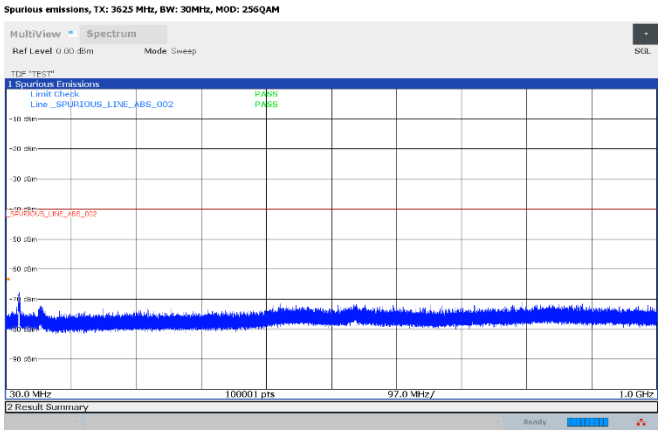
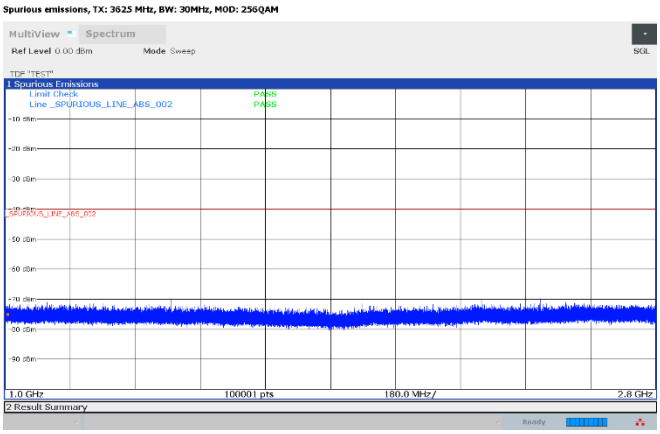
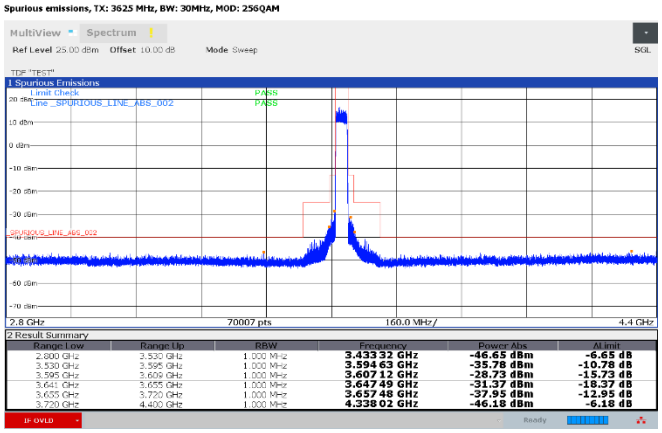
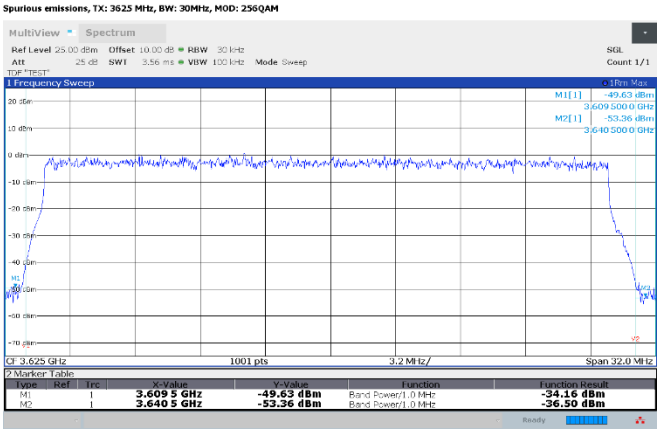
TX: 3625 MHz, 30 MHz BW, 256QAM modulation:

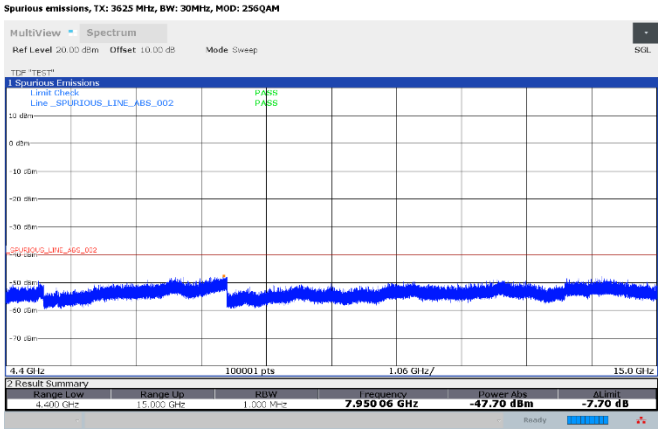


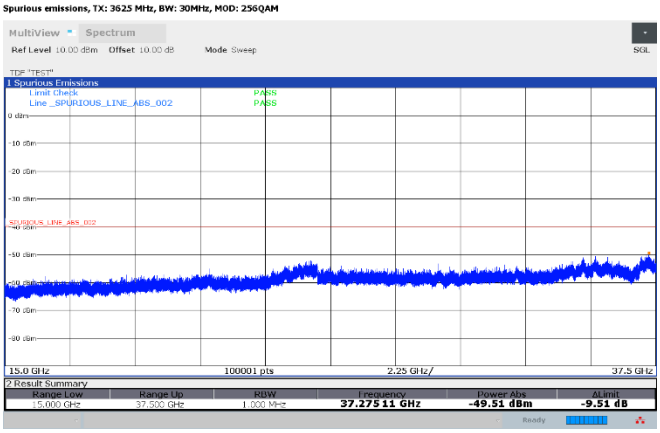




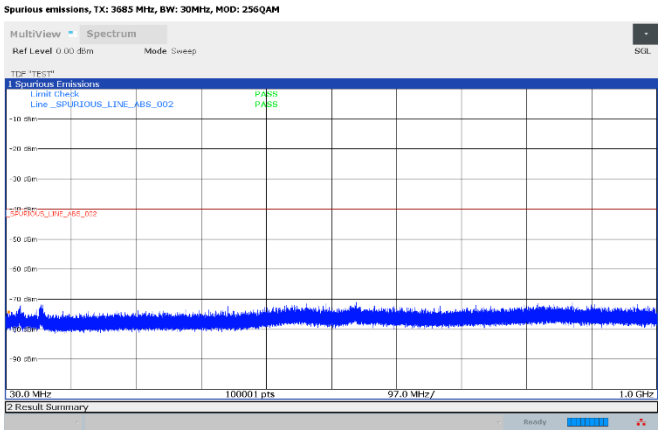


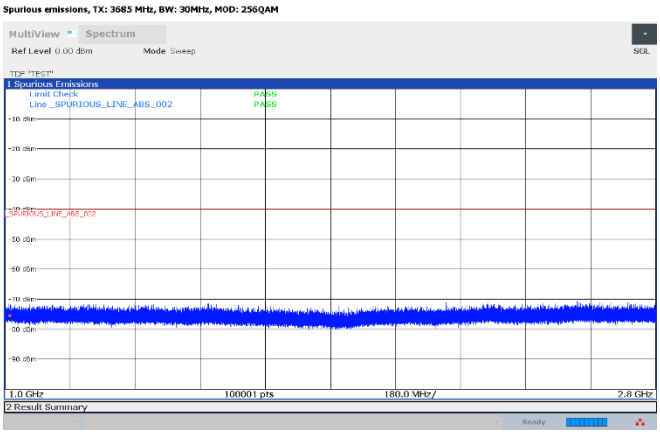
Note: Analyzer was marginally driven to IF overlead due to the fundamental. Result kept so as to keep sufficient headroom between noise floor and limit.

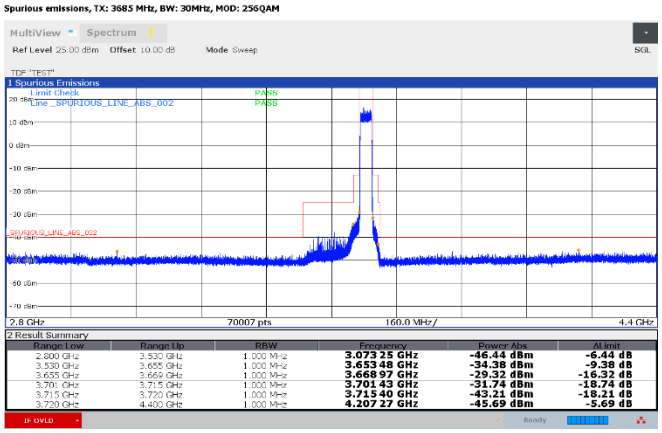


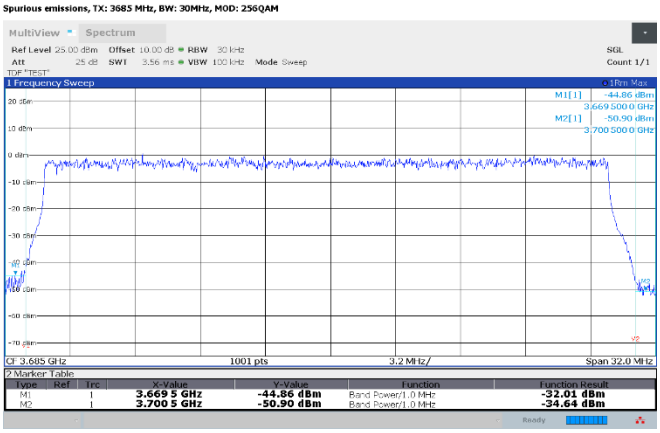


TX: 3625 MHz, 30 MHz BW, 256QAM modulation:

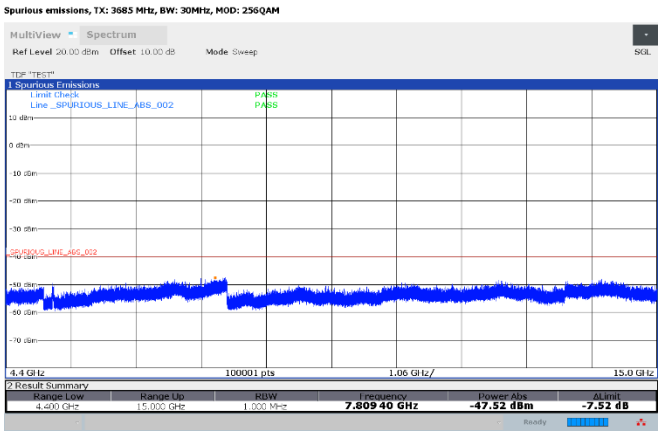


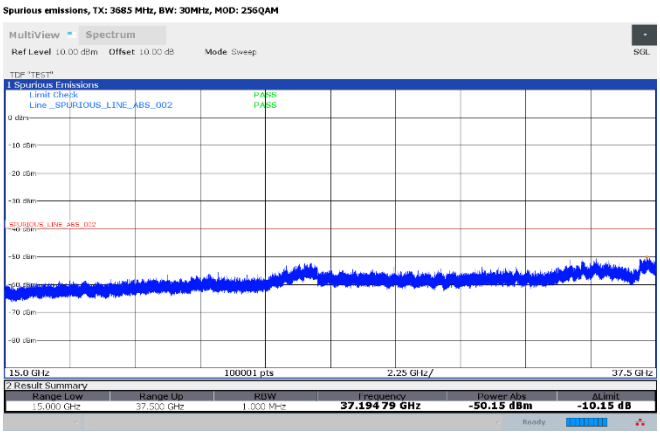






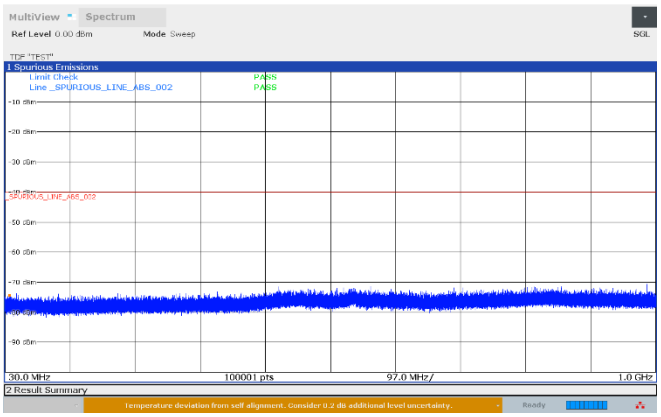
Note: Analyzer was marginally driven to IF overlead due to the fundamental. Result kept so as to keep sufficient headroom between noise floor and limit.



