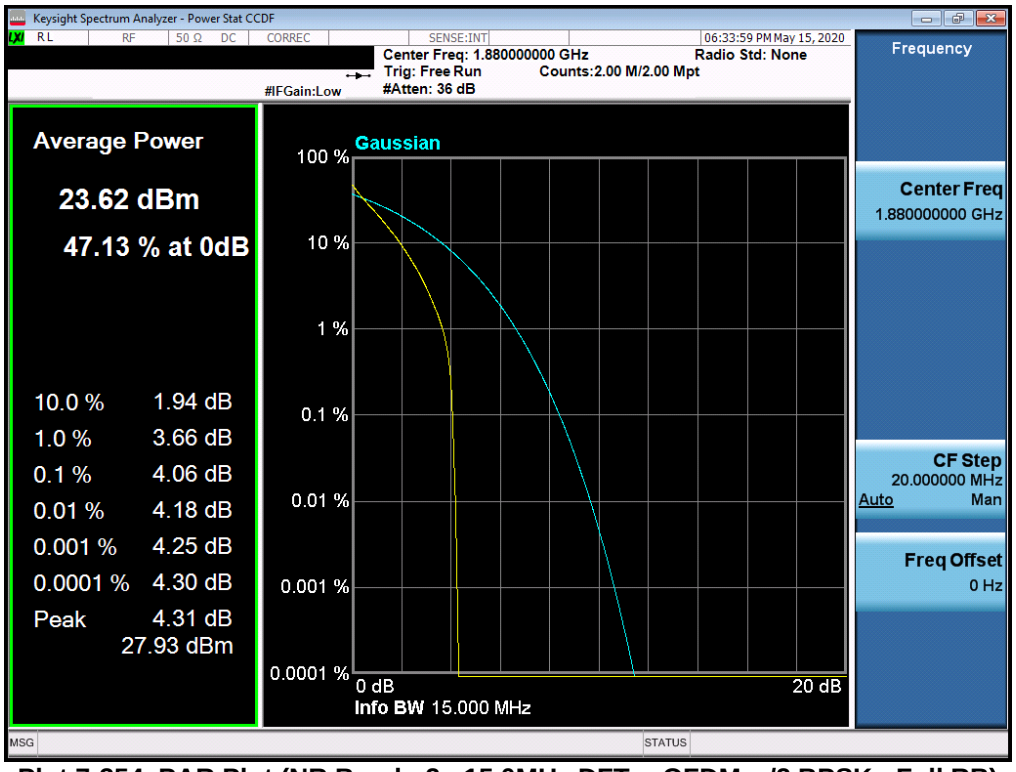
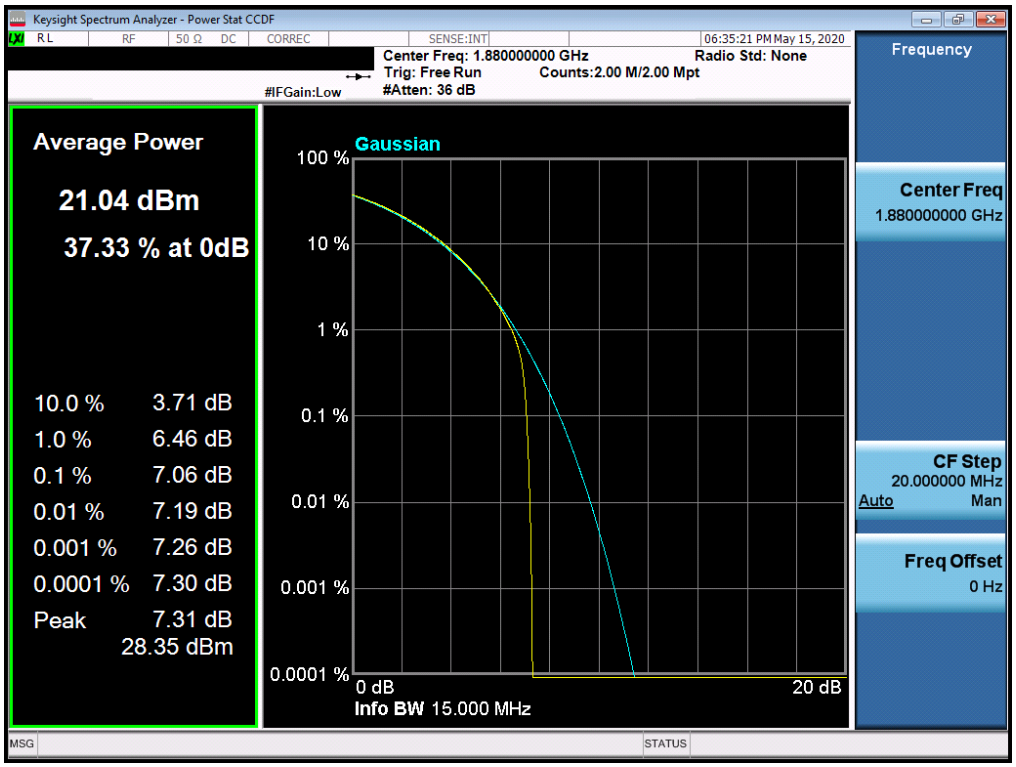
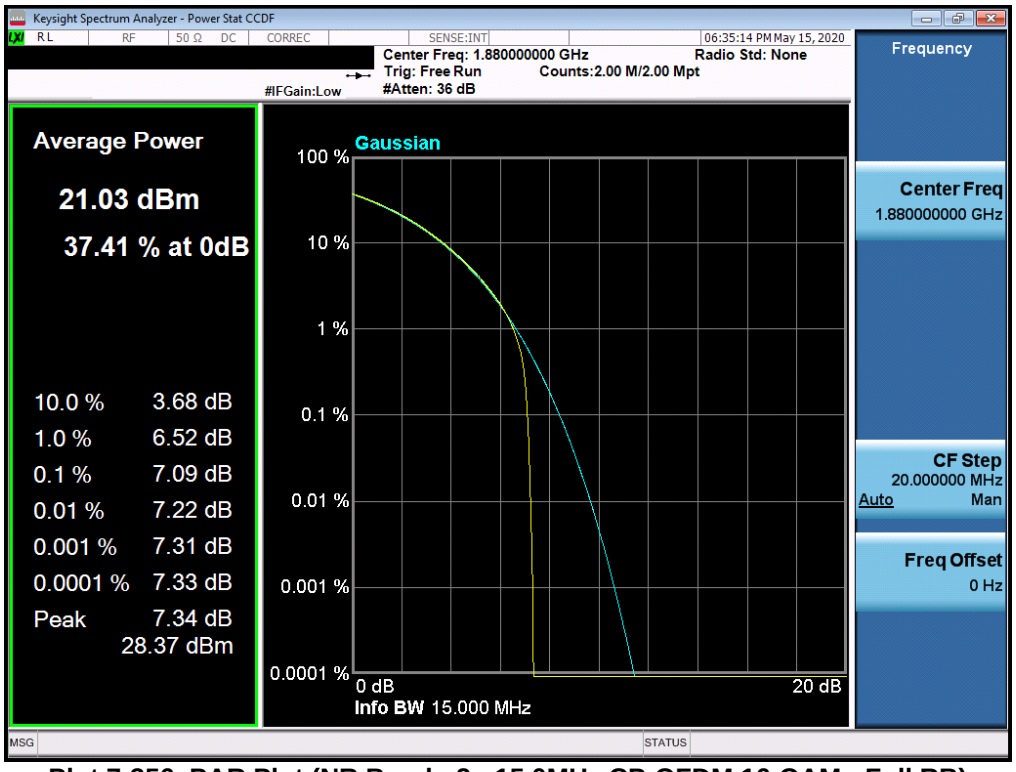


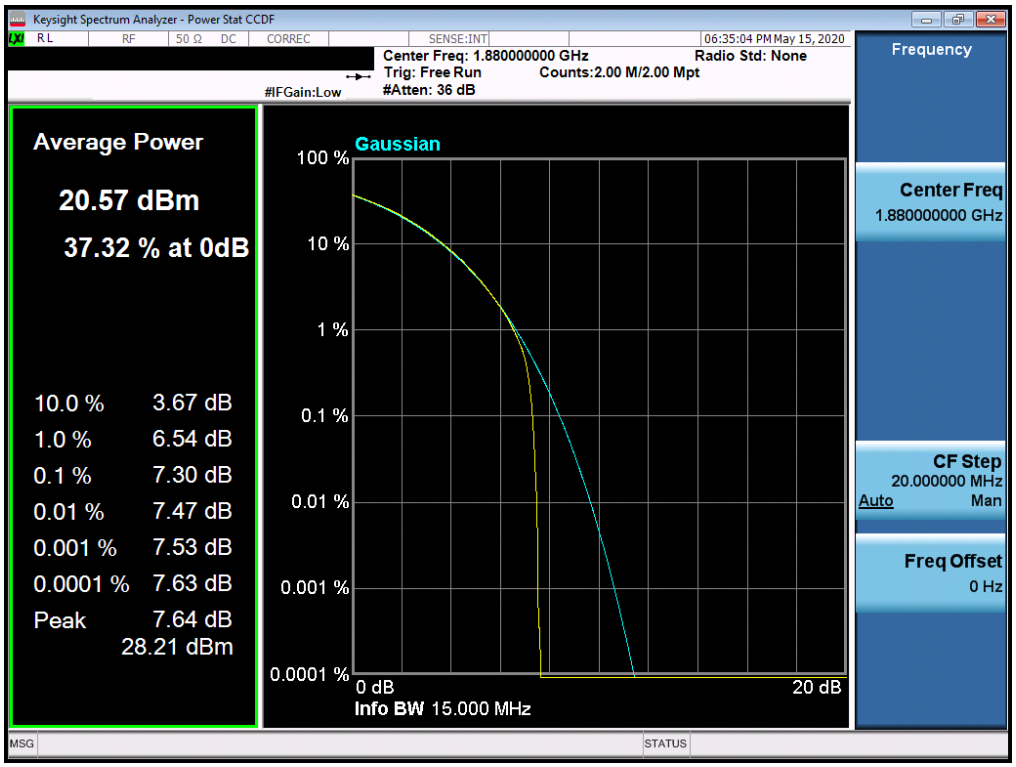
Plot 7-354. PAR Plot (NR Band n2 - 15.0MHz DFT-s-OFDM π/2 BPSK - Full RB)



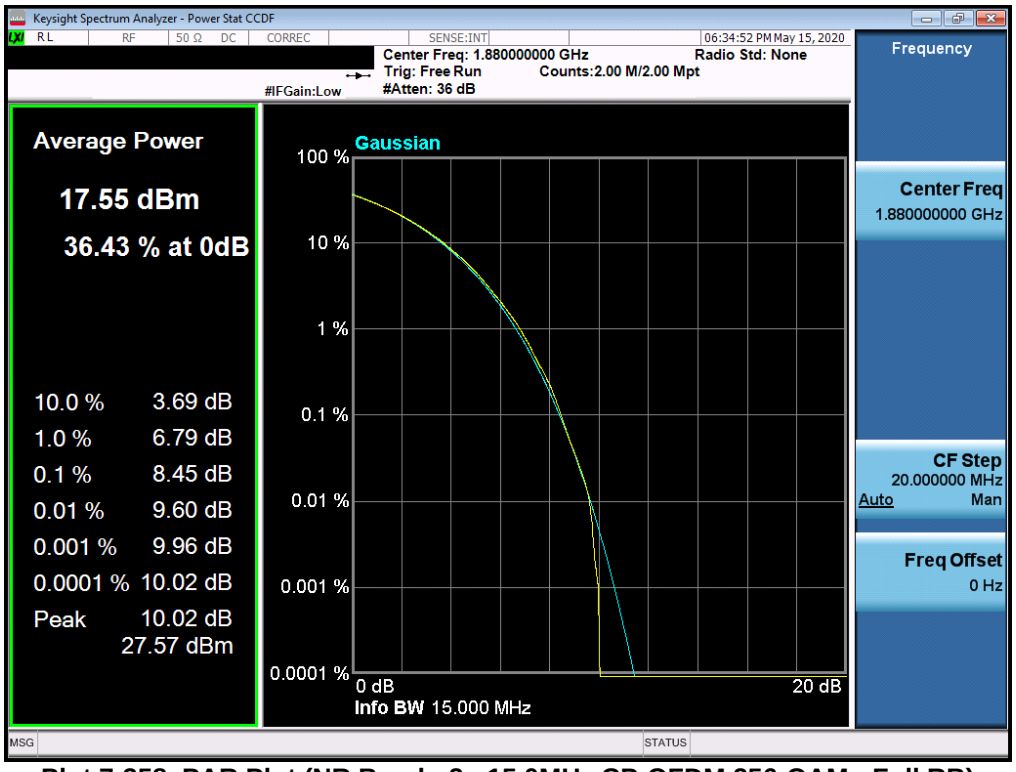
Plot 7-355. PAR Plot (NR Band n2 - 15.0MHz CP-OFDM QPSK - Full RB)



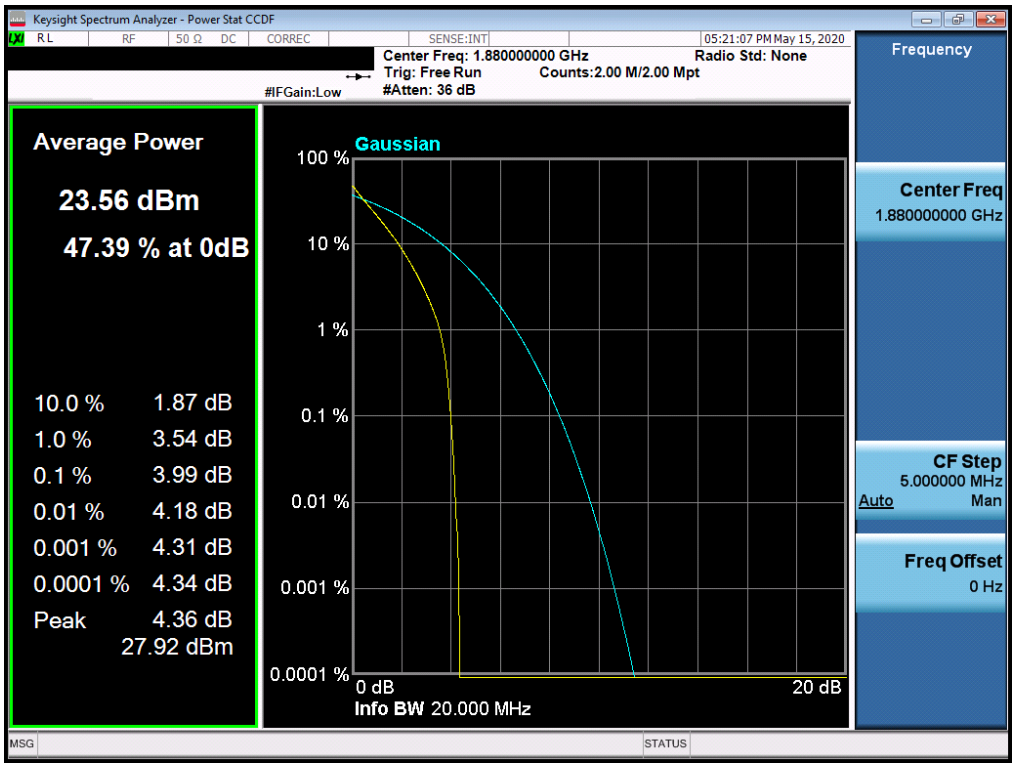
Plot 7-356. PAR Plot (NR Band n2 - 15.0MHz CP-OFDM 16-QAM - Full RB)



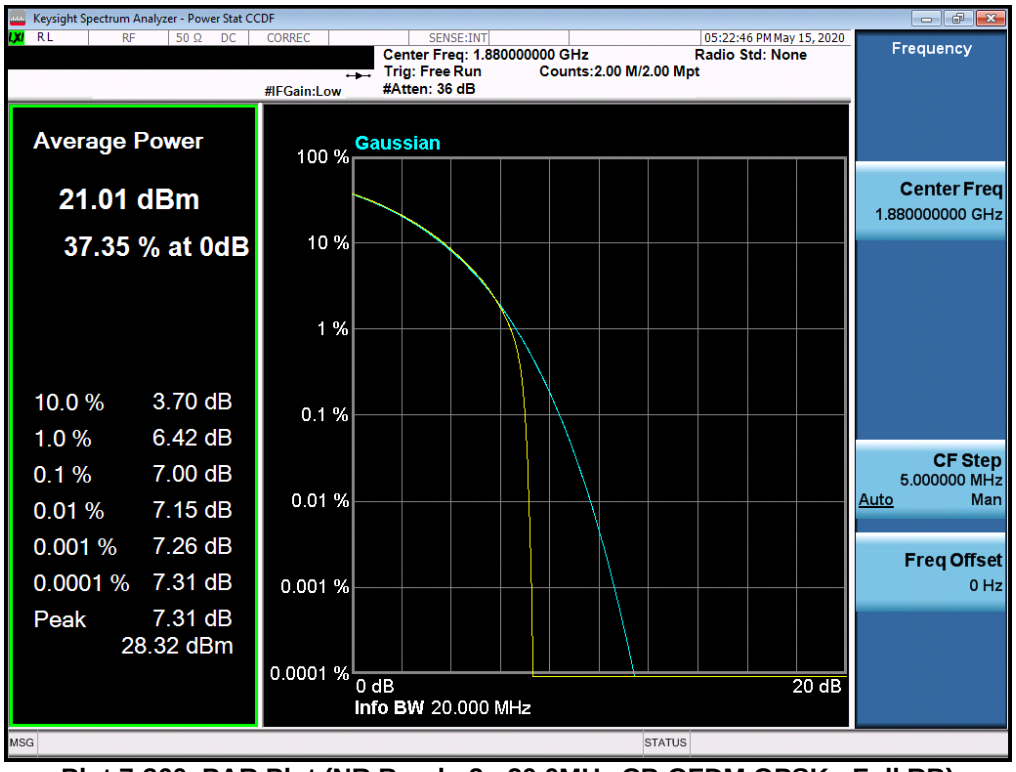
Plot 7-357. PAR Plot (NR Band n2 - 15.0MHz CP-OFDM 64-QAM - Full RB)



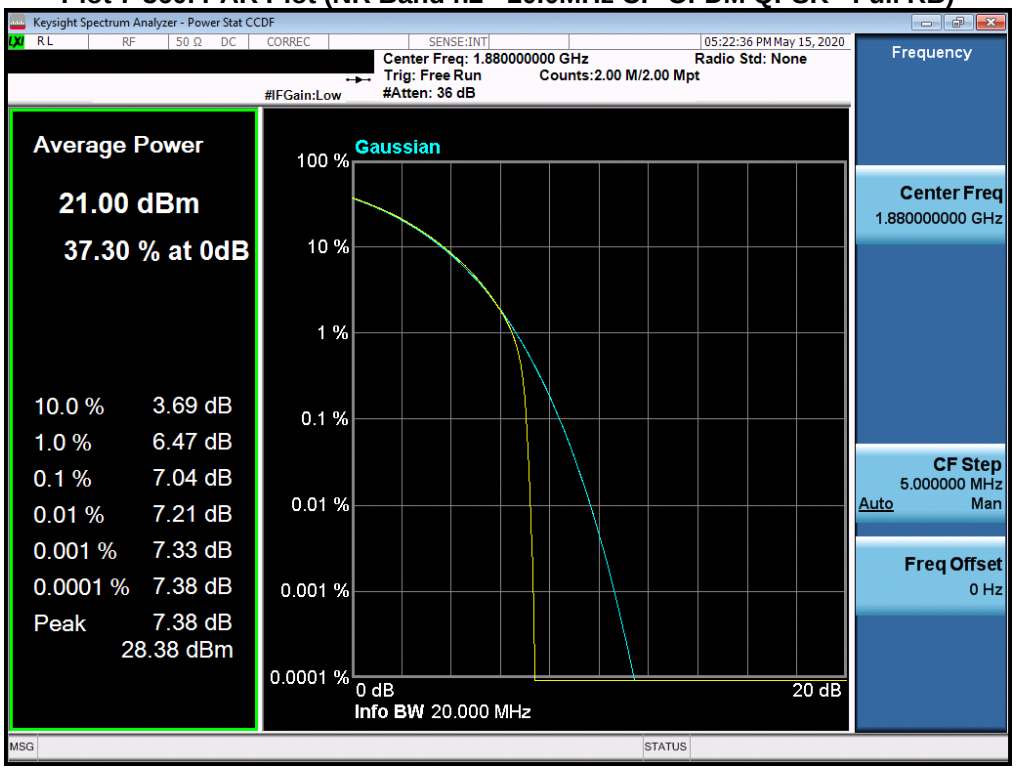
Plot 7-358. PAR Plot (NR Band n2 - 15.0MHz CP-OFDM 256-QAM - Full RB)



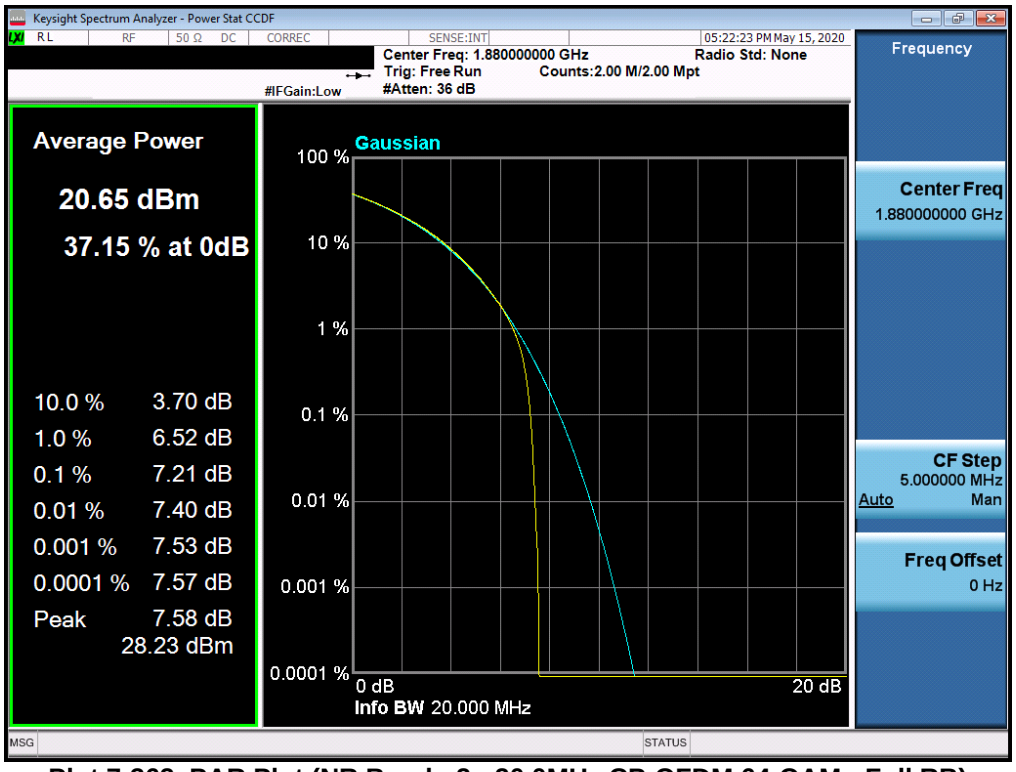
Plot 7-359. PAR Plot (NR Band n2 - 20.0MHz DFT-s-OFDM π/2 BPSK - Full RB)



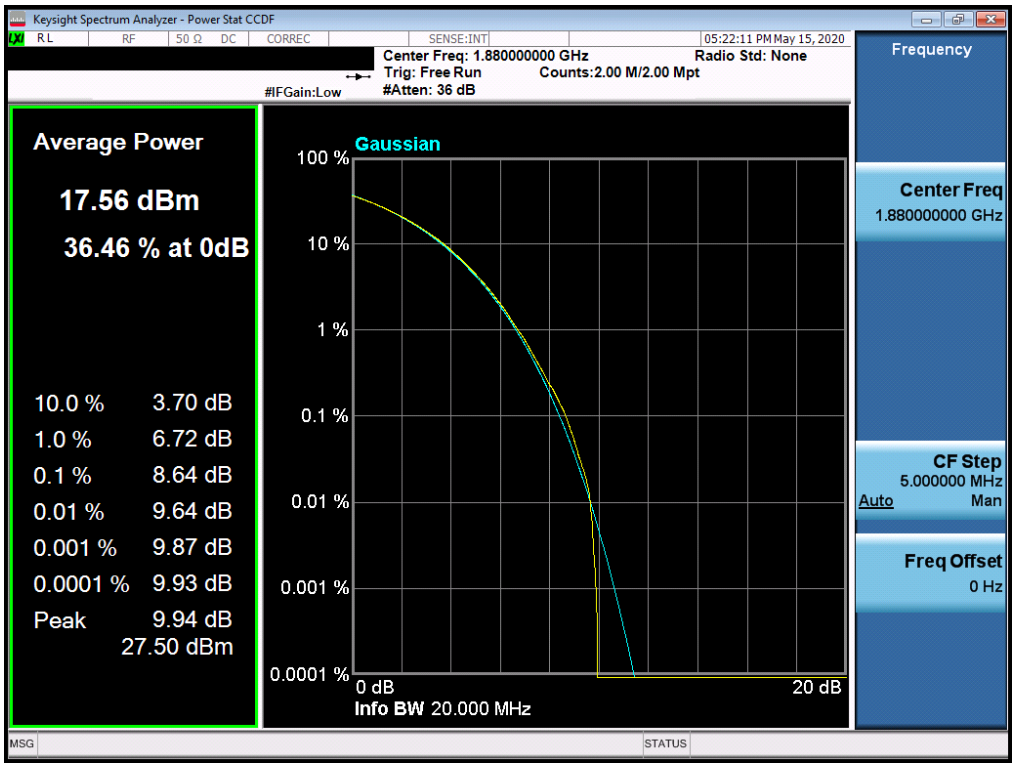
Plot 7-360. PAR Plot (NR Band n2 - 20.0MHz CP-OFDM QPSK - Full RB)



Plot 7-361. PAR Plot (NR Band n2 - 20.0MHz CP-OFDM 16-QAM - Full RB)



Plot 7-362. PAR Plot (NR Band n2 - 20.0MHz CP-OFDM 64-QAM - Full RB)



Plot 7-363. PAR Plot (NR Band n2 - 20.0MHz CP-OFDM 256-QAM - Full RB)

7.6 Transmitter Conducted Output Power

Test Overview and Limit

A transmitter port of EUT is connected to the input of a signal analyzer while also connected to a base station simulator to enabe the LTE link. For Sub-6GHz NR measurements, manufacturer provided software was used to establish the NR transmission and the power measurements are measured on the spectrum analyzer. 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 Procedure Used

KDB 971168 D01 v03r01 – Section 5.2.2
ANSI/TIA-603-E-2016 – Section 2.2.17
KDB 662911 D01 v02r01 – Section E)1) In-Band Power Measurements

Test Settings

1. Conducted power measurements are performed using the signal analyzer's "channel power" measurement capability for signals with continuous operation.
2. RBW = 1 – 5% of the expected OBW, not to exceed 1MHz
3. VBW ≥ 3 x RBW
4. Span = 2 times the OBW
5. No. of sweep points > 2 x span / RBW
6. Detector = RMS
7. Trace mode = Trace-Averaging (RMS) set to average over 100 sweeps
8. The trace was allowed to stabilize

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

LTE Band 13

LTE Band 13 5 MHz Bandwidth			
Modulation	RB Size	RB Offset	Mid Channel 23230 (782.0 MHz) Conducted Power [dBm]
QPSK	1	0	**23.47**
	1	12	23.32
	1	24	23.31
	25	0	22.48
16QAM	1	0	22.37
	1	12	22.41
	1	24	22.44
	25	0	21.44
64QAM	1	0	21.90
	1	12	21.15
	1	24	21.51
	25	0	20.55

Table 7-3. Conducted Powers (B13, 5MHz)

LTE Band 13 10 MHz Bandwidth			
Modulation	RB Size	RB Offset	Mid Channel 23230 (782.0 MHz) Conducted Power [dBm]
QPSK	1	0	**24.57**
	1	25	24.36
	1	49	24.33
	50	0	23.58
16QAM	1	0	23.87
	1	25	23.89
	1	49	23.65
	50	0	22.66
64QAM	1	0	22.78
	1	25	22.84
	1	49	22.48
	50	0	21.18

Table 7-4. Conducted Powers (B13, 10MHz)

LTE Band 5

LTE Band 5 (Cell) 1.4 MHz Bandwidth					
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel
			20407 (824.7 MHz)	20525 (836.5 MHz)	20643 (848.3 MHz)
			Conducted Power [dBm]		
QPSK	1	0	23.47	23.62	23.54
	1	2	23.61	23.74	**23.76**
	1	5	23.62	23.68	23.47
	6	0	22.67	22.71	22.54
16QAM	1	0	22.94	22.67	22.91
	1	2	22.67	22.61	22.47
	1	5	22.81	22.81	22.63
	6	0	21.74	21.67	21.48
64QAM	1	0	21.76	21.74	21.98
	1	2	21.66	21.79	21.59
	1	5	21.97	22.01	21.84
	6	0	20.69	20.91	20.44

