TEST REPORT

Application No.:	BTEK241111036A01-T05
Applicant:	MAXNERVA TECHNOLOGY SERVICES LTD
Address of Applicant:	Room 1001,10/F Houston Centre, 63 Mody Road, Tsim Sha Tsui East, Kowloon,Hong Kong SAR,China
Manufacturer:	MAXNERVA TECHNOLOGY SERVICES LTD
Address of Manufacturer:	Room 1001,10/F Houston Centre, 63 Mody Road, Tsim Sha Tsui East, Kowloon,Hong Kong SAR,China
Equipment Under Test (EUT):	
EUT Name:	MULTIMEDIA PROJECTOR
Test Model.:	P138
Adding Model(s):	IN3028SL, IN3038SL
Trade Mark:	InFocus
FCC ID:	2BDYA-P138
Standard(s) :	47 CFR Part 15, Subpart C 15.247 KDB558074 D01 15.247 Meas Guidance v05r02 ANSI C63.10:2013
Date of Receipt Sample(s):	2024-11-13
Date of Test:	2024-11-14 to 2024-12-17
Date of Issue:	2024-12-18
Test Result:	**Pass***

* In the configuration tested, the EUT complied with the standards specified above.

Lion Cai/ Approved & Authorized
EMC Laboratory Manager

ShenZhen BANTEK Testing Co.,Ltd.
Add：A5&A6, Building B1&B2, No.45 Gangtou Road, Bogang Community, Shajing Street
Bao'an District, Shenzhen, Guangdong, China 518104
Tel：+(86)755-2334 4200 E-mail：Service@btek-lab.com Web：www.btek-lab.com

Revision Record			
Version	**Issue Date**	**Revisions**	**Remarks**
V0	2024-12-18	Initial	Valid

Authorized for issue by:				
		 **Karl Liu / File Editor**		
		 **June Li/Reviewer**		

Remarks:

The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

2 Test Summary

Radio Spectrum Technical Requirement				
Standard	**Item**	**Method**	**Requirement**	**Result**
47 CFR Part 15, Subpart C 15.247	Antenna Requirement	N/A	47 CFR Part 15, Subpart C 15.203 & 15.247(b)(4)	Pass

Radio Spectrum Matter Part				
Standard	**Item**	**Method**	**Requirement**	**Result**
47 CFR Part 15, Subpart C 15.247	Conducted Emissions at AC Power Line (150kHz-30MHz)	ANSI C63.10 (2013) Section 6.2	47 CFR Part 15, Subpart C 15.207	Pass
	Conducted Peak Output Power	ANSI C63.10 (2013) Section 11.9.1.3	47 CFR Part 15, Subpart C 15.247(b)(3)	Pass
	Minimum 6dB Bandwidth	ANSI C63.10 (2013) Section 11.8.1	47 CFR Part 15, Subpart C 15.247a(2)	Pass
	Power Spectrum Density	ANSI C63.10 (2013) Section 11.10.2	47 CFR Part 15, Subpart C 15.247(e)	Pass
	Conducted Band Edges Measurement	ANSI C63.10 (2013) Section 11.13.3.2	47 CFR Part 15, Subpart C 15.247(d)	Pass
	Conducted Spurious Emissions	ANSI C63.10 (2013) Section 11.11	47 CFR Part 15, Subpart C 15.247(d)	Pass
	Radiated Emissions which fall in the restricted bands	ANSI C63.10 (2013) Section 6.10.5	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass
	Radiated Spurious Emissions	ANSI C63.10 (2013) Section 6.4,6.5,6.6	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass

Note:

E.U.T./EUT means Equipment Under Test.

Pass means the test result passed the test standard requirement, please find the detailed decision rule in the report relative section.

3 Contents

4 General Information

4.1 Details of E.U.T.

Power supply:	WITCHING ADAPTER Model:MSS-Z6320WR190-120C0-E Input:AC100-240V~ 50/60Hz 2.0A max. Output:120.0W.19.0V 6.32A	
Support Standards:	802.11b, 802.11g, 802.11n-HT20, 802.11n-HT40	
Frequency Range:	2412-2462MHz for 802.11b/g/n(HT20) 2422-2452MHz for 802.11n(HT40)	
Type of Modulation:	802.11b: DSSS; 802.11g/n: OFDM	
Quantity of Channels	11 for 802.11b/g/n(HT20) 7 for 802.11n(HT40)	
Channel Separation:	5MHz	
Type of Antenna:	Modules 1 7663:FPC Antenna Modules 2 GTV:PCB Antenna	
Antenna Gain:	Modules 1 7663:	ANT1:2.75dBi ANT2:2.75dBi
	Modules 2 GTV:	ANT1:2.75dBi ANT2:2.75dBi
Sample No.:	BTEK241111036A01-T05	
Model(s) Difference Statement	☐Singel Model.	
	☒Multi-Models: Model No.: P138, IN3028SL,IN3038SL Only the model DISPLAY FOR P138 was tested. According to the declaration from the applicant, the electrical circuit design, layout, components used, internal wiring and functions of other models are identical for the above models, with only difference on Model No	

4.2 EUT Test Mode and Test Condition

Test Mode	Description	Remark
1	802.11b	2412MHz, 2437MHz, 2462MHz
2	802.11g	2412MHz, 2437MHz, 2462MHz
3	802.11n-HT20	2412MHz, 2437MHz, 2462MHz
3	802.11n-HT40	2422MHz, 2437MHz, 2452MHz

Test Conditions	
Temperature:	22 °C
Relative Humidity:	53 %
ATM Pressure:	1010 mbar

4.3 Measurement Uncertainty

Test Item	Measurement Uncertainty
Conducted Emissions at AC Power Line (150kHz-30MHz)	±3.12dB
Conducted Peak Output Power	± 0.75dB
Minimum 6dB Bandwidth	± 3%
Power Spectrum Density	± 2.84dB
Conducted Band Edges Measurement	± 0.75dB
Conducted Spurious Emissions	± 0.75dB
Radiated Emissions which fall in the restricted bands	±5.08dB (1GHz-6GHz);±5.14dB(above 6GHz)

Radiated Spurious Emissions (Below 1GHz)	±5.06dB (3m); ±4.46dB (10m)
Radiated Spurious Emissions (Above 1GHz)	±5.08dB (1GHz-6GHz);±5.14dB(above 6GHz)

4.4 Test Location

All tests were performed at:

Shenzhen BANTEK Testing Co., Ltd.

