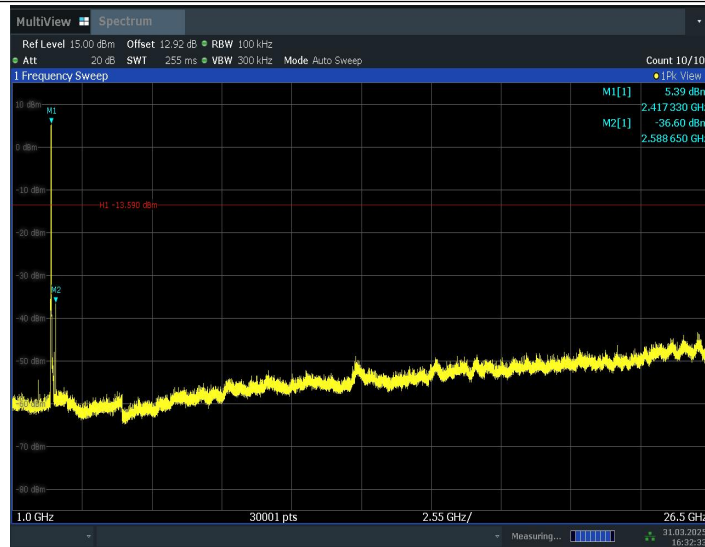
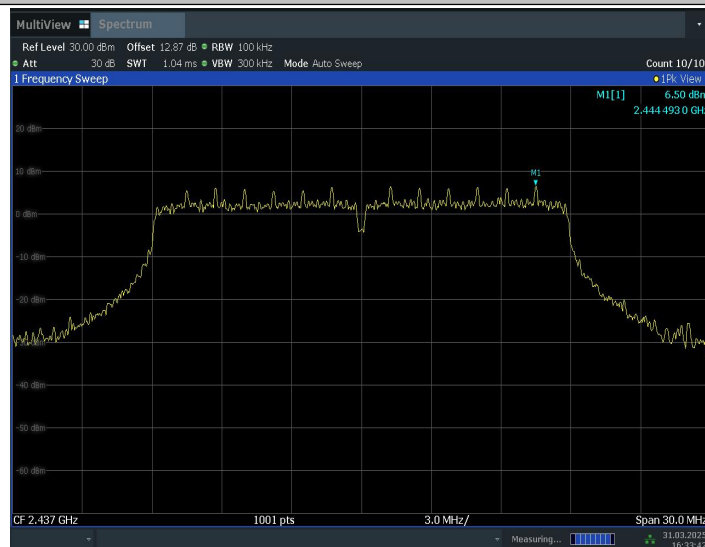




