Shenzhen CTA Testing Technology Co., Ltd.

Room 106, Building 1, Yibaolai Industrial Park, Qiaotou Community, Fuhai Street, Bao'an District, Shenzhen, China

FCC Part 15 Subpart E 15.407

Report Reference No.....:	**CTA24072900906**
FCC ID..... :	**2AY4C-MG01**
Compiled by (position+printed name+signature) .:	File administrators Jinghua Xiao
Supervised by (position+printed name+signature) .:	Project Engineer Xudong Zhang
Approved by (position+printed name+signature) .:	RF Manager Eric Wang
Date of issue .....:	Oct. 16, 2024
Testing Laboratory Name.....:	**Shenzhen CTA Testing Technology Co., Ltd.**
Address .....:	Room 106, Building 1, Yibaolai Industrial Park, Qiaotou Community, Fuhai Street, Bao'an District, Shenzhen, China
Applicant's name.....:	**ShenZhen Jiteng Network Technology Co., Ltd.**
Address .....:	Floor 7, Building B, Boton Science and Technology Park, Chaguang Road, Xili Street, Nanshan District, Shenzhen, 518055, China
Test specification.....**:**	
Standard.....:	**FCC Part 15 Subpart E 15.407**
TRF Originator.....:	Shenzhen CTA Testing Technology Co., Ltd.

Test item description .....:	**Gaming Mini PC**
Trade Mark .....:	N/A
Manufacturer .....:	ShenZhen Jiteng Network Technology Co., Ltd.
Model/Type reference .....:	MegaMini2
Listed Models .....:	N/A
Modulation Type.....:	CCK/DSSS/OFDM
Operation Frequency.....:	U-NII-5: 5955MHz~6415MHz, U-NII-6: 6435MHz~6515MHz U-NII-7: 6535MHz~6875MHz, U-NII-8: 6895MHz~7095MHz
Rating .....:	DC 19.5V From external circuit
Result .....:	**PASS**

TEST REPORT

Equipment under Test	:	Gaming Mini PC
Model /Type	:	MegaMini2
Series Model No.		N/A
Applicant	:	**ShenZhen Jiteng Network Technology Co., Ltd.**
Address	:	Floor 7, Building B, Boton Science and Technology Park, Chaguang Road, Xili Street, Nanshan District, Shenzhen, 518055, China
Manufacturer	:	**ShenZhen Jiteng Network Technology Co., Ltd.**
Address	:	Floor 7, Building B, Boton Science and Technology Park, Chaguang Road, Xili Street, Nanshan District, Shenzhen, 518055, China

Test Result:	**PASS**

The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

Contents

1 TEST STANDARDS

The tests were performed according to following standards:

FCC Rules Part 15.407: UNLICENSED NATIONAL INFORMATION INFRASTRUCTURE DEVICES.
ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices
KDB 662911 D01 Multiple Transmitter Output v02r01: Emissions Testing of Transmitters with Multiple Outputs in the Same Band
KDB 987594 D01 U-NII 6GHz General Requirements v01r02: UNLICENSED NATIONAL INFORMATION INFRASTRUCTURE 6 GHz (U-NII) DEVISES PART 15, SUBPART E
KDB 987594 D02 U-NII 6GHz EMC Measurement v01r01: Part 15 Subpart E U-NII 6 GHz General Guidance Bands 5, 6, 7, 8

2 SUMMARY

2.1 General Remarks

Date of receipt of test sample	:	Aug. 05, 2024
Testing commenced on	:	Aug. 05, 2024
Testing concluded on	:	Oct. 16, 2024

2.2 Product Description

Product Name:	Gaming Mini PC	
Model/Type reference:	MegaMini2	
Power supply:	DC 19.5V From external circuit	
Adapter information:	Model: HKA300195A5-0A7 Input: AC 100-240V 50/60Hz 5.0A Output: DC 19.5V 15.38A 299.9W	
testing sample ID:	CTA240729009-1# (Engineer sample) CTA240729009-2# (Normal sample)	
Hardware version:	V1.0	
Software version:	V1.0	
WIFI :		
Operation frequency:	Operation Frequency: U-NII-5: 5955MHz~6415MHz, U-NII-6: 6435MHz~6515MHz U-NII-7: 6535MHz~6875MHz, U-NII-8: 6895MHz~7095MHz	
Modulation:	802.11a: OFDM (QPSK, BPSK, 16QAM, 64QAM) 802.11ax: OFDMA (BPSK, QPSK,16QAM, 64QAM, 256QAM, 1024QAM)	
Beamforming Function:	☒With Beamforming, ☐Without Beamforming	
Device Type:	☒Indoor Access Point	☐Subordinate
	☐Indoor Client	☐Standard Power
	☐Dual Client	☐Access Point
	☐Fixed Client	☐Standard Client
Antenna type:	Internal antenna	
Antenna gain:	ANT1:2.17 dBi, ANT2:4.71 dBi	
Note1:	For Power: Beamforming Mode: Directional gain = 10 log[($10^{Chain0/20}$ + $10^{Chain1/20}$+$10^{Chain2/20}$ + $10^{Chain3/20}$)^2 / 4] CDD Mode use max. antenna Gain	
Note2:	For PSD: CDD/Beamforming Mode: Directional gain = 10 log[($10^{Chain0/20}$ + $10^{Chain1/20}$+$10^{Chain2/20}$ + $10^{Chain3/20}$)^2 / 4]	

2.3 Equipment Under Test

Power supply system utilised

Power supply voltage	:	○	230V / 50 Hz	○	120V / 60Hz
		○	12V DC	○	24V DC
		●	Other (specified in blank below)		

DC 19.5V From external circuit

2.4 Short description of the Equipment under Test (EUT)

This is a Gaming Mini PC.
For more details, refer to the user's manual of the EUT.

2.5 EUT operation mode

(1) Channel List:

5955-6415MHz(U-NII-5 band)				
Bandwidth	**Channel No.**	**Frequency (MHz)**	**Channel No.**	**Frequency (MHz)**
802.11ax(HE20)	1	5955	49	6195
	5	5975	53	6215
	9	5995	57	6235
	13	6015	61	6255
	17	6035	65	6275
	21	6055	69	6295
	25	6075	73	6315
	29	6095	77	6335
	33	6115	81	6355
	37	6135	85	6375
	41	6155	89	6395
	45	6175	93	6415
Bandwidth	**Channel No.**	**Frequency (MHz)**	**Channel No.**	**Frequency (MHz)**
802.11ax(HE40)	3	5965	51	6205
	11	6005	59	6245
	19	6045	67	6285
	27	6085	75	6325
	35	6125	83	6365
	43	6165	91	6405
Bandwidth	**Channel No.**	**Frequency (MHz)**	**Channel No.**	**Frequency (MHz)**
802.11ax(HE80)	7	5985	55	6225
	23	6065	71	6305
	39	6145	87	6385
Bandwidth	**Channel No.**	**Frequency (MHz)**	**Channel No.**	**Frequency (MHz)**
802.11ax(HE160)	15	6025	79	6345
	47	6185		

