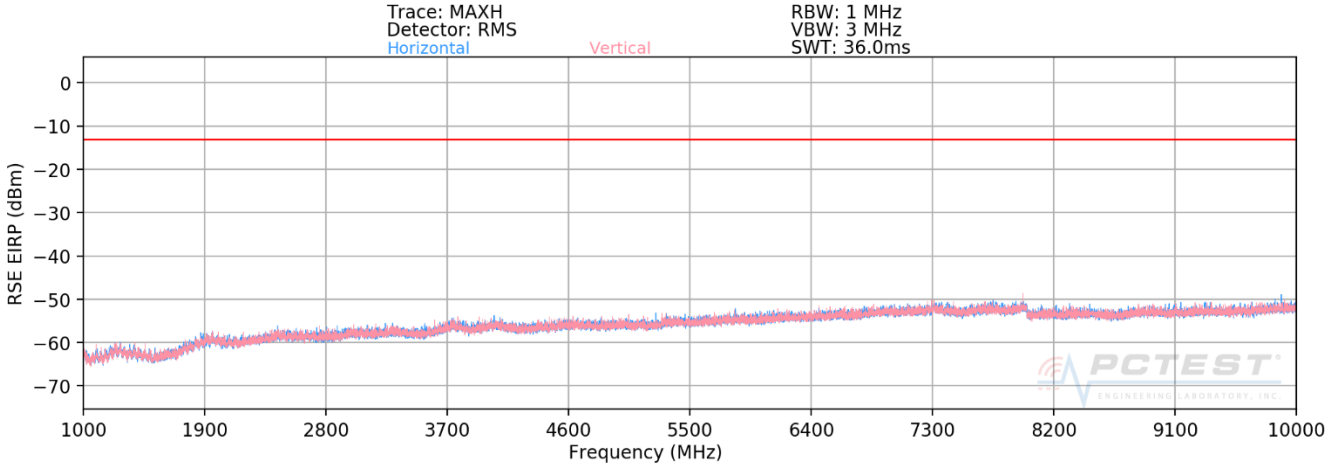
Band 12/17



Plot 7-451. Radiated Spurious Plot above 1GHz (Band 12/17)

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

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1408.00	V	162	91	-70.90	4.35	-66.55	-53.6
2112.00	V	-	-	-69.73	5.05	-64.67	-51.7
2816.00	V	-	-	-70.09	6.90	-63.19	-50.2
3520.00	V	-	-	-70.86	8.03	-62.83	-49.8

Table 7-45. Radiated Spurious Data (Band 12/17 – Low Channel)

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

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1415.00	V	113	88	-70.78	4.42	-66.36	-53.4
2122.50	V	-	-	-69.74	5.22	-64.52	-51.5
2830.00	V	-	-	-70.71	7.01	-63.70	-50.7
3537.50	V	-	-	-70.15	8.00	-62.16	-49.2

Table 7-46. Radiated Spurious Data (Band 12/17 – Mid Channel)

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

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1422.00	V	170	90	-70.22	4.50	-65.72	-52.7
2133.00	V	-	-	-70.45	5.34	-65.11	-52.1
2844.00	V	-	-	-71.20	7.06	-64.14	-51.1
3555.00	V	-	-	-70.93	7.98	-62.94	-49.9

Table 7-47. Radiated Spurious Data (Band 12/17 – High Channel)

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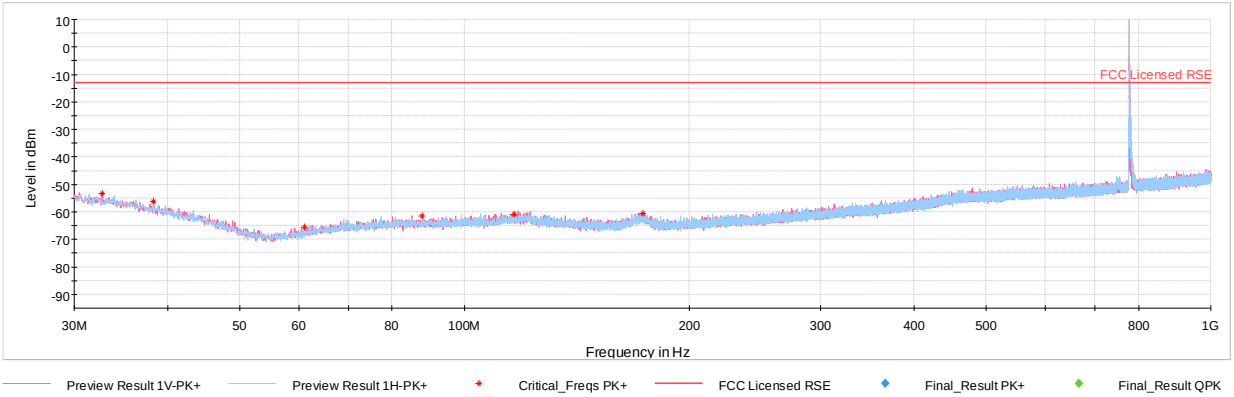
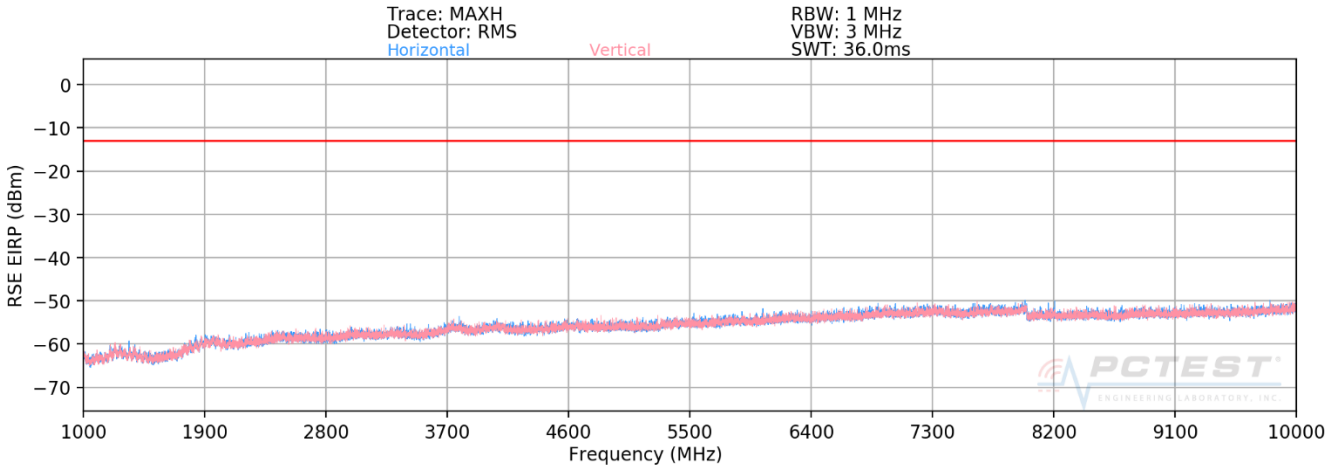
Band 13



Plot 7-452. Radiated Spurious Plot below 1GHz with AC/DC Adapter (Band 13)



Plot 7-453. Radiated Spurious Plot above 1GHz (Band 13)

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
32.67	Max-Peak	V	100	119	-42.45	-10.82	-53.27	-13.00	-40.27
38.34	Max-Peak	V	100	119	-42.55	-13.63	-56.18	-13.00	-43.18
61.09	Max-Peak	V	100	298	-43.51	-22.03	-65.54	-13.00	-52.54
87.81	Max-Peak	H	100	76	-43.14	-18.38	-61.52	-13.00	-48.52
116.67	Max-Peak	V	250	182	-44.18	-16.80	-60.98	-13.00	-47.98
173.51	Max-Peak	V	250	15	-44.20	-16.25	-60.45	-13.00	-47.45

Table 7-48. Radiated Spurious Data below 1GHz with AC/DC Adapter (Band 13)

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OPERATING FREQUENCY:	779.50	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]
2338.50	H	137	256	-63.86	6.21	-57.65	-44.7
3118.00	H	-	-	-68.04	7.46	-60.58	-47.6
3897.50	H	-	-	-68.62	8.89	-59.72	-46.7
4677.00	H	-	-	-67.99	9.79	-58.20	-45.2

Table 7-49. Radiated Spurious Data (Band 13 – Low Channel)

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	169	257	-63.71	6.22	-57.48	-44.5
3128.00	H	-	-	-67.33	7.50	-59.83	-46.8
3910.00	H	-	-	-68.57	8.92	-59.65	-46.7
4692.00	H	-	-	-68.29	9.87	-58.42	-45.4

Table 7-50. Radiated Spurious Data (Band 13 – Mid Channel)

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OPERATING FREQUENCY: 784.50 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]
2353.50	H	124	27	-66.23	6.22	-60.01	-47.0
3138.00	H	-	-	-67.98	7.54	-60.44	-47.4
3922.50	H	-	-	-68.74	8.95	-59.79	-46.8
4707.00	H	-	-	-56.90	9.92	-46.98	-34.0

Table 7-51. Radiated Spurious Data (Band 13 – High Channel)

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

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1559.00	H	-	-	-71.40	5.80	-65.60	-25.6
1564.00	H	-	-	-71.38	5.82	-65.57	-25.6
1569.00	H	-	-	-71.24	5.82	-65.42	-25.4

Table 7-52. Radiated Spurious Data (Band 13 – 1559-1610MHz Band)

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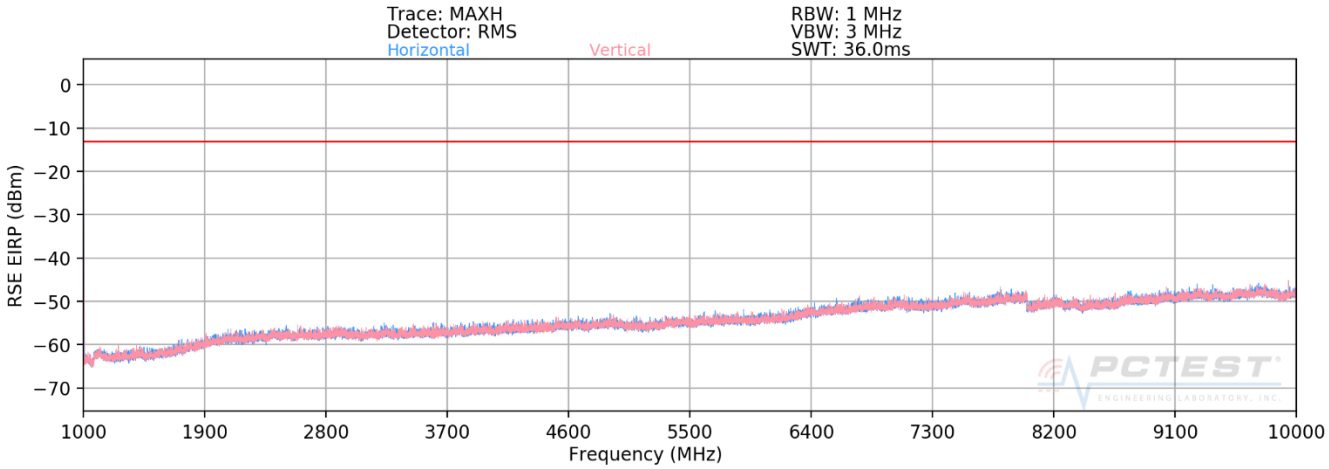
Band 26/5



Plot 7-454. Radiated Spurious Plot above 1GHz (Band 26/5)

OPERATING FREQUENCY:	829.00	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]
1658.00	H	-	-	-72.53	5.50	-67.03	-54.0
2487.00	H	-	-	-69.61	5.92	-63.70	-50.7
3316.00	H	-	-	-71.27	7.87	-63.40	-50.4

Table 7-53. Radiated Spurious Data (Band 26/5 – Low Channel)

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OPERATING FREQUENCY:	836.50	MHz
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	10.0	MHz
DISTANCE:	3	meters
LIMIT:	-13	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1673.00	H	-	-	-72.43	5.60	-66.82	-53.8
2509.50	H	-	-	-69.16	5.90	-63.26	-50.3
3346.00	H	-	-	-70.70	7.95	-62.75	-49.8

Table 7-54. Radiated Spurious Data (Band 26/5 – Mid Channel)

OPERATING FREQUENCY:	844.00	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]
1688.00	H	-	-	-72.24	5.65	-66.59	-53.6
2532.00	H	-	-	-69.03	5.93	-63.10	-50.1
3376.00	H	-	-	-70.94	8.04	-62.90	-49.9

Table 7-55. Radiated Spurious Data (Band 26/5 – High Channel)

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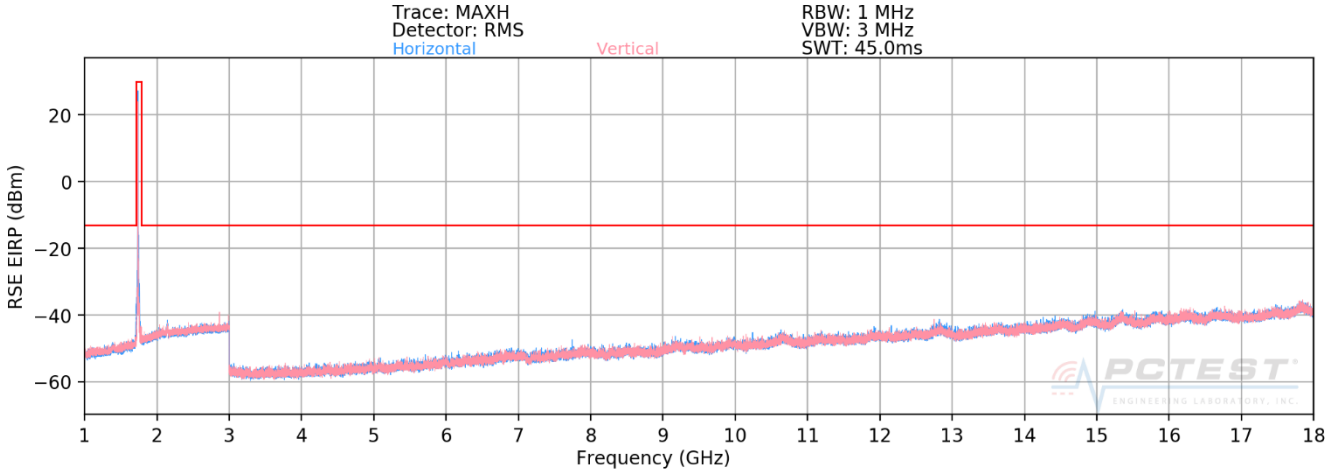
Band 66/4



Plot 7-455. 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	-	-	-70.72	8.12	-62.60	-49.6
5160.00	H	112	41	-69.71	10.14	-59.57	-46.6
6880.00	H	-	-	-68.90	11.38	-57.52	-44.5
8600.00	H	-	-	-69.58	13.02	-56.56	-43.6
10320.00	H	-	-	-66.95	13.10	-53.85	-40.8

Table 7-56. 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	-	-	-70.65	8.09	-62.57	-49.6
5235.00	H	280	144	-70.60	10.26	-60.34	-47.3
6980.00	H	-	-	-69.33	11.47	-57.86	-44.9
8725.00	H	-	-	-69.98	13.18	-56.80	-43.8
10470.00	H	-	-	-66.92	13.07	-53.85	-40.9

Table 7-57. 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	-	-	-70.59	7.99	-62.60	-49.6
5310.00	H	182	255	-65.63	10.28	-55.35	-42.4
7080.00	H	-	-	-69.30	11.58	-57.73	-44.7
8850.00	H	-	-	-69.74	13.14	-56.60	-43.6
10620.00	H	-	-	-65.51	13.05	-52.46	-39.5

Table 7-58. Radiated Spurious Data (Band 66/4 – High Channel)

