TEST REPORT

Applicant:	TIANSHI DIGITAL TECHNOLOGY DEVELOPMENT LIMITED
Address of Applicant:	UNIT 1306 13/F ARION COMMERCIAL CENTRE,2-12 QUEEN'S ROAD WEST,SHEUNG WAN HK,China
Manufacturer/Factory:	Huizhou Hengdu Electronics Co., Ltd.
Address of Manufacturer/Factory:	No.8 Huitai Road,Huinan High-tech Industrial Park,Huiao Avenue,Huizhou,Guangdong,China
Equipment Under Test (EUT)	
Product Name:	Car Multimedia System
Model No.:	CVS1520, CVS1520A, CVS1520B, CVS1539, CVS1541
FCC ID:	2BQHV-CVS1520
Applicable standards:	FCC CFR Title 47 Part 15 Subpart E Section 15.407
Date of sample receipt:	May 15, 2025
Date of Test:	May 16, 2025-June 23, 2025
Date of report issue:	June 24, 2025
Test Result :	PASS *

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

Authorized Signature:

Robinson Luo

Laboratory Manager

2 Version

Version No.	Date	Description
00	*June 24, 2025*	*Original*

Prepared By: *Jason Wu* ***Date:*** *June 24, 2025*

Project Engineer

Check By: *Robinson Luo* ***Date:*** *June 24, 2025*

Reviewer

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4 Test Summary

Test Item	Section	Result
Antenna requirement	FCC part 15.203	PASS
AC Power Line Conducted Emission	FCC part 15.207	PASS
Emission Bandwidth	FCC part 15.407	PASS
Maximum Conducted Output Power	FCC part 15.407(a)(1)	PASS
Power Spectral Density	FCC part 15.407(a)(1)	PASS
Undesirable Emission	FCC part 15.407(b), 15.205/15.209	PASS
Radiated Emission	FCC part 15.205/15.209	PASS
Band Edge	FCC part 15.407(b)(1)	PASS
Frequency Stability	FCC part 15.407(g)	PASS

Remark:

Pass: The EUT complies with the essential requirements in the standard.

4.1 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Radio Frequency	$\pm 7.25\times10^{-8}$
2	Duty cycle	±0.37%
3	Occupied Bandwidth	±3%
4	RF conducted power	±0.75dB
5	RF power density	±3dB
6	Conducted Spurious emissions	±2.58dB
7	AC Power Line Conducted Emission	±3.44dB (0.15MHz ~ 30MHz)
8	Radiated Spurious emission test	±3.1dB (9kHz-30MHz)
		±3.8039dB (30MHz-200MHz)
		±3.9679dB (200MHz-1GHz)
		±4.29dB (1GHz-18GHz)
		±3.30dB (18GHz-40GHz)
9	Temperature test	±1°C
10	Humidity test	±3%
11	Time	±3%

5 General Information

5.1 General Description of EUT

<table>
<tr><td>Product Name:</td><td colspan="4">Car Multimedia System</td></tr>
<tr><td>Model No.:</td><td colspan="4">CVS1520, CVS1520A, CVS1520B, CVS1539, CVS1541</td></tr>
<tr><td>Test Model No:</td><td colspan="4">CVS1520</td></tr>
<tr><td colspan="5">Remark: All above models are identical in the same PCB layout, interior structure and electrical circuits. The only difference is model name for commercial purpose.</td></tr>
<tr><td>Test sample(s) ID:</td><td colspan="4">GTS2025050198-1</td></tr>
<tr><td>Sample(s) Status:</td><td colspan="4">Engineer sample</td></tr>
<tr><td>S/N:</td><td colspan="4">N/A</td></tr>
<tr><td>Operation Frequency:</td><td colspan="4"><table>
<tr><th>Band</th><th>Mode</th><th>Frequency Range(MHz)</th><th>Number of channels</th></tr>
<tr><td rowspan="3">U-NII Band I</td><td>IEEE 802.11a</td><td>5180-5240</td><td>4</td></tr>
<tr><td>IEEE 802.11n (HT20)</td><td>5180-5240</td><td>4</td></tr>
<tr><td>IEEE 802.11n (HT40)</td><td>5190-5230</td><td>2</td></tr>
</table></td></tr>
<tr><td>Modulation technology:</td><td colspan="4">OFDM</td></tr>
<tr><td>Antenna Type:</td><td colspan="4">Wire Antenna</td></tr>
<tr><td>Antenna gain:</td><td colspan="4">1.58dBi</td></tr>
<tr><td>Power supply:</td><td colspan="4">DC 10.5-16V</td></tr>
</table>

Remark:
1. Antenna gain information provided by the customer
2. The relevant information of the sample is provided by the entrusting company, and the laboratory is not responsible for its authenticity.

Channel list for 802.11a/n(HT20)							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
36	5180MHz	40	5200MHz	44	5220MHz	48	5240MHz

Channel list for 802.11n(HT40)			
Channel	Frequency	Channel	Frequency
38	5190MHz	46	5230MHz

5.2 Test mode

Transmitting mode	Keep the EUT in transmitting with modulation..

We have verified the construction and function in typical operation. All the test modes were carried out with the EUT in transmitting operation, which was shown in this test report and defined as follows:

Pre-scan all kind of data rate in lowest channel, and found the follow list which it was worst case.

Mode	Data rate	Mode	Data rate
802.11a/n(HT20)	6/6.5 Mbps	802.11n(HT40)	13.5 Mbps

5.3 Test Facility

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

● **FCC —Registration No.: 381383**

Designation Number: CN5029

Global United Technology Services Co., Ltd., Shenzhen 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 files.

● **ISED—Registration No.: 9079A**

CAB identifier: CN0091

The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of ISED for radio equipment testing .

● **NVLAP (LAB CODE:600179-0)**

Global United Technology Services Co., Ltd., is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP).

5.4 Test Location

All tests were performed at:

Global United Technology Services Co., Ltd.
Address: No. 123-128, Tower A, Jinyuan Business Building, No.2, Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, Guangdong, China 518102
Tel: 0755-27798480
Fax: 0755-27798960

5.5 Description of Support Units

None.

5.6 Deviation from Standards

None.

