

Fig.A.6.1.59 Transmitter Spurious Emission - Conducted (802.11n-HT20, Ch6, 1 GHz-2.5 GHz)

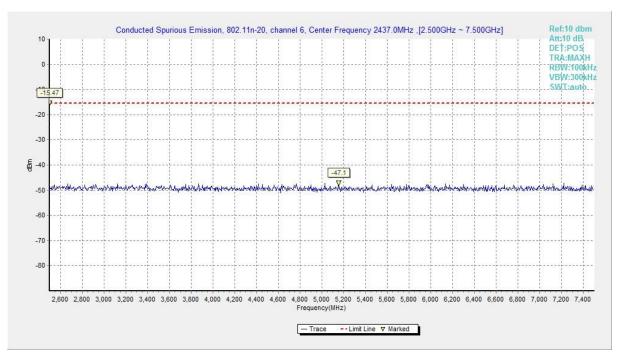


Fig.A.6.1.60 Transmitter Spurious Emission - Conducted (802.11n-HT20, Ch6, 2.5 GHz-7.5 GHz)



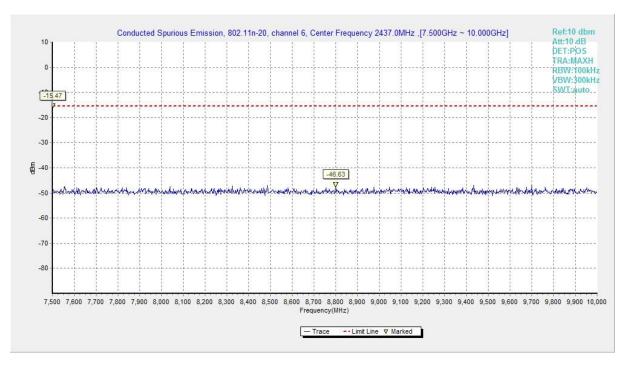


Fig.A.6.1.61 Transmitter Spurious Emission - Conducted (802.11n-HT20, Ch6, 7.5 GHz-10 GHz)

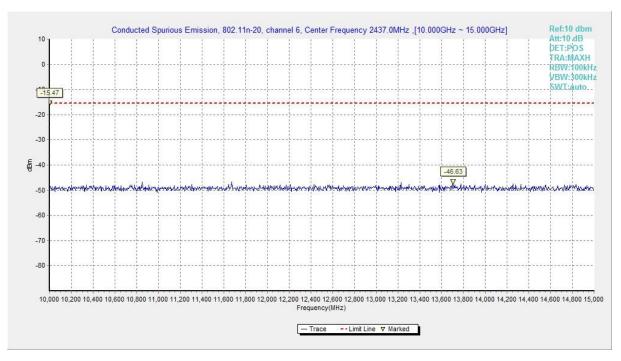


Fig.A.6.1.62 Transmitter Spurious Emission - Conducted (802.11n-HT20, Ch6, 10 GHz-15 GHz)



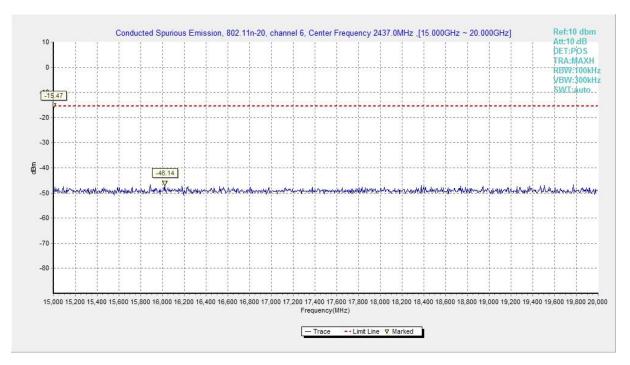


Fig.A.6.1.63 Transmitter Spurious Emission - Conducted (802.11n-HT20, Ch6, 15 GHz-20 GHz)

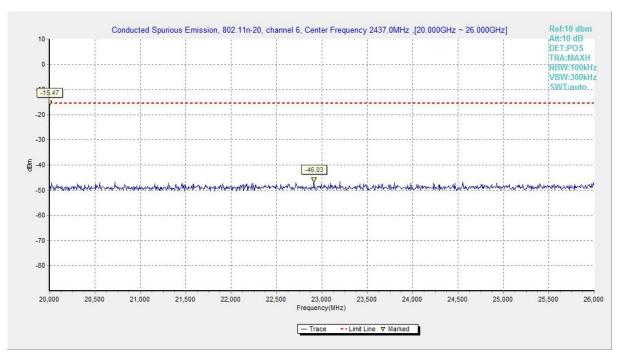


Fig.A.6.1.64 Transmitter Spurious Emission - Conducted (802.11n-HT20, Ch6, 20 GHz-26 GHz)



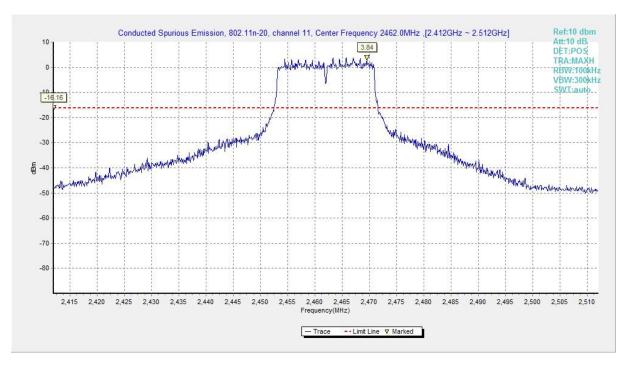


Fig.A.6.1.65 Transmitter Spurious Emission - Conducted (802.11n-HT20, Ch11, Center Frequency)

