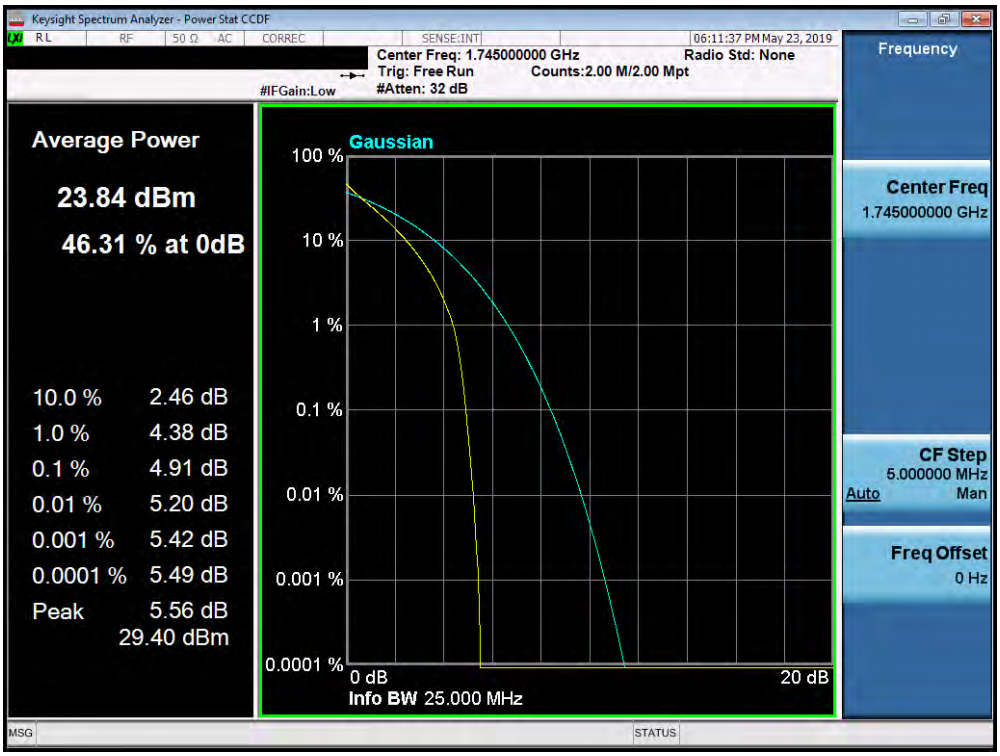
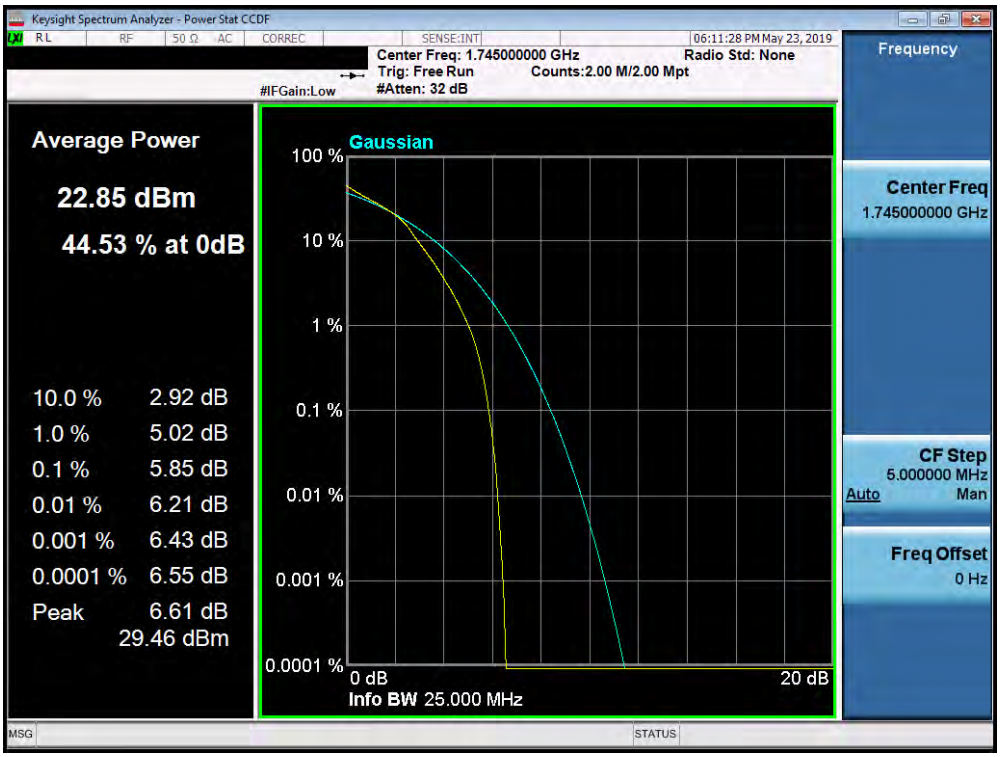


Plot 7-412. PAR Plot (Band 66/4 - 20.0MHz QPSK - Full RB Configuration)



Plot 7-413. PAR Plot (Band 66/4 - 20.0MHz 16-QAM - Full RB Configuration)

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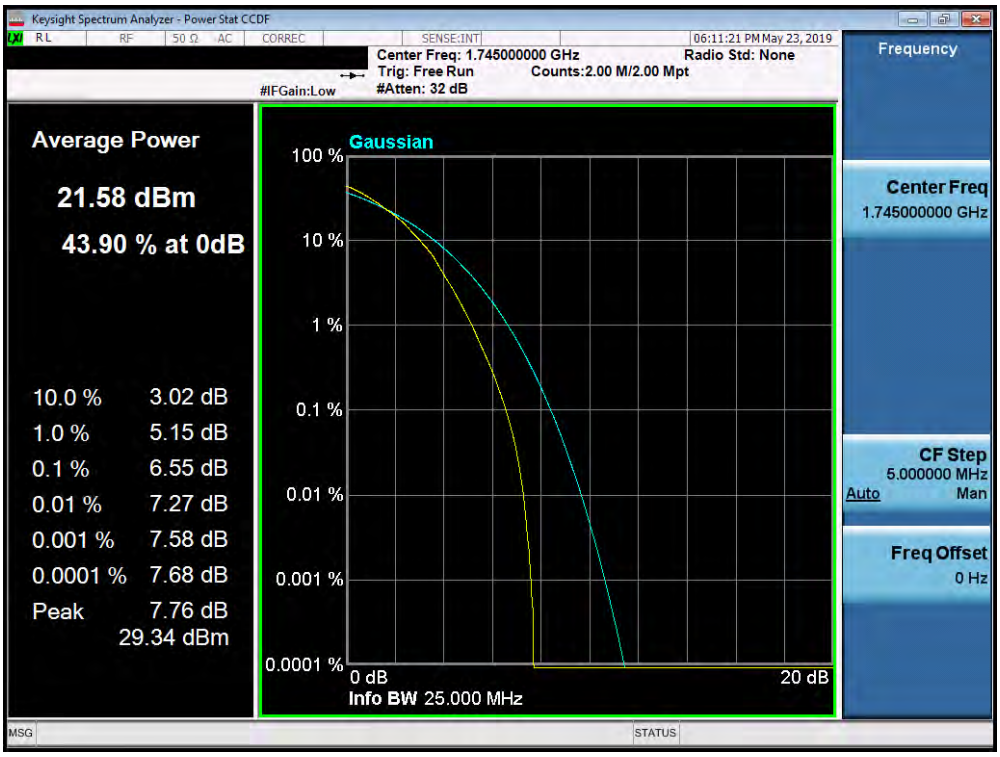
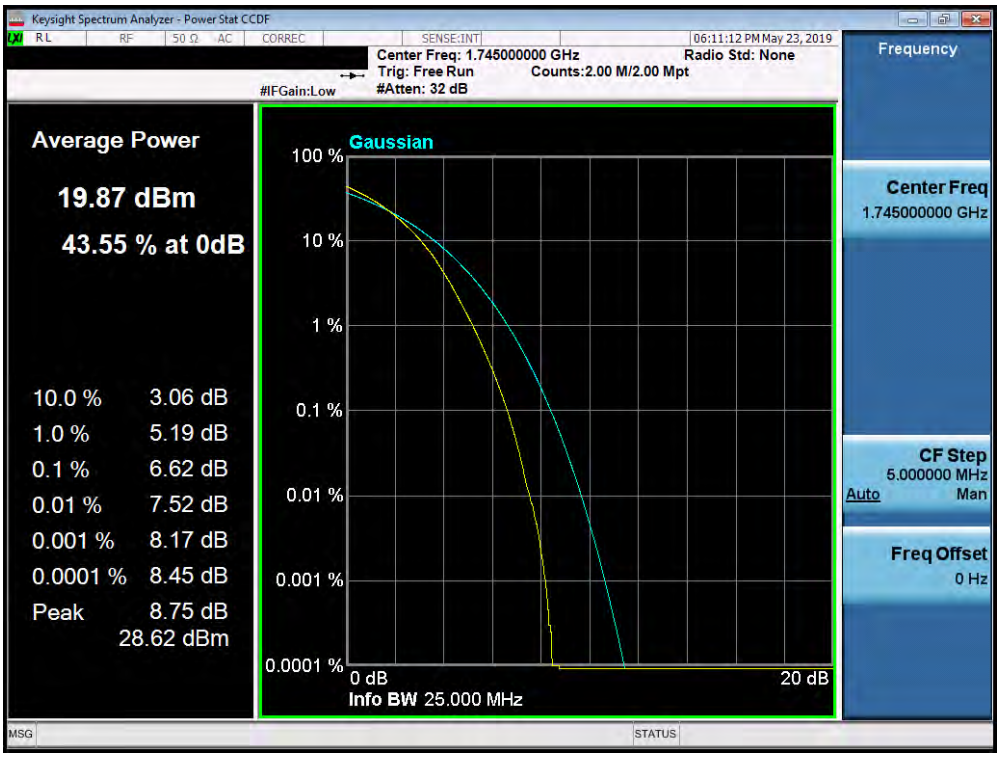


Plot 7-414. PAR Plot (Band 66/4 - 20.0MHz 64-QAM - Full RB Configuration)



Plot 7-415. PAR Plot (Band 66/4 - 20.0MHz 256-QAM - Full RB Configuration)

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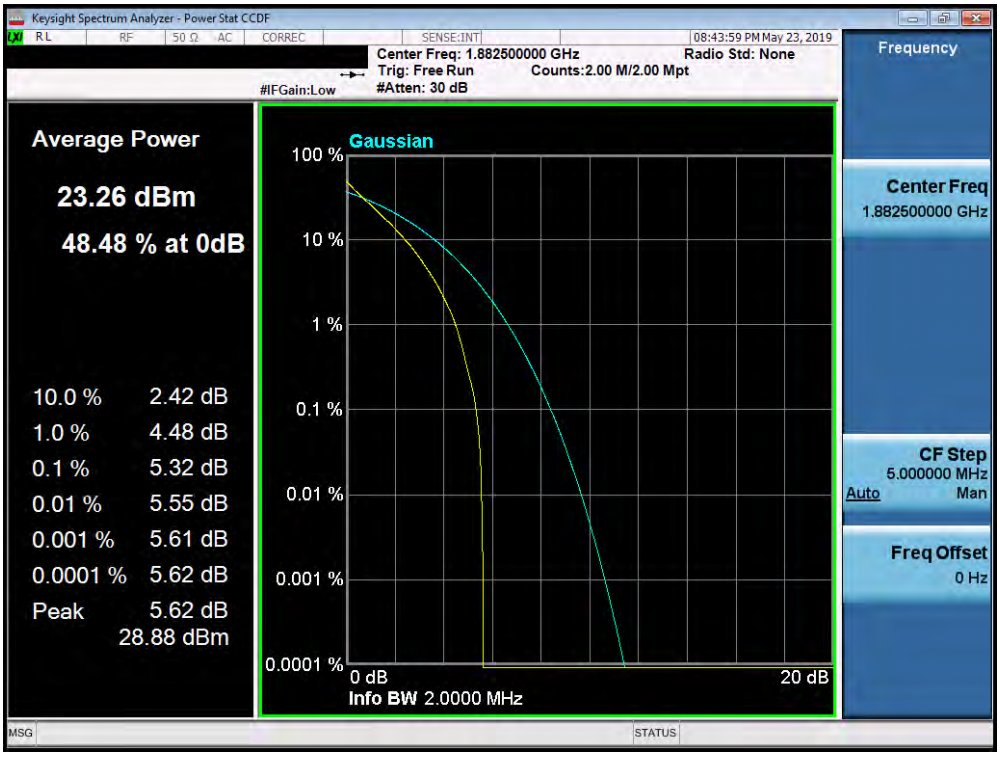
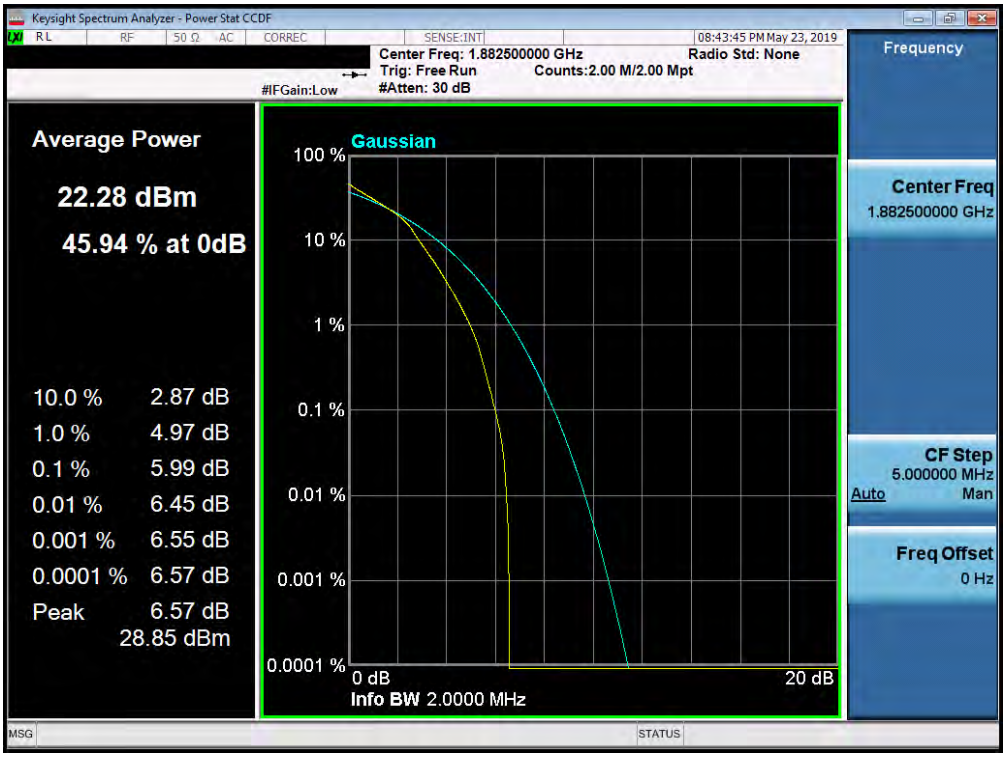
Band 25/2



Plot 7-416. PAR Plot (Band 25/2 - 1.4MHz QPSK - Full RB Configuration)



Plot 7-417. PAR Plot (Band 25/2 - 1.4MHz 16-QAM - Full RB Configuration)

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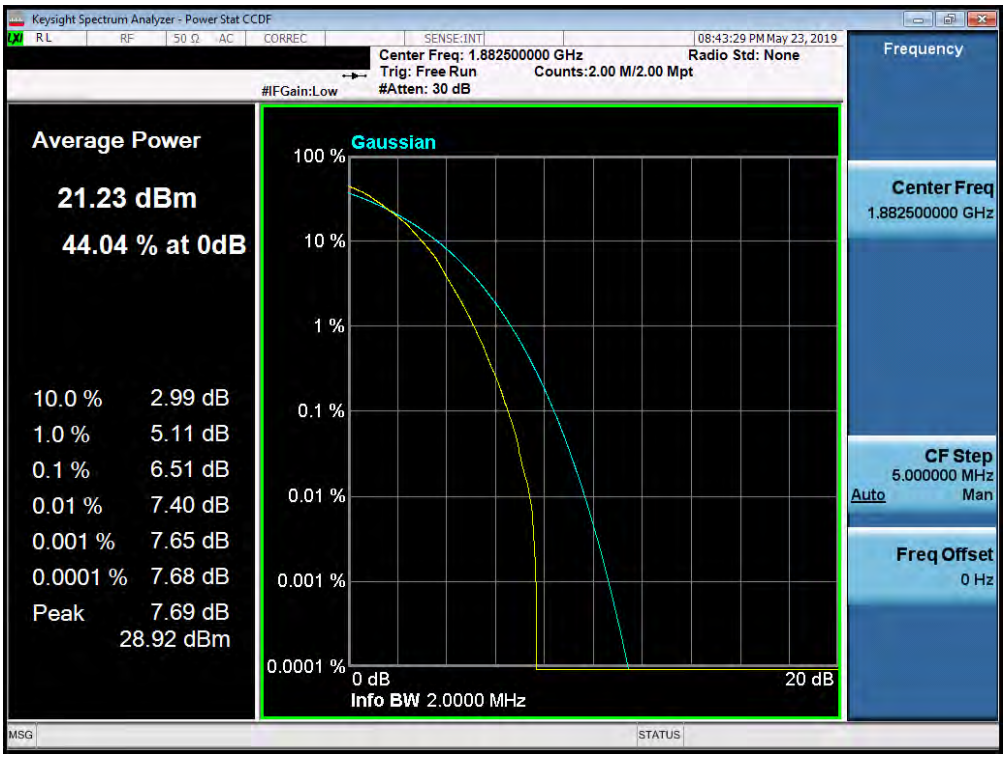
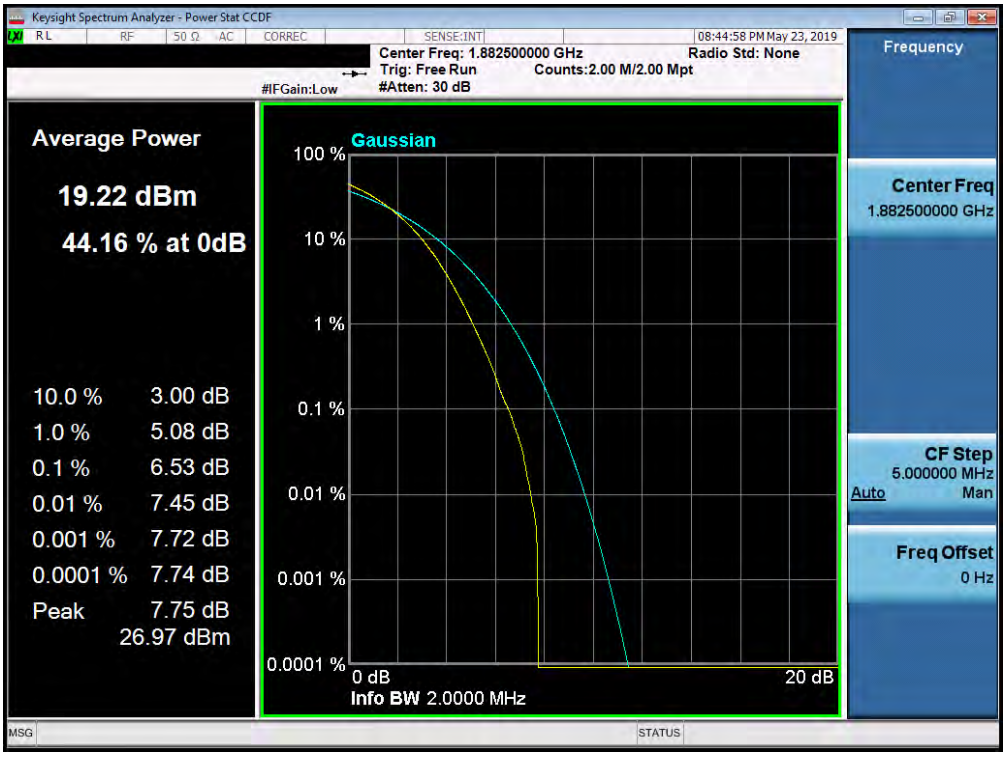


Plot 7-418. PAR Plot (Band 25/2 - 1.4MHz 64-QAM - Full RB Configuration)



Plot 7-419. PAR Plot (Band 25/2 - 1.4MHz 256-QAM - Full RB Configuration)

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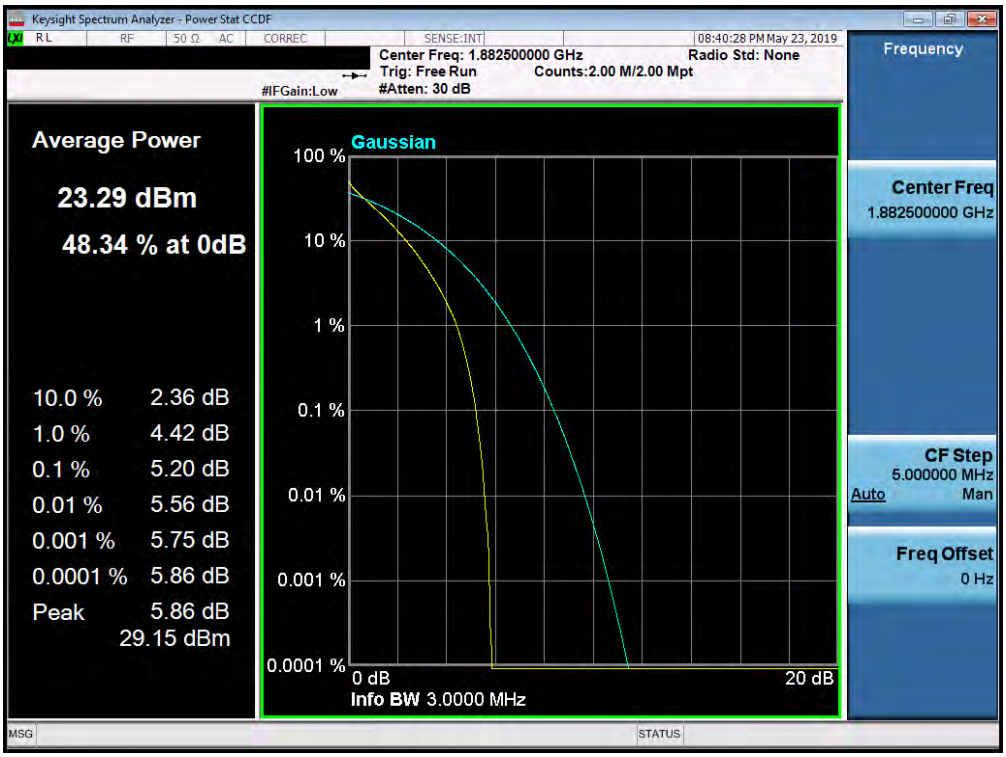
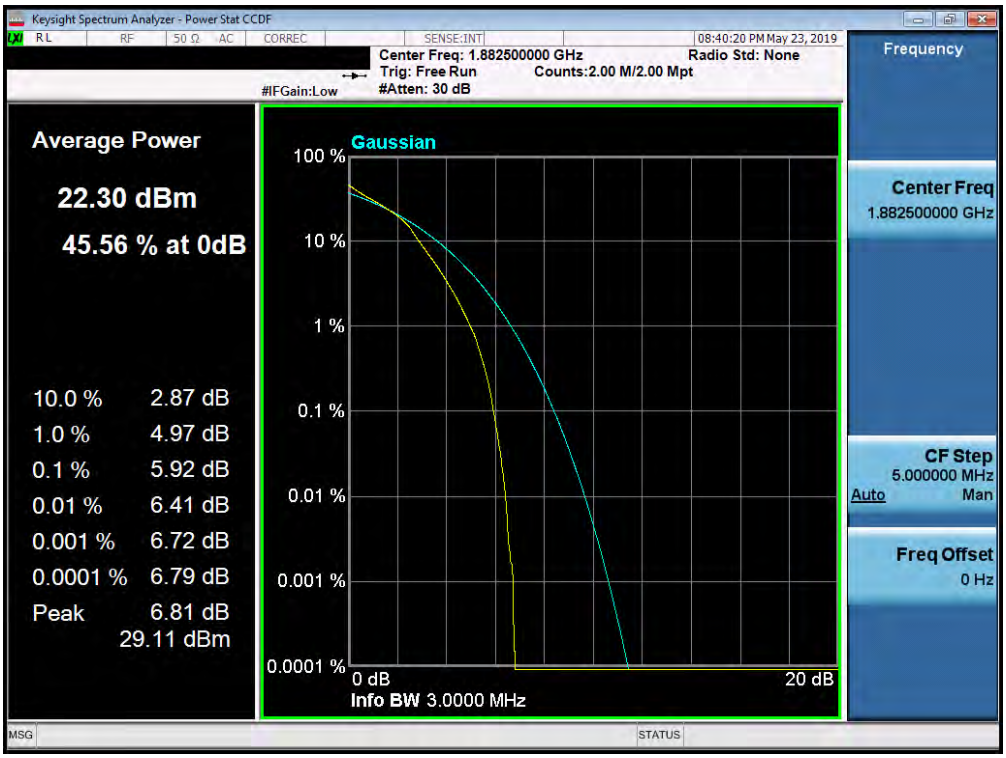


Plot 7-420. PAR Plot (Band 25/2 - 3.0MHz QPSK - Full RB Configuration)



Plot 7-421. PAR Plot (Band 25/2 - 3.0MHz 16-QAM - Full RB Configuration)

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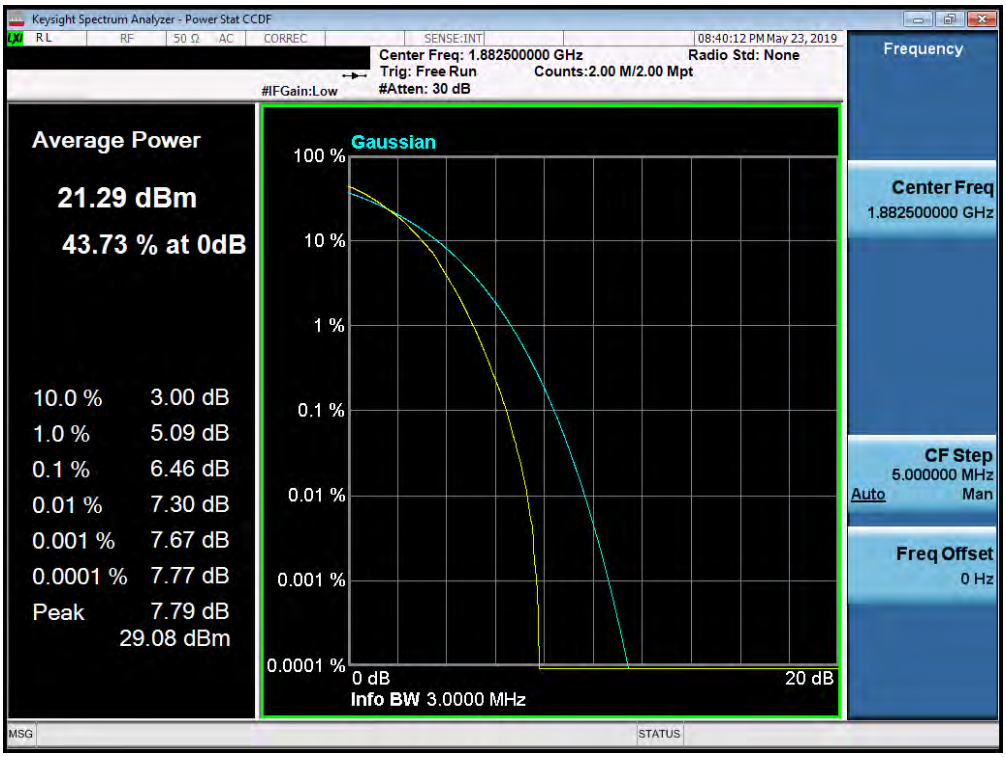
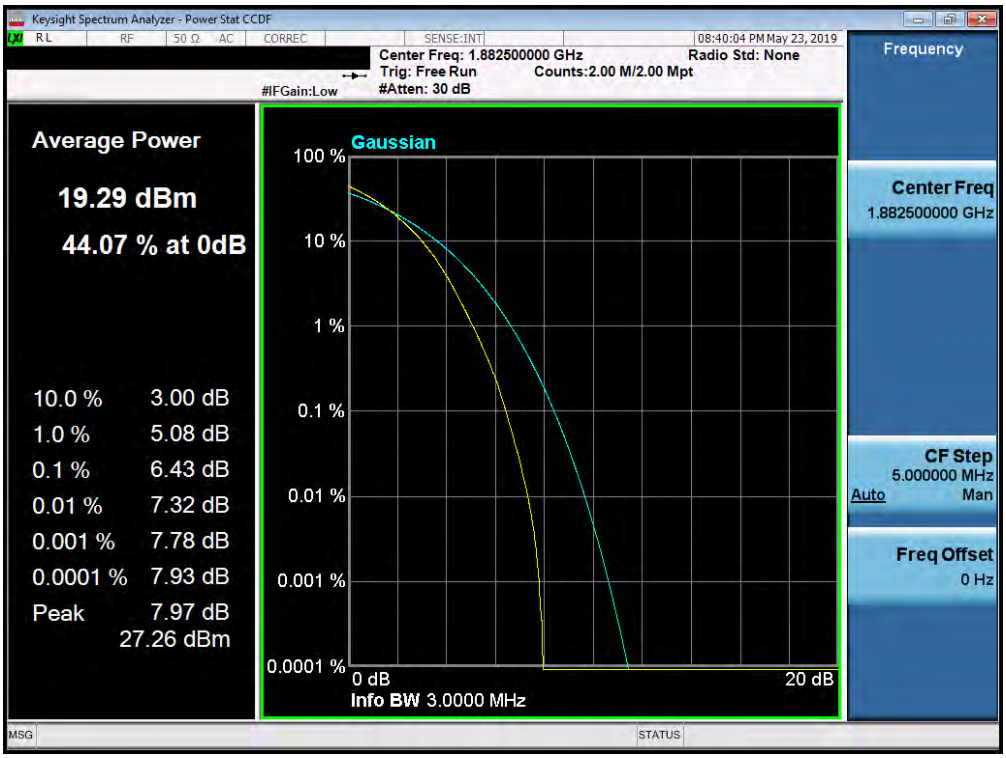


Plot 7-422. PAR Plot (Band 25/2 - 3.0MHz 64-QAM - Full RB Configuration)



Plot 7-423. PAR Plot (Band 25/2 - 3.0MHz 256-QAM - Full RB Configuration)

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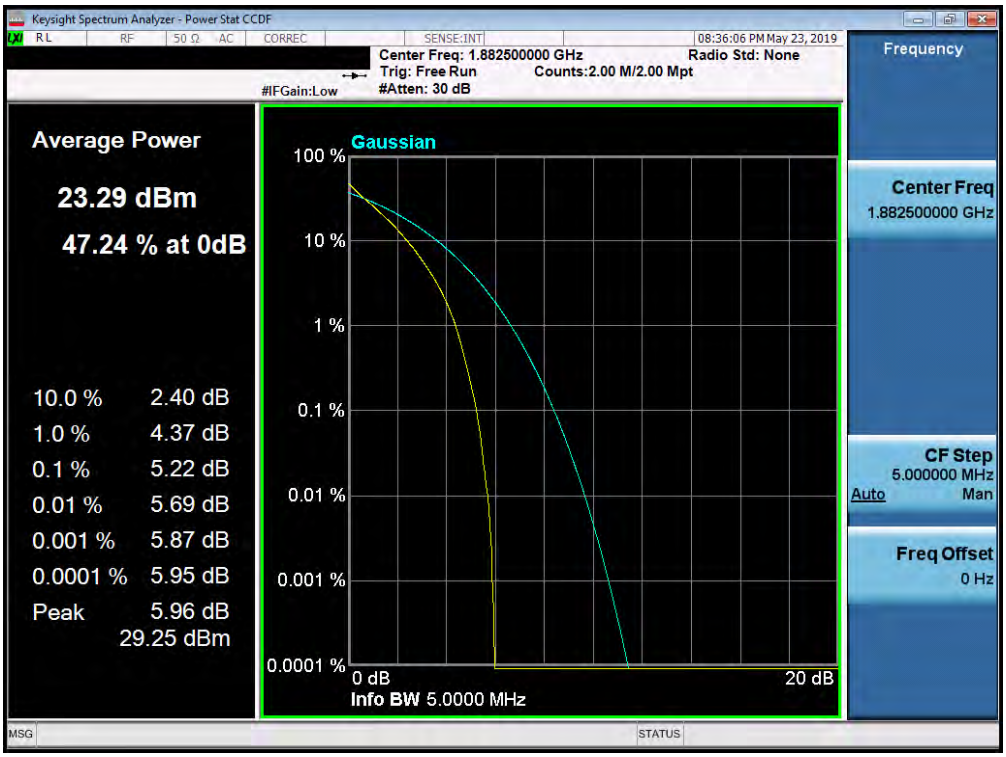
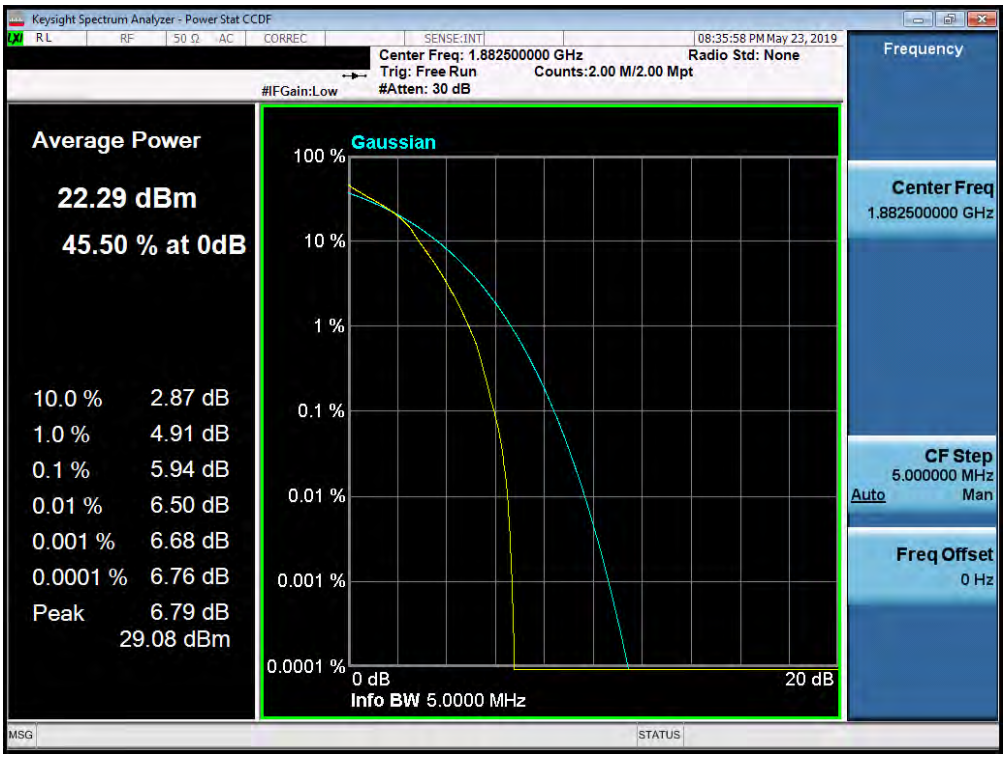


Plot 7-424. PAR Plot (Band 25/2 - 5.0MHz QPSK - Full RB Configuration)



Plot 7-425. PAR Plot (Band 25/2 - 5.0MHz 16-QAM - Full RB Configuration)

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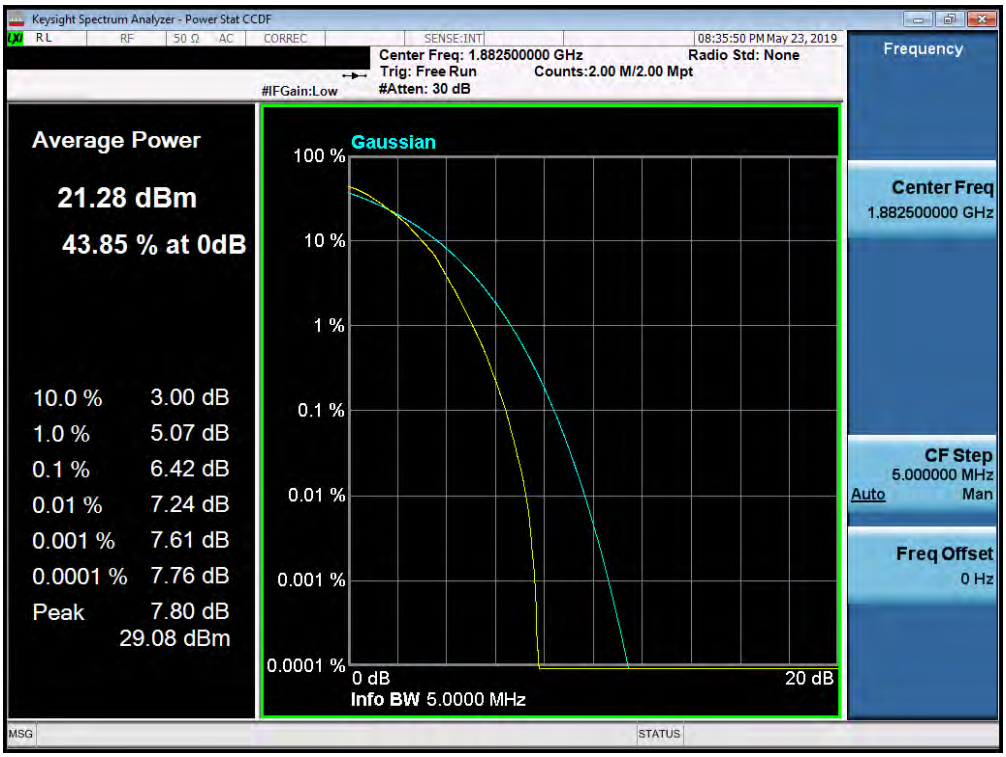
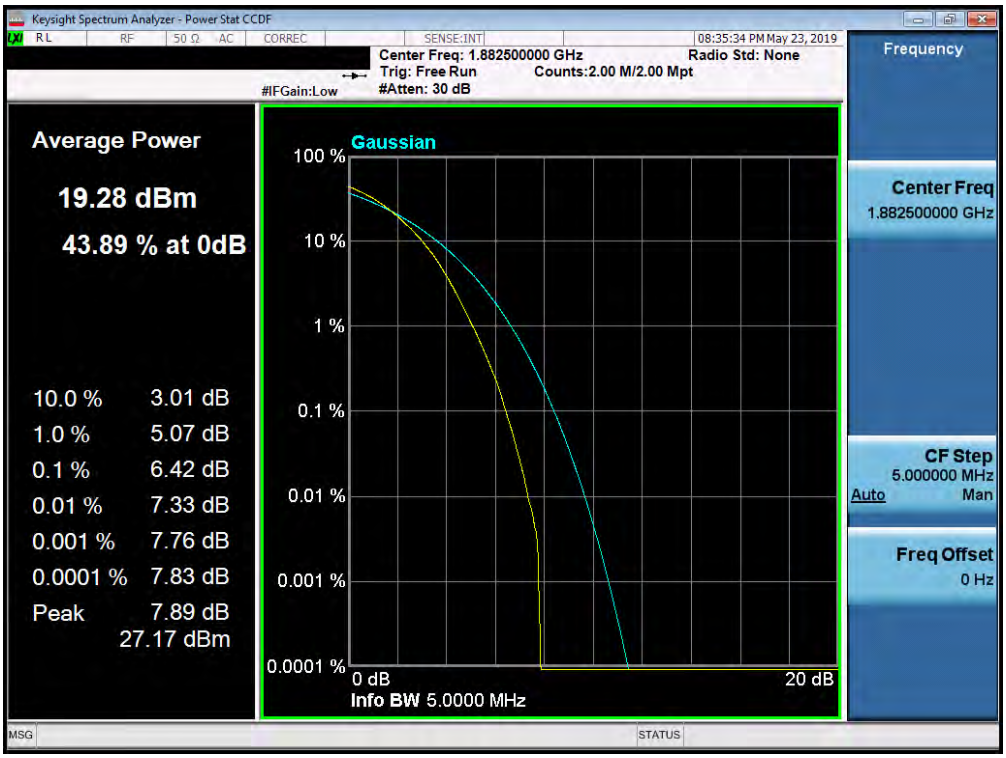


Plot 7-426. PAR Plot (Band 25/2 - 5.0MHz 64-QAM - Full RB Configuration)



Plot 7-427. PAR Plot (Band 25/2 - 5.0MHz 256-QAM - Full RB Configuration)

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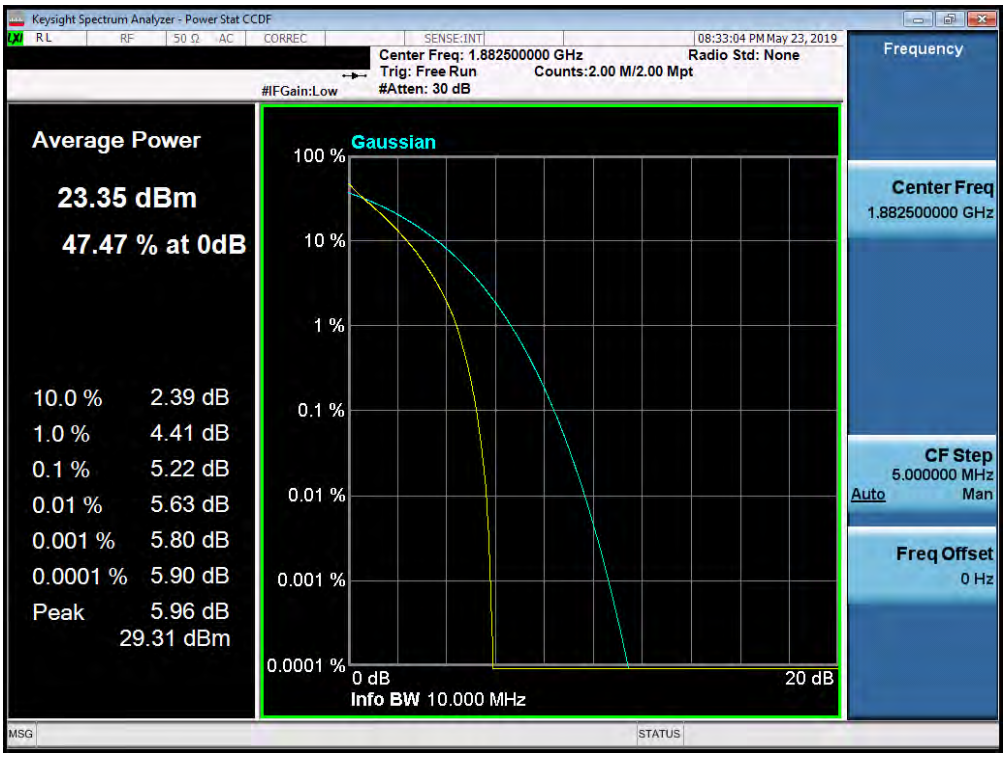
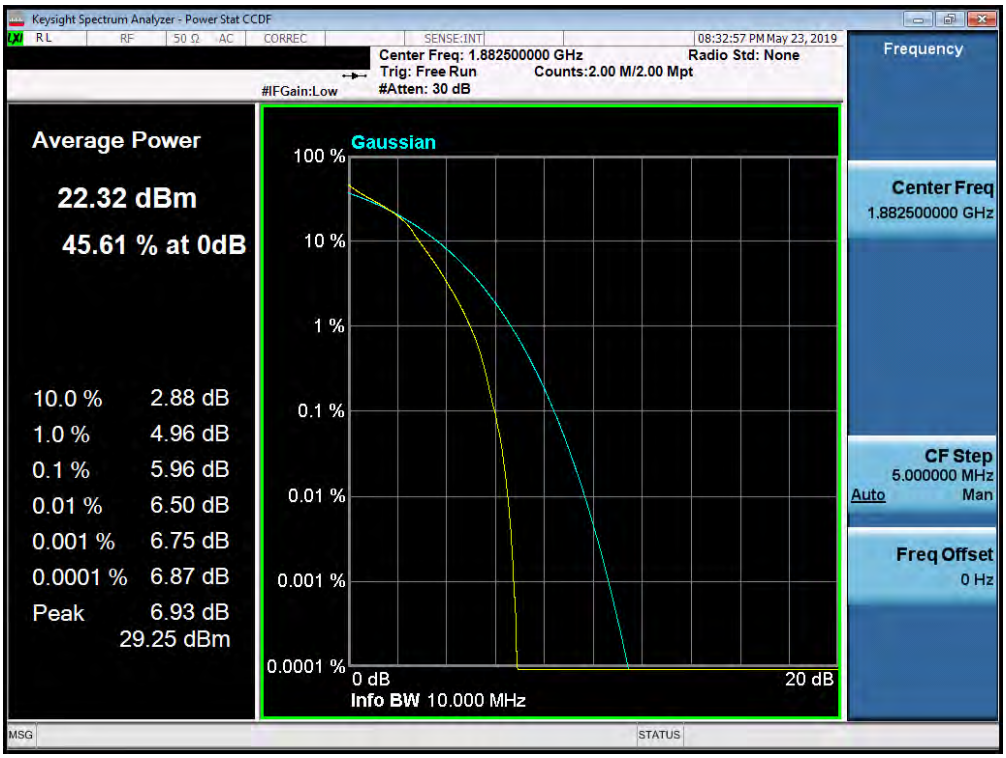


