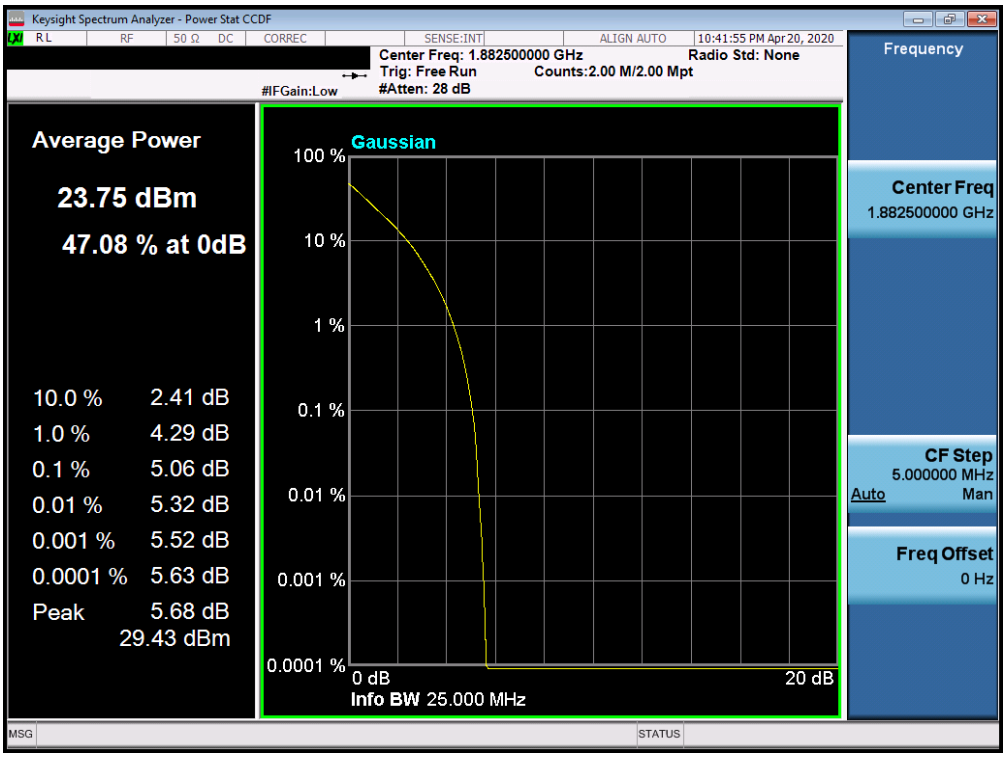
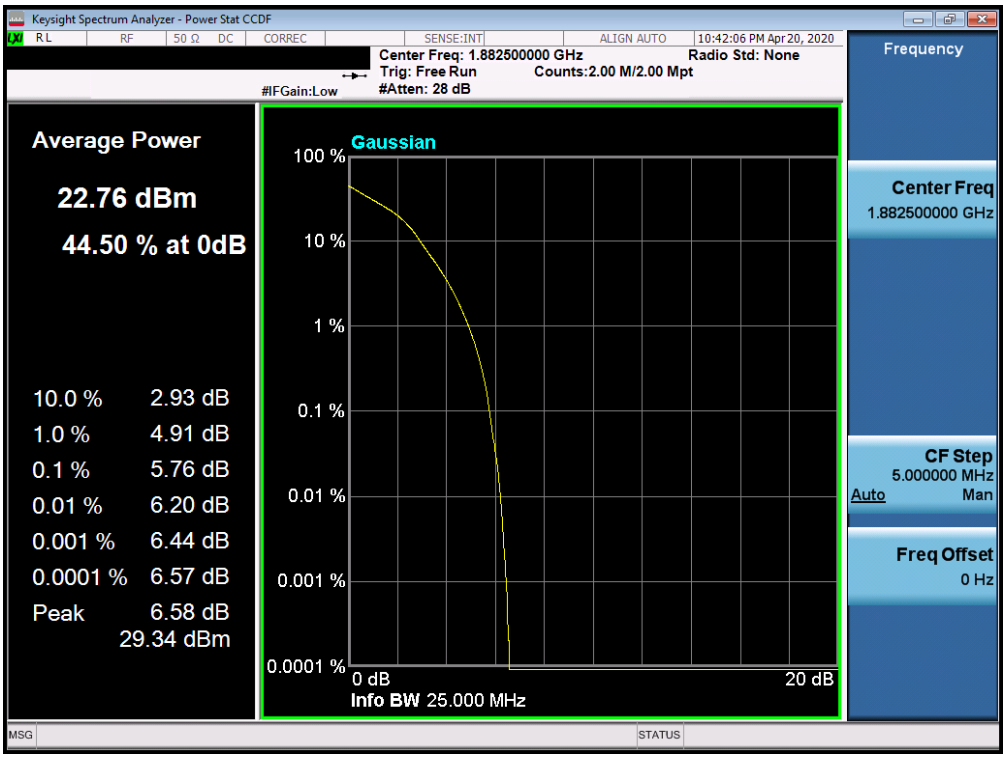


Plot 7-277. PAR Plot (Band 25/2 - 15.0MHz QPSK - Full RB Configuration)



Plot 7-278. PAR Plot (Band 25/2 - 15.0MHz 16-QAM - Full RB Configuration)

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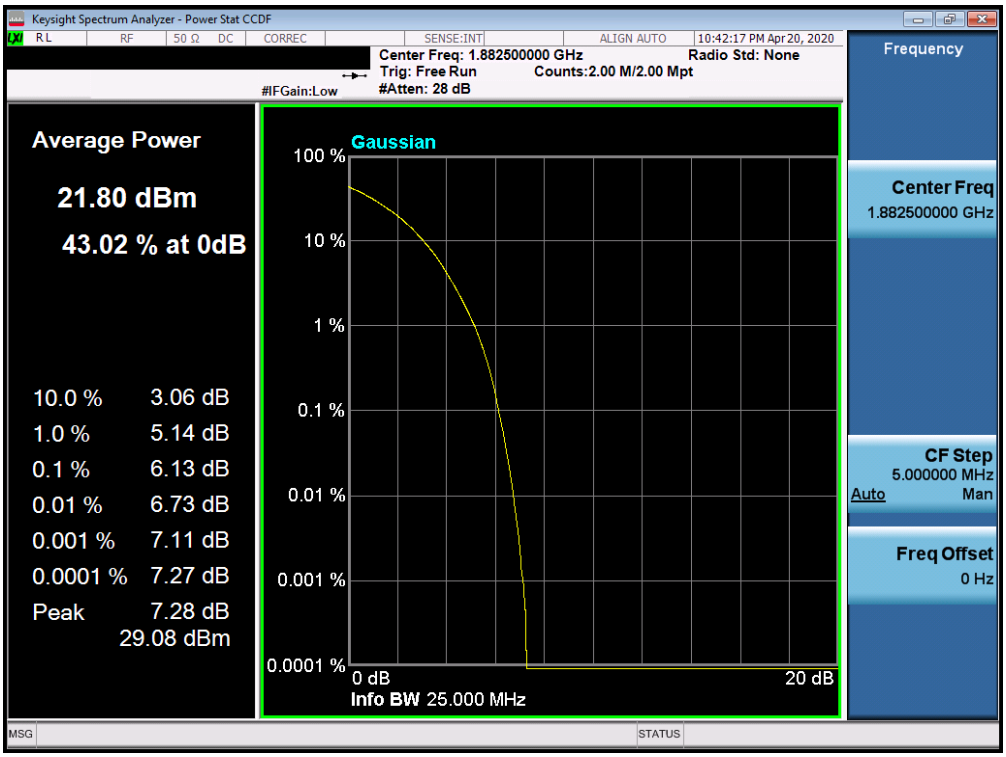
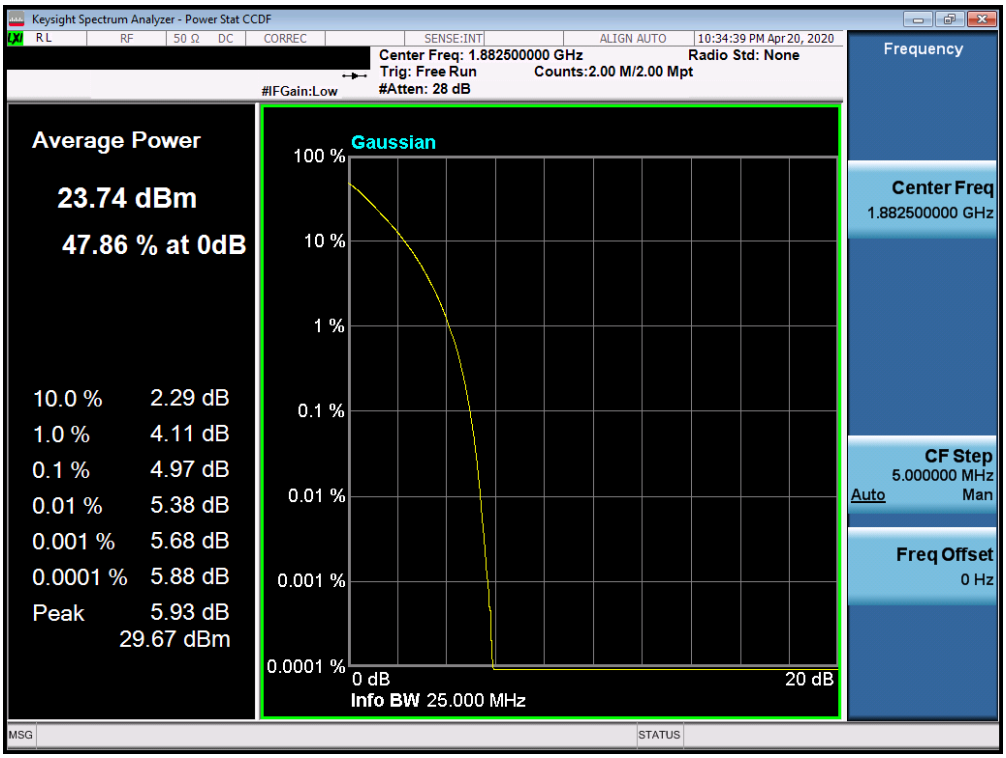


Plot 7-279. PAR Plot (Band 25/2 - 15.0MHz 64-QAM - Full RB Configuration)



Plot 7-280. PAR Plot (Band 25/2 - 20.0MHz QPSK - Full RB Configuration)

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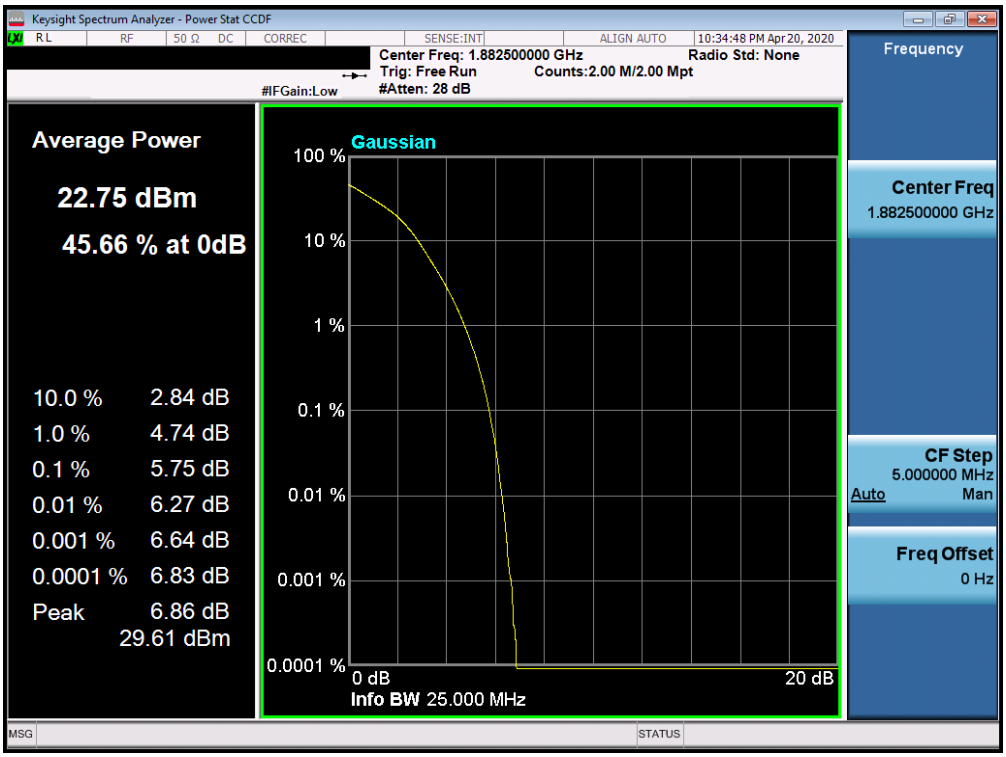
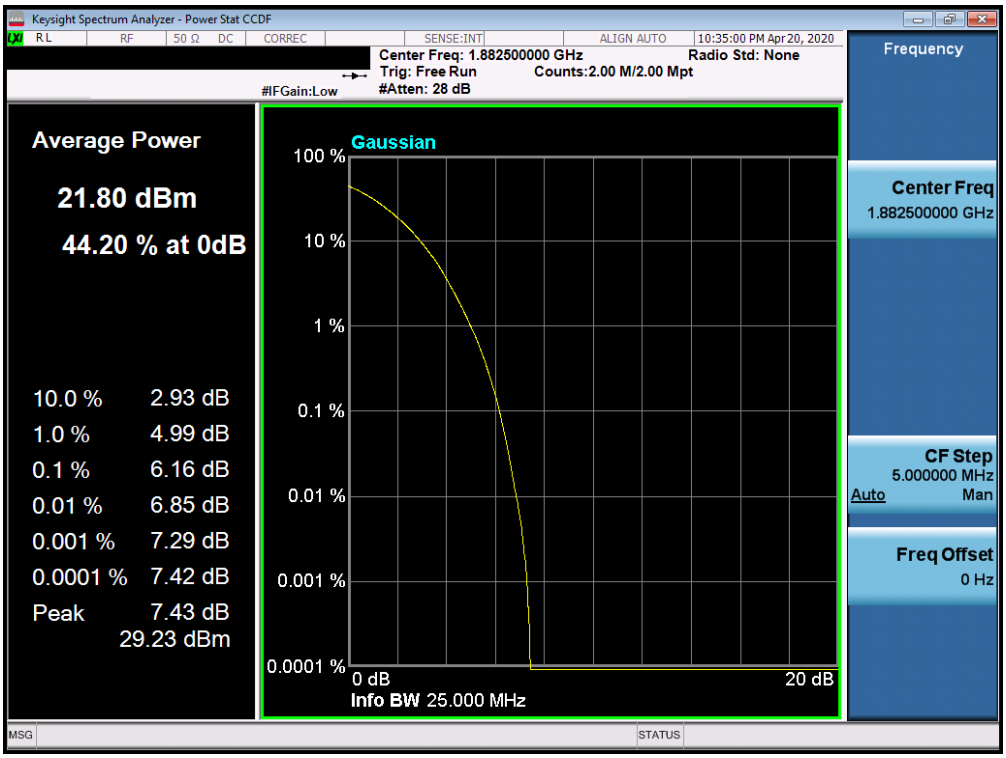


Plot 7-281. PAR Plot (Band 25/2 - 20.0MHz 16-QAM - Full RB Configuration)



Plot 7-282. PAR Plot (Band 25/2 - 20.0MHz 64-QAM - Full RB Configuration)

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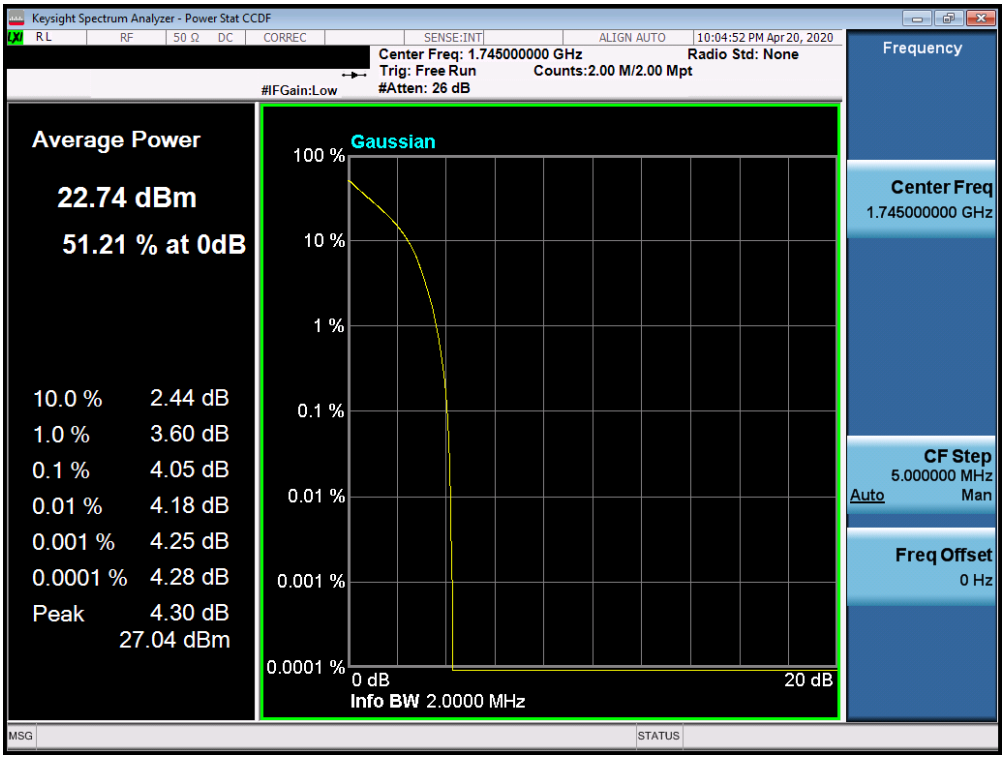
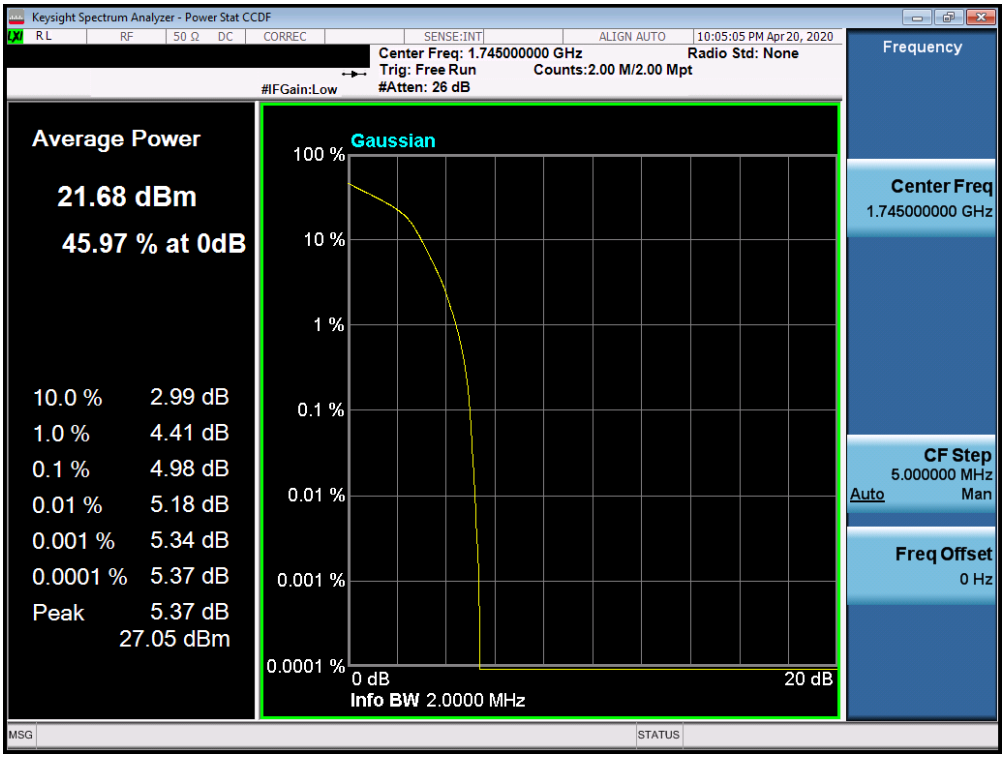
Band 66/4



