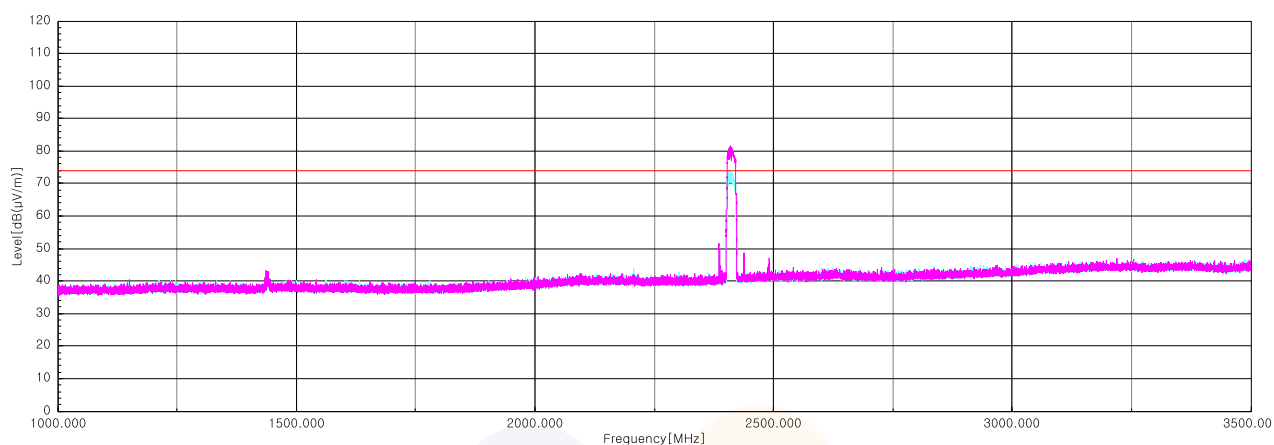
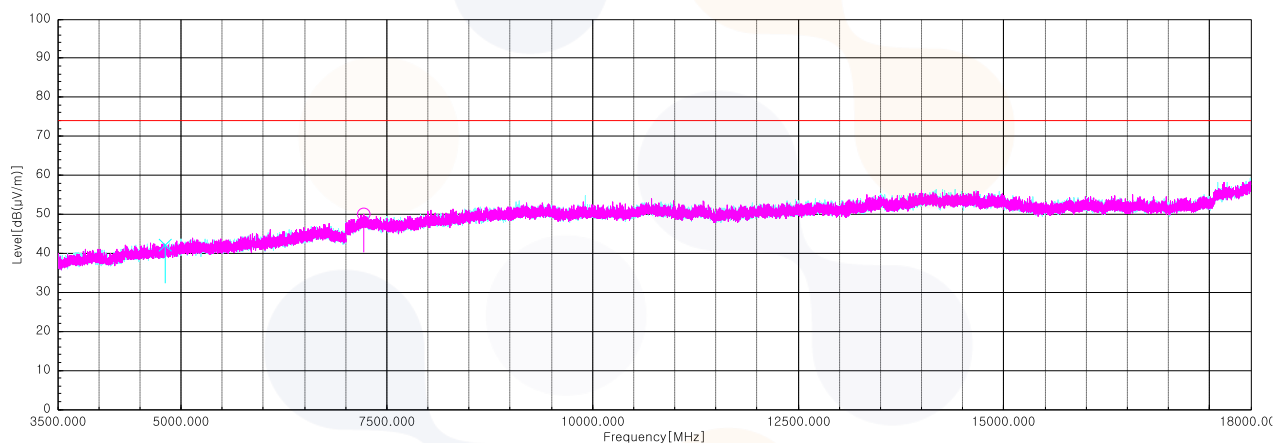


Horizontal/Vertical for 1 GHz ~ 3.5 GHz



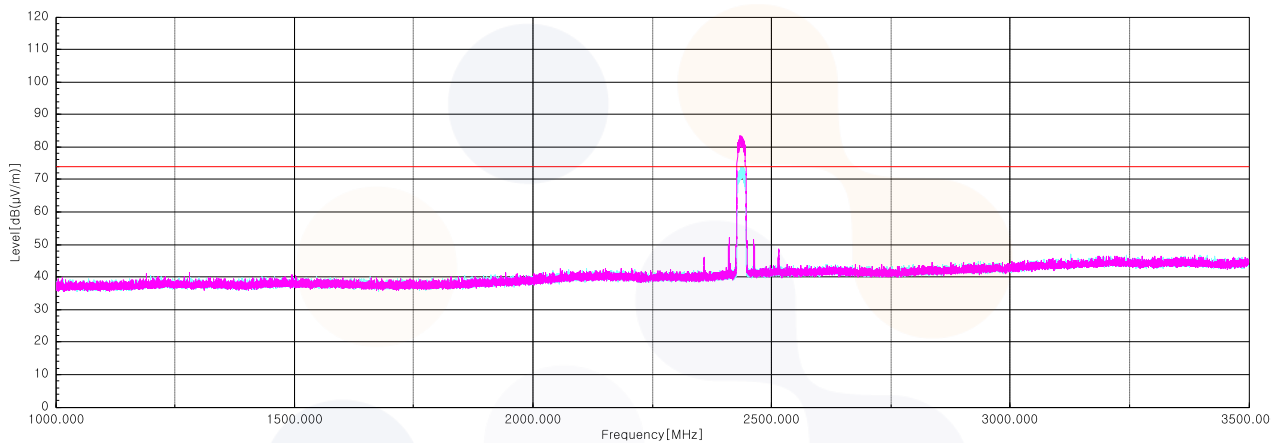
Horizontal/Vertical for 3.5 GHz ~ 18 GHz



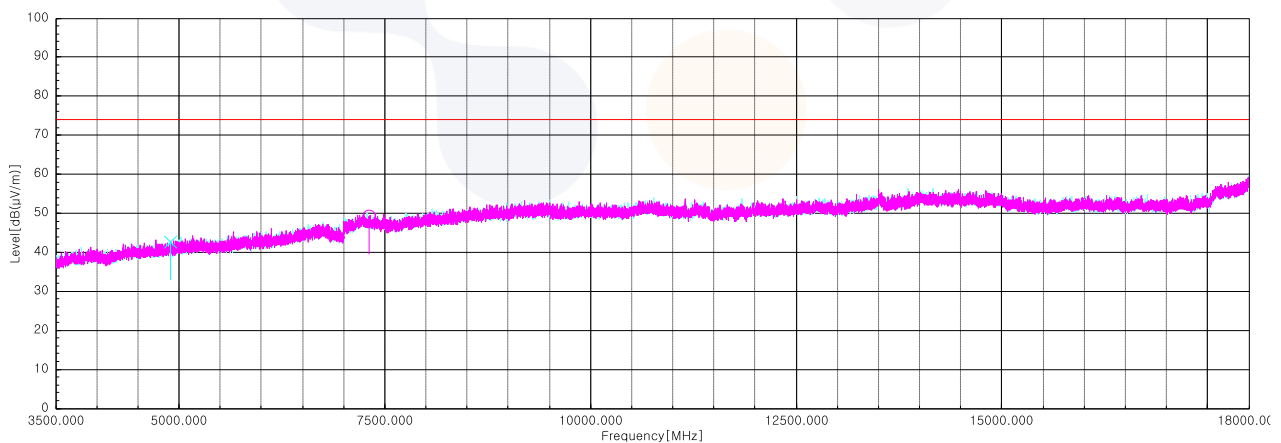
2 437 MHz

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								
4 892.48 ¹⁾	V	54.50	32.57	-44.45	-	42.62	74.00	31.38
7 304.80 ¹⁾	H	54.70	36.98	-42.57	-	49.11	74.00	24.89
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

