C2PC Test Report

FCC Part15 Subpart E

Product Name	:	Wireless Access Point
Model No.	:	AP630
FCC ID	:	WBV-AP630

Applicant	:	Aerohive Networks, Inc.
Address	:	Aerohive Networks, 1011 McCarthy Boulevard, Milpitas, CA 95035, United States

Date of Receipt	:	Jul. 18, 2018
Test Date	:	Aug. 20, 2018 ~ Aug. 29, 2018
Issued Date	:	Sep. 05, 2018
Report No.	:	1872112R-RF-US-P09V01
Report Version	:	V1.1

Test Report Certification

Issued Date : Sep. 05, 2018
Report No. : 1872112R-RF-US-P09V01

Product Name	:	Wireless Access Point
Applicant	:	Aerohive Networks, Inc.
Address	:	Aerohive Networks, 1011 McCarthy Boulevard, Milpitas, CA 95035, United States
Manufacturer	:	Aerohive Networks, Inc.
Address	:	Aerohive Networks, 1011 McCarthy Boulevard, Milpitas, CA 95035, United States
Model No.	:	AP630
FCC ID	:	WBV-AP630
EUT Voltage	:	PoE 48V
Test Voltage	:	AC 120V/60Hz
Brand Name	:	Aerohive
Applicable Standard	:	FCC CFR Title 47 Part 15 Subpart E ANSI C63.10:2013; 789033 D02 General UNII Test Procedures New Rules v02r01 KDB 662911 D01 Multiple Transmitter Output v02r01
Test Result	:	Complied
Performed Location	:	DEKRA Testing and Certification (Suzhou) Co., Ltd. No.99 Hongye Rd., Suzhou Industrial Park, Suzhou,215006, Jiangsu, China TEL: +86-512-6251-5088 / FAX: +86-512-6251-5098 FCC Designation Number: CN1199

Documented By : Kathy Feng
(Project Assistant: Kathy Feng)

Reviewed By : Frank He
(Senior Engineer: Frank He)

Approved By : Harry Zhao
(Engineering Manager: Harry Zhao)

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History of This Test Report

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
1872112R-RF-US-P09V01	V1.0	Initial Issued Report	Aug. 29, 2018
1872112R-RF-US-P09V01	V1.1	Add some description	Sep. 05, 2018

1. General Information

1.1. EUT Description

Product Name	Wireless Access Point						
Brand Name	Aerohive						
Model No.	AP630						
EUT Voltage	PoE 48V						
Type of Modulation	OFDM-BPSK, QPSK, 16QAM, 64QAM, 128QAM, 256QAM,1024QAM						
Data Rate	802.11a: 6/9/12/18/24/36/48/54Mbps						
	802.11n: up to 600Mbps						
	802.11ac: up to 1.7Gbps						
	802.11ax: up to 2.4Gbps						
Channel Control	Auto						
Transmit modes	☒	802.11a	☒	802.11n(20MHz)	☒	802.11n(40MHz)	
	☒	802.11ac(20MHz)	☒	802.11ac(40MHz)	☒	802.11ac(80MHz)	
	☒	802.11ax(20MHz)	☒	802.11ax(40MHz)	☒	802.11ax(80MHz)	
Support Bands	☒	5150MHz~5250MHz	☐	Outdoor AP			
			☒	Indoor AP			
			☐	Fixed point-to-point AP			
			☐	Mobile and Portable Client			
	☐	5250MHz~5350MHz					
	☐	5500MHz~5710MHz	☐	With TDWR Channels			
			☐	Without TDWR Channels			
	☒	5725MHz~5850MHz					

Note: This appendix report was based on Report No. 1872112R, the differences between the two batch of samples are as follows:
There are no RF or analog changes between BCM43694 B0 and B1. Both have the same 802.11a/b/g/n/ac/ax functions with no change in RF modulation and output power. The two chip revisions are pin to pin compatible in the 12x12mm package.
The metal mask change to B1 only affects digital circuitry in the receiver. Regression evaluation should be performed to confirm compliance based on the FCC Permissive Change Policy (KDB178919 D01).
We had confirmed that RF exposure levels aren't degraded, so C2PC was applied. And we only test Conducted Emission and Radiated Emission.

1.2. Antenna information

Antenna Model No.	N/A							
Antenna Manufacturer	N/A							
Antenna Delivery	☐	1*TX+1*RX	☒	2*TX+2*RX	☐	3*TX+3*RX	☒	4*TX+4*RX
Antenna Technology	☐	SISO						
	☒	MIMO	☐	Basic methodology				
			☐	Sectorized antenna systems				
			☐	Cross-polarized antennas				
			☐	Unequal antenna gains, with equal transmit powers				
			☐	Spatial Multiplexing				
			☒	Cyclic Delay Diversity (CDD)				
Antenna Type	Metal Antenna							

Antenna Technology(2*TX+2*RX)	Ant Gain (dBi)	Directional Gain (dBi)	
		For Power	For PSD
☒ CDD	Ant0:4.74 Ant1: 5.17	4.96	7.97
☒ Beam-forming		7.97	7.97

Antenna Technology(4*TX+4*RX)	Ant Gain (dBi)	Directional Gain (dBi)	
		For Power	For PSD
☒ CDD	Ant0:4.74 Ant1: 5.17 Ant2:5.19 Ant3: 4.92	5.01	11.03
☒ Beam-forming		11.03	11.03

1.3. Working Frequency of Each Channel:

802.11a/n/ac/ax(20MHz) Working Frequency of Each Channel:							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
36	5180 MHz	40	5200 MHz	44	5220 MHz	48	5240 MHz
149	5745 MHz	153	5765 MHz	157	5785 MHz	161	5805 MHz
165	5825MHz	N/A	N/A	N/A	N/A	N/A	N/A
802.11n/ac/ax(40MHz) Working Frequency of Each Channel:							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz	151	5755 MHz	159	5795 MHz
802.11ac/ax(80MHz) Working Frequency of Each Channel:							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
42	5210 MHz	155	5775 MHz	N/A	N/A	N/A	N/A

1.4. Mode of Operation

DEKRA has verified the construction and function in typical operation. All the test modes were carried out with the EUT in normal operation, which was shown in this test report and defined as:

Test Mode
Mode 1: Transmit by 802.11a with CDD
Mode 2: Transmit by 802.11n(20MHz) with CDD
Mode 3: Transmit by 802.11n(40MHz) with CDD
Mode 4: Transmit by 802.11ac(20MHz) with CDD
Mode 5: Transmit by 802.11ac(40MHz) with CDD
Mode 6: Transmit by 802.11ac(80MHz) with CDD
Mode 7: Transmit by 802.11ax(20MHz) with CDD
Mode 8: Transmit by 802. 11ax(40MHz) with CDD
Mode 9: Transmit by 802. 11ax(80MHz) with CDD
Mode 10: Transmit by 802.11a with Beam-forming
Mode 11: Transmit by 802. 11n(20MHz) with Beam-forming
Mode 12: Transmit by 802. 11n(40MHz) with Beam-forming
Mode 13: Transmit by 802.11ac(20MHz) with Beam-forming
Mode 14: Transmit by 802.11ac(40MHz) with Beam-forming
Mode 15: Transmit by 802.11ac(80MHz) with Beam-forming
Mode 16: Transmit by 802.11ax(20MHz) with Beam-forming
Mode 17: Transmit by 802.11ax(40MHz) with Beam-forming
Mode 18: Transmit by 802.11ax(80MHz) with Beam-forming

Note 1: Regards to the frequency band operation: the lowest, middle and highest frequency of channel were selected to perform the test, then shown on this report.