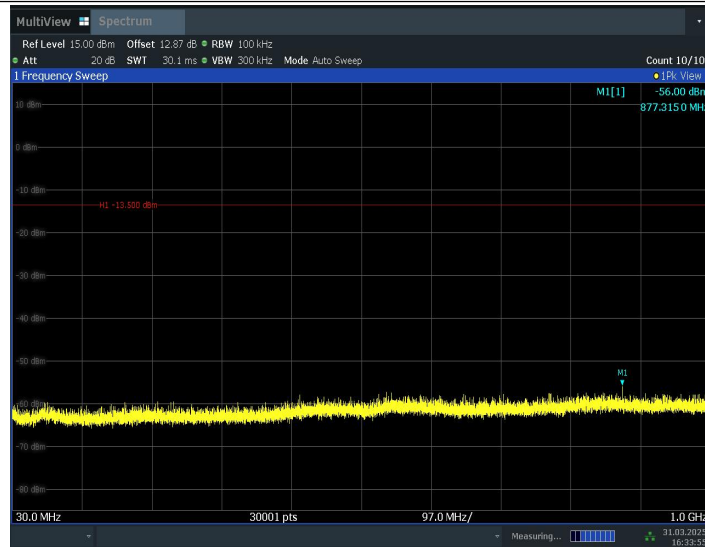
16:32:34 31.03.2025

11N20SISO_Ant1_2437_0~Reference

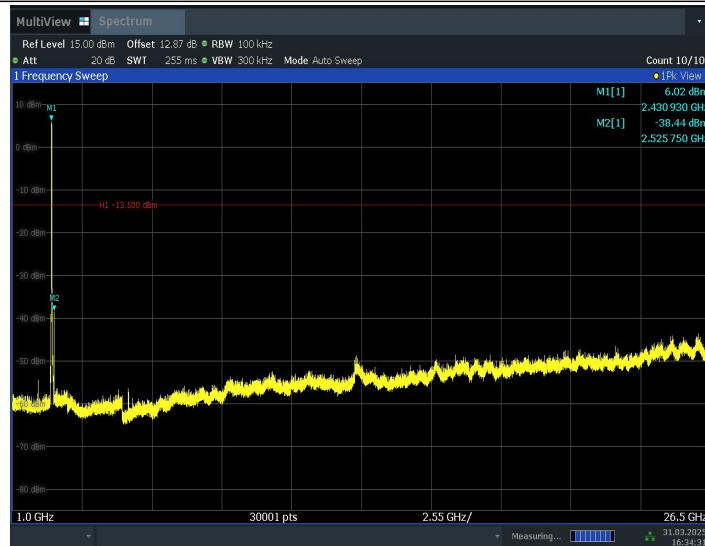


16:33:42 31.03.2025

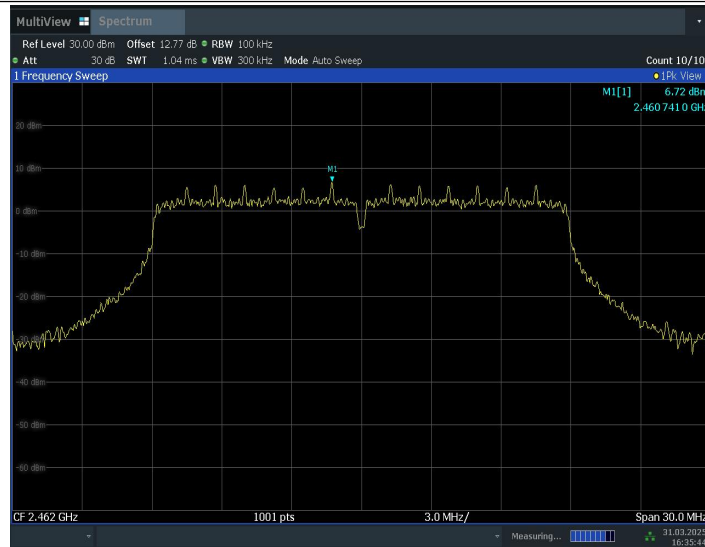
11N20SISO_Ant1_2437_30~1000



11N20SISO_Ant1_2437_1000~26500

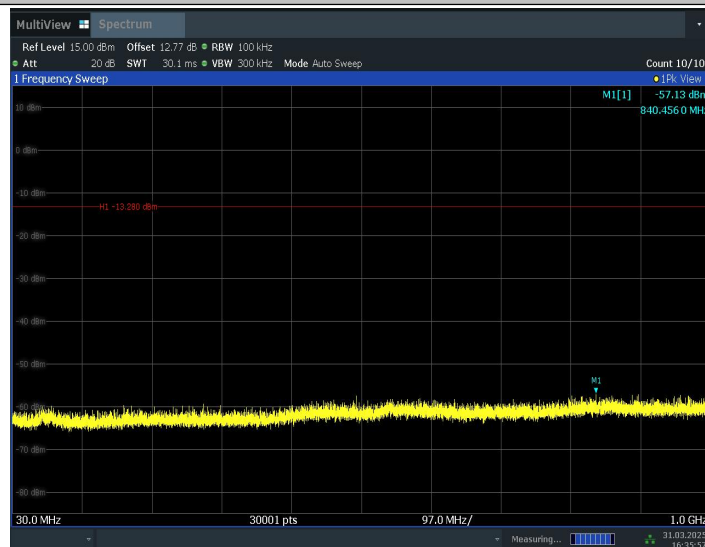


11N20SISO_Ant1_2462_0~Reference



16:35:44 31.03.2025

11N20SISO_Ant1_2462_30~1000



16:35:58 31.03.2025

11N20SISO_Ant1_2462_1000~26500



Conclusion: Pass

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

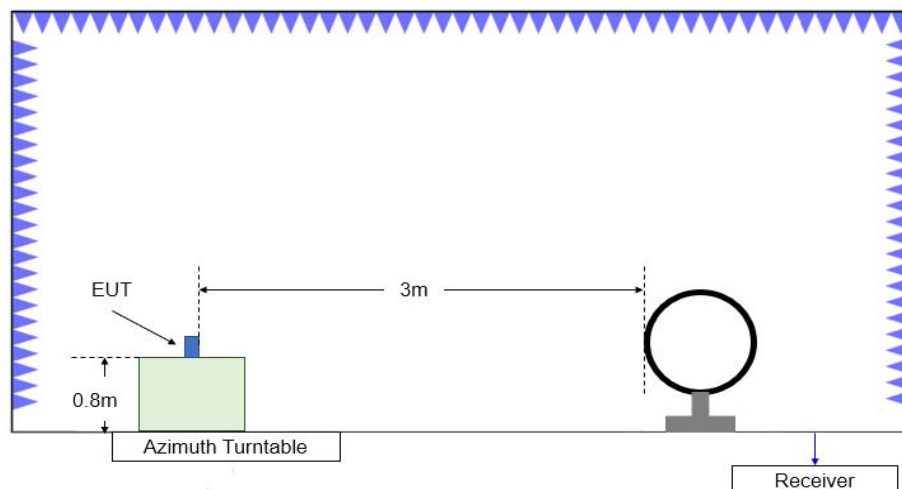


Figure A.2.1. Test Site Diagram (9kHz-30MHz)

