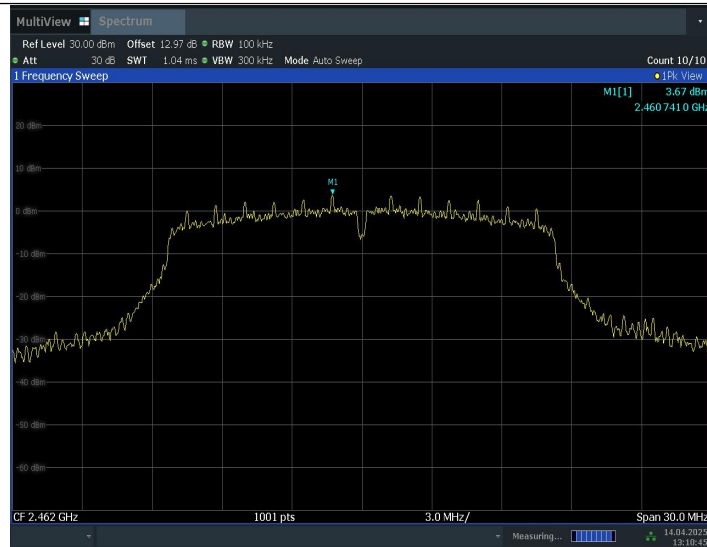
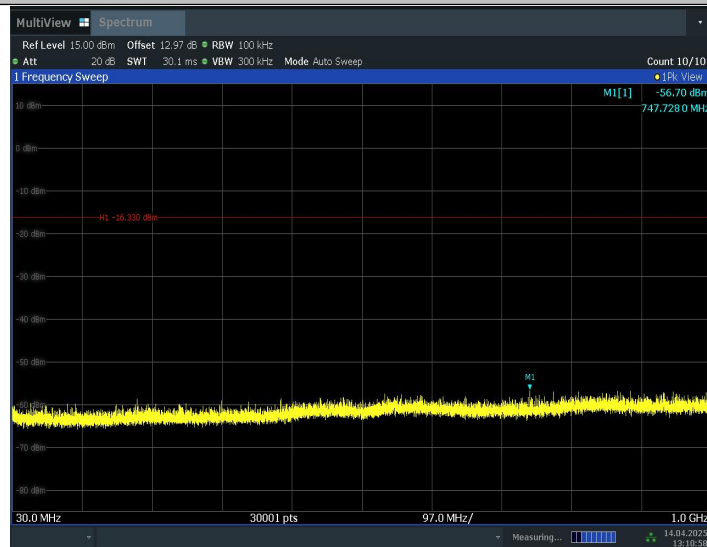