Note 2: For portable device, radiated tests was verified over X, Y, Z axis, and shown the worst case on this report.

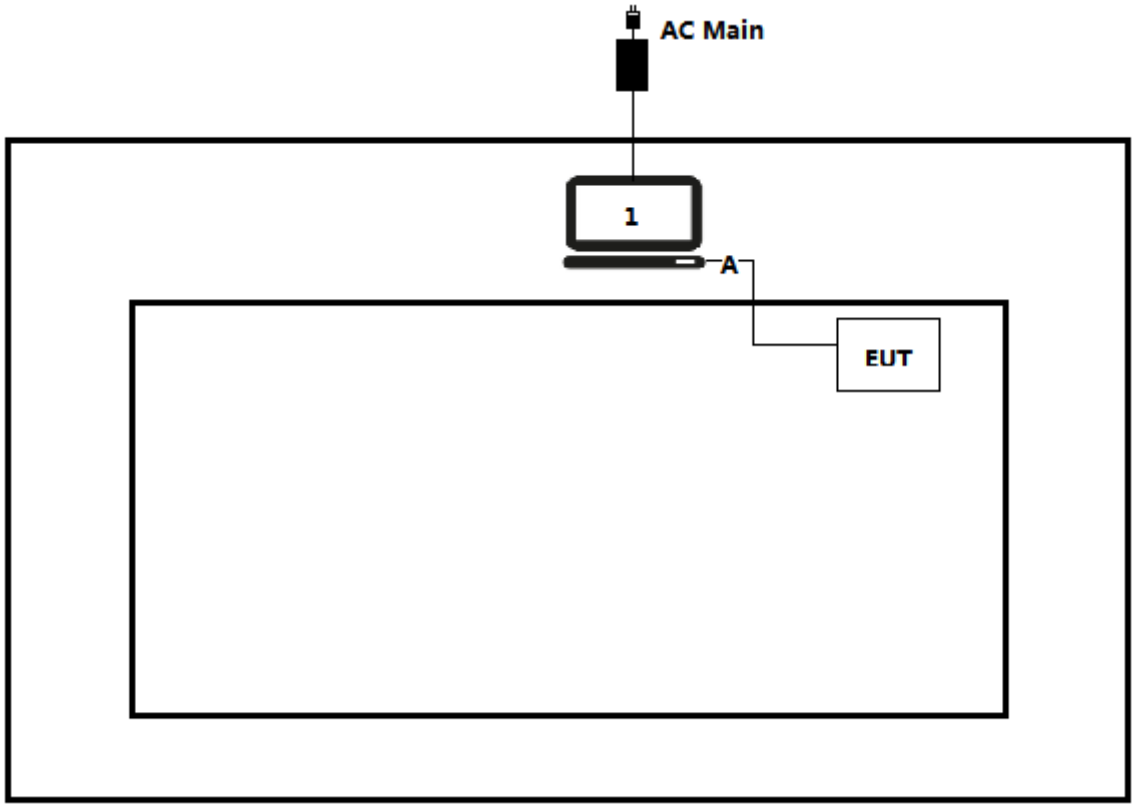
1.5. Tested System Details

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

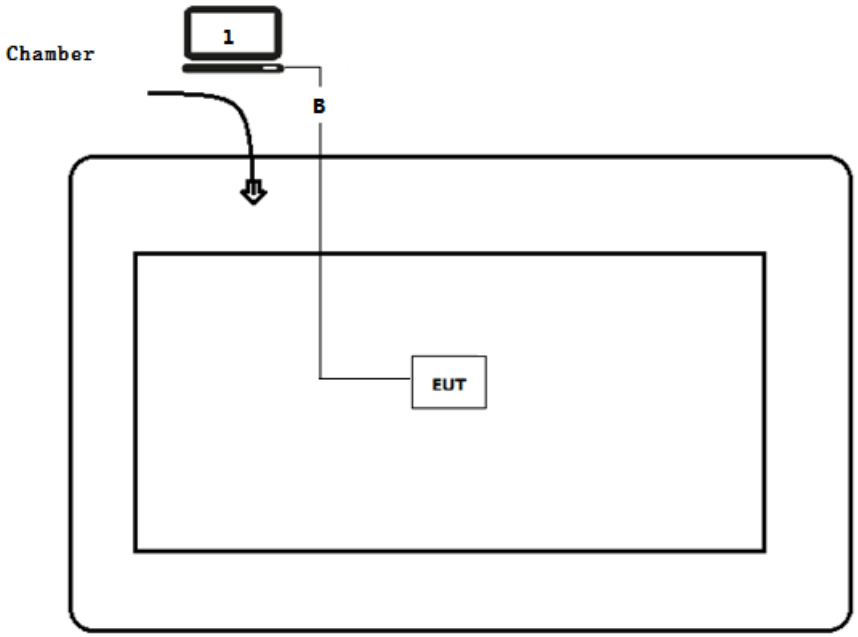
Product		Manufacturer	Model No.	Serial No.	Power Cord
1	Notebook	Lenovo	Think pad x220	SUA0600195	Non-shielded
A	USB cable	N/A	N/A	N/A	Shielded, 0.5m
B	USB cable	N/A	N/A	N/A	Shielded, 10m

1.6. Configuration of Tested System

Test setup Diagram- AC Line Conducted Emission Test



Test setup Diagram- Radiated Emission



1.7. EUT Exercise Software

1	Setup the EUT and simulators as shown on above.
2	Turn on the power of equipment.
3	Run RF software [MTool 3.0.0.6], and set the test mode and channel, then press OK to start to continue transmit.