Table 7-5. Conducted Powers (B5, 1.4MHz)

LTE Band 5 (Cell) 3 MHz Bandwidth					
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel
			20415 (825.5 MHz)	20525 (836.5 MHz)	20635 (847.5 MHz)
			Conducted Power [dBm]		
QPSK	1	0	23.64	23.51	23.61
	1	7	23.49	23.66	**23.77**
	1	14	23.67	23.74	23.37
	15	0	22.81	22.74	22.61
16QAM	1	0	22.83	22.51	22.49
	1	7	22.71	22.67	22.51
	1	14	22.84	22.89	22.92
	15	0	21.61	21.37	21.54
64QAM	1	0	21.81	21.63	21.93
	1	7	21.64	21.84	21.61
	1	14	21.84	22.18	21.88
	15	0	20.41	20.84	20.31

Table 7-6. Conducted Powers (B5, 3MHz)

LTE Band 5 (Cell) 5 MHz Bandwidth					
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel
			20425 (826.5 MHz)	20525 (836.5 MHz)	20625 (846.5 MHz)
			Conducted Power [dBm]		
QPSK	1	0	23.56	23.57	23.64
	1	12	23.45	23.80	23.71
	1	24	23.65	**23.86**	23.52
	25	0	22.73	22.69	22.62
16QAM	1	0	22.90	22.71	22.66
	1	12	22.72	22.84	22.90
	1	24	22.84	22.64	22.54
	25	0	21.69	21.71	21.67
64QAM	1	0	21.84	21.61	22.07
	1	12	21.79	21.73	21.96
	1	24	22.01	21.89	21.97
	25	0	20.71	20.67	20.65

Table 7-7. Conducted Powers (B5, 5MHz)

LTE Band 5 (Cell) 10 MHz Bandwidth			
Modulation	RB Size	RB Offset	Mid Channel
			20525 (836.5 MHz)
			Conducted Power [dBm]
QPSK	1	0	23.57
	1	25	23.80
	1	49	**23.86**
	50	0	22.69
16QAM	1	0	22.71
	1	25	22.84
	1	49	22.64
	50	0	21.71
64QAM	1	0	21.61
	1	25	21.73
	1	49	21.89
	50	0	20.67

Table 7-8. Conducted Powers (B5, 10MHz)

LTE Band 66

LTE Band 66 (AWS) 1.4 MHz Bandwidth					
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel
			131979 (1710.7 MHz)	132322 (1745.0 MHz)	132665 (1779.3 MHz)
			Conducted Power [dBm]		
QPSK	1	0	23.98	24.13	24.13
	1	2	24.06	**24.22**	24.19
	1	5	24.04	24.13	24.10
	6	0	23.22	23.24	23.06
16QAM	1	0	23.13	23.09	22.88
	1	2	23.21	23.18	22.96
	1	5	23.17	23.08	22.87
	6	0	22.23	22.21	22.32
64QAM	1	0	21.32	21.76	21.71
	1	2	21.38	21.85	21.81
	1	5	21.39	21.82	21.64
	6	0	20.40	21.37	20.52

Table 7-9. Conducted Powers (B66, 1.4MHz)

LTE Band 66 (AWS) 3 MHz Bandwidth					
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel
			131987 (1711.5 MHz)	132322 (1745.0 MHz)	132657 (1778.5 MHz)
			Conducted Power [dBm]		
QPSK	1	0	24.06	**24.22**	24.04
	1	7	24.10	24.20	23.94
	1	14	24.16	24.11	23.95
	15	0	23.29	23.33	23.16
16QAM	1	0	23.13	23.33	22.96
	1	7	23.17	23.31	22.87
	1	14	23.19	23.26	22.84
	15	0	22.40	22.44	22.16
64QAM	1	0	20.96	22.18	21.82
	1	7	21.04	22.28	21.84
	1	14	21.06	22.36	21.79
	15	0	20.47	21.15	20.82

Table 7-10. Conducted Powers (B66, 3MHz)

LTE Band 66 (AWS) 5 MHz Bandwidth					
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel
			131997 (1712.5 MHz)	132322 (1745.0 MHz)	132647 (1777.5 MHz)
			Conducted Power [dBm]		
QPSK	1	0	23.97	**24.27**	24.15
	1	12	24.12	24.26	24.14
	1	24	24.08	24.11	24.00
	25	0	23.30	23.32	23.13
16QAM	1	0	23.18	23.49	23.22
	1	12	23.33	23.37	23.14
	1	24	23.26	23.27	23.03
	25	0	22.48	22.36	22.25
64QAM	1	0	21.45	22.22	21.97
	1	12	21.61	22.37	22.02
	1	24	21.55	22.46	21.89
	25	0	20.43	21.24	20.76

Table 7-11. Conducted Powers (B66, 5MHz)

LTE Band 66 (AWS) 10 MHz Bandwidth					
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel
			132022 (1715.0 MHz)	132322 (1745.0 MHz)	132622 (1775.0 MHz)
			Conducted Power [dBm]		
QPSK	1	0	24.08	24.00	23.84
	1	25	**24.36**	24.20	24.01
	1	49	23.92	23.94	23.78
	50	0	23.40	23.28	23.12
16QAM	1	0	23.29	23.06	23.31
	1	25	23.46	23.24	23.47
	1	49	23.13	22.97	23.28
	50	0	22.47	22.24	22.13
64QAM	1	0	21.20	21.48	20.94
	1	25	21.49	22.18	21.82
	1	49	20.97	21.93	21.48
	50	0	20.56	21.10	20.82

Table 7-12. Conducted Powers (B66, 10MHz)

LTE Band 66 (AWS) 15 MHz Bandwidth					
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel
			132047 (1717.5 MHz)	132322 (1745.0 MHz)	132597 (1772.5 MHz)
			Conducted Power [dBm]		
QPSK	1	0	24.28	24.37	23.87
	1	36	24.46	**24.48**	24.28
	1	74	24.11	24.28	24.11
	75	0	23.49	23.50	23.30
16QAM	1	0	23.30	23.31	23.26
	1	36	23.38	23.45	23.49
	1	74	23.18	23.33	23.44
	75	0	22.41	22.48	22.39
64QAM	1	0	21.75	22.12	20.98
	1	36	21.80	22.41	21.68
	1	74	21.40	22.45	21.67
	75	0	20.74	21.15	20.76

Table 7-13. Conducted Powers (B66, 15MHz)

LTE Band 66 (AWS) 20 MHz Bandwidth					
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel
			132072 (1720.0 MHz)	132322 (1745.0 MHz)	132572 (1770.0 MHz)
			Conducted Power [dBm]		
QPSK	1	0	24.24	24.22	24.01
	1	50	24.36	**24.38**	24.23
	1	99	23.99	24.10	24.11
	100	0	23.48	23.48	23.21
16QAM	1	0	23.41	23.41	23.30
	1	50	23.46	23.47	23.27
	1	99	23.49	23.40	23.45
	100	0	22.41	22.50	22.19
64QAM	1	0	21.84	21.70	21.68
	1	50	21.83	22.46	22.16
	1	99	21.41	22.30	22.42
	100	0	20.80	21.48	20.52

Table 7-14. Conducted Powers (B66, 20MHz)

LTE Band 2

LTE Band 2 (PCS) 1.4 MHz Bandwidth					
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel
			18607 (1850.7 MHz)	18900 (1880.0 MHz)	19193 (1909.3 MHz)
			Conducted Power [dBm]		
QPSK	1	0	24.15	24.25	24.23
	1	2	24.23	**24.27**	24.21
	1	5	24.11	24.22	24.16
	6	0	23.32	23.22	23.18
16QAM	1	0	22.97	23.08	22.92
	1	2	23.02	23.11	22.97
	1	5	22.94	23.02	22.94
	6	0	22.37	22.12	22.28
64QAM	1	0	21.35	22.05	21.49
	1	2	21.47	22.12	21.59
	1	5	21.51	21.98	21.39
	6	0	20.51	21.48	20.41

Table 7-15. Conducted Powers (B2, 1.4MHz)

LTE Band 2 (PCS) 3 MHz Bandwidth					
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel
			18615 (1851.5 MHz)	18900 (1880.0 MHz)	19185 (1908.5 MHz)
			Conducted Power [dBm]		
QPSK	1	0	24.19	**24.21**	24.15
	1	7	24.18	24.14	24.03
	1	14	24.12	24.11	23.90
	15	0	23.30	23.31	23.26
16QAM	1	0	23.29	23.22	23.21
	1	7	23.42	23.23	23.13
	1	14	23.48	23.13	23.04
	15	0	22.38	22.30	22.33
64QAM	1	0	21.49	22.49	22.08
	1	7	21.63	22.46	21.95
	1	14	21.75	22.38	21.82
	15	0	20.59	21.34	20.48

Table 7-16. Conducted Powers (B2, 3MHz)

LTE Band 2 (PCS) 5 MHz Bandwidth					
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel
			18625 (1852.5 MHz)	18900 (1880.0 MHz)	19175 (1907.5 MHz)
			Conducted Power [dBm]		
QPSK	1	0	24.03	24.17	24.17
	1	12	24.10	**24.28**	24.27
	1	24	24.01	24.18	24.15
	25	0	23.37	23.29	23.29
16QAM	1	0	23.22	23.22	23.21
	1	12	23.32	23.31	23.25
	1	24	23.27	23.18	23.19
	25	0	22.31	22.43	22.38
64QAM	1	0	21.43	22.34	21.82
	1	12	21.79	22.42	21.76
	1	24	21.91	22.31	21.54
	25	0	20.57	21.25	20.61

Table 7-17. Conducted Powers (B2, 5MHz)

LTE Band 2 (PCS) 10 MHz Bandwidth					
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel
			18650 (1855.0 MHz)	18900 (1880.0 MHz)	19150 (1905.0 MHz)
			Conducted Power [dBm]		
QPSK	1	0	23.67	23.75	24.19
	1	25	**24.22**	24.07	24.12
	1	49	23.84	23.88	24.02
	50	0	23.30	23.16	23.22
16QAM	1	0	22.83	22.91	23.21
	1	25	23.35	23.22	23.28
	1	49	22.85	23.01	23.23
	50	0	22.31	22.17	22.23
64QAM	1	0	21.15	22.08	22.47
	1	25	21.89	22.49	22.05
	1	49	21.49	22.17	21.71
	50	0	20.69	21.24	20.86

Table 7-18. Conducted Powers (B2, 10MHz)

LTE Band 2 (PCS) 15 MHz Bandwidth					
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel
			18675 (1857.5 MHz)	18900 (1880.0 MHz)	19125 (1902.5 MHz)
			Conducted Power [dBm]		
QPSK	1	0	23.96	24.06	24.09
	1	36	24.10	**24.22**	24.09
	1	74	24.12	24.10	24.13
	75	0	23.17	23.14	23.15
16QAM	1	0	23.17	23.22	23.39
	1	36	23.29	23.31	23.33
	1	74	23.31	23.35	23.38
	75	0	22.23	22.03	22.20
64QAM	1	0	21.28	22.09	22.04
	1	36	21.54	22.02	21.99
	1	74	21.44	21.98	21.74
	75	0	20.58	21.09	20.99

Table 7-19. Conducted Powers (B2, 15MHz)

LTE Band 2 (PCS) 20 MHz Bandwidth					
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel
			18700 (1860.0 MHz)	18900 (1880.0 MHz)	19100 (1900.0 MHz)
			Conducted Power [dBm]		
QPSK	1	0	24.08	24.03	23.88
	1	50	24.07	24.05	24.05
	1	99	**24.11**	**24.11**	24.09
	100	0	23.13	22.94	23.10
16QAM	1	0	23.37	23.48	23.15
	1	50	23.35	23.35	23.20
	1	99	23.36	23.38	23.31
	100	0	22.10	22.15	22.22
64QAM	1	0	22.27	22.16	22.46
	1	50	22.25	22.33	22.30
	1	99	22.47	22.36	22.04
	100	0	20.57	21.10	20.93

Table 7-20. Conducted Powers (B2, 20MHz)

NR Band 5

NR Band n5 20 MHz Bandwidth					
			Channel		
Modulation	RB Size	RB Offset	166800 (834.0 MHz)	167300 (836.5 MHz)	167800 (839.0 MHz)
			Conducted Power [dBm]		
DFT-s-OFDM π/2 BPSK	1	1	23.48	23.44	23.39
	1	53	23.70	24.35	23.65
	1	104	23.34	23.16	23.24
	50	0	23.60	23.51	23.56
	50	28	23.54	23.47	23.45
	50	56	23.53	23.45	23.44
	100	0	23.58	23.54	23.51
DFT-s-OFDM QPSK	1	1	**23.55**	23.47	23.47
	1	53	23.54	23.51	23.46
	1	104	23.34	23.21	23.30
	50	0	**23.59**	23.54	23.56
	50	28	23.48	23.50	23.45
	50	56	23.43	23.40	23.43
	100	0	**23.52**	23.50	23.49
DFT-s-OFDM 16QAM	1	1	23.56	23.86	23.59
CP-OFDM	1	1	**22.93**	22.71	22.78

Table 7-21. Conducted Powers (n5, 20MHz)

NR Band n5 15 MHz Bandwidth					
			Channel		
Modulation	RB Size	RB Offset	166300 (831.5 MHz)	167300 (836.5 MHz)	168300 (841.5 MHz)
			Conducted Power [dBm]		
DFT-s-OFDM π/2 BPSK	1	1	23.30	23.21	23.27
	1	40	23.46	23.47	23.46
	1	77	23.37	23.24	23.16
	36	0	23.50	23.53	23.41
	36	22	23.45	23.46	23.44
	36	43	23.46	23.44	23.34
	75	0	23.54	23.44	23.47
DFT-s-OFDM QPSK	1	1	23.34	23.30	23.22
	1	40	23.42	23.45	23.41
	1	77	23.21	23.25	23.19
	36	0	23.54	23.49	23.46
	36	22	23.52	23.50	23.36
	36	43	23.49	23.47	23.39
	75	0	23.44	23.41	23.46
DFT-s-OFDM 16QAM	1	1	23.39	23.35	23.39
CP-OFDM QPSK	1	1	22.65	**22.85**	22.74

Table 7-22. Conducted Powers (n5, 15MHz)

NR Band n5 10 MHz Bandwidth					
			Channel		
Modulation	RB Size	RB Offset	165800 (829 MHz)	167300 (836.5 MHz)	168800 (844.0 MHz)
			Conducted Power [dBm]		
DFT-s-OFDM π/2 BPSK	1	1	23.21	23.14	23.11
	1	26	23.74	24.39	23.55
	1	50	23.34	23.10	23.02
	25	0	23.62	23.50	23.41
	25	14	23.65	23.48	23.38
	25	27	23.58	23.48	23.36
	50	0	23.52	23.51	23.42
DFT-s-OFDM QPSK	1	1	23.32	23.23	23.17
	1	26	**23.77**	23.61	23.71
	1	50	23.32	23.12	23.12
	25	0	23.52	23.50	23.38
	25	14	**23.69**	23.51	23.46
	25	27	23.54	23.43	23.39
	50	0	**23.57**	23.41	23.41
DFT-s-OFDM 16QAM	1	1	23.36	23.43	23.03
CP-OFDM QPSK	1	1	**22.79**	22.63	22.56

Table 7-23. Conducted Powers (n5, 10MHz)

NR Band n5 5 MHz Bandwidth					
			Channel		
Modulation	RB Size	RB Offset	165300 (826.5 MHz)	167300 (836.5 MHz)	169300 (846.5 MHz)
			Conducted Power [dBm]		
DFT-s-OFDM π/2 BPSK	1	1	23.07	22.97	22.92
	1	13	23.65	23.57	23.38
	1	23	23.09	23.03	22.89
	12	0	23.48	23.33	23.24
	12	7	23.69	23.61	23.52
	12	13	23.52	23.35	23.25
	25	0	23.50	23.35	23.21
DFT-s-OFDM QPSK	1	1	23.13	22.97	22.91
	1	13	23.65	23.55	23.42
	1	23	23.15	23.01	22.88
	12	0	23.41	23.31	23.27
	12	7	23.56	23.52	23.39
	12	13	23.43	23.31	23.21
	25	0	23.47	23.37	23.24
DFT-s-OFDM 16QAM	1	1	23.30	23.11	23.01
CP-OFDM QPSK	1	1	**22.42**	22.34	22.25

Table 7-24. Conducted Powers (n5, 5MHz)

NR Band 66

NR Band n66 20 MHz Bandwidth					
			Channel		
Modulation	RB Size	RB Offset	344000 (1720 MHz)	349000 (1745 MHz)	354000 (1770 MHz)
			Conducted Power [dBm]		
DFT-s-OFDM π/2 BPSK	1	1	22.57	22.87	22.81
	1	53	23.86	23.84	23.84
	1	104	22.89	22.83	22.87
	50	0	22.90	22.91	23.00
	50	28	22.96	22.90	23.02
	50	56	22.96	22.96	22.99
	100	0	22.81	23.04	23.04
DFT-s-OFDM QPSK	1	1	22.45	22.75	22.81
	1	53	22.80	**23.06**	23.02
	1	104	22.84	22.81	22.82
	50	0	22.80	22.97	22.99
	50	28	22.79	22.90	23.00
	50	56	22.87	**23.03**	**23.03**
	100	0	22.84	**22.99**	22.91
DFT-s-OFDM 16QAM	1	1	22.84	22.93	22.92
CP-OFDM	1	1	22.39	**22.78**	22.26

Table 7-25. Conducted Powers (n66, 20MHz)

NR Band n66 15 MHz Bandwidth					
			Channel		
Modulation	RB Size	RB Offset	343500 (1717.5 MHz)	349000 (1745 MHz)	354500 (1772.5 MHz)
			Conducted Power [dBm]		
DFT-s-OFDM π/2 BPSK	1	1	22.42	22.81	22.70
	1	40	22.78	22.97	22.95
	1	77	22.68	22.75	22.70
	36	0	22.86	23.05	23.00
	36	22	22.82	23.02	22.97
	36	43	22.95	23.01	23.01
	75	0	22.77	23.05	23.01
DFT-s-OFDM QPSK	1	1	22.50	22.81	22.80
	1	40	22.82	**23.00**	22.93
	1	77	22.68	22.76	22.84
	36	0	22.81	22.95	22.96
	36	22	22.88	**22.98**	22.91
	36	43	22.91	22.91	**22.98**
	75	0	22.80	22.95	**22.99**
DFT-s-OFDM 16QAM	1	1	22.53	22.99	23.22
CP-OFDM QPSK	1	1	22.33	**22.48**	22.47

Table 7-26. Conducted Powers (n66, 15MHz)

NR Band n66 10 MHz Bandwidth					
			Channel		
Modulation	RB Size	RB Offset	343000 (1715 MHz)	349000 (1745 MHz)	355000 (1775 MHz)
			Conducted Power [dBm]		
DFT-s-OFDM π/2 BPSK	1	1	22.40	22.55	22.64
	1	26	23.63	23.79	23.92
	1	50	22.45	22.74	22.66
	25	0	22.71	23.11	23.01
	25	14	22.76	23.09	23.04
	25	27	22.82	23.04	22.99
	50	0	22.78	23.13	23.03
DFT-s-OFDM QPSK	1	1	22.40	22.70	22.72
	1	26	22.89	**23.19**	23.12
	1	50	22.54	22.77	22.76
	25	0	22.73	22.91	22.93
	25	14	22.78	22.98	22.92
	25	27	22.74	**23.00**	22.92
	50	0	22.73	**22.98**	**22.98**
DFT-s-OFDM 16QAM	1	1	22.71	22.75	22.81
CP-OFDM QPSK	1	1	22.08	22.43	**22.49**

Table 7-27. Conducted Powers (n66, 10MHz)

NR Band n66 5 MHz Bandwidth					
			Channel		
Modulation	RB Size	RB Offset	342500 (1712.5 MHz)	349000 (1745 MHz)	355500 (1777.5 MHz)
			Conducted Power [dBm]		
DFT-s-OFDM π/2 BPSK	1	1	22.23	22.61	22.44
	1	13	22.81	23.11	23.09
	1	23	22.33	22.64	22.58
	12	0	22.65	22.96	22.91
	12	7	22.96	23.25	23.18
	12	13	22.72	22.97	22.89
	25	0	22.66	22.96	22.87
DFT-s-OFDM QPSK	1	1	22.24	22.61	22.50
	1	13	22.88	23.12	23.05
	1	23	22.40	22.61	22.58
	12	0	22.64	22.97	22.83
	12	7	22.81	22.92	22.92
	12	13	22.67	22.96	22.93
	25	0	22.70	23.00	22.87
DFT-s-OFDM 16QAM	1	1	22.35	22.81	22.75
CP-OFDM QPSK	1	1	22.04	**22.38**	22.35

Table 7-28. Conducted Powers (n66, 5MHz)

NR Band 2

NR Band n2 20 MHz Bandwidth					
			Channel		
Modulation	RB Size	RB Offset	372000 (1860 MHz)	376000 (1880 MHz)	380000 (1900 MHz)
			Conducted Power [dBm]		
DFT-s-OFDM π/2 BPSK	1	1	23.29	23.11	22.83
	1	53	23.47	23.79	23.14
	1	104	23.19	23.10	22.82
	50	0	23.28	23.16	23.07
	50	28	23.00	23.08	23.07
	50	56	23.25	23.07	23.02
	100	0	23.26	23.17	23.10
DFT-s-OFDM QPSK	1	1	23.27	23.21	22.96
	1	53	23.15	**23.87**	23.10
	1	104	23.02	22.90	22.85
	50	0	23.15	23.05	23.05
	50	28	23.17	23.11	23.10
	50	56	**23.23**	23.14	23.03
	100	0	23.19	**23.27**	23.07
DFT-s-OFDM 16QAM	1	1	22.71	22.63	23.05
CP-OFDM QPSK	1	1	22.06	22.34	**22.46**

Table 7-29. Conducted Powers (n2, 20MHz)

NR Band n2 15 MHz Bandwidth					
			Channel		
Modulation	RB Size	RB Offset	371500 (1857.5 MHz)	376000 (1880 MHz)	380500 (1902.5 MHz)
			Conducted Power [dBm]		
DFT-s-OFDM π/2 BPSK	1	1	23.45	23.04	22.81
	1	40	23.32	23.12	23.06
	1	77	23.34	22.94	22.90
	36	0	23.38	23.15	23.12
	36	22	23.43	23.13	23.08
	36	43	23.41	23.12	23.02
	75	0	23.44	23.28	23.08
DFT-s-OFDM QPSK	1	1	23.11	23.07	22.89
	1	40	23.35	23.24	23.11
	1	77	**23.43**	22.95	22.92
	36	0	22.58	23.24	23.15
	36	22	**23.40**	23.27	23.16
	36	43	22.80	23.23	23.09
	75	0	22.64	**23.23**	23.17
DFT-s-OFDM 16QAM	1	1	22.06	**23.05**	23.00
CP-OFDM QPSK	1	1	21.12	22.34	22.44

Table 7-30. Conducted Powers (n2, 15MHz)

NR Band n2 10 MHz Bandwidth					
			Channel		
Modulation	RB Size	RB Offset	371000 (1855 MHz)	376000 (1880 MHz)	381000 (1905 MHz)
			Conducted Power [dBm]		
DFT-s-OFDM π/2 BPSK	1	1	23.17	22.78	22.84
	1	26	23.62	23.36	23.33
	1	50	23.21	22.93	22.90
	25	0	23.51	23.24	23.10
	25	14	23.50	23.31	23.24
	25	27	23.45	23.22	23.14
	50	0	23.47	23.26	23.20
DFT-s-OFDM QPSK	1	1	22.76	22.87	22.83
	1	26	**23.54**	23.29	23.26
	1	50	23.24	22.99	22.88
	25	0	22.40	23.15	23.05
	25	14	**23.55**	23.27	23.15
	25	27	23.54	23.19	23.04
	50	0	22.51	**23.27**	23.19
DFT-s-OFDM 16QAM	1	1	21.86	22.79	22.94
CP-OFDM QPSK	1	1	21.00	21.97	22.25

Table 7-31. Conducted Powers (n2, 10MHz)

NR Band n2 5 MHz Bandwidth					
			Channel		
Modulation	RB Size	RB Offset	370500 (1852.5 MHz)	376000 (1880 MHz)	381500 (1907.5 MHz)
			Conducted Power [dBm]		
DFT-s-OFDM π/2 BPSK	1	1	23.04	22.81	22.72
	1	13	23.67	23.32	23.30
	1	23	23.11	22.83	22.83
	12	0	23.51	23.15	23.16
	12	7	23.76	23.46	23.41
	12	13	23.49	23.24	23.17
	25	0	23.49	23.24	23.15
DFT-s-OFDM QPSK	1	1	23.14	22.83	22.70
	1	13	**23.66**	23.38	23.30
	1	23	23.20	22.92	22.86
	12	0	22.58	23.21	22.99
	12	7	**23.71**	23.54	23.32
	12	13	22.91	23.20	22.83
	25	0	22.60	**23.19**	22.83
DFT-s-OFDM 16QAM	1	1	21.81	22.79	22.38
CP-OFDM QPSK	1	1	21.20	**22.14**	21.89

Table 7-32. Conducted Powers (n2, 5MHz)

7.7 Uplink Carrier Aggregation

§22.917(a), 27.53(h)

Test Overview

The EUT is set up to transmit two contiguous LTE channels. The power level of both carriers and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10th harmonic. All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

For Band 5 & 66, the minimum permissible attenuation level of any spurious emission is 43 + 10 $log_{10}(P_{[Watts]})$.

Test Procedure Used

KDB 971168 D01 v03r01 – Section 6.0

Test Settings

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

Test Setup

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

Figure 7-6. Test Instrument & Measurement Setup

Test Notes

1. Conducted power and spurious emissions measurements were evaluated for the two contiguous channels using various combinations of RB size, RB offset, modulation, and channel bandwidth. Channel bandwidth data is shown in the tables below based only on the channel bandwidths that were supported in this device. The worst case (highest) powers were found while operating with QPSK modulation, as shown in Table 7-503 and 7-504 below, with both carriers set to transmit using 1RB.

2. Compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater for frequencies less than 1 GHz and 1 MHz or greater for frequencies greater than 1 GHz. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

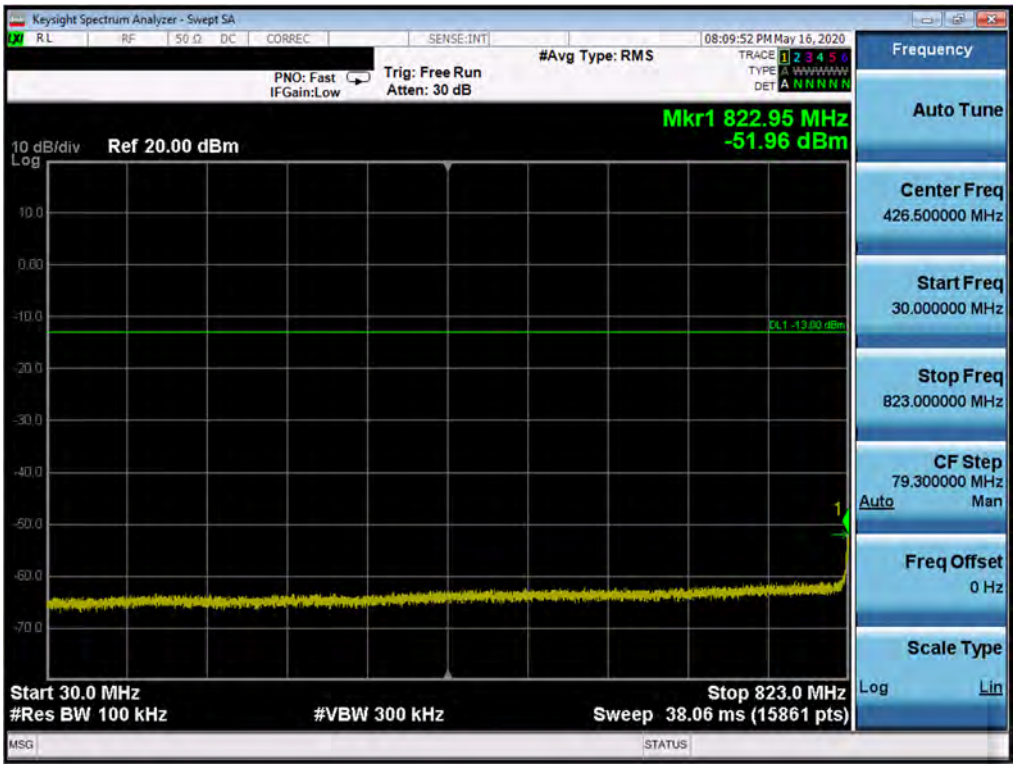
ULCA Band 5

PCC						SCC						
Channel	Frequency [MHz]	BW [MHz]	Mod.	RB Size	RB Offset	Channel	Frequency [MHz]	BW [MHz]	Mod.	RB Size	RB Offset	ULCA Tx.Power (dBm)
20525	836.5	10	QPSK	50	0	20597	843.7	10	QPSK	50	0	23.39
20525	836.5	10	16-QAM	50	0	20597	843.7	10	16-QAM	50	0	22.50
20525	836.5	10	64-QAM	50	0	20597	843.7	10	64-QAM	50	0	22.14

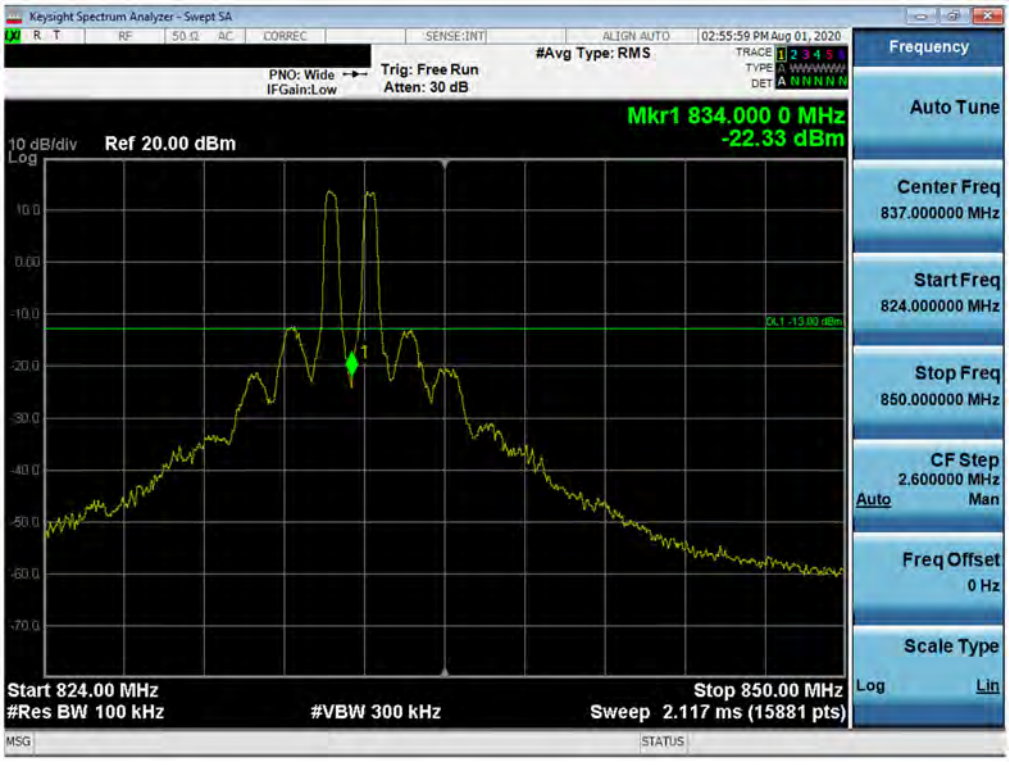
Table 7-33. Conducted Powers (B5)

PCC						SCC						
Channel	Frequency [MHz]	BW [MHz]	Mod.	RB Size	RB Offset	Channel	Frequency [MHz]	BW [MHz]	Mod.	RB Size	RB Offset	ULCA Tx.Power (dBm)
20450	829.0	10	QPSK	1	49	20549	838.9	10	QPSK	1	0	22.52
20525	836.5	10	QPSK	1	49	20597	843.7	5	QPSK	1	0	23.46
20600	844.0	10	QPSK	1	0	20501	834.1	10	QPSK	1	49	21.88

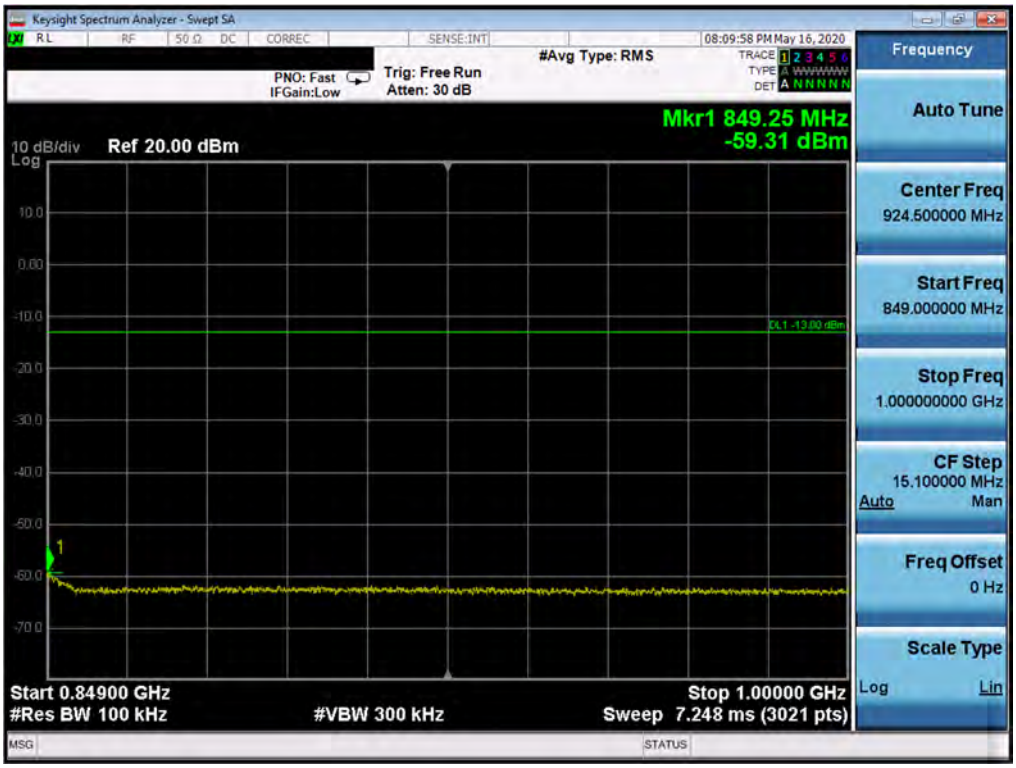
Table 7-34. Conducted Powers (B5 with Various Combinations for 10MHz Channel Bandwidth)



Plot 7-364. Conducted Spurious Plot (Band 5 – 10 + 10 MHz QPSK – PCC 1/0 SCC 1/45 – Low Channel)

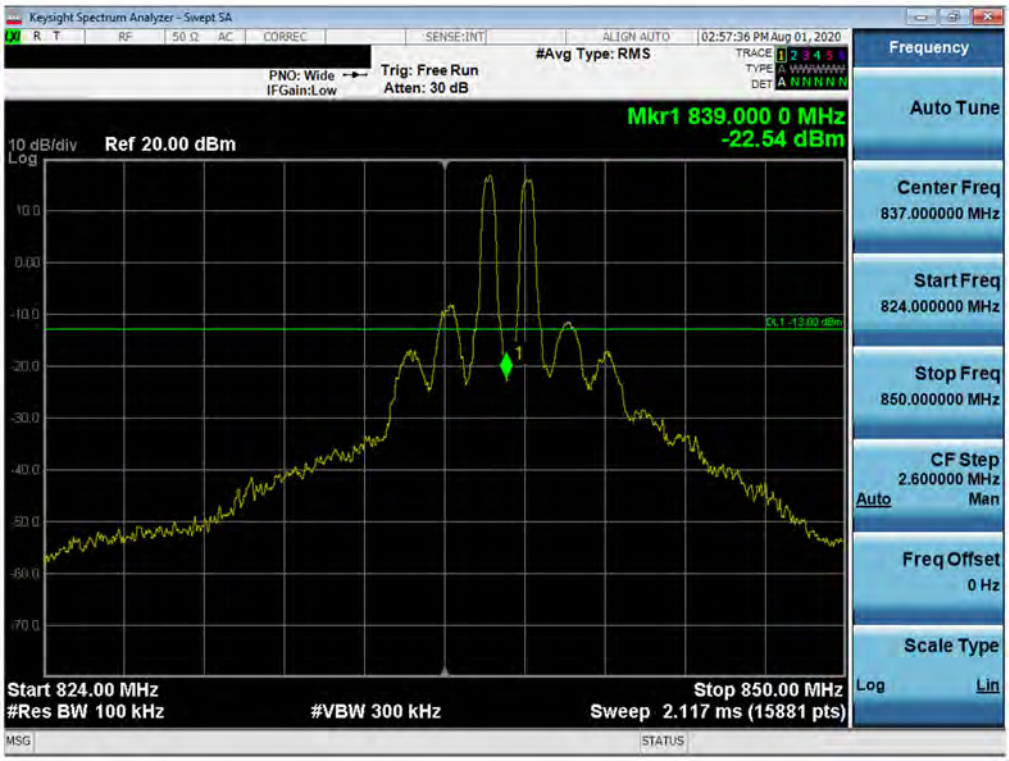


Plot 7-365. Conducted Spurious Plot (Band 5 – 10 + 10 MHz QPSK – PCC 1/0 SCC 1/45 – Low Channel)

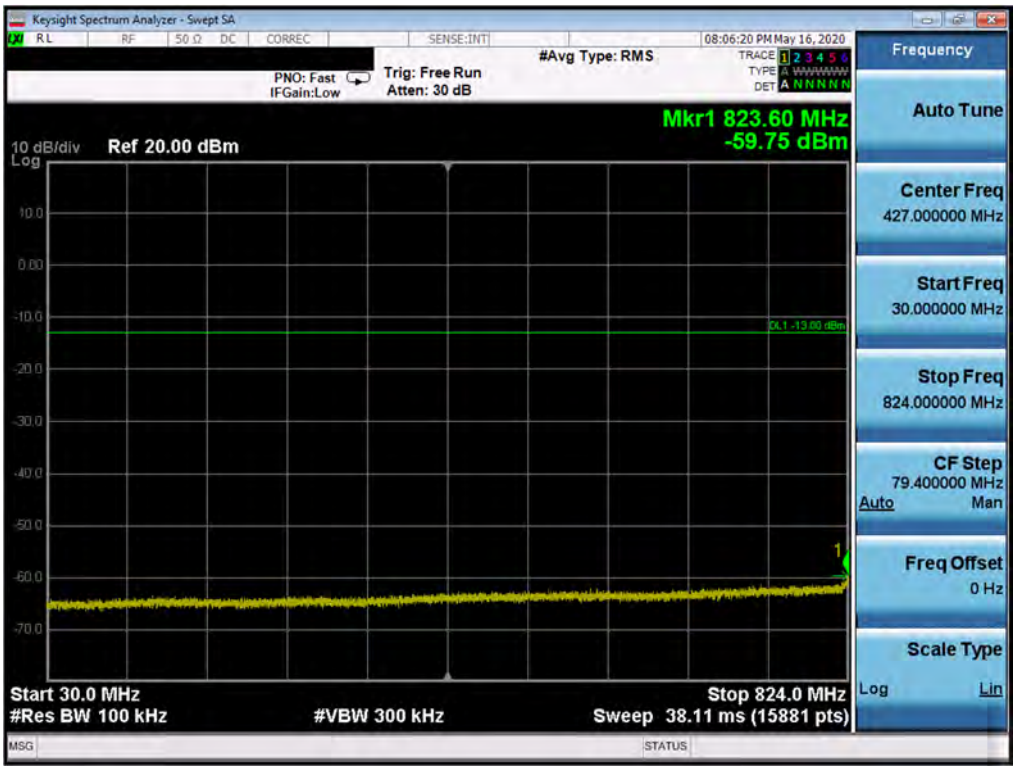


Plot 7-366. Conducted Spurious Plot (Band 5 – 10 + 10 MHz QPSK – PCC 1/0 SCC 1/45 – Low Channel)

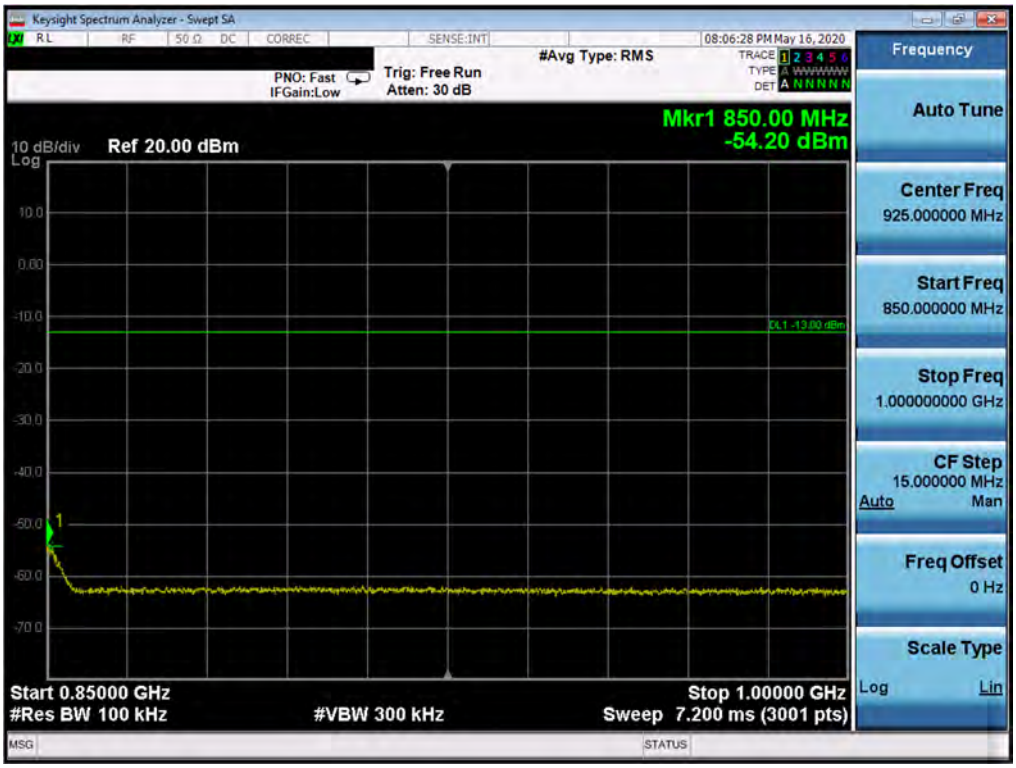
Plot 7-367. Conducted Spurious Plot (Band 5 – 10 + 10 MHz QPSK – PCC 1/0 SCC 1/45 – Low Channel)



Plot 7-368. Conducted Spurious Plot (Band 5 – 10 + 10 MHz QPSK – PCC 1/49 SCC 1/0 – High Channel)

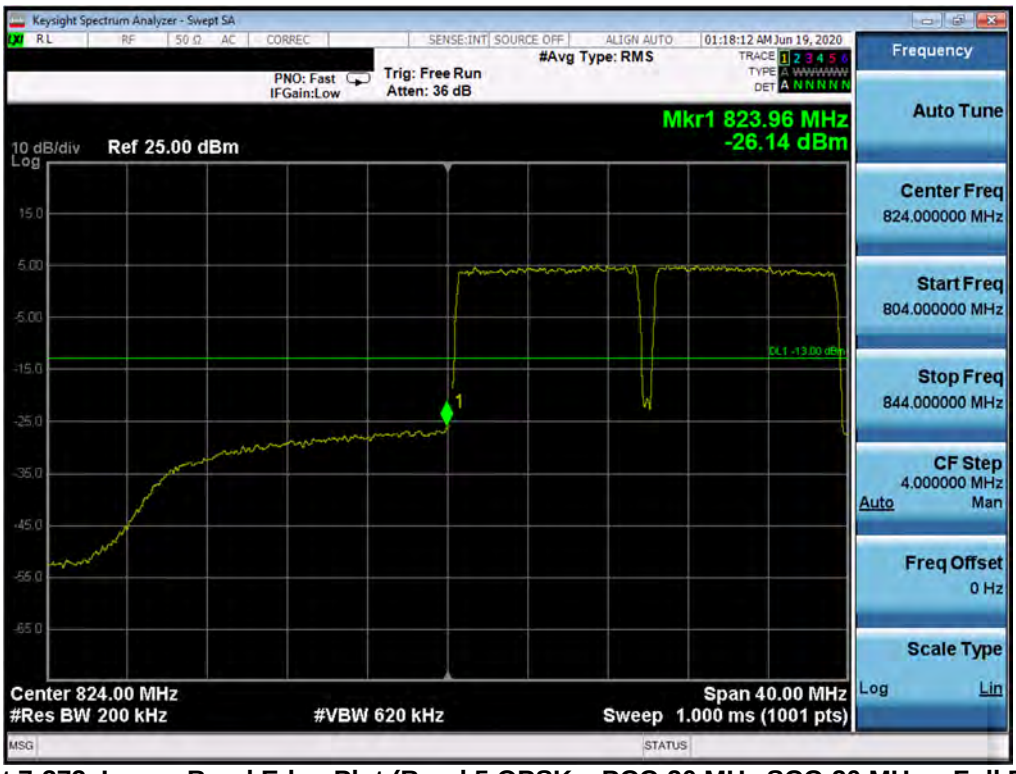


Plot 7-369. Conducted Spurious Plot (Band 5 – 10 + 10 MHz QPSK – PCC 1/49 SCC 1/0 – High Channel)

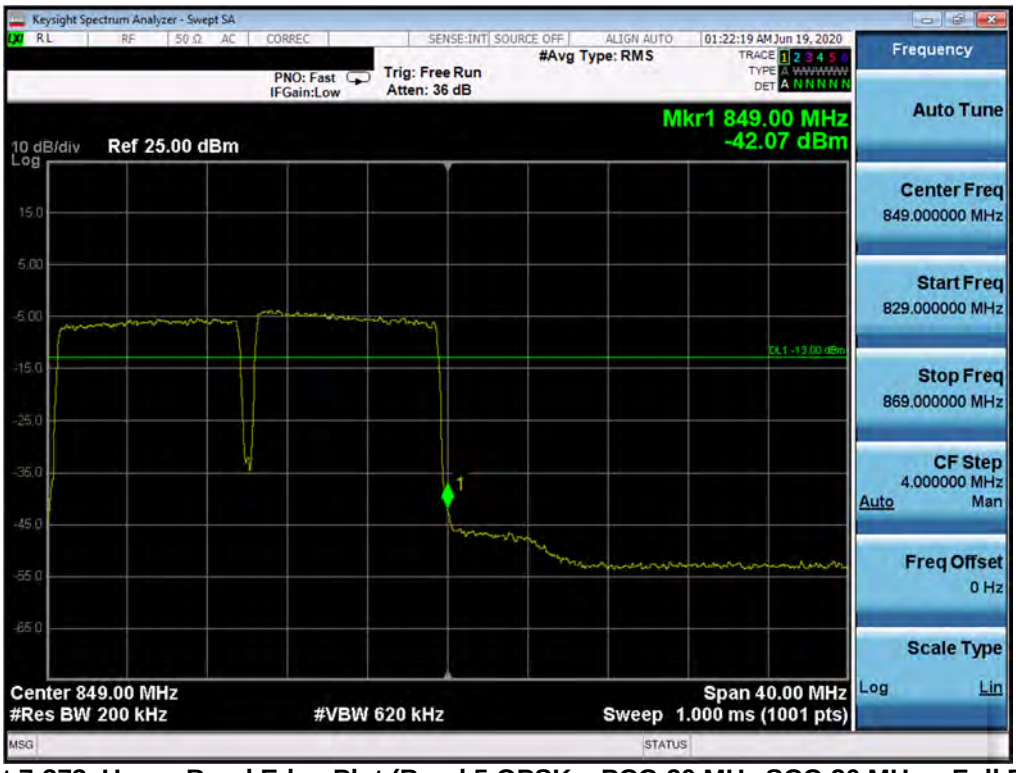


Plot 7-370. Conducted Spurious Plot (Band 5 – 10 + 10 MHz QPSK – PCC 1/49 SCC 1/0 – High Channel)

Plot 7-371. Conducted Spurious Plot (Band 5 – 10 + 10 MHz QPSK – PCC 1/49 SCC 1/0 – High Channel)



Plot 7-372. Lower Band Edge Plot (Band 5 QPSK – PCC:20 MHz SCC:20 MHz – Full RB)



Plot 7-373. Upper Band Edge Plot (Band 5 QPSK – PCC:20 MHz SCC:20 MHz – Full RB)

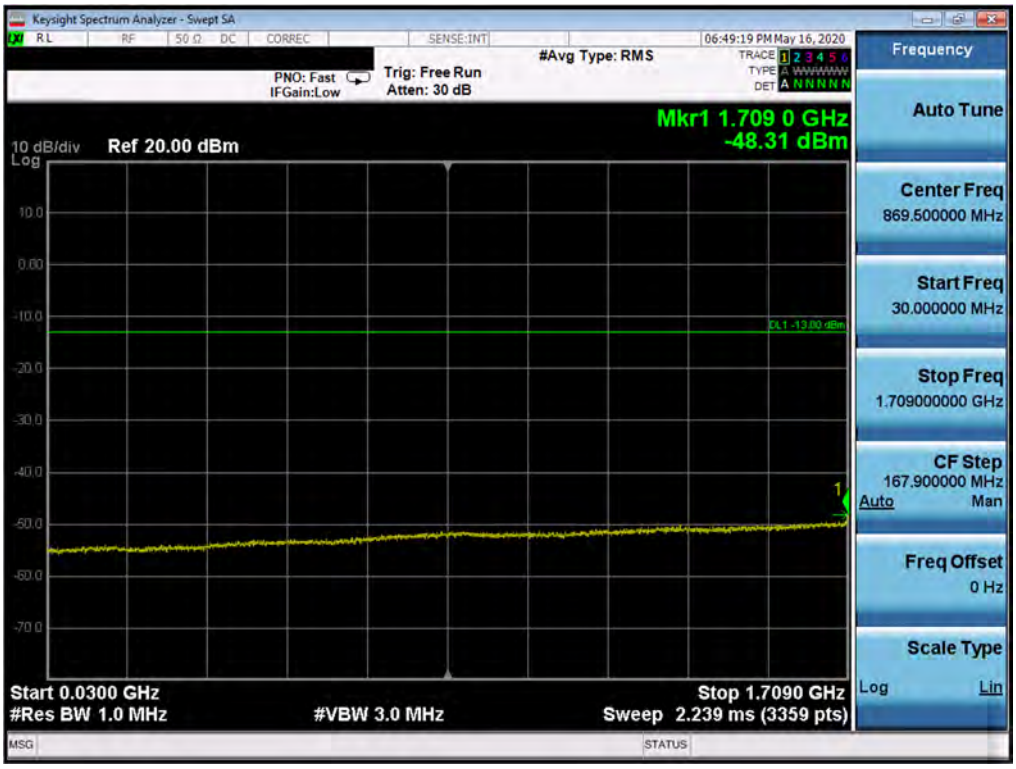
ULCA Band 66

PCC						SCC						
Channel	Frequency [MHz]	BW [MHz]	Mod.	RB Size	RB Offset	Channel	Frequency [MHz]	BW [MHz]	Mod.	RB Size	RB Offset	ULCA Tx.Power (dBm)
132072	1720.0	20	QPSK	1	99	132270	1739.8	20	QPSK	1	0	23.44
132322	1745.0	20	QPSK	1	99	132520	1764.8	20	QPSK	1	0	23.24
132572	1770.0	20	QPSK	1	0	132374	1750.2	20	QPSK	1	99	23.28

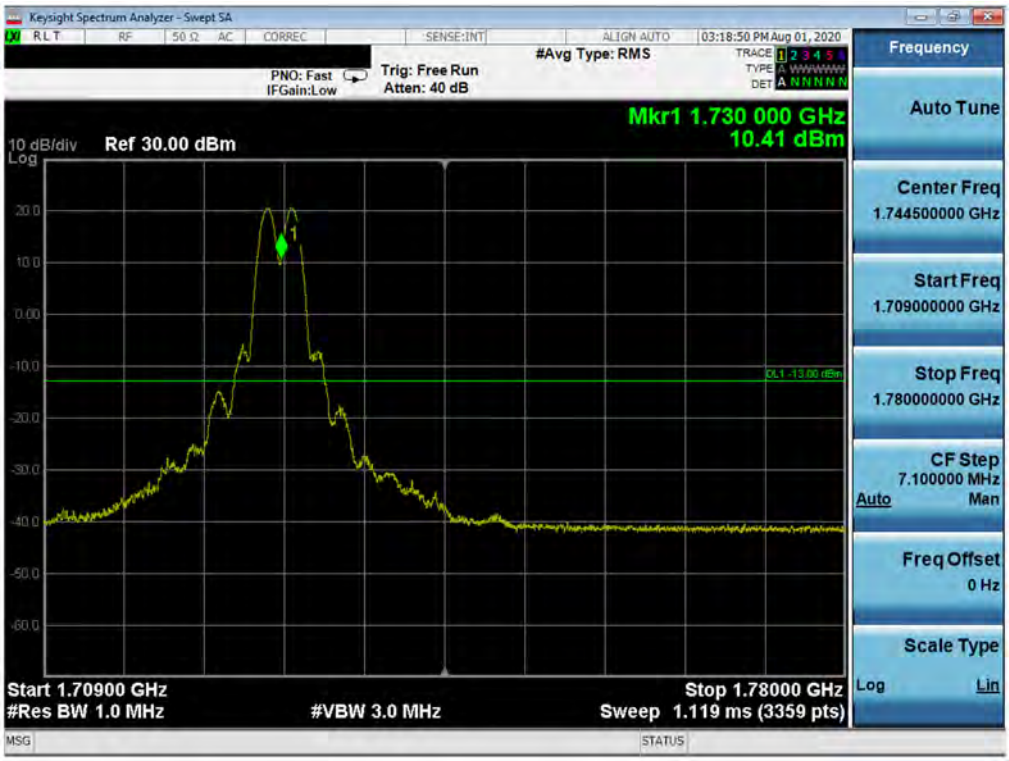
Table 7-35. Conducted Powers (B66)

PCC						SCC						
Channel	Frequency [MHz]	BW [MHz]	Mod.	RB Size	RB Offset	Channel	Frequency [MHz]	BW [MHz]	Mod.	RB Size	RB Offset	ULCA Tx.Power (dBm)
132072	1720.0	20	QPSK	100	0	132270	1739.8	20	QPSK	100	0	22.45
132072	1720.0	20	16-QAM	100	0	132270	1739.8	20	16-QAM	100	0	21.43
132072	1720.0	20	64-QAM	100	0	132270	1739.8	20	64-QAM	100	0	21.42

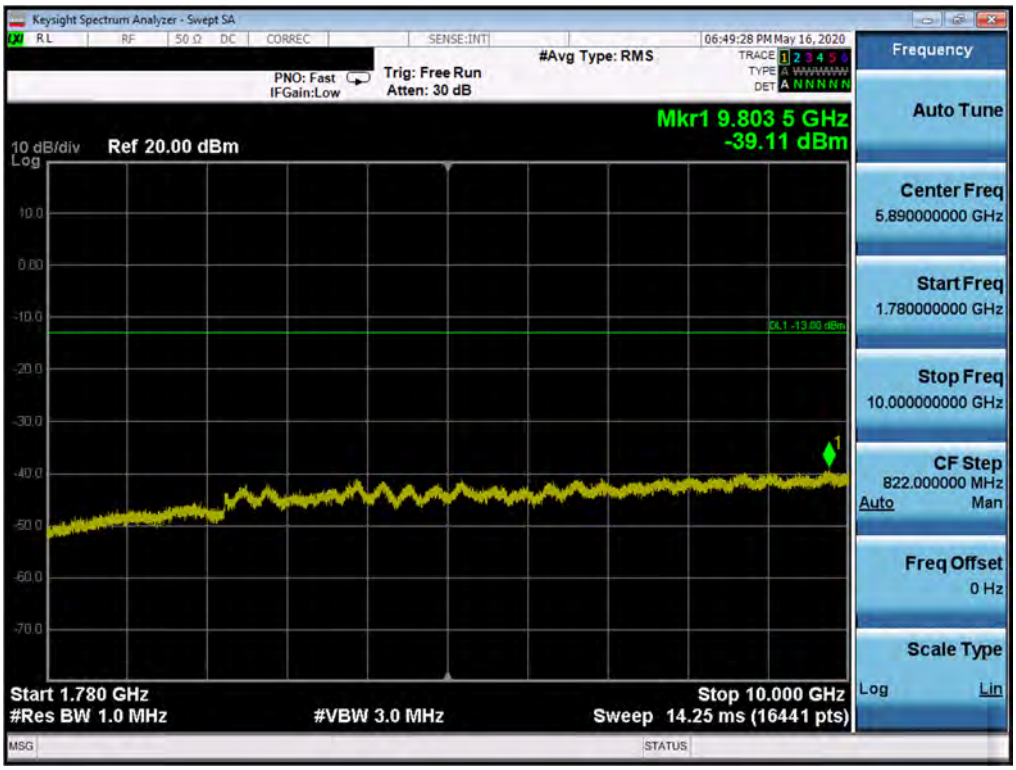
Table 7-36. Conducted Powers (B66 with Various Combinations for 20MHz Channel Bandwidth)



