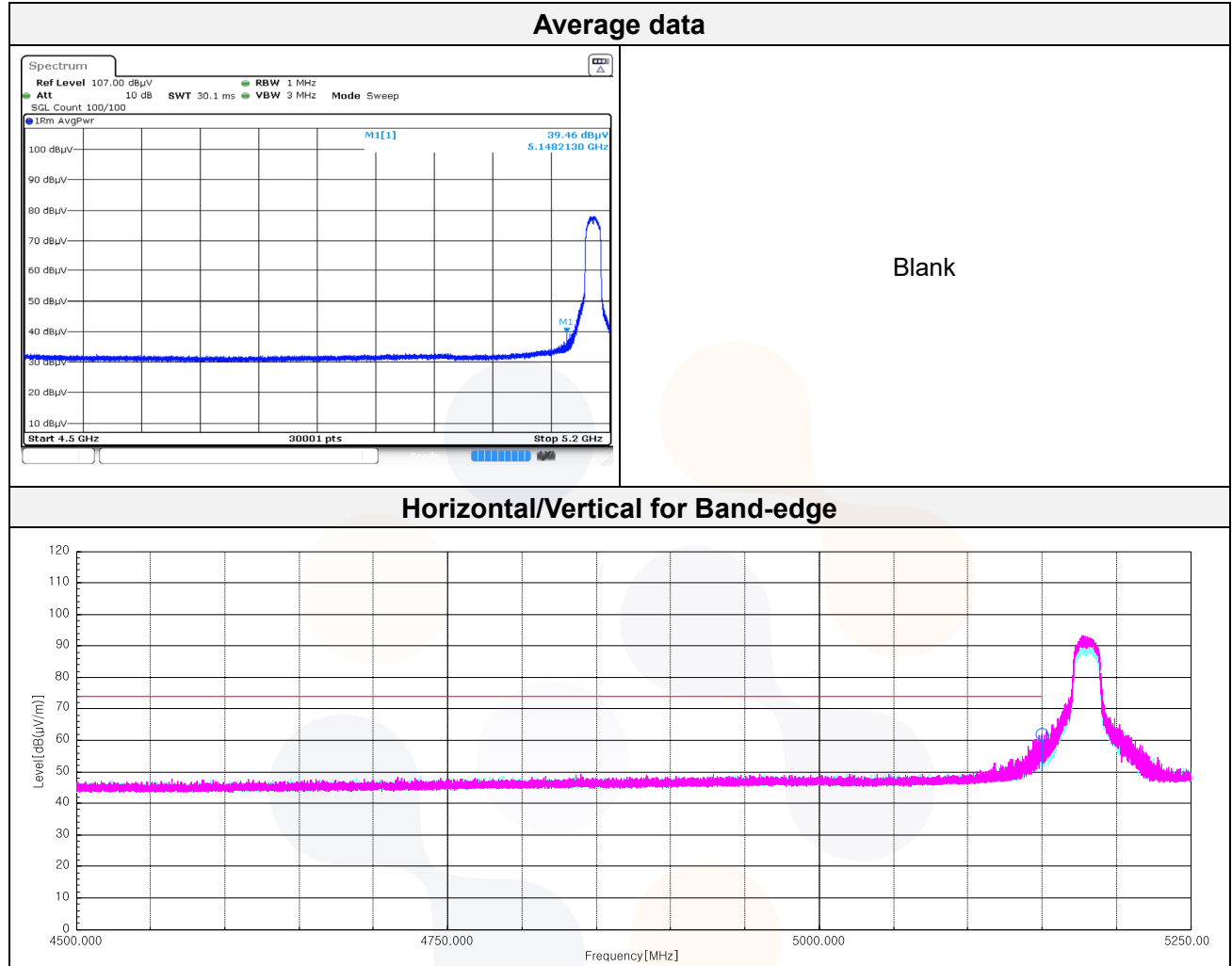


In order to simplify the report, attached plots were only the lowest margin condition

802.11n_HT20_Lowest Channel (5 180 MHz)

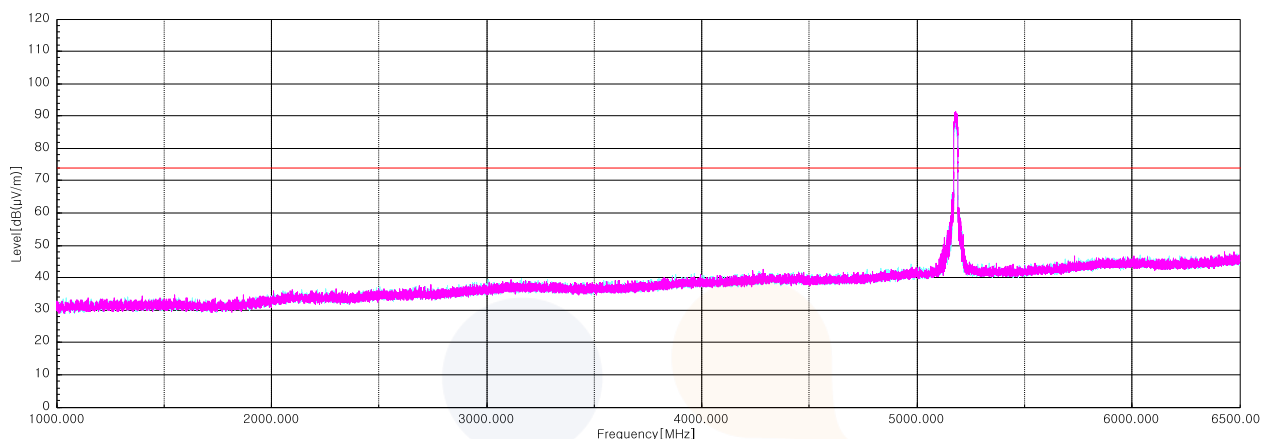


Plot of Harmonics and Spurious Emissions

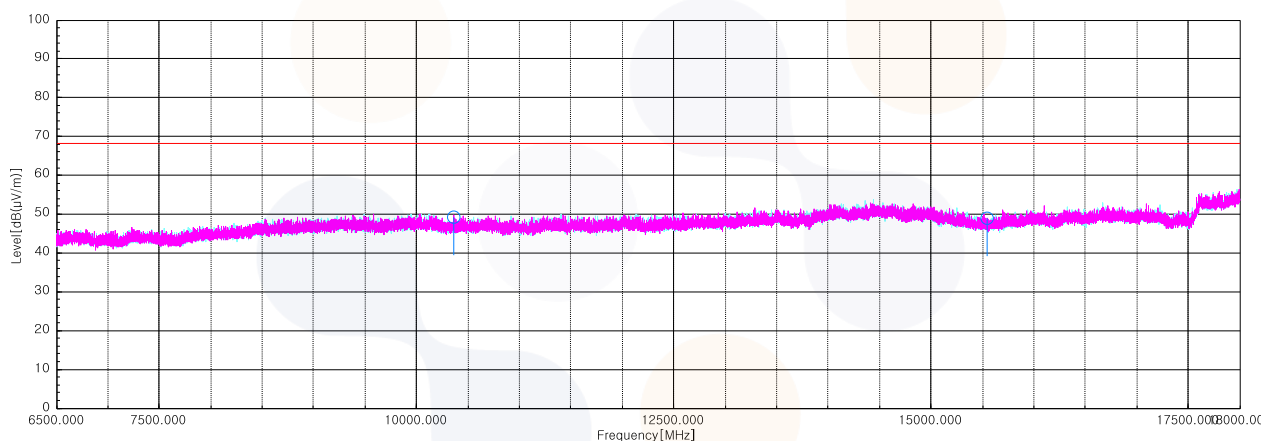
In order to simplify the report, attached plots were only the lowest margin condition

802.11n HT20_UNII 1_Lowest Channel (5 180 MHz)

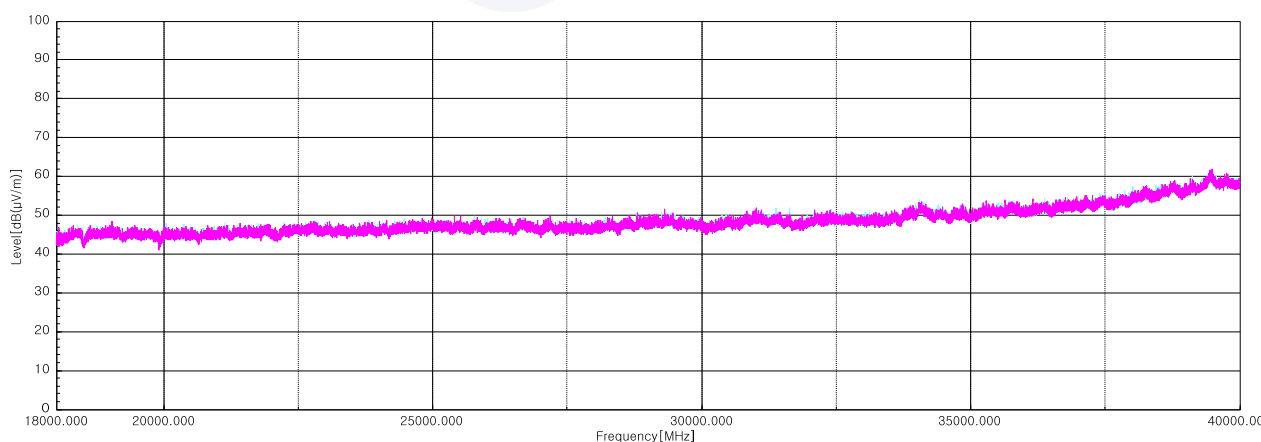
Horizontal/Vertical for 1 GHz ~ 6.5 GHz



Horizontal/Vertical for 6.5 GHz ~ 18 GHz



Horizontal/Vertical for 18 GHz ~ 40 GHz



UNII 2A

802.11a_Lowest Channel (5 260 MHz)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μV))	(dB)	(dB)	(dB)	(dB(μV/m))	(dB(μV/m))	(dB)
Peak data								
10 520.78	H	56.60	39.00	-44.53	-	51.07	68.20	17.13
15 770.15 ¹⁾	V	54.90	38.10	-42.36	-	50.64	74.00	23.36
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

802.11a_Middle Channel (5 280 MHz)