2. Technical Test

2.1. Summary of Test Result

☒ No deviations from the test standards

☐ Deviations from the test standards as below description:

Performed Test Item	Normative References	Limit	Result
Conducted Emission	FCC CFR Title 47 Part 15 Subpart E: 2015 Section 15.207	FCC 15.207	PASS
Radiated Emission	FCC CFR Title 47 Part 15 Subpart E: 2015 Section 15.209	FCC 15.209	PASS

2.2. Test Frequency configuration:

Modulation Mode	Channel	Frequency	Channel	Frequency	Channel	Frequency
802.11a/n/ac/ax (20MHz)/	36	5180MHz	44	5220MHz	48	5240MHz
	149	5745MHz	157	5785MHz	165	5825MHz
802.11n/ac/ax(40MHz)	38	5190MHz	46	5230MHz	151	5755MHz
	159	5795MHz	N/A	N/A	N/A	N/A
802.11ac/ax(80MHz)	42	5210MHz	155	5775MHz	N/A	N/A

2.3. Power Parameter Value of the test software

Test Mode	Frequency	Power Setting	
		Ant 0+1	Ant 0+1+2+3
802.11a with CDD	5180	80	65
	5220	80	65
	5240	80	65
	5745	88	81
	5785	88	81
	5825	88	81
802.11n(20MHz) with CDD	5180	80	64
	5220	80	64
	5240	80	64
	5745	88	80
	5785	88	79
	5825	88	79
802.11n(40MHz) with CDD	5190	74	57
	5230	74	57
	5755	88	82
	5795	88	88
802.11ac(20MHz) with CDD	5180	80	64
	5220	80	64
	5240	80	64
	5745	88	79
	5785	88	78
	5825	88	79
802.11ac(40MHz) with CDD	5190	72	56
	5230	72	56
	5755	88	82
	5795	88	88
802.11ac(80MHz) with CDD	5210	74	52
	5775	84	67
802.11 ax(20MHz) with CDD	5180	78	63
	5220	78	63
	5240	78	63

	5745	88	80
	5785	88	77
	5825	88	76
802.11ax(40MHz) with CDD	5190	72	56
	5230	72	56
	5755	88	82
	5795	88	85
802.11ax(80MHz) with CDD	5210	74	52
	5775	84	67
802.11a with with Beam-forming	5180	78	64
	5220	78	64
	5240	78	64
	5745	85	80
	5785	85	80
	5825	85	78
802.11n(20MHz) with Beam-forming	5180	78	62
	5220	78	62
	5240	78	62
	5745	85	78
	5785	85	77
	5825	85	77
802.11n(40MHz) with Beam-forming	5190	71	56
	5230	71	56
	5755	85	82
	5795	85	82
802.11ac(20MHz) with Beam-forming	5180	78	64
	5220	78	64
	5240	78	64
	5745	85	78
	5785	85	78
	5825	85	78
802.11ac(40MHz) with Beam-forming	5190	71	57
	5230	71	57
	5755	85	80
	5795	85	79
802.11ac(80MHz) with Beam-forming	5210	71	54
	5775	81	69

802.11 ax(20MHz) with Beam-forming	5180	78	63
	5220	78	63
	5240	78	63
	5745	85	77
	5785	85	77
	5825	85	77
802.11ax(40MHz) with Beam-forming	5190	71	55
	5230	71	55
	5755	85	80
	5795	85	80
802.11ax(80MHz) with Beam-forming	5210	72	50
	5775	81	66

2.4. Power vs Data Rate

MCS Index for 802.11n	Spatial Streams	Data Rate (Mbps)						
		802.11b	802.11g	802.11a	20MHz Bandwidth		40MHz Bandwidth	
					800ns GI	400ns GI	800ns GI	400ns GI
0	1	1	6	6	6.5	7.2	13.5	15.0
1	1	2	9	9	13.0	14.4	27.0	30.0
2	1	5.5	12	12	19.5	21.7	40.5	45.0
3	1	11	18	18	26.0	28.9	54.0	60.0
4	1	---	24	24	39.0	43.3	81.0	90.0
5	1	---	36	36	52.0	57.8	108.0	120.0
6	1	---	48	48	58.5	65.0	121.5	135.0
7	1	---	54	54	65.0	72.2	135.0	150.0
8	2	---	---	---	13.0	14.4	27.0	30.0
9	2	---	---	---	26.0	28.9	54.0	60.0
10	2	---	---	---	39.0	43.3	81.0	90.0
11	2	---	---	---	52.0	57.8	108.0	120.0
12	2	---	---	---	78.0	86.7	162.0	180.0
13	2	---	---	---	104.0	115.6	216.0	240.0
14	2	---	---	---	117.0	130.0	243.0	270.0
15	2	---	---	---	130.0	144.0	270.0	300.0
16	3	---	---	---	19.5	21.6	40.5	45.0
17	3	---	---	---	39.0	43.2	81.0	90.0
18	3	---	---	---	58.5	65.1	121.5	135.0
19	3	---	---	---	78.0	86.7	162.0	180.0
20	3	---	---	---	117.0	129.9	243.0	270.0
21	3	---	---	---	156.0	173.4	324.0	360.0
22	3	---	---	---	175.5	195.0	364.5	405.0
23	3	---	---	---	195.0	216.6	405.0	450.0
24	4	---	---	---	26.0	28.8	54.0	60.0
25	4	---	---	---	52.0	57.6	108.0	120.0
26	4	---	---	---	78.0	86.8	162.0	180.0
27	4	---	---	---	104.0	115.6	216.0	240.0
28	4	---	---	---	156.0	173.2	324.0	360.0
29	4	---	---	---	208.0	231.2	432.0	480.0
30	4	---	---	---	234.0	260.0	486.0	540.0
31	4	---	---	---	260.0	288.8	540.0	600.0

Note1: The blue form is the maximum power data rate.

2: The EUT supports four spatial streams.

Spatial Streams (Note1)	MCS Index	Modulation type	Coding rate	Data Rate(Mb/s)					
				20MHz		40MHz		80MHz	
				Guard Interval		Guard Interval		Guard Interval	
				800ns	400ns	800ns	400ns	800ns	400ns
1	0	BPSK	1/2	6.5	7.2	13.5	15	29.3	32.5
	1	QPSK	1/2	13	14.4	27	30	58.5	65
	2	QPSK	3/4	19.5	21.7	40.5	45	87.8	97.5
	3	16-QAM	1/2	26	28.9	54	60	117	130
	4	16-QAM	3/4	39	43.3	81	90	175.5	195
	5	64-QAM	2/3	52	57.8	108	120	234	260
	6	64-QAM	3/4	58.5	65	121.5	135	263.3	292.5
	7	64-QAM	5/6	65	72.2	135	150	292.5	325
	8	256-QAM	3/4	78	86.7	162	180	351	390
	9	256-QAM	5/6	N/A	N/A	180	200	390	433.3
2	10	BPSK	1/2	13.0	14.4	27.0	30.0	58.6	65.0
	11	QPSK	1/2	26.0	28.8	54.0	60.0	117.0	130.0
	12	QPSK	3/4	39.0	43.4	81.0	90.0	175.6	195.0
	13	16-QAM	1/2	52.0	57.8	108.0	120.0	234.0	260.0
	14	16-QAM	3/4	78.0	86.6	162.0	180.0	351.0	390.0
	15	64-QAM	2/3	104.0	115.6	216.0	240.0	468.0	520.0
	16	64-QAM	3/4	117.0	130.0	243.0	270.0	526.6	585.0
	17	64-QAM	5/6	130.0	144.4	270.0	300.0	585.0	650.0
	18	256-QAM	3/4	156.0	173.4	324.0	360.0	702.0	780.0
	19	256-QAM	5/6	#VALUE!	#VALUE!	360.0	400.0	780.0	866.6
3	20	BPSK	1/2	19.5	21.6	40.5	45.0	87.9	97.5
	21	QPSK	1/2	39.0	43.2	81.0	90.0	175.5	195.0
	22	QPSK	3/4	58.5	65.1	121.5	135.0	263.4	292.5
	23	16-QAM	1/2	78.0	86.7	162.0	180.0	351.0	390.0
	24	16-QAM	3/4	117.0	129.9	243.0	270.0	526.5	585.0
	25	64-QAM	2/3	156.0	173.4	324.0	360.0	702.0	780.0
	26	64-QAM	3/4	175.5	195.0	364.5	405.0	789.9	877.5
	27	64-QAM	5/6	195.0	216.6	405.0	450.0	877.5	975.0
	28	256-QAM	3/4	234.0	260.1	486.0	540.0	1053.0	1170.0
	29	256-QAM	5/6	#VALUE!	#VALUE!	540.0	600.0	1170.0	1299.9
4	30	BPSK	1/2	26.0	28.8	54.0	60.0	117.2	130.0
	31	QPSK	1/2	52.0	57.6	108.0	120.0	234.0	260.0
	32	QPSK	3/4	78.0	86.8	162.0	180.0	351.2	390.0

