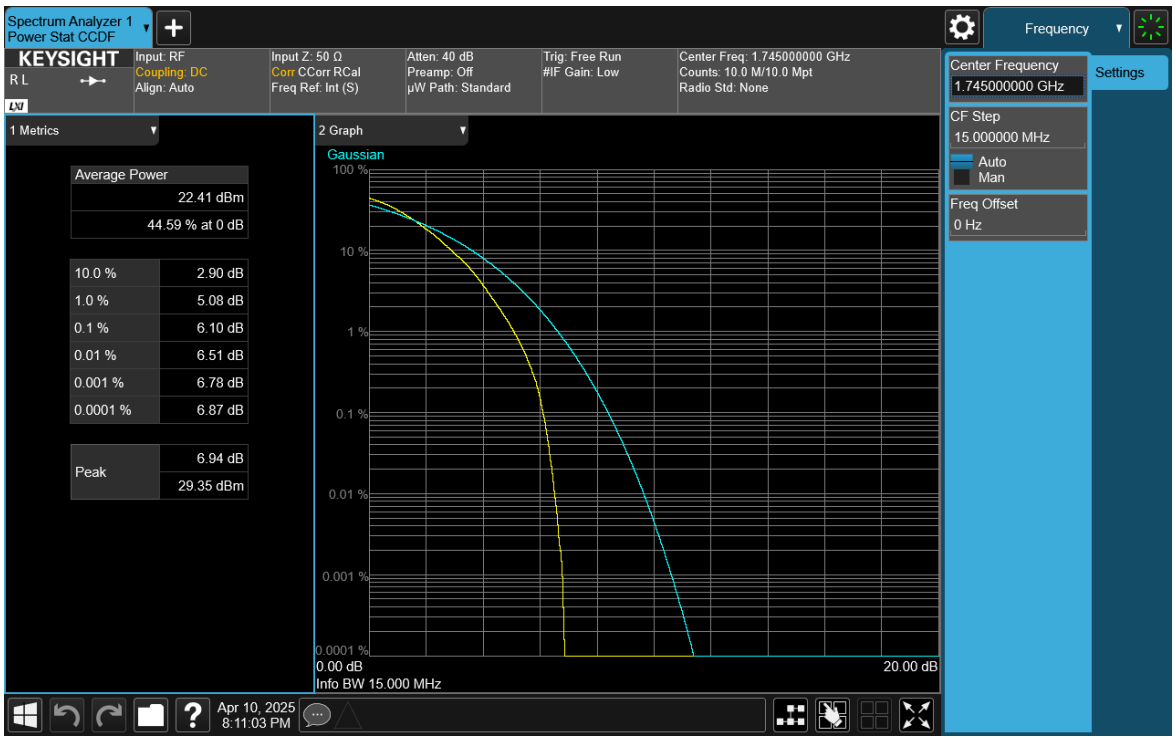

**Plot 7-274. PAR Plot (NR Band n66 - 15MHz DFT-s-OFDM π/2 BPSK - Full RB)**



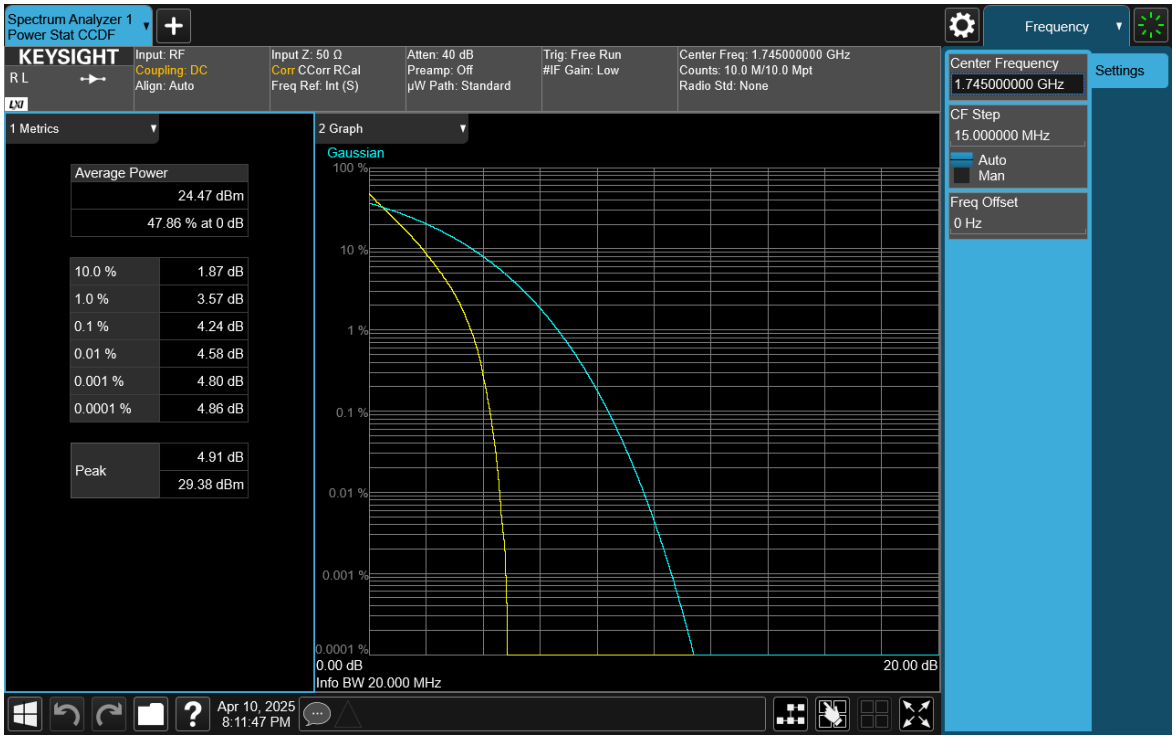

**Plot 7-275. PAR Plot (NR Band n66 - 15MHz DFT-s-OFDM QPSK - Full RB)**



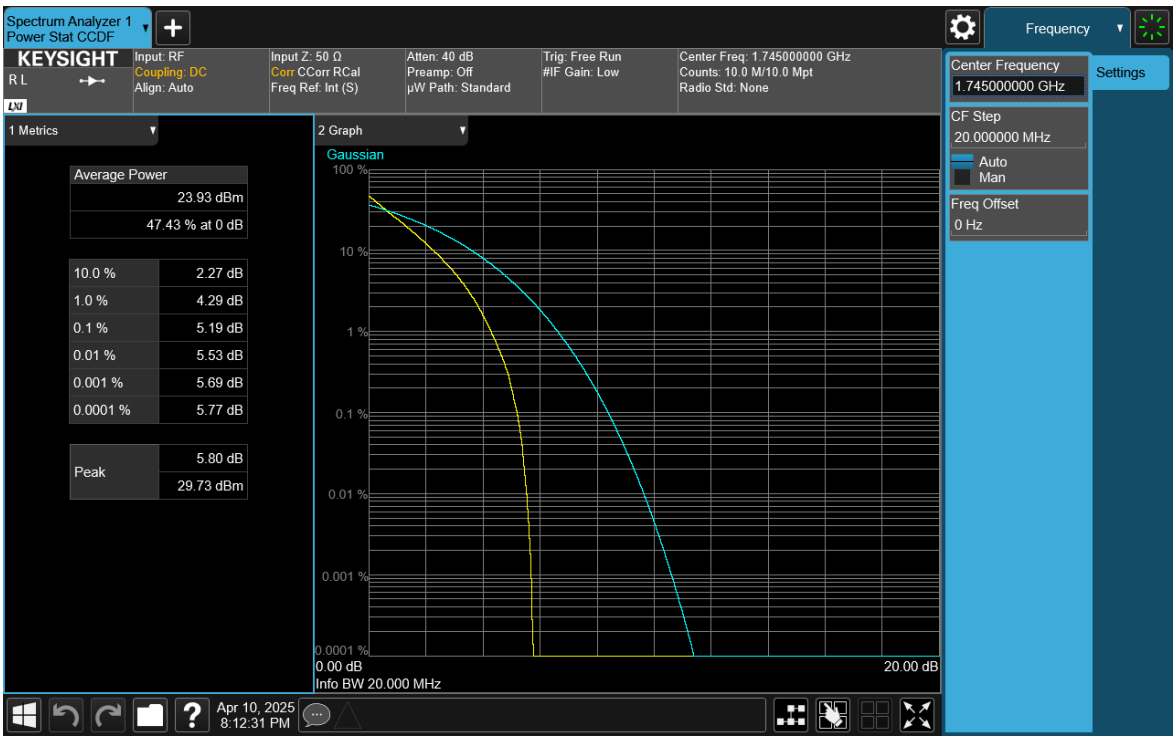

**Plot 7-276. PAR Plot (NR Band n66 - 15MHz DFT-s-OFDM 16-QAM - Full RB)**



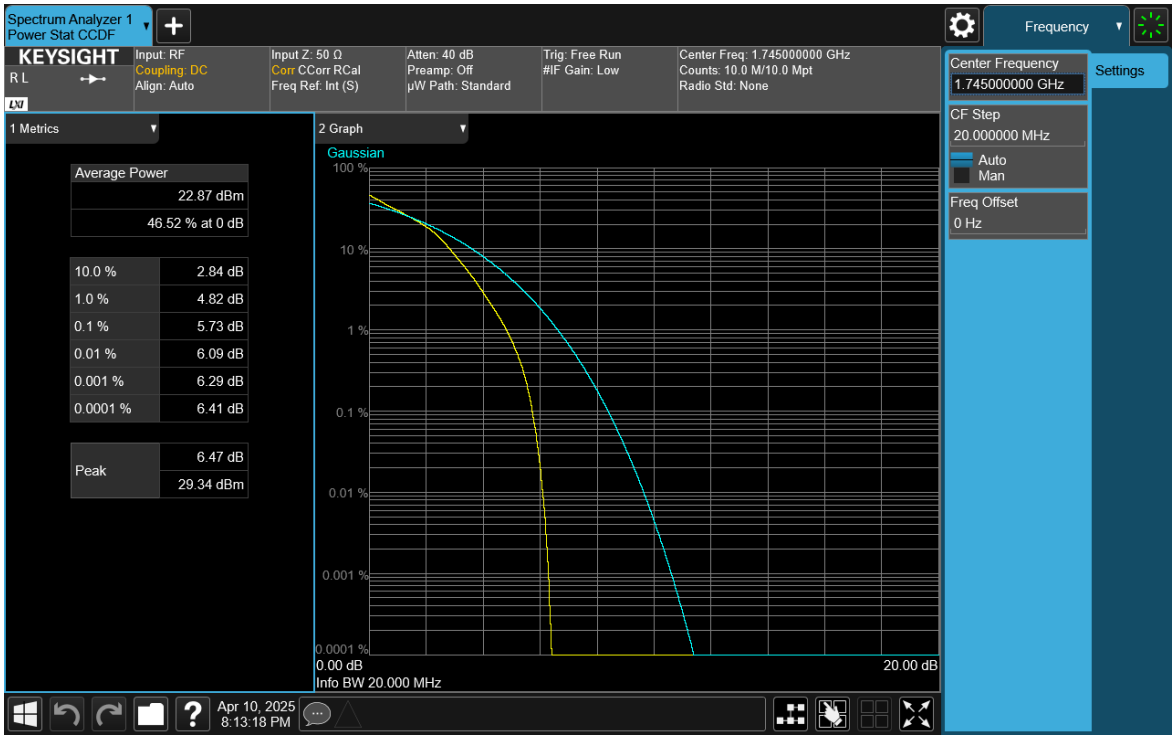

**Plot 7-277. PAR Plot (NR Band n66 - 15MHz DFT-s-OFDM 64-QAM - Full RB)**



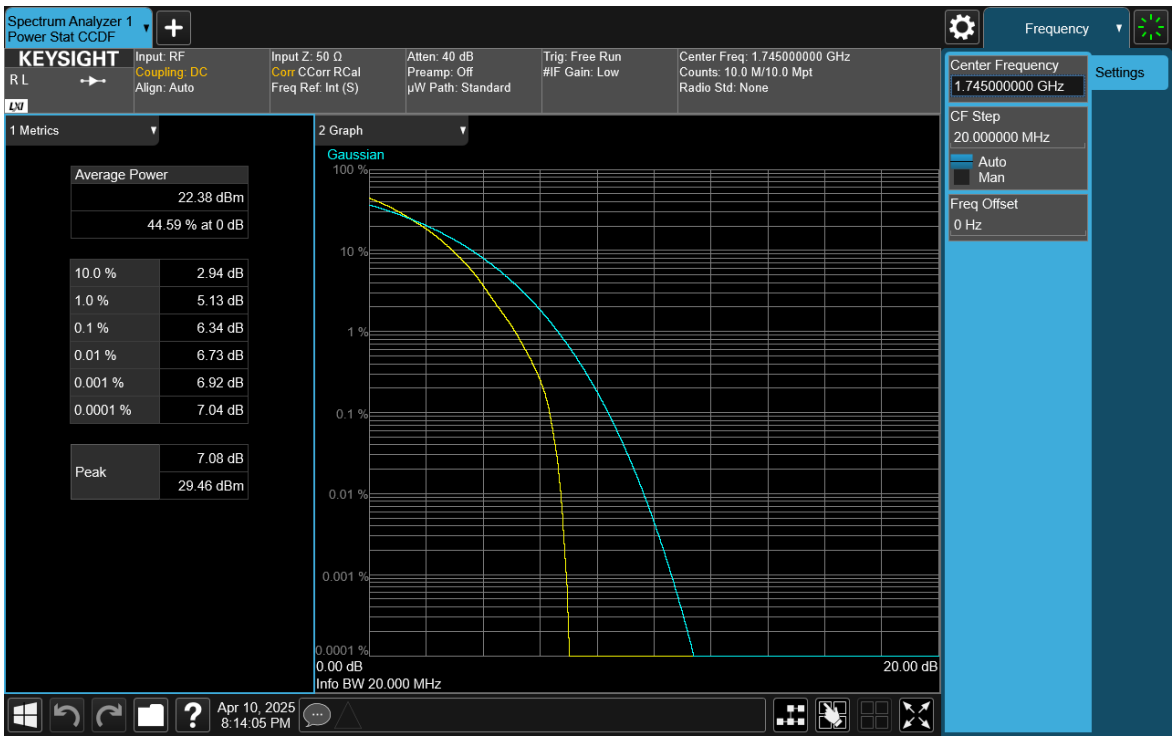

**Plot 7-278. PAR Plot (NR Band n66 - 20MHz DFT-s-OFDM π/2 BPSK - Full RB)**




**Plot 7-279. PAR Plot (NR Band n66 - 20MHz DFT-s-OFDM QPSK - Full RB)**




**Plot 7-280. PAR Plot (NR Band n66 - 20MHz DFT-s-OFDM 16-QAM - Full RB)**




**Plot 7-281. PAR Plot (NR Band n66 - 20MHz DFT-s-OFDM 64-QAM - Full RB)**

## 7.6 Radiated Power (ERP/EIRP)

**§27.50(b)(10), §27.50(c)(10), §27.50(d)(4)**

### Test Overview

Effective Radiated Power (ERP) and Equivalent Isotropic Radiated Power (EIRP) measurements are calculated by adding highest antenna gain to maximum measured conducted output power. 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 C63.26-2015 – Section 5.2.5.5