Plot 7-428. PAR Plot (Band 25/2 - 10.0MHz QPSK - Full RB Configuration)



Plot 7-429. PAR Plot (Band 25/2 - 10.0MHz 16-QAM - Full RB Configuration)

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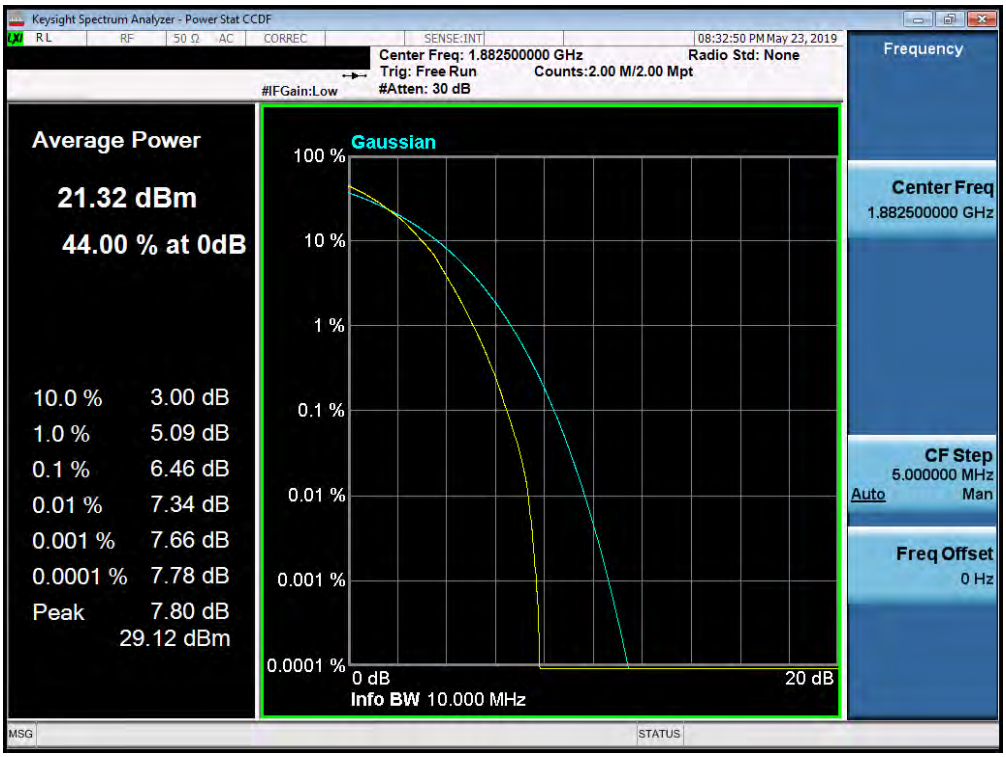
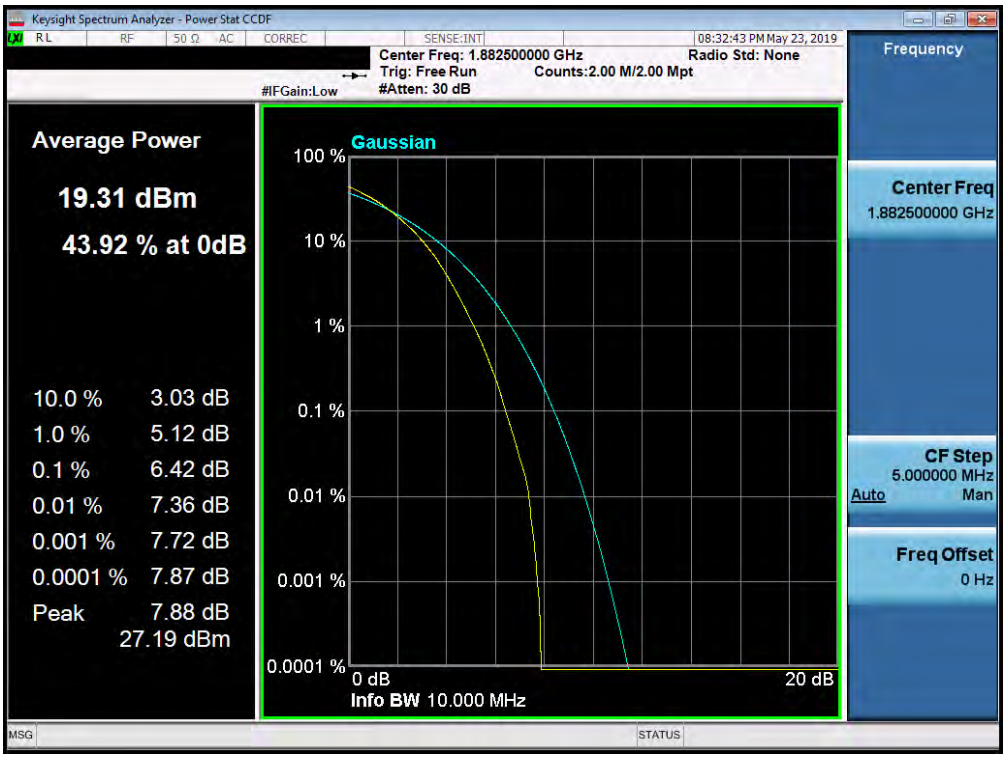


Plot 7-430. PAR Plot (Band 25/2 - 10.0MHz 64-QAM - Full RB Configuration)



Plot 7-431. PAR Plot (Band 25/2 - 10.0MHz 256-QAM - Full RB Configuration)

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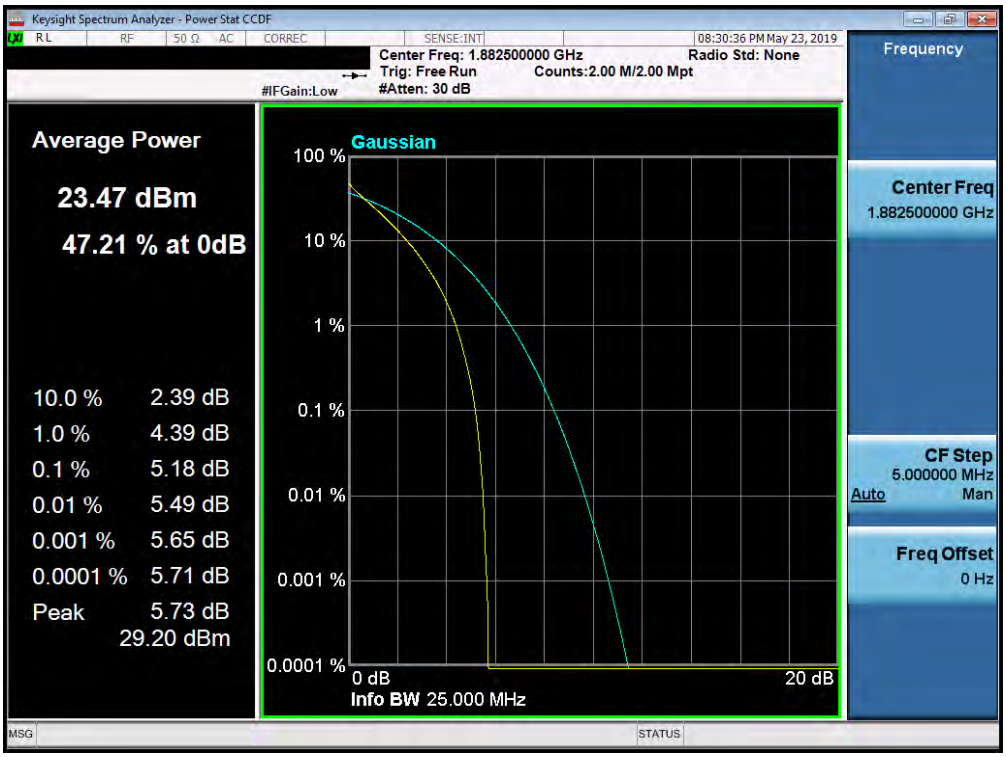
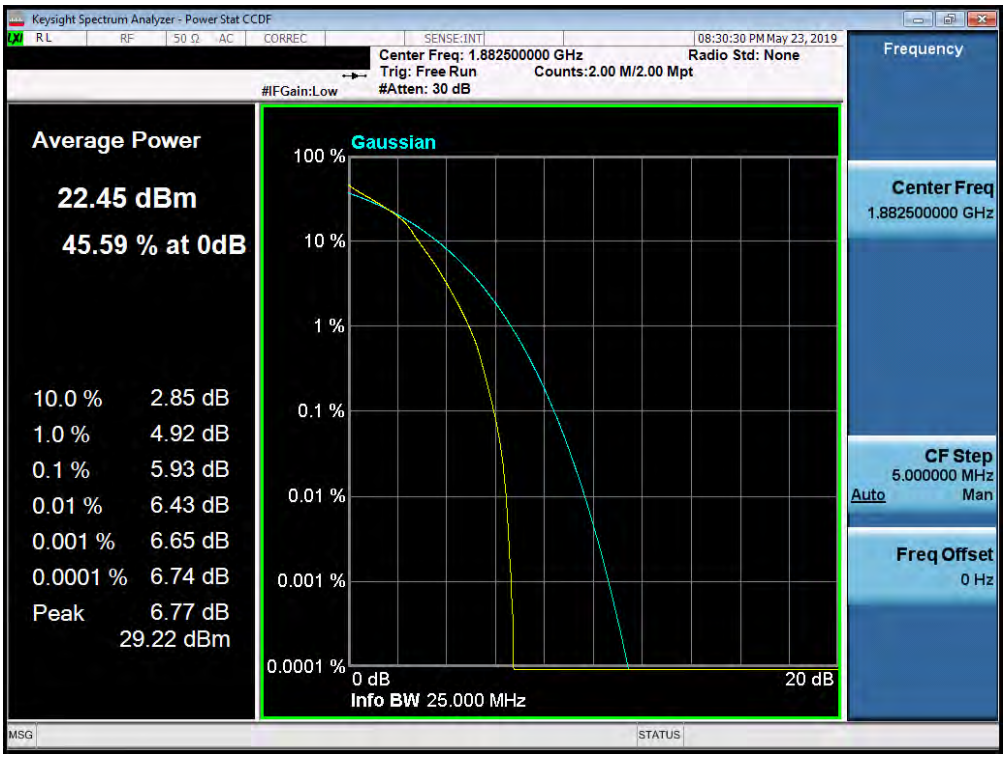


Plot 7-432. PAR Plot (Band 25/2 - 15.0MHz QPSK - Full RB Configuration)



Plot 7-433. PAR Plot (Band 25/2 - 15.0MHz 16-QAM - Full RB Configuration)

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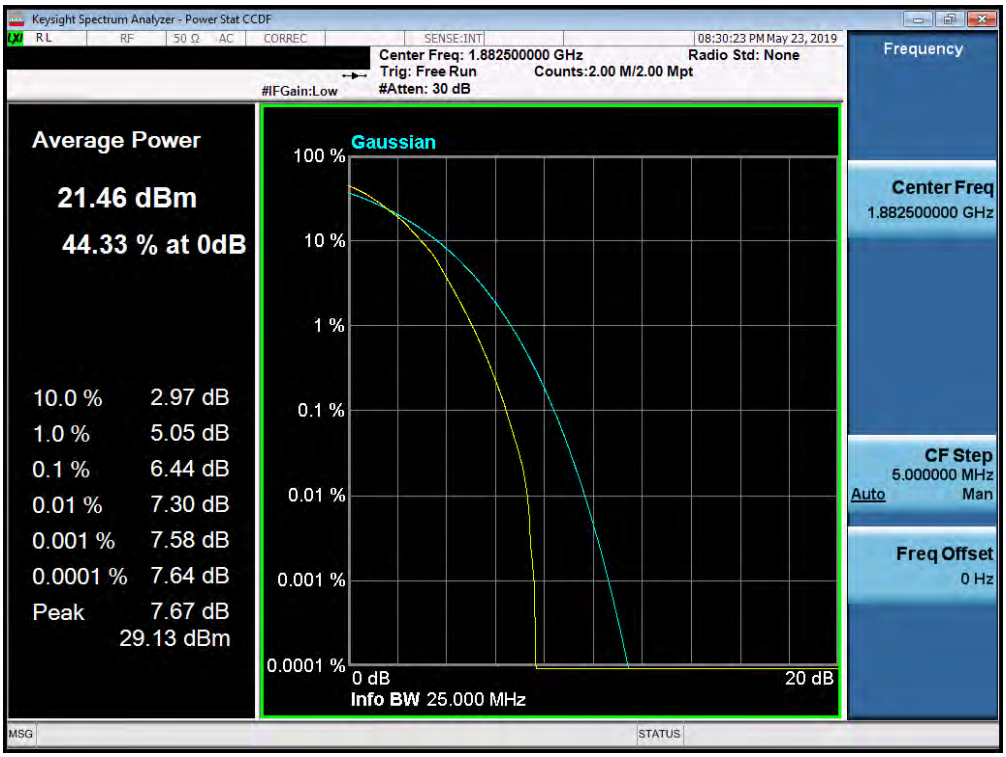
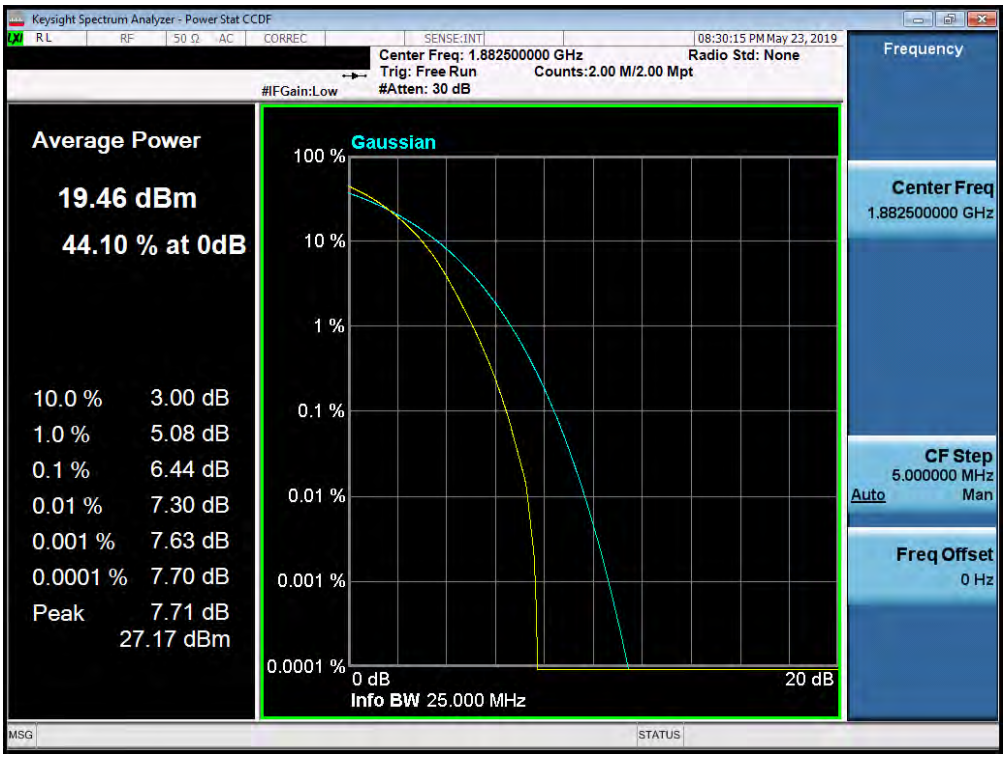


Plot 7-434. PAR Plot (Band 25/2 - 15.0MHz 64-QAM - Full RB Configuration)



Plot 7-435. PAR Plot (Band 25/2 - 15.0MHz 256-QAM - Full RB Configuration)

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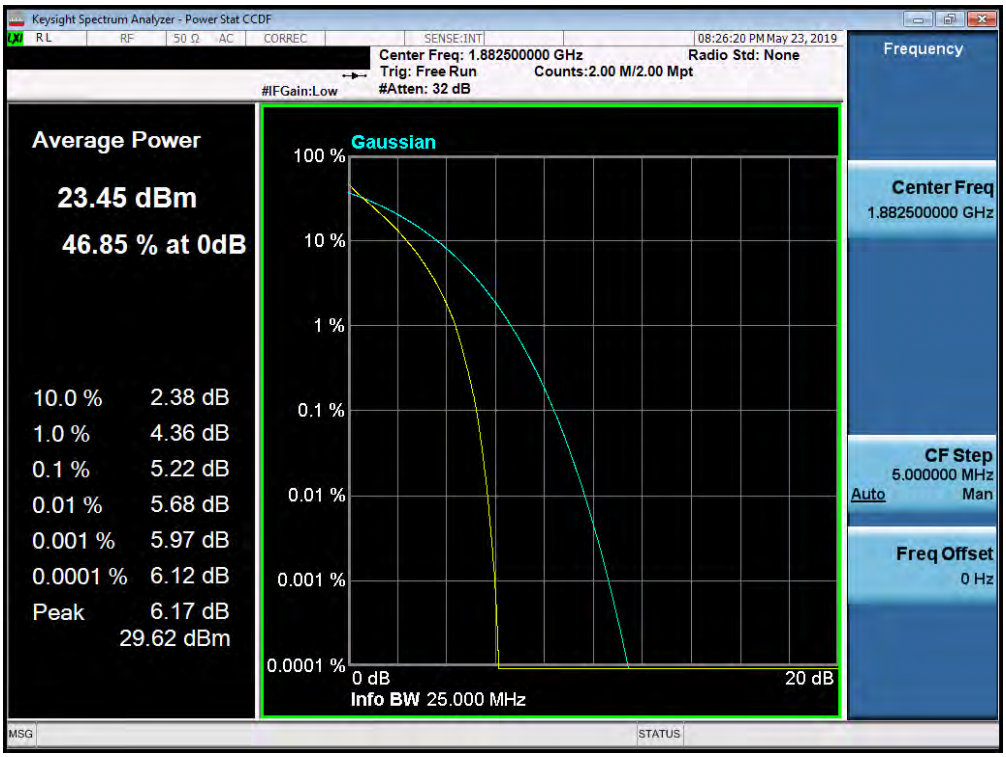
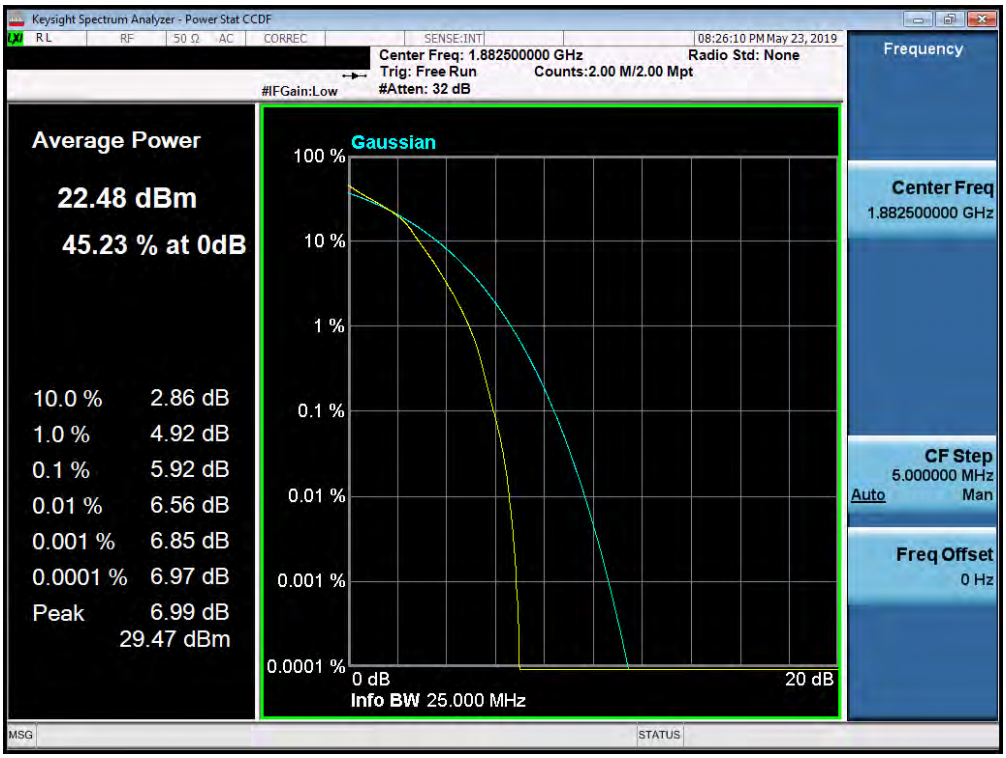


Plot 7-436. PAR Plot (Band 25/2 - 20.0MHz QPSK - Full RB Configuration)



Plot 7-437. PAR Plot (Band 25/2 - 20.0MHz 16-QAM - Full RB Configuration)

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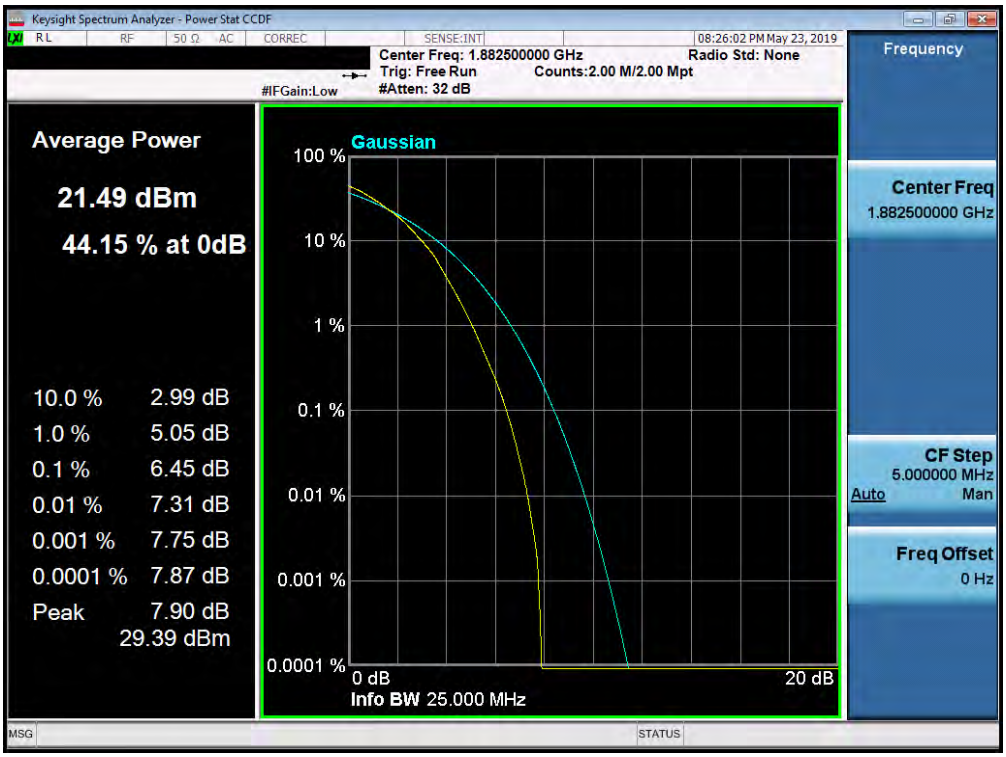
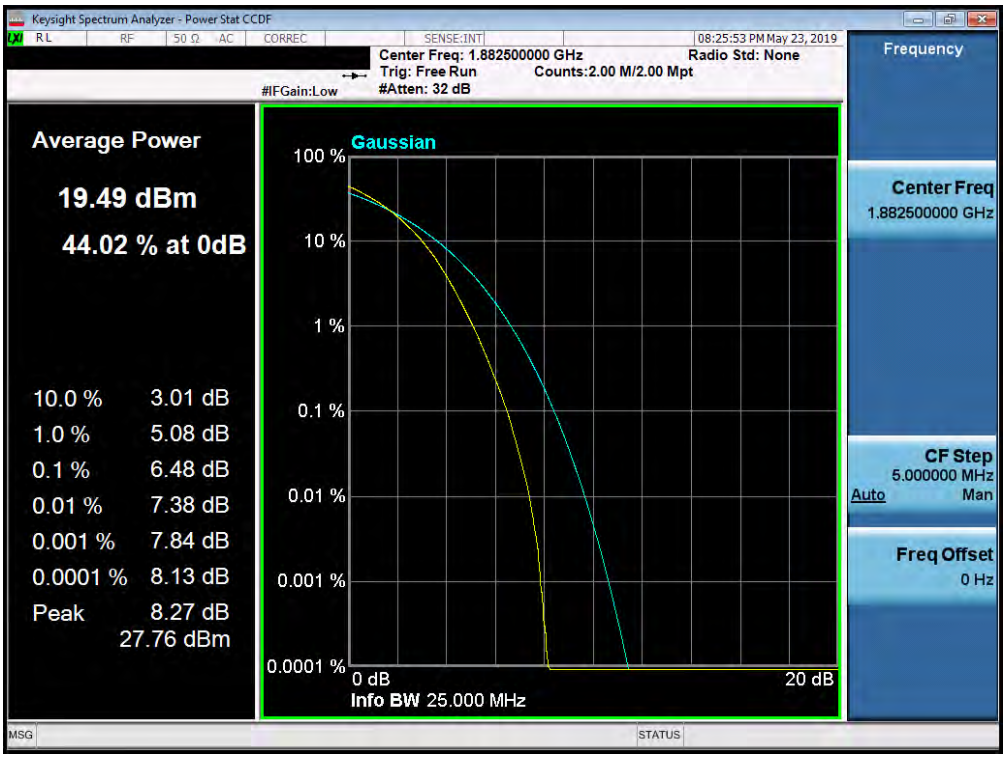


Plot 7-438. PAR Plot (Band 25/2 - 20.0MHz 64-QAM - Full RB Configuration)



Plot 7-439. PAR Plot (Band 25/2 - 20.0MHz 256-QAM - Full RB Configuration)

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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 v03r01 – 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.

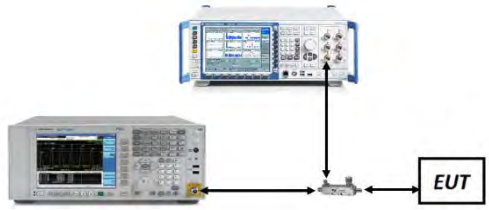

Figure 7-5. Test Instrument & Measurement Setup

Test Notes

None.

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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	01	312	530	5	39675	2498.5	QPSK	1	0	0	≤ 3	23.50
							16-QAM	1	0	≤ 1		22.69
							64-QAM	1	0	≤ 2		21.52
							256-QAM	1	0	≤ 4		18.60
2				5	39675	2498.5	QPSK	1	9	0	0	26.45
							16-QAM	1	9	≤ 1		25.71
							64-QAM	1	9	≤ 2		24.61
							256-QAM	1	9	≤ 4		21.54
3				10	39700	2501	QPSK	1	0	0	≤ 5	26.49
							16-QAM	1	0	≤ 1		25.73
							64-QAM	1	0	≤ 2		24.62
							256-QAM	1	0	≤ 4		21.54
4				10	39700	2501	QPSK	20	0	0	≤ 2	23.53
							16-QAM	20	0	≤ 1		22.53
							64-QAM	20	0	≤ 2		21.52
							256-QAM	20	0	≤ 4		19.54
5				10	39700	2501	QPSK	50	0	0	≤ 3	22.47
							16-QAM	50	0	≤ 1		21.49
							64-QAM	50	0	≤ 2		20.50
							256-QAM	50	0	≤ 4		18.52
6				10	39700	2501	QPSK	25	20	0	≤ 1	24.43
							16-QAM	25	20	≤ 1		23.48
							64-QAM	25	20	≤ 2		22.51
							256-QAM	25	20	≤ 4		20.45
7				10	39700	2501	QPSK	1	36	0	0	26.33
							16-QAM	1	36	≤ 1		25.50
							64-QAM	1	36	≤ 2		24.42
							256-QAM	1	36	≤ 4		21.30
8				15	39725	2503.5	QPSK	1	0	0	≤ 5	26.55
							16-QAM	1	0	≤ 1		25.90
							64-QAM	1	0	≤ 2		24.75
							256-QAM	1	0	≤ 4		21.67
9				15	39725	2503.5	QPSK	20	0	0	≤ 2	23.57
							16-QAM	20	0	≤ 1		22.56
							64-QAM	20	0	≤ 2		21.61
							256-QAM	20	0	≤ 4		19.63
10				15	39725	2503.5	QPSK	75	0	0	≤ 4	21.55
							16-QAM	75	0	≤ 1		20.57
							64-QAM	75	0	≤ 2		19.58
							256-QAM	75	0	≤ 4		17.58
11				15	39725	2503.5	QPSK	50	15	0	≤ 3	22.56
							16-QAM	50	15	≤ 1		21.58
							64-QAM	50	15	≤ 2		20.60
							256-QAM	50	15	≤ 4		18.62
12				15	39725	2503.5	QPSK	1	60	0	0	26.46
							16-QAM	1	60	≤ 1		25.68
							64-QAM	1	60	≤ 2		24.51
							256-QAM	1	60	≤ 4		21.51
13				20	39750	2506	QPSK	1	0	0	≤ 5	26.64
							16-QAM	1	0	≤ 1		25.86
							64-QAM	1	0	≤ 2		24.70
							256-QAM	1	0	≤ 4		21.68
14				20	39750	2506	QPSK	20	0	0	≤ 2	23.59
							16-QAM	20	0	≤ 1		22.50
							64-QAM	20	0	≤ 2		21.60
							256-QAM	20	0	≤ 4		19.61
15				20	39750	2506	QPSK	100	0	0	≤ 4	21.57
							16-QAM	100	0	≤ 1		20.70
							64-QAM	100	0	≤ 2		19.58
							256-QAM	100	0	≤ 4		17.58
16				20	39750	2506	QPSK	75	24	0	≤ 3	22.54
							16-QAM	75	24	≤ 1		21.56
							64-QAM	75	24	≤ 2		20.57
							256-QAM	75	24	≤ 4		18.57
17				20	39750	2506	QPSK	1	77	0	0	26.64
							16-QAM	1	77	≤ 1		25.79
							64-QAM	1	77	≤ 2		24.6
							256-QAM	1	77	≤ 4		21.61
18	01	310	120	5	39675	2498.5	QPSK	1	0	0	≤ 3	23.47
							16-QAM			≤ 1		22.6
							64-QAM			≤ 2		21.62
							256-QAM			≤ 4		18.63
19	01	001	01	5	39675	2498.5	QPSK	1	0	0	0	26.53
							16-QAM			≤ 1		25.72
							64-QAM			≤ 2		24.51
							256-QAM			≤ 4		21.55

Table 7-3. A-MPR Conducted Power Measurements

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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 + 10 $\log_{10}(P_{[Watts]})$.

Test Procedure Used

KDB 971168 D01 v03r01 – Section 6.0

Test Settings

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

Test Setup

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

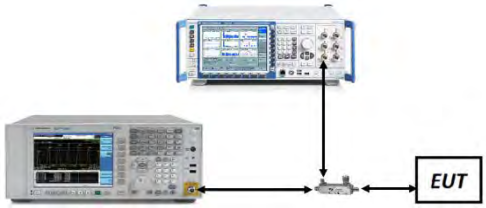

Figure 7-6. Test Instrument & Measurement Setup

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Test Notes

1. For Band 41, 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.

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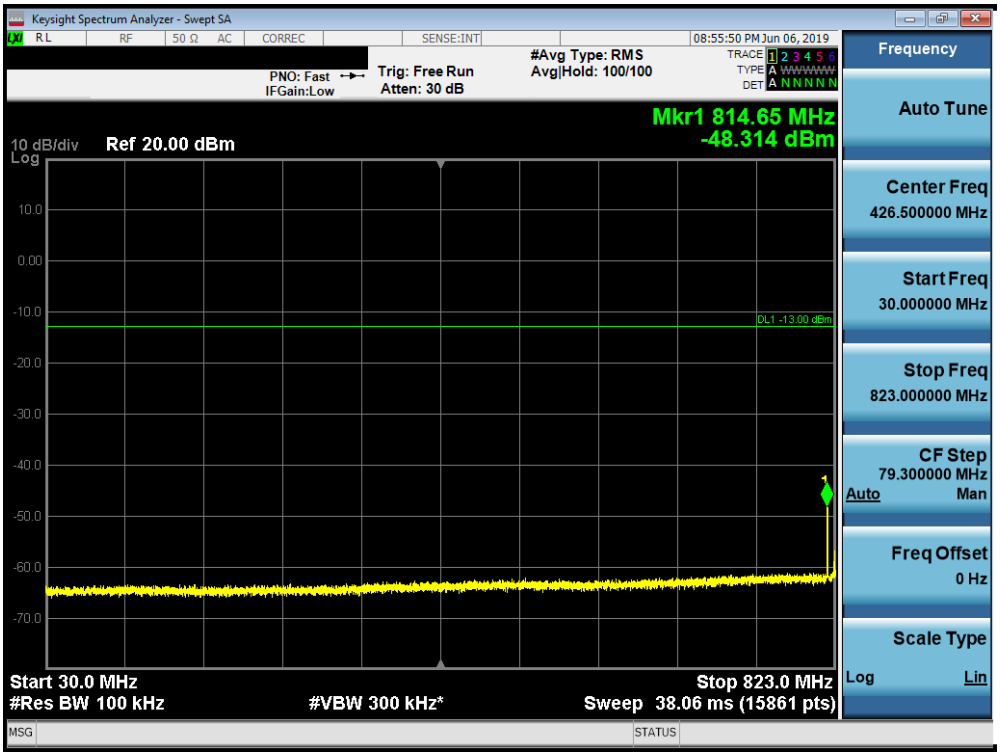
Uplink CA Configuration 5B

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	SCC UL# RB	SCC UL RB Offset	ULCA Tx.Power (dBm)
Max	LTE B41	20	39750	2506	QPSK	1	99	LTE B41	20	39948	2525.8	QPSK	1	0	27.21
Max	LTE B41	20	40620	2593	QPSK	1	99	LTE B41	20	40818	2612.8	QPSK	1	0	27.17
Max	LTE B41	20	41490	2680	QPSK	1	0	LTE B41	20	41292	2660.2	QPSK	1	99	27.33

Table 7-4. Conducted Powers (B5 – PCC/SCC: RB Size 1)

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	SCC UL# RB	SCC UL RB Offset	ULCA Tx.Power (dBm)
Max	LTE B41	20	41490	2680	QPSK	100	0	LTE B41	20	41292	2660.2	QPSK	100	0	24.81
Max	LTE B41	20	41490	2680	16-QAM	100	0	LTE B41	20	41292	2660.2	16-QAM	100	0	23.74
Max	LTE B41	20	41490	2680	64-QAM	100	0	LTE B41	20	41292	2660.2	64-QAM	100	0	22.91
Max	LTE B41	20	41490	2680	256-QAM	100	0	LTE B41	20	41292	2660.2	256-QAM	100	0	21.63

Table 7-5. Conducted Powers (B5 with Various Combinations for 10MHz Channel Bandwidth)



Plot 7-440. Conducted Spurious Plot (Band 5 – 10.0MHz QPSK – PCC 1/49 SCC 1/0 – Low Channel)

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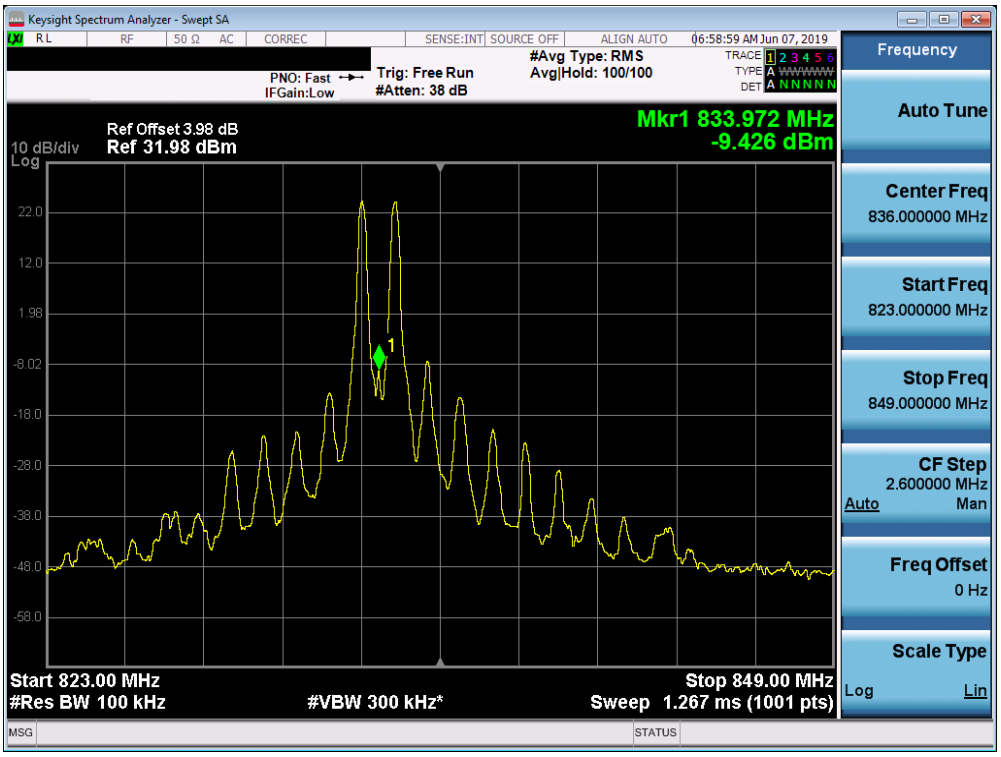
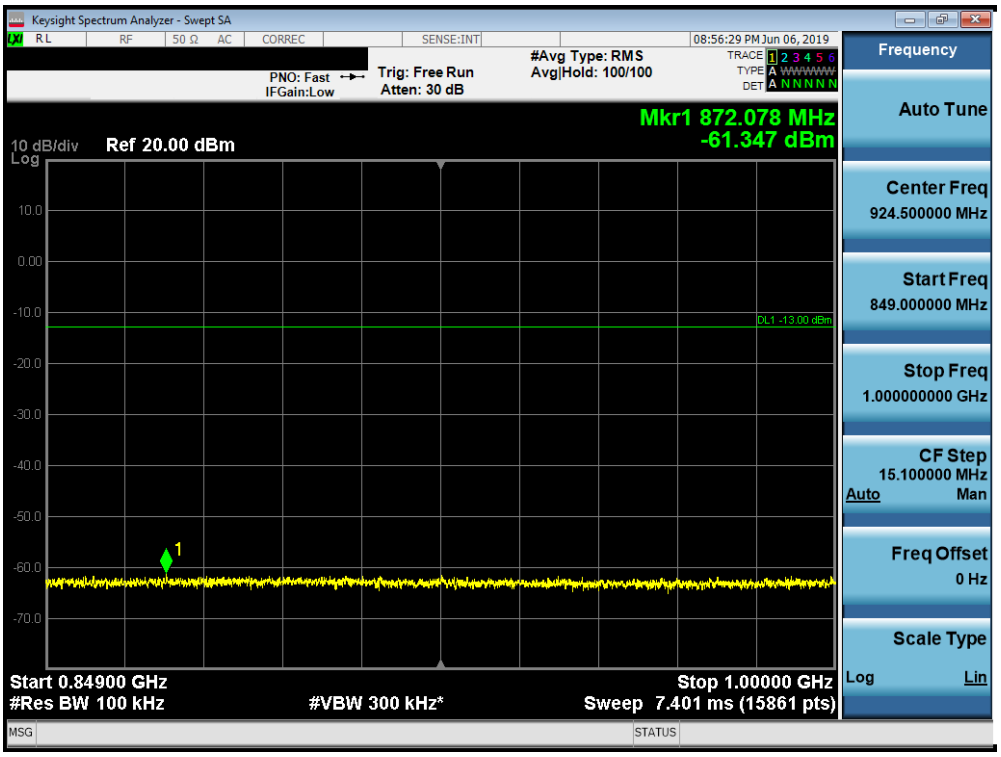


Plot 7-441. Conducted Spurious Plot (Band 5 – 10.0MHz QPSK – PCC 1/49 SCC 1/0 – Low Channel)



Plot 7-442. Conducted Spurious Plot (Band 5 – 10.0MHz QPSK – PCC 1/49 SCC 1/0 – Low Channel)

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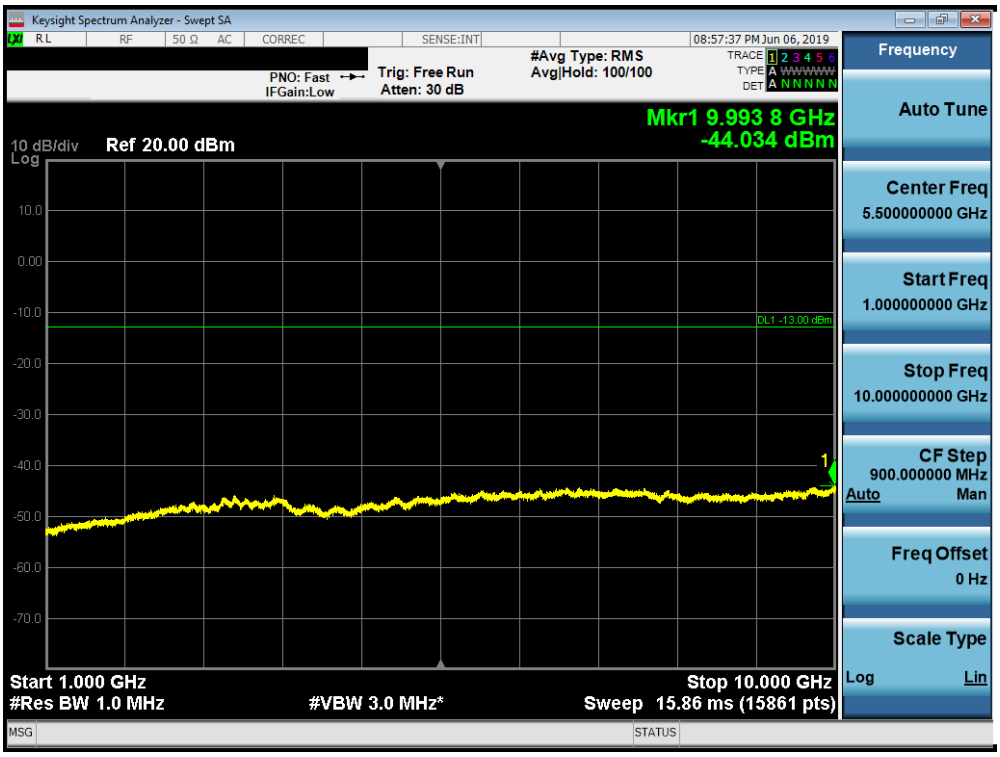
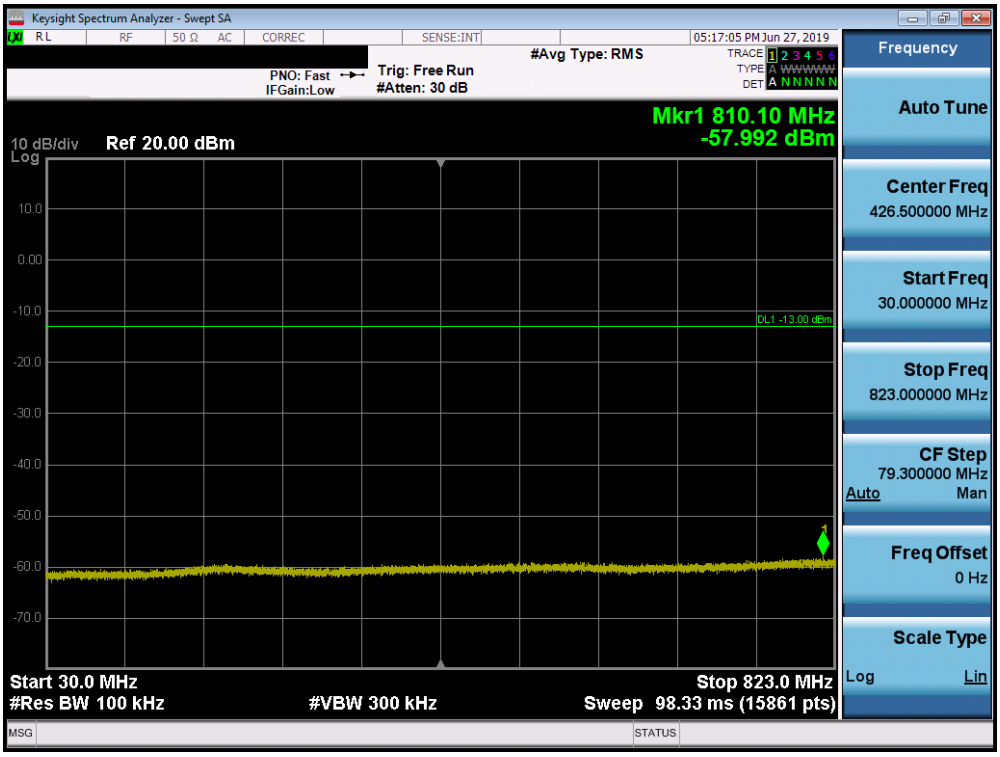