A5&A6, Building B1&B2, No.45 Gangtou Road, Bogang Community, Shajing Street, Bao'an District, Shenzhen, Guangdong, China 518104

Tel: +86 0755-2334 4200 Fax: +86 0755-2334 4200

FCC Registration Number: 264293

Designation Number: CN1356

No tests were sub-contracted.

4.5 Deviation from Standards

None

4.6 Abnormalities from Standard Conditions

None

5 Equipment List

Conducted Test					
Description	**Manufacturer**	**Model**	**Serial No.**	**Cal. Date**	**Cal. Due**
Shielding Room	YIHENG ENECTRONIC	9*5*3.3	YH-BT-220304-04	2022-03-03	2025-03-02
EMI Test Receiver	Rohde&Schwarz	ESCI	101021	2024-06-11	2025-06-10
Measurement Software	Fara	EZ_EMC Ver. FA-03A2	N/A	N/A	N/A
LISN	Rohde&Schwarz	ENV216	101472	2024-06-11	2025-06-10
LISN	Schwarzbeck	NSLK 8128	05127	2024-06-11	2025-06-10

RF Conducted					
Equipment	**Manufacturer**	**Model No**	**Serial No**	**Cal Date**	**Cal Due Date**
Shielding Room	YIHENG ENECTRONIC	5.5*3.1*3	YH-BT-220304-03	2022-03-03	2025-03-02
EXA Signal Analyzer	KEYSIGHT	N9020A	MY54230486	2024-06-11	2025-06-10
DC Power Supply	E3632A	E3642A	KR75304416	2024-06-11	2025-06-10
Attenuator	RswTech	SMA-JK-6dB	N/A	2024-06-11	2025-06-10
Attenuator	RswTech	SMA-JK-3dB	N/A	2024-06-11	2025-06-10
RF Control Unit	Techy	TR1029-1	N/A	2024-06-11	2025-06-10
RF Sensor Unit	Techy	TR1029-2	N/A	2024-06-11	2025-06-10
WIDEBAND RADIO COMMUNICATION TESTER	R&S	CMW 500	141258	2024-06-11	2025-06-10
MXG Vector Signal Generator	Agilent	N5182A	US46240522	2024-06-11	2025-06-10
Programmable Temperature&Humidity Chamber	GRT	GR-HWX1000	GR22051001	2024-06-11	2025-06-10
Measurement Software	TACHOY	RF TestSoft	N/A	N/A	N/A

RSE					
Equipment	**Manufacturer**	**Model No**	**Serial No**	**Cal Date**	**Cal Due Date**
3m Semi-Anechoic Chamber	YIHENG ENECTRONIC	966	YH-BT-220304-01	2022-05-06	2025-05-05
EMI Test Receiver	Rohde&Schwarz	ESCI	100694	2024-06-11	2025-06-10
TRILOG Broadband Antenna	Schwarzbeck	VULB 9168	01324	2024-06-16	2025-06-15
Pre-Amplifier	Schwarzbeck	BBV 9745	#180	2024-06-11	2025-06-10
Measurement Software	Fara	EZ_EMC Ver. FA-03A2	N/A	2024-06-11	2025-06-10
EXA Signal Analyzer	Keysight	N9020A	MY54440290	2024-06-11	2025-06-10
Horn Antenna	Schwarzbeck	BBHA 9120D	02695	2024-06-15	2025-06-14
Pre-Amplifier	Tonscend	TAP0118045	AP20K806109	2024-06-11	2025-06-10
Horn Antenna	SCHWARZBECK	BBHA9170	1157	2024-06-15	2025-06-14
Low Noise Pre-amplifier	SKET	LNPA-1840G-50	SK2022032902	2024-06-11	2025-06-10
Signal analyzer	ROHDE&SCHWARZ	FSQ40	100010	2024-06-11	2025-06-10
Loop Antenna	ETS	6502	00201177	2024-06-15	2025-06-14

Cable	BTEK	LMR400UF-NMNM-7.00M	/	2024-06-15	2025-06-14
Cable	BTEK	LMR400UF-NMNM-2.50M	/	2024-06-15	2025-06-14
Cable	BTEK	LMR400UF-NMNM-3.00M	/	2024-06-15	2025-06-14
Cable	BTEK	SFT205PUR-MNSWSM-7.00M	/	2024-06-15	2025-06-14
Cable	BTEK	SFT205PUR-MNSWSM-2.50M	/	2024-06-15	2025-06-14
Cable	BTEK	SFT205PUR-MNSWSM-2.50M	/	2024-06-15	2025-06-14
Cable	BTEK	SFT205PUR-MNSWSM-0.30M	/	2024-06-15	2025-06-14

6 Radio Spectrum Technical Requirement

6.1 Antenna Requirement

6.1.1 Test Requirement:

47 CFR Part 15, Subpart C 15.203 & 15.247(b)(4)

6.1.2 Conclusion

This product has an Integral antenna, fulfill the requirement of this section.

7 Radio Spectrum Matter Test Results

7.1 Conducted Emissions at AC Power Line (150kHz-30MHz)

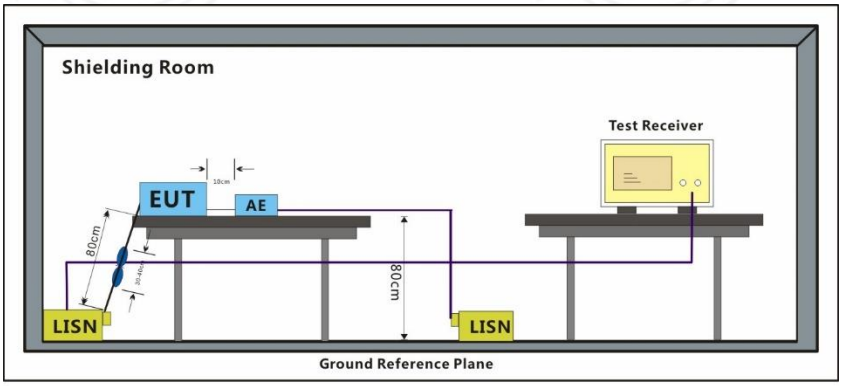
Test Requirement 47 CFR Part 15, Subpart C 15.207

Test Method: ANSI C63.10 (2013) Section 6.2

Limit:

Frequency of emission(MHz)	Conducted limit(dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50
*Decreases with the logarithm of the frequency.		
Detector: Peak for pre-scan (9kHz resolution bandwidth) 0.15M to 30MHz		

7.1.1 Test Setup Diagram



7.1.2 Measurement Procedure and Data

1) The mains terminal disturbance voltage test was conducted in a shielded room.

