FCC RADIO TEST REPORT

FCC ID: 2ANTC-SD04W

Product：	Wireless NVR
Trade Name：	N/A
Model Name：	SD04W
Serial Model：	SK08W, ZR04DS, ZR08DS, 89001, 89000
Report No.：	UNIA2018052802-2FR-01

Prepared for

Ansjer Electronics Co., Ltd

301, 1st Building, No.21 Yongtian Road, Xiangzhou, Zhuhai, Guangdong, China

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 ..... :	Ansjer Electronics Co., Ltd
Address ..... :	301, 1st Building, No.21 Yongtian Road, Xiangzhou, Zhuhai, Guangdong, China
Manufacture's Name ..... :	Ansjer Electronics Co., Ltd
Address ..... :	No.5 WanLi Road, SanXiang, ZhongShan 528463, Guangdong, China
Product description	
Trade Mark ..... :	N/A
Product name..... :	Wireless NVR
Model and/or type reference :	SD04W, SK08W, ZR04DS, ZR08DS, 89001, 89000
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.....:	May 28, 2018 ~ Jun. 12, 2018
Date of Issue .....:	Jun. 14, 2018
Test Result .....:	Pass

Prepared by: Kahn yang/Editor

Reviewer: Sherwin Qian/Supervisor

Approved & Authorized Signer: Liuze/Manager

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1. TEST SUMMARY

1.1 TEST PROCEDURES AND RESULTS

DESCRIPTION OF TEST	RESULT
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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

1.2 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.

1.3 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	Wireless NVR
Trade Mark	N/A
Model Name	SD04W
Serial No.	SK08W, ZR04DS, ZR08DS, 89001, 89000
Model Difference	All model's the function, software and electric circuit are the same, only with a product color and model named different. Test sample model: SD04W.
FCC ID	2ANTC-SD04W
Antenna Type	Antenna port 1: Integral Antenna Antenna port 2: Integral Antenna
Antenna Gain	Antenna port 1: 1dBi Antenna port 2: 1dBi
Frequency Range	802.11b/g/n20: 2412~2462 MHz 802.11n40: 2422~2452MHz
Number of Channels	802.11b/g/n20: 11CH 802.11n40: 7CH
Modulation Type	CCK, OFDM, DBPSK, DAPSK
Battery	N/A
Power Source	DC 12V from adapter with AC 120V/60Hz
Adapter Model	M/N: EQ-24BCN Input: AC 100-240V, 50/60Hz, 0.8A Output: DC 12V, 2.0A

2.2 Carrier Frequency of Channels

Channel List for 802.11b/g/n(20MHz)							
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		

Channel List for 802.11n(40MHz)							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
03	2422	06	2437	09	2452		
04	2427	07	2442				
05	2432	08	2447				

2.3 Operation of EUT during testing

Operating Mode

The mode is used: Transmitting mode for 802.11b/g/n(20MHz)

Low Channel: 2412MHz

Middle Channel: 2437MHz

High Channel: 2462MHz

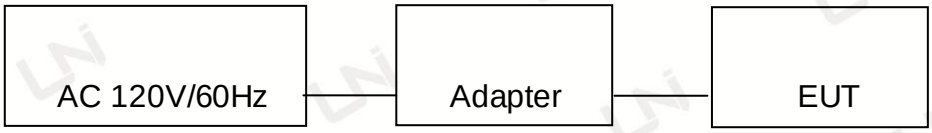
Transmitting mode for 802.11n(40MHz)

Low Channel: 2422MHz

Middle Channel: 2437MHz

High Channel: 2452MHz

2.4 DESCRIPTION OF TEST SETUP



2.5 MEASUREMENT INSTRUMENTS LIST

Item	Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
1	Horn Antenna	Sunol	DRH-118	A101415	2018.9.29
2	BicoNILog Antenna	Sunol	JB1 Antenna	A090215	2018.9.29
3	PREAMP	HP	8449B	3008A00160	2018.9.9
4	PREAMP	HP	8447D	2944A07999	2018.9.9
5	EMI TEST RECEIVER	Rohde&Schwarz	ESR3	101891	2018.9.9
6	VECTOR Signal Generator	Rohde&Schwarz	SMU200A	101521	2018.9.28
7	Signal Generator	Agilent	E4421B	MY4335105	2018.9.28
8	MXA Signal Analyzer	Agilent	N9020A	MY50510140	2018.9.28
9	MXA Signal Analyzer	Agilent	N9020A	MY51110104	2018.9.9
10	ANT Tower&Turn table Controller	Champro	EM 1000	60764	2018.9.28
11	Anechoic Chamber	Taihe Maorui	9m*6m*6m	966A0001	2018.9.9
12	Shielding Room	Taihe Maorui	6.4m*4m*3m	643A0001	2018.9.9
13	RF Power sensor	DARE	RPR3006W	15I00041SNO88	2019.3.14
14	RF Power sensor	DARE	RPR3006W	15I00041SNO89	2019.3.14
15	RF power divider	Anritsu	K241B	992289	2018.9.28
16	Wideband radio communication tester	Rohde&Schwarz	CMW500	154987	2018.9.28
17	Biconical antenna	Schwarzbeck	VHA 9103	91032360	2018.9.8
18	Biconical antenna	Schwarzbeck	VHA 9103	91032361	2018.9.8
19	Broadband Hybrid Antennas	Schwarzbeck	VULB9163	VULB9163#958	2018.9.8
20	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-1680	2019.1.12
21	Active Receive Loop Antenna	Schwarzbeck	FMZB 1919B	00023	2018.11.02
22	Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170651	2019.03.14
23	Microwave Broadband Preamplifier	Schwarzbeck	BBV 9721	100472	2018.10.24
24	Active Loop Antenna	Com-Power	AL-130R	10160009	2019.05.10

3. CONDUCTED EMISSIONS TEST

3.1 Conducted Power Line Emission Limit

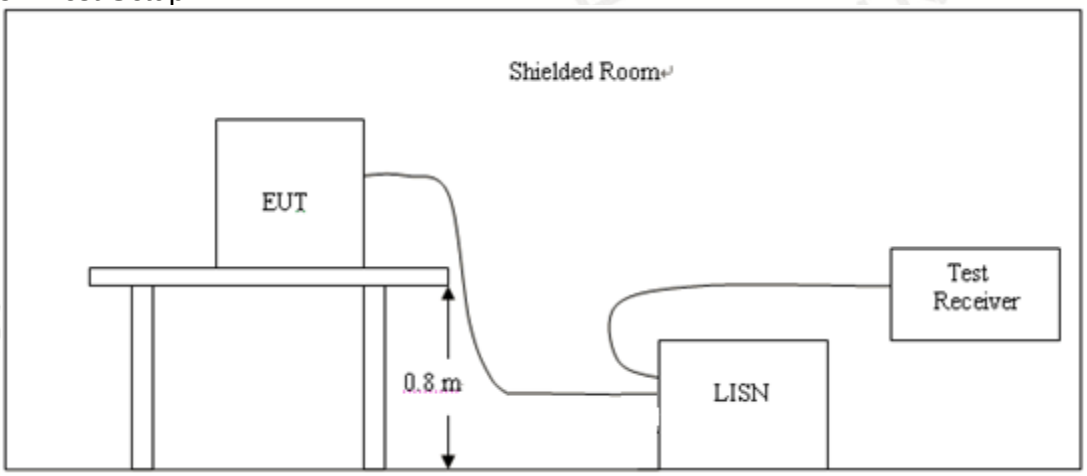
For unintentional device, according to § 15.107(a) Line Conducted Emission Limits is as following

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

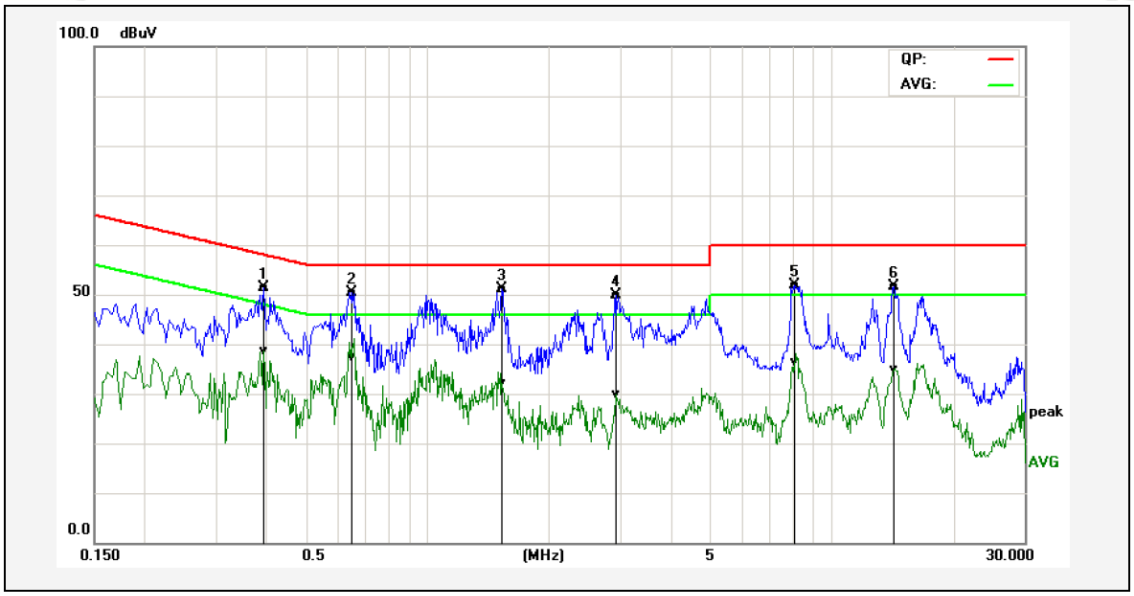
1, The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. A wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10.
2, Support equipment, if needed, was placed as per ANSI C63.10.
3, All I/O cables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

3.4 Test Result

Pass

Remark: All modes were tested, only the worst result was reported as below:

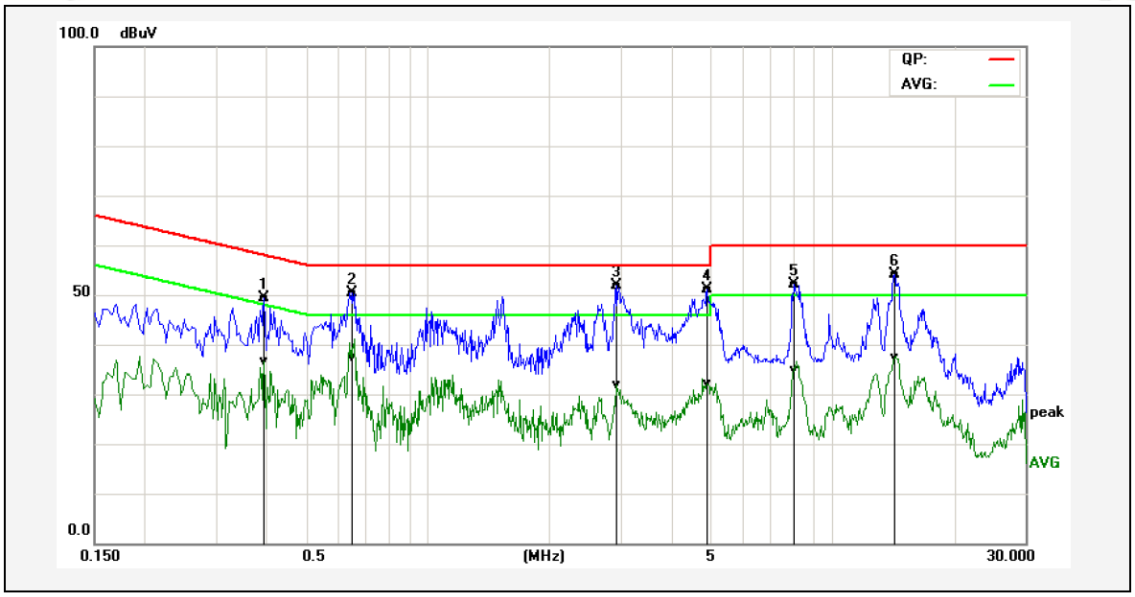
Test Specification: Line



No.	Frequency	QuasiPeak reading	Average reading	Correction factor	QuasiPeak result	Average result	QuasiPeak limit	Average limit	QuasiPeak margin	Average margin	Remark
	(MHz)	(dBuV)	(dBuV)	(dB)	(dBuV)	(dBuV)	(dBuV)	(dBuV)	(dB)	(dB)	
1P	0.3940	41.39	28.57	10.02	51.41	38.59	57.98	47.98	-6.57	-9.39	Pass
2P	0.6500	40.39	27.31	10.02	50.41	37.33	56.00	46.00	-5.59	-8.67	Pass
3*	1.5340	41.10	21.88	10.15	51.25	32.03	56.00	46.00	-4.75	-13.97	Pass
4P	2.9260	39.78	19.67	10.18	49.96	29.85	56.00	46.00	-6.04	-16.15	Pass
5P	8.0980	41.74	26.36	10.05	51.79	36.41	60.00	50.00	-8.21	-13.59	Pass
6P	14.2700	41.32	24.62	10.23	51.55	34.85	60.00	50.00	-8.45	-15.15	Pass

Remark: Factor = Insertion Loss + Cable Loss, Result=Reading + Factor, Margin=Result – Limit.

Test Specification: Neutral



No.	Frequency	QuasiPeak reading	Average reading	Correction factor	QuasiPeak result	Average result	QuasiPeak limit	Average limit	QuasiPeak margin	Average margin	Remark
	(MHz)	(dBuV)	(dBuV)	(dB)	(dBuV)	(dBuV)	(dBuV)	(dBuV)	(dB)	(dB)	
1P	0.3940	39.39	26.57	10.02	49.41	36.59	57.98	47.98	-8.57	-11.39	Pass
2P	0.6500	40.39	27.31	10.02	50.41	37.33	56.00	46.00	-5.59	-8.67	Pass
3*	2.9260	41.78	21.67	10.18	51.96	31.85	56.00	46.00	-4.04	-14.15	Pass
4P	4.9020	41.13	22.03	10.10	51.23	32.13	56.00	46.00	-4.77	-13.87	Pass
5P	8.0620	42.16	24.89	10.05	52.21	34.94	60.00	50.00	-7.79	-15.06	Pass
6P	14.2700	43.82	27.12	10.23	54.05	37.35	60.00	50.00	-5.95	-12.65	Pass

Remark: Factor = Insertion Loss + Cable Loss, Result=Reading + Factor, Margin=Result – Limit.

4 RADIATED EMISSION TEST

4.1 Radiation Limit

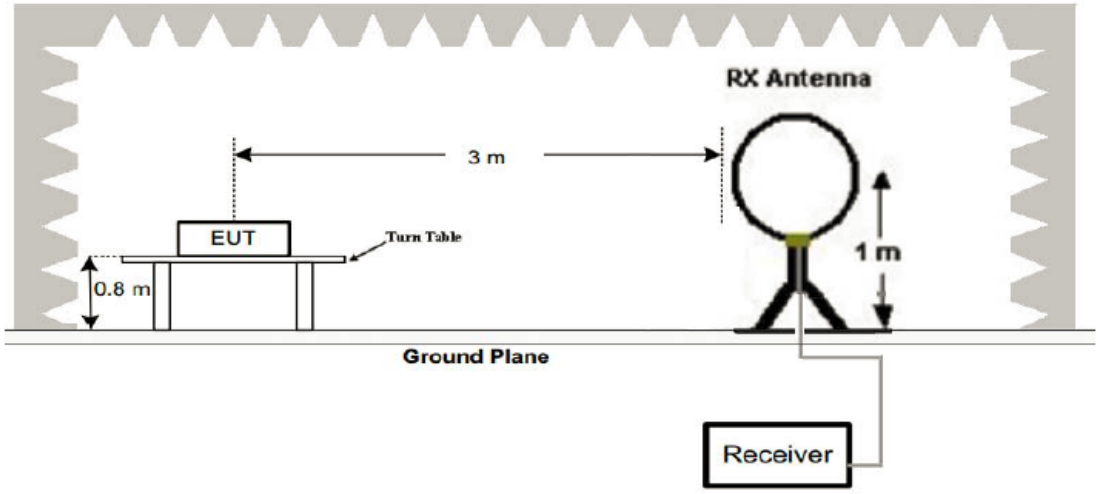
For unintentional device, according to § 15.109(a), except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

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

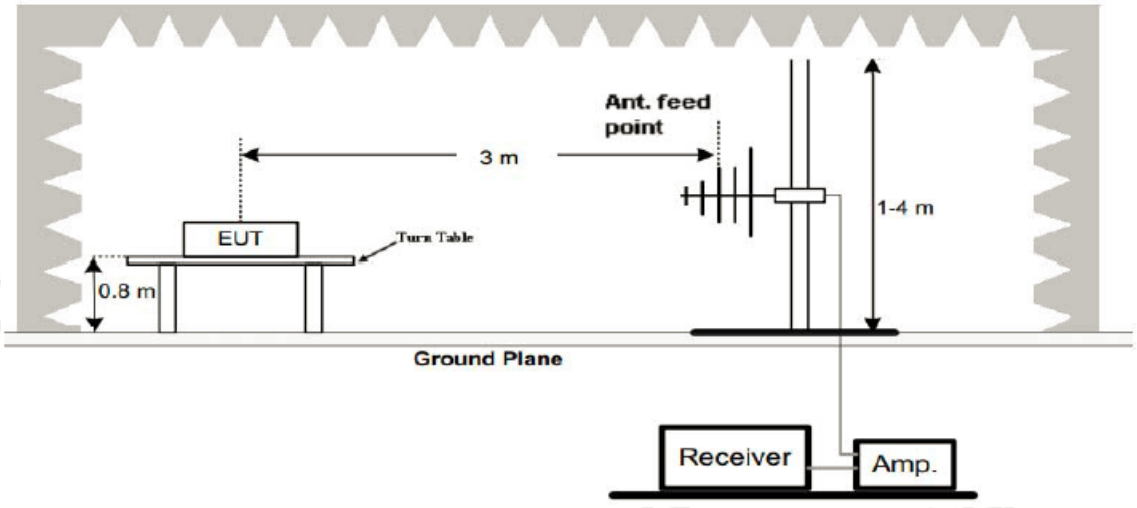
For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emissions from intentional radiators at a distance of 3 meters shall not exceed the above table.

4.2 Test Setup

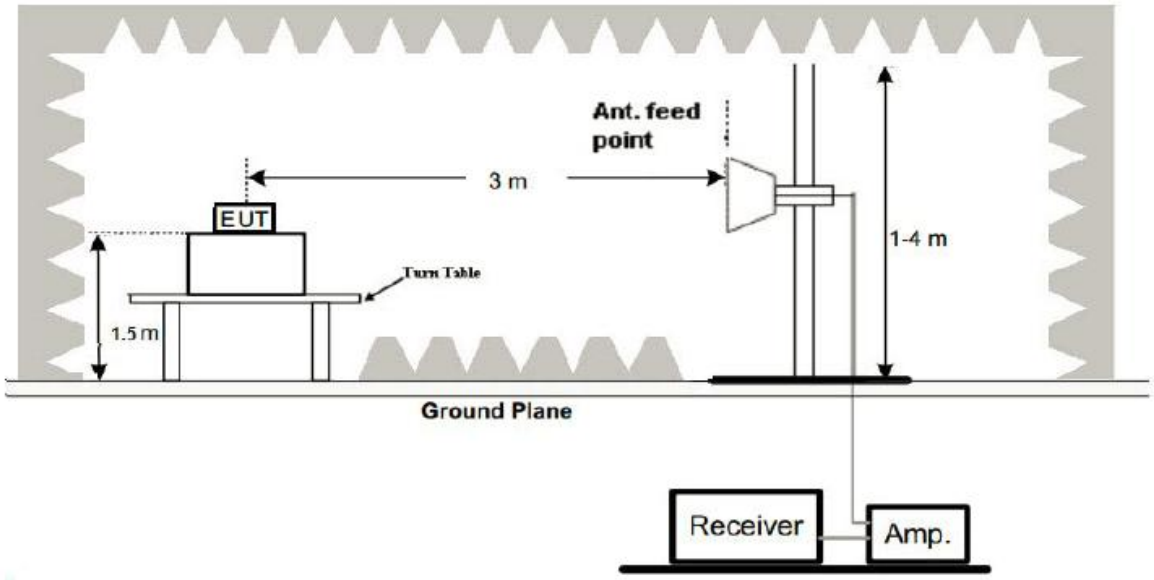
1. Radiated Emission Test-Up Frequency Below 30MHz



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 highest emissions.
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 both horizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.
7. The test frequency range from 9KHz to 25GHz per FCC PART 15.33(a).

