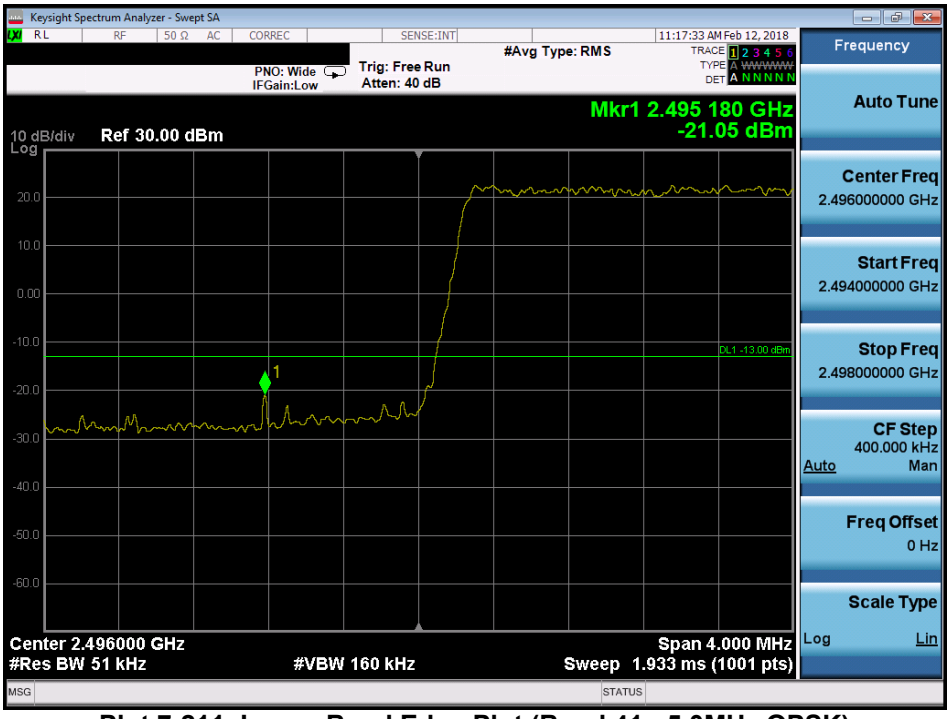
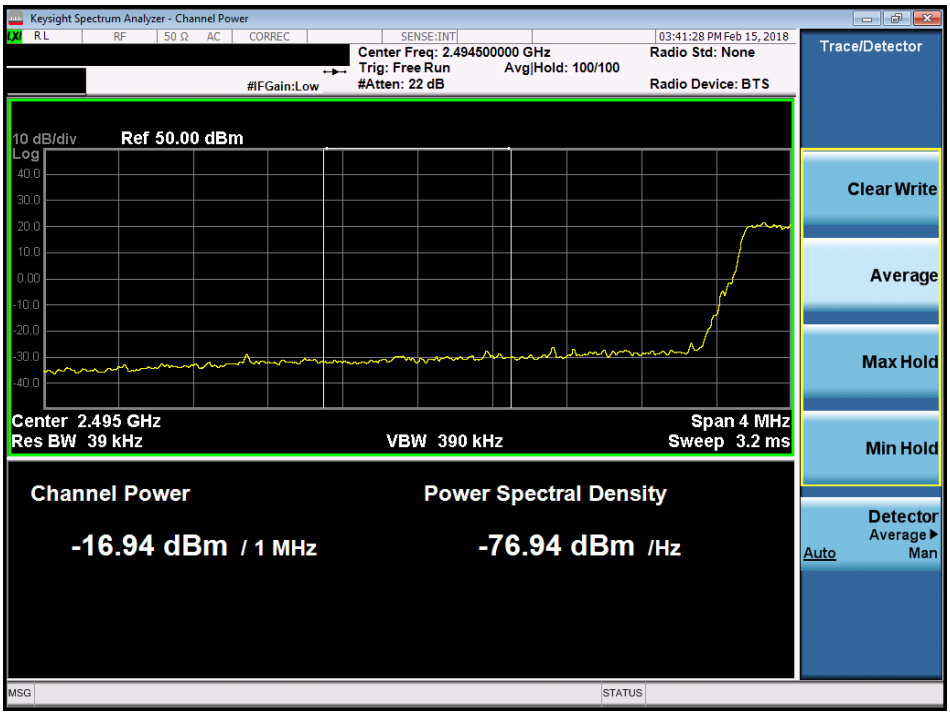
Band 41 – Antenna 2



Plot 7-211. Lower Band Edge Plot (Band 41 - 5.0MHz QPSK)



Plot 7-212. Lower Extended Band Edge Plot (Band 41 - 5.0MHz QPSK)

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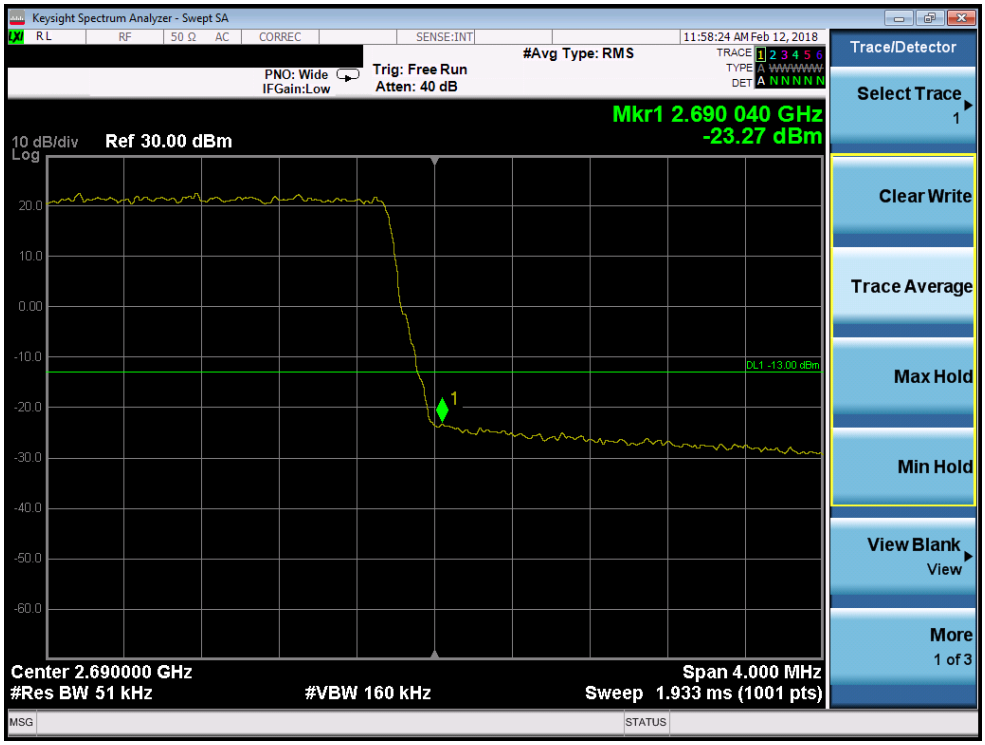
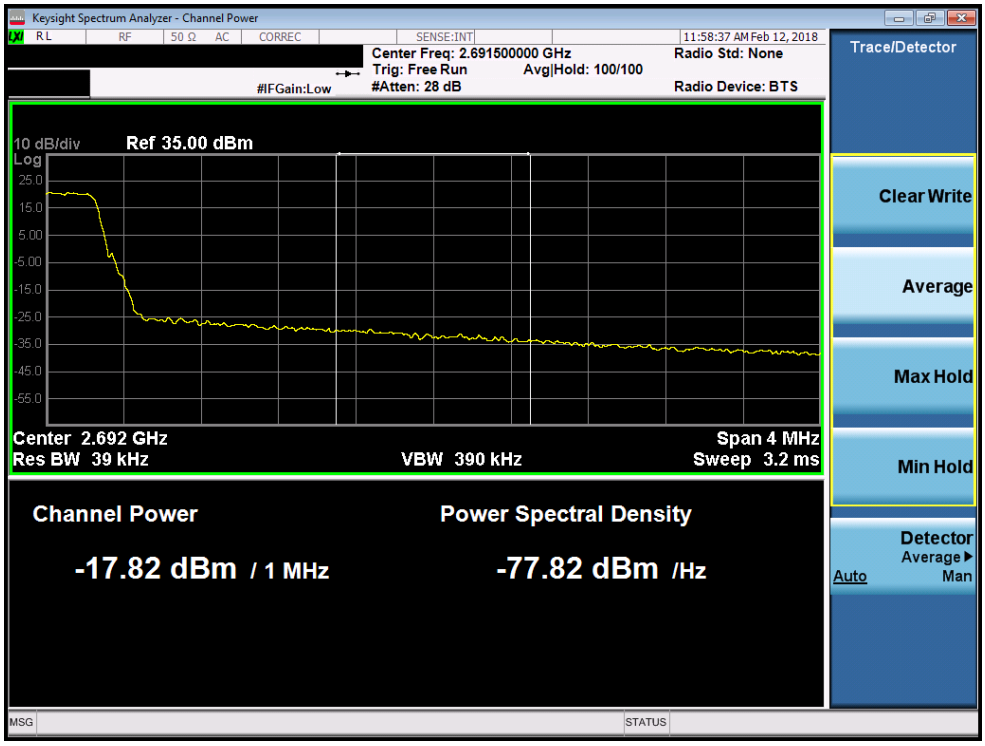


Plot 7-213. Upper Band Edge Plot (Band 41 - 5.0MHz QPSK)



Plot 7-214. Upper Extended Band Edge Plot (Band 41 - 5.0MHz QPSK)

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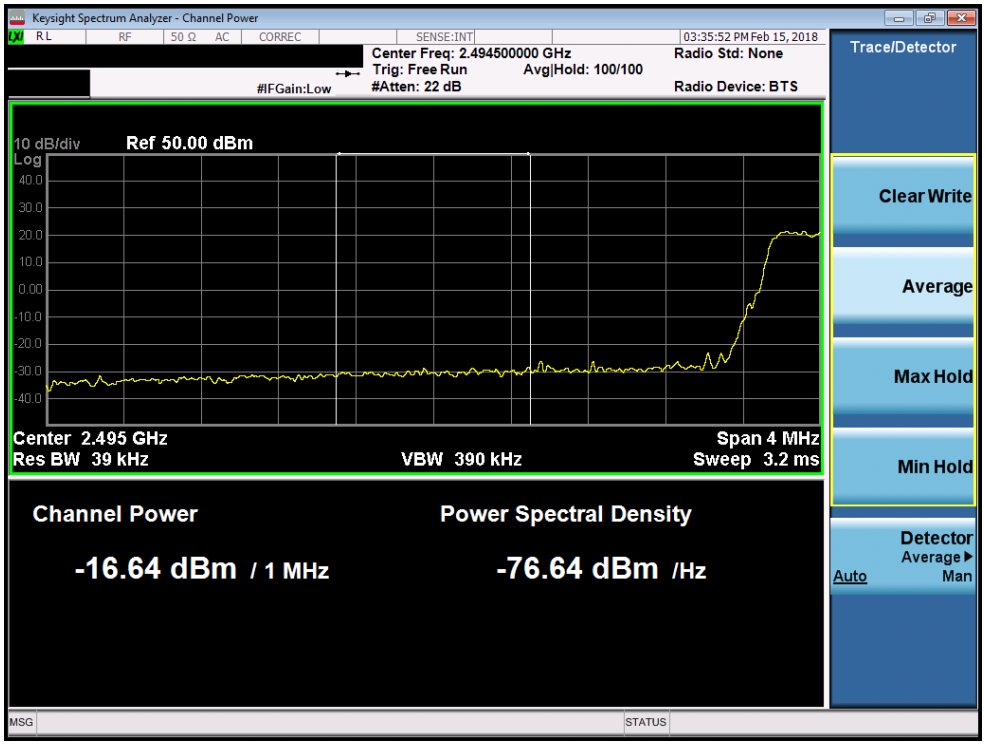
Plot 7-215. Lower Band Edge Plot (Band 41 - 5.0MHz 16-QAM)



Plot 7-216. Lower Extended Band Edge Plot (Band 41 - 5.0MHz 16-QAM)

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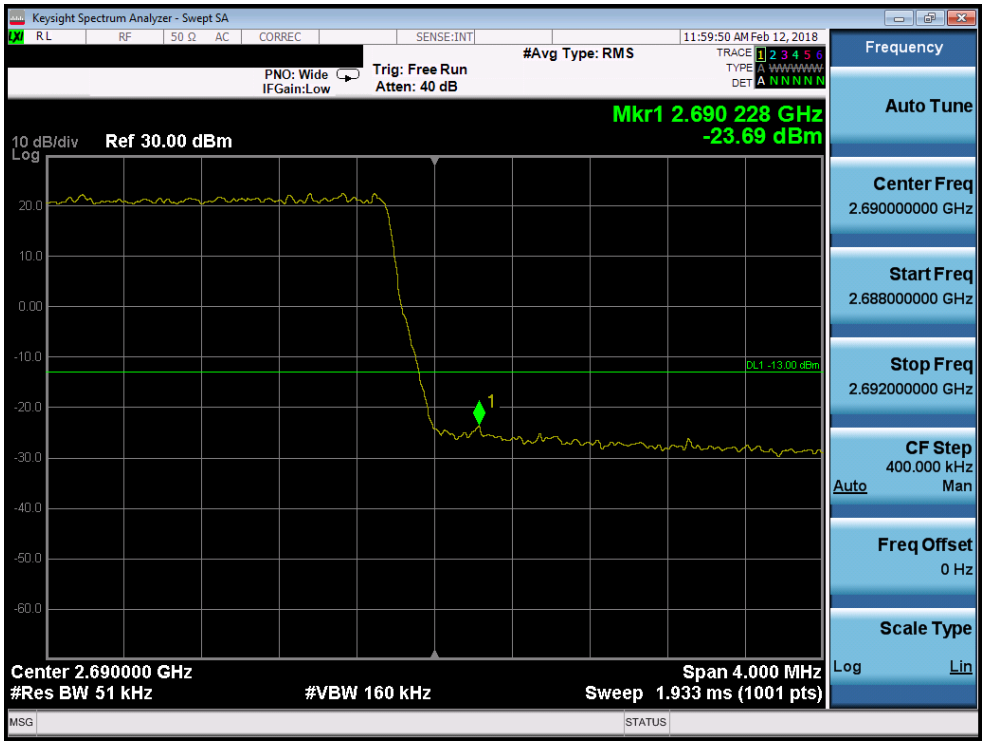
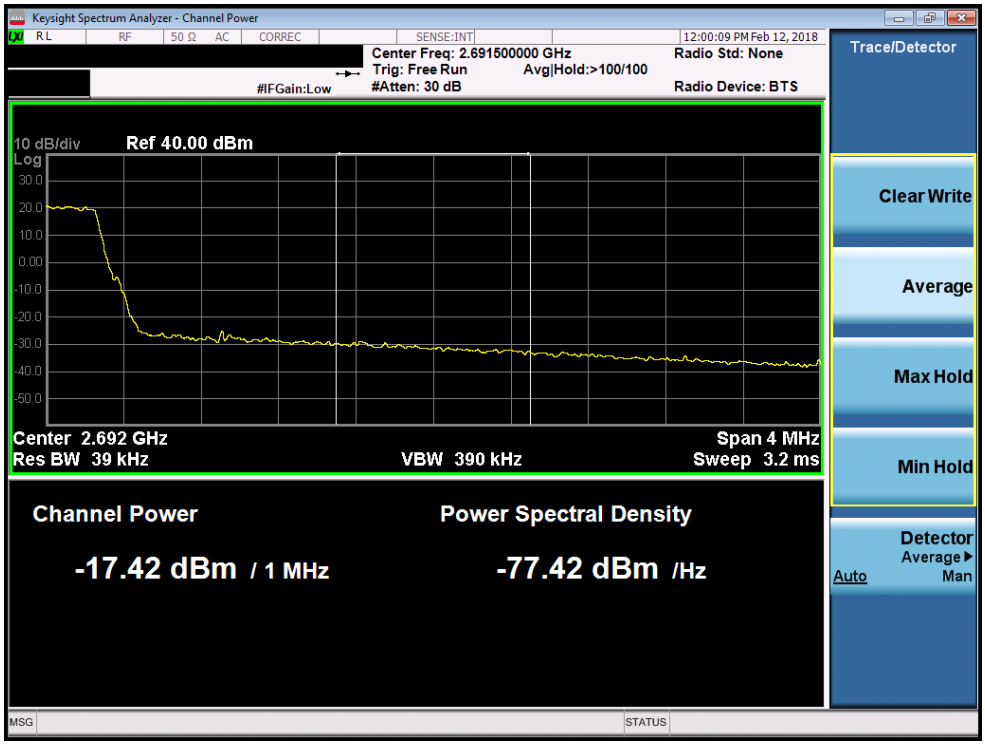


Plot 7-217. Upper Band Edge Plot (Band 41 - 5.0MHz 16-QAM)



Plot 7-218. Upper Extended Band Edge Plot (Band 41 - 5.0MHz 16-QAM)

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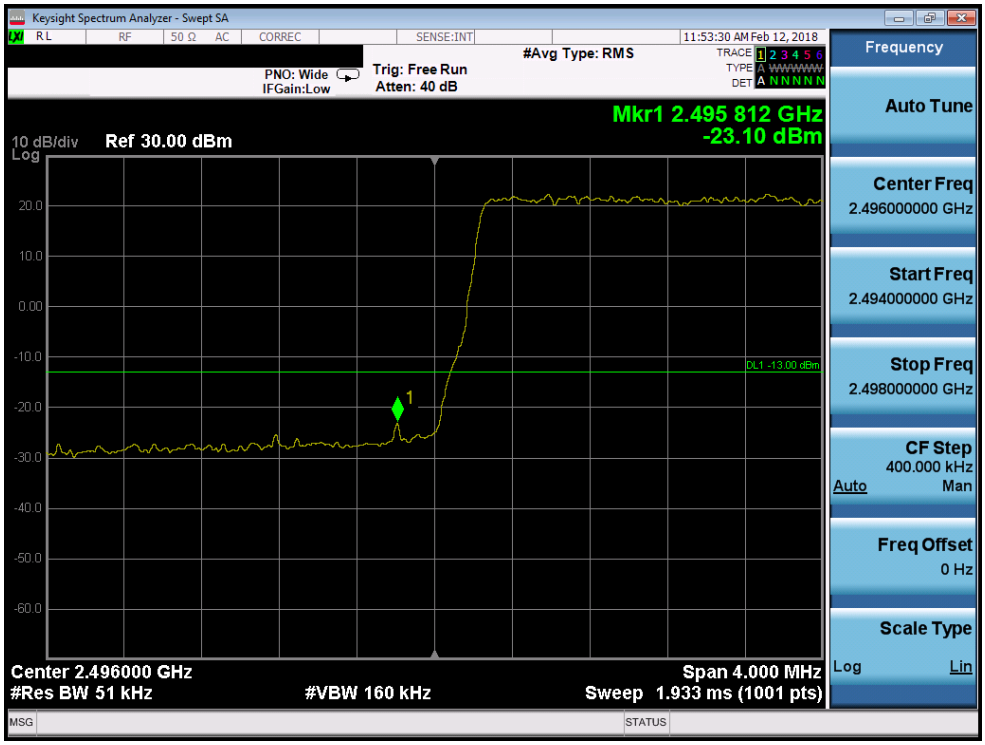
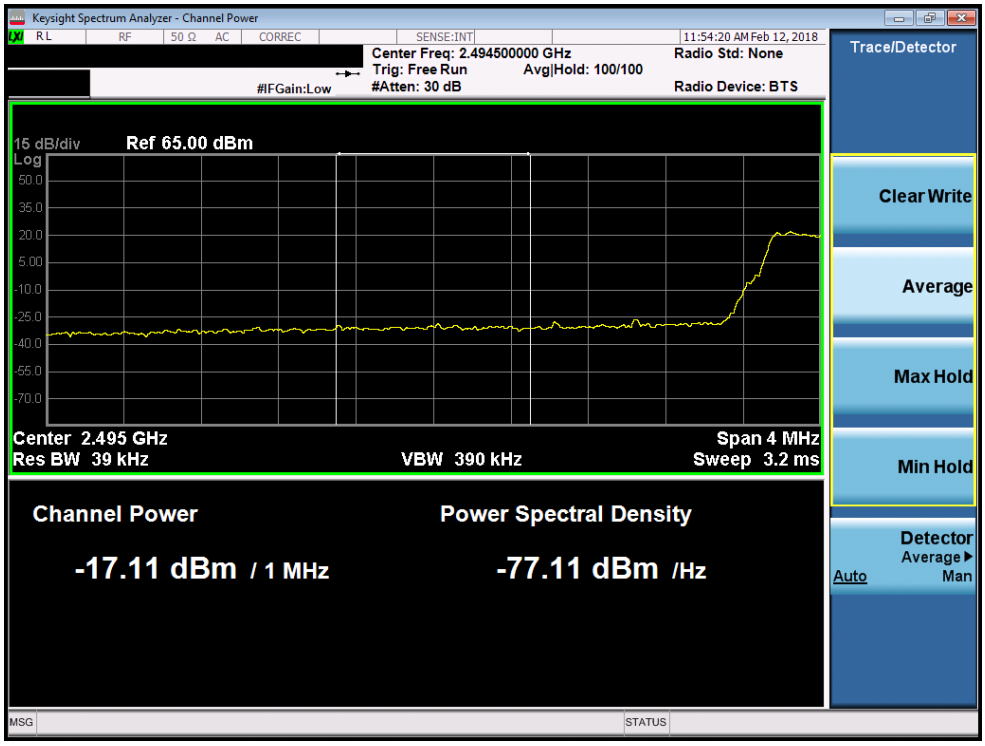


Plot 7-219. Lower Band Edge Plot (Band 41 - 5.0MHz 64-QAM)



Plot 7-220. Lower Extended Band Edge Plot (Band 41 - 5.0MHz 64-QAM)

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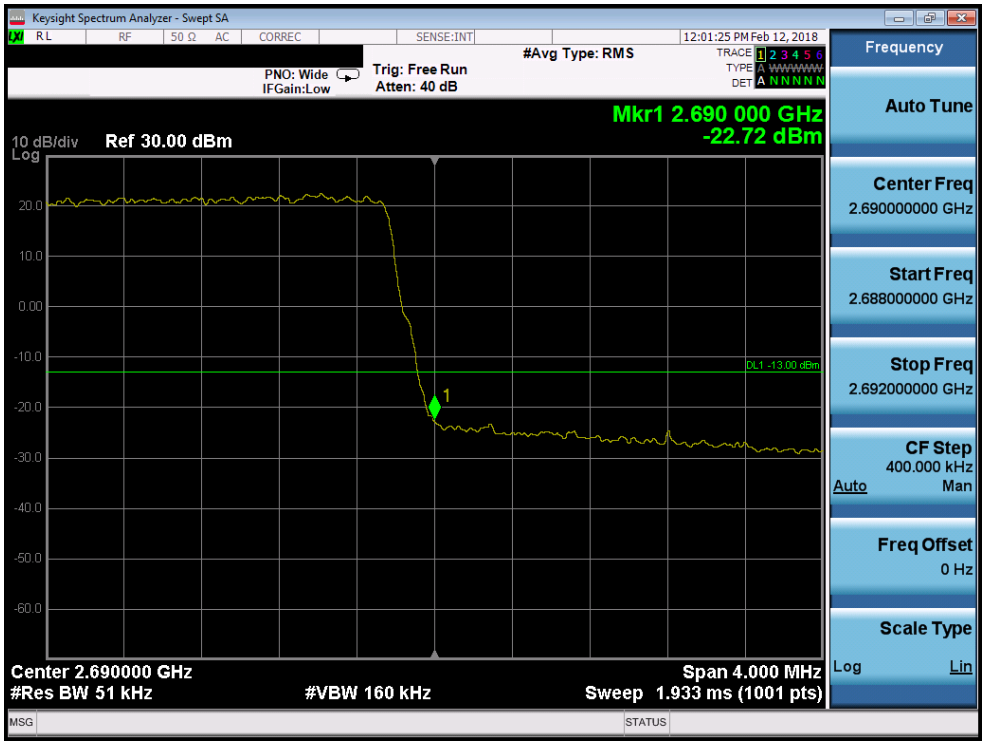
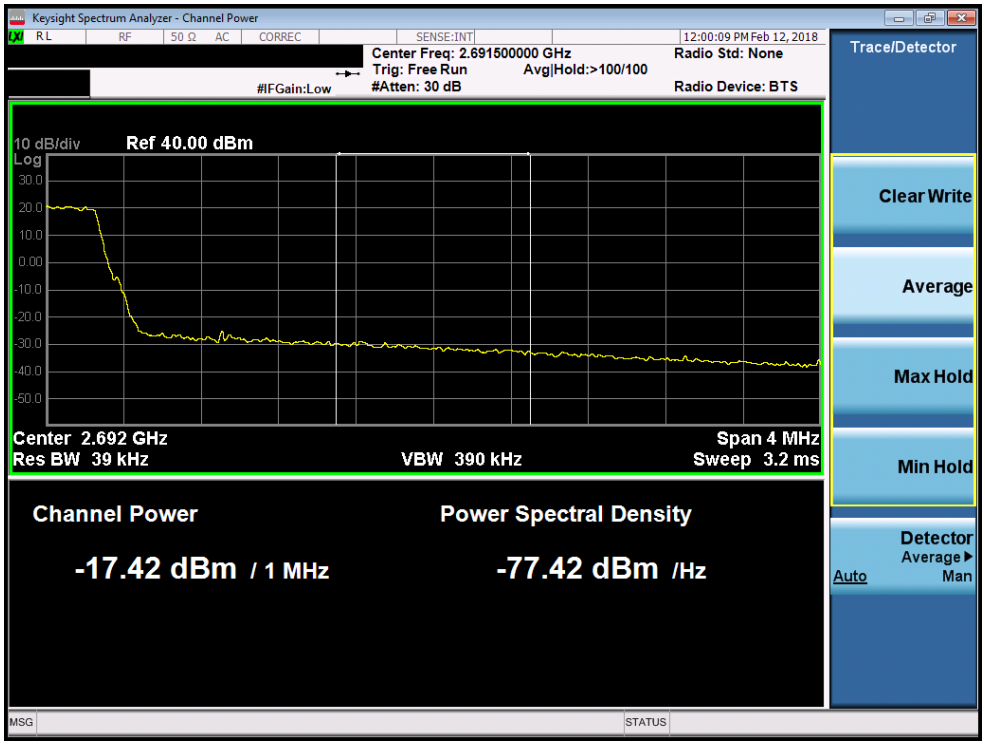


Plot 7-221. Upper Band Edge Plot (Band 41 - 5.0MHz 64-QAM)



Plot 7-222. Upper Extended Band Edge Plot (Band 41 - 5.0MHz 64-QAM)

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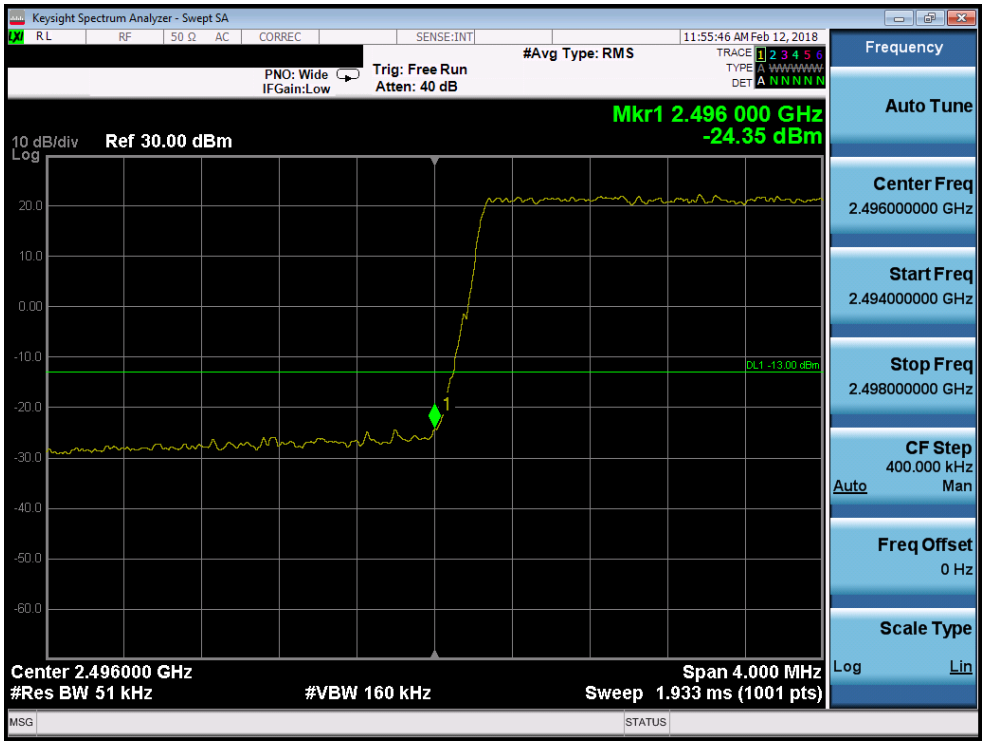
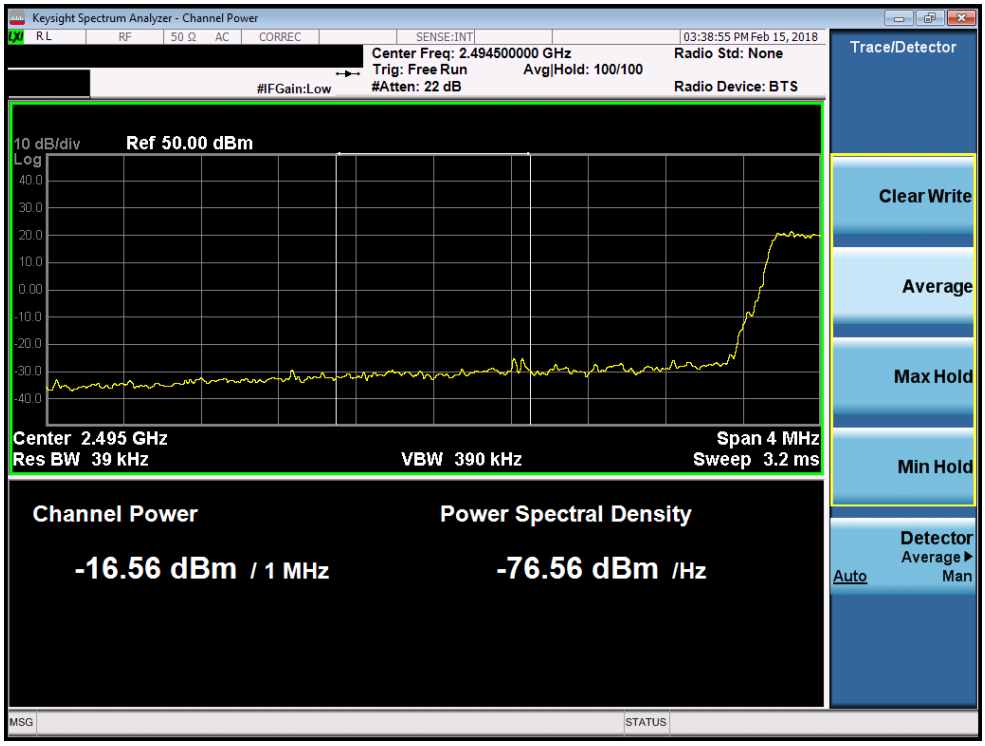


Plot 7-223. Lower Band Edge Plot (Band 41 - 5.0MHz 256-QAM)