5.7 Additional Instructions

Test Software	EngineerMode
Power level setup	Default

6 Test Instruments list

Radiated Emission:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	3m Semi- Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	GTS250	Apr. 11, 2025	Apr. 10, 2026
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A
3	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	Apr. 12, 2025	Apr. 11, 2026
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9168	GTS640	Apr. 12, 2025	Apr. 11, 2026
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120 D	GTS208	Apr. 11, 2025	Apr. 10, 2026
6	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	GTS575	Jul. 02, 2024	Jul. 01, 2025
7	Loop Antenna	ZHINAN	ZN30900A	GTS534	Nov.16, 2024	Nov.15, 2025
8	Broadband Preamplifier	SCHWARZBECK	BBV9718	GTS535	Apr. 11, 2025	Apr. 10, 2026
9	Amplifier(1GHz-26.5GHz)	HP	8449B	GTS601	Apr. 11, 2025	Apr. 10, 2026
10	Horn Antenna (18GH-40GHz)	Schwarzbeck	BBHA 9170	GTS691	Apr. 11, 2025	Apr. 10, 2026
11	FSV·Signal Analyzer (10Hz-40GHz)	Keysight	FSV-40-N	GTS666	Mar. 11, 2025	Mar. 10, 2026
12	Amplifier	/	LNA-1000-30S	GTS650	Apr. 11, 2025	Apr. 10, 2026
13	CDNE M2+M3-16A	HCT	30MHz-300MHz	GTS692	Nov. 13, 2024	Nov. 12, 2025
14	Wideband Amplifier	/	WDA-01004000-15P35	GTS602	Apr. 11, 2025	Apr. 10, 2026
15	Thermo meter	JINCHUANG	GSP-8A	GTS643	Apr. 15, 2025	Apr. 14, 2026
16	RE cable 1	GTS	N/A	GTS675	Jul. 02, 2024	Jul. 01, 2025
17	RE cable 2	GTS	N/A	GTS676	Jul. 02, 2024	Jul. 01, 2025
18	RE cable 3	GTS	N/A	GTS677	Jul. 02, 2024	Jul. 01, 2025
19	RE cable 4	GTS	N/A	GTS678	Jul. 02, 2024	Jul. 01, 2025
20	RE cable 5	GTS	N/A	GTS679	Jul. 02, 2024	Jul. 01, 2025
21	RE cable 6	GTS	N/A	GTS680	Jul. 02, 2024	Jul. 01, 2025
22	RE cable 7	GTS	N/A	GTS681	Jul. 05, 2024	Jul. 04, 2025
23	RE cable 8	GTS	N/A	GTS682	Jul. 05, 2024	Jul. 04, 2025
24	EMI Test Software	AUDIX	E3-6.100614a	GTS725	N/A	N/A

Conducted Emission						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	Shielding Room	ZhongYu Electron	7.3(L)x3.1(W)x2.9(H)	GTS252	Jul. 12, 2022	Jul. 11, 2027
2	EMI Test Receiver	R&S	ESCI 7	GTS552	Apr. 12, 2025	Apr. 11, 2026
3	LISN	ROHDE & SCHWARZ	ENV216	GTS226	Apr. 11, 2025	Apr. 10, 2026
4	Coaxial Cable	GTS	N/A	GTS227	N/A	N/A
5	Thermo meter	JINCHUANG	GSP-8A	GTS642	Apr. 15, 2025	Apr. 14, 2026
6	Absorbing clamp	Elektronik-Feinmechanik	MDS21	GTS229	Apr. 12, 2025	Apr. 11, 2026
7	ISN	SCHWARZBECK	NTFM 8158	GTS565	Apr. 11, 2025	Apr. 10, 2026
8	High voltage probe	SCHWARZBECK	TK9420	GTS537	Apr. 11, 2025	Apr. 10, 2026
9	Antenna end assembly	Weinschel	1870A	GTS560	Apr. 11, 2025	Apr. 10, 2026
10	EMI Test Software	AUDIX	E3-6.100622	GTS726	N/A	N/A
11	Current probe	CYBERTEK	EM5011	GTS698	Jan. 13, 2025	Jan. 12, 2026

RF Conducted Test:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	MXA Signal Analyzer	Agilent	N9020A	GTS566	Apr. 11, 2025	Apr. 10, 2026
2	EMI Test Receiver	R&S	ESCI 7	GTS552	Apr. 12, 2025	Apr. 11, 2026
3	PSA Series Spectrum Analyzer	Agilent	E4440A	GTS536	Apr. 11, 2025	Apr. 10, 2026
4	MXG vector Signal Generator	Agilent	N5182A	GTS567	Apr. 11, 2025	Apr. 10, 2026
5	ESG Analog Signal Generator	Agilent	E4428C	GTS568	Apr. 11, 2025	Apr. 10, 2026
6	Wideband Power Meter	Keysighte	N1924A	GTS673	Apr. 11, 2025	Apr. 10, 2026
7	USB RF Power Sensor	DARE	RPR3006W	GTS569	Apr. 11, 2025	Apr. 10, 2026
8	RF Switch Box	Shongyi	RFSW3003328	GTS571	Apr. 11, 2025	Apr. 10, 2026
9	Programmable Constant Temp & Humi Test Chamber	WEWON	WHTH-150L-40-880	GTS572	Apr. 11, 2025	Apr. 10, 2026
10	Thermo meter	JINCHUANG	GSP-8A	GTS641	Apr. 15, 2025	Apr. 14, 2026
11	EXA Signal Analyzer	Keysight	N9010B	MY60241168	Nov. 02, 2024	Nov. 01, 2025

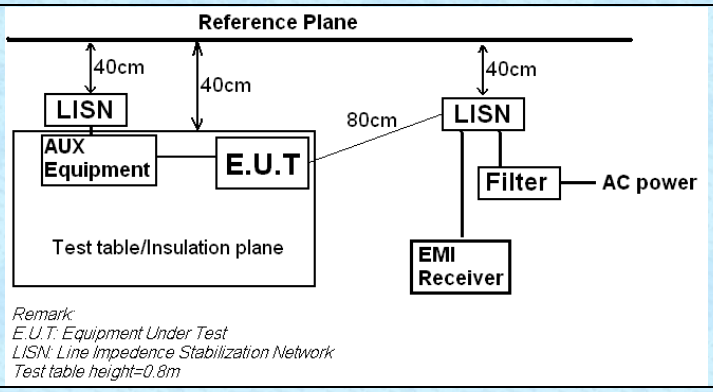
General used equipment:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	Barometer	KUMAO	SF132	GTS647	Aug. 17, 2024	Aug. 16, 2025

7 Test results and Measurement Data

7.1 Antenna requirement:

	Standard requirement:	FCC Part15 C Section 15.203
	15.203 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, 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.	
	E.U.T Antenna:	
	The antenna is wire antenna, reference to the appendix II for details	