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

4.4 Test Result

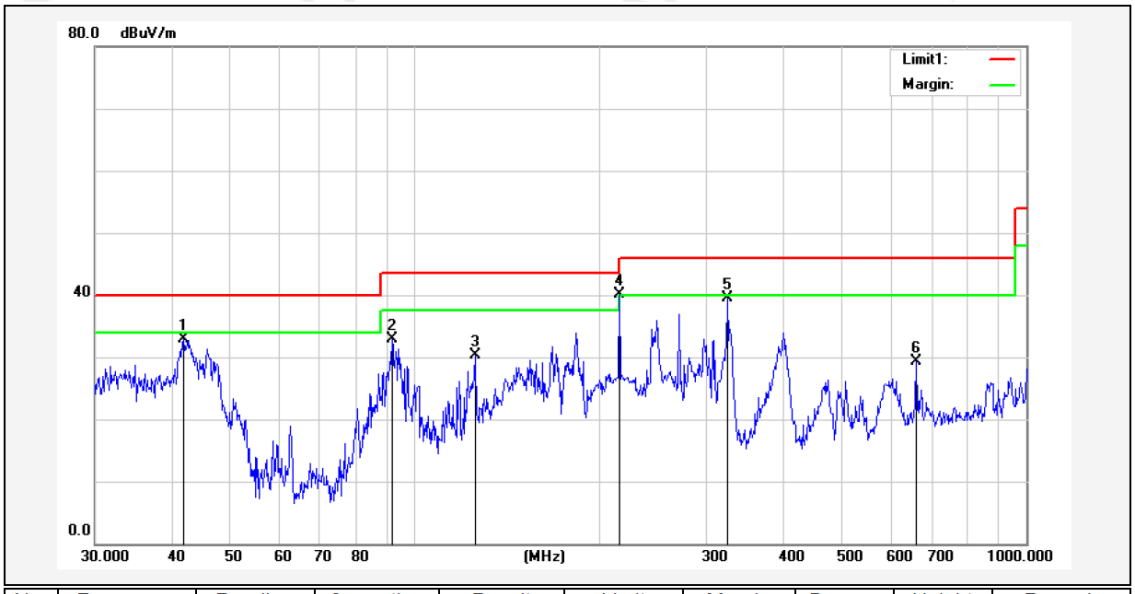
PASS

Remark:

1. All modes were tested, only the worst result was reported.
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:

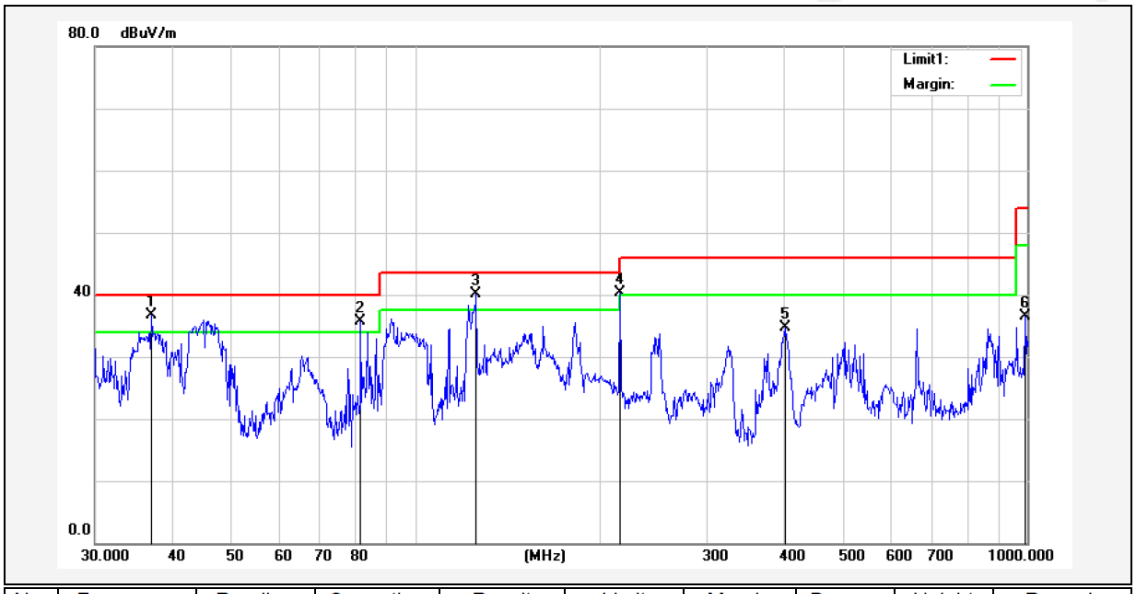
Antenna polarity: H



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (deg.)	Height (cm)	Remark
1	41.8596	49.07	-16.14	32.93	40.00	-7.07			peak
2	91.8163	51.92	-18.97	32.95	43.50	-10.55			peak
3	125.4457	44.79	-14.40	30.39	43.50	-13.11			peak
4*	216.0240	56.46	-16.33	40.13	46.00	-5.87			peak
5	324.4561	51.47	-12.06	39.41	46.00	-6.59			peak
6	661.1505	35.45	-6.18	29.27	46.00	-16.73			peak

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

Antenna polarity: V



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (deg.)	Height (cm)	Remark
1*	37.1550	49.27	-12.59	36.68	40.00	-3.32			peak
2!	81.4970	55.74	-19.96	35.78	40.00	-4.22			peak
3!	125.8864	54.37	-14.35	40.02	43.50	-3.48			peak
4!	216.0240	56.61	-16.33	40.28	46.00	-5.72			peak
5	403.2500	45.88	-11.22	34.66	46.00	-11.34			peak
6	993.0114	38.00	-1.47	36.53	54.00	-17.47			peak

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

Remark：

(1) Measuring frequencies from 9 KHz to the 1 GHz, Radiated emission test from 9KHz to 30MHz was 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.

All modes were tested. The test data of the worst case MIMO mode was reported.
For MIMO antenna port 1 and port 2 above 1 GHz Test Results:

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	62.84	-3.64	59.2	74	-14.80	peak
4824	47.05	-3.64	43.41	54	-10.59	AVG
7236	56.66	-0.95	55.71	74	-18.29	peak
7236	44.00	-0.95	43.05	54	-10.95	AVG
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	62.43	-3.64	58.79	74	-15.21	peak
4824	48.11	-3.64	44.47	54	-9.53	AVG
7236	56.89	-0.95	55.94	74	-18.06	peak
7236	44.27	-0.95	43.32	54	-10.68	AVG
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	63.51	-3.51	60.00	74	-14.00	peak
4874	47.18	-3.51	43.67	54	-10.33	AVG
7311	56.92	-0.82	56.10	74	-17.90	peak
7311	45.10	-0.82	44.28	54	-9.72	AVG
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	63.85	-3.51	60.34	74	-13.66	peak
4874	47.79	-3.51	44.28	54	-9.72	AVG
7311	57.23	-0.82	56.41	74	-17.59	peak
7311	43.86	-0.82	43.04	54	-10.96	AVG
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	64.05	-3.43	60.62	74	-13.38	peak
4924	47.48	-3.43	44.05	54	-9.95	AVG
7386	56.85	-0.75	56.10	74	-17.90	peak
7386	44.78	-0.75	44.03	54	-9.97	AVG
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	63.86	-3.43	60.43	74	-13.57	peak
4924	46.46	-3.43	43.03	54	-10.97	AVG
7386	56.72	-0.75	55.97	74	-18.03	peak
7386	43.33	-0.75	42.58	54	-11.42	AVG
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 1MHz and video bandwidth is 3MHz for peak measurement with peak detector at frequency above 1GHz. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and 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	63.12	-3.64	59.48	74	-14.52	peak
4824	46.96	-3.64	43.32	54	-10.68	AVG
7236	56.21	-0.95	55.26	74	-18.74	peak
7236	44.35	-0.95	43.40	54	-10.60	AVG
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	62.99	-3.64	59.35	74	-14.65	peak
4824	47.25	-3.64	43.61	54	-10.39	AVG
7236	56.44	-0.95	55.49	74	-18.51	peak
7236	43.80	-0.95	42.85	54	-11.15	AVG
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	63.00	-3.51	59.49	74	-14.51	peak
4874	47.29	-3.51	43.78	54	-10.22	AVG
7311	55.86	-0.82	55.04	74	-18.96	peak
7311	44.10	-0.82	43.28	54	-10.72	AVG
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	62.49	-3.51	58.98	74	-15.02	peak
4874	46.34	-3.51	42.83	54	-11.17	AVG
7311	56.02	-0.82	55.20	74	-18.80	peak
7311	43.72	-0.82	42.90	54	-11.10	AVG
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	63.13	-3.43	59.70	74	-14.30	peak
4924	47.96	-3.43	44.53	54	-9.47	AVG
7386	56.06	-0.75	55.31	74	-18.69	peak
7386	43.75	-0.75	43.00	54	-11.00	AVG
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	62.88	-3.43	59.45	74	-14.55	peak
4924	46.68	-3.43	43.25	54	-10.75	AVG
7386	55.45	-0.75	54.70	74	-19.30	peak
7386	44.04	-0.75	43.29	54	-10.71	AVG
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 1MHz and video bandwidth is 3MHz for peak measurement with peak detector at frequency above 1GHz. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and 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	63.25	-3.64	59.61	74	-14.39	peak
4824	47.05	-3.64	43.41	54	-10.59	AVG
7236	57.70	-0.95	56.75	74	-17.25	peak
7236	45.36	-0.95	44.41	54	-9.59	AVG
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	64.45	-3.64	60.81	74	-13.19	peak
4824	46.83	-3.64	43.19	54	-10.81	AVG
7236	56.77	-0.95	55.82	74	-18.18	peak
7236	43.56	-0.95	42.61	54	-11.39	AVG
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	63.49	-3.51	59.98	74	-14.02	peak
4874	46.80	-3.51	43.29	54	-10.71	AVG
7311	57.00	-0.82	56.18	74	-17.82	peak
7311	44.97	-0.82	44.15	54	-9.85	AVG
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	64.06	-3.51	60.55	74	-13.45	peak
4874	48.07	-3.51	44.56	54	-9.44	AVG
7311	56.76	-0.82	55.94	74	-18.06	peak
7311	45.11	-0.82	44.29	54	-9.71	AVG
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	63.59	-3.43	60.16	74	-13.84	peak
4924	46.22	-3.43	42.79	54	-11.21	AVG
7386	57.34	-0.75	56.59	74	-17.41	peak
7386	45.16	-0.75	44.41	54	-9.59	AVG
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	63.55	-3.43	60.12	74	-13.88	peak
4924	47.13	-3.43	43.70	54	-10.30	AVG
7386	57.15	-0.75	56.40	74	-17.60	peak
7386	44.91	-0.75	44.16	54	-9.84	AVG
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 1MHz and video bandwidth is 3MHz for peak measurement with peak detector at frequency above 1GHz. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and 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	63.19	-3.63	59.56	74	-14.44	peak
4844	46.72	-3.63	43.09	54	-10.91	AVG
7266	56.85	-0.94	55.91	74	-18.09	peak
7266	45.32	-0.94	44.38	54	-9.62	AVG
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	63.04	-3.63	59.41	74	-14.59	peak
4844	47.13	-3.63	43.50	54	-10.50	AVG
7266	56.33	-0.94	55.39	74	-18.61	peak
7266	44.73	-0.94	43.79	54	-10.21	AVG
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	62.96	-3.51	59.45	74	-14.55	peak
4874	47.15	-3.51	43.64	54	-10.36	AVG
7311	56.72	-0.82	55.90	74	-18.10	peak
7311	44.47	-0.82	43.65	54	-10.35	AVG
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	62.82	-3.51	59.31	74	-14.69	peak
4874	46.83	-3.51	43.32	54	-10.68	AVG
7311	57.39	-0.82	56.57	74	-17.43	peak
7311	43.11	-0.82	42.29	54	-11.71	AVG
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	63.19	-3.43	59.76	74	-14.24	peak
4904	47.09	-3.43	43.66	54	-10.34	AVG
7356	55.58	-0.75	54.83	74	-19.17	peak
7356	44.16	-0.75	43.41	54	-10.59	AVG
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	62.75	-3.43	59.32	74	-14.68	peak
4904	46.76	-3.43	43.33	54	-10.67	AVG
7356	54.92	-0.75	54.17	74	-19.83	peak
7356	43.97	-0.75	43.22	54	-10.78	AVG
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 1MHz and video bandwidth is 3MHz for peak measurement with peak detector at frequency above 1GHz. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and 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 50 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 ANSI C63.10 with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the measurement antenna height and polarization etc. Set RBW to 100KHz and VBM to 300KHz to measure the peak field strength and set RBW to 1MHz and VBW to 10Hz 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

Remark: All modes were tested. The test data of the worst case MIMO mode was reported.
For MIMO antenna port 1 and port 2 Radiated Band Edge Test Results:

Operation Mode: 802.11b Mode TX CH Low (2412MHz)

Horizontal:

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2390	55.79	-5.81	49.98	74	-24.02	peak
2390	/	-5.81	/	54	/	AVG
2399	63.64	-5.84	57.80	74	-16.20	peak
2399	48.72	-5.84	42.88	54	-11.12	AVG
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
2390	56.12	-5.81	50.31	74	-23.69	peak
2390	/	-5.81	/	54	/	AVG
2399	64.36	-5.84	58.52	74	-15.48	peak
2399	47.93	-5.84	42.09	54	-11.91	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Operation Mode: 802.11b Mode TX CH High (2462MHz)

Horizontal:

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2483.5	56.19	-5.65	50.54	74	-23.46	peak
2483.5	/	-5.65	/	54	/	AVG
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	55.7	-5.65	50.05	74	-23.95	peak
2483.5	/	-5.65	/	54	/	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Operation Mode: 802.11g Mode TX CH Low (2412MHz)

Horizontal:

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2390	56.95	-5.81	51.14	74	-22.86	peak
2390	/	-5.81	/	54	/	AVG
2399	64.17	-5.84	58.33	74	-15.67	peak
2399	49.05	-5.84	43.21	54	-10.79	AVG
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
2390	56.34	-5.81	50.53	74	-23.47	peak
2390	/	-5.81	/	54	/	AVG
2399	63.82	-5.84	57.98	74	-16.02	peak
2399	47.78	-5.84	41.94	54	-12.06	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Operation Mode: 802.11g Mode TX CH High (2462MHz)

Horizontal:

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2483.5	56.74	-5.65	51.09	74	-22.91	peak
2483.5	/	-5.65	/	54	/	AVG
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	57.31	-5.65	51.66	74	-22.34	peak
2483.5	/	-5.65	/	54	/	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Operation Mode: 802.11n/H20 Mode TX CH Low (2412MHz)

Horizontal:

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2390	56.70	-5.81	50.89	74	-23.11	peak
2390	/	-5.81	/	54	/	AVG
2399	63.33	-5.84	57.49	74	-16.51	peak
2399	46.95	-5.84	41.11	54	-12.89	AVG
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
2390	55.15	-5.81	49.34	74	-24.66	peak
2390	/	-5.81	/	54	/	AVG
2399	62.77	-5.84	56.93	74	-17.07	peak
2399	47.25	-5.84	41.41	54	-12.59	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Operation Mode: 802.11n/H20 Mode TX CH High (2462MHz)

Horizontal:

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2483.5	56.71	-5.65	51.06	74	-22.94	peak
2483.5	/	-5.65	/	54	/	AVG
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	57.55	-5.65	51.90	74	-22.10	peak
2483.5	/	-5.65	/	54	/	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Operation Mode: 802.11n/H40 Mode TX CH Low (2422MHz)

Horizontal:

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2390	57.12	-5.81	51.31	74	-22.69	peak
2390	/	-5.81	/	54	/	AVG
2399	63.20	-5.84	57.36	74	-16.64	peak
2399	50.17	-5.84	44.33	54	-9.67	AVG
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
2390	54.38	-5.81	48.57	74	-25.43	peak
2390	/	-5.81	/	54	/	AVG
2399	64.44	-5.84	58.60	74	-15.40	peak
2399	49.91	-5.84	44.07	54	-9.93	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Operation Mode: 802.11n/H40 Mode TX CH High (2452MHz)

Horizontal:

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2483.5	57.20	-5.65	51.55	74	-22.45	peak
2483.5	/	-5.65	/	54	/	AVG
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	56.78	-5.65	51.13	74	-22.87	peak
2483.5	/	-5.65	/	54	/	AVG
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 as Radiated Emission Measurement

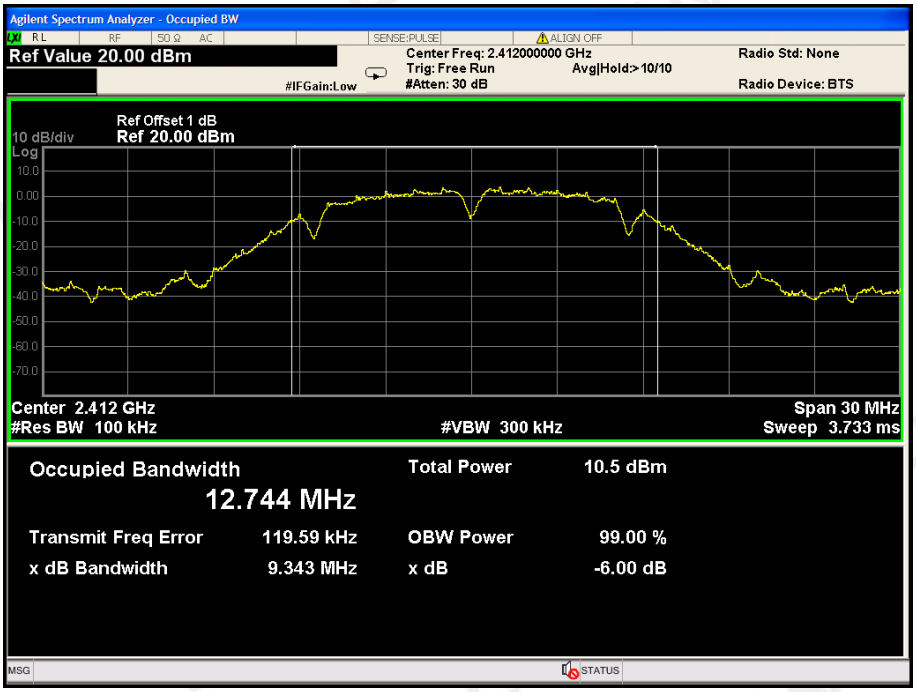
6.4 Test Result

PASS

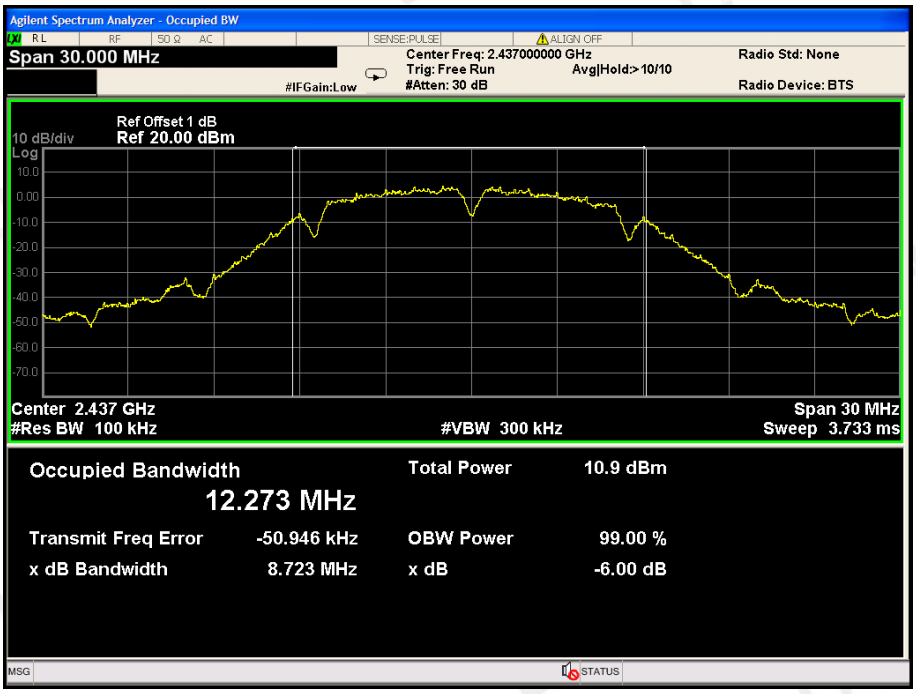
For antenna port 1:

TX 802.11b Mode			
Frequency	6dB Bandwidth (MHz)	Channel Separation (MHz)	Result
2412 MHz	9.343	>=500KHz	PASS
2437 MHz	8.723	>=500KHz	PASS
2462 MHz	10.06	>=500KHz	PASS

