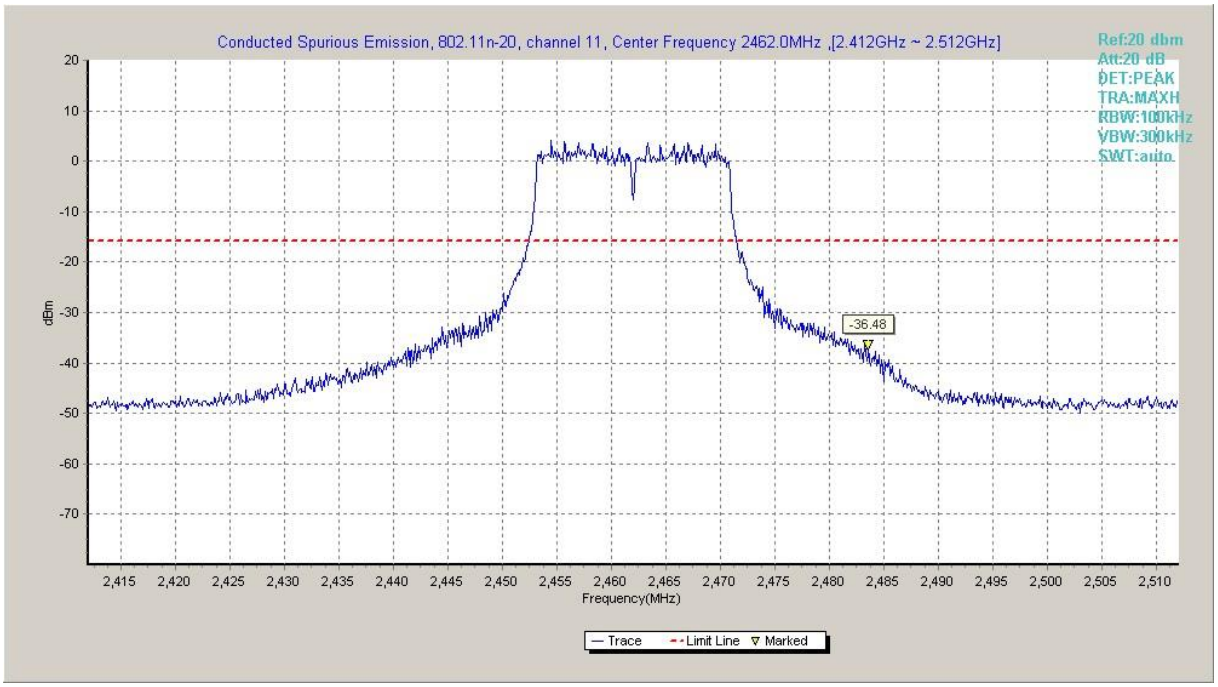

Fig.A.6.1.65 Transmitter Spurious Emission - Conducted (802.11n-HT20, Ch11, Center Frequency)

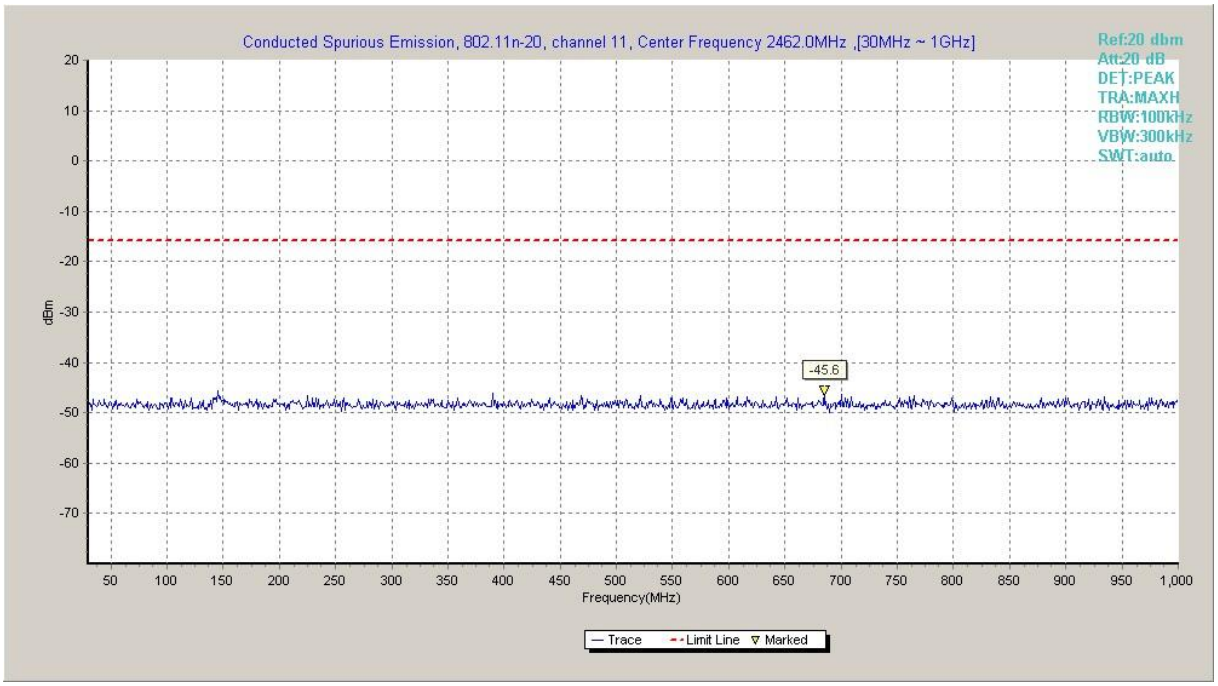

Fig.A.6.1.66 Transmitter Spurious Emission - Conducted (802.11n-HT20, Ch11, 30 MHz-1 GHz)