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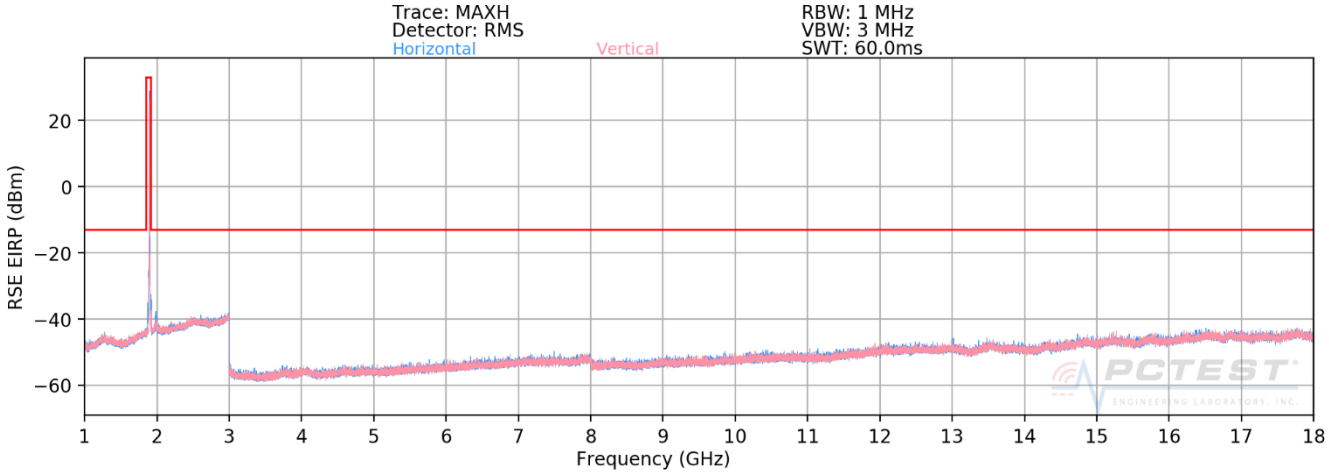
Band 25/2



Plot 7-456. Radiated Spurious Plot above 1GHz (Band 25/2)

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

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3720.00	H	123	361	-67.51	8.43	-59.08	-46.1
5580.00	H	128	20	-62.26	10.72	-51.55	-38.5
7440.00	H	-	-	-70.77	11.90	-58.87	-45.9
9300.00	H	-	-	-71.47	13.27	-58.20	-45.2
11160.00	H	-	-	-69.96	13.20	-56.76	-43.8

Table 7-59. Radiated Spurious Data (Band 25/2 – Low Channel)

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

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3765.00	H	-	-	-69.99	8.48	-61.52	-48.5
5647.50	H	-	-	-71.34	10.69	-60.66	-47.7
7530.00	H	-	-	-70.85	11.99	-58.87	-45.9

Table 7-60. Radiated Spurious Data (Band 25/2 – Mid Channel)

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

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3810.00	H	112	16	-64.21	8.59	-55.61	-42.6
5715.00	H	114	19	-52.70	10.66	-42.03	-29.0
7620.00	H	-	-	-71.35	12.16	-59.19	-46.2
9525.00	H	-	-	-71.81	13.23	-58.58	-45.6
11430.00	H	-	-	-70.04	13.28	-56.76	-43.8

Table 7-61. Radiated Spurious Data (Band 25/2 – High Channel)

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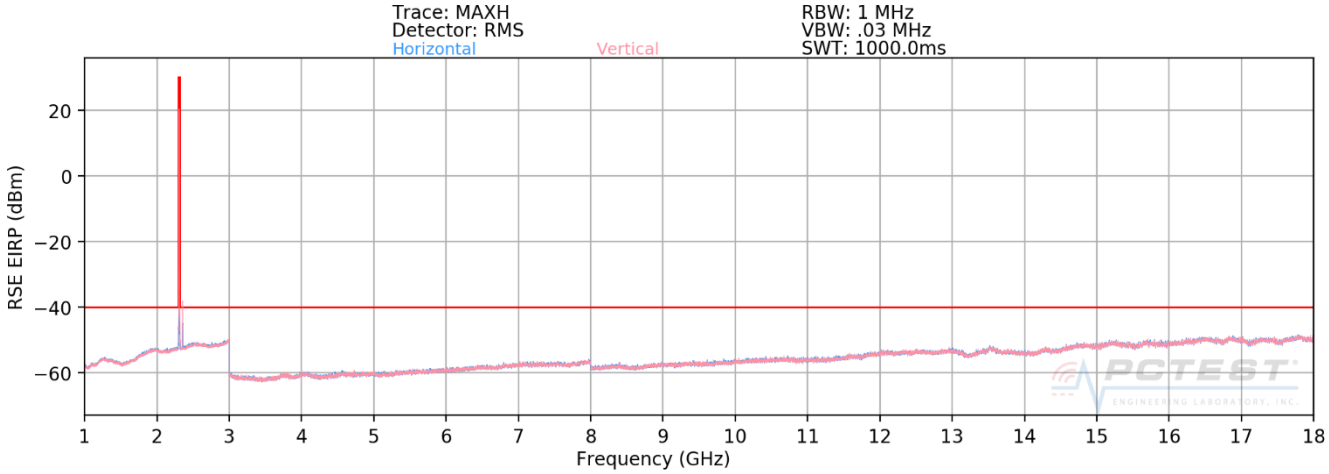
Band 30



Plot 7-457. Radiated Spurious Plot 1GHz - 18GHz (Band 30)

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

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
4615.00	H	-	-	-71.10	9.49	-61.61	-21.6
6922.50	H	-	-	-70.72	11.40	-59.32	-19.3
9230.00	V	107	147	-70.73	13.29	-57.44	-17.4
11537.50	H	-	-	-70.01	13.25	-56.76	-16.8
13845.00	H	-	-	-69.67	14.41	-55.27	-15.3
16152.50	H	-	-	-66.70	13.69	-53.00	-13.0

Table 7-62. Radiated Spurious Data (Band 30 – Low Channel)

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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	H	-	-	-71.06	9.51	-61.54	-21.5
6930.00	H	-	-	-70.71	11.41	-59.30	-19.3
9240.00	H	-	-	-71.68	13.30	-58.39	-18.4

Table 7-63. Radiated Spurious Data (Band 30 – Mid Channel)

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

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
4625.00	H	-	-	-70.88	9.54	-61.34	-21.3
6937.50	H	-	-	-70.72	11.41	-59.31	-19.3
9250.00	H	-	-	-71.40	13.31	-58.09	-18.1

Table 7-64. Radiated Spurious Data (Band 30 – High Channel)

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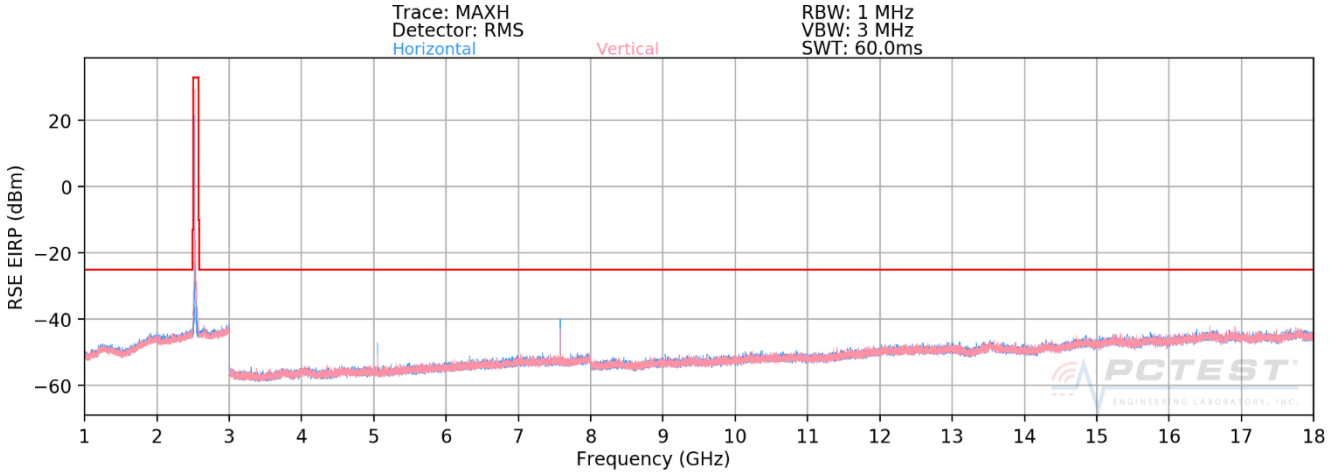
Band 7



Plot 7-458. Radiated Spurious Plot 1GHz - 18GHz (Band 7)

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	233	258	-62.37	10.00	-52.37	-27.4
7530.00	H	300	225	-61.71	11.99	-49.73	-24.7
10040.00	V	169	173	-68.04	13.11	-54.92	-29.9
12550.00	V	-	-	-67.47	13.13	-54.34	-29.3
15060.00	V	-	-	-66.86	14.05	-52.81	-27.8

Table 7-65. Radiated Spurious Data (Band 7 – Low Channel)

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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	189	262	-61.12	10.07	-51.05	-26.0
7605.00	H	167	265	-59.75	12.15	-47.59	-22.6
10140.00	V	244	177	-67.18	13.10	-54.09	-29.1
12675.00	V	-	-	-67.34	13.15	-54.19	-29.2
15210.00	V	-	-	-65.97	14.00	-51.97	-27.0

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

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	168	263	-62.61	10.10	-52.51	-27.5
7680.00	H	152	255	-59.97	12.15	-47.81	-22.8
10240.00	V	236	174	-69.78	13.10	-56.68	-31.7
12800.00	V	-	-	-68.16	13.17	-54.99	-30.0
15360.00	V	-	-	-66.65	14.01	-52.64	-27.6

Table 7-67. Radiated Spurious Data (Band 7 – High Channel)

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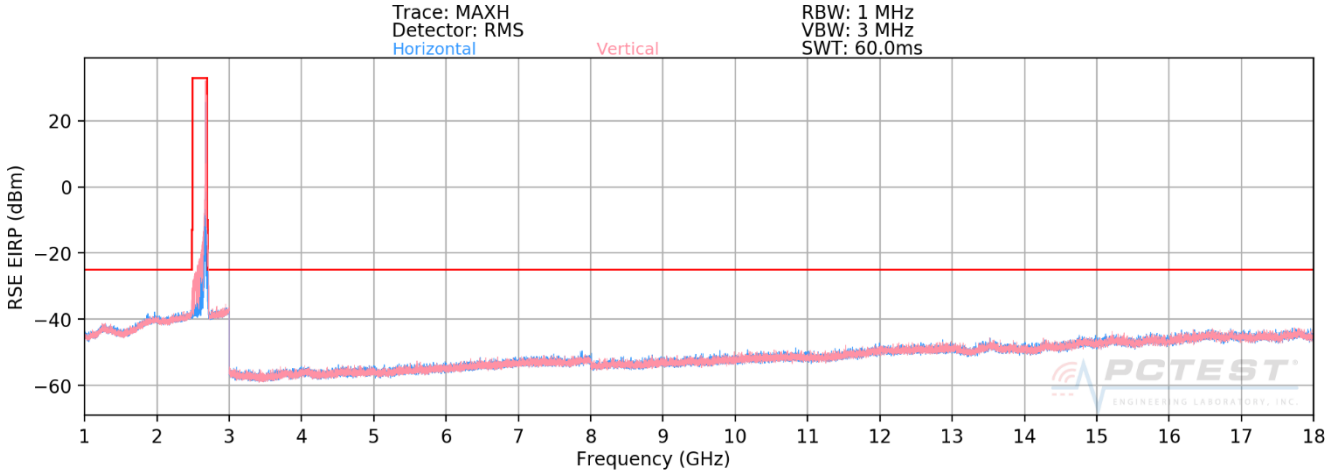
Band 41



Plot 7-459. Radiated Spurious Plot 1GHz - 18GHz (Band 41)

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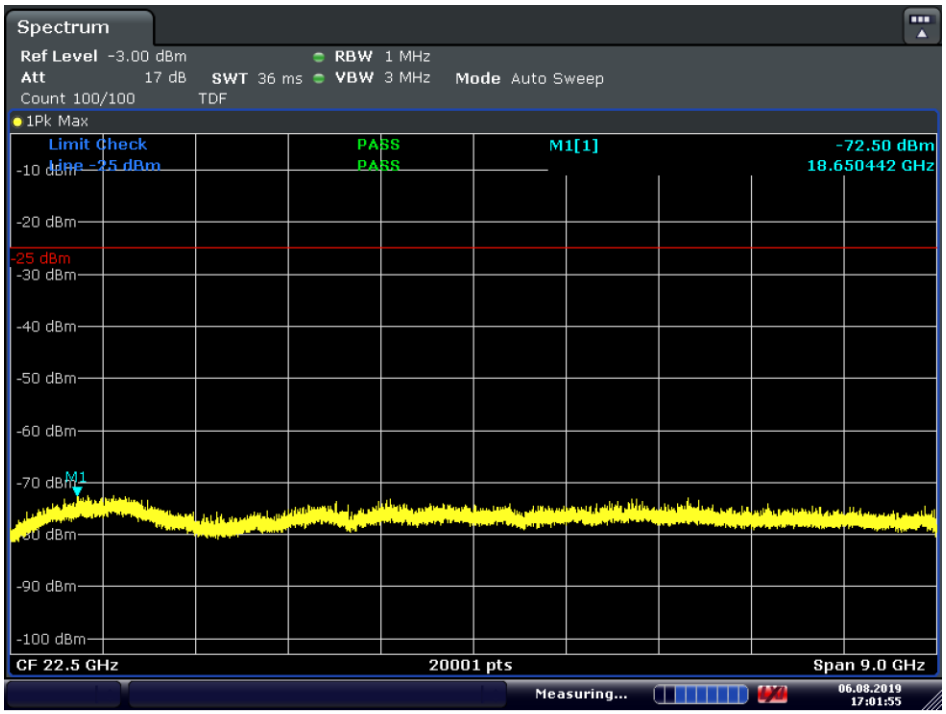
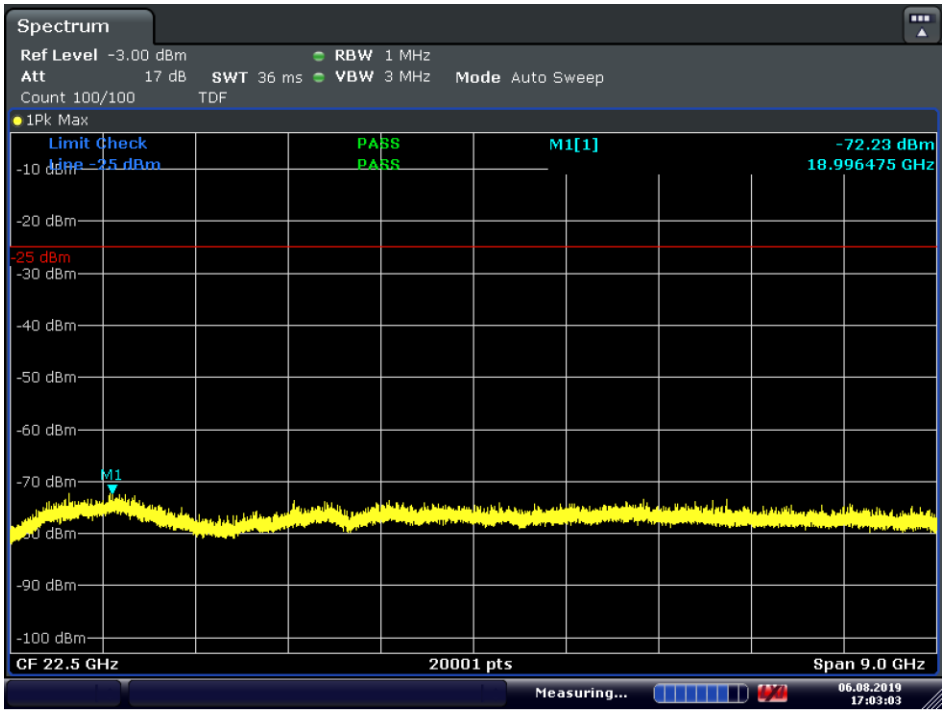


Plot 7-460. Radiated Spurious Plot 18GHz – 27GHz (Band 41, Pol. H)



Plot 7-461. Radiated Spurious Plot 18GHz – 27GHz (Band 41, Pol. V)

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OPERATING FREQUENCY:	2506.00	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]
5012.00	H	400	361	-61.51	9.99	-51.52	-26.5
7518.00	H	131	255	-57.57	11.99	-45.59	-20.6
10024.00	V	120	178	-60.92	13.11	-47.80	-22.8
12530.00	H	-	-	-60.03	13.15	-46.89	-21.9
15036.00	H	-	-	-59.12	14.06	-45.06	-20.1
17542.00	H	-	-	-57.13	14.14	-42.99	-18.0

Table 7-68. Radiated Spurious Data (Band 41 – Low Channel)

OPERATING FREQUENCY:	2593.00	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]
5186.00	H	118	264	-62.60	10.20	-52.39	-27.4
7779.00	H	311	213	-57.74	12.20	-45.54	-20.5
10372.00	V	184	181	-60.95	13.07	-47.88	-22.9
12965.00	H	-	-	-59.62	13.25	-46.37	-21.4
15558.00	H	-	-	-58.23	14.01	-44.22	-19.2

