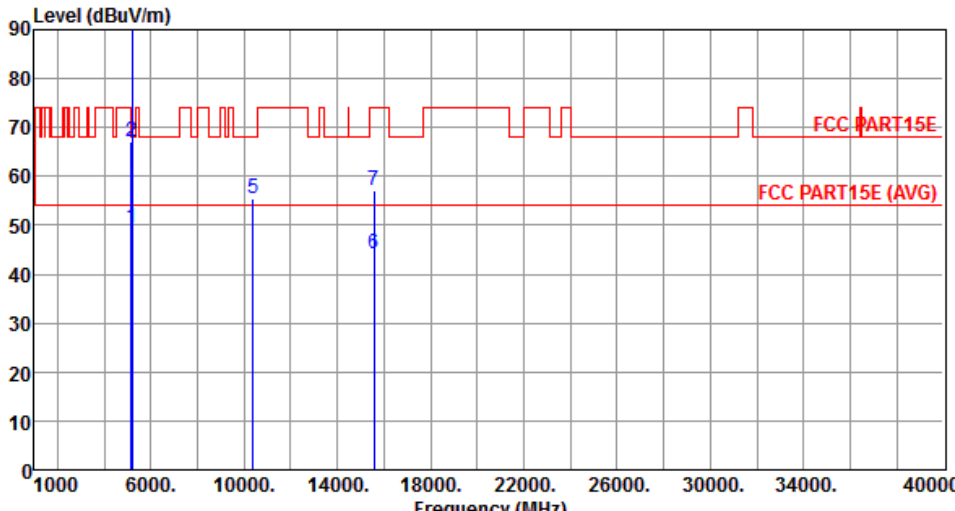
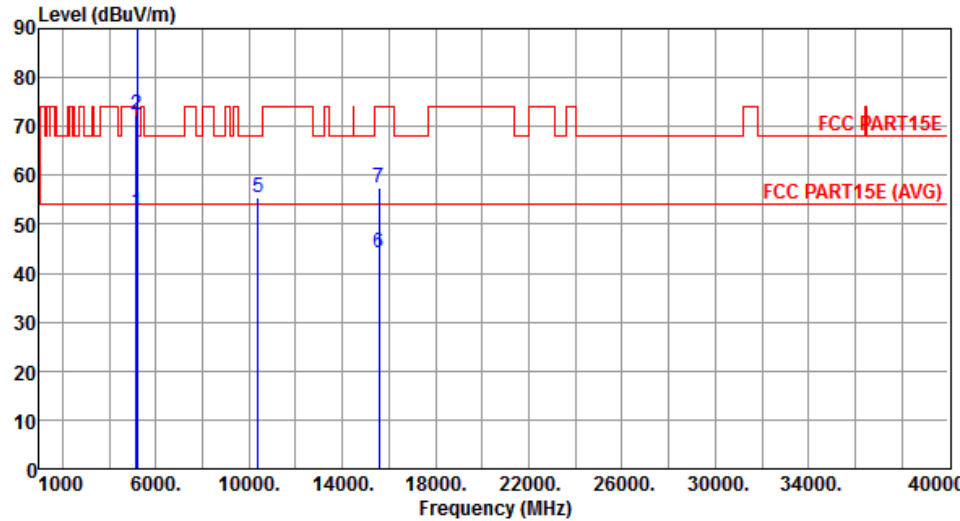


3.5.12 Transmitter Radiated Unwanted Emissions (Above 1GHz) for VHT40

Modulation	VHT40	Test Freq. (MHz)	5190						
Polarization	Horizontal								
									
	Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High	Turn Table
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB		cm	deg
1	5150.00	49.51	54.00	-4.49	45.11	4.40	Average	200	111
2	5150.00	67.17	74.00	-6.83	62.77	4.40	Peak	200	111
3 *	5190.00	98.44			93.98	4.46	Average	200	98
4 *	5190.00	110.80			106.34	4.46	Peak	200	98
5	10380.00	55.45	68.20	-12.75	41.20	14.25	Peak	188	165
6	15570.00	44.18	54.00	-9.82	29.12	15.06	Average	155	332
7	15570.00	57.06	74.00	-16.94	42.00	15.06	Peak	155	332

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3:"*" is Peak / Average value of fundamental frequency

Modulation	VHT40	Test Freq. (MHz)	5190
Polarization	Vertical		

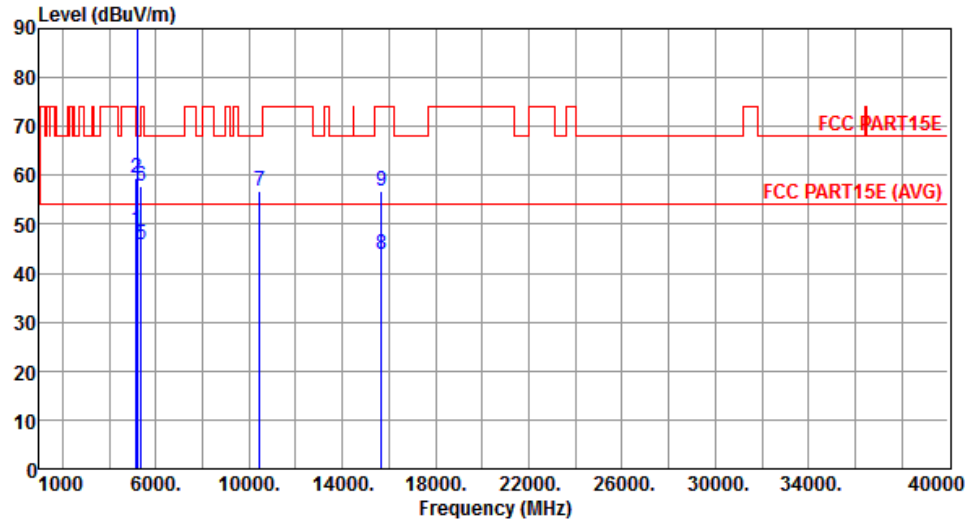


The spectrum plot displays the emission level in dBUV/m across a frequency range from 1000 to 40000 MHz. The y-axis ranges from 0 to 90 dBUV/m. A red line represents the FCC PART15E limit, and a red line represents the FCC PART15E (AVG) limit. A blue line shows the test signal, with peaks labeled 1 through 7. The test signal is a VHT40 modulation at 5190 MHz, with a peak level of 72.28 dBUV/m and an average level of 52.42 dBUV/m. The margin is -1.72 dB. The test signal is also measured at 10380 MHz, 15570 MHz, and 15570 MHz, with peak levels of 55.53 dBUV/m, 44.29 dBUV/m, and 57.41 dBUV/m respectively. The margins are -12.67 dB, -9.71 dB, and -16.59 dB respectively.

	Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5150.00	52.42	54.00	-1.58	48.02	4.40	Average	222	255
2	5150.00	72.28	74.00	-1.72	67.88	4.40	Peak	222	255
3 *	5190.00	105.49			101.03	4.46	Average	203	100
4 *	5190.00	118.14			113.68	4.46	Peak	203	100
5	10380.00	55.53	68.20	-12.67	41.28	14.25	Peak	233	321
6	15570.00	44.29	54.00	-9.71	29.23	15.06	Average	222	304
7	15570.00	57.41	74.00	-16.59	42.35	15.06	Peak	222	304

Note 1: Emission Level (dBUV/m) = SA Reading (dBUV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBUV/m) – Limit (dBUV/m).
Note 3: "*" is Peak / Average value of fundamental frequency

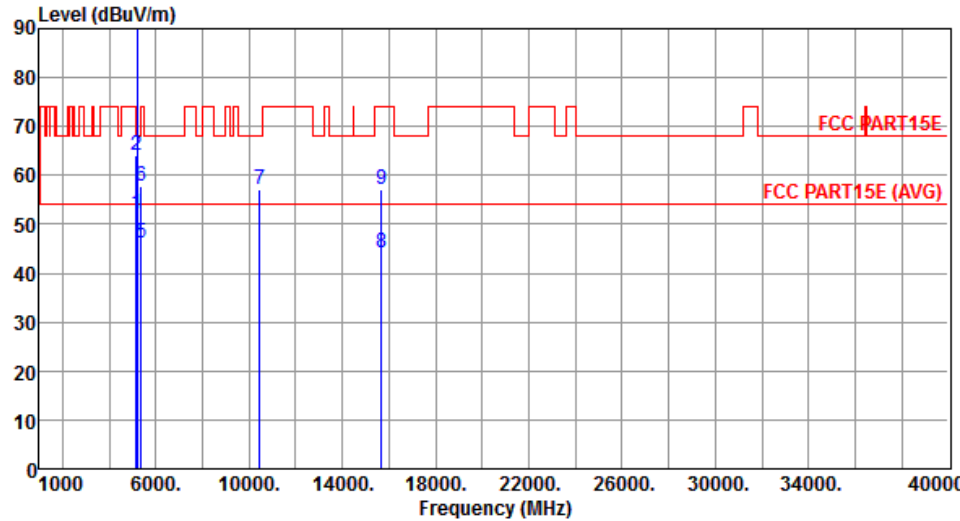
Modulation	VHT40	Test Freq. (MHz)	5230
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5150.00	48.67	54.00	-5.33	44.27	4.40	Average	199	89
2	5150.00	59.59	74.00	-14.41	55.19	4.40	Peak	199	89
3 *	5230.00	101.64			97.13	4.51	Average	191	111
4 *	5230.00	113.29			108.78	4.51	Peak	191	111
5	5350.00	45.87	54.00	-8.13	41.23	4.64	Average	191	111
6	5350.00	57.87	74.00	-16.13	53.23	4.64	Peak	191	111
7	10460.00	56.66	68.20	-11.54	42.26	14.40	Peak	233	314
8	15690.00	43.95	54.00	-10.05	29.04	14.91	Average	222	187
9	15690.00	56.80	74.00	-17.20	41.89	14.91	Peak	222	187

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3: "*" is Peak / Average value of fundamental frequency

Modulation	VHT40	Test Freq. (MHz)	5230
Polarization	Vertical		



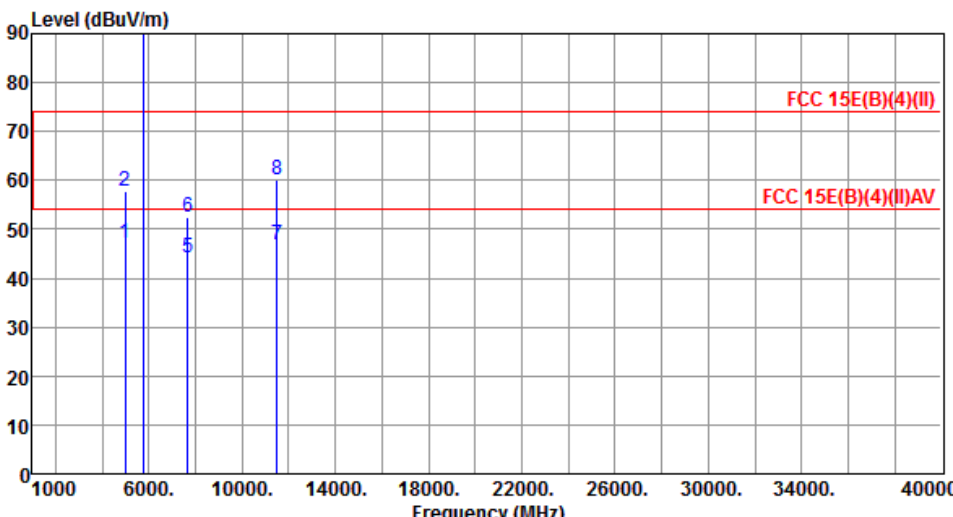
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5150.00	52.05	54.00	-1.95	47.65	4.40	Average	188	173
2	5150.00	63.95	74.00	-10.05	59.55	4.40	Peak	188	173
3 *	5230.00	109.02			104.51	4.51	Average	217	177
4 *	5230.00	120.76			116.25	4.51	Peak	217	177
5	5350.00	46.33	54.00	-7.67	41.69	4.64	Average	217	177
6	5350.00	57.84	74.00	-16.16	53.20	4.64	Peak	217	177
7	10460.00	56.98	68.20	-11.22	42.58	14.40	Peak	222	199
8	15690.00	44.16	54.00	-9.84	29.25	14.91	Average	235	321
9	15690.00	57.09	74.00	-16.91	42.18	14.91	Peak	235	321

Note 1: Emission Level (dBUV/m) = SA Reading (dBUV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBUV/m) – Limit (dBUV/m).