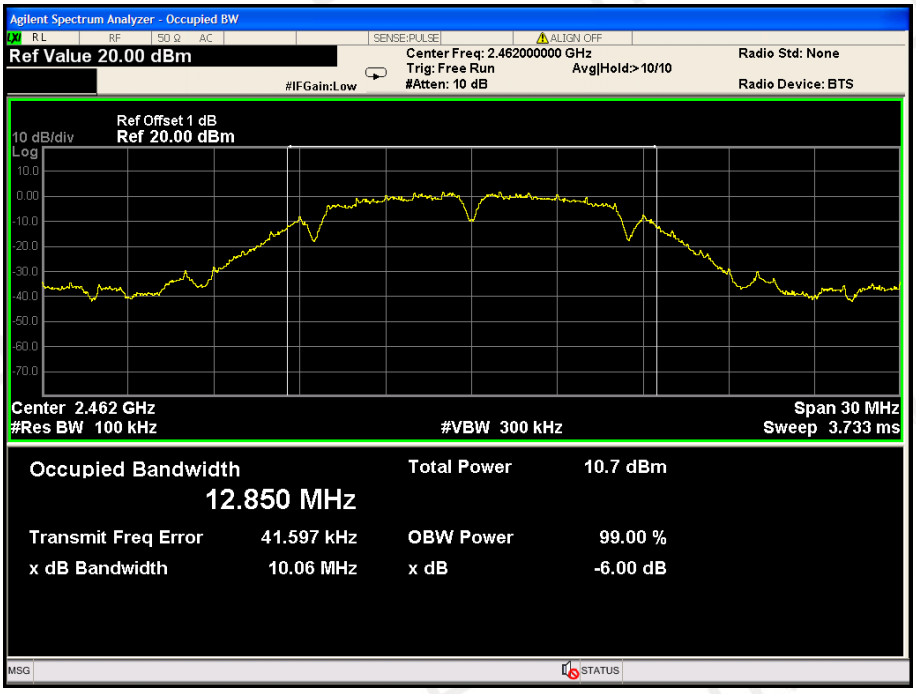
CH: 2412MHz



CH: 2437MHz

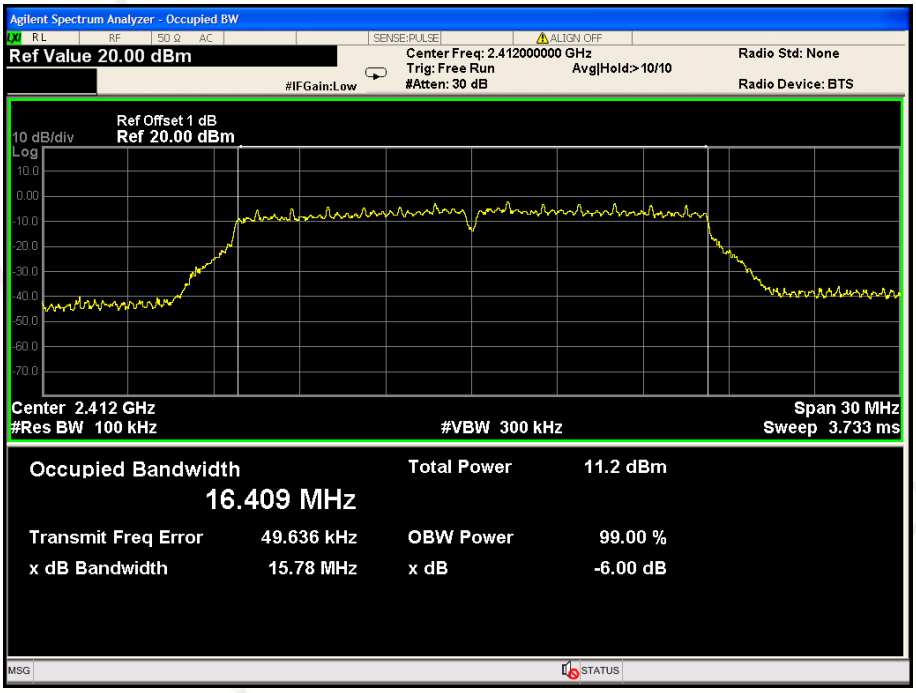


CH: 2462MHz

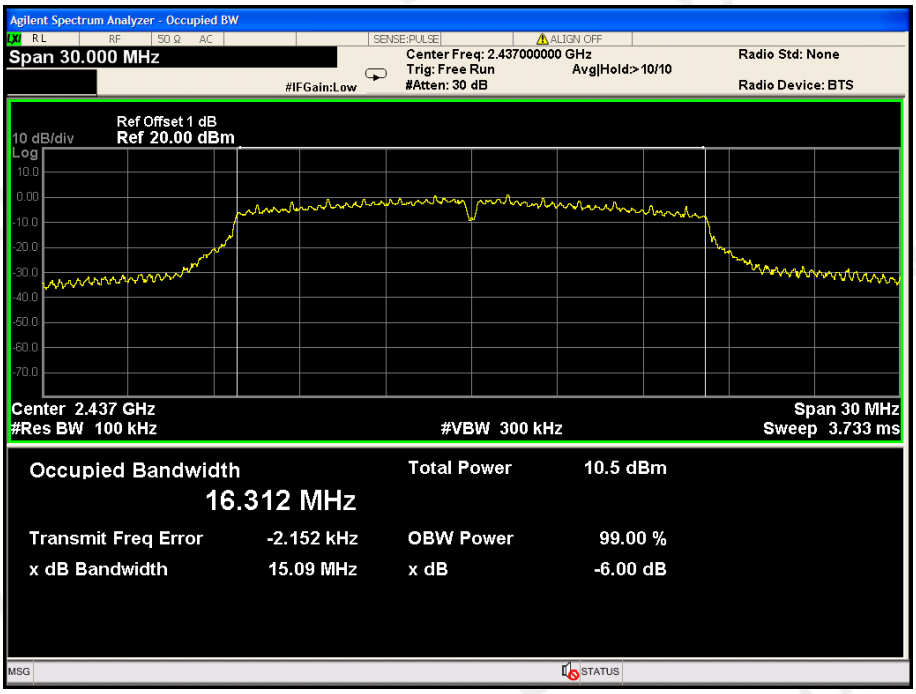


TX 802.11g Mode			
Frequency	6dB Bandwidth (MHz)	Channel Separation (MHz)	Result
2412 MHz	15.78	>=500KHz	PASS
2437 MHz	15.09	>=500KHz	PASS
2462 MHz	16.38	>=500KHz	PASS

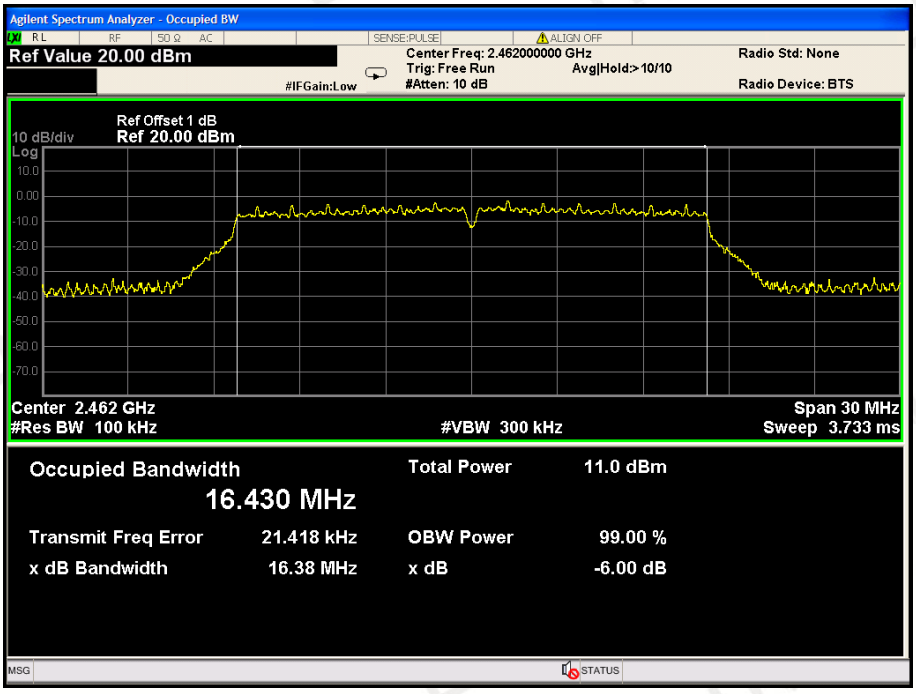
CH: 2412MHz



CH: 2437MHz

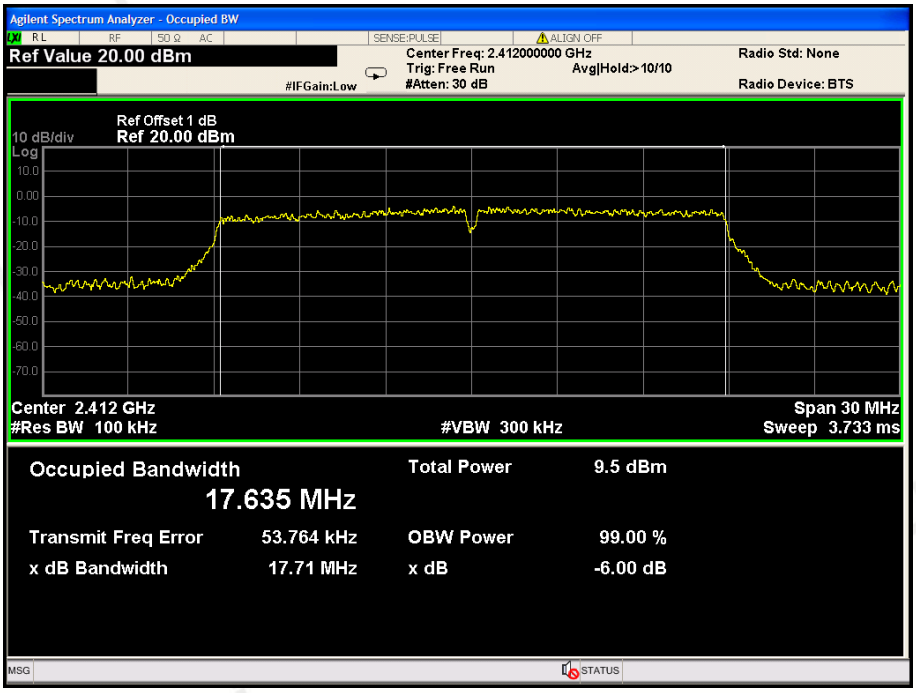


CH: 2462MHz

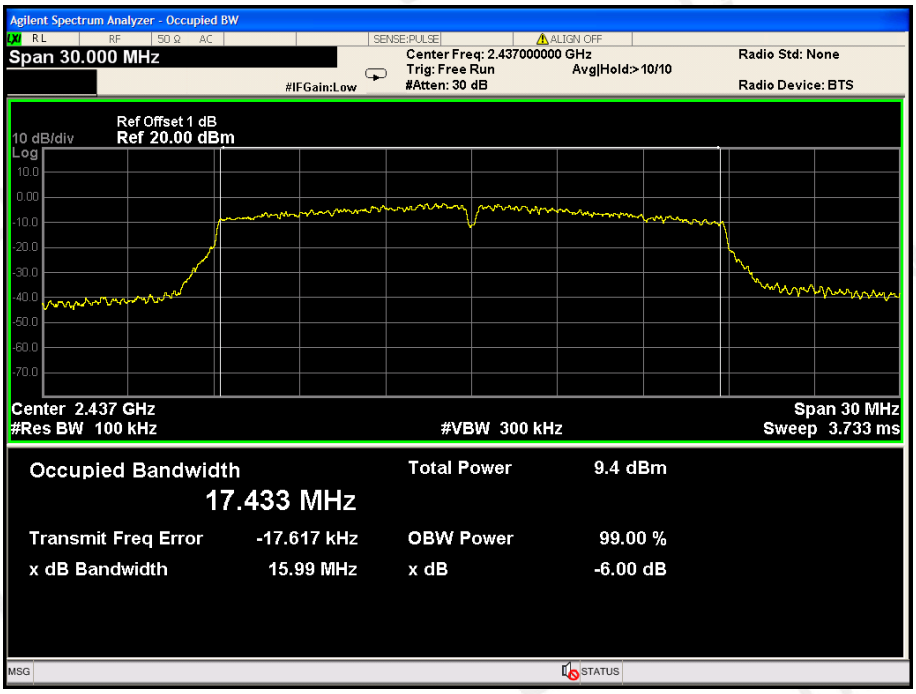


TX 802.11n/HT20 Mode			
Frequency	6dB Bandwidth (MHz)	Channel Separation (MHz)	Result
2412 MHz	17.71	>=500KHz	PASS
2437 MHz	15.99	>=500KHz	PASS
2462 MHz	17.72	>=500KHz	PASS

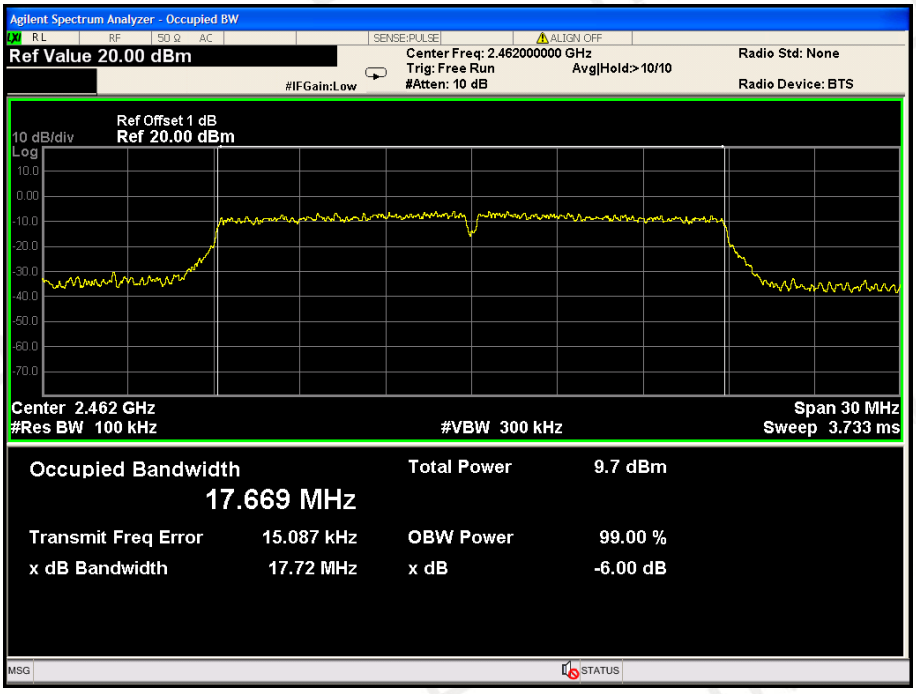
CH: 2412MHz



CH: 2437MHz

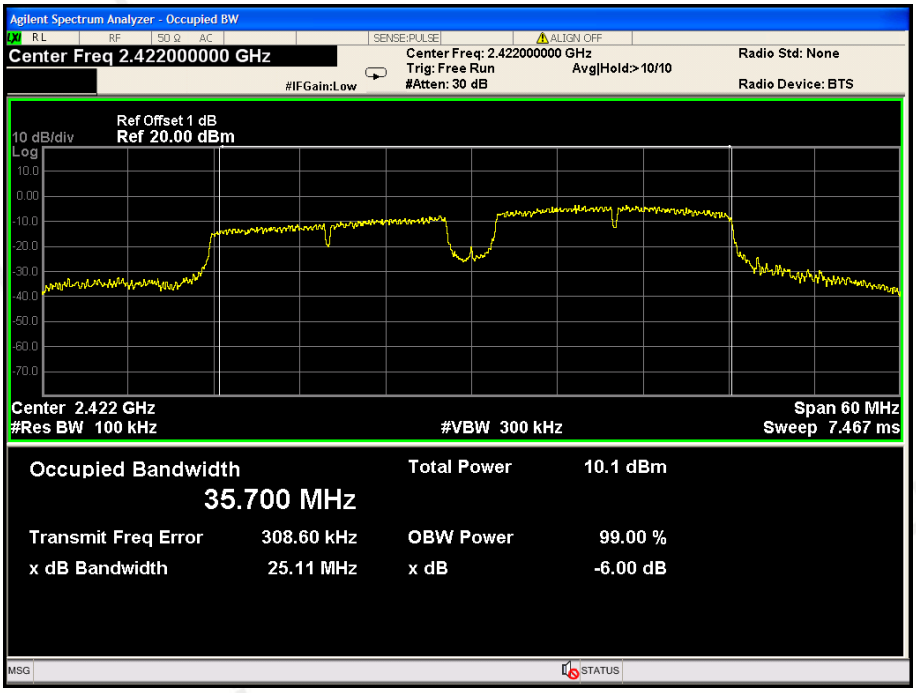


CH: 2462MHz

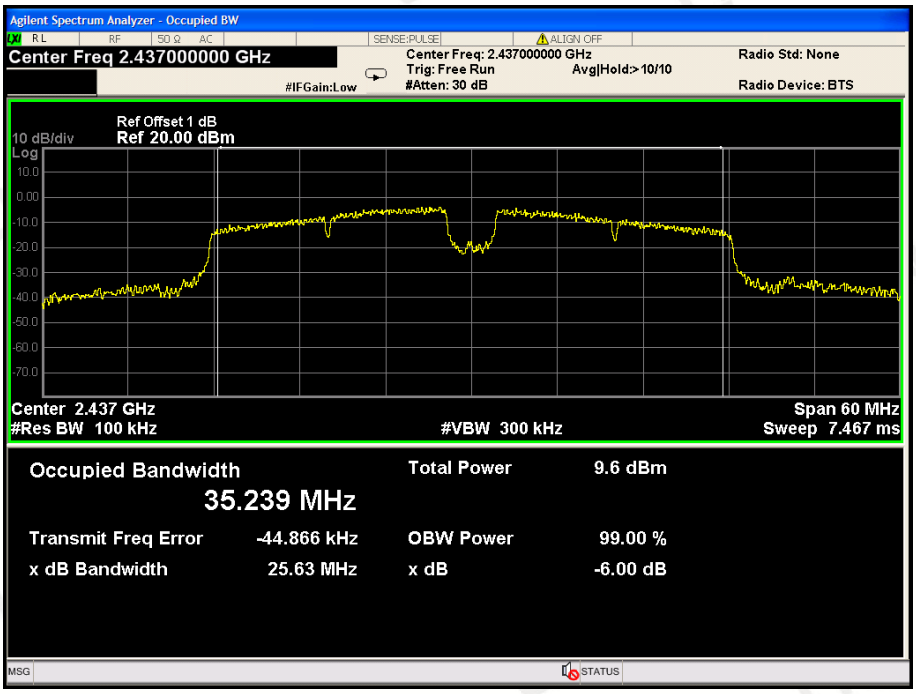


TX 802.11n/HT40 Mode			
Frequency	6dB Bandwidth (MHz)	Channel Separation (MHz)	Result
2422 MHz	25.11	>=500KHz	PASS
2437 MHz	25.63	>=500KHz	PASS
2452 MHz	26.64	>=500KHz	PASS