Plot 7-283. PAR Plot (Band 66/4 - 1.4MHz QPSK - Full RB Configuration)



Plot 7-284. PAR Plot (Band 66/4 - 1.4MHz 16-QAM - Full RB Configuration)

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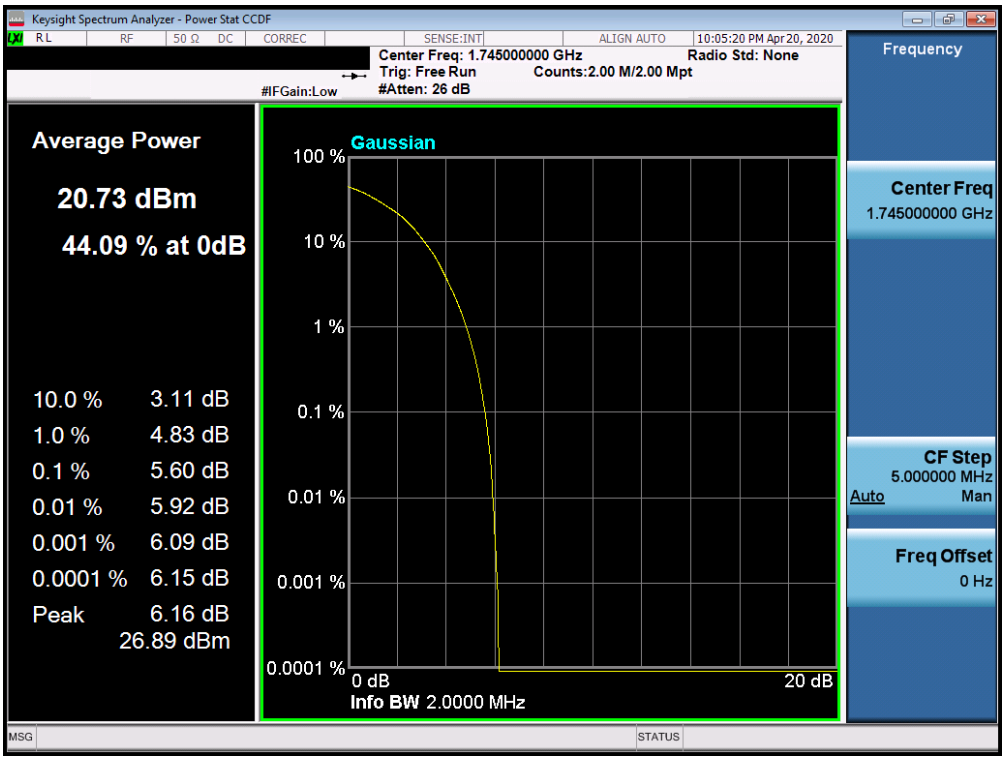
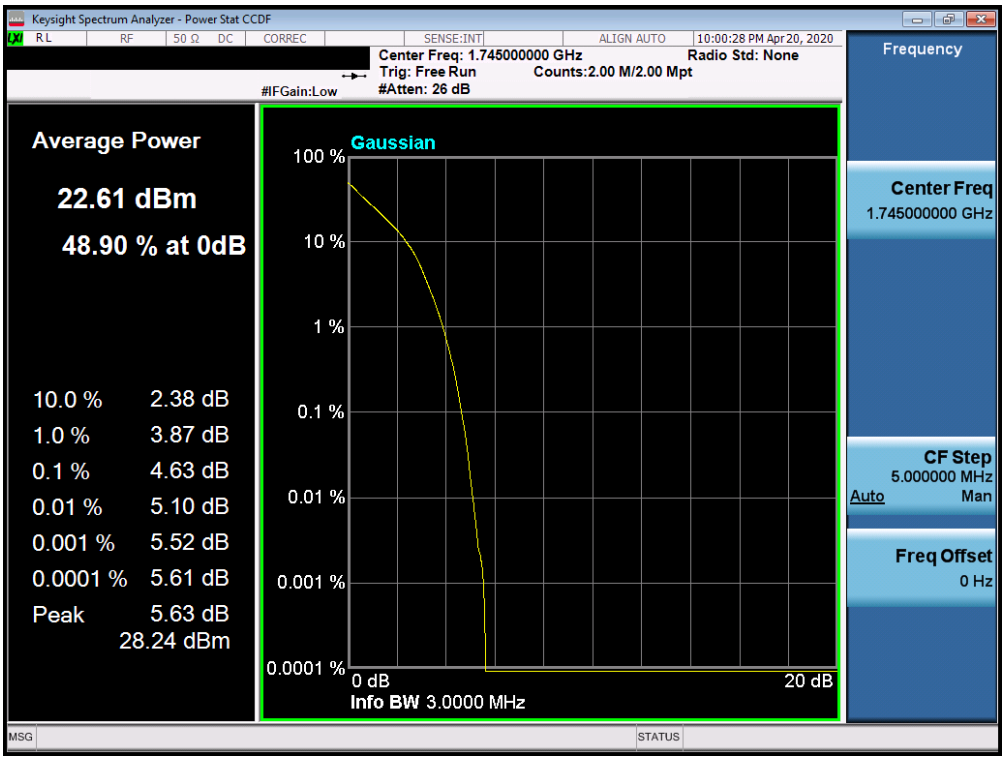


Plot 7-285. PAR Plot (Band 66/4 - 1.4MHz 64-QAM - Full RB Configuration)



Plot 7-286. PAR Plot (Band 66/4 - 3.0MHz QPSK - Full RB Configuration)

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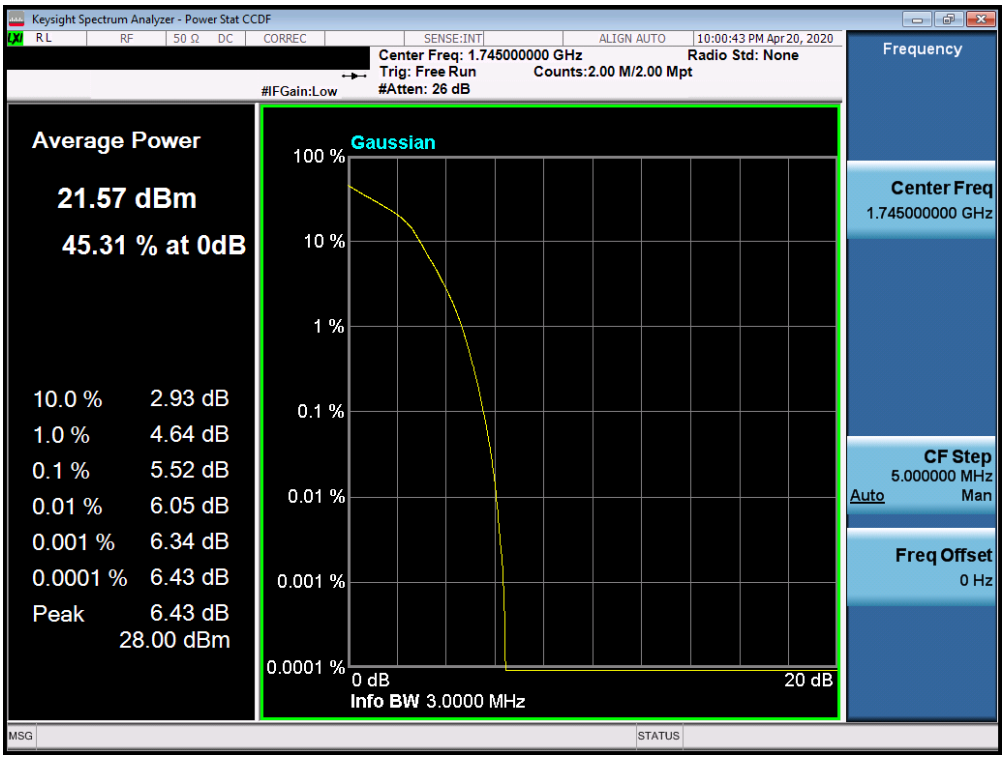
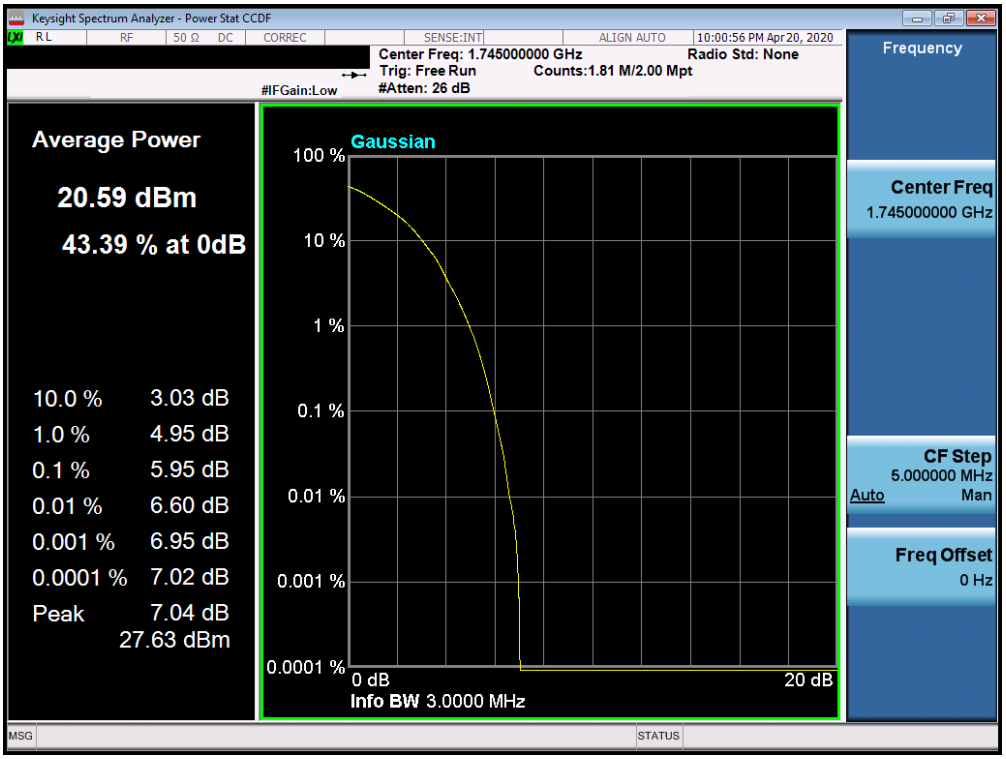


Plot 7-287. PAR Plot (Band 66/4 - 3.0MHz 16-QAM - Full RB Configuration)



Plot 7-288. PAR Plot (Band 66/4 - 3.0MHz 64-QAM - Full RB Configuration)

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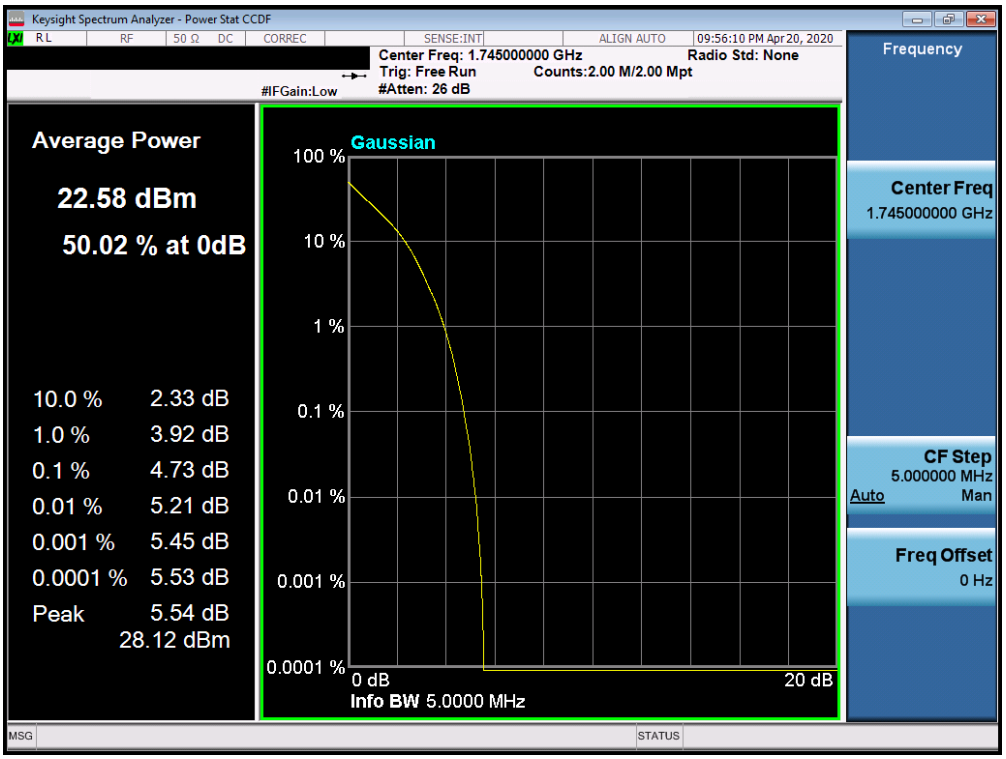
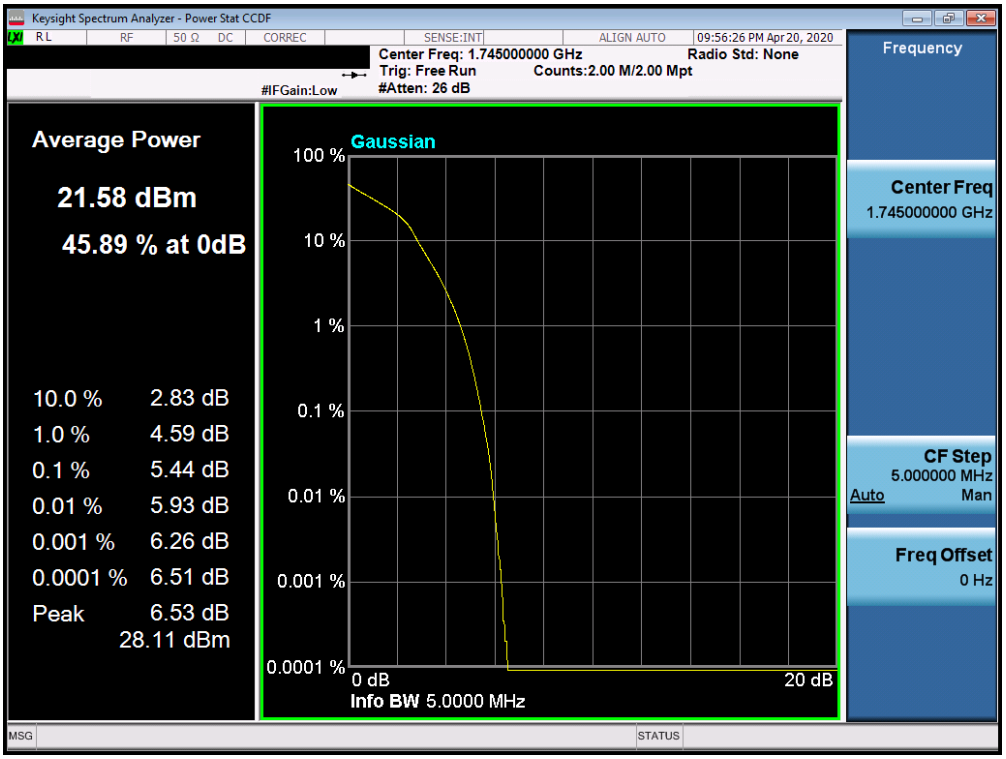


Plot 7-289. PAR Plot (Band 66/4 - 5.0MHz QPSK - Full RB Configuration)



Plot 7-290. PAR Plot (Band 66/4 - 5.0MHz 16-QAM - Full RB Configuration)

