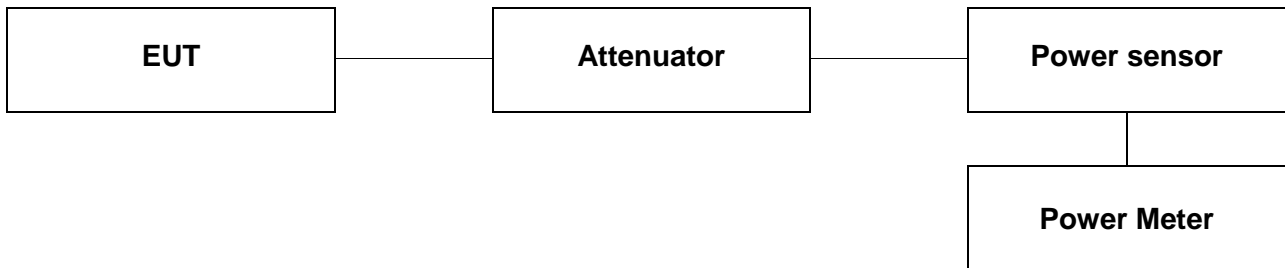


5. Maximum Conducted Output Power

5.1. Test setup



5.2. Limit

FCC 15.407 (a)(1)(iv)

For mobile and portable client devices in the 5.15 - 5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dB i. In addition, the maximum power spectral density shall not exceed 11 dB m in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dB i are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dB i.

(a)(2)

For the 5.25 - 5.35 GHz and 5.47 - 5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dB m 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dB m in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dB i are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dB i.

(a)(3)

For the band 5.725 - 5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dB m in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dB i are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dB i. However, fixed point-to point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dB i without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

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A4(210 mm x 297 mm)

5.3. Test procedure

1. This measurement settings are specified in section E.3.a of KDB 789033_v01r01.
2. Measurements may be performed using a wideband RF power meter with a thermocouple detector or equivalent if all of the conditions listed below are satisfied.
 - The EUT is configured to transmit continuously or to transmit with a consistent duty cycle.
 - At all times when the EUT is transmitting, it must be transmitting at its maximum power control level.
 - The integration period of the power meter exceeds the repetition period of the transmitted signal by at least a factor of five.
3. If the transmitter does not transmit continuously, measure the duty cycle, x , of the transmitter output signal as described in section II.B.
4. Measure the average power of the transmitter. This measurement is an average over both the on and off periods of the transmitter.
5. Adjust the measurement in dBm by adding $10 \log (1/x)$ where x is the duty cycle (e.g., $10 \log(1/0.25)$ if the duty cycle is 25 percent).

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A4(210 mm x 297 mm)

5.4. Test result

Ambient temperature : (23 ± 1) °C

Relative humidity : 47 % R.H.

- 11a

Band	Power	Frequency (MHz)	Conducted Power (dB m)							
			Data Rate [Mbps]							
			6	9	12	18	24	36	48	54
U-NII 1	Mea. average	5 180	11.79	11.64	11.23	10.98	9.45	9.23	8.77	8.54
	Result		12.11	12.15	11.89	11.95	10.47	10.72	10.71	10.48
	Mea. average	5 200	11.78	11.63	11.24	10.99	9.20	8.78	8.53	8.10
	Result		12.10	12.14	11.90	11.96	10.22	10.27	10.47	10.04
	Mea. average	5 240	11.86	11.67	11.55	11.09	9.18	8.67	8.43	8.29
	Result		12.18	12.18	12.21	12.06	10.20	10.16	10.37	10.23
U-NII 2A	Mea. average	5 260	13.22	13.07	12.88	12.26	11.01	10.71	9.87	9.55
	Result		13.54	13.58	13.54	13.23	12.03	12.20	11.81	11.49
	Mea. average	5 280	13.61	13.32	13.25	12.97	11.96	11.44	10.90	10.55
	Result		13.93	13.83	13.91	13.94	12.98	12.93	12.84	12.49
	Mea. average	5 320	12.89	12.12	11.94	11.66	10.05	9.89	9.64	9.55
	Result		13.21	12.63	12.6	12.63	11.07	11.38	11.58	11.49
U-NII 2C	Mea. average	5 500	13.68	13.41	13.13	12.90	11.25	11.03	10.86	10.42
	Result		14.00	13.92	13.79	13.87	12.27	12.52	12.80	12.36
	Mea. average	5 580	14.45	14.30	14.24	13.98	11.83	11.42	11.04	10.92
	Result		14.77	14.81	14.90	14.95	12.85	12.91	12.98	12.86
	Mea. average	5 700	13.96	13.81	13.68	13.47	11.60	11.29	11.04	10.73
	Result		14.28	14.32	14.34	14.44	12.62	12.78	12.98	12.67
U-NII 3	Mea. average	5 745	12.46	12.21	11.90	11.75	10.74	10.20	9.87	9.19
	Result		12.78	12.72	12.56	12.72	11.76	11.69	11.81	11.13
	Mea. average	5 785	13.20	13.02	12.87	12.45	10.66	10.23	9.93	9.79
	Result		13.52	13.53	13.53	13.42	11.68	11.72	11.87	11.73
	Mea. average	5 825	13.98	13.48	13.19	13.20	11.11	10.65	10.35	10.45
	Result		14.30	13.99	13.85	14.17	12.13	12.14	12.29	12.39

Band	Conducted Power Limit (dB m)					
	Frequency (MHz)	Fixed Limit (dB m)	26 dB BW (MHz)	11+10LogB (dB m)	Antenna gain (dB i)	Limit (dB m)
U-NII 1	5 180	24				
	5 200	24				
	5 240	24				
U-NII 2A	5 260	24	18.581	23.69	-1.40	23.69
	5 280	24	21.538	24.33	-1.40	24
	5 320	24	21.459	24.32	-1.40	24
U-NII 2C	5 500	24	21.499	24.32	2.70	24
	5 580	24	18.541	23.68	2.70	23.68
	5 700	24	21.459	24.32	2.70	24
U-NII 3	5 745	30				
	5 785	30				
	5 825	30				

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Mode	Duty cycle							
	Data Rate [Mbps]							
11a	6	9	12	18	24	36	48	54
Duty Cycle (%)	93	89	86	80	79	71	64	64
Correction factor (dB)	0.32	0.51	0.66	0.97	1.02	1.49	1.94	1.94

Remark:

1. Result (dB m) = Average (dB m) + Correction factor (dB)
2. Duty cycle (%) = (Tx on time / Tx on + off time) x 100
3. Correction factor (dB) = 10 log (1/duty cycle (ms))

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Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

- 11n_HT20

Band	Power	Frequency (MHz)	Conducted Power (dB m)							
			Data Rate [MCS]							
			0	1	2	3	4	5	6	7
U-NII 1	Mea. average	5 180	10.55	10.23	10.02	8.53	8.21	8.01	7.88	7.38
	Result		10.87	10.83	10.88	9.61	9.70	9.81	9.82	9.46
	Mea. average	5 200	10.69	10.38	10.07	8.39	7.80	7.50	7.28	6.64
	Result		11.01	10.98	10.93	9.47	9.29	9.30	9.22	8.72
	Mea. average	5 240	10.90	10.41	10.07	8.63	7.83	7.65	7.39	6.63
	Result		11.22	11.01	10.93	9.71	9.32	9.45	9.33	8.71
U-NII 2A	Mea. average	5 260	11.65	11.33	11.15	9.79	9.45	9.10	8.76	8.38
	Result		11.97	11.93	12.01	10.87	10.94	10.90	10.70	10.46
	Mea. average	5 280	11.80	11.35	10.67	9.02	8.90	8.44	7.78	7.06
	Result		12.12	11.95	11.53	10.10	10.39	10.24	9.72	9.14
	Mea. average	5 320	11.87	11.56	11.30	10.76	10.21	9.88	8.69	8.44
	Result		12.19	12.16	12.16	11.84	11.70	11.68	10.63	10.52
U-NII 2C	Mea. average	5 500	12.52	12.21	12.07	10.77	10.46	9.98	9.43	9.23
	Result		12.84	12.81	12.93	11.85	11.95	11.78	11.37	11.31
	Mea. average	5 580	13.31	12.85	12.72	11.84	11.32	11.13	10.97	9.90
	Result		13.63	13.45	13.58	12.92	12.81	12.93	12.91	11.98
	Mea. average	5 700	12.91	12.66	12.40	11.52	11.19	10.78	10.71	9.64
	Result		13.23	13.26	13.26	12.60	12.68	12.58	12.65	11.72
U-NII 3	Mea. average	5 745	11.35	11.03	10.91	9.66	9.43	9.21	8.68	8.03
	Result		11.67	11.63	11.77	10.74	10.92	11.01	10.62	10.11
	Mea. average	5 785	12.20	11.89	11.34	9.87	9.46	9.23	8.87	8.55
	Result		12.52	12.49	12.20	10.95	10.95	11.03	10.81	10.63
	Mea. average	5 825	12.75	12.37	11.96	11.12	10.89	10.40	10.56	9.46
	Result		13.07	12.97	12.82	12.20	12.38	12.20	12.50	11.54

Band	Conducted Power Limit (dB m)					
	Frequency (MHz)	Fixed Limit (dB m)	26 dB BW (MHz)	11+10LogB (dB m)	Antenna gain (dB i)	Limit (dB m)
U-NII 1	5 180	24				
	5 200	24				
	5 240	24				
U-NII 2A	5 260	24	18.981	23.78	-1.40	23.78
	5 280	24	21.658	24.36	-1.40	24
	5 320	24	21.778	24.38	-1.40	24
U-NII 2C	5 500	24	21.818	24.39	2.70	24
	5 580	24	18.901	23.76	2.70	23.76
	5 700	24	21.738	24.37	2.70	24
U-NII 3	5 745	30				
	5 785	30				
	5 825	30				

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Mode	Duty cycle							
	Data Rate [MCS]							
11n_HT20	0	1	2	3	4	5	6	7
Duty Cycle (%)	93	87	82	78	71	66	64	62
Correction factor (dB)	0.32	0.60	0.86	1.08	1.49	1.80	1.94	2.08

Remark:

1. Result (dB m) = Average (dB m) + Correction factor (dB)
2. Duty cycle (%) = (Tx on time / Tx on + off time) x 100
3. Correction factor (dB) = 10 log (1/duty cycle (ms))

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A4(210 mm x 297 mm)

- 11n_HT40

Band	Power	Frequency (MHz)	Conducted Power (dB m)							
			Data Rate [MCS]							
			0	1	2	3	4	5	6	7
U-NII 1	Mea. average	5 190	10.14	9.88	9.46	8.12	7.45	6.88	6.11	5.59
	Result		11.11	10.96	10.95	9.92	9.82	9.56	9.03	8.60
	Mea. average	5 230	10.77	10.40	10.16	8.93	8.51	8.15	7.49	5.51
	Result		11.74	11.48	11.65	10.73	10.88	10.83	10.41	8.52
U-NII 2A	Mea. average	5 270	11.00	10.58	10.33	8.76	8.26	7.87	7.49	7.19
	Result		11.97	11.66	11.82	10.56	10.63	10.55	10.41	10.20
	Mea. average	5 310	11.79	11.46	11.13	9.24	8.77	8.12	7.88	6.67
	Result		12.76	12.54	12.62	11.04	11.14	10.80	10.80	9.68
U-NII 2C	Mea. average	5 510	11.78	11.49	11.23	9.44	9.17	8.67	8.16	7.66
	Result		12.75	12.57	12.72	11.24	11.54	11.35	11.08	10.67
	Mea. average	5 550	11.61	11.38	11.03	9.20	9.00	7.73	7.26	6.31
	Result		12.58	12.46	12.52	11.00	11.37	10.41	10.18	9.32
	Mea. average	5 670	12.00	11.81	11.45	10.17	9.60	9.27	9.03	7.97
	Result		12.97	12.89	12.94	11.97	11.97	11.95	11.95	10.98
U-NII 3	Mea. average	5 755	10.82	10.45	10.16	8.49	8.23	7.87	7.29	6.73
	Result		11.79	11.53	11.65	10.29	10.60	10.55	10.21	9.74
	Mea. average	5 795	11.82	11.46	11.06	9.49	9.11	8.66	7.84	7.12
	Result		12.79	12.54	12.55	11.29	11.48	11.34	10.76	10.13

Band	Conducted Power Limit (dB m)					
	Frequency (MHz)	Fixed Limit (dB m)	26 dB BW (MHz)	11+10LogB (dB m)	Antenna gain (dB i)	Limit (dB m)
U-NII 1	5 190	24				
	5 230	24				
U-NII 2A	5 270	24	40.519	27.08	-1.40	24
	5 310	24	40.599	27.09	-1.40	24
U-NII 2C	5 510	24	40.599	27.09	2.70	24
	5 550	24	40.519	27.08	2.70	24
	5 670	24	40.679	27.09	2.70	24
U-NII 3	5 755	30				
	5 795	30				

Mode	Duty cycle							
	Data Rate [MCS]							
11n_HT40	0	1	2	3	4	5	6	7
Duty Cycle (%)	80	78	71	66	58	54	51	50
Correction factor (dB)	0.97	1.08	1.49	1.80	2.37	2.68	2.92	3.01

Remark:

1. Result (dB m) = Average (dB m) + Correction factor (dB)
2. Duty cycle (%) = (Tx on time / Tx on + off time) x 100
3. Correction factor (dB) = 10 log (1/duty cycle (ms))

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- 11ac_VHT20

Band	Power	Frequency (MHz)	Conducted Power (dB m)								
			Data Rate [MCS]								
			0	1	2	3	4	5	6	7	8
U-NII 1	Mea. average	5 180	10.85	10.49	10.17	9.21	9.02	8.79	8.26	7.87	7.49
	Result		11.17	11.09	11.03	10.29	10.51	10.59	10.20	9.95	9.78
	Mea. average	5 200	11.56	11.29	11.05	9.63	9.16	8.63	8.05	7.31	6.81
	Result		11.88	11.89	11.91	10.71	10.65	10.43	9.99	9.39	9.10
	Mea. average	5 240	11.68	11.43	11.16	9.23	9.16	8.63	7.84	7.41	7.16
	Result		12.00	12.03	12.02	10.31	10.65	10.43	9.78	9.49	9.45
U-NII 2A	Mea. average	5 260	11.79	11.49	11.10	9.57	9.26	9.11	8.76	8.49	8.34
	Result		12.11	12.09	11.96	10.65	10.75	10.91	10.70	10.57	10.63
	Mea. average	5 280	11.81	11.56	11.23	9.11	8.65	8.32	7.90	7.56	7.33
	Result		12.13	12.16	12.09	10.19	10.14	10.12	9.84	9.64	9.62
	Mea. average	5 320	11.81	11.19	11.05	9.76	9.49	9.16	8.67	8.45	8.32
	Result		12.13	11.79	11.91	10.84	10.98	10.96	10.61	10.53	10.61
U-NII 2C	Mea. average	5 500	12.62	12.23	12.11	10.87	10.46	10.10	9.83	9.67	9.26
	Result		12.94	12.83	12.97	11.95	11.95	11.90	11.77	11.75	11.55
	Mea. average	5 580	13.21	12.95	12.77	11.76	11.40	11.12	11.00	10.71	9.65
	Result		13.53	13.55	13.63	12.84	12.89	12.92	12.94	12.79	11.94
	Mea. average	5 700	12.89	12.67	12.35	11.59	11.24	10.92	10.79	9.75	9.32
	Result		13.21	13.27	13.21	12.67	12.73	12.72	12.73	11.83	11.61
U-NII 3	Mea. average	5 745	11.53	11.21	11.02	9.38	9.22	9.03	8.64	8.39	7.53
	Result		11.85	11.81	11.88	10.46	10.71	10.83	10.58	10.47	9.82
	Mea. average	5 785	12.36	12.11	11.60	10.32	10.10	9.60	8.98	8.72	8.30
	Result		12.68	12.71	12.46	11.40	11.59	11.40	10.92	10.80	10.59
	Mea. average	5 825	12.60	12.35	12.06	11.17	10.63	10.44	10.40	9.31	9.14
	Result		12.92	12.95	12.92	12.25	12.12	12.24	12.34	11.39	11.43

