Test Report

FCC Part15 Subpart C & RSS-247 Issue 2

Product Name	:	Wireless Access point
Model No.	:	AP650X
FCC ID	:	WBV-AP650X
IC	:	7774A-AP650X

Applicant	:	Aerohive Networks, Inc
Address	:	Aerohive Networks1011 McCarthy Boulevard Milpitas, CA 95035 United States

Date of Receipt	:	Apr. 04, 2018
Test Date	:	May. 15, 2018 ~ Aug. 01, 2018
Issued Date	:	Aug. 22, 2018
Report No.	:	1842039R-RF-US-P06V01
Report Version	:	V1.0

Test Report Certification

Issued Date : Aug. 22, 2018
Report No. : 1842039R-RF-US-P06V01

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.	:	AP650X
FCC ID	:	WBV-AP650X
IC		7774A-AP650X
EUT Voltage	:	POE 48V
Test Voltage	:	AC 120V/60Hz
Brand Name	:	Aerohive
Applicable Standard	:	FCC CFR Title 47 Part 15 Subpart C ANSI C63.10:2013; KDB 558074 D01v04 KDB 662911 D01 Multiple Transmitter Output v02r01 RSS-Gen Issue 5 / RSS-247 Issue 2
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; ISED Lab Code: 4075B

Documented By : Kitty Li

(Adm. Specialist: Kitty Li)

Reviewed By : Frank he

(Senior Engineer: Frank He)

Approved By : Harry Zhao

(Engineering Manager: Harry Zhao)

TABLE OF CONTENTS

History of This Test Report

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
1842039R-RF-US-P06V01	V1.0	Initial Issued Report	Aug. 01, 2018
1842039R-RF-US-P06V01	V1.1	1) Revised the ISED number. 2) Page 6, revised the EUT description. 3) Page 61~70,revised the 99% bandwidth data.	Aug. 22, 2018

1. General Information

1.1. EUT Description

Product Name	Wireless Access point
Brand Name	Aerohive
Model No.	AP650X
EUT Voltage	AC 120V/60Hz
Frequency Range	For 2.4GHz Band 802.11b/g/n/ac/ax(20MHz): 2412~2462MHz 802.11n/ac/ax(40MHz): 2422~2452MHz
Channel Number	For 2.4GHz Band 802.11b/g/n/ac/ax(20MHz): 11 802.11n/ac/ax(40MHz): 7
Type of Modulation	802.11b: DSSS-DBPSK, DQPSK, CCK
	802.11g/n/ac/ax: OFDM-BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM
Data Rate	802.11b: 1/2/5.5/11 Mbps
	802.11g: 6/9/12/18/24/36/48/54 Mbps
	802.11n: up to 600 Mbps
	802.11ac: up to 800 Mbps
	802.11ax: up to 1148 Mbps
Channel Control	Auto

1.2. Working Frequency of Each Channel:

802.11b/g/n/ac/ax(20MHz) Working Frequency of Each Channel:							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
01	2412 MHz	02	2417 MHz	03	2422 MHz	04	2427 MHz
05	2432 MHz	06	2437 MHz	07	2442 MHz	08	2447 MHz
09	2452 MHz	10	2457 MHz	11	2462 MHz	N/A	N/A
802.11n/ac/ax(40MHz) Working Frequency of Each Channel:							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
03	2422 MHz	04	2427 MHz	05	2432 MHz	06	2437 MHz
07	2442 MHz	08	2447 MHz	09	2452 MHz	N/A	N/A

1.3. Antenna information

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				
			☒	CDD				
			☐	Sectorized				
			☒	Beam-forming				
Antenna Type	☒	External	☒	Dipole				
			☐	Sectorized				
	☐	Internal	☐	PIFA				
			☐	PCB				
			☐	Ceramic Chip Antenna				
			☐	Metal plate type F antenna				

Antenna Technology(2*TX+2*RX)	Ant Gain (dBi)	Directional Gain (dBi)	
		For Power	For PSD
☒ CDD	5	3.5	6.5
☒ Beam-forming		6.5	6.5

Antenna Technology(4*TX+4*RX)	Ant Gain (dBi)	Directional Gain (dBi)	
		For Power	For PSD
☒ CDD	5	3.5	9.5
☒ Beam-forming		9.5	9.5

1.4. Mode of Operation

Test Modes List
Mode 1: Transmit by 802.11b with CDD
Mode 2: Transmit by 802.11g with CDD
Mode 3: Transmit by 802.11n(20MHz) with CDD
Mode 4: Transmit by 802.11n(40MHz) with CDD
Mode 5: Transmit by 802.11ac(20MHz) with CDD
Mode 6: Transmit by 802.11ac(40MHz) with CDD
Mode 7: Transmit by 802.11ax(20MHz) with CDD
Mode 8: Transmit by 802.11ax(40MHz) with CDD
Mode 9: Transmit by 802.11b with Beam-forming
Mode 10: Transmit by 802.11g 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 802.11ax(20MHz) with Beam-forming
Mode 16: Transmit by 802.11ax(40MHz) with Beam-forming

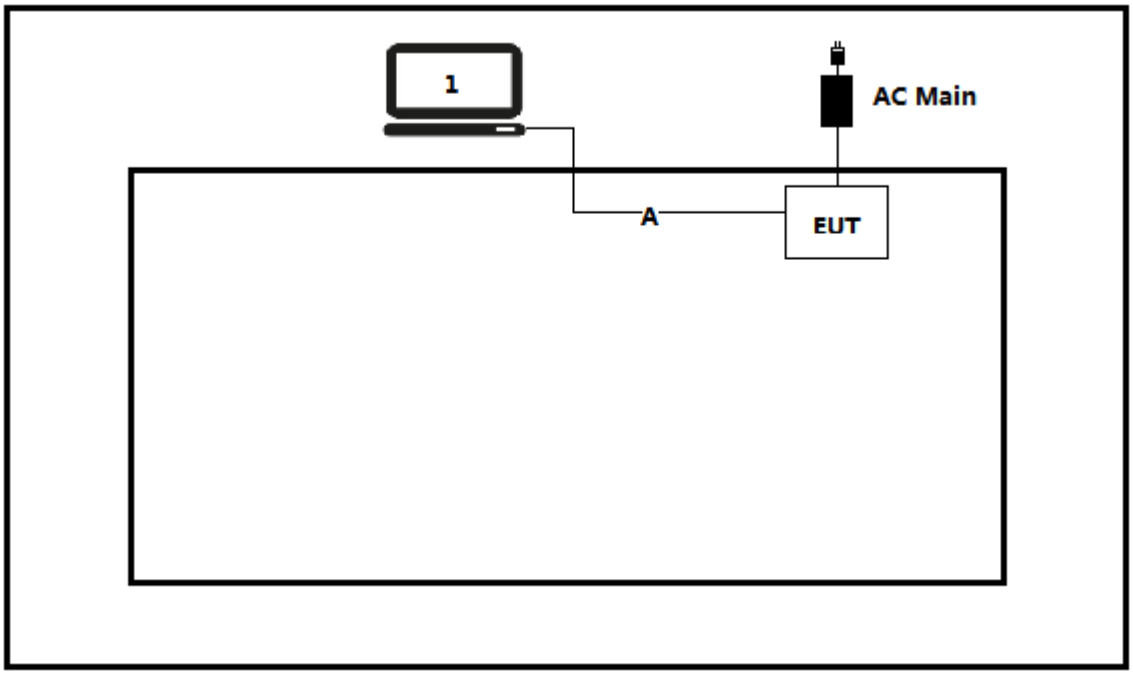
1.5. Tested System Details

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

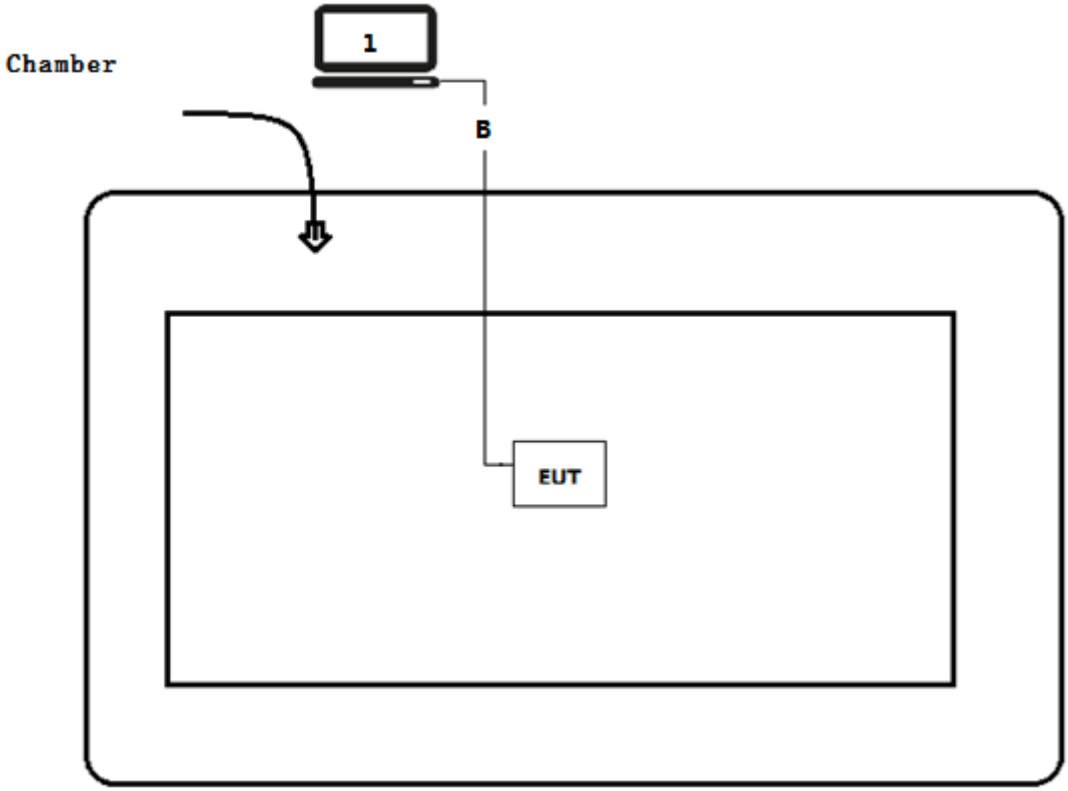
No.	Product	Manufacturer	Model No.	Serial No.	Power Cord
1	Notebook	Lenovo	Think pad x220	SUA0600195	Non-shielded
A	LAN cable	N/A	N/A	N/A	Shielded, 0.5m
B	LAN cable	N/A	N/A	N/A	Shielded, 10m

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], and set the test mode and channel, then press OK to start to continue transmit.

2. Technical Test

2.2. Summary of Test Result

For FCC rule:

Performed Test Item	Normative References	Limit	Result
AC Power Line Conducted Emission	FCC CFR Title 47 Part 15 Subpart C: Section 15.207	FCC 15.207	PASS
Emissions in restricted frequency bands	FCC CFR Title 47 Part 15 Subpart C: Section 15.209	FCC 15.209	PASS
Emissions in non-restricted frequency bands	FCC CFR Title 47 Part 15 Subpart C: Section 15.247(d)	⩾20dBc	PASS
Radiated Emission Band Edge	FCC CFR Title 47 Part 15 Subpart C: 15.247(d)	FCC 15.209	PASS
Occupied Bandwidth	FCC CFR Title 47 Part 15 Subpart C: Section 15.247(a)(2)	⩾500kHz	PASS
Fundamental emission output power	FCC CFR Title 47 Part 15 Subpart C: Section 15.247(b)(3)	⩽30dBm	PASS
Power Spectral Density	FCC CFR Title 47 Part 15 Subpart C: Section 15.247(e)	⩽8dBm/3kHz	PASS
Antenna Requirement	FCC CFR Title 47 Part 15 Subpart C: Section 15.203	FCC 15.203	PASS

For ISED rule:

Performed Test Item	Normative References	Limit	Result
AC Power Line Conducted Emission	RSS-Gen Issue 5 Section 8.8	RSS-Gen	N/A
Emissions in restricted frequency bands	RSS-Gen Issue 5 Section 8.10	RSS-Gen	PASS
Emissions in non-restricted frequency bands	RSS-247 Issue 2 Section A5.5	⩾20dBc	PASS
Radiated Emission Band Edge	RSS-247 Issue 2 Section A5.5	RSS-247	PASS
Occupied Bandwidth	RSS-Gen Issue 5 Section 6.7 RSS-247 Issue 2 Section A5.2(1)	⩾500kHz	PASS
Fundamental emission output power	RSS-247 Issue 2 Section A5.4(4)	⩽30dBm	PASS
Power Spectral Density	RSS-247 Issue 2 Section A5.2(2)	⩽8dBm/3kHz	PASS
Antenna Requirement	RSS-Gen Issue 5 Section 6.8	RSS-Gen	PASS

2.3. Test Frequency configuration:

Modulation Mode	Channel	Frequency	Channel	Frequency	Channel	Frequency
802.11b	01	2412 MHz	06	2437MHz	11	2462MHz
802.11g	01	2412 MHz	06	2437MHz	11	2462MHz
802.11n/ac/ax(20MHz)	01	2412 MHz	06	2437MHz	11	2462MHz
802.11n/ac/ax(40MHz)	03	2422 MHz	06	2437MHz	09	2452MHz

2.4. Power setting parameter

Test Mode	Frequency	Mtool Power Setting						
		1*1	2*2		3*3		4*4	
			CDD	Beamforming	CDD	Beamforming	CDD	Beamforming
802.11b	2412	**78**	**78**	**77**	**77**	**75**	**77**	**75**
	2437	**79**	**79**	**78**	**77**	**75**	**77**	**75**
	2462	**79**	**79**	**78**	**77**	**75**	**77**	**75**
802.11g	2412	**60**	**60**	**58**	**50**	**48**	**50**	**48**
	2437	**60**	**60**	**58**	**50**	**48**	**50**	**48**
	2462	**56**	**56**	**54**	**50**	**48**	**50**	**48**
802.11n(20MHz)	2412	**58**	**58**	**56**	**52**	**50**	**52**	**50**
	2437	**58**	**58**	**56**	**52**	**50**	**52**	**50**
	2462	**54**	**54**	**52**	**52**	**50**	**52**	**50**
802.11n(40MHz)	2422	**53**	**53**	**51**	**52**	**50**	**52**	**50**
	2437	**53**	**53**	**51**	**52**	**50**	**52**	**50**
	2452	**48**	**48**	**46**	**52**	**50**	**52**	**50**
802.11ac(20MHz)	2412	**59**	**59**	**57**	**51**	**49**	**51**	**49**
	2437	**60**	**60**	**58**	**50**	**48**	**50**	**48**
	2462	**56**	**56**	**54**	**50**	**48**	**50**	**48**
802.11ac(40MHz)	2422	**53**	**53**	**51**	**51**	**49**	**51**	**49**
	2437	**53**	**53**	**51**	**51**	**49**	**51**	**49**
	2452	**48**	**48**	**46**	**51**	**49**	**51**	**49**
802.11ax(20MHz)	2412	**55**	**55**	**53**	**48**	**46**	**48**	**46**
	2437	**55**	**55**	**53**	**48**	**46**	**48**	**46**
	2462	**53**	**53**	**51**	**49**	**47**	**49**	**47**
802.11ax(40MHz)	2422	**53**	**53**	**51**	**49**	**47**	**49**	**47**
	2437	**53**	**53**	**51**	**48**	**46**	**48**	**46**
	2452	**48**	**48**	**46**	**49**	**47**	**49**	**47**

Note 1: The 1*1 and 3*3 power setting are same with 2*2 and 4*4, so we only test 2*2 and 4*4 for compliance.

Note 2: We have evaluated all antenna combination(Ant 1+2,1+3,1+4,2+3,2+4,3+4),shown in the report is the worst data(Ant 1+2).

2.5. 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	N/A	N/A	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	N/A	N/A	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**	**N/A**	**N/A**	**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.

2.6. 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

2.7. Measurement Uncertainty

Test Items	Uncertainty
AC Power Line Conducted Emission	±2.02dB
Radiated Emission	Below 1GHz ±3.8 dB
	Above 1GHz ±3.9 dB
RF Antenna Port Conducted Emission	±1.27dB
Radiated Emission Band Edge	±3.9dB
Occupied Bandwidth	±1kHz
Power Spectral Density	±1.27dB

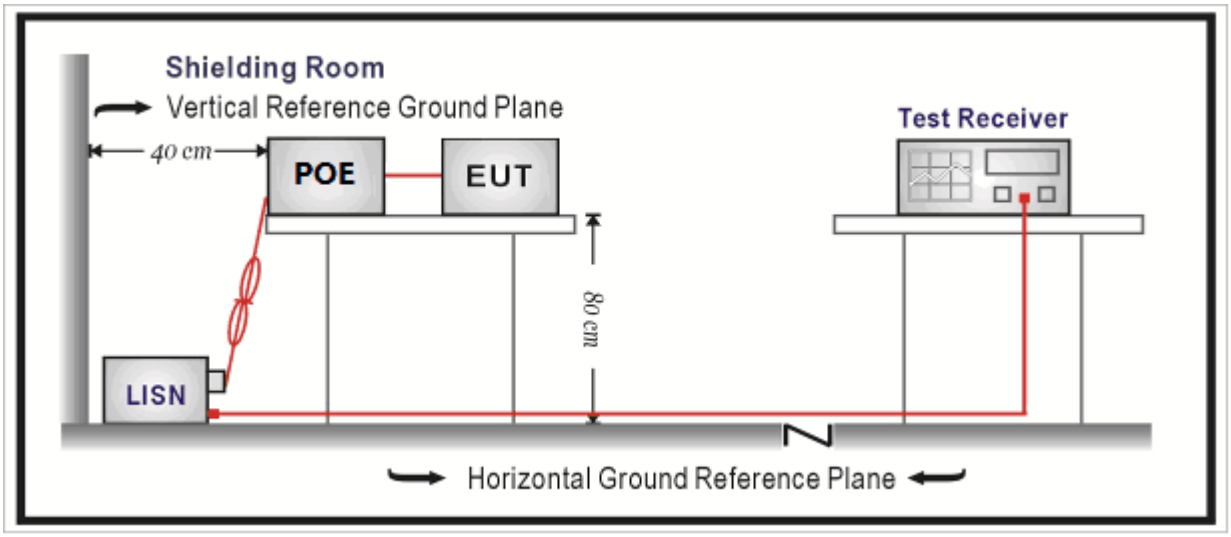
3. AC Power Line Conducted Emission

3.2. Test Equipment

AC Power Line Conducted Emission / TR-1					
Instrument	Manufacturer	Type No.	Serial No.	Cal. Date	Cal. Due Date
EMI Test Receiver	R&S	ESCI	100726	2018.03.29	2019.03.28
Two-Line V-Network	R&S	ENV216	100043	2018.03.29	2019.03.28
Two-Line V-Network	R&S	ENV216	100044	2017.09.17	2018.09.16
50ohm Coaxial Switch	Anritsu	MP59B	6200464462	2018.03.02	2019.03.01
50ohm Termination	SHX	TF2	07081401	2017.09.17	2018.09.16
Temperature/Humidity Meter	zhichen	ZC1-2	TR1-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.					

3.3. Test Setup

AC Power Line Conducted Emission test setup



3.4. Limit

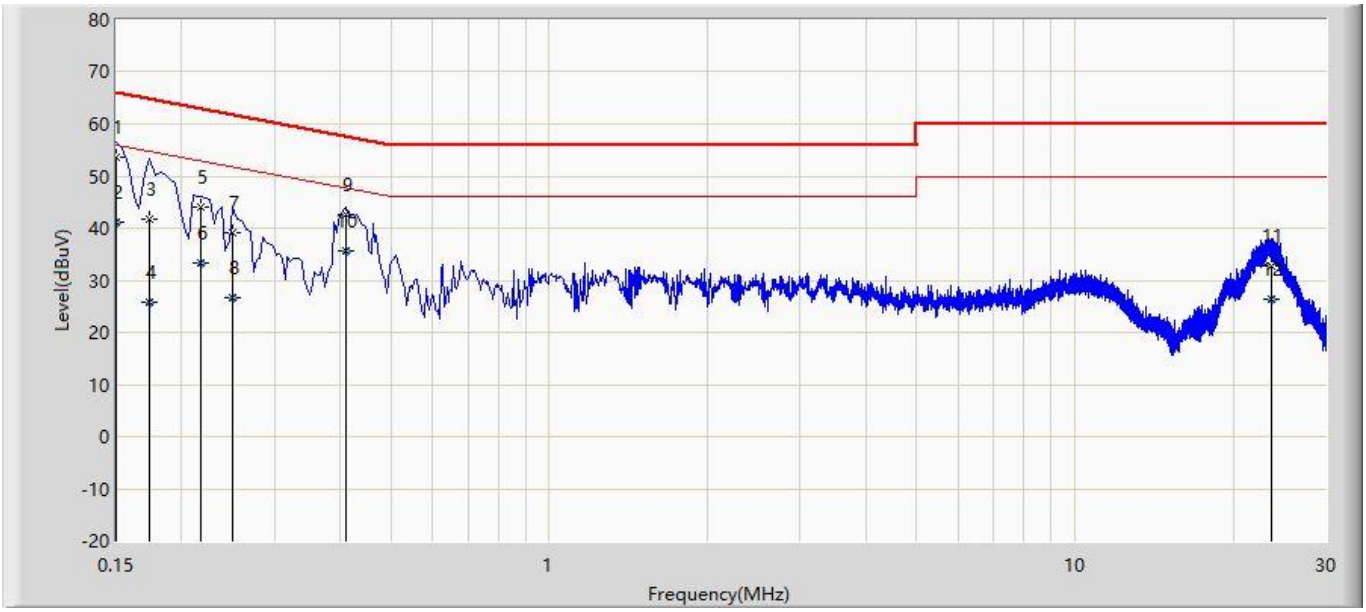
Frequency of Emission (MHz)	Conducted Limit	
	Quasi-peak (dBμV)	Average(dBμV)
0.15-0.5	66 to 56	56 to 46
0.5-5	56	46
5-30	60	50
Note 1: The lower limit shall apply at the transition frequencies. Note 2: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.		