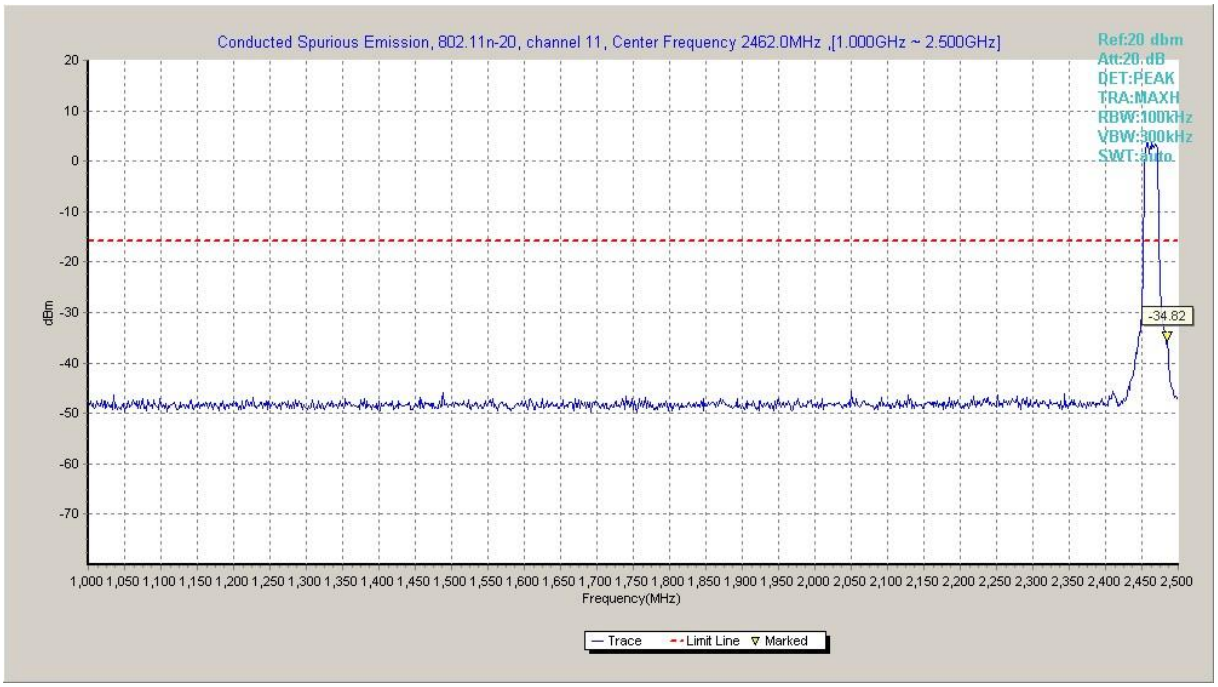

Fig.A.6.1.67 Transmitter Spurious Emission - Conducted (802.11n-HT20, Ch11, 1 GHz-2.5 GHz)

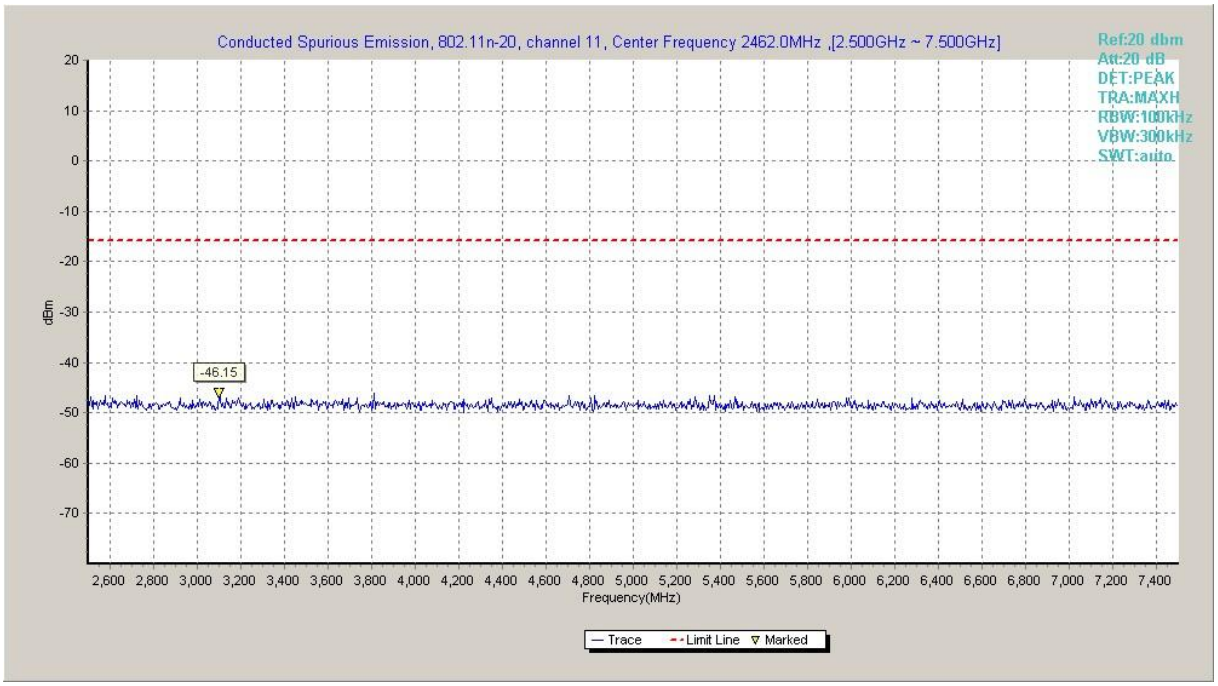

Fig.A.6.1.68 Transmitter Spurious Emission - Conducted (802.11n-HT20, Ch11, 2.5 GHz-7.5 GHz)