Table 7-69. Radiated Spurious Data (Band 41 – Mid Channel)

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OPERATING FREQUENCY:	2680.00	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]
5360.00	H	-	-	-61.77	10.37	-51.40	-26.4
8040.00	H	184	173	-54.84	12.53	-42.31	-17.3
10720.00	H	-	-	-60.30	13.07	-47.24	-22.2
13400.00	H	-	-	-60.60	13.78	-46.83	-21.8
16080.00	H	-	-	-57.41	13.63	-43.78	-18.8

Table 7-70. Radiated Spurious Data (Band 41 – High Channel)

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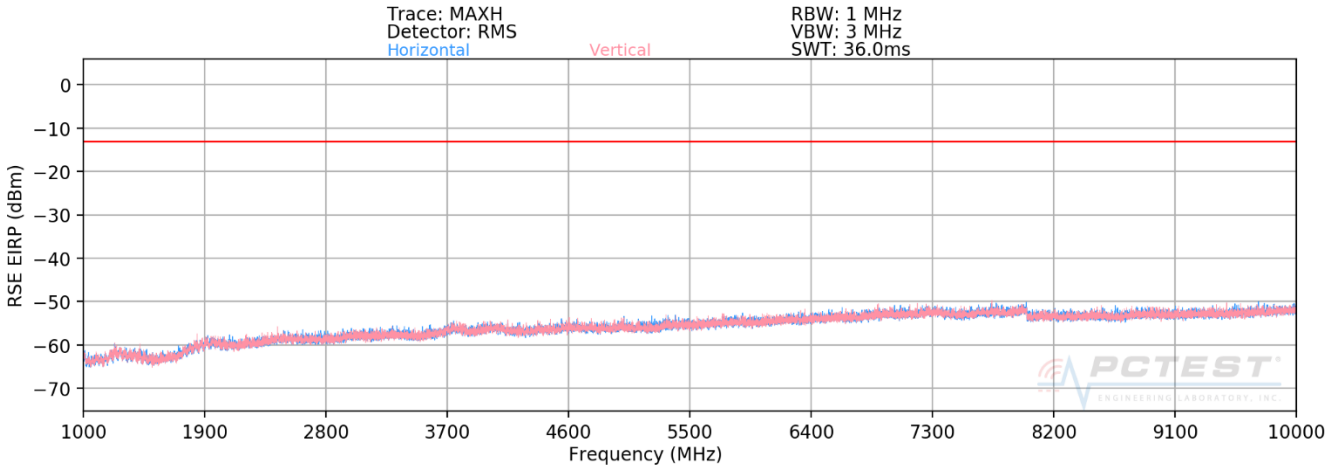
7.9.2 ANT WF5 (Port B) Radiated Spurious Emissions Measurements Band 71



Plot 7-462. 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	255	284	-73.86	3.46	-70.40	-57.4
2019.00	H	-	-	-72.20	4.27	-67.93	-54.9
2692.00	H	-	-	-73.56	6.52	-67.04	-54.0
3365.00	H	-	-	-73.73	8.00	-65.73	-52.7

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

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OPERATING FREQUENCY:	680.50	MHz
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	20.0	MHz
DISTANCE:	680.5	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	-	-	-75.17	3.40	-71.77	-58.8
2041.50	H	-	-	-75.38	4.53	-70.85	-57.8
2722.00	H	-	-	-64.33	6.61	-57.71	-44.7

Table 7-72. 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	-	-	-74.40	3.71	-70.69	-57.7
2064.00	H	-	-	-72.39	4.58	-67.81	-54.8
2752.00	H	-	-	-73.72	6.67	-67.05	-54.0

Table 7-73. Radiated Spurious Data (Band 71 – High Channel)

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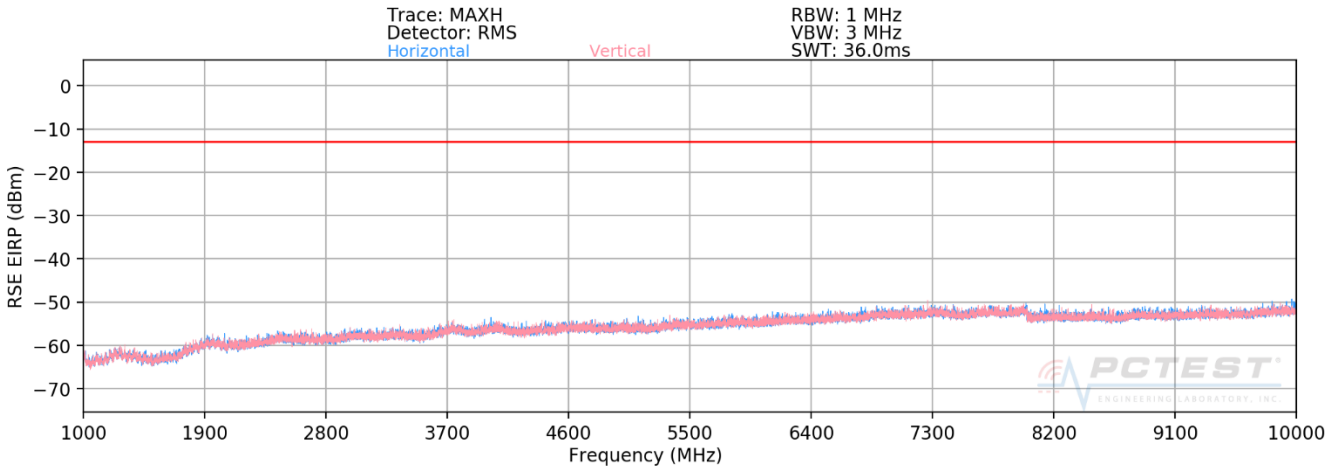
Band 12/17



Plot 7-463. Radiated Spurious Plot above 1GHz (Band 12/17)

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

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1408.00	H	-	-	-71.46	4.35	-67.11	-54.1
2112.00	H	-	-	-69.59	5.05	-64.53	-51.5
2816.00	H	-	-	-70.44	6.90	-63.54	-50.5

Table 7-74. Radiated Spurious Data (Band 12/17 – Low Channel)

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

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1415.00	H	-	-	-72.19	4.42	-67.77	-54.8
2122.50	H	-	-	-70.44	5.22	-65.22	-52.2
2830.00	H	-	-	-71.07	7.01	-64.06	-51.1

Table 7-75. Radiated Spurious Data (Band 12/17 – Mid Channel)

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

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1422.00	V	151	96	-71.34	4.50	-66.84	-53.8
2133.00	H	-	-	-70.56	5.34	-65.22	-52.2
2844.00	H	-	-	-71.23	7.06	-64.17	-51.2
3555.00	H	-	-	-70.57	7.98	-62.58	-49.6

Table 7-76. Radiated Spurious Data (Band 12/17 – High Channel)

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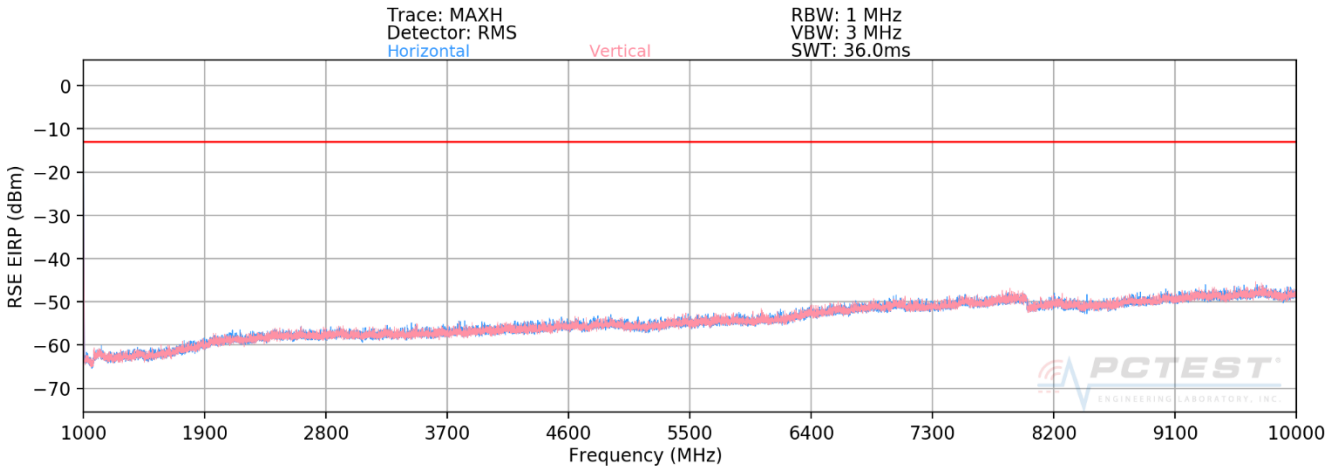
Band 13



Plot 7-464. Radiated Spurious Plot above 1GHz (Band 13)

OPERATING FREQUENCY:	779.50	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]
2338.50	H	-	-	-70.56	6.21	-64.36	-51.4
3118.00	H	-	-	-71.60	7.46	-64.15	-51.1
3897.50	H	-	-	-72.88	8.89	-63.98	-51.0

Table 7-77. Radiated Spurious Data (Band 13 – Low Channel)

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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	-	-	-70.61	6.22	-64.39	-51.4
3128.00	H	-	-	-71.67	7.50	-64.18	-51.2
3910.00	H	-	-	-72.86	8.92	-63.94	-50.9

Table 7-78. Radiated Spurious Data (Band 13 – Mid Channel)

OPERATING FREQUENCY:	784.50	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]
2353.50	H	-	-	-70.69	6.22	-64.47	-51.5
3138.00	H	-	-	-71.81	7.54	-64.27	-51.3
3922.50	H	-	-	-73.00	8.95	-64.05	-51.0

Table 7-79. Radiated Spurious Data (Band 13 – High Channel)

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

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1559.00	H	-	-	-73.26	5.80	-67.46	-27.5
1564.00	H	-	-	-73.56	5.82	-67.74	-27.7
1569.00	H	-	-	-73.42	5.82	-67.60	-27.6

Table 7-80. Radiated Spurious Data (Band 13 – 1559-1610MHz Band)

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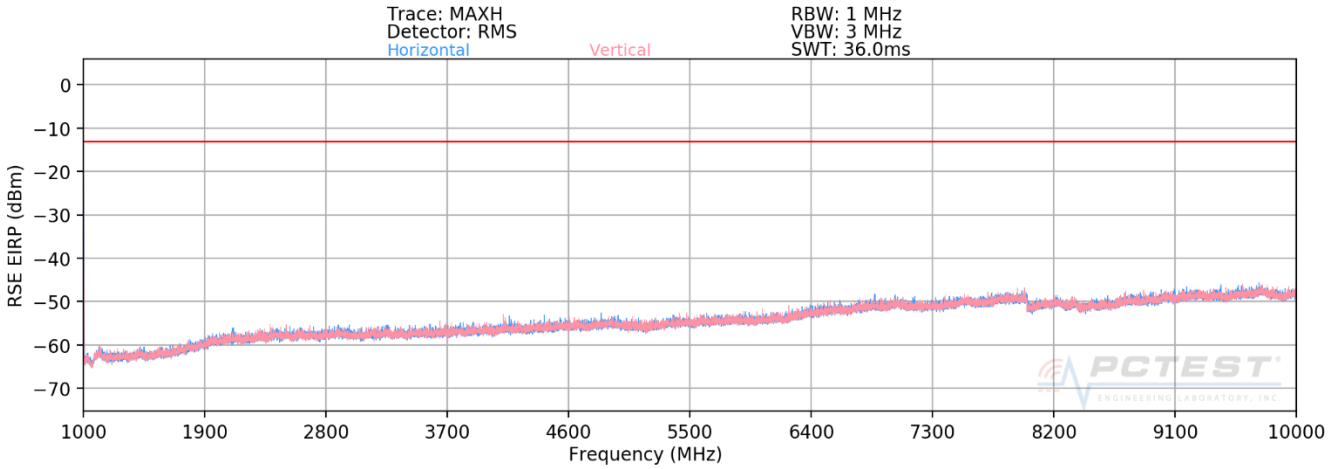
Band 26/5



Plot 7-465. Radiated Spurious Plot above 1GHz (Band 26/5)

OPERATING FREQUENCY:	829.00	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]
1658.00	H	-	-	-72.37	5.50	-66.87	-53.9
2487.00	H	-	-	-68.89	5.92	-62.98	-50.0
3316.00	H	-	-	-70.96	7.87	-63.09	-50.1

Table 7-81. Radiated Spurious Data (Band 26/5 – Low Channel)

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OPERATING FREQUENCY:	836.50	MHz
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	10.0	MHz
DISTANCE:	3	meters
LIMIT:	-13	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1673.00	H	-	-	-72.37	5.60	-66.76	-53.8
2509.50	H	-	-	-69.10	5.90	-63.20	-50.2
3346.00	H	-	-	-70.64	7.95	-62.69	-49.7

Table 7-82. Radiated Spurious Data (Band 26/5 – Mid Channel)

OPERATING FREQUENCY:	844.00	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]
1688.00	H	-	-	-72.35	5.65	-66.70	-53.7
2532.00	H	-	-	-69.08	5.93	-63.15	-50.2
3376.00	H	-	-	-70.78	8.04	-62.74	-49.7

Table 7-83. Radiated Spurious Data (Band 26/5 – High Channel)

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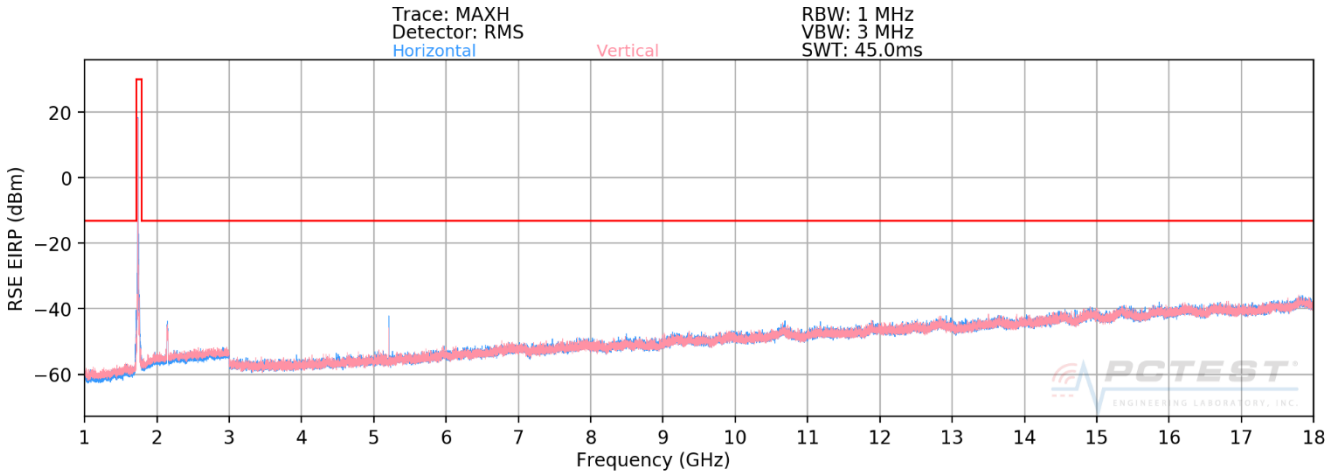
Band 66/4



Plot 7-466. 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	-	-	-70.78	8.12	-62.66	-49.7
5160.00	H	-	-	-71.22	10.14	-61.08	-48.1
6880.00	H	-	-	-68.76	11.38	-57.38	-44.4
8600.00	H	-	-	-69.48	13.02	-56.46	-43.5
10320.00	H	-	-	-66.92	13.10	-53.82	-40.8

Table 7-84. 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	-	-	-70.49	8.09	-62.41	-49.4
5235.00	H	117	28	-65.52	10.26	-55.26	-42.3
6980.00	H	-	-	-69.28	11.47	-57.81	-44.8
8725.00	H	-	-	-69.98	13.18	-56.80	-43.8
10470.00	H	-	-	-66.90	13.07	-53.83	-40.8

Table 7-85. 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	-	-	-71.81	7.99	-63.82	-50.8
5310.00	H	-	-	-71.02	10.28	-60.74	-47.7
7080.00	H	-	-	-69.97	11.58	-58.40	-45.4
8850.00	H	-	-	-70.42	13.14	-57.28	-44.3

Table 7-86. Radiated Spurious Data (Band 66/4 – High Channel)