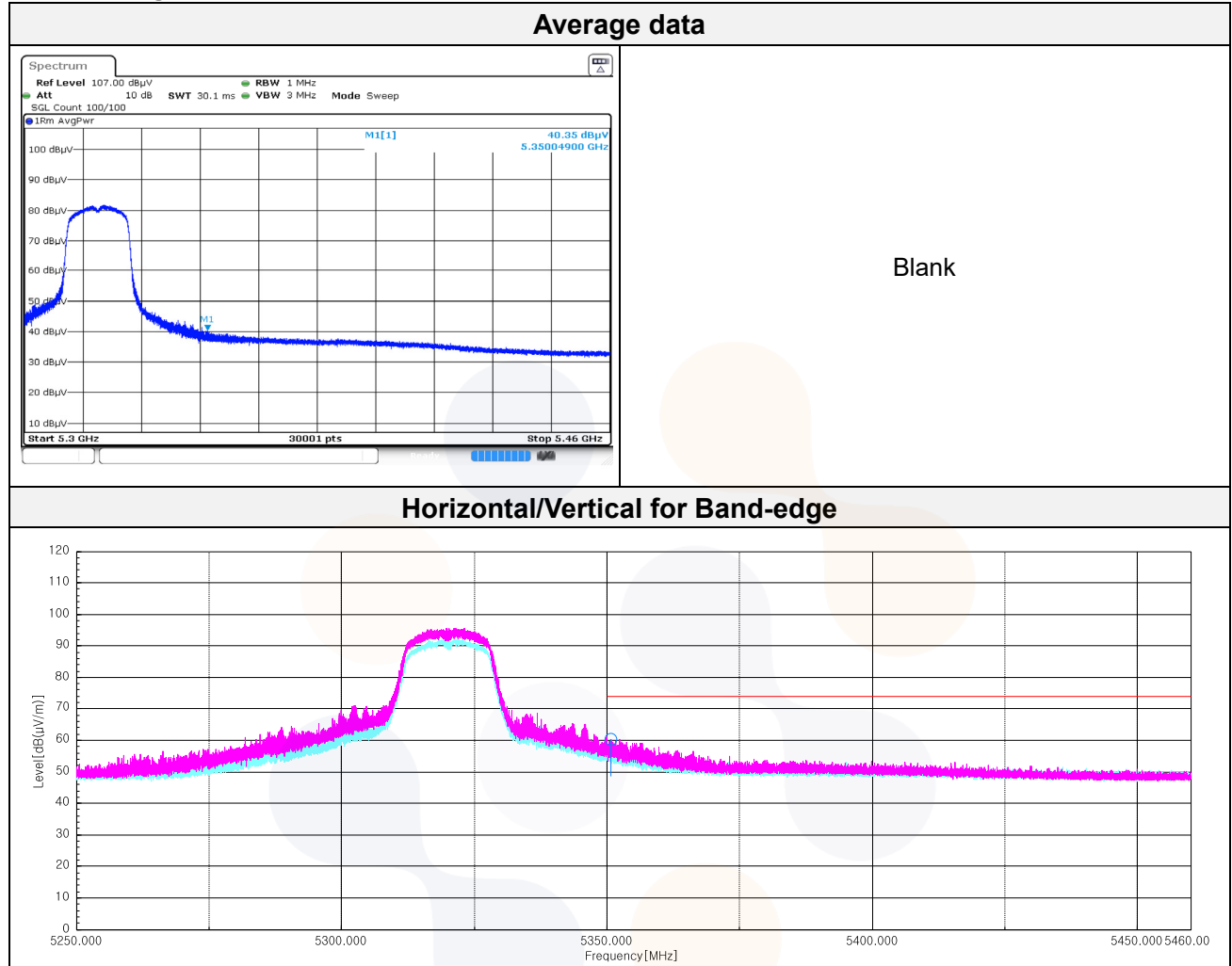
Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μV))	(dB)	(dB)	(dB)	(dB(μV/m))	(dB(μV/m))	(dB)
Peak data								
10 520.78	H	56.60	39.00	-44.53	-	51.07	68.20	17.13
15 772.45 ¹⁾	H	54.00	38.10	-42.36	-	49.74	74.00	24.26
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

802.11a_Highest Channel (5 320 MHz)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μV))	(dB)	(dB)	(dB)	(dB(μV/m))	(dB(μV/m))	(dB)
Peak data								
5 350.05 ¹⁾	H	54.30	33.00	-26.92	-	60.38	74.00	13.62
10 638.08 ¹⁾	H	54.60	39.28	-44.68	-	49.20	74.00	24.80
15 959.90 ¹⁾	V	53.50	38.20	-41.82	-	49.88	74.00	24.12
Average Data								
5 350.05 ¹⁾	H	40.35	33.00	-26.92	0.40	46.83	54.00	7.17

In order to simplify the report, attached plots were only the lowest margin condition

802.11a_Highest Channel (5 320 MHz)



802.11n_HT20_Lowest Channel (5 260 MHz)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μV))	(dB)	(dB)	(dB)	(dB(μV/m))	(dB(μV/m))	(dB)
Peak data								
10 518.87	H	55.10	39.00	-44.52	-	49.58	68.20	18.62
15 768.62 ¹⁾	H	53.90	38.10	-42.37	-	49.63	74.00	24.37
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

802.11n_HT20_Middle Channel (5 280 MHz)

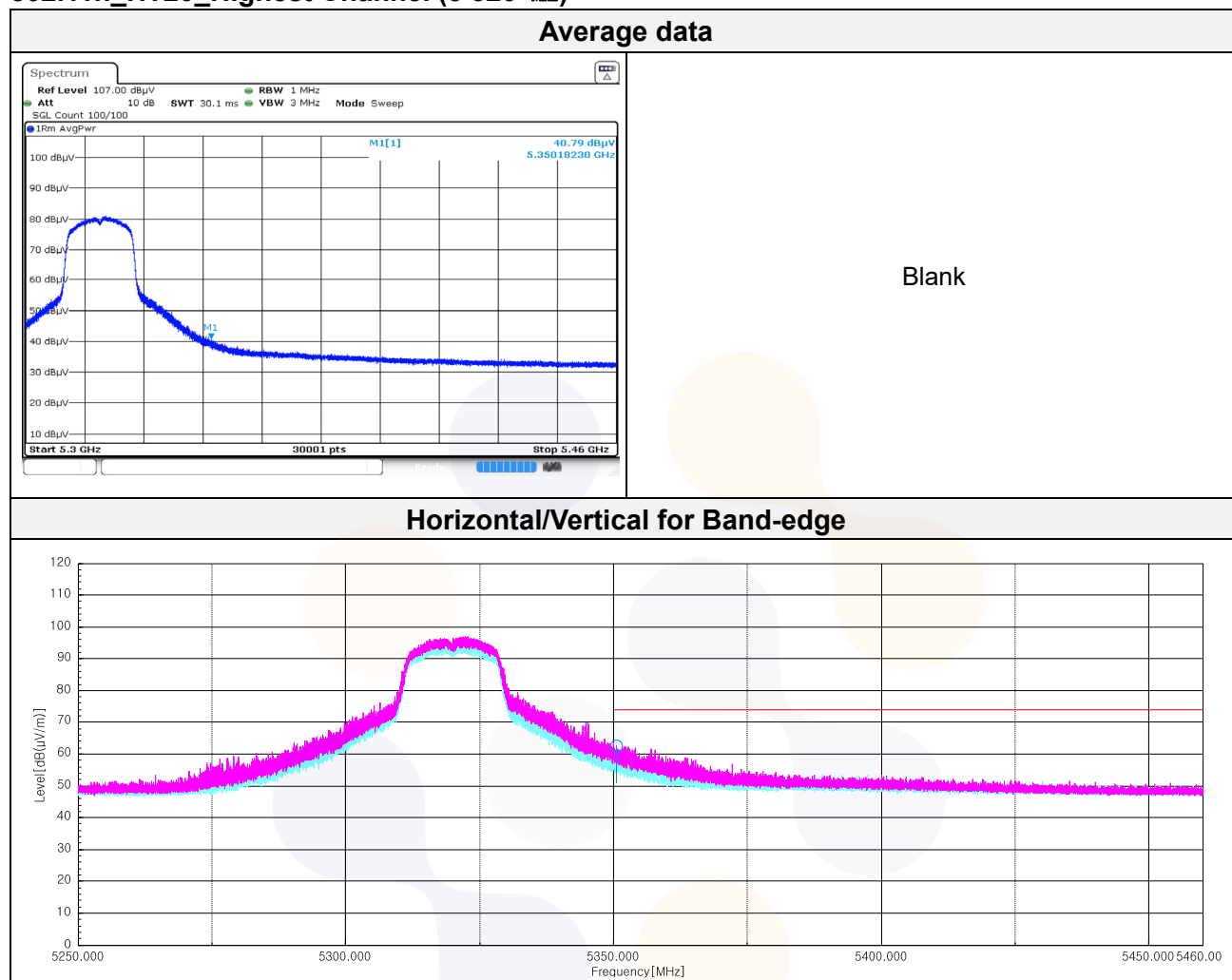
Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μV))	(dB)	(dB)	(dB)	(dB(μV/m))	(dB(μV/m))	(dB)
Peak data								
10 558.73	V	53.90	39.12	-44.58	-	48.44	68.20	19.76
15 838.38 ¹⁾	H	53.00	38.28	-42.17	-	49.11	74.00	24.89
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

802.11n_HT20_Highest Channel (5 320 MHz)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μV))	(dB)	(dB)	(dB)	(dB(μV/m))	(dB(μV/m))	(dB)
Peak data								
5 350.18 ¹⁾	H	56.50	33.00	-26.92	-	62.58	74.00	11.42
10 644.98 ¹⁾	H	55.90	39.29	-44.69	-	50.50	74.00	23.50
15 987.88 ¹⁾	H	54.30	38.20	-41.74	-	50.76	74.00	23.24
Average Data								
5 350.18 ¹⁾	H	40.79	33.00	-26.92	0.45	47.32	54.00	6.68

In order to simplify the report, attached plots were only the lowest margin condition

802.11n_HT20_Highest Channel (5 320 MHz)

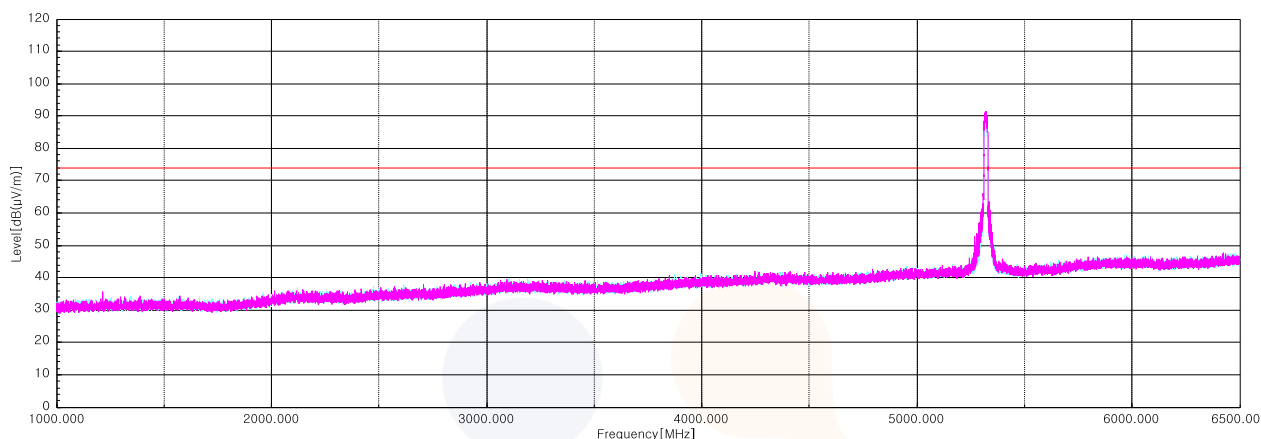


Plot of Harmonics and Spurious Emissions

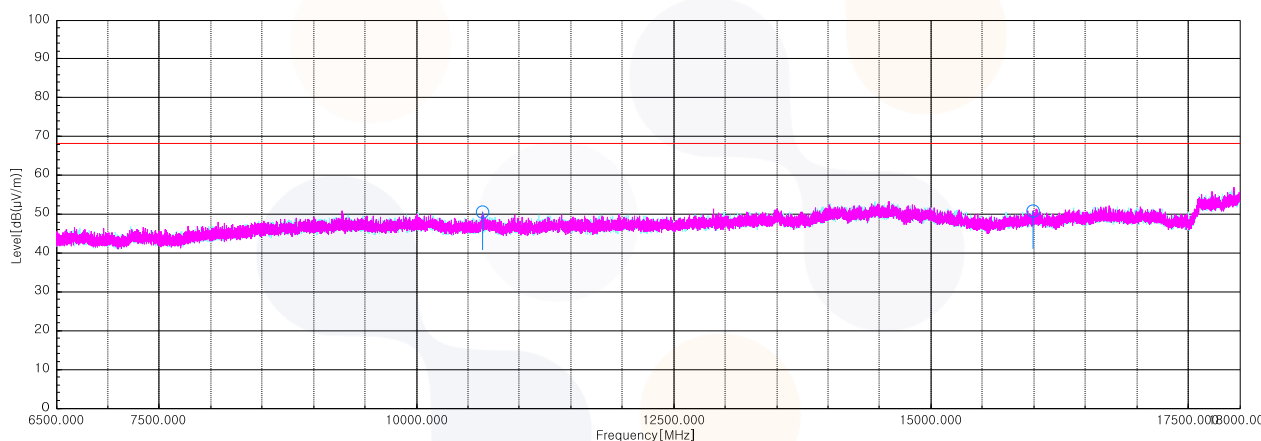
In order to simplify the report, attached plots were only the lowest margin condition