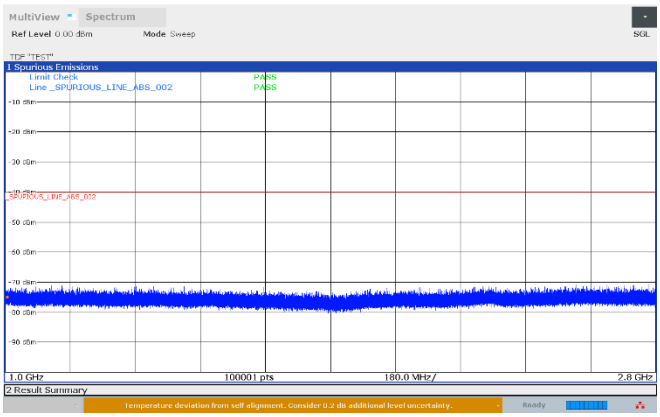


TX: 3570 MHz, 40 MHz BW, QPSK modulation:

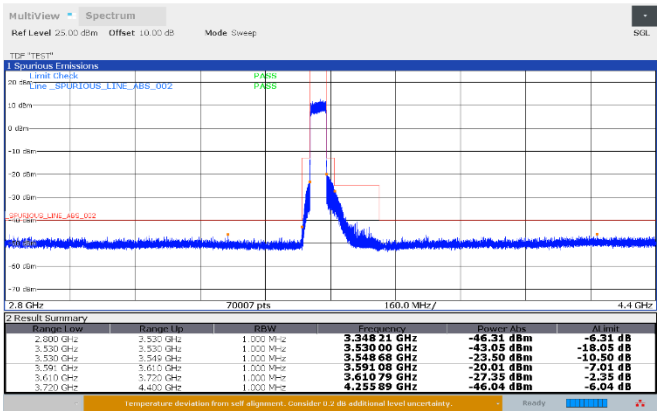
Spurious emissions, TX: 3570 MHz, BW: 40MHz, MOD: QPSK



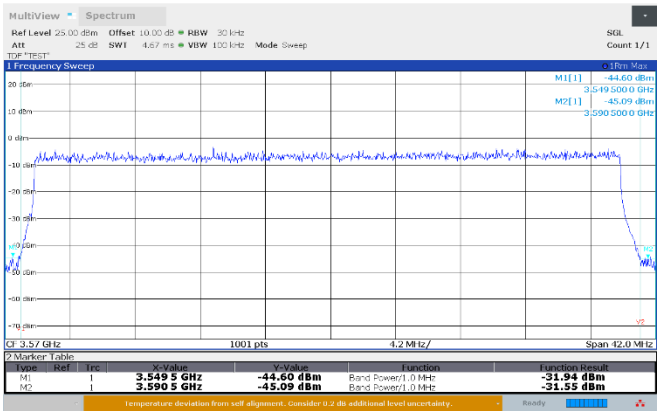
Spurious emissions, TX: 3570 MHz, BW: 40MHz, MOD: QPSK



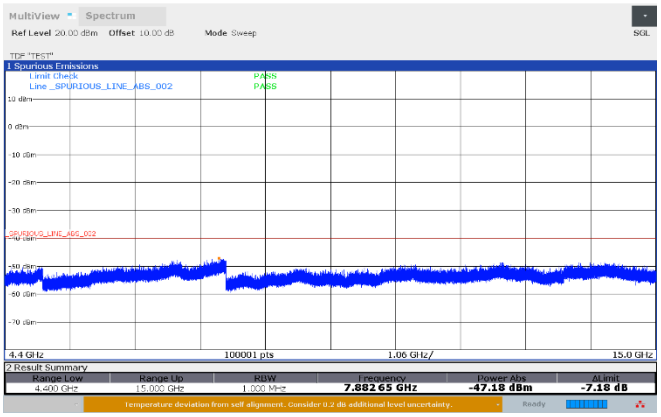
Spurious emissions, TX: 3570 MHz, BW: 40MHz, MOD: QPSK



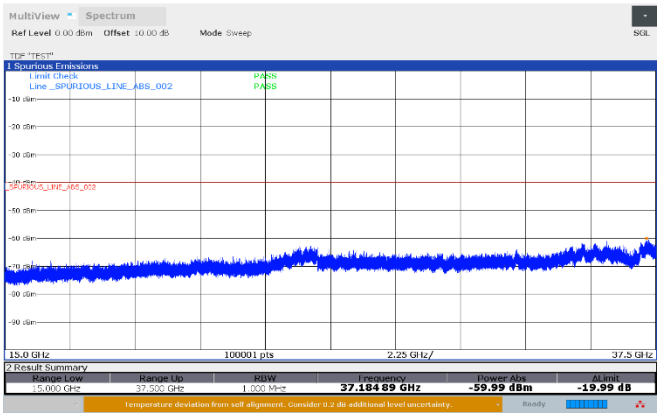
Spurious emissions, TX: 3570 MHz, BW: 40MHz, MOD: QPSK



Spurious emissions, TX: 3570 MHz, BW: 40MHz, MOD: QPSK

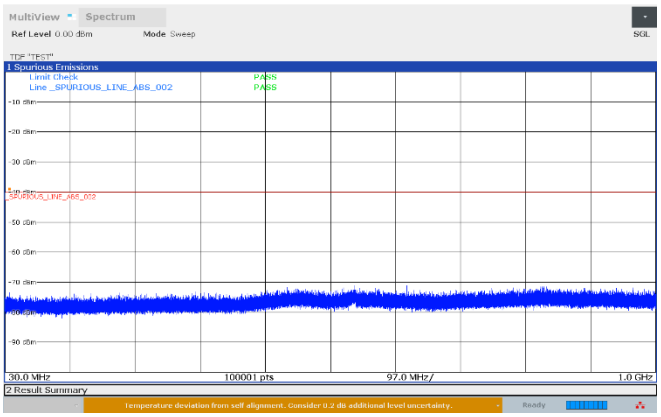


Spurious emissions, TX: 3570 MHz, BW: 40MHz, MOD: QPSK

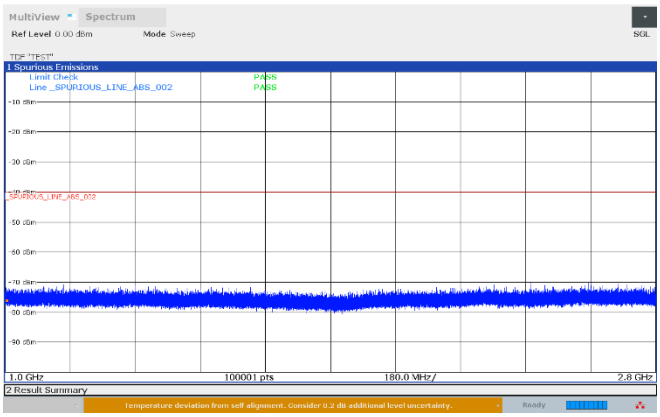


TX: 3625 MHz, 40 MHz BW, QPSK modulation:

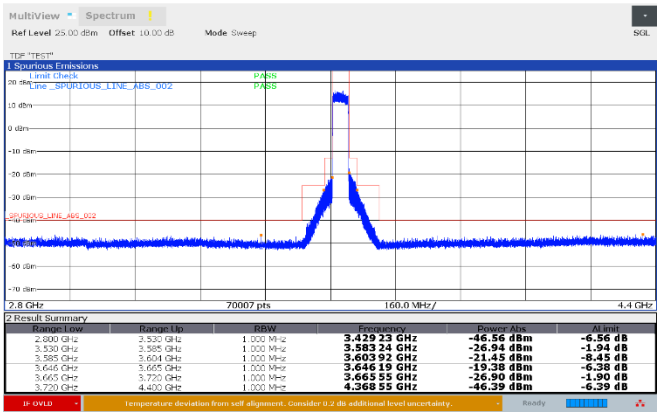
Spurious emissions, TX: 3625 MHz, BW: 40MHz, MOD: QPSK



Spurious emissions, TX: 3625 MHz, BW: 40MHz, MOD: QPSK

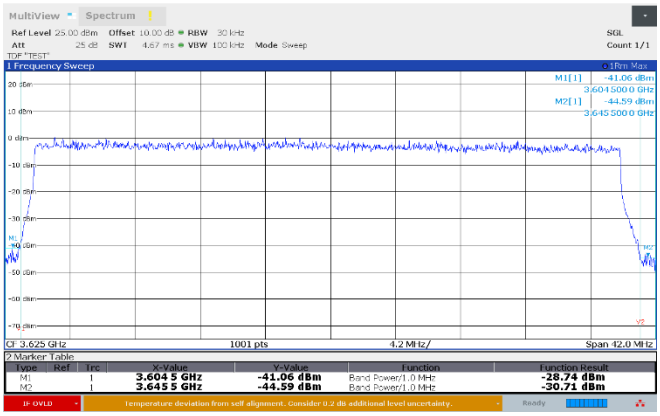


Spurious emissions, TX: 3625 MHz, BW: 40MHz, MOD: QPSK



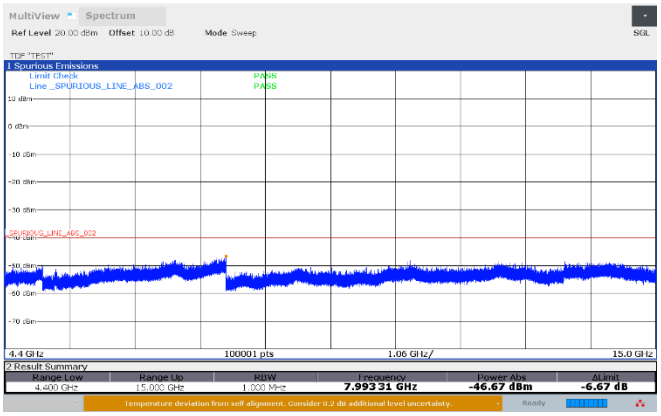
Note: Analyzer was marginally driven to IF overlaid due to the fundamental. Result kept so as to keep sufficient headroom between noise floor and limit.

Spurious emissions, TX: 3625 MHz, BW: 40MHz, MOD: QPSK

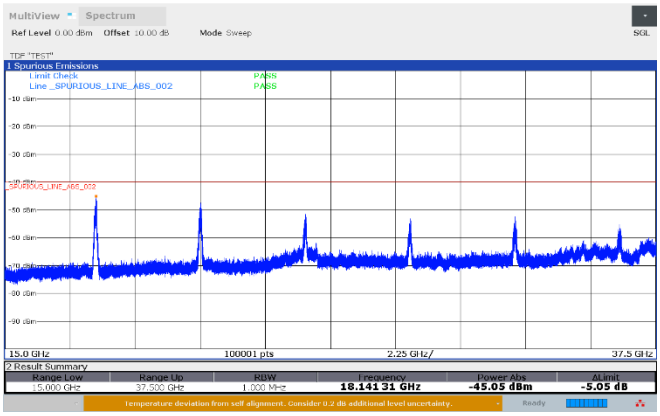


Note: Analyzer was marginally driven to IF overlaid due to the fundamental. Result kept so as to keep sufficient headroom between noise floor and limit.

Spurious emissions, TX: 3625 MHz, BW: 40MHz, MOD: QPSK

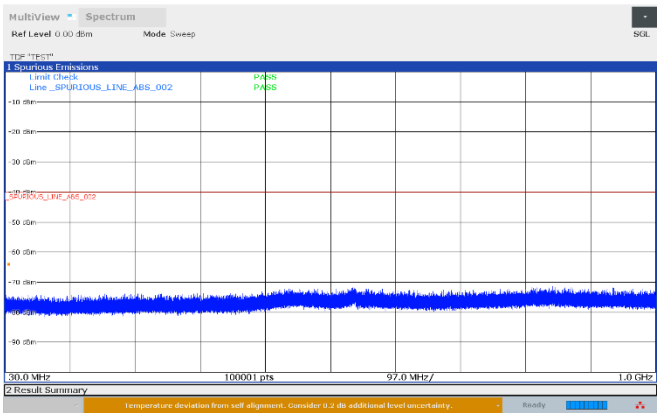


Spurious emissions, TX: 3625 MHz, BW: 40MHz, MOD: QPSK

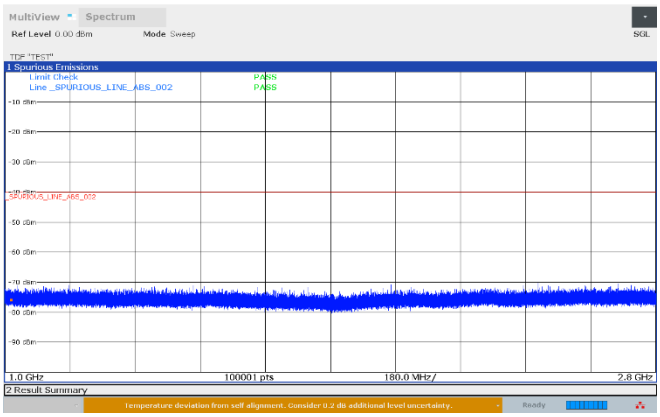


TX: 3680 MHz, 40 MHz BW, QPSK modulation:

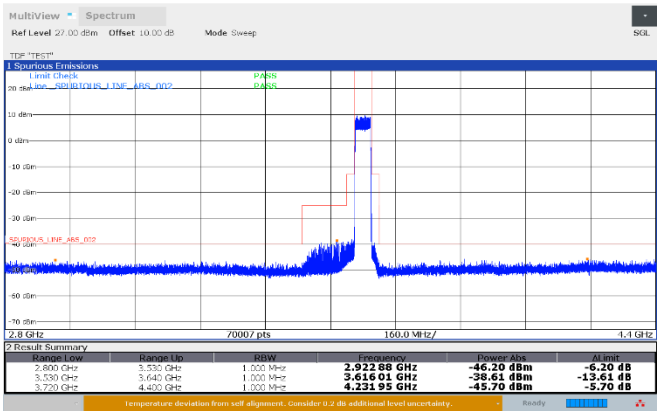
Spurious emissions, TX: 3680 MHz, BW: 40MHz, MOD: QPSK



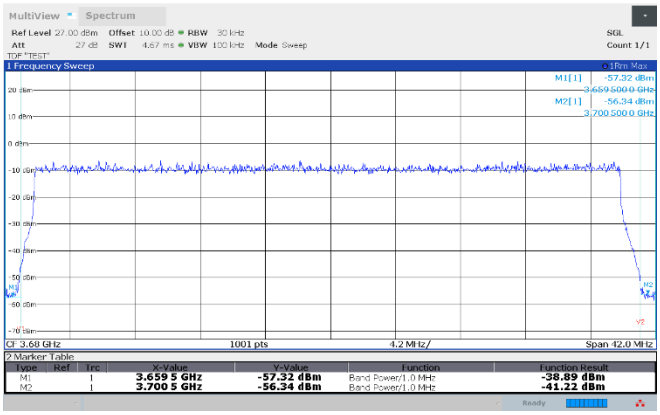
Spurious emissions, TX: 3680 MHz, BW: 40MHz, MOD: QPSK