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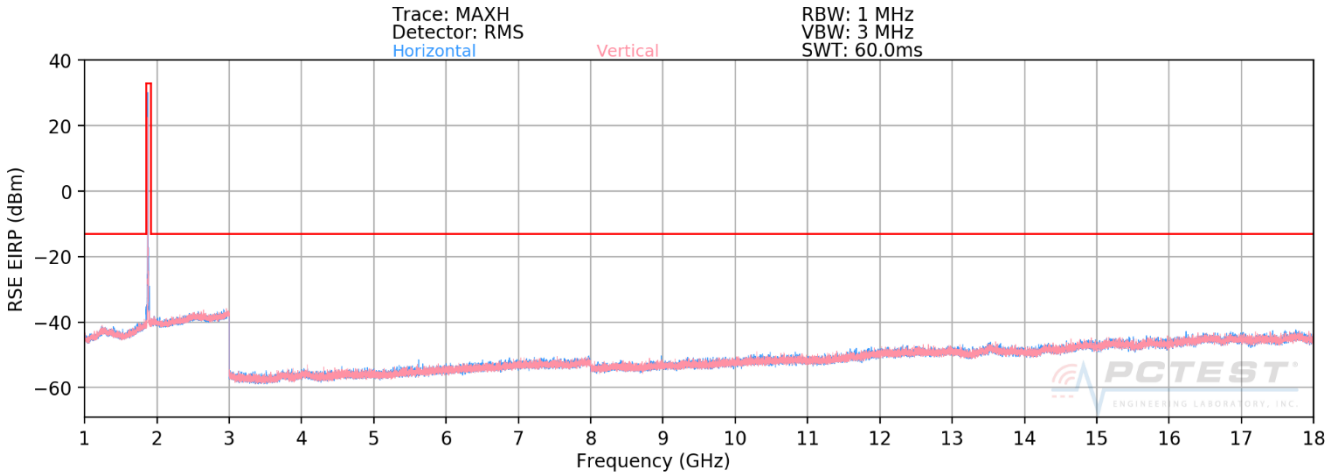
Band 25/2



Plot 7-467. Radiated Spurious Plot above 1GHz (Band 25/2)

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

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3720.00	H	124	360	-67.67	8.43	-59.24	-46.2
5580.00	H	108	29	-62.72	10.72	-52.01	-39.0
7440.00	H	-	-	-70.65	11.90	-58.75	-45.7
9300.00	H	-	-	-71.37	13.27	-58.10	-45.1
11160.00	H	-	-	-70.14	13.20	-56.94	-43.9

Table 7-87. Radiated Spurious Data (Band 25/2 – Low Channel)

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

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3765.00	H	120	23	-68.61	8.48	-60.14	-47.1
5647.50	H	140	21	-68.64	10.69	-57.96	-45.0
7530.00	H	-	-	-71.03	11.99	-59.05	-46.0
9412.50	H	-	-	-71.36	13.36	-58.01	-45.0
11295.00	H	-	-	-69.92	13.24	-56.68	-43.7

Table 7-88. Radiated Spurious Data (Band 25/2 – Mid Channel)

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

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3810.00	H	140	8	-68.80	8.59	-60.20	-47.2
5715.00	H	120	17	-68.29	10.66	-57.62	-44.6
7620.00	H	-	-	-71.38	12.16	-59.22	-46.2
9525.00	H	-	-	-71.34	13.23	-58.11	-45.1
11430.00	H	-	-	-69.93	13.28	-56.65	-43.7

Table 7-89. Radiated Spurious Data (Band 25/2 – High Channel)

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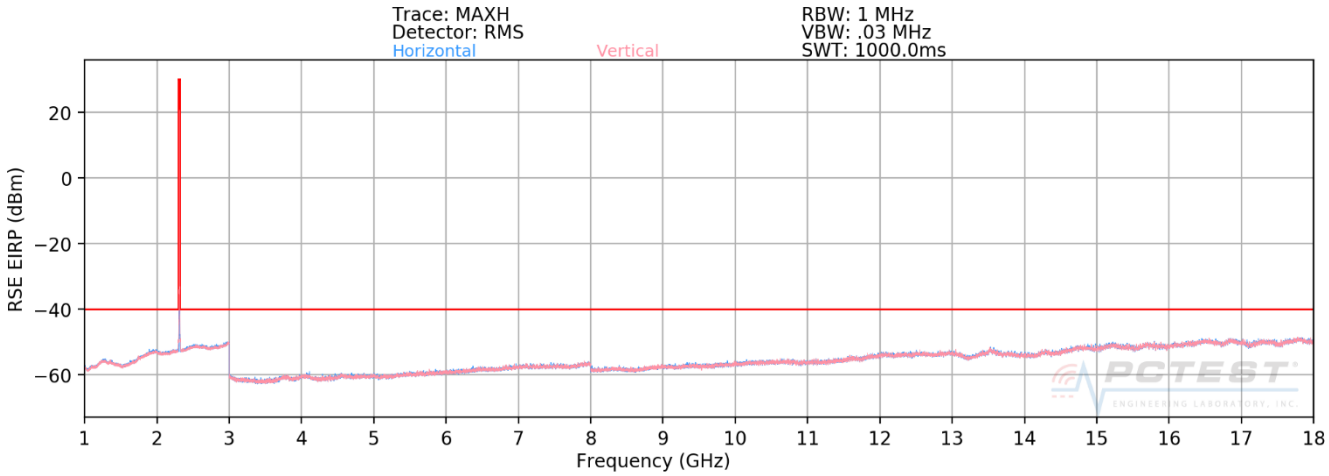
Band 30



Plot 7-468. Radiated Spurious Plot 1GHz – 18GHz (Band 30)

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

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
4615.00	H	-	-	-70.86	9.49	-61.37	-21.4
6922.50	H	-	-	-70.49	11.40	-59.09	-19.1
9230.00	H	-	-	-71.70	13.29	-58.41	-18.4

Table 7-90. Radiated Spurious Data (Band 30 – Low Channel)

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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	H	-	-	-71.05	9.51	-61.53	-21.5
6930.00	H	-	-	-70.72	11.41	-59.31	-19.3
9240.00	H	-	-	-71.67	13.30	-58.38	-18.4

Table 7-91. Radiated Spurious Data (Band 30 – Mid Channel)

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

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
4625.00	H	-	-	-71.60	9.54	-62.06	-22.1
6937.50	H	-	-	-71.69	11.41	-60.28	-20.3
9250.00	H	108	153	-70.54	13.31	-57.23	-17.2
11562.50	H	-	-	-69.53	13.24	-56.28	-16.3
13875.00	H	-	-	-70.06	14.42	-55.64	-15.6

Table 7-92. Radiated Spurious Data (Band 30 – High Channel)

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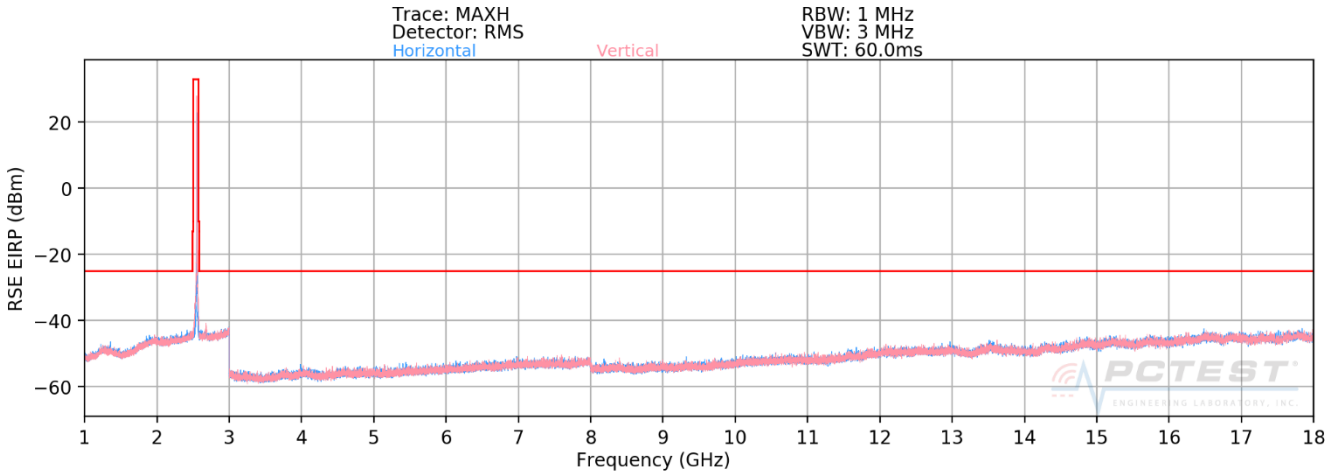
Band 7



Plot 7-469. Radiated Spurious Plot 1GHz - 18GHz (Band 7)

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	-	-	-71.12	10.00	-61.12	-36.1
7530.00	H	169	130	-69.17	11.99	-57.19	-32.2
10040.00	V	123	183	-69.85	13.11	-56.73	-31.7
12550.00	V	-	-	-68.22	13.13	-55.09	-30.1
15060.00	V	-	-	-67.36	14.05	-53.31	-28.3

Table 7-93. Radiated Spurious Data (Band 7 – Low Channel)

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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	V	213	224	-69.57	10.07	-59.50	-34.5
7605.00	V	-	-	-71.09	12.15	-58.93	-33.9
10140.00	V	125	186	-69.40	13.10	-56.31	-31.3
12675.00	V	-	-	-66.89	13.15	-53.74	-28.7
15210.00	V	-	-	-65.88	14.00	-51.88	-26.9

Table 7-94. Radiated Spurious Data (Band 7 – Mid Channel)

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	V	-	-	-71.16	10.10	-61.06	-36.1
7680.00	V	360	114	-70.18	12.15	-58.02	-33.0
10240.00	V	117	183	-68.90	13.10	-55.80	-30.8
12800.00	V	-	-	-67.02	13.17	-53.85	-28.9
15360.00	V	-	-	-66.46	14.01	-52.45	-27.5

Table 7-95. Radiated Spurious Data (Band 7 – High Channel)

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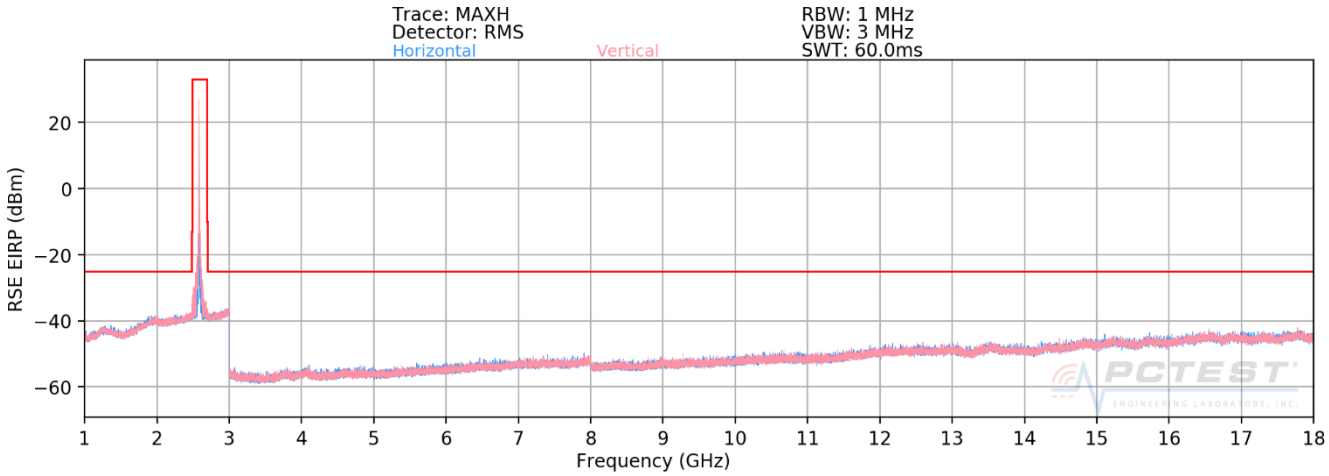
Band 41



Plot 7-470. Radiated Spurious Plot 1GHz - 18GHz (Band 41)

OPERATING FREQUENCY:	2506.00	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]
5012.00	H	-	-	-62.47	9.99	-52.48	-27.5
7518.00	H	104	167	-61.06	11.99	-49.08	-24.1
10024.00	V	159	183	-61.62	13.11	-48.50	-23.5
12530.00	H	-	-	-60.11	13.15	-46.97	-22.0
15036.00	H	-	-	-58.49	14.06	-44.43	-19.4
17542.00	H	-	-	-57.41	14.14	-43.27	-18.3

Table 7-96. Radiated Spurious Data (Band 41 – Low Channel)

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OPERATING FREQUENCY: 2593.00 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]
5186.00	H	-	-	-62.18	10.20	-51.97	-27.0
7779.00	H	135	156	-56.27	12.20	-44.07	-19.1
10372.00	H	-	-	-61.61	13.07	-48.54	-23.5
12965.00	H	-	-	-60.51	13.25	-47.26	-22.3
15558.00	H	-	-	-58.43	14.01	-44.42	-19.4

Table 7-97. Radiated Spurious Data (Band 41 – Mid Channel)

OPERATING FREQUENCY: 2680.00 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]
5360.00	H	-	-	-62.25	10.37	-51.88	-26.9
8040.00	V	145	329	-57.92	12.53	-45.39	-20.4
10720.00	H	-	-	-61.72	13.07	-48.66	-23.7
13400.00	H	-	-	-58.64	13.78	-44.87	-19.9
16080.00	H	-	-	-57.72	13.63	-44.09	-19.1

Table 7-98. Radiated Spurious Data (Band 41 – 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.

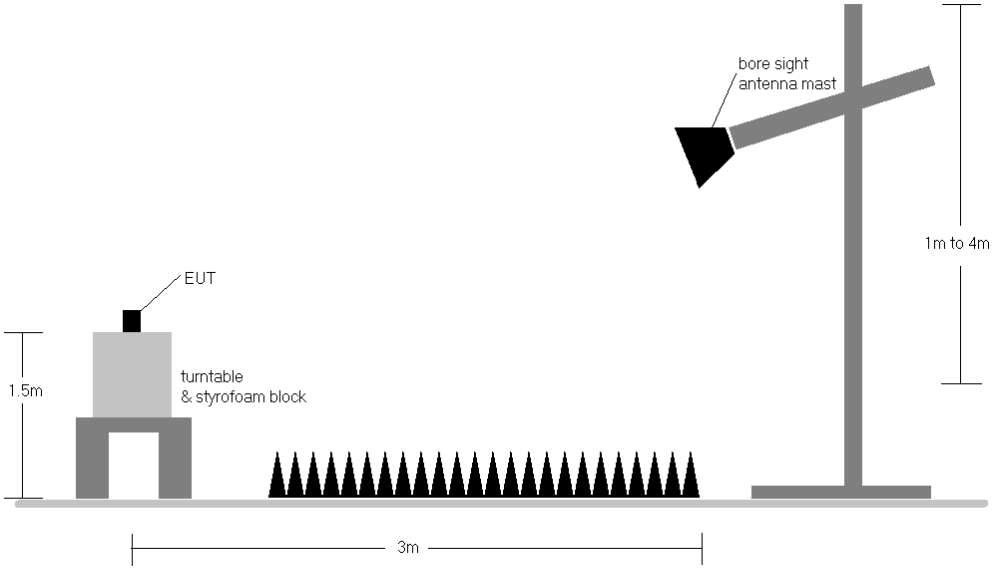

Figure 7-9. Test Instrument & Measurement Setup

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) 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.

7) All ports were tested and only the worst case data were reported.

8) Refer to Table 2-1 Section 2.3 of this test report for correlation between Antennas and Ports.