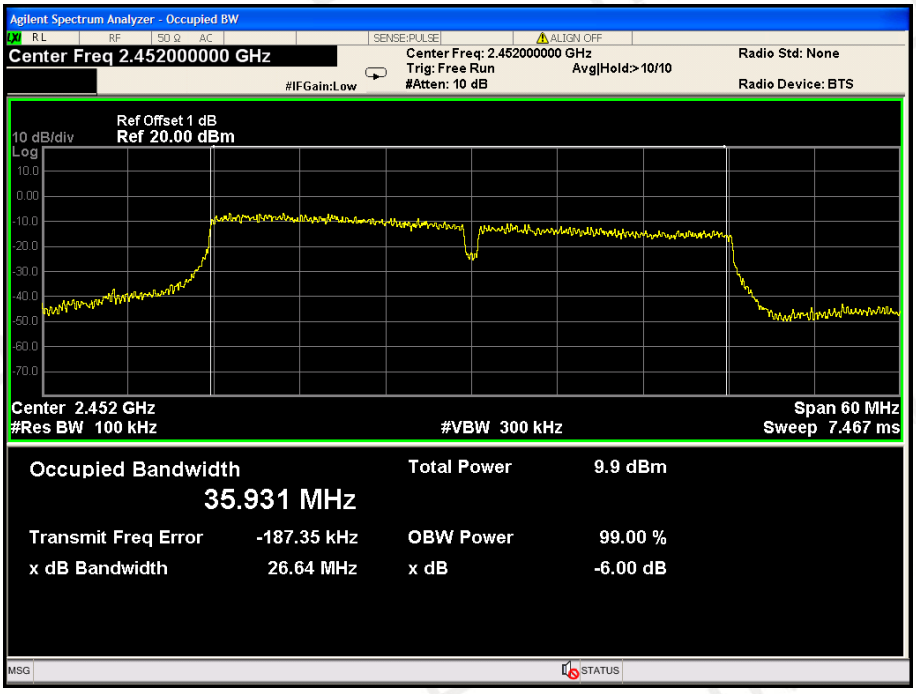
CH: 2422MHz



CH: 2437MHz



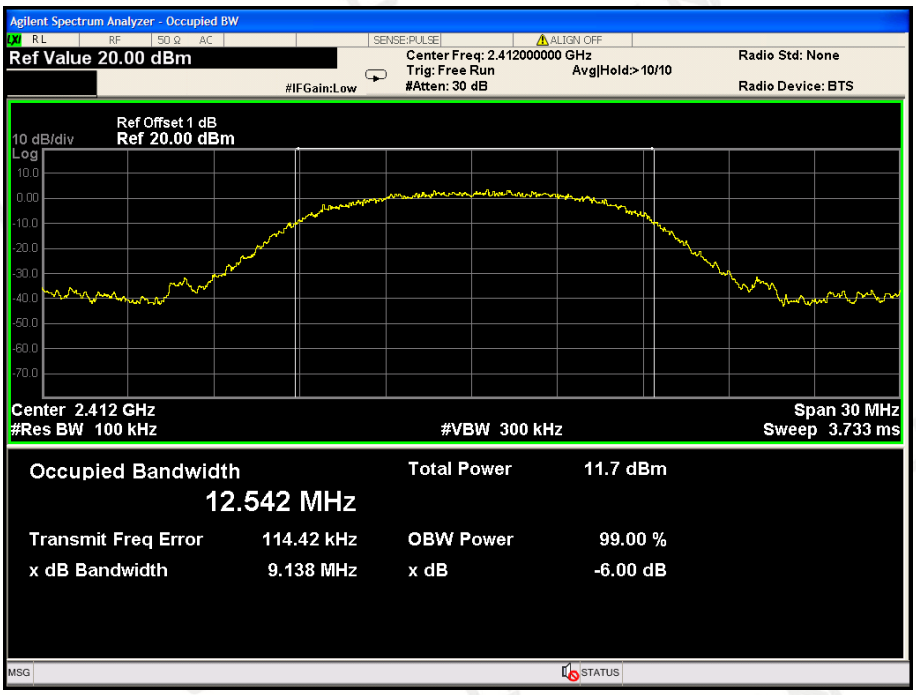
CH: 2452MHz



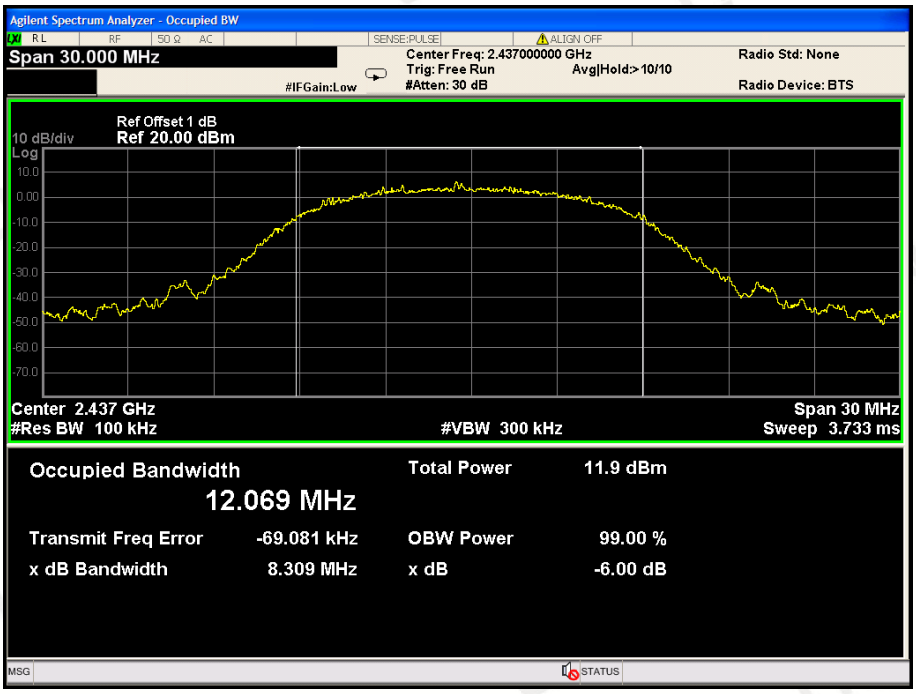
For antenna port 2:

TX 802.11b Mode			
Frequency	6dB Bandwidth (MHz)	Channel Separation (MHz)	Result
2412 MHz	9.138	>=500KHz	PASS
2437 MHz	8.309	>=500KHz	PASS
2462 MHz	9.573	>=500KHz	PASS

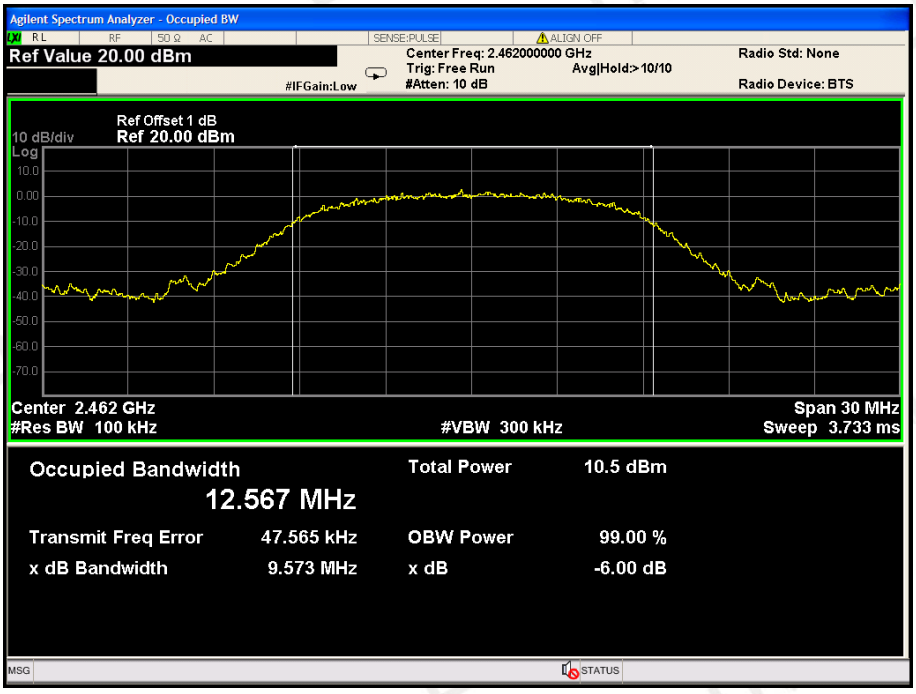
CH: 2412MHz



CH: 2437MHz

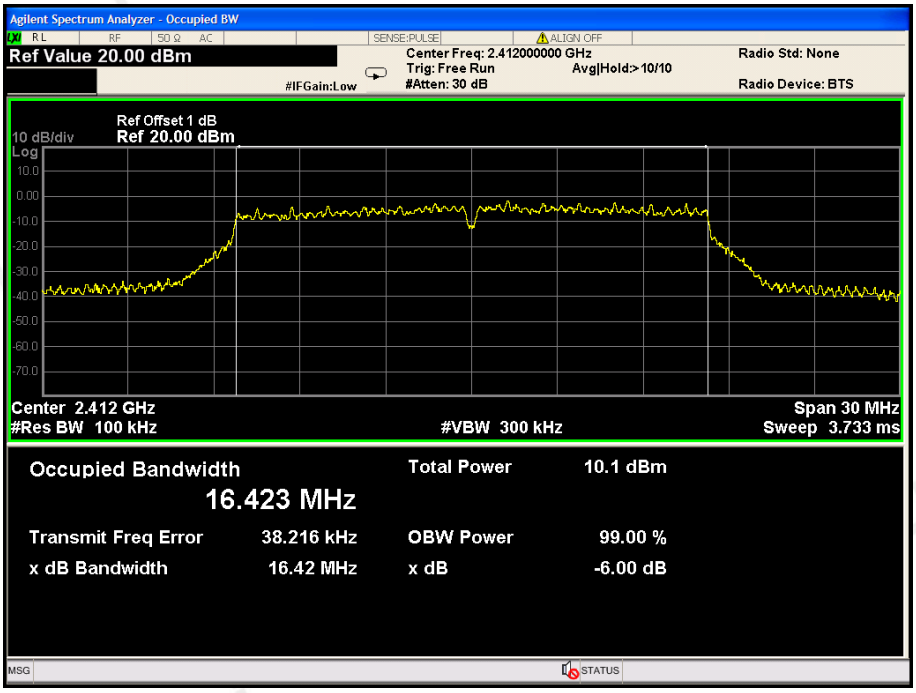


CH: 2462MHz

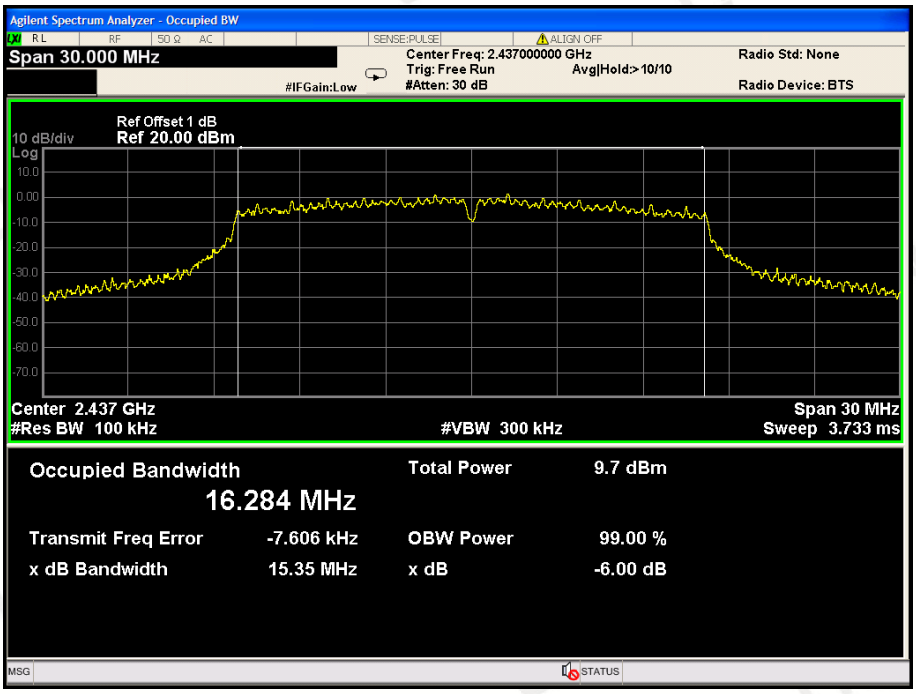


TX 802.11g Mode			
Frequency	6dB Bandwidth (MHz)	Channel Separation (MHz)	Result
2412 MHz	16.42	>=500KHz	PASS
2437 MHz	15.35	>=500KHz	PASS
2462 MHz	16.46	>=500KHz	PASS

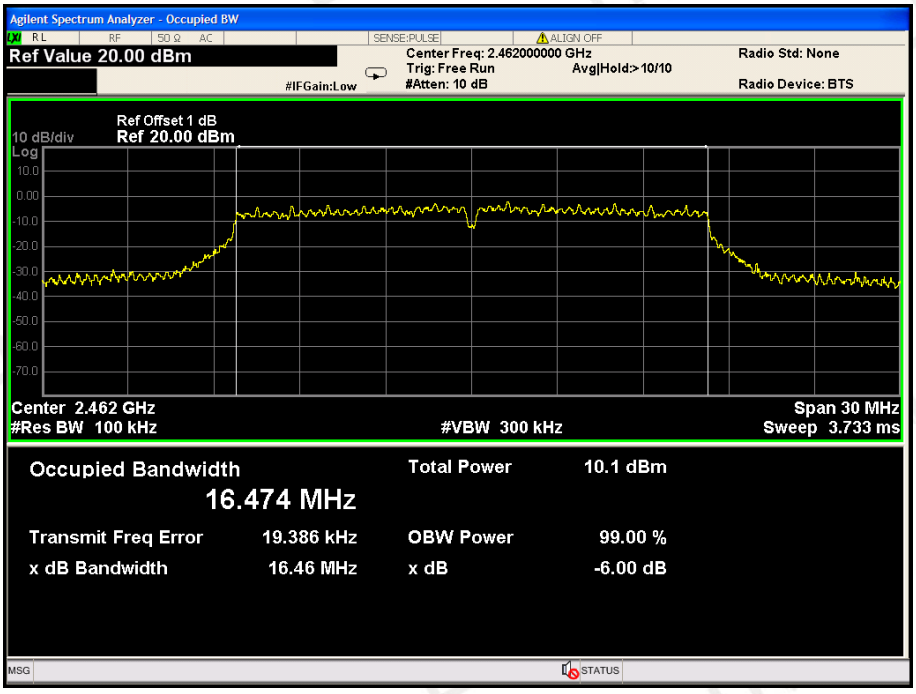
CH: 2412MHz



CH: 2437MHz

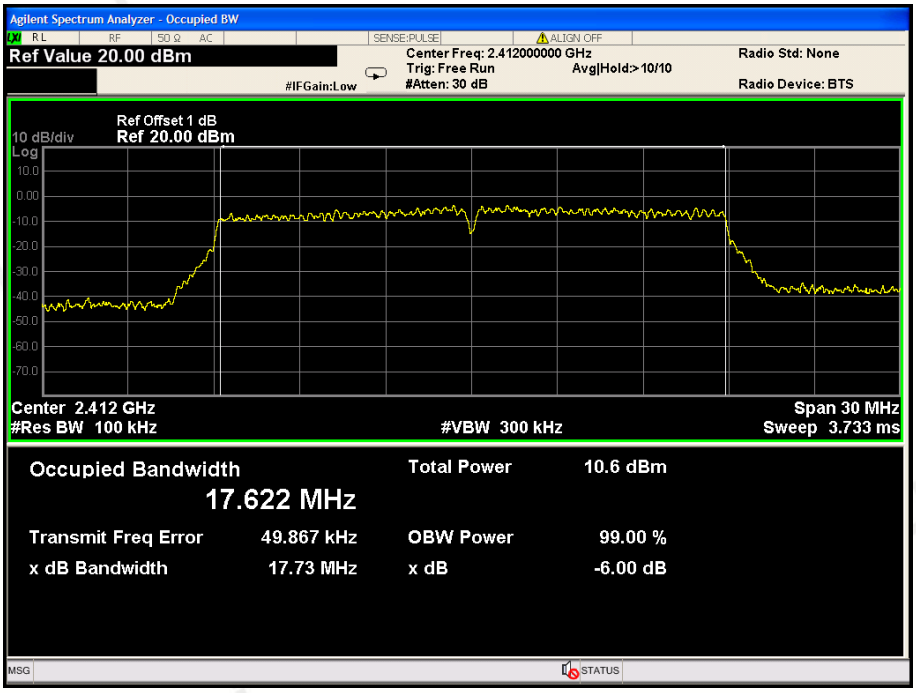


CH: 2462MHz

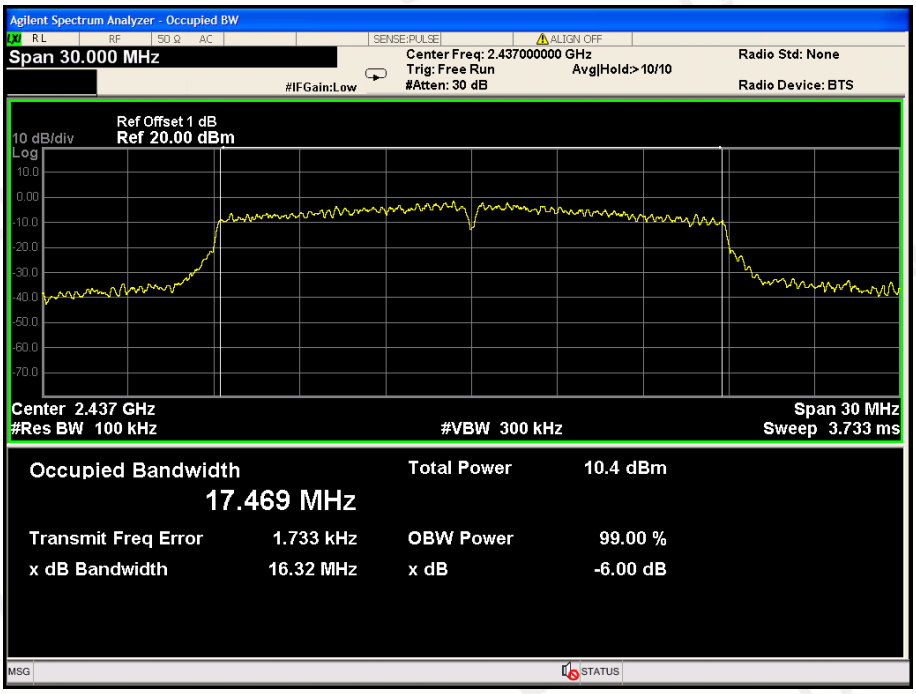


TX 802.11n/HT20 Mode			
Frequency	6dB Bandwidth (MHz)	Channel Separation (MHz)	Result
2412 MHz	17.73	>=500KHz	PASS
2437 MHz	16.32	>=500KHz	PASS
2462 MHz	17.74	>=500KHz	PASS

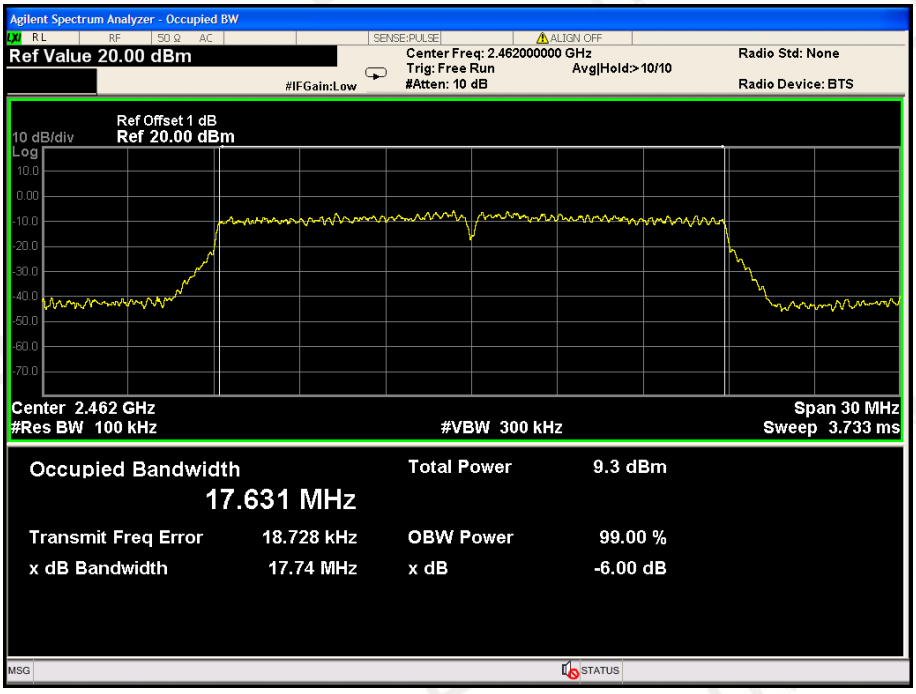
CH: 2412MHz



CH: 2437MHz

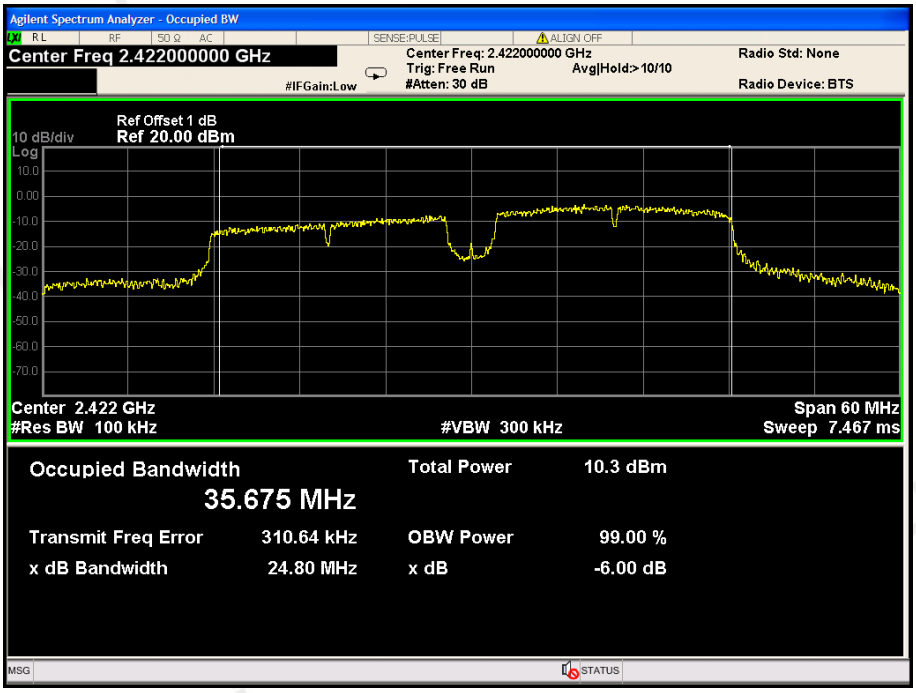


CH: 2462MHz

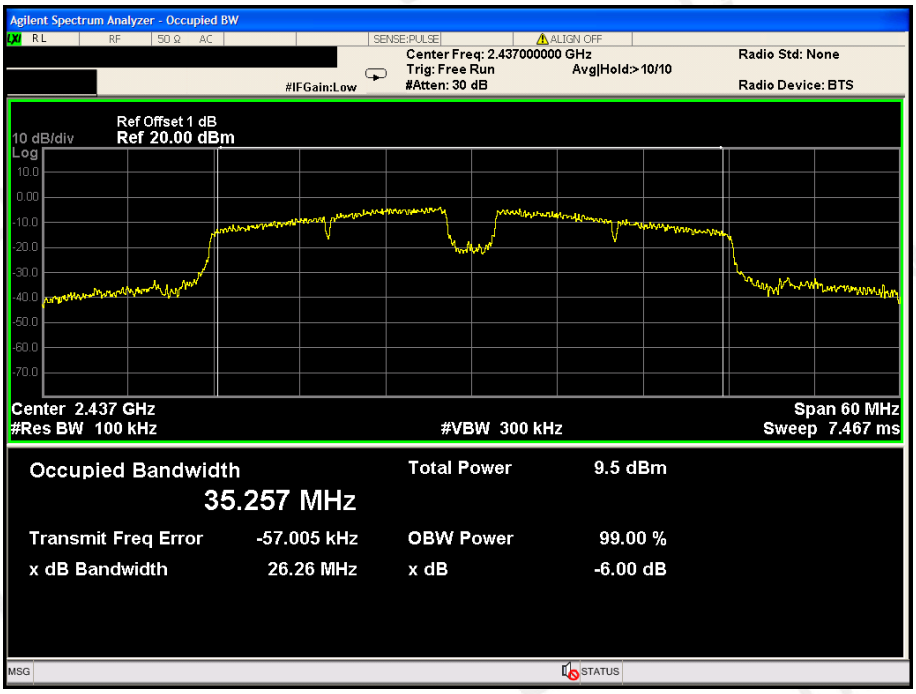


TX 802.11n/HT40 Mode			
Frequency	6dB Bandwidth (MHz)	Channel Separation (MHz)	Result
2422 MHz	24.80	>=500KHz	PASS
2437 MHz	26.26	>=500KHz	PASS
2452 MHz	25.74	>=500KHz	PASS