### Test Settings

The relevant equation for determining the ERP or EIRP from the conducted RF output power measured is:

ERP/EIRP = PMeas – LC + GT

Where:

ERP/EIRP = Effective or Equivalent Isotropic Radiated Power, respectively (expressed in the same units as PMeas, typically dBW or dBm)

PMeas = measured transmitter output power or PSD, in dBW or dBm

LC = signal attenuation in the connecting cable between the transmitter and antenna in dB

GT = gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP)

### Test Setup

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

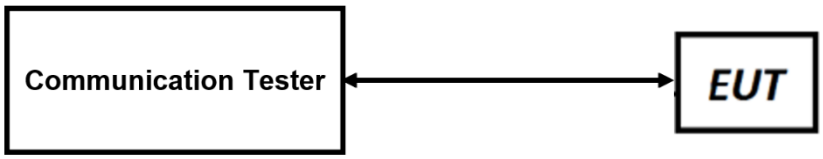



**Figure 7-9. LTE ERP/EIRP Measurement Setup**

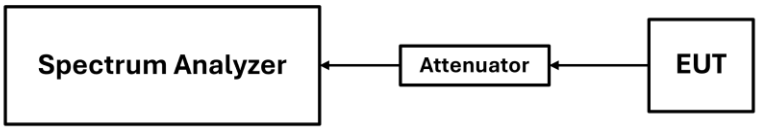



**Figure 7-10. FR1 ERP/EIRP Measurement Setup**

## Test Notes

1. The EUT was tested in all possible test configurations. The worst case emissions are reported with the EUT 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 Level (dBm) readings in the table were taken with a correction table loaded into the base station simulator. The correction table was used to account for the signal attenuation in the connecting cable between the transmitter and antenna.

4. The Ant. Gains (GT) are listed in dBi.

5. For NR operation, all subcarrier spacings (SCS) and transmission schemes (e.g. CP-OFDM and DFT-s-OFDM) 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.

## 7.6.1 Antenna FCM – EIRP/ERP

### LTE Band 66

| Bandwidth | Modulation | Frequency [MHz] | Ant. Gain [dBi] | RB Size/Offset | Conducted Power [dBm] | EIRP [dBm] | EIRP [mW] | EIRP Limit [dBm] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|
| 1.4 MHz | QPSK | 1710.7 | -12.70 | 1 / 5 | 25.13 | 12.43 | 17.498 | 30.00 | -17.57 |
| | | 1745.0 | -12.70 | 1 / 0 | 25.20 | **12.50** | 17.783 | 30.00 | -17.50 |
| | | 1779.3 | -12.70 | 1 / 5 | 25.18 | 12.48 | 17.701 | 30.00 | -17.52 |
| | 16-QAM | 1779.3 | -12.70 | 1 / 3 | 24.21 | 11.51 | 14.158 | 30.00 | -18.49 |
| 3 MHz | QPSK | 1711.5 | -12.70 | 1 / 14 | 25.20 | **12.50** | 17.783 | 30.00 | -17.50 |
| | | 1745.0 | -12.70 | 1 / 0 | 25.04 | 12.34 | 17.140 | 30.00 | -17.66 |
| | | 1778.5 | -12.70 | 1 / 7 | 25.12 | 12.42 | 17.458 | 30.00 | -17.58 |
| | 16-QAM | 1778.5 | -12.70 | 1 / 14 | 24.22 | 11.52 | 14.191 | 30.00 | -18.48 |
| 5 MHz | QPSK | 1712.5 | -12.70 | 1 / 24 | 24.99 | 12.29 | 16.943 | 30.00 | -17.71 |
| | | 1745.0 | -12.70 | 1 / 12 | 25.11 | 12.41 | 17.418 | 30.00 | -17.59 |
| | | 1777.5 | -12.70 | 1 / 0 | 25.20 | **12.50** | 17.783 | 30.00 | -17.50 |
| | 16-QAM | 1777.5 | -12.70 | 1 / 0 | 24.17 | 11.47 | 14.028 | 30.00 | -18.53 |
| 10 MHz | QPSK | 1715.0 | -12.70 | 1 / 49 | 25.13 | 12.43 | 17.498 | 30.00 | -17.57 |
| | | 1745.0 | -12.70 | 1 / 0 | 25.14 | 12.44 | 17.539 | 30.00 | -17.56 |
| | | 1775.0 | -12.70 | 1 / 0 | 25.20 | **12.50** | 17.783 | 30.00 | -17.50 |
| | 16-QAM | 1745.0 | -12.70 | 1 / 0 | 24.13 | 11.43 | 13.900 | 30.00 | -18.57 |
| 15 MHz | QPSK | 1717.5 | -12.70 | 1 / 0 | 24.99 | 12.29 | 16.943 | 30.00 | -17.71 |
| | | 1745.0 | -12.70 | 1 / 37 | 25.13 | **12.43** | 17.498 | 30.00 | -17.57 |
| | | 1772.5 | -12.70 | 1 / 74 | 25.11 | 12.41 | 17.418 | 30.00 | -17.59 |
| | 16-QAM | 1745.0 | -12.70 | 1 / 37 | 24.26 | 11.56 | 14.322 | 30.00 | -18.44 |
| 20 MHz | QPSK | 1720.0 | -12.70 | 1 / 99 | 25.18 | 12.48 | 17.701 | 30.00 | -17.52 |
| | | 1745.0 | -12.70 | 1 / 0 | 25.20 | **12.50** | 17.783 | 30.00 | -17.50 |
| | | 1770.0 | -12.70 | 1 / 99 | 24.86 | 12.16 | 16.444 | 30.00 | -17.84 |
| | 16-QAM | 1745.0 | -12.70 | 1 / 0 | 24.10 | 11.40 | 13.804 | 30.00 | -18.60 |

**Table 7-2. Antenna FCM EIRP Data LTE Band 66**

## LTE Band 4

| Bandwidth | Modulation | Frequency [MHz] | Ant. Gain [dBi] | RB Size/Offset | Conducted Power [dBm] | EIRP [dBm] | EIRP [mW] | EIRP Limit [dBm] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|
| 1.4 MHz | QPSK | 1710.7 | -12.70 | 1 / 3 | 25.12 | 12.42 | 17.458 | 30.00 | -17.58 |
| | | 1732.5 | -12.70 | 1 / 5 | 25.20 | **12.50** | 17.783 | 30.00 | -17.50 |
| | | 1754.3 | -12.70 | 1 / 0 | 25.04 | 12.34 | 17.140 | 30.00 | -17.66 |
| | 16-QAM | 1754.3 | -12.70 | 1 / 3 | 24.22 | 11.52 | 14.191 | 30.00 | -18.48 |
| 3 MHz | QPSK | 1711.5 | -12.70 | 1 / 7 | 25.16 | 12.46 | 17.620 | 30.00 | -17.54 |
| | | 1732.5 | -12.70 | 1 / 0 | 25.20 | **12.50** | 17.783 | 30.00 | -17.50 |
| | | 1753.5 | -12.70 | 1 / 14 | 25.16 | 12.46 | 17.620 | 30.00 | -17.54 |
| | 16-QAM | 1753.5 | -12.70 | 1 / 14 | 24.15 | 11.45 | 13.964 | 30.00 | -18.55 |
| 5 MHz | QPSK | 1712.5 | -12.70 | 1 / 12 | 25.20 | **12.50** | 17.783 | 30.00 | -17.50 |
| | | 1732.5 | -12.70 | 1 / 0 | 25.15 | 12.45 | 17.579 | 30.00 | -17.55 |
| | | 1752.5 | -12.70 | 1 / 24 | 25.09 | 12.39 | 17.338 | 30.00 | -17.61 |
| | 16-QAM | 1712.5 | -12.70 | 1 / 12 | 24.22 | 11.52 | 14.191 | 30.00 | -18.48 |
| 10 MHz | QPSK | 1715.0 | -12.70 | 1 / 0 | 25.16 | 12.46 | 17.620 | 30.00 | -17.54 |
| | | 1732.5 | -12.70 | 1 / 25 | 25.20 | **12.50** | 17.783 | 30.00 | -17.50 |
| | | 1750.0 | -12.70 | 1 / 49 | 25.09 | 12.39 | 17.338 | 30.00 | -17.61 |
| | 16-QAM | 1715.0 | -12.70 | 1 / 0 | 24.20 | 11.50 | 14.125 | 30.00 | -18.50 |
| 15 MHz | QPSK | 1717.5 | -12.70 | 1 / 0 | 25.20 | **12.50** | 17.783 | 30.00 | -17.50 |
| | | 1732.5 | -12.70 | 1 / 0 | 25.15 | 12.45 | 17.579 | 30.00 | -17.55 |
| | | 1747.5 | -12.70 | 1 / 74 | 25.11 | 12.41 | 17.418 | 30.00 | -17.59 |
| | 16-QAM | 1732.5 | -12.70 | 1 / 0 | 24.11 | 11.41 | 13.836 | 30.00 | -18.59 |
| 20 MHz | QPSK | 1720.0 | -12.70 | 1 / 0 | 25.15 | **12.45** | 17.579 | 30.00 | -17.55 |
| | | 1732.5 | -12.70 | 1 / 99 | 24.90 | 12.20 | 16.596 | 30.00 | -17.80 |
| | | 1745.0 | -12.70 | 1 / 50 | 25.14 | 12.44 | 17.539 | 30.00 | -17.56 |
| | 16-QAM | 1732.5 | -12.70 | 1 / 50 | 24.19 | 11.49 | 14.093 | 30.00 | -18.51 |

**Table 7-3. Antenna FCM EIRP Data LTE Band 4**

## LTE Band 71

| Bandwidth | Modulation | Frequency [MHz] | Ant. Gain [dBi] | RB Size/Offset | Conducted Power [dBm] | ERP [dBm] | ERP [mW] | ERP Limit [dBm] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|
| 5 MHz | QPSK | 665.5 | -29.70 | 1 / 24 | 25.35 | **-6.50** | 0.224 | 34.77 | -41.27 |
| | | 680.5 | -29.70 | 1 / 24 | 25.60 | -6.25 | 0.237 | 34.77 | -41.02 |
| | | 695.5 | -29.70 | 1 / 12 | 25.49 | -6.36 | 0.231 | 34.77 | -41.13 |
| | 16-QAM | 665.5 | -29.70 | 1 / 0 | 24.70 | -7.15 | 0.193 | 34.77 | -41.92 |
| 10 MHz | QPSK | 668.0 | -29.70 | 1 / 49 | 25.59 | -6.26 | 0.237 | 34.77 | -41.03 |
| | | 680.5 | -29.70 | 1 / 49 | 25.55 | -6.30 | 0.234 | 34.77 | -41.07 |
| | | 693.0 | -29.70 | 1 / 0 | 25.49 | -6.36 | 0.231 | 34.77 | -41.13 |
| | 16-QAM | 680.5 | -29.70 | 1 / 25 | 24.69 | -7.16 | 0.192 | 34.77 | -41.93 |
| 15 MHz | QPSK | 670.5 | -29.70 | 1 / 74 | 25.69 | **-6.16** | 0.242 | 34.77 | -40.93 |
| | | 680.5 | -29.70 | 1 / 74 | 25.66 | -6.19 | 0.240 | 34.77 | -40.96 |
| | | 690.5 | -29.70 | 1 / 0 | 25.60 | -6.25 | 0.237 | 34.77 | -41.02 |
| | 16-QAM | 680.5 | -29.70 | 1 / 74 | 24.63 | -7.22 | 0.190 | 34.77 | -41.99 |
| 20 MHz | QPSK | 673.0 | -29.70 | 1 / 99 | 25.68 | -6.17 | 0.242 | 34.77 | -40.94 |
| | | 680.5 | -29.70 | 1 / 50 | 25.56 | -6.29 | 0.235 | 34.77 | -41.06 |
| | | 688.0 | -29.70 | 1 / 0 | 25.70 | **-6.15** | 0.243 | 34.77 | -40.92 |
| | 16-QAM | 688.0 | -29.70 | 1 / 0 | 24.60 | -7.25 | 0.188 | 34.77 | -42.02 |

**Table 7-4. Antenna BCM ERP Data LTE Band 71**

## LTE Band 12

| Bandwidth | Modulation | Frequency [MHz] | Ant. Gain [dBi] | RB Size/Offset | Conducted Power [dBm] | ERP [dBm] | ERP [mW] | ERP Limit [dBm] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|
| 1.4 MHz | QPSK | 699.7 | -29.50 | 1 / 0 | 25.56 | **-6.09** | 0.246 | 34.77 | -40.86 |
| | | 707.5 | -29.50 | 1 / 0 | 25.70 | **-5.95** | 0.254 | 34.77 | -40.72 |
| | | 715.3 | -29.50 | 1 / 5 | 25.61 | -6.04 | 0.249 | 34.77 | -40.81 |
| | 16-QAM | 707.5 | -29.50 | 1 / 5 | 24.69 | -6.96 | 0.201 | 34.77 | -41.73 |
| 3 MHz | QPSK | 700.5 | -29.50 | 1 / 14 | 25.70 | **-5.95** | 0.254 | 34.77 | -40.72 |
| | | 707.5 | -29.50 | 1 / 0 | 25.38 | -6.27 | 0.236 | 34.77 | -41.04 |
| | | 714.5 | -29.50 | 1 / 14 | 25.70 | **-5.95** | 0.254 | 34.77 | -40.72 |
| | 16-QAM | 714.5 | -29.50 | 1 / 0 | 24.53 | -7.12 | 0.194 | 34.77 | -41.89 |
| 5 MHz | QPSK | 701.5 | -29.50 | 1 / 24 | 25.50 | -6.15 | 0.243 | 34.77 | -40.92 |
| | | 707.5 | -29.50 | 1 / 12 | 25.68 | -5.97 | 0.253 | 34.77 | -40.74 |
| | | 713.5 | -29.50 | 1 / 12 | 25.70 | **-5.95** | 0.254 | 34.77 | -40.72 |
| | 16-QAM | 713.5 | -29.50 | 1 / 24 | 24.72 | -6.93 | 0.203 | 34.77 | -41.70 |
| 10 MHz | QPSK | 704.0 | -29.50 | 1 / 49 | 25.63 | -6.02 | 0.250 | 34.77 | -40.79 |
| | | 707.5 | -29.50 | 1 / 49 | 25.70 | **-5.95** | 0.254 | 34.77 | -40.72 |
| | | 711.0 | -29.50 | 1 / 25 | 25.51 | -6.14 | 0.243 | 34.77 | -40.91 |
| | 16-QAM | 707.5 | -29.50 | 1 / 0 | 24.71 | -6.94 | 0.202 | 34.77 | -41.71 |