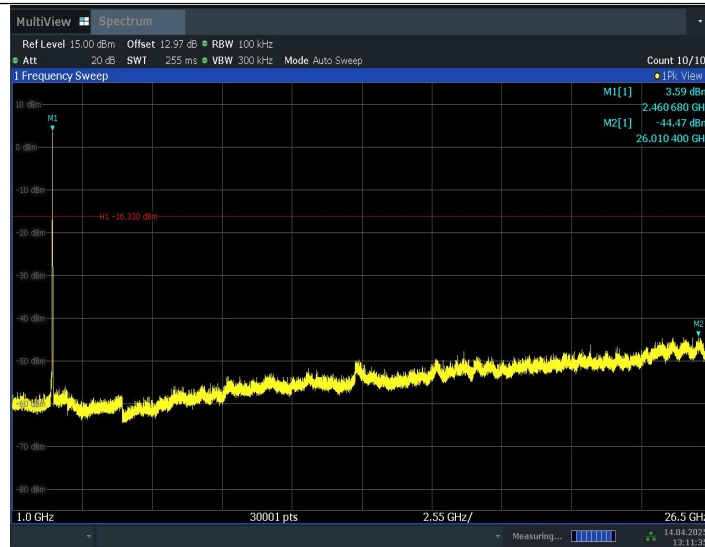
13:10:46 14.04.2025

11G_2462_30~1000



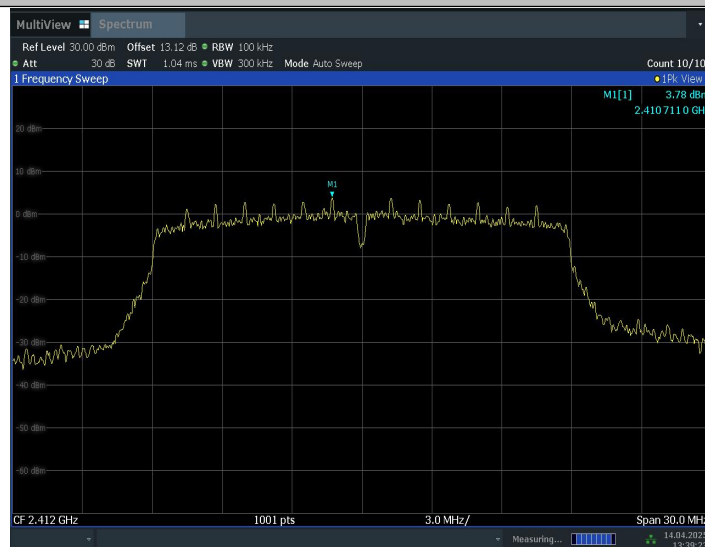
13:10:59 14.04.2025

11G_2462_1000~26500



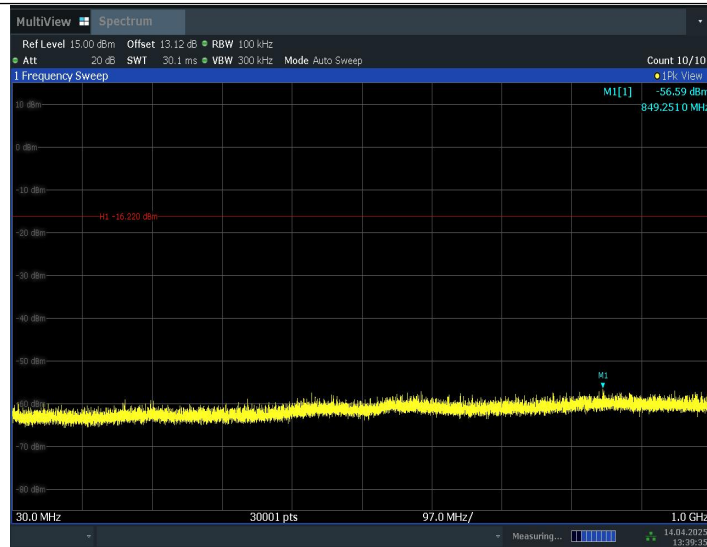
13:11:35 14.04.2025

11N20SISO_2412_0~Reference



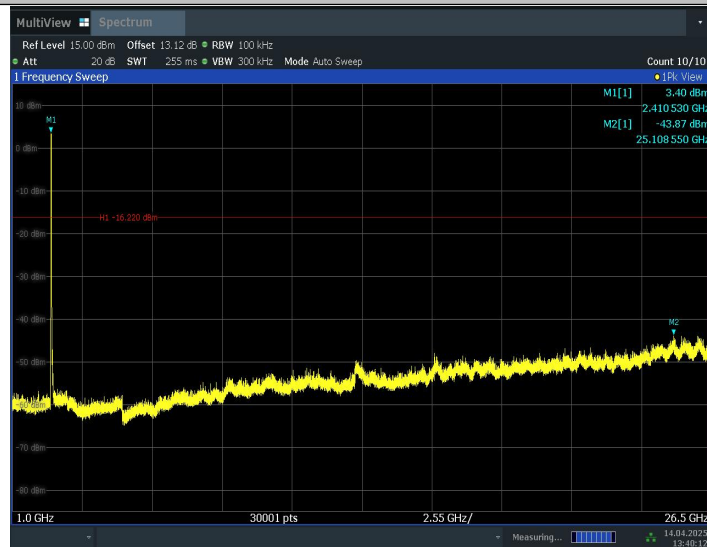
13:39:23 14.04.2025

11N20SISO_2412_30~1000



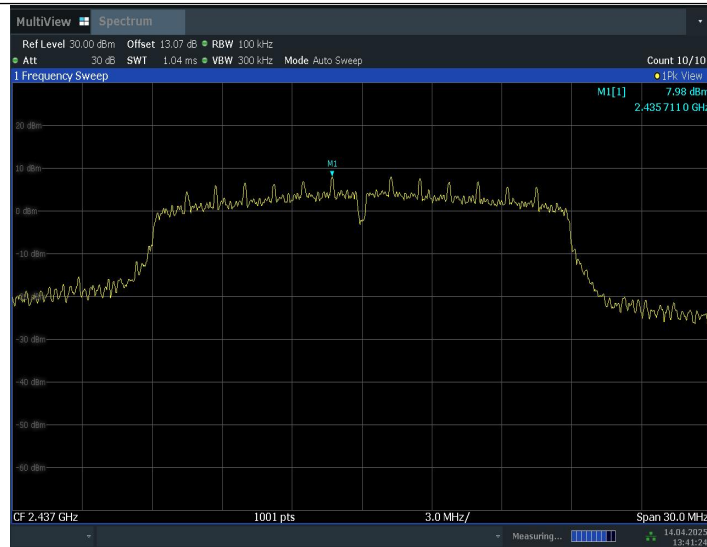
13:39:36 14.04.2025

11N20SISO_2412_1000~26500



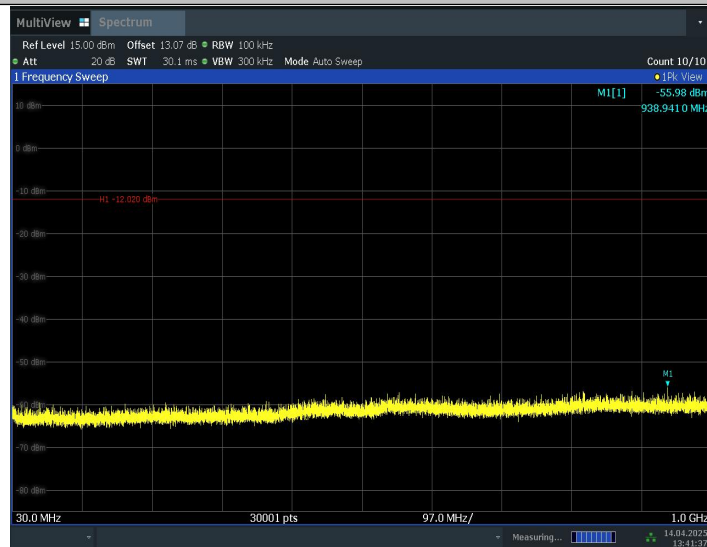
13:40:12 14.04.2025

11N20SISO_2437_0~Reference



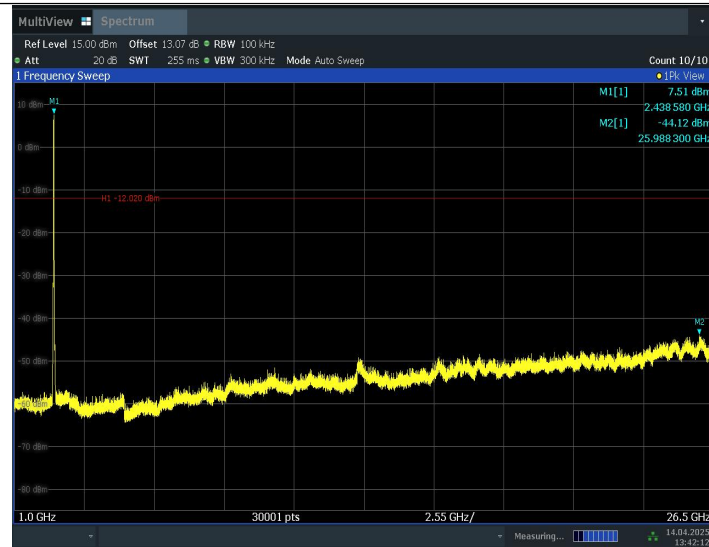
13:41:24 14.04.2025

11N20SISO_2437_30~1000



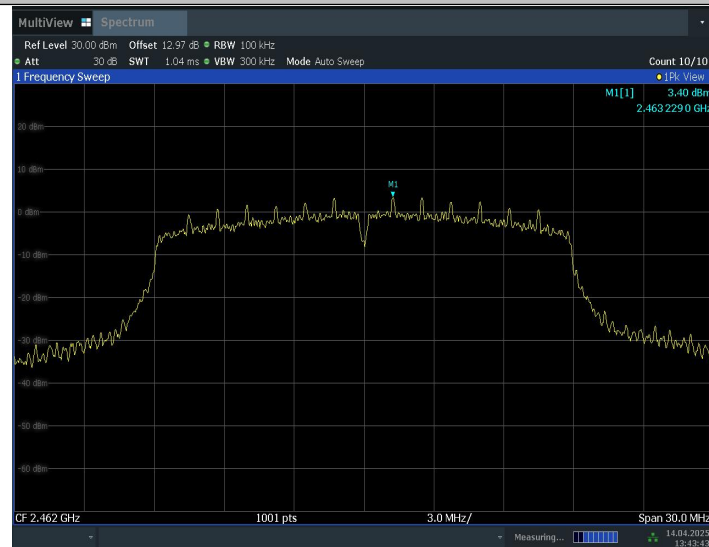
13:41:37 14.04.2025

11N20SISO_2437_1000~26500



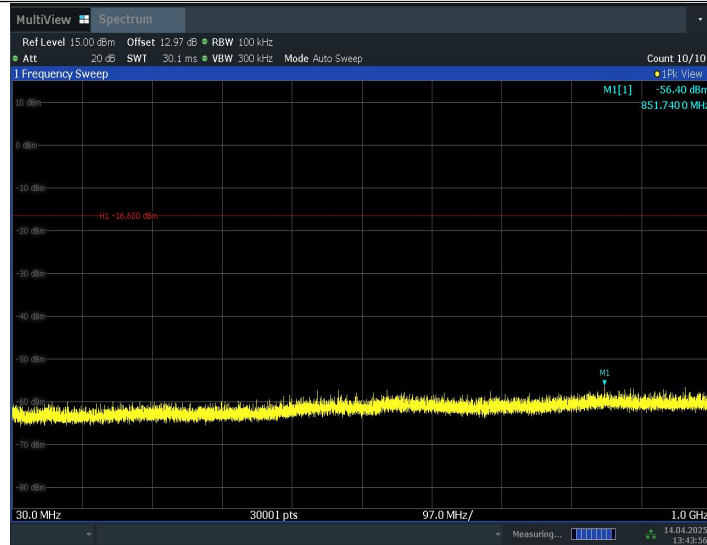
13:42:13 14.04.2025

11N20SISO_2462_0~Reference



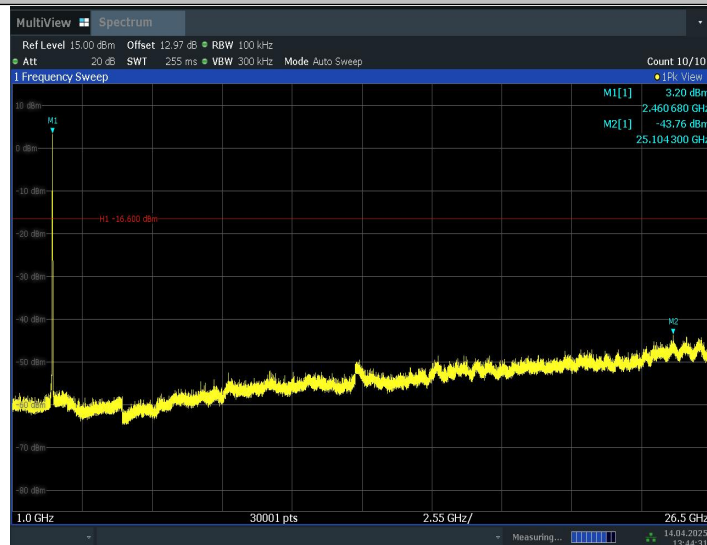
13:43:43 14.04.2025

11N20SISO_2462_30~1000



13:43:56 14.04.2025