Horizontal/Vertical for 1 GHz ~ 3.5 GHz

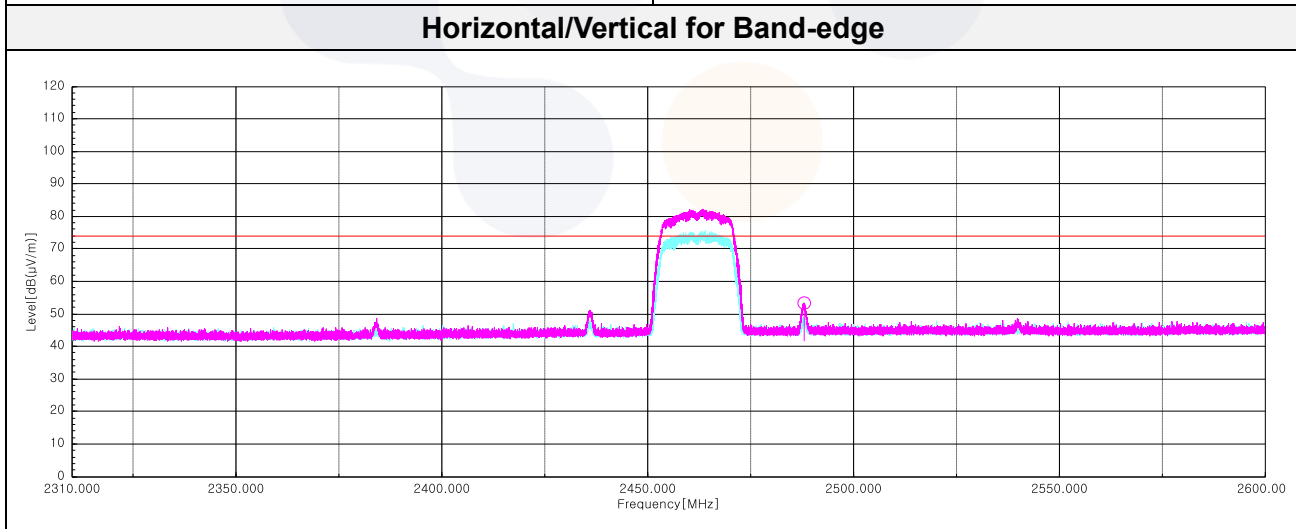
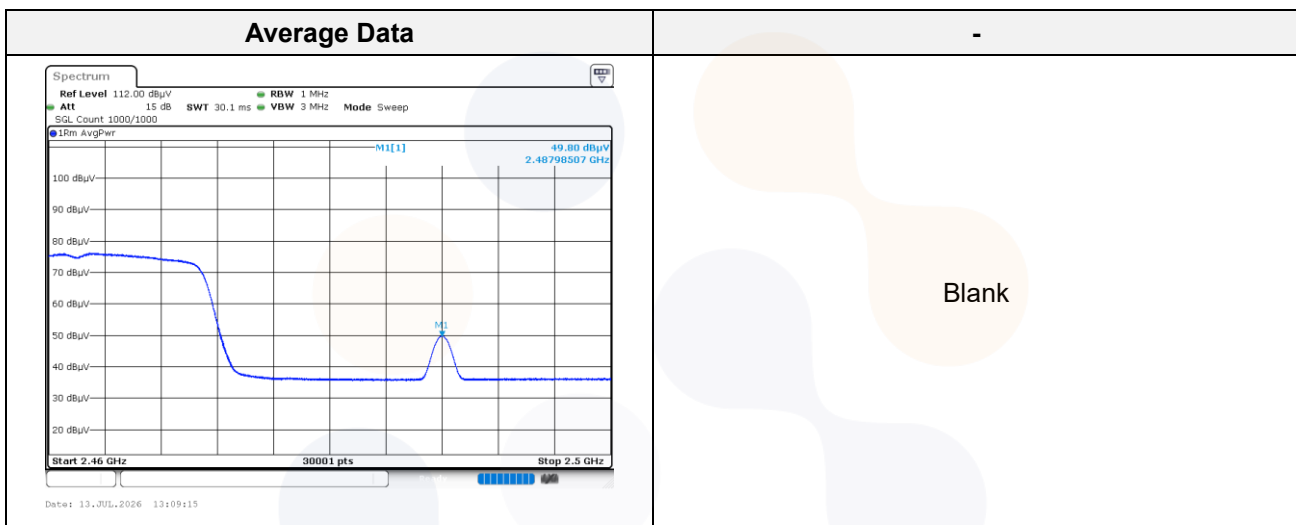


Horizontal/Vertical for 3.5 GHz ~ 18 GHz

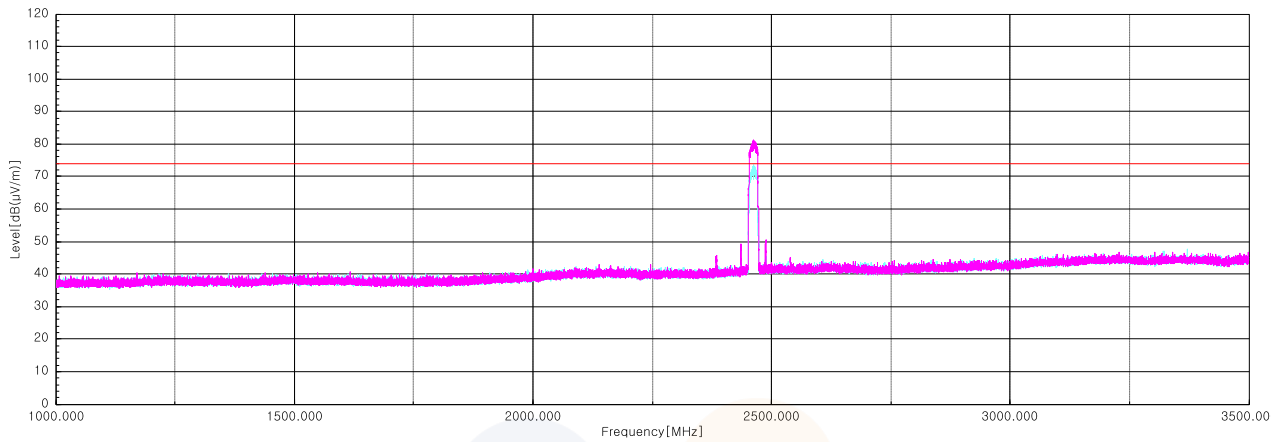


2 462 MHz

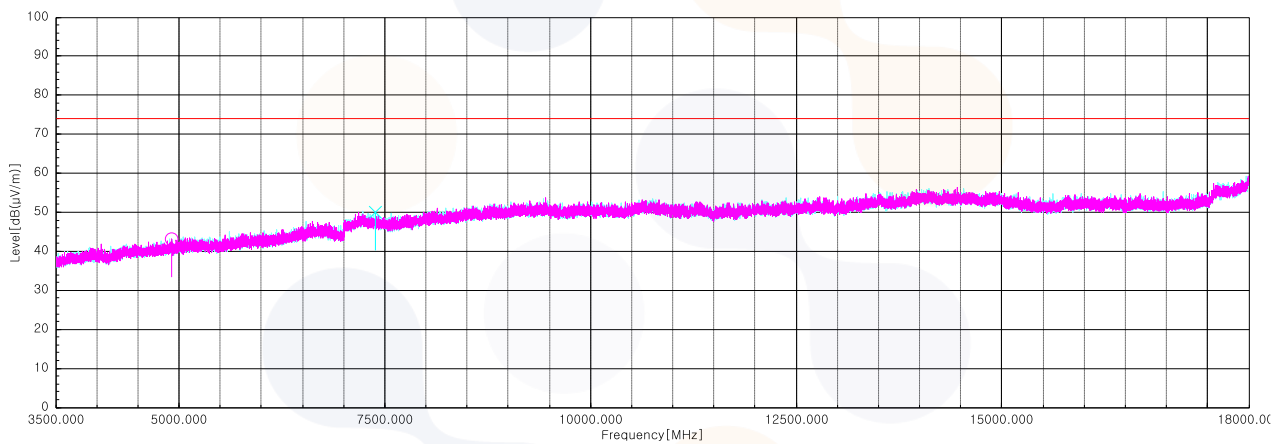
Frequency	Pol.	Reading	Ant. Factor	Amp. + Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μV))	(dB)	(dB)	(dB)	(dB(μV/m))	(dB(μV/m))	(dB)
Peak data								
2 487.99 ¹⁾	H	54.50	27.78	-28.83	-	53.45	74.00	20.55
4 908.43 ¹⁾	H	54.70	32.75	-44.38	-	43.07	74.00	30.93
7 383.58 ¹⁾	V	55.50	36.83	-42.45	-	49.88	74.00	24.12
Average Data								
2 487.99 ¹⁾	H	49.80	27.78	-28.83	0.40	49.15	54.00	4.85