6425-6525MHz(U-NII-6 band)				
Bandwidth	**Channel No.**	**Frequency (MHz)**	**Channel No.**	**Frequency (MHz)**
802.11ax(HE20)	97	6435	109	6495
	101	6455	113	6515
	105	6475		
Bandwidth	**Channel No.**	**Frequency (MHz)**	**Channel No.**	**Frequency (MHz)**
802.11ax(HE40)	99	6445	*115	6525
	107	6485		
Bandwidth	**Channel No.**	**Frequency (MHz)**	**Channel No.**	**Frequency (MHz)**
802.11ax(HE80)	103	6465	*119	6545
Bandwidth	**Channel No.**	**Frequency (MHz)**	**Channel No.**	**Frequency (MHz)**
802.11ax(HE160)	*111	6505		
***mean this is straddle channel.**				

6525-6885MHz(U-NII-7 band)				
Bandwidth	**Channel No.**	**Frequency (MHz)**	**Channel No.**	**Frequency (MHz)**
802.11ax(HE20)	117	6535	153	6715
	121	6555	157	6735
	125	6575	161	6755
	129	6595	165	6775
	133	6615	169	6795
	137	6635	173	6815
	141	6655	177	6835
	145	6675	181	6855
	149	6695	*185	6875
Bandwidth	**Channel No.**	**Frequency (MHz)**	**Channel No.**	**Frequency (MHz)**
802.11ax(HE40)	123	6565	163	6765
	131	6605	171	6805
	139	6645	179	6845
	147	6685	*187	6885
	155	6725		
Bandwidth	**Channel No.**	**Frequency (MHz)**	**Channel No.**	**Frequency (MHz)**
802.11ax(HE80)	135	6625	167	6785
	151	6705	*183	6865
Bandwidth	**Channel No.**	**Frequency (MHz)**	**Channel No.**	**Frequency (MHz)**
802.11ax(HE160)	143	6665	*175	6825
***mean this is straddle channel.**				

6875-7125MHz(U-NII-8 band)				
Bandwidth	**Channel No.**	**Frequency (MHz)**	**Channel No.**	**Frequency (MHz)**
802.11ax(HE20)	189	6895	213	7015
	193	6915	217	7035
	197	6935	221	7055
	201	6955	225	7075
	205	6975	229	7095
	209	6995		
Bandwidth	**Channel No.**	**Frequency (MHz)**	**Channel No.**	**Frequency (MHz)**
802.11ax(HE40)	195	6925	219	7045
	203	6965	227	7085
	211	7005		
Bandwidth	**Channel No.**	**Frequency (MHz)**	**Channel No.**	**Frequency (MHz)**
802.11ax(HE80)	199	6945	215	7025
Bandwidth	**Channel No.**	**Frequency (MHz)**	**Channel No.**	**Frequency (MHz)**
802.11ax(HE160)	207	6985	/	/

(2) Test Channel

Test Software: MT7922 QA.0.0.2.66			
U-NII-5			
Mode	Frequency(MHz)	Parameters	
		CDD Mode	BF Mode
802.11ax(HE20)	5955	32	N/A
	6175	32	N/A
	6415	32	N/A
802.11ax(HE40)	5965	56	N/A
	6165	58	N/A
	6405	60	N/A
802.11ax(HE80)	5985	70	N/A
	6145	72	N/A
	6385	76	N/A
802.11ax(HE160)	6025	68	N/A
	6185	68	N/A
	6345	72	N/A
U-NII-6			
Mode	Frequency(MHz)	Parameters	
		CDD Mode	BF Mode
802.11ax(HE20)	6435	32	N/A
	6475	32	N/A
	6515	36	N/A
802.11ax(HE40)	6445	64	N/A
	6485	64	N/A
	6525	64	N/A
802.11ax(HE80)	6465	80	N/A
	6545	80	N/A
802.11ax(HE160)	6505	72	N/A
U-NII-7			
Mode	Frequency(MHz)	Parameters	
		CDD Mode	BF Mode
802.11ax(HE20)	6535	36	N/A
	6695	36	N/A
	6855	36	N/A
	6875	36	N/A
802.11ax(HE40)	6565	64	N/A
	6685	64	N/A
	6845	64	N/A
	6885	64	N/A
802.11ax(HE80)	6625	80	N/A
	6705	80	N/A
	6785	80	N/A
	6865	80	N/A
802.11ax(HE160)	6665	72	N/A
	6825	72	N/A
U-NII-8			
Mode	Frequency(MHz)	Parameters	
		CDD Mode	BF Mode
802.11ax(HE20)	6895	36	N/A
	6995	36	N/A
	7095	36	N/A
802.11ax(HE40)	6925	64	N/A
	6965	64	N/A
	7085	64	N/A
802.11ax(HE80)	6945	76	N/A
	7025	76	N/A
802.11ax(HE160)	6985	72	N/A

Note:

(1) For all test, we have verified the construction and function in typical operation. And all the test modes were carried out with the EUT in transmitting operation in maximum power with all kinds of data rate.

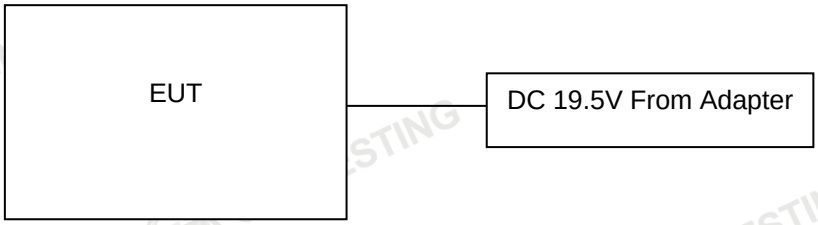
According to ANSI C63.10 standards, the measurements are performed at the highest, middle, lowest available channels, and the worst case data rate as follows:

(2) During the testing procedure, the continuously transmitting with the maximum power mode was programmed by the customer.

Mode	Data Rate
AX(HE20) Mode-CDD	HE0NSS1
AX(HE40) Mode-CDD	HE0NSS1
AX(HE80) Mode-CDD	HE0NSS1
AX(HE160) Mode-CDD	HE0NSS1

(3) The EUT is considered a Mobile unit; in normal use it was positioned on X-plane. The worst case was found positioned on X-plane. Therefore only the test data of this X-plane was used for radiated emission measurement test.

2.6 Block Diagram of Test Setup



2.7 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for filing to comply with Section 15.407 of the FCC Part 15, Subpart E Rules.

2.8 Modifications

No modifications were implemented to meet testing criteria.

3 TEST ENVIRONMENT

3.1 Address of the test laboratory

Shenzhen CTA Testing Technology Co., Ltd.
Room 106, Building 1, Yibaolai Industrial Park, Qiaotou Community, Fuhai Street, Bao'an District, Shenzhen, China

3.2 Test Facility

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

FCC-Registration No.: 517856 Designation Number: CN1318
Shenzhen CTA Testing Technology Co., Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements.

A2LA-Lab Cert. No.: 6534.01
Shenzhen CTA Testing Technology Co., Ltd. has been listed by American Association for Laboratory Accreditation to perform electromagnetic emission measurement.

ISED#: 27890 CAB identifier: CN0127
Shenzhen CTA Testing Technology Co., Ltd. has been listed by Innovation, Science and Economic Development Canada to perform electromagnetic emission measurement.

