7.5 Peak-Average Ratio

§24.232(d)

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 v03 – Section 5.7.1

Test Settings

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

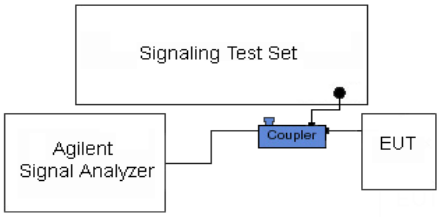
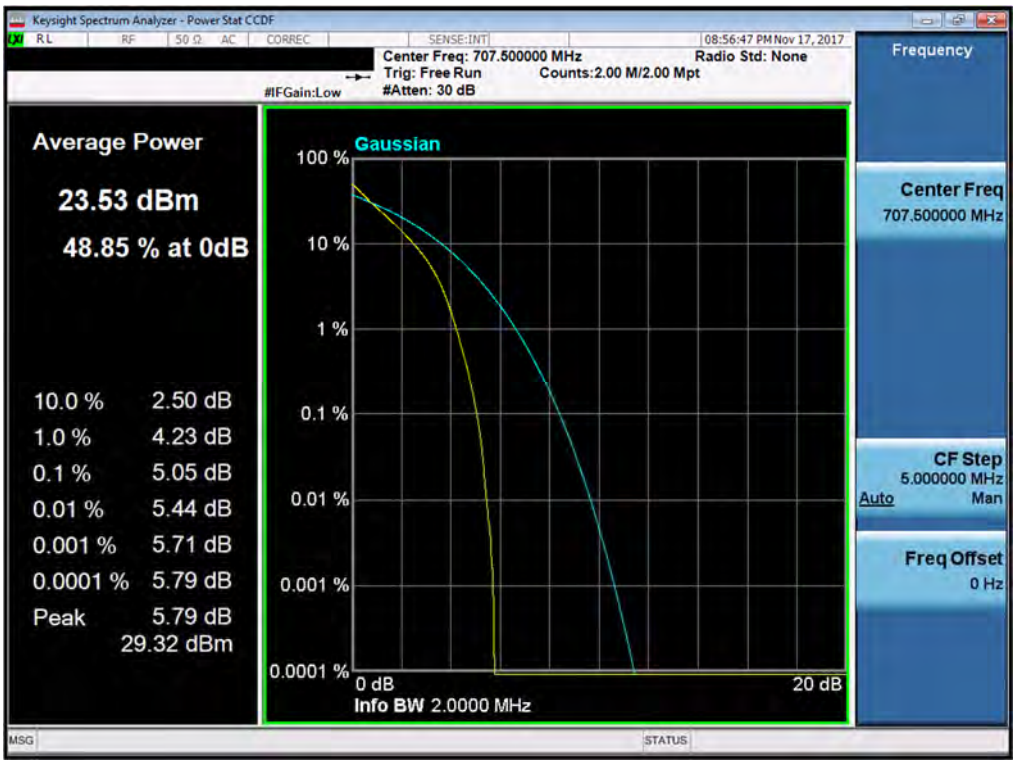


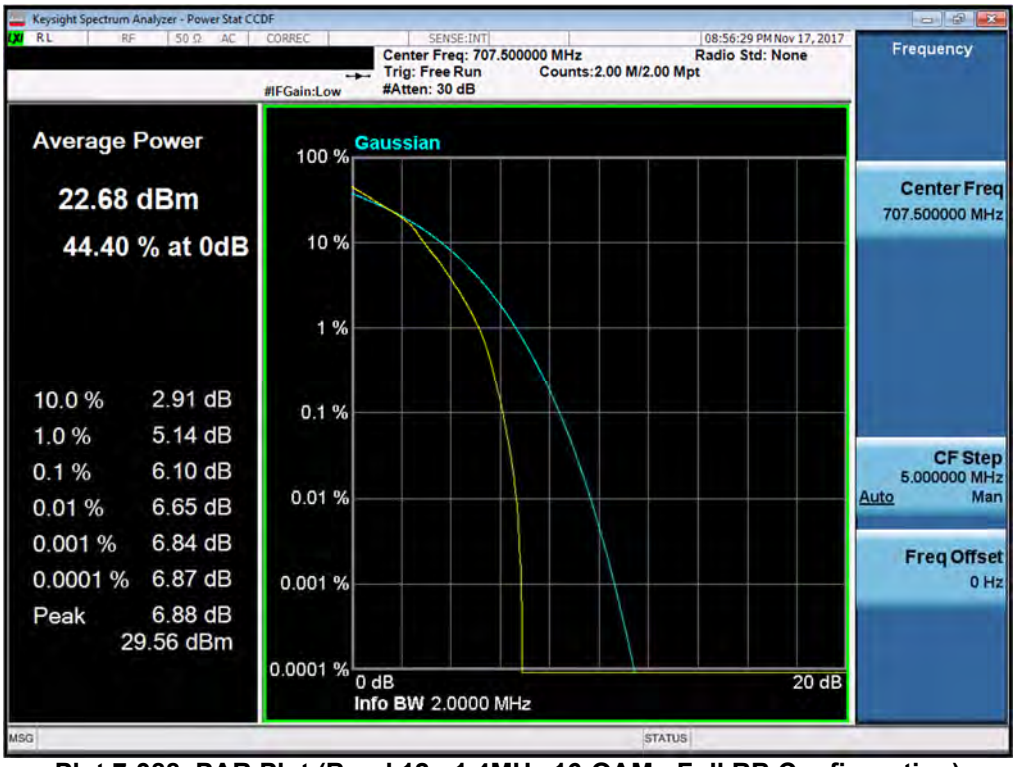
Figure 7-4. Test Instrument & Measurement Setup

Test Notes

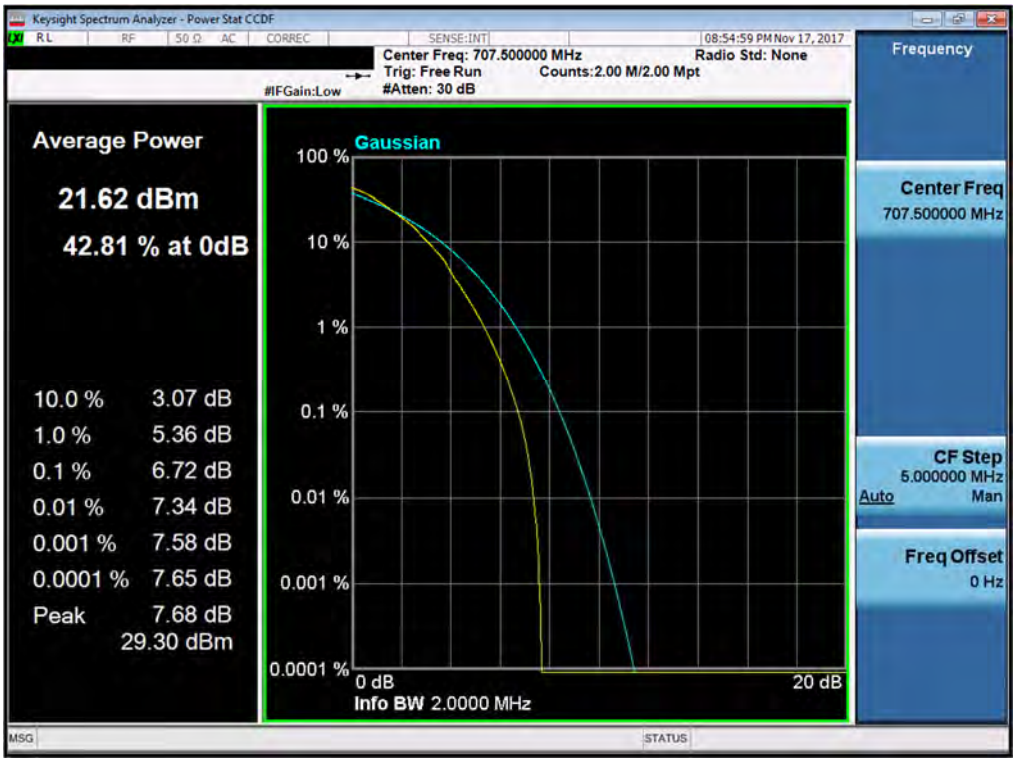
None.



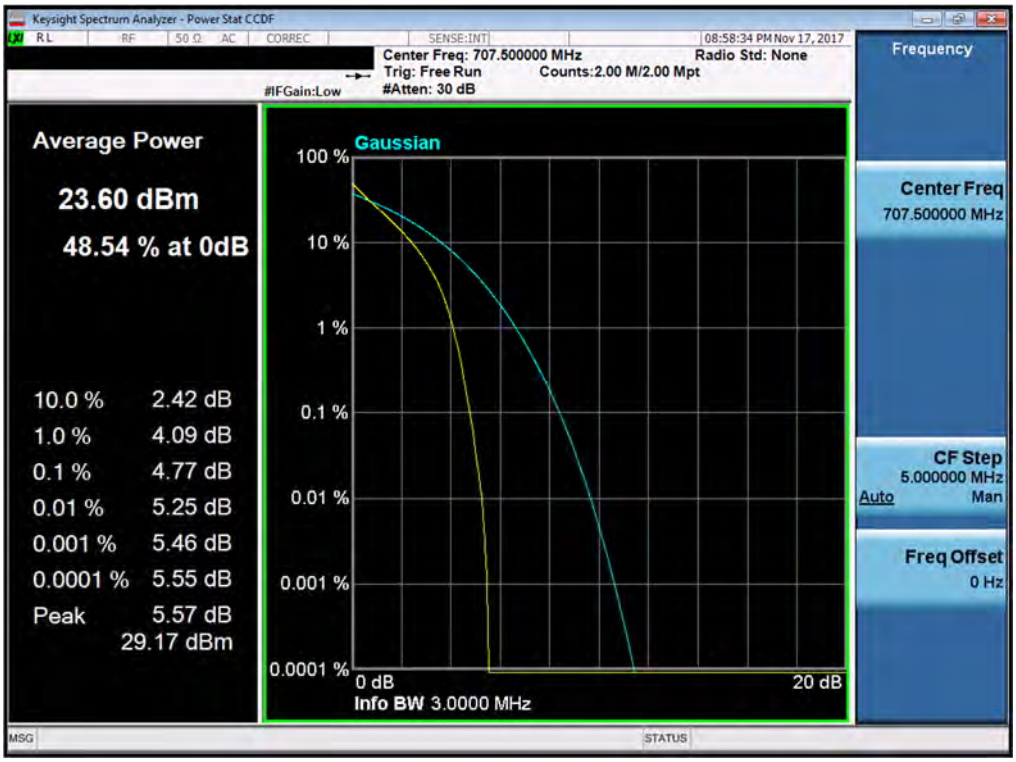
Plot 7-387. PAR Plot (Band 12 - 1.4MHz QPSK - Full RB Configuration)



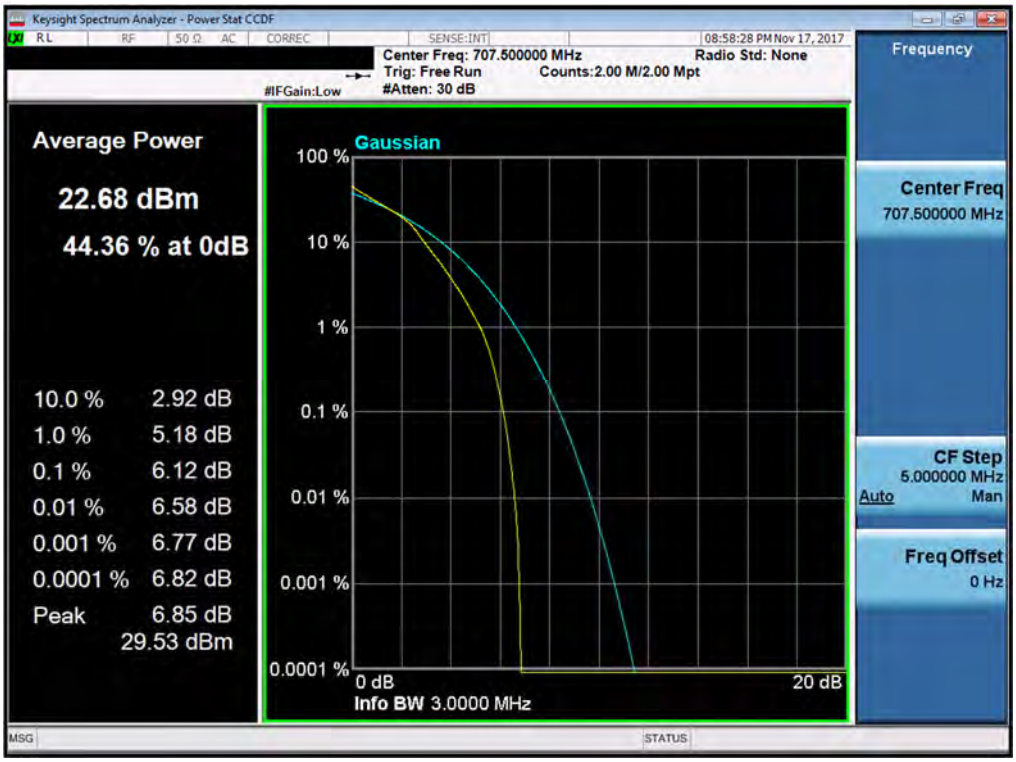
Plot 7-388. PAR Plot (Band 12 - 1.4MHz 16-QAM - Full RB Configuration)



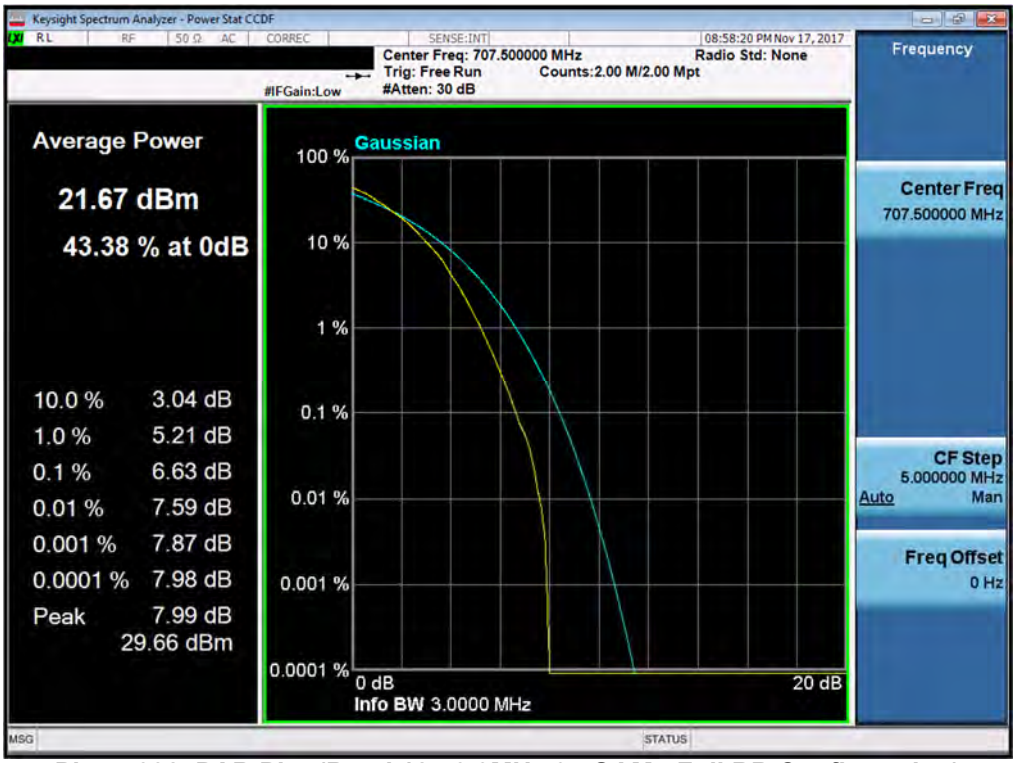
Plot 7-389. PAR Plot (Band 12 - 1.4MHz 64-QAM - Full RB Configuration)



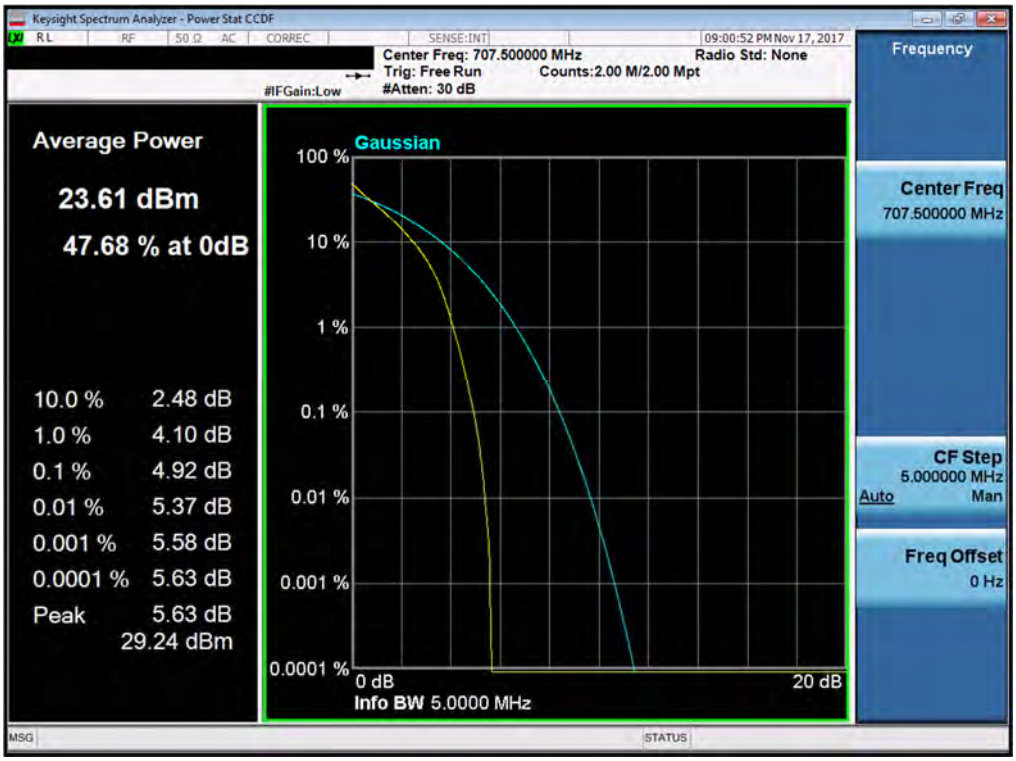
Plot 7-390. PAR Plot (Band 12 - 3.0MHz QPSK - Full RB Configuration)



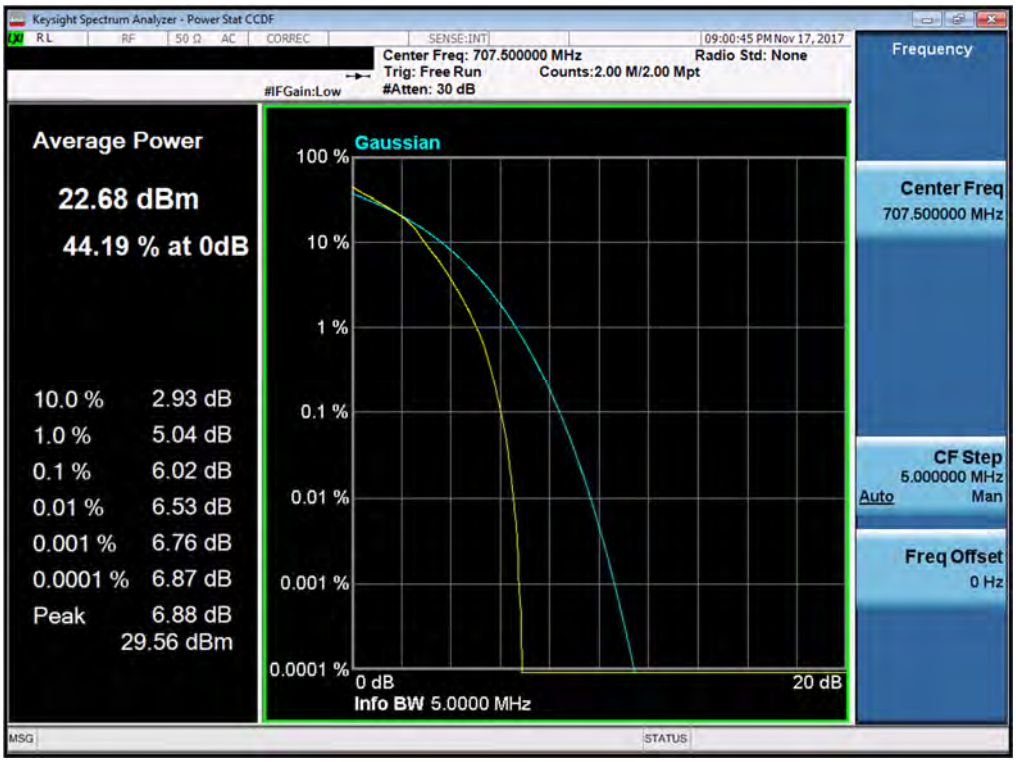
Plot 7-391. PAR Plot (Band 12 - 3.0MHz 16-QAM - Full RB Configuration)



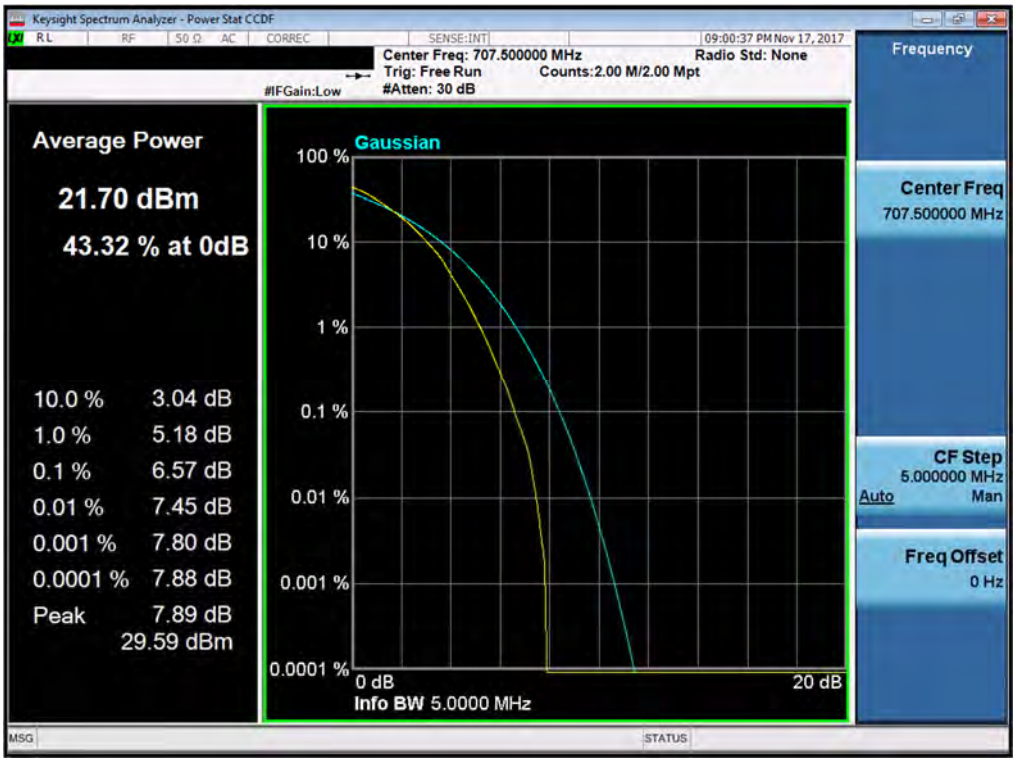
Plot 7-392. PAR Plot (Band 12 - 3.0MHz 64-QAM - Full RB Configuration)



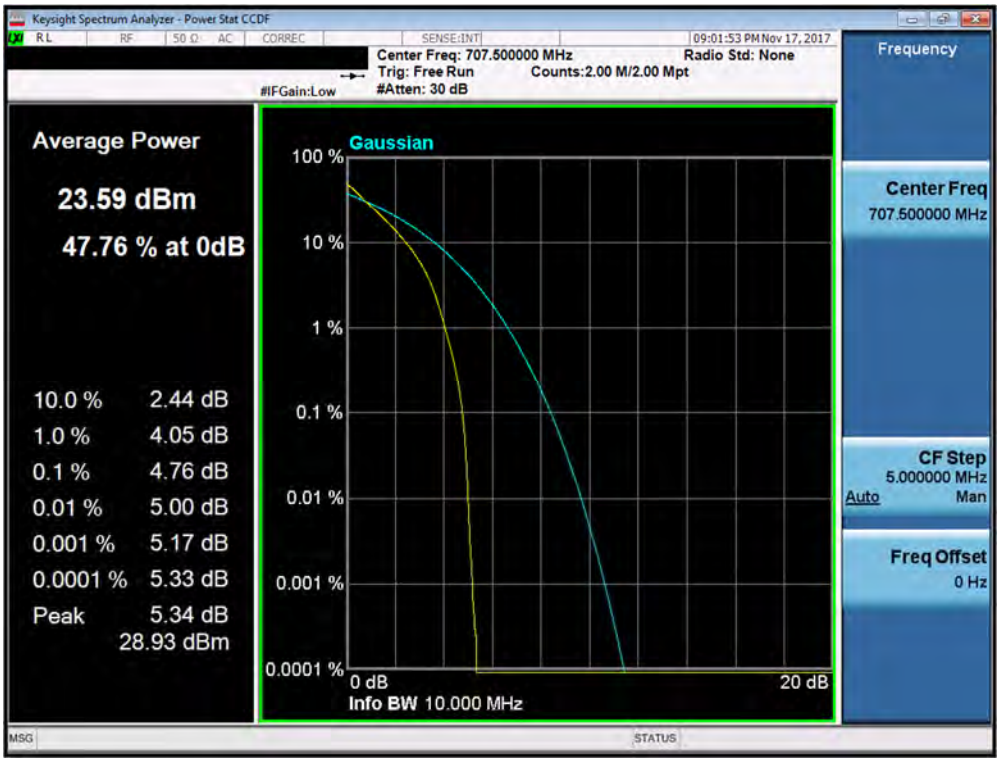
Plot 7-393. PAR Plot (Band 12/17 - 5.0MHz QPSK - Full RB Configuration)



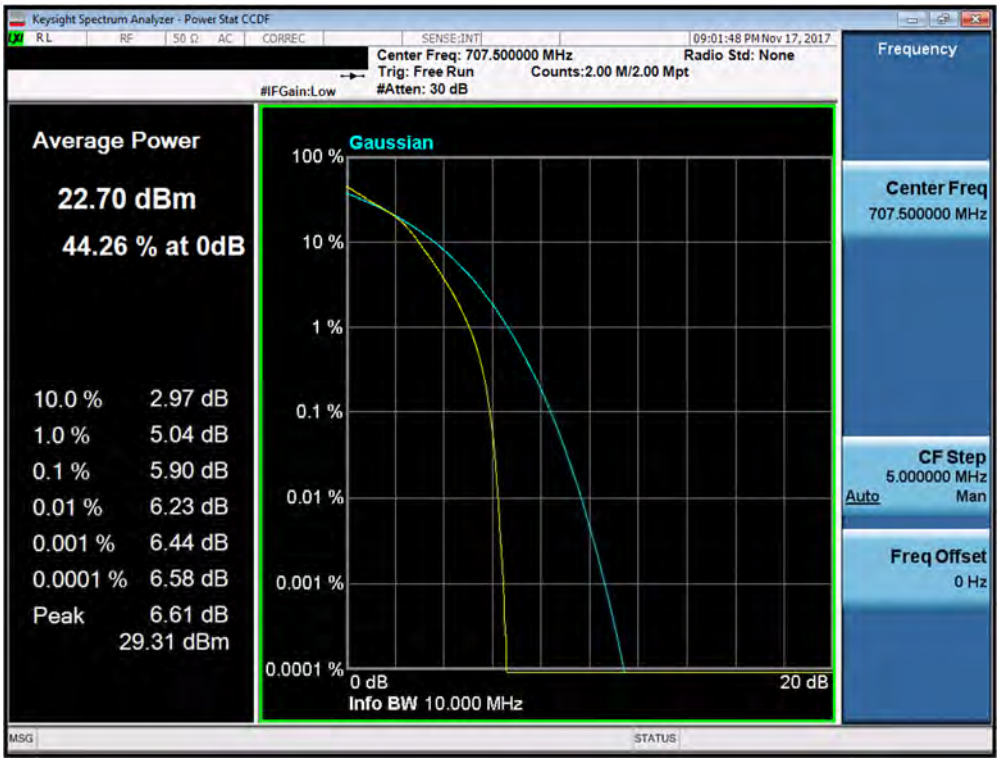
Plot 7-394. PAR Plot (Band 12/17 - 5.0MHz 16-QAM - Full RB Configuration)



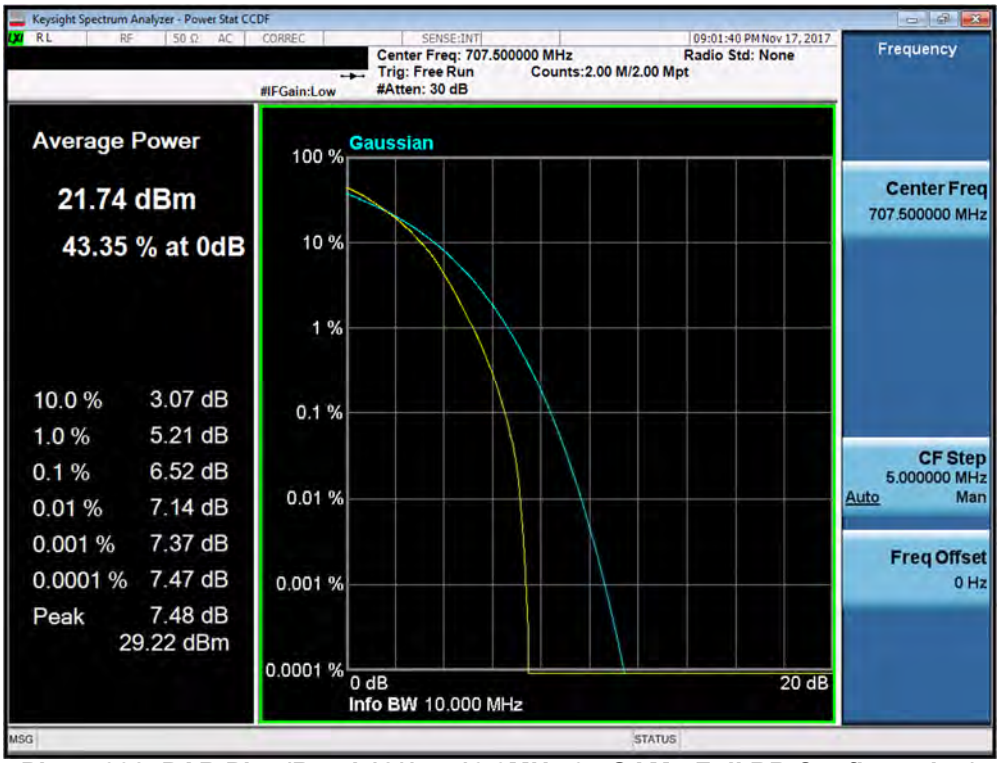
Plot 7-395. PAR Plot (Band 12/17 - 5.0MHz 64-QAM - Full RB Configuration)



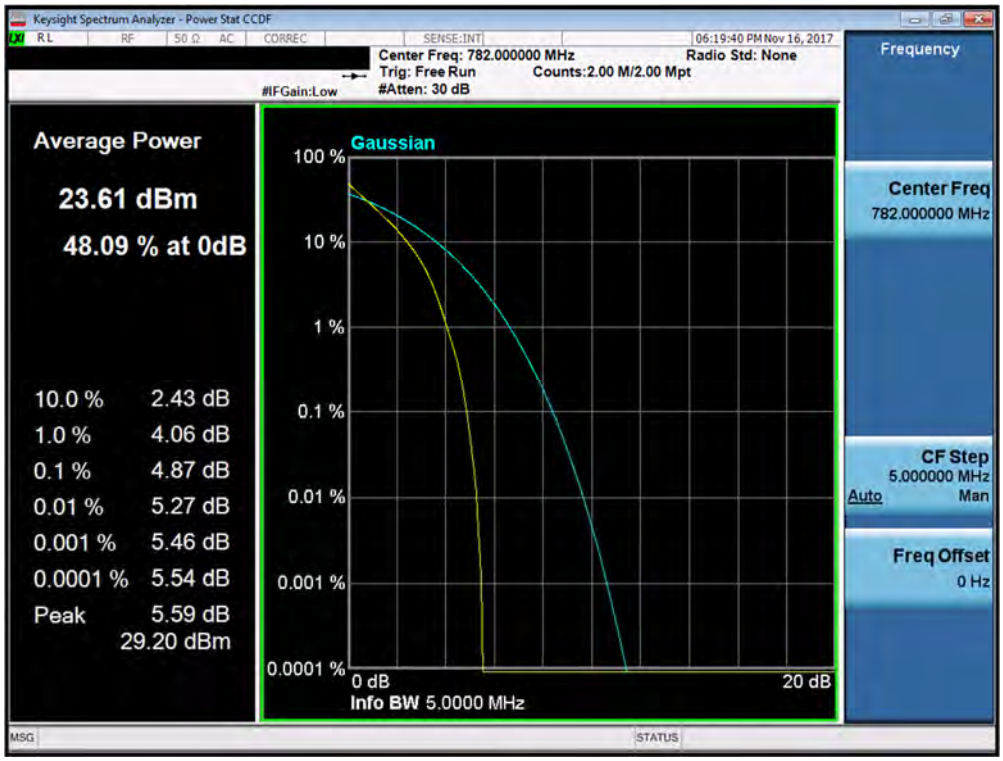
Plot 7-396. PAR Plot (Band 12/17 - 10.0MHz QPSK - Full RB Configuration)



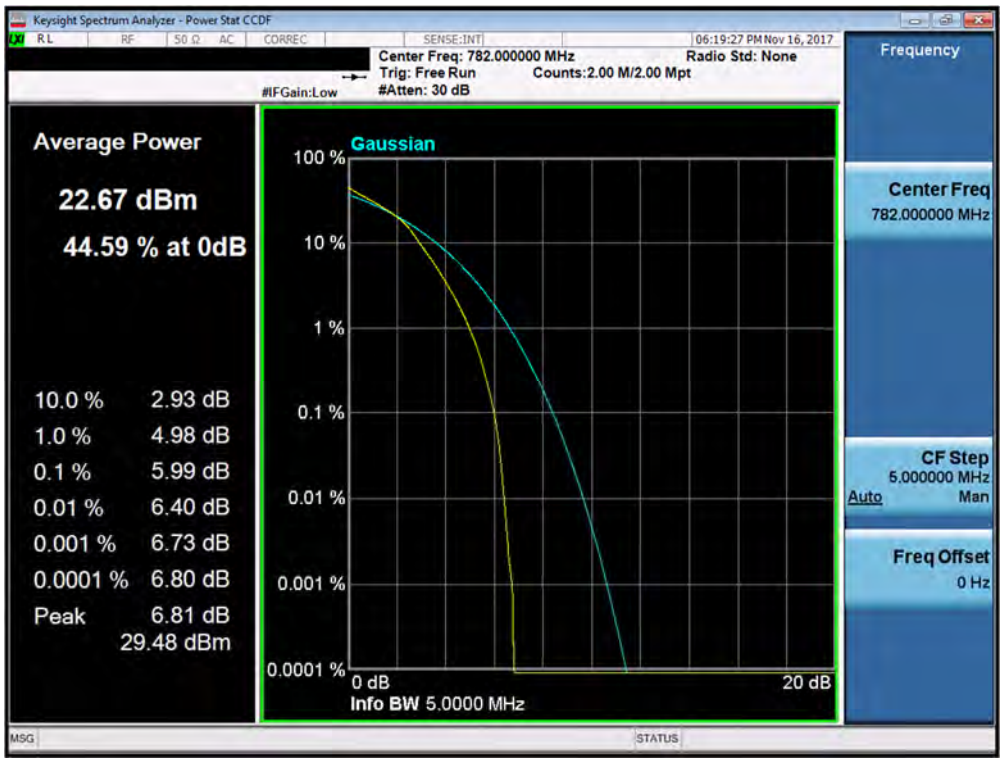
Plot 7-397. PAR Plot (Band 12/17 - 10.0MHz 16-QAM - Full RB Configuration)



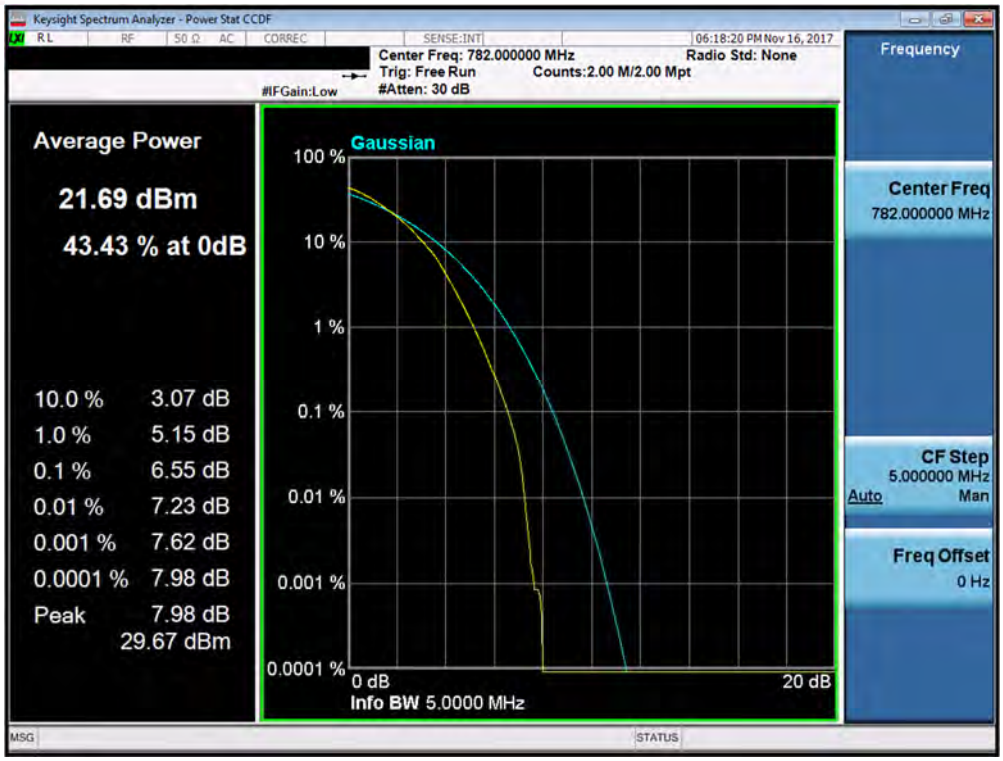
Plot 7-398. PAR Plot (Band 12/17 - 10.0MHz 64-QAM - Full RB Configuration)



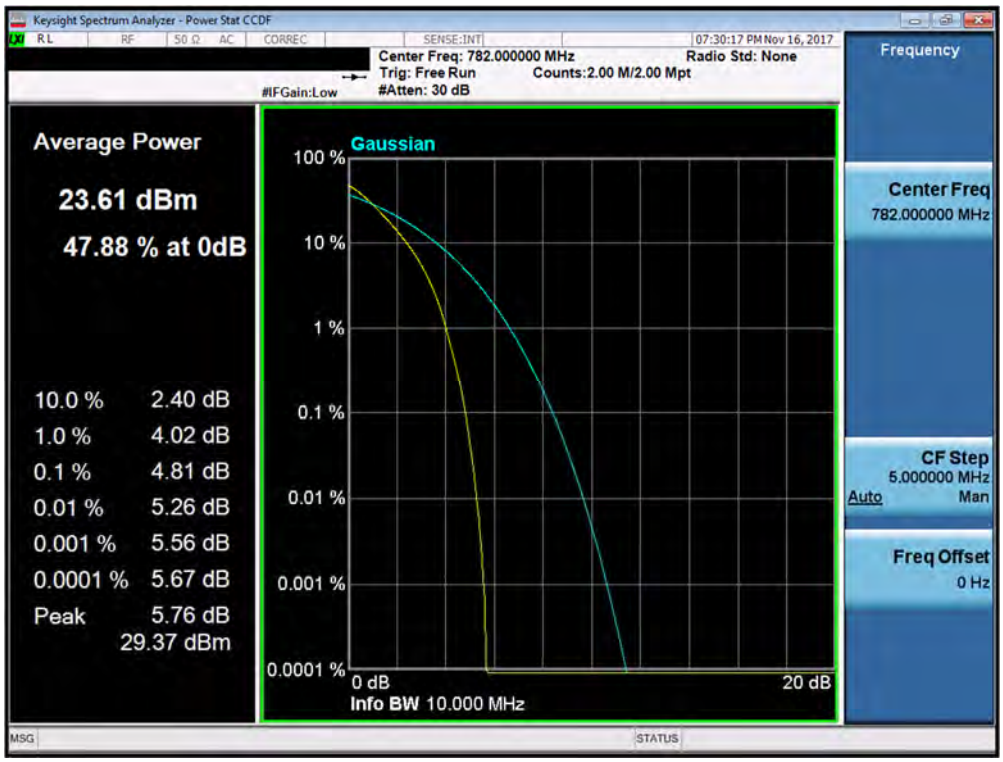
Plot 7-399. PAR Plot (Band 13 - 5.0MHz QPSK - Full RB Configuration)



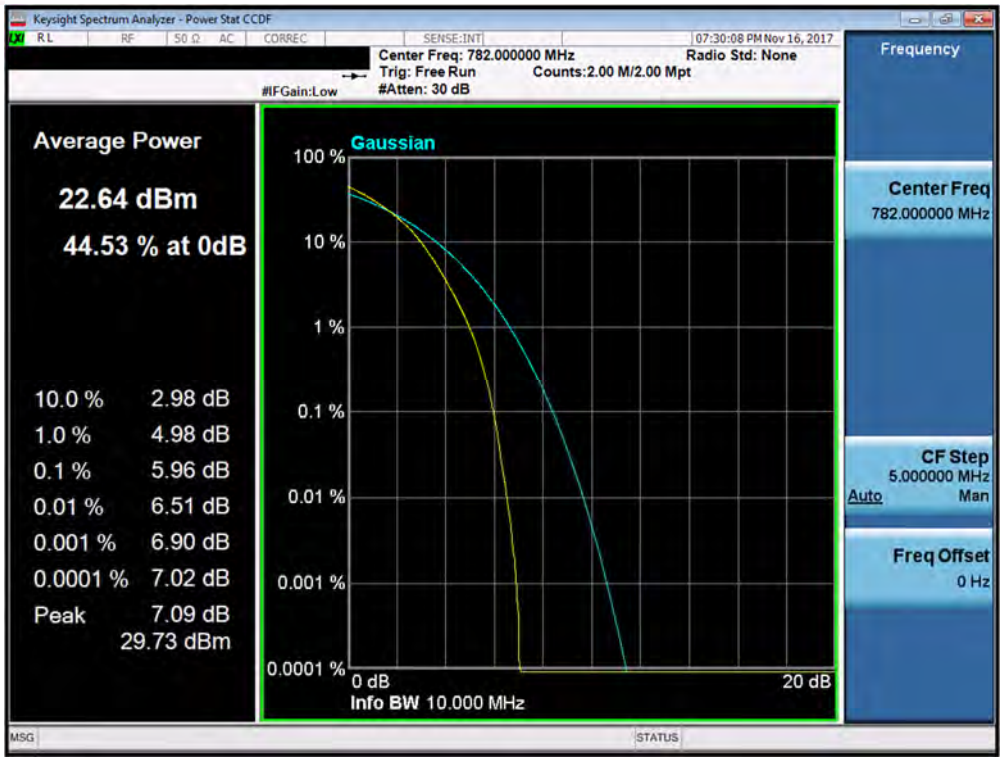
Plot 7-400. PAR Plot (Band 13 - 5.0MHz 16-QAM - Full RB Configuration)



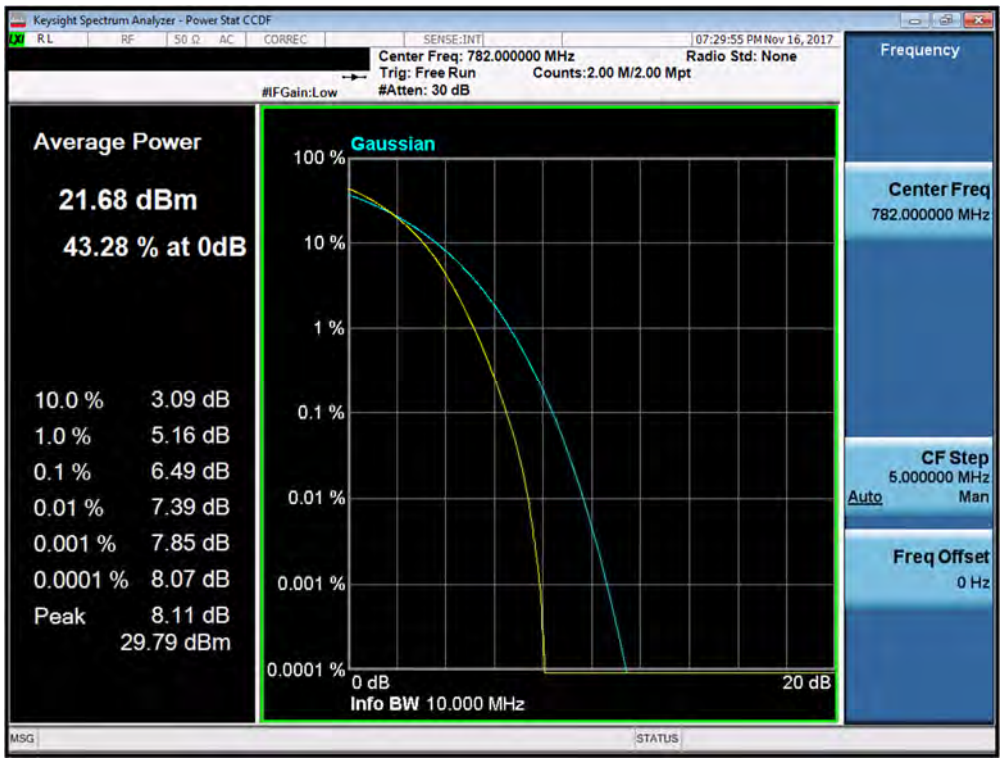
Plot 7-401. PAR Plot (Band 13 - 5.0MHz 64-QAM - Full RB Configuration)



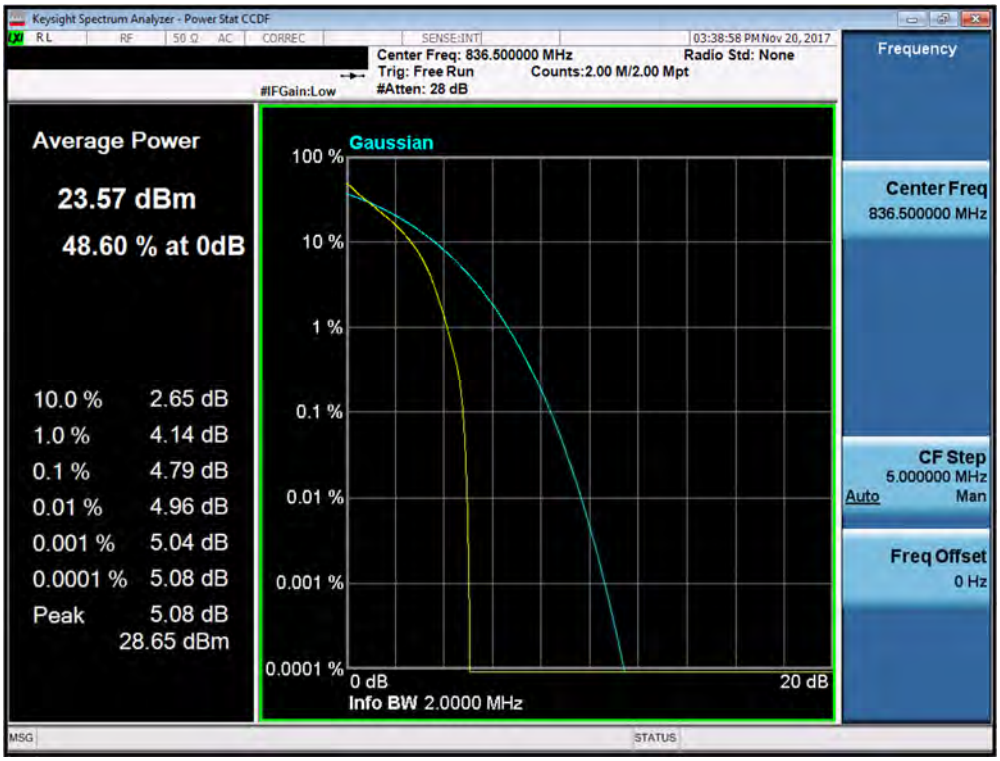
Plot 7-402. PAR Plot (Band 13 - 10.0MHz QPSK - Full RB Configuration)



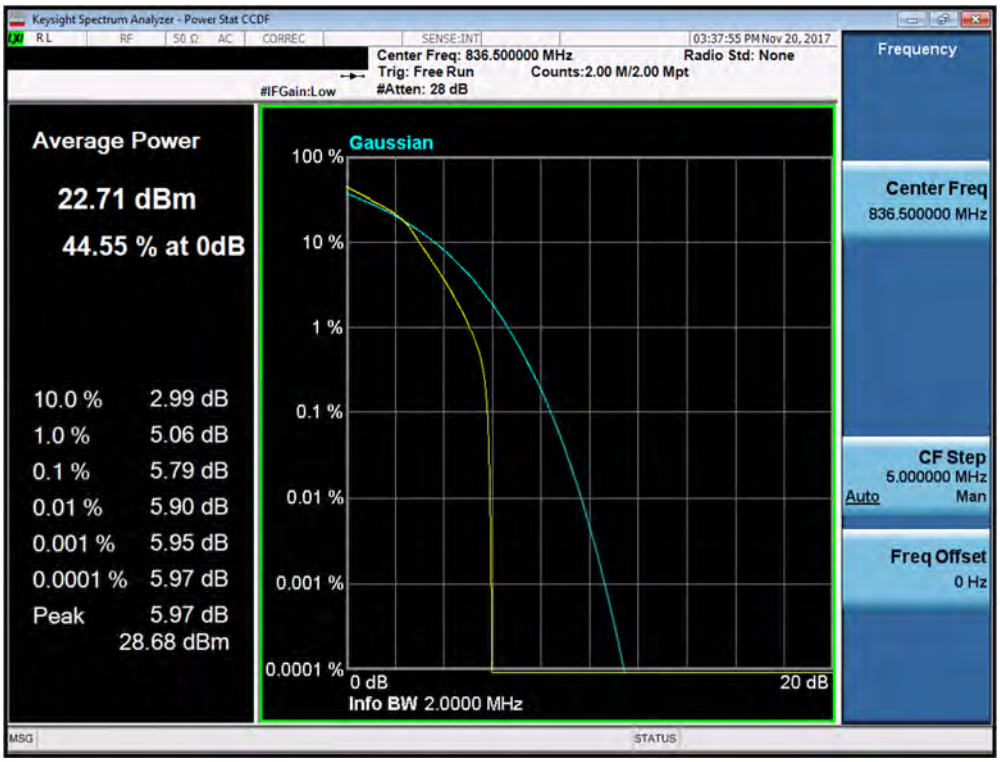
Plot 7-403. PAR Plot (Band 13 - 10.0MHz 16-QAM - Full RB Configuration)



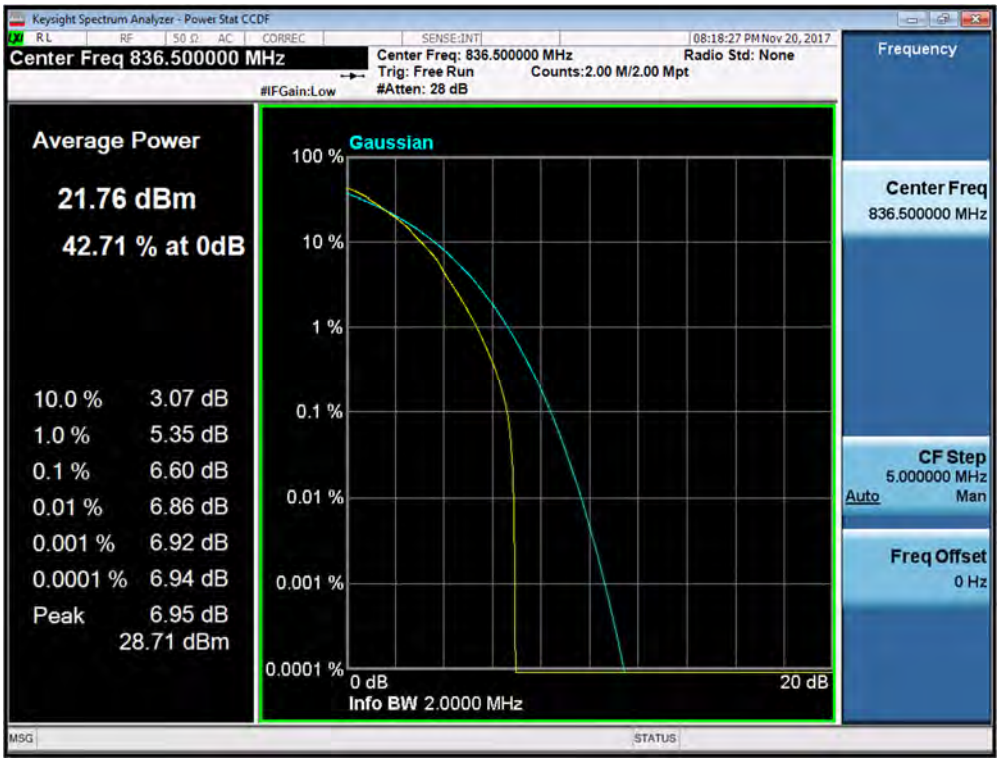
Plot 7-404. PAR Plot (Band 13 - 10.0MHz 64-QAM - Full RB Configuration)