802.11n20 UNII 2A_Highest Channel (5 320 MHz)

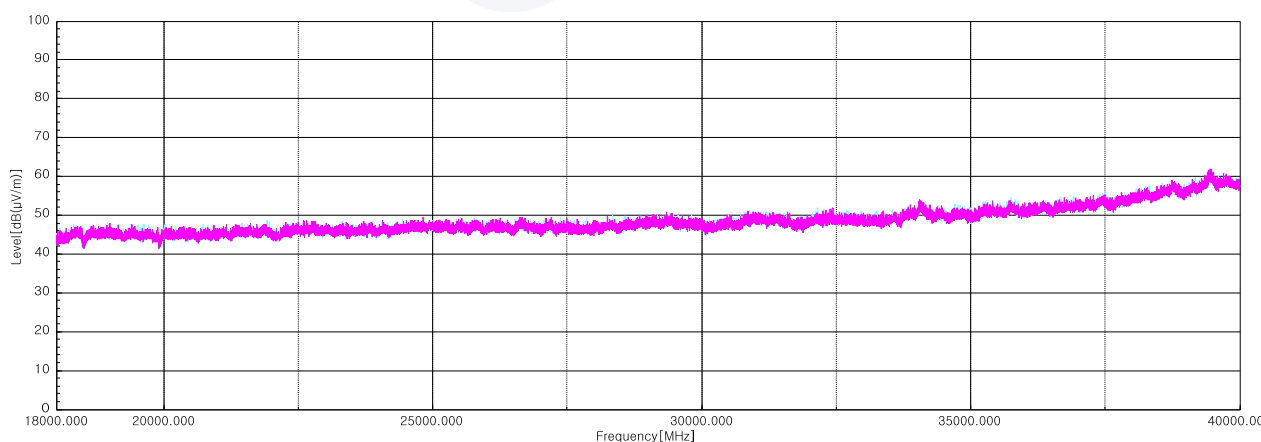
Horizontal/Vertical for 1 GHz ~ 6.5 GHz



Horizontal/Vertical for 6.5 GHz ~ 18 GHz



Horizontal/Vertical for 18 GHz ~ 40 GHz



UNII 2C

802.11a_Lowest Channel (5 500 MHz)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μV))	(dB)	(dB)	(dB)	(dB(μV/m))	(dB(μV/m))	(dB)
Peak data								
5 459.44 ¹⁾	H	50.50	33.00	-26.82	-	56.68	74.00	17.32
10 979.63 ¹⁾	V	54.30	39.14	-44.14	-	49.30	74.00	24.70
16 488.13	H	54.30	38.10	-41.45	-	50.95	68.20	17.25
Average Data								
5 459.44 ¹⁾	H	38.81	33.00	-26.82	0.40	45.39	54.00	8.61

802.11a_Middle Channel (5 600 MHz)

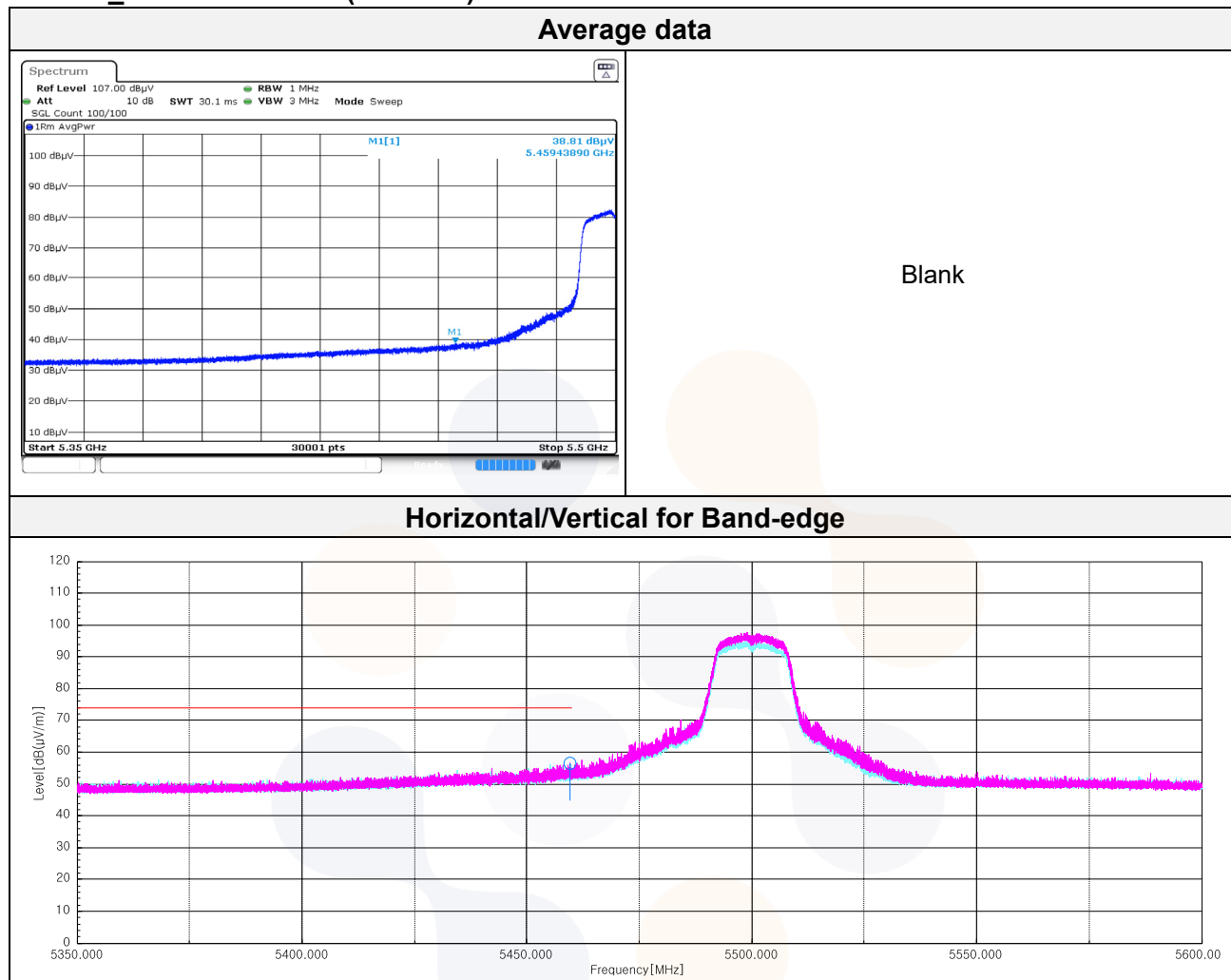
Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μV))	(dB)	(dB)	(dB)	(dB(μV/m))	(dB(μV/m))	(dB)
Peak data								
11 186.25 ¹⁾	H	54.10	39.00	-43.98	-	49.12	74.00	24.88
16 774.48	V	54.90	38.05	-41.36	-	51.59	68.20	16.61
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

802.11a_Highest Channel (5 700 MHz)

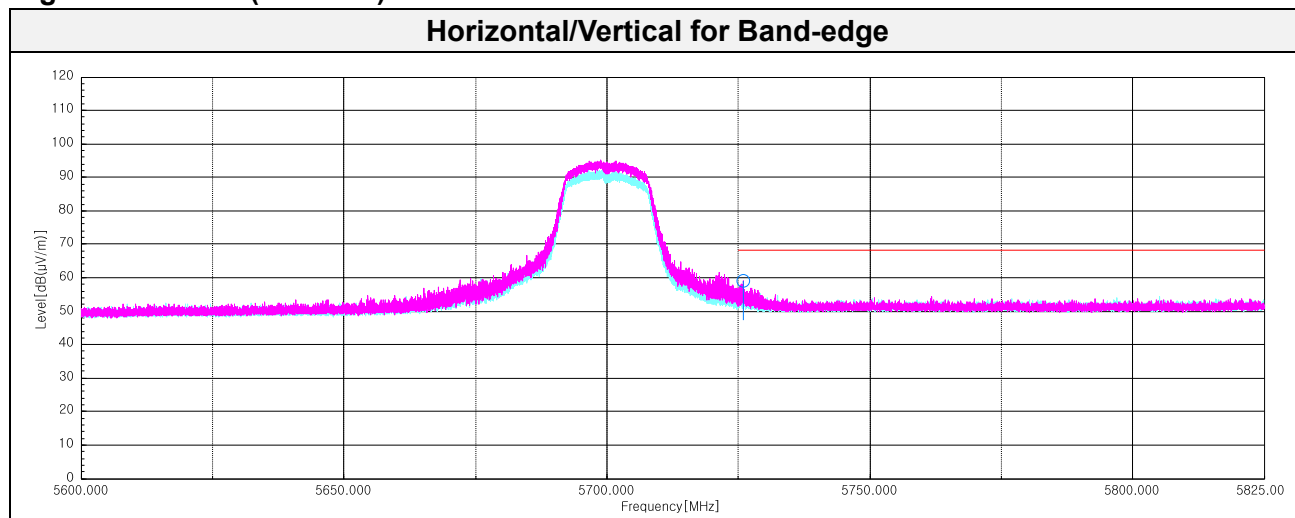
Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μV))	(dB)	(dB)	(dB)	(dB(μV/m))	(dB(μV/m))	(dB)
Peak data								
5 725.97	H	51.30	33.76	-26.14	-	58.92	68.20	9.28
11 137.95 ¹⁾	H	54.50	39.00	-44.00	-	49.50	74.00	24.50
17 115.65	H	55.10	38.10	-41.96	-	51.24	68.20	16.96
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

In order to simplify the report, attached plots were only the lowest margin condition