The 3m-Semi anechoic test site fulfils CISPR 16-1-4 according to ANSI C63.10 and CISPR 16-1-4:2010.

3.3 Environmental conditions

During the measurement the environmental conditions were within the listed ranges:
Radiated Emission:

Temperature:	25 ° C
Humidity:	45 %
Atmospheric pressure:	950-1050mbar

Conducted testing：

Temperature:	25 ° C
Humidity:	44 %
Atmospheric pressure:	950-1050mbar

AC Power Conducted Emission

Temperature:	24 ° C
Humidity:	44 %
Atmospheric pressure:	950-1050mbar

3.4 Test Description

FCC PART 15.407		
Standard Section	**Test Item**	**Judgment**
15.407(b)(8)	Conducted Emission	PASS
15.407(b)(5)(8)	Radiated Spurious Emission	PASS
15.407(b)(5)(8)	Conducted Spurious Emission	PASS
15.407(b)(6)	In-Band Emission(Mask)	PASS
15.407(a)(4/5/6/7/8)	Max E.I.R.P.	PASS
15.407(a)(10)	Emission Bandwidth Measurement	PASS
15.407(a)(4/5/6/7/8)	E.I.R.P Spectral Density	PASS
15.407(d)(6)	Contention-based Protocol	PASS
15.407(g)	Frequency Stability	PASS
15.407(d)	Operational restrictions for 6GHz U-NII devices	PASS
15.203	Antenna Requirement	PASS
/	On Time and Duty Cycle	PASS

3.5 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to TR-100028-01" Electromagnetic compatibility and Radio spectrum Matters (ERM);Uncertainties in the measurement of mobile radio equipment characteristics; Part 1" and TR-100028-02 "Electromagnetic compatibility and Radio spectrum Matters (ERM);Uncertainties in the measurement of mobile radio equipment characteristics; Part 2 " and is documented in the Shenzhen CTA Testing Technology Co., Ltd. quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.
Hereafter the best measurement capability for Shenzhen CTA Testing Technology Co., Ltd. :

Test	Range	Measurement Uncertainty	Notes
Radiated Emission	9KHz~30MHz	3.02 dB	(1)
Radiated Emission	30~1000MHz	4.06 dB	(1)
Radiated Emission	1~18GHz	5.14 dB	(1)
Radiated Emission	18-40GHz	5.38 dB	(1)
Conducted Disturbance	0.15~30MHz	2.14 dB	(1)
Output Peak power	30MHz~18GHz	0.55 dB	(1)
Power spectral density	/	0.57 dB	(1)
Spectrum bandwidth	/	1.1%	(1)
Radiated spurious emission (30MHz-1GHz)	30~1000MHz	4.10 dB	(1)
Radiated spurious emission (1GHz-18GHz)	1~18GHz	4.32 dB	(1)
Radiated spurious emission (18GHz-40GHz)	18-40GHz	5.54 dB	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

3.6 Equipments Used during the Test

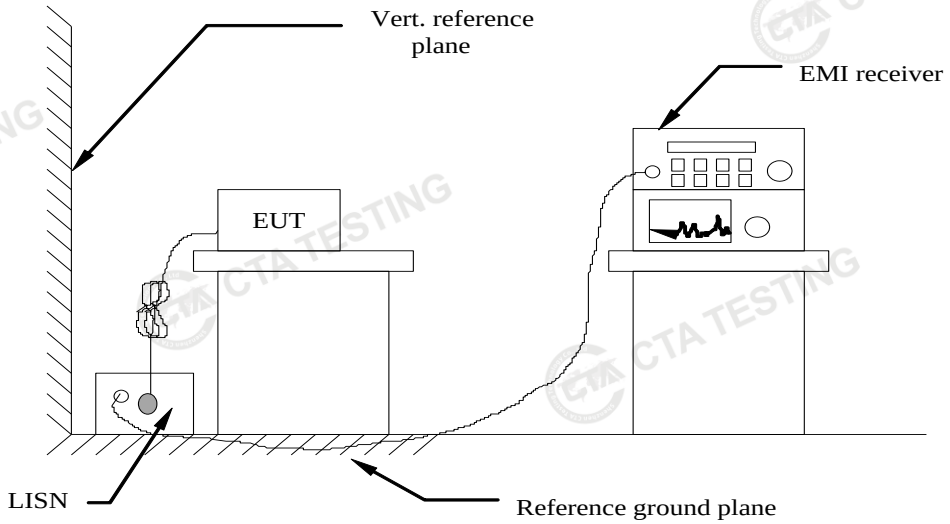
Test Equipment	Manufacturer	Model No.	Equipment No.	Calibration Date	Calibration Due Date
LISN	R&S	ENV216	CTA-308	2024/08/03	2025/08/02
LISN	R&S	ENV216	CTA-314	2024/08/03	2025/08/02
EMI Test Receiver	R&S	ESPI	CTA-307	2024/08/03	2025/08/02
EMI Test Receiver	R&S	ESCI	CTA-306	2024/08/03	2025/08/02
Spectrum Analyzer	Agilent	N9020A	CTA-301	2024/08/03	2025/08/02
Spectrum Analyzer	R&S	FSU	CTA-337	2024/08/03	2025/08/02
Spectrum Analyzer	R&S	FSV40	CTA-338	2024/08/03	2025/08/02
Vector Signal generator	Agilent	N5182A	CTA-305	2024/08/03	2025/08/02
Analog Signal Generator	R&S	SML03	CTA-304	2024/08/03	2025/08/02
WIDEBAND RADIO COMMUNICATION TESTER	CMW500	R&S	CTA-302	2024/08/03	2025/08/02
Temperature and humidity meter	Chigo	ZG-7020	CTA-326	2024/08/03	2025/08/02
Ultra-Broadband Antenna	Schwarzbeck	VULB9163	CTA-310	2023/10/17	2024/10/16
Horn Antenna	Schwarzbeck	BBHA 9120D	CTA-309	2023/10/13	2024/10/12
Loop Antenna	Zhinan	ZN30900C	CTA-311	2023/10/17	2024/10/16
Broadband Horn Antenna	A-INFOMW	LB-180500H-2.4F	CTA-336	2023/09/13	2026/09/12
Amplifier	Schwarzbeck	BBV 9745	CTA-312	2024/08/03	2025/08/02
Amplifier	Taiwan chengyi	EMC051845B	CTA-313	2024/08/03	2025/08/02
Directional coupler	NARDA	4226-10	CTA-303	2024/08/03	2025/08/02
High-Pass Filter	XingBo	XBLBQ-GTA18	CTA-402	2024/08/03	2025/08/02
High-Pass Filter	XingBo	XBLBQ-GTA27	CTA-403	2024/08/03	2025/08/02
Automated filter bank	Tonscend	JS0806-F	CTA-404	2024/08/03	2025/08/02
Power Sensor	Agilent	U2021XA	CTA-405	2024/08/03	2025/08/02
Amplifier	Schwarzbeck	BBV9719	CTA-406	2024/08/03	2025/08/02

Test Equipment	Manufacturer	Model No.	Version number	Calibration Date	Calibration Due Date
EMI Test Software	Tonscend	TS®JS32-RE	5.0.0.2	N/A	N/A
EMI Test Software	Tonscend	TS®JS32-CE	5.0.0.1	N/A	N/A
RF Test Software	Tonscend	TS®JS1120-3	3.1.65	N/A	N/A
RF Test Software	Tonscend	TS®JS1120	3.1.46	N/A	N/A

4 TEST CONDITIONS AND RESULTS

4.1 AC Power Conducted Emission

TEST CONFIGURATION



TEST PROCEDURE

1 The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10-2013.
2 Support equipment, if needed, was placed as per ANSI C63.10-2013
3 All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10-2013
4 The EUT received power from adapter, the adapter received AC120V/60Hz and AC 240V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
5 All support equipments received AC power from a second LISN, if any.
6 The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT.The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7 Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.
8 During the above scans, the emissions were maximized by cable manipulation.