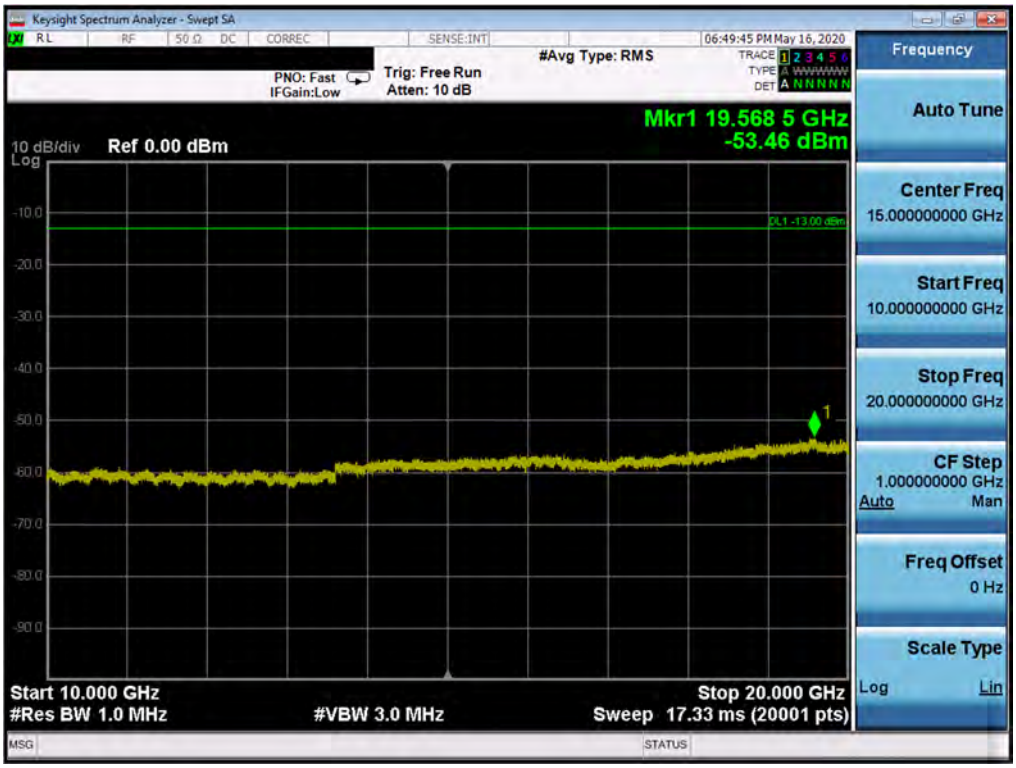
Plot 7-374. Conducted Spurious Plot (Band 66 – 20 + 20 MHz QPSK – PCC 1/0 SCC 1/99 – Low Channel)



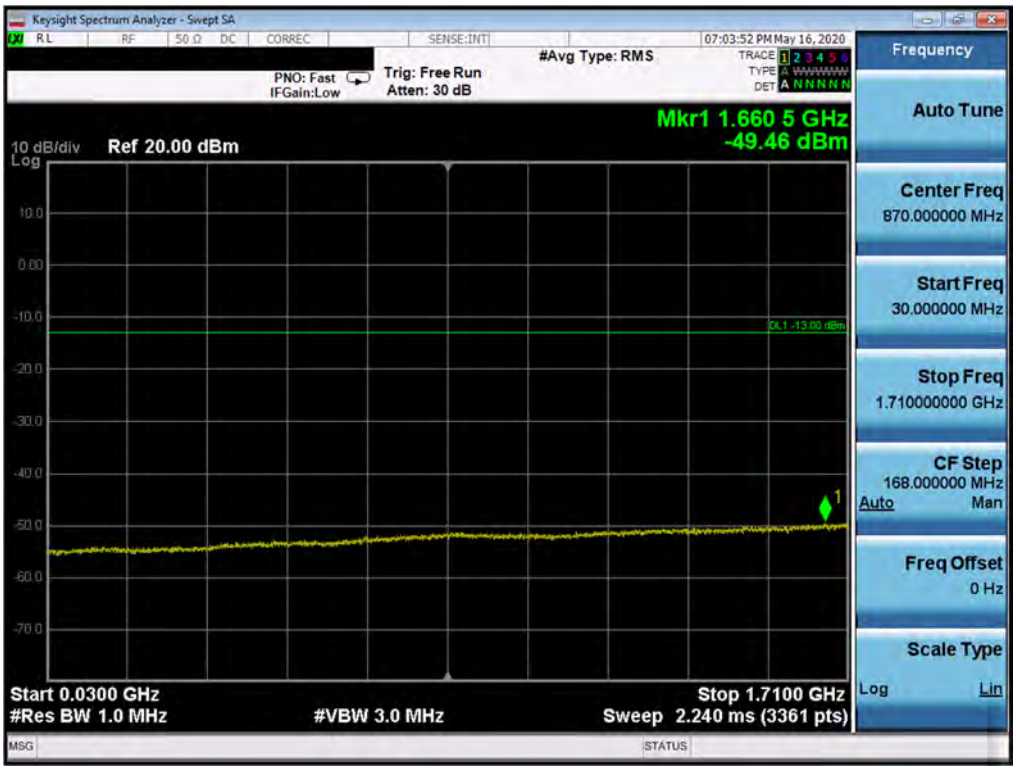
Plot 7-375. Conducted Spurious Plot (Band 66 – 20 + 20 MHz QPSK – PCC 1/0 SCC 1/99 – Low Channel)



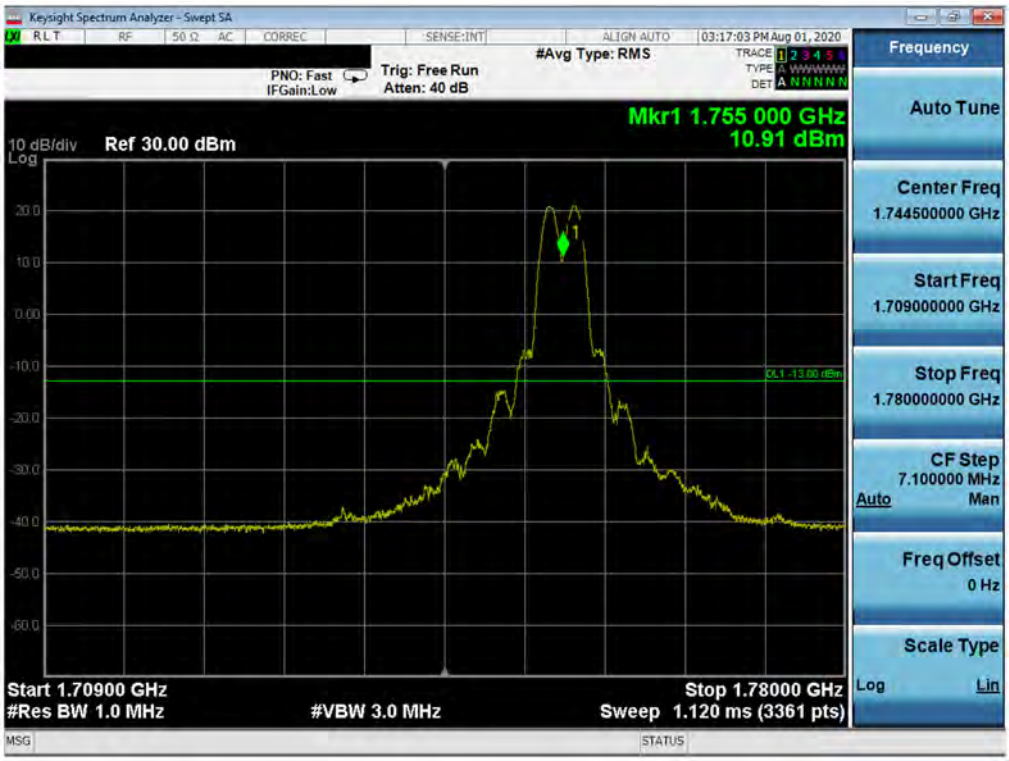
Plot 7-376. Conducted Spurious Plot (Band 66 – 20 + 20 MHz QPSK – PCC 1/0 SCC 1/99 – Low Channel)



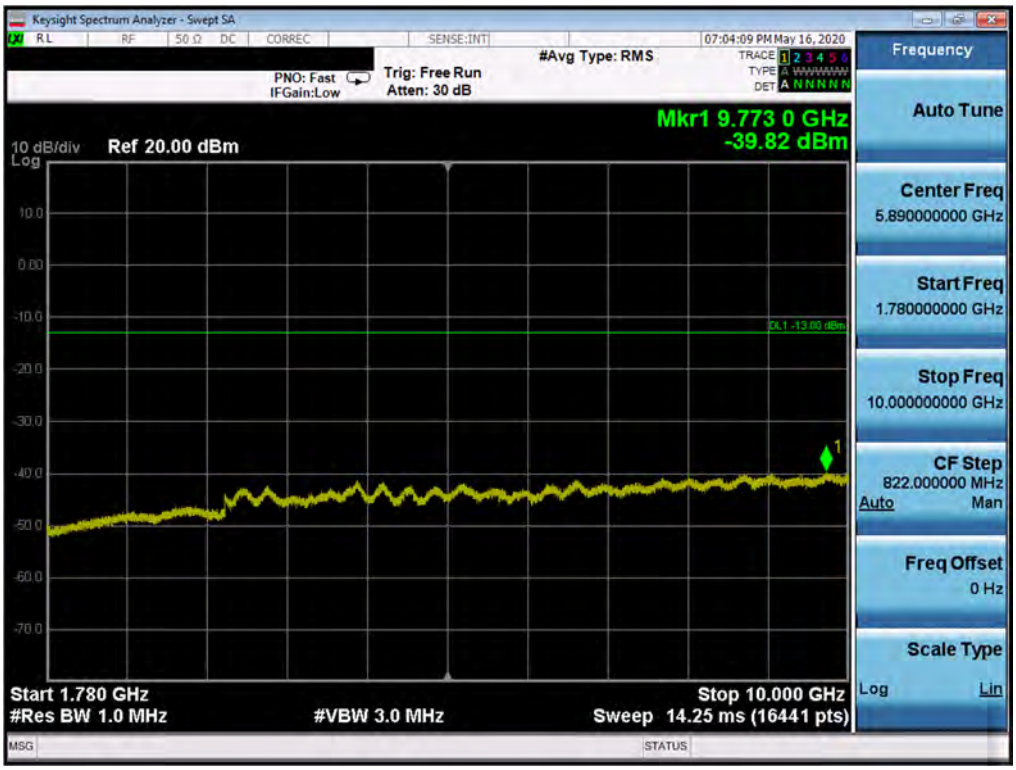
Plot 7-377. Conducted Spurious Plot (Band 66 – 20 + 20 MHz QPSK – PCC 1/0 SCC 1/99 – Low Channel)



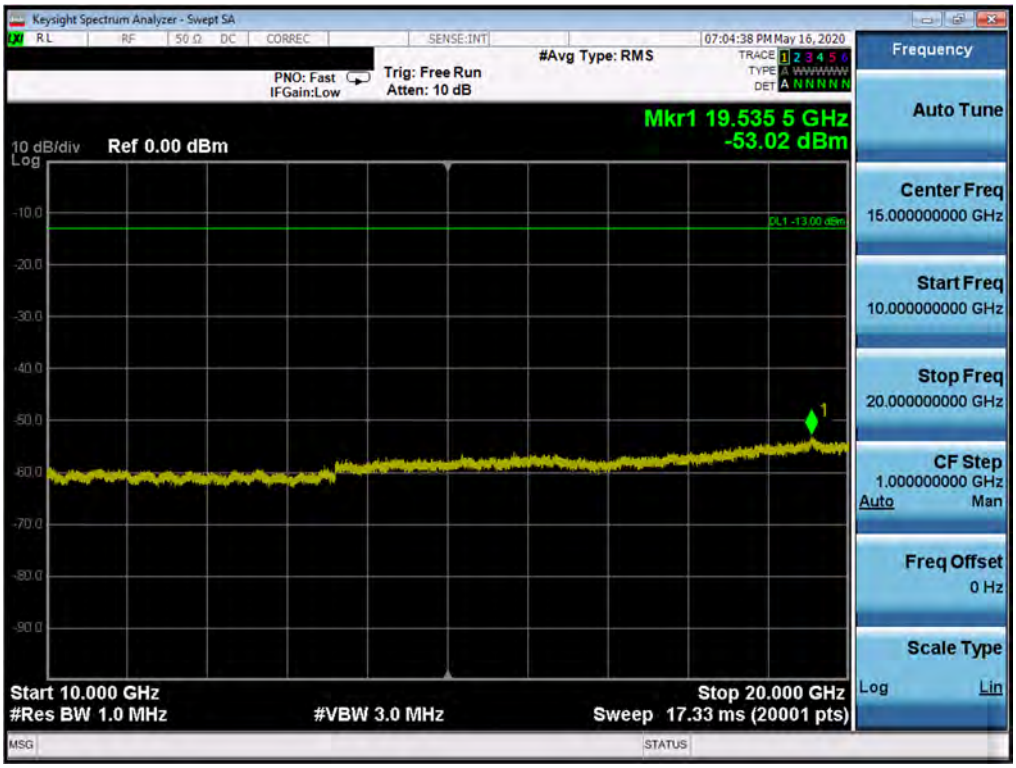
Plot 7-378. Conducted Spurious Plot (Band 66 – 20 + 20 MHz QPSK – PCC 1/0 SCC 1/99 – Mid Channel)



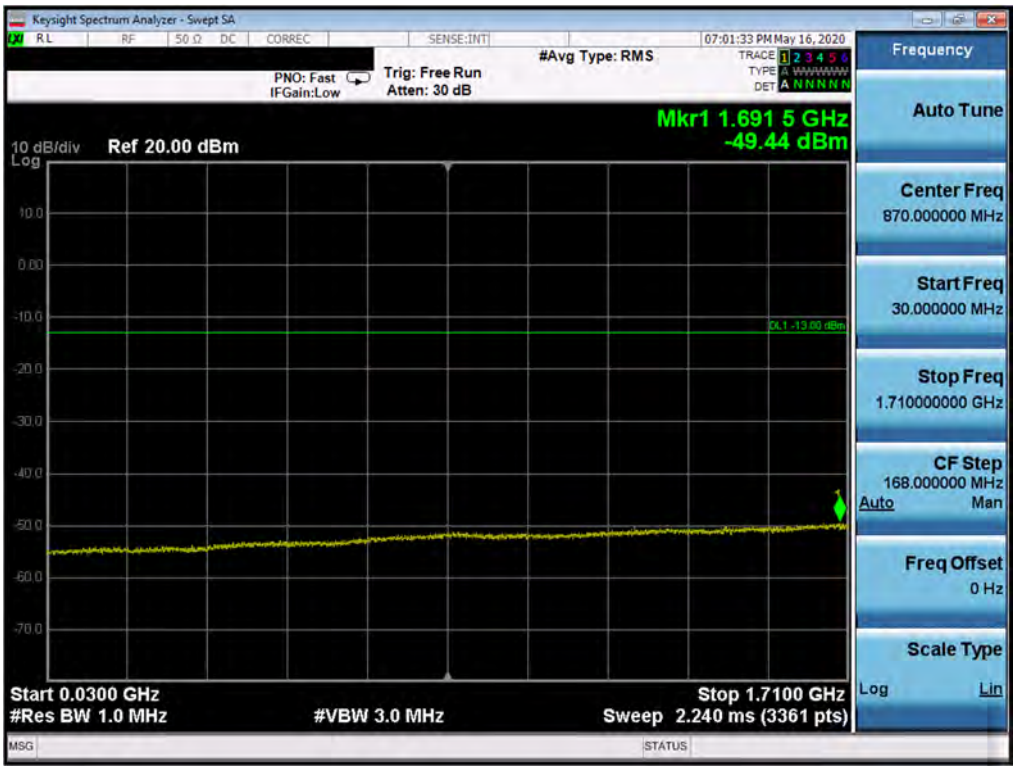
Plot 7-379. Conducted Spurious Plot (Band 66 – 20 + 20 MHz QPSK – PCC 1/0 SCC 1/99 – Mid Channel)



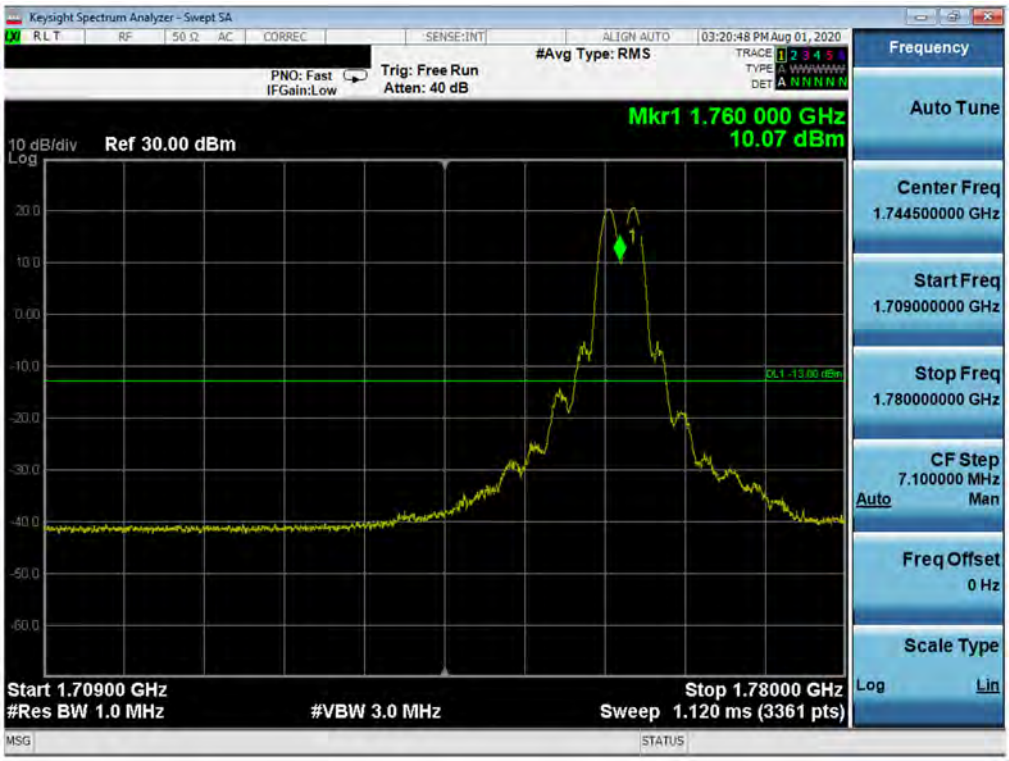
Plot 7-380. Conducted Spurious Plot (Band 66 – 20 + 20 MHz QPSK – PCC 1/0 SCC 1/99 – Mid Channel)



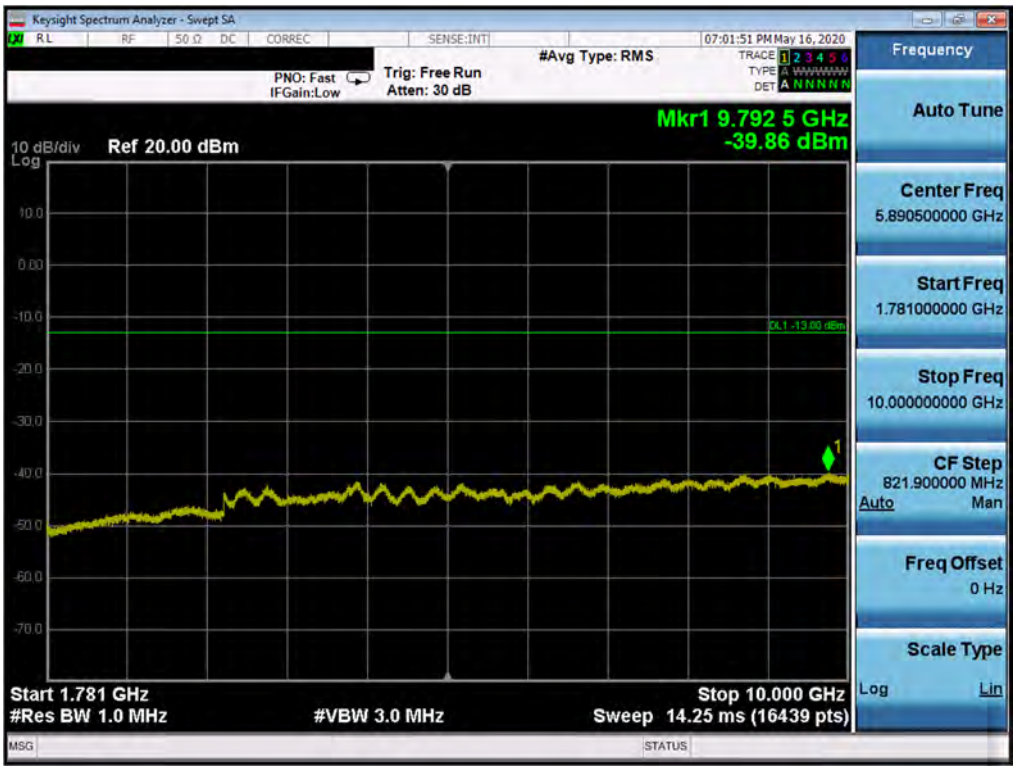
Plot 7-381. Conducted Spurious Plot (Band 66 – 20 + 20 MHz QPSK – PCC 1/0 SCC 1/99 – Mid Channel)



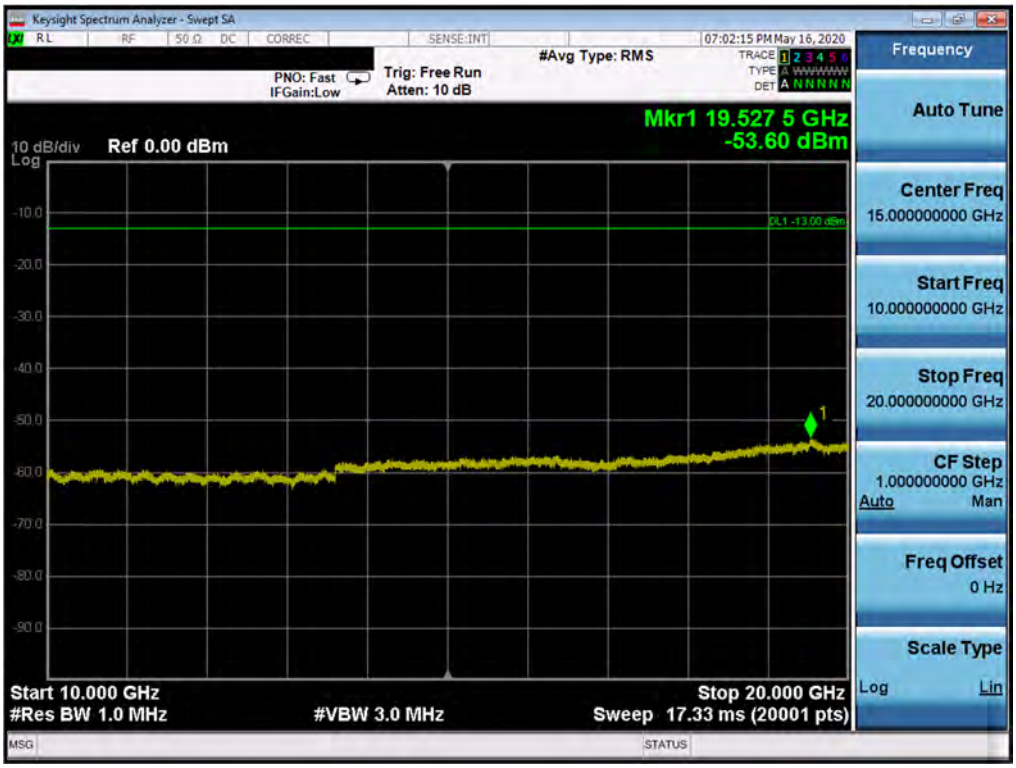
Plot 7-382. Conducted Spurious Plot (Band 66 – 20 + 20 MHz QPSK – PCC 1/99 SCC 1/0 – High Channel)



Plot 7-383. Conducted Spurious Plot (Band 66 – 20 + 20 MHz QPSK – PCC 1/99 SCC 1/0 – High Channel)

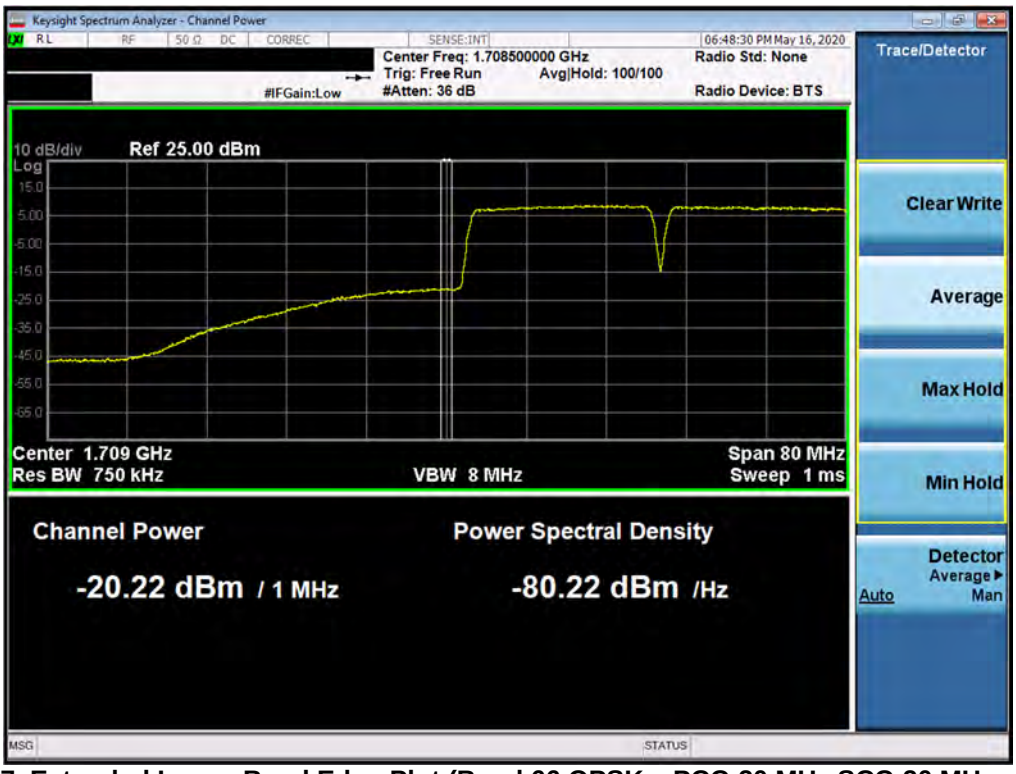


Plot 7-384. Conducted Spurious Plot (Band 66 – 20 + 20 MHz QPSK – PCC 1/99 SCC 1/0 – High Channel)



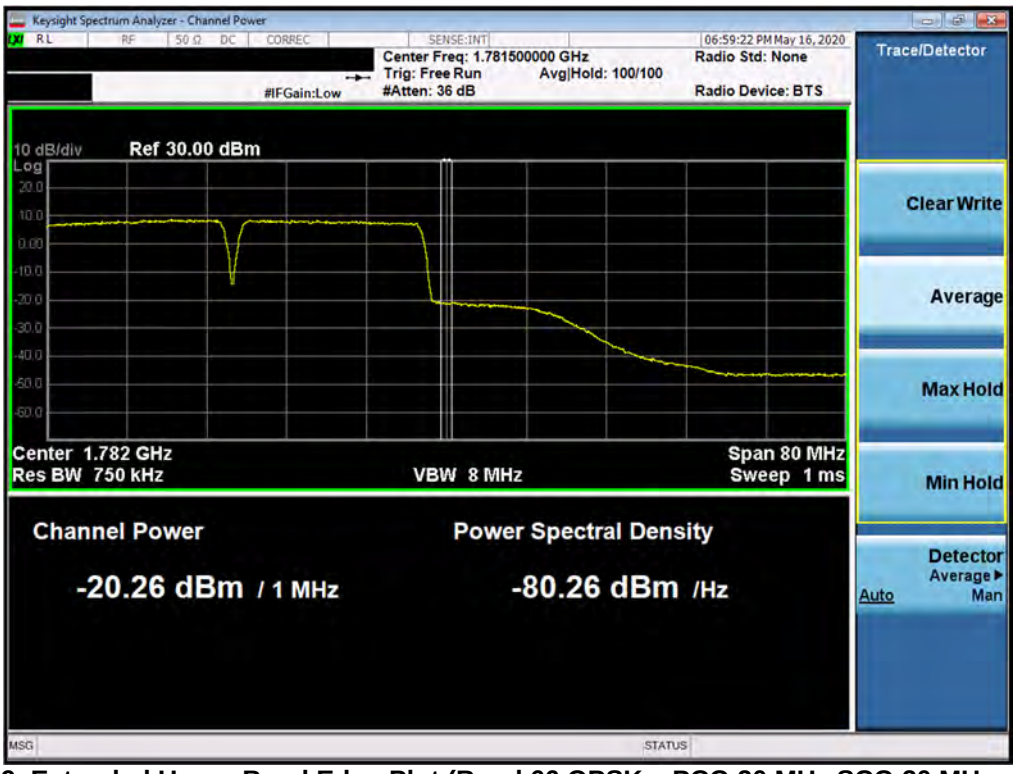
Plot 7-385. Conducted Spurious Plot (Band 66 – 20 + 20 MHz QPSK – PCC 1/99 SCC 1/0 – High Channel)