Note 3: "*" is Peak / Average value of fundamental frequency

Modulation	VHT40	Test Freq. (MHz)	5755
Polarization	Horizontal		

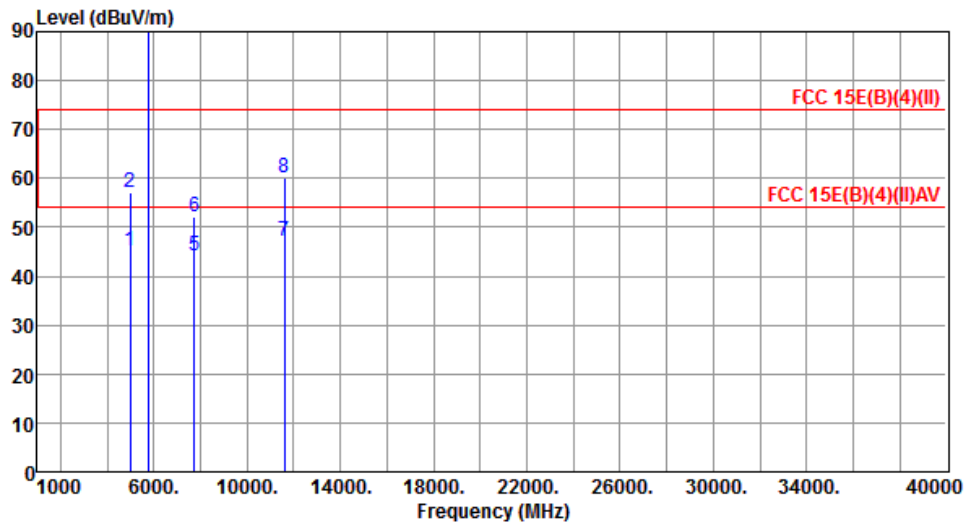


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5000.00	47.04	54.00	-6.96	42.87	4.17	Average	144	213
2	5000.00	57.82	74.00	-16.18	53.65	4.17	Peak	144	213
3 *	5755.00	103.51			98.37	5.14	Average	208	98
4 *	5755.00	116.46			111.32	5.14	Peak	208	98
5	7673.33	44.32	54.00	-9.68	35.54	8.78	Average	200	199
6	7673.33	52.55	74.00	-21.45	43.77	8.78	Peak	200	199
7	11510.00	46.99	54.00	-7.01	31.48	15.51	Average	222	189
8	11510.00	60.05	74.00	-13.95	44.54	15.51	Peak	222	189

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
Note 3: "*" is Peak / Average value of fundamental frequency

Modulation	VHT40	Test Freq. (MHz)	5755
Polarization	Vertical		
Level (dBuV/m) </			

Modulation	VHT40	Test Freq. (MHz)	5795
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5000.00	45.33	54.00	-8.67	41.16	4.17	Average	166	211
2	5000.00	57.06	74.00	-16.94	52.89	4.17	Peak	166	211
3 *	5795.00	103.43			98.23	5.20	Average	222	74
4 *	5795.00	115.55			110.35	5.20	Peak	222	74
5	7726.66	44.06	54.00	-9.94	35.34	8.72	Average	221	189
6	7726.66	52.08	74.00	-21.92	43.36	8.72	Peak	221	189
7	11590.00	47.17	54.00	-6.83	31.90	15.27	Average	222	165
8	11590.00	60.01	74.00	-13.99	44.74	15.27	Peak	222	165

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)

*Factor includes antenna factor , cable loss and amplifier gain

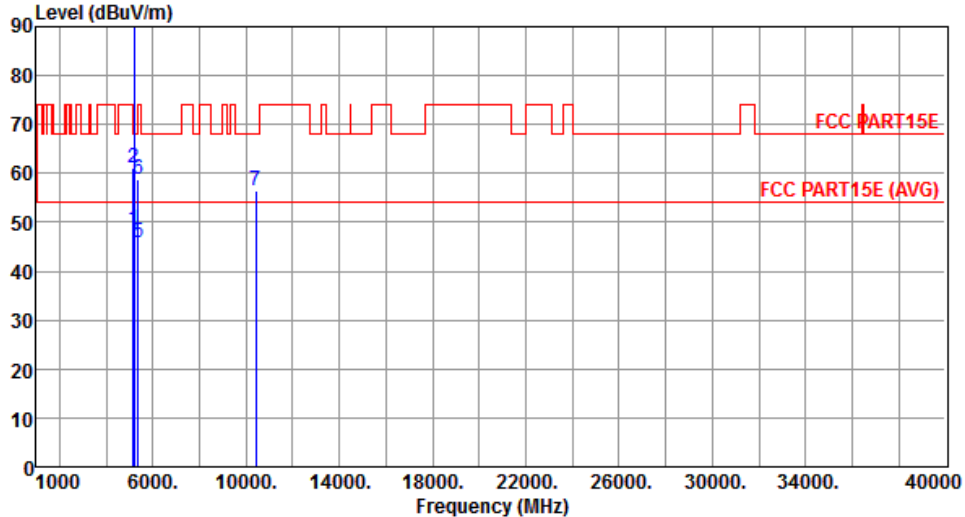
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

Note 3: "*" is Peak / Average value of fundamental frequency

Modulation	VHT40	Test Freq. (MHz)	5795
Polarization	Vertical		
Level (dBuV/m)			

3.5.13 Transmitter Radiated Unwanted Emissions (Above 1GHz) for VHT80

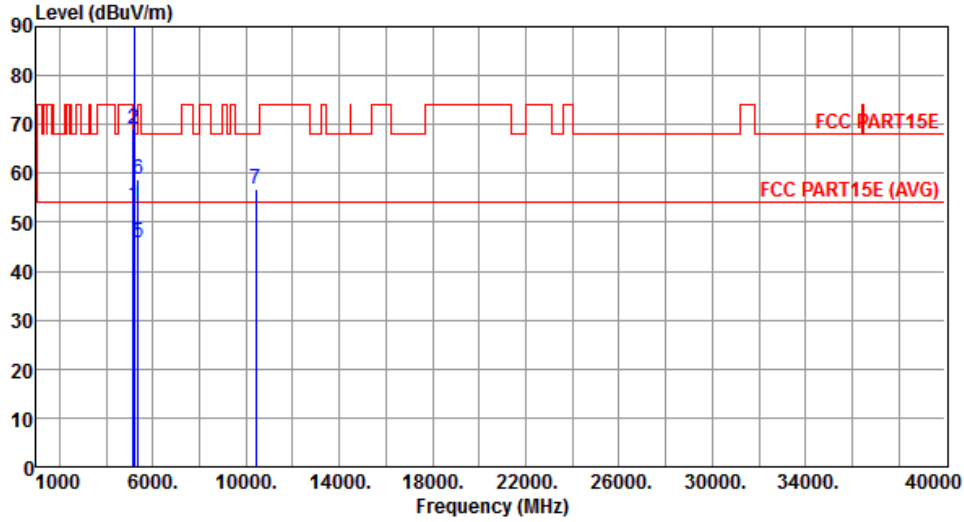
Modulation	VHT80	Test Freq. (MHz)	5210
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5150.00	48.39	54.00	-5.61	43.99	4.40	Average	212	76
2	5150.00	61.17	74.00	-12.83	56.77	4.40	Peak	212	76
3 *	5210.00	93.60			89.11	4.49	Average	212	76
4 *	5210.00	105.23			100.74	4.49	Peak	212	76
5	5350.00	45.98	54.00	-8.02	41.34	4.64	Average	212	76
6	5350.00	58.86	74.00	-15.14	54.22	4.64	Peak	212	76
7	10420.00	56.43	68.20	-11.77	42.11	14.32	Peak	217	166

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)
 *Factor includes antenna factor , cable loss and amplifier gain
 Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).
 Note 3: "*" is Peak / Average value of fundamental frequency

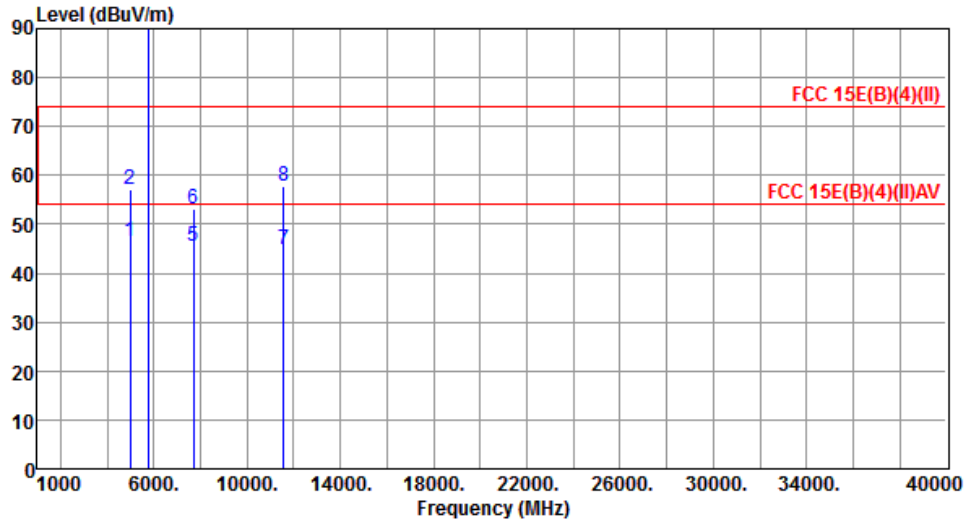
Modulation	VHT80	Test Freq. (MHz)	5210
Polarization	Vertical		



	Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5150.00	53.55	54.00	-0.45	49.15	4.40	Average	205	231
2	5150.00	68.93	74.00	-5.07	64.53	4.40	Peak	205	231
3 *	5210.00	99.72			95.23	4.49	Average	205	231
4 *	5210.00	111.81			107.32	4.49	Peak	205	231
5	5350.00	45.92	54.00	-8.08	41.28	4.64	Average	205	231
6	5350.00	58.86	74.00	-15.14	54.22	4.64	Peak	205	231
7	10420.00	56.64	68.20	-11.56	42.32	14.32	Peak	222	255

Note 1: Emission Level (dBUV/m) = SA Reading (dBUV/m) + Factor* (dB)
 *Factor includes antenna factor , cable loss and amplifier gain
 Note 2: Margin (dB) = Emission level (dBUV/m) – Limit (dBUV/m).
 Note 3: "*" is Peak / Average value of fundamental frequency

Modulation	VHT80	Test Freq. (MHz)	5775
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	5000.00	46.39	54.00	-7.61	42.22	4.17	Average	188	211
2	5000.00	57.00	74.00	-17.00	52.83	4.17	Peak	188	211
3 *	5775.00	100.28			95.11	5.17	Average	222	100
4 *	5775.00	112.85			107.68	5.17	Peak	222	100
5	7700.00	45.64	54.00	-8.36	36.89	8.75	Average	222	199
6	7700.00	53.12	74.00	-20.88	44.37	8.75	Peak	222	199
7	11550.00	44.94	54.00	-9.06	29.54	15.40	Average	222	165
8	11550.00	57.73	74.00	-16.27	42.33	15.40	Peak	222	165

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)

*Factor includes antenna factor , cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

Note 3: "*" is Peak / Average value of fundamental frequency

Modulation	VHT80	Test Freq. (MHz)	5775
Polarization	Vertical		
Level (dBuV/m)			

3.5.14 Transmitter Radiated Unwanted Emissions (Above 1GHz) for VHT80+80

Modulation	VHT80+80	Test Freq. (MHz)	5210+5775
Polarization	Horizontal		
Level (dBuV/m) <			