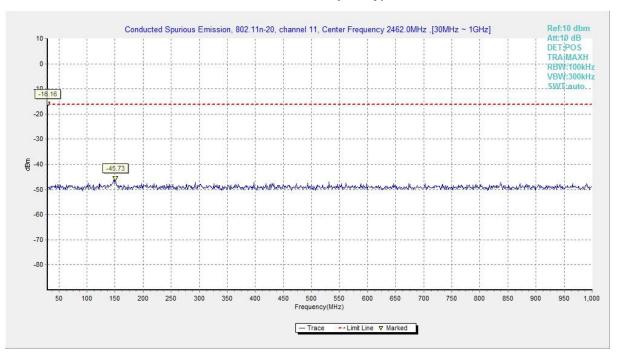


Fig.A.6.1.66 Transmitter Spurious Emission - Conducted (802.11n-HT20, Ch11, 30 MHz-1 GHz)



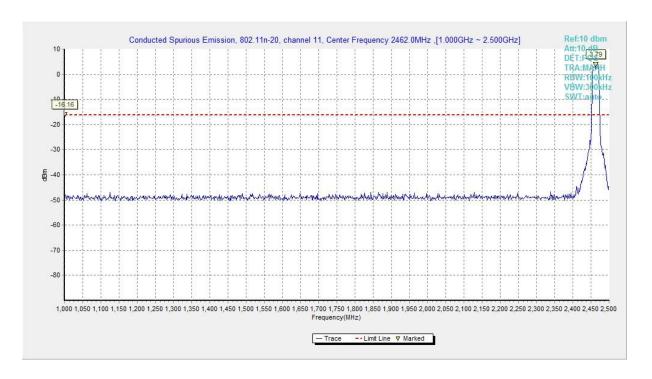


Fig.A.6.1.67 Transmitter Spurious Emission - Conducted (802.11n-HT20, Ch11, 1 GHz-2.5 GHz)

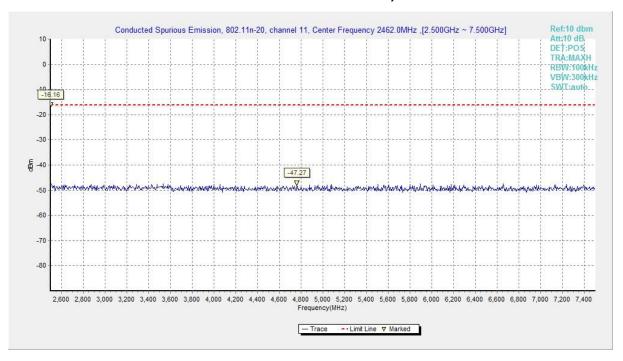


Fig.A.6.1.68 Transmitter Spurious Emission - Conducted (802.11n-HT20, Ch11, 2.5 GHz-7.5 GHz)



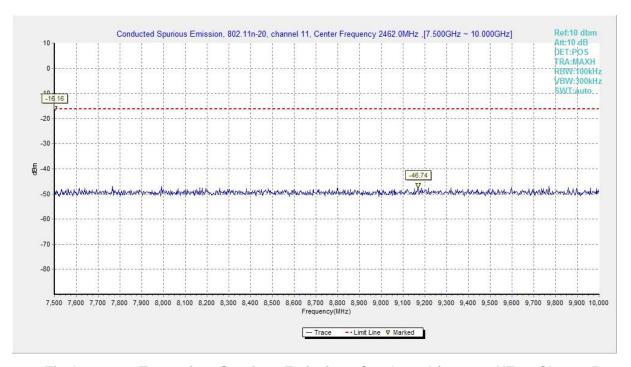


Fig.A.6.1.69 Transmitter Spurious Emission - Conducted (802.11n-HT20, Ch11, 7.5 GHz-10 GHz)

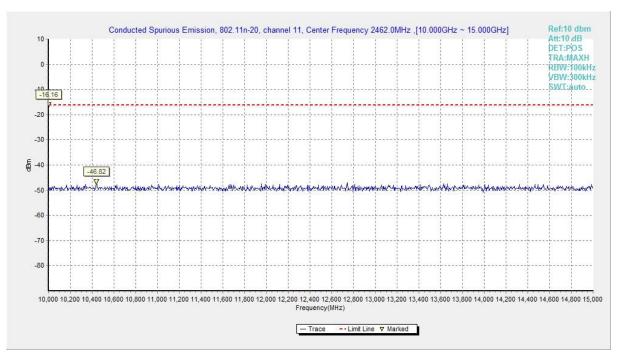


Fig.A.6.1.70 Transmitter Spurious Emission - Conducted (802.11n-HT20, Ch11, 10 GHz-15 GHz)



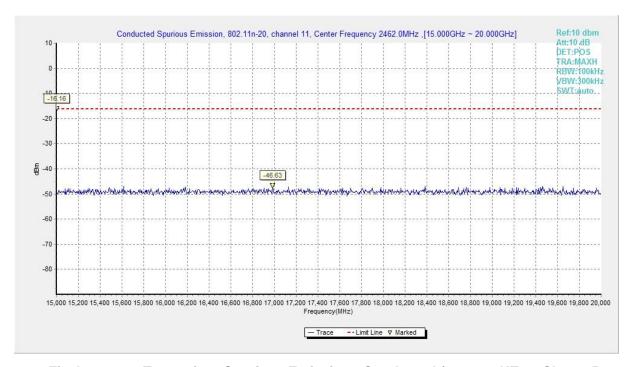


Fig.A.6.1.71 Transmitter Spurious Emission - Conducted (802.11n-HT20, Ch11, 15 GHz-20 GHz)

