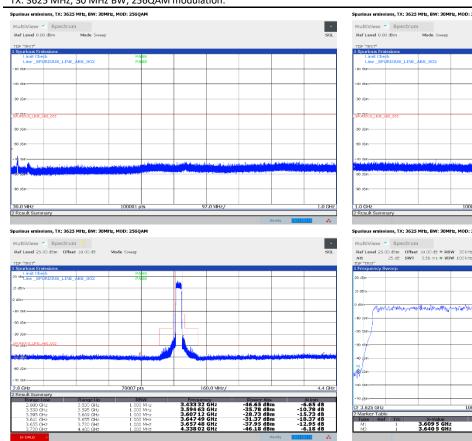
Test name FCC §96.41(e)(1) Emissions intensity

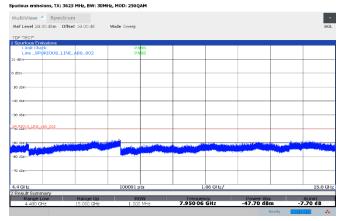
Specification FCC Part 96

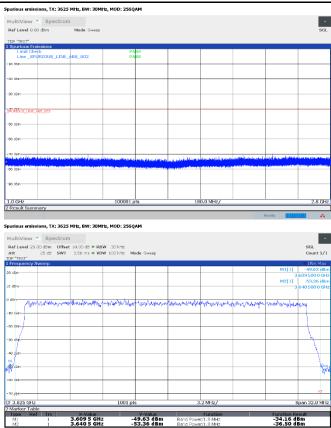


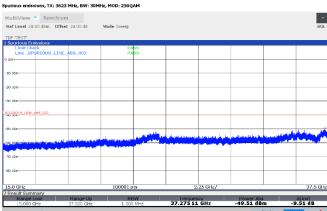
TX: 3625 MHz, 30 MHz BW, 256QAM modulation:



Note: Analyzer was marginally driven to IF overlead due to the fundamental. Result kept so as to keep sufficient headroom between noise floor and limit.





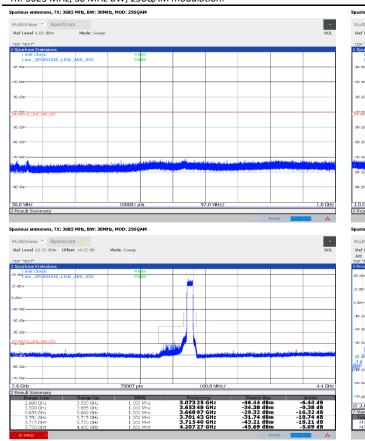


Test name FCC §96.41(e)(1) Emissions intensity

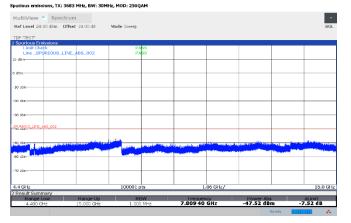
Specification FCC Part 96

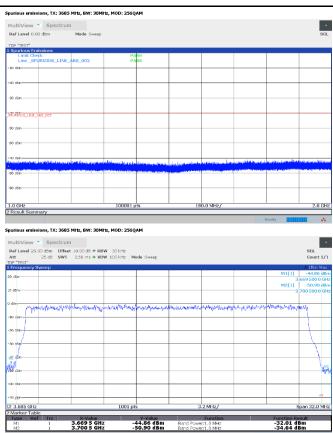


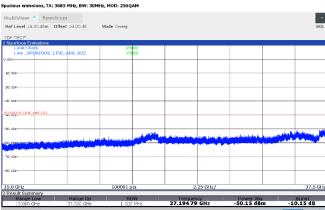
TX: 3625 MHz, 30 MHz BW, 256QAM modulation:



Note: Analyzer was marginally driven to IF overlead due to the fundamental. Result kept so as to keep sufficient headroom between noise floor and limit.







Test name FCC §96.41(e)(1) Emissions intensity

Specification FCC Part 96



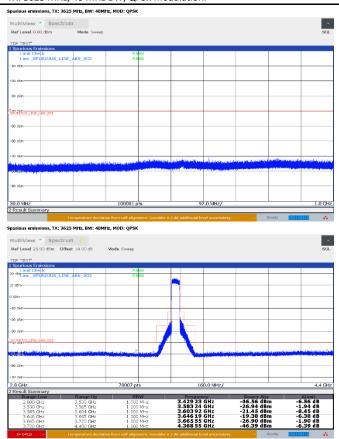
TX: 3570 MHz, 40 MHz BW, QPSK modulation: Spurious emissions, TX: 3570 MHz, BW: 40MHz, MOD: QPSK Spurious emissions, TX: 3570 MHz, BW: 40MHz, MOD: QPSK MultiView Spectrum Ref Level 0.00 dBm Mo Ref Level 0.00 d8m K RIOUS_LINE_ABS_002 IOUS_LINE_ABS_002 50 dBm-97.0 MHz/ 180.0 MHz/ 100001 pt 1.0 GHz 100001 pts 2.8 GHz Spurious emissions, TX: 3570 MHz, BW: 40MHz, MOD: QPSK Spurious emissions, TX: 3570 MHz, BW: 40MHz, MOD: QPSK SGL Count 1/1 Ref Level 25.00 dBm Offset 10.00 dB Limit Check I SENTINE SPURIOUS LINE ABS 0 -20 dBm-70007 pts 160.0 MHz/ 4.4 GHz 1001 pts 4.2 MHz/ Span 42.0 MHz X-Value 3.549 5 GHz 3.590 5 GHz Y-Value -44.60 dBm -45.09 dBm -31.94 dBm -31.55 dBm Spurious emissions, TX: 3570 MHz, BW: 40MHz, MOD: QPSK Spurious emissions, TX: 3570 MHz, BW: 40MHz, MOD: QPSK 100001 pt 1.06 GHz/ 15.0 GHz 100001 pts 2.25 GHz/ 37.5 GHz ΔLimit -7.18 dB 7.882 65 GHz Power Abs -47.18 dBm Frequency 37.184 89 GHz Power Abs -59.99 dBm ΔLimit -19.99 dB