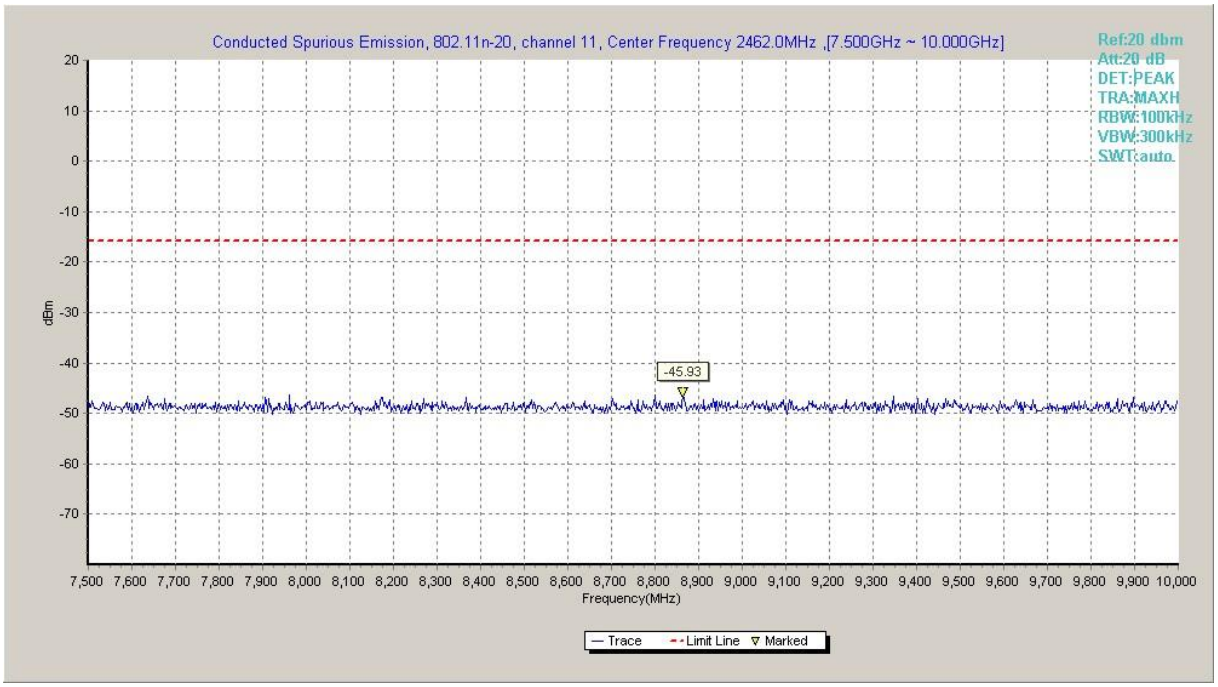

Fig.A.6.1.69 Transmitter Spurious Emission - Conducted (802.11n-HT20, Ch11, 7.5 GHz-10 GHz)

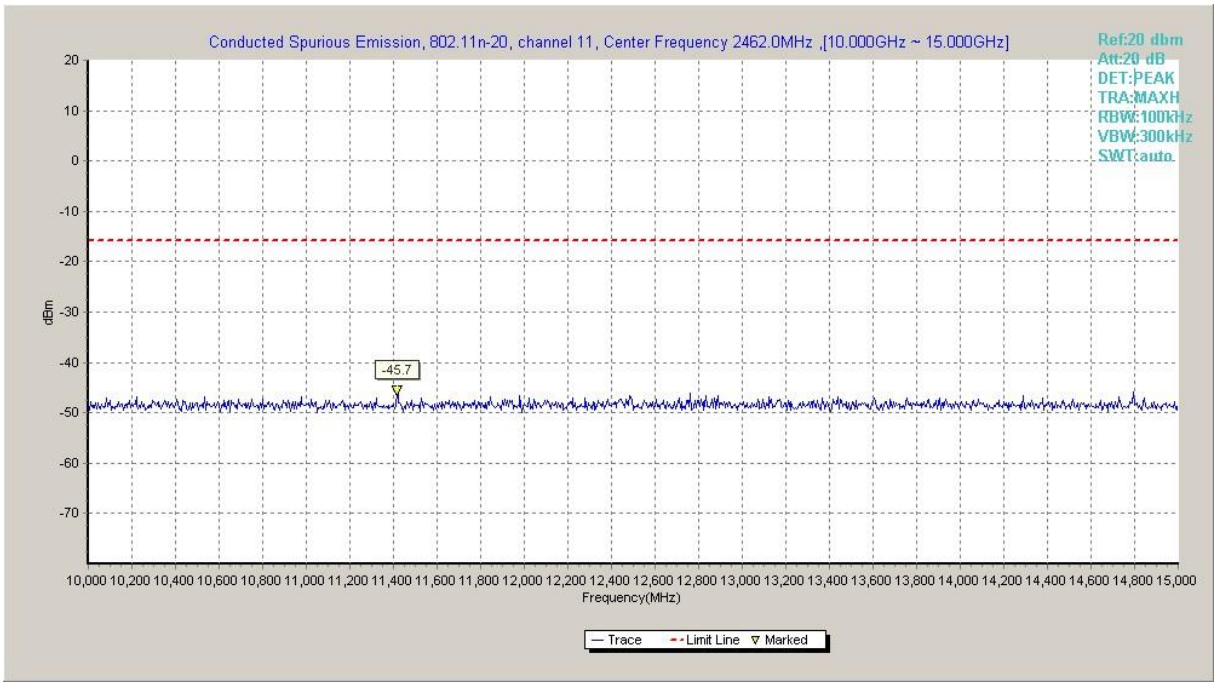

Fig.A.6.1.70 Transmitter Spurious Emission - Conducted (802.11n-HT20, Ch11, 10 GHz-15 GHz)

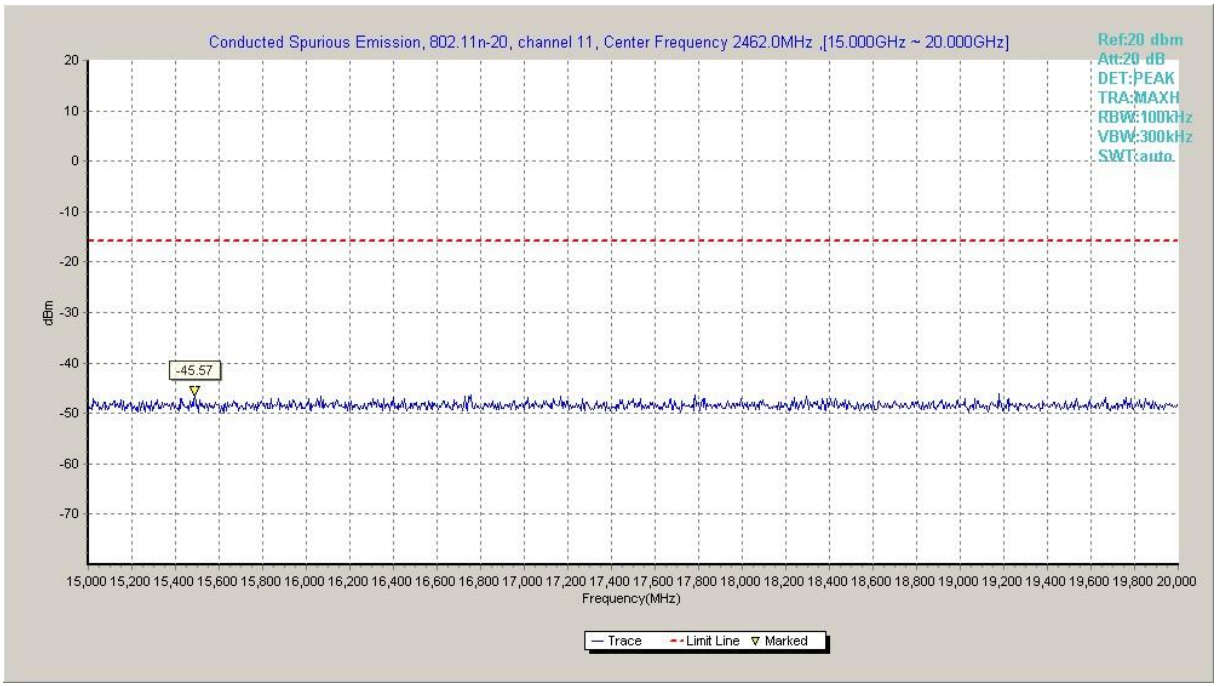

Fig.A.6.1.71 Transmitter Spurious Emission - Conducted (802.11n-HT20, Ch11, 15 GHz-20 GHz)