**Table 7-5. Antenna BCM ERP Data LTE Band 12**

## LTE Band 17

| Bandwidth | Modulation | Frequency [MHz] | Ant. Gain [dBi] | RB Size/Offset | Conducted Power [dBm] | ERP [dBm] | ERP [mW] | ERP Limit [dBm] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|
| 5 MHz | QPSK | 706.5 | -29.50 | 1 / 24 | 25.42 | **-6.23** | 0.238 | 34.77 | -41.00 |
| | | 710.0 | -29.50 | 1 / 24 | 25.48 | **-6.17** | 0.242 | 34.77 | -40.94 |
| | | 713.5 | -29.50 | 1 / 0 | 25.43 | -6.22 | 0.239 | 34.77 | -40.99 |
| | 16-QAM | 706.5 | -29.50 | 1 / 0 | 24.70 | -6.95 | 0.202 | 34.77 | -41.72 |
| 10 MHz | QPSK | 709.0 | -29.50 | 1 / 0 | 25.38 | -6.27 | 0.236 | 34.77 | -41.04 |
| | | 710.0 | -29.50 | 1 / 49 | 25.64 | -6.01 | 0.251 | 34.77 | -40.78 |
| | | 711.0 | -29.50 | 1 / 49 | 25.70 | **-5.95** | 0.254 | 34.77 | -40.72 |
| | 16-QAM | 710.0 | -29.50 | 1 / 49 | 24.64 | -7.01 | 0.199 | 34.77 | -41.78 |

**Table 7-6. Antenna BCM ERP Data LTE Band 17**

## LTE Band 13

| Bandwidth | Modulation | Frequency [MHz] | Ant. Gain [dBi] | RB Size/Offset | Conducted Power [dBm] | ERP [dBm] | ERP [mW] | ERP Limit [dBm] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|
| 5 MHz | QPSK | 779.5 | -27.80 | 1 / 0 | 25.52 | **-4.43** | 0.361 | 34.77 | -39.20 |
| | | 782.0 | -27.80 | 1 / 12 | 25.41 | -4.54 | 0.352 | 34.77 | -39.31 |
| | | 784.5 | -27.80 | 1 / 0 | 25.70 | **-4.25** | 0.376 | 34.77 | -39.02 |
| | 16-QAM | 782.0 | -27.80 | 1 / 24 | 24.59 | -5.36 | 0.291 | 34.77 | -40.13 |
| 10 MHz | QPSK | 782.0 | -27.80 | 1 / 49 | 25.58 | **-4.37** | 0.366 | 34.77 | -39.14 |
| | 16-QAM | 782.0 | -27.80 | 1 / 49 | 24.73 | -5.22 | 0.301 | 34.77 | -39.99 |

**Table 7-7. Antenna BCM ERP Data LTE Band 13**

## NR Band n66

| Bandwidth | Modulation | Frequency [MHz] | Ant. Gain [dBi] | RB Size/Offset | Conducted Power [dBm] | EIRP [dBm] | EIRP [mW] | EIRP Limit [dBm] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|
| 5 MHz | π/2 BPSK | 1712.5 | -12.70 | 1 / 12 | 25.10 | 12.40 | 17.378 | 30.00 | -17.60 |
| | | 1745.0 | -12.70 | 1 / 12 | 25.06 | 12.36 | 17.219 | 30.00 | -17.64 |
| | | 1777.5 | -12.70 | 1 / 24 | 25.01 | 12.31 | 17.022 | 30.00 | -17.69 |
| | QPSK | 1712.5 | -12.70 | 1 / 24 | 25.06 | 12.36 | 17.219 | 30.00 | -17.64 |
| | | 1745.0 | -12.70 | 1 / 12 | 25.20 | **12.50** | 17.783 | 30.00 | -17.50 |
| | | 1777.5 | -12.70 | 1 / 24 | 25.12 | 12.42 | 17.458 | 30.00 | -17.58 |
| | 16-QAM | 1712.5 | -12.70 | 1 / 12 | 24.11 | 11.41 | 13.836 | 30.00 | -18.59 |
| | 64-QAM | 1712.5 | -12.70 | 1 / 0 | 23.21 | 10.51 | 11.246 | 30.00 | -19.49 |
| 10 MHz | π/2 BPSK | 1715.0 | -12.70 | 1 / 25 | 25.07 | 12.37 | 17.258 | 30.00 | -17.63 |
| | | 1745.0 | -12.70 | 1 / 25 | 25.17 | 12.47 | 17.660 | 30.00 | -17.53 |
| | | 1775.0 | -12.70 | 1 / 49 | 25.18 | 12.48 | 17.701 | 30.00 | -17.52 |
| | QPSK | 1715.0 | -12.70 | 1 / 49 | 25.04 | 12.34 | 17.140 | 30.00 | -17.66 |
| | | 1745.0 | -12.70 | 1 / 25 | 25.20 | **12.50** | 17.783 | 30.00 | -17.50 |
| | | 1775.0 | -12.70 | 1 / 25 | 25.14 | 12.44 | 17.539 | 30.00 | -17.56 |
| | 16-QAM | 1775.0 | -12.70 | 1 / 49 | 24.19 | 11.49 | 14.093 | 30.00 | -18.51 |
| | 64-QAM | 1775.0 | -12.70 | 1 / 0 | 23.16 | 10.46 | 11.117 | 30.00 | -19.54 |
| 15 MHz | π/2 BPSK | 1717.5 | -12.70 | 1 / 0 | 25.18 | 12.48 | 17.701 | 30.00 | -17.52 |
| | | 1745.0 | -12.70 | 1 / 0 | 25.10 | 12.40 | 17.378 | 30.00 | -17.60 |
| | | 1772.5 | -12.70 | 1 / 37 | 25.00 | 12.30 | 16.982 | 30.00 | -17.70 |
| | QPSK | 1717.5 | -12.70 | 1 / 74 | 25.20 | **12.50** | 17.783 | 30.00 | -17.50 |
| | | 1745.0 | -12.70 | 1 / 74 | 25.17 | 12.47 | 17.660 | 30.00 | -17.53 |
| | | 1772.5 | -12.70 | 1 / 37 | 24.98 | 12.28 | 16.904 | 30.00 | -17.72 |
| | 16-QAM | 1745.0 | -12.70 | 1 / 0 | 24.23 | 11.53 | 14.223 | 30.00 | -18.47 |
| | 64-QAM | 1772.5 | -12.70 | 1 / 0 | 23.21 | 10.51 | 11.246 | 30.00 | -19.49 |
| 20 MHz | π/2 BPSK | 1720.0 | -12.70 | 1 / 99 | 25.20 | **12.50** | 17.783 | 30.00 | -17.50 |
| | | 1745.0 | -12.70 | 1 / 0 | 24.97 | 12.27 | 16.866 | 30.00 | -17.73 |
| | | 1770.0 | -12.70 | 1 / 99 | 25.17 | 12.47 | 17.660 | 30.00 | -17.53 |
| | QPSK | 1720.0 | -12.70 | 1 / 0 | 24.99 | 12.29 | 16.943 | 30.00 | -17.71 |
| | | 1745.0 | -12.70 | 1 / 99 | 25.14 | 12.44 | 17.539 | 30.00 | -17.56 |
| | | 1770.0 | -12.70 | 1 / 99 | 24.80 | 12.10 | 16.218 | 30.00 | -17.90 |
| | 16-QAM | 1720.0 | -12.70 | 1 / 50 | 24.16 | 11.46 | 13.996 | 30.00 | -18.54 |
| | 64-QAM | 1720.0 | -12.70 | 1 / 0 | 23.17 | 10.47 | 11.143 | 30.00 | -19.53 |

**Table 7-8. Antenna FCM EIRP Data NR Band n66**

## NR Band n71

| Bandwidth | Modulation | Frequency [MHz] | Ant. Gain [dBi] | RB Size/Offset | Conducted Power [dBm] | ERP [dBm] | ERP [mW] | ERP Limit [dBm] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|
| 5 MHz | π/2 BPSK | 665.5 | -29.70 | 1 / 24 | 25.59 | **-6.26** | 0.237 | 34.77 | -41.03 |
| | | 680.5 | -29.70 | 1 / 0 | 25.55 | -6.30 | 0.234 | 34.77 | -41.07 |
| | | 695.5 | -29.70 | 1 / 12 | 25.70 | **-6.15** | 0.243 | 34.77 | -40.92 |
| | QPSK | 665.5 | -29.70 | 1 / 24 | 25.65 | -6.20 | 0.240 | 34.77 | -40.97 |
| | | 680.5 | -29.70 | 1 / 12 | 25.69 | -6.16 | 0.242 | 34.77 | -40.93 |
| | | 695.5 | -29.70 | 1 / 0 | 25.47 | -6.38 | 0.230 | 34.77 | -41.15 |
| | 16-QAM | 680.5 | -29.70 | 1 / 0 | 24.65 | -7.20 | 0.191 | 34.77 | -41.97 |
| | 64-QAM | 665.5 | -29.70 | 1 / 24 | 23.73 | -8.12 | 0.154 | 34.77 | -42.89 |
| 10 MHz | π/2 BPSK | 668.0 | -29.70 | 1 / 25 | 25.66 | -6.19 | 0.240 | 34.77 | -40.96 |
| | | 680.5 | -29.70 | 1 / 25 | 25.63 | -6.22 | 0.239 | 34.77 | -40.99 |
| | | 693.0 | -29.70 | 1 / 25 | 25.61 | -6.24 | 0.238 | 34.77 | -41.01 |
| | QPSK | 668.0 | -29.70 | 1 / 25 | 25.62 | -6.23 | 0.238 | 34.77 | -41.00 |
| | | 680.5 | -29.70 | 1 / 49 | 25.70 | **-6.15** | 0.243 | 34.77 | -40.92 |
| | | 693.0 | -29.70 | 1 / 49 | 25.70 | **-6.15** | 0.243 | 34.77 | -40.92 |
| | 16-QAM | 680.5 | -29.70 | 1 / 49 | 24.67 | -7.18 | 0.191 | 34.77 | -41.95 |
| | 64-QAM | 668.0 | -29.70 | 1 / 49 | 23.70 | -8.15 | 0.153 | 34.77 | -42.92 |
| 15 MHz | π/2 BPSK | 670.5 | -29.70 | 1 / 0 | 25.70 | **-6.15** | 0.243 | 34.77 | -40.92 |
| | | 680.5 | -29.70 | 1 / 37 | 25.58 | -6.27 | 0.236 | 34.77 | -41.04 |
| | | 690.5 | -29.70 | 1 / 74 | 25.70 | **-6.15** | 0.243 | 34.77 | -40.92 |
| | QPSK | 670.5 | -29.70 | 1 / 74 | 25.59 | -6.26 | 0.237 | 34.77 | -41.03 |
| | | 680.5 | -29.70 | 1 / 74 | 25.45 | -6.40 | 0.229 | 34.77 | -41.17 |
| | | 690.5 | -29.70 | 1 / 0 | 25.58 | -6.27 | 0.236 | 34.77 | -41.04 |
| | 16-QAM | 680.5 | -29.70 | 1 / 0 | 24.72 | -7.13 | 0.194 | 34.77 | -41.90 |
| | 64-QAM | 680.5 | -29.70 | 1 / 0 | 23.59 | -8.26 | 0.149 | 34.77 | -43.03 |
| 20 MHz | π/2 BPSK | 673.0 | -29.70 | 1 / 99 | 25.48 | -6.37 | 0.231 | 34.77 | -41.14 |
| | | 680.5 | -29.70 | 1 / 99 | 25.56 | -6.29 | 0.235 | 34.77 | -41.06 |
| | | 688.0 | -29.70 | 1 / 50 | 25.32 | -6.53 | 0.222 | 34.77 | -41.30 |
| | QPSK | 673.0 | -29.70 | 1 / 0 | 25.70 | **-6.15** | 0.243 | 34.77 | -40.92 |
| | | 680.5 | -29.70 | 1 / 50 | 25.55 | -6.30 | 0.234 | 34.77 | -41.07 |
| | | 688.0 | -29.70 | 1 / 0 | 25.63 | -6.22 | 0.239 | 34.77 | -40.99 |
| | 16-QAM | 673.0 | -29.70 | 1 / 99 | 24.68 | -7.17 | 0.192 | 34.77 | -41.94 |
| | 64-QAM | 680.5 | -29.70 | 1 / 50 | 23.72 | -8.13 | 0.154 | 34.77 | -42.90 |