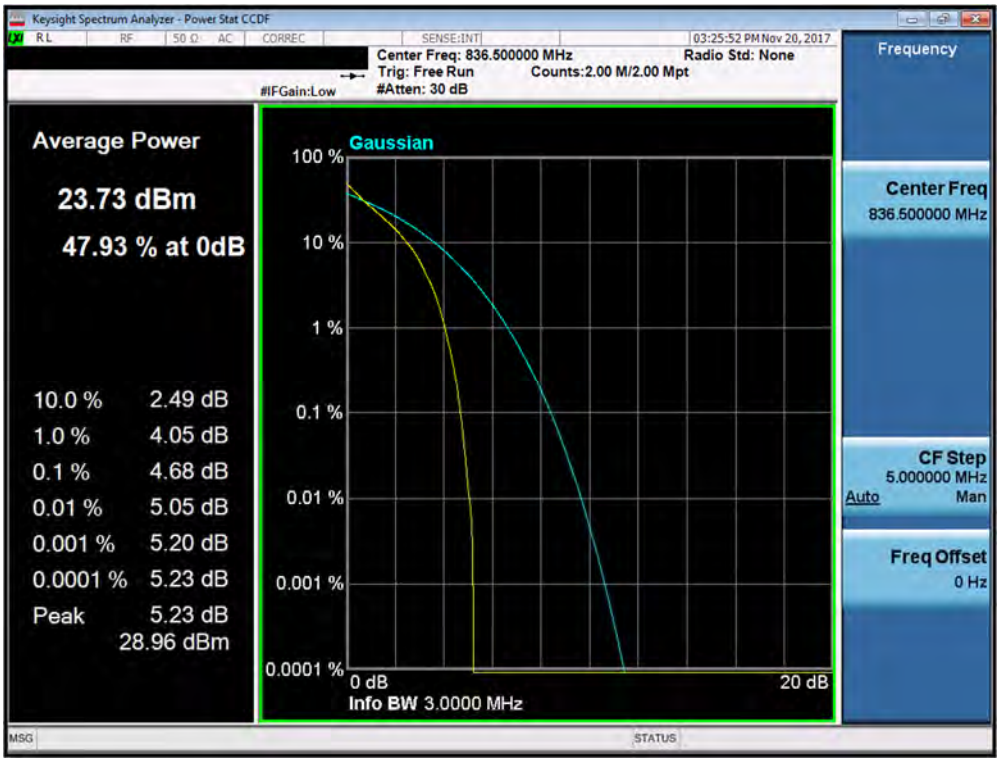
Plot 7-405. PAR Plot (Band 5/26 - 1.4MHz QPSK - Full RB Configuration)



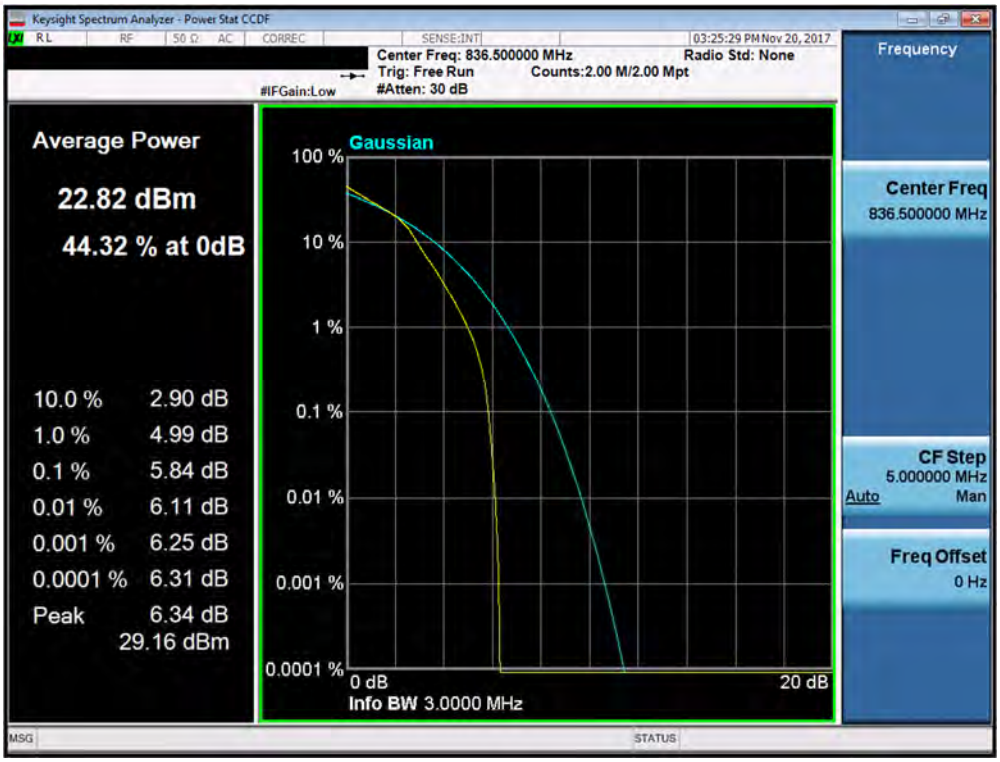
Plot 7-406. PAR Plot (Band 5/26 - 1.4MHz 16-QAM - Full RB Configuration)



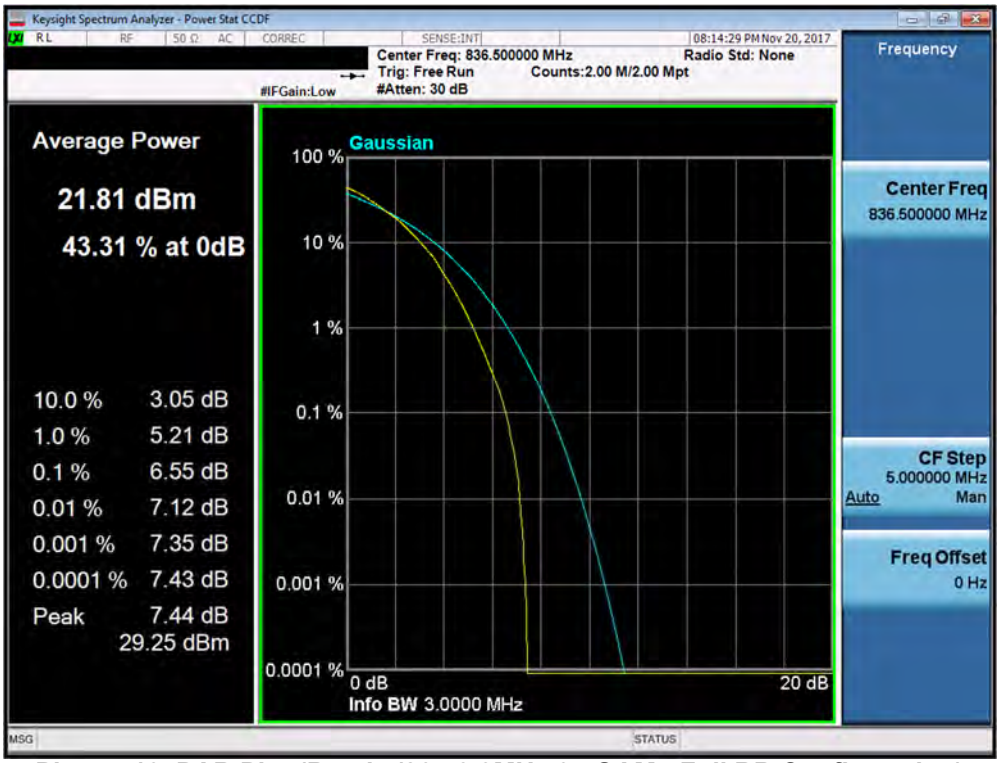
Plot 7-407. PAR Plot (Band 5/26 - 1.4MHz 64-QAM - Full RB Configuration)



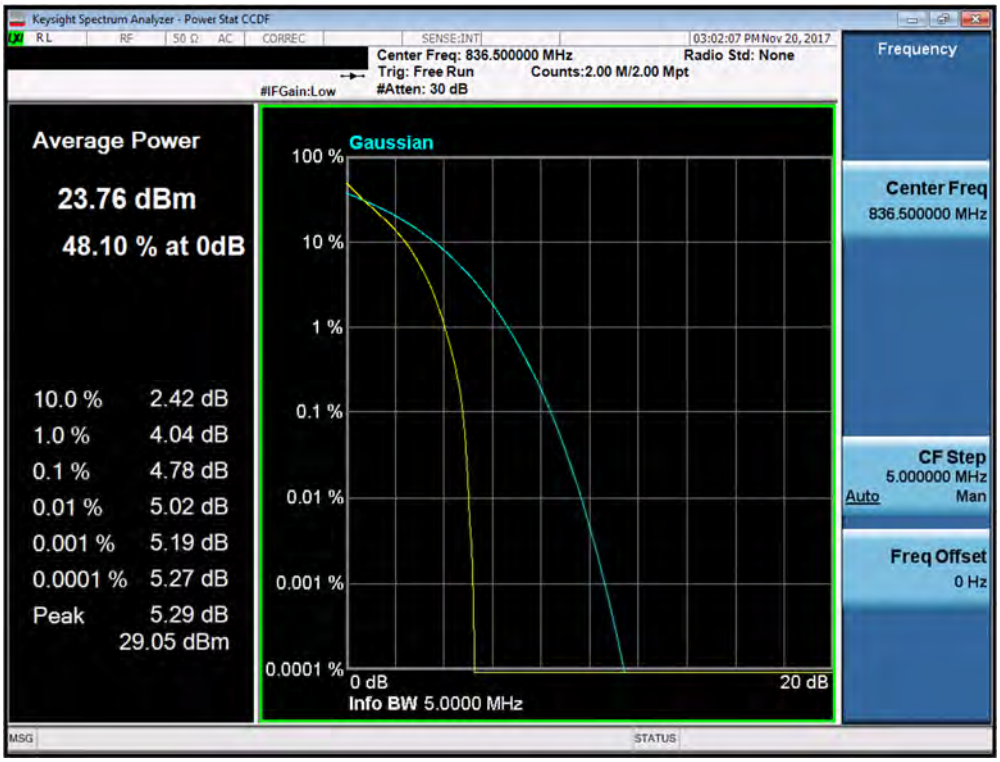
Plot 7-408. PAR Plot (Band 5/26 - 3.0MHz QPSK - Full RB Configuration)



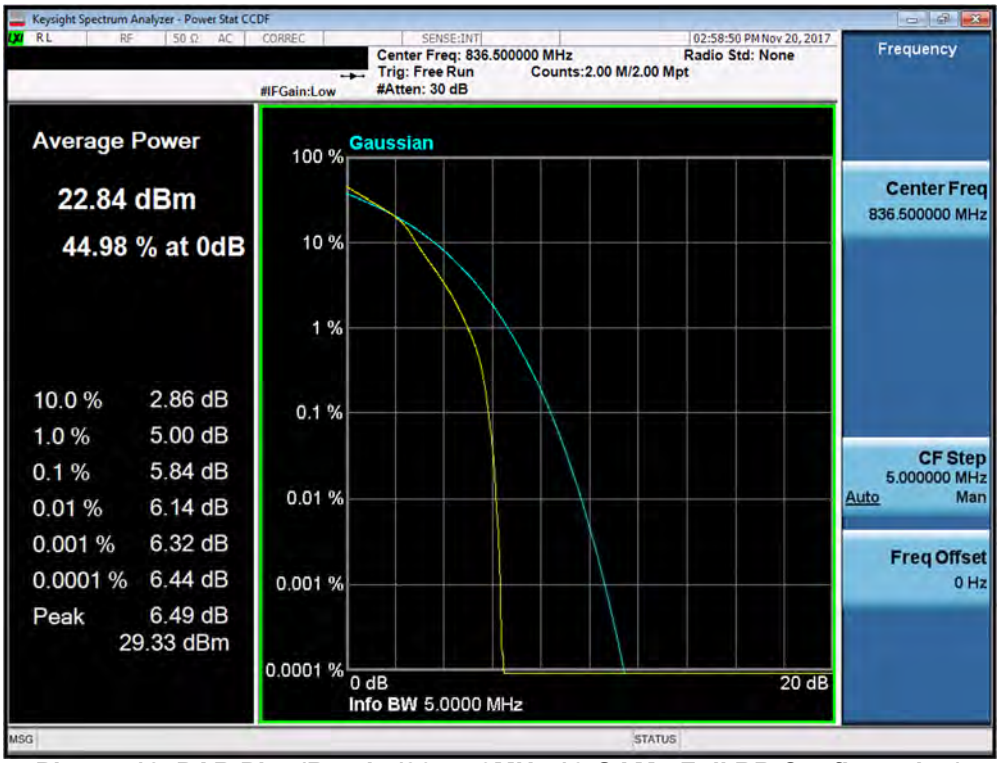
Plot 7-409. PAR Plot (Band 5/26 - 3.0MHz 16-QAM - Full RB Configuration)



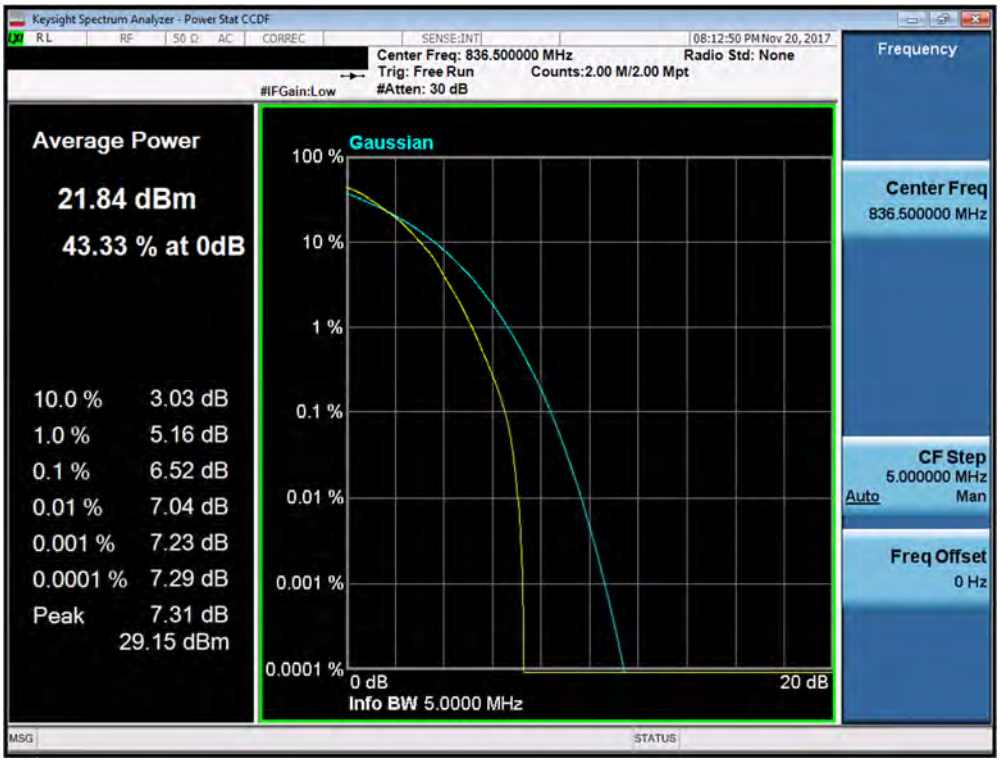
Plot 7-410. PAR Plot (Band 5/26 - 3.0MHz 64-QAM - Full RB Configuration)



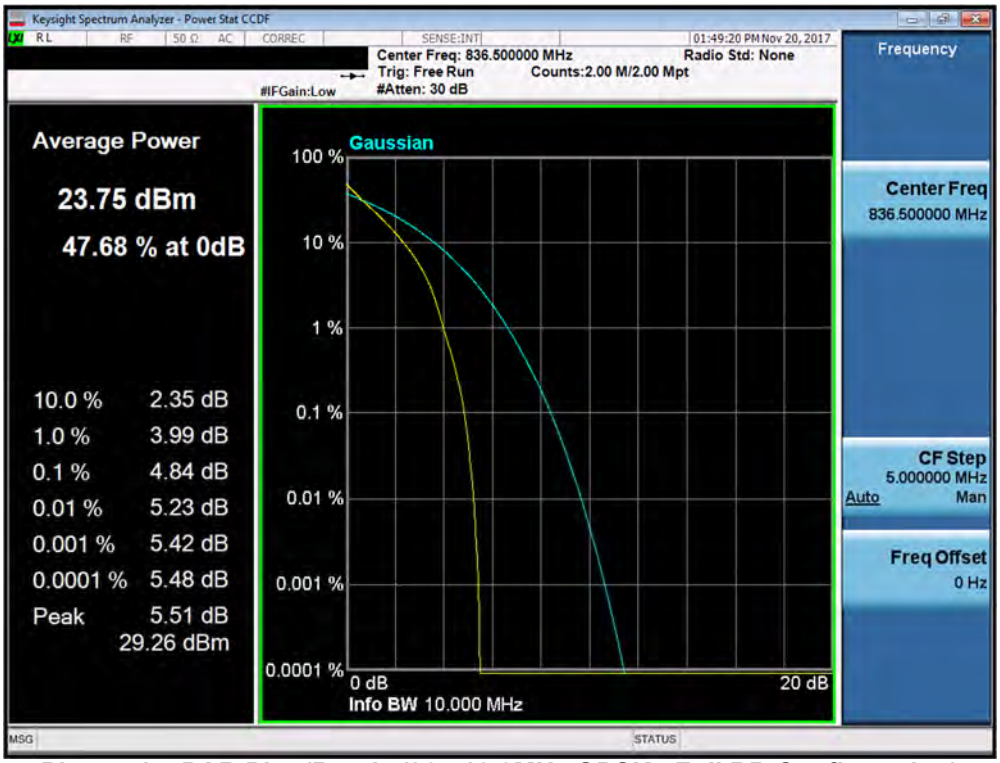
Plot 7-411. PAR Plot (Band 5/26 - 5.0MHz QPSK - Full RB Configuration)



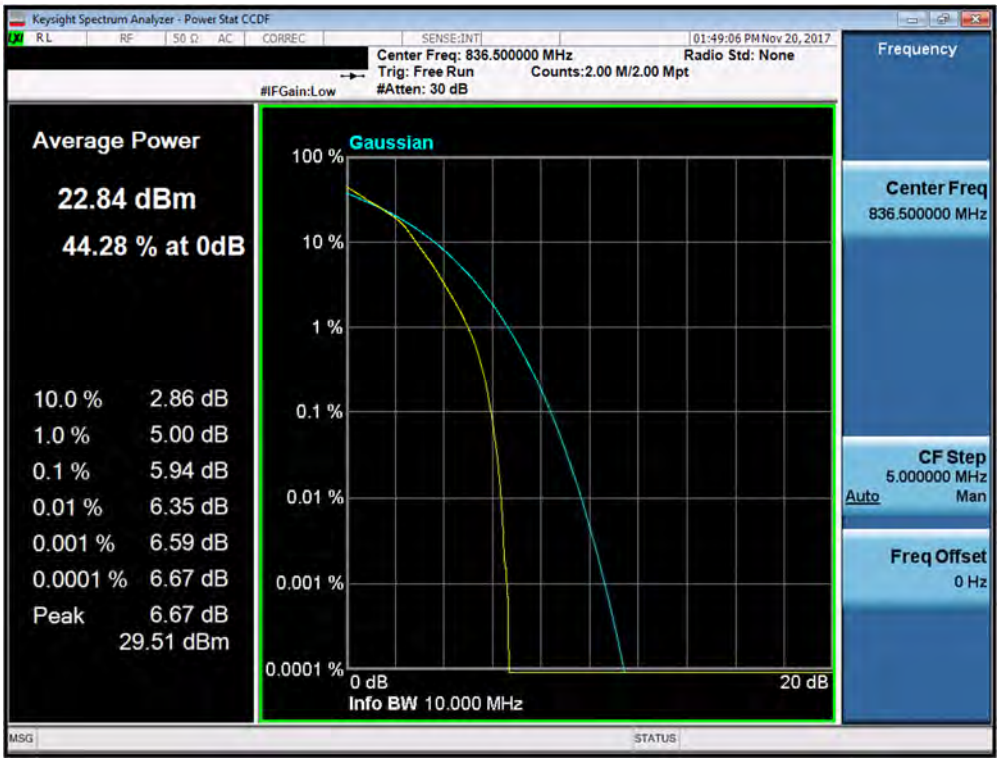
Plot 7-412. PAR Plot (Band 5/26 - 5.0MHz 16-QAM - Full RB Configuration)



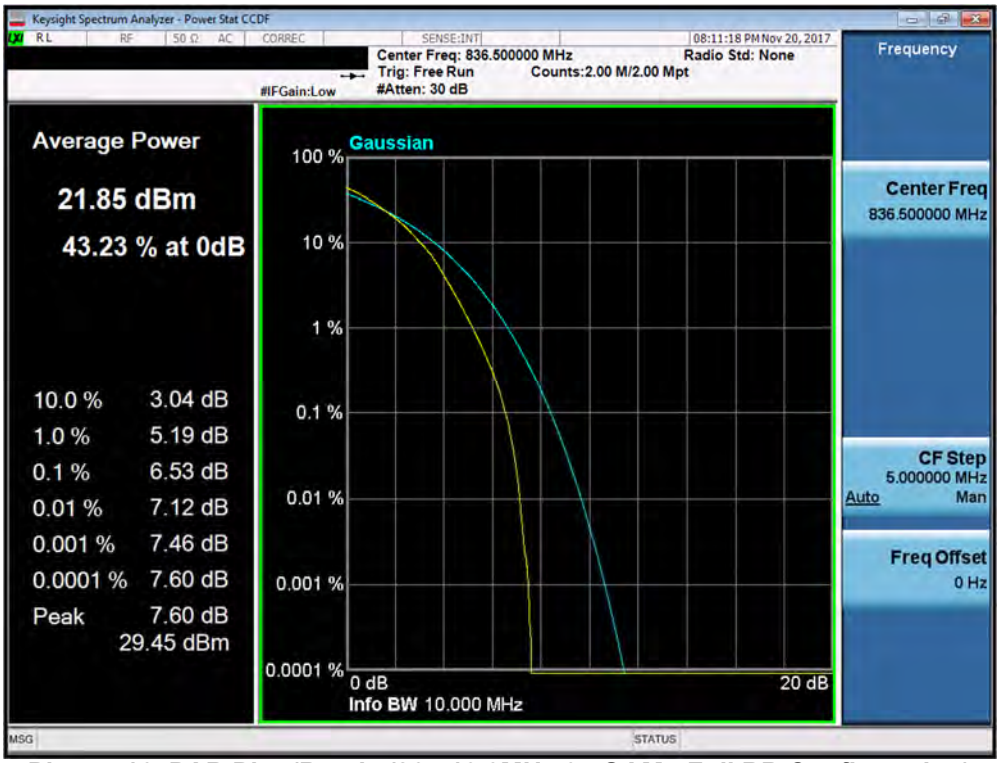
Plot 7-413. PAR Plot (Band 5/26 - 5.0MHz 64-QAM - Full RB Configuration)



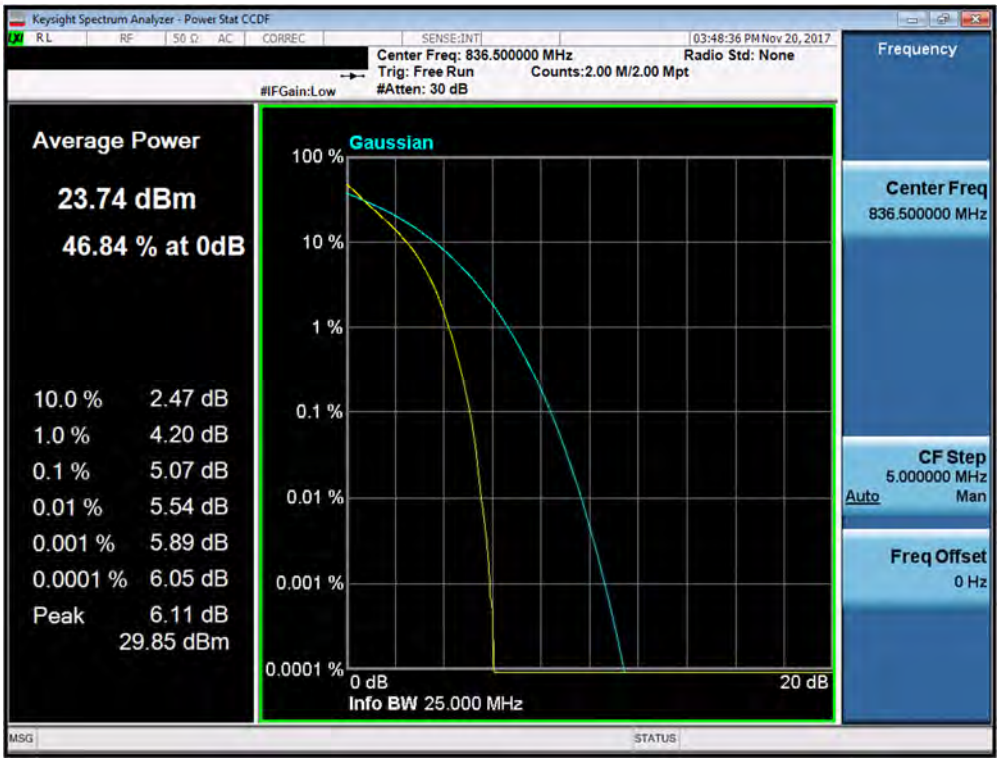
Plot 7-414. PAR Plot (Band 5/26 - 10.0MHz QPSK - Full RB Configuration)



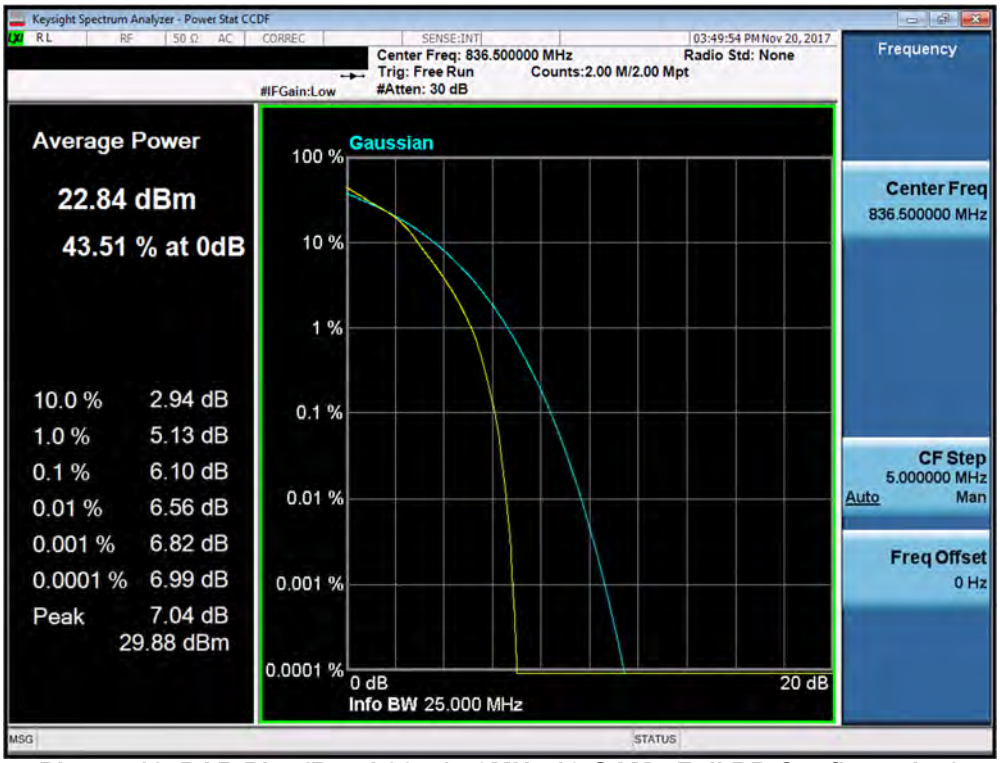
Plot 7-415. PAR Plot (Band 5/26 - 10.0MHz 16-QAM - Full RB Configuration)



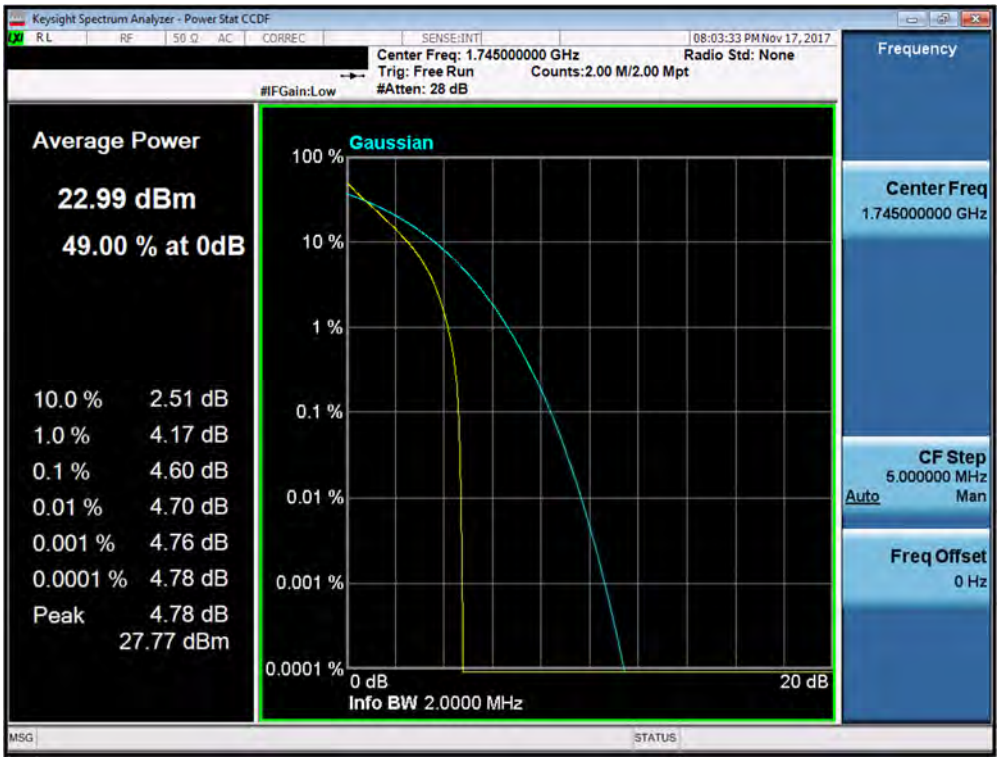
Plot 7-416. PAR Plot (Band 5/26 - 10.0MHz 64-QAM - Full RB Configuration)



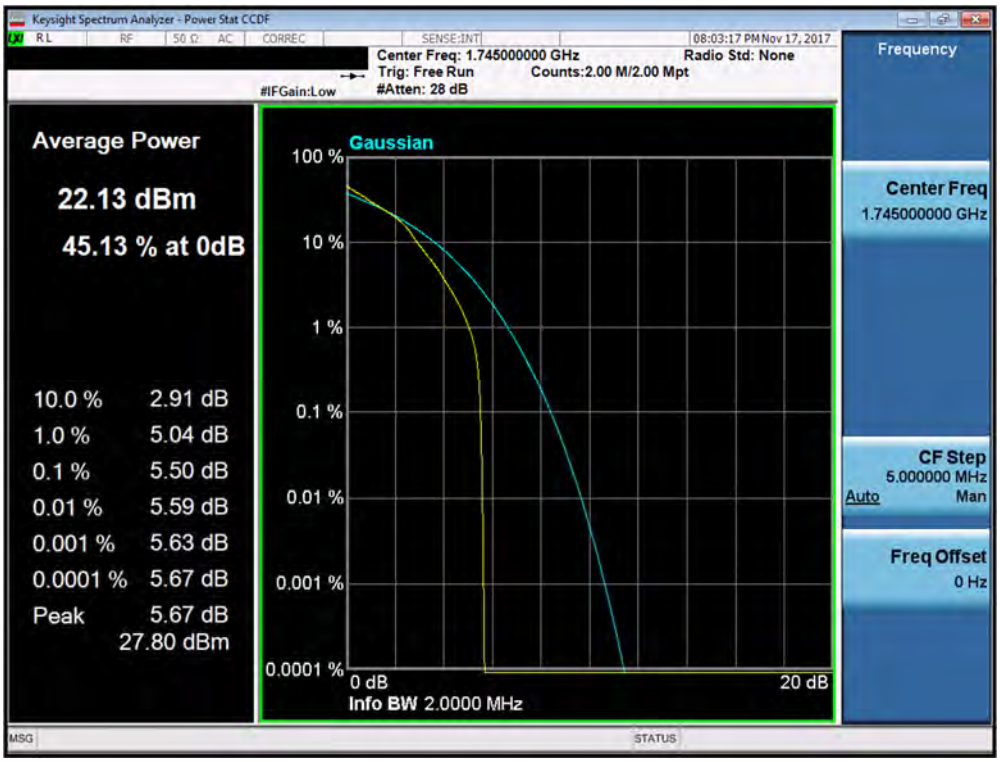
Plot 7-417. PAR Plot (Band 26 - 15.0MHz QPSK - Full RB Configuration)



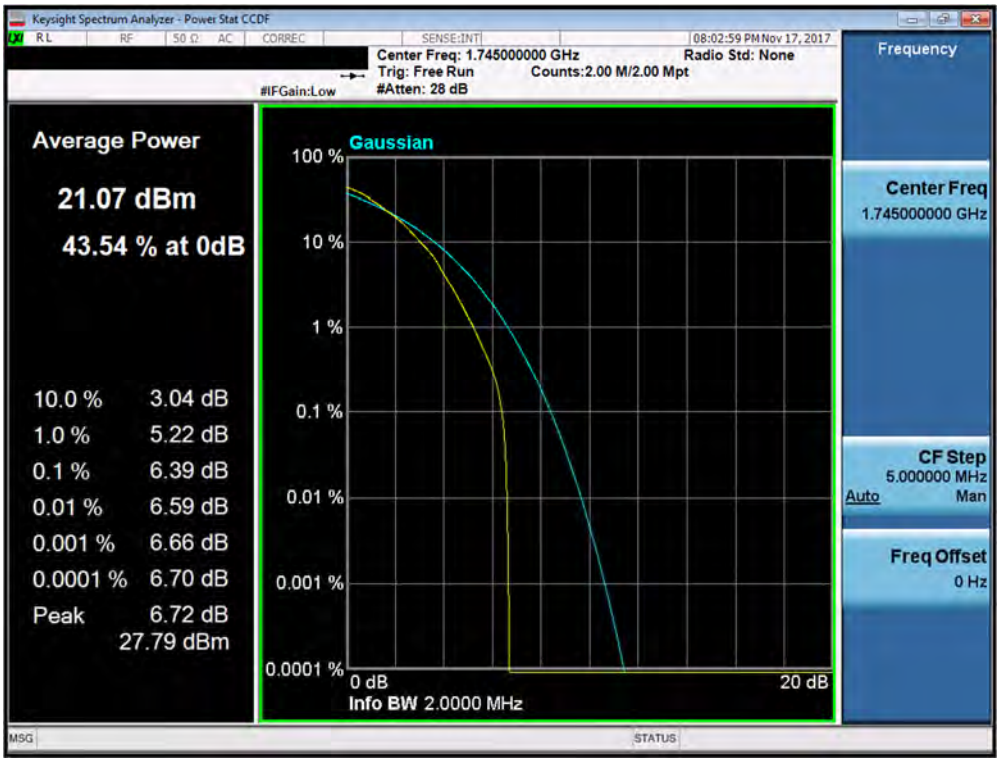
Plot 7-418. PAR Plot (Band 26 - 15.0MHz 16-QAM - Full RB Configuration)



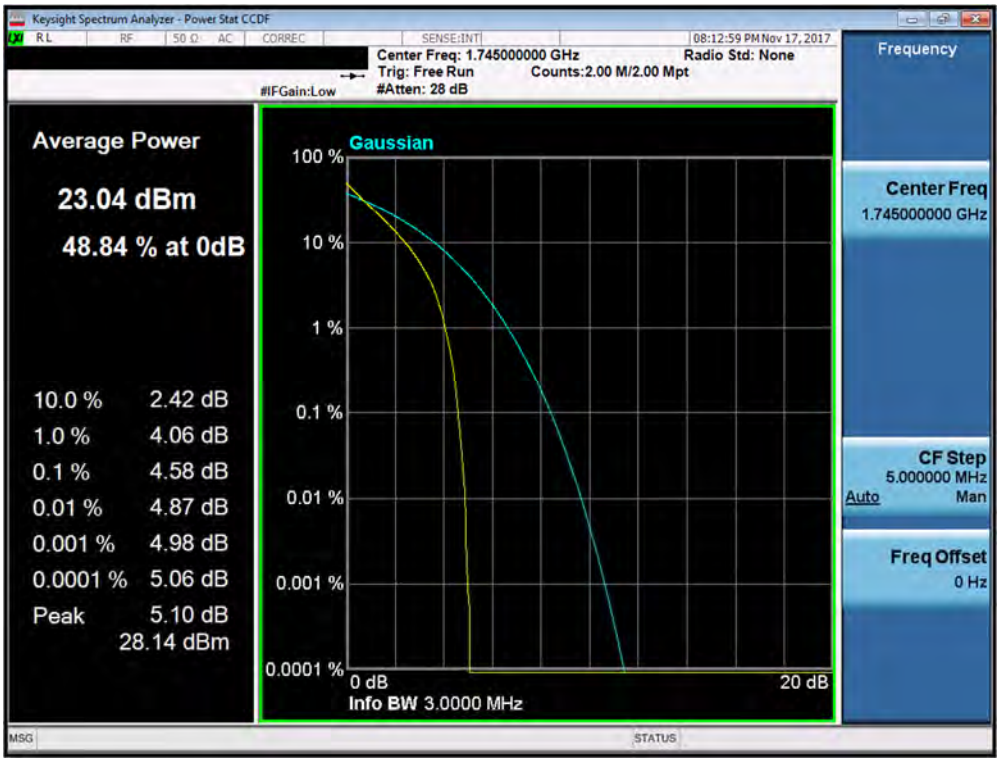
Plot 7-419. PAR Plot (Band 4/66 - 1.4MHz QPSK - Full RB Configuration)



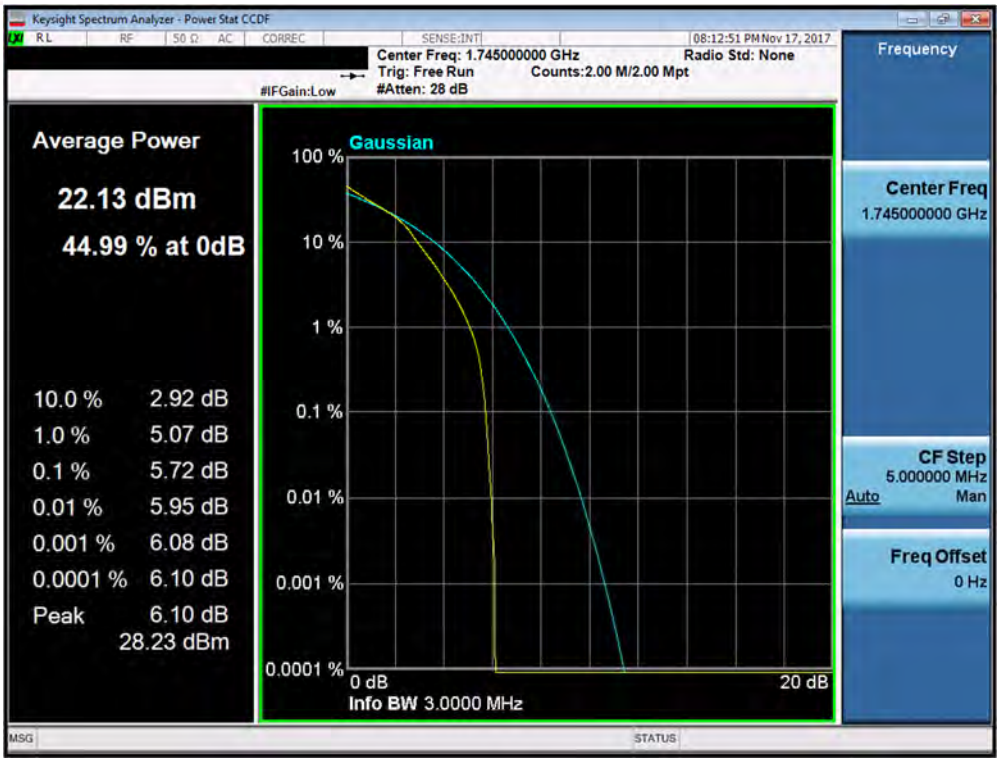
Plot 7-420. PAR Plot (Band 4/66 - 1.4MHz 16-QAM - Full RB Configuration)



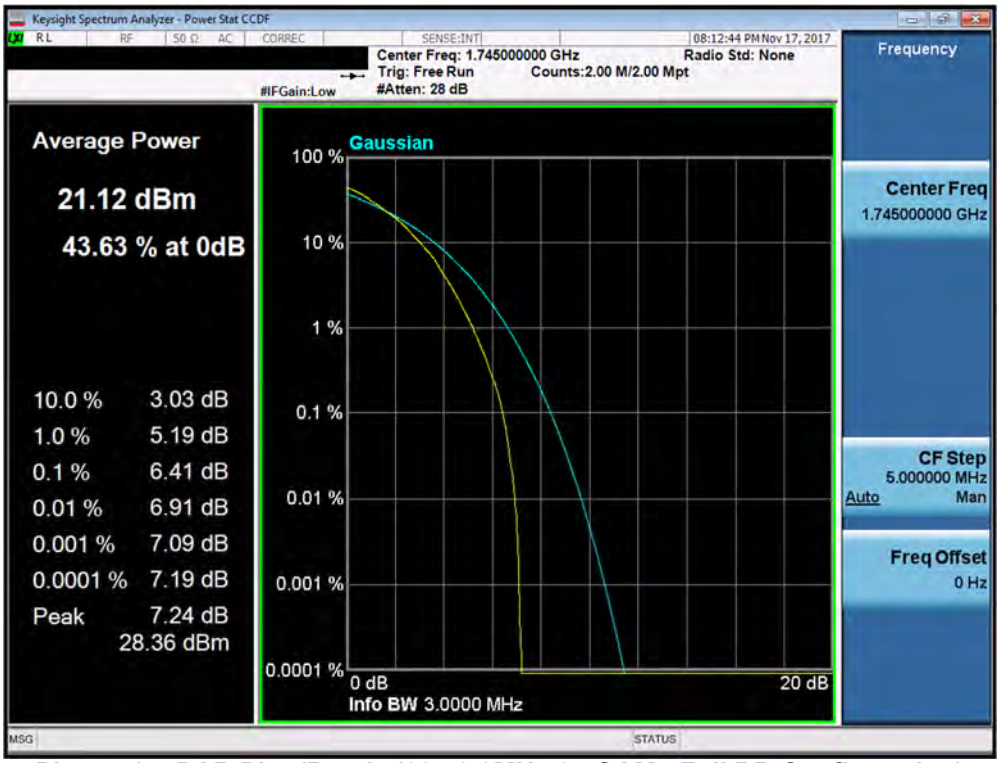
Plot 7-421. PAR Plot (Band 4/66 - 1.4MHz 64-QAM - Full RB Configuration)



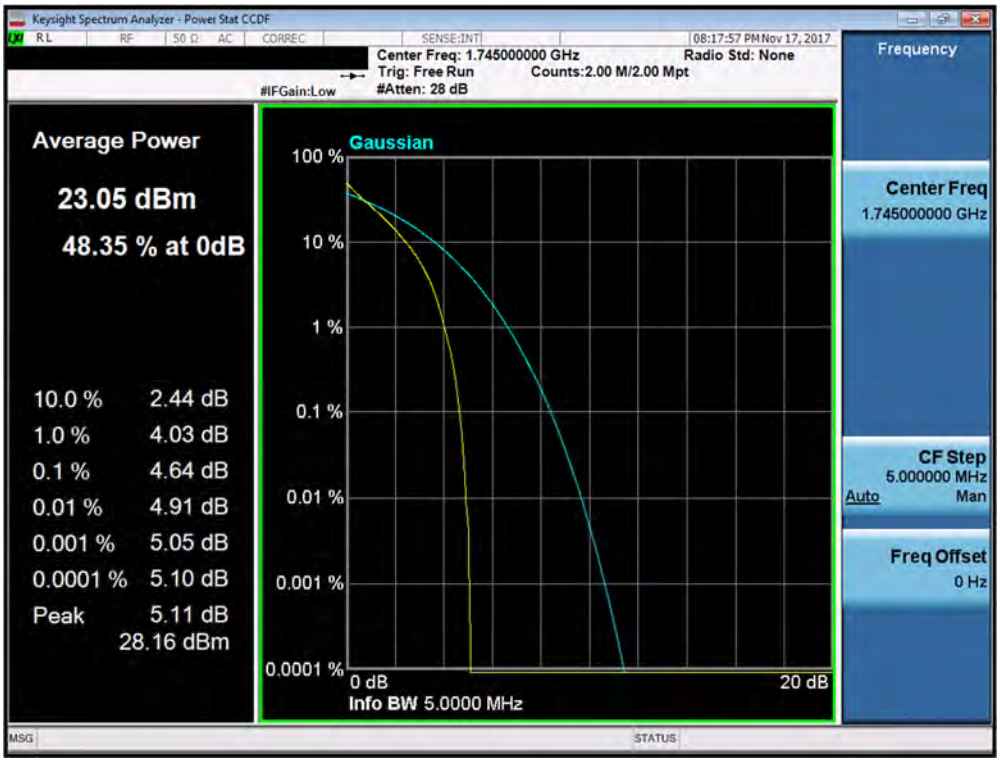
Plot 7-422. PAR Plot (Band 4/66 - 3.0MHz QPSK - Full RB Configuration)



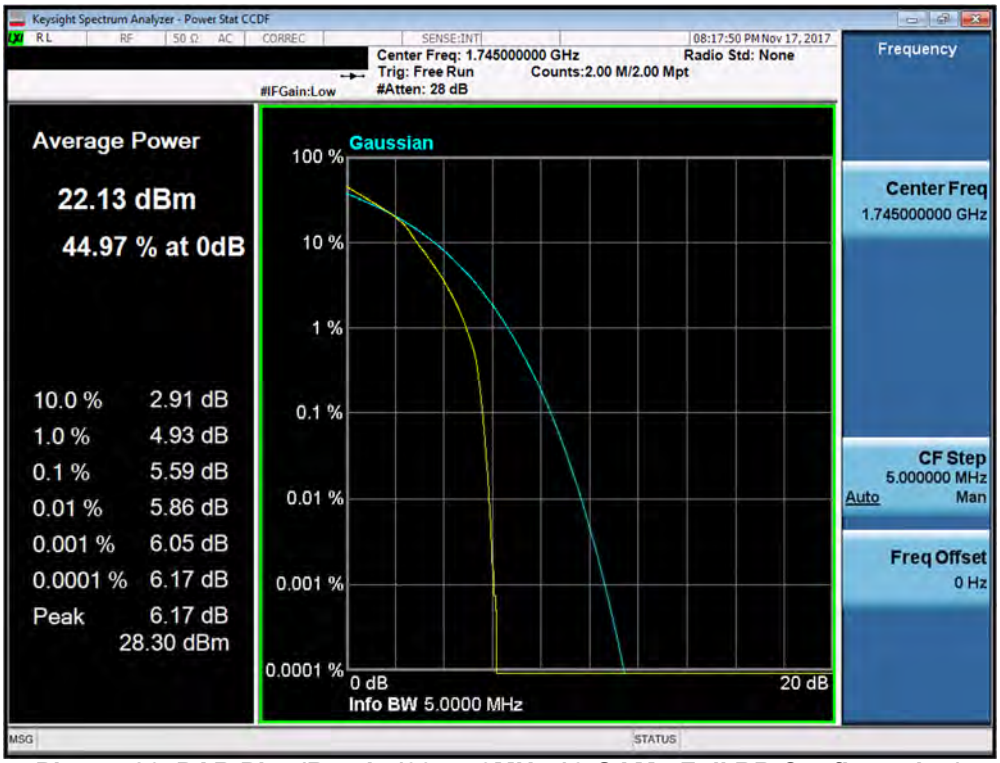
Plot 7-423. PAR Plot (Band 4/66 - 3.0MHz 16-QAM - Full RB Configuration)



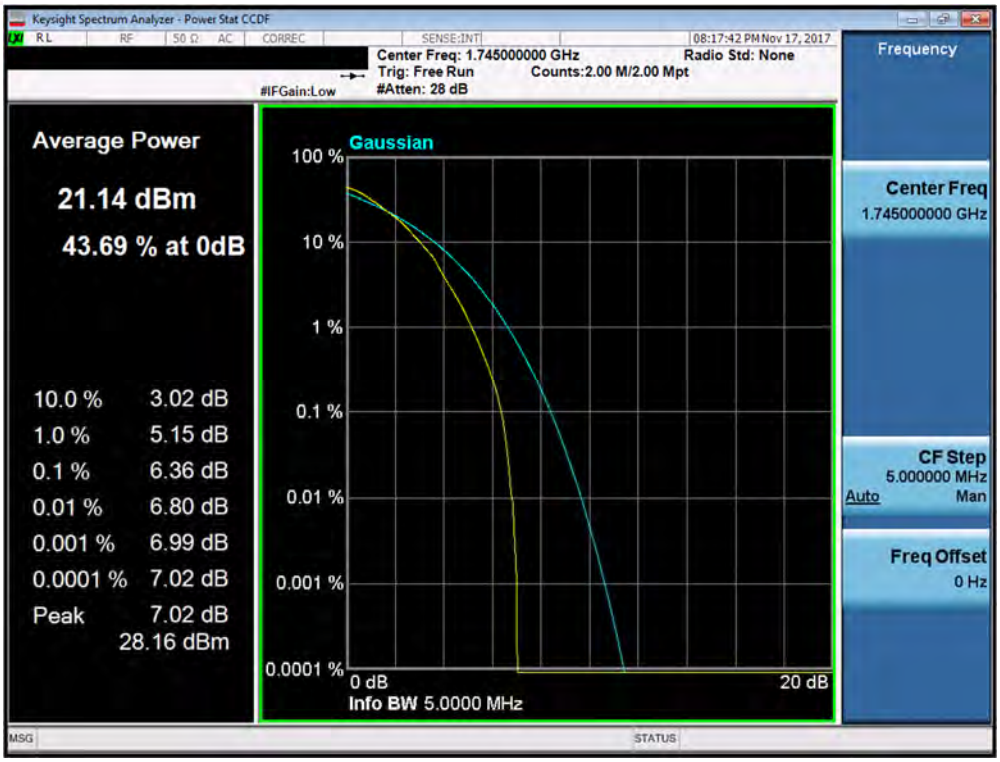
Plot 7-424. PAR Plot (Band 4/66 - 3.0MHz 64-QAM - Full RB Configuration)



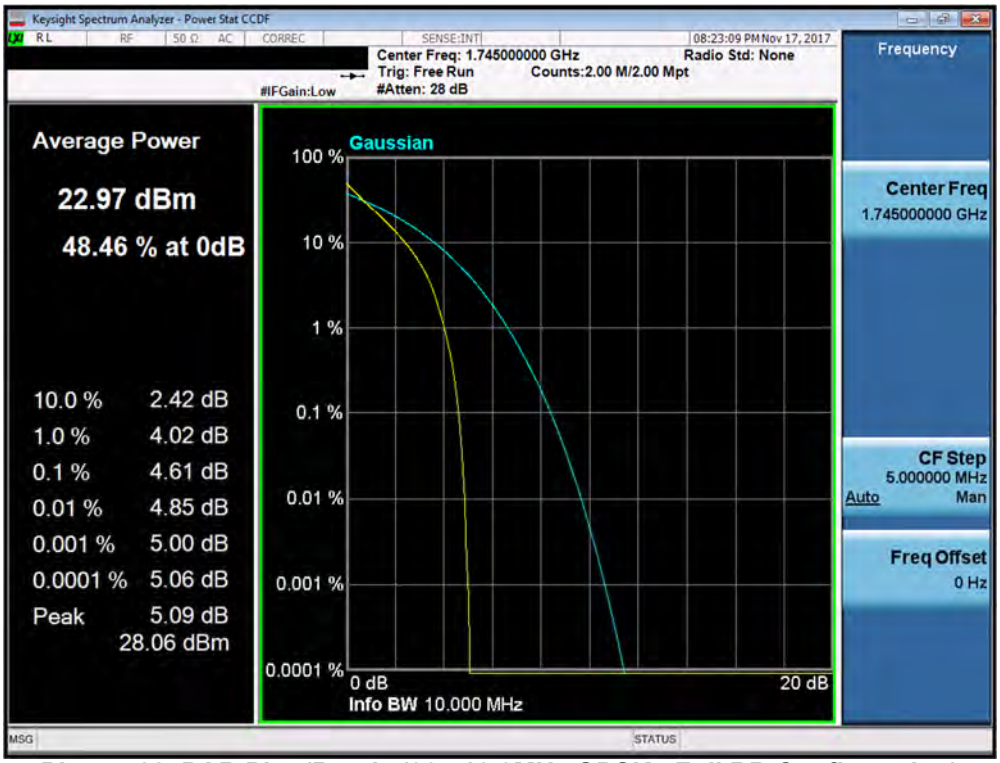
Plot 7-425. PAR Plot (Band 4/66 - 5.0MHz QPSK - Full RB Configuration)



