FCC RADIO TEST REPORT

FCC ID:2ATIH-DR02D-PL

Product： DASH CAM
Trade Name： AUKEY
Model Name： DR02 D-PL
Serial Model： N/A
Report No.： UNIA20111609ER-01

Prepared for

Aukey Technology Co.,Ltd.
Room 102, Building P09, South China City Electronic trading center, Longgang District,Shenzhen , China 518111

Prepared by

Shenzhen United Testing Technology Co., Ltd.

2F, Annex Bldg, Jiahuangyuan Tech Park, #365 Baotian 1 Rd, Tiegang Community, Xixiang Str, Bao'an District, Shenzhen, China

TEST RESULT CERTIFICATION

Applicant's name..... : Aukey Technology Co.,Ltd.

Address..... : Room 102, Building P09, South China City Electronic trading center, Longgang District, Shenzhen , China 518111

Manufacture's Name..... : Dongguan Haotai Electronic Technology Co.,Ltd

Address..... : No. 16 Xinfa Road, Lincun, Tangxia, Dongguan City (Block 87, New Sun Industrial City) Guangdong, China. 523711

Product description

Product name..... : DASH CAM

Trade Mark..... : AUKEY

Model and/or type reference . : DR02 D-PL

Standards..... : FCC Rules and Regulations Part 15 Subpart C Section 15.247
ANSI C63.10: 2013

This device described above has been tested by Shenzhen United Testing Technology Co., Ltd., and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

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Date of Test..... :

Date (s) of performance of tests..... : Nov.10 ~ 18, 2020

Date of Issue..... : Nov.19, 2020

Test Result..... : Pass

Tested By: Bob liao

Bob liao/Editor

Reviewer: Kahn.Yang

Kahn yang/Supervisor

Approved & Authorized Signer: liuze

Liuze/Manager

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1.TEST SUMMARY

TEST PROCEDURES AND RESULTS

DESCRIPTION OF TEST	RESULT
CONDUCTED EMISSIONS TEST	N/A
RADIATED EMISSION TEST	COMPLIANT
BAND EDGE	COMPLIANT
OCCUPIED BANDWIDTH MEASUREMENT	COMPLIANT
POWER SPECTRAL DENSITY	COMPLIANT
PEAK OUTPUT POWER	COMPLIANT
OUT OF BAND EMISSIONS	COMPLIANT
ANTENNA REQUIREMENT	COMPLIANT

1.1 TEST FACILITY

Test Firm : Shenzhen United Testing Technology Co., Ltd.

Address :2F, Annex Bldg, Jiahuangyuan Tech Park, #365 Baotian 1 Rd,Tiegang Community, Xixiang Str, Bao'an District, Shenzhen, China

The testing quality ability of our laboratory meet with "Quality Law of People's Republic of China" Clause 19.The testing quality system of our laboratory meets with ISO/IEC-17025 requirements, which is approved by CNAS. This approval result is accepted by MRA of APLAC.

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

CNAS-LAB Code: L6494

The EMC Laboratory has been assessed and in compliance with CNAS-CL01 accreditation criteria for testing Laboratories (identical to ISO/IEC 17025:2017 General Requirements) for the Competence of testing Laboratories.

Designation Number: CN1227

Test Firm Registration Number: 674885

The EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications commission. The acceptance letter from the FCC is maintained in our files.

1.2 MEASUREMENT UNCERTAINTY

Measurement Uncertainty

Conducted Emission Expanded Uncertainty	=	2.23dB, k=2
Radiated emission expanded uncertainty(9kHz-30MHz)	=	3.08dB, k=2
Radiated emission expanded uncertainty(30MHz-1000MHz)	=	4.42dB, k=2
Radiated emission expanded uncertainty(Above 1GHz)	=	4.06dB, k=2

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	DASH CAM
Trade Mark	AUKEY
Model Name	DR02 D-PL
Sample ID	UNIA20111609ER-1
Serial No.	N/A
Model Difference	N/A
FCC ID	2ATIH-DR02D-PL
Antenna Type	Internal Antenna
Antenna Gain	2dBi
Frequency Range	802.11b/g/n20:2412~2462 MHz 802.11n40:2422-2452 MHz
Number of Channels	802.11b/g/n20: 11CH 802.11n40:7CH
Modulation Type	DSSS, OFDM
PowerSource	DC 5V/1A from Car Charger
USB Cable	1.Unshielded,length 6.9m ;2.Unshielded,length 3.9m
Car Charger	
Manufacturer	Aukey Technology Co.,Ltd.
M/N	D1000
Input	DC 12-24V
Output	USB*2: DC 5V/3.1A Max

2.2 Carrier Frequency of Channels

Channel List for 802.11b/g/n(20MHz/40MHz)							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
01	2412	04	2427	07	2442	10	2457
02	2417	05	2432	08	2447	11	2462
03	2422	06	2437	09	2452		

2.3 Operation of EUT during testing

Operating Mode
The mode is used: Transmitting modefor 802.11b/g/n(20MHz)/n(40MHz)
Low Channel: 2412MHz/2422MHz
Middle Channel: 2437MHz
High Channel: 2462MHz/2452MHz
Test SW Version:MP_Kit_RTL11n

2.4 DESCRIPTION OF TEST SETUP

Operation of EUT during Radiation testing:

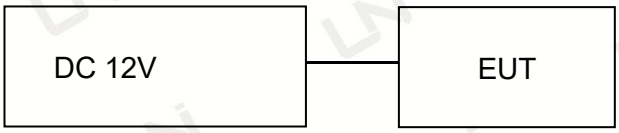


Table forauxiliary equipment:

Equipment Description	Manufacturer	Model	Calibration Due Date
N/A	N/A	N/A	N/A

2.5 MEASUREMENT INSTRUMENTS LIST

Item	Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
CONDUCTED EMISSIONS TEST					
1	AMN	Schwarzbeck	NNLK8121	8121370	2021.10.15
2	AMN	ETS	3810/2	00020199	2021.10.15
3	EMI TEST RECEIVER	Rohde&Schwarz	ESCI	101210	2021.10.15
4	AAN	TESEQ	T8-Cat6	38888	2021.10.15
RADIATED EMISSION TEST					
1	Horn Antenna	Sunol	DRH-118	A101415	2021.10.20
2	BicoNILog Antenna	Sunol	JB1 Antenna	A090215	2021.10.20
3	PREAMP	HP	8449B	3008A00160	2021.10.15
4	PREAMP	HP	8447D	2944A07999	2021.10.15
5	EMI TEST RECEIVER	Rohde&Schwarz	ESR3	101891	2021.10.15
6	VECTOR Signal Generator	Rohde&Schwarz	SMU200A	101521	2021.10.15
7	Signal Generator	Agilent	E4421B	MY4335105	2021.10.15
8	MXA Signal Analyzer	Agilent	N9020A	MY50510140	2021.10.15
9	MXA Signal Analyzer	Agilent	N9020A	MY51110104	2021.10.15
10	ANT Tower&Turn table Controller	Champro	EM 1000	60764	2021.10.15
11	Anechoic Chamber	Taihe Maorui	9m*6m*6m	966A0001	2021.10.15
12	Shielding Room	Taihe Maorui	6.4m*4m*3m	643A0001	2021.10.15
13	RF Power sensor	DARE	RPR3006W	15I00041SNO88	2021.10.15
14	RF Power sensor	DARE	RPR3006W	15I00041SNO89	2021.10.15
15	RF power divider	Anritsu	K241B	992289	2021.10.15
16	Wideband radio communication tester	Rohde&Schwarz	CMW500	154987	2021.10.15
17	Biconical antenna	Schwarzbeck	VHA 9103	91032360	2021.10.20
18	Biconical antenna	Schwarzbeck	VHA 9103	91032361	2021.10.20
19	Broadband Hybrid Antennas	Schwarzbeck	VULB9163	VULB9163#958	2021.10.20
20	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-1680	2021.10.20
21	Active Receive Loop Antenna	Schwarzbeck	FMZB 1919B	00023	2021.10.20
22	Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170651	2021.10.20
23	Microwave Broadband Pre-amplifier	Schwarzbeck	BBV 9721	100472	2021.10.20
24	Active Loop Antenna	Com-Power	AL-130R	10160009	2021.10.15
25	Power Meter	KEYSIGHT	N1911A	MY50520168	2021.10.15
26	Frequency Meter	VICTOR	VC2000	997406086	2021.10.15
27	DC Power Source	HYELEC	HY5020E	055161818	2021.10.15
Test software					
1	E3	Audix	6.101223a	N/A	N/A