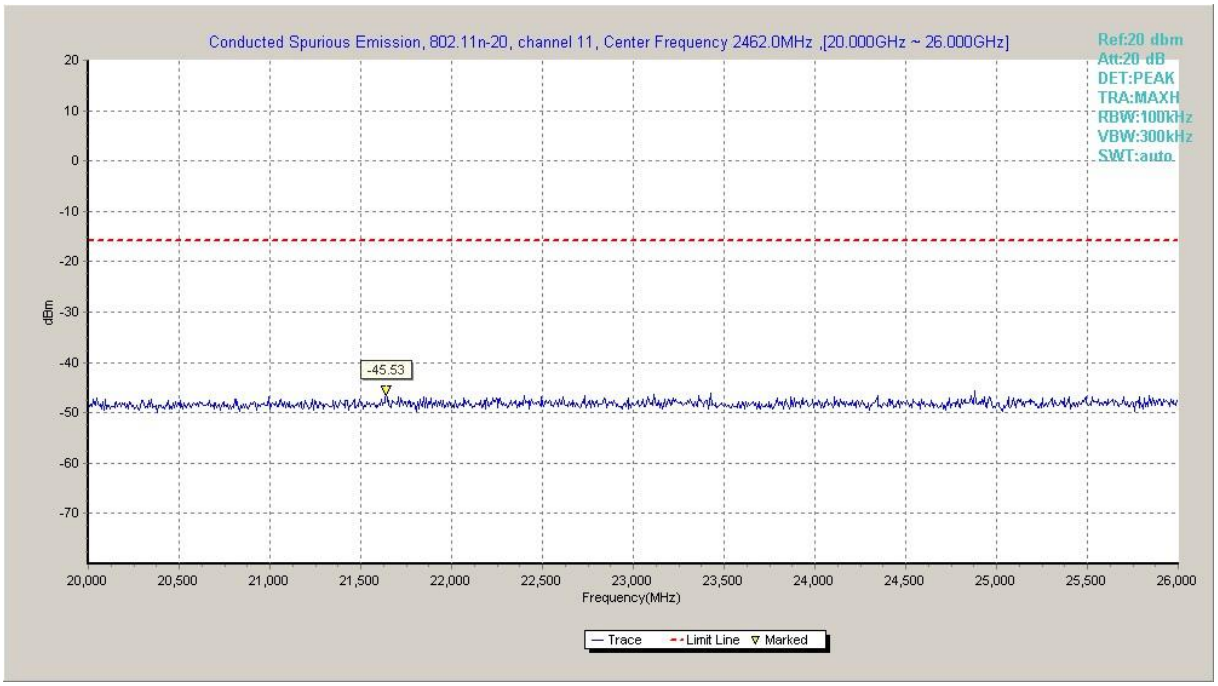

Fig.A.6.1.72 Transmitter Spurious Emission - Conducted (802.11n-HT20, Ch11, 20 GHz-26 GHz)

A.6.2 Transmitter Spurious Emission - Radiated

Method of Measurement: See ANSI C63.10-2013-clause 6.4 &6.5 & 6.6

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 of emission (MHz)	Field strength(uV/m)	Field strength(dBuV/m)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

Frequency (MHz)	Field strength(μV/m)	Measurement distance (m)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30

Test Condition

The EUT was placed on a non-conductive table. The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.

Frequency of emission (MHz)	RBW/VBW	Sweep Time(s)
30-1000	100KHz/300KHz	5
1000-4000	1MHz/1MHz	15
4000-18000	1MHz/1MHz	40
18000-26500	1MHz/1MHz	20

EUT ID: EUT1

Measurement Results:

802.11b mode

Mode	Channel	Frequency Range	Test Results	Conclusion
802.11b	Power	2.38GHz ~2.45GHz	Fig.A.6.2.1	**P**
	Power	2.45GHz ~2.5GHz	Fig.A.6.2.2	**P**

802.11g mode

Mode	Channel	Frequency Range	Test Results	Conclusion
802.11g	Power	2.38GHz ~2.43GHz	Fig.A.6.2.3	**P**
	Power	2.45GHz ~2.5GHz	Fig.A.6.2.4	**P**

802.11n-HT20 mode

Mode	Channel	Frequency Range	Test Results	Conclusion
802.11n (HT20)	Power	2.38GHz ~2.45GHz	Fig.A.6.2.5	**P**
	Power	2.45GHz ~2.5GHz	Fig.A.6.2.6	**P**

Conclusion: Pass

Note:

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:

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

Peak

802.11b

Ch1

Frequency(MHz)	Result (dBuV/m)	Cable Loss(dB)	Antenna Factor	P_{Mea} (dBuV/m)	Polarization
2386.690	61.0	-38.8	27.7	72.100	H
17970.000	53.1	-17.7	45.6	25.200	V
17905.500	52.8	-18.5	45.6	25.700	H
17959.500	52.8	-17.7	45.6	24.900	V
17832.000	52.6	-18.5	45.6	25.500	H
17880.000	52.6	-18.5	45.6	25.500	H

Ch6

Frequency(MHz)	Result (dBuV/m)	Cable Loss(dB)	Antenna Factor	P_{Mea} (dBuV/m)	Polarization
17899.500	52.9	-18.5	45.6	25.800	V
17943.000	52.9	-17.7	45.6	25.000	H
17913.000	52.8	-18.5	45.6	25.700	H
17821.500	52.7	-18.5	45.6	25.600	V
17928.000	52.7	-17.7	45.6	24.800	V
17986.500	52.6	-17.7	45.6	24.700	H

Ch11

Frequency(MHz)	Result (dBuV/m)	Cable Loss(dB)	Antenna Factor	P_{Mea} (dBuV/m)	Polarization
2486.470	56.3	-38.9	27.7	67.500	H
17989.500	53.1	-17.7	45.6	25.200	V
17937.000	53.1	-17.7	45.6	25.200	V
17959.500	52.8	-17.7	45.6	24.900	H
17998.500	52.6	-17.7	45.6	24.700	H
17986.500	52.5	-17.7	45.6	24.600	H

802.11g

Ch1

Frequency(MHz)	Result (dBuV/m)	Cable Loss(dB)	Antenna Factor	P_{Mea} (dBuV/m)	Polarization
2486.585	46.8	-38.9	27.7	58.000	V
17997.000	41.5	-17.7	45.6	13.600	V
17994.000	41.5	-17.7	45.6	13.600	H
17908.500	41.3	-18.5	45.6	14.200	H
18000.000	41.3	-45.6	44.5	42.366	V
17998.500	41.3	-17.7	45.6	13.400	H