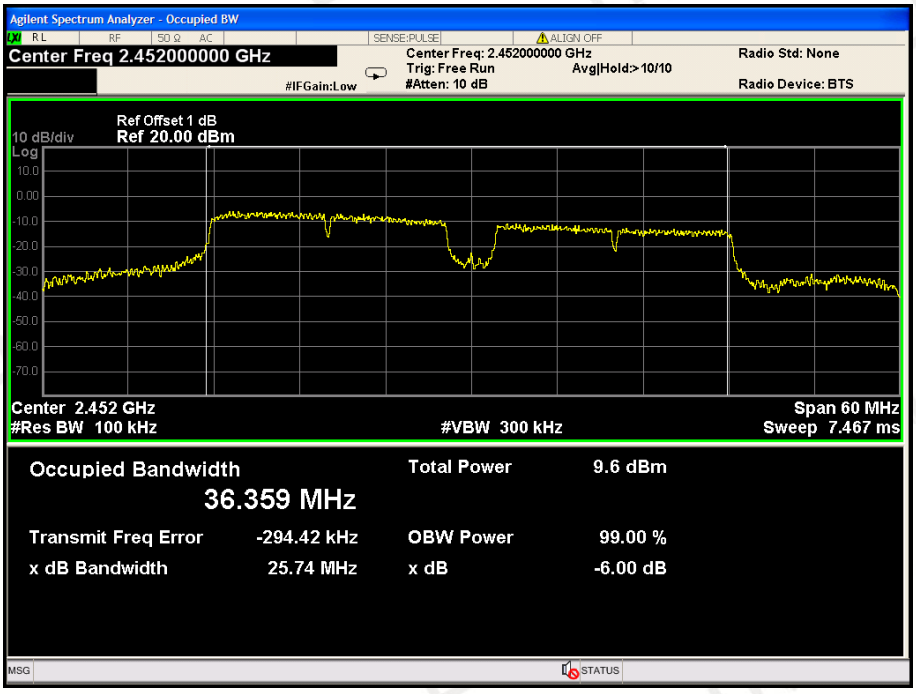
CH: 2422MHz



CH: 2437MHz



CH: 2452MHz



7 POWER SPECTRAL DENSITY TEST

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 as Radiated Emission Measurement

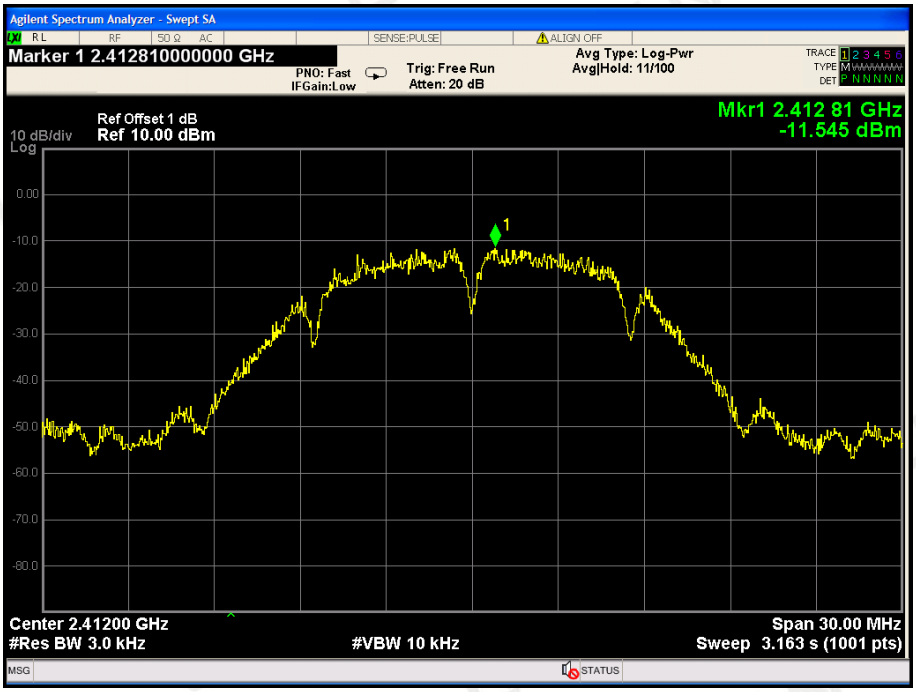
7.4 Test Result

PASS

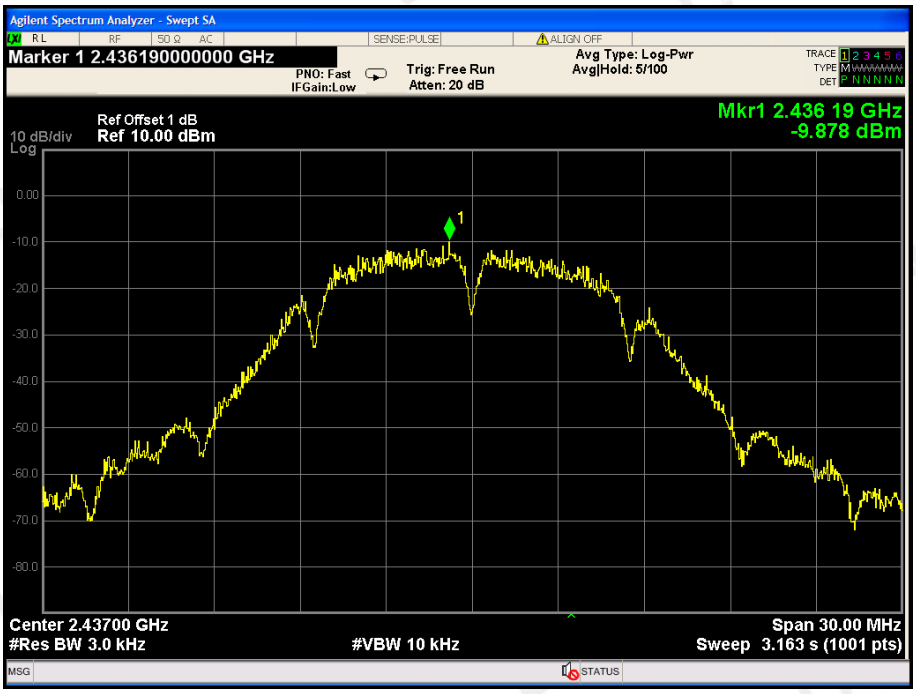
For antenna port 1:

TX 802.11b Mode			
Frequency	Power Density (dBm/3KHz)	Limit (dBm/3KHz)	Result
2412 MHz	-11.545	8	PASS
2437 MHz	-9.878	8	PASS
2462 MHz	-11.817	8	PASS

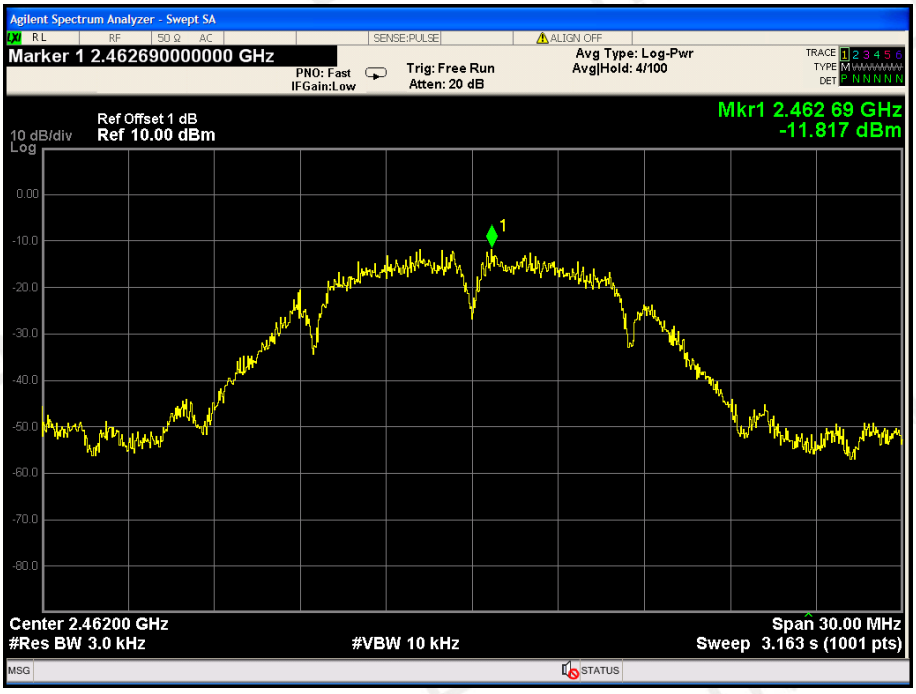
CH: 2412MHz



CH: 2437MHz

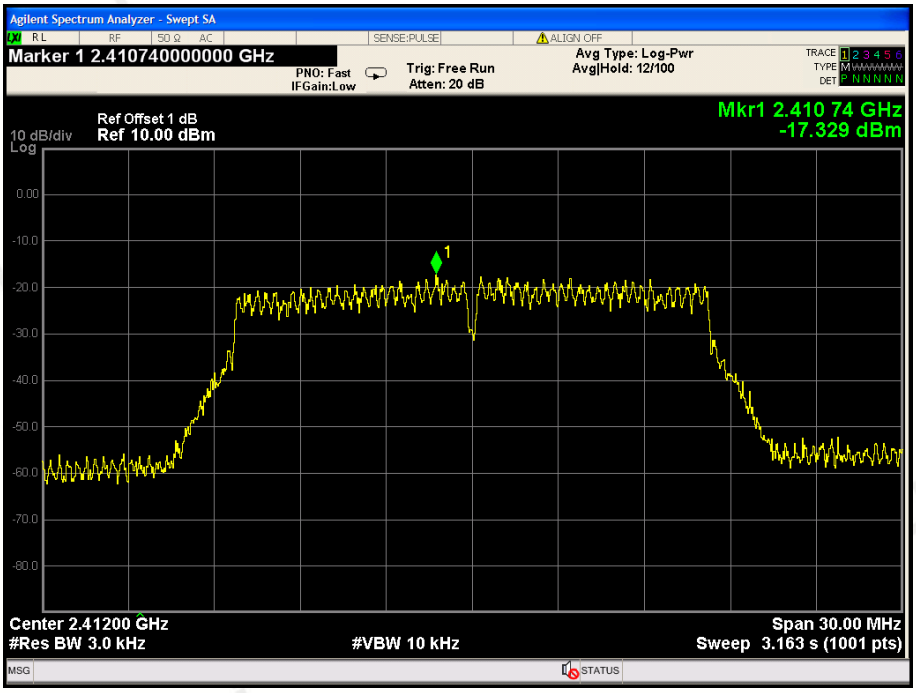


CH: 2462MHz

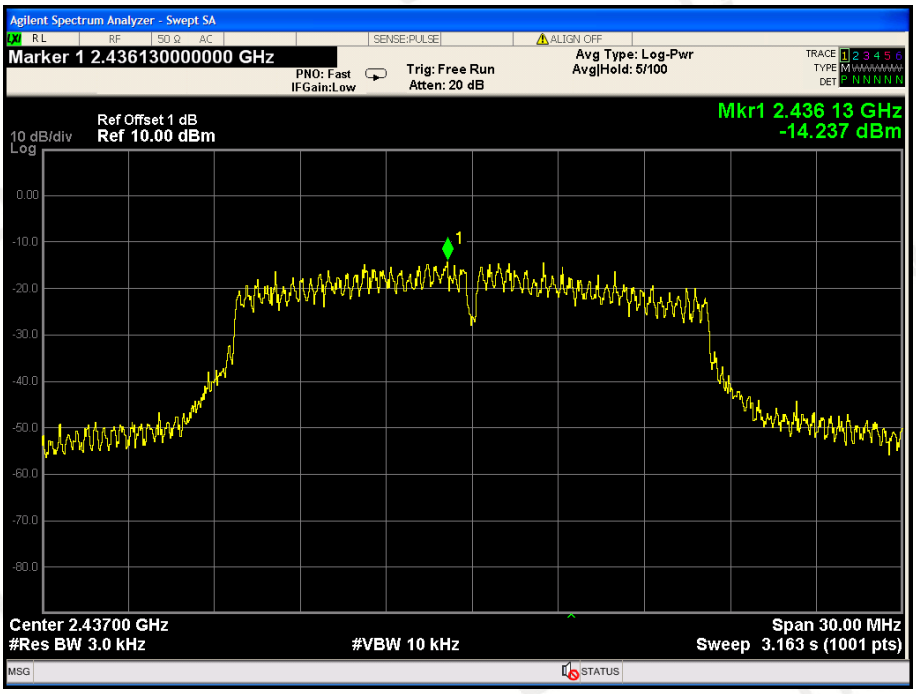


TX 802.11g Mode			
Frequency	Power Density (dBm/3KHz)	Limit (dBm/3KHz)	Result
2412 MHz	-17.329	8	PASS
2437 MHz	-14.237	8	PASS
2462 MHz	-15.391	8	PASS

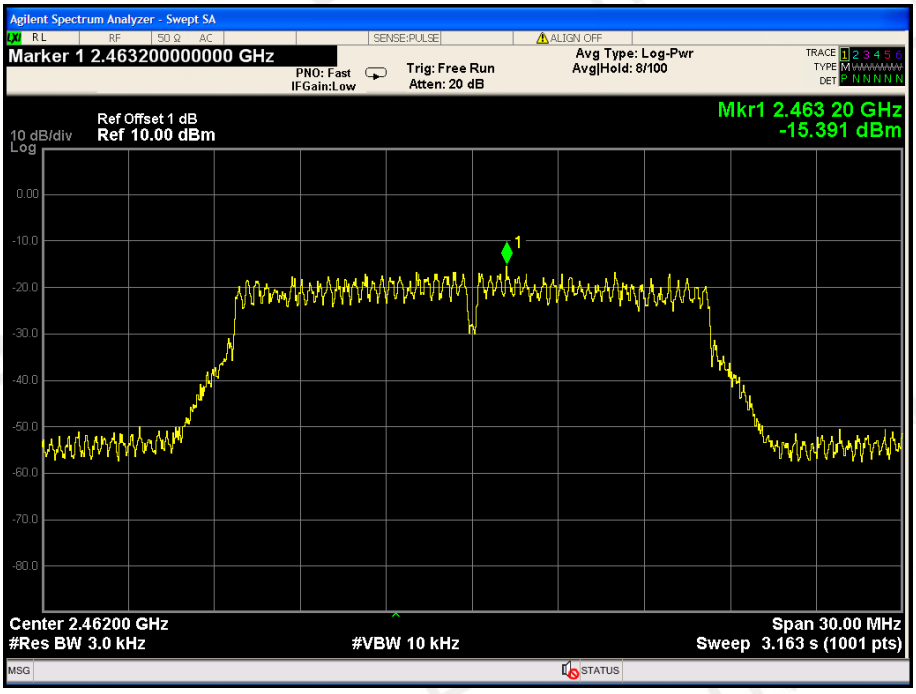
CH: 2412MHz



CH: 2437MHz

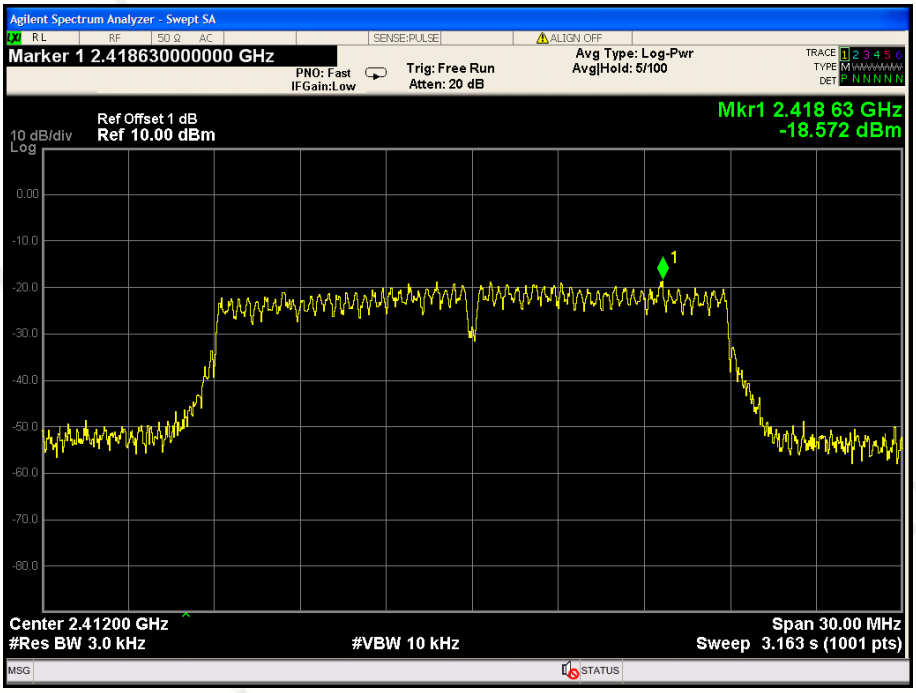


CH: 2462MHz

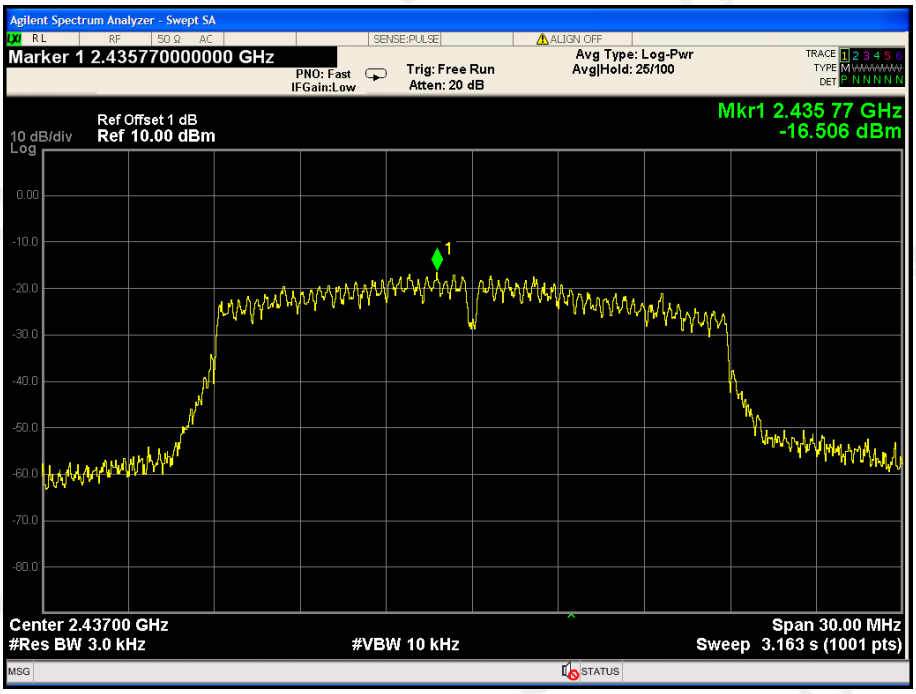


TX 802.11n/HT20 Mode			
Frequency	Power Density (dBm/3KHz)	Limit (dBm/3KHz)	Result
2412 MHz	-18.572	8	PASS
2437 MHz	-16.506	8	PASS
2462 MHz	-19.201	8	PASS