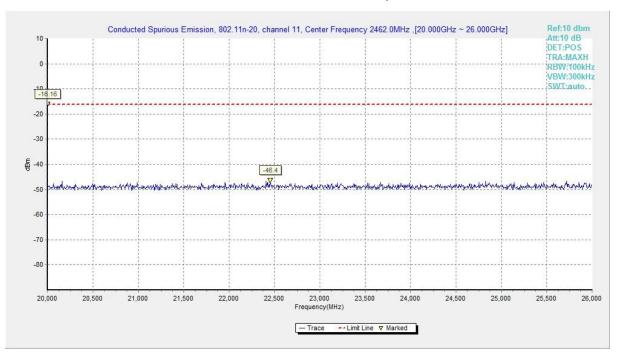


Fig.A.6.1.72 Transmitter Spurious Emission - Conducted (802.11n-HT20, Ch11, 20 GHz-26 GHz)



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	Field strength(uV/m)	Field strength(dBuV/m)
(MHz)		
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	RBW/VBW	Sweep Time(s)
(MHz)		
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
	Power	2.38GHz ~2.45GHz	Fig.A.6.2.1	Р
	1	1 GHz ~ 3 GHz	Fig.A.6.2.2	Р
	ı	3 GHz ~ 18 GHz	Fig.A.6.2.3	Р
		9 kHz ~30 MHz	Fig.A.6.2.4	Р
		30 MHz ~1 GHz	Fig.A.6.2.5	Р
802.11b	6	1 GHz ~ 3 GHz	Fig.A.6.2.6	Р
		3 GHz ~ 18 GHz	Fig.A.6.2.7	Р
		18 GHz~ 26.5 GHz	Fig.A.6.2.8	Р
	Power	2.45GHz ~2.5GHz	Fig.A.6.2.9	Р
	11	1 GHz ~ 3 GHz	Fig.A.6.2.10	Р
	11	3 GHz ~ 18 GHz	Fig.A.6.2.11	Р

802.11g mode

Mode	Channel	Frequency Range	Test Results	Conclusion
	Power	2.38GHz ~2.43GHz	Fig.A.6.2.12	Р
	4	1 GHz ~ 3 GHz	Fig.A.6.2.13	Р
	l	3 GHz ~ 18 GHz	Fig.A.6.2.14	Р
		30 MHz ~1 GHz	Fig.A.6.2.15	Р
902 11a	6	1 GHz ~ 3 GHz	Fig.A.6.2.16	Р
802.11g	0	3 GHz ~ 18 GHz	Fig.A.6.2.17	Р
		18 GHz~ 26.5 GHz	Fig.A.6.2.18	Р
	Power	2.45GHz ~2.5GHz	Fig.A.6.2.19	Р
1	11	1 GHz ~ 3 GHz	Fig.A.6.2.20	Р
	11	3 GHz ~ 18 GHz	Fig.A.6.2.21	Р

802.11n-HT20 mode

Mode	Channel	Frequency Range	Test Results	Conclusion
	Power	2.38GHz ~2.45GHz	Fig.A.6.2.22	Р
	4	1 GHz ~ 3 GHz	Fig.A.6.2.23	Р
	'	3 GHz ~ 18 GHz	Fig.A.6.2.24	Р
		30 MHz ~1 GHz	Fig.A.6.2.25	Р
802.11n	6	1 GHz ~ 3 GHz	Fig.A.6.2.26	Р
(HT20)		3 GHz ~ 18 GHz	Fig.A.6.2.27	Р
		18 GHz~ 26.5 GHz	Fig.A.6.2.28	Р
	Power	2.45GHz ~2.5GHz	Fig.A.6.2.29	Р
	11	1 GHz ~ 3 GHz	Fig.A.6.2.30	Р
	11	3 GHz ~ 18 GHz	Fig.A.6.2.31	Р



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

802.11b

Ch1

Fraguenov/MHz)	Result	Cable	Antenna	P _{Mea}	Polarization
Frequency(MHz)	(dBuV/m)	Loss(dB)	Factor	(dBuV/m)	
2385.275	49.7	-38.8	27.7	60.800	Н
17936.000	63.6	-17.7	45.6	35.700	Н
17865.500	63.2	-18.5	45.6	36.100	Н
17916.500	62.8	-17.7	45.6	34.900	Н
17974.000	62.8	-17.7	45.6	34.900	V
17973.000	62.8	-17.7	45.6	34.900	V

Ch6

Fraguenov/MUz)	Result	Cable	Antenna	P _{Mea}	Polarization
Frequency(MHz)	(dBuV/m)	Loss(dB)	Factor	(dBuV/m)	
17797.000	63.2	-18.5	45.6	36.100	Н
17748.000	62.9	-18.5	45.6	35.800	Н
17805.500	62.7	-18.5	45.6	35.600	V
17872.500	62.7	-18.5	45.6	35.600	V
17958.500	62.6	-17.7	45.6	34.700	Н
17982.000	62.5	-17.7	45.6	34.600	V

Ch11

Eroguanov/MHz)	Result	Cable	Antenna	P _{Mea}	Polarization
Frequency(MHz)	(dBuV/m)	Loss(dB)	Factor	(dBuV/m)	
2494.190	51.5	-38.9	27.7	62.700	Н
17858.000	63.1	-18.5	45.6	36.000	Н
17927.500	63.0	-17.7	45.6	35.100	V
17832.500	62.7	-18.5	45.6	35.600	Н
17827.000	62.7	-18.5	45.6	35.600	V
17916.500	62.6	-17.7	45.6	34.700	Н



802.11g

Ch1

Fraguenov/MHz)	Result	Cable	Antenna	P_{Mea}	Polarization
Frequency(MHz)	(dBuV/m)	Loss(dB)	Factor	(dBuV/m)	
2389.825	53.5	-38.8	27.7	64.600	V
17871.000	63.6	-18.5	45.6	36.500	Н
17948.000	62.8	-17.7	45.6	34.900	Н
17848.000	62.7	-18.5	45.6	35.600	Н
17996.500	62.6	-17.7	45.6	34.700	Н
17970.500	62.4	-17.7	45.6	34.500	V