Ch6

Frequency(MHz)	Result (dBuV/m)	Cable Loss(dB)	Antenna Factor	P_{Mea} (dBuV/m)	Polarization
17994	53	-17.7	45.6	25.1	H
17944.5	53	-17.7	45.6	25.1	H
17896.5	52.9	-18.5	45.6	25.8	V
17923.5	52.7	-17.7	45.6	24.8	V
17956.5	52.5	-17.7	45.6	24.6	V
17907	52.4	-18.5	45.6	25.3	H

Ch11

Frequency(MHz)	Result (dBuV/m)	Cable Loss(dB)	Antenna Factor	P_{Mea} (dBuV/m)	Polarization
2487.745	54.5	-38.9	27.7	65.700	V
17983.500	53.5	-17.7	45.6	25.600	H
17952.000	52.7	-17.7	45.6	24.800	H
17976.000	52.7	-17.7	45.6	24.800	H
17866.500	52.5	-18.5	45.6	25.400	V
17896.500	52.5	-18.5	45.6	25.400	H

802.11n-HT20

Ch1

Frequency(MHz)	Result (dBuV/m)	Cable Loss(dB)	Antenna Factor	P_{Mea} (dBuV/m)	Polarization
2387.875	53.8	-38.8	27.7	64.900	H
17941.500	53.0	-17.7	45.6	25.100	V
17929.500	52.9	-17.7	45.6	25.000	H
17830.500	52.6	-18.5	45.6	25.500	H
17998.500	52.6	-17.7	45.6	24.700	H
17836.500	52.5	-18.5	45.6	25.400	V

Ch6

Frequency(MHz)	Result (dBuV/m)	Cable Loss(dB)	Antenna Factor	P_{Mea} (dBuV/m)	Polarization
17808.000	53.0	-18.5	45.6	25.900	H
17989.500	52.7	-17.7	45.6	24.800	V
17947.500	52.6	-17.7	45.6	24.700	H
17998.500	52.3	-17.7	45.6	24.400	V
17997.000	52.3	-17.7	45.6	24.400	H
17961.000	52.3	-17.7	45.6	24.400	H

Ch11

Frequency(MHz)	Result (dBuV/m)	Cable Loss(dB)	Antenna Factor	P_{Mea} (dBuV/m)	Polarization
2489.495	53.8	-38.9	27.7	65.000	H
17986.500	52.9	-17.7	45.6	25.000	V
18000.000	52.8	-45.6	44.5	53.866	V
17995.500	52.7	-17.7	45.6	24.800	V
17931.000	52.6	-17.7	45.6	24.700	H
17826.000	52.6	-18.5	45.6	25.500	H

Average

802.11b

Ch1

Frequency(MHz)	Result (dBuV/m)	Cable Loss(dB)	Antenna Factor	P_{Mea} (dBuV/m)	Polarization
2386.295	53.5	-38.8	27.7	64.600	H
17997.000	41.4	-17.7	45.6	13.500	V
18000.000	41.4	-45.6	44.5	42.466	H
17908.500	41.3	-18.5	45.6	14.200	V
17992.500	41.2	-17.7	45.6	13.300	H
17995.500	41.2	-17.7	45.6	13.300	H

Ch6

Frequency(MHz)	Result (dBuV/m)	Cable Loss(dB)	Antenna Factor	P_{Mea} (dBuV/m)	Polarization
18000.000	41.5	-45.6	44.5	42.566	V
17998.500	41.4	-17.7	45.6	13.500	H
17997.000	41.4	-17.7	45.6	13.500	V
17992.500	41.3	-17.7	45.6	13.400	H
17995.500	41.3	-17.7	45.6	13.400	H
17989.500	41.3	-17.7	45.6	13.400	H

Ch11

Frequency(MHz)	Result (dBuV/m)	Cable Loss(dB)	Antenna Factor	P_{Mea} (dBuV/m)	Polarization
2485.000	42.6	-38.9	27.7	53.800	H
17995.500	41.6	-17.7	45.6	13.700	V
17997.000	41.3	-17.7	45.6	13.400	V
18000.000	41.2	-45.6	44.5	42.266	H
17986.500	41.2	-17.7	45.6	13.300	H
17994.000	41.2	-17.7	45.6	13.300	H

802.11g

Ch1

Frequency(MHz)	Result (dBuV/m)	Cable Loss(dB)	Antenna Factor	P_{Mea} (dBuV/m)	Polarization
2390.000	47.7	-38.8	27.7	58.800	V
17998.500	41.6	-17.7	45.6	13.700	H
18000.000	41.5	-45.6	44.5	42.566	V
17994.000	41.4	-17.7	45.6	13.500	V
17992.500	41.3	-17.7	45.6	13.400	H
17997.000	41.3	-17.7	45.6	13.400	V

Ch6

Frequency(MHz)	Result (dBuV/m)	Cable Loss(dB)	Antenna Factor	P_{Mea} (dBuV/m)	Polarization
18000.000	41.4	-45.6	44.5	42.466	H
17994.000	41.3	-17.7	45.6	13.400	H
17992.500	41.3	-17.7	45.6	13.400	H
17995.500	41.3	-17.7	45.6	13.400	V
17997.000	41.2	-17.7	45.6	13.300	H
17985.000	41.2	-17.7	45.6	13.300	H

Ch11

Frequency(MHz)	Result (dBuV/m)	Cable Loss(dB)	Antenna Factor	P_{Mea} (dBuV/m)	Polarization
2487.695	41.6	-38.9	27.7	52.800	V
17995.500	41.5	-17.7	45.6	13.600	V
17983.500	41.4	-17.7	45.6	13.500	H
17992.500	41.4	-17.7	45.6	13.500	V
18000.000	41.3	-45.6	44.5	42.366	H
17985.000	41.3	-17.7	45.6	13.400	V

802.11n-HT20

Ch1

Frequency(MHz)	Result (dBuV/m)	Cable Loss(dB)	Antenna Factor	P_{Mea} (dBuV/m)	Polarization
2387.880	41.7	-38.8	27.7	52.800	H
18000.000	41.5	-45.6	44.5	42.566	V
17997.000	41.4	-17.7	45.6	13.500	H
17998.500	41.3	-17.7	45.6	13.400	V
17989.500	41.3	-17.7	45.6	13.400	H
17994.000	41.2	-17.7	45.6	13.300	H

Ch6

Frequency(MHz)	Result (dBuV/m)	Cable Loss(dB)	Antenna Factor	P_{Mea} (dBuV/m)	Polarization
17995.500	41.5	-17.7	45.6	13.600	H
17997.000	41.5	-17.7	45.6	13.600	H
17992.500	41.4	-17.7	45.6	13.500	V
17998.500	41.4	-17.7	45.6	13.500	H
17991.000	41.4	-17.7	45.6	13.500	H
18000.000	41.2	-45.6	44.5	42.266	V