2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50ohm/50μH + 5ohm linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.

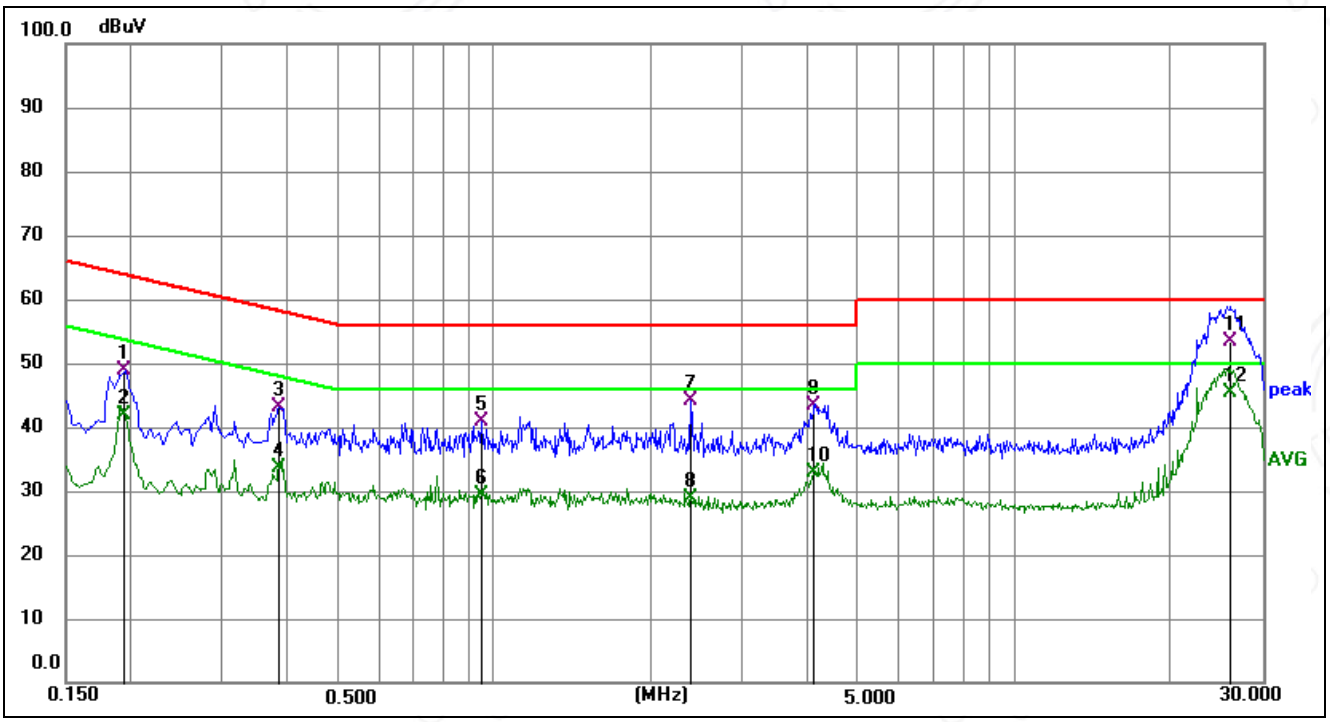
3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane.

4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.

5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.

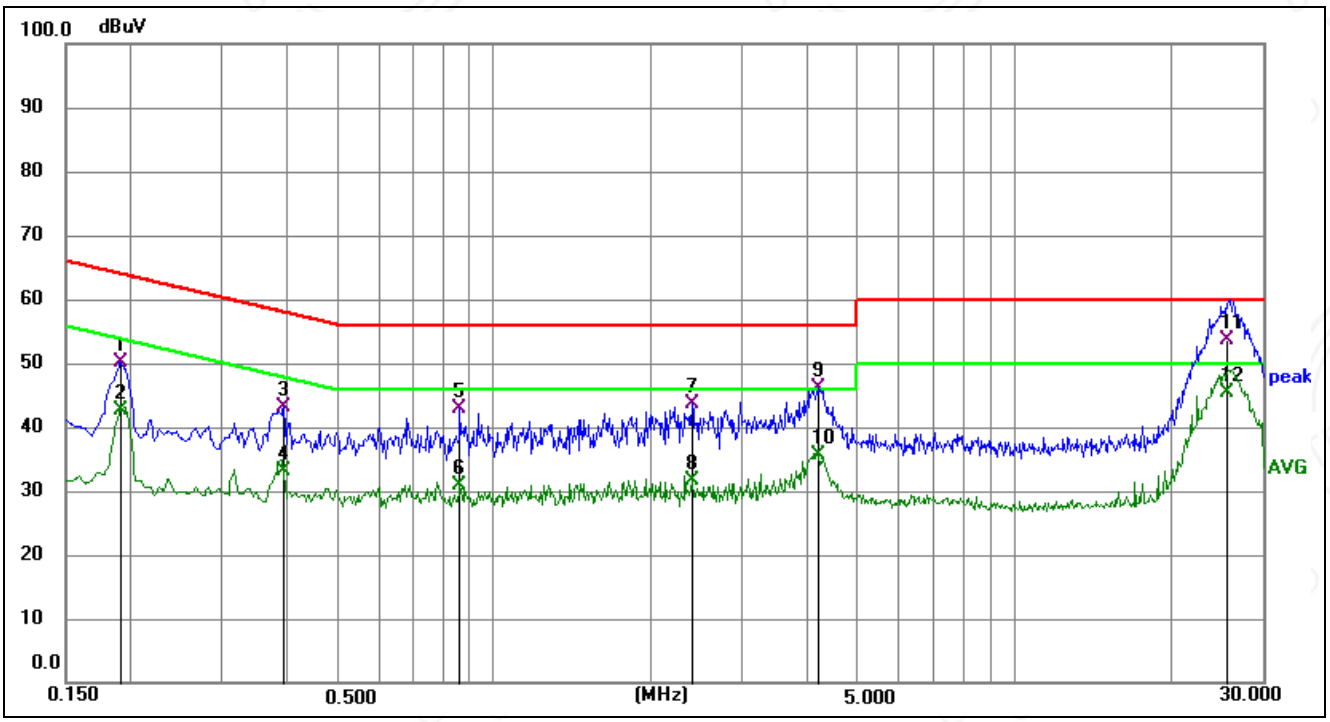
Remark: LISN=Read Level+ Cable Loss+ LISN Factor