11N20SISO_2462_1000~26500



13:44:32 14.04.2025

A.7. Radiated Unwanted Emission

Limits

Measurement Limit

Standard	Limit
FCC 47 CFR Part 15.247, 15.205, 15.209	20dB below peak output power

In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).

Limit in restricted band

Frequency (MHz)	Field strength($\mu\text{V/m}$)	Measurement distance (m)
0.009 - 0.490	$2400/F(\text{kHz})$	300
0.490 - 1.705	$24000/F(\text{kHz})$	30
1.705 – 30.0	30	30

Frequency of emission (MHz)	Field strength ($\mu\text{V/m}$)	Field strength (dB $\mu\text{V/m}$)	Measurement distance (m)
30-88	100	40	3
88-216	150	43.5	3
216-960	200	46	3
Above 960	500	54	3

Note: When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor.

Test setup

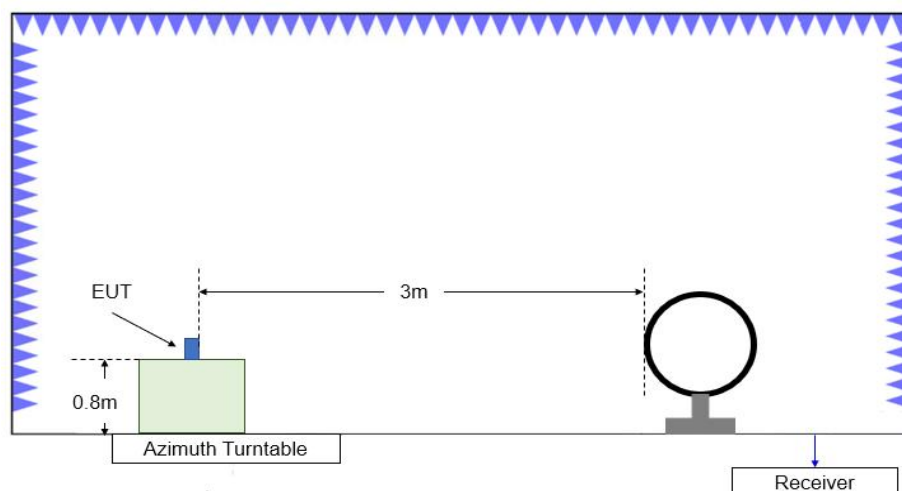


Figure A.2.1. Test Site Diagram (9kHz-30MHz)

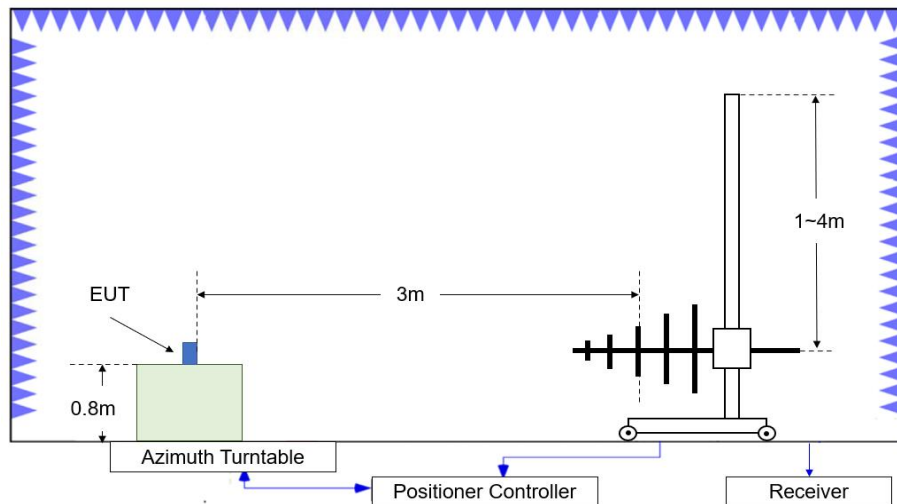


Figure A.2.2. Test Site Diagram (30MHz-1GHz)