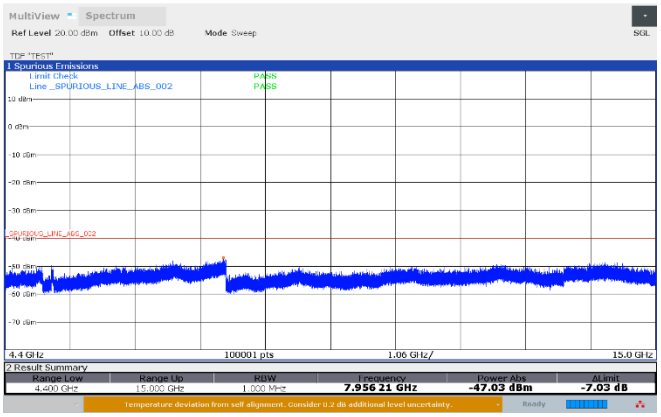
Spurious emissions, TX: 3680 MHz, BW: 40MHz, MOD: QPSK



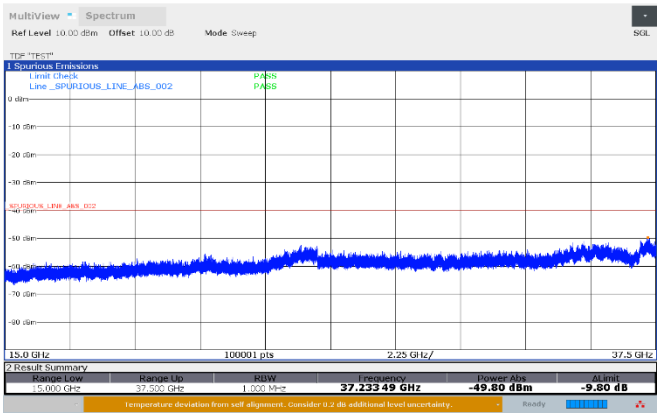
Spurious emissions, TX: 3680 MHz, BW: 40MHz, MOD: QPSK



Spurious emissions, TX: 3680 MHz, BW: 40MHz, MOD: QPSK

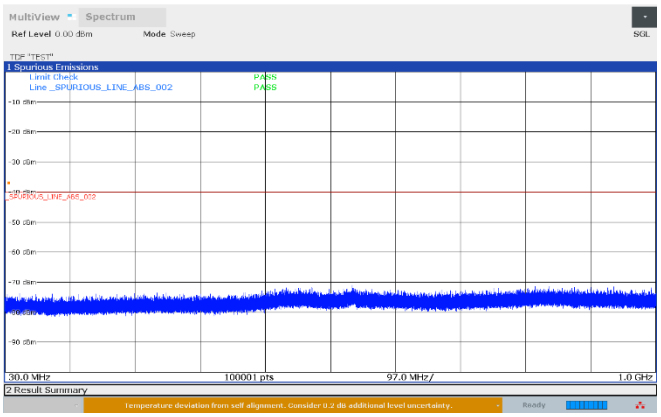


Spurious emissions, TX: 3680 MHz, BW: 40MHz, MOD: QPSK

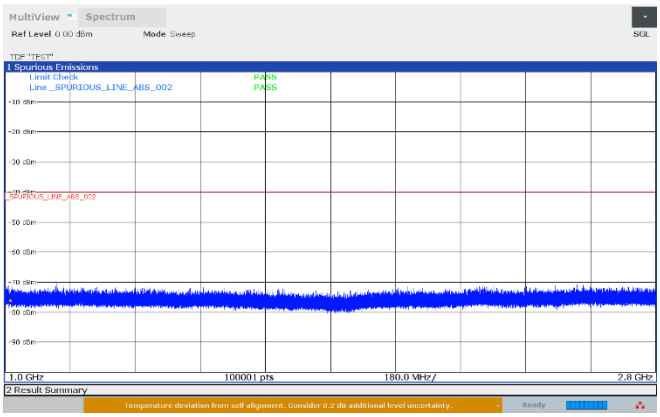


TX: 3570 MHz, 40 MHz BW, 16QAM modulation:

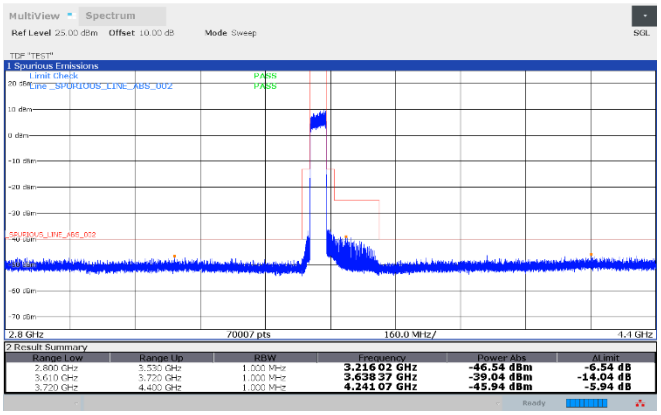
Spurious emissions, TX: 3570 MHz, BW: 40MHz, MOD: 16QAM



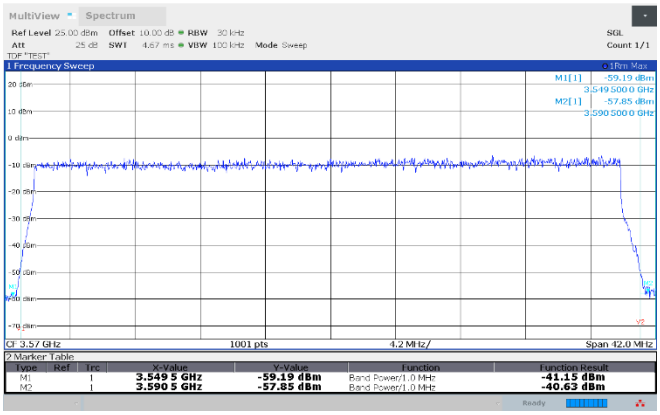
Spurious emissions, TX: 3570 MHz, BW: 40MHz, MOD: 16QAM



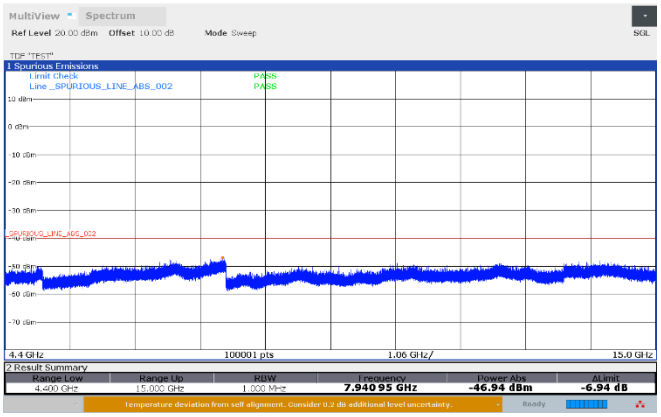
Spurious emissions, TX: 3570 MHz, BW: 40MHz, MOD: 16QAM



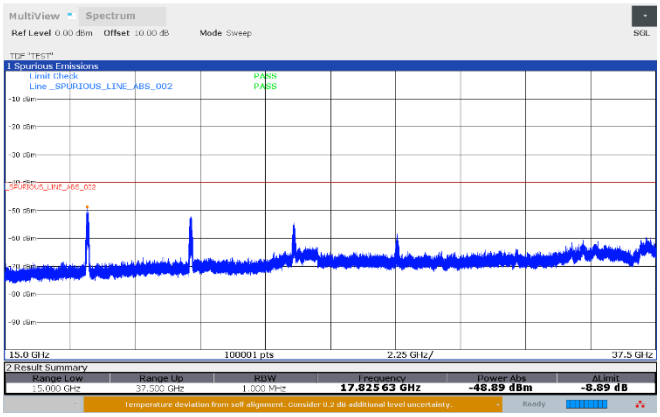
Spurious emissions, TX: 3570 MHz, BW: 40MHz, MOD: 16QAM



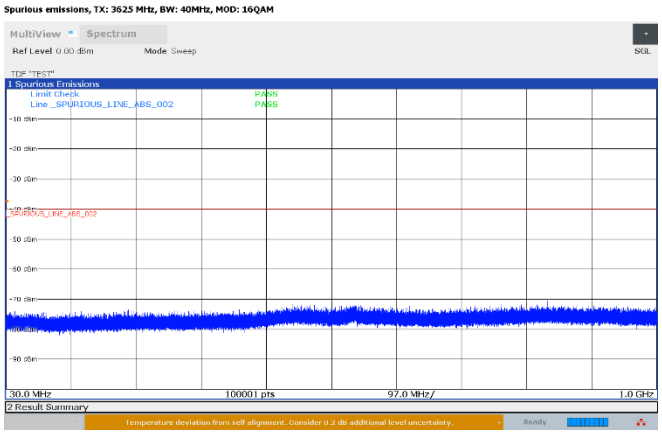
Spurious emissions, TX: 3570 MHz, BW: 40MHz, MOD: 16QAM

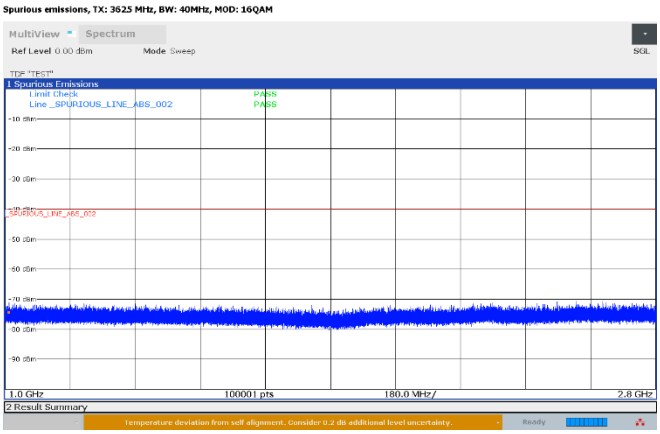


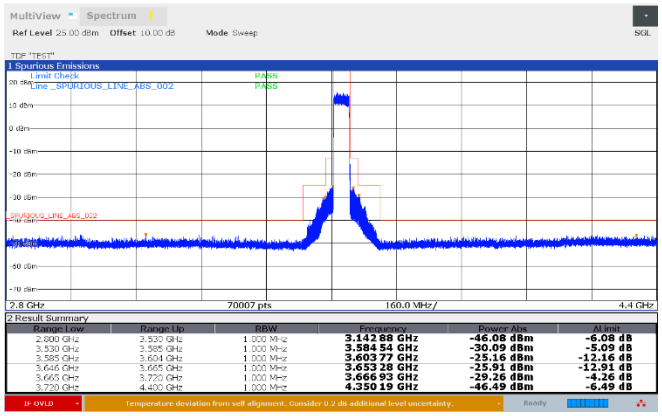
Spurious emissions, TX: 3570 MHz, BW: 40MHz, MOD: 16QAM



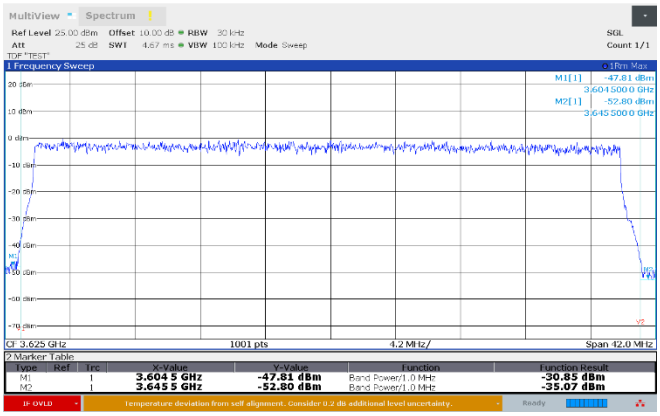
TX: 3625 MHz, 40 MHz BW, 16QAM modulation:



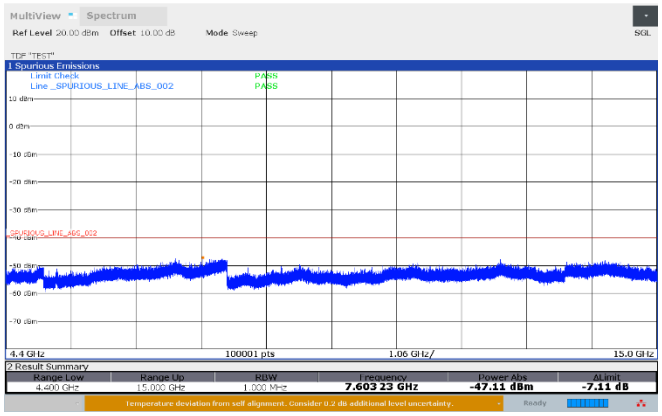


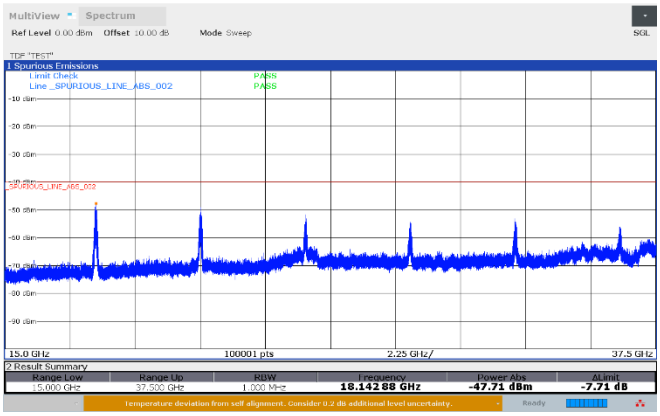


Note: Analyzer was marginally driven to IF overlead due to the fundamental. Result kept so as to keep sufficient headroom between noise floor and limit.



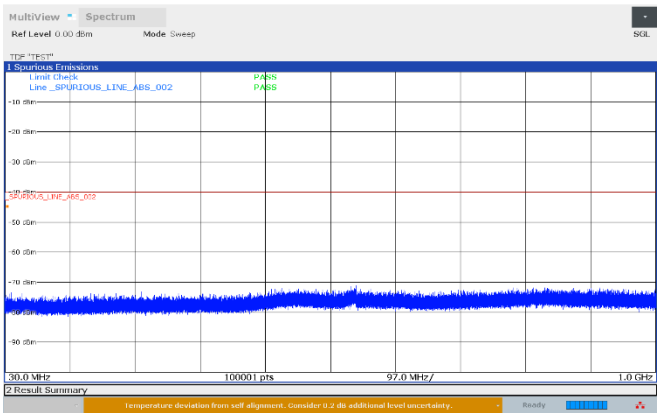
Note: Analyzer was marginally driven to IF overlead due to the fundamental. Result kept so as to keep sufficient headroom between noise floor and limit.