Plot 7-386. Lower Band Edge Plot (Band 66 QPSK – PCC:20 MHz SCC:20 MHz – Full RB)



Plot 7-387. Extended Lower Band Edge Plot (Band 66 QPSK – PCC:20 MHz SCC:20 MHz – Full RB)

Plot 7-388. Upper Band Edge Plot (Band 66 QPSK – PCC:20 MHz SCC:20 MHz – Full RB)



Plot 7-389. Extended Upper Band Edge Plot (Band 66 QPSK – PCC:20 MHz SCC:20 MHz – Full RB)

7.8 Radiated Power (ERP/EIRP)

Test Overview

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

Test Procedures Used

KDB 971168 D01 v03r01 – Section 5.2.1

ANSI/TIA-603-E-2016 – Section 2.2.17

Test Settings

1. Radiated power measurements are performed using the signal analyzer's "channel power" measurement capability for signals with continuous operation.
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".
8. The integration bandwidth was roughly set equal to the measured OBW of the signal for signals with continuous operation.
9. Trace mode = trace averaging (RMS) over 100 sweeps
10. The trace was allowed to stabilize

Test Setup

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

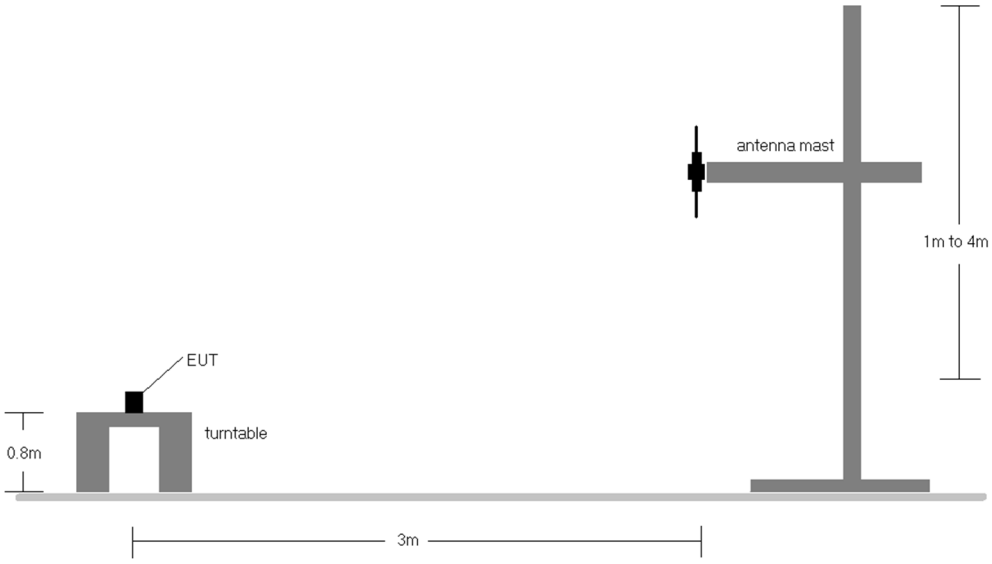


Figure 7-7. Radiated Test Setup <1GHz

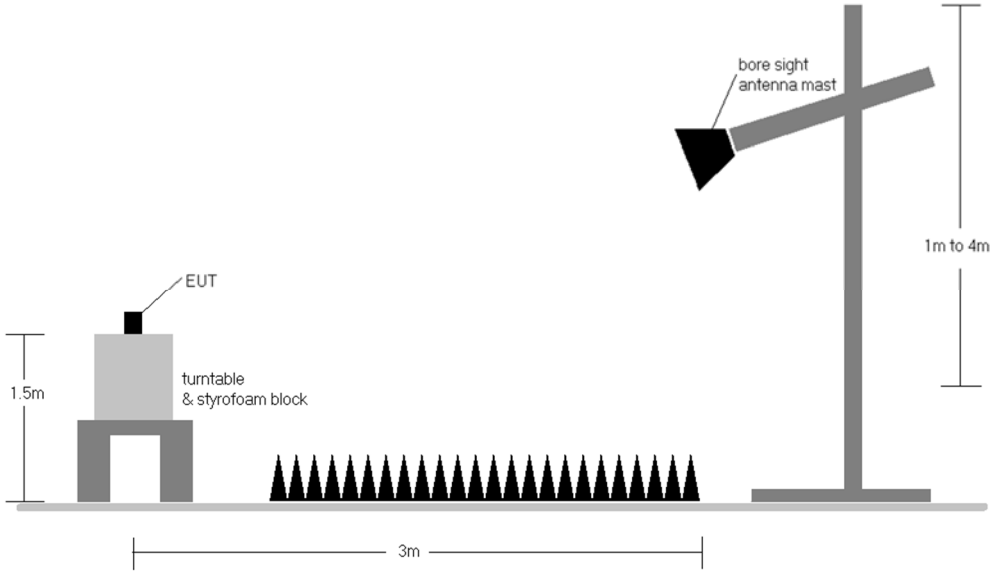


Figure 7-8. Radiated Test Setup >1GHz

Test Notes

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

2) This unit was tested while powered by a 56V DC PoE power source.

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]
779.50	5	QPSK	V	154	191	1 / 24	20.43	5.77	24.05	0.254	34.77	-10.73
782.00	5	QPSK	V	154	184	1 / 0	20.35	5.79	23.99	0.251	34.77	-10.78
784.50	5	QPSK	V	143	184	1 / 24	20.51	5.82	**24.18**	0.262	34.77	-10.59
784.50	5	16-QAM	V	143	184	1 / 24	19.80	5.82	**23.47**	0.222	34.77	-11.30
784.50	5	64-QAM	V	143	184	1 / 0	18.75	5.82	**22.42**	0.175	34.77	-12.35
782.00	10	QPSK	V	155	170	1 / 49	20.68	5.79	**24.32**	**0.271**	34.77	-10.45
782.00	10	16-QAM	V	155	170	1 / 49	19.85	5.79	**23.49**	0.224	34.77	-11.28
782.00	10	64-QAM	V	155	170	1 / 49	19.15	5.79	**22.79**	0.190	34.77	-11.98
782.00	10	QPSK	H	147	164	1 / 49	18.49	5.79	22.13	0.163	34.77	-12.64

Table 7-37. ERP Data (Band 13)

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
824.70	1.4	QPSK	V	144	189	3 / 2	19.17	6.36	23.38	0.218	38.45	-15.08
836.50	1.4	QPSK	V	135	181	1 / 0	19.40	6.38	**23.63**	0.231	38.45	-14.82
848.30	1.4	QPSK	V	133	178	3 / 2	19.08	6.50	23.43	0.220	38.45	-15.02
836.50	1.4	16-QAM	V	135	181	1 / 0	18.81	6.38	**23.04**	0.201	38.45	-15.41
836.50	1.4	64-QAM	V	135	181	1 / 5	17.63	6.38	**21.86**	0.153	38.45	-16.59
825.50	3	QPSK	V	142	186	1 / 14	19.12	6.36	23.33	0.215	38.45	-15.12
836.50	3	QPSK	V	136	182	1 / 0	19.49	6.38	**23.72**	0.235	38.45	-14.73
847.50	3	QPSK	V	138	175	1 / 0	19.07	6.49	23.41	0.219	38.45	-15.04
847.50	3	16-QAM	V	138	175	1 / 0	18.66	6.49	**23.00**	0.200	38.45	-15.45
847.50	3	64-QAM	V	138	175	1 / 0	17.61	6.49	**21.95**	0.157	38.45	-16.50
826.50	5	QPSK	V	137	189	1 / 24	18.95	6.37	23.17	0.208	38.45	-15.28
836.50	5	QPSK	V	133	180	1 / 24	19.42	6.38	**23.65**	0.232	38.45	-14.80
846.50	5	QPSK	V	146	183	1 / 0	19.05	6.48	23.38	0.218	38.45	-15.07
836.50	5	16-QAM	V	133	180	1 / 0	18.90	6.38	**23.13**	0.206	38.45	-15.32
836.50	5	64-QAM	V	133	180	1 / 0	17.85	6.38	**22.08**	0.161	38.45	-16.37
829.00	10	QPSK	V	139	184	1 / 0	19.19	6.40	23.44	0.221	38.45	-15.01
836.50	10	QPSK	V	139	183	1 / 49	19.52	6.38	**23.75**	**0.237**	38.45	-14.70
844.00	10	QPSK	V	140	181	1 / 49	19.16	6.46	23.47	0.222	38.45	-14.98
836.50	10	16-QAM	V	139	183	1 / 0	18.87	6.38	**23.10**	0.204	38.45	-15.35
844.00	10	64-QAM	V	140	181	1 / 49	17.66	6.46	**21.97**	0.157	38.45	-16.48
836.50	10	QPSK	H	182	188	1 / 49	17.82	6.68	22.35	0.172	38.45	-16.10

Table 7-38. ERP Data (Band 5)

Bandwidth	Mod.	Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Ant. Gain [dBi]	RB Size/Offset	Substitute Level [dBm]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
20 MHz	π/2 BPSK	836.5	V	123.0	11.0	1.18	1 / 53	24.63	**23.66**	0.232	38.45	-14.79
		839.0	V	125.0	9.0	1.20	1 / 53	24.24	23.29	0.213	38.45	-15.16
	QPSK	834.0	V	127.0	9.0	1.17	1 / 53	24.18	23.20	0.209	38.45	-15.25
		836.5	V	123.0	11.0	1.18	1 / 53	24.21	**23.24**	0.211	38.45	-15.21
		839.0	V	125.0	9.0	1.20	1 / 53	24.06	23.11	0.204	38.45	-15.34
	16-QAM	834.0	V	127.0	9.0	1.17	1 / 53	24.00	**23.02**	0.201	38.45	-15.43
	64-QAM	839.0	V	125.0	9.0	1.20	1 / 53	22.61	**21.66**	0.146	38.45	-16.79
	256-QAM	836.5	V	123.0	11.0	1.18	1 / 53	20.42	**19.45**	0.088	38.45	-19.00
15 MHz	π/2 BPSK	831.5	V	127.0	9.0	1.16	1 / 58	23.99	23.00	0.200	38.45	-15.45
		836.5	V	123.0	11.0	1.18	1 / 9	23.54	22.57	0.181	38.45	-15.88
		841.5	V	125.0	9.0	1.21	75 / 0	24.44	**23.50**	0.224	38.45	-14.95
	QPSK	831.5	V	127.0	9.0	1.16	1 / 58	23.88	22.89	0.195	38.45	-15.56
		836.5	V	123.0	11.0	1.18	1 / 20	23.13	22.16	0.165	38.45	-16.29
		841.5	V	125.0	9.0	1.21	1 / 39	24.09	**23.15**	0.206	38.45	-15.30
	16-QAM	841.5	V	125.0	9.0	1.21	1 / 39	23.71	**22.77**	0.189	38.45	-15.68
	64-QAM	831.5	V	127.0	9.0	1.16	1 / 58	22.03	**21.04**	0.127	38.45	-17.41
	256-QAM	831.5	V	127.0	9.0	1.16	1 / 58	20.23	**19.24**	0.084	38.45	-19.21
10 MHz	π/2 BPSK	829.0	V	127.0	9.0	1.15	1 / 26	24.26	23.26	0.212	38.45	-15.19
		836.5	V	123.0	11.0	1.18	1 / 26	24.48	23.51	0.225	38.45	-14.94
		844.0	V	125.0	9.0	1.22	1 / 26	24.88	**23.95**	0.248	38.45	-14.50
	QPSK	829.0	V	127.0	9.0	1.15	1 / 26	23.95	22.95	0.197	38.45	-15.50
		836.5	V	123.0	11.0	1.18	1 / 26	24.45	23.48	0.223	38.45	-14.97
		844.0	V	125.0	9.0	1.22	1 / 26	24.69	**23.76**	0.238	38.45	-14.69
	16-QAM	844.0	V	125.0	9.0	1.22	1 / 26	24.35	**23.42**	0.220	38.45	-15.03
	64-QAM	844.0	V	125.0	9.0	1.22	1 / 26	22.89	**21.96**	0.157	38.45	-16.49
	256-QAM	844.0	V	125.0	9.0	1.22	1 / 26	21.93	**21.00**	0.126	38.45	-17.45
5 MHz	π/2 BPSK	826.5	V	127.0	9.0	1.13	1 / 6	23.62	22.60	0.182	38.45	-15.85
		836.5	V	123.0	11.0	1.18	1 / 12	24.30	23.33	0.215	38.45	-15.12
		846.5	V	125.0	9.0	1.23	1 / 12	24.41	**23.49**	0.224	38.45	-14.96
	QPSK	826.5	V	127.0	9.0	1.13	1 / 12	23.64	22.62	0.183	38.45	-15.83
		836.5	V	123.0	11.0	1.18	1 / 12	23.70	22.73	0.188	38.45	-15.72
		846.5	V	125.0	9.0	1.23	1 / 12	24.39	**23.47**	0.222	38.45	-14.98
	16-QAM	846.5	V	125.0	9.0	1.23	1 / 12	24.36	**23.44**	0.221	38.45	-15.01
	64-QAM	846.5	V	125.0	9.0	1.23	1 / 12	22.83	**21.91**	0.155	38.45	-16.54
	256-QAM	846.5	V	125.0	9.0	1.23	1 / 12	20.75	**19.83**	0.096	38.45	-18.62
10 MHz	QPSK (CP-OFDM)	844.0	v	119.0	4.0	1.22	1 / 53	21.10	**22.32**	0.171	38.45	-16.13
10 MHz	QPSK (Opposite Pol.)	844.0	H	137.0	332.0	1.22	1 / 53	8.00	9.22	0.008	38.45	-29.23

Table 7-39. EIRP Data (NR n5)

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	241	191	1 / 5	18.39	9.47	27.86	0.611	30.00	-2.14
1745.00	1.4	QPSK	H	212	200	3 / 2	19.87	9.26	**29.13**	0.819	30.00	-0.87
1779.30	1.4	QPSK	H	198	185	3 / 2	19.28	9.29	28.57	0.719	30.00	-1.43
1745.00	1.4	16-QAM	H	212	200	3 / 2	18.96	9.26	**28.22**	0.664	30.00	-1.78
1779.30	1.4	64-QAM	H	198	185	1 / 0	18.56	9.29	**27.85**	0.609	30.00	-2.15
1711.50	3	QPSK	H	245	197	1 / 14	18.60	9.47	28.07	0.641	30.00	-1.93
1745.00	3	QPSK	H	224	190	1 / 0	19.95	9.26	**29.21**	0.834	30.00	-0.79
1778.50	3	QPSK	H	198	192	1 / 0	19.29	9.28	28.57	0.720	30.00	-1.43
1745.00	3	16-QAM	H	224	190	1 / 0	19.36	9.26	**28.62**	0.728	30.00	-1.38
1778.50	3	64-QAM	H	198	192	1 / 0	18.63	9.28	**27.91**	0.619	30.00	-2.09
1712.50	5	QPSK	H	239	195	1 / 24	18.57	9.46	28.03	0.635	30.00	-1.97
1745.00	5	QPSK	H	212	191	1 / 0	19.78	9.26	**29.04**	0.802	30.00	-0.96
1777.50	5	QPSK	H	200	194	1 / 0	19.57	9.28	28.85	0.768	30.00	-1.15
1777.50	5	16-QAM	H	200	194	1 / 0	19.19	9.28	**28.47**	0.703	30.00	-1.53
1777.50	5	64-QAM	H	200	194	1 / 0	19.03	9.28	**28.31**	0.678	30.00	-1.69
1715.00	10	QPSK	H	237	196	1 / 49	18.73	9.44	28.17	0.657	30.00	-1.83
1745.00	10	QPSK	H	220	201	1 / 49	19.64	9.26	**28.90**	0.776	30.00	-1.10
1775.00	10	QPSK	H	201	184	1 / 49	19.52	9.28	28.80	0.758	30.00	-1.20
1745.00	10	16-QAM	H	220	201	1 / 49	19.05	9.26	**28.31**	0.678	30.00	-1.69
1775.00	10	64-QAM	H	201	184	1 / 49	18.86	9.28	**28.14**	0.651	30.00	-1.86
1717.50	15	QPSK	H	240	197	1 / 74	18.98	9.43	28.41	0.693	30.00	-1.59
1745.00	15	QPSK	H	218	201	1 / 74	19.95	9.26	29.21	0.834	30.00	-0.79
1772.50	15	QPSK	H	197	192	1 / 74	19.96	9.27	**29.23**	0.838	30.00	-0.77
1772.50	15	16-QAM	H	197	192	1 / 74	19.29	9.27	**28.56**	0.718	30.00	-1.44
1772.50	15	64-QAM	H	197	192	1 / 74	19.34	9.27	**28.61**	0.727	30.00	-1.39
1720.00	20	QPSK	H	243	197	1 / 0	18.93	9.41	28.34	0.683	30.00	-1.66
1745.00	20	QPSK	H	218	197	1 / 99	19.97	9.26	29.23	0.838	30.00	-0.77
1770.00	20	QPSK	H	200	187	1 / 99	20.01	9.27	**29.28**	**0.847**	30.00	-0.72
1770.00	20	16-QAM	H	200	187	1 / 99	19.44	9.27	**28.71**	0.743	30.00	-1.29
1770.00	20	64-QAM	H	200	187	1 / 99	19.12	9.27	**28.39**	0.690	30.00	-1.61
1770.00	20	QPSK	V	176	195	1 / 99	19.33	9.17	28.50	0.708	30.00	-1.50

Table 7-40. EIRP Data (Band 66/4)

Bandwidth	Mod.	Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Ant. Gain [dBi]	RB Size/Offset	Substitute Level [dBm]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
20 MHz	π/2 BPSK	1720.0	V	145.0	349.0	8.66	1 / 53	20.21	28.87	0.770	30.00	-1.13
		1745.0	V	102.0	11.0	8.18	1 / 53	20.80	**28.98**	0.791	30.00	-1.02
		1770.0	V	134.0	348.0	8.19	1 / 53	20.42	28.61	0.726	30.00	-1.39
	QPSK	1720.0	V	145.0	349.0	8.66	1 / 53	20.11	28.77	0.753	30.00	-1.23
		1745.0	V	102.0	11.0	8.18	1 / 53	20.67	**28.85**	0.768	30.00	-1.15
		1770.0	V	134.0	348.0	8.19	1 / 53	20.36	28.55	0.716	30.00	-1.45
	16-QAM	1745.0	V	102.0	11.0	8.18	1 / 53	20.82	**29.00**	0.795	30.00	-1.00
	64-QAM	1745.0	V	102.0	11.0	8.18	1 / 53	19.39	**27.57**	0.572	30.00	-2.43
	256-QAM	1745.0	V	102.0	11.0	8.18	1 / 53	17.90	**26.08**	0.406	30.00	-3.92
15 MHz	π/2 BPSK	1717.5	V	145.0	349.0	8.70	1 / 58	21.13	**29.83**	0.962	30.00	-0.17
		1745.0	V	102.0	11.0	8.18	1 / 37	20.62	28.80	0.759	30.00	-1.20
		1772.5	V	134.0	348.0	8.20	79 / 0	21.40	29.60	0.912	30.00	-0.40
	QPSK	1717.5	V	145.0	349.0	8.70	1 / 58	21.01	**29.71**	0.936	30.00	-0.29
		1745.0	V	102.0	11.0	8.18	1 / 37	20.72	28.90	0.777	30.00	-1.10
		1772.5	V	134.0	348.0	8.20	79 / 0	21.39	29.59	0.910	30.00	-0.41
	16-QAM	1717.5	V	145.0	349.0	8.70	1 / 58	21.12	**29.82**	0.960	30.00	-0.18
	64-QAM	1772.5	V	134.0	348.0	8.20	79 / 0	20.37	**28.57**	0.720	30.00	-1.43
	256-QAM	1717.5	V	145.0	349.0	8.70	1 / 58	17.96	**26.66**	0.464	30.00	-3.34
10 MHz	π/2 BPSK	1715.0	V	145.0	349.0	8.75	1 / 26	20.87	29.62	0.916	30.00	-0.38
		1745.0	V	102.0	11.0	8.18	1 / 26	21.24	29.42	0.876	30.00	-0.58
		1775.0	V	134.0	348.0	8.21	1 / 26	21.45	**29.66**	0.925	30.00	-0.34
	QPSK	1715.0	V	145.0	349.0	8.75	1 / 26	20.67	29.42	0.875	30.00	-0.58
		1745.0	V	102.0	11.0	8.18	1 / 26	21.06	29.24	0.840	30.00	-0.76
		1775.0	V	134.0	348.0	8.21	1 / 26	21.23	**29.44**	0.880	30.00	-0.56
	16-QAM	1775.0	V	134.0	348.0	8.21	1 / 26	21.24	**29.45**	0.882	30.00	-0.55
	64-QAM	1775.0	V	134.0	348.0	8.21	1 / 26	19.85	**28.06**	0.640	30.00	-1.94
	256-QAM	1775.0	V	134.0	348.0	8.21	1 / 26	18.21	**26.42**	0.439	30.00	-3.58
5 MHz	π/2 BPSK	1712.5	V	145.0	349.0	8.80	1 / 12	20.39	29.19	0.830	30.00	-0.81
		1745.0	V	102.0	11.0	8.18	1 / 12	20.98	29.16	0.825	30.00	-0.84
		1777.5	V	134.0	348.0	8.23	1 / 12	21.76	**29.99**	0.997	30.00	-0.01
	QPSK	1712.5	V	145.0	349.0	8.80	1 / 12	20.51	29.31	0.853	30.00	-0.69
		1745.0	V	102.0	11.0	8.18	1 / 12	20.95	29.13	0.819	30.00	-0.87
		1777.5	V	134.0	348.0	8.23	1 / 12	21.74	**29.97**	0.992	30.00	-0.03
	16-QAM	1777.5	V	134.0	348.0	8.23	1 / 12	21.64	**29.87**	0.970	30.00	-0.13
	256-QAM	1777.5	V	134.0	348.0	8.23	1 / 12	18.39	**26.62**	0.459	30.00	-3.38
5 MHz	QPSK (CP-OFDM)	1777.5	V	101.0	9.0	8.23	1 / 12	21.06	**29.29**	0.848	30.00	-0.71
5 MHz	QPSK (Opposite Pol.)	1777.5	H	181.0	17.0	8.23	1 / 12	12.44	20.67	0.117	30.00	-9.33

Table 7-41. EIRP Data (NR n66)

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
1850.70	1.4	QPSK	V	103	177	3 / 2	21.24	9.91	31.15	1.302	33.01	-1.86
1880.00	1.4	QPSK	V	112	159	3 / 2	20.74	10.13	30.87	1.223	33.01	-2.14
1909.30	1.4	QPSK	V	100	175	3 / 2	20.88	10.34	**31.22**	1.324	33.01	-1.79
1850.70	1.4	16-QAM	V	103	177	1 / 0	20.90	9.91	**30.81**	1.204	33.01	-2.20
1850.70	1.4	64-QAM	V	103	177	3 / 2	20.07	9.91	**29.98**	0.995	33.01	-3.03
1851.50	3	QPSK	V	101	173	1 / 0	21.18	9.91	31.09	1.286	33.01	-1.92
1880.00	3	QPSK	V	118	166	1 / 14	20.68	10.13	30.81	1.206	33.01	-2.20
1908.50	3	QPSK	V	100	175	1 / 0	20.85	10.33	**31.18**	1.313	33.01	-1.83
1851.50	3	16-QAM	V	101	173	1 / 0	21.07	9.91	**30.98**	1.254	33.01	-2.03
1851.50	3	64-QAM	V	101	173	1 / 14	19.85	9.91	**29.76**	0.947	33.01	-3.25
1852.50	5	QPSK	V	102	170	1 / 24	21.17	9.92	31.09	1.285	33.01	-1.92
1880.00	5	QPSK	V	115	158	1 / 24	20.70	10.13	30.83	1.212	33.01	-2.18
1907.50	5	QPSK	V	107	175	1 / 0	21.00	10.33	**31.33**	1.358	33.01	-1.68
1852.50	5	16-QAM	V	102	170	1 / 0	20.82	9.92	**30.74**	1.186	33.01	-2.27
1852.50	5	64-QAM	V	102	170	1 / 24	19.97	9.92	**29.89**	0.975	33.01	-3.12
1855.00	10	QPSK	V	109	174	1 / 49	20.62	9.94	30.56	1.138	33.01	-2.45
1880.00	10	QPSK	V	124	162	1 / 49	20.66	10.13	30.79	1.200	33.01	-2.22
1905.00	10	QPSK	V	106	176	1 / 0	21.25	10.31	**31.56**	1.433	33.01	-1.45
1905.00	10	16-QAM	V	106	176	1 / 0	20.60	10.31	**30.91**	1.234	33.01	-2.10
1905.00	10	64-QAM	V	106	176	1 / 0	19.44	10.31	**29.75**	0.945	33.01	-3.26
1857.50	15	QPSK	V	110	177	1 / 0	20.72	9.96	30.68	1.169	33.01	-2.33
1880.00	15	QPSK	V	115	162	1 / 74	21.10	10.13	31.23	1.328	33.01	-1.78
1902.50	15	QPSK	V	100	172	1 / 0	21.22	10.30	**31.52**	1.419	33.01	-1.49
1902.50	15	16-QAM	V	100	172	1 / 0	20.65	10.30	**30.95**	1.245	33.01	-2.06
1902.50	15	64-QAM	V	100	172	1 / 0	19.99	10.30	**30.29**	1.069	33.01	-2.72
1860.00	20	QPSK	V	103	175	1 / 0	21.47	9.98	31.45	1.396	33.01	-1.56
1880.00	20	QPSK	V	118	163	1 / 99	21.12	10.13	31.25	1.335	33.01	-1.76
1900.00	20	QPSK	V	100	179	1 / 0	21.31	10.29	**31.60**	**1.444**	33.01	-1.41
1900.00	20	16-QAM	V	100	179	1 / 0	20.82	10.29	**31.11**	1.290	33.01	-1.90
1900.00	20	64-QAM	V	100	179	1 / 0	19.68	10.29	**29.97**	0.992	33.01	-3.04
1900.00	20	QPSK	H	178	195	1 / 0	21.25	10.20	31.45	1.398	33.01	-1.56

Table 7-42. EIRP Data (Band 2)