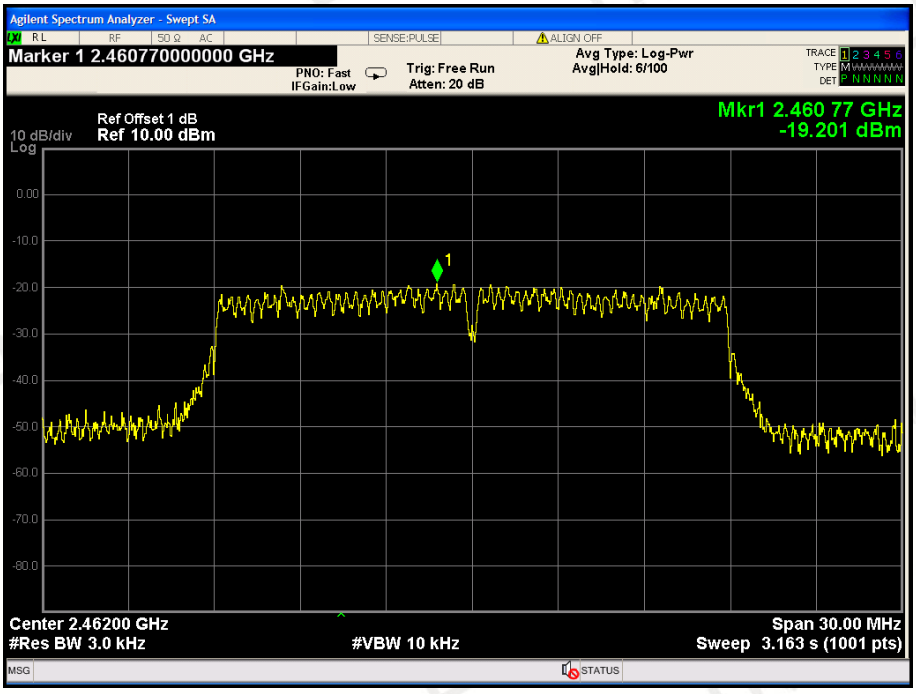
CH: 2412MHz



CH: 2437MHz

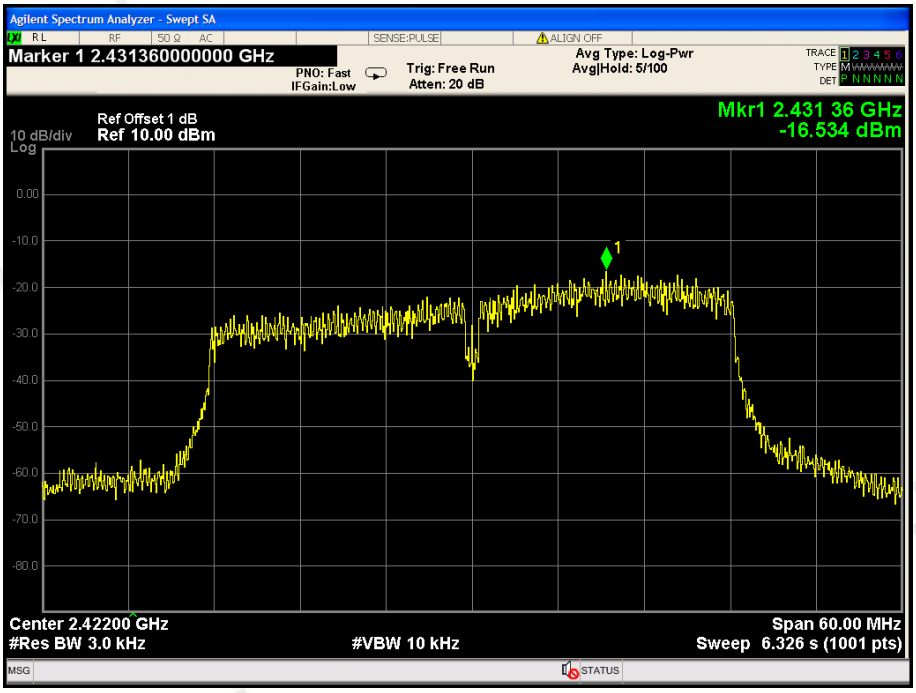


CH: 2462MHz

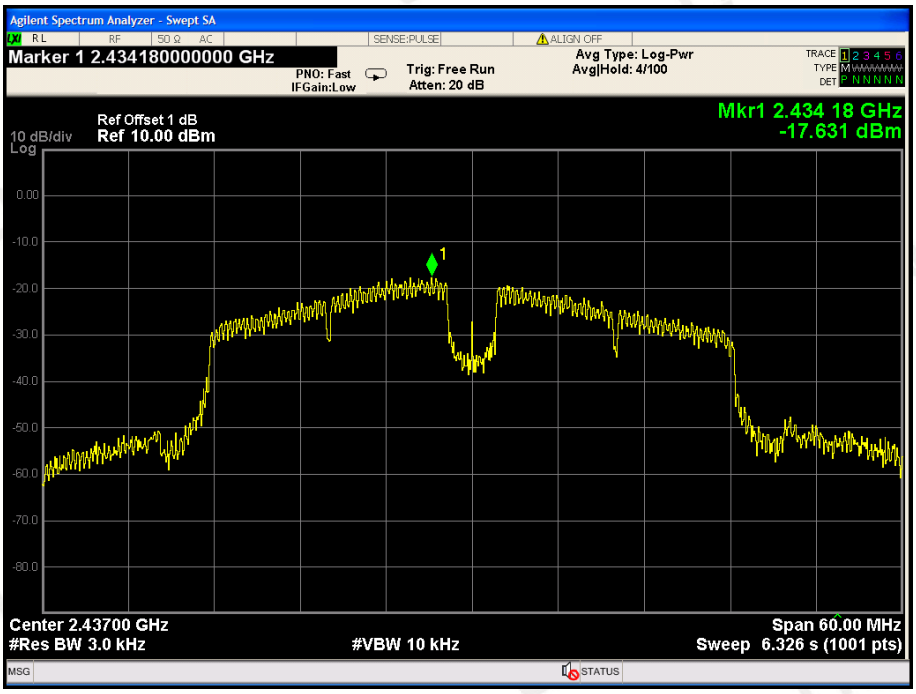


TX 802.11n/HT40 Mode			
Frequency	Power Density (dBm/3KHz)	Limit (dBm/3KHz)	Result
2412 MHz	-16.534	8	PASS
2437 MHz	-17.631	8	PASS
2462 MHz	-17.227	8	PASS

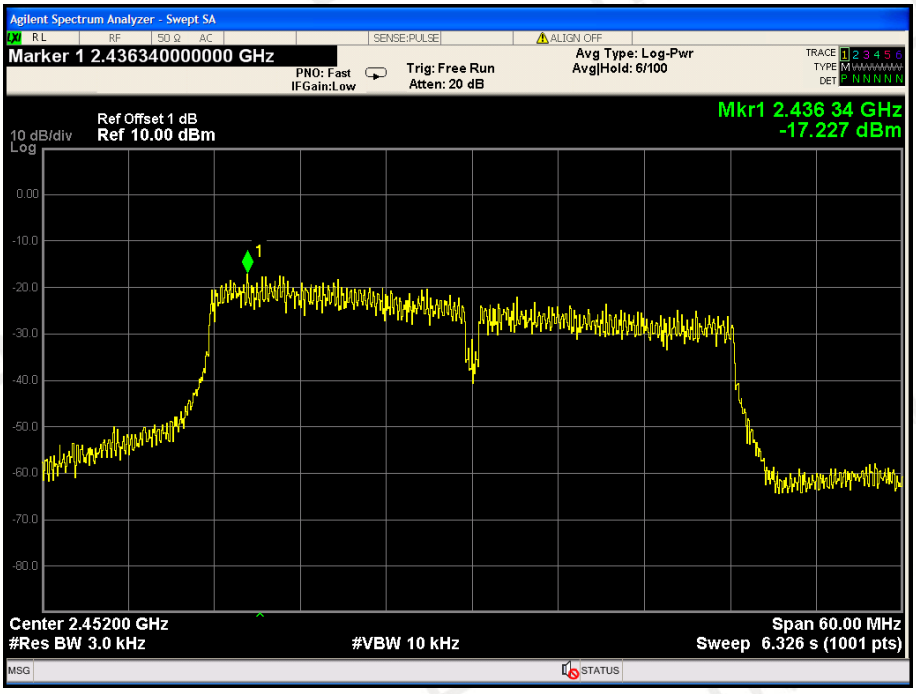
CH: 2422MHz



CH: 2437MHz



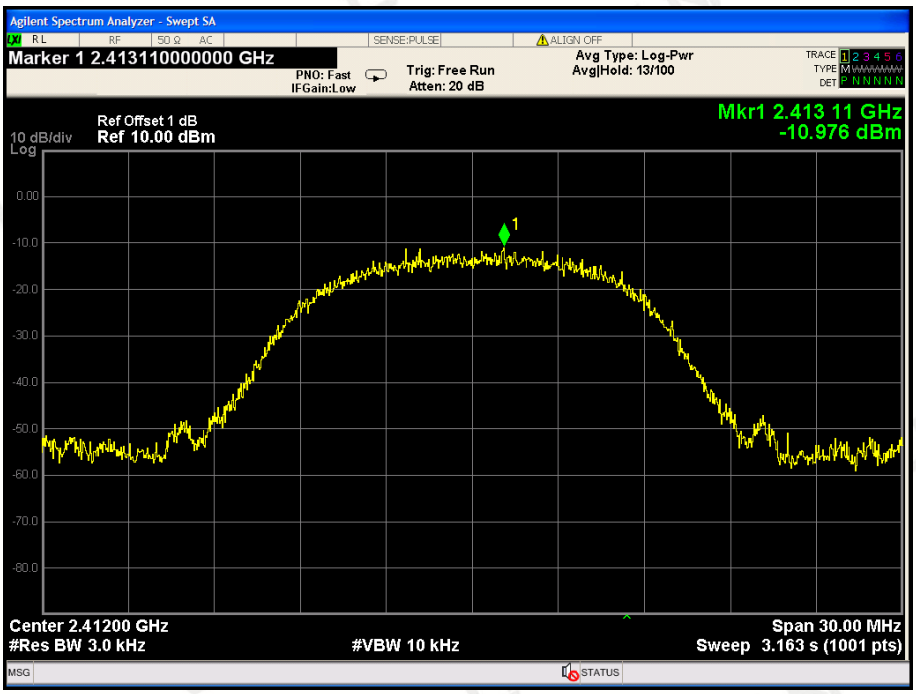
CH: 2452MHz



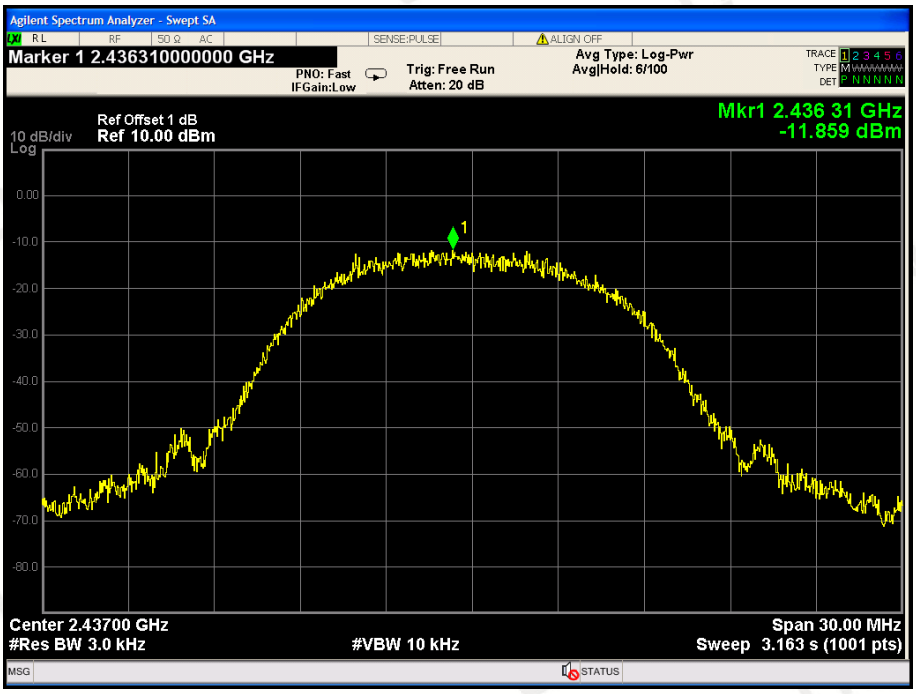
For antenna port 2:

TX 802.11b Mode			
Frequency	Power Density (dBm/3KHz)	Limit (dBm/3KHz)	Result
2412 MHz	-10.976	8	PASS
2437 MHz	-11.859	8	PASS
2462 MHz	-12.845	8	PASS

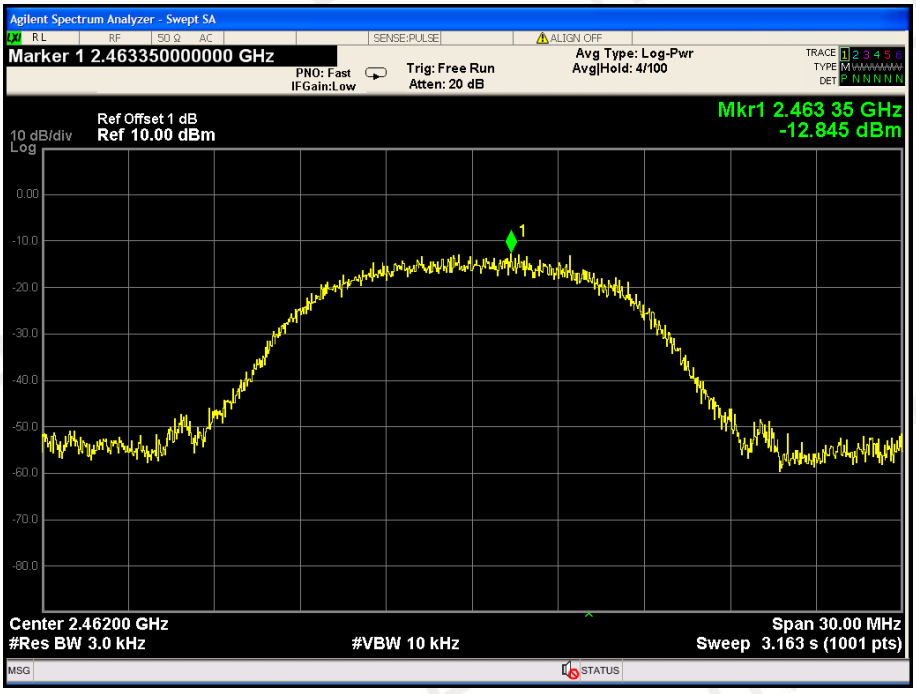
CH: 2412MHz



CH: 2437MHz

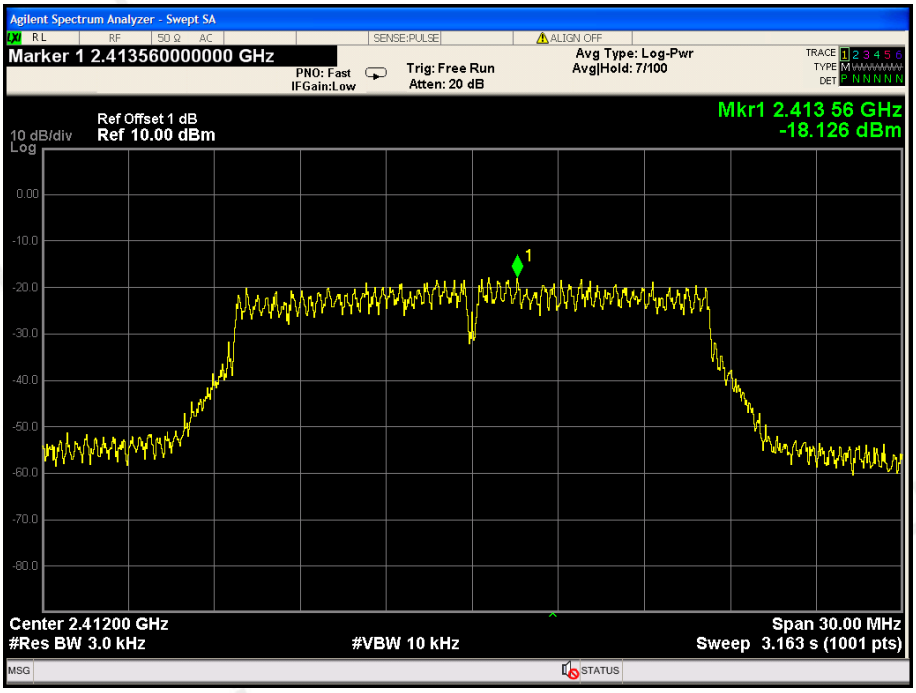


CH: 2462MHz

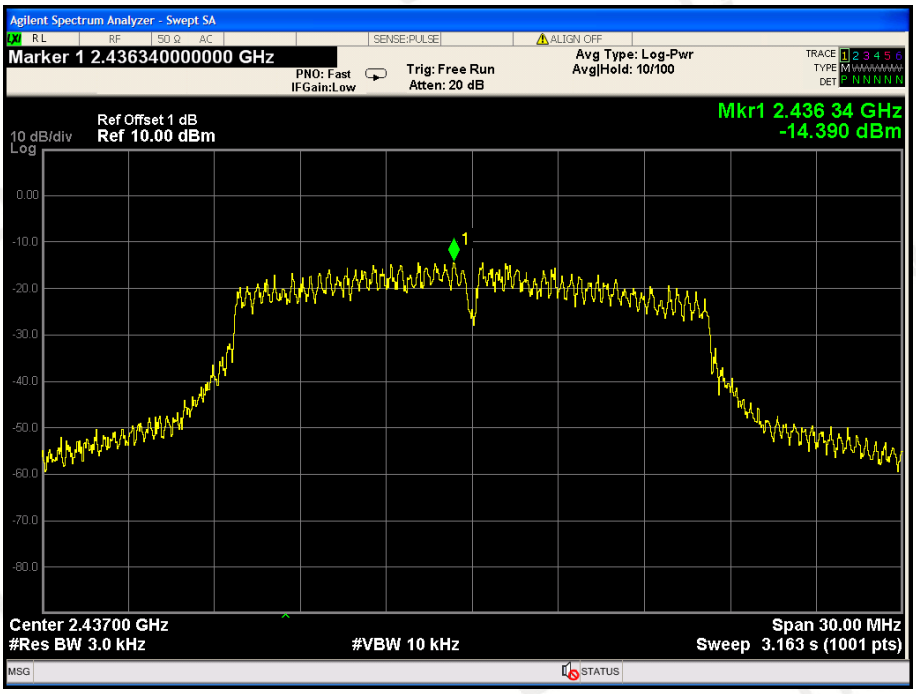


TX 802.11g Mode			
Frequency	Power Density (dBm/3KHz)	Limit (dBm/3KHz)	Result
2412 MHz	-18.126	8	PASS
2437 MHz	-14.390	8	PASS
2462 MHz	-16.231	8	PASS