AC Power Conducted Emission Limit

For intentional device, according to § 15.207(a) AC Power Conducted Emission Limits is as following :

Frequency range (MHz)	Limit (dBuV)	
	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.		

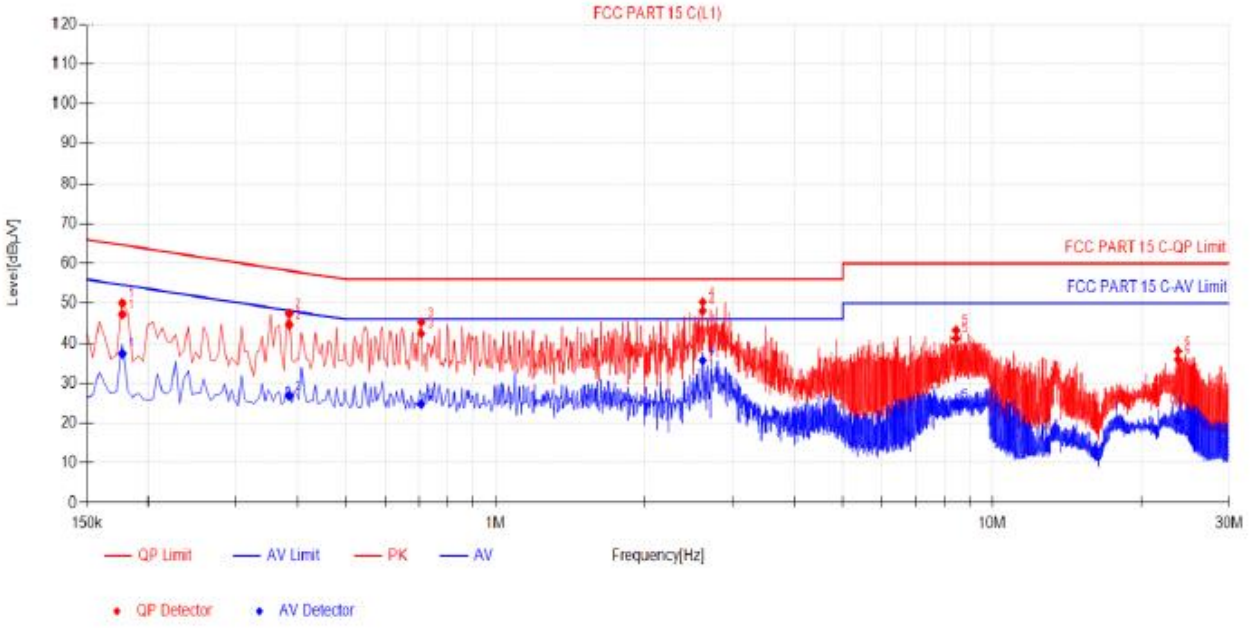
TEST RESULTS

Remark:

1. All modes of 802.11ax were tested at Low, Middle, and High channel; only the worst result of 802.11ax(HE20) U-NII-5 was reported as below:

2. Both 120 VAC, 50/60 Hz and 240 VAC, 50/60 Hz power supply have been tested, only the worst result of 120 VAC, 60 Hz was reported as below:

Power supply:	DC 19.5V From Adapter AC 120V/60Hz	Polarization	L



Final Data List

NO.	Freq. [MHz]	Factor [dB]	QP Reading[dBµV]	QP Value [dBµV]	QP Limit [dBµV]	QP Margin [dB]	AV Reading [dBµV]	AV Value [dBµV]	AV Limit [dBµV]	AV Margin [dB]	Verdict
1	0.177	9.99	37.24	47.23	64.63	17.40	27.43	37.42	54.63	17.21	PASS
2	0.384	9.87	34.76	44.63	58.19	13.56	16.99	26.86	48.19	21.33	PASS
3	0.708	9.91	32.51	42.42	56.00	13.58	14.85	24.76	46.00	21.24	PASS
4	2.6115	10.08	38.08	48.16	56.00	7.84	25.59	35.67	46.00	10.33	PASS
5	8.457	10.27	30.92	41.19	60.00	18.81	14.54	24.81	50.00	25.19	PASS
6	23.6895	10.49	25.45	35.94	60.00	24.06	10.01	20.50	50.00	29.50	PASS

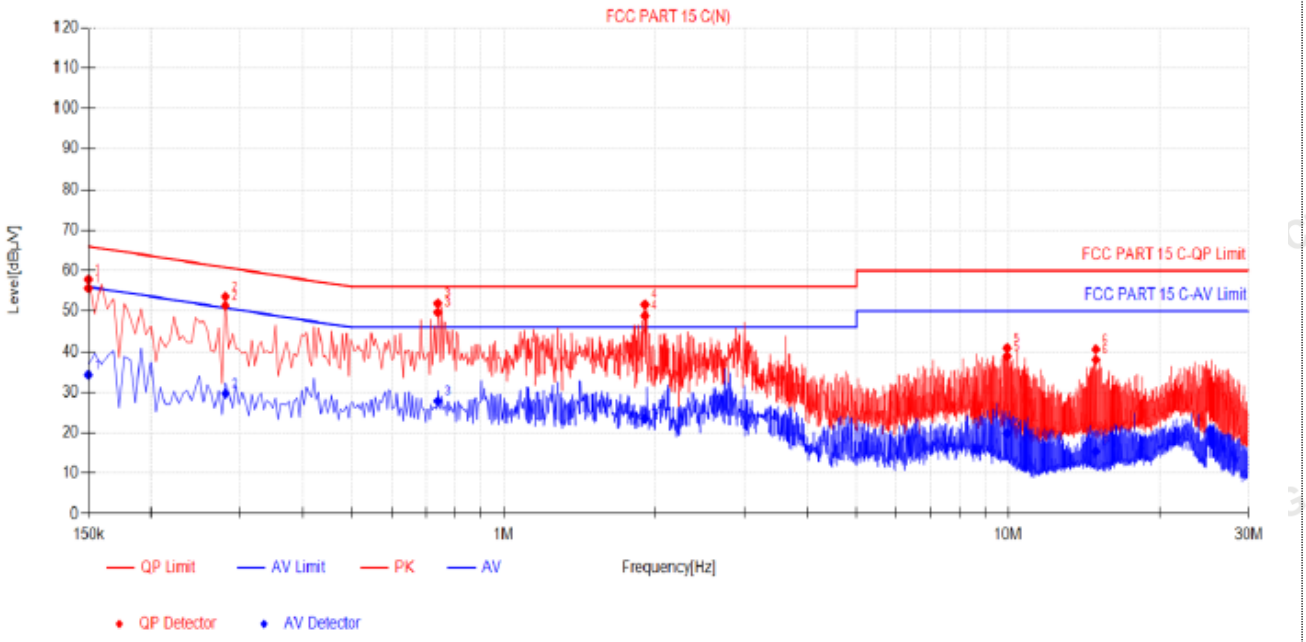
Note:1).QP Value (dBµV)= QP Reading (dBµV)+ Factor (dB)