802.11a_Lowest Channel (5 500 MHz)



Highest Channel (5 700 MHz)



802.11n_HT20_Lowest Channel (5 500 MHz)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μV))	(dB)	(dB)	(dB)	(dB(μV/m))	(dB(μV/m))	(dB)
Peak data								
5 459.46 ¹⁾	H	51.40	33.00	-26.82	-	57.58	74.00	16.42
10 993.05 ¹⁾	V	53.10	39.11	-44.10	-	48.11	74.00	25.89
16 508.83	H	54.20	38.10	-41.42	-	50.88	68.20	17.32
Average Data								
5 459.46 ¹⁾	H	38.25	33.00	-26.82	0.45	44.88	54.00	9.12

802.11n_HT20_Middle Channel (5 600 MHz)

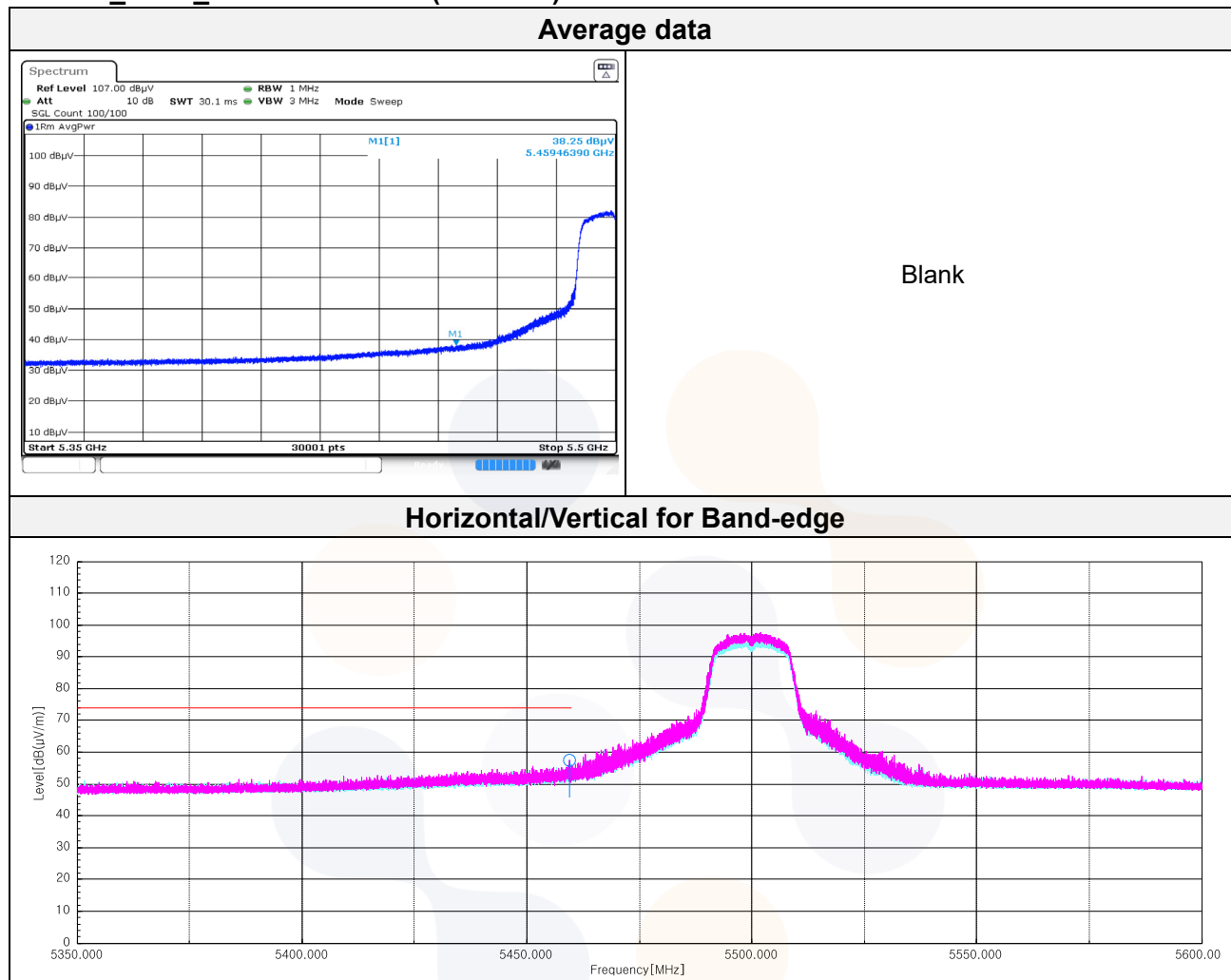
Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μV))	(dB)	(dB)	(dB)	(dB(μV/m))	(dB(μV/m))	(dB)
Peak data								
11 200.43 ¹⁾	H	54.30	39.10	-43.97	-	49.43	74.00	24.57
16 798.25	H	55.00	38.00	-41.43	-	51.57	68.20	16.63
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

802.11n_HT20_Highest Channel (5 700 MHz)

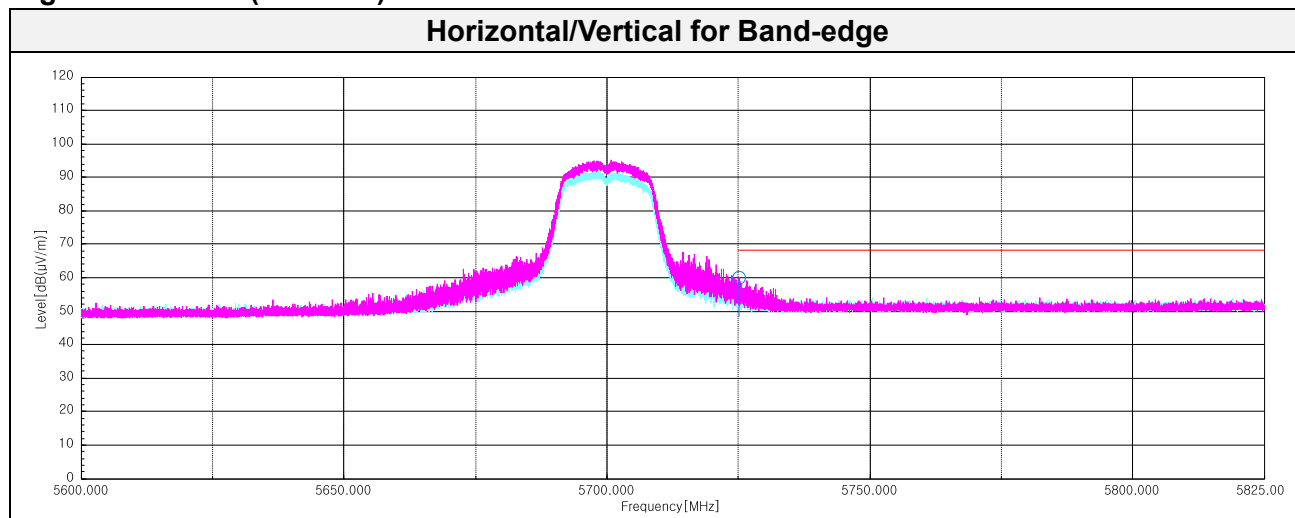
Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μV))	(dB)	(dB)	(dB)	(dB(μV/m))	(dB(μV/m))	(dB)
Peak data								
5 725.16	H	52.30	33.75	-26.14	-	59.91	68.20	8.29
11 400.15 ¹⁾	H	53.20	39.20	-43.44	-	48.96	74.00	25.04
17 096.87	H	55.20	38.19	-41.98	-	51.41	68.20	16.79
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

In order to simplify the report, attached plots were only the lowest margin condition

802.11n_HT20_Lowest Channel (5 500 MHz)



Highest Channel (5 700 MHz)

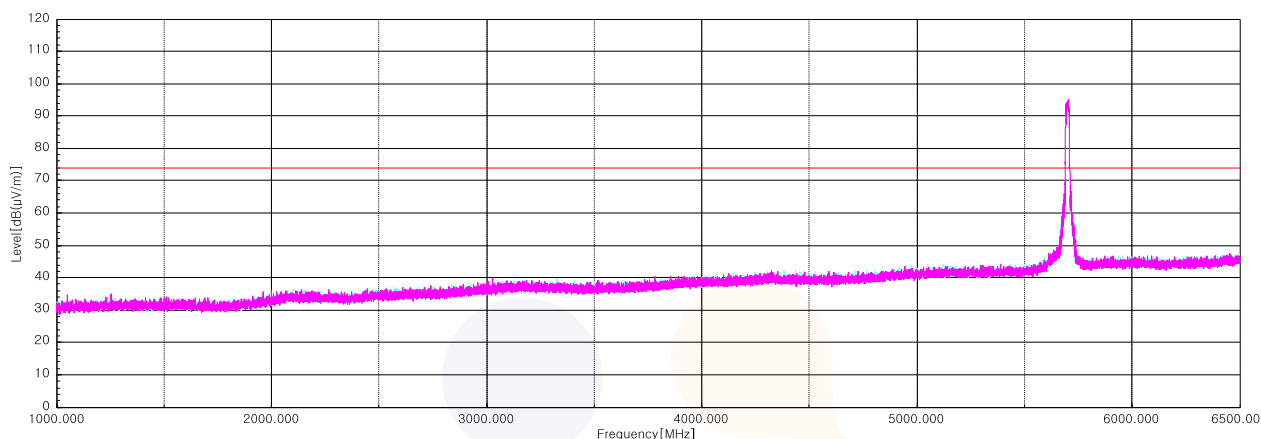


Plot of Harmonics and Spurious Emissions

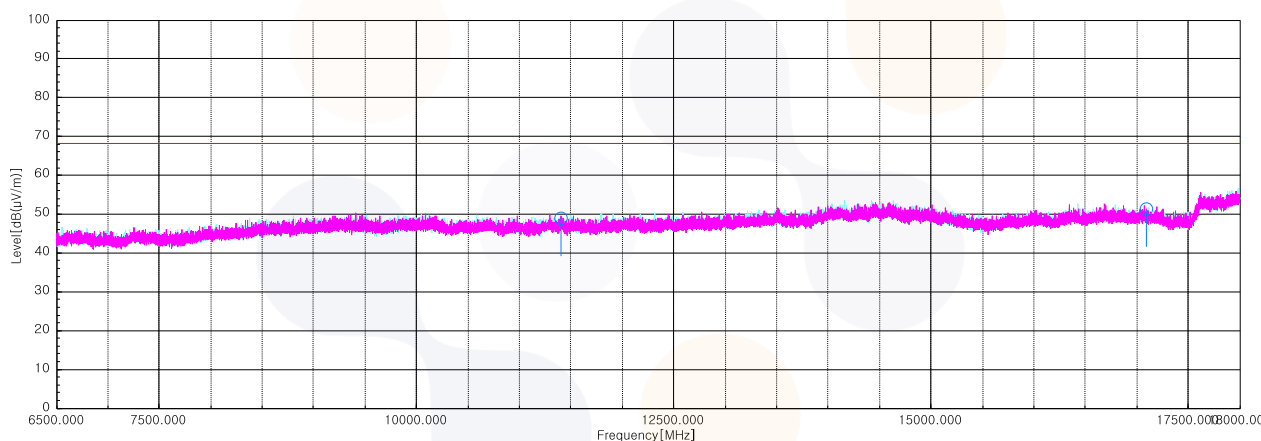
In order to simplify the report, attached plots were only the lowest margin condition