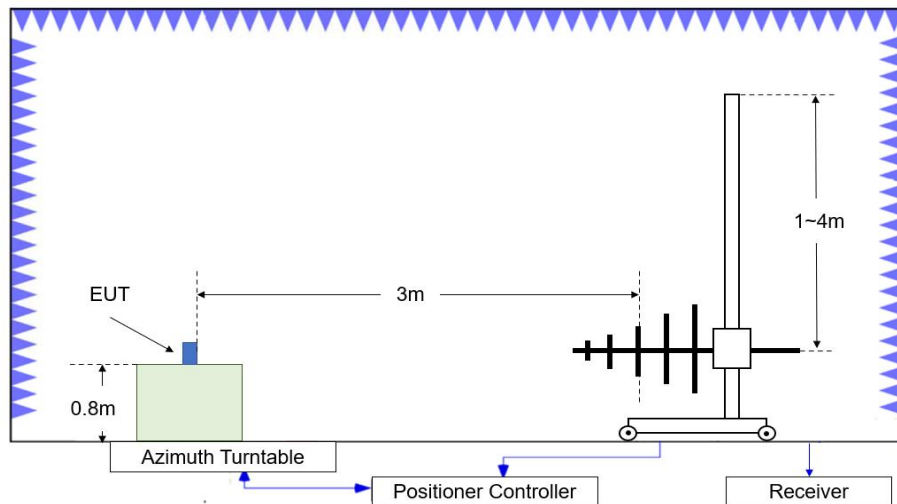


Figure A.2.2. Test Site Diagram (30MHz-1GHz)

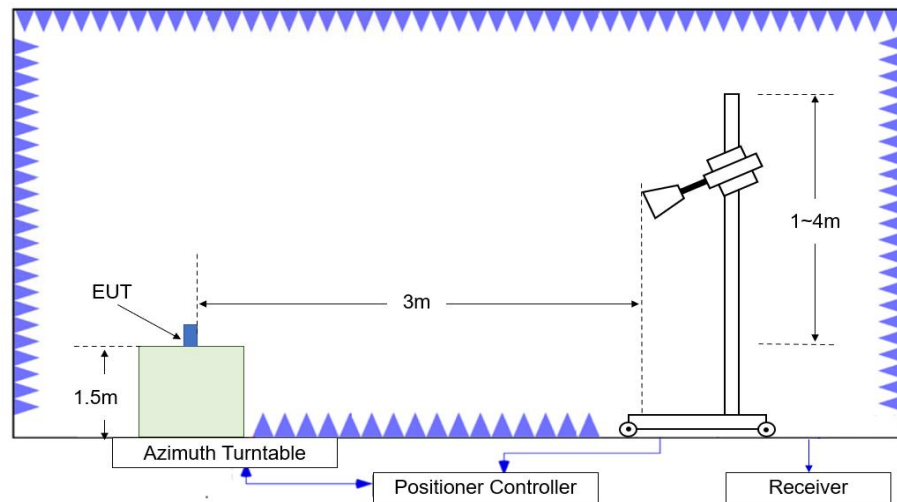


Figure A.2.3. Test Site Diagram (1GHz-40GHz)

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)
2380.630	62.15	4.59	31.90	25.66	74.00	11.85	V
2387.028	62.88	4.61	31.90	26.37	74.00	11.12	V
4824.000	45.42	-32.75	33.85	44.32	74.00	28.58	H
7237.000	50.65	-31.50	35.48	46.67	74.00	23.35	V
9648.000	45.09	-29.87	36.60	38.36	74.00	28.91	H
12060.000	47.84	-27.97	38.96	36.85	74.00	26.16	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)
2398.800	54.16	-26.55	31.90	48.81	74.00	19.85	V
2467.800	54.58	-26.57	32.10	49.05	74.00	19.42	H
4874.000	43.81	-32.99	33.85	42.95	74.00	30.19	V
7312.000	50.11	-31.42	35.55	45.98	74.00	23.89	H
9748.000	45.21	-29.86	36.79	38.29	74.00	28.79	V
12185.000	47.78	-27.86	38.83	36.81	74.00	26.22	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)
2492.735	63.01	4.63	32.10	26.28	74.00	10.99	V
2499.645	62.95	4.63	32.10	26.22	74.00	11.06	V

