



8.6 RADIATED SPURIOUS EMISSION

8.6.1 Applicable Standard

According to FCC Part 15.247(d),15.205, 15.209 and KDB 558074 D01 15.247 Meas Guidancev05r02 According to IC RSS-Gen and RSS-247

8.6.2 Conformance Limit

According to FCC Part 15.247(d): 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)).

According to FCC Part15.205, Rest	tricted bands
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MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
10.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	(2)
13.36-13.41			

According to FCC Part 15.205 the level of any transmitter spurious emission in Restricted bands shall not exceed the level of the emission specified in the following table

Restricted	Field Strength (µV/m)	Field Strength	Measurement
Frequency(MHz)		(dBµV/m)	Distance
0.009-0.490	2400/F(KHz)	20 log (uV/m)	300
0.490-1.705	24000/F(KHz)	20 log (uV/m)	30
1.705-30	30	29.5	30
30-88	100	40	3
88-216	150	43.5	3
216-960	216-960 200		3
Above 960	500	54	3

8.6.3 Test Configuration

Test according to clause 6.2 radio frequency test setup

8.6.4 Test Procedure

This test is required for any spurious emission that falls in a Restricted Band, as defined in Section 15.205. It must be performed with the highest gain of each type of antenna proposed for use with the EUT. Use the following spectrum analyzer settings:

For Above 1GHz:

The EUT was placed on a turn table which is 1.5m above ground plane.

Maximum procedure was performed on the highest emissions to ensure EUT compliance.

Span = wide enough to fully capture the emission being measured

RBW = 1 MHz

 $VBW \ge RBW$

Sweep = auto

Detector function = peak

Trace = max hold



For Below 1GHz:

The EUT was placed on a turn table which is 0.8m above ground plane.

Maximum procedure was performed on the highest emissions to ensure EUT compliance.

Span = wide enough to fully capture the emission being measured

RBW = 100 kHz for

 $VBW \ge RBW$

Sweep = auto

Detector function = peak

Trace = max hold

For Below 30MHz:

The EUT was placed on a turn table which is 0.8m above ground plane.

Maximum procedure was performed on the highest emissions to ensure EUT compliance.

Span = wide enough to fully capture the emission being measured

RBW = 9kHz

 $VBW \ge RBW$

Sweep = auto

Detector function = peak

Trace = max hold

For Below 150KHz:

The EUT was placed on a turn table which is 0.8m above ground plane.

Maximum procedure was performed on the highest emissions to ensure EUT compliance.

Span = wide enough to fully capture the emission being measured

RBW = 200Hz

VBW ≥ RBW

Sweep = auto

Detector function = peak

Trace = max hold

Follow the guidelines in ANSI C63.10 with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the measurement antenna height and polarization, etc. A pre-amp and a high pass filter are required for this test, in order to provide the measuring system with sufficient sensitivity. Allow the trace to stabilize. The peak reading of the emission, after being corrected by the antenna factor, cable loss, pre-amp gain, etc., is the peak field strength, which must comply with the limit. Submit this data.

Now set the VBW to 10 Hz, while maintaining all of the other instrument settings. This peak level, once corrected, must comply with the limit. If the dwell time per channel of the hopping signal is less than 100 ms, then the reading obtained with the 10 Hz VBW may be further adjusted by a "duty cycle correction factor", derived from 20log(dwell time/100 ms), in an effort to demonstrate compliance with the limit. Submit this data.

Repeat above procedures until all frequency measured was complete.

8.6.5 Test Results

Temperature:	25° C
Relative Humidity:	60%
ATM Pressure:	1011 mbar

■ Spurious Emission below 30MHz(9KHz to 30MHz)

Freq.	Ant.Pol.	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Over(dB)	
(MHz)	H/V	PK	AV	PK	AV	PK	AV

Note: the amplitude of spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be reported.