802.11n_HT20_UNII 2C_Highest Channel (5 700 MHz)

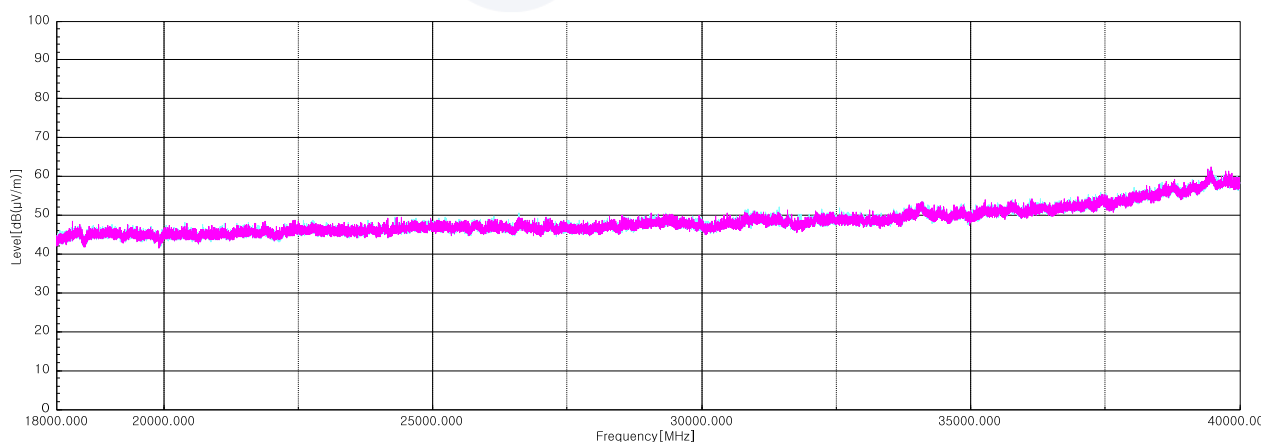
Horizontal/Vertical for 1 GHz ~ 6.5 GHz



Horizontal/Vertical for 6.5 GHz ~ 18 GHz



Horizontal/Vertical for 18 GHz ~ 40 GHz



Straddle Channel

802.11a (5 720 MHz)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μV))	(dB)	(dB)	(dB)	(dB(μV/m))	(dB(μV/m))	(dB)
Peak data								
11 431.97 ¹⁾	H	53.30	39.20	-43.33	-	49.17	74.00	24.83
17 160.88	V	54.60	38.10	-41.93	-	50.77	68.20	17.43
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

802.11n HT20 (5 720 MHz)

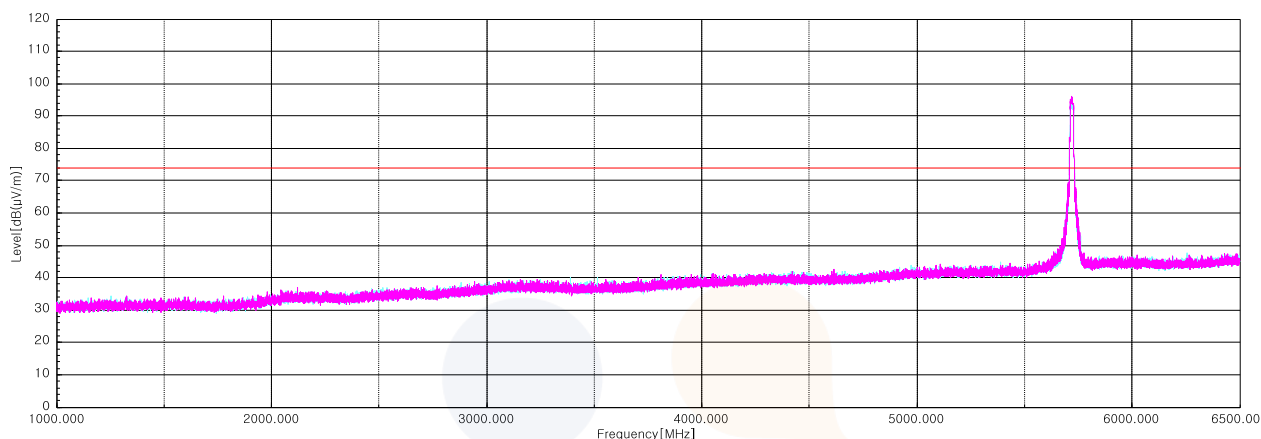
Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μV))	(dB)	(dB)	(dB)	(dB(μV/m))	(dB(μV/m))	(dB)
Peak data								
11 445.77 ¹⁾	H	52.70	39.20	-43.28	-	48.62	74.00	25.38
17 158.20	V	55.90	38.10	-41.93	-	52.07	68.20	16.13
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

Plot of Harmonics and Spurious Emissions

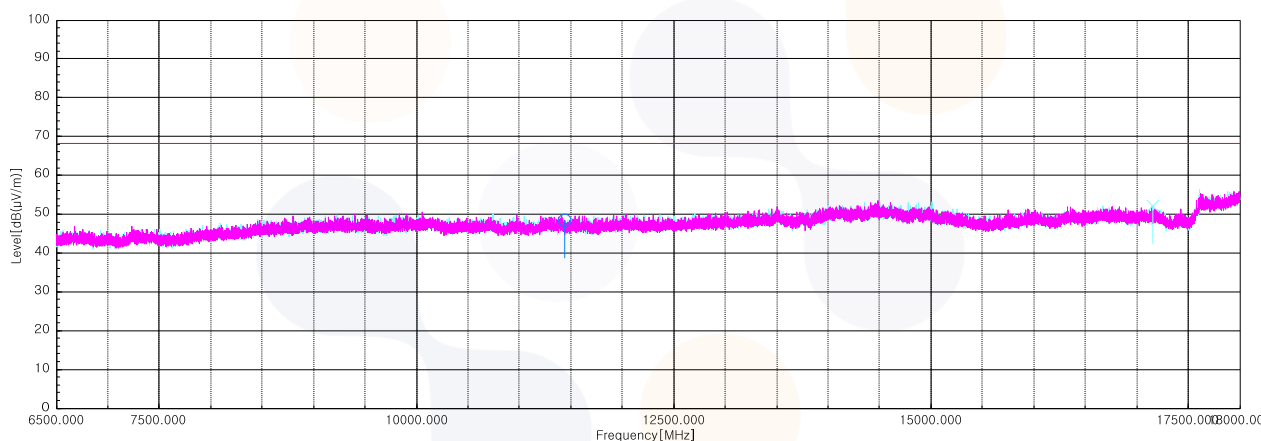
In order to simplify the report, attached plots were only the lowest margin condition

802.11n HT20_Straddle Channel (5 720 MHz)

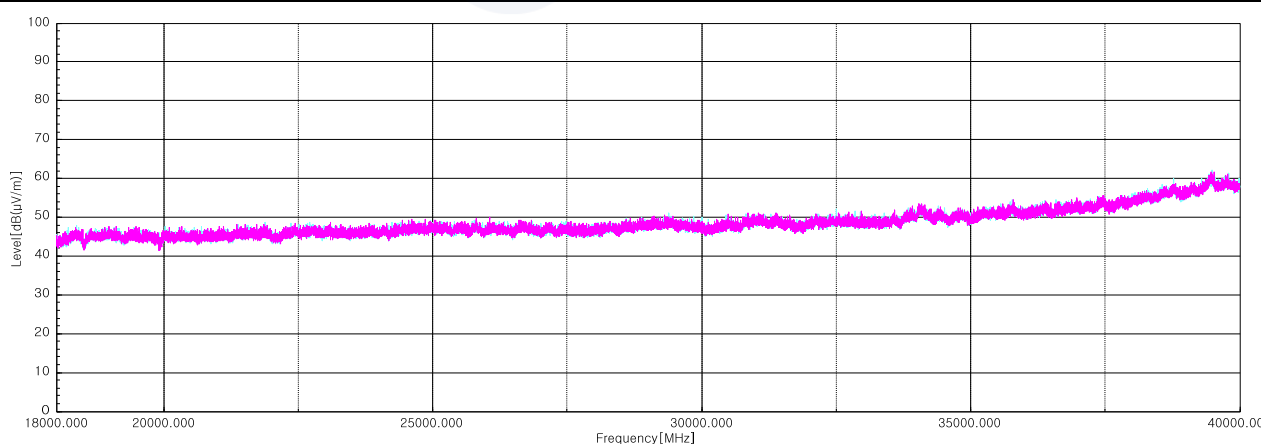
Horizontal/Vertical for 1 GHz ~ 6.5 GHz



Horizontal/Vertical for 6.5 GHz ~ 18 GHz



Horizontal/Vertical for 18 GHz ~ 40 GHz



UNII 3

802.11a_Lowest Channel (5 745 MHz)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data								
5 724.90	H	59.50	33.75	-26.14	-	67.11	122.00	54.89
11 475.67 ¹⁾	V	53.80	39.05	-43.18	-	49.67	74.00	24.33
17 235.63	H	54.70	38.44	-41.87	-	51.27	68.20	16.93
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

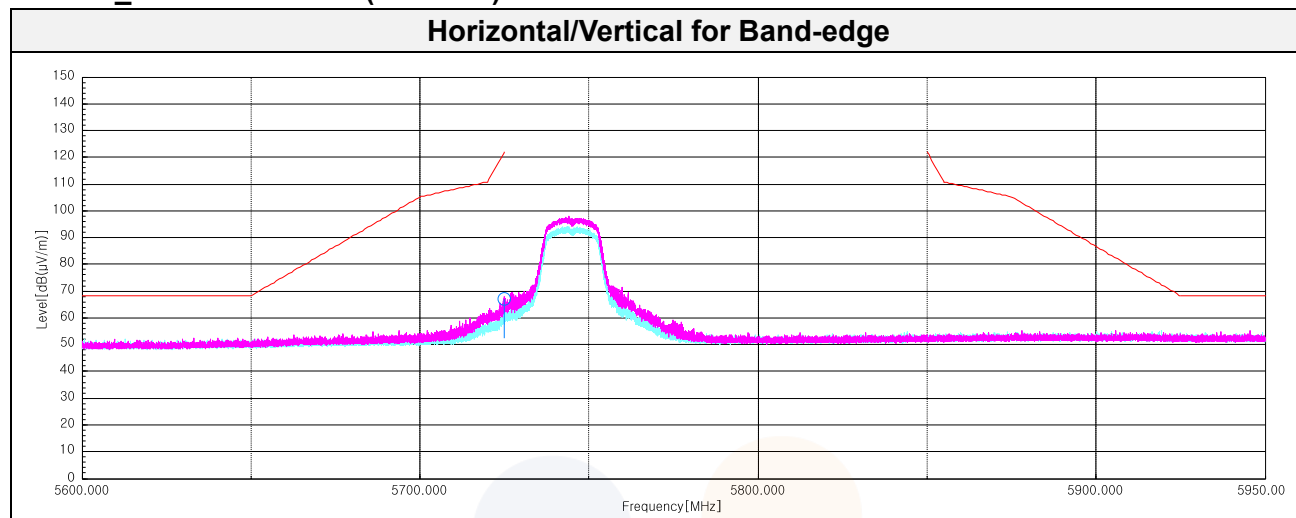
802.11a_Middle Channel (5 785 MHz)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data								
11 561.53 ¹⁾	V	53.20	38.88	-42.90	-	49.18	74.00	24.82
17 381.30	V	52.80	38.83	-42.13	-	49.50	68.20	18.70
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