Test name FCC §96.41(e)(1) Emissions intensity

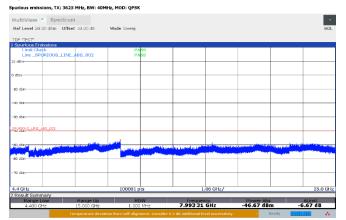
Specification FCC Part 96

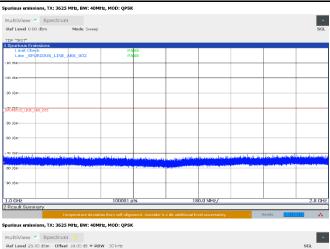


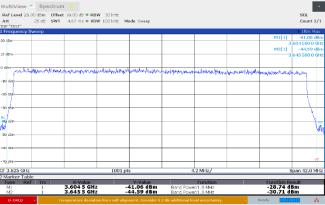
TX: 3625 MHz, 40 MHz BW, QPSK modulation:



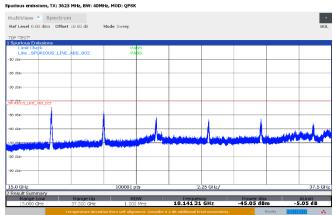
Note: Analyzer was marginally driven to IF overlead due to the fundamental. Result kept so as to keep sufficient headroom between noise floor and limit.







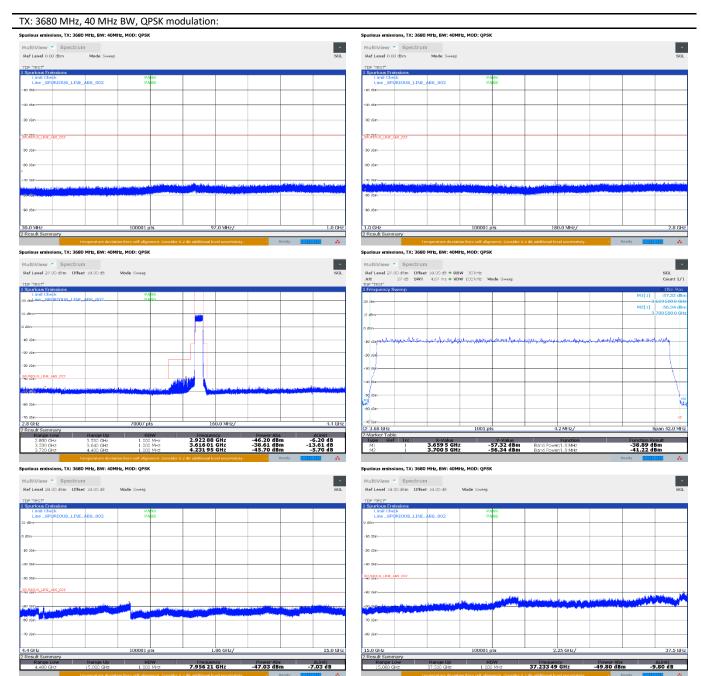
Note: Analyzer was marginally driven to IF overlead due to the fundamental. Result kept so as to keep sufficient headroom between noise floor and limit.