	33	**16-QAM**	**1/2**	**104.0**	**115.6**	**216.0**	**240.0**	**468.0**	**520.0**
	34	**16-QAM**	**3/4**	**156.0**	**173.2**	**324.0**	**360.0**	**702.0**	**780.0**
	35	**64-QAM**	**2/3**	**208.0**	**231.2**	**432.0**	**480.0**	**936.0**	**1040.0**
	36	**64-QAM**	**3/4**	**234.0**	**260.0**	**486.0**	**540.0**	**1053.2**	**1170.0**
	37	**64-QAM**	**5/6**	**260.0**	**288.8**	**540.0**	**600.0**	**1170.0**	**1300.0**
	38	**256-QAM**	**3/4**	**312.0**	**346.8**	**648.0**	**720.0**	**1404.0**	**1560.0**
	39	**256-QAM**	**5/6**	**#VALUE!**	**#VALUE!**	**720.0**	**800.0**	**1560.0**	**1733.2**
Note 1: The blue form is the maximum power data rate. **2: The EUT supports four spatial streams.**									

Spatial Streams (Note1)	MCS Index	Modulation type	Coding rate	Data Rate(Mb/s)							
				20MHz		40MHz		80MHz		160MHz	
				Guard Interval		Guard Interval		Guard Interval		Guard Interval	
				1600 ns GI	800 ns GI	1600 ns GI	800 ns GI	1600 ns GI	800 ns GI	1600 ns GI	800 ns GI
1	0	BPSK	1/2	4	4	8	9	17	18	34	36
	1	QPSK	1/2	16	17	33	34	68	72	136	144
	2	QPSK	3/4	24	26	49	52	102	108	204	216
	3	16-QAM	1/2	33	34	65	69	136	144	272	282
	4	16-QAM	3/4	49	52	98	103	204	216	408	432
	5	64-QAM	2/3	65	69	130	138	272	288	544	576
	6	64-QAM	3/4	73	77	146	155	306	324	613	649
	7	64-QAM	5/6	81	86	163	172	340	360	681	721
	8	256-QAM	3/4	98	103	195	207	408	432	817	865
	9	256-QAM	5/6	108	115	217	229	453	480	907	961
	10	1024-QAM	3/4	122	129	244	258	510	540	1021	1081
	11	1024-QAM	5/6	135	143	271	287	567	600	1134	1201
2	12	BPSK	1/2	8	8	16	18	34	36	68	72
	13	QPSK	1/2	32	34	66	68	136	144	272	288
	14	QPSK	3/4	48	52	98	104	204	216	408	432
	15	16-QAM	1/2	66	68	130	138	272	288	544	564
	16	16-QAM	3/4	98	104	196	206	408	432	816	864
	17	64-QAM	2/3	130	138	260	276	544	576	1088	1152
	18	64-QAM	3/4	146	154	292	310	612	648	1226	1298
	19	64-QAM	5/6	162	172	326	344	680	720	1362	1442
	20	256-QAM	3/4	196	206	390	414	816	864	1634	1730
	21	256-QAM	5/6	216	230	434	458	906	960	1814	1922
	22	1024-QAM	3/4	244	258	488	516	1020	1080	2042	2162
	23	1024-QAM	5/6	270	286	542	574	1134	1200	2268	2402
3	24	BPSK	1/2	12	12	24	27	51	54	102	108
	25	QPSK	1/2	48	51	99	102	204	216	408	432
	26	QPSK	3/4	72	78	147	156	306	324	612	648
	27	16-QAM	1/2	99	102	195	207	408	432	816	846
	28	16-QAM	3/4	147	156	294	309	612	648	1224	1296
	29	64-QAM	2/3	195	207	390	414	816	864	1632	1728
	30	64-QAM	3/4	219	231	438	465	918	972	1839	1947
	31	64-QAM	5/6	243	258	489	516	1020	1080	2043	2163

	32	256-QAM	3/4	294	309	585	621	1224	1296	2451	2595
	33	256-QAM	5/6	324	345	651	687	1359	1440	2721	2883
	34	1024-QAM	3/4	366	387	732	774	1530	1620	3063	3243
	35	1024-QAM	5/6	405	429	813	861	1701	1800	3402	3603
4	36	BPSK	1/2	16	16	32	36	68	72	136	144
	37	QPSK	1/2	64	68	132	136	272	288	544	576
	38	QPSK	3/4	96	104	196	208	408	432	816	864
	39	16-QAM	1/2	132	136	260	276	544	576	1088	1128
	40	16-QAM	3/4	196	208	392	412	816	864	1632	1728
	41	64-QAM	2/3	260	276	520	552	1088	1152	2176	2304
	42	64-QAM	3/4	292	308	584	620	1224	1296	2452	2596
	43	64-QAM	5/6	324	344	652	688	1360	1440	2724	2884
	44	256-QAM	3/4	392	412	780	828	1632	1728	3268	3460
	45	256-QAM	5/6	432	460	868	916	1812	1920	3628	3844
	46	1024-QAM	3/4	488	516	976	1032	2040	2160	4084	4324
	47	1024-QAM	5/6	540	572	1084	1148	2268	2400	4536	4804

Note 1: The blue form is the maximum power data rate.

2: The EUT supports four spatial streams.

