

FCC Test Report

Applicant : **YABER TECHNOLOGIES CO., LIMITED**

Address : **Room 406, 4 Floor, B Building, BanTian
International Center, HuanCheng South Road,
BanTian Street, LongGang District, Shenzhen,
China**

Product Name : **Projector**

Report Date : **Apr. 08, 2024**



Shenzhen Anbotek Compliance Laboratory Limited

Shenzhen Anbotek Compliance Laboratory Limited

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Report No.: 18220WC30265703

FCC ID: 2A4K9-V12

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TEST REPORT

Applicant : YABER TECHNOLOGIES CO., LIMITED

Manufacturer : YABER TECHNOLOGIES CO., LIMITED

Product Name : Projector

Test Model No. : V12

Reference Model No. : Please refer to page 7

Trade Mark : Yaber

Rating(s) : Input: 100-240V~, 50/60Hz,140W

47 CFR Part 15.247
ANSI C63.10-2020
Test Standard(s) : KDB 558074 D01 15.247 Meas Guidance v05r02
KDB 662911 D01 Multiple Transmitter Output v02r01

The device described above is tested by Shenzhen Anbotek Compliance Laboratory Limited to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The measurement results are contained in this test report and Shenzhen Anbotek Compliance Laboratory Limited is assumed full of responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT (Equipment Under Test) is technically compliant with above listed standard(s) requirements. This report applies to above tested sample only and shall not be reproduced in part without written approval of Shenzhen Anbotek Compliance Laboratory Limited.

Date of Receipt:

Dec. 15, 2023

Date of Test:

Feb. 15, 2024 to Mar. 05, 2024

Prepared By:



(Ella Liang)

Approved & Authorized Signer:



(Edward Pan)

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Revision History

Report Version	Description	Issued Date
R00	Original Issue.	Apr. 08, 2024

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1. General Information

1.1. Client Information

Applicant	:	YABER TECHNOLOGIES CO., LIMITED
Address	:	Room 406, 4 Floor, B Building, BanTian International Center, HuanCheng South Road, BanTian Street, LongGang District, Shenzhen, China
Manufacturer	:	YABER TECHNOLOGIES CO., LIMITED
Address	:	Room 406, 4 Floor, B Building, BanTian International Center, HuanCheng South Road, BanTian Street, LongGang District, Shenzhen, China
Factory	:	YABER TECHNOLOGIES CO., LIMITED
Address	:	Room 406, 4 Floor, B Building, BanTian International Center, HuanCheng South Road, BanTian Street, LongGang District, Shenzhen, China

1.2. Description of Device (EUT)

Product Name	:	Projector
Test Model No.	:	V12
Reference Model No.	:	Please refer to page 7 (Note: All samples are the same except the model number, so we prepare "V12" for test only.)
Trade Mark	:	Yaber
Test Power Supply	:	AC 120V/60Hz
Test Sample No.	:	1-2-1(Normal Sample), 1-2-2(Engineering Sample)
Adapter	:	N/A
RF Specification		
Operation Frequency	:	802.11b/g/n(HT20): 2412MHz to 2462MHz; 802.11n(HT40): 2422MHz to 2452MHz
Number of Channel	:	802.11b/g/n(HT20): 11 Channels; 802.11n(HT40): 7 Channels
Modulation Type	:	802.11b: DSSS(CCK, DQPSK, DBPSK); 802.11g: OFDM(BPSK, QPSK, 16QAM, 64QAM); 802.11n(HT20 and HT40): OFDM (BPSK, QPSK, 16QAM, 64QAM)
Antenna Type	:	FPC Antenna
Antenna Gain(Peak)	:	WiFi 0: 2.56dBi WiFi 1: 3.12dBi
Directional antenna gain	:	5.86dBi
Remark:		
(1) All of the RF specification are provided by customer.		
(2) For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.		
3) Only 802.11n(HT20) & 802.11n(HT40) support MIMO.		
4) Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2]$ dBi		

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Reference Model No.						
T series	T2	T2 Max	T2 SE	T2 Pro	T2s	T2 Plus
	T3	T3 Max	T3 SE	T3 Pro	T3s	T3 Plus
	T4	T4 Max	T4 SE	T4 Pro	T4s	T4 Plus
	T5	T5 Max	T5 SE	T5 Pro	T5s	T5 Plus
	T6	T6 Max	T6 SE	T6 Pro	T6s	T6 Plus
	T10	T10 Max	T10 SE	T10 Pro	T10s	T10 Plus
	T20	T20 Max	T20 SE	T20 Pro	T20s	T20 Plus
V series	V13	V13 Max	V13 SE	V13 Pro	V13s	V13 Plus
	V14	V14 Max	V14 SE	V14 Pro	V14s	V14 Plus
	V15	V15 Max	V15 SE	V15 Pro	V15s	V15 Plus
U series	U13	U13 Max	U13 SE	U13 Pro	U13s	U13 Plus
	U14	U14 Max	U14 SE	U14 Pro	U14s	U14 Plus
	U15	U15 Max	U15 SE	U15 Pro	U15s	U15 Plus
E series	E2	E2 Max	E2 SE	E2 Pro	E2s	E2 Plus
	E3	E3 Max	E3 SE	E3 Pro	E3s	E3 Plus
	E4	E4 Max	E4 SE	E4 Pro	E4s	E4 Plus
	E5	E5 Max	E5 SE	E5 Pro	E5s	E5 Plus
	E6	E6 Max	E6 SE	E6 Pro	E6s	E6 Plus
	E10	E10 Max	E10 SE	E10 Pro	E10s	E10 Plus
	E20	E20 Max	E20 SE	E20 Pro	E20s	E20 Plus
L series	L2	L2 Max	L2 SE	L2 Pro	L2s	L2 Plus
	L3	L3 Max	L3 SE	L3 Pro	L3s	L3 Plus
	L4	L4 Max	L4 SE	L4 Pro	L4s	L4 Plus
	L5	L5 Max	L5 SE	L5 Pro	L5s	L5 Plus
	L6	L6 Max	L6 SE	L6 Pro	L6s	L6 Plus
	L10	L10 Max	L10 SE	L10 Pro	L10s	L10 Plus
	L20	L20 Max	L20 SE	L20 Pro	L20s	L20 Plus
K series	K3	K3 Max	K3 SE	K3 Pro	K3s	K3 Plus
	K4	K4 Max	K4 SE	K4 Pro	K4s	K4 Plus
	K5	K5 Max	K5 SE	K5 Pro	K5s	K5 Plus
	K6	K6 Max	K6 SE	K6 Pro	K6s	K6 Plus
	K100	K100 Max	K100 SE	K100 Pro	K100s	K100 Plus
	K200	K200 Max	K200 SE	K200 Pro	K200s	K200 Plus
	K300	K300 Max	K300 SE	K300 Pro	K300s	K300 Plus
	K400	K400 Max	K400 SE	K400 Pro	K400s	K400 Plus
P series	K1000	K1000 Max	K1000 SE	K1000 Pro	K1000s	K1000 Plus
	P1	P1 Max	P1 SE	P1 Pro	P1s	P1 Plus
	P2	P2 Max	P2 SE	P2 Pro	P2s	P2 Plus
	P3	P3 Max	P3 SE	P3 Pro	P3s	P3 Plus
	P4	P4 Max	P4 SE	P4 Pro	P4s	P4 Plus
	P10	P10 Max	P10 SE	P10 Pro	P10s	P10 Plus
	P20	P20 Max	P20 SE	P20 Pro	P20s	P20 Plus