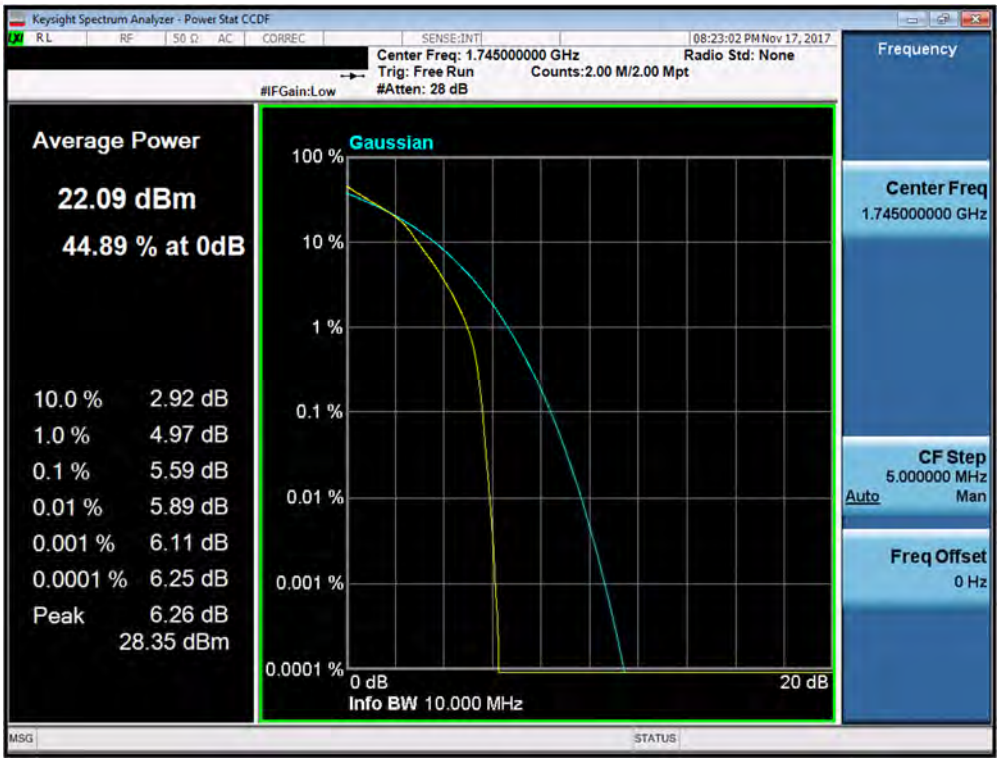
Plot 7-426. PAR Plot (Band 4/66 - 5.0MHz 16-QAM - Full RB Configuration)



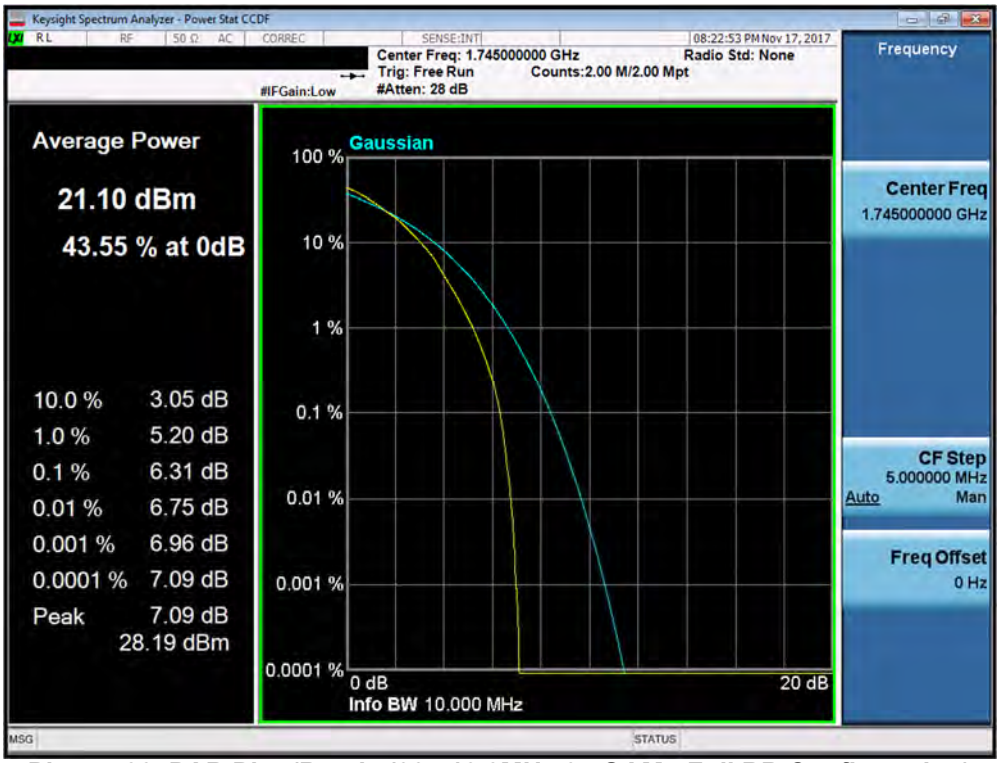
Plot 7-427. PAR Plot (Band 4/66 - 5.0MHz 64-QAM - Full RB Configuration)



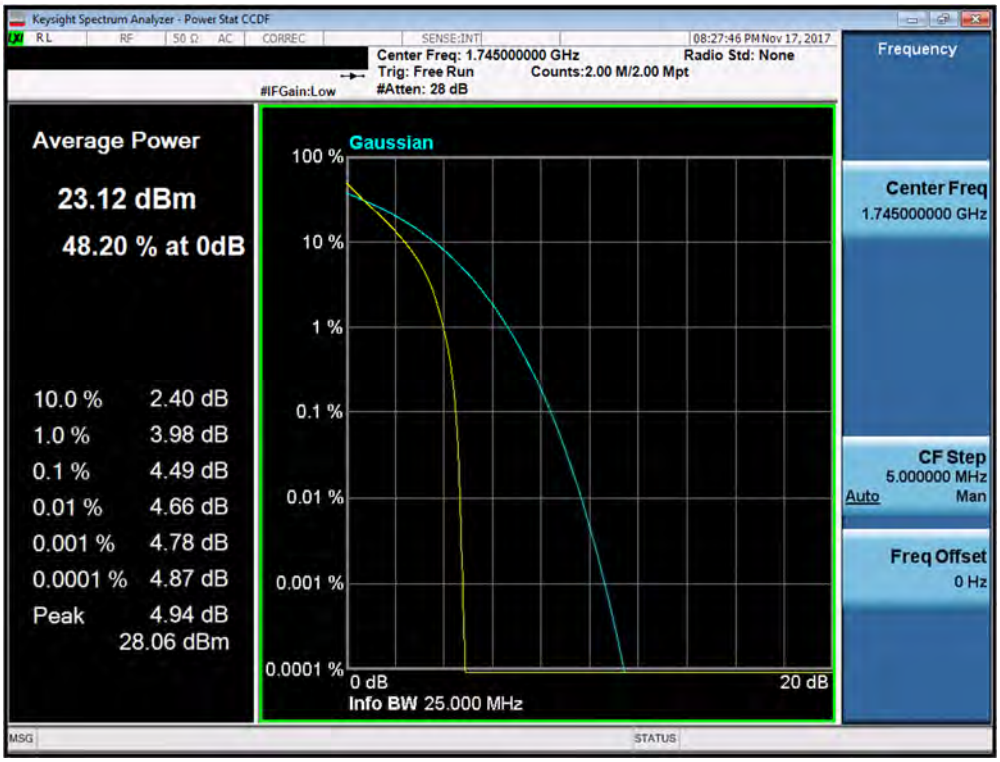
Plot 7-428. PAR Plot (Band 4/66 - 10.0MHz QPSK - Full RB Configuration)



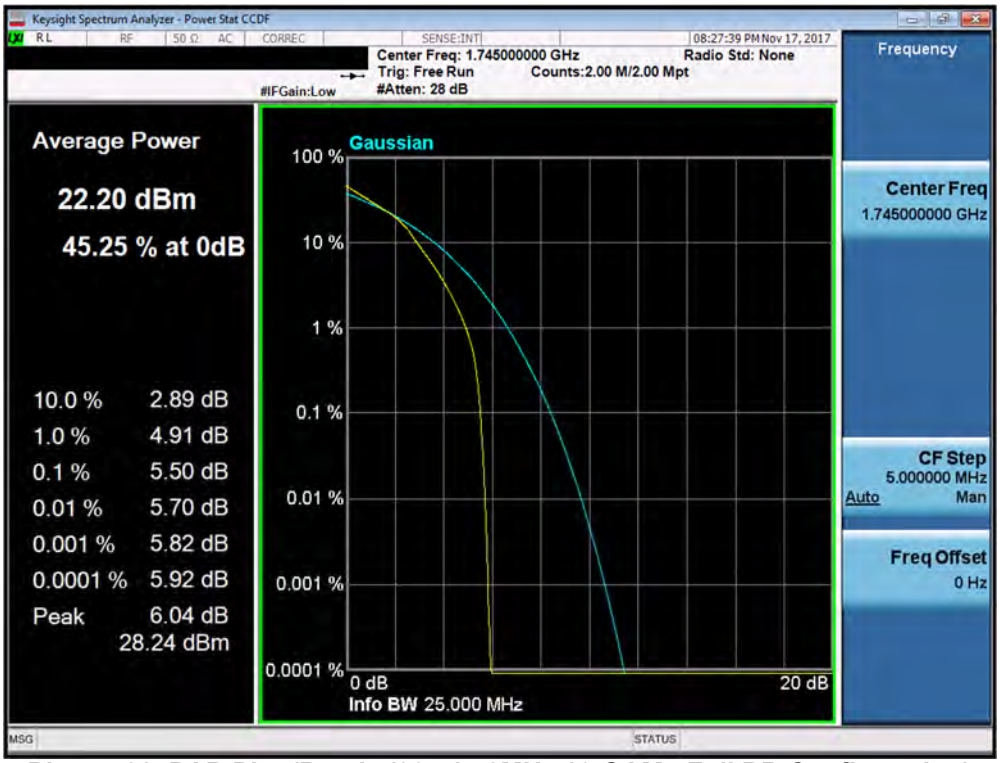
Plot 7-429. PAR Plot (Band 4/66 - 10.0MHz 16-QAM - Full RB Configuration)



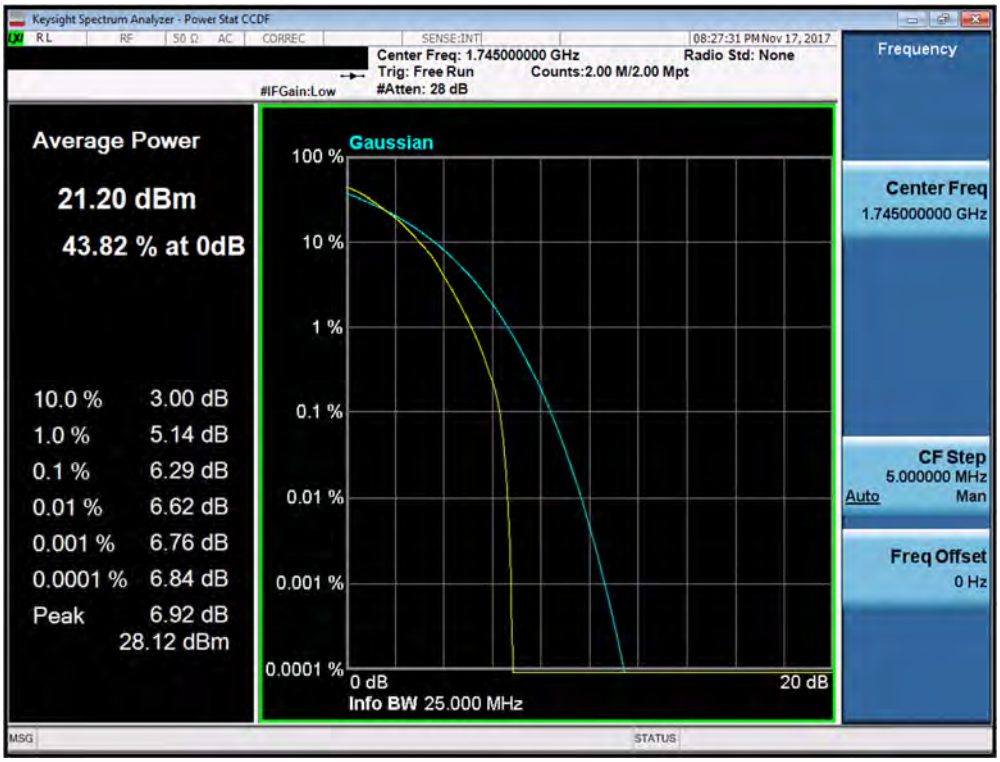
Plot 7-430. PAR Plot (Band 4/66 - 10.0MHz 64-QAM - Full RB Configuration)



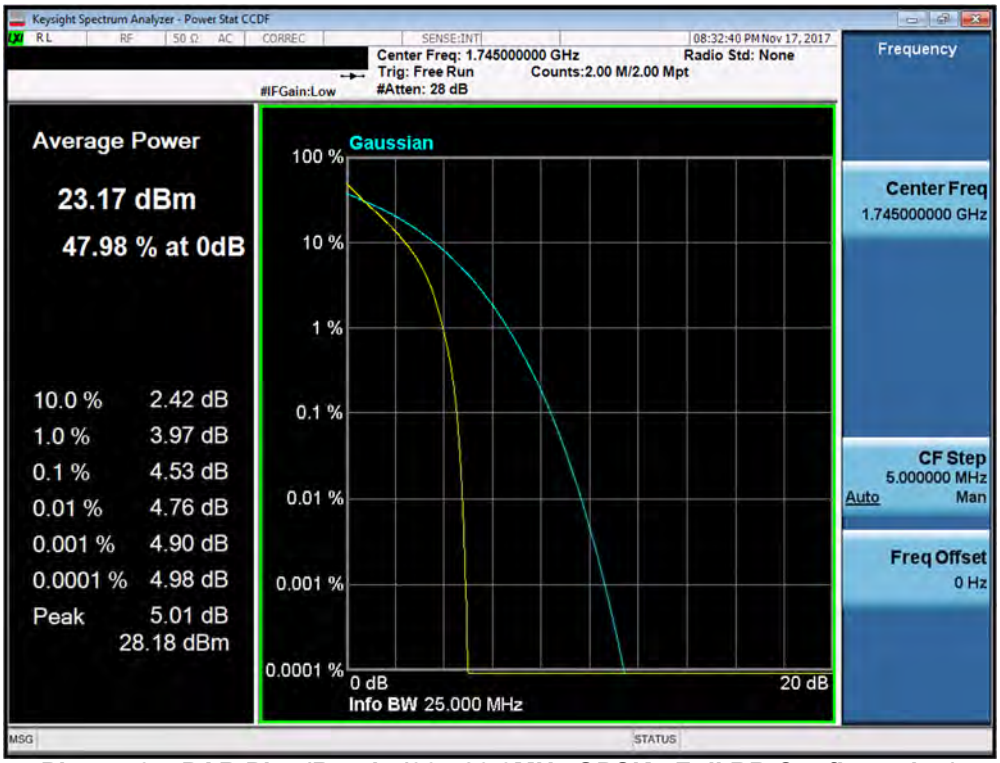
Plot 7-431. PAR Plot (Band 4/66 - 15.0MHz QPSK - Full RB Configuration)



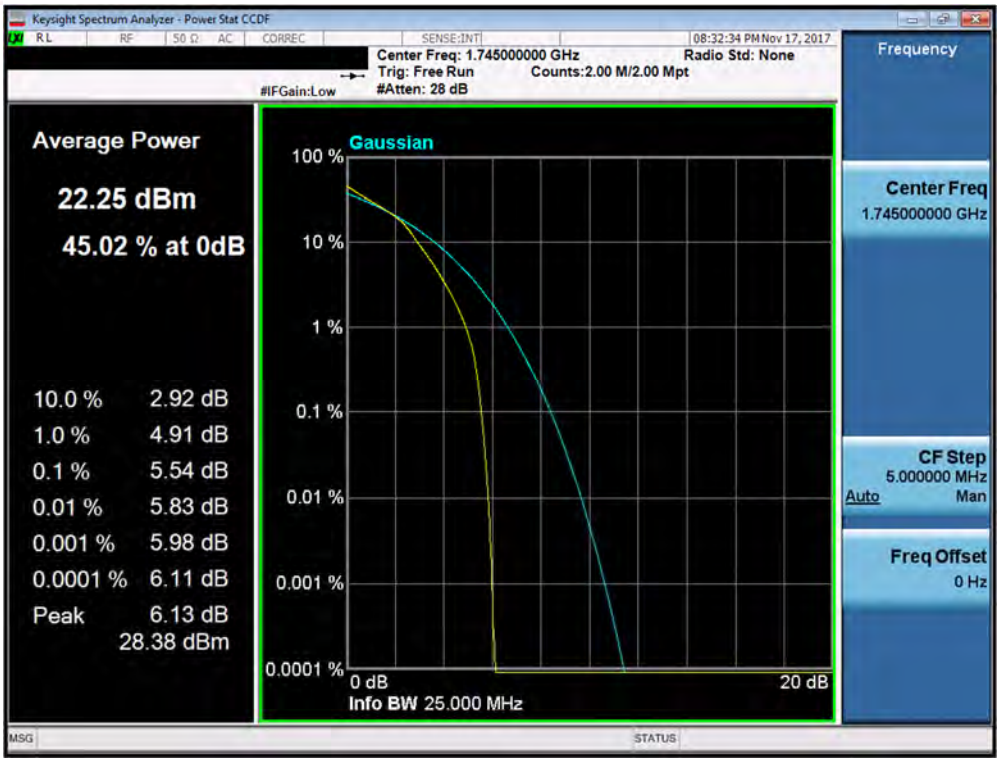
Plot 7-432. PAR Plot (Band 4/66 - 15.0MHz 16-QAM - Full RB Configuration)



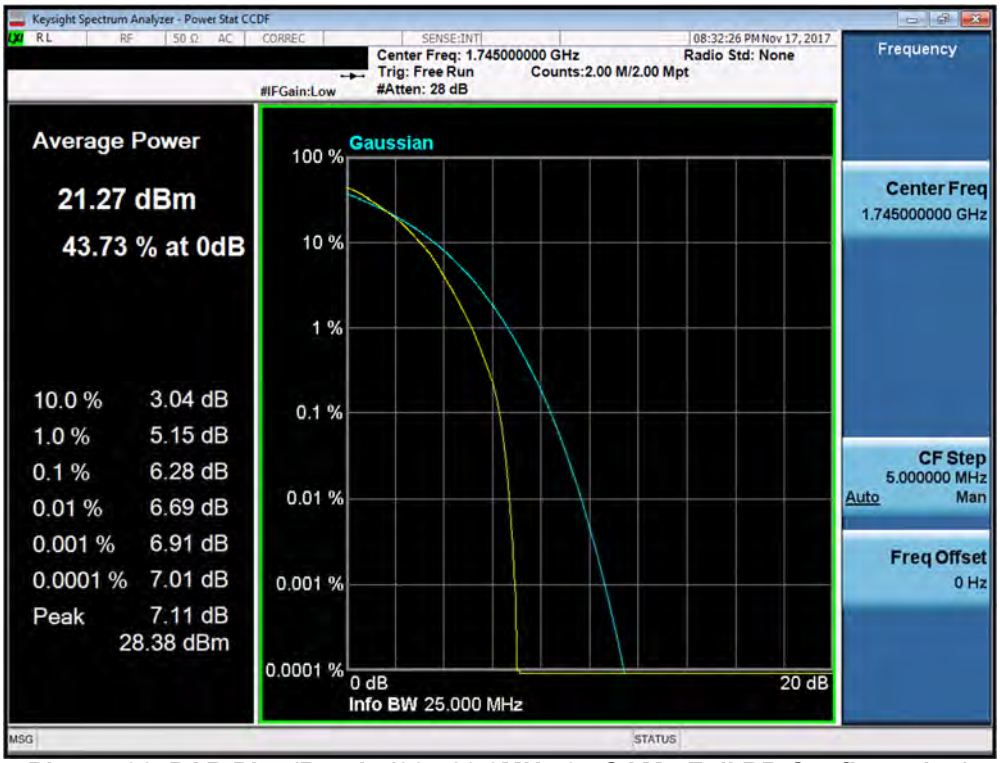
Plot 7-433. PAR Plot (Band 4/66 - 15.0MHz 64-QAM - Full RB Configuration)



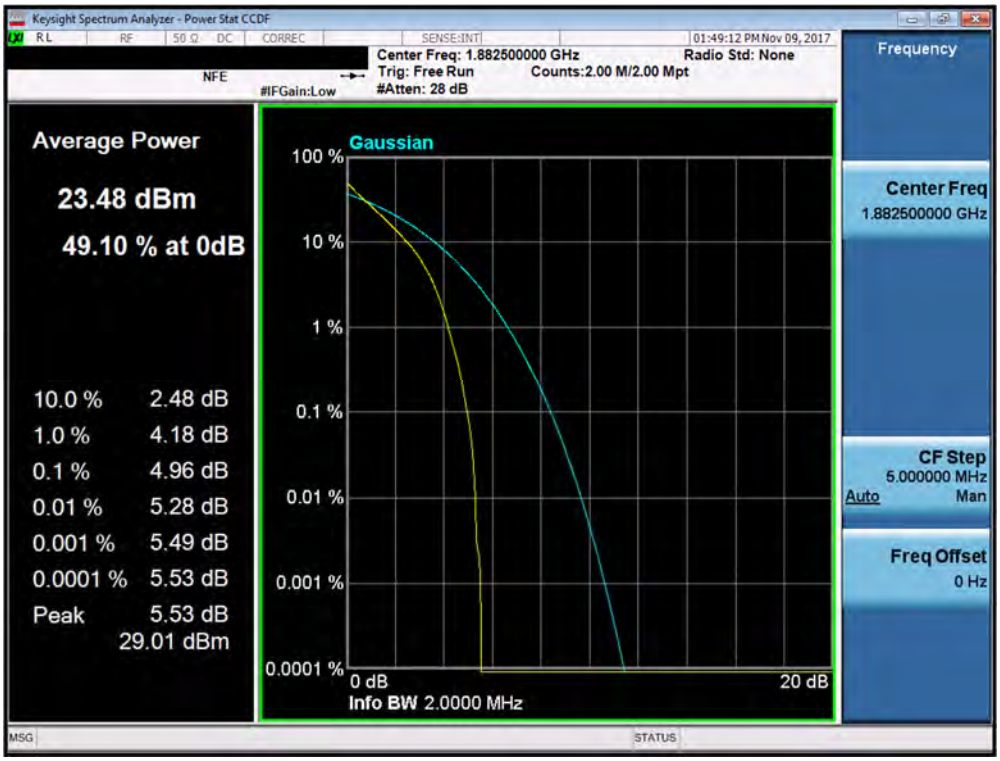
Plot 7-434. PAR Plot (Band 4/66 - 20.0MHz QPSK - Full RB Configuration)



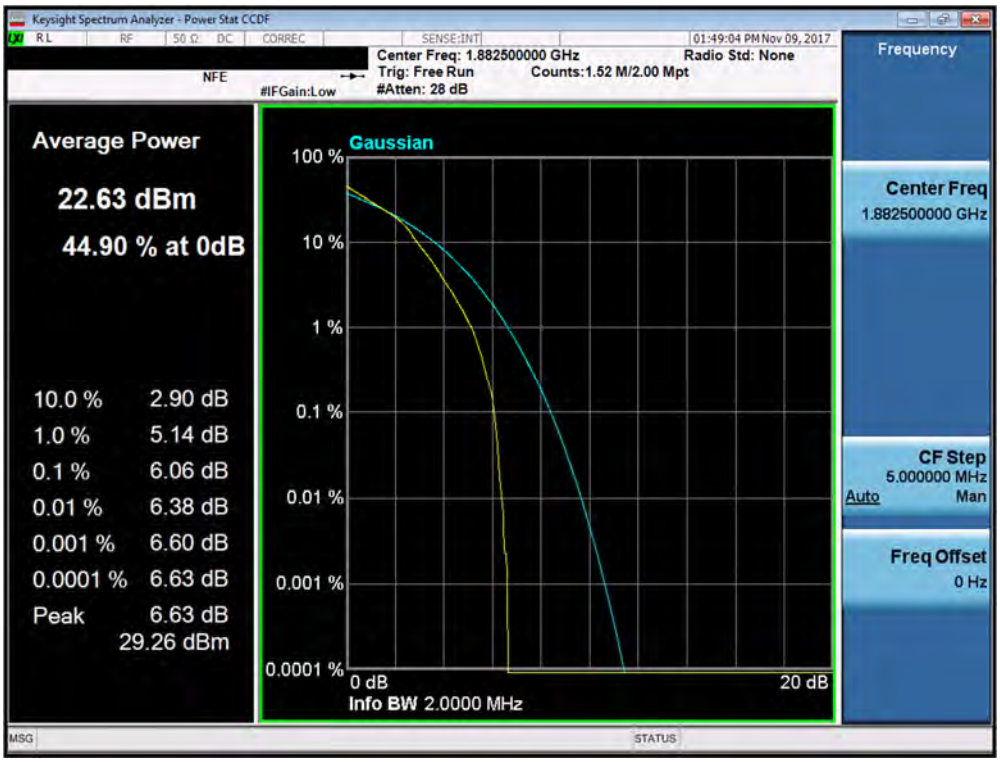
Plot 7-435. PAR Plot (Band 4/66 - 20.0MHz 16-QAM - Full RB Configuration)



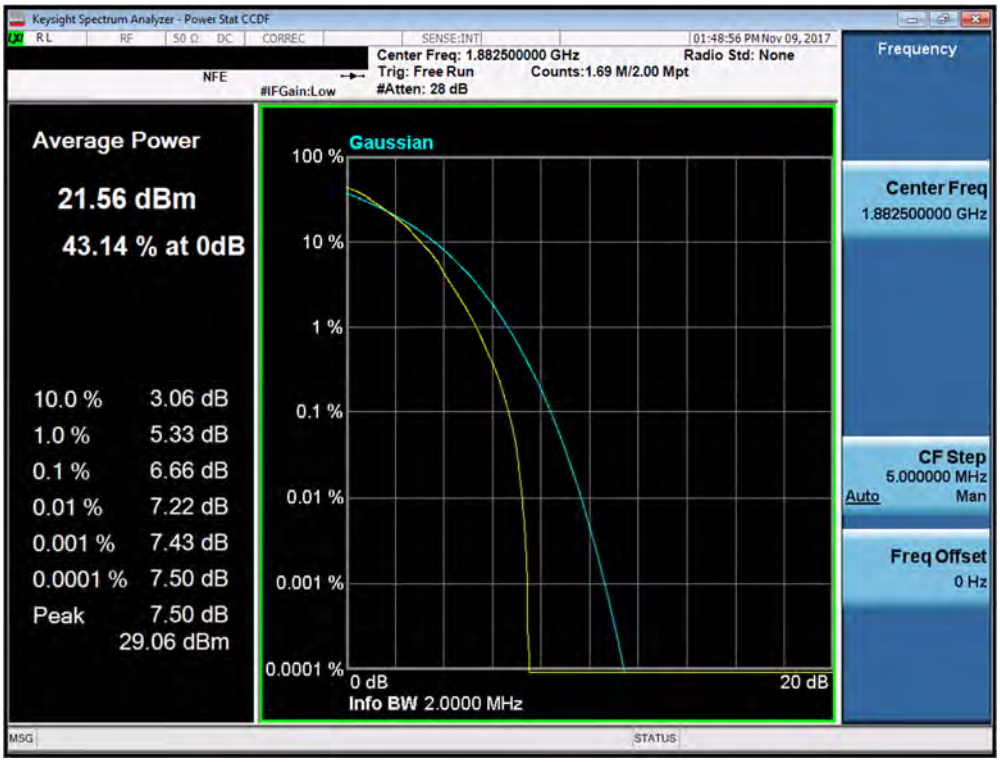
Plot 7-436. PAR Plot (Band 4/66 - 20.0MHz 64-QAM - Full RB Configuration)



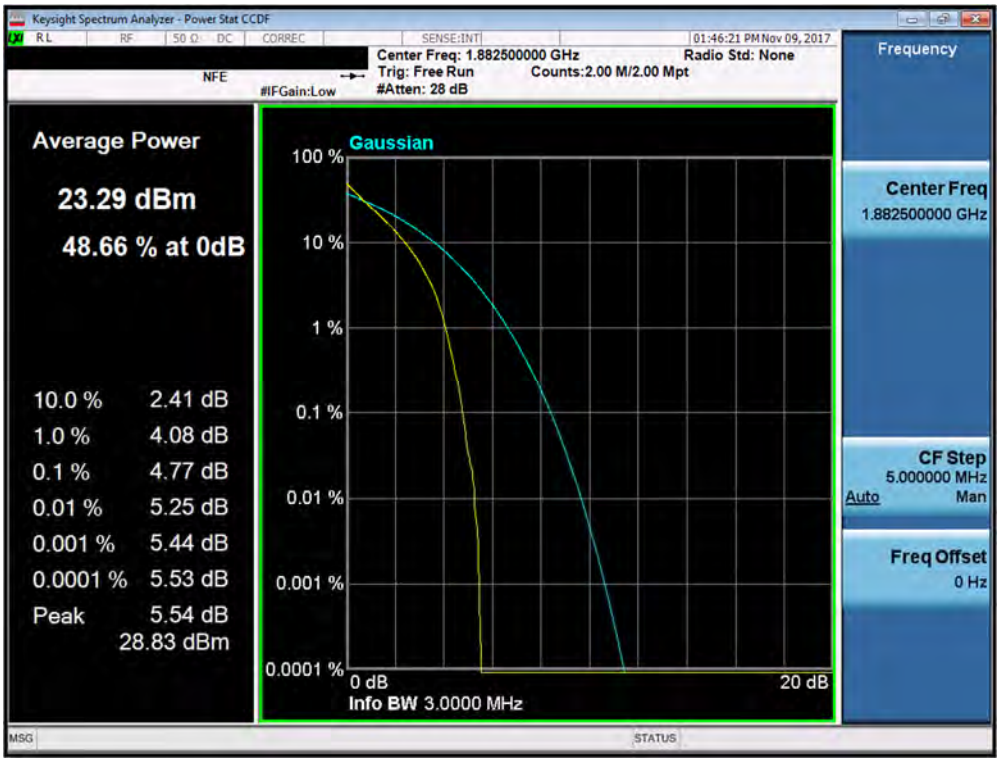
Plot 7-437. PAR Plot (Band 2/25 - 1.4MHz QPSK - Full RB Configuration)



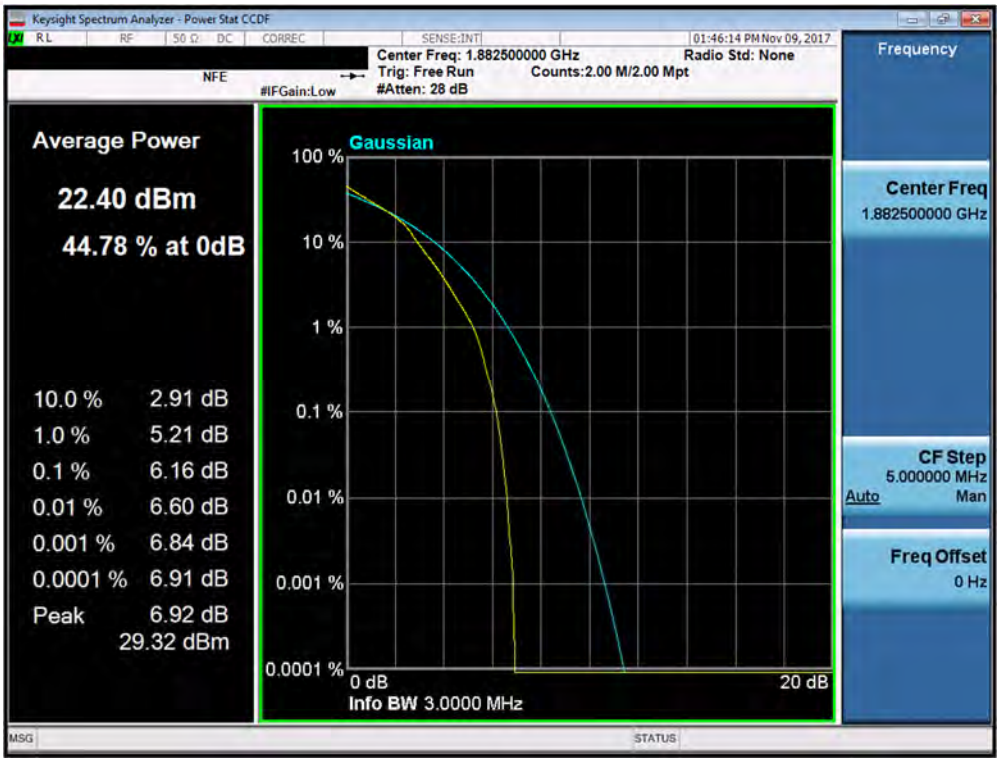
Plot 7-438. PAR Plot (Band 2/25 - 1.4MHz 16-QAM - Full RB Configuration)



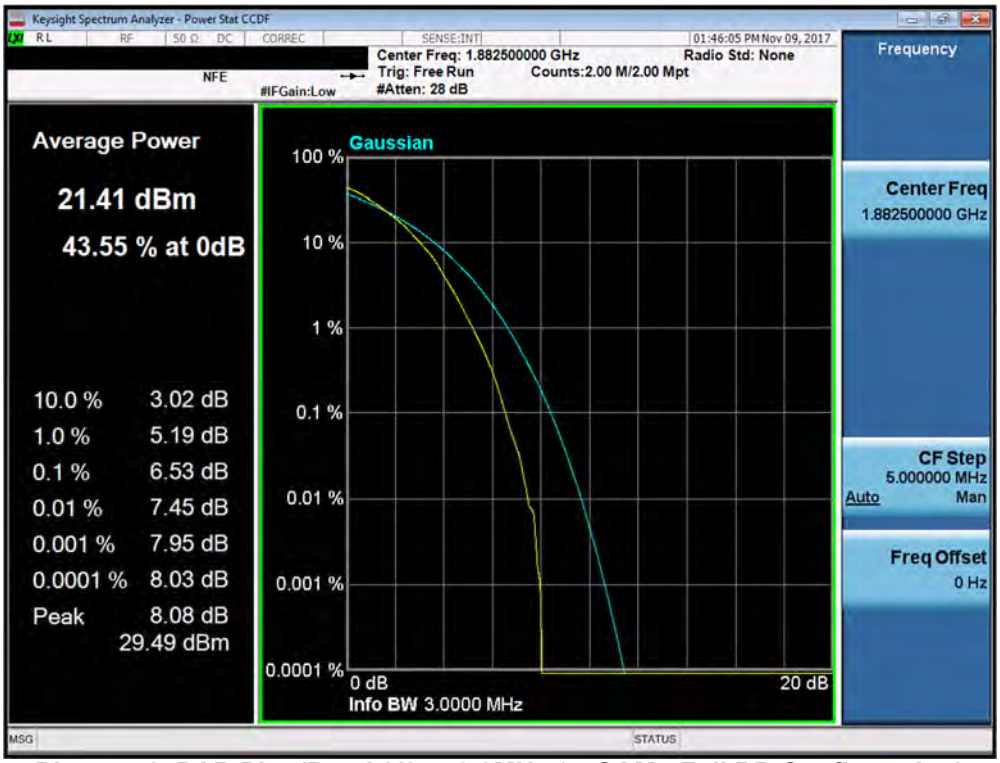
Plot 7-439. PAR Plot (Band 2/25 - 1.4MHz 64-QAM - Full RB Configuration)



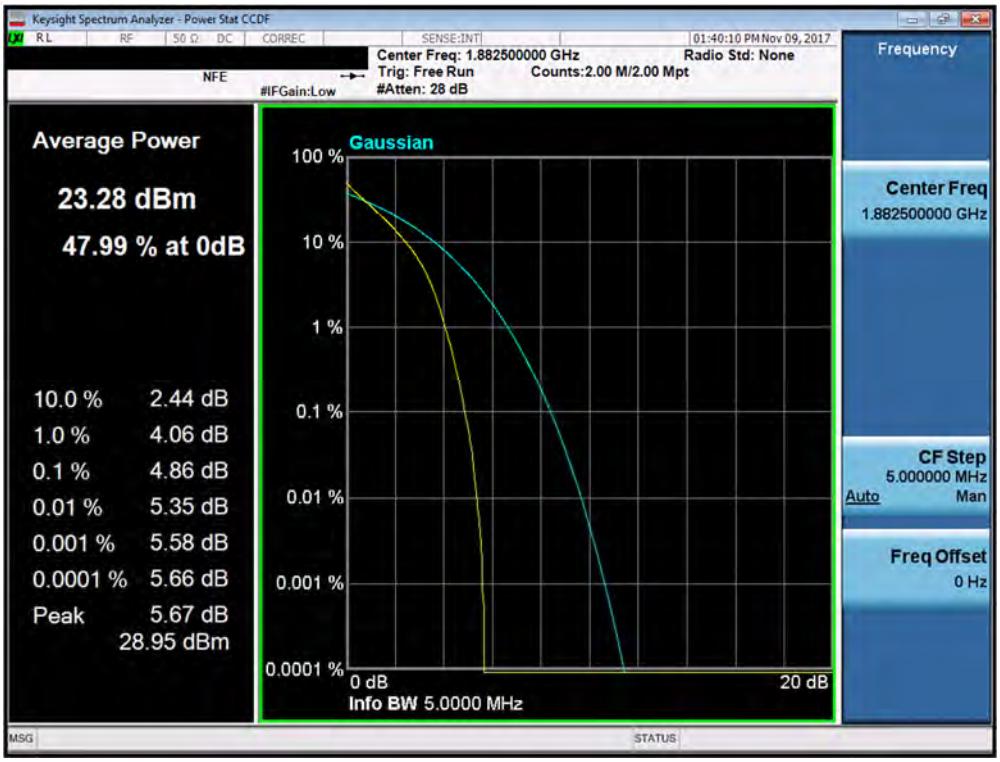
Plot 7-440. PAR Plot (Band 2/25 - 3.0MHz QPSK - Full RB Configuration)



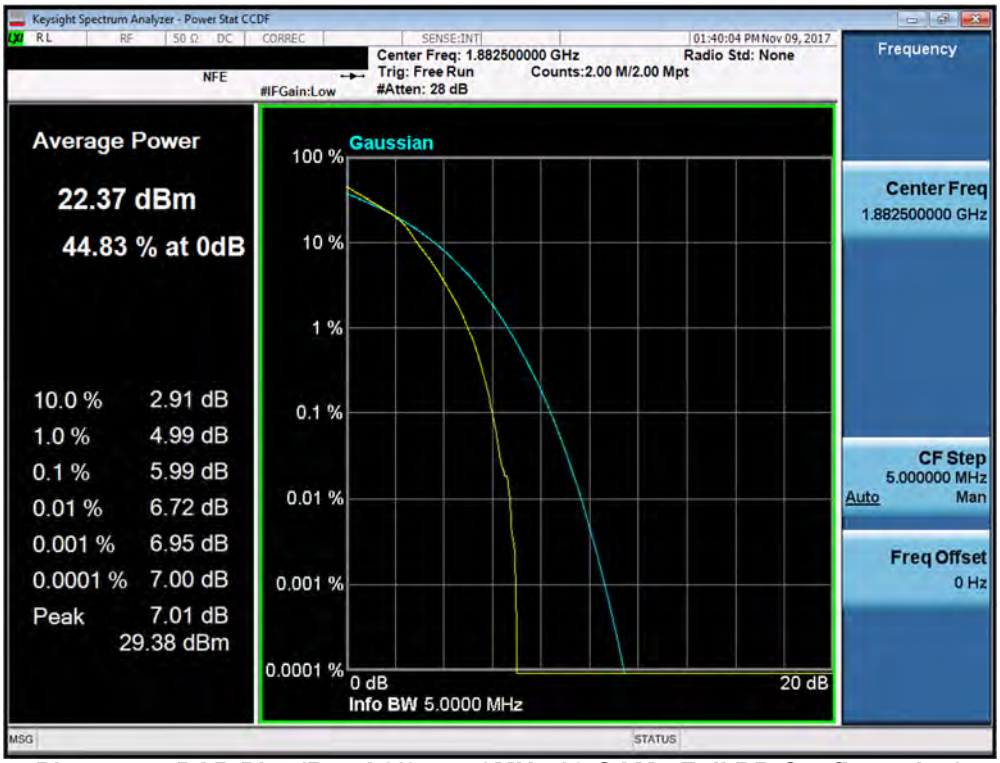
Plot 7-441. PAR Plot (Band 2/25 - 3.0MHz 16-QAM - Full RB Configuration)



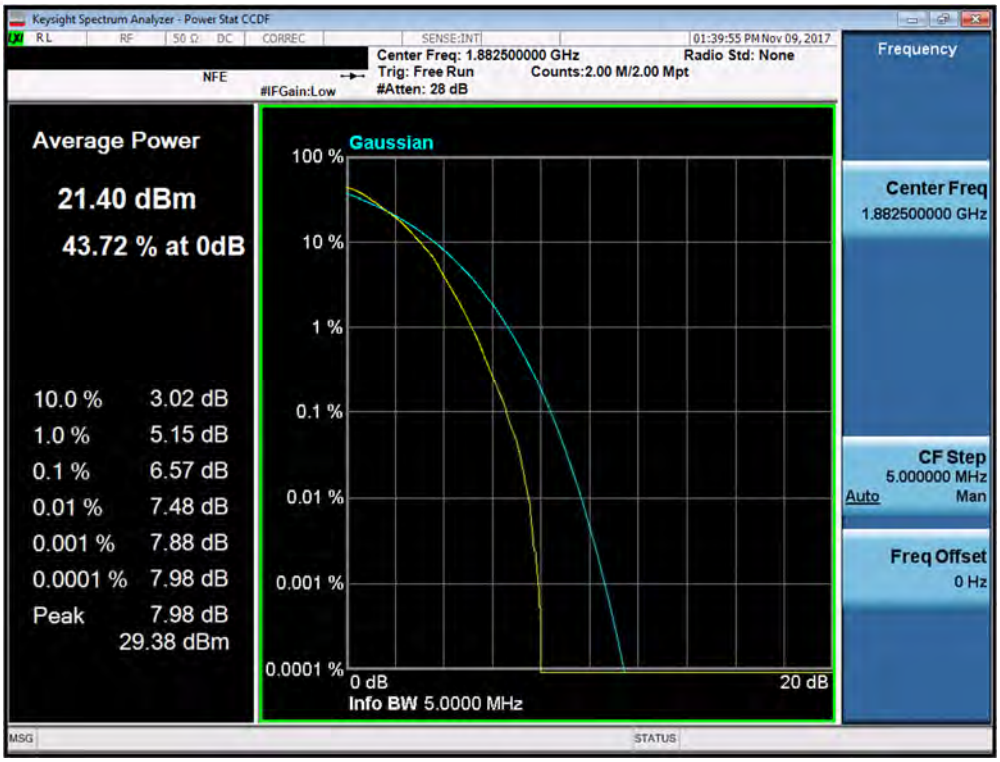
Plot 7-442. PAR Plot (Band 2/25 - 3.0MHz 64-QAM - Full RB Configuration)



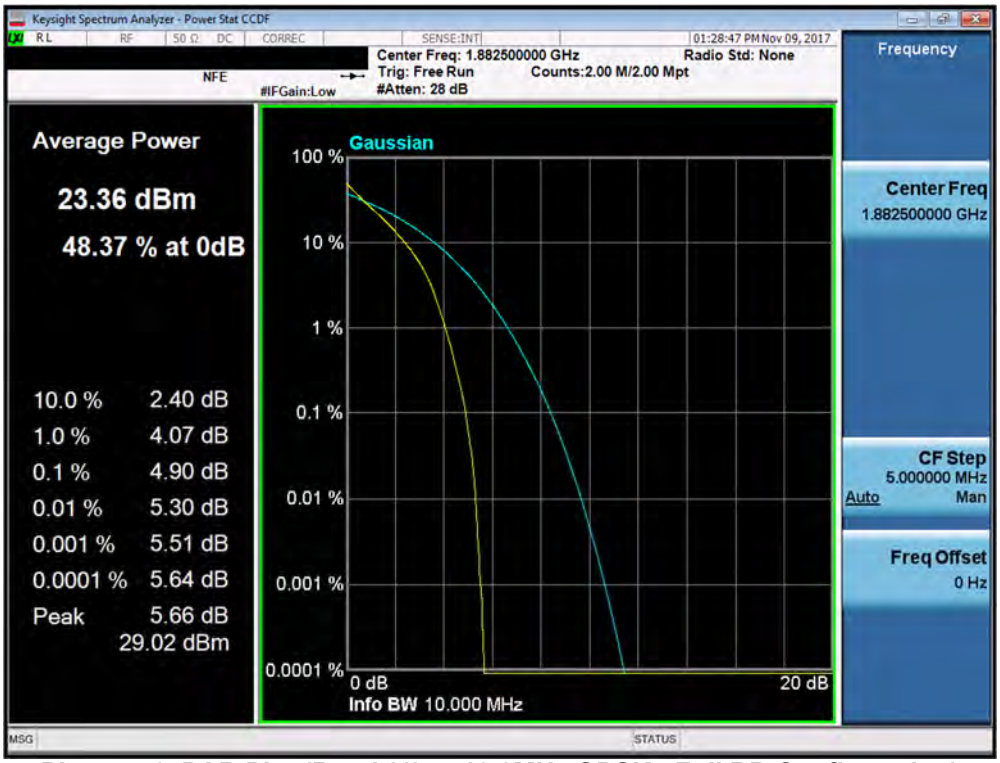
Plot 7-443. PAR Plot (Band 2/25 - 5.0MHz QPSK - Full RB Configuration)



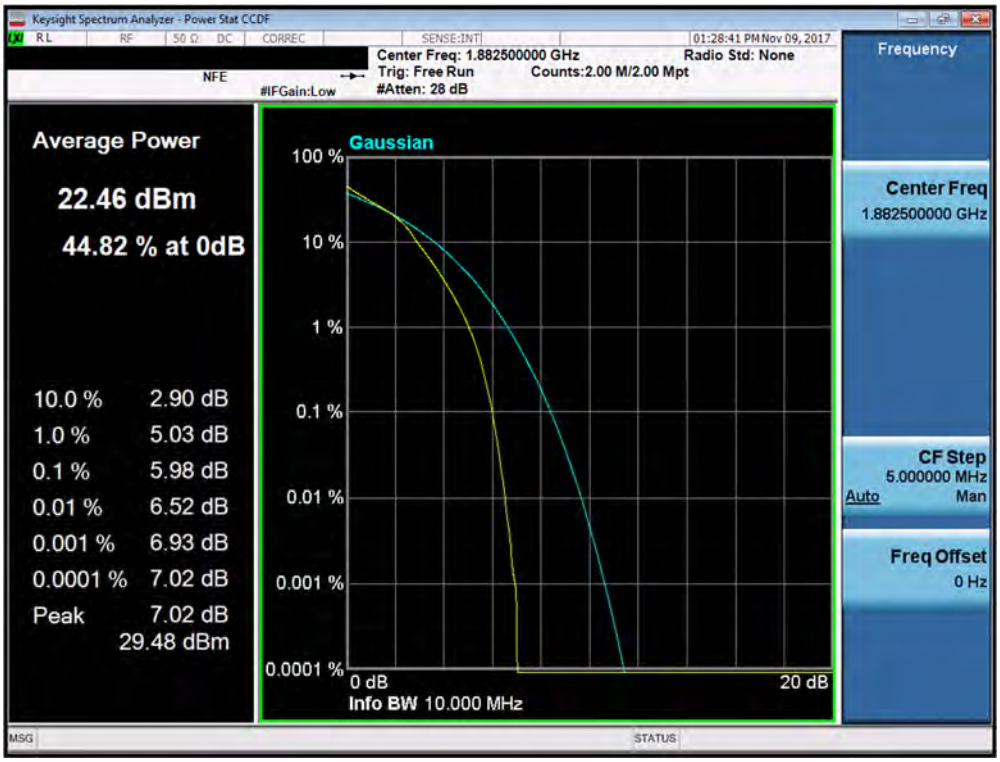
Plot 7-444. PAR Plot (Band 2/25 - 5.0MHz 16-QAM - Full RB Configuration)



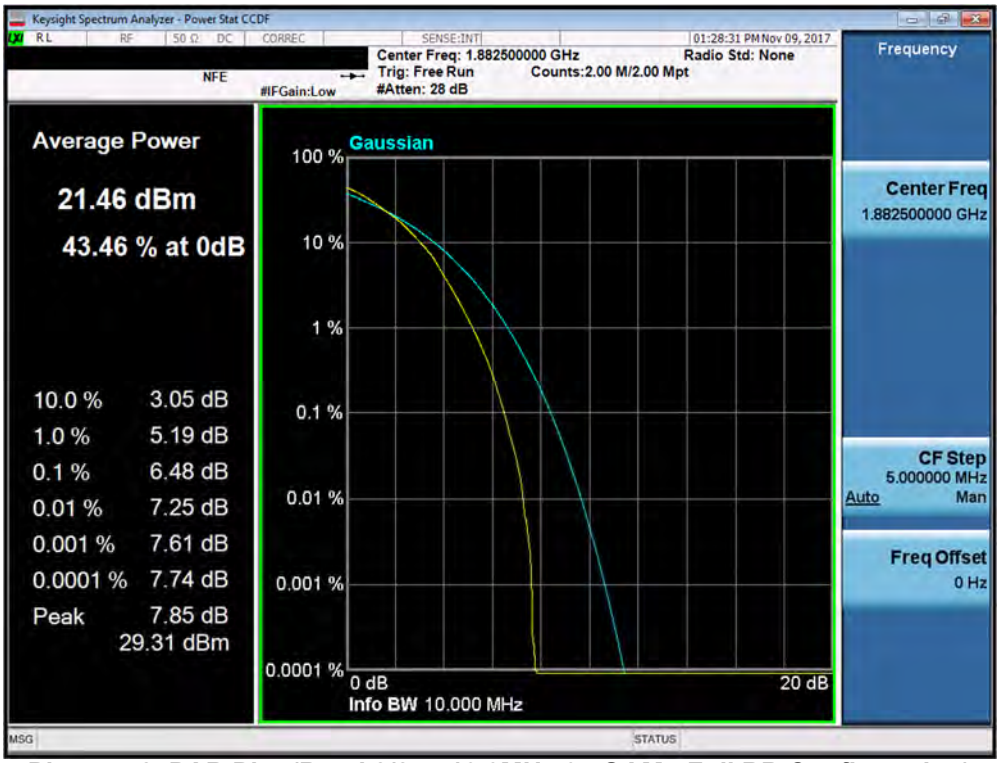
Plot 7-445. PAR Plot (Band 2/25 - 5.0MHz 64-QAM - Full RB Configuration)



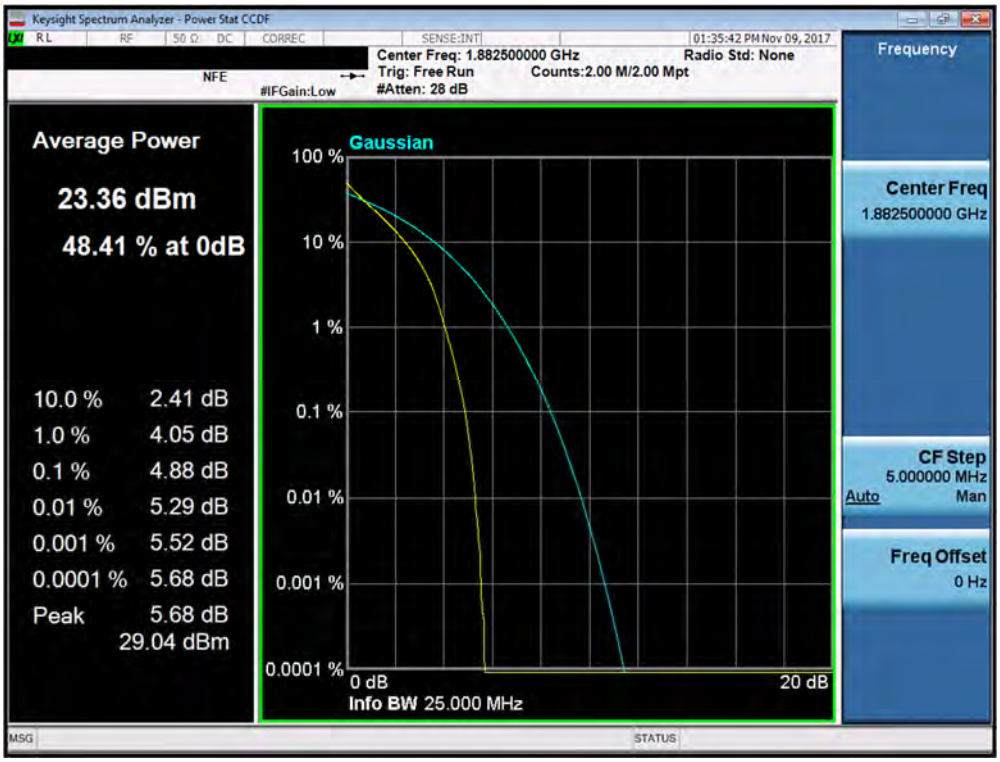
Plot 7-446. PAR Plot (Band 2/25 - 10.0MHz QPSK - Full RB Configuration)



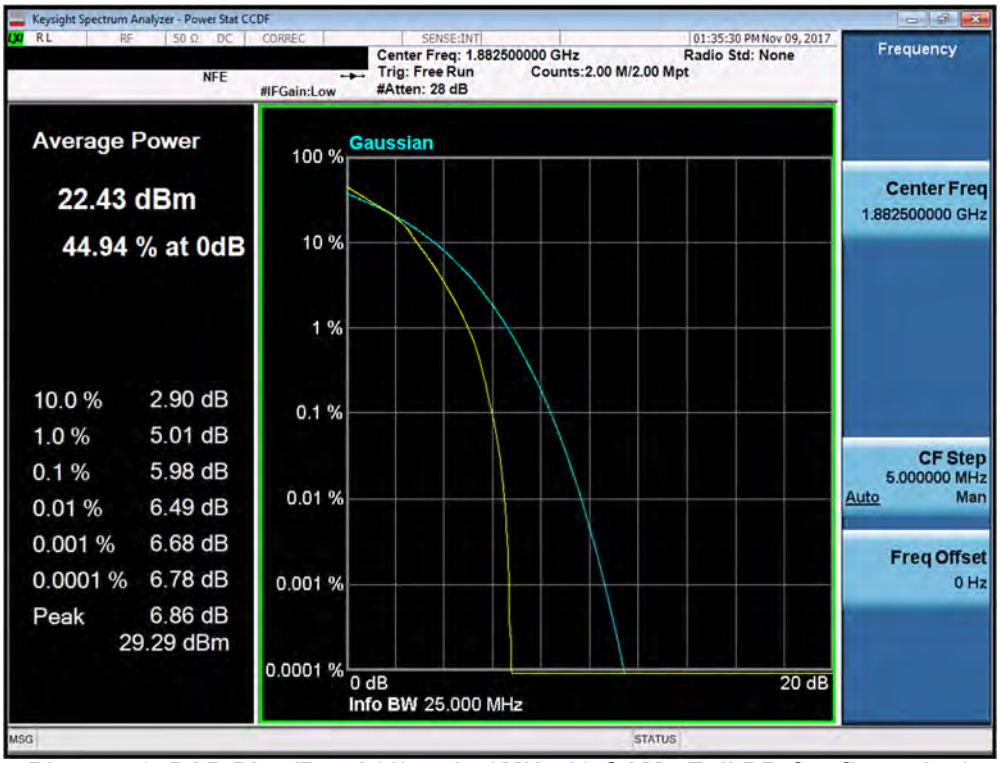
Plot 7-447. PAR Plot (Band 2/25 - 10.0MHz 16-QAM - Full RB Configuration)