Plot 7-443. Conducted Spurious Plot (Band 5 – 10.0MHz QPSK – PCC 1/49 SCC 1/0 – Low Channel)



Plot 7-444. Conducted Spurious Plot (Band 5 – 10.0MHz QPSK – PCC 1/49 SCC 1/0 – Mid Channel)

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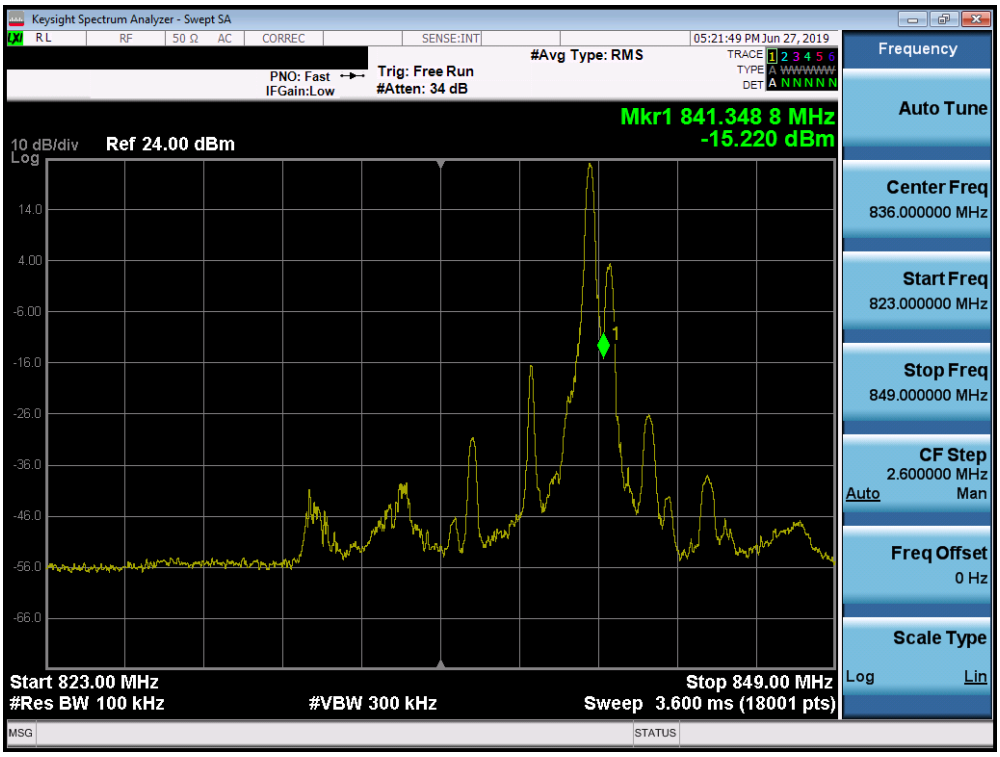
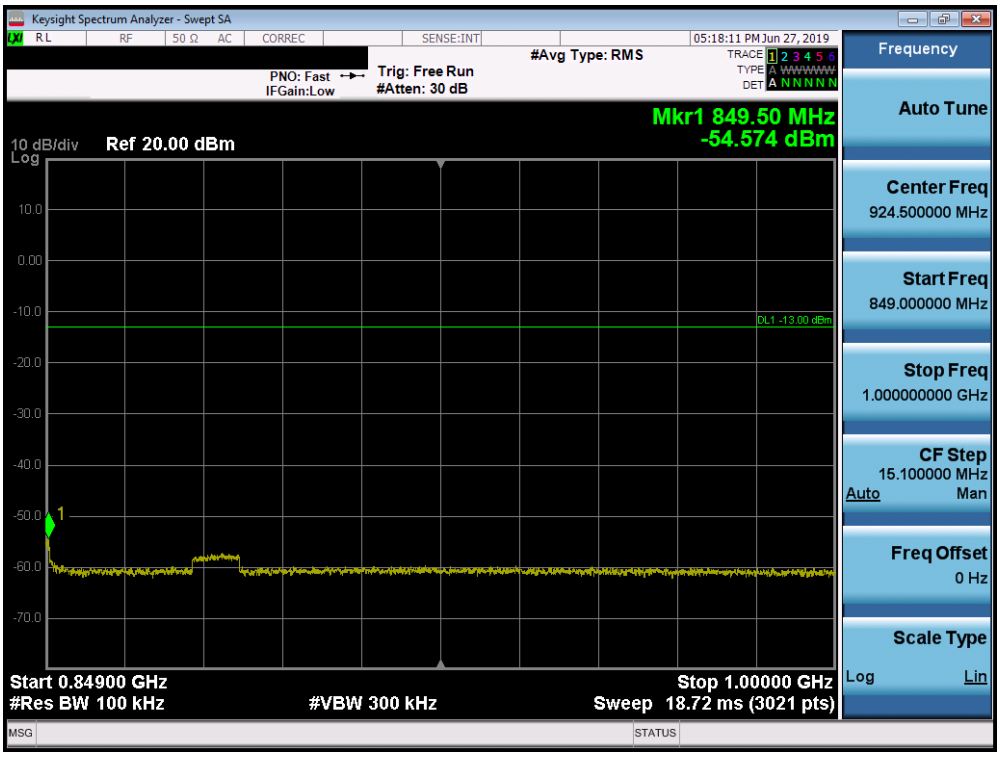


Plot 7-445. Conducted Spurious Plot (Band 5 – 10.0MHz QPSK – PCC 1/49 SCC 1/0 – Mid Channel)



Plot 7-446. Conducted Spurious Plot (Band 5 – 10.0MHz QPSK – PCC 1/49 SCC 1/0 – Mid Channel)

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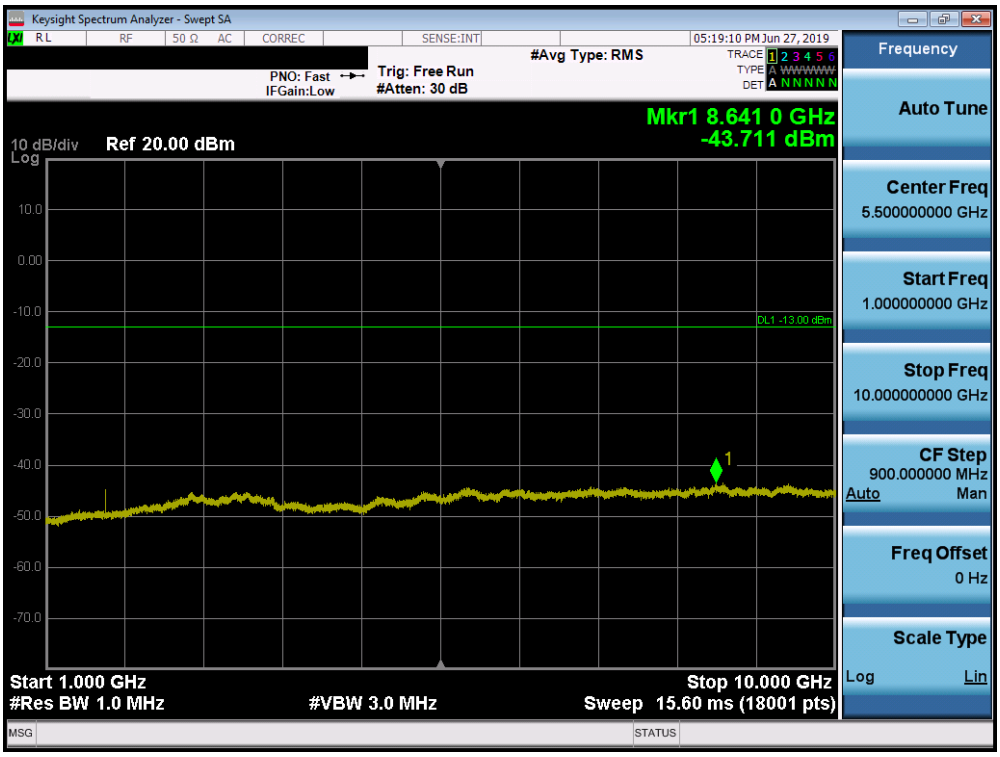
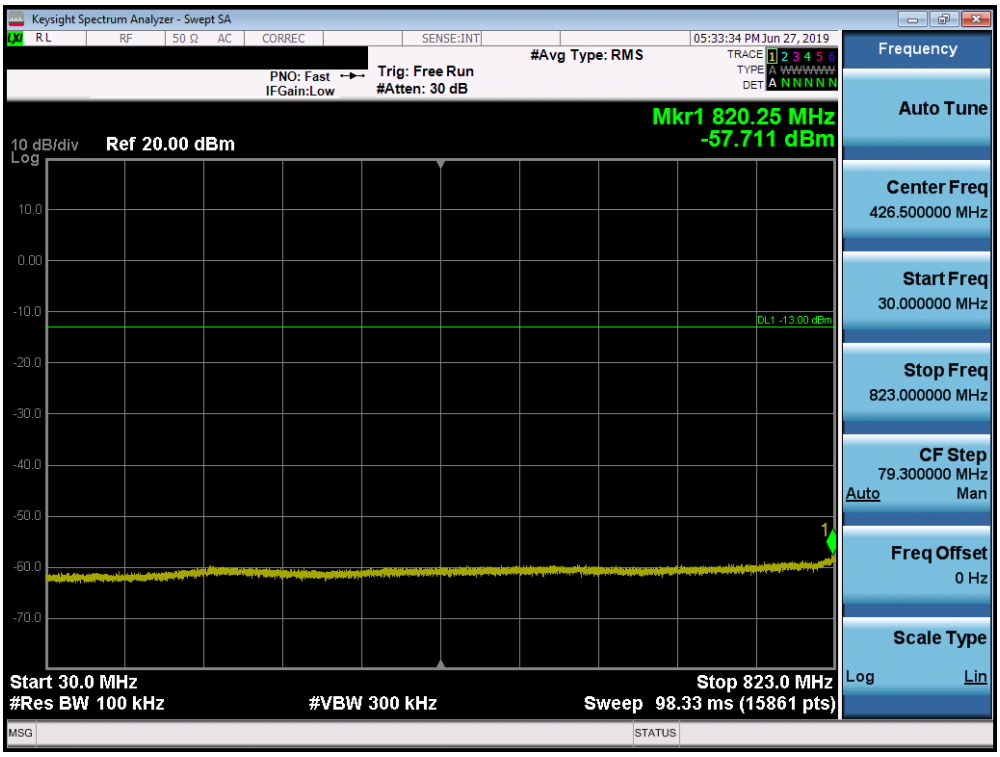


Plot 7-447. Conducted Spurious Plot (Band 5 – 10.0MHz QPSK – PCC 1/49 SCC 1/0 – Mid Channel)



Plot 7-448. Conducted Spurious Plot (Band 5 – 10.0MHz QPSK – PCC 1/0 SCC 1/49 – High Channel)

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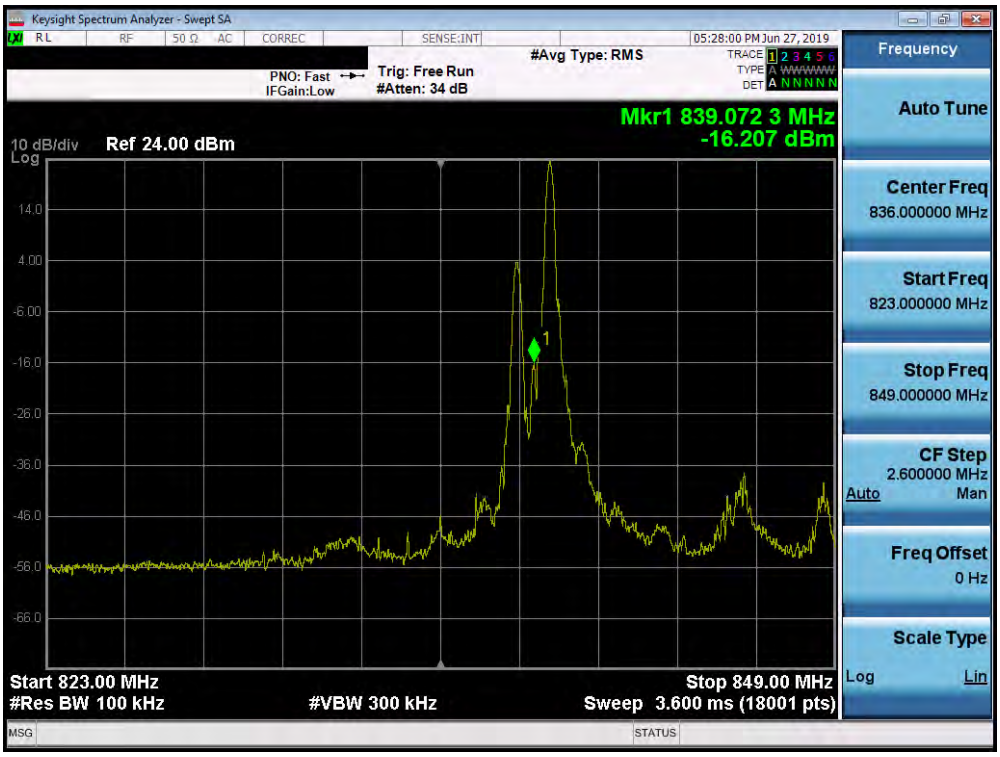
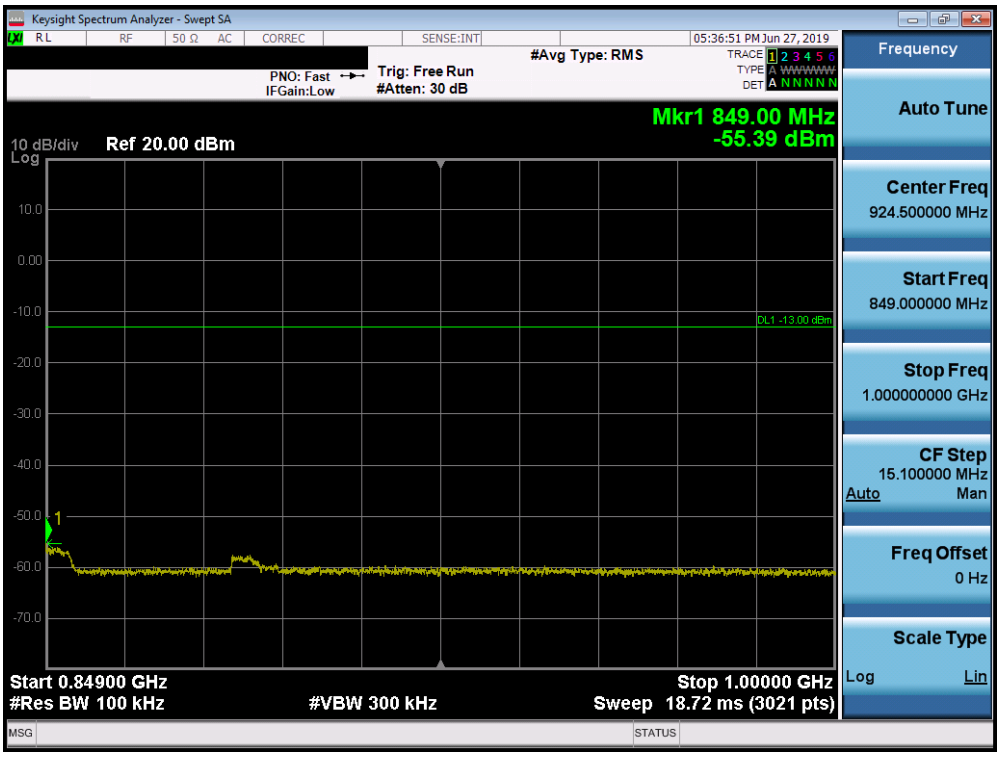


Plot 7-449. Conducted Spurious Plot (Band 5 – 10.0MHz QPSK – PCC 1/0 SCC 1/49 – High Channel)



Plot 7-450. Conducted Spurious Plot (Band 5 – 10.0MHz QPSK – PCC 1/0 SCC 1/49 – High Channel)

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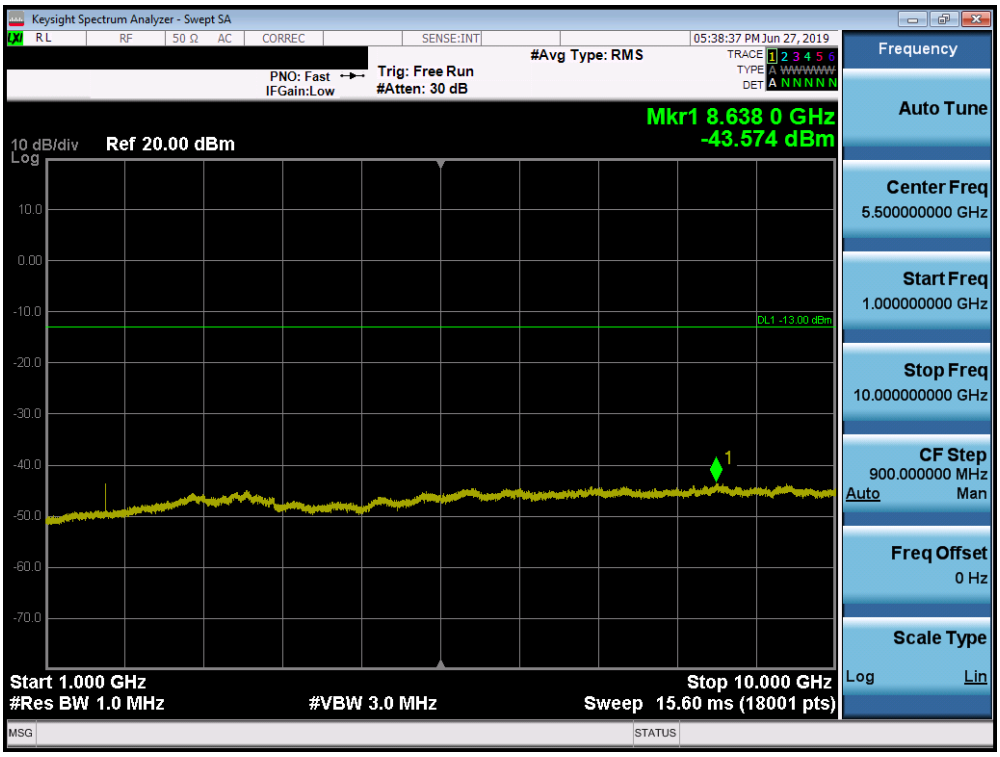
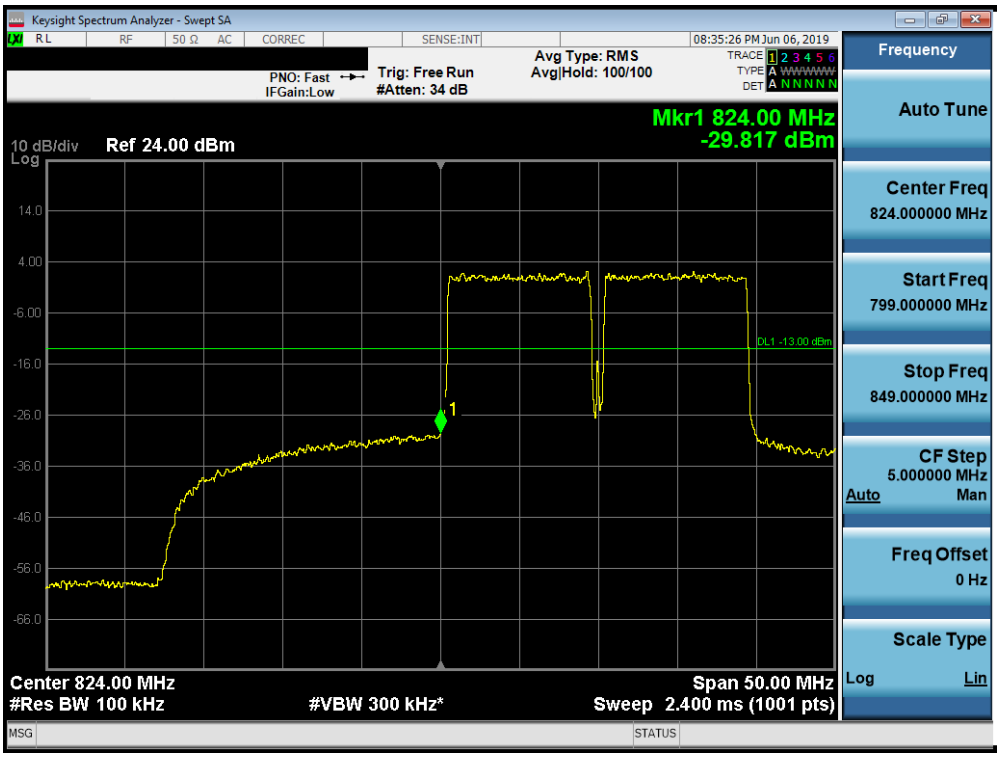


Plot 7-451. Conducted Spurious Plot (Band 5 – 10.0MHz QPSK – PCC 1/0 SCC 1/49 – High Channel)



Plot 7-452. Lower Band Edge Plot (Band 5 QPSK – PCC:10 MHz SCC:10 MHz – Full RB)

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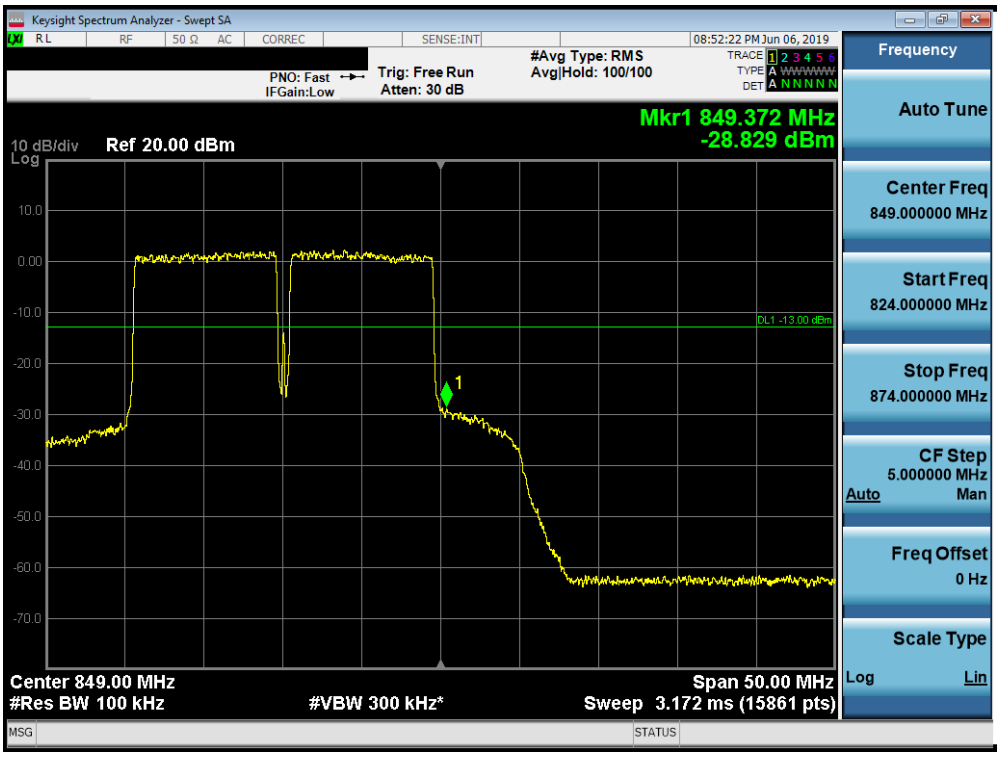

Plot 7-453. Upper Band Edge Plot (Band 5 QPSK – PCC:10 MHz SCC:10 MHz – Full RB)

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Uplink CA Configuration 66B/C

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	SCC UL# RB	SCC UL RB Offset	ULCA Tx.Power (dBm)
Max	LTE B66	20	132072	1720	QPSK	1	99	LTE B66	20	132270	1739.8	QPSK	1	0	23.13
Max	LTE B66	20	132322	1745	QPSK	1	99	LTE B66	20	132520	1764.8	QPSK	1	0	23.71
Max	LTE B66	20	132572	1770	QPSK	1	0	LTE B66	20	132374	1750.2	QPSK	1	99	24.11

Table 7-6. Conducted Powers (B66 – 20MHz + 20MHz Channel Bandwidth – PCC/SCC: RB Size 1)

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	SCC UL# RB	SCC UL RB Offset	ULCA Tx.Power (dBm)
Max	LTE B66	20	132572	1770	QPSK	100	0	LTE B66	20	132374	1750.2	QPSK	100	0	22.71
Max	LTE B66	20	132572	1770	16QAM	100	0	LTE B66	20	132374	1750.2	16QAM	100	0	21.86
Max	LTE B66	20	132572	1770	64QAM	100	0	LTE B66	20	132374	1750.2	64QAM	100	0	20.93
Max	LTE B66	20	132572	1770	256QAM	100	0	LTE B66	20	132374	1750.2	256QAM	100	0	19.92

Table 7-7. Conducted Powers (B66 with Various Combinations for 20MHz + 20MHz Channel Bandwidth)

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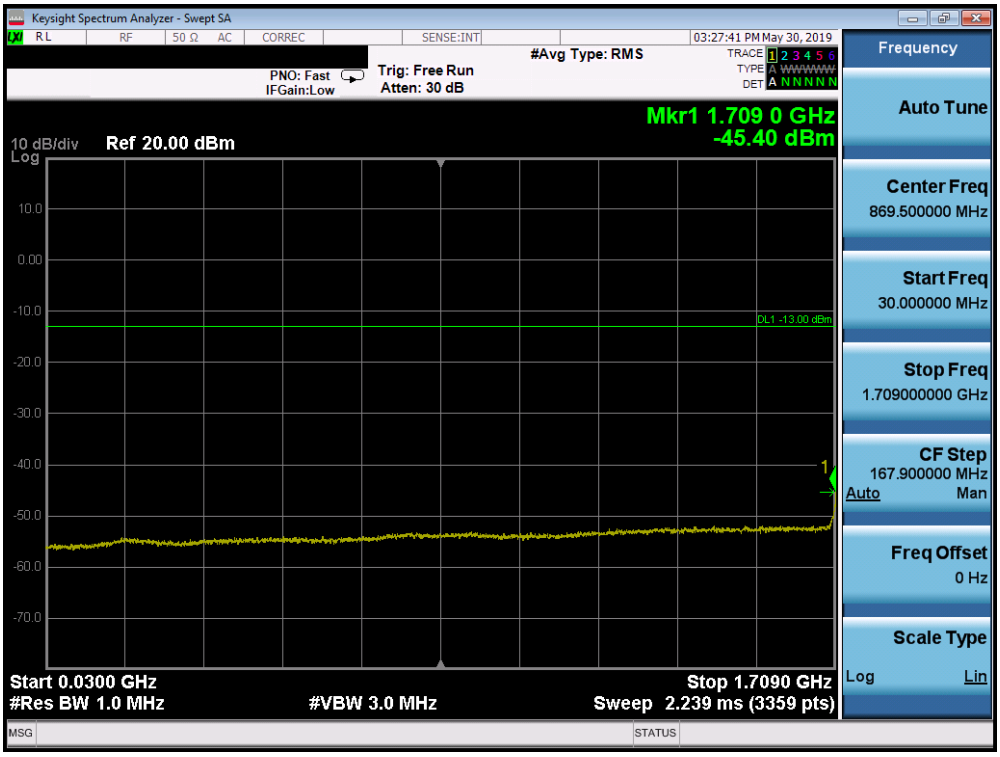

Plot 7-454. Conducted Spurious Plot (Band 66 – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Low Channel)

Plot 7-455. Conducted Spurious Plot (Band 66 – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Low Channel)

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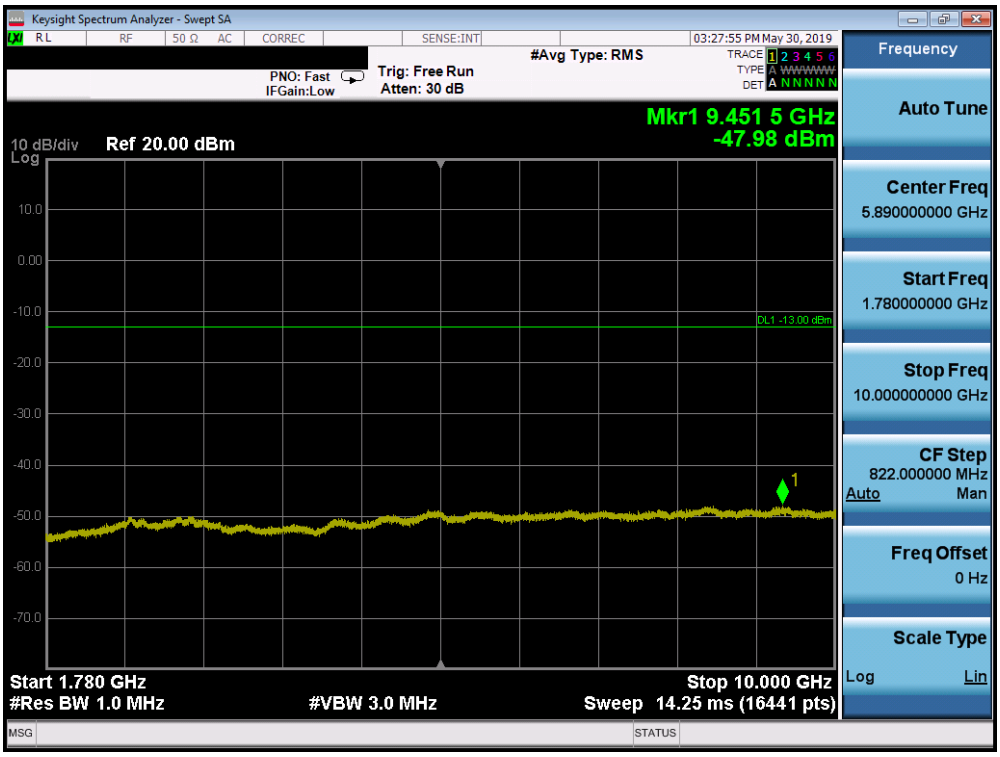
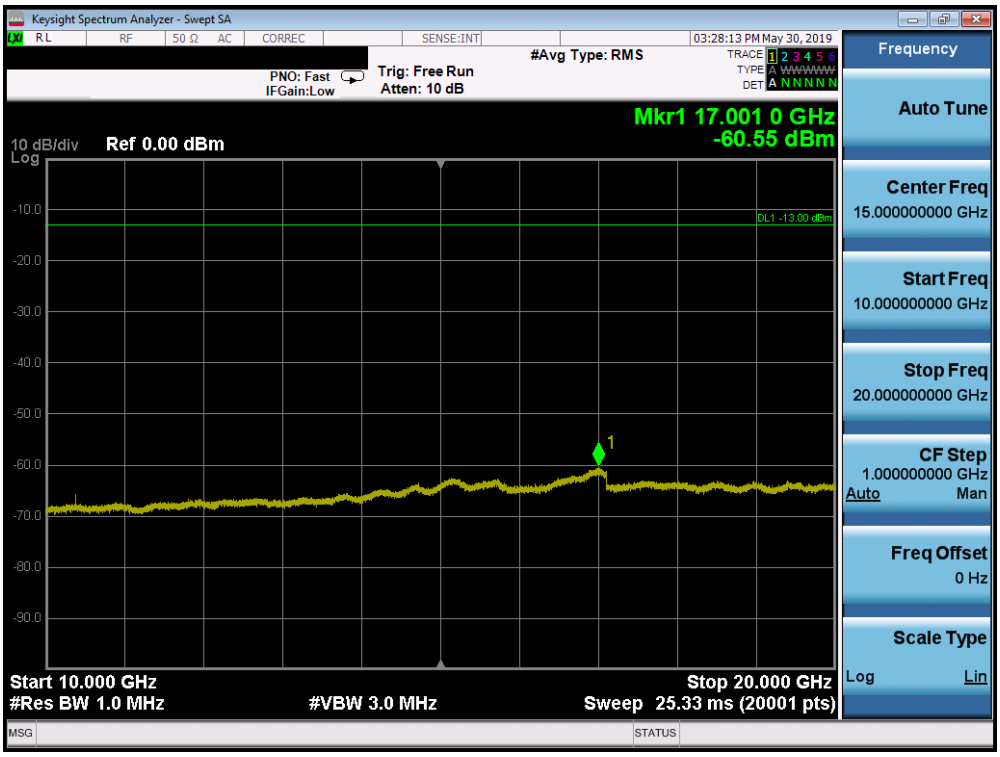


Plot 7-456. Conducted Spurious Plot (Band 66 – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Low Channel)



Plot 7-457. Conducted Spurious Plot (Band 66 – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Low Channel)

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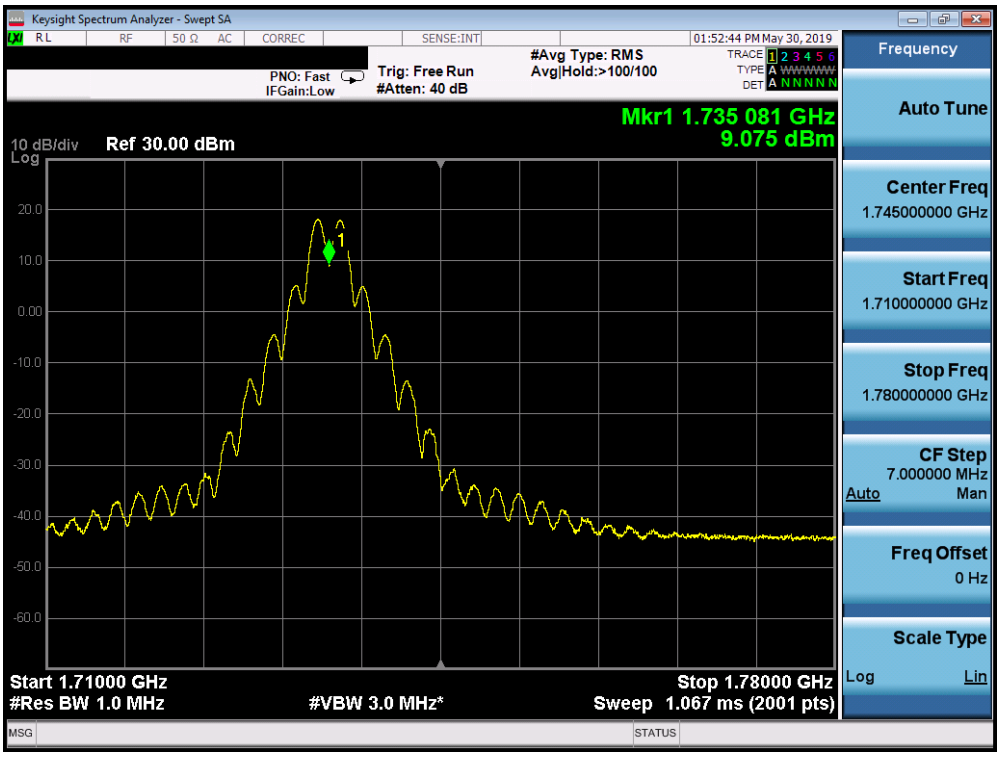
Plot 7-458. Conducted Spurious Plot (Band 66 – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Mid Channel)



Plot 7-459. Conducted Spurious Plot (Band 66 – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Mid Channel)

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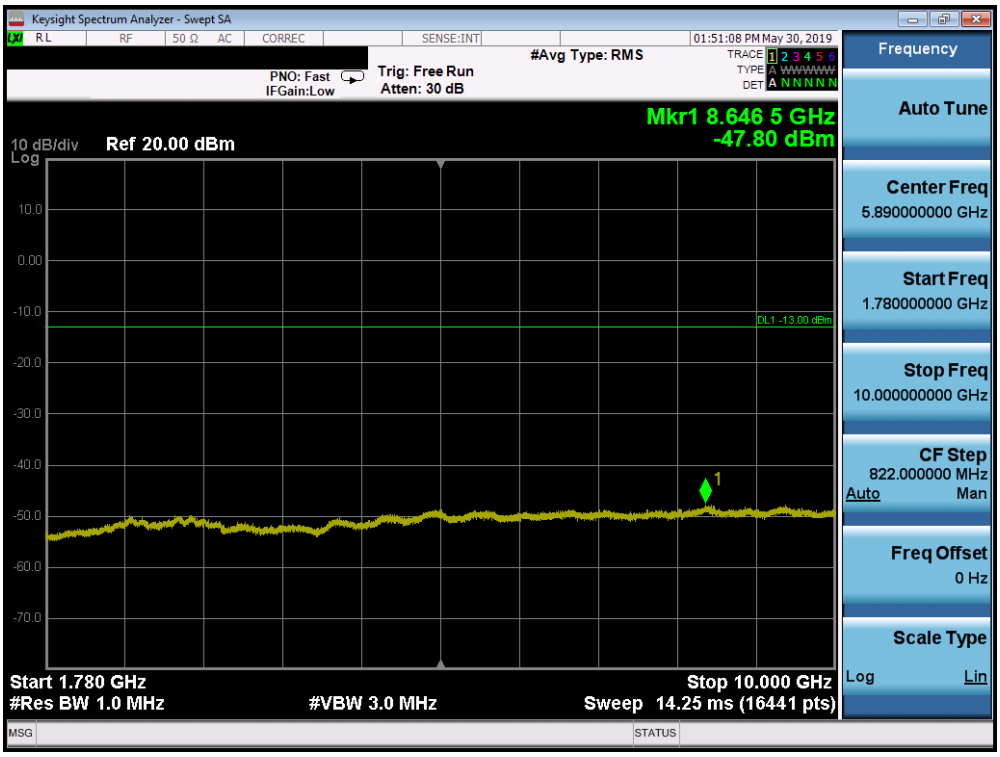
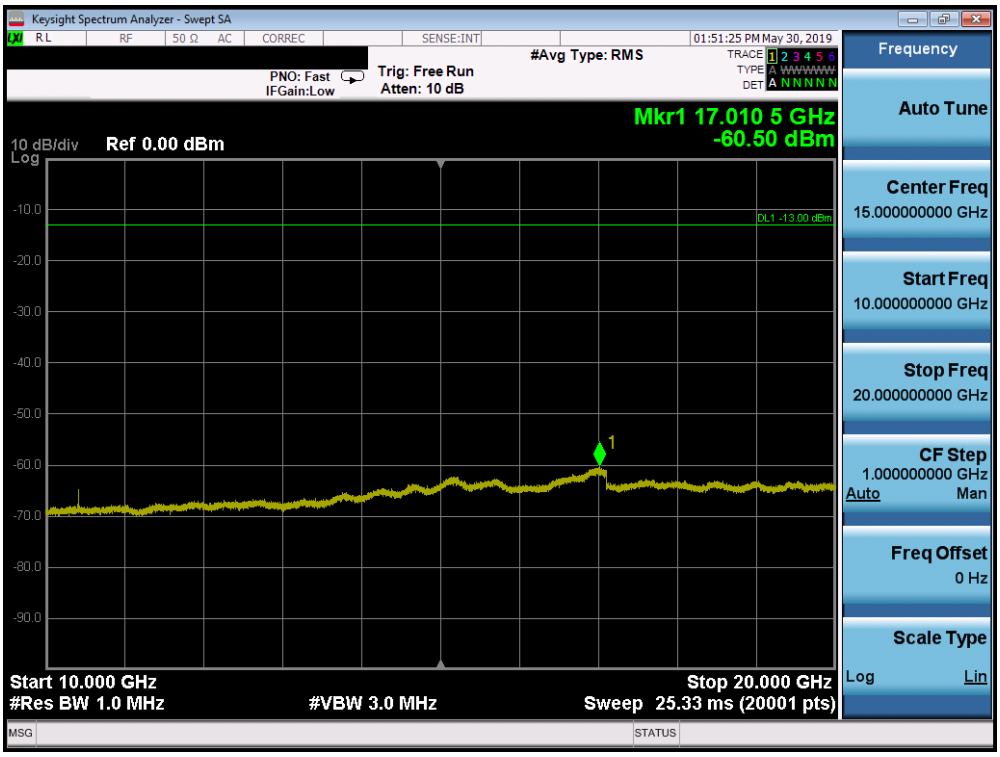


Plot 7-460. Conducted Spurious Plot (Band 66 – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Mid Channel)



Plot 7-461. Conducted Spurious Plot (Band 66 – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Mid Channel)

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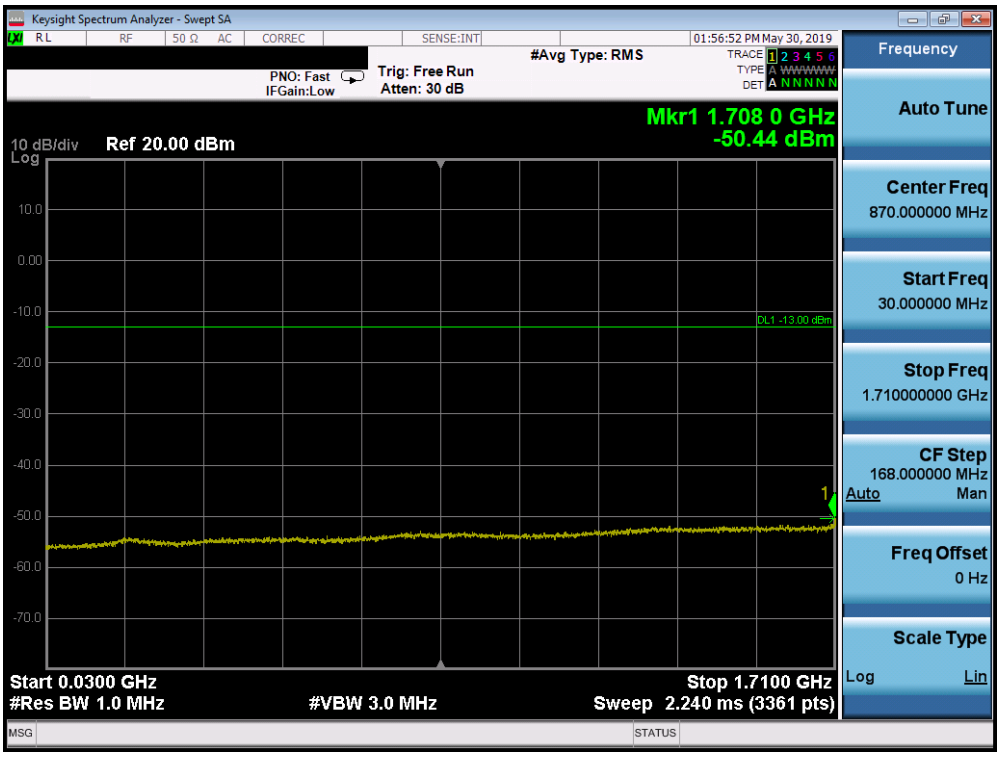
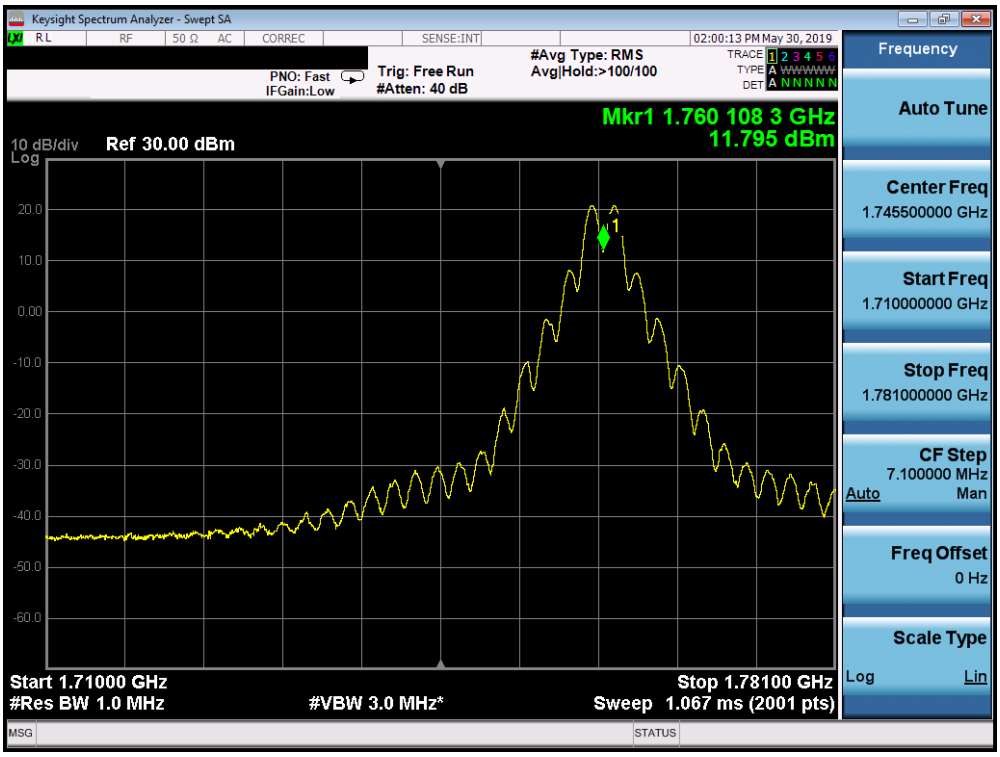