**Table 7-9. Antenna BCM ERP Data NR Band n71**

## NR Band n12

| Bandwidth | Modulation | Frequency [MHz] | Ant. Gain [dBi] | RB Size/Offset | Conducted Power [dBm] | ERP [dBm] | ERP [mW] | ERP Limit [dBm] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|
| 5 MHz | π/2 BPSK | 701.5 | -29.50 | 1 / 1 | 25.45 | **-6.20** | 0.240 | 34.77 | -40.97 |
| | | 707.5 | -29.50 | 1 / 23 | 25.65 | -6.00 | 0.251 | 34.77 | -40.77 |
| | | 713.5 | -29.50 | 1 / 12 | 25.70 | **-5.95** | 0.254 | 34.77 | -40.72 |
| | QPSK | 701.5 | -29.50 | 1 / 23 | 25.55 | -6.10 | 0.245 | 34.77 | -40.87 |
| | | 707.5 | -29.50 | 1 / 23 | 25.67 | -5.98 | 0.252 | 34.77 | -40.75 |
| | | 713.5 | -29.50 | 1 / 12 | 25.66 | -5.99 | 0.252 | 34.77 | -40.76 |
| | 16-QAM | 701.5 | -29.50 | 1 / 1 | 24.67 | -6.98 | 0.200 | 34.77 | -41.75 |
| | 64-QAM | 707.5 | -29.50 | 1 / 1 | 23.71 | -7.94 | 0.161 | 34.77 | -42.71 |
| 10 MHz | π/2 BPSK | 704.0 | -29.50 | 1 / 26 | 25.70 | **-5.95** | 0.254 | 34.77 | -40.72 |
| | | 707.5 | -29.50 | 1 / 50 | 25.54 | -6.11 | 0.245 | 34.77 | -40.88 |
| | | 711.0 | -29.50 | 1 / 26 | 25.62 | -6.03 | 0.249 | 34.77 | -40.80 |
| | QPSK | 704.0 | -29.50 | 1 / 1 | 25.68 | -5.97 | 0.253 | 34.77 | -40.74 |
| | | 707.5 | -29.50 | 1 / 50 | 25.61 | -6.04 | 0.249 | 34.77 | -40.81 |
| | | 711.0 | -29.50 | 1 / 50 | 25.61 | -6.04 | 0.249 | 34.77 | -40.81 |
| | 16-QAM | 711.0 | -29.50 | 1 / 26 | 24.60 | -7.05 | 0.197 | 34.77 | -41.82 |
| | 64-QAM | 704.0 | -29.50 | 1 / 26 | 23.70 | -7.95 | 0.160 | 34.77 | -42.72 |
| 15 MHz | π/2 BPSK | 706.5 | -29.50 | 1 / 77 | 25.70 | **-5.95** | 0.254 | 34.77 | -40.72 |
| | | 707.5 | -29.50 | 1 / 39 | 25.69 | **-5.96** | 0.254 | 34.77 | -40.73 |
| | | 708.5 | -29.50 | 1 / 77 | 25.59 | -6.06 | 0.248 | 34.77 | -40.83 |
| | QPSK | 706.5 | -29.50 | 1 / 1 | 25.58 | -6.07 | 0.247 | 34.77 | -40.84 |
| | | 707.5 | -29.50 | 1 / 77 | 25.68 | -5.97 | 0.253 | 34.77 | -40.74 |
| | | 708.5 | -29.50 | 1 / 39 | 25.35 | -6.30 | 0.234 | 34.77 | -41.07 |
| | 16-QAM | 706.5 | -29.50 | 1 / 77 | 24.70 | -6.95 | 0.202 | 34.77 | -41.72 |
| | 64-QAM | 707.5 | -29.50 | 1 / 39 | 23.70 | -7.95 | 0.160 | 34.77 | -42.72 |

**Table 7-10. Antenna BCM ERP Data NR Band n12**

## 7.7 Radiated Spurious Emissions

**§2.1053, §27.53(f)**

### Test Overview

Radiated spurious emissions measurements are performed using the field strength conversion method described in KDB 971168 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using horizontally and vertically polarized broadband hybrid antennas. Measurements on signals operating above 1GHz are performed using vertically and horizontally polarized broadband horn antennas. All measurements are performed while the EUT is operating at maximum power and at the appropriate frequencies.

### Test Procedures Used

KDB 971168 D01 v03r01 – Section 5.8

ANSI C63.26 2015, 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.

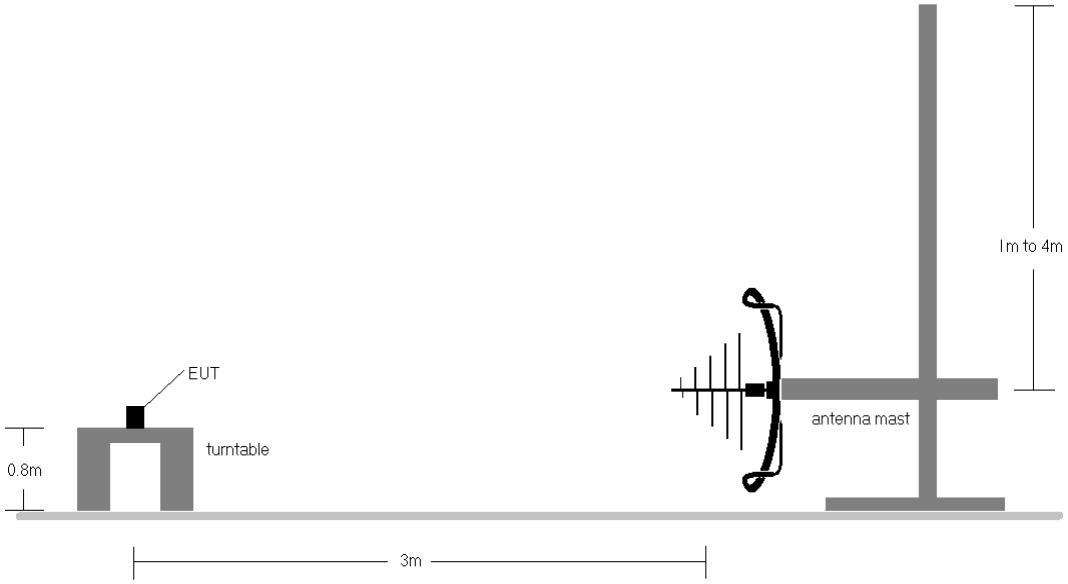



**Figure 7-11. Test Instrument & Measurement Setup < 1GHz**

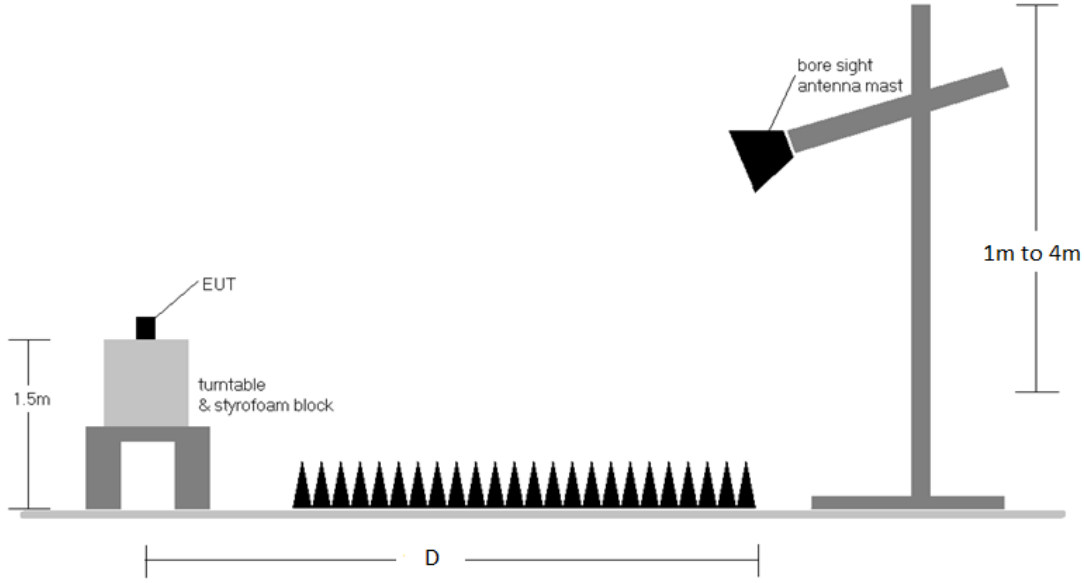



**Figure 7-12. Test Instrument & Measurement Setup > 1GHz**

## Test Notes

1. Field strengths are calculated using the Measurement quantity conversions in KDB 971168 Section 5.8.4.
    a. E(dBµV/m) = Measured amplitude level (dBm) + 107 + Cable Loss (dB) + Antenna Factor (dB/m)
    b. EIRP (dBm) = E(dBµV/m) + 20logD – 104.8; where D is the measurement distance in meters.

2. 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.

3. This unit was tested with its standard battery.

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

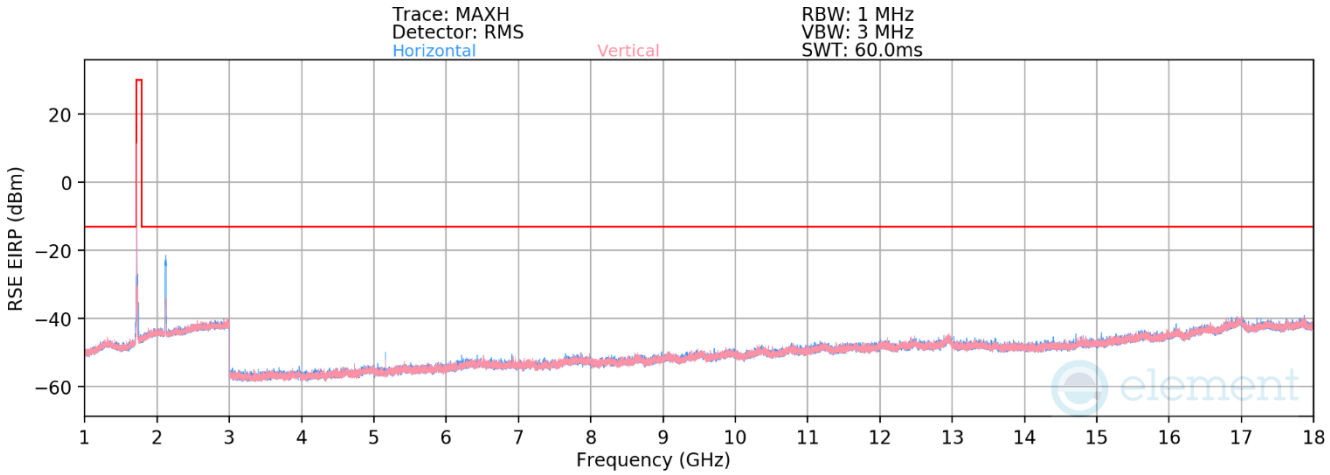
5. Emissions below 18GHz were measured at a 3 meter test distance while emissions above 18GHz were measured at a 1 meter test distance with the application of a distance correction factor.

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

7. For NR operation, all subcarrier spacings (SCS) and transmission schemes (e.g. CP-OFDM and DFT-s-OFDM) 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.

## 7.7.1 Antenna FCM Radiated Spurious Emission Measurements

### LTE Band 66/4




**Plot 7-282. Antenna FCM Radiated Spurious Emission above 1GHz (LTE Band 66/4)**

| | |
|---|---|
| **Bandwidth (MHz):** | 20 |
| **Frequency (MHz):** | 1720.0 |
| **RB / Offset:** | 1 / 50 |

| Frequency [MHz] | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Field Strength [dBµV/m] | EIRP Spurious Emission Level [dBm] | Limit [dBm] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|
| 3440.0 | H | - | - | -79.43 | 5.31 | 32.88 | -62.38 | -13.00 | -49.38 |
| 5160.0 | H | 270 | 125 | -78.46 | 8.23 | 36.77 | -58.49 | -13.00 | -45.49 |
| 6880.0 | H | - | - | -81.96 | 11.06 | 36.10 | -59.16 | -13.00 | -46.16 |
| 8600.0 | H | - | - | -81.40 | 11.53 | 37.13 | -58.13 | -13.00 | -45.13 |

**Table 7-11. Radiated Spurious Data (LTE Band 66/4 – Low Channel)**

| | |
|---|---|
| **Bandwidth (MHz):** | 20 |
| **Frequency (MHz):** | 1745.0 |
| **RB / Offset:** | 1 / 50 |

| Frequency [MHz] | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Field Strength [dBµV/m] | EIRP Spurious Emission Level [dBm] | Limit [dBm] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|
| 3490.0 | H | - | - | -78.83 | 5.21 | 33.38 | -61.87 | -13.00 | -48.87 |
| 5235.0 | H | - | - | -81.27 | 8.71 | 34.44 | -60.81 | -13.00 | -47.81 |
| 6980.0 | H | - | - | -82.65 | 11.54 | 35.89 | -59.37 | -13.00 | -46.37 |

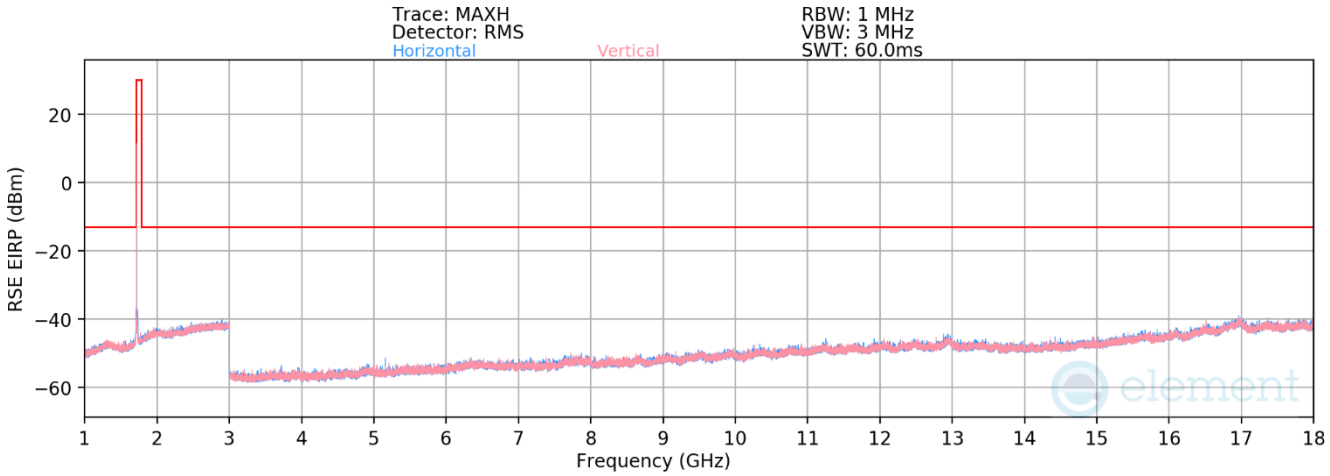
**Table 7-12. Radiated Spurious Data (LTE Band 66/4 – Mid Channel)**

| | |
|---|---|
| **Bandwidth (MHz):** | 20 |
| **Frequency (MHz):** | 1770.0 |
| **RB / Offset:** | 1 / 50 |

| Frequency [MHz] | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Field Strength [dBµV/m] | EIRP Spurious Emission Level [dBm] | Limit [dBm] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|
| 3540.0 | H | - | - | -79.31 | 5.22 | 32.92 | -62.34 | -13.00 | -49.34 |
| 5310.0 | H | - | - | -80.86 | 8.69 | 34.83 | -60.43 | -13.00 | -47.43 |
| 7080.0 | H | - | - | -82.27 | 11.29 | 36.02 | -59.24 | -13.00 | -46.24 |