2.5. Test Environment

Items	Required (IEC 68-1)	Actual
Temperature (°C)	15-35	21
Humidity (%RH)	25-75	50
Barometric pressure (mbar)	860-1060	950-1000

2.6. Uncertainty

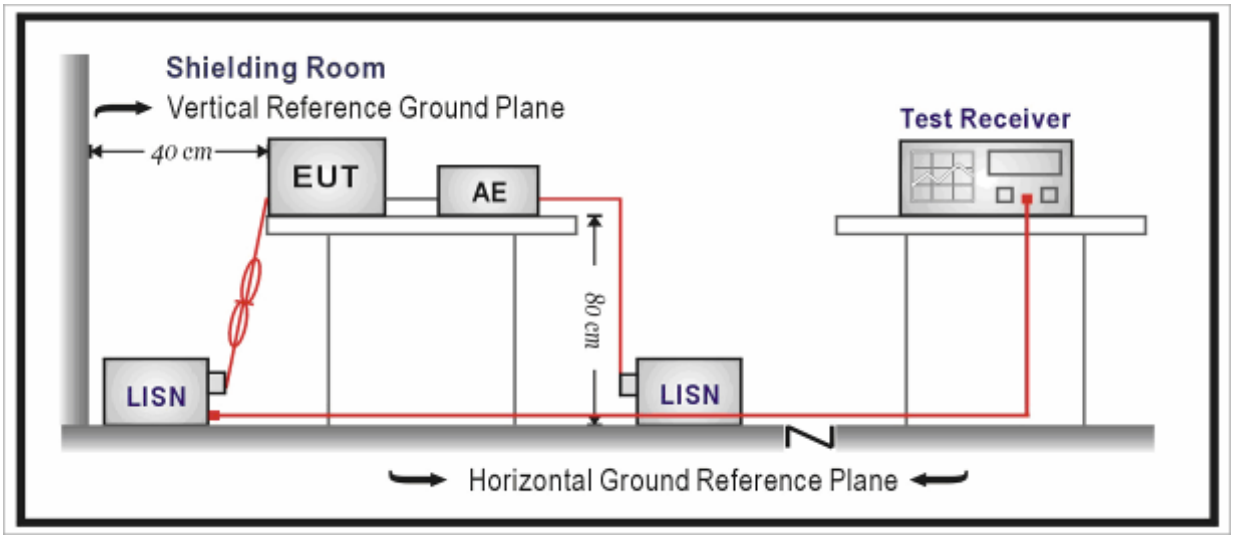
Test Items	Uncertainty
AC Power Line Conducted Emission	±2.02dB
Radiated Emission	Below 1GHz ±3.8 dB
	Above 1GHz ±3.9 dB

3. Conducted Emission

3.1. Test Equipment

Conducted Emission / TR-1					
Instrument	Manufacturer	Type No.	Serial No.	Cal. Date	Cal. Due Date
EMI Test Receiver	R&S	ESCI	100906	2018.03.05	2019.03.04
Two-Line V-Network	R&S	ENV 216	101189	2018.06.16	2019.06.15
Two-Line V-Network	R&S	ENV 216	101044	2017.09.16	2018.09.15
50ohm Coaxial Switch	Anritsu	MP59B	6200464462	N/A	N/A
50ohm Termination	SHX	TF2	07081402	2017.09.16	2018.09.15
Temperature/Humidity Meter	Zhichen	ZC1-2	TR1-TH	2018.01.05	2019.01.04
Note: All equipment are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.					

3.2. Test Setup



3.3. Limit

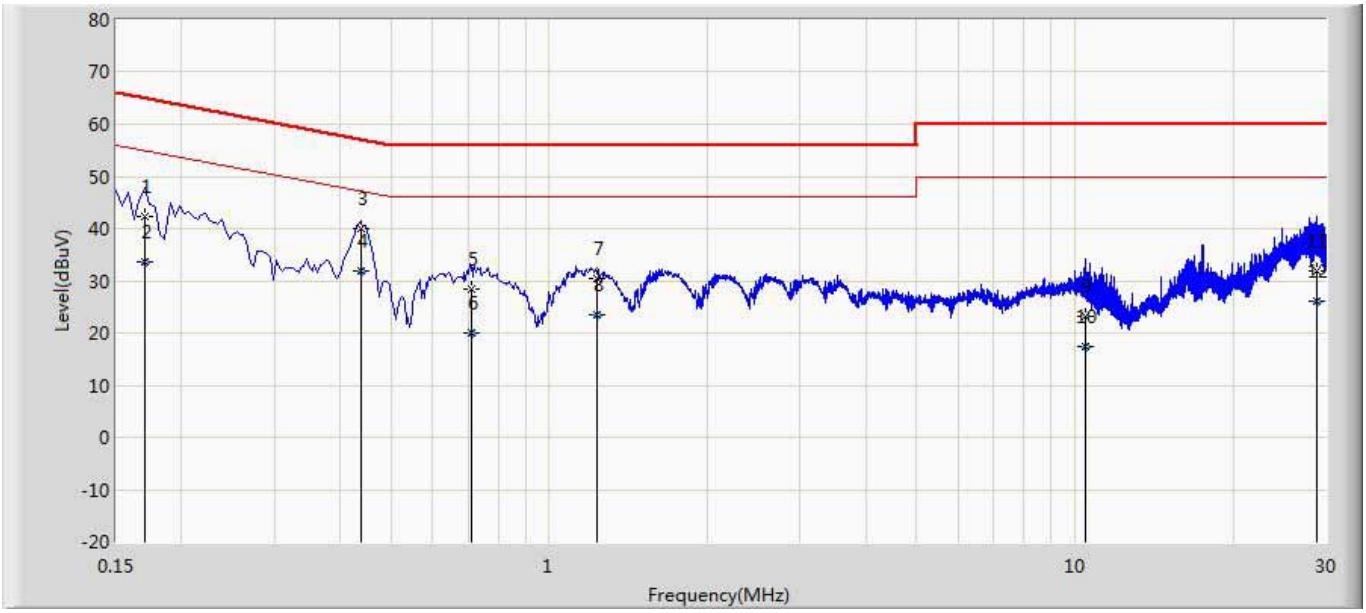
Frequency (MHz)	QP (dBμV)	AV (dBμV)
0.15 - 0.50	66 – 56	56 – 46
0.50 - 5.0	56	46
5.0 - 30	60	50
Note 1: The lower limit shall apply at the transition frequencies. Note 2: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.		

3.4. Test Procedure

Test Method			
	References Rule	Chapter	Item
☒	ANSI C63.10-2013	6.2	Standard test method for ac power-line conducted emissions from unlicensed wireless devices