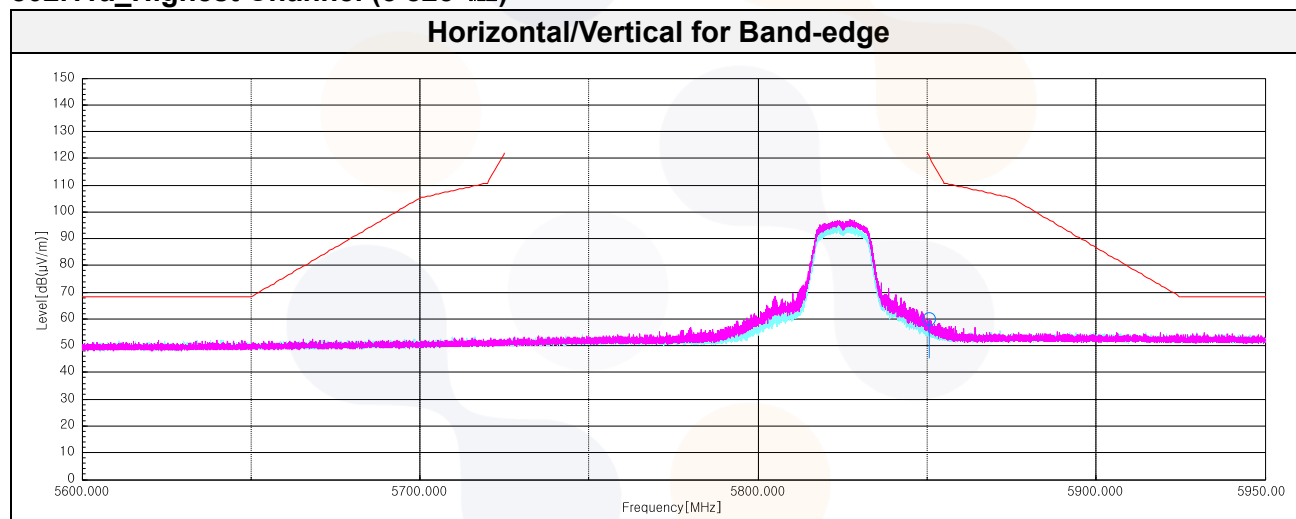
802.11a_Highest Channel (5 825 MHz)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data								
5 850.75	H	51.60	34.20	-25.93	-	59.87	120.50	60.63
11 564.60 ¹⁾	H	52.70	38.87	-42.89	-	48.68	74.00	25.32
17 377.08	H	53.70	38.81	-42.12	-	50.39	68.20	17.81
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

802.11a_Lowest Channel (5 745 MHz)



802.11a_Highest Channel (5 825 MHz)



802.11n_HT20_Lowest Channel (5 745 MHz)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μV))	(dB)	(dB)	(dB)	(dB(μV/m))	(dB(μV/m))	(dB)
Peak data								
5 724.23	H	59.20	33.75	-26.14	-	66.81	120.40	53.59
11 518.60 ¹⁾	H	54.00	38.96	-43.04	-	49.92	74.00	24.08
17 235.25	V	53.60	38.44	-41.87	-	50.17	68.20	18.03
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

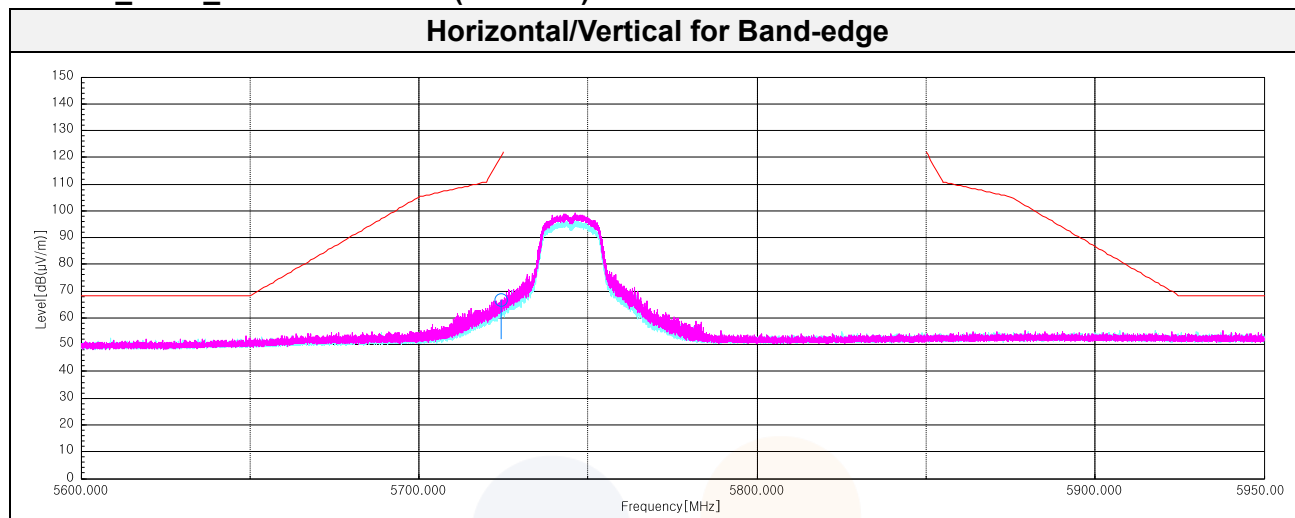
802.11n_HT20_Middle Channel (5 785 MHz)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μV))	(dB)	(dB)	(dB)	(dB(μV/m))	(dB(μV/m))	(dB)
Peak data								
11 587.60 ¹⁾	H	53.30	38.82	-42.81	-	49.31	74.00	24.69
17 365.58	H	53.90	38.76	-42.10	-	50.56	68.20	17.64
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

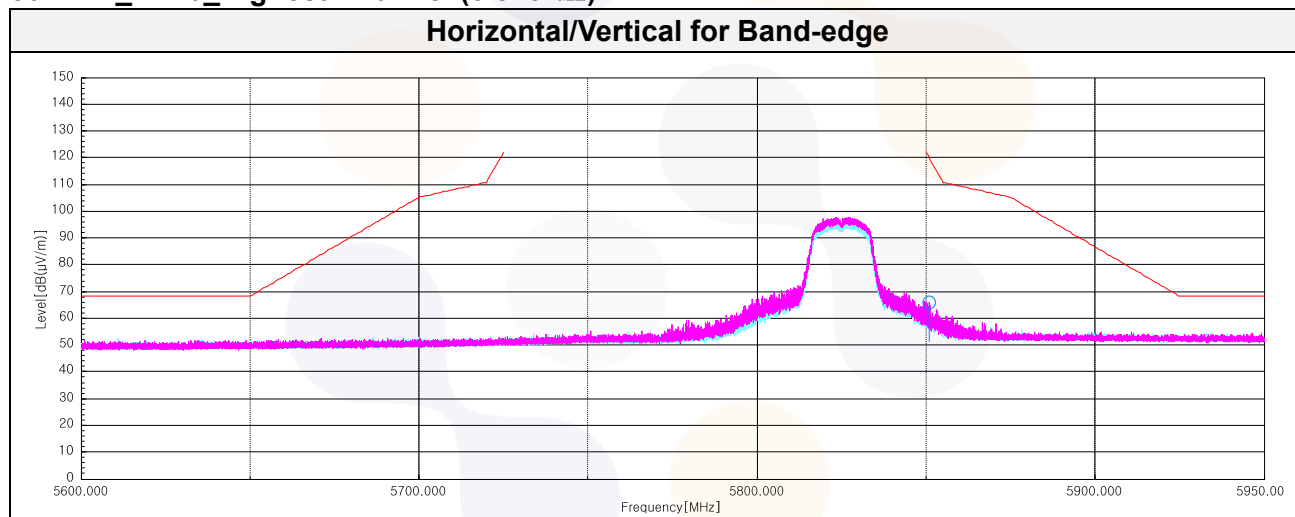
802.11n_HT20_Highest Channel (5 825 MHz)

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μV))	(dB)	(dB)	(dB)	(dB(μV/m))	(dB(μV/m))	(dB)
Peak data								
5 851.09	H	57.60	34.20	-25.93	-	65.87	119.70	53.83
11 629.77 ¹⁾	V	53.30	38.74	-42.67	-	49.37	74.00	24.63
17 474.83	V	51.50	39.30	-42.32	-	48.48	68.20	19.72
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

802.11n_HT20_Lowest Channel (5 745 MHz)



802.11n_HT20_Highest Channel (5 825 MHz)

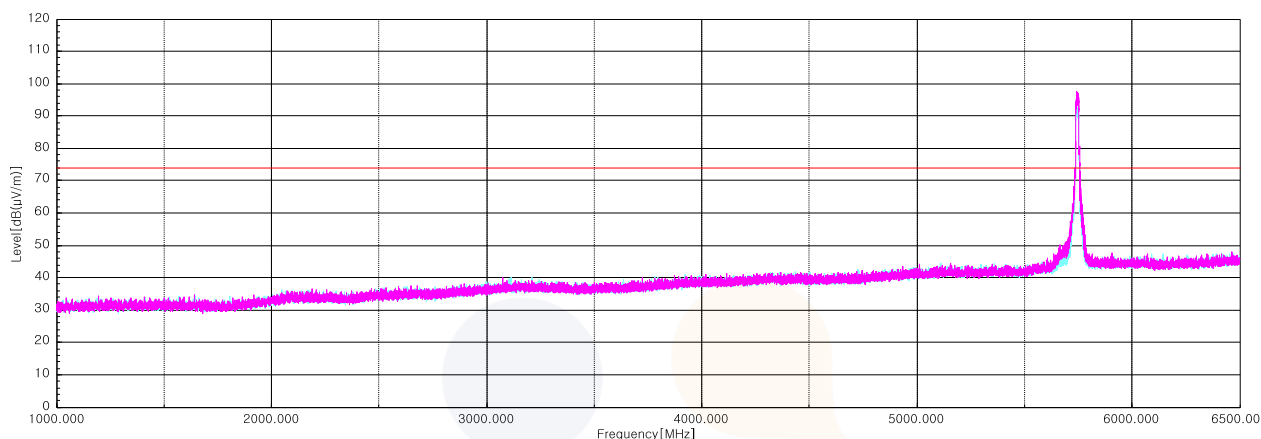


Plot of Harmonics and Spurious Emissions

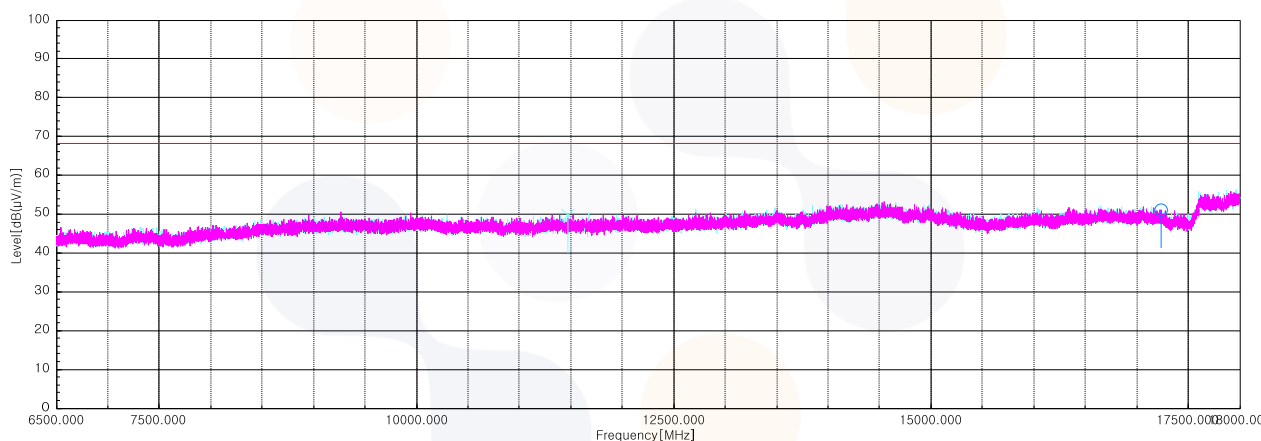
In order to simplify the report, attached plots were only the lowest margin condition