Bandwidth	Mod.	Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Ant. Gain [dBi]	RB Size/Offset	Substitute Level [dBm]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
20 MHz	π/2 BPSK	1860.0	V	123.0	351.0	8.62	1 / 26	23.67	**32.29**	1.694	33.01	-0.72
		1880.0	V	119.0	350.0	8.51	1 / 26	23.23	31.74	1.493	33.01	-1.27
		1900.0	V	118.0	339.0	8.40	106 / 0	22.60	31.00	1.260	33.01	-2.01
	QPSK	1860.0	V	123.0	351.0	8.62	1 / 26	23.13	31.75	1.496	33.01	-1.26
		1880.0	V	119.0	350.0	8.51	1 / 26	23.24	**31.75**	1.497	33.01	-1.26
		1900.0	V	118.0	339.0	8.40	106 / 0	22.56	30.96	1.249	33.01	-2.05
	16-QAM	1880.0	V	119.0	350.0	8.51	1 / 26	22.88	**31.39**	1.377	33.01	-1.62
	64-QAM	1880.0	V	119.0	350.0	8.51	1 / 26	21.25	**29.76**	0.946	33.01	-3.25
	256-QAM	1880.0	V	119.0	350.0	8.51	1 / 26	19.59	**28.10**	0.646	33.01	-4.91
15 MHz	π/2 BPSK	1857.5	V	123.0	351.0	8.63	1 / 39	23.43	**32.06**	1.608	33.01	-0.95
		1880.0	V	119.0	350.0	8.51	1 / 39	23.26	31.77	1.503	33.01	-1.24
		1902.5	V	118.0	339.0	8.41	1 / 39	22.73	31.14	1.300	33.01	-1.87
	QPSK	1857.5	V	123.0	351.0	8.63	1 / 39	23.36	**31.99**	1.582	33.01	-1.02
		1880.0	V	119.0	350.0	8.51	1 / 39	23.19	31.70	1.479	33.01	-1.31
		1902.5	V	118.0	339.0	8.41	1 / 39	22.62	31.03	1.268	33.01	-1.98
	16-QAM	1880.0	V	119.0	350.0	8.51	1 / 39	23.09	**31.60**	1.446	33.01	-1.41
	64-QAM	1880.0	V	119.0	350.0	8.51	1 / 39	21.50	**30.01**	1.003	33.01	-3.00
	256-QAM	1880.0	V	119.0	350.0	8.51	1 / 39	19.78	**28.29**	0.675	33.01	-4.72
10 MHz	π/2 BPSK	1855.0	V	123.0	351.0	8.65	1 / 26	23.43	**32.08**	1.613	33.01	-0.93
		1880.0	V	119.0	350.0	8.51	1 / 26	23.22	31.73	1.490	33.01	-1.28
		1905.0	V	118.0	339.0	8.42	1 / 26	22.91	31.33	1.357	33.01	-1.68
	QPSK	1855.0	V	123.0	351.0	8.65	1 / 26	23.25	**31.90**	1.547	33.01	-1.11
		1880.0	V	119.0	350.0	8.51	1 / 26	23.03	31.54	1.426	33.01	-1.47
		1905.0	V	118.0	339.0	8.42	1 / 26	22.73	31.15	1.302	33.01	-1.86
	16-QAM	1880.0	V	119.0	350.0	8.51	1 / 26	23.23	**31.74**	1.493	33.01	-1.27
	64-QAM	1880.0	V	119.0	350.0	8.51	1 / 26	21.61	**30.12**	1.028	33.01	-2.89
	256-QAM	1855.0	V	123.0	351.0	8.65	1 / 26	19.75	**28.40**	0.691	33.01	-4.61
5 MHz	π/2 BPSK	1852.5	V	123.0	351.0	8.66	1 / 12	23.60	**32.26**	1.682	33.01	-0.75
		1880.0	V	119.0	350.0	8.51	1 / 12	22.93	31.44	1.393	33.01	-1.57
		1907.5	V	118.0	339.0	8.42	1 / 12	22.61	31.03	1.269	33.01	-1.98
	QPSK	1852.5	V	123.0	351.0	8.66	1 / 12	23.49	**32.15**	1.640	33.01	-0.86
		1880.0	V	119.0	350.0	8.51	1 / 12	22.87	31.38	1.374	33.01	-1.63
		1907.5	V	118.0	339.0	8.42	1 / 12	22.54	30.96	1.248	33.01	-2.05
	16-QAM	1880.0	V	119.0	350.0	8.51	1 / 12	22.95	**31.46**	1.400	33.01	-1.55
	64-QAM	1880.0	V	119.0	350.0	8.51	1 / 12	21.52	**30.03**	1.007	33.01	-2.98
20 MHz	QPSK (CP-OFDM)	1860.0	V	123.0	351.0	8.62	1 / 26	23.02	**31.64**	1.458	33.01	-1.37
20 MHz	QPSK (Opposite Pol.)	1860.0	H	264.0	4.0	8.62	1 / 26	12.79	21.41	0.138	33.01	-11.60

Table 7-43. EIRP Data (NR n2)

7.9 Radiated Spurious Emissions Measurements

Test Overview

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

Test Procedures Used

KDB 971168 D01 v03r01 – Section 5.8

ANSI/TIA-603-E-2016 – Section 2.2.12

ANSI C63.26-2015 – Section 5.5.4

Test Settings

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

Test Setup

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

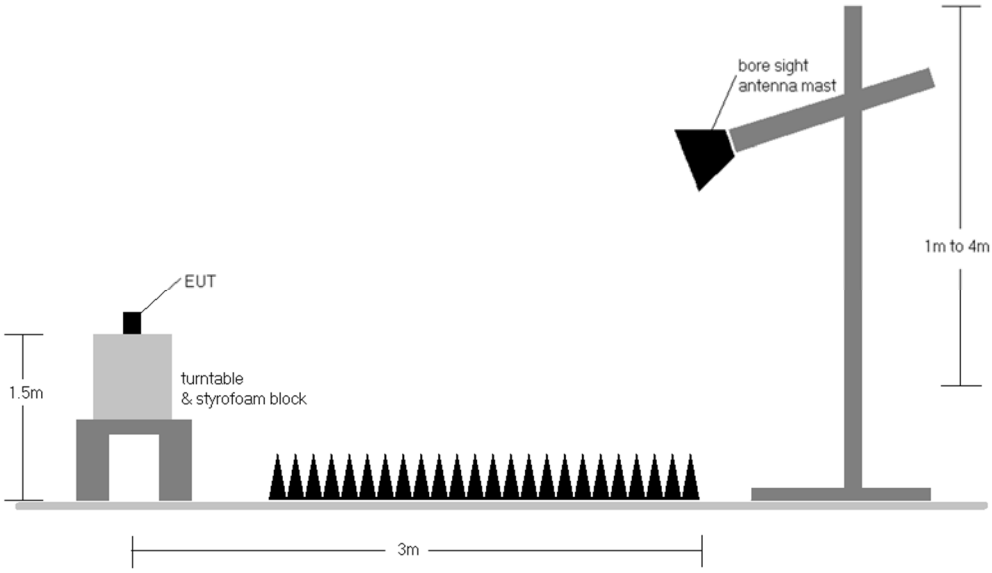


Figure 7-9. Test Instrument & Measurement Setup

Test Notes

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

2) This unit was tested while powered by a 56V DC PoE power source.

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.

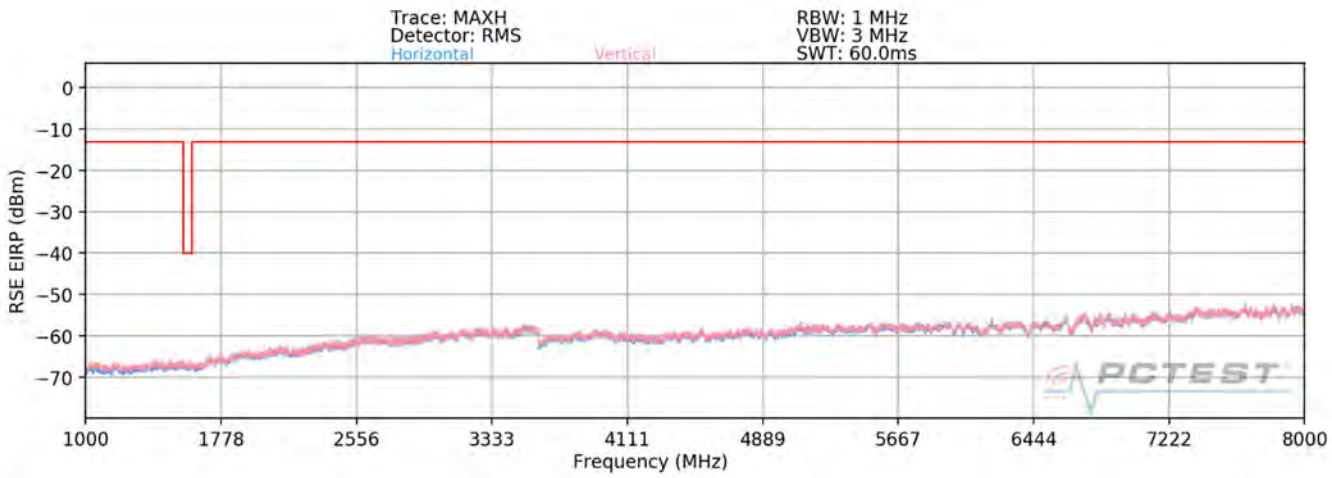
5) The "-" shown in the following RSE tables are used to denote a noise floor measurement.

6) Per KDB 971168, Field Strength Level (dBµV/m) is converted to EIRP Spurious Emission Level (dBm) using the formula in Section 5.8.4 (d):

$$EIRP\ (dBm) = E\ (dB\mu V/m) + 20 \log D - 104.8;\ \text{where D is the measurement distance in meters}$$

7) RSE's were investigated in EN-DC mode and all emission at not close to the limit.

Band 13



Plot 7-390. Radiated Spurious Plot above 1GHz (Band 13)

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

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
2346.00	H	-	-	-73.25	3.64	-69.61	-56.6
3128.00	H	-	-	-71.88	5.73	-66.15	-53.1
3910.00	H	-	-	-71.45	7.25	-64.20	-51.2

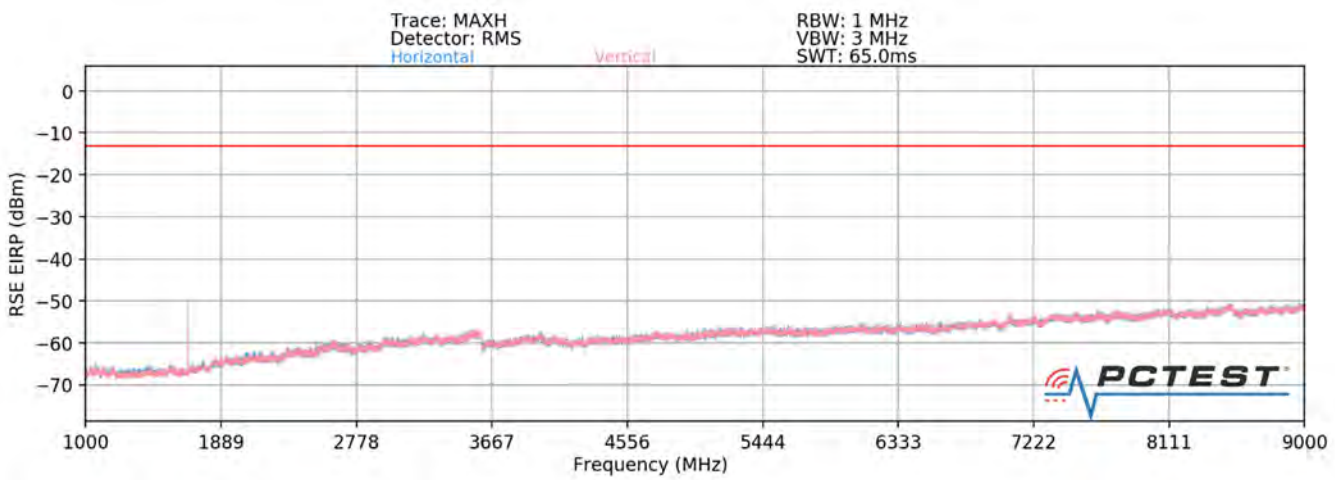
Table 7-44. Radiated Spurious Data (Band 13 – Mid Channel)

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

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1564.00	H	148	147	-60.90	2.93	-57.97	-18.0

Table 7-45. Radiated Spurious Data (Band 13 – 1559-1610MHz Band)

Band 5



Plot 7-391. Radiated Spurious Plot above 1GHz (Band 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	V	149	171	-59.25	3.12	-56.13	-43.1
2487.00	V	-	-	-72.55	3.87	-68.68	-55.7
3316.00	V	-	-	-71.47	6.01	-65.46	-52.5
4145.00	V	-	-	-72.25	7.77	-64.48	-51.5

Table 7-46. Radiated Spurious Data (Band 5 – Low Channel)

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	V	278	7	-57.73	3.10	-54.63	-41.6
2509.50	V	-	-	-73.04	4.02	-69.02	-56.0
3346.00	V	-	-	-72.15	6.03	-66.13	-53.1
4182.50	V	-	-	-72.05	7.79	-64.25	-51.3

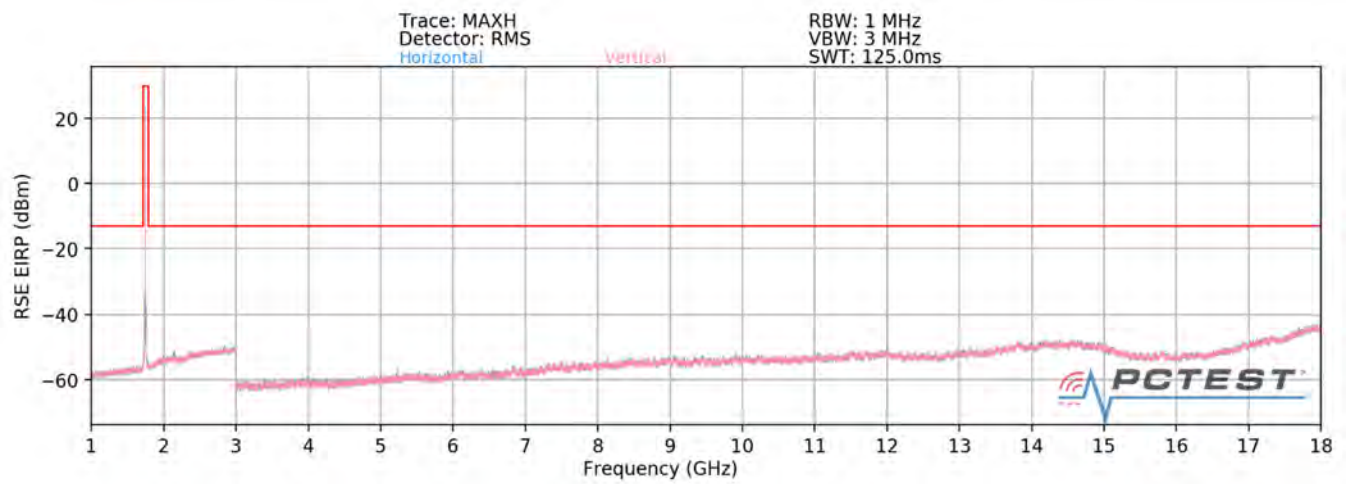
Table 7-47. Radiated Spurious Data (Band 5 – Mid Channel)

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	V	141	4	-61.50	3.18	-58.33	-45.3
2532.00	V	326	122	-77.64	4.10	-73.54	-60.5
3376.00	V	-	-	-80.48	6.15	-74.33	-61.3
4220.00	V	-	-	-80.43	7.88	-72.55	-59.6

Table 7-48. Radiated Spurious Data (Band 5 – High Channel)

Band 66/4



Plot 7-392. 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	115	-69.34	6.28	-63.06	-50.1
5160.00	H	347	216	-67.08	8.98	-58.09	-45.1
6880.00	H	-	-	-68.54	9.42	-59.12	-46.1
8600.00	H	-	-	-65.53	9.62	-55.91	-42.9
10320.00	H	-	-	-65.26	9.56	-55.69	-42.7

Table 7-49. Radiated Spurious Data (Band 66/4 – Low Channel)

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	152	167	-70.06	6.47	-63.59	-50.6
5235.00	H	354	290	-69.49	8.97	-60.52	-47.5
6980.00	H	120	211	-67.07	9.23	-57.84	-44.8
8725.00	H	-	-	-65.21	9.59	-55.62	-42.6
10470.00	H	-	-	-63.73	9.43	-54.30	-41.3

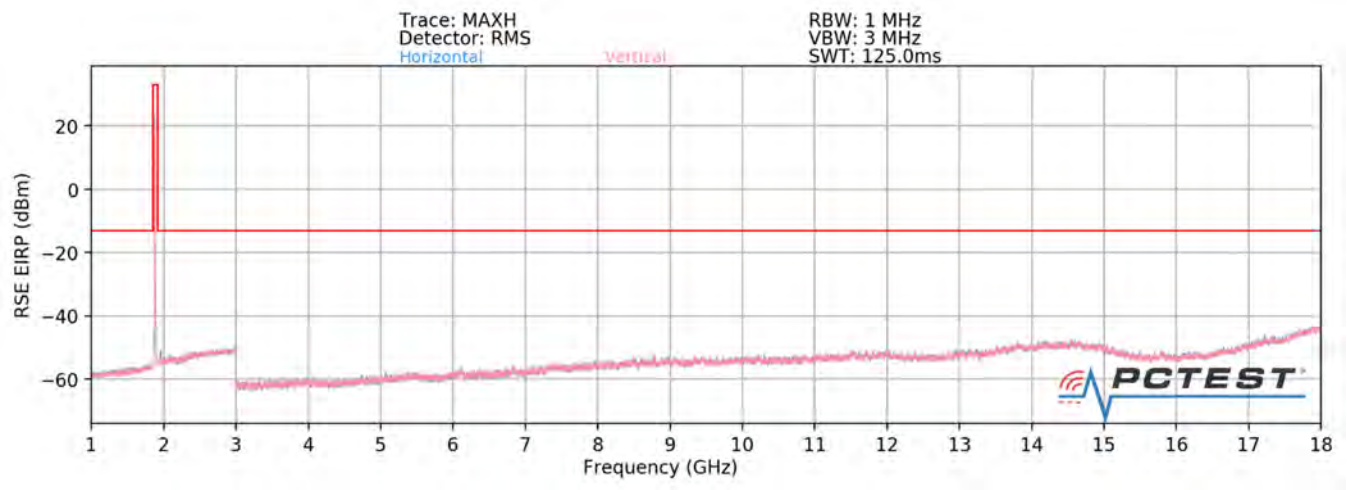
Table 7-50. Radiated Spurious Data (Band 66/4 – Mid Channel)

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	264	208	-68.70	6.45	-62.25	-49.2
5310.00	H	160	205	-69.69	9.09	-60.59	-47.6
7080.00	H	-	-	-68.05	9.17	-58.88	-45.9
8850.00	H	-	-	-65.96	9.57	-56.39	-43.4
10620.00	H	-	-	-64.68	9.55	-55.13	-42.1

Table 7-51. Radiated Spurious Data (Band 66/4 – High Channel)

Band 2



Plot 7-393. Radiated Spurious Plot above 1GHz (Band 2)

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

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3720.00	V	-	-	-70.10	6.90	-63.20	-50.2
5580.00	V	269	25	-66.41	9.06	-57.35	-44.4
7440.00	V	-	-	-67.24	9.26	-57.98	-45.0
9300.00	V	-	-	-65.75	9.40	-56.35	-43.4

Table 7-52. Radiated Spurious Data (Band 2 – Low Channel)

OPERATING FREQUENCY:	1880.00	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]
3760.00	V	181	183	-68.56	6.93	-61.62	-48.6
5640.00	V	157	202	-66.85	9.15	-57.70	-44.7
7520.00	V	-	-	-67.06	9.31	-57.75	-44.7
9400.00	V	-	-	-65.15	9.49	-55.66	-42.7

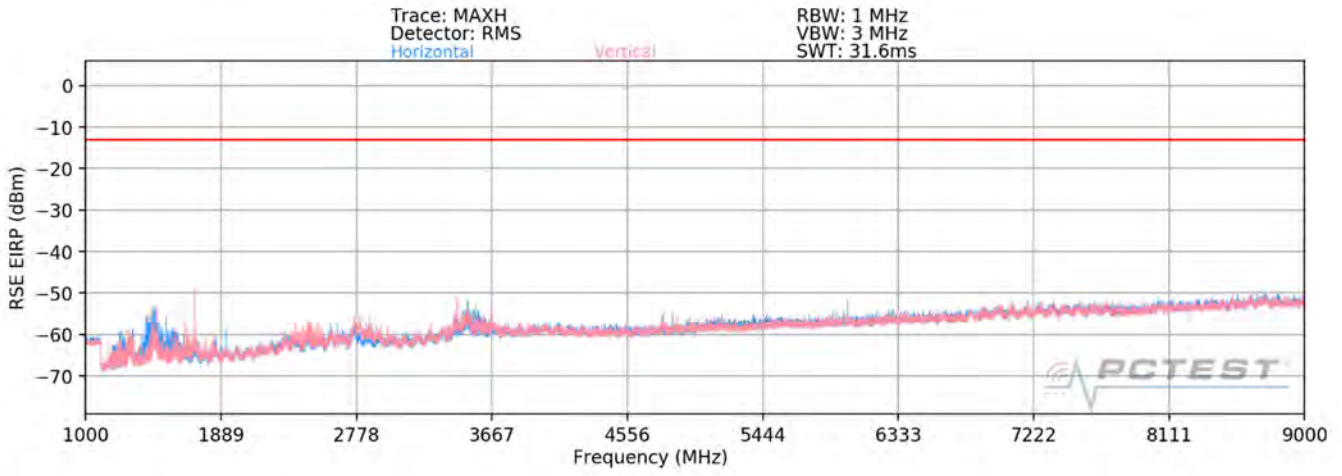
Table 7-53. Radiated Spurious Data (Band 2 – Mid Channel)

OPERATING FREQUENCY:	1900.00	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]
3800.00	V	124	182	-70.97	7.02	-63.95	-50.9
5700.00	V	123	206	-62.08	9.05	-53.04	-40.0
7600.00	V	-	-	-68.75	9.25	-59.50	-46.5
9500.00	V	-	-	-67.26	9.48	-57.77	-44.8

Table 7-54. Radiated Spurious Data (Band 2 – High Channel)

NR Band n5



Plot 7-394. Radiated Spurious Plot (NR Band n5 Standalone)

Bandwidth (MHz):	10
Frequency (MHz):	829.0
RB / Offset:	1 / 26
Mode:	SA
Anchor Band:	N/A

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1658.0	H	-	-	-74.65	-6.74	25.61	-69.64	-13.00	-56.64
2487.0	H	-	-	-75.16	-3.34	28.50	-66.76	-13.00	-53.76
3316.0	H	-	-	-75.70	-1.08	30.22	-65.04	-13.00	-52.04
4145.0	H	-	-	-76.89	1.29	31.40	-63.85	-13.00	-50.85
4974.0	H	-	-	-77.35	2.55	32.20	-63.06	-13.00	-50.06

Table 7-55. Radiated Spurious Data (NR Band n5 Standalone – Low Channel)

Bandwidth (MHz):	10
Frequency (MHz):	836.5
RB / Offset:	1 / 26
Mode:	SA
Anchor Band:	N/A

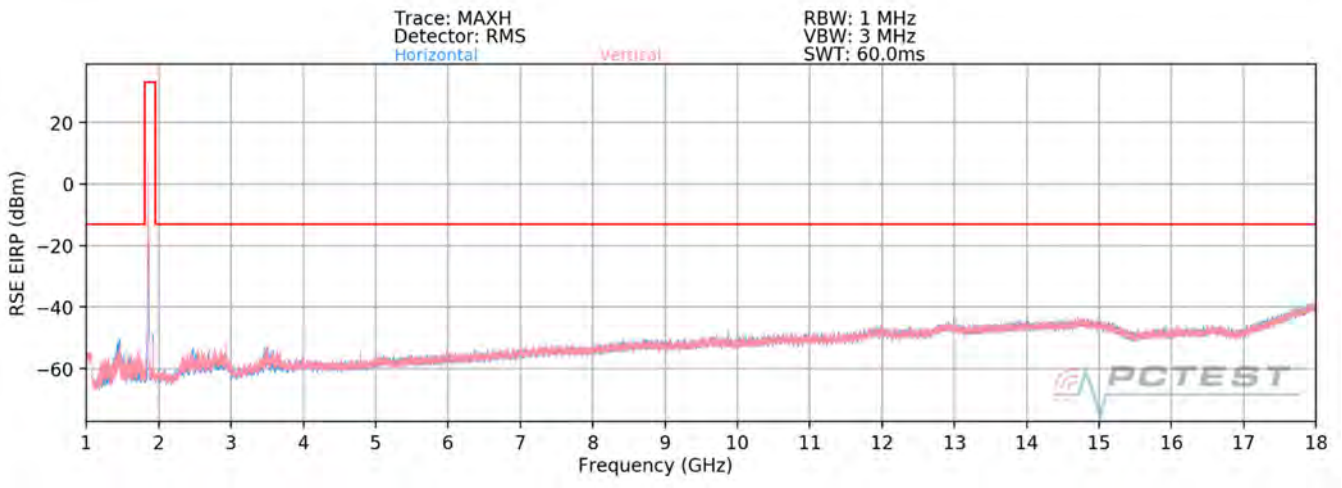
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1673.0	H	-	-	-74.76	-6.79	25.45	-69.81	-13.00	-56.81
2509.5	H	-	-	-74.53	-3.24	29.23	-66.03	-13.00	-53.03
3346.0	H	-	-	-75.29	-0.97	30.74	-64.51	-13.00	-51.51
4182.5	H	-	-	-76.26	0.94	31.68	-63.58	-13.00	-50.58
5019.0	H	-	-	-77.41	2.48	32.07	-63.19	-13.00	-50.19

Table 7-56. Radiated Spurious Data (NR Band n5 Standalone – Mid Channel)

Bandwidth (MHz):	10
Frequency (MHz):	844.0
RB / Offset:	1 / 26
Mode:	SA
Anchor Band:	N/A

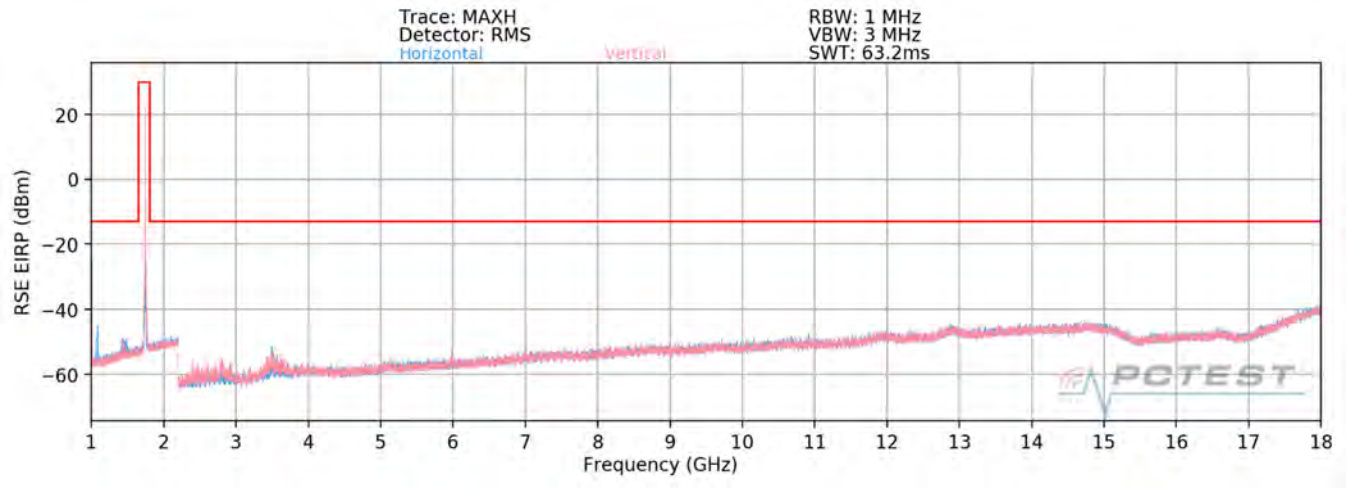
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1688.0	H	-	-	-76.81	-6.82	23.37	-71.89	-13.00	-58.89
2532.0	H	-	-	-75.10	-3.27	28.63	-66.63	-13.00	-53.63
3376.0	H	-	-	-75.29	-0.83	30.88	-64.38	-13.00	-51.38
4220.0	H	-	-	-76.46	0.91	31.45	-63.81	-13.00	-50.81
5064.0	H	-	-	-76.82	2.78	32.96	-62.30	-13.00	-49.30

Table 7-57. Radiated Spurious Data (NR Band n5 Standalone – High Channel)



Plot 7-395. Radiated Spurious Plot (EN-DC n5-LB2)

NR Band n66



Plot 7-396. Radiated Spurious Plot (NR Band n66 Standalone)

Bandwidth (MHz):	5
Frequency (MHz):	1715.0
RB / Offset:	1 / 12
Mode:	SA
Anchor Band:	N/A

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
3430.0	H	-	-	-75.90	-0.01	31.09	-64.17	-13.00	-51.17
5145.0	H	-	-	-77.55	3.67	33.12	-62.14	-13.00	-49.14
6860.0	H	-	-	-78.91	9.15	37.24	-58.02	-13.00	-45.02
8575.0	H	-	-	-80.37	11.10	37.73	-57.53	-13.00	-44.53
10290.0	H	-	-	-81.46	13.76	39.30	-55.96	-13.00	-42.96

Table 7-58. Radiated Spurious Data (NR Band n66 Standalone – Low Channel)

Bandwidth (MHz):	5
Frequency (MHz):	1745.0
RB / Offset:	1 / 12
Mode:	SA
Anchor Band:	N/A