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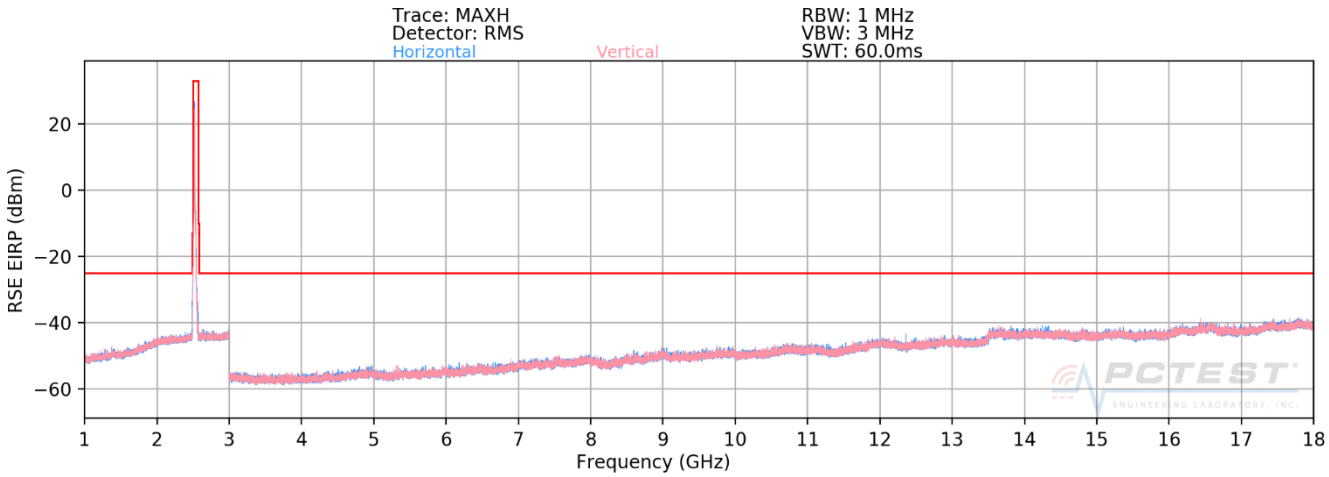
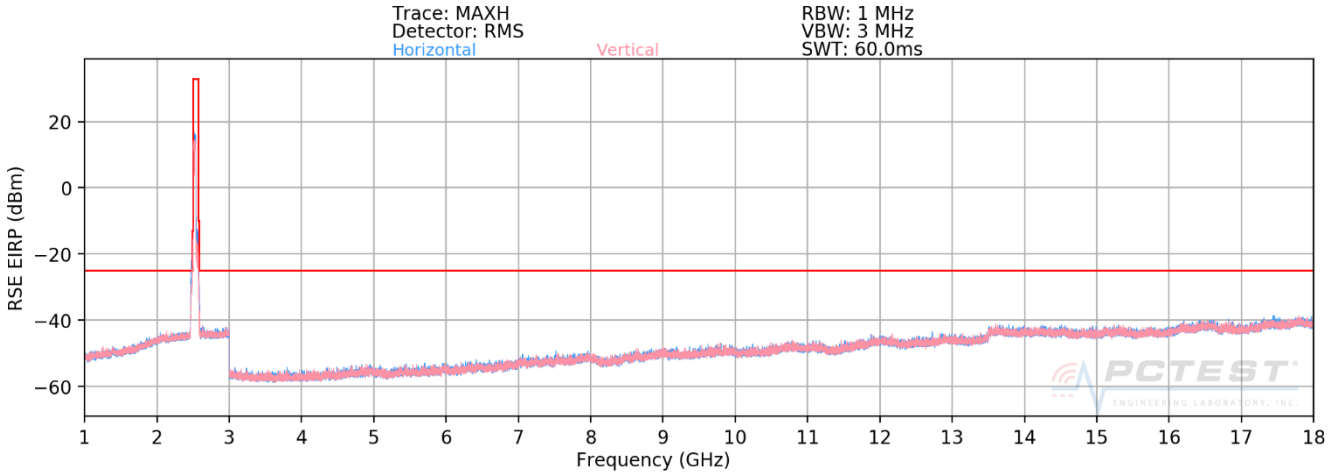
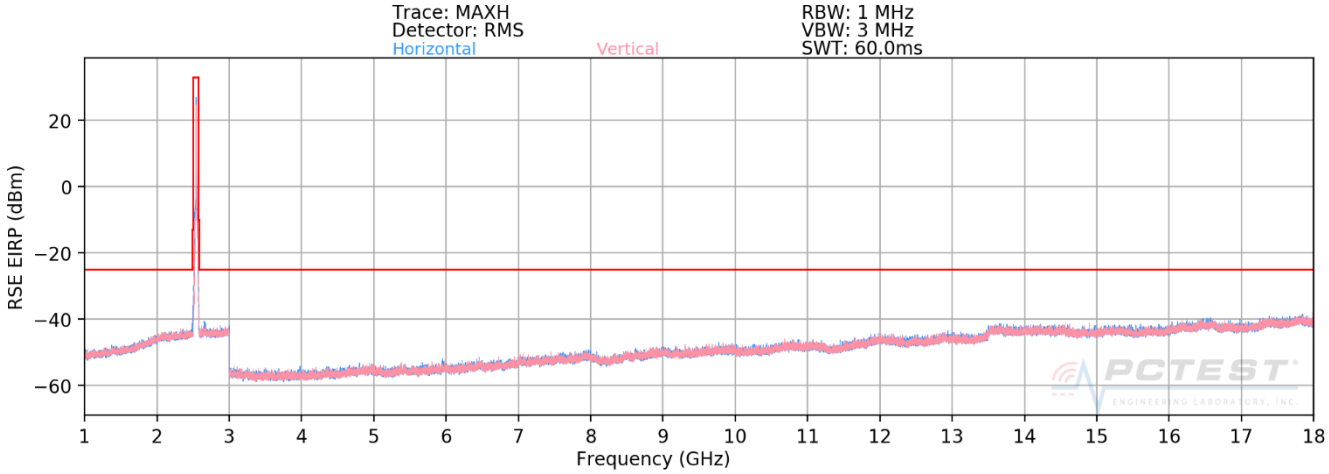
Band 7



Plot 7-471. Radiated Spurious Plot (ULCA B7 PCC: RB 1 Offset 99, SCC: RB 1 Offset 0 – Low Channel)



Plot 7-472. Radiated Spurious Plot (ULCA B7 PCC: RB 100 Offset 0, SCC: RB 100 Offset 0 – Low Channel)



Plot 7-473. Radiated Spurious Plot (ULCA B7 PCC: RB 1 Offset 0, SCC: RB 1 Offset 99 – Mid Channel)

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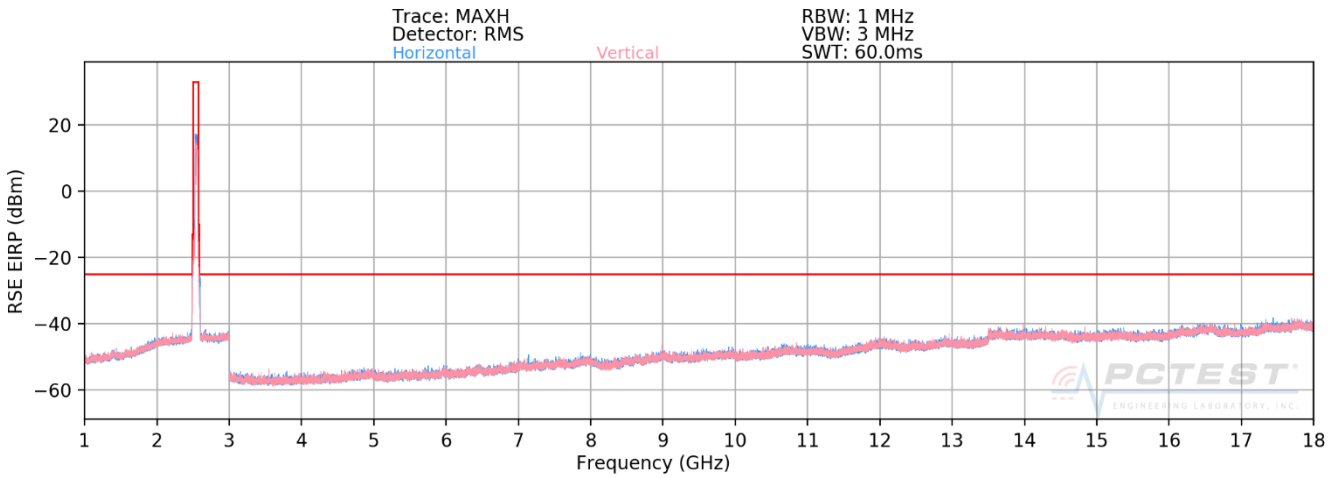
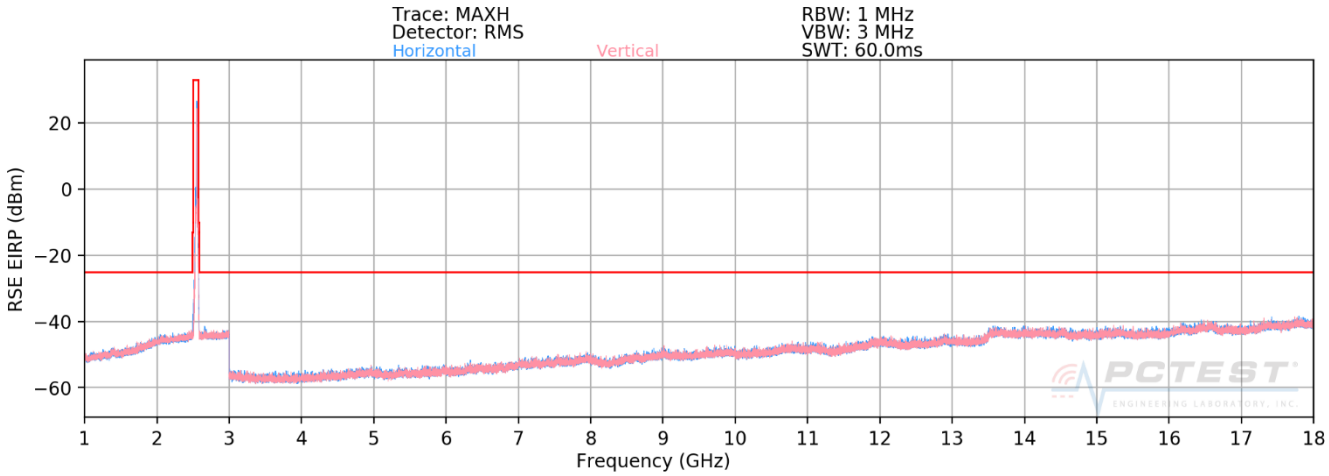
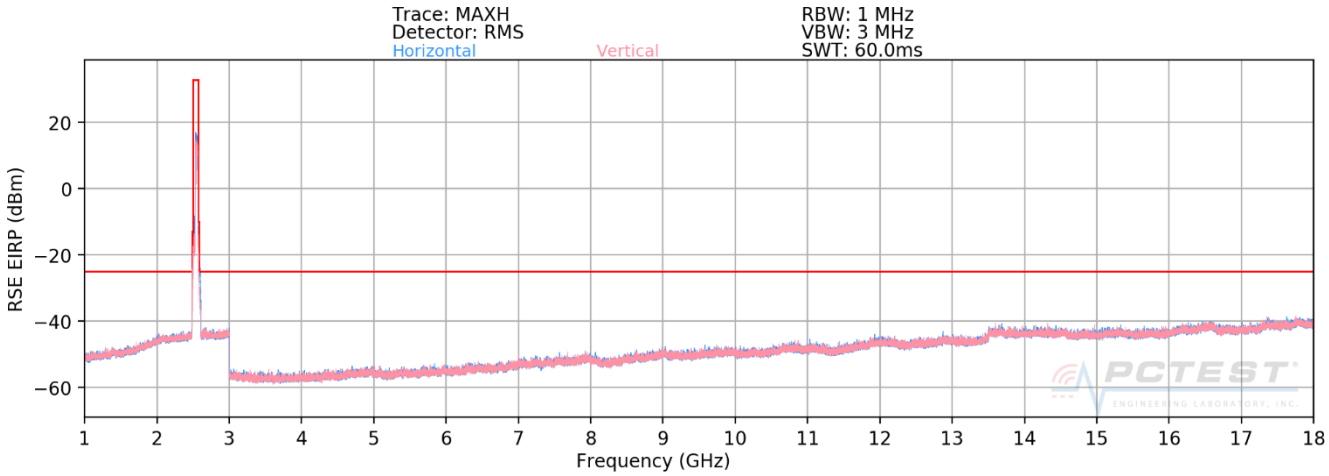


Plot 7-474. Radiated Spurious Plot (ULCA B7 PCC: RB 100 Offset 0, SCC: RB 100 Offset 0 – Mid Channel)



Plot 7-475. Radiated Spurious Plot (ULCA B7 PCC: RB 1 Offset 0, SCC: RB 1 Offset 99 – High Channel)



Plot 7-476. Radiated Spurious Plot (ULCA B7 PCC: RB 100 Offset 0, SCC: RB 100 Offset 0 – High Channel)

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OPERATING FREQUENCY (PCC):	2510.00	MHz
OPERATING FREQUENCY (SCC):	2529.80	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	V	106	263	-66.00	10.00	-56.00	-31.0
7530.00	V	236	171	-62.78	11.99	-50.79	-25.8
10040.00	V	-	-	-68.17	13.11	-55.05	-30.1
12550.00	V	-	-	-65.35	13.13	-52.22	-27.2
15060.00	V	-	-	-63.40	14.05	-49.35	-24.4

Table 7-99. Radiated Spurious Data (ULCA B7 PCC: RB 1 Offset 99, SCC: RB 1 Offset 0 – Low Channel)

OPERATING FREQUENCY (PCC):	2535.00	MHz
OPERATING FREQUENCY (SCC):	2554.80	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	110	36	-69.60	10.07	-59.54	-34.5
7605.00	H	369	345	-67.55	12.15	-55.40	-30.4
10140.00	V	-	-	-68.11	13.10	-55.01	-30.0
12675.00	V	-	-	-65.10	13.15	-51.95	-27.0
15210.00	V	-	-	-63.43	14.00	-49.43	-24.4

Table 7-100. Radiated Spurious Data (ULCA B7 PCC: RB 1 Offset 0, SCC: RB 1 Offset 99 – Mid Channel)

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OPERATING FREQUENCY (PCC):	2560.00	MHz
OPERATING FREQUENCY (SCC):	2540.20	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	142	563	-70.61	10.10	-60.51	-35.5
7680.00	V	256	171	-68.33	12.15	-56.18	-31.2
10240.00	V	-	-	-68.09	13.10	-54.99	-30.0
12800.00	V	-	-	-64.46	13.17	-51.29	-26.3
15360.00	V	-	-	-63.06	14.01	-49.05	-24.1

Table 7-101. Radiated Spurious Data (ULCA B7 PCC: RB 1 Offset 0, SCC: RB 1 Offset 99 – High Channel)