**Table 7-13. Radiated Spurious Data (LTE Band 66/4 – High Channel)**

## NR Band n66




**Plot 7-283. Antenna FCM Radiated Spurious Emission above 1GHz (NR Band n66)**

| | |
|---|---|
| **Bandwidth (MHz):** | 20 |
| **Frequency (MHz):** | 1720.0 |
| **RB / Offset:** | 1 / 50 |

| Frequency [MHz] | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Field Strength [dBµV/m] | EIRP Spurious Emission Level [dBm] | Limit [dBm] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|
| 3440.0 | H | - | - | -79.33 | 5.22 | 32.90 | -62.36 | -13.00 | -49.36 |
| 5160.0 | H | 274 | 216 | -77.60 | 8.23 | 37.62 | -57.63 | -13.00 | -44.63 |
| 6880.0 | H | - | - | -81.88 | 11.06 | 36.18 | -59.07 | -13.00 | -46.07 |
| 8600.0 | H | - | - | -81.00 | 11.17 | 37.18 | -58.08 | -13.00 | -45.08 |
| 10320.0 | H | - | - | -81.35 | 14.11 | 39.76 | -55.50 | -13.00 | -42.50 |

**Table 7-14. Radiated Spurious Data (NR Band n66 – Low Channel)**

| | |
|---|---|
| **Bandwidth (MHz):** | 20 |
| **Frequency (MHz):** | 1745.0 |
| **RB / Offset:** | 1 / 50 |

| Frequency [MHz] | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Field Strength [dBµV/m] | EIRP Spurious Emission Level [dBm] | Limit [dBm] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|
| 3490.0 | H | 117 | 167 | -75.20 | 5.21 | 37.01 | -58.25 | -13.00 | -45.25 |
| 5235.0 | V | 288 | 177 | -76.98 | 8.59 | 38.61 | -56.65 | -13.00 | -43.65 |
| 6980.0 | H | - | - | -82.52 | 11.54 | 36.02 | -59.23 | -13.00 | -46.23 |
| 8725.0 | H | - | - | -81.51 | 11.89 | 37.39 | -57.87 | -13.00 | -44.87 |
| 10470.0 | H | - | - | -82.70 | 15.08 | 39.38 | -55.88 | -13.00 | -42.88 |

**Table 7-15. Radiated Spurious Data (NR Band n66 – Mid Channel)**

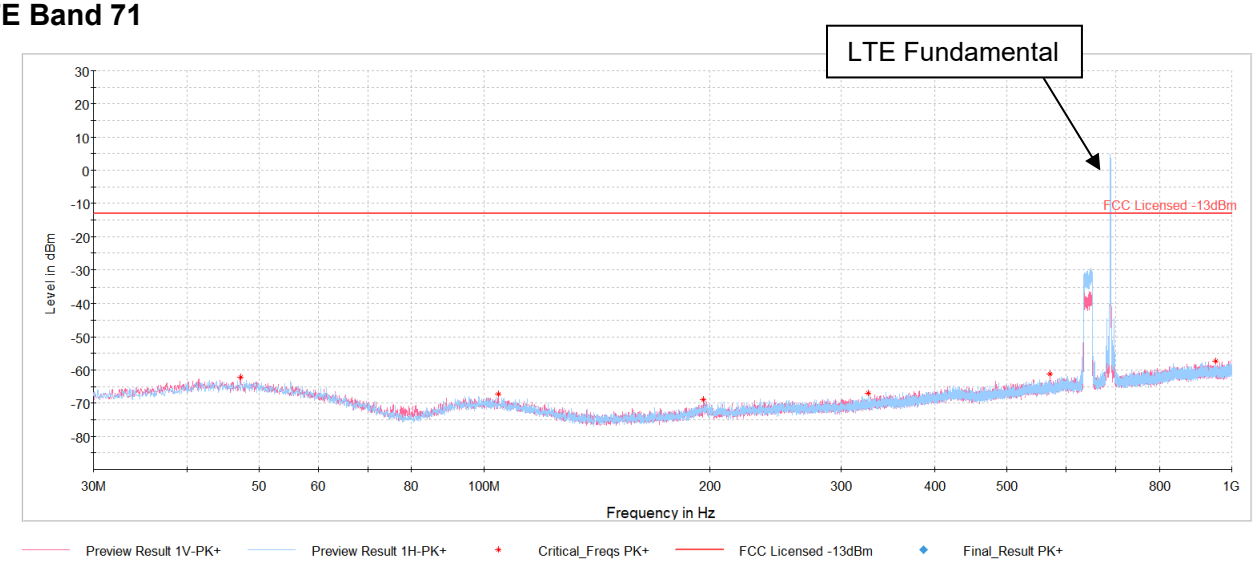
| | |
|---|---|
| **Bandwidth (MHz):** | 20 |
| **Frequency (MHz):** | 1770.0 |
| **RB / Offset:** | 1 / 50 |

| Frequency [MHz] | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Field Strength [dBµV/m] | EIRP Spurious Emission Level [dBm] | Limit [dBm] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|
| 3540.0 | H | - | - | -79.37 | 5.23 | 32.87 | -62.39 | -13.00 | -49.39 |
| 5310.0 | H | - | - | -81.30 | 8.52 | 34.21 | -61.05 | -13.00 | -48.05 |
| 7080.0 | H | - | - | -82.36 | 11.29 | 35.93 | -59.33 | -13.00 | -46.33 |

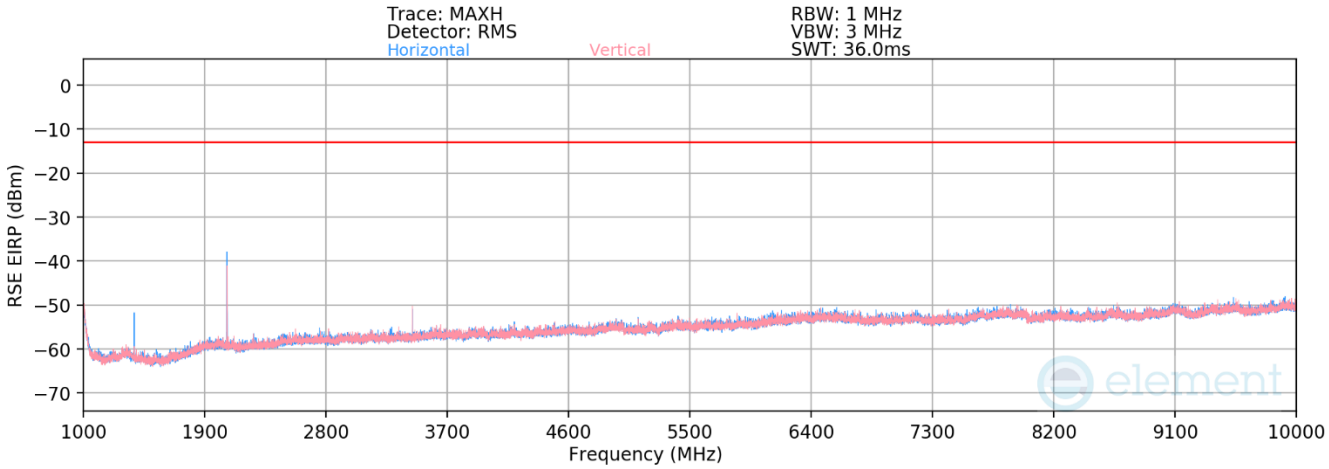
**Table 7-16. Radiated Spurious Data (NR Band n66 – High Channel)**

## 7.7.2 Antenna BCM Radiated Spurious Emission Measurements

### LTE Band 71




**Plot 7-284. Antenna BCM Radiated Spurious Emission below 1GHz (LTE Band 71)**




**Plot 7-285. Antenna BCM Radiated Spurious Emission above 1GHz (LTE Band 71)**

| | |
|---|---|
| **Bandwidth (MHz):** | 20 |
| **Frequency (MHz):** | 673.0 |
| **RB / Offset:** | 1 / 50 |

| Frequency [MHz] | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Field Strength [dBµV/m] | EIRP Spurious Emission Level [dBm] | Limit [dBm] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|
| 1346.0 | H | 154 | 283 | -70.90 | -1.07 | 35.03 | -60.23 | -13.00 | -47.23 |
| 2019.0 | H | 279 | 178 | -62.81 | 1.63 | 45.81 | -49.44 | -13.00 | -36.44 |
| 2692.0 | H | - | - | -78.59 | 3.14 | 31.54 | -63.72 | -13.00 | -50.72 |
| 3365.0 | H | - | - | -79.38 | 4.64 | 32.27 | -62.99 | -13.00 | -49.99 |
| 4038.0 | H | - | - | -79.50 | 5.79 | 33.29 | -61.97 | -13.00 | -48.97 |

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

| | |
|---|---|
| **Bandwidth (MHz):** | 20 |
| **Frequency (MHz):** | 680.5 |
| **RB / Offset:** | 1 / 50 |

| Frequency [MHz] | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Field Strength [dBµV/m] | EIRP Spurious Emission Level [dBm] | Limit [dBm] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|
| 1361.0 | H | 205 | 129 | -71.16 | -1.25 | 34.59 | -60.66 | -13.00 | -47.66 |
| 2041.5 | H | 213 | 151 | -64.94 | 1.83 | 43.90 | -51.36 | -13.00 | -38.36 |
| 2722.0 | H | - | - | -78.40 | 3.17 | 31.77 | -63.49 | -13.00 | -50.49 |
| 3402.5 | H | - | - | -78.89 | 4.31 | 32.42 | -62.83 | -13.00 | -49.83 |
| 4083.0 | H | - | - | -80.20 | 6.47 | 33.27 | -61.98 | -13.00 | -48.98 |

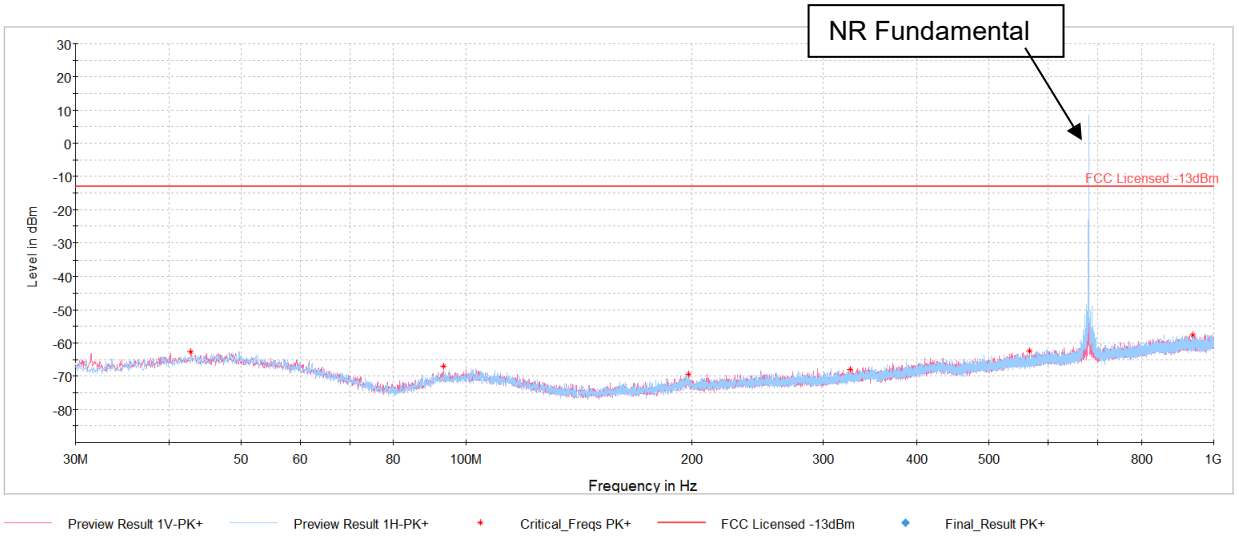
**Table 7-18. Radiated Spurious Data (LTE Band 71 – Mid Channel)**

| | |
|---|---|
| **Bandwidth (MHz):** | 20 |
| **Frequency (MHz):** | 688.0 |
| **RB / Offset:** | 1 / 50 |

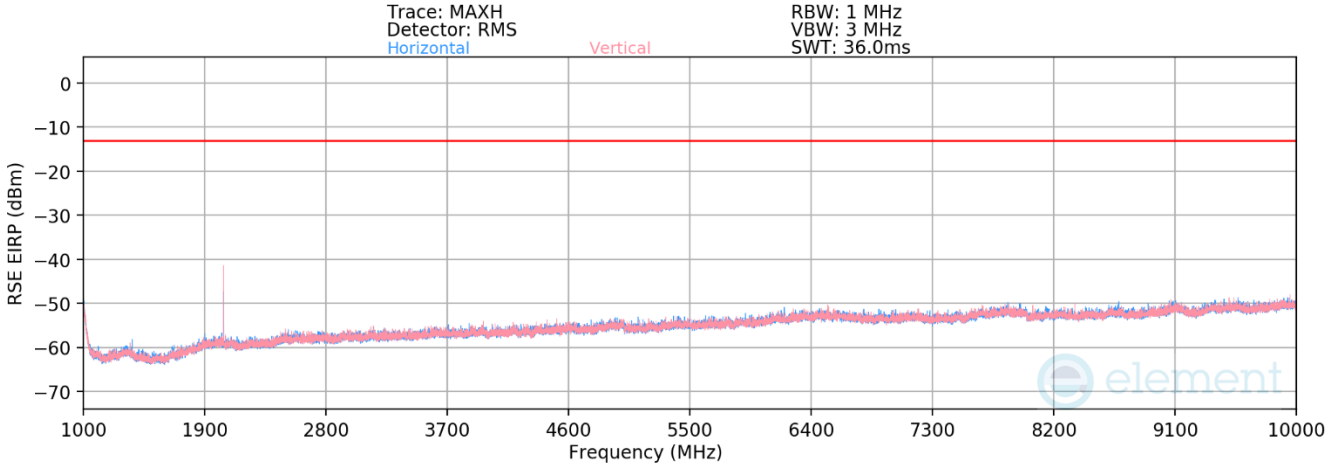
| Frequency [MHz] | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Field Strength [dBµV/m] | EIRP Spurious Emission Level [dBm] | Limit [dBm] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|
| 1376.0 | H | 132 | 290 | -72.60 | -1.23 | 33.18 | -62.08 | -13.00 | -49.08 |
| 2064.0 | H | 177 | 331 | -57.61 | 1.65 | 51.04 | -44.21 | -13.00 | -31.21 |
| 2752.0 | H | - | - | -78.56 | 3.38 | 31.82 | -63.44 | -13.00 | -50.44 |
| 3440.0 | H | 296 | 241 | -70.73 | 4.58 | 40.85 | -54.41 | -13.00 | -41.41 |
| 4128.0 | H | - | - | -80.21 | 6.53 | 33.32 | -61.94 | -13.00 | -48.94 |
| 4816.0 | H | - | - | -80.30 | 7.73 | 34.43 | -60.83 | -13.00 | -47.83 |
| 5504.0 | H | - | - | -81.76 | 9.61 | 34.85 | -60.41 | -13.00 | -47.41 |