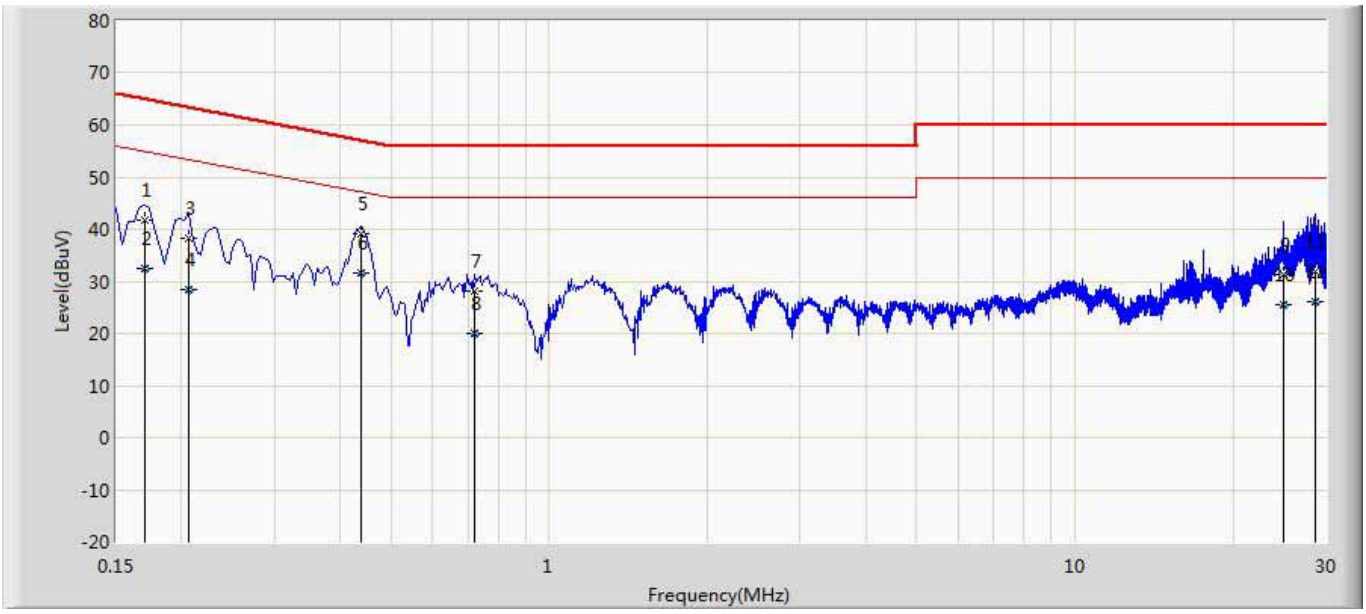
3.5. Test Result

Engineer: CptJack	
Site: TR1	Time: 2018/08/28
Limit: EN55032_CE_Mains_ClassB	Margin: 0
Probe: ENV216_101190(0.009-30MHz)	Polarity: Line
EUT: Wireless Access Point	Power: AC 230V/50Hz
Note: Mode 1:Transmit at 2402MHz by BLE	



No	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Probe (dB)	Cable (dB)	Amp (dB)	Type
1		0.170	42.457	32.824	-22.504	64.960	9.606	0.027	0.000	QP
2		0.170	33.651	24.018	-21.309	54.960	9.606	0.027	0.000	AV
3		0.438	39.874	30.234	-17.225	57.100	9.600	0.040	0.000	QP
4	*	0.438	31.884	22.244	-15.216	47.100	9.600	0.040	0.000	AV
5		0.710	28.530	18.880	-27.470	56.000	9.600	0.050	0.000	QP
6		0.710	19.886	10.235	-26.114	46.000	9.600	0.050	0.000	AV
7		1.230	30.408	20.732	-25.592	56.000	9.610	0.066	0.000	QP
8		1.230	23.370	13.694	-22.630	46.000	9.610	0.066	0.000	AV
9		10.454	23.197	13.209	-36.803	60.000	9.782	0.206	0.000	QP
10		10.454	17.509	7.521	-32.491	50.000	9.782	0.206	0.000	AV
11		28.806	31.809	21.058	-28.191	60.000	10.402	0.349	0.000	QP
12		28.806	26.214	15.463	-23.786	50.000	10.402	0.349	0.000	AV

Engineer: CptJack	
Site: TR1	Time: 2018/08/28
Limit: EN55032_CE_Mains_ClassB	Margin: 0
Probe: ENV216_101190(0.009-30MHz)	Polarity: Neutral
EUT: Wireless Access Point	Power: AC 230V/50Hz
Note: Mode 1:Transmit at 2402MHz by BLE	



No	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Probe (dB)	Cable (dB)	Amp (dB)	Type
1		0.170	41.843	32.221	-23.118	64.960	9.594	0.027	0.000	QP
2		0.170	32.583	22.961	-22.378	54.960	9.594	0.027	0.000	AV
3		0.206	38.325	28.698	-25.040	63.365	9.599	0.029	0.000	QP
4		0.206	28.272	18.644	-25.093	53.365	9.599	0.029	0.000	AV
5		0.438	39.232	29.600	-17.867	57.100	9.592	0.040	0.000	QP
6	*	0.438	31.495	21.863	-15.605	47.100	9.592	0.040	0.000	AV
7		0.722	28.038	18.397	-27.962	56.000	9.590	0.050	0.000	QP
8		0.722	19.952	10.312	-26.048	46.000	9.590	0.050	0.000	AV
9		24.898	31.193	20.219	-28.807	60.000	10.651	0.323	0.000	QP
10		24.898	25.391	14.417	-24.609	50.000	10.651	0.323	0.000	AV
11		28.638	31.927	20.962	-28.073	60.000	10.616	0.348	0.000	QP
12		28.638	26.137	15.173	-23.863	50.000	10.616	0.348	0.000	AV

Note:

1. " * ", means this data is the worst emission level.
2. Measurement Level = Reading Level + Factor(Probe+Cable-Amp).

4. Radiated Emission

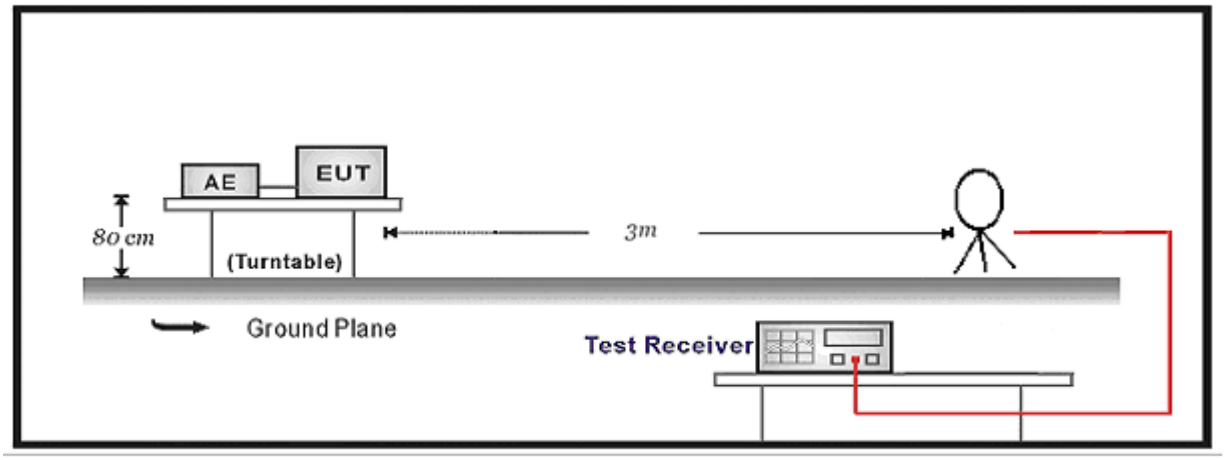
4.1. Test Equipment

Radiated Emission / AC-2					
Instrument	Manufacturer	Type No.	Serial No.	Cal. Date	Cal. Due Date
EMI Test Receiver	R&S	ESCI	100573	2018.03.29	2019.03.28
Loop Antenna	R&S	HFH2-Z2	833799/003	2017.11.16	2018.11.15
Bilog Antenna	Teseq GmbH	CBL6112D	27611	2017.10.16	2018.10.15
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC2-C	2018.03.02	2019.03.01
Temperature/Humidity Meter	Zhichen	ZC1-2	AC2-TH	2018.01.04	2019.01.03