Plot 7-224. Lower Extended Band Edge Plot (Band 41 - 5.0MHz 256-QAM

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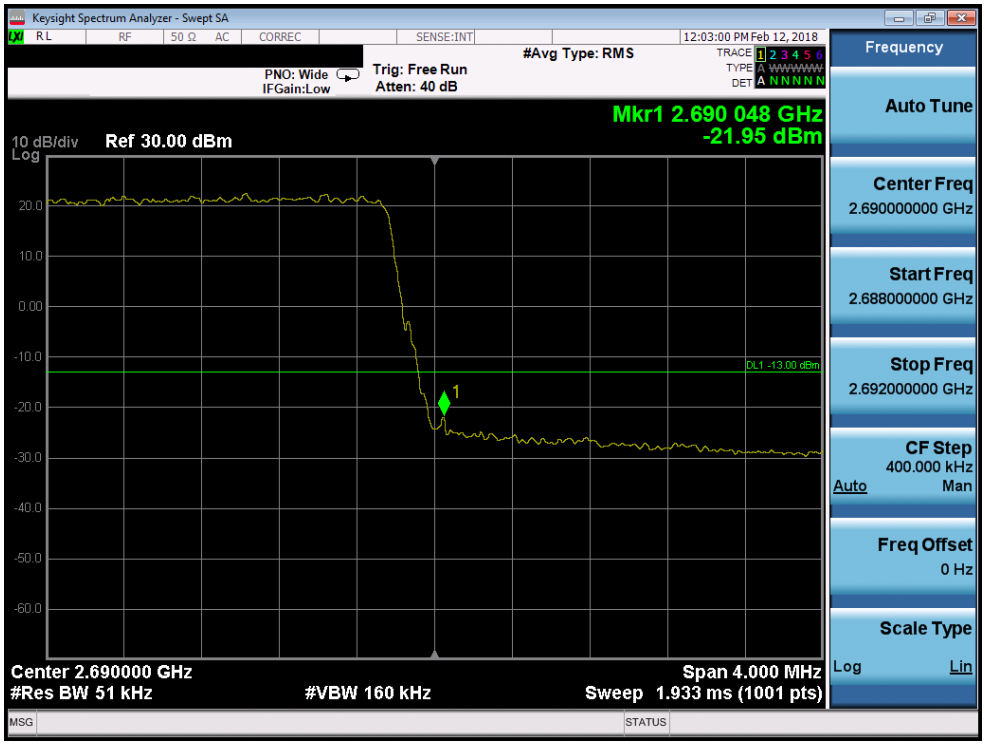
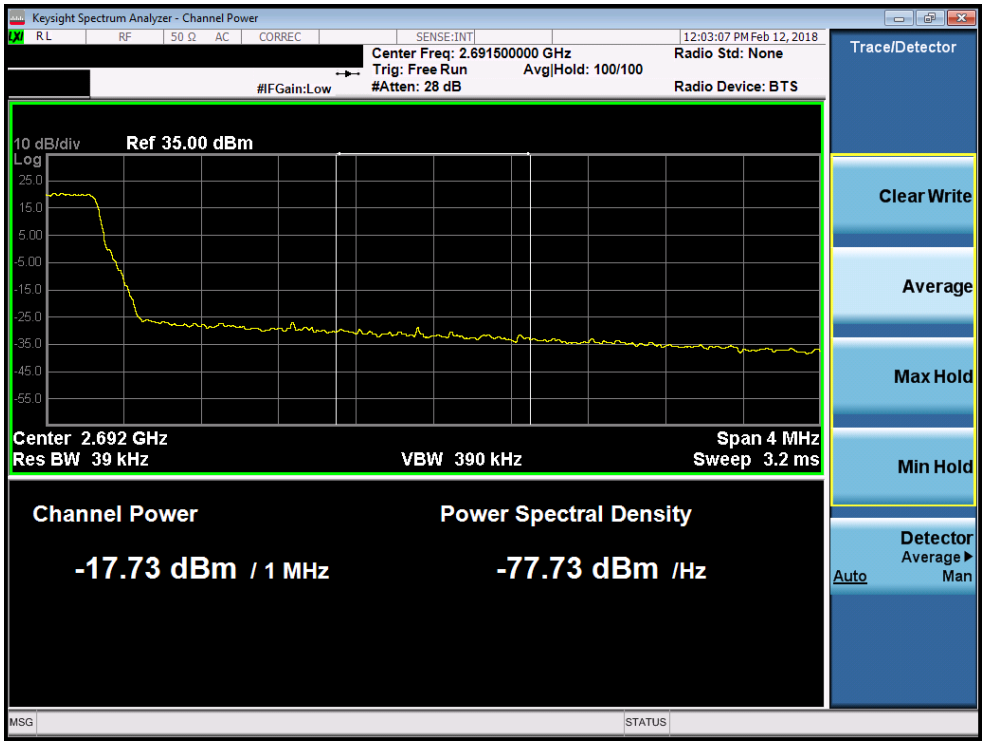


Plot 7-225. Upper Band Edge Plot (Band 41 - 5.0MHz 256-QAM)



Plot 7-226. Upper Extended Band Edge Plot (Band 41 - 5.0MHz 256-QAM)

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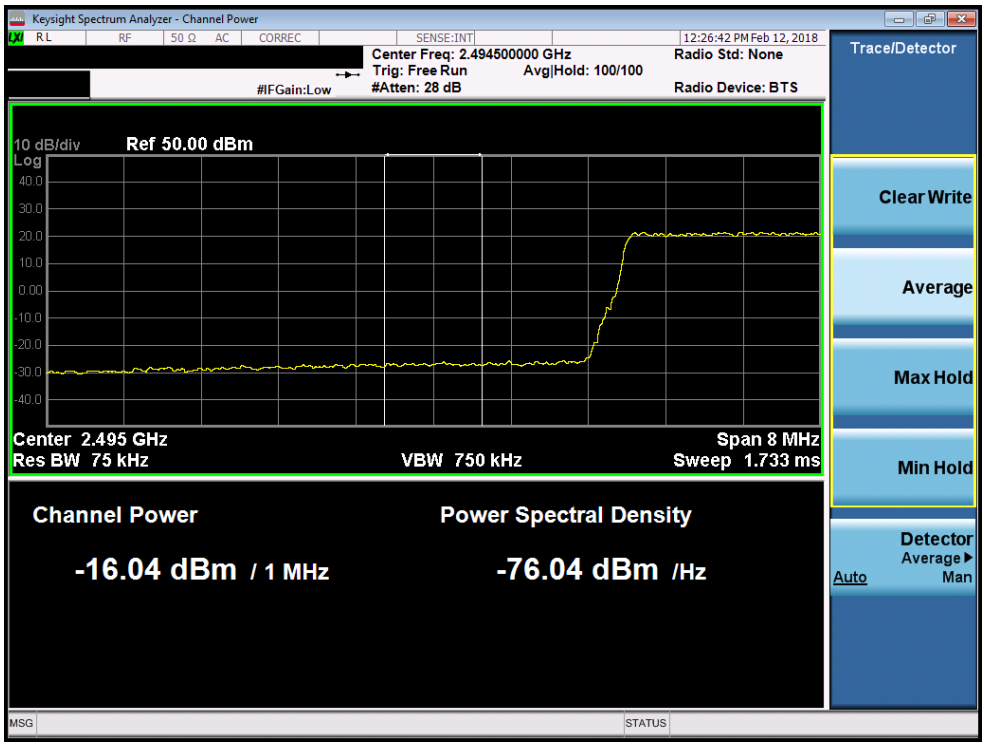
Plot 7-227. Lower Band Edge Plot (Band 41 - 10.0MHz QPSK)



Plot 7-228. Lower Extended Band Edge Plot (Band 41 - 10.0MHz QPSK)

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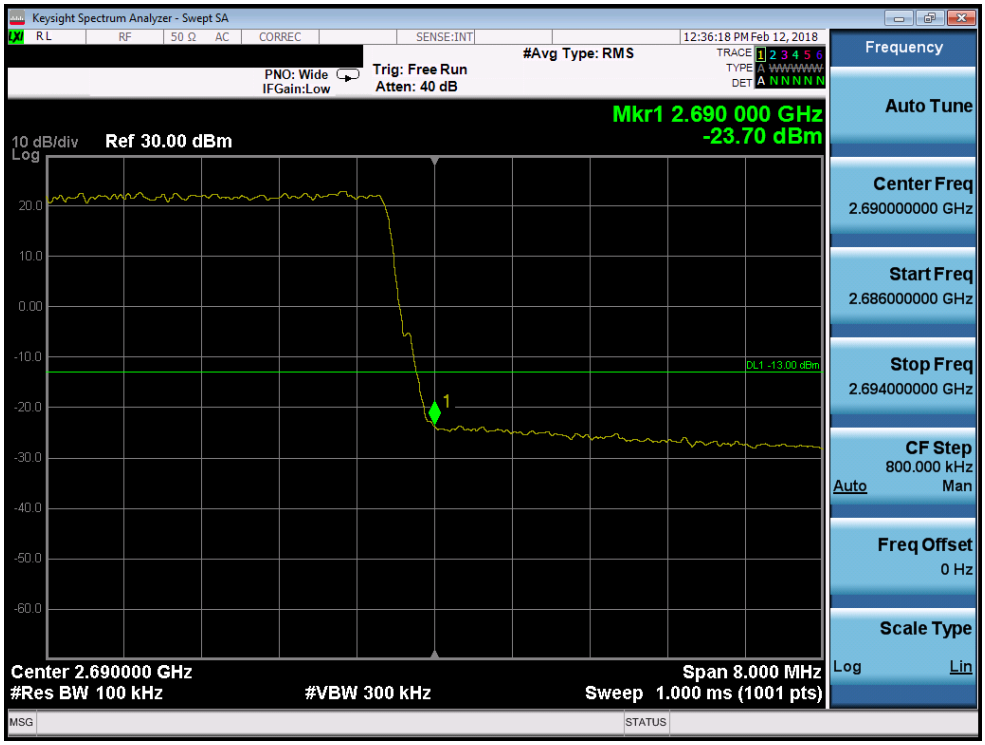
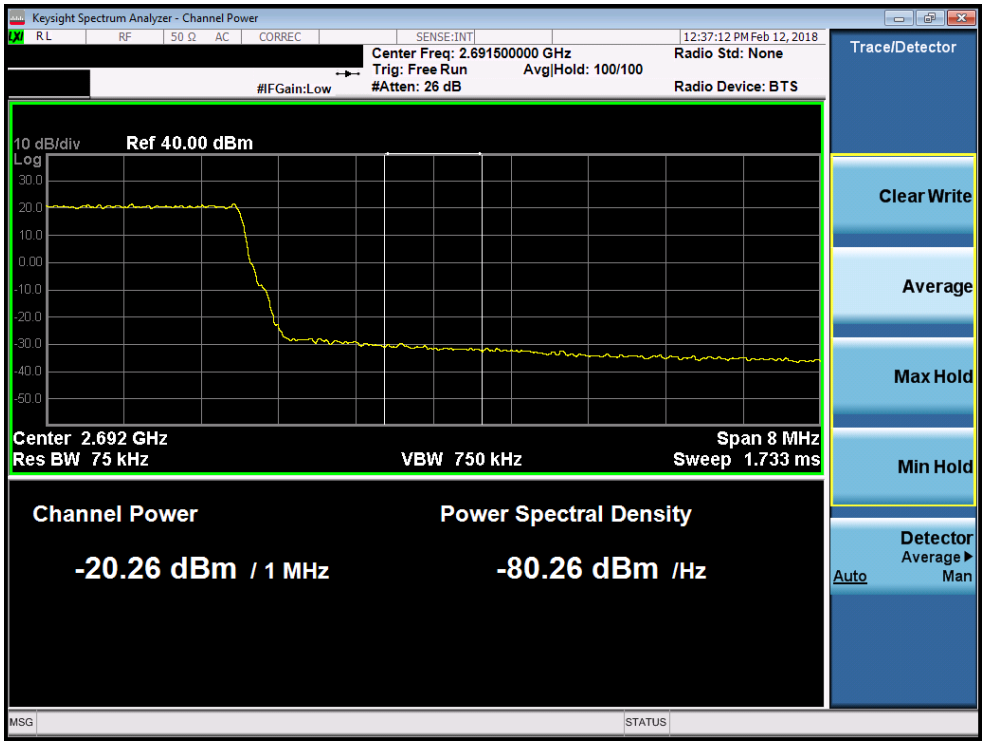


Plot 7-229. Upper Band Edge Plot (Band 41 - 10.0MHz QPSK)



Plot 7-230. Upper Extended Band Edge Plot (Band 41 - 10.0MHz QPSK)

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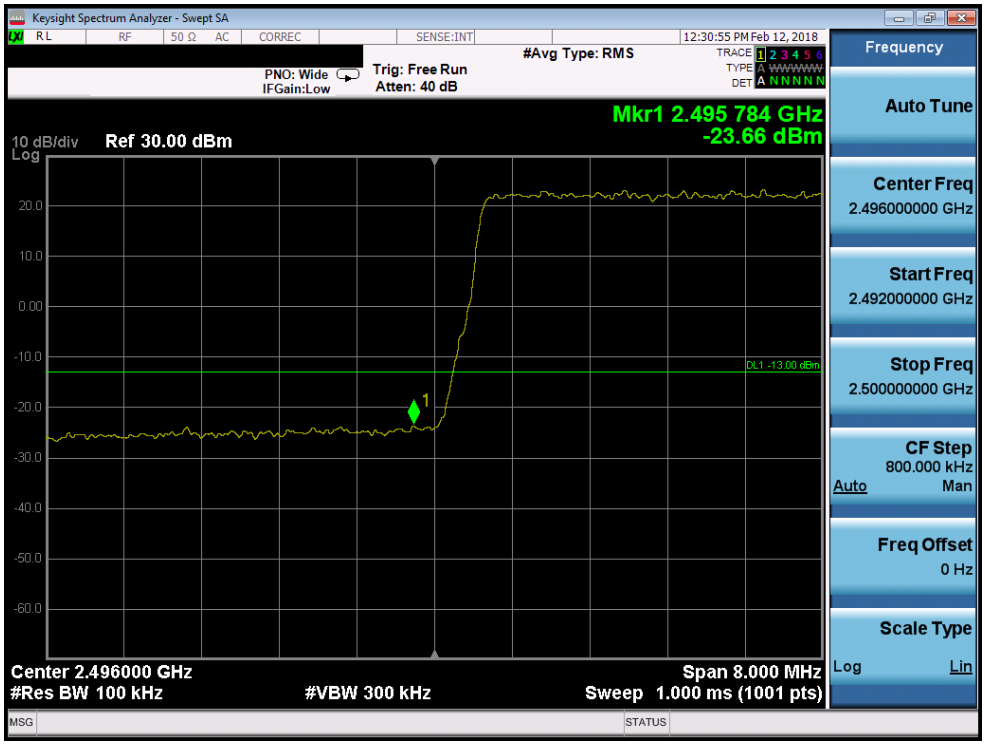
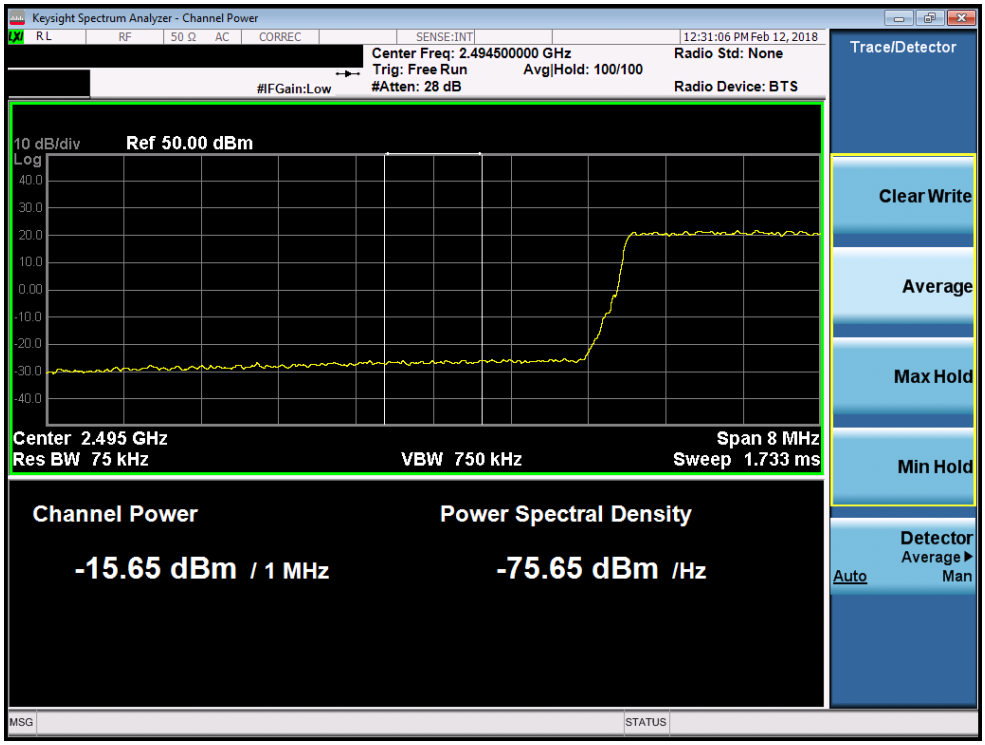


Plot 7-231. Lower Band Edge Plot (Band 41 - 10.0MHz 16-QAM)



Plot 7-232. Lower Extended Band Edge Plot (Band 41 - 10.0MHz 16-QAM)

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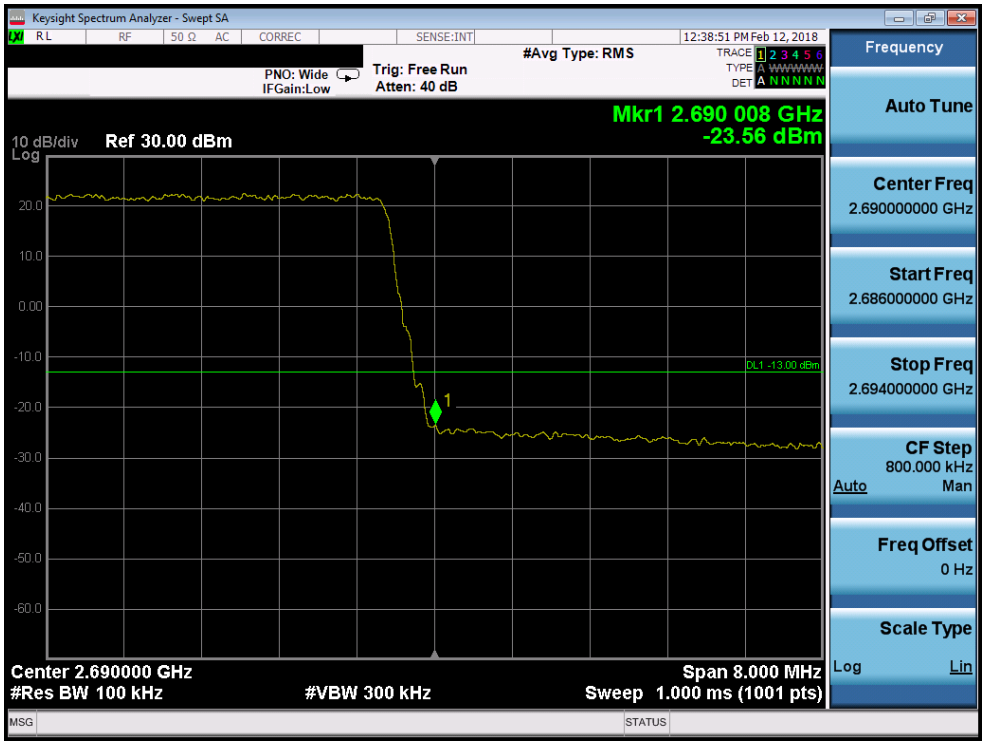
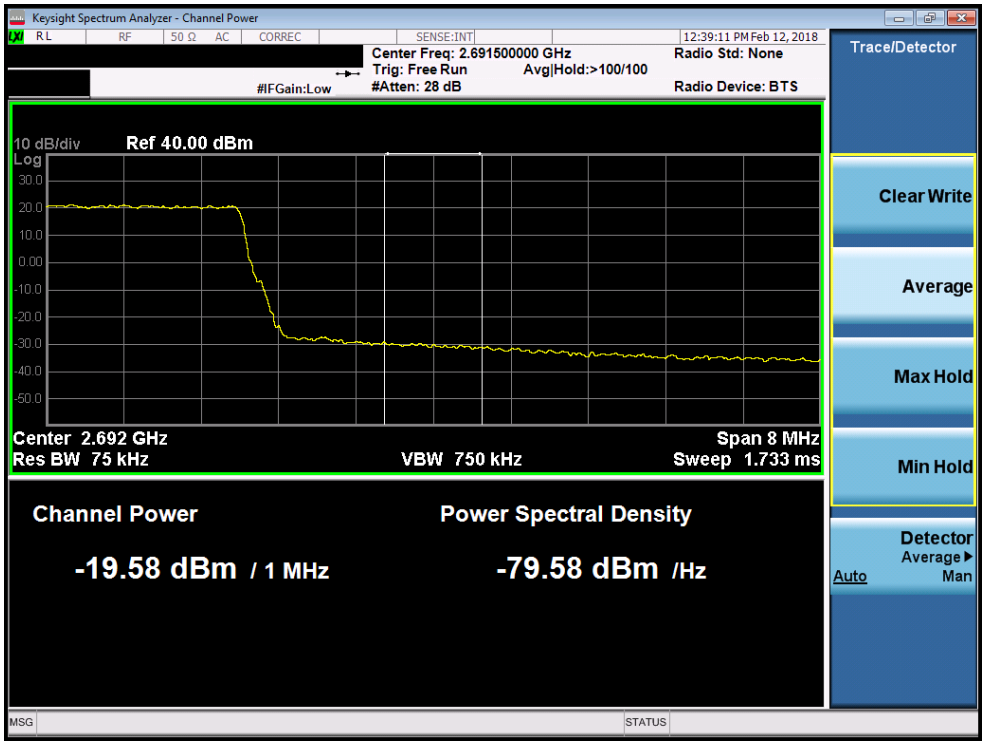


Plot 7-233. Upper Band Edge Plot (Band 41 - 10.0MHz 16-QAM)



Plot 7-234. Upper Extended Band Edge Plot (Band 41 - 10.0MHz 16-QAM)

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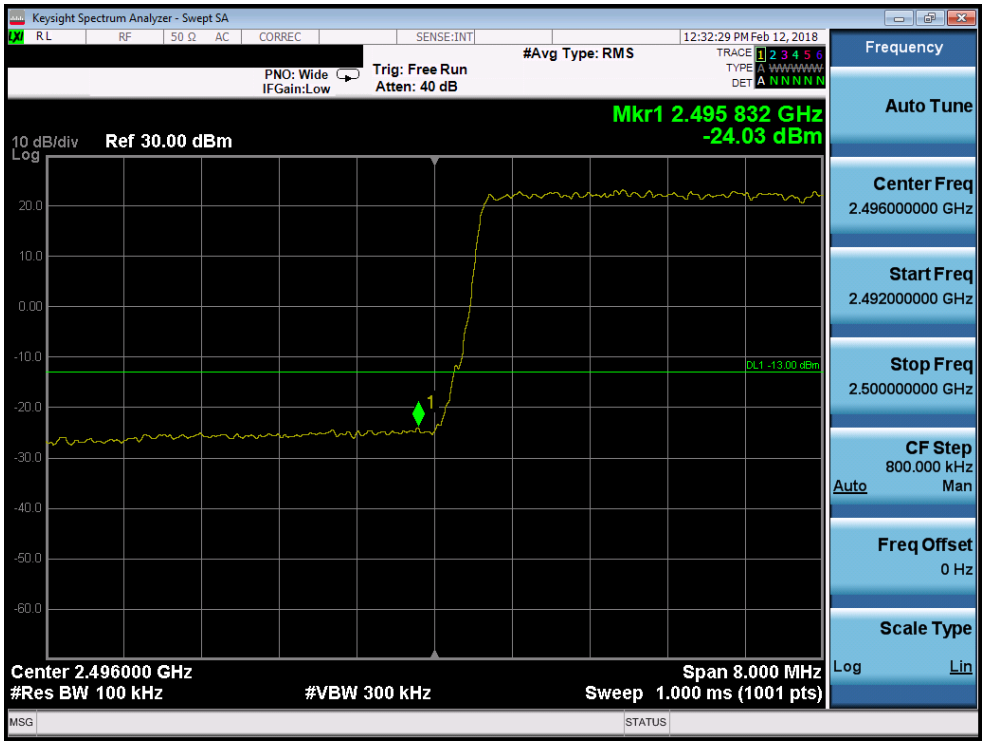
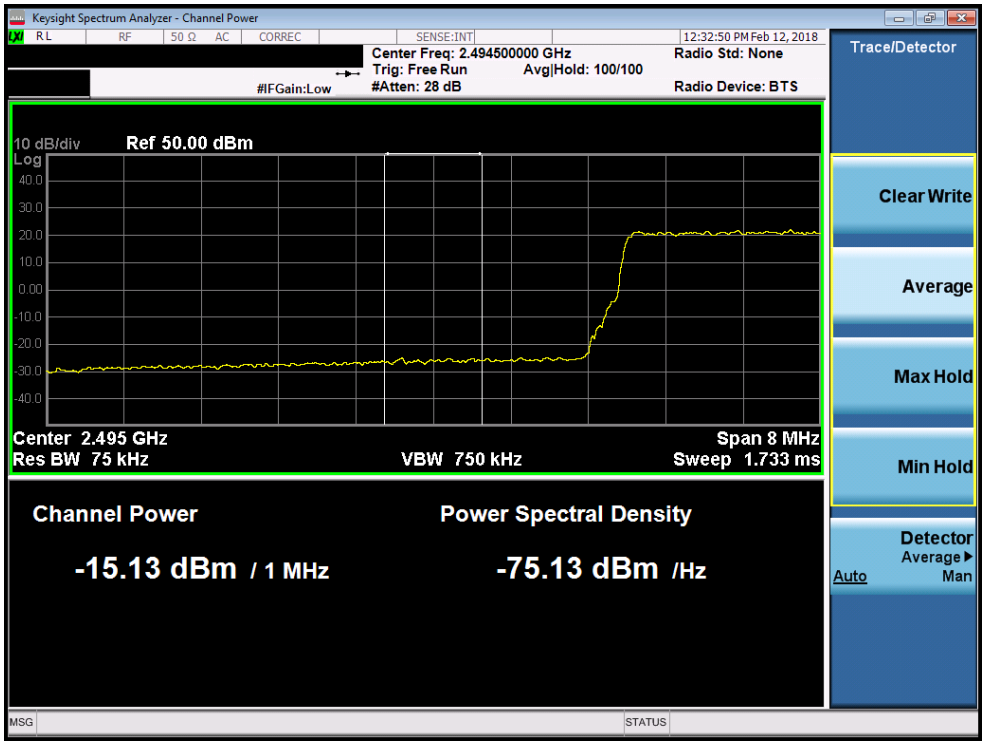


Plot 7-235. Lower Band Edge Plot (Band 41 - 10.0MHz 64-QAM)



Plot 7-236. Lower Extended Band Edge Plot (Band 41 - 10.0MHz 64-QAM)

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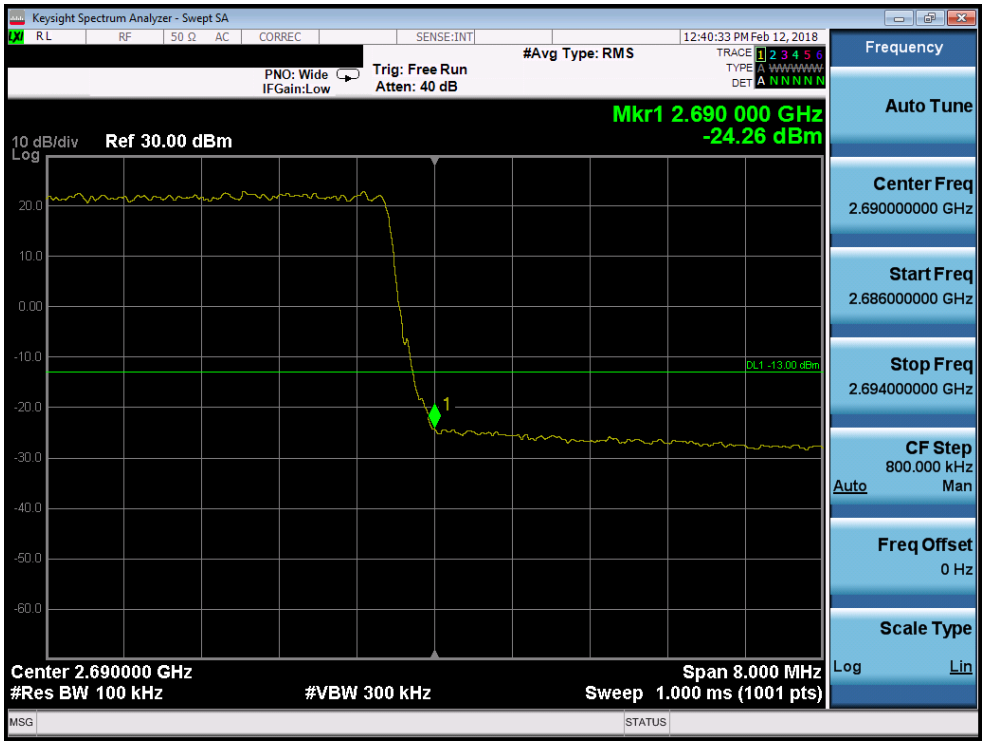
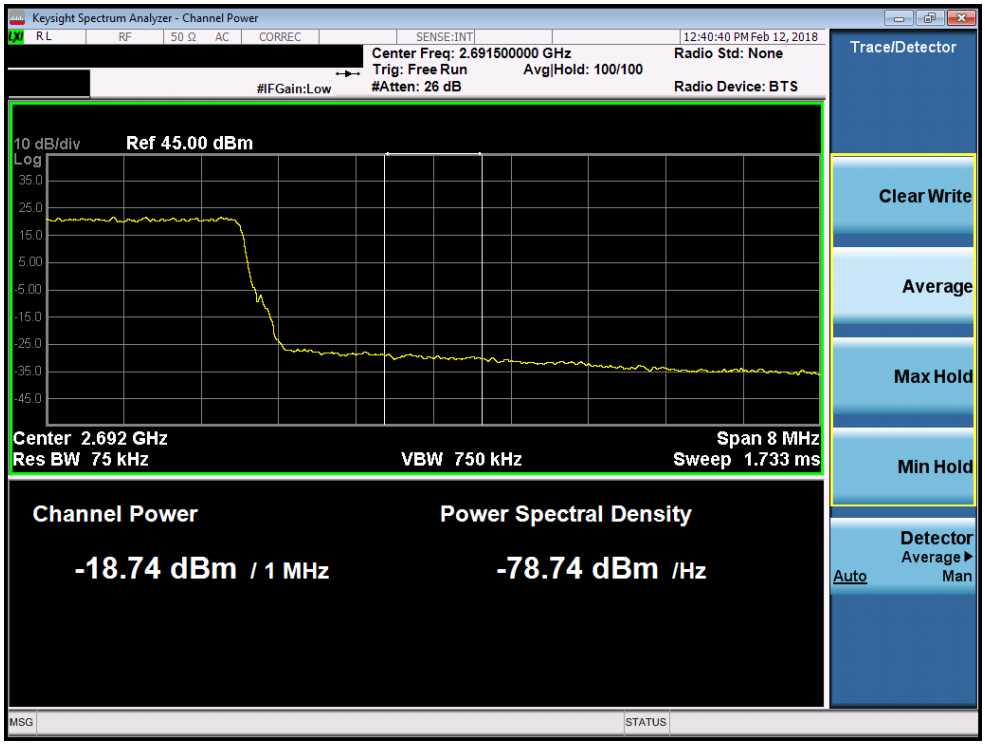


Plot 7-237. Upper Band Edge Plot (Band 41 - 10.0MHz 64-QAM)



Plot 7-238. Upper Extended Band Edge Plot (Band 41 - 10.0MHz 64-QAM)