U12,Q3, Q4, Q5, Q6,K11, K12, K13, K14, K15,P65, P66, P67,S28, S29, S30,B1, B2, B3, B4, ,TR26, TR27, TR28, TR29,X8, X9, X10, X11

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1.3. Auxiliary Equipment Used During Test

Title	Manufacturer	Model No.	Serial No.
/	/	/	/

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1.4. Operation channel list

Operation Band:

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2412	5	2432	9	2452
2	2417	6	2437	10	2457
3	2422	7	2442	11	2462
4	2427	8	2447	/	/

1.5. Description of Test Modes

Pretest Modes	Descriptions
TM1	Keep the EUT in 802.11b transmitting mode.
TM2	Keep the EUT in 802.11g transmitting mode.
TM3	Keep the EUT in 802.11n(HT20) transmitting mode.
TM4	Keep the EUT in 802.11n(HT40) transmitting mode.

1.6. Measurement Uncertainty

Parameter	Uncertainty
Conducted emissions (AMN 150kHz~30MHz)	3.8dB
Occupied Bandwidth	925Hz
Conducted Output Power	0.76dB
Power Spectral Density	0.76dB
Conducted Spurious Emission	1.24dB
Radiated spurious emissions (above 1GHz)	1G-6GHz: 4.78dB; 6G-18GHz: 4.88dB 18G-40GHz: 5.68dB
Radiated emissions (Below 30MHz)	3.53dB
Radiated spurious emissions (30MHz~1GHz)	Horizontal: 3.92dB; Vertical: 4.52dB

The measurement uncertainty and decision risk evaluated according to AB/WI-RF-F-032. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

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1.7. Test Summary

Test Items	Test Modes	Status
Antenna requirement	/	P
Conducted Emission at AC power line	Mode1,2,3,4	P
Occupied Bandwidth	Mode1,2,3,4	P
Maximum Conducted Output Power	Mode1,2,3,4	P
Power Spectral Density	Mode1,2,3,4	P
Emissions in non-restricted frequency bands	Mode1,2,3,4	P
Band edge emissions (Radiated)	Mode1,2,3,4	P
Emissions in frequency bands (below 1GHz)	Mode1,2,3,4	P
Emissions in frequency bands (above 1GHz)	Mode1,2,3,4	P
Note: P: Pass N: N/A, not applicable		

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1.8. Description of Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

FCC-Registration No.:434132

Shenzhen Anbotek Compliance Laboratory Limited, EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration No. 434132.

ISED-Registration No.: 8058A

Shenzhen Anbotek Compliance Laboratory Limited, EMC Laboratory has been registered and fully described in a report filed with the (ISED) Innovation, Science and Economic Development Canada. The acceptance letter from the ISED is maintained in our files. Registration 8058A.

Test Location

Shenzhen Anbotek Compliance Laboratory Limited.

1/F, Building D, Sogood Science and Technology Park, Sanwei community, Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China.

1.9. Disclaimer

1. The test report is invalid if not marked with the signatures of the persons responsible for preparing and approving the test report.
2. The test report is invalid if there is any evidence and/or falsification.
3. The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein.
4. This document may not be altered or revised in any way unless done so by Anbotek and all revisions are duly noted in the revisions section.
5. Content of the test report, in part or in full, cannot be used for publicity and/or promotional purposes without prior written approval from the laboratory.
6. The authenticity of the information provided by the customer is the responsibility of the customer and the laboratory is not responsible for its authenticity.

The laboratory is only responsible for the data released by the laboratory, except for the part provided by the applicant.

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1.10. Test Equipment List

Conducted Emission at AC power line						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal.Due Date
1	L.I.S.N. Artificial Mains Network	Rohde & Schwarz	ENV216	100055	2023-10-12	2024-10-11
2	Three Phase V-type Artificial Power Network	CYBERTEK	EM5040DT	E215040D T001	2023-07-05	2024-07-04
3	EMI Test Receiver	Rohde & Schwarz	ESCI	100627	2023-10-12	2024-10-11
4	Software Name EZ-EMC	Farad Technology	ANB-03A	N/A	/	/

Occupied Bandwidth Maximum Conducted Output Power Power Spectral Density Emissions in non-restricted frequency bands						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal.Due Date
1	Constant Temperature Humidity Chamber	ZHONGJIAN	ZJ-KHWS80B	N/A	2023-10-16	2024-10-15
2	DC Power Supply	IVYTECH	IV3605	1804D360 510	2023-10-20	2024-10-19
3	Spectrum Analyzer	Rohde & Schwarz	FSV40-N	101792	2023-05-26	2024-05-25
4	MXA Spectrum Analysis	KEYSIGHT	N9020A	MY505318 23	2023-10-12	2024-10-11
5	Oscilloscope	Tektronix	MDO3012	C020298	2023-10-12	2024-10-11
6	MXG RF Vector Signal Generator	Agilent	N5182A	MY474206 47	2023-02-23	2024-10-22

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Band edge emissions (Radiated) Emissions in frequency bands (above 1GHz)						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal.Due Date
1	EMI Test Receiver	Rohde & Schwarz	ESR26	101481	2023-10-12	2024-10-11
2	EMI Preamplifier	SKET Electronic	LNPA-0118G-45	SKET-PA-002	2023-10-12	2024-10-11
3	Double Ridged Horn Antenna	SCHWARZBECK	BBHA 9120D	02555	2022-10-16	2025-10-15
4	EMI Test Software EZ-EMC	SHURPLE	N/A	N/A	/	/
5	Horn Antenna	A-INFO	LB-180400-KF	J211060628	2023-10-12	2024-10-11
6	Spectrum Analyzer	Rohde & Schwarz	FSV40-N	101792	2023-05-26	2024-05-25
7	Amplifier	Talent Microwave	TLLA18G40 G-50-30	23022802	2023-05-25	2024-05-24

Emissions in frequency bands (below 1GHz)						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal.Due Date
1	EMI Test Receiver	Rohde & Schwarz	ESR26	101481	2023-10-12	2024-10-11
2	Pre-amplifier	SONOMA	310N	186860	2023-10-12	2024-10-11
3	Bilog Broadband Antenna	Schwarzbeck	VULB9163	345	2022-10-23	2025-10-22
4	Loop Antenna (9K-30M)	Schwarzbeck	FMZB1519 B	00053	2023-10-12	2024-10-11
5	EMI Test Software EZ-EMC	SHURPLE	N/A	N/A	/	/

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2. Antenna requirement

Test Requirement:

Refer to 47 CFR Part 15.203, 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 considered sufficient to comply with the provisions of this section.

2.1. Conclusion

The antenna is a FPC Antenna which permanently attached, and the best case gain of the antenna is 2.56dBi for WiFi 0, 3.12dBi for WiFi 1. It complies with the standard requirement.