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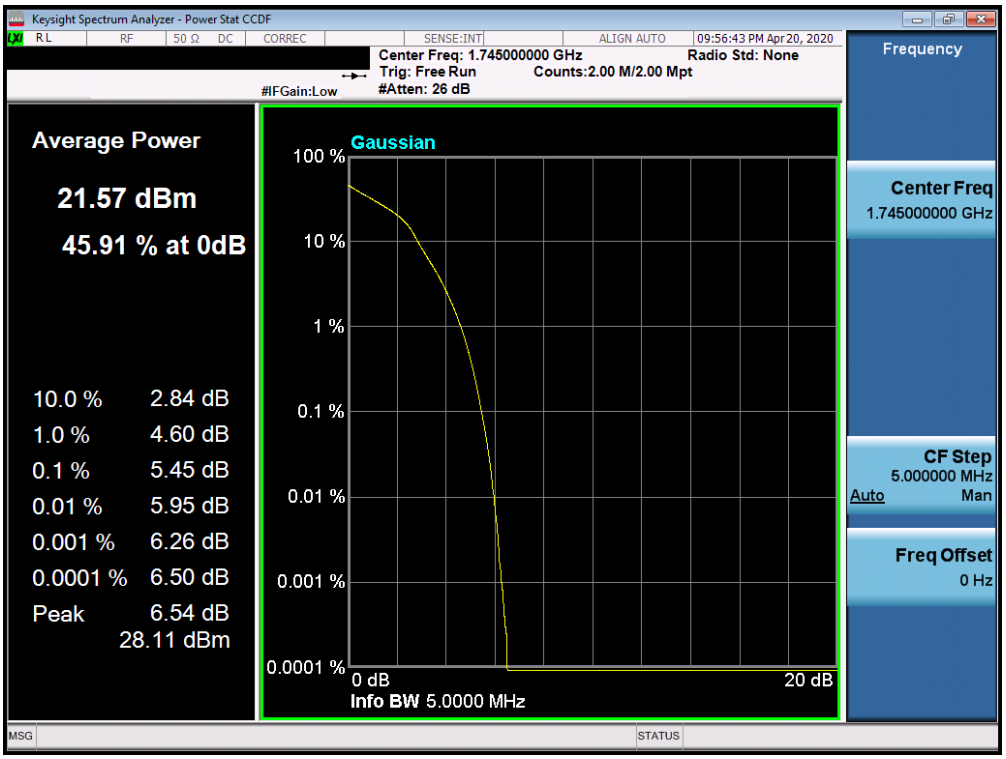
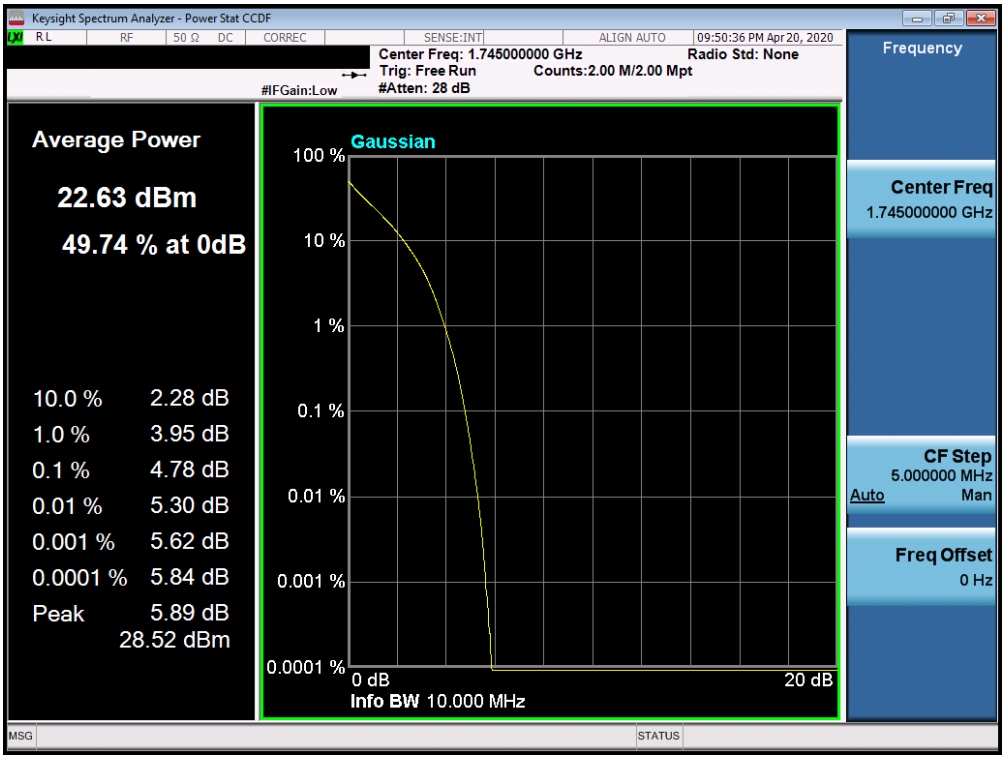


Plot 7-291. PAR Plot (Band 66/4 - 5.0MHz 64-QAM - Full RB Configuration)



Plot 7-292. PAR Plot (Band 66/4 - 10.0MHz QPSK - Full RB Configuration)

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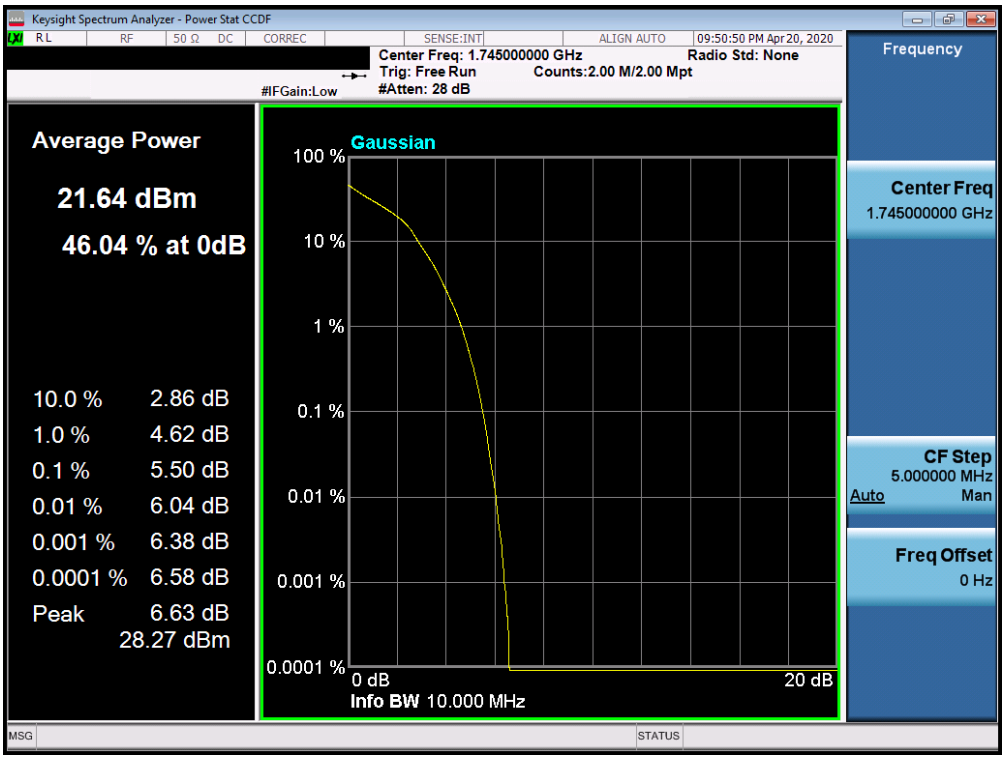
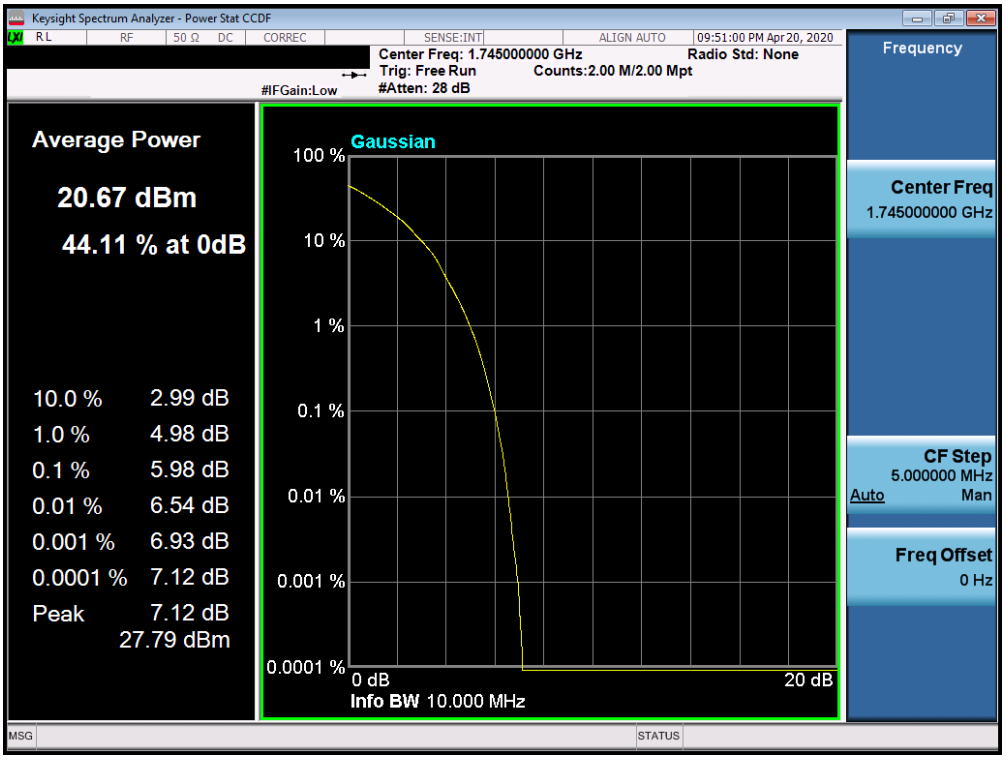


Plot 7-293. PAR Plot (Band 66/4 - 10.0MHz 16-QAM - Full RB Configuration)



Plot 7-294. PAR Plot (Band 66/4 - 10.0MHz 64-QAM - Full RB Configuration)

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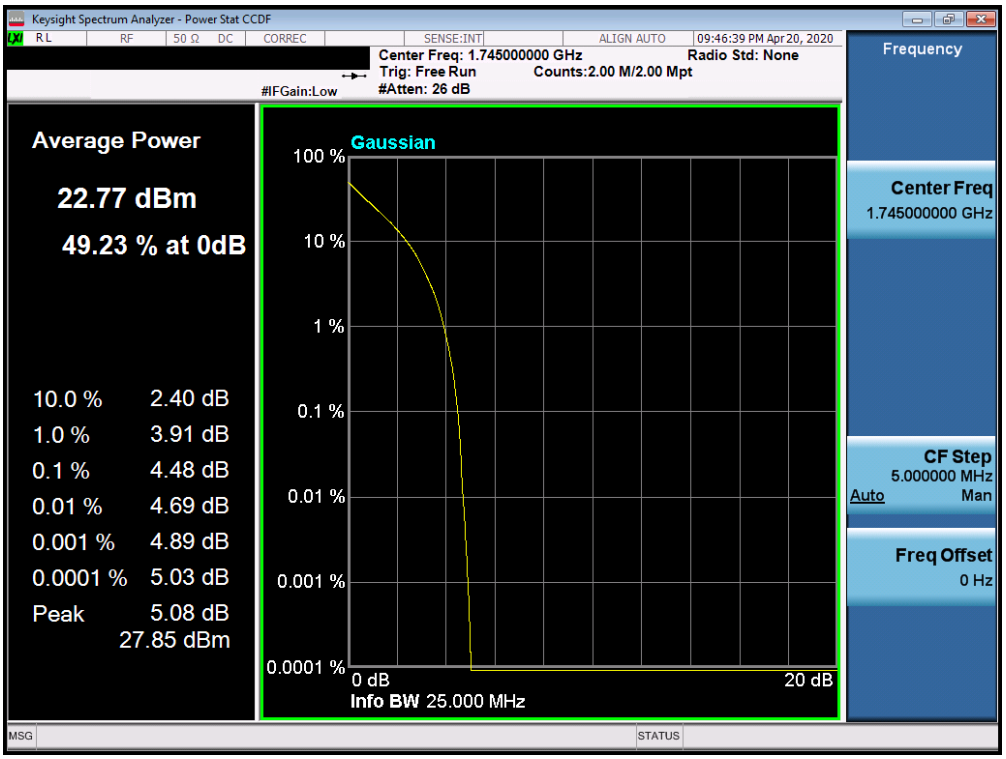
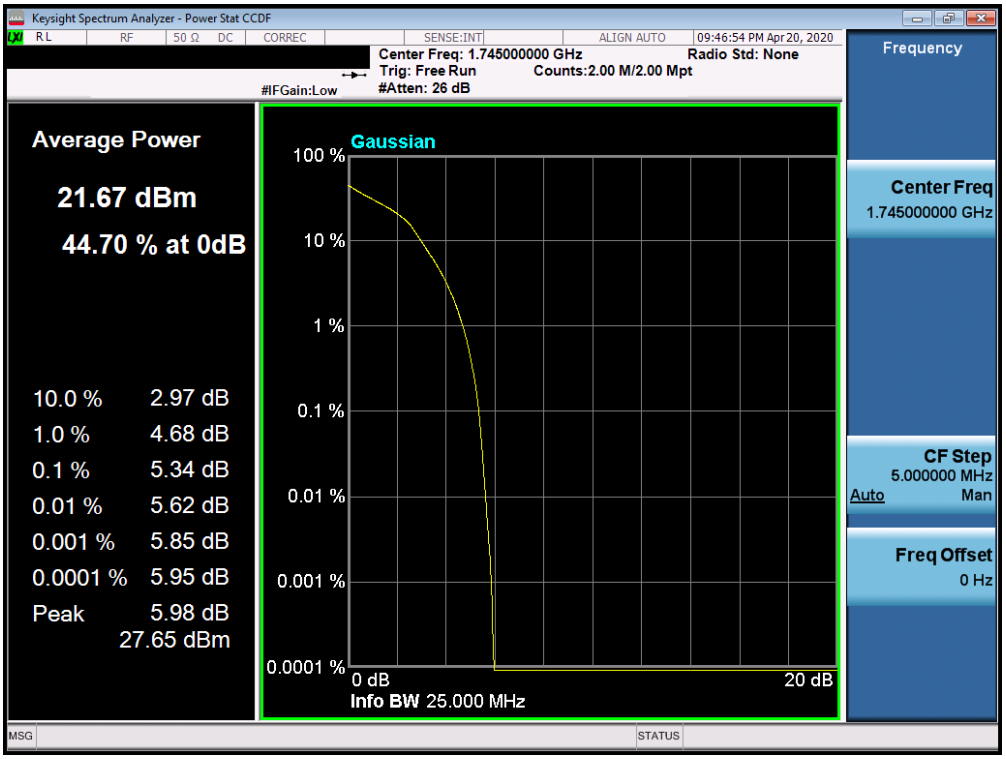


Plot 7-295. PAR Plot (Band 66/4 - 15.0MHz QPSK - Full RB Configuration)



Plot 7-296. PAR Plot (Band 66/4 - 15.0MHz 16-QAM - Full RB Configuration)

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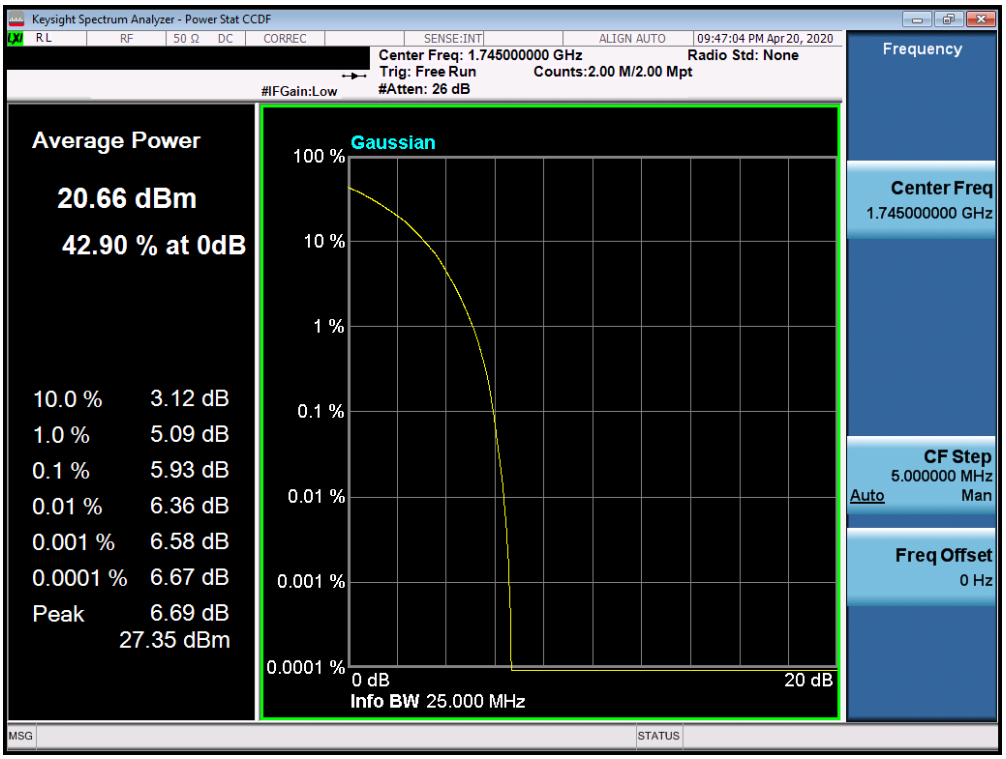
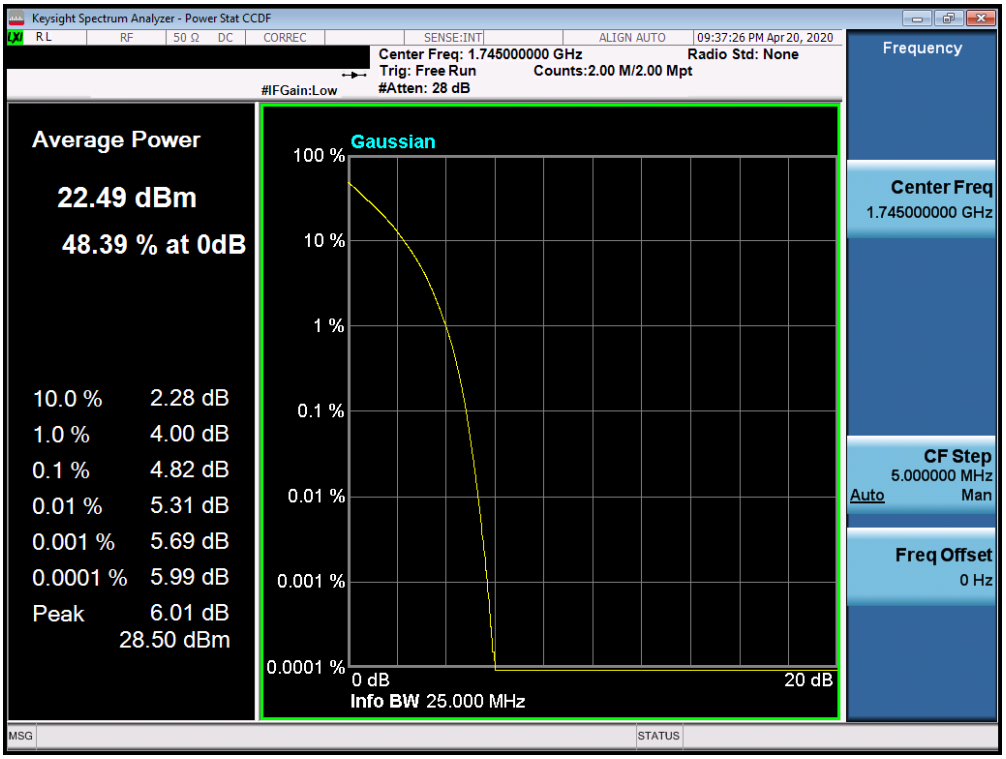