Modulation	VHT80+80	Test Freq. (MHz)	5210+5775
Polarization	Vertical		
Level (dBuV/m) </			

3.6 Emissions in Non-Restricted Frequency Bands

3.6.1 Emissions in Non-Restricted Frequency Bands Limit

This test is for transmitters operating in the 5.725 - 5.850 GHz band only.
Peak power in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 30 dB relative to the maximum in-band peak PSD level in 100 kHz

3.6.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.6.3 Test Procedures

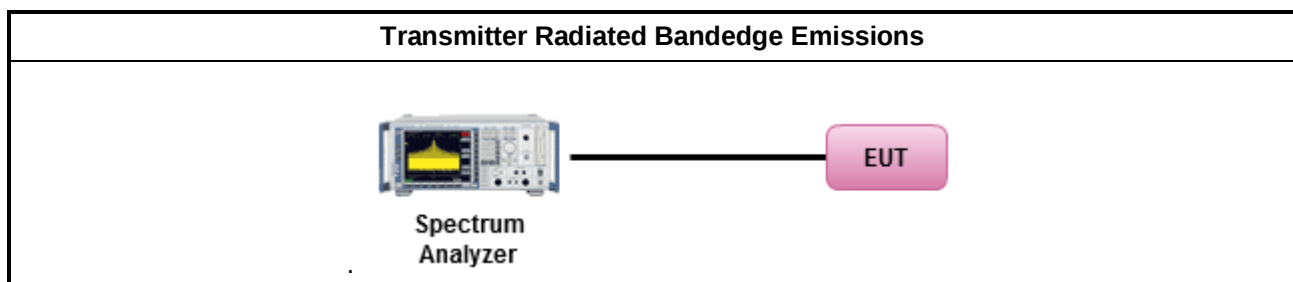
Reference level measurement

1. Set RBW=100kHz, VBW = 300kHz , Detector = Peak, Sweep time = Auto
2. Trace = max hold , Allow Trace to fully stabilize
3. Use the peak marker function to determine the maximum PSD level

Emission level measurement

1. Set RBW=100kHz, VBW = 300kHz , Detector = Peak, Sweep time = Auto
2. Trace = max hold , Allow Trace to fully stabilize
3. Scan Frequency range is up to 40GHz
4. Use the peak marker function to determine the maximum amplitude level

3.6.4 Test Setup



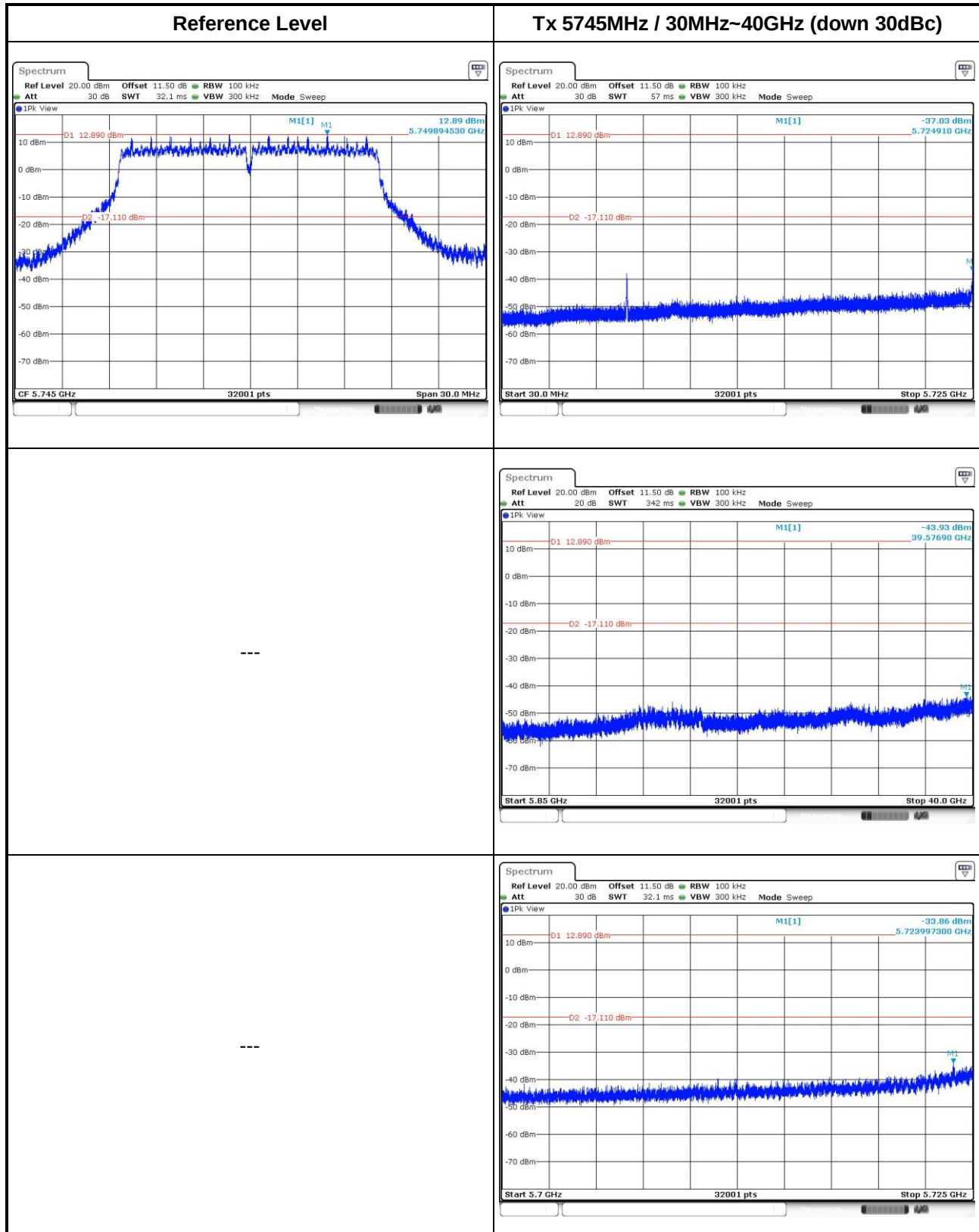
3.6.5 Test Result of Emissions in non-restricted frequency bands

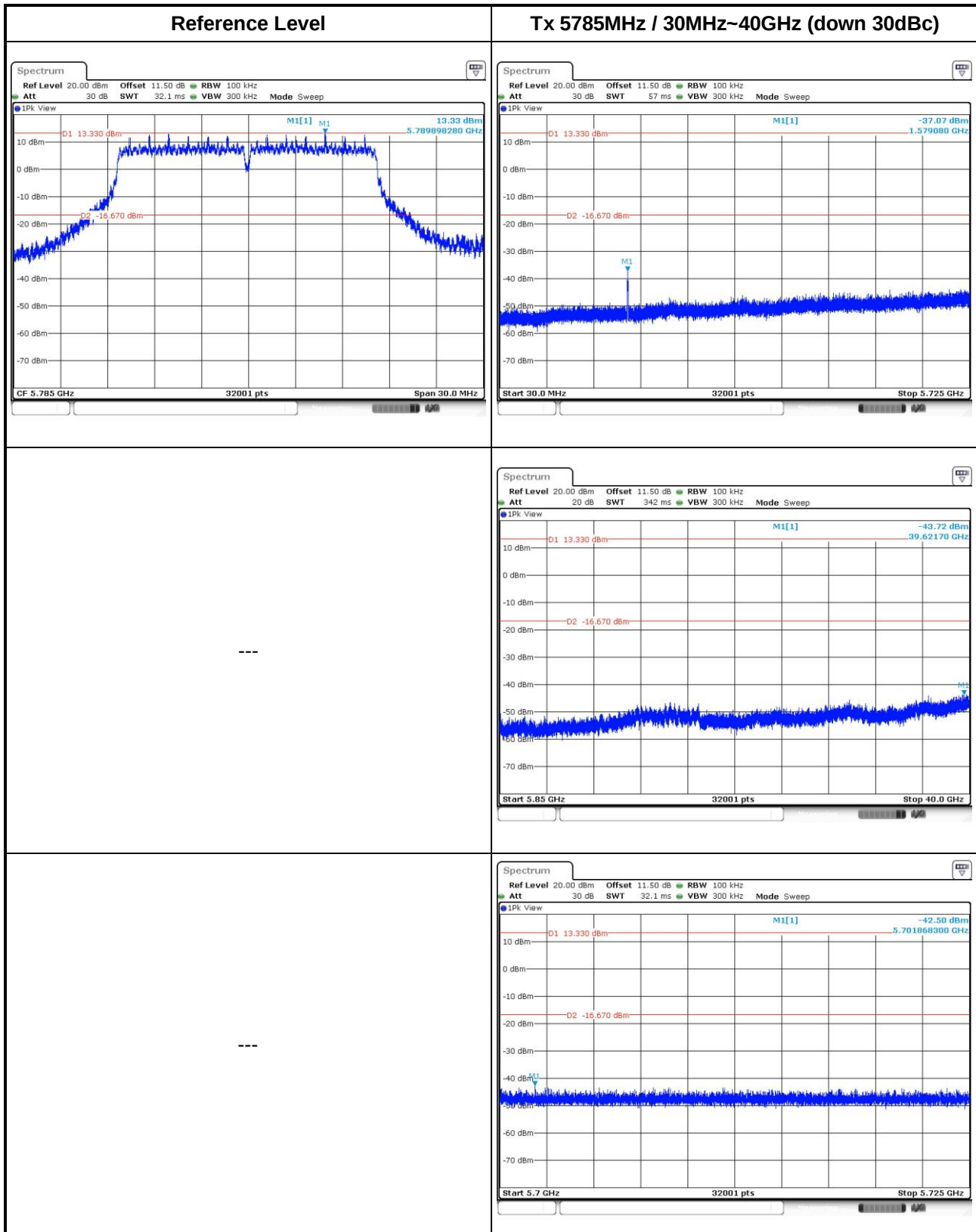
This test item is performed on each TX output individually without summing or adding $10 \log(N_{ANT})$ since measurements are made relative to the in-band emissions on the individual outputs. Only worst test result of each operating mode is presented.