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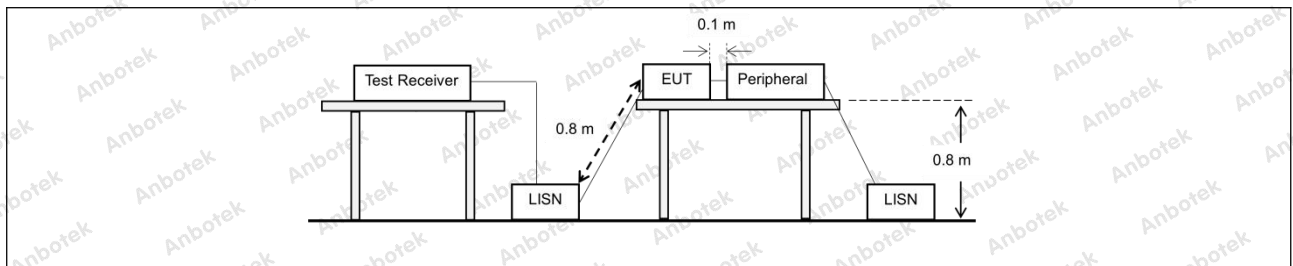
3. Conducted Emission at AC power line

Test Requirement:	Refer to 47 CFR 15.207(a), Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN).		
Test Limit:	Frequency of emission (MHz)	Conducted limit (dB μ V)	
		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.		
Test Method:	ANSI C63.10-2020 section 6.2		
Procedure:	Refer to ANSI C63.10-2020 section 6.2, standard test method for ac power-line conducted emissions from unlicensed wireless devices		

3.1. EUT Operation

Operating Environment:	
Test mode:	<ol style="list-style-type: none"> 1: 802.11b mode: Keep the EUT in 802.11b transmitting mode. 2: 802.11g mode: Keep the EUT in 802.11g transmitting mode. 3: 802.11n(HT20) mode: Keep the EUT in 802.11n(HT20) transmitting mode. 4: 802.11n(HT40) mode: Keep the EUT in 802.11n(HT40) transmitting mode.

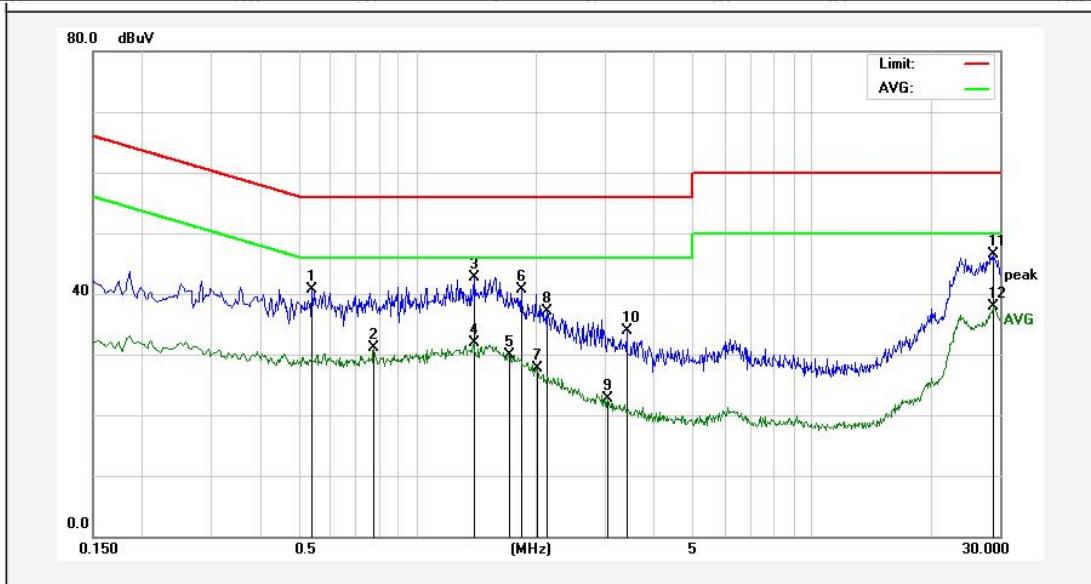
3.2. Test Setup



3.3. Test Data

Temperature:	22.2 °C	Humidity:	55.8 %	Atmospheric Pressure:	101 kPa
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TM2 / Line: Line / Band: 2400-2483.5 MHz / BW: 20 / CH: L/ ANT2



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Over Limit (dB)	Detector	Remark
1	0.5420	22.87	17.86	40.73	56.00	-15.27	QP	
2	0.7780	13.22	17.87	31.09	46.00	-14.91	AVG	
3	1.3940	24.94	17.86	42.80	56.00	-13.20	QP	
4	1.3940	13.95	17.86	31.81	46.00	-14.19	AVG	
5	1.7140	12.00	17.85	29.85	46.00	-16.15	AVG	
6	1.8300	22.89	17.86	40.75	56.00	-15.25	QP	
7	2.0180	9.90	17.85	27.75	46.00	-18.25	AVG	
8	2.1420	19.32	17.85	37.17	56.00	-18.83	QP	
9	3.0380	4.95	17.85	22.80	46.00	-23.20	AVG	
10	3.3980	15.99	17.85	33.84	56.00	-22.16	QP	
11	28.7860	27.90	18.67	46.57	60.00	-13.43	QP	
12	28.7860	19.28	18.67	37.95	50.00	-12.05	AVG	

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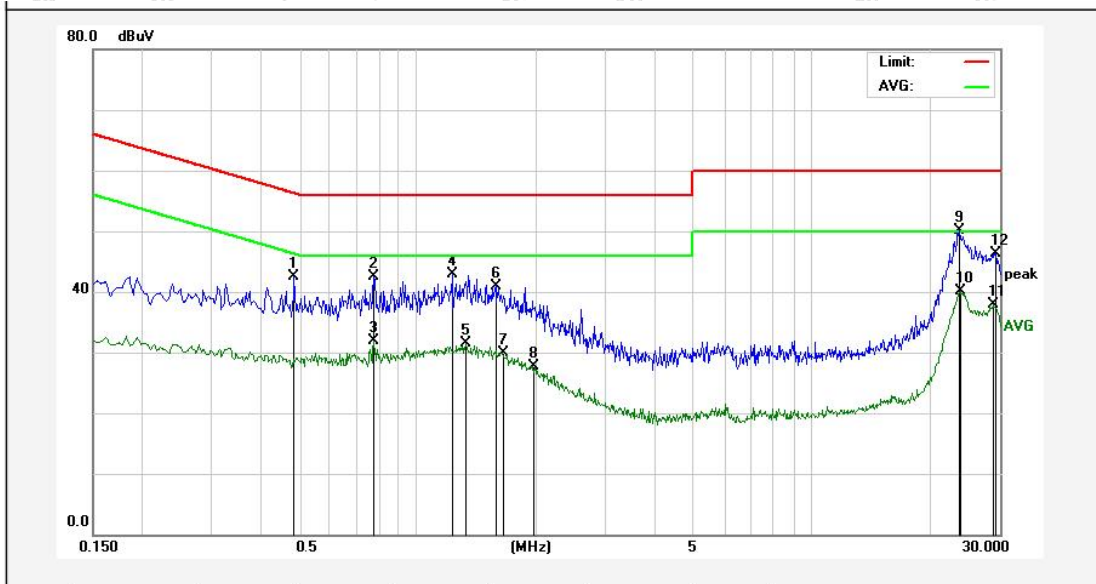
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Temperature:	22.2 °C	Humidity:	55.8 %	Atmospheric Pressure:	101 kPa
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TM2 / Line: Neutral / Band: 2400-2483.5 MHz / BW: 20 / CH: L/ ANT2