Horizontal/Vertical for 1 GHz ~ 3.5 GHz



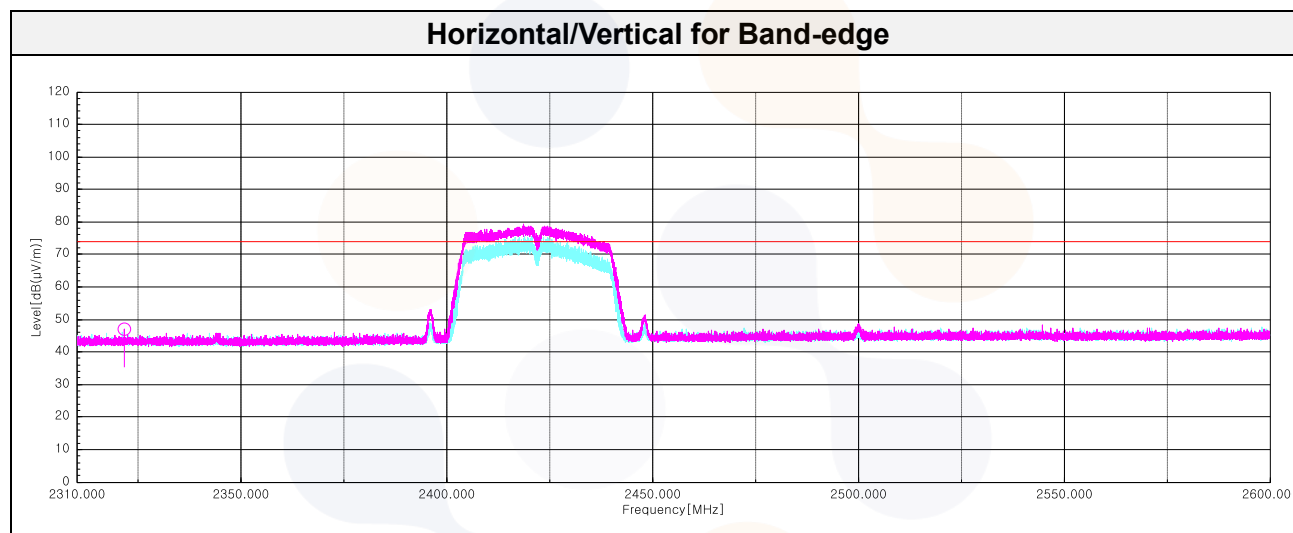
Horizontal/Vertical for 3.5 GHz ~ 18 GHz



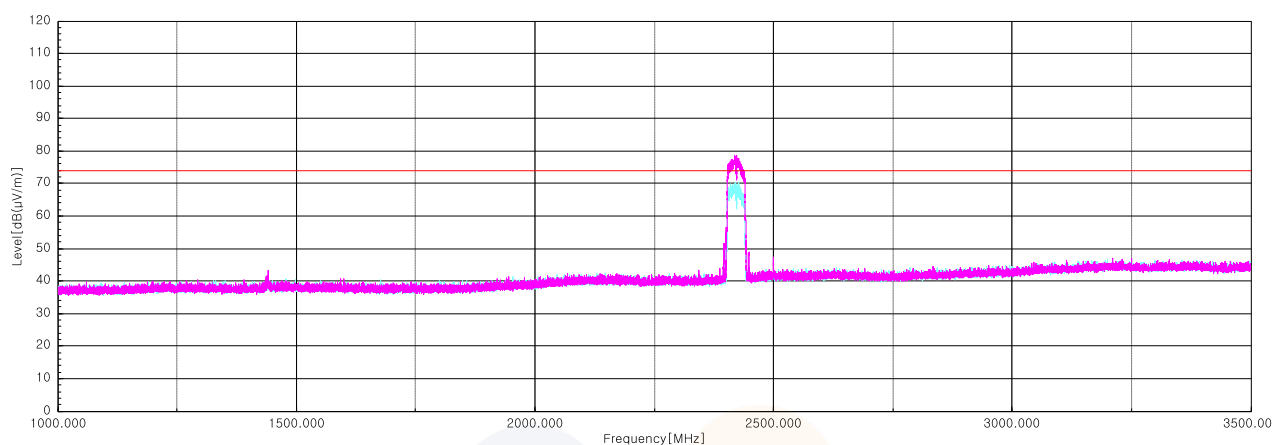
802.11n HT40

2 422 MHz

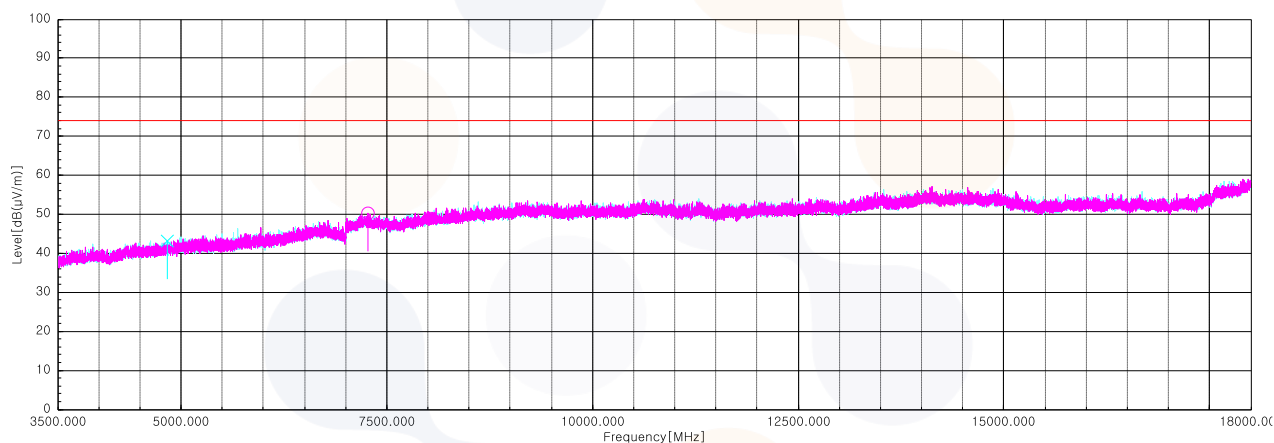
Frequency	Pol.	Reading	Ant. Factor	Amp. + Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μV))	(dB)	(dB)	(dB)	(dB(μV/m))	(dB(μV/m))	(dB)
Peak data								
2 321.62 ¹⁾	H	49.20	27.00	-29.15	-	47.05	74.00	26.95
4 830.62 ¹⁾	V	55.60	32.26	-44.73	-	43.13	74.00	30.87
7 277.25 ¹⁾	H	55.90	37.31	-42.61	-	50.60	74.00	23.40
Average Data								
No spurious emissions were detected within 20 dB of the limit.								