7.2 Conducted Emissions

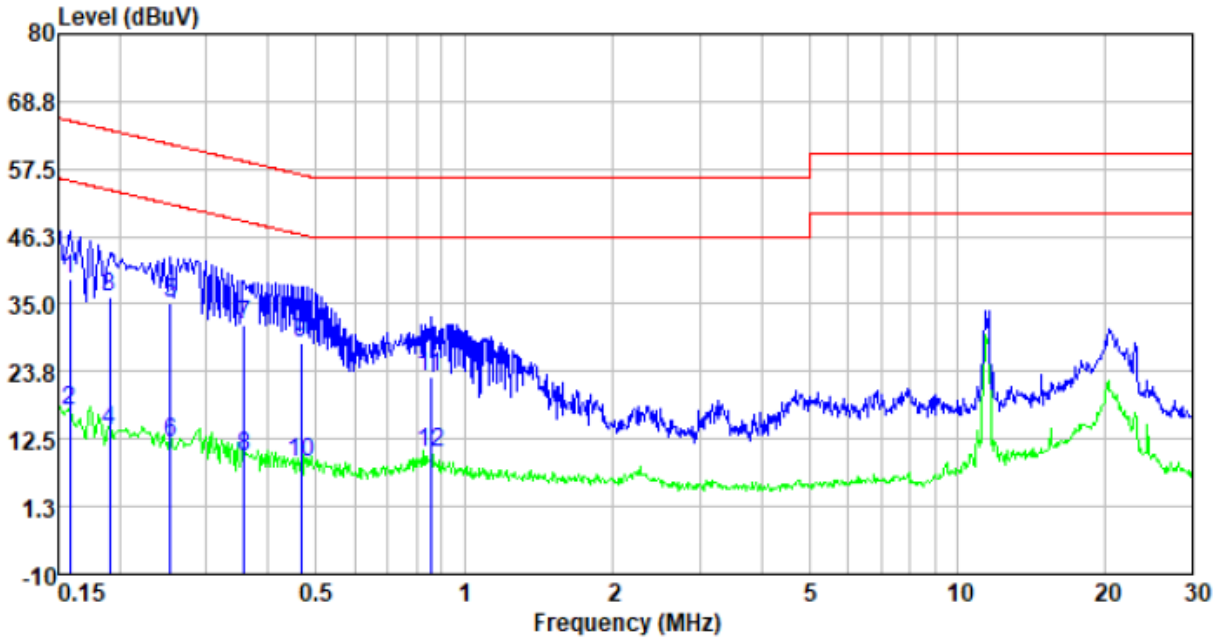
<table>
<tr><td>Test Requirement:</td><td colspan="6">FCC Part15 C Section 15.207</td></tr>
<tr><td>Test Method:</td><td colspan="6">ANSI C63.10:2013</td></tr>
<tr><td>Test Frequency Range:</td><td colspan="6">150KHz to 30MHz</td></tr>
<tr><td>Receiver setup:</td><td colspan="6">RBW=9KHz, VBW=30KHz</td></tr>
<tr><td>Limit:</td><td colspan="6">
<table>
<tr><td rowspan="2">Frequency range (MHz)</td><td colspan="2">Limit (dBuV)</td></tr>
<tr><td>Quasi-peak</td><td>Average</td></tr>
<tr><td>0.15-0.5</td><td>66 to 56*</td><td>56 to 46*</td></tr>
<tr><td>0.5-5</td><td>56</td><td>46</td></tr>
<tr><td>5-30</td><td>60</td><td>50</td></tr>
</table>
* Decreases with the logarithm of the frequency.
</td></tr>
<tr><td>Test procedure</td><td colspan="6">The E.U.T and simulators are connected to the main power through a line impedance stabilization network(L.I.S.N.). The provide a 50ohm/50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refers to the block diagram of the test setup and photographs). Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10:2013 on conducted measurement.</td></tr>
<tr><td>Test setup:</td><td colspan="6"> 

Remark:
E.U.T: Equipment Under Test
LISN: Line Impedence Stabilization Network
Test table height=0.8m</td></tr>
<tr><td>Test Instruments:</td><td colspan="6">Refer to section 6.0 for details</td></tr>
<tr><td>Test mode:</td><td colspan="6">Refer to section 5.2 for details</td></tr>
<tr><td>Test environment:</td><td>Temp.:</td><td>25 °C</td><td>Humid.:</td><td>52%</td><td>Press.:</td><td>1012mbar</td></tr>
<tr><td>Test voltage:</td><td colspan="6">DC 12V</td></tr>
<tr><td>Test results:</td><td colspan="6">Pass</td></tr>
</table>

Measurement data:

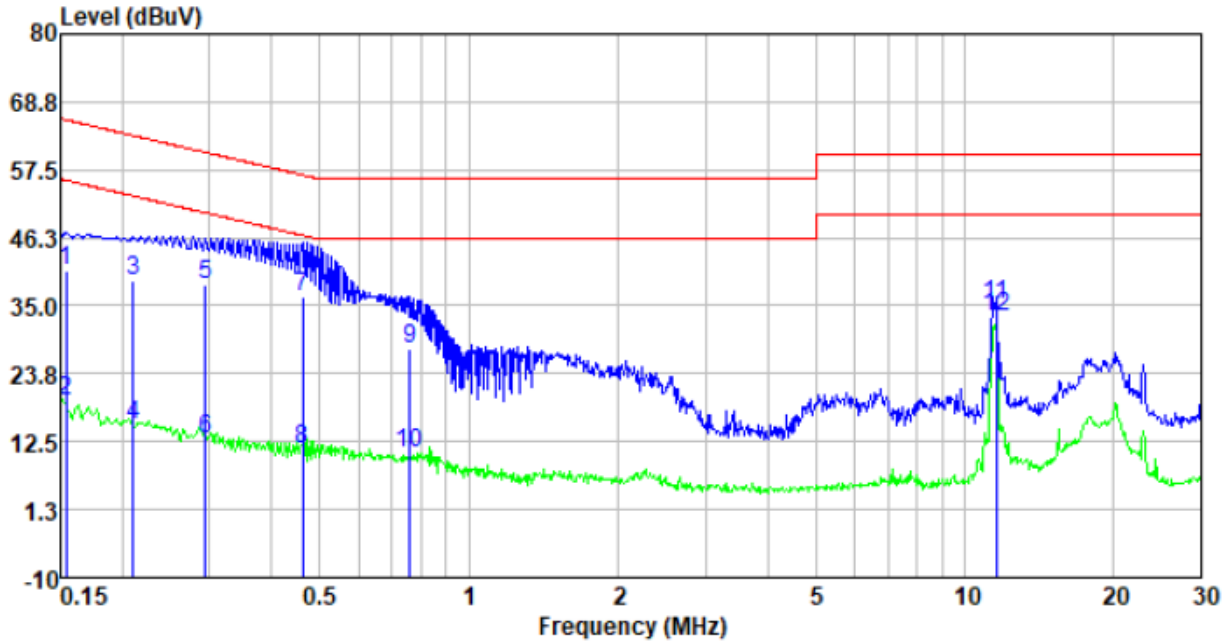
Pre-scan all test modes, found worst case at 802.11a 5180MHz, and so only show the test result of it

Line:



Freq	Reading level	LISN/ISN factor	Cable loss	Level	Limit level	Over limit	Remark
MHz	dBuV	dB	dB	dBuV	dBuV	dB	
0.16	19.10	9.98	0.01	39.09	65.56	-26.47	QP
0.16	-2.91	9.98	0.01	17.08	55.56	-38.48	Average
0.19	16.59	9.64	0.01	36.24	64.02	-27.78	QP
0.19	-5.78	9.64	0.01	13.87	54.02	-40.15	Average
0.25	15.42	9.60	0.01	35.03	61.64	-26.61	QP
0.25	-7.59	9.60	0.01	12.02	51.64	-39.62	Average
0.36	11.82	9.60	0.01	31.43	58.78	-27.35	QP
0.36	-10.02	9.60	0.01	9.59	48.78	-39.19	Average
0.47	8.83	9.79	0.01	28.63	56.58	-27.95	QP
0.47	-11.24	9.79	0.01	8.56	46.58	-38.02	Average
0.85	3.01	9.73	0.03	22.77	56.00	-33.23	QP
0.85	-9.63	9.73	0.03	10.13	46.00	-35.87	Average

Neutral:

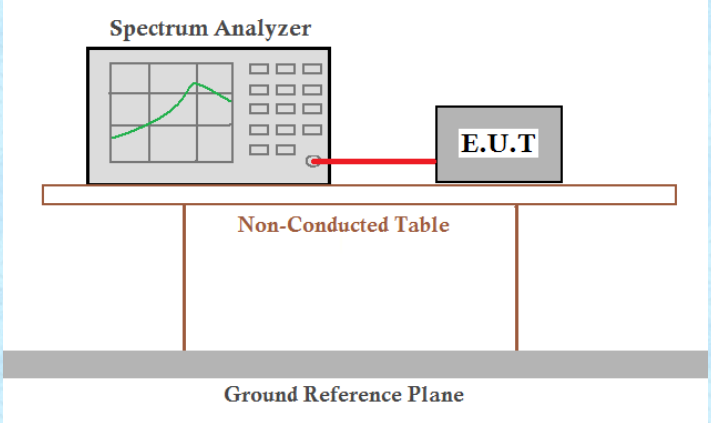


Freq	Reading level	LISN/ISN factor	Cable loss	Level	Limit level	Over limit	Remark
MHz	dBuV	dB	dB	dBuV	dBuV	dB	
0.15	20.96	9.88	0.01	40.85	65.78	-24.93	QP
0.15	-0.50	9.88	0.01	19.39	55.78	-36.39	Average
0.21	19.47	9.74	0.01	39.22	63.18	-23.96	QP
0.21	-4.53	9.74	0.01	15.22	53.18	-37.96	Average
0.29	18.76	9.75	0.01	38.52	60.41	-21.89	QP
0.29	-6.71	9.75	0.01	13.05	50.41	-37.36	Average
0.46	16.82	9.72	0.01	36.55	56.67	-20.12	QP
0.46	-8.41	9.72	0.01	11.32	46.67	-35.35	Average
0.76	8.07	9.92	0.02	28.01	56.00	-27.99	QP
0.76	-9.32	9.92	0.02	10.62	46.00	-35.38	Average
11.56	15.15	9.74	0.13	35.02	60.00	-24.98	QP
11.56	13.14	9.74	0.13	33.01	50.00	-16.99	Average

Notes:

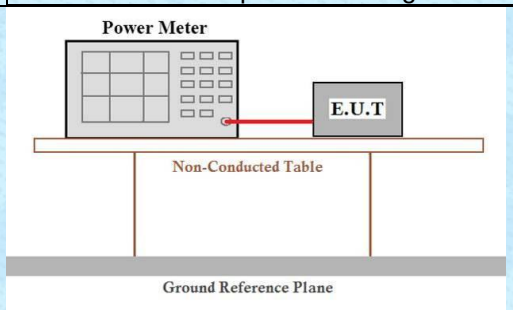
1. *An initial pre-scan was performed on the line and neutral lines with peak detector.*
2. *Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.*
3. *Final Level =Receiver Read level + LISN Factor + Cable Loss*

7.3 Emission Bandwidth

Test Requirement :	FCC Part15 E Section 15.407
Test Method :	ANSI C63.10:2013 & KDB 789033 D02 v02r01
Limit:	N/A
Test setup:	
Test procedure:	According to KDB 789033 D02 General U-NII Test Procedures New Rules v02r01.
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

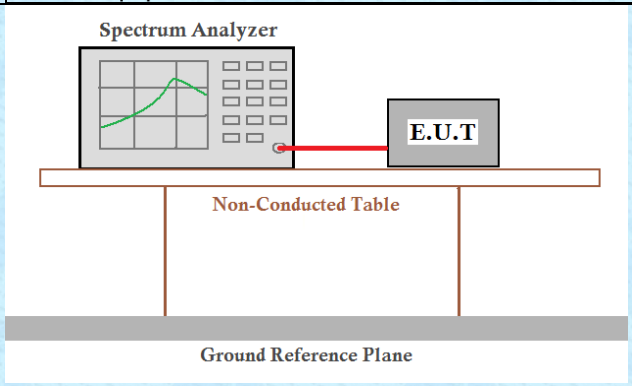
Measurement Data: The detailed test data see Appendix.

7.4 Maximum Conducted Output Power

Test Requirement	FCC Part15 E Section 15.407
Test Method :	ANSI C63.10:2013 & KDB 789033 D02 v02r01
Limit:	<table><tr><th>Frequency band (MHz)</th><th>Limit</th></tr><tr><td rowspan="2">5150-5250</td><td>≤1W(30dBm) for master device</td></tr><tr><td>≤250Mw(23.98dBm) for client device</td></tr><tr><td>5250-5350</td><td>≤250Mw(23.98dBm) for client device or 11dBm+10logB*</td></tr><tr><td>5470-5725</td><td>≤250Mw(23.98dBm) for client device or 11dBm+10logB*</td></tr><tr><td colspan="2">Remark: *Where B is the 26Db emission bandwidth in MHz. The maximum conducted output power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage.</td></tr></table>
Test setup:	
Duty Cycle set up:	RBW=VBW=8MHz
Test procedure:	**Measurement using an RF average power meter** (i) Measurements may be performed using a wideband RF power meter with a thermocouple detector or equivalent if all of the conditions listed below are satisfied a) The EUT is configured to transmit continuously or to transmit with a constant duty cycle. b) At all times when the EUT is transmitting, it must be transmitting at its maximum power control level. c) The integration period of the power meter exceeds the repetition period of the transmitted signal by at least a factor of five. (ii) If the transmitter does not transmit continuously, measure the duty cycle, x, of the transmitter output signal as described in section B). (iii) Measure the average power of the transmitter. This measurement is an average over both the on and off periods of the transmitter. (iv) Adjust the measurement in dBm by adding 10 log(1/x) where x is the duty cycle (e.g., 10log(1/0.25) if the duty cycle is 25 percent).
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement Data: The detailed test data see Appendix.

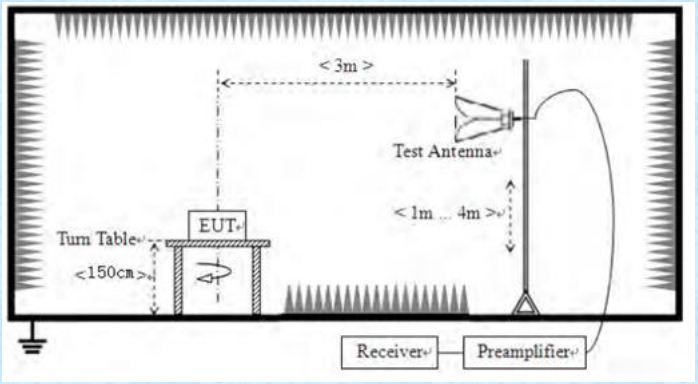
7.5 Power Spectral Density

Test Requirement:	FCC Part15 E Section 15.407
Test Method :	ANSI C63.10:2013 & KDB 789033 D02 v02r01
Limit:	Frequency band (MHz) / Limit 5150-5250 / ≤17dBm in 1MHz for master device 5150-5250 / ≤11dBm in 1MHz for client device 5250-5350 / ≤11dBm in 1MHz for client device 5470-5725 / ≤11dBm in 1MHz for client device Remark: The maximum power spectral density is measured as a conducted emission by direct connection of a calibrated test instrument to the equipment under test.
Test setup:	
Test procedure:	1) Create an average power spectrum for the EUT operating mode being tested by following the instructions in section E)2) for measuring maximum conducted output power using a spectrum analyzer or EMI receiver: select the appropriate test method (SA-1, SA-2, SA-3, or alternatives to each) and apply it up to, but not including, the step labeled, “Compute power…”. 2) Use the peak search function on the instrument to find the peak of the spectrum. 3) Make the following adjustments to the peak value of the spectrum, if applicable: a) If Method SA-2 or SA-2 Alternative was used, add 10 log(1/x), where x is the duty cycle, to the peak of the spectrum. b) If Method SA-3 Alternative was used and the linear mode was used in step E)2)g)(viii), add 1 dB to the final result to compensate for the difference between linear averaging and power averaging. 4) The result is the PSD.
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement Data: The detailed test data see Appendix.

