

5 - SPURIOUS EMISSIONS AT ANTENNA TERMINALS

Applicable Standard

FCC §2.1051, §22.861, §74.462, §80.211, and §90.210

Test Procedure

The RF output of the EUT was connected to a spectrum analyzer through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 100kHz for below 1GHz, and 1MHz for above 1GHz. Sufficient scans were taken to show any out of band emissions up to 10th harmonic.

Test Data

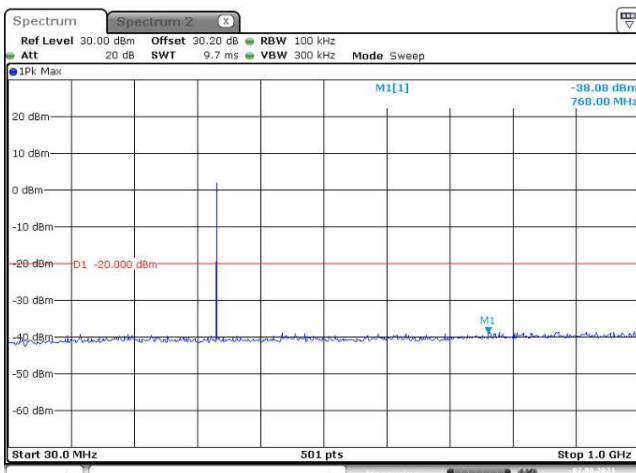
Test Mode: Transmitting

Test Result: Compliance. Please refer to following plots.

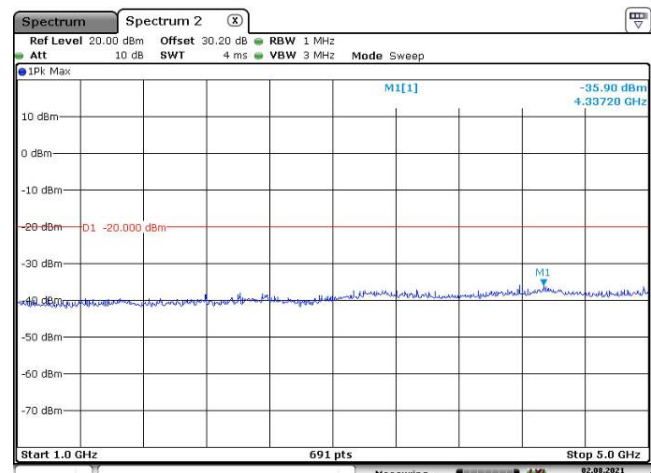
Test performed at high power level with Band Rejector Filter, please refer to the following table.

FM, 12.5kHz:

Low Channel, 350.0125 MHz

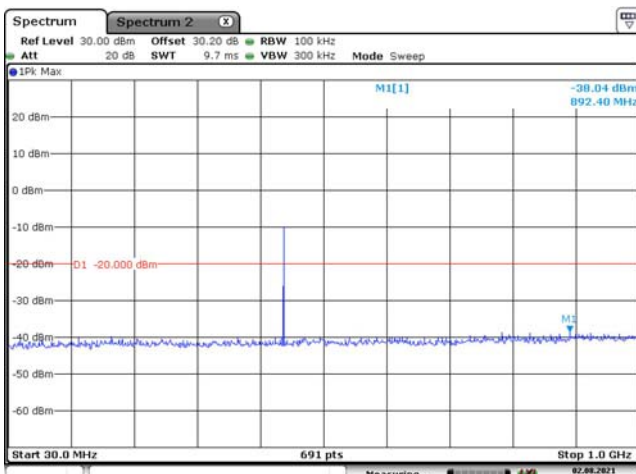


Date: 2.AUG.2021 07:21:20

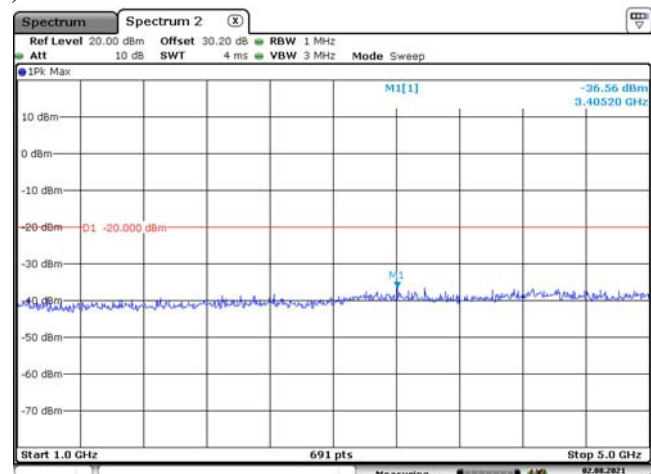


Date: 2.AUG.2021 07:22:36

Middle Channel, 453.2125 MHz

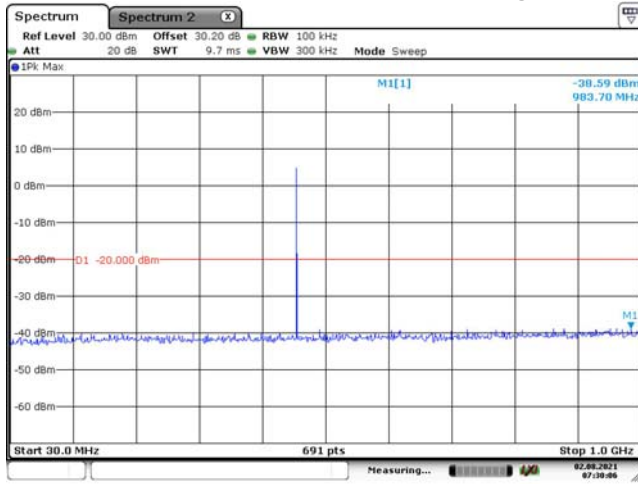


Date: 2.AUG.2021 07:28:35

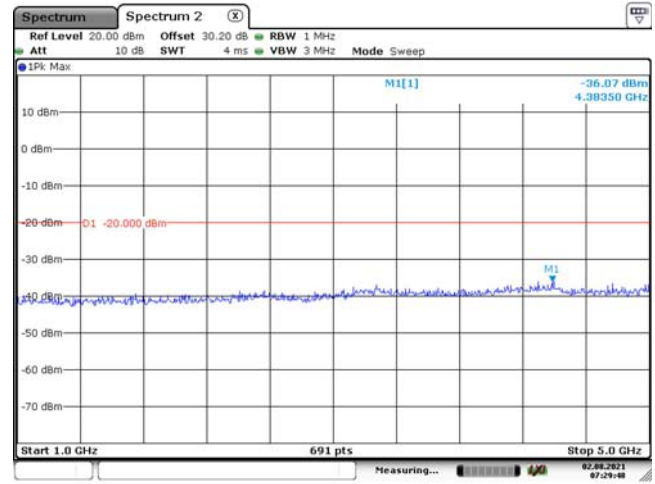


Date: 2.AUG.2021 07:28:04

High Channel, 469.9875 MHz



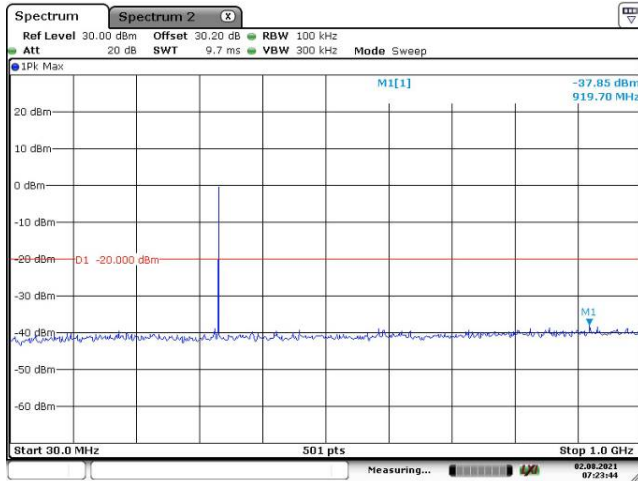
Date: 2.AUG.2021 07:30:06



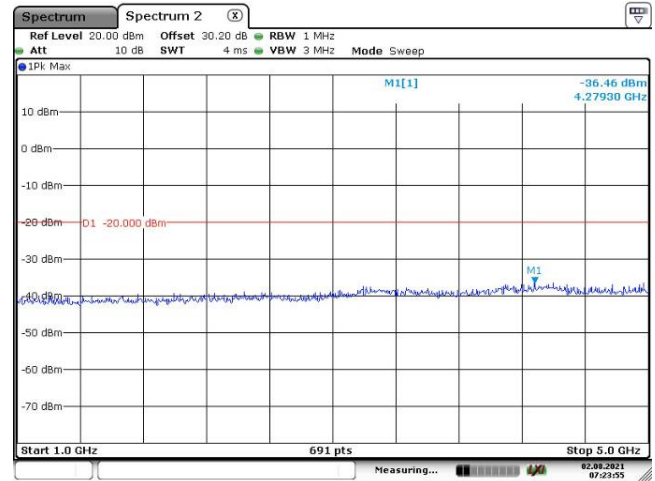
Date: 2.AUG.2021 07:29:48

4FSK, 12.5kHz:

Low Channel, 350.0125 MHz

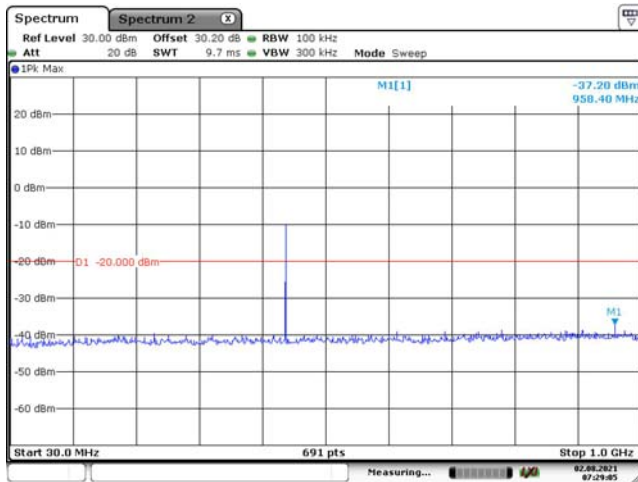


Date: 2.AUG.2021 07:23:44

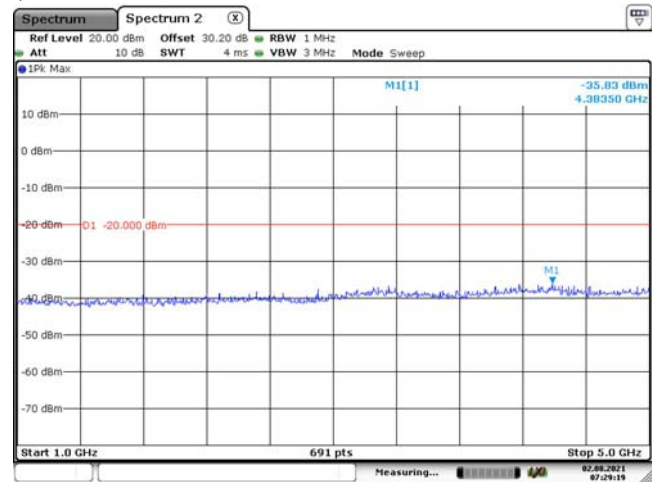


Date: 2.AUG.2021 07:23:56

Middle Channel, 453.2125 MHz

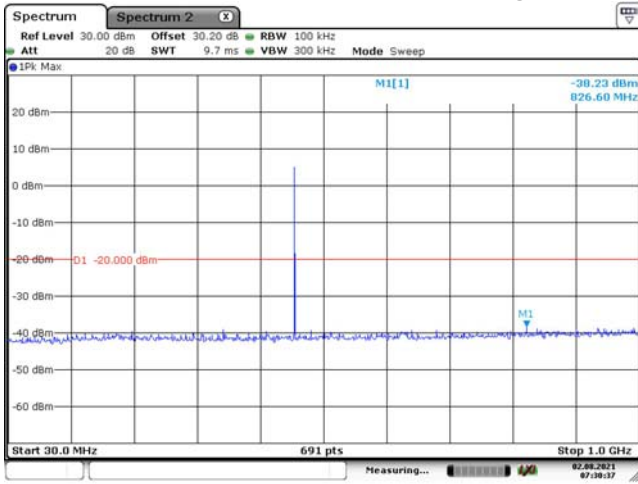


Date: 2.AUG.2021 07:29:05

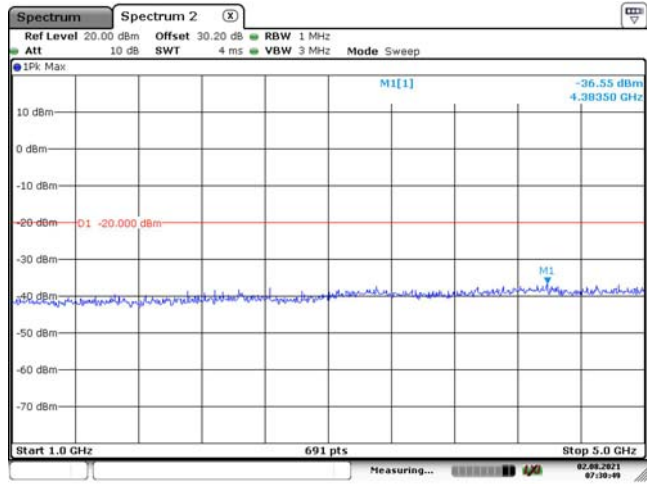


Date: 2.AUG.2021 07:29:19

High Channel, 469.9875 MHz



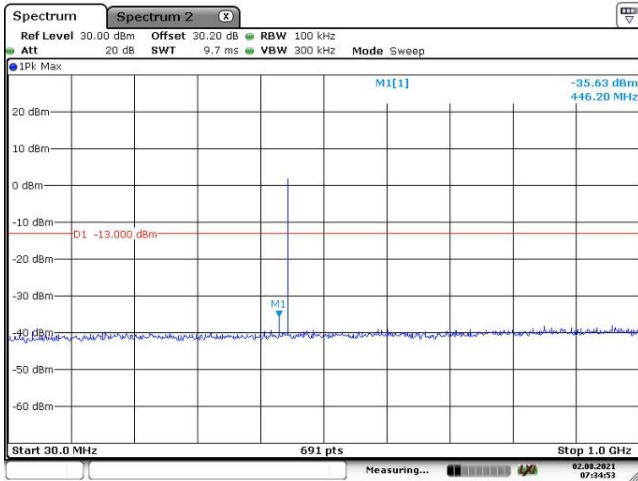
Date: 2.AUG.2021 07:30:37



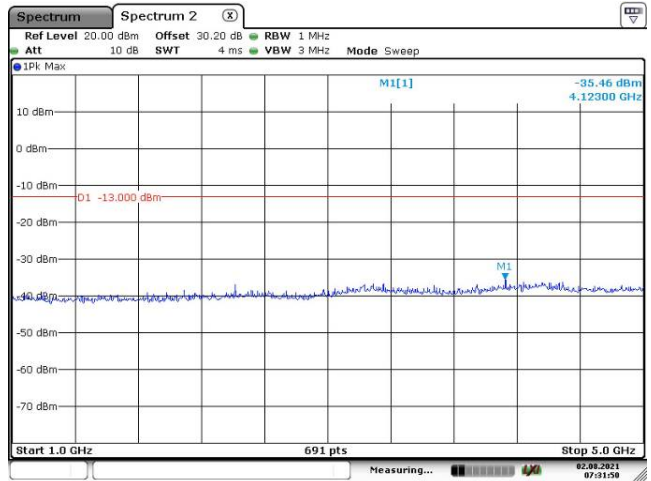
Date: 2.AUG.2021 07:30:49

Part 80:

FM,25kHz, 459.8875 MHz



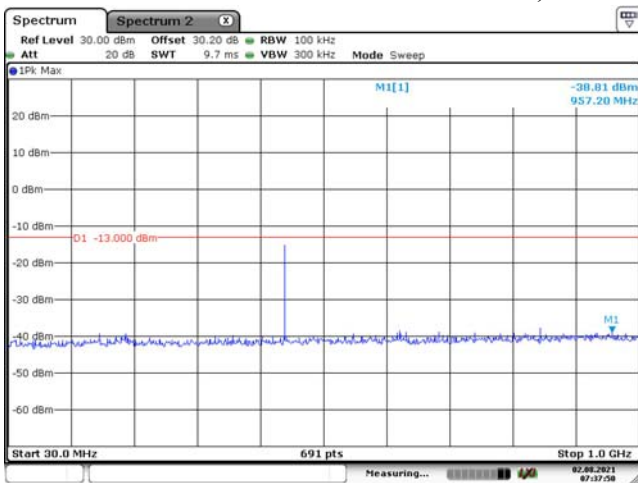
Date: 2.AUG.2021 07:34:53



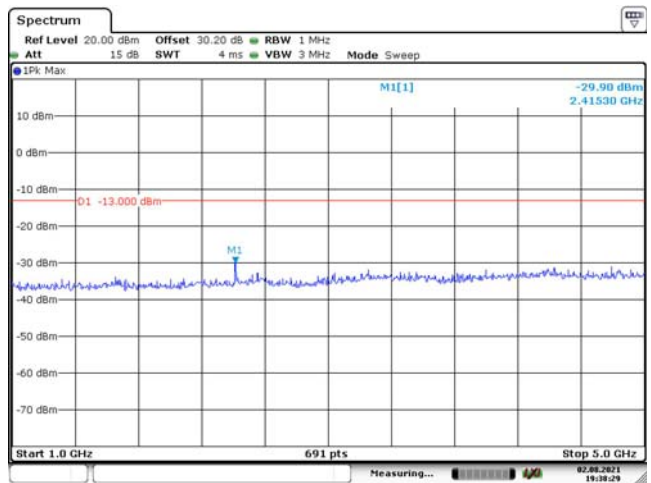
Date: 2.AUG.2021 07:31:50

Part 74:

FM,12.5kHz, 455.0125 MHz

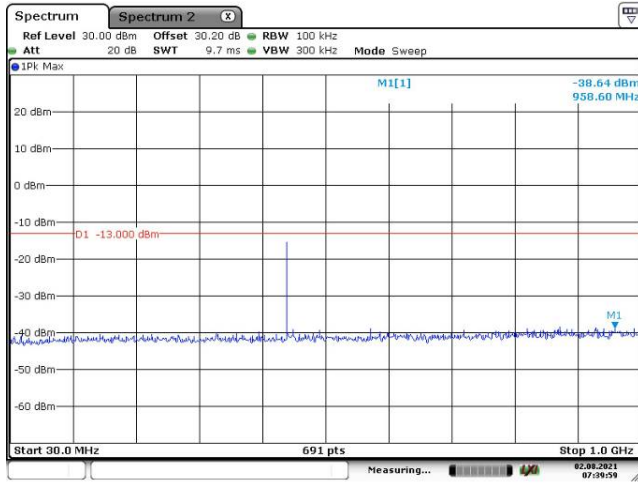


Date: 2.AUG.2021 07:37:50

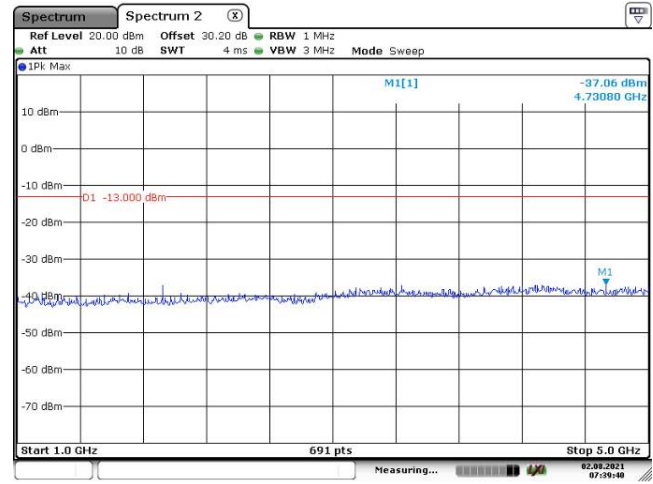


Date: 2.AUG.2021 19:38:29

FM, 25kHz, 455.0125 MHz

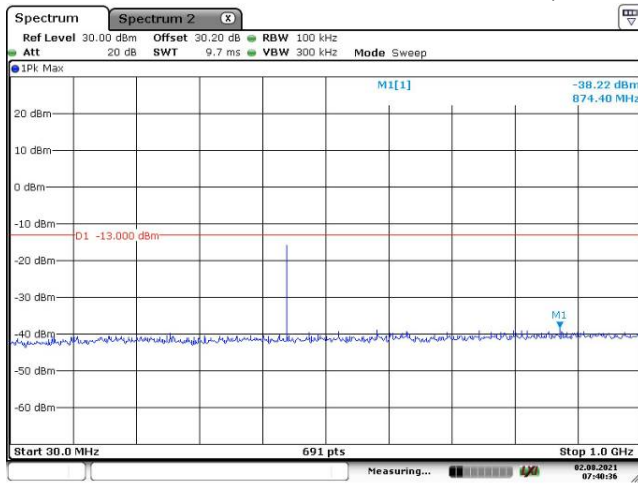


Date: 2.AUG.2021 07:39:59

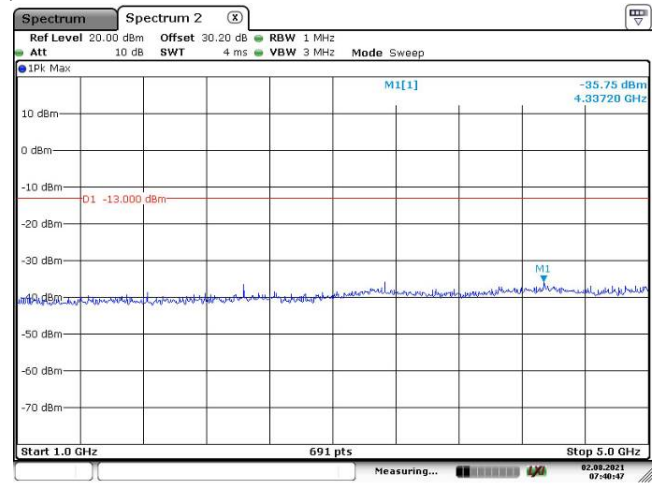


Date: 2.AUG.2021 07:39:40

4FSK, 12.5kHz, 455.0125 MHz



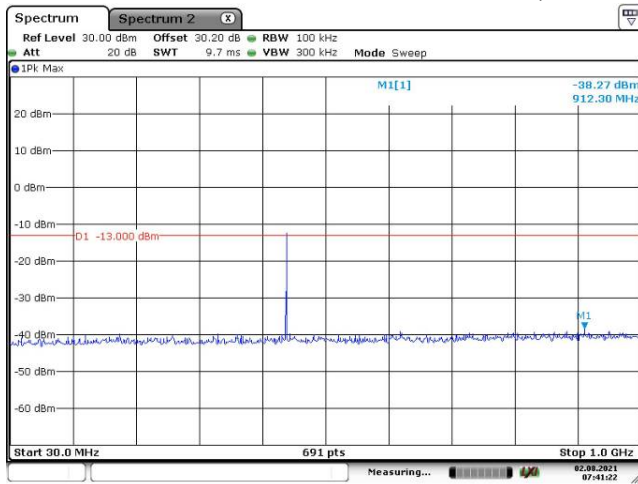
Date: 2.AUG.2021 07:40:37



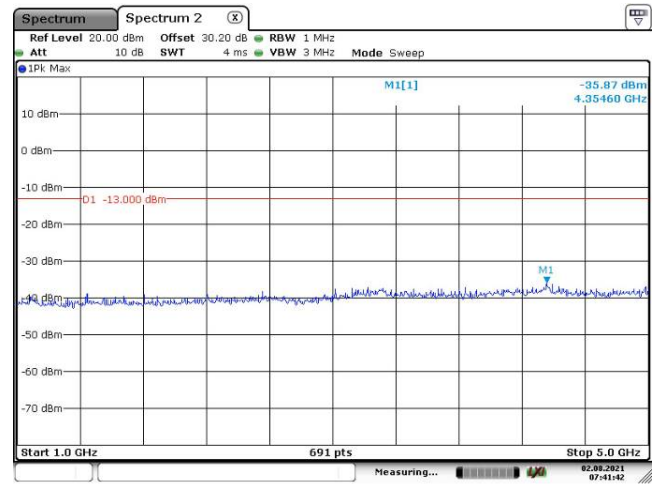
Date: 2.AUG.2021 07:40:48

Part 22:

FM, 12.5kHz, 454.0125 MHz

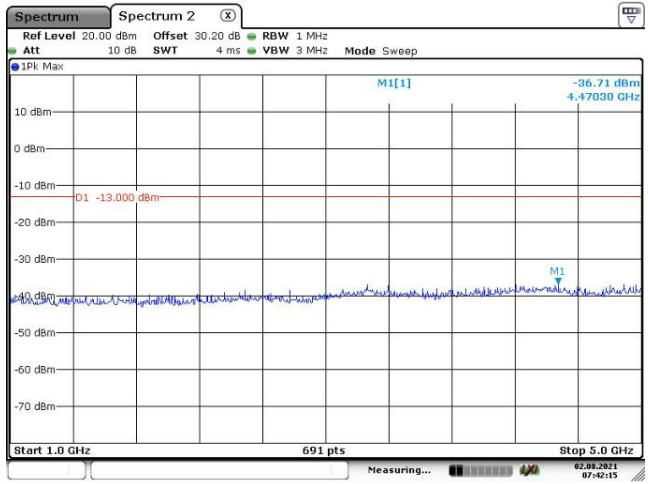
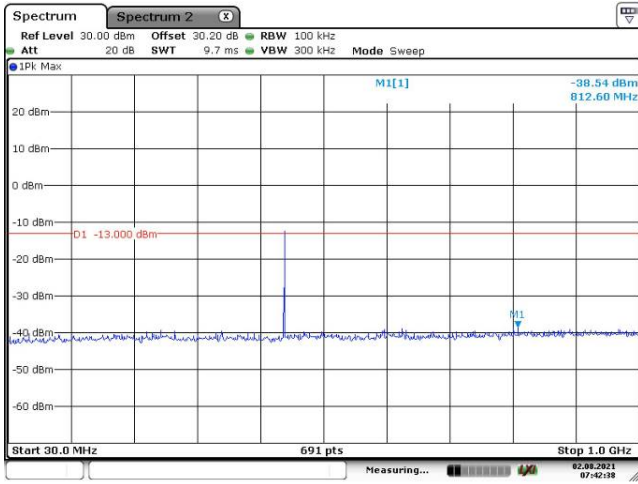


Date: 2.AUG.2021 07:41:22

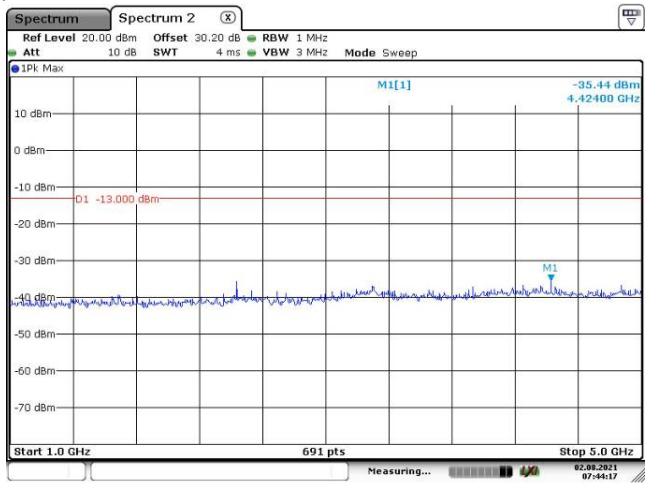
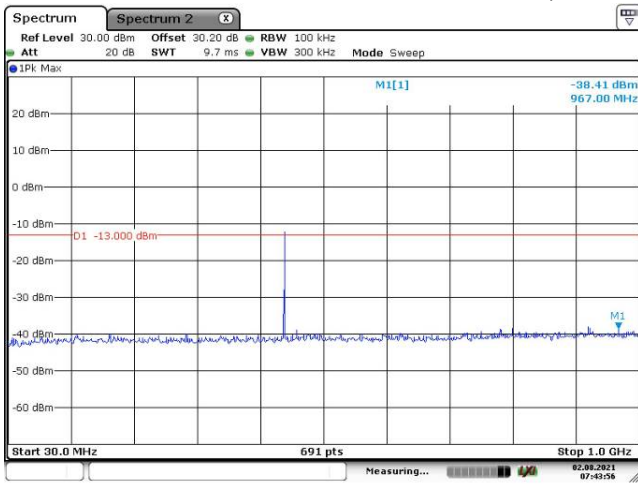


Date: 2.AUG.2021 07:41:42

FM,25kHz, 454.0125 MHz



4FSK,12.5kHz, 454.0125 MHz



6 - RADIATED SPURIOUS EMISSIONS

Applicable Standard

FCC §2.1053, §22.861, §74.462, §80.211 and §90.210

Test Procedure

The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load, which was also placed on the turntable.

The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.

The frequency range up to tenth harmonic of the fundamental frequency was investigated.

Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

Spurious emissions in dB = 10 lg (TXpwr in Watts/0.001)-the absolute level

Test Data

Test Mode: Transmitting

Test Result: Compliance.

Note: Pre-scan the model HP782 Uv and HP702 Uv, the worst case is model HP782 Uv.

Test performed at high power level with Band Rejector Filter, *please refer to the following table.*

30MHz - 5GHz:

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBµV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
FM, Frequency: 350.0125MHz-12.5 kHz								
700.03	H	38.07	-63.36	0.00	0.94	-64.30	-20.00	44.30
700.03	V	66.50	-37.40	0.00	0.94	-38.34	-20.00	18.34
1050.04	H	38.15	-65.68	7.65	0.88	-58.91	-20.00	38.91
1050.04	V	38.26	-66.07	7.65	0.88	-59.30	-20.00	39.30
1400.05	H	37.26	-66.13	9.00	1.20	-58.33	-20.00	38.33
1400.05	V	37.52	-66.47	9.00	1.20	-58.67	-20.00	38.67
1750.06	H	37.62	-66.37	10.95	0.71	-56.13	-20.00	36.13
1750.06	V	37.18	-67.41	10.95	0.71	-57.17	-20.00	37.17
2100.08	H	36.59	-65.47	11.40	1.10	-55.17	-20.00	35.17
2100.08	V	36.24	-65.82	11.40	1.10	-55.52	-20.00	35.52
2450.09	H	36.75	-65.93	12.70	1.26	-54.49	-20.00	34.49
2450.09	V	36.58	-66.20	12.70	1.26	-54.76	-20.00	34.76
2800.10	H	36.75	-64.97	13.10	1.36	-53.23	-20.00	33.23
2800.10	V	36.18	-65.74	13.10	1.36	-54.00	-20.00	34.00
3150.11	H	36.84	-62.46	13.40	1.70	-50.76	-20.00	30.76
3150.11	V	36.28	-63.05	13.40	1.70	-51.35	-20.00	31.35
3500.13	H	35.49	-63.52	13.80	1.61	-51.33	-20.00	31.33
3500.13	V	35.13	-63.88	13.80	1.61	-51.69	-20.00	31.69
4FSK, Frequency: 350.0125MHz-12.5 kHz								
700.03	H	37.31	-64.12	0.00	0.94	-65.06	-20.00	45.06
700.03	V	66.75	-37.15	0.00	0.94	-38.09	-20.00	18.09
1050.04	H	38.29	-65.54	7.65	0.88	-58.77	-20.00	38.77
1050.04	V	38.40	-65.93	7.65	0.88	-59.16	-20.00	39.16
1400.05	H	37.40	-65.99	9.00	1.20	-58.19	-20.00	38.19
1400.05	V	37.66	-66.33	9.00	1.20	-58.53	-20.00	38.53
1750.06	H	37.76	-66.23	10.95	0.71	-55.99	-20.00	35.99
1750.06	V	37.32	-67.27	10.95	0.71	-57.03	-20.00	37.03
2100.08	H	36.73	-65.33	11.40	1.10	-55.03	-20.00	35.03
2100.08	V	36.38	-65.68	11.40	1.10	-55.38	-20.00	35.38
2450.09	H	36.89	-65.79	12.70	1.26	-54.35	-20.00	34.35
2450.09	V	36.72	-66.06	12.70	1.26	-54.62	-20.00	34.62
2800.10	H	36.89	-64.83	13.10	1.36	-53.09	-20.00	33.09
2800.10	V	36.32	-65.60	13.10	1.36	-53.86	-20.00	33.86
3150.11	H	36.98	-62.32	13.40	1.70	-50.62	-20.00	30.62
3150.11	V	36.42	-62.91	13.40	1.70	-51.21	-20.00	31.21
3500.13	H	35.63	-63.38	13.80	1.61	-51.19	-20.00	31.19
3500.13	V	35.27	-63.74	13.80	1.61	-51.55	-20.00	31.55