Ch6

Frequency(MHz)	Result	Cable	Antenna	P _{Mea}	Polarization
Frequency(WHZ)	(dBuV/m)	Loss(dB)	Factor	(dBuV/m)	
17818.5	63	-18.5	45.6	35.9	Н
17934.5	62.5	-17.7	45.6	34.6	Н
17829	62.4	-18.5	45.6	35.3	V
17634	62.3	-18.9	45.6	35.6	V
17939	62.3	-17.7	45.6	34.4	Н
17687	62.3	-18.9	45.6	35.6	V

Ch11

Fraguenov/MHz)	Result	Cable	Antenna	P _{Mea}	Polarization
Frequency(MHz)	(dBuV/m)	Loss(dB)	Factor (dBuV/m)		
2483.840	52.0	-38.9	27.7	63.200	V
17858.000	63.1	-18.5	45.6	36.000	Н
17927.500	63.0	-17.7	45.6	35.100	Н
17832.500	62.7	-18.5	45.6	35.600	Н
17827.000	62.7	-18.5	45.6	35.600	V
17916.500	62.6	-17.7	45.6	34.700	Н

802.11n-HT20

Ch1

Fraguenov/MHz)	Result	Cable	Antenna	P _{Mea}	Polarization
Frequency(MHz)	(dBuV/m)	Loss(dB)	Factor	(dBuV/m)	
2389.860	54.5	-38.8	27.7	65.600	Н
17800.000	63.7	-18.5	45.6	36.600	Н
17950.500	63.6	-17.7	45.6	35.700	Н
17889.000	62.8	-18.5	45.6	35.700	V
17859.500	62.6	-18.5	45.6	35.500	V
17947.500	62.6	-17.7	45.6	34.700	Н



Ch6

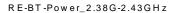
Fraguenov/MUz)	Result	Cable	Antenna	P _{Mea}	Polarization
Frequency(MHz)	(dBuV/m)	Loss(dB)	Factor	(dBuV/m)	
17996.000	62.8	-17.7	45.6	34.900	Н
17995.000	62.7	-17.7	45.6	34.800	Н
17967.500	62.6	-17.7	45.6	34.700	V
17963.000	62.6	-17.7	45.6	34.700	V
17974.500	62.5	-17.7	45.6	34.600	Н
17931.500	62.5	-17.7	45.6	34.600	V

Ch11

Fraguenov/MHz)	Result	Cable	Antenna	P _{Mea}	Polarization
Frequency(MHz)	(dBuV/m)	//m) Loss(dB) Factor (dBuV/m)		(dBuV/m)	
2483.650	64.0	-38.9	27.7	75.200	Н
17956.000	62.9	-17.7	45.6	35.000	Н
17988.500	62.6	-17.7	45.6	34.700	V
17995.500	62.6	-17.7	45.6	34.700	Н
17852.500	62.5	-18.5	45.6	35.400	V
17893.000	62.5	-18.5	45.6	35.400	V



Test graphs as below:



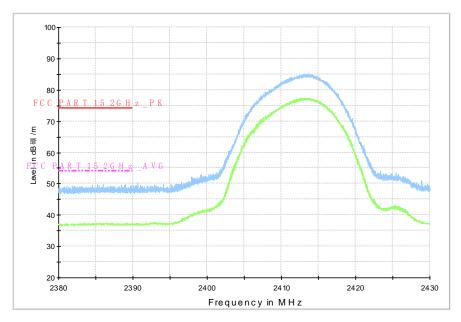
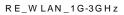


Fig.A.6.2.1 Transmitter Spurious Emission - Radiated (Power): 802.11b, ch1, 2.38 GHz - 2.45GHz



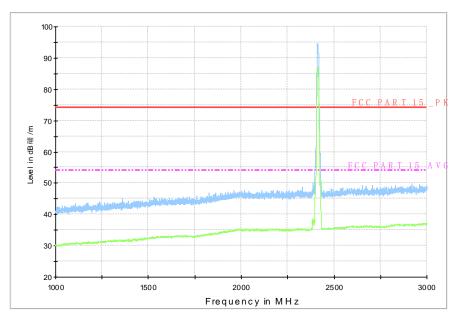


Fig.A.6.2.2 Transmitter Spurious Emission - Radiated (802.11b, Ch1, 1 GHz-3 GHz)



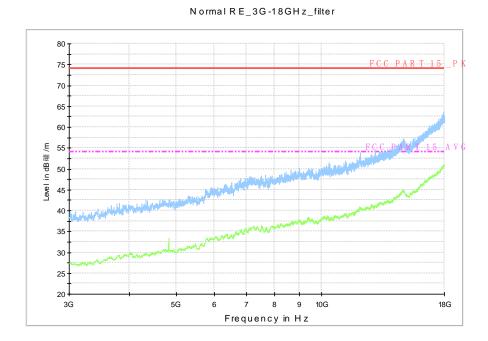


Fig.A.6.2.3 Transmitter Spurious Emission - Radiated (802.11b, Ch1, 3 GHz-18 GHz)

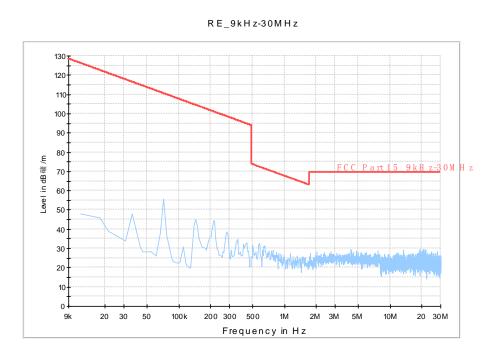


Fig.A.6.2.4 Transmitter Spurious Emission - Radiated (802.11b, Ch6, 9kHz-30 MHz)