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Over Limit (dB)	Detector	Remark
1	0.4860	24.68	17.85	42.53	56.24	-13.71	QP	
2	0.7780	24.57	17.87	42.44	56.00	-13.56	QP	
3	0.7780	14.02	17.87	31.89	46.00	-14.11	AVG	
4	1.2260	25.09	17.85	42.94	56.00	-13.06	QP	
5	1.3300	13.60	17.86	31.46	46.00	-14.54	AVG	
6	1.5820	23.03	17.85	40.88	56.00	-15.12	QP	
7	1.6420	12.15	17.85	30.00	46.00	-16.00	AVG	
8	1.9620	9.93	17.85	27.78	46.00	-18.22	AVG	
9	23.6500	31.64	18.44	50.08	60.00	-9.92	QP	
10	23.7740	21.61	18.44	40.05	50.00	-9.95	AVG	
11	28.8940	19.14	18.68	37.82	50.00	-12.18	AVG	
12	29.3540	27.60	18.69	46.29	60.00	-13.71	QP	

Note: Only record the worst data (802.11g ANT2) in the report.



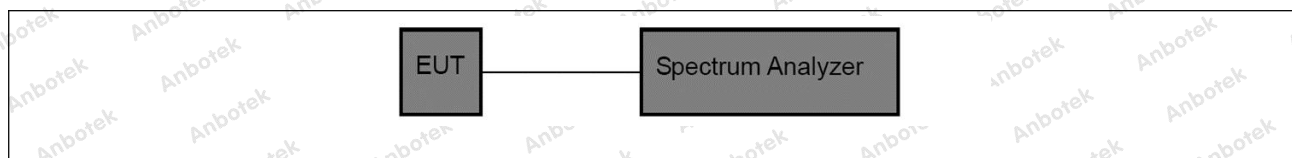
4. Occupied Bandwidth

Test Requirement:	47 CFR 15.247(a)(2)
Test Limit:	Refer to 47 CFR 15.247(a)(2), Systems using digital modulation techniques may operate in the 902-928 MHz, and 2400-2483.5 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.
Test Method:	ANSI C63.10-2020, section 11.8 KDB 558074 D01 15.247 Meas Guidance v05r02
Procedure:	<p>11.8.1 Option 1 The steps for the first option are as follows:</p> <ul style="list-style-type: none"> a) Set RBW = shall be in the range of 1% to 5% of the OBW but not less than 100 kHz. b) Set the VBW $\geq [3 \times \text{RBW}]$. c) Detector = peak. d) Trace mode = max-hold. e) Sweep = No faster than coupled (auto) time. f) Allow the trace to stabilize. g) Measure the maximum width of the emission by placing two markers, one at the lowest frequency and the other at the highest frequency of the envelope of the spectral display, such that each marker is at or slightly below the “-6 dB down amplitude”. If a marker is below this “-6 dB down amplitude” value, then it shall be as close as possible to this value. <p>11.8.2 Option 2 The automatic bandwidth measurement capability of an instrument may be employed using the X dB bandwidth mode with X set to 6 dB, if the functionality described in 11.8.1 (i.e., RBW = 100 kHz, VBW $\geq 3 \times \text{RBW}$, and peak detector with maximum hold) is implemented by the instrumentation function. When using this capability, care shall be taken so that the bandwidth measurement is not influenced by any intermediate power nulls in the fundamental emission that might be ≥ 6 dB.</p>

4.1. EUT Operation

Operating Environment:	
Test mode:	<ul style="list-style-type: none"> 1: 802.11b mode: Keep the EUT in 802.11b transmitting mode. 2: 802.11g mode: Keep the EUT in 802.11g transmitting mode. 3: 802.11n(HT20) mode: Keep the EUT in 802.11n(HT20) transmitting mode. 4: 802.11n(HT40) mode: Keep the EUT in 802.11n(HT40) transmitting mode.

4.2. Test Setup



4.3. Test Data

Temperature:	23.7 °C	Humidity:	40 %	Atmospheric Pressure:	101 kPa
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Please Refer to Appendix for Details.

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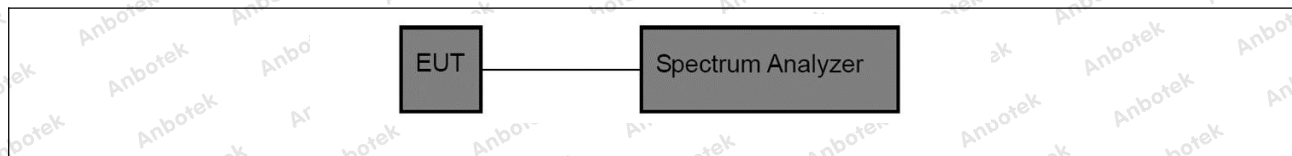
5. Maximum Conducted Output Power

Test Requirement:	47 CFR 15.247(b)(3)
Test Limit:	Refer to 47 CFR 15.247(b)(3), For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.
Test Method:	ANSI C63.10-2020, section 11.9.2 KDB 558074 D01 15.247 Meas Guidance v05r02
Procedure:	ANSI C63.10-2020, section 11.9.2 Maximum conducted (average) output power

5.1. EUT Operation

Operating Environment:	
Test mode:	<ol style="list-style-type: none"> 1: 802.11b mode: Keep the EUT in 802.11b transmitting mode. 2: 802.11g mode: Keep the EUT in 802.11g transmitting mode. 3: 802.11n(HT20) mode: Keep the EUT in 802.11n(HT20) transmitting mode. 4: 802.11n(HT40) mode: Keep the EUT in 802.11n(HT40) transmitting mode.

5.2. Test Setup



5.3. Test Data

Temperature:	23.7 °C	Humidity:	40 %	Atmospheric Pressure:	101 kPa
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Please Refer to Appendix for Details.



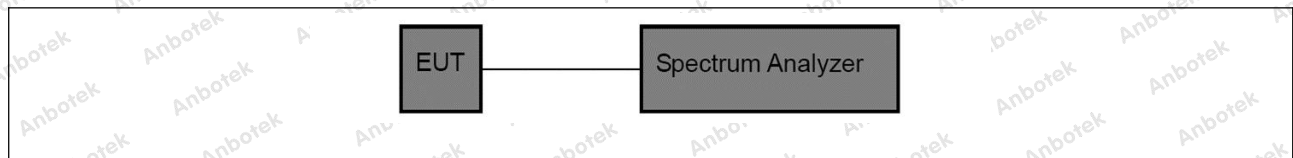
6. Power Spectral Density

Test Requirement:	47 CFR 15.247(e)
Test Limit:	Refer to 47 CFR 15.247(e), For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.
Test Method:	ANSI C63.10-2020, section 11.10 KDB 558074 D01 15.247 Meas Guidance v05r02
Procedure:	ANSI C63.10-2020, section 11.10, Maximum power spectral density level in the fundamental emission

6.1. EUT Operation

Operating Environment:	
Test mode:	<ol style="list-style-type: none"> 1: 802.11b mode: Keep the EUT in 802.11b transmitting mode. 2: 802.11g mode: Keep the EUT in 802.11g transmitting mode. 3: 802.11n(HT20) mode: Keep the EUT in 802.11n(HT20) transmitting mode. 4: 802.11n(HT40) mode: Keep the EUT in 802.11n(HT40) transmitting mode.