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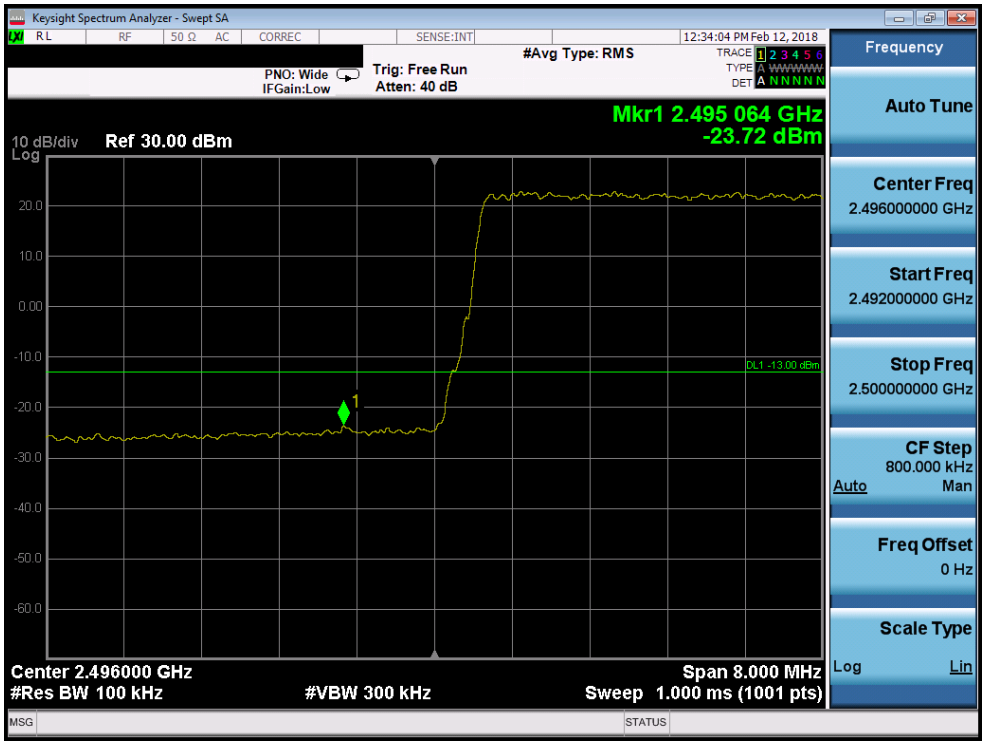
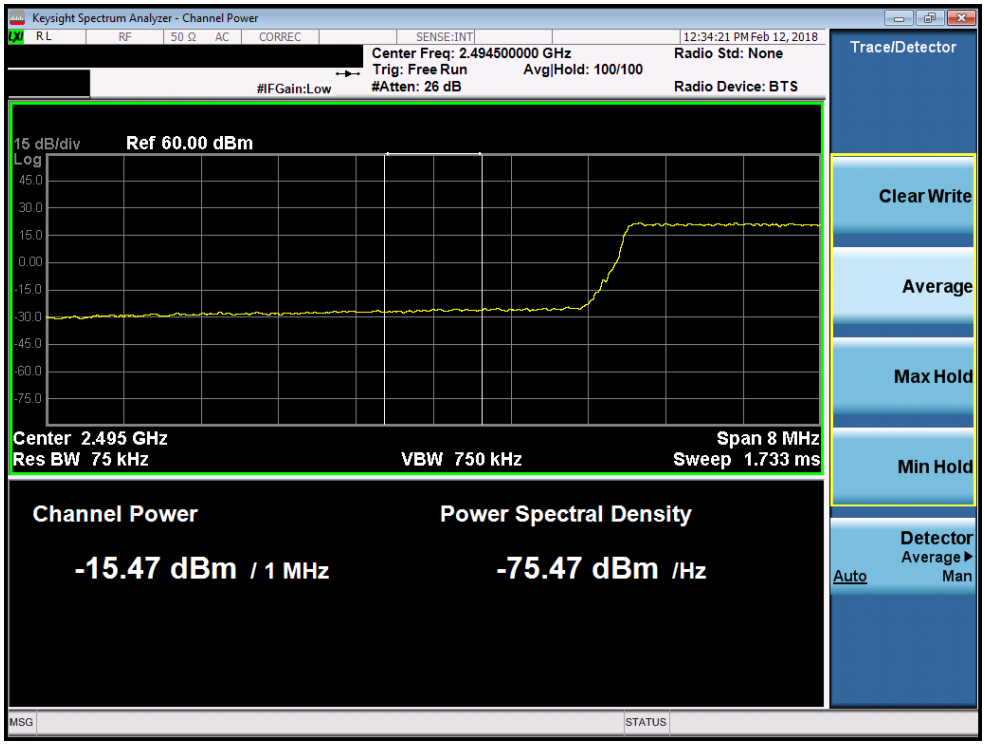


Plot 7-239. Lower Band Edge Plot (Band 41 - 10.0MHz 256-QAM)



Plot 7-240. Lower Extended Band Edge Plot (Band 41 - 10.0MHz 256-QAM)

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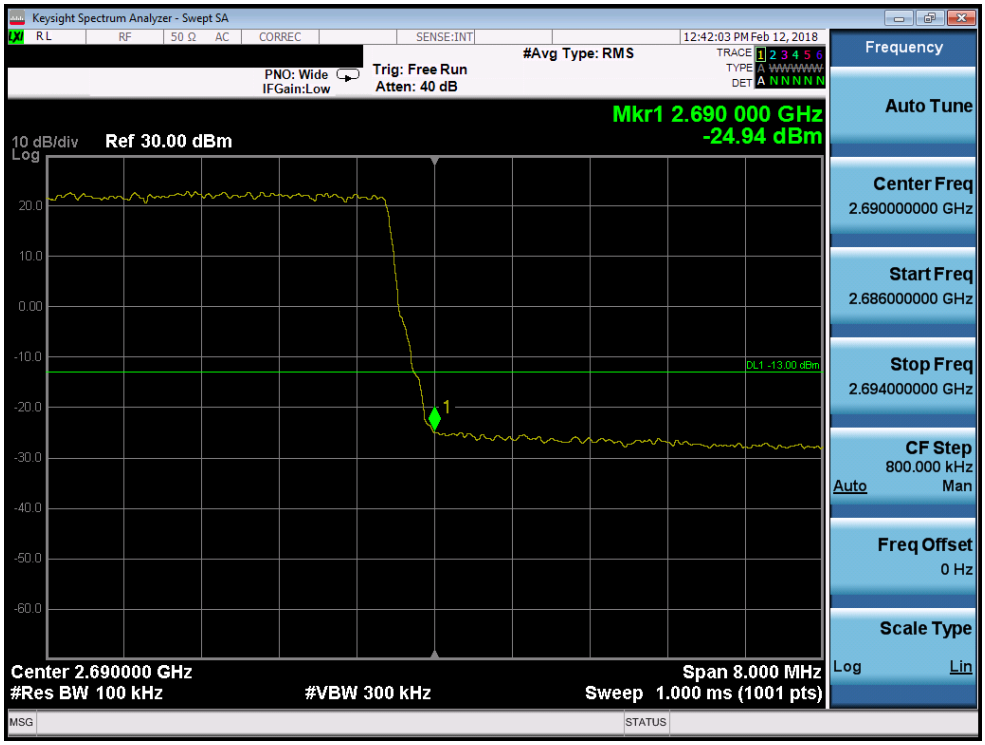
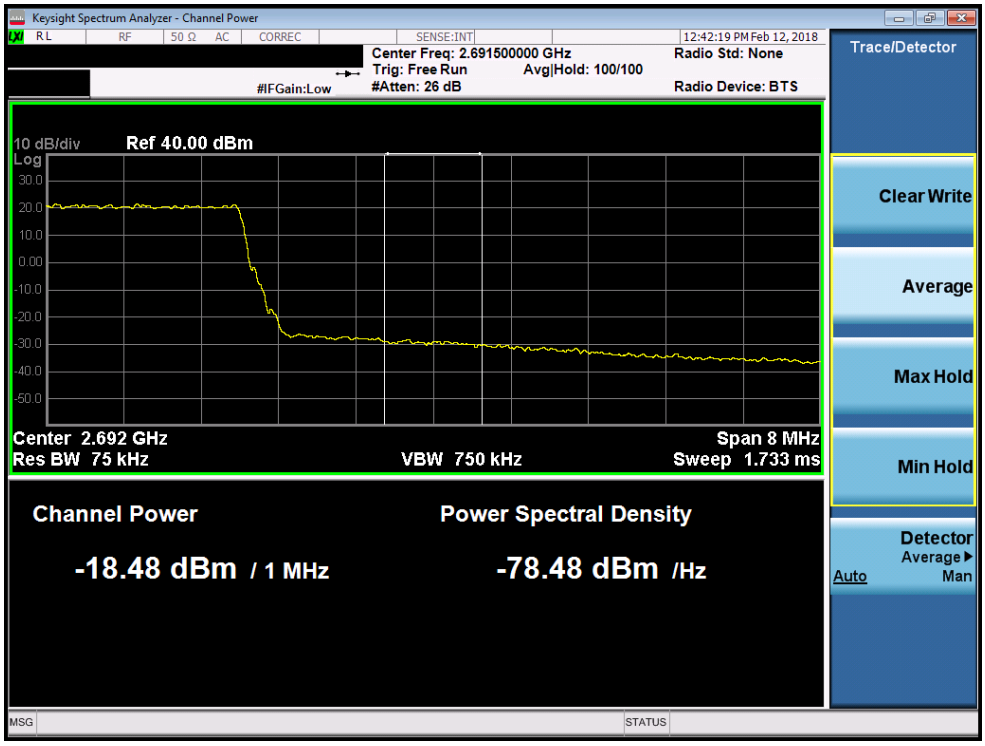


Plot 7-241. Upper Band Edge Plot (Band 41 - 10.0MHz 256-QAM)



Plot 7-242. Upper Extended Band Edge Plot (Band 41 - 10.0MHz 256-QAM)

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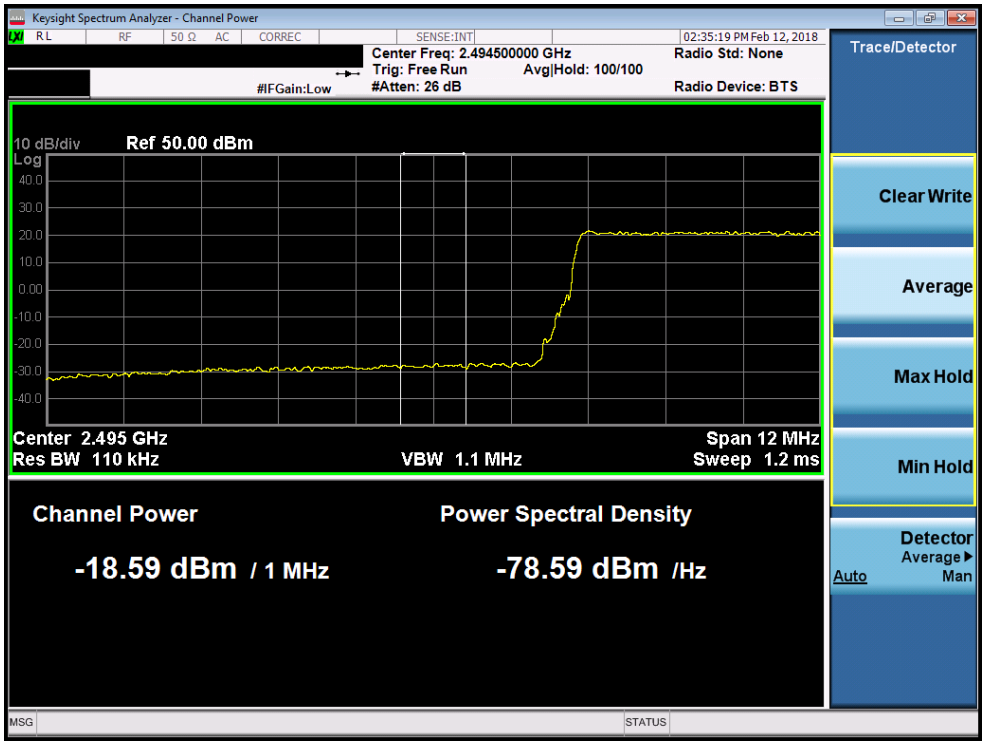
Plot 7-243. Lower Band Edge Plot (Band 41 - 15.0MHz QPSK)



Plot 7-244. Lower Extended Band Edge Plot (Band 41 - 15.0MHz QPSK)

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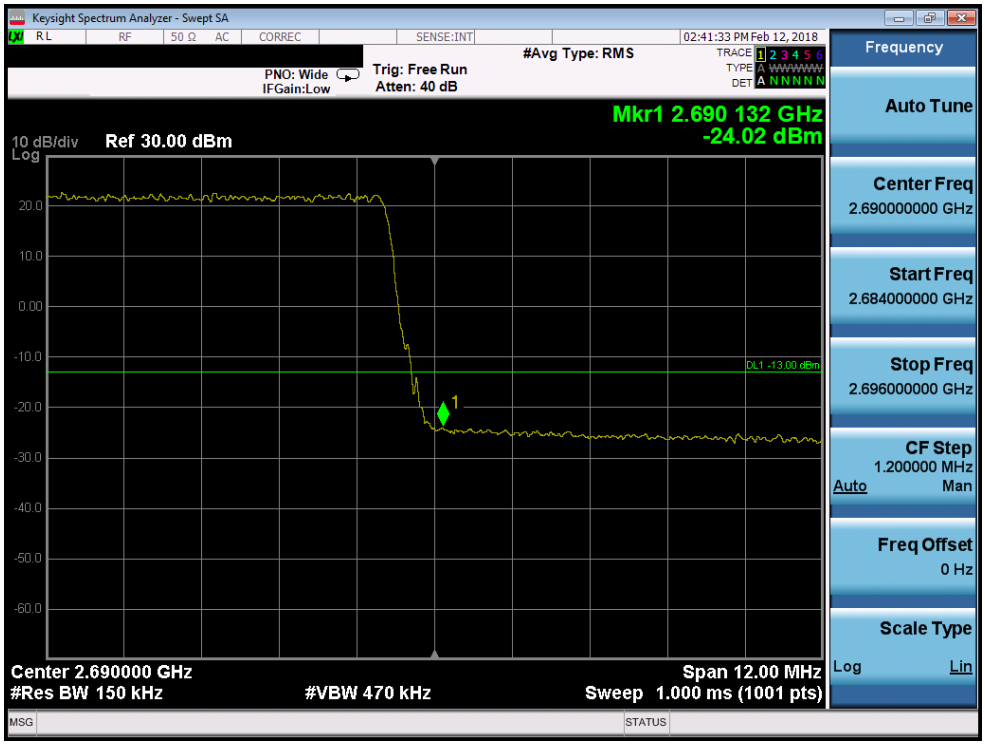
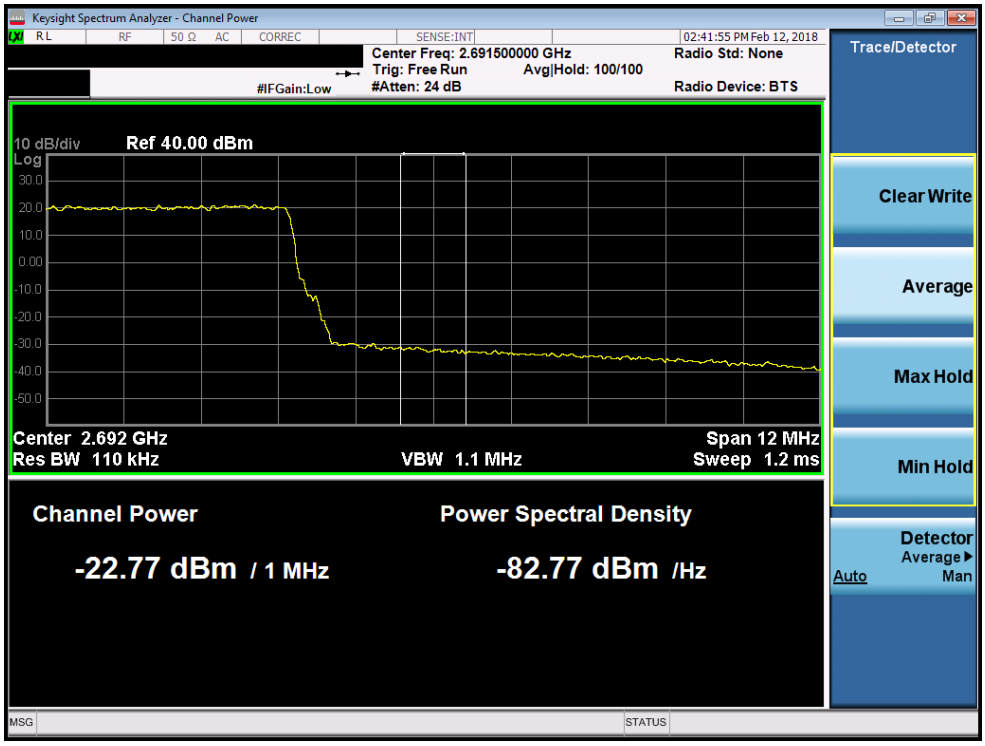


Plot 7-245. Upper Band Edge Plot (Band 41 - 15.0MHz QPSK)



Plot 7-246. Upper Extended Band Edge Plot (Band 41 - 15.0MHz QPSK)

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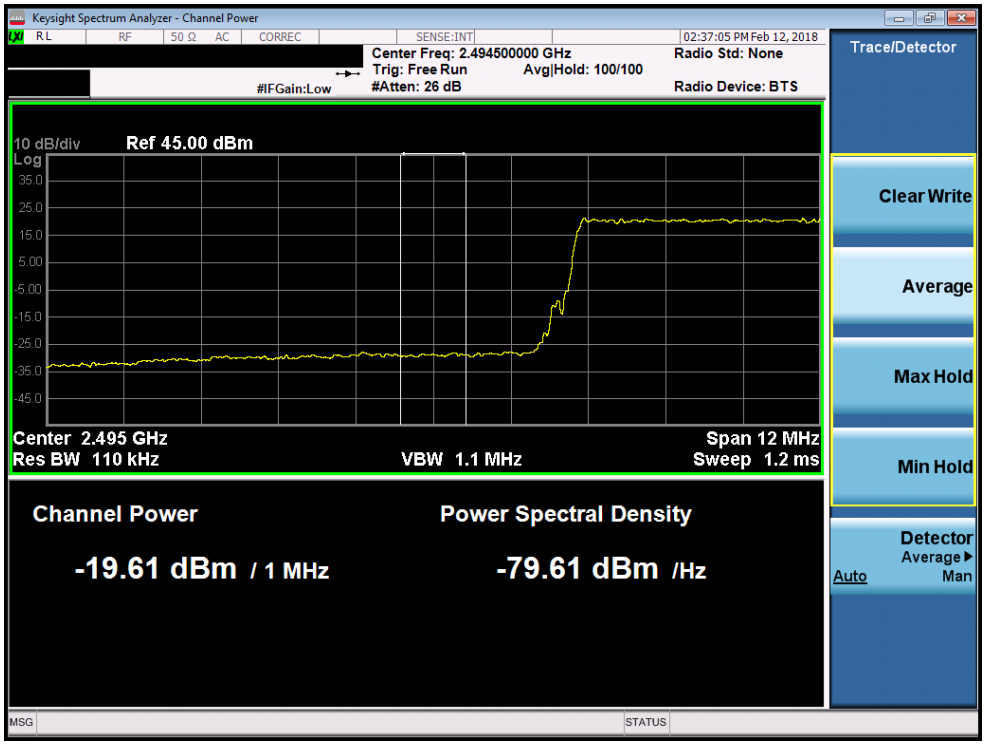
Plot 7-247. Lower Band Edge Plot (Band 41 - 15.0MHz 16-QAM)



Plot 7-248. Lower Extended Band Edge Plot (Band 41 - 15.0MHz 16-QAM)

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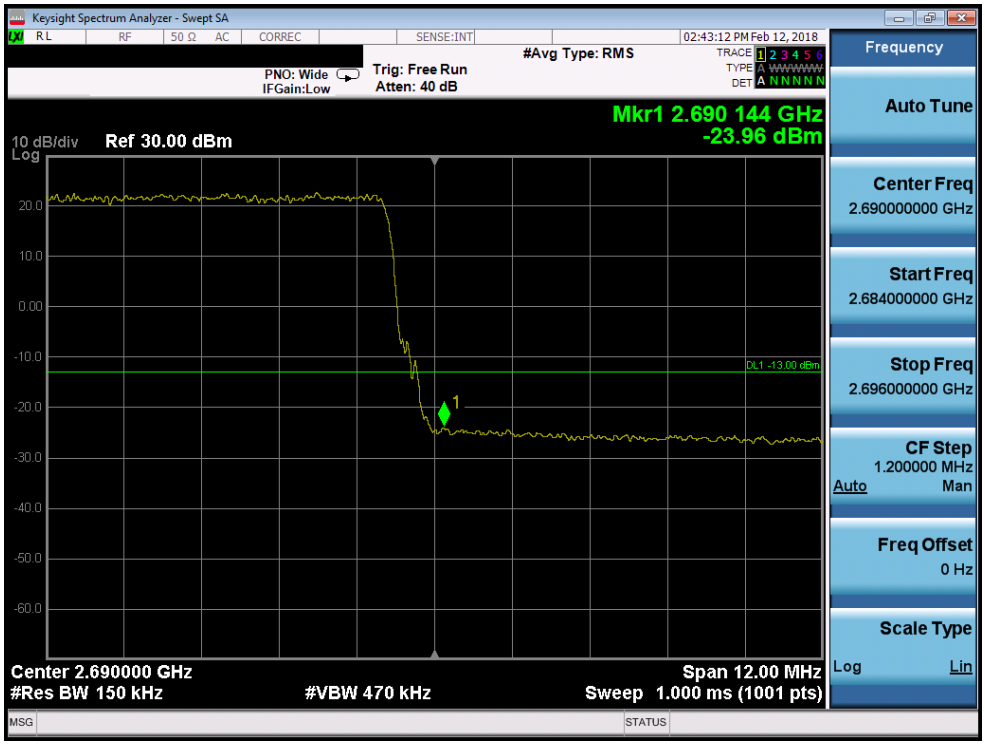
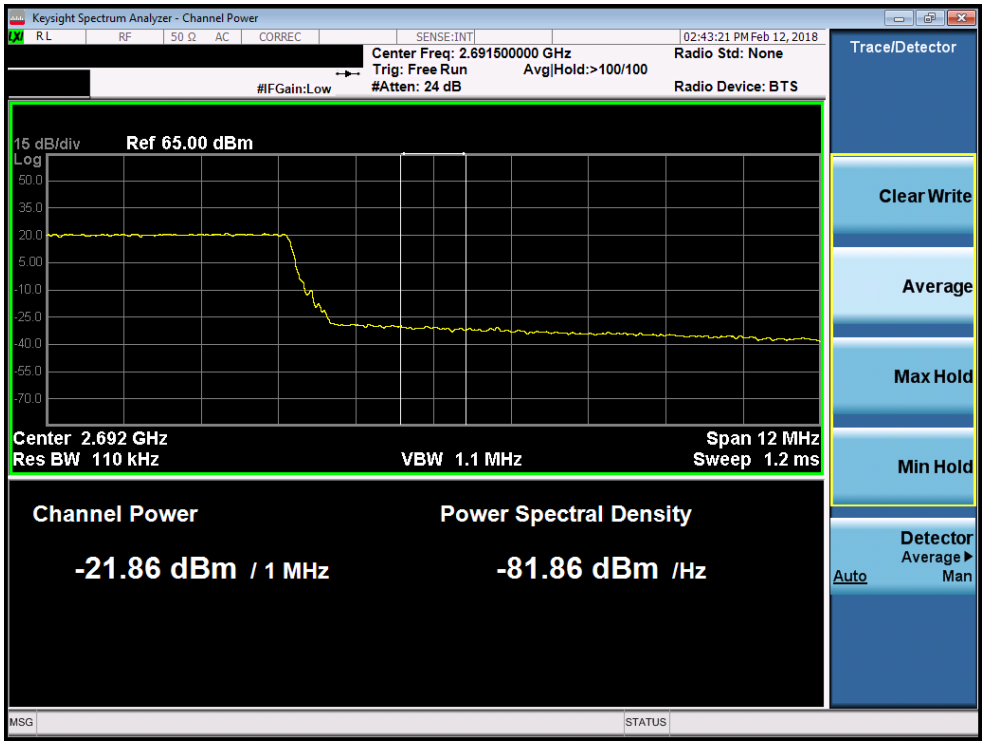


Plot 7-249. Upper Band Edge Plot (Band 41 - 15.0MHz 16-QAM)



Plot 7-250. Upper Extended Band Edge Plot (Band 41 - 15.0MHz 16-QAM)

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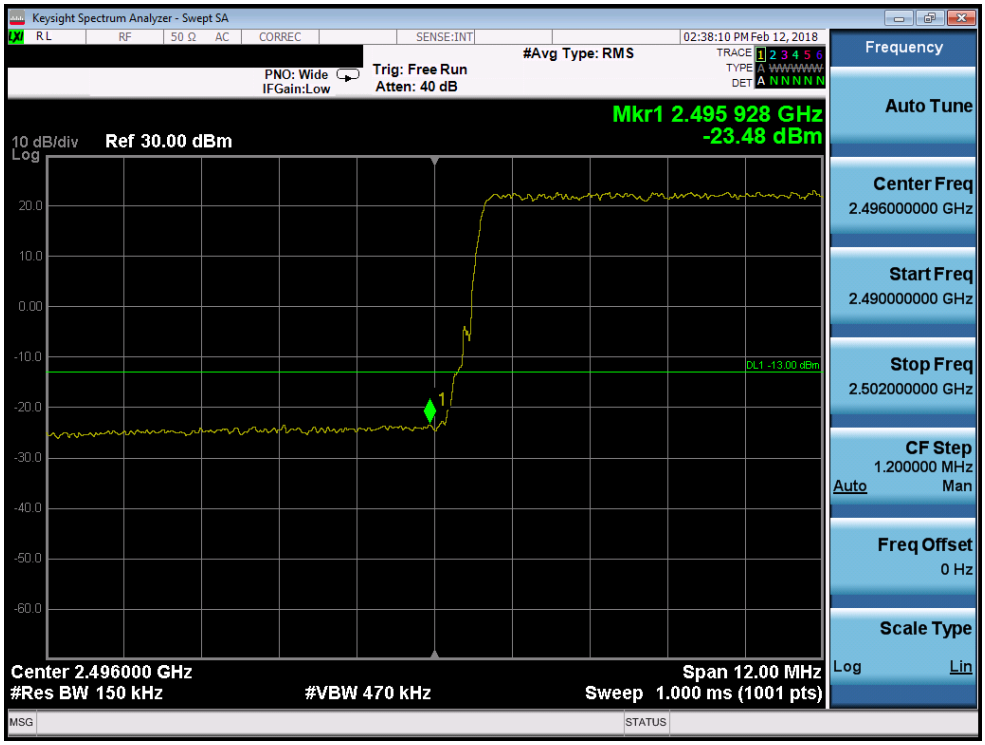
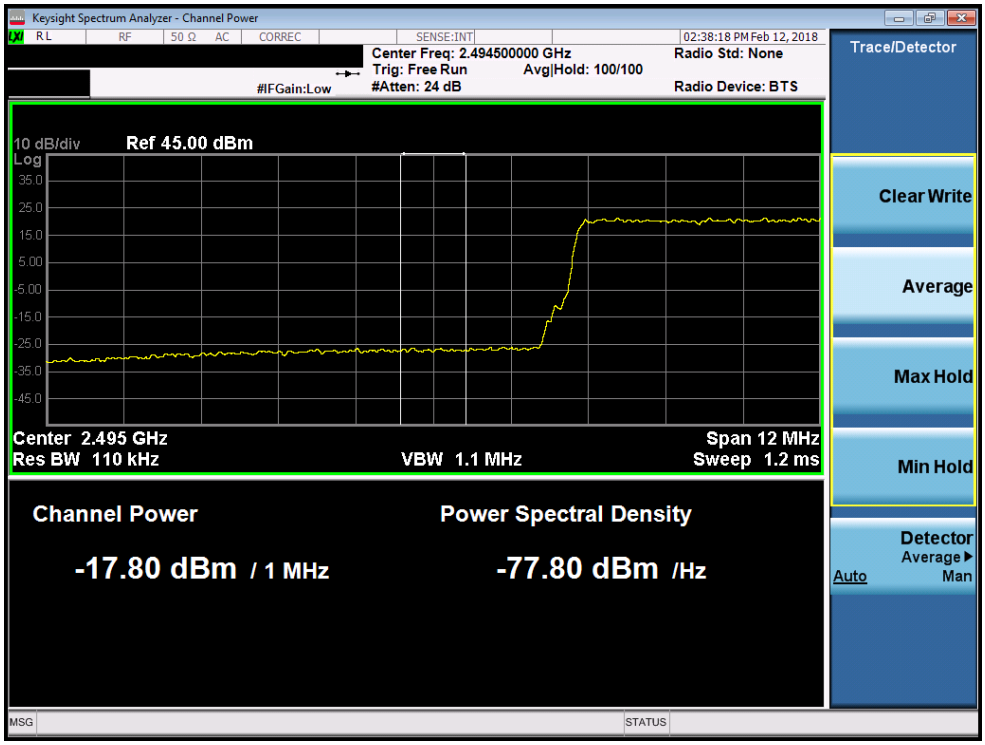


Plot 7-251. Lower Band Edge Plot (Band 41 - 15.0MHz 64-QAM)



Plot 7-252. Lower Extended Band Edge Plot (Band 41 - 15.0MHz 64-QAM)

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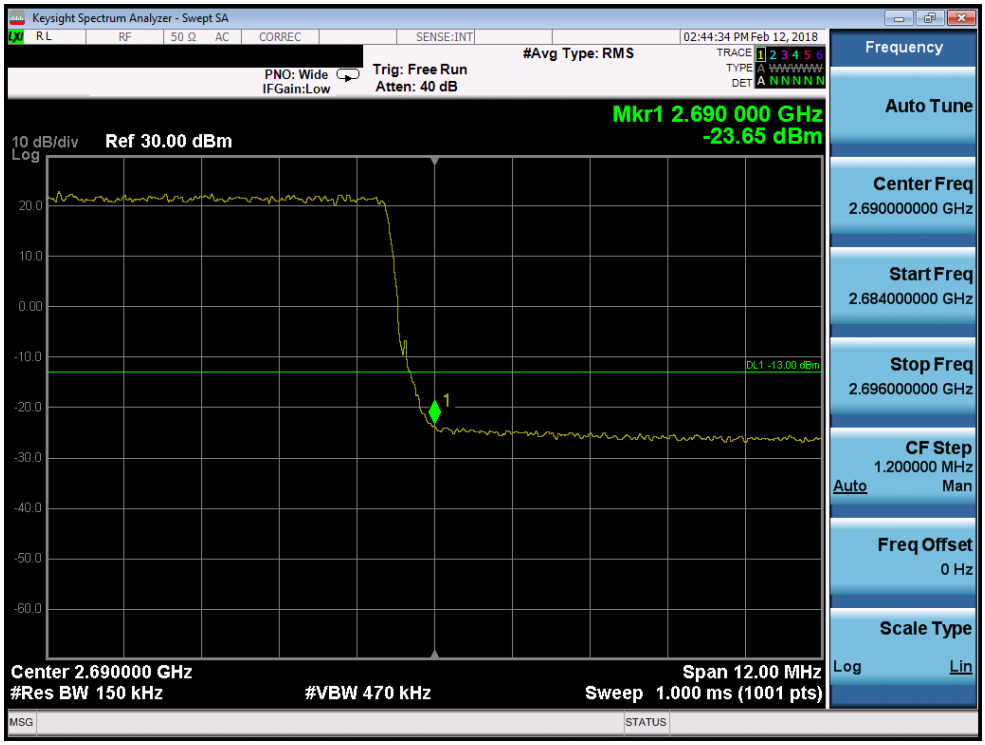
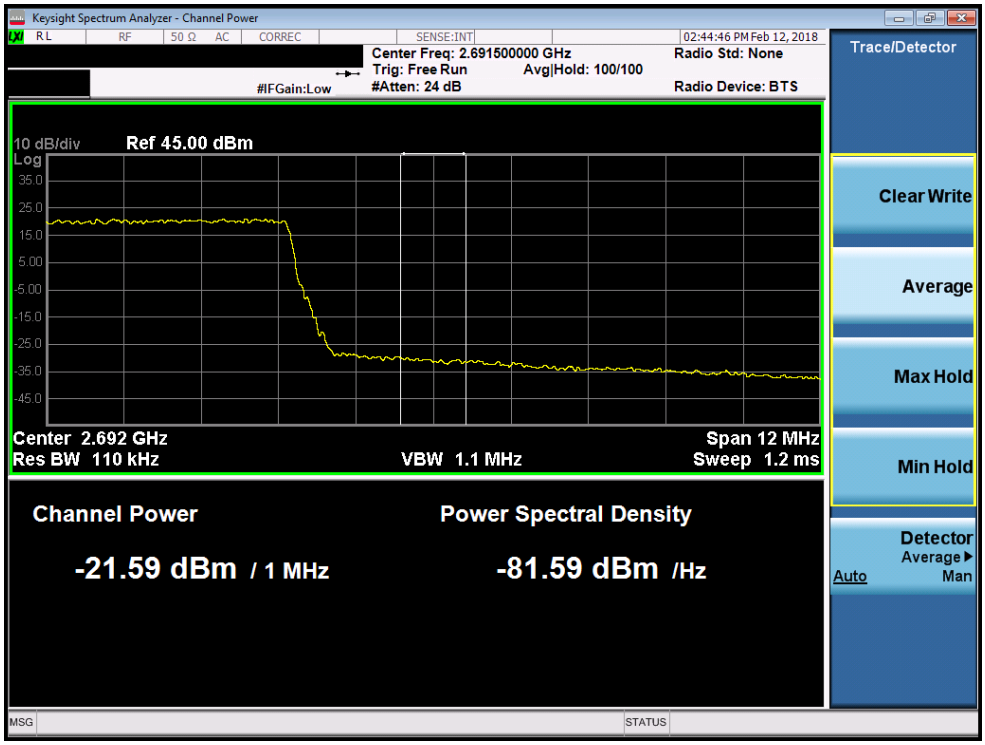