802.11a_UNII 3_Lowest Channel (5 745 MHz)

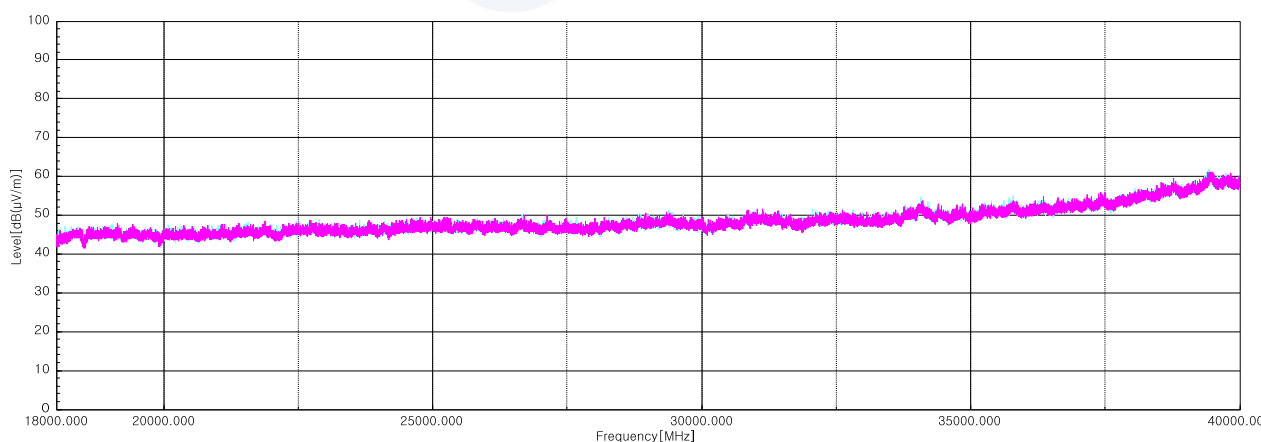
Horizontal/Vertical for 1 GHz ~ 6.5 GHz



Horizontal/Vertical for 6.5 GHz ~ 18 GHz



Horizontal/Vertical for 18 GHz ~ 40 GHz



Spurious Emission for Simultaneous Tx Condition

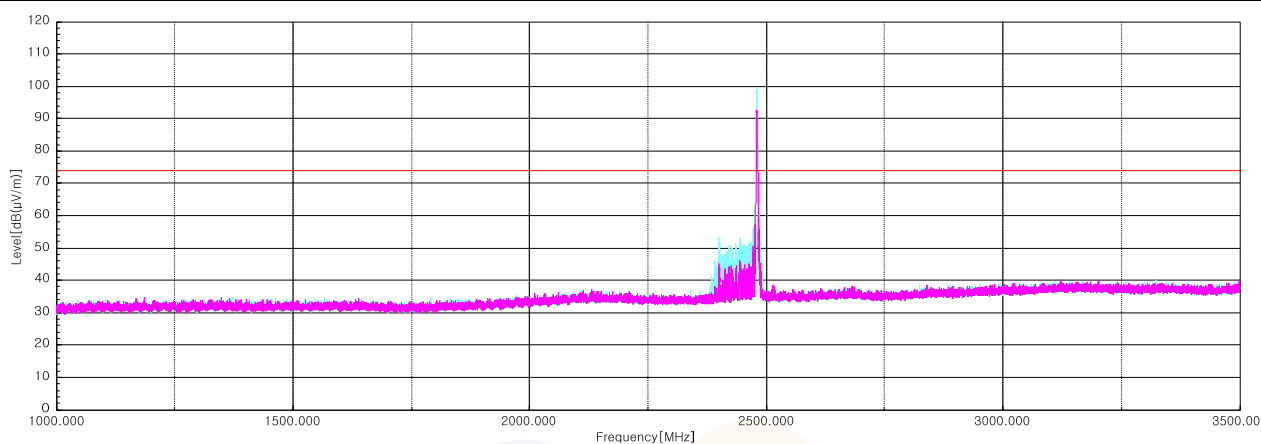
Case	WLAN 5 GHz	Bluetooth
Mode	802.11n HT20	BLE
Channel	64	39
Frequency	5 320 MHz	2 480 MHz
Data Rate	MCS0	2M Bits/s, 37 Packet

Notes.

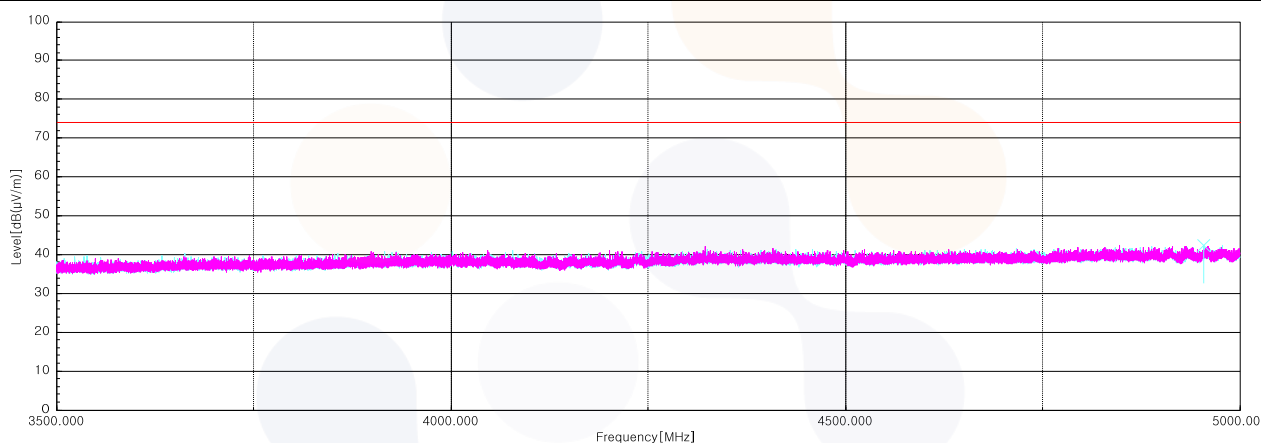
The lowest margin condition among the channels and modes were selected for test.

Frequency	Pol.	Reading	Ant. Factor	Amp.+Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data								
4 953.90 ¹⁾	V	54.90	32.81	-45.46	-	42.25	74.00	31.75
7 426.13 ¹⁾	V	53.10	36.85	-43.60	-	46.35	74.00	27.65
10 716.67 ¹⁾	V	56.30	39.30	-44.79	-	50.81	74.00	23.19
15 953.00 ¹⁾	V	54.40	38.20	-41.84	-	50.76	74.00	23.24
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