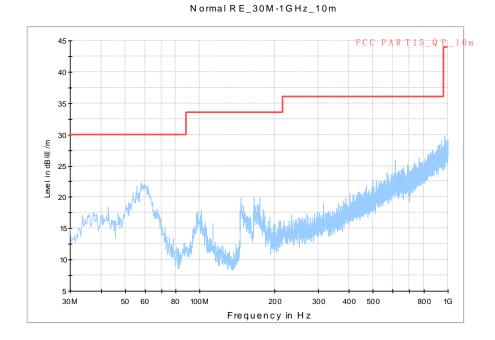


Fig.A.6.2.5 Transmitter Spurious Emission - Radiated (802.11b, Ch6, 30 MHz-1 GHz)

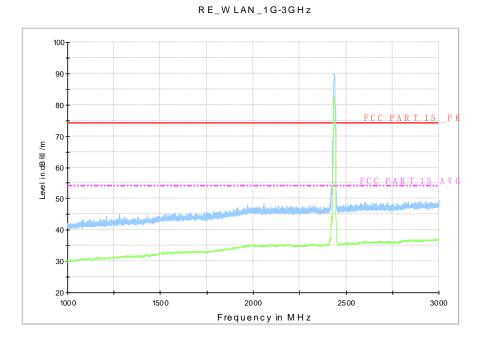


Fig.A.6.2.6 Transmitter Spurious Emission - Radiated (802.11b, Ch6, 1 GHz-3 GHz)



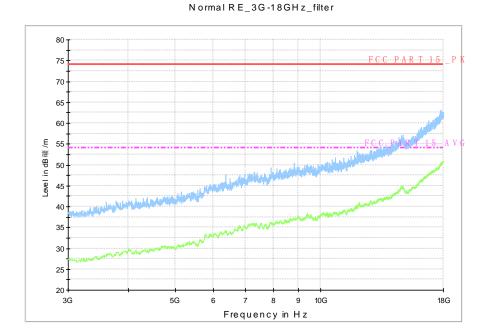


Fig.A.6.2.7 Transmitter Spurious Emission - Radiated (802.11b, Ch6, 3 GHz-18 GHz)

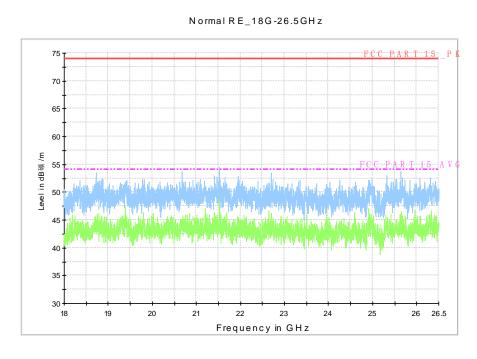


Fig.A.6.2.8 Transmitter Spurious Emission - Radiated (802.11b, Ch6, 18GHz - 26.5GHz)



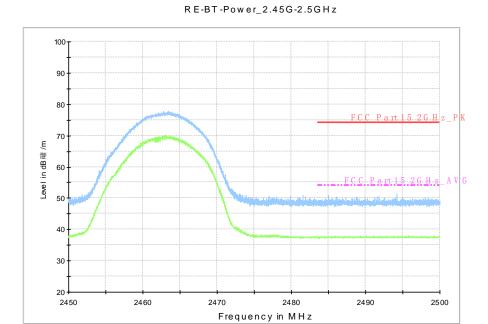


Fig.A.6.2.9 Transmitter Spurious Emission - Radiated (Power): 802.11b, ch11, 2.45 GHz - 2.50GHz

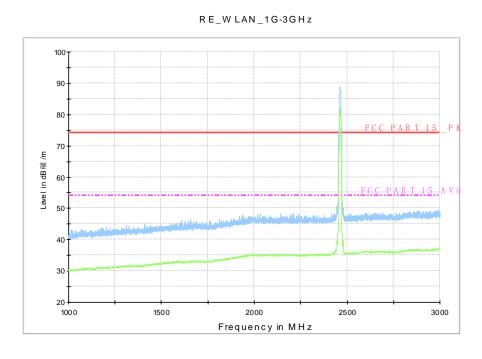


Fig.A.6.2.10 Transmitter Spurious Emission - Radiated (802.11b, Ch11, 1 GHz-3 GHz)



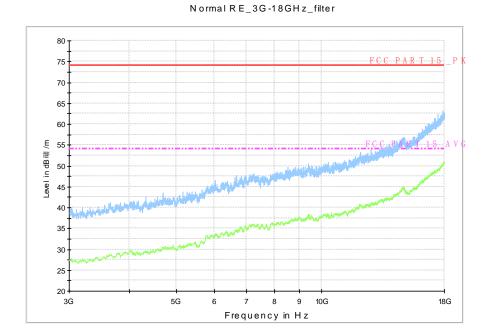


Fig.A.6.2.11 Transmitter Spurious Emission - Radiated (802.11b, Ch11, 3 GHz-18 GHz)

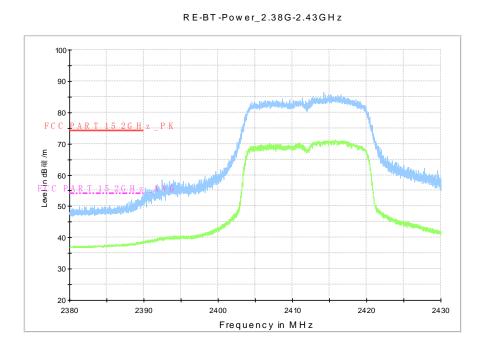


Fig.A.6.2.12 Transmitter Spurious Emission - Radiated (Power): 802.11g, ch1, 2.38 GHz - 2.45GHz