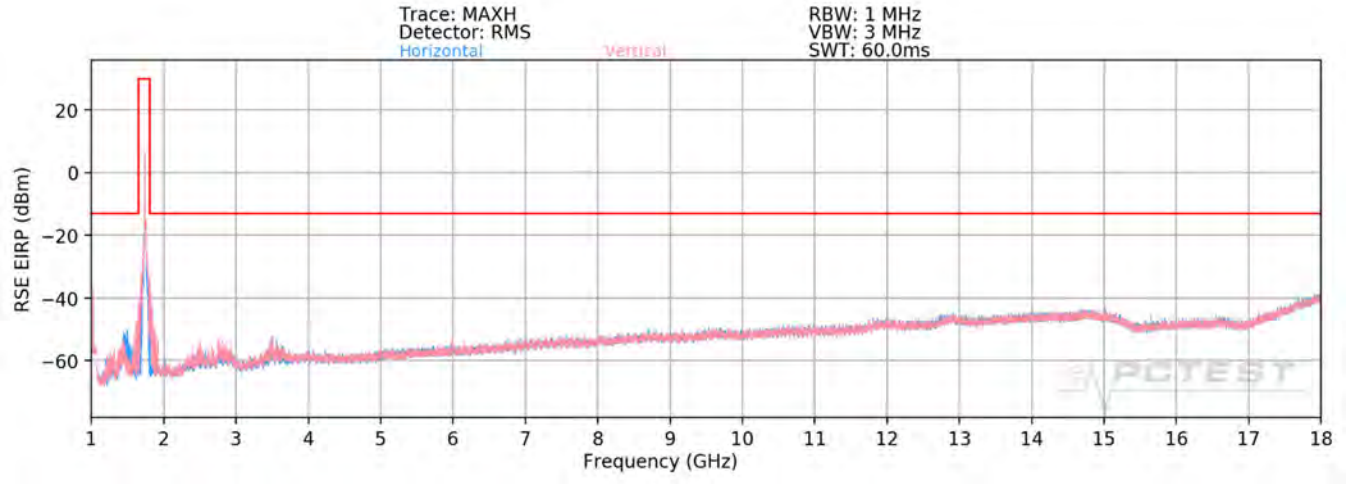
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
3490.0	H	-	-	-75.50	0.08	31.58	-63.68	-13.00	-50.68
5235.0	H	-	-	-77.33	4.02	33.69	-61.57	-13.00	-48.57
6980.0	H	-	-	-78.73	9.22	37.49	-57.77	-13.00	-44.77
8725.0	H	-	-	-80.28	12.10	38.82	-56.44	-13.00	-43.44
10470.0	H	-	-	-81.47	14.36	39.89	-55.37	-13.00	-42.37

Table 7-59. Radiated Spurious Data (NR Band n66 Standalone – Mid Channel)

Bandwidth (MHz):	5
Frequency (MHz):	1777.5
RB / Offset:	1 / 12
Mode:	SA
Anchor Band:	N/A

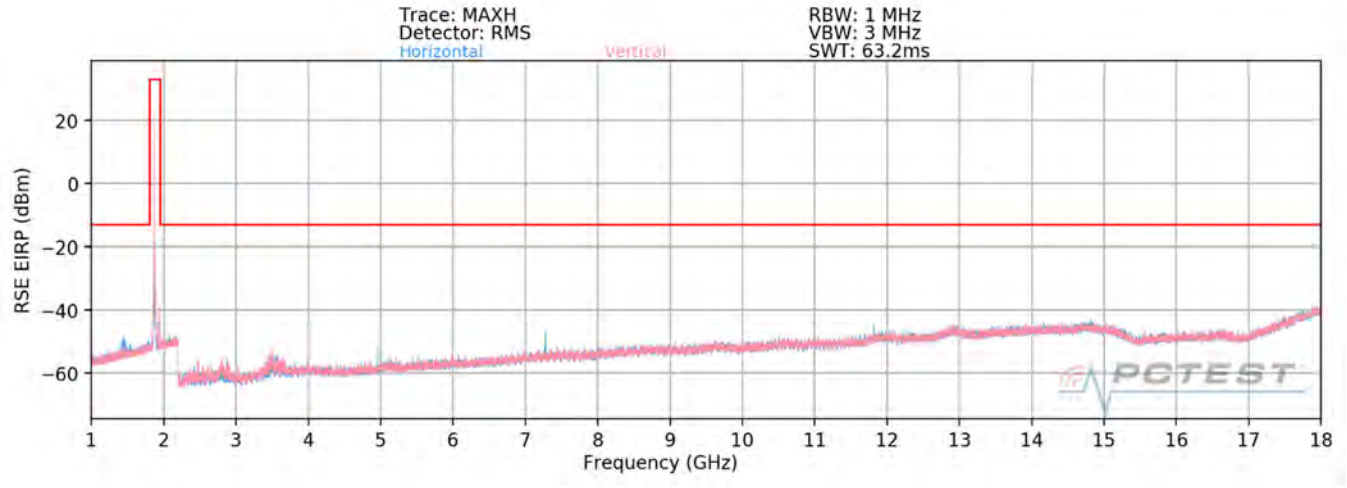
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
3555.0	H	-	-	-75.73	0.45	31.72	-63.54	-13.00	-50.54
5332.5	H	-	-	-78.04	4.65	33.61	-61.65	-13.00	-48.65
7110.0	H	-	-	-79.06	9.07	37.01	-58.25	-13.00	-45.25
8887.5	H	-	-	-80.09	12.05	38.96	-56.30	-13.00	-43.30
10665.0	H	-	-	-81.35	14.71	40.36	-54.90	-13.00	-41.90

Table 7-60. Radiated Spurious Data (NR Band n66 Standalone – High Channel)



Plot 7-397. Radiated Spurious Plot (EN-DC n66-LB13)

NR Band n2



Plot 7-398. Radiated Spurious Plot (NR Band n2 Standalone)

Bandwidth (MHz):	20
Frequency (MHz):	1860.0
RB / Offset:	1 / 53
Mode:	SA
Anchor Band:	N/A

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
3720.0	H	-	-	-78.17	-0.05	28.78	-66.48	-13.00	-53.48
5580.0	H	-	-	-79.02	3.57	31.55	-63.71	-13.00	-50.71
7440.0	H	-	-	-80.80	9.06	35.26	-59.99	-13.00	-46.99
9300.0	H	-	-	-82.45	11.64	36.19	-59.07	-13.00	-46.07
11160.0	H	-	-	-82.60	14.23	38.63	-56.62	-13.00	-43.62

Table 7-61. Radiated Spurious Data (NR Band n2 Standalone – Low Channel)

Bandwidth (MHz):	20
Frequency (MHz):	1880.0
RB / Offset:	1 / 53
Mode:	SA
Anchor Band:	N/A

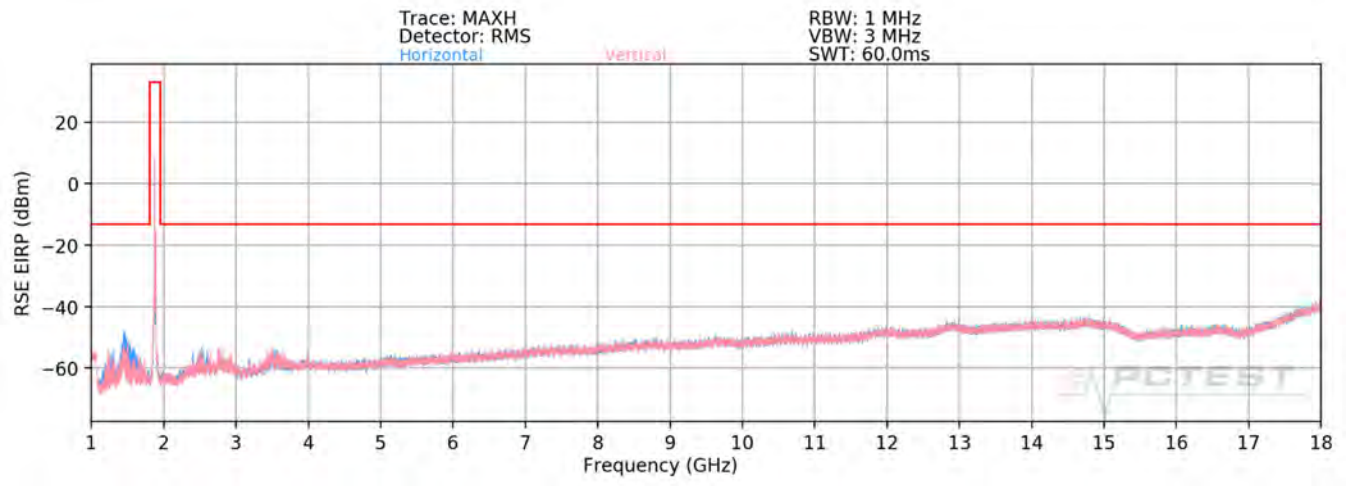
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
3760.0	H	-	-	-78.27	0.08	28.81	-66.45	-13.00	-53.45
5640.0	H	-	-	-79.18	4.02	31.84	-63.42	-13.00	-50.42
7520.0	H	-	-	-80.75	9.22	35.47	-59.79	-13.00	-46.79
9400.0	H	-	-	-81.76	12.10	37.34	-57.92	-13.00	-44.92
11280.0	H	-	-	-83.02	14.36	38.34	-56.92	-13.00	-43.92

Table 7-62. Radiated Spurious Data (NR Band n2 Standalone – Mid Channel)

Bandwidth (MHz):	20
Frequency (MHz):	1900.0
RB / Offset:	1 / 53
Mode:	SA
Anchor Band:	N/A

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
3800.0	H	-	-	-77.93	0.55	29.62	-65.64	-13.00	-52.64
5700.0	H	-	-	-79.43	4.65	32.22	-63.04	-13.00	-50.04
7600.0	H	-	-	-81.31	8.74	34.43	-60.83	-13.00	-47.83
9500.0	H	-	-	-82.00	11.75	36.75	-58.51	-13.00	-45.51
11400.0	H	-	-	-82.93	14.46	38.53	-56.72	-13.00	-43.72

Table 7-63. Radiated Spurious Data (NR Band n2 Standalone – High Channel)



Plot 7-399. Radiated Spurious Plot (EN-DC n2-LB5)

7.10 Uplink Carrier Aggregation Radiated Measurements

§2.1053,

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-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. 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

Test Setup

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

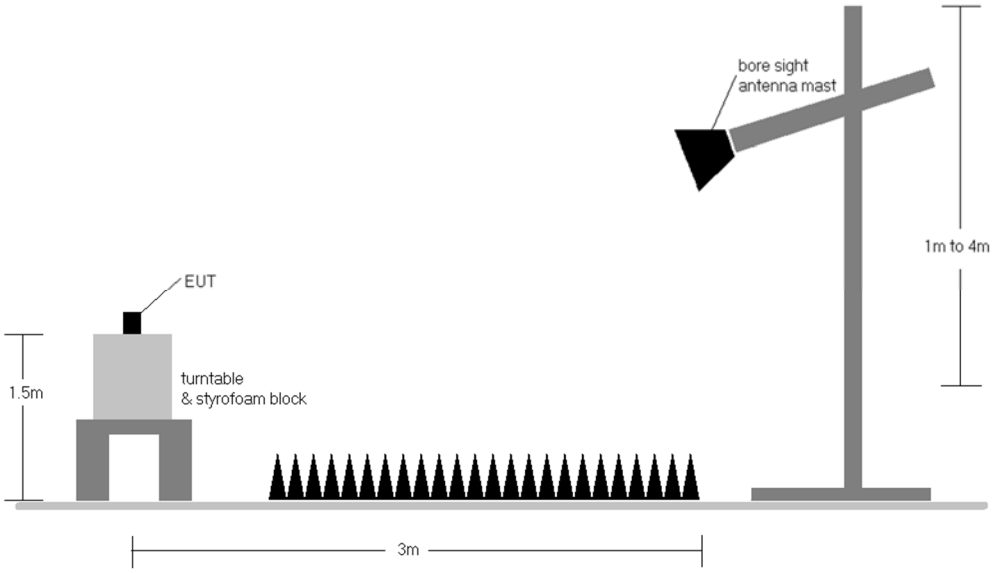


Figure 7-10. Test Instrument & Measurement Setup

Test Notes

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

2) This unit was tested while powered by a 56V DC PoE power source.

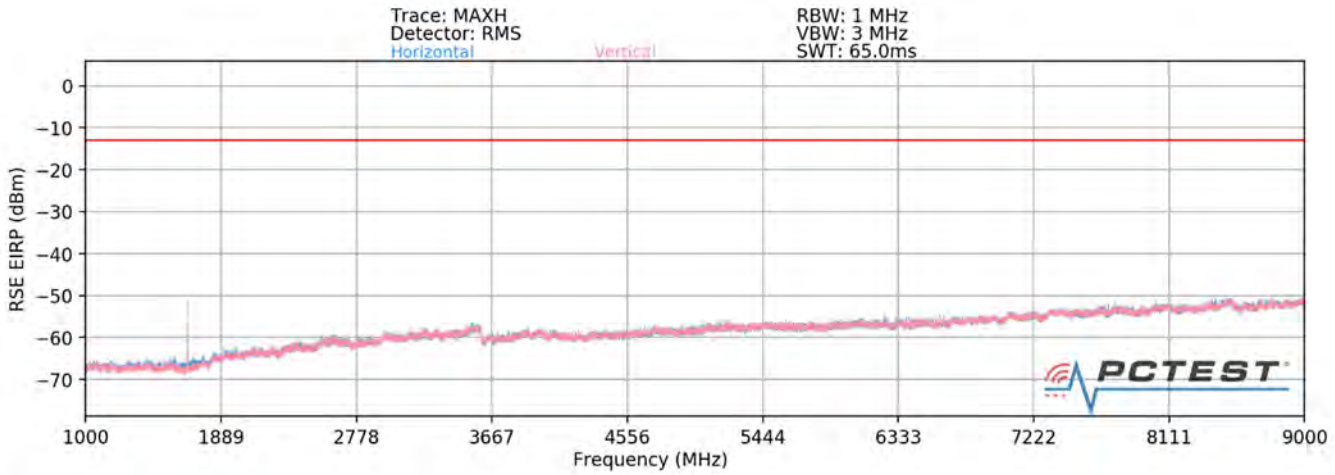
3) Radiated spurious emissions measurements were evaluated for the two contiguous channels using various combinations of RB size, RB offset, modulation, and channel bandwidth. The worst case (highest) emissions were found while operating with QPSK modulation with both carriers set to transmit using 1RB.

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

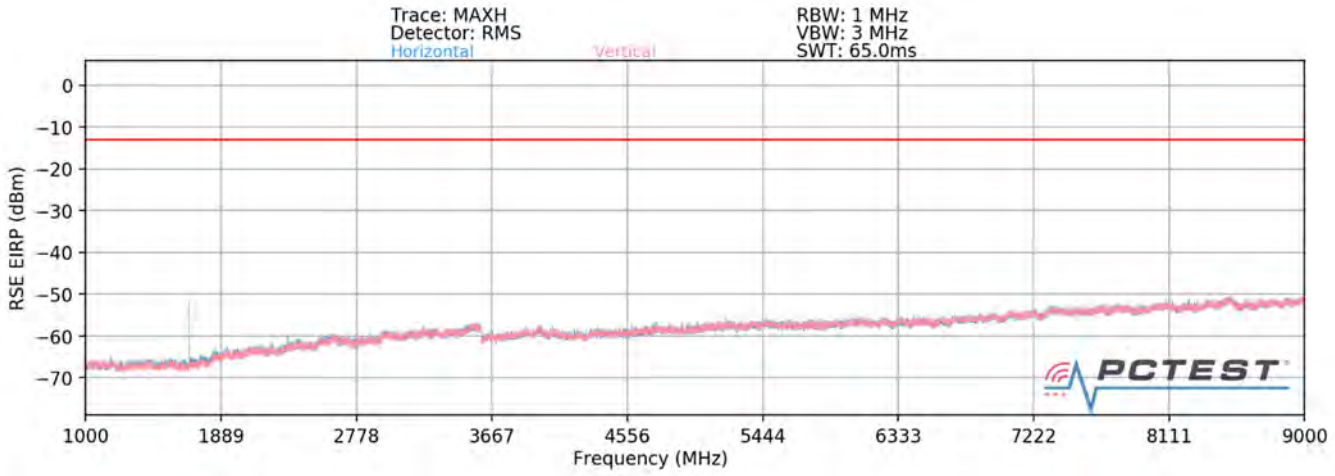
5) Emissions below 18GHz were measured at a 3 meter test distance while emissions above 18GHz were measured at a 1 meter test distance with the application of a distance correction factor.

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

LTE Band 5B ULCA



Plot 7-64. Radiated Spurious Plot 1GHz - 18GHz (ULCA Band 5 Low Channel)



Plot 7-65. Radiated Spurious Plot 1GHz - 18GHz (ULCA Band 5 High Channel)

OPERATING FREQUENCY (PCC):	829.00	MHz
OPERATING FREQUENCY (SCC):	838.90	MHz
CHANNEL (PCC):	20450	
CHANNEL (SCC):	20549	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	10.0	MHz
DISTANCE:	3	meters
LIMIT:	-13	dBm

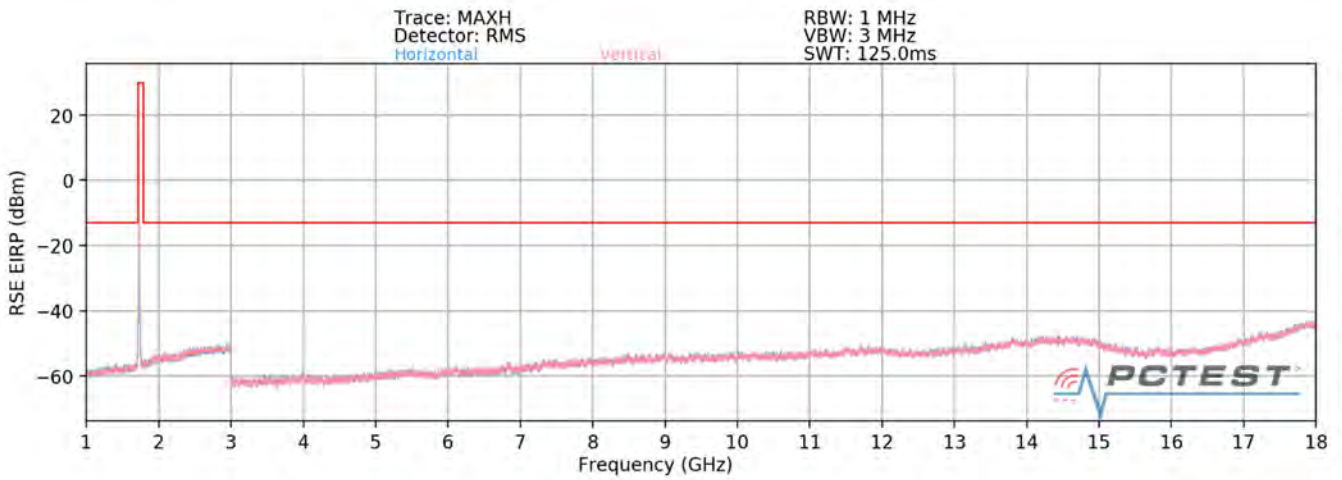
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1658.00	H	159	179	-56.51	3.61	-52.90	-39.9
2487.00	H	358	149	-72.23	4.25	-67.99	-55.0
3316.00	H	-	-	-71.20	5.83	-65.37	-52.4
4145.00	H	-	-	-72.12	7.66	-64.46	-51.5
4974.00	H	-	-	-72.07	8.56	-63.51	-50.5

Plot 7-66. Radiated Spurious Data (B5)

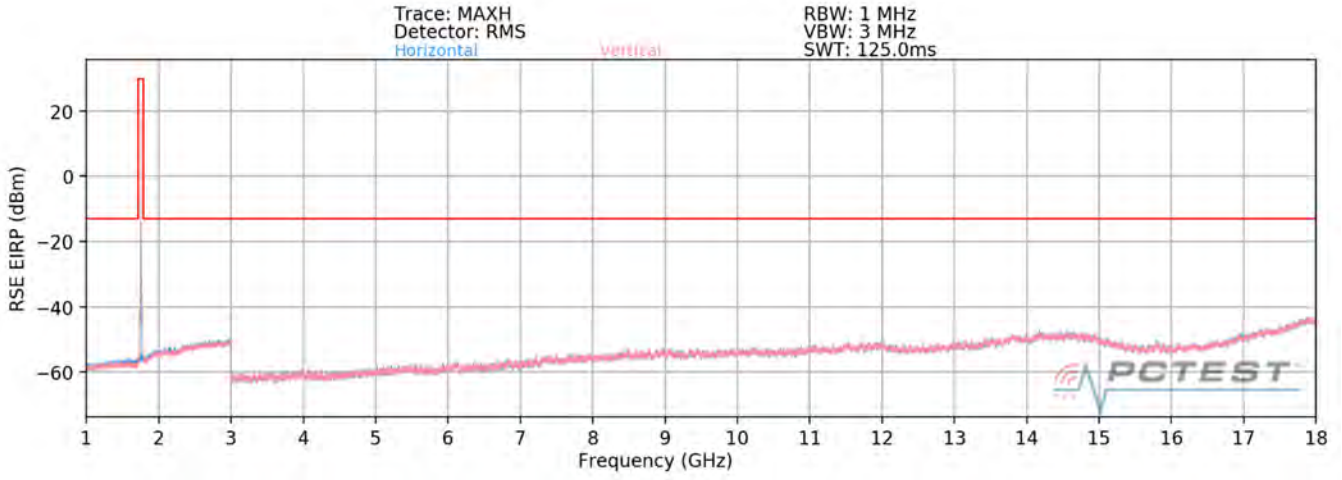
OPERATING FREQUENCY (PCC):	844.00	MHz
OPERATING FREQUENCY (SCC):	834.10	MHz
CHANNEL (PCC):	20600	
CHANNEL (SCC):	20501	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	10.0	MHz
DISTANCE:	3	meters
LIMIT:	-13	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1688.00	H	138	177	-55.59	3.63	-51.97	-39.0
2532.00	H	246	180	-70.27	4.47	-65.80	-52.8
3376.00	H	-	-	-71.28	6.05	-65.23	-52.2
4220.00	H	-	-	-72.41	7.75	-64.66	-51.7
5064.00	H	-	-	-71.85	8.59	-63.26	-50.3

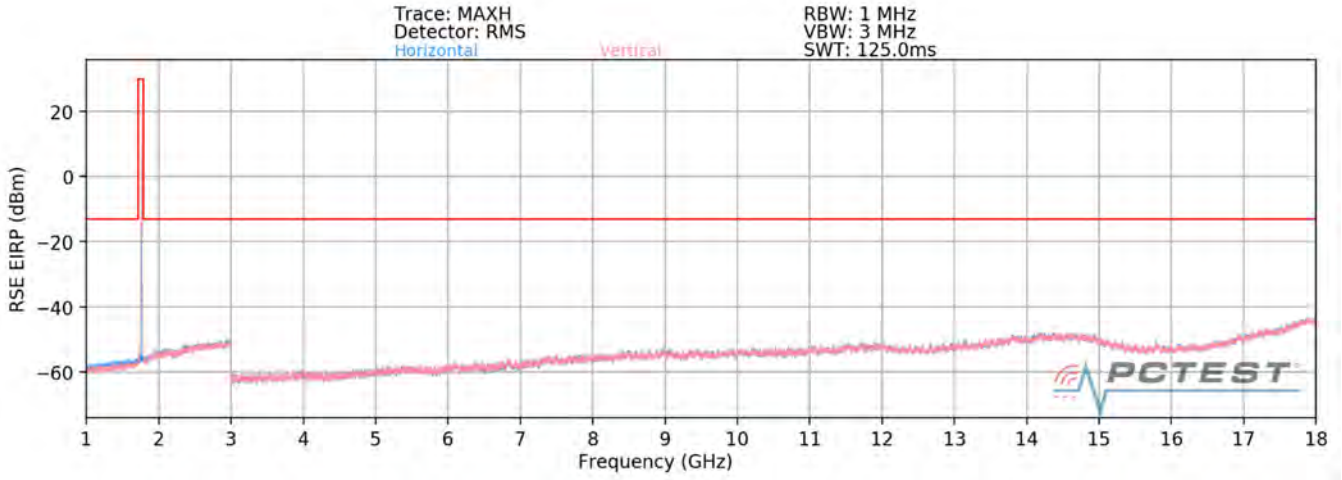
Plot 7-67. Radiated Spurious Data (B5)



Plot 7-68. Radiated Spurious Plot 1GHz - 18GHz (ULCA Band 66 Low Channel)



Plot 7-69. Radiated Spurious Plot 1GHz - 18GHz (ULCA Band 66 Mid Channel)



Plot 7-70. Radiated Spurious Plot 1GHz - 18GHz (ULCA Band 66 High Channel)

OPERATING FREQUENCY (PCC):	1720.00	MHz
OPERATING FREQUENCY (SCC):	1739.80	MHz
CHANNEL (PCC):	132072	
CHANNEL (SCC):	132270	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	20.0	MHz
DISTANCE:	3	meters
LIMIT:	-13	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3440.00	H	173	230	-69.11	6.22	-62.89	-49.9
5160.00	H	363	180	-71.08	8.68	-62.40	-49.4
6880.00	H	-	-	-67.40	8.76	-58.64	-45.6
8600.00	H	-	-	-66.80	9.17	-57.63	-44.6
10320.00	H	-	-	-67.45	9.64	-57.81	-44.8

Plot 7-71. Radiated Spurious Data (B66)

OPERATING FREQUENCY (PCC):	1745.00	MHz
OPERATING FREQUENCY (SCC):	1764.80	MHz
CHANNEL (PCC):	132322	
CHANNEL (SCC):	132520	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	20.0	MHz
DISTANCE:	3	meters
LIMIT:	-13	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3490.00	V	-	-	-70.53	6.32	-64.21	-51.2
5235.00	V	181	216	-63.71	8.71	-54.99	-42.0
6980.00	V	-	-	-69.26	8.74	-60.52	-47.5
8725.00	V	-	-	-66.69	9.42	-57.28	-44.3
10470.00	V	-	-	-66.86	9.62	-57.25	-44.2

Plot 7-72. Radiated Spurious Data (B66)

OPERATING FREQUENCY (PCC):	1770.00	MHz
OPERATING FREQUENCY (SCC):	1750.20	MHz
CHANNEL (PCC):	132572	
CHANNEL (SCC):	132374	
MODULATION SIGNAL:	QPSK	
BANDWIDTH:	20.0	MHz
DISTANCE:	3	meters
LIMIT:	-13	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3540.00	V	-	-	-70.31	6.31	-64.01	-51.0
5310.00	V	147	193	-70.03	8.74	-61.29	-48.3
7080.00	V	-	-	-68.38	8.66	-59.72	-46.7
8850.00	V	-	-	-67.17	9.53	-57.64	-44.6
10620.00	V	-	-	-66.63	9.50	-57.13	-44.1

Plot 7-73. Radiated Spurious Data (B66)

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

9. The carrier frequency of the transmitter is measured at room temperature (20°C to provide a reference).
10. 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.
11. Frequency measurements are made at 10°C intervals ranging from -30°C to +50°C. A period of at least one half-hour is provided to allow stabilization of the equipment at each temperature level.