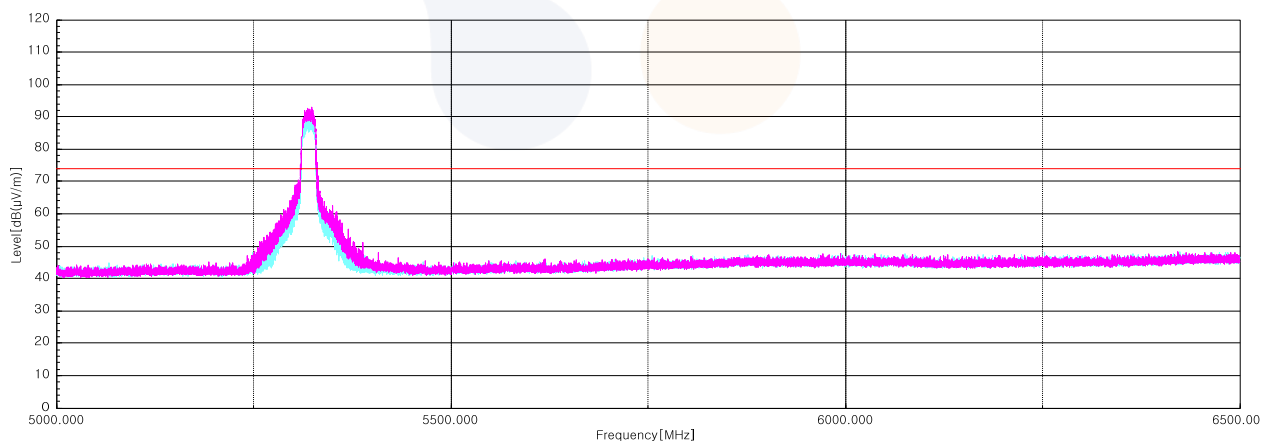
Horizontal/Vertical for 1 GHz ~ 3.5 GHz



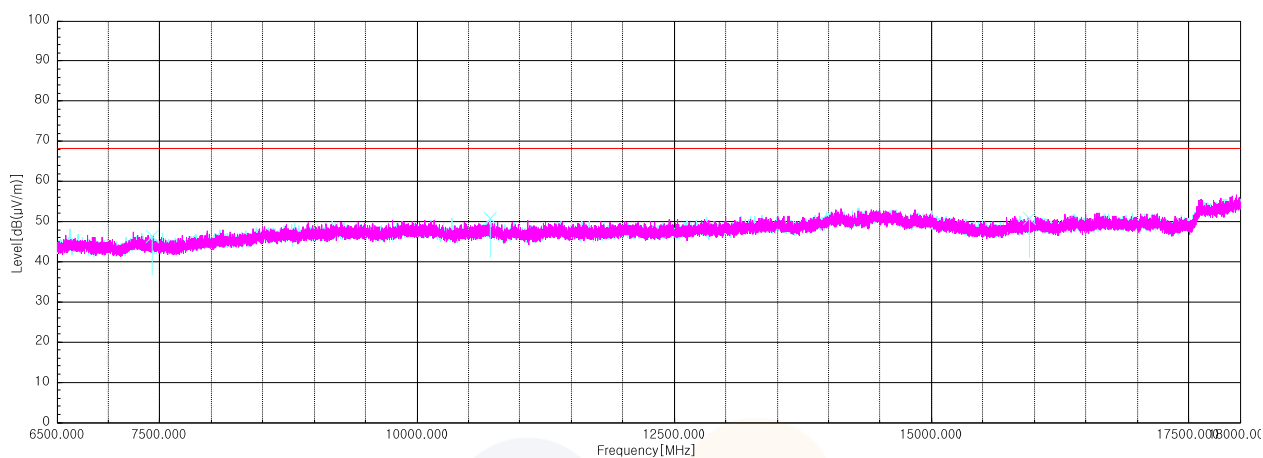
Horizontal/Vertical for 3.5 GHz ~ 5 GHz



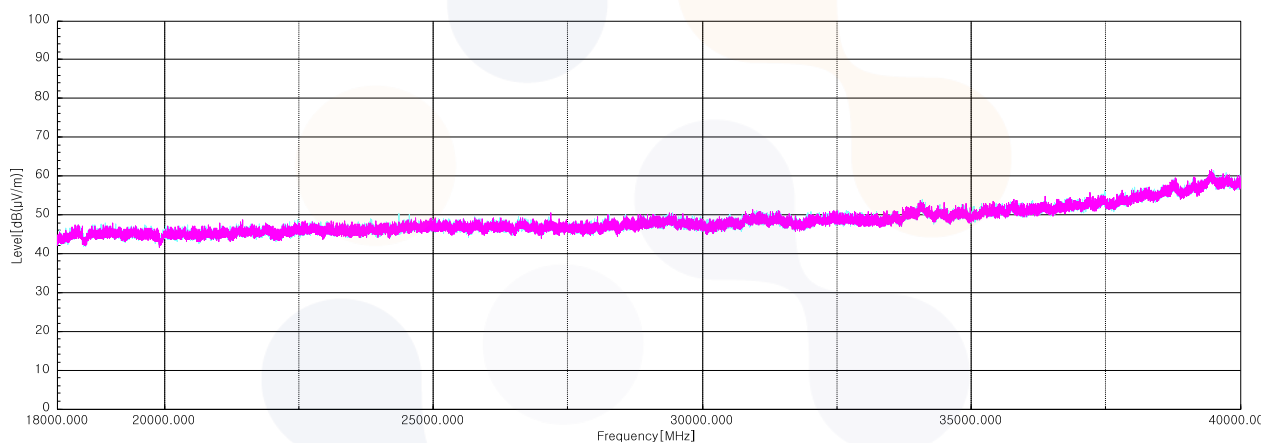
Horizontal/Vertical for 5 GHz ~ 6.5 GHz



Horizontal/Vertical for 6.5 GHz ~ 18 GHz

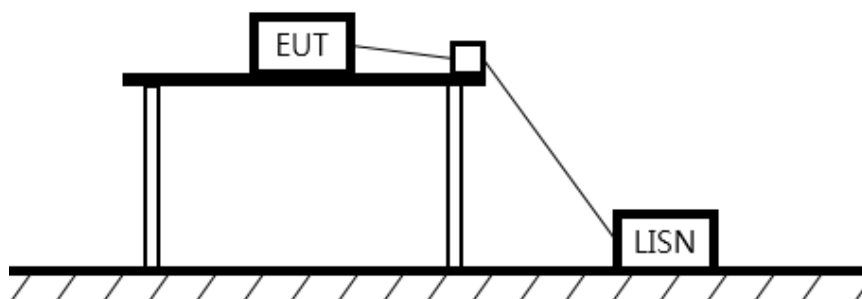


Horizontal/Vertical for 18 GHz ~ 40 GHz



7.8. AC Conducted emission

Test setup



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 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

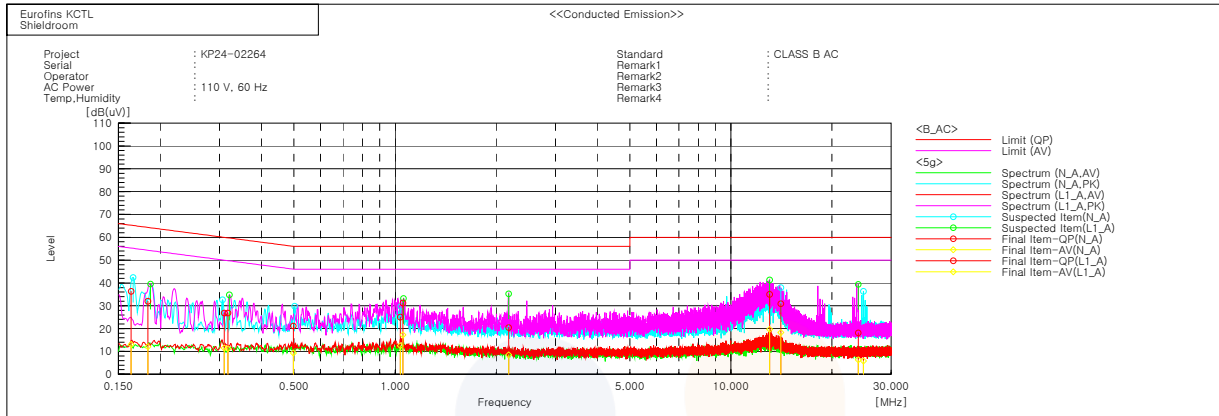
Frequency of Emission (MHz)	Conducted limit (dB μ V/m)	
	Quasi-peak	Average
0.15 – 0.50	66 - 56*	56 - 46*
0.50 – 5.00	56	46
5.00 – 30.0	60	50

Measurement procedure

1. The EUT was placed on a wooden table of size, 1 m by 1.5 m, raised 80 cm in which is located 40 cm away from the vertical wall and 1.5m away from the side wall of the shielded room.
2. Each current-carrying conductor of the EUT power cord was individually connected through a 50 Ω /50 μ H LISN, which is an input transducer to a spectrum analyzer or an EMI/Field Intensity Meter, to the input power source.
3. Exploratory measurements were made to identify the frequency of the emission that had the highest amplitude relative to the limit by operating the EUT in a range of typical modes of operation, cable position, and with a typical system equipment configuration and arrangement. Based on the exploratory tests of the EUT, the one EUT cable configuration and arrangement and mode of operation that had produced the emission with the highest amplitude relative to the limit was selected for the final measurement.
4. The final test on all current-carrying conductors of all of the power cords to the equipment that comprises the EUT (but not the cords associated with other non-EUT equipment is the system) was then performed over the frequency range of 0.15 MHz to 30 MHz.
5. The measurements were made with the detector set to peak amplitude within a bandwidth of 10 kHz or to quasi-peak and average within a bandwidth of 9 kHz. The EUT was in transmitting mode during the measurements.

Test results

Worst case: 802.11a / UNII 3_5 745 MHz



Final Result

--- N_A Phase ---

No.	Frequency [MHz]	Reading QP [dB(uV)]	Reading CAV [dB(uV)]	c.f [dB]	Result QP [dB(uV)]	Result CAV [dB(uV)]	Limit QP [dB(uV)]	Limit AV [dB(uV)]	Margin QP [dB]	Margin CAV [dB]
1	0.16371	25.9	2.6	10.4	36.3	13.0	65.3	55.3	29.0	42.3
2	0.30994	16.7	1.4	10.1	26.8	11.5	60.0	50.0	33.2	38.5
3	0.49786	11.0	-0.9	10.2	21.2	9.3	56.0	46.0	34.8	36.7
4	1.03625	15.0	2.6	10.0	25.0	12.6	56.0	46.0	31.0	33.4
5	14.07795	20.1	7.5	10.8	30.9	18.3	60.0	50.0	29.1	31.7
6	24.81856	-1.2	-5.7	11.5	10.3	5.8	60.0	50.0	49.7	44.2

--- L1_A Phase ---

No.	Frequency [MHz]	Reading QP [dB(uV)]	Reading CAV [dB(uV)]	c.f [dB]	Result QP [dB(uV)]	Result CAV [dB(uV)]	Limit QP [dB(uV)]	Limit AV [dB(uV)]	Margin QP [dB]	Margin CAV [dB]
1	0.18355	21.6	1.6	10.4	32.0	12.0	64.3	54.3	32.3	42.3
2	0.31785	16.7	1.1	10.1	26.8	11.2	59.8	49.8	33.0	38.6
3	1.05554	21.2	7.3	10.0	31.2	17.3	56.0	46.0	24.8	28.7
4	2.17801	10.6	-1.5	9.9	20.5	8.4	56.0	46.0	35.5	37.6
5	13.03542	24.2	8.9	10.8	35.0	19.7	60.0	50.0	25.0	30.3
6	23.95282	6.7	-5.1	11.4	18.1	6.3	60.0	50.0	41.9	43.7

8. Measurement equipment

Equipment Name	Manufacturer	Model No.	Serial No.	Next Cal. Date
Spectrum Analyzer	R&S	FSV30	100807	24.07.03
Signal Generator	R&S	SMB100A	176206	25.01.18
DC Power Supply	AGILENT	E3632A	MY40016393	24.07.04
Attenuator	API Inmet	40AH2W-10	10	24.07.04
Spectrum Analyzer	R&S	FSVA40	101575	24.06.19
Spectrum Analyzer	R&S	FSV40	100988	24.07.03
PSA Spectrum Analyzer	Agilent	E4440A	MY44303500	24.07.04
EMI TEST RECEIVER	R&S	ESCI3	101408	24.08.18
TWO-LINE V - NETWORK	R&S	ENV216	101358	24.09.27
Broadband PreAmplifier	SCHWARZBECK	BBV9718D	57	25.01.19
Low Noise Amplifier	TESTEK	TK-PA18H	220124-L	24.10.12
Low Noise Amplifier	TESTEK	TK-PA1840H	220133-L	24.10.17
Amplifier	SONOMA INSTRUMENT	310N	421910	24.10.12
Bilog Antenna	Teseq GmbH	CBL 6112D	61521	24.11.17
Loop Antenna	R&S	HFH2-Z2	100355	24.08.10
Horn Antenna	SCHWARZBECK	BBHA9120D	2763	24.10.18
Horn Antenna	SCHWARZBECK	BBHA9170	1267	24.10.16
Band reject Filter	Wainwright Instruments GmbH	WTRCJV8-5100-5850-20-100-50SSK	62	24.10.13
High Pass Filter	Wainwright Instruments GmbH	WHKX12-2805-3000-18000-40SS	SN58	24.10.16
High Pass Filter	Wainwright Instruments GmbH	WHKX8-5655-6500-18000-40SS	SN8	24.10.16
High Pass Filter	QOTANA TECHNOLOGIES	DBHF0508004000A	23041800061	24.07.10
Power Divider	Aeroflex/Weinschel, Inc	1580-1	PE430	24.07.04
Power Divider	AGILENT	11636B	54456	24.10.13
Step Attenuator	KEYSIGHT	8495D	MY42144300	25.01.19
Step Attenuator	AGILENT	8494B	MY42140941	25.01.19
Vector Signal Generator	R&S	SMBV100A	257566	24.07.04
DC Power Supply	AGILENT	E3632A	KR94907664	24.04.27

End of test report