Distance extrapolation factor =40log(Specific distance/ test distance)(dB);

Limit line=Specific limits(dBuV) + distance extrapolation factor



■ Spurious Emission Above 1GHz(1GHz to 25GHz)

All the antenna (Antenna 1&2)and modes (802.11b/g/n)have been tested and the worst (Antenna 1,802.11b) result recorded was report as below:

Test mode:	802.	11b	Freque	ency:	y: Channel 1: 2412MHz			
Freq. (MHz)	Ant.Pol.		Emission Level(dBuV/m)		Limit 3m(dBuV/m)		(dB)	
(IVII IZ)	H/V	PK	AV	PK	AV	PK	AV	
4822.5	V	49.11	45.88	74.00	54.00	24.89	8.12	
9856.87	V	61.89	41.41	74.00	54.00	12.11	12.59	
12588.7	V	63.02	44.97	74.00	54.00	10.98	9.03	
8017.5	Н	56.03	39.43	74.00	54.00	17.97	14.57	
9946.87	Н	61.48	42.80	74.00	54.00	12.52	11.20	
12631.8	Н	63.66	44.84	74.00	54.00	10.34	9.16	

Test mode:	802.11b	Frequency:	Channel 6: 2437MHz

Freq. (MHz)	Ant.Pol.	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Over(dB)	
	H/V	PK AV		PK	AV	PK	AV
4873.12	V	48.70	29.59	74.00	54.00	25.30	24.41
9954.37	V	62.68	42.75	74.00	54.00	11.32	11.25
12682.5	V	62.32	44.88	74.00	54.00	11.68	9.12
7830	Н	55.48	39.29	74.00	54.00	18.52	14.71
9894.37	Н	62.22	42.74	74.00	54.00	11.78	11.26
12549.3	Н	62.68	44.10	74.00	54.00	11.32	9.90

Test mode:	802.	11b	Freque	ency:	Channel		
Freq. (MHz)	Ant.Pol.		ssion BuV/m)	Limit 3m(dBuV/m)		Over(dB)	
(IVITZ)	H/V	PK	AV	PK	AV	PK	AV
5553.75	V	49.97	33.34	74.00	54.00	24.03	20.66
9991.87	V	62.09	42.81	74.00	54.00	11.91	11.19
12594.3	V	63.05	44.95	74.00	54.00	10.95	9.05
6960	Н	53.63	38.63	74.00	54.00	20.37	15.37
9909.37	Н	62.15	42.87	74.00	54.00	11.85	11.13
12545.6	Н	62.60	44.03	74.00	54.00	11.40	9.97

- (1) All Readings are Peak Value (VBW=3MHz) and Average Value (VBW=10Hz).
- (2) Emission Level= Reading Level+Correct Factor.
- (3) Correct Factor= Ant_F + Cab_L Preamp
- (4) The reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.



■ Spurious Emission in Restricted Band 2310-2390MHz and 2483.5-2500MHz All the antenna(Antenna 1&2) and modes(802.11b/g/n) have been tested and the worst(Antenna 1,802.11n(HT20)) result recorded was report as below:

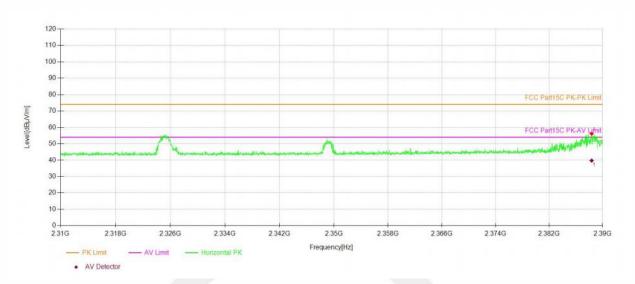
Test mode:	t mode: 802.11n(HT20) Frequency:		ency: (Channel 1: 2412MHz		
Frequency (MHz)	Polarity	PK(dBuV/m) (VBW=3MHz)	Limit 3m (dBuV/m)	AV(dBuV/m) (VBW=10Hz)	Limit 3m (dBuV/m)	
2388.37	Н	56.16	74.00	39.74	54.00	
2389.78	V	60.27	74.00	42.29	54.00	

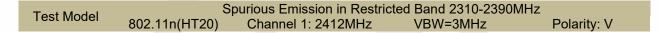
rest mode: 802.11n(H120) Frequency: Channel 11: 2462MHz							
Frequency (MHz)	Polarity	PK(dBuV/m) (VBW=3MHz)	Limit 3m (dBuV/m)	AV(dBuV/m) (VBW=10Hz)	Limit 3m (dBuV/m)		
2483.90	Н	58.47	74.00	40.39	54.00		
2483.51	V	59.51	74.00	38.65	54.00		