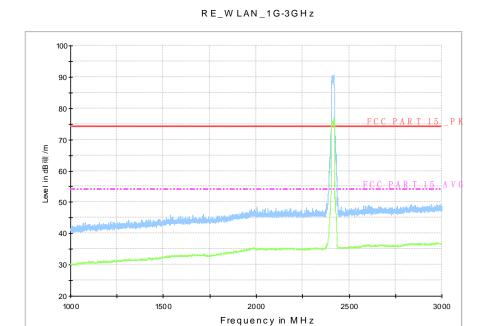


Fig.A.6.2.13 Transmitter Spurious Emission - Radiated (802.11g, Ch1, 1 GHz-3 GHz)

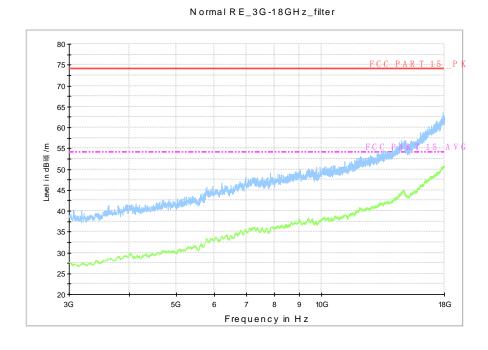


Fig.A.6.2.14 Transmitter Spurious Emission - Radiated (802.11g, Ch1, 3 GHz-18 GHz)



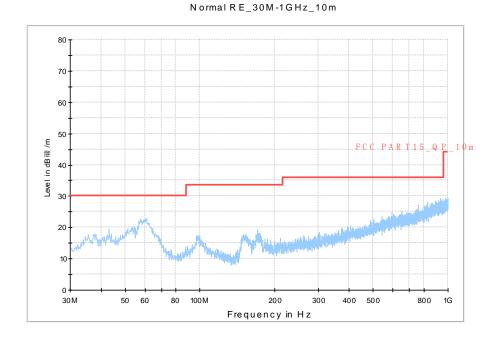


Fig.A.6.2.15 Transmitter Spurious Emission - Radiated (802.11g, Ch6, 30 MHz-1 GHz)

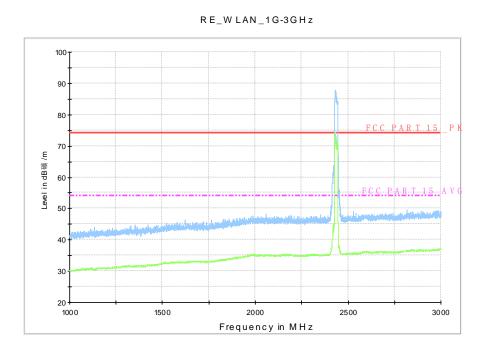


Fig.A.6.2.16 Transmitter Spurious Emission - Radiated (802.11g, Ch6, 1 GHz-3 GHz)



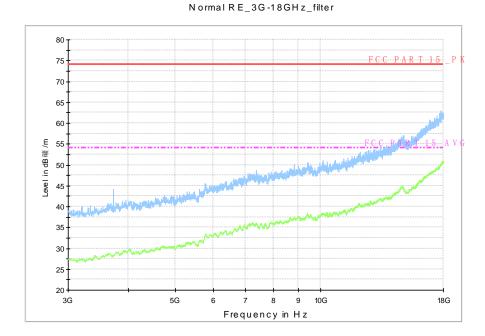


Fig.A.6.2.17 Transmitter Spurious Emission - Radiated (802.11g, Ch6, 3 GHz-18 GHz)

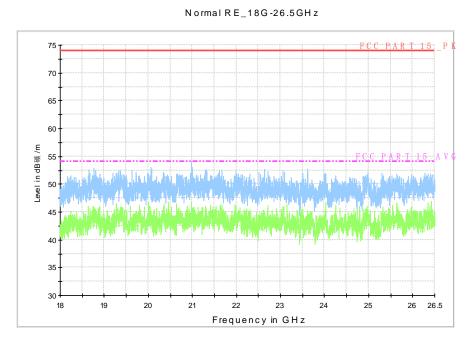


Fig.A.6.2.18 Transmitter Spurious Emission - Radiated (802.11g, Ch6, 18GHz – 26.5GHz)



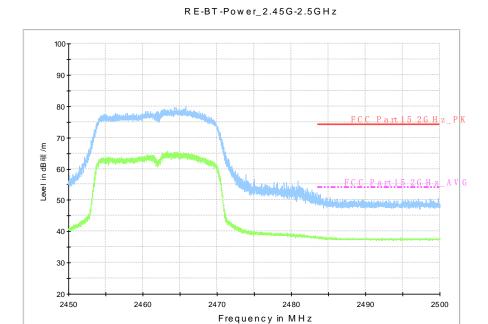


Fig.A.6.2.19 Transmitter Spurious Emission - Radiated (Power): 802.11g, ch11, 2.45 GHz - 2.50GHz

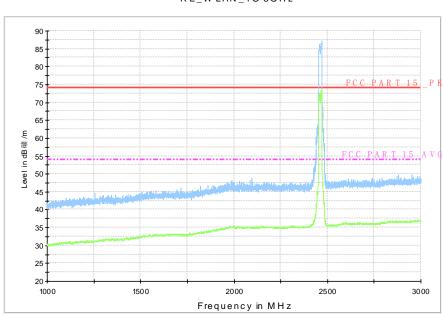


Fig.A.6.2.20 Transmitter Spurious Emission - Radiated (802.11g, Ch11, 1 GHz-3 GHz)