Plot 7-462. Conducted Spurious Plot (Band 66 – 20.0MHz QPSK – PCC 1/0 SCC 1/99 – High Channel)



Plot 7-463. Conducted Spurious Plot (Band 66 – 20.0MHz QPSK – PCC 1/0 SCC 1/99 – High Channel)

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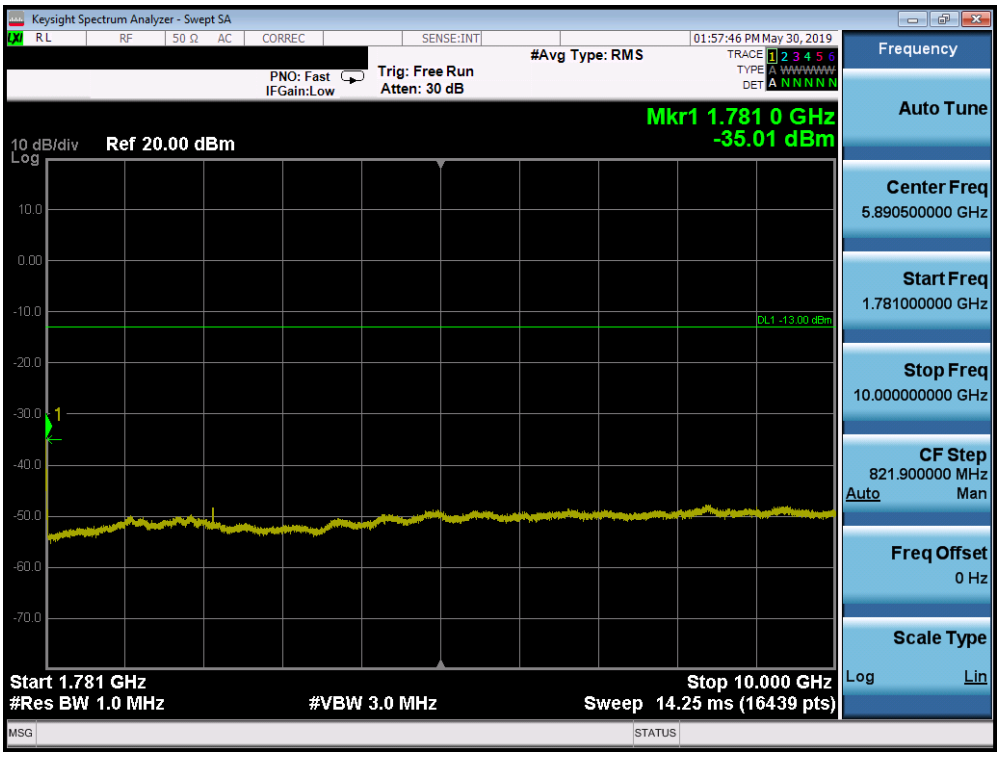
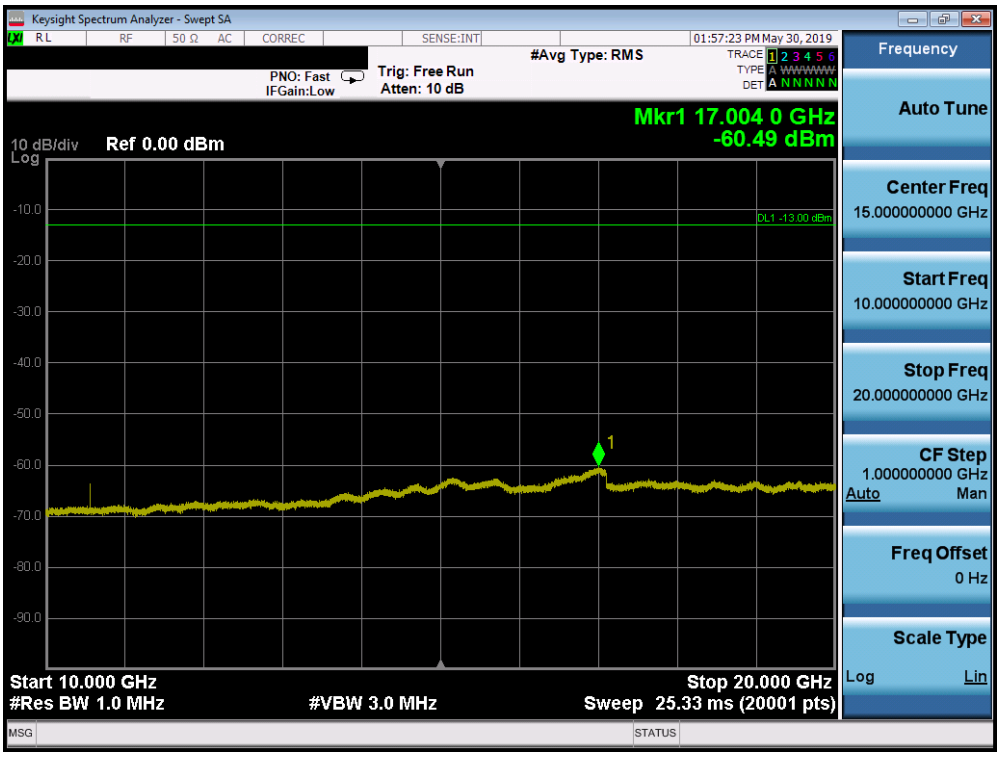


Plot 7-464. Conducted Spurious Plot (Band 66 – 20.0MHz QPSK – PCC 1/0 SCC 1/99 – High Channel)



Plot 7-465. Conducted Spurious Plot (Band 66 – 20.0MHz QPSK – PCC 1/0 SCC 1/99 – High Channel)

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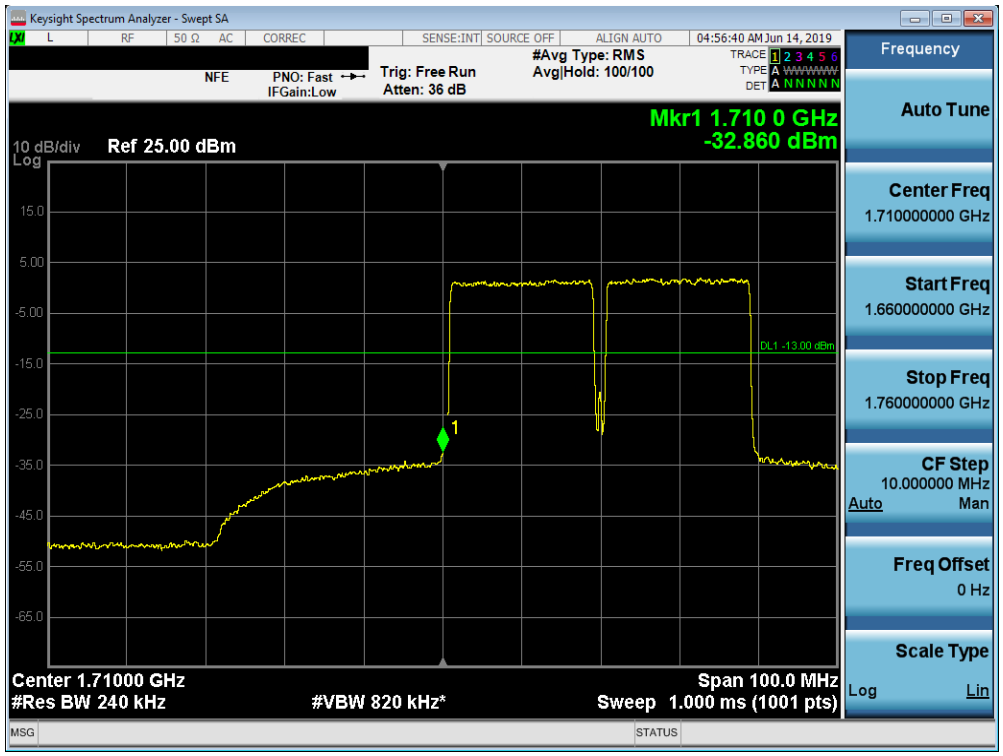
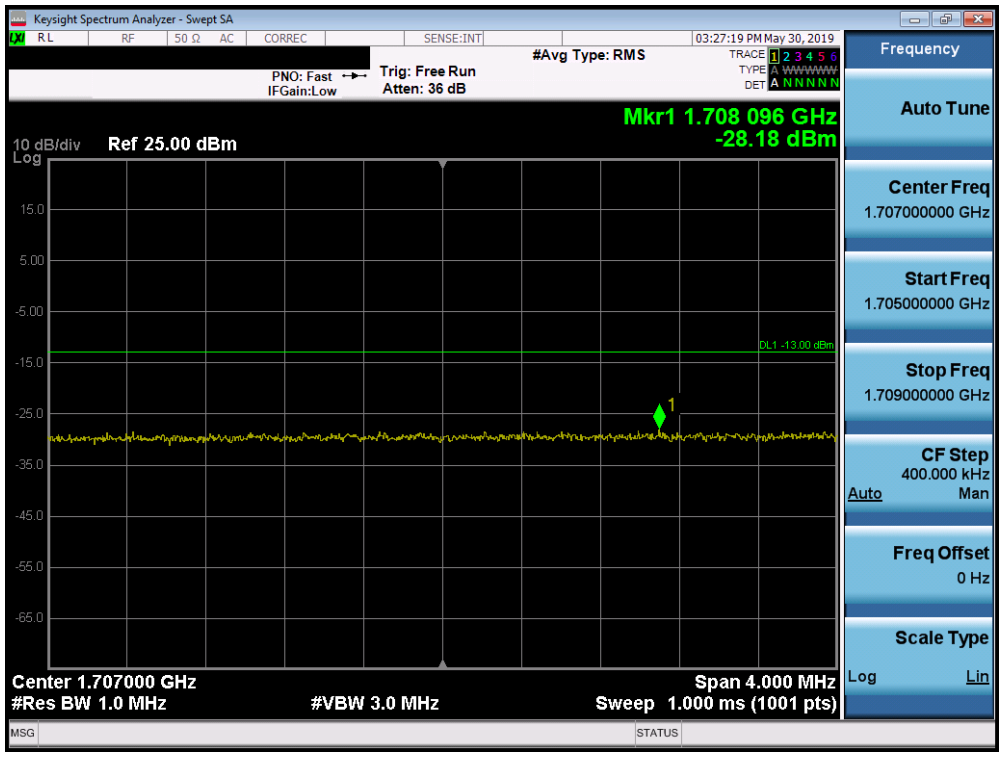


Plot 7-466. Lower Band Edge Plot (Band 66 QPSK – PCC:20 MHz SCC:20 MHz – Full RB)



Plot 7-467. Extended Lower Band Edge Plot (Band 66 QPSK – PCC:20 MHz SCC:20 MHz – Full RB)

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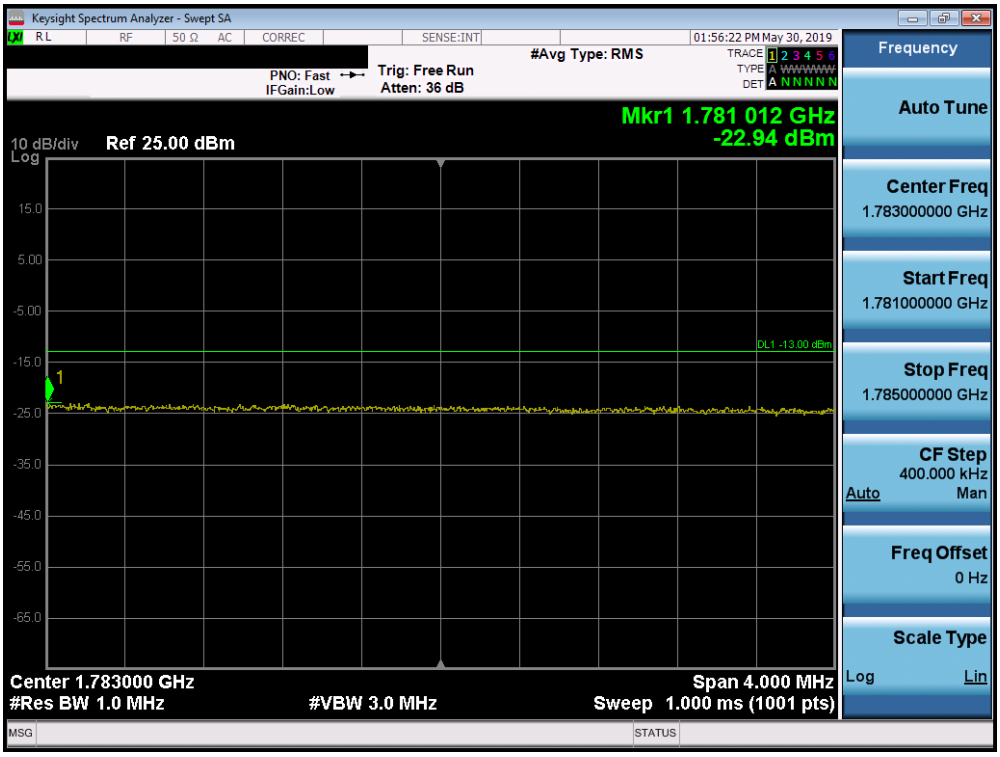
Plot 7-468. Upper Band Edge Plot (Band 66 QPSK – PCC:20 MHz SCC:20 MHz – Full RB)



Plot 7-469. Extended Upper Band Edge Plot (Band 66 QPSK – PCC:20 MHz SCC:20 MHz – Full RB)

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Uplink CA Configuration B41 (PC3)

Power State	PCC							SCC							Power
	PCC Band	PCC Bandwidth [MHz]	PCC (UL) Channel	PCC (UL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	SCC Band	SCC Bandwidth [MHz]	SCC (UL) Channel	SCC (UL) Frequency [MHz]	Modulation	SCC UL# RB	SCC UL RB Offset	ULCA Tx.Power (dBm)
Max	LTE B41	20	39750	2506	QPSK	1	99	LTE B41	20	39948	2525.8	QPSK	1	0	24.30
Max	LTE B41	20	40620	2593	QPSK	1	99	LTE B41	20	40818	2612.8	QPSK	1	0	24.47
Max	LTE B41	20	41490	2680	QPSK	1	0	LTE B41	20	41292	2660.2	QPSK	1	99	24.24

Table 7-8. Conducted Powers (B41 (PC3) – 20MHz + 20MHz Channel Bandwidth - PCC/SCC: 1RB)

Power State	PCC							SCC							Power
	PCC Band	PCC Bandwidth [MHz]	PCC (UL) Channel	PCC (UL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	SCC Band	SCC Bandwidth [MHz]	SCC (UL) Channel	SCC (UL) Frequency [MHz]	Modulation	SCC UL# RB	SCC UL RB Offset	ULCA Tx.Power (dBm)
Max	LTE B41	20	40620	2593	QPSK	100	0	LTE B41	20	40818	2612.8	QPSK	100	0	23.47
Max	LTE B41	20	40620	2593	16-QAM	100	0	LTE B41	20	40818	2612.8	16-QAM	100	0	21.79
Max	LTE B41	20	40620	2593	64-QAM	100	0	LTE B41	20	40818	2612.8	64-QAM	100	0	21.26
Max	LTE B41	20	40620	2593	256-QAM	100	0	LTE B41	20	40818	2612.8	256-QAM	100	0	19.41

Table 7-9. Conducted Powers (B41 (PC3) with Various Combinations for 20MHz + 20MHz Channel Bandwidth)

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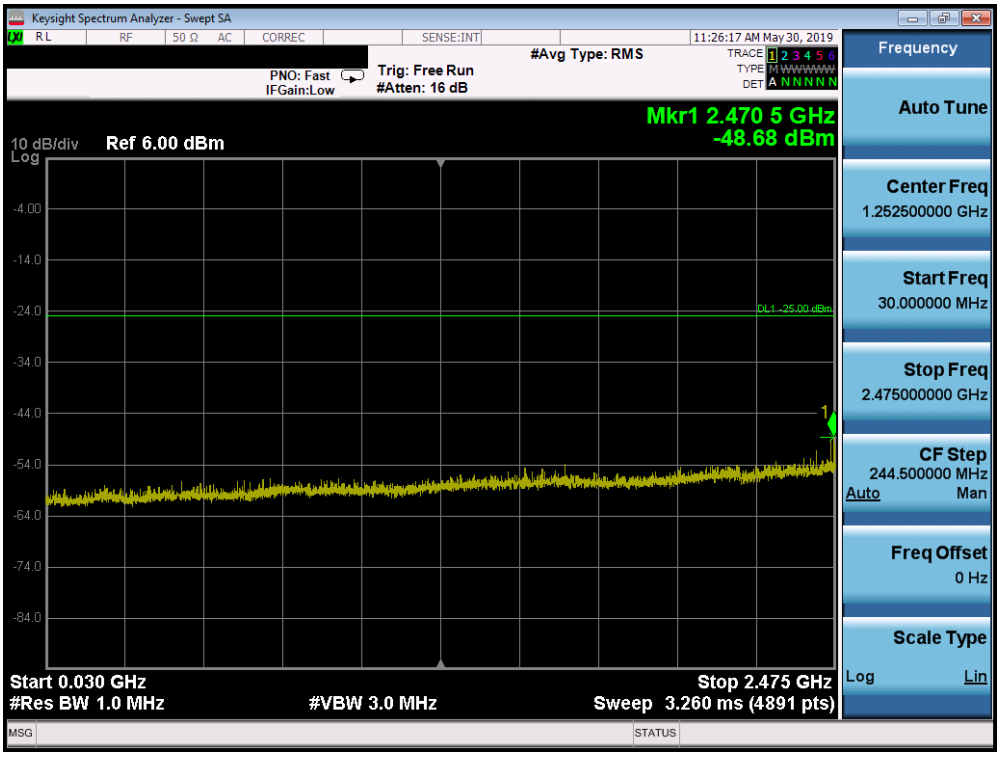
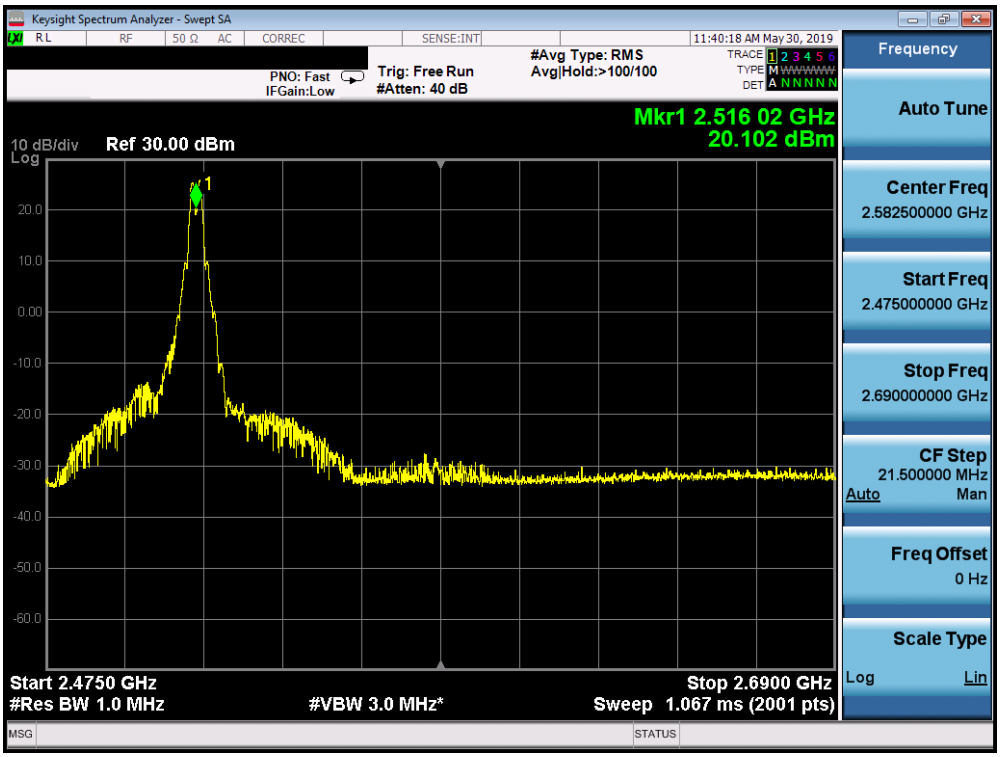


Plot 7-470. Conducted Spurious Plot (Band 41 (PC3) – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Low Channel)



Plot 7-471. Conducted Spurious Plot (Band 41 (PC3) – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Low Channel)

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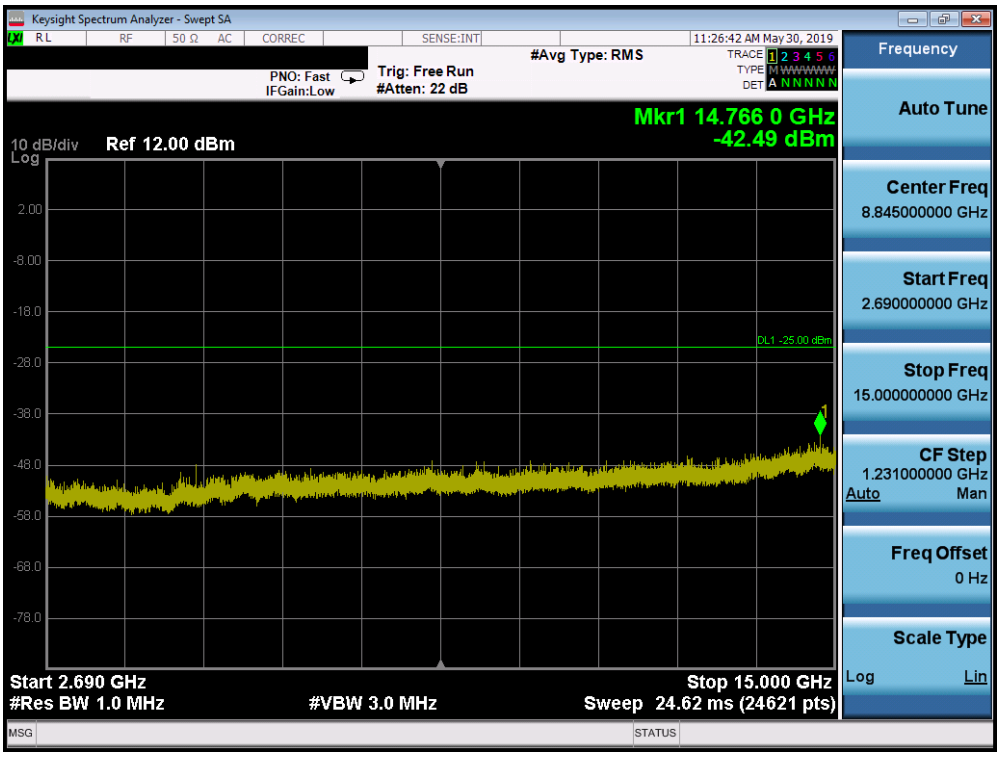
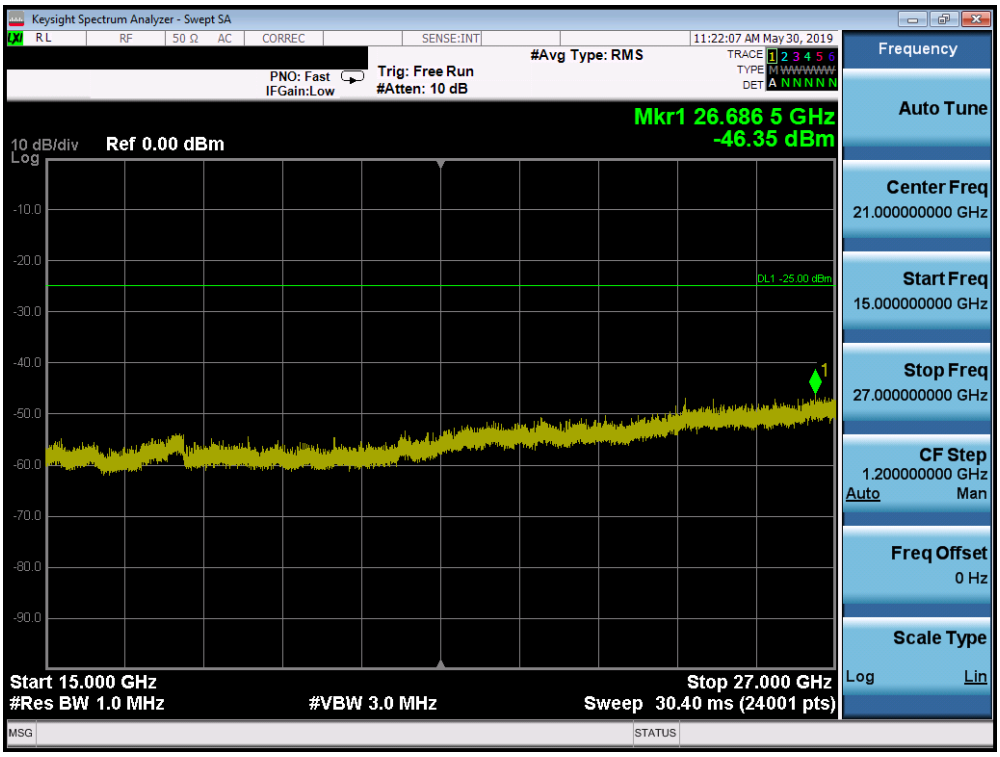


Plot 7-472. Conducted Spurious Plot (Band 41 (PC3) – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Low Channel)



Plot 7-473. Conducted Spurious Plot (Band 41 (PC3) – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Low Channel)

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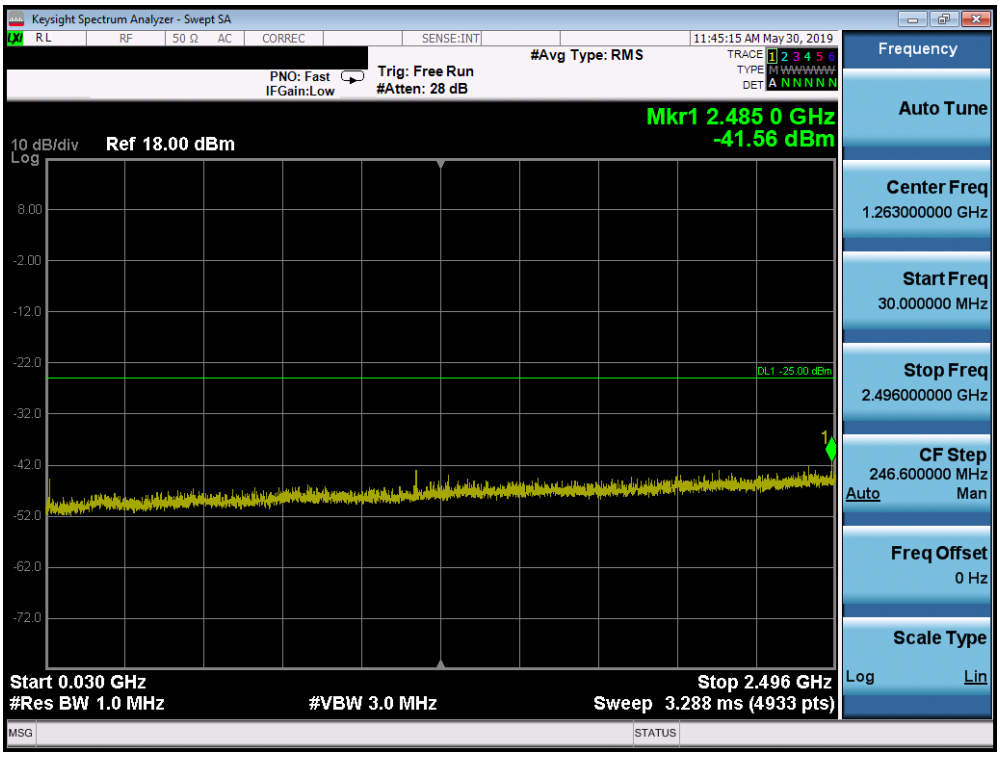
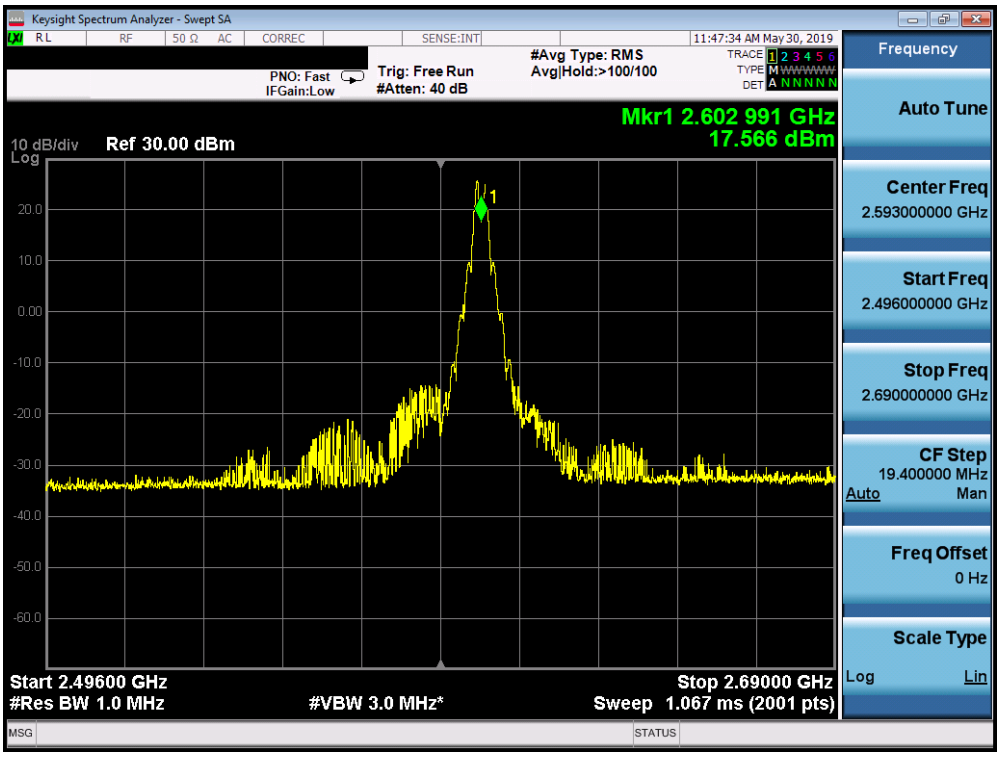


Plot 7-474. Conducted Spurious Plot (Band 41 (PC3) – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Mid Channel)



Plot 7-475. Conducted Spurious Plot (Band 41 (PC3) – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Mid Channel)

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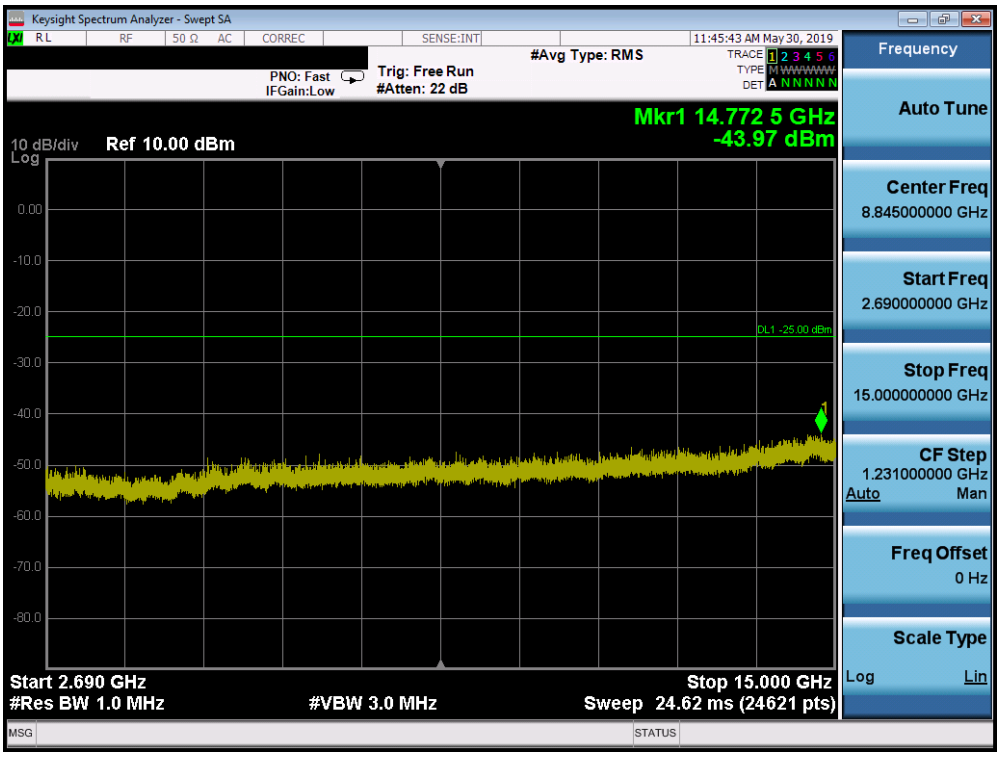
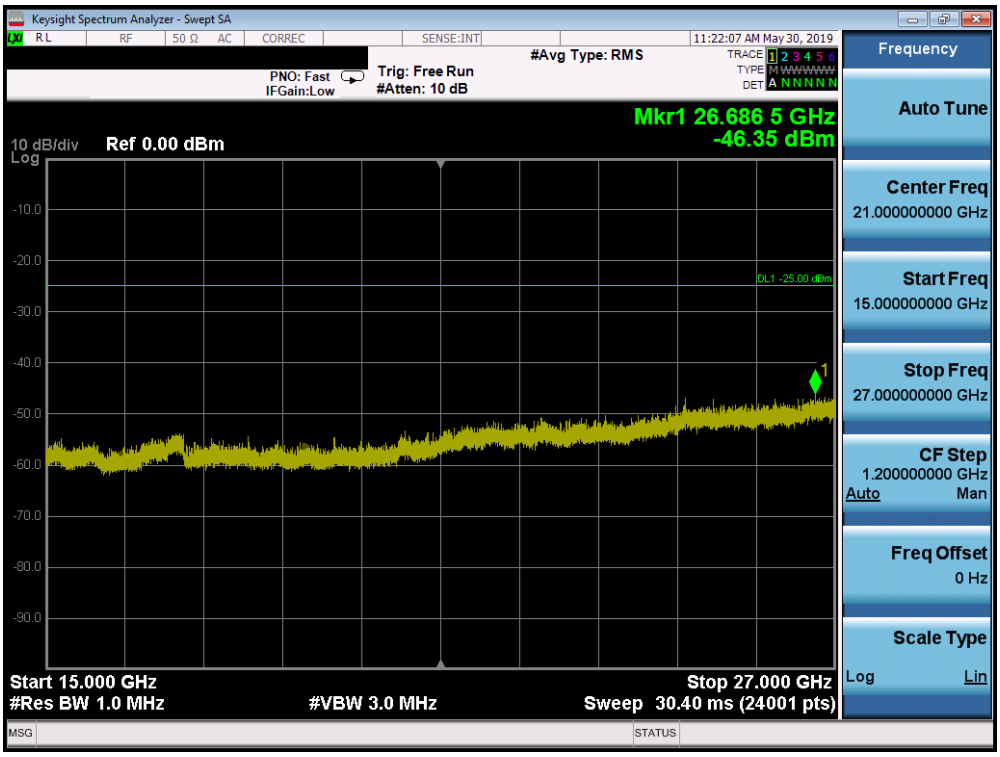


Plot 7-476. Conducted Spurious Plot (Band 41 (PC3) – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Mid Channel)



Plot 7-477. Conducted Spurious Plot (Band 41 (PC3) – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Mid Channel)

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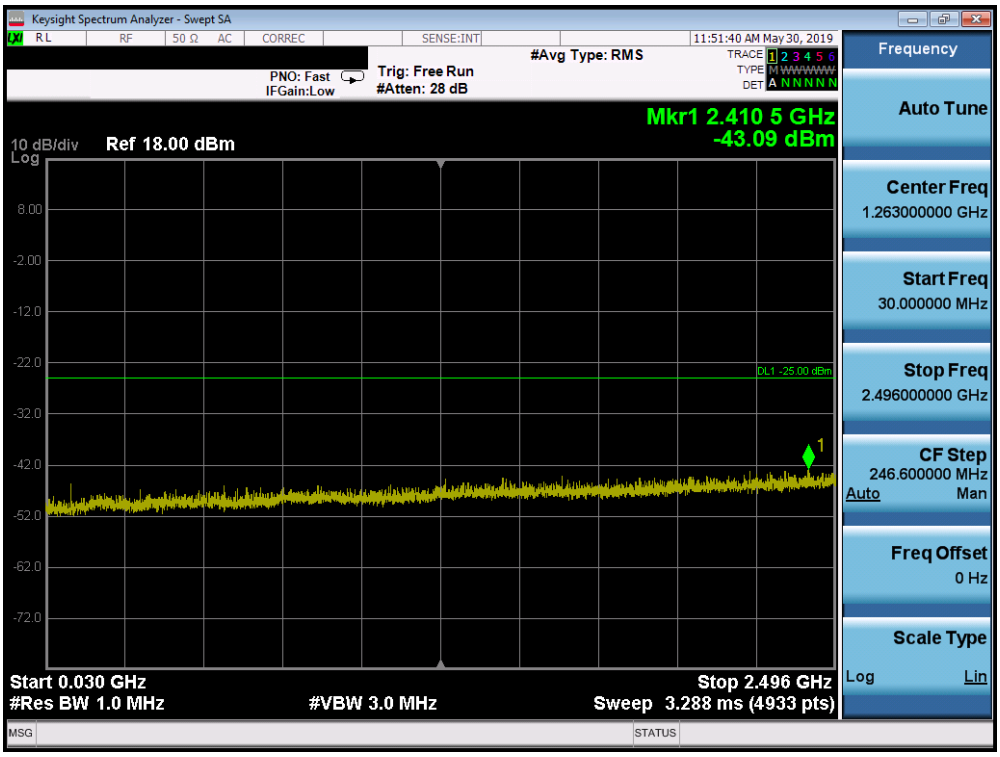
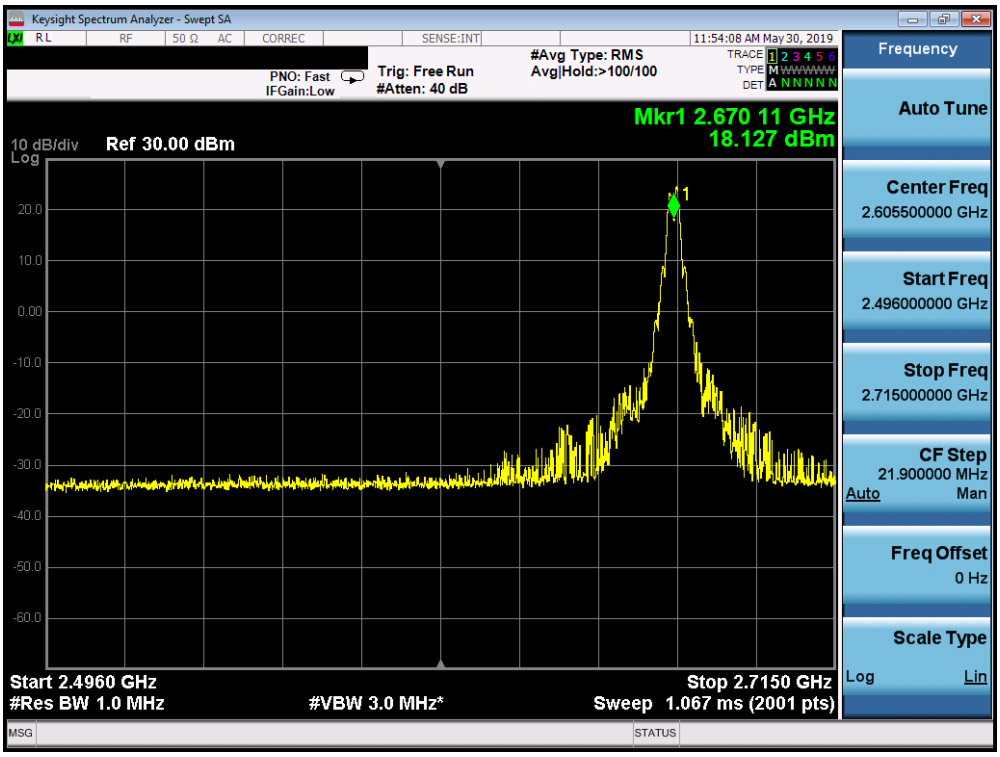


Plot 7-478. Conducted Spurious Plot (Band 41 (PC3) – 20.0MHz QPSK – PCC 1/0 SCC 1/99 – High Channel)



Plot 7-479. Conducted Spurious Plot (Band 41 (PC3) – 20.0MHz QPSK – PCC 1/0 SCC 1/99 – High Channel)

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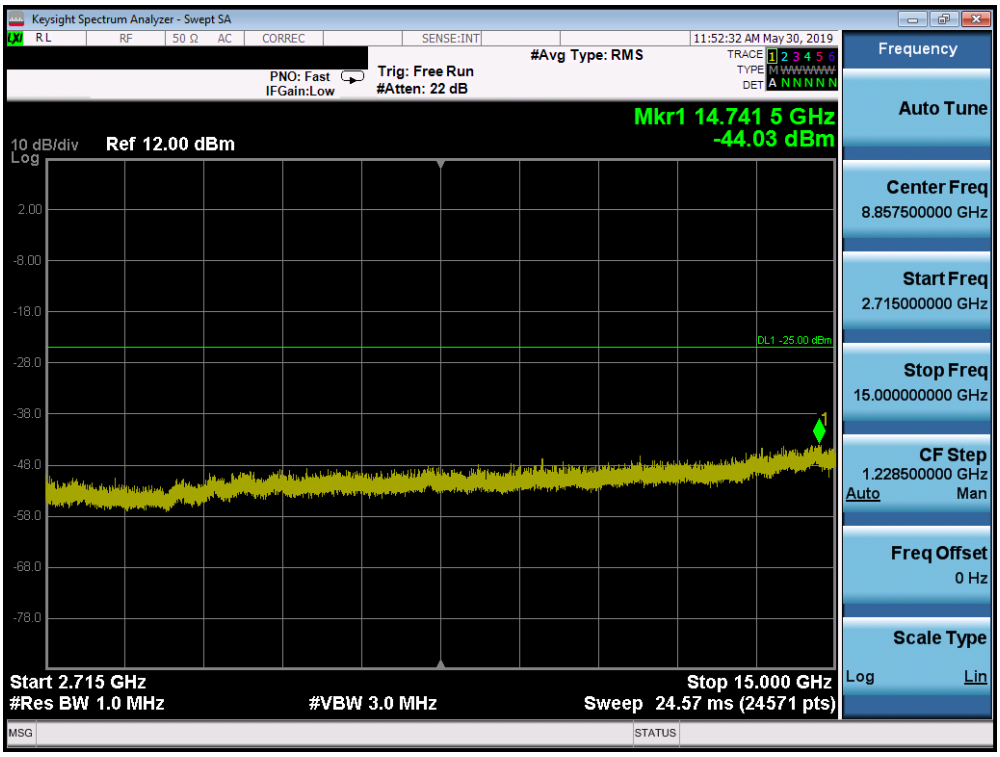
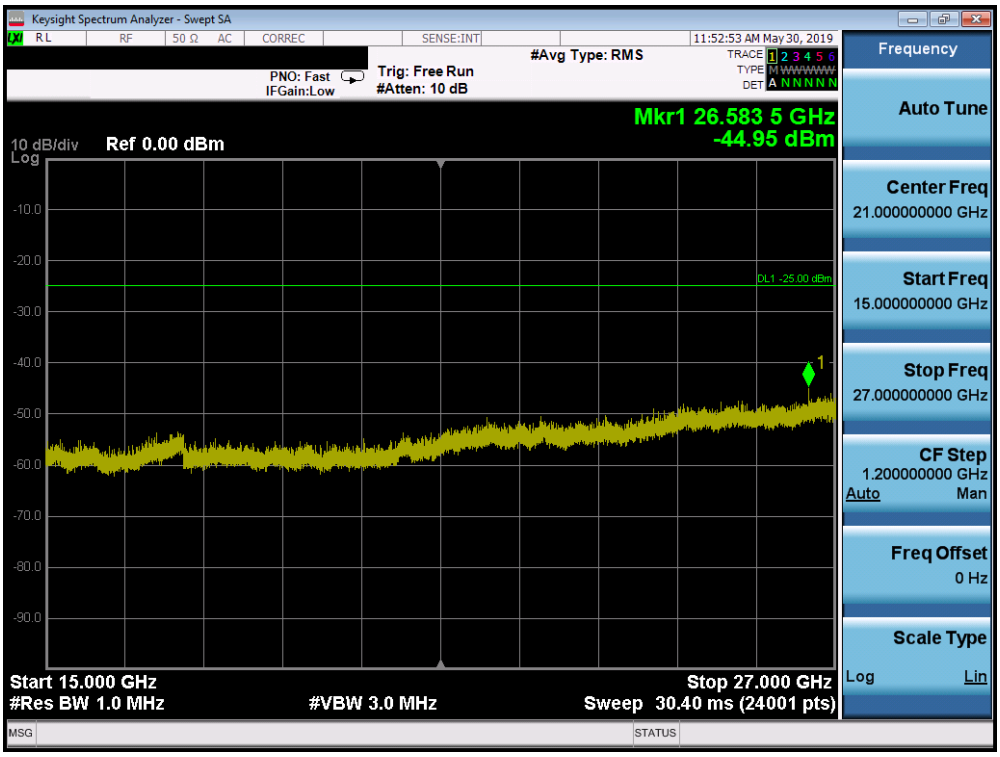