Horizontal/Vertical for 1 GHz ~ 3.5 GHz



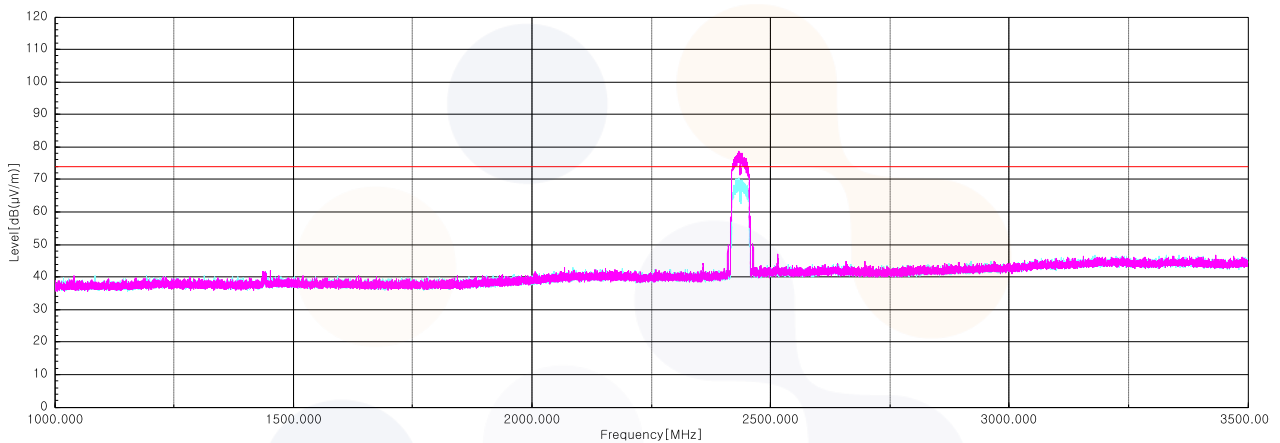
Horizontal/Vertical for 3.5 GHz ~ 18 GHz



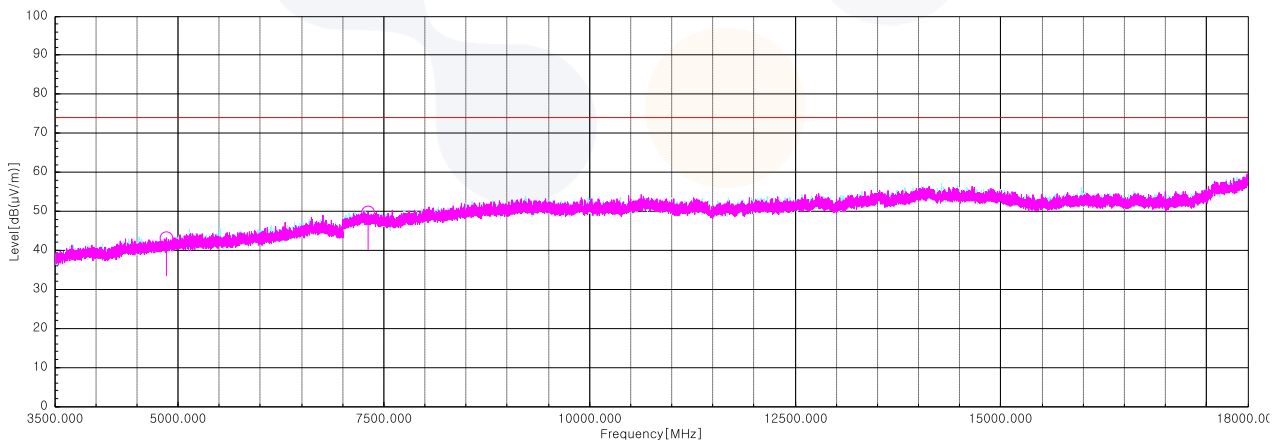
2 437 MHz

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								
4 861.07 ¹⁾	H	55.20	32.44	-44.59	-	43.05	74.00	30.95
7 311.57 ¹⁾	H	55.20	36.95	-42.56	-	49.59	74.00	24.41
Average Data								
No spurious emissions were detected within 20 dB of the limit.								