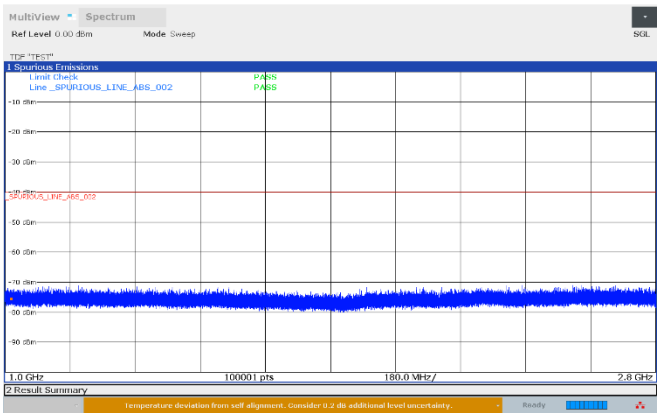


TX: 3680 MHz, 40 MHz BW, 16QAM modulation:

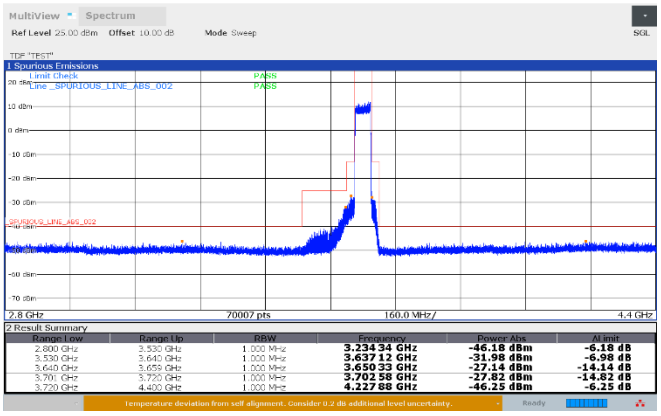
Spurious emissions, TX: 3680 MHz, BW: 40MHz, MOD: 16QAM



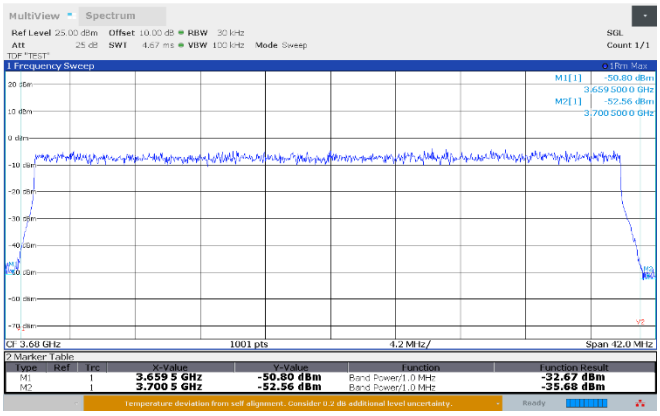
Spurious emissions, TX: 3680 MHz, BW: 40MHz, MOD: 16QAM



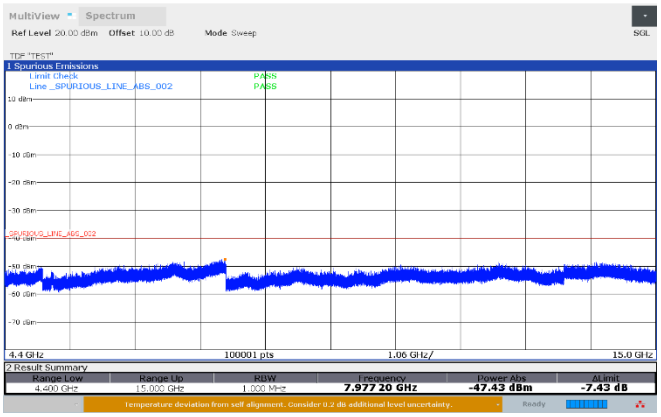
Spurious emissions, TX: 3680 MHz, BW: 40MHz, MOD: 16QAM



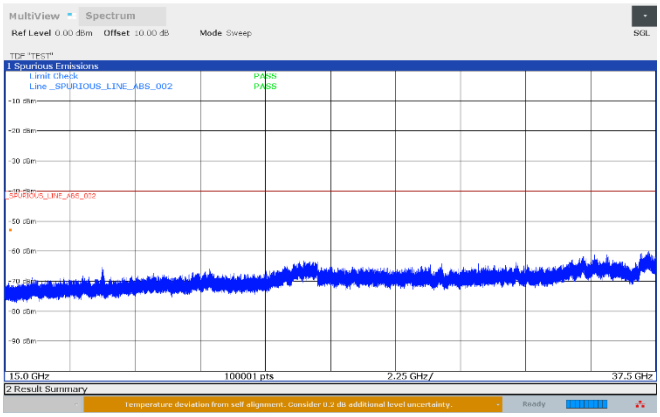
Spurious emissions, TX: 3680 MHz, BW: 40MHz, MOD: 16QAM



Spurious emissions, TX: 3680 MHz, BW: 40MHz, MOD: 16QAM

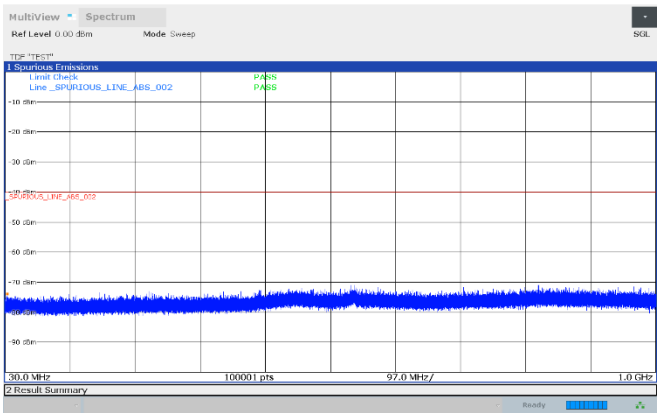


Spurious emissions, TX: 3680 MHz, BW: 40MHz, MOD: 16QAM

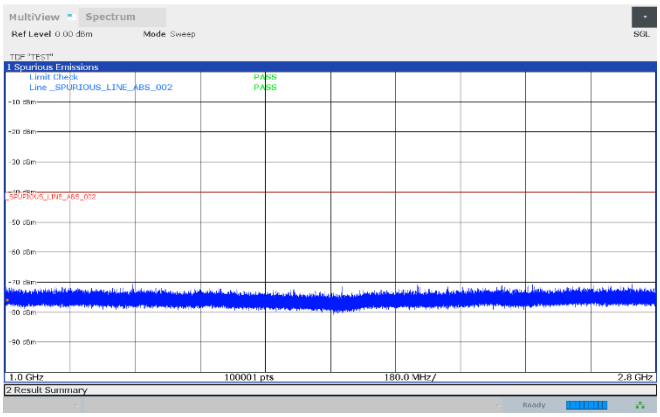


TX: 3570 MHz, 40 MHz BW, 64QAM modulation:

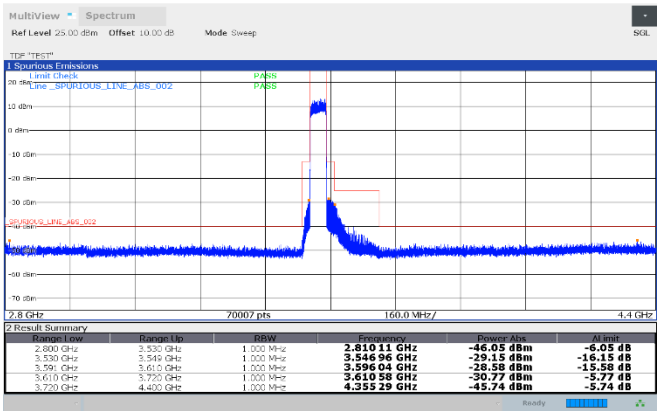
Spurious emissions, TX: 3570 MHz, BW: 40MHz, MOD: 64QAM



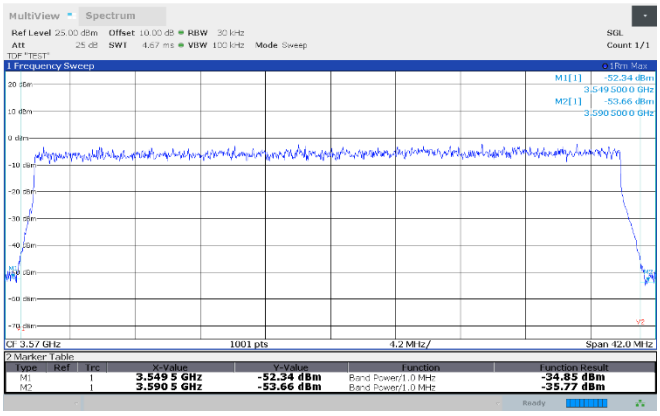
Spurious emissions, TX: 3570 MHz, BW: 40MHz, MOD: 64QAM



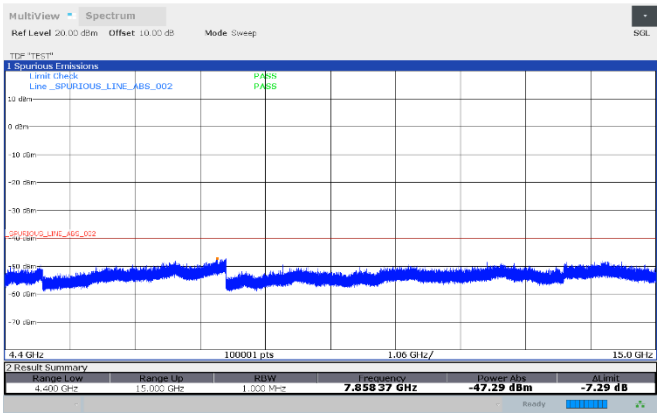
Spurious emissions, TX: 3570 MHz, BW: 40MHz, MOD: 64QAM



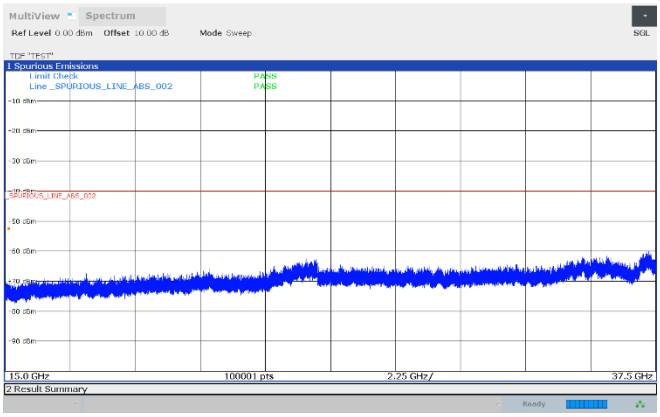
Spurious emissions, TX: 3570 MHz, BW: 40MHz, MOD: 64QAM



Spurious emissions, TX: 3570 MHz, BW: 40MHz, MOD: 64QAM

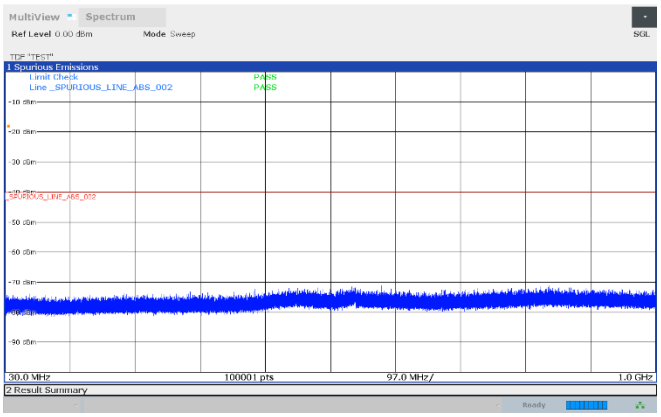


Spurious emissions, TX: 3570 MHz, BW: 40MHz, MOD: 64QAM

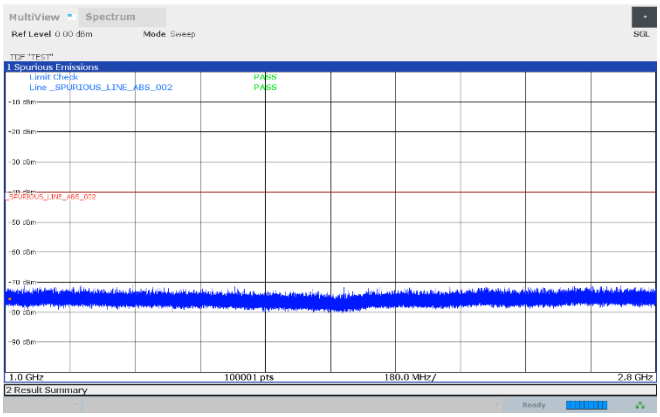


TX: 3625 MHz, 40 MHz BW, 64QAM modulation:

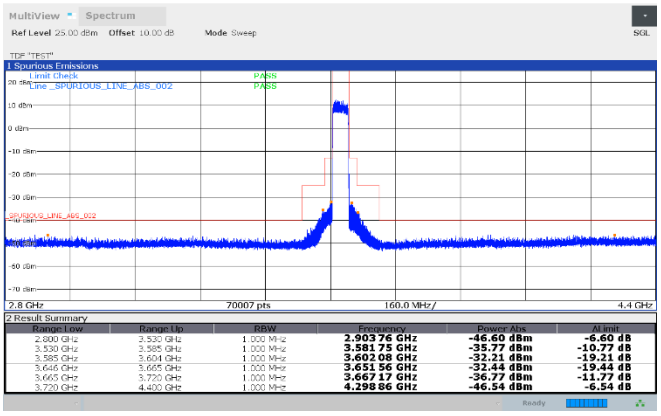
Spurious emissions, TX: 3625 MHz, BW: 40MHz, MOD: 64QAM