6.2. Test Setup



6.3. Test Data

Temperature:	23.7 °C	Humidity:	40 %	Atmospheric Pressure:	101 kPa
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Please Refer to Appendix for Details.



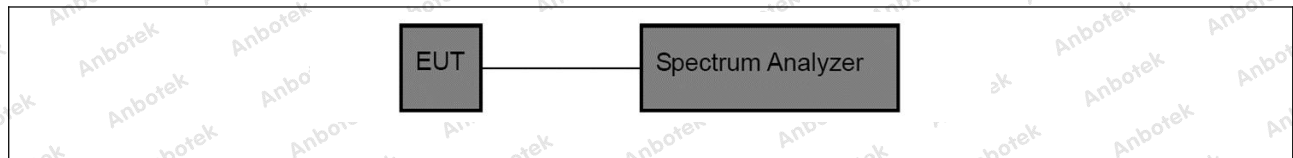
7. Emissions in non-restricted frequency bands

Test Requirement:	47 CFR 15.247(d), 15.209, 15.205
Test Limit:	Refer to 47 CFR 15.247(d), 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.
Test Method:	ANSI C63.10-2020 section 11.11 KDB 558074 D01 15.247 Meas Guidance v05r02
Procedure:	ANSI C63.10-2020 Section 11.11.1, Section 11.11.2, Section 11.11.3

7.1. EUT Operation

Operating Environment:	
Test mode:	<ol style="list-style-type: none"> 1: 802.11b mode: Keep the EUT in 802.11b transmitting mode. 2: 802.11g mode: Keep the EUT in 802.11g transmitting mode. 3: 802.11n(HT20) mode: Keep the EUT in 802.11n(HT20) transmitting mode. 4: 802.11n(HT40) mode: Keep the EUT in 802.11n(HT40) transmitting mode.

7.2. Test Setup



7.3. Test Data

Temperature:	23.7 °C	Humidity:	40 %	Atmospheric Pressure:	101 kPa
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Please Refer to Appendix for Details.



8. Band edge emissions (Radiated)

Test Requirement:	Refer to 47 CFR 15.247(d), 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)).`		
Test 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
Test Method:	ANSI C63.10-2020 section 6.10 KDB 558074 D01 15.247 Meas Guidance v05r02		
Procedure:	ANSI C63.10-2020 section 6.10.5.2		

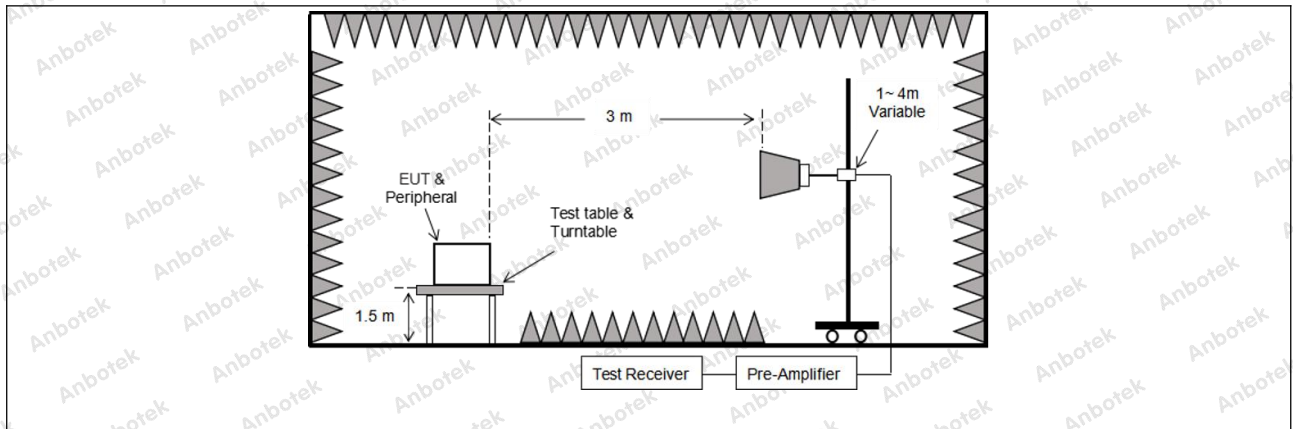
** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241. In the emission table above, the tighter limit applies at the band edges. The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

8.1. EUT Operation

Operating Environment:	
Test mode:	<p>1: 802.11b mode: Keep the EUT in 802.11b transmitting mode.</p> <p>2: 802.11g mode: Keep the EUT in 802.11g transmitting mode.</p> <p>3: 802.11n(HT20) mode: Keep the EUT in 802.11n(HT20) transmitting mode.</p> <p>4: 802.11n(HT40) mode: Keep the EUT in 802.11n(HT40) transmitting mode.</p>



8.2. Test Setup



8.3. Test Data

Temperature:	23.7 °C	Humidity:	40 %	Atmospheric Pressure:	101 kPa
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TM1 / CH: L						
Peak value:						
Frequency (MHz)	Reading (dBUV)	Factor (dB/m)	Result (dBUV/m)	Limit Line (dBUV/m)	Over Limit (dB)	Polarization
2310.00	38.34	9.58	47.92	74.00	-26.08	Horizontal
2390.00	40.69	9.73	50.42	74.00	-23.58	Horizontal
2310.00	39.66	9.58	49.24	74.00	-24.76	Vertical
2390.00	46.32	9.73	56.05	74.00	-17.95	Vertical
Average value:						
Frequency (MHz)	Reading (dBUV)	Factor (dB/m)	Result (dBUV/m)	Limit Line (dBUV/m)	Over Limit (dB)	Polarization
2310.00	28.98	9.58	38.56	54.00	-15.44	Horizontal
2390.00	36.19	9.73	45.92	54.00	-8.08	Horizontal
2310.00	30.23	9.58	39.81	54.00	-14.19	Vertical
2390.00	38.54	9.73	48.27	54.00	-5.73	Vertical

TM1 / CH: H						
Peak value:						
Frequency (MHz)	Reading (dBUV)	Factor (dB/m)	Result (dBUV/m)	Limit Line (dBUV/m)	Over Limit (dB)	Polarization
2483.50	46.38	9.91	56.29	74.00	-17.71	Horizontal
2500.00	40.45	9.94	50.39	74.00	-23.61	Horizontal
2483.50	46.74	9.91	56.65	74.00	-17.35	Vertical
2500.00	40.12	9.94	50.06	74.00	-23.95	Vertical
Average value:						
Frequency (MHz)	Reading (dBUV)	Factor (dB/m)	Result (dBUV/m)	Limit Line (dBUV/m)	Over Limit (dB)	Polarization
2483.50	37.63	9.91	47.54	54.00	-6.46	Horizontal
2500.00	29.49	9.94	39.43	54.00	-14.57	Horizontal
2483.50	39.24	9.91	49.15	54.00	-4.85	Vertical
2500.00	29.86	9.94	39.80	54.00	-14.20	Vertical

Remark:

1. Result=Reading + Factor
2. During the test, all antenna chains has been tested, and only worst case (ANT2) data is listed in the report.