Band	Conducted Power Limit (dB m)					
	Frequency (MHz)	Fixed Limit (dB m)	26 dB BW (MHz)	11+10LogB (dB m)	Antenna gain (dB i)	Limit (dB m)
U-NII 1	5 180	24				
	5 200	24				
	5 240	24				
U-NII 2A	5 260	24	18.821	23.75	-1.40	23.75
	5 280	24	21.658	24.36	-1.40	24
	5 320	24	21.618	24.35	-1.40	24
U-NII 2C	5 500	24	21.778	24.38	2.70	24
	5 580	24	18.941	23.77	2.70	23.77
	5 700	24	21.698	24.36	2.70	24
U-NII 3	5 745	30				
	5 785	30				
	5 825	30				

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Mode	Duty cycle								
	Data Rate [MCS]								
	0	1	2	3	4	5	6	7	8
11ac_VHT20									
Duty Cycle (%)	93	87	82	78	71	66	64	62	59
Correction factor (dB)	0.32	0.60	0.86	1.08	1.49	1.80	1.94	2.08	2.29

Remark:

1. Result (dB m) = Average (dB m) + Correction factor (dB)
2. Duty cycle (%) = (Tx on time / Tx on + off time) x 100
3. Correction factor (dB) = 10 log (1/duty cycle (ms))

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A4(210 mm x 297 mm)

- 11ac_VHT40

Band	Power	Frequency (MHz)	Conducted Power (dB m)									
			Data Rate [MCS]									
			0	1	2	3	4	5	6	7	8	9
U-NII 1	Mea. average	5 190	10.57	10.06	9.78	8.75	8.21	7.64	7.53	5.83	5.80	5.78
	Result		11.54	11.14	11.27	10.55	10.58	10.32	10.45	8.84	8.90	8.97
	Mea. average	5 230	10.52	9.94	9.59	7.08	6.92	6.33	6.17	5.09	4.95	4.60
	Result		11.49	11.02	11.08	8.88	9.29	9.01	9.09	8.10	8.05	7.79
U-NII 2A	Mea. average	5 270	11.35	10.96	10.49	8.26	8.05	7.86	7.60	7.49	6.99	6.84
	Result		12.32	12.04	11.98	10.06	10.42	10.54	10.52	10.50	10.09	10.03
	Mea. average	5 310	11.68	11.30	10.89	8.69	8.40	8.05	6.92	6.76	6.25	6.13
	Result		12.65	12.38	12.38	10.49	10.77	10.73	9.84	9.77	9.35	9.32
U-NII 2C	Mea. average	5 510	12.00	11.67	11.19	9.88	9.49	9.12	8.77	7.98	7.67	7.50
	Result		12.97	12.75	12.68	11.68	11.86	11.80	11.69	10.99	10.77	10.69
	Mea. average	5 550	11.95	11.53	11.16	9.10	8.71	8.01	7.57	6.83	6.35	6.20
	Result		12.92	12.61	12.65	10.90	11.08	10.69	10.49	9.84	9.45	9.39
	Mea. average	5 670	12.00	11.78	11.41	10.15	9.57	9.28	9.06	7.94	7.86	7.61
	Result		12.97	12.86	12.90	11.95	11.94	11.96	11.98	10.95	10.96	10.80
U-NII 3	Mea. average	5 755	11.29	10.91	10.49	10.11	8.49	8.23	8.05	7.06	6.88	6.57
	Result		12.26	11.99	11.98	11.91	10.86	10.91	10.97	10.07	9.98	9.76
	Mea. average	5 795	12.02	11.66	11.23	9.87	9.45	9.11	8.79	7.68	7.53	7.31
	Result		<u>12.99</u>	12.74	12.72	11.67	11.82	11.79	11.71	10.69	10.63	10.50

Band	Conducted Power Limit (dB m)					
	Frequency (MHz)	Fixed Limit (dB m)	26 dB BW (MHz)	11+10LogB (dB m)	Antenna gain (dB i)	Limit (dB m)
U-NII 1	5 190	24				
	5 230	24				
U-NII 2A	5 270	24	40.360	27.06	-1.40	24
	5 310	24	40.340	27.06	-1.40	24
U-NII 2C	5 510	24	40.519	27.08	2.70	24
	5 550	24	40.519	27.08	2.70	24
	5 670	24	40.440	27.07	2.70	24
U-NII 3	5 755	30				
	5 795	30				

Mode	Duty cycle									
	Data Rate [MCS]									
11ac_VHT40	0	1	2	3	4	5	6	7	8	9
Duty Cycle (%)	80	78	71	66	58	54	51	50	49	48
Correction factor (dB)	0.97	1.08	1.49	1.80	2.37	2.68	2.92	3.01	3.10	3.19

Remark:

1. Result (dB m) = Average (dB m) + Correction factor (dB)
2. Duty cycle (%) = (Tx on time / Tx on + off time) x 100
3. Correction factor (dB) = 10 log (1/duty cycle (ms))

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- 11ac_VHT80

Band	Power	Frequency (MHz)	Conducted Power (dB m)									
			Data Rate [MCS]									
			0	1	2	3	4	5	6	7	8	9
U-NII 1	Mea. Average	5 210	8.72	7.91	7.48	5.63	5.40	4.91	4.78	4.48	4.29	4.08
	Result		9.86	9.78	9.85	8.47	8.50	8.48	8.55	8.35	8.27	8.28
U-NII 2A	Mea. Average	5 290	9.13	8.17	7.88	5.57	5.16	4.67	4.43	4.83	4.71	4.68
	Result		10.27	10.04	10.25	8.41	8.26	8.24	8.20	8.70	8.69	8.88
U-NII 2C	Mea. Average	5 530	9.90	9.14	8.66	6.66	6.24	5.87	5.65	5.67	5.39	5.30
	Result		11.04	11.01	11.03	9.50	9.34	9.44	9.42	9.54	9.37	9.50
U-NII 3	Mea. Average	5 775	10.12	9.38	8.86	6.77	6.51	6.04	5.92	5.72	5.61	5.55
	Result		11.26	11.25	11.23	9.61	9.61	9.61	9.69	9.59	9.59	9.75

Band	Conducted Power Limit (dB m)					
	Frequency (MHz)	Fixed Limit (dB m)	26 dB BW (MHz)	11+10LogB (dB m)	Antenna gain (dB i)	Limit (dB m)
U-NII 1	5 210	24				
U-NII 2A	5 290	24	82.480	30.16	-1.40	24
U-NII 2C	5 530	24	82.320	30.16	2.70	24
U-NII 3	5 775	30				

Mode	Duty cycle									
	Data Rate [MCS]									
11ac_VHT80	0	1	2	3	4	5	6	7	8	9
Duty Cycle (%)	77	65	58	52	49	44	42	41	40	38
Correction factor (dB)	1.14	1.87	2.37	2.84	3.10	3.57	3.77	3.87	3.98	4.20

Remark:

1. Result (dB m) = Average (dB m) + Correction factor (dB)
2. Duty cycle (%) = (Tx on time / Tx on + off time) x 100
3. Correction factor (dB) = 10 log (1/duty cycle (ms))

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6. Peak Power Spectral Density

6.1. Test setup



6.2. Limit

FCC 15.407 (a)(1)(iv)

For mobile and portable client devices in the 5.15 - 5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(a)(2)

For the 5.25 - 5.35 GHz and 5.47 - 5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(a)(3)

For the band 5.725 - 5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

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A4(210 mm x 297 mm)

6.3. Test procedure

All data rates and modes were investigated for this test. The full data for the worst case data rate are reported in this section.

1. This measurement settings are specified in section F of KDB 789033_v01r01.
2. Create an average power spectrum for the EUT operating mode being tested by following the instructions in section II.E.2. for measuring maximum conducted output power using a spectrum analyzer or EMI receiver: select the appropriate test method (SA-1, SA-2, SA-3, or alternatives to each) and apply it up to, but not including, the step labeled, "Compute power...". (This procedure is required even if the maximum conducted output power measurement was performed using a power meter, method PM.)
3. Use the peak search function on the instrument to find the peak of the spectrum and record its value.
4. Make the following adjustments to the peak value of the spectrum, if applicable:
 - a) **If Method SA-2 or SA-2 Alternative was used, add $10 \log(1/x)$, where x is the duty cycle, to the peak of the spectrum.**
 - b) If Method SA-3 Alternative was used and the linear mode was used in step II.E.2.g)(viii), add 1 dB to the final result to compensate for the difference between linear averaging and power averaging.
5. The result is the Maximum PSD over 1 MHz reference bandwidth.
6. For devices operating in the bands 5.15-5.25 GHz, 5.25-5.35 GHz, and 5.47-5.725 GHz, the above procedures make use of 1 MHz RBW to satisfy directly the 1 MHz reference bandwidth specified in § 15.407(a)(5). For devices operating in the band 5.725-5.85 GHz, the rules specify a measurement bandwidth of 500 kHz. Many spectrum analyzers do not have 500 kHz RBW, thus a narrower RBW may need to be used. The rules permit the use of a RBWs less than 1 MHz, or 500 kHz, "provided that the measured power is integrated over the full reference bandwidth" to show the total power over the specified measurement bandwidth (*i.e.*, 1 MHz, or 500 kHz). If measurements are performed using a reduced resolution bandwidth (< 1 MHz, or < 500 kHz) and integrated over 1 MHz, or 500 kHz bandwidth, the following adjustments to the procedures apply:
 - a) Set $RBW \geq 1/T$, where T is defined in section II.B.I.a).
 - b) Set $VBW \geq 3$ RBW.
 - c) If measurement bandwidth of Maximum PSD is specified in 500 kHz, add $10\log(500 \text{ kHz}/RBW)$ to the measured result, whereas RBW (< 500 kHz) is the reduced resolution bandwidth of the spectrum analyzer set during measurement.
 - d) If measurement bandwidth of Maximum PSD is specified in 1 MHz, add $10\log(1 \text{ MHz}/RBW)$ to the measured result, whereas RBW (< 1 MHz) is the reduced resolution bandwidth of spectrum analyzer set during measurement.
 - e) Care must be taken to ensure that the measurements are performed during a period of continuous transmission or are corrected upward for duty cycle.

Note: As a practical matter, it is recommended to use reduced RBW of 100 kHz for the sections 5.c) and 5.d) above, since RBW = 100 kHz is available on nearly all spectrum analyzers.

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A4(210 mm x 297 mm)

6.4. Test result

Ambient temperature : (23 ± 1) °C

Relative humidity : 47 % R.H.

Band	Mode	Frequency (MHz)	Ch.	Data Rate (Mbps)	Measured PPSP (dB m)	Duty Factor (dB)	Final PPSP (dB m)	Limit (dB m/1 MHz)
U-NII 1	11a	5 180	36	6	-0.20	0.32	0.12	11
		5 200	44	6	0.01	0.32	0.33	11
		5 240	48	6	0.46	0.32	0.78	11
	11n_HT20	5 180	36	MCS0	-1.56	0.32	-1.24	11
		5 200	44	MCS0	-0.62	0.32	-0.30	11
		5 240	48	MCS0	-0.61	0.32	-0.29	11
	11n_HT40	5 190	38	MCS0	-7.82	0.97	-6.85	11
		5 230	46	MCS0	-7.60	0.97	-6.63	11
	11ac_VHT80	5 210	42	MCS0	-10.39	1.14	-9.25	11
U-NII 2A	11a	5 260	52	6	0.79	0.32	1.11	11
		5 300	60	6	0.21	0.32	0.53	11
		5 320	64	6	-0.01	0.32	0.31	11
	11n_HT20	5 260	52	MCS0	-0.76	0.32	-0.44	11
		5 300	60	MCS0	-0.74	0.32	-0.42	11
		5 320	64	MCS0	-0.91	0.32	-0.59	11
	11n_HT40	5 270	54	MCS0	-6.92	0.97	-5.95	11
		5 310	62	MCS0	-7.75	0.97	-6.78	11
	11ac_VHT80	5 290	58	MCS0	-11.68	1.14	-10.54	11
U-NII 2C	11a	5 500	134	6	1.04	0.32	1.36	11
		5 580	106	6	0.80	0.32	1.12	11
		5 700	140	6	0.36	0.32	0.68	11
	11n_HT20	5 500	100	MCS0	-0.26	0.32	0.06	11
		5 580	116	MCS0	0.48	0.32	0.80	11
		5 700	140	MCS0	0.44	0.32	0.76	11
	11n_HT40	5 510	102	MCS0	-6.24	0.97	-5.27	11
		5 550	110	MCS0	-6.45	0.97	-5.48	11
		5 670	134	MCS0	-6.50	0.97	-5.53	11
	11ac_VHT80	5 530	106	MCS0	-13.67	1.14	-12.53	11

Band	Mode	Frequency (MHz)	Ch.	Data Rate	Measured PPSP (dB m)	Duty Factor (dB)	Final PPSP (dB m)	Limit (dB m/500 kHz)
U-NII 3	11a	5 745	149	6	-3.26	0.32	-2.94	30
		5 785	157	6	-3.51	0.32	-3.19	30
		5 825	165	6	-2.40	0.32	-2.08	30
	11n_HT20	5 745	149	MCS0	-3.99	0.32	-3.67	30
		5 785	157	MCS0	-4.89	0.32	-4.57	30
		5 825	165	MCS0	-2.89	0.32	-2.57	30
	11n_HT40	5 755	151	MCS0	-10.89	0.97	-9.92	30
		5 795	159	MCS0	-10.26	0.97	-9.29	30
	11ac_VHT80	5 775	155	MCS0	-18.09	1.14	-16.95	30

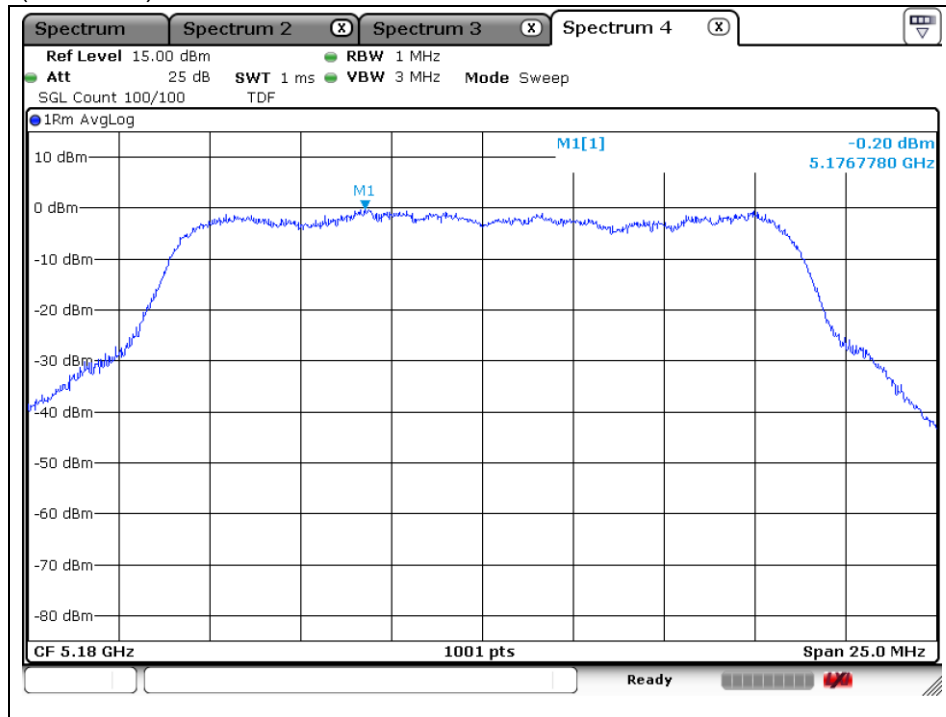
Note : Final PPSP = Measured PPSP + Duty Factor