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBµV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
FM, Frequency: 453.2125MHz-12.5 kHz								
906.43	H	32.90	-63.97	0.00	1.03	-65.00	-20.00	45.00
906.43	V	59.30	-39.54	0.00	1.03	-40.57	-20.00	20.57
1359.64	H	38.42	-65.14	8.72	1.20	-57.62	-20.00	37.62
1359.64	V	38.53	-65.75	8.72	1.20	-58.23	-20.00	38.23
1812.85	H	37.53	-66.57	11.19	0.72	-56.10	-20.00	36.10
1812.85	V	37.79	-66.87	11.19	0.72	-56.40	-20.00	36.40
2266.06	H	37.89	-64.16	11.06	1.20	-54.30	-20.00	34.30
2266.06	V	37.45	-64.50	11.06	1.20	-54.64	-20.00	34.64
2719.28	H	36.86	-65.05	13.10	1.27	-53.22	-20.00	33.22
2719.28	V	36.51	-65.51	13.10	1.27	-53.68	-20.00	33.68
3172.49	H	37.02	-62.00	13.49	1.64	-50.15	-20.00	30.15
3172.49	V	36.85	-62.21	13.49	1.64	-50.36	-20.00	30.36
3625.70	H	37.02	-61.74	14.07	1.58	-49.25	-20.00	29.25
3625.70	V	36.45	-62.31	14.07	1.58	-49.82	-20.00	29.82
4078.91	H	37.11	-60.88	13.76	1.36	-48.48	-20.00	28.48
4078.91	V	36.55	-61.56	13.76	1.36	-49.16	-20.00	29.16
4532.13	H	35.76	-61.49	14.13	1.64	-49.00	-20.00	29.00
4532.13	V	35.40	-61.78	14.13	1.64	-49.29	-20.00	29.29
4FSK, Frequency: 453.2125MHz -12.5 kHz								
906.43	H	30.91	-65.96	0.00	1.03	-66.99	-20.00	46.99
906.43	V	67.64	-31.20	0.00	1.03	-32.23	-20.00	12.23
1359.64	H	38.57	-64.99	8.72	1.20	-57.47	-20.00	37.47
1359.64	V	38.68	-65.60	8.72	1.20	-58.08	-20.00	38.08
1812.85	H	37.68	-66.42	11.19	0.72	-55.95	-20.00	35.95
1812.85	V	37.94	-66.72	11.19	0.72	-56.25	-20.00	36.25
2266.06	H	38.04	-64.01	11.06	1.20	-54.15	-20.00	34.15
2266.06	V	37.60	-64.35	11.06	1.20	-54.49	-20.00	34.49
2719.28	H	37.01	-64.90	13.10	1.27	-53.07	-20.00	33.07
2719.28	V	36.66	-65.36	13.10	1.27	-53.53	-20.00	33.53
3172.49	H	37.17	-61.85	13.49	1.64	-50.00	-20.00	30.00
3172.49	V	37.00	-62.06	13.49	1.64	-50.21	-20.00	30.21
3625.70	H	37.17	-61.59	14.07	1.58	-49.10	-20.00	29.10
3625.70	V	36.60	-62.16	14.07	1.58	-49.67	-20.00	29.67
4078.91	H	37.26	-60.73	13.76	1.36	-48.33	-20.00	28.33
4078.91	V	36.70	-61.41	13.76	1.36	-49.01	-20.00	29.01
4532.13	H	35.91	-61.34	14.13	1.64	-48.85	-20.00	28.85
4532.13	V	35.55	-61.63	14.13	1.64	-49.14	-20.00	29.14

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBµV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
FM, Frequency: 469.9875MHz-12.5 kHz								
939.98	H	35.05	-60.43	0.00	0.93	-61.36	-20.00	41.36
939.98	V	65.12	-32.08	0.00	0.93	-33.01	-20.00	13.01
1409.96	H	38.38	-65.16	9.05	1.21	-57.32	-20.00	37.32
1409.96	V	38.49	-65.60	9.05	1.21	-57.76	-20.00	37.76
1879.95	H	37.49	-65.62	11.66	0.95	-54.91	-20.00	34.91
1879.95	V	37.75	-65.72	11.66	0.95	-55.01	-20.00	35.01
2349.94	H	37.85	-64.45	11.75	1.26	-53.96	-20.00	33.96
2349.94	V	37.41	-64.94	11.75	1.26	-54.45	-20.00	34.45
2819.93	H	36.82	-64.70	13.26	1.36	-52.80	-20.00	32.80
2819.93	V	36.47	-65.27	13.26	1.36	-53.37	-20.00	33.37
3289.91	H	36.98	-62.72	13.60	1.59	-50.71	-20.00	30.71
3289.91	V	36.81	-62.90	13.60	1.59	-50.89	-20.00	30.89
3759.90	H	36.98	-60.66	13.76	1.63	-48.53	-20.00	28.53
3759.90	V	36.41	-61.09	13.76	1.63	-48.96	-20.00	28.96
4229.89	H	37.07	-60.60	13.97	1.35	-47.98	-20.00	27.98
4229.89	V	36.51	-61.15	13.97	1.35	-48.53	-20.00	28.53
4699.88	H	35.72	-61.51	14.40	1.67	-48.78	-20.00	28.78
4699.88	V	35.41	-61.91	14.40	1.67	-49.18	-20.00	29.18
4FSK, Frequency: 469.9875MHz -12.5 kHz								
939.98	H	35.17	-60.31	0.00	0.93	-61.24	-20.00	41.24
939.98	V	63.41	-33.79	0.00	0.93	-34.72	-20.00	14.72
1409.96	H	38.63	-64.91	9.05	1.21	-57.07	-20.00	37.07
1409.96	V	38.74	-65.35	9.05	1.21	-57.51	-20.00	37.51
1879.95	H	37.74	-65.37	11.66	0.95	-54.66	-20.00	34.66
1879.95	V	38.00	-65.47	11.66	0.95	-54.76	-20.00	34.76
2349.94	H	38.10	-64.20	11.75	1.26	-53.71	-20.00	33.71
2349.94	V	37.66	-64.69	11.75	1.26	-54.20	-20.00	34.20
2819.93	H	37.07	-64.45	13.26	1.36	-52.55	-20.00	32.55
2819.93	V	36.72	-65.02	13.26	1.36	-53.12	-20.00	33.12
3289.91	H	37.23	-62.47	13.60	1.59	-50.46	-20.00	30.46
3289.91	V	37.06	-62.65	13.60	1.59	-50.64	-20.00	30.64
3759.90	H	37.23	-60.41	13.76	1.63	-48.28	-20.00	28.28
3759.90	V	36.66	-60.84	13.76	1.63	-48.71	-20.00	28.71
4229.89	H	37.32	-60.35	13.97	1.35	-47.73	-20.00	27.73
4229.89	V	36.76	-60.90	13.97	1.35	-48.28	-20.00	28.28
4699.88	H	35.97	-61.26	14.40	1.67	-48.53	-20.00	28.53
4699.88	V	35.66	-61.66	14.40	1.67	-48.93	-20.00	28.93