Plot 7-253. Upper Band Edge Plot (Band 41 - 15.0MHz 64-QAM)



Plot 7-254. Upper Extended Band Edge Plot (Band 41 - 15.0MHz 64-QAM)

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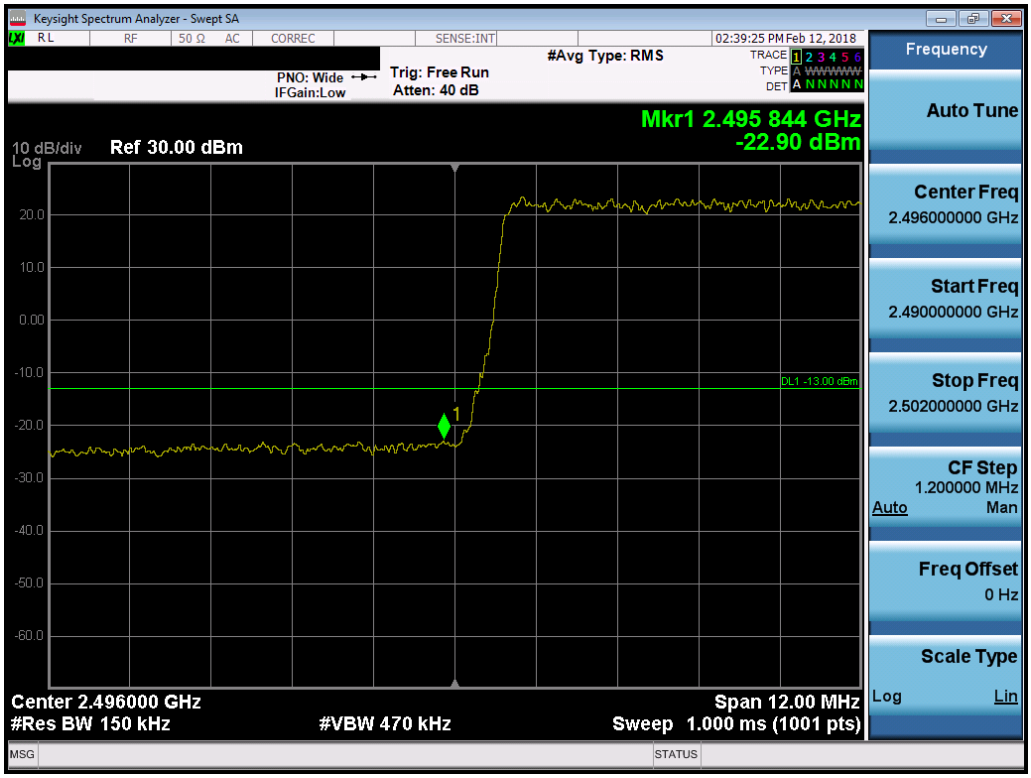
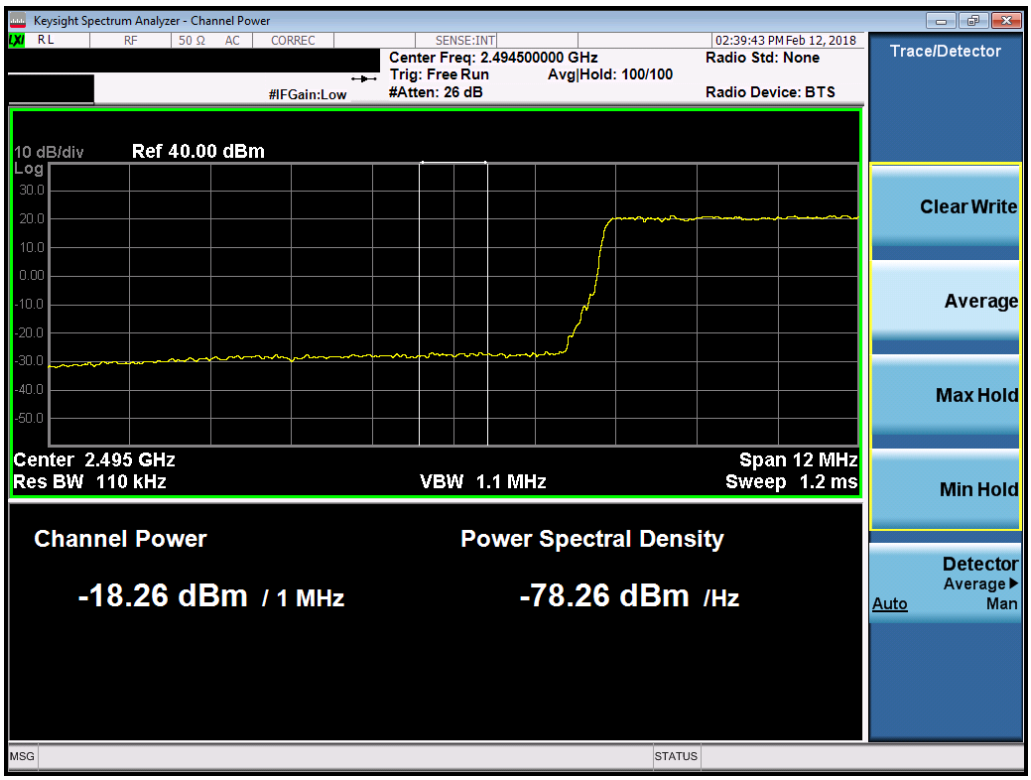


Plot 7-255. Lower Band Edge Plot (Band 41 - 15.0MHz 256-QAM)



Plot 7-256. Lower Extended Band Edge Plot (Band 41 - 15.0MHz 256-QAM)

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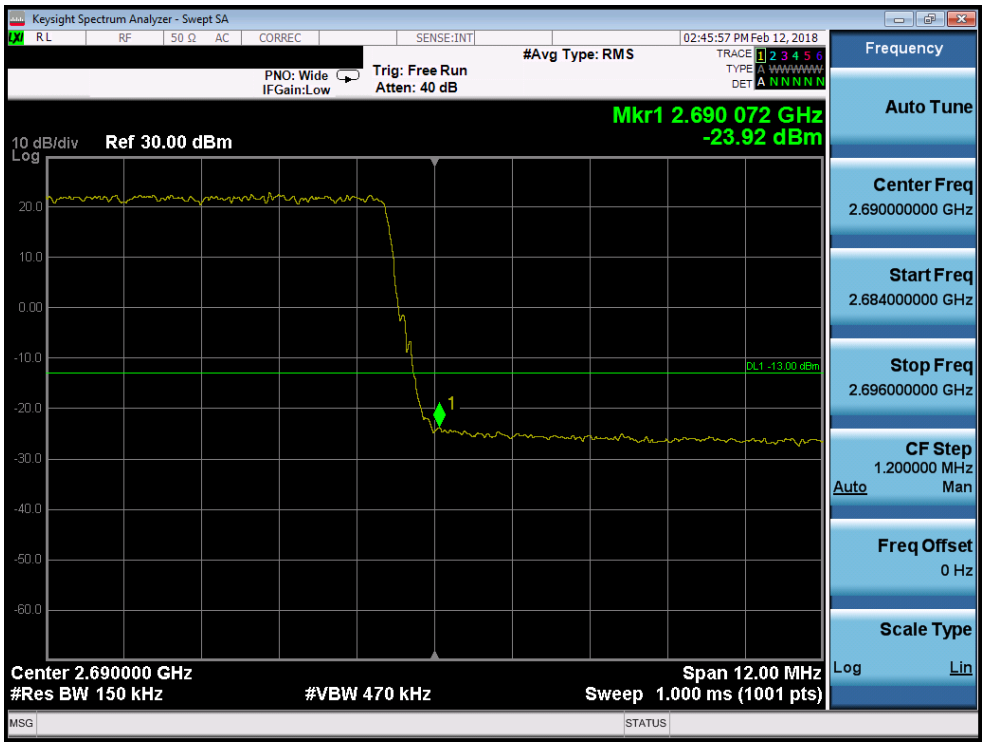
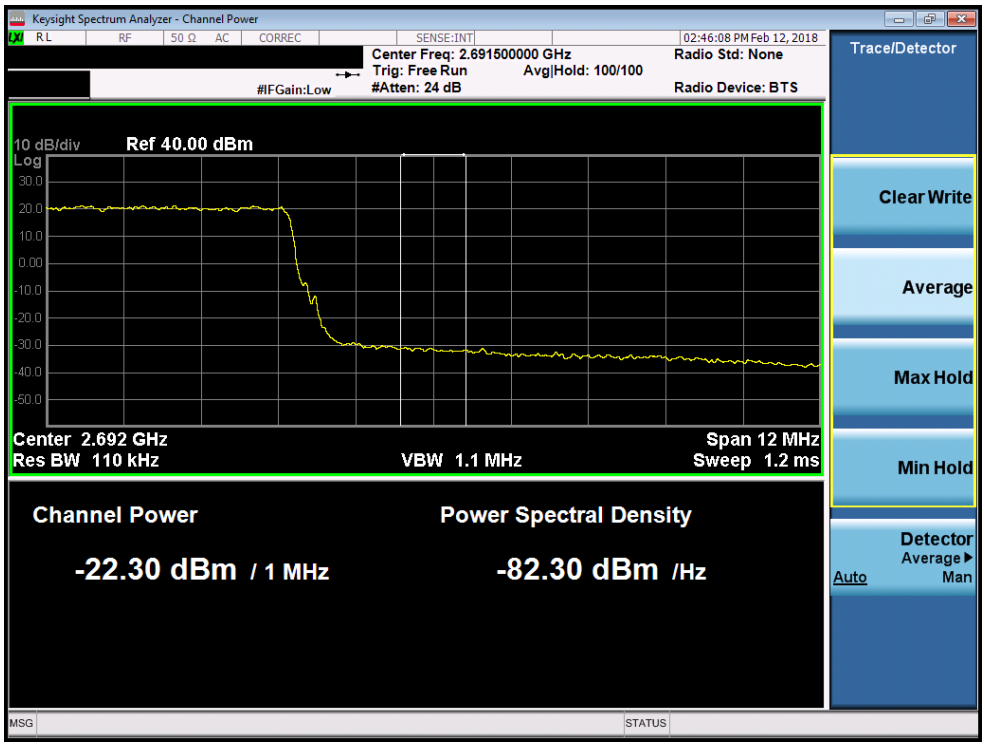


Plot 7-257. Upper Band Edge Plot (Band 41 - 15.0MHz 256-QAM)



Plot 7-258. Upper Extended Band Edge Plot (Band 41 - 15.0MHz 256-QAM)

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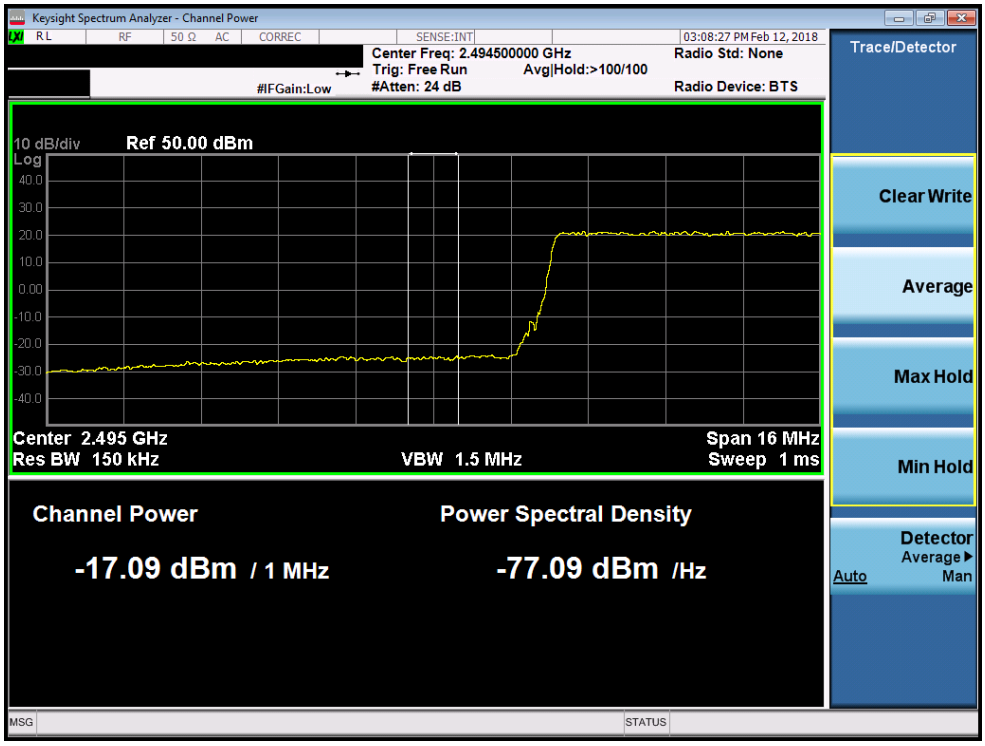
Plot 7-259. Lower Band Edge Plot (Band 41 - 20.0MHz QPSK)



Plot 7-260. Lower Extended Band Edge Plot (Band 41 - 20.0MHz QPSK)

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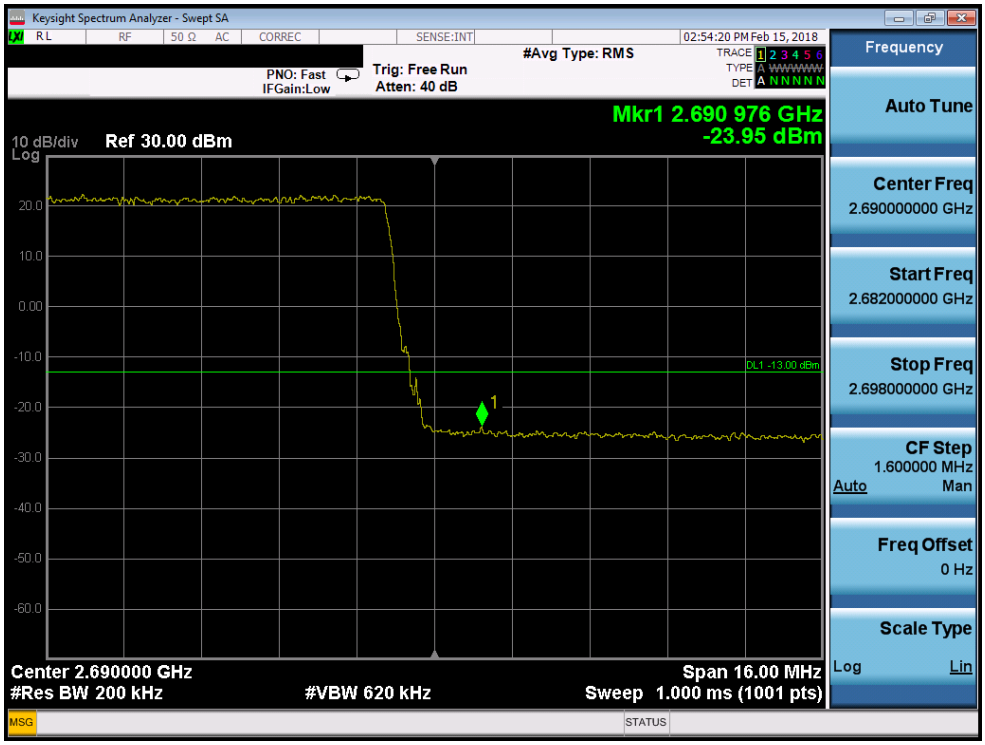
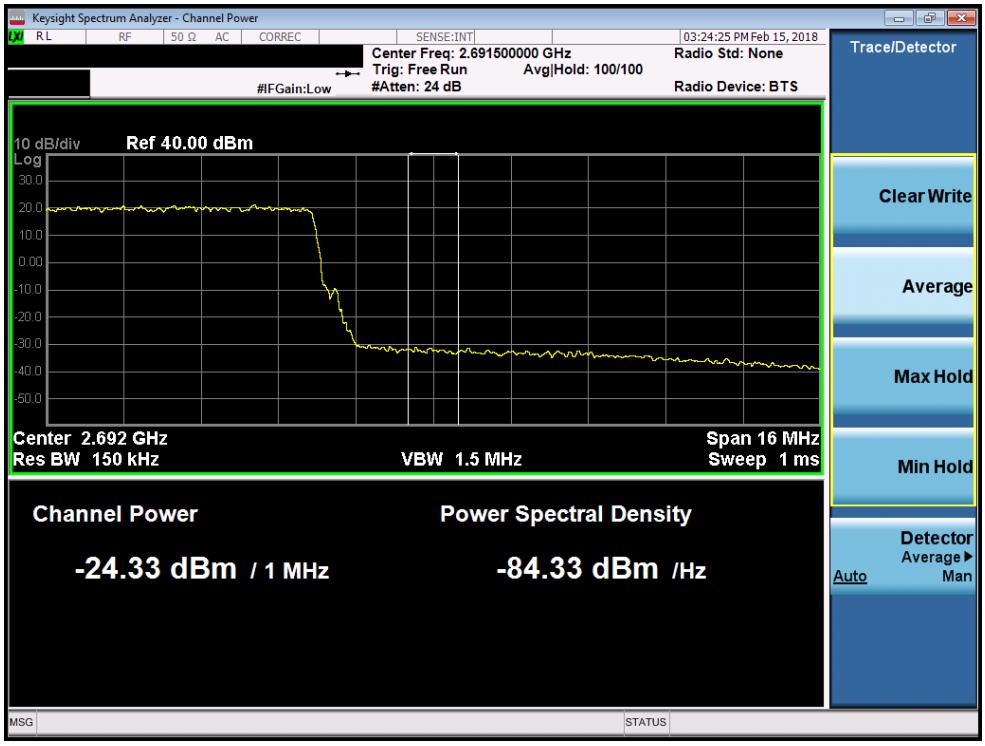


Plot 7-261. Upper Band Edge Plot (Band 41 - 20.0MHz QPSK)



Plot 7-262. Upper Extended Band Edge Plot (Band 41 - 20.0MHz QPSK)

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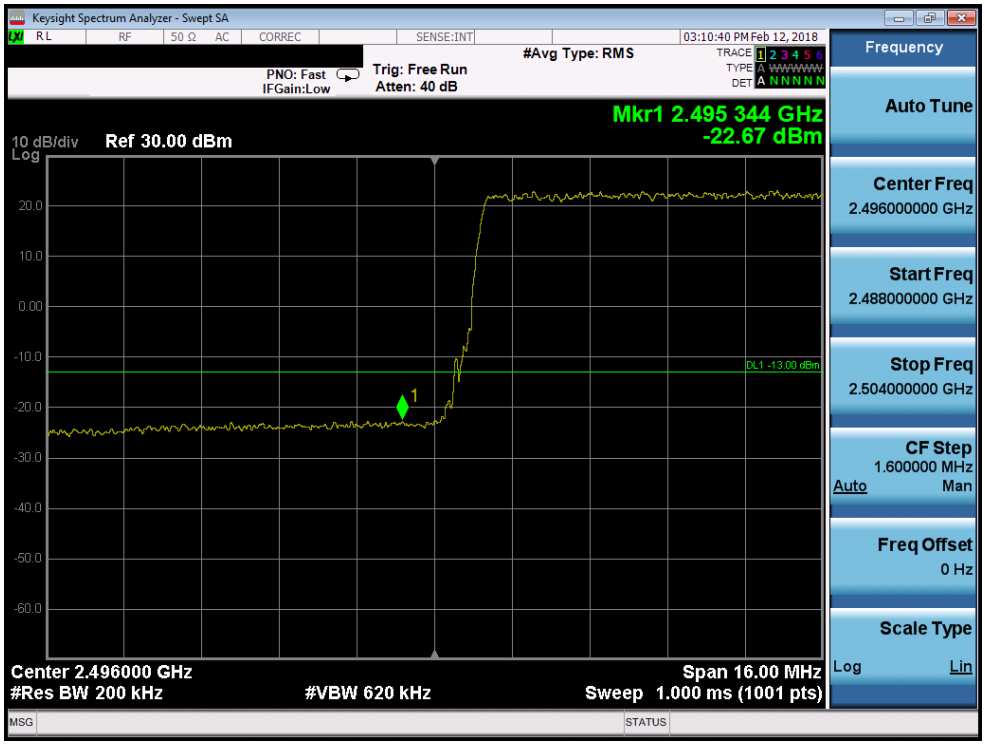
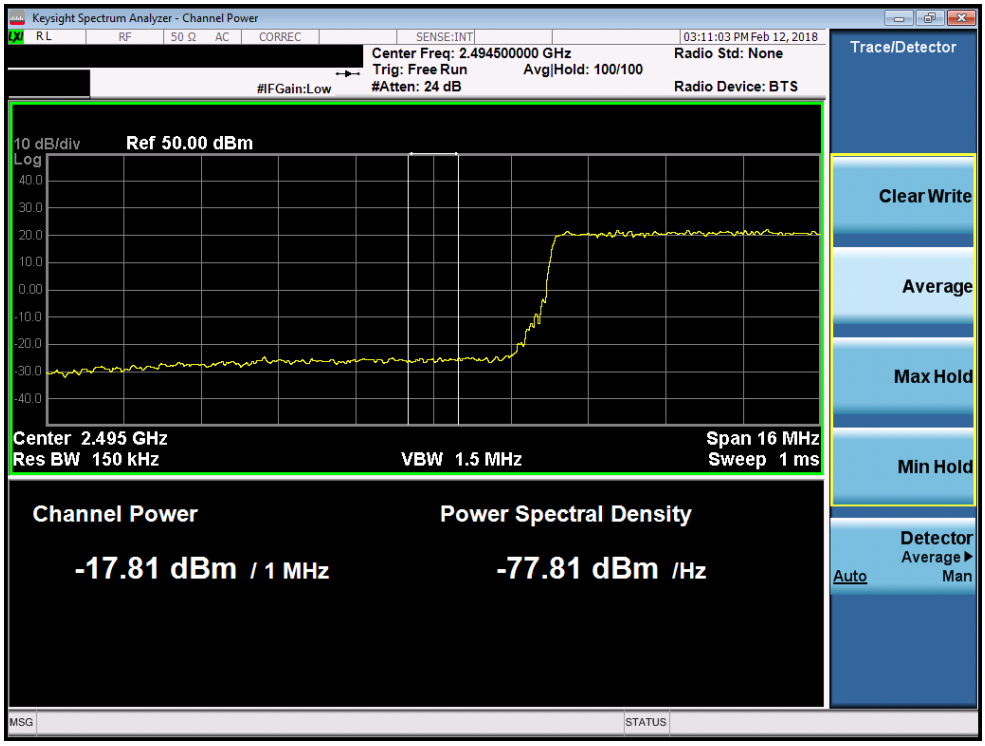


Plot 7-263. Lower Band Edge Plot (Band 41 - 20.0MHz 16-QAM)



Plot 7-264. Lower Extended Band Edge Plot (Band 41 - 20.0MHz 16-QAM)

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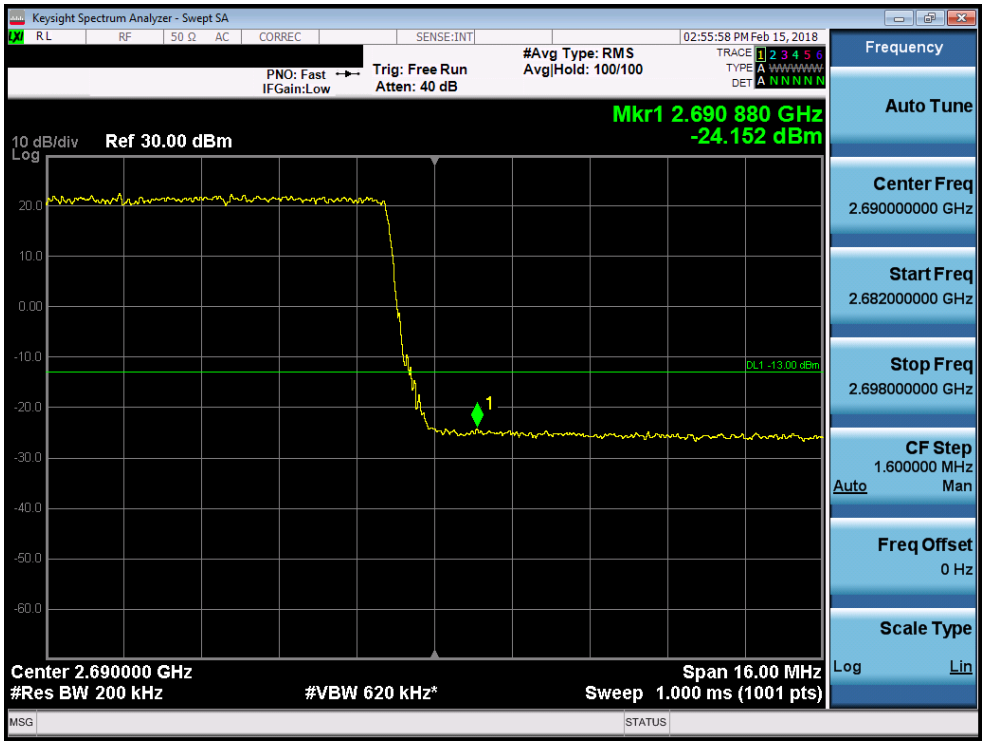
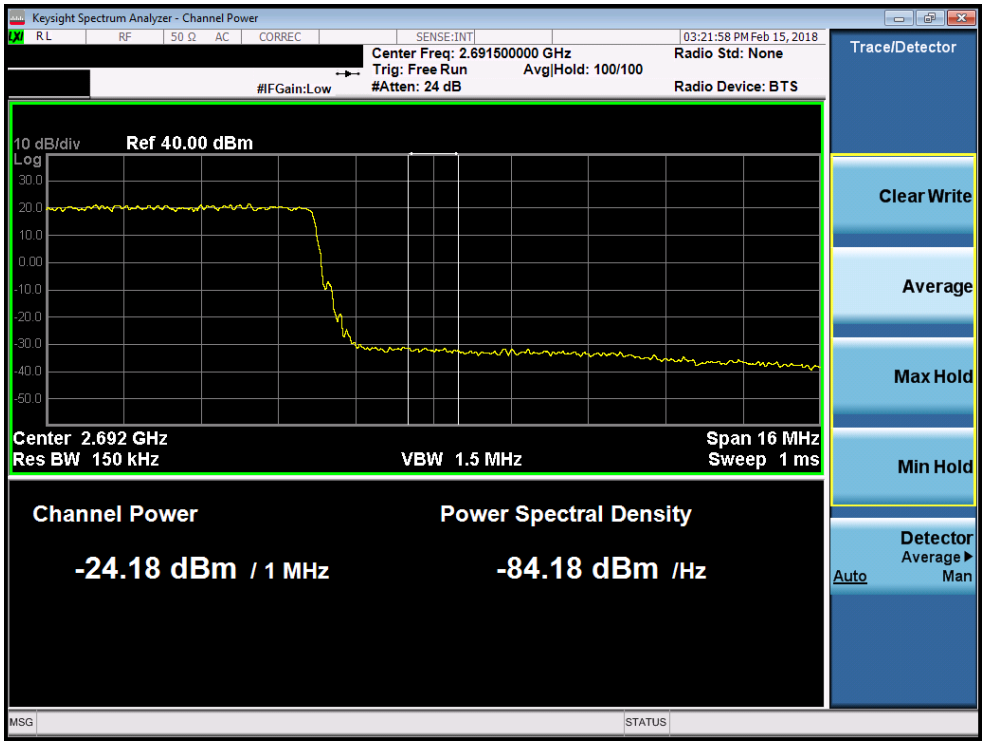


Plot 7-265. Upper Band Edge Plot (Band 41 - 20.0MHz 16-QAM)



Plot 7-266. Upper Extended Band Edge Plot (Band 41 - 20.0MHz 16-QAM)

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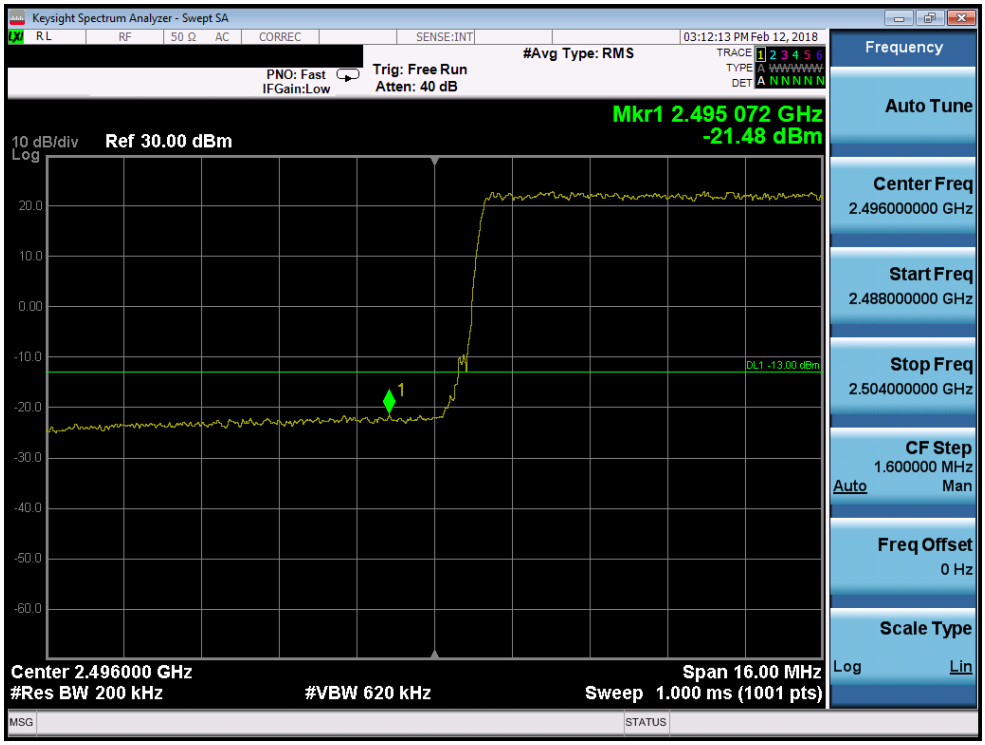
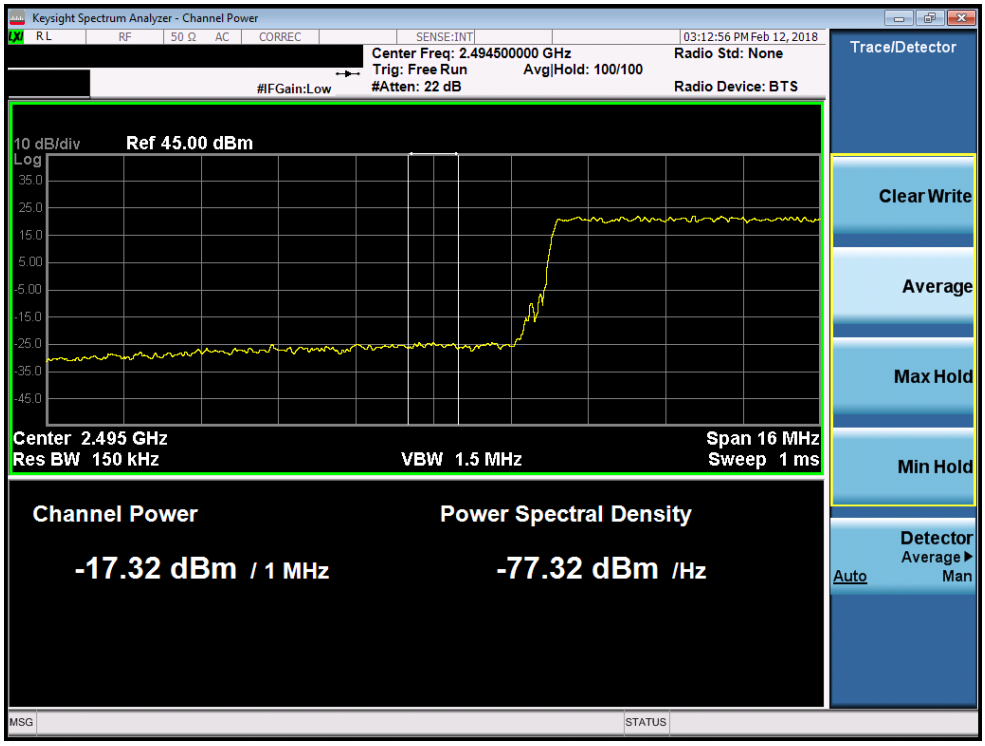