Ch11

Frequency(MHz)	Result (dBuV/m)	Cable Loss(dB)	Antenna Factor	P_{Mea} (dBuV/m)	Polarization
2489.475	41.6	-38.9	27.7	52.800	H
17998.500	41.5	-17.7	45.6	13.600	V
17997.000	41.4	-17.7	45.6	13.500	H
17994.000	41.4	-17.7	45.6	13.500	H
17991.000	41.4	-17.7	45.6	13.500	H
17992.500	41.3	-17.7	45.6	13.400	H

Test graphs as below:

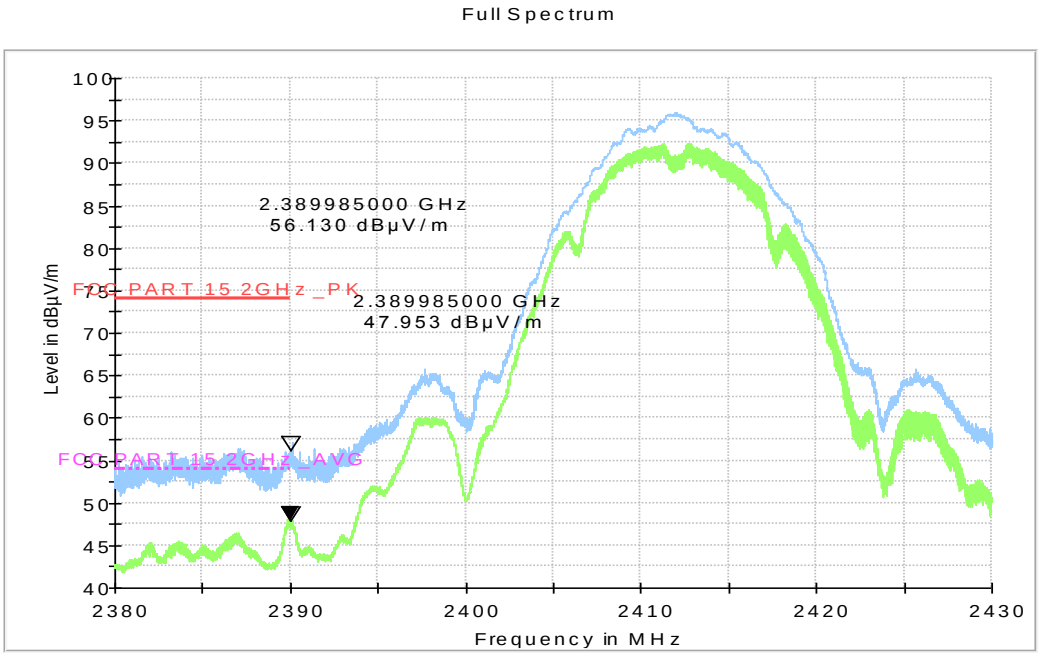

Fig.A.6.2.1 Transmitter Spurious Emission - Radiated (Power): 802.11b, ch1, 2.38 GHz – 2.45GHz

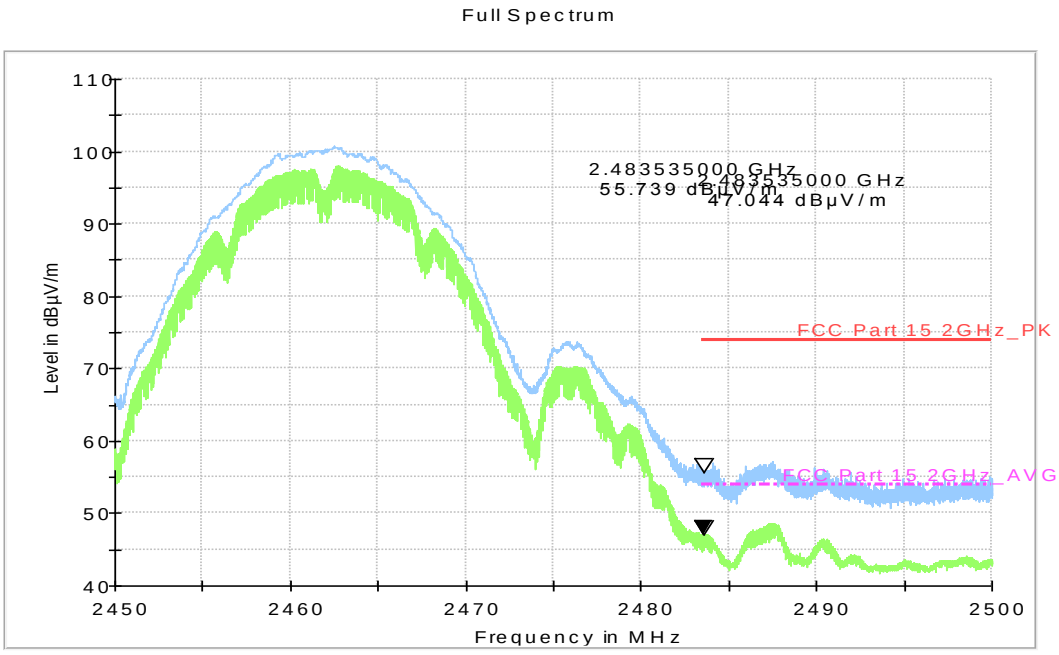

Fig.A.6.2.2 Transmitter Spurious Emission - Radiated (Power): 802.11b, ch11, 2.45 GHz - 2.50GHz