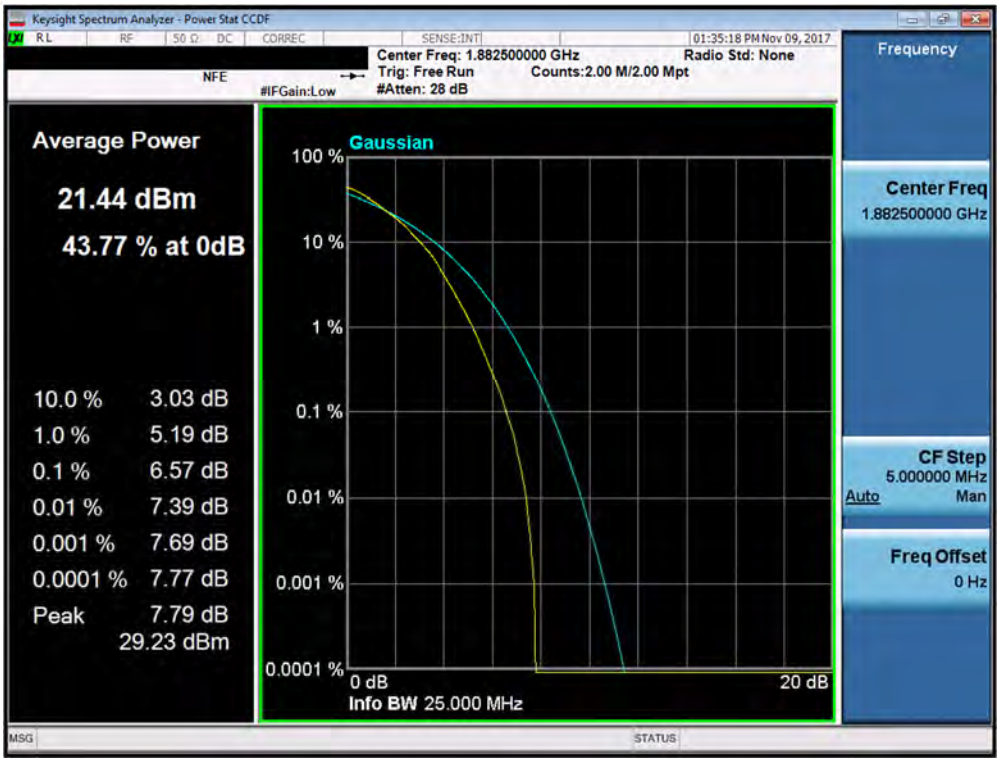
Plot 7-448. PAR Plot (Band 2/25 - 10.0MHz 64-QAM - Full RB Configuration)



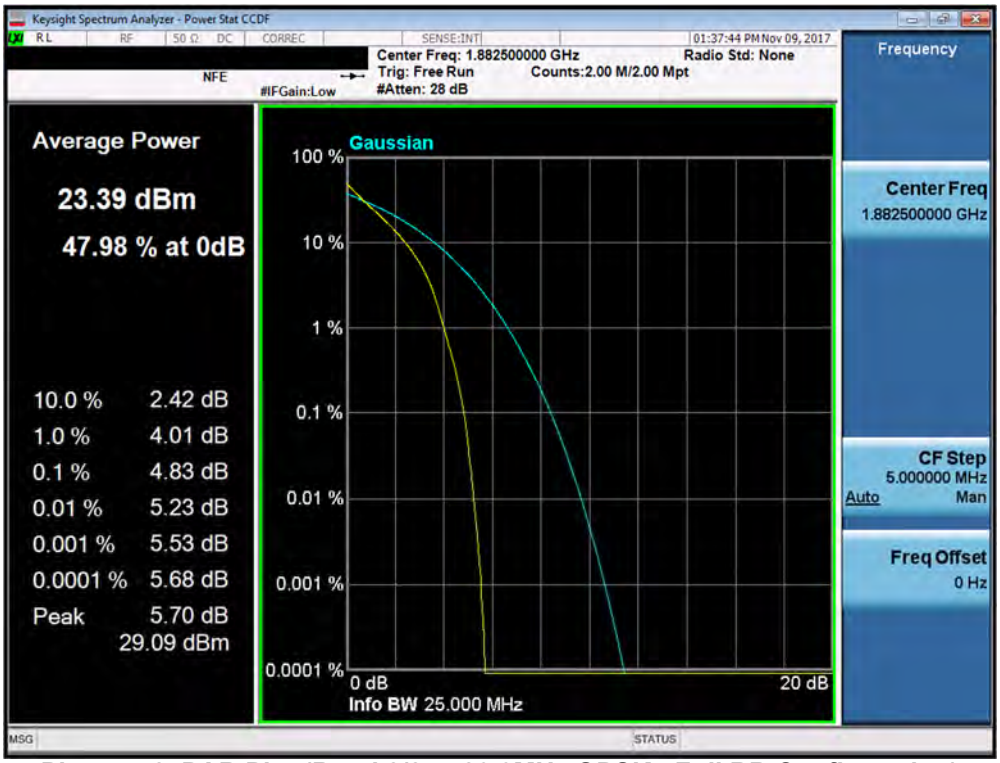
Plot 7-449. PAR Plot (Band 2/25 - 15.0MHz QPSK - Full RB Configuration)



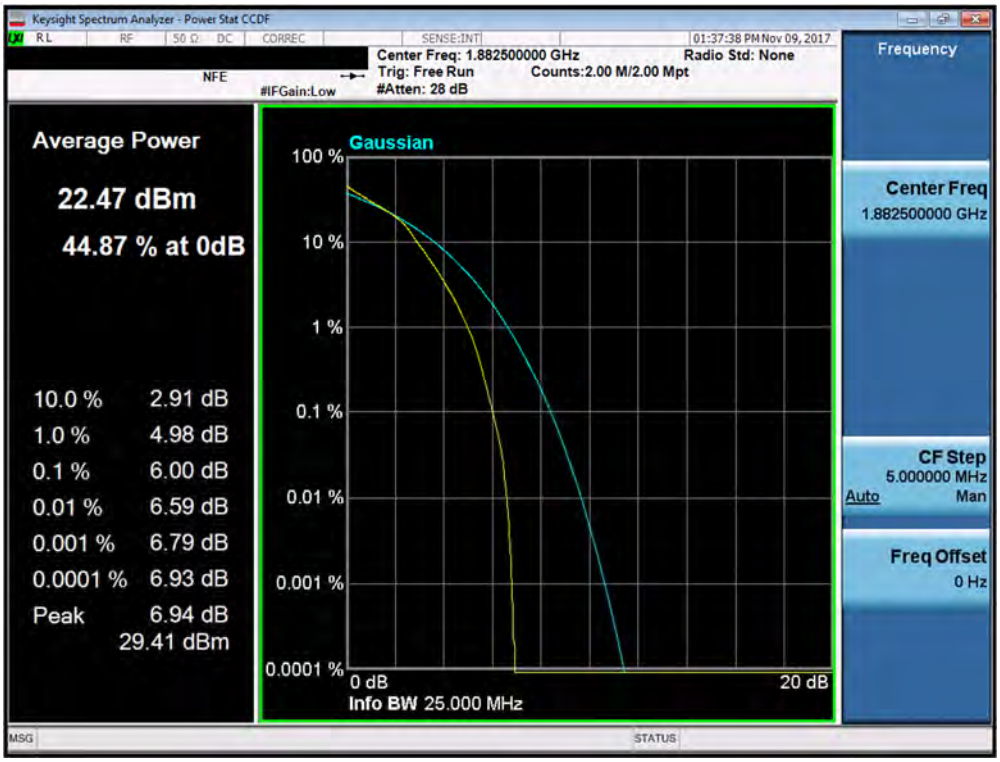
Plot 7-450. PAR Plot (Band 2/25 - 15.0MHz 16-QAM - Full RB Configuration)



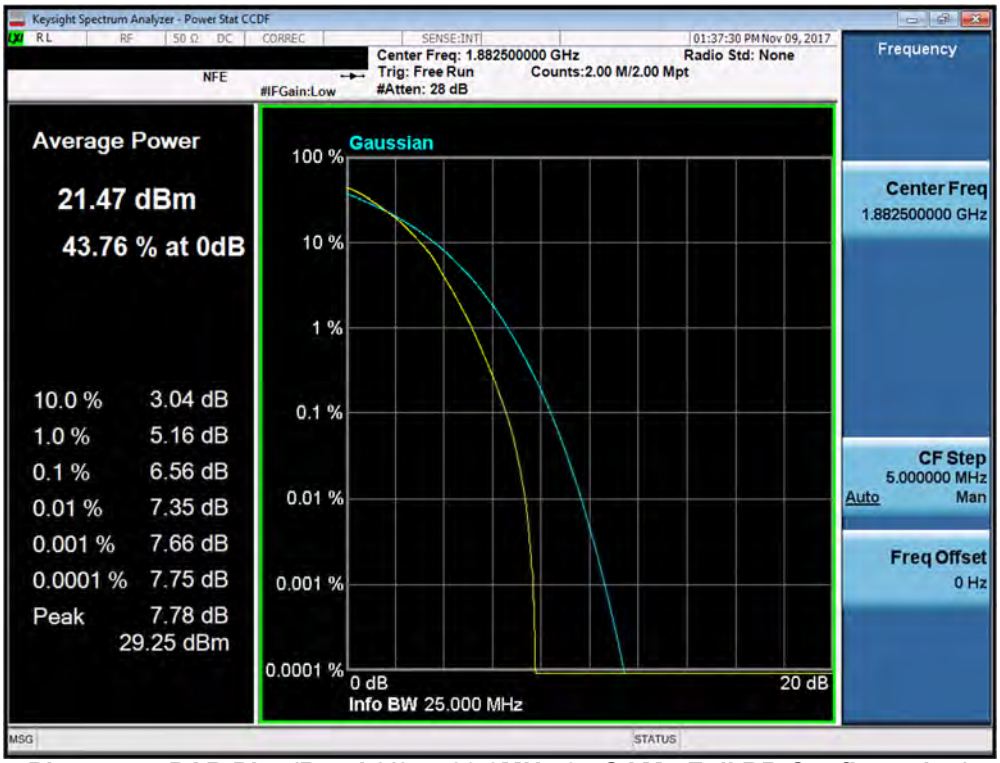
Plot 7-451. PAR Plot (Band 2/25 - 15.0MHz 64-QAM - Full RB Configuration)



Plot 7-452. PAR Plot (Band 2/25 - 20.0MHz QPSK - Full RB Configuration)

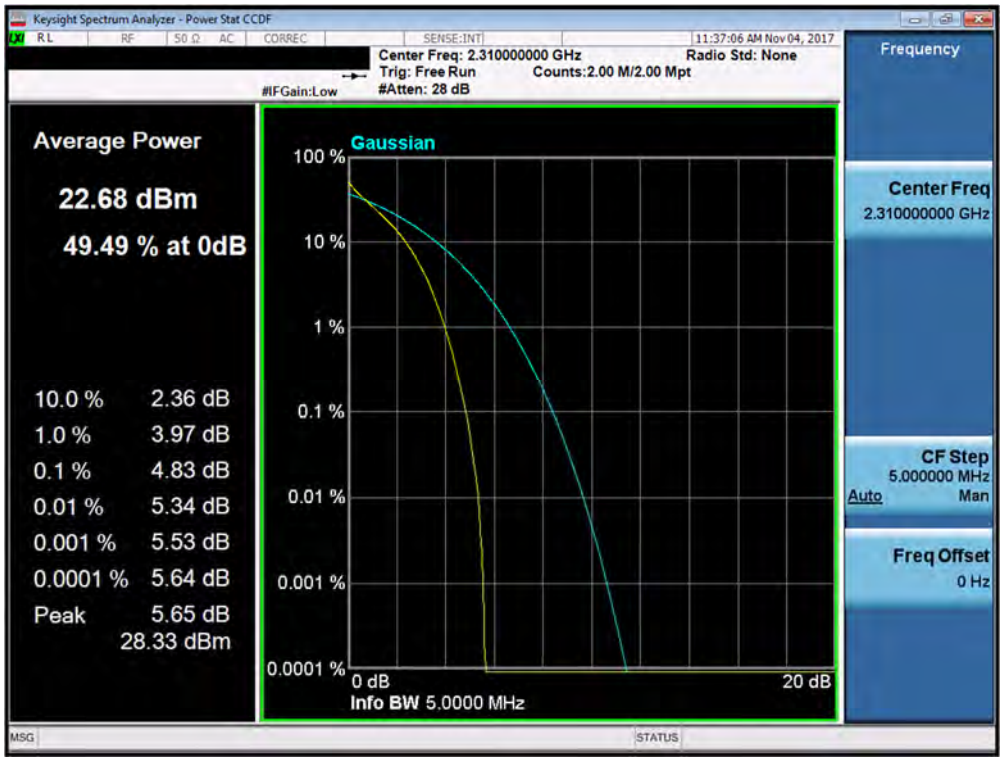


Plot 7-453. PAR Plot (Band 2/25 - 20.0MHz 16-QAM - Full RB Configuration)

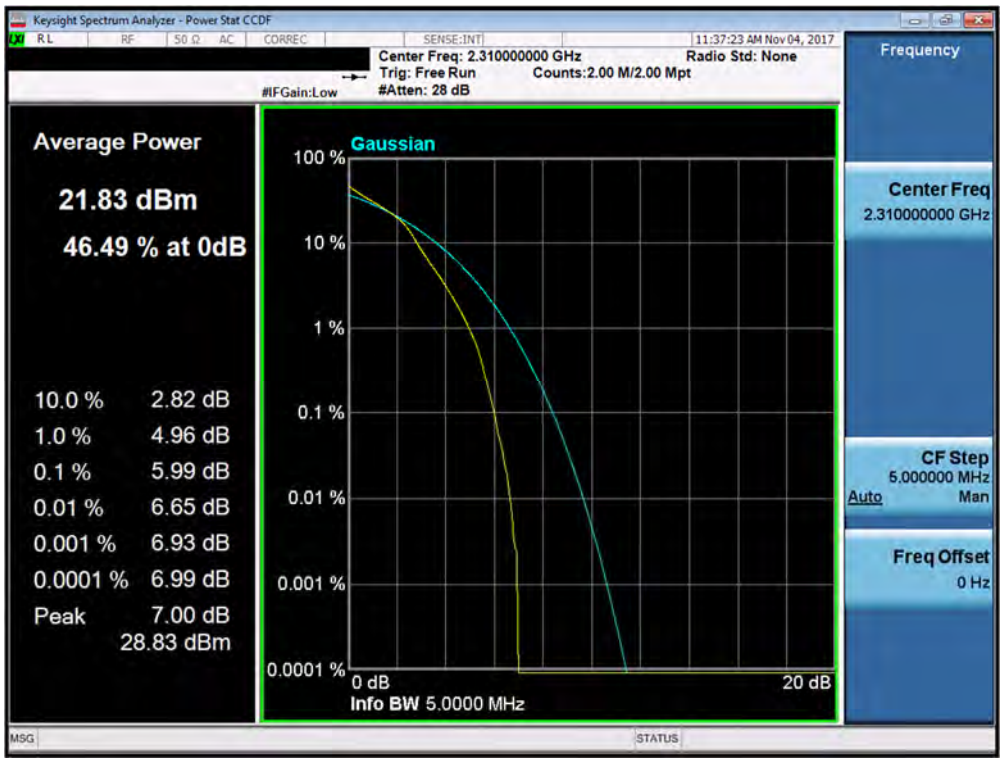


Plot 7-454. PAR Plot (Band 2/25 - 20.0MHz 64-QAM - Full RB Configuration)

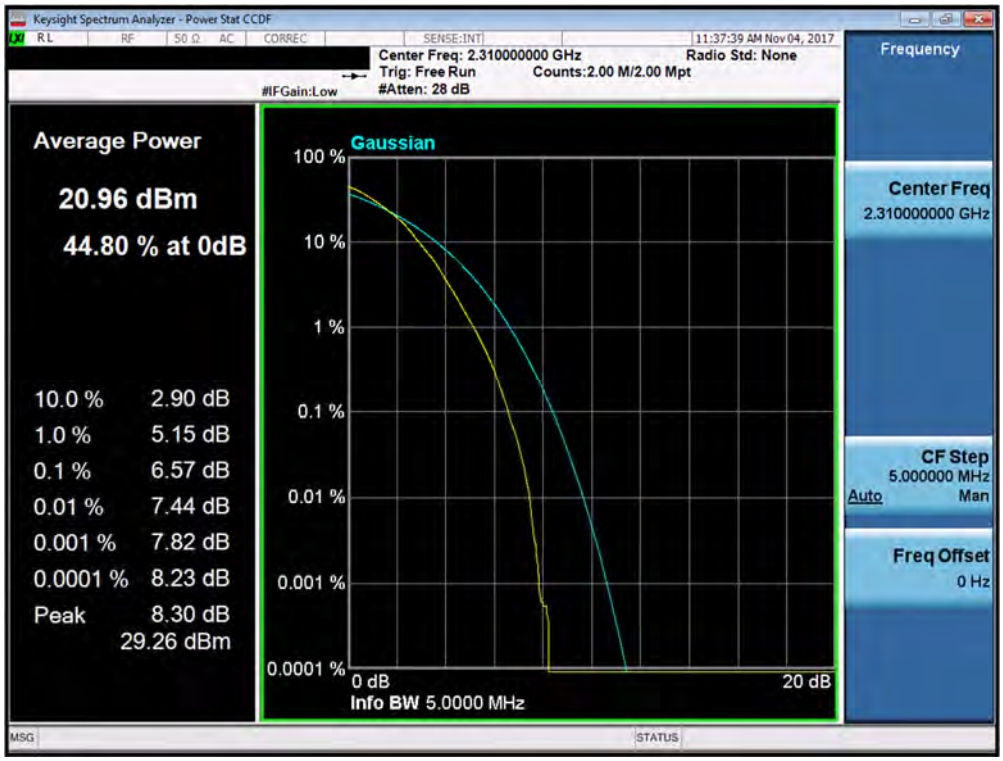
Band 30 (Antenna B)



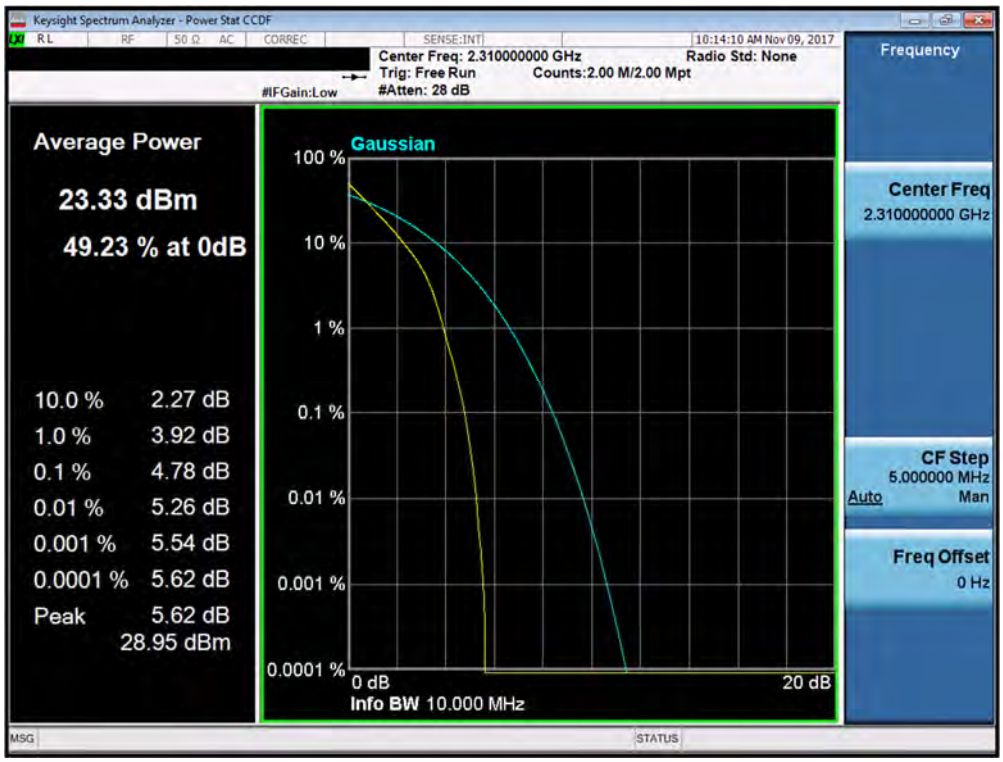
Plot 7-455. PAR Plot (Band 30 - 5.0MHz QPSK - Full RB Configuration – Antenna B)



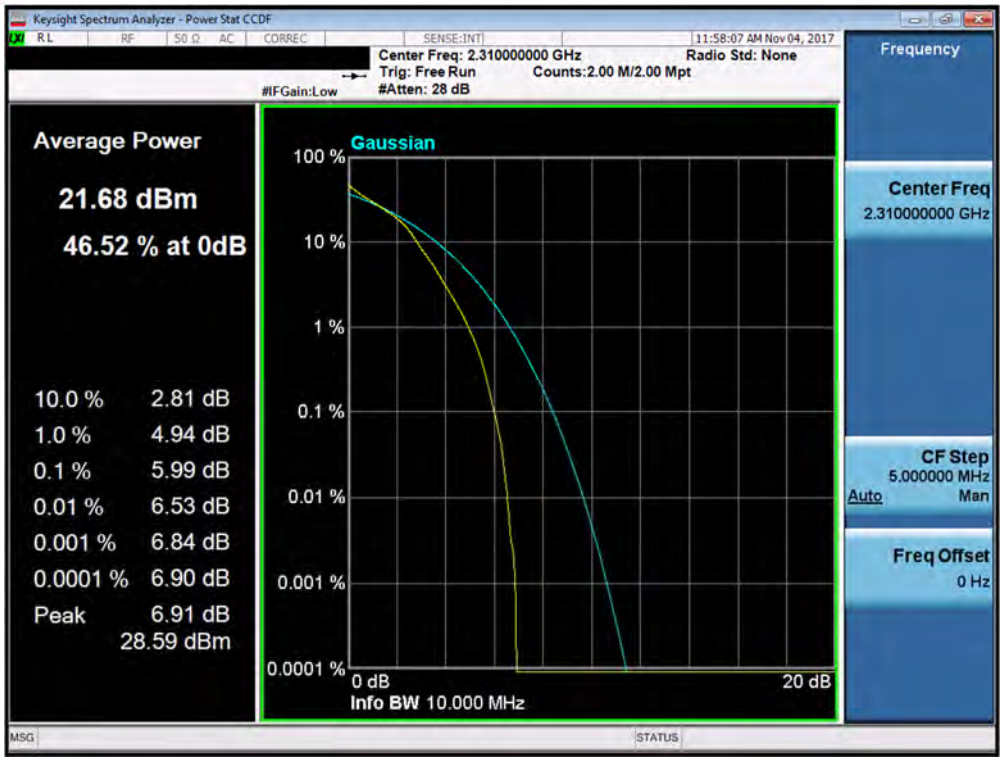
Plot 7-456. PAR Plot (Band 30 - 5.0MHz 16-QAM - Full RB Configuration– Antenna B)



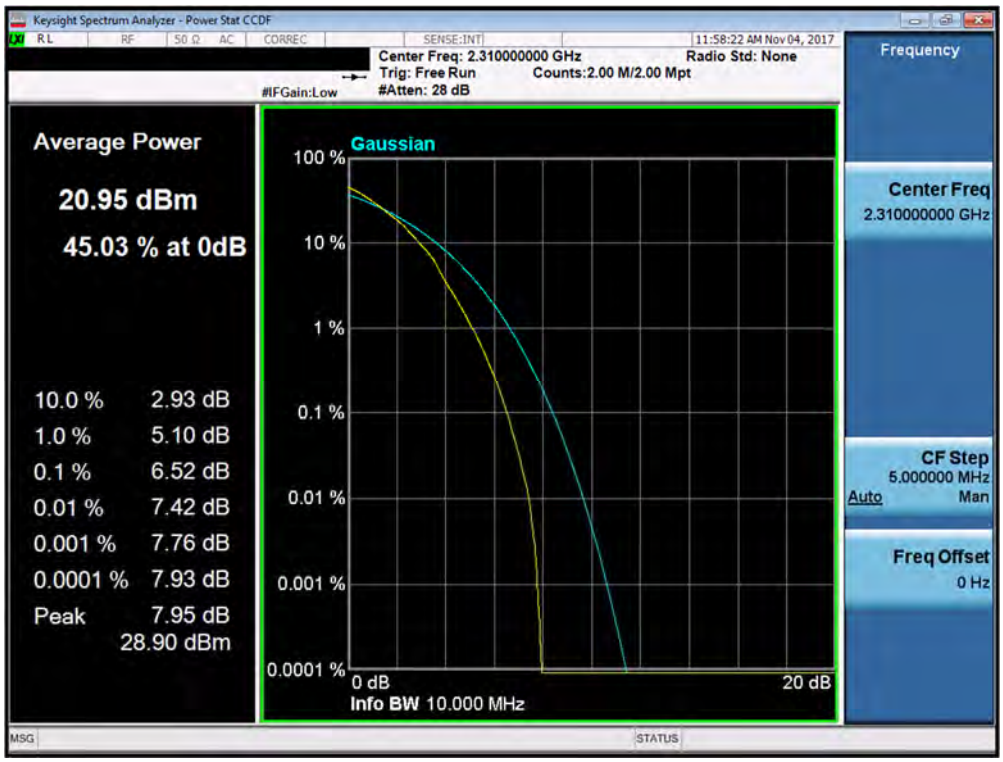
Plot 7-457. PAR Plot (Band 30 - 5.0MHz 64-QAM - Full RB Configuration– Antenna B)



Plot 7-458. PAR Plot (Band 30 - 10.0MHz QPSK - Full RB Configuration– Antenna B)

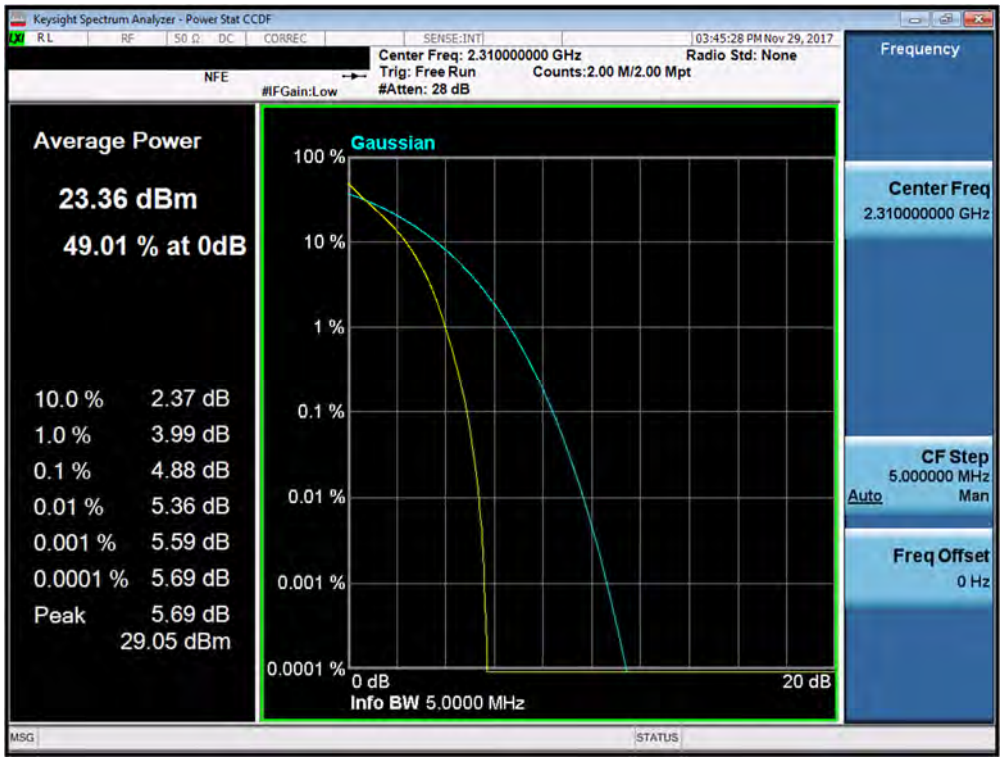


Plot 7-459. PAR Plot (Band 30 - 10.0MHz 16-QAM - Full RB Configuration– Antenna B)

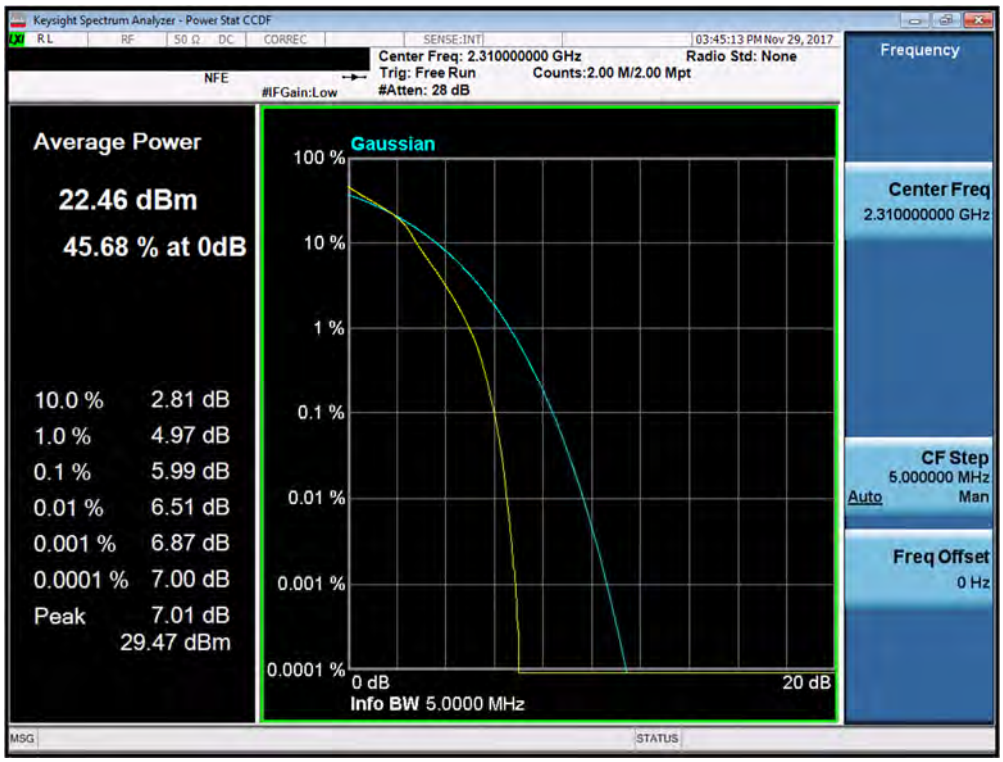


Plot 7-460. PAR Plot (Band 30 - 10.0MHz 64-QAM - Full RB Configuration– Antenna B)

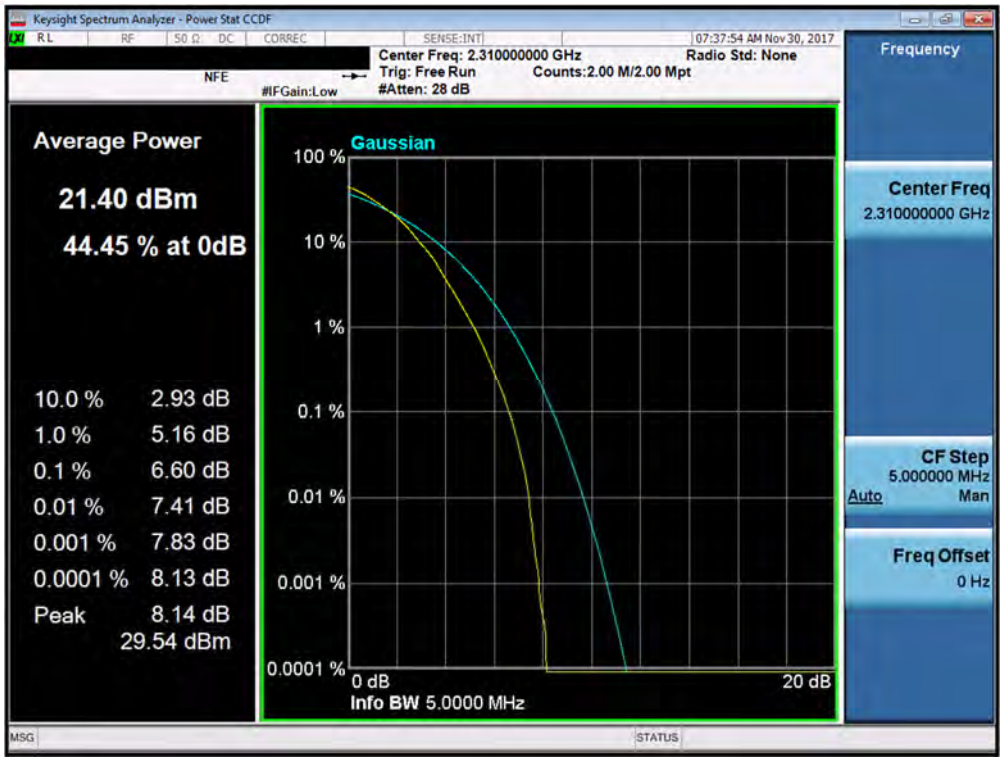
Band 30 (Antenna A)



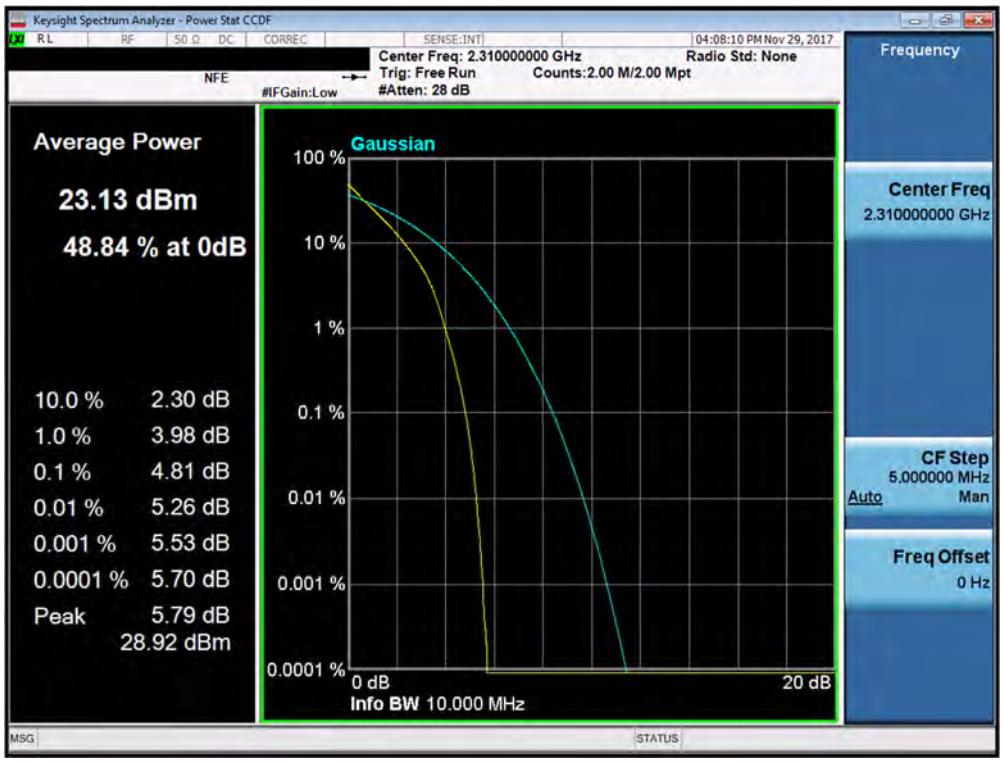
Plot 7-461. PAR Plot (Band 30 - 5.0MHz QPSK - Full RB Configuration – Antenna A)



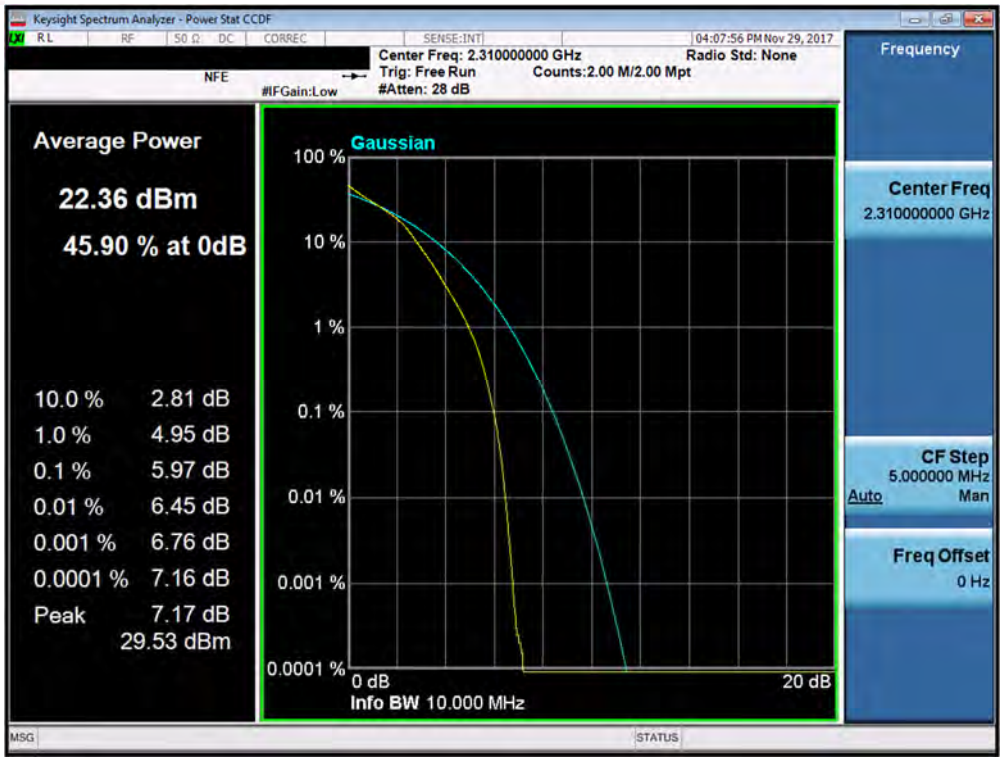
Plot 7-462. PAR Plot (Band 30 - 5.0MHz 16-QAM - Full RB Configuration– Antenna A)



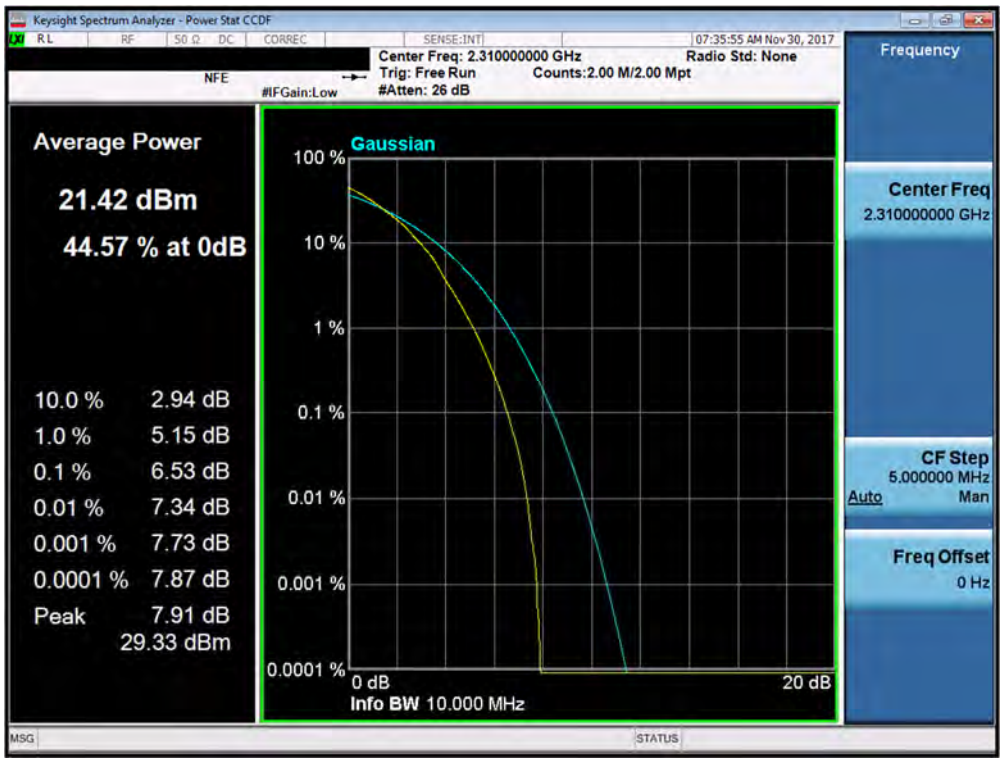
Plot 7-463. PAR Plot (Band 30 - 5.0MHz 64-QAM - Full RB Configuration– Antenna A)



Plot 7-464. PAR Plot (Band 30 - 10.0MHz QPSK - Full RB Configuration– Antenna A)

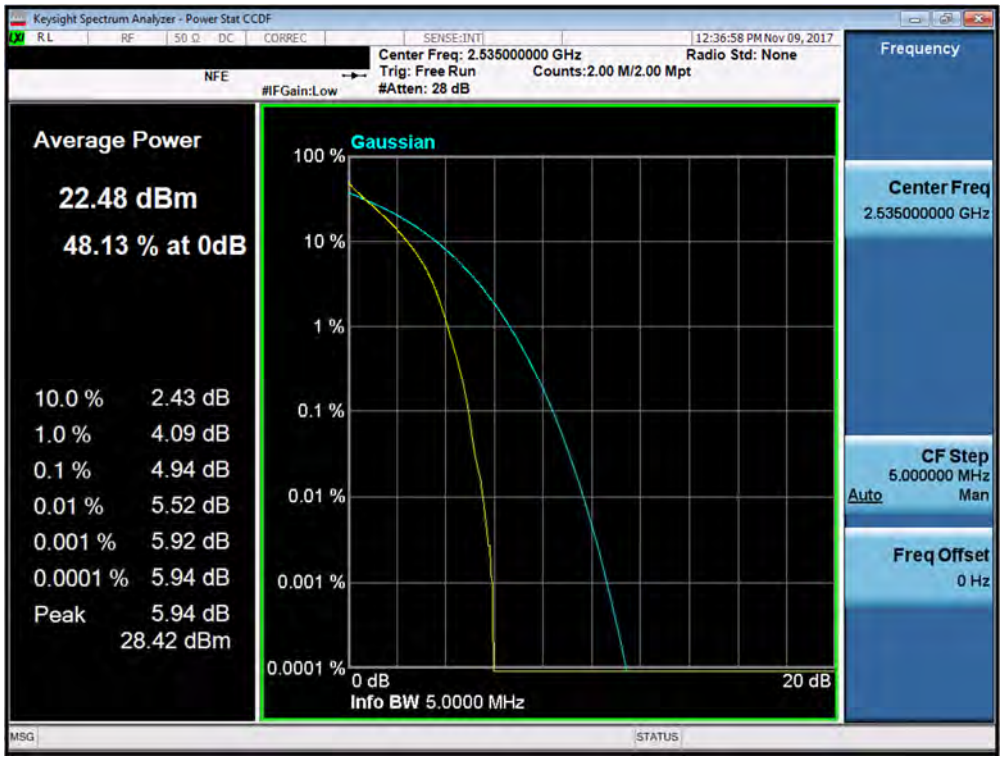


Plot 7-465. PAR Plot (Band 30 - 10.0MHz 16-QAM - Full RB Configuration– Antenna A)

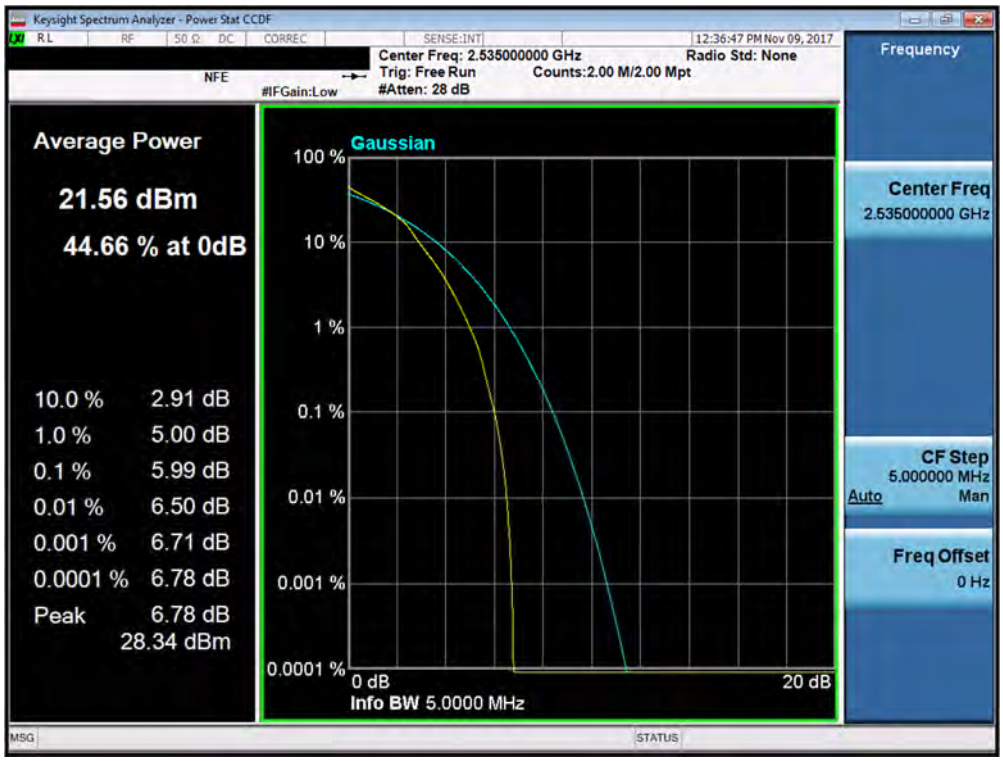


Plot 7-466. PAR Plot (Band 30 - 10.0MHz 64-QAM - Full RB Configuration– Antenna A)

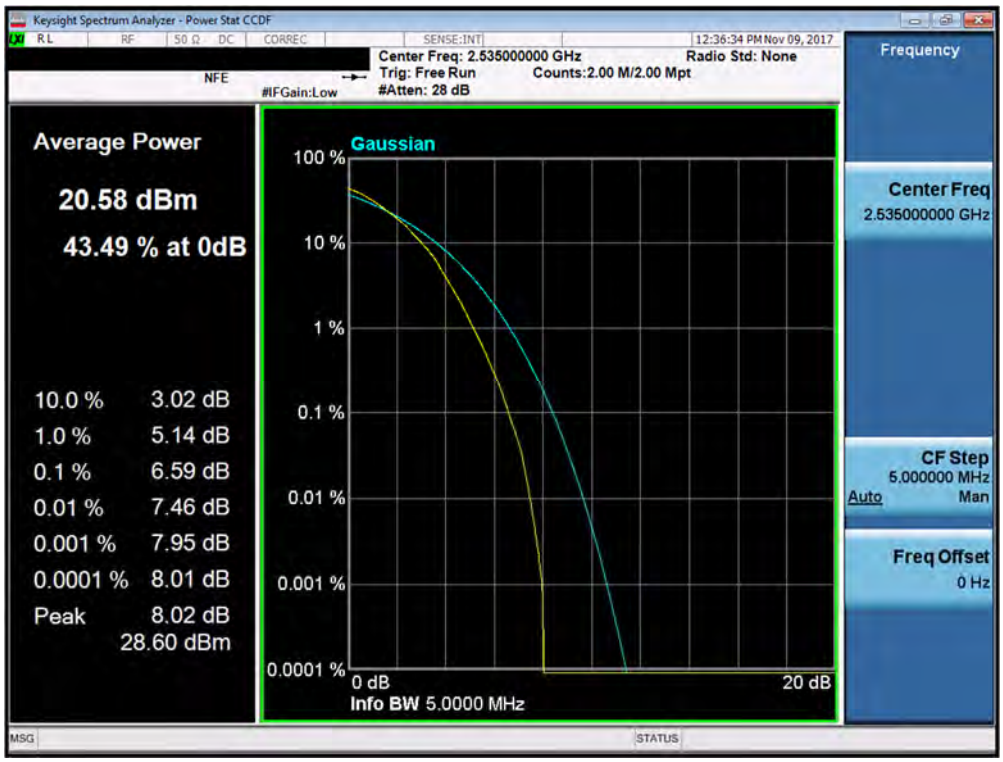
Band 7 (Antenna B)



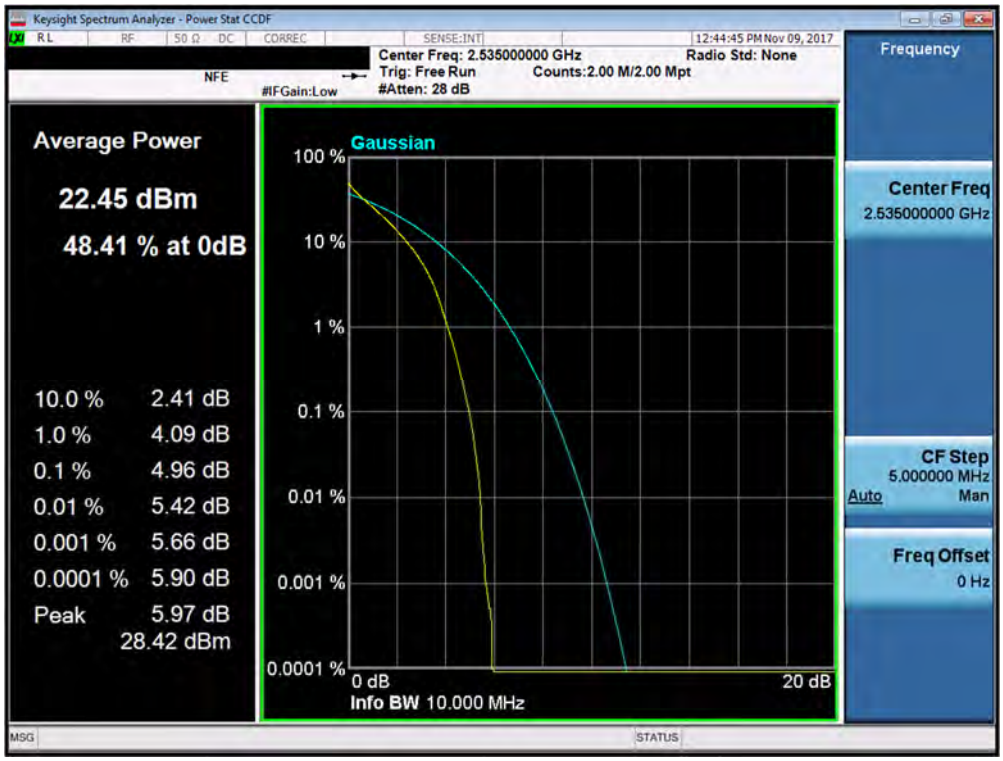
Plot 7-467. PAR Plot (Band 7 - 5.0MHz QPSK - Full RB Configuration – Antenna B)



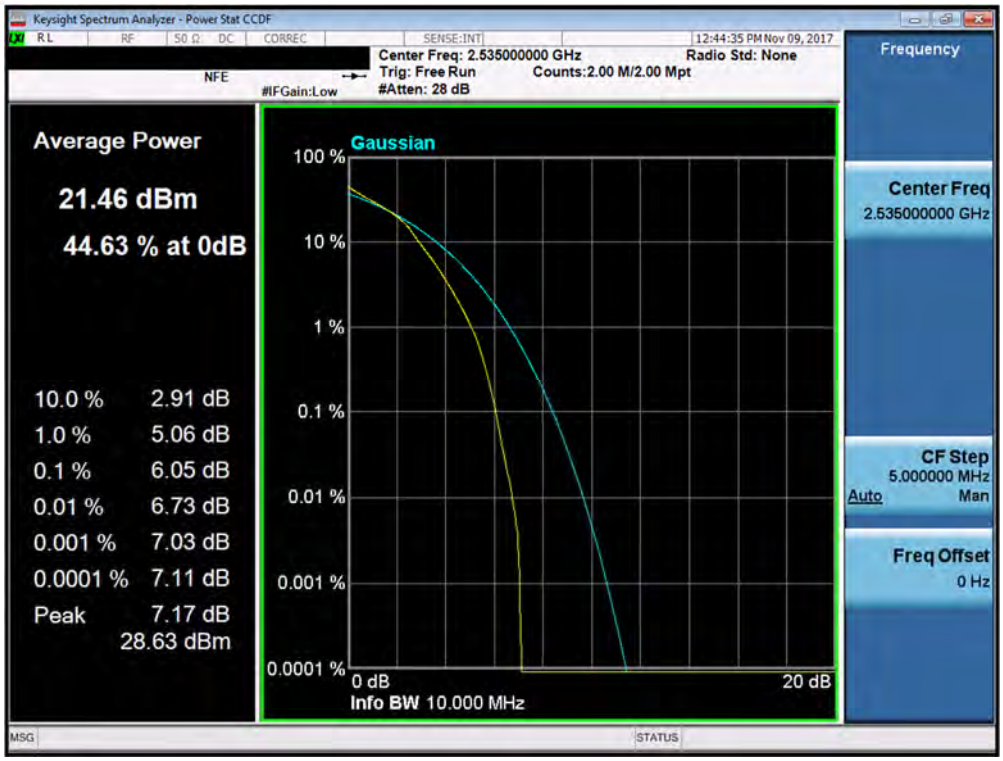
Plot 7-468. PAR Plot (Band 7 - 5.0MHz 16-QAM - Full RB Configuration– Antenna B)