3. CONDUCTED EMISSIONS TEST

3.1 Conducted Power Line Emission Limit

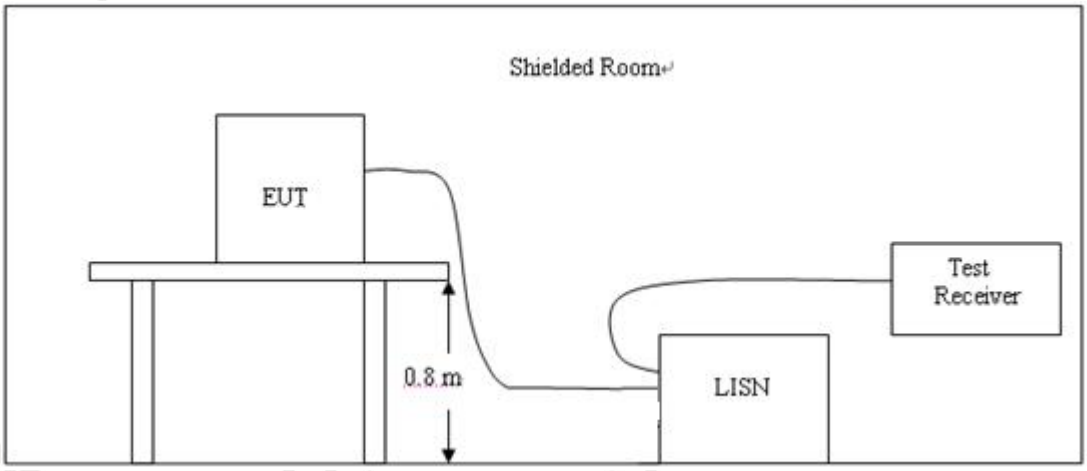
For unintentional device, according to § 15.107(a) Line Conducted Emission Limits is as following

Frequency (MHz)	Maximum RF Line Voltage(dBμV)			
	CLASS A		CLASS B	
	Q.P.	Ave.	Q.P.	Ave.
0.15~0.50	79	66	66~56*	56~46*
0.50~5.00	73	60	56	46
5.00~30.0	73	60	60	50

* Decreasing linearly with the logarithm of the frequency

For intentional device, according to §15.207(a) Line Conducted Emission Limit is same as above table.

3.2 Test Setup



3.3 Test Procedure

1, The equipment was set up as per the test configuration to simulate typical actual usage per the user'smanual. A wooden table with a height of 0.8 meters is used and is placed onthe ground plane as per ANSI C63.10.

2, Support equipment, if needed, was placed as per ANSI C63.10.

3, All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.

4,If a EUT received DC power from the USB Port of Notebook PC, the PC's adapter received AC120V/60Hzpower through a Line Impedance Stabilization Network (LISN) which supplied power source and wasgrounded to the ground plane.

5, All support equipments received AC power from a second LISN, if any.

6, The EUT test program was started. Emissions were measured on each current carrying line of the EUTusing a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has twomonitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.

7, Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.

3.4 Test Result

N/A

4. RADIATED EMISSION TEST

4.1 Radiation Limit

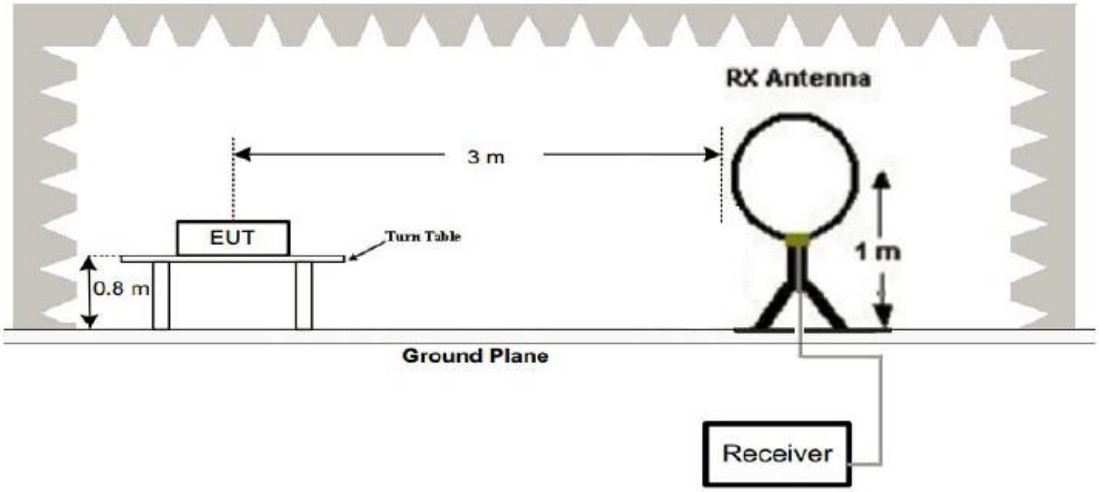
For unintentional device, according to § 15.109(a), except for Class A digital devices, the field strength ofradiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the followingvalues：

Frequency (MHz)	Distance (Meters)	Radiated (dBμV/m)	Radiated (μV/m)
30-88	3	40	100
88-216	3	43.5	150
216-960	3	46	200
Above 960	3	54	500

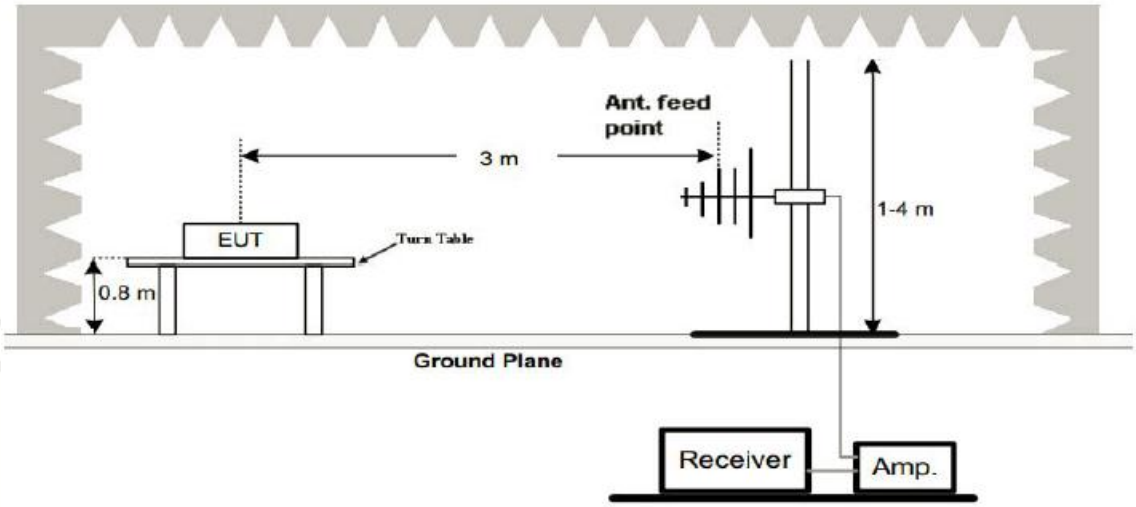
For intentional device, according to § 15.209(a), the general requirement of field strength of radiatedemissions from intentional radiators at a distance of 3 meters shall not exceed the above table.