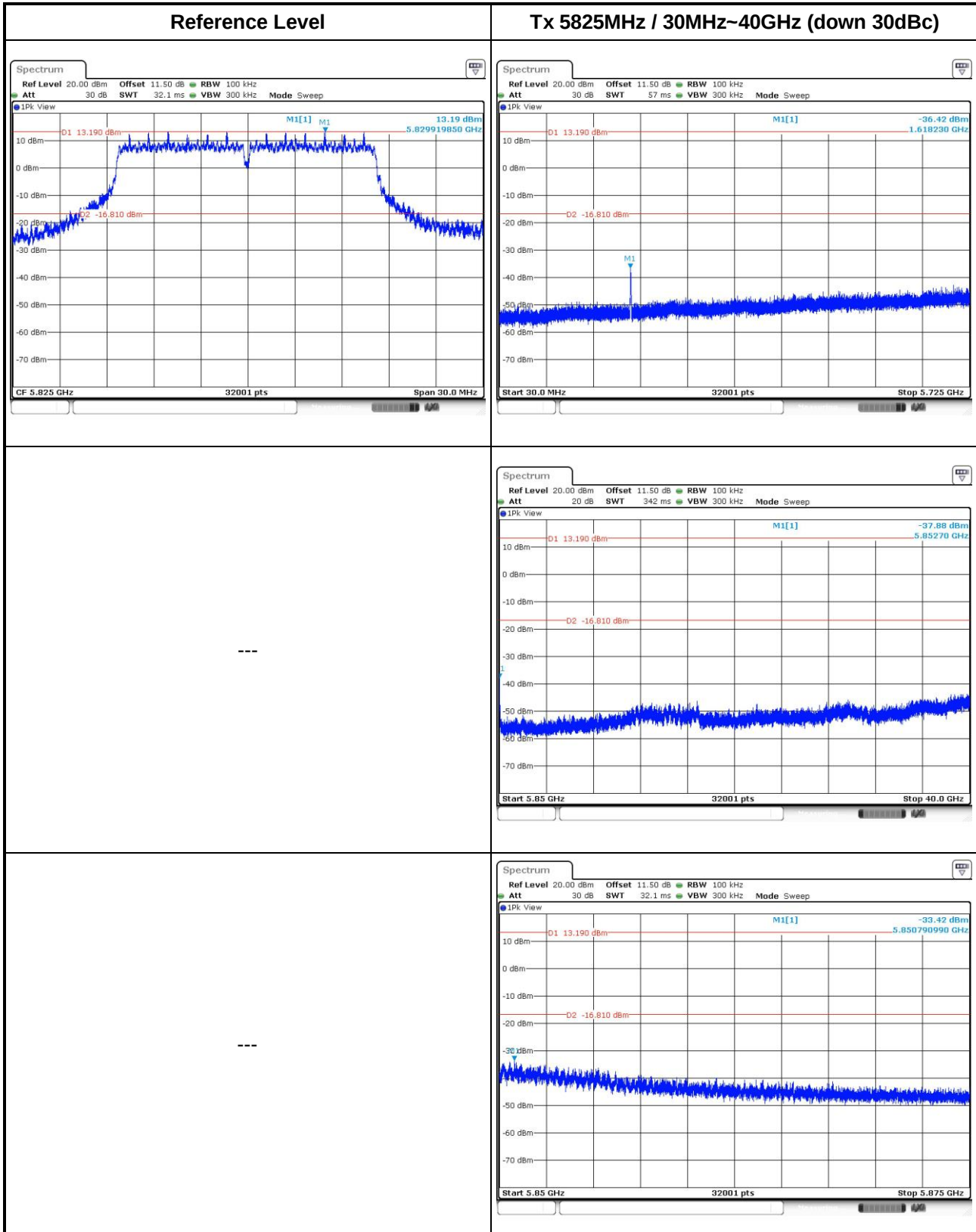
Non-beamforming mode

3.6.6 Unwanted Emissions into Non-Restricted Frequency Bands

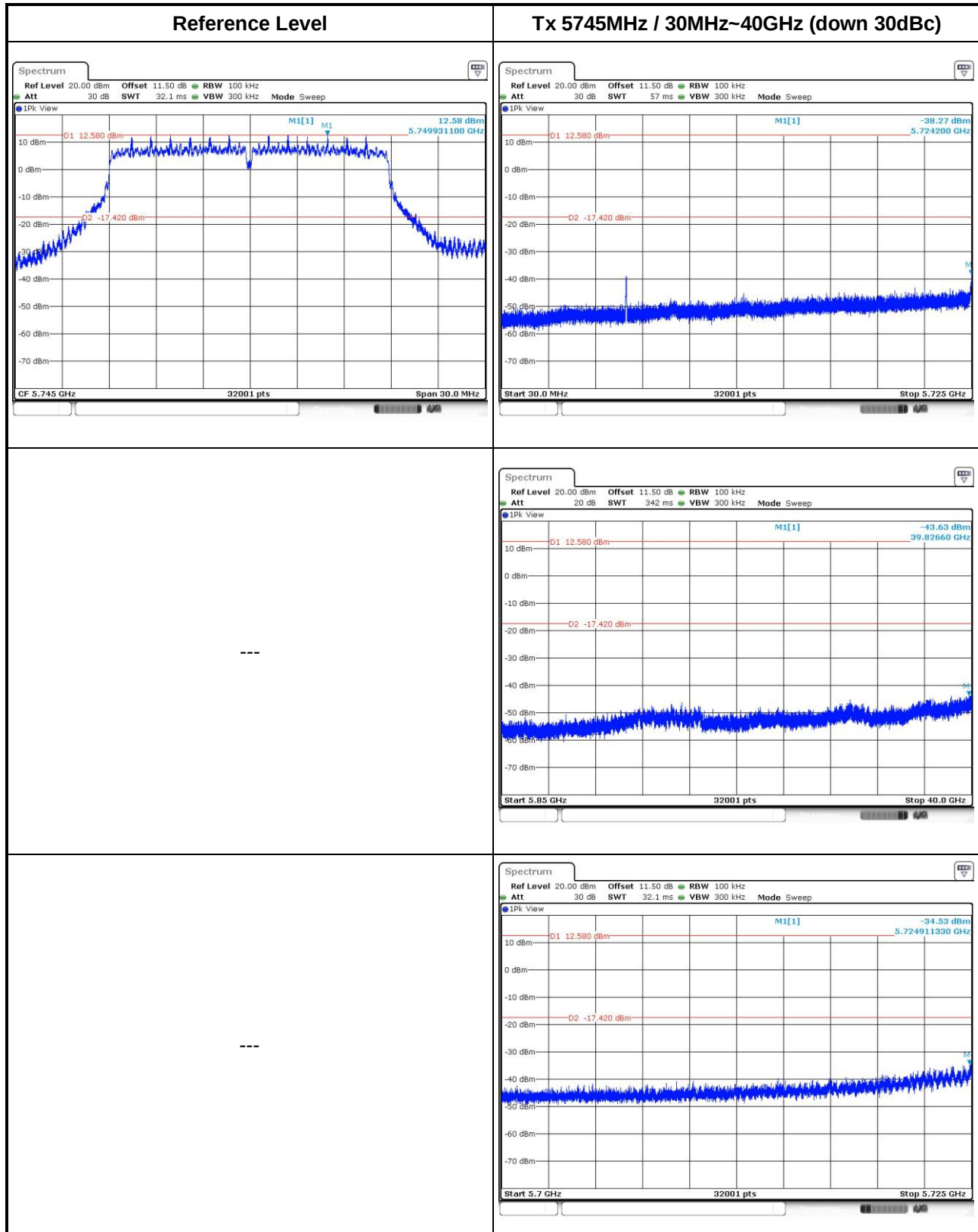
802.11a

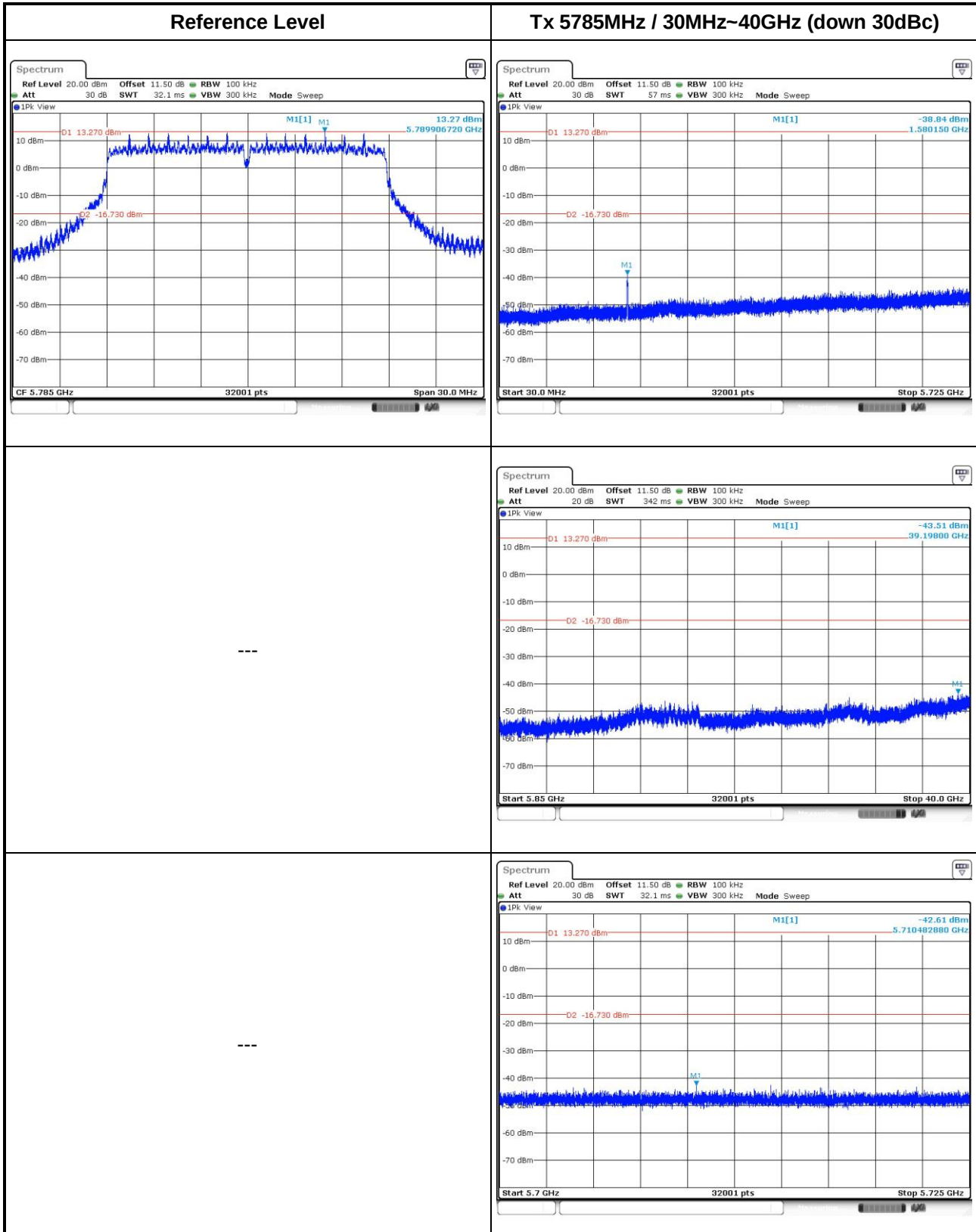


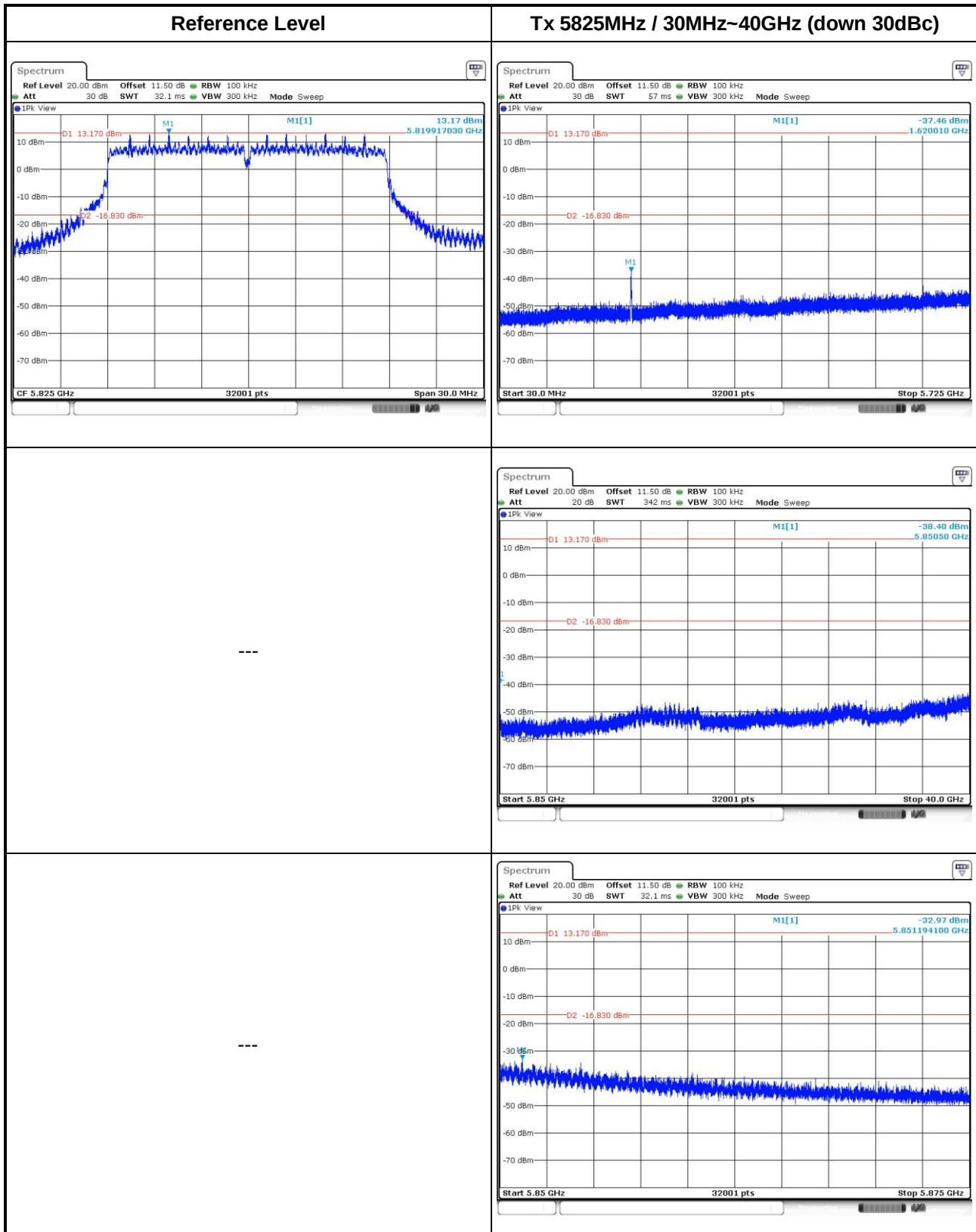




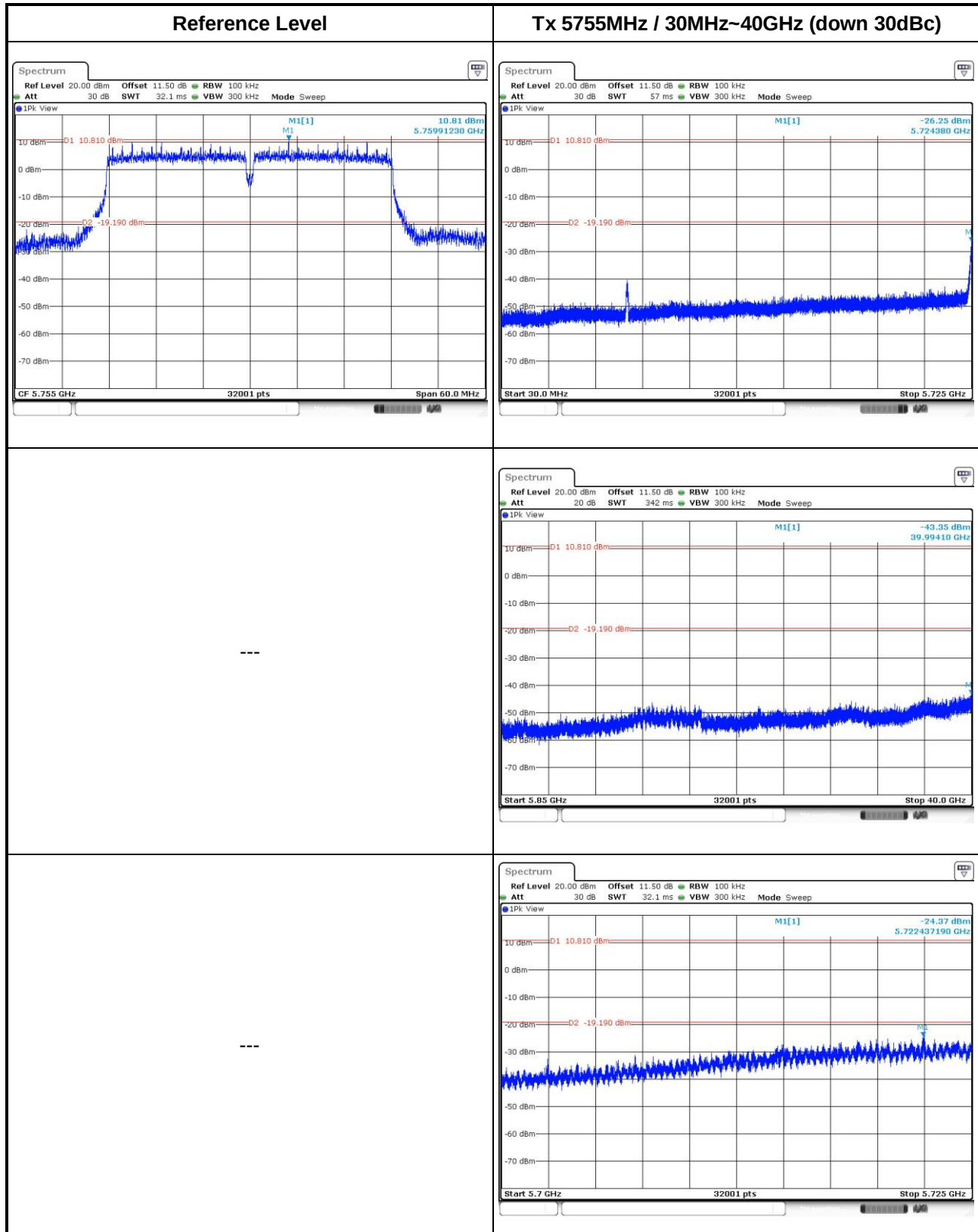
VHT20

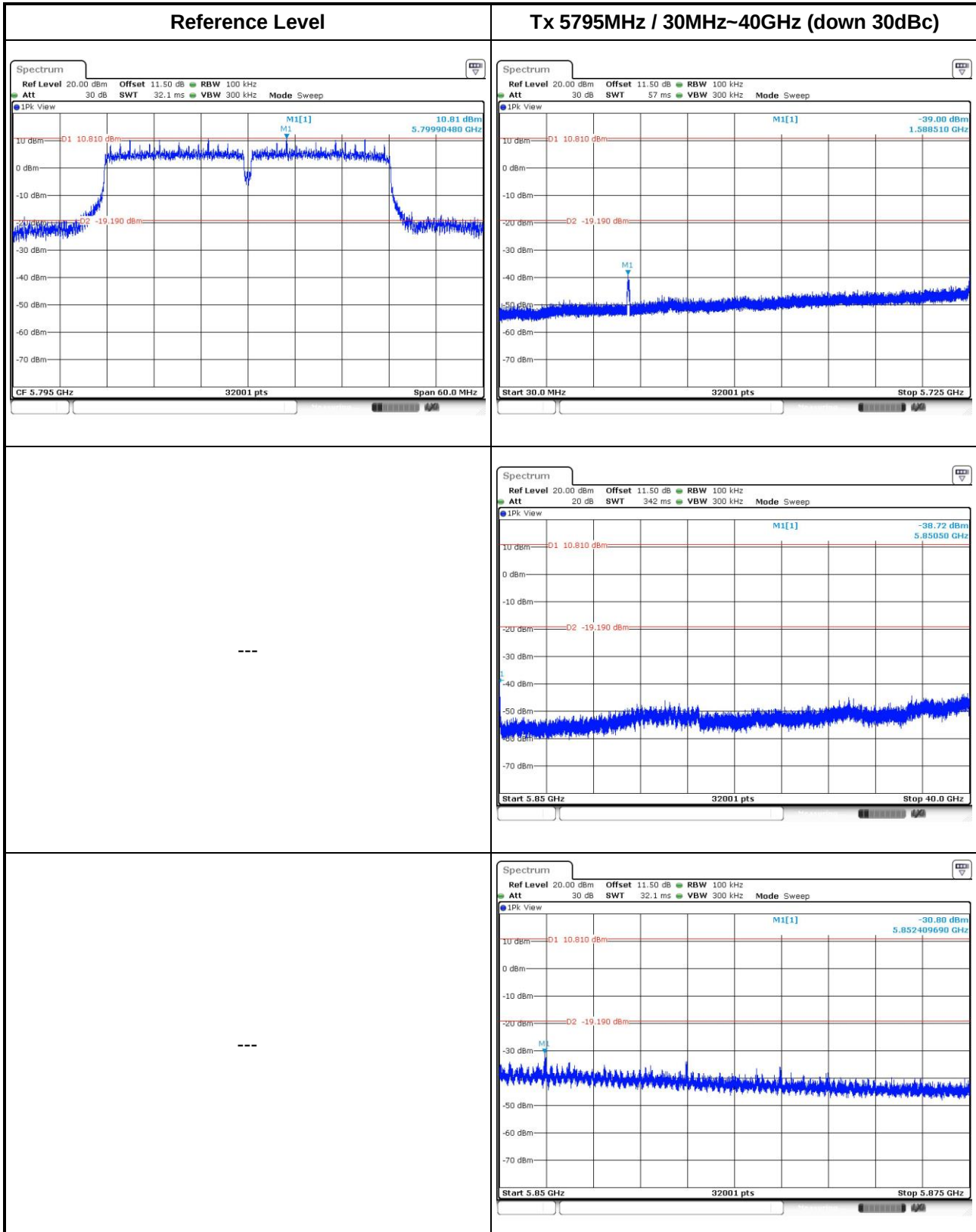




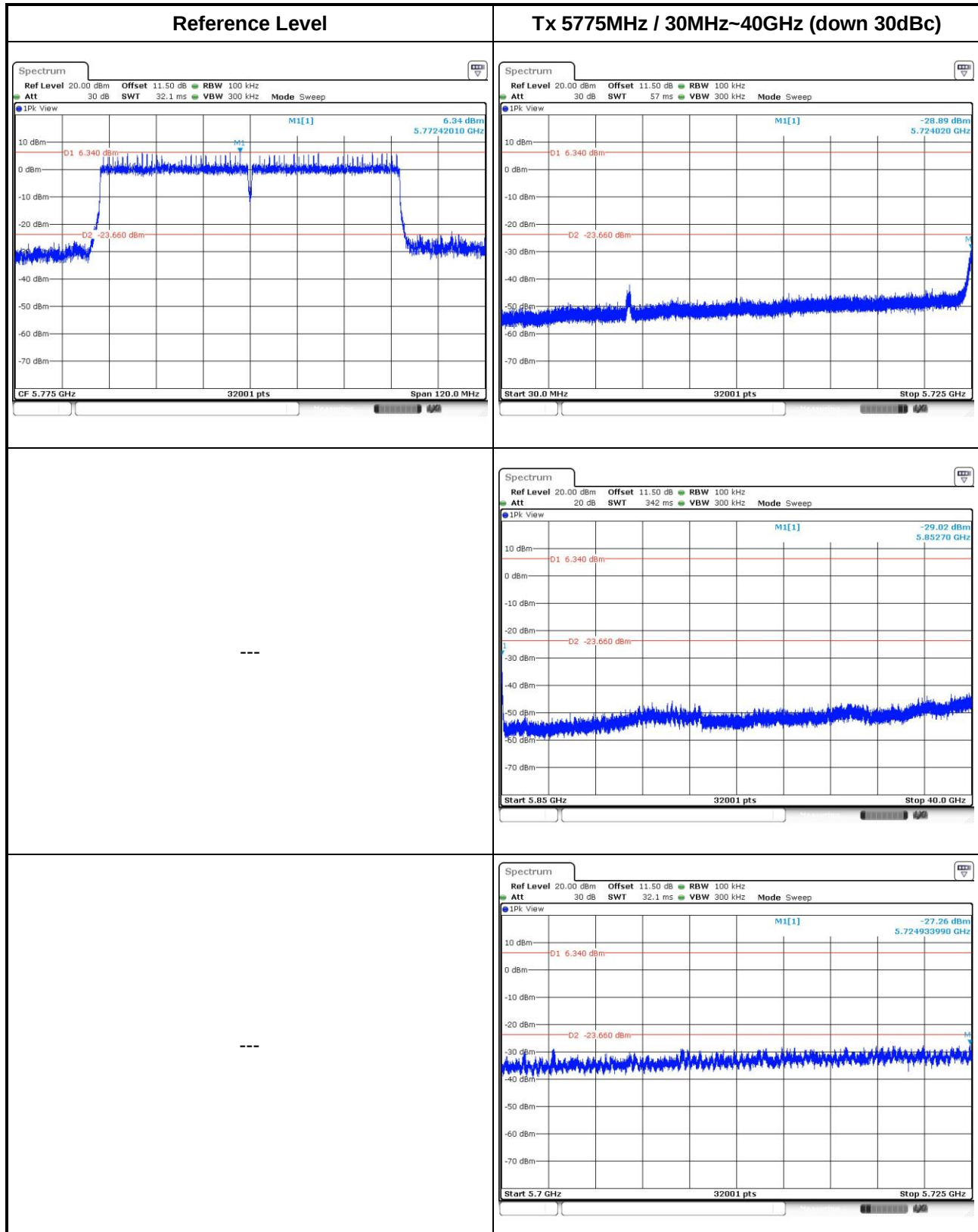


VHT40

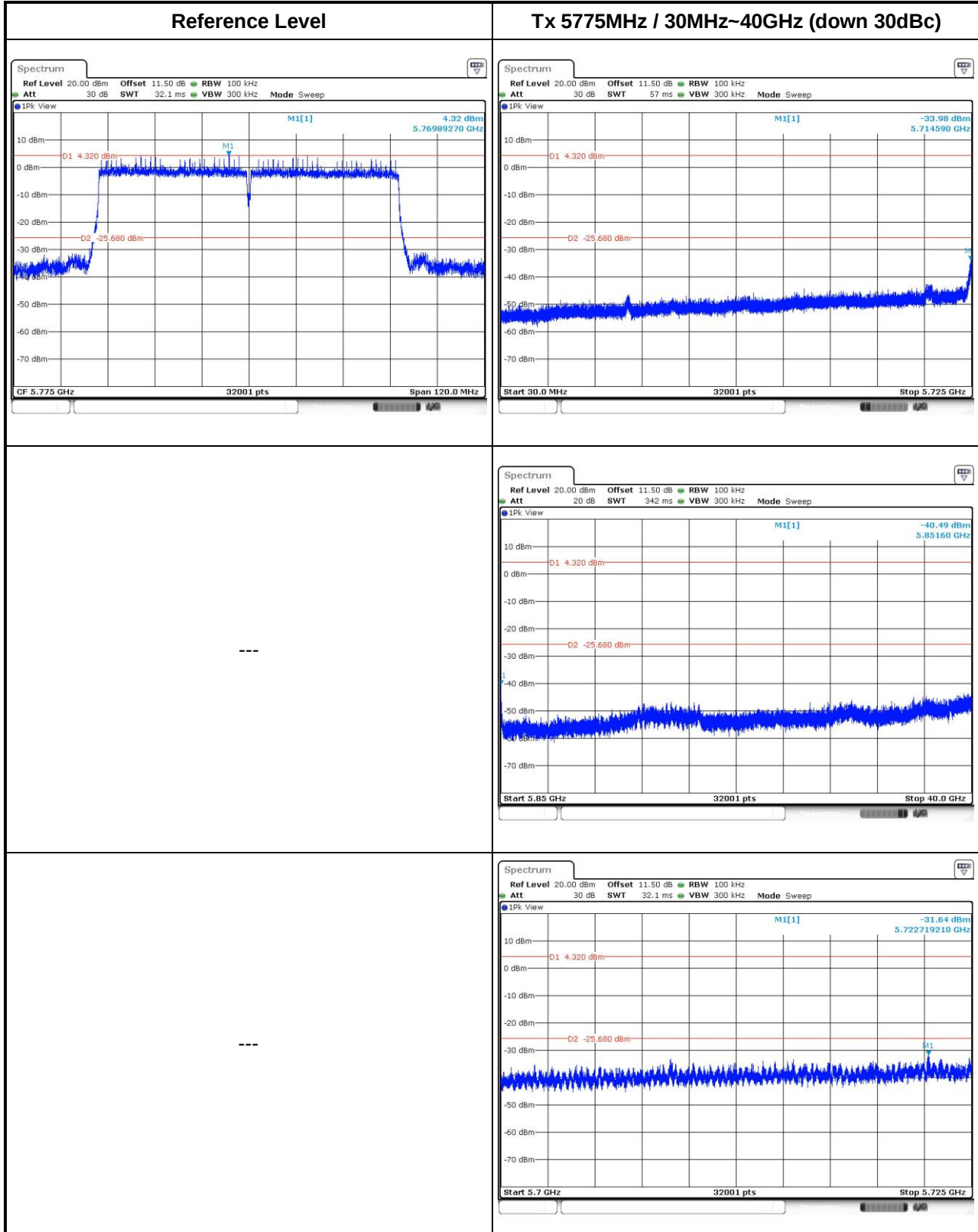




VHT80



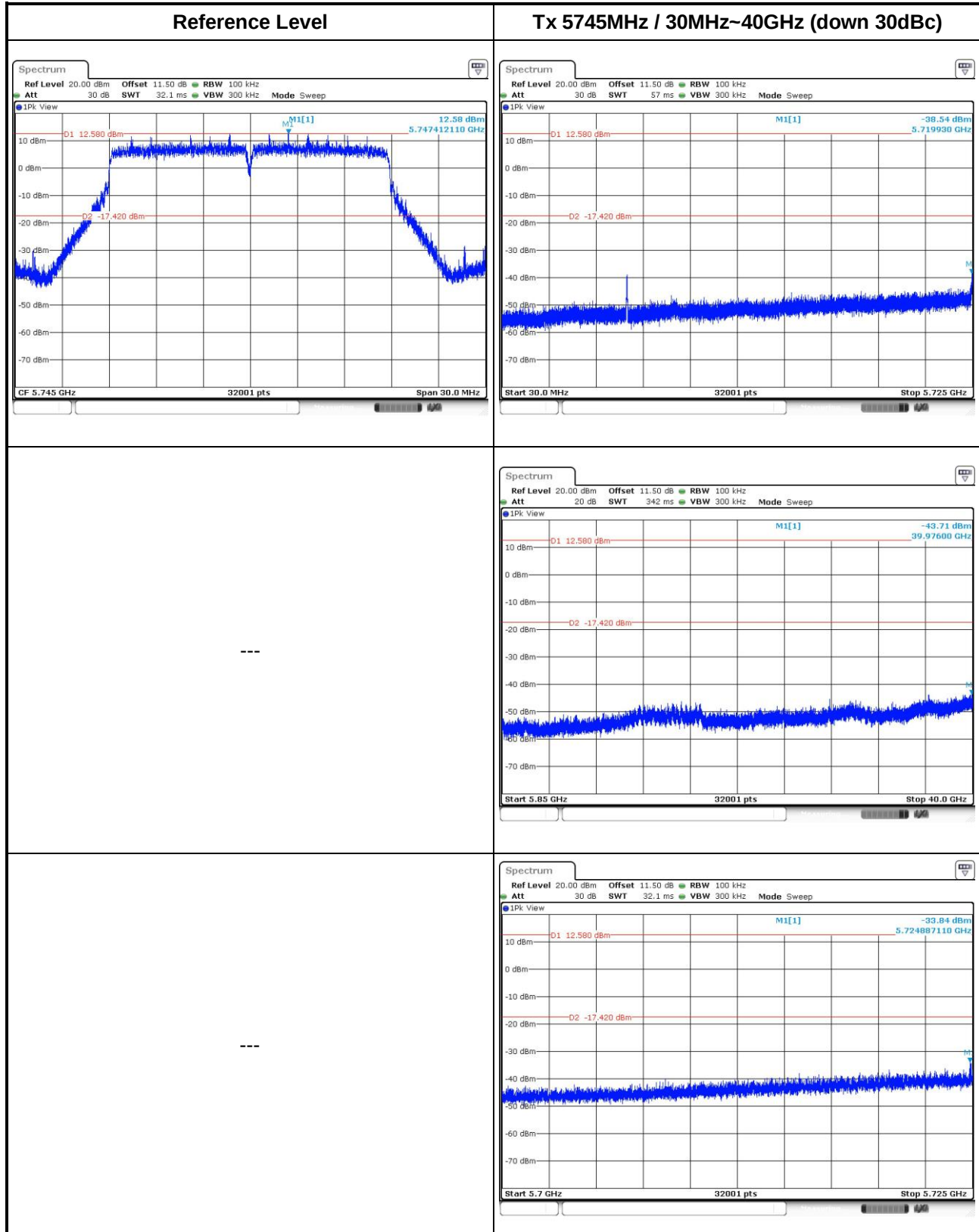
VHT80+80

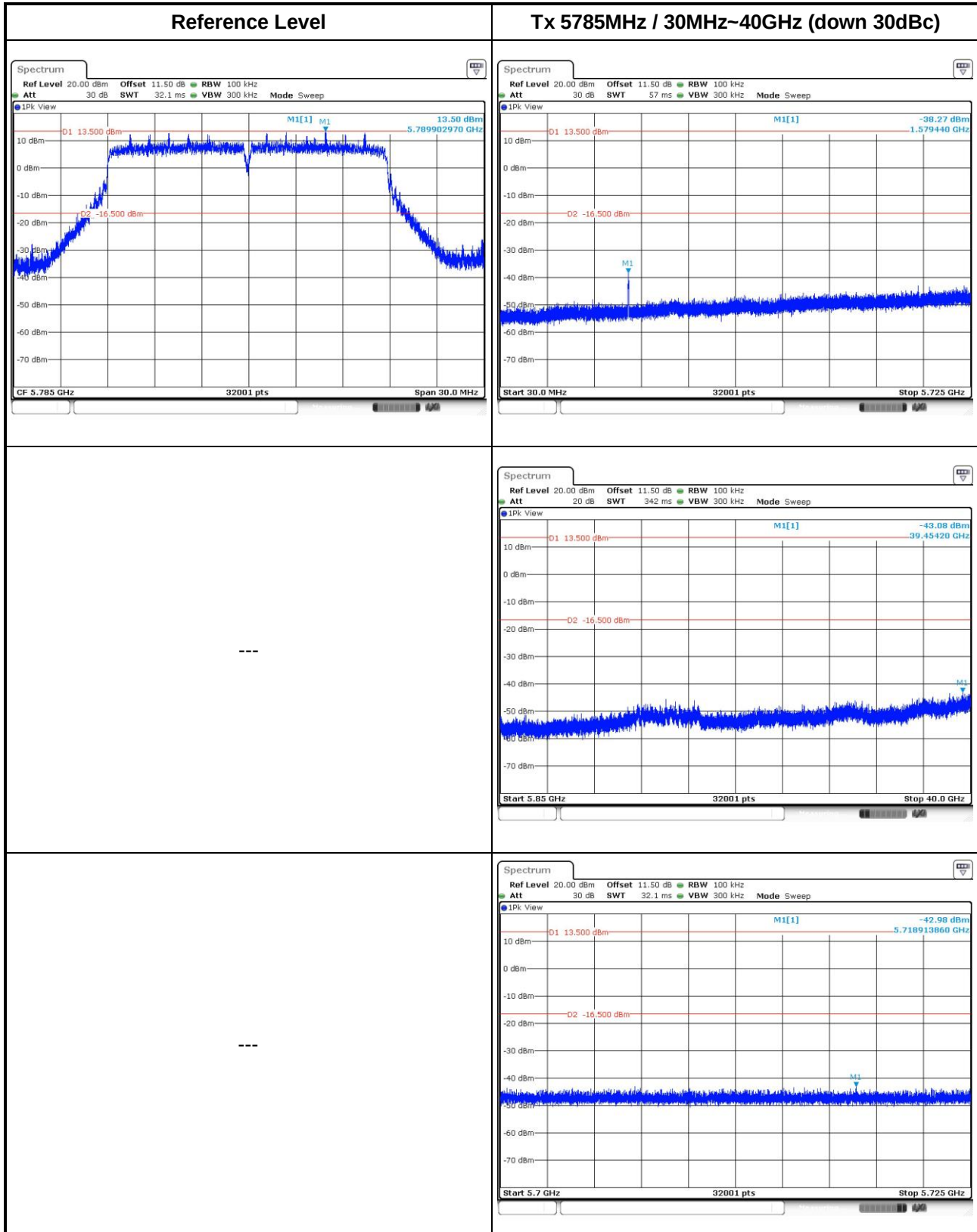


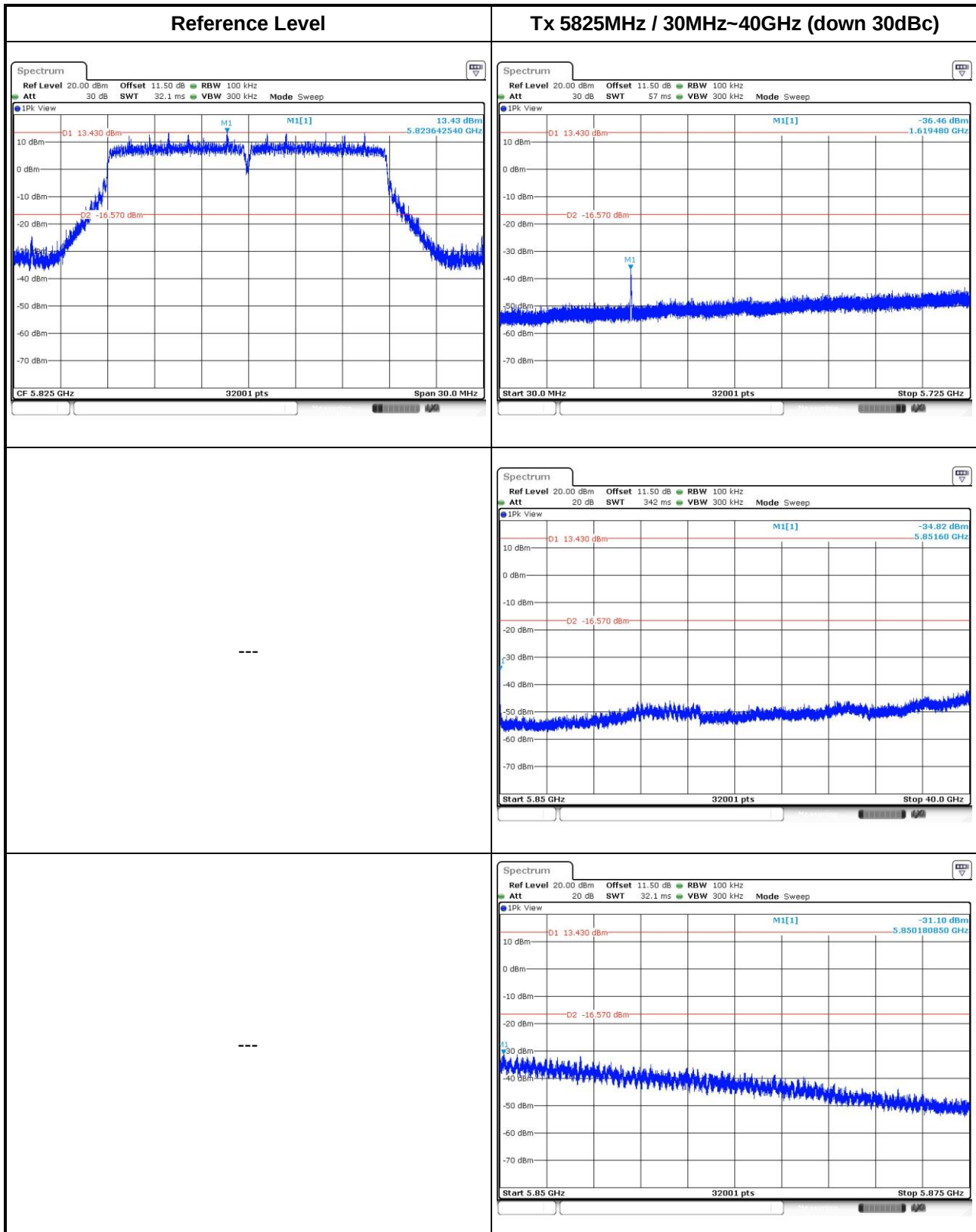
Beamforming mode

3.6.7 Unwanted Emissions into Non-Restricted Frequency Bands

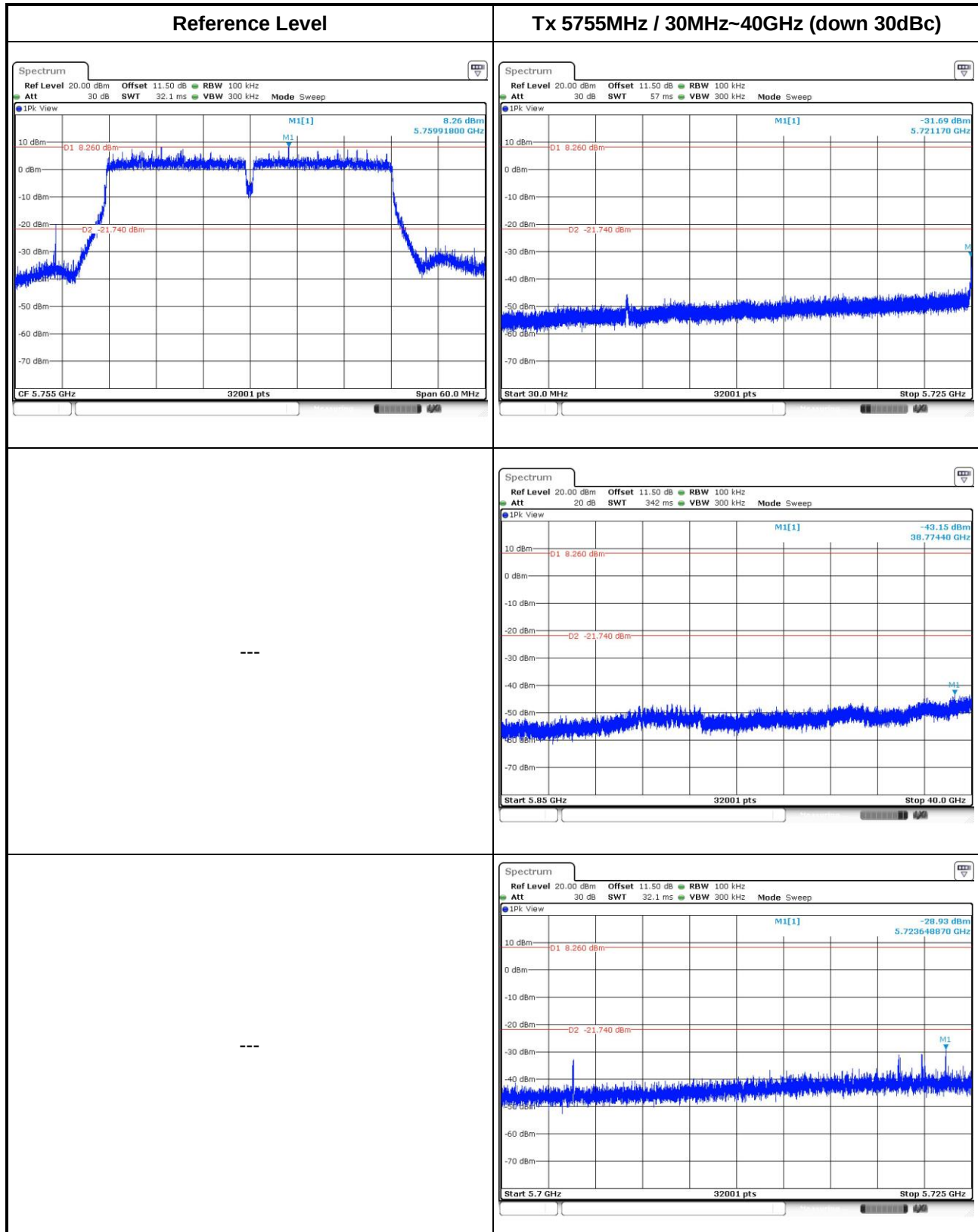
VHT20

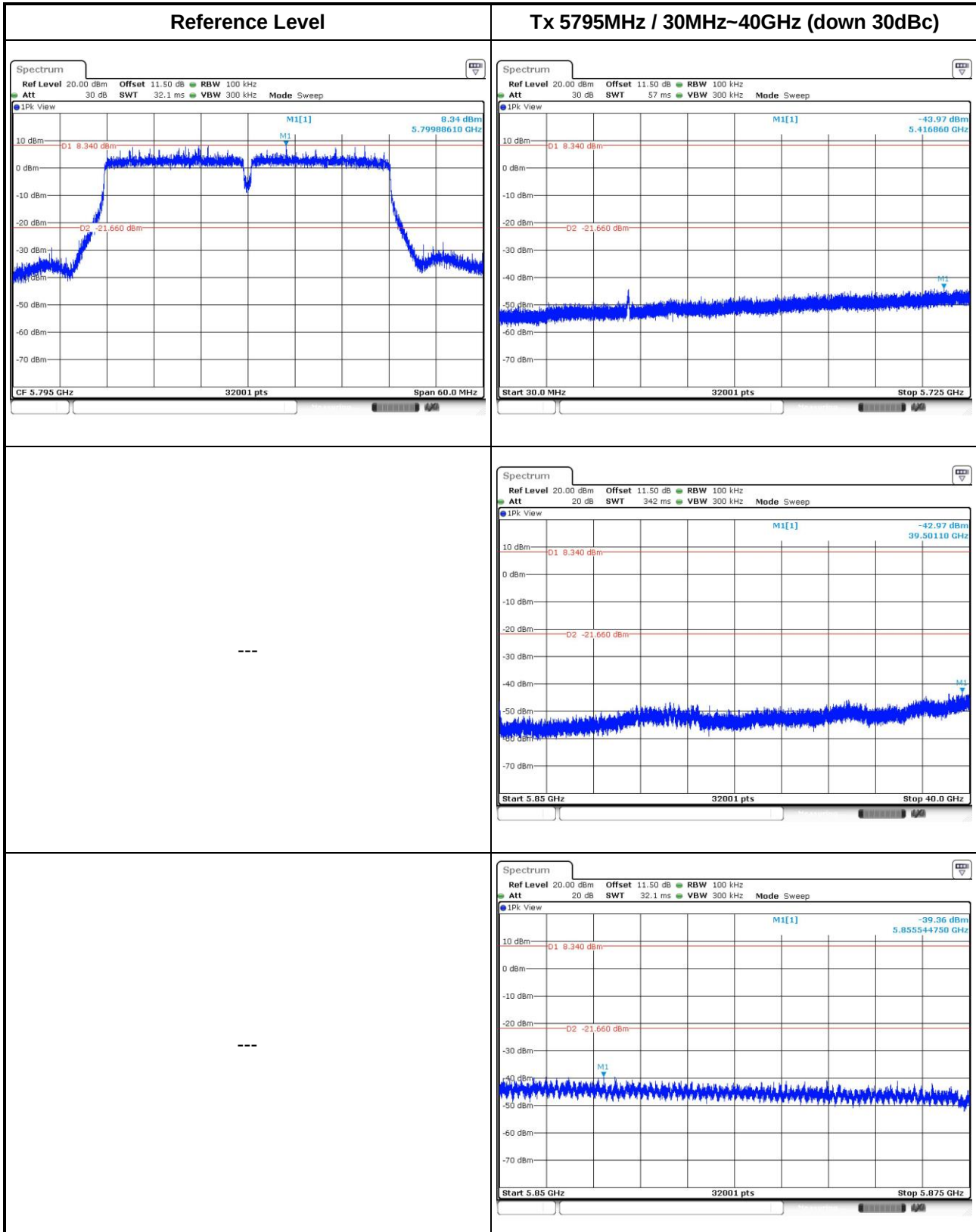




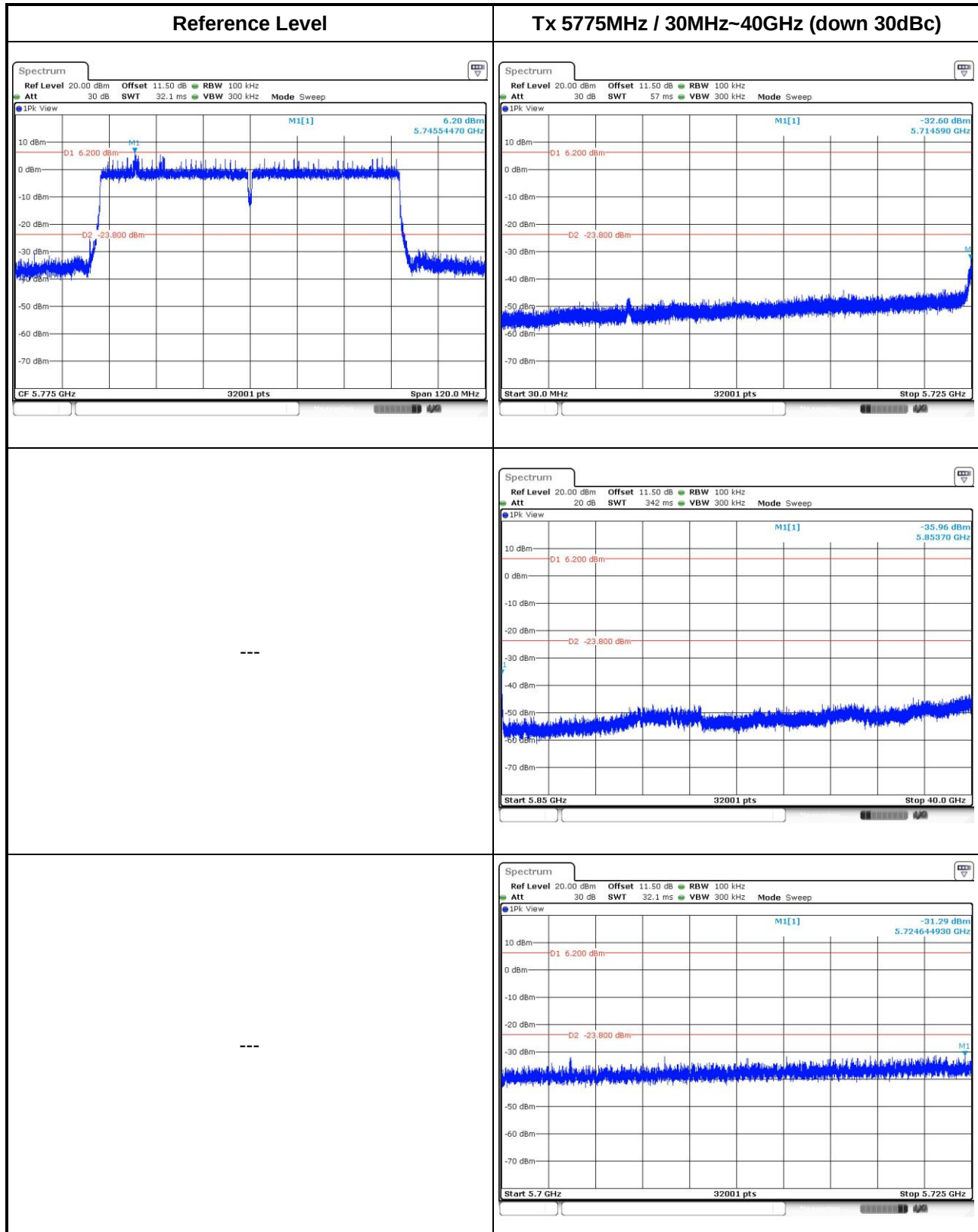


VHT40

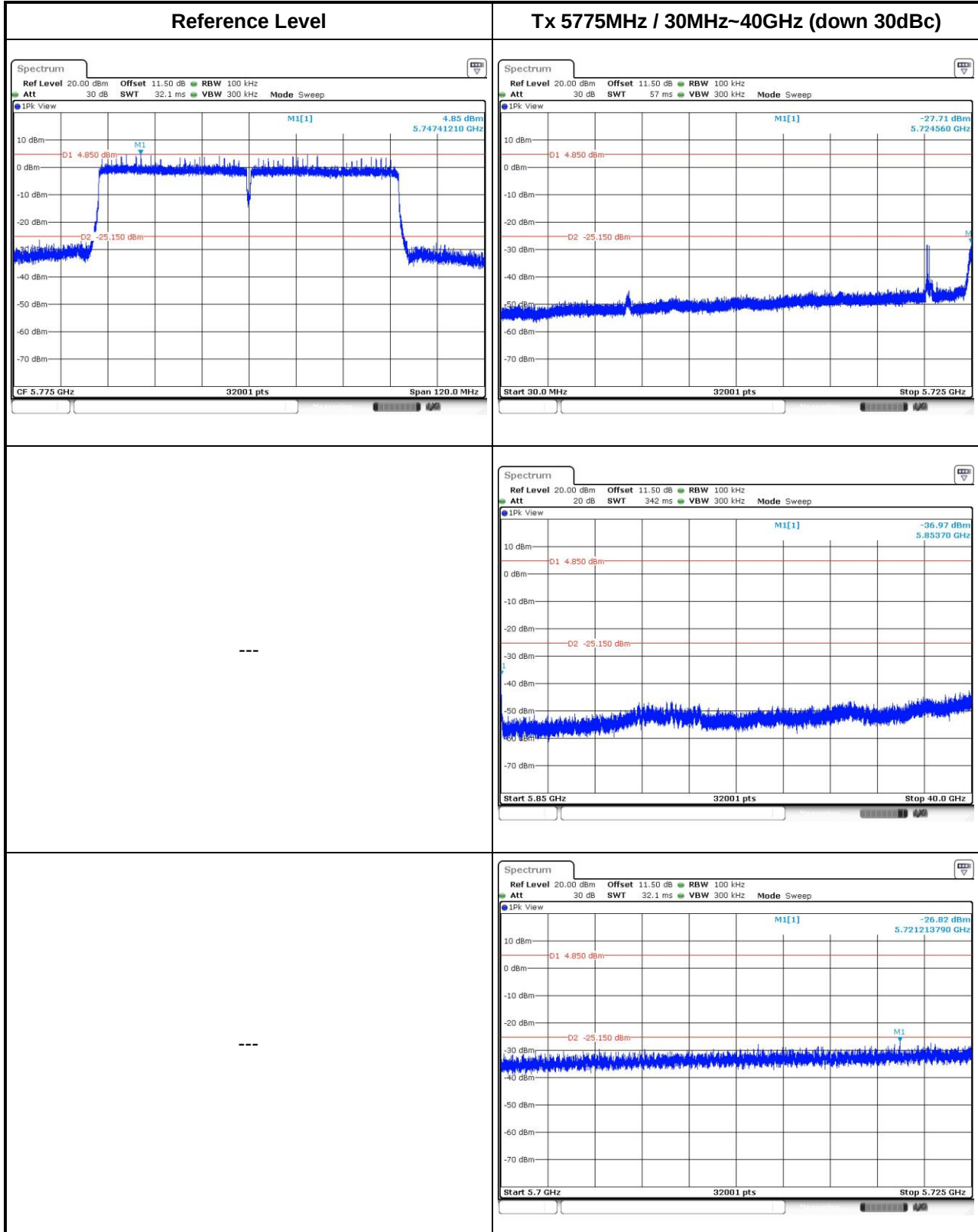