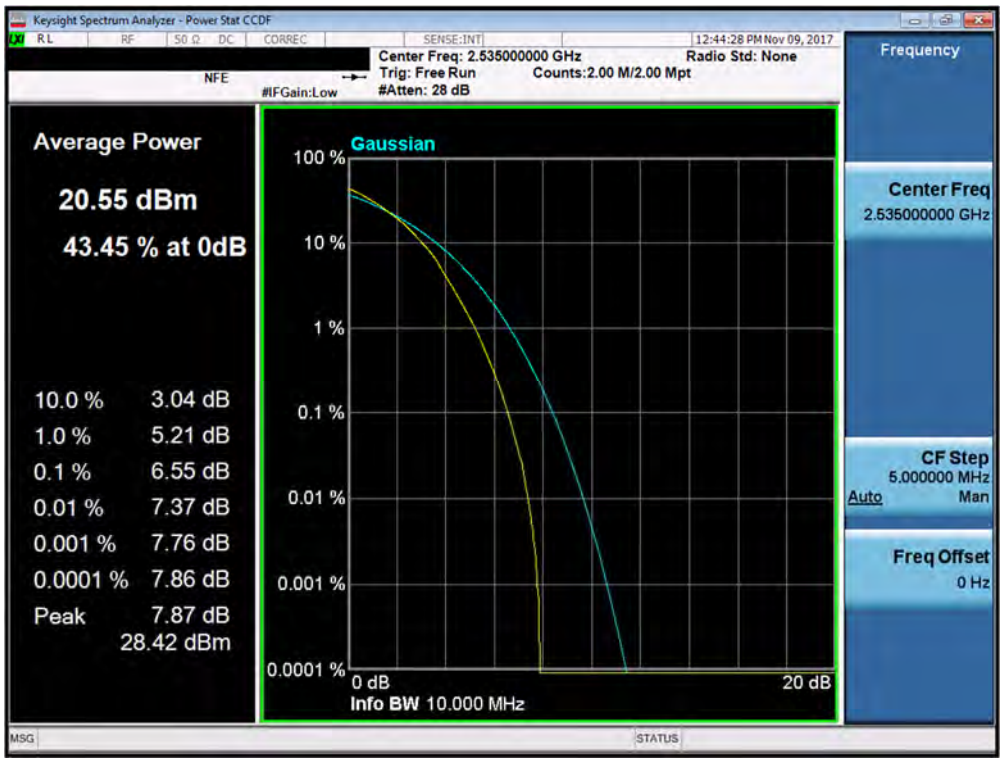
Plot 7-469. PAR Plot (Band 7 - 5.0MHz 64-QAM - Full RB Configuration– Antenna B)



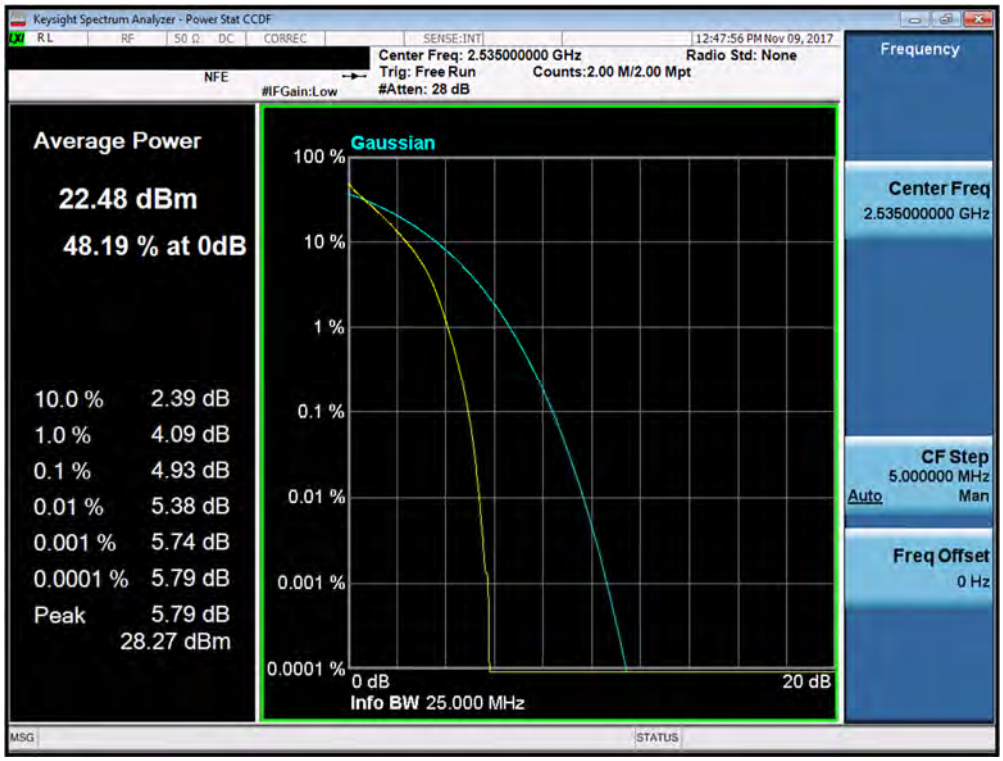
Plot 7-470. PAR Plot (Band 7 - 10.0MHz QPSK - Full RB Configuration– Antenna B)



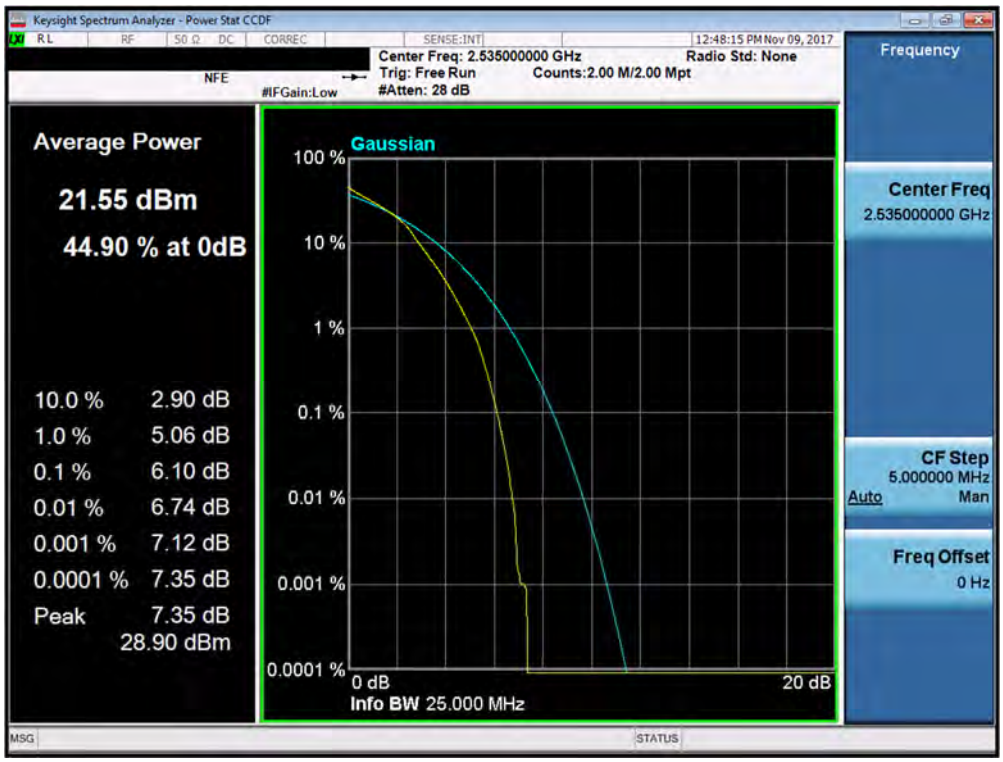
Plot 7-471. PAR Plot (Band 7 - 10.0MHz 16-QAM - Full RB Configuration– Antenna B)



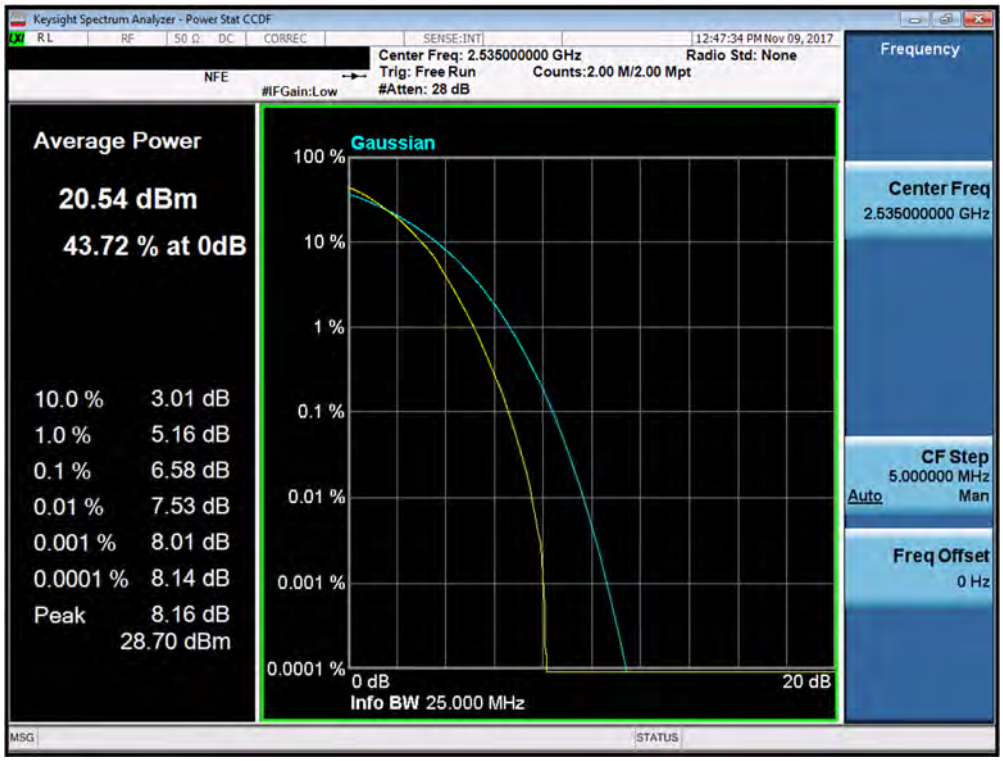
Plot 7-472. PAR Plot (Band 7 - 10.0MHz 64-QAM - Full RB Configuration– Antenna B)



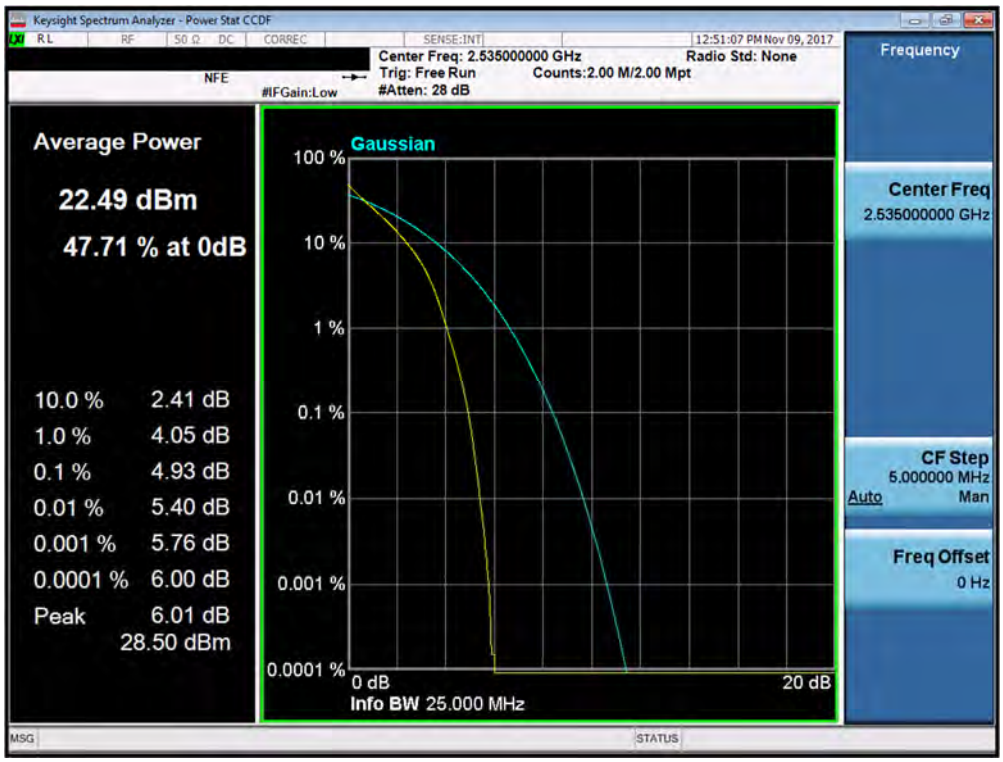
Plot 7-473. PAR Plot (Band 7 - 15.0MHz QPSK - Full RB Configuration– Antenna B)



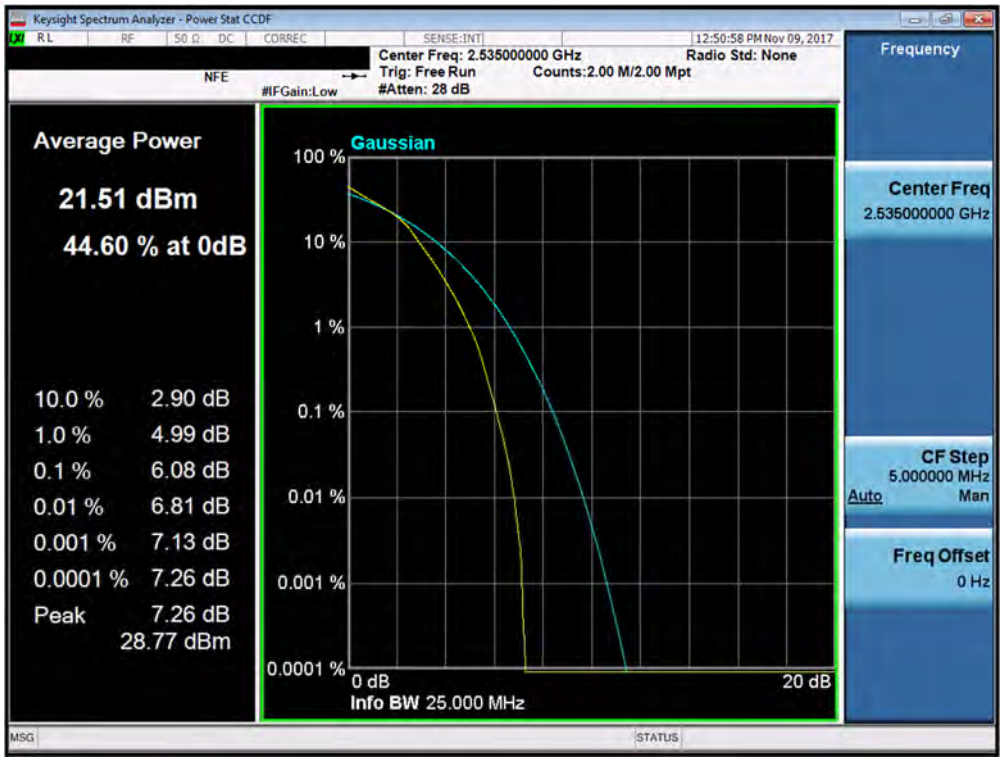
Plot 7-474. PAR Plot (Band 7 - 15.0MHz 16-QAM - Full RB Configuration– Antenna B)



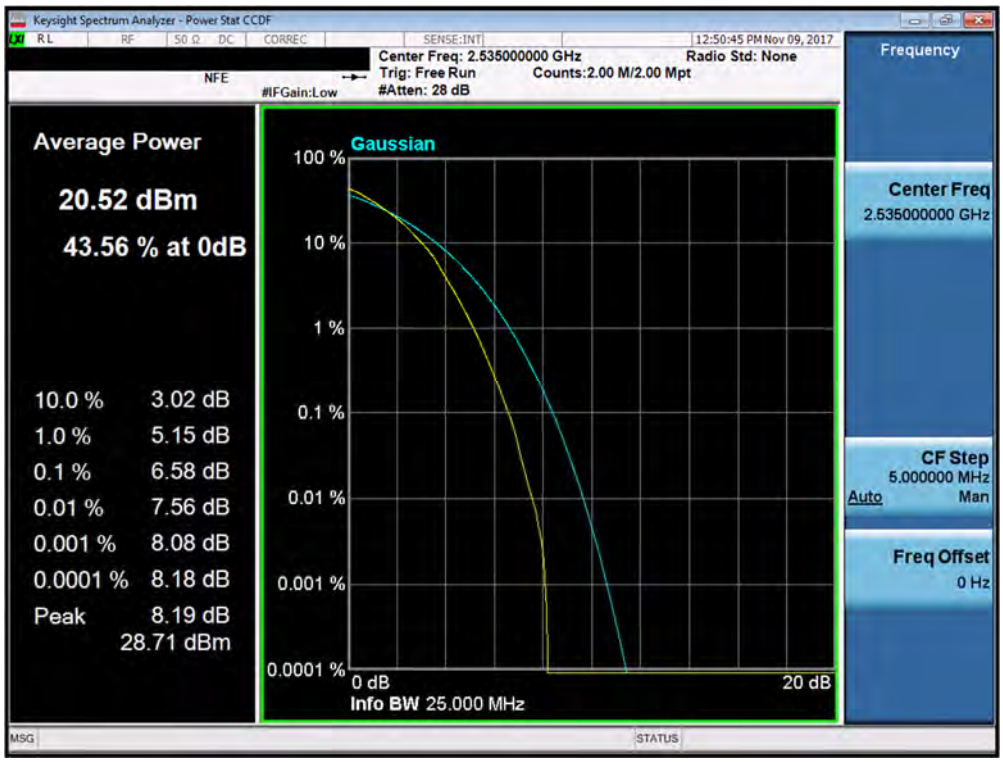
Plot 7-475. PAR Plot (Band 7 - 15.0MHz 64-QAM - Full RB Configuration– Antenna B)



Plot 7-476. PAR Plot (Band 7 - 20.0MHz QPSK - Full RB Configuration– Antenna B)

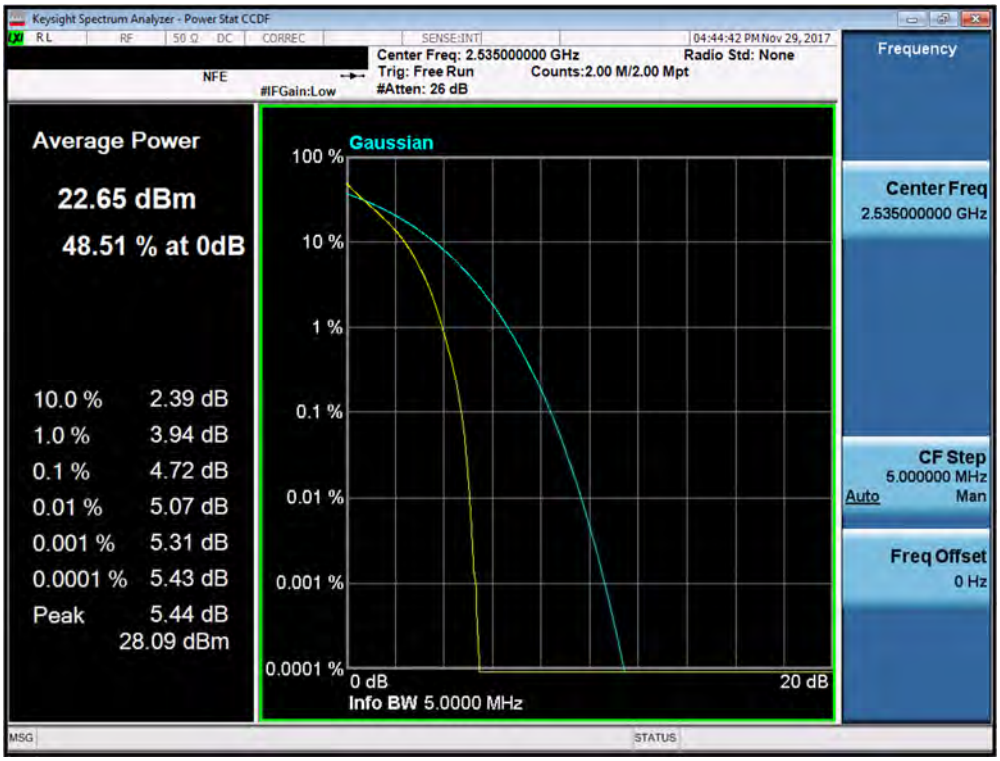


Plot 7-477. PAR Plot (Band 7 - 20.0MHz 16-QAM - Full RB Configuration– Antenna B)

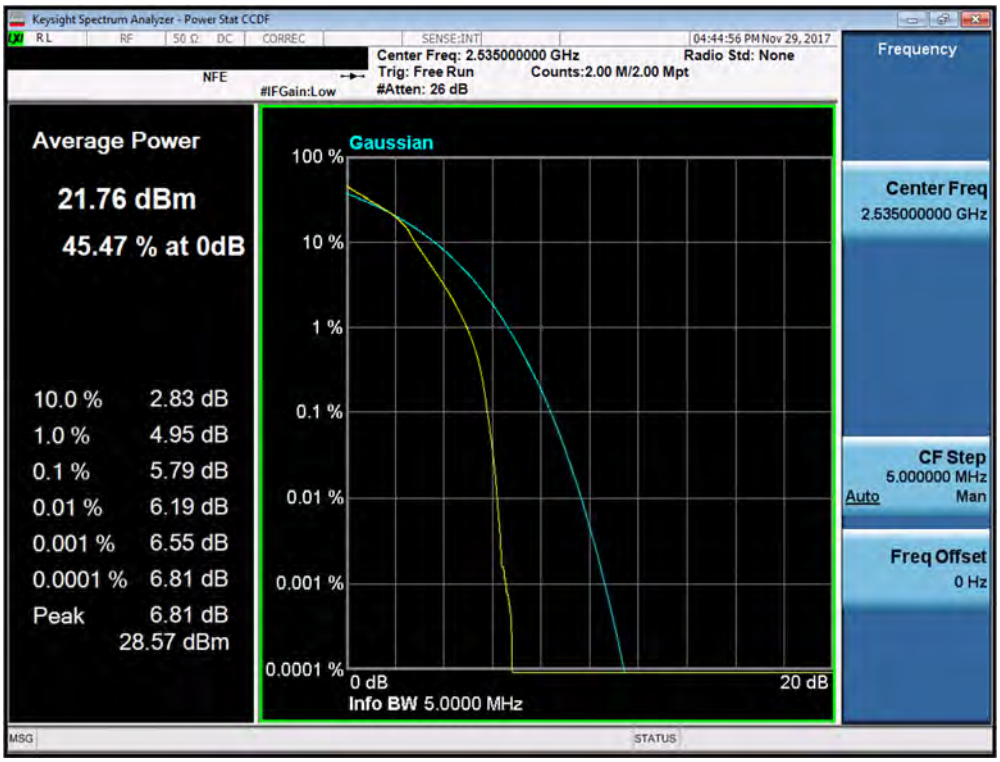


Plot 7-478. PAR Plot (Band 7 - 20.0MHz 64-QAM - Full RB Configuration– Antenna B)

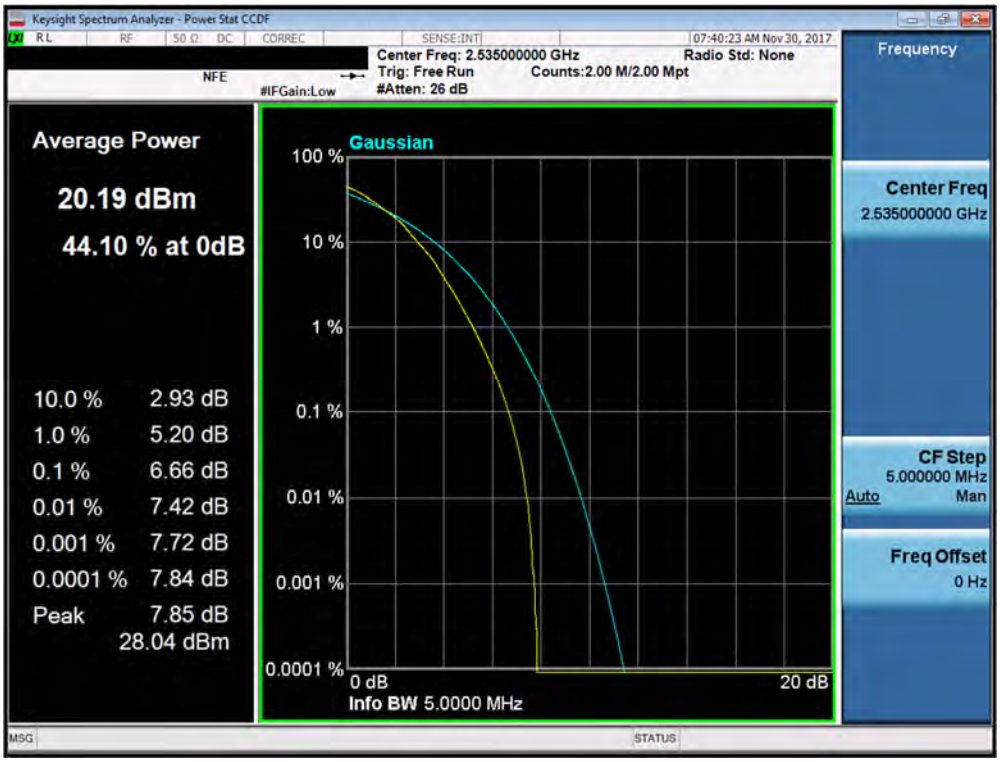
Band 7 (Antenna A)



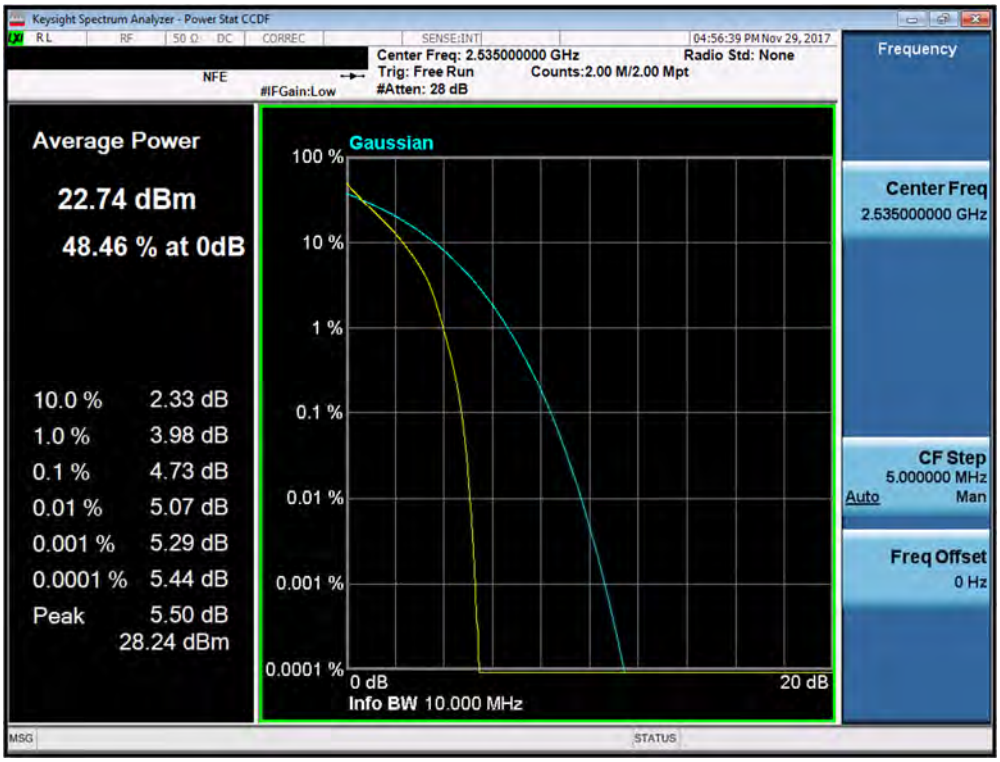
Plot 7-479. PAR Plot (Band 7 - 5.0MHz QPSK - Full RB Configuration – Antenna A)



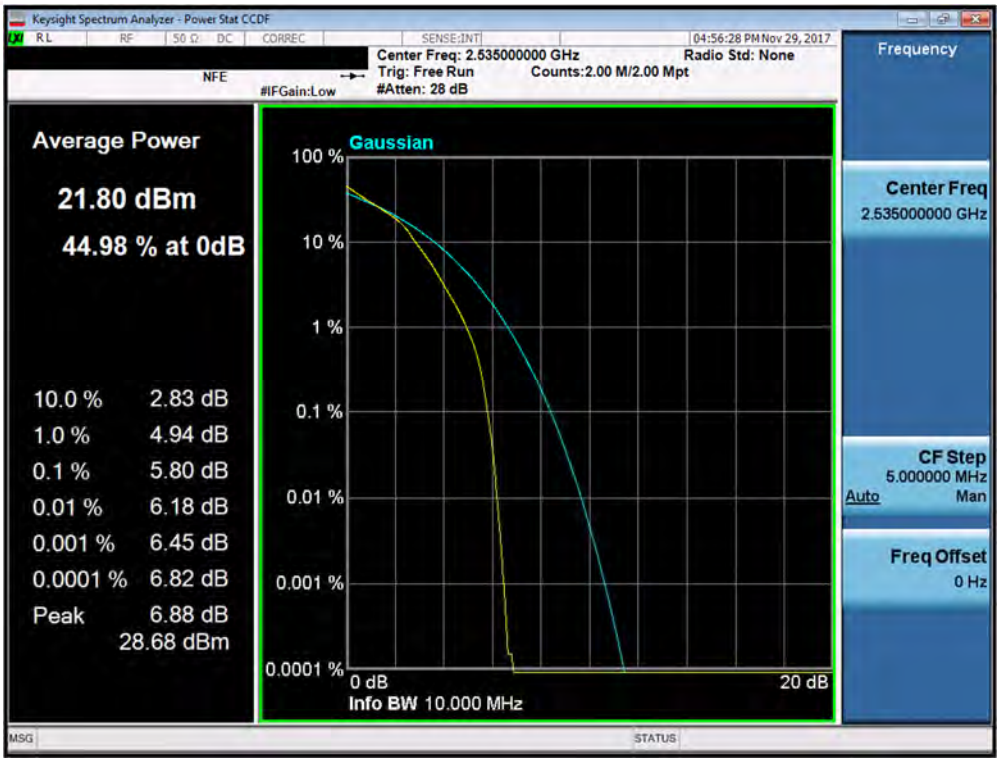
Plot 7-480. PAR Plot (Band 7 - 5.0MHz 16-QAM - Full RB Configuration– Antenna A)



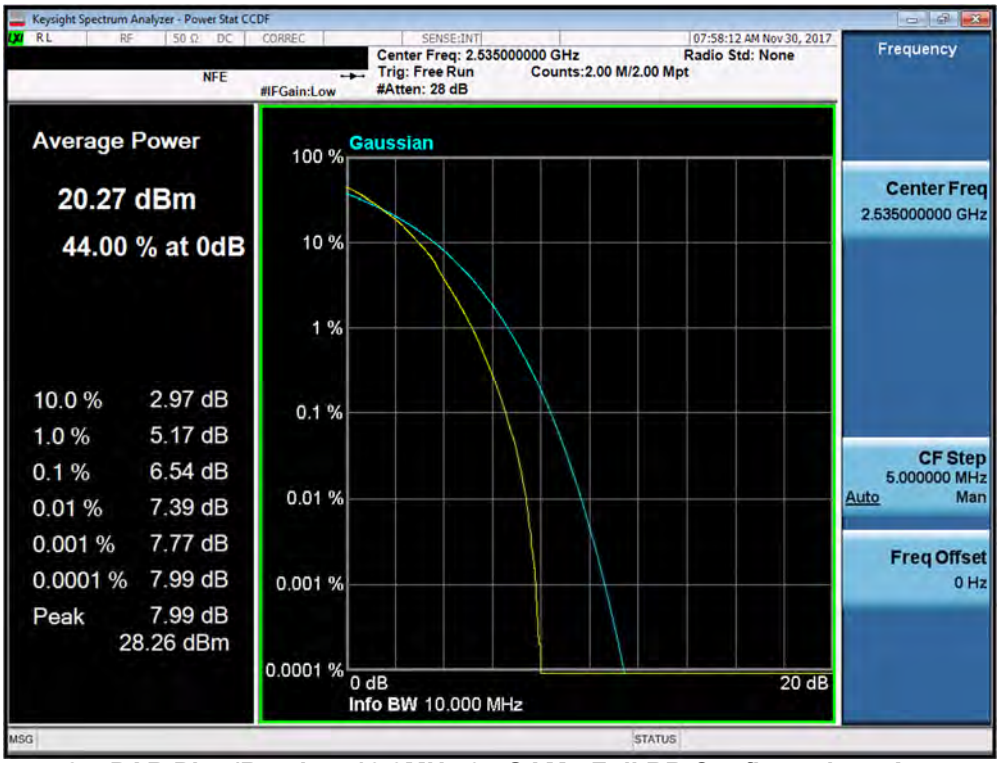
Plot 7-481. PAR Plot (Band 7 - 5.0MHz 64-QAM - Full RB Configuration– Antenna A)



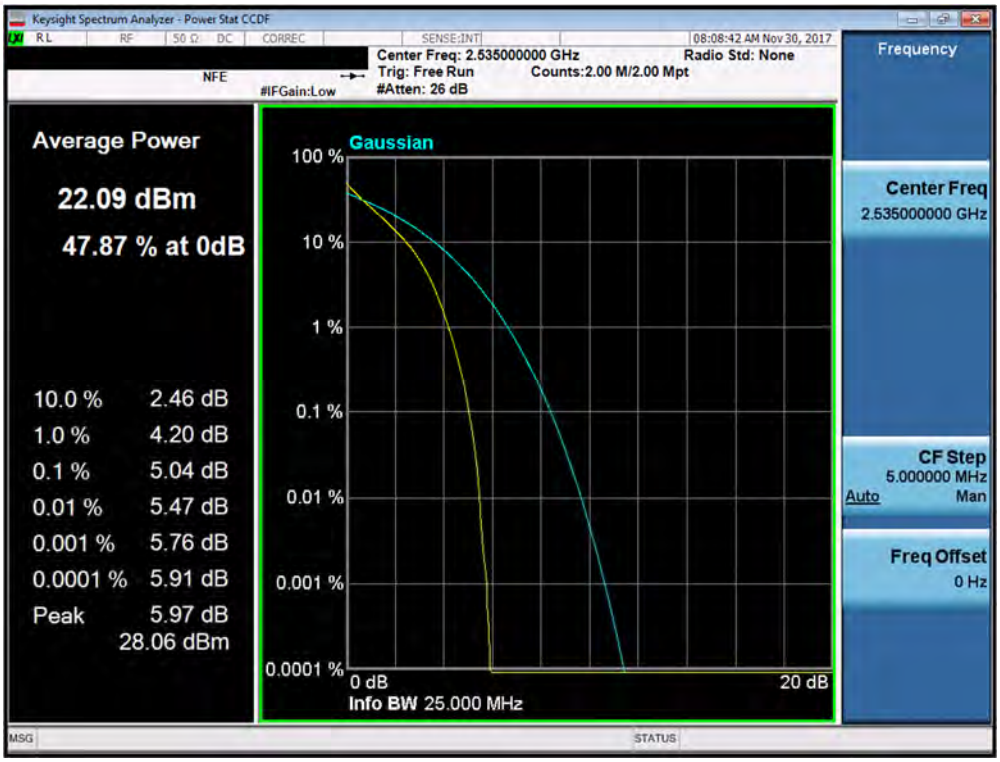
Plot 7-482. PAR Plot (Band 7 - 10.0MHz QPSK - Full RB Configuration– Antenna A)



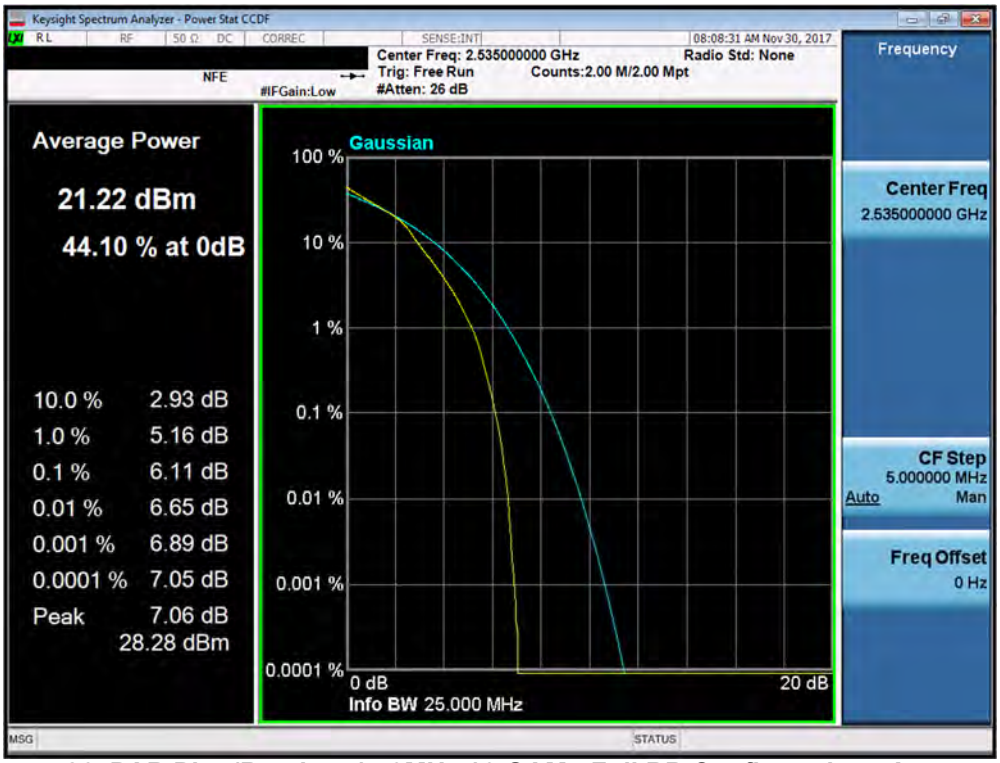
Plot 7-483. PAR Plot (Band 7 - 10.0MHz 16-QAM - Full RB Configuration– Antenna A)



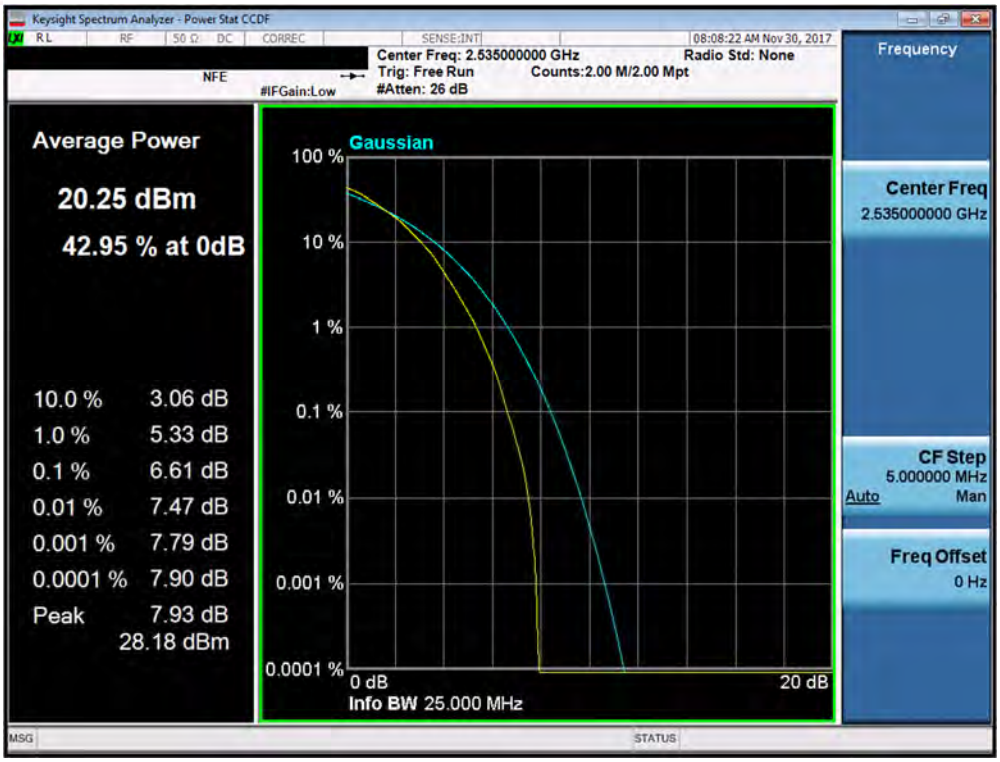
Plot 7-484. PAR Plot (Band 7 - 10.0MHz 64-QAM - Full RB Configuration– Antenna A)



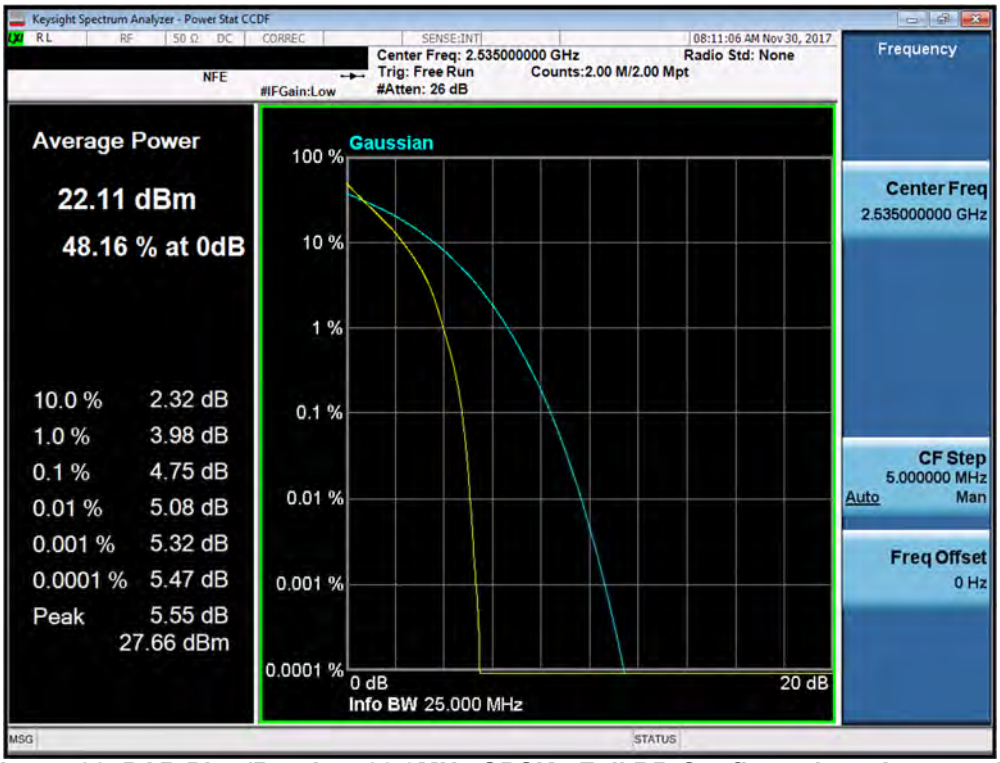
Plot 7-485. PAR Plot (Band 7 - 15.0MHz QPSK - Full RB Configuration– Antenna A)



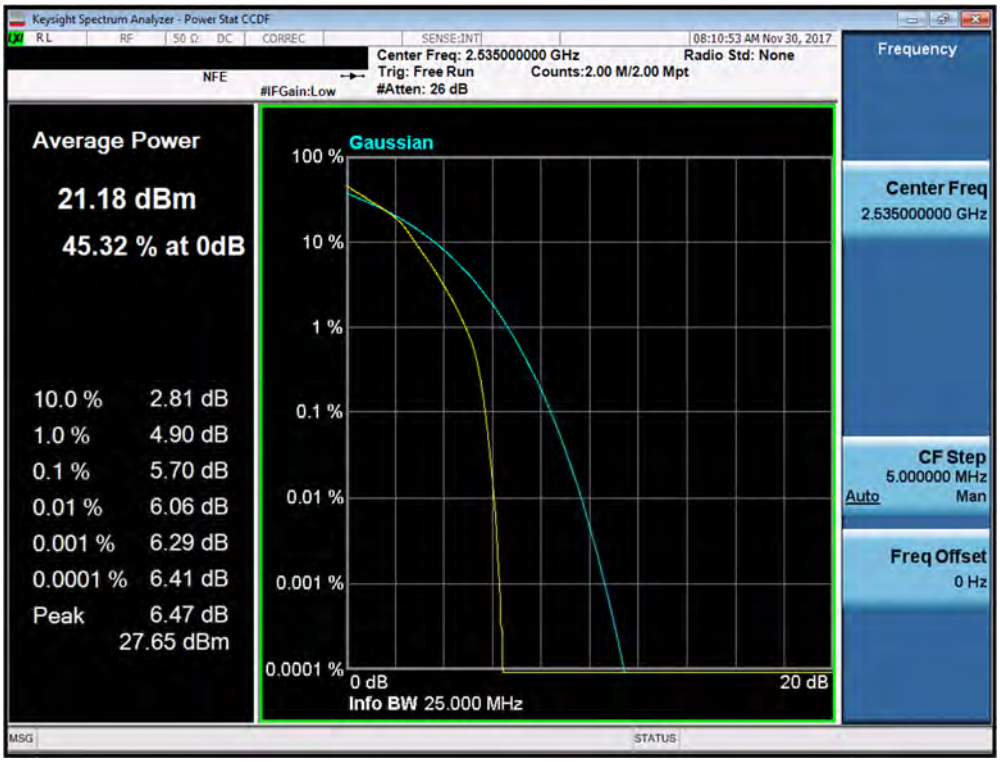
Plot 7-486. PAR Plot (Band 7 - 15.0MHz 16-QAM - Full RB Configuration– Antenna A)



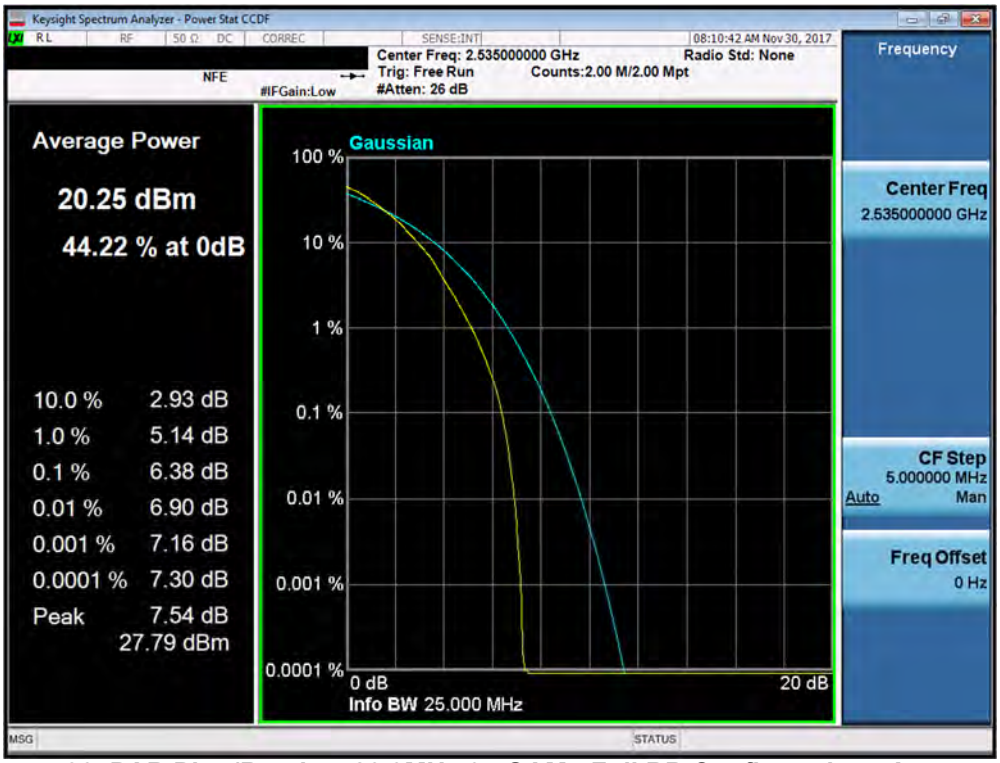
Plot 7-487. PAR Plot (Band 7 - 15.0MHz 64-QAM - Full RB Configuration– Antenna A)



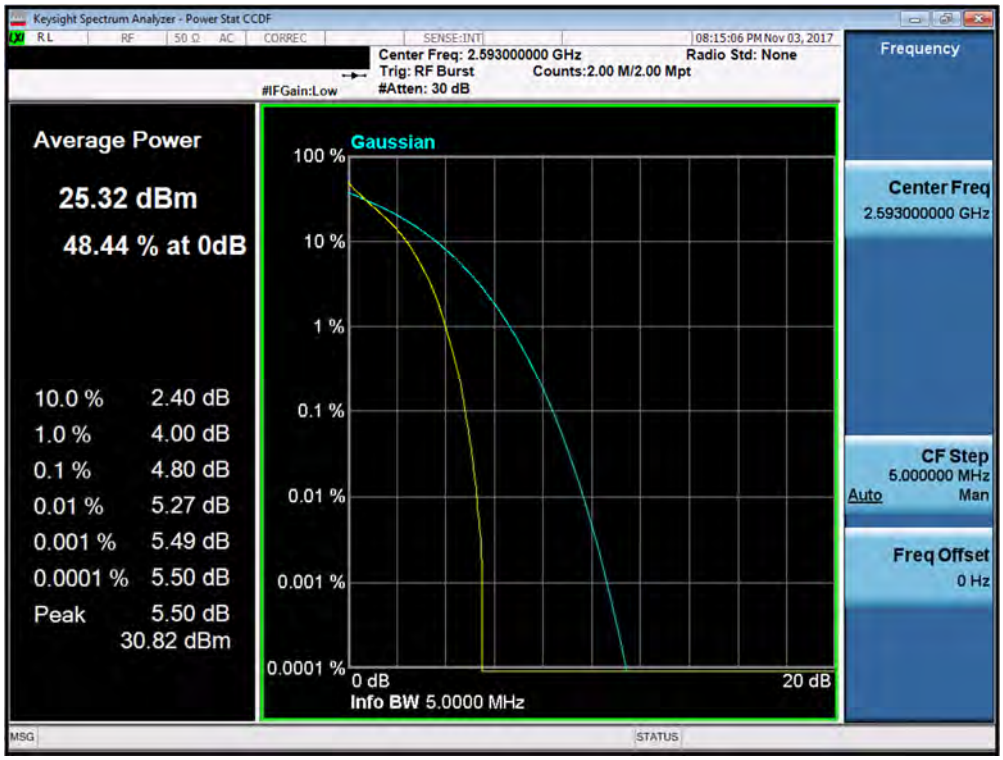
Plot 7-488. PAR Plot (Band 7 - 20.0MHz QPSK - Full RB Configuration– Antenna A)



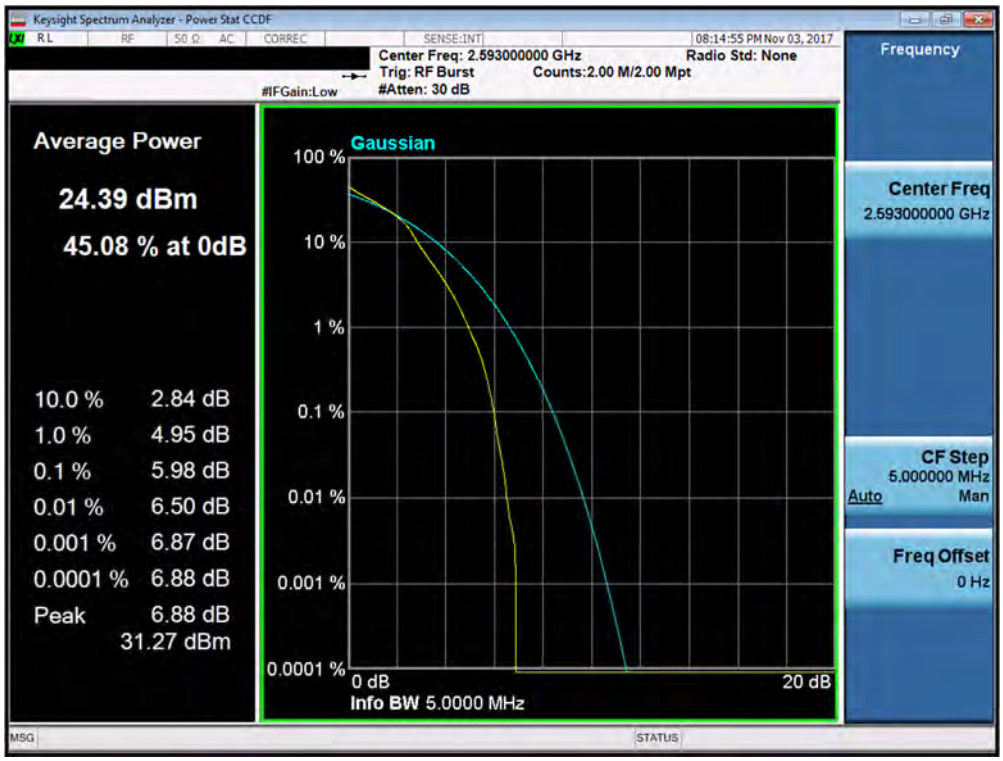
Plot 7-489. PAR Plot (Band 7 - 20.0MHz 16-QAM - Full RB Configuration– Antenna A)