4.2 Test Setup

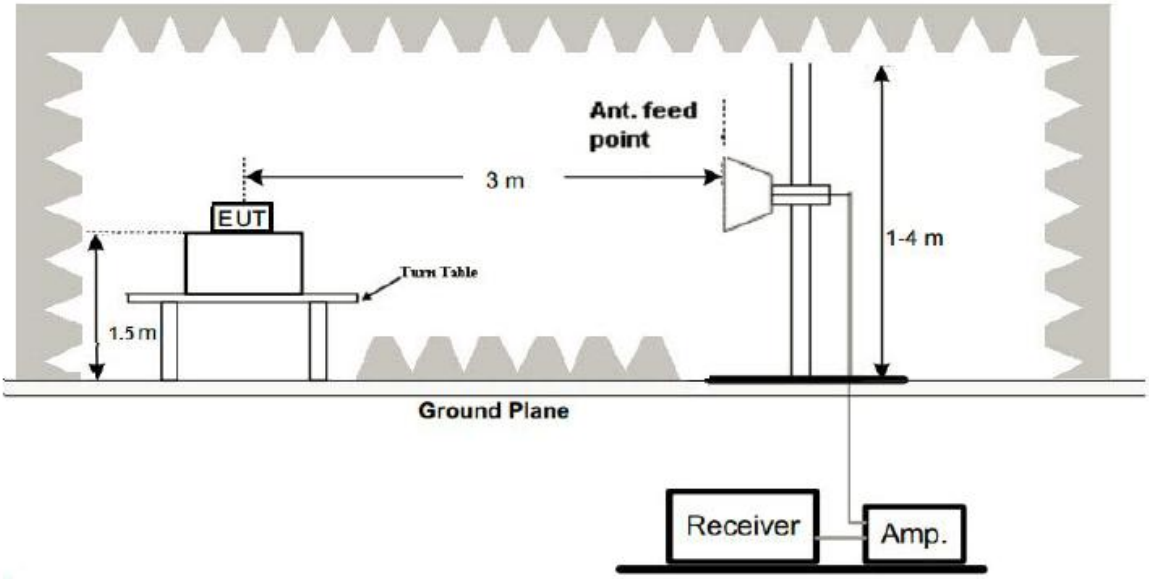
1. Radiated Emission Test-Up Frequency Below 30MHz



2. Radiated Emission Test-Up Frequency 30MHz~1GHz



3. Radiated Emission Test-Up Frequency Above 1GHz



4.3 Test Procedure

1. Below 1GHz measurement the EUT is placed on turntable which is 0.8m above ground plane. And above 1GHz measurement EUT was placed on low permittivity and low tangent turn table which is 1.5m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highestemissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna bothhorizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.
7. The test frequency range from 9KHz to25GHz per FCC PART 15.33(a).
8. The distance between test antenna and EUT as following table states:

Test Frequency range	Test Antenna Type	Test Distance
9KHz-30MHz	Active Loop Antenna	3
30MHz-1GHz	Bilog Antenna	3
1GHz-18GHz	Horn Antenna	3
18GHz-25GHz	Horn Anternna	1

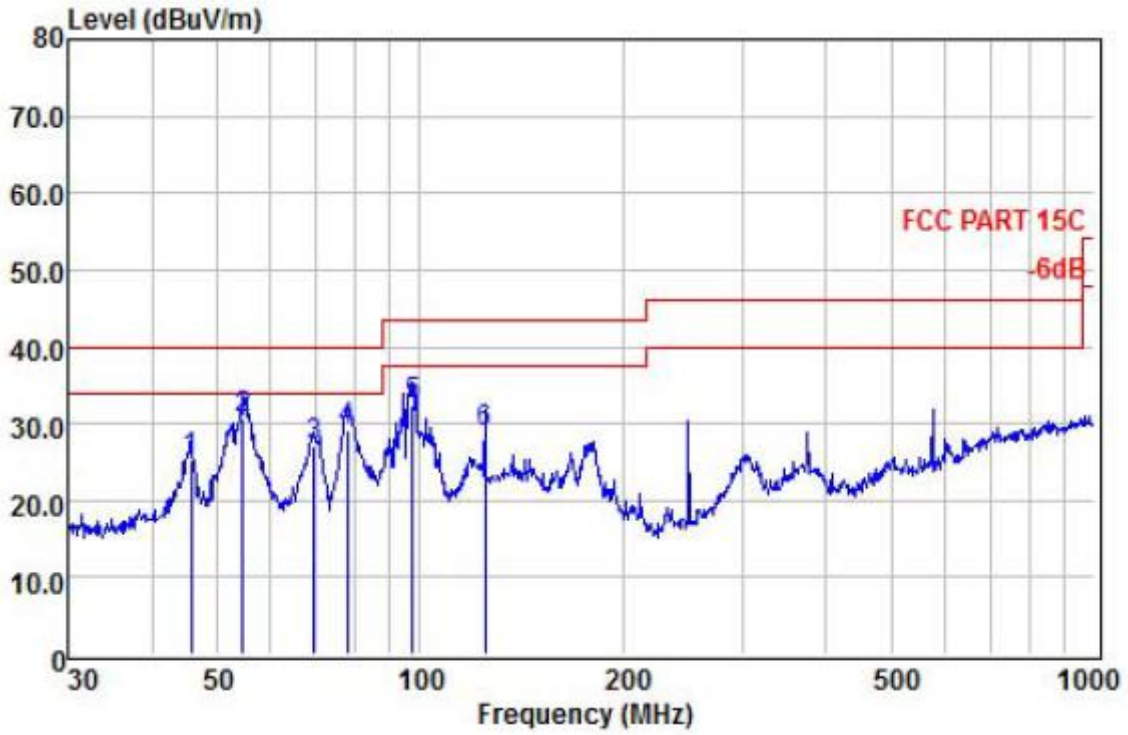
Note:
For battery operated equipment, the equipment tests shall be performed using a new battery.

4.4 Test Result

PASS
Remark:
1. All modes of 802.11b/g/n20 were test at Low, Middle, and High channel, only the worst result of 802.11b Low Channel was reported for below 1GHz test.
2. By preliminary testing and verifying three axis (X, Y and Z) position of EUT transmitted status, it was found that “Z axis” position was the worst, and test data recorded in this report.

Below 1GHz Test Results:

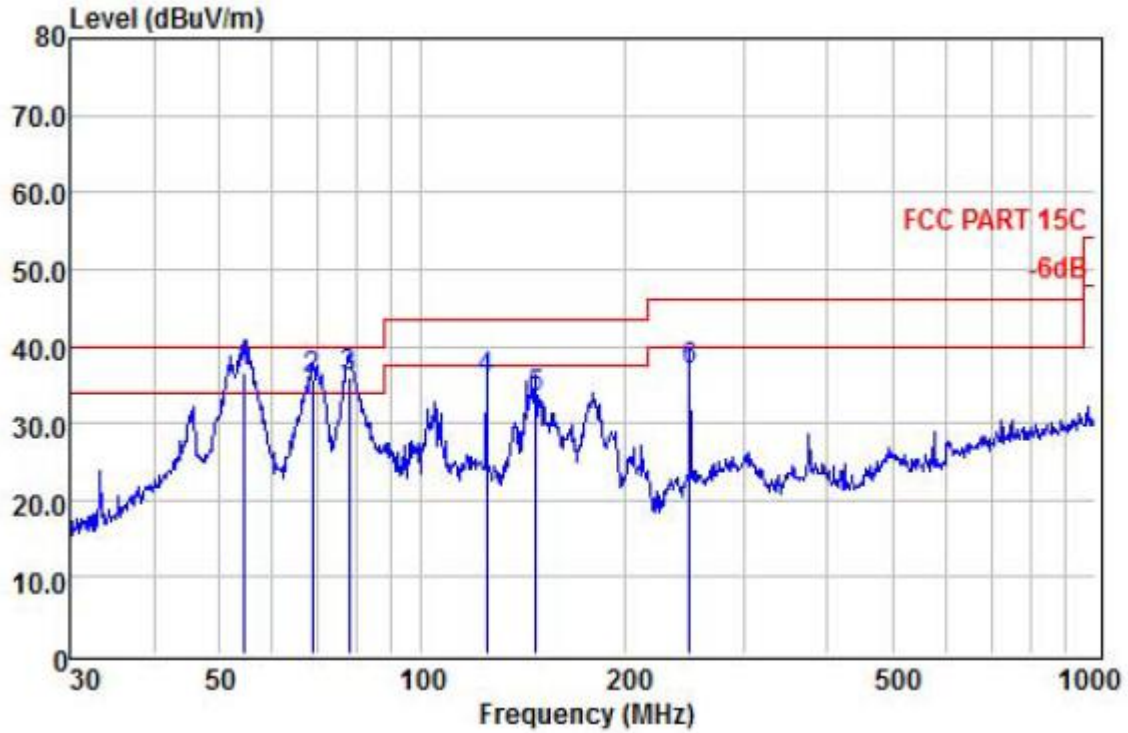
Temperature:	24.9℃	Relative Humidity:	55%
Test Date:	Nov. 13, 2020	Pressure:	1015hPa
Test Voltage:	DC 12V	Polarization:	Horizontal
Test Mode:	Transmitting mode of 802.11b 2412MHz		