Plot 7-297. PAR Plot (Band 66/4 - 15.0MHz 64-QAM - Full RB Configuration)



Plot 7-298. PAR Plot (Band 66/4 - 20.0MHz QPSK - Full RB Configuration)

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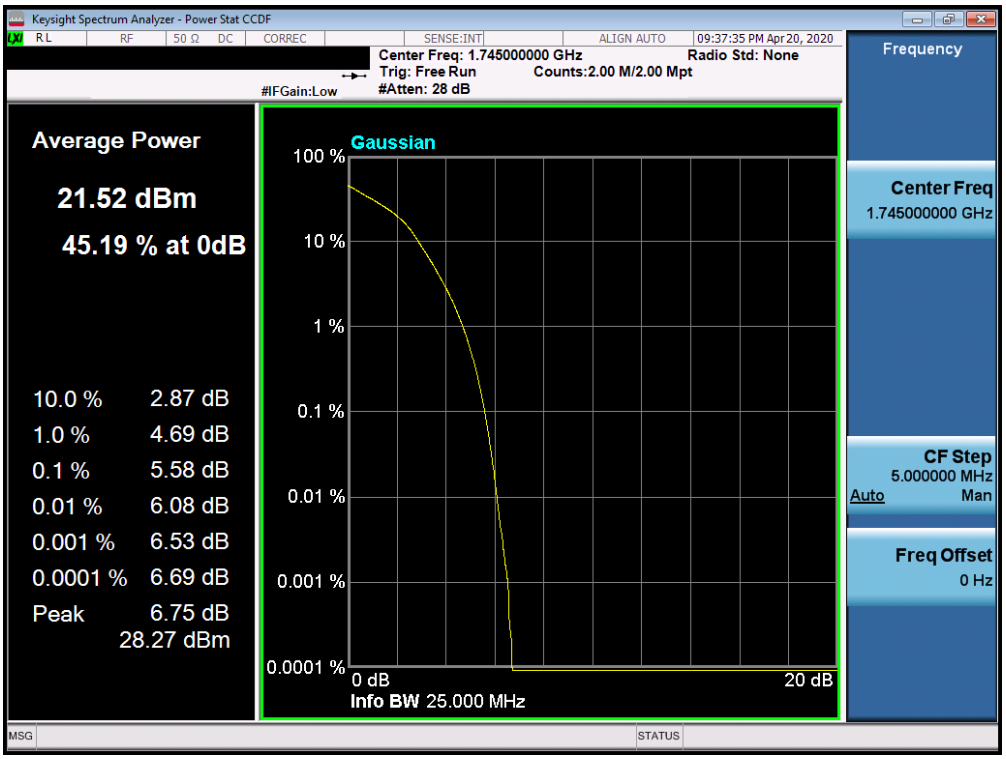
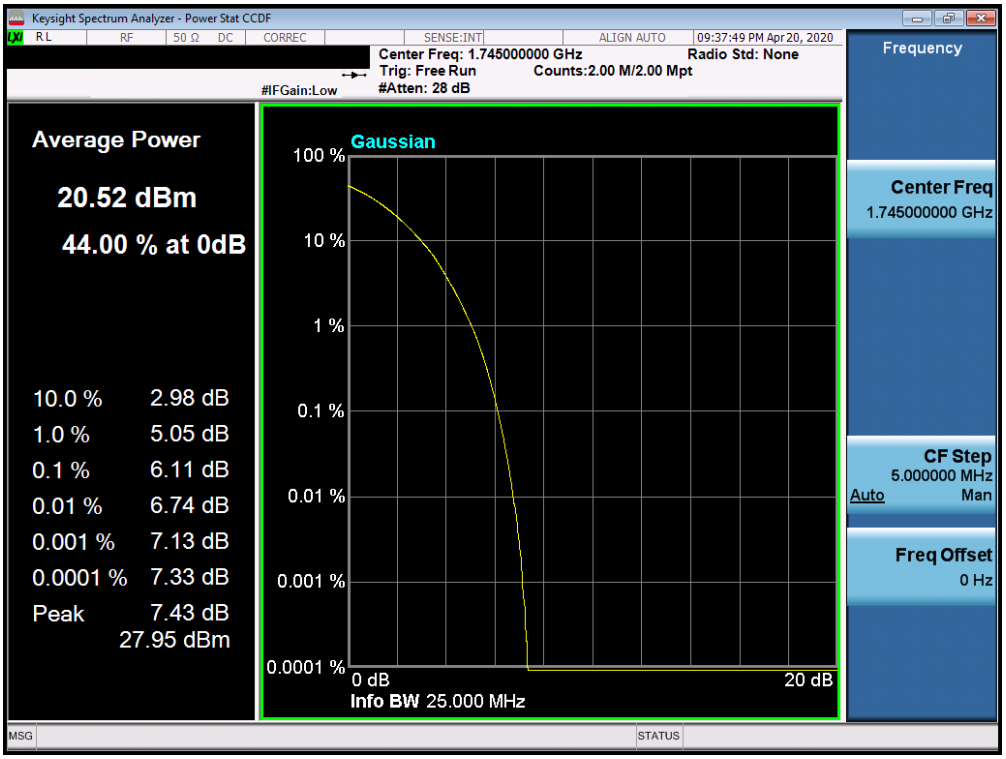


Plot 7-299. PAR Plot (Band 66/4 - 20.0MHz 16-QAM - Full RB Configuration)



Plot 7-300. PAR Plot (Band 66/4 - 20.0MHz 64-QAM - Full RB Configuration)

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7.6 Additional Maximum Power Reduction (A-MPR)
§2.1046

Test Overview

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

Test Procedure Used

KDB 971168 D01 v03r01 – Section 5.2.2

Test Settings

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

Test Setup

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

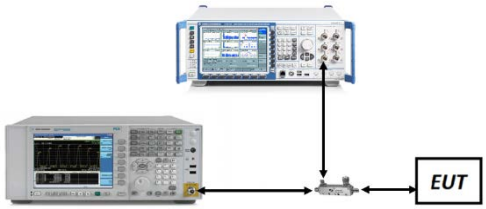

Figure 7-5. Test Instrument & Measurement Setup

Test Notes

None.

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NS	MCC	MNC	Channel BW [MHz]	Channel Number	Channel Frequency [MHz]	Modulation	RB Size	RB Offset	MPR [dB]	A-MPR [dB]	Measured Power [dBm]
01	310	830	5	39675	2498.5	QPSK	1	0	0	≤ 3	22.86
						16-QAM			≤ 1		21.65
						64-QAM			≤ 2		20.61
			5	39675	2498.5	QPSK	1	9	0	0	25.83
						16-QAM			≤ 1		24.67
						64-QAM			≤ 2		23.89
			10	39700	2501	QPSK	1	0	0	≤ 5	20.46
						16-QAM	1	0	≤ 1		19.97
						64-QAM	1	0	≤ 2		18.78
			10	39700	2501	QPSK	20	0	0	≤ 2	22.99
						16-QAM	20	0	≤ 1		21.84
						64-QAM	20	0	≤ 2		20.94
			10	39700	2501	QPSK	50	0	0	≤ 3	21.73
						16-QAM	50	0	≤ 1		20.91
						64-QAM	50	0	≤ 2		19.69
			10	39700	2501	QPSK	25	20	0	≤ 1	24.01
						16-QAM	25	20	≤ 1		23.02
						64-QAM	25	20	≤ 2		21.94
			10	39700	2501	QPSK	1	36	0	0	25.92
						16-QAM	1	36	≤ 1		24.58
						64-QAM	1	36	≤ 2		23.81
			15	39725	2503.5	QPSK	1	0	0	≤ 5	20.86
						16-QAM	1	0	≤ 1		19.40
						64-QAM	1	0	≤ 2		18.93
			15	39725	2503.5	QPSK	20	0	0	≤ 2	22.68
						16-QAM	20	0	≤ 1		21.89
						64-QAM	20	0	≤ 2		20.87
			15	39725	2503.5	QPSK	75	0	0	≤ 4	20.81
						16-QAM	75	0	≤ 1		19.91
						64-QAM	75	0	≤ 2		18.85
			15	39725	2503.5	QPSK	50	15	0	≤ 3	21.94
						16-QAM	50	15	≤ 1		20.85
						64-QAM	50	15	≤ 2		19.79
			15	39725	2503.5	QPSK	1	60	0	0	25.91
						16-QAM	1	60	≤ 1		24.48
						64-QAM	1	60	≤ 2		24.11
			20	39750	2506	QPSK	1	0	0	≤ 5	20.76
						16-QAM	1	0	≤ 1		19.76
						64-QAM	1	0	≤ 2		18.68
			20	39750	2506	QPSK	20	0	0	≤ 2	22.66
						16-QAM	20	0	≤ 1		21.78
						64-QAM	20	0	≤ 2		20.79
			20	39750	2506	QPSK	100	0	0	≤ 4	20.84
						16-QAM	100	0	≤ 1		19.84
						64-QAM	100	0	≤ 2		19.00
			20	39750	2506	QPSK	75	24	0	≤ 3	21.88
						16-QAM	75	24	≤ 1		21.09
						64-QAM	75	24	≤ 2		19.83
			20	39750	2506	QPSK	1	77	0	0	25.67
						16-QAM	1	77	≤ 1		24.45
						64-QAM	1	77	≤ 2		23.69
01	001	01	5	39675	2498.5	QPSK	1	0	0	0	25.74
						16-QAM			≤ 1		24.83
						64-QAM			≤ 2		23.73

Table 7-3. A-MPR Conducted Power Measurements

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7.7 Radiated Power (ERP/EIRP)

Test Overview

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

Test Procedures Used

KDB 971168 D01 v03r01 – Section 5.2.1

ANSI/TIA-603-E-2016 – Section 2.2.17

Test Settings

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

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Test Setup

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

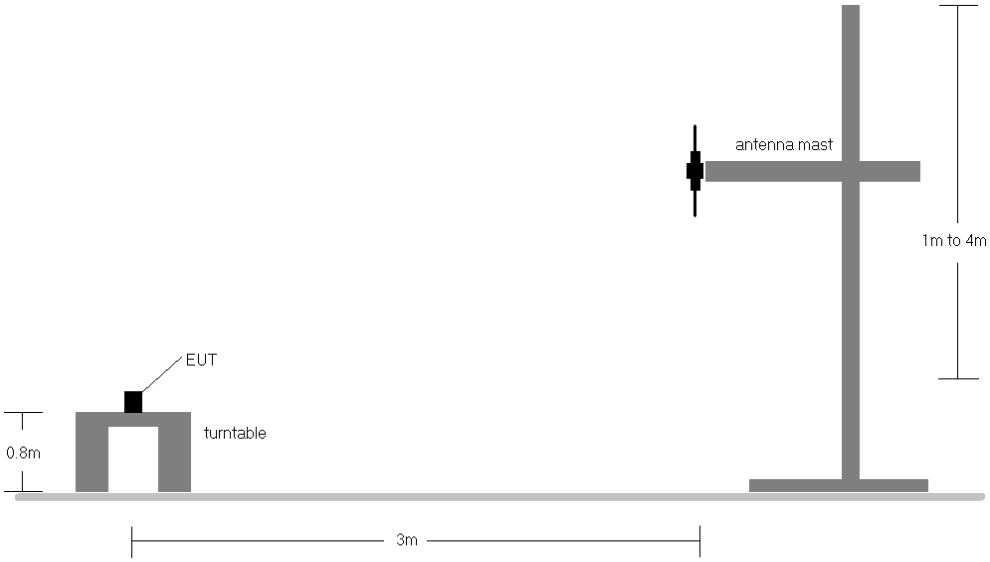

Figure 7-6. Radiated Test Setup <1GHz

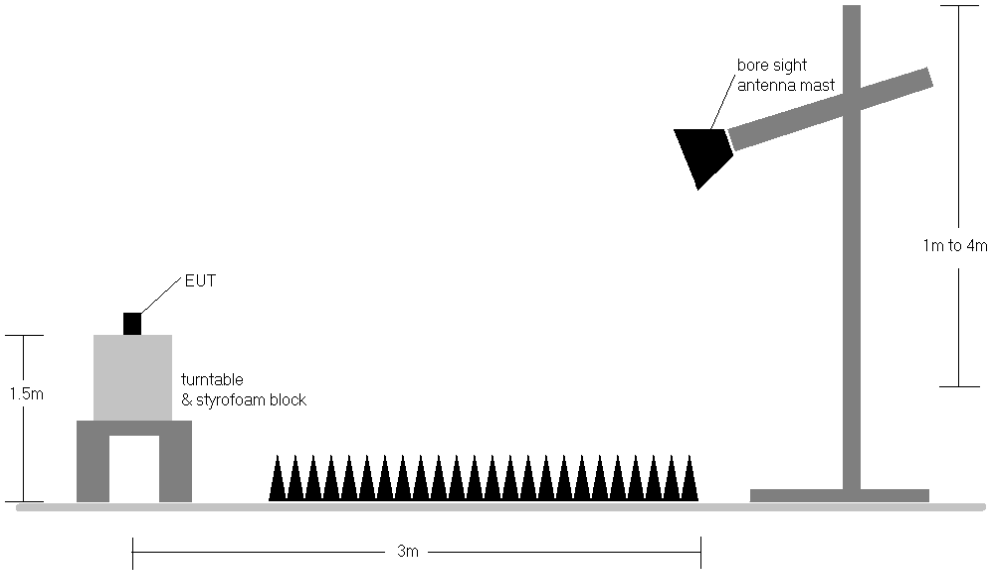

Figure 7-7. Radiated Test Setup >1GHz

Test Notes

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

2) This unit was tested with its standard battery.

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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
665.50	5	QPSK	H	178	120	1 / 0	17.21	2.99	18.06	0.064	34.77	-16.71
680.50	5	QPSK	H	178	111	1 / 0	17.86	3.19	**18.90**	0.078	34.77	-15.88
695.50	5	QPSK	H	179	117	1 / 0	16.92	3.38	18.14	0.065	34.77	-16.63
680.50	5	16-QAM	H	178	111	1 / 0	16.69	3.19	**17.73**	0.059	34.77	-17.05
680.50	5	64-QAM	H	178	111	1 / 0	16.17	3.19	**17.21**	0.053	34.77	-17.57
668.00	10	QPSK	H	173	115	1 / 0	17.38	3.02	18.26	0.067	34.77	-16.51
680.50	10	QPSK	H	180	111	1 / 0	18.05	3.19	**19.09**	0.081	34.77	-15.69
693.00	10	QPSK	H	178	111	1 / 0	17.28	3.34	18.47	0.070	34.77	-16.30
693.00	10	16-QAM	H	178	111	1 / 0	16.96	3.34	**18.15**	0.065	34.77	-16.62
680.50	10	64-QAM	H	180	111	1 / 0	16.12	3.19	**17.16**	0.052	34.77	-17.62
670.50	15	QPSK	H	173	120	1 / 0	17.35	3.06	18.26	0.067	34.77	-16.51
680.50	15	QPSK	H	176	108	1 / 0	17.99	3.19	**19.03**	0.080	34.77	-15.75
690.50	15	QPSK	H	180	120	1 / 0	17.31	3.31	18.47	0.070	34.77	-16.30
680.50	15	16-QAM	H	176	108	1 / 0	17.05	3.19	**18.09**	0.064	34.77	-16.69
680.50	15	64-QAM	H	176	108	1 / 0	16.06	3.19	**17.10**	0.051	34.77	-17.68
673.00	20	QPSK	V	173	117	1 / 0	17.54	3.09	18.48	0.070	34.77	-16.29
680.50	20	QPSK	V	176	107	1 / 0	18.07	3.19	**19.11**	**0.081**	34.77	-15.67
688.00	20	QPSK	V	178	111	1 / 0	17.39	3.28	18.52	0.071	34.77	-16.25
680.50	20	16-QAM	V	176	107	1 / 0	17.12	3.19	**18.16**	0.065	34.77	-16.62
680.50	20	64-QAM	V	176	107	1 / 0	16.22	3.19	**17.26**	0.053	34.77	-17.52
680.50	20	QPSK	H	276	16	1 / 0	16.75	3.19	17.79	0.060	34.77	-16.99

Table 7-4. ERP Data (Band 71)

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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
699.70	1.4	QPSK	H	283	188	1 / 0	16.52	3.43	17.80	0.060	34.77	-16.97	19.95	0.099	36.99	-17.04
707.50	1.4	QPSK	H	285	185	1 / 0	16.31	3.72	17.88	0.061	34.77	-16.89	20.03	0.101	36.99	-16.96
715.30	1.4	QPSK	H	282	183	1 / 0	16.32	3.72	**17.89**	0.062	34.77	-16.88	**20.04**	0.101	36.99	-16.95
715.30	1.4	16-QAM	H	282	183	1 / 0	15.57	3.72	**17.14**	0.052	34.77	-17.63	**19.29**	0.085	36.99	-17.70
715.30	1.4	64-QAM	H	282	183	1 / 0	14.42	3.72	15.99	0.040	34.77	-18.78	18.14	0.065	36.99	-18.85
700.50	3	QPSK	H	282	185	1 / 0	16.52	3.44	17.81	0.060	34.77	-16.96	19.96	0.099	36.99	-17.03
707.50	3	QPSK	H	284	183	1 / 0	16.31	3.72	**17.88**	0.061	34.77	-16.89	**20.03**	0.101	36.99	-16.96
714.50	3	QPSK	H	283	185	1 / 0	16.29	3.71	17.85	0.061	34.77	-16.92	20.00	0.100	36.99	-16.99
707.50	3	16-QAM	H	284	183	1 / 0	15.27	3.72	16.84	0.048	34.77	-17.93	18.99	0.079	36.99	-18.00
707.50	3	64-QAM	H	284	183	1 / 0	14.55	3.72	**16.12**	0.041	34.77	-18.65	**18.27**	0.067	36.99	-18.72
701.50	5	QPSK	H	282	185	1 / 0	16.52	3.45	17.82	0.061	34.77	-16.95	19.97	0.099	36.99	-17.02
707.50	5	QPSK	H	280	182	1 / 0	16.29	3.72	**17.86**	0.061	34.77	-16.91	**20.01**	0.100	36.99	-16.98
713.50	5	QPSK	H	285	190	1 / 0	16.28	3.70	17.83	0.061	34.77	-16.94	19.98	0.099	36.99	-17.01
707.50	5	16-QAM	H	280	182	1 / 0	15.27	3.72	16.84	0.048	34.77	-17.93	18.99	0.079	36.99	-18.00
707.50	5	64-QAM	H	280	182	1 / 0	14.55	3.72	**16.12**	0.041	34.77	-18.65	**18.27**	0.067	36.99	-18.72
704.00	10	QPSK	H	282	188	1 / 0	16.52	3.58	17.95	0.062	34.77	-16.82	20.10	0.102	36.99	-16.89
707.50	10	QPSK	H	280	182	1 / 0	16.31	3.72	17.88	0.061	34.77	-16.89	20.03	0.101	36.99	-16.96
711.00	10	QPSK	H	282	193	1 / 0	16.52	3.67	**18.04**	**0.064**	34.77	-16.73	**20.19**	**0.104**	36.99	-16.80
711.00	10	16-QAM	H	282	193	1 / 0	15.57	3.67	**17.09**	0.051	34.77	-17.68	**19.24**	0.084	36.99	-17.75
711.00	10	64-QAM	H	282	193	1 / 0	14.42	3.67	15.94	0.039	34.77	-18.83	18.09	0.064	36.99	-18.90
711.00	10	QPSK	V	165	107	1 / 0	16.34	3.67	17.86	0.061	34.77	-16.91	20.01	0.100	36.99	-16.98