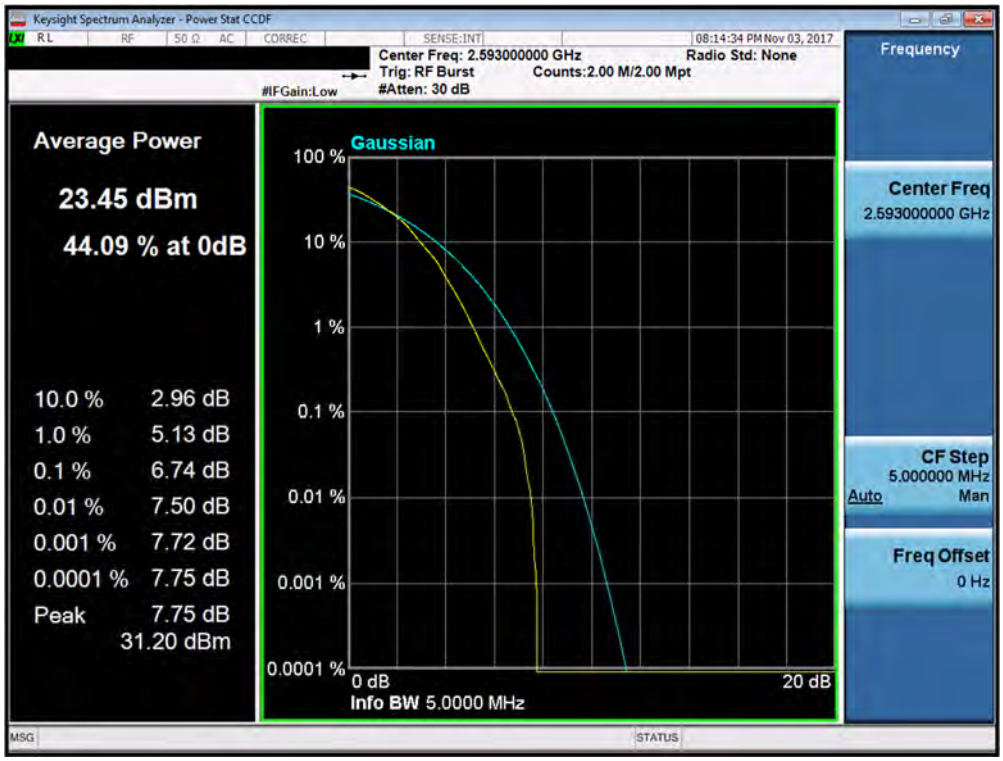
Plot 7-490. PAR Plot (Band 7 - 20.0MHz 64-QAM - Full RB Configuration– Antenna A)



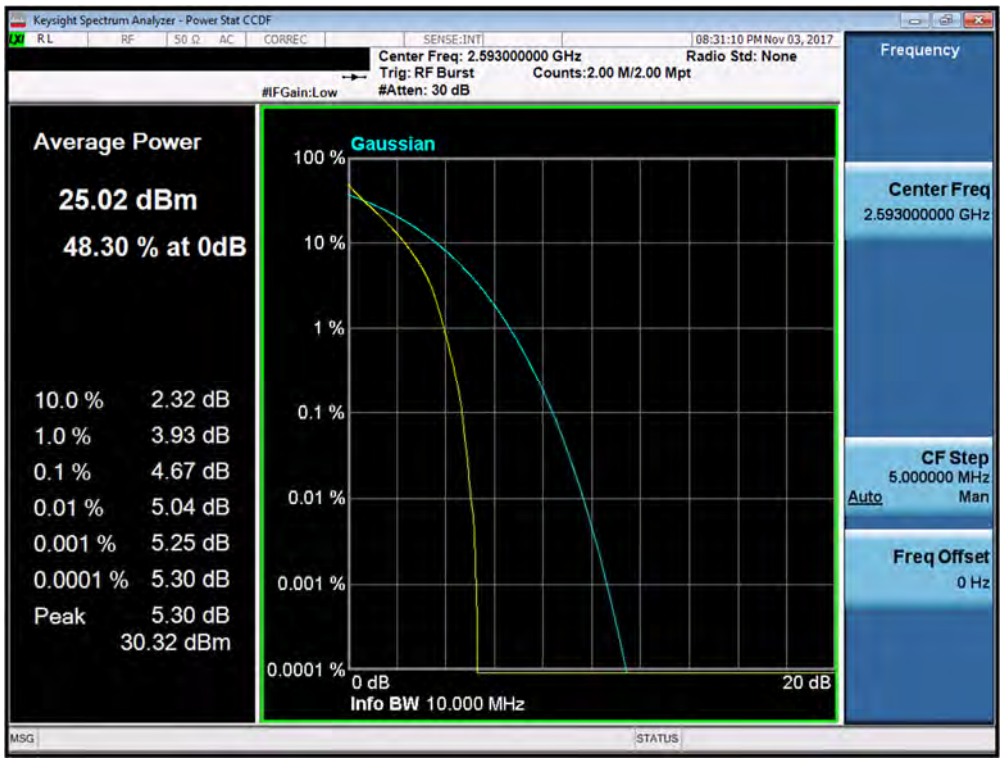
Plot 7-491. PAR Plot (Band 38/41 - 5.0MHz QPSK - Full RB Configuration)



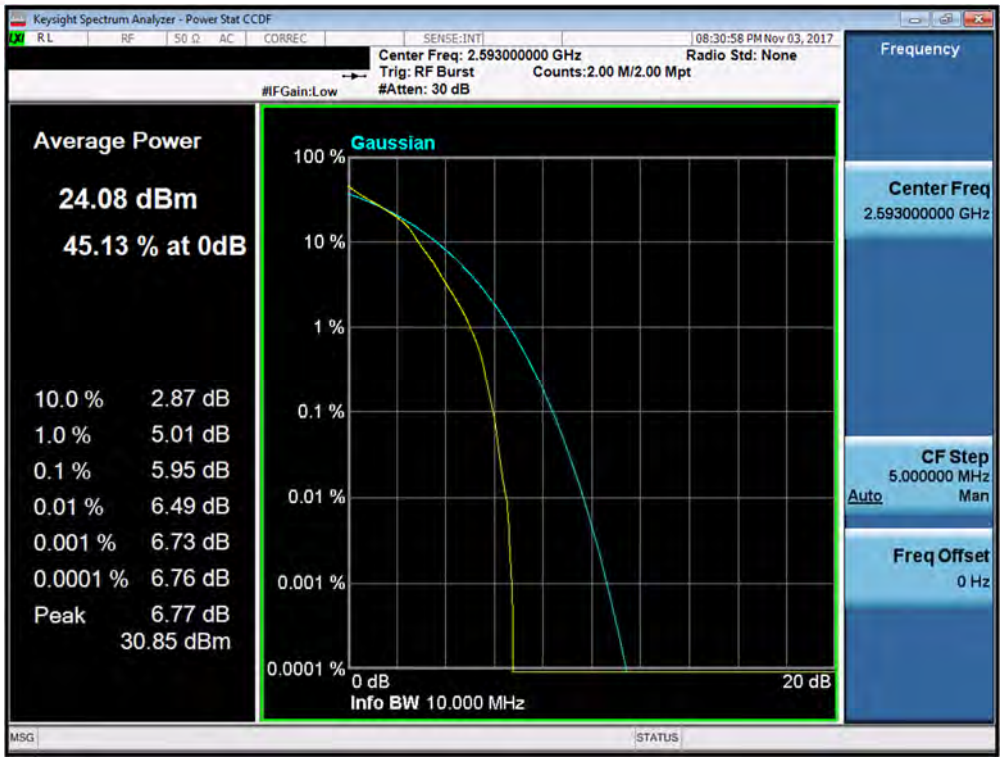
Plot 7-492. PAR Plot (Band 38/41 - 5.0MHz 16-QAM - Full RB Configuration)



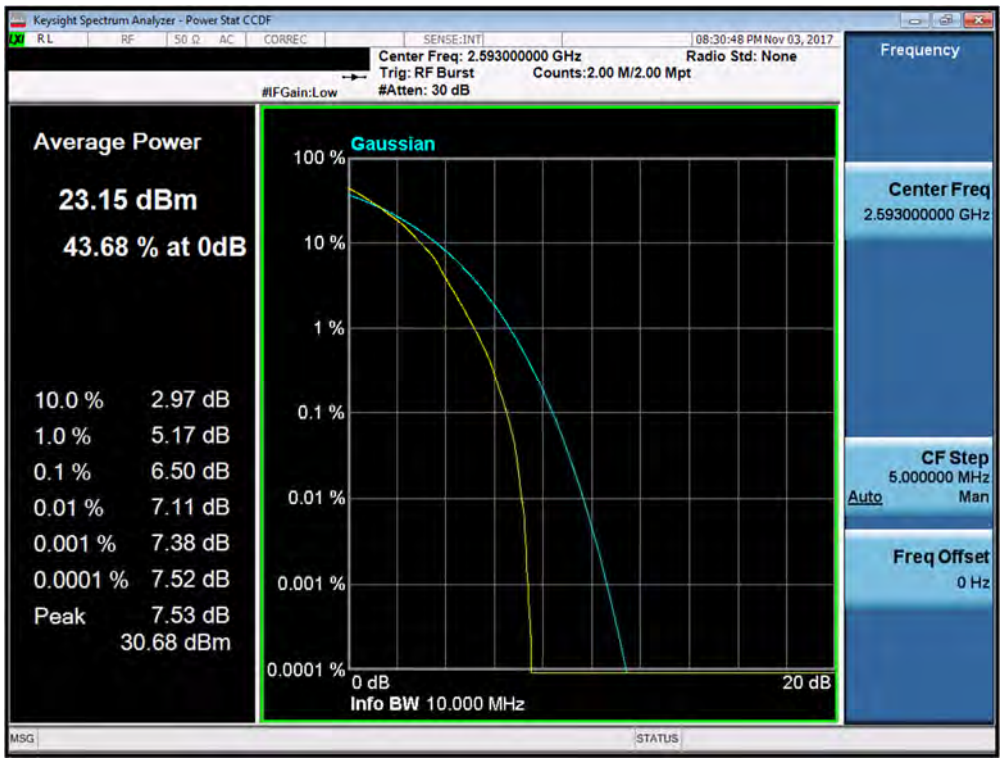
Plot 7-493. PAR Plot (Band 38/41 - 5.0MHz 64-QAM - Full RB Configuration)



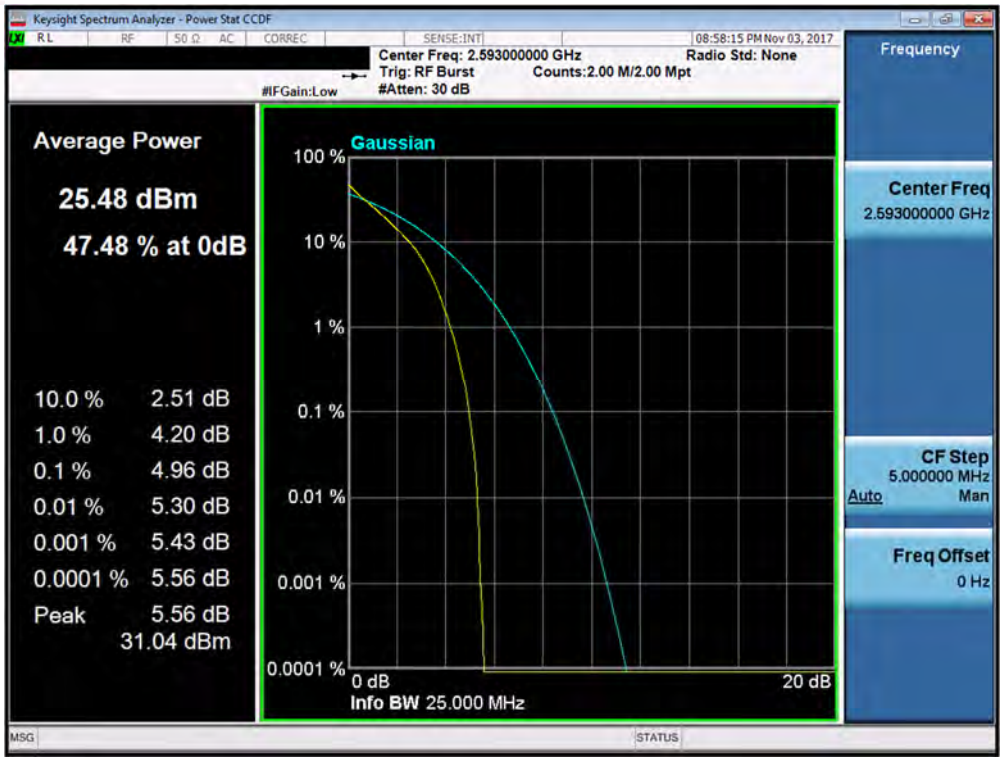
Plot 7-494. PAR Plot (Band 38/41 - 10.0MHz QPSK - Full RB Configuration)



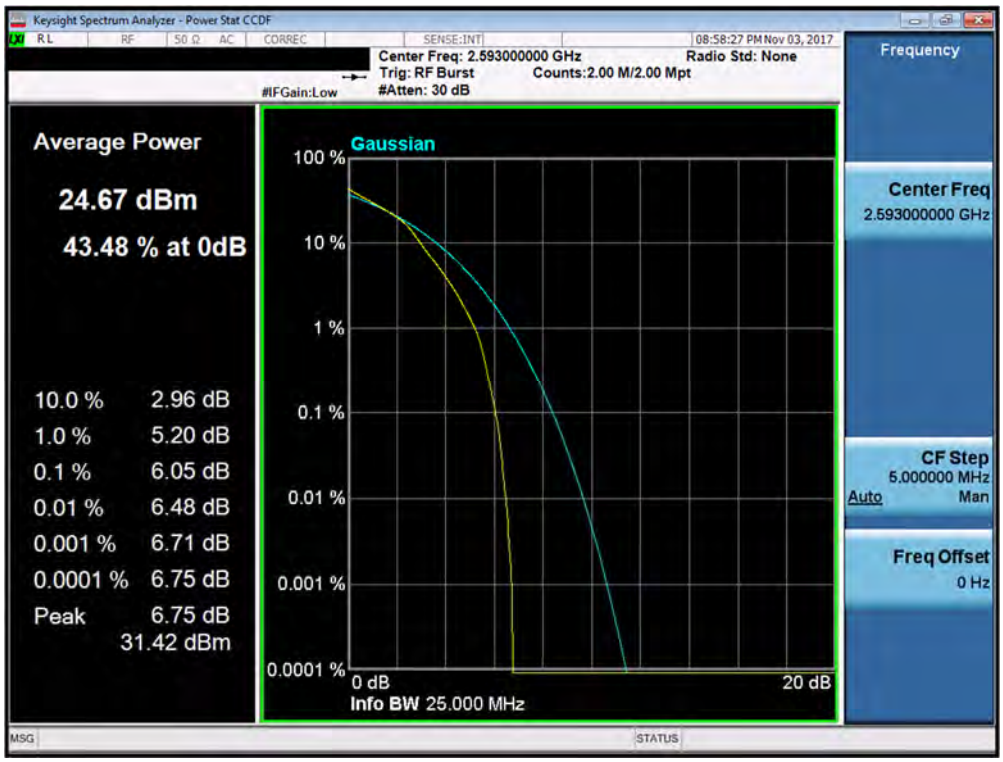
Plot 7-495. PAR Plot (Band 38/41 - 10.0MHz 16-QAM - Full RB Configuration)



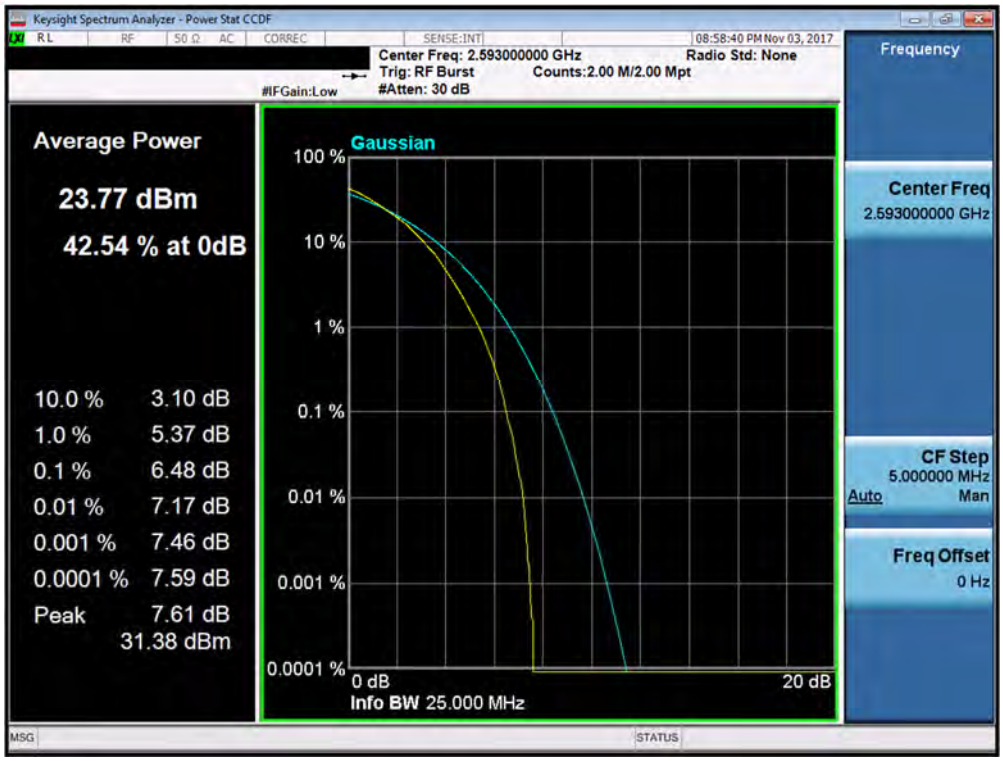
Plot 7-496. PAR Plot (Band 38/41 - 10.0MHz 64-QAM - Full RB Configuration)



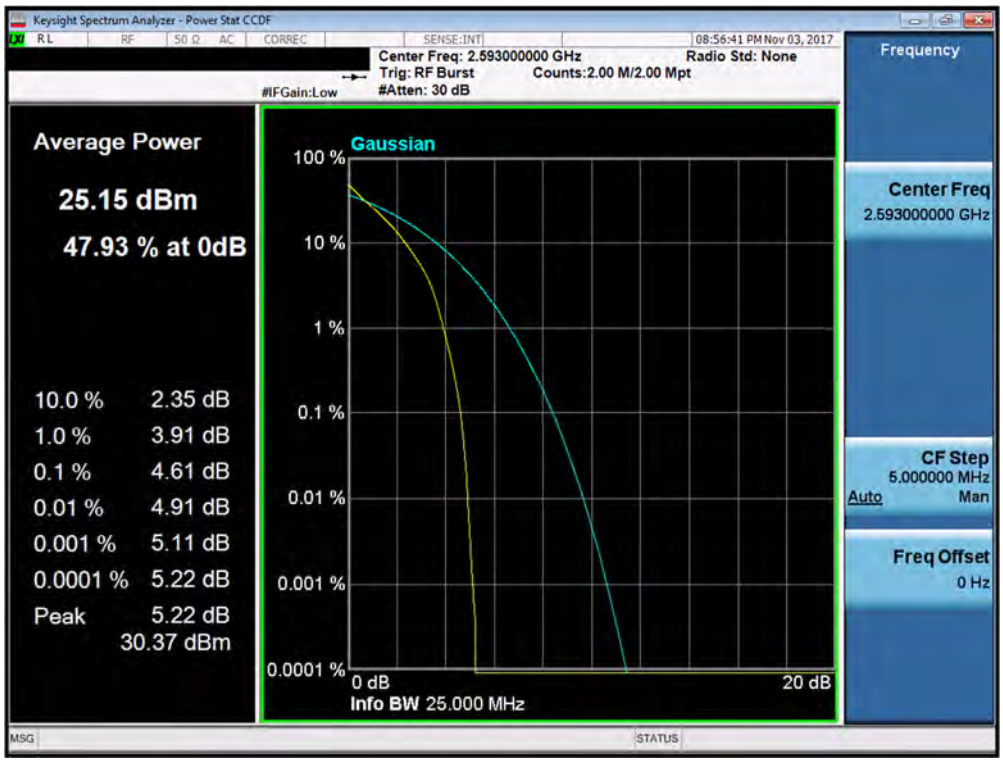
Plot 7-497. PAR Plot (Band 38/41 - 15.0MHz QPSK - Full RB Configuration)



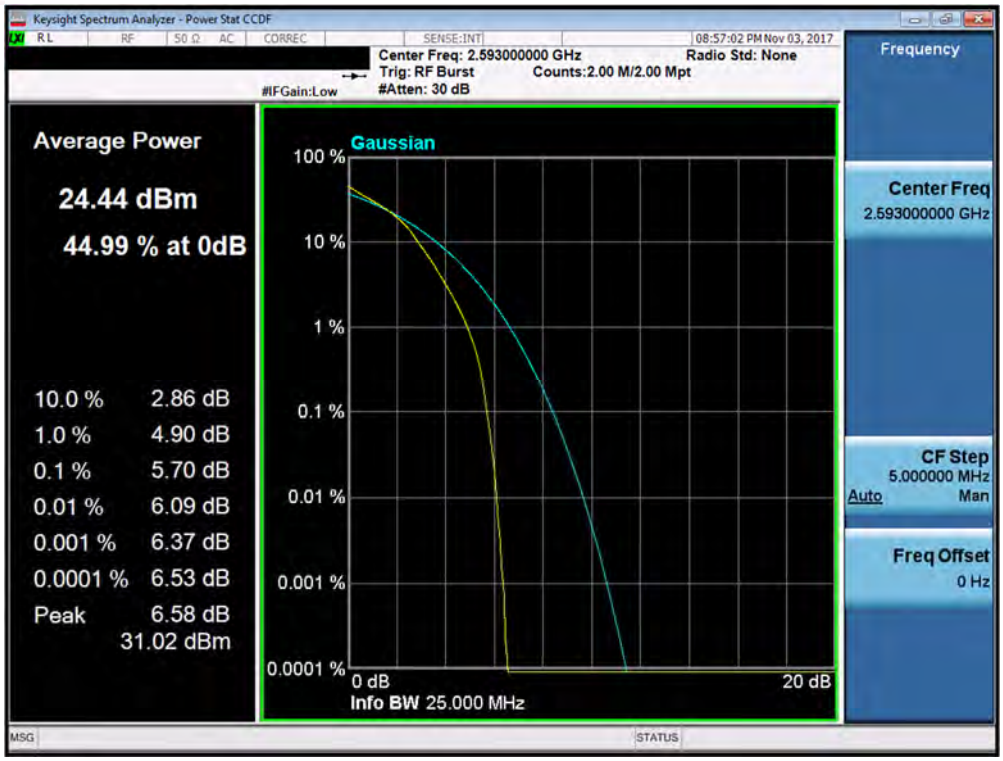
Plot 7-498. PAR Plot (Band 38/41 - 15.0MHz 16-QAM - Full RB Configuration)



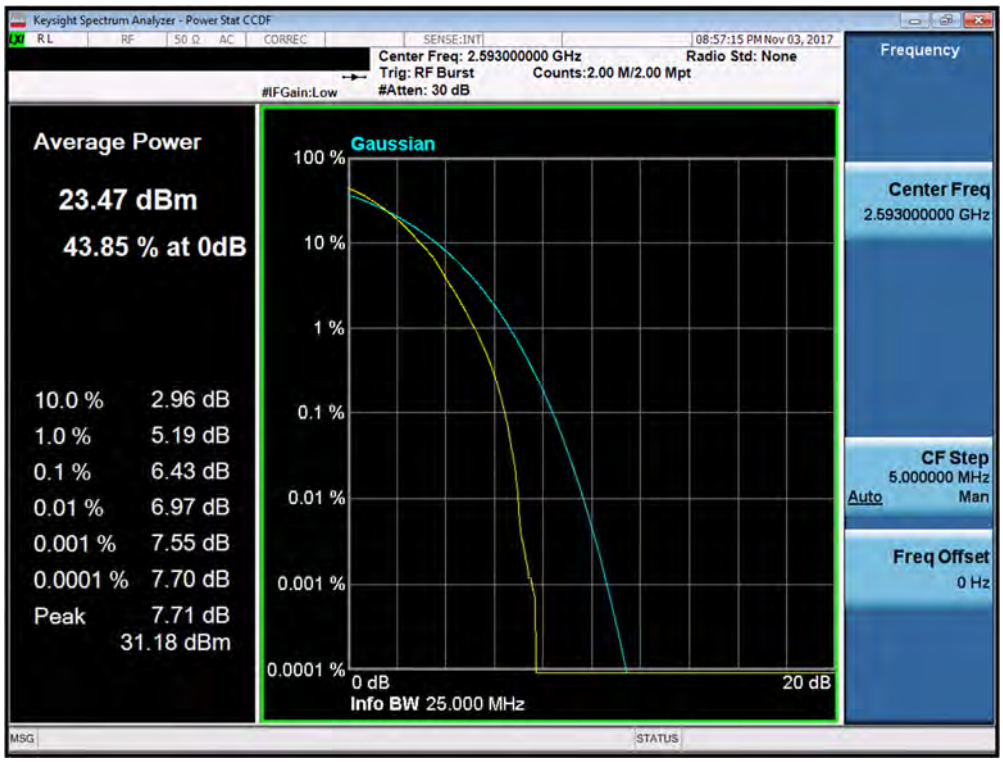
Plot 7-499. PAR Plot (Band 38/41 - 15.0MHz 64-QAM - Full RB Configuration)



Plot 7-500. PAR Plot (Band 38/41 - 20.0MHz QPSK - Full RB Configuration)



Plot 7-501. PAR Plot (Band 38/41 - 20.0MHz 16-QAM - Full RB Configuration)



Plot 7-502. PAR Plot (Band 38/41 - 230.0MHz 64-QAM - Full RB Configuration)

7.6 Additional Maximum Power Reduction (A-MPR)

§2.1046

Test Overview

A-MPR is implemented in this device when operating at Power Class 2 in LTE Band 41 per the A-MPR specification in 3GPP TS 36.101. The conducted powers are shown herein to cover the different A-MPR levels specified in the standard. Measurement equipment was set up with triggering/gating on the spectrum analyzer such that powers were measured only during the on-time of the signal.

Test Procedure Used

KDB 971168 D01 v03 – Section 5.2.2

Test Settings

1. Span = 2 x OBW to 3 x OBW
2. RBW = 1% to 5% of the OBW
3. Number of measurement points in sweep ≥ 2 x span / RBW
4. Sweep = auto-couple (less than transmission burst duration)
5. Detector = RMS (power)
6. Trigger was set to enable power measurements only on full power bursts
7. Trace was allowed to stabilize
8. Spectrum analyzer's "Channel Power" function was used to compute the power by integrating the spectrum across the OBW of the signal

Test Setup

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

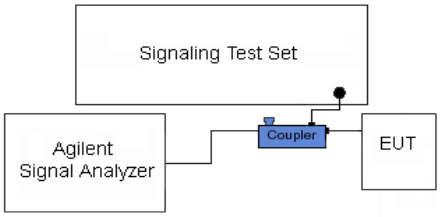


Figure 7-5. Test Instrument & Measurement Setup

Test Notes

None.

Test Case	NS	MCC	MNC	Channel BW [MHz]	Channel Number	Channel Frequency [MHz]	Modulation	RB Size	RB Offset	MPR [dB]	A-MPR [dB]	Measured Power [dBm]
1	1	312	530	5	39675	2498.5	QPSK	1	0	0	3	23.42
							16-QAM			1	3	22.65
							64-QAM			2	3	22.16
2				5	39675	2498.5	QPSK	1	9	0	0	26.48
							16-QAM			1	0	25.78
							64-QAM			2	0	24.95
3				10	39700	2501	QPSK	1	0	0	5	22.32
							16-QAM			1	5	21.37
							64-QAM			2	5	20.01
4				10	39700	2501	QPSK	20	0	1	2	23.42
							16-QAM			2	2	22.33
							64-QAM			3	2	21.68
5				10	39700	2501	QPSK	50	0	1	3	22.06
							16-QAM			2	3	22.04
							64-QAM			3	3	20.40
6				10	39700	2501	QPSK	25	20	1	1	24.24
							16-QAM			2	1	23.06
							64-QAM			3	1	22.47
7				10	39700	2501	QPSK	1	36	0	0	27.11
							16-QAM			1	0	25.93
							64-QAM			2	0	24.77
8				15	39725	2503.5	QPSK	1	0	0	5	23.48
							16-QAM			1	5	22.57
							64-QAM			2	5	20.29
9				15	39725	2503.5	QPSK	20	0	1	2	24.06
							16-QAM			2	2	22.96
							64-QAM			3	2	21.73
10				15	39725	2503.5	QPSK	75	0	1	4	21.64
							16-QAM			2	4	20.47
							64-QAM			3	4	19.40
11				15	39725	2503.5	QPSK	50	15	1	3	22.04
							16-QAM			2	3	22.29
							64-QAM			3	3	20.65
12				15	39725	2503.5	QPSK	1	60	0	0	27.28
							16-QAM			1	0	26.35
							64-QAM			2	0	24.40
13				20	39750	2506	QPSK	1	0	0	5	22.27
							16-QAM			1	5	21.36
							64-QAM			2	5	20.71
14				20	39750	2506	QPSK	20	0	1	2	24.33
							16-QAM			2	2	22.66
							64-QAM			3	2	21.80
15				20	39750	2506	QPSK	100	0	1	4	21.69
							16-QAM			2	4	20.25
							64-QAM			3	4	19.21
16				20	39750	2506	QPSK	75	24	1	3	22.09
							16-QAM			2	3	21.16
							64-QAM			3	3	20.12
17				20	39750	2506	QPSK	1	77	0	0	26.06
							16-QAM			1	0	25.16
							64-QAM			2	0	24.45
18	1	310	120	5	39675	2498.5	QPSK	1	0	0	3	23.86
							16-QAM			1	3	22.86
							64-QAM			2	3	22.16
19	1	001 (R&S sim card)	01	5	39675	2498.5	QPSK	1	0	0	0	26.42
							16-QAM			1	0	25.46
							64-QAM			2	0	24.91

Table 7-3. A-MPR Conducted Power Measurements

7.7 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 38/41, the minimum permissible attenuation level of any spurious emission is 55 + $log_{10}(P_{[Watts]})$.

Test Procedure Used

KDB 971168 D01 v03 – 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.

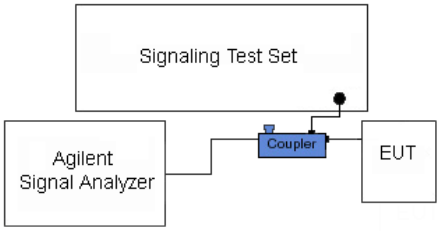


Figure 7-6. Test Instrument & Measurement Setup

Test Notes

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

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	10	40620	2593	QPSK	1	49	LTE B41	20	40764	2607.4	QPSK	1	0	24.29
Max	LTE B41	15	40620	2593	QPSK	1	74	LTE B41	15	40770	2608	QPSK	1	0	24.30
Max	LTE B41	15	40620	2593	QPSK	1	74	LTE B41	20	40791	2610.1	QPSK	1	0	24.35
Max	LTE B41	20	40620	2593	QPSK	1	99	LTE B41	10	40764	2607.4	QPSK	1	0	24.03
Max	LTE B41	20	40620	2593	QPSK	1	99	LTE B41	15	40791	2610.1	QPSK	1	0	24.16
Max	LTE B41	20	40620	2593	QPSK	1	99	LTE B41	20	40818	2612.8	QPSK	1	0	24.33

Table 7-4. Conducted Powers (B41 – PCC: RB Size 1 Offset Max SCC: RB Size 1 Offset 0)

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	0	LTE B41	20	39948	2525.8	QPSK	1	0	19.83
Max	LTE B41	20	39750	2506	QPSK	1	99	LTE B41	20	39948	2525.8	QPSK	1	99	17.07
Max	LTE B41	20	39750	2506	QPSK	1	0	LTE B41	20	39948	2525.8	QPSK	1	99	12.85
Max	LTE B41	20	39750	2506	QPSK	1	50	LTE B41	20	39948	2525.8	QPSK	1	50	20.01
Max	LTE B41	20	39750	2506	QPSK	1	99	LTE B41	20	39948	2525.8	QPSK	1	0	24.65
Max	LTE B41	20	39750	2506	QPSK	100	0	LTE B41	20	39948	2525.8	QPSK	100	0	21.27
Max	LTE B41	20	39750	2506	16-QAM	100	0	LTE B41	20	39948	2525.8	16-QAM	100	0	20.46
Max	LTE B41	20	39750	2506	64-QAM	100	0	LTE B41	20	39948	2525.8	64-QAM	100	0	20.13

Table 7-5. Conducted Powers (B41 with Various Combinations for 20MHz Channel Bandwidth)

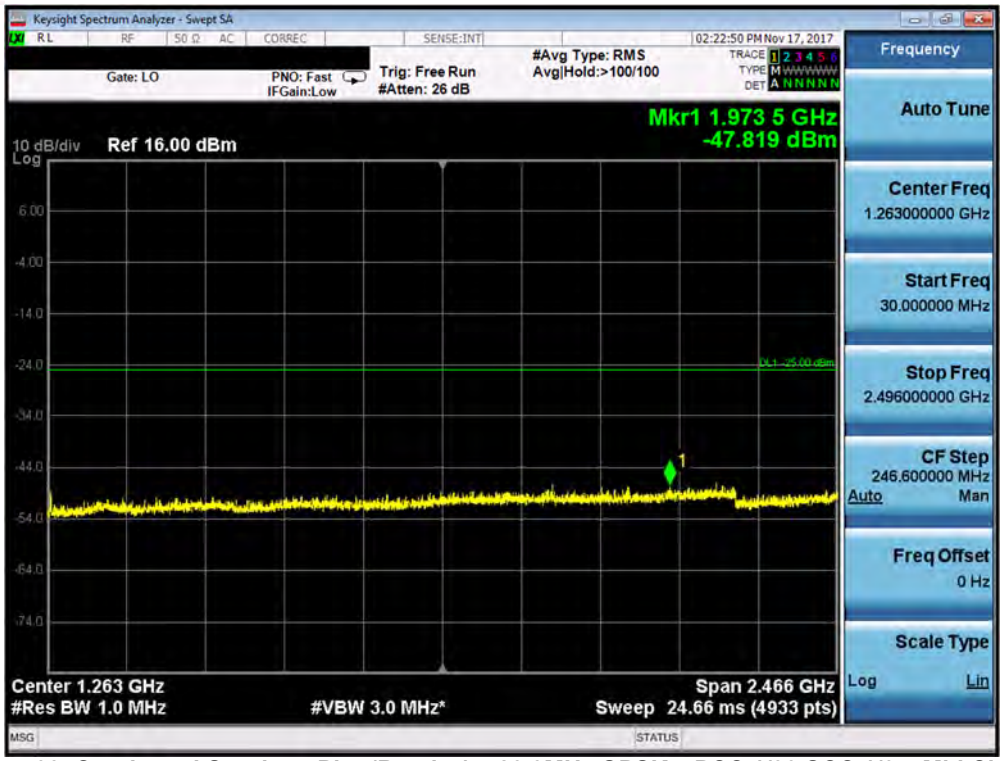


Table 7-503. Conducted Spurious Plot (Band 41 – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Mid Channel)

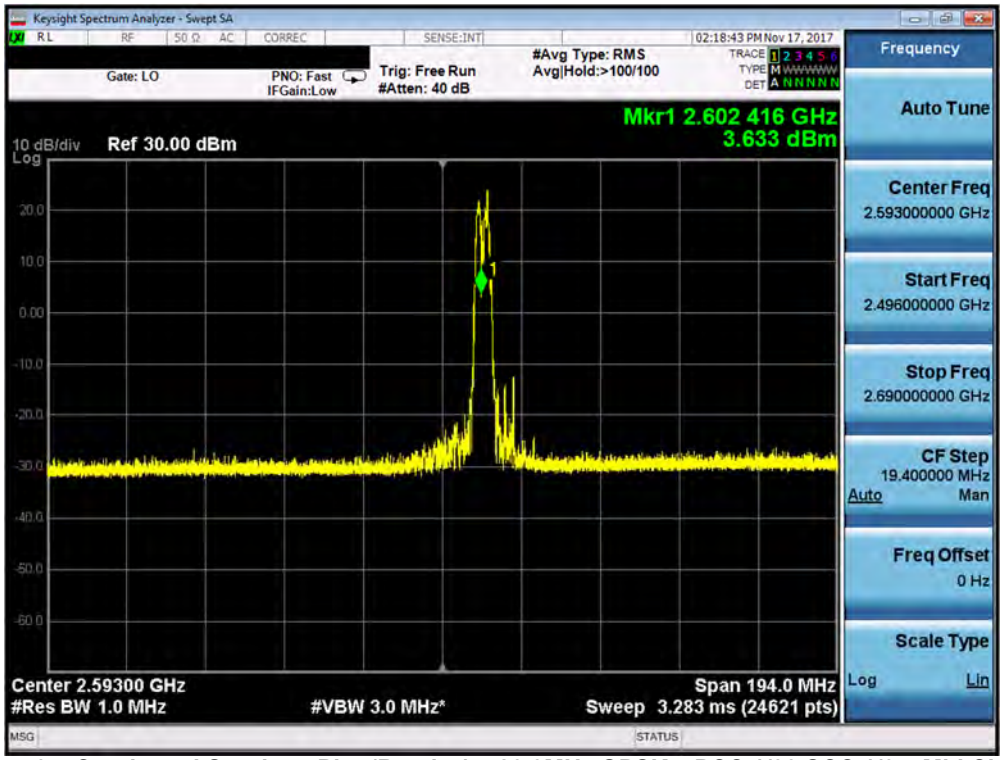


Table 7-504. Conducted Spurious Plot (Band 41 – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Mid Channel)

Table 7-505. Conducted Spurious Plot (Band 41 – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Mid Channel)

Table 7-506. Conducted Spurious Plot (Band 41 – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Mid Channel)

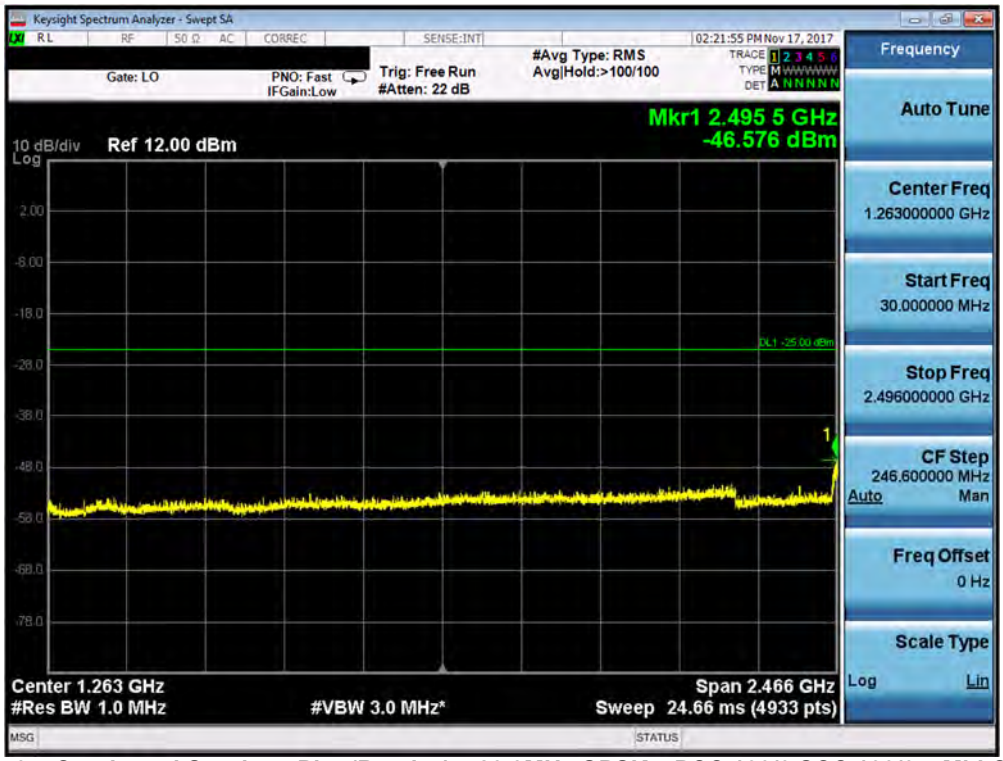


Table 7-507. Conducted Spurious Plot (Band 41 – 20.0MHz QPSK – PCC 100/0 SCC 100/0 – Mid Channel)

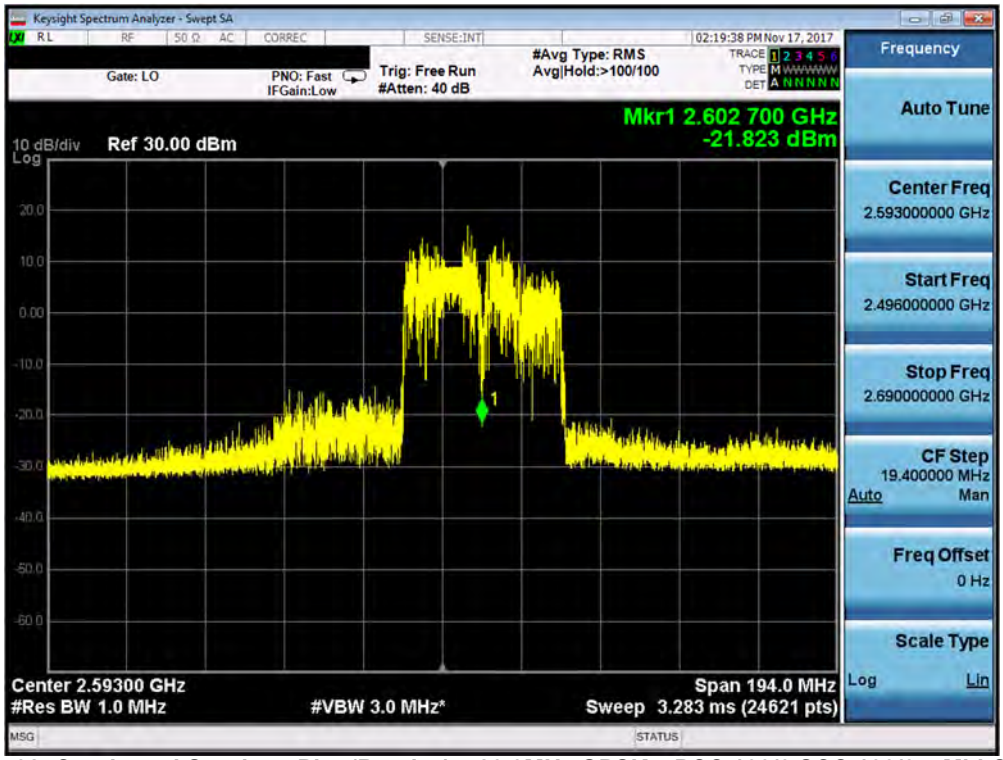


Table 7-508. Conducted Spurious Plot (Band 41 – 20.0MHz QPSK – PCC 100/0 SCC 100/0 – Mid Channel)

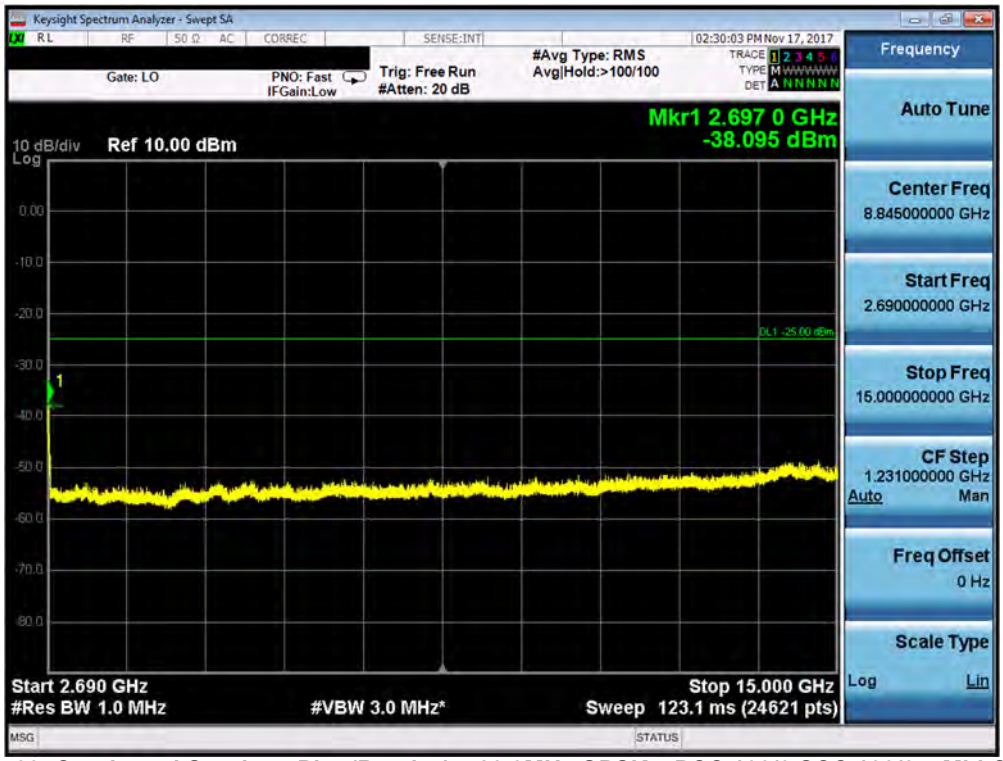
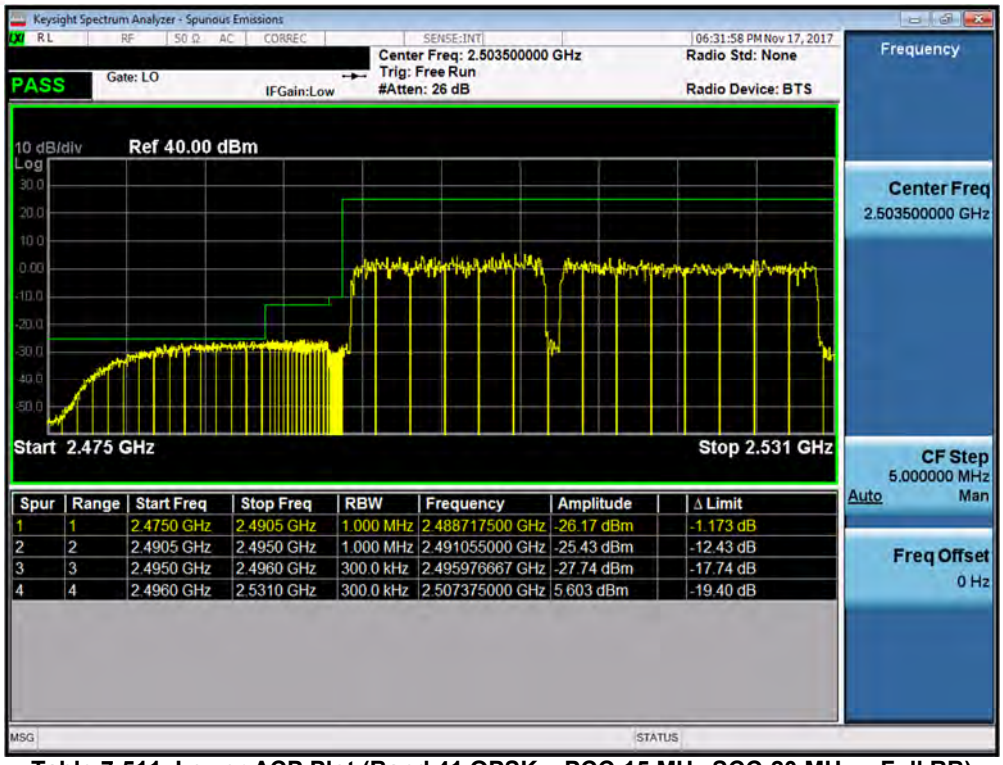


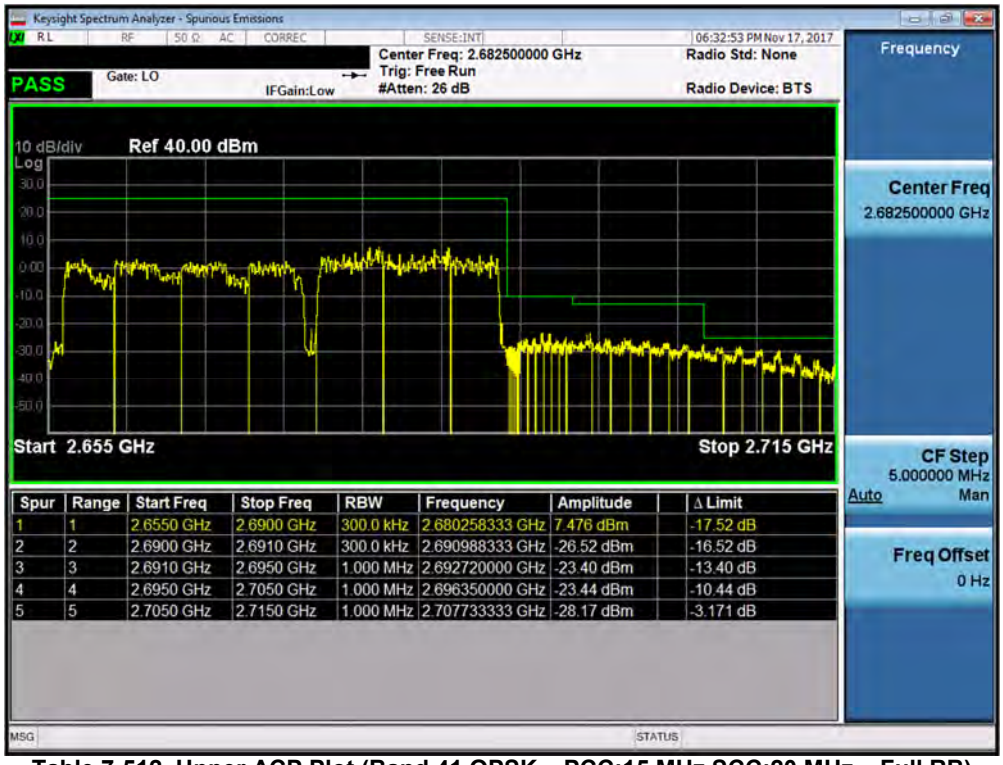
Table 7-509. Conducted Spurious Plot (Band 41 – 20.0MHz QPSK – PCC 100/0 SCC 100/0 – Mid Channel)

Table 7-510. Conducted Spurious Plot (Band 41 – 20.0MHz QPSK – PCC 100/0 SCC 100/0 – Mid Channel)



Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.4750 GHz	2.4905 GHz	1.000 MHz	2.488717500 GHz	-26.17 dBm	-1.173 dB
2	2	2.4905 GHz	2.4950 GHz	1.000 MHz	2.491055000 GHz	-25.43 dBm	-12.43 dB
3	3	2.4950 GHz	2.4960 GHz	300.0 kHz	2.495976667 GHz	-27.74 dBm	-17.74 dB
4	4	2.4960 GHz	2.5310 GHz	300.0 kHz	2.507375000 GHz	5.603 dBm	-19.40 dB

Table 7-511. Lower ACP Plot (Band 41 QPSK – PCC:15 MHz SCC:20 MHz – Full RB)



Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.6550 GHz	2.6900 GHz	300.0 kHz	2.680258333 GHz	7.476 dBm	-17.52 dB
2	2	2.6900 GHz	2.6910 GHz	300.0 kHz	2.690988333 GHz	-26.52 dBm	-16.52 dB
3	3	2.6910 GHz	2.6950 GHz	1.000 MHz	2.692720000 GHz	-23.40 dBm	-13.40 dB
4	4	2.6950 GHz	2.7050 GHz	1.000 MHz	2.696350000 GHz	-23.44 dBm	-10.44 dB
5	5	2.7050 GHz	2.7150 GHz	1.000 MHz	2.707733333 GHz	-28.17 dBm	-3.171 dB

Table 7-512. Upper ACP Plot (Band 41 QPSK – PCC:15 MHz SCC:20 MHz – Full RB)

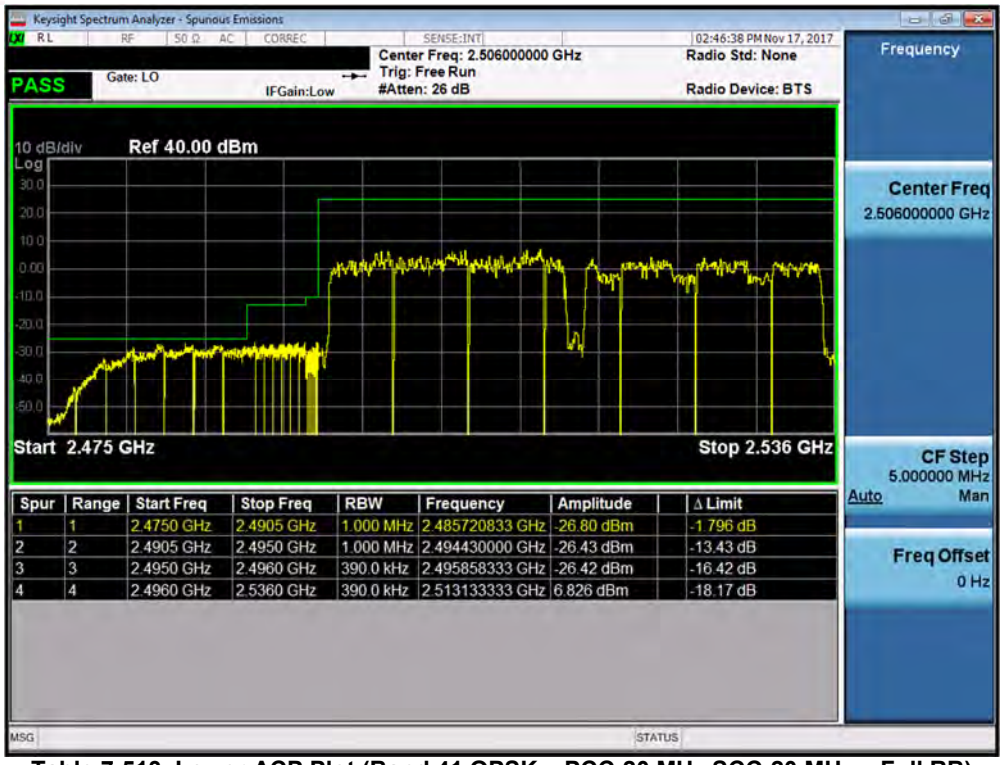


Table 7-513. Lower ACP Plot (Band 41 QPSK – PCC:20 MHz SCC:20 MHz – Full RB)

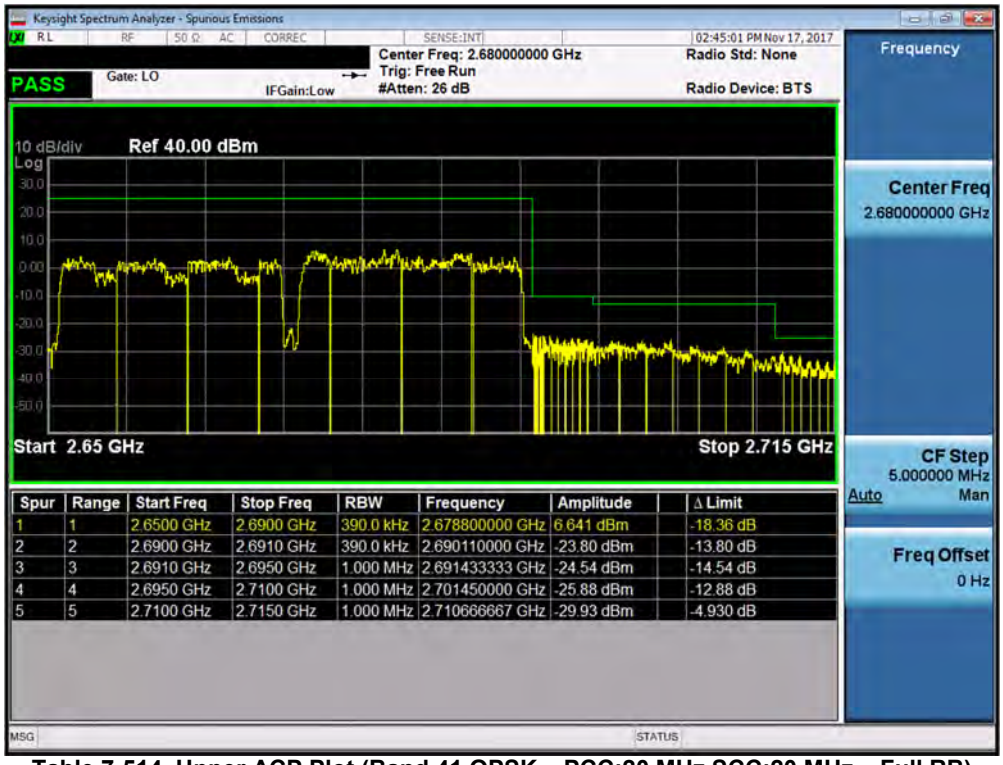


Table 7-514. Upper ACP Plot (Band 41 QPSK – PCC:20 MHz SCC:20 MHz – Full RB)

7.8 Radiated Power (ERP/EIRP)

§22.913(a)(2) §24.232(c.2) §27.50(h)(2) §27.50(b)(10) §27.50(c)(10) §27.50(d)(4) §27.50(a)(3)

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 v03 – 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

Test Setup

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

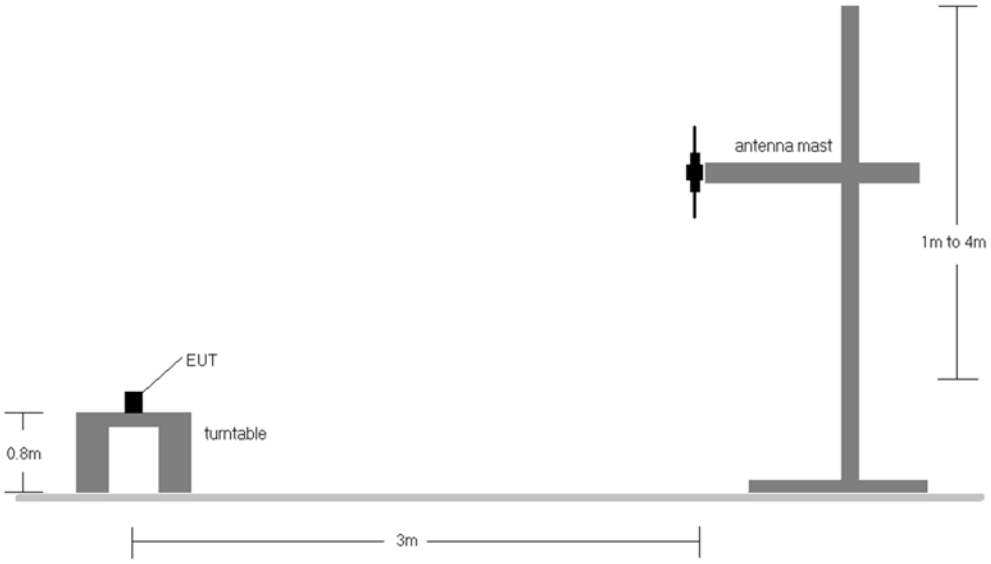


Figure 7-7. Radiated Test Setup <1GHz

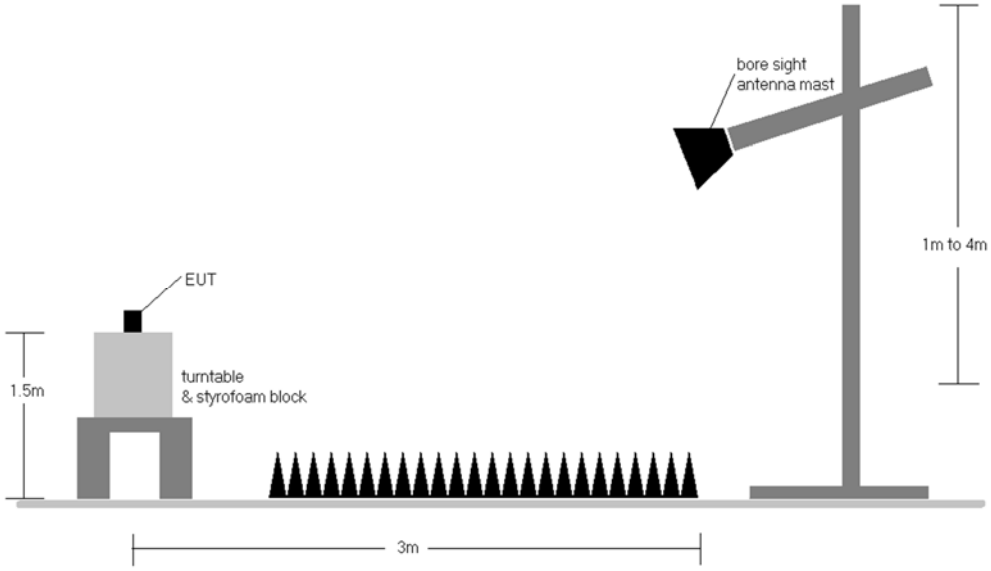


Figure 7-8. Radiated Test Setup >1GHz

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.