**Table 7-19. Radiated Spurious Data (LTE Band 71 – High Channel)**

## NR Band n71




**Plot 7-286. Antenna BCM Radiated Spurious Emission below 1GHz (NR Band n71)**




**Plot 7-287. Antenna BCM Radiated Spurious Emission above 1GHz (NR Band n71)**

| | |
|---|---|
| **Bandwidth (MHz):** | 20 |
| **Frequency (MHz):** | 673.0 |
| **RB / Offset:** | 1 / 50 |

| Frequency [MHz] | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Field Strength [dBµV/m] | EIRP Spurious Emission Level [dBm] | Limit [dBm] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|
| 1346.0 | H | 208 | 175 | -71.91 | -1.07 | 34.02 | -61.23 | -13.00 | -48.23 |
| 2019.0 | H | 161 | 153 | -69.21 | 1.63 | 39.42 | -55.84 | -13.00 | -42.84 |
| 2692.0 | H | - | - | -78.56 | 3.27 | 31.72 | -63.54 | -13.00 | -50.54 |
| 3365.0 | H | - | - | -78.84 | 4.57 | 32.72 | -62.53 | -13.00 | -49.53 |
| 4038.0 | H | - | - | -79.58 | 5.89 | 33.31 | -61.95 | -13.00 | -48.95 |

**Table 7-20. Radiated Spurious Data (NR Band n71 – Low Channel)**

| | |
|---|---|
| **Bandwidth (MHz):** | 20 |
| **Frequency (MHz):** | 680.5 |
| **RB / Offset:** | 1 / 50 |

| Frequency [MHz] | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Field Strength [dBµV/m] | EIRP Spurious Emission Level [dBm] | Limit [dBm] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|
| 1361.0 | H | 154 | 317 | -75.37 | -1.25 | 30.38 | -64.88 | -13.00 | -51.88 |
| 2041.5 | V | 163 | 13 | -62.03 | 1.83 | 46.80 | -48.45 | -13.00 | -35.45 |
| 2722.0 | H | - | - | -78.24 | 3.17 | 31.93 | -63.33 | -13.00 | -50.33 |
| 3402.5 | H | - | - | -79.04 | 4.50 | 32.46 | -62.79 | -13.00 | -49.79 |
| 4083.0 | H | - | - | -80.00 | 6.53 | 33.54 | -61.72 | -13.00 | -48.72 |

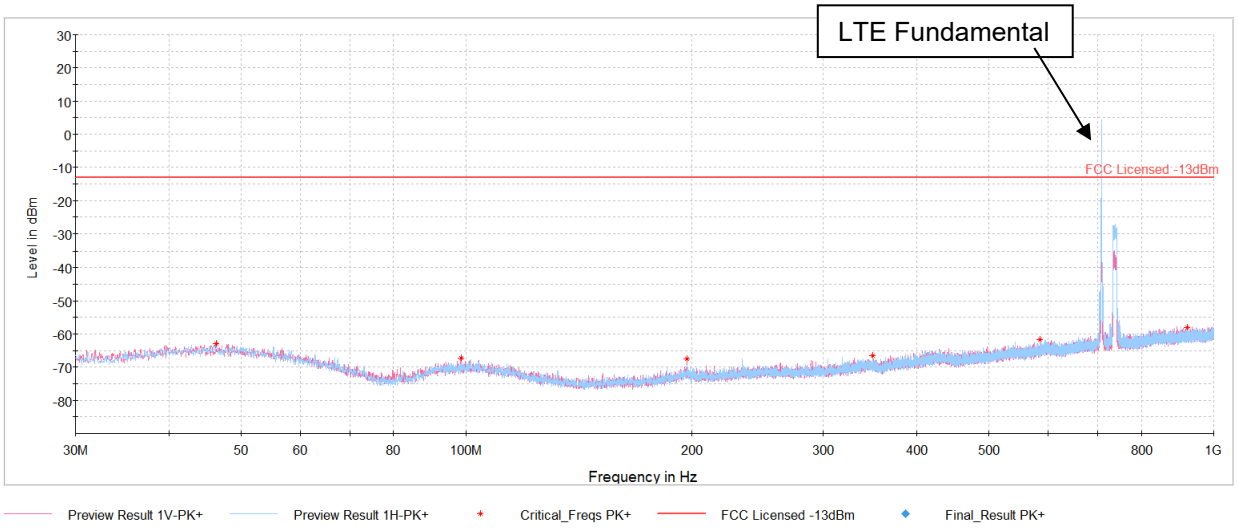
**Table 7-21. Radiated Spurious Data (NR Band n71 – Mid Channel)**

| | |
|---|---|
| **Bandwidth (MHz):** | 20 |
| **Frequency (MHz):** | 688.0 |
| **RB / Offset:** | 1 / 50 |

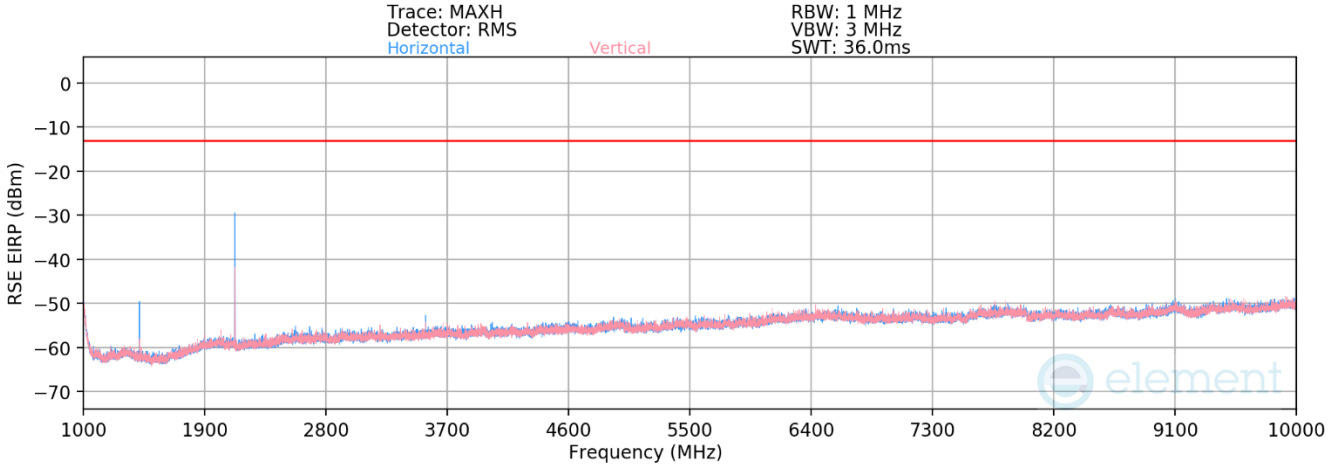
| Frequency [MHz] | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Field Strength [dBµV/m] | EIRP Spurious Emission Level [dBm] | Limit [dBm] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|
| 1376.0 | H | 121 | 293 | -75.64 | -1.23 | 30.14 | -65.12 | -13.00 | -52.12 |
| 2064.0 | H | 180 | 2 | -63.18 | 1.65 | 45.47 | -49.79 | -13.00 | -36.79 |
| 2752.0 | V | - | - | -78.29 | 3.38 | 32.08 | -63.17 | -13.00 | -50.17 |
| 3440.0 | V | - | - | -79.05 | 4.55 | 32.50 | -62.76 | -13.00 | -49.76 |
| 4128.0 | V | - | - | -80.07 | 6.18 | 33.12 | -62.14 | -13.00 | -49.14 |

**Table 7-22. Radiated Spurious Data (NR Band n71 – High Channel)**

## LTE Band 12/17




**Plot 7-288. Antenna BCM Radiated Spurious Emission below 1GHz (LTE Band 12/17)**




**Plot 7-289. Antenna BCM Radiated Spurious Emission above 1GHz (LTE Band 12/17)**

| | |
|---|---|
| **Bandwidth (MHz):** | 10 |
| **Frequency (MHz):** | 704.0 |
| **RB / Offset:** | 1 / 25 |

| Frequency [MHz] | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Field Strength [dBµV/m] | EIRP Spurious Emission Level [dBm] | Limit [dBm] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|
| 1408.0 | H | 209 | 174 | -70.74 | -1.98 | 34.28 | -60.98 | -13.00 | -47.98 |
| 2112.0 | H | 218 | 156 | -68.37 | 1.45 | 40.08 | -55.18 | -13.00 | -42.18 |
| 2816.0 | H | - | - | -78.44 | 3.23 | 31.79 | -63.47 | -13.00 | -50.47 |
| 3520.0 | H | - | - | -79.32 | 4.87 | 32.56 | -62.70 | -13.00 | -49.70 |
| 4224.0 | H | - | - | -80.46 | 6.58 | 33.11 | -62.14 | -13.00 | -49.14 |

**Table 7-23. Radiated Spurious Data (LTE Band 12/17 – Low Channel)**

| | |
|---|---|
| **Bandwidth (MHz):** | 10 |
| **Frequency (MHz):** | 707.5 |
| **RB / Offset:** | 1 / 25 |

| Frequency [MHz] | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Field Strength [dBµV/m] | EIRP Spurious Emission Level [dBm] | Limit [dBm] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|
| 1415.0 | H | 276 | 163 | -77.21 | -1.98 | 27.81 | -67.45 | -13.00 | -54.45 |
| 2122.5 | H | 110 | 206 | -62.49 | 1.42 | 45.92 | -49.34 | -13.00 | -36.34 |
| 2830.0 | H | - | - | -78.74 | 3.26 | 31.52 | -63.74 | -13.00 | -50.74 |
| 3537.5 | H | 173 | 10 | -76.20 | 4.79 | 35.59 | -59.66 | -13.00 | -46.66 |
| 4245.0 | V | - | - | -80.07 | 6.32 | 33.25 | -62.00 | -13.00 | -49.00 |
| 4952.5 | H | - | - | -80.75 | 8.17 | 34.43 | -60.83 | -13.00 | -47.83 |
| 5660.0 | V | - | - | -81.69 | 9.57 | 34.89 | -60.37 | -13.00 | -47.37 |

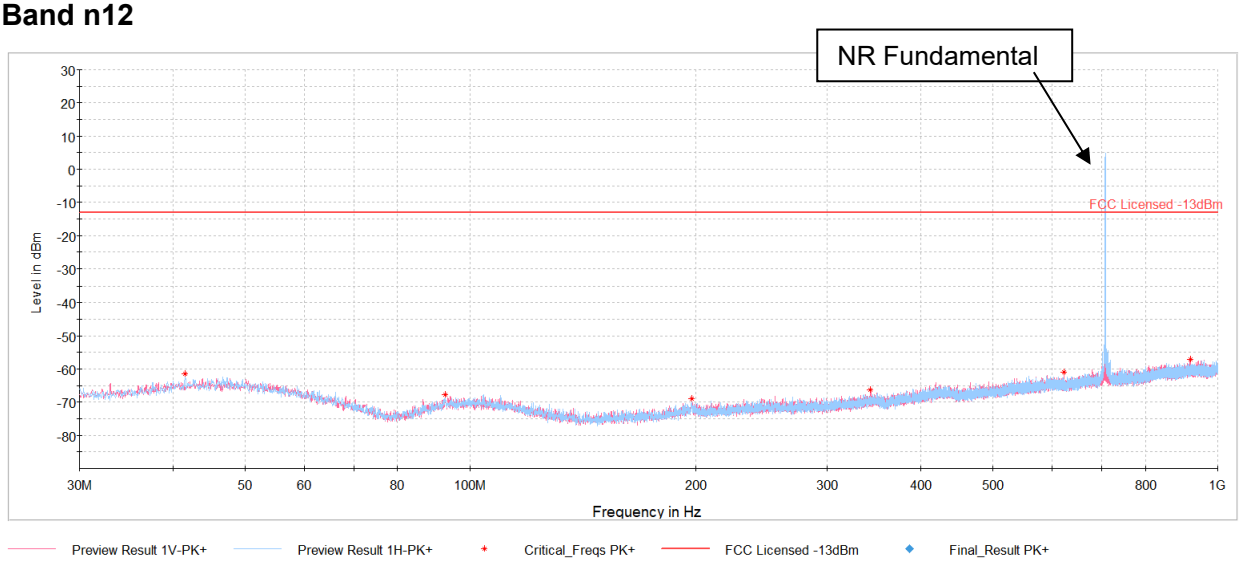
**Table 7-24. Radiated Spurious Data (LTE Band 12/17 – Mid Channel)**

| | |
|---|---|
| **Bandwidth (MHz):** | 10 |
| **Frequency (MHz):** | 711.0 |
| **RB / Offset:** | 1 / 25 |

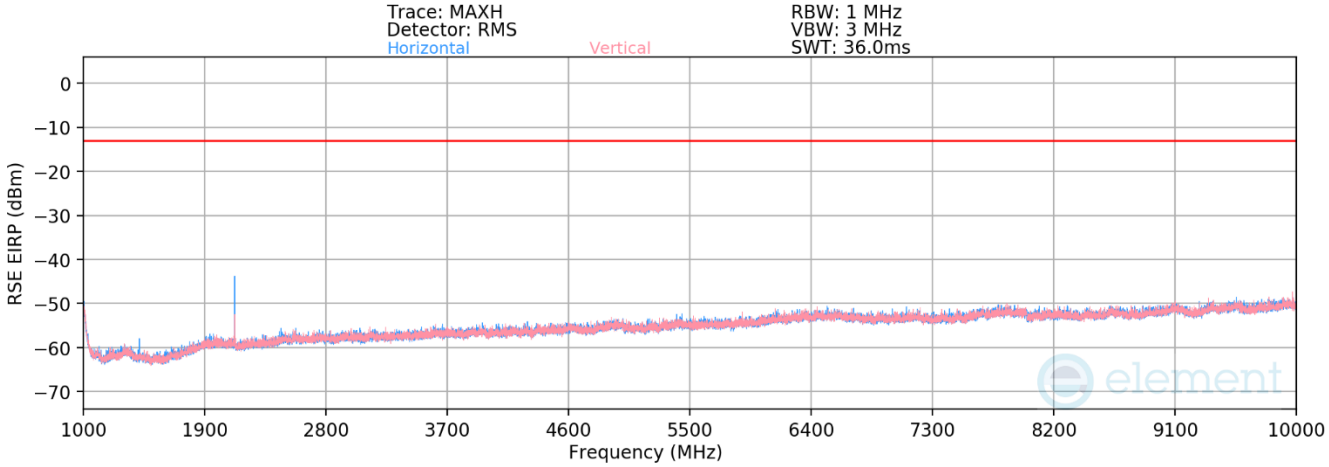
| Frequency [MHz] | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Field Strength [dBµV/m] | EIRP Spurious Emission Level [dBm] | Limit [dBm] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|
| 1422.0 | H | 295 | 167 | -72.08 | -1.98 | 32.94 | -62.31 | -13.00 | -49.31 |
| 2133.0 | H | 249 | 351 | -67.74 | 1.42 | 40.67 | -54.58 | -13.00 | -41.58 |
| 2844.0 | H | - | - | -78.61 | 3.09 | 31.48 | -63.78 | -13.00 | -50.78 |
| 3555.0 | V | - | - | -79.30 | 4.73 | 32.43 | -62.83 | -13.00 | -49.83 |
| 4266.0 | H | - | - | -79.99 | 6.46 | 33.47 | -61.79 | -13.00 | -48.79 |