Table 7-5. ERP Data (Band 12)

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
779.50	5	QPSK	H	225	65	1 / 0	12.91	5.82	16.57	0.045	34.77	-18.20	18.72	0.075	36.99	-18.27
782.00	5	QPSK	H	227	55	1 / 0	12.96	5.89	**16.70**	0.047	34.77	-18.07	**18.85**	0.077	36.99	-18.14
784.50	5	QPSK	H	225	58	1 / 0	12.87	5.92	16.64	0.046	34.77	-18.13	18.79	0.076	36.99	-18.20
782.00	5	16-QAM	H	227	55	1 / 0	11.94	5.89	**15.68**	0.037	34.77	-19.09	**17.83**	0.061	36.99	-19.16
782.00	5	64-QAM	H	227	55	1 / 0	11.23	5.89	**14.97**	0.031	34.77	-19.80	**17.12**	0.052	36.99	-19.87
782.00	10	QPSK	H	227	53	1 / 0	13.03	5.89	**16.77**	**0.048**	34.77	-18.00	**18.92**	**0.078**	36.99	-18.07
782.00	10	16-QAM	H	227	53	1 / 0	11.77	5.89	**15.51**	0.036	34.77	-19.26	**17.66**	0.058	36.99	-19.33
782.00	10	64-QAM	H	227	53	1 / 0	10.94	5.89	**14.68**	0.029	34.77	-20.09	**16.83**	0.048	36.99	-20.16
782.00	10	QPSK	V	136	169	1 / 0	12.24	5.89	15.98	0.040	34.77	-18.79	18.13	0.065	36.99	-18.86

Table 7-6. ERP Data (Band 13)

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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
824.70	1.4	QPSK	H	220	50	1 / 0	12.06	6.76	**16.66**	0.046	38.45	-21.79	**18.81**	0.076	40.61	-21.80
836.50	1.4	QPSK	H	228	51	1 / 0	11.68	6.68	16.21	0.042	38.45	-22.24	18.36	0.069	40.61	-22.25
848.30	1.4	QPSK	H	228	41	1 / 0	11.35	6.70	15.90	0.039	38.45	-22.55	18.05	0.064	40.61	-22.55
824.70	1.4	16-QAM	H	220	50	1 / 0	11.19	6.76	**15.79**	0.038	38.45	-22.66	**17.94**	0.062	40.61	-22.67
824.70	1.4	64-QAM	H	220	50	1 / 0	10.46	6.76	**15.06**	0.032	38.45	-23.39	**17.21**	0.053	40.61	-23.40
825.50	3	QPSK	H	220	50	1 / 0	11.79	6.76	**16.40**	0.044	38.45	-22.05	**18.55**	0.072	40.61	-22.05
836.50	3	QPSK	H	228	51	1 / 0	11.72	6.68	16.25	0.042	38.45	-22.20	18.40	0.069	40.61	-22.21
847.50	3	QPSK	H	228	41	1 / 0	11.25	6.69	15.80	0.038	38.45	-22.65	17.95	0.062	40.61	-22.66
825.50	3	16-QAM	H	220	50	1 / 0	11.31	6.76	**15.92**	0.039	38.45	-22.53	**18.07**	0.064	40.61	-22.54
825.50	3	64-QAM	H	220	50	1 / 0	10.30	6.76	**14.91**	0.031	38.45	-23.54	**17.06**	0.051	40.61	-23.55
826.50	5	QPSK	H	220	50	1 / 0	11.73	6.77	**16.35**	0.043	38.45	-22.10	**18.50**	0.071	40.61	-22.10
836.50	5	QPSK	H	230	51	1 / 0	11.70	6.68	16.23	0.042	38.45	-22.22	18.38	0.069	40.61	-22.23
846.50	5	QPSK	H	229	45	1 / 0	11.04	6.68	15.57	0.036	38.45	-22.88	17.72	0.059	40.61	-22.89
826.50	5	16-QAM	H	220	50	1 / 0	11.10	6.77	**15.72**	0.037	38.45	-22.73	**17.87**	0.061	40.61	-22.73
826.50	5	64-QAM	H	220	50	1 / 0	10.41	6.77	**15.03**	0.032	38.45	-23.42	**17.18**	0.052	40.61	-23.42
829.00	10	QPSK	H	220	50	1 / 0	12.02	6.80	**16.67**	0.046	38.45	-21.78	**18.82**	**0.076**	40.61	-21.79
836.50	10	QPSK	H	228	51	1 / 0	11.64	6.68	16.17	0.041	38.45	-22.28	18.32	0.068	40.61	-22.29
844.00	10	QPSK	H	228	41	1 / 0	11.28	6.66	15.79	0.038	38.45	-22.66	17.94	0.062	40.61	-22.67
829.00	10	16-QAM	H	220	50	1 / 0	11.18	6.80	**15.83**	0.038	38.45	-22.62	**17.98**	0.063	40.61	-22.63
829.00	10	64-QAM	H	220	50	1 / 0	10.36	6.80	**15.01**	0.032	38.45	-23.44	**17.16**	0.052	40.61	-23.45
829.00	10	QPSK	V	147	217	1 / 0	11.58	6.80	16.23	0.042	38.45	-22.22	18.38	0.069	40.61	-22.23

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

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
831.50	15	QPSK	H	221	52	1 / 0	11.75	6.73	**16.33**	0.043	38.45	-22.12	**18.48**	0.070	40.61	-22.13
836.50	15	QPSK	H	227	55	1 / 0	11.69	6.68	16.22	0.042	38.45	-22.23	18.37	0.069	40.61	-22.24
841.50	15	QPSK	H	227	42	1 / 0	11.11	6.63	15.59	0.036	38.45	-22.86	17.74	0.059	40.61	-22.87
831.50	15	16-QAM	H	221	52	1 / 0	11.18	6.73	**15.76**	0.038	38.45	-22.69	**17.91**	0.062	40.61	-22.70
831.50	15	64-QAM	H	221	52	1 / 0	10.36	6.73	**14.94**	0.031	38.45	-23.51	**17.09**	0.051	40.61	-23.52

Table 7-8. ERP Data (Band 26)

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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
1710.70	1.4	QPSK	H	133	166	1 / 5	11.22	9.47	20.69	0.117	30.00	-9.31
1745.00	1.4	QPSK	H	120	22	1 / 5	11.57	9.26	**20.83**	0.121	30.00	-9.17
1779.30	1.4	QPSK	H	134	11	1 / 5	11.18	9.29	20.47	0.111	30.00	-9.53
1745.00	1.4	16-QAM	H	120	22	1 / 5	10.09	9.26	19.35	0.086	30.00	-10.65
1745.00	1.4	64-QAM	H	120	22	1 / 5	8.44	9.26	17.70	0.059	30.00	-12.30
1711.50	3	QPSK	H	131	162	1 / 14	11.35	9.47	20.82	0.121	30.00	-9.18
1745.00	3	QPSK	H	118	25	1 / 14	11.61	9.26	**20.87**	0.122	30.00	-9.13
1778.50	3	QPSK	H	131	4	1 / 14	11.23	9.28	20.51	0.112	30.00	-9.49
1745.00	3	16-QAM	H	118	25	1 / 14	10.07	9.26	19.33	0.086	30.00	-10.67
1745.00	3	64-QAM	H	118	25	1 / 14	8.31	9.26	17.57	0.057	30.00	-12.43
1712.50	5	QPSK	H	132	169	1 / 24	11.48	9.46	**20.94**	0.124	30.00	-9.06
1745.00	5	QPSK	H	122	27	1 / 24	11.60	9.26	20.86	0.122	30.00	-9.14
1777.50	5	QPSK	H	135	5	1 / 24	11.26	9.28	20.54	0.113	30.00	-9.46
1712.50	5	16-QAM	H	132	169	1 / 24	10.29	9.46	**19.75**	0.094	30.00	-10.25
1712.50	5	64-QAM	H	132	169	1 / 24	9.38	9.46	**18.84**	0.077	30.00	-11.16
1715.00	10	QPSK	H	132	166	1 / 49	11.61	9.44	**21.05**	0.127	30.00	-8.95
1745.00	10	QPSK	H	118	25	1 / 49	11.56	9.26	20.82	0.121	30.00	-9.18
1775.00	10	QPSK	H	133	23	1 / 49	11.25	9.28	20.52	0.113	30.00	-9.48
1715.00	10	16-QAM	H	132	166	1 / 49	10.40	9.44	**19.85**	0.097	30.00	-10.15
1715.00	10	64-QAM	H	132	166	1 / 49	9.51	9.44	**18.96**	0.079	30.00	-11.04
1717.50	15	QPSK	H	132	165	1 / 74	11.56	9.43	**20.99**	0.126	30.00	-9.01
1745.00	15	QPSK	H	115	24	1 / 74	11.59	9.26	20.85	0.122	30.00	-9.15
1772.50	15	QPSK	H	132	3	1 / 74	11.33	9.27	20.60	0.115	30.00	-9.40
1717.50	15	16-QAM	H	132	165	1 / 74	10.32	9.43	**19.75**	0.094	30.00	-10.25
1717.50	15	64-QAM	H	132	165	1 / 74	9.36	9.43	**18.79**	0.076	30.00	-11.21
1720.00	20	QPSK	V	132	165	1 / 99	11.75	9.41	**21.16**	**0.131**	30.00	-8.84
1745.00	20	QPSK	V	115	24	1 / 99	11.65	9.26	20.91	0.123	30.00	-9.09
1770.00	20	QPSK	V	132	3	1 / 99	11.36	9.27	20.63	0.116	30.00	-9.37
1720.00	20	16-QAM	V	132	165	1 / 99	10.27	9.41	**19.68**	0.093	30.00	-10.32
1720.00	20	64-QAM	V	132	165	1 / 99	9.24	9.41	**18.65**	0.073	30.00	-11.35
1720.00	20	QPSK	H	101	356	1 / 99	11.47	9.41	20.88	0.123	30.00	-9.12

Table 7-9. EIRP Data (Band 66/4)

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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
1850.70	1.4	QPSK	H	122	16	1 / 0	10.70	9.51	20.21	0.105	33.01	-12.80
1882.50	1.4	QPSK	H	157	124	1 / 0	10.42	9.96	**20.38**	0.109	33.01	-12.63
1914.30	1.4	QPSK	H	152	13	1 / 5	9.66	10.32	19.98	0.100	33.01	-13.03
1882.50	1.4	16-QAM	H	157	124	1 / 0	9.79	9.96	**19.75**	0.094	33.01	-13.26
1882.50	1.4	64-QAM	H	157	124	1 / 0	9.01	9.96	**18.97**	0.079	33.01	-14.04
1851.50	3	QPSK	H	122	11	1 / 0	10.84	9.52	20.36	0.109	33.01	-12.65
1882.50	3	QPSK	H	155	121	1 / 0	10.99	9.96	**20.95**	0.124	33.01	-12.06
1913.50	3	QPSK	H	153	12	1 / 14	9.71	10.31	20.02	0.100	33.01	-12.99
1882.50	3	16-QAM	H	155	121	1 / 0	9.97	9.96	**19.93**	0.098	33.01	-13.08
1882.50	3	64-QAM	H	155	121	1 / 0	8.99	9.96	**18.95**	0.079	33.01	-14.06
1852.50	5	QPSK	H	123	12	1 / 0	10.98	9.54	20.52	0.113	33.01	-12.49
1882.50	5	QPSK	H	151	122	1 / 0	10.73	9.96	**20.69**	0.117	33.01	-12.32
1912.50	5	QPSK	H	155	15	1 / 24	9.93	10.30	20.23	0.106	33.01	-12.78
1882.50	5	16-QAM	H	151	122	1 / 0	9.79	9.96	**19.75**	0.094	33.01	-13.26
1882.50	5	64-QAM	H	151	122	1 / 0	8.96	9.96	**18.92**	0.078	33.01	-14.09
1855.00	10	QPSK	H	124	11	1 / 0	11.12	9.57	20.69	0.117	33.01	-12.32
1882.50	10	QPSK	H	153	121	1 / 0	10.80	9.96	**20.76**	0.119	33.01	-12.25
1910.00	10	QPSK	H	153	11	1 / 49	9.63	10.28	19.91	0.098	33.01	-13.10
1882.50	10	16-QAM	H	153	121	1 / 0	9.91	9.96	**19.87**	0.097	33.01	-13.14
1882.50	10	64-QAM	H	153	121	1 / 0	9.06	9.96	**19.02**	0.080	33.01	-13.99
1857.50	15	QPSK	H	125	9	1 / 0	11.26	9.61	**20.87**	0.122	33.01	-12.14
1882.50	15	QPSK	H	155	121	1 / 0	10.70	9.96	20.66	0.116	33.01	-12.35
1907.50	15	QPSK	H	155	11	1 / 74	10.07	10.26	20.33	0.108	33.01	-12.68
1857.50	15	16-QAM	H	125	9	1 / 0	10.13	9.61	19.74	0.094	33.01	-13.27
1857.50	15	64-QAM	H	125	9	1 / 0	9.05	9.61	18.66	0.073	33.01	-14.35
1860.00	20	QPSK	H	121	9	1 / 0	11.40	9.64	**21.04**	**0.127**	33.01	-11.97
1882.50	20	QPSK	H	153	121	1 / 0	10.90	9.96	20.86	0.122	33.01	-12.15
1905.00	20	QPSK	H	152	10	1 / 99	10.30	10.24	20.54	0.113	33.01	-12.47
1860.00	20	16-QAM	H	121	9	1 / 0	10.12	9.64	19.76	0.095	33.01	-13.25
1860.00	20	64-QAM	H	121	9	1 / 0	8.94	9.64	18.58	0.072	33.01	-14.43
1860.00	20	QPSK	V	102	55	1 / 0	10.91	9.64	20.55	0.114	33.01	-12.46

Table 7-10. EIRP Data (Band 25/2)

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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
2498.50	5	QPSK	H	146	178	1 / 0	14.20	9.46	23.66	0.232	33.01	-9.35
2593.00	5	QPSK	H	103	145	1 / 0	14.74	9.58	24.32	0.270	33.01	-8.69
2687.50	5	QPSK	H	110	143	1 / 0	14.51	9.85	**24.36**	0.273	33.01	-8.65
2593.00	5	16-QAM	H	103	145	1 / 0	13.99	9.58	**23.57**	0.228	33.01	-9.44
2593.00	5	64-QAM	H	103	145	1 / 0	12.34	9.58	**21.92**	0.156	33.01	-11.09
2501.00	10	QPSK	H	145	180	1 / 0	13.82	9.46	23.28	0.213	33.01	-9.73
2593.00	10	QPSK	H	102	145	1 / 0	14.71	9.58	24.29	0.269	33.01	-8.72
2685.00	10	QPSK	H	110	145	1 / 0	14.48	9.85	**24.33**	0.271	33.01	-8.68
2593.00	10	16-QAM	H	102	145	1 / 0	14.13	9.58	**23.71**	0.235	33.01	-9.30
2593.00	10	64-QAM	H	102	145	1 / 0	12.25	9.58	**21.83**	0.152	33.01	-11.18
2503.50	15	QPSK	H	147	181	1 / 0	13.80	9.45	23.25	0.212	33.01	-9.76
2593.00	15	QPSK	H	103	142	1 / 0	14.89	9.58	**24.47**	0.280	33.01	-8.54
2682.50	15	QPSK	H	109	146	1 / 0	14.53	9.86	24.39	0.275	33.01	-8.62
2593.00	15	16-QAM	H	103	142	1 / 0	14.34	9.58	**23.92**	0.247	33.01	-9.09
2593.00	15	64-QAM	H	103	142	1 / 0	12.54	9.58	**22.12**	0.163	33.01	-10.89
2506.00	20	QPSK	H	147	180	1 / 0	13.69	9.45	23.14	0.206	33.01	-9.87
2593.00	20	QPSK	H	102	140	1 / 0	14.90	9.58	**24.48**	**0.281**	33.01	-8.53
2680.00	20	QPSK	H	108	148	1 / 0	14.42	9.86	24.28	0.268	33.01	-8.73
2593.00	20	16-QAM	H	102	140	1 / 0	13.92	9.58	**23.50**	0.224	33.01	-9.51
2593.00	20	64-QAM	H	102	140	1 / 0	12.45	9.58	**22.03**	0.160	33.01	-10.98
2593.00	20	QPSK	V	155	352	1 / 0	13.78	9.58	23.36	0.217	33.01	-9.65

Table 7-11. EIRP Data (Band 41 – PC2)

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
2593.00	20	QPSK	H	107	138	1 / 0	13.17	9.58	**22.75**	**0.188**	33.01	-10.26
2593.00	20	16-QAM	H	107	138	1 / 0	11.97	9.58	**21.55**	0.143	33.01	-11.46
2593.00	20	64-QAM	H	107	138	1 / 0	10.37	9.58	**19.95**	0.099	33.01	-13.06
2593.00	20	QPSK	V	157	355	1 / 0	12.36	9.58	21.94	0.156	33.01	-11.07

Table 7-12. EIRP Data (Band 41 – PC3)

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7.8 Radiated Spurious Emissions Measurements

Test Overview

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

Test Procedures Used

KDB 971168 D01 v03r01 – Section 5.8

ANSI/TIA-603-E-2016 – Section 2.2.12

Test Settings

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

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Test Setup

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

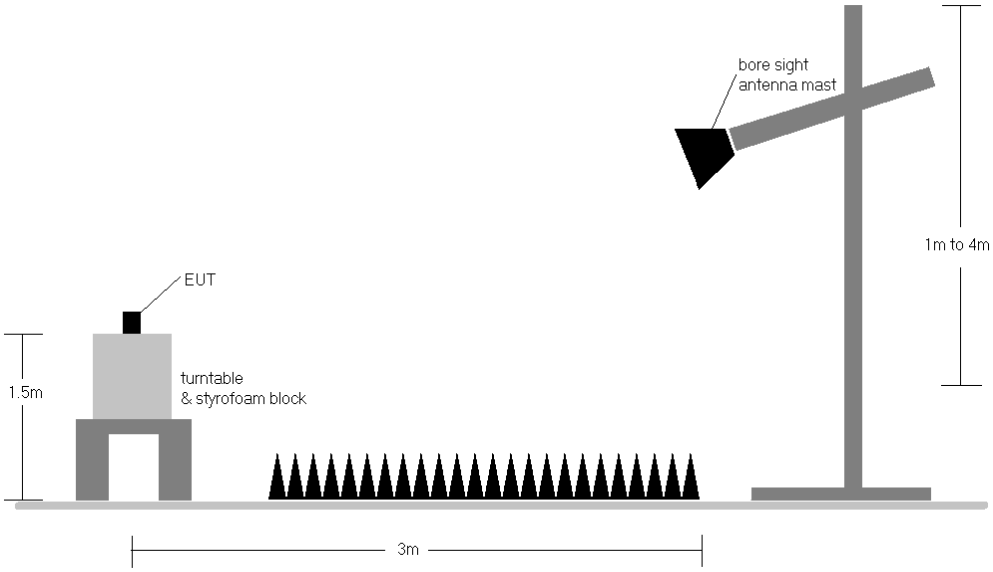

Figure 7-8. Test Instrument & Measurement Setup

Test Notes

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

2) This unit was tested with its standard battery.