Plot 7-267. Lower Band Edge Plot (Band 41 - 20.0MHz 64-QAM)



Plot 7-268. Lower Extended Band Edge Plot (Band 41 - 20.0MHz 64-QAM)

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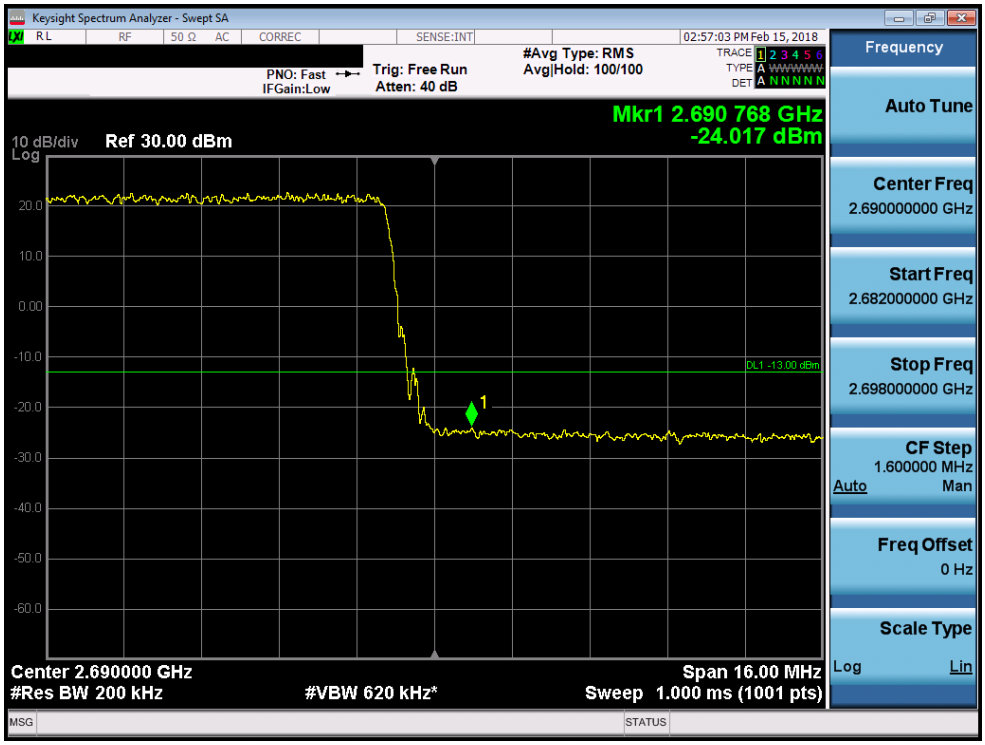
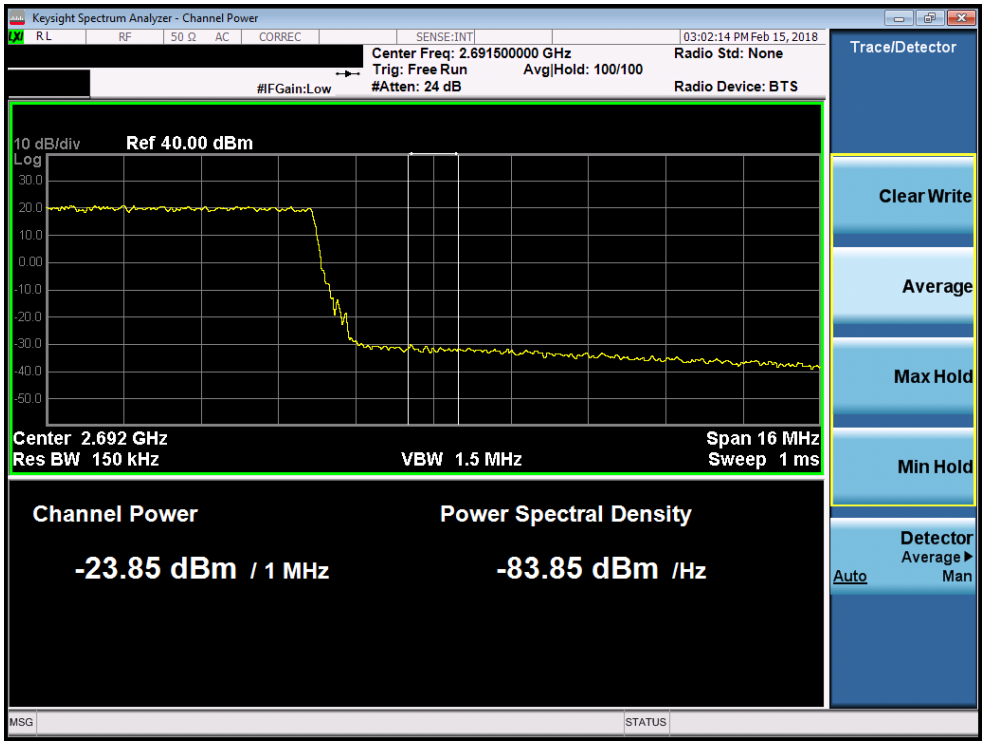


Plot 7-269. Upper Band Edge Plot (Band 41 - 20.0MHz 64-QAM)



Plot 7-270. Upper Extended Band Edge Plot (Band 41 - 20.0MHz 64-QAM)

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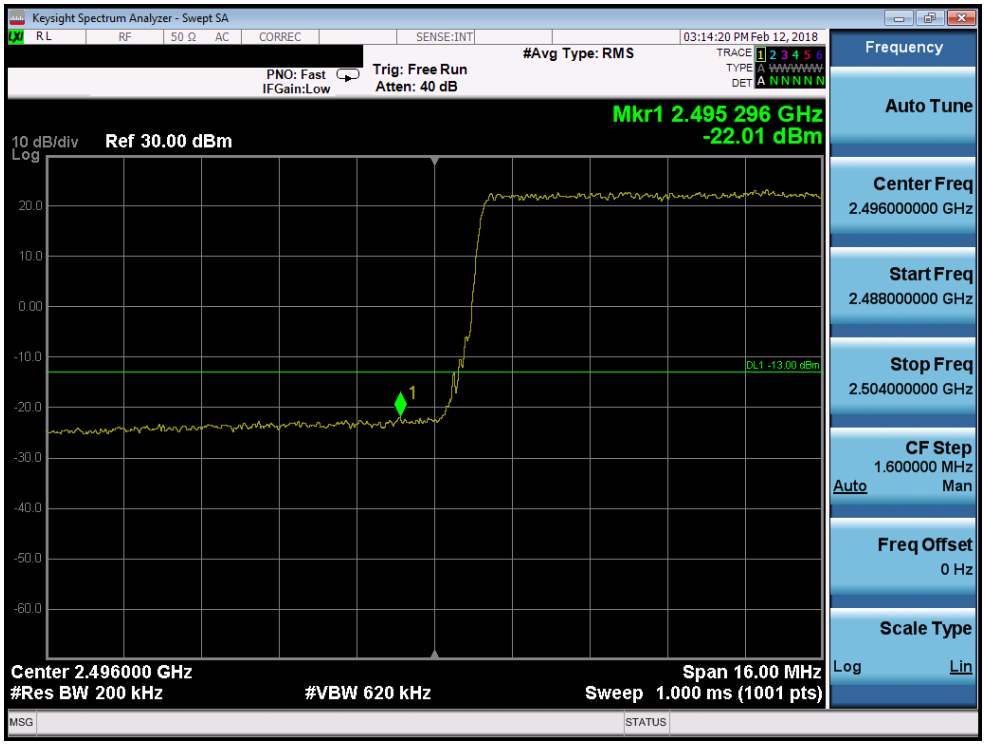
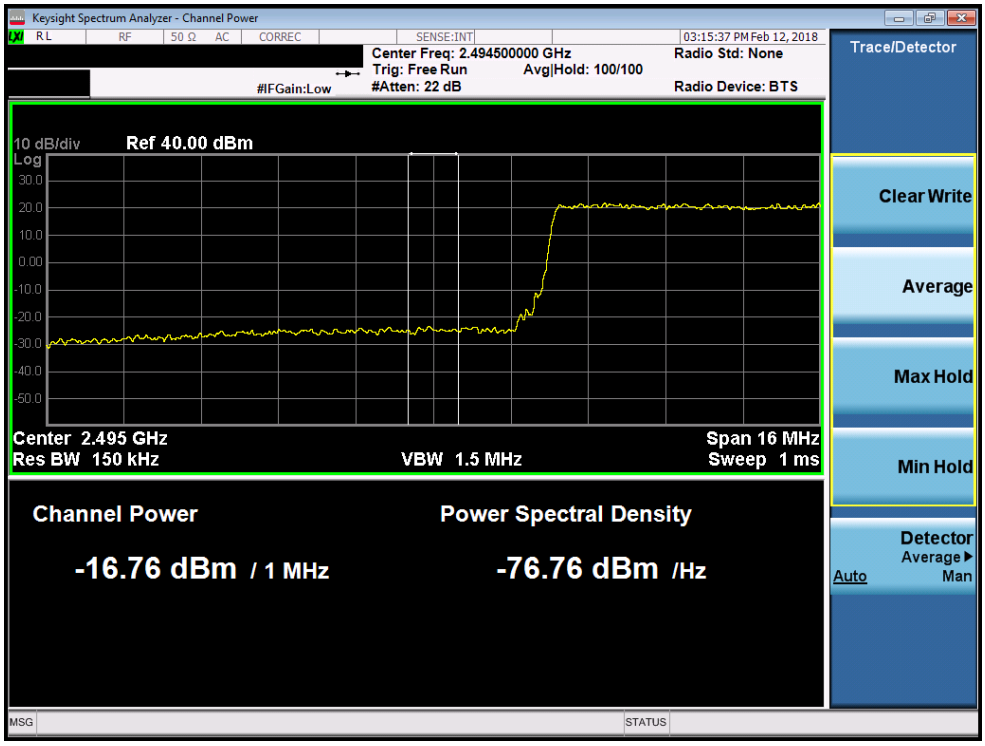


Plot 7-271. Lower Band Edge Plot (Band 41 - 20.0MHz 256-QAM)



Plot 7-272. Lower Extended Band Edge Plot (Band 41 - 20.0MHz 256-QAM)

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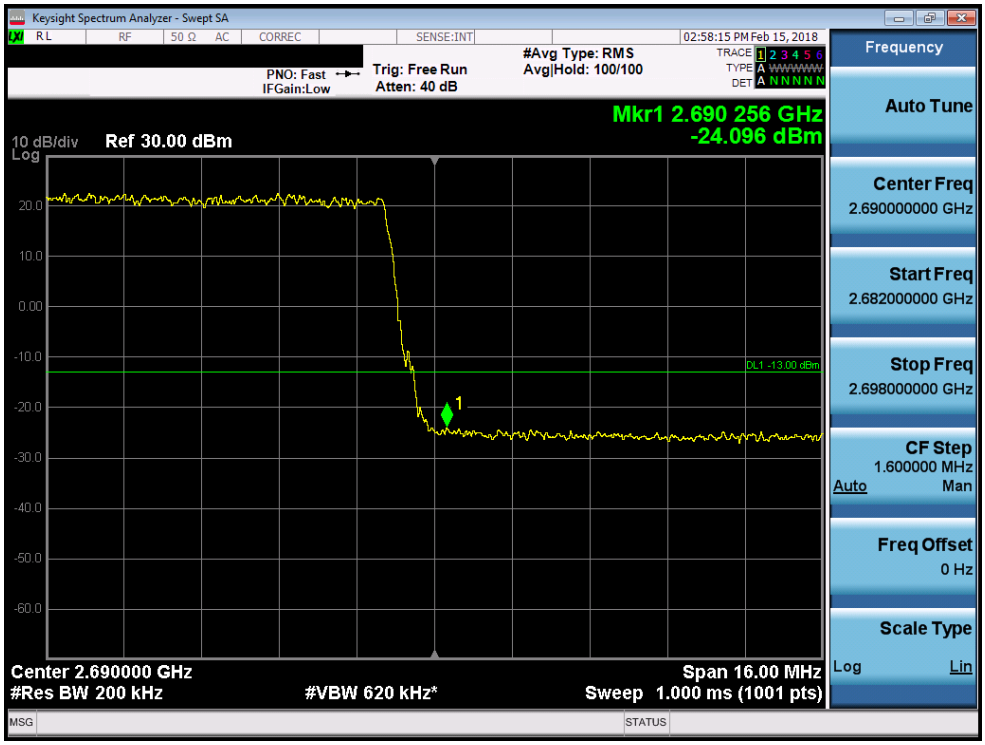
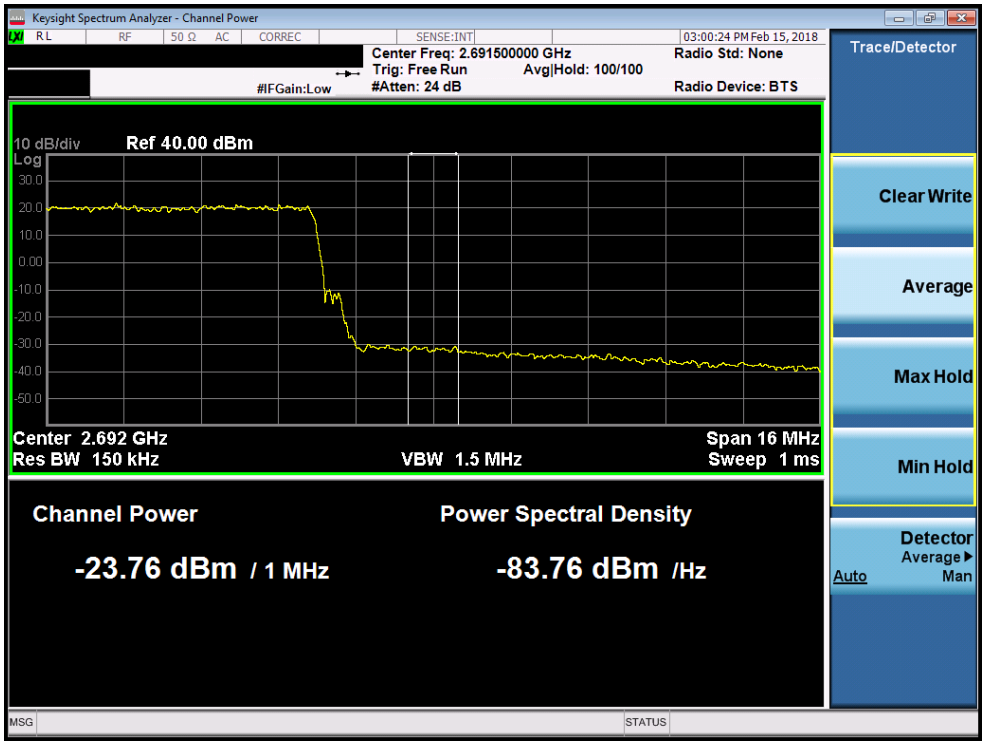


Plot 7-273. Upper Band Edge Plot (Band 41 - 20.0MHz 256-QAM)



Plot 7-274. Upper Extended Band Edge Plot (Band 41 - 20.0MHz 256-QAM)

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Band 41 – MIMO Coducted Band Edge Measurement

Channel Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Band Edge	Ant 1 Cond. Band Edge [dBm]	Ant 2 Cond. Band Edge [dBm]	MIMO Cond. Band Edge [dBm]	MIMO Cond. Band Edge Limit [dBm]	Cond. Band Edge Margin [dB]
2498.50	5	QPSK	Lower	-17.01	-21.05	-15.56	-13	-2.56
2498.50	5	QPSK	Lower Extended	-15.57	-16.94	-13.19	-13	-0.19
2687.50	5	QPSK	Upper	-17.08	-23.27	-16.15	-13	-3.15
2687.50	5	QPSK	Upper Extended	-19.85	-17.82	-15.71	-13	-2.71
2498.50	5	16-QAM	Lower	-17.23	-22.81	-16.17	-13	-3.17
2498.50	5	16-QAM	Lower Extended	-16.08	-16.64	-13.34	-13	-0.34
2687.50	5	16-QAM	Upper	-18.16	-23.69	-17.09	-13	-4.09
2687.50	5	16-QAM	Upper Extended	-19.34	-17.42	-15.26	-13	-2.26
2498.50	5	64-QAM	Lower	-16.43	-23.10	-15.59	-13	-2.59
2498.50	5	64-QAM	Lower Extended	-16.13	-17.11	-13.58	-13	-0.58
2687.50	5	64-QAM	Upper	-18.89	-22.72	-17.38	-13	-4.38
2687.50	5	64-QAM	Upper Extended	-19.22	-17.42	-15.22	-13	-2.22
2498.50	5	256-QAM	Lower	-16.85	-24.35	-16.14	-13	-3.14
2498.50	5	256-QAM	Lower Extended	-16.13	-16.56	-13.33	-13	-0.33
2687.50	5	256-QAM	Upper	-18.65	-21.95	-16.98	-13	-3.98
2687.50	5	256-QAM	Upper Extended	-19.22	-17.73	-15.40	-13	-2.40
2501.00	10	QPSK	Lower	-23.57	-24.11	-20.82	-13	-7.82
2501.00	10	QPSK	Lower Extended	-17.94	-16.04	-13.88	-13	-0.88
2685.00	10	QPSK	Upper	-26.14	-23.70	-21.74	-13	-8.74
2685.00	10	QPSK	Upper Extended	-21.36	-20.26	-17.76	-13	-4.76
2501.00	10	16-QAM	Lower	-23.26	-23.66	-20.45	-13	-7.45
2501.00	10	16-QAM	Lower Extended	-18.37	-15.65	-13.79	-13	-0.79
2685.00	10	16-QAM	Upper	-26.31	-23.56	-21.71	-13	-8.71
2685.00	10	16-QAM	Upper Extended	-21.16	-19.58	-17.29	-13	-4.29
2501.00	10	64-QAM	Lower	-24.26	-24.03	-21.13	-13	-8.13
2501.00	10	64-QAM	Lower Extended	-18.08	-15.13	-13.35	-13	-0.35
2685.00	10	64-QAM	Upper	-25.61	-24.26	-21.87	-13	-8.87
2685.00	10	64-QAM	Upper Extended	-21.43	-18.74	-16.87	-13	-3.87
2501.00	10	256-QAM	Lower	-24.69	-23.72	-21.17	-13	-8.17
2501.00	10	256-QAM	Lower Extended	-17.65	-15.47	-13.41	-13	-0.41
2685.00	10	256-QAM	Upper	-26.10	-24.94	-22.47	-13	-9.47
2685.00	10	256-QAM	Upper Extended	-20.86	-18.48	-16.50	-13	-3.50

Channel Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Band Edge	Ant 1 Cond. Band Edge [dBm]	Ant 2 Cond. Band Edge [dBm]	MIMO Cond. Band Edge [dBm]	MIMO Cond. Band Edge Limit [dBm]	Cond. Band Edge Margin [dB]
2503.50	15	QPSK	Lower	-22.32	-22.42	-19.36	-13	-6.36
2503.50	15	QPSK	Lower Extended	-17.64	-18.59	-15.08	-13	-2.08
2682.50	15	QPSK	Upper	-24.80	-24.02	-21.38	-13	-8.38
2682.50	15	QPSK	Upper Extended	-22.84	-22.77	-19.79	-13	-6.79
2503.50	15	16-QAM	Lower	-23.22	-22.54	-19.86	-13	-6.86
2503.50	15	16-QAM	Lower Extended	-20.10	-19.61	-16.84	-13	-3.84
2682.50	15	16-QAM	Upper	-24.96	-23.96	-21.42	-13	-8.42
2682.50	15	16-QAM	Upper Extended	-22.95	-21.86	-19.36	-13	-6.36
2503.50	15	64-QAM	Lower	-24.00	-23.48	-20.72	-13	-7.72
2503.50	15	64-QAM	Lower Extended	-18.39	-17.80	-15.07	-13	-2.07
2682.50	15	64-QAM	Upper	-25.18	-23.65	-21.34	-13	-8.34
2682.50	15	64-QAM	Upper Extended	-22.96	-21.59	-19.21	-13	-6.21
2503.50	15	256-QAM	Lower	-23.02	-22.90	-19.95	-13	-6.95
2503.50	15	256-QAM	Lower Extended	-17.74	-18.26	-14.98	-13	-1.98
2682.50	15	256-QAM	Upper	-25.25	-23.92	-21.52	-13	-8.52
2682.50	15	256-QAM	Upper Extended	-22.73	-22.30	-19.50	-13	-6.50
2506.00	20	QPSK	Lower	-21.95	-21.37	-18.64	-13	-5.64
2506.00	20	QPSK	Lower Extended	-20.38	-17.09	-15.42	-13	-2.42
2680.00	20	QPSK	Upper	-23.70	-23.95	-20.81	-13	-7.81
2680.00	20	QPSK	Upper Extended	-22.85	-24.33	-20.52	-13	-7.52
2506.00	20	16-QAM	Lower	-21.70	-22.67	-19.15	-13	-6.15
2506.00	20	16-QAM	Lower Extended	-19.37	-17.81	-15.51	-13	-2.51
2680.00	20	16-QAM	Upper	-23.10	-24.15	-20.58	-13	-7.58
2680.00	20	16-QAM	Upper Extended	-23.63	-24.18	-20.89	-13	-7.89
2506.00	20	64-QAM	Lower	-23.07	-21.48	-19.19	-13	-6.19
2506.00	20	64-QAM	Lower Extended	-20.83	-17.32	-15.72	-13	-2.72
2680.00	20	64-QAM	Upper	-23.55	-24.02	-20.77	-13	-7.77
2680.00	20	64-QAM	Upper Extended	-23.21	-23.85	-20.51	-13	-7.51
2506.00	20	256-QAM	Lower	-23.23	-22.01	-19.57	-13	-6.57
2506.00	20	256-QAM	Lower Extended	-18.92	-16.76	-14.70	-13	-1.70
2680.00	20	256-QAM	Upper	-23.45	-24.10	-20.75	-13	-7.75
2680.00	20	256-QAM	Upper Extended	-23.79	-23.76	-20.76	-13	-7.76

Table 7-2. Conducted Band Edge Measurements

Note:

Per ANSI C63.10-2015 Section 6.4.4.1 and KDB 662911 v02r01 Section E)1), the conducted emissions at Antenna 1 and Antenna 2 were first measured separately during MIMO transmission as shown in the section above. The measured values were then summed in linear power units then converted back to dBm.

Lower band edge was investigated at 2496MHz, lower extended band edge at 2495MHz, upper band edge at 2690MHz, and upper extended band edge at 2691MHz.

Sample MIMO Calculation:

At 2498.5MHz in QPSK modulation, the average conducted emission was measured to be -17.01 dBm for Antenna-1 and -21.05 dBm for Antenna-2.

Antenna 1 + Antenna 2 = MIMO

(-17.01 dBm + -21.05 dBm) = (0.02 mW + 0.0078 mW) = 0.0278 mW = -15.56 dBm

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7.6 Peak-Average Ratio

Test Overview

A peak to average ratio measurement is performed at the conducted port of the EUT. The spectrum analyzers Complementary Cumulative Distribution Function (CCDF) measurement profile is used to determine the largest deviation between the average and the peak power of the EUT in a given bandwidth. The CCDF curve shows how much time the peak waveform spends at or above a given average power level. The percent of time the signal spends at or above the level defines the probability for that particular power level.

Test Procedure Used

KDB 971168 D01 v03 – Section 5.7.1

Test Settings

1. The signal analyzer's CCDF measurement profile is enabled
2. Frequency = carrier center frequency
3. Measurement BW > Emission bandwidth of signal
4. The signal analyzer was set to collect one million samples to generate the CCDF curve
5. The measurement interval was set depending on the type of signal analyzed. For continuous signals (>98% duty cycle), the measurement interval was set to 1ms. For burst transmissions, the spectrum analyzer is set to use an internal "RF Burst" trigger that is synced with an incoming pulse and the measurement interval is set to less than the duration of the "on time" of one burst to ensure that energy is only captured during a time in which the transmitter is operating at maximum power

Test Setup

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

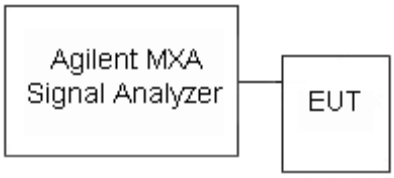

Figure 7-4. Test Instrument & Measurement Setup

Test Notes

None.

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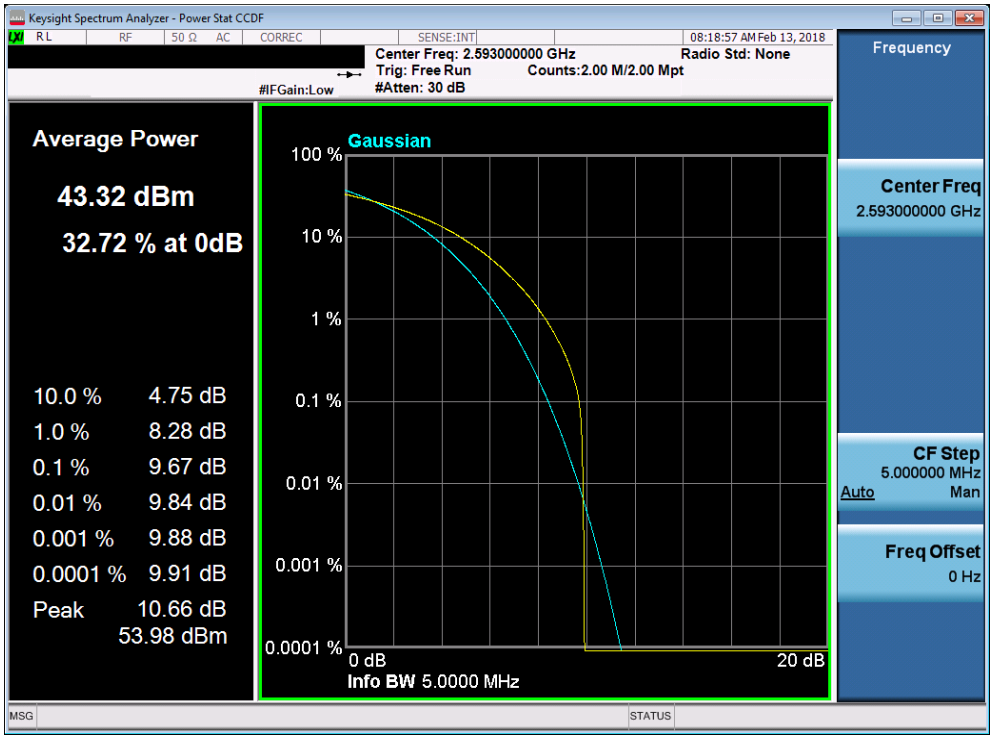
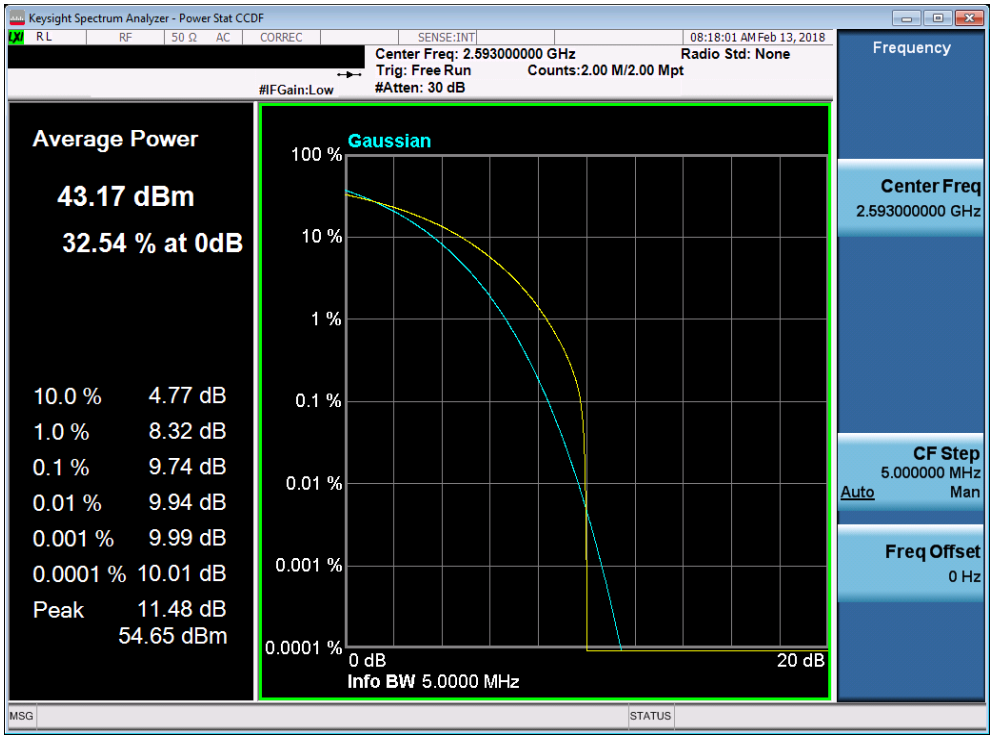
Band 41 – Antenna 1



Plot 7-275. PAR Plot (Band 41 - 5.0MHz QPSK)



Plot 7-276. PAR Plot (Band 41 - 5.0MHz 16-QAM)