7.6 Band Edge

<table>
<tr><td>Test Requirement:</td><td>FCC Part15 E Section 15.407 and 5.205</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.10:2013</td></tr>
<tr><td>Test site:</td><td>Measurement Distance: 3m (Semi-Anechoic Chamber)</td></tr>
<tr><td>Receiver setup:</td><td>
<table>
<tr><td>Frequency</td><td>Detector</td><td>RBW</td><td>VBW</td><td>Remark</td></tr>
<tr><td>30MHz-1GHz</td><td>Quasi-peak</td><td>120KHz</td><td>300KHz</td><td>Quasi-peak Value</td></tr>
<tr><td rowspan="2">Above 1GHz</td><td>Peak</td><td>1MHz</td><td>3MHz</td><td>Peak Value</td></tr>
<tr><td>AV</td><td>1MHz</td><td>3MHz</td><td>Average Value</td></tr>
</table>
</td></tr>
<tr><td>Limit:</td><td>
<table>
<tr><td>Frequency</td><td>Limit (dBuV/m @3m)</td><td>Remark</td></tr>
<tr><td>30MHz-88MHz</td><td>40.0</td><td>Quasi-peak Value</td></tr>
<tr><td>88MHz-216MHz</td><td>43.5</td><td>Quasi-peak Value</td></tr>
<tr><td>216MHz-960MHz</td><td>46.0</td><td>Quasi-peak Value</td></tr>
<tr><td>960MHz-1GHz</td><td>54.0</td><td>Quasi-peak Value</td></tr>
<tr><td rowspan="2">Above 1GHz</td><td>54.0</td><td>Average Value</td></tr>
<tr><td>68.2</td><td>Peak Value</td></tr>
</table>
Undesirable emission limits:
(1) For transmitters operating in the 5.15-5.25 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz.
(2) For transmitters operating in the 5.25-5.35 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz. Devices operating in the 5.25-5.35 GHz band that generate emissions in the 5.15-5.25 GHz band must meet all applicable technical requirements for operation in the 5.15-5.25 GHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of -27 dBm/MHz in the 5.15-5.25 GHz band.
(3) For transmitters operating in the 5.47-5.725 GHz band: all emissions outside of the 5.47-5.725 GHz band shall not exceed an EIRP of −27 dBm/MHz.
</td></tr>
<tr><td>Test Procedure:</td><td>
a. The EUT was placed on the top of a rotating table 1.5 m above the ground at a 3 meter camber. 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 rotable 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
</td></tr>
</table>

	sheet.
Test setup:	For radiated emissions above 1GHz 
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Remarks:

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*
3. *The pre-test were performed on lowest, middle and highest frequencies, only the worst case's (lowest and highest frequencies) data was showed.*
4. *According to KDB 789033 D02 v02r01 section G) 1) (d), for For measurements above 1000 MHz @ 3m distance, the limit of field strength is computed as follows:*
   E[dBuV/m] = EIRP[dBm] + 95.2;
   For example, if EIRP = -27dBm
   E[dBuV/m] = -27 + 95.2 = 68.2dBuV/m.

Measurement Data:

Test mode:		802.11a		Test Frequency:		5180MHz	
Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Over (dB)	Detector Type	Ant. Pol. H/V
5150	50.35	-3.63	46.72	68.20	-21.48	peak	H
5150	45.97	-3.63	42.34	54.00	-11.66	AVG	H
5150	51.94	-3.63	48.31	68.20	-19.89	peak	V
5150	45.26	-3.63	41.63	54.00	-12.37	AVG	V
Test mode:		802.11a		Test Frequency:		5240MHz	
Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Over (dB)	Detector Type	Ant. Pol. H/V
5350	48.84	-3.59	45.25	68.20	-22.95	peak	H
5350	45.38	-3.59	41.79	54.00	-12.21	AVG	H
5350	50.35	-3.59	46.76	68.20	-21.44	peak	V
5350	44.01	-3.59	40.42	54.00	-13.58	AVG	V
Test mode:		802.11n		Test Frequency:		5180MHz	
Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Over (dB)	Detector Type	Ant. Pol. H/V
5150	49.62	-3.63	45.99	68.20	-22.21	peak	H
5150	46.12	-3.63	42.49	54.00	-11.51	AVG	H
5150	52.03	-3.63	48.40	68.20	-19.80	peak	V
5150	44.82	-3.63	41.19	54.00	-12.81	AVG	V
Test mode:		802.11n		Test Frequency:		5240MHz	
Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Over (dB)	Detector Type	Ant. Pol. H/V
5350	48.99	-3.59	45.40	68.20	-22.80	peak	H
5350	45.41	-3.59	41.82	54.00	-12.18	AVG	H
5350	49.76	-3.59	46.17	68.20	-22.03	peak	V
5350	44.00	-3.59	40.41	54.00	-13.59	AVG	V

Test mode:		802.11n(HT40)		Test Frequency:		5190MHz	
Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Over (dB)	Detector Type	Ant. Pol. H/V
5150	49.62	-3.63	45.99	68.20	-22.21	peak	H
5150	46.12	-3.63	42.49	54.00	-11.51	AVG	H
5150	52.03	-3.63	48.40	68.20	-19.80	peak	V
5150	44.82	-3.63	41.19	54.00	-12.81	AVG	V
Test mode:		802.11n(HT40)		Test Frequency:		5230MHz	
Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Over (dB)	Detector Type	Ant. Pol. H/V
5350	48.97	-3.45	45.52	68.20	-22.68	peak	H
5350	45.40	-3.45	41.95	54.00	-12.05	AVG	H
5350	49.75	-3.45	46.30	68.20	-21.90	peak	V
5350	43.98	-3.45	40.53	54.00	-13.47	AVG	V

7.7 Radiated Emission

Test Requirement :	FCC Part15 C Section 15.209 and 15.205
Test Method :	ANSI C63.10: 2013
Test Frequency Range:	9kHz to 40GHz
Test site:	Measurement Distance: 3m (Semi-Anechoic Chamber)

Receiver setup:

Frequency	Detector	RBW	VBW	Value
9kHz-150KHz	Quasi-peak	200Hz	1kHz	Quasi-peak Value
150kHz-30MHz	Quasi-peak	9kHz	30kHz	Quasi-peak Value
30MHz-1GHz	Quasi-peak	120KHz	300KHz	Quasi-peak Value
Above 1GHz	Peak	1MHz	3MHz	Peak Value
	AV	1MHz	3MHz	Average Value
Note: For Duty cycle ≥ 98%, average detector set as above For Duty cycle < 98%, average detector set as below: VBW ≥ 1 / T				