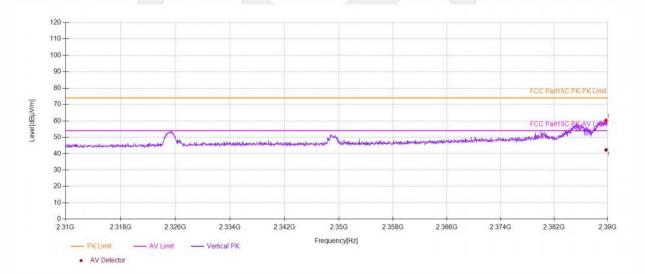
- (1) All Readings are Peak Value (VBW=3MHz) and Average Value (VBW=10Hz).
- (2) Emission Level= Reading Level+Correct Factor.
- (3) Correct Factor= Ant_F + Cab_L Preamp
- (4) The reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.



Test Model Spurious Emission in Restricted Band 2310-2390MHz
802.11n(HT20) Channel 1: 2412MHz VBW=3MHz Polarity: H

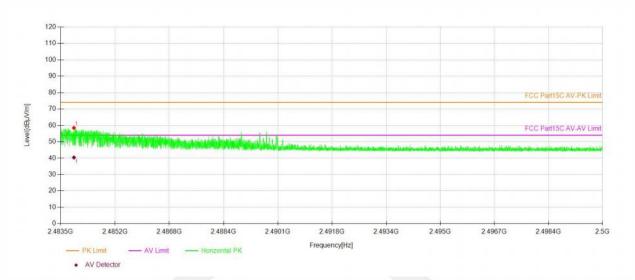




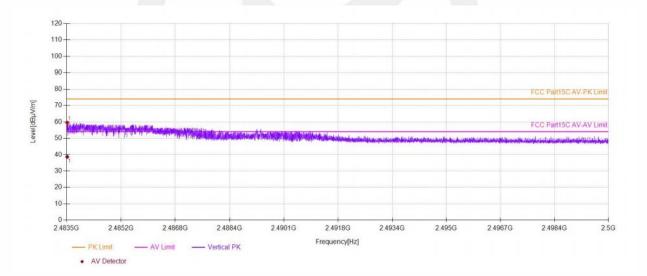




Test Model Spurious Emission in Restricted Band 2483.5-2500MHz 802.11n(HT20) Channel 11: 2462MHz VBW=3MHz Polarity: H



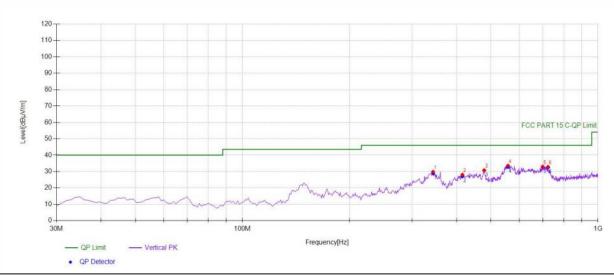
Test Model Spurious Emission in Restricted Band 2483.5-2500MHz
802.11n(HT20) Channel 11: 2462MHz VBW=3MHz Polarity: V





■ Spurious Emission below 1GHz (30MHz to 1GHz)
All the antenna(Antenna 1&2) and modes(802.11b/g/n) have been tested and the worst(Antenna 1,802.11b) result recorded was report as below:



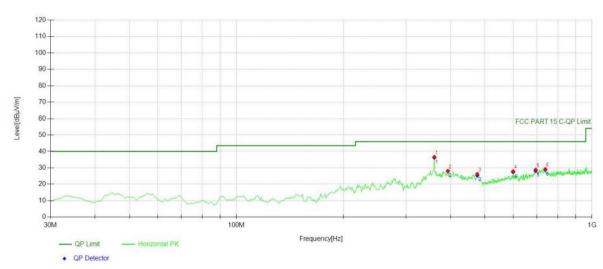


Suspe	Suspected Data List									
NO.	Freq. [MHz]	Reading [dBµV]	Factor [dB/m]	Level [dBµV/m]	Detector	Limit [dBµV/m]	Margin [dB]	Polarity		
1	343.623	42.23	-12.36	29.87	PK	46.00	16.13	Vertical		
2	415.475	39.84	-11.76	28.08	PK	46.00	17.92	Vertical		
3	478.588	40.97	-10.18	30.79	PK	46.00	15.21	Vertical		
4	558.208	42.37	-8.73	33.64	PK	46.00	12.36	Vertical		
5	698.999	39.25	-6.23	33.02	PK	46.00	12.98	Vertical		
6	723.273	39.00	-6.12	32.88	PK	46.00	13.12	Vertical		

Final Data List									
NO.	Freq. [MHz]	Factor [dB/m]	QP Value [dBμV/m]	QP Limit [dBµV/m]	QP Margin [dB]				
1	343.6236	-12.36	28.89	46.00	17.11				
2	415.4755	-11.76	27.10	46.00	18.90				
3	478.5886	-10.18	30.65	46.00	15.35				
4	558.2082	-8.73	32.86	46.00	13.14				
5	698.999	-6.23	32.60	46.00	13.40				
6	723.2733	-6.12	32.46	46.00	13.54				



Mode:	11B 2412
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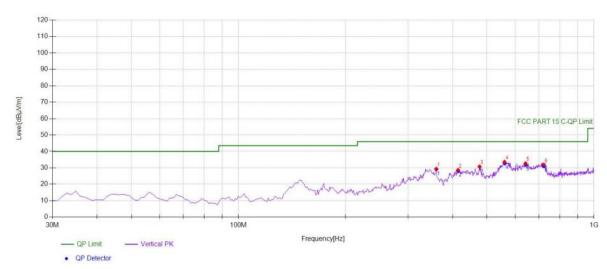


Suspected Data List									
NO.	Freq. [MHz]	Reading [dBµV]	Factor [dB/m]	Level [dBµV/m]	Detector	Limit [dBµV/m]	Margin [dB]	Polarity	
1	360.130	49.01	-12.34	36.67	PK	46.00	9.33	Horizontal	
2	393.143	39.63	-11.45	28.18	PK	46.00	17.82	Horizontal	
3	475.675	36.49	-10.20	26.29	PK	46.00	19.71	Horizontal	
4	599.96	34.40	-6.42	27.98	PK	46.00	18.02	Horizontal	
5	694.144	35.30	-6.41	28.89	PK	46.00	17.11	Horizontal	
6	738.808	35.02	-5.78	29.24	PK	46.00	16.76	Horizontal	

Final Data List									
NO.	Freq. [MHz]	Factor [dB/m]	QP Value [dΒμV/m]	QP Limit [dBµV/m]	QP Margin [dB]				
1	360.1301	-12.34	36.20	46.00	9.80				
2	393.1431	-11.45	27.91	46.00	18.09				
3	475.6757	-10.20	25.38	46.00	20.62				
4	599.96	-6.42	27.43	46.00	18.57				
5	694.1441	-6.41	28.17	46.00	17.83				
6	738.8088	-5.78	28.88	46.00	17.12				



Mode:	11B 2437
Wode.	110 2401

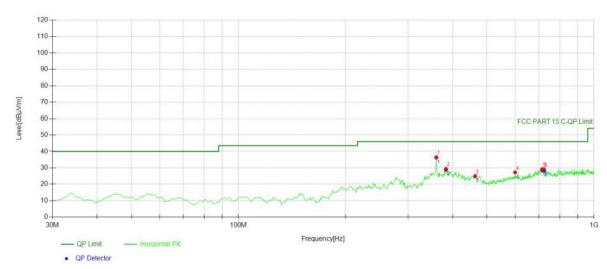


Suspe	Suspected Data List									
NO.	Freq. [MHz]	Reading [dBµV]	Factor [dB/m]	Level [dBµV/m]	Detector	Limit [dBµV/m]	Margin [dB]	Polarity		
1	360.130	41.80	-12.34	29.46	PK	46.00	16.54	Vertical		
2	414.504	40.45	-11.75	28.70	PK	46.00	17.30	Vertical		
3	476.646	41.04	-10.19	30.85	PK	46.00	15.15	Vertical		
4	560.150	42.32	-8.65	33.67	PK	46.00	12.33	Vertical		
5	641.711	40.19	-7.41	32.78	PK	46.00	13.22	Vertical		
6	722.302	38.14	-6.14	32.00	PK	46.00	14.00	Vertical		