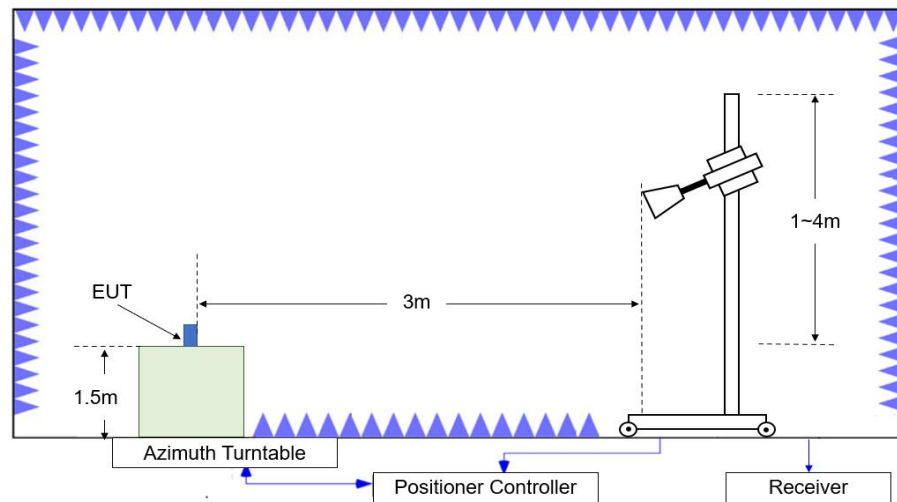


Figure A.2.3. Test Site Diagram (1GHz-40GHz)

Test Procedures

Radiated unwanted emissions from the EUT were measured according to ANSI C63.10.

Test setting

Frequency of emission (MHz)	RBW/VBW	Sweep Time(s)
30-1000	100kHz/300kHz	5
1000-3000	1MHz/3MHz	15
3000-18000	1MHz/3MHz	40
18000-26500	1MHz/3MHz	20

Sample Calculation

A "reference path loss" is established and the A_{Rpl} is the attenuation of "reference path loss", and including the gain of receive antenna, the gain of the preamplifier, the cable loss.

P_{Mea} is the field strength recorded from the instrument.

The measurement results are obtained as described below:

$$\text{Result} = P_{\text{Mea}} + A_{\text{Rpl}} = P_{\text{Mea}} + \text{Cable Loss} + \text{Antenna Factor}$$

Test note

1. The EUT is operating at its maximum duty cycle and its maximum power control level.
2. Investigation has been done on all modes and modulations/data rates. Only the radiated emissions of the configuration that produced the worst case emissions are reported in this section.
3. Spurious emissions for all channels were investigated and almost the same below 1GHz. According to FCC 47 CFR §15.31, emission levels are not report much lower than the limit by over 20dB
4. Measurement frequencies were performed from 9 kHz to the 10th harmonic of highest fundamental frequency or 40GHz, whichever is lower.

Test Result

Peak

802.11b

Ch1

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17953.000	56.91	-25.40	42.30	40.01	74.00	17.09	V
13807.000	51.60	-29.10	40.90	39.80	74.00	22.40	H
4824.000	49.35	-37.10	32.60	53.85	74.00	24.65	H
12852.000	49.22	-30.60	39.60	40.22	74.00	24.78	H
9632.000	46.91	-33.00	37.90	42.01	74.00	27.09	H
2363.400	56.81	-19.20	27.30	48.71	74.00	17.19	V

Ch6

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17889.000	56.04	-25.40	42.30	39.14	74.00	17.96	V
13716.500	51.61	-29.10	40.70	40.01	74.00	22.39	H
4874.000	50.65	-36.90	32.80	54.75	74.00	23.35	H
11865.500	49.51	-31.00	38.90	41.61	74.00	24.49	V
9570.000	46.80	-33.20	37.90	42.10	74.00	27.20	H
7613.500	45.62	-34.80	37.40	43.02	74.00	28.38	V

Ch11

Frequency (MHz)	Measurement Result	Cable Loss	Antenna Factor	Receiver Reading	Limit (dBuV/m)	Margin (dB)	Antenna Pol.
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	(dBuV/m)	(dB)	(dB/m)	(dBuV)			(H/V)
17887.000	56.39	-25.40	42.30	39.49	74.00	17.61	V
13916.500	51.76	-28.90	40.90	39.76	74.00	22.24	H
4924.000	49.86	-36.90	32.90	53.86	74.00	24.14	H
12549.500	49.29	-30.40	39.00	40.69	74.00	24.71	V
9837.000	47.15	-33.10	38.00	42.25	74.00	26.85	H
2485.100	58.07	-19.00	27.90	49.17	74.00	15.93	H

802.11g

Ch1

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17879.500	55.88	-25.40	42.30	38.98	74.00	18.12	H
13832.500	51.88	-29.10	40.90	40.08	74.00	22.12	V
12978.000	50.39	-29.80	39.80	40.39	74.00	23.61	V
8975.000	47.09	-33.60	37.60	43.09	74.00	26.91	H
7901.500	45.99	-34.60	37.00	43.59	74.00	28.01	V
2389.100	69.59	-19.20	27.50	61.29	74.00	4.41	H

Ch6

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17896.500	56.44	-25.40	42.30	39.54	74.00	17.56	V
13736.000	52.12	-29.10	40.70	40.52	74.00	21.88	V
12958.000	49.82	-29.80	39.70	39.92	74.00	24.18	H
9307.000	46.93	-34.10	38.10	42.93	74.00	27.07	H
7517.000	46.20	-34.60	37.50	43.30	74.00	27.80	V
4876.000	44.28	-36.90	32.80	48.38	74.00	29.72	H

Ch11

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
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17935.000	56.56	-25.40	42.30	39.66	74.00	17.44	H
14157.000	51.49	-29.40	40.50	40.39	74.00	22.51	V
12422.000	49.34	-30.10	38.80	40.64	74.00	24.66	H
9580.000	47.44	-33.20	37.90	42.74	74.00	26.56	V
7828.500	45.98	-34.70	37.10	43.58	74.00	28.02	H
2485.600	69.06	-19.00	27.90	60.16	74.00	4.94	H

802.11n-HT20
Ch1

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17968.500	56.53	-25.40	42.30	39.63	74.00	17.47	V
13925.500	51.95	-28.90	40.90	39.95	74.00	22.05	V
12405.500	49.65	-30.10	38.80	40.95	74.00	24.35	V
7235.500	47.03	-34.50	37.40	44.13	74.00	26.97	V
9420.000	46.75	-33.60	38.10	42.25	74.00	27.25	H
2389.600	71.35	-19.20	27.50	63.05	74.00	2.65	H