4924.000	46.33	-32.94	33.90	45.37	74.00	27.68	H
7385.000	48.43	-31.37	35.70	44.10	74.00	25.57	H
9848.000	46.00	-29.76	36.90	38.86	74.00	28.00	V
12310.000	47.03	-28.06	38.90	36.19	74.00	26.97	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)
2389.926	73.57	4.62	31.90	37.05	74.00	0.43	H
2389.982	73.64	4.62	31.90	37.13	74.00	0.36	H
4824.000	42.85	-32.75	33.85	41.75	74.00	31.15	V
7242.500	53.80	-31.47	35.44	49.83	74.00	20.20	V
9648.000	45.33	-29.87	36.60	38.60	74.00	28.67	H
12060.000	48.00	-27.97	38.96	37.02	74.00	26.00	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)
2369.600	52.31	-26.70	31.90	47.11	74.00	21.69	V
2509.400	52.51	-26.53	32.14	46.89	74.00	21.50	H
4874.000	42.79	-32.99	33.85	41.93	74.00	31.21	V
7296.000	54.38	-31.65	35.49	50.53	74.00	19.62	V
9748.000	46.00	-29.86	36.79	39.08	74.00	28.00	V
12185.000	47.71	-27.86	38.83	36.74	74.00	26.30	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)
2483.520	71.37	4.65	32.10	34.62	74.00	2.63	H
2484.200	71.12	4.65	32.10	34.37	74.00	2.88	V
4924.000	43.21	-32.94	33.90	42.25	74.00	30.79	V
7387.500	51.18	-31.34	35.70	46.82	74.00	22.82	H
9848.000	45.94	-29.76	36.90	38.80	74.00	28.06	H
12310.000	48.61	-28.06	38.90	37.77	74.00	25.39	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)
2389.324	73.81	4.61	31.90	37.30	74.00	0.19	H
2389.814	73.51	4.61	31.90	37.00	74.00	0.49	H
4824.000	43.11	-32.75	33.85	42.01	74.00	30.89	H
7227.500	53.49	-31.70	35.53	49.65	74.00	20.51	V
9648.000	45.98	-29.87	36.60	39.25	74.00	28.02	H
12060.000	48.07	-27.97	38.96	37.08	74.00	25.94	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)
2370.200	51.62	-26.70	31.90	46.41	74.00	22.39	H
2508.400	52.39	-26.55	32.13	46.80	74.00	21.61	V
4874.000	42.34	-32.99	33.85	41.48	74.00	31.66	V
7310.500	55.01	-31.41	35.54	50.88	74.00	18.99	H
9748.000	45.91	-29.86	36.79	38.98	74.00	28.09	H
12185.000	47.88	-27.86	38.83	36.91	74.00	26.12	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)
2483.850	71.42	4.65	32.10	34.66	74.00	2.58	V
2483.880	70.32	4.65	32.10	33.57	74.00	3.68	V
4924.000	42.92	-32.94	33.90	41.97	74.00	31.08	H
7386.000	52.18	-31.36	35.70	47.84	74.00	21.82	H
9848.000	45.45	-29.76	36.90	38.31	74.00	28.55	V
12310.000	47.89	-28.06	38.90	37.05	74.00	26.11	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)
2386.710	48.58	4.61	31.90	12.07	54.00	5.43	V
2390.000	48.50	4.62	31.90	11.98	54.00	5.50	V
4824.000	35.91	-32.75	33.85	34.81	54.00	18.09	H
7236.000	42.48	-31.52	35.48	38.51	54.00	11.52	H
9648.000	33.25	-29.87	36.60	26.52	54.00	20.75	H
12060.000	35.78	-27.97	38.96	24.80	54.00	18.22	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)
2419.530	50.44	4.65	31.98	13.81	54.00	3.56	V
2455.200	49.26	4.67	32.10	12.48	54.00	4.74	V
4874.000	32.22	-32.99	33.85	31.36	54.00	21.78	H
7310.000	41.98	-31.41	35.54	37.84	54.00	12.03	H
9748.000	33.15	-29.86	36.79	26.22	54.00	20.85	H
12185.000	35.56	-27.86	38.83	24.59	54.00	18.44	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)
2484.300	48.59	4.65	32.10	11.84	54.00	5.41	V
2485.920	48.60	4.65	32.10	11.85	54.00	5.40	V
4924.000	35.97	-32.94	33.90	35.02	54.00	18.03	H
7385.000	38.59	-31.37	35.70	34.26	54.00	15.41	V
9848.000	33.52	-29.76	36.90	26.38	54.00	20.48	H
12310.000	35.58	-28.06	38.90	24.74	54.00	18.42	V