3.5. 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

3.6. Test Result

Engineer: Lucas	
Site: TR1	Time: 2018/06/20
Limit: FCC_Part15.107_CE_AC Power_ClassB	Margin: 0
Probe: ENV216_101190(0.009-30MHz)	Polarity: Line
EUT: Wireless Access Point	Power: AC 120V/60Hz
Note: Mode 1: Transmit at channel 2412MHz by 802.11b	



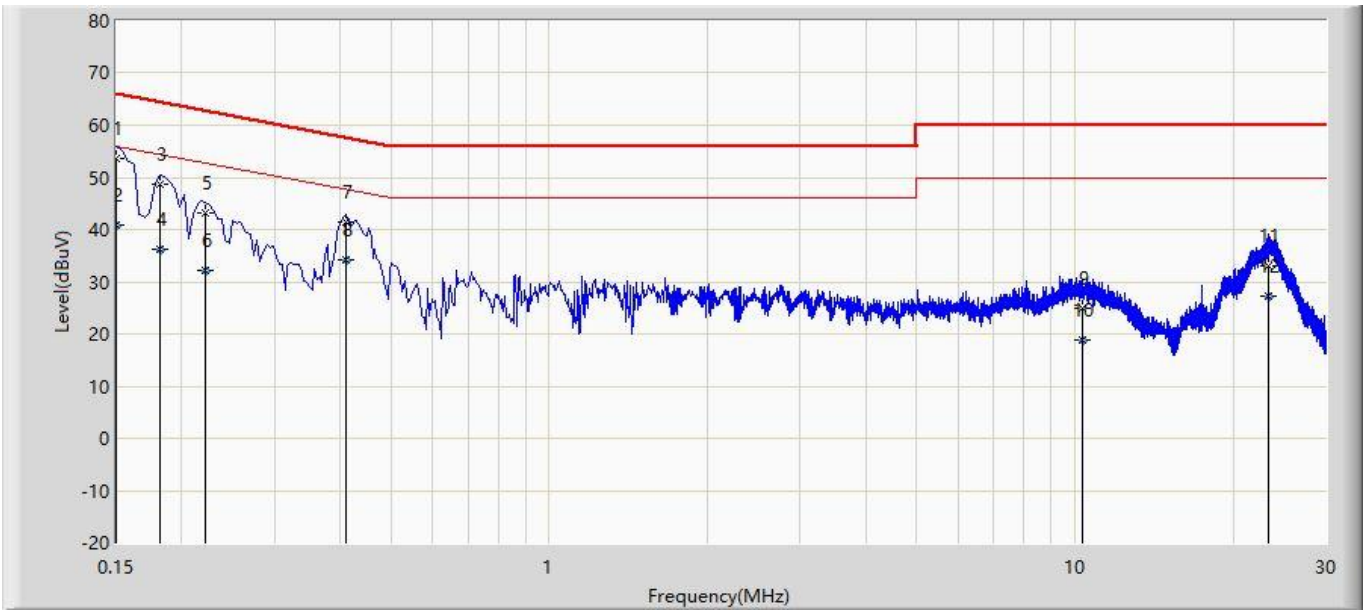
No	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Probe (dB)	Cable (dB)	Amp (dB)	Type
1		0.150	53.766	44.131	-12.234	66.000	9.610	0.025	0.000	QP
2		0.150	41.118	31.483	-14.882	56.000	9.610	0.025	0.000	AV
3		0.174	41.846	32.213	-22.921	64.767	9.605	0.027	0.000	QP
4		0.174	25.878	16.246	-28.889	54.767	9.605	0.027	0.000	AV
5		0.218	44.117	34.487	-18.778	62.895	9.600	0.029	0.000	QP
6		0.218	33.443	23.814	-19.452	52.895	9.600	0.029	0.000	AV
7		0.250	39.162	29.531	-22.595	61.757	9.600	0.031	0.000	QP
8		0.250	26.588	16.957	-25.169	51.757	9.600	0.031	0.000	AV
9		0.410	42.721	33.083	-14.927	57.648	9.600	0.039	0.000	QP
10	*	0.410	35.590	25.951	-12.058	47.648	9.600	0.039	0.000	AV
11		23.574	32.630	21.940	-27.370	60.000	10.375	0.315	0.000	QP
12		23.574	26.503	15.813	-23.497	50.000	10.375	0.315	0.000	AV

Note:

1. " * ", means this data is the worst emission level.

2. Measurement Level = Reading Level + Factor(Probe+Cable-Amp).

Engineer: Lucas	
Site: TR1	Time: 2018/06/20
Limit: FCC_Part15.107_CE_AC Power_ClassB	Margin: 0
Probe: ENV216_101190(0.009-30MHz)	Polarity: Neutral
EUT: Wireless Access Point	Power: AC 120V/60Hz
Note: Mode 2: Powered by POE	



No	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Probe (dB)	Cable (dB)	Amp (dB)	Type
1	*	0.150	53.518	43.900	-12.482	66.000	9.594	0.025	0.000	QP
2		0.150	40.795	31.176	-15.205	56.000	9.594	0.025	0.000	AV
3		0.182	48.650	39.025	-15.744	64.394	9.597	0.028	0.000	QP
4		0.182	36.195	26.570	-18.199	54.394	9.597	0.028	0.000	AV
5		0.222	43.103	33.475	-19.640	62.744	9.599	0.029	0.000	QP
6		0.222	32.276	22.648	-20.467	52.744	9.599	0.029	0.000	AV
7		0.410	41.558	31.926	-16.090	57.648	9.593	0.039	0.000	QP
8		0.410	34.095	24.464	-13.553	47.648	9.593	0.039	0.000	AV
9		10.342	24.790	14.784	-35.210	60.000	9.802	0.205	0.000	QP
10		10.342	18.722	8.715	-31.278	50.000	9.802	0.205	0.000	AV
11		23.330	33.168	22.355	-26.832	60.000	10.500	0.313	0.000	QP
12		23.330	27.105	16.292	-22.895	50.000	10.500	0.313	0.000	AV

Note:

1. " * ", means this data is the worst emission level.

2. Measurement Level = Reading Level + Factor(Probe+Cable-Amp).

4. Emissions in restricted frequency bands

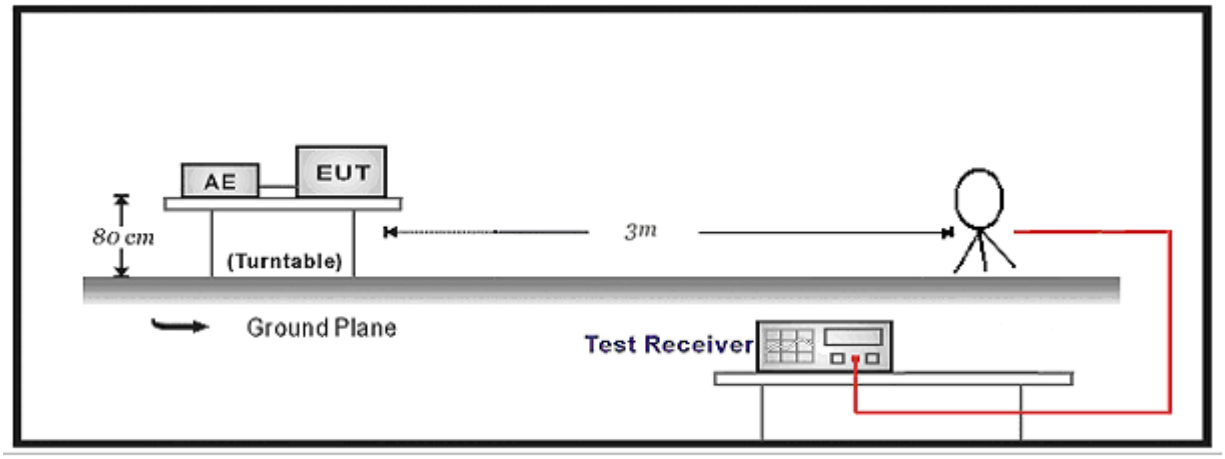
4.2. Test Equipment

Radiated Emission(Below 1GHz) / 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
Note: All equipment are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.					

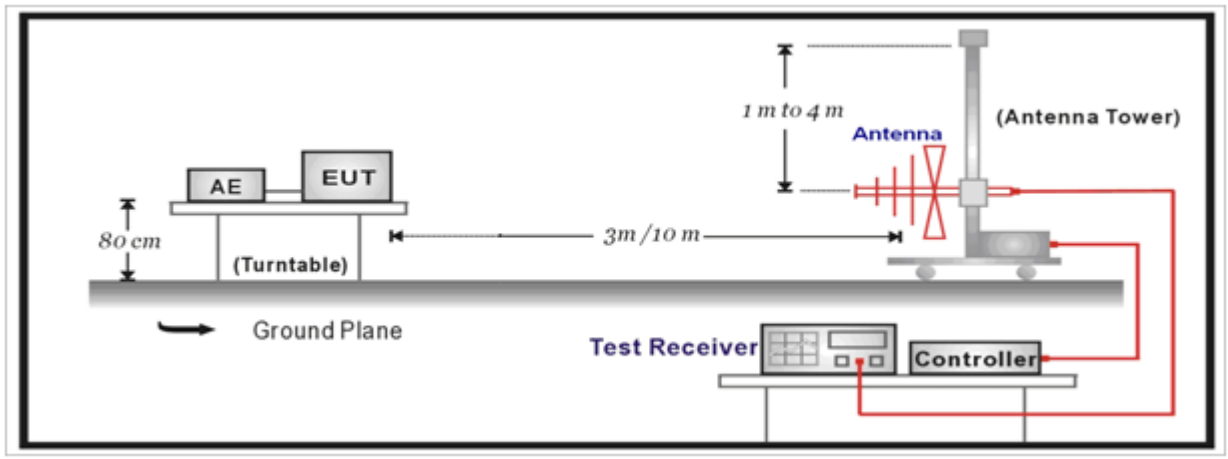
Radiated Emission(Above 1GHz) / AC-5					
Instrument	Manufacturer	Type No.	Serial No.	Cal. Date	Cal. Due Date
Spectrum Analyzer	Agilent	E4446A	MY45300103	2018.01.04	2019.01.03
Preamplifier	Miteq	NSP1800-25	1364185	2018.05.06	2019.05.05
Preamplifier	QuieTek	AP-040G	CHM-0906001	2018.05.06	2019.05.05
DRG 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.					

4.3. Test Setup

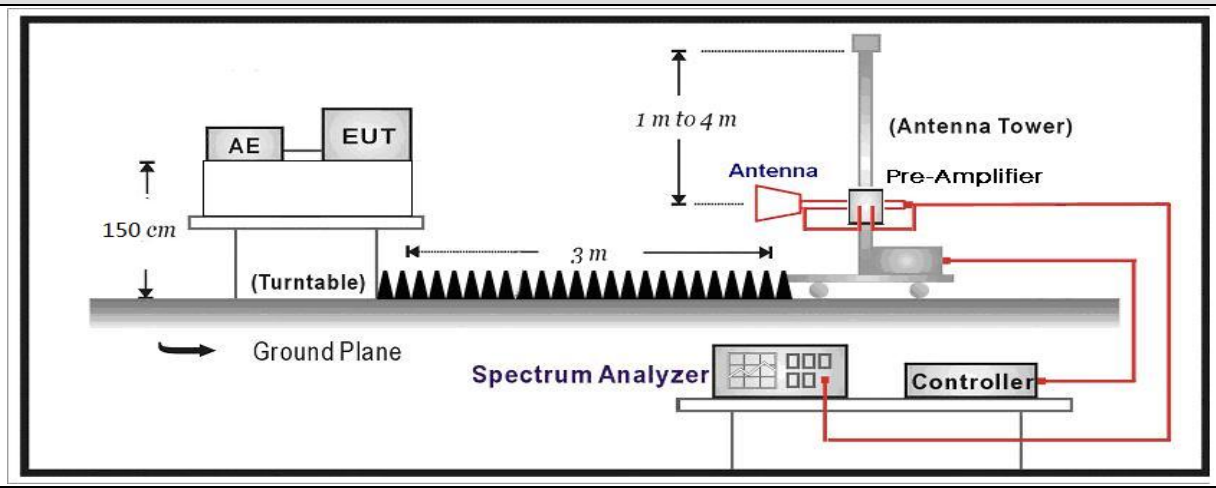
Below 30MHz Test Setup:



30MHz-1GHz Test Setup:



Above 1GHz Test Setup:



4.4. Limit

For FCC

Restricted Bands of operation			
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			

For ISED:

Restricted Bands of operation			
Frequency (MHz)	Frequency (MHz)	Frequency (MHz)	Frequency (GHz)
0.090 - 0.110	13.36 - 13.41	960 - 1427	9.0 - 9.2
0.495 - 0.505	16.42 - 16.423	1435 - 1626.5	9.3 - 9.5
2.1735 - 2.1905	16.69475 - 16.69525	1645.5 - 1646.5	10.6 - 12.7
3.020 - 3.026	16.80425 - 16.80475	1660 - 1710	13.25 - 13.4
4.125 - 4.128	25.5 - 25.67	1718.8 - 1722.2	14.47 - 14.5
4.17725 - 4.17775	37.5 - 38.25	2200 - 2300	15.35 - 16.2
4.20725 - 4.20775	73 - 74.6	2310 - 2390	17.7 - 21.4
5.677 - 5.683	74.8 - 75.2	2483.5 - 2500	22.01 - 23.12
6.215 - 6.218	108 - 138	2655 - 2900	23.6 - 24.0
6.26775 - 6.26825	149.9 - 150.05	3260 - 3267	31.2 - 31.8
6.31175 - 6.31225	156.52475 - 156.52525	3332 - 3339	36.43 - 36.5
8.291 - 8.294	156.7 - 156.9	3345.8 - 3358	Above 38.6
8.362 - 8.366	162.0125 - 167.17	3500 - 4400	
8.37625 - 8.38675	167.72 - 173.2	4500 - 5150	
8.41425 - 8.41475	240 - 285	5350 - 5460	
12.29 - 12.293	322 - 335.4	7250 - 7750	
12.51975 - 12.52025	399.9 - 410	8025 - 8500	
12.57675 - 12.57725	608 - 614	--	

Restricted Band Emissions Limit			
Frequency (MHz)	Field strength (μV/m)	Field strength (dBμV/m)	Measurement distance (m)
0.009 - 0.49	2400/F(kHz)	48.5 – 13.8	300(Note 1)
0.49 - 1.705	24000/F(kHz)	33.8 - 23	30(Note 1)
1.705 - 30	30	29.5	30(Note 1)
30 - 88	100	40	3(Note 2)
88 - 216	150	43.5	3(Note 2)
216 - 960	200	46	3(Note 2)
Above 960	500	54	3(Note 2)

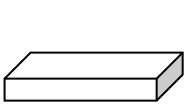
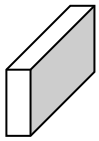
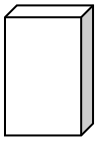
Note 1: At frequencies below 30 MHz, measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field. Pending the development of an appropriate measurement procedure for measurements performed 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).

4.5. Test Procedure

Test Method								
	References Rule						Chapter	Description
☐	ANSI C63.10						11.11	Emissions in non-restricted frequency bands
	☐	ANSI C63.10					11.11.2	Reference level measurement
	☐	ANSI C63.10					11.11.3	Emission level measurement
☒	ANSI C63.10						11.12	Emissions in restricted frequency bands
	☒	ANSI C63.10					11.12.1	Radiated emission measurements
	☒	ANSI C63.10					11.12.2.7	Radiated spurious emission test
		☒	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
	☐	ANSI C63.10					11.12.2	Antenna-port conducted measurements
		☐	ANSI C63.10				11.12.2.3	Quasi-peak measurement procedure
		☐	ANSI C63.10				11.12.2.4	Peak power measurement procedure
		☐	ANSI C63.10				11.12.2.5	Average power measurement procedures
			☐	ANSI C63.10			11.12.2.5.1	Trace averaging with continuous EUT transmission at full power
			☐	ANSI C63.10			11.12.2.5.2	Trace averaging across ON and OFF times of the EUT transmissions followed by duty cycle correction
			☐	ANSI C63.10			11.12.2.5.3	Reduced VBW averaging across ON and OFF times of the EUT transmissions with max hold

4.6. EUT test Axis definition

<table>
<tr><th>Item</th><th colspan="5">Emissions in restricted frequency bands</th></tr>
<tr><td rowspan="3">Device Category</td><td>☐</td><td colspan="4">Fixed point-to-point</td></tr>
<tr><td>☐</td><td colspan="4">Emit multiple directional beams, simultaneously or sequentially</td></tr>
<tr><td>☒</td><td colspan="4">Other cases</td></tr>
<tr><td>Test mode</td><td colspan="5">Mode 1~16</td></tr>
<tr><td rowspan="6">Test method</td><td>☒</td><td colspan="4">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>
<tr><td>Worst Axis ☒</td><td>Worst Axis ☐</td><td>Worst Axis ☐</td></tr>
<tr><td>☐</td><td colspan="4">Conducted</td></tr>
<tr><td>☐</td><td>Chain 1</td><td>Chain 2</td><td>Chain 3</td><td>Chain 4</td></tr>
<tr><td></td><td colspan="4">  </td></tr>
</table>

4.7. Test Result

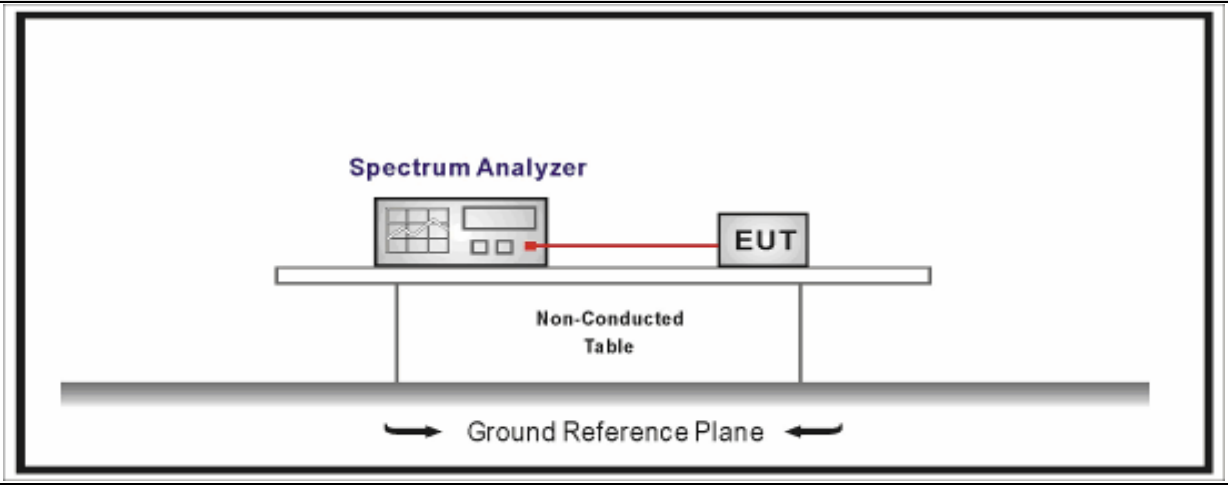
Please refer to 2.4G-Appendix 1-RSE

5. Emissions in non-restricted frequency bands

5.1. Test Equipment

Emissions in non-restricted frequency bands / TR-8					
Instrument	Manufacturer	Type No.	Serial No.	Cal. Date	Cal. Due Date
Spectrum Analyzer	Agilent	N9010A	MY48030494	2017.02.04	2018.02.03
EXA Spectrum Analyzer	Keysight	N9010A	MY55370495	2017.04.09	2018.04.08
MXA Signal Analyzer	Keysight	N9020A	MY56060147	2017.04.09	2018.04.08
Temperature/Humidity Meter	zhichen	ZC1-2	TR8-TH	2017.04.10	2018.04.09
Note: All equipment are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.					

5.2. Test Setup

Emissions in non-restricted frequency bands


5.3. Limit

Un-Restricted Band Emissions Limit	
RF Output power (Detection methods)	Limit(dB)
RF Output power(Average detector)	30c(Note1)
RF Output power(PK detector)	20c(Note2)

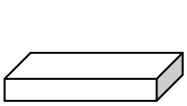
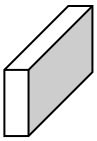
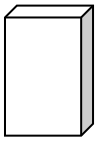
Note 1: If maximum conducted (average) output power was used to demonstrate compliance as described in 9.2, then the peak power in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 30 dB relative to the maximum in-band peak PSD level in 100 kHz (i.e., 30 dBc).

Note 2: If the maximum peak conducted output power procedure was used, then the peak output power measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz (i.e., 20 dBc).