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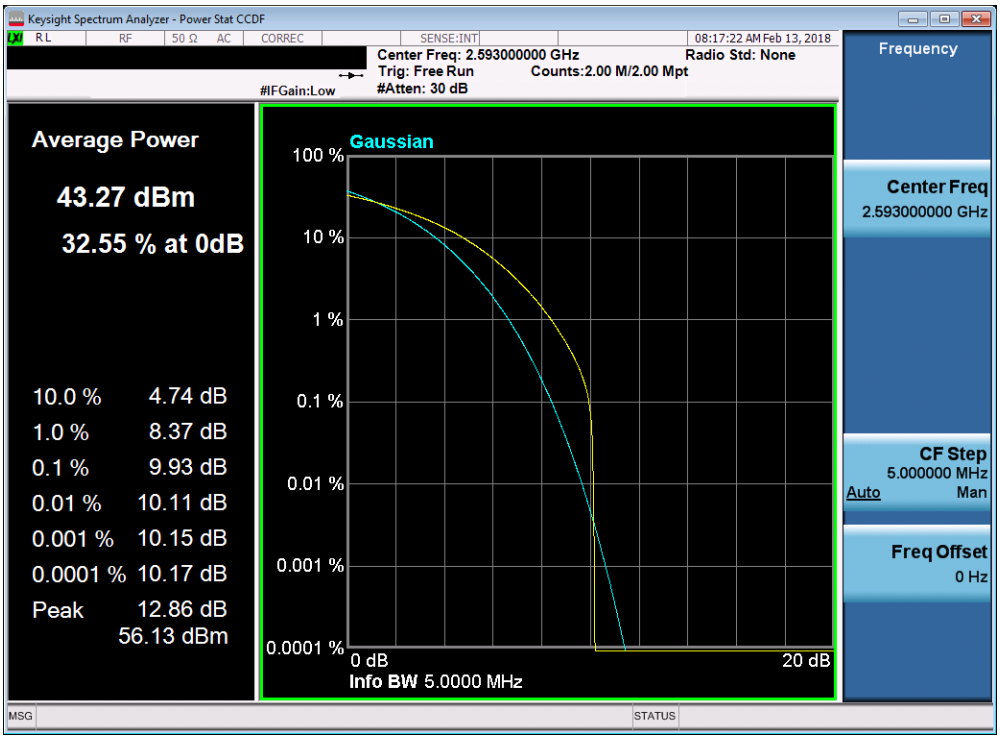
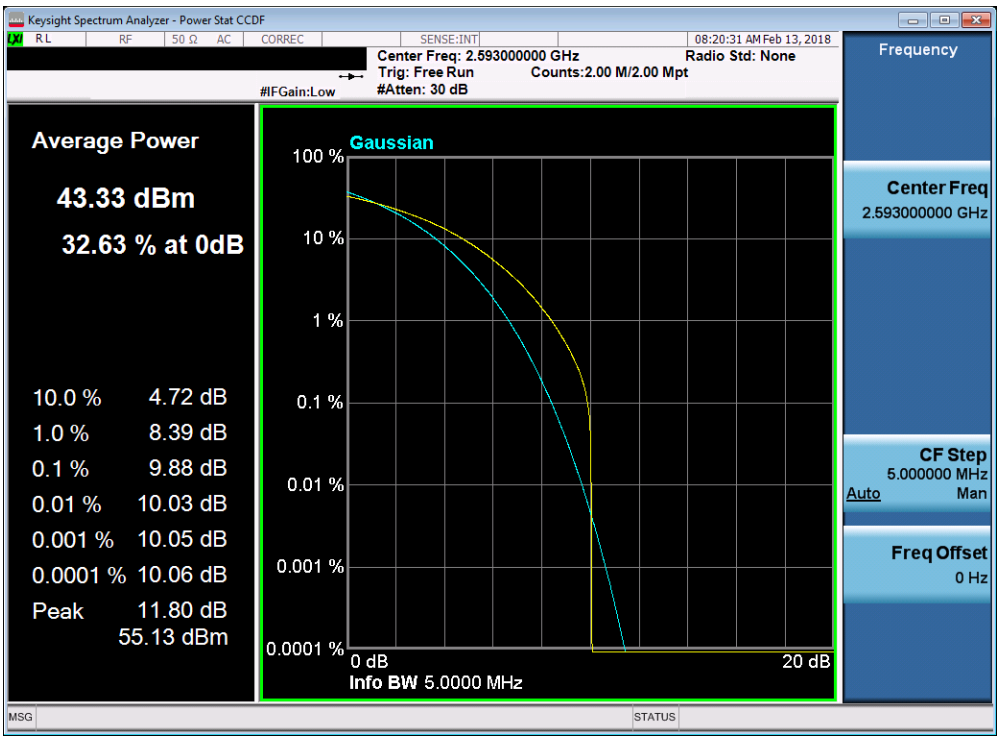


Plot 7-277. PAR Plot (Band 41 - 5.0MHz 64-QAM)



Plot 7-278. PAR Plot (Band 41 - 5.0MHz 256-QAM

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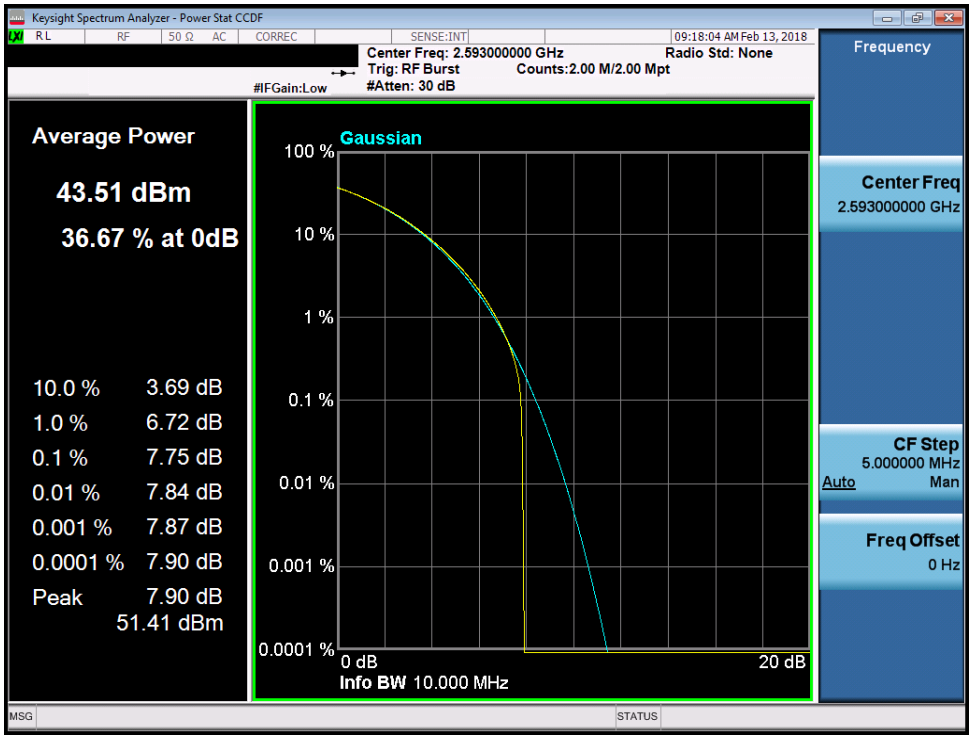
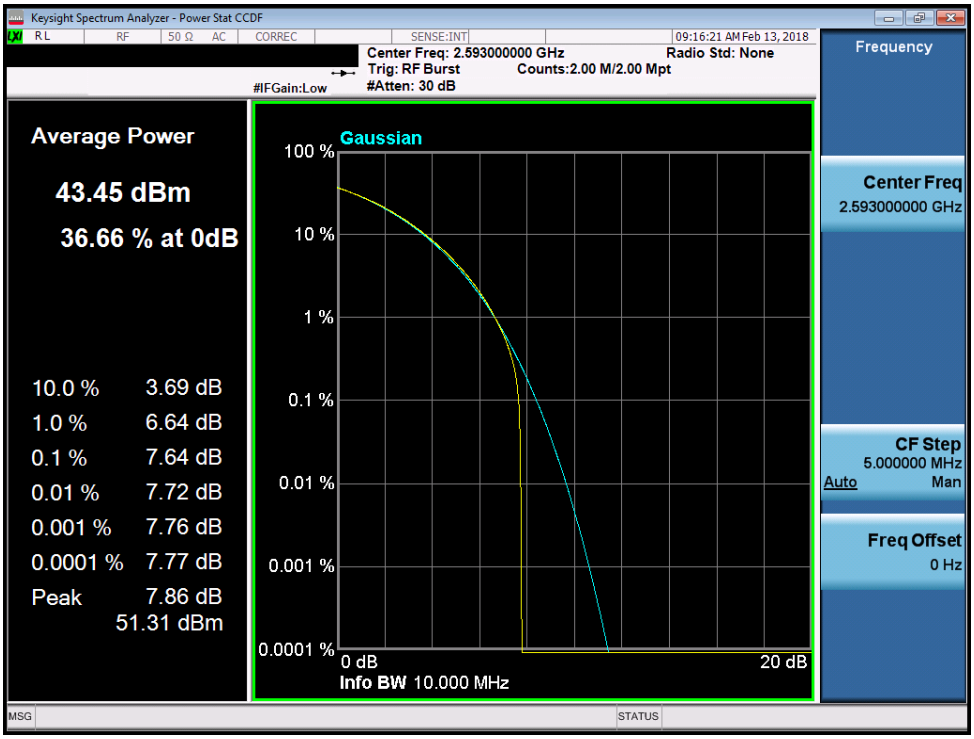


Plot 7-279. PAR Plot (Band 41 - 10.0MHz QPSK)



Plot 7-280. PAR Plot (Band 41 - 10.0MHz 16-QAM)

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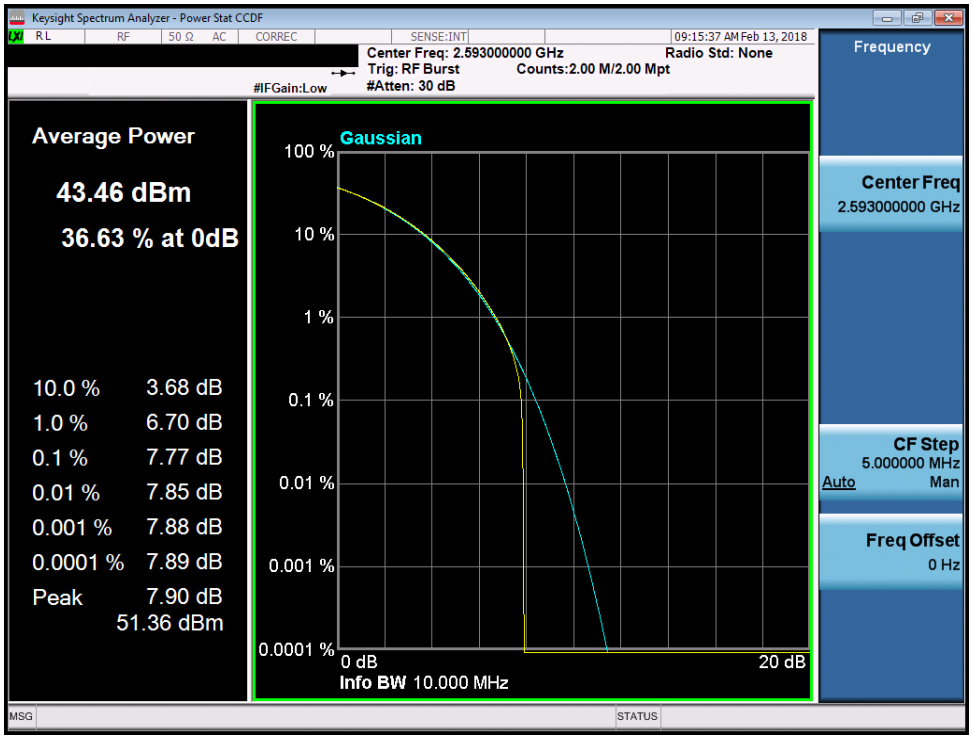
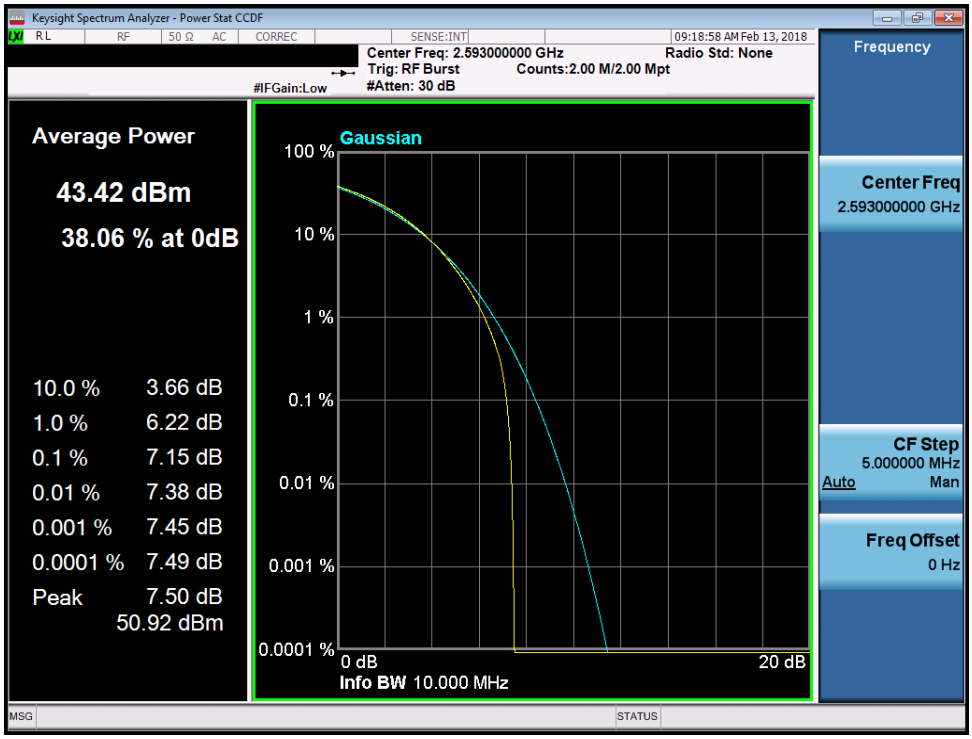


Plot 7-281. PAR Plot (Band 41 - 10.0MHz 64-QAM)



Plot 7-282. PAR Plot (Band 41 - 10.0MHz 256-QAM)

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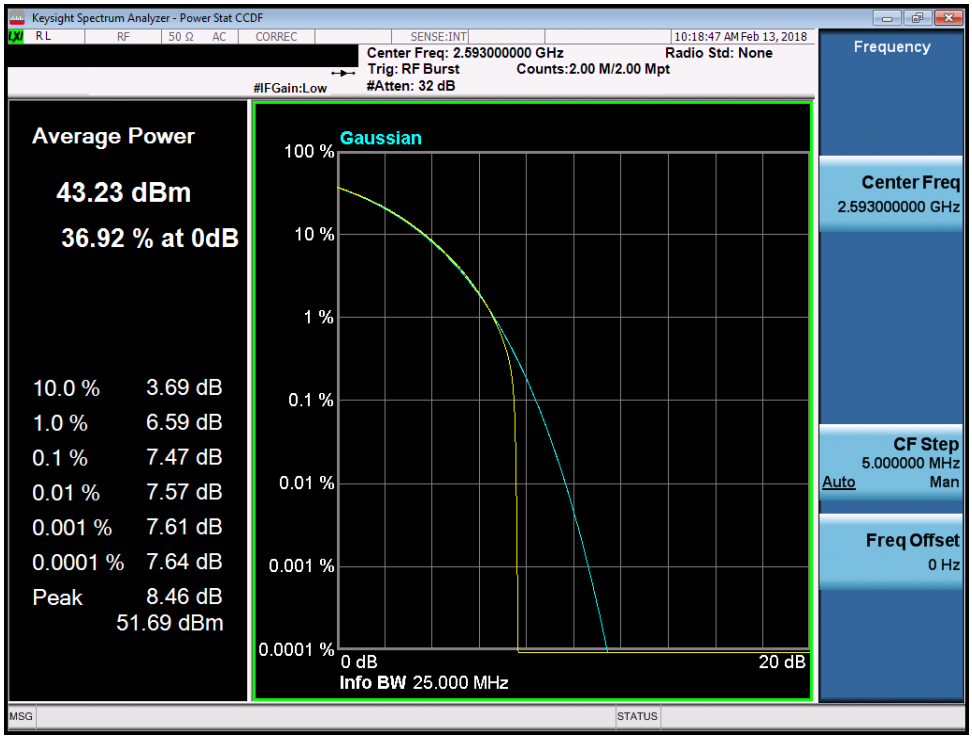
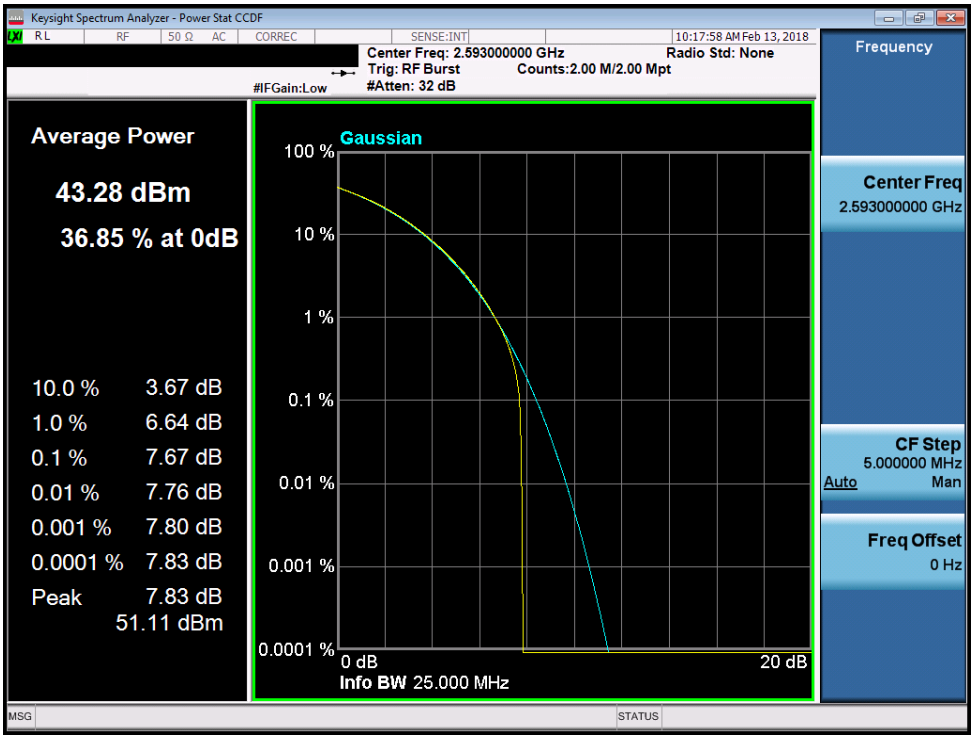


Plot 7-283. PAR Plot (Band 41 - 15.0MHz QPSK)



Plot 7-284. PAR Plot (Band 41 - 15.0MHz 16-QAM)

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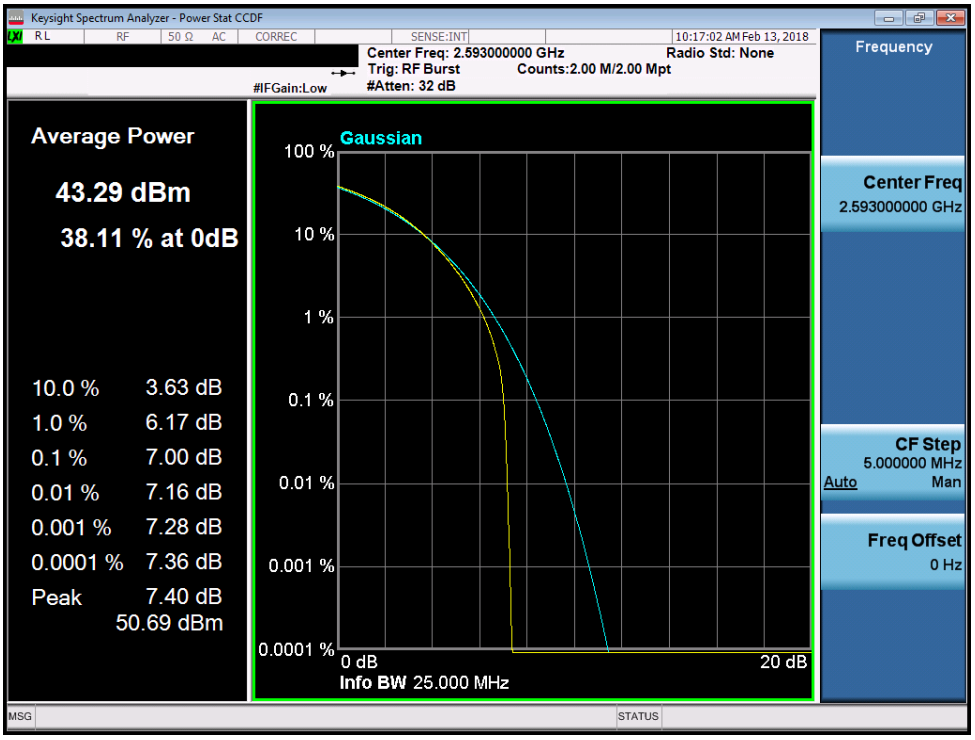
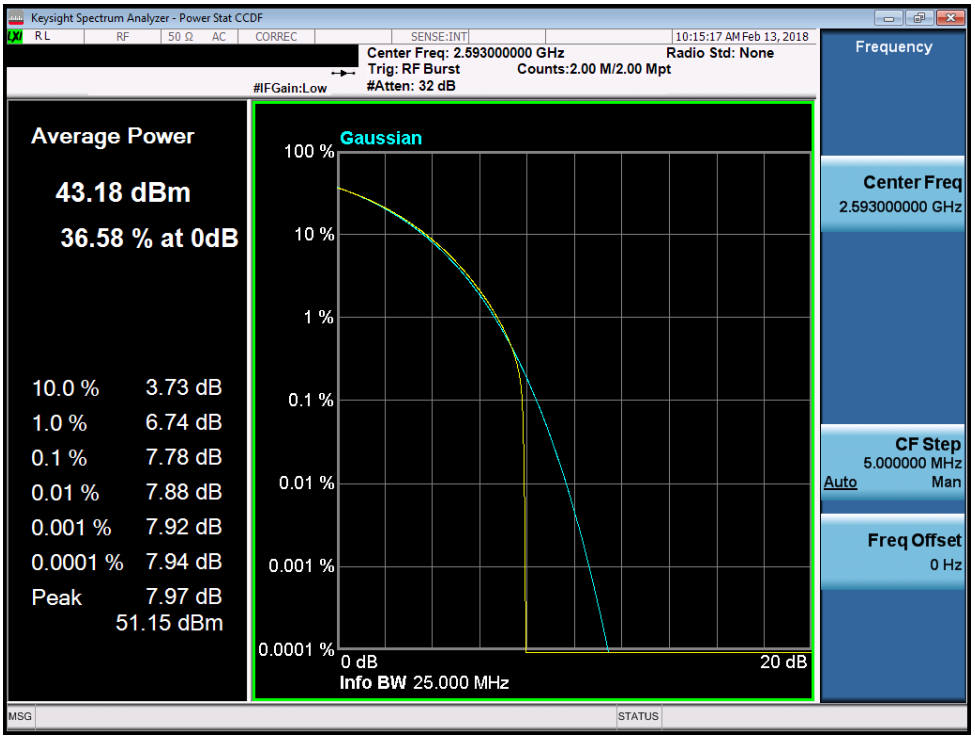


Plot 7-285. PAR Plot (Band 41 - 15.0MHz 64-QAM)



Plot 7-286. PAR Plot (Band 41 - 15.0MHz 256-QAM)

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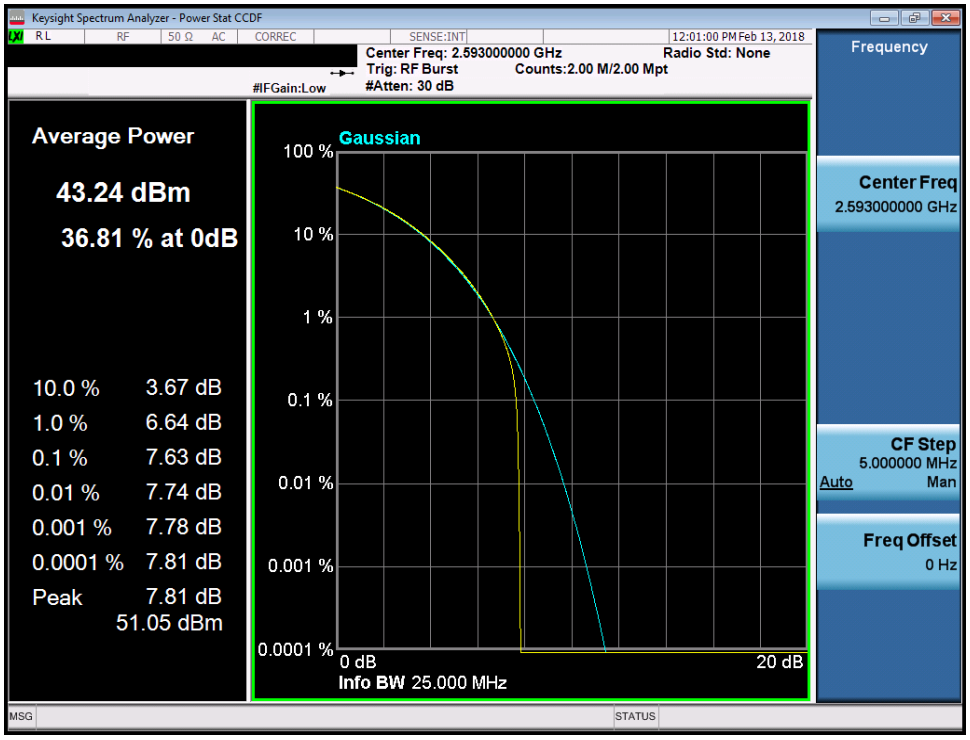
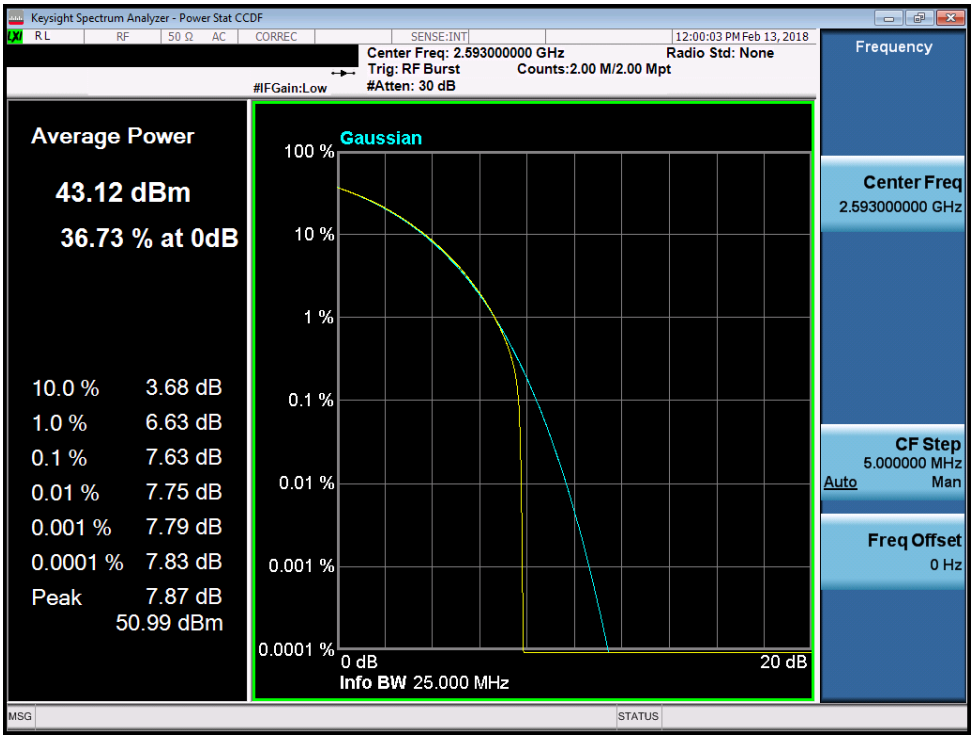


Plot 7-287. PAR Plot (Band 41 - 20.0MHz QPSK)



Plot 7-288. PAR Plot (Band 41 - 20.0MHz 16-QAM)

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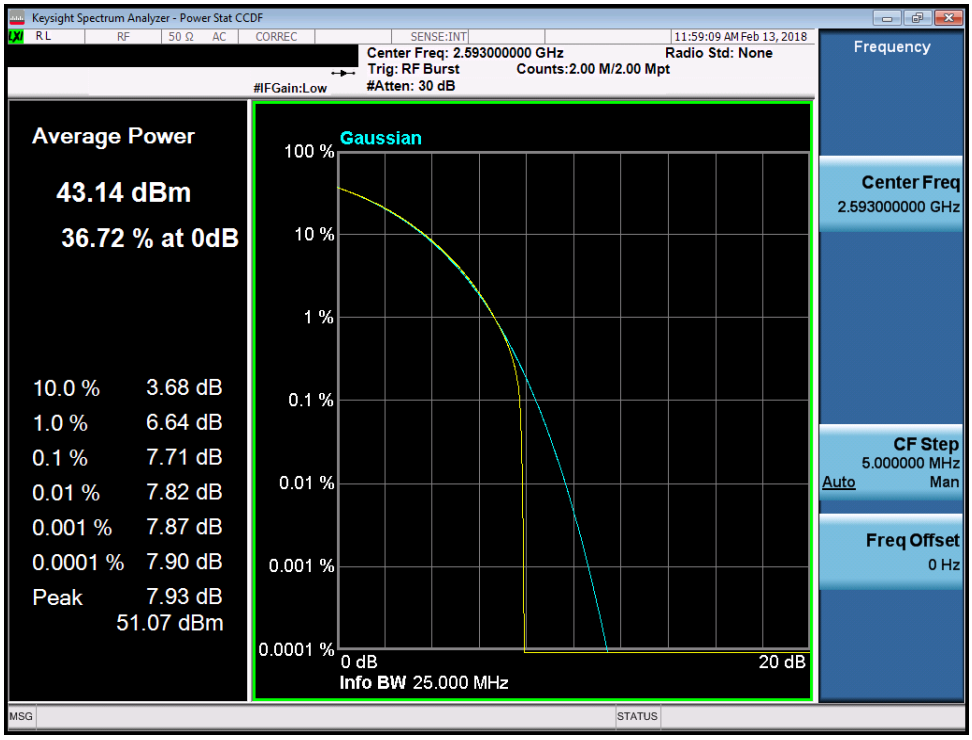
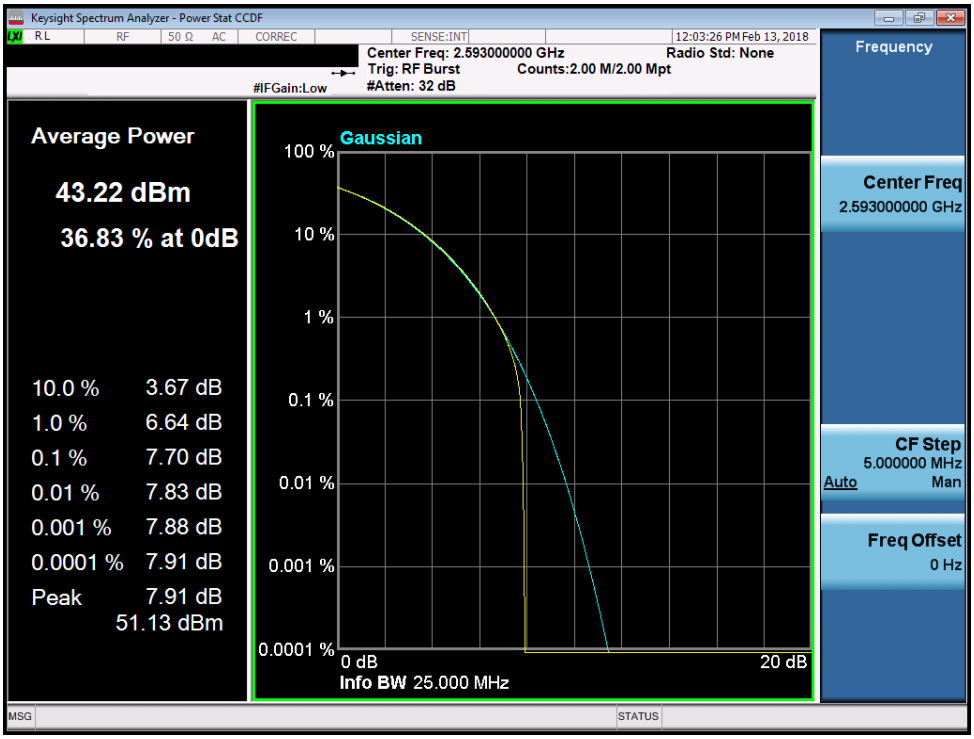


Plot 7-289. PAR Plot (Band 41 - 20.0MHz 64-QAM)



Plot 7-290. PAR Plot (Band 41 - 20.0MHz 256-QAM)