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

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

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

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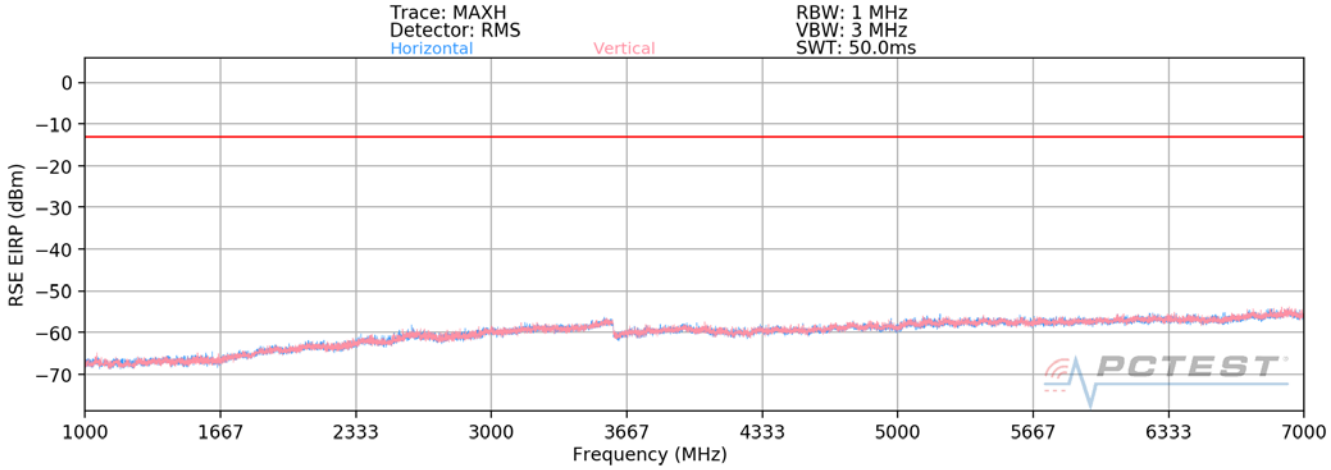
Band 71



Plot 7-301. Radiated Spurious Plot above 1GHz (Band 71)

OPERATING FREQUENCY:	668.00	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]
1336.00	V	319	333	-67.95	8.81	-59.14	-46.1
2004.00	V	116	251	-72.74	10.37	-62.37	-49.4
2672.00	V	-	-	-71.95	9.88	-62.07	-49.1
3340.00	V	-	-	-68.23	7.37	-60.86	-47.9

Table 7-13. Radiated Spurious Data (Band 71 – Low Channel)

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OPERATING FREQUENCY: 680.50 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]
1361.00	V	311	331	-70.76	8.64	-62.12	-49.1
2041.50	V	112	234	-69.44	10.06	-59.38	-46.4
2722.00	V	-	-	-71.57	9.60	-61.97	-49.0
3402.50	V	-	-	-67.33	7.36	-59.97	-47.0

Table 7-14. Radiated Spurious Data (Band 71 – Mid Channel)

OPERATING FREQUENCY: 693.00 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]
1386.00	V	388	348	-69.51	8.31	-61.19	-48.2
2079.00	V	118	335	-68.44	9.80	-58.64	-45.6
2772.00	V	-	-	-72.22	9.24	-62.98	-50.0
3465.00	V	-	-	-68.04	7.57	-60.47	-47.5

Table 7-15. Radiated Spurious Data (Band 71 – High Channel)

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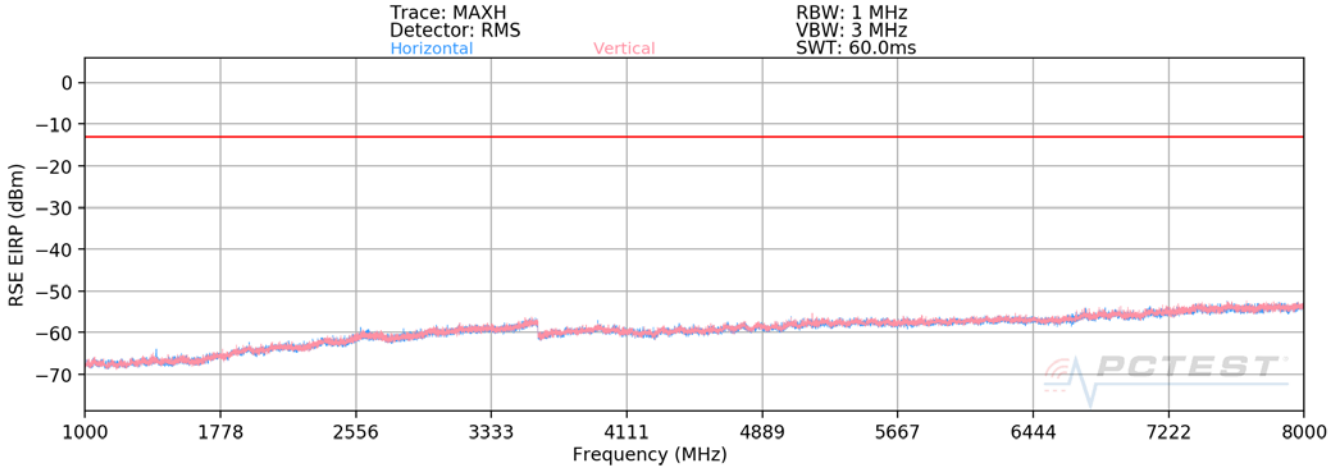
Band 12



Plot 7-302. Radiated Spurious Plot above 1GHz (Band 12)

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	310	297	-72.64	8.19	-64.45	-51.4
2112.00	V	112	233	-72.12	9.63	-62.49	-49.5
2816.00	V	-	-	-72.09	9.12	-62.97	-50.0
3520.00	V	-	-	-66.90	7.39	-59.50	-46.5

Table 7-16. Radiated Spurious Data (Band 12 – 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	207	257	-69.89	8.25	-61.64	-48.6
2122.50	V	139	289	-71.93	9.61	-62.32	-49.3
2830.00	V	-	-	-71.54	9.13	-62.41	-49.4

Table 7-17. Radiated Spurious Data (Band 12 – 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	291	257	-73.38	8.30	-65.08	-52.1
2133.00	V	134	281	-71.49	9.60	-61.89	-48.9
2844.00	V	-	-	-71.26	9.14	-62.11	-49.1

Table 7-18. Radiated Spurious Data (Band 12 – High Channel)

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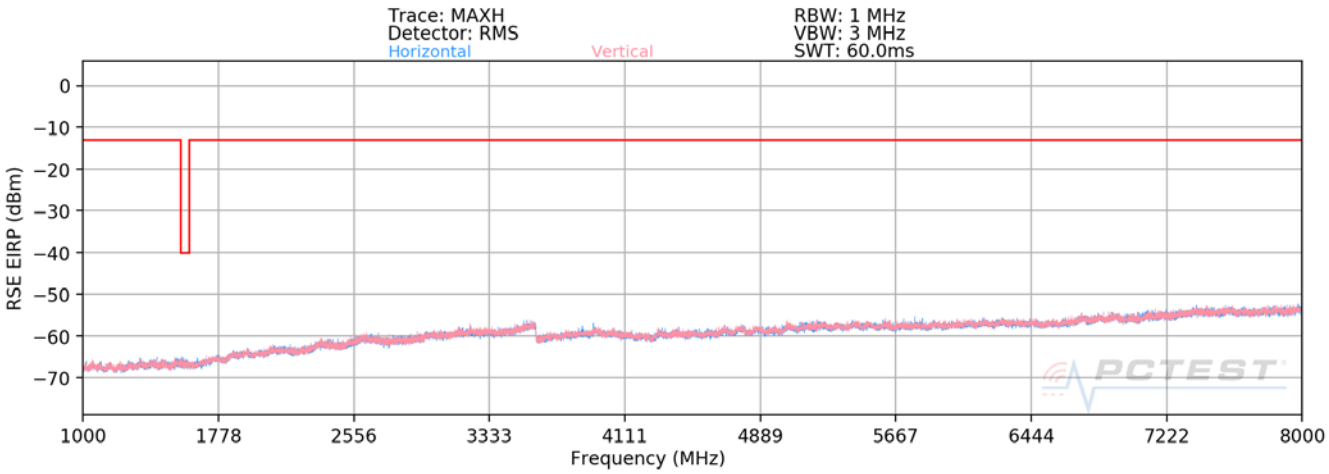
Band 13



Plot 7-303. Radiated Spurious Plot above 1GHz (Band 13)

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

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
2346.00	V	126	122	-64.00	10.31	-53.69	-40.7
3128.00	V	-	-	-69.34	8.60	-60.74	-47.7
3910.00	V	-	-	-65.61	5.98	-59.63	-46.6

Table 7-19. Radiated Spurious Data (Band 13 – Mid Channel)

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

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1564.00	V	142	328	-68.71	9.44	-59.27	-19.3

Table 7-20. Radiated Spurious Data (Band 13 – 1559-1610MHz Band)

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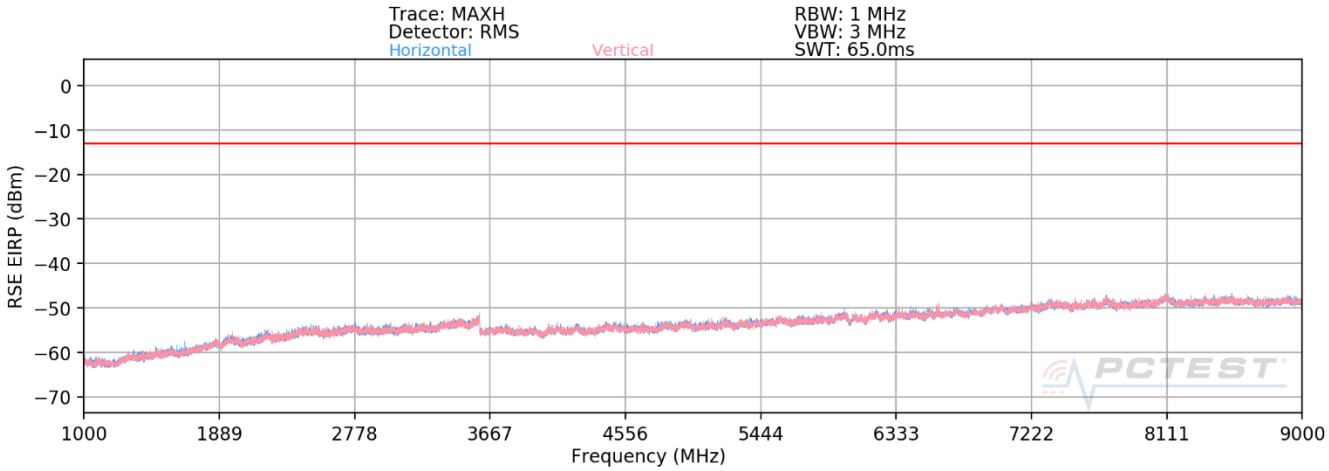
Band 26/5



Plot 7-304. 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	159	12	-71.64	9.55	-62.10	-49.1
2487.00	H	134	161	-63.60	9.44	-54.16	-41.2
3316.00	H	-	-	-69.71	7.40	-62.31	-49.3
4145.00	H	-	-	-68.25	8.09	-60.16	-47.2

Table 7-21. 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	367	363	-72.29	9.54	-62.75	-49.7
2509.50	H	400	153	-69.88	9.42	-60.46	-47.5
3346.00	H	-	-	-67.50	7.32	-60.18	-47.2
4182.50	H	-	-	-68.36	8.16	-60.20	-47.2

Table 7-22. 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	154	180	-67.02	9.53	-57.49	-44.5
2532.00	H	112	143	-66.52	9.41	-57.12	-44.1
3376.00	H	-	-	-67.13	7.31	-59.82	-46.8

Table 7-23. Radiated Spurious Data (Band 26/5 – High Channel)

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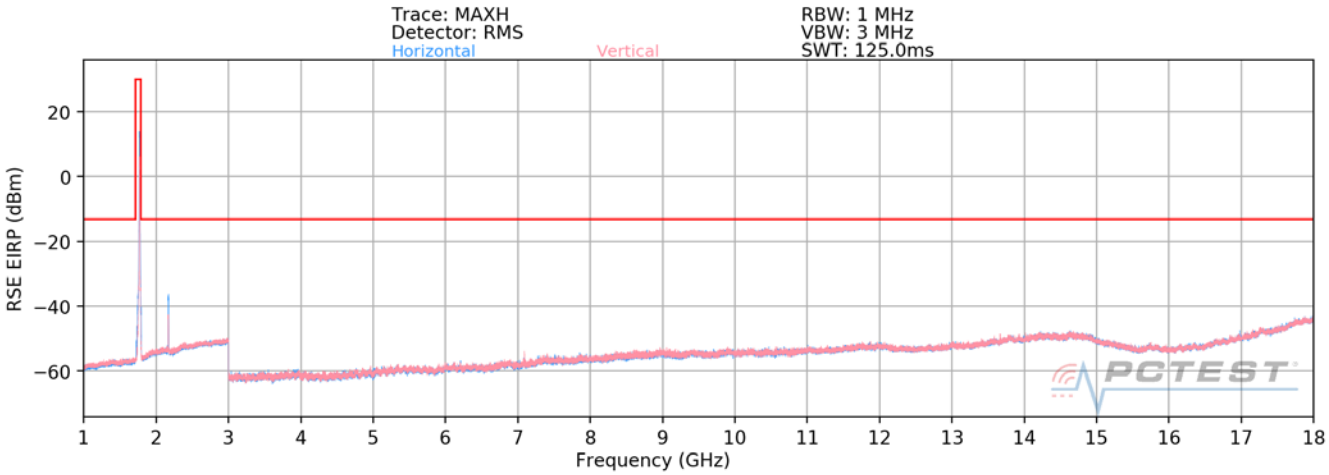
Band 66/4



Plot 7-305. 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	113	148	-58.63	6.22	-52.41	-39.4
5160.00	H	-	-	-66.66	8.68	-57.99	-45.0
6880.00	H	327	190	-48.37	8.76	-39.61	-26.6
8600.00	H	-	-	-61.30	9.17	-52.13	-39.1
10320.00	H	167	174	-56.87	9.64	-47.24	-34.2
12040.00	H	-	-	-58.22	9.23	-48.98	-36.0
13760.00	H	-	-	-55.14	9.01	-46.14	-33.1

Table 7-24. 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	112	147	-60.51	6.32	-54.19	-41.2
5235.00	H	379	152	-68.55	8.71	-59.83	-46.8
6980.00	H	294	193	-49.20	8.74	-40.47	-27.5
8725.00	H	-	-	-64.89	9.42	-55.47	-42.5
10470.00	H	400	178	-57.79	9.62	-48.17	-35.2
12215.00	H	-	-	-62.06	9.09	-52.97	-40.0
13960.00	H	-	-	-59.81	8.90	-50.90	-37.9

Table 7-25. 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	395	45	-61.25	6.31	-54.94	-41.9
5310.00	H	-	-	-69.33	8.74	-60.60	-47.6
7080.00	H	301	190	-52.33	8.66	-43.67	-30.7
8850.00	H	-	-	-65.33	9.53	-55.80	-42.8
10620.00	H	400	177	-57.79	9.50	-48.29	-35.3
12390.00	H	-	-	-62.94	9.12	-53.81	-40.8
14160.00	H	-	-	-58.64	8.85	-49.79	-36.8

Table 7-26. Radiated Spurious Data (Band 66/4 – High Channel)