5.4. Test Procedure

Test Method						
	References Rule				Chapter	Description
☒	ANSI C63.10				11.11	Emissions in non-restricted frequency bands
	☒	ANSI C63.10			11.11.2	Reference level measurement
	☒	ANSI C63.10			11.11.3	Emission level measurement
☐	ANSI C63.10				11.12	Emissions in restricted frequency bands
	☐	ANSI C63.10			11.12.1	Radiated emission measurements
	☐	ANSI C63.10			11.12.2.7	Radiated spurious emission test
☐	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
	☐	ANSI C63.10			11.12.2	Antenna-port conducted measurements
		☐	ANSI C63.10		11.12.2.3	Quasi-peak measurement procedure
		☐	ANSI C63.10		11.12.2.4	Peak power measurement procedure
		☐	ANSI C63.10		11.12.2.5	Average power measurement procedures
			☐	ANSI C63.10	11.12.2.5.1	Trace averaging with continuous EUT transmission at full power
			☐	ANSI C63.10	11.12.2.5.2	Trace averaging across ON and OFF times of the EUT transmissions followed by duty cycle correction
			☐	ANSI C63.10	11.12.2.5.3	Reduced VBW averaging across ON and OFF times of the EUT transmissions with max hold

5.5. EUT test Axis definition

<table>
<tr><th>Item</th><th colspan="5">Emissions in non-restricted frequency bands</th></tr>
<tr><td rowspan="3">Device Category</td><td>☐</td><td colspan="4">Fixed point-to-point</td></tr>
<tr><td>☐</td><td colspan="4">Emit multiple directional beams, simultaneously or sequentially</td></tr>
<tr><td>☒</td><td colspan="4">Other cases</td></tr>
<tr><td>Test mode</td><td colspan="5">Mode 1~16</td></tr>
<tr><td rowspan="6">Test method</td><td>☒</td><td colspan="4">Radiated</td></tr>
<tr><td rowspan="3"></td><td>X Axis</td><td>Y Axis</td><td colspan="2">Z Axis</td></tr>
<tr><td>  </td><td>  </td><td colspan="2">  </td></tr>
<tr><td>Worst Axis ☒</td><td>Worst Axis ☐</td><td colspan="2">Worst Axis ☐</td></tr>
<tr><td>☒</td><td colspan="4">Conducted</td></tr>
<tr><td>☒</td><td>Chain 1</td><td>Chain 2</td><td>Chain 3</td><td>Chain 4</td></tr>
<tr><td></td><td colspan="4">  </td></tr>
</table>

5.6. Test Result

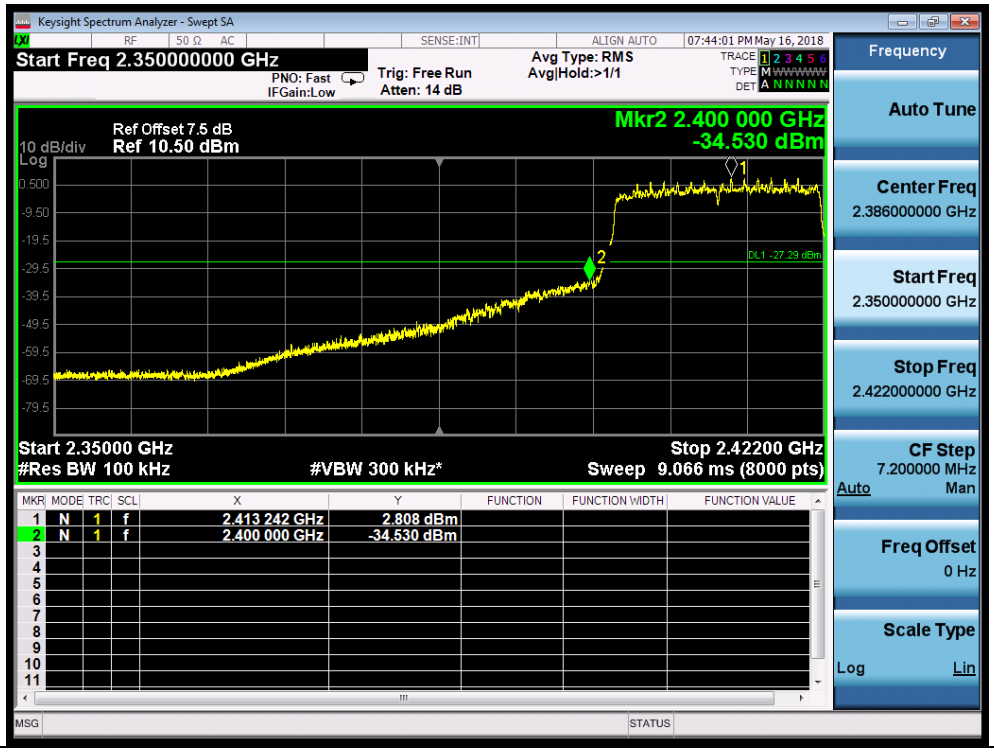
Product Name	:	Wireless Access point	Power	:	AC 120V/60Hz
Test Mode	:	Mode1~8	Test Site	:	TR8
Test Date	:	2018.05.16	Test Engineer	:	Eric

2TX*2RX

Mode	Channel	Test Frequency (MHz)	Maximum In-Band PSD[a] (dBm/100kHz)	Frequency (MHz)	Out-Band PSD[b] (dBm/100kHz)	[a]-[b] (dB)	Limit (dB)	Result
1	01	2412	13.084	2400	-34.250	47.334	>20	Pass
1	11	2462	12.588	2500	-49.225	61.813	>20	Pass
2	01	2412	3.449	2400	-40.974	44.423	>20	Pass
2	11	2462	2.018	2500	-55.160	57.178	>20	Pass
3	01	2412	3.677	2400	-40.438	44.115	>20	Pass
3	11	2462	2.529	2500	-56.764	59.293	>20	Pass
4	03	2422	-0.445	2400	-47.118	46.673	>20	Pass
4	09	2452	-2.709	2500	-56.463	53.754	>20	Pass
5	01	2412	3.762	2400	-42.529	46.291	>20	Pass
5	11	2462	2.660	2500	-58.467	61.127	>20	Pass
6	03	2422	-0.366	2400	-47.986	47.620	>20	Pass
6	09	2452	-2.777	2500	-57.738	54.961	>20	Pass
7	01	2412	2.808	2400	-34.530	37.338	>20	Pass
7	11	2462	1.629	2500	-57.674	59.303	>20	Pass
8	03	2422	-0.578	2400	-46.144	45.566	>20	Pass

8	09	2452	-3.132	2500	-57.172	54.040	>20	Pass
9	01	2412	7.275	2400	-51.889	59.164	>20	Pass
9	11	2462	6.261	2500	-59.053	65.314	>20	Pass
10	01	2412	1.749	2400	-43.945	45.694	>20	Pass
10	11	2462	-1.720	2500	-60.670	58.950	>20	Pass
11	01	2412	1.174	2400	-45.029	46.203	>20	Pass
11	11	2462	-1.667	2500	-60.749	59.082	>20	Pass
12	03	2422	0.550	2400	-45.531	46.081	>20	Pass
12	09	2452	-5.187	2500	-60.332	55.145	>20	Pass
13	01	2412	0.404	2400	-45.313	45.717	>20	Pass
13	11	2462	-2.424	2500	-61.347	58.923	>20	Pass
14	03	2422	-4.219	2400	-53.728	49.509	>20	Pass
14	09	2452	-5.240	2500	-61.161	55.921	>20	Pass
15	01	2412	0.464	2400	-45.531	45.995	>20	Pass
15	11	2462	-2.479	2500	-62.538	60.059	>20	Pass
16	03	2422	-4.733	2400	-53.517	48.784	>20	Pass
16	09	2452	-5.327	2500	-62.220	56.893	>20	Pass
Note: The worst case of emissions in non-restricted frequency bands as below:								

Mode 7 CH01(2412MHz)



4TX*4RX

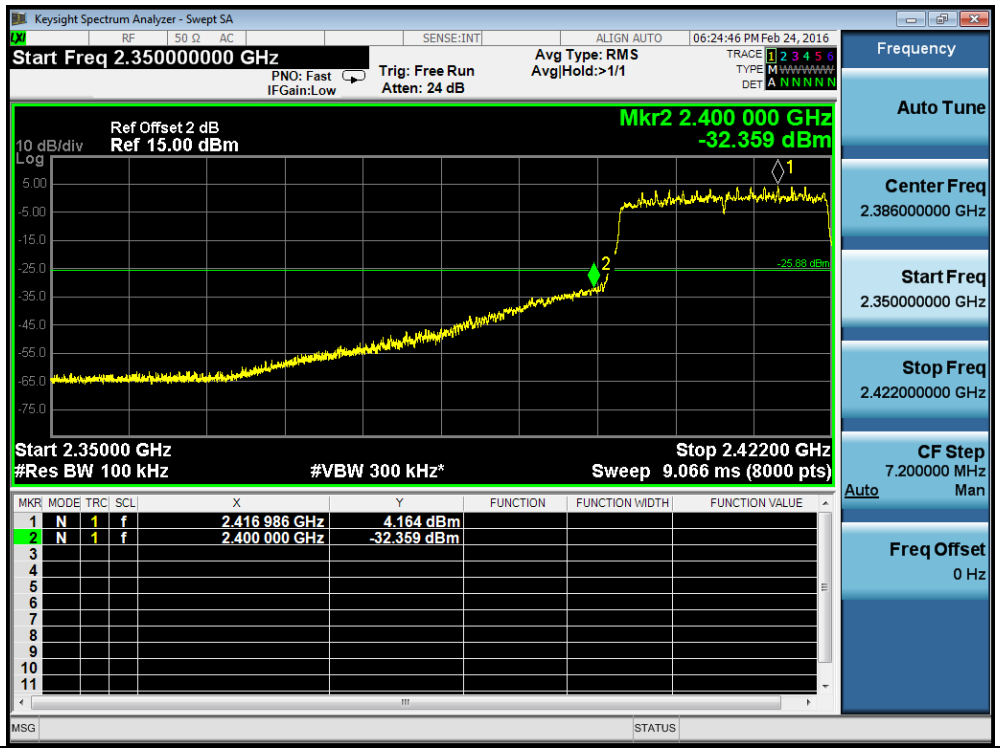
Mode	Channel	Test Frequency (MHz)	Maximum In-Band PSD[a] (dBm/100kHz)	Frequency (MHz)	Out-Band PSD[b] (dBm/100kHz)	[a]-[b] (dB)	Limit (dB)	Result
1	01	2412	6.614	2400	-54.693	61.307	>20	Pass
1	11	2462	4.929	2500	-59.110	64.039	>20	Pass
2	01	2412	0.858	2400	-44.973	45.831	>20	Pass
2	11	2462	-2.174	2500	-60.946	58.772	>20	Pass
3	01	2412	-0.270	2400	-46.049	45.779	>20	Pass
3	11	2462	-4.260	2500	-61.654	57.394	>20	Pass
4	03	2422	-5.220	2400	-50.903	45.683	>20	Pass
4	09	2452	-6.159	2500	-60.583	54.424	>20	Pass
5	01	2412	-0.634	2400	-46.524	45.890	>20	Pass

5	11	2462	-3.235	2500	-61.930	58.695	>20	Pass
6	03	2422	-5.448	2400	-53.775	48.327	>20	Pass
6	09	2452	-5.752	2500	-61.398	55.646	>20	Pass
7	01	2412	-0.486	2400	-44.973	44.487	>20	Pass
7	11	2462	-3.039	2500	-60.673	57.634	>20	Pass
8	03	2422	-5.328	2400	-53.834	48.506	>20	Pass
8	09	2452	-6.182	2500	-60.842	54.660	>20	Pass
9	01	2412	13.749	2400	-33.472	47.221	>20	Pass
9	11	2462	13.023	2500	-51.762	64.785	>20	Pass
10	01	2412	4.798	2400	-37.757	42.555	>20	Pass
10	11	2462	3.247	2500	-57.641	60.888	>20	Pass
11	01	2412	4.390	2400	-40.260	44.650	>20	Pass
11	11	2462	3.180	2500	-55.878	59.058	>20	Pass
12	03	2422	0.482	2400	-46.513	46.995	>20	Pass
12	09	2452	-1.767	2500	-57.382	55.615	>20	Pass
13	01	2412	4.413	2400	-41.235	45.648	>20	Pass
13	11	2462	3.291	2500	-57.307	60.598	>20	Pass
14	03	2422	0.357	2400	-47.043	47.400	>20	Pass
14	09	2452	-2.480	2500	-57.739	55.259	>20	Pass
15	01	2412	4.164	2400	-32.359	36.523	>20	Pass

15	11	2462	3.211	2500	-55.288	58.499	>20	Pass
16	03	2422	0.365	2400	-46.376	46.741	>20	Pass
16	09	2452	-2.108	2500	-57.551	55.443	>20	Pass

Note: The worst case of emissions in non-restricted frequency bands as below:

Mode 15 CH01(2412MHz)

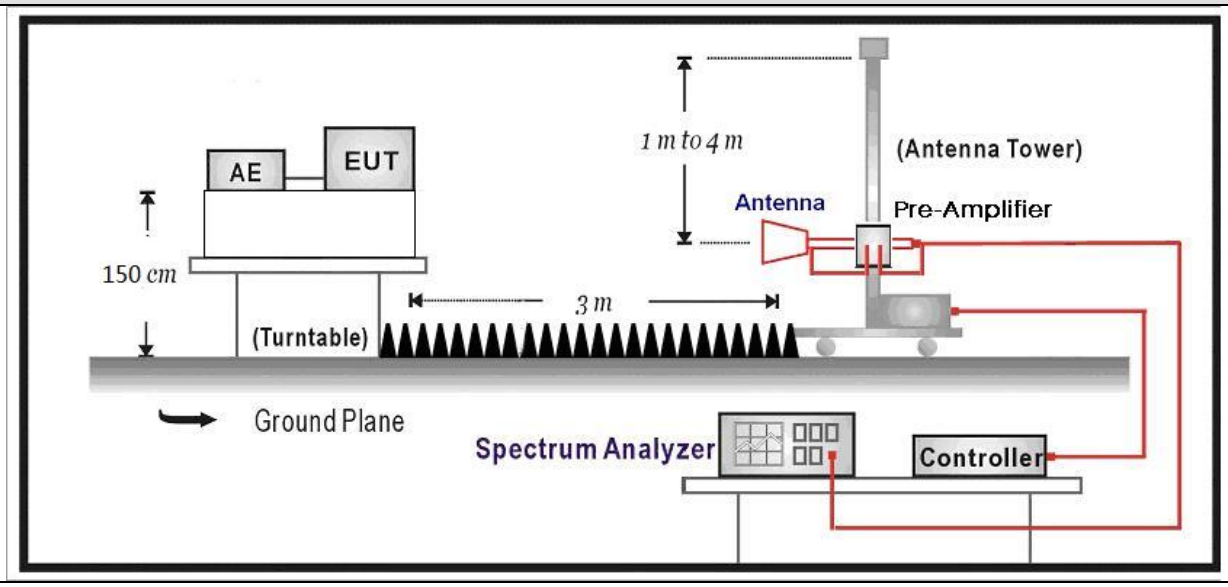


6. Radiated Emission Band Edge

6.1. Test Equipment

Radiated Emission Band Edge / 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	QuieTek	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.					

6.2. Test Setup

Radiated Emission Band Edge


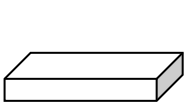
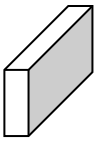
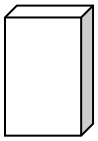
6.3. Limit

Band edge Limit				
Frequency bands (MHz)	Detector	Limit (dB μ V/m)	RBW (MHz)	Distance (m)
2310-2390 2483.5-2500	PK	74	1	3
	AV	54	1	3
Note: The field strength of emissions appearing within these frequency bands shall not exceed the limits.				

6.4. Test Procedure

Radiated Emission Band Edge									
	References Rule						Chapter	Description
☒	ANSI C63.10						6.10	Band-edge testing
	☒	ANSI C63.10					6.10.5	Restricted-band band-edge measurements
	☐	ANSI C63.10					6.10.6	Marker-delta method
☒	ANSI C63.10						11.12	Emissions in restricted frequency bands
	☒	ANSI C63.10					11.12.1	Radiated emission measurements
	☒	ANSI C63.10					11.12.2.7	Radiated spurious emission test
☐	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
	☐	ANSI C63.10					11.12.2	Antenna-port conducted measurements
		☐	ANSI C63.10				11.12.2.3	Quasi-peak measurement procedure
		☐	ANSI C63.10				11.12.2.4	Peak power measurement procedure
		☐	ANSI C63.10				11.12.2.5	Average power measurement procedures
			☐	ANSI C63.10			11.12.2.5.1	Trace averaging with continuous EUT transmission at full power
			☐	ANSI C63.10			11.12.2.5.2	Trace averaging across ON and OFF times of the EUT transmissions followed by duty cycle correction
			☐	ANSI C63.10			11.12.2.5.3	Reduced VBW averaging across ON and OFF times of the EUT transmissions with max hold

6.5. EUT test definition

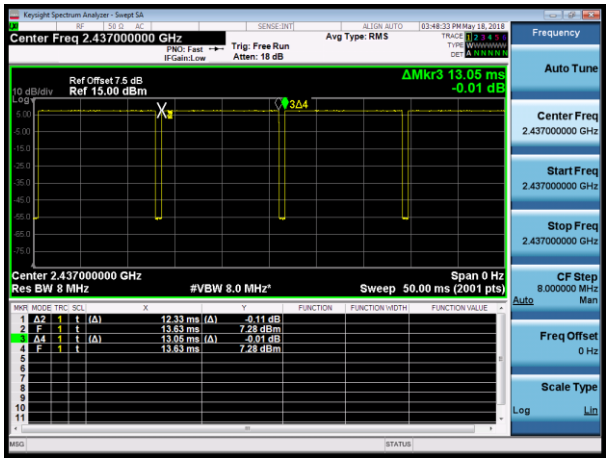
<table>
<tr><th>Item</th><th colspan="5">Radiated Emission Band Edge</th></tr>
<tr><td rowspan="3">Device Category</td><td>☐</td><td colspan="4">Fixed point-to-point</td></tr>
<tr><td>☐</td><td colspan="4">Emit multiple directional beams, simultaneously or sequentially</td></tr>
<tr><td>☒</td><td colspan="4">Other cases</td></tr>
<tr><td>Test mode</td><td colspan="5">Mode 1~16</td></tr>
<tr><td rowspan="6">Test method</td><td>☒</td><td colspan="4">Radiated</td></tr>
<tr><td rowspan="3"></td><td>X Axis</td><td>Y Axis</td><td colspan="2">Z Axis</td></tr>
<tr><td>  </td><td>  </td><td colspan="2">  </td></tr>
<tr><td>Worst Axis ☒</td><td>Worst Axis ☐</td><td colspan="2">Worst Axis ☐</td></tr>
<tr><td>☒</td><td colspan="4">Conducted</td></tr>
<tr><td>☒</td><td>Chain 1</td><td>Chain 2</td><td>Chain 3</td><td>Chain 4</td></tr>
<tr><td></td><td colspan="4">  </td></tr>
</table>

6.6. Duty Cycle

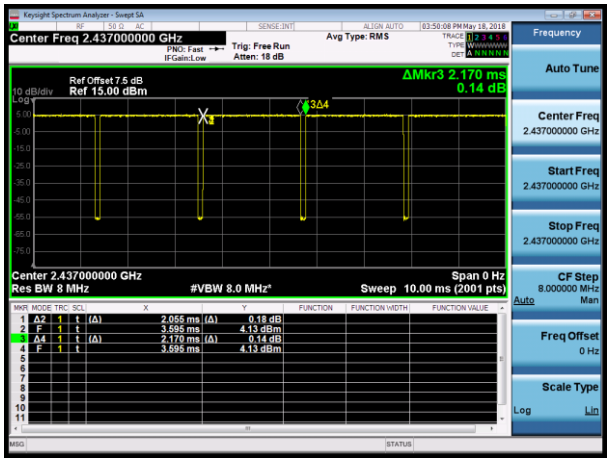
2*TX+2*RX:

Test Mode	Tx On (ms)	Tx Off (ms)	VBW	Tx On + Tx Off (ms)	Duty Cycle
802.11b	12.33	0.72	82Hz	13.05	94.48%
802.11g	2.06	0.11	510Hz	2.17	94.93%
802.11n(20MHz)	1.90	0.11	560Hz	2.01	94.53%
802.11n(40MHz)	0.94	0.11	1.1KHz	1.05	89.52%
802.11ac(20MHz)	1.92	0.04	560Hz	1.96	97.96%
802.11ac(40MHz)	0.94	0.04	1.1KHz	0.98	95.92%
802.11ax(20MHz)	1.49	0.03	680Hz	1.52	98.03%
802.11ax(40MHz)	0.76	0.05	1.5KHz	0.81	93.83%
802.11b with Beam-forming	12.33	0.72	82Hz	13.05	94.48%
802.11g with Beam-forming	2.06	0.11	510Hz	2.17	94.93%
802.11n(20MHz) with Beam-forming	1.90	0.11	560Hz	2.01	94.53%
802.11n(40MHz) with Beam-forming	0.94	0.11	1.1KHz	1.05	89.52%
802.11ac(20MHz) with Beam-forming	1.92	0.04	560Hz	1.96	97.96%
802.11ac(40MHz) with Beam-forming	0.94	0.04	1.1KHz	0.98	95.92%
802.11ax(20MHz) with Beam-forming	1.49	0.03	680Hz	1.52	98.03%
802.11ax(40MHz) with Beam-forming	0.76	0.05	1.5KHz	0.81	93.83%

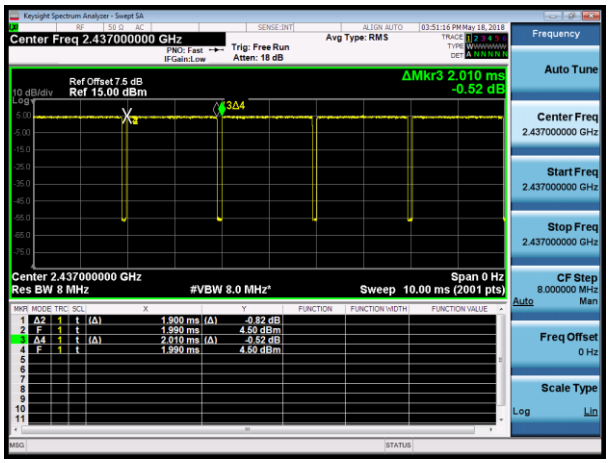
802.11b



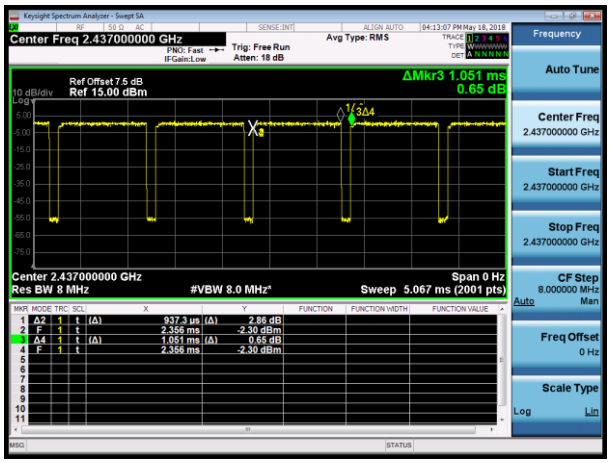
802.11g



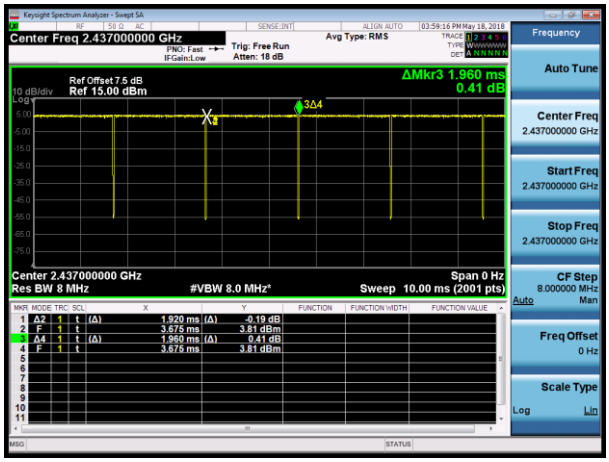
802.11n(20MHz)



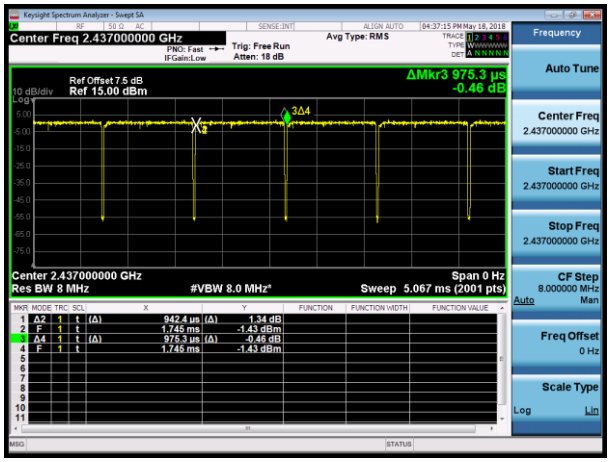
802.11n(40MHz)



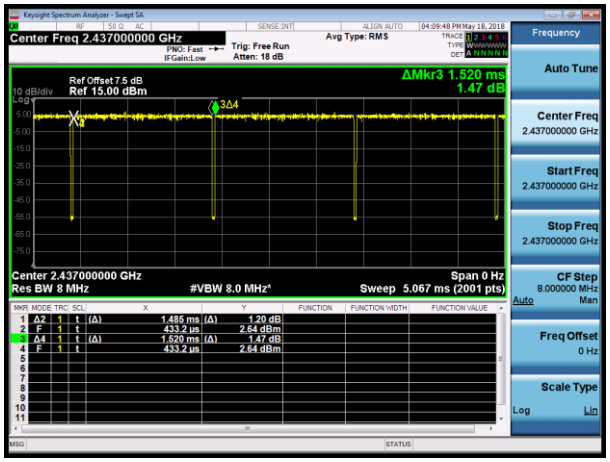
802.11ac(20MHz)