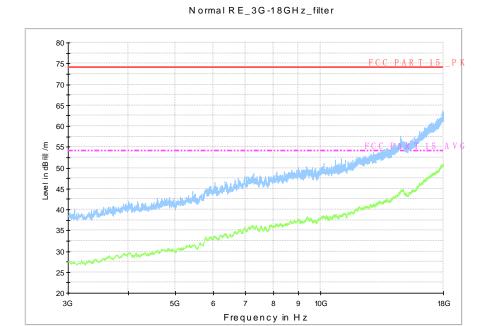


Fig.A.6.2.21 Transmitter Spurious Emission - Radiated (802.11g, Ch11, 3 GHz-18 GHz)

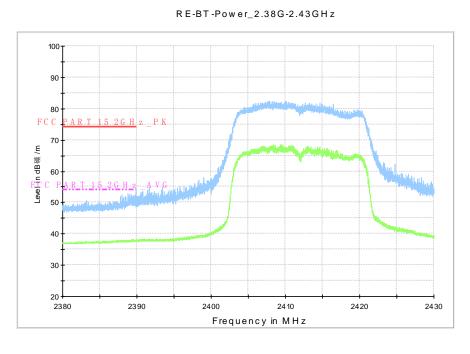


Fig.A.6.2.22 Transmitter Spurious Emission - Radiated (Power): 802.11n-HT20, ch1, 2.38 GHz - 2.45GHz



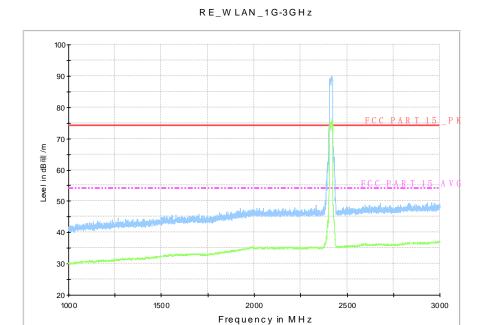


Fig.A.6.2.23 Transmitter Spurious Emission - Radiated (802.11n-HT20, Ch1, 1 GHz-3 GHz)

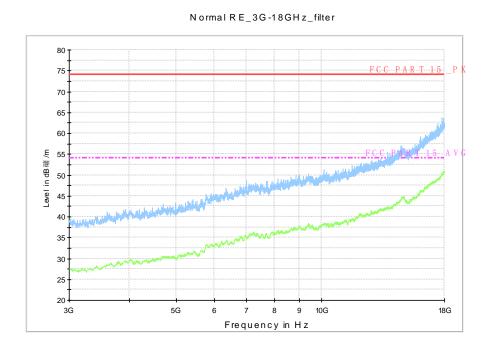


Fig.A.6.2.24 Transmitter Spurious Emission - Radiated (802.11n-HT20, Ch1, 3 GHz-18 GHz)



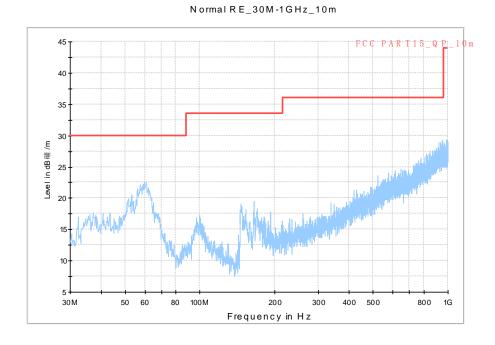


Fig.A.6.2.25 Transmitter Spurious Emission - Radiated (802.11n-HT20, Ch6, 30 MHz-1 GHz)

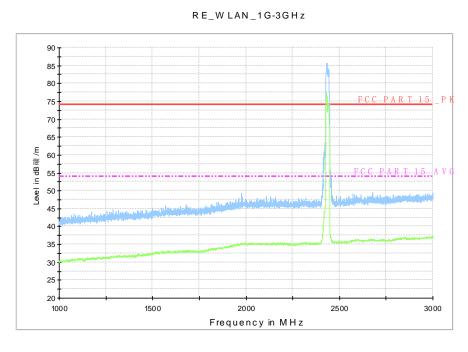


Fig.A.6.2.26 Transmitter Spurious Emission - Radiated (802.11n-HT20, Ch6, 1 GHz-3 GHz)



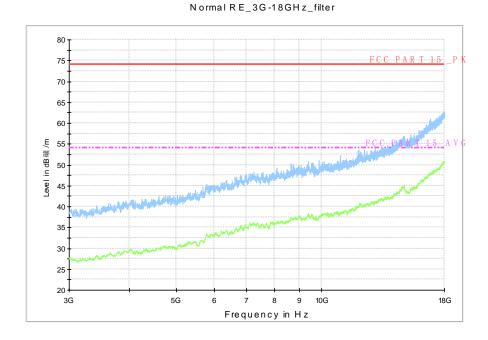


Fig.A.6.2.27 Transmitter Spurious Emission - Radiated (802.11n-HT20, Ch6, 3 GHz-18 GHz)

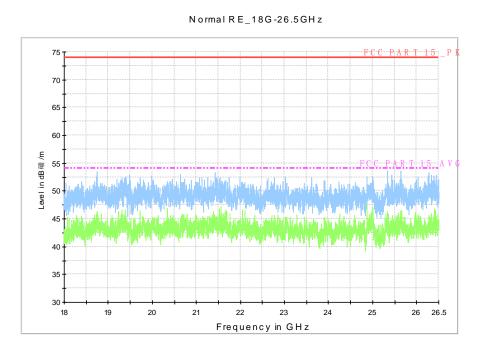


Fig.A.6.2.28 Transmitter Spurious Emission - Radiated (802.11n-HT20, Ch6, 18GHz – 26.5GHz)