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)
2389.440	51.94	4.61	31.90	15.43	54.00	2.06	V
2389.980	52.32	4.62	31.90	15.80	54.00	1.68	V
4824.000	31.12	-32.75	33.85	30.02	54.00	22.88	H
7235.330	37.09	-31.53	35.49	33.14	54.00	16.91	H
9648.000	33.40	-29.87	36.60	26.67	54.00	20.60	V
12060.000	36.05	-27.97	38.96	25.06	54.00	17.95	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)
2406.420	50.24	4.64	31.93	13.67	54.00	3.76	V
2463.780	50.81	4.68	32.10	14.04	54.00	3.19	V
4874.000	29.71	-32.99	33.85	28.85	54.00	24.30	H
7308.000	37.49	-31.46	35.53	33.41	54.00	16.52	V
9748.000	33.24	-29.86	36.79	26.32	54.00	20.76	H
12185.000	35.81	-27.86	38.83	24.84	54.00	18.19	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)
2483.790	51.46	4.65	32.10	14.71	54.00	2.54	V
2484.330	51.16	4.65	32.10	14.41	54.00	2.84	V
4924.000	30.47	-32.94	33.90	29.51	54.00	23.53	V
7384.330	34.90	-31.38	35.70	30.58	54.00	19.10	V
9848.000	33.72	-29.76	36.90	26.58	54.00	20.28	V
12310.000	35.52	-28.06	38.90	24.68	54.00	18.48	V

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)
2388.900	51.85	4.61	31.90	15.33	54.00	2.15	V
2389.590	52.29	4.61	31.90	15.78	54.00	1.71	V
4824.000	30.47	-32.75	33.85	29.37	54.00	23.53	V
7237.330	35.91	-31.50	35.48	31.93	54.00	18.09	V
9648.000	33.14	-29.87	36.60	26.41	54.00	20.86	V
12060.000	35.79	-27.97	38.96	24.80	54.00	18.22	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)
2405.700	49.75	4.64	31.92	13.18	54.00	4.26	V
2464.710	50.32	4.68	32.10	13.55	54.00	3.68	V
4874.000	29.70	-32.99	33.85	28.85	54.00	24.30	H
7307.330	36.41	-31.47	35.53	32.35	54.00	17.59	H
9748.000	33.23	-29.86	36.79	26.31	54.00	20.77	V
12185.000	35.71	-27.86	38.83	24.74	54.00	18.29	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)
2483.520	51.24	4.65	32.10	14.49	54.00	2.76	V
2484.300	50.97	4.65	32.10	14.22	54.00	3.03	V
4924.000	29.90	-32.94	33.90	28.95	54.00	24.10	H
7383.666	34.48	-31.38	35.70	30.16	54.00	19.52	V
9848.000	33.68	-29.76	36.90	26.54	54.00	20.32	H
12310.000	35.67	-28.06	38.90	24.83	54.00	18.33	V

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

Test graphs as below:

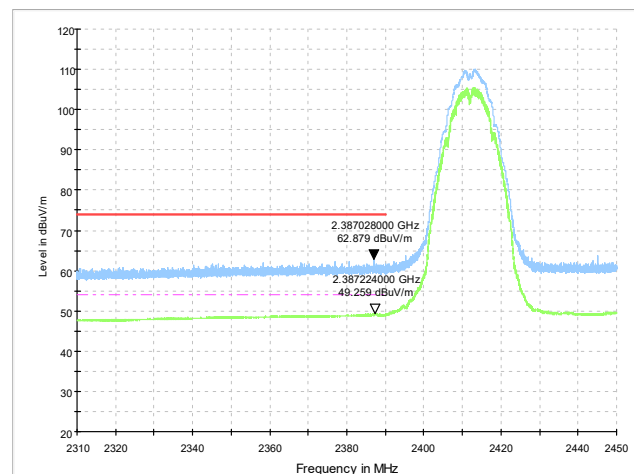


Fig.A.6.2.1 Transmitter Spurious Emission - Radiated (Power): 802.11b, ch1, 2.31 GHz – 2.43GHz

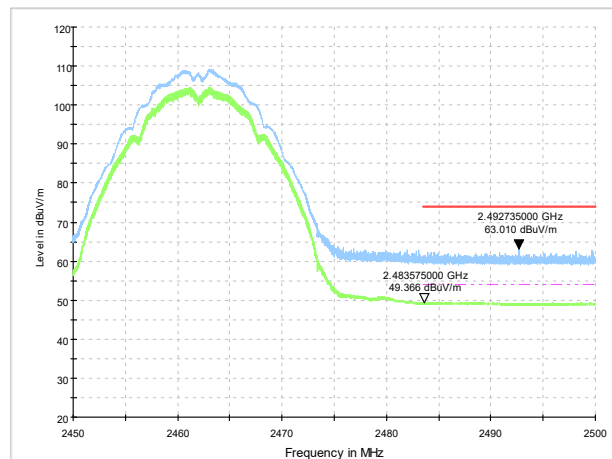


Fig.A.6.2.2 Transmitter Spurious Emission - Radiated (Power): 802.11b, ch11, 2.45 GHz - 2.50GHz