Plot 7-480. Conducted Spurious Plot (Band 41 (PC3) – 20.0MHz QPSK – PCC 1/0 SCC 1/99 – High Channel)



Plot 7-481. Conducted Spurious Plot (Band 41 (PC3) – 20.0MHz QPSK – PCC 1/0 SCC 1/99 – High Channel)

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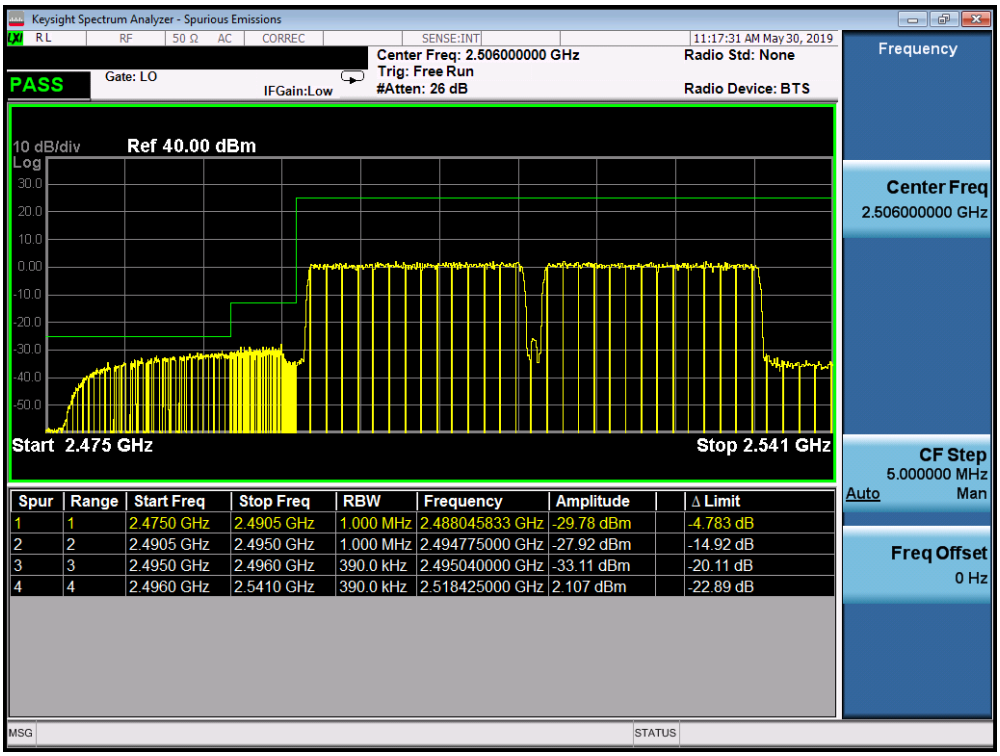
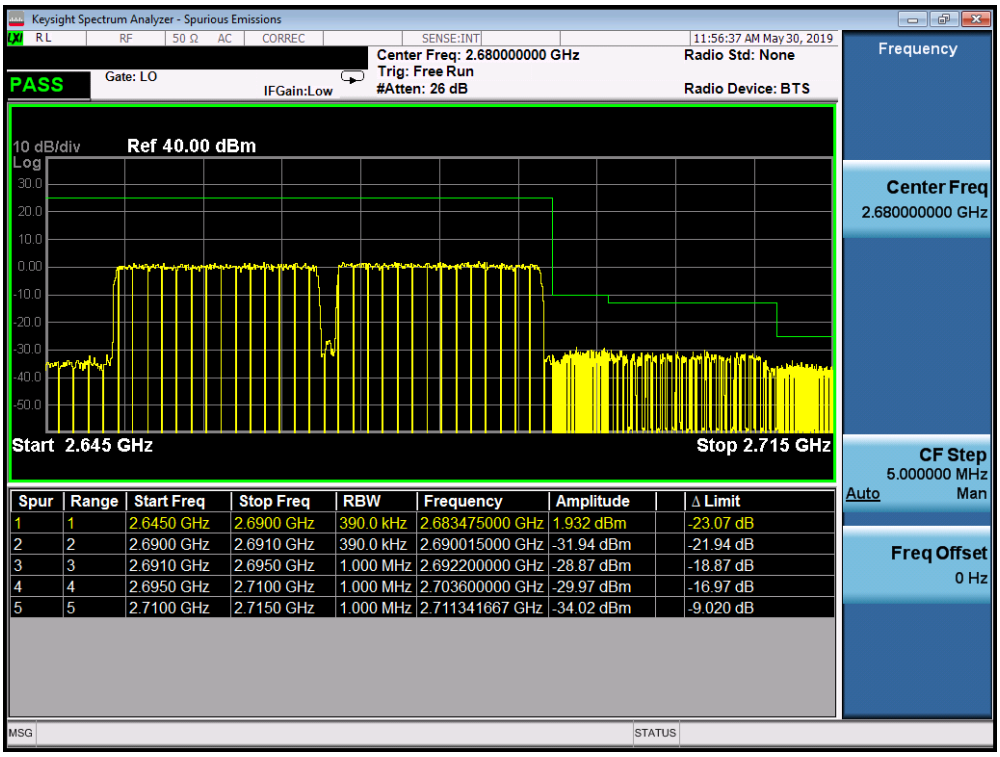


Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.4750 GHz	2.4905 GHz	1.000 MHz	2.488045833 GHz	-29.78 dBm	-4.783 dB
2	2	2.4905 GHz	2.4950 GHz	1.000 MHz	2.494775000 GHz	-27.92 dBm	-14.92 dB
3	3	2.4950 GHz	2.4960 GHz	390.0 kHz	2.495040000 GHz	-33.11 dBm	-20.11 dB
4	4	2.4960 GHz	2.5410 GHz	390.0 kHz	2.518425000 GHz	2.107 dBm	-22.89 dB

Table 7-482. Lower ACP Plot (Band 41 (PC3) QPSK – PCC:20 MHz SCC:20 MHz – Full RB)



Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.6450 GHz	2.6900 GHz	390.0 kHz	2.683475000 GHz	1.932 dBm	-23.07 dB
2	2	2.6900 GHz	2.6910 GHz	390.0 kHz	2.690015000 GHz	-31.94 dBm	-21.94 dB
3	3	2.6910 GHz	2.6950 GHz	1.000 MHz	2.692200000 GHz	-28.87 dBm	-18.87 dB
4	4	2.6950 GHz	2.7100 GHz	1.000 MHz	2.703600000 GHz	-29.97 dBm	-16.97 dB
5	5	2.7100 GHz	2.7150 GHz	1.000 MHz	2.711341667 GHz	-34.02 dBm	-9.020 dB

Table 7-483. Upper ACP Plot (Band 41 (PC3) QPSK – PCC:20 MHz SCC:20 MHz – Full RB)

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Uplink CA Configuration B41 (PC2)

Power State	PCC							SCC							Power
	PCC Band	PCC Bandwidth [MHz]	PCC (UL) Channel	PCC (UL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	SCC Band	SCC Bandwidth [MHz]	SCC (UL) Channel	SCC (UL) Frequency [MHz]	Modulation	SCC UL# RB	SCC UL RB Offset	ULCA Tx.Power (dBm)
Max	LTE B41	20	39750	2506	QPSK	1	99	LTE B41	20	39948	2525.8	QPSK	1	0	27.21
Max	LTE B41	20	40620	2593	QPSK	1	99	LTE B41	20	40818	2612.8	QPSK	1	0	27.17
Max	LTE B41	20	41490	2680	QPSK	1	0	LTE B41	20	41292	2660.2	QPSK	1	99	27.33

Table 7-10. Conducted Powers (B41 (PC2) - 20MHz + 20MHz Channel Bandwidth - PCC/SCC: 1RB)

Power State	PCC							SCC							Power
	PCC Band	PCC Bandwidth [MHz]	PCC (UL) Channel	PCC (UL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	SCC Band	SCC Bandwidth [MHz]	SCC (UL) Channel	SCC (UL) Frequency [MHz]	Modulation	SCC UL# RB	SCC UL RB Offset	ULCA Tx.Power (dBm)
Max	LTE B41	20	41490	2680	QPSK	100	0	LTE B41	20	41292	2660.2	QPSK	100	0	24.81
Max	LTE B41	20	41490	2680	16-QAM	100	0	LTE B41	20	41292	2660.2	16-QAM	100	0	23.74
Max	LTE B41	20	41490	2680	64-QAM	100	0	LTE B41	20	41292	2660.2	64-QAM	100	0	22.91
Max	LTE B41	20	41490	2680	256-QAM	100	0	LTE B41	20	41292	2660.2	256-QAM	100	0	21.63

Table 7-11. Conducted Powers (B41 (PC2) with Various Combinations for 20MHz + 20MHz Channel Bandwidth)

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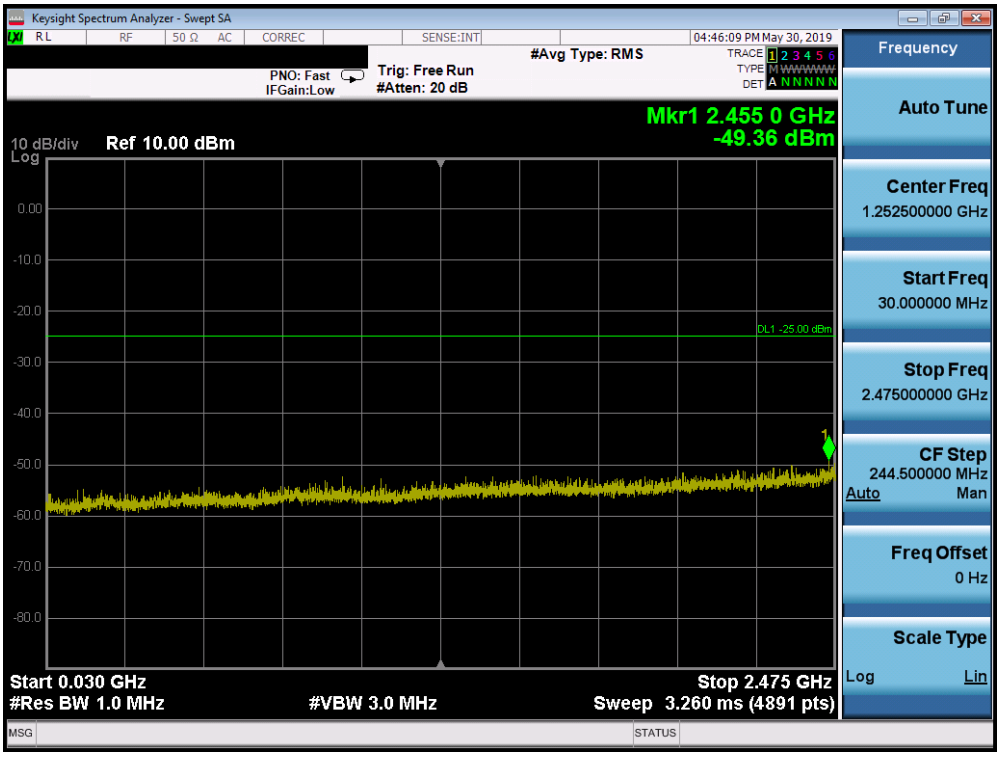
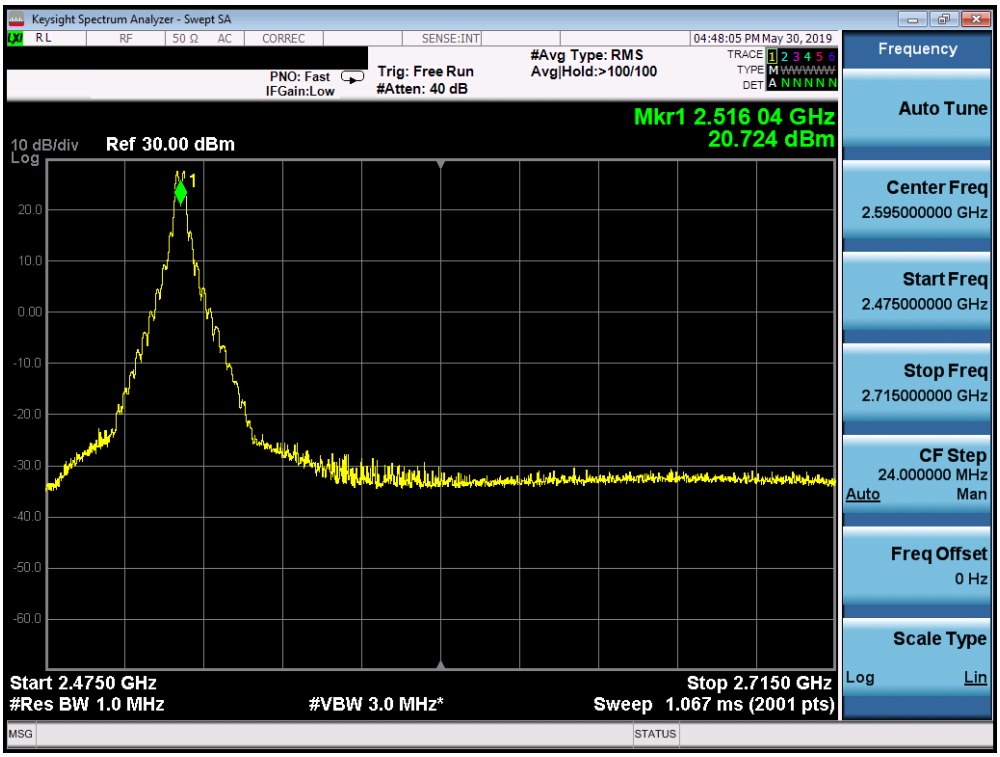


Plot 7-484. Conducted Spurious Plot (Band 41 (PC2) – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Low Channel)



Plot 7-485. Conducted Spurious Plot (Band 41 (PC2) – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Low Channel)

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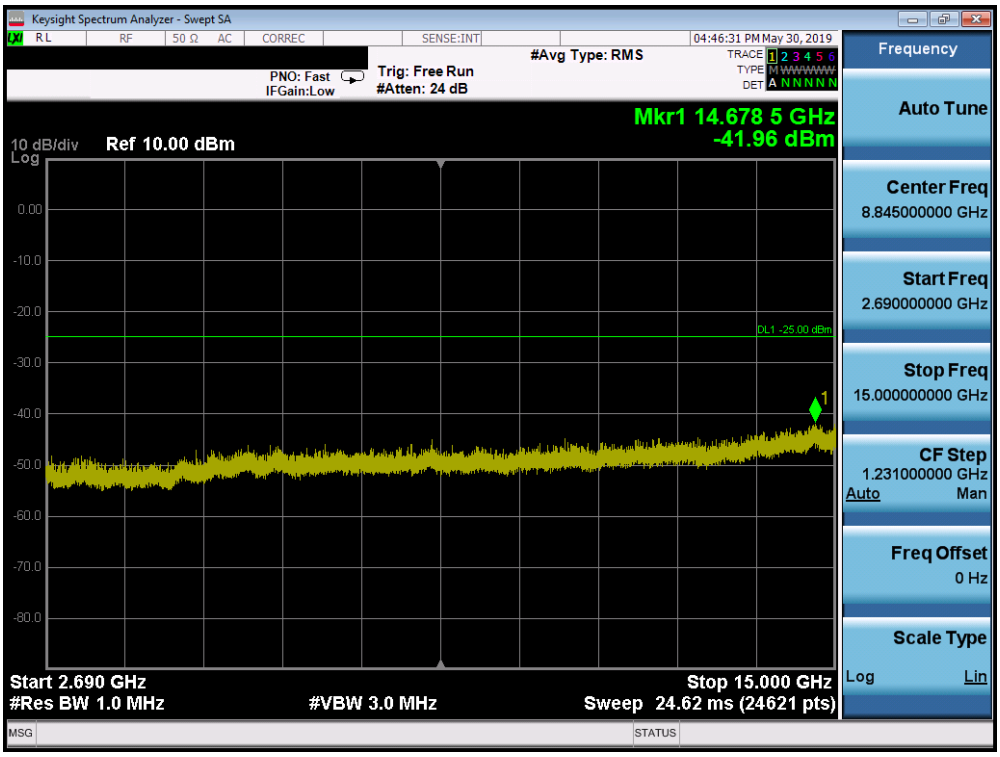
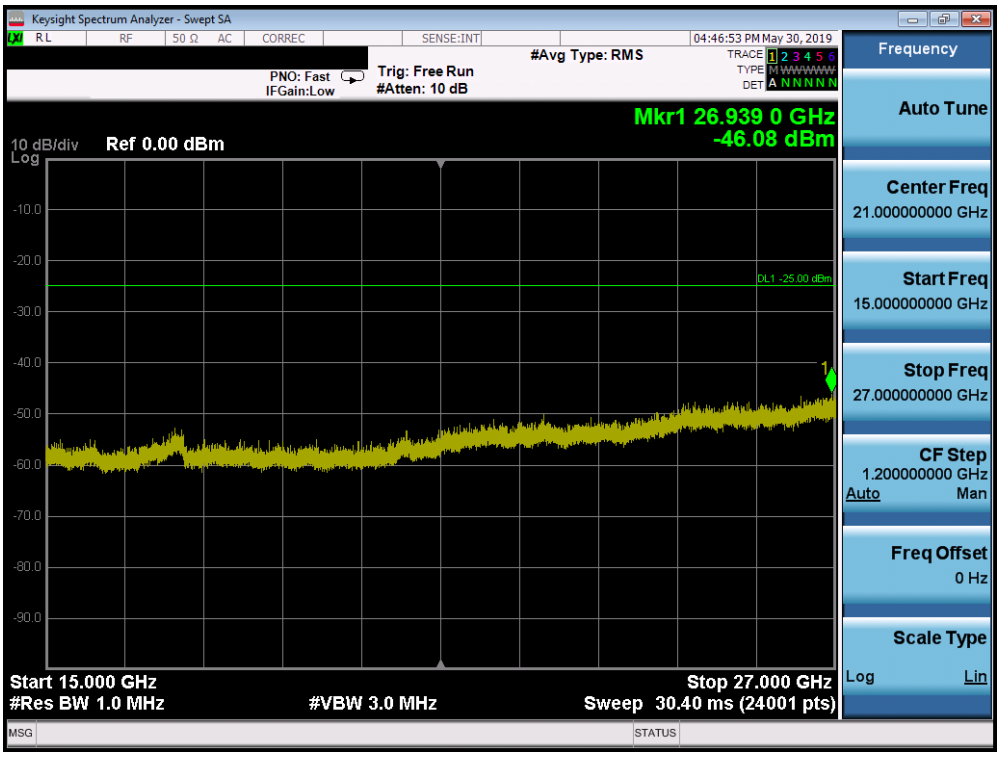


Plot 7-486. Conducted Spurious Plot (Band 41 (PC2) – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Low Channel)



Plot 7-487. Conducted Spurious Plot (Band 41 (PC2) – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Low Channel)

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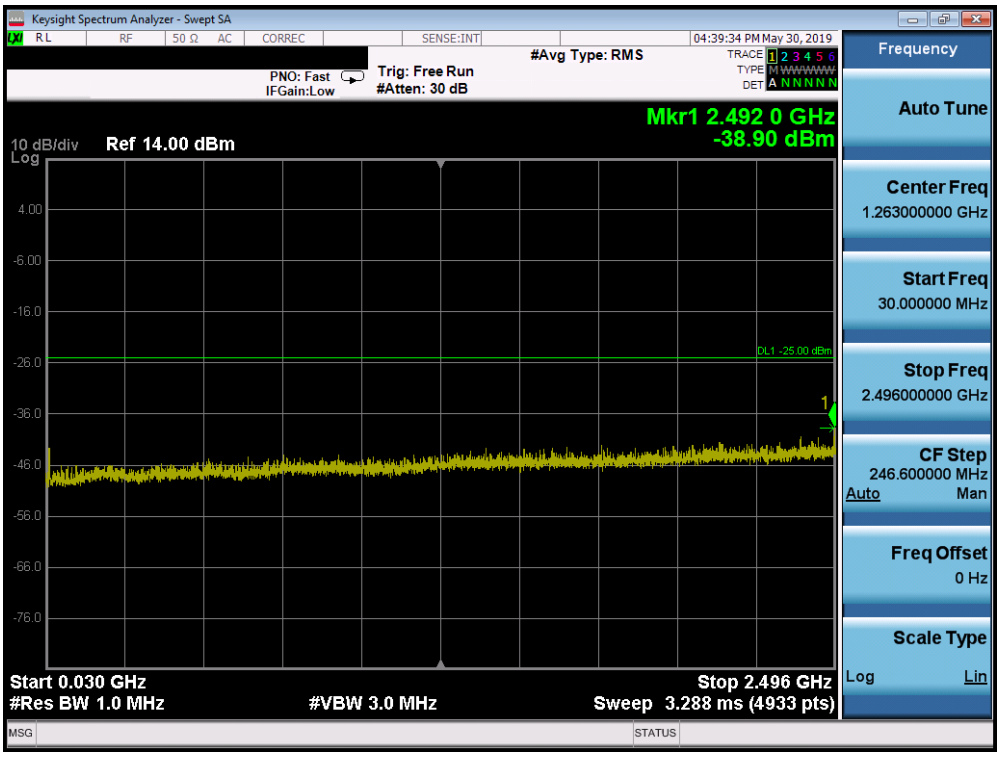
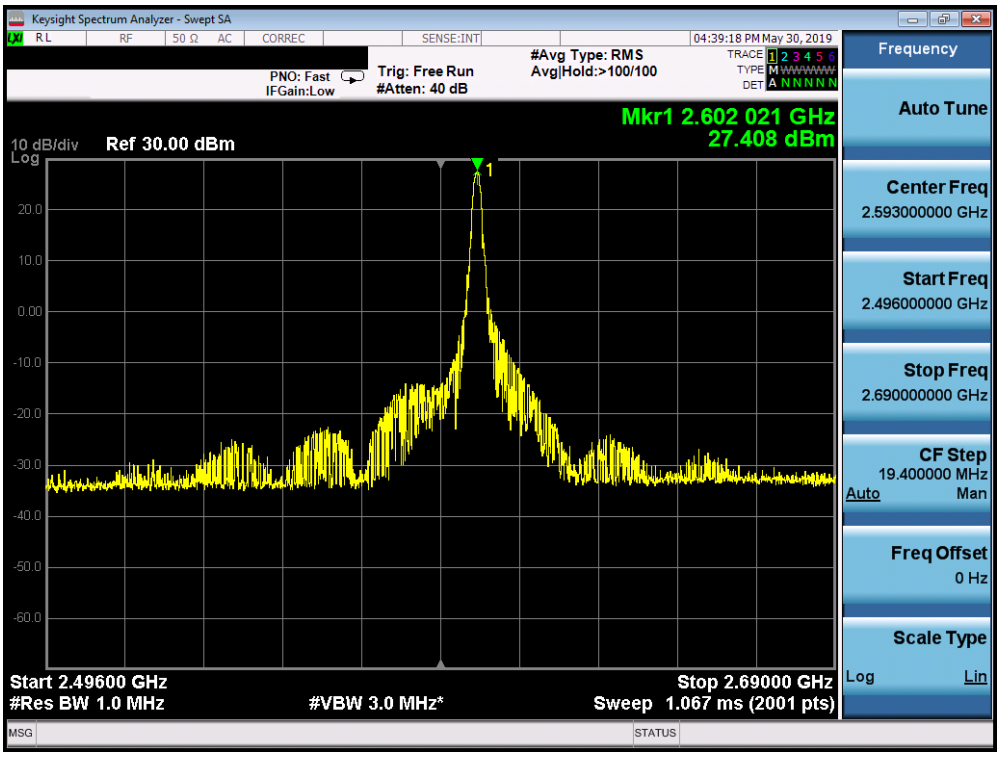


Plot 7-488. Conducted Spurious Plot (Band 41 (PC2) – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Mid Channel)



Plot 7-489. Conducted Spurious Plot (Band 41 (PC2) – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Mid Channel)

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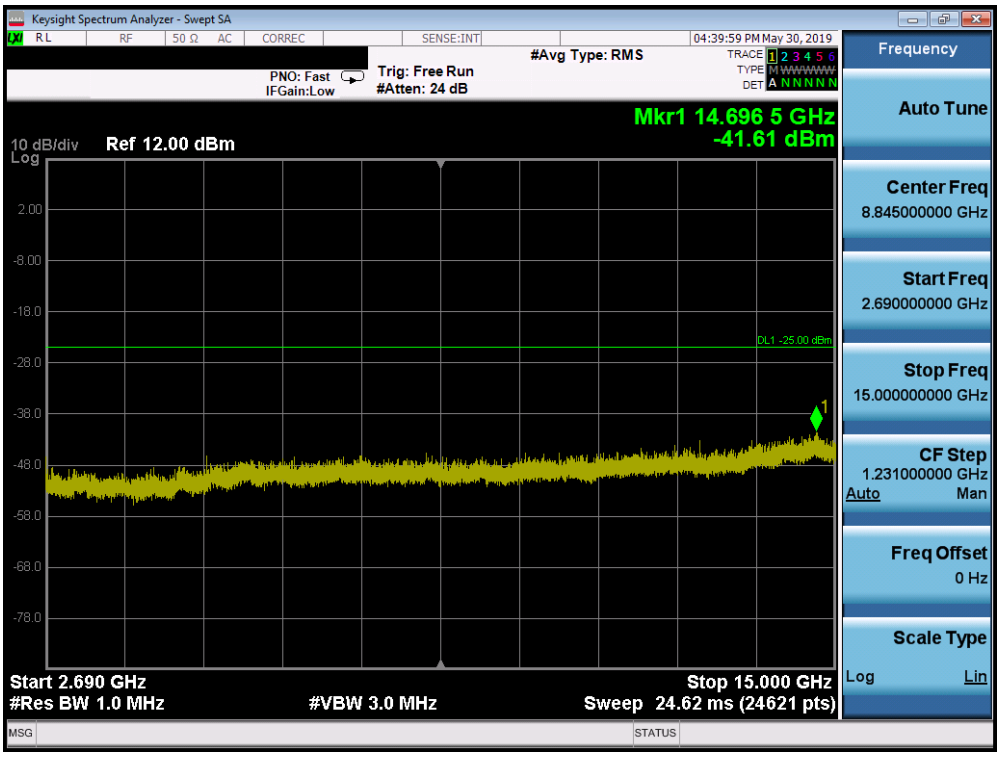
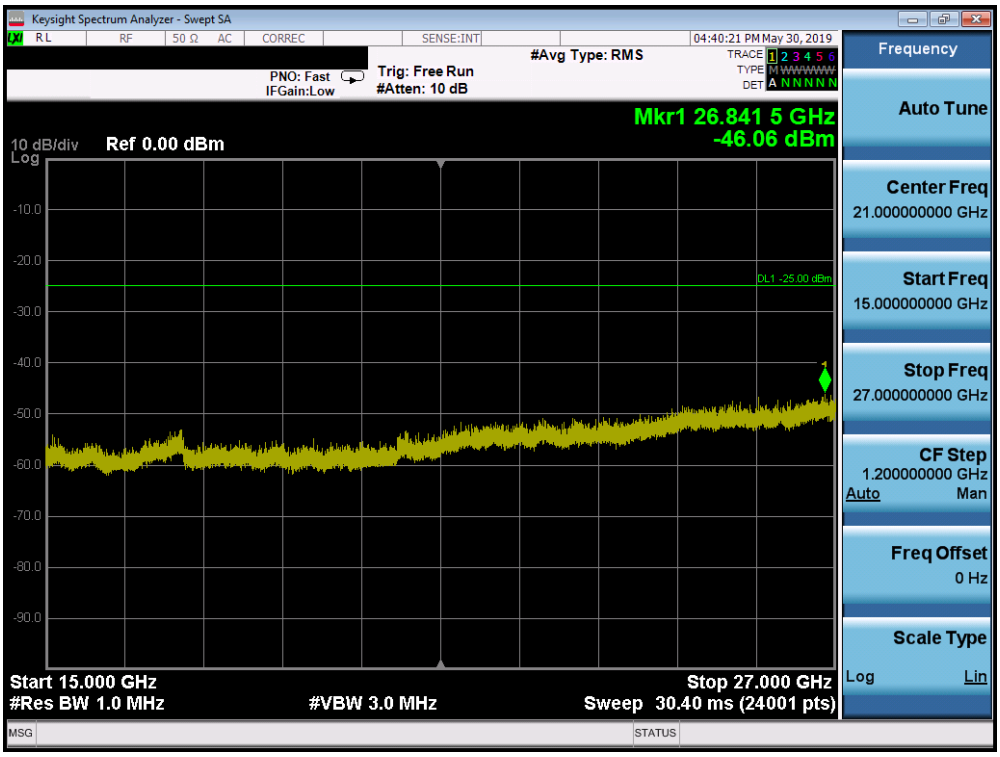


Plot 7-490. Conducted Spurious Plot (Band 41 (PC2) – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Mid Channel)



Plot 7-491. Conducted Spurious Plot (Band 41 (PC2) – 20.0MHz QPSK – PCC 1/99 SCC 1/0 – Mid Channel)

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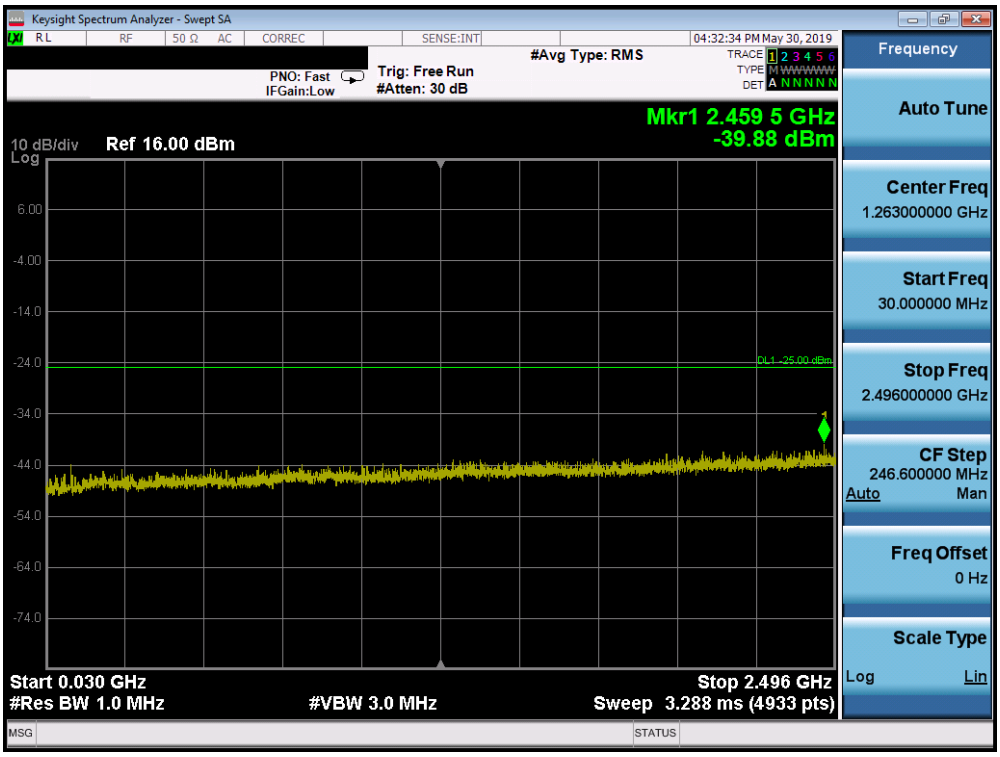
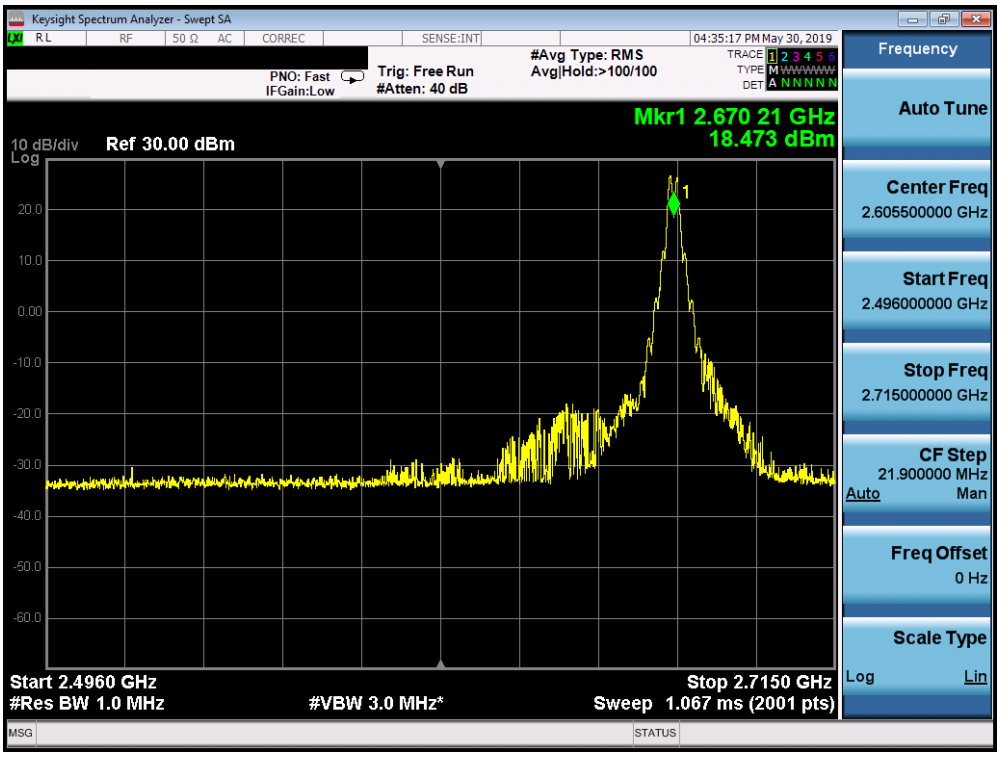


Plot 7-492. Conducted Spurious Plot (Band 41 (PC2) – 20.0MHz QPSK – PCC 1/0 SCC 1/99 – High Channel)



Plot 7-493. Conducted Spurious Plot (Band 41 (PC2) – 20.0MHz QPSK – PCC 1/0 SCC 1/99 – High Channel)

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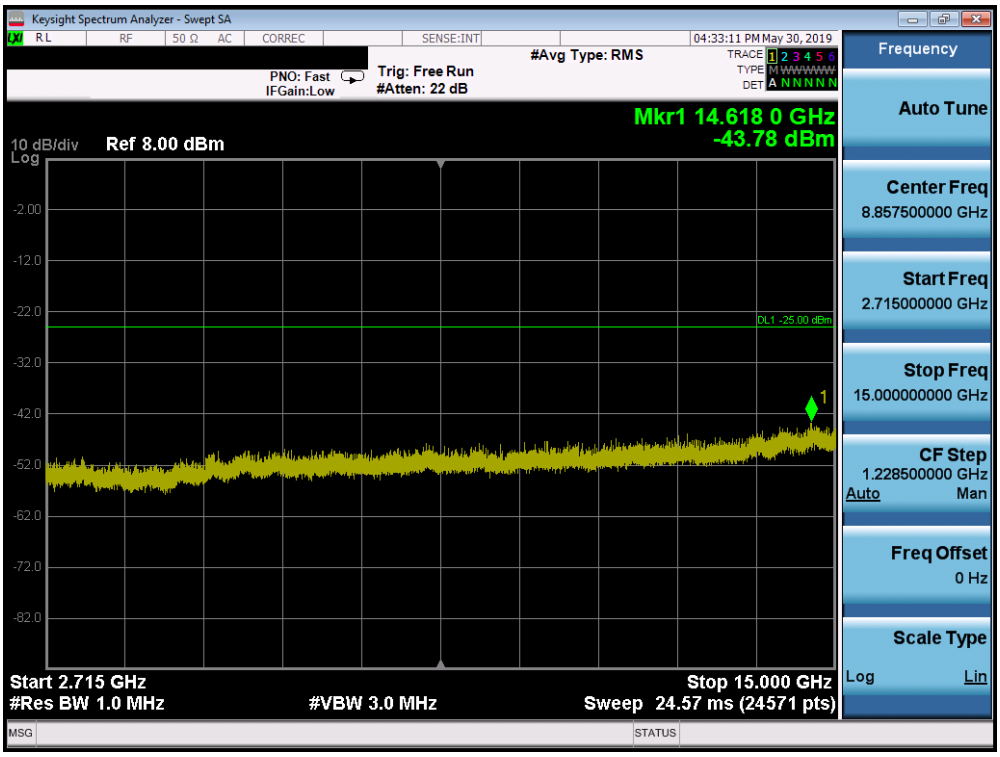
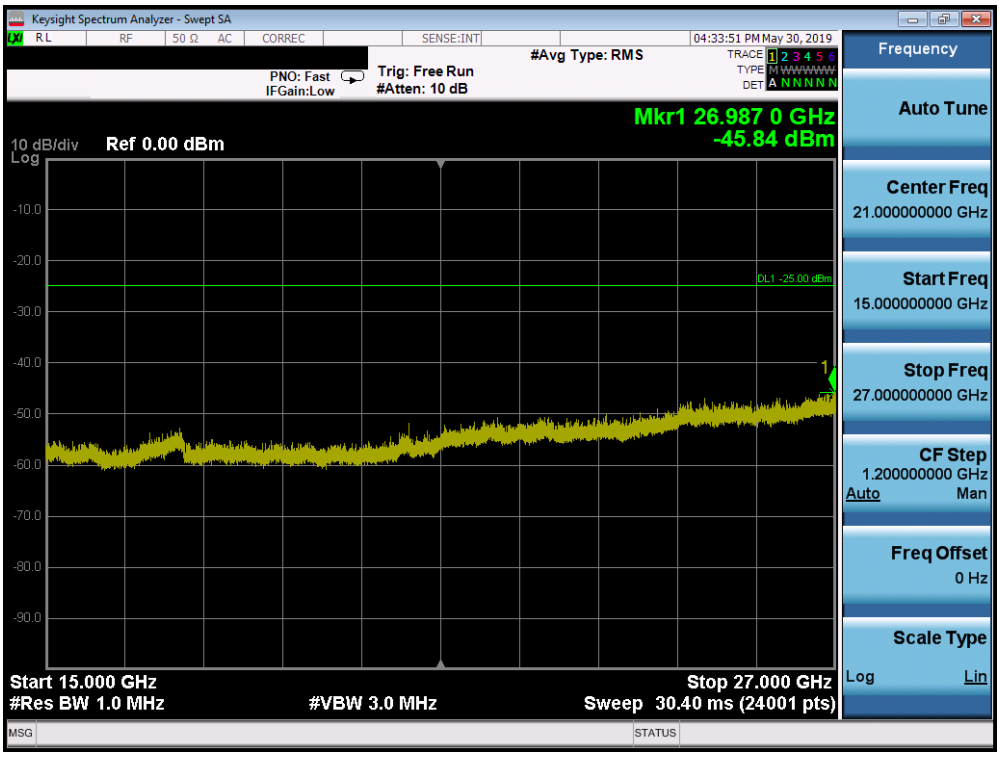


Plot 7-494. Conducted Spurious Plot (Band 41 (PC2) – 20.0MHz QPSK – PCC 1/0 SCC 1/99 – High Channel)



Plot 7-495. Conducted Spurious Plot (Band 41 (PC2) – 20.0MHz QPSK – PCC 1/0 SCC 1/99 – High Channel)

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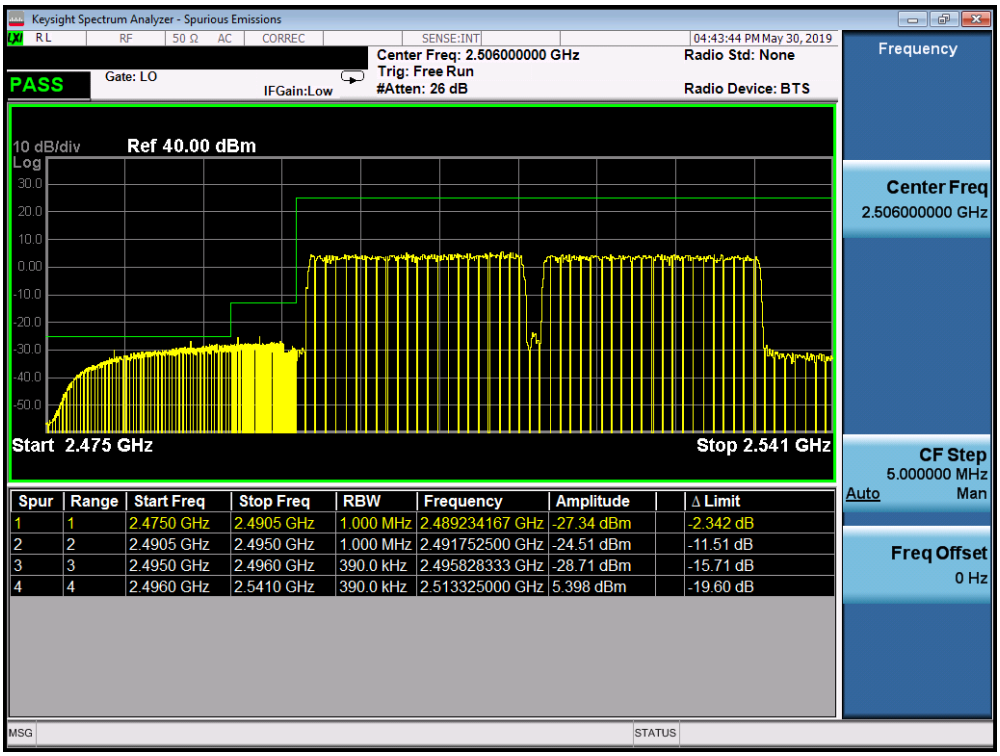
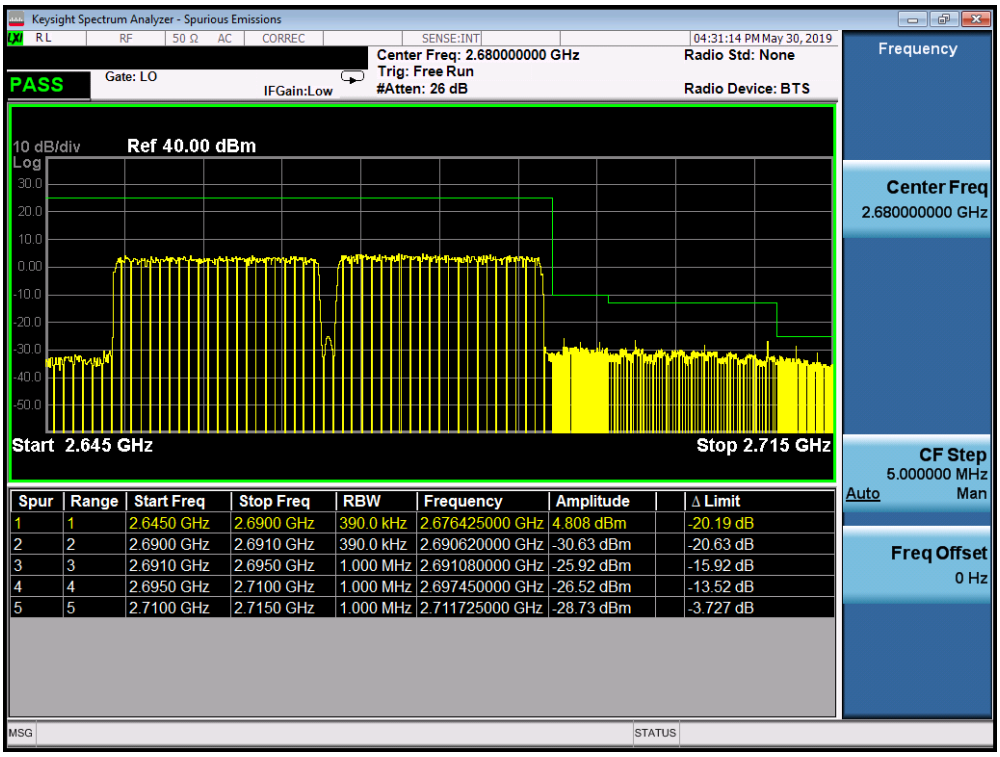


Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.4750 GHz	2.4905 GHz	1.000 MHz	2.489234167 GHz	-27.34 dBm	-2.342 dB
2	2	2.4905 GHz	2.4950 GHz	1.000 MHz	2.491752500 GHz	-24.51 dBm	-11.51 dB
3	3	2.4950 GHz	2.4960 GHz	390.0 kHz	2.495828333 GHz	-28.71 dBm	-15.71 dB
4	4	2.4960 GHz	2.5410 GHz	390.0 kHz	2.513325000 GHz	5.398 dBm	-19.60 dB

Table 7-496. Lower ACP Plot (Band 41 (PC2) QPSK – PCC:20 MHz SCC:20 MHz – Full RB)



Spur	Range	Start Freq	Stop Freq	RBW	Frequency	Amplitude	Δ Limit
1	1	2.6450 GHz	2.6900 GHz	390.0 kHz	2.676425000 GHz	4.808 dBm	-20.19 dB
2	2	2.6900 GHz	2.6910 GHz	390.0 kHz	2.690620000 GHz	-30.63 dBm	-20.63 dB
3	3	2.6910 GHz	2.6950 GHz	1.000 MHz	2.691080000 GHz	-25.92 dBm	-15.92 dB
4	4	2.6950 GHz	2.7100 GHz	1.000 MHz	2.697450000 GHz	-26.52 dBm	-13.52 dB
5	5	2.7100 GHz	2.7150 GHz	1.000 MHz	2.711725000 GHz	-28.73 dBm	-3.727 dB

Table 7-497. Upper ACP Plot (Band 41 (PC2) QPSK – PCC:20 MHz SCC:20 MHz – Full RB)

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7.8 Radiated Power (ERP/EIRP)

Test Overview

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

Test Procedures Used

KDB 971168 D01 v03r01 – Section 5.2.1

ANSI/TIA-603-E-2016 – Section 2.2.17

Test Settings

1. Radiated power measurements are performed using the signal analyzer's "channel power" measurement capability for signals with continuous operation. For signals with burst transmission, the signal analyzer's "time domain power" measurement capability is used
2. RBW = 1 – 5% of the expected OBW, not to exceed 1MHz
3. VBW ≥ 3 x RBW
4. Span = 1.5 times the OBW
5. No. of sweep points ≥ 2 x span / RBW
6. Detector = RMS
7. Trigger is set to "free run" for signals with continuous operation with the sweep times set to "auto". Trigger is set to enable triggering only on full power bursts with the sweep time set less than or equal to the transmission burst duration
8. The integration bandwidth was roughly set equal to the measured OBW of the signal for signals with continuous operation. For signals with burst transmission, the "gating" function was enabled to ensure that measurements are performed during times in which the transmitter is operating at its maximum power
9. Trace mode = trace averaging (RMS) over 100 sweeps
10. The trace was allowed to stabilize

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Test Setup

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

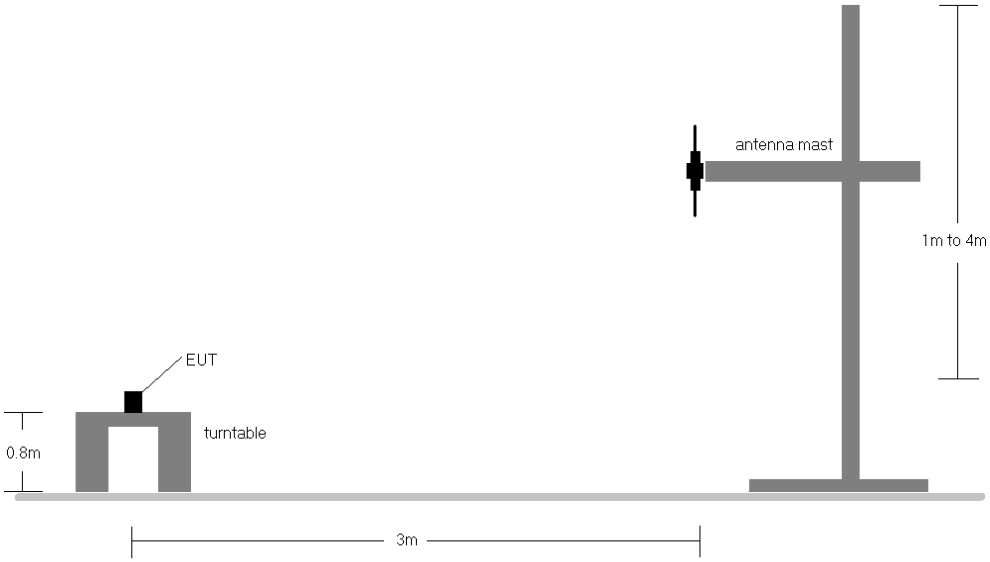

Figure 7-7. Radiated Test Setup <1GHz

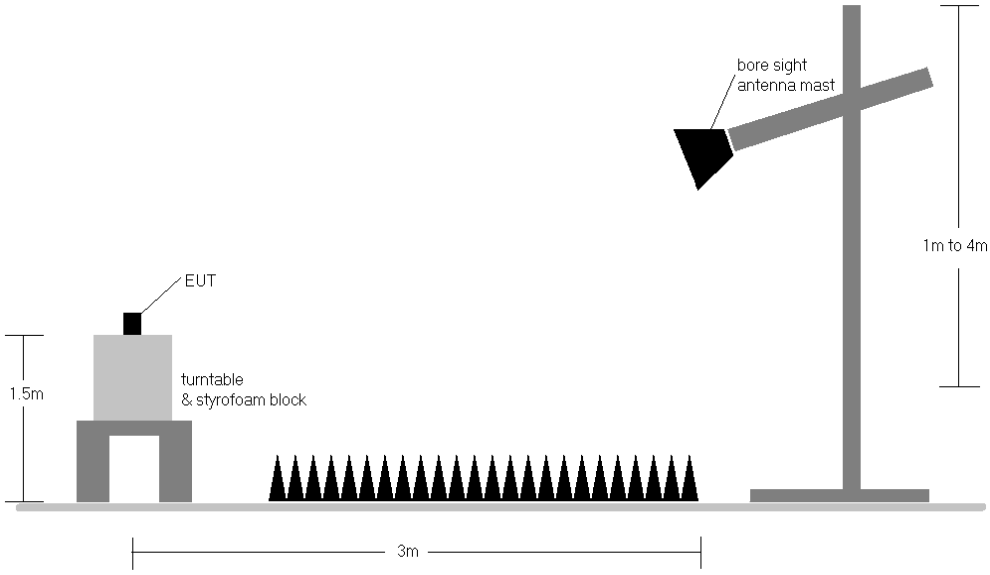

Figure 7-8. Radiated Test Setup >1GHz

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.

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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
665.50	5	QPSK	V	239	228	1 / 24	14.70	3.75	16.30	0.043	34.77	-18.47
680.50	5	QPSK	V	220	215	1 / 24	14.32	4.20	16.37	0.043	34.77	-18.40
695.50	5	QPSK	V	225	235	1 / 24	15.04	4.50	**17.39**	0.055	34.77	-17.38
695.50	5	16-QAM	V	225	235	1 / 24	13.84	4.50	**16.19**	0.042	34.77	-18.58
695.50	5	64-QAM	V	225	235	1 / 24	12.53	4.50	**14.88**	0.031	34.77	-19.89
695.50	5	256-QAM	V	225	235	1 / 24	9.94	4.50	12.29	0.017	34.77	-22.48
668.00	10	QPSK	V	260	246	1 / 49	14.89	3.80	16.54	0.045	34.77	-18.23
680.50	10	QPSK	V	271	251	1 / 49	14.80	4.20	16.85	0.048	34.77	-17.92
693.00	10	QPSK	V	220	215	1 / 49	15.00	4.40	**17.25**	0.053	34.77	-17.52
693.00	10	16-QAM	V	220	215	1 / 49	13.41	4.40	**15.66**	0.037	34.77	-19.11
693.00	10	64-QAM	V	220	215	1 / 49	12.66	4.40	**14.91**	0.031	34.77	-19.86
693.00	10	256-QAM	V	220	215	1 / 49	10.16	4.40	**12.41**	**0.017**	34.77	-22.36
670.50	15	QPSK	V	261	302	1 / 0	15.59	3.90	17.34	0.054	34.77	-17.43
680.50	15	QPSK	V	275	298	1 / 0	15.58	4.20	**17.63**	0.058	34.77	-17.14
690.50	15	QPSK	V	100	210	1 / 74	14.31	4.40	16.56	0.045	34.77	-18.21
680.50	15	16-QAM	V	275	298	1 / 0	14.69	4.20	**16.74**	0.047	34.77	-18.03
680.50	15	64-QAM	V	275	298	1 / 0	13.78	4.20	**15.83**	0.038	34.77	-18.94
680.50	15	256-QAM	V	275	298	1 / 0	10.97	4.20	**13.02**	**0.020**	34.77	-21.75
673.00	20	QPSK	V	252	303	1 / 0	15.92	4.00	17.77	0.060	34.77	-17.00
680.50	20	QPSK	V	244	298	1 / 0	15.91	4.20	**17.96**	**0.063**	34.77	-16.81
688.00	20	QPSK	V	203	240	1 / 99	14.51	4.40	16.76	0.047	34.77	-18.01
680.50	20	16-QAM	V	244	298	1 / 0	15.04	4.20	**17.09**	0.051	34.77	-17.68
680.50	20	64-QAM	V	244	298	1 / 0	14.08	4.20	**16.13**	0.041	34.77	-18.64
680.50	20	256-QAM	V	244	298	1 / 0	11.27	4.20	**13.32**	**0.021**	34.77	-21.45
680.50	20	QPSK	H	179	78	1 / 0	14.04	4.20	16.09	0.041	34.77	-18.68
680.50	20 (WCP)	QPSK	V	106	180	1 / 0	11.21	4.20	13.26	0.021	34.77	-21.51

Table 7-12. ERP Data (Band 71)

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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
699.70	1.4	QPSK	H	295	107	1 / 5	15.13	3.40	16.38	0.043	34.77	-18.39	18.53	0.071	36.99	-18.46
707.50	1.4	QPSK	H	293	109	3 / 2	15.61	3.65	**17.11**	0.051	34.77	-17.66	**19.26**	0.084	36.99	-17.73
715.30	1.4	QPSK	H	295	109	1 / 0	14.94	3.70	16.49	0.045	34.77	-18.28	18.64	0.073	36.99	-18.35
707.50	1.4	16-QAM	H	293	109	1 / 5	14.74	3.65	**16.24**	0.042	34.77	-18.53	**18.39**	0.069	36.99	-18.60
707.50	1.4	64-QAM	H	293	109	1 / 5	13.63	3.65	**15.13**	0.033	34.77	-19.64	**17.28**	0.053	36.99	-19.71
707.50	1.4	256-QAM	H	293	109	1 / 5	10.55	3.65	**12.05**	**0.016**	34.77	-22.72	**14.20**	**0.026**	36.99	-22.79
700.50	3	QPSK	H	296	103	1 / 14	15.35	3.40	16.60	0.046	34.77	-18.17	18.75	0.075	36.99	-18.24
707.50	3	QPSK	H	294	107	1 / 14	15.76	3.65	**17.26**	0.053	34.77	-17.51	**19.41**	0.087	36.99	-17.58
714.50	3	QPSK	H	306	114	1 / 0	15.19	3.70	16.74	0.047	34.77	-18.03	18.89	0.077	36.99	-18.10
707.50	3	16-QAM	H	294	107	1 / 14	14.59	3.65	**16.09**	0.041	34.77	-18.68	**18.24**	0.067	36.99	-18.75
707.50	3	64-QAM	H	294	107	1 / 14	13.44	3.65	**14.94**	0.031	34.77	-19.83	**17.09**	0.051	36.99	-19.90
707.50	3	256-QAM	H	294	107	1 / 14	10.69	3.65	**12.19**	**0.017**	34.77	-22.58	**14.34**	**0.027**	36.99	-22.65
701.50	5	QPSK	H	293	106	1 / 24	15.41	3.40	16.66	0.046	34.77	-18.11	18.81	0.076	36.99	-18.18
707.50	5	QPSK	H	295	107	1 / 24	15.85	3.65	**17.35**	**0.054**	34.77	-17.42	**19.50**	**0.089**	36.99	-17.49
713.50	5	QPSK	H	299	113	1 / 0	15.51	3.70	17.06	0.051	34.77	-17.71	19.21	0.083	36.99	-17.78
707.50	5	16-QAM	H	295	107	1 / 24	14.99	3.65	**16.49**	0.045	34.77	-18.28	**18.64**	0.073	36.99	-18.35
707.50	5	64-QAM	H	295	107	1 / 24	13.44	3.65	**14.94**	0.031	34.77	-19.83	**17.09**	0.051	36.99	-19.90
707.50	5	256-QAM	H	295	107	1 / 24	10.27	3.65	**11.77**	**0.015**	34.77	-23.00	**13.92**	**0.025**	36.99	-23.07
704.00	10	QPSK	H	294	103	1 / 49	15.62	3.50	16.97	0.050	34.77	-17.80	19.12	0.082	36.99	-17.87
707.50	10	QPSK	H	298	116	1 / 49	15.73	3.65	**17.23**	0.053	34.77	-17.54	**19.38**	0.087	36.99	-17.61
711.00	10	QPSK	H	301	99	1 / 0	15.17	3.70	16.72	0.047	34.77	-18.05	18.87	0.077	36.99	-18.12
707.50	10	16-QAM	H	298	116	1 / 49	14.88	3.65	**16.38**	0.043	34.77	-18.39	**18.53**	0.071	36.99	-18.46
707.50	10	64-QAM	H	298	116	1 / 49	13.76	3.65	**15.26**	0.034	34.77	-19.51	**17.41**	0.055	36.99	-19.58
707.50	10	256-QAM	H	298	116	1 / 49	10.89	3.65	**12.39**	**0.017**	34.77	-22.38	**14.54**	**0.028**	36.99	-22.45
707.50	5	QPSK	V	363	93	1 / 24	15.33	3.65	16.83	0.048	34.77	-17.94	18.98	0.079	36.99	-18.01
707.50	5 (WCP)	QPSK	H	168	282	1 / 24	10.76	3.65	12.26	0.017	34.77	-22.51	14.41	0.028	36.99	-22.58

Table 7-13. ERP Data (Band 12)

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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
779.50	5	QPSK	V	291	48	1 / 24	15.55	5.70	19.10	0.081	34.77	-15.67	21.25	0.133	36.99	-15.74
782.00	5	QPSK	V	285	47	1 / 0	15.63	5.80	**19.28**	**0.085**	34.77	-15.49	**21.43**	**0.139**	36.99	-15.56
784.50	5	QPSK	V	287	27	1 / 0	15.46	5.80	19.11	0.081	34.77	-15.66	21.26	0.134	36.99	-15.73
782.00	5	16-QAM	V	285	47	1 / 0	14.64	5.80	**18.29**	0.067	34.77	-16.48	**20.44**	0.111	36.99	-16.55
782.00	5	64-QAM	V	285	47	1 / 0	13.48	5.80	**17.13**	0.052	34.77	-17.64	**19.28**	0.085	36.99	-17.71
782.00	5	256-QAM	V	285	47	1 / 0	11.30	5.80	**14.95**	**0.031**	34.77	-19.82	**17.10**	**0.051**	36.99	-19.89
782.00	10	QPSK	V	289	86	1 / 0	15.61	5.80	**19.26**	0.084	34.77	-15.51	**21.41**	0.138	36.99	-15.58
782.00	10	16-QAM	V	289	86	1 / 0	14.46	5.80	**18.11**	0.065	34.77	-16.66	**20.26**	0.106	36.99	-16.73
782.00	10	64-QAM	V	289	86	1 / 0	13.19	5.80	**16.84**	0.048	34.77	-17.93	**18.99**	0.079	36.99	-18.00
782.00	10	256-QAM	V	289	86	1 / 0	11.28	5.80	**14.93**	**0.031**	34.77	-19.84	**17.08**	**0.051**	36.99	-19.91
782.00	5	QPSK	H	257	117	1 / 0	12.82	5.80	16.47	0.044	34.77	-18.30	18.62	0.073	36.99	-18.37
782.00	5 (WCP)	QPSK	V	138	203	1 / 0	12.33	5.80	15.98	0.040	34.77	-18.79	18.13	0.065	36.99	-18.86

Table 7-14. ERP Data (Band 13)

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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
824.70	1.4	QPSK	H	219	117	1 / 5	14.32	6.70	18.87	0.077	38.45	-19.58	21.02	0.126	40.61	-19.59
836.50	1.4	QPSK	H	218	114	1 / 5	15.11	6.70	19.66	0.092	38.45	-18.79	21.81	0.152	40.61	-18.80
848.30	1.4	QPSK	H	212	117	1 / 5	15.49	6.70	**20.04**	0.101	38.45	-18.41	**22.19**	0.166	40.61	-18.42
848.30	1.4	16-QAM	H	212	117	1 / 5	14.73	6.70	**19.28**	0.085	38.45	-19.17	**21.43**	0.139	40.61	-19.18
848.30	1.4	64-QAM	H	212	117	1 / 5	13.55	6.70	**18.10**	0.065	38.45	-20.35	**20.25**	0.106	40.61	-20.36
848.30	1.4	256-QAM	H	212	117	1 / 5	10.66	6.70	**15.21**	**0.033**	38.45	-23.24	**17.36**	**0.054**	40.61	-23.25
825.50	3	QPSK	H	143	100	1 / 14	13.65	6.70	18.20	0.066	38.45	-20.25	20.35	0.108	40.61	-20.26
836.50	3	QPSK	H	141	102	1 / 14	15.19	6.70	19.74	0.094	38.45	-18.71	21.89	0.155	40.61	-18.72
847.50	3	QPSK	H	128	103	1 / 14	15.61	6.65	**20.11**	**0.103**	38.45	-18.34	**22.26**	**0.168**	40.61	-18.35
847.50	3	16-QAM	H	128	103	1 / 14	14.78	6.65	**19.28**	0.085	38.45	-19.17	**21.43**	0.139	40.61	-19.18
847.50	3	64-QAM	H	128	103	1 / 14	13.61	6.65	**18.11**	0.065	38.45	-20.34	**20.26**	0.106	40.61	-20.35
847.50	3	256-QAM	H	128	103	1 / 14	10.81	6.65	**15.31**	**0.034**	38.45	-23.14	**17.46**	**0.056**	40.61	-23.15
826.50	5	QPSK	H	229	118	1 / 24	14.64	6.70	19.19	0.083	38.45	-19.26	21.34	0.136	40.61	-19.27
836.50	5	QPSK	H	224	109	1 / 24	15.32	6.70	19.87	0.097	38.45	-18.58	22.02	0.159	40.61	-18.59
846.50	5	QPSK	H	225	105	1 / 24	15.58	6.60	**20.03**	0.101	38.45	-18.42	**22.18**	0.165	40.61	-18.43
846.50	5	16-QAM	H	225	105	1 / 24	14.82	6.60	**19.27**	0.085	38.45	-19.18	**21.42**	0.139	40.61	-19.19
846.50	5	64-QAM	H	225	105	1 / 24	13.79	6.60	**18.24**	0.067	38.45	-20.21	**20.39**	0.109	40.61	-20.22
846.50	5	256-QAM	H	225	105	1 / 24	10.84	6.60	**15.29**	**0.034**	38.45	-23.16	**17.44**	**0.055**	40.61	-23.17
829.00	10	QPSK	H	139	104	1 / 49	14.60	6.70	19.15	0.082	38.45	-19.30	21.30	0.135	40.61	-19.31
836.50	10	QPSK	H	139	104	1 / 49	15.43	6.70	**19.98**	0.100	38.45	-18.47	**22.13**	0.163	40.61	-18.48
844.00	10	QPSK	H	144	105	1 / 49	15.50	6.60	19.95	0.099	38.45	-18.50	22.10	0.162	40.61	-18.51
836.50	10	16-QAM	H	139	104	1 / 49	15.06	6.70	**19.61**	0.091	38.45	-18.84	**21.76**	0.150	40.61	-18.85
836.50	10	64-QAM	H	139	104	1 / 49	14.05	6.70	**18.60**	0.072	38.45	-19.85	**20.75**	0.119	40.61	-19.86
836.50	10	256-QAM	H	139	104	1 / 49	10.89	6.70	**15.44**	**0.035**	38.45	-23.01	**17.59**	**0.057**	40.61	-23.02
847.50	3	QPSK	V	243	67	1 / 14	15.46	6.65	19.96	0.099	38.45	-18.49	22.11	0.163	40.61	-18.50
847.50	3 (WCP)	QPSK	H	135	215	1 / 14	10.95	6.65	15.45	0.035	38.45	-23.00	17.60	0.058	40.61	-23.01

Table 7-15. ERP Data (Band 26/5)

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
831.50	15	QPSK	H	142	297	1 / 74	14.27	6.70	18.82	0.076	38.45	-19.63	20.97	0.125	40.61	-19.64
836.50	15	QPSK	H	233	278	1 / 74	14.89	6.70	**19.44**	0.088	38.45	-19.01	**21.59**	0.144	40.61	-19.02
841.50	15	QPSK	H	231	274	1 / 74	14.25	6.60	18.70	0.074	38.45	-19.75	20.85	0.122	40.61	-19.76
836.50	15	16-QAM	H	233	278	1 / 74	13.78	6.70	**18.33**	0.068	38.45	-20.12	**20.48**	0.112	40.61	-20.13
836.50	15	64-QAM	H	233	278	1 / 74	12.79	6.70	**17.34**	0.054	38.45	-21.11	**19.49**	0.089	40.61	-21.12
836.50	15	256-QAM	H	233	278	1 / 74	10.15	6.70	**14.70**	**0.030**	38.45	-23.75	**16.85**	**0.048**	40.61	-23.76

Table 7-16. ERP Data (Band 26)

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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
1710.70	1.4	QPSK	V	130	347	1 / 5	12.71	9.35	22.06	0.161	30.00	-7.94
1745.00	1.4	QPSK	V	128	338	1 / 0	13.87	9.11	**22.98**	0.199	30.00	-7.02
1779.30	1.4	QPSK	V	116	356	1 / 0	12.05	9.17	21.22	0.132	30.00	-8.78
1745.00	1.4	16-QAM	V	128	338	1 / 0	12.79	9.11	**21.90**	0.155	30.00	-8.10
1745.00	1.4	64-QAM	V	128	338	1 / 0	11.92	9.11	**21.03**	0.127	30.00	-8.97
1745.00	1.4	256-QAM	V	128	338	1 / 0	8.84	9.11	**17.95**	**0.062**	30.00	-12.05
1711.50	3	QPSK	V	135	347	1 / 14	12.74	9.34	22.08	0.162	30.00	-7.92
1745.00	3	QPSK	V	127	333	1 / 0	13.71	9.11	**22.82**	0.191	30.00	-7.18
1778.50	3	QPSK	V	121	352	1 / 0	12.33	9.17	21.50	0.141	30.00	-8.50
1745.00	3	16-QAM	V	127	333	1 / 0	12.81	9.11	**21.92**	0.156	30.00	-8.08
1745.00	3	64-QAM	V	127	333	1 / 0	11.90	9.11	**21.01**	0.126	30.00	-8.99
1745.00	3	256-QAM	V	127	333	1 / 0	8.79	9.11	**17.90**	**0.062**	30.00	-12.10
1712.50	5	QPSK	V	132	328	1 / 24	12.49	9.34	21.83	0.152	30.00	-8.17
1745.00	5	QPSK	V	128	334	1 / 24	13.78	9.11	**22.89**	0.194	30.00	-7.11
1777.50	5	QPSK	V	118	342	1 / 0	12.95	9.16	22.11	0.163	30.00	-7.89
1745.00	5	16-QAM	V	128	334	1 / 24	13.05	9.11	**22.16**	0.164	30.00	-7.84
1745.00	5	64-QAM	V	128	334	1 / 24	11.97	9.11	**21.08**	0.128	30.00	-8.92
1745.00	5	256-QAM	V	128	334	1 / 24	8.81	9.11	**17.92**	**0.062**	30.00	-12.08
1715.00	10	QPSK	V	115	215	1 / 49	12.58	9.32	21.90	0.155	30.00	-8.10
1745.00	10	QPSK	V	102	210	1 / 49	13.42	9.11	**22.53**	0.179	30.00	-7.47
1775.00	10	QPSK	V	113	203	1 / 49	11.32	9.16	20.48	0.112	30.00	-9.52
1715.00	10	16-QAM	V	115	215	1 / 49	12.08	9.32	**21.40**	0.138	30.00	-8.60
1715.00	10	64-QAM	V	115	215	1 / 49	11.36	9.32	**20.68**	0.117	30.00	-9.32
1715.00	10	256-QAM	V	115	215	1 / 49	8.44	9.32	**17.76**	**0.060**	30.00	-12.24
1717.50	15	QPSK	V	140	317	1 / 74	14.03	9.30	**23.33**	0.215	30.00	-6.67
1745.00	15	QPSK	V	129	329	1 / 0	13.87	9.11	22.98	0.199	30.00	-7.02
1772.50	15	QPSK	V	125	331	1 / 0	13.33	9.15	22.48	0.177	30.00	-7.52
1717.50	15	16-QAM	V	140	317	1 / 74	13.21	9.30	**22.51**	0.178	30.00	-7.49
1717.50	15	64-QAM	V	140	317	1 / 74	12.26	9.30	**21.56**	0.143	30.00	-8.44
1717.50	15	256-QAM	V	140	317	1 / 74	9.08	9.30	**18.38**	**0.069**	30.00	-11.62
1720.00	20	QPSK	V	135	337	1 / 99	14.10	9.28	**23.38**	**0.218**	30.00	-6.62
1745.00	20	QPSK	V	121	341	1 / 99	13.87	9.11	22.98	0.199	30.00	-7.02
1770.00	20	QPSK	V	121	351	1 / 0	13.92	9.14	23.06	0.202	30.00	-6.94
1720.00	20	16-QAM	V	135	337	1 / 99	13.48	9.28	**22.76**	0.189	30.00	-7.24
1720.00	20	64-QAM	V	135	337	1 / 99	12.32	9.28	**21.60**	0.145	30.00	-8.40
1720.00	20	256-QAM	V	135	337	1 / 99	9.18	9.28	**18.46**	**0.070**	30.00	-11.54
1720.00	20	QPSK	H	232	361	1 / 99	12.69	9.28	21.97	0.157	30.00	-8.03
1720.00	20 (WCP)	QPSK	V	106	46	1 / 99	9.06	9.28	18.34	0.068	30.00	-11.66

Table 7-17. EIRP Data (Band 66/4)

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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
1850.70	1.4	QPSK	V	100	24	1 / 5	12.89	9.88	22.77	0.189	33.01	-10.24
1882.50	1.4	QPSK	V	100	30	1 / 5	13.41	10.12	**23.53**	0.226	33.01	-9.48
1914.30	1.4	QPSK	V	100	10	1 / 0	12.42	10.34	22.76	0.189	33.01	-10.25
1882.50	1.4	16-QAM	V	100	30	1 / 5	12.54	10.12	**22.66**	0.185	33.01	-10.35
1882.50	1.4	64-QAM	V	100	30	1 / 5	11.45	10.12	**21.57**	0.144	33.01	-11.44
1882.50	1.4	256-QAM	V	100	30	1 / 5	9.53	10.12	**19.65**	**0.092**	33.01	-13.36
1851.50	3	QPSK	V	100	24	1 / 14	12.99	9.88	22.87	0.194	33.01	-10.14
1882.50	3	QPSK	V	100	26	1 / 14	13.51	10.12	**23.63**	0.231	33.01	-9.38
1913.50	3	QPSK	V	100	12	1 / 0	11.82	10.33	22.15	0.164	33.01	-10.86
1882.50	3	16-QAM	V	100	26	1 / 14	12.75	10.12	**22.87**	0.194	33.01	-10.14
1882.50	3	64-QAM	V	100	26	1 / 14	11.93	10.12	**22.05**	0.160	33.01	-10.96
1882.50	3	256-QAM	V	100	26	1 / 14	9.94	10.12	**20.06**	**0.101**	33.01	-12.95
1852.50	5	QPSK	V	100	24	1 / 24	13.94	9.89	23.83	0.242	33.01	-9.18
1882.50	5	QPSK	V	100	28	1 / 24	14.48	10.12	**24.60**	0.289	33.01	-8.41
1912.50	5	QPSK	V	100	7	1 / 24	13.02	10.33	23.35	0.216	33.01	-9.66
1882.50	5	16-QAM	V	100	28	1 / 24	13.61	10.12	**23.73**	0.236	33.01	-9.28
1882.50	5	64-QAM	V	100	28	1 / 24	12.75	10.12	**22.87**	0.194	33.01	-10.14
1882.50	5	256-QAM	V	100	28	1 / 24	9.84	10.12	**19.96**	**0.099**	33.01	-13.05
1855.00	10	QPSK	V	102	27	1 / 49	13.72	9.91	23.63	0.231	33.01	-9.38
1882.50	10	QPSK	V	100	25	1 / 49	14.50	10.12	**24.62**	0.290	33.01	-8.39
1910.00	10	QPSK	V	100	26	1 / 0	12.83	10.31	23.14	0.206	33.01	-9.87
1882.50	10	16-QAM	V	100	25	1 / 49	13.48	10.12	**23.60**	0.229	33.01	-9.41
1882.50	10	64-QAM	V	100	25	1 / 49	12.30	10.12	**22.42**	0.175	33.01	-10.59
1882.50	10	256-QAM	V	100	25	1 / 49	10.04	10.12	**20.16**	**0.104**	33.01	-12.85
1857.50	15	QPSK	V	100	26	1 / 0	14.37	9.93	24.30	0.269	33.01	-8.71
1882.50	15	QPSK	V	100	30	1 / 74	14.72	10.12	**24.84**	0.305	33.01	-8.17
1907.50	15	QPSK	V	100	22	1 / 0	13.62	10.30	23.92	0.247	33.01	-9.09
1882.50	15	16-QAM	V	100	30	1 / 74	13.44	10.12	**23.56**	0.227	33.01	-9.45
1882.50	15	64-QAM	V	100	30	1 / 74	12.15	10.12	**22.27**	0.169	33.01	-10.74
1882.50	15	256-QAM	V	100	30	1 / 74	9.91	10.12	**20.03**	**0.101**	33.01	-12.98
1860.00	20	QPSK	V	100	26	1 / 99	14.54	9.95	24.49	0.281	33.01	-8.52
1882.50	20	QPSK	V	100	31	1 / 0	14.86	10.12	**24.98**	**0.315**	33.01	-8.03
1905.00	20	QPSK	V	100	27	1 / 0	13.15	10.28	23.43	0.221	33.01	-9.58
1882.50	20	16-QAM	V	100	31	1 / 0	13.98	10.12	**24.10**	0.257	33.01	-8.91
1882.50	20	64-QAM	V	100	31	1 / 0	12.93	10.12	**23.05**	0.202	33.01	-9.96
1882.50	20	256-QAM	V	100	31	1 / 0	10.63	10.12	**20.75**	**0.119**	33.01	-12.26
1882.50	20	QPSK	H	100	189	1 / 0	14.47	10.12	24.59	0.288	33.01	-8.42
1882.50	20 (WCP)	QPSK	V	100	25	1 / 0	10.70	10.12	20.82	0.121	33.01	-12.19

Table 7-18. EIRP Data (Band 25/2)

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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
2307.50	5	QPSK	V	145	50	1 / 0	12.33	10.23	**22.56**	**0.180**	23.98	-1.42
2312.50	5	QPSK	V	102	47	1 / 24	12.34	10.21	22.55	0.180	23.98	-1.43
2307.50	5	16-QAM	V	145	50	1 / 0	11.59	10.23	**21.82**	0.152	23.98	-2.16
2307.50	5	64-QAM	V	145	50	1 / 0	10.59	10.23	20.82	0.121	23.98	-3.16
2307.50	5	64-QAM	V	145	50	1 / 0	7.51	10.23	**17.74**	**0.059**	23.98	-6.24
2310.00	10	QPSK	V	118	59	1 / 0	12.18	10.22	**22.40**	0.174	23.98	-1.58
2310.00	10	16-QAM	V	118	59	1 / 0	11.42	10.22	21.64	0.146	23.98	-2.34
2310.00	10	64-QAM	V	118	59	1 / 0	10.41	10.22	20.63	0.116	23.98	-3.35
2310.00	10	64-QAM	V	118	59	1 / 0	7.31	10.22	**17.53**	**0.057**	23.98	-6.45
2307.50	5	QPSK	H	149	25	1 / 0	11.30	10.23	21.53	0.142	23.98	-2.45
2307.50	5 (WCP)	QPSK	V	238	189	1 / 0	9.06	10.23	19.29	0.085	23.98	-4.69

Table 7-19. EIRP Data (Band 30)

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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
2502.50	5	QPSK	H	158	344	1 / 0	12.72	9.40	22.12	0.163	33.01	-10.90
2535.00	5	QPSK	H	156	330	1 / 0	13.27	9.38	22.65	0.184	33.01	-10.36
2567.50	5	QPSK	H	115	337	1 / 0	13.30	9.45	**22.75**	0.188	33.01	-10.26
2535.00	5	16-QAM	H	156	330	1 / 0	12.66	9.38	**22.04**	0.160	33.01	-10.97
2535.00	5	64-QAM	H	156	330	1 / 0	11.33	9.38	**20.71**	0.118	33.01	-12.30
2535.00	5	256-QAM	H	156	330	1 / 0	8.60	9.38	**17.98**	**0.063**	33.01	-15.03
2505.00	10	QPSK	H	156	345	1 / 0	12.26	9.39	21.65	0.146	33.01	-11.36
2535.00	10	QPSK	H	155	331	1 / 0	13.03	9.38	22.41	0.174	33.01	-10.60
2565.00	10	QPSK	H	116	338	1 / 49	13.13	9.44	**22.57**	0.181	33.01	-10.44
2565.00	10	16-QAM	H	116	338	1 / 49	12.26	9.44	**21.70**	0.148	33.01	-11.31
2565.00	10	64-QAM	H	116	338	1 / 49	10.90	9.44	**20.34**	0.108	33.01	-12.67
2565.00	10	256-QAM	H	116	338	1 / 49	7.81	9.44	**17.25**	**0.053**	33.01	-15.76
2507.50	15	QPSK	H	155	345	1 / 0	12.40	9.39	21.79	0.151	33.01	-11.22
2535.00	15	QPSK	H	158	330	1 / 0	13.38	9.38	22.76	0.189	33.01	-10.25
2562.50	15	QPSK	H	115	335	1 / 74	13.40	9.43	**22.83**	0.192	33.01	-10.18
2562.50	15	16-QAM	H	115	335	1 / 74	12.63	9.43	**22.06**	0.161	33.01	-10.95
2562.50	15	64-QAM	H	115	335	1 / 74	11.04	9.43	**20.47**	0.111	33.01	-12.54
2562.50	15	256-QAM	H	115	335	1 / 74	7.93	9.43	**17.36**	**0.054**	33.01	-15.65
2510.00	20	QPSK	H	152	346	1 / 99	12.74	9.39	22.13	0.163	33.01	-10.88
2535.00	20	QPSK	H	153	332	1 / 0	13.41	9.38	22.79	0.190	33.01	-10.22
2560.00	20	QPSK	H	117	332	1 / 99	13.45	9.42	**22.87**	**0.194**	33.01	-10.14
2560.00	20	16-QAM	H	117	332	1 / 99	12.68	9.42	**22.10**	0.162	33.01	-10.91
2560.00	20	64-QAM	H	117	332	1 / 99	10.89	9.42	**20.31**	0.107	33.01	-12.70
2560.00	20	256-QAM	H	117	332	1 / 99	7.83	9.42	**17.25**	**0.053**	33.01	-15.76
2560.00	20	QPSK	V	293	341	1 / 99	11.80	9.42	21.22	0.132	33.01	-11.79
2560.00	20	QPSK	H	100	37	1 / 99	13.28	9.42	22.70	0.186	33.01	-10.31

Table 7-20. EIRP Data (Band 7)

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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
2498.50	5	QPSK	H	110	328	1 / 0	14.95	9.43	24.38	0.274	33.01	-8.63
2502.50	5	QPSK	H	116	311	1 / 0	14.22	9.43	23.65	0.232	33.01	-9.36
2593.00	5	QPSK	H	125	289	1 / 0	15.31	9.55	24.86	0.306	33.01	-8.15
2687.50	5	QPSK	H	105	318	1 / 0	16.70	9.82	**26.52**	0.449	33.01	-6.49
2687.50	5	16-QAM	H	105	318	1 / 0	15.74	9.82	**25.56**	0.360	33.01	-7.45
2687.50	5	64-QAM	H	105	318	1 / 0	13.53	9.82	**23.35**	0.216	33.01	-9.66
2687.50	5	256-QAM	H	105	318	1 / 0	11.94	9.82	**21.76**	**0.150**	33.01	-11.25
2501.00	10	QPSK	H	112	331	1 / 0	14.95	9.43	24.38	0.274	33.01	-8.63
2505.00	10	QPSK	H	117	305	1 / 0	14.22	9.43	23.65	0.232	33.01	-9.36
2593.00	10	QPSK	H	118	292	1 / 0	15.31	9.55	24.86	0.306	33.01	-8.15
2685.00	10	QPSK	H	100	320	1 / 0	16.97	9.82	**26.79**	0.478	33.01	-6.22
2685.00	10	16-QAM	H	100	320	1 / 0	16.01	9.82	**25.83**	0.383	33.01	-7.18
2685.00	10	64-QAM	H	100	320	1 / 0	13.69	9.82	**23.51**	0.225	33.01	-9.50
2685.00	10	256-QAM	H	100	320	1 / 0	11.88	9.82	**21.70**	**0.148**	33.01	-11.31
2503.50	15	QPSK	H	114	325	1 / 0	15.04	9.43	24.47	0.280	33.01	-8.54
2507.50	15	QPSK	H	120	301	1 / 0	14.60	9.42	24.02	0.253	33.01	-8.99
2593.00	15	QPSK	H	115	289	1 / 0	15.43	9.55	24.98	0.315	33.01	-8.03
2682.50	15	QPSK	H	100	318	1 / 0	17.14	9.83	**26.97**	**0.498**	33.01	-6.04
2682.50	15	16-QAM	H	100	318	1 / 0	16.26	9.83	**26.09**	0.406	33.01	-6.92
2682.50	15	64-QAM	H	100	318	1 / 0	14.09	9.83	**23.92**	0.247	33.01	-9.09
2682.50	15	256-QAM	H	100	318	1 / 0	12.08	9.83	**21.91**	**0.155**	33.01	-11.10
2506.00	20	QPSK	H	116	321	1 / 0	15.38	9.42	24.80	0.302	33.01	-8.21
2510.00	20	QPSK	H	125	305	1 / 0	14.72	9.42	24.14	0.259	33.01	-8.87
2593.00	20	QPSK	H	116	289	1 / 0	15.60	9.55	25.15	0.328	33.01	-7.86
2680.00	20	QPSK	H	100	318	1 / 0	17.08	9.83	**26.91**	0.491	33.01	-6.10
2680.00	20	16-QAM	H	100	318	1 / 0	16.20	9.83	**26.03**	0.401	33.01	-6.98
2680.00	20	64-QAM	H	100	318	1 / 0	14.23	9.83	**24.06**	0.255	33.01	-8.95
2680.00	20	256-QAM	H	100	318	1 / 0	12.37	9.83	**22.20**	**0.166**	33.01	-10.81
2682.50	15	QPSK	V	131	299	1 / 0	14.42	9.83	24.25	0.266	33.01	-8.76
2682.50	15 (WCP)	QPSK	H	115	286	1 / 0	13.96	9.83	23.79	0.239	33.01	-9.22

Table 7-21. EIRP Data (Band 41 – PC2)

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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
2498.50	5	QPSK	H	105	321	1 / 0	11.92	9.43	21.35	0.137	33.01	-11.66
2593.00	5	QPSK	H	174	341	1 / 0	12.24	9.55	21.79	0.151	33.01	-11.22
2687.50	5	QPSK	H	100	340	1 / 0	13.36	9.82	**23.18**	0.208	33.01	-9.83
2687.50	5	16-QAM	H	100	340	1 / 0	12.84	9.82	**22.66**	0.184	33.01	-10.35
2687.50	5	64-QAM	H	100	340	1 / 0	11.25	9.82	**21.07**	0.128	33.01	-11.94
2687.50	5	256-QAM	H	100	340	1 / 0	8.76	9.82	**18.58**	**0.072**	33.01	-14.43
2501.00	10	QPSK	H	105	319	1 / 0	11.42	9.43	20.85	0.122	33.01	-12.16
2593.00	10	QPSK	H	175	343	1 / 0	11.70	9.55	21.25	0.133	33.01	-11.76
2685.00	10	QPSK	H	100	339	1 / 0	13.08	9.82	**22.90**	0.195	33.01	-10.11
2685.00	10	16-QAM	H	100	339	1 / 0	12.18	9.82	**22.00**	0.159	33.01	-11.01
2685.00	10	64-QAM	H	100	339	1 / 0	10.96	9.82	**20.78**	0.120	33.01	-12.23
2685.00	10	256-QAM	H	100	339	1 / 0	7.86	9.82	**17.68**	**0.059**	33.01	-15.33
2503.50	15	QPSK	H	101	321	1 / 0	11.79	9.43	21.22	0.132	33.01	-11.79
2593.00	15	QPSK	H	177	340	1 / 0	11.97	9.55	21.52	0.142	33.01	-11.49
2682.50	15	QPSK	H	100	338	1 / 0	13.46	9.83	**23.29**	**0.213**	33.01	-9.72
2682.50	15	16-QAM	H	100	338	1 / 0	12.60	9.83	**22.43**	0.175	33.01	-10.58
2682.50	15	64-QAM	H	100	338	1 / 0	11.30	9.83	**21.13**	0.130	33.01	-11.88
2682.50	15	256-QAM	H	100	338	1 / 0	8.40	9.83	**18.23**	**0.067**	33.01	-14.78
2506.00	20	QPSK	H	100	323	1 / 0	12.30	9.42	21.72	0.149	33.01	-11.29
2593.00	20	QPSK	H	182	338	1 / 0	12.96	9.55	22.51	0.178	33.01	-10.50
2680.00	20	QPSK	H	175	331	1 / 0	13.18	9.83	**23.01**	0.200	33.01	-10.00
2680.00	20	16-QAM	H	175	331	1 / 0	12.46	9.83	**22.29**	0.170	33.01	-10.72
2680.00	20	64-QAM	H	175	331	1 / 0	11.14	9.83	**20.97**	0.125	33.01	-12.04
2680.00	20	256-QAM	H	175	331	1 / 0	8.17	9.83	**18.00**	**0.063**	33.01	-15.01
2682.50	15	QPSK	V	400	328	1 / 0	12.85	9.83	22.68	0.185	33.01	-10.33
2682.50	15 (WCP)	QPSK	H	114	271	1 / 0	11.86	9.83	21.69	0.148	33.01	-11.32

Table 7-22. EIRP Data (Band 41 – PC3)

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7.9 Radiated Spurious Emissions Measurements

Test Overview

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

Test Procedures Used

KDB 971168 D01 v03r01 – Section 5.8

ANSI/TIA-603-E-2016 – Section 2.2.12

Test Settings

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

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Test Setup

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

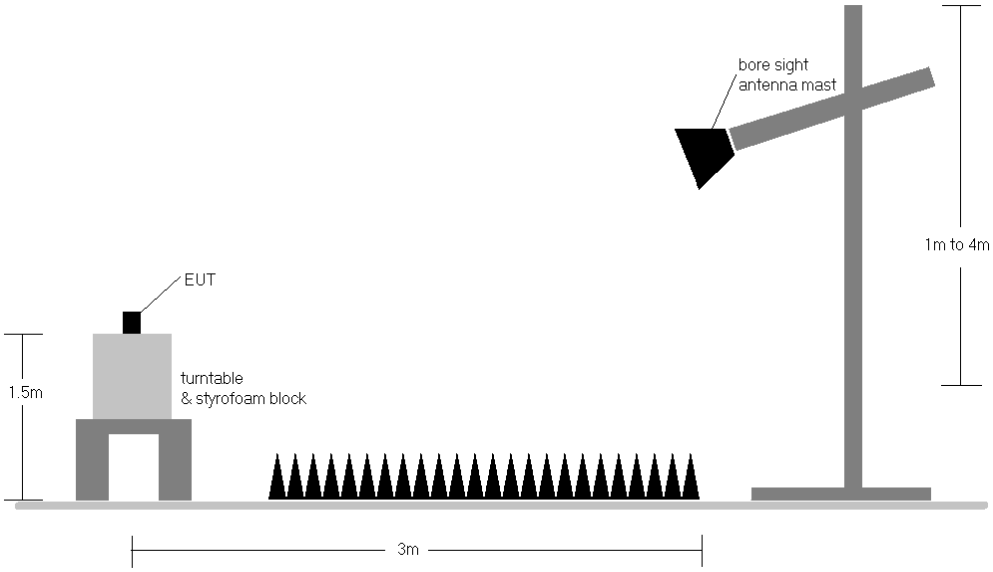

Figure 7-9. Test Instrument & Measurement Setup

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.