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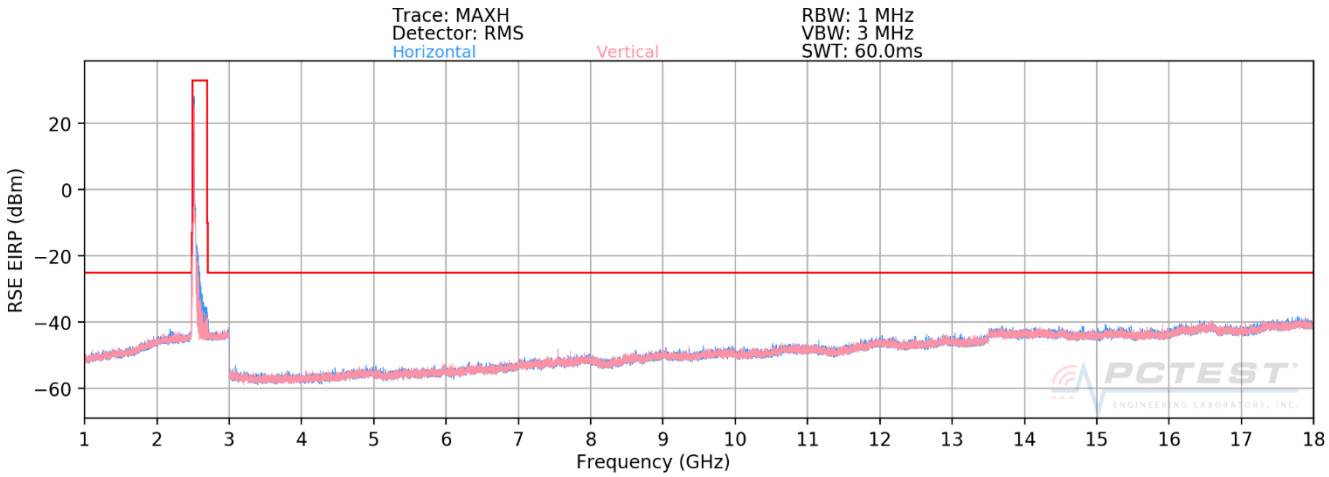
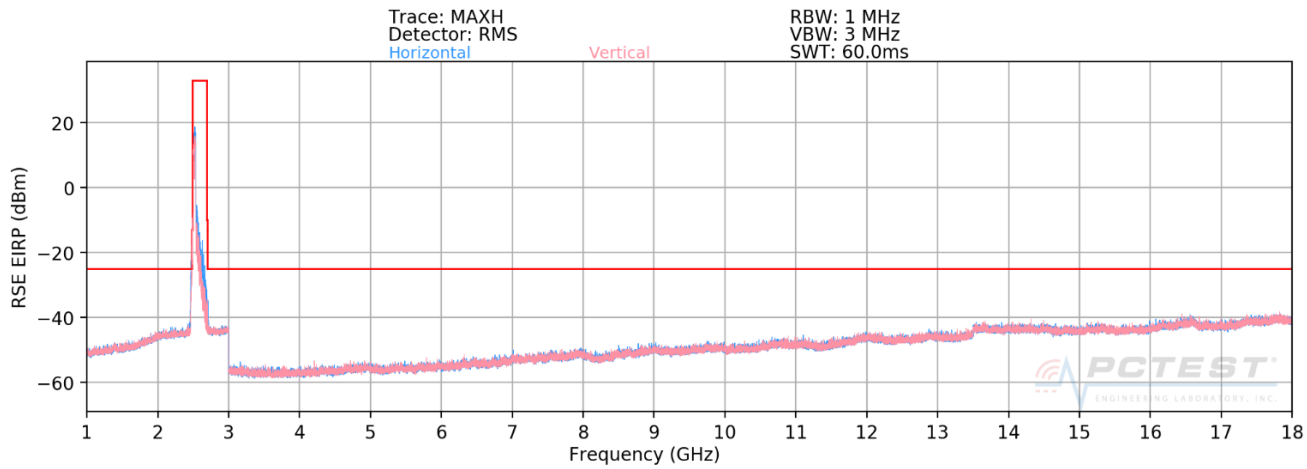
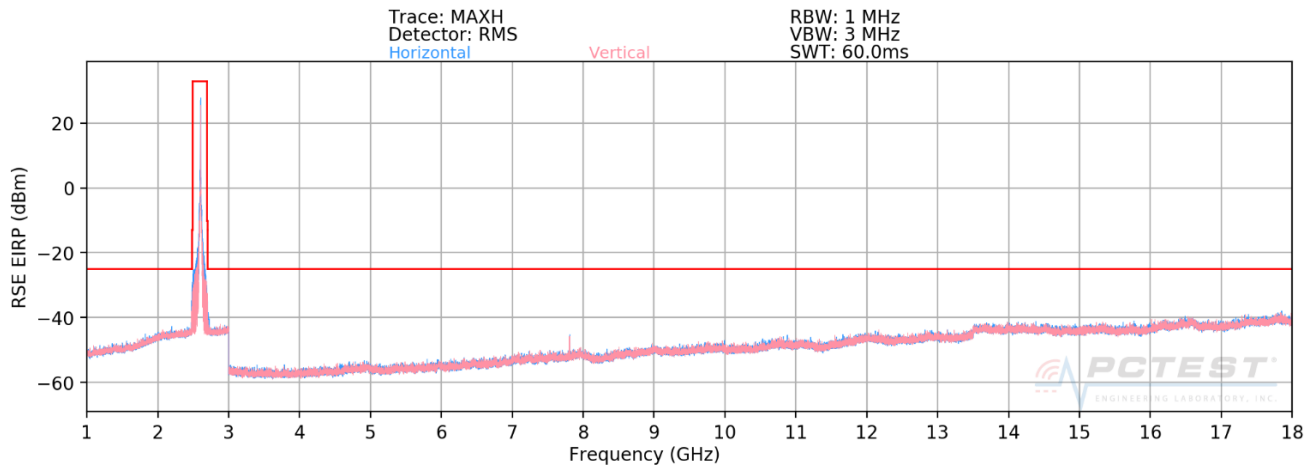
Band 41



Plot 7-477. Radiated Spurious Plot (ULCA B41 PCC: RB 1 Offset 99, SCC: RB 1 Offset 0 – Low Channel)



Plot 7-478. Radiated Spurious Plot (ULCA B41 PCC: RB 100 Offset 0, SCC: RB 100 Offset 0 – Low Channel)



Plot 7-479. Radiated Spurious Plot (ULCA B41 PCC: RB 1 Offset 0, SCC: RB 1 Offset 99 – Mid Channel)

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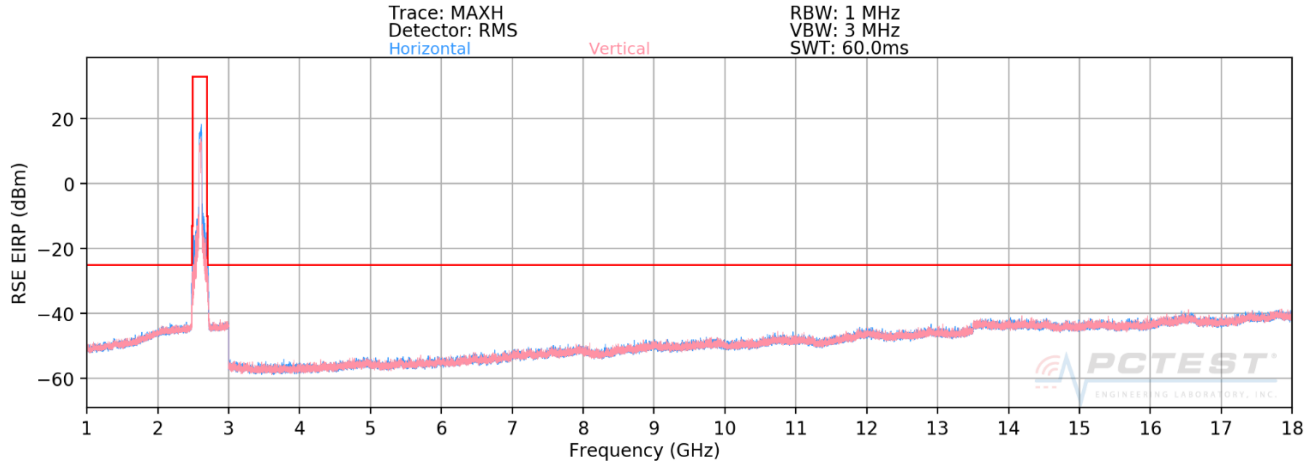
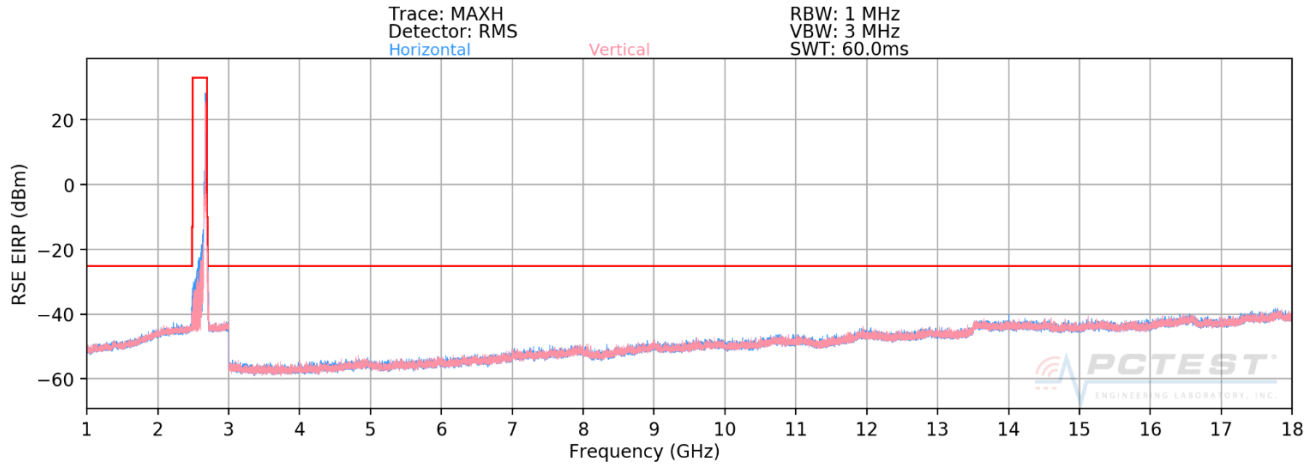
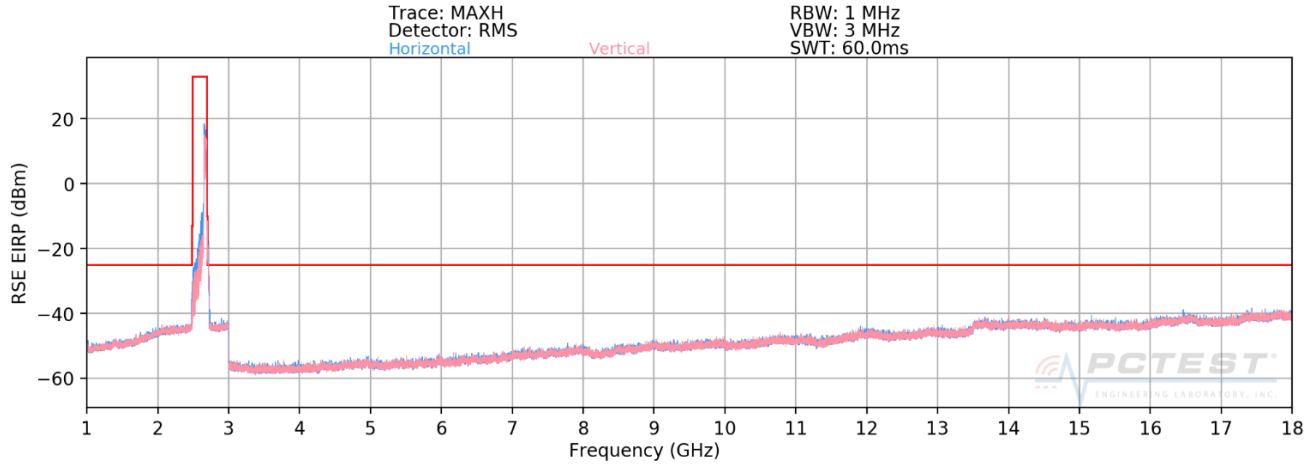


Plot 7-480. Radiated Spurious Plot (ULCA B41 PCC: RB 100 Offset 0, SCC: RB 100 Offset 0 – Mid Channel)



Plot 7-481. Radiated Spurious Plot (ULCA B41 PCC: RB 1 Offset 0, SCC: RB 1 Offset 99 – High Channel)



Plot 7-482. Radiated Spurious Plot (ULCA B41 PCC: RB 100 Offset 0, SCC: RB 100 Offset 0 – High Channel)

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OPERATING FREQUENCY (PCC):	2506.00	MHz
OPERATING FREQUENCY (SCC):	2525.80	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]
5012.00	V	134	138	-59.42	9.99	-49.42	-24.4
7518.00	V	252	168	-50.97	11.99	-38.98	-14.0
10024.00	V	-	-	-59.66	13.11	-46.55	-21.5
12530.00	V	-	-	-56.73	13.15	-43.59	-18.6
15036.00	V	-	-	-54.42	14.06	-40.36	-15.4

Table 7-102. Radiated Spurious Data (ULCA B41 PCC: RB 1 Offset 99, SCC: RB 1 Offset 0 – Low Channel)

OPERATING FREQUENCY (PCC):	2593.00	MHz
OPERATING FREQUENCY (SCC):	2612.80	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]
5186.00	V	362	242	-60.46	10.20	-50.26	-25.3
7779.00	V	280	147	-55.14	12.20	-42.94	-17.9
10372.00	V	-	-	-58.55	13.07	-45.48	-20.5
12965.00	V	-	-	-56.05	13.25	-42.80	-17.8
15558.00	V	-	-	-54.48	14.01	-40.47	-15.5

Table 7-103. Radiated Spurious Data (ULCA B41 PCC: RB 1 Offset 0, SCC: RB 1 Offset 99 – Mid Channel)

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OPERATING FREQUENCY (PCC):	2680.00	MHz
OPERATING FREQUENCY (SCC):	2660.20	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]
5360.00	V	102	141	-58.07	10.37	-47.69	-22.7
8040.00	V	-	-	-60.15	12.53	-47.61	-22.6
10720.00	V	-	-	-57.46	13.07	-44.40	-19.4
13400.00	V	-	-	-55.68	13.78	-41.90	-16.9
16080.00	V	-	-	-53.96	13.63	-40.33	-15.3

Table 7-104. Radiated Spurious Data (ULCA B41 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

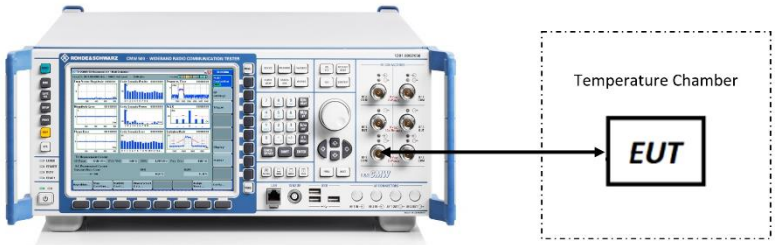

Figure 7-10. Test Instrument & Measurement Setup

Test Notes

None

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Band 71 Frequency Stability Measurements

OPERATING FREQUENCY: 680,500,000 Hz

CHANNEL: 133297

REFERENCE VOLTAGE: 3.80 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	- 30	680,500,008	8	0.0000012
100 %		- 20	680,500,008	8	0.0000011
100 %		- 10	680,500,008	8	0.0000012
100 %		0	680,500,007	7	0.0000011
100 %		+ 10	680,500,008	8	0.0000012
100 %		+ 20	680,500,008	8	0.0000012
100 %		+ 30	680,500,008	8	0.0000012
100 %		+ 40	680,500,008	8	0.0000012
100 %		+ 50	680,500,008	8	0.0000011
BATT. ENDPOINT	3.40	+ 20	680,500,008	8	0.0000012

Table 7-105. 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

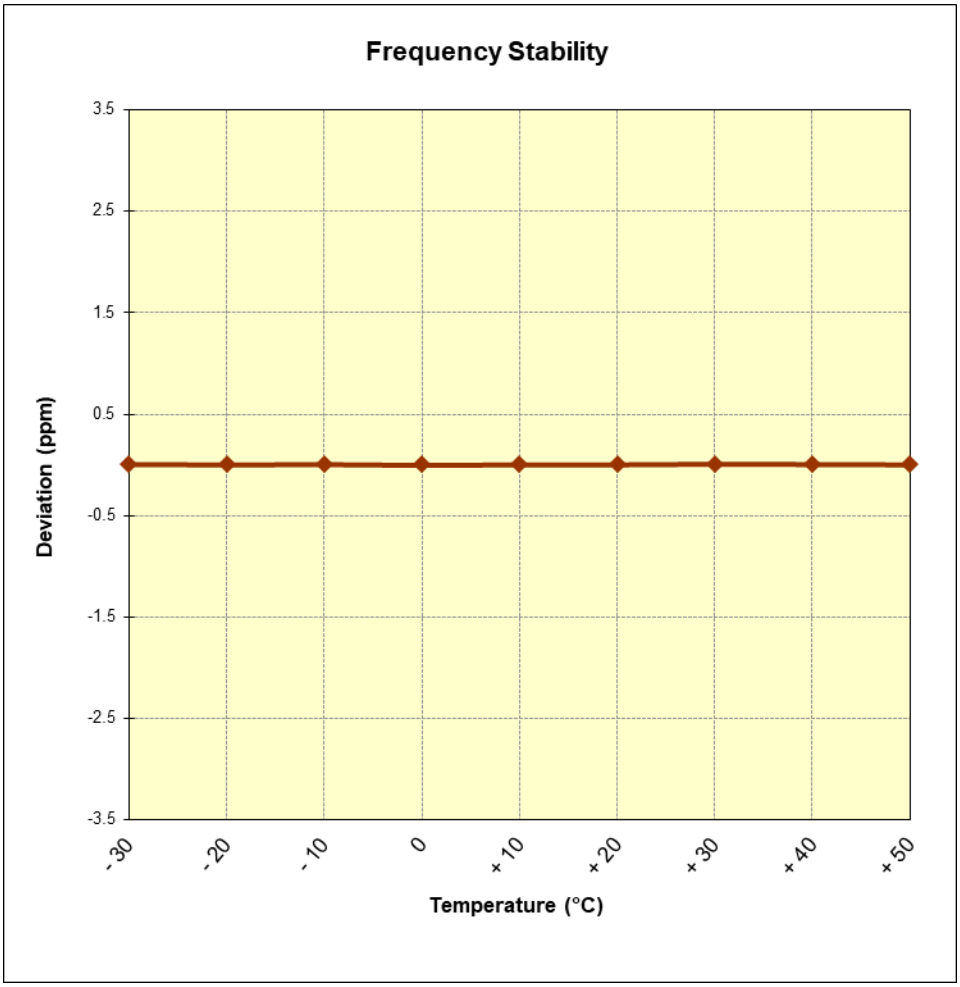

Figure 7-11. Frequency Stability Graph (Band 71)