Horizontal/Vertical for 1 GHz ~ 3.5 GHz

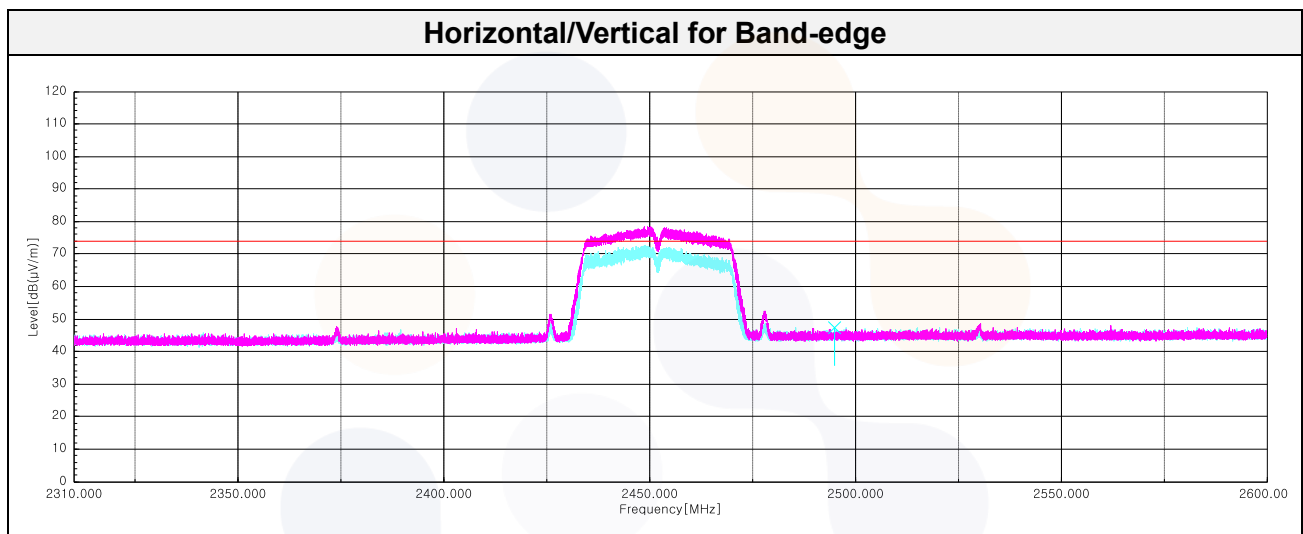


Horizontal/Vertical for 3.5 GHz ~ 18 GHz

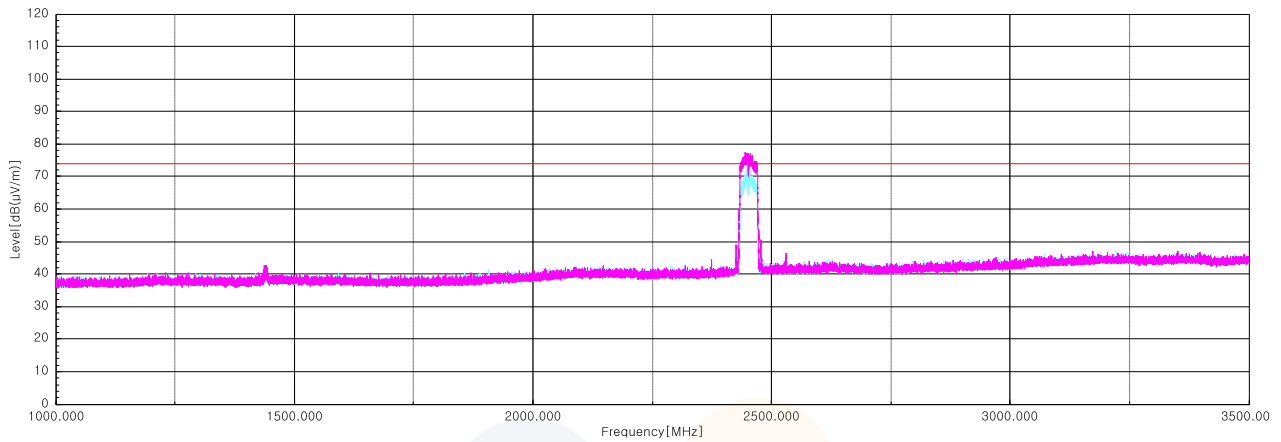


2 452 MHz

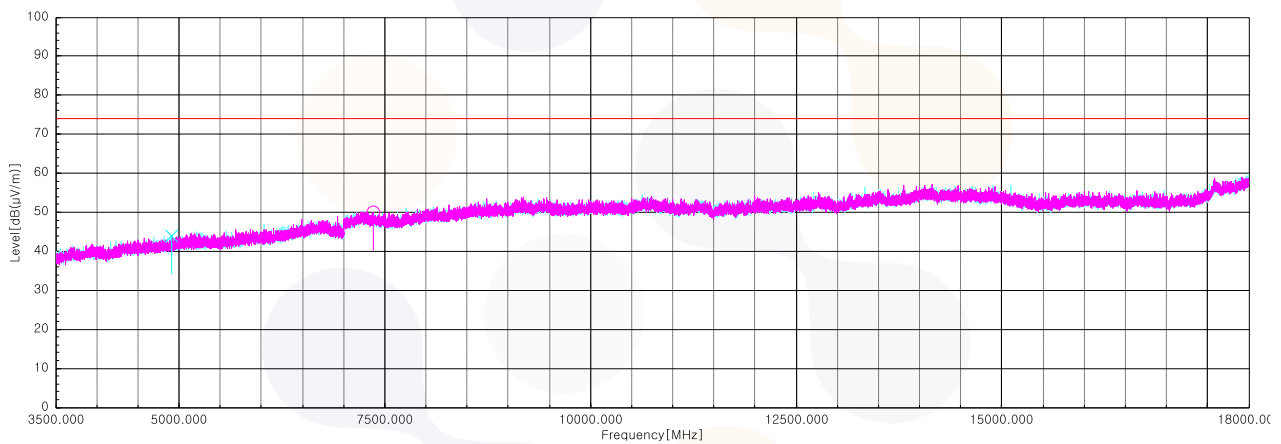
Frequency	Pol.	Reading	Ant. Factor	Amp. + Cable	DCF	Result	Limit	Margin
(MHz)	(V/H)	(dB(μ V))	(dB)	(dB)	(dB)	(dB(μ V/m))	(dB(μ V/m))	(dB)
Peak data								
2 495.02 ¹⁾	V	48.40	27.70	-28.82	-	47.28	74.00	26.72
4 910.37 ¹⁾	V	55.60	32.76	-44.37	-	43.99	74.00	30.01
7 363.77 ¹⁾	H	55.70	36.87	-42.48	-	50.09	74.00	23.91
Average Data								
No spurious emissions were detected within 20 dB of the limit.								



Horizontal/Vertical for 1 GHz ~ 3.5 GHz

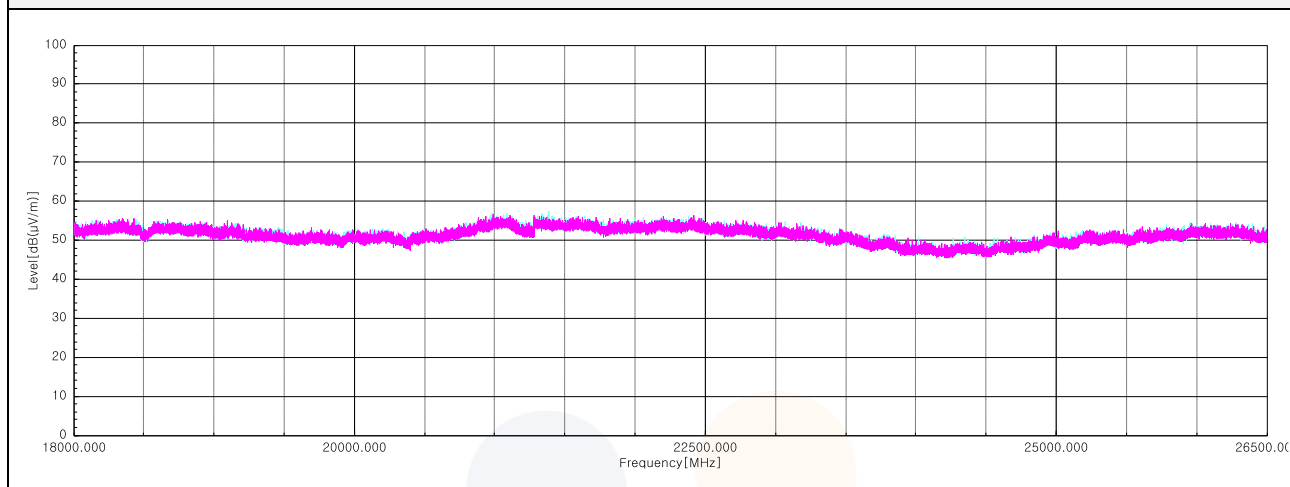


Horizontal/Vertical for 3.5 GHz ~ 18 GHz



Test results (Above 18 GHz) – Worst Case : 802.11n HT20 mode / 2.412 GHz

Horizontal/Vertical for 18 GHz ~ 26.5 GHz

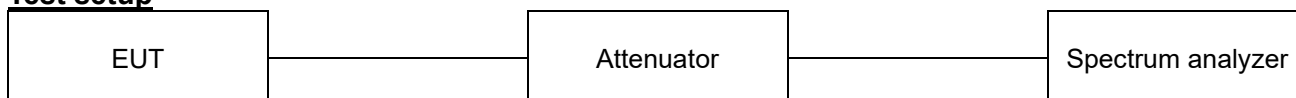


Note:

The Worst case was based on the lowest margin condition considering Harmonic and Spurious Emission.

7.5. Conducted Spurious Emission

Test setup



Limit

According to §15.247(d),

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under section 5.4(d), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

Limit : 20 dBc

Test procedure

ANSI C63.10 - Section 11.11.3

Test settings

Establish an emission level by using the following procedure:

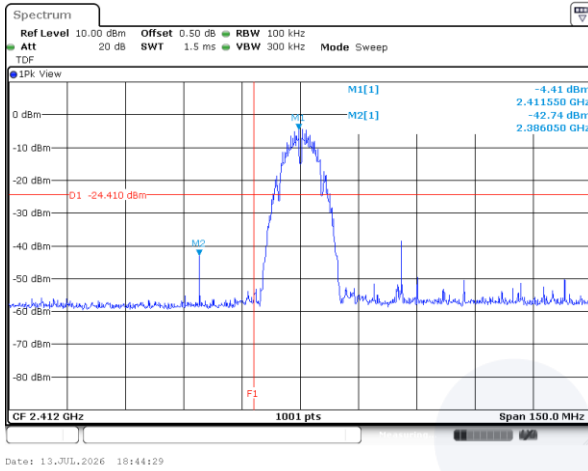
- Set the center frequency and span to encompass frequency range to be measured.
- Set the RBW = 100 kHz
- Set the VBW $\geq [3 \times \text{RBW}]$
- Detector = peak
- Sweep time = No faster than coupled (auto) time
- Trace mode = max hold
- Allow trace to fully stabilize.
- Use the peak marker function to determine the maximum amplitude level.

Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band (excluding restricted frequency bands) is attenuated by at least the minimum requirements specified in 11.11. Report the three highest emissions relative to the limit.