Part 80

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBµV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
FM, Frequency: 459.9875MHz-25 kHz								
919.98	H	30.34	-65.97	0.00	0.99	-66.96	-13.00	53.96
919.98	V	71.45	-26.73	0.00	0.99	-27.72	-13.00	14.72
1379.96	H	38.48	-64.99	8.86	1.20	-57.33	-13.00	44.33
1379.96	V	38.59	-65.54	8.86	1.20	-57.88	-13.00	44.88
1839.95	H	37.59	-66.11	11.38	0.82	-55.55	-13.00	42.55
1839.95	V	37.85	-66.33	11.38	0.82	-55.77	-13.00	42.77
2299.94	H	37.95	-64.20	11.20	1.23	-54.23	-13.00	41.23
2299.94	V	37.51	-64.54	11.20	1.23	-54.57	-13.00	41.57
2759.93	H	36.92	-64.89	13.10	1.32	-53.11	-13.00	40.11
2759.93	V	36.57	-65.40	13.10	1.32	-53.62	-13.00	40.62
3219.91	H	37.08	-61.82	13.60	1.57	-49.79	-13.00	36.79
3219.91	V	36.91	-62.04	13.60	1.57	-50.01	-13.00	37.01
3679.90	H	37.08	-61.12	14.02	1.76	-48.86	-13.00	35.86
3679.90	V	36.51	-61.67	14.02	1.76	-49.41	-13.00	36.41
4139.89	H	37.17	-60.77	13.82	1.45	-48.40	-13.00	35.40
4139.89	V	36.61	-61.40	13.82	1.45	-49.03	-13.00	36.03
4599.88	H	35.82	-61.25	14.20	1.85	-48.90	-13.00	35.90
4599.88	V	35.51	-61.66	14.20	1.85	-49.31	-13.00	36.31

Part 74

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBµV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
FM, Frequency: 455.0125MHz-12.5 kHz								
910.03	H	31.79	-64.93	0.00	1.02	-65.95	-20.00	45.95
910.03	V	65.07	-33.59	0.00	1.02	-34.61	-20.00	14.61
1365.04	H	38.73	-64.80	8.76	1.20	-57.24	-20.00	37.24
1365.04	V	38.84	-65.40	8.76	1.20	-57.84	-20.00	37.84
1820.05	H	37.84	-66.16	11.24	0.75	-55.67	-20.00	35.67
1820.05	V	38.10	-66.44	11.24	0.75	-55.95	-20.00	35.95
2275.06	H	38.20	-63.88	11.10	1.21	-53.99	-20.00	33.99
2275.06	V	37.76	-64.22	11.10	1.21	-54.33	-20.00	34.33
2730.08	H	37.17	-64.71	13.10	1.28	-52.89	-20.00	32.89
2730.08	V	36.82	-65.19	13.10	1.28	-53.37	-20.00	33.37
3185.09	H	37.33	-61.53	13.54	1.61	-49.60	-20.00	29.60
3185.09	V	37.16	-61.75	13.54	1.61	-49.82	-20.00	29.82
3640.10	H	37.33	-61.28	14.06	1.63	-48.85	-20.00	28.85
3640.10	V	36.76	-61.84	14.06	1.63	-49.41	-20.00	29.41
4095.11	H	37.42	-60.68	13.71	1.35	-48.32	-20.00	28.32
4095.11	V	36.86	-61.37	13.71	1.35	-49.01	-20.00	29.01
4550.13	H	36.07	-61.13	14.15	1.70	-48.68	-20.00	28.68
4550.13	V	35.76	-61.41	14.15	1.70	-48.96	-20.00	28.96
FM, Frequency: 455.0125MHz-25 kHz								
910.03	H	31.99	-64.73	0.00	1.02	-65.75	-13.00	52.75
910.03	V	62.76	-35.90	0.00	1.02	-36.92	-13.00	23.92
1365.04	H	38.84	-64.69	8.76	1.20	-57.13	-13.00	44.13
1365.04	V	38.95	-65.29	8.76	1.20	-57.73	-13.00	44.73
1820.05	H	37.95	-66.05	11.24	0.75	-55.56	-13.00	42.56
1820.05	V	38.21	-66.33	11.24	0.75	-55.84	-13.00	42.84
2275.06	H	38.31	-63.77	11.10	1.21	-53.88	-13.00	40.88
2275.06	V	37.87	-64.11	11.10	1.21	-54.22	-13.00	41.22
2730.08	H	37.28	-64.60	13.10	1.28	-52.78	-13.00	39.78
2730.08	V	36.93	-65.08	13.10	1.28	-53.26	-13.00	40.26
3185.09	H	37.44	-61.42	13.54	1.61	-49.49	-13.00	36.49
3185.09	V	37.27	-61.64	13.54	1.61	-49.71	-13.00	36.71
3640.10	H	37.44	-61.17	14.06	1.63	-48.74	-13.00	35.74
3640.10	V	36.87	-61.73	14.06	1.63	-49.30	-13.00	36.30
4095.11	H	37.53	-60.57	13.71	1.35	-48.21	-13.00	35.21
4095.11	V	36.97	-61.26	13.71	1.35	-48.90	-13.00	35.90
4550.13	H	36.18	-61.02	14.15	1.70	-48.57	-13.00	35.57
4550.13	V	35.87	-61.30	14.15	1.70	-48.85	-13.00	35.85

Frequency (MHz)	Polar (H/V)	Receiver Reading (dB μ V)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
4FSK, Frequency: 455.0125MHz-12.5 kHz								
910.03	H	31.21	-65.51	0.00	1.02	-66.53	-20.00	46.53
910.03	V	70.67	-27.99	0.00	1.02	-29.01	-20.00	9.01
1365.04	H	38.63	-64.91	8.76	1.20	-57.35	-20.00	37.35
1365.04	V	38.74	-65.50	8.76	1.20	-57.94	-20.00	37.94
1820.05	H	37.74	-66.26	11.24	0.75	-55.77	-20.00	35.77
1820.05	V	38.00	-66.54	11.24	0.75	-56.05	-20.00	36.05
2275.06	H	38.10	-63.98	11.10	1.21	-54.09	-20.00	34.09
2275.06	V	37.66	-64.32	11.10	1.21	-54.43	-20.00	34.43
2730.08	H	37.07	-64.81	13.10	1.28	-52.99	-20.00	32.99
2730.08	V	36.72	-65.29	13.10	1.28	-53.47	-20.00	33.47
3185.09	H	37.23	-61.63	13.54	1.61	-49.70	-20.00	29.70
3185.09	V	37.06	-61.85	13.54	1.61	-49.92	-20.00	29.92
3640.10	H	37.23	-61.39	14.06	1.63	-48.96	-20.00	28.96
3640.10	V	36.66	-61.95	14.06	1.63	-49.52	-20.00	29.52
4095.11	H	37.32	-60.78	13.71	1.35	-48.42	-20.00	28.42
4095.11	V	36.76	-61.48	13.71	1.35	-49.12	-20.00	29.12
4550.13	H	35.97	-61.23	14.15	1.70	-48.78	-20.00	28.78
4550.13	V	35.66	-61.52	14.15	1.70	-49.07	-20.00	29.07