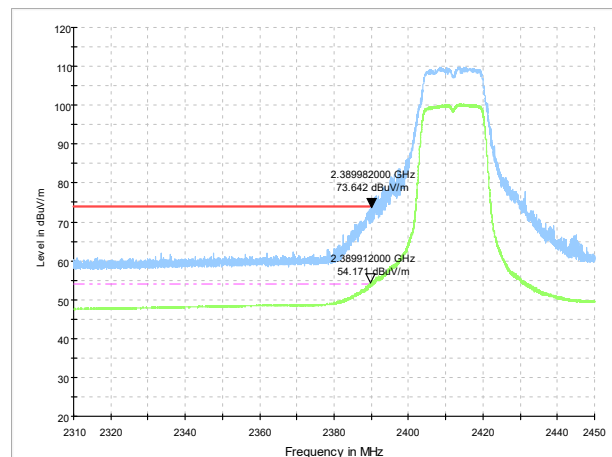


Fig.A.6.2.3 Transmitter Spurious Emission - Radiated (Power): 802.11g, ch1, 2.31 GHz - 2.43GHz

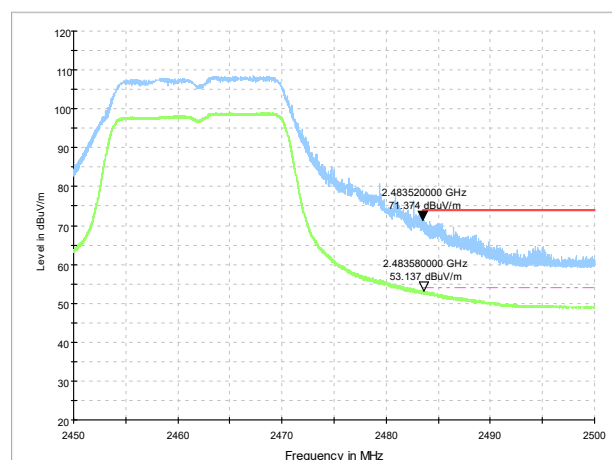


Fig.A.6.2.4 Transmitter Spurious Emission - Radiated (Power): 802.11g, ch11, 2.45 GHz - 2.50GHz

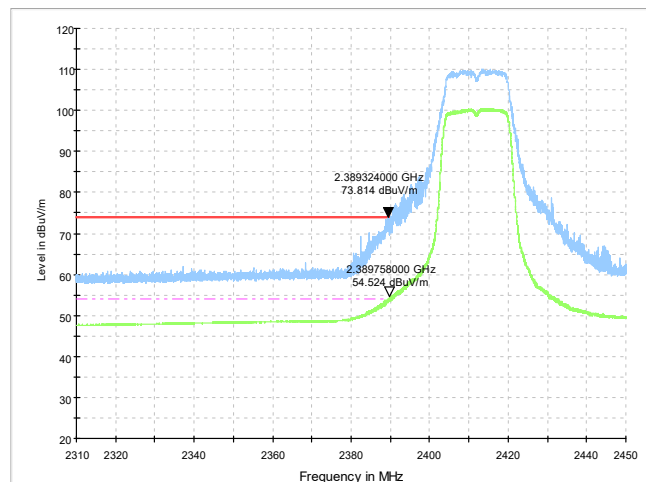


Fig.A.6.2.5 Transmitter Spurious Emission - Radiated (Power): 802.11n-HT20, ch1, 2.31 GHz - 2.43GHz

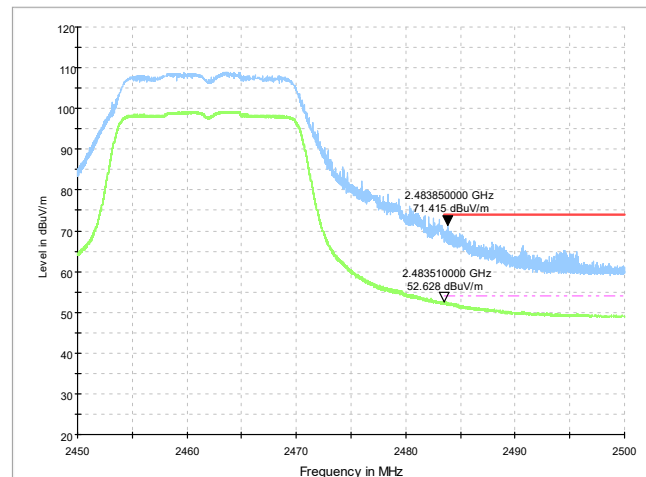


Fig.A.6.2.6 Transmitter Spurious Emission - Radiated (Power): 802.11n-HT20, ch11, 2.45 GHz - 2.50GHz

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.