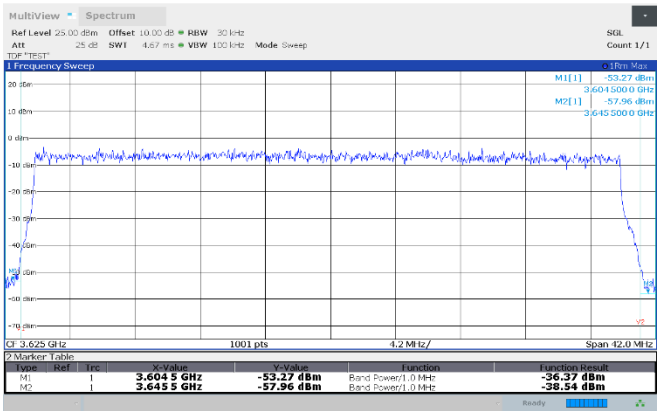
Spurious emissions, TX: 3625 MHz, BW: 40MHz, MOD: 64QAM



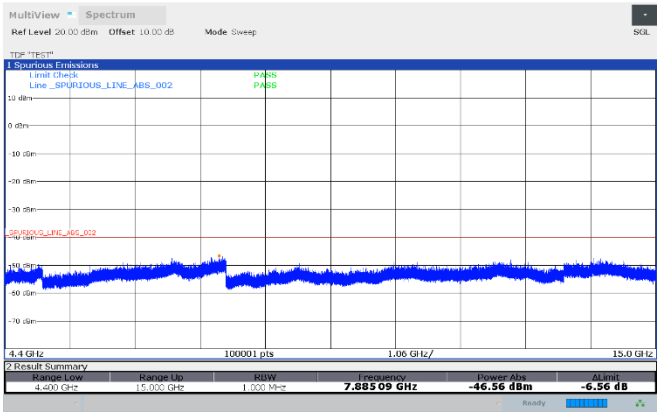
Spurious emissions, TX: 3625 MHz, BW: 40MHz, MOD: 64QAM



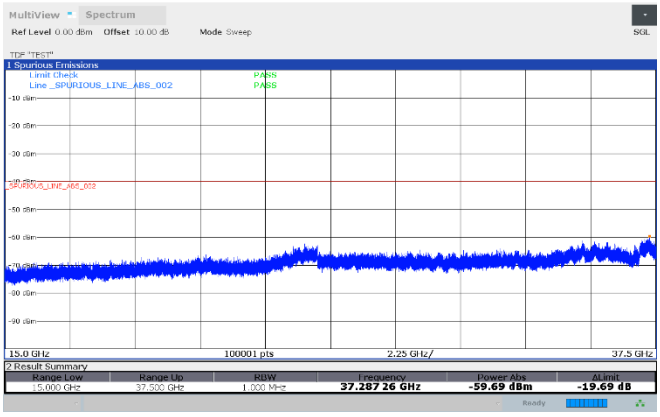
Spurious emissions, TX: 3625 MHz, BW: 40MHz, MOD: 64QAM



Spurious emissions, TX: 3625 MHz, BW: 40MHz, MOD: 64QAM

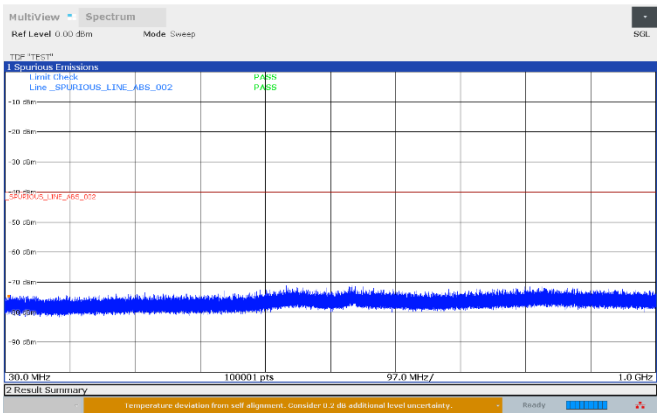


Spurious emissions, TX: 3625 MHz, BW: 40MHz, MOD: 64QAM

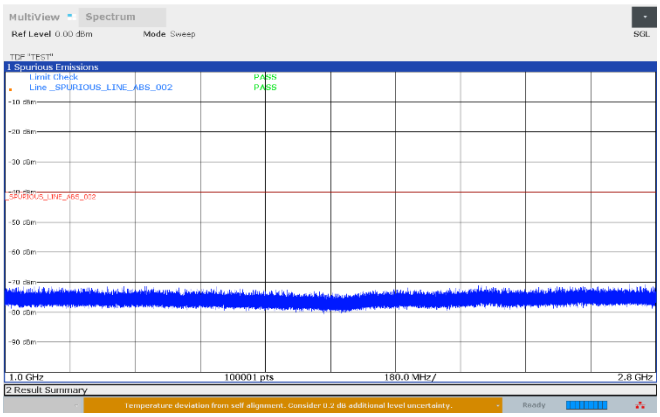


TX: 3680 MHz, 40 MHz BW, 64QAM modulation:

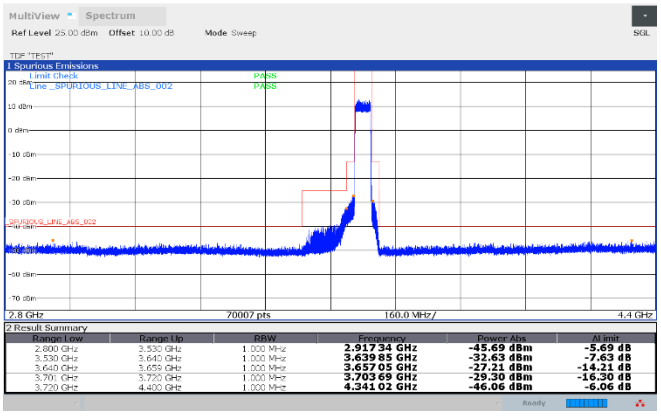
Spurious emissions, TX: 3680 MHz, BW: 40MHz, MOD: 64QAM



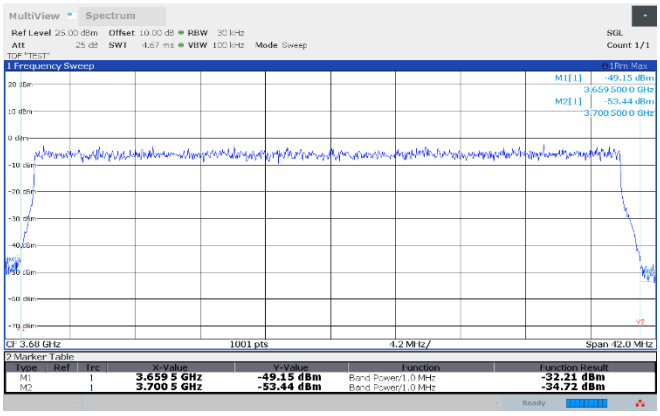
Spurious emissions, TX: 3680 MHz, BW: 40MHz, MOD: 64QAM



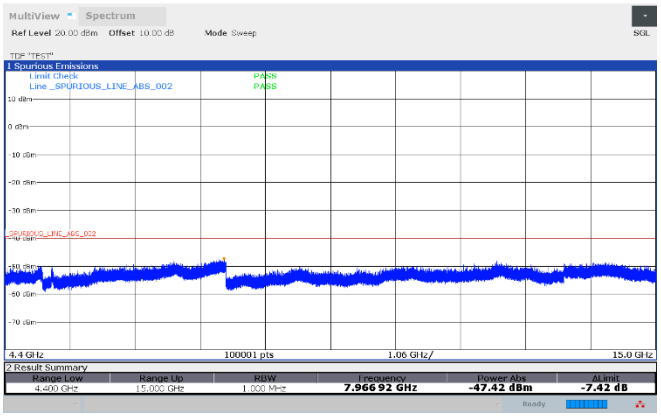
Spurious emissions, TX: 3680 MHz, BW: 40MHz, MOD: 64QAM



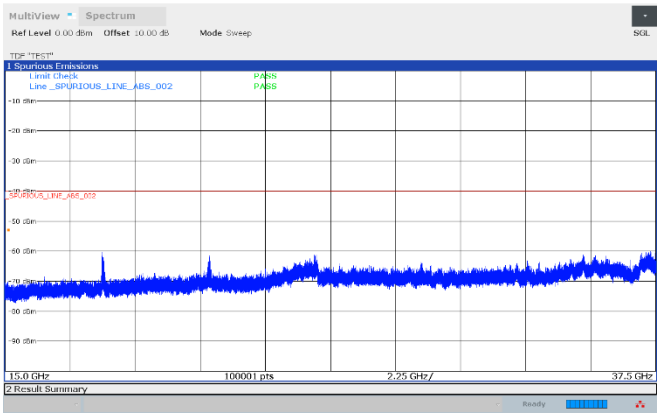
Spurious emissions, TX: 3680 MHz, BW: 40MHz, MOD: 64QAM



Spurious emissions, TX: 3680 MHz, BW: 40MHz, MOD: 64QAM

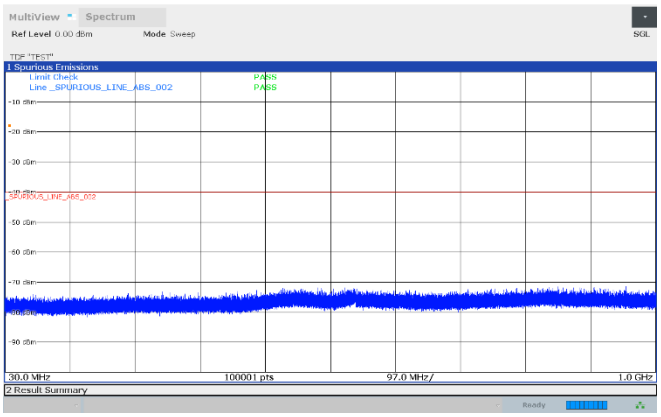


Spurious emissions, TX: 3680 MHz, BW: 40MHz, MOD: 64QAM

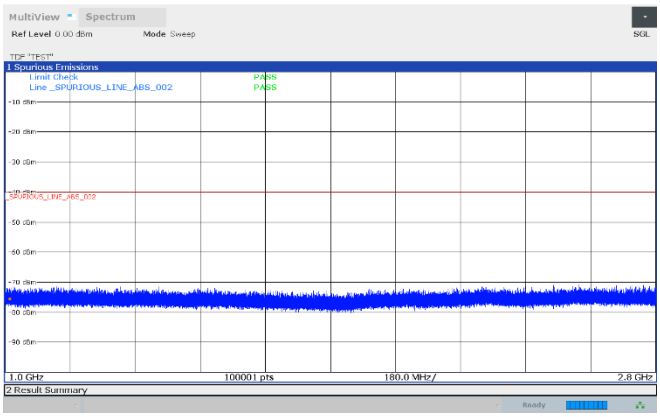


TX: 3570 MHz, 40 MHz BW, 256QAM modulation:

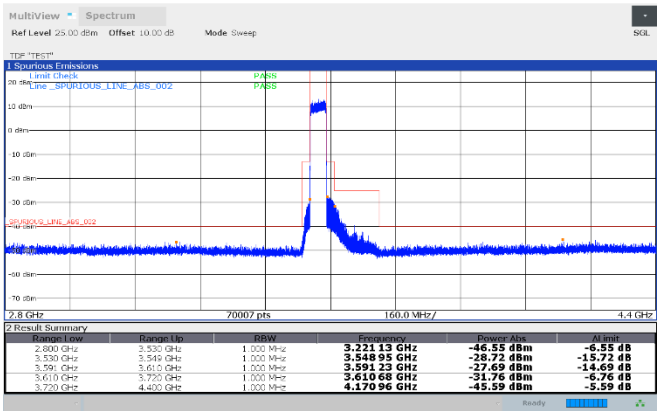
Spurious emissions, TX: 3570 MHz, BW: 40MHz, MOD: 256QAM



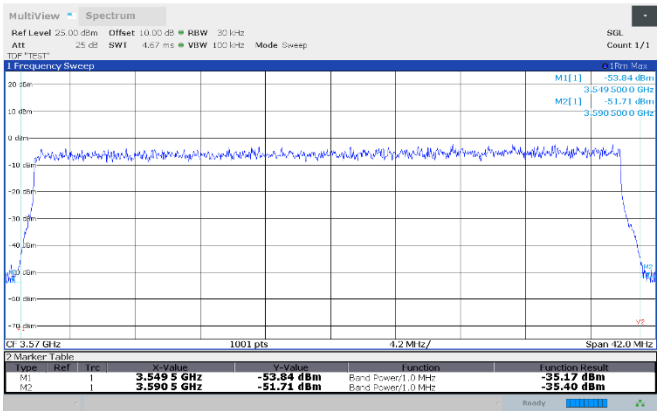
Spurious emissions, TX: 3570 MHz, BW: 40MHz, MOD: 256QAM



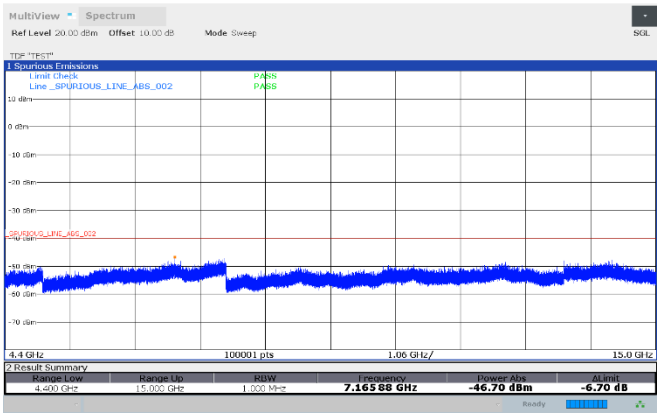
Spurious emissions, TX: 3570 MHz, BW: 40MHz, MOD: 256QAM