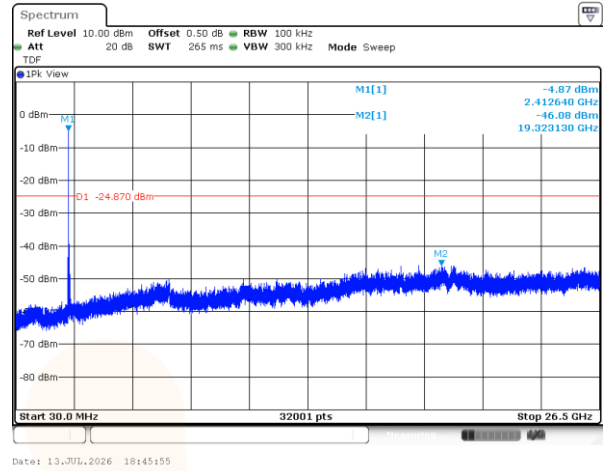
Test results

802.11b

Conducted band-edge / 2 412 MHz



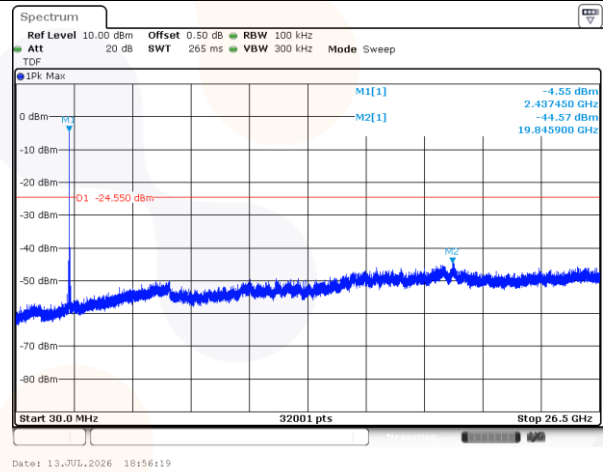
Conducted spurious / 2 412 MHz



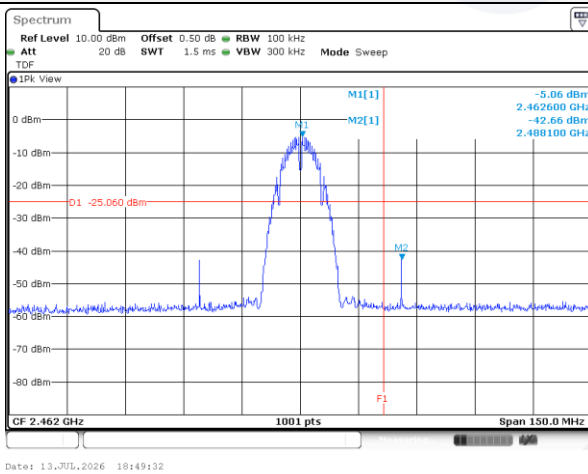
Conducted band-edge / 2 437 MHz

Blank

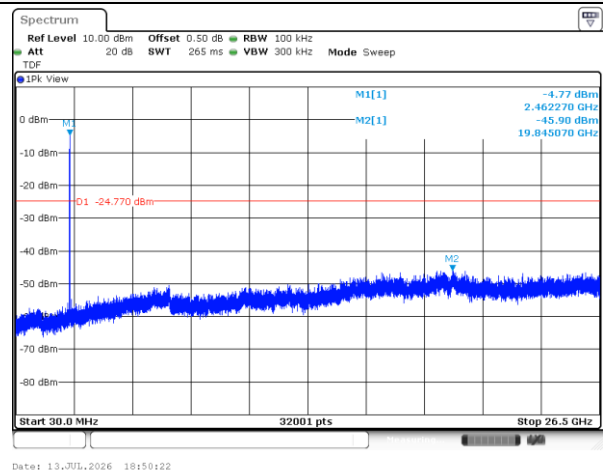
Conducted spurious / 2 437 MHz



Conducted band-edge / 2 462 MHz

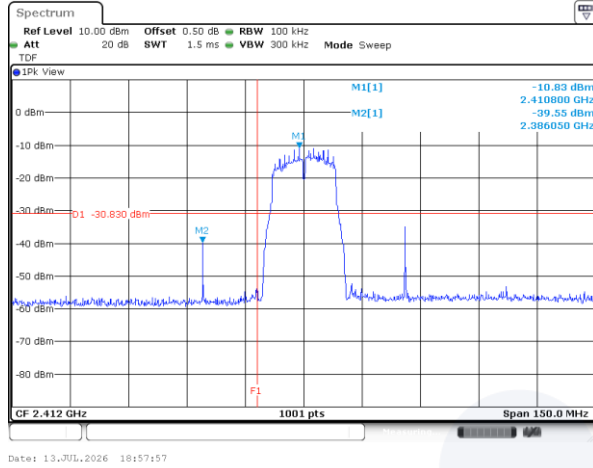


Conducted spurious / 2 462 MHz

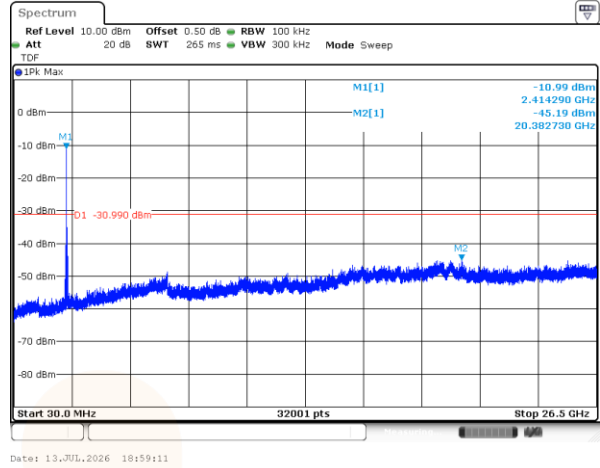


802.11g

Conducted band-edge / 2 412 MHz



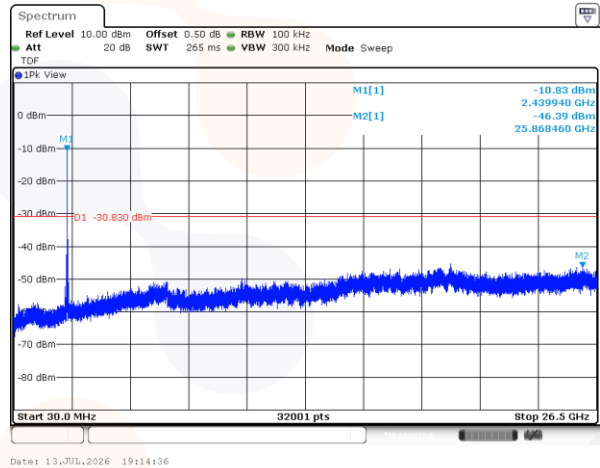
Conducted spurious / 2 412 MHz



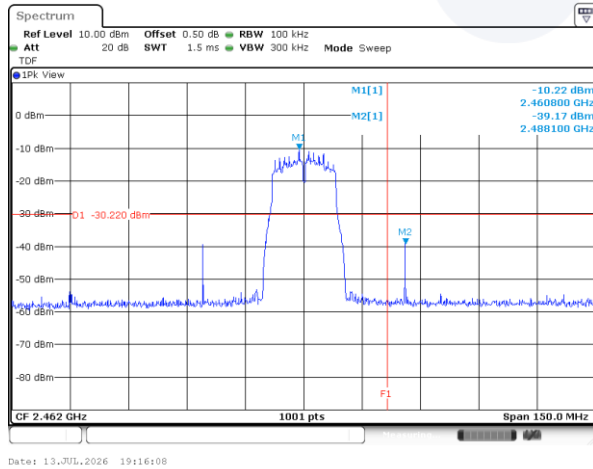
Conducted band-edge / 2 437 MHz

Blank

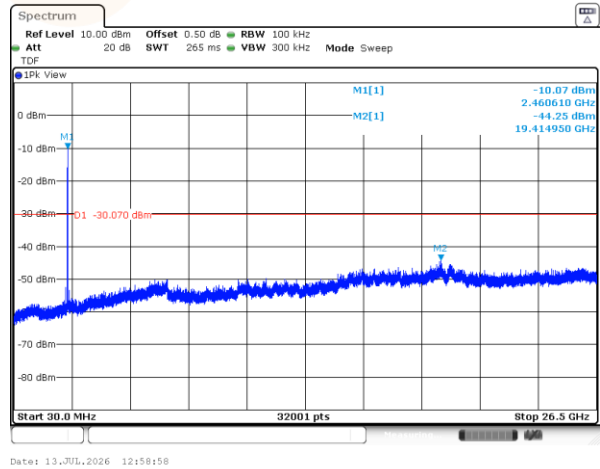
Conducted spurious / 2 437 MHz



Conducted band-edge / 2 462 MHz

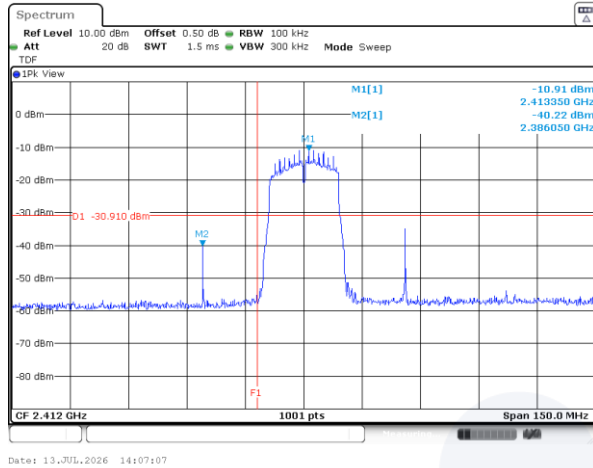


Conducted spurious / 2 462 MHz

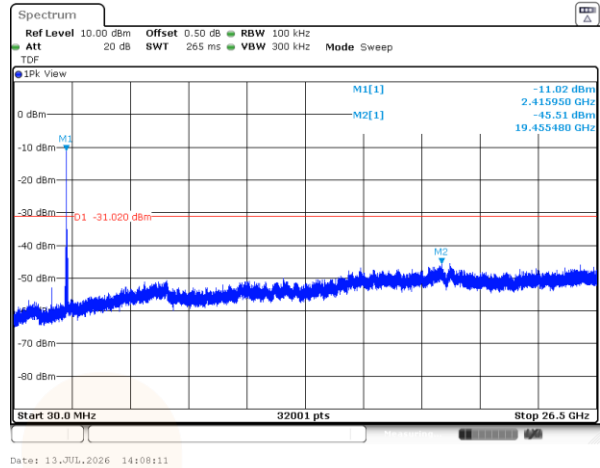


802.11n_HT20

Conducted band-edge / 2 412 MHz



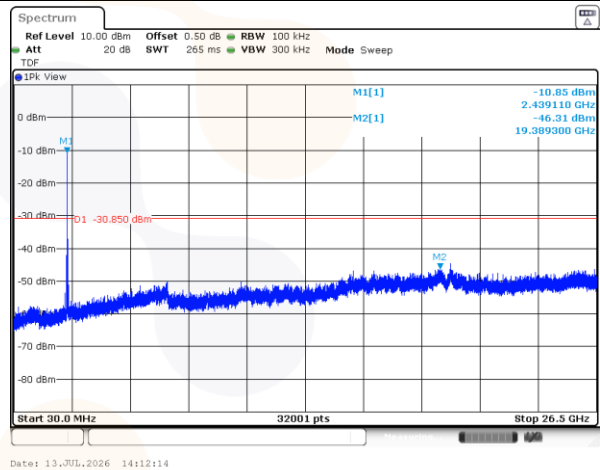
Conducted spurious / 2 412 MHz



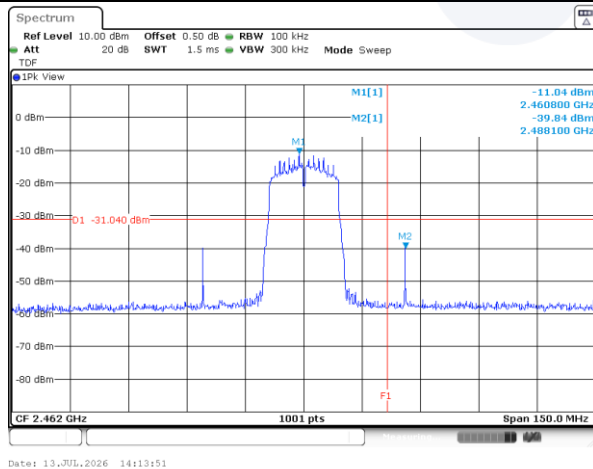
Conducted band-edge / 2 437 MHz

Blank

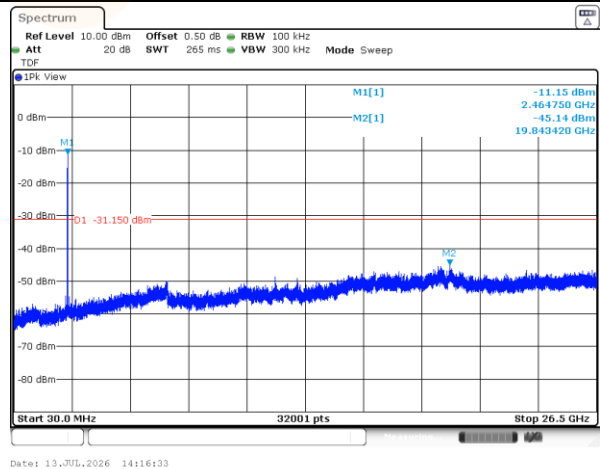
Conducted spurious / 2 437 MHz



Conducted band-edge / 2 462 MHz

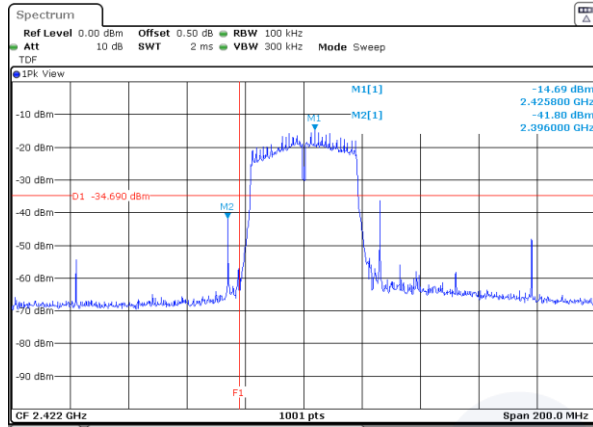


Conducted spurious / 2 462 MHz

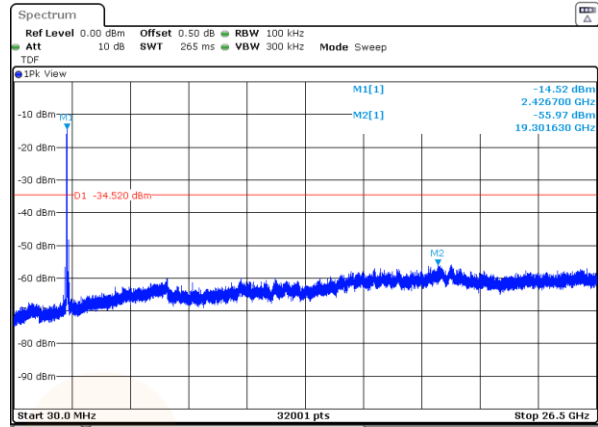


802.11n_HT40

Conducted band-edge / 2 422 MHz



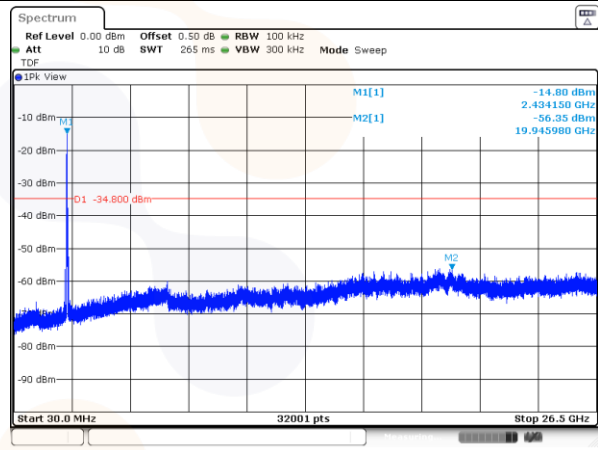
Conducted spurious / 2 422 MHz