Final Data List									
NO.	Freq. [MHz]	Factor [dB/m]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]				
1	360.1301	-12.34	29.08	46.00	16.92				
2	414.5045	-11.75	28.15	46.00	17.85				
3	476.6466	-10.19	30.66	46.00	15.34				
4	560.1502	-8.65	32.84	46.00	13.16				
5	641.7117	-7.41	31.95	46.00	14.05				
6	722.3023	-6.14	31.01	46.00	14.99				



Mode.	11B 2437
Wode.	110 2701

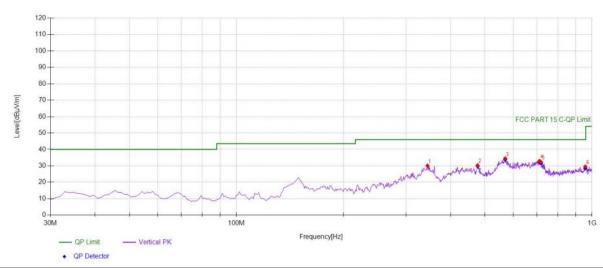


Suspected Data List									
NO.	Freq. [MHz]	Reading [dBµV]	Factor [dB/m]	Level [dBµV/m]	Detector	Limit [dBµV/m]	Margin [dB]	Polarity	
1	360.130	48.92	-12.34	36.58	PK	46.00	9.42	Horizontal	
2	383.433	41.14	-11.62	29.52	PK	46.00	16.48	Horizontal	
3	463.053	35.43	-10.35	25.08	PK	46.00	20.92	Horizontal	
4	599.96	33.68	-6.42	27.26	PK	46.00	18.74	Horizontal	
5	714.534	35.38	-6.14	29.24	PK	46.00	16.76	Horizontal	
6	723.273	35.33	-6.12	29.21	PK	46.00	16.79	Horizontal	

Final Data List									
NO.	Freq. [MHz]	Factor [dB/m]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]				
1	360.1301	-12.34	36.17	46.00	9.83				
2	383.4334	-11.62	28.95	46.00	17.05				
3	463.0531	-10.35	24.87	46.00	21.13				
4	599.96	-6.42	27.24	46.00	18.76				
5	714.5345	-6.14	28.58	46.00	17.42				
6	723.2733	-6.12	28.39	46.00	17.61				



Mode: 11B 2462

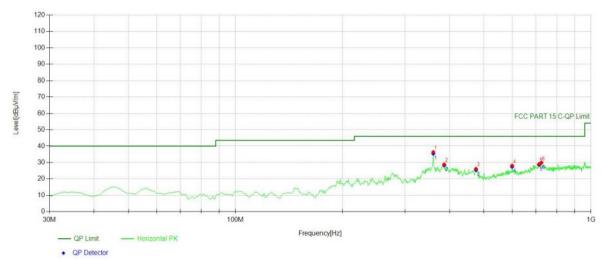


Suspe	Suspected Data List									
NO.	Freq. [MHz]	Reading [dBµV]	Factor [dB/m]	Level [dBµV/m]	Detector	Limit [dBµV/m]	Margin [dB]	Polarity		
1	344.594	42.42	-12.36	30.06	PK	46.00	15.94	Vertical		
2	476.646	40.48	-10.19	30.29	PK	46.00	15.71	Vertical		
3	569.859	42.54	-8.00	34.54	PK	46.00	11.46	Vertical		
4	711.621	39.18	-6.12	33.06	PK	46.00	12.94	Vertical		
5	718.418	38.49	-6.18	32.31	PK	46.00	13.69	Vertical		
6	957.277	32.12	-2.59	29.53	PK	46.00	16.47	Vertical		