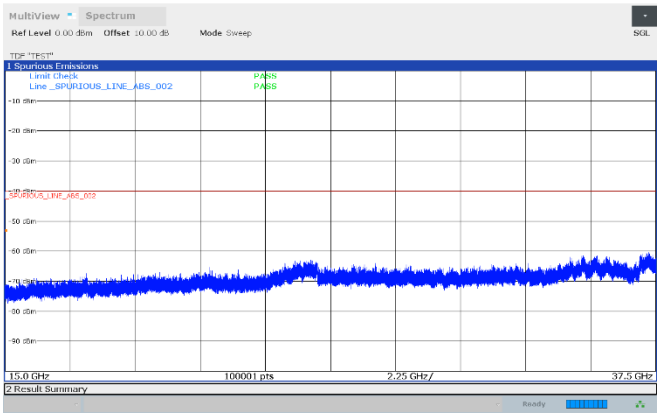
Spurious emissions, TX: 3570 MHz, BW: 40MHz, MOD: 256QAM



Spurious emissions, TX: 3570 MHz, BW: 40MHz, MOD: 256QAM

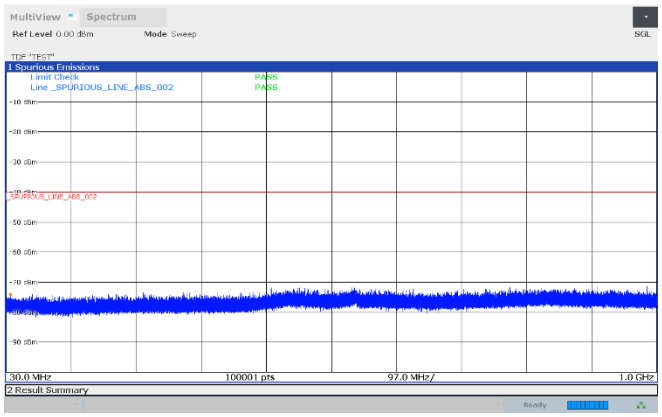


Spurious emissions, TX: 3570 MHz, BW: 40MHz, MOD: 256QAM

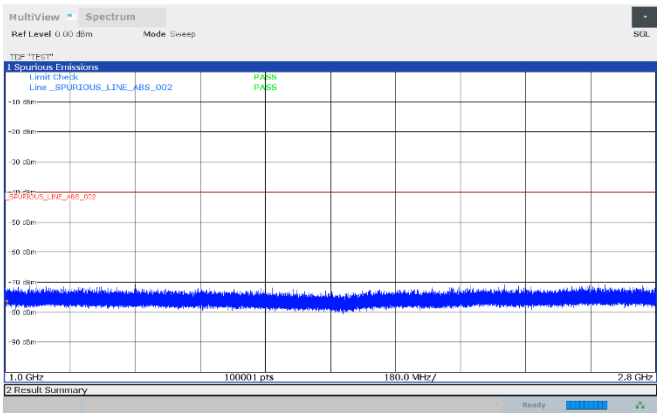


TX: 3625 MHz, 40 MHz BW, 256QAM modulation:

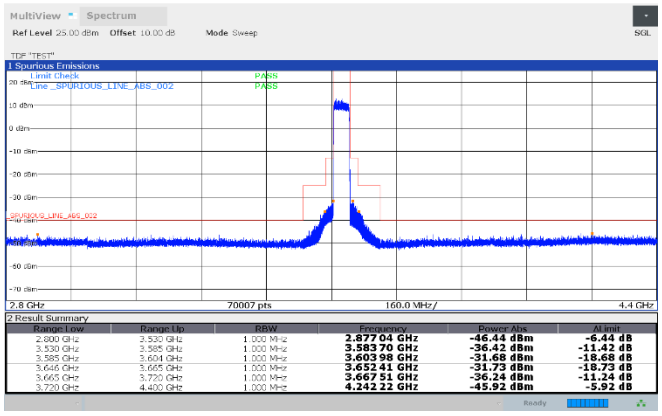
Spurious emissions, TX: 3625 MHz, BW: 40MHz, MOD: 256QAM



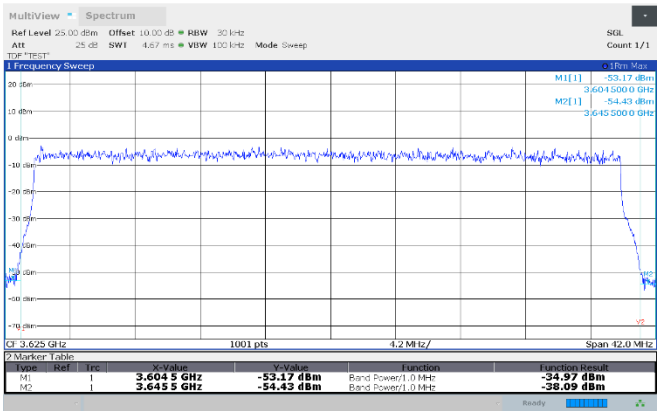
Spurious emissions, TX: 3625 MHz, BW: 40MHz, MOD: 256QAM



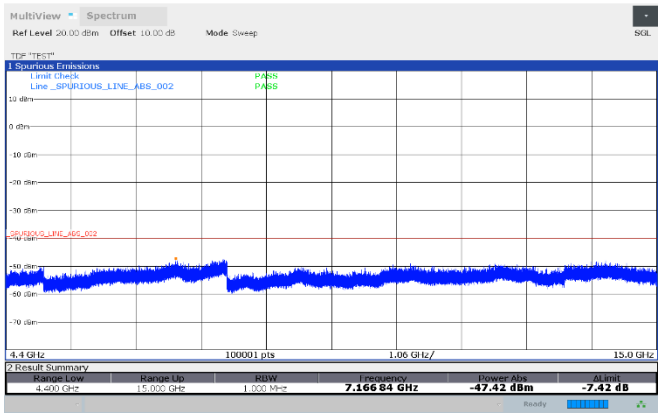
Spurious emissions, TX: 3625 MHz, BW: 40MHz, MOD: 256QAM



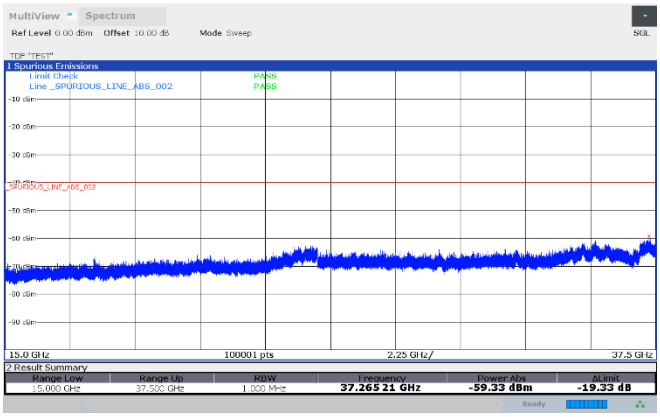
Spurious emissions, TX: 3625 MHz, BW: 40MHz, MOD: 256QAM



Spurious emissions, TX: 3625 MHz, BW: 40MHz, MOD: 256QAM

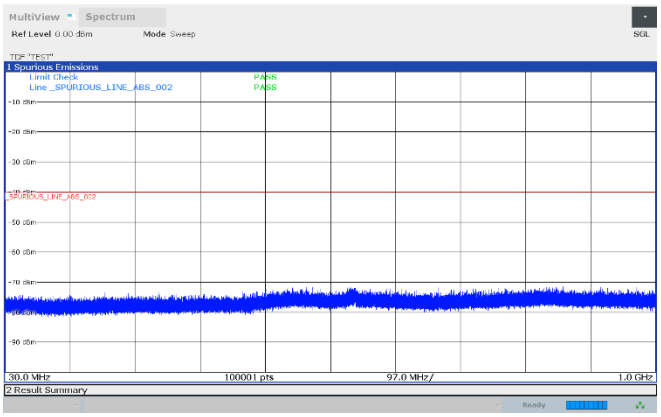


Spurious emissions, TX: 3625 MHz, BW: 40MHz, MOD: 256QAM

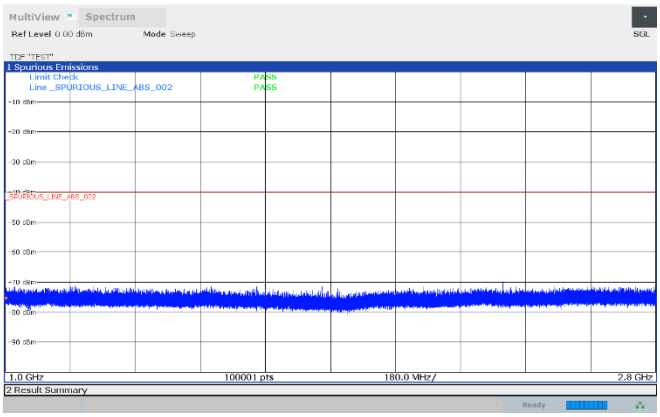


TX: 3680 MHz, 40 MHz BW, 256QAM modulation:

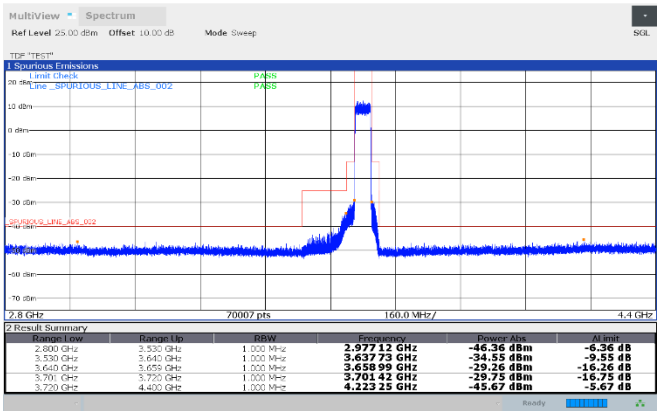
Spurious emissions, TX: 3680 MHz, BW: 40MHz, MOD: 256QAM



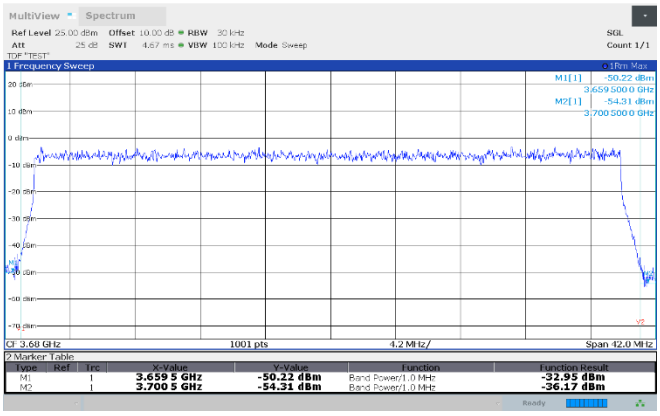
Spurious emissions, TX: 3680 MHz, BW: 40MHz, MOD: 256QAM



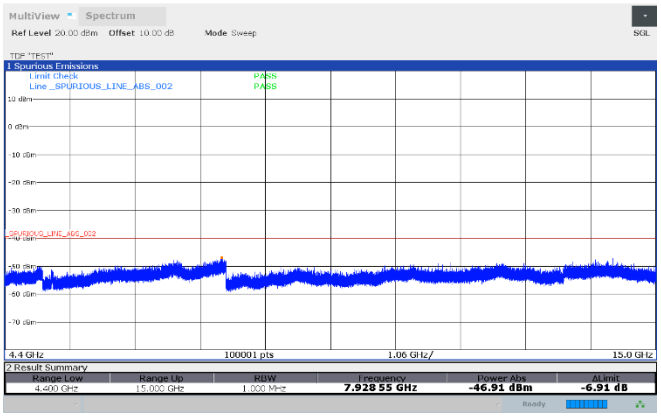
Spurious emissions, TX: 3680 MHz, BW: 40MHz, MOD: 256QAM



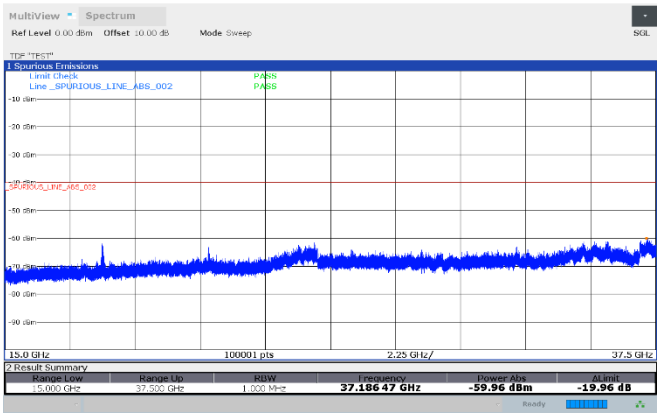
Spurious emissions, TX: 3680 MHz, BW: 40MHz, MOD: 256QAM



Spurious emissions, TX: 3680 MHz, BW: 40MHz, MOD: 256QAM



Spurious emissions, TX: 3680 MHz, BW: 40MHz, MOD: 256QAM



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.