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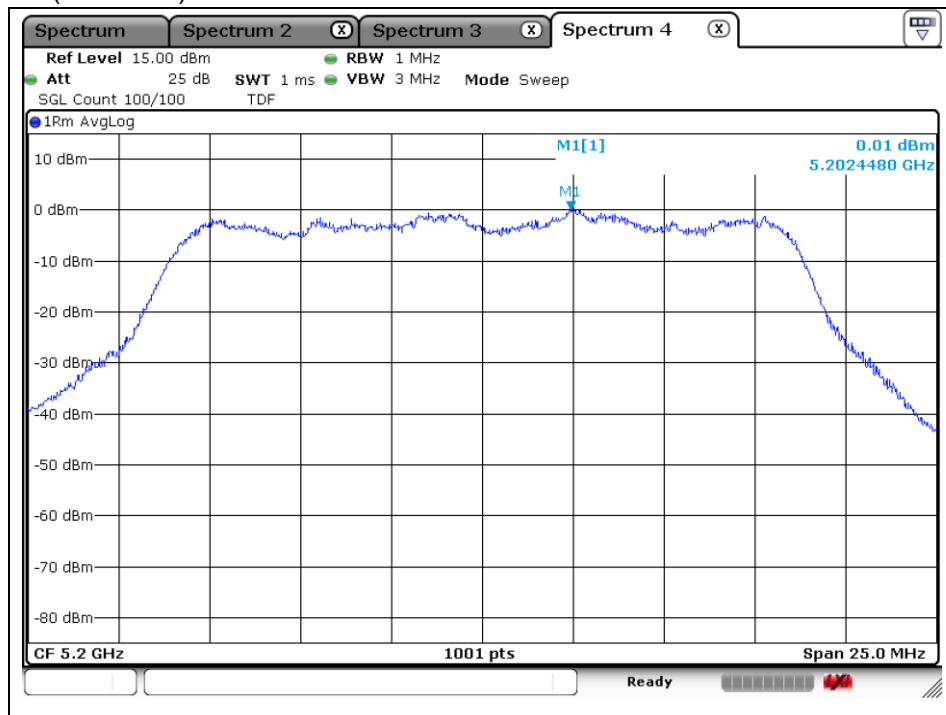
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802.11a (Band 1)

Low Channel (5 180 MHz)



Middle Channel (5 200 MHz)



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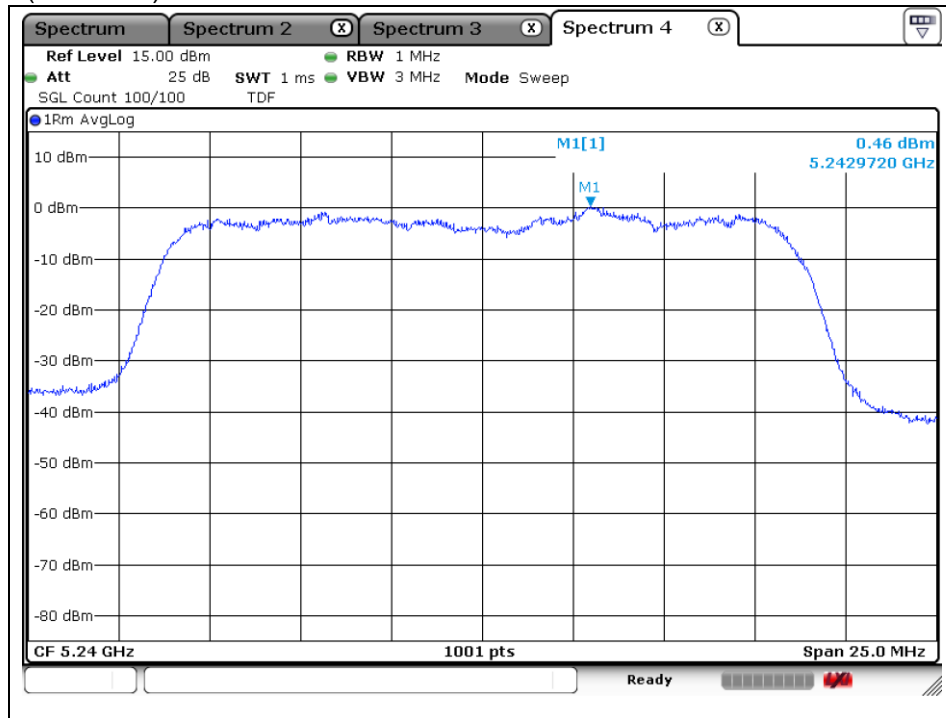
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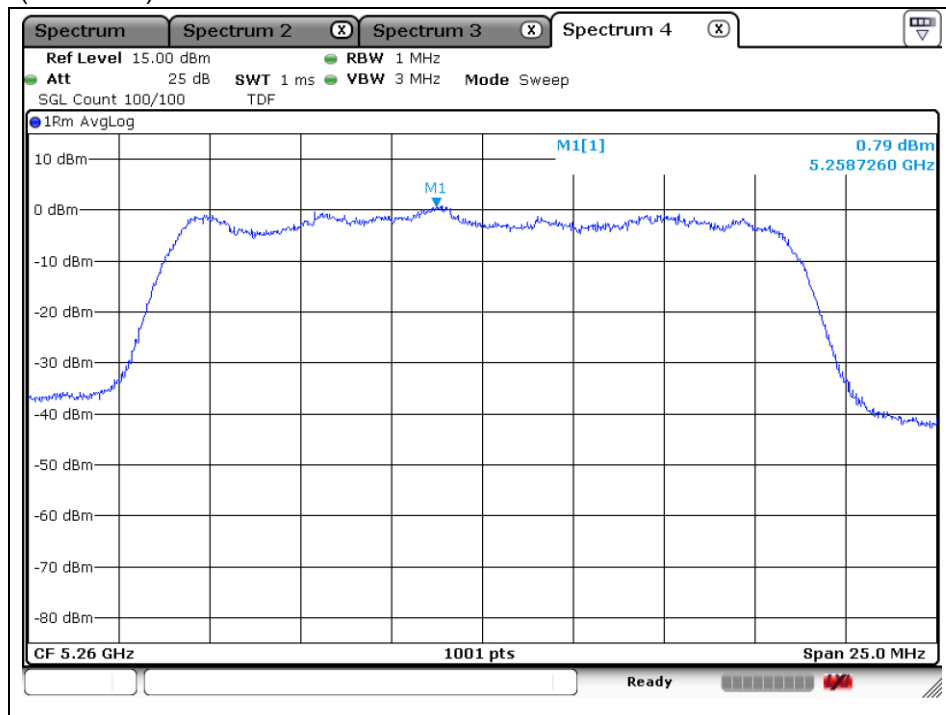
A4(210 mm x 297 mm)

High Channel (5 240 MHz)



802.11a (Band 2A)

Low Channel (5 260 MHz)



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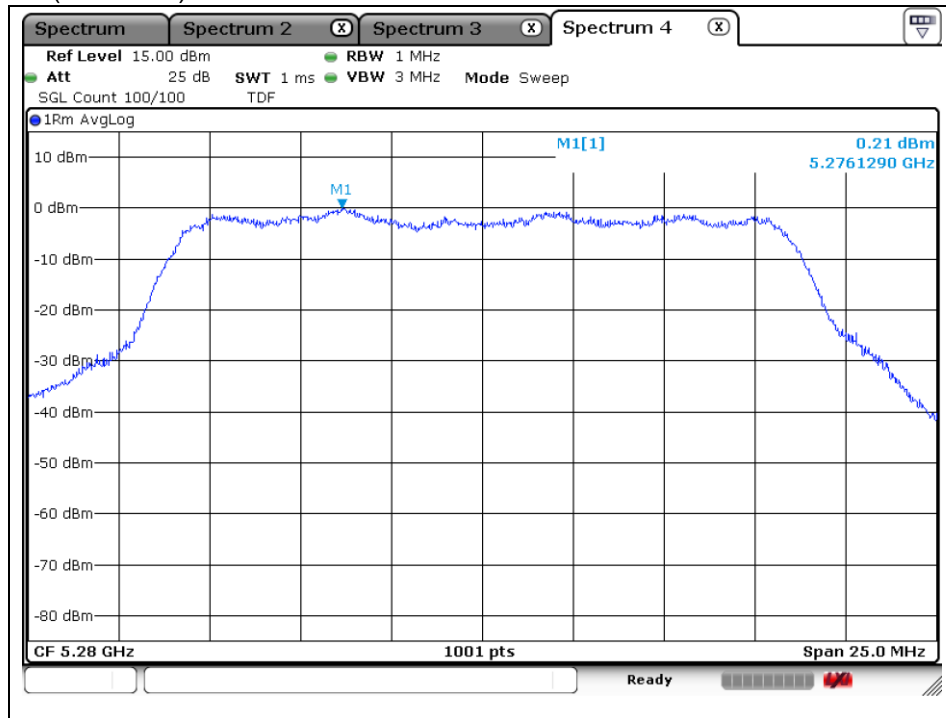
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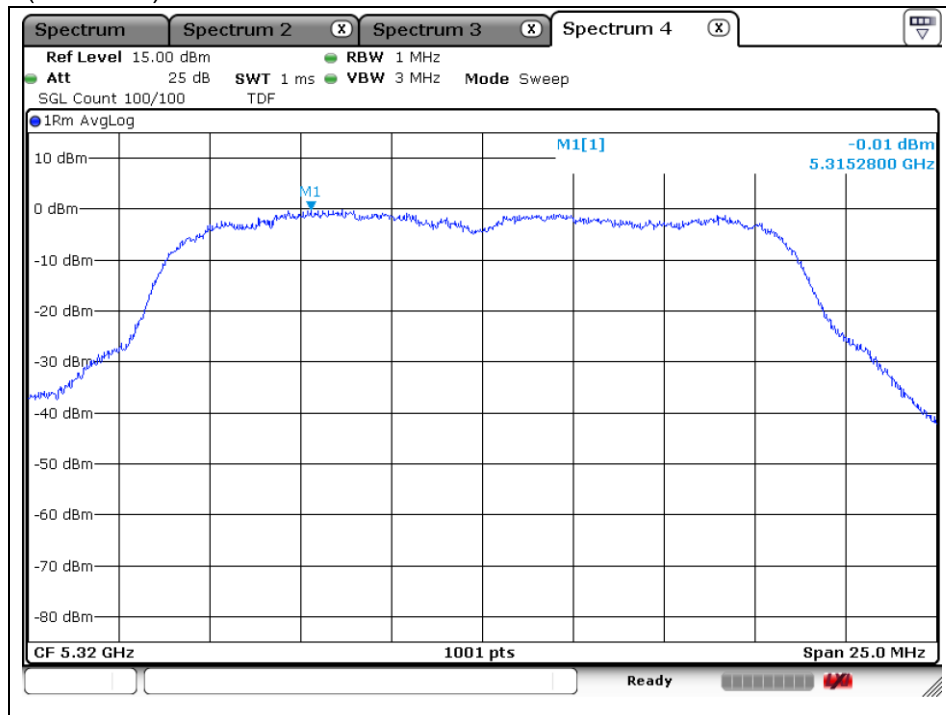
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A4(210 mm x 297 mm)

Middle Channel (5 280 MHz)



High Channel (5 320 MHz)



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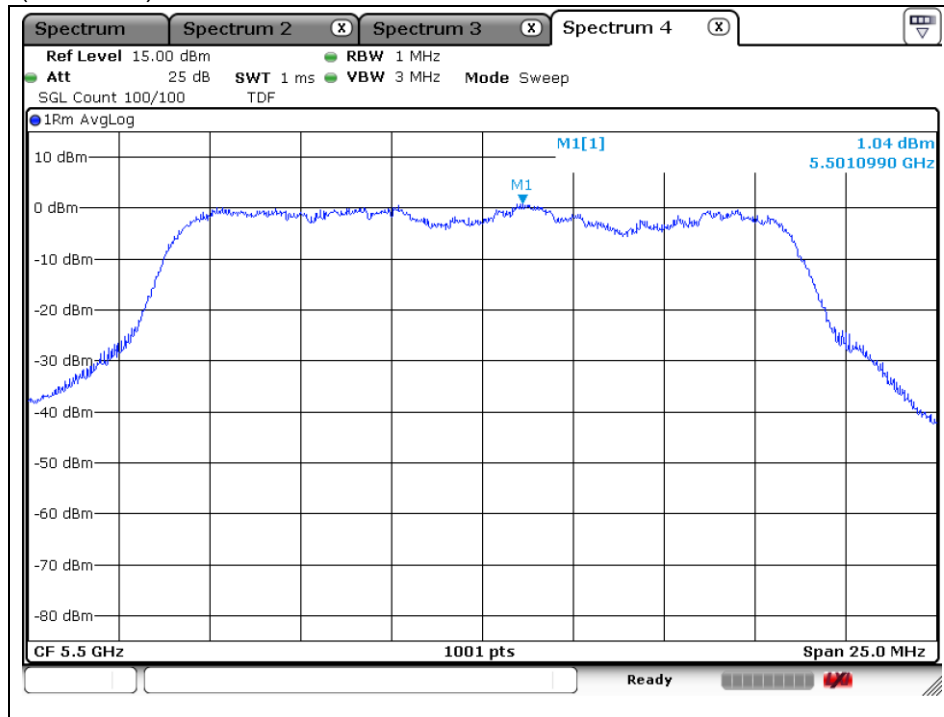
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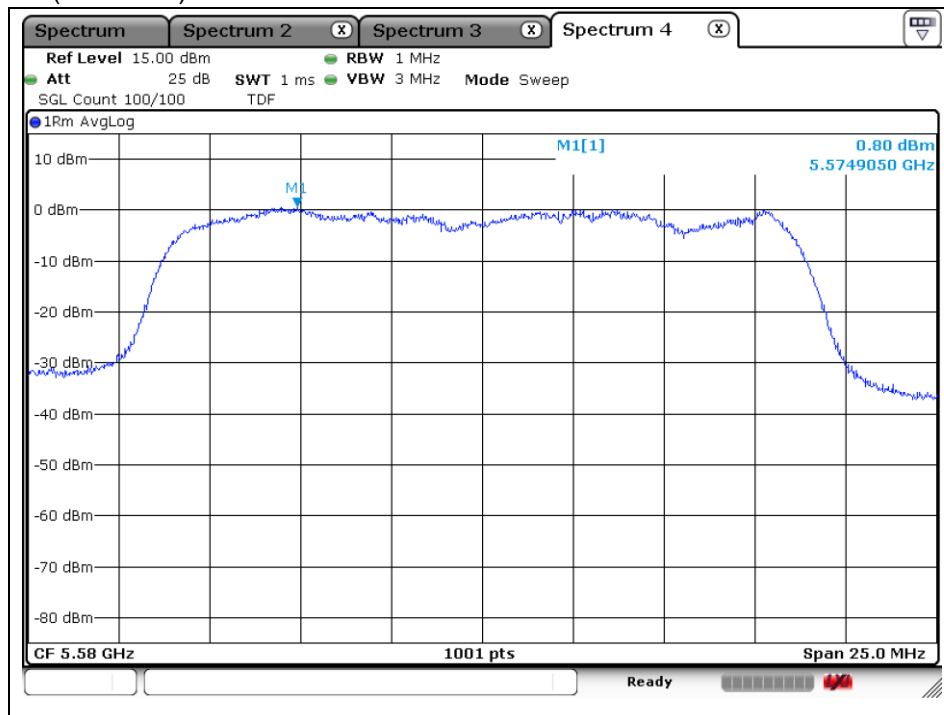
A4(210 mm x 297 mm)