	Freq	Read Level	Antenna Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dBuV/m	dBuV/m	dB	
1	45.69	11.64	13.25	0.27	25.16	40.00	-14.84	QP
2	54.64	17.39	12.95	0.39	30.73	40.00	-9.27	QP
3	69.60	16.21	9.93	0.81	26.95	40.00	-13.05	QP
4	77.87	19.23	8.91	0.86	29.00	40.00	-11.00	QP
5	97.46	21.11	10.35	0.83	32.29	43.50	-11.21	QP
6	125.01	14.23	13.85	0.84	28.92	43.50	-14.58	QP

Remark: Absolute Level= Reading Level+ Factor, Margin= Absolute Level – Limit
Factor=Ant. Factor + Cable Loss

Temperature:	24.9℃	Relative Humidity:	55%
Test Date:	Nov. 13, 2020	Pressure:	1015hPa
Test Voltage:	DC 12V	Polarization:	Vertical
Test Mode:	Transmitting mode of 802.11b 2412MHz		



	Freq	Read Level	Antenna Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dBuV/m	dBuV/m	dB	
1 !	54.64	23.35	12.95	0.39	36.69	40.00	-3.31	QP
2 !	68.87	24.76	10.12	0.79	35.67	40.00	-4.33	QP
3 !	77.87	26.25	8.91	0.86	36.02	40.00	-3.98	QP
4	125.01	21.10	13.85	0.84	35.79	43.50	-7.71	QP
5	147.92	17.56	14.96	0.85	33.37	43.50	-10.13	QP
6	250.30	24.39	11.51	0.86	36.76	46.00	-9.24	QP

Remark: Absolute Level= Reading Level+ Factor, Margin= Absolute Level – Limit
Factor=Ant. Factor + Cable Loss

Remark：
(1) Measuring frequencies from 9 KHz to the 1 GHz, Radiated emission test from 9KHz to 30MHzwas verified, and no any emission was found except system noise floor.
(2) * denotes emission frequency which appearing within the Restricted Bands specified in provision of 15.205, then the general radiated emission limits in 15.209 apply.
(3) The IF bandwidth of EMI Test Receiver between 30MHz to 1GHz was 120KHz, 1 MHz for measuring above 1 GHz, below 30MHz was 10KHz.

Above 1 GHz Test Results:

CH Low of 802.11b Mode (2412MHz)

Horizontal:

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
4824	64.23	-3.64	60.59	74	-13.41	PK
4824	52.12	-3.64	48.48	54	-5.52	AV
7236	60.39	-0.95	59.44	74	-14.56	PK
7236	45.29	-0.95	44.34	54	-9.66	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit						

Vertical:

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
4824	63.56	-3.64	59.92	74	-14.08	PK
4824	52.48	-3.64	48.84	54	-5.16	AV
7236	57.46	-0.95	56.51	74	-17.49	PK
7236	45.66	-0.95	44.71	54	-9.29	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit						

CH Middle of 802.11b Mode (2437MHz)

Horizontal:

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
4874	61.18	-3.51	57.67	74	-16.33	PK
4874	48.65	-3.51	45.14	54	-8.86	AV
7311	59.35	-0.82	58.53	74	-15.47	PK
7311	46.33	-0.82	45.51	54	-8.49	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit						

Vertical:

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
4874	60.23	-3.51	56.72	74	-17.28	PK
4874	49.35	-3.51	45.84	54	-8.16	AV
7311	58.57	-0.82	57.75	74	-16.25	PK
7311	48.36	-0.82	47.54	54	-6.46	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit						

CH High of 802.11b Mode (2462MHz)

Horizontal:

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
4924	61.35	-3.43	57.92	74	-16.08	PK
4924	50.45	-3.43	47.02	54	-6.98	AV
7386	59.78	-0.75	59.03	74	-14.97	PK
7386	49.66	-0.75	48.91	54	-5.09	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit						

Vertical:

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
4924	60.38	-3.43	56.95	74	-17.05	PK
4924	51.26	-3.43	47.83	54	-6.17	AV
7386	55.38	-0.75	54.63	74	-19.37	PK
7386	48.65	-0.75	47.9	54	-6.1	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit						

Remark：
(1) Measuring frequencies from 1 GHz to the 25 GHz.
(2) “F” denotes fundamental frequency; “H” denotes spurious frequency. “E” denotes band edge frequency.
(3) * denotes emission frequency which appearing within the Restricted Bands specified in provision of 15.205, then the general radiated emission limits in 15.209 apply.
(4) Data of measurement within this frequency range shown “--- ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
(5) The IF bandwidth of EMI Test Receiver between 30MHz to 1GHz was 120KHz, 1 MHz for measuring above 1 GHz, below 30MHz was 10KHz.The resolution bandwidth of test receiver/spectrum analyzer is 1MHzand video bandwidth is 3MHz for peak measurement with peak detectorat frequency above 1GHz.The resolution bandwidth of test receiver/spectrum analyzer is 1MHzand video bandwidth is 10Hz for Average measurement with peak detection at frequency above 1GHz.
(6) When the test results of Peak Detected below the limits of Average Detected, the Average Detected is not need completed. For example: Top Channel at Fundamental 73.16dBuV/m(PK Value) <93.98(AV Limit), at harmonic 53.20 dBuV/m(PK Value) <54 dBuV/m(AV Limit), the Average Detected not need to completed.

CH Low of 802.11g Mode (2412MHz)

Horizontal:

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
4824	59.39	-3.64	55.75	74	-18.25	PK
4824	48.55	-3.64	44.91	54	-9.09	AV
7236	54.26	-0.95	53.31	74	-20.69	PK
7236	48.18	-0.95	47.23	54	-6.77	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit						

Vertical:

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
4824	58.66	-3.64	55.02	74	-18.98	PK
4824	49.39	-3.64	45.75	54	-8.25	AV
7236	55.36	-0.95	54.41	74	-19.59	PK
7236	47.17	-0.95	46.22	54	-7.78	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit						

CH Middle of 802.11g Mode (2437MHz)

Horizontal:

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
4874	59.65	-3.51	56.14	74	-17.86	PK
4874	48.23	-3.51	44.72	54	-9.28	AV
7311	53.29	-0.82	52.47	74	-21.53	PK
7311	47.26	-0.82	46.44	54	-7.56	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit						

Vertical:

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
4874	58.45	-3.51	54.94	74	-19.06	PK
4874	47.63	-3.51	44.12	54	-9.88	AV
7311	54.36	-0.82	53.54	74	-20.46	PK
7311	46.28	-0.82	45.46	54	-8.54	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit						

CH High of 802.11g Mode (2462MHz)

Horizontal:

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
4924	61.55	-3.43	58.12	74	-15.88	PK
4924	50.23	-3.43	46.8	54	-7.2	AV
7386	59.36	-0.75	58.61	74	-15.39	PK
7386	49.66	-0.75	48.91	54	-5.09	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit						

Vertical:

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
4924	60.26	-3.43	56.83	74	-17.17	PK
4924	51.25	-3.43	47.82	54	-6.18	AV
7386	55.33	-0.75	54.58	74	-19.42	PK
7386	48.66	-0.75	47.91	54	-6.09	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit						

Remark：
(1) Measuring frequencies from 1 GHz to the 25 GHz.
(2) “F” denotes fundamental frequency; “H” denotes spurious frequency. “E” denotes band edge frequency.
(3) * denotes emission frequency which appearing within the Restricted Bands specified in provision of 15.205, then the general radiated emission limits in 15.209 apply.
(4) Data of measurement within this frequency range shown “--- ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
(5) The IF bandwidth of EMI Test Receiver between 30MHz to 1GHz was 120KHz, 1 MHz for measuring above 1 GHz, below 30MHz was 10KHz.The resolution bandwidth of test receiver/spectrum analyzer is 1MHzand video bandwidth is 3MHz for peak measurement with peak detectorat frequency above 1GHz.The resolution bandwidth of test receiver/spectrum analyzer is 1MHzand video bandwidth is 10Hz for Average measurement with peak detection at frequency above 1GHz.
(6) When the test results of Peak Detected below the limits of Average Detected, the Average Detected is not need completed. For example: Top Channel at Fundamental 73.16dBuV/m(PK Value) <93.98(AV Limit), at harmonic 53.20 dBuV/m(PK Value) <54 dBuV/m(AV Limit), the Average Detected not need to completed.