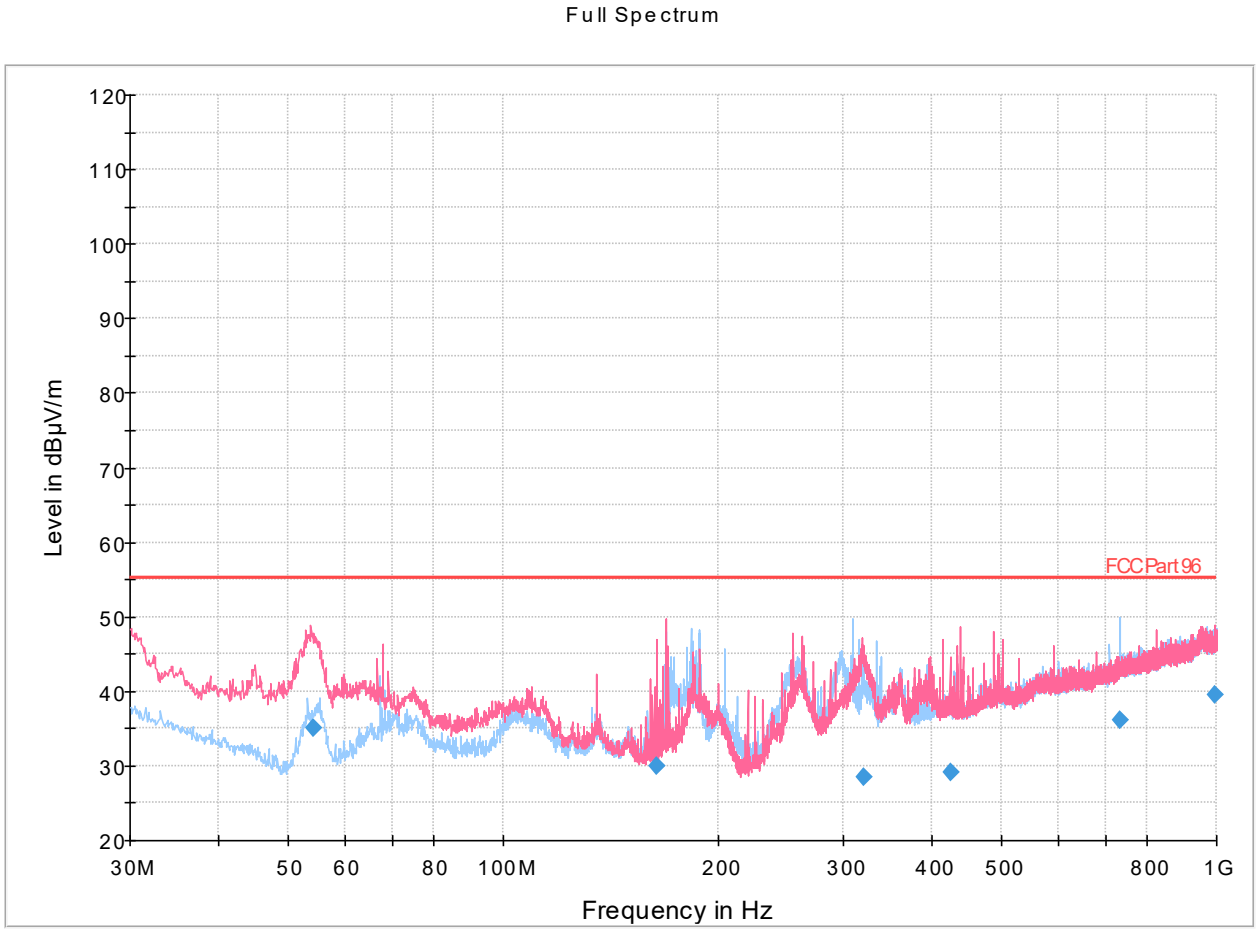


Figure 8.8-1: *Radiated emissions spectral plot (30 MHz - 1 GHz), MID channel, 20 MHz bandwidth, GFSK modulation*

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	H	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	H	208.0	31.4
995.502000	39.58	55.23	15.65	5000.0	1000.000	281.0	V	120.0	34.7

Notes:
[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.

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.

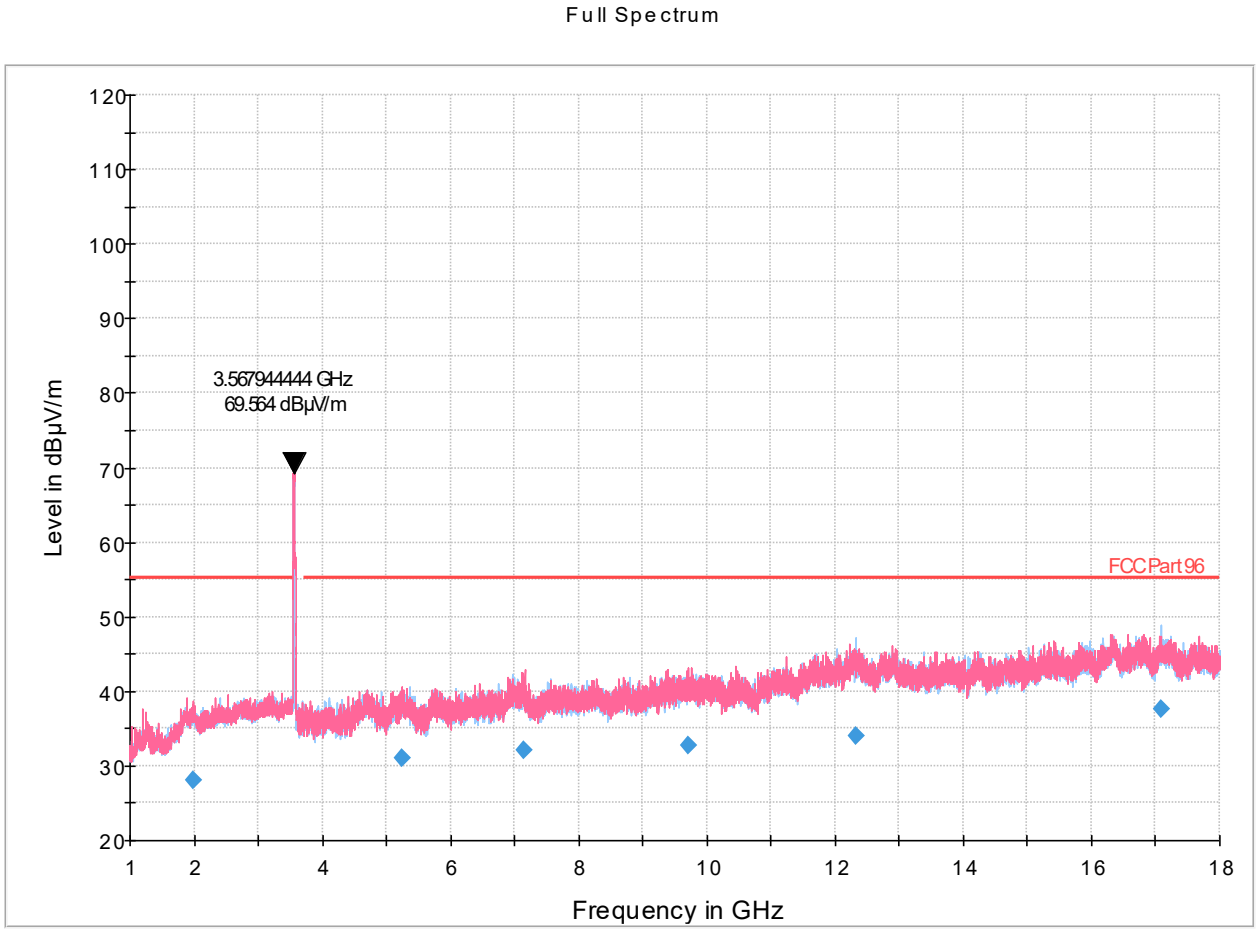


Figure 8.8-2: *Radiated emissions spectral plot (1 GHz - 18 GHz), LOW channel, 20 MHz bandwidth, GFSK modulation*

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 (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
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	H	171.0	7.2
17081.933333	37.55	55.23	17.68	5000.0	1000.000	126.0	H	226.0	13.1

Notes:
[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.

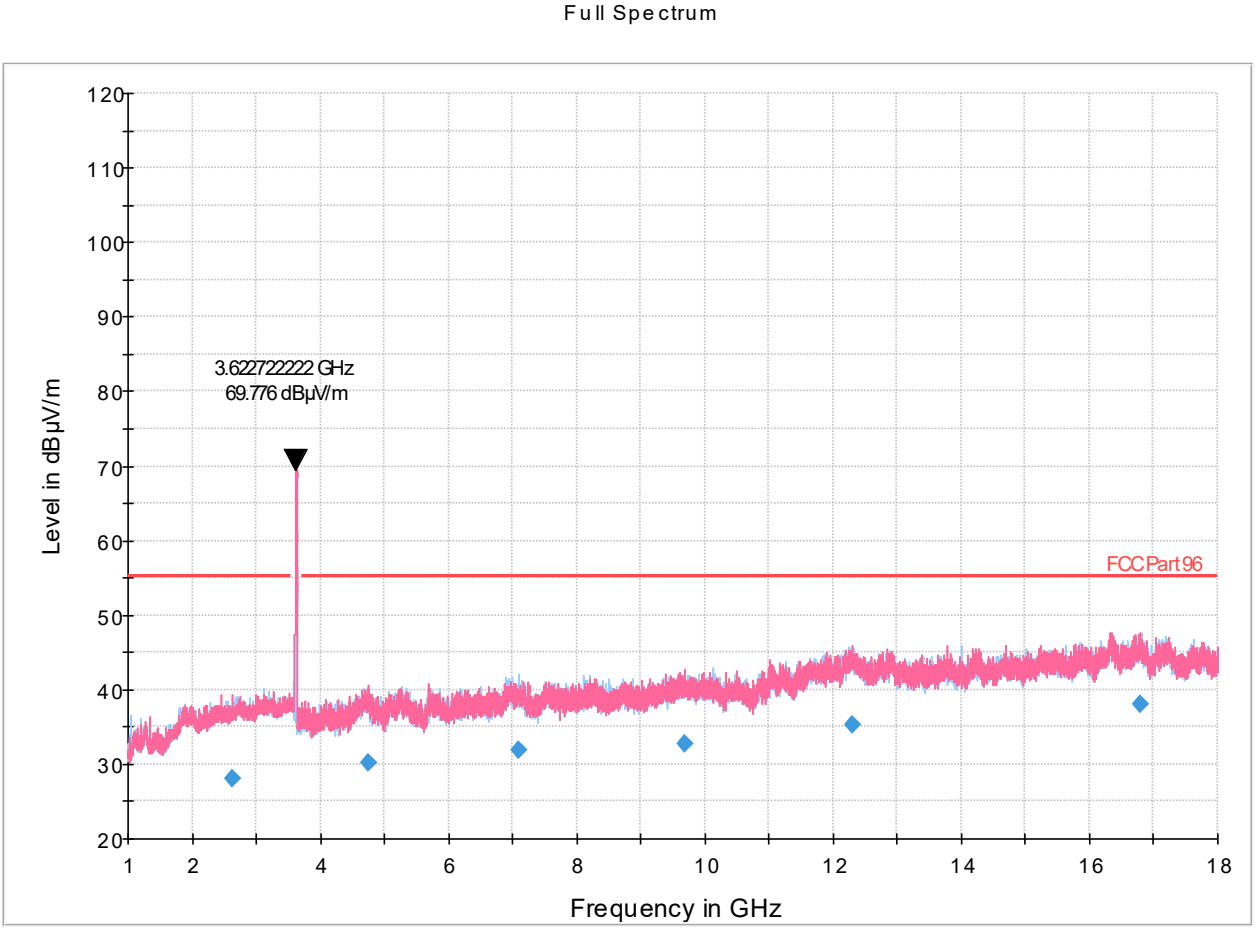


Figure 8.8-3: *Radiated emissions spectral plot (1 GHz - 18 GHz), MID channel, 20 MHz bandwidth, GFSK modulation*

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	H	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

Notes:
[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.

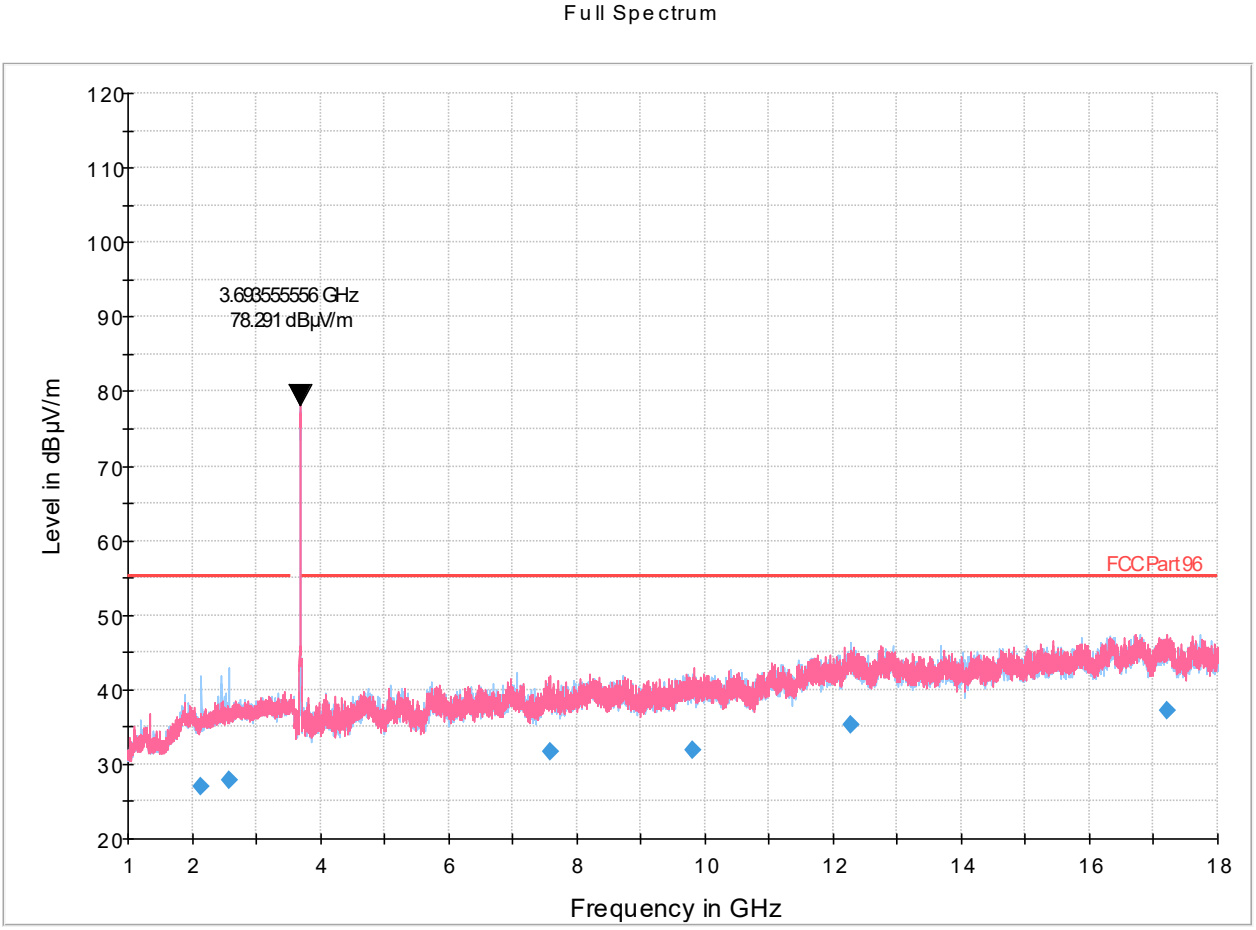


Figure 8.8-4: *Radiated emissions spectral plot (1 GHz - 18 GHz), HIGH channel, 20 MHz bandwidth, GFSK modulation*

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	H	18.0	-11.1
2582.244444	27.92	55.23	27.31	5000.0	1000.000	144.0	H	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	H	344.0	7.1
17222.077778	37.21	55.23	18.02	5000.0	1000.000	366.0	H	315.0	15.1

Notes:
[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.