802.11a (Band 2C)

Low Channel (5 500 MHz)



Middle Channel (5 580 MHz)



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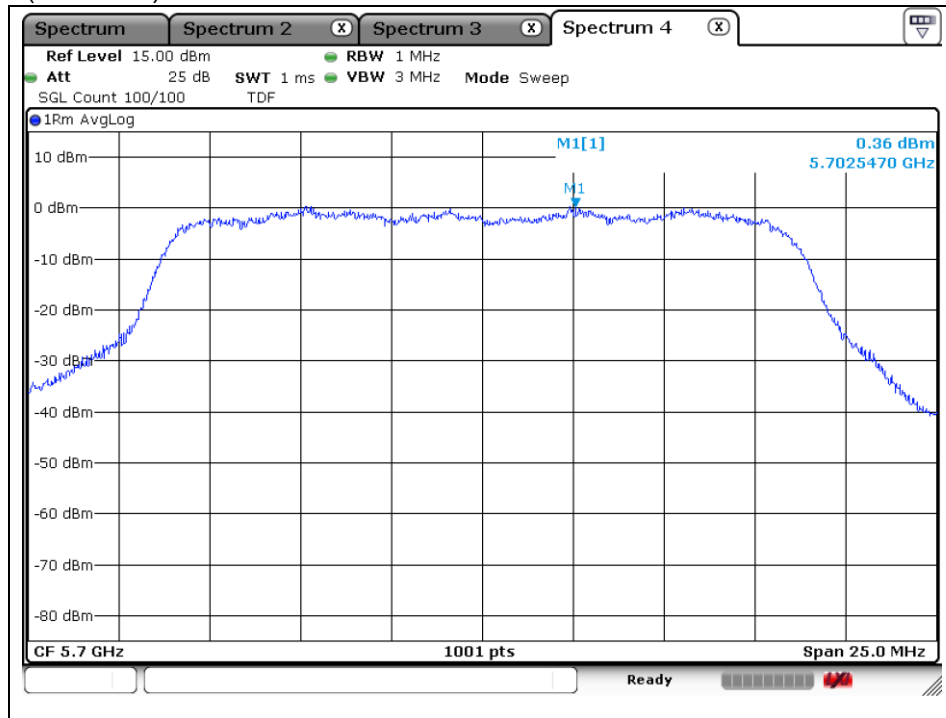
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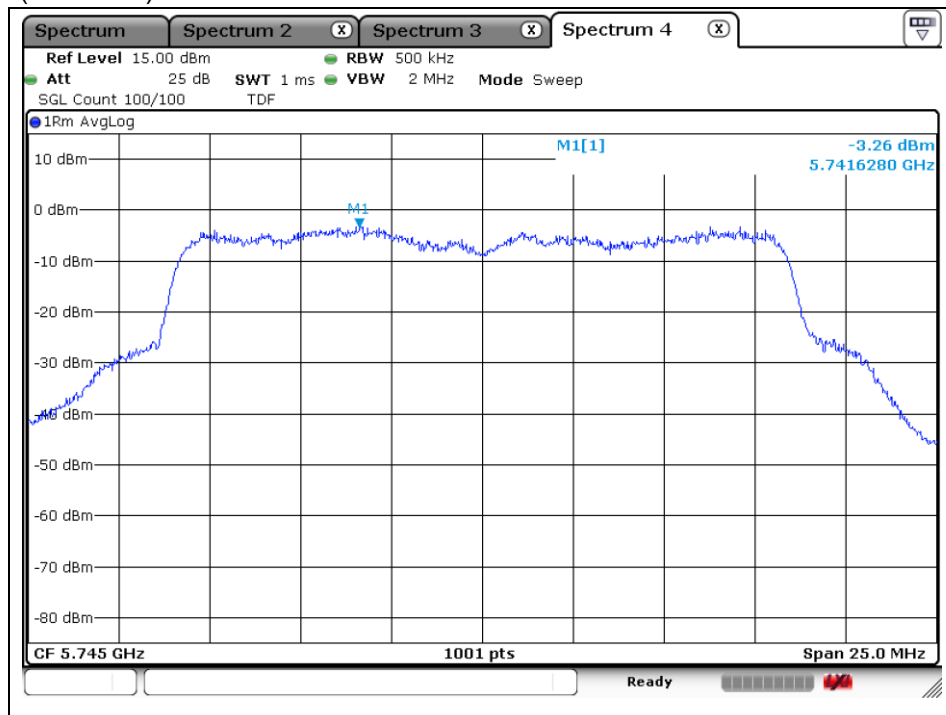
A4(210 mm x 297 mm)

High Channel (5 700 MHz)



802.11a (Band 3)

Low Channel (5 745 MHz)



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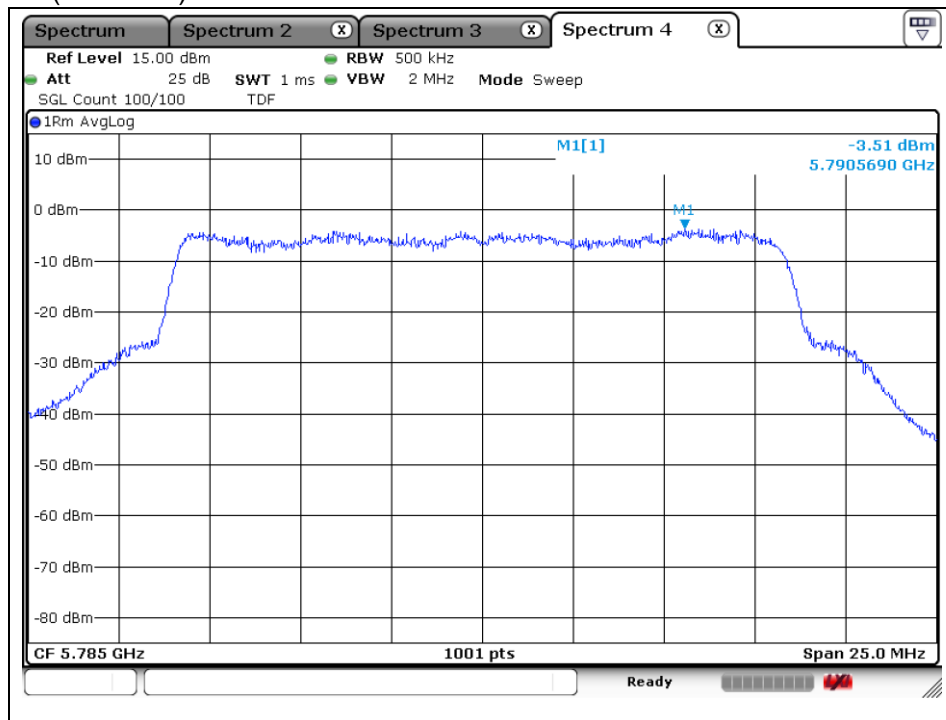
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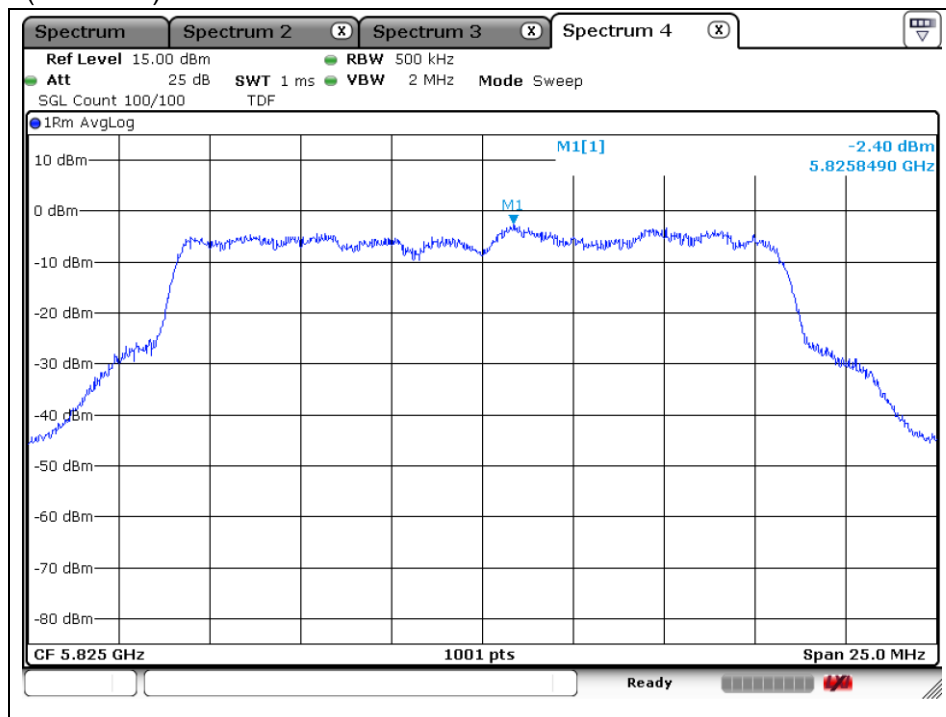
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A4(210 mm x 297 mm)

Middle Channel (5 785 MHz)



High Channel (5 825 MHz)



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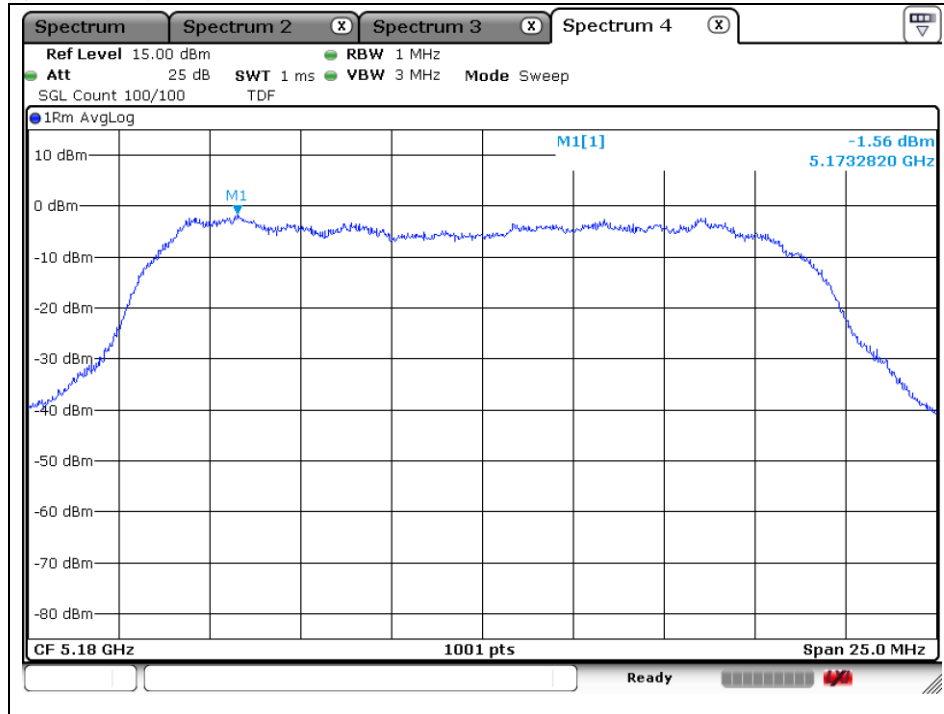
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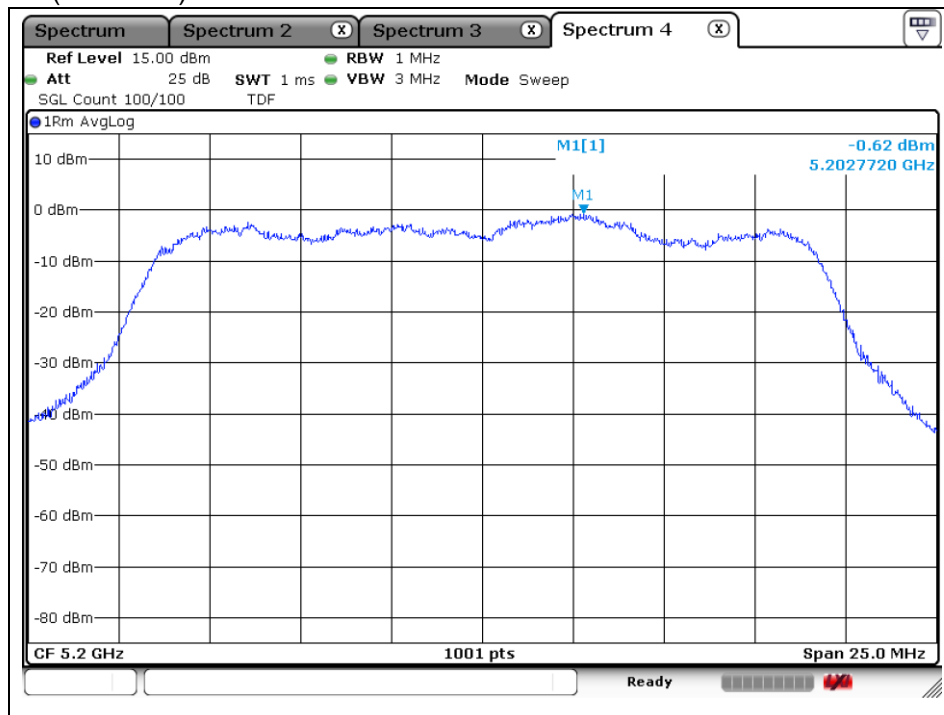
A4(210 mm x 297 mm)

802.11n_HT20 (Band 1)

Low Channel (5 180 MHz)



Middle Channel (5 200 MHz)