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TM2 / CH: L						
Peak value:						
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2310.00	37.07	9.58	46.65	74.00	-27.35	Horizontal
2390.00	40.81	9.73	50.54	74.00	-23.46	Horizontal
2310.00	39.24	9.58	48.82	74.00	-25.18	Vertical
2390.00	42.98	9.73	52.71	74.00	-21.29	Vertical
Average value:						
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2310.00	29.51	9.58	39.09	54.00	-14.91	Horizontal
2390.00	35.92	9.73	45.65	54.00	-8.35	Horizontal
2310.00	30.37	9.58	39.95	54.00	-14.06	Vertical
2390.00	36.05	9.73	45.78	54.00	-8.22	Vertical

TM2 / CH: H						
Peak value:						
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.50	46.40	9.91	56.31	74.00	-17.69	Horizontal
2500.00	40.44	9.94	50.38	74.00	-23.62	Horizontal
2483.50	46.52	9.91	56.43	74.00	-17.57	Vertical
2500.00	40.04	9.94	49.98	74.00	-24.02	Vertical
Average value:						
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.50	35.80	9.91	45.71	54.00	-8.29	Horizontal
2500.00	28.59	9.94	38.53	54.00	-15.47	Horizontal
2483.50	38.19	9.91	48.10	54.00	-5.90	Vertical
2500.00	29.39	9.94	39.33	54.00	-14.67	Vertical

Remark:

1. Result=Reading + Factor
2. During the test, all antenna chains has been tested, and only worst case (ANT2) data is listed in the report.

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TM3 / CH: L						
Peak value:						
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2310.00	35.07	9.58	44.65	74.00	-29.35	Horizontal
2390.00	38.81	9.73	48.54	74.00	-25.46	Horizontal
2310.00	38.24	9.58	47.82	74.00	-26.18	Vertical
2390.00	40.98	9.73	50.71	74.00	-23.29	Vertical
Average value:						
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2310.00	28.19	9.58	37.77	54.00	-16.23	Horizontal
2390.00	33.56	9.73	43.29	54.00	-10.71	Horizontal
2310.00	27.98	9.58	37.56	54.00	-16.45	Vertical
2390.00	34.05	9.73	43.78	54.00	-10.22	Vertical

TM3 / CH: H						
Peak value:						
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.50	44.15	9.91	54.06	74.00	-19.94	Horizontal
2500.00	38.45	9.94	48.39	74.00	-25.61	Horizontal
2483.50	45.74	9.91	55.65	74.00	-18.35	Vertical
2500.00	40.12	9.94	50.06	74.00	-23.95	Vertical
Average value:						
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.50	33.78	9.91	43.69	54.00	-10.31	Horizontal
2500.00	28.74	9.94	38.68	54.00	-15.32	Horizontal
2483.50	35.01	9.91	44.92	54.00	-9.08	Vertical
2500.00	29.53	9.94	39.47	54.00	-14.53	Vertical

Remark:

1. Result=Reading + Factor
2. During the test, SISO and MIMO modes have been tested, and only worst case (MIMO) data is listed in the report.



TM4 / CH: L						
Peak value:						
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2310.00	37.54	9.58	47.12	74.00	-26.88	Horizontal
2390.00	41.81	9.73	51.54	74.00	-22.46	Horizontal
2310.00	40.24	9.58	49.82	74.00	-24.18	Vertical
2390.00	43.19	9.73	52.92	74.00	-21.08	Vertical
Average value:						
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2310.00	29.11	9.58	38.69	54.00	-15.31	Horizontal
2390.00	34.50	9.73	44.23	54.00	-9.77	Horizontal
2310.00	29.18	9.58	38.76	54.00	-15.25	Vertical
2390.00	33.45	9.73	43.18	54.00	-10.82	Vertical

TM4 / CH: H						
Peak value:						
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.50	44.06	9.91	53.97	74.00	-20.03	Horizontal
2500.00	39.13	9.94	49.07	74.00	-24.93	Horizontal
2483.50	45.87	9.91	55.78	74.00	-18.22	Vertical
2500.00	40.62	9.94	50.56	74.00	-23.45	Vertical
Average value:						
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.50	33.48	9.91	43.39	54.00	-10.61	Horizontal
2500.00	30.74	9.94	40.68	54.00	-13.32	Horizontal
2483.50	35.01	9.91	44.92	54.00	-9.08	Vertical
2500.00	30.53	9.94	40.47	54.00	-13.53	Vertical

Remark:

1. Result=Reading + Factor
2. During the test, SISO and MIMO modes have been tested, and only worst case (MIMO) data is listed in the report.

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9. Emissions in frequency bands (below 1GHz)

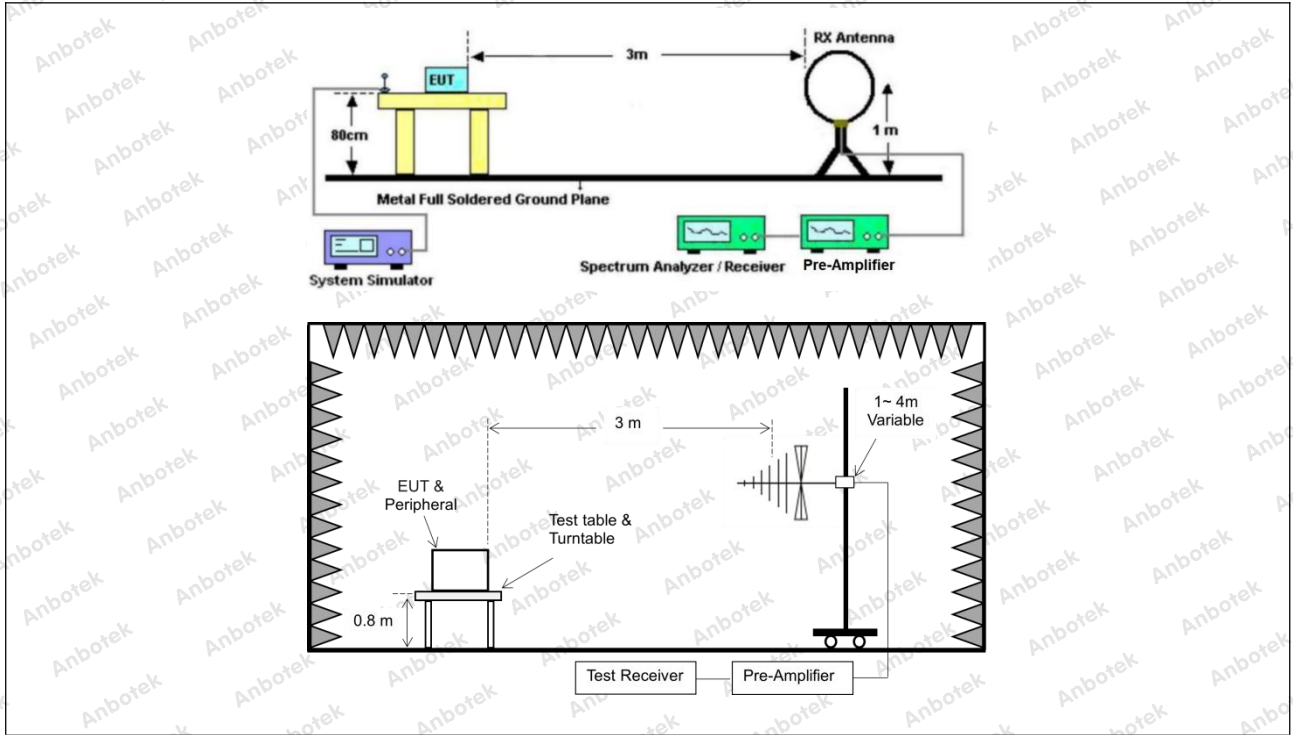
Test Requirement:	Refer to 47 CFR 15.247(d), In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a)(see § 15.205(c)).`		
Test Limit:	Frequency (MHz)	Field strength (microvolts/meter)	Measurement 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
Test Method:	<p>** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241.</p> <p>In the emission table above, the tighter limit applies at the band edges. The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.</p>		
Procedure:	ANSI C63.10-2020 section 6.6.4		
Test Method:	ANSI C63.10-2020 section 6.6.4 KDB 558074 D01 15.247 Meas Guidance v05r02		