Ch6

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17955.000	56.18	-25.40	42.30	39.28	74.00	17.82	V
13734.000	51.81	-29.10	40.70	40.21	74.00	22.19	H
12972.500	49.71	-29.80	39.80	39.71	74.00	24.29	H
7515.000	47.37	-34.60	37.50	44.47	74.00	26.63	V
9013.000	47.32	-33.60	37.60	43.32	74.00	26.68	V
4871.500	44.37	-36.90	32.80	48.47	74.00	29.63	H

Ch11

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17962.000	56.04	-25.40	42.30	39.14	74.00	17.96	V
14073.500	51.86	-28.70	40.50	40.06	74.00	22.14	V
11351.000	49.47	-32.20	38.90	42.77	74.00	24.53	H
8934.500	46.85	-33.60	37.70	42.75	74.00	27.15	V
7428.000	46.23	-34.30	37.50	43.03	74.00	27.77	H
2485.300	68.60	-19.00	27.90	59.70	74.00	5.40	H

Average
802.11b

Ch1

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17853.000	46.89	-25.40	42.30	29.99	54.00	7.11	H
4824.000	46.45	-37.10	32.60	50.95	54.00	7.55	H
13802.000	42.17	-29.10	40.90	30.37	54.00	11.83	H
12980.500	39.75	-29.80	39.80	29.75	54.00	14.25	H
7235.000	38.56	-34.50	37.40	35.66	54.00	15.44	H
2388.500	45.50	-19.20	27.50	37.20	54.00	8.50	H

Ch6

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
4874.000	48.50	-36.90	32.80	52.60	54.00	5.50	H
17907.000	47.64	-25.40	42.30	30.74	54.00	6.36	H
13724.000	42.17	-29.10	40.70	30.57	54.00	11.83	V
12852.000	40.00	-30.60	39.60	31.00	54.00	14.00	H
7309.000	38.10	-35.10	37.50	35.70	54.00	15.90	H
9002.500	37.51	-33.60	37.60	33.51	54.00	16.49	V

Ch11

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
4924.000	47.54	-36.90	32.90	51.54	54.00	6.46	H
17904.000	46.87	-25.40	42.30	29.97	54.00	7.13	H
13808.000	42.24	-29.10	40.90	30.44	54.00	11.76	V
12950.000	39.72	-29.80	39.70	29.82	54.00	14.28	H
9165.500	37.30	-33.70	37.90	33.10	54.00	16.70	V
2485.700	47.05	-19.00	27.90	38.15	54.00	6.95	H

802.11g

Ch1

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17909.000	46.79	-25.40	42.30	29.89	54.00	7.21	V
14118.000	42.74	-29.40	40.50	31.64	54.00	11.26	V
12428.000	39.89	-30.10	38.80	31.19	54.00	14.11	V
9631.000	37.31	-33.00	37.90	32.41	54.00	16.69	H
7627.500	36.47	-34.60	37.30	33.77	54.00	17.53	H
2389.900	52.77	-19.20	27.50	44.47	54.00	1.23	H

Ch6

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17920.000	46.67	-25.40	42.30	29.77	54.00	7.33	V
14110.500	42.31	-29.40	40.50	31.21	54.00	11.69	H
12980.500	39.91	-29.80	39.80	29.91	54.00	14.09	H
9623.500	38.14	-33.00	37.90	33.24	54.00	15.86	H
7311.000	37.57	-35.10	37.50	35.17	54.00	16.43	H
4879.000	35.60	-36.90	32.80	39.70	54.00	18.40	H

Ch11

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17936.500	46.82	-25.40	42.30	29.92	54.00	7.18	V
13799.000	42.20	-29.10	40.90	30.40	54.00	11.80	V
12962.000	40.05	-29.80	39.70	30.15	54.00	13.95	V
9499.500	37.61	-33.60	38.10	33.11	54.00	16.39	H
7526.000	36.39	-34.60	37.40	33.59	54.00	17.61	H
2485.200	51.69	-19.00	27.90	42.79	54.00	2.31	H

802.11n-HT20

Ch1

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17882.000	47.08	-25.40	42.30	30.18	54.00	6.92	H
13761.000	42.15	-29.10	40.70	30.55	54.00	11.85	H
12333.500	39.98	-30.10	38.80	31.28	54.00	14.02	V
9663.000	37.69	-33.00	37.80	32.89	54.00	16.31	H
7423.000	36.77	-34.90	37.50	34.17	54.00	17.23	H
2389.500	51.93	-19.20	27.50	43.63	54.00	2.07	H

Ch6

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17944.500	47.10	-25.40	42.30	30.20	54.00	6.90	H
13698.500	42.46	-29.90	40.70	31.66	54.00	11.54	V
12780.500	39.96	-30.40	39.60	30.76	54.00	14.04	H
9186.500	37.53	-33.70	37.90	33.33	54.00	16.47	V
7314.000	36.89	-35.10	37.50	34.49	54.00	17.11	H
4871.500	35.48	-36.90	32.80	39.58	54.00	18.52	H

Ch11

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
17912.000	46.95	-25.40	42.30	30.05	54.00	7.05	V
13734.000	42.16	-29.10	40.70	30.56	54.00	11.84	H
12372.500	39.34	-30.10	38.80	30.64	54.00	14.66	H
8980.500	37.18	-33.60	37.60	33.18	54.00	16.82	V
7220.000	36.74	-34.50	37.40	33.84	54.00	17.26	V
2485.400	51.37	-19.00	27.90	42.47	54.00	2.63	H

Band edge compliance

802.11b mode

Mode	Channel	Frequency Range	Test Results	Conclusion
802.11b	1	2.31GHz~2.43GHz---L	Fig.1	P
	11	2.45GHz~2.50GHz---H	Fig.2	P

802.11g mode

Mode	Channel	Frequency Range	Test Results	Conclusion
802.11g	1	2.31GHz~2.43GHz---L	Fig.3	P
	11	2.45GHz~2.50GHz---H	Fig.4	P

802.11n-HT20 mode

Mode	Channel	Frequency Range	Test Results	Conclusion
802.11n (HT20)	1	2.31GHz~2.43GHz---L	Fig.5	P
	11	2.45GHz~2.50GHz---H	Fig.6	P

Conclusion: Pass

Test graphs as below:

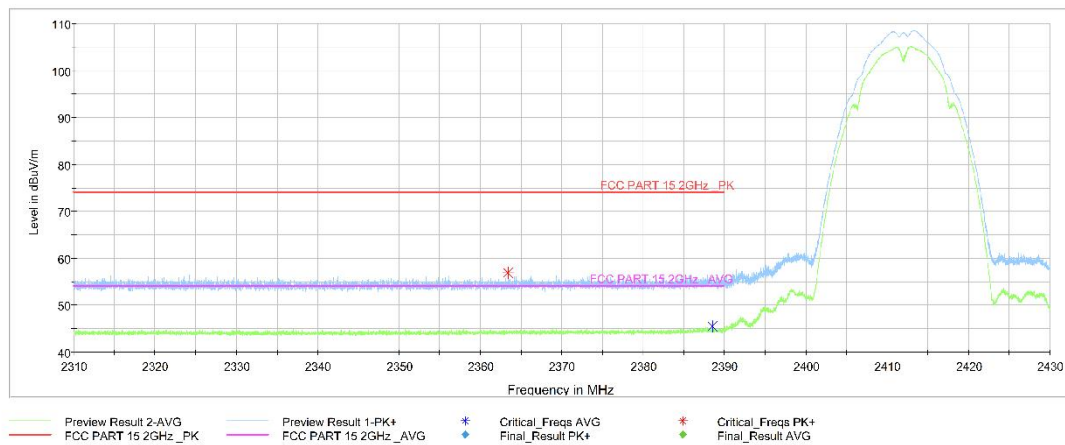


Fig.1 Transmitter Spurious Emission - Radiated (Power): 802.11b, ch1, 2.31 GHz – 2.43GHz

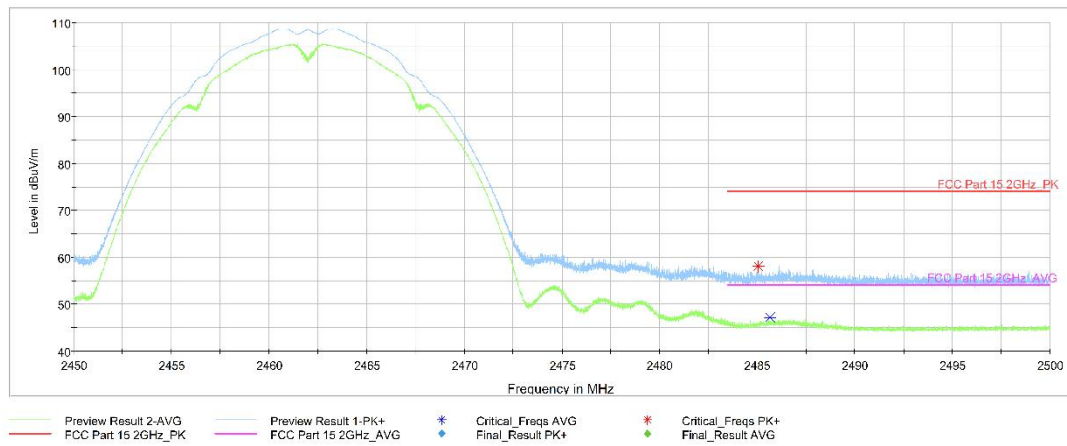


Fig.2 Transmitter Spurious Emission - Radiated (Power): 802.11b, ch11, 2.45 GHz - 2.50GHz

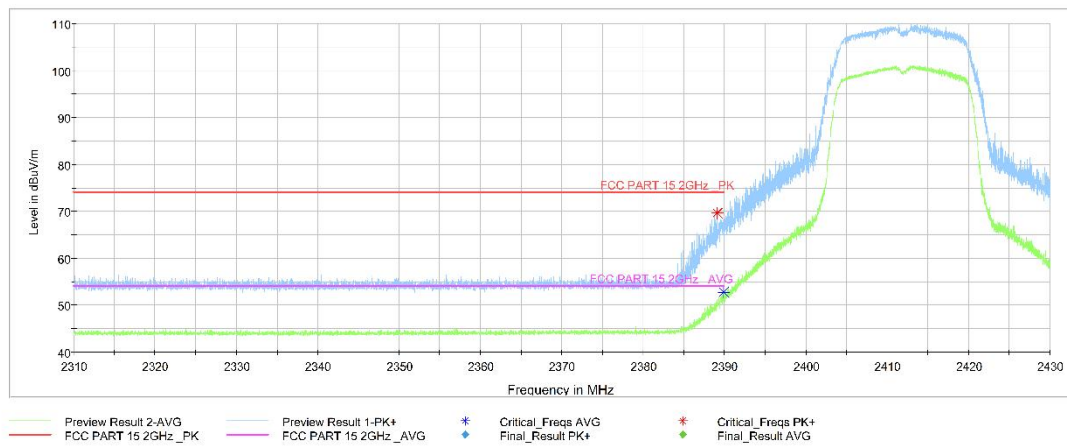


Fig.3 Transmitter Spurious Emission - Radiated (Power): 802.11g, ch1, 2.31 GHz - 2.43GHz

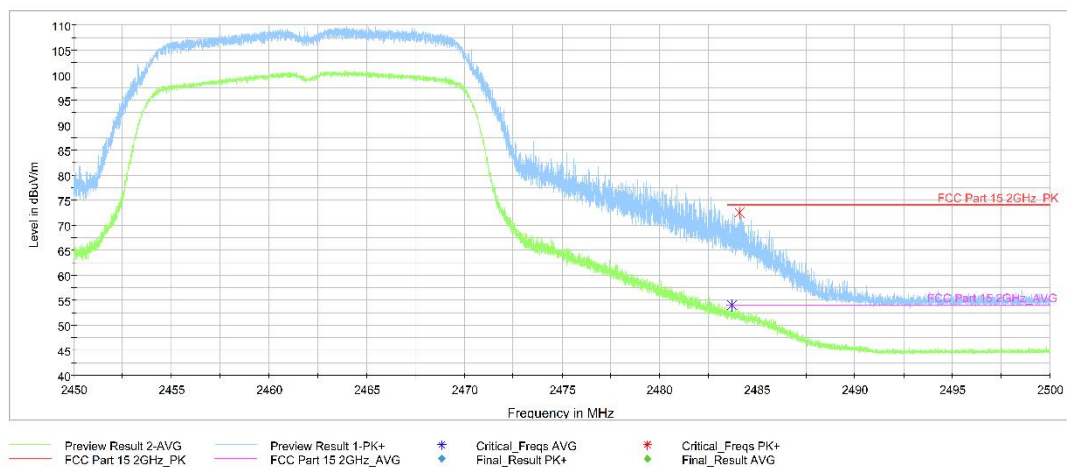


Fig.4 Transmitter Spurious Emission - Radiated (Power): 802.11g, ch11, 2.45 GHz - 2.50GHz