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Band 12/17 Frequency Stability Measurements

OPERATING FREQUENCY: 707,500,000 Hz

CHANNEL: 23790

REFERENCE VOLTAGE: 3.80 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	- 30	707,500,009	9	0.0000013
100 %		- 20	707,500,009	9	0.0000013
100 %		- 10	707,500,009	9	0.0000013
100 %		0	707,500,008	8	0.0000012
100 %		+ 10	707,500,009	9	0.0000012
100 %		+ 20	707,500,008	8	0.0000012
100 %		+ 30	707,500,008	8	0.0000012
100 %		+ 40	707,500,009	9	0.0000013
100 %		+ 50	707,500,008	8	0.0000012
BATT. ENDPOINT	3.40	+ 20	707,500,007	7	0.0000010

Table 7-106. Frequency Stability Data (Band 12/17)

Note:

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

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Band 12/17 Frequency Stability Measurements

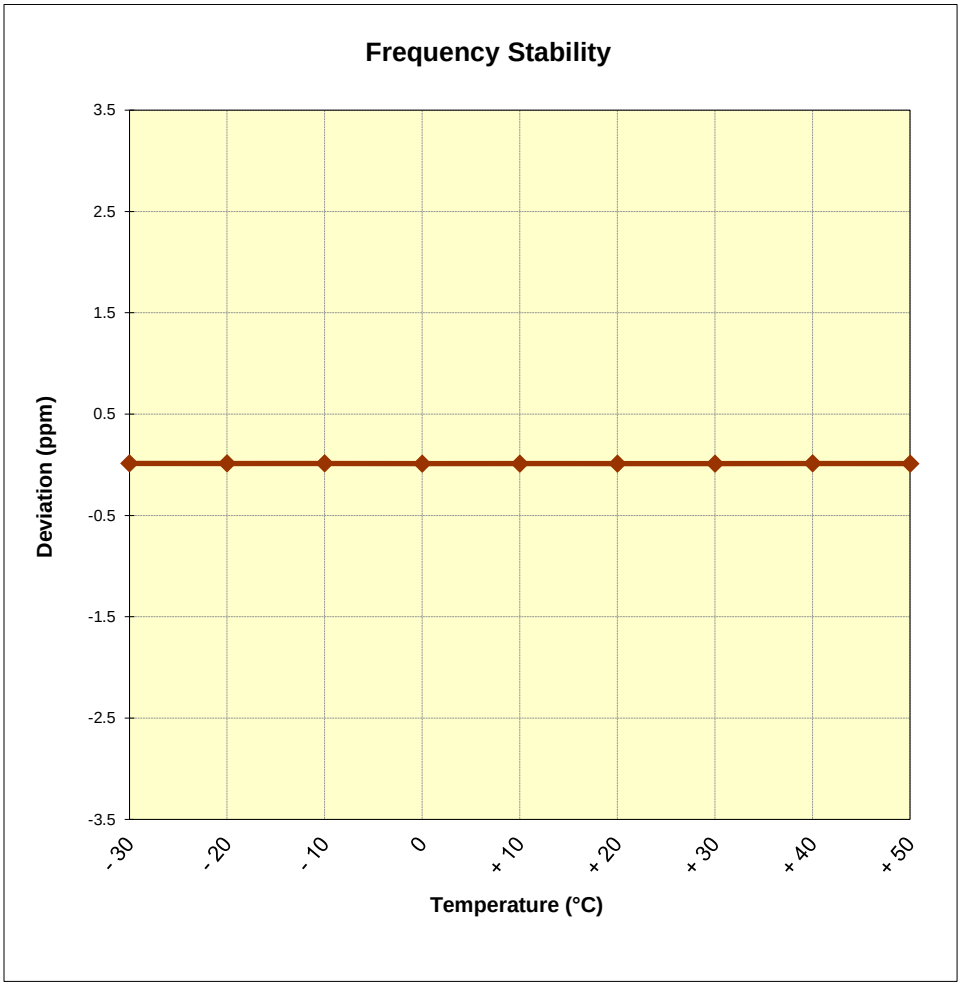

Figure 7-12. Frequency Stability Graph (Band 12/17)

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Band 13 Frequency Stability Measurements

OPERATING FREQUENCY: 782,000,000 Hz

CHANNEL: 23230

REFERENCE VOLTAGE: 3.80 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	- 30	782,000,008	8	0.0000010
100 %		- 20	782,000,008	8	0.0000010
100 %		- 10	782,000,009	9	0.0000011
100 %		0	782,000,008	8	0.0000011
100 %		+ 10	782,000,009	9	0.0000012
100 %		+ 20	782,000,008	8	0.0000011
100 %		+ 30	782,000,009	9	0.0000012
100 %		+ 40	782,000,009	9	0.0000011
100 %		+ 50	782,000,009	9	0.0000012
BATT. ENDPOINT	3.40	+ 20	782,000,009	9	0.0000011

Table 7-107. 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

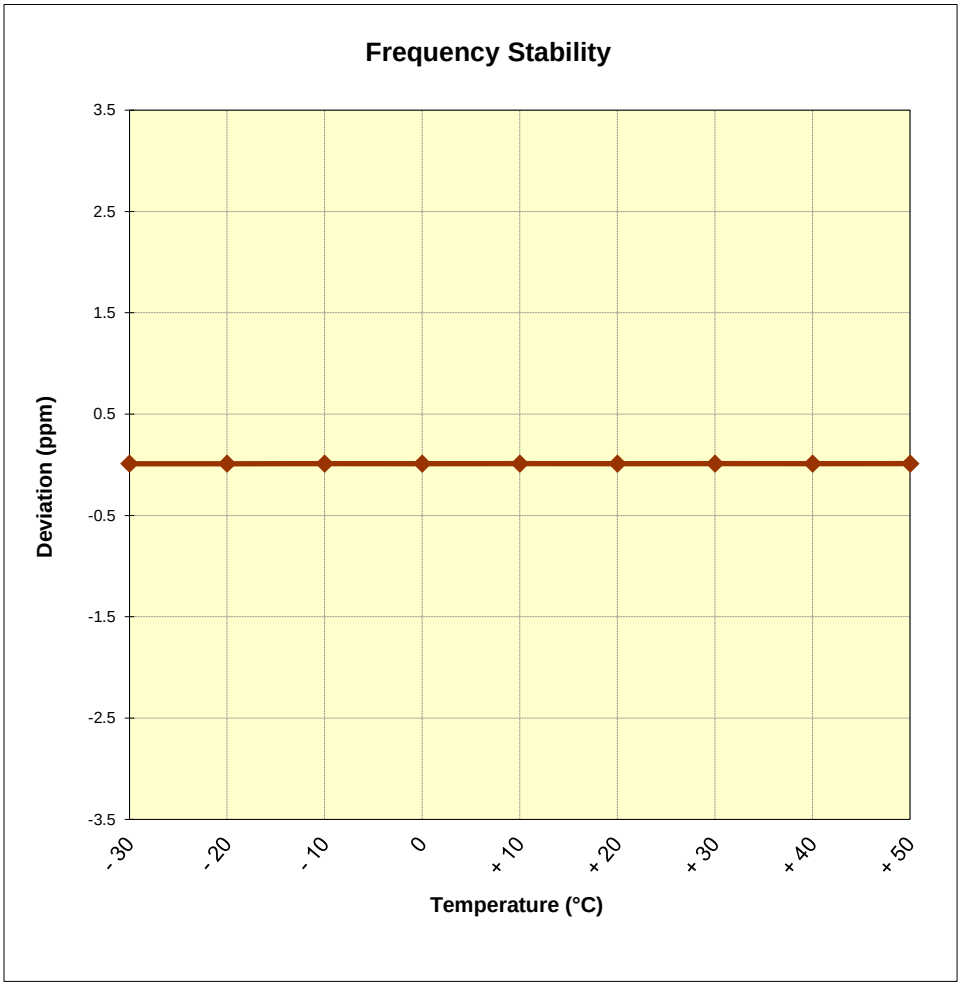

Figure 7-13. Frequency Stability Graph (Band 13)

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Band 26/5 Frequency Stability Measurements

OPERATING FREQUENCY:	836,500,000	Hz
CHANNEL:	26865	
REFERENCE VOLTAGE:	3.80	VDC
DEVIATION LIMIT:	± 0.00025 % or 2.5 ppm	

VOLTAGE (%)	POWER (VDC)	TEMP (^{o}C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	- 30	836,500,008	8	0.0000009
100 %		- 20	836,500,009	9	0.0000011
100 %		- 10	836,500,009	9	0.0000011
100 %		0	836,500,009	9	0.0000010
100 %		+ 10	836,500,008	8	0.0000010
100 %		+ 20	836,500,009	9	0.0000011
100 %		+ 30	836,500,009	9	0.0000010
100 %		+ 40	836,500,008	8	0.0000010
100 %		+ 50	836,500,008	8	0.0000010
BATT. ENDPOINT	3.40	+ 20	836,500,008	8	0.0000010

Table 7-108. Frequency Stability Data (Band 26/5)

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Band 26/5 Frequency Stability Measurements

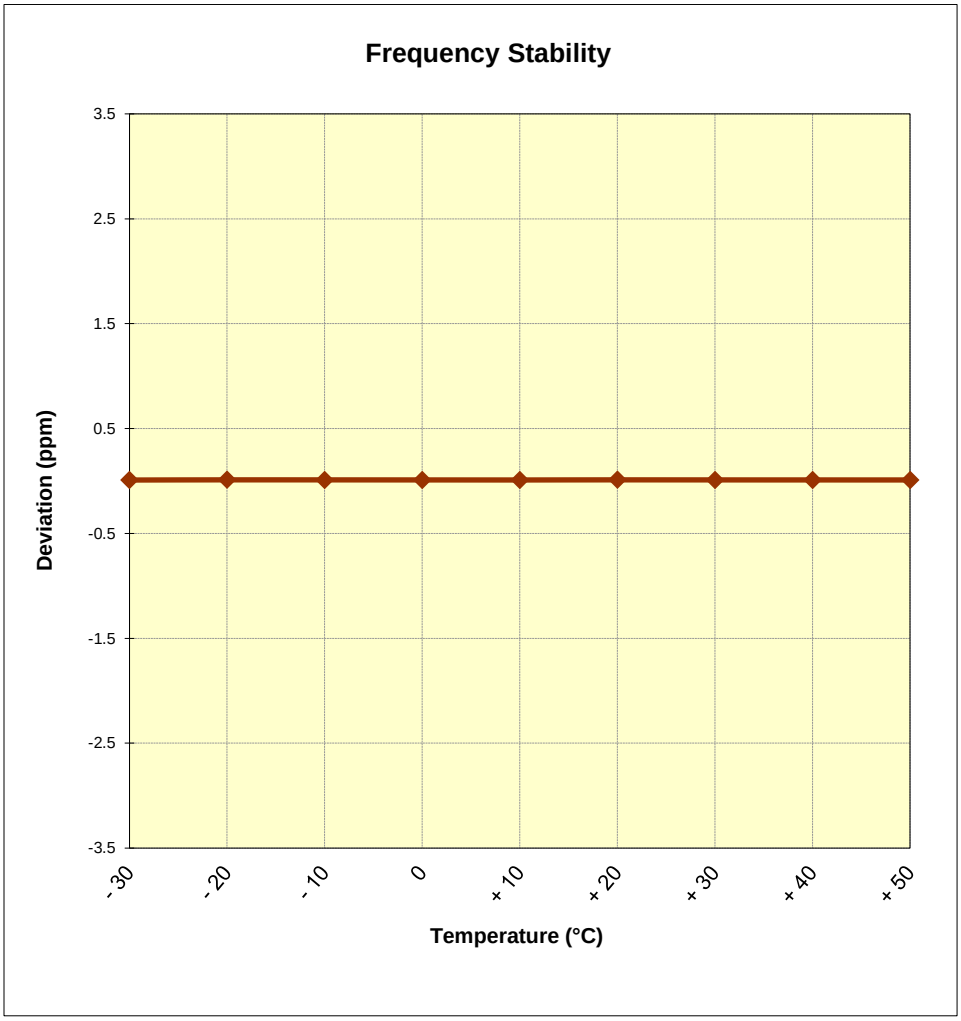

Figure 7-14. Frequency Stability Graph (Band 26/5)

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Band 66/4 Frequency Stability Measurements

OPERATING FREQUENCY: 1,745,000,000 Hz

CHANNEL: 132322

REFERENCE VOLTAGE: 3.80 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (^{o}C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	- 30	1,745,000,008	8	0.0000005
100 %		- 20	1,745,000,008	8	0.0000005
100 %		- 10	1,745,000,008	8	0.0000005
100 %		0	1,745,000,009	9	0.0000005
100 %		+ 10	1,745,000,009	9	0.0000005
100 %		+ 20	1,745,000,009	9	0.0000005
100 %		+ 30	1,745,000,008	8	0.0000005
100 %		+ 40	1,745,000,008	8	0.0000004
100 %		+ 50	1,745,000,009	9	0.0000005
BATT. ENDPOINT	3.40	+ 20	1,745,000,008	8	0.0000005

Table 7-109. 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

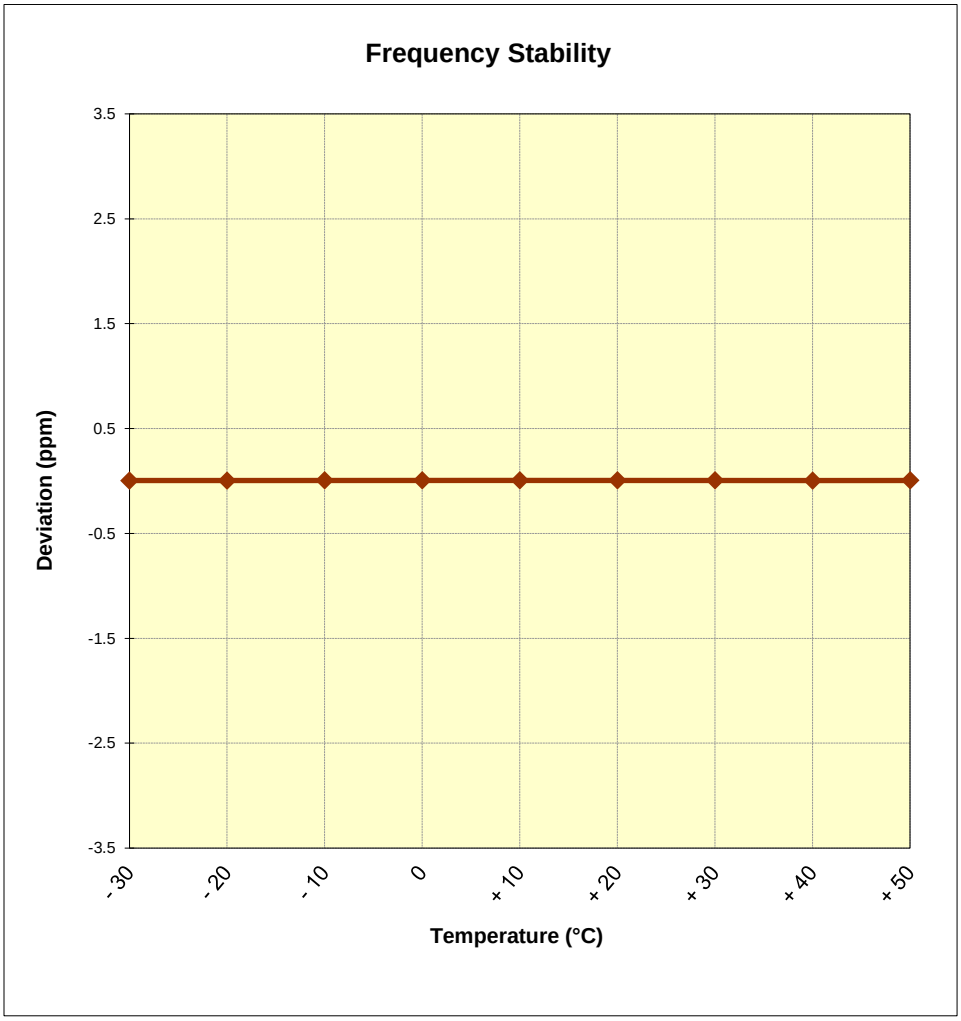

Figure 7-15. Frequency Stability Graph (Band 66/4)

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Band 25/2 Frequency Stability Measurements