Limit:

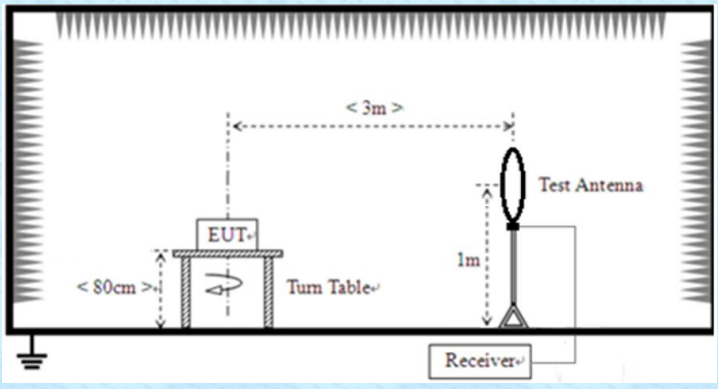
Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100**	3
88-216	150**	3
216-960	200**	3
Above 960	500	3

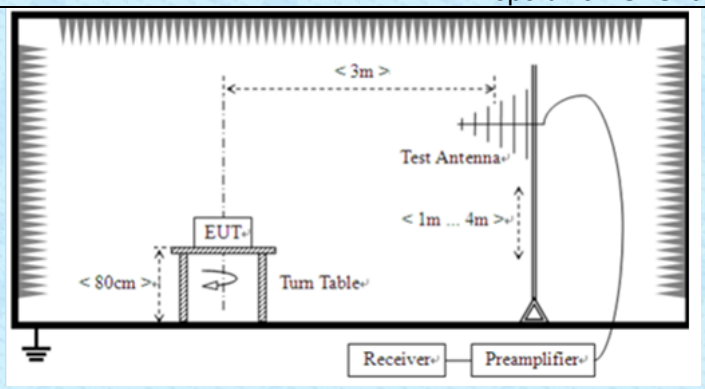
The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

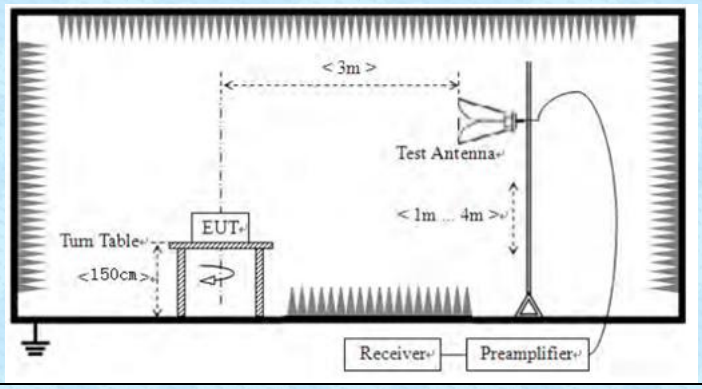
Test Procedure:

Substitution method was performed to determine the actual ERP emission levels of the EUT.
The following test procedure as below:
1>.Below 1GHz test procedure:

1. The EUT was placed on the top of a rotating table (0.8m for below 1GHz and 1.5 meters for above 1GHz) above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.
2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
3. 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.
4. 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 rotable table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. 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. 2>.Above 1GHz test procedure: 1. On the test site as test setup graph above,the EUT shall be placed at the 0.8m support on the turntable and in the position closest to normal use as declared by the provider. 2. The test antenna shall be oriented initially for vertical polarization and shall be chosen to correspond to the frequency of the transmitter.The output of the test antenna shall be connected to the measuring receiver. 3. The transmitter shall be switched on, if possible, without modulation and the measuring receiver shall be tuned to the frequency of the transmitter under test. 4. The test antenna shall be raised and lowered from 1m to 4m until a maximum signal level is detected by the measuring receiver. Then the turntable should be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver. 5. Repeat step 4 for test frequency with the test antenna polarized horizontally. 6. Remove the transmitter and replace it with a substitution antenna 7. Feed the substitution antenna at the transmitter end with a signal generator connected to the antenna by means of a nonradiating cable. With the antennas at both ends vertically polarized, and with the signal generator tuned to a particular test frequency, raise and lower the test antenna to obtain a maximum reading at the spectrum analyzer. Adjust the level of the signal generator output until the previously recorded maximum reading for this set of conditions is obtained. This should be done carefully repeating the adjustment of the test antenna and generator output. 8. Repeat step 7 with both antennas horizontally polarized for each test frequency. 9. Calculate power in dBm into a reference ideal half-wave dipole antenna by reducing the readings obtained in steps 7 and 8 by the power loss in the cable between the generator and the antenna, and further corrected for the gain of the substitution antenna used relative to an ideal half-wave dipole antenna by the following formula: EIRP(dBm) = Pg(dBm) – cable loss (dB) + antenna gain (dBi) where: Pg is the generator output power into the substitution antenna.
Test setup:	For radiated emissions from 9kHz to 30MHz  For radiated emissions from 30MHz to1GHz

<table>
<tr><td></td><td colspan="6"> 

For radiated emissions above 1GHz

</td></tr>
<tr><td>Test Instruments:</td><td colspan="6">Refer to section 6.0 for details</td></tr>
<tr><td>Test mode:</td><td colspan="6">Refer to section 5.2 for details</td></tr>
<tr><td>Test environment:</td><td>Temp.:</td><td>25 °C</td><td>Humid.:</td><td>52%</td><td>Press.:</td><td>1012mbar</td></tr>
<tr><td>Test voltage:</td><td colspan="6">DC 12V</td></tr>
<tr><td>Test results:</td><td colspan="6">Pass</td></tr>
</table>

Remarks:

1. Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the Y-axis which it is worse case.

Measurement Data:

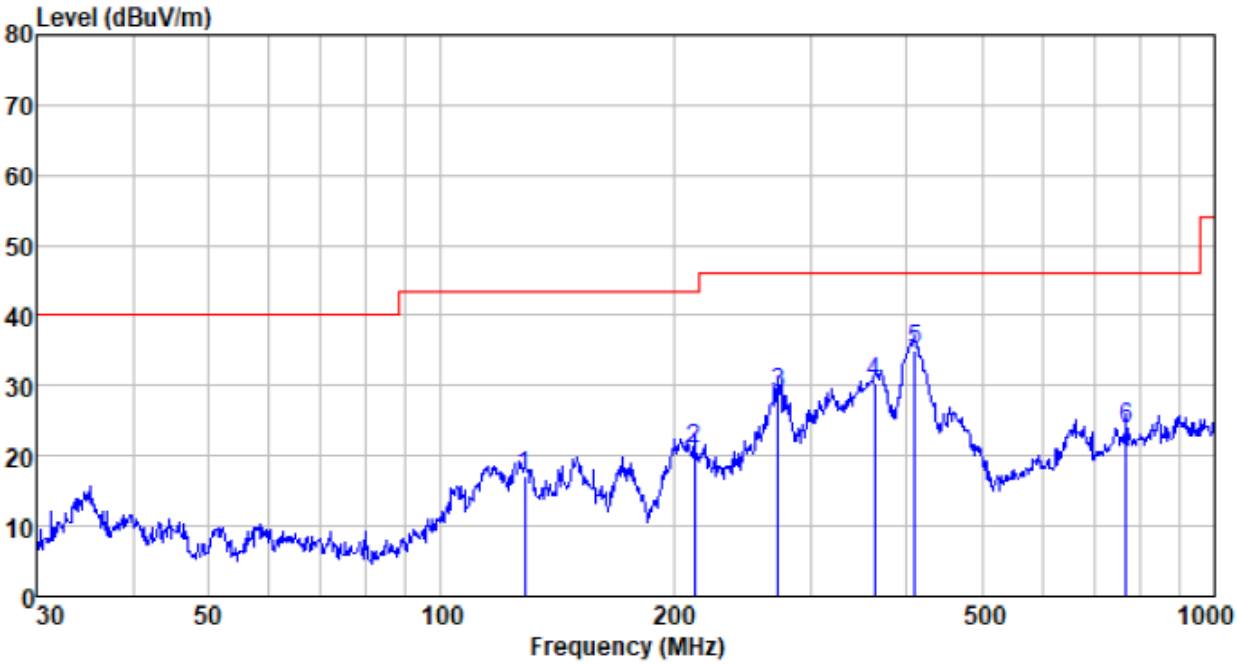
9 kHz ~ 30 MHz

The low frequency, which started from 9 kHz to 30 MHz, was pre-scanned and the result which was 20 dB lower than the limit line per 15.31(o) was not reported.

30MHz~ 1GHz

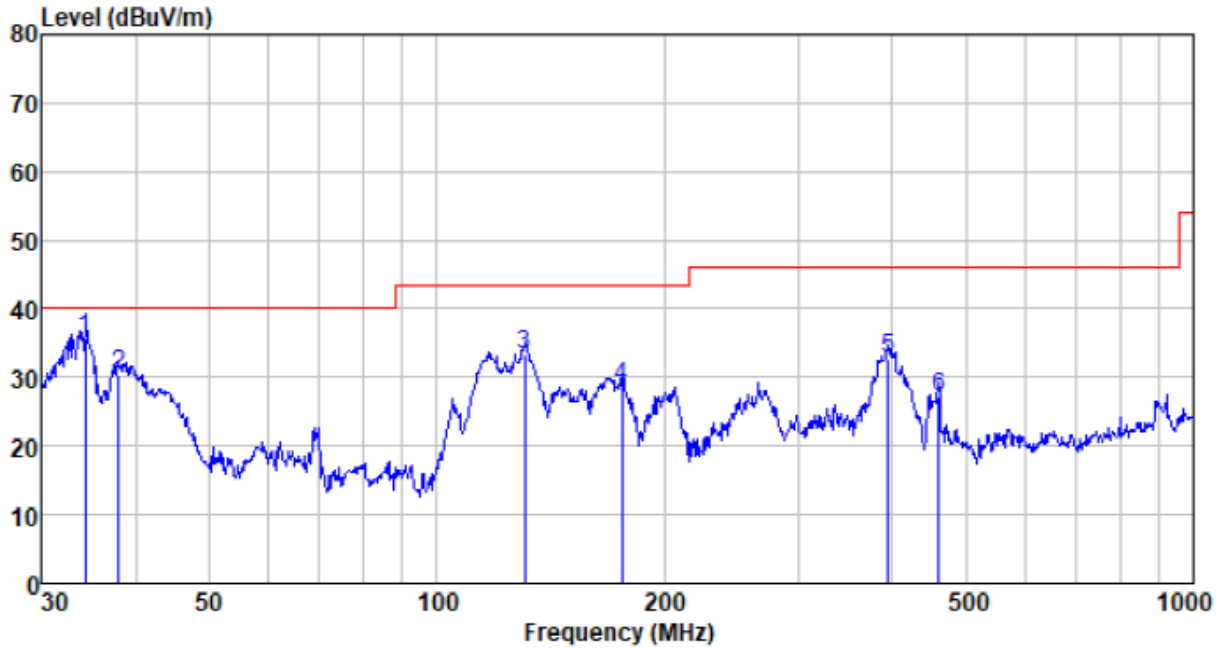
Pre-scan all test modes, found worst case at 802.11a 5180MHz, and so only show the test result of it

Horizontal:



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
128.113	34.38	13.01	2.26	32.47	17.18	43.50	-26.32	QP
212.270	40.64	9.85	2.93	32.39	21.03	43.50	-22.47	QP
273.234	46.54	11.53	3.29	32.33	29.03	46.00	-16.97	QP
362.985	45.00	13.86	3.72	32.27	30.31	46.00	-15.69	QP
410.383	48.54	15.01	3.92	32.24	35.23	46.00	-10.77	QP
768.748	28.40	21.50	5.35	31.21	24.04	46.00	-21.96	QP

Vertical:



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
34.276	53.82	12.88	1.17	32.30	35.57	40.00	-4.43	QP
37.945	47.62	13.88	1.23	32.30	30.43	40.00	-9.57	QP
130.837	50.12	13.28	2.29	32.47	33.22	43.50	-10.28	QP
175.652	45.64	12.87	2.68	32.42	28.77	43.50	-14.73	QP
394.855	46.57	14.69	3.86	32.25	32.87	46.00	-13.13	QP
460.727	39.28	16.11	4.08	32.22	27.25	46.00	-18.75	QP

Above 1GHz:

802.11a					Test Frequency: 5180MHz			
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10360	36.37	38.96	8.27	35.64	47.96	68.20	-20.24	Vertical
15540	34.28	38.40	10.57	35.35	47.90	68.20	-20.30	Vertical
10360	35.46	38.96	8.27	35.64	47.05	68.20	-21.15	Horizontal
15540	31.91	38.40	10.57	35.35	45.53	68.20	-22.67	Horizontal
10360	28.77	38.96	8.27	35.64	40.36	54.00	-13.64	Vertical
15540	27.08	38.40	10.57	35.35	40.70	54.00	-13.30	Vertical
10360	26.64	38.96	8.27	35.64	38.23	54.00	-15.77	Horizontal
15540	26.65	38.40	10.57	35.35	40.27	54.00	-13.73	Horizontal

802.11a					Test Frequency: 5200MHz			
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10400	36.11	39.01	8.29	35.67	47.74	68.20	-20.46	Vertical
15600	34.36	38.30	10.62	35.36	47.92	68.20	-20.28	Vertical
10400	35.88	39.01	8.29	35.67	47.51	68.20	-20.69	Horizontal
15600	29.90	38.30	10.62	35.36	43.46	68.20	-24.74	Horizontal
10400	29.70	39.01	8.29	35.67	41.33	54.00	-12.67	Vertical
15600	28.35	38.30	10.62	35.36	41.91	54.00	-12.09	Vertical
10400	24.91	39.01	8.29	35.67	36.54	54.00	-17.46	Horizontal
15600	25.69	38.30	10.62	35.36	39.25	54.00	-14.75	Horizontal