**Table 7-25. Radiated Spurious Data (LTE Band 12/17 – High Channel)**

## NR Band n12




**Plot 7-290. Antenna BCM Radiated Spurious Emission below 1GHz (NR Band n12)**




**Plot 7-291. Antenna BCM Radiated Spurious Emission above 1GHz (NR Band n12)**

| | |
|---|---|
| **Bandwidth (MHz):** | 15 |
| **Frequency (MHz):** | 706.5 |
| **RB / Offset:** | 1 / 37 |

| Frequency [MHz] | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Field Strength [dBµV/m] | EIRP Spurious Emission Level [dBm] | Limit [dBm] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|
| 1413.0 | H | 396 | 247 | -73.93 | -1.98 | 31.09 | -64.17 | -13.00 | -51.17 |
| 2119.5 | V | 118 | 358 | -77.21 | 1.45 | 31.24 | -64.01 | -13.00 | -51.01 |
| 2826.0 | H | - | - | -78.73 | 3.26 | 31.52 | -63.73 | -13.00 | -50.73 |
| 3532.5 | H | - | - | -79.36 | 4.87 | 32.51 | -62.74 | -13.00 | -49.74 |
| 4239.0 | H | - | - | -80.14 | 6.27 | 33.13 | -62.13 | -13.00 | -49.13 |

**Table 7-26. Radiated Spurious Data (NR Band n12 – Low Channel)**

| | |
|---|---|
| **Bandwidth (MHz):** | 15 |
| **Frequency (MHz):** | 707.5 |
| **RB / Offset:** | 1 / 37 |

| Frequency [MHz] | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Field Strength [dBµV/m] | EIRP Spurious Emission Level [dBm] | Limit [dBm] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|
| 1415.0 | H | 192 | 161 | -75.05 | -1.98 | 29.97 | -65.28 | -13.00 | -52.28 |
| 2122.5 | H | 214 | 141 | -64.68 | 1.45 | 43.76 | -51.49 | -13.00 | -38.49 |
| 2830.0 | H | - | - | -78.34 | 3.26 | 31.91 | -63.34 | -13.00 | -50.34 |
| 3537.5 | H | - | - | -79.18 | 4.84 | 32.66 | -62.59 | -13.00 | -49.59 |
| 4245.0 | H | - | - | -79.94 | 6.27 | 33.33 | -61.93 | -13.00 | -48.93 |

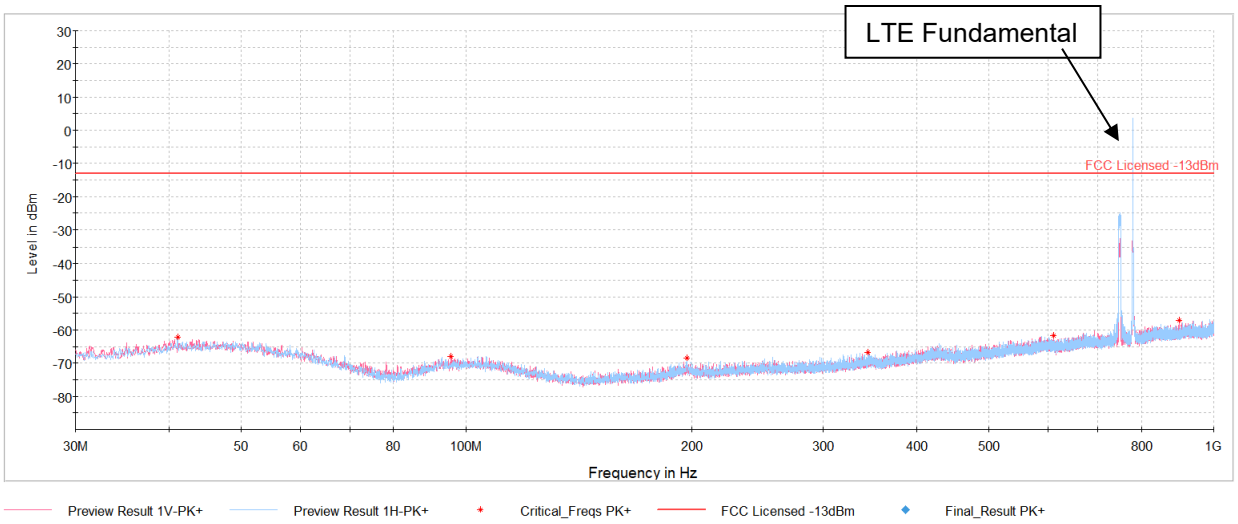
**Table 7-27. Radiated Spurious Data (NR Band n12 – Mid Channel)**

| | |
|---|---|
| **Bandwidth (MHz):** | 15 |
| **Frequency (MHz):** | 708.5 |
| **RB / Offset:** | 1 / 37 |

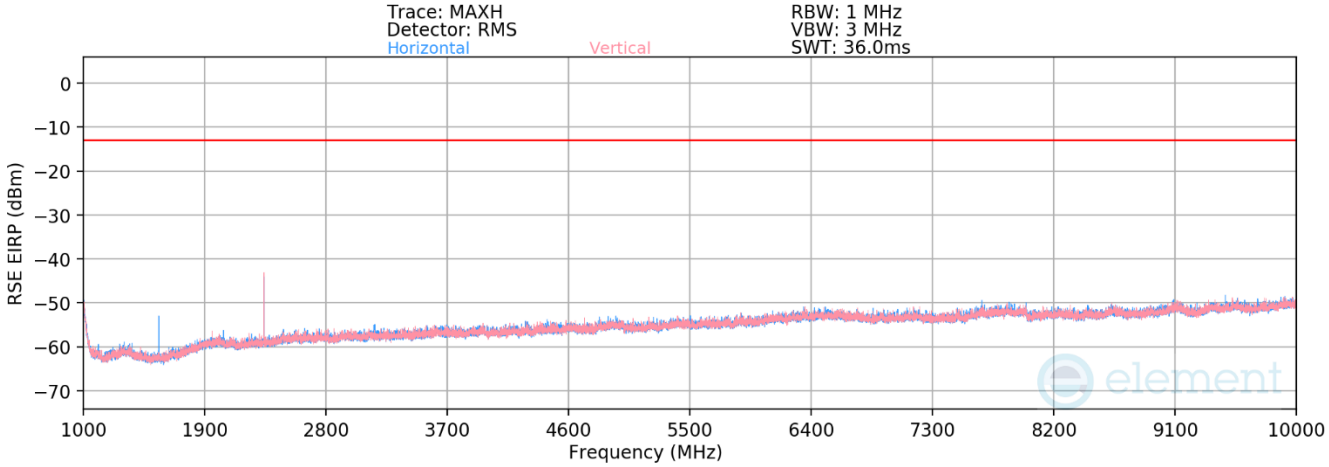
| Frequency [MHz] | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Field Strength [dBµV/m] | EIRP Spurious Emission Level [dBm] | Limit [dBm] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|
| 1417.0 | H | 237 | 288 | -73.34 | -1.98 | 31.68 | -63.57 | -13.00 | -50.57 |
| 2125.5 | H | 334 | 215 | -74.04 | 1.42 | 34.38 | -60.88 | -13.00 | -47.88 |
| 2834.0 | H | - | - | -78.60 | 3.26 | 31.66 | -63.60 | -13.00 | -50.60 |
| 3542.5 | H | - | - | -79.50 | 4.87 | 32.37 | -62.89 | -13.00 | -49.89 |
| 4251.0 | H | - | - | -80.04 | 6.32 | 33.29 | -61.97 | -13.00 | -48.97 |

**Table 7-28. Radiated Spurious Data (NR Band n12 – High Channel)**

## LTE Band 13




**Plot 7-292. Antenna BCM Radiated Spurious Emission below 1GHz (LTE Band 13)**




**Plot 7-293. Antenna BCM Radiated Spurious Emission above 1GHz (LTE Band 13)**

| | |
|---|---|
| **Bandwidth (MHz):** | 5 |
| **Frequency (MHz):** | 779.5 |
| **RB / Offset:** | 1 / 25 |

| Frequency [MHz] | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Field Strength [dBµV/m] | EIRP Spurious Emission Level [dBm] | Limit [dBm] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|
| 1559.0 | H | 256 | 157 | -69.31 | -2.44 | 35.25 | -60.01 | -40.00 | -20.01 |
| 2338.5 | V | 173 | 62 | -63.61 | 1.75 | 45.14 | -50.12 | -13.00 | -37.12 |
| 3118.0 | V | - | - | -78.70 | 4.33 | 32.64 | -62.62 | -13.00 | -49.62 |
| 3897.5 | H | - | - | -79.63 | 5.76 | 33.13 | -62.13 | -13.00 | -49.13 |
| 4677.0 | H | - | - | -81.22 | 7.99 | 33.77 | -61.49 | -13.00 | -48.49 |

**Table 7-29. Radiated Spurious Data (LTE Band 13 – Low Channel)**

| | |
|---|---|
| **Bandwidth (MHz):** | 10 |
| **Frequency (MHz):** | 782.0 |
| **RB / Offset:** | 1 / 25 |

| Frequency [MHz] | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Field Strength [dBµV/m] | EIRP Spurious Emission Level [dBm] | Limit [dBm] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|
| 1564.0 | H | 214 | 341 | -76.02 | -2.36 | 28.62 | -66.64 | -40.00 | -26.64 |
| 2346.0 | H | 141 | 152 | -65.13 | 1.71 | 43.58 | -51.68 | -13.00 | -38.68 |
| 3128.0 | V | - | - | -78.83 | 4.33 | 32.50 | -62.75 | -13.00 | -49.75 |
| 3910.0 | V | - | - | -79.84 | 5.93 | 33.10 | -62.16 | -13.00 | -49.16 |
| 4692.0 | H | - | - | -80.90 | 7.69 | 33.79 | -61.47 | -13.00 | -48.47 |

**Table 7-30. Radiated Spurious Data (LTE Band 13 – Mid Channel)**

| | |
|---|---|
| **Bandwidth (MHz):** | 5 |
| **Frequency (MHz):** | 784.5 |
| **RB / Offset:** | 1 / 25 |

| Frequency [MHz] | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Field Strength [dBµV/m] | EIRP Spurious Emission Level [dBm] | Limit [dBm] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|
| 1569.0 | H | 196 | 354 | -73.49 | -2.36 | 31.15 | -64.11 | -40.00 | -24.11 |
| 2353.5 | H | 115 | 340 | -59.95 | 1.63 | 48.68 | -46.57 | -13.00 | -33.57 |
| 3138.0 | V | - | - | -78.70 | 4.33 | 32.64 | -62.62 | -13.00 | -49.62 |
| 3922.5 | V | - | - | -79.74 | 5.76 | 33.02 | -62.24 | -13.00 | -49.24 |
| 4707.0 | V | - | - | -80.59 | 7.47 | 33.88 | -61.38 | -13.00 | -48.38 |

**Table 7-31. Radiated Spurious Data (LTE Band 13 – High Channel)**

## 7.8 Frequency Stability / Temperature Variation

**§2.1053, §27.53**

### Test Overview and Limit

Frequency stability testing is performed in accordance with the guidelines of ANSI C63.26-2015 and 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 27, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.***

### Test Procedure Used

ANSI C63.26-2015

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. For LTE testing, in addition, the EUT was connected to a communication tester via an attenuated RF coupler.