VHT80



VHT80+80



3.7 Frequency Stability

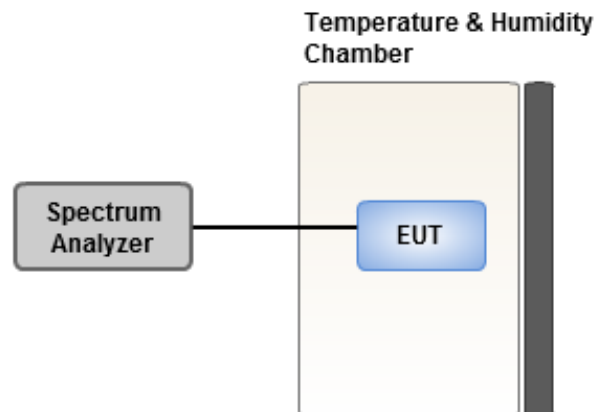
3.7.1 Limit of Frequency Stability

Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

3.7.2 Test Procedures

1. The EUT is installed in an environment test chamber with external power source.
2. Set the chamber to operate at 50 centigrade and external power source to output at nominal voltage of EUT.
3. A sufficient stabilization period at each temperature is used prior to each frequency measurement.
4. When temperature is stabled, measure the frequency stability.
5. The test shall be performed under -30 to 50 centigrade and 85 to 115 percent of the nominal voltage. Change setting of chamber and external power source to complete all conditions.

3.7.3 Test Setup



3.7.4 Test Result of Frequency Stability