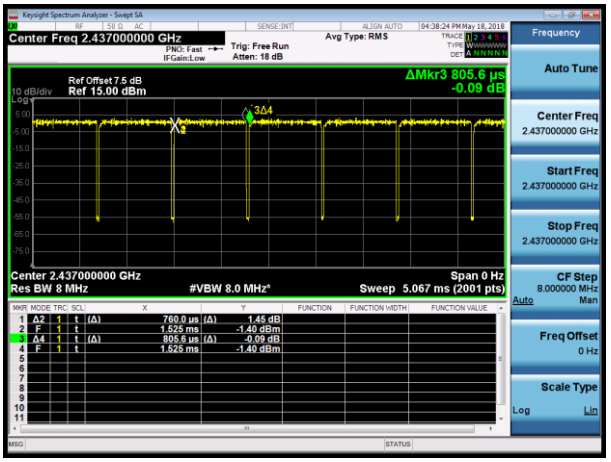
802.11ac(40MHz)



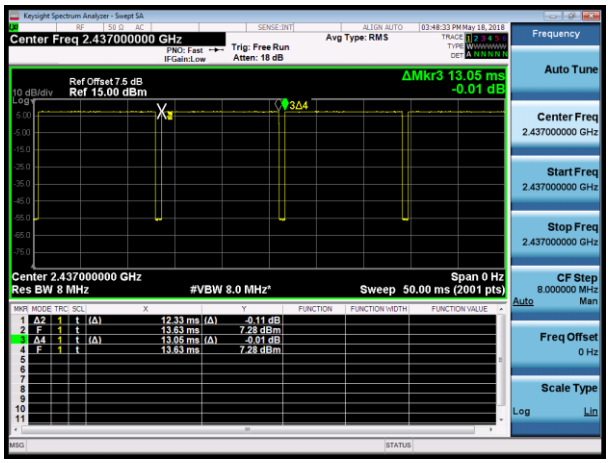
802.11ax(20MHz)



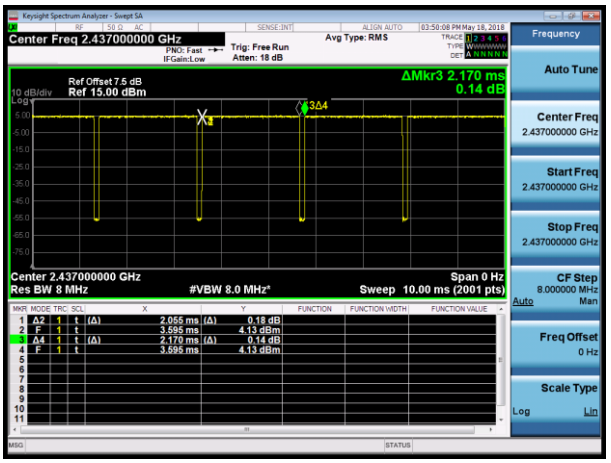
802.11ax(40MHz)



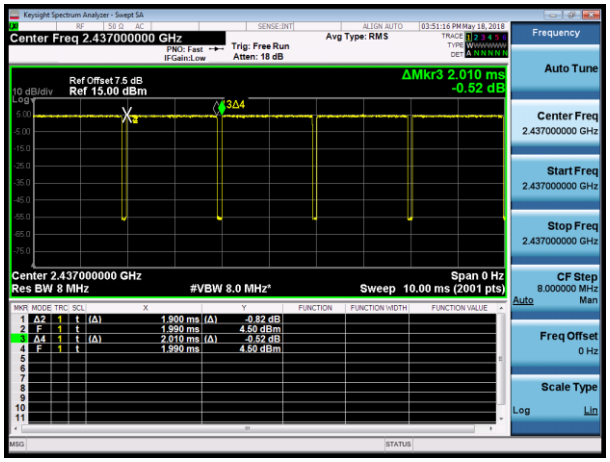
802.11b with Beam-forming



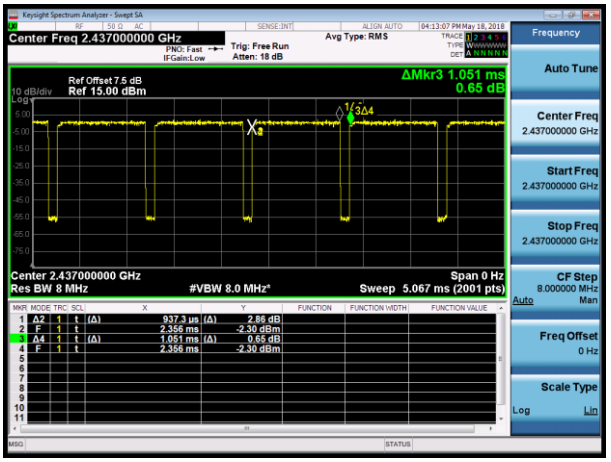
802.11g with Beam-forming



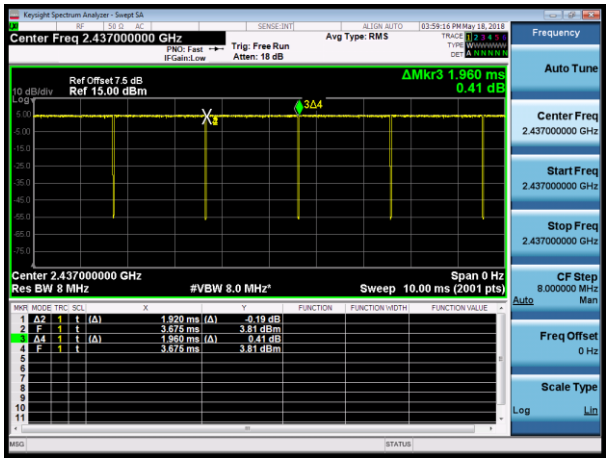
802.11n(20MHz) with Beam-forming



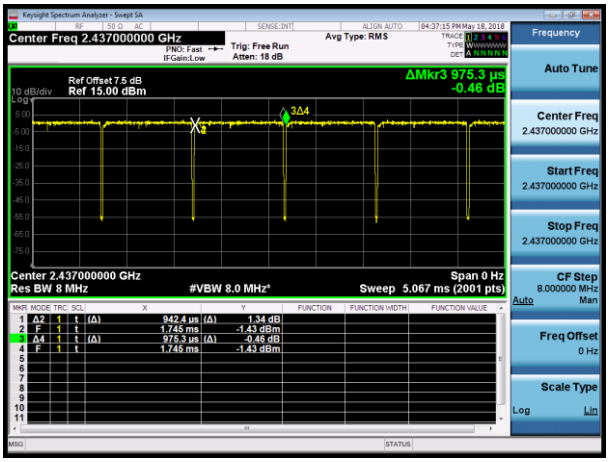
802.11n(40MHz) with Beam-forming



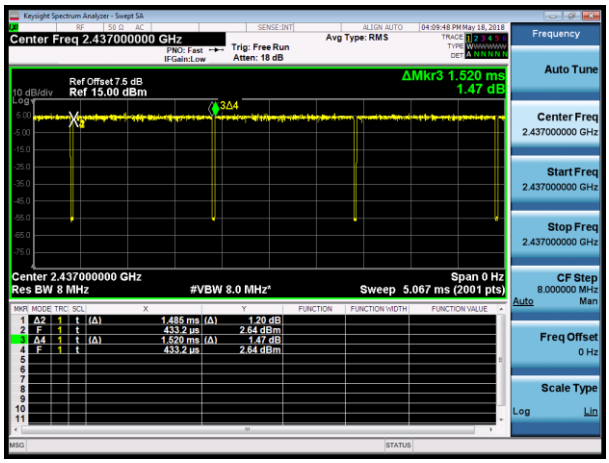
802.11ac(20MHz) with Beam-forming



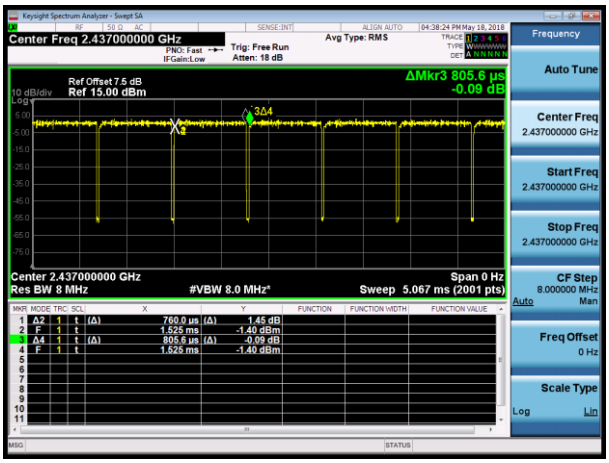
802.11ac(40MHz) with Beam-forming



802.11ax(20MHz) with Beam-forming



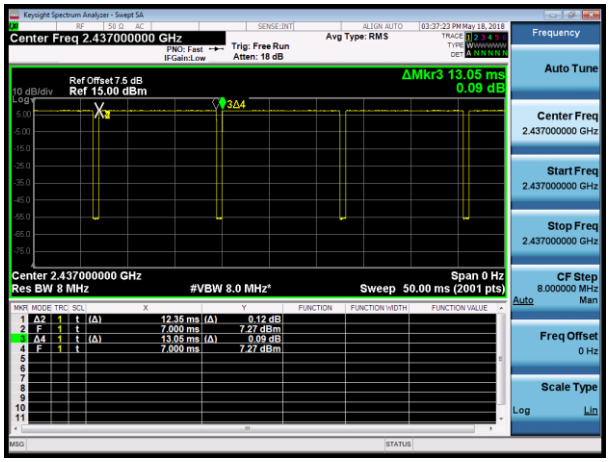
802.11ax(40MHz) with Beam-forming



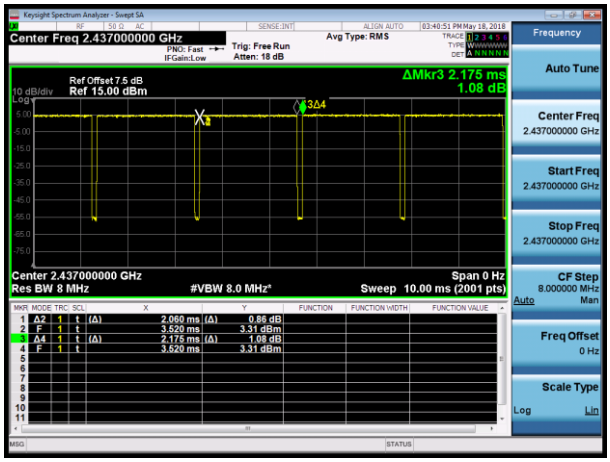
4*TX+4*RX:

Test Mode	Tx On (ms)	Tx Off (ms)	VBW	Tx On + Tx Off (ms)	Duty Cycle
802.11b	12.35	0.70	82Hz	13.05	94.64%
802.11g	2.06	0.12	510Hz	2.18	94.50%
802.11n(20MHz)	1.92	0.10	560Hz	2.02	95.05%
802.11n(40MHz)	0.94	0.10	1.1KHz	1.04	90.38%
802.11ac(20MHz)	1.93	0.03	560Hz	1.96	98.47%
802.11ac(40MHz)	0.95	0.03	1.1KHz	0.98	96.94%
802.11ax(20MHz)	1.49	0.03	680Hz	1.52	98.03%
802.11ax(40MHz)	0.77	0.03	1.3KHz	0.80	96.25%
802.11b with Beam-forming	12.35	0.70	82Hz	13.05	94.64%
802.11g with Beam-forming	2.06	0.12	510Hz	2.18	94.50%
802.11n(20MHz) with Beam-forming	1.92	0.10	560Hz	2.02	95.05%
802.11n(40MHz) with Beam-forming	0.94	0.10	1.1KHz	1.04	90.38%
802.11ac(20MHz) with Beam-forming	1.93	0.03	560Hz	1.96	98.47%
802.11ac(40MHz) with Beam-forming	0.95	0.03	1.1KHz	0.98	96.94%
802.11ax(20MHz) with Beam-forming	1.49	0.03	680Hz	1.52	98.03%
802.11ax(40MHz) with Beam-forming	0.77	0.03	1.3KHz	0.80	96.25%

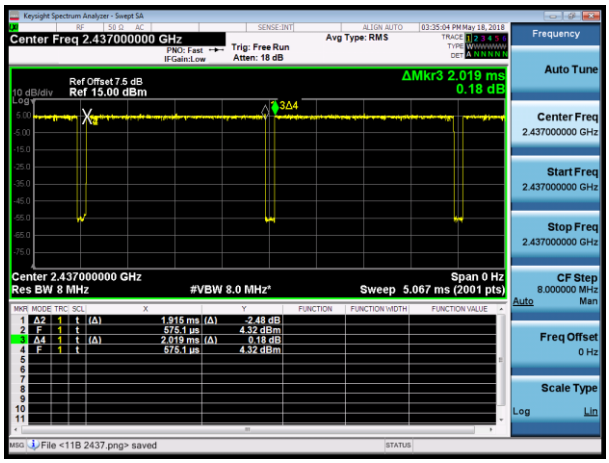
802.11b



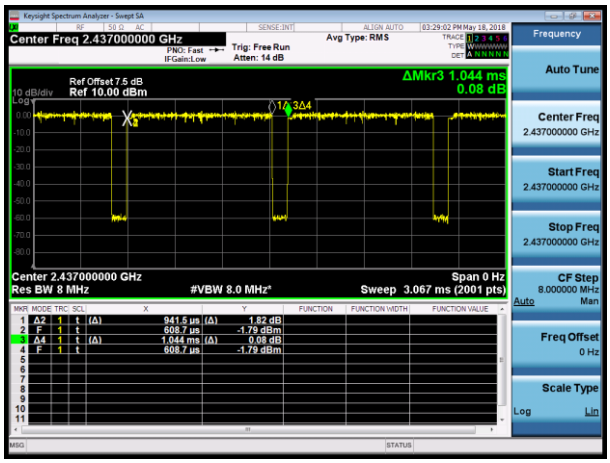
802.11g



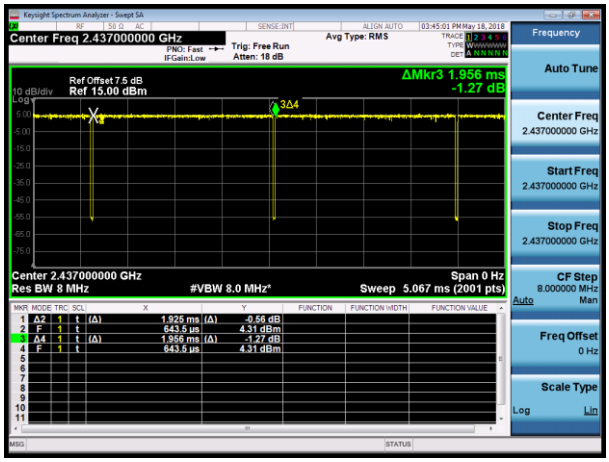
802.11n(20MHz)



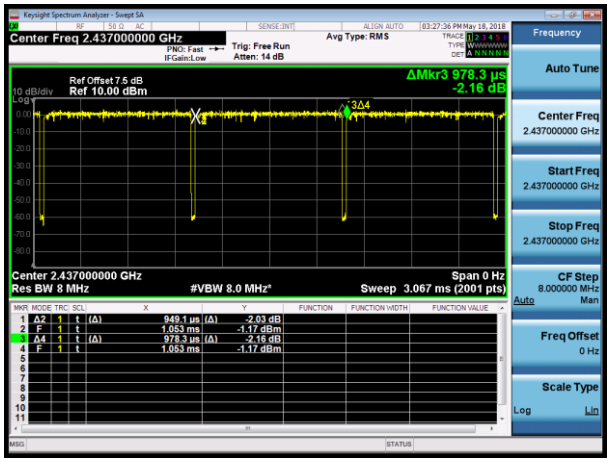
802.11n(40MHz)



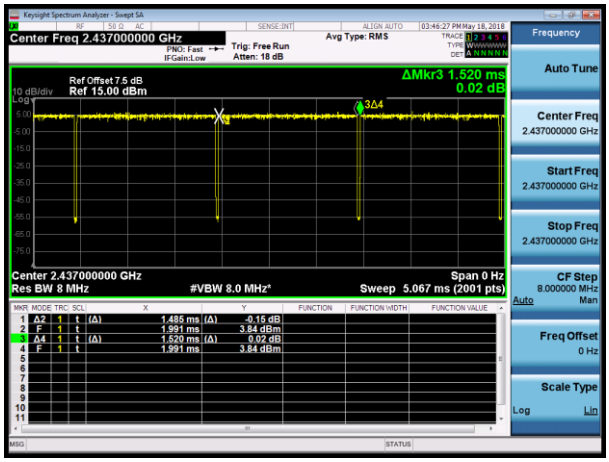
802.11ac(20MHz)



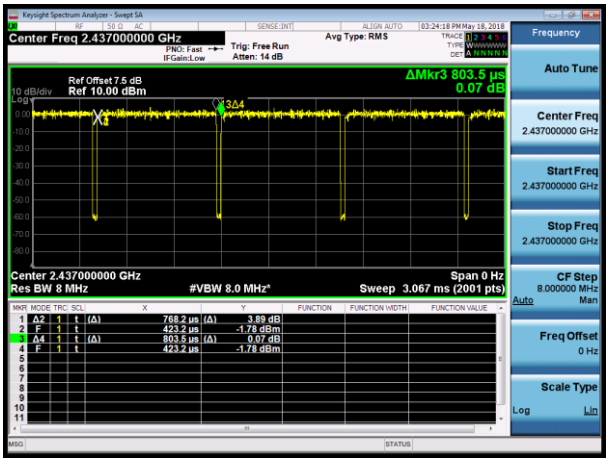
802.11ac(40MHz)



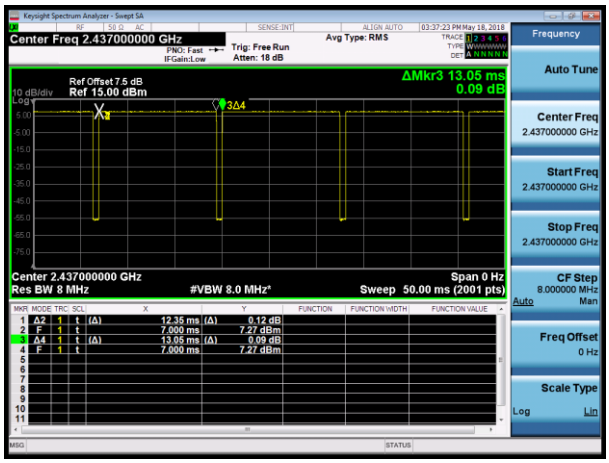
802.11ax(20MHz)



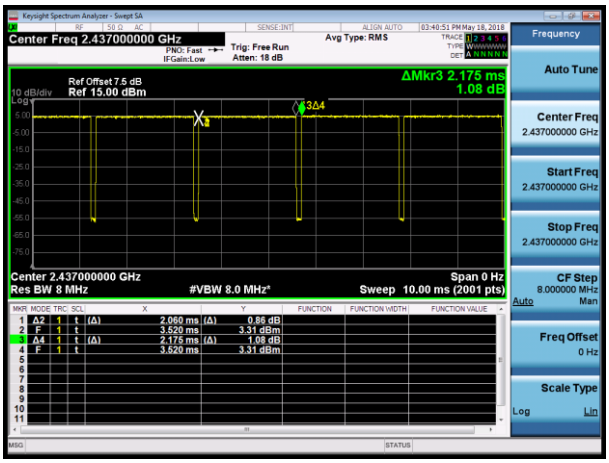
802.11ax(40MHz)