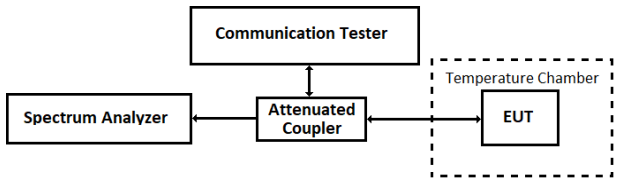



**Figure 7-13. LTE Test Instrument & Measurement Setup**

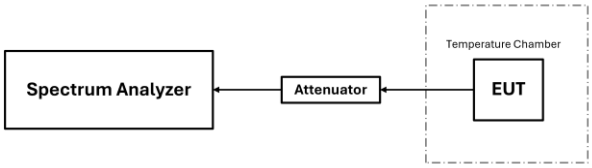



**Figure 7-14. FR1 Test Instrument & Measurement Setup**

### Test Notes

N/A

**Frequency Stability / Temperature Variation**

## LTE Band 66/4

| | |
|---|---|
| Operating Band Lower Boundary (GHz) | 1.710 |
| Ref. Voltage (VDC): | 3.80 |

| Voltage (%) | Power (VDC) | Temp (°C) | Measured Freq. (GHz) | Freq. Delta from Operating Range (GHz) |
|---|---|---|---|---|
| 100 % | 3.80 | - 30 | 1.71089186 | -0.00089186 |
| | | - 20 | 1.71089436 | -0.00089436 |
| | | - 10 | 1.71088419 | -0.00088419 |
| | | 0 | 1.71088126 | -0.00088126 |
| | | + 10 | 1.71088775 | -0.00088775 |
| | | + 20 (Ref) | 1.71088592 | -0.00088592 |
| | | + 30 | 1.71088016 | -0.00088016 |
| | | + 40 | 1.71088094 | -0.00088094 |
| | | + 50 | 1.71088404 | -0.00088404 |
| Battery Endpoint | 3.40 | + 20 | 1.71089685 | -0.00089685 |

**Table 7-32. LTE Band 66/4 Lower Boundary Frequency Stability Data**

## LTE Band 66/4

| | |
|---|---|
| Operating Band Upper Boundary (GHz) | 1.780 |
| Ref. Voltage (VDC): | 3.80 |

| Voltage (%) | Power (VDC) | Temp (°C) | Measured Freq. (GHz) | Freq. Delta from Operating Range (GHz) |
|---|---|---|---|---|
| 100 % | 3.80 | - 30 | 1.77914775 | -0.00085225 |
| | | - 20 | 1.77909507 | -0.00090493 |
| | | - 10 | 1.77908872 | -0.00091128 |
| | | 0 | 1.77914568 | -0.00085432 |
| | | + 10 | 1.77911456 | -0.00088544 |
| | | + 20 (Ref) | 1.77911297 | -0.00088703 |
| | | + 30 | 1.77911677 | -0.00088323 |
| | | + 40 | 1.77912097 | -0.00087903 |
| | | + 50 | 1.77911440 | -0.00088560 |
| Battery Endpoint | 3.40 | + 20 | 1.77910534 | -0.00089467 |

**Table 7-33. LTE Band 66/4 Upper Boundary Frequency Stability Data**

**Frequency Stability / Temperature Variation**

| LTE Band 71 | | |
|---|---|---|
| | Operating Band Lower Boundary (GHz) | 0.663 |
| | Ref. Voltage (VDC): | 3.80 |

| Voltage (%) | Power (VDC) | Temp (°C) | Measured Freq. (GHz) | Freq. Delta from Operating Range (GHz) |
|---|---|---|---|---|
| 100 % | 3.80 | - 30 | 0.66389580 | -0.00089580 |
| | | - 20 | 0.66391160 | -0.00091160 |
| | | - 10 | 0.66389092 | -0.00089092 |
| | | 0 | 0.66389801 | -0.00089801 |
| | | + 10 | 0.66389563 | -0.00089563 |
| | | + 20 (Ref) | 0.66389390 | -0.00089390 |
| | | + 30 | 0.66390121 | -0.00090121 |
| | | + 40 | 0.66388982 | -0.00088982 |
| | | + 50 | 0.66389391 | -0.00089391 |
| Battery Endpoint | 3.40 | + 20 | 0.66388603 | -0.00088603 |

**Table 7-34. LTE Band 71 Lower Boundary Frequency Stability Data**

| LTE Band 71 | | |
|---|---|---|
| | Operating Band Upper Boundary (GHz) | 0.698 |
| | Ref. Voltage (VDC): | 3.80 |

| Voltage (%) | Power (VDC) | Temp (°C) | Measured Freq. (GHz) | Freq. Delta from Operating Range (GHz) |
|---|---|---|---|---|
| 100 % | 3.80 | - 30 | 0.69711283 | -0.00088717 |
| | | - 20 | 0.69711610 | -0.00088390 |
| | | - 10 | 0.69711239 | -0.00088761 |
| | | 0 | 0.69708388 | -0.00091612 |
| | | + 10 | 0.69713274 | -0.00086726 |
| | | + 20 (Ref) | 0.69709574 | -0.00090426 |
| | | + 30 | 0.69711905 | -0.00088095 |
| | | + 40 | 0.69708005 | -0.00091995 |
| | | + 50 | 0.69713105 | -0.00086895 |
| Battery Endpoint | 3.40 | + 20 | 0.69709981 | -0.00090019 |

**Table 7-35. LTE Band 71 Upper Boundary Frequency Stability Data**

**Frequency Stability / Temperature Variation**

## LTE Band 12/17

| | |
|---|---|
| Operating Band Lower Boundary (GHz) | 0.699 |
| Ref. Voltage (VDC): | 3.80 |

| Voltage (%) | Power (VDC) | Temp (°C) | Measured Freq. (GHz) | Freq. Delta from Operating Range (GHz) |
|---|---|---|---|---|
| 100 % | 3.80 | - 30 | 0.69939539 | -0.00139539 |
| | | - 20 | 0.69938702 | -0.00138702 |
| | | - 10 | 0.69938287 | -0.00138287 |
| | | 0 | 0.69936217 | -0.00136217 |
| | | + 10 | 0.69940082 | -0.00140082 |
| | | + 20 (Ref) | 0.69937221 | -0.00137221 |
| | | + 30 | 0.69940152 | -0.00140152 |
| | | + 40 | 0.69937448 | -0.00137448 |
| | | + 50 | 0.69940404 | -0.00140404 |
| Battery Endpoint | 3.40 | + 20 | 0.69937648 | -0.00137648 |

**Table 7-36. LTE Band 12/17 Lower Boundary Frequency Stability Data**

## LTE Band 12/17

| | |
|---|---|
| Operating Band Upper Boundary (GHz) | 0.716 |
| Ref. Voltage (VDC): | 3.80 |

| Voltage (%) | Power (VDC) | Temp (°C) | Measured Freq. (GHz) | Freq. Delta from Operating Range (GHz) |
|---|---|---|---|---|
| 100 % | 3.80 | - 30 | 0.71563544 | -0.00036456 |
| | | - 20 | 0.71558393 | -0.00041607 |
| | | - 10 | 0.71560702 | -0.00039298 |
| | | 0 | 0.71563055 | -0.00036945 |
| | | + 10 | 0.71561628 | -0.00038372 |
| | | + 20 (Ref) | 0.71563073 | -0.00036927 |
| | | + 30 | 0.71562346 | -0.00037654 |
| | | + 40 | 0.71562854 | -0.00037146 |
| | | + 50 | 0.71561014 | -0.00038986 |
| Battery Endpoint | 3.40 | + 20 | 0.71558145 | -0.00041855 |

**Table 7-37. LTE Band 12/17 Upper Boundary Frequency Stability Data**

**Frequency Stability / Temperature Variation**

| LTE Band 13 | | | | |
|---|---|---|---|---|
| | Operating Band Lower Boundary (GHz) | | 0.777 | |
| | Ref. Voltage (VDC): | | 3.80 | |
| **Voltage (%)** | **Power (VDC)** | **Temp (°C)** | **Measured Freq. (GHz)** | **Freq. Delta from Operating Range (GHz)** |
| 100 % | 3.80 | - 30 | 0.77738862 | -0.00038862 |
| | | - 20 | 0.77738421 | -0.00038421 |
| | | - 10 | 0.77740369 | -0.00040369 |
| | | 0 | 0.77741142 | -0.00041142 |
| | | + 10 | 0.77738699 | -0.00038699 |
| | | + 20 (Ref) | 0.77740413 | -0.00040413 |
| | | + 30 | 0.77738566 | -0.00038566 |
| | | + 40 | 0.77740121 | -0.00040121 |
| | | + 50 | 0.77738995 | -0.00038995 |
| Battery Endpoint | 3.40 | + 20 | 0.77737594 | -0.00037593 |

**Table 7-38. LTE Band 13 Lower Boundary Frequency Stability Data**

| LTE Band 13 | | | | |
|---|---|---|---|---|
| | Operating Band Upper Boundary (GHz) | | 0.787 | |
| | Ref. Voltage (VDC): | | 3.80 | |
| **Voltage (%)** | **Power (VDC)** | **Temp (°C)** | **Measured Freq. (GHz)** | **Freq. Delta from Operating Range (GHz)** |
| 100 % | 3.80 | - 30 | 0.78661997 | -0.00038003 |
| | | - 20 | 0.78660753 | -0.00039247 |
| | | - 10 | 0.78659192 | -0.00040808 |
| | | 0 | 0.78659443 | -0.00040557 |
| | | + 10 | 0.78663524 | -0.00036476 |
| | | + 20 (Ref) | 0.78659369 | -0.00040631 |
| | | + 30 | 0.78661346 | -0.00038654 |
| | | + 40 | 0.78660573 | -0.00039427 |
| | | + 50 | 0.78660605 | -0.00039395 |
| Battery Endpoint | 3.40 | + 20 | 0.78661911 | -0.00038089 |

**Table 7-39. LTE Band 13 Upper Boundary Frequency Stability Data**

**Frequency Stability / Temperature Variation**

## NR Band n66

| | |
|---|---|
| Operating Band Lower Boundary (GHz) | 1.710 |
| Ref. Voltage (VDC): | 3.80 |

| Voltage (%) | Power (VDC) | Temp (°C) | Measured Freq. (GHz) | Freq. Delta from Operating Range (GHz) |
|---|---|---|---|---|
| 100 % | 3.80 | - 30 | 1.71051747 | -0.00051747 |
| | | - 20 | 1.71051791 | -0.00051791 |
| | | - 10 | 1.71051603 | -0.00051603 |
| | | 0 | 1.71051335 | -0.00051335 |
| | | + 10 | 1.71051253 | -0.00051253 |
| | | + 20 (Ref) | 1.71051194 | -0.00051194 |
| | | + 30 | 1.71048726 | -0.00048726 |
| | | + 40 | 1.71048564 | -0.00048564 |
| | | + 50 | 1.71048872 | -0.00048872 |
| Battery Endpoint | 3.40 | + 20 | 1.71033413 | -0.00033413 |

**Table 7-40. NR Band n66 Lower Boundary Frequency Stability Data**

## NR Band n66

| | |
|---|---|
| Operating Band Upper Boundary (GHz) | 1.780 |
| Ref. Voltage (VDC): | 3.80 |

| Voltage (%) | Power (VDC) | Temp (°C) | Measured Freq. (GHz) | Freq. Delta from Operating Range (GHz) |
|---|---|---|---|---|
| 100 % | 3.80 | - 30 | 1.77950424 | -0.00049576 |
| | | - 20 | 1.77949563 | -0.00050437 |
| | | - 10 | 1.77949139 | -0.00050861 |
| | | 0 | 1.77948279 | -0.00051721 |
| | | + 10 | 1.77947836 | -0.00052165 |
| | | + 20 (Ref) | 1.77947268 | -0.00052732 |
| | | + 30 | 1.77946729 | -0.00053271 |
| | | + 40 | 1.77949901 | -0.00050099 |
| | | + 50 | 1.77949157 | -0.00050843 |
| Battery Endpoint | 3.40 | + 20 | 1.77967354 | -0.00032646 |

**Table 7-41. NR Band n66 Upper Boundary Frequency Stability Data**

**Frequency Stability / Temperature Variation**

## NR Band n71

| | |
|---|---|
| Operating Band Lower Boundary (GHz) | 0.663 |
| Ref. Voltage (VDC): | 3.80 |

| Voltage (%) | Power (VDC) | Temp (°C) | Measured Freq. (GHz) | Freq. Delta from Operating Range (GHz) |
|---|---|---|---|---|
| 100 % | 3.80 | - 30 | 0.66340714 | -0.00040714 |
| | | - 20 | 0.66340595 | -0.00040595 |
| | | - 10 | 0.66340679 | -0.00040679 |
| | | 0 | 0.66340630 | -0.00040630 |
| | | + 10 | 0.66340312 | -0.00040311 |
| | | + 20 (Ref) | 0.66340560 | -0.00040560 |
| | | + 30 | 0.66340507 | -0.00040507 |
| | | + 40 | 0.66340196 | -0.00040196 |
| | | + 50 | 0.66340131 | -0.00040131 |
| Battery Endpoint | 3.40 | + 20 | 0.66335009 | -0.00035009 |

**Table 7-42. NR Band n71 Lower Boundary Frequency Stability Data**

## NR Band n71

| | |
|---|---|
| Operating Band Upper Boundary (GHz) | 0.698 |
| Ref. Voltage (VDC): | 3.80 |

| Voltage (%) | Power (VDC) | Temp (°C) | Measured Freq. (GHz) | Freq. Delta from Operating Range (GHz) |
|---|---|---|---|---|
| 100 % | 3.80 | - 30 | 0.69759002 | -0.00040998 |
| | | - 20 | 0.69759399 | -0.00040601 |
| | | - 10 | 0.69759419 | -0.00040581 |
| | | 0 | 0.69759471 | -0.00040529 |
| | | + 10 | 0.69759456 | -0.00040544 |
| | | + 20 (Ref) | 0.69759221 | -0.00040779 |
| | | + 30 | 0.69759374 | -0.00040626 |
| | | + 40 | 0.69757097 | -0.00042903 |
| | | + 50 | 0.69756725 | -0.00043275 |
| Battery Endpoint | 3.40 | + 20 | 0.69766369 | -0.00033631 |

**Table 7-43. NR Band n71 Upper Boundary Frequency Stability Data**

**Frequency Stability / Temperature Variation**

## NR Band n12

| | |
|---|---|
| Operating Band Lower Boundary (GHz) | 0.699 |
| Ref. Voltage (VDC): | 3.80 |

| Voltage (%) | Power (VDC) | Temp (°C) | Measured Freq. (GHz) | Freq. Delta from Operating Range (GHz) |
|---|---|---|---|---|
| 100 % | 3.80 | - 30 | 0.69933241 | -0.00033241 |
| | | - 20 | 0.69933025 | -0.00033025 |
| | | - 10 | 0.69932305 | -0.00032305 |
| | | 0 | 0.69931835 | -0.00031835 |
| | | + 10 | 0.69932467 | -0.00032467 |
| | | + 20 (Ref) | 0.69933062 | -0.00033062 |
| | | + 30 | 0.69931571 | -0.00031571 |
| | | + 40 | 0.69933875 | -0.00033875 |
| | | + 50 | 0.69933863 | -0.00033863 |
| Battery Endpoint | 3.40 | + 20 | 0.69924101 | -0.00024101 |

**Table 7-44. NR Band n12 Lower Boundary Frequency Stability Data**

## NR Band n12

| | |
|---|---|
| Operating Band Upper Boundary (GHz) | 0.716 |
| Ref. Voltage (VDC): | 3.80 |

| Voltage (%) | Power (VDC) | Temp (°C) | Measured Freq. (GHz) | Freq. Delta from Operating Range (GHz) |
|---|---|---|---|---|
| 100 % | 3.80 | - 30 | 0.71565994 | -0.00034006 |
| | | - 20 | 0.71566077 | -0.00033923 |
| | | - 10 | 0.71565709 | -0.00034291 |
| | | 0 | 0.71565847 | -0.00034153 |
| | | + 10 | 0.71565691 | -0.00034309 |
| | | + 20 (Ref) | 0.71565566 | -0.00034434 |
| | | + 30 | 0.71564997 | -0.00035003 |
| | | + 40 | 0.71563804 | -0.00036196 |
| | | + 50 | 0.71564528 | -0.00035472 |
| Battery Endpoint | 3.40 | + 20 | 0.71571443 | -0.00028557 |

**Table 7-45. NR Band n12 Upper Boundary Frequency Stability Data**

# 8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **Apple Watch FCC ID: BCG-A3335** complies with all the requirements of Part 27 of the FCC rules.