Radiated Power (ERP/EIRP)

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
665.50	5	QPSK	H	197	240	1 / 24	18.43	3.84	20.12	0.103	34.77	-14.66
680.50	5	QPSK	H	197	240	1 / 0	18.70	3.91	20.46	0.111	34.77	-14.31
695.50	5	QPSK	H	197	240	1 / 0	14.15	3.98	15.98	0.040	34.77	-18.79
680.50	5	16-QAM	H	197	240	1 / 0	17.94	3.91	19.70	0.093	34.77	-15.07
680.50	5	64-QAM	H	197	240	1 / 0	16.96	3.91	18.72	0.074	34.77	-16.05
668.00	10	QPSK	H	198	322	1 / 49	18.56	3.85	20.26	0.106	34.77	-14.51
680.50	10	QPSK	H	198	322	1 / 0	18.94	3.91	20.70	0.117	34.77	-14.07
693.00	10	QPSK	H	198	345	1 / 0	16.41	3.97	18.23	0.066	34.77	-16.54
680.50	10	16-QAM	H	198	322	1 / 0	18.17	3.91	19.93	0.098	34.77	-14.84
680.50	10	64-QAM	H	198	322	1 / 0	17.11	3.91	18.87	0.077	34.77	-15.90
670.50	15	QPSK	H	197	323	1 / 74	18.77	3.86	20.48	0.112	34.77	-14.29
680.50	15	QPSK	H	197	323	1 / 0	18.78	3.91	20.54	0.113	34.77	-14.23
690.50	15	QPSK	H	197	323	1 / 0	17.94	3.96	19.75	0.094	34.77	-15.03
680.50	15	16-QAM	H	197	323	1 / 0	17.98	3.91	19.74	0.094	34.77	-15.03
680.50	15	64-QAM	H	197	323	1 / 0	16.96	3.91	18.72	0.074	34.77	-16.05
673.00	20	QPSK	H	110	173	1 / 99	18.46	3.87	20.18	0.104	34.77	-14.59
680.50	20	QPSK	H	110	173	1 / 0	18.75	3.91	20.51	0.112	34.77	-14.26
688.00	20	QPSK	H	110	173	1 / 0	18.74	3.94	20.53	0.113	34.77	-14.24
680.50	20	16-QAM	H	110	173	1 / 0	17.91	3.91	19.67	0.093	34.77	-15.10
680.50	20	64-QAM	H	110	173	1 / 0	16.91	3.91	18.67	0.074	34.77	-16.10
680.50	10	QPSK	V	207	228	1 / 0	15.42	3.61	16.88	0.049	34.77	-17.89
680.50	10 (WCP)	QPSK	H	100	330	1 / 0	16.20	3.91	17.96	0.062	34.77	-16.81

Table 7-6. ERP Data (Band 71)

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
699.70	1.4	QPSK	H	150	207	1 / 0	18.83	1.10	17.78	0.060	34.77	-16.99	19.93	0.098	36.99	-17.06
707.50	1.4	QPSK	H	150	207	1 / 0	19.16	1.13	18.14	0.065	34.77	-16.63	20.29	0.107	36.99	-16.70
715.30	1.4	QPSK	H	150	207	1 / 0	18.15	1.16	17.16	0.052	34.77	-17.61	19.31	0.085	36.99	-17.68
707.50	1.4	16-QAM	H	150	207	1 / 0	18.61	1.13	17.59	0.057	34.77	-17.18	19.74	0.094	36.99	-17.25
707.50	1.4	64-QAM	H	150	207	1 / 0	17.82	1.13	16.80	0.048	34.77	-17.97	18.95	0.079	36.99	-18.04
700.50	3	QPSK	H	150	219	1 / 0	18.47	1.10	17.42	0.055	34.77	-17.35	19.57	0.091	36.99	-17.42
707.50	3	QPSK	H	150	219	1 / 0	19.26	1.13	18.24	0.067	34.77	-16.53	20.39	0.109	36.99	-16.60
714.50	3	QPSK	H	150	219	1 / 0	18.21	1.16	17.22	0.053	34.77	-17.55	19.37	0.086	36.99	-17.62
707.50	3	16-QAM	H	150	219	1 / 0	18.59	1.13	17.57	0.057	34.77	-17.20	19.72	0.094	36.99	-17.27
707.50	3	64-QAM	H	150	219	1 / 0	17.90	1.13	16.88	0.049	34.77	-17.89	19.03	0.080	36.99	-17.96

Table 7-7. ERP/EIRP 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]
701.50	5	QPSK	H	150	203	1 / 0	18.72	1.11	17.68	0.059	34.77	-17.10	19.83	0.096	36.99	-17.16
707.50	5	QPSK	H	150	203	1 / 0	19.18	1.13	18.16	0.065	34.77	-16.61	20.31	0.107	36.99	-16.68
713.50	5	QPSK	H	150	203	1 / 0	18.67	1.15	17.67	0.059	34.77	-17.10	19.82	0.096	36.99	-17.16
707.50	5	16-QAM	H	150	203	1 / 0	18.65	1.13	17.63	0.058	34.77	-17.14	19.78	0.095	36.99	-17.21
707.50	5	64-QAM	H	150	203	1 / 0	17.86	1.13	16.84	0.048	34.77	-17.93	18.99	0.079	36.99	-18.00
704.00	10	QPSK	H	150	202	1 / 49	19.00	1.12	17.97	0.063	34.77	-16.80	20.12	0.103	36.99	-16.87
707.50	10	QPSK	H	150	202	1 / 0	19.51	1.13	18.49	0.071	34.77	-16.28	20.64	0.116	36.99	-16.35
711.00	10	QPSK	H	150	202	1 / 0	19.49	1.14	18.48	0.071	34.77	-16.29	20.63	0.116	36.99	-16.35
707.50	10	16-QAM	H	150	202	1 / 0	18.65	1.13	17.63	0.058	34.77	-17.14	19.78	0.095	36.99	-17.21
707.50	10	64-QAM	H	150	202	1 / 0	17.86	1.13	16.84	0.048	34.77	-17.93	18.99	0.079	36.99	-18.00
707.50	10	QPSK	V	150	99	1 / 0	18.35	1.13	17.33	0.054	34.77	-17.44	19.48	0.089	36.99	-17.51
707.50	10 (WCP)	QPSK	V	150	116	1 / 0	18.06	1.13	17.04	0.051	34.77	-17.73	19.19	0.083	36.99	-17.80

Table 7-8. ERP/EIRP Data (Band 12/17)

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Positioner Azimuth [degree]	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	H	50	290	1 / 24	19.74	1.32	18.91	0.078	34.77	-15.86	21.06	0.128	36.99	-15.93
782.00	5	QPSK	H	10	303	1 / 24	19.86	1.33	19.04	0.080	34.77	-15.73	21.19	0.131	36.99	-15.80
784.50	5	QPSK	H	31	296	1 / 24	20.23	1.34	19.42	0.087	34.77	-15.35	21.57	0.143	36.99	-15.42
784.50	5	16-QAM	H	31	296	1 / 24	19.78	1.34	18.97	0.079	34.77	-15.80	21.12	0.129	36.99	-15.87
784.50	5	64-QAM	H	31	296	1 / 24	18.40	1.34	17.59	0.057	34.77	-17.18	19.74	0.094	36.99	-17.25
782.00	10	QPSK	H	338	287	1 / 49	19.46	1.33	18.64	0.073	34.77	-16.13	20.79	0.120	36.99	-16.20
782.00	10	16-QAM	H	338	287	1 / 49	18.68	1.33	17.86	0.061	34.77	-16.91	20.01	0.100	36.99	-16.98
782.00	10	64-QAM	H	338	287	1 / 49	17.79	1.33	16.97	0.050	34.77	-17.80	19.12	0.082	36.99	-17.87
784.50	5	QPSK	V	356	345	1 / 24	8.53	1.34	7.72	0.006	34.77	-27.05	9.87	0.010	36.99	-27.12
784.50	5 (WCP)	QPSK	H	348	357	1 / 24	19.76	1.34	18.95	0.078	34.77	-15.82	21.10	0.129	36.99	-15.89

Table 7-9. ERP/EIRP Data (Band 13)

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
824.70	1.4	QPSK	H	150	23	1 / 0	20.79	1.50	20.14	0.103	38.45	-18.31	22.29	0.169	36.99	-14.70
836.50	1.4	QPSK	H	150	23	1 / 0	21.86	1.50	21.21	0.132	38.45	-17.24	23.36	0.217	36.99	-13.63
848.30	1.4	QPSK	H	150	23	1 / 0	20.32	1.50	19.67	0.093	38.45	-18.78	21.82	0.152	36.99	-15.17
836.50	1.4	16-QAM	H	150	23	1 / 0	20.87	1.50	20.22	0.105	38.45	-18.23	22.37	0.173	36.99	-14.62
836.50	1.4	64-QAM	H	150	23	1 / 0	19.68	1.50	19.03	0.080	38.45	-19.42	21.18	0.131	36.99	-15.81
825.50	3	QPSK	H	150	21	1 / 0	20.76	1.50	20.11	0.103	38.45	-18.34	22.26	0.168	36.99	-14.73
836.50	3	QPSK	H	150	21	1 / 0	21.76	1.50	21.11	0.129	38.45	-17.34	23.26	0.212	36.99	-13.73
847.50	3	QPSK	H	150	21	1 / 0	21.73	1.50	21.08	0.128	38.45	-17.37	23.23	0.210	36.99	-13.76
836.50	3	16-QAM	H	150	21	1 / 0	21.24	1.50	20.59	0.115	38.45	-17.86	22.74	0.188	36.99	-14.25
836.50	3	64-QAM	H	150	21	1 / 0	19.63	1.50	18.98	0.079	38.45	-19.47	21.13	0.130	36.99	-15.86
826.50	5	QPSK	H	150	29	1 / 0	20.74	1.50	20.09	0.102	38.45	-18.36	22.24	0.167	36.99	-14.75
836.50	5	QPSK	H	150	29	1 / 0	21.69	1.50	21.04	0.127	38.45	-17.41	23.19	0.208	36.99	-13.80
846.50	5	QPSK	H	150	29	1 / 0	22.23	1.50	21.58	0.144	38.45	-16.87	23.73	0.236	36.99	-13.26
846.50	5	16-QAM	H	150	29	1 / 0	21.37	1.50	20.72	0.118	38.45	-17.73	22.87	0.194	36.99	-14.12
846.50	5	64-QAM	H	150	29	1 / 0	19.77	1.50	19.12	0.082	38.45	-19.33	21.27	0.134	36.99	-15.72
829.00	10	QPSK	H	150	40	1 / 0	20.74	1.50	20.09	0.102	38.45	-18.36	22.24	0.167	36.99	-14.75
836.50	10	QPSK	H	150	40	1 / 49	21.89	1.50	21.24	0.133	38.45	-17.21	23.39	0.218	36.99	-13.60
844.00	10	QPSK	H	150	40	1 / 0	21.29	1.50	20.64	0.116	38.45	-17.81	22.79	0.190	36.99	-14.20
836.50	10	16-QAM	H	150	40	1 / 49	21.50	1.50	20.85	0.122	38.45	-17.60	23.00	0.200	36.99	-13.99
836.50	10	64-QAM	H	150	40	1 / 0	19.69	1.50	19.04	0.080	38.45	-19.41	21.19	0.132	36.99	-15.80

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

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	H	150	28	1 / 74	21.42	1.50	20.77	0.119	38.45	-17.68	22.92	0.196	36.99	-14.07
836.50	15	QPSK	H	150	28	1 / 74	22.22	1.50	21.57	0.144	38.45	-16.88	23.72	0.236	36.99	-13.27
841.50	15	QPSK	H	150	28	1 / 74	20.73	1.50	20.08	0.102	38.45	-18.37	22.23	0.167	36.99	-14.76
836.50	15	16-QAM	H	150	28	1 / 74	21.52	1.50	20.87	0.122	38.45	-17.58	23.02	0.200	36.99	-13.97
836.50	15	64-QAM	H	150	28	1 / 0	19.66	1.50	19.01	0.080	38.45	-19.44	21.16	0.131	36.99	-15.83
846.50	5	QPSK	V	150	15	1 / 0	20.24	1.50	19.59	0.091	38.45	-18.86	21.74	0.149	36.99	-15.25
846.50	5 (WCP)	QPSK	H	150	13	1 / 0	17.78	1.50	17.13	0.052	38.45	-21.32	19.28	0.085	36.99	-17.71

Table 7-11. ERP/EIRP Data (Band 26)

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Positioner Azimuth [degree]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
1710.70	1.4	QPSK	H	349	14	3 / 2	17.79	5.56	23.35	0.216	30.00	-6.65
1745.00	1.4	QPSK	H	346	18	3 / 2	17.80	5.32	23.12	0.205	30.00	-6.88
1779.30	1.4	QPSK	H	347	18	3 / 2	19.21	5.09	24.30	0.269	30.00	-5.70
1779.30	1.4	16-QAM	H	347	18	3 / 2	18.34	5.09	23.43	0.220	30.00	-6.57
1779.30	1.4	64-QAM	H	347	18	3 / 2	17.49	5.09	22.58	0.181	30.00	-7.42
1711.50	3	QPSK	H	337	18	1 / 0	17.81	5.55	23.36	0.217	30.00	-6.64
1745.00	3	QPSK	H	346	11	1 / 0	17.93	5.32	23.25	0.211	30.00	-6.75
1778.50	3	QPSK	H	343	13	1 / 14	19.34	5.10	24.44	0.278	30.00	-5.56
1778.50	3	16-QAM	H	343	13	1 / 14	18.59	5.10	23.69	0.234	30.00	-6.31
1778.50	3	64-QAM	H	343	13	1 / 14	17.64	5.10	22.74	0.188	30.00	-7.26
1712.50	5	QPSK	H	352	13	1 / 0	17.95	5.55	23.50	0.224	30.00	-6.50
1745.00	5	QPSK	H	346	18	1 / 24	17.84	5.32	23.16	0.207	30.00	-6.84
1777.50	5	QPSK	H	349	15	1 / 24	19.57	5.10	24.67	0.293	30.00	-5.33
1777.50	5	16-QAM	H	349	15	1 / 24	18.86	5.10	23.96	0.249	30.00	-6.04
1777.50	5	64-QAM	H	349	15	1 / 24	17.81	5.10	22.91	0.196	30.00	-7.09
1715.00	10	QPSK	H	4	7	1 / 0	17.79	5.53	23.32	0.215	30.00	-6.68
1745.00	10	QPSK	H	349	11	1 / 0	18.28	5.32	23.60	0.229	30.00	-6.40
1775.00	10	QPSK	H	337	18	1 / 49	19.22	5.12	24.34	0.272	30.00	-5.66
1775.00	10	16-QAM	H	337	18	1 / 49	18.50	5.12	23.62	0.230	30.00	-6.38
1775.00	10	64-QAM	H	337	18	1 / 49	17.45	5.12	22.57	0.181	30.00	-7.43
1717.50	15	QPSK	H	2	9	1 / 74	18.33	5.51	23.84	0.242	30.00	-6.16
1745.00	15	QPSK	H	4	7	1 / 0	19.16	5.32	24.48	0.281	30.00	-5.52
1772.50	15	QPSK	H	346	18	1 / 74	19.64	5.14	24.78	0.300	30.00	-5.22
1772.50	15	16-QAM	H	346	18	1 / 0	18.92	5.14	24.06	0.255	30.00	-5.94
1772.50	15	64-QAM	H	346	18	1 / 0	17.78	5.14	22.92	0.196	30.00	-7.08
1720.00	20	QPSK	H	2	9	1 / 99	18.62	5.49	24.11	0.258	30.00	-5.89
1745.00	20	QPSK	H	4	7	1 / 99	19.40	5.32	24.72	0.297	30.00	-5.28
1770.00	20	QPSK	H	2	11	1 / 0	19.68	5.15	24.83	0.304	30.00	-5.17
1770.00	20	16-QAM	H	2	11	1 / 0	19.09	5.15	24.24	0.266	30.00	-5.76
1770.00	20	64-QAM	H	2	11	1 / 0	18.08	5.15	23.23	0.211	30.00	-6.77
1770.00	20	QPSK	V	81	158	1 / 0	17.31	5.00	22.31	0.170	30.00	-7.69
1770.00	20 (WCP)	QPSK	H	356	11	1 / 0	18.33	5.15	23.48	0.223	30.00	-6.52

Table 7-12. EIRP Data (Band 4/66)

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Positioner Azimuth [degree]	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	347	18	3 / 2	18.65	4.82	23.47	0.222	33.01	-9.54
1882.50	1.4	QPSK	H	357	11	3 / 2	17.84	4.73	22.57	0.181	33.01	-10.44
1914.30	1.4	QPSK	H	345	18	3 / 2	17.19	4.68	21.87	0.154	33.01	-11.14
1850.70	1.4	16-QAM	H	347	18	3 / 2	17.82	4.82	22.64	0.184	33.01	-10.37
1850.70	1.4	64-QAM	H	347	18	3 / 2	16.86	4.82	21.68	0.147	33.01	-11.33
1851.50	3	QPSK	H	347	18	1 / 0	18.81	4.82	23.63	0.230	33.01	-9.38
1882.50	3	QPSK	H	357	11	1 / 0	18.27	4.73	23.00	0.200	33.01	-10.01
1913.50	3	QPSK	H	345	18	1 / 0	18.99	4.68	23.67	0.233	33.01	-9.34
1851.50	3	16-QAM	H	347	18	1 / 0	18.17	4.82	22.99	0.199	33.01	-10.02
1851.50	3	64-QAM	H	347	18	1 / 0	16.98	4.82	21.80	0.151	33.01	-11.21
1852.50	5	QPSK	H	337	18	1 / 24	18.35	4.81	23.16	0.207	33.01	-9.85
1882.50	5	QPSK	H	329	25	1 / 24	17.87	4.73	22.60	0.182	33.01	-10.41
1912.50	5	QPSK	H	337	25	1 / 24	17.25	4.68	21.93	0.156	33.01	-11.08
1852.50	5	16-QAM	H	337	18	1 / 24	17.49	4.81	22.30	0.170	33.01	-10.71
1852.50	5	64-QAM	H	337	18	1 / 24	16.75	4.81	21.56	0.143	33.01	-11.45
1855.00	10	QPSK	H	337	18	1 / 0	19.04	4.81	23.85	0.242	33.01	-9.16
1882.50	10	QPSK	H	329	25	1 / 0	18.49	4.73	23.22	0.210	33.01	-9.79
1910.00	10	QPSK	H	337	25	1 / 0	18.31	4.68	22.99	0.199	33.01	-10.02
1855.00	10	16-QAM	H	337	18	1 / 0	18.55	4.81	23.36	0.217	33.01	-9.65
1855.00	10	64-QAM	H	337	18	1 / 0	17.35	4.81	22.16	0.164	33.01	-10.85
1857.50	15	QPSK	H	337	18	1 / 0	18.94	4.80	23.74	0.237	33.01	-9.27
1882.50	15	QPSK	H	329	25	1 / 0	18.67	4.73	23.40	0.219	33.01	-9.61
1907.50	15	QPSK	H	337	25	1 / 0	18.70	4.68	23.38	0.218	33.01	-9.63
1857.50	15	16-QAM	H	337	18	1 / 0	17.93	4.80	22.73	0.187	33.01	-10.28
1857.50	15	64-QAM	H	337	18	1 / 0	17.29	4.80	22.09	0.162	33.01	-10.92
1860.00	20	QPSK	H	5	8	1 / 0	19.17	4.79	23.96	0.249	33.01	-9.05
1882.50	20	QPSK	H	5	8	1 / 0	18.83	4.73	23.56	0.227	33.01	-9.45
1905.00	20	QPSK	H	5	8	1 / 0	19.05	4.68	23.73	0.236	33.01	-9.28
1860.00	20	16-QAM	H	5	8	1 / 0	18.70	4.79	23.49	0.224	33.01	-9.52
1860.00	20	64-QAM	H	5	8	1 / 0	17.42	4.79	22.21	0.166	33.01	-10.80
1860.00	20	QPSK	V	330	25	1 / 0	17.92	4.81	22.73	0.187	33.01	-10.28
1860.00	20 (WCP)	QPSK	H	35	321	1 / 99	16.32	4.79	21.11	0.129	33.01	-11.90

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

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
2307.50	5	QPSK	V	150	302	1 / 0	15.40	5.56	20.96	0.125	23.98	-3.02
2312.50	5	QPSK	V	150	307	1 / 0	15.47	5.59	21.06	0.128	23.98	-2.92
2307.50	5	16-QAM	V	150	302	1 / 0	14.76	5.56	20.32	0.108	23.98	-3.66
2312.50	5	64-QAM	V	150	307	1 / 0	13.62	5.59	19.21	0.083	23.98	-4.77
2310.00	10	QPSK	V	150	304	1 / 0	15.49	5.57	21.06	0.128	23.98	-2.92
2310.00	10	16-QAM	V	150	304	1 / 0	14.62	5.57	20.19	0.105	23.98	-3.79
2310.00	10	64-QAM	V	150	304	1 / 0	13.70	5.57	19.27	0.085	23.98	-4.71
2310.00	10	QPSK	H	150	8	1 / 0	14.87	5.74	20.61	0.115	23.98	-3.37
2310.00	10 (WCP)	QPSK	H	150	205	1 / 0	13.26	5.74	19.00	0.079	23.98	-4.98

Table 7-14. EIRP Data (Band 30 – Antenna B)

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
2307.50	5	QPSK	H	150	31	1 / 0	16.84	5.74	22.58	0.181	23.98	-1.40
2312.50	5	QPSK	H	150	31	1 / 0	16.65	5.74	22.39	0.173	23.98	-1.59
2307.50	5	16-QAM	H	150	31	1 / 0	16.54	5.74	22.28	0.169	23.98	-1.70
2307.50	5	64-QAM	H	150	31	1 / 0	15.47	5.74	21.21	0.132	23.98	-2.77
2310.00	10	QPSK	H	150	29	1 / 0	16.68	5.74	22.42	0.174	23.98	-1.56
2310.00	10	16-QAM	H	150	29	1 / 0	16.18	5.74	21.92	0.156	23.98	-2.06
2310.00	10	64-QAM	H	150	29	1 / 0	14.49	5.74	20.23	0.105	23.98	-3.75
2307.50	5	QPSK	V	150	288	1 / 0	14.71	5.56	20.27	0.106	23.98	-3.71
2307.50	5 (WCP)	QPSK	V	150	301	1 / 0	13.22	5.56	18.78	0.076	23.98	-5.20

Table 7-15. EIRP Data (Band 30 – Antenna A)

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
2502.50	5	QPSK	H	150	131	1 / 0	15.32	5.74	21.06	0.128	33.01	-11.95
2535.00	5	QPSK	H	150	131	1 / 0	15.02	5.86	20.88	0.122	33.01	-12.13
2567.50	5	QPSK	H	150	131	1 / 24	16.13	5.98	22.11	0.163	33.01	-10.90
2535.00	5	16-QAM	H	150	131	1 / 0	14.30	5.86	20.16	0.104	33.01	-12.85
2535.00	5	64-QAM	H	150	131	1 / 0	13.45	5.86	19.31	0.085	33.01	-13.70
2505.00	10	QPSK	H	150	131	1 / 0	15.40	5.75	21.15	0.130	33.01	-11.86
2535.00	10	QPSK	H	150	131	1 / 0	15.84	5.86	21.70	0.148	33.01	-11.31
2565.00	10	QPSK	H	150	131	1 / 49	16.14	5.97	22.11	0.163	33.01	-10.90
2565.00	10	16-QAM	H	150	131	1 / 49	15.36	5.97	21.33	0.136	33.01	-11.68
2565.00	10	64-QAM	H	150	131	1 / 49	14.39	5.97	20.36	0.109	33.01	-12.65
2507.50	15	QPSK	H	150	130	1 / 74	15.84	5.76	21.60	0.144	33.01	-11.41
2535.00	15	QPSK	H	150	130	1 / 74	16.48	5.86	22.34	0.171	33.01	-10.67
2562.50	15	QPSK	H	150	130	1 / 74	16.18	5.96	22.14	0.164	33.01	-10.87
2535.00	15	16-QAM	H	150	130	1 / 74	15.74	5.86	21.60	0.145	33.01	-11.41
2535.00	15	64-QAM	H	150	130	1 / 74	14.71	5.86	20.57	0.114	33.01	-12.44
2510.00	20	QPSK	H	150	130	1 / 99	15.83	5.77	21.60	0.144	33.01	-11.41
2535.00	20	QPSK	H	150	130	1 / 99	16.67	5.86	22.53	0.179	33.01	-10.48
2560.00	20	QPSK	H	150	130	1 / 0	16.52	5.95	22.47	0.177	33.01	-10.54
2535.00	20	16-QAM	H	150	130	1 / 0	15.48	5.86	21.34	0.136	33.01	-11.67
2535.00	20	64-QAM	H	150	130	1 / 0	14.49	5.86	20.35	0.108	33.01	-12.66
2535.00	20	QPSK	V	150	282	1 / 99	15.33	5.85	21.18	0.131	33.01	-11.83
2535.00	20 (WCP)	QPSK	H	150	323	1 / 0	15.41	5.86	21.27	0.134	33.01	-11.74

Table 7-16. EIRP Data (Band 7 – Antenna B)

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
2502.50	5	QPSK	H	150	35	1 / 0	16.43	5.74	22.17	0.165	33.01	-10.84
2535.00	5	QPSK	H	150	32	1 / 0	17.54	5.86	23.40	0.219	33.01	-9.61
2567.50	5	QPSK	H	150	38	1 / 24	18.53	5.98	24.51	0.282	33.01	-8.50
2567.50	5	16-QAM	H	150	38	1 / 24	17.88	5.98	23.86	0.243	33.01	-9.15
2567.50	5	64-QAM	H	150	38	1 / 24	15.59	5.98	21.57	0.144	33.01	-11.44
2505.00	10	QPSK	H	150	34	1 / 49	16.69	5.75	22.44	0.175	33.01	-10.57
2535.00	10	QPSK	H	150	34	1 / 49	17.91	5.86	23.77	0.238	33.01	-9.24
2565.00	10	QPSK	H	150	32	1 / 49	18.28	5.97	24.25	0.266	33.01	-8.76
2565.00	10	16-QAM	H	150	32	1 / 49	17.80	5.97	23.77	0.238	33.01	-9.24
2565.00	10	64-QAM	H	150	32	1 / 49	15.78	5.97	21.75	0.150	33.01	-11.26
2507.50	15	QPSK	H	150	37	1 / 74	16.80	5.76	22.56	0.180	33.01	-10.45
2535.00	15	QPSK	H	150	36	1 / 74	18.08	5.86	23.94	0.248	33.01	-9.07
2562.50	15	QPSK	H	150	37	1 / 74	18.53	5.96	24.49	0.281	33.01	-8.52
2562.50	15	16-QAM	H	150	37	1 / 74	18.01	5.96	23.97	0.250	33.01	-9.04
2562.50	15	64-QAM	H	150	37	1 / 0	15.89	5.96	21.85	0.153	33.01	-11.16
2510.00	20	QPSK	H	150	34	1 / 99	17.05	5.77	22.82	0.191	33.01	-10.19
2535.00	20	QPSK	H	150	34	1 / 99	18.12	5.86	23.98	0.250	33.01	-9.03
2560.00	20	QPSK	H	150	31	1 / 0	18.55	5.95	24.50	0.282	33.01	-8.51
2560.00	20	16-QAM	H	150	31	1 / 0	17.99	5.95	23.94	0.248	33.01	-9.07
2560.00	20	64-QAM	H	150	31	1 / 99	15.79	5.95	21.74	0.149	33.01	-11.27
2567.50	5	QPSK	V	150	322	1 / 0	16.41	6.09	22.50	0.178	33.01	-10.51
2567.50	5 (WCP)	QPSK	V	150	26	1 / 0	17.21	6.09	23.30	0.214	33.01	-9.71

Table 7-17. EIRP Data (Band 7 – Antenna A)

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	150	130	1 / 0	20.66	5.73	26.39	0.435	33.01	-6.62
2502.50	5	QPSK	H	150	134	1 / 24	20.78	5.74	26.52	0.449	33.01	-6.49
2593.00	5	QPSK	H	150	135	1 / 24	19.91	6.07	25.98	0.397	33.01	-7.03
2687.50	5	QPSK	H	150	171	1 / 0	17.91	6.48	24.39	0.275	33.01	-8.62
2502.50	5	16-QAM	H	150	134	1 / 24	18.34	5.74	24.08	0.256	33.01	-8.93
2502.50	5	64-QAM	H	150	134	1 / 24	17.37	5.74	23.11	0.205	33.01	-9.90
2501.00	10	QPSK	H	150	128	1 / 49	21.06	5.73	26.79	0.478	33.01	-6.22
2505.00	10	QPSK	H	150	127	1 / 49	21.63	5.75	27.38	0.547	33.01	-5.63
2593.00	10	QPSK	H	150	129	1 / 0	20.42	6.07	26.49	0.446	33.01	-6.52
2685.00	10	QPSK	H	150	164	1 / 0	18.86	6.47	25.33	0.341	33.01	-7.68
2501.00	10	16-QAM	H	150	128	1 / 49	18.95	5.73	24.68	0.294	33.01	-8.33
2505.00	10	64-QAM	H	150	127	1 / 49	18.75	5.75	24.50	0.282	33.01	-8.51
2503.50	15	QPSK	H	150	164	1 / 74	20.67	5.74	26.41	0.438	33.01	-6.60
2507.50	15	QPSK	H	150	167	1 / 74	20.50	5.76	26.26	0.422	33.01	-6.75
2593.00	15	QPSK	H	150	129	1 / 0	19.12	6.07	25.19	0.331	33.01	-7.82
2682.50	15	QPSK	H	150	127	1 / 74	20.58	6.46	27.04	0.506	33.01	-5.97
2507.50	15	16-QAM	H	150	167	1 / 74	18.82	5.76	24.58	0.287	33.01	-8.43
2593.00	15	64-QAM	H	150	129	1 / 0	17.59	6.07	23.66	0.232	33.01	-9.35
2506.00	20	QPSK	H	150	135	1 / 0	20.82	5.75	26.57	0.454	33.01	-6.44
2510.00	20	QPSK	H	150	133	1 / 99	21.17	5.77	26.94	0.494	33.01	-6.07
2593.00	20	QPSK	H	150	137	1 / 0	19.95	6.07	26.02	0.400	33.01	-6.99
2680.00	20	QPSK	H	150	172	1 / 0	19.56	6.45	26.01	0.399	33.01	-7.00
2506.00	20	16-QAM	H	-24	135	1 / 0	19.27	5.75	25.02	0.318	33.01	-7.99
2680.00	20	64-QAM	H	150	172	1 / 0	17.11	6.45	23.56	0.227	33.01	-9.45
2505.00	10	QPSK	V	150	136	1 / 49	19.91	5.63	25.54	0.358	33.01	-7.47
2505.00	10 (WCP)	QPSK	H	150	287	1 / 0	20.53	5.75	26.28	0.424	33.01	-6.73

Table 7-18. EIRP Data (Band 41 - PC2)

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	150	316	1 / 24	18.83	5.73	24.56	0.286	33.01	-8.45
2502.50	5	QPSK	H	150	316	1 / 24	19.11	5.74	24.85	0.305	33.01	-8.16
2593.00	5	QPSK	H	150	316	1 / 24	19.49	6.07	25.56	0.360	33.01	-7.45
2687.50	5	QPSK	H	150	316	1 / 24	18.88	6.48	25.36	0.344	33.01	-7.65
2687.50	5	16-QAM	H	150	316	1 / 24	15.93	6.48	22.41	0.174	33.01	-10.60
2687.50	5	64-QAM	H	150	316	1 / 24	13.03	6.48	19.51	0.089	33.01	-13.50
2501.00	10	QPSK	H	150	306	1 / 49	18.44	5.73	24.17	0.261	33.01	-8.84
2505.00	10	QPSK	H	150	306	1 / 49	18.43	5.75	24.18	0.262	33.01	-8.83
2593.00	10	QPSK	H	150	306	1 / 49	18.06	6.07	24.13	0.259	33.01	-8.88
2685.00	10	QPSK	H	150	306	1 / 49	18.24	6.47	24.71	0.296	33.01	-8.30
2501.00	10	16-QAM	H	150	306	1 / 49	15.71	5.73	21.44	0.139	33.01	-11.57
2501.00	10	64-QAM	H	150	306	1 / 49	14.49	5.73	20.22	0.105	33.01	-12.79
2503.50	15	QPSK	H	150	316	1 / 74	17.89	5.74	23.63	0.231	33.01	-9.38
2507.50	15	QPSK	H	150	326	1 / 74	17.86	5.76	23.62	0.230	33.01	-9.39
2593.00	15	QPSK	H	150	316	1 / 74	17.81	6.07	23.88	0.244	33.01	-9.13
2682.50	15	QPSK	H	150	316	1 / 74	17.83	6.46	24.29	0.269	33.01	-8.72
2503.50	15	16-QAM	H	150	316	1 / 74	17.47	5.74	23.21	0.210	33.01	-9.80
2503.50	15	64-QAM	H	150	316	1 / 74	16.03	5.74	21.77	0.150	33.01	-11.24
2506.00	20	QPSK	H	150	329	1 / 99	17.93	5.75	23.68	0.233	33.01	-9.33
2510.00	20	QPSK	H	150	329	1 / 99	18.07	5.77	23.84	0.242	33.01	-9.17
2593.00	20	QPSK	H	150	329	1 / 99	18.33	6.07	24.40	0.276	33.01	-8.61
2680.00	20	QPSK	H	150	329	1 / 99	18.13	6.45	24.58	0.287	33.01	-8.43
2680.00	20	16-QAM	H	150	329	1 / 99	17.40	6.45	23.85	0.243	33.01	-9.16
2680.00	20	64-QAM	H	150	329	1 / 99	16.93	6.45	23.38	0.218	33.01	-9.63
2593.00	5	QPSK	V	150	269	1 / 24	19.01	6.27	25.28	0.337	33.01	-7.73
2593.00	5 (WCP)	QPSK	H	150	329	1 / 24	18.21	6.07	24.28	0.268	33.01	-8.73

Table 7-19. EIRP Data (Band 38/41 – PC3)

7.9 Radiated Spurious Emissions Measurements

§2.1053 §22.917(a) §24.238(a) §27.53(c) §27.53(f) §27.53(g) §27.53(h) §27.53(m) §27.53(a)(4)

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 v03 – Section 5.8

ANSI/TIA-603-E-2016 – Section 2.2.12

Test Settings

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

Test Setup

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

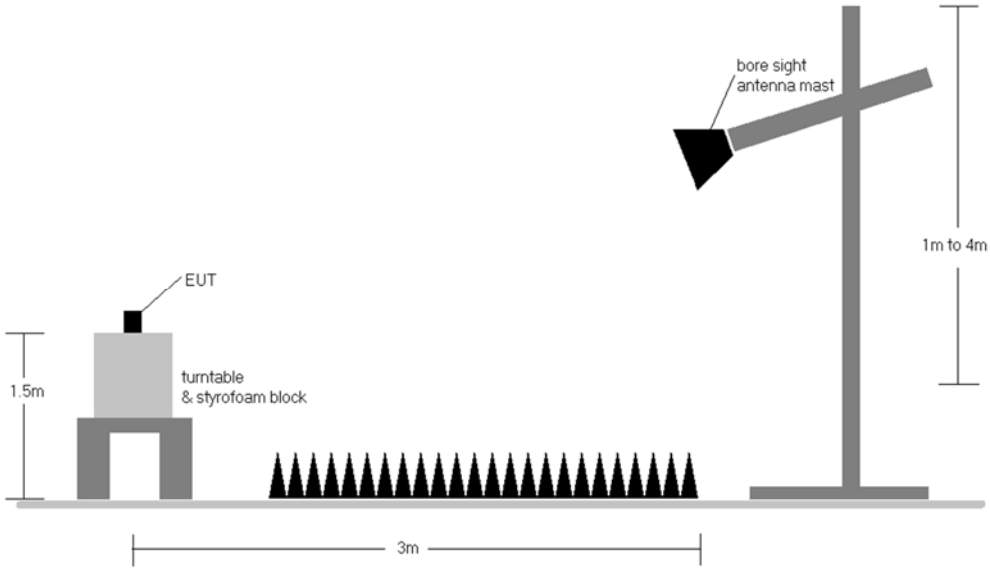


Figure 7-9. Test Instrument & Measurement Setup

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.

Radiated Spurious Emissions Measurements

Band 71

OPERATING FREQUENCY:	668	MHz
CHANNEL:	138642	
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]
1336.00	H	122	260	-75.52	7.44	-68.08	-55.1
2004.00	H	132	297	-73.72	8.50	-65.22	-52.2
2672.00	H	-	-	-77.19	9.92	-67.27	-54.3
3340.00	H	133	297	-72.89	9.64	-63.25	-50.2
4008.00	H	-	-	-72.03	9.73	-62.30	-49.3

Table 7-20. Radiated Spurious Data (Band 71 – Low Channel)

OPERATING FREQUENCY:	680.50	MHz
CHANNEL:	138767	
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]
1361.00	H	178	229	-74.99	7.55	-67.44	-54.4
2041.50	H	397	270	-69.85	8.62	-61.23	-48.2
2722.00	H	-	-	-76.59	10.02	-66.57	-53.6
3402.50	H	136	305	-74.54	9.84	-64.70	-51.7
4083.00	H	-	-	-73.21	10.09	-63.13	-50.1

Table 7-21. Radiated Spurious Data (Band 71 – Mid Channel)

OPERATING FREQUENCY:	693.00	MHz
CHANNEL:	138892	
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]
1386.00	H	162	66	-78.07	7.67	-70.40	-57.4
2079.00	H	113	21	-76.86	8.74	-68.12	-55.1
2772.00	H	-	-	-77.55	10.05	-67.49	-54.5

Table 7-22. Radiated Spurious Data (Band 71 – High Channel)

OPERATING FREQUENCY:	680.50	MHz
CHANNEL:	138767	
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]
1361.00	V	157	159	-75.88	7.55	-68.33	-55.3
2041.50	V	125	177	-77.12	8.62	-68.50	-55.5
2722.00	V	-	-	-76.95	10.02	-66.93	-53.9

Table 7-23. Radiated Spurious Data with WCP (Band 71 – High Channel)

Band 12

OPERATING FREQUENCY:	704.00	MHz
CHANNEL:	23060	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	10.0	MHz
DISTANCE:	3	meters
LIMIT:	-13	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1408.00	H	114	231	-74.76	7.94	-66.82	-53.8
2112.00	H	162	32	-71.13	8.90	-62.23	-49.2
2816.00	H	-	-	-72.97	10.07	-62.90	-49.9

Table 7-24. Radiated Spurious Data (Band 12 – Low Channel)

OPERATING FREQUENCY:	707.50	MHz
CHANNEL:	23095	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	10.0	MHz
DISTANCE:	3	meters
LIMIT:	-13	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1415.00	H	106	220	-74.93	8.09	-66.84	-53.8
2122.50	H	304	338	-71.90	8.88	-63.02	-50.0
2830.00	H	-	-	-72.81	10.13	-62.68	-49.7

Table 7-25. Radiated Spurious Data (Band 12 – Mid Channel)

OPERATING FREQUENCY:	711.00	MHz
CHANNEL:	23130	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	10.0	MHz
DISTANCE:	3	meters
LIMIT:	-13	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1422.00	H	106	123	-75.07	8.23	-66.84	-53.8
2133.00	H	-	-	-73.63	8.86	-64.77	-51.8

Table 7-26. Radiated Spurious Data (Band 12 – High Channel)

OPERATING FREQUENCY:	707.50	MHz
CHANNEL:	23095	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	10.0	MHz
DISTANCE:	3	meters
LIMIT:	-13	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1415.00	H	134	157	-75.57	8.09	-67.48	-54.5
2122.50	H	191	123	-71.86	8.88	-62.98	-50.0
2830.00	H	-	-	-72.80	10.13	-62.67	-49.7

Table 7-27. Radiated Spurious Data with WCP (Band 12 – Mid Channel)

Band 13

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

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
2338.50	H	-	-	-57.78	4.86	-52.92	-39.9

Table 7-28. Radiated Spurious Data (Band 13 – Low Channel)

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

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
2346.00	H	-	-	-57.89	4.88	-53.01	-40.0

Table 7-29. Radiated Spurious Data (Band 13 – Mid Channel)

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

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
2353.50	H	-	-	-57.71	4.90	-52.81	-39.8

Table 7-30. Radiated Spurious Data (Band 13 – High Channel)

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

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1559.00	H	-	-	-61.72	4.47	-57.25	-17.3
1564.00	H	-	-	-62.15	4.50	-57.66	-17.7
1569.00	H	-	-	-62.38	4.53	-57.85	-17.9

Table 7-31. Radiated Spurious Data (Band 13 – 1559-1610MHz Band)

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

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
2353.50	H	-	-	-60.02	4.90	-55.12	-42.1

Table 7-32. Radiated Spurious Data with WCP (Band 13 – High Channel)

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

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1569.00	H	-	-	-65.36	4.53	-60.83	-20.8

Table 7-33. Radiated Spurious Data with WCP (Band 13 – 1559-1610MHz Band)

Band 5/26

OPERATING FREQUENCY:	826.50	MHz
CHANNEL:	26815	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	5.0	MHz
DISTANCE:	3	meters
LIMIT:	-13	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1653.00	H	248	154	-79.11	8.99	-70.12	-57.1
2479.50	H	-	-	-75.24	9.12	-66.11	-53.1

Table 7-34. Radiated Spurious Data (Band 5/26 – Low Channel)

OPERATING FREQUENCY:	836.50	MHz
CHANNEL:	26915	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	5.0	MHz
DISTANCE:	3	meters
LIMIT:	-13	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1673.00	H	-	-	-79.70	8.85	-70.85	-57.9
2509.50	H	-	-	-76.39	9.17	-67.22	-54.2

Table 7-35. Radiated Spurious Data (Band 5/26 – Mid Channel)

OPERATING FREQUENCY:	846.50	MHz
CHANNEL:	27015	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	5.0	MHz
DISTANCE:	3	meters
LIMIT:	-13	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1693.00	H	-	-	-78.64	8.70	-69.93	-56.9
2539.50	H	-	-	-76.07	9.26	-66.81	-53.8

Table 7-36. Radiated Spurious Data (Band 5/26 – High Channel)

OPERATING FREQUENCY:	846.50	MHz
CHANNEL:	27015	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	5.0	MHz
DISTANCE:	3	meters
LIMIT:	-13	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1693.00	H	-	-	-78.75	8.70	-70.04	-57.0
2539.50	H	-	-	-76.01	9.26	-66.75	-53.8

Table 7-37. Radiated Spurious Data with WCP (Band 5/26 – High Channel)

Band 4/66

OPERATING FREQUENCY:	1720.00	MHz
CHANNEL:	132072	
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	113	225	-67.35	9.54	-57.81	-44.8
5160.00	H	-	-	-68.47	10.79	-57.67	-44.7
6880.00	H	-	-	-63.98	10.86	-53.13	-40.1

Table 7-38. Radiated Spurious Data (Band 4/66 – Low Channel)

OPERATING FREQUENCY:	1745.00	MHz
CHANNEL:	132322	
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	106	226	-65.98	9.65	-56.33	-43.3
5235.00	H	-	-	-67.32	10.93	-56.39	-43.4
6980.00	H	-	-	-62.95	10.96	-51.99	-39.0

Table 7-39. Radiated Spurious Data (Band 4/66 – Mid Channel)

OPERATING FREQUENCY:	1770.00	MHz
CHANNEL:	132572	
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	-	-	-69.84	9.69	-60.14	-47.1
5310.00	H	-	-	-68.67	10.97	-57.71	-44.7

Table 7-40. Radiated Spurious Data (Band 4/66 – High Channel)

OPERATING FREQUENCY:	1770.00	MHz
CHANNEL:	132572	
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	-	-	-70.90	9.69	-61.20	-48.2
5310.00	H	-	-	-68.81	10.97	-57.85	-44.8

Table 7-41. Radiated Spurious Data with WCP (Band 4/66 – High Channel)

Band 2/25

OPERATING FREQUENCY:	1860.00	MHz
CHANNEL:	26140	
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	374	113	-66.87	9.48	-57.39	-44.4
5580.00	H	-	-	-71.62	11.11	-60.52	-47.5

Table 7-42. Radiated Spurious Data (Band 2/25 – Low Channel)

OPERATING FREQUENCY:	1882.50	MHz
CHANNEL:	26365	
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	374	113	-68.00	9.37	-58.62	-45.6
5647.50	H	-	-	-72.58	11.23	-61.35	-48.4

Table 7-43. Radiated Spurious Data (Band 2/25 – Mid Channel)

OPERATING FREQUENCY:	1905.00	MHz
CHANNEL:	26590	
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	116	121	-67.27	9.31	-57.96	-45.0
5715.00	H	-	-	-71.93	11.33	-60.61	-47.6

Table 7-44. Radiated Spurious Data (Band 2/25 – High Channel)

OPERATING FREQUENCY:	1860.00	MHz
CHANNEL:	26140	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	20.0	MHz
DISTANCE:	3	meters
LIMIT:	-13	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3720.00	V	124	14	-69.82	9.48	-60.34	-47.3
5580.00	V	-	-	-71.98	11.11	-60.87	-47.9

Table 7-45. Radiated Spurious Data with WCP (Band 2/25 – Low Channel)

Band 30 (Antenna B)

OPERATING FREQUENCY:	2307.50	MHz
CHANNEL:	27685	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	5.0	MHz
DISTANCE:	3	meters
LIMIT:	-40	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
4615.00	H	-	-	-64.49	8.10	-56.39	-16.4
6925.00	H	-	-	-62.04	8.68	-53.36	-13.4

Table 7-46. Radiated Spurious Data (Band 30 – Low Channel – Antenna B)

OPERATING FREQUENCY:	2312.50	MHz
CHANNEL:	27735	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	5.0	MHz
DISTANCE:	3	meters
LIMIT:	-40	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
4625.00	H	-	-	-65.32	8.10	-57.22	-17.2
6935.00	H	-	-	-62.16	8.66	-53.50	-13.5

Table 7-47. Radiated Spurious Data (Band 30 – High Channel – Antenna B)

OPERATING FREQUENCY:	2307.50	MHz
CHANNEL:	27685	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	5.0	MHz
DISTANCE:	3	meters
LIMIT:	-40	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
4615.00	H	-	-	-65.13	8.10	-57.04	-17.0
6925.00	H	-	-	-62.48	8.68	-53.80	-13.8

Table 7-48. Radiated Spurious Data with WCP (Band 30 – Low Channel – Antenna B)

Band 30 (Antenna A)

OPERATING FREQUENCY:	2310.00	MHz
CHANNEL:	27710	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	10.0	MHz
DISTANCE:	3	meters
LIMIT:	-40	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
4620.00	H	330	349	-58.15	8.10	-50.06	-10.1
6930.00	H	358	164	-60.69	8.67	-52.02	-12.0
9240.00	H	339	70	-59.50	9.89	-49.61	-9.6
11550.00	H	-	-	-59.66	9.12	-50.54	-10.5

Table 7-49. Radiated Spurious Data (Band 30 – Mid Channel – Antenna A)

OPERATING FREQUENCY:	2310.00	MHz
CHANNEL:	27710	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	10.0	MHz
DISTANCE:	3	meters
LIMIT:	-40	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
4620.00	H	150	272	-59.57	8.10	-51.47	-11.5
6930.00	H	-	-	-57.89	8.67	-49.22	-9.2

Table 7-50. Radiated Spurious Data with WCP (Band 30 – Mid Channel– Antenna A)

Band 7 (Antenna B)

OPERATING FREQUENCY:	2502.50	MHz
CHANNEL:	20775	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	5.0	MHz
DISTANCE:	3	meters
LIMIT:	-25	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
5005.00	H	-	-	-63.97	8.33	-55.64	-30.6
7515.00	H	-	-	-60.84	8.44	-52.40	-27.4

Table 7-51. Radiated Spurious Data (Band 7 – Low Channel– Antenna B)

OPERATING FREQUENCY:	2535.00	MHz
CHANNEL:	21100	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	5.0	MHz
DISTANCE:	3	meters
LIMIT:	-25	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
5070.00	H	-	-	-64.01	8.39	-55.62	-30.6
7605.00	H	-	-	-62.23	8.51	-53.72	-28.7

Table 7-52. Radiated Spurious Data (Band 7 – Mid Channel– Antenna B)

OPERATING FREQUENCY:	2567.50	MHz
CHANNEL:	21425	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	5.0	MHz
DISTANCE:	3	meters
LIMIT:	-25	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
5135.00	H	-	-	-65.17	8.43	-56.75	-31.7
7695.00	H	-	-	-62.72	8.66	-54.06	-29.1

Table 7-53. Radiated Spurious Data (Band 7 – High Channel - Antenna B)

OPERATING FREQUENCY:	2567.50	MHz
CHANNEL:	21425	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	5.0	MHz
DISTANCE:	3	meters
LIMIT:	-25	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
5135.00	H	-	-	-65.27	8.43	-56.85	-31.8
7670.00	H	-	-	-62.43	8.66	-53.77	-28.8

Table 7-54. Radiated Spurious Data with WCP (Band 7 –High Channel – Antenna B)

Band 7 (Antenna A)

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

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
5020.00	H	109	329	-66.79	10.90	-55.89	-30.9
7530.00	H	113	250	-67.12	11.13	-55.99	-31.0
10040.00	H	-	-	-66.69	12.08	-54.61	-29.6

Table 7-55. Radiated Spurious Data (Band 7 – Low Channel– Antenna A)

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

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
5070.00	H	119	29	-66.67	10.81	-55.86	-30.9
7605.00	H	111	212	-65.46	11.30	-54.16	-29.2
10140.00	H	-	-	-64.96	12.17	-52.79	-27.8

Table 7-56. Radiated Spurious Data (Band 7 – Mid Channel– Antenna A)

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

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
5120.00	H	111	148	-67.84	10.76	-57.09	-32.1
7680.00	H	110	160	-65.35	11.37	-53.97	-29.0
10240.00	H	-	-	-65.84	12.30	-53.54	-28.5

Table 7-57. Radiated Spurious Data (Band 7 – High Channel - Antenna A)

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

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
5070.00	V	209	92	-68.45	10.81	-57.64	-32.6
7605.00	V	126	362	-65.23	11.30	-53.93	-28.9
10140.00	V	-	-	-64.95	12.17	-52.78	-27.8

Table 7-58. Radiated Spurious Data with WCP (Band 7 – Mid Channel – Antenna A)

Band 38/41

OPERATING FREQUENCY:	2505.00	MHz
CHANNEL:	39740	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	10.0	MHz
DISTANCE:	3	meters
LIMIT:	-25	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
5010.00	H	150	142	-64.94	13.19	-51.75	-26.7
7515.00	H	150	7	-62.56	13.14	-49.42	-24.4
10020.00	H	-	-	-62.12	14.40	-47.72	-22.7

Table 7-59. Radiated Spurious Data (Band 38/41 – Low Channel)

OPERATING FREQUENCY:	2593.00	MHz
CHANNEL:	40620	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	10.0	MHz
DISTANCE:	3	meters
LIMIT:	-25	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
5186.00	H	150	346	-63.08	13.33	-49.75	-24.7
7779.00	H	150	67	-56.71	13.51	-43.19	-18.2
10372.00	H	-	-	-61.46	13.98	-47.48	-22.5

Table 7-60. Radiated Spurious Data (Band 38/41 – Mid Channel)

OPERATING FREQUENCY:	2685.00	MHz
CHANNEL:	41540	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	10.0	MHz
DISTANCE:	3	meters
LIMIT:	-25	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
5370.00	H	150	136	-64.49	13.35	-51.14	-26.1
8055.00	H	150	129	-53.82	13.76	-40.06	-15.1
10740.00	H	-	-	-61.09	13.90	-47.19	-22.2

Table 7-61. Radiated Spurious Data (Band 38/41 – High Channel)

OPERATING FREQUENCY:	2505.00	MHz
CHANNEL:	39740	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	10.0	MHz
DISTANCE:	3	meters
LIMIT:	-25	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
5010.00	H	150	337	-64.36	13.19	-51.17	-26.2
7515.00	H	150	94	-60.18	13.14	-47.04	-22.0
10020.00	H	-	-	-63.12	14.40	-48.72	-23.7

Table 7-62. Radiated Spurious Data with WCP (Band 38/41 – High Channel)

7.10 Uplink Carrier Aggregation Radiated Measurements

§2.1053, §27.53(m)

Test Overview

Radiated spurious emissions measurements are performed using the substitution method described in ANSI/TIA-603-D-2010 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 peak 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 v02r02 – Section 5.8

ANSI/TIA-603-D-2010 – 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. No. of sweep points ≥ 2 x span / RBW
4. Detector = RMS
5. Trace mode = Max Hold
6. The trace was allowed to stabilize

Test Setup

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

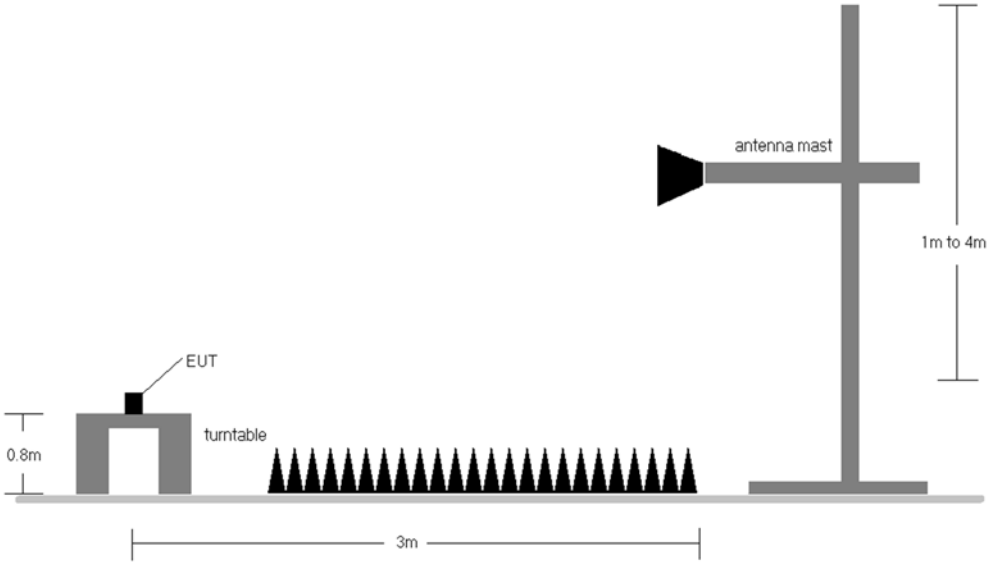


Figure 7-10. Test Instrument & Measurement Setup

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.