OPERATING FREQUENCY: 1,882,500,000 Hz

CHANNEL: 26365

REFERENCE VOLTAGE: 3.80 VDC

DEVIATION LIMIT: ± 0.00025 % or 2.5 ppm

VOLTAGE (%)	POWER (VDC)	TEMP (^{o}C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	- 30	1,882,500,008	8	0.0000004
100 %		- 20	1,882,500,009	9	0.0000005
100 %		- 10	1,882,500,007	7	0.0000004
100 %		0	1,882,500,008	8	0.0000004
100 %		+ 10	1,882,500,008	8	0.0000004
100 %		+ 20	1,882,500,008	8	0.0000004
100 %		+ 30	1,882,500,009	9	0.0000005
100 %		+ 40	1,882,500,009	9	0.0000005
100 %		+ 50	1,882,500,010	10	0.0000005
BATT. ENDPOINT	3.40	+ 20	1,882,500,008	8	0.0000004

Table 7-110. Frequency Stability Data (Band 25/2)

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Band 25/2 Frequency Stability Measurements

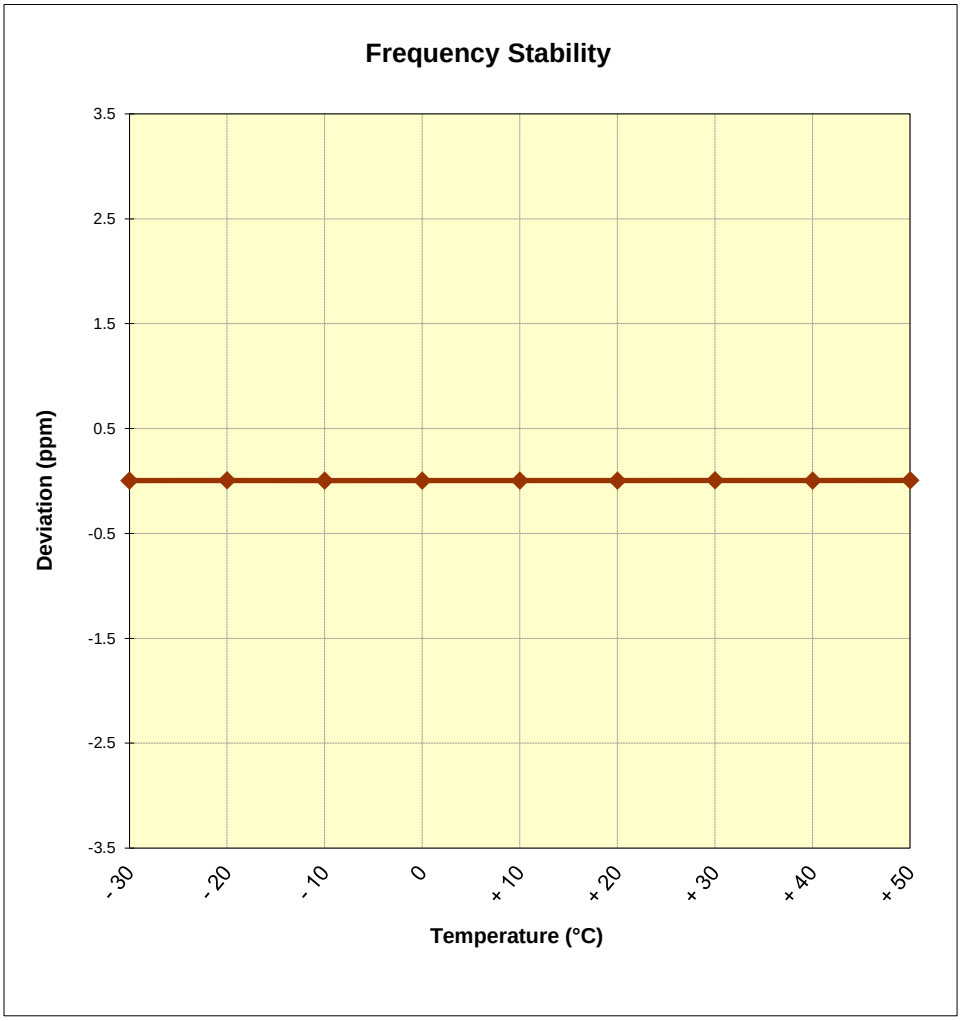

Figure 7-16. Frequency Stability Graph (Band 25/2)

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Band 30 Frequency Stability Measurements

OPERATING FREQUENCY: 2,310,000,000 Hz

CHANNEL: 27710

REFERENCE VOLTAGE: 3.80 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (^{o}C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	- 30	2,310,000,009	9	0.0000004
100 %		- 20	2,309,999,989	-11	-0.0000005
100 %		- 10	2,310,000,010	10	0.0000004
100 %		0	2,309,999,990	-10	-0.0000004
100 %		+ 10	2,310,000,010	10	0.0000004
100 %		+ 20	2,310,000,009	9	0.0000004
100 %		+ 30	2,310,000,009	9	0.0000004
100 %		+ 40	2,310,000,011	11	0.0000005
100 %		+ 50	2,310,000,011	11	0.0000005
BATT. ENDPOINT	3.40	+ 20	2,310,000,010	10	0.0000004

Table 7-111. Frequency Stability Data (Band 30)

Note:

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

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Band 30 Frequency Stability Measurements

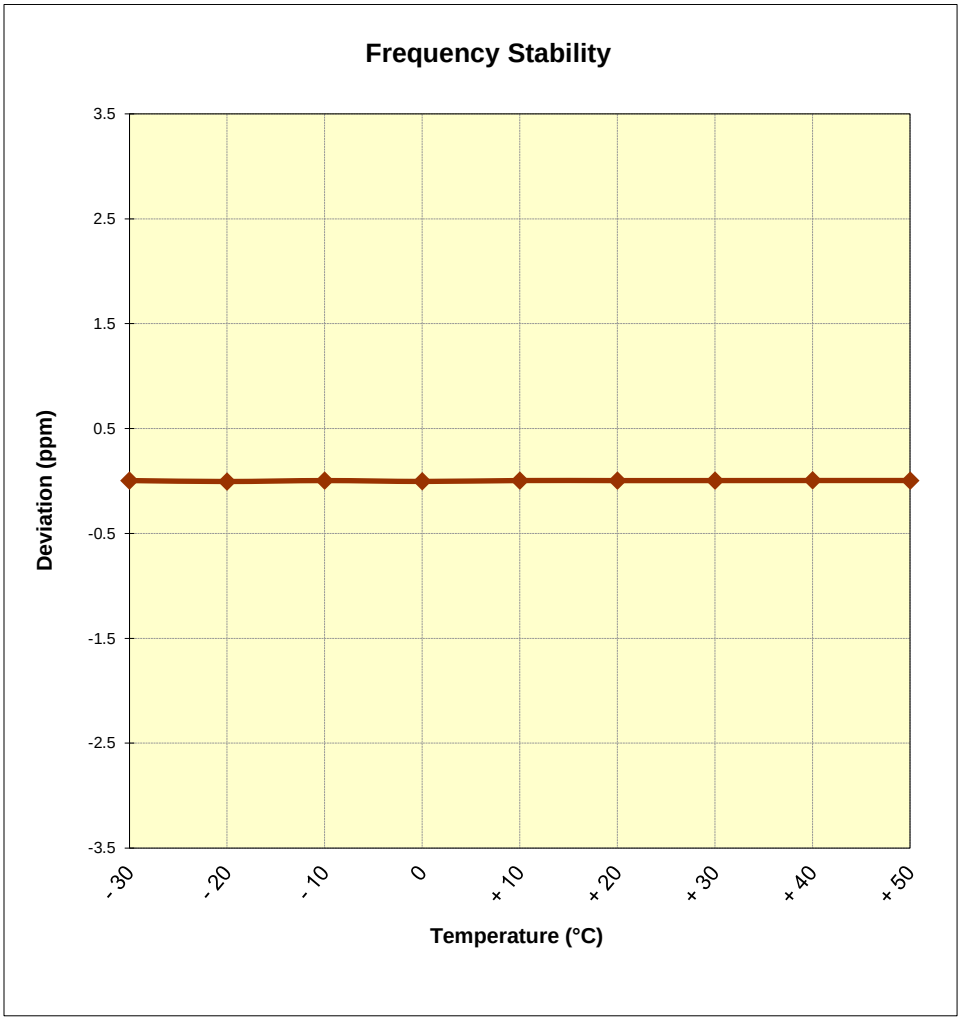

Figure 7-17. Frequency Stability Graph (Band 30)

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Band 7 Frequency Stability Measurements

OPERATING FREQUENCY: 2,535,000,000 Hz

CHANNEL: 21100

REFERENCE VOLTAGE: 3.80 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	- 30	2,535,000,010	10	0.0000004
100 %		- 20	2,535,000,010	10	0.0000004
100 %		- 10	2,535,000,011	11	0.0000004
100 %		0	2,535,000,012	12	0.0000005
100 %		+ 10	2,535,000,013	13	0.0000005
100 %		+ 20	2,535,000,010	10	0.0000004
100 %		+ 30	2,535,000,011	11	0.0000004
100 %		+ 40	2,535,000,012	12	0.0000005
100 %		+ 50	2,535,000,011	11	0.0000004
BATT. ENDPOINT	3.40	+ 20	2,535,000,010	10	0.0000004

Table 7-112. Frequency Stability Data (Band 7)

Note:

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

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Band 7 Frequency Stability Measurements

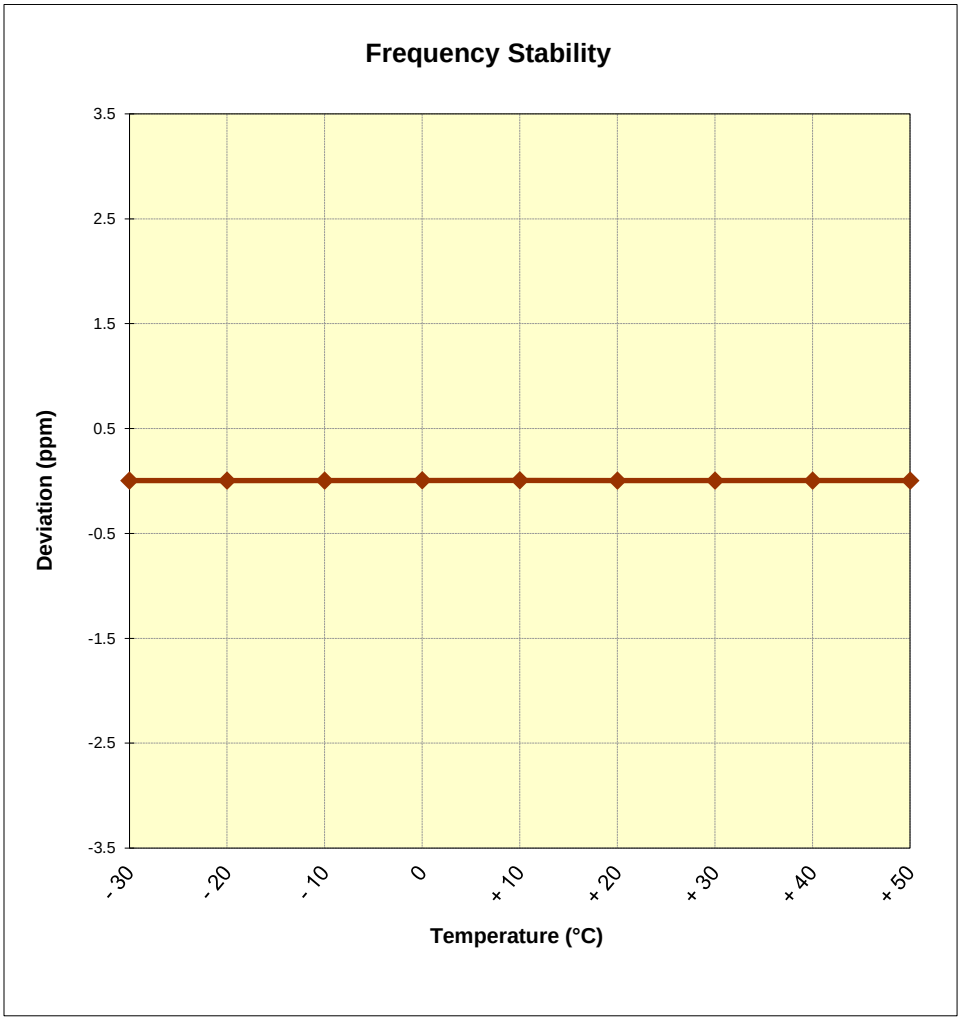

Figure 7-18. Frequency Stability Graph (Band 7)

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Band 41 Frequency Stability Measurements

OPERATING FREQUENCY: 2,593,000,000 Hz

CHANNEL: 40620

REFERENCE VOLTAGE: 3.80 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	- 30	2,593,000,059	59	0.0000023
100 %		- 20	2,593,000,057	57	0.0000022
100 %		- 10	2,593,000,059	59	0.0000023
100 %		0	2,593,000,057	57	0.0000022
100 %		+ 10	2,593,000,061	61	0.0000023
100 %		+ 20	2,593,000,056	56	0.0000021
100 %		+ 30	2,593,000,057	57	0.0000022
100 %		+ 40	2,593,000,057	57	0.0000022
100 %		+ 50	2,593,000,064	64	0.0000025
BATT. ENDPOINT	3.40	+ 20	2,593,000,062	62	0.0000024

Table 7-113. 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

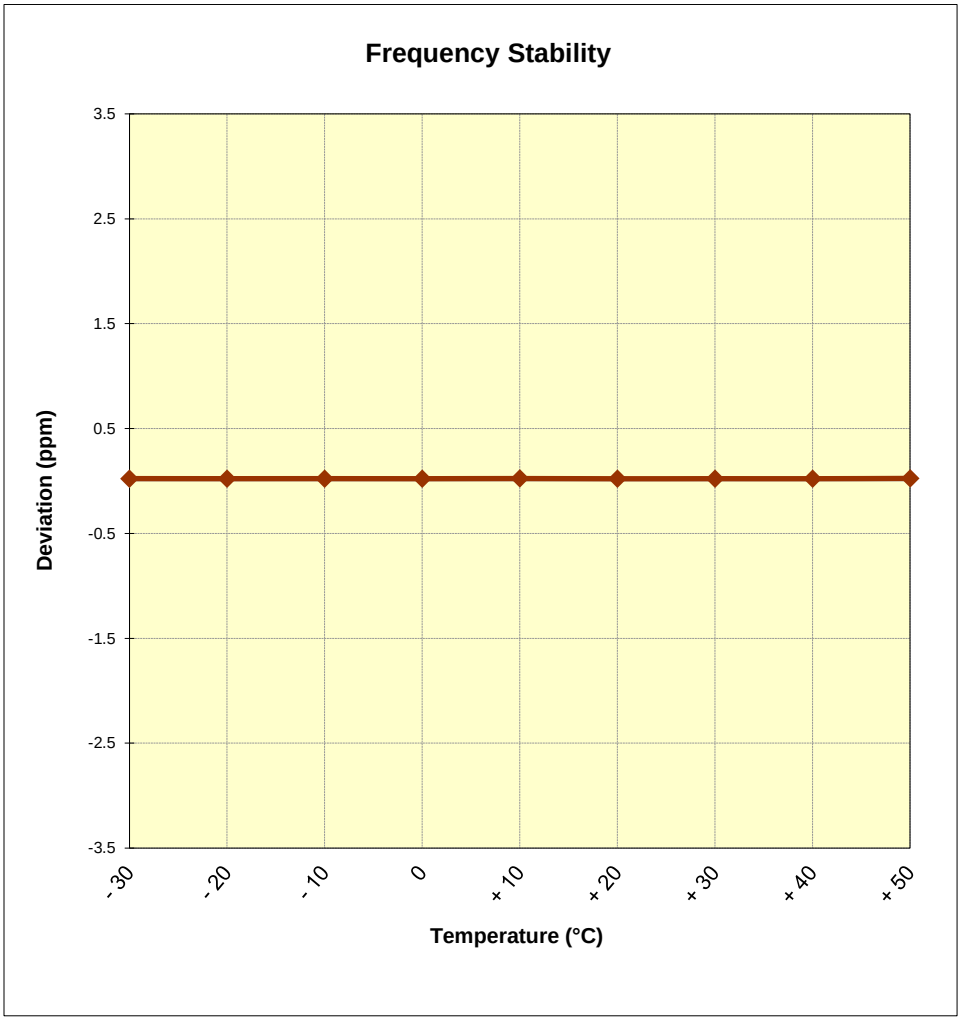

Figure 7-19. Frequency Stability Graph (Band 41)

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8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **Apple Tablet Device** **FCC ID: BCGA2200** complies with all the requirements of Part 22, 24, & 27 of the FCC Rules for LTE operation only.

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