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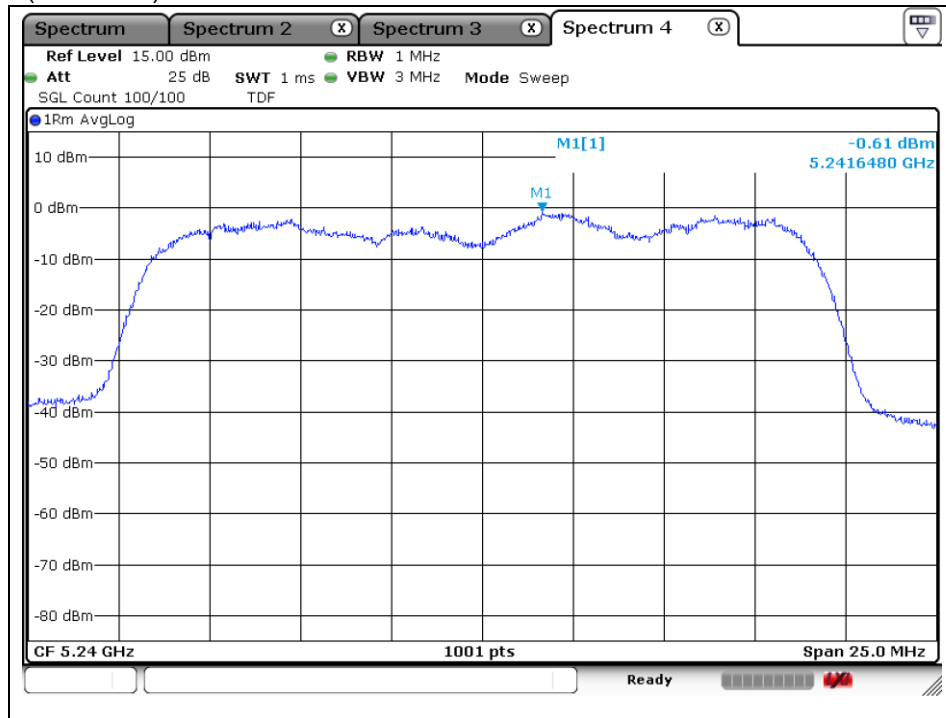
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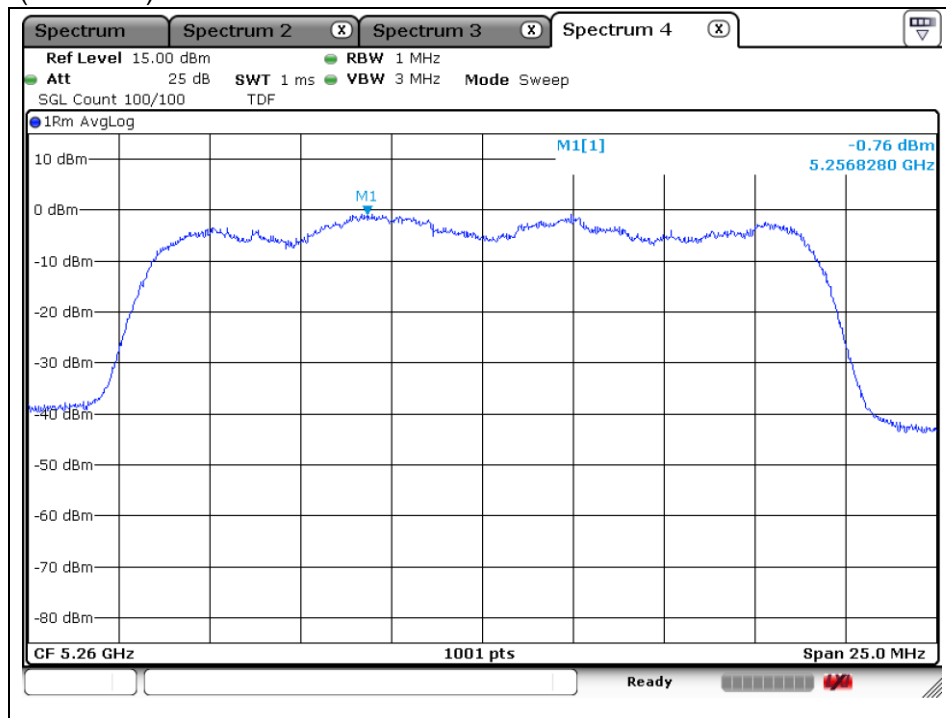
A4(210 mm x 297 mm)

High Channel (5 240 MHz)



802.11n_HT20 (Band 2A)

Low Channel (5 260 MHz)



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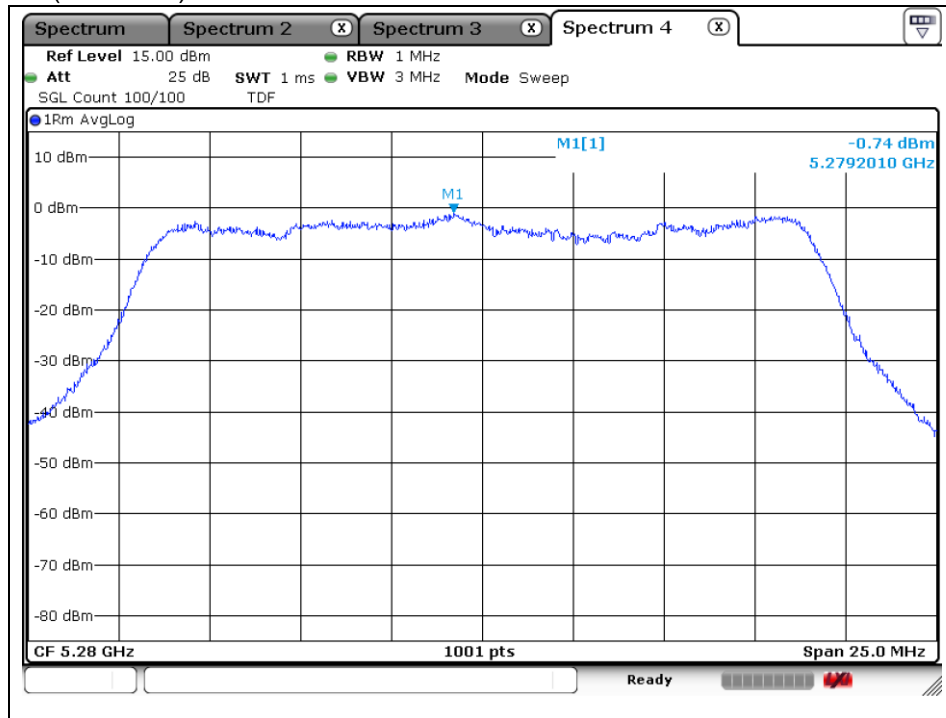
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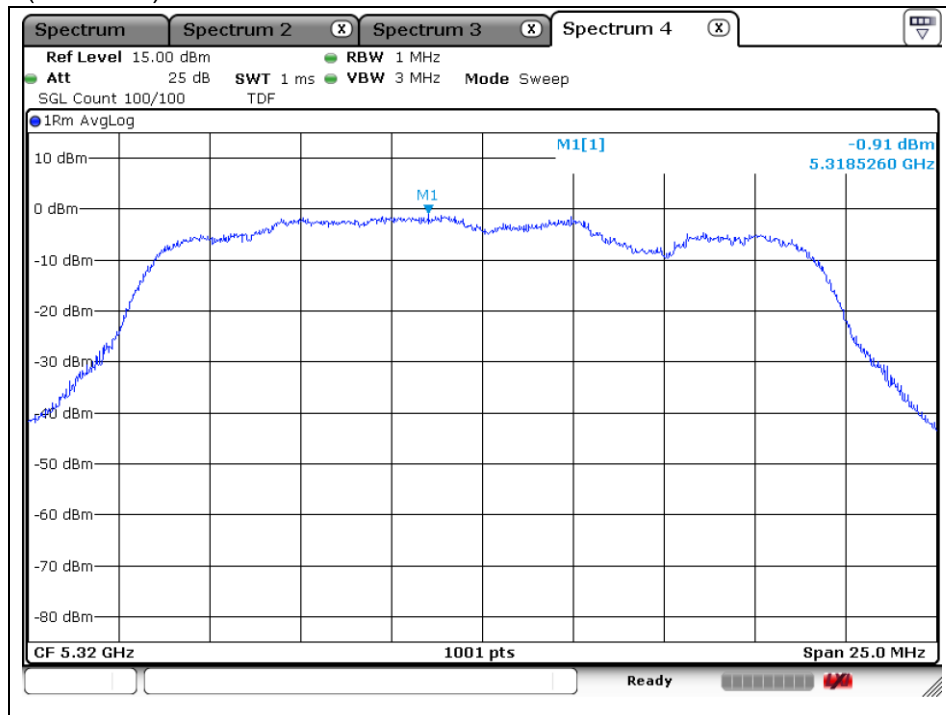
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A4(210 mm x 297 mm)

Middle Channel (5 280 MHz)



High Channel (5 320 MHz)



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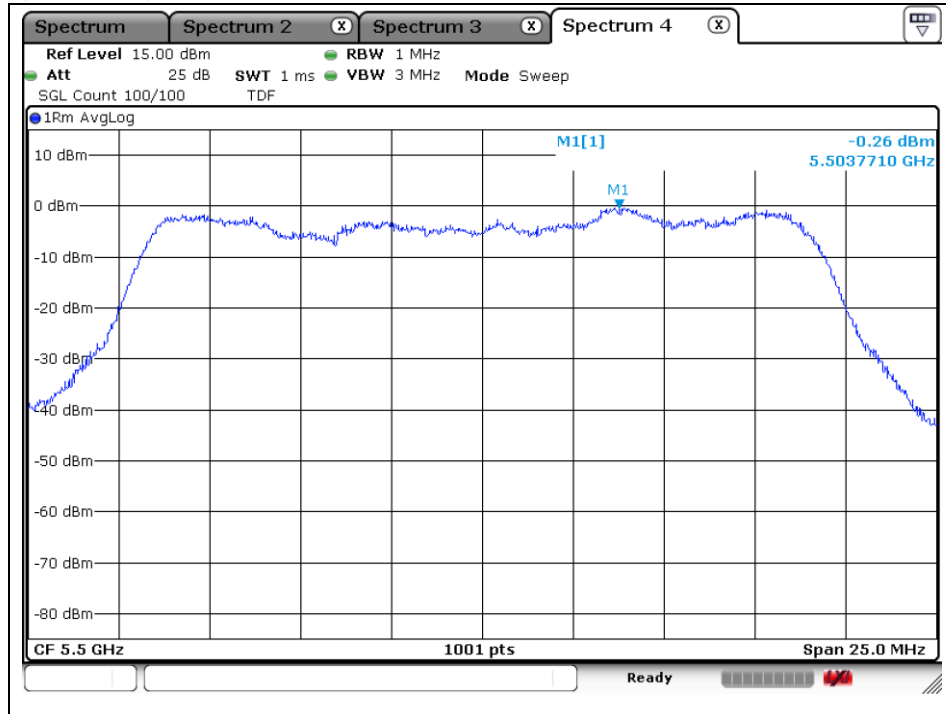
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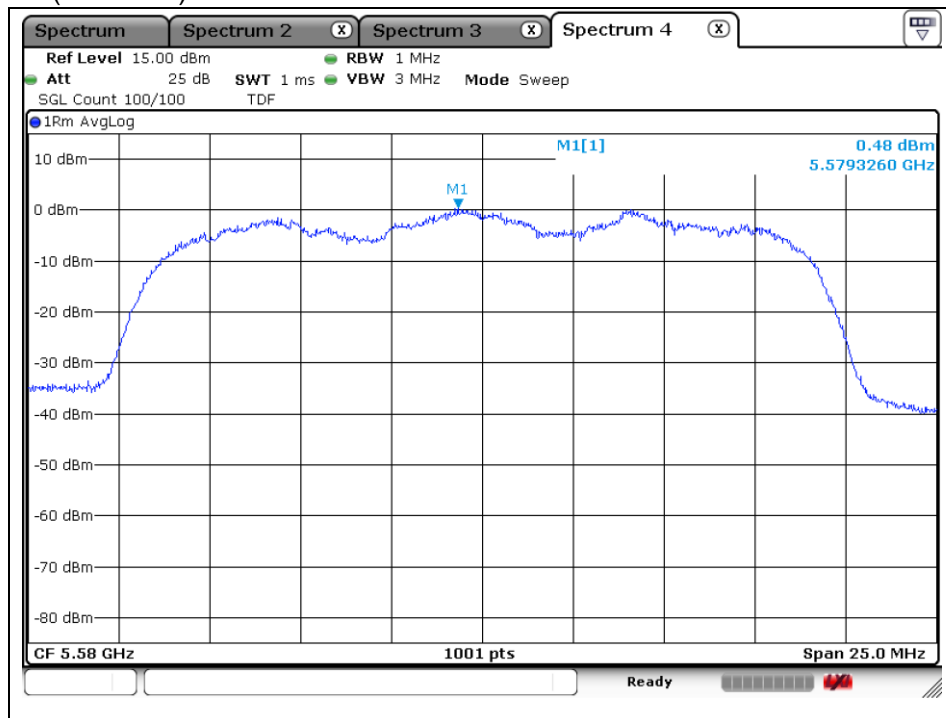
A4(210 mm x 297 mm)

802.11n_HT20 (Band 2C)

Low Channel (5 500 MHz)



Middle Channel (5 580 MHz)



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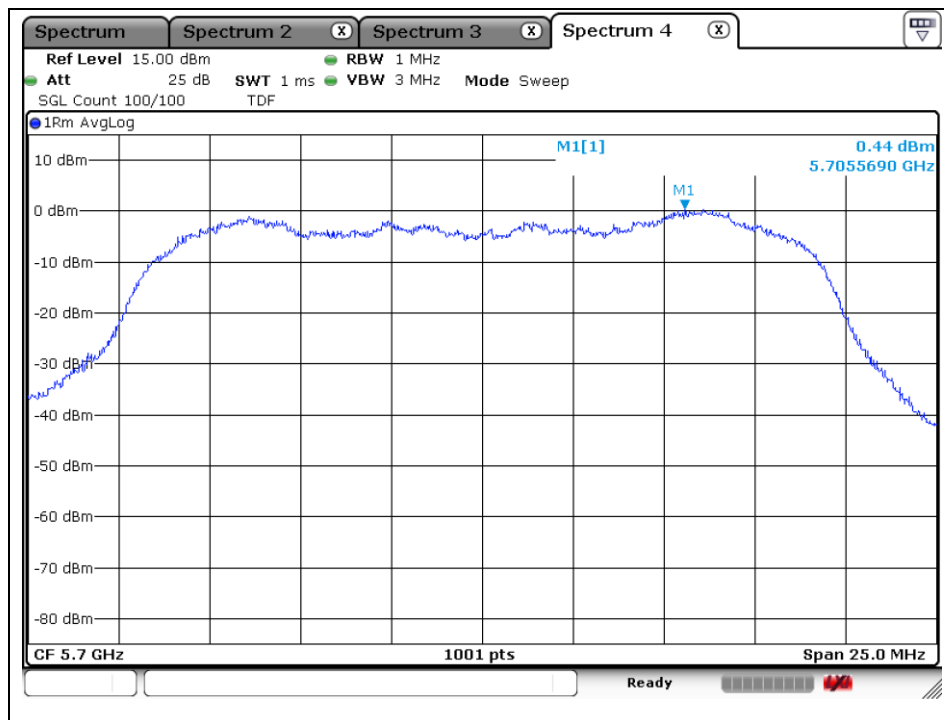
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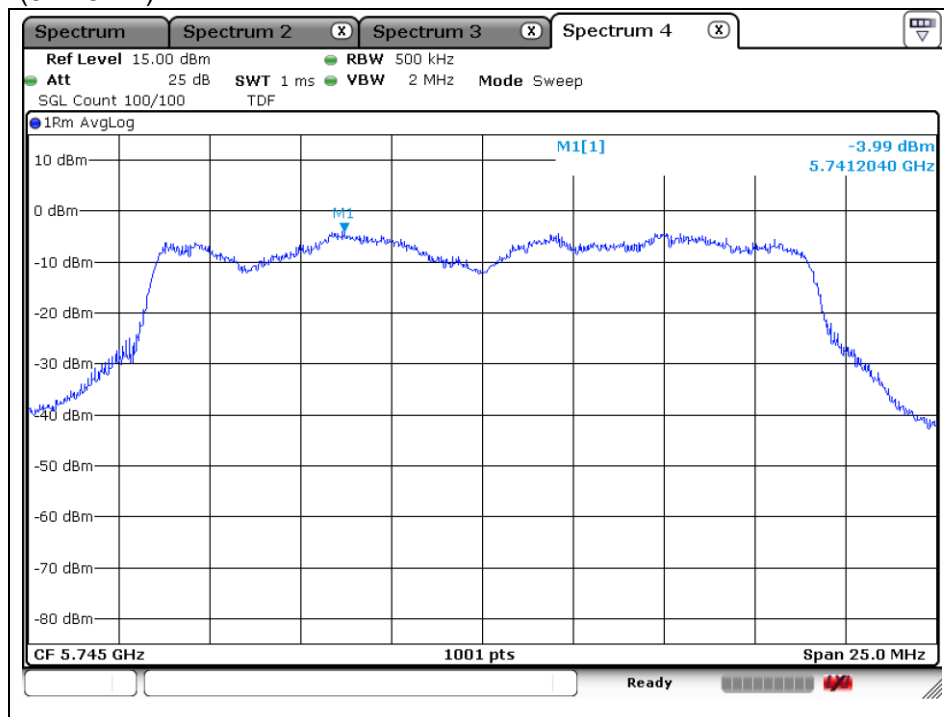
A4(210 mm x 297 mm)