2). Factor (dB)=insertion loss of LISN (dB) + Cable loss (dB)

3). QPMargin(dB) = QP Limit (dBµV) - QP Value (dBµV)

4). AVMargin(dB) = AV Limit (dBµV) - AV Value (dBµV)

Power supply:	DC 19.5V From Adapter AC 120V/60Hz	Polarization	N



Final Data List

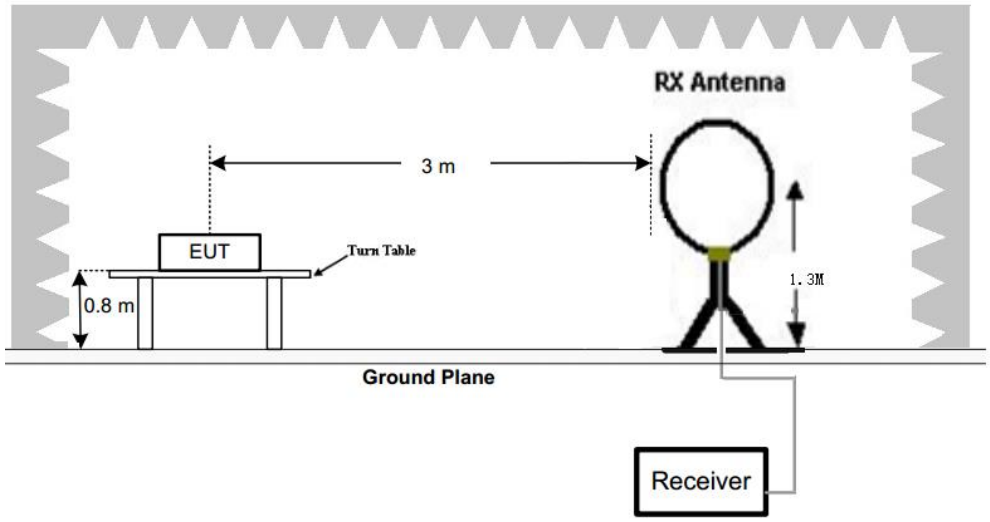
NO.	Freq. [MHz]	Factor [dB]	QP Reading[dBµV]	QP Value [dBµV]	QP Limit [dBµV]	QP Margin [dB]	AV Reading [dBµV]	AV Value [dBµV]	AV Limit [dBµV]	AV Margin [dB]	Verdict
1	0.15	9.98	45.67	55.65	66.00	10.35	24.28	34.26	56.00	21.74	PASS
2	0.2805	9.92	41.45	51.37	60.80	9.43	19.77	29.69	50.80	21.11	PASS
3	0.7395	10.09	39.63	49.72	56.00	6.28	17.74	27.83	46.00	18.17	PASS
4	1.905	10.18	38.65	48.83	56.00	7.17	13.33	23.51	46.00	22.49	PASS
5	9.9555	10.40	28.45	38.85	60.00	21.15	9.43	19.83	50.00	30.17	PASS
6	14.9325	10.42	27.59	38.01	60.00	21.99	5.00	15.42	50.00	34.58	PASS

Note:1).QP Value (dBµV)= QP Reading (dBµV)+ Factor (dB)
2). Factor (dB)=insertion loss of LISN (dB) + Cable loss (dB)
3). QPMargin(dB) = QP Limit (dBµV) - QP Value (dBµV)
4). AVMargin(dB) = AV Limit (dBµV) - AV Value (dBµV)

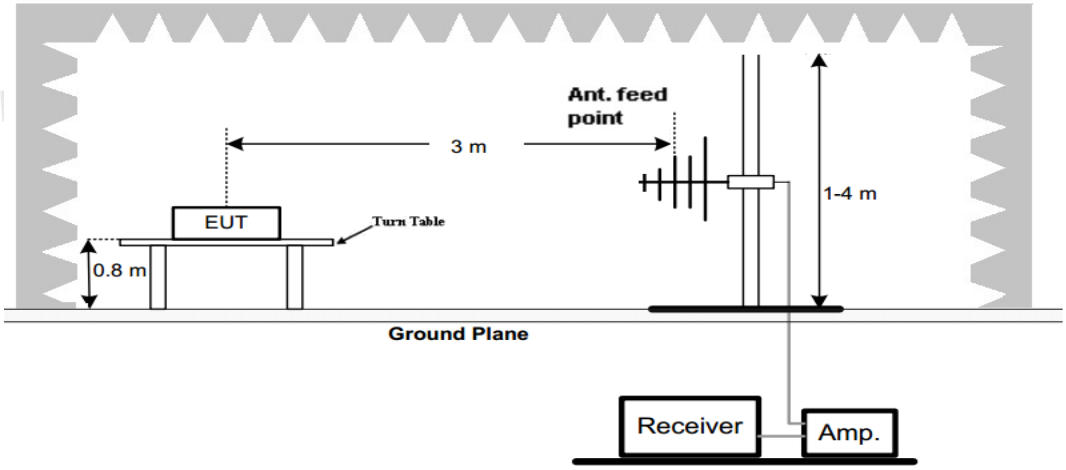
4.2 Radiated Emission and Restricted Bands Requirement

TEST CONFIGURATION

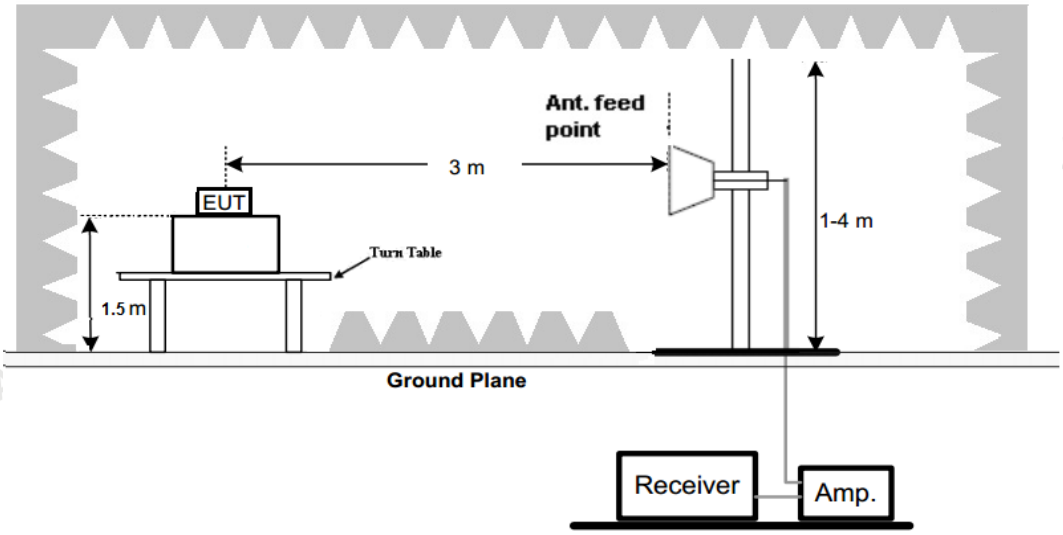
(A) Radiated Emission Test Set-Up, Frequency Below 30MHz