CH Low of 802.11n/H20 Mode (2412MHz)

Horizontal:

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
4824	64.23	-3.64	60.59	74	-13.41	PK
4824	52.36	-3.64	48.72	54	-5.28	AV
7236	60.45	-0.95	59.5	74	-14.5	PK
7236	45.23	-0.95	44.28	54	-9.72	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit						

Vertical:

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
4824	63.36	-3.64	59.72	74	-14.28	PK
4824	52.55	-3.64	48.91	54	-5.09	AV
7236	57.45	-0.95	56.5	74	-17.5	PK
7236	45.66	-0.95	44.71	54	-9.29	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit						

CH Middle of 802.11n/H20 Mode (2437MHz)

Horizontal:

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
4874	61.36	-3.51	57.85	74	-16.15	PK
4874	48.69	-3.51	45.18	54	-8.82	AV
7311	59.26	-0.82	58.44	74	-15.56	PK
7311	46.33	-0.82	45.51	54	-8.49	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit						

Vertical:

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
4874	60.51	-3.51	57	74	-17	PK
4874	49.68	-3.51	46.17	54	-7.83	AV
7311	58.37	-0.82	57.55	74	-16.45	PK
7311	48.36	-0.82	47.54	54	-6.46	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit						

CH High of 802.11n/H20 Mode (2462MHz)

Horizontal:

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
4924	61.53	-3.43	58.1	74	-15.9	PK
4924	50.26	-3.43	46.83	54	-7.17	AV
7386	59.38	-0.75	58.63	74	-15.37	PK
7386	49.56	-0.75	48.81	54	-5.19	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit						

Vertical:

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
4924	60.66	-3.43	57.23	74	-16.77	PK
4924	51.55	-3.43	48.12	54	-5.88	AV
7386	55.39	-0.75	54.64	74	-19.36	PK
7386	48.69	-0.75	47.94	54	-6.06	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit						

Remark：
(1) Measuring frequencies from 1 GHz to the 25 GHz.
(2) “F” denotes fundamental frequency; “H” denotes spurious frequency. “E” denotes band edge frequency.
(3) * denotes emission frequency which appearing within the Restricted Bands specified in provision of 15.205, then the general radiated emission limits in 15.209 apply.
(4) Data of measurement within this frequency range shown “--- ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
(5) The IF bandwidth of EMI Test Receiver between 30MHz to 1GHz was 120KHz, 1 MHz for measuring above 1 GHz, below 30MHz was 10KHz.The resolution bandwidth of test receiver/spectrum analyzer is 1MHzand video bandwidth is 3MHz for peak measurement with peak detectorat frequency above 1GHz.The resolution bandwidth of test receiver/spectrum analyzer is 1MHzand video bandwidth is 10Hz for Average measurement with peak detection at frequency above 1GHz.
(6) When the test results of Peak Detected below the limits of Average Detected, the Average Detected is not need completed. For example: Top Channel at Fundamental 73.16dBuV/m(PK Value) <93.98(AV Limit), at harmonic 53.20 dBuV/m(PK Value) <54 dBuV/m(AV Limit), the Average Detected not need to completed.

CH Low of 802.11n/H40 Mode (2422MHz)

Horizontal:

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
4844	58.78	-3.64	55.14	74	-18.86	PK
4844	48.26	-3.64	44.62	54	-9.38	AV
7266	54.27	-0.95	53.32	74	-20.68	PK
7266	49.36	-0.95	48.41	54	-5.59	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit						

Vertical:

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
4844	59.63	-3.64	55.99	74	-18.01	PK
4844	51.27	-3.64	47.63	54	-6.37	AV
7266	55.36	-0.95	54.41	74	-19.59	PK
7266	48.25	-0.95	47.3	54	-6.7	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit						

CH Middle of 802.11n/H40 Mode (2437MHz)

Horizontal:

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
4874	59.36	-3.51	55.85	74	-18.15	PK
4874	47.19	-3.51	43.68	54	-10.32	AV
7311	58.73	-0.82	57.91	74	-16.09	PK
7311	47.29	-0.82	46.47	54	-7.53	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit						

Vertical:

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
4874	61.25	-3.51	57.74	74	-16.26	PK
4874	48.69	-3.51	45.18	54	-8.82	AV
7311	59.37	-0.82	58.55	74	-15.45	PK
7311	47.28	-0.82	46.46	54	-7.54	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit						

CH High of 802.11n/H40 Mode (2452MHz)

Horizontal:

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
4904	60.43	-3.43	57	74	-17	PK
4904	51.24	-3.43	47.81	54	-6.19	AV
7356	55.09	-0.75	54.34	74	-19.66	PK
7356	44.38	-0.75	43.63	54	-10.37	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit						

Vertical:

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
4904	60.39	-3.43	56.96	74	-17.04	PK
4904	49.53	-3.43	46.1	54	-7.9	AV
7356	59.16	-0.75	58.41	74	-15.59	PK
7356	46.37	-0.75	45.62	54	-8.38	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit						

Remark：
(1) Measuring frequencies from 1 GHz to the 25 GHz.
(2) “F” denotes fundamental frequency; “H” denotes spurious frequency. “E” denotes band edge frequency.
(3) * denotes emission frequency which appearing within the Restricted Bands specified in provision of 15.205, then the general radiated emission limits in 15.209 apply.
(4) Data of measurement within this frequency range shown “--- ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
(5) The IF bandwidth of EMI Test Receiver between 30MHz to 1GHz was 120KHz, 1 MHz for measuring above 1 GHz, below 30MHz was 10KHz.The resolution bandwidth of test receiver/spectrum analyzer is 1MHzand video bandwidth is 3MHz for peak measurement with peak detectorat frequency above 1GHz.The resolution bandwidth of test receiver/spectrum analyzer is 1MHzand video bandwidth is 10Hz for Average measurement with peak detection at frequency above 1GHz.
(6) When the test results of Peak Detected below the limits of Average Detected, the Average Detected is not need completed. For example: Top Channel at Fundamental 73.16dBuV/m(PK Value) <93.98(AV Limit), at harmonic 53.20 dBuV/m(PK Value) <54 dBuV/m(AV Limit), the Average Detected not need to completed.

5. BAND EDGE

5.1 Limits

FCC PART 15.247 Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 20 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

5.2 Test Procedure

The band edge compliance of RF radiated emission should be measured by following the guidance in ANSIC63.10 with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT issituated in three orthogonal planes (if appropriate), adjusting the measurement antenna height andpolarization etc. Set RBW to 1MHz and VBM to 3MHz to measure the peak field strength and setRBW to 1MHz and VBW to 10kHz to measure the average radiated field strength.The conducted RF band edge was measured by using a spectrum analyzer. Set span wide enough to capture the highest in-band emission and the emission at the band edge. Set RBW to 100 KHz and VBW to 300 KHz,to measure the conducted peak band edge.

5.3 Test Result

PASS

We tested at 802.11b/802.11g/802.11n HT20/802.11n HT40 mode at the antenna single and recored the worst data 802.11b mode in report.

Horizontal:

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2310	56.35	-5.81	50.54	74	-23.46	PK
2310	50.24	-5.81	44.43	54	-9.57	AV
2390	63.26	-5.84	57.42	74	-16.58	PK
2390	49.63	-5.84	43.79	54	-10.21	AV
2400	62.38	-5.84	56.54	74	-17.46	PK
2400	51.27	-5.84	45.43	54	-8.57	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2310	57.49	-5.81	51.68	74	-22.32	PK
2310	51.26	-5.81	45.45	54	-8.55	AV
2390	62.59	-5.84	56.75	74	-17.25	PK
2390	50.39	-5.84	44.55	54	-9.45	AV
2400	61.27	-5.84	55.43	74	-18.57	PK
2400	51.37	-5.84	45.53	54	-8.47	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Horizontal :

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2483.5	57.46	-5.54	51.92	74	-22.08	PK
2483.5	51.26	-5.54	45.72	54	-8.28	AV
2500	58.43	-5.72	52.71	74	-21.29	PK
2500	50.24	-5.72	44.52	54	-9.48	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Vertical:

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2483.5	56.39	-5.54	50.85	74	-23.15	PK
2483.5	52.16	-5.54	46.62	54	-7.38	AV
2500	54.16	-5.72	48.44	74	-25.56	PK
2500	51.28	-5.72	45.56	54	-8.44	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

6. OCCUPIED BANDWIDTH MEASUREMENT

6.1 Test Limit

FCC Part15(15.247), Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(a)(2)	Bandwidth	>= 500KHz (6dB bandwidth)	2400-2483.5	PASS

6.2 Test Procedure

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Set EUT as normal operation.
3. Based on FCC Part15 C Section 15.247: RBW=100KHz, VBW=300KHz.
4. The useful radiated emission from the EUT was detected by the spectrum analyzer with peak detector.