9.1. EUT Operation

Operating Environment:	
Test mode:	<p>1: 802.11b mode: Keep the EUT in 802.11b transmitting mode.</p> <p>2: 802.11g mode: Keep the EUT in 802.11g transmitting mode.</p> <p>3: 802.11n(HT20) mode: Keep the EUT in 802.11n(HT20) transmitting mode.</p> <p>4: 802.11n(HT40) mode: Keep the EUT in 802.11n(HT40) transmitting mode.</p>



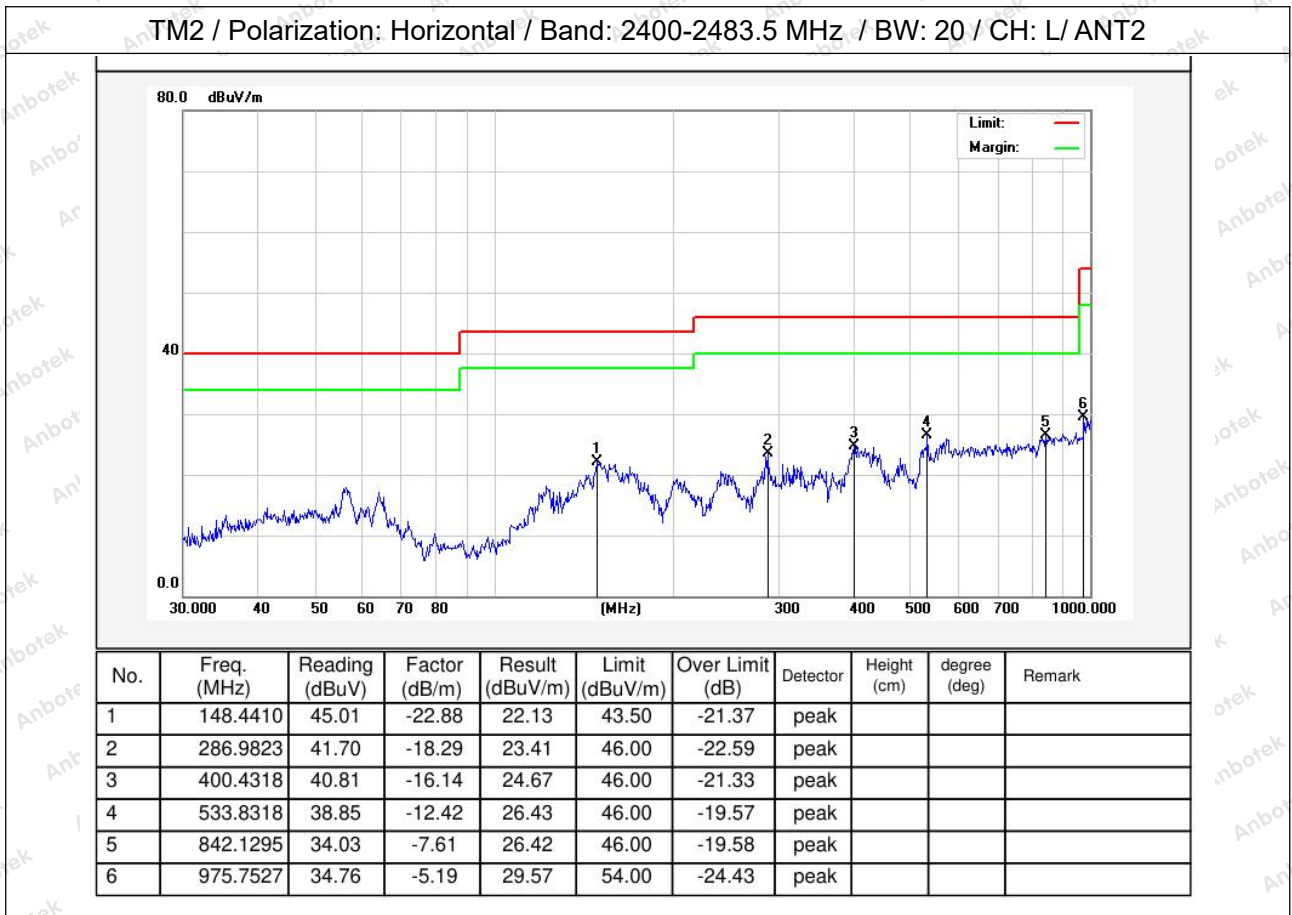
9.2. Test Setup



9.3. Test Data

The test results of 9kHz-30MHz was attenuated more than 20dB below the permissible limits, so the results don't record in the report.

Temperature:	23.7 °C	Humidity:	40 %	Atmospheric Pressure:	101 kPa
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Temperature:	23.7 °C	Humidity:	40 %	Atmospheric Pressure:	101 kPa
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TM2 / Polarization: Vertical / Band: 2400-2483.5 MHz / BW: 20 / CH: L/ ANT2



No.	Freq. (MHz)	Reading (dBUV)	Factor (dB/m)	Result (dBUV/m)	Limit (dBUV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	142.3240	46.02	-22.16	23.86	43.50	-19.64	peak			
2	296.1836	38.36	-16.39	21.97	46.00	-24.03	peak			
3	423.5403	39.57	-14.09	25.48	46.00	-20.52	peak			
4	520.8881	38.77	-12.03	26.74	46.00	-19.26	peak			
5	691.9867	35.55	-10.03	25.52	46.00	-20.48	peak			
6	979.1802	42.04	-5.14	36.90	54.00	-17.10	peak			

Note: Only record the worst data (802.11g ANT2) in the report.