Final Data List					
NO.	Freq. [MHz]	Factor [dB/m]	QP Value [dΒμV/m]	QP Limit [dBµV/m]	QP Margin [dB]
1	344.5946	-12.36	30.05	46.00	15.95
2	476.6466	-10.19	29.83	46.00	16.17
3	569.8599	-8.00	33.80	46.00	12.20
4	711.6216	-6.12	32.16	46.00	13.84
5	718.4184	-6.18	31.60	46.00	14.40
6	957.2773	-2.59	28.54	46.00	17.46



Mode: 11B 2462



Suspe	cted Data	List						
NO.	Freq. [MHz]	Reading [dBµV]	Factor [dB/m]	Level [dBµV/m]	Detector	Limit [dBµV/m]	Margin [dB]	Polarity
1	360.130	48.74	-12.34	36.40	PK	46.00	9.60	Horizontal
2	386.346	40.49	-11.57	28.92	PK	46.00	17.08	Horizontal
3	474.704	36.41	-10.21	26.20	PK	46.00	19.80	Horizontal
4	599.96	34.59	-6.42	28.17	PK	46.00	17.83	Horizontal
5	713.563	35.13	-6.14	28.99	PK	46.00	17.01	Horizontal
6	725.215	36.01	-6.06	29.95	PK	46.00	16.05	Horizontal

Final Data List					
NO.	Freq. [MHz]	Factor [dB/m]	QP Value [dΒμV/m]	QP Limit [dBµV/m]	QP Margin [dB]
1	360.1301	-12.34	35.44	46.00	10.56
2	386.3463	-11.57	28.31	46.00	17.69
3	474.7047	-10.21	25.43	46.00	20.57
4	599.96	-6.42	27.40	46.00	18.60
5	713.5636	-6.14	28.58	46.00	17.42
6	725.2152	-6.06	29.90	46.00	16.10



8.7 CONDUCTED EMISSION TEST

8.7.1 Applicable Standard

According to FCC Part 15.207(a) According to IC RSS-Gen 8.8

8.7.2 Conformance Limit

Conducted Emission Limit

Frequency(MHz)	Quasi-peak	Average
0.15-0.5	66-56	56-46
0.5-5.0	56	46
5.0-30.0	60	50

Note: 1. The lower limit shall apply at the transition frequencies

2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

8.7.3 Test Configuration

Test according to clause 6.3conducted emission test setup

8.7.4 Test Procedure

The EUT was placed on a table which is 0.8m above ground plane.

Maximum procedure was performed on the highest emissions to ensure EUT compliance.

Repeat above procedures until all frequency measured were complete.

8.7.5 Test Results

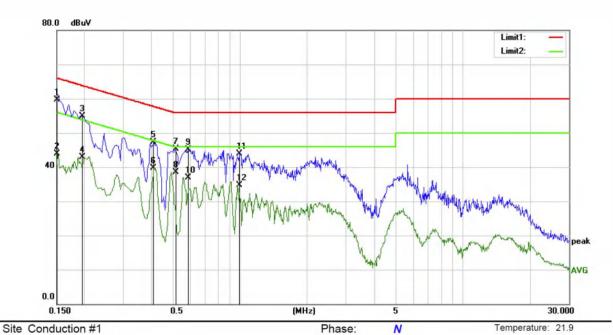
Pass

The AC120V &240V voltage have been tested, and the worst result recorded was report as below:



Humidity:

58 %



Power: AC 120V/60Hz

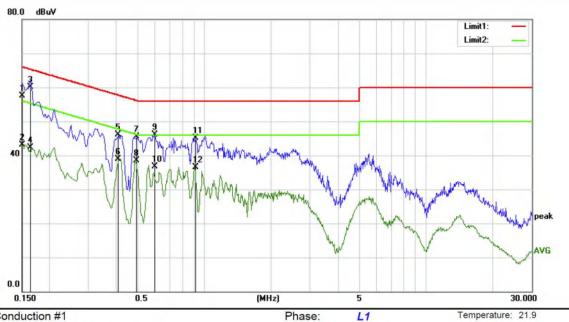
Limit: (CE)FCC PART 15 class B_QP

Mode: WIFI mode

No. M	k.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1 *		0.1500	50.17	9.53	59.70	66.00	-6.30	QP	
2		0.1500	34.40	9.53	43.93	56.00	-12.07	AVG	
3		0.1955	45.45	9.53	54.98	63.80	-8.82	QP	
4		0.1955	33.38	9.53	42.91	53.80	-10.89	AVG	
5		0.4100	37.84	9.54	47.38	57.65	-10.27	QP	
6		0.4100	30.14	9.54	39.68	47.65	-7.97	AVG	
7		0.5150	35.75	9.53	45.28	56.00	-10.72	QP	
8		0.5150	29.07	9.53	38.60	46.00	-7.40	AVG	
9		0.5850	35.59	9.53	45.12	56.00	-10.88	QP	
10	,	0.5850	27.46	9.53	36.99	46.00	-9.01	AVG	
11		0.9950	34.38	9.55	43.93	56.00	-12.07	QP	
12		0.9950	25.13	9.55	34.68	46.00	-11.32	AVG	



Humidity:



Power: AC 120V/60Hz

Site Conduction #1

Limit: (CE)FCC PART 15 class B_QP

Mode: WIFI mode

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1500	48.07	9.53	57.60	66.00	-8.40	QP	
2		0.1500	33.59	9.53	43.12	56.00	-12.88	AVG	
3	*	0.1650	50.57	9.53	60.10	65.21	-5.11	QP	
4		0.1650	32.85	9.53	42.38	55.21	-12.83	AVG	
5		0.4100	36.58	9.54	46.12	57.65	-11.53	QP	
6		0.4100	29.42	9.54	38.96	47.65	-8.69	AVG	
7		0.4950	35.94	9.53	45.47	56.08	-10.61	QP	
8		0.4950	28.98	9.53	38.51	46.08	-7.57	AVG	
9		0.6000	36.53	9.54	46.07	56.00	-9.93	QP	
10		0.6000	27.15	9.54	36.69	46.00	-9.31	AVG	
11		0.9150	35.62	9.55	45.17	56.00	-10.83	QP	
12		0.9150	27.04	9.55	36.59	46.00	-9.41	AVG	



8.8 ANTENNA APPLICATION

8.8.1 Antenna Requirement

Standard Requirement An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be FCC CRF Part15.203 considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. If transmitting antennas of directional gain greater than 6dBi are used, FCC 47 CFR Part 15.247 the power shall be reduced by the amount in dB that the directional gain (b) of the antenna exceeds 6dBi. The applicant for equipment certification shall provide a list of all antenna types that may be used with the transmitter, where applicable (i.e. for transmitters with detachable antenna), indicating the maximum permissible antenna gain (in dBi) and the required impedance for each RSS-Gen Section 6.8 antenna. The test report shall demonstrate the compliance of the transmitter with the limit for maximum equivalent isotropically radiated power (e.i.r.p.) specified in the applicable RSS, when the transmitter is equipped with any antenna type, selected from this list. If the transmitter employs an antenna system that emits multiple directional beams, but does not emit multiple directional beams simultaneously, the total output power conducted to the array or arrays that comprise the device (i.e. the sum of the power supplied to all antennas, antenna elements, staves, etc., and summed across all carriers or frequency channels) shall not exceed the applicable output RSS-247 Section 5.4 power limit. However, the total conducted output power shall be reduced by 1 dB below the specified limits for each 3 dB that the directional gain of the antenna/antenna array exceeds 6 dBi. The directional antenna gain shall be computed as the sum of 10 log (number of array elements or staves) plus the directional gain of the element or stave having the highest gain. 8.8.2 Result PASS. Note: \checkmark Antenna use a permanently attached antenna which is not replaceable. Not using a standard antenna jack or electrical connector for antenna replacement The antenna has to be professionally installed (please provide method of installation)

*** End of Report ***

Please refer to the attached documentInternal Photos to show the antenna connector.



9 APPENDIX PHOTOGRAPHS OF EUT

Please refer to the file of External Photo and Internal Photo.





10 APPENDIX PHOTOGRAPHS OF TEST SETUP

Please refer to the file of Test Setup Photo.