High Channel (5 700 MHz)



802.11n_HT20 (Band 3)

Low Channel (5 745 MHz)



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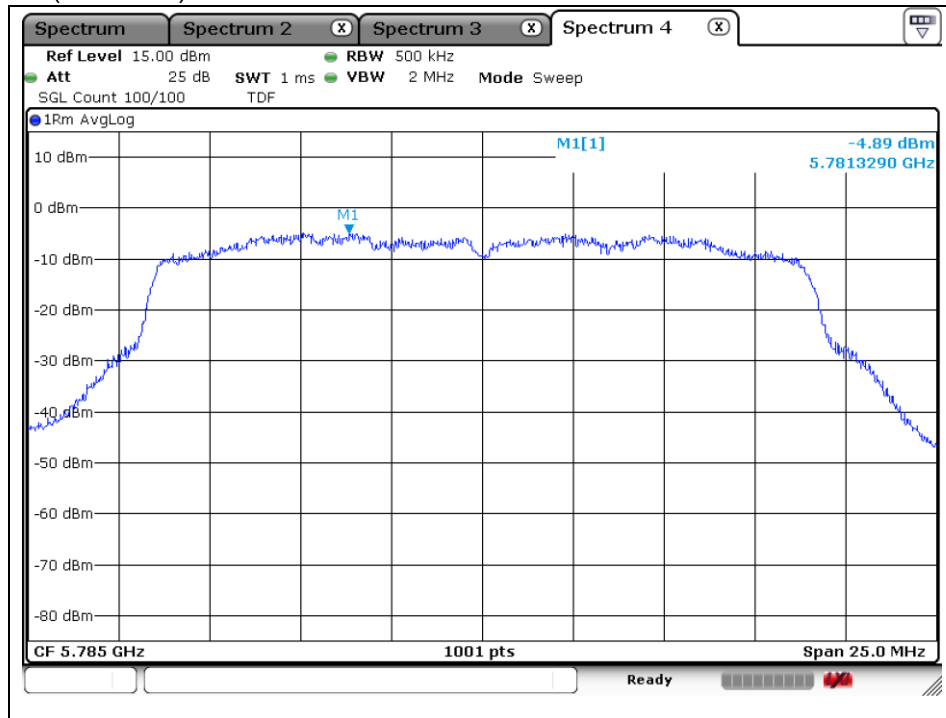
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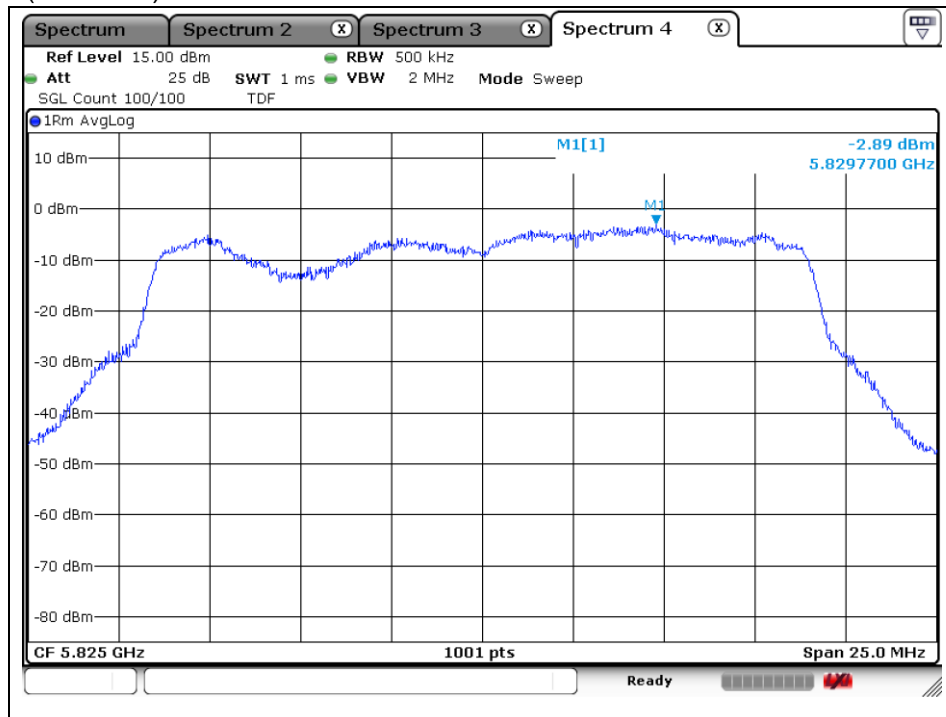
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A4(210 mm x 297 mm)

Middle Channel (5 785 MHz)



High Channel (5 825 MHz)



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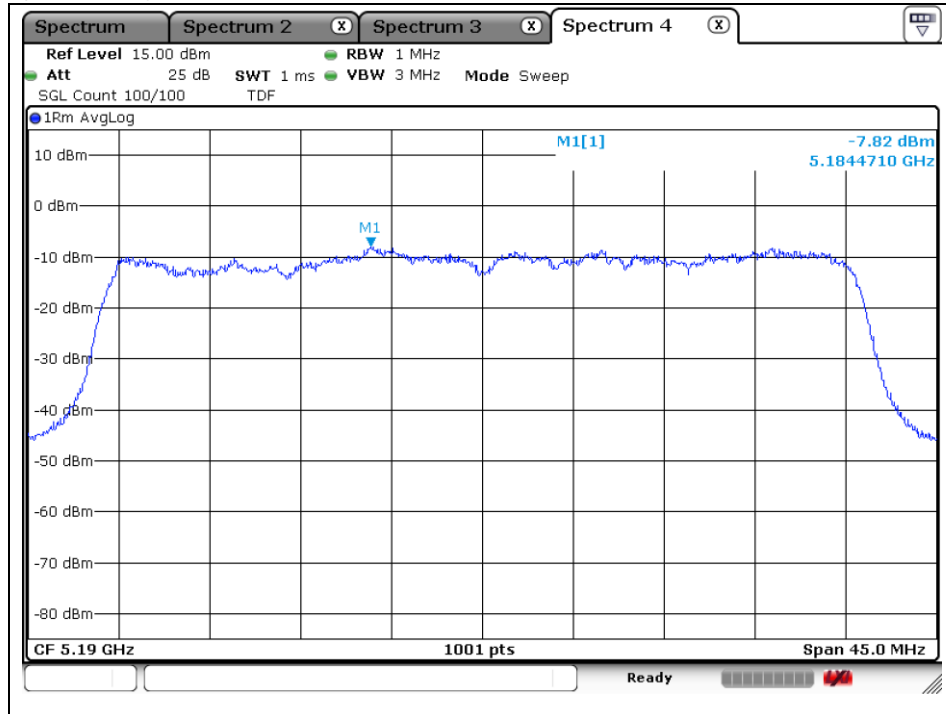
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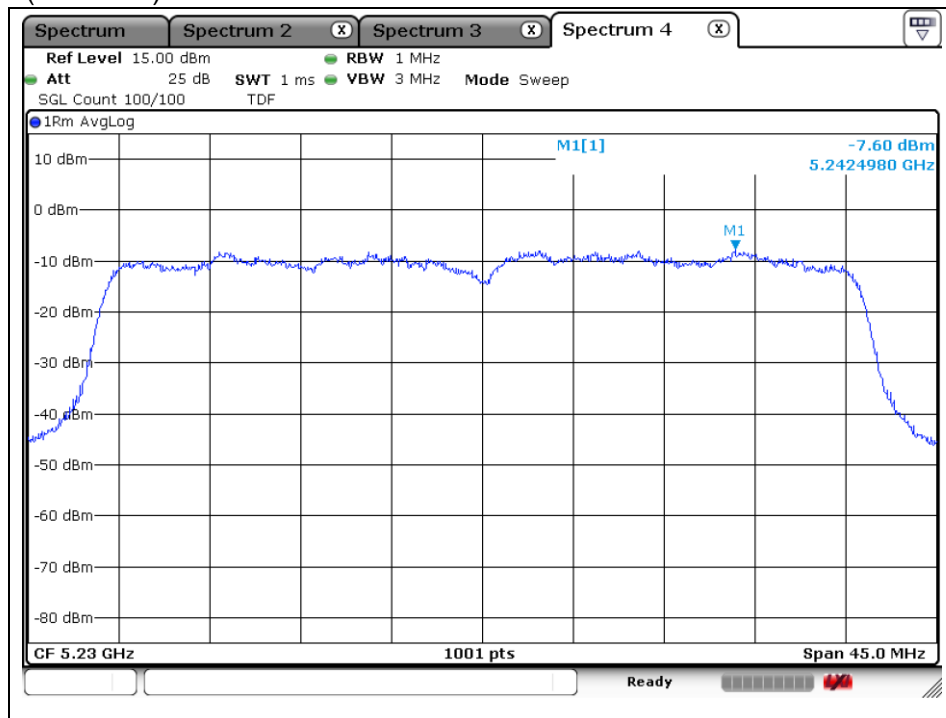
A4(210 mm x 297 mm)

802.11n_HT40 (Band 1)

Low Channel (5 190 MHz)



High Channel (5 230 MHz)



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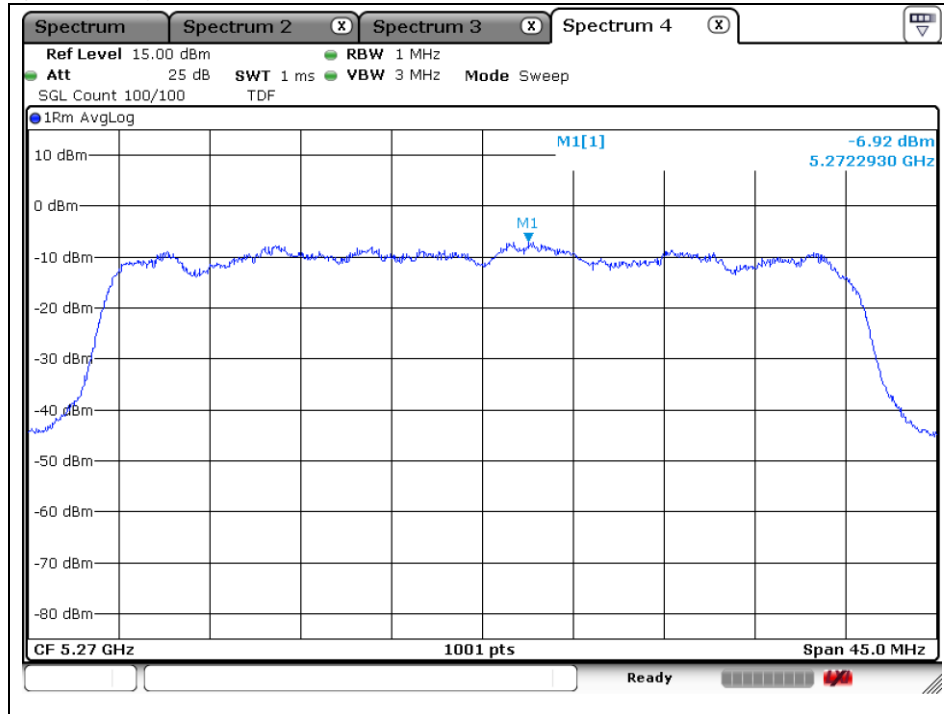
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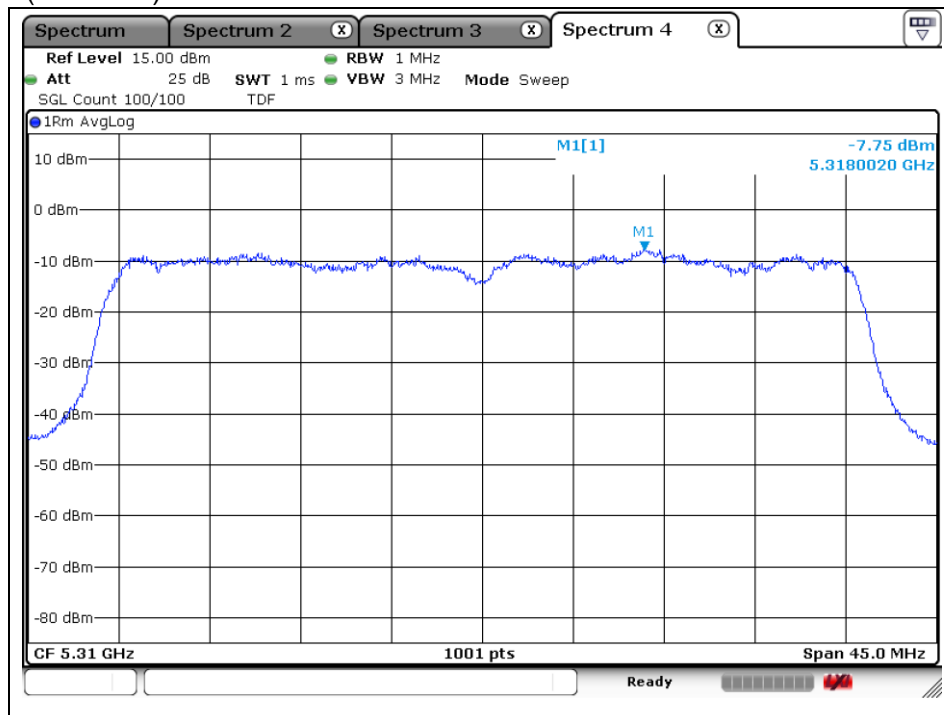
A4(210 mm x 297 mm)

802.11n_HT40 (Band 2A)

Low Channel (5 270 MHz)



High Channel (5 310 MHz)