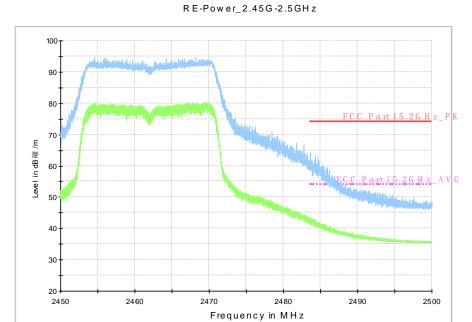
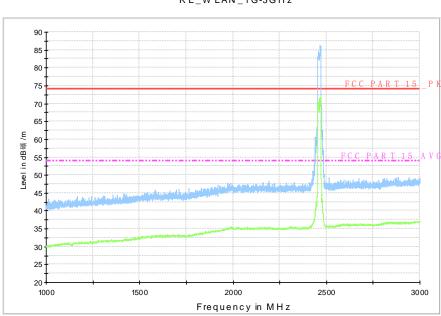


Fig.A.6.2.29 Transmitter Spurious Emission - Radiated (Power): 802.11n-HT20, ch11,



RE_WLAN_1G-3GHz

2.45 GHz - 2.50GHz

Fig.A.6.2.30 Transmitter Spurious Emission - Radiated (802.11n-HT20, Ch11, 1 GHz-3 GHz)



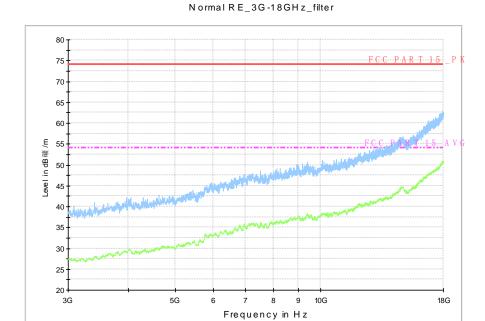


Fig.A.6.2.31 Transmitter Spurious Emission - Radiated (802.11n-HT20, Ch11, 3 GHz-18 GHz)



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.
- 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.
- 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.
- 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) With charger		Conclusion	
(111112)	Ziiiit (αΒμν)	802.11b	ldle		
0.15 to 0.5	66 to 56				
0.5 to 5	56	Fig.A.7.1	Fig.A.7.2	Р	
5 to 30	60				

NOTE: The limit decreases linearly with the logarithm of the frequency in the range $0.15\,\mathrm{MHz}$ to $0.5\,\mathrm{MHz}$.

WLAN (Average Limit)

Frequency range	Average Limit	Result With c	Conclusion	
(MHz)	(dBμV)	802.11b	ldle	
0.15 to 0.5	56 to 46			
0.5 to 5	46	Fig.A.7.1	Fig.A.7.2	Р
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:

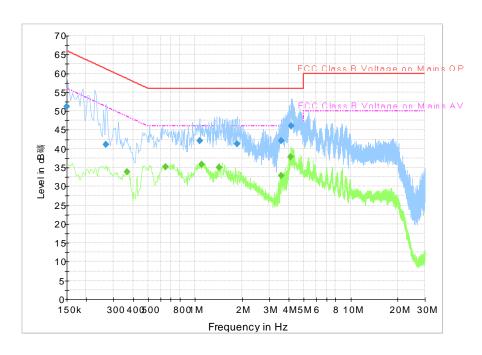


Fig.A.7.1 AC Powerline Conducted Emission-802.11b

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



Final Result 1

Frequency	QuasiPea	Meas.	Bandwidth	Filter	Line	Corr.	Margin	Limit
(MHz)	k	Time	(kHz)			(dB)	(dB)	(dBµV
	(dBµV)	(ms))
0.150000	51.2	2000.	9.000	On	N	20.2	14.8	66.0
0.267000	41.1	2000.	9.000	On	N	19.8	20.1	61.2
1.072500	42.2	2000.	9.000	On	N	19.7	13.8	56.0
1.864500	41.2	2000.	9.000	On	L1	19.7	14.8	56.0
3.597000	42.1	2000.	9.000	On	L1	19.5	13.9	56.0
4.137000	46.1	2000.	9.000	On	L1	19.6	9.9	56.0

Final Result 2

Frequency	CAverage	Meas.	Bandwidth	Filter	Line	Corr.	Margin	Limit
(MHz)	(dBµV)	Time	(kHz)			(dB)	(dB)	(dBµV
		(ms))
0.366000	33.9	2000.	9.000	On	N	19.8	14.7	48.6
0.649500	35.2	2000.	9.000	On	N	19.8	10.8	46.0
1.104000	35.8	2000.	9.000	On	N	19.7	10.2	46.0
1.432500	35.0	2000.	9.000	On	N	19.7	11.0	46.0
3.574500	32.9	2000.	9.000	On	L1	19.5	13.1	46.0
4.105500	37.8	2000.	9.000	On	L1	19.6	8.2	46.0

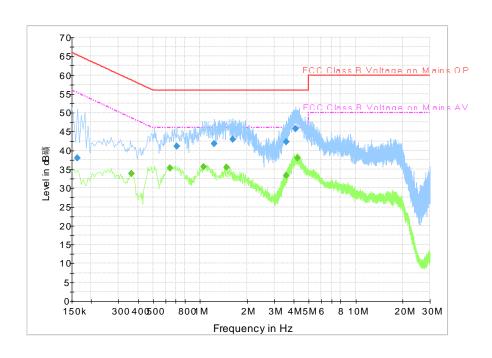


Fig.A.7.2 AC Powerline Conducted Emission-Idle

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

Final Result 1