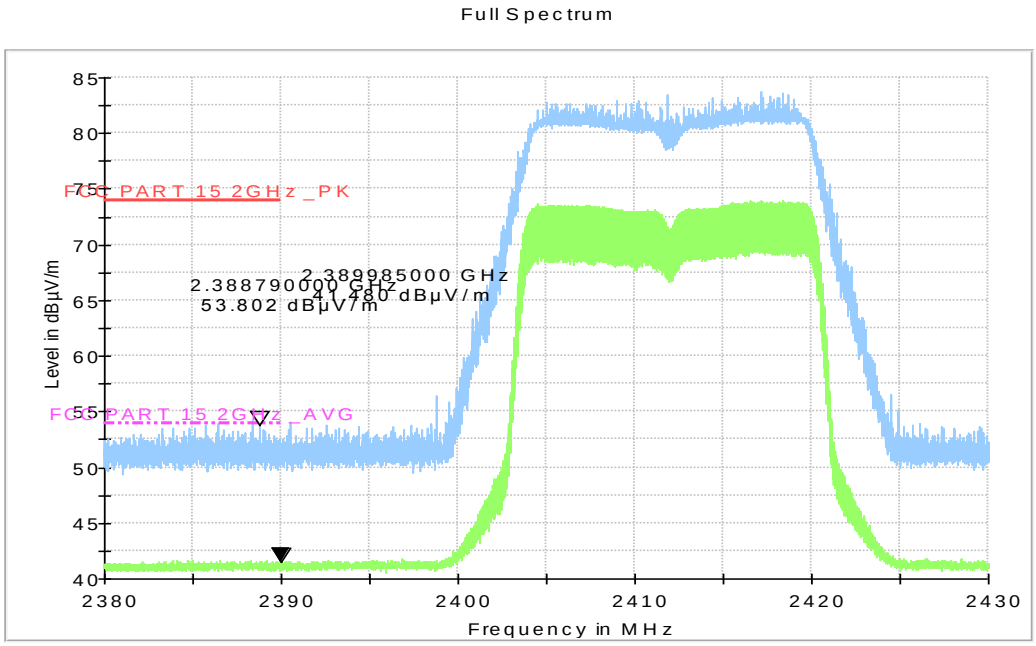

Fig.A.6.2.3 Transmitter Spurious Emission - Radiated (Power): 802.11g, ch1, 2.38 GHz - 2.45GHz

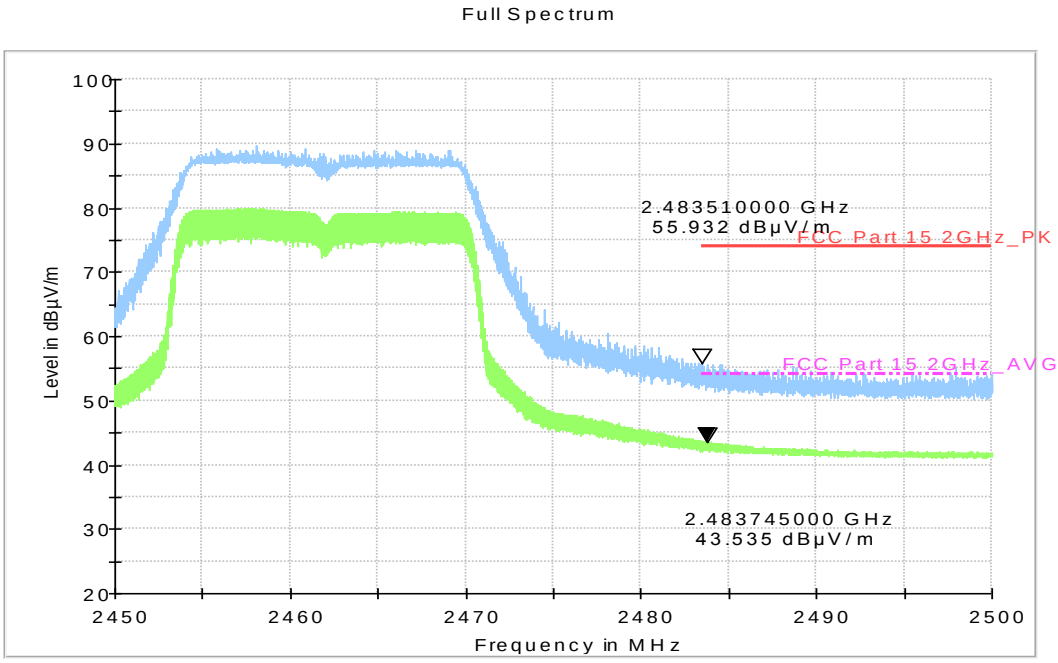

Fig.A.6.2.4 Transmitter Spurious Emission - Radiated (Power): 802.11g, ch11, 2.45 GHz - 2.50GHz

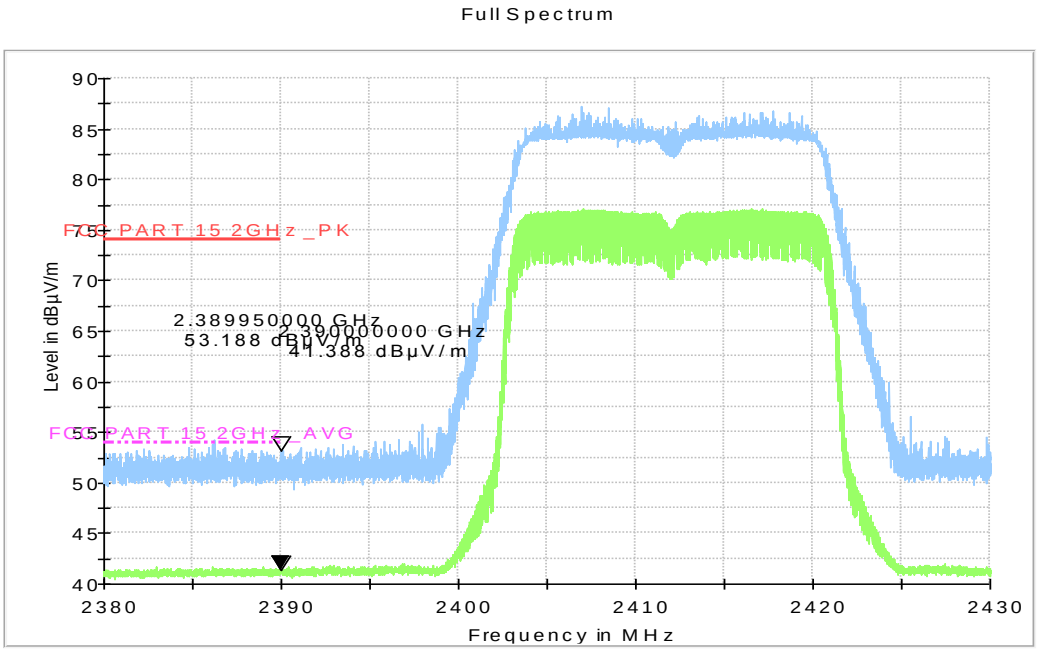

Fig.A.6.2.5 Transmitter Spurious Emission - Radiated (Power): 802.11n-HT20, ch1, 2.38 GHz - 2.45GHz