Test name FCC §96.41(e)(1) Emissions intensity

Specification FCC Part 96

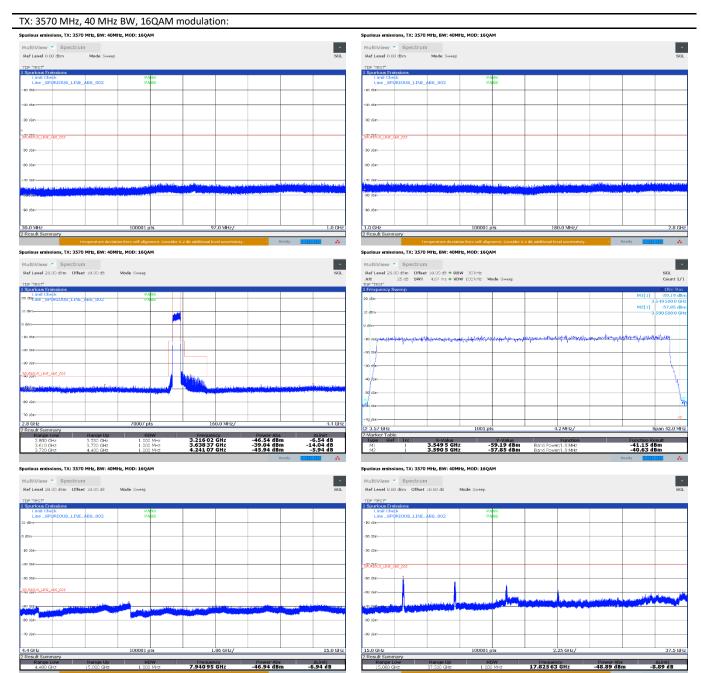




Test name FCC §96.41(e)(1) Emissions intensity

Specification FCC Part 96



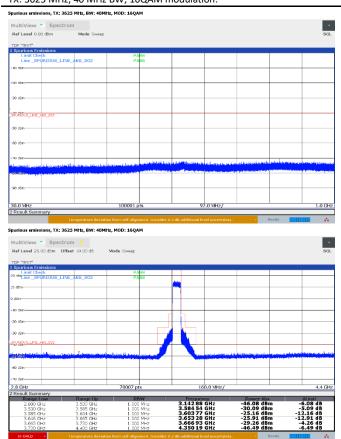


Test name FCC §96.41(e)(1) Emissions intensity

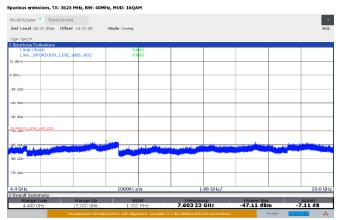
Specification FCC Part 96

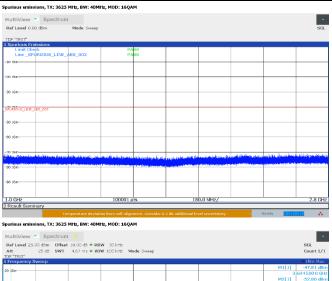


TX: 3625 MHz, 40 MHz BW, 16QAM modulation:



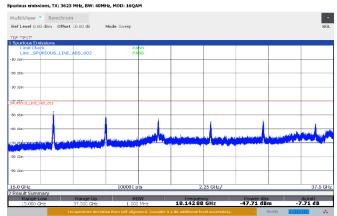
Note: Analyzer was marginally driven to IF overlead due to the fundamental. Result kept so as to keep sufficient headroom between noise floor and limit.







Note: Analyzer was marginally driven to IF overlead due to the fundamental. Result kept so as to keep sufficient headroom between noise floor and limit.



Test name FCC §96.41(e)(1) Emissions intensity

Specification FCC Part 96



TX: 3680 MHz, 40 MHz BW, 16QAM modulation: Spurious emissions, TX: 3680 MHz, BW: 40MHz, MOD: 16QAM Spurious emissions, TX: 3680 MHz, BW: 40MHz, MOD: 16QAM MultiView Spectrum Ref Level 0.00 dBm Mod Ref Level 0.00 dBm K RIOUS_LINE_ABS_002 IOUS_LINE_ABS_002 50 dBm-97.0 MHz/ 180.0 MHz/ 100001 pt 1.0 GHz 100001 pts 2.8 GHz Spurious emissions, TX: 3680 MHz, BW: 40MHz, MOD: 16QAM Spurious emissions, TX: 3680 MHz, BW: 40MHz, MOD: 16QAM SGL Count 1/1 Ref Level 25.00 dBm Offset 10.00 dB Limit Check O dan Limit Check Ine SPURIOUS LINE ABS 00 10 cBm 20 300 30 dBm-SPURIOUS_LIN 70007 pt 160.0 MHz/ 4.4 GHz 1001 pts 4.2 MHz/ Span 42.0 MHz X-Value 3.659 5 GHz 3.700 5 GHz -32.67 dBm -35.68 dBm -50.80 dBm -52.56 dBm Spurious emissions, TX: 3680 MHz, BW: 40MHz, MOD: 16QAM Spurious emissions, TX: 3680 MHz, BW: 40MHz, MOD: 16QAM IOUS_LINE_ABS_002 100001 pt 1.06 GHz/ 15.0 GHz 100001 pts ΔLimit -7.43 dB 7.977 20 GHz Power Abs -47.43 dBm

Test name FCC §96.41(e)(1) Emissions intensity

Specification FCC Part 96



TX: 3570 MHz, 40 MHz BW, 64QAM modulation: Spurious emissions, TX: 3570 MHz, BW: 40MHz, MOD: 64QAM Spurious emissions, TX: 3570 MHz, BW: 40MHz, MOD: 64QAM MultiView Spectrum Ref Level 0.00 dBm Mod Ref Level 0.00 d8m K RIOUS_LINE_ABS_002 IOUS_LINE_ABS_002 50 dBm-180.0 MHz/ 100001 pt 97.0 MHz/ 1.0 GHz 100001 pts 2.8 GHz Spurious emissions, TX: 3570 MHz, BW: 40MHz, MOD: 64QAM Spurious emissions, TX: 3570 MHz, BW: 40MHz, MOD: 64QAM SGL Count 1/1 Ref Level 25.00 dBm Offset 10.00 dB Limit Check of the Spurious LINE ABS 0 The state of the s 10 dBm 30 dBm-SPURIOUS_LINE 70007 pt 160.0 MHz/ 4.4 GHz 1001 pts 4.2 MHz/ Span 42.0 MHz Function Result -34.85 dBm -35.77 dBm X-Value 3.549 5 GHz 3.590 5 GHz -52.34 dBm -53.66 dBm Spurious emissions, TX: 3570 MHz, BW: 40MHz, MOD: 64QAM Spurious emissions, TX: 3570 MHz, BW: 40MHz, MOD: 64QAM IOUS_LINE_ABS_002