802.11a					Test Frequency: 5240MHz			
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10480	36.75	39.15	8.32	35.78	48.44	68.20	-19.76	Vertical
15720	33.21	38.00	10.72	35.37	46.56	68.20	-21.64	Vertical
10480	33.44	39.15	8.32	35.78	45.13	68.20	-23.07	Horizontal
15720	33.45	38.00	10.72	35.37	46.80	68.20	-21.40	Horizontal
10480	27.36	39.15	8.32	35.78	39.05	54.00	-14.95	Vertical
15720	25.24	38.00	10.72	35.37	38.59	54.00	-15.41	Vertical
10480	25.82	39.15	8.32	35.78	37.51	54.00	-16.49	Horizontal
15720	22.54	38.00	10.72	35.37	35.89	54.00	-18.11	Horizontal

802.11n(HT20)				Test Frequency: 5180MHz				
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10360	36.30	39.20	8.34	35.82	48.02	68.20	-20.18	Vertical
15540	34.80	37.90	10.77	35.38	48.09	68.20	-20.11	Vertical
10360	36.12	39.20	8.34	35.82	47.84	68.20	-20.36	Horizontal
15540	30.12	37.90	10.77	35.38	43.41	68.20	-24.79	Horizontal
10360	28.40	39.20	8.34	35.82	40.12	54.00	-13.88	Vertical
15540	25.92	37.90	10.77	35.38	39.21	54.00	-14.79	Vertical
10360	24.37	39.20	8.34	35.82	36.09	54.00	-17.91	Horizontal
15540	24.35	37.90	10.77	35.38	37.64	54.00	-16.36	Horizontal

802.11n(HT20)				Test Frequency: 5200MHz				
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10400	37.07	38.96	8.27	35.64	48.66	68.20	-19.54	Vertical
15600	32.39	38.40	10.57	35.35	46.01	68.20	-22.19	Vertical
10400	33.16	38.96	8.27	35.64	44.75	68.20	-23.45	Horizontal
15600	34.02	38.40	10.57	35.35	47.64	68.20	-20.56	Horizontal
10400	30.25	38.96	8.27	35.64	41.84	54.00	-12.16	Vertical
15600	28.49	38.40	10.57	35.35	42.11	54.00	-11.89	Vertical
10400	27.46	38.96	8.27	35.64	39.05	54.00	-14.95	Horizontal
15600	22.76	38.40	10.57	35.35	36.38	54.00	-17.62	Horizontal

802.11n(HT20)				Test Frequency: 5240MHz				
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10480	33.77	39.15	8.32	35.78	45.46	68.20	-22.74	Vertical
15720	33.26	38.00	10.72	35.37	46.61	68.20	-21.59	Vertical
10480	32.94	39.15	8.32	35.78	44.63	68.20	-23.57	Horizontal
15720	29.19	38.00	10.72	35.37	42.54	68.20	-25.66	Horizontal
10480	28.31	39.15	8.32	35.78	40.00	54.00	-14.00	Vertical
15720	27.94	38.00	10.72	35.37	41.29	54.00	-12.71	Vertical
10480	24.60	39.15	8.32	35.78	36.29	54.00	-17.71	Horizontal
15720	25.80	38.00	10.72	35.37	39.15	54.00	-14.85	Horizontal

802.11n(HT40)				Test Frequency: 5190MHz				
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10380	37.75	39.01	8.28	35.67	49.37	68.20	-18.83	Vertical
15570	33.00	38.30	10.60	35.36	46.54	68.20	-21.66	Vertical
10380	34.15	39.01	8.28	35.67	45.77	68.20	-22.43	Horizontal
15570	30.97	38.30	10.60	35.36	44.51	68.20	-23.69	Horizontal
10380	27.04	39.01	8.28	35.67	38.66	54.00	-15.34	Vertical
15570	26.39	38.30	10.60	35.36	39.93	54.00	-14.07	Vertical
10380	27.88	39.01	8.28	35.67	39.50	54.00	-14.50	Horizontal
15570	25.43	38.30	10.60	35.36	38.97	54.00	-15.03	Horizontal

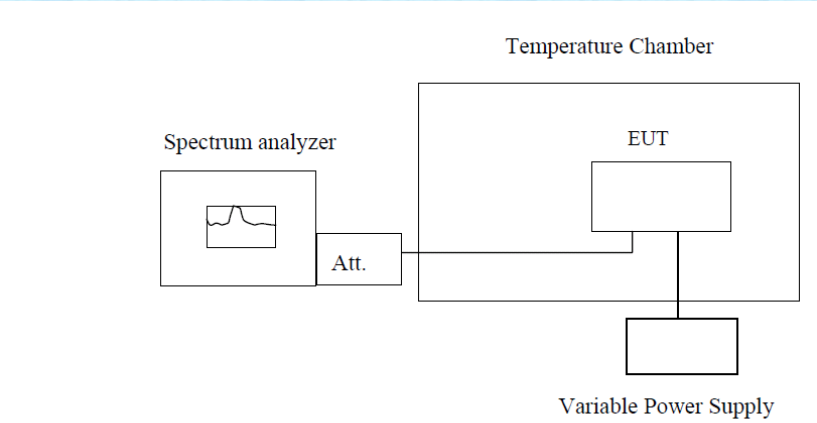
802.11n(HT40)				Test Frequency: 5230MHz				
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10460	36.32	39.11	8.31	35.75	47.99	68.20	-20.21	Vertical
15690	33.54	38.10	10.70	35.37	46.97	68.20	-21.23	Vertical
10460	33.15	39.11	8.31	35.75	44.82	68.20	-23.38	Horizontal
15690	30.97	38.10	10.70	35.37	44.40	68.20	-23.80	Horizontal
10460	30.18	39.11	8.31	35.75	41.85	54.00	-12.15	Vertical
15690	29.13	38.10	10.70	35.37	42.56	54.00	-11.44	Vertical
10460	25.22	39.11	8.31	35.75	36.89	54.00	-17.11	Horizontal
15690	27.40	38.10	10.70	35.37	40.83	54.00	-13.17	Horizontal

Notes:

1. Level = Read Level + Antenna Factor+ Cable loss- Preamp Factor.

2. The test trace is same as the ambient noise (the test frequency range: 18GHz~40GHz), therefore no data appear in the report.

7.8 Frequency stability

Test Requirement:	FCC Part15 C Section 15.407(g)
Test Method:	ANSI C63.10:2013, FCC Part 2.1055,
Limit:	Manufactures of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified
Test Procedure:	The EUT was setup to ANSI C63.4, 2003; tested to 2.1055 for compliance to FCC Part 15.407(g) requirements.
Test setup:	 **Note :** Measurement setup for testing on Antenna connector
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement Data:

Test Condition	Test Mode	Test Frequency [MHz]	Ant	Result [ppm]	Limit [ppm]	Verdict
NTNV	Carrier	5180	1	-0.19	<=20	PASS
		5190	1	-1.08	.<=20	PASS
		5200	1	-0.28	<=20	PASS
		5210	1	-1.34	<=20	PASS
		5230	1	-1.66	<=20	PASS
		5240	1	-0.83	<=20	PASS

8 Test Setup Photo

Reference to the **appendix I** for details.

9 EUT Constructional Details

Reference to the **appendix II** for details.

---END---