Test Mode	Communication-TX	Polarity:	Neutral



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1949	28.88	19.93	48.81	63.83	-15.02	QP	P	
2	0.1949	22.03	19.93	41.96	53.83	-11.87	AVG	P	
3	0.3840	23.19	19.94	43.13	58.19	-15.06	QP	P	
4	0.3840	13.59	19.94	33.53	48.19	-14.66	AVG	P	
5	0.9465	20.82	20.09	40.91	56.00	-15.09	QP	P	
6	0.9465	9.28	20.09	29.37	46.00	-16.63	AVG	P	
7	2.3955	23.86	20.18	44.04	56.00	-11.96	QP	P	
8	2.3955	8.68	20.18	28.86	46.00	-17.14	AVG	P	
9	4.1369	23.25	20.25	43.50	56.00	-12.50	QP	P	
10	4.1369	12.55	20.25	32.80	46.00	-13.20	AVG	P	
11	26.0228	30.95	22.52	53.47	60.00	-6.53	QP	P	
12 *	26.0228	22.89	22.52	45.41	50.00	-4.59	AVG	P	

Test Mode	Communication-TX	Polarity:	Line



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1905	30.39	19.86	50.25	64.01	-13.76	QP	P	
2	0.1905	22.88	19.86	42.74	54.01	-11.27	AVG	P	
3	0.3930	23.18	19.88	43.06	58.00	-14.94	QP	P	
4	0.3930	13.27	19.88	33.15	48.00	-14.85	AVG	P	
5	0.8610	22.95	19.98	42.93	56.00	-13.07	QP	P	
6	0.8610	10.82	19.98	30.80	46.00	-15.20	AVG	P	
7	2.4000	23.46	20.19	43.65	56.00	-12.35	QP	P	
8	2.4000	11.33	20.19	31.52	46.00	-14.48	AVG	P	
9	4.2180	25.72	20.32	46.04	56.00	-9.96	QP	P	
10	4.2180	15.21	20.32	35.53	46.00	-10.47	AVG	P	
11	25.8091	30.90	22.61	53.51	60.00	-6.49	QP	P	
12 *	25.8091	22.87	22.61	45.48	50.00	-4.52	AVG	P	

7.2 Conducted Peak Output Power

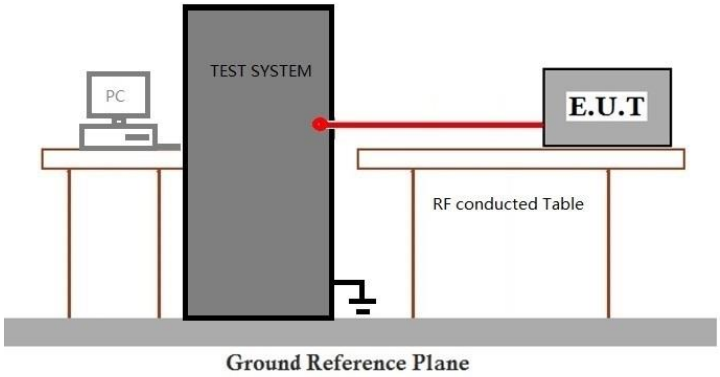
Test Requirement 47 CFR Part 15, Subpart C 15.247(b)(3)

Test Method: ANSI C63.10 (2013) Section 11.9.1.3

Limit:

Frequency range(MHz)	Output power of the intentional radiator(watt)
902-928	1 for ≥50 hopping channels
	0.25 for 25≤ hopping channels <50
	1 for digital modulation
2400-2483.5	1 for ≥75 non-overlapping hopping channels
	0.125 for all other frequency hopping systems
	1 for digital modulation
5725-5850	1 for frequency hopping systems and digital modulation

7.2.1 Test Setup Diagram



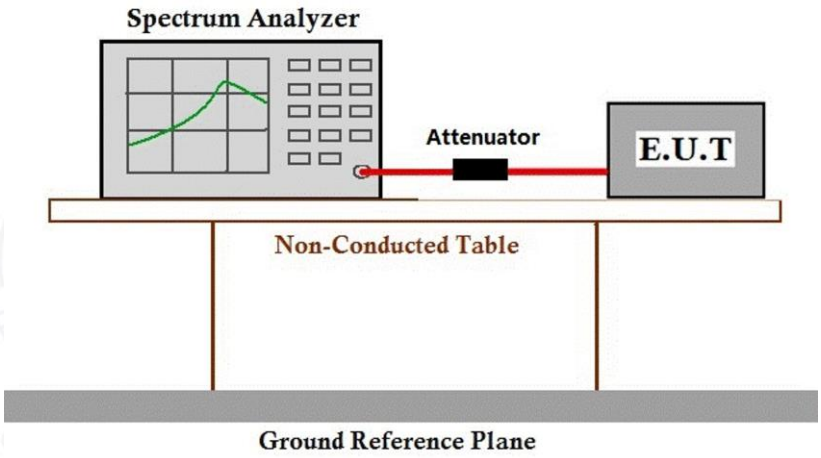
7.2.2 Measurement Procedure and Data

Please Refer to Appendix for Details

7.3 Minimum 6dB Bandwidth

Test Requirement 47 CFR Part 15, Subpart C 15.247a(2)
Test Method: ANSI C63.10 (2013) Section 11.8.1
Limit: ≥500 kHz

7.3.1 Test Setup Diagram



7.3.2 Measurement Procedure and Data

Please Refer to Appendix for Details

7.4 Power Spectrum Density

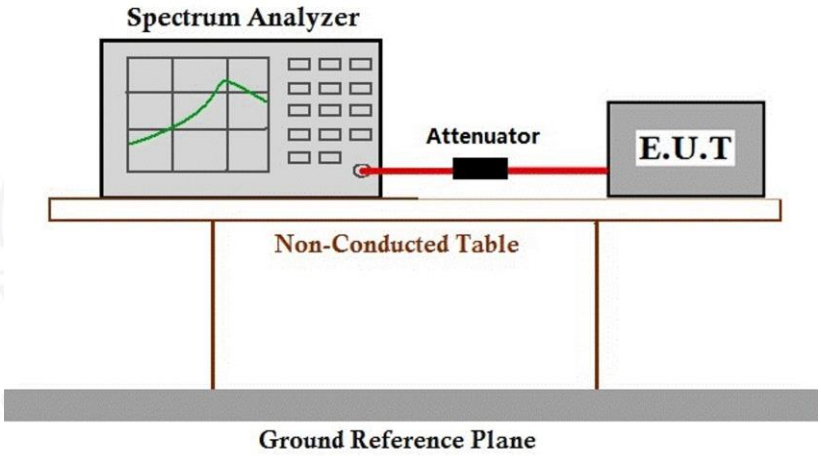
Test Requirement 47 CFR Part 15, Subpart C 15.247(e)