15.0 GHz

ΔLimit -7.29 dB 100001 pts

100001 pt

1.06 GHz/

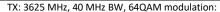
Power Abs -47.29 dBm

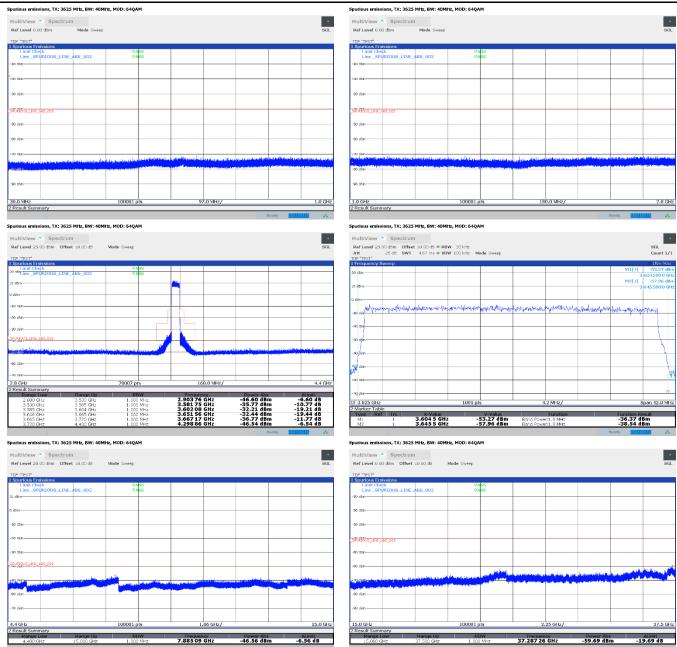
7.85837 GHz

FCC §96.41(e)(1) Emissions intensity Test name

Specification FCC Part 96







7.885 09 GHz

Power Abs -46.56 dBm

Frequency 37.287 26 GHz

Power Abs -59.69 dBm

ΔLimit -19.69 dB

Test name FCC §96.41(e)(1) Emissions intensity

Specification FCC Part 96



TX: 3680 MHz, 40 MHz BW, 64QAM modulation: Spurious emissions, TX: 3680 MHz, BW: 40MHz, MOD: 64QAM Spurious emissions, TX: 3680 MHz, BW: 40MHz, MOD: 64QAM MultiView Spectrum Ref Level 0.00 dBm Mod Ref Level 0.00 d8m :X |RIOUS_LINE_ABS_002 IOUS_LINE_ABS_002 50 dBm-97.0 MHz/ 180.0 MHz/ 100001 pt 1.0 GHz 100001 pts 2.8 GHz Spurious emissions, TX: 3680 MHz, BW: 40MHz, MOD: 64QAM Spurious emissions, TX: 3680 MHz, BW: 40MHz, MOD: 64QAM SGL Count 1/1 Ref Level 25.00 dBm Offset 10.00 dB Limit Check O dan Limit Check Ine SPURIOUS LINE ABS 00 personal residence of the personal and the control of the control of the personal and the control of the personal and the control of the personal and the perso 10 dBm 30 dBm-SPURIOUS_LINE 70007 pt 160.0 MHz/ 4.4 GHz 1001 pts 4.2 MHz/ Span 42.0 MHz X-Value 3.659 5 GHz 3.700 5 GHz -49.15 dBm -53.44 dBm -32,21 dBm -34,72 dBm Spurious emissions, TX: 3680 MHz, BW: 40MHz, MOD: 64QAM Spurious emissions, TX: 3680 MHz, BW: 40MHz, MOD: 64QAM IOUS_LINE_ABS_002

15.0 GHz

ALimit -7.42 dB 100001 pts

100001 pt

1.06 GHz/

Power Abs -47.42 dBm

7.966 92 GHz

Test name FCC §96.41(e)(1) Emissions intensity

Specification FCC Part 96



TX: 3570 MHz, 40 MHz BW, 256QAM modulation: Spurious emissions, TX: 3570 MHz, BW: 40MHz, MOD: 256QAM Spurious emissions, TX: 3570 MHz, BW: 40MHz, MOD: 256QAM MultiView Spectrum Ref Level 0.00 dBm Mod Ref Level 0.00 d8m :X |RIOUS_LINE_ABS_002 IOUS_LINE_ABS_002 50 dBm-100001 pt 97.0 MHz/ 1.0 GHz 100001 pts 180.0 MHz/ 2.8 GHz Spurious emissions, TX: 3570 MHz, BW: 40MHz, MOD: 2560AM Spurious emissions, TX: 3570 MHz, BW: 40MHz, MOD: 256QAM • SGL Count 1/1 Ref Level 25.00 dBm Offset 10.00 dB Limit Check of the Spurious LINE ABS 0 photographic transfer of the state of the st 10 cBm 30 dBm-SPURIOUS_LIN 70007 pt 160.0 MHz/ 4.4 GHz 1001 pts 4.2 MHz/ Span 42.0 MHz Y-Value -53.84 dBm -51.71 dBm -35.17 dBm -35.40 dBm X-Value 3.549 5 GHz 3.590 5 GHz Spurious emissions, TX: 3570 MHz, BW: 40MHz, MOD: 256QAM Spurious emissions, TX: 3570 MHz, BW: 40MHz, MOD: 256QAM IOUS_LINE_ABS_002