Frequency: 5200 MHz	Frequency Drift (ppm)			
Temperature (°C)	0 minute	2 minutes	5 minutes	10 minutes
T20°C Vmax	0.50	0.94	0.69	0.95
T20°C Vmin	0.23	0.87	0.45	0.41
T50°C Vnom	0.94	0.47	1.62	1.34
T40°C Vnom	-0.10	-0.28	0.09	0.44
T30°C Vnom	0.28	0.74	0.23	0.26
T20°C Vnom	-0.09	0.42	-0.11	0.03
T10°C Vnom	-0.06	0.18	0.31	0.30
T0°C Vnom	0.03	-0.22	-0.12	0.39
T-10°C Vnom	0.09	0.10	0.43	0.02
T-20°C Vnom	0.29	0.79	0.48	0.89
T-30°C Vnom	-0.23	0.30	-0.73	-0.24
Vnom [Vac]: 120		Vmax [Vac]: 138		Vmin [Vac]: 102
Tnom [°C]: 20		Tmax [°C]: 50		Tmin [°C]: -30

Frequency: 5785 MHz	Frequency Drift (ppm)			
Temperature (°C)	0 minute	2 minutes	5 minutes	10 minutes
T20°C Vmax	0.43	1.00	0.84	0.34
T20°C Vmin	0.04	0.51	0.30	-0.34
T50°C Vnom	1.14	1.36	0.79	1.63
T40°C Vnom	0.51	1.21	0.50	0.90
T30°C Vnom	0.90	0.97	0.69	0.79
T20°C Vnom	0.27	0.10	0.69	0.39