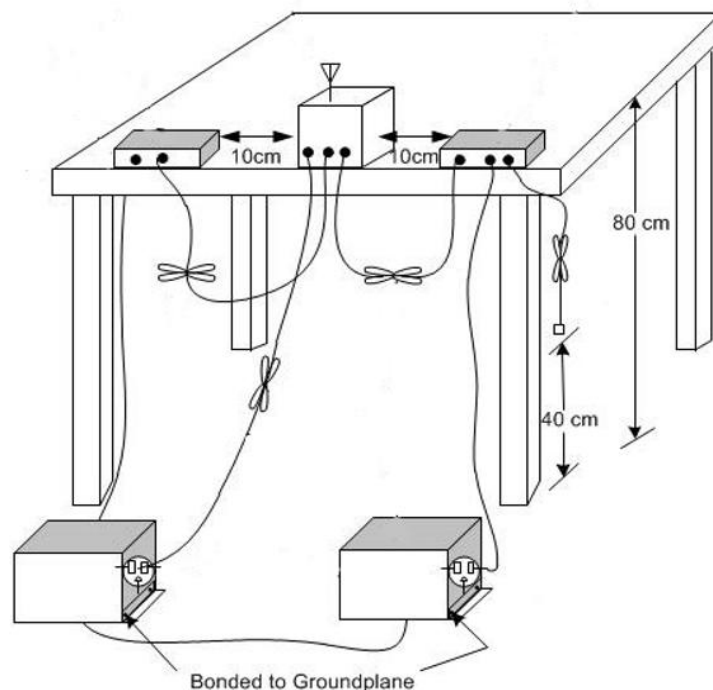
The measurement bandwidth is:

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.8.1	Fig.A.8.2	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.8.1	Fig.A.8.2	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.				

Conclusion: Pass
Test graphs as below:

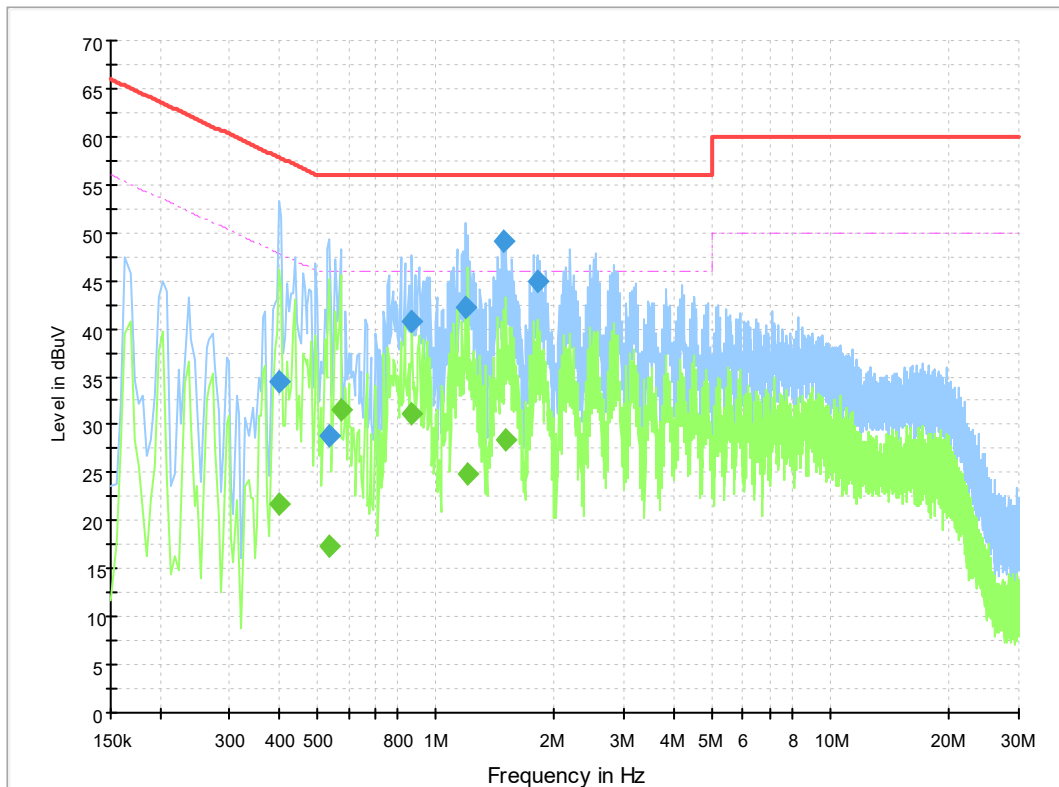


Fig.A.8.1 AC Powerline Conducted Emission-802.11b

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
0.402000	34.6	2000.0	9.000	On	L1	20.0	23.3	57.8	
0.537000	28.9	2000.0	9.000	On	L1	20.1	27.1	56.0	
0.870000	40.7	2000.0	9.000	On	L1	19.9	15.3	56.0	
1.189500	42.1	2000.0	9.000	On	N	20.0	13.9	56.0	
1.491000	49.2	2000.0	9.000	On	L1	19.9	6.8	56.0	
1.801500	45.0	2000.0	9.000	On	L1	19.8	11.0	56.0	