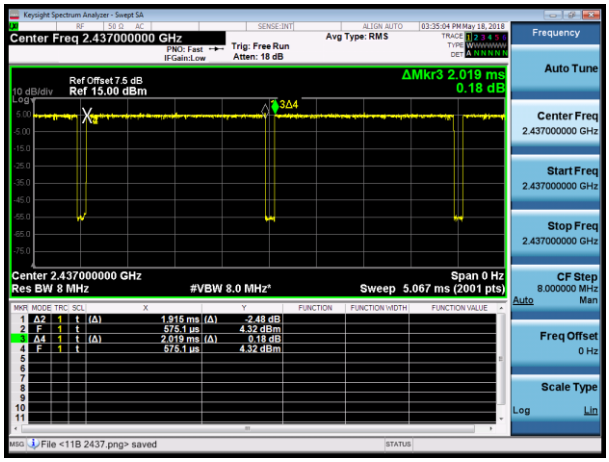
802.11b with Beam-forming



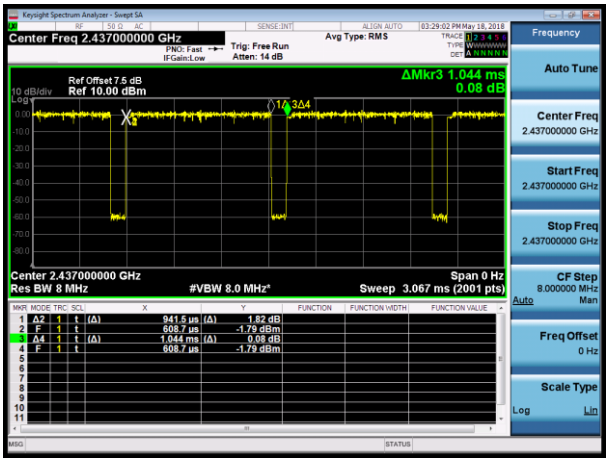
802.11g with Beam-forming



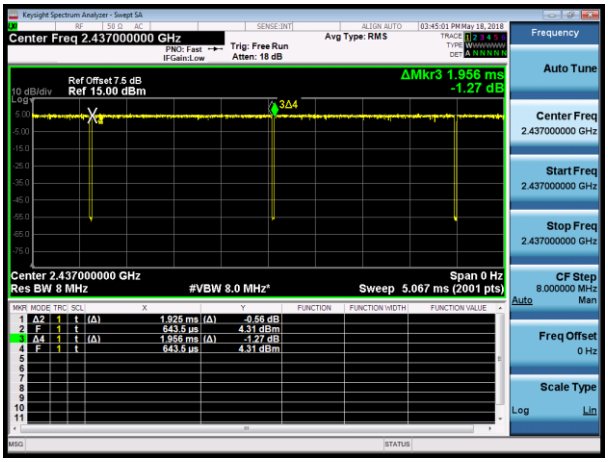
802.11n(20MHz) with Beam-forming



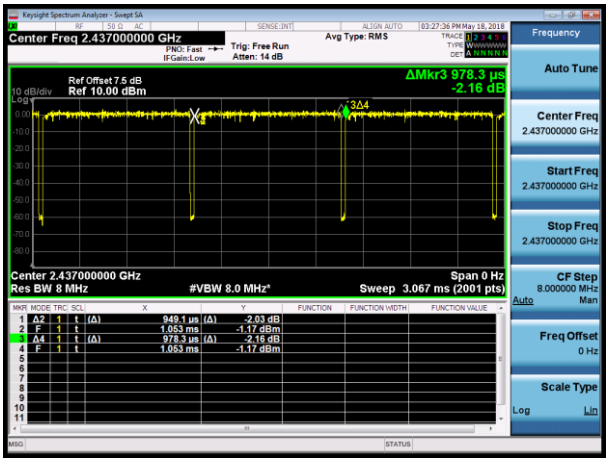
802.11n(40MHz) with Beam-forming



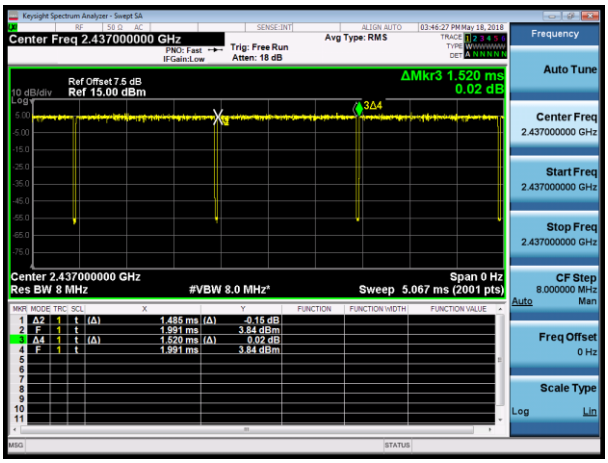
802.11ac(20MHz) with Beam-forming



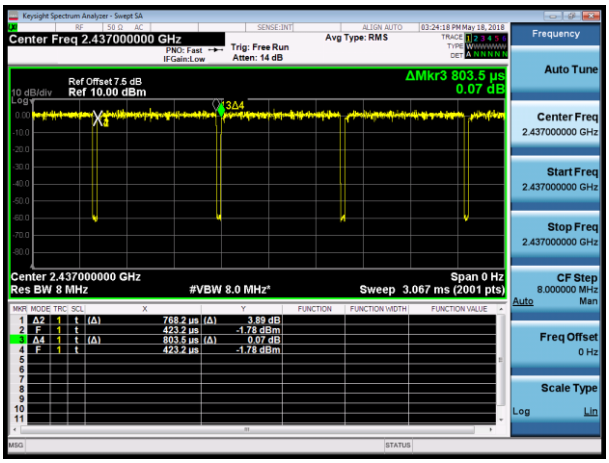
802.11ac(40MHz) with Beam-forming



802.11ax(20MHz) with Beam-forming



802.11ax(40MHz) with Beam-forming



6.7. Test Result

Please refer to 2.4G-Appendix 2-Band-edge

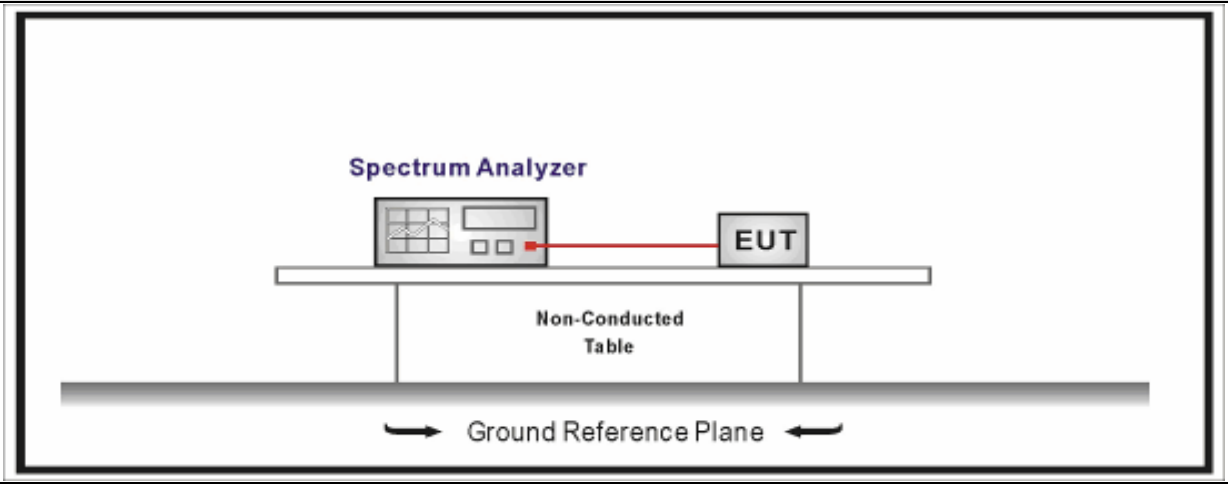
7. Occupied Bandwidth

7.1. Test Equipment

Occupied Bandwidth / TR-8					
Instrument	Manufacturer	Type No.	Serial No.	Cal. Date	Cal. Due Date
Spectrum Analyzer	Agilent	N9010A	MY48030494	2017.02.04	2019.02.03
EXA Spectrum Analyzer	Keysight	N9010A	MY55370495	2017.04.09	2019.04.08
MXA Signal Anlyzer	Keysight	N9020A	MY56060147	2017.04.09	2019.04.08
Temperature/Humidity Meter	zhichen	ZC1-2	TR8-TH	2017.04.10	2019.04.09
Note: All equipment are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.					

7.2. Test Setup

Occupied Bandwidth test setup:



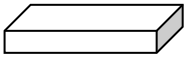
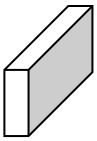
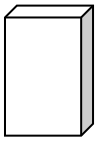
7.3. Limit

Occupied Bandwidth
Systems using digital modulation techniques operate in the2400-2483.5 MHz .The minimum 6 dB bandwidth shall be at least 500 kHz

7.4. Test Procedure

Test Method				
	Reference Rule		Chapter	Description
☒	ANSI C63.10		11.8	DTS bandwidth
	☐	ANSI C63.10	11.8.1	Option 1
	☒	ANSI C63.10	11.8.2	Option 2

7.5. EUT test definition

<table>
<tr><th>Item</th><th colspan="5">Occupied Bandwidth</th></tr>
<tr><td rowspan="3">Device Category</td><td>☐</td><td colspan="4">Fixed point-to-point</td></tr>
<tr><td>☐</td><td colspan="4">Emit multiple directional beams, simultaneously or sequentially</td></tr>
<tr><td>☒</td><td colspan="4">Other cases</td></tr>
<tr><td>Test mode</td><td colspan="5">Mode 1~16</td></tr>
<tr><td rowspan="6">Test method</td><td>☐</td><td colspan="4">Radiated</td></tr>
<tr><td rowspan="3"></td><td>X Axis</td><td>Y Axis</td><td colspan="2">Z Axis</td></tr>
<tr><td>  </td><td>  </td><td colspan="2">  </td></tr>
<tr><td>Worst Axis ☐</td><td>Worst Axis ☐</td><td colspan="2">Worst Axis ☐</td></tr>
<tr><td>☒</td><td colspan="4">Conducted</td></tr>
<tr><td>☒</td><td>Chain 1</td><td>Chain 2</td><td>Chain 3</td><td>Chain 4</td></tr>
<tr><td></td><td colspan="4">  </td></tr>
</table>

7.6. Test Result

Product Name	:	Wireless Access point	Power	:	AC 120V/60Hz
Test Mode	:	Mode1~16	Test Site	:	TR8
Test Date	:	2018.05.16	Test Engineer	:	Eric

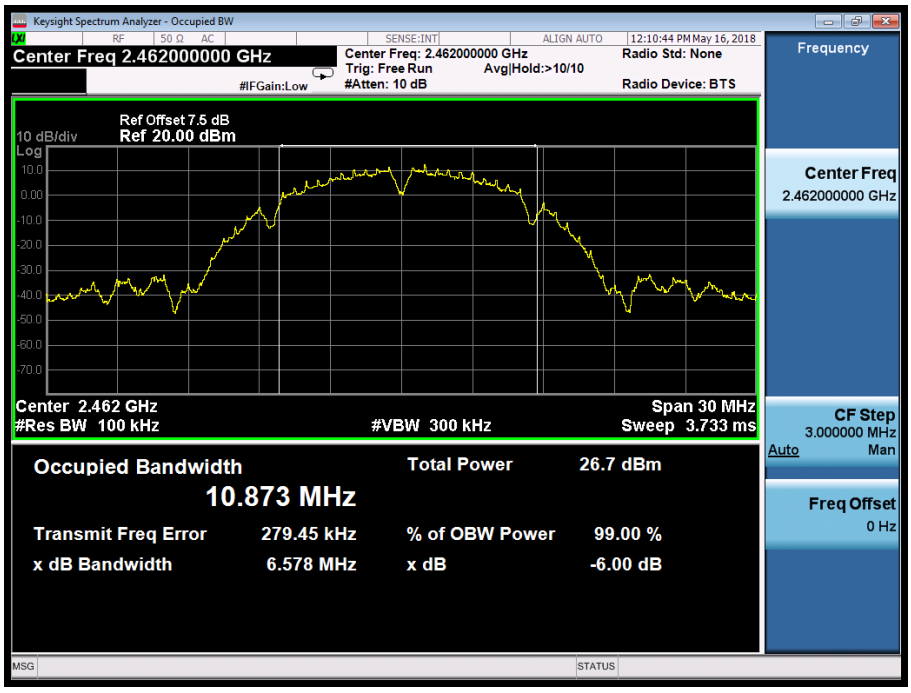
2*TX+2*RX:

Mode	CH.	Test Freq. (MHz)	99% Occupied Bandwidth (MHz)		6dB Occupied Bandwidth (MHz)		Limit (kHz)	Result
			Ant 1	Ant 2	Ant 1	Ant 2		
1	01	2412	11.793	11.739	10.72	7.59	>500	Pass
1	06	2437	11.871	11.953	7.54	7.55	>500	Pass
1	11	2462	11.860	11.664	6.58	6.59	>500	Pass
2	01	2412	17.075	17.078	16.35	15.97	>500	Pass
2	06	2437	17.109	17.110	16.34	16.34	>500	Pass
2	11	2462	17.108	17.112	16.39	16.42	>500	Pass
3	01	2412	18.264	18.273	16.71	16.55	>500	Pass
3	06	2437	18.317	18.309	17.59	17.58	>500	Pass
3	11	2462	18.301	18.292	17.58	17.60	>500	Pass
4	03	2422	36.576	36.579	35.12	35.17	>500	Pass
4	06	2437	36.781	36.777	36.34	35.76	>500	Pass
4	09	2452	36.846	36.840	36.42	36.42	>500	Pass
5	01	2412	18.262	18.264	17.18	16.94	>500	Pass
5	06	2437	18.322	18.304	17.61	17.59	>500	Pass
5	11	2462	18.296	18.302	17.57	17.24	>500	Pass
6	01	2422	36.624	36.603	35.45	35.41	>500	Pass
6	06	2437	36.793	36.803	36.37	35.76	>500	Pass
6	11	2452	36.866	36.848	36.45	36.39	>500	Pass
7	01	2412	19.516	19.523	18.23	18.21	>500	Pass
7	06	2437	19.554	19.559	18.82	18.81	>500	Pass
7	11	2462	19.542	19.545	18.70	18.69	>500	Pass
8	03	2422	37.797	37.781	35.09	35.85	>500	Pass
8	06	2437	38.119	38.062	37.33	36.60	>500	Pass
8	09	2452	38.167	38.192	37.69	37.68	>500	Pass
9	01	2412	12.569	12.508	9.58	9.57	>500	Pass
9	06	2437	12.531	12.562	9.60	9.62	>500	Pass
9	11	2462	12.735	12.695	9.61	9.23	>500	Pass
10	01	2412	17.084	17.087	16.42	16.38	>500	Pass

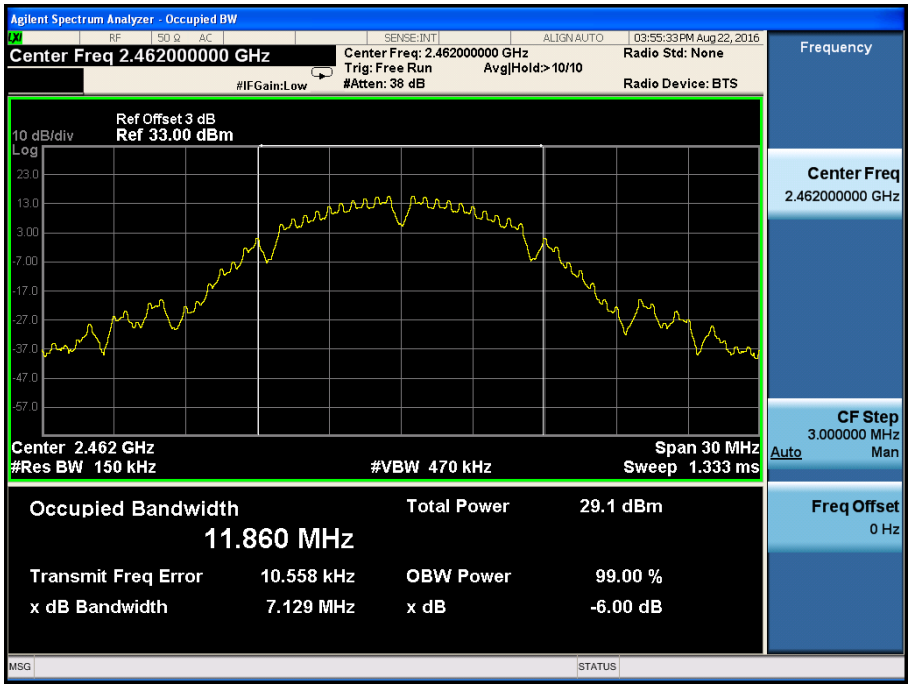
10	06	2437	17.084	17.078	16.37	16.39	>500	Pass
10	11	2462	17.080	17.078	16.41	16.38	>500	Pass
11	01	2412	18.280	18.271	17.63	17.60	>500	Pass
11	06	2437	18.262	18.277	17.60	17.60	>500	Pass
11	11	2462	18.267	18.280	17.61	17.61	>500	Pass
12	03	2422	36.778	36.796	36.39	36.41	>500	Pass
12	06	2437	36.739	36.737	36.09	36.31	>500	Pass
12	09	2452	36.726	36.750	36.33	36.37	>500	Pass
13	01	2412	18.281	18.284	17.62	17.64	>500	Pass
13	06	2437	18.272	18.275	17.60	17.60	>500	Pass
13	11	2462	18.272	18.265	17.62	17.64	>500	Pass
14	01	2422	36.797	36.779	36.44	36.40	>500	Pass
14	06	2437	36.738	36.706	36.37	36.29	>500	Pass
14	11	2452	36.730	36.729	36.31	36.33	>500	Pass
15	01	2412	19.592	19.588	18.96	18.97	>500	Pass
15	06	2437	19.588	19.567	18.73	18.72	>500	Pass
15	11	2462	19.586	19.575	18.95	18.89	>500	Pass
16	03	2422	38.108	37.460	37.46	36.99	>500	Pass
16	06	2437	38.016	38.007	36.03	36.36	>500	Pass
16	09	2452	38.011	37.984	35.77	36.66	>500	Pass

Note : The worst case of Occupied Bandwidth as below in next page:

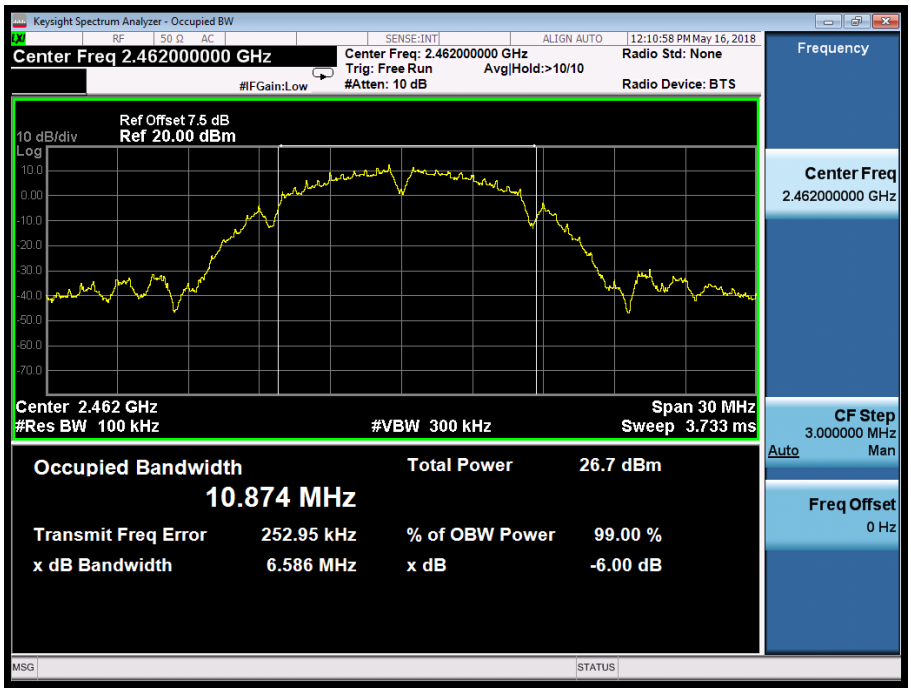
Mode 1 CH11 (2462MHz) Ant 1(-6dB)



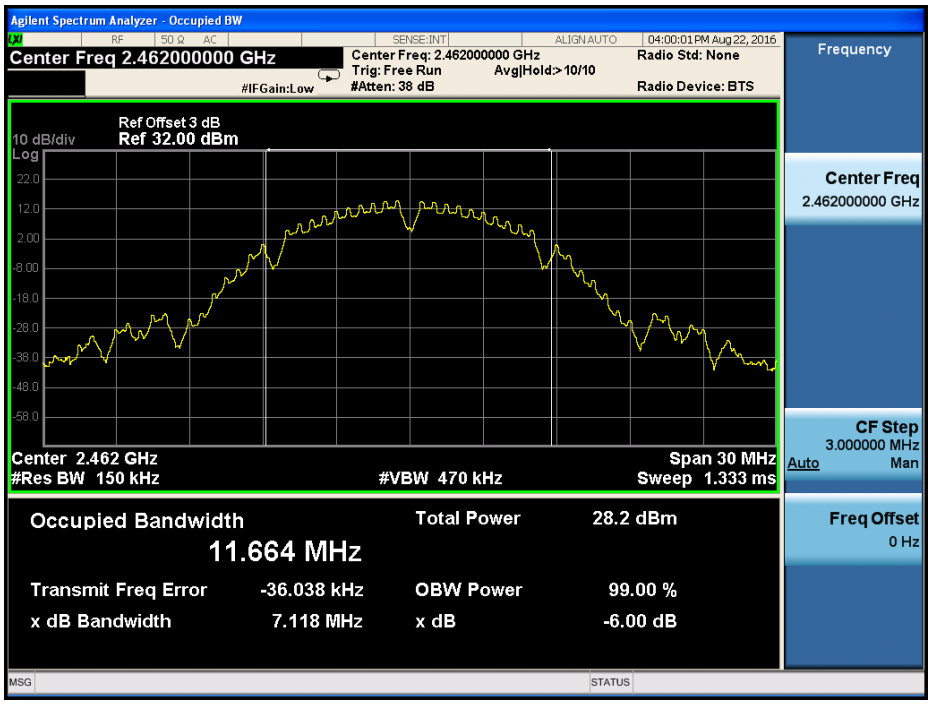
Mode 1 CH11 (2462MHz) Ant 2(99%)



Mode 1 CH11 (2462MHz) Ant 1(-6dB)



Mode 1 CH11 (2462MHz) Ant 1(99%)



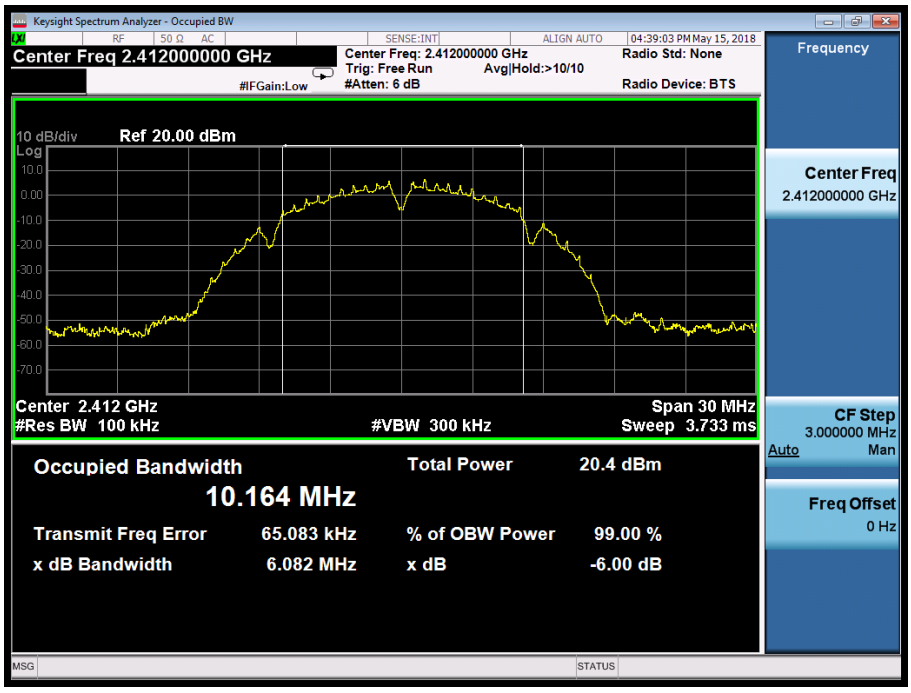
4*TX+4*RX:

Mode	CH.	Test Freq. (MHz)	99% Occupied Bandwidth (MHz)				6dB Occupied Bandwidth (MHz)				Limit (kHz)	Result
			Ant 1	Ant 2	Ant 3	Ant 4	Ant 1	Ant 2	Ant 3	Ant 4		
1	01	2412	10.553	10.416	10.580	10.458	6.08	6.55	7.06	6.59	>500	Pass
1	06	2437	10.627	10.648	10.651	10.636	6.55	7.09	7.09	7.55	>500	Pass
1	11	2462	10.635	10.628	10.638	10.619	7.07	6.56	6.59	6.57	>500	Pass
2	01	2412	16.869	16.870	16.879	16.871	16.34	16.08	16.32	16.32	>500	Pass
2	06	2437	16.909	16.916	16.911	16.912	16.41	16.36	16.32	16.39	>500	Pass
2	11	2462	16.946	16.945	16.902	16.913	16.36	16.36	16.37	16.35	>500	Pass
3	01	2412	18.075	18.085	18.085	18.074	16.94	16.67	17.59	16.73	>500	Pass
3	06	2437	18.125	18.127	18.126	18.137	17.62	17.63	17.61	17.60	>500	Pass
3	11	2462	18.120	18.123	18.118	18.116	17.59	17.30	17.58	17.60	>500	Pass
4	03	2422	36.357	36.386	36.379	36.403	35.44	35.13	35.12	35.08	>500	Pass
4	06	2437	36.595	36.614	36.596	36.618	36.34	36.37	36.33	36.38	>500	Pass
4	09	2452	36.650	36.641	36.658	36.634	36.21	36.42	36.44	36.42	>500	Pass
5	01	2412	18.073	18.079	18.061	18.072	17.20	17.30	16.34	17.56	>500	Pass
5	06	2437	18.117	18.112	18.101	18.101	17.59	17.60	17.60	17.60	>500	Pass
5	11	2462	18.120	18.110	18.126	18.104	17.60	17.59	17.60	17.59	>500	Pass
6	01	2422	36.389	36.421	36.406	36.439	35.46	35.12	35.46	35.09	>500	Pass
6	06	2437	36.627	36.598	36.603	36.620	36.37	36.37	35.80	36.38	>500	Pass
6	11	2452	36.644	36.662	36.654	36.654	36.42	36.43	36.42	36.42	>500	Pass
7	01	2412	19.374	19.317	19.305	19.332	18.98	18.21	18.59	18.24	>500	Pass
7	06	2437	19.369	19.377	19.378	19.380	18.70	18.81	18.78	18.89	>500	Pass
7	11	2462	19.382	19.365	19.386	19.356	18.70	18.70	18.16	18.66	>500	Pass
8	03	2422	37.638	37.637	37.620	37.631	35.84	36.35	35.86	35.63	>500	Pass
8	06	2437	37.905	37.904	37.894	37.889	37.30	37.31	36.67	37.28	>500	Pass
8	09	2452	37.981	37.999	37.981	37.970	37.66	37.65	37.68	36.99	>500	Pass
9	01	2412	10.613	10.614	10.604	10.616	7.05	6.55	7.53	7.08	>500	Pass
9	06	2437	10.674	10.644	10.683	10.666	6.54	7.08	7.53	6.56	>500	Pass
9	11	2462	10.654	10.658	10.697	10.652	7.09	7.07	7.05	7.06	>500	Pass
10	01	2412	16.929	16.927	16.925	16.927	16.39	16.38	16.39	16.38	>500	Pass
10	06	2437	16.928	16.922	16.922	16.915	16.38	16.35	16.38	16.41	>500	Pass
10	11	2462	16.916	16.925	16.921	16.929	16.36	16.37	16.51	16.40	>500	Pass
11	01	2412	18.089	18.089	18.087	18.090	17.63	17.61	17.60	17.61	>500	Pass
11	06	2437	18.084	18.082	18.074	18.076	17.62	17.60	17.61	17.62	>500	Pass
11	11	2462	18.085	18.081	18.073	18.086	17.62	17.61	17.61	17.59	>500	Pass

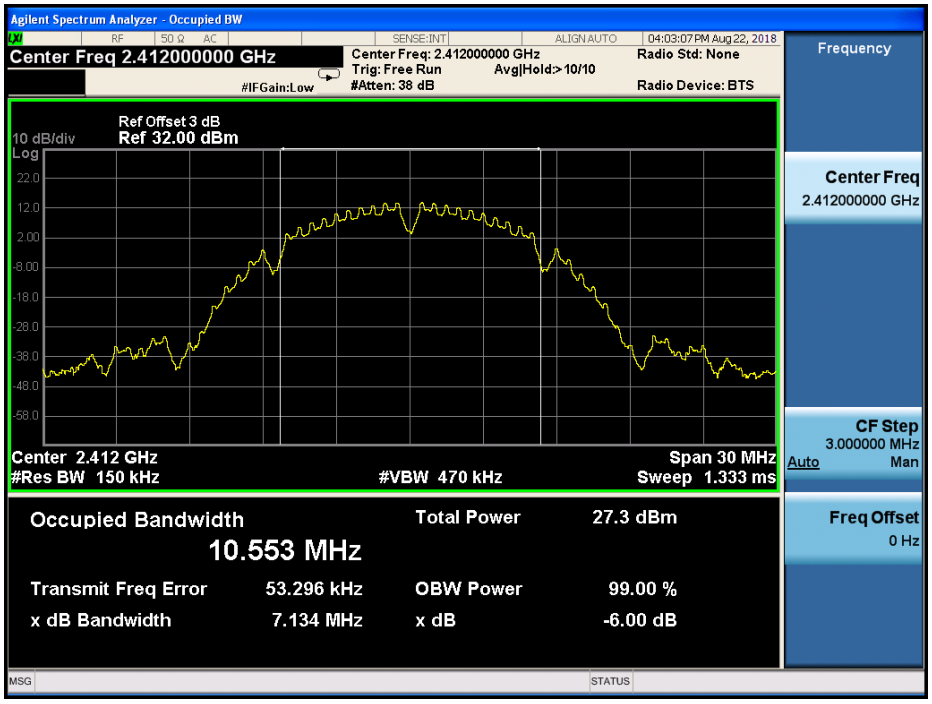
12	03	2422	36.594	36.611	36.600	36.615	36.41	36.39	36.40	36.39	>500	Pass
12	06	2437	36.562	36.545	36.545	36.561	36.36	36.37	36.37	36.36	>500	Pass
12	09	2452	36.516	36.530	36.564	36.509	36.36	36.35	36.37	36.31	>500	Pass
13	01	2412	18.095	18.092	18.110	18.097	17.65	17.63	17.64	17.63	>500	Pass
13	06	2437	18.083	18.083	18.084	18.092	17.62	17.65	17.64	17.60	>500	Pass
13	11	2462	18.084	18.082	18.087	18.072	17.64	17.62	17.63	17.62	>500	Pass
14	01	2422	36.606	36.626	36.609	36.645	36.44	36.45	36.39	36.45	>500	Pass
14	06	2437	36.573	36.592	36.575	36.575	36.36	36.39	36.37	36.39	>500	Pass
14	11	2452	36.557	36.571	36.546	36.543	36.35	36.36	36.35	36.34	>500	Pass
15	01	2412	19.398	19.389	19.395	19.410	18.92	18.95	18.99	18.91	>500	Pass
15	06	2437	19.383	19.372	19.394	19.368	18.28	18.93	18.74	18.76	>500	Pass
15	11	2462	19.375	19.400	19.372	19.387	18.88	18.98	18.93	18.98	>500	Pass
16	03	2422	37.909	37.905	37.949	37.884	37.17	36.86	37.23	37.18	>500	Pass
16	06	2437	37.815	37.874	37.826	37.861	36.12	36.16	36.46	36.40	>500	Pass
16	09	2452	37.815	37.808	37.848	37.828	36.89	35.53	36.89	36.57	>500	Pass

Note : The worst case of Occupied Bandwidth as below in next page:

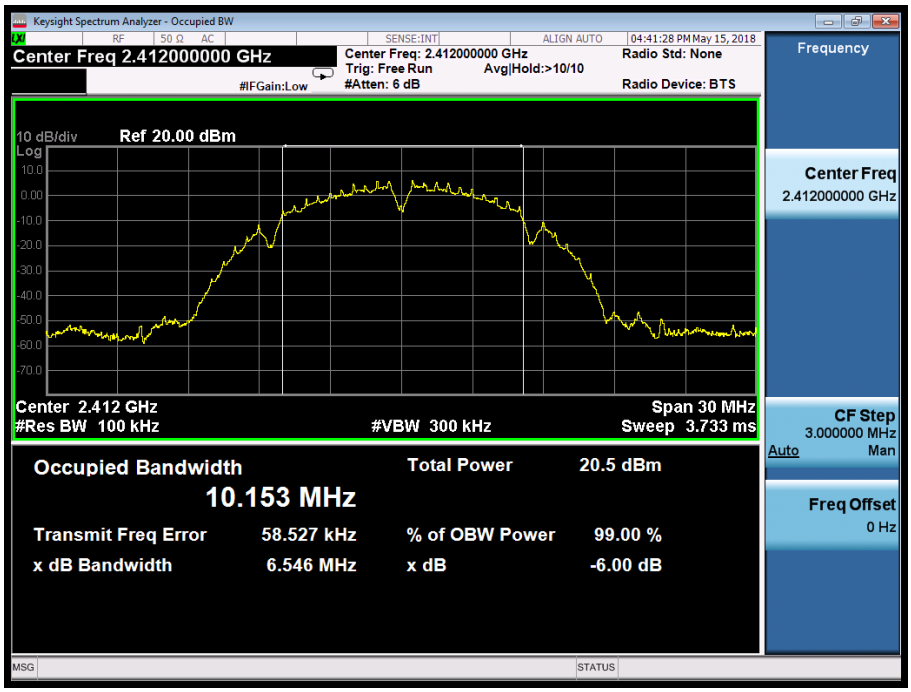
Mode 1 CH01 (2412MHz) Ant 0(-6dB)



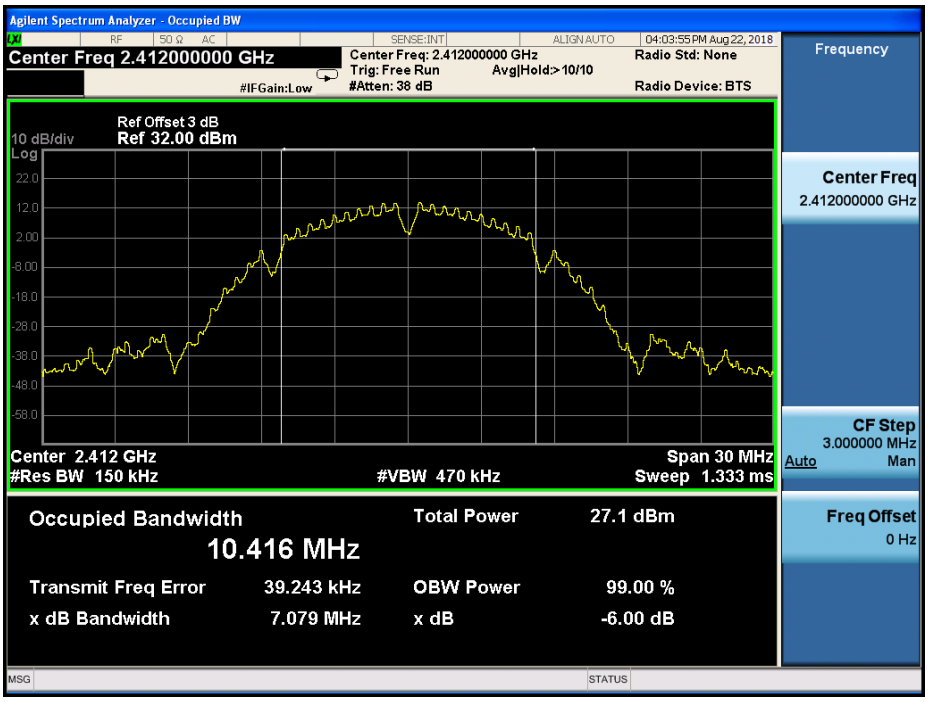
Mode 1 CH01 (2412MHz) Ant 0(99%)



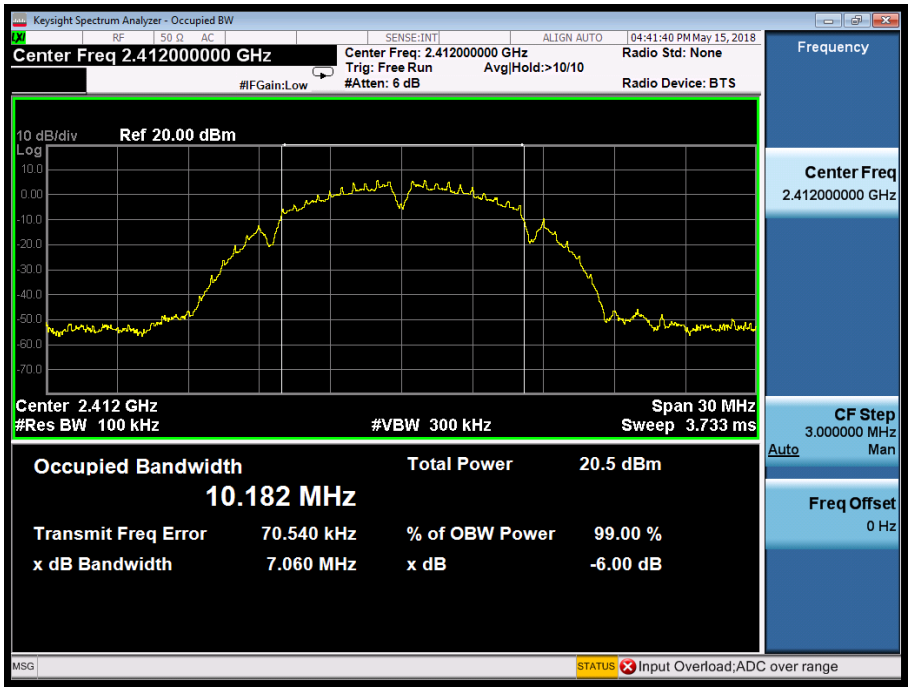
Mode 1 CH01 (2412MHz) Ant 1(-6dB)



Mode 1 CH01 (2412MHz) Ant 1(99%)

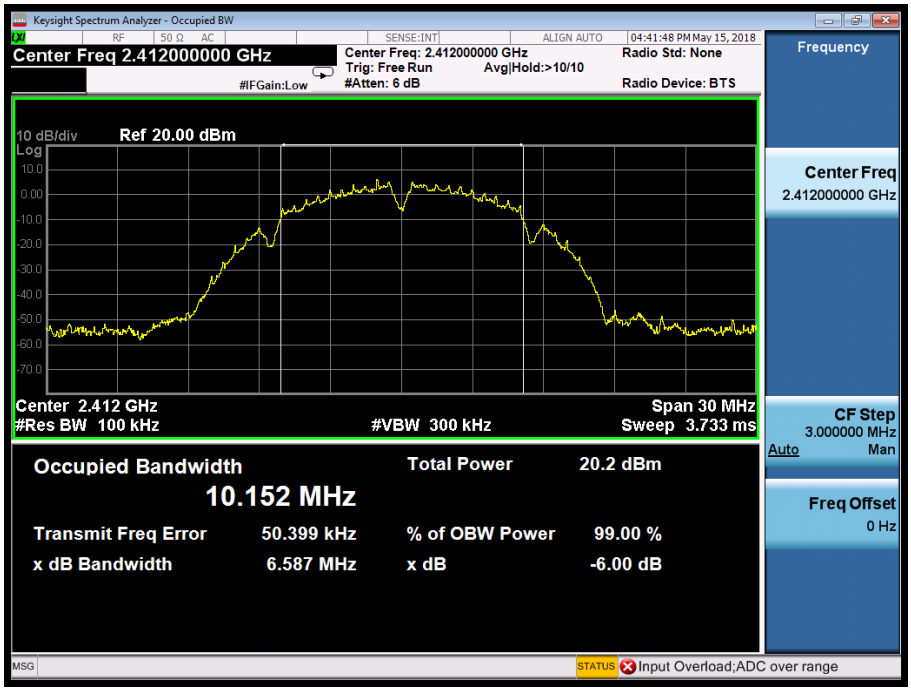


Mode 1 CH01 (2412MHz) Ant 2(-6dB)

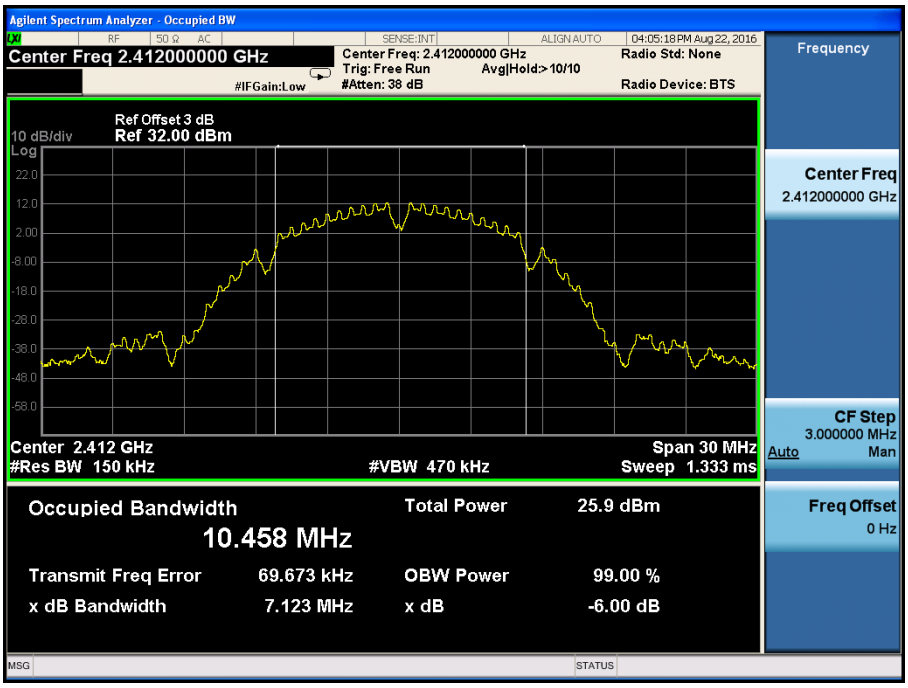


Mode 1 CH01 (2412MHz) Ant 2(99%)

Mode 1 CH01 (2412MHz) Ant 3(-6dB)



Mode 1 CH01 (2412MHz) Ant 3(99%)



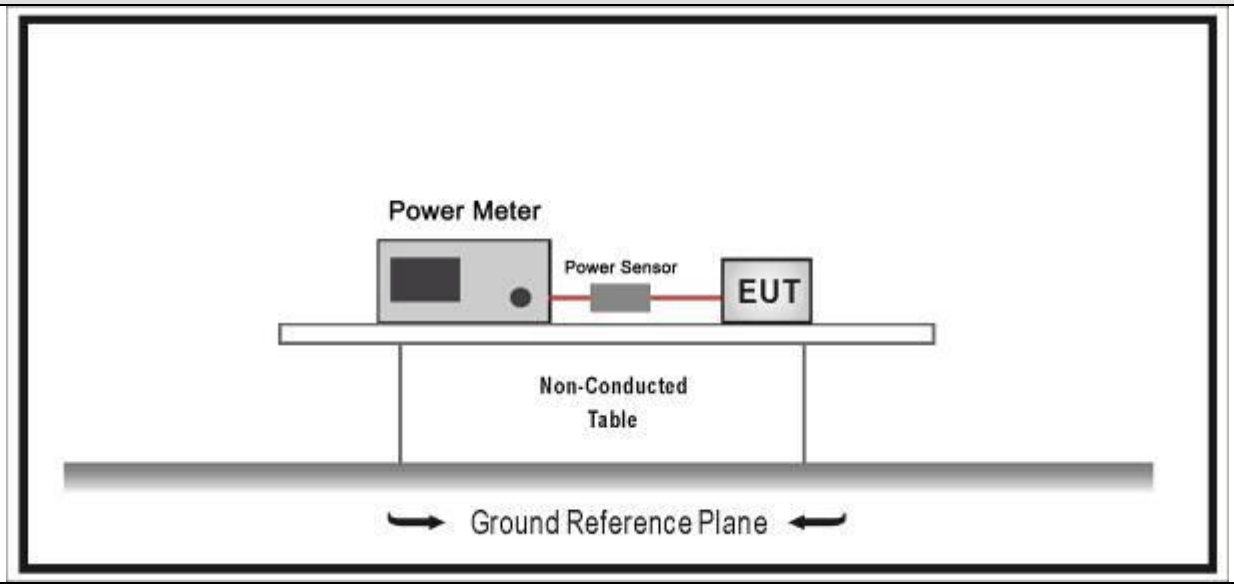
8. Fundamental emission output power

8.1. Test Equipment

Fundamental emission output power/ TR-8					
Instrument	Manufacturer	Type No.	Serial No.	Cal. Date	Cal. Due Date
Spectrum Analyzer	Agilent	E4446A	MY45300103	2018.01.04	2019.01.03
Spectrum Analyzer	Agilent	N9010A	MY48030494	2017.02.04	2019.02.03
Wideband Peak Power Meter	Anritsu	ML2495A	0905006	2017.10.14	2018.10.13
Power Sensor	Anritsu	MA2411B	0846014	2017.10.14	2018.10.13
Temperature/Humidity Meter	zhicheng	ZC1-2	TR8-TH	2017.04.10	2018.04.09
Note: All equipment are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.					

8.2. Test Setup

Fundamental emission output power test setup



8.3. Limit

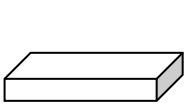
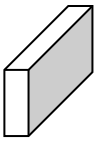
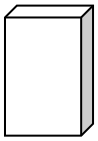
Fundamental emission output power Limit			
☐	G_{TX} ＜6dBi		P_{out}≤30dBm
☒	G_{TX} ＞6dBi		
	☐	Non-Fix point-point	P_{out}≤30-(G_{TX} -6)
	☐	Fix point-point	P_{out}≤30-[(G_{TX}-6)]/3
	☒	Point-to-multipoint	Pout≤30-(GTX-6)
	☐	Overlap Beams	P_{out}≤30-[(G_{TX}-6)]/3
	☐	Aggregate power transmitted simultaneously on all beams	P_{out}≤30-[(G_{TX}-6)]/3
	☐	single directional beam	P_{out}≤30-[(G_{TX}-6)]/3+8dB
Note 1 : G_{TX} directional gain of transmitting antennas. Note 2 : P_{out} is maximum peak conducted output power .			