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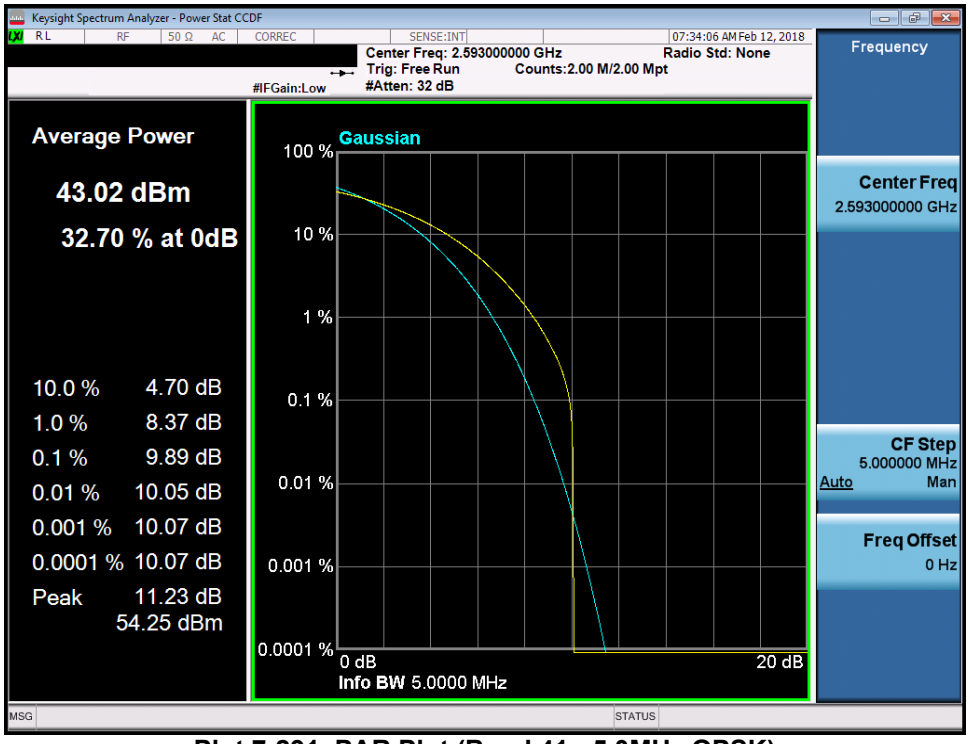
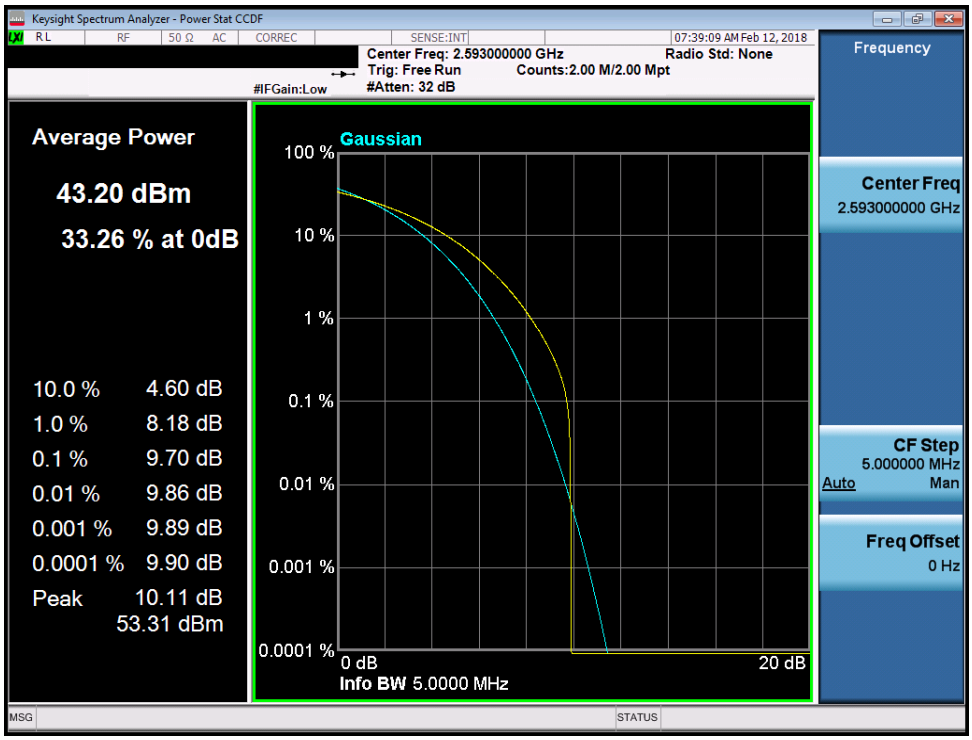
Band 41 – Antenna 2



Plot 7-291. PAR Plot (Band 41 - 5.0MHz QPSK)



Plot 7-292. PAR Plot (Band 41 - 5.0MHz 16-QAM)

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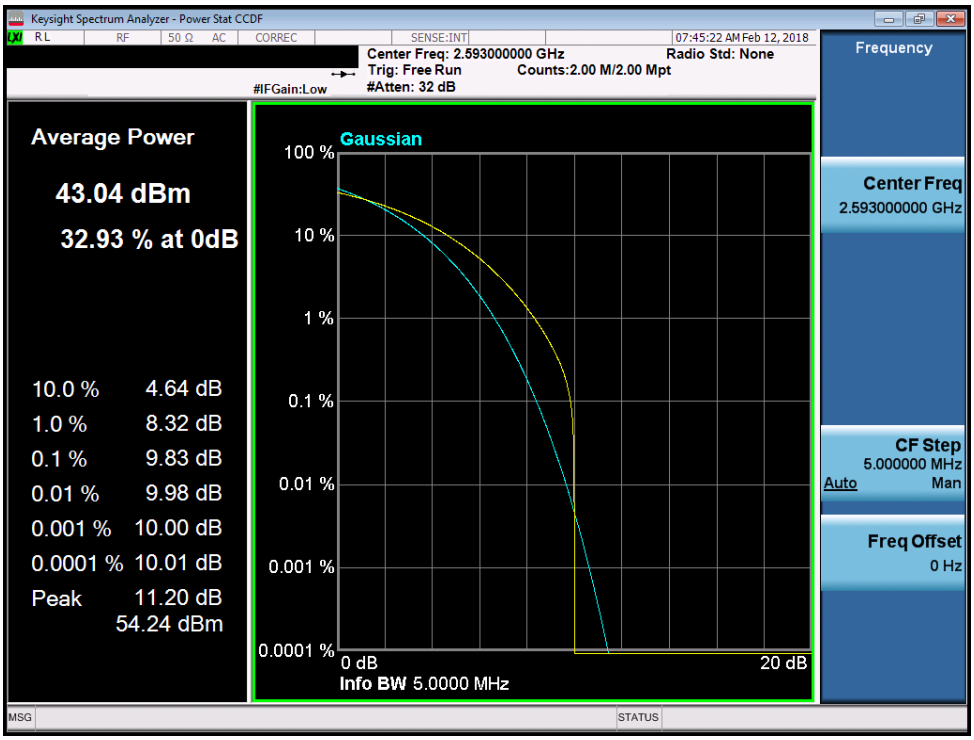
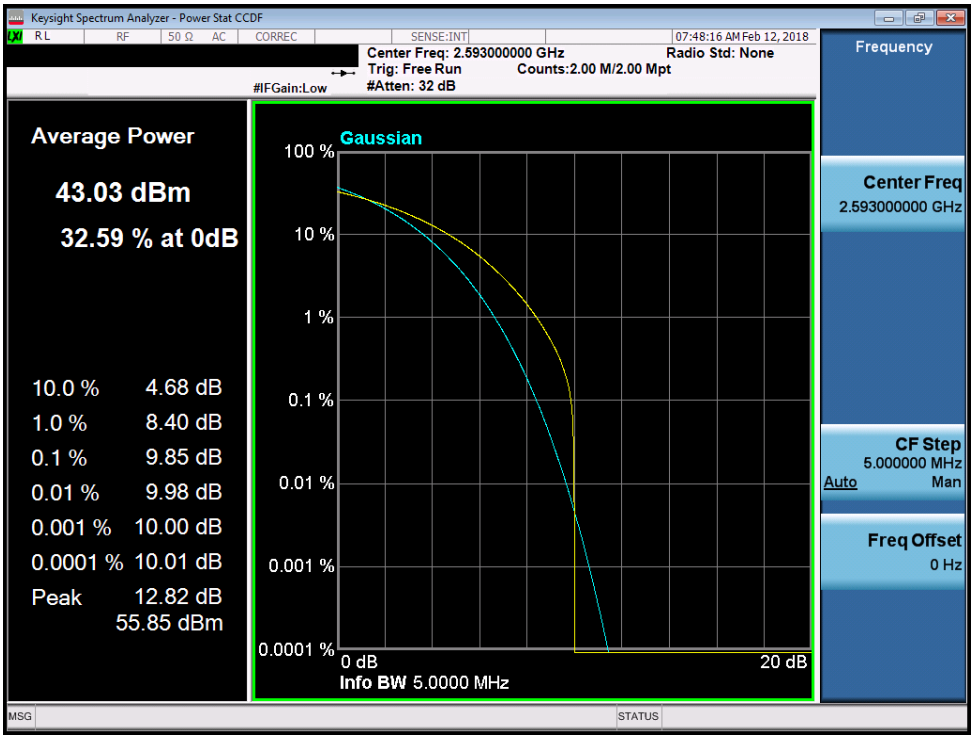


Plot 7-293. PAR Plot (Band 41 - 5.0MHz 64-QAM)



Plot 7-294. PAR Plot (Band 41 - 5.0MHz 256-QAM

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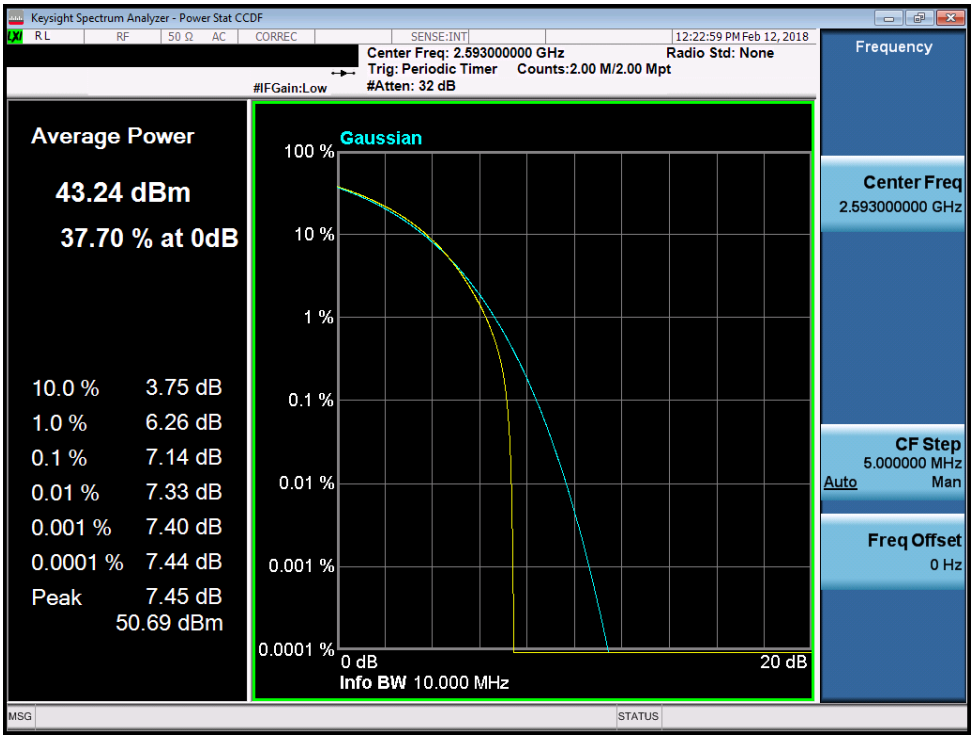
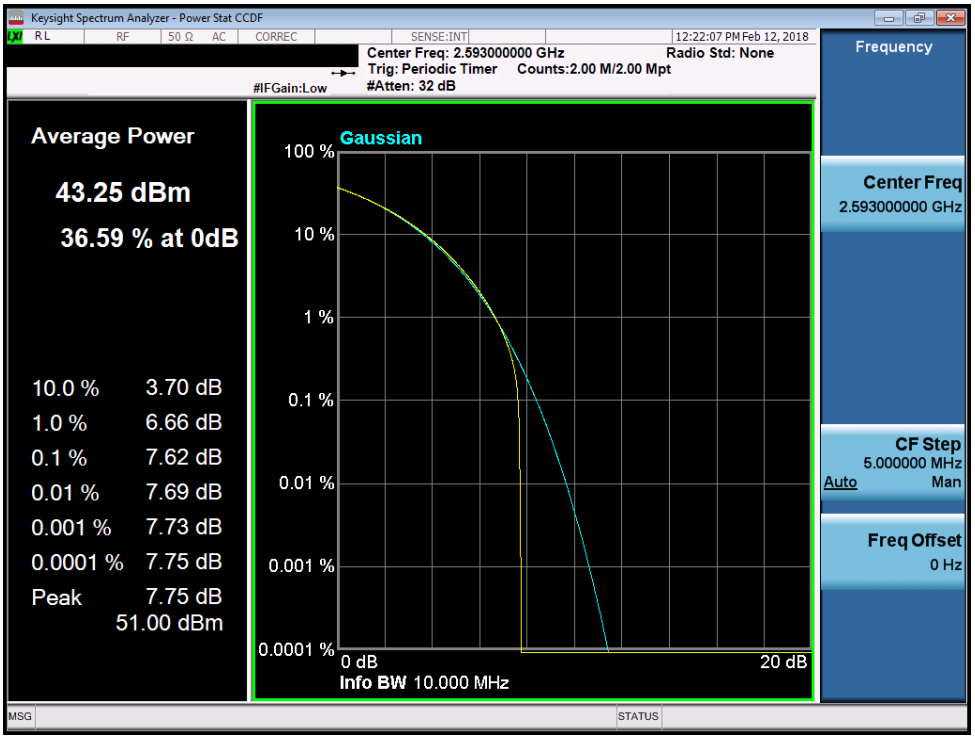


Plot 7-295. PAR Plot (Band 41 - 10.0MHz QPSK)



Plot 7-296. PAR Plot (Band 41 - 10.0MHz 16-QAM)

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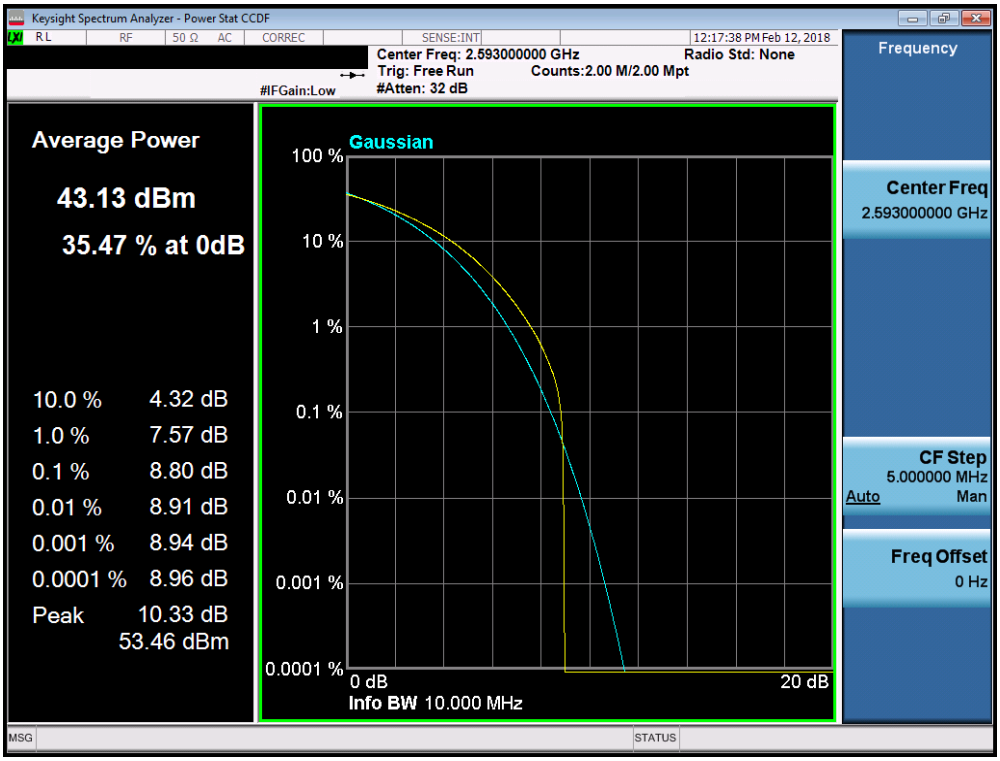
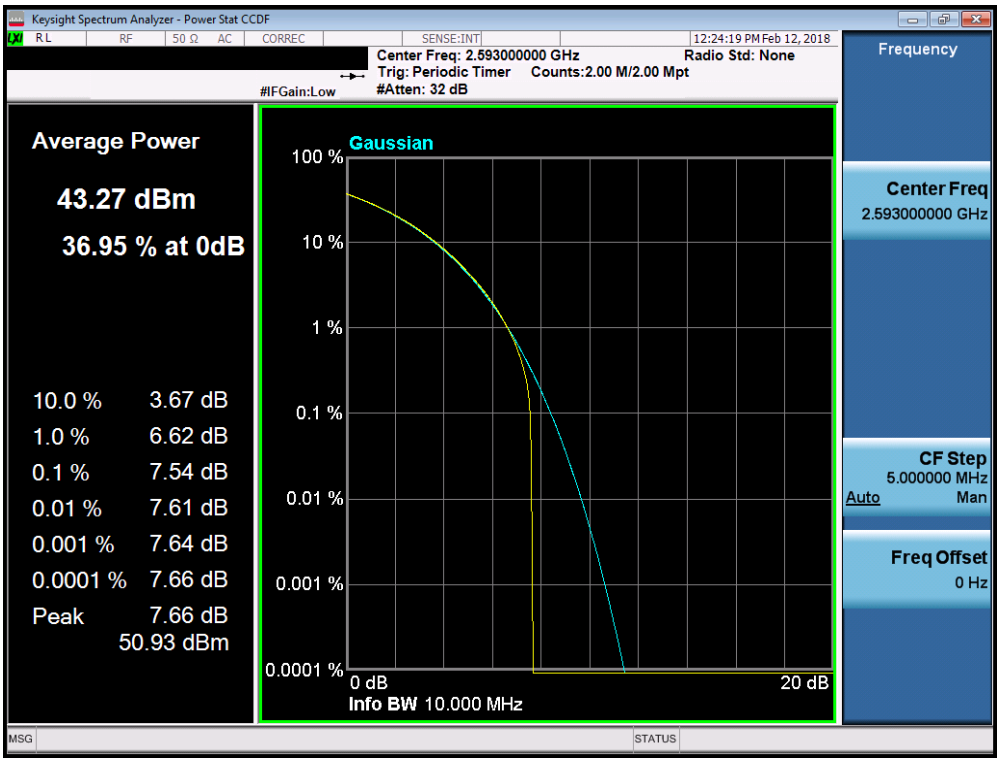


Plot 7-297. PAR Plot (Band 41 - 10.0MHz 64-QAM)



Plot 7-298. PAR Plot (Band 41 - 10.0MHz 256-QAM)

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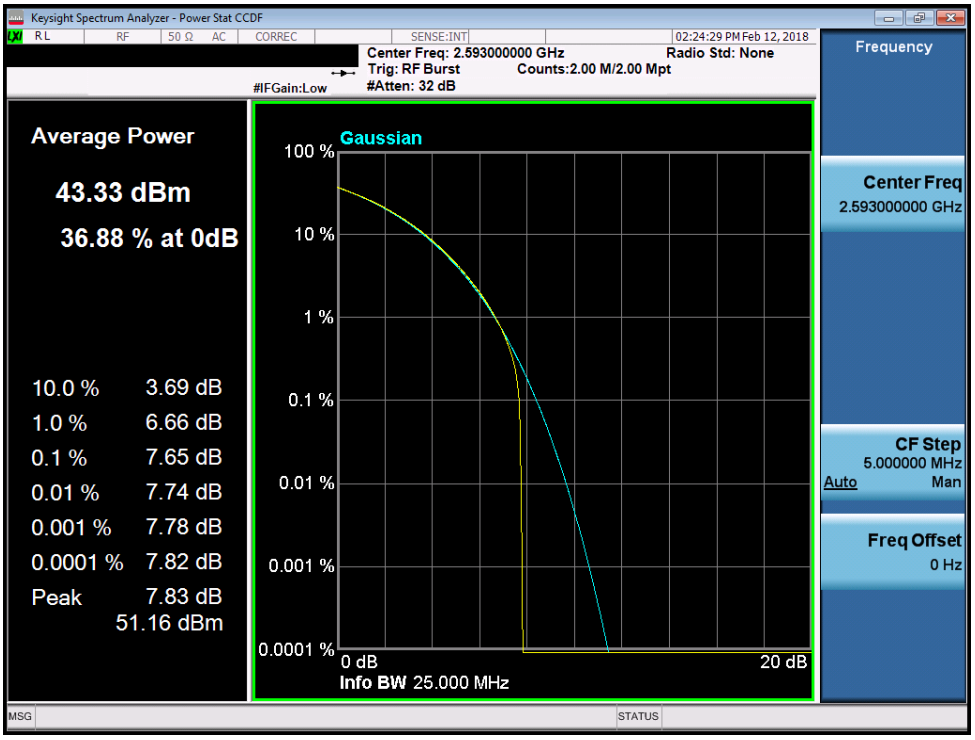
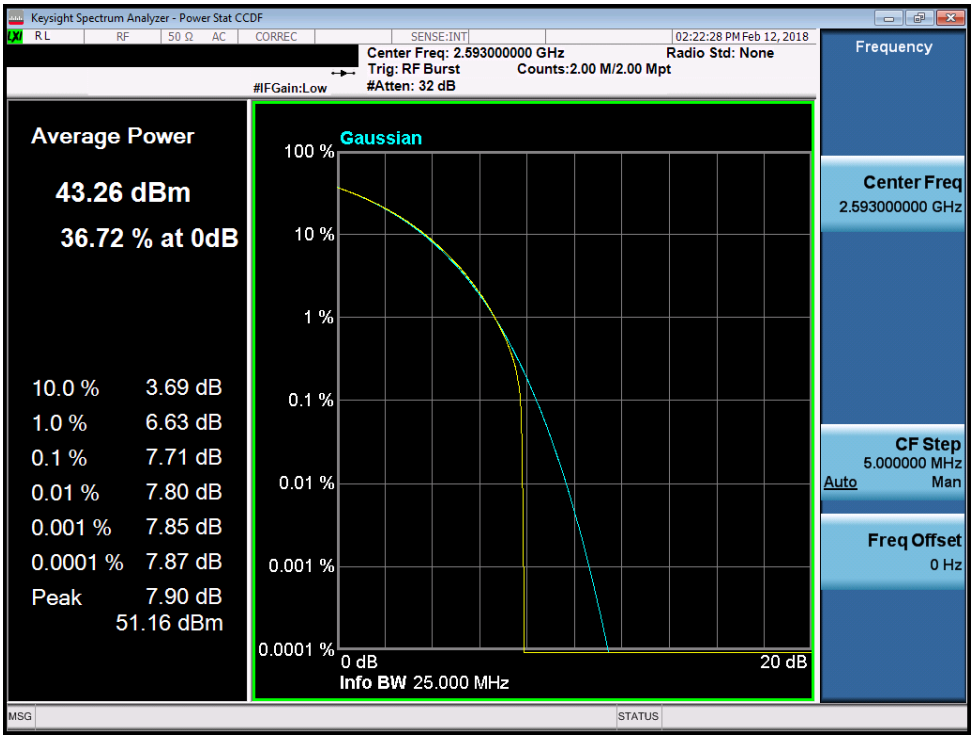


Plot 7-299. PAR Plot (Band 41 - 15.0MHz QPSK)



Plot 7-300. PAR Plot (Band 41 - 15.0MHz 16-QAM)

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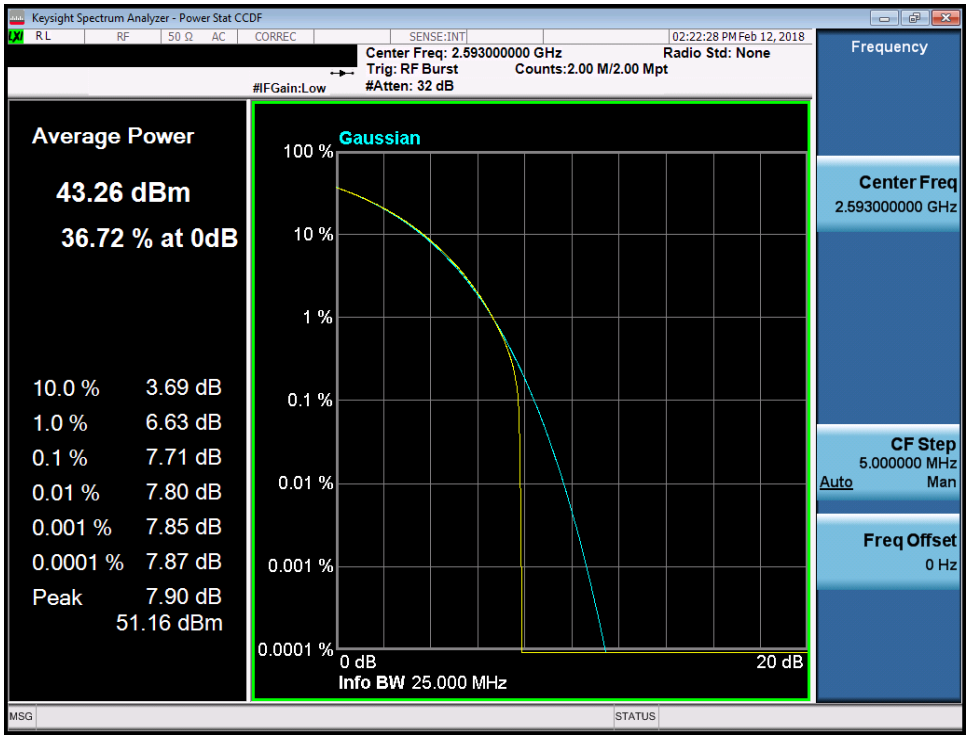
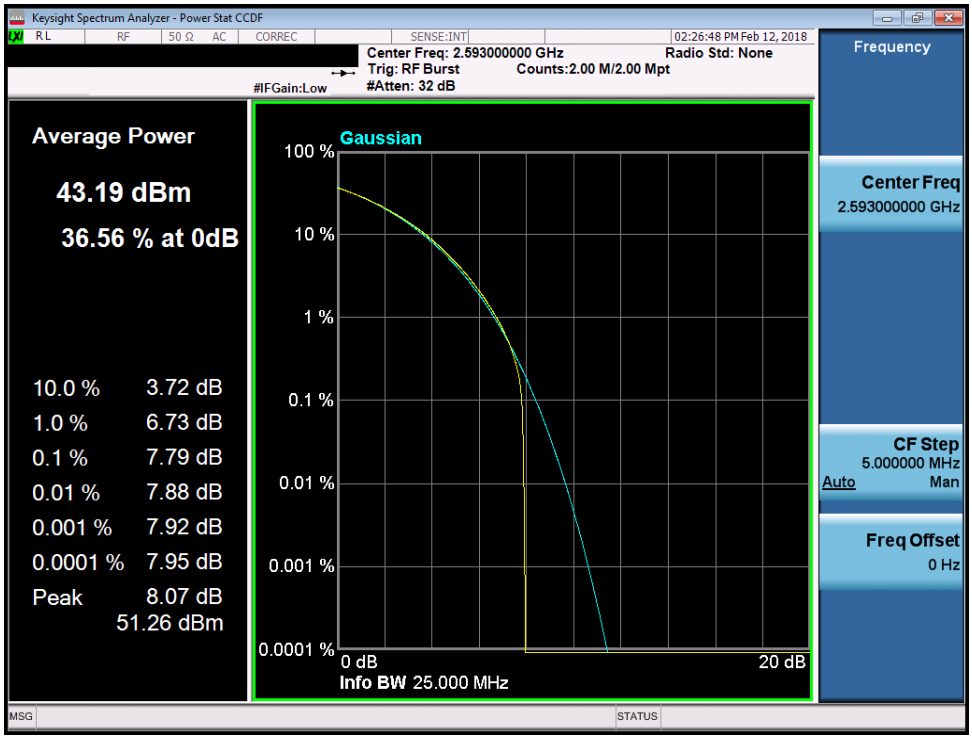


Plot 7-301. PAR Plot (Band 41 - 15.0MHz 64-QAM)



Plot 7-302. PAR Plot (Band 41 - 15.0MHz 256-QAM)

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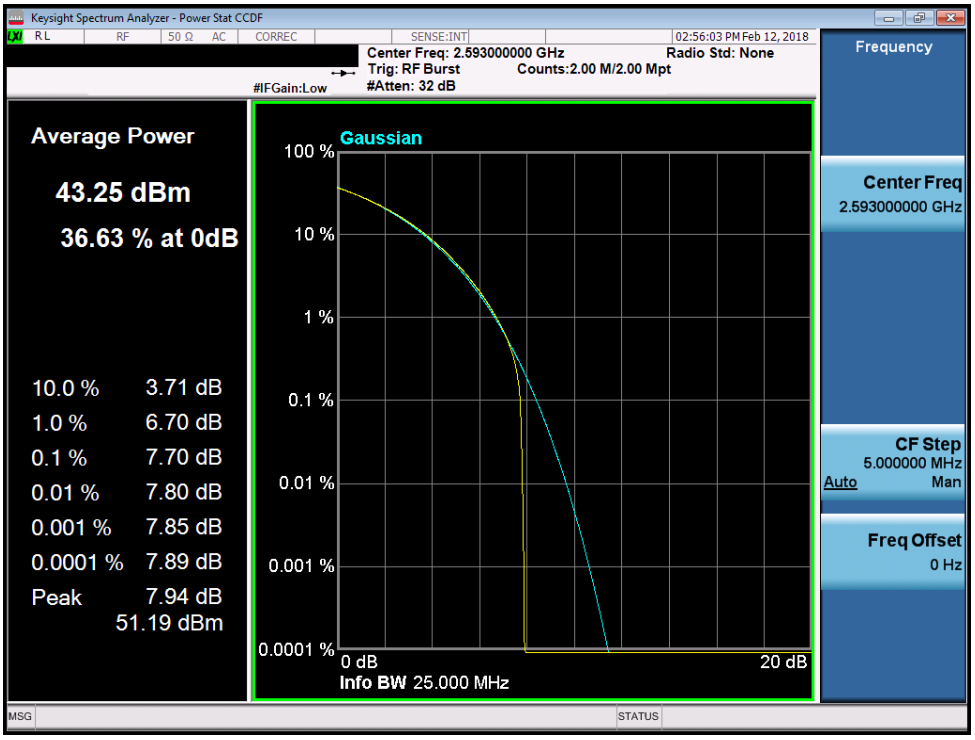
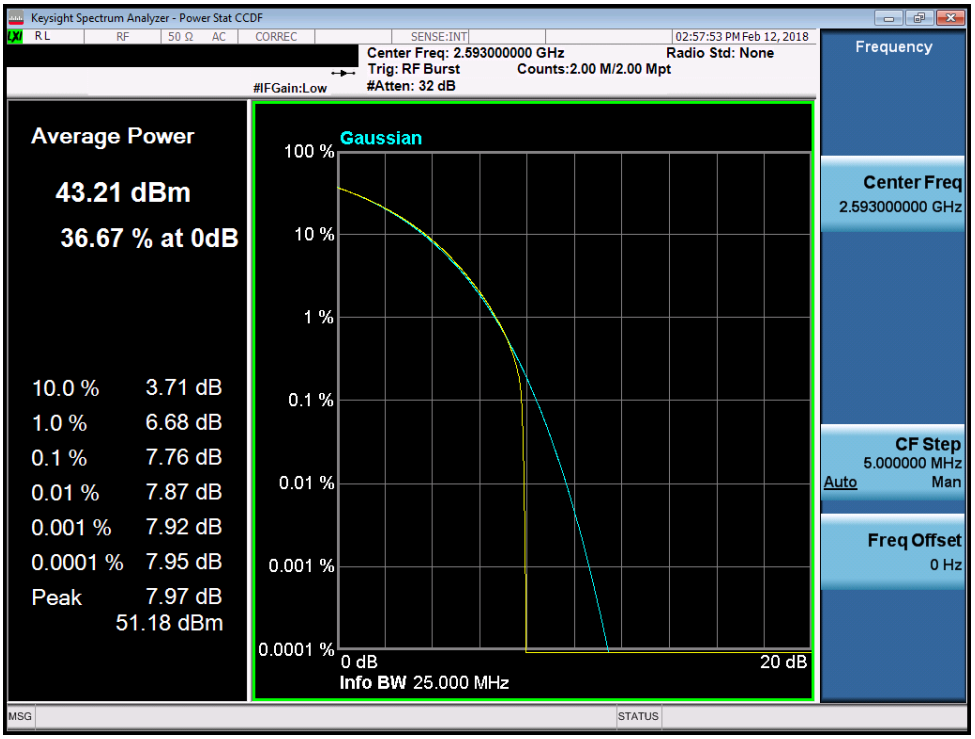