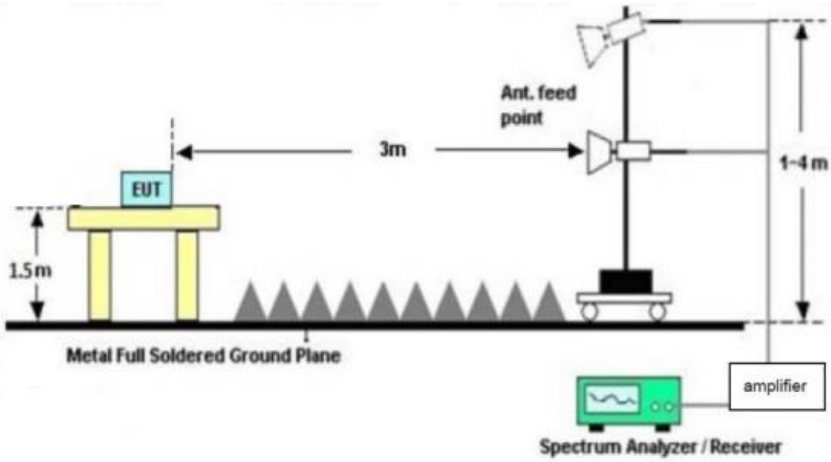


(B) Radiated Emission Test Set-Up, Frequency below 1000MHz



(C) Radiated Emission Test Set-Up, Frequency above 1000MHz





TEST PROCEDURE

---Radiated measurement

●The measuring distance of 3m shall be used for measurements at frequency up to 1GHz and above 1 GHz. The EUT was placed on a rotating 0.8m high above ground, the table was rotated 360 degrees to determine the position of the highest radiation.

● Measurements at frequency above 1GHz. The EUT was placed on a rotating 1.5m high above the ground. RF absorbers covered the ground plane with a minimum area of 3.0m by 3.0m between the EUT and measurement receiver antenna. The RF absorber shall not exceed 30cm in high above the conducting floor. The table was rotated 360 degrees to determine the position of the highest radiation.

● The Test antenna shall vary between 1m and 4m, Both Horizontal and Vertical antenna are set to make measurement.

●The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.

●If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit Below 1 GHz, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed. But the Peak Value and average value both need to comply with applicable limit above 1 GHz.

●Testing frequency range 30MHz-1GHz the measuring instrument use VBW=120 kHz with Quasi-peak detection. Testing frequency range 9KHz-150Hz the measuring instrument use VBW=200Hz with Quasi-peak detection. Testing frequency range 9KHz-30MHz the measuring instrument use VBW=9kHz with Quasi-peak detection.

●Testing frequency range above 1GHz the measuring instrument use RBW=1 MHz and VBW=3 MHz with Peak Detector for Peak Values, and use RBW=1 MHz and VBW=10 Hz with Peak Detector for Average Values.

●For the actual test configuration, please see the test setup photo.

---Restricted Radiated Bands measurement

● Measurements at frequency above 1GHz. The EUT was placed on a rotating 1.5m high above the ground. RF absorbers covered the ground plane with a minimum area of 3.0m by 3.0m between the EUT and measurement receiver antenna. The RF absorber shall not exceed 30cm in high above the conducting floor. The table was rotated 360 degrees to determine the position of the highest radiation.

● The Test antenna shall vary between 1m and 4m, Both Horizontal and Vertical antenna are set to make measurement.

●The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.

●The Peak Value and average value both need to comply with applicable limit above 1 GHz.

●Testing frequency range above 1GHz the measuring instrument use RBW=1 MHz and VBW=3 MHz with Peak Detector for Peak Values, and use RBW=1 MHz and VBW=10 Hz with Peak Detector for Average Values.

●For the actual test configuration, please see the test setup photo.

--- Conducted measurement

●Reference level measurement

Establish a reference level by using the following procedure:

a) Set instrument center frequency to DTS channel center frequency.
b) Set the span to≥1.5 times the DTS bandwidth.
c) Set the RBW = 100 kHz.
d) Set the VBW≥[3*RBW].
e) Detector = peak.
f) Sweep time = auto couple.
g) Trace mode = max hold.
h) Allow trace to fully stabilize.
i) Use the peak marker function to determine the maximum PSD level.

Note that the channel found to contain the maximum PSD level can be used to establish the reference level.

--- Conducted Radiated Bands measurement

a) Measure the conducted output power (in dBm) using the detector specified by the appropriate regulatory agency (see 11.12.2.3 through 11.12.2.5 for guidance regarding measurement procedures for determining quasi-peak, peak, and average conducted output power, respectively).
b) Add the maximum transmit antenna gain (in dBi) to the measured output power level to determine the EIRP (see 11.12.2.6 for guidance on determining the applicable antenna gain).
c) Add the appropriate maximum ground reflection factor to the EIRP (6 dB for frequencies ≤30 MHz; 4.7 dB for frequencies between 30 MHz and 1000 MHz, inclusive; and 0 dB for frequencies > 1000 MHz).
d) For MIMO devices, measure the power of each chain and sum the EIRP of all chains in linear terms (i.e., watts and mW).
e) Convert the resultant EIRP to an equivalent electric field strength using the following relationship:

$$E = EIRP - 20 \log d + 104.8$$

where
E is the electric field strength in dBuV/m
EIRP is the equivalent isotropically radiated power in dBm
d is the specified measurement distance in m
f) Compare the resultant electric field strength level with the applicable regulatory limit.
g) Perform the radiated spurious emission test.

●Emission level measurement

Establish an emission level by using the following procedure:

a) Set the center frequency and span to encompass frequency range to be measured.
b) Set the RBW = 100 kHz.
c) Set the VBW≥[3*RBW].
d) Detector = peak.
e) Sweep time = auto couple.
f) Trace mode = max hold.
g) Allow trace to fully stabilize.
h) Use the peak marker function to determine the maximum amplitude level.

Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band (excluding restricted frequency bands) is attenuated by at least the minimum requirements specified in 11.11. Report the three highest emissions relative to the limit.

Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor(if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CL - AG

Where FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
RA = Reading Amplitude	AG = Amplifier Gain
AF = Antenna Factor	

Transd=AF +CL-AG

RADIATION LIMIT

FCC Part 15.209 & FCC Part 15.407(b)

The pre-test have done for the EUT in three axes and found the worst emission at position shown in test setup photos.

General field strength limits at frequencies Below 30MHz		
Frequency (MHz)	**Field Strength (microvolt/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
Note: The emission limits for the ranges 9-90 kHz and 110-490 kHz are based on measurements employing a linear average detector.		