8.4. Test Procedure

Fundamental emission output power Test Method						
	References Rule				Chapter	Description
☒	ANSI C63.10				11.9	Fundamental emission output power
	☒	ANSI C63.10			11.9.1	Maximum peak conducted output power
		☐	ANSI C63.10		11.9.1.1	RBW ≥ DTS bandwidth
		☐	ANSI C63.10		11.9.1.2	Integrated band power method
		☒	ANSI C63.10		11.9.1.3	PKPM1 Peak power meter method
	☐	ANSI C63.10			11.9.2	Maximum conducted (average) output power
		☐	ANSI C63.10		11.9.2.2	Measurement using a spectrum analyzer (SA)
			☐	ANSI C63.10	11.9.2.2.2	Method AVGSA-1(Duty cycle≥98%)
			☐	ANSI C63.10	11.9.2.2.3	Method AVGSA-1A(Duty cycle≥98%)
			☐	ANSI C63.10	11.9.2.2.4	Method AVGSA-2(Duty cycle≤98%)
			☐	ANSI C63.10	11.9.2.2.5	Method AVGSA-2A(Duty cycle≤98%)
			☐	ANSI C63.10	11.9.2.2.4	Method AVGSA-3
			☐	ANSI C63.10	11.9.2.2.5	Method AVGSA-3A
		☐	ANSI C63.10		11.9.2.3	Measurement using a power meter (PM)
			☐	ANSI C63.10	11.9.2.3.1	Method AVGPM
			☐	ANSI C63.10	11.9.2.3.2	Method AVGPM-G

Directional Gain Calculations for In-Band test method				
	References Rule		Chapter	Description
☐	KDB 662911		F2)a)	Basic methodology
	☐	KDB 662911	F2)a) (i)	transmit signals are correlated
	☐	KDB 662911	F2)a) (ii)	transmit signals are uncorrelated
☐	KDB 662911		F2)b)	Sectorized antenna systems.
☐	KDB 662911		F2)c)	Cross-polarized antennas
	☐	ANSI C63.10	F2)c) (i)	Cross-polarized antennas
	☐	ANSI C63.10	F2)c) (ii)	Multiple antennas
☒	KDB 662911		F2)e)	Spatial Multiplexing
	☒	KDB 662911	F2)e) (i)	Antennas have the same gain
	☐	KDB 662911	F2)e) (ii)	Antenna have the different gain with one spatial stream
	☐	KDB 662911	F2)e) (iii)	Antenna have the different gain with more than one spatial stream
☒	KDB 662911		F2)f)	Cyclic Delay Diversity (CDD)
	☒	KDB 662911	F2)f) (i)	Antennas have the same gain
	☐	KDB 662911	F2)f) (ii)	Antenna have the different gain with one spatial stream
	☐	KDB 662911	F2)f) (iii)	Antenna have the different gain with more than one spatial stream

8.5. EUT test definition

<table>
<tr><th>Item</th><th colspan="5">Fundamental emission output power</th></tr>
<tr><td rowspan="3">Device Category</td><td>☐</td><td colspan="4">Fixed point-to-point</td></tr>
<tr><td>☐</td><td colspan="4">Emit multiple directional beams, simultaneously or sequentially</td></tr>
<tr><td>☒</td><td colspan="4">Other cases</td></tr>
<tr><td>Test mode</td><td colspan="5">Mode 1~16</td></tr>
<tr><td rowspan="6">Test method</td><td>☐</td><td colspan="4">Radiated</td></tr>
<tr><td rowspan="3"></td><td>X Axis</td><td>Y Axis</td><td colspan="2">Z Axis</td></tr>
<tr><td>  </td><td>  </td><td colspan="2">  </td></tr>
<tr><td>Worst Axis ☐</td><td>Worst Axis ☐</td><td colspan="2">Worst Axis ☐</td></tr>
<tr><td>☒</td><td colspan="4">Conducted</td></tr>
<tr><td>☒</td><td>Chain 1</td><td>Chain 2</td><td>Chain 3</td><td>Chain 4</td></tr>
<tr><td></td><td colspan="4">  </td></tr>
</table>

8.6. Test Result

Product Name	:	Wireless Access point	Power	:	AC 120V/60Hz
Test Mode	:	Mode1~16	Test Site	:	TR8
Test Date	:	2018.6.25	Test Engineer	:	Eric

2*TX+2*RX:

Mode	Channel	Test Frequency (MHz)	Average Power Output (dBm)		Total Power (dBm)	Directional Gain (dBi)	Limit (dBm)	Result
			Ant 1	Ant 2				
1	01	2412	**21.30**	**21.65**	**24.49**	3.5	30	Pass
1	06	2437	**21.56**	**21.59**	**24.59**	3.5	30	Pass
1	11	2462	**21.59**	**21.60**	**24.61**	3.5	30	Pass
2	01	2412	**15.50**	**15.75**	**18.64**	3.5	30	Pass
2	06	2437	**15.29**	**15.87**	**18.60**	3.5	30	Pass
2	11	2462	**14.26**	**14.61**	**17.45**	3.5	30	Pass
3	01	2412	**15.00**	**15.27**	**18.15**	3.5	30	Pass
3	06	2437	**14.86**	**15.19**	**18.04**	3.5	30	Pass
3	11	2462	**13.93**	**14.60**	**17.29**	3.5	30	Pass
4	03	2422	**12.92**	**13.08**	**16.01**	3.5	30	Pass
4	06	2437	**13.05**	**12.96**	**16.02**	3.5	30	Pass
4	09	2452	**11.69**	**11.34**	**14.53**	3.5	30	Pass
5	01	2412	**15.26**	**15.26**	**18.27**	3.5	30	Pass
5	06	2437	**15.41**	**15.72**	**18.58**	3.5	30	Pass
5	11	2462	**14.48**	**14.78**	**17.64**	3.5	30	Pass
6	03	2422	**13.45**	**13.36**	**16.42**	3.5	30	Pass

6	06	2437	**13.43**	**13.49**	**16.47**	3.5	30	Pass
6	09	2452	**11.96**	**12.16**	**15.07**	3.5	30	Pass
7	01	2412	**14.47**	**14.46**	**17.48**	3.5	30	Pass
7	06	2437	**14.63**	**14.47**	**17.56**	3.5	30	Pass
7	11	2462	**13.76**	**13.54**	**16.66**	3.5	30	Pass
8	03	2422	**13.54**	**13.70**	**16.63**	3.5	30	Pass
8	06	2437	**13.45**	**13.65**	**16.56**	3.5	30	Pass
8	09	2452	**11.96**	**12.15**	**15.07**	3.5	30	Pass
9	01	2412	**20.68**	**20.83**	**23.77**	6.5	29.5	Pass
9	06	2437	**20.66**	**20.59**	**23.64**	6.5	29.5	Pass
9	11	2462	**20.70**	**20.86**	**23.79**	6.5	29.5	Pass
10	01	2412	**14.44**	**14.94**	**17.71**	6.5	29.5	Pass
10	06	2437	**14.61**	**14.95**	**17.79**	6.5	29.5	Pass
10	11	2462	**13.66**	**13.94**	**16.81**	6.5	29.5	Pass
11	01	2412	**14.44**	**14.47**	**17.47**	6.5	29.5	Pass
11	06	2437	**14.13**	**14.56**	**17.36**	6.5	29.5	Pass
11	11	2462	**13.46**	**13.71**	**16.60**	6.5	29.5	Pass
12	03	2422	**12.13**	**12.23**	**15.19**	6.5	29.5	Pass
12	06	2437	**12.18**	**12.25**	**15.23**	6.5	29.5	Pass
12	09	2452	**10.97**	**10.85**	**13.92**	6.5	29.5	Pass
13	01	2412	**14.48**	**14.57**	**17.54**	6.5	29.5	Pass
13	06	2437	**14.58**	**15.04**	**17.83**	6.5	29.5	Pass
13	11	2462	**13.69**	**14.17**	**16.95**	6.5	29.5	Pass

14	03	2422	**12.72**	**12.74**	**15.74**	6.5	29.5	Pass
14	06	2437	**12.40**	**12.50**	**15.46**	6.5	29.5	Pass
14	09	2452	**11.12**	**11.34**	**14.24**	6.5	29.5	Pass
15	01	2412	**14.75**	**14.47**	**17.62**	6.5	29.5	Pass
15	06	2437	**14.51**	**14.87**	**17.70**	6.5	29.5	Pass
15	11	2462	**13.95**	**13.79**	**16.88**	6.5	29.5	Pass
16	03	2422	**12.69**	**12.70**	**15.71**	6.5	29.5	Pass
16	06	2437	**12.89**	**12.80**	**15.86**	6.5	29.5	Pass
16	09	2452	**11.11**	**11.38**	**14.26**	6.5	29.5	Pass

2*TX+2*RX EIRP:

Mode	Channel	Test Frequency (MHz)	Average Power Output (dBm)		Total Power (dBm)	Directional Gain (dBi)	EIRP (dBm)	Limit (dBm)	Result
			Ant 1	Ant 2					
1	01	2412	**21.30**	**21.65**	**24.49**	3.5	**27.99**	36	Pass
1	06	2437	**21.56**	**21.59**	**24.59**	3.5	**28.09**	36	Pass
1	11	2462	**21.59**	**21.60**	**24.61**	3.5	**28.11**	36	Pass
2	01	2412	**15.50**	**15.75**	**18.64**	3.5	**22.14**	36	Pass
2	06	2437	**15.29**	**15.87**	**18.60**	3.5	**22.10**	36	Pass
2	11	2462	**14.26**	**14.61**	**17.45**	3.5	**20.95**	36	Pass
3	01	2412	**15.00**	**15.27**	**18.15**	3.5	**21.65**	36	Pass
3	06	2437	**14.86**	**15.19**	**18.04**	3.5	**21.54**	36	Pass
3	11	2462	**13.93**	**14.60**	**17.29**	3.5	**20.79**	36	Pass
4	03	2422	**12.92**	**13.08**	**16.01**	3.5	**19.51**	36	Pass
4	06	2437	**13.05**	**12.96**	**16.02**	3.5	**19.52**	36	Pass
4	09	2452	**11.69**	**11.34**	**14.53**	3.5	**18.03**	36	Pass
5	01	2412	**15.26**	**15.26**	**18.27**	3.5	**21.77**	36	Pass
5	06	2437	**15.41**	**15.72**	**18.58**	3.5	**22.08**	36	Pass
5	11	2462	**14.48**	**14.78**	**17.64**	3.5	**21.14**	36	Pass
6	03	2422	**13.45**	**13.36**	**16.42**	3.5	**19.92**	36	Pass
6	06	2437	**13.43**	**13.49**	**16.47**	3.5	**19.97**	36	Pass
6	09	2452	**11.96**	**12.16**	**15.07**	3.5	**18.57**	36	Pass
7	01	2412	**14.47**	**14.46**	**17.48**	3.5	**20.98**	36	Pass

7	06	2437	**14.63**	**14.47**	**17.56**	3.5	**21.06**	36	Pass
7	11	2462	**13.76**	**13.54**	**16.66**	3.5	**20.16**	36	Pass
8	03	2422	**13.54**	**13.70**	**16.63**	3.5	**20.13**	36	Pass
8	06	2437	**13.45**	**13.65**	**16.56**	3.5	**20.06**	36	Pass
8	09	2452	**11.96**	**12.15**	**15.07**	3.5	**18.57**	36	Pass
9	01	2412	**20.68**	**20.83**	**23.77**	6.5	**30.27**	36	Pass
9	06	2437	**20.66**	**20.59**	**23.64**	6.5	**30.14**	36	Pass
9	11	2462	**20.70**	**20.86**	**23.79**	6.5	**30.29**	36	Pass
10	01	2412	**14.44**	**14.94**	**17.71**	6.5	**24.21**	36	Pass
10	06	2437	**14.61**	**14.95**	**17.79**	6.5	**24.29**	36	Pass
10	11	2462	**13.66**	**13.94**	**16.81**	6.5	**23.31**	36	Pass
11	01	2412	**14.44**	**14.47**	**17.47**	6.5	**23.97**	36	Pass
11	06	2437	**14.13**	**14.56**	**17.36**	6.5	**23.86**	36	Pass
11	11	2462	**13.46**	**13.71**	**16.60**	6.5	**23.10**	36	Pass
12	03	2422	**12.13**	**12.23**	**15.19**	6.5	**21.69**	36	Pass
12	06	2437	**12.18**	**12.25**	**15.23**	6.5	**21.73**	36	Pass
12	09	2452	**10.97**	**10.85**	**13.92**	6.5	**20.42**	36	Pass
13	01	2412	**14.48**	**14.57**	**17.54**	6.5	**24.04**	36	Pass
13	06	2437	**14.58**	**15.04**	**17.83**	6.5	**24.33**	36	Pass
13	11	2462	**13.69**	**14.17**	**16.95**	6.5	**23.45**	36	Pass
14	03	2422	**12.72**	**12.74**	**15.74**	6.5	**22.24**	36	Pass
14	06	2437	**12.40**	**12.50**	**15.46**	6.5	**21.96**	36	Pass
14	09	2452	**11.12**	**11.34**	**14.24**	6.5	**20.74**	36	Pass

15	01	2412	**14.75**	**14.47**	**17.62**	6.5	**24.12**	36	Pass
15	06	2437	**14.51**	**14.87**	**17.70**	6.5	**24.20**	36	Pass
15	11	2462	**13.95**	**13.79**	**16.88**	6.5	**23.38**	36	Pass
16	03	2422	**12.69**	**12.70**	**15.71**	6.5	**22.21**	36	Pass
16	06	2437	**12.89**	**12.80**	**15.86**	6.5	**22.36**	36	Pass
16	09	2452	**11.11**	**11.38**	**14.26**	6.5	**20.76**	36	Pass

4*TX+4*RX:

Mode	Channel	Test Frequency (MHz)	Peak Power Output (dBm)				Total Power (dBm)	Directional Gain (dBi)	Limit (dBm)	Result
			Ant 0	Ant 1	Ant 2	Ant 3				
1	01	2412	**21.59**	**22.02**	**22.14**	**21.89**	**26.93**	3.5	30	Pass
1	06	2437	**21.79**	**22.13**	**22.20**	**22.11**	**27.05**	3.5	30	Pass
1	11	2462	**21.64**	**22.25**	**22.31**	**22.04**	**27.08**	3.5	30	Pass
2	01	2412	**12.23**	**12.37**	**12.63**	**12.47**	**18.11**	3.5	30	Pass
2	06	2437	**12.41**	**12.43**	**12.76**	**12.33**	**18.20**	3.5	30	Pass
2	11	2462	**12.40**	**12.41**	**12.53**	**12.54**	**18.15**	3.5	30	Pass
3	01	2412	**12.84**	**12.99**	**12.96**	**12.88**	**18.56**	3.5	30	Pass
3	06	2437	**12.56**	**12.81**	**13.11**	**12.98**	**18.49**	3.5	30	Pass
3	11	2462	**12.69**	**12.86**	**13.10**	**12.93**	**18.53**	3.5	30	Pass
4	03	2422	**12.51**	**13.00**	**13.43**	**12.89**	**18.62**	3.5	30	Pass
4	06	2437	**12.61**	**12.85**	**13.24**	**12.88**	**18.54**	3.5	30	Pass
4	09	2452	**12.62**	**12.89**	**13.30**	**12.63**	**18.56**	3.5	30	Pass
5	01	2412	**12.64**	**12.68**	**13.16**	**12.62**	**18.46**	3.5	30	Pass
5	06	2437	**12.69**	**13.06**	**13.15**	**12.99**	**18.60**	3.5	30	Pass
5	11	2462	**12.60**	**12.84**	**13.28**	**13.04**	**18.56**	3.5	30	Pass
6	03	2422	**12.72**	**12.99**	**13.21**	**12.87**	**18.60**	3.5	30	Pass
6	06	2437	**12.65**	**12.87**	**13.28**	**12.92**	**18.57**	3.5	30	Pass
6	09	2452	**12.63**	**12.94**	**13.14**	**12.96**	**18.55**	3.5	30	Pass
7	01	2412	**12.61**	**12.50**	**12.71**	**12.53**	**18.27**	3.5	30	Pass
7	06	2437	**12.58**	**12.63**	**12.81**	**12.77**	**18.34**	3.5	30	Pass

7	11	2462	**12.91**	**12.84**	**13.03**	**10.72**	**18.43**	3.5	30	Pass
8	03	2422	**12.30**	**12.55**	**12.59**	**12.66**	**18.18**	3.5	30	Pass
8	06	2437	**12.33**	**12.47**	**12.50**	**12.41**	**18.13**	3.5	30	Pass
8	09	2452	**12.18**	**12.61**	**12.78**	**12.76**	**18.23**	3.5	30	Pass
9	01	2412	**20.55**	**20.89**	**21.21**	**20.66**	**25.90**	6.5	29.5	Pass
9	06	2437	**20.58**	**20.88**	**21.11**	**20.99**	**25.88**	6.5	29.5	Pass
9	11	2462	**20.49**	**21.06**	**21.00**	**20.85**	**25.87**	6.5	29.5	Pass
10	01	2412	**12.22**	**12.19**	**12.16**	**12.17**	**17.91**	6.5	29.5	Pass
10	06	2437	**12.15**	**12.42**	**12.32**	**12.11**	**18.00**	6.5	29.5	Pass
10	11	2462	**12.03**	**12.22**	**12.40**	**12.23**	**17.94**	6.5	29.5	Pass
11	01	2412	**12.74**	**12.64**	**12.90**	**12.67**	**18.41**	6.5	29.5	Pass
11	06	2437	**12.43**	**12.83**	**12.93**	**12.51**	**18.38**	6.5	29.5	Pass
11	11	2462	**12.31**	**12.46**	**13.09**	**12.77**	**18.31**	6.5	29.5	Pass
12	03	2422	**12.47**	**12.52**	**12.85**	**12.69**	**18.29**	6.5	29.5	Pass
12	06	2437	**12.49**	**12.62**	**12.93**	**12.47**	**18.33**	6.5	29.5	Pass
12	09	2452	**12.34**	**12.57**	**12.86**	**12.54**	**18.27**	6.5	29.5	Pass
13	01	2412	**12.42**	**12.51**	**12.95**	**12.48**	**18.29**	6.5	29.5	Pass
13	06	2437	**12.50**	**12.53**	**12.80**	**12.98**	**18.31**	6.5	29.5	Pass
13	11	2462	**12.15**	**12.56**	**13.07**	**12.61**	**18.28**	6.5	29.5	Pass
14	03	2422	**12.34**	**12.81**	**13.17**	**12.75**	**18.43**	6.5	29.5	Pass
14	06	2437	**12.58**	**12.79**	**13.01**	**12.52**	**18.43**	6.5	29.5	Pass
14	09	2452	**12.60**	**12.57**	**12.92**	**12.99**	**18.38**	6.5	29.5	Pass
15	01	2412	**12.59**	**12.65**	**12.81**	**12.46**	**18.33**	6.5	29.5	Pass

15	06	2437	**12.60**	**12.65**	**12.83**	**12.77**	**18.36**	6.5	29.5	Pass
15	11	2462	**12.60**	**12.80**	**13.01**	**12.67**	**18.45**	6.5	29.5	Pass
16	03	2422	**12.15**	**12.19**	**12.44**	**12.28**	**17.98**	6.5	29.5	Pass
16	06	2437	**12.15**	**12.17**	**12.34**	**12.38**	**17.95**	6.5	29.5	Pass
16	09	2452	**11.98**	**12.39**	**12.55**	**12.46**	**18.03**	6.5	29.5	Pass

4*TX+4*RX EIRP:

Mode	Channel	Test Frequency (MHz)	Peak Power Output (dBm)				Total Power (dBm)	Directional Gain (dBi)	EIRP (dBm)	Limit (dBm)	Result
			Ant 0	Ant 1	Ant 2	Ant 3					
1	01	2412	**21.59**	**22.02**	**22.14**	**21.89**	**26.93**	3.5	**29.93**	36	Pass
1	06	2437	**21.79**	**22.13**	**22.20**	**22.11**	**27.05**	3.5	**30.05**	36	Pass
1	11	2462	**21.64**	**22.25**	**22.31**	**22.04**	**27.08**	3.5	**30.08**	36	Pass
2	01	2412	**12.23**	**12.37**	**12.63**	**12.47**	**18.11**	3.5	**23.11**	36	Pass
2	06	2437	**12.41**	**12.43**	**12.76**	**12.33**	**18.20**	3.5	**23.20**	36	Pass
2	11	2462	**12.40**	**12.41**	**12.53**	**12.54**	**18.15**	3.5	**23.15**	36	Pass
3	01	2412	**12.84**	**12.99**	**12.96**	**12.88**	**18.56**	3.5	**23.56**	36	Pass
3	06	2437	**12.56**	**12.81**	**13.11**	**12.98**	**18.49**	3.5	**23.49**	36	Pass
3	11	2462	**12.69**	**12.86**	**13.10**	**12.93**	**18.53**	3.5	**23.53**	36	Pass
4	03	2422	**12.51**	**13.00**	**13.43**	**12.89**	**18.62**	3.5	**23.62**	36	Pass
4	06	2437	**12.61**	**12.85**	**13.24**	**12.88**	**18.54**	3.5	**23.54**	36	Pass
4	09	2452	**12.62**	**12.89**	**13.30**	**12.63**	**18.56**	3.5	**23.56**	36	Pass
5	01	2412	**12.64**	**12.68**	**13.16**	**12.62**	**18.46**	3.5	**23.46**	36	Pass
5	06	2437	**12.69**	**13.06**	**13.15**	**12.99**	**18.60**	3.5	**23.60**	36	Pass
5	11	2462	**12.60**	**12.84**	**13.28**	**13.04**	**18.56**	3.5	**23.56**	36	Pass
6	03	2422	**12.72**	**12.99**	**13.21**	**12.87**	**18.60**	3.5	**23.60**	36	Pass
6	06	2437	**12.65**	**12.87**	**13.28**	**12.92**	**18.57**	3.5	**23.57**	36	Pass
6	09	2452	**12.63**	**12.94**	**13.14**	**12.96**	**18.55**	3.5	**23.55**	36	Pass
7	01	2412	**12.61**	**12.50**	**12.71**	**12.53**	**18.27**	3.5	**23.27**	36	Pass
7	06	2437	**12.58**	**12.63**	**12.81**	**12.77**	**18.34**	3.5	**23.34**	36	Pass

7	11	2462	**12.91**	**12.84**	**13.03**	**10.72**	**18.43**	3.5	**23.43**	36	Pass
8	03	2422	**12.30**	**12.55**	**12.59**	**12.66**	**18.18**	3.5	**23.18**	36	Pass
8	06	2437	**12.33**	**12.47**	**12.50**	**12.41**	**18.13**	3.5	**23.13**	36	Pass
8	09	2452	**12.18**	**12.61**	**12.78**	**12.76**	**18.23**	3.5	**23.23**	36	Pass
9	01	2412	**19.55**	**19.89**	**20.21**	**19.66**	**24.90**	6.5	**32.90**	36	Pass
9	06	2437	**19.58**	**19.88**	**20.11**	**19.99**	**24.88**	6.5	**32.88**	36	Pass
9	11	2462	**19.49**	**20.06**	**20.00**	**19.85**	**24.87**	6.5	**32.87**	36	Pass
10	01	2412	**12.22**	**12.19**	**12.16**	**12.17**	**17.91**	6.5	**25.91**	36	Pass
10	06	2437	**12.15**	**12.42**	**12.32**	**12.11**	**18.00**	6.5	**26.00**	36	Pass
10	11	2462	**12.03**	**12.22**	**12.40**	**12.23**	**17.94**	6.5	**25.94**	36	Pass
11	01	2412	**12.74**	**12.64**	**12.90**	**12.67**	**18.41**	6.5	**26.41**	36	Pass
11	06	2437	**12.43**	**12.83**	**12.93**	**12.51**	**18.38**	6.5	**26.38**	36	Pass
11	11	2462	**12.31**	**12.46**	**13.09**	**12.77**	**18.31**	6.5	**26.31**	36	Pass
12	03	2422	**12.47**	**12.52**	**12.85**	**12.69**	**18.29**	6.5	**26.29**	36	Pass
12	06	2437	**12.49**	**12.62**	**12.93**	**12.47**	**18.33**	6.5	**26.33**	36	Pass
12	09	2452	**12.34**	**12.57**	**12.86**	**12.54**	**18.27**	6.5	**26.27**	36	Pass
13	01	2412	**12.42**	**12.51**	**12.95**	**12.48**	**18.29**	6.5	**26.29**	36	Pass
13	06	2437	**12.50**	**12.53**	**12.80**	**12.98**	**18.31**	6.5	**26.31**	36	Pass
13	11	2462	**12.15**	**12.56**	**13.07**	**12.61**	**18.28**	6.5	**26.28**	36	Pass
14	03	2422	**12.34**	**12.81**	**13.17**	**12.75**	**18.43**	6.5	**26.43**	36	Pass
14	06	2437	**12.58**	**12.79**	**13.01**	**12.52**	**18.43**	6.5	**26.43**	36	Pass
14	09	2452	**12.60**	**12.57**	**12.92**	**12.99**	**18.38**	6.5	**26.38**	36	Pass
15	01	2412	**12.59**	**12.65**	**12.81**	**12.46**	**18.33**	6.5	**26.33**	36	Pass