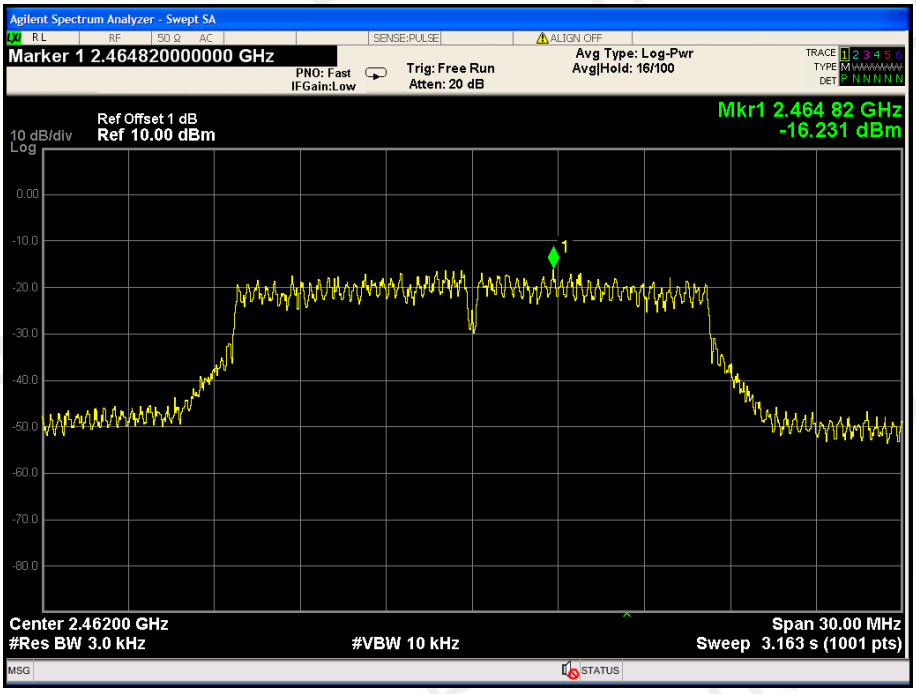
CH: 2412MHz



CH: 2437MHz

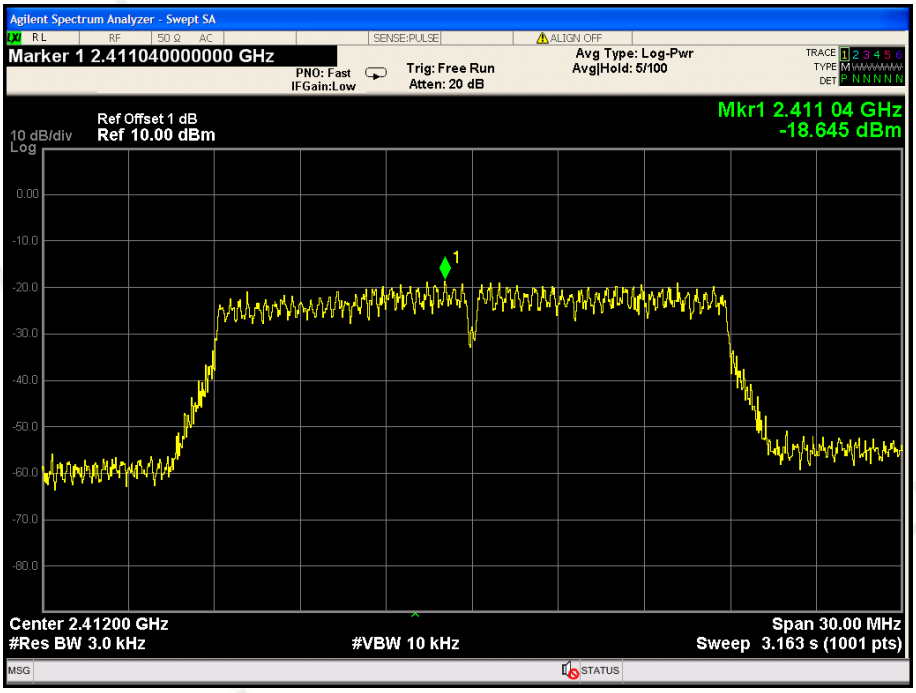


CH: 2462MHz

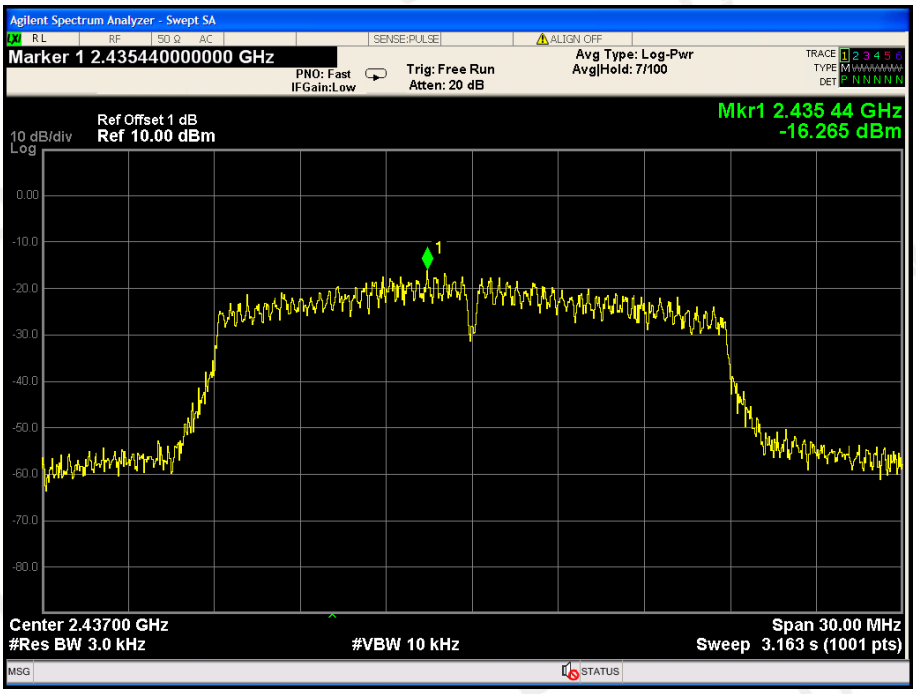


TX 802.11n/HT20 Mode			
Frequency	Power Density (dBm/3KHz)	Limit (dBm/3KHz)	Result
2412 MHz	-18.645	8	PASS
2437 MHz	-16.265	8	PASS
2462 MHz	-18.964	8	PASS

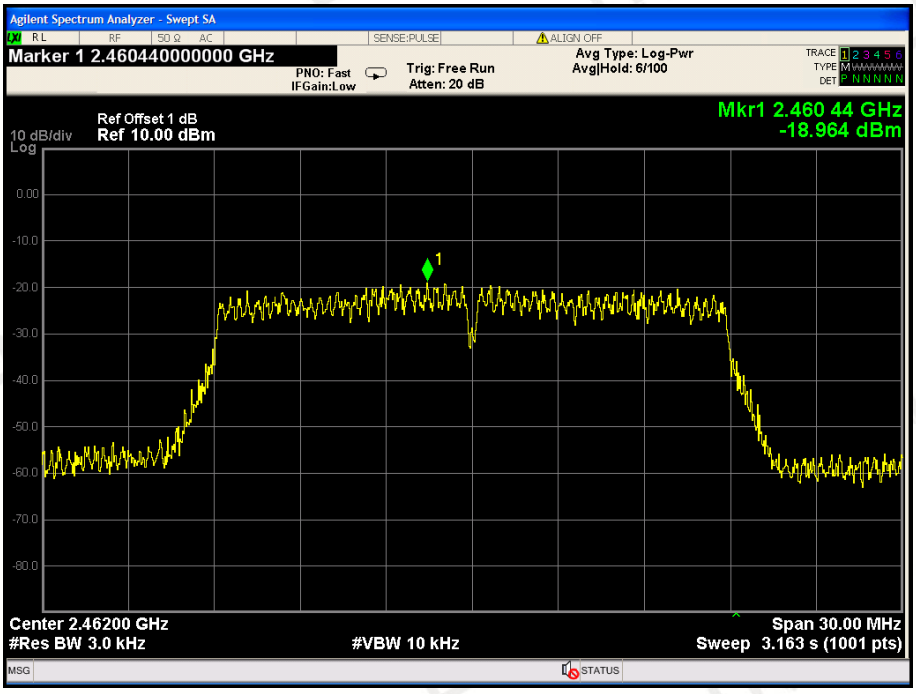
CH: 2412MHz



CH: 2437MHz

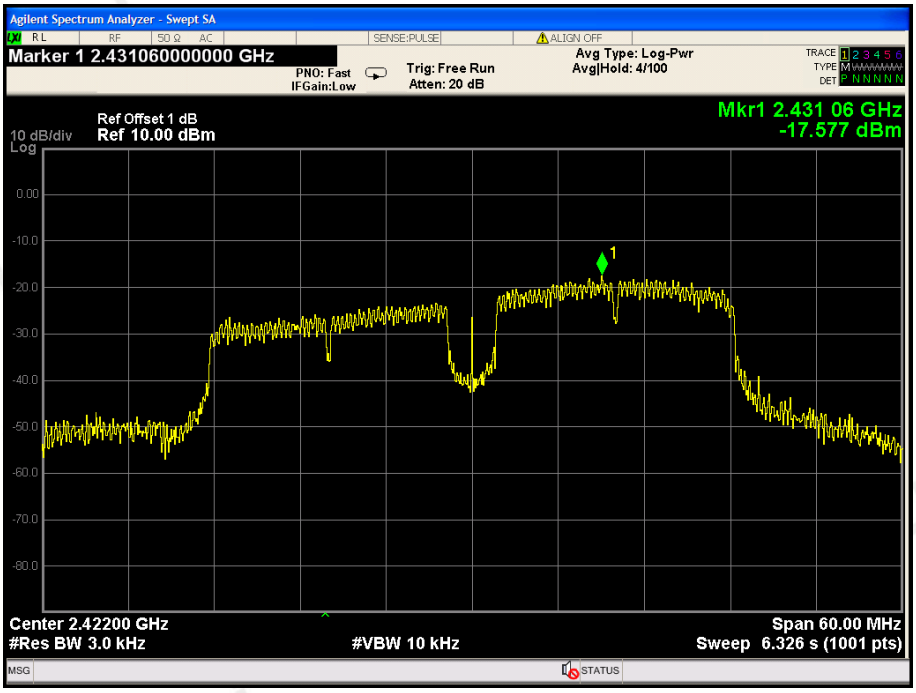


CH: 2462MHz

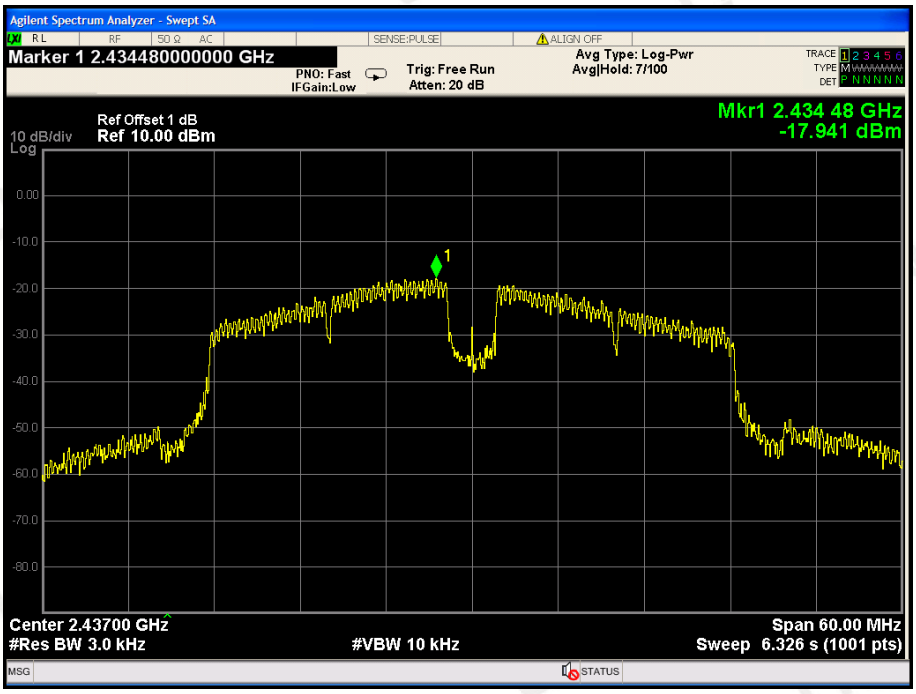


TX 802.11n/HT40 Mode			
Frequency	Power Density (dBm/3KHz)	Limit (dBm/3KHz)	Result
2412 MHz	-17.577	8	PASS
2437 MHz	-17.941	8	PASS
2462 MHz	-18.460	8	PASS

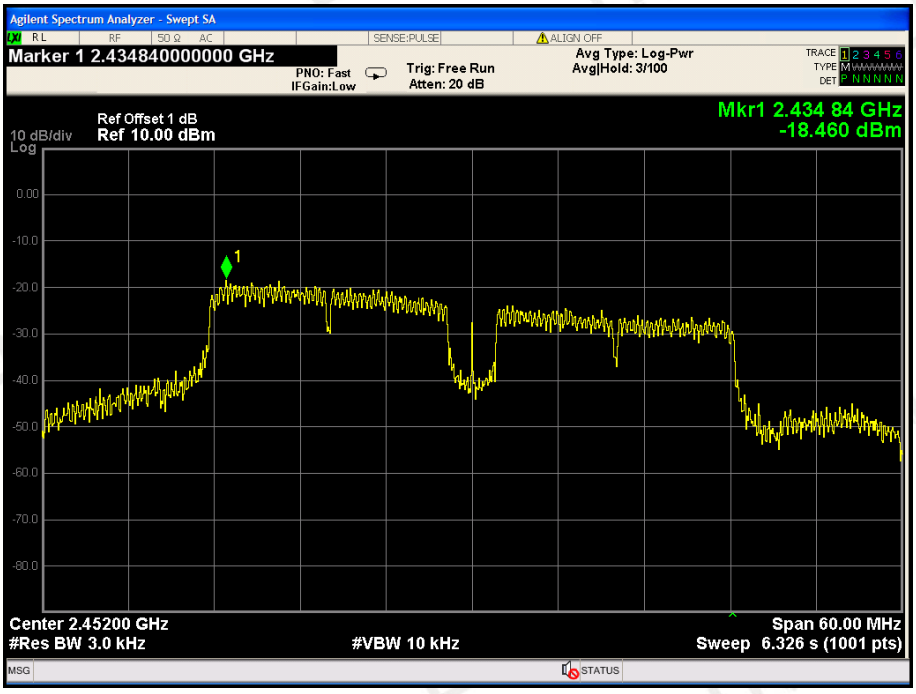
CH: 2422MHz



CH: 2437MHz



CH: 2452MHz



For MIMO antenna port 1+antenna port 2:

TX 802.11n/HT40 Mode			
Frequency	Power Density (dBm/3KHz)	Limit (dBm/3KHz)	Result
2412 MHz	-11.750	8	PASS
2437 MHz	-10.203	8	PASS
2462 MHz	-11.937	8	PASS
TX 802.11n/HT40 Mode			
Frequency	Power Density (dBm/3KHz)	Limit (dBm/3KHz)	Result
2412 MHz	-16.762	8	PASS
2437 MHz	-15.055	8	PASS
2462 MHz	-16.024	8	PASS
TX 802.11n/HT40 Mode			
Frequency	Power Density (dBm/3KHz)	Limit (dBm/3KHz)	Result
2412 MHz	-17.768	8	PASS
2437 MHz	-15.892	8	PASS
2462 MHz	-18.755	8	PASS
TX 802.11n/HT40 Mode			
Frequency	Power Density (dBm/3KHz)	Limit (dBm/3KHz)	Result
2412 MHz	-17.102	8	PASS
2437 MHz	-16.564	8	PASS
2462 MHz	-17.615	8	PASS
Note:1. According to KDB 662911, Result power = $10\log(10^{(ant1/10)}+10^{(ant2/10)})$. 2. Result unit: W, The end result is converted to units of dBm.			

8 PEAK OUTPUT POWER TEST

8.1 Test Limit

FCC Part15(15.247), Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(b)(3)	Peak Output Power	1 watt or 30dBm	2400-2483.5	PASS

8.2 Test Procedure

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. The EUT was directly connected to the Power meter.

8.3 Measurement Equipment Used

Same as Radiated Emission Measurement

8.4 Test Result

PASS

All the test modes completed for test.

TX 802.11b Mode					
Test Channel	Frequency (MHz)	Maximum Peak Conducted Output Power(dBm)			LIMIT (dBm)
		Antenna port 1	Antenna port 2	MIMO	
CH01	2412	9.17	9.24	9.86	30
CH06	2437	9.29	9.11	9.91	30
CH11	2462	9.03	8.95	9.77	30
TX 802.11g Mode					
CH01	2412	8.69	8.87	9.12	30
CH06	2437	8.56	8.71	9.33	30
CH11	2462	8.47	8.62	9.25	30
TX 802.11n20 Mode					
CH01	2412	7.77	7.54	8.55	30
CH06	2437	7.62	7.83	8.47	30
CH11	2462	7.56	7.31	8.32	30
TX 802.11n40 Mode					
CH03	2422	6.79	6.65	7.72	30
CH06	2437	6.95	6.68	7.65	30
CH09	2452	6.84	6.71	7.84	30

9 OUT OF BAND EMISSIONS TEST

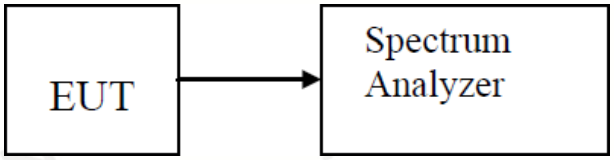
9.1 Test Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

9.2 Test Procedure

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

9.3 Test Setup

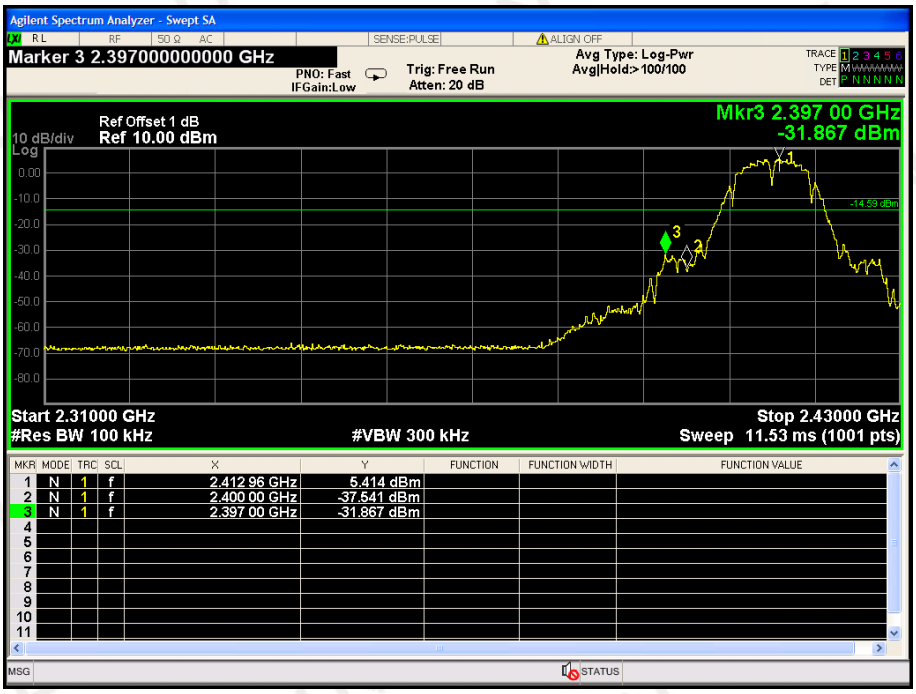


9.4 Test Result

PASS

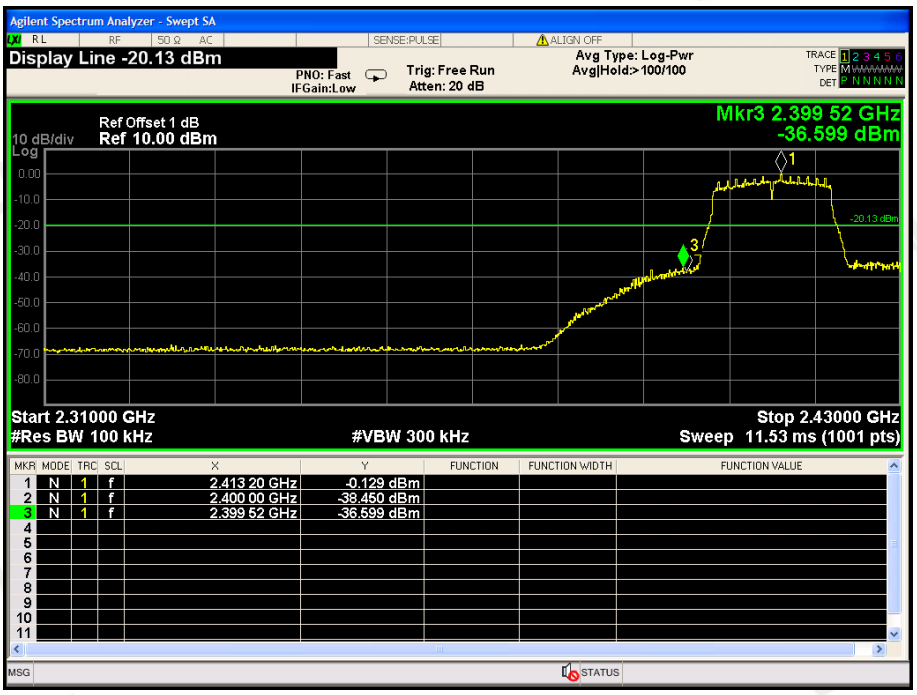
For antenna port 1:

TX 802.11b Mode
CH: 2412MHz



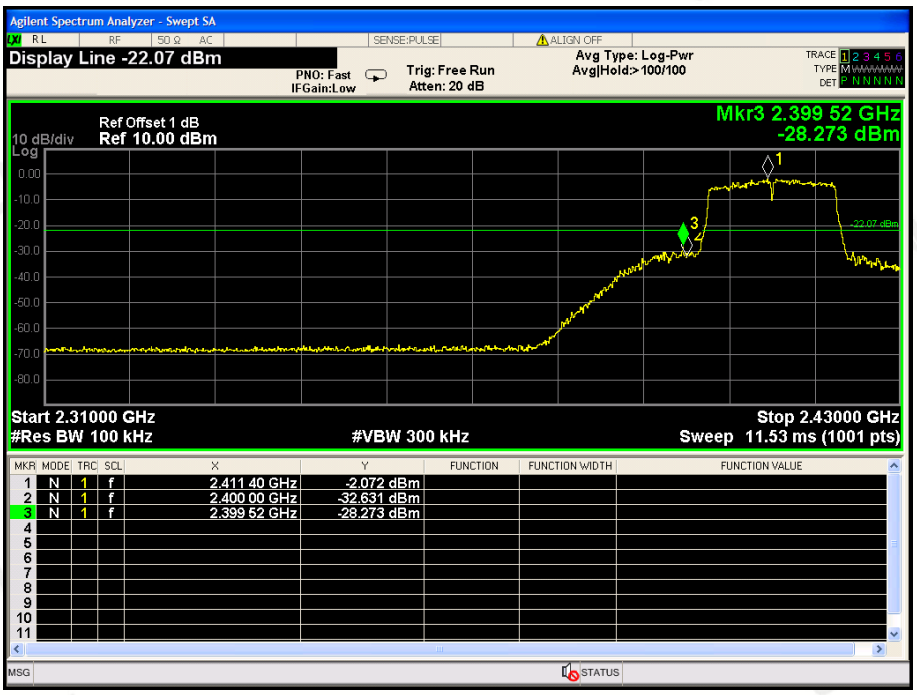
CH: 2462MHz

TX 802.11g Mode
CH: 2412MHz



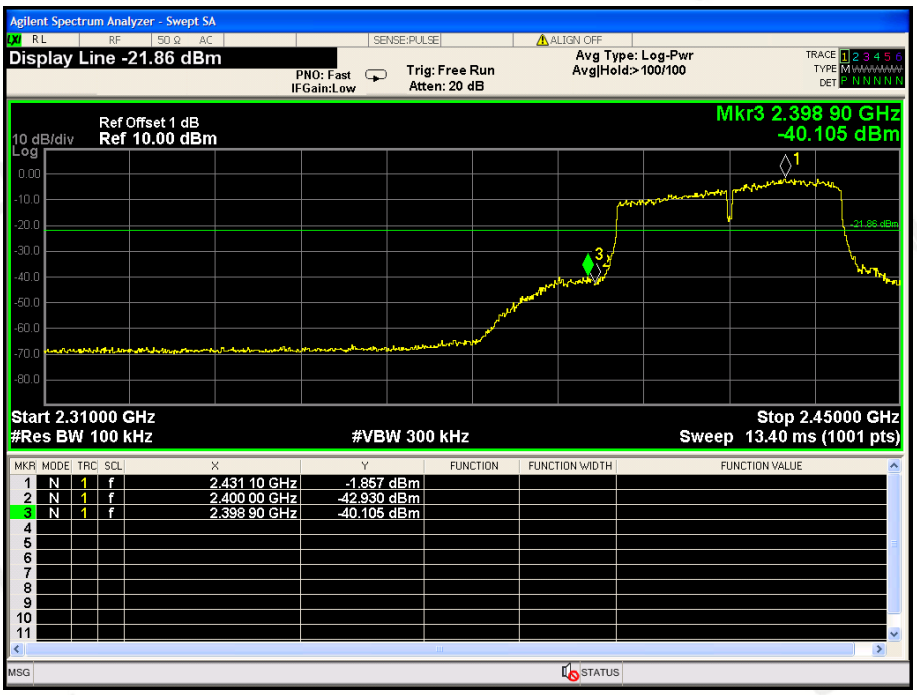
CH: 2462MHz

TX 802.11n/HT20 Mode
CH: 2412MHz



CH: 2462MHz

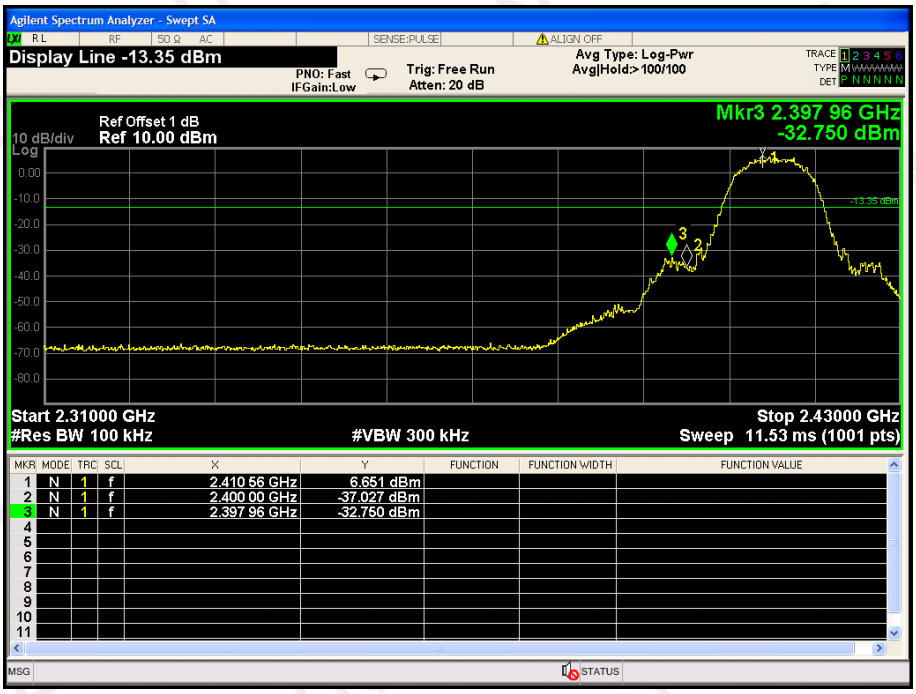
TX 802.11n/HT40 Mode
CH: 2422MHz



CH: 2452MHz

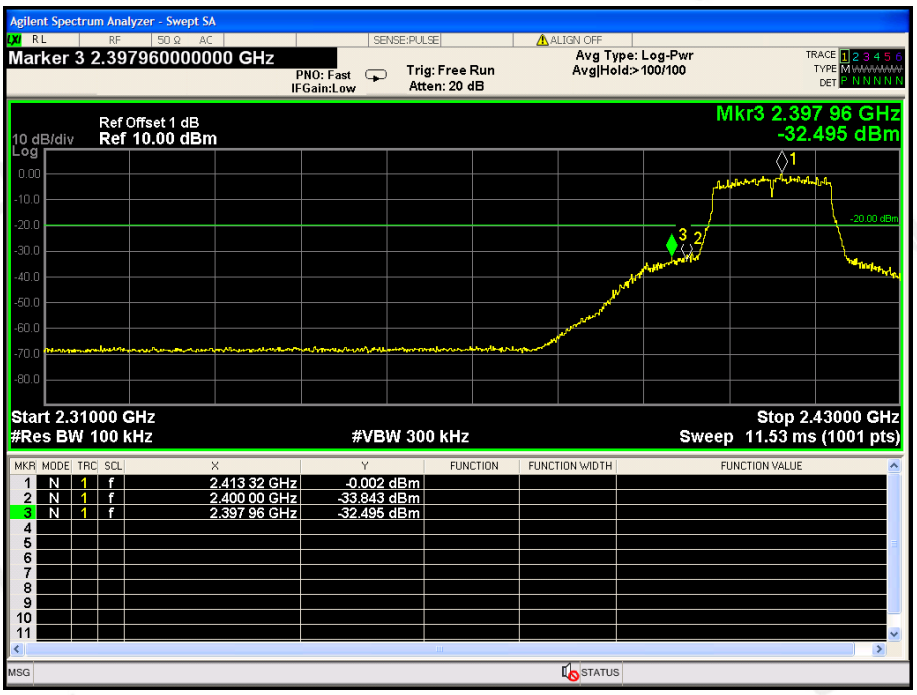
For antenna port 2:

TX 802.11b Mode
CH: 2412MHz



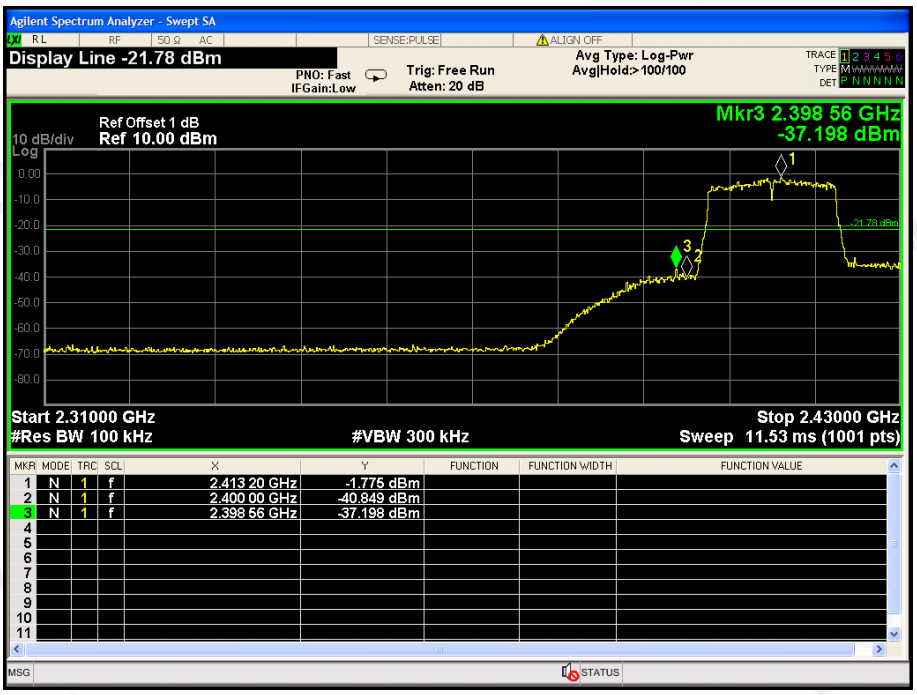
CH: 2462MHz

TX 802.11g Mode
CH: 2412MHz

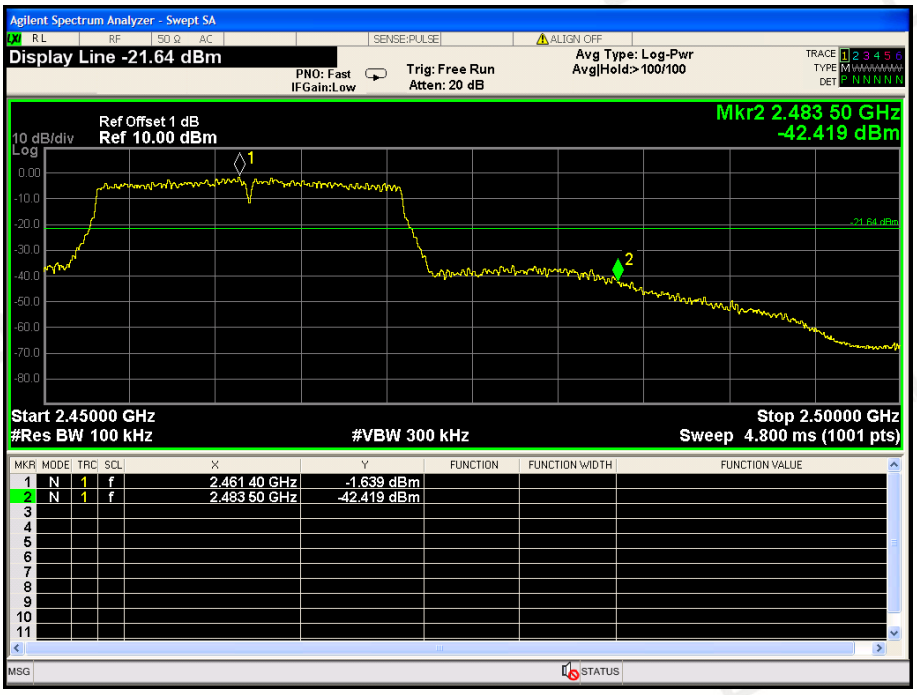


CH: 2462MHz

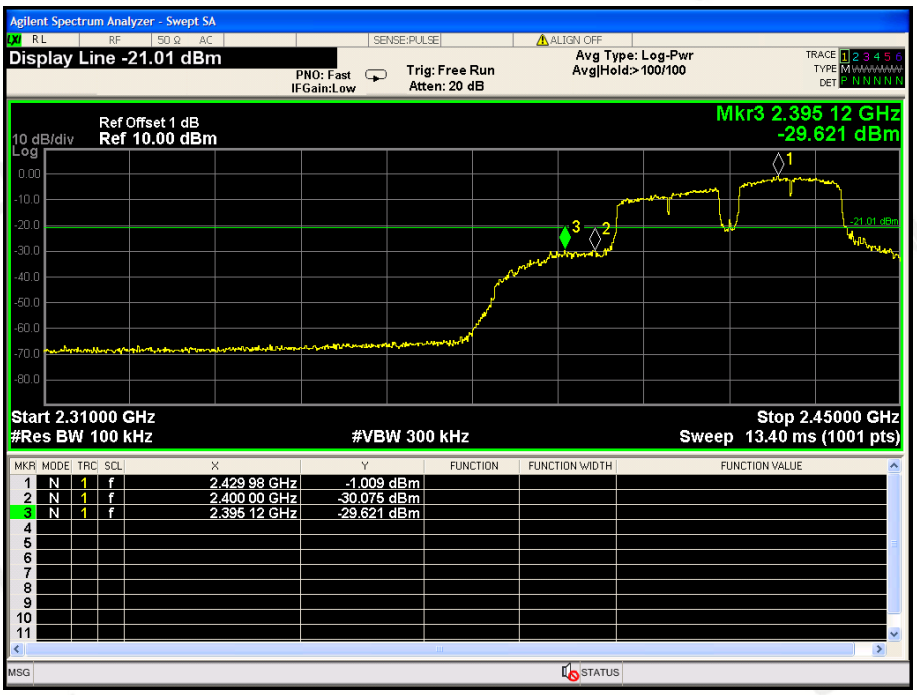
TX 802.11n/HT20 Mode
CH: 2412MHz



CH: 2462MHz



TX 802.11n/HT40 Mode
CH: 2422MHz

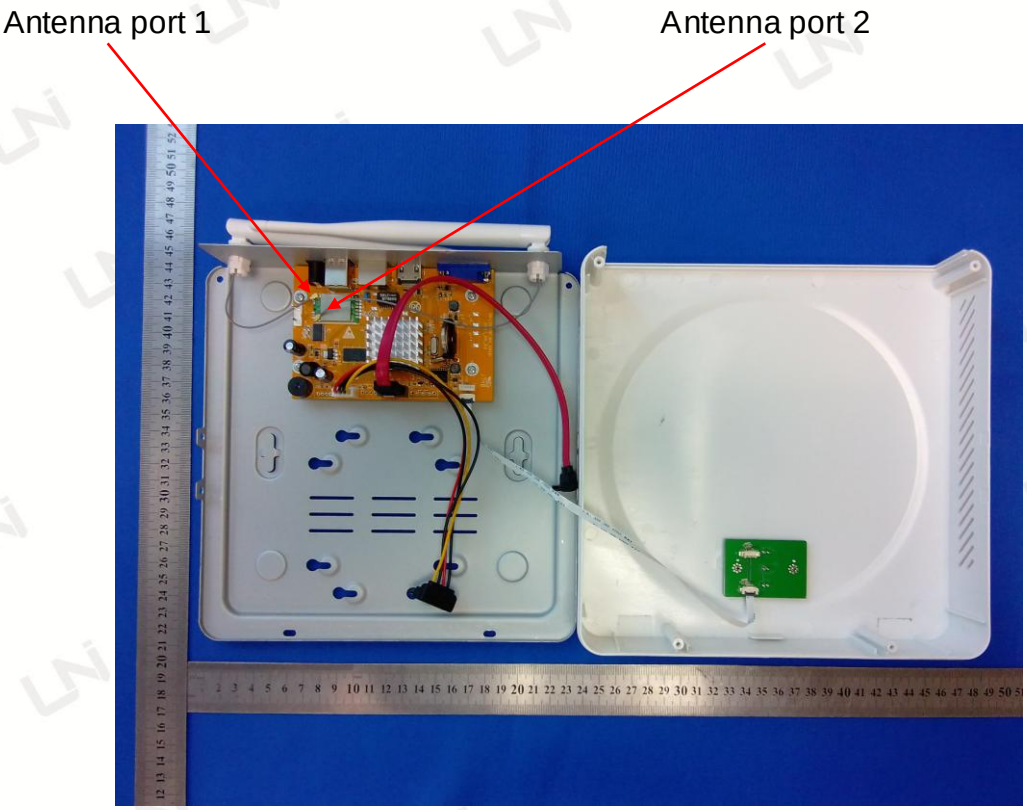


CH: 2452MHz

10 ANTENNA REQUIREMENT

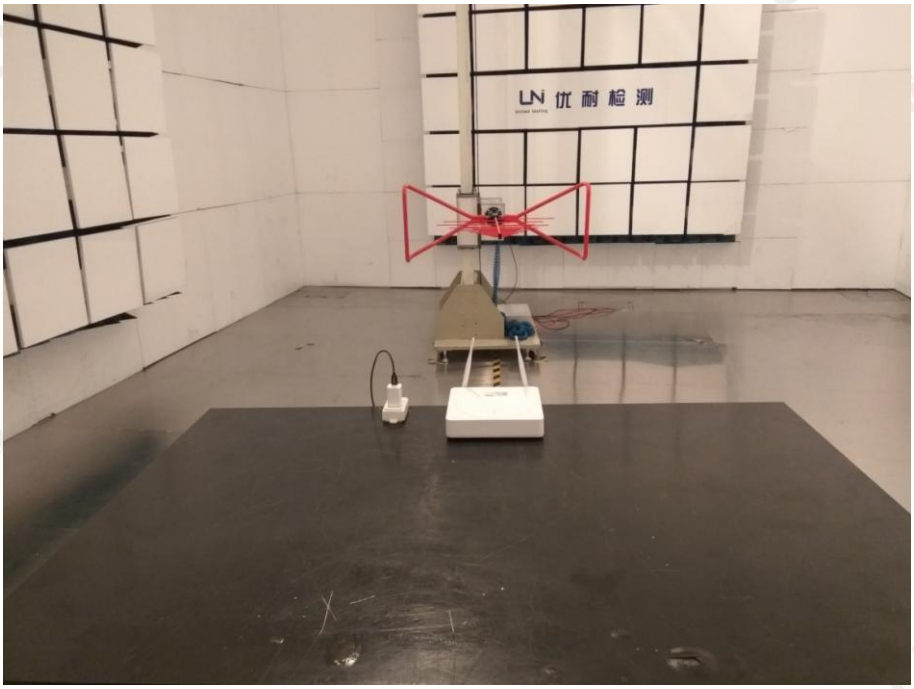
Standard Applicable:
For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

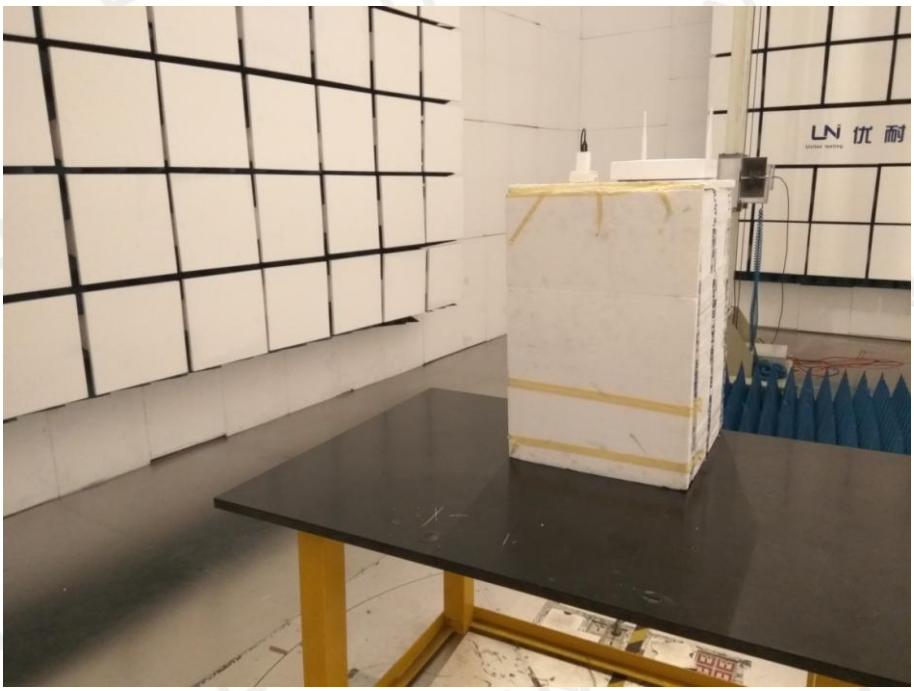
Antenna Connected Construction
The antenna used is a detachable antenna, using a reverse SMA connector (Provided by non-manufacturers will use the product can not work), considered a special connector accepted by the FCC to comply with rule part 15.203. Please see EUT photos for details, it comply with the standard requirement. The directional gains of antenna used for transmitting is 1dBi.



11 PHOTOGRAPH OF TEST

11.1 Radiated Emission





11.2 Conducted Emission

End of Report