15.0 GHz

-6.70 dB

100001 pts

100001 pt

1.06 GHz/

Power Abs -46.70 dBm

7.16588 GHz

Test name FCC §96.41(e)(1) Emissions intensity

Specification FCC Part 96



TX: 3625 MHz, 40 MHz BW, 256QAM modulation: Spurious emissions, TX: 3625 MHz, BW: 40MHz, MOD: 256QAM Spurious emissions, TX: 3625 MHz, BW: 40MHz, MOD: 256QAM MultiView Spectrum Ref Level 0.00 dBm Mod Ref Level 0.00 d8m K RIOUS_LINE_ABS_002 IOUS_LINE_ABS_002 50 dBm-100001 p 97.0 MHz/ 1.0 GHz 100001 pts 180.0 MHz/ 2.8 GHz Spurious emissions, TX: 3625 MHz, BW: 40MHz, MOD: 2560AM Spurious emissions, TX: 3625 MHz, BW: 40MHz, MOD: 256QAM SGL Count 1/1 Ref Level 25.00 dBm Offset 10.00 dB Limit Check 1 SPURIOUS LINE ABS 00 market from the first of the second of the s -20 dBm-70007 pts 160.0 MHz/ 4.4 GHz 1001 pts 4.2 MHz/ Span 42.0 MHz Function Result -34.97 dBm -38.09 dBm X-Value 3.604 5 GHz 3.645 5 GHz -53.17 dBm -54.43 dBm Spurious emissions, TX: 3625 MHz, BW: 40MHz, MOD: 256QAM Spurious emissions, TX: 3625 MHz, BW: 40MHz, MOD: 256QAM

15.0 GHz

∆Limit -7.42 dB 100001 pts

2.25 GHz/

Power Abs -59.33 dBm

Frequency 37.265 21 GHz

100001 pt

1.06 GHz/

Power Abs -47.42 dBm

7.166 84 GHz

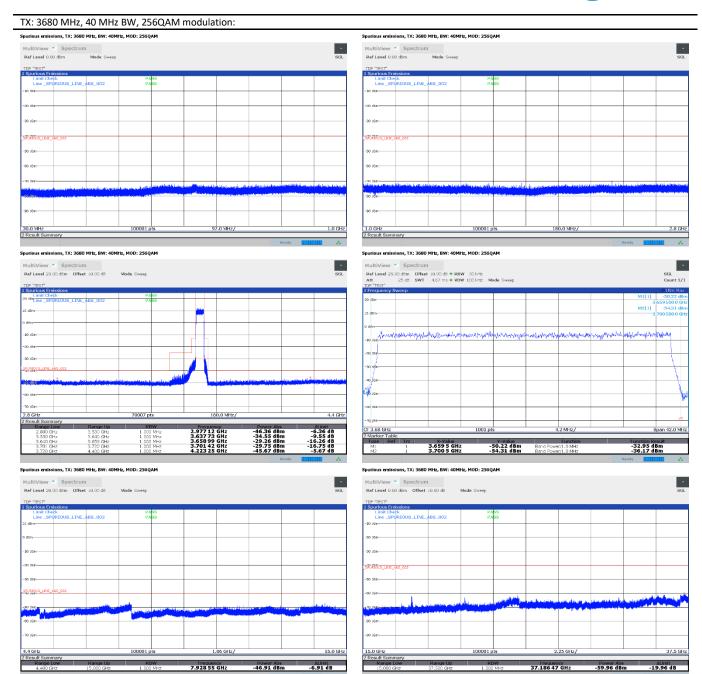
37.5 GHz

ΔLimit -19.33 dB

Test name FCC §96.41(e)(1) Emissions intensity

Specification FCC Part 96





Test name FCC §96.41(e)(1) Emissions intensity

Specification FCC Part 96



Radiated spurious emissions:

30 - 1000 MHz

All operating modes were investigated and observed to have similar emissions characteristics. Data for the worst case operating mode (all transmitters operating at full power, MID channel, 20 MHz operating bandwidth, GFSK modulation) is presented below. Preliminary scans to were performed with a peak detector to identify suspect frequencies. Identified suspect frequencies were maximized with respect to azimuth, measurement antenna height and polarization and measured with an RMS detector with a 1 MHz resolution bandwidth.

Full Spectrum

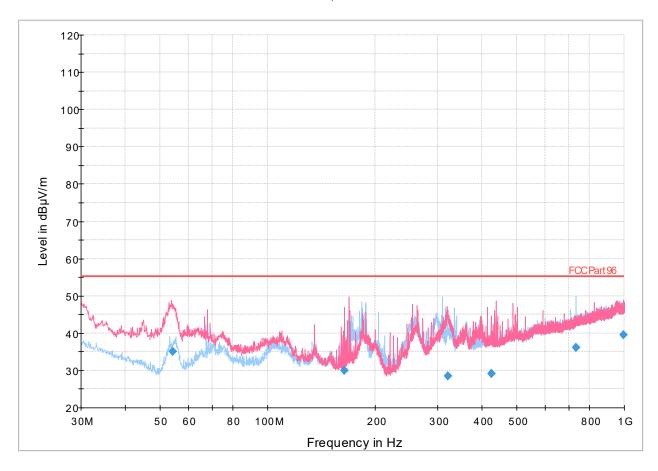


Figure 8.8-1: Radiated emissions spectral plot (30 MHz - 1 GHz), MID channel, 20 MHz bandwidth, GFSK modulation

Table 8.8-1: Radiated emissions results, MID channel, 20 MHz bandwidth, GFSK modulation