General field strength limits at frequencies above 30 MHz		
Frequency (MHz)	**Field strength (μV/m at 3 m)**	**Measurement Distance (meters)**
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

General field strength limits at frequencies Above 1000MHz		
Frequency (MHz)	**Distance of 3m (dBuV/m)**	
	Peak	**Average**
Above 1000	74	54
Note: (1) The tighter limit applies at the band edges. (2) Emission Level(dBuV/m)=20log Emission Level(uV/m)		

Limits of unwanted emission out of the restricted bands

Frequency (MHz)	EIRP Limits (dBm)	Equivalent Field Strength at 3m (dBuV/m)
5925~7125	Peak: -7	88.2
	AVG: -27	68.2
NOTE: The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength: E= $\frac{1000000\sqrt{30P}}{3}$ uV/m, where P is the eirp (Watts) For above 1000MHz *E[dBuV/m]=EIRP[dBm]+95.2, for d=3*		
Note: For above 1000 MHz. Unwanted emissions outside of restricted bands are measured with a RMS detector. In addition, 15.35(b) applies where the peak emissions must be limited to no more than 20 dB above the average limit.		

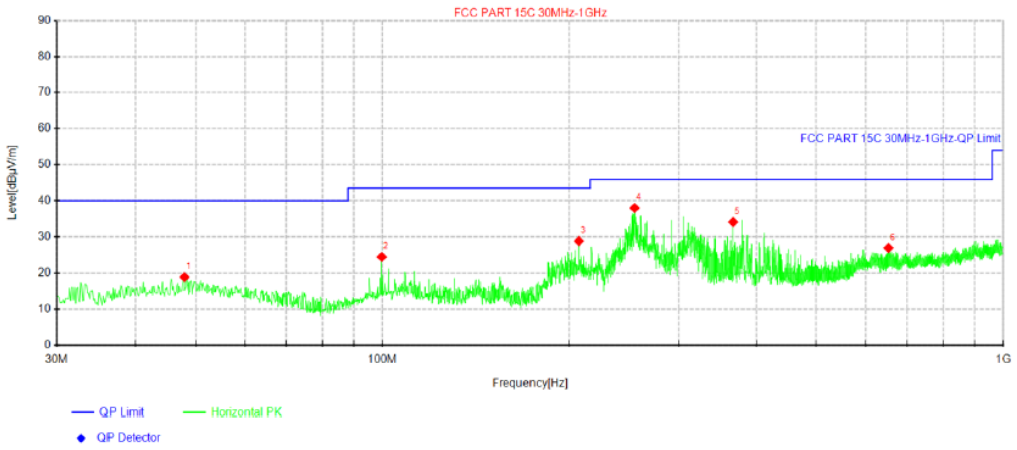
TEST RESULTS

Remark:

1. This test was performed with EUT in X, Y, Z position and the worse case was found when EUT in X position.
1. All 802.11 ax modes have been tested for below 1GHz test, only the worst case Low channel 802.11ax(HE20) U-NII-5 MIMO was recorded.
2. All 802.11ax modes have been tested for above 1GHz test, only the worst case 802.11ax(HE20) U-NII-5 was recorded.
3. Radiated emission test from 9 KHz to 10th harmonic of fundamental was verified, and no emission found except system noise floor in 9 KHz to 30MHz and not recorded in this report.

For 30MHz-1GHz

Horizontal



Suspected Data List

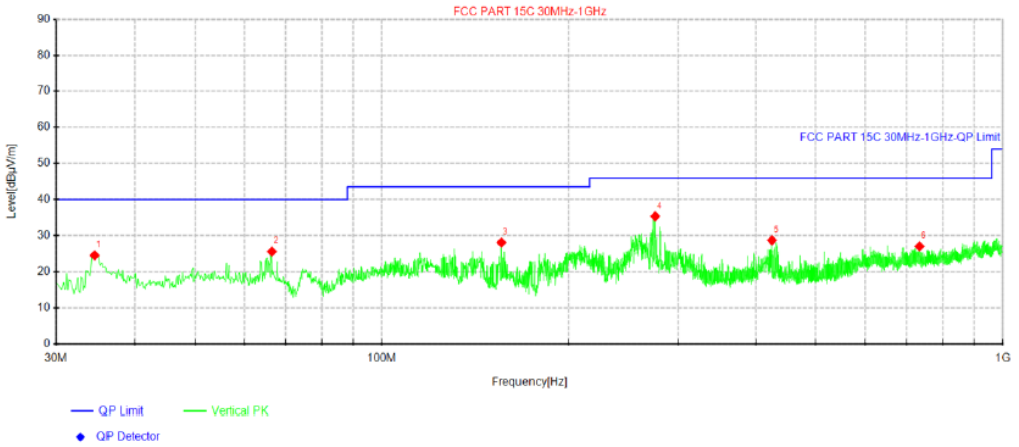
NO.	Freq. [MHz]	Reading [dBµV]	Level [dBµV/m]	Factor [dB/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	47.945	30.47	18.91	-11.56	40.00	21.09	100	247	Horizontal
2	99.7188	37.87	24.47	-13.40	43.50	19.03	100	304	Horizontal
3	207.267	42.11	28.87	-13.24	43.50	14.63	200	340	Horizontal
4	254.797	50.59	38.04	-12.55	46.00	7.96	100	200	Horizontal
5	367.075	45.08	34.16	-10.92	46.00	11.84	200	0	Horizontal
6	653.467	32.15	26.95	-5.20	46.00	19.05	100	130	Horizontal

Note:1).Level (dBµV/m)= Reading (dBµV)+ Factor (dB/m)

2). Factor(dB/m)=Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB)

3). Margin(dB) = Limit (dBµV/m) - Level (dBµV/m)

Vertical



Suspected Data List

NO.	Freq. [MHz]	Reading [dBµV]	Level [dBµV/m]	Factor [dB/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	34.6075	38.60	24.54	-14.06	40.00	15.46	100	137	Vertical
2	66.4962	40.05	25.59	-14.46	40.00	14.41	100	241	Vertical
3	155.736	44.32	28.09	-16.23	43.50	15.41	200	277	Vertical
4	275.531	47.46	35.39	-12.07	46.00	10.61	100	68	Vertical
5	424.79	38.98	28.72	-10.26	46.00	17.28	200	21	Vertical
6	734.462	32.06	27.04	-5.02	46.00	18.96	100	3	Vertical

Note:1).Level (dBµV/m)= Reading (dBµV)+ Factor (dB/m)

2). Factor(dB/m)=Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB)

3). Margin(dB) = Limit (dBµV/m) - Level (dBµV/m)

For 1GHz to 40GHz

Note: All MIMO and 802.11ax modes have been tested for above 1GHz test, only the worst case 802.11ax(HE20) U-NII-5 MIMO was recorded.