Test Method: ANSI C63.10 (2013) Section 11.10.2

Limit:

≤8dBm in any 3 kHz band during any time interval of continuous transmission

7.4.1 Test Setup Diagram



7.4.2 Measurement Procedure and Data

Please Refer to Appendix for Details

7.5 Conducted Band Edges Measurement

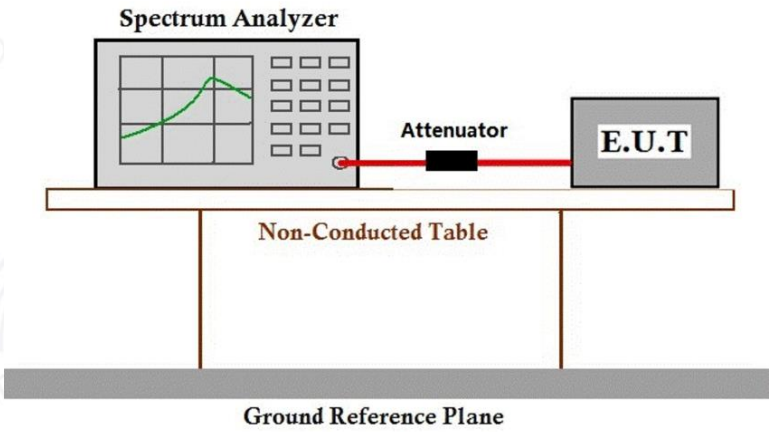
Test Requirement 47 CFR Part 15, Subpart C 15.247(d)

Test Method: ANSI C63.10 (2013) Section 11.13.3.2

Limit:

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. 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).

7.5.1 Test Setup Diagram



7.5.2 Measurement Procedure and Data

Please Refer to Appendix for Details

7.6 Conducted Spurious Emissions

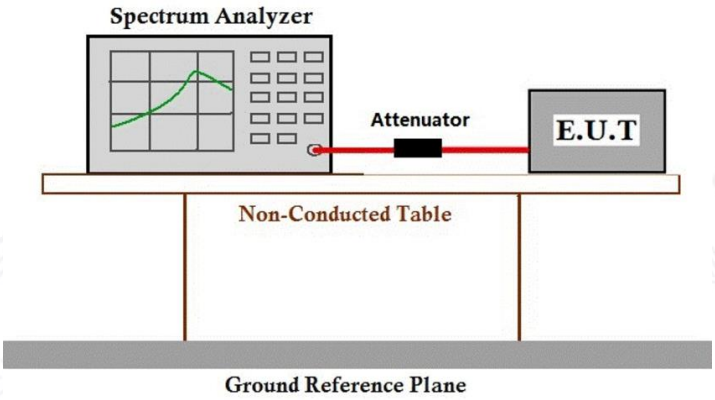
Test Requirement 47 CFR Part 15, Subpart C 15.247(d)

Test Method: ANSI C63.10 (2013) Section 11.11

Limit:

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. 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).

7.6.1 Test Setup Diagram



7.6.2 Measurement Procedure and Data

Please Refer to Appendix for Details

7.7 Radiated Emissions which fall in the restricted bands

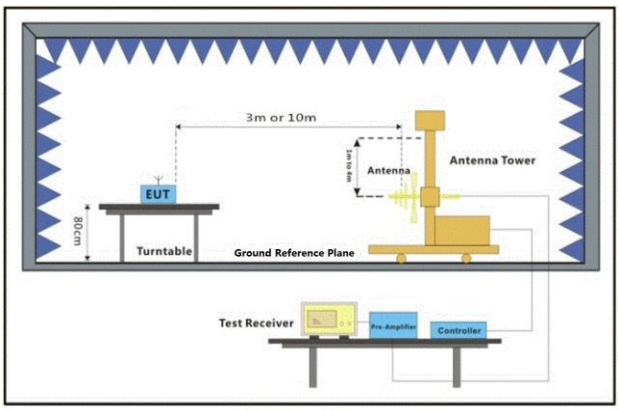
Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.209

Test Method: ANSI C63.10 (2013) Section 6.10.5

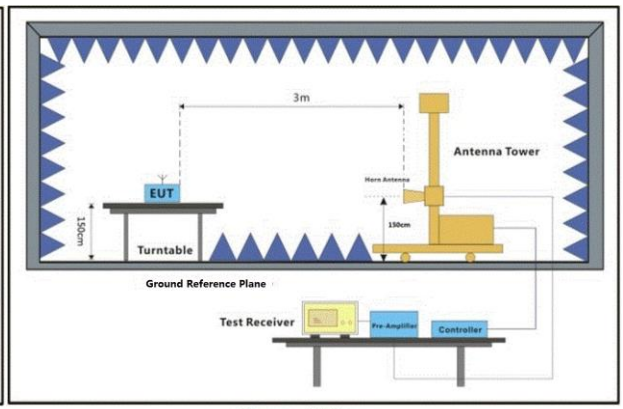
Limit:

Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3
Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.		

7.7.1 Test Setup Diagram



30MHz-1GHz



Above 1GHz

7.7.2 Measurement Procedure and Data

a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

d. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

h. Test the EUT in the lowest channel, the Highest channel.

i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.

j. Repeat above procedures until all frequencies measured was complete.

Remark 1: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

Remark 2: For frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.