Part 22

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBµV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
FM, Frequency: 454.0125MHz-12.5 kHz								
908.03	H	30.05	-66.76	0.00	1.03	-67.79	-13.00	54.79
908.03	V	65.81	-32.95	0.00	1.03	-33.98	-13.00	20.98
1362.04	H	38.84	-64.70	8.73	1.20	-57.17	-13.00	44.17
1362.04	V	38.95	-65.31	8.73	1.20	-57.78	-13.00	44.78
1816.05	H	37.95	-66.10	11.21	0.73	-55.62	-13.00	42.62
1816.05	V	38.21	-66.39	11.21	0.73	-55.91	-13.00	42.91
2270.06	H	38.31	-63.75	11.08	1.20	-53.87	-13.00	40.87
2270.06	V	37.87	-64.09	11.08	1.20	-54.21	-13.00	41.21
2724.08	H	37.28	-64.61	13.10	1.28	-52.79	-13.00	39.79
2724.08	V	36.93	-65.09	13.10	1.28	-53.27	-13.00	40.27
3178.09	H	37.44	-61.50	13.51	1.63	-49.62	-13.00	36.62
3178.09	V	37.27	-61.72	13.51	1.63	-49.84	-13.00	36.84
3632.10	H	37.44	-61.25	14.07	1.61	-48.79	-13.00	35.79
3632.10	V	36.87	-61.82	14.07	1.61	-49.36	-13.00	36.36
4086.11	H	37.53	-60.51	13.74	1.36	-48.13	-13.00	35.13
4086.11	V	36.97	-61.19	13.74	1.36	-48.81	-13.00	35.81
4540.13	H	36.18	-61.04	14.14	1.66	-48.56	-13.00	35.56
4540.13	V	35.87	-61.30	14.14	1.66	-48.82	-13.00	35.82
FM, Frequency: 454.0125MHz-25 kHz								
908.03	H	31.22	-65.59	0.00	1.03	-66.62	-13.00	53.62
908.03	V	71.75	-27.01	0.00	1.03	-28.04	-13.00	15.04
1362.04	H	38.61	-64.93	8.73	1.20	-57.40	-13.00	44.40
1362.04	V	38.72	-65.54	8.73	1.20	-58.01	-13.00	45.01
1816.05	H	37.72	-66.33	11.21	0.73	-55.85	-13.00	42.85
1816.05	V	37.98	-66.62	11.21	0.73	-56.14	-13.00	43.14
2270.06	H	38.08	-63.98	11.08	1.20	-54.10	-13.00	41.10
2270.06	V	37.64	-64.32	11.08	1.20	-54.44	-13.00	41.44
2724.08	H	37.05	-64.84	13.10	1.28	-53.02	-13.00	40.02
2724.08	V	36.70	-65.32	13.10	1.28	-53.50	-13.00	40.50
3178.09	H	37.21	-61.73	13.51	1.63	-49.85	-13.00	36.85
3178.09	V	37.04	-61.95	13.51	1.63	-50.07	-13.00	37.07
3632.10	H	37.21	-61.48	14.07	1.61	-49.02	-13.00	36.02
3632.10	V	36.64	-62.05	14.07	1.61	-49.59	-13.00	36.59
4086.11	H	37.30	-60.74	13.74	1.36	-48.36	-13.00	35.36
4086.11	V	36.74	-61.42	13.74	1.36	-49.04	-13.00	36.04
4540.13	H	35.95	-61.27	14.14	1.66	-48.79	-13.00	35.79
4540.13	V	35.64	-61.53	14.14	1.66	-49.05	-13.00	36.05

Frequency (MHz)	Polar (H/V)	Receiver Reading (dB μ V)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
4FSK, Frequency: 454.0125MHz-12.5 kHz								
908.03	H	32.35	-64.46	0.00	1.03	-65.49	-13.00	52.49
908.03	V	60.48	-38.28	0.00	1.03	-39.31	-13.00	26.31
1362.04	H	38.75	-64.79	8.73	1.20	-57.26	-13.00	44.26
1362.04	V	38.86	-65.40	8.73	1.20	-57.87	-13.00	44.87
1816.05	H	37.86	-66.19	11.21	0.73	-55.71	-13.00	42.71
1816.05	V	38.12	-66.48	11.21	0.73	-56.00	-13.00	43.00
2270.06	H	38.22	-63.84	11.08	1.20	-53.96	-13.00	40.96
2270.06	V	37.78	-64.18	11.08	1.20	-54.30	-13.00	41.30
2724.08	H	37.19	-64.70	13.10	1.28	-52.88	-13.00	39.88
2724.08	V	36.84	-65.18	13.10	1.28	-53.36	-13.00	40.36
3178.09	H	37.35	-61.59	13.51	1.63	-49.71	-13.00	36.71
3178.09	V	37.18	-61.81	13.51	1.63	-49.93	-13.00	36.93
3632.10	H	37.35	-61.34	14.07	1.61	-48.88	-13.00	35.88
3632.10	V	36.78	-61.91	14.07	1.61	-49.45	-13.00	36.45
4086.11	H	37.44	-60.60	13.74	1.36	-48.22	-13.00	35.22
4086.11	V	36.88	-61.28	13.74	1.36	-48.90	-13.00	35.90
4540.13	H	36.09	-61.13	14.14	1.66	-48.65	-13.00	35.65
4540.13	V	35.78	-61.39	14.14	1.66	-48.91	-13.00	35.91

Note 1: The unit of antenna gain is dBd for frequency below 1GHz and is dBi for frequency above 1GHz.

Note 2:

Absolute Level = Substituted Level - Cable loss + Antenna Gain

Margin = Limit - Absolute Level

7 - FREQUENCY STABILITY

Applicable Standard

FCC §2.1055, § 22.355, §74.464, §80.209 and §90.213

Test Procedure

Frequency Stability vs. Temperature: The equipment under test was connected to an external DC power supply and the RF output was connected to a frequency counter via feed-through attenuators. The EUT was placed inside the temperature chamber. The DC leads and RF output cable exited the chamber through an opening made for the purpose.

After the temperature stabilized for approximately 20 minutes, the frequency output was recorded from the counter.

Test Data

Test Mode: Transmitting

Test Result: Compliance. *Please refer to following tables.*

FCC Part 90:

FM,12.5kHz, Reference Frequency: 453.2125 MHz, Limit: ±2.5 ppm			
Temperature (°C)	Voltage Supplied (V _{DC})	Measured Frequency (MHz)	Frequency Error (ppm)
-30	7.7	453.2127428	0.54
-20		453.2127399	0.53
-10		453.2125751	0.17
0		453.2125833	0.18
10		453.2126462	0.32
20		453.2125800	0.18
30		453.2125046	0.01
40		453.2126696	0.37
50		453.2127952	0.65
20		6.0	453.2127215
20	8.8	453.2126587	0.35

4FSK, 12.5kHz, Reference Frequency: 453.2125MHz, Limit: ±2.5 ppm			
Temperature (°C)	Voltage Supplied (V _{DC})	Measured Frequency (MHz)	Frequency Error (ppm)
-30	7.7	453.2127257	0.50
-20		453.2125764	0.17
-10		453.2125865	0.19
0		453.2127626	0.58
10		453.2126219	0.27
20		453.2125500	0.11
30		453.2126543	0.34
40		453.2125786	0.17
50		453.2126089	0.24
20		6.0	453.2126734
20	8.8	453.2126395	0.31

FCC Part 80:

FM,25kHz, Reference Frequency: 459.9875MHz,Limit: ±5.0 ppm			
Temperature (°C)	Voltage Supplied (V_{DC})	Measured Frequency (MHz)	Frequency Error (ppm)
-30	7.7	459.987544	0.10
-20		459.987487	-0.03
-10		459.987689	0.41
0		459.987633	0.29
10		459.987575	0.16
20		459.987540	0.09
30		459.987501	0.00
40		459.987486	-0.03
50		459.987573	0.16
20		6.0	459.987576
20	8.8	459.987698	0.43

FCC Part 74:

FM, 12.5kHz, Reference Frequency: 455.0125 MHz, Limit: ±2.5 ppm			
Temperature (°C)	Voltage Supplied (V_{DC})	Measured Frequency (MHz)	Frequency Error (ppm)
-30	7.7	455.0124639	-0.08
-20		455.0125686	0.15
-10		455.0127044	0.45
0		455.0126991	0.44
10		455.0126999	0.44
20		455.0125400	0.09
30		455.0125219	0.05
40		455.0127073	0.46
50		455.0125624	0.14
20		6.0	455.0127006
20	8.8	455.0127103	0.46