Frequency (MHz)	RMS (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
54.268000	35.04	55.23	20.19	5000.0	1000.000	114.0	V	275.0	14.2
164.183000	30.05	55.23	25.18	5000.0	1000.000	100.0	V	145.0	18.5
320.681000	28.59	55.23	26.64	5000.0	1000.000	292.0	Н	146.0	22.6
425.127000	29.22	55.23	26.01	5000.0	1000.000	133.0	V	223.0	26.2
733.216000	36.21	55.23	19.02	5000.0	1000.000	219.0	Н	208.0	31.4
995.502000	39.58	55.23	15.65	5000.0	1000.000	281.0	V	120.0	34.7

- 1 Field strength (dB V/m) = receiver/spectrum analyzer value (dB V) + correction factor (dB)
- ² Correction factors = antenna factor ACF (dB) + cable loss (dB)

³ Emissions that were continuously present for a minimum of 1 second and occurred more than once for every 15 seconds observation period were considered valid emissions. The maximum value of valid emissions has been recorded.

Test name FCC §96.41(e)(1) Emissions intensity

Specification FCC Part 96



1 - 18 GHz:

All operating modes were investigated and observed to have similar emissions characteristics. Data for the worst case operating modes (all transmitters operating at full power, LOW, MID and HIGH channel, 20 MHz operating bandwidth, GFSK modulation) is presented below. Three channels (LOW, MID and HIGH) are presented to verify performance in the vicinity of the operating band. Preliminary scans to were performed with a peak detector to identify suspect frequencies. Identified suspect frequencies were maximized with respect to azimuth, measurement antenna height and polarization and measured with an RMS detector with a 1 MHz resolution bandwidth.

Full Spectrum

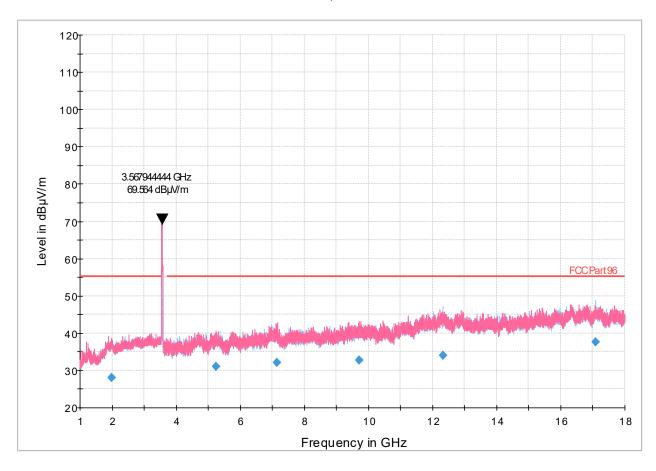


Figure 8.8-2: Radiated emissions spectral plot (1 GHz - 18 GHz), LOW channel, 20 MHz bandwidth, GFSK modulation

Table 8.8-2: Radiated emissions results, LOW channel, 20 MHz bandwidth, GFSK modulation

Frequency (MHz)	RMS (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
				(ms)					
1993.777778	28.09	55.23	27.14	5000.0	1000.000	144.0	V	82.0	-10.8
5239.755556	31.07	55.23	24.16	5000.0	1000.000	382.0	V	341.0	-2.2
7154.833333	32.17	55.23	23.06	5000.0	1000.000	339.0	V	356.0	0.8
9713.477778	32.72	55.23	22.51	5000.0	1000.000	282.0	V	10.0	3.6
12317.422222	34.08	55.23	21.15	5000.0	1000.000	343.0	Н	171.0	7.2
17081.933333	37.55	55.23	17.68	5000.0	1000.000	126.0	Н	226.0	13.1

- 1 Field strength (dB V/m) = receiver/spectrum analyzer value (dB V) + correction factor (dB)
- ² Correction factors = antenna factor ACF (dB) + cable loss (dB)
- ³ Emissions that were continuously present for a minimum of 1 second and occurred more than once for every 15 seconds observation period were considered valid emissions. The maximum value of valid emissions has been recorded.



Full Spectrum

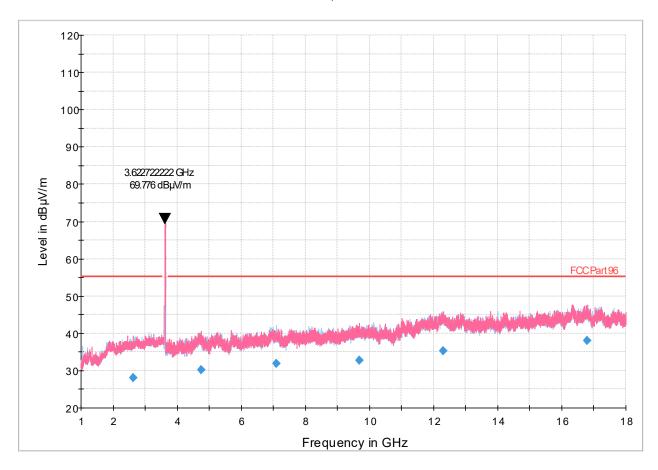


Figure 8.8-3: Radiated emissions spectral plot (1 GHz - 18 GHz), MID channel, 20 MHz bandwidth, GFSK modulation

Table 8.8-3: Radiated emissions results, MID channel, 20 MHz bandwidth, GFSK modulation