6.3 Measurement Equipment Used

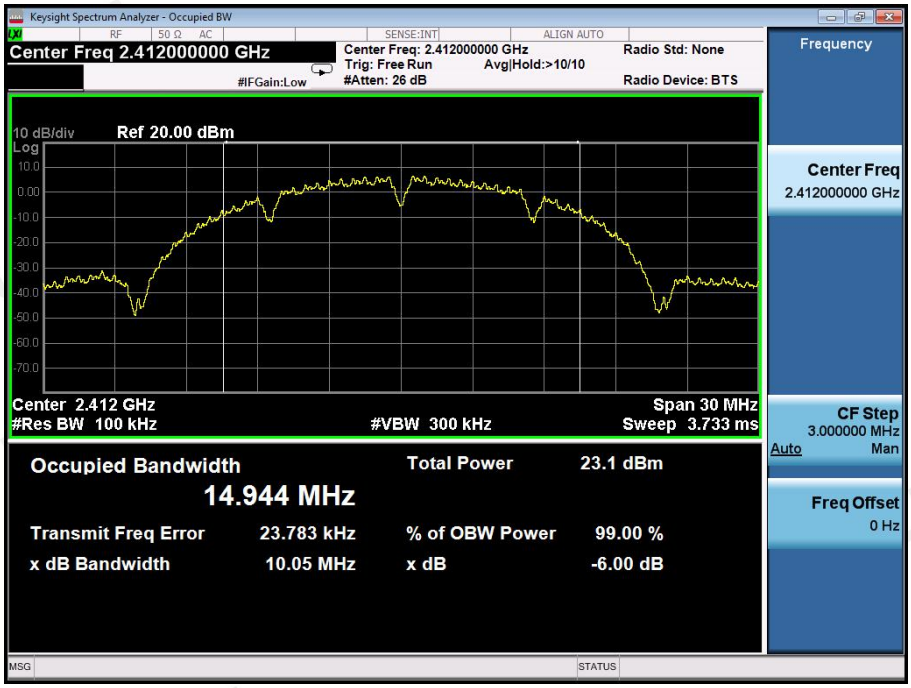
Same asRadiated Emission Measurement

6.4 Test Result

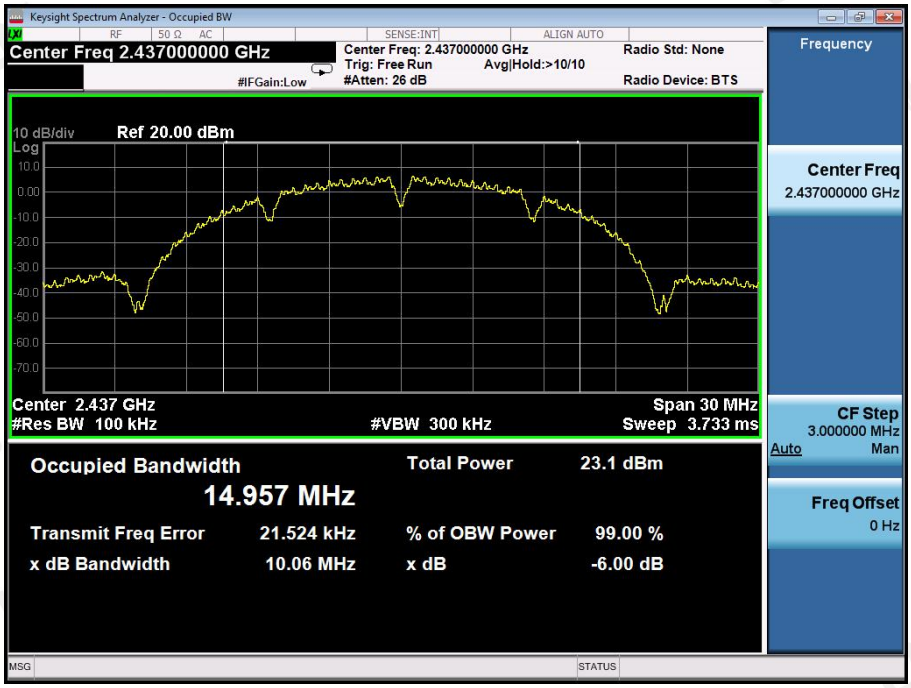
PASS

TX 802.11b Mode			
Frequency (MHz)	6dB Bandwidth (MHz)	Channel Separation (MHz)	Result
2412	10.05	>=500KHz	PASS
2437	10.06	>=500KHz	PASS
2462	10.06	>=500KHz	PASS