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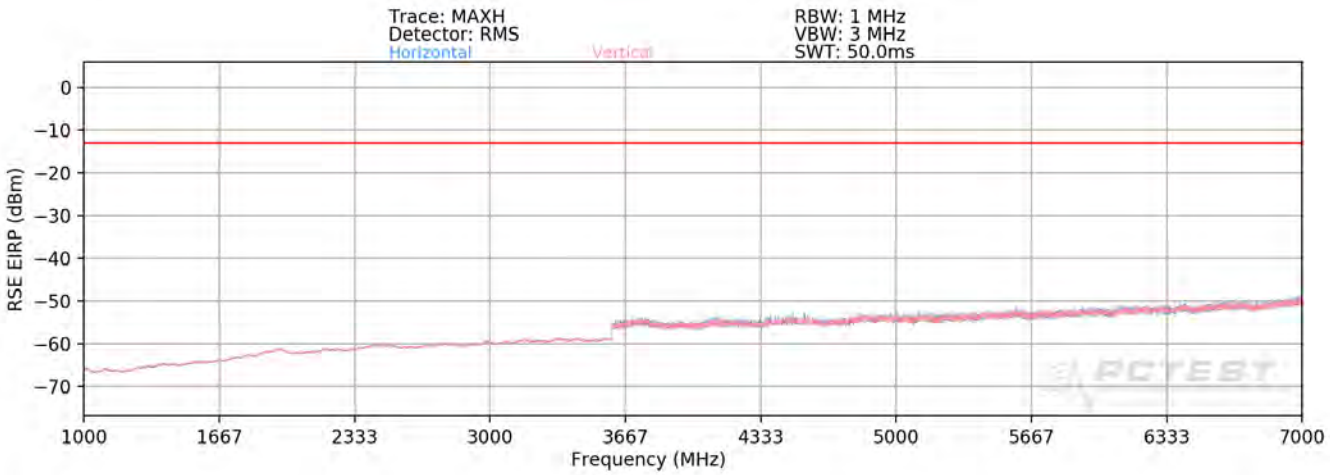
Band 71



Plot 7-498. Radiated Spurious Plot above 1GHz (Band 71)

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

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1346.00	H	113	169	-69.08	7.47	-61.61	-48.6
2019.00	H	-	-	-77.63	8.68	-68.95	-55.9
2692.00	H	-	-	-78.30	9.99	-68.31	-55.3

Table 7-23. Radiated Spurious Data (Band 71 – Low Channel)

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

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1361.00	H	340	170	-61.08	7.48	-53.59	-40.6
2041.50	H	218	180	-74.67	8.76	-65.91	-52.9
2722.00	H	-	-	-78.88	10.08	-68.80	-55.8
3402.50	H	-	-	-76.25	9.80	-66.45	-53.4

Table 7-24. Radiated Spurious Data (Band 71 – Mid Channel)

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

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1376.00	H	-	-	-78.98	7.46	-71.52	-58.5
2064.00	H	-	-	-78.98	8.80	-70.18	-57.2

Table 7-25. Radiated Spurious Data (Band 71 – High Channel)

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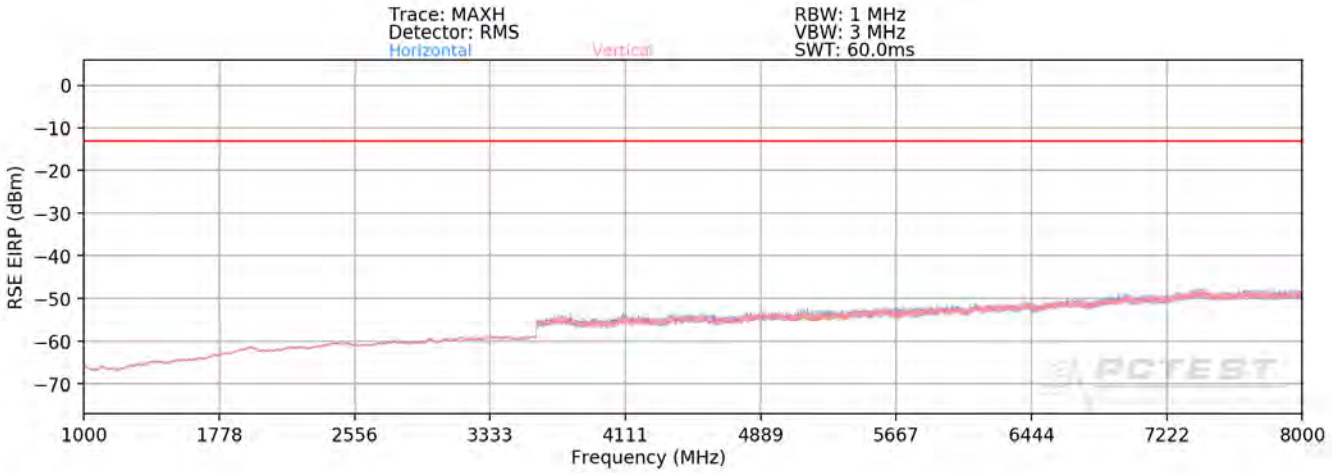
Band 12



Plot 7-499. Radiated Spurious Plot above 1GHz (Band 12)

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

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1403.00	H	256	175	-69.64	7.47	-62.17	-49.2
2104.50	H	-	-	-77.75	8.84	-68.91	-55.9
2806.00	H	-	-	-77.89	10.14	-67.75	-54.8

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

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

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1415.00	H	307	183	-68.91	7.63	-61.28	-48.3
2122.50	H	-	-	-79.50	8.86	-70.64	-57.6
2830.00	H	-	-	-78.04	10.10	-67.95	-54.9

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

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

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1427.00	H	299	191	-70.03	7.79	-62.24	-49.2
2140.50	H	-	-	-78.16	8.88	-69.28	-56.3
2854.00	H	-	-	-78.08	10.05	-68.02	-55.0

Table 7-28. Radiated Spurious Data (Band 12 – High Channel)

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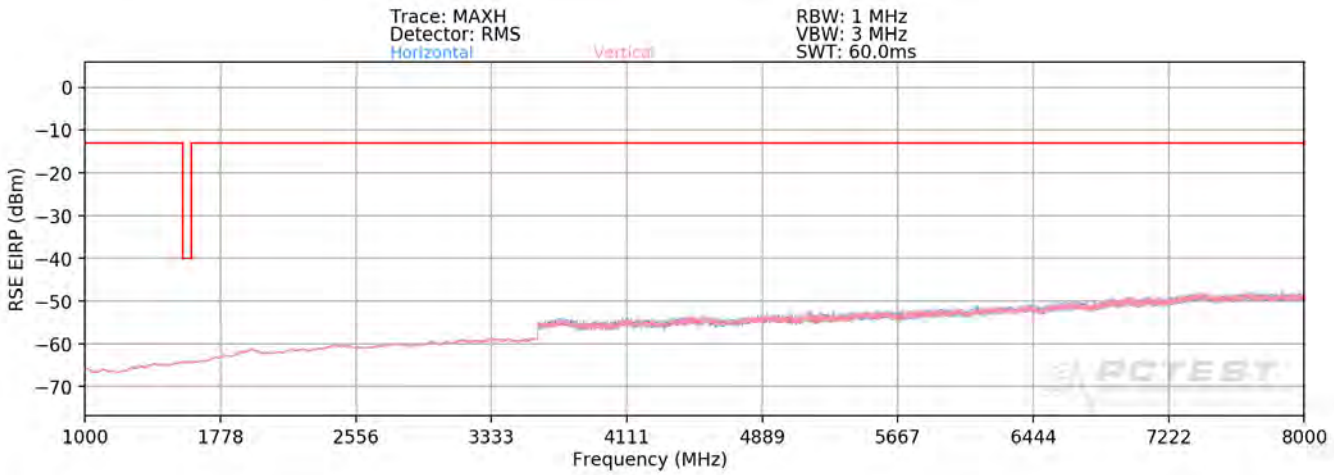
Band 13



Plot 7-500. Radiated Spurious Plot above 1GHz (Band 13)

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

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
2346.00	H	-	-	-78.40	9.43	-68.97	-56.0
3128.00	H	-	-	-76.19	9.34	-66.85	-53.8

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

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

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1564.00	H	112	148	-77.15	8.53	-68.62	-28.6

Table 7-30. Radiated Spurious Data (Band 13 – 1559-1610MHz Band)

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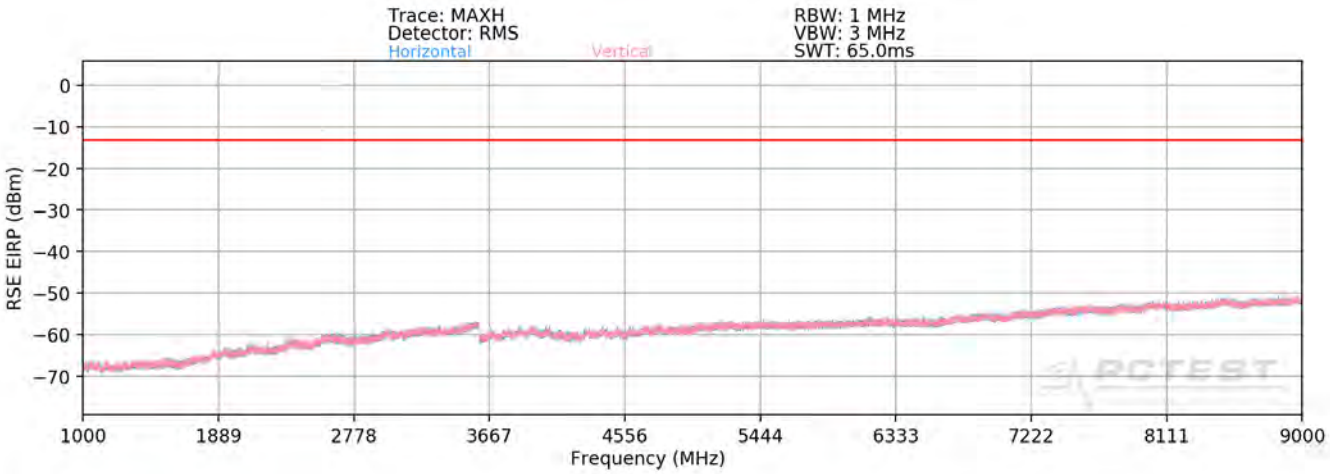
Band 26/5



Plot 7-501. Radiated Spurious Plot above 1GHz (Band 26/5)

OPERATING FREQUENCY:	825.50	MHz
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	3.0	MHz
DISTANCE:	3	meters
LIMIT:	-13	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1651.00	H	-	-	-80.77	8.95	-71.82	-58.8
2476.50	H	-	-	-79.27	9.66	-69.61	-56.6

Table 7-31. Radiated Spurious Data (Band 26/5 – Low Channel)

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OPERATING FREQUENCY: 836.50 MHz
MODULATION SIGNAL: QPSK
BANDWIDTH: 3.0 MHz
DISTANCE: 3 meters
LIMIT: -13 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1673.00	H	-	-	-83.18	8.95	-74.23	-61.2
2509.50	H	-	-	-82.52	9.75	-72.77	-59.8
3346.00	H	-	-	-77.05	9.60	-67.45	-54.4

Table 7-32. Radiated Spurious Data (Band 26/5 – Mid Channel)

OPERATING FREQUENCY: 847.50 MHz
MODULATION SIGNAL: QPSK
BANDWIDTH: 3.0 MHz
DISTANCE: 3 meters
LIMIT: -13 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1695.00	H	140	370	-77.91	8.95	-68.96	-56.0
2542.50	H	-	-	-76.73	9.74	-66.98	-54.0
3390.00	H	-	-	-75.29	9.76	-65.53	-52.5

Table 7-33. Radiated Spurious Data (Band 26/5 – High Channel)

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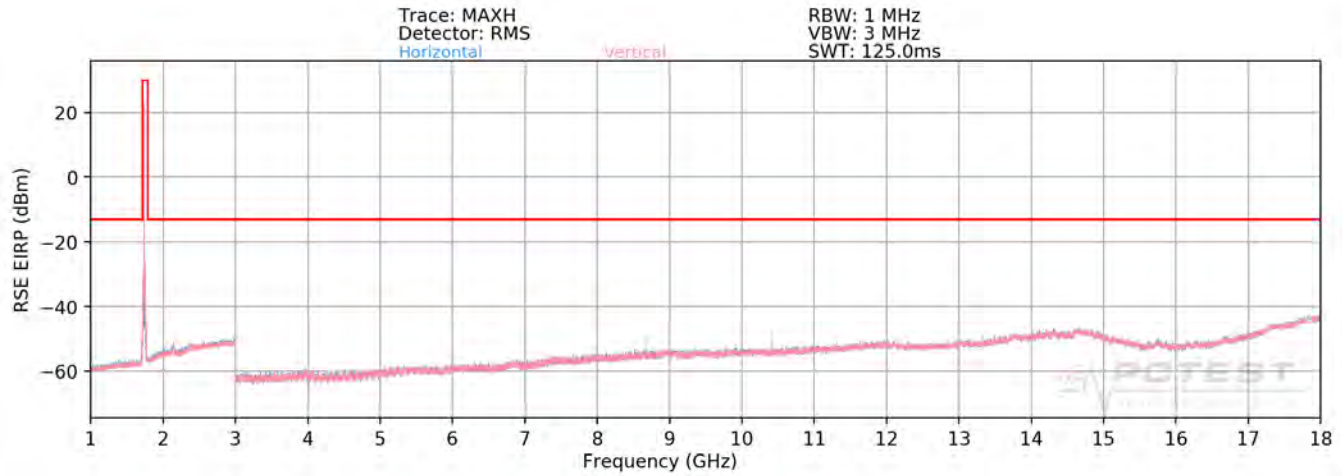
Band 66/4



Plot 7-502. Radiated Spurious Plot above 1GHz (Band 66/4)

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

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3440.00	H	-	-	-72.77	9.84	-62.93	-49.9
5160.00	H	-	-	-72.24	10.71	-61.53	-48.5
6880.00	H	-	-	-70.78	11.68	-59.10	-46.1
8600.00	H	298	360	-60.92	11.08	-49.84	-36.8
10320.00	H	301	15	-55.12	12.38	-42.74	-29.7
12040.00	H	-	-	-64.28	12.71	-51.57	-38.6

Table 7-34. Radiated Spurious Data (Band 66/4 – Low Channel)

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

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3490.00	H	-	-	-73.63	9.91	-63.72	-50.7
5235.00	H	-	-	-72.63	10.73	-61.89	-48.9
6980.00	H	-	-	-71.43	11.82	-59.60	-46.6
8725.00	H	303	6	-59.19	11.00	-48.20	-35.2
10470.00	H	115	288	-57.54	12.58	-44.96	-32.0
12215.00	H	-	-	-65.71	13.11	-52.60	-39.6

Table 7-35. Radiated Spurious Data (Band 66/4 – Mid Channel)

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

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3540.00	H	-	-	-73.22	9.89	-63.33	-50.3
5310.00	H	143	19	-67.46	10.69	-56.78	-43.8
7080.00	H	-	-	-71.02	11.79	-59.23	-46.2
8850.00	H	301	7	-56.03	11.00	-45.04	-32.0
10620.00	H	112	286	-57.63	12.58	-45.05	-32.1
12390.00	H	-	-	-66.30	13.33	-52.97	-40.0

Table 7-36. Radiated Spurious Data (Band 66/4 – High Channel)

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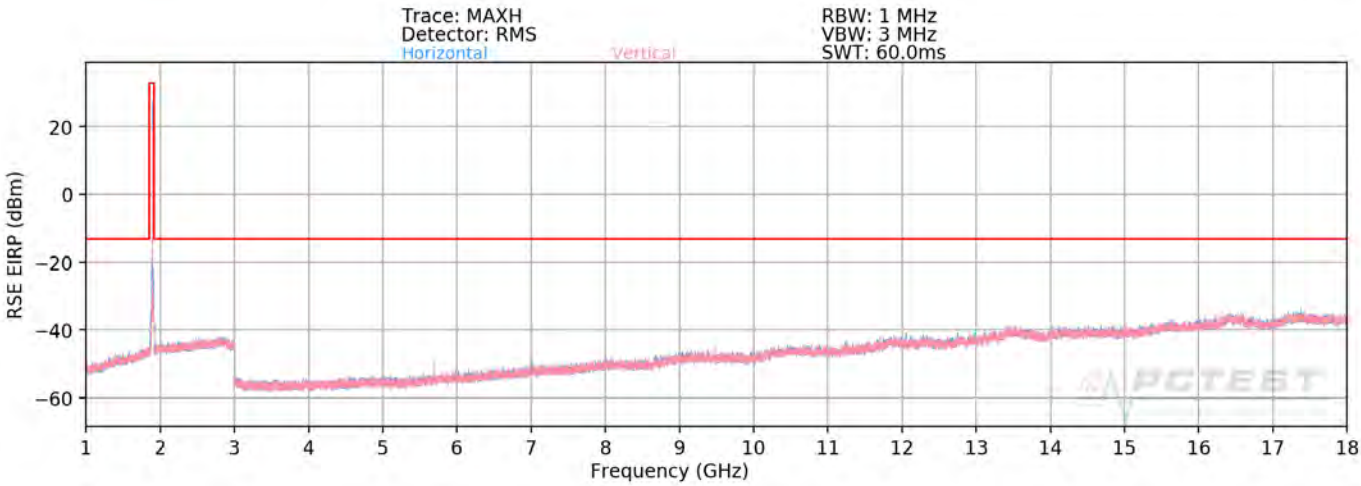
Band 25/2



Plot 7-503. Radiated Spurious Plot above 1GHz (Band 25/2)

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

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3720.00	V	111	300	-64.68	6.90	-57.78	-44.8
5580.00	V	106	331	-57.08	9.06	-48.02	-35.0
7440.00	V	-	-	-65.50	9.26	-56.24	-43.2
9300.00	V	-	-	-62.72	9.40	-53.32	-40.3

Table 7-37. Radiated Spurious Data (Band 25/2 – Low Channel)

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

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3765.00	V	-	-	-68.07	6.94	-61.13	-48.1
5647.50	V	106	328	-59.17	9.17	-50.01	-37.0
7530.00	V	-	-	-65.78	9.31	-56.48	-43.5
9412.50	V	101	141	-58.44	9.50	-48.94	-35.9
11295.00	V	-	-	-61.93	9.49	-52.44	-39.4
13177.50	V	-	-	-58.62	8.73	-49.90	-36.9

Table 7-38. Radiated Spurious Data (Band 25/2 – Mid Channel)

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

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3810.00	V	-	-	-67.51	7.07	-60.44	-47.4
5715.00	V	102	329	-58.11	9.04	-49.07	-36.1
7620.00	V	-	-	-65.15	9.27	-55.88	-42.9
9525.00	V	100	145	-58.00	9.46	-48.55	-35.5
11430.00	V	-	-	-61.57	9.49	-52.08	-39.1
13335.00	V	-	-	-57.79	8.76	-49.03	-36.0

Table 7-39. Radiated Spurious Data (Band 25/2 – High Channel)

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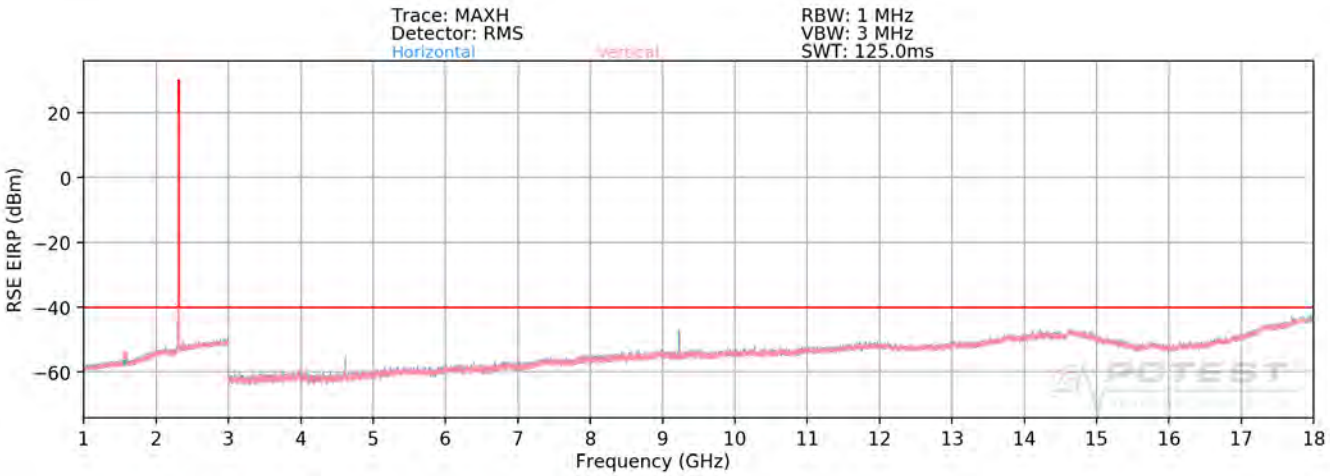
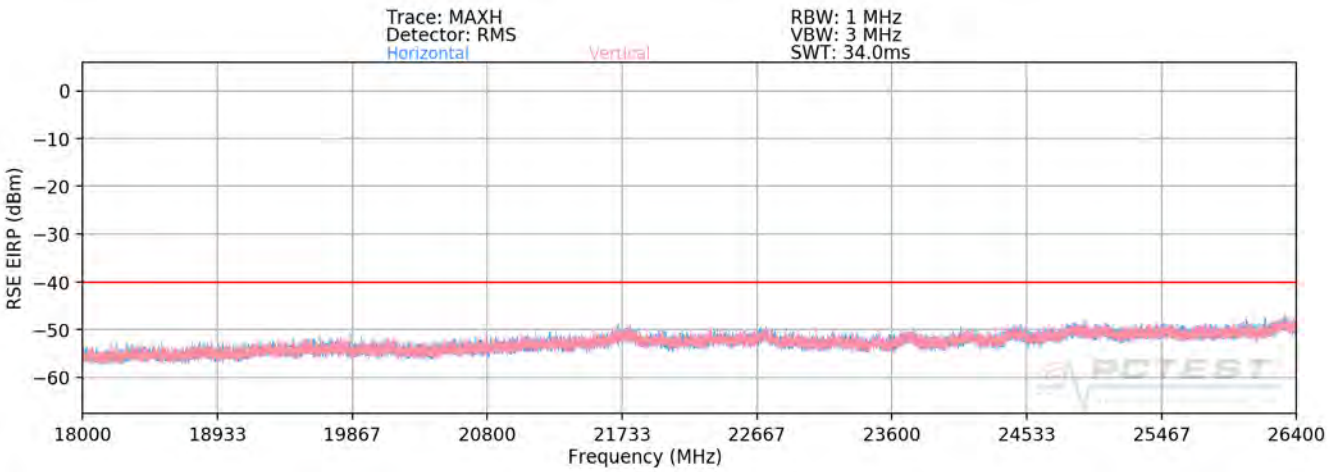
Band 30



Plot 7-504. Radiated Spurious Plot 1GHz - 18GHz (Band 30)



Plot 7-505. Radiated Spurious Plot 18GHz – 26.5GHz (Band 30)

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OPERATING FREQUENCY: 2310.00 MHz
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	V	353	2	-68.93	10.92	-58.01	-18.0
6930.00	V	-	-	-72.40	11.75	-60.65	-20.6
9240.00	V	111	20	-55.90	11.63	-44.27	-4.3
11550.00	V	-	-	-67.61	12.71	-54.90	-14.9
13860.00	V	188	2	-63.18	11.98	-51.20	-11.2
16170.00	V	251	25	-70.01	16.60	-53.41	-13.4

Table 7-40. Radiated Spurious Data (Band 30 – Mid Channel)

OPERATING FREQUENCY: 2310.00 MHz
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	V	255	15	-65.61	10.92	-54.69	-14.7
6930.00	V	-	-	-73.73	11.75	-61.98	-22.0
9240.00	V	191	29	-60.78	11.63	-49.15	-9.2
11550.00	V	-	-	-69.99	12.71	-57.28	-17.3
13860.00	V	248	311	-66.04	11.98	-54.06	-14.1
16170.00	V	400	1	-73.04	16.60	-56.44	-16.4

Table 7-41. Radiated Spurious Data with WCP (Band 30 – Mid Channel)

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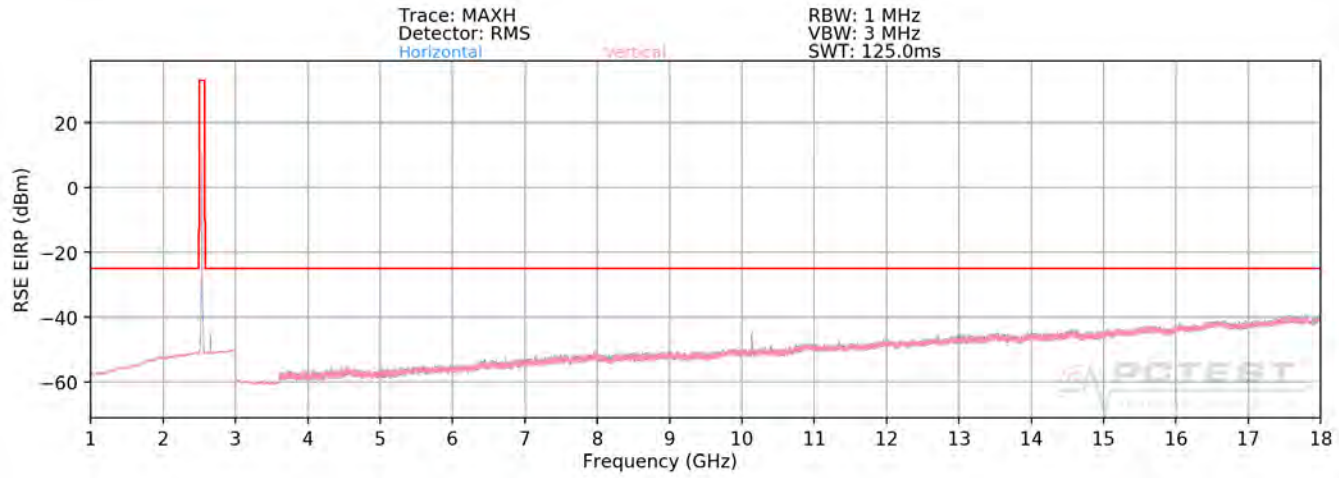
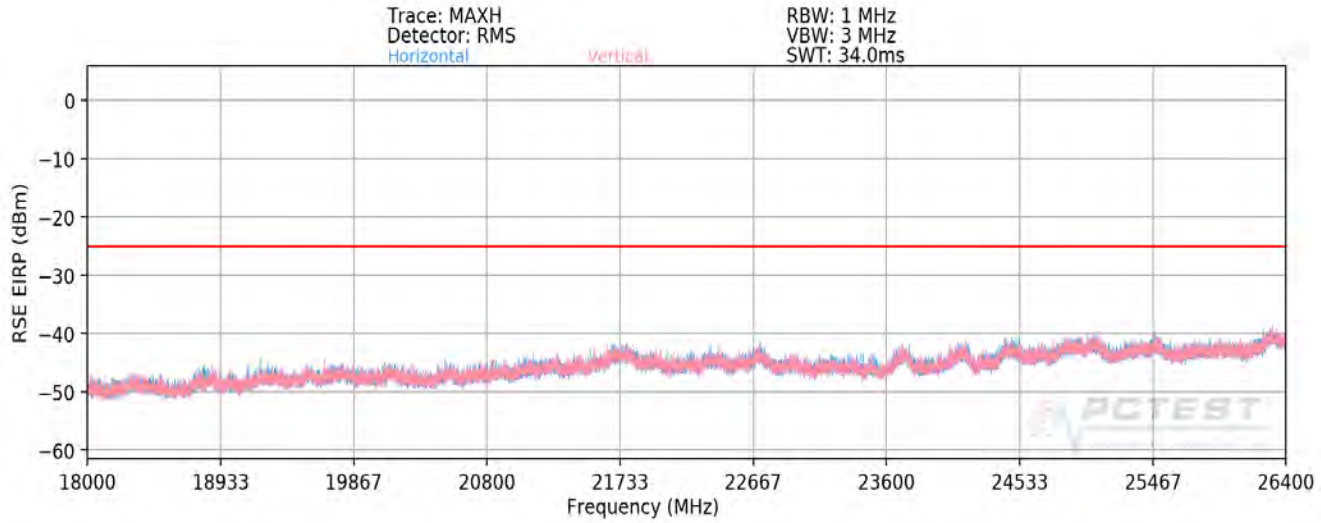
Band 7



Plot 7-506. Radiated Spurious Plot 1GHz - 18GHz (Band 7)



Plot 7-507. Radiated Spurious Plot 18GHz – 26.5GHz (Band 7)

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OPERATING FREQUENCY: 2510.00 MHz
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	352	2	-71.45	10.88	-60.56	-35.6
7530.00	H	-	-	-68.42	11.13	-57.29	-32.3
10040.00	H	358	341	-50.70	11.99	-38.71	-13.7
12550.00	H	-	-	-66.27	13.56	-52.71	-27.7
15060.00	H	-	-	-63.02	13.58	-49.45	-24.4

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

OPERATING FREQUENCY: 2535.00 MHz
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	-	-	-72.40	10.75	-61.65	-36.6
7605.00	H	-	-	-69.06	11.25	-57.81	-32.8
10140.00	H	111	31	-49.23	12.07	-37.16	-12.2
12675.00	H	-	-	-66.68	13.66	-53.01	-28.0
15210.00	H	-	-	-66.36	14.71	-51.65	-26.7

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

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OPERATING FREQUENCY:	2560.00	MHz
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	-	-	-71.66	10.68	-60.98	-36.0
7680.00	H	-	-	-68.73	11.39	-57.34	-32.3
10240.00	H	260	33	-49.24	12.18	-37.06	-12.1
12800.00	H	-	-	-66.23	13.50	-52.73	-27.7
15360.00	H	-	-	-66.07	15.29	-50.78	-25.8

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

OPERATING FREQUENCY:	20.00	MHz
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	-	-	-71.78	10.68	-61.10	-36.1
7680.00	H	-	-	-69.05	11.39	-57.66	-32.7
10240.00	H	251	21	-52.60	12.18	-40.42	-15.4
12800.00	H	-	-	-66.41	13.50	-52.91	-27.9
15360.00	H	-	-	-66.01	15.29	-50.72	-25.7

Table 7-45. Radiated Spurious Data with WCP (Band 7 – High Channel)

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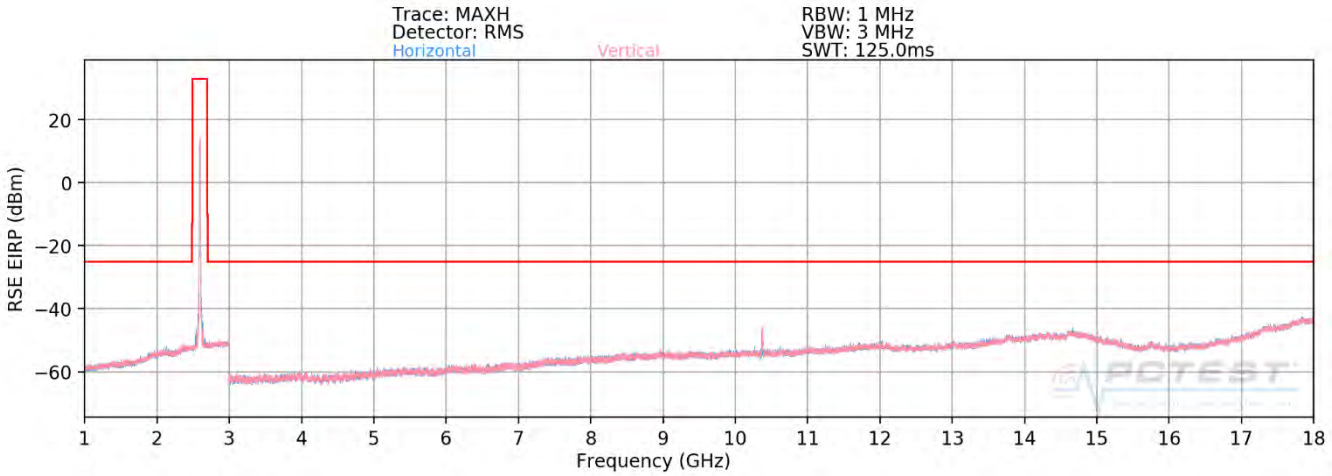
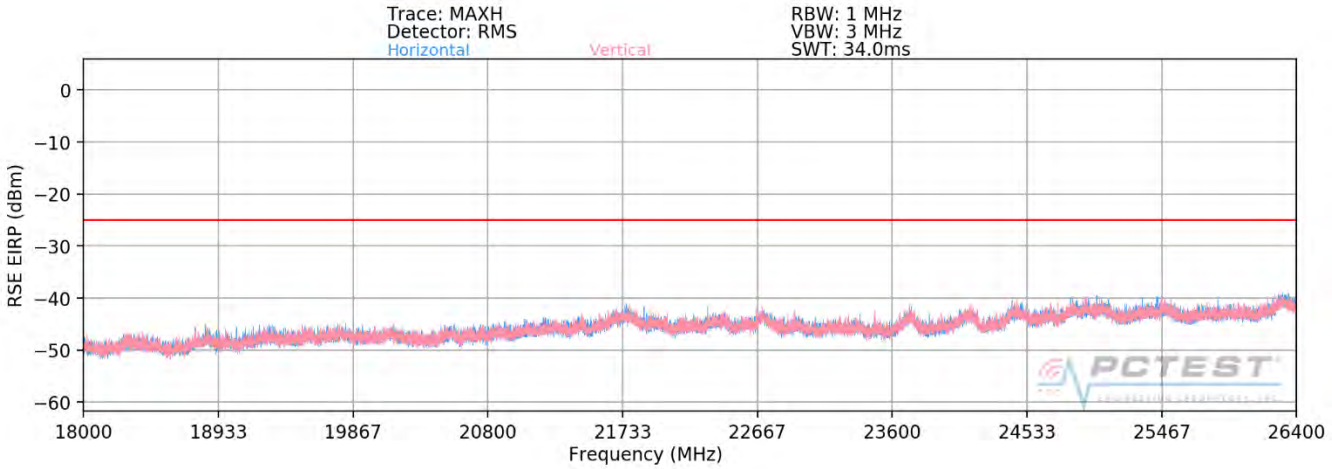
Band 41 (PC2)



Plot 7-508. Radiated Spurious Plot 1GHz - 18GHz (Band 41 (PC2))



Plot 7-509. Radiated Spurious Plot 18GHz – 26.5GHz (Band 41 (PC2))

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OPERATING FREQUENCY: 2507.50 MHz
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]
5015.00	H	347	20	-63.93	10.90	-53.03	-28.0
7522.50	H	348	0	-66.14	11.12	-55.03	-30.0
10030.00	H	111	38	-45.79	11.99	-33.80	-8.8
12537.50	H	235	29	-64.78	13.56	-51.22	-26.2
15045.00	H	377	53	-65.68	13.53	-52.15	-27.1
17552.50	H	-	-	-61.02	11.65	-49.37	-24.4

Table 7-46. Radiated Spurious Data (Band 41 (PC2) – Low Channel)

OPERATING FREQUENCY: 2593.00 MHz
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	112	294	-64.37	10.74	-53.63	-28.6
7779.00	H	338	9	-57.80	11.44	-46.36	-21.4
10372.00	H	114	358	-58.76	12.42	-46.34	-21.3
12965.00	H	194	6	-62.72	13.29	-49.43	-24.4
15558.00	H	234	56	-67.85	16.33	-51.52	-26.5

Table 7-47. Radiated Spurious Data (Band 41 (PC2) – Mid Channel)

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OPERATING FREQUENCY: 2682.50 MHz
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]
5365.00	H	356	6	-67.66	10.69	-56.96	-32.0
8047.50	H	322	24	-69.32	11.16	-58.17	-33.2
10730.00	H	112	289	-50.35	12.60	-37.75	-12.8
13412.50	H	227	52	-67.11	12.59	-54.53	-29.5
16095.00	H	176	58	-67.55	16.67	-50.89	-25.9

Table 7-48. Radiated Spurious Data (Band 41 (PC2) – High Channel)

OPERATING FREQUENCY: 2682.50 MHz
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]
5365.00	H	356	6	-67.66	10.69	-56.96	-32.0
8047.50	H	322	24	-69.32	11.16	-58.17	-33.2
10730.00	H	112	289	-50.35	12.60	-37.75	-12.8
13412.50	H	227	52	-67.11	12.59	-54.53	-29.5
16095.00	H	176	58	-67.55	16.67	-50.89	-25.9

Table 7-49. Radiated Spurious Data with WCP (Band 41 (PC2) – High Channel)

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Band 41/38 (PC3)

OPERATING FREQUENCY:	2507.50	MHz
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]
5015.00	H	112	319	-69.46	10.90	-58.56	-33.6
7522.50	H	322	101	-67.47	11.12	-56.36	-31.4
10030.00	H	111	32	-50.93	11.99	-38.94	-13.9
12537.50	H	-	-	-67.70	13.56	-54.14	-29.1
15045.00	H	-	-	-65.03	13.53	-51.50	-26.5
17552.50	H	-	-	-59.28	11.65	-47.63	-22.6

Table 7-50. Radiated Spurious Data (Band 41/38 (PC3) – Low Channel)

OPERATING FREQUENCY:	2593.00	MHz
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	111	289	-69.86	10.74	-59.12	-34.1
7779.00	H	355	18	-64.46	11.44	-53.02	-28.0
10372.00	H	114	288	-56.18	12.42	-43.76	-18.8
12965.00	H	-	-	-64.90	13.29	-51.61	-26.6

Table 7-51. Radiated Spurious Data (Band 41/38 (PC3) – Mid Channel)

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OPERATING FREQUENCY:	2682.50	MHz
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]
5365.00	H	111	297	-68.36	10.69	-57.66	-32.7
8047.50	H	348	12	-61.79	11.16	-50.64	-25.6
10730.00	H	112	288	-64.40	12.60	-51.80	-26.8
13412.50	H	201	10	-66.98	12.59	-54.40	-29.4
16095.00	H	-	-	-68.88	16.67	-52.22	-27.2

Table 7-52. Radiated Spurious Data (Band 41/38 (PC3) – High Channel)

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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 = trace average for continuous emissions, max hold for pulse emissions
6. The trace was allowed to stabilize

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Test Setup

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

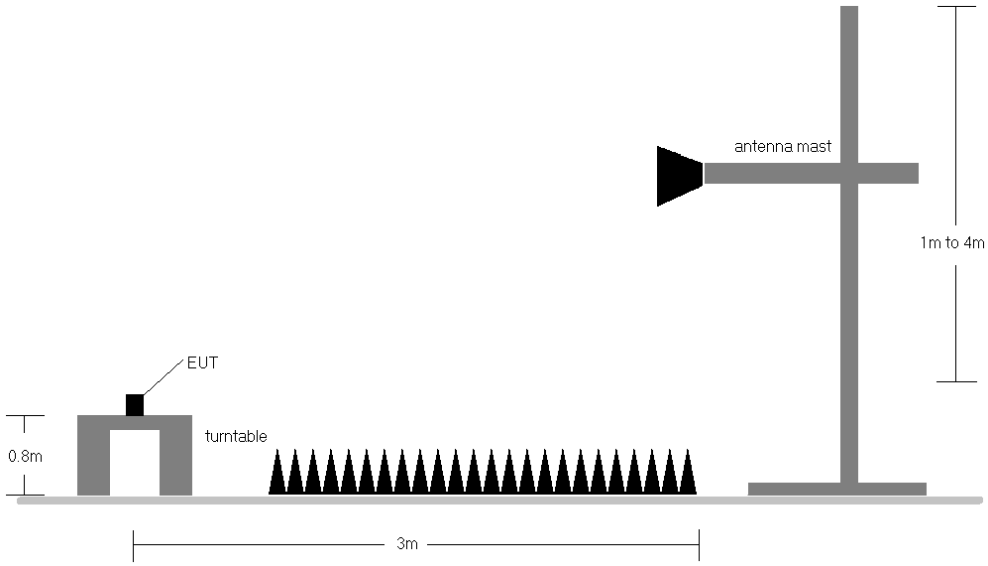

Figure 7-10. Test Instrument & Measurement Setup

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.