Polarity: Horizontal; Worst case 802.11b ; Channel:Low

No.	Frequency (MHz)	Reading (dBuv)	Factor (dB/m)	Level (dBuv/m)	Limit (dBuv/m)	Margin(dB)	Detector	P/F
1	2310.000	63.39	-24.14	39.25	74.00	-34.75	peak	P
2	2390.000	69.18	-23.92	45.26	74.00	-28.74	peak	P
3	2400.000	70.18	-23.92	46.26	74.00	-27.74	peak	P

Polarity: Vertical; Worst case 802.11b ; Channel:Low

No.	Frequency (MHz)	Reading (dBuv)	Factor (dB/m)	Level (dBuv/m)	Limit (dBuv/m)	Margin(dB)	Detector	P/F
1	2310.000	64.52	-24.14	40.38	74.00	-33.62	peak	P
2	2390.000	72.88	-23.92	48.96	74.00	-25.04	peak	P
3	2400.000	73.97	-23.92	50.05	74.00	-23.95	peak	P

Polarity: Horizontal; Worst case 802.11b; Channel:High

No.	Frequency (MHz)	Reading (dBuv)	Factor (dB/m)	Level (dBuv/m)	Limit (dBuv/m)	Margin(dB)	Detector	P/F
1	2483.500	73.70	-23.65	50.05	74.00	-23.95	peak	P
2	2500.000	73.47	-23.65	49.82	74.00	-24.18	peak	P

Polarity: Vertical; Worst case 802.11b ; Channel:High

No.	Frequency (MHz)	Reading (dBuv)	Factor (dB/m)	Level (dBuv/m)	Limit (dBuv/m)	Margin(dB)	Detector	P/F
1	2483.500	74.10	-23.65	50.45	74.00	-23.55	peak	P
2	2500.000	70.17	-23.65	46.52	74.00	-27.48	peak	P

Polarity: Horizontal; Worst case 802.11b ; Channel:Low

No.	Frequency (MHz)	Reading (dBuv)	Factor (dB/m)	Level (dBuv/m)	Limit (dBuv/m)	Margin(dB)	Detector	P/F
1	2310.000	63.40	-24.14	39.26	74.00	-34.74	peak	P
2	2390.000	69.72	-23.92	45.80	74.00	-28.20	peak	P
3	2400.000	70.48	-23.92	46.56	74.00	-27.44	peak	P

Polarity: Vertical; Worst case 802.11b ; Channel:Low

No.	Frequency (MHz)	Reading (dBuv)	Factor (dB/m)	Level (dBuv/m)	Limit (dBuv/m)	Margin(dB)	Detector	P/F
1	2310.000	65.34	-24.14	41.20	74.00	-32.80	peak	P
2	2390.000	72.74	-23.92	48.82	74.00	-25.18	peak	P
3	2400.000	75.55	-23.92	51.63	74.00	-22.37	peak	P

Polarity: Horizontal; Worst case 802.11b; Channel:High

No.	Frequency (MHz)	Reading (dBuv)	Factor (dB/m)	Level (dBuv/m)	Limit (dBuv/m)	Margin(dB)	Detector	P/F
1	2483.500	73.83	-23.65	50.18	74.00	-23.82	peak	P
2	2500.000	73.27	-23.65	49.62	74.00	-24.38	peak	P

Polarity: Vertical; Worst case 802.11b ; Channel:High

No.	Frequency (MHz)	Reading (dBuv)	Factor (dB/m)	Level (dBuv/m)	Limit (dBuv/m)	Margin(dB)	Detector	P/F
1	2483.500	73.03	-23.65	49.38	74.00	-24.62	peak	P
2	2500.000	70.36	-23.65	46.71	74.00	-27.29	peak	P

7.8 Radiated Spurious Emissions

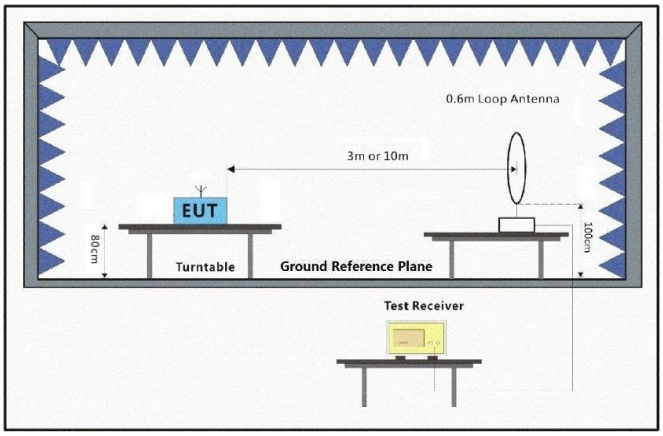
Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.209

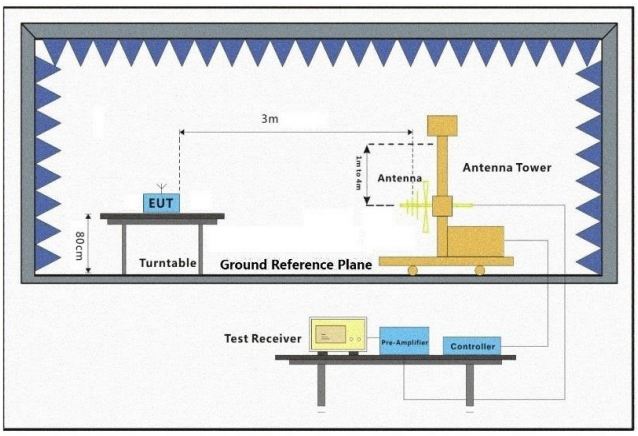
Test Method: ANSI C63.10 (2013) Section 6.4,6.5,6.6

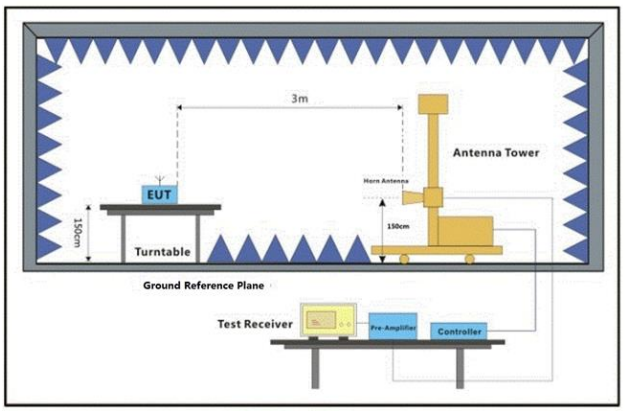
Limit:

Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3
Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.		