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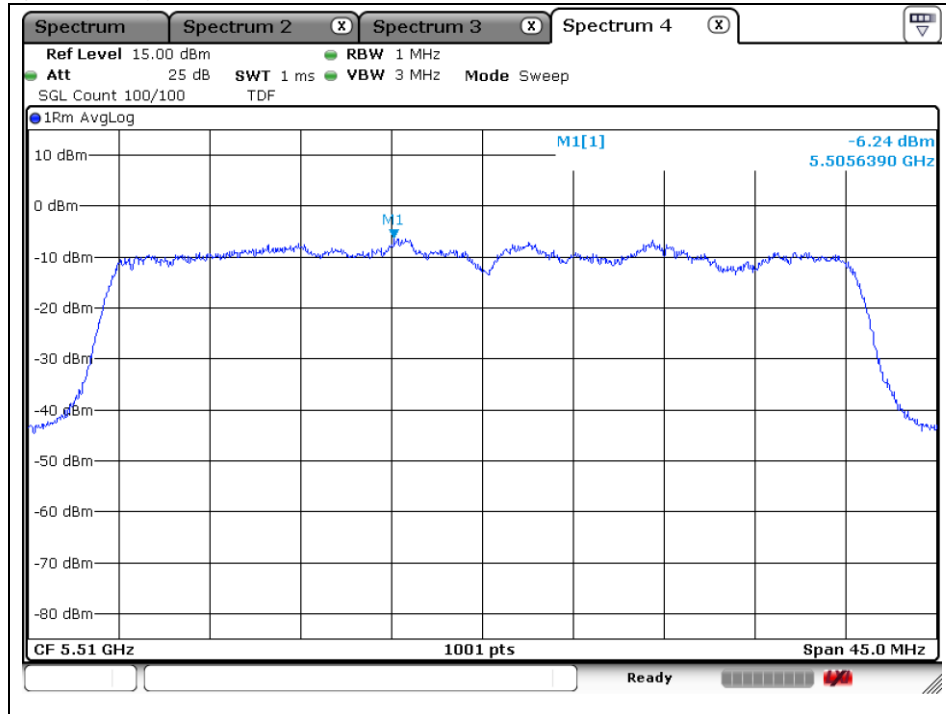
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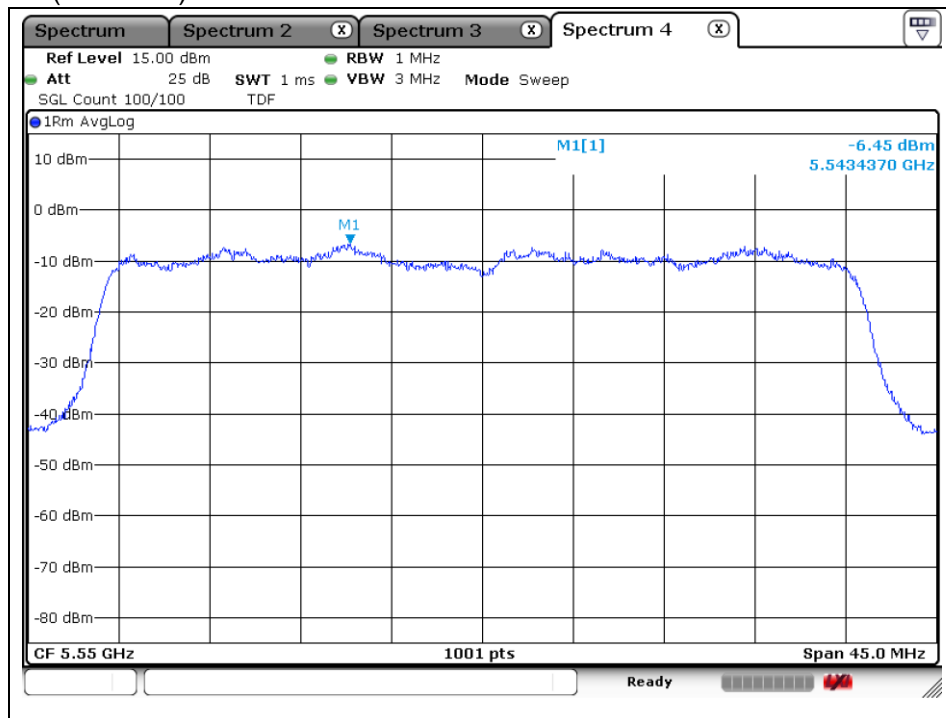
A4(210 mm x 297 mm)

802.11n_HT40 (Band 2C)

Low Channel (5 510 MHz)



Middle Channel (5 550 MHz)



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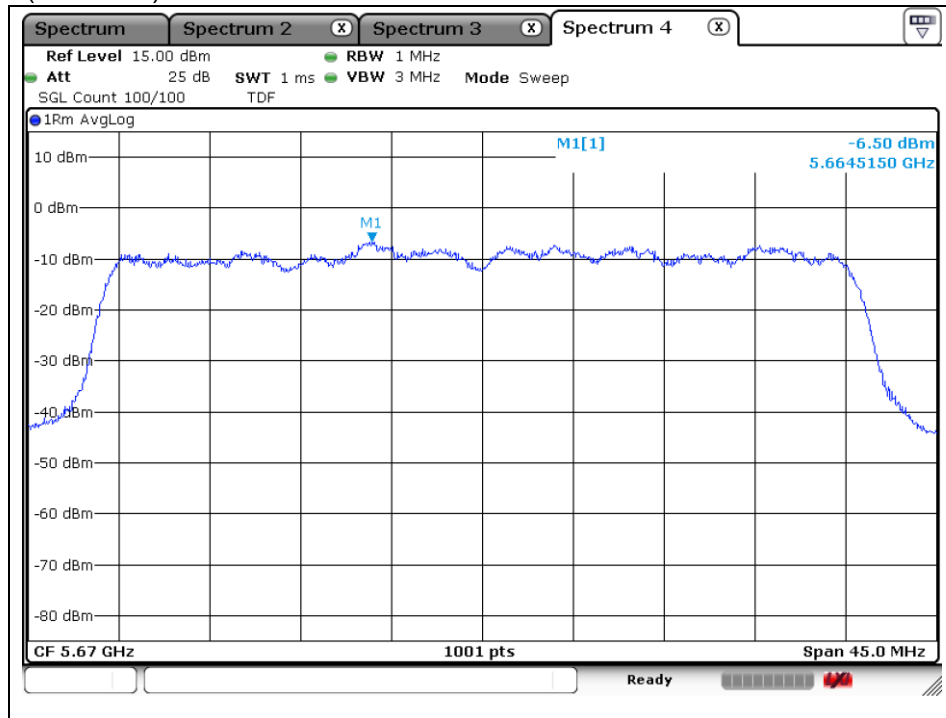
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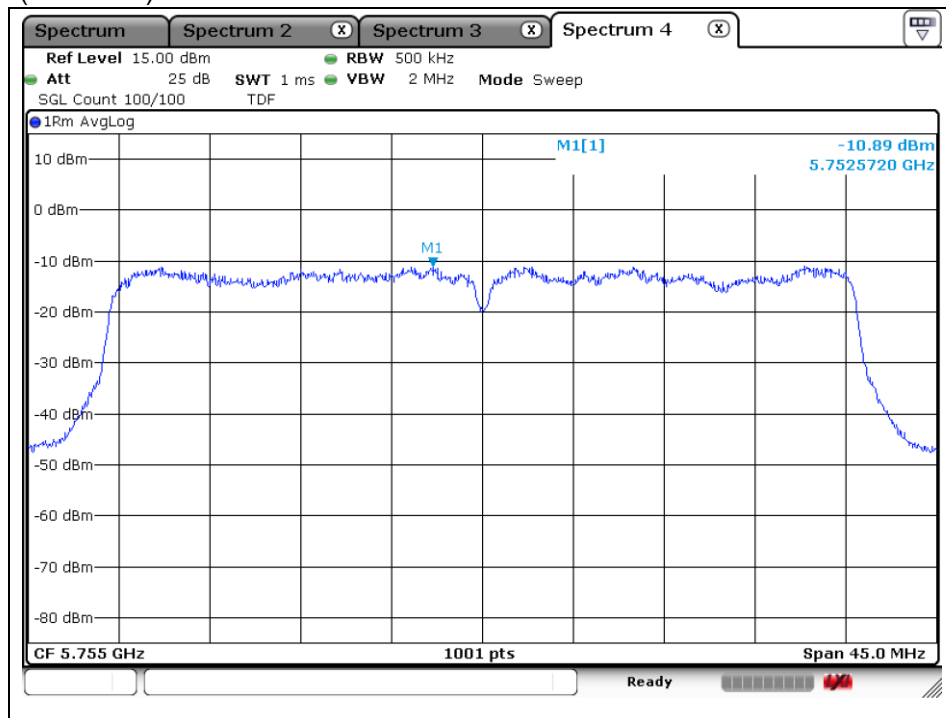
A4(210 mm x 297 mm)

High Channel (5 670 MHz)



802.11n_HT40 (Band 3)

Low Channel (5 755 MHz)



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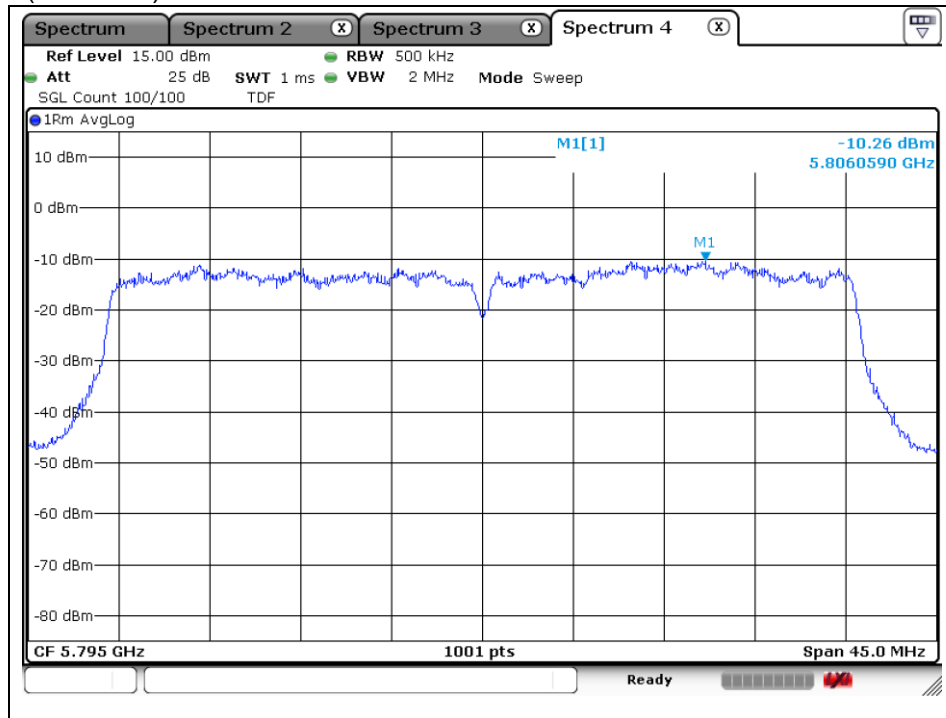
SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

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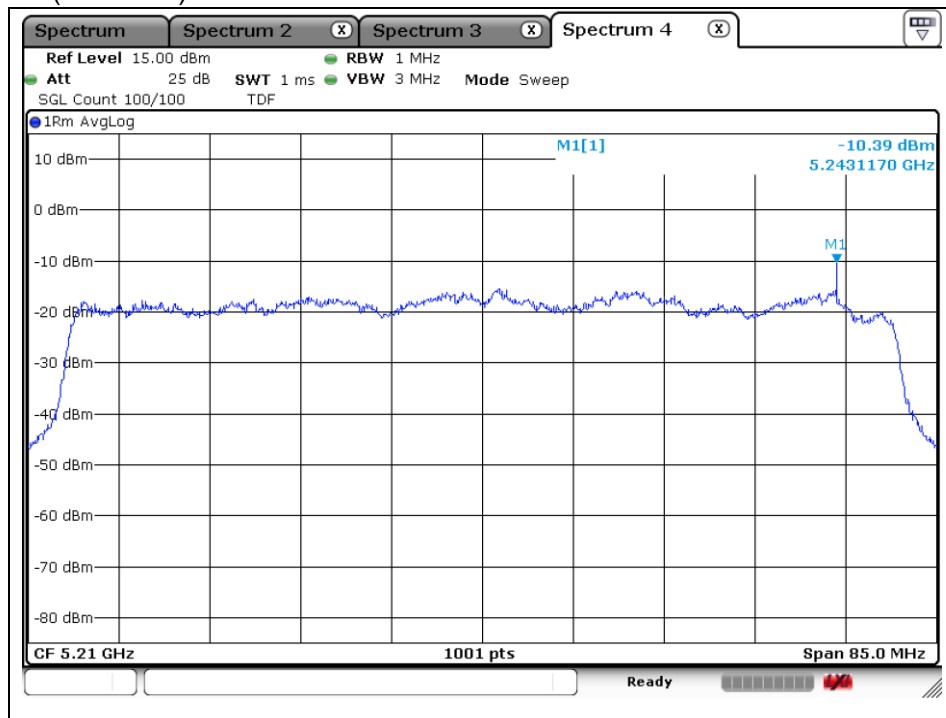
A4(210 mm x 297 mm)

High Channel (5 795 MHz)



802.11ac_VHT80 (Band 1)

Middle Channel (5 210 MHz)



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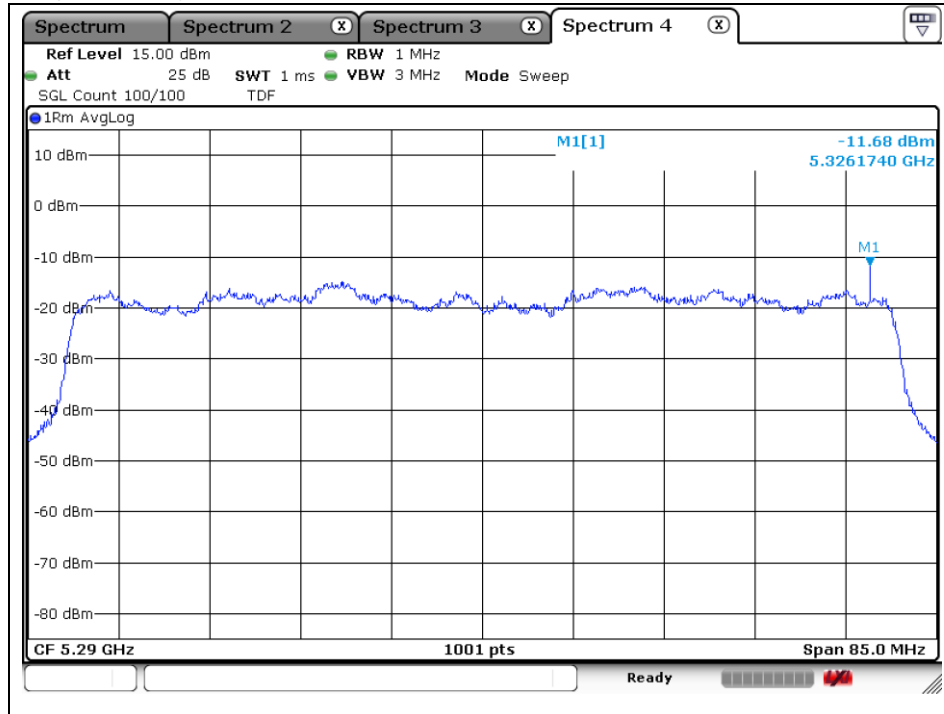
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A4(210 mm x 297 mm)

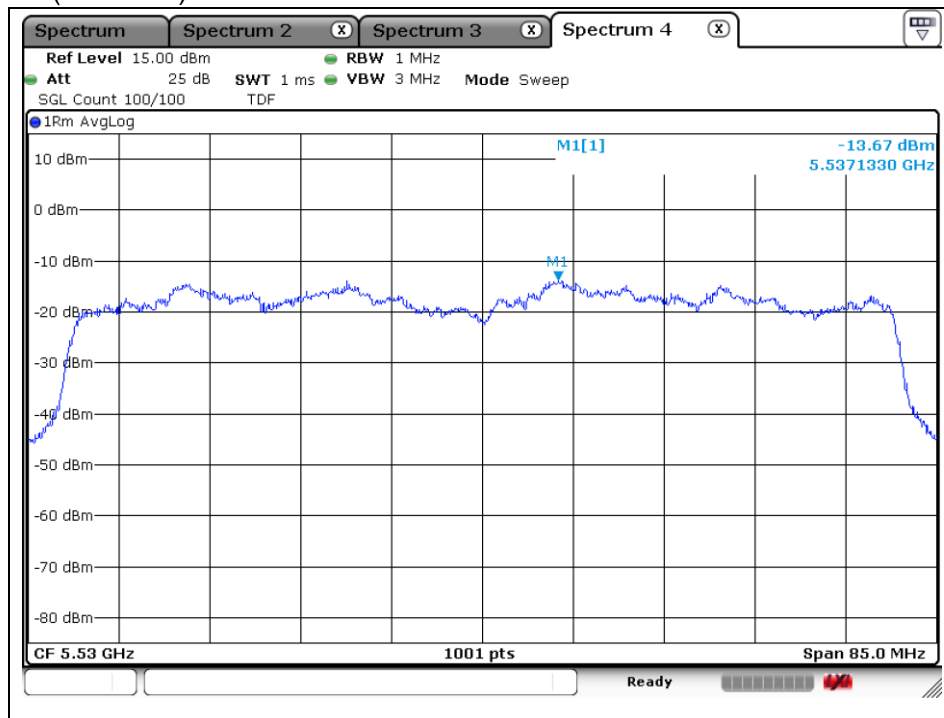
802.11ac_VHT80 (Band 2A)