802.11ax(HE20) U-NII-5 MIMO ***Mode (above 1GHz)***

Tested Channel	Frequency (MHz)	Emission Level (dBuV/m)	Detector Mode	ANT Pol	Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre amplifier (dB)	Correction Factor (dB/m)
36.00 5180MHz	5150.00	58.53	PK	H	68.20	9.67	61.96	33.04	5.45	41.92	-3.43
	5150.00	50.12	AV	H	54.00	3.88	53.55	33.04	5.45	41.92	-3.43
	10360.00	51.87	PK	H	68.20	16.33	38.83	38.83	10.12	45.28	3.67
	--		--	--	--	--	--	--	--	--	--
44.00 5220MHz	10440.00	53.21	PK	H	68.20	14.99	49.53	38.85	10.13	45.3	3.68
	--		--	--	--	--	--	--	--	--	--
48.00 5240MHz	5350.50	57.85	PK	H	68.20	10.35	61.12	32.84	5.97	42.08	-3.27
	5350.50	48.38	AV	H	54.00	5.62	51.65	32.84	5.97	42.08	-3.27
	10480.00	52.65	PK	H	68.20	15.55	48.91	38.89	10.19	45.34	3.74

Tested Channel	Frequency (MHz)	Emission Level (dBuV/m)	Detector Mode	ANT Pol	Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre amplifier (dB)	Correction Factor (dB/m)
36.00 5180MHz	5150.00	54.65	PK	V	68.20	13.55	58.08	33.04	5.45	41.92	-3.43
	5150.00	47.73	AV	V	54.00	6.27	51.16	33.04	5.45	41.92	-3.43
	10360.00	53.68	PK	V	68.20	14.52	50.01	38.83	10.12	45.28	3.67
	--		--	--	--	--	--	--	--	--	--
44.00 5220MHz	10440.00	53.71	PK	V	68.20	14.49	50.03	38.85	10.13	45.3	3.68
	--		--	--	--	--	--	--	--	--	--
48.00 5240MHz	5350.50	57.22	PK	V	68.20	10.98	60.49	32.84	5.97	42.08	-3.27
	5350.50	49.31	AV	V	54.00	4.69	52.58	32.84	5.97	42.08	-3.27
	10480.00	52.85	PK	V	68.20	15.35	49.11	38.89	10.19	45.34	3.74

Note：

1) Emission level (dBuV/m) = Meter Reading+ antenna Factor+ cable loss- preamp factor.
2) Margin value = Limits-Emission level.
3) -- Mean the PK detector measured value is below average limit.
4) The other emission levels were very low against the limit.
5) RBW1MHz VBW3MHz Peak detector is for PK value; RBW 1MHz VBW10Hz Peak detector is for AV value.

4.3 Maximum E.I.R.P.

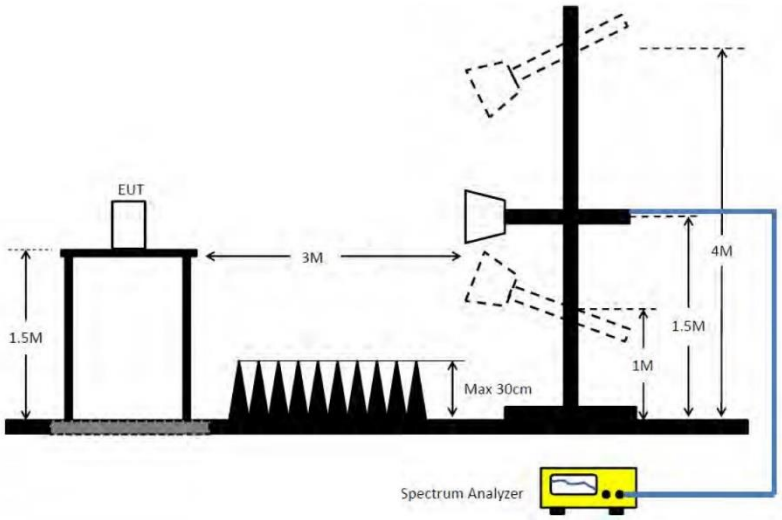
Limit

FCC Part 15 Subpart E(15.407) Limit			
Frequency	**Device Type**	**e.i.r.p. spectral density**	**e.i.r.p.**
5925-7125MHz	indoor access point	not exceed 5dBm/MHz	not exceed 30dBm
	subordinate device operating under the control of an indoor access point	not exceed -1dBm/MHz	not exceed 24dBm
5925–6425MHz and 6525–6875 MHz	client devices, except for fixed client devices	not exceed 17dBm/MHz	not exceed 30dBm; no more than 6 dB below its associated standard power
5925-7125MHz	client devices operating under the control of an indoor access point	not exceed -1dBm/MHz	not exceed 24dBm

Test Procedure

For radiated measurement. Refer as ANSI C63.10, clause 6.6 for radiated emissions above 1GHz.

Test Configuration



Test Results

Please refer to the Appendix RF Test Data for WIFI 6E.

4.4 E.I.R.P. Spectral Density Test

Limit

FCC Part 15 Subpart E(15.407) Limit			
Frequency	**Device Type**	**e.i.r.p. spectral density**	**e.i.r.p.**
5925-7125MHz	indoor access point	not exceed 5dBm/MHz	not exceed 30dBm
	subordinate device operating under the control of an indoor access point	not exceed -1dBm/MHz	not exceed 24dBm
5925–6425MHz and 6525–6875 MHz	client devices, except for fixed client devices	not exceed 17dBm/MHz	not exceed 30dBm; no more than 6 dB below its associated standard power
5925-7125MHz	client devices operating under the control of an indoor access point	not exceed -1dBm/MHz	not exceed 24dBm

Test Procedure

●Notwithstanding that some regulatory requirements refer to peak power spectral density (PPSD), in some cases the intent is to measure the maximum value of the time average of the power spectral density during a period of continuous transmission. The procedure for this method is as follows:

a) Create an average power spectrum for the EUT operating mode being tested by following the instructions in 12.3.2 for measuring maximum conducted output power using a spectrum analyzer or EMI receiver; that is, select the appropriate test method (SA-1, SA-2, SA-3, or their respective alternatives) and apply it up to, but not including, the step labeled, "Compute power…."(This procedure is required even if the maximum conducted output power measurement was performed using the power meter method PM.)

b) Use the peak search function on the instrument to find the peak of the spectrum.

c) Make the following adjustments to the peak value of the spectrum, if applicable:

1) If method SA-2 or SA-2A was used, then add [10 log (1 / D)], where D is the duty cycle, to the peak of the spectrum.

2) If method SA-3A was used and the linear mode was used in step h) of 12.3.2.7, add 1 dB to the final result to compensate for the difference between linear averaging and power averaging.

d) The result is the PPSD.

e) The procedure in item a) through item c) requires the use of 1 MHz resolution bandwidth to satisfy the 1 MHz measurement bandwidth specified by some regulatory authorities.95 This requirement also permits use of resolution bandwidths less than 1 MHz"provided that the measured power is integrated to show the total power over the measurement bandwidth"(i.e., 1 MHz). If measurements are performed using a reduced resolution bandwidth and integrated over 1 MHz bandwidth, the following adjustments to the procedures apply:

1) Set RBW≥1 / T, where T is defined in 12.2 a).

2) Set VBW ≥ [3*RBW].

3) Care shall be taken such that the measurements are performed during a period of continuous transmission or are corrected upward for duty cycle.

For radiated measurement. Refer as ANSI C63.10, clause 6.6 for radiated emissions above 1GHz.