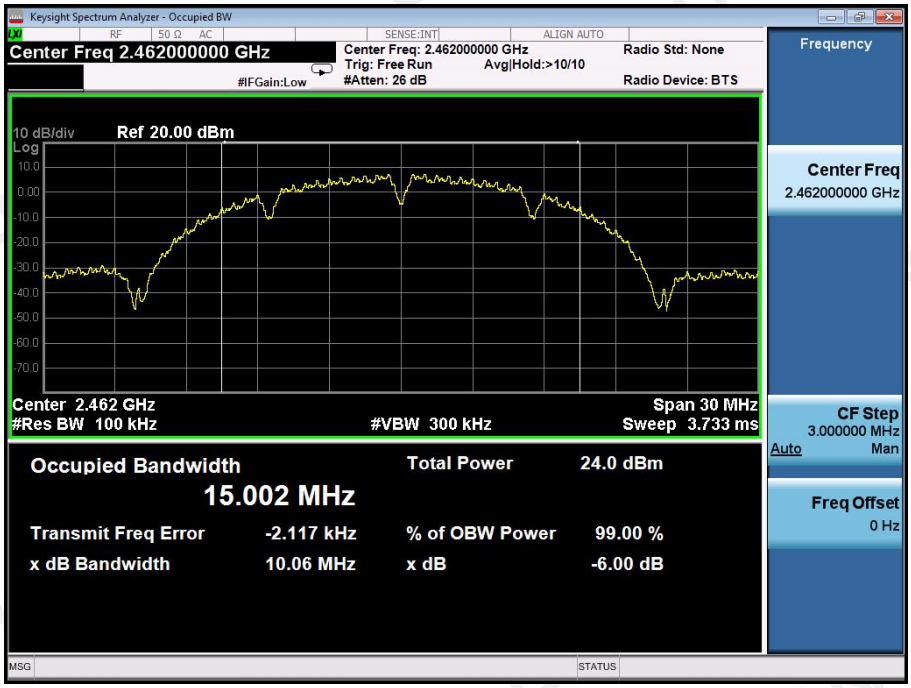
CH: 2412MHz



CH: 2437MHz

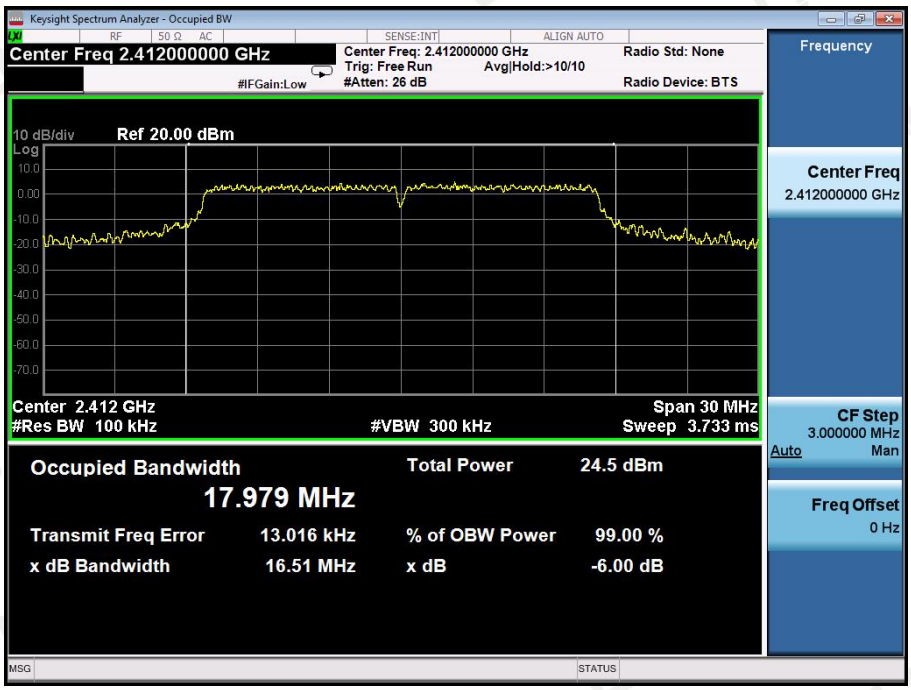


CH: 2462MHz

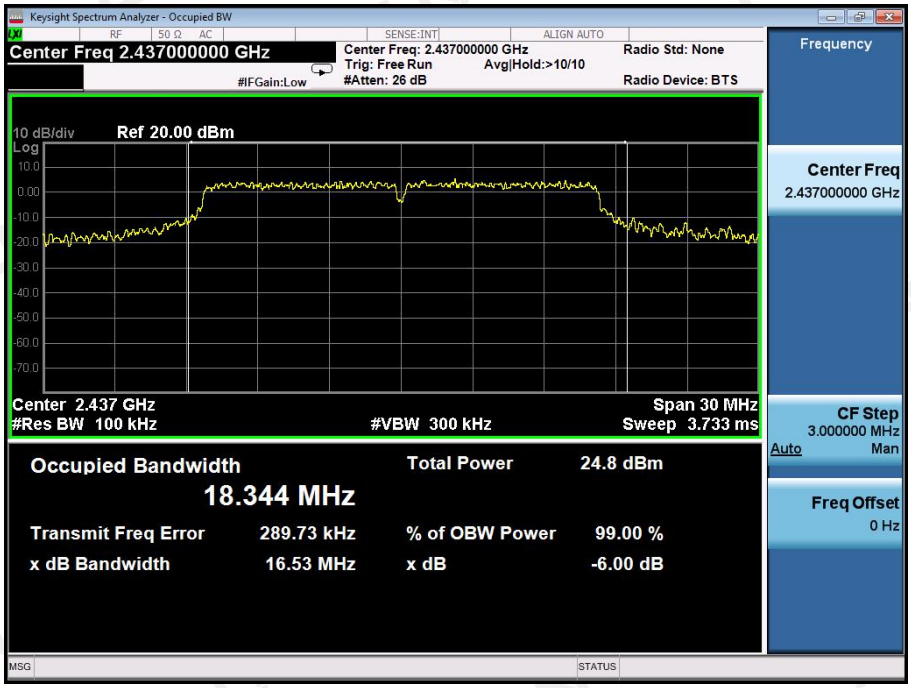


TX 802.11g Mode			
Frequency (MHz)	6dB Bandwidth (MHz)	Channel Separation (MHz)	Result
2412	16.51	>=500KHz	PASS
2437	16.53	>=500KHz	PASS
2462	16.55	>=500KHz	PASS

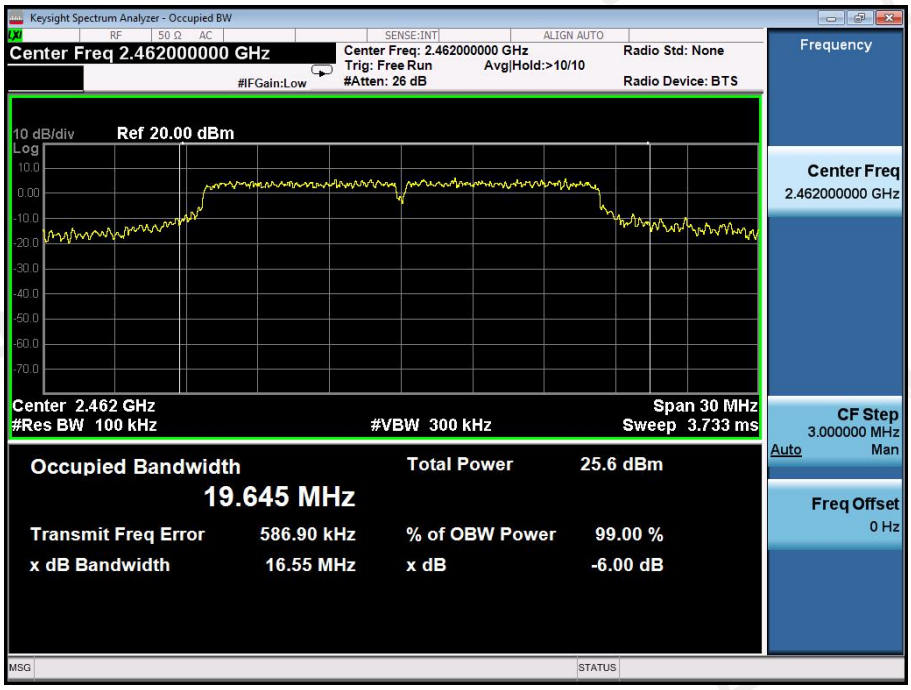
CH: 2412MHz



CH: 2437MHz

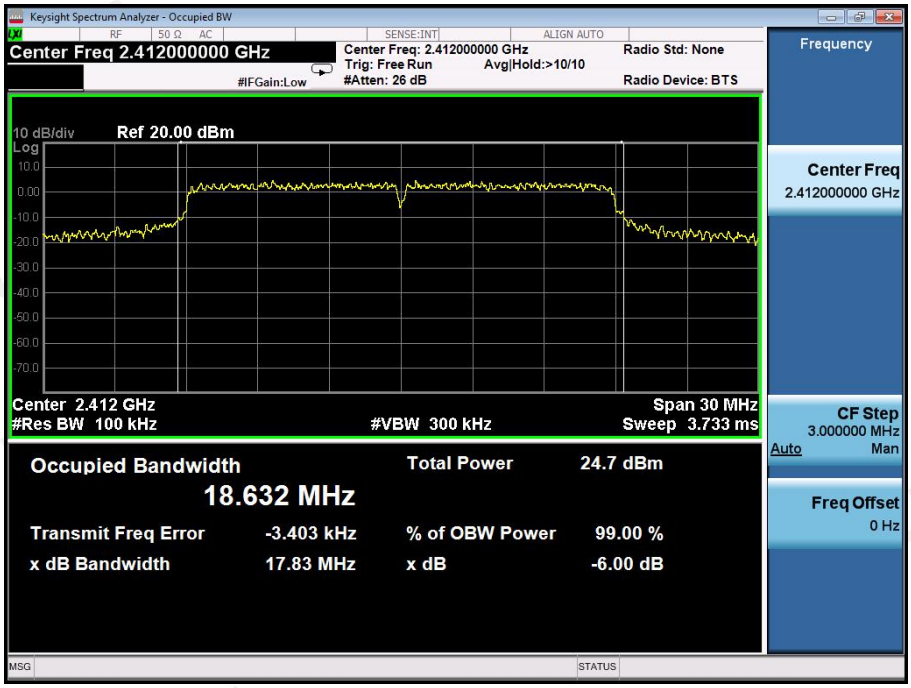


CH: 2462MHz



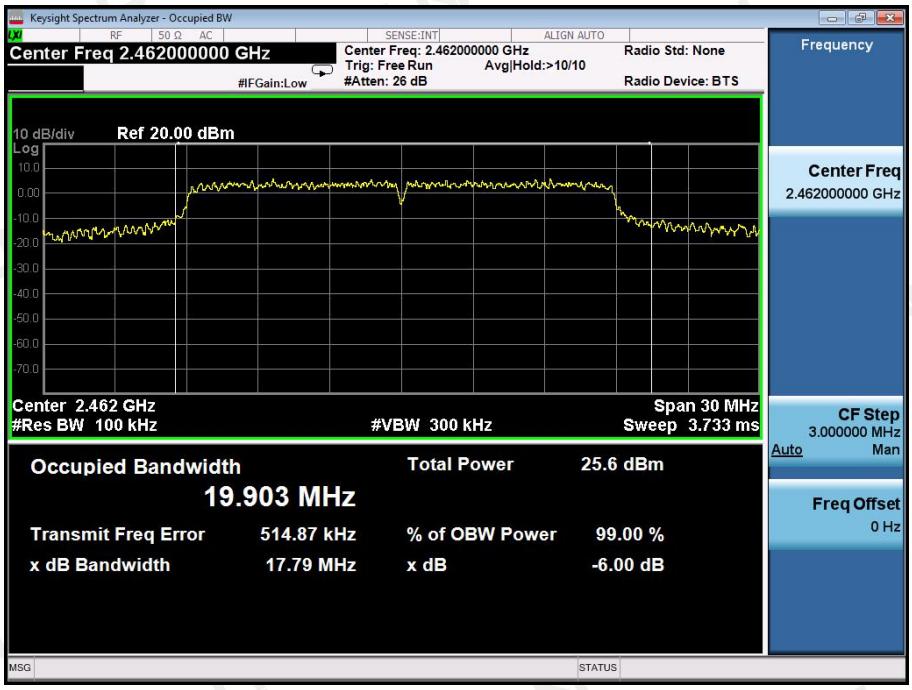
TX 802.11n/HT20 Mode			
Frequency (MHz)	6dB Bandwidth (MHz)	Channel Separation (MHz)	Result
2412	17.83	>=500KHz	PASS
2437	17.81	>=500KHz	PASS
2462	17.79	>=500KHz	PASS