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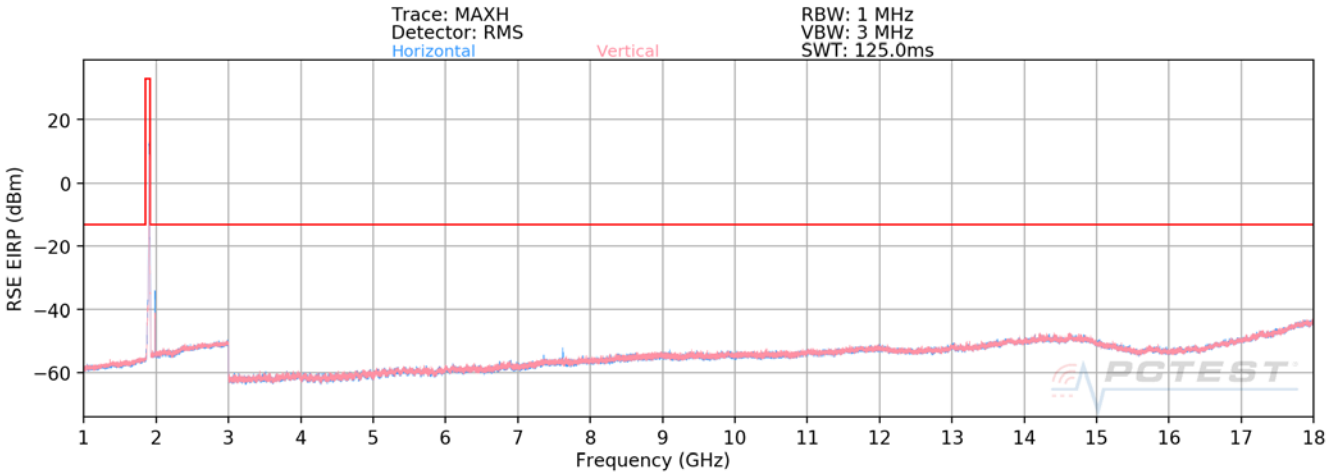
Band 25/2



Plot 7-306. 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	397	147	-62.82	6.58	-56.23	-43.2
5580.00	H	-	-	-66.34	8.74	-57.61	-44.6
7440.00	H	162	59	-52.86	8.41	-44.45	-31.4
9300.00	H	-	-	-61.24	9.33	-51.91	-38.9
11160.00	H	131	182	-56.59	9.32	-47.27	-34.3
13020.00	H	-	-	-57.10	8.96	-48.14	-35.1
14880.00	H	-	-	-54.35	8.67	-45.69	-32.7

Table 7-27. 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	327	141	-64.30	6.70	-57.60	-44.6
5647.50	H	311	218	-66.48	8.83	-57.65	-44.6
7530.00	H	378	181	-49.42	8.46	-40.96	-28.0
9412.50	H	-	-	-64.33	9.32	-55.01	-42.0
11295.00	H	135	184	-60.60	9.23	-51.37	-38.4
13177.50	H	-	-	-61.09	9.08	-52.01	-39.0
15060.00	H	-	-	-60.48	8.74	-51.74	-38.7

Table 7-28. 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	375	150	-63.01	6.94	-56.07	-43.1
5715.00	H	342	197	-64.32	8.77	-55.56	-42.6
7620.00	H	374	182	-49.44	8.51	-40.94	-27.9
9525.00	H	-	-	-60.52	9.40	-51.12	-38.1
11430.00	H	328	174	-55.25	9.19	-46.06	-33.1
13335.00	H	-	-	-57.13	8.91	-48.22	-35.2
15240.00	H	-	-	-56.27	8.41	-47.86	-34.9

Table 7-29. Radiated Spurious Data (Band 25/2 – High Channel)

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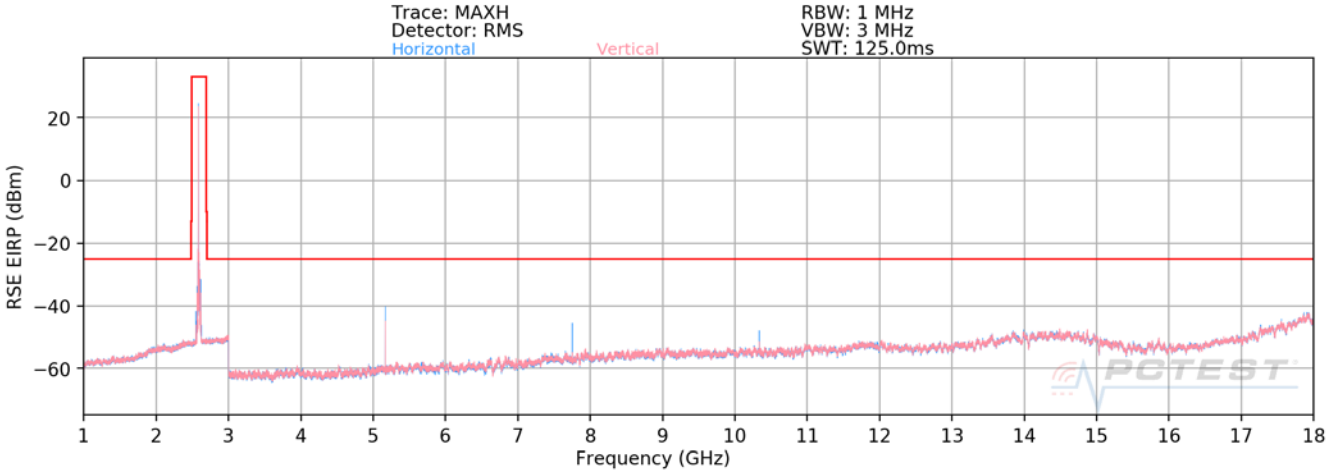
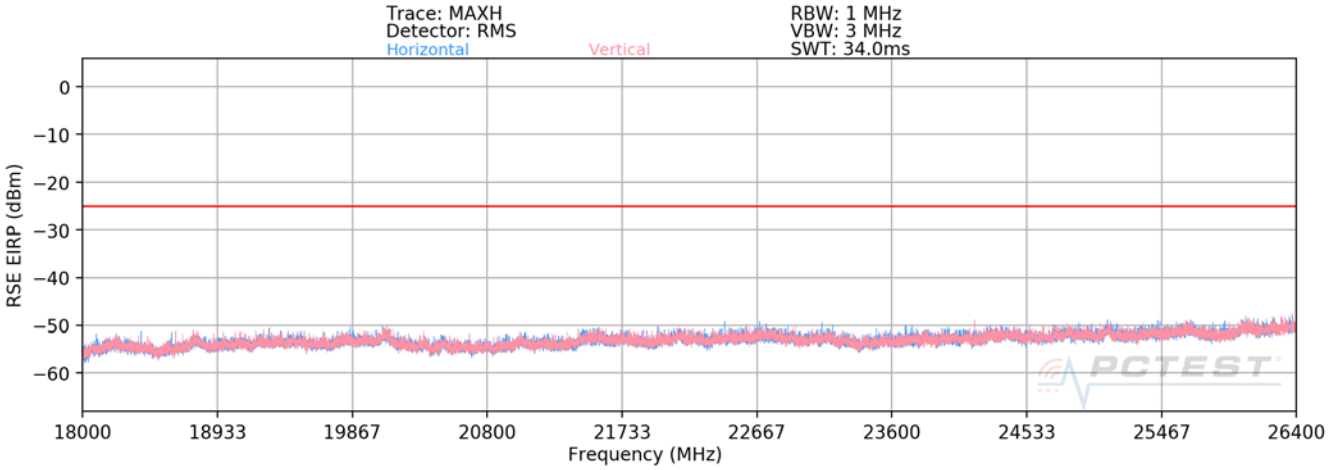
Band 41 PC2



Plot 7-307. Radiated Spurious Plot 1GHz - 18GHz (Band 41)



Plot 7-308. Radiated Spurious Plot 18GHz – 26.5GHz (Band 41)

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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	388	48	-54.49	10.80	-43.69	-18.7
7518.00	H	336	345	-51.99	12.59	-39.40	-14.4
10024.00	H	366	3	-52.22	12.03	-40.19	-15.2
12530.00	H	400	369	-63.01	13.59	-49.42	-24.4
15036.00	H	161	342	-64.57	10.73	-53.84	-28.8
17542.00	H	398	15	-61.20	12.55	-48.65	-23.6

Table 7-30. 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	361	30	-45.36	11.14	-34.22	-9.2
7779.00	H	398	51	-55.60	12.33	-43.27	-18.3
10372.00	H	400	11	-51.83	12.48	-39.35	-14.4
12965.00	H	185	39	-69.00	13.34	-55.66	-30.7
15558.00	H	191	337	-61.49	12.76	-48.73	-23.7

Table 7-31. 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	386	349	-52.40	11.47	-40.93	-15.9
8040.00	H	332	319	-51.95	11.97	-39.99	-15.0
10720.00	H	166	358	-49.14	12.65	-36.49	-11.5
13400.00	H	166	313	-59.83	12.61	-47.22	-22.2
16080.00	H	266	22	-68.75	16.62	-52.13	-27.1

Table 7-32. Radiated Spurious Data (Band 41 – High Channel)

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7.9 Frequency Stability / Temperature Variation

Test Overview and Limit

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

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

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

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

Test Procedure Used

ANSI/TIA-603-E-2016

Test Settings

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

Test Setup

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

Test Notes

None

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Band 71 Frequency Stability Measurements

OPERATING FREQUENCY: 680,500,000 Hz

REFERENCE VOLTAGE: 4.00 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (^{0}C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.00	- 30	680,500,294	294	0.0000432
100 %		- 20	680,499,957	-43	-0.0000063
100 %		- 10	680,500,136	136	0.0000200
100 %		0	680,499,749	-251	-0.0000369
100 %		+ 10	680,499,938	-62	-0.0000091
100 %		+ 20	680,500,089	89	0.0000131
100 %		+ 30	680,500,073	73	0.0000107
100 %		+ 40	680,500,118	118	0.0000173
100 %		+ 50	680,499,768	-232	-0.0000341
BATT. ENDPOINT	2.90	+ 20	680,500,192	192	0.0000282

Table 7-33. 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

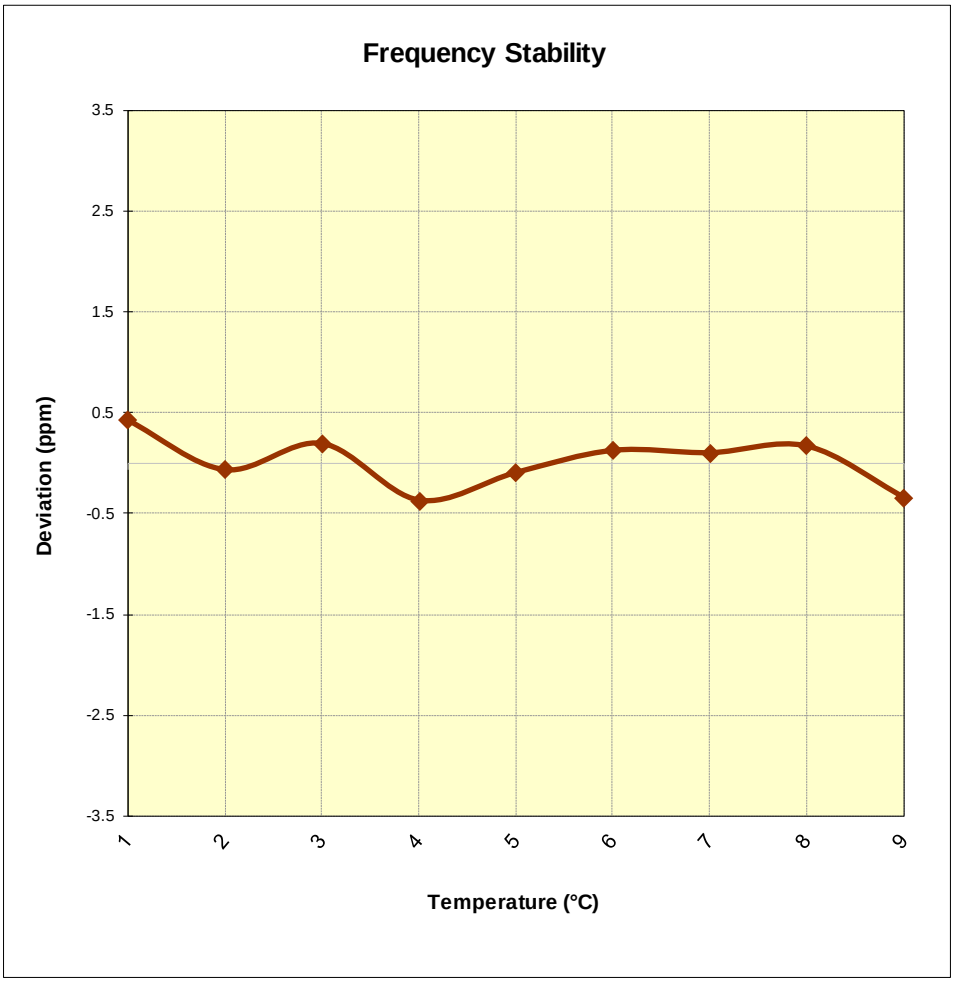

Figure 7-9. Frequency Stability Graph (Band 71)

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Band 12 Frequency Stability Measurements

OPERATING FREQUENCY: 707,500,000 Hz

CHANNEL: 23790

REFERENCE VOLTAGE: 4.00 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (^{0}C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.00	- 30	707,500,006	6	0.0000008
100 %		- 20	707,500,041	41	0.0000058
100 %		- 10	707,500,355	355	0.0000502
100 %		0	707,499,990	-10	-0.0000014
100 %		+ 10	707,500,002	2	0.0000003
100 %		+ 20	707,500,154	154	0.0000218
100 %		+ 30	707,500,416	416	0.0000588
100 %		+ 40	707,500,123	123	0.0000174
100 %		+ 50	707,499,673	-327	-0.0000462
BATT. ENDPOINT	2.90	+ 20	707,500,058	58	0.0000082

Table 7-34. Frequency Stability Data (Band 12)

Note:

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

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Band 12 Frequency Stability Measurements

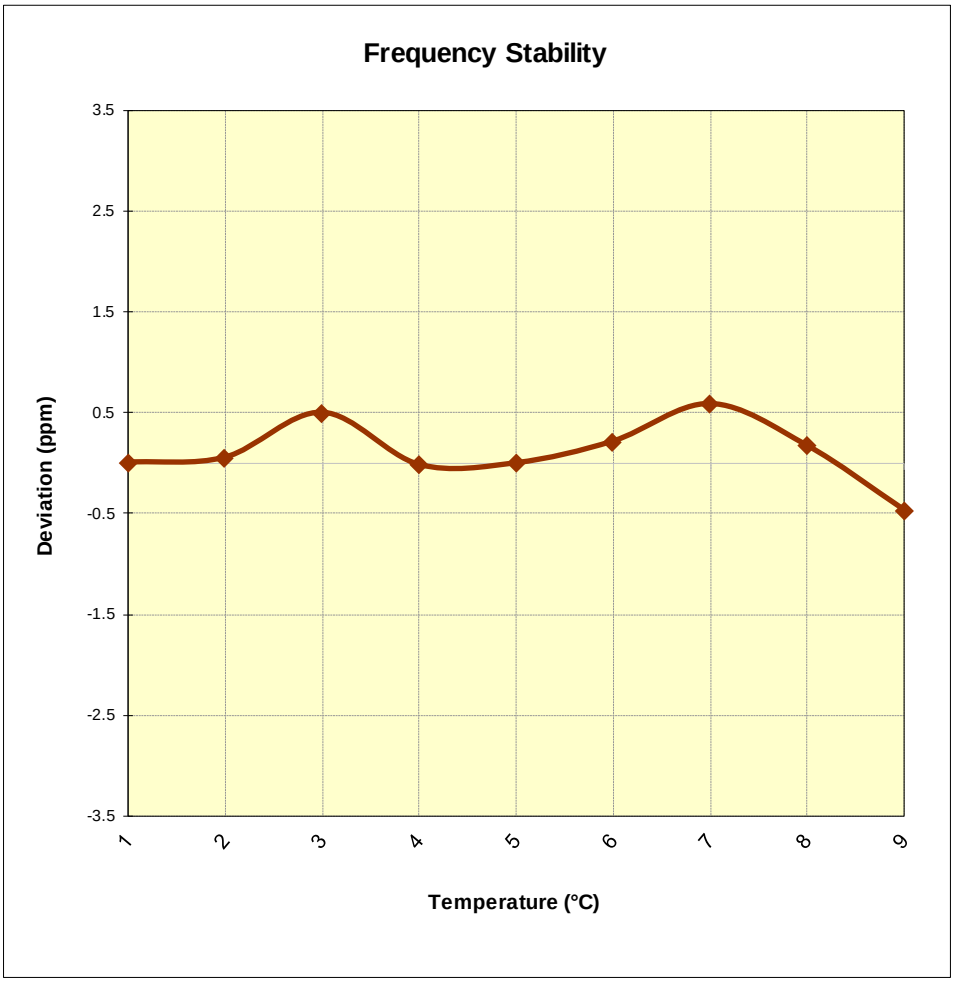

Figure 7-10. Frequency Stability Graph (Band 12)

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Band 13 Frequency Stability Measurements

OPERATING FREQUENCY: 782,000,000 Hz

CHANNEL: 23230

REFERENCE VOLTAGE: 4.00 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (^{0}C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.00	- 30	782,000,298	298	0.0000381
100 %		- 20	781,999,883	-117	-0.0000150
100 %		- 10	782,000,089	89	0.0000114
100 %		0	781,999,819	-181	-0.0000231
100 %		+ 10	782,000,221	221	0.0000283
100 %		+ 20	781,999,905	-95	-0.0000121
100 %		+ 30	782,000,121	121	0.0000155
100 %		+ 40	782,000,018	18	0.0000023
100 %		+ 50	781,999,947	-53	-0.0000068
BATT. ENDPOINT	2.90	+ 20	781,999,886	-114	-0.0000146