Frequency (MHz)	RMS (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2625.066667	28.11	55.23	27.12	5000.0	1000.000	127.0	V	123.0	-9.2
4745.155556	30.19	55.23	25.04	5000.0	1000.000	353.0	V	127.0	-2.1
7106.088889	31.91	55.23	23.32	5000.0	1000.000	372.0	Н	264.0	0.7
9689.733333	32.75	55.23	22.48	5000.0	1000.000	188.0	V	172.0	3.6
12302.533333	35.31	55.23	19.92	5000.0	1000.000	177.0	V	24.0	7.1
16795.833333	38.05	55.23	17.18	5000.0	1000.000	346.0	V	212.0	14.5

 $^{^{1}}$ Field strength (dB V/m) = receiver/spectrum analyzer value (dB V) + correction factor (dB)

² Correction factors = antenna factor ACF (dB) + cable loss (dB)

³ Emissions that were continuously present for a minimum of 1 second and occurred more than once for every 15 seconds observation period were considered valid emissions. The maximum value of valid emissions has been recorded.



Full Spectrum

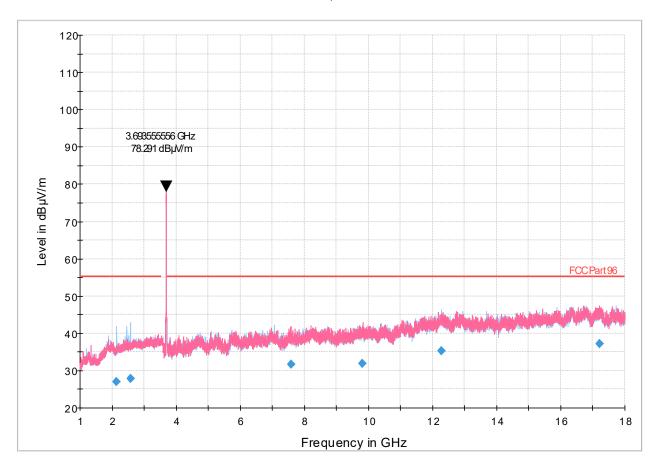


Figure 8.8-4: Radiated emissions spectral plot (1 GHz - 18 GHz), HIGH channel, 20 MHz bandwidth, GFSK modulation

Table 8.8-4: Radiated emissions results, HIGH channel, 20 MHz bandwidth, GFSK modulation

Frequency (MHz)	RMS (dBµV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2144.155556	26.94	55.23	28.29	5000.0	1000.000	384.0	Н	18.0	-11.1
2582.244444	27.92	55.23	27.31	5000.0	1000.000	144.0	Н	290.0	-9.6
7584.811111	31.67	55.23	23.56	5000.0	1000.000	299.0	V	266.0	1.1
9815.255556	31.83	55.23	23.40	5000.0	1000.000	311.0	V	57.0	3.6
12269.988889	35.38	55.23	19.85	5000.0	1000.000	388.0	Н	344.0	7.1
17222.077778	37.21	55.23	18.02	5000.0	1000.000	366.0	Н	315.0	15.1

 $^{^{1}}$ Field strength (dB V/m) = receiver/spectrum analyzer value (dB V) + correction factor (dB)

² Correction factors = antenna factor ACF (dB) + cable loss (dB)

³ Emissions that were continuously present for a minimum of 1 second and occurred more than once for every 15 seconds observation period were considered valid emissions. The maximum value of valid emissions has been recorded.

Test name FCC §96.41(e)(1) Emissions intensity

Specification FCC Part 96



18 - 26.5 GHz

All operating modes were investigated and observed to no significant emissions. Data from a representative operating mode (all transmitters operating at full power, MID channel, 20 MHz operating bandwidth, GFSK modulation) is presented below. Preliminary scans to were performed with a peak detector to identify suspect frequencies. Identified suspect frequencies were maximized with respect to azimuth, measurement antenna height and polarization and measured with an RMS detector with a 1 MHz resolution bandwidth.

Full Spectrum

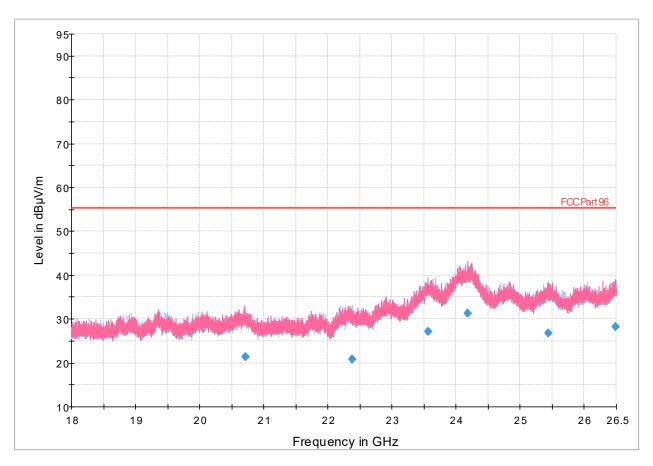


Figure 8.8-5: Radiated emissions spectral plot (18 GHz - 26.5 GHz), MID channel, 20 MHz bandwidth, GFSK modulation

Table 8.8-5: Radiated emissions results, MID channel, 20 MHz bandwidth, GFSK modulation