10. Emissions in frequency bands (above 1GHz)

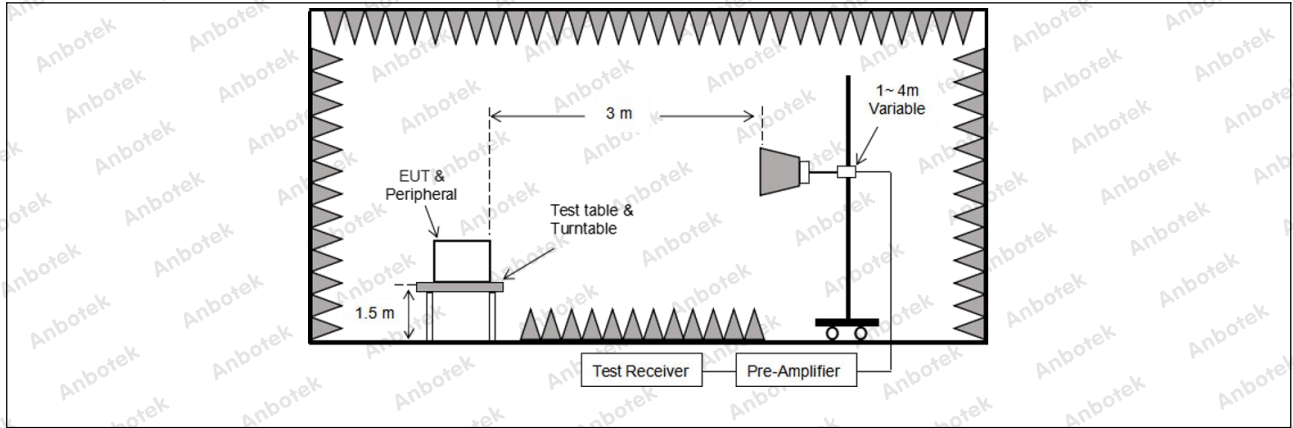
Test Requirement:	In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a)(see § 15.205(c)).		
Test Limit:	Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
	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
	<p>** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241.</p> <p>In the emission table above, the tighter limit applies at the band edges. The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.</p>		
Test Method:	ANSI C63.10-2020 section 6.6.4 KDB 558074 D01 15.247 Meas Guidance v05r02		
Procedure:	ANSI C63.10-2020 section 6.6.4		

10.1. EUT Operation

Operating Environment:	
Test mode:	<p>1: 802.11b mode: Keep the EUT in 802.11b transmitting mode.</p> <p>2: 802.11g mode: Keep the EUT in 802.11g transmitting mode.</p> <p>3: 802.11n(HT20) mode: Keep the EUT in 802.11n(HT20) transmitting mode.</p> <p>4: 802.11n(HT40) mode: Keep the EUT in 802.11n(HT40) transmitting mode.</p>



10.2. Test Setup



10.3. Test Data

Temperature:	23.7 °C	Humidity:	40 %	Atmospheric Pressure:	101 kPa
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TM2 / CH: L						
Peak value:						
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4824.00	27.75	15.31	43.06	74.00	-30.94	Vertical
7236.00	28.41	18.06	46.47	74.00	-27.53	Vertical
9648.00	29.36	23.77	53.13	74.00	-20.87	Vertical
12060.00	*			74.00		Vertical
14472.00	*			74.00		Vertical
4824.00	27.29	15.31	42.60	74.00	-31.40	Horizontal
7236.00	30.00	18.06	48.06	74.00	-25.94	Horizontal
9648.00	28.91	23.77	52.68	74.00	-21.32	Horizontal
12060.00	*			74.00		Horizontal
14472.00	*			74.00		Horizontal
Average value:						
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4824.00	18.83	15.31	34.14	54.00	-19.86	Vertical
7236.00	19.28	18.06	37.34	54.00	-16.66	Vertical
9648.00	19.71	23.77	43.48	54.00	-10.52	Vertical
12060.00	*			54.00		Vertical
14472.00	*			54.00		Vertical
4824.00	18.82	15.31	34.13	54.00	-19.87	Horizontal
7236.00	21.24	18.06	39.30	54.00	-14.70	Horizontal
9648.00	19.66	23.77	43.43	54.00	-10.57	Horizontal
12060.00	*			54.00		Horizontal
14472.00	*			54.00		Horizontal

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TM2 / CH: M						
Peak value:						
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4874.00	27.80	15.41	43.21	74.00	-30.79	Vertical
7311.00	28.47	18.01	46.48	74.00	-27.52	Vertical
9748.00	29.38	23.79	53.17	74.00	-20.83	Vertical
12185.00	*			74.00		Vertical
14622.00	*			74.00		Vertical
4874.00	28.14	15.41	43.55	74.00	-30.45	Horizontal
7311.00	29.62	18.01	47.63	74.00	-26.37	Horizontal
9748.00	29.23	23.79	53.02	74.00	-20.98	Horizontal
12185.00	*			74.00		Horizontal
14622.00	*			74.00		Horizontal
Average value:						
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4874.00	18.64	15.41	34.05	54.00	-19.95	Vertical
7311.00	19.79	18.01	37.80	54.00	-16.20	Vertical
9748.00	20.63	23.79	44.42	54.00	-9.58	Vertical
12185.00	*			54.00		Vertical
14622.00	*			54.00		Vertical
4874.00	20.25	15.41	35.66	54.00	-18.34	Horizontal
7311.00	20.71	18.01	38.72	54.00	-15.28	Horizontal
9748.00	18.95	23.79	42.74	54.00	-11.26	Horizontal
12185.00	*			54.00		Horizontal
14622.00	*			54.00		Horizontal

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TM2 / CH: H						
Peak value:						
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4924.00	28.36	15.51	43.87	74.00	-30.13	Vertical
7386.00	29.17	17.97	47.14	74.00	-26.86	Vertical
9848.00	30.19	23.82	54.01	74.00	-19.99	Vertical
12310.00	*			74.00		Vertical
14772.00	*			74.00		Vertical
4924.00	27.53	15.51	43.04	74.00	-30.96	Horizontal
7386.00	28.58	17.97	46.55	74.00	-27.45	Horizontal
9848.00	28.83	23.82	52.65	74.00	-21.35	Horizontal
12310.00	*			74.00		Horizontal
14772.00	*			74.00		Horizontal
Average value:						
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4924.00	18.27	15.51	33.78	54.00	-20.22	Vertical
7386.00	19.09	17.97	37.06	54.00	-16.94	Vertical
9848.00	20.19	23.82	44.01	54.00	-9.99	Vertical
12310.00	*			54.00		Vertical
14772.00	*			54.00		Vertical
4924.00	17.89	15.51	33.40	54.00	-20.60	Horizontal
7386.00	19.05	17.97	37.02	54.00	-16.98	Horizontal
9848.00	18.44	23.82	42.26	54.00	-11.74	Horizontal
12310.00	*			54.00		Horizontal
14772.00	*			54.00		Horizontal

Remark:

1. Result = Reading + Factor
2. “*” means the test results were attenuated more than 20dB below the permissible limits, so the results don't record in the report.
3. Only the worst case (802.11g ANT2) is recorded in the report.

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APPENDIX I -- TEST SETUP PHOTOGRAPH

Please refer to separated files Appendix I -- Test Setup Photograph_RF

APPENDIX II -- EXTERNAL PHOTOGRAPH

Please refer to separated files Appendix II -- External Photograph

APPENDIX III -- INTERNAL PHOTOGRAPH

Please refer to separated files Appendix III -- Internal Photograph

----- End of Report -----

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