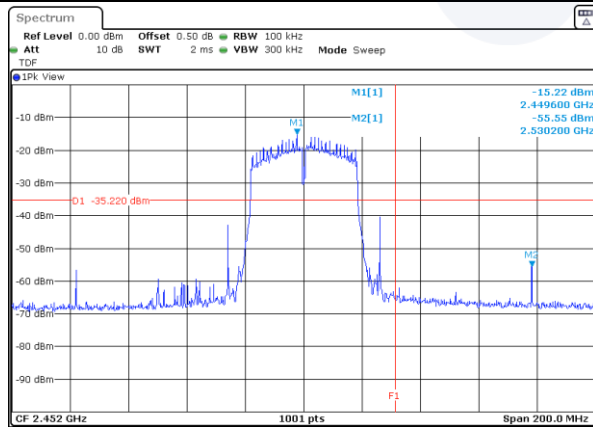
Conducted band-edge / 2 437 MHz

Blank

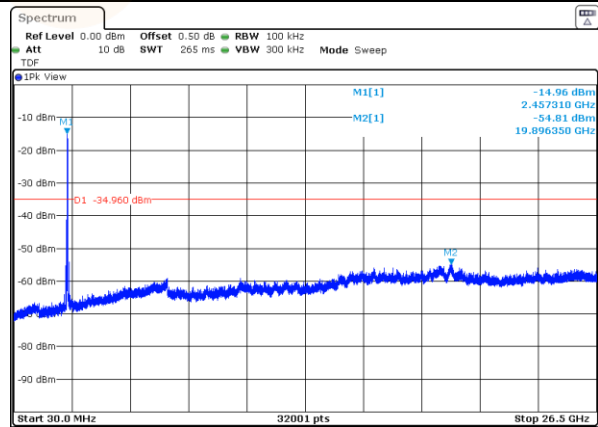
Conducted spurious / 2 437 MHz



Conducted band-edge / 2 452 MHz

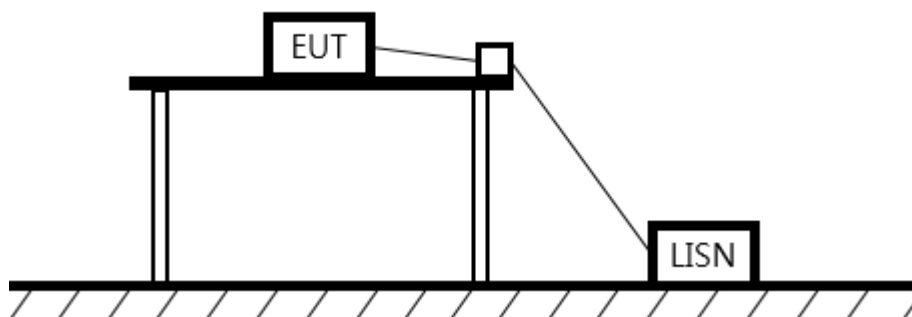


Conducted spurious / 2 452 MHz



7.6. 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.

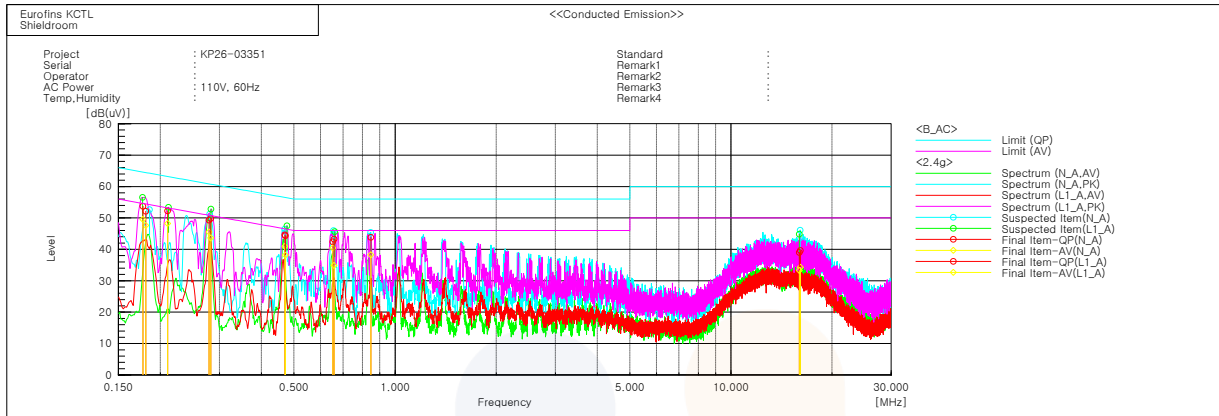
Frequency of Emission (MHz)	Conducted limit (dB μ V/m)	
	Quasi-peak	Average
0.15 – 0.50	66 - 56*	56 - 46*
0.50 – 5.00	56	46
5.00 – 30.0	60	50

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: 802.11n HT20 mode / 2 412 MHz



Final Result

--- N_A Phase ---										
No.	Frequency	Reading QP	Reading CAV	c.f	Result QP	Result CAV	Limit QP	Limit AV	Margin QP	Margin CAV
	[MHz]	[dB(uV)]	[dB(uV)]	[dB]	[dB(uV)]	[dB(uV)]	[dB(uV)]	[dB(uV)]	[dB]	[dB]
1	0.18088	41.5	37.0	10.6	52.1	47.6	64.4	54.4	12.3	6.8
2	0.27917	39.0	35.2	10.3	49.3	45.5	60.8	50.8	11.5	5.3
3	0.46959	34.0	30.3	10.6	44.6	40.9	56.5	46.5	11.9	5.6
4	0.65261	31.9	29.9	10.5	42.4	40.4	56.0	46.0	13.6	5.6
5	0.84724	33.4	27.9	10.4	43.8	38.3	56.0	46.0	12.2	7.7
6	16.09099	28.5	23.2	11.1	39.6	34.3	60.0	50.0	20.4	15.7

--- L1_A Phase ---										
No.	Frequency	Reading QP	Reading CAV	c.f	Result QP	Result CAV	Limit QP	Limit AV	Margin QP	Margin CAV
	[MHz]	[dB(uV)]	[dB(uV)]	[dB]	[dB(uV)]	[dB(uV)]	[dB(uV)]	[dB(uV)]	[dB]	[dB]
1	0.17739	43.1	38.9	10.6	53.7	49.5	64.6	54.6	10.9	5.1
2	0.2103	41.8	37.8	10.4	52.2	48.2	63.2	53.2	11.0	5.0