T10°C Vnom	0.36	0.25	0.69	0.45
T0°C Vnom	0.39	0.44	0.25	0.67
T-10°C Vnom	0.42	0.19	0.39	0.59
T-20°C Vnom	0.21	0.43	0.10	0.63
T-30°C Vnom	0.15	0.15	0.66	0.37
Vnom [Vac]: 120		Vmax [Vac]: 138		Vmin [Vac]: 102
Tnom [°C]: 20		Tmax [°C]: 50		Tmin [°C]: -30

4 Test laboratory information

Established in 2012, ICC provides foremost EMC & RF Testing and advisory consultation services by our skilled engineers and technicians. Our services employ a wide variety of advanced edge test equipment and one of the widest certification extents in the business.

International Certification Corp (EMC and Wireless Communication Laboratory), it is our definitive objective is to institute long term, trust-based associations with our clients. The expectation we set up with our clients is based on outstanding service, practical expertise and devotion to a certified value structure. Our passion is to grant our clients with best EMC / RF services by oriented knowledgeable and accommodating staff.

Our Test sites are located at Linkou District and Kwei Shan Hsiang. Location map can be found on our website <http://www.icertifi.com.tw>.

Linkou

Tel: 886-2-2601-1640

No. 30-2, Ding Fwu Tsuen, Lin
Kou District, New Taipei City,
Taiwan, R.O.C.

Kwei Shan

Tel: 886-3-271-8666

No. 3-1, Lane 6, Wen San 3rd St.,
Kwei Shan District, Tao Yuan City
333, Taiwan, R.O.C.

Kwei Shan Site II

Tel: 886-3-271-8640

No. 14-1, Lane 19, Wen San 3rd
St., Kwei Shan District, Tao Yuan
City 333, Taiwan, R.O.C..

If you have any suggestion, please feel free to contact us as below information

Tel: 886-3-271-8666

Fax: 886-3-318-0155

Email: ICC_Service@icertifi.com.tw

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