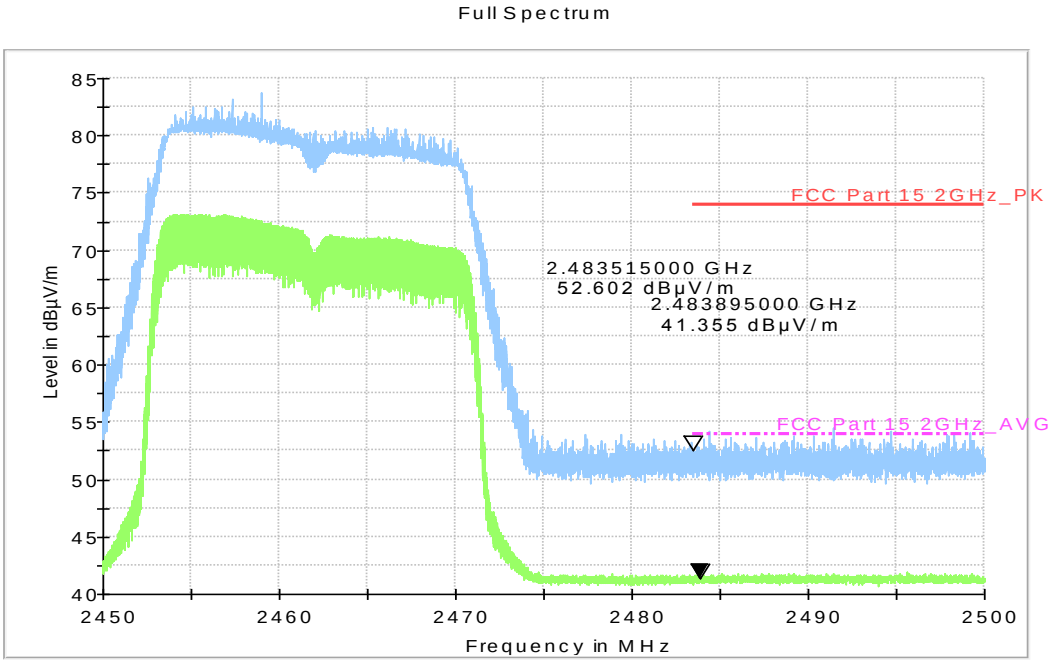

Fig.A.6.2.6 Transmitter Spurious Emission - Radiated (Power): 802.11n-HT20, ch11, 2.45 GHz - 2.50GHz

A.7. AC Power-line Conducted Emission

Method of Measurement: See ANSI C63.10-2013-clause 6.2

1 The one EUT cable configuration and arrangement and mode of operation that produced the emission with the highest amplitude relative to the limit is selected for the final measurement, while applying the appropriate modulating signal to the EUT.

2 If the EUT is relocated from an exploratory test site to a final test site, the highest emissions shall be remaximized at the final test location before final ac power-line conducted emission measurements are performed.

3 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 in the system) is then performed for the full frequency range for which the EUT is being tested for compliance without further variation of the EUT arrangement, cable positions, or EUT mode of operation.

4 If the EUT is comprised of equipment units that have their own separate ac power connections, e.g., floor-standing equipment with independent power cords for each shelf that are able to connect directly to the ac power network, each current-carrying conductor of one unit is measured while the other units are connected to a second (or more) LISN(s). All units shall be separately measured. If a power strip is provided by the manufacturer, to supply all of the units making up the EUT, only the conductors in the power cord of the power strip shall be measured.

5 If the EUT uses a detachable antenna, these measurements shall be made with a suitable dummy load connected to the antenna output terminals; otherwise, the tests shall be made with the antenna connected and, if adjustable, fully extended. When measuring the ac conducted emissions from a device that operates between 150 kHz and 30 MHz a non-detachable antenna may be replaced with a dummy load for the measurements within the fundamental emission band of the transmitter, but only for those measurements.36 Record the six highest EUT emissions relative to the limit of each of the current-carrying conductors of the power cords of the equipment that comprises the EUT over the frequency range specified by the procuring or regulatory agency. Diagram or photograph the test setup that was used. See Clause 8 for full reporting requirements.

Test Condition:

Voltage（V）	Frequency（Hz）
120	60

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.7.1	Fig.A.7.2	**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.7.1	Fig.A.7.2	**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:

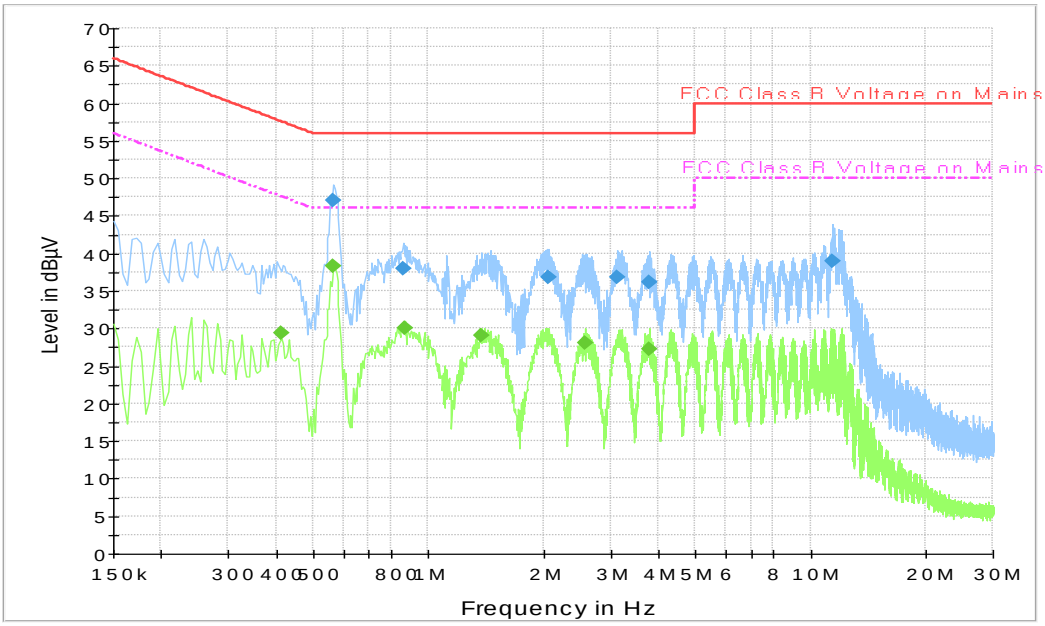

Fig.A.7.1 AC Powerline Conducted Emission-802.11b

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)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.564000	47.1	GND	L1	19.9	8.9	56.0
0.861000	37.9	GND	L1	19.7	18.1	56.0
2.071500	36.8	GND	L1	19.7	19.2	56.0
3.133500	36.8	GND	L1	19.7	19.2	56.0
3.777000	36.1	GND	L1	19.6	19.9	56.0
11.463000	39.0	GND	L1	19.9	21.0	60.0

Final Result 2

Frequency (MHz)	Average (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.411000	29.3	GND	L1	19.9	18.3	47.6
0.564000	38.3	GND	L1	19.9	7.7	46.0
0.870000	30.0	GND	L1	19.7	16.0	46.0
1.378500	29.0	GND	L1	19.6	17.0	46.0
2.571000	28.1	GND	L1	19.7	17.9	46.0
3.777000	27.3	GND	L1	19.6	18.7	46.0