7.8.1 Test Setup Diagram







Above 1GHz

7.8.2 Measurement Procedure and Data

a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

g. Test the EUT in the lowest channel, the middle channel, the Highest channel.

h. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.

i. Repeat above procedures until all frequencies measured was complete.

a. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

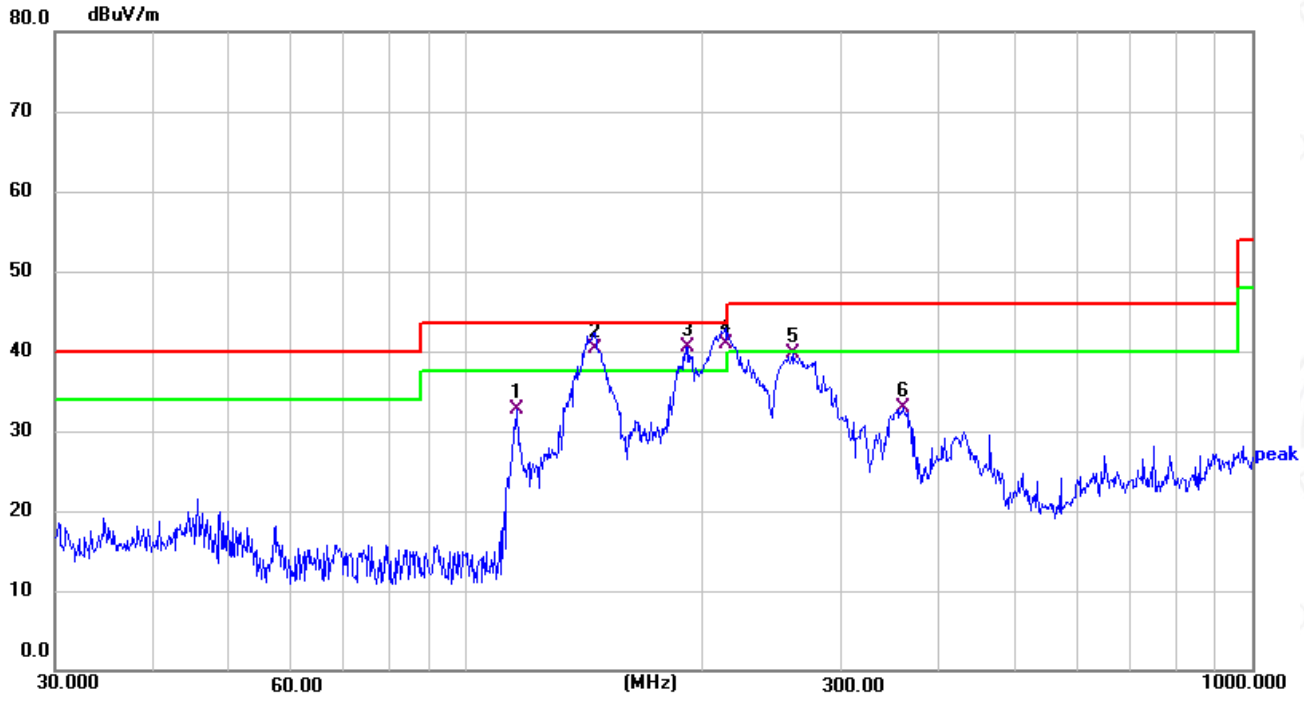
g. Test the EUT in the lowest channel, the middle channel, the Highest channel.

h. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.

i. Repeat above procedures until all frequencies measured was complete.

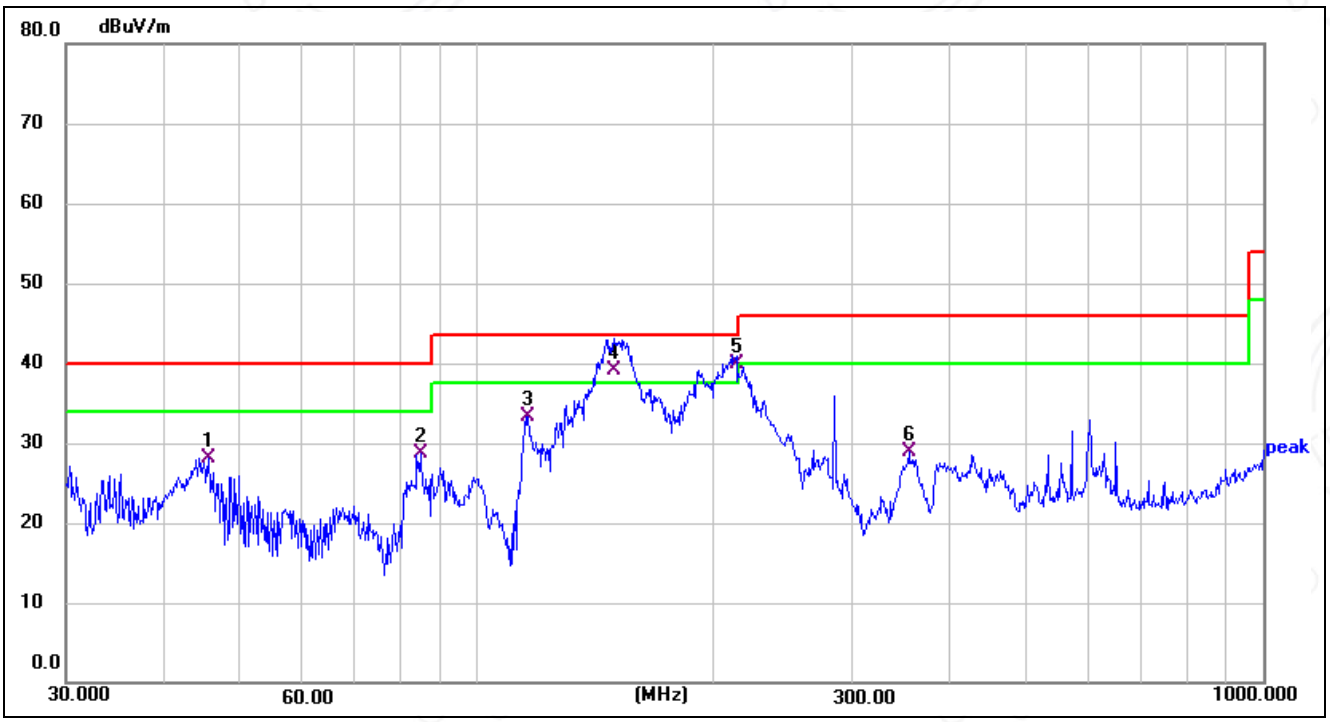
Spurious Emissions Below 1GHz

Test Channel	Low	Polarity:	Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	116.1321	49.30	-16.62	32.68	43.50	-10.82	QP	100	0	P	
2 !	145.8611	55.04	-14.65	40.39	43.50	-3.11	QP	100	0	P	
3 !	191.7450	56.69	-16.15	40.54	43.50	-2.96	QP	100	0	P	
4 *	213.7634	57.61	-16.68	40.93	43.50	-2.57	QP	100	0	P	
5	260.1444	55.60	-15.93	39.67	46.00	-6.33	QP	100	0	P	
6	359.1860	46.31	-13.43	32.88	46.00	-13.12	QP	100	0	P	

Test Channel	Low	Polarity:	Vertical



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	45.5348	42.74	-14.55	28.19	40.00	-11.81	QP	100	0	P	
2	84.7020	48.45	-19.74	28.71	40.00	-11.29	QP	100	0	P	
3	116.1321	50.02	-16.62	33.40	43.50	-10.10	QP	100	0	P	
4 !	149.4857	53.39	-14.28	39.11	43.50	-4.39	QP	100	0	P	
5 *	213.7634	56.66	-16.68	39.98	43.50	-3.52	QP	100	0	P	
6	354.1831	42.52	-13.58	28.94	46.00	-17.06	QP	100	0	P	

Remark:

1) Through pre-scan 802.11b/g/n found the worst case is 802.11b lowest channel. Only the worst case is recorded in the report.

2) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level = Reading Level + Factor

3) Scan from 9kHz to 1 GHz, the disturbance below 30MHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.

Polarity: Horizontal; Worst case 802.11b; Channel:Low

No.	Frequency (MHz)	Reading (dBuv)	Factor (dB/m)	Level (dBuv/m)	Limit (dBuv/m)	Margin(dB)	Detector	P/F
1	4823.366	56.25	-15.52	40.73	74.00	-33.27	peak	P
2	7236.617	52.94	-10.87	42.07	74.00	-31.93	peak	P

Polarity: Vertical; Worst case 802.11b; Channel:Low

No.	Frequency (MHz)	Reading (dBuv)	Factor (dB/m)	Level (dBuv/m)	Limit (dBuv/m)	Margin(dB)	Detector	P/F
1	4824.162	56.53	-15.52	41.01	74.00	-32.99	peak	P
2	7236.035	51.70	-10.87	40.83	74.00	-33.17	peak	P

Polarity: Horizontal; Worst case 802.11b; Channel:middle

No.	Frequency (MHz)	Reading (dBuv)	Factor (dB/m)	Level (dBuv/m)	Limit (dBuv/m)	Margin(dB)	Detector	P/F
1	4874.541	54.41	-15.48	38.93	74.00	-35.07	peak	P
2	7310.304	51.16	-10.81	40.35	74.00	-33.65	peak	P

Polarity: Vertical; Worst case 802.11b; Channel:middle

No.	Frequency (MHz)	Reading (dBuv)	Factor (dB/m)	Level (dBuv/m)	Limit (dBuv/m)	Margin(dB)	Detector	P/F
1	4874.281	55.07	-15.48	39.59	74.00	-34.41	peak	P
2	7310.145	51.54	-10.81	40.73	74.00	-33.27	peak	P

Polarity: Horizontal; Worst case 802.11b; Channel:High

No.	Frequency (MHz)	Reading (dBuv)	Factor (dB/m)	Level (dBuv/m)	Limit (dBuv/m)	Margin(dB)	Detector	P/F
1	4923.360	56.45	-15.45	41.00	74.00	-33.00	peak	P
2	7386.265	51.30	-10.73	40.57	74.00	-33.43	peak	P

Polarity: Vertical; Worst case 802.11b; Channel:High

No.	Frequency (MHz)	Reading (dBuv)	Factor (dB/m)	Level (dBuv/m)	Limit (dBuv/m)	Margin(dB)	Detector	P/F
1	4923.955	55.22	-15.45	39.77	74.00	-34.23	peak	P
2	7385.156	52.04	-10.73	41.31	74.00	-32.69	peak	P

Polarity: Horizontal; Worst case 802.11b; Channel:Low

No.	Frequency (MHz)	Reading (dBuv)	Factor (dB/m)	Level (dBuv/m)	Limit (dBuv/m)	Margin(dB)	Detector	P/F
1	4824.012	56.97	-15.52	41.45	74.00	-32.55	peak	P
2	7235.892	51.84	-10.87	40.97	74.00	-33.03	peak	P

; Polarity: Vertical; Worst case 802.11b; Channel:Low

No.	Frequency (MHz)	Reading (dBuv)	Factor (dB/m)	Level (dBuv/m)	Limit (dBuv/m)	Margin(dB)	Detector	P/F
1	4824.528	58.06	-15.52	42.54	74.00	-31.46	peak	P
2	7236.803	51.52	-10.87	40.65	74.00	-33.35	peak	P

Polarity: Horizontal; Worst case 802.11b; Channel:middle

No.	Frequency (MHz)	Reading (dBuv)	Factor (dB/m)	Level (dBuv/m)	Limit (dBuv/m)	Margin(dB)	Detector	P/F
1	4873.186	54.37	-15.48	38.89	74.00	-35.11	peak	P
2	7311.282	50.89	-10.81	40.08	74.00	-33.92	peak	P

Polarity: Vertical; Worst case 802.11b; Channel:middle

No.	Frequency (MHz)	Reading (dBuv)	Factor (dB/m)	Level (dBuv/m)	Limit (dBuv/m)	Margin(dB)	Detector	P/F
1	4874.050	55.38	-15.48	39.90	74.00	-34.10	peak	P
2	7310.613	51.26	-10.81	40.45	74.00	-33.55	peak	P

Polarity: Horizontal; Worst case 802.11b; Channel:High

No.	Frequency (MHz)	Reading (dBuv)	Factor (dB/m)	Level (dBuv/m)	Limit (dBuv/m)	Margin(dB)	Detector	P/F
1	4924.081	55.83	-15.45	40.38	74.00	-33.62	peak	P
2	7385.040	51.76	-10.73	41.03	74.00	-32.97	peak	P

Polarity: Vertical; Worst case 802.11b; Channel:High

No.	Frequency (MHz)	Reading (dBuv)	Factor (dB/m)	Level (dBuv/m)	Limit (dBuv/m)	Margin(dB)	Detector	P/F
1	4923.584	54.96	-15.45	39.51	74.00	-34.49	peak	P
2	7385.441	51.91	-10.73	41.18	74.00	-32.82	peak	P

Remark:

1) Through pre-scan 802.11b/g/n mode found the worst case is 802.11b . Only the worst case is recorded in the report.

2) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level = Reading Level + Factor

3) Testing is carried out with frequency rang 1GHz to the tenth harmonics, other than listed in the table above are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

4) If the peak-detected amplitude can be shown to comply with the average limit, then it is not necessary to perform a separate average measurement.

8 Test Setup Photo

Please refer to the Appendix Test Setup Photos

9 EUT Constructional Details (EUT Photos)

Please refer to the Appendix EUT Photos

- End of the Report -