Final Result 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.402000	21.8	2000.0	9.000	On	L1	20.0	26.0	47.8	
0.537000	17.3	2000.0	9.000	On	L1	20.1	28.7	46.0	
0.573000	31.5	2000.0	9.000	On	N	20.2	14.5	46.0	
0.870000	31.1	2000.0	9.000	On	L1	19.9	14.9	46.0	
1.207500	25.0	2000.0	9.000	On	N	20.0	21.0	46.0	
1.509000	28.5	2000.0	9.000	On	N	20.0	17.5	46.0	

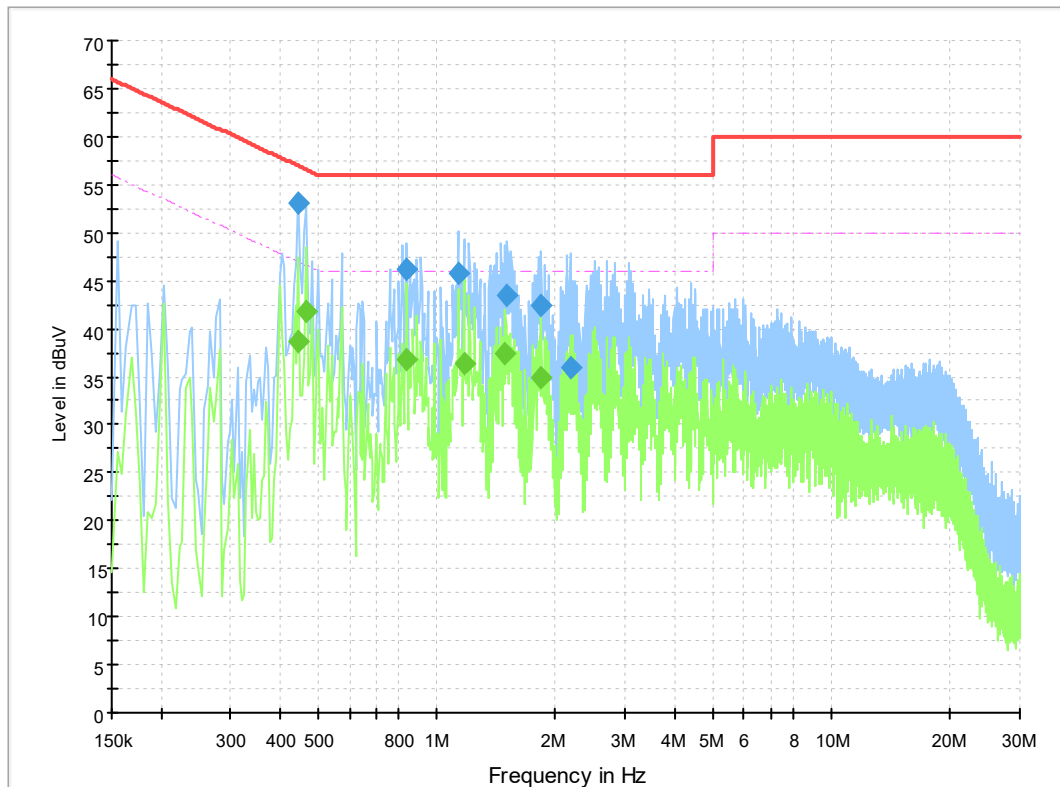


Fig.A.8.2 AC Powerline Conducted Emission-Idle

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

Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.447000	53.1	2000.0	9.000	On	L1	20.1	3.9	56.9	
0.838500	46.1	2000.0	9.000	On	L1	19.9	9.9	56.0	
1.131000	45.7	2000.0	9.000	On	L1	19.9	10.3	56.0	
1.509000	43.4	2000.0	9.000	On	L1	19.9	12.6	56.0	
1.842000	42.4	2000.0	9.000	On	L1	19.8	13.6	56.0	
2.175000	36.0	2000.0	9.000	On	N	20.0	20.0	56.0	

Final Result 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.447000	38.6	2000.0	9.000	On	N	20.2	8.4	46.9	
0.465000	41.7	2000.0	9.000	On	L1	20.1	4.9	46.6	
0.838500	36.8	2000.0	9.000	On	L1	19.9	9.2	46.0	
1.171500	36.3	2000.0	9.000	On	L1	19.9	9.7	46.0	
1.491000	37.4	2000.0	9.000	On	L1	19.9	8.6	46.0	
1.842000	34.9	2000.0	9.000	On	L1	19.8	11.1	46.0	

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*****