CH: 2412MHz



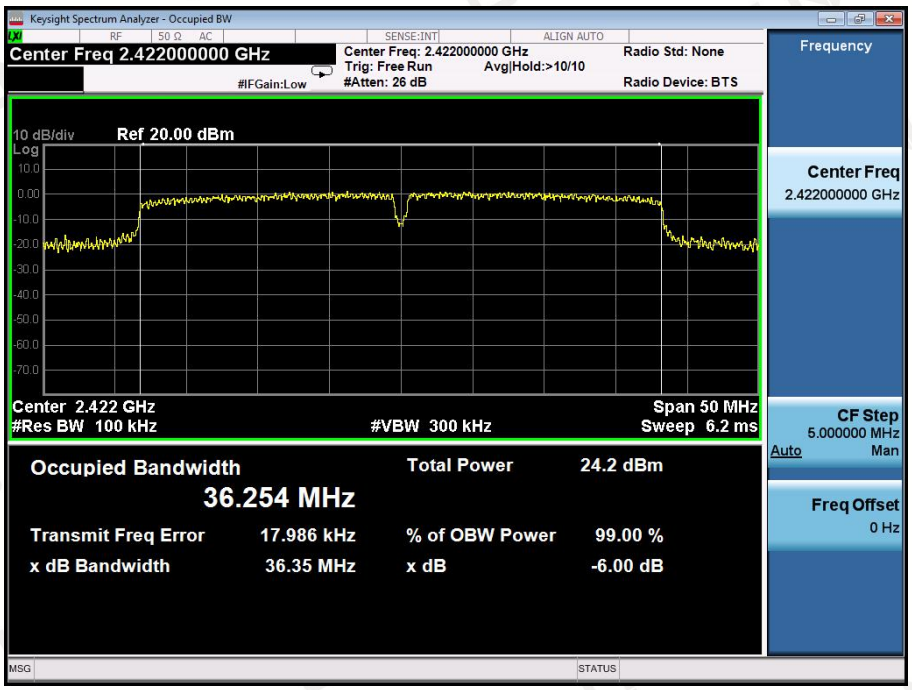
CH: 2437MHz

CH: 2462MHz

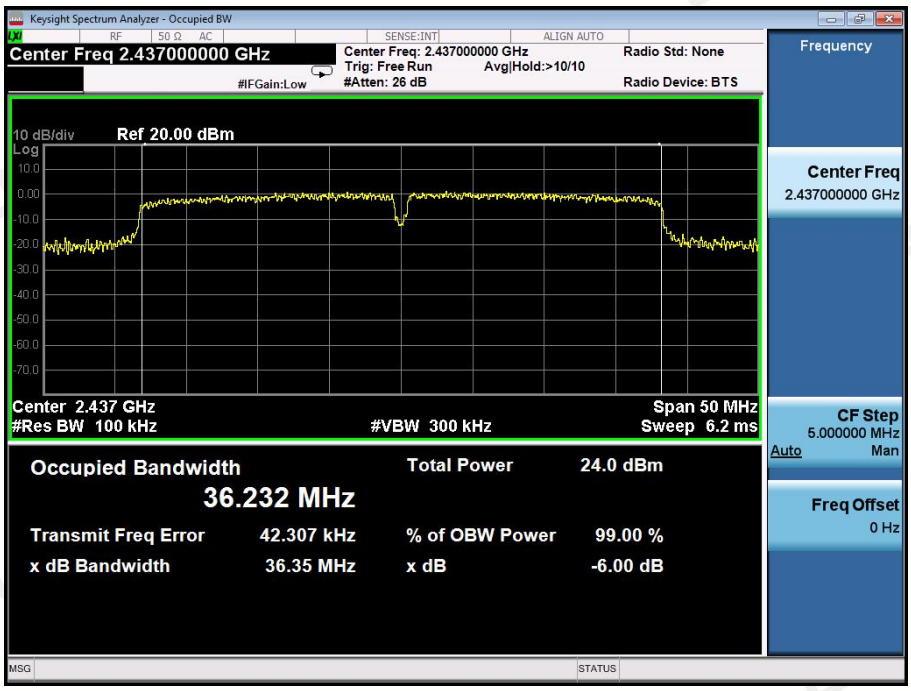


TX 802.11n/HT40 Mode			
Frequency (MHz)	6dB Bandwidth (MHz)	Channel Separation (MHz)	Result
2422	36.35	>=500KHz	PASS
2437	36.35	>=500KHz	PASS
2452	36.34	>=500KHz	PASS

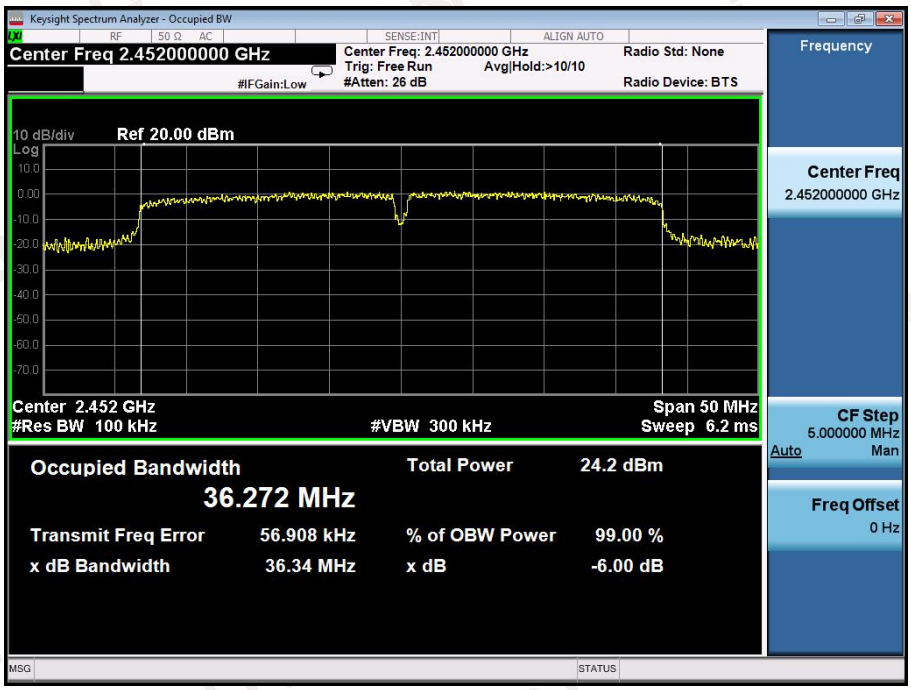
CH: 2422MHz



CH: 2437MHz



CH: 2452MHz



7.POWER SPECTRAL DENSITYTEST

7.1 Test Limit

FCC Part15(15.247), Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247	Power Spectral Density	8 dBm (in any 3KHz)	2400-2483.5	PASS

7.2 Test Procedure

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Set EUT as normal operation.
3. Based on FCC Part15 C Section 15.247: RBW=3KHz, VBW=10KHz.
4. The useful radiated emission from the EUT was detected by the spectrum analyzer with peak detector.

7.3 Measurement Equipment Used

Same asRadiated Emission Measurement

7.4 Test Result

PASS