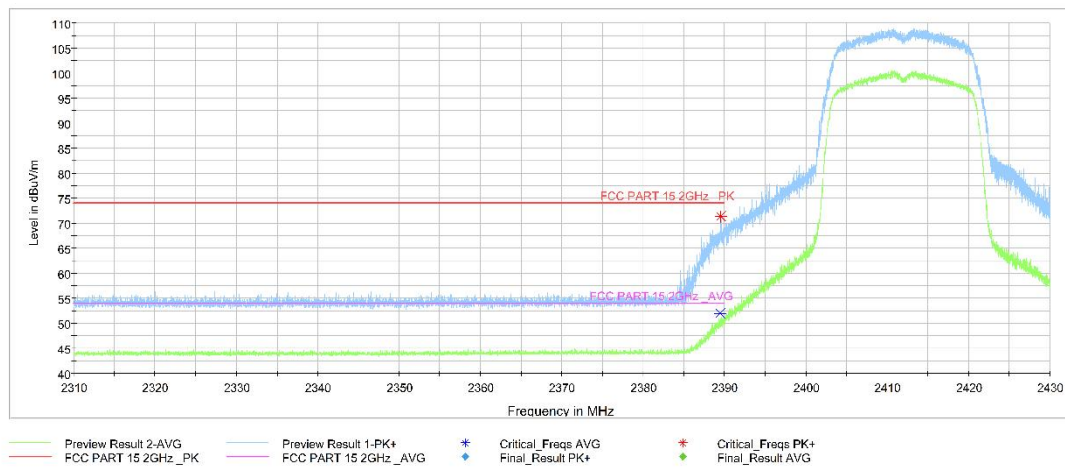


Fig.5 Transmitter Spurious Emission - Radiated (Power): 802.11n-HT20, ch1, 2.31 GHz - 2.43GHz

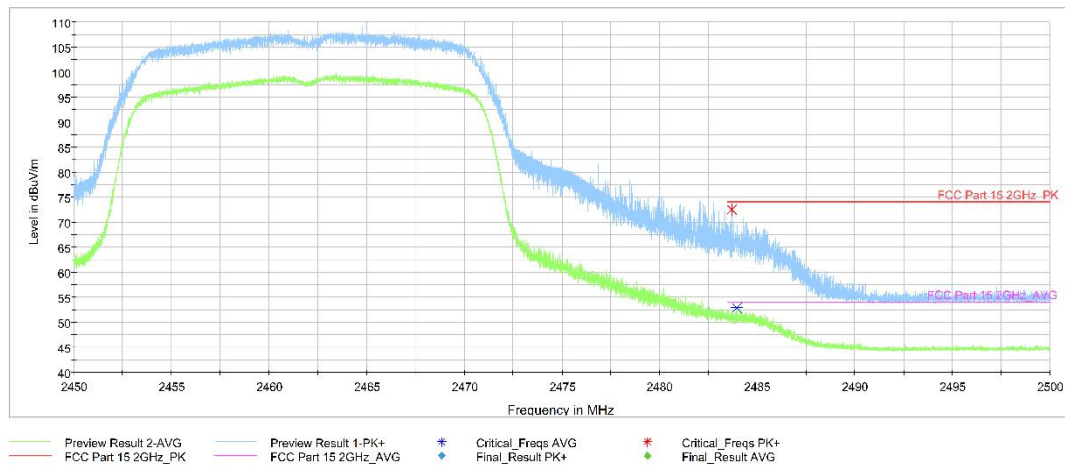


Fig.6 Transmitter Spurious Emission - Radiated (Power): 802.11n-HT20, ch11, 2.45 GHz - 2.50GHz

A.8. AC Power-line Conducted Emission

Summary

All AC line conducted spurious emissions are measured with a receiver connected to a grounded LISN while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates and modes were investigated for conducted spurious emissions. Only the conducted emissions of the configuration that produced the worst case emissions are reported in this section

Method of Measurement:

See Clause 6.2 of ANSI C63.10 specifically.

See Clause 4 and Clause 5 of ANSI C63.10 generally.

The conducted emissions from the AC port of the EUT are measured in a shielding room. The EUT is connected to a Line Impedance Stabilization Network (LISN). An overview sweep with peak detection was performed. The measurements were performed with a quasi-peak detector and if required, an average detector.

The conducted emission measurements were made with the following detector of the test receiver:
Quasi-Peak / Average Detector.

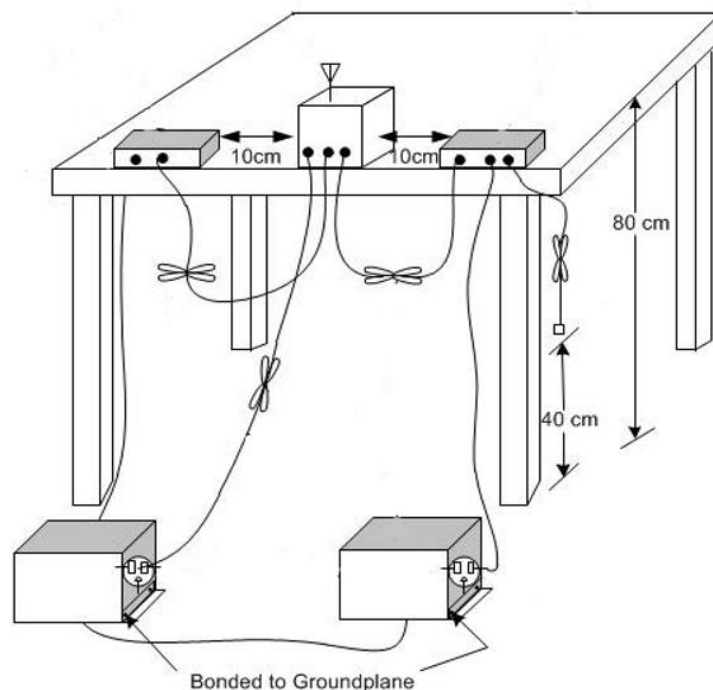
The measurement bandwidth is:

Frequency of Emission (MHz)	RBW/IF bandwidth
0.15-30	9kHz

Test Condition:

Voltage (V)	Frequency (Hz)
120	60

Test setup



Measurement Result and limit:
WLAN (Quasi-peak Limit)

Frequency range (MHz)	Quasi-peak Limit (dBμV)	Result (dBμV)		Conclusion
		With charger		
		802.11b	Idle	
0.15 to 0.5	66 to 56	Fig.A.7	Fig.8	P
0.5 to 5	56			
5 to 30	60			
NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.				

WLAN (Average Limit)

Frequency range (MHz)	Average Limit (dBμV)	Result (dBμV)		Conclusion
		With charger		
		802.11b	Idle	
0.15 to 0.5	56 to 46	Fig.A.7	Fig.8	P
0.5 to 5	46			
5 to 30	50			
NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.				