Plot 7-303. PAR Plot (Band 41 - 20.0MHz QPSK)



Plot 7-304. PAR Plot (Band 41 - 20.0MHz 16-QAM)

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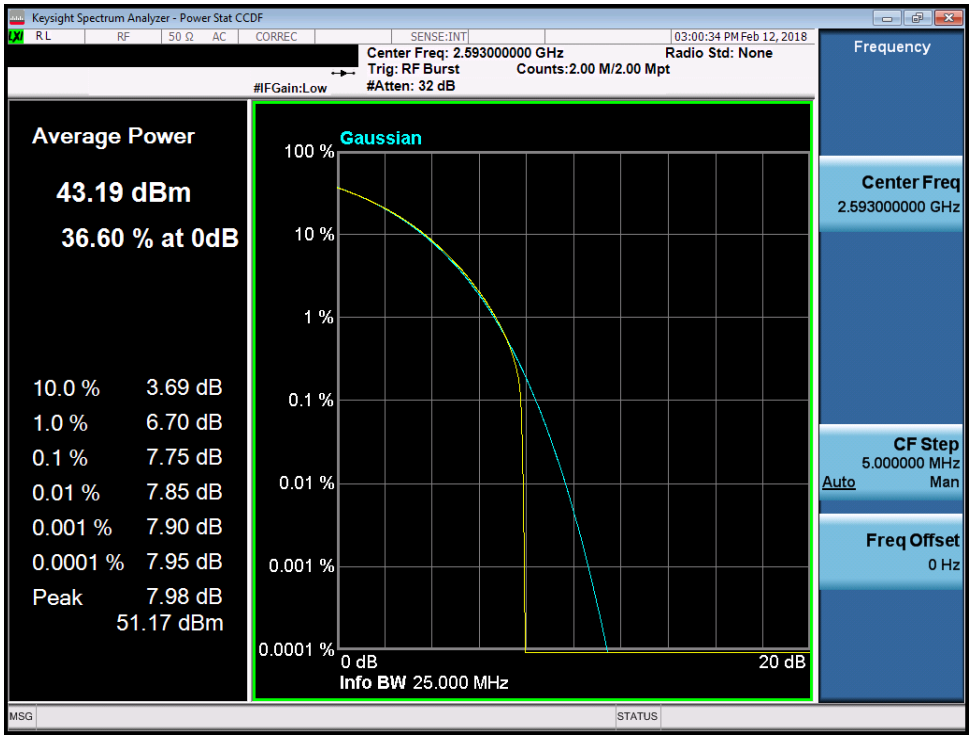
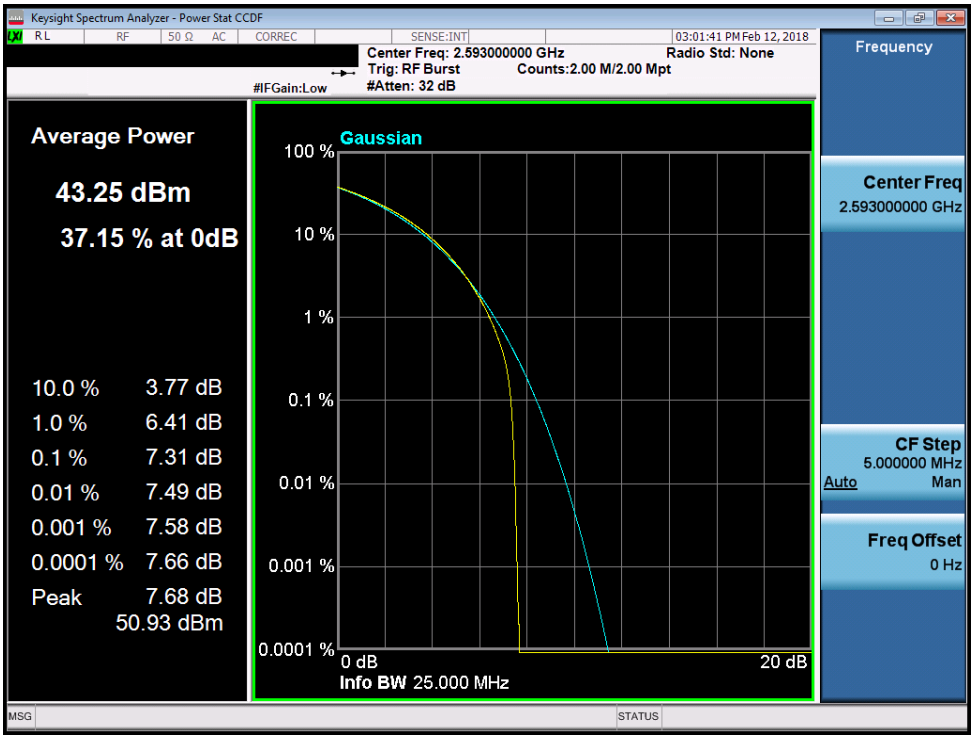


Plot 7-305. PAR Plot (Band 41 - 20.0MHz 64-QAM)



Plot 7-306. PAR Plot (Band 41 - 20.0MHz 256-QAM)

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7.7 Radiated Spurious Emissions Measurements – Above 1GHz

§2.1053 §27.53(m)

Test Overview

Radiated spurious emissions measurements are performed using the substitution method described in ANSI/TIA-603-E-2016 with the antenna output ports terminated in 50ohms while the EUT is transmitting at maximum power. Measurements on signals operating above 1GHz are performed using vertically and horizontally polarized broadband horn antennas.

Test Procedures Used

KDB 971168 D01 v03 – Section 5.8

ANSI/TIA-603-E-2016 – Section 2.2.12

Test Settings

1. RBW = 1MHz
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 = Max Hold
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.

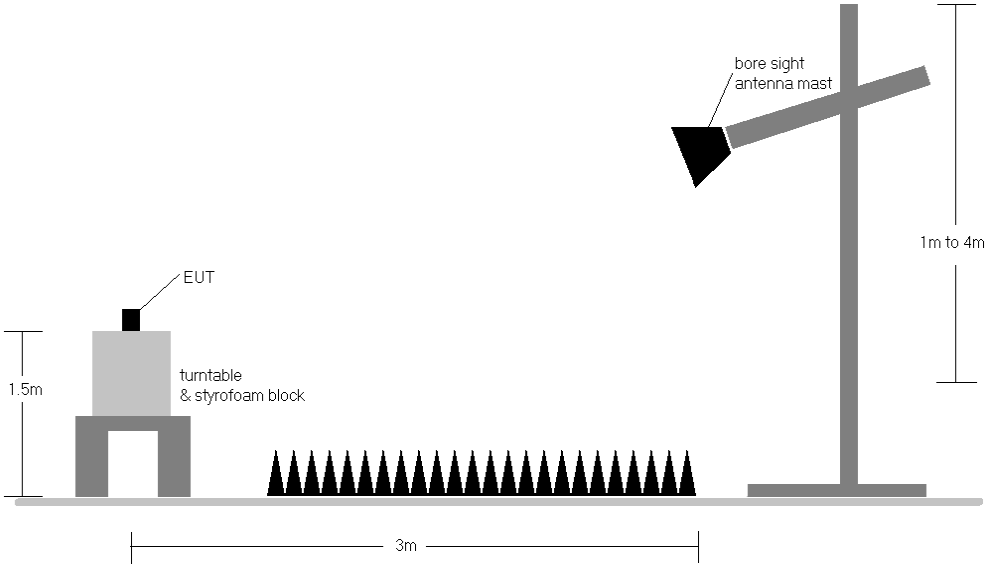

Figure 7-5. Radiated Test Setup > 1GHz

Test Notes

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

2) This unit was tested while powered by a -48VDC power supply.

3) The EUT was tested while transmitting from both antenna ports simultaneously with both ports terminated in 50ohms.

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

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

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

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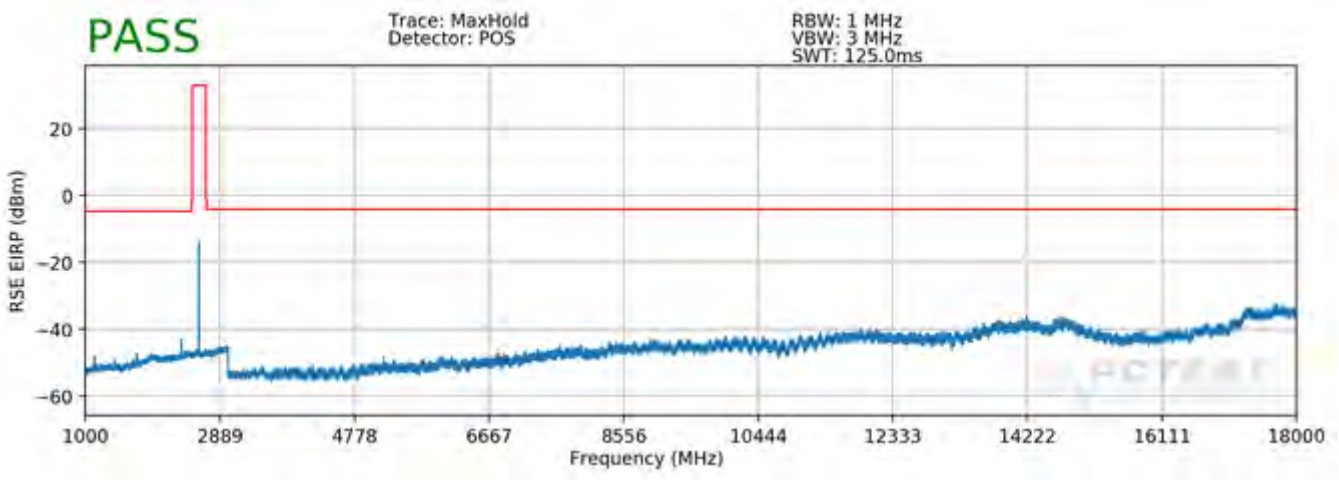
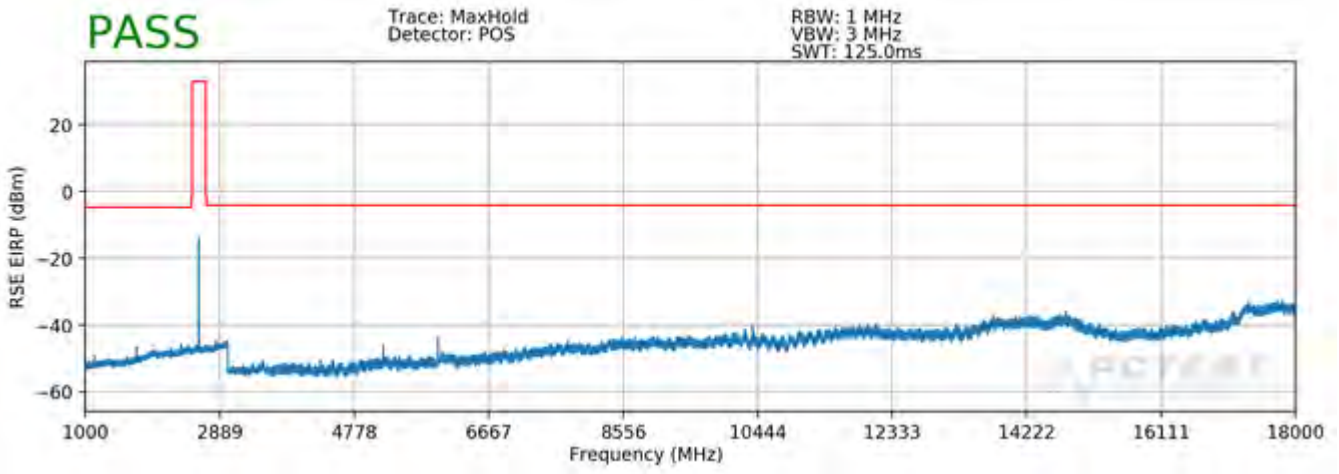
Band 41



Plot 7-307. Radiated Spurious Plot 1-18GHz (Band 41 – Mid Channel - 5.0MHz QPSK, Ant. Pol. H)



Plot 7-308. Radiated Spurious Plot 1-18GHz (Band 41 – Mid Channel - 5.0MHz QPSK, Ant. Pol. V)

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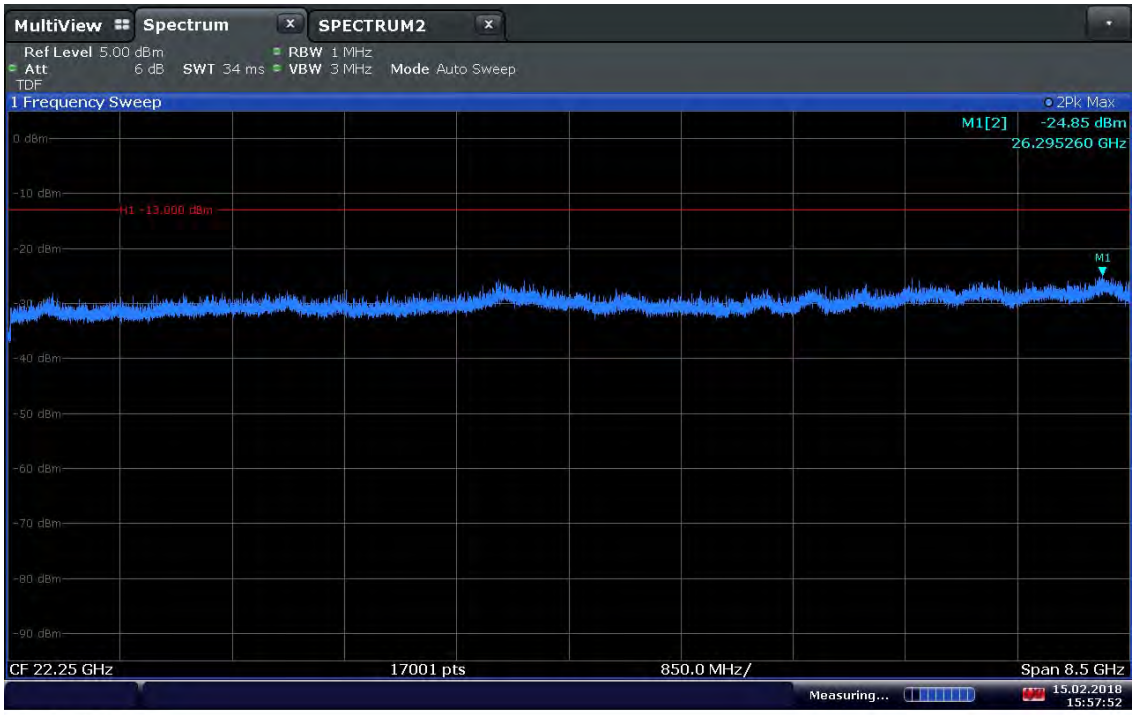
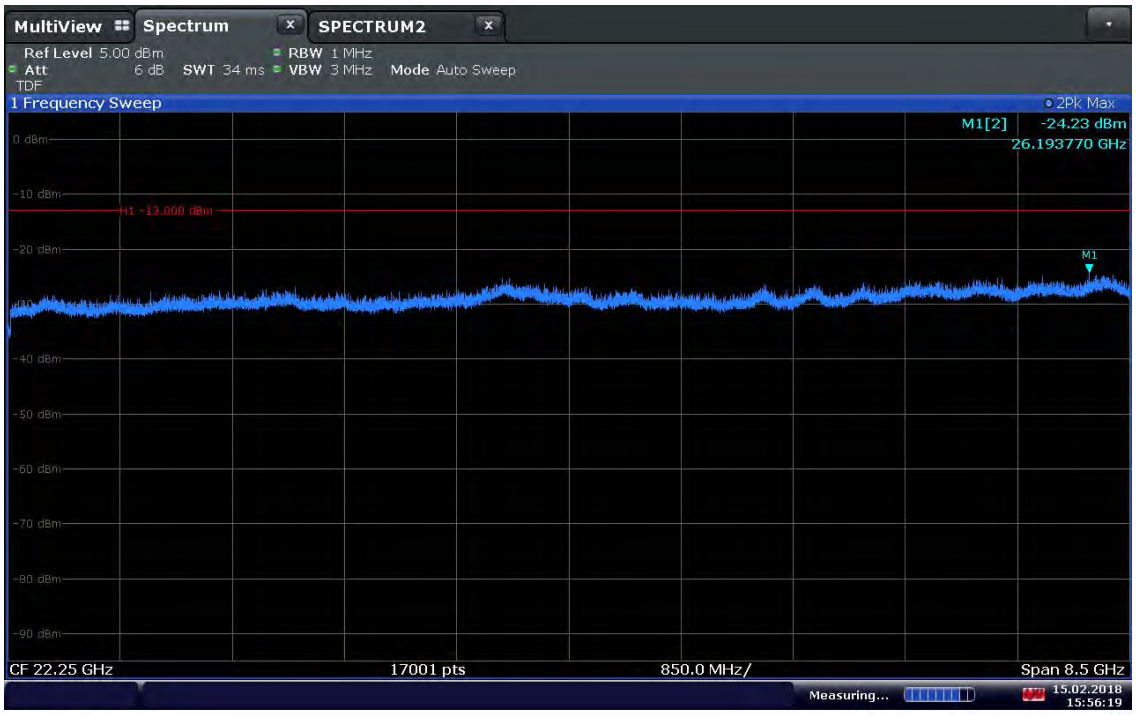


15:57:53 15.02.2018

Plot 7-309. Radiated Spurious Plot above 18GHz (Band 41 – Mid Channel - 5.0MHz QPSK, Ant. Pol. H)



15:56:19 15.02.2018

Plot 7-310. Radiated Spurious Plot above 18GHz (Band 41 – Mid Channel - 5.0MHz QPSK, Ant. Pol. V)

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OPERATING FREQUENCY:	2498.50	MHz
CHANNEL:	39675	
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]
4997.00	V	129	260	-65.06	10.88	-54.18	-41.2
7495.50	V	110	192	-60.17	11.06	-49.11	-36.1
9994.00	V	-	-	-62.57	12.05	-50.52	-37.5
12492.50	V	-	-	-64.00	13.46	-50.54	-37.5

Table 7-3. Radiated Spurious Data (Band 41 – Low Channel)

OPERATING FREQUENCY:	2593.00	MHz
CHANNEL:	40620	
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]
5186.00	V	110	251	-61.25	10.62	-50.63	-37.6
7779.00	V	111	189	-60.17	11.40	-48.77	-35.8
10372.00	V	110	194	-59.55	12.54	-47.01	-34.0
12965.00	V	-	-	-63.24	13.33	-49.91	-36.9

Table 7-4. Radiated Spurious Data (Band 41 – Mid Channel)

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OPERATING FREQUENCY:	2687.50	MHz
CHANNEL:	41565	
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]
5375.00	V	118	178	-61.09	10.73	-50.36	-37.4
8062.50	V	-	-	-64.56	11.14	-53.42	-40.4
10750.00	V	114	188	-63.67	12.73	-50.94	-37.9
13437.50	V	-	-	-62.36	12.47	-49.89	-36.9

Table 7-5. Radiated Spurious Data (Band 41 – High Channel)

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7.8 Radiated Spurious Emissions Measurements – Below 1GHz

§2.1053 §27.53(m)

Test Overview

Measurements on signals operating below 1GHz are performed using horizontally and vertically polarized broadband antennas. All measurements are performed as RMS measurements while the EUT is operating at maximum power, and at the appropriate frequencies.

Test Procedures Used

KDB 971168 D01 v03 – Section 5.8

ANSI/TIA-603-E-2016 – Section 2.2.12

Test Settings

Quasi-Peak Field Strength Measurements

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 120kHz (for emissions from 30MHz – 1GHz)
3. Detector = RMS
4. Sweep time = auto couple
5. Trace mode = max hold
6. Trace was allowed to stabilize

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Test Setup

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

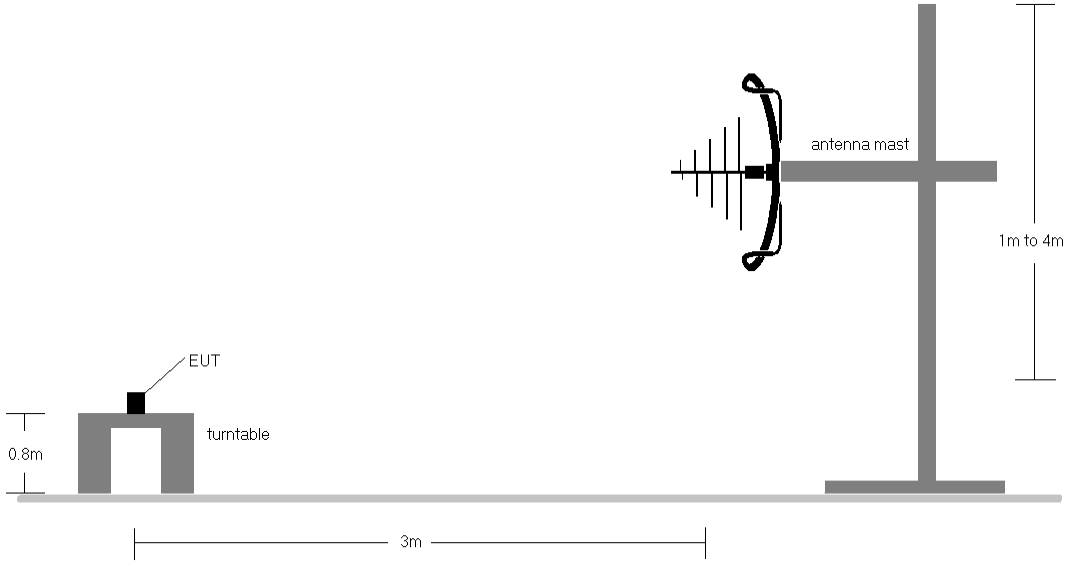

Figure 7-6. Radiated Test Setup < 1GHz

Test Notes

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

2) This unit was tested while powered by a -48VDC power supply.

3) Emissions were measured at a 3m test distance.

4) The spectrum is measured from 30MHz to 1GHz. The worst-case emissions are reported.

5) The pre-scan plots below are performed using Max Hold traces but final measurements were made using Trace Averaging.

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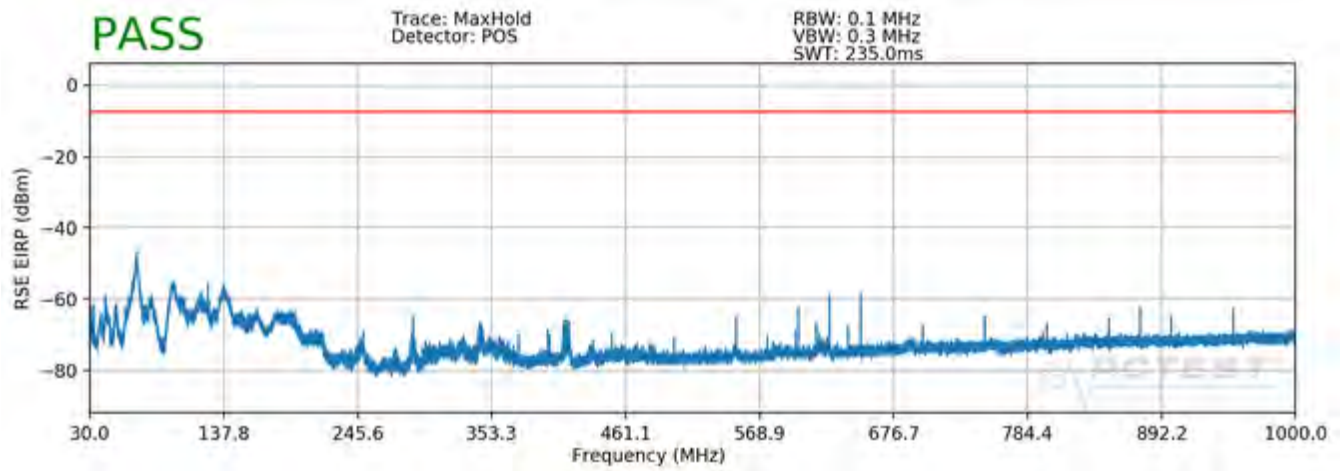
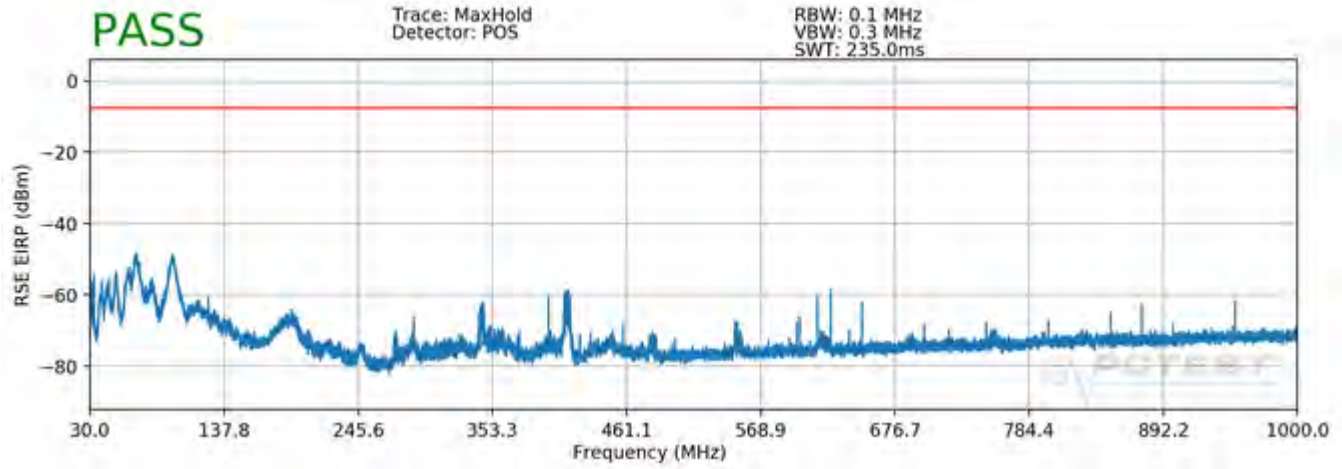


Plot 7-311. Radiated Spurious Plot Below 1GHz (Band 41 – Mid Channel - 20.0MHz QPSK, Ant. Pol. H)



Plot 7-312. Radiated Spurious Plot Below 1GHz (Band 41 – Mid Channel - 20.0MHz QPSK, Ant. Pol. V)

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OPERATING FREQUENCY:	2593.00	MHz
CHANNEL:	40620	
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]
65.51	V	110	150	-37.66	-7.27	-44.93	-31.9
96.84	H	110	184	-42.67	-6.57	-49.24	-36.2
344.01	H	110	0	-63.49	0.37	-63.12	-50.1
415.36	H	110	231	-60.11	-0.30	-60.41	-47.4
614.00	V	100	209	-59.31	0.70	-58.61	-45.6
625.36	H	110	141	-55.34	0.73	-54.61	-41.6
650.24	H	110	155	-54.93	0.97	-53.96	-41.0

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7.9 Frequency Stability / Temperature Variation

§2.1055 §27.54

Test Overview and Limit

Frequency stability testing is performed in accordance with the guidelines of ANSI C63.26-2015. 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 supply voltage. For hand-carried, battery-powered equipment, primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacturer.

For Part 27, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

Test Procedure Used

ANSI C63.26-2015 Section 5.6

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 41 Frequency Stability Measurements

§2.1055 §27.54

OPERATING FREQUENCY:	2,593,000,000	Hz
CHANNEL:	40620	
REFERENCE VOLTAGE:	48.00	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	48.00	+ 20 (Ref)	2,593,000,255	255	0.0000098
100 %		- 30	2,592,998,806	-1,194	-0.0000460
100 %		- 20	2,592,997,031	-2,969	-0.0001145
100 %		- 10	2,593,002,674	2,674	0.0001031
100 %		0	2,592,999,808	-192	-0.0000074
100 %		+ 10	2,593,002,519	2,519	0.0000971
100 %		+ 20	2,593,000,255	255	0.0000098
100 %		+ 30	2,593,005,519	5,519	0.0002128
100 %		+ 40	2,593,003,240	3,240	0.0001250
100 %		+ 50	2,593,001,352	1,352	0.0000521
85 %	40.80	+ 20	2,593,003,138	3,138	0.0001210
115 %	55.20	+ 20	2,593,002,521	2,521	0.0000972

Table 7-6. Frequency Stability Data (Band 41)

Note:

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

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Band 41 Frequency Stability Measurements

§2.1055 §27.54

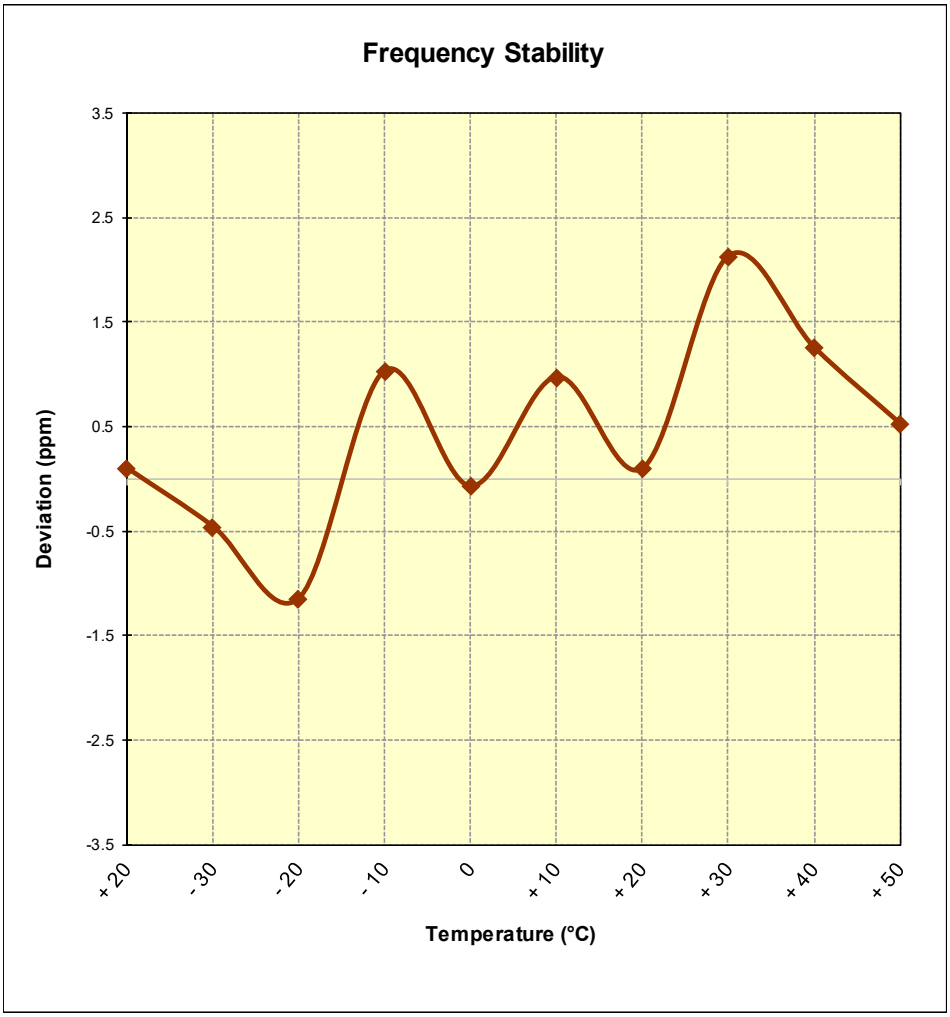

Figure 7-7. Frequency Stability Graph (Band 41)

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8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **Tecore Networks Remote Radio Head FCC ID: QLJ4GRFN-041** complies with all the requirements of Part 27 of the FCC Rules for LTE operation only.

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