Table 7-35. 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

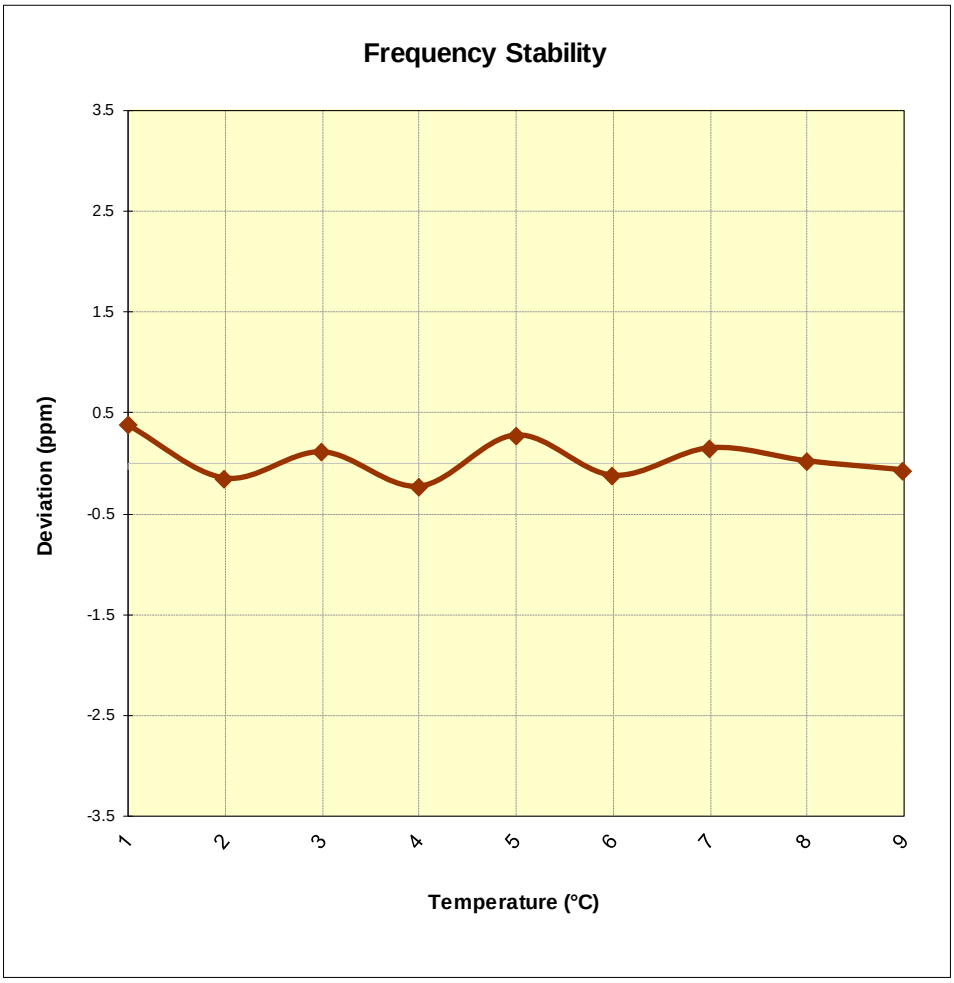

Figure 7-11. Frequency Stability Graph (Band 13)

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Band 26/5 Frequency Stability Measurements

OPERATING FREQUENCY:	831,500,000	Hz
CHANNEL:	26865	
REFERENCE VOLTAGE:	4.00	VDC
DEVIATION LIMIT:	± 0.00025 % or 2.5 ppm	

VOLTAGE (%)	POWER (VDC)	TEMP (^{0}C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.00	- 30	831,500,110	110	0.0000132
100 %		- 20	831,499,789	-211	-0.0000254
100 %		- 10	831,499,894	-106	-0.0000127
100 %		0	831,499,885	-115	-0.0000138
100 %		+ 10	831,500,091	91	0.0000109
100 %		+ 20	831,500,204	204	0.0000245
100 %		+ 30	831,499,743	-257	-0.0000309
100 %		+ 40	831,499,523	-477	-0.0000574
100 %		+ 50	831,500,031	31	0.0000037
BATT. ENDPOINT	2.90	+ 20	831,500,075	75	0.0000090

Table 7-36. Frequency Stability Data (Band 26/5)

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Band 26/5 Frequency Stability Measurements

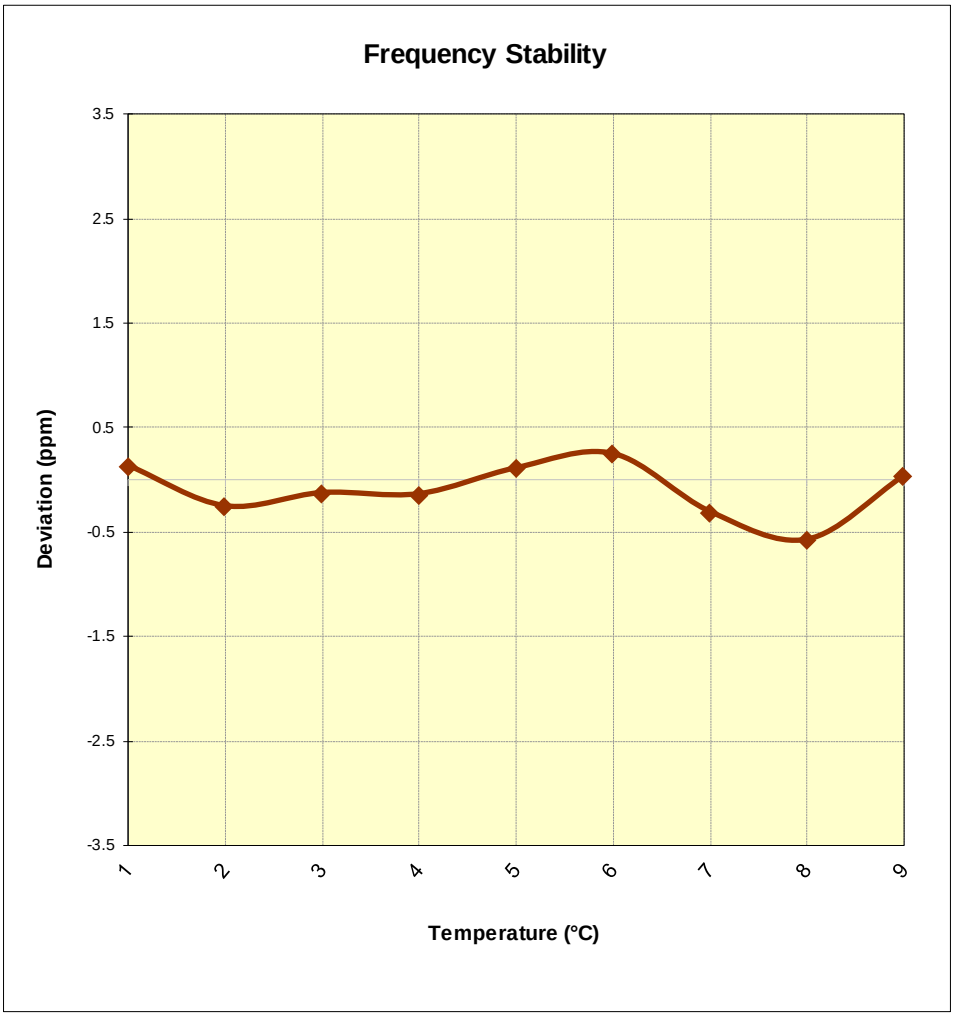

Figure 7-12. Frequency Stability Graph (Band 26/5)

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Band 66/4 Frequency Stability Measurements

OPERATING FREQUENCY: 1,745,000,000 Hz

CHANNEL: 132322

REFERENCE VOLTAGE: 4.00 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (^{0}C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.00	- 30	1,745,000,071	71	0.0000041
100 %		- 20	1,745,000,222	222	0.0000127
100 %		- 10	1,744,999,894	-106	-0.0000061
100 %		0	1,744,999,706	-294	-0.0000168
100 %		+ 10	1,745,000,009	9	0.0000005
100 %		+ 20	1,744,999,845	-155	-0.0000089
100 %		+ 30	1,744,999,868	-132	-0.0000076
100 %		+ 40	1,744,999,995	-5	-0.0000003
100 %		+ 50	1,745,000,112	112	0.0000064
BATT. ENDPOINT	2.90	+ 20	1,744,999,956	-44	-0.0000025

Table 7-37. 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

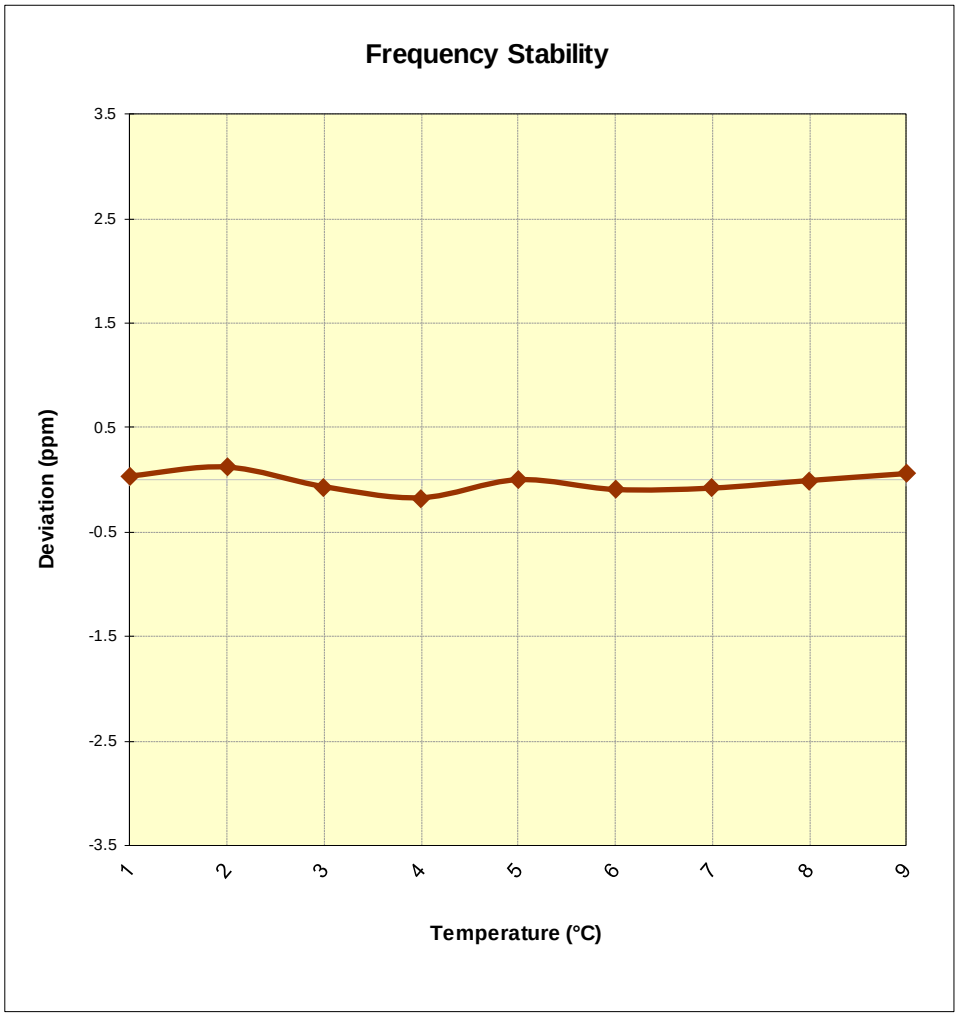

Figure 7-13. Frequency Stability Graph (Band 66/4)

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Band 25/2 Frequency Stability Measurements

OPERATING FREQUENCY:	1,882,500,000	Hz
CHANNEL:	26365	
REFERENCE VOLTAGE:	4.00	VDC
DEVIATION LIMIT:	± 0.00025 % or 2.5 ppm	

VOLTAGE (%)	POWER (VDC)	TEMP (^{0}C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.00	- 30	1,882,499,804	-196	-0.0000104
100 %		- 20	1,882,499,702	-298	-0.0000158
100 %		- 10	1,882,499,690	-310	-0.0000165
100 %		0	1,882,499,852	-148	-0.0000079
100 %		+ 10	1,882,499,949	-51	-0.0000027
100 %		+ 20	1,882,499,753	-247	-0.0000131
100 %		+ 30	1,882,500,141	141	0.0000075
100 %		+ 40	1,882,499,694	-306	-0.0000163
100 %		+ 50	1,882,500,012	12	0.0000006
BATT. ENDPOINT	2.90	+ 20	1,882,499,958	-42	-0.0000022

Table 7-38. Frequency Stability Data (Band 25/2)

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Band 25/2 Frequency Stability Measurements

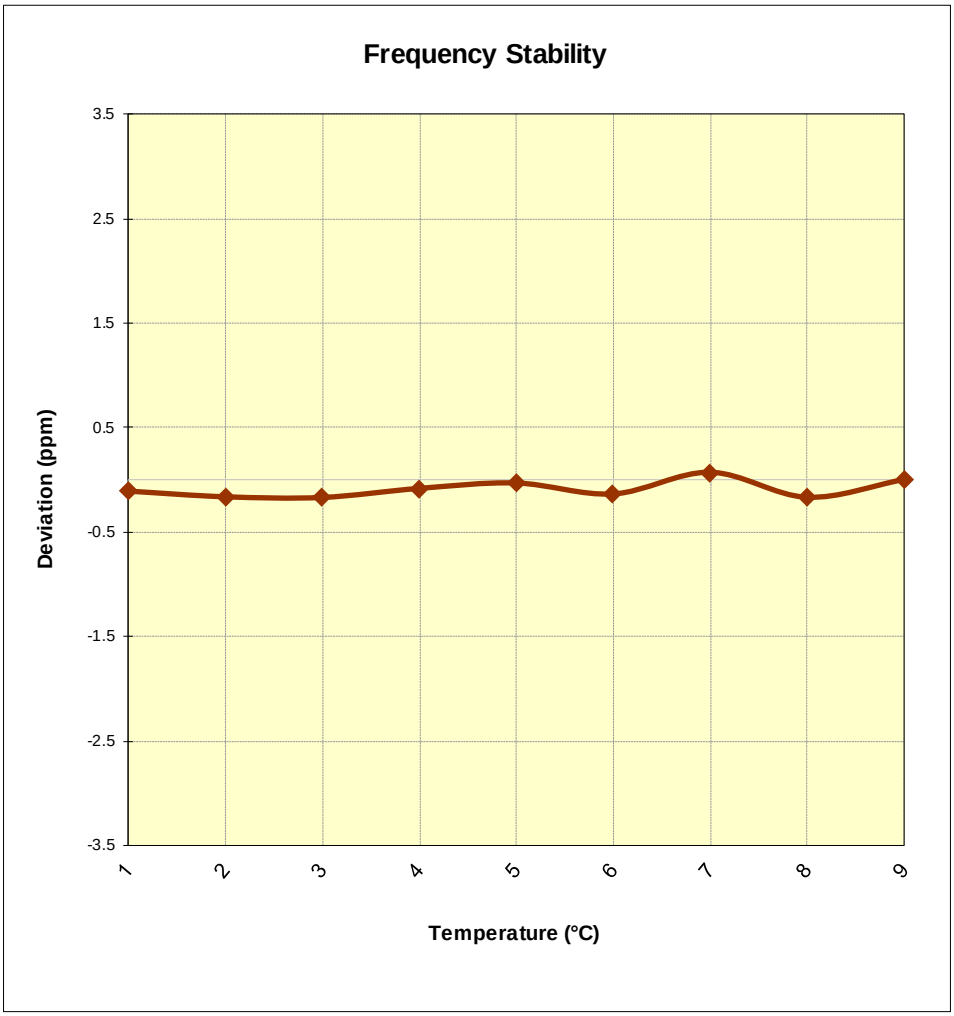

Figure 7-14. Frequency Stability Graph (Band 25/2)

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Band 41 Frequency Stability Measurements

OPERATING FREQUENCY: 2,593,000,000 Hz

CHANNEL: 40620

REFERENCE VOLTAGE: 4.00 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (^{0}C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.00	- 30	2,592,999,935	-65	-0.0000025
100 %		- 20	2,592,999,807	-193	-0.0000074
100 %		- 10	2,592,999,959	-41	-0.0000016
100 %		0	2,593,000,024	24	0.0000009
100 %		+ 10	2,593,000,062	62	0.0000024
100 %		+ 20	2,593,000,094	94	0.0000036
100 %		+ 30	2,593,000,005	5	0.0000002
100 %		+ 40	2,592,999,885	-115	-0.0000044
100 %		+ 50	2,592,999,771	-229	-0.0000088
BATT. ENDPOINT	2.90	+ 20	2,593,000,070	70	0.0000027

Table 7-39. 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

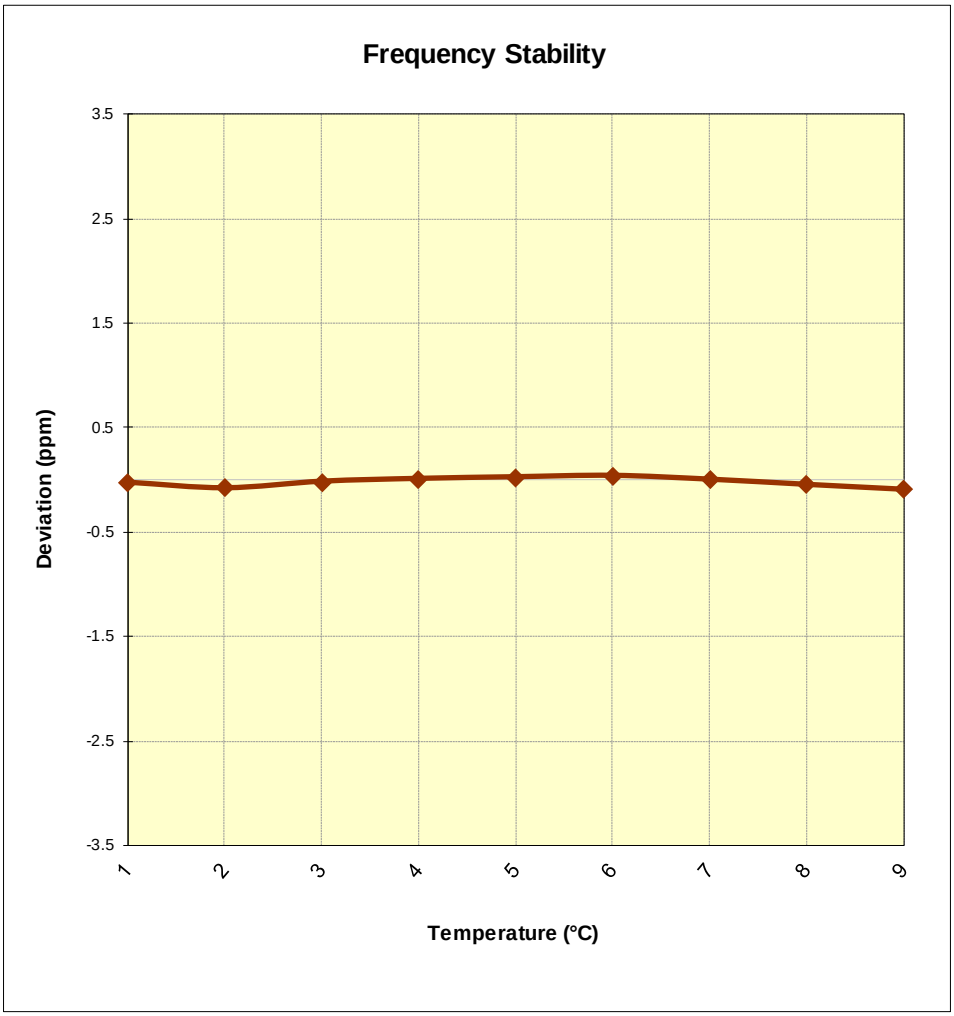

Figure 7-15. Frequency Stability Graph (Band 41)

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8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **LG Portable Handset FCC ID: ZNFQ730VM** complies with all the requirements of Part 22, 24, & 27 of the FCC Rules for LTE operation only.

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