3	0.28256	39.5	33.3	10.3	49.8	43.6	60.7	50.7	10.9	7.1
4	0.47147	33.8	27.7	10.5	44.3	38.2	56.5	46.5	12.2	8.3
5	0.65784	32.7	24.3	10.5	43.2	34.8	56.0	46.0	12.8	11.2
6	15.9878	27.8	22.1	11.2	39.0	33.3	60.0	50.0	21.0	16.7

8. Measurement equipment

Equipment Name	Manufacturer	Model No.	Serial No.	Next Cal. Date
Spectrum Analyzer	R&S	FSV30	100914	27.04.23
Signal Generator	R&S	SMB100A	176206	27.01.15
DC Power Supply	AGILENT	E3632A	KR94907664	27.04.23
Attenuator	API Inmet	40AH2W-10	16	27.04.27
Attenuator	R&S	DNF	0007	27.01.15
Power Sensor	R&S	NRP-Z81	1137.9009.02-106223-bB	27.04.24
Spectrum Analyzer	R&S	FSVA40	101575	27.04.23
Broadband Pre-Amplifier	SCHWARZBECK	BBV9718D	57	27.01.15
Low Noise Amplifier	TESTEK	TK-PA18H	220124-L	26.09.29
Low Noise Amplifier	TESTEK	TK-PA1840H	220133-L	26.10.13
Horn Antenna	SCHWARZBECK	BBHA9120D	2763	26.10.02
Horn Antenna	SCHWARZBECK	BBHA9170	1267	26.10.02
High Pass Filter	QOTANA TECHNOLOGIES	DBHF0508004000A	23041800061	27.04.28
High Pass Filter	Wainwright Instruments GmbH	WHKX12-2805-3000-18000-40SS	SN58	26.09.30
Spectrum Analyzer	R&S	FSV40	100988	27.04.06
Amplifier	SONOMA INSTRUMENT	310N	421910	27.07.06*
Bi-log Antenna	Teseq GmbH	CBL 6112D	61521	26.12.11
Loop Antenna	R&S	HFH2-Z2	100355	28.06.29
Vector Signal Generator	R&S	SMBV100A	257566	27.07.06*
TWO-LINE V - NETWORK	R&S	ENV216	101584	27.03.24
EMI TEST RECEIVER	R&S	ESCI3	101428	27.08.11

*This equipment was calibrated during the test period, and was used after calibration.

End of test report