Middle Channel (5 290 MHz)



802.11ac_VHT80 (Band 2C)

Middle Channel (5 530 MHz)



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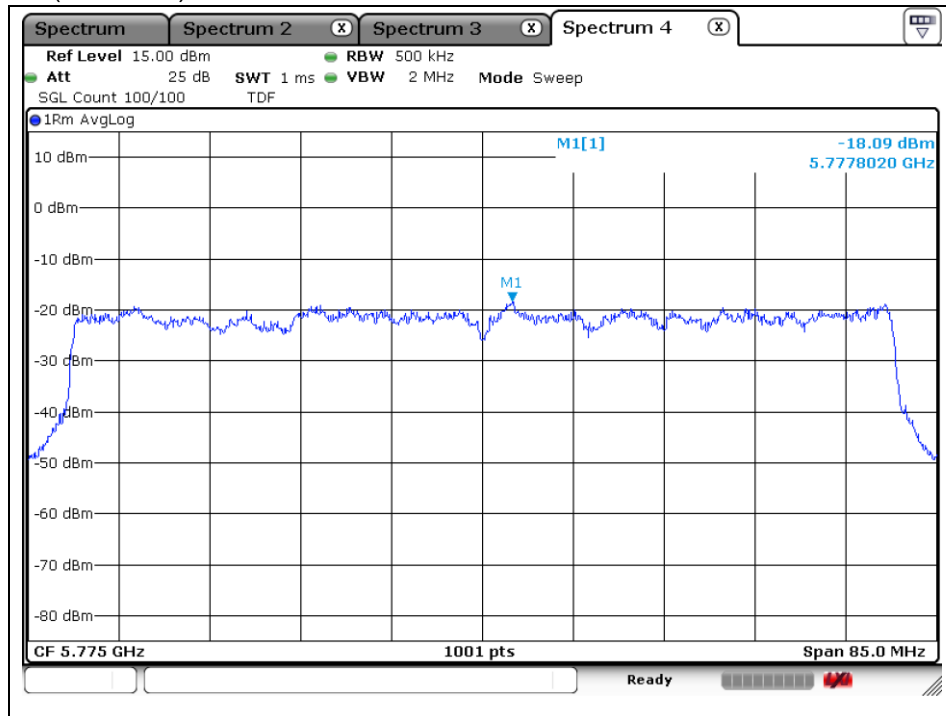
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A4(210 mm x 297 mm)

802.11ac_VHT80 (Band 3) Middle Channel (5 775 MHz)

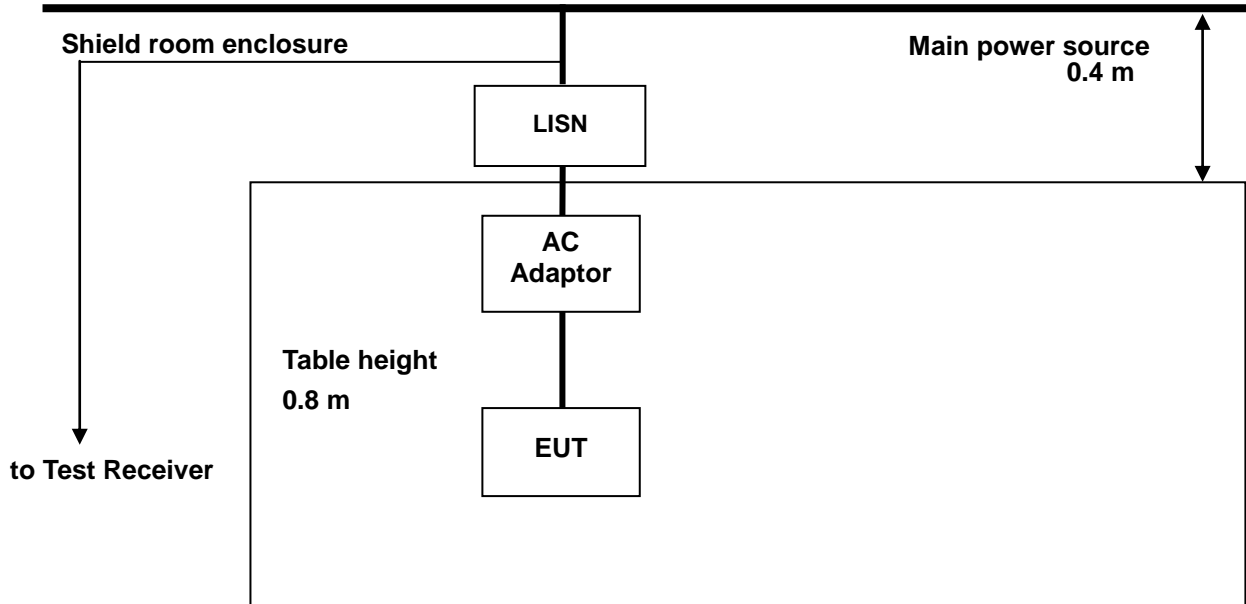


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7. AC Power Line Conducted Emission

7.1. Test Setup



7.2. Limit

According to §15.207(a) for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μ H / 50 ohm line impedance stabilization network (LISN).

Compliance with the provision of this paragraph shall be on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower applies at the boundary between the frequency ranges.

Frequency of Emission (MHz)	Conducted limit (dB μ V)	
	Quasi-peak	Average
0.15 – 0.50	66 - 56*	56 - 46*
0.50 – 5.00	56	46
5.00 – 30.0	60	50

* Decreases with the logarithm of the frequency.

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7.3. Test Procedures

All data rates and modes were investigated for this test. The full data for the worst case data rate are reported in this section.

AC line conducted emissions from the EUT were measured according to the dictates of ANSI C63.10-2009

1. The test procedure is performed in a 6.5 m × 3.6 m × 3.6 m (L × W × H) shielded room. The EUT along with its peripherals were placed on a 1.0 m (W) × 1.5 m (L) and 0.8 m in height wooden table and the EUT was adjusted to maintain a 0.4 meter space from a vertical reference plane.
2. The EUT was connected to power mains through a line impedance stabilization network (LISN) which provides 50 ohm coupling impedance for measuring instrument and the chassis ground was bounded to the horizontal ground plane of shielded room.
3. The excess power cable between the EUT and the LISN was bundled. All connecting cables of EUT were moved to find the maximum emission.

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A4(210 mm × 297 mm)

7.4. Test Results

The following table shows the highest levels of conducted emissions on both phase of Hot and Neutral line

Ambient temperature : (23 ± 1) °C
Relative humidity : 47 % R.H.

Frequency range : 0.15 MHz – 30 MHz
Measured Bandwidth : 9 kHz

FREQ. (MHz)	LEVEL(dB μ V)		LINE	LIMIT(dB μ V)		MARGIN(dB)	
	Q-Peak	Average		Q-Peak	Average	Q-Peak	Average
0.56	37.10	28.70	N	56.00	46.00	18.90	17.30
1.13	24.50	17.70	N	56.00	46.00	31.50	28.30
1.70	18.20	14.00	N	56.00	46.00	37.80	32.00
3.85	17.00	8.90	N	56.00	46.00	39.00	37.10
8.45	23.40	12.00	N	60.00	50.00	36.60	38.00
18.44	19.30	16.40	N	60.00	50.00	40.70	33.60
0.56	43.40	39.00	H	56.00	46.00	12.60	7.00
0.73	29.10	20.80	H	56.00	46.00	26.90	25.20
1.13	29.10	20.70	H	56.00	46.00	26.90	25.30
3.32	26.80	14.40	H	56.00	46.00	29.20	31.60
8.71	27.40	13.20	H	60.00	50.00	32.60	36.80
18.99	21.30	14.00	H	60.00	50.00	38.70	36.00

Remark;

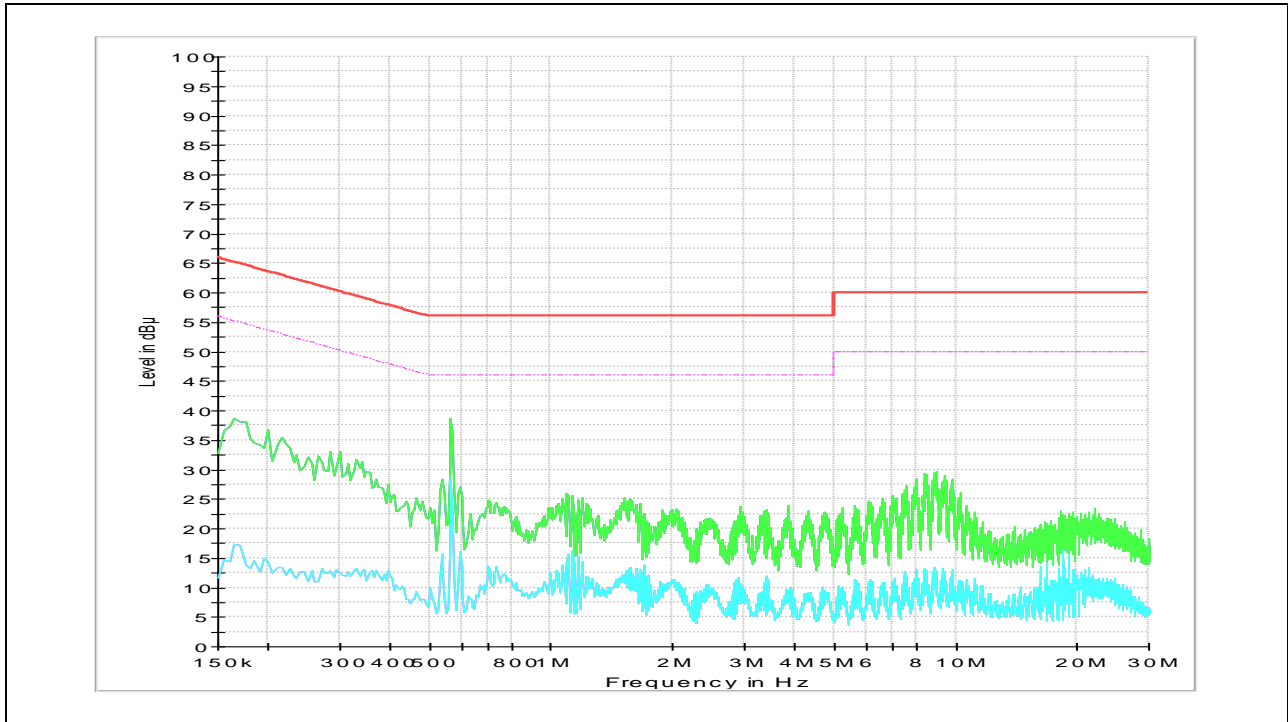
- Line (H): Hot, Line (N): Neutral
- All modes of operation were investigated and the worst-case emissions were reported using 11a (Band 2C) Mode, 6Mbps, Middle channel.
- Traces shown in plot mad using a peak detector and average detector
- The limit for Class B device(s) from 150 kHz to 30 MHz are specified in Section of the Title 47 CFR.
- Deviations to the Specifications: None.

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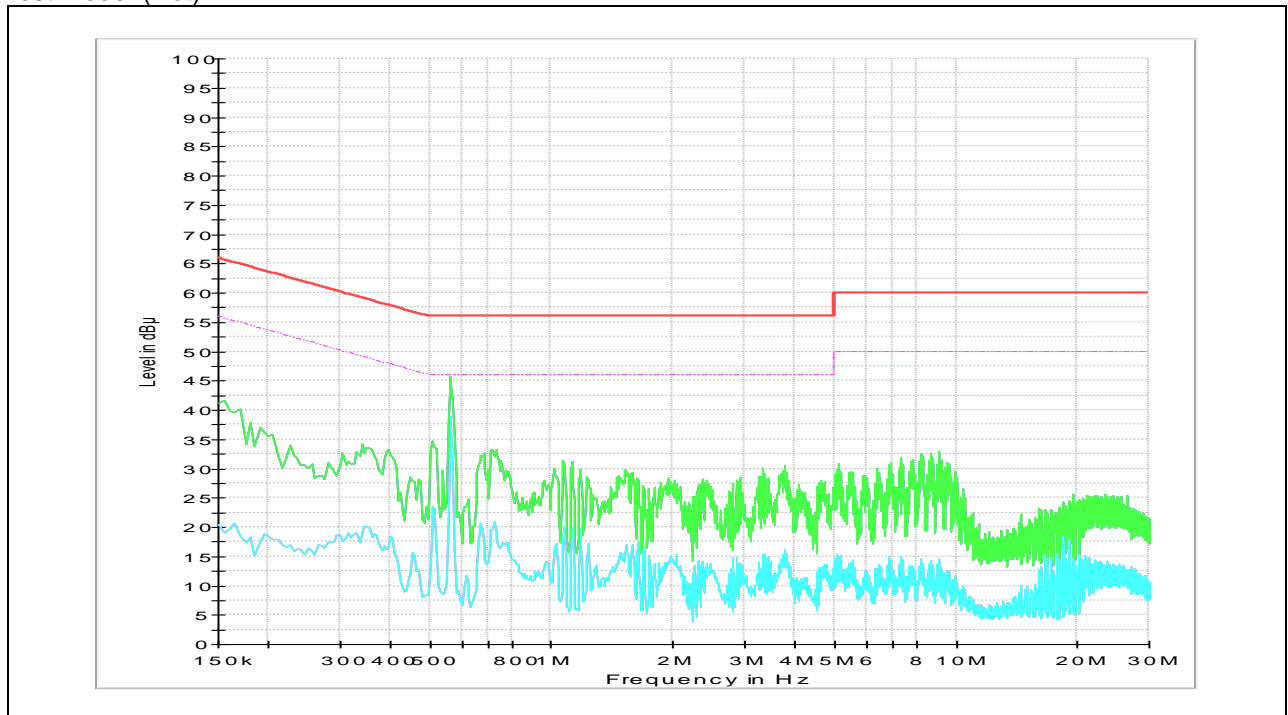
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Plots of Conducted Power line

Test mode: (Neutral)



Test mode: (Hot)



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A4(210 mm x 297 mm)

8. Antenna Requirement

8.1. Standard Applicable

For intentional device, according to FCC 47 CFR Section §15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section §15.407 (a) if transmitting antennas of directional gain greater than 6 dB i are used, the power shall be reduced by the amount in dB that the gain of the antenna exceeds 6 dB i.

8.2. Antenna Connected Construction

Antenna used in this product is PIFA type and peak max gain of antenna as below.

Band	5 180 MHz – 5 320 MHz	5 500 MHz – 5 700 MHz	5 745 MHz – 5 825 MHz
Mode	11a/n_HT20, HT40, 11ac_VHT20, VHT40, VHT80		
Gain	-1.40 dB i	2.70 dB i	-0.70 dB i

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