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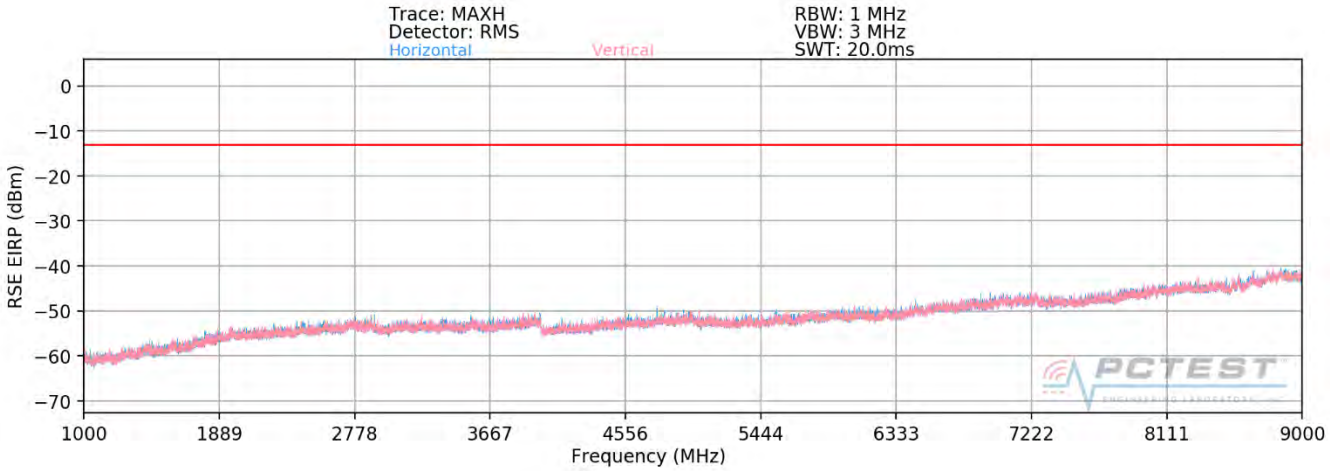
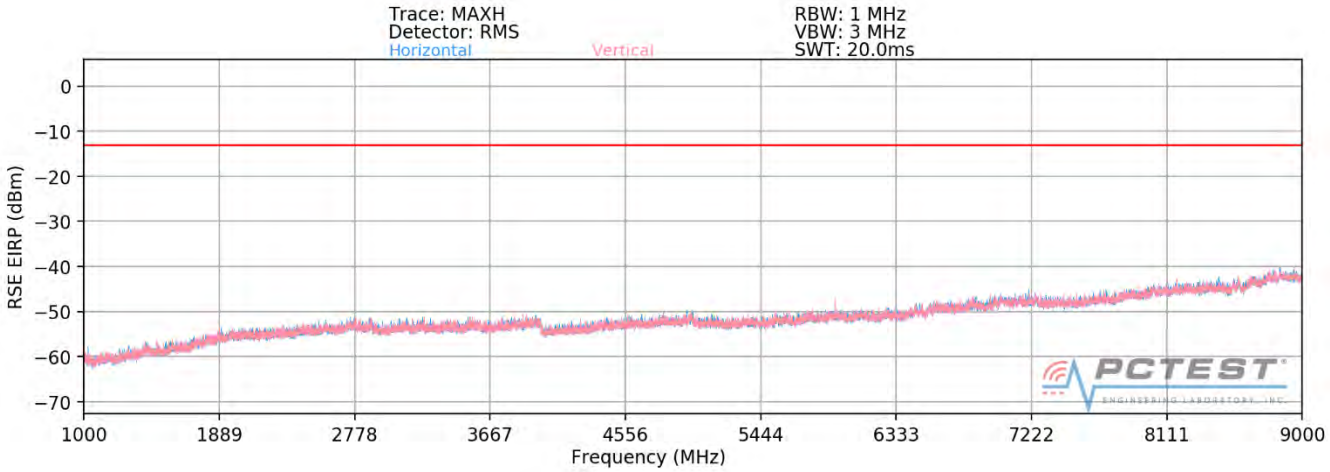
ULCA Band 5



Plot 7-510. Radiated Spurious Plot 1GHz - 18GHz (ULCA Band 5 Low Channel – PCC/SCC: 1RB)



Plot 7-511. Radiated Spurious Plot 1GHz - 18GHz (ULCA Band 5 High Channel – PCC/SCC: 1RB)

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OPERATING FREQUENCY (PCC):	829.00	MHz
OPERATING FREQUENCY (SCC):	838.90	MHz
CHANNEL (PCC):	20450	
CHANNEL (SCC):	20549	
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]
1658.00	H	-	-	-69.11	3.12	-65.99	-66.0
2487.00	H	-	-	-66.64	3.87	-62.77	-62.8

Plot 7-53. Radiated Spurious Data (ULCA B5 PCC: RB 1 Offset 49, SCC: RB 1 Offset 0 – Low Channel)

OPERATING FREQUENCY (PCC):	844.00	MHz
OPERATING FREQUENCY (SCC):	834.10	MHz
CHANNEL (PCC):	20600	
CHANNEL (SCC):	20501	
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]
1688.00	H	-	-	-69.26	3.18	-66.08	-66.1
2532.00	H	-	-	-67.24	4.10	-63.14	-63.1

Plot 7-54. Radiated Spurious Data (ULCA B5 PCC: RB 1 Offset 0, SCC: RB 1 Offset 49 – High Channel)

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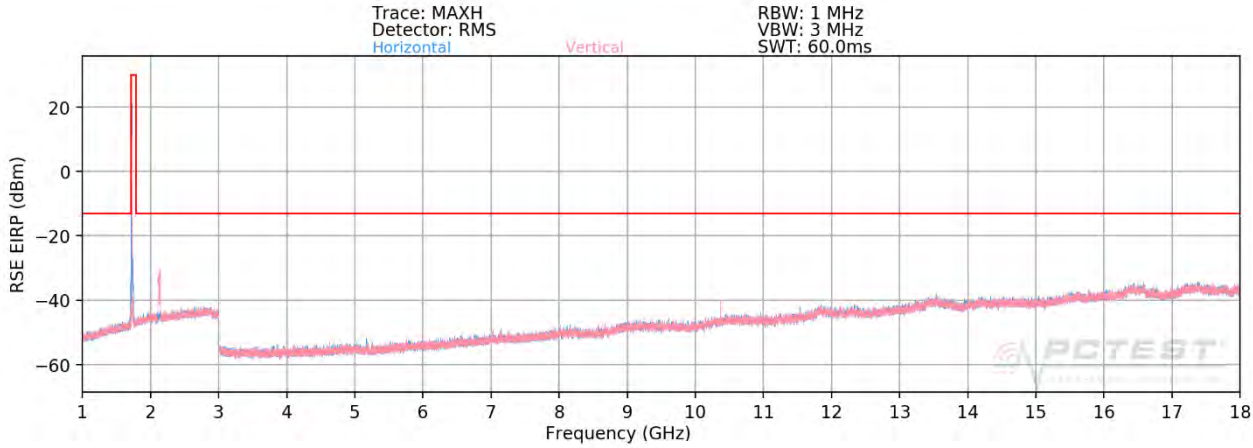
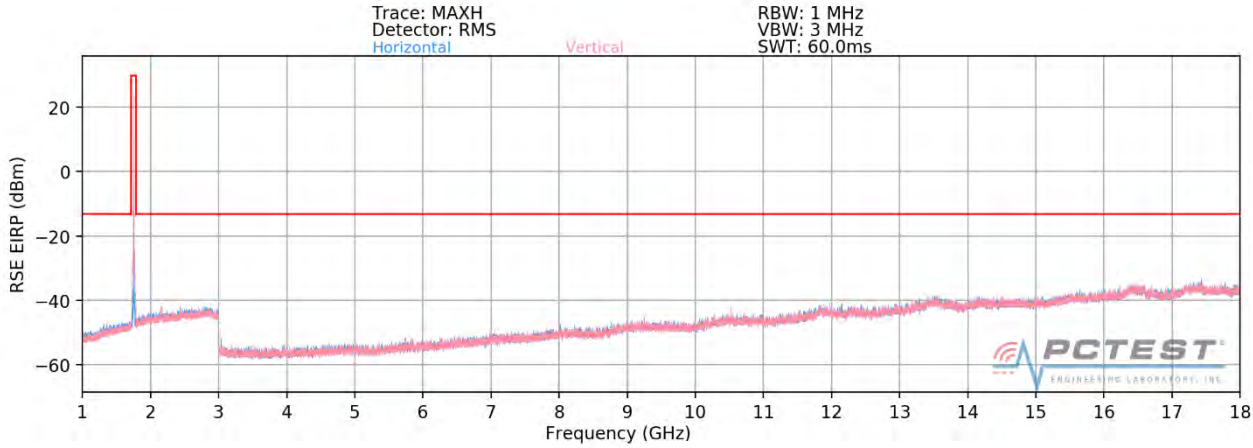
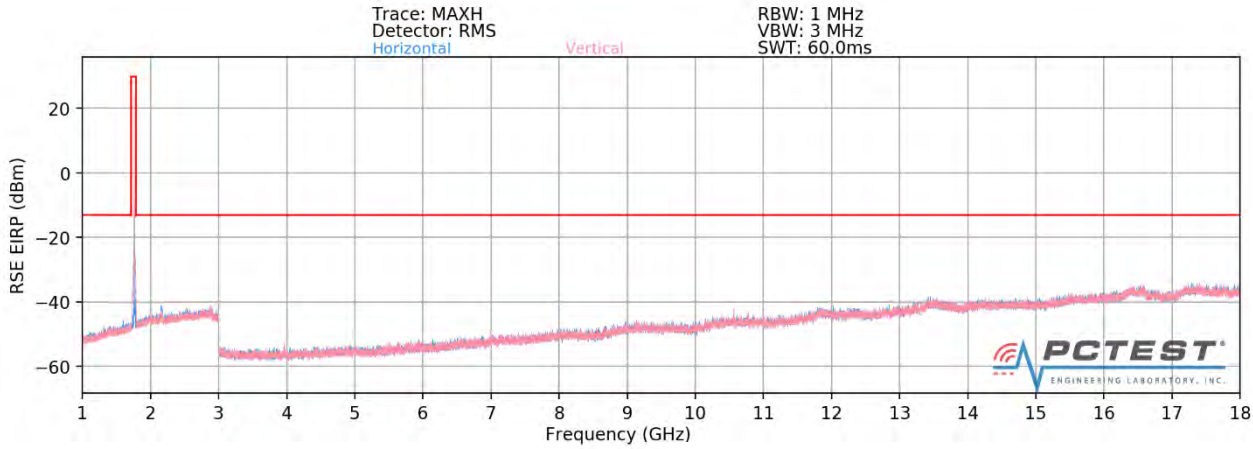
ULCA Band 66



Plot 7-512. Radiated Spurious Plot 1GHz - 18GHz (ULCA Band 66 Low Channel – PCC/SCC: 1RB)



Plot 7-513. Radiated Spurious Plot 1GHz - 18GHz (ULCA Band 66 Mid Channel – PCC/SCC: 1RB)



Plot 7-514. Radiated Spurious Plot 1GHz - 18GHz (ULCA Band 66 High Channel – PCC/SCC: 1RB)

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OPERATING FREQUENCY (PCC):	1720.00	MHz
OPERATING FREQUENCY (SCC):	1739.80	MHz
CHANNEL (PCC):	132072	
CHANNEL (SCC):	132270	
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	102	128	-65.81	6.28	-59.53	-59.5
5160.00	H	-	-	-69.29	8.98	-60.31	-60.3
6880.00	H	-	-	-67.49	9.42	-58.07	-58.1

Plot 7-55. Radiated Spurious Data (ULCA B66 PCC: RB 1 Offset 99, SCC: RB 1 Offset 0 – Low Channel)

OPERATING FREQUENCY (PCC):	1745.00	MHz
OPERATING FREQUENCY (SCC):	1764.80	MHz
CHANNEL (PCC):	132322	
CHANNEL (SCC):	132520	
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	-	-	-68.16	6.47	-61.69	-61.7
5235.00	H	-	-	-69.66	8.97	-60.69	-60.7

Plot 7-56. Radiated Spurious Data (ULCA B66 PCC: RB 1 Offset 99, SCC: RB 1 Offset 0 – Mid Channel)

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OPERATING FREQUENCY (PCC):	1770.00	MHz
OPERATING FREQUENCY (SCC):	1750.20	MHz
CHANNEL (PCC):	132572	
CHANNEL (SCC):	132374	
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	-	-	-67.79	6.45	-61.34	-61.3
5310.00	H	-	-	-69.13	9.09	-60.03	-60.0

Plot 7-57. Radiated Spurious Data (ULCA B66 PCC: RB 1 Offset 0, SCC: RB 1 Offset 99 – High Channel)

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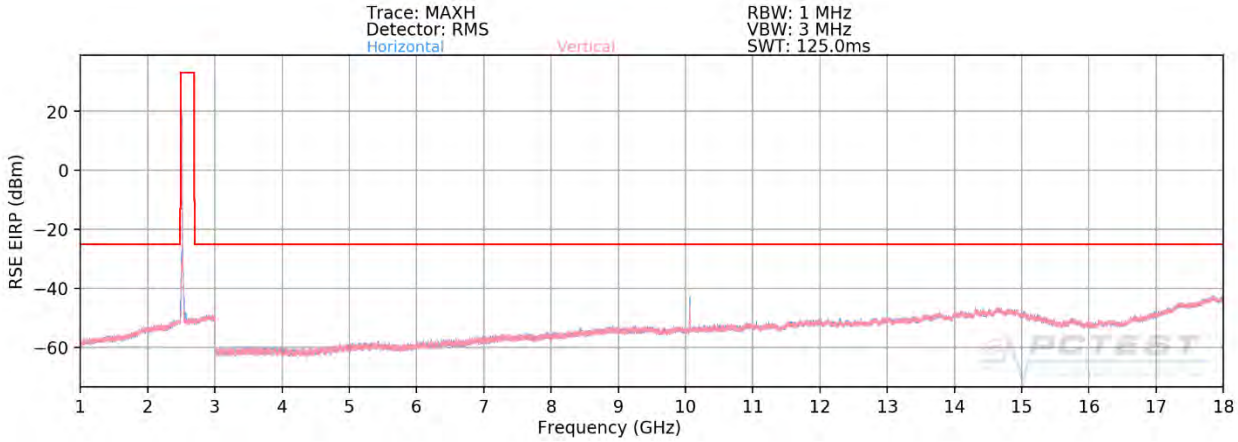
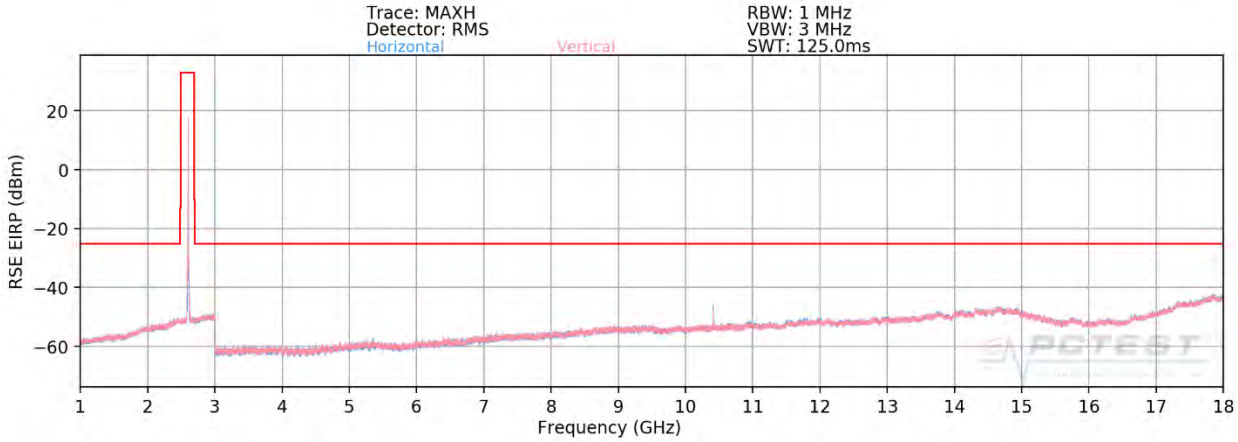
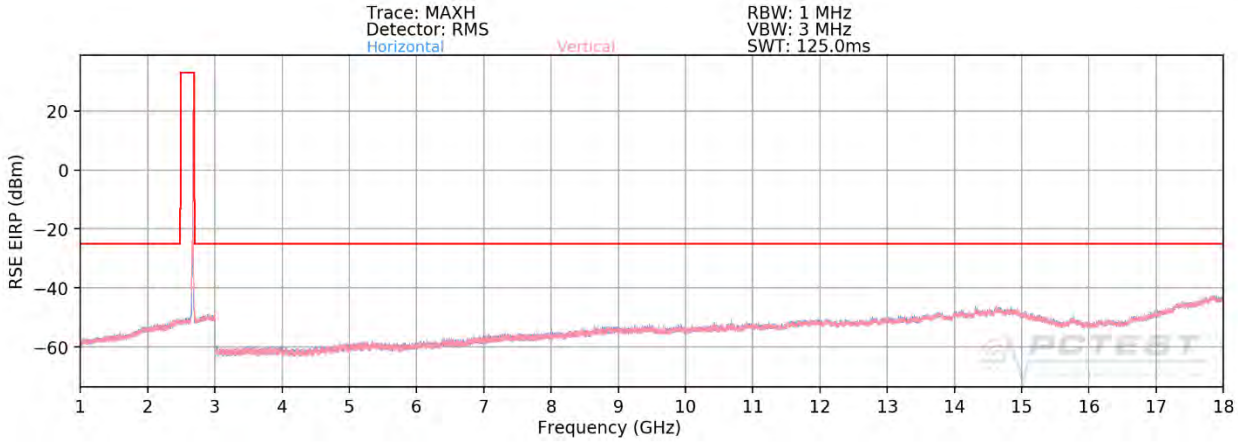
ULCA Band 41 (PC2)



Plot 7-515. Radiated Spurious Plot 1GHz - 18GHz (ULCA Band 41 (PC2) Low Channel – PCC/SCC: 1RB)



Plot 7-516. Radiated Spurious Plot 1GHz - 18GHz (ULCA Band 41 (PC2) Mid Channel – PCC/SCC: 1RB)



Plot 7-517. Radiated Spurious Plot 1GHz - 18GHz (ULCA Band 41 (PC2) High Channel – PCC/SCC: 1RB)

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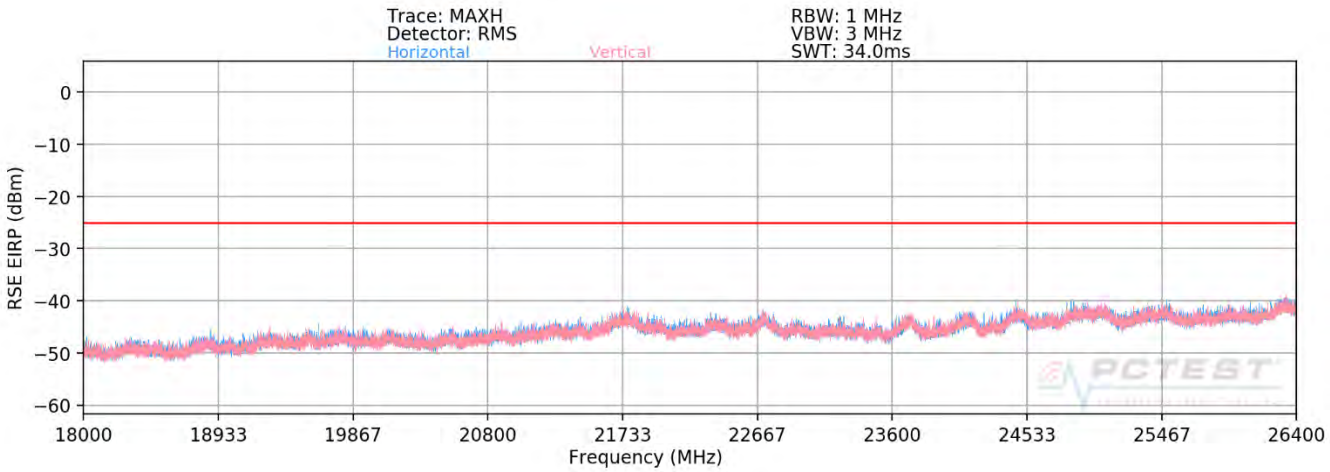

Plot 7-518. Radiated Spurious Plot 18GHz – 26.5GHz (ULCA Band 41 (PC2))

OPERATING FREQUENCY (PCC):	2506.00	MHz
OPERATING FREQUENCY (SCC):	2525.80	MHz
CHANNEL (PCC):	39750	
CHANNEL (SCC):	39948	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	20 + 20	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]
5012.00	H	112	319	-69.46	10.90	-58.56	-58.6
7518.00	H	322	101	-67.47	11.12	-56.36	-56.4
10024.00	H	111	32	-50.93	11.99	-38.94	-38.9
12530.00	H	-	-	-67.70	13.56	-54.14	-54.1
15036.00	H	-	-	-65.03	13.53	-51.50	-51.5
17542.00	H	-	-	-59.28	11.65	-47.63	-47.6

Plot 7-58. Radiated Spurious Data (ULCA B41 (PC2) PCC: RB 1 Offset 99, SCC: RB 1 Offset 0 – Low Channel)

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OPERATING FREQUENCY (PCC):	2593.00	MHz
OPERATING FREQUENCY (SCC):	2612.80	MHz
CHANNEL (PCC):	40620	
CHANNEL (SCC):	40818	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	20 + 20	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	111	289	-69.86	10.74	-59.12	-59.1
7779.00	H	355	18	-64.46	11.44	-53.02	-53.0
10372.00	H	114	288	-56.18	12.42	-43.76	-43.8
12965.00	H	-	-	-64.90	13.29	-51.61	-51.6

Plot 7-59. Radiated Spurious Data (ULCA B41 (PC2) PCC: RB 1 Offset 99, SCC: RB 1 Offset 0 – Mid Channel)

OPERATING FREQUENCY (PCC):	2680.00	MHz
OPERATING FREQUENCY (SCC):	2660.20	MHz
CHANNEL (PCC):	41490	
CHANNEL (SCC):	41292	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	20 + 20	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]
5360.00	H	111	297	-68.36	10.69	-57.66	-57.7
8040.00	H	348	12	-61.79	11.16	-50.64	-50.6
10720.00	H	112	288	-64.40	12.60	-51.80	-51.8
13400.00	H	201	10	-66.98	12.59	-54.40	-54.4
16080.00	H	-	-	-68.88	16.67	-52.22	-52.2

Plot 7-60. Radiated Spurious Data (ULCA B41 (PC2) PCC: RB 1 Offset 0, SCC: RB 1 Offset 99 – High Channel)

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7.11 Frequency Stability / Temperature Variation

Test Overview and Limit

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

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

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

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

Test Procedure Used

ANSI/TIA-603-E-2016

Test Settings

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

Test Setup

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

Test Notes

None

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Band 71 Frequency Stability Measurements

OPERATING FREQUENCY: 680,500,000 Hz

CHANNEL: 133372

REFERENCE VOLTAGE: 4.25 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (^{0}C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.25	- 30	680,499,975	-25	-0.0000037
100 %		- 20	680,500,317	317	0.0000466
100 %		- 10	680,499,786	-214	-0.0000314
100 %		0	680,500,016	16	0.0000024
100 %		+ 10	680,499,914	-86	-0.0000126
100 %		+ 20	680,500,125	125	0.0000184
100 %		+ 30	680,500,399	399	0.0000586
100 %		+ 40	680,499,726	-274	-0.0000403
100 %		+ 50	680,499,928	-72	-0.0000106
BATT. ENDPOINT	3.38	+ 20	680,499,582	-418	-0.0000614

Table 7-61. 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.

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Band 71 Frequency Stability Measurements

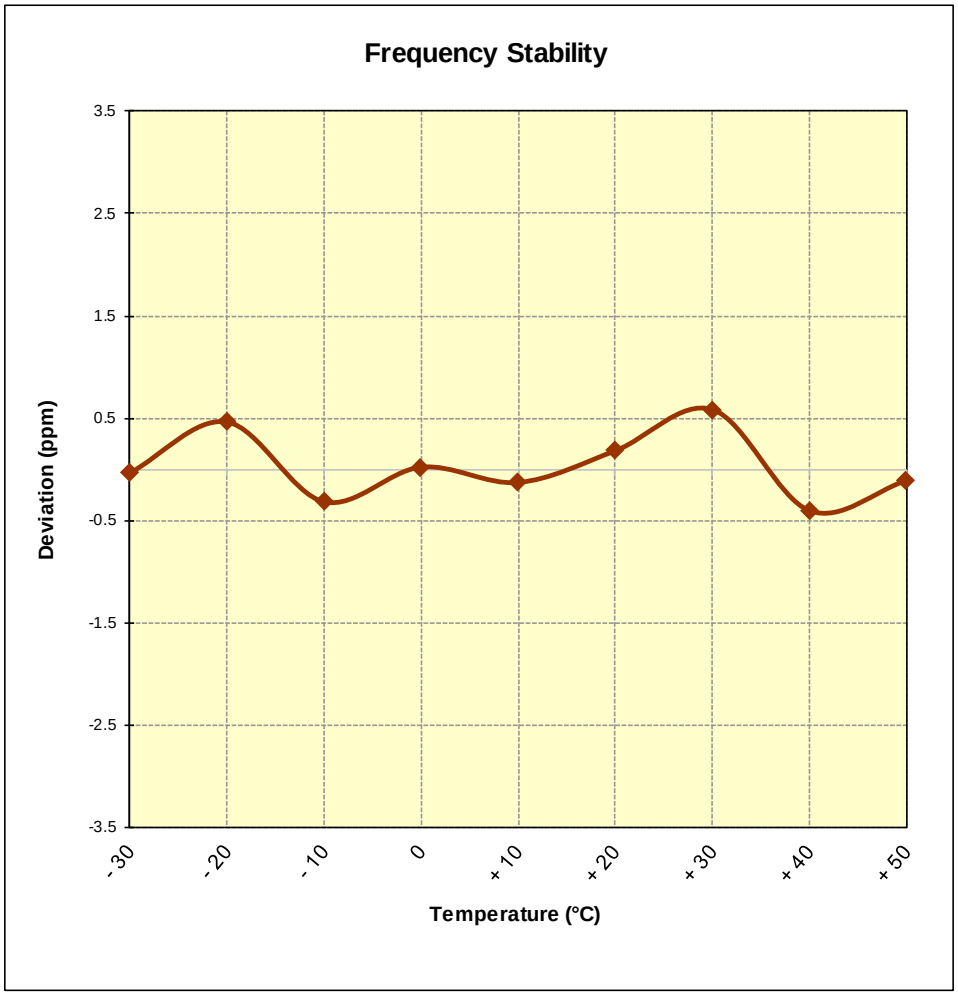

Figure 7-11. Frequency Stability Graph (Band 71)

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Band 12 Frequency Stability Measurements

OPERATING FREQUENCY: 707,500,000 Hz

CHANNEL: 23790

REFERENCE VOLTAGE: 4.25 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (^{o}C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.25	- 30	707,499,553	-447	-0.0000632
100 %		- 20	707,500,227	227	0.0000321
100 %		- 10	707,499,740	-260	-0.0000367
100 %		0	707,500,211	211	0.0000298
100 %		+ 10	707,500,015	15	0.0000021
100 %		+ 20	707,499,920	-80	-0.0000113
100 %		+ 30	707,499,950	-50	-0.0000071
100 %		+ 40	707,500,292	292	0.0000413
100 %		+ 50	707,499,962	-38	-0.0000054
BATT. ENDPOINT	3.38	+ 20	707,499,821	-179	-0.0000253

Table 7-62. Frequency Stability Data (Band 12)

Note:

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

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Band 12 Frequency Stability Measurements

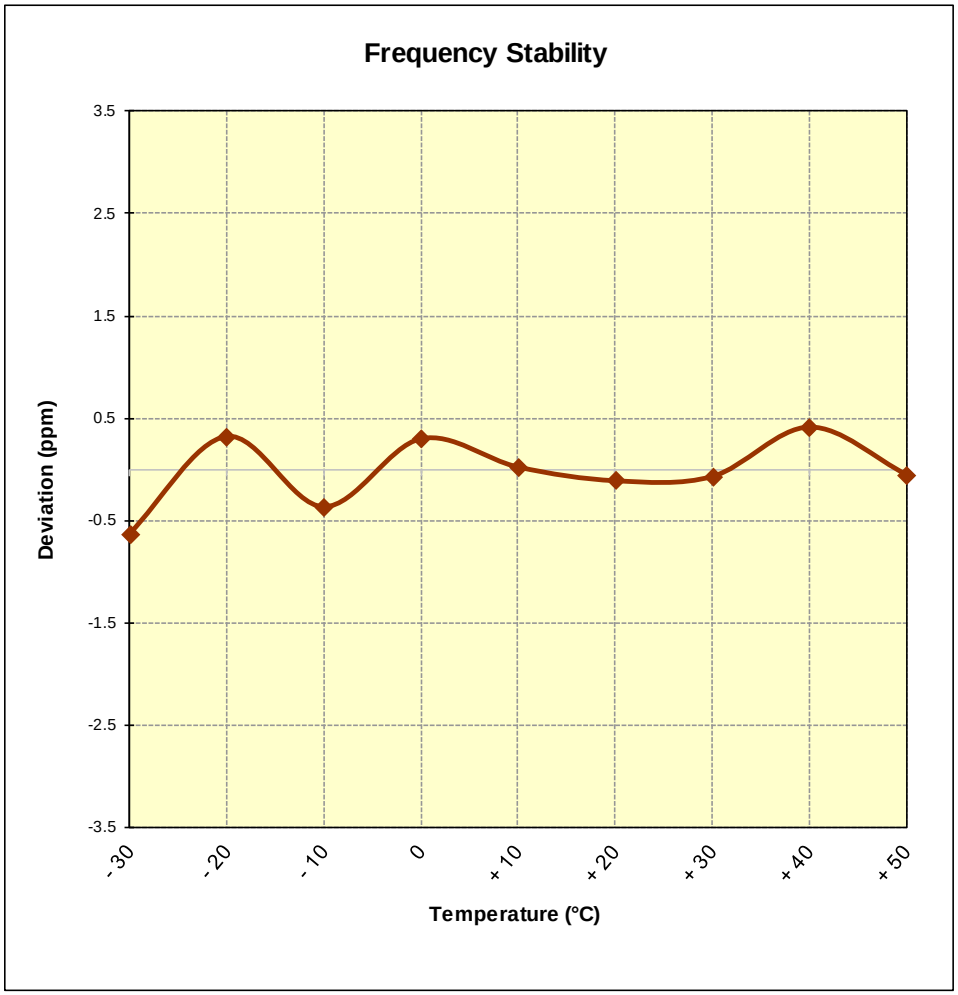

Figure 7-12. Frequency Stability Graph (Band 12)

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Band 13 Frequency Stability Measurements

OPERATING FREQUENCY: 782,000,000 Hz

CHANNEL: 23230

REFERENCE VOLTAGE: 4.25 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (^{o}C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.25	- 30	782,000,224	224	0.0000286
100 %		- 20	781,999,690	-310	-0.0000396
100 %		- 10	782,000,176	176	0.0000225
100 %		0	781,999,914	-86	-0.0000110
100 %		+ 10	782,000,344	344	0.0000440
100 %		+ 20	781,999,920	-80	-0.0000102
100 %		+ 30	781,999,914	-86	-0.0000110
100 %		+ 40	781,999,942	-58	-0.0000074
100 %		+ 50	782,000,001	1	0.0000001
BATT. ENDPOINT	3.38	+ 20	782,000,331	331	0.0000423

Table 7-63. Frequency Stability Data (Band 13)

Note:

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

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Band 13 Frequency Stability Measurements

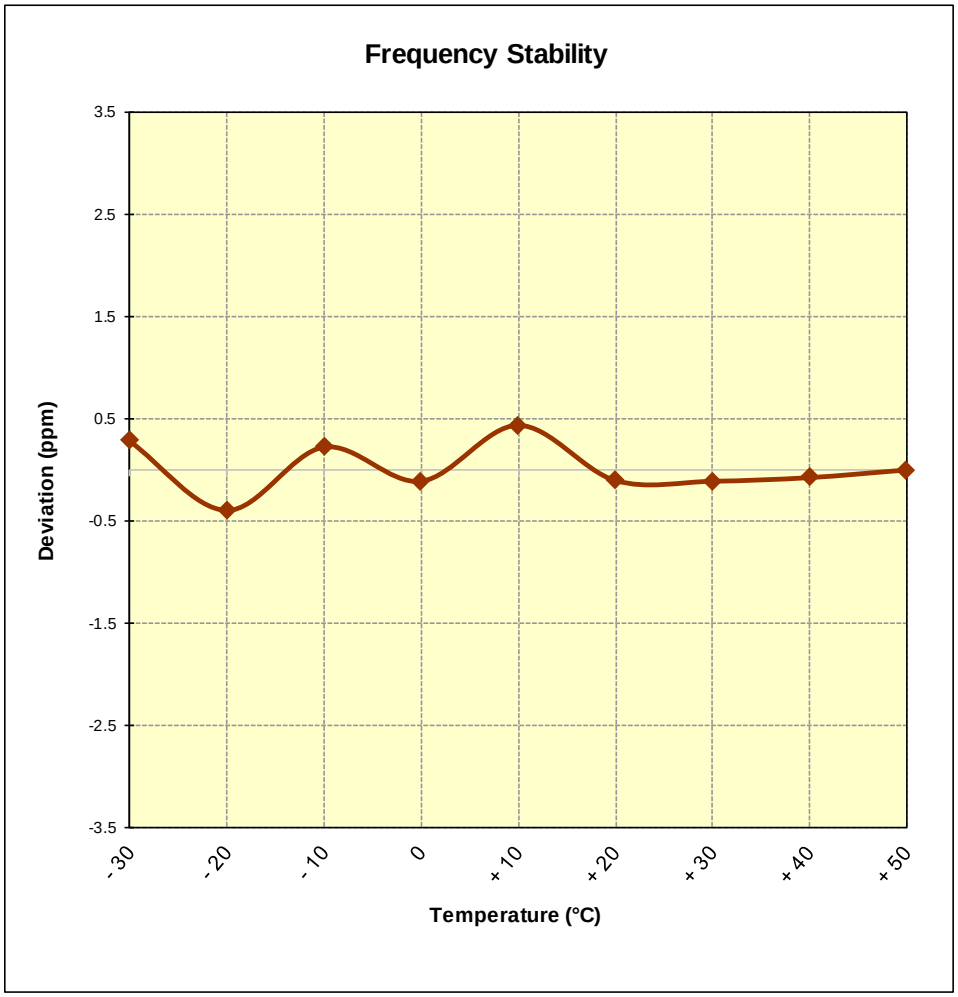

Figure 7-13. Frequency Stability Graph (Band 13)

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Band 26/5 Frequency Stability Measurements

OPERATING FREQUENCY: 831,500,000 Hz

CHANNEL: 26865

REFERENCE VOLTAGE: 4.25 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.25	- 30	831,500,041	41	0.0000049
100 %		- 20	831,499,813	-187	-0.0000225
100 %		- 10	831,499,917	-83	-0.0000100
100 %		0	831,500,011	11	0.0000013
100 %		+ 10	831,499,733	-267	-0.0000321
100 %		+ 20	831,500,265	265	0.0000319
100 %		+ 30	831,500,023	23	0.0000028
100 %		+ 40	831,499,768	-232	-0.0000279
100 %		+ 50	831,500,003	3	0.0000004
BATT. ENDPOINT	3.38	+ 20	831,500,101	101	0.0000121

Table 7-64. Frequency Stability Data (Band 26/5)

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Band 26/5 Frequency Stability Measurements

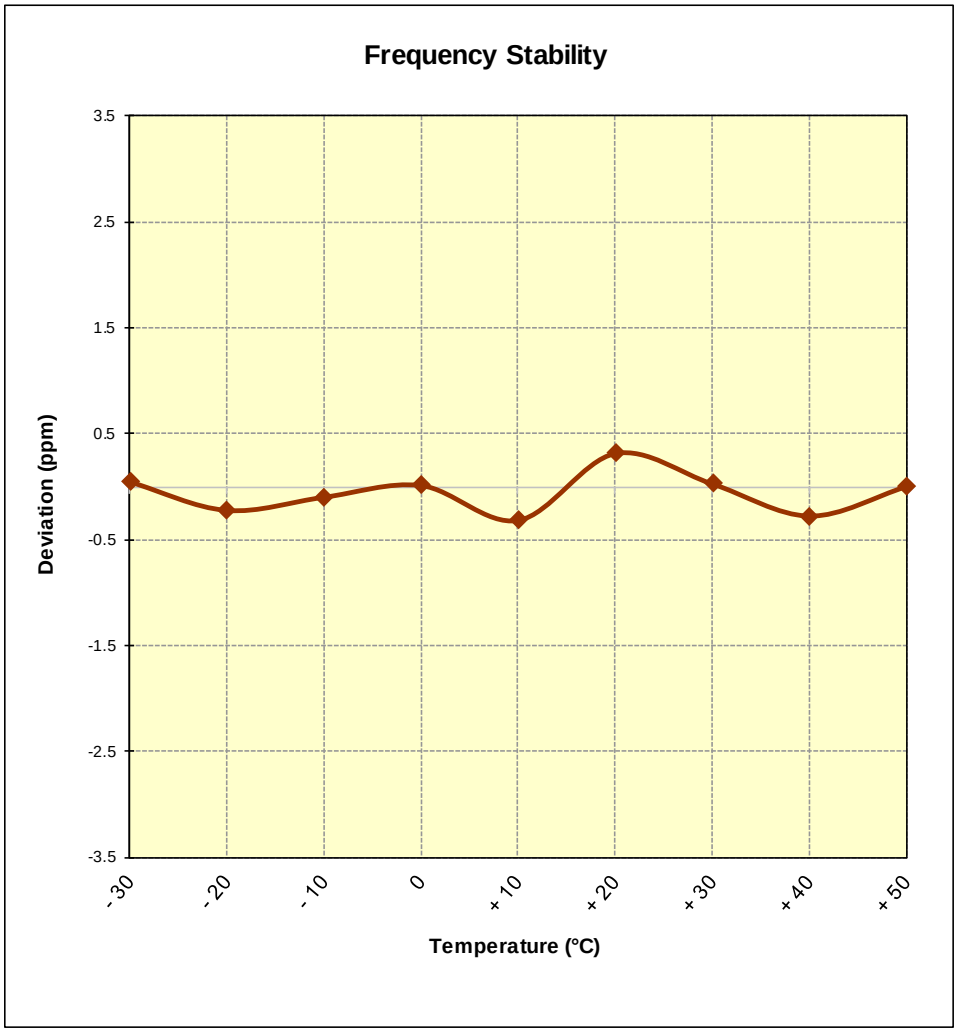

Figure 7-14. Frequency Stability Graph (Band 26/5)

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Band 66/4 Frequency Stability Measurements

OPERATING FREQUENCY: 1,745,000,000 Hz

CHANNEL: 132322

REFERENCE VOLTAGE: 4.25 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (^{o}C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.25	- 30	1,744,999,941	-59	-0.0000034
100 %		- 20	1,745,000,162	162	0.0000093
100 %		- 10	1,744,999,931	-69	-0.0000040
100 %		0	1,744,999,821	-179	-0.0000103
100 %		+ 10	1,744,999,912	-88	-0.0000050
100 %		+ 20	1,745,000,094	94	0.0000054
100 %		+ 30	1,745,000,012	12	0.0000007
100 %		+ 40	1,745,000,002	2	0.0000001
100 %		+ 50	1,745,000,020	20	0.0000011
BATT. ENDPOINT	3.38	+ 20	1,745,000,070	70	0.0000040

Table 7-65. Frequency Stability Data (Band 66/4)

Note:

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

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Band 66/4 Frequency Stability Measurements

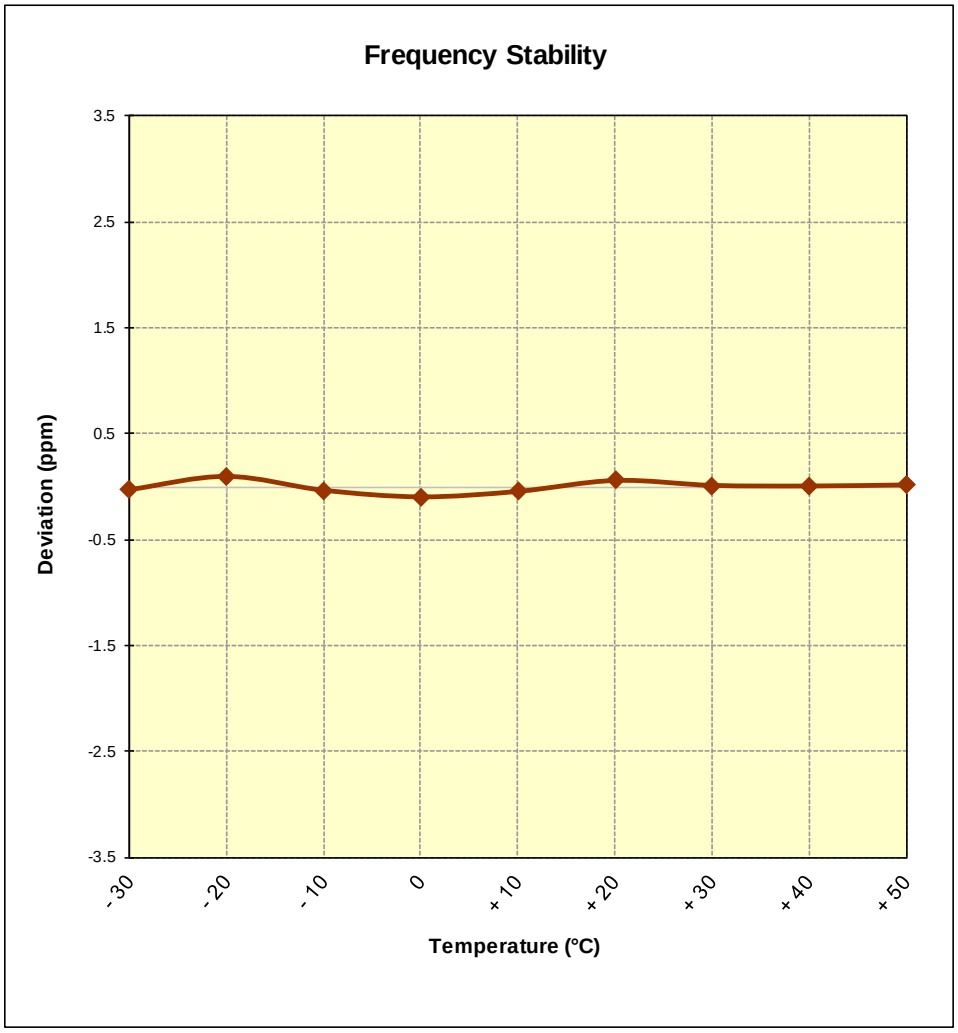

Figure 7-15. Frequency Stability Graph (Band 66/4)

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Band 25/2 Frequency Stability Measurements

OPERATING FREQUENCY: 1,882,500,000 Hz

CHANNEL: 26365

REFERENCE VOLTAGE: 4.25 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.25	- 30	1,882,500,261	261	0.0000139
100 %		- 20	1,882,499,884	-116	-0.0000062
100 %		- 10	1,882,500,377	377	0.0000200
100 %		0	1,882,500,169	169	0.0000090
100 %		+ 10	1,882,499,957	-43	-0.0000023
100 %		+ 20	1,882,500,314	314	0.0000167
100 %		+ 30	1,882,499,998	-2	-0.0000001
100 %		+ 40	1,882,499,622	-378	-0.0000201
100 %		+ 50	1,882,500,295	295	0.0000157
BATT. ENDPOINT	3.38	+ 20	1,882,499,917	-83	-0.0000044

Table 7-66. Frequency Stability Data (Band 25/2)

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Band 25/2 Frequency Stability Measurements

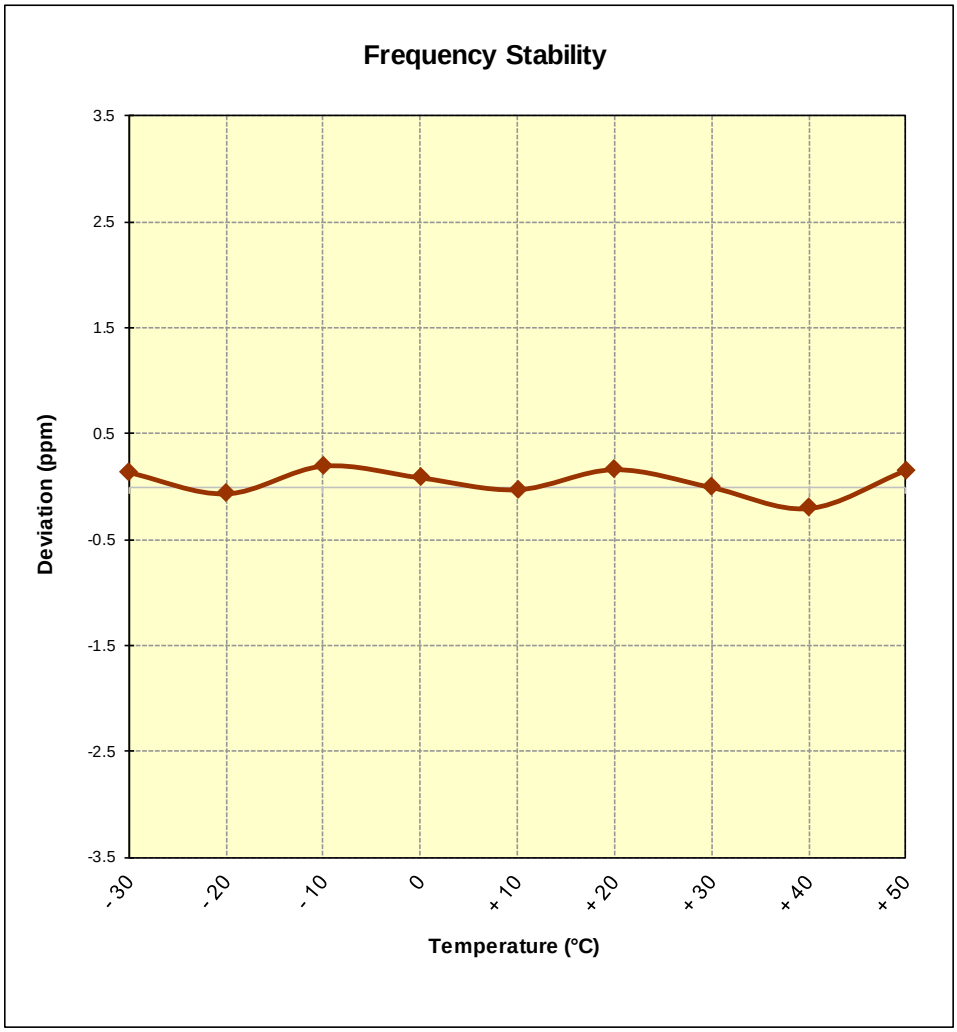

Figure 7-16. Frequency Stability Graph (Band 25/2)

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