15	06	2437	**12.60**	**12.65**	**12.83**	**12.77**	**18.36**	6.5	**26.36**	36	Pass
15	11	2462	**12.60**	**12.80**	**13.01**	**12.67**	**18.45**	6.5	**26.45**	36	Pass
16	03	2422	**12.15**	**12.19**	**12.44**	**12.28**	**17.98**	6.5	**25.98**	36	Pass
16	06	2437	**12.15**	**12.17**	**12.34**	**12.38**	**17.95**	6.5	**25.95**	36	Pass
16	09	2452	**11.98**	**12.39**	**12.55**	**12.46**	**18.03**	6.5	**26.03**	36	Pass

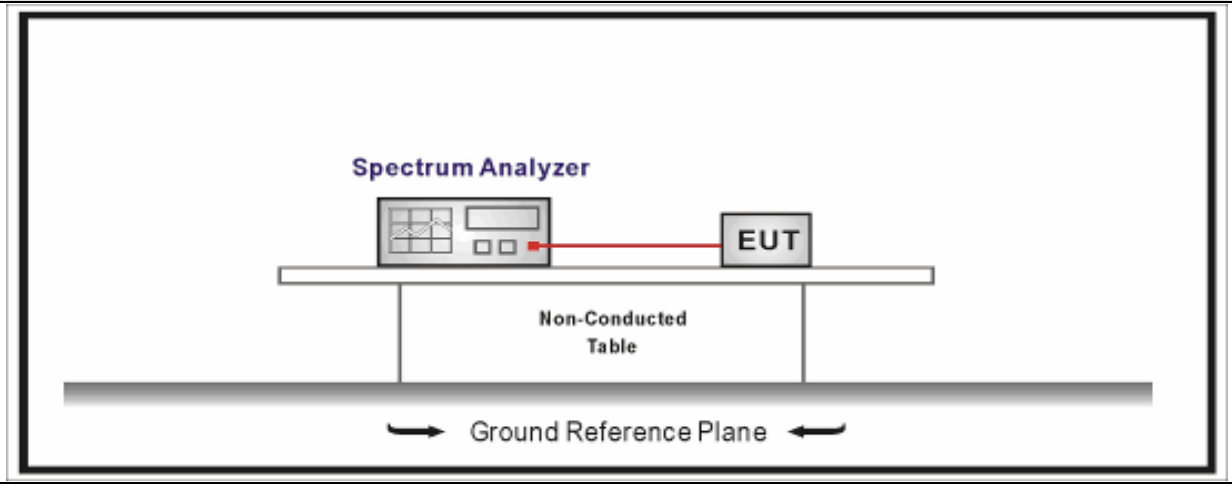
9. Power Spectral Density

9.1. Test Equipment

Power Spectral Density / TR-8					
Instrument	Manufacturer	Type No.	Serial No.	Cal. Date	Cal. Due Date
Spectrum Analyzer	Agilent	N9010A	MY48030494	2017.02.04	2018.02.03
EXA Spectrum Analyzer	Keysight	N9010A	MY55370495	2017.04.09	2018.04.08
MXA Signal Anlyzer	Keysight	N9020A	MY56060147	2017.04.09	2018.04.08
Temperature/Humidity Meter	zhichen	ZC1-2	TR8-TH	2017.04.10	2018.04.09
Note: All equipment are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.					

9.2. Test Setup

Power Spectral Density test setup



9.3. Limit

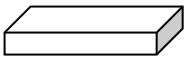
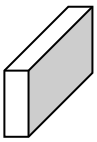
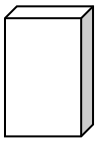
Power Spectral Density Limit
Power Spectral Density≤8dBm/3kHz

9.4. Test Procedure

Power Spectral Density Test Method				
	References Rule		Chapter	Description
☒	ANSI C63.10		11.10	Maximum power spectral density level in the fundamental emission
	☒	ANSI C63.10	11.10.2	Method PKPSD (peak PSD)
	☐	ANSI C63.10	11.10.3	Method AVGPSD-1(Duty cycle≥98%)
	☐	ANSI C63.10	11.10.4	Method AVGPSD-1A(Duty cycle≥98%)
	☐	ANSI C63.10	11.10.5	Method AVGPSD-2(Duty cycle＜98%)
	☐	ANSI C63.10	11.10.6	Method AVGPSD-2A(Duty cycle＜98%)
	☐	ANSI C63.10	11.10.7	Method AVGPSD-3
	☐	ANSI C63.10	11.10.8	Method AVGPSD-3A

Directional Gain Calculations for In-Band test method				
	Referred Rule		Chapter	Description
☐	KDB 662911		F2)a)	Basic methodology
	☐	KDB 662911	F2)a) (i)	transmit signals are correlated
	☐	KDB 662911	F2)a) (ii)	transmit signals are uncorrelated
☐	KDB 662911		F2)b)	Sectorized antenna systems.
☐	KDB 662911		F2)c)	Cross-polarized antennas
	☐	ANSI C63.10	F2)c) (i)	Cross-polarized antennas
	☐	ANSI C63.10	F2)c) (ii)	Multiple antennas
☐	KDB 662911		F2)e)	Spatial Multiplexing
	☐	KDB 662911	F2)e) (i)	Antennas have the same gain
	☐	KDB 662911	F2)e) (ii)	Antenna have the different gain with one spatial stream
	☒	KDB 662911	F2)e) (iii)	Antenna have the different gain with more than one spatial stream
☒	KDB 662911		F2)f)	Cyclic Delay Diversity (CDD)
	☐	KDB 662911	F2)f) (i)	Antennas have the same gain
	☒	KDB 662911	F2)f) (ii)	Antenna have the different gain with one spatial stream
	☐	KDB 662911	F2)f) (iii)	Antenna have the different gain with more than one spatial stream

9.5. EUT test definition

<table>
<tr><th>Item</th><th colspan="5">Power Spectral Density Test Method</th></tr>
<tr><td rowspan="3">Device Category</td><td>☐</td><td colspan="4">Fixed point-to-point</td></tr>
<tr><td>☐</td><td colspan="4">Emit multiple directional beams, simultaneously or sequentially</td></tr>
<tr><td>☒</td><td colspan="4">Other cases</td></tr>
<tr><td>Test mode</td><td colspan="5">Mode 1~16</td></tr>
<tr><td rowspan="6">Test method</td><td>☐</td><td colspan="4">Radiated</td></tr>
<tr><td rowspan="3"></td><td>X Axis</td><td>Y Axis</td><td colspan="2">Z Axis</td></tr>
<tr><td>  </td><td>  </td><td colspan="2">  </td></tr>
<tr><td>Worst Axis ☐</td><td>Worst Axis ☐</td><td colspan="2">Worst Axis ☐</td></tr>
<tr><td>☒</td><td colspan="4">Conducted</td></tr>
<tr><td>☒</td><td>Chain 1</td><td>Chain 2</td><td>Chain 3</td><td>Chain 4</td></tr>
<tr><td></td><td colspan="4">  </td></tr>
</table>

9.6. Test Result

Product Name	:	Wireless Access Point	Power	:	PoE 48V
Test Mode	:	Mode1~16	Test Site	:	TR8
Test Date	:	2018.07.19	Test Engineer	:	Cloud

2*TX+2*RX:

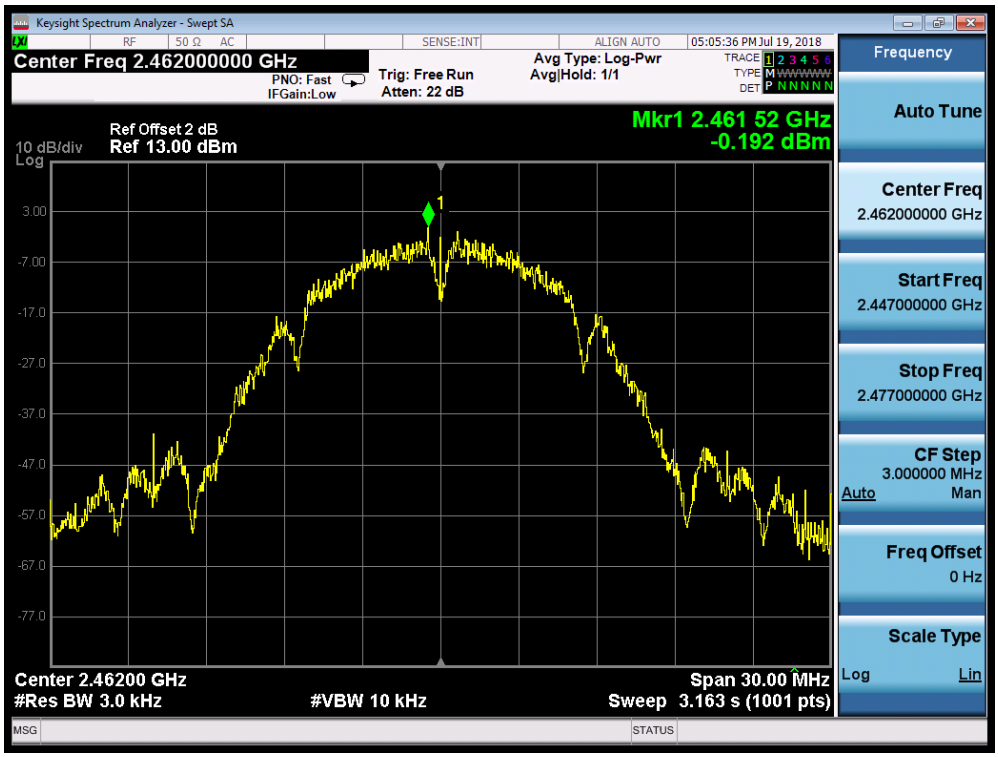
Mode	Channel	Test Frequency (MHz)	Measurement PSD (dBm/3kHz)		Total Measurement PSD (dBm/3kHz)	Directional Gain (dBi)	Limit (dBm/3kHz)	Result
			Ant 1	Ant 2				
1	01	2412	-1.914	-1.869	1.119	6.5	7.5	Pass
1	06	2437	-0.079	-2.011	2.072	6.5	7.5	Pass
1	11	2462	-0.180	-1.042	2.421	6.5	7.5	Pass
2	01	2412	-8.360	-7.488	-4.892	6.5	7.5	Pass
2	06	2437	-7.608	-7.769	-4.677	6.5	7.5	Pass
2	11	2462	-7.242	-8.130	-4.653	6.5	7.5	Pass
3	01	2412	-8.905	-8.678	-5.780	6.5	7.5	Pass
3	06	2437	-7.977	-7.519	-4.732	6.5	7.5	Pass
3	11	2462	-9.410	-8.764	-6.065	6.5	7.5	Pass
4	03	2422	-14.705	-14.044	-11.352	6.5	7.5	Pass
4	06	2437	-15.194	-14.485	-11.815	6.5	7.5	Pass
4	09	2452	-14.606	-14.564	-11.575	6.5	7.5	Pass
5	01	2412	-8.956	-8.891	-5.913	6.5	7.5	Pass
5	06	2437	-8.231	-8.313	-5.262	6.5	7.5	Pass
5	11	2462	-9.608	-9.366	-6.475	6.5	7.5	Pass
6	03	2422	-14.814	-14.192	-11.482	6.5	7.5	Pass

6	06	2437	-15.238	-14.976	-12.095	6.5	7.5	Pass
6	09	2452	-15.269	-15.602	-12.422	6.5	7.5	Pass
7	01	2412	-9.214	-9.736	-6.457	6.5	7.5	Pass
7	06	2437	-9.931	-9.713	-6.810	6.5	7.5	Pass
7	11	2462	-10.108	-10.213	-7.150	6.5	7.5	Pass
8	03	2422	-14.962	-14.261	-11.587	6.5	7.5	Pass
8	06	2437	-15.478	-14.998	-12.221	6.5	7.5	Pass
8	09	2452	-15.339	-15.675	-12.493	6.5	7.5	Pass
9	01	2412	-1.824	-0.772	1.744	6.5	7.5	Pass
9	06	2437	-1.464	-2.113	1.234	6.5	7.5	Pass
9	11	2462	-0.192	-0.624	2.608	6.5	7.5	Pass
10	01	2412	-11.210	-8.956	-6.928	6.5	7.5	Pass
10	06	2437	-7.430	-6.925	-4.160	6.5	7.5	Pass
10	11	2462	-8.370	-7.814	-5.073	6.5	7.5	Pass
11	01	2412	-7.763	-7.784	-4.763	6.5	7.5	Pass
11	06	2437	-9.253	-8.642	-5.926	6.5	7.5	Pass
11	11	2462	-10.382	-9.403	-6.855	6.5	7.5	Pass
12	03	2422	-15.393	-14.653	-11.997	6.5	7.5	Pass
12	06	2437	-15.194	-15.482	-12.325	6.5	7.5	Pass
12	09	2452	-15.784	-15.185	-12.464	6.5	7.5	Pass
13	01	2412	-8.975	-8.736	-5.844	6.5	7.5	Pass
13	06	2437	-9.478	-8.721	-6.073	6.5	7.5	Pass
13	11	2462	-10.218	-9.538	-6.854	6.5	7.5	Pass

14	03	2422	-15.412	-14.518	-11.932	6.5	7.5	Pass
14	06	2437	-15.231	-15.471	-12.339	6.5	7.5	Pass
14	09	2452	-15.945	-15.286	-12.593	6.5	7.5	Pass
15	01	2412	-9.121	-9.312	-6.205	6.5	7.5	Pass
15	06	2437	-9.691	-8.901	-6.268	6.5	7.5	Pass
15	11	2462	-10.413	-9.816	-7.094	6.5	7.5	Pass
16	03	2422	-15.732	-14.629	-12.135	6.5	7.5	Pass
16	06	2437	-15.319	-15.583	-12.439	6.5	7.5	Pass
16	09	2452	-15.978	-15.412	-12.675	6.5	7.5	Pass

Note: Limit=8-(Directional gain-6)

Mode 9 CH11(2462MHz) Ant 1



Mode 1 CH11(2462MHz) Ant 2

4*TX+4*RX:

Mode	Channel	Test Frequency (MHz)	Measurement PSD (dBm/3kHz)				Total Measurement PSD (dBm/3kHz)	Directional Gain (dBi)	Limit (dBm/3kHz)	Result
			Ant 1	Ant 2	Ant 3	Ant 4				
1	01	2412	-2.521	-3.417	-2.766	-1.515	3.521	9.5	4.5	Pass
1	06	2437	-2.469	-2.577	-3.256	-2.048	3.454	9.5	4.5	Pass
1	11	2462	-3.116	-2.008	-2.425	-1.252	3.873	9.5	4.5	Pass
2	01	2412	-13.707	-11.119	-11.573	-11.292	-5.788	9.5	4.5	Pass
2	06	2437	-10.608	-10.593	-10.706	-10.744	-4.642	9.5	4.5	Pass
2	11	2462	-10.536	-10.059	-10.489	-10.976	-4.482	9.5	4.5	Pass
3	01	2412	-11.750	-12.357	-11.902	-11.709	-5.901	9.5	4.5	Pass
3	06	2437	-10.571	-11.583	-10.356	-10.989	-4.829	9.5	4.5	Pass
3	11	2462	-11.963	-11.296	-12.225	-12.436	-5.938	9.5	4.5	Pass
4	03	2422	-16.362	-16.195	-16.089	-14.854	-9.811	9.5	4.5	Pass
4	06	2437	-14.919	-15.904	-15.413	-15.325	-9.356	9.5	4.5	Pass
4	09	2452	-15.628	-15.278	-15.935	-15.280	-9.501	9.5	4.5	Pass
5	01	2412	-13.888	-13.456	-14.005	-14.406	-7.905	9.5	4.5	Pass
5	06	2437	-13.231	-14.516	-12.995	-12.475	-7.221	9.5	4.5	Pass
5	11	2462	-13.203	-13.229	-13.705	-13.346	-7.346	9.5	4.5	Pass
6	03	2422	-14.635	-16.309	-15.616	-16.052	-9.584	9.5	4.5	Pass
6	06	2437	-15.213	-16.047	-15.847	-16.246	-9.800	9.5	4.5	Pass
6	09	2452	-17.368	-15.951	-15.460	-15.971	-10.111	9.5	4.5	Pass
7	01	2412	-16.345	-17.732	-18.289	-17.446	-11.373	9.5	4.5	Pass

7	06	2437	-14.638	-15.189	-17.289	-15.866	-9.617	9.5	4.5	Pass
7	11	2462	-16.623	-16.072	-16.591	-16.094	-10.316	9.5	4.5	Pass
8	03	2422	-17.526	-18.276	-16.890	-18.586	-11.748	9.5	4.5	Pass
8	06	2437	-16.835	-17.423	-17.313	-16.734	-11.046	9.5	4.5	Pass
8	09	2452	-18.566	-18.105	-18.498	-18.029	-12.273	9.5	4.5	Pass
9	01	2412	-0.791	-1.958	-1.914	-1.332	2.548	9.5	4.5	Pass
9	06	2437	-0.648	-2.064	-1.522	-2.421	2.409	9.5	4.5	Pass
9	11	2462	-0.464	-1.687	-2.087	-2.247	2.458	9.5	4.5	Pass
10	01	2412	-11.450	-11.430	-11.091	-11.082	-5.239	9.5	4.5	Pass
10	06	2437	-11.554	-11.692	-11.826	-12.761	-5.913	9.5	4.5	Pass
10	11	2462	-10.588	-10.111	-9.938	-10.430	-4.239	9.5	4.5	Pass
11	01	2412	-10.877	-12419	-11.085	-12.310	-6.608	9.5	4.5	Pass
11	06	2437	-11.166	-12.397	-12.474	-10.425	-5.509	9.5	4.5	Pass
11	11	2462	-10.625	-11.442	-11.971	-11.339	-5.297	9.5	4.5	Pass
12	03	2422	-16.058	-16.257	-16.018	-16.269	-10.128	9.5	4.5	Pass
12	06	2437	-15.777	-16.061	-15.069	-15.874	-9.658	9.5	4.5	Pass
12	09	2452	-16.146	-16.425	-16.093	-16.108	-10.170	9.5	4.5	Pass
13	01	2412	-11.806	-12.744	-11.783	-12.926	-6.263	9.5	4.5	Pass
13	06	2437	-11.938	-12.987	-12.752	-11.423	-6.209	9.5	4.5	Pass
13	11	2462	-11.185	-12.206	-12.732	-12.127	-6.005	9.5	4.5	Pass
14	03	2422	-17.050	-16.609	-16.366	-16.505	-10.604	9.5	4.5	Pass
14	06	2437	-16.496	-16.159	-15.557	-16.436	-10.125	9.5	4.5	Pass
14	09	2452	-16.906	-16.672	-16.656	-16.778	-10.731	9.5	4.5	Pass

15	01	2412	-10.939	-12.855	-11.812	-12.562	-5.957	9.5	4.5	Pass
15	06	2437	-11.333	-13.272	-13.157	-10.510	-5.885	9.5	4.5	Pass
15	11	2462	-11.532	-11.815	-12.844	-12.162	-6.041	9.5	4.5	Pass
16	03	2422	-16.304	-16.919	-16.526	-17.127	-10.686	9.5	4.5	Pass
16	06	2437	-16.161	-16.473	-15.259	-16.205	-9.979	9.5	4.5	Pass
16	09	2452	-16.721	-16.855	-16.803	-17.046	-10.834	9.5	4.5	Pass

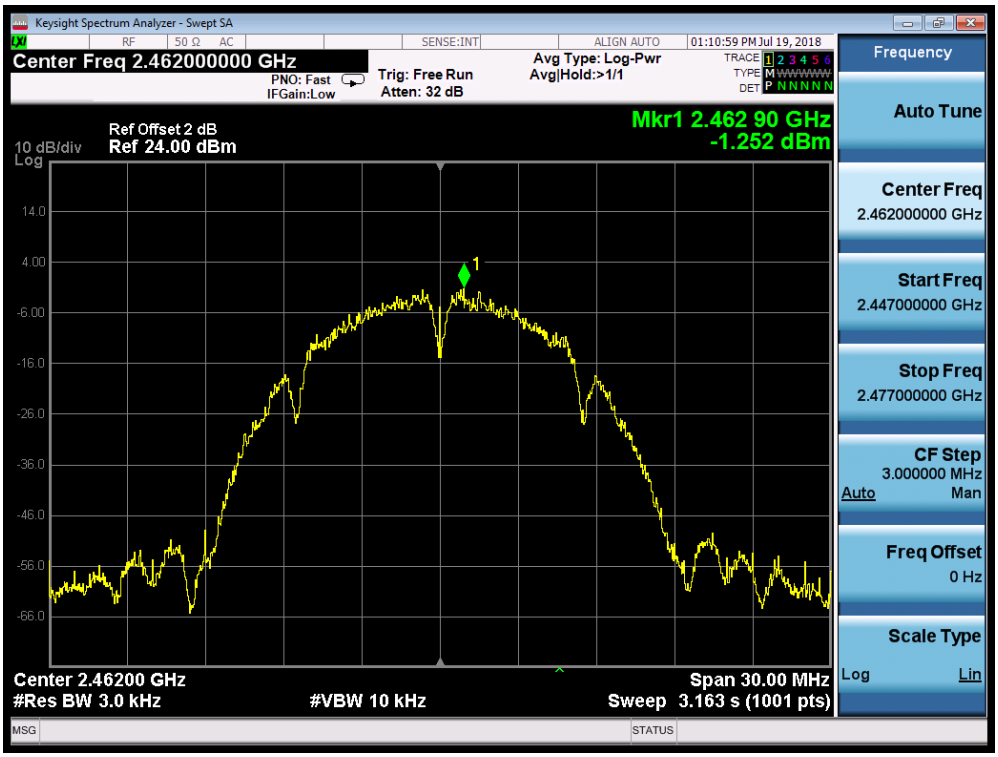
Note: Limit=8-(Directional gain-6)

Mode 1 CH11(2462MHz) Ant 1

Mode 1 CH11(2462MHz) Ant 2

Mode 1 CH11(2462MHz) Ant 3

Mode 1 CH11(2462MHz) Ant 4



10. Antenna Requirement

10.1. Limit

Antenna Requirement Limit
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. 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. This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, §15.213, §15.217, §15.219, or §15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

10.2. Antenna Connector Construction

Antenna Connector Construction	
☒	The use of a permanently attached antenna
☐	The antenna use of a unique coupling to the intentional radiator
☐	The use of a nonstandard antenna jack or electrical connector
Please refer to the attached document “Internal Photograph” to show the antenna connector.	

The End