Frequency (MHz)	RMS (dBμV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
				(ms)					
20715.181250	21.37	55.23	33.86	5000.0	1000.000	368.0	V	58.0	18.5
22381.818750	20.85	55.23	34.38	5000.0	1000.000	246.0	Н	202.0	17.4
23557.700000	27.10	55.23	28.13	5000.0	1000.000	107.0	Н	283.0	23.7
24174.643750	31.26	55.23	23.97	5000.0	1000.000	366.0	V	331.0	27.2
25441.431250	26.84	55.23	28.39	5000.0	1000.000	250.0	Н	0.0	21.7
26493.831250	28.24	55.23	26.99	5000.0	1000.000	400.0	V	151.0	23.4

 $^{^{1}}$ Field strength (dB V/m) = receiver/spectrum analyzer value (dB V) + correction factor (dB)

² Correction factors = antenna factor ACF (dB) + cable loss (dB)

³ Emissions that were continuously present for a minimum of 1 second and occurred more than once for every 15 seconds observation period were considered valid emissions. The maximum value of valid emissions has been recorded.

Test name FCC §96.41(e)(1) Emissions intensity

Specification FCC Part 96



26.5 - 40 GHz

All operating modes were investigated and observed to no significant emissions. Data from a representative operating mode (all transmitters operating at full power, MID channel, 20 MHz operating bandwidth, GFSK modulation) is presented below. Preliminary scans to were performed with a peak detector to identify suspect frequencies. Identified suspect frequencies were maximized with respect to azimuth, measurement antenna height and polarization and measured with an RMS detector with a 1 MHz resolution bandwidth.

Full Spectrum

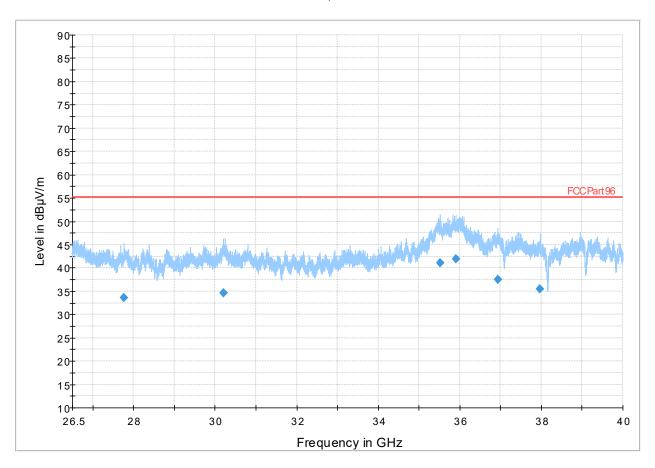


Figure 8.8-6: Radiated emissions spectral plot (26.5 GHz - 40 GHz), MID channel, 20 MHz bandwidth, GFSK modulation

Table 8.8-6: Radiated emissions results, MID channel, 20 MHz bandwidth, GFSK modulation

Frequency	RMS	Limit	Margin	Meas.	Bandwidth	Height	Pol	Azimuth	Corr.
(MHz)	(dBμV/m)	(dBμV/m)	(dB)	Time	(kHz)	(cm)		(deg)	(dB/m)
				(ms)					
27759.293750	33.65	55.23	21.58	5000.0	1000.000	123.0	Н	192.0	9.6
30196.668750	34.62	55.23	20.61	5000.0	1000.000	106.0	Н	90.0	11.8
35523.881250	41.04	55.23	14.19	5000.0	1000.000	225.0	Н	164.0	19.6
35911.162500	41.85	55.23	13.38	5000.0	1000.000	204.0	Н	22.0	20.8
36939.612500	37.48	55.23	17.75	5000.0	1000.000	125.0	Н	85.0	16.4
37969.556250	35.55	55.23	19.68	5000.0	1000.000	225.0	V	293.0	15.6

 $^{^{1}}$ Field strength (dB V/m) = receiver/spectrum analyzer value (dB V) + correction factor (dB)

² Correction factors = antenna factor ACF (dB) + cable loss (dB)

³ Emissions that were continuously present for a minimum of 1 second and occurred more than once for every 15 seconds observation period were considered valid emissions. The maximum value of valid emissions has been recorded.



Section 9. Block diagrams of test setups

9.1 Radiated emissions set-up

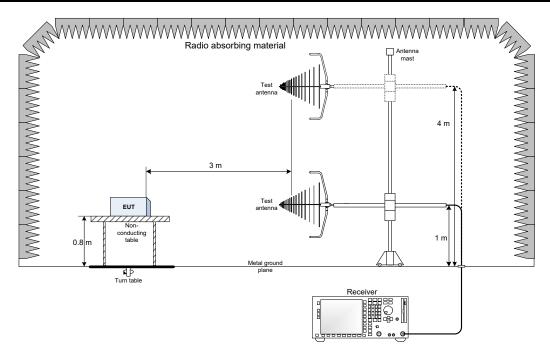


Figure 9.1-1: Below 1 GHz setup

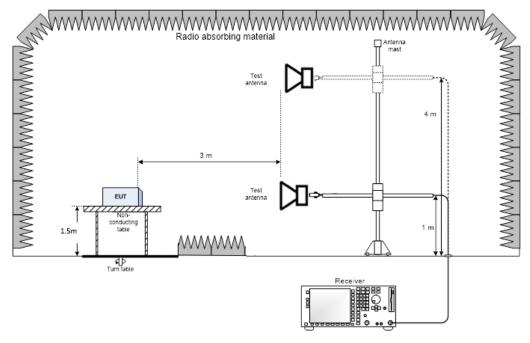


Figure 9.1-2: Above 1GHz setup