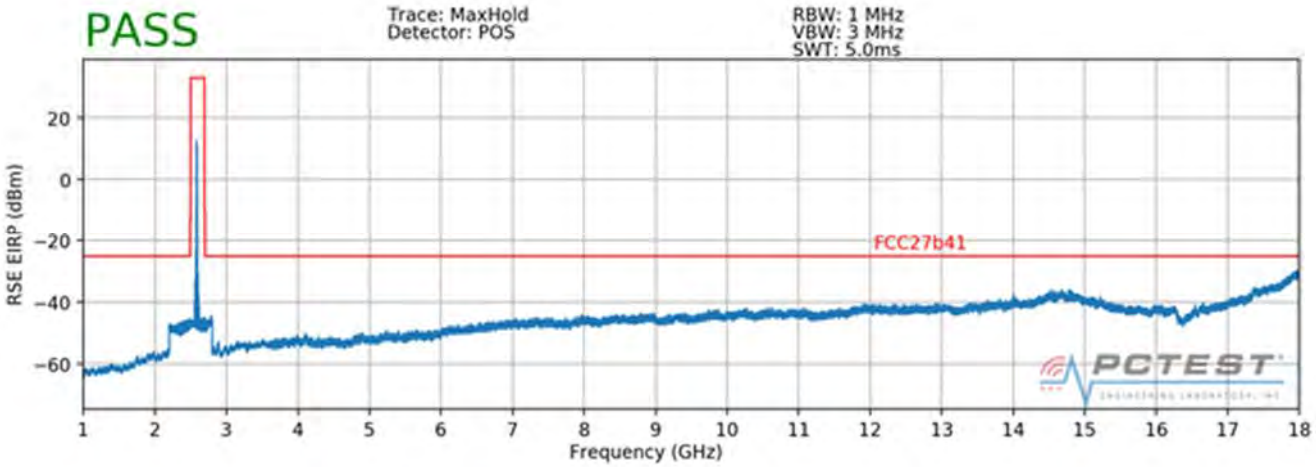
2) This unit was tested with its standard battery.

3) Radiated spurious emissions measurements were evaluated for the two contiguous channels using various combinations of RB size, RB offset, modulation, and channel bandwidth. The worst case (highest) emissions were found while operating with QPSK modulation with both carriers set to transmit using 1RB.

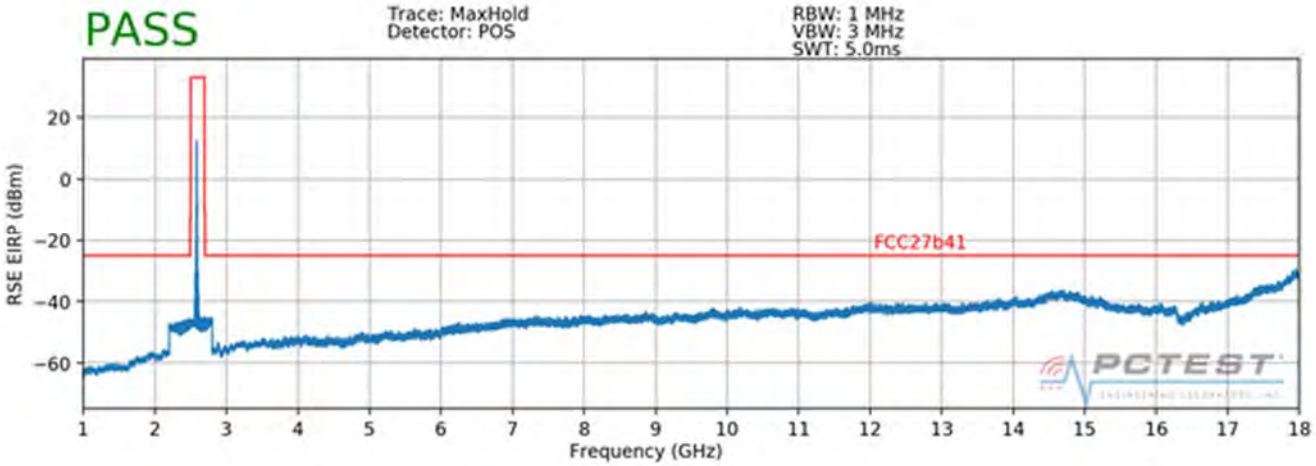
4) The spectrum is measured from 9kHz to the 10th harmonic of the fundamental frequency of the transmitter. The worst-case emissions are reported.

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.

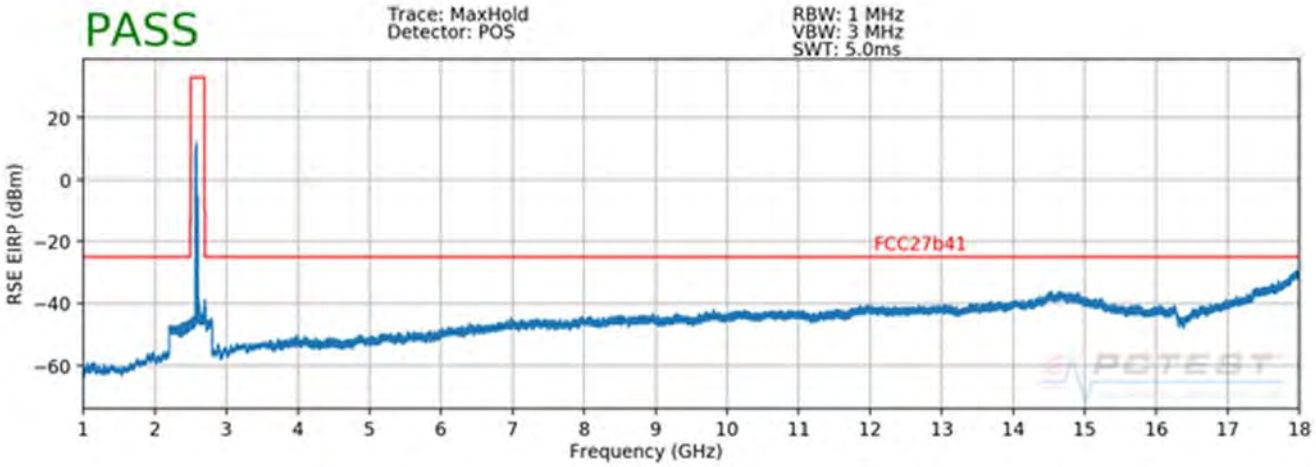
6) No significant emissions were found as a result of two uplink carriers operating contiguously.



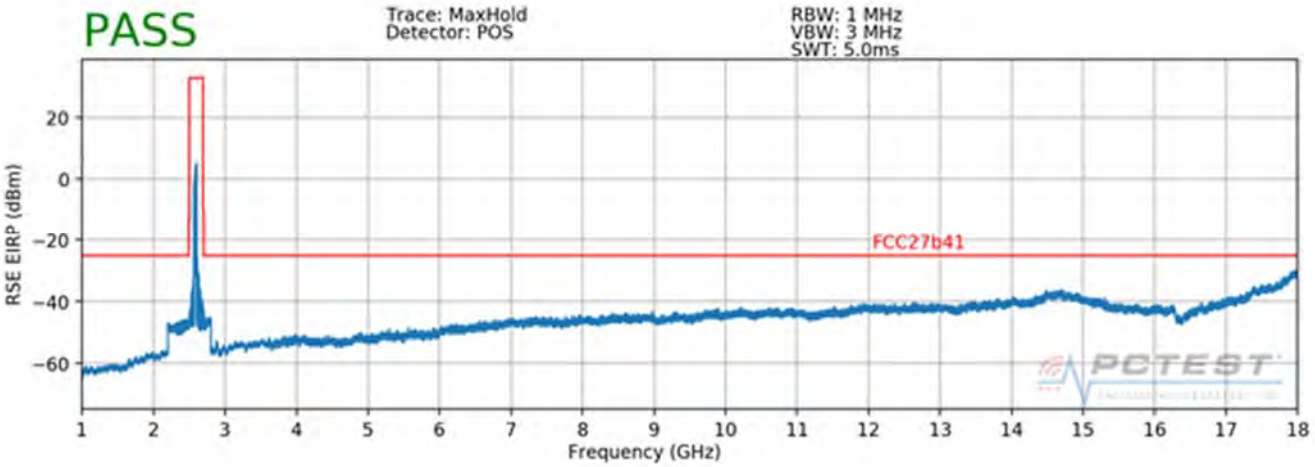
Plot 7-63. Radiated Spruious Plot (ULCA B41 PCC: RB 1 Offset 99, SCC: RB 1 Offset 0, Ant. Pol. H)



Plot 7-64. Radiated Spruious Plot (ULCA B41 PCC: RB 1 Offset 99, SCC: RB 1 Offset 0, Ant. Pol. V)



Plot 7-65. Radiated Spruious Plot (ULCA B41 PCC: RB 100 Offset 0, SCC: RB 100 Offset 0, Ant. Pol. H)



Plot 7-66. Radiated Spruious Plot (ULCA B41 PCC: RB 100 Offset 0, SCC: RB 100 Offset 0, Ant. Pol. V)

OPERATING FREQUENCY (PCC):	2593.00	MHz
OPERATING FREQUENCY (SCC):	2573.20	MHz
CHANNEL (PCC):	40620	
CHANNEL (SCC):	40422	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	15.0	MHz
DISTANCE:	3	meters
LIMIT:	-25	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
5186.00	H	114	137	-69.26	10.82	-58.44	-58.4
7779.00	H	100	257	-64.66	11.45	-53.20	-53.2
10372.00	H	-	-	-64.72	12.53	-52.18	-52.2
12965.00	H	-	-	-63.07	12.70	-50.37	-50.4

Plot 7-67. Radiated Spruious Data (ULCA B41 PCC: RB 1 Offset 0, SCC: RB 1 Offset 99)

7.11 Frequency Stability / Temperature Variation

§2.1055 §22.355 §24.235 §27.54

Test Overview and Limit

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

a.) **Temperature:** The temperature is varied from -30°C to +50°C in 10°C increments using an environmental chamber.

b.) **Primary Supply Voltage:** The primary supply voltage is varied from 85% to 115% of the nominal value for non hand-carried battery and AC powered equipment. For hand-carried, battery-powered equipment, primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacturer.

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

Test Procedure Used

ANSI/TIA-603-E-2016

Test Settings

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

Test Setup

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

Test Notes

None

Band 71 Frequency Stability Measurements

§2.1055 §27.54

OPERATING FREQUENCY:	680,500,000	Hz
CHANNEL:	138767	
REFERENCE VOLTAGE:	4.30	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.30	+ 20 (Ref)	680,500,279	279	0.0000410
100 %		- 30	680,500,066	66	0.0000097
100 %		- 20	680,500,039	39	0.0000057
100 %		- 10	680,499,770	-230	-0.0000338
100 %		0	680,500,158	158	0.0000232
100 %		+ 10	680,499,879	-121	-0.0000178
100 %		+ 20	680,500,027	27	0.0000040
100 %		+ 30	680,500,056	56	0.0000082
100 %		+ 40	680,499,899	-101	-0.0000148
100 %		+ 50	680,500,198	198	0.0000291
BATT. ENDPOINT	3.70	+ 20	680,499,841	-159	-0.0000234

Table 7-68. Frequency Stability Data (Band 71)

Note:

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

Band 71 Frequency Stability Measurements

§2.1055 §27.54

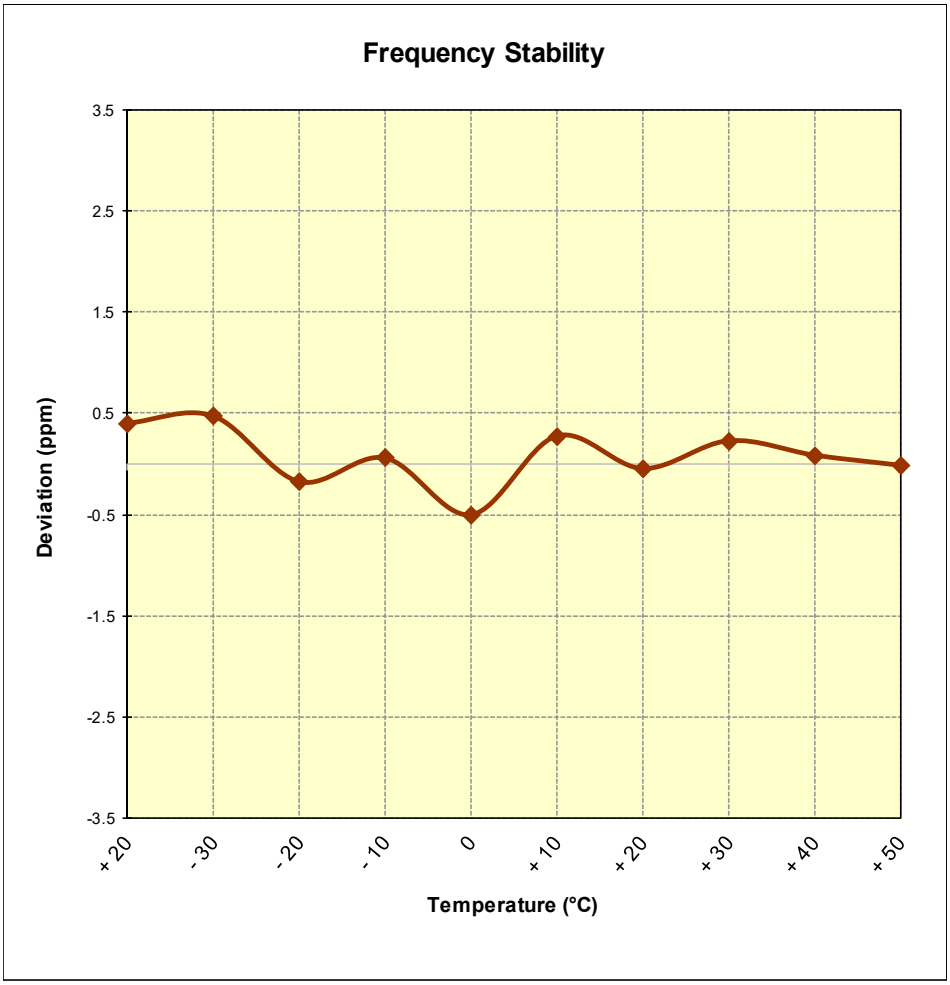


Figure 7-11. Frequency Stability Graph (Band 71)

Band 12/17 Frequency Stability Measurements

§2.1055 §27.54

OPERATING FREQUENCY:	707,500,000	Hz
CHANNEL:	23790	
REFERENCE VOLTAGE:	4.30	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.30	+ 20 (Ref)	707,500,289	289	0.0000408
100 %		- 30	707,500,340	340	0.0000481
100 %		- 20	707,499,879	-121	-0.0000171
100 %		- 10	707,500,046	46	0.0000065
100 %		0	707,499,646	-354	-0.0000500
100 %		+ 10	707,500,201	201	0.0000284
100 %		+ 20	707,499,971	-29	-0.0000041
100 %		+ 30	707,500,167	167	0.0000236
100 %		+ 40	707,500,065	65	0.0000092
100 %		+ 50	707,499,994	-6	-0.0000008
BATT. ENDPOINT	3.70	+ 20	707,499,949	-51	-0.0000072

Table 7-69. Frequency Stability Data (Band 12/17)

Note:

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

Band 12/17 Frequency Stability Measurements

§2.1055 §27.54

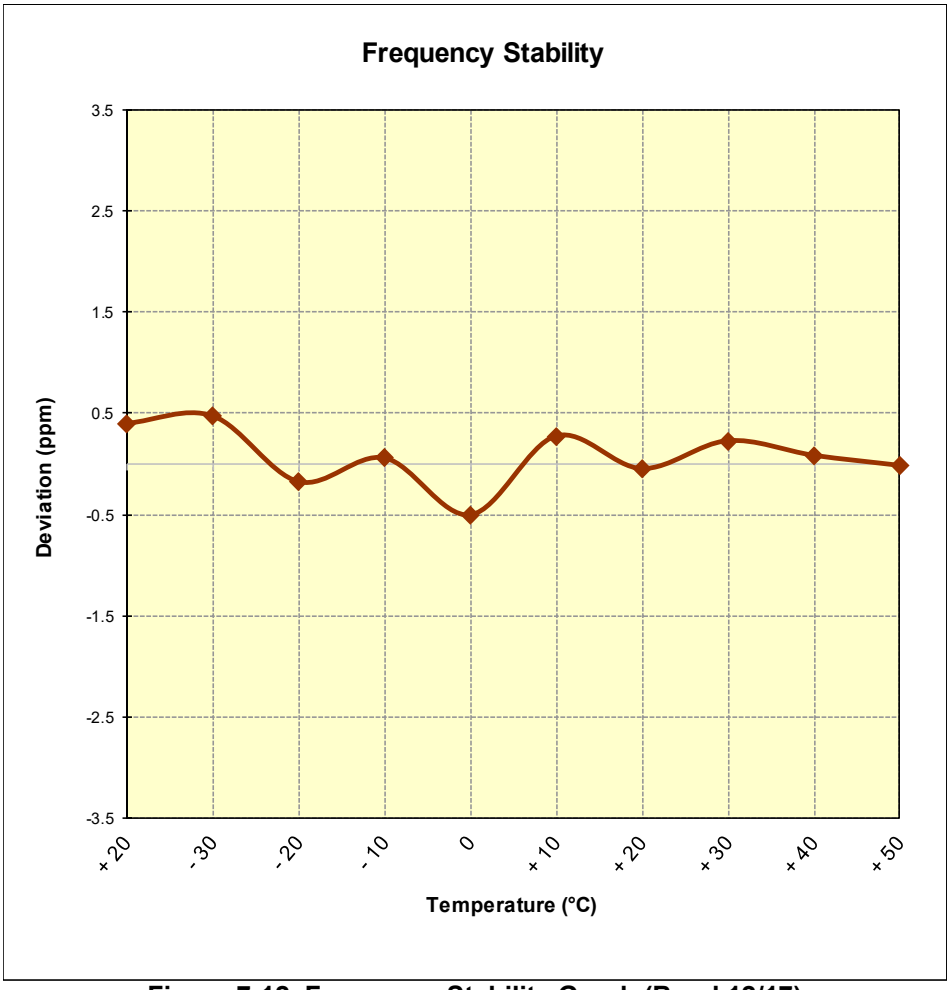


Figure 7-12. Frequency Stability Graph (Band 12/17)

Band 13 Frequency Stability Measurements

§2.1055 §27.54

OPERATING FREQUENCY:	782,000,000	Hz
CHANNEL:	23230	
REFERENCE VOLTAGE:	4.30	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.30	+ 20 (Ref)	782,000,028	28	0.0000036
100 %		- 30	781,999,992	-8	-0.0000010
100 %		- 20	781,999,898	-102	-0.0000130
100 %		- 10	782,000,010	10	0.0000013
100 %		0	781,999,909	-91	-0.0000116
100 %		+ 10	781,999,835	-165	-0.0000211
100 %		+ 20	781,999,977	-23	-0.0000029
100 %		+ 30	781,999,970	-30	-0.0000038
100 %		+ 40	782,000,167	167	0.0000214
100 %		+ 50	782,000,082	82	0.0000105
BATT. ENDPOINT	3.70	+ 20	782,000,348	348	0.0000445

Table 7-70. Frequency Stability Data (Band 13)

Note:

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

Band 13 Frequency Stability Measurements

§2.1055 §27.54

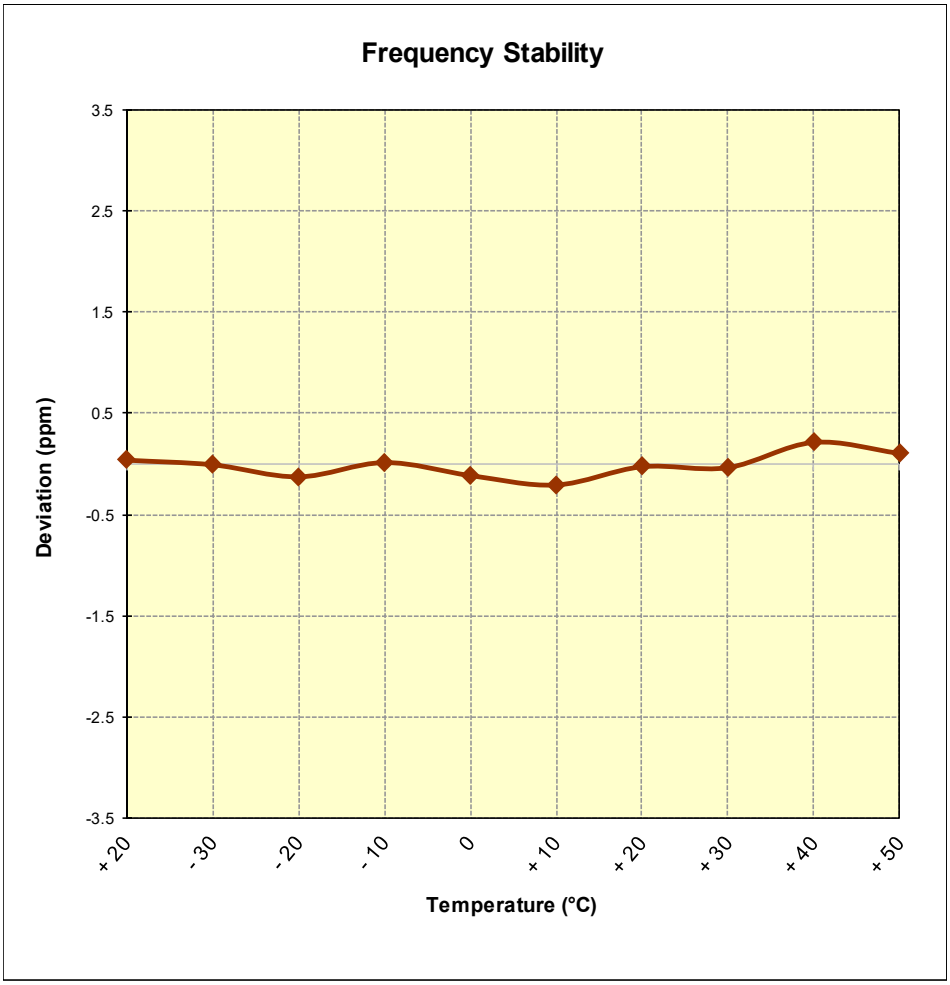


Figure 7-13. Frequency Stability Graph (Band 13)

Band 5/26 Frequency Stability Measurements

§2.1055 §22.355

OPERATING FREQUENCY:	831,500,000	Hz
CHANNEL:	26865	
REFERENCE VOLTAGE:	4.30	VDC
DEVIATION LIMIT:	± 0.00025 % or 2.5 ppm	

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.30	+ 20 (Ref)	831,499,882	-118	-0.0000142
100 %		- 30	831,500,300	300	0.0000361
100 %		- 20	831,499,650	-350	-0.0000421
100 %		- 10	831,499,962	-38	-0.0000046
100 %		0	831,500,012	12	0.0000014
100 %		+ 10	831,500,293	293	0.0000352
100 %		+ 20	831,500,026	26	0.0000031
100 %		+ 30	831,500,093	93	0.0000112
100 %		+ 40	831,499,743	-257	-0.0000309
100 %		+ 50	831,499,952	-48	-0.0000058
BATT. ENDPOINT	3.70	+ 20	831,500,323	323	0.0000388

Table 7-71. Frequency Stability Data (Band 5/26)

Band 5/26 Frequency Stability Measurements

§2.1055 §22.355

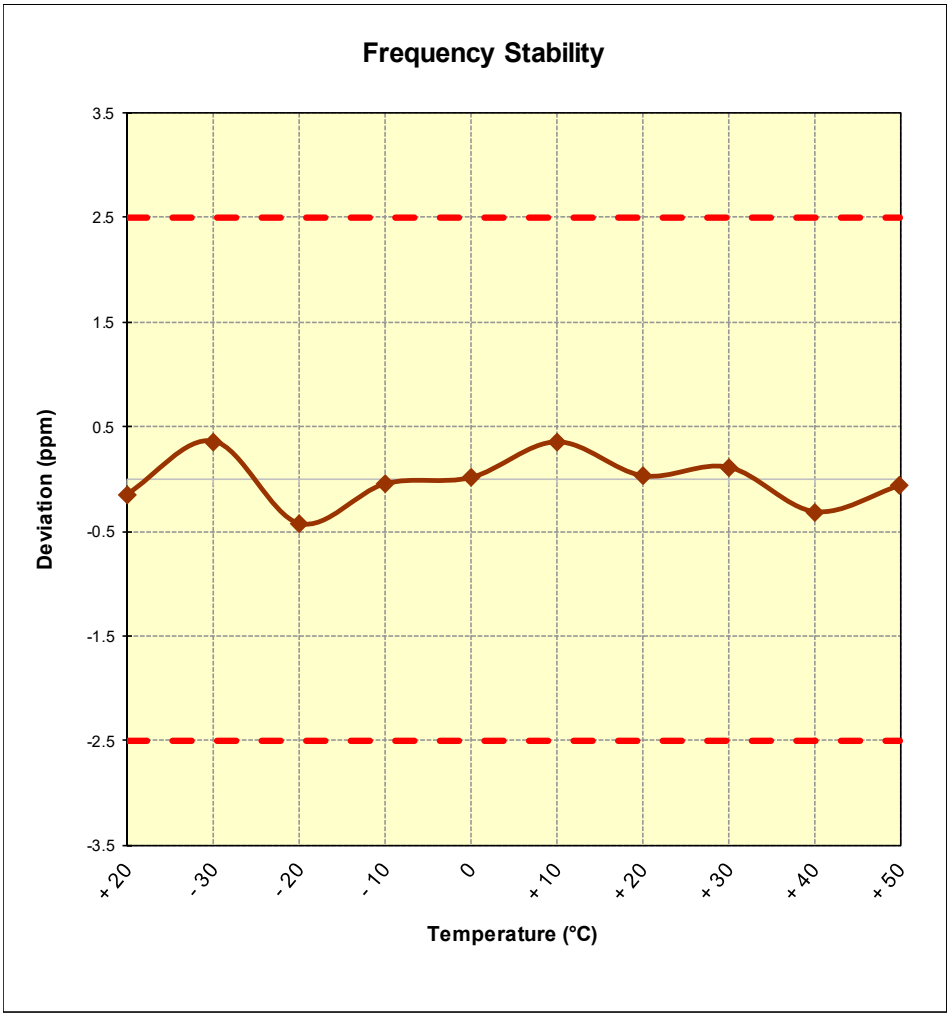


Figure 7-14. Frequency Stability Graph (Band 5/26)

Band 4/66 Frequency Stability Measurements

§2.1055 §§27.54

OPERATING FREQUENCY:	1,745,000,000	Hz
CHANNEL:	132322	
REFERENCE VOLTAGE:	4.30	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.30	+ 20 (Ref)	1,745,000,080	80	0.0000046
100 %		- 30	1,744,999,787	-213	-0.0000122
100 %		- 20	1,744,999,775	-225	-0.0000129
100 %		- 10	1,745,000,109	109	0.0000062
100 %		0	1,745,000,000	0	0.0000000
100 %		+ 10	1,745,000,086	86	0.0000049
100 %		+ 20	1,744,999,935	-65	-0.0000037
100 %		+ 30	1,744,999,819	-181	-0.0000104
100 %		+ 40	1,745,000,257	257	0.0000147
100 %		+ 50	1,744,999,935	-65	-0.0000037
BATT. ENDPOINT	3.70	+ 20	1,744,999,965	-35	-0.0000020

Table 7-72. Frequency Stability Data (Band 4/66)

Note:

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

Band 4/66 Frequency Stability Measurements

§2.1055 §§27.54

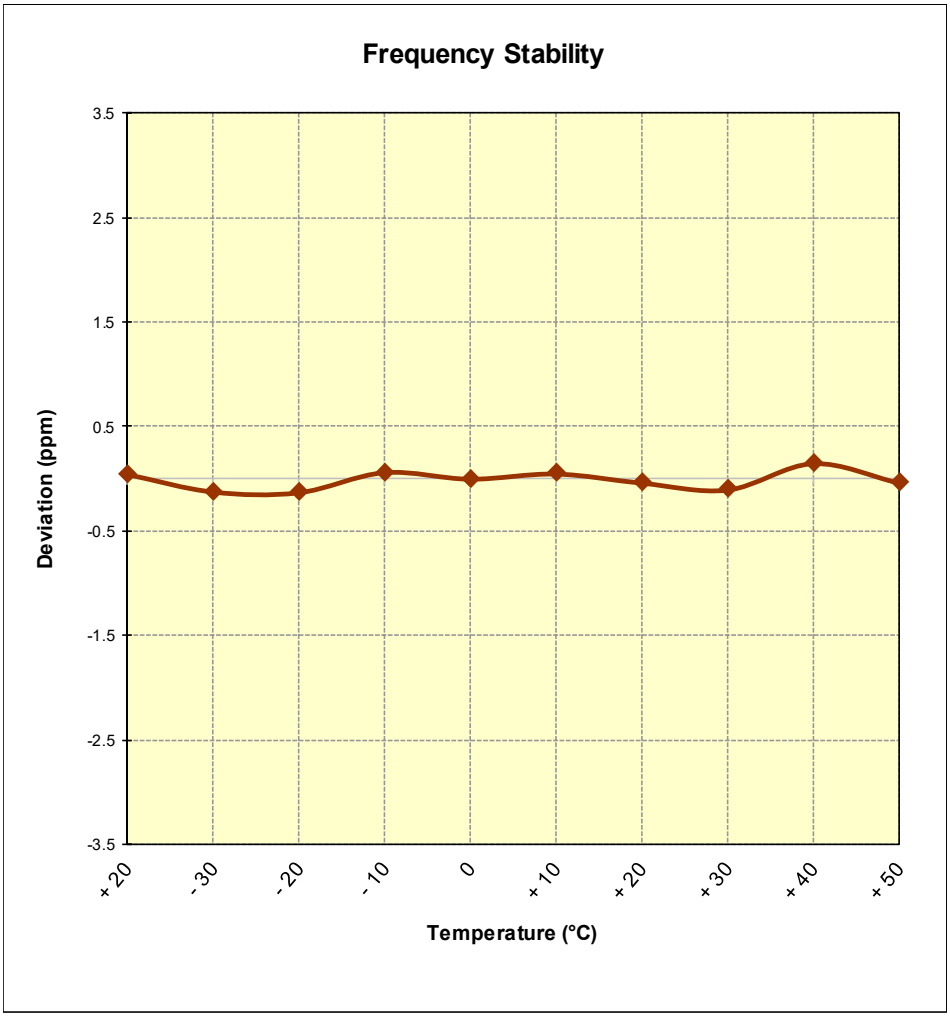


Figure 7-15. Frequency Stability Graph (Band 4/66)

Band 2/25 Frequency Stability Measurements

§2.1055 §24.235

OPERATING FREQUENCY:	1,882,500,000	Hz
CHANNEL:	26365	
REFERENCE VOLTAGE:	4.30	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.30	+ 20 (Ref)	1,882,500,108	108	0.0000057
100 %		- 30	1,882,499,794	-206	-0.0000109
100 %		- 20	1,882,500,114	114	0.0000061
100 %		- 10	1,882,500,110	110	0.0000058
100 %		0	1,882,500,017	17	0.0000009
100 %		+ 10	1,882,500,178	178	0.0000095
100 %		+ 20	1,882,499,957	-43	-0.0000023
100 %		+ 30	1,882,500,182	182	0.0000097
100 %		+ 40	1,882,500,048	48	0.0000025
100 %		+ 50	1,882,500,005	5	0.0000003
BATT. ENDPOINT	3.70	+ 20	1,882,500,083	83	0.0000044

Table 7-73. Frequency Stability Data (Band 2/25)

Band 2/25 Frequency Stability Measurements

§2.1055 §24.235

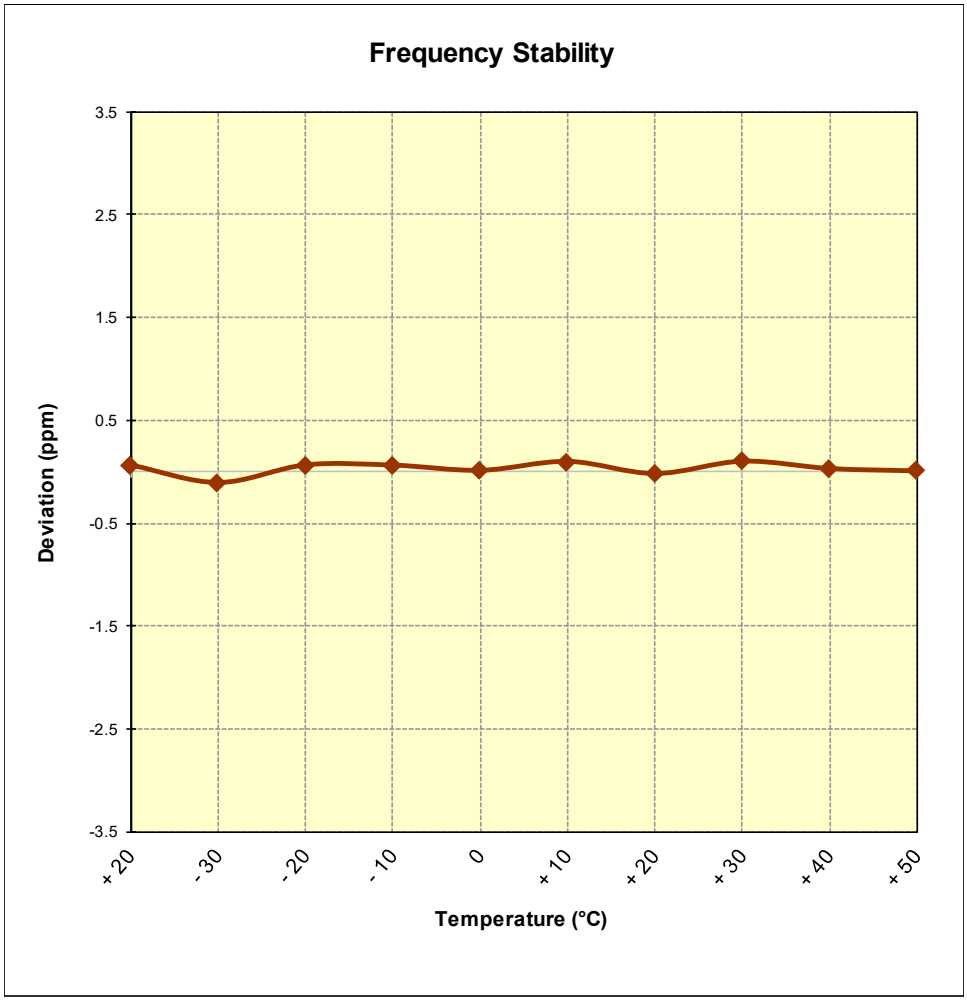


Figure 7-16. Frequency Stability Graph (Band 2/25)

Band 30 Frequency Stability Measurements

§2.1055 §24.235

OPERATING FREQUENCY:	2,310,000,000	Hz
CHANNEL:	27710	
REFERENCE VOLTAGE:	4.30	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.30	+ 20 (Ref)	2,309,999,941	-59	-0.0000026
100 %		- 30	2,310,000,083	83	0.0000036
100 %		- 20	2,309,999,939	-61	-0.0000026
100 %		- 10	2,309,999,916	-84	-0.0000036
100 %		0	2,310,000,069	69	0.0000030
100 %		+ 10	2,310,000,116	116	0.0000050
100 %		+ 20	2,310,000,078	78	0.0000034
100 %		+ 30	2,310,000,058	58	0.0000025
100 %		+ 40	2,310,000,062	62	0.0000027
100 %		+ 50	2,309,999,762	-238	-0.0000103
BATT. ENDPOINT	3.70	+ 20	2,310,000,313	313	0.0000135

Table 7-74. Frequency Stability Data (Band 30)

Note:

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

Band 30 Frequency Stability Measurements

§2.1055 §24.235

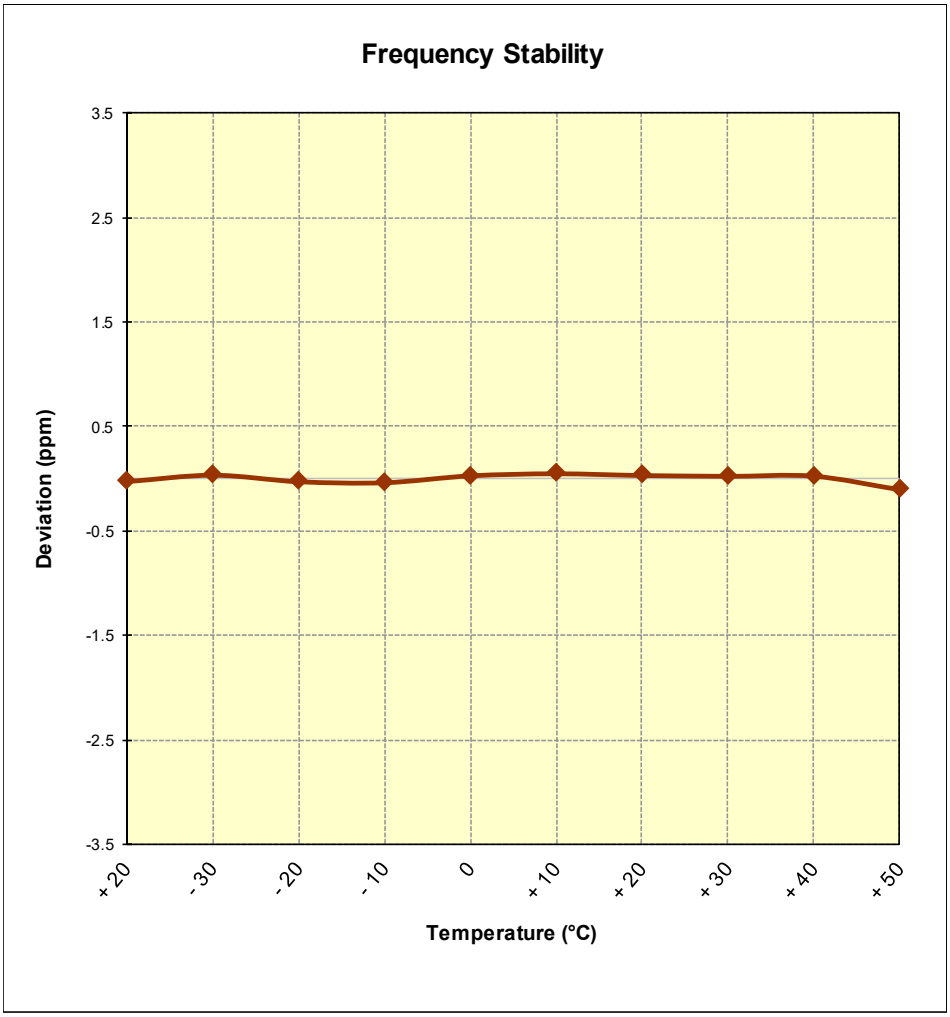


Figure 7-17. Frequency Stability Graph (Band 30)

Band 7 Frequency Stability Measurements

§2.1055 §27.54

OPERATING FREQUENCY:	2,535,000,000	Hz
CHANNEL:	21100	
REFERENCE VOLTAGE:	4.30	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.30	+ 20 (Ref)	2,535,000,012	12	0.0000005
100 %		- 30	2,534,999,727	-273	-0.0000108
100 %		- 20	2,534,999,839	-161	-0.0000064
100 %		- 10	2,535,000,388	388	0.0000153
100 %		0	2,535,000,114	114	0.0000045
100 %		+ 10	2,534,999,927	-73	-0.0000029
100 %		+ 20	2,535,000,062	62	0.0000024
100 %		+ 30	2,534,999,736	-264	-0.0000104
100 %		+ 40	2,535,000,048	48	0.0000019
100 %		+ 50	2,534,999,920	-80	-0.0000032
BATT. ENDPOINT	3.70	+ 20	2,534,999,704	-296	-0.0000117

Table 7-75. Frequency Stability Data (Band 7)

Note:

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

Band 7 Frequency Stability Measurements

§2.1055 §27.54

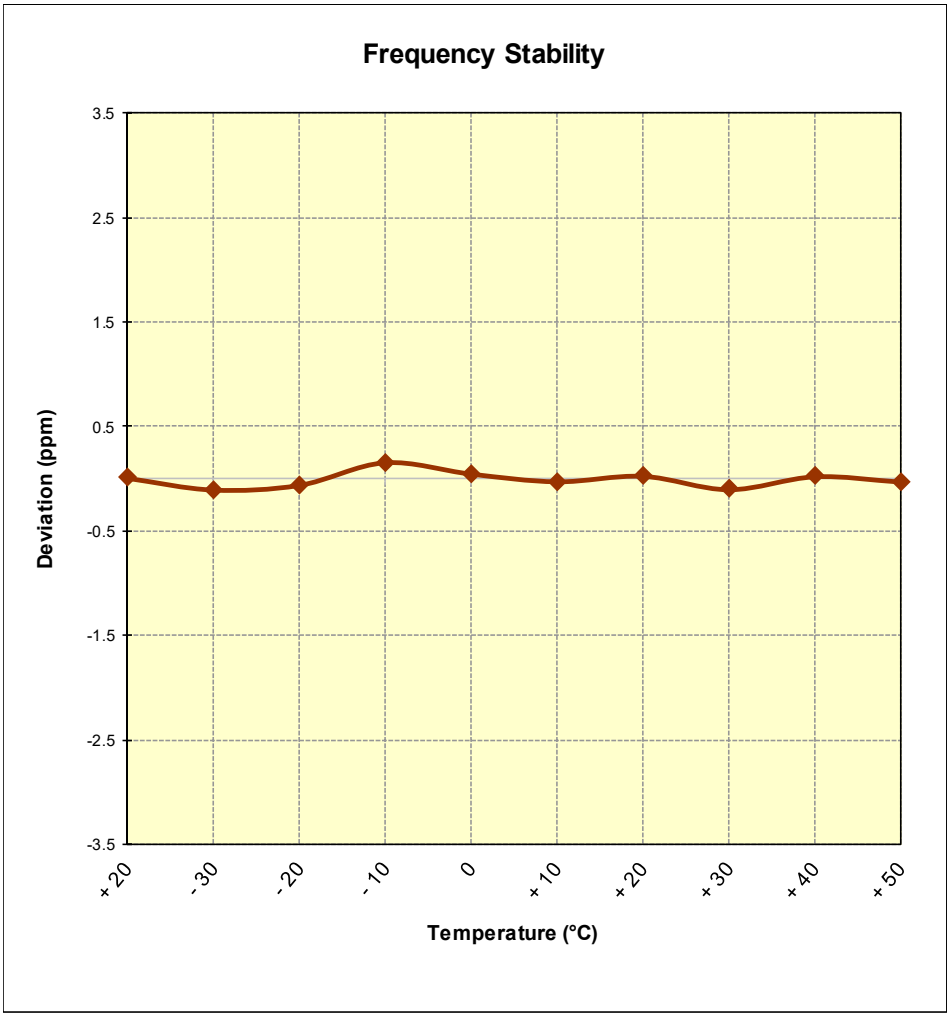


Figure 7-18. Frequency Stability Graph (Band 7)

Band 38/41 Frequency Stability Measurements

§2.1055 §27.54

OPERATING FREQUENCY:	2,593,000,000	Hz
CHANNEL:	40620	
REFERENCE VOLTAGE:	4.30	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.30	+ 20 (Ref)	2,593,000,043	43	0.0000017
100 %		- 30	2,593,000,346	346	0.0000133
100 %		- 20	2,593,000,038	38	0.0000015
100 %		- 10	2,592,999,990	-10	-0.0000004
100 %		0	2,593,000,027	27	0.0000010
100 %		+ 10	2,593,000,120	120	0.0000046
100 %		+ 20	2,592,999,693	-307	-0.0000118
100 %		+ 30	2,593,000,383	383	0.0000148
100 %		+ 40	2,592,999,950	-50	-0.0000019
100 %		+ 50	2,592,999,855	-145	-0.0000056
BATT. ENDPOINT	3.70	+ 20	2,593,000,345	345	0.0000133

Table 7-76. Frequency Stability Data (Band 38/41)

Note:

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

Band 38/41 Frequency Stability Measurements

§2.1055 §27.54

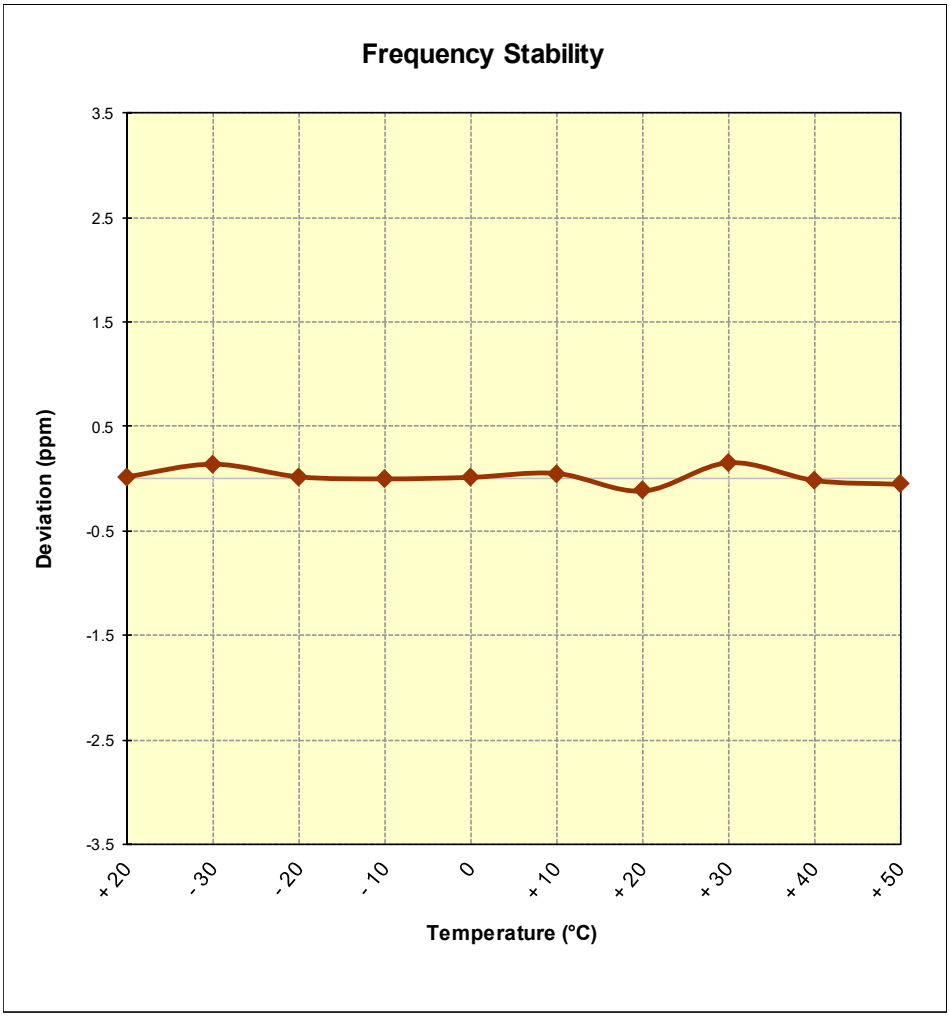


Figure 7-19. Frequency Stability Graph (Band 38/41)

8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **Samsung Portable Handset** **FCC ID: A3LSMG960U** complies with all the requirements of Part 22, 24, & 27 of the FCC Rules.