Test Setup

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

Test Notes

None

Band 13 Frequency Stability Measurements

OPERATING FREQUENCY:	782,000,000	Hz
CHANNEL:	23230	
REFERENCE VOLTAGE:	56.00	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	56.00	- 30	782,000,158	158	0.0000202
100 %		- 20	781,999,799	-201	-0.0000257
100 %		- 10	781,999,583	-417	-0.0000533
100 %		0	781,999,804	-196	-0.0000251
100 %		+ 10	782,000,160	160	0.0000205
100 %		+ 20	782,000,266	266	0.0000340
100 %		+ 30	781,999,925	-75	-0.0000096
100 %		+ 40	782,000,198	198	0.0000253
100 %		+ 50	781,999,722	-278	-0.0000355
85 %	47.60	+ 20	782,000,201	201	0.0000257
115 %	64.40	+ 20	782,000,391	391	0.0000500

Table 7-74. Frequency Stability Data (Band 13)

Note:

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

Band 13 Frequency Stability Measurements

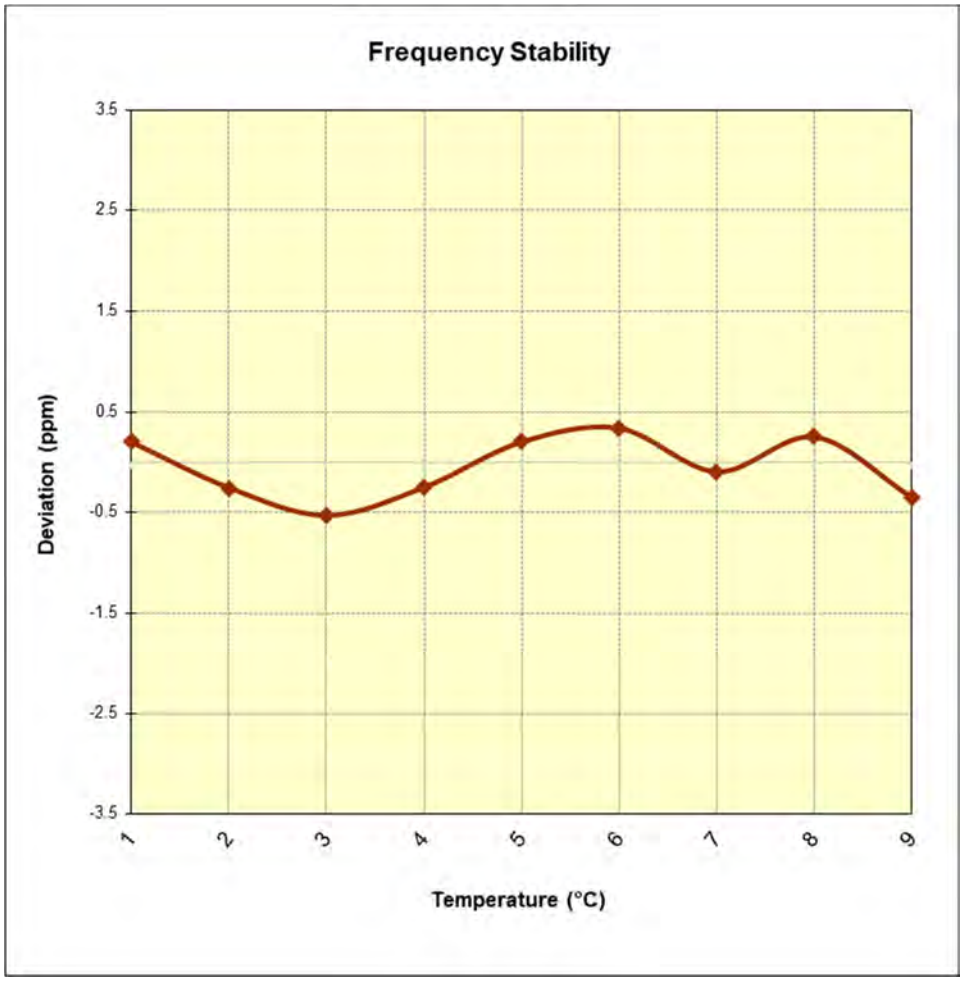


Figure 7-11. Frequency Stability Graph (Band 13)

Band 5 Frequency Stability Measurements

OPERATING FREQUENCY:	836,500,000	Hz
CHANNEL:	20525	
REFERENCE VOLTAGE:	56.00	VDC
DEVIATION LIMIT:	± 0.00025 % or 2.5 ppm	

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	56.00	- 30	836,499,957	-43	-0.0000051
100 %		- 20	836,500,118	118	0.0000141
100 %		- 10	836,500,155	155	0.0000185
100 %		0	836,500,112	112	0.0000134
100 %		+ 10	836,499,968	-32	-0.0000038
100 %		+ 20	836,499,717	-283	-0.0000338
100 %		+ 30	836,499,933	-67	-0.0000080
100 %		+ 40	836,499,792	-208	-0.0000249
100 %		+ 50	836,500,006	6	0.0000007
85 %	47.60	+ 20	836,500,013	13	0.0000016
115 %	64.40	+ 20	836,500,307	307	0.0000367

Table 7-75. Frequency Stability Data (Band 5)

Band 5 Frequency Stability Measurements

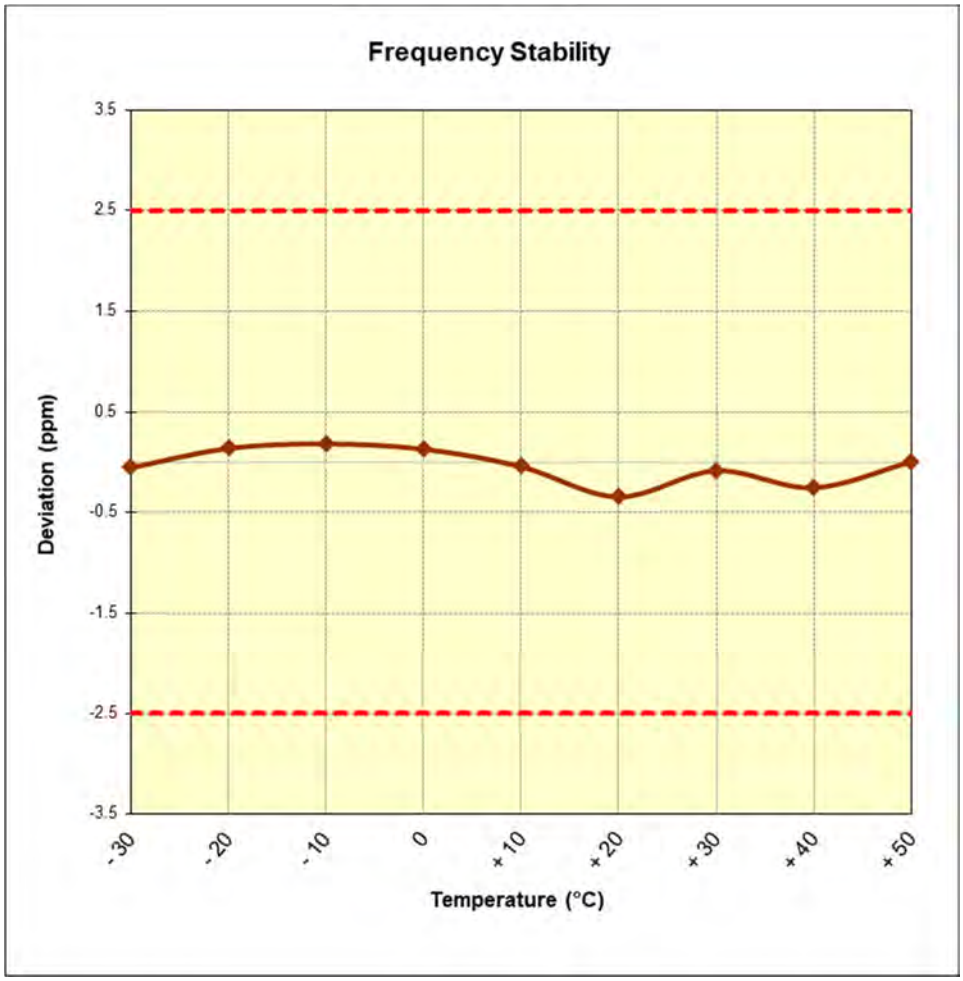


Figure 7-12. Frequency Stability Graph (Band 5)

Band 66/4 Frequency Stability Measurements

OPERATING FREQUENCY:	1,745,000,000	Hz
CHANNEL:	132322	
REFERENCE VOLTAGE:	56.00	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	56.00	- 30	1,744,999,955	-45	-0.0000026
100 %		- 20	1,744,999,890	-110	-0.0000063
100 %		- 10	1,745,000,060	60	0.0000034
100 %		0	1,745,000,010	10	0.0000006
100 %		+ 10	1,745,000,157	157	0.0000090
100 %		+ 20	1,745,000,116	116	0.0000066
100 %		+ 30	1,744,999,658	-342	-0.0000196
100 %		+ 40	1,744,999,936	-64	-0.0000037
100 %		+ 50	1,745,000,035	35	0.0000020
85 %	47.60	+ 20	1,745,000,208	208	0.0000119
115 %	64.40	+ 20	1,745,000,455	455	0.0000261

Table 7-76. 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.

Band 66/4 Frequency Stability Measurements

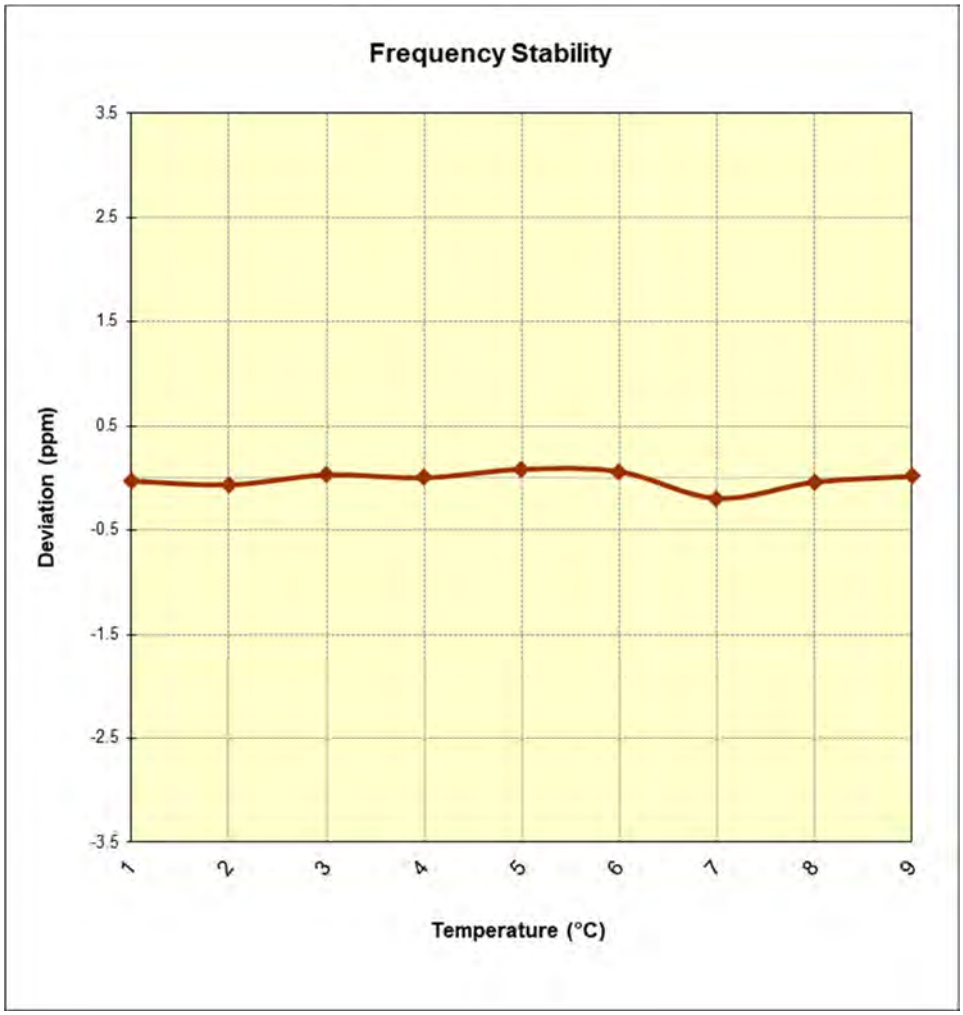


Figure 7-13. Frequency Stability Graph (Band 66/4)

Band 2 Frequency Stability Measurements

OPERATING FREQUENCY:	1,880,000,000	Hz
CHANNEL:	18900	
REFERENCE VOLTAGE:	56.00	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	56.00	- 30	1,880,000,046	46	0.0000024
100 %		- 20	1,879,999,946	-54	-0.0000029
100 %		- 10	1,879,999,957	-43	-0.0000023
100 %		0	1,879,999,723	-277	-0.0000147
100 %		+ 10	1,880,000,031	31	0.0000016
100 %		+ 20	1,879,999,845	-155	-0.0000082
100 %		+ 30	1,879,999,862	-138	-0.0000073
100 %		+ 40	1,880,000,004	4	0.0000002
100 %		+ 50	1,879,999,991	-9	-0.0000005
85 %	47.60	+ 20	1,880,000,019	19	0.0000010
115 %	64.40	+ 20	1,880,000,465	465	0.0000247

Table 7-77. Frequency Stability Data (Band 2)

Band 2 Frequency Stability Measurements

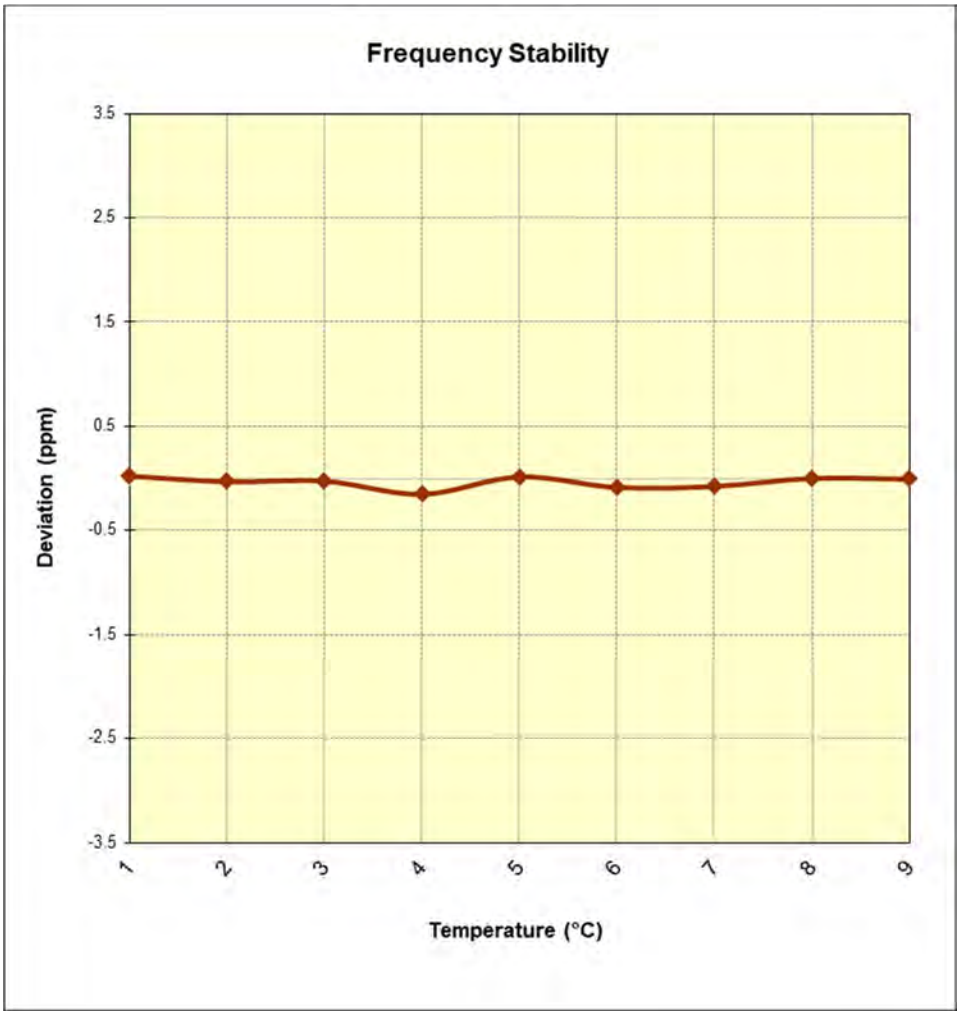


Figure 7-14. Frequency Stability Graph (Band 2)

NR Band 5 Frequency Stability Measurements

LTE Band 5

Operating Frequency (Hz):	836,500,000
Ref. Voltage (VDC):	56.00
Deviation Limit:	± 0.00025% or 2.5 ppm

Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	56.00	- 30	836,500,017	29	0.0000035
		- 20	836,500,239	251	0.0000300
		- 10	836,500,080	92	0.0000110
		0	836,499,758	-230	-0.0000275
		+ 10	836,500,267	279	0.0000334
		+ 20 (Ref)	836,499,988	0	0.0000000
		+ 30	836,499,760	-228	-0.0000273
		+ 40	836,500,030	42	0.0000050
		+ 50	836,499,844	-144	-0.0000172
85 %	47.60	+ 20	836,500,132	144	0.0000172
115 %	64.40	+ 20	836,500,031	43	0.0000051

Table 7-78. Frequency Stability Data (NR Band 5)

NR Band 5 Frequency Stability Measurements

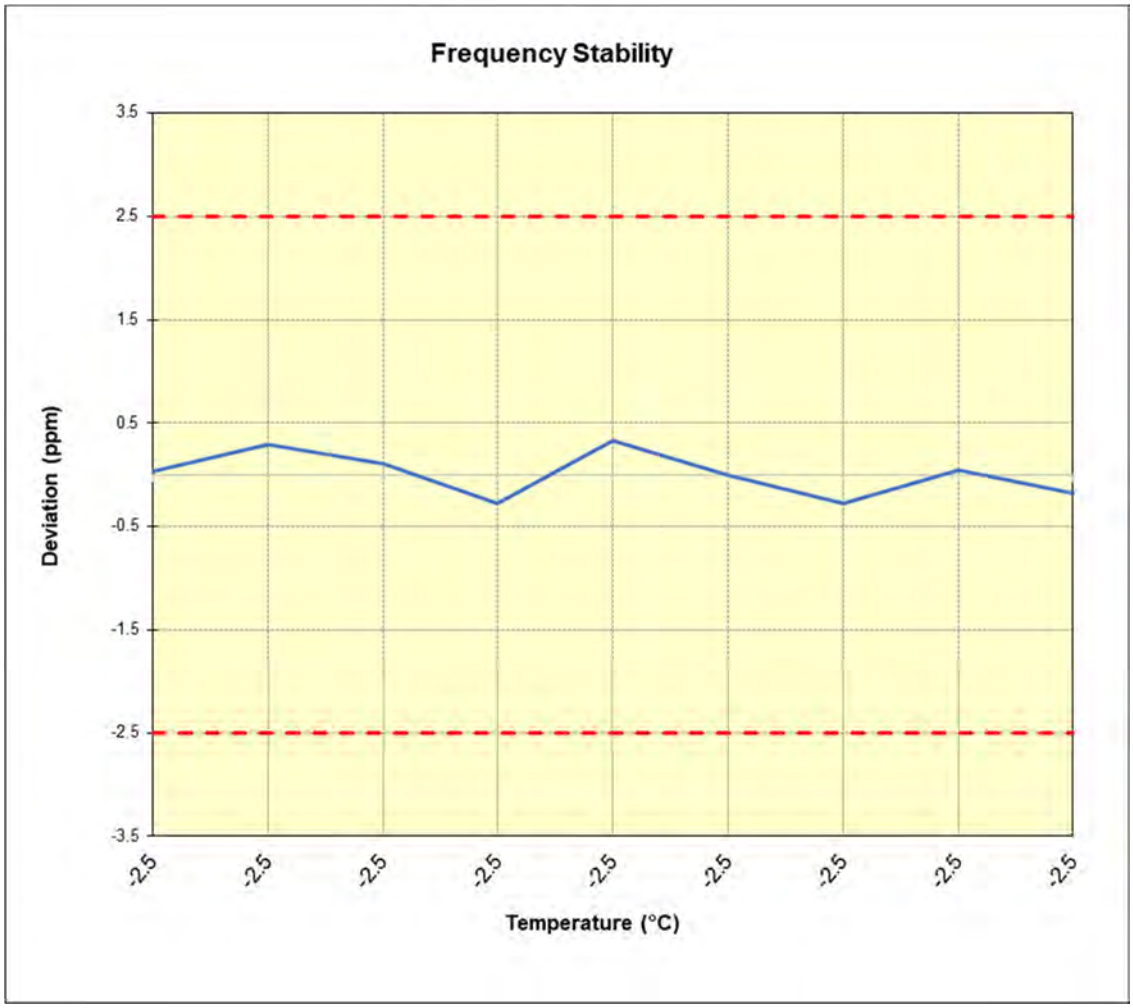


Figure 7-15. Frequency Stability Graph (NR Band 5)

NR Band 66 Frequency Stability Measurements

NR Band 66

Operating Frequency (Hz):	1,745,000,000
Ref. Voltage (VDC):	56.00

Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	56.00	- 30	1,744,999,816	-112	-0.0000064
		- 20	1,744,999,969	41	0.0000023
		- 10	1,744,999,975	47	0.0000027
		0	1,744,999,806	-122	-0.0000070
		+ 10	1,745,000,327	399	0.0000229
		+ 20 (Ref)	1,744,999,928	0	0.0000000
		+ 30	1,744,999,785	-143	-0.0000082
		+ 40	1,745,000,258	330	0.0000189
		+ 50	1,745,000,132	204	0.0000117
85 %	47.60	+ 20	1,745,000,361	433	0.0000248
115 %	64.40	+ 20	1,744,999,934	6	0.0000003

Table 7-79. Frequency Stability Data (NR Band 66)

NR Band 66 Frequency Stability Measurements

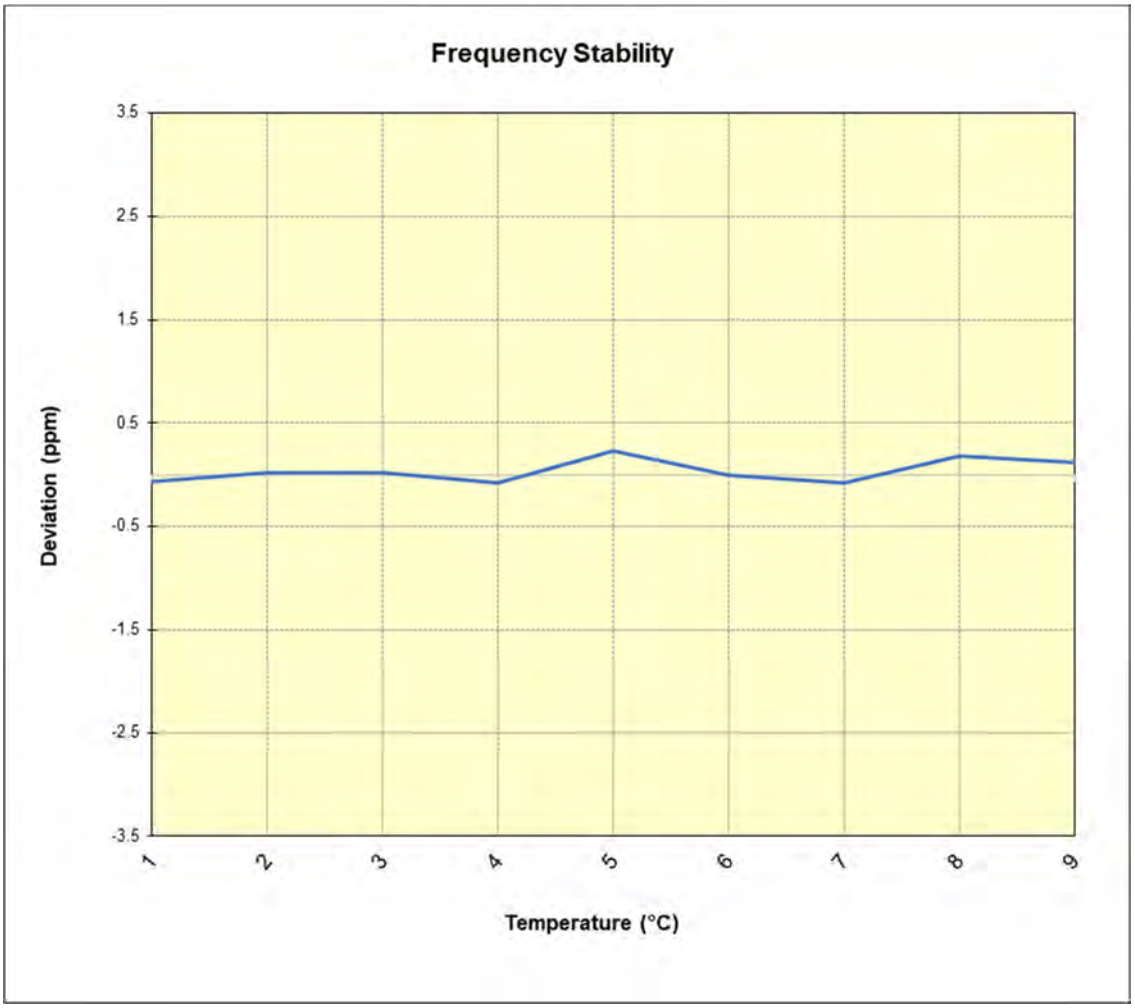


Figure 7-16. Frequency Stability Graph (NR Band 66)

NR Band 2 Frequency Stability Measurements

NR Band n2

Operating Frequency (Hz):	1,880,000,000
Ref. Voltage (VDC):	56.00

Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	56.00	- 30	1,880,000,252	396	0.0000211
		- 20	1,880,000,085	229	0.0000122
		- 10	1,879,999,657	-199	-0.0000106
		0	1,879,999,791	-65	-0.0000035
		+ 10	1,879,999,676	-180	-0.0000096
		+ 20 (Ref)	1,879,999,856	0	0.0000000
		+ 30	1,879,999,999	143	0.0000076
		+ 40	1,880,000,191	335	0.0000178
		+ 50	1,879,999,900	44	0.0000023
85 %	47.60	+ 20	1,879,999,880	24	0.0000013
115 %	64.40	+ 20	1,879,999,907	51	0.0000027

Table 7-80. Frequency Stability Data (NR Band 2)

NR Band 2 Frequency Stability Measurements

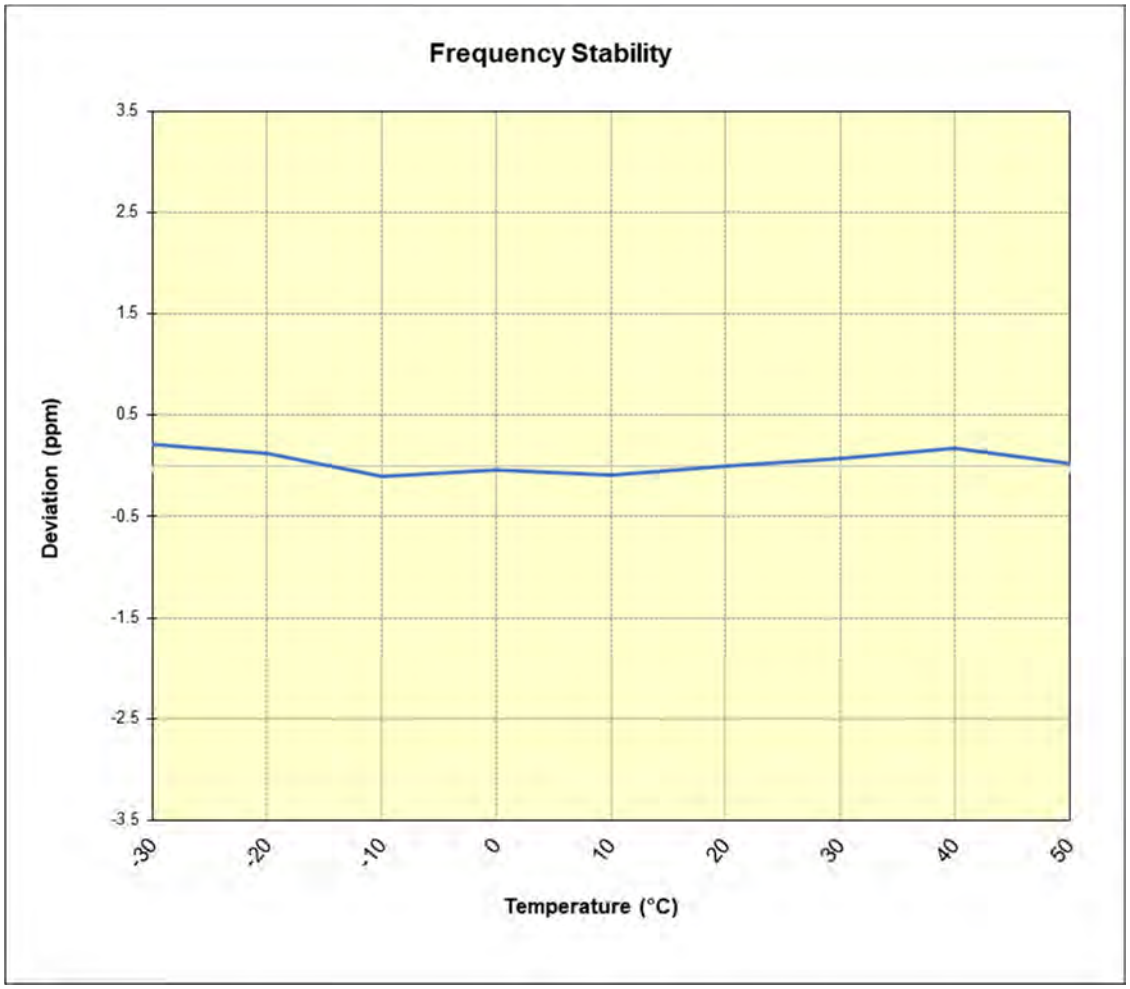


Figure 7-17. Frequency Stability Graph (NR Band 2)

8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **Samsung Outdoor Customer Premises Equipment (CPE) FCC ID: A3LSMH303V** complies with all the requirements of Parts 22, 24, & 27 of the FCC Rules.