Test graphs as below:

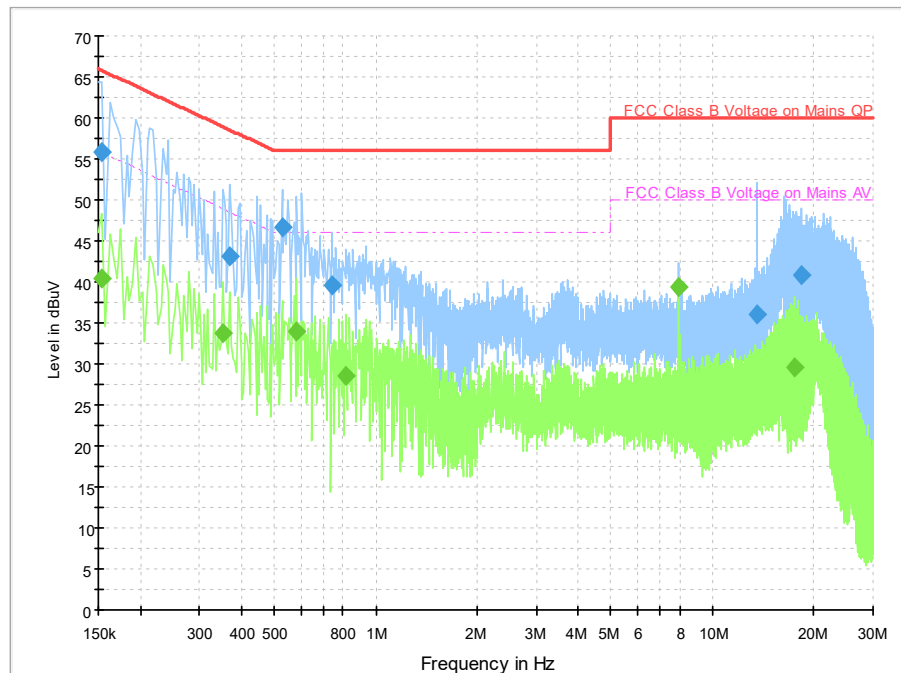


Fig.7 AC Powerline Conducted Emission-802.11b

Note: The graphic result above is the maximum of the measurements for both phase line and neutral line.

Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.154000	55.9	2000.0	9.000	On	L1	20.0	9.9	65.8	
0.370000	43.0	2000.0	9.000	On	L1	19.9	15.5	58.5	
0.526000	46.7	2000.0	9.000	On	L1	20.0	9.3	56.0	
0.738000	39.5	2000.0	9.000	On	L1	20.0	16.5	56.0	
13.546000	36.1	2000.0	9.000	On	L1	20.0	23.9	60.0	
18.462000	40.8	2000.0	9.000	On	L1	20.0	19.2	60.0	

Final Result 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.154000	40.5	2000.0	9.000	On	L1	20.0	15.3	55.8	
0.350000	33.8	2000.0	9.000	On	L1	19.9	15.1	49.0	
0.582000	33.9	2000.0	9.000	On	L1	20.0	12.1	46.0	
0.818000	28.5	2000.0	9.000	On	L1	19.9	17.5	46.0	
7.922000	39.4	2000.0	9.000	On	L1	19.9	10.6	50.0	
17.602000	29.6	2000.0	9.000	On	L1	20.0	20.4	50.0	

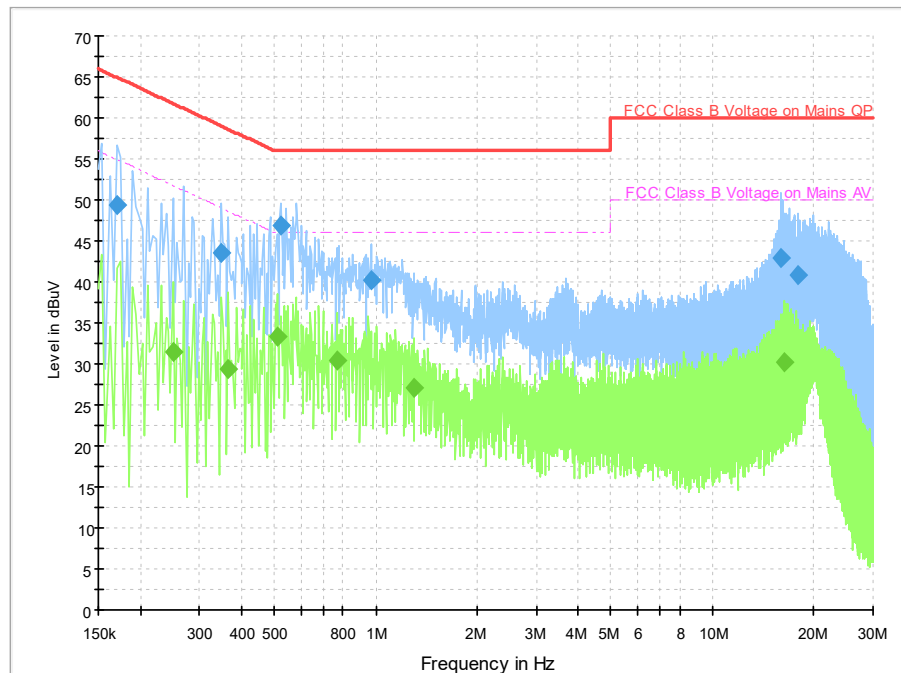


Fig.8 AC Powerline Conducted Emission-Idle

Note: The graphic result above is the maximum of the measurements for both phase line and neutral line.

Final Result 1

Frequency (MHz)	QuasiPeak (dB μ V)	Meas. Time	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)	Comment
0.170000	49.4	2000.0	9.000	On	L1	19.9	15.6	65.0	
0.346000	43.5	2000.0	9.000	On	L1	19.9	15.5	59.1	
0.522000	46.8	2000.0	9.000	On	L1	20.0	9.2	56.0	
0.970000	40.2	2000.0	9.000	On	L1	19.9	15.8	56.0	
16.018000	43.0	2000.0	9.000	On	L1	20.0	17.0	60.0	
17.870000	40.8	2000.0	9.000	On	L1	20.0	19.2	60.0	

Final Result 2

Frequency (MHz)	CAverage (dB μ V)	Meas. Time	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)	Comment
0.250000	31.5	2000.0	9.000	On	L1	19.9	20.3	51.8	
0.366000	29.5	2000.0	9.000	On	L1	19.9	19.1	48.6	
0.510000	33.3	2000.0	9.000	On	L1	20.0	12.7	46.0	
0.766000	30.5	2000.0	9.000	On	L1	19.9	15.5	46.0	
1.302000	27.1	2000.0	9.000	On	L1	19.9	18.9	46.0	
16.422000	30.2	2000.0	9.000	On	L1	20.0	19.8	50.0	

A.9. Antenna Requirement

The antenna of the device is permanently attached. There are no provisions for connection to an external antenna.

The unit complies with the requirement of FCC Part 15.203.

ANNEX B: EUT parameters

Disclaimer: The antenna gain and worse case provided by the client may affect the validity of the measurement results in this report, and the client shall bear the impact and consequences arising therefrom.

ANNEX C: Accreditation Certificate



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