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.

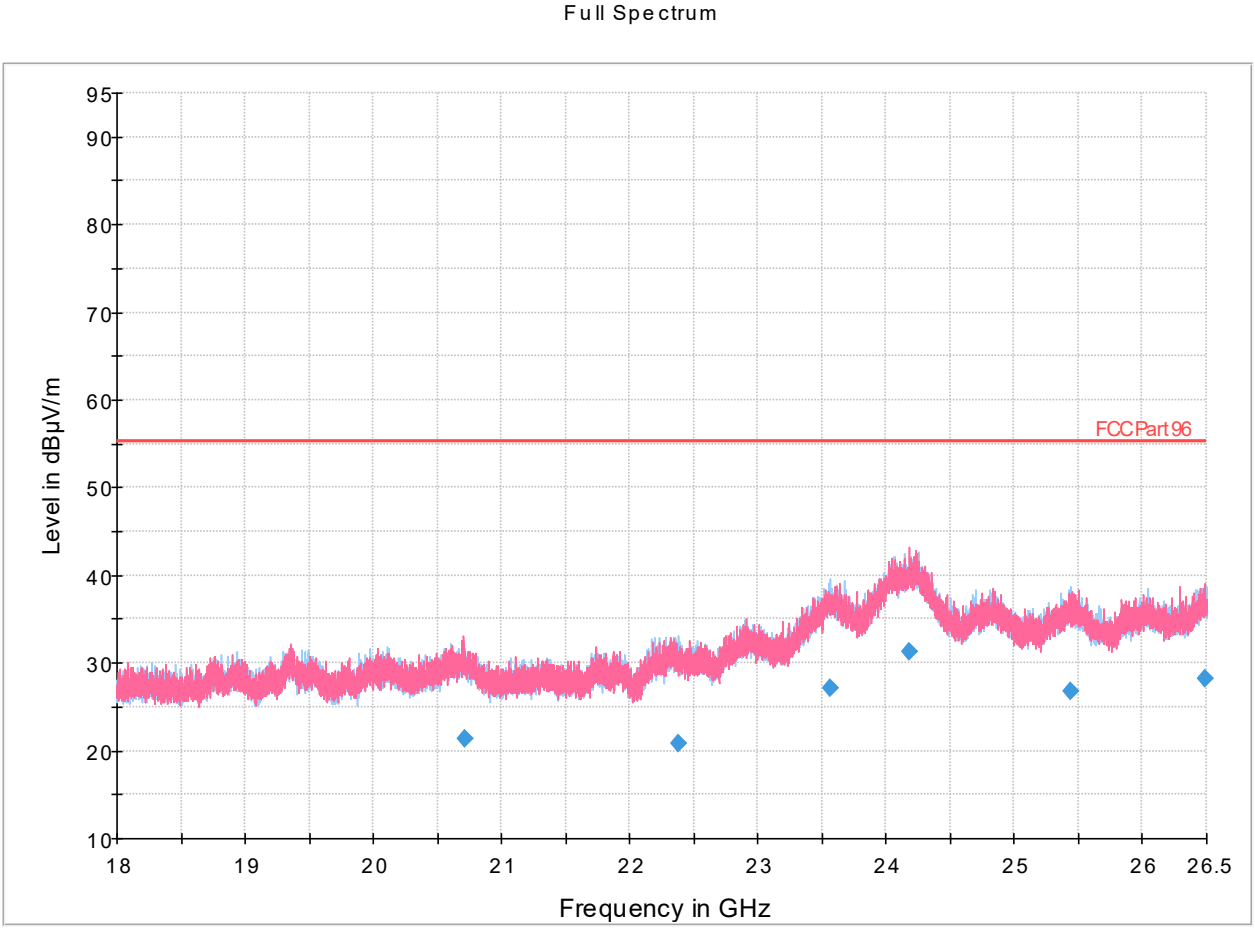


Figure 8.8-5: *Radiated emissions spectral plot (18 GHz - 26.5 GHz), MID channel, 20 MHz bandwidth, GFSK modulation*

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 (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
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	H	202.0	17.4
23557.700000	27.10	55.23	28.13	5000.0	1000.000	107.0	H	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	H	0.0	21.7
26493.831250	28.24	55.23	26.99	5000.0	1000.000	400.0	V	151.0	23.4

Notes:
[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.

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.

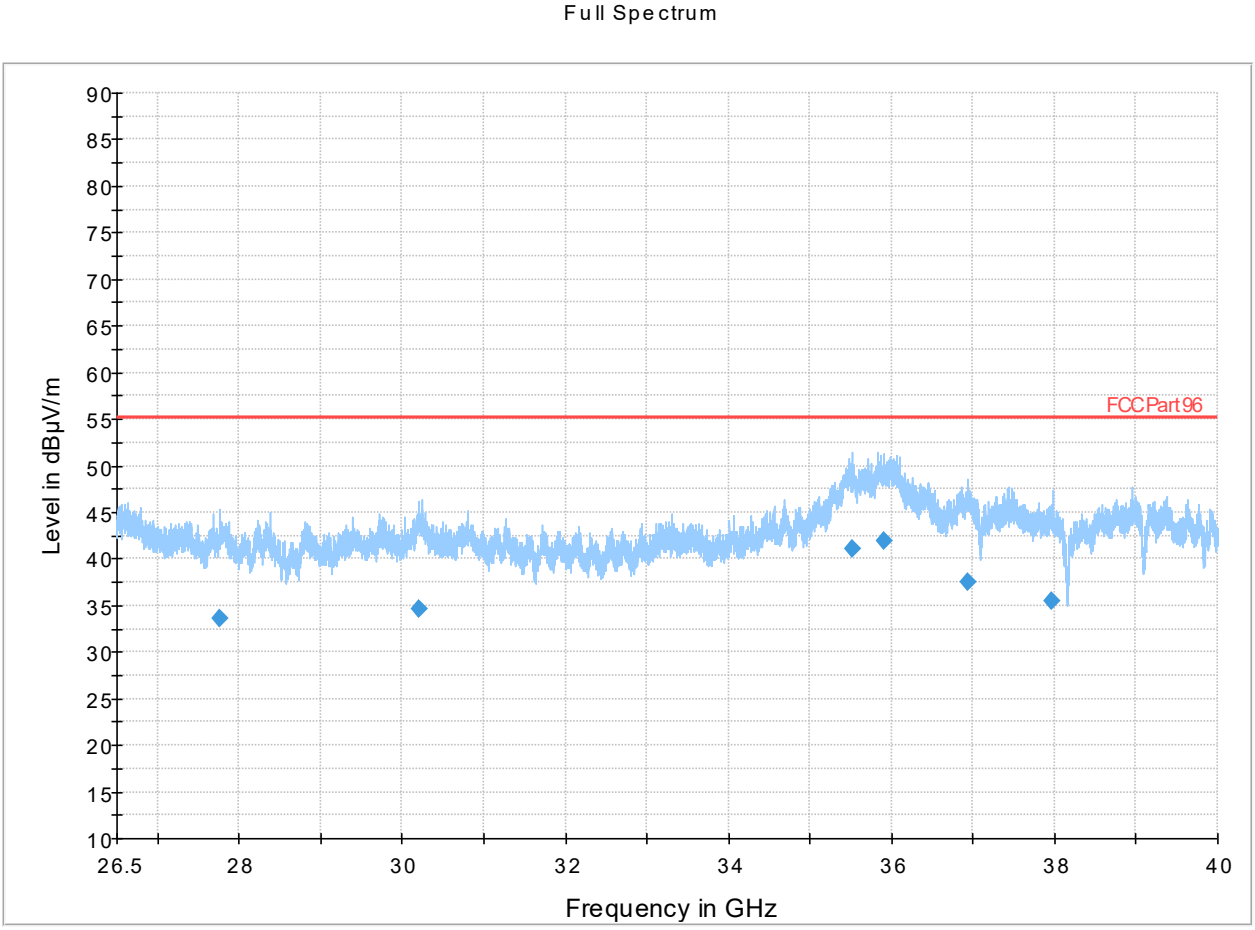


Figure 8.8-6: *Radiated emissions spectral plot (26.5 GHz - 40 GHz), MID channel, 20 MHz bandwidth, GFSK modulation*

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

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

Notes: [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

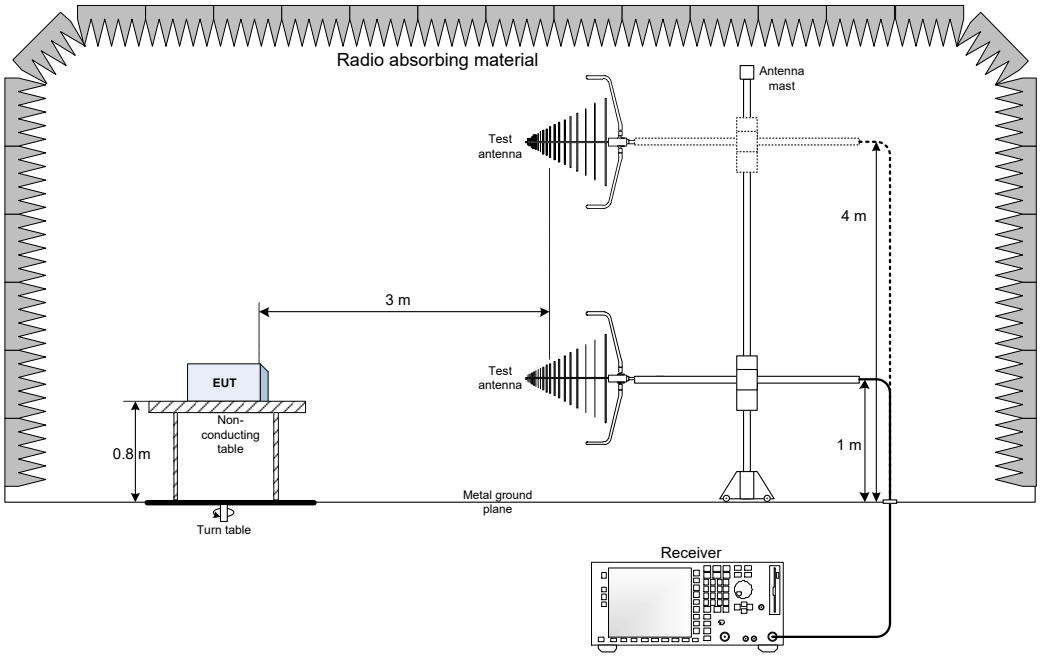


Figure 9.1-1: *Below 1 GHz setup*

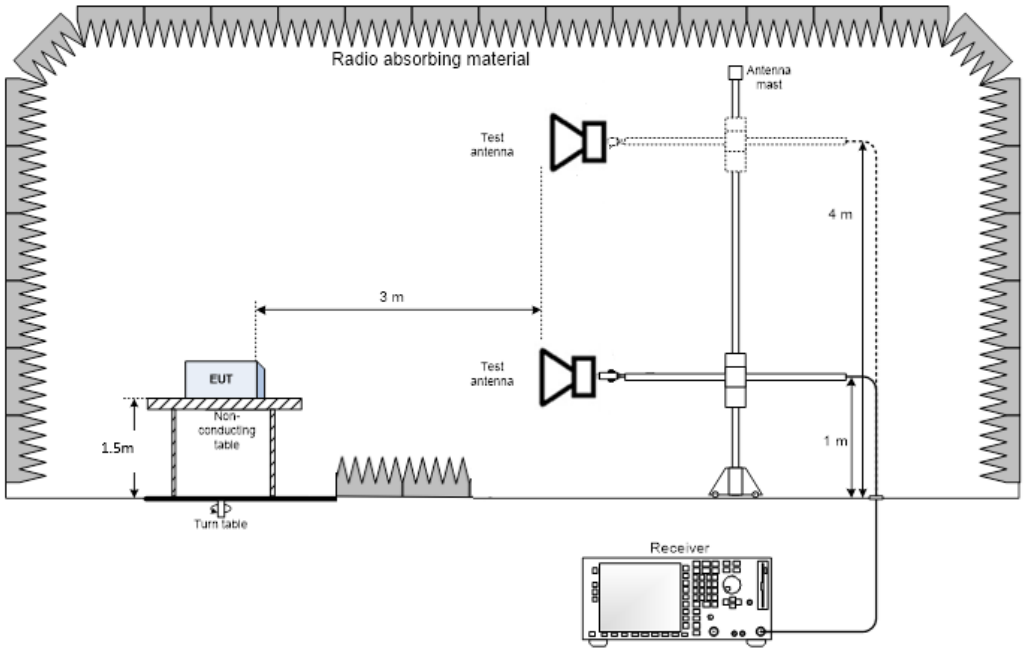


Figure 9.1-2: *Above 1GHz setup*