4FSK, 12.5kHz, Reference Frequency: 455.0125 MHz, Limit: ±2.5 ppm			
Temperature (°C)	Voltage Supplied (V_{DC})	Measured Frequency (MHz)	Frequency Error (ppm)
-30	7.7	455.0126441	0.32
-20		455.0127169	0.48
-10		455.0126029	0.23
0		455.0127140	0.47
10		455.0124993	0.00
20		455.0125000	0.00
30		455.0125743	0.16
40		455.0124703	-0.07
50		455.0126811	0.40
20		6.0	455.0126904
20	8.8	455.0127164	0.48

FM, 25kHz, Reference Frequency: 455.0125 MHz, Limit: ±2.5 ppm			
Temperature (°C)	Voltage Supplied (V_{DC})	Measured Frequency (MHz)	Frequency Error (ppm)
-30	7.7	455.0127412	0.53
-20		455.0126584	0.35
-10		455.0125379	0.08
0		455.0125451	0.10
10		455.0127427	0.53
20		455.0125400	0.09
30		455.0124718	-0.06
40		455.0125171	0.04
50		455.0126921	0.42
20		6.0	455.0124894
20	8.8	455.0126935	0.43

FCC Part 22:

FM, 12.5kHz, Reference Frequency: 454.0125MHz, Limit: ±5.0ppm			
Temperature (°C)	Voltage Supplied (V_{DC})	Measured Frequency (MHz)	Frequency Error (ppm)
-30	7.7	454.0126294	0.29
-20		454.0126623	0.36
-10		454.0125522	0.11
0		454.0126014	0.22
10		454.0125877	0.19
20		454.0125400	0.09
30		454.0125021	0.00
40		454.0126330	0.29
50		454.0126850	0.41
20		6.0	454.0124971
20	8.8	454.0125377	0.08

4FSK, 12.5kHz, Reference Frequency: 454.0125MHz, Limit: ±5.0ppm			
Temperature (°C)	Voltage Supplied (V_{DC})	Measured Frequency (MHz)	Frequency Error (ppm)
-30	7.7	454.0126676	0.37
-20		454.0127111	0.46
-10		454.0126016	0.22
0		454.0125128	0.03
10		454.0126747	0.38
20		454.0125500	0.11
30		454.0125352	0.08
40		454.0126735	0.38
50		454.0126369	0.30
20		6.0	454.0125512
20	8.8	454.0125924	0.20

FM, 25kHz, Reference Frequency: 454.0125MHz, Limit: ±5.0 ppm			
Temperature (°C)	Voltage Supplied (V_{DC})	Measured Frequency (MHz)	Frequency Error (ppm)
-30	7.7	454.0127056	0.45
-20		454.0126637	0.36
-10		454.0125852	0.19
0		454.0125721	0.16
10		454.0124812	-0.04
20		454.0125400	0.09
30		454.0127490	0.55
40		454.0126558	0.34
50		454.0126948	0.43
20		6.0	454.0125544
20	8.8	454.0126967	0.43

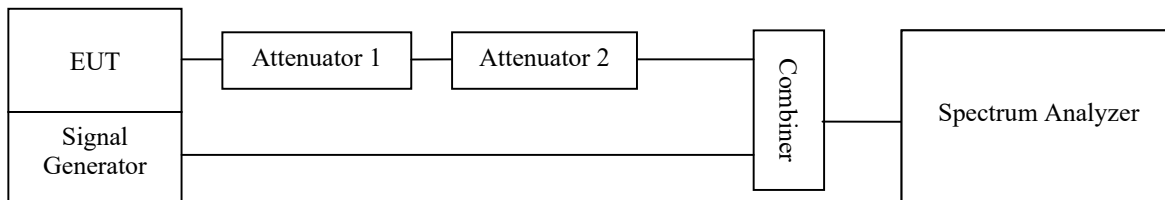
8 - TRANSIENT FREQUENCY BEHAVIOR

Applicable Standard

Regulations: FCC §90.214

Test Procedure

- a) Connect the EUT and test equipment as shown on the following block diagram.
- b) Set the Spectrum Analyzer to measure FM deviation, and tune the RF frequency to the transmitter assigned frequency.
- c) Set the signal generator to the assigned transmitter frequency and modulate it with a 1 kHz tone at ± 12.5 kHz deviation and set its output level to -100dBm.
- d) Turn on the transmitter.
- e) Supply sufficient attenuation via the RF attenuator to provide an input level to the Spectrum Analyzer that is 40 dB below the maximum allowed input power when the transmitter is operating at its rated power level. Note this power level on the Spectrum Analyzer as P_0 .
- f) Turn off the transmitter.
- g) Adjust the RF level of the signal generator to provide RF power equal to P_0 . This signal generator RF level shall be maintained throughout the rest of the measurement.
- h) Remove the attenuation 1, so the input power to the Spectrum Analyzer is increased by 30 dB when the transmitter is turned on.
- i) Adjust the vertical amplitude control of the spectrum analyzer to display the 1000 Hz at ± 4 divisions vertically centered on the display. Set trigger mode of the Spectrum Analyzer to "Video", and tune the "trigger level" on suitable level. Then set the "trigger offset" to -10ms for turn on and -15ms for turn off.
- j) Turn on the transmitter and the transient wave will be captured on the screen of Spectrum Analyzer. Observe the stored display. The instant when the 1 kHz test signal is completely suppressed is considered to be t_{on} . The trace should be maintained within the allowed divisions during the period t_1 and t_2 .
- k) Then turn off the transmitter, and another transient wave will be captured on the screen of Spectrum Analyzer. The trace should be maintained within the allowed divisions during the period t_3 .



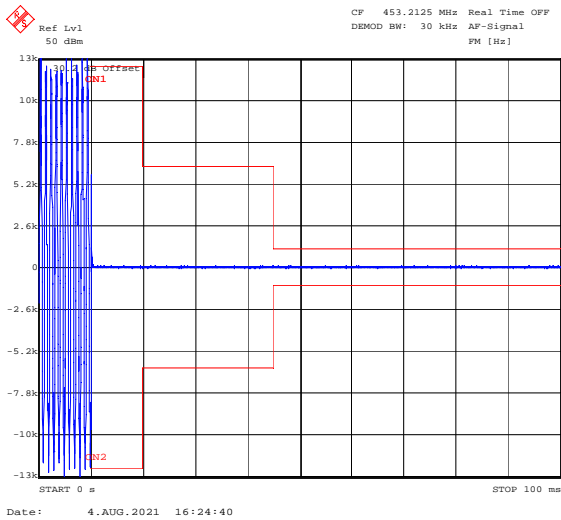
Test Data

Test Mode: Transmitting

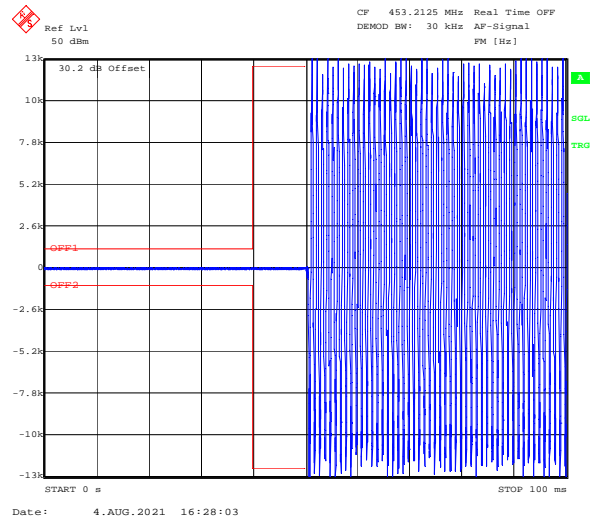
Test Result: Compliance. Please refer to the following table and plots.

Channel Spacing (kHz)	Transient Period (ms)	Transient Frequency	Result
12.5	10(t ₁)	±12.5 kHz	Pass
	25(t ₂)	±6.25 kHz	
	10(t ₃)	±12.5 kHz	

453.2125_Turn On



453.2125_Turn Off



******* END OF REPORT *******