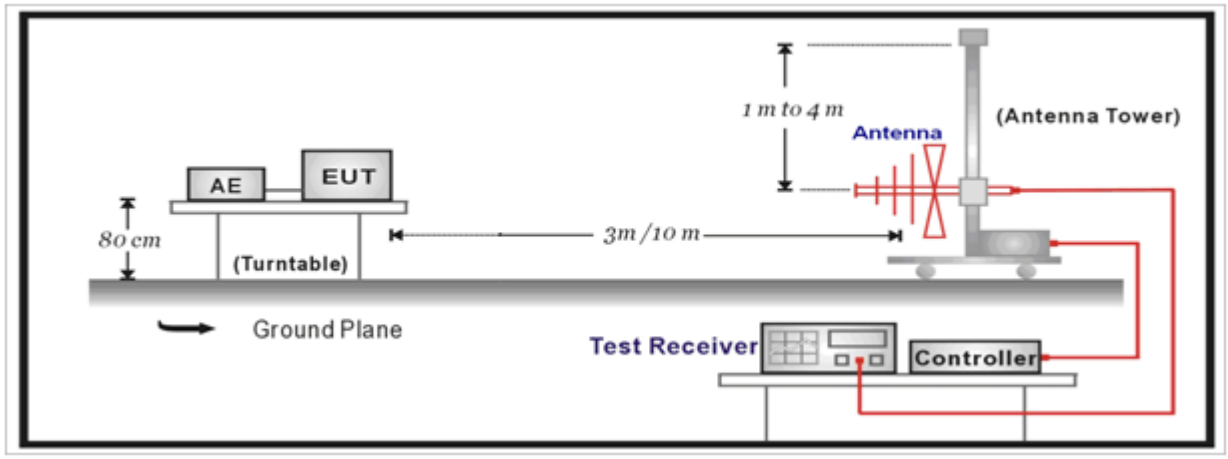
Radiated Emission / AC-5					
Instrument	Manufacturer	Type No.	Serial No.	Cal. Date	Cal. Due Date
Spectrum Analyzer	Agilent	E4446A	MY45300103	2018.01.04	2019.01.03
Preamplifier	Miteq	NSP1800-25	1364185	2018.05.06	2019.05.05
Preamplifier	DEKRA Testing and Certification (Suzhou) Co., Ltd.	AP-040G	CHM-0906001	2018.05.06	2019.05.05
DRG Horn	ETS-Lindgren	3117	00123988	2018.01.22	2019.01.21
Broad-Band Horn Antenna	Schwarzbeck	BBHA9170	294	2017.11.25	2018.11.24
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC5-C1	2018.03.02	2019.03.01
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC5-C2	2018.03.02	2019.03.01
Coaxial Cable	Huber+Suhner	SUCOFLEX 102	AC5-C3	2018.03.02	2019.03.01
EMI Receiver	Agilent	N9038A	MY51210196	2018.06.10	2019.06.09
Temperature/Humidity Meter	Zhichen	ZC1-2	AC5-TH	2018.01.04	2019.01.03
Note: All equipment are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.					

4.2. Test Setup

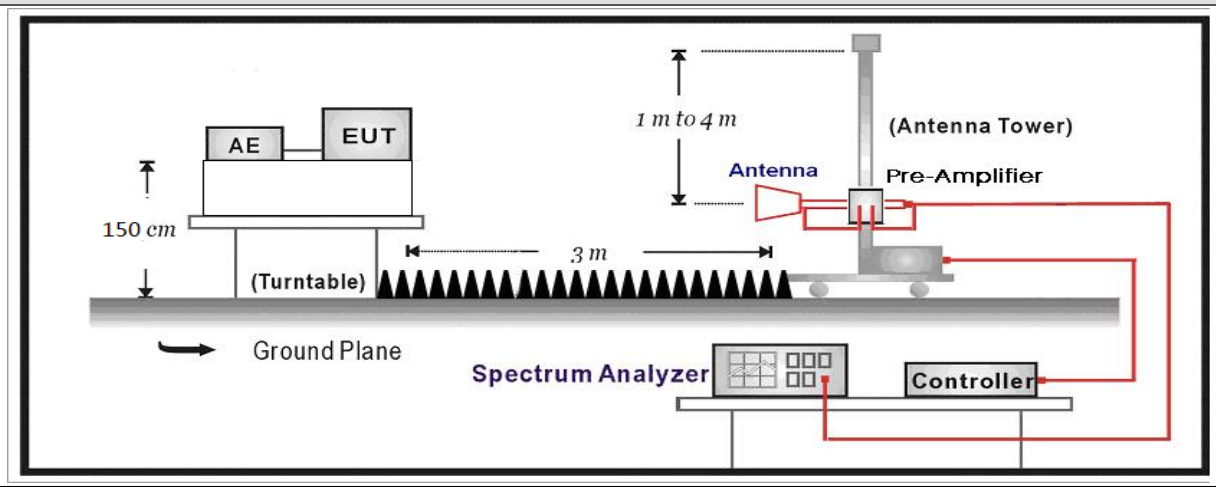
Below 30MHz Test Setup:



30MHz-1GHz Test Setup:



Above 1GHz Test Setup:



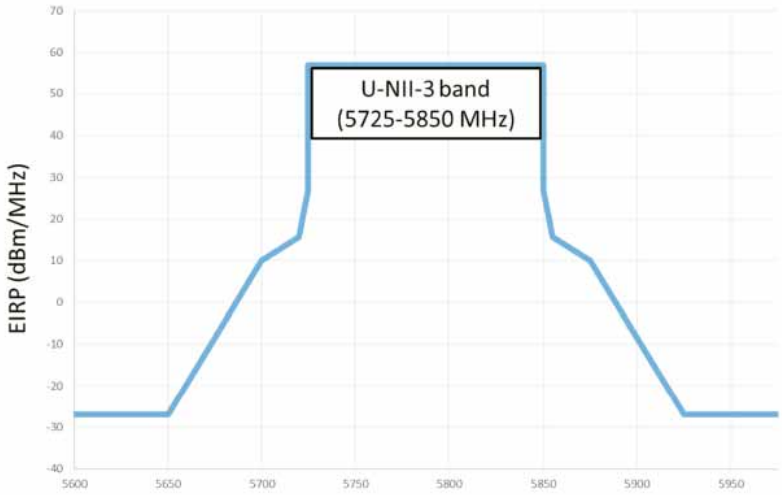
4.3. Limit

FCC Part 15 Subpart C Paragraph 15.209 (Restricted Band Emissions Limit)		
Frequency (MHz)	Distance (m)	Level (dB μ V/m)
0.009-0.490	300	2400/F(kHz)
0.490-1.705	30	24000/F(kHz)
1.705-30.0	30	30
30-88	3	100**
88-216	3	150**
216-960	3	200**
Above 960	3	500

Note 1: At frequencies below 30 MHz, measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field. Pending the development of an appropriate measurement procedure for measurements performed below 30 MHz, when performing measurements at a closer distance than specified, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two distances on at least one radial to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB/decade).

Note 2: At frequencies at or above 30 MHz, measurements may be performed at a distance other than what is specified provided: measurements are not made in the near field except where it can be shown that near field measurements are appropriate due to the characteristics of the device; and it can be demonstrated that the signal levels needed to be measured at the distance employed can be detected by the measurement equipment. Measurements shall not be performed at a distance greater than 30 meters unless it can be further demonstrated that measurements at a distance of 30 meters or less are impractical. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse linear-distance for field strength measurements; inverse-linear-distance-squared for power density measurements).

FCC Part 15 Subpart C Paragraph 15.205 (Restricted Band)			
Frequency (MHz)	Frequency (MHz)	Frequency (MHz)	Frequency (GHz)
0.090 – 0.110	16.42 – 16.423	399.9 – 410	4.5 – 5.15
0.495 – 0.505	16.69475 –16.69525	608 – 614	5.35 – 5.46
2.1735 – 2.1905	16.80425 – 16.80475	960 – 1240	7.25 – 7.75
4.125 – 4.128	25.5 – 25.67	1300 – 1427	8.025 – 8.5
4.17725 – 4.17775	37.5 – 38.25	1435 – 1626.5	9.0 – 9.2
4.20725 – 4.20775	73 – 74.6	1645.5 – 1646.5	9.3 – 9.5
6.215 – 6.218	74.8 – 75.2	1660 – 1710	10.6 – 12.7
6.26775 – 6.26825	108 – 121.94	1718.8 – 1722.2	13.25 – 13.4
6.31175 – 6.31225	123 – 138	2200 – 2300	14.47 – 14.5
8.291 – 8.294	149.9 – 150.05	2310 – 2390	15.35 – 16.2
8.362 – 8.366	156.52475 – 156.52525	2483.5 – 2500	17.7 – 21.4
8.37625 – 8.38675	156.7 – 156.9	2690 – 2900	22.01 – 23.12
8.81425 – 8.81475	162.0125 – 167.17	3260 – 3267	23.6 – 24.0
12.29 – 12.293	167.72 – 173.2	3332 – 3339	31.2 – 31.8
12.51975–12.52025	240 – 285	3345.8 – 3358	36.43 – 36.5
12.57675–12.57725	322 – 335.4	3600 – 4400	
13.36 – 13.41			

FCC Part 15 Subpart C Paragraph 15.407(5)(b) (Unrestricted Band Emissions Limit)		
Operating Frequency Band (MHz)	EIRP Limit (dBm/MHz)	Equivalent Field Strength at 3m (dB μ V/m)
5150 - 5250	-27	68.3
5250 - 5350	-27	68.3
5470 - 5725	-27	68.3
Operating Frequency Band (MHz)	EIRP Limit (dBm/MHz)	
5725 - 5850		

4.4. Test Procedure

Test Method					
	References Rule			Chapter	Description
☐	ANSI C63.10			12.7.3	Emissions in non-restricted frequency bands
☒	ANSI C63.10			12.7.2	Emissions in restricted frequency bands
	☒	ANSI C63.10		12.7.5	Radiated emission measurements
	☒	ANSI C63.10		12.7.6	Procedure for peak unwanted emissions measurements above 1000 MHz
	☒	ANSI C63.10		12.7.7	Procedures for average unwanted emissions measurements above 1000 MHz
		☐	ANSI C63.10	12.7.7.2	Method AD (average detection)—primary method
		☒	ANSI C63.10	12.7.7.3	Method VB-A (Alternative)
	☒	ANSI C63.10		6.4	Radiated emissions from unlicensed wireless devices below 30 MHz
	☒	ANSI C63.10		6.5	Radiated emissions from unlicensed wireless devices in the frequency range of 30 MHz to 1000 MHz
	☒	ANSI C63.10		6.6	Radiated emissions from unlicensed wireless devices above 1 GHz
☐	FCC KDB 789033 D02v01r04			G.2	Unwanted Emissions that fall Outside of the Restricted Bands
☐	FCC KDB 789033 D02v01r04			G.1	Unwanted Emissions in the Restricted Bands
	☐	FCC KDB 789033 D02v01r04		G.4	Procedure for Unwanted Emissions Measurements below 1000 MHz
	☐	FCC KDB 789033 D02v01r04		G.5	Procedure for Unwanted Maximum Emissions Measurements above 1000 MHz
	☐	FCC KDB 789033 D02v01r04		G.6	Procedures for Average Unwanted Emissions Measurements above 1000 MHz
		☐	FCC KDB 789033 D02v01r04	G.6.c	Method AD (Average detection)—primary method
		☐	FCC KDB 789033 D02v01r04	G.6.d	Method VB (Averaging using reduced video bandwidth): Alternative method.

4.5. EUT test Axis definition

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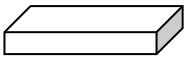
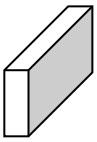
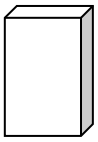
<tr><td rowspan="4">Device Category</td><td>☒</td><td colspan="3">Indoor use</td></tr>
<tr><td>☐</td><td colspan="3">Outdoor use</td></tr>
<tr><td>☐</td><td colspan="3">Fix position use</td></tr>
<tr><td>☐</td><td colspan="3">Client use</td></tr>
<tr><td>Test mode</td><td colspan="4">Mode 1-20</td></tr>
<tr><td rowspan="13">Test method</td><td>☒</td><td colspan="3">Radiated</td></tr>
<tr><td rowspan="3"></td><td>X Axis</td><td>Y Axis</td><td>Z Axis</td></tr>
<tr><td>  </td><td>  </td><td>  </td></tr>
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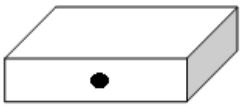
<tr><td></td><td colspan="3">  </td></tr>
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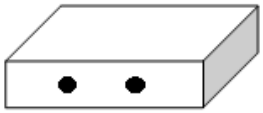
<tr><td></td><td colspan="3">  </td></tr>
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4.6. Test Result

Note:

Appendix 1: CDD Ant 2x2 RSE
Appendix 2: CDD Ant 4x4 RSE
Appendix 3: Beam-Forming Ant 2x2 RSE
Appendix 4: Beam-Forming Ant 4x4 RSE
Appendix 5: Worst case RSE

The End