FCC TEST REPORT

FCC ID:2ATSQ-ZK902A

Product	:	Vacuum Cleaner
Model Name	:	ZK902A
Additional model	:	ZK902B,ZK902C,ZK902D,ZK902E,ZK902F,ZK902G,ZK902H,ZK902J, ZK902K,ZK902L,ZK902M,ZK902N,ZK902P,ZK902Q,ZK902R,ZK902T, ZK902U,ZK902V,ZK902W
Brand	:	小旋风 Smart Cyclone
Report No.	:	PTC21011300402E-FC03

Prepared for

Dongguan Zhike Intelligent Science and Technology Co., Ltd

#1，Juxin 1st Road，Dalang Town；Dongguan City，Guangdong Province,China

Prepared by

Precise Testing & Certification Co., Ltd.

Building 1, No. 6, Tongxin Road, Dongcheng Street, Dongguan, Guangdong, China.

1 TEST RESULT CERTIFICATION

Applicant's name	:	Dongguan Zhike Intelligent Science and Technology Co., Ltd
Address	:	#1，Juxin 1st Road，Dalang Town；Dongguan City，Guangdong Province,China
Manufacture's name	:	Dongguan Zhike Intelligent Science and Technology Co., Ltd
Address	:	#1，Juxin 1st Road，Dalang Town；Dongguan City，Guangdong Province,China
Product name	:	Vacuum Cleaner
Model name	:	ZK902A
Additional model	:	ZK902B,ZK902C,ZK902D,ZK902E,ZK902F,ZK902G,ZK902H,ZK902J, ZK902K,ZK902L,ZK902M,ZK902N,ZK902P,ZK902Q,ZK902R,ZK902T, ZK902U,ZK902V,ZK902W
Standards	:	FCC CFR47 Part 15 Section 15.247
Test procedure	:	ANSI C63.10: 2013, KDB558074 D01 DTS Meas Guidance v05 KDB662911 D01 Multiple Transmitter Output v02r01
Test Date	:	Jan. 18, 2021 to Mar. 02, 2021
Date of Issue	:	Mar. 02, 2021
Test Result	:	Pass

This device described above has been tested by PTC, 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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Test Engineer:

Leo Yang

Leo Yang / Engineer

Technical Manager:

Chris Du / Manager

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2 Test Summary

Standard Section	Test Item	Result
15.203/15.247(c)	Antenna Requirement	PASS
15.207	Conducted Emission	PASS
15.205/15.209	Spurious Emission	PASS
15.247(b)(3)	Conducted Peak Output Power	PASS
15.247(a)(2)	6dB Occupied Bandwidth	PASS
15.247(e)	Power Spectral Density	PASS
15.247(d)	Band Edge	PASS
Remark: “N/A” is an abbreviation for Not Applicable.		

2.1 Antenna Infomation

Ant No	Brand	Model	AntennaType	Connector	Gain(dbi)
1	-	-	PIFA antenna	-	3.9
2	-	-	PIFA antenna	-	3.9

Note:

The EUT has two antennas,the antennas can support SISO function in IEEE 802.11b and IEEE 802.11g,and can support MIMO function in IEEE 802.11n

The EUT can work as CDD mode in IEEE 802.11n HT20 and can operate with one spatial stream

According to ANSI C63.10:2013 14.4.3.2.5 a):

Directional gain=3.9dbi+10xlog(2/1)db=6.91dBi＞6dBi

After pre-test all antenna configurations,the worst case configuration as list below.

TX Mode \ ANT	SISO Configuration	MIMO Configuration
IEEE 802.11B	ANT1 and ANT2	/
IEEE 802.11G	ANT1 and ANT2	/
IEEE 802.11n HT20	/	ANT1 and ANT2
IEEE 802.11n HT40	/	/

3 General Information

3.1 General Description of E.U.T.

Product Name	:	Vacuum Cleaner
Model Name	:	ZK902A
Additional model		ZK902B,ZK902C,ZK902D,ZK902E,ZK902F,ZK902G,ZK902H,ZK902J, ZK902K,ZK902L,ZK902M,ZK902N,ZK902P,ZK902Q,ZK902R,ZK902T, ZK902U,ZK902V,ZK902W Note:The appearance of the product is different in color , and the PCB board is the same. So choose ZK902A as the main test model
Specification	:	802.11b/g/n HT20
Operation Frequency	:	2412-2462MHz for 802.11b; 2412-2462MHz for 802.11g; 2412-2462MHz for 802.11n(HT20);
Number of Channel	:	11 Channels for 802.11b; 11 Channels for 802.11g; 11 Channels for 802.11n(HT20);
Type of Modulation	:	DSSS with DBPSK/DQPSK/CCK for 802.11b; OFDM with BPSK/QPSK/16QAM/64QAM for 802.11g/n;
Antenna installation	:	PIFA Antenna
Antenna Gain	:	3.9dBi
The directional gain	:	6.91dBi
Power supply	:	Input:AC100-240V,50/60Hz, 0.8A Output : DC 24V-1A
Hardware Version	:	VER 1.2
Software Version	:	N/A

3.2 Channel List

The EUT has been tested under its typical operating condition.

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

The Transmitter was operated in the normal operating mode. The TX frequency was fixed which was for the purpose of the measurements.

Test of channel included the lowest and middle and highest frequency to perform the test, then record on this report.

Those data rates (802.11b: 1 Mbps; 802.11g: 6 Mbps; 802.11n (HT20): MCS0;) were used for all test.

Pre-defined engineering program for regulatory testing used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

Frequency and Channel list for 802.11 b/g/n (HT20)

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2412	5	2432	9	2452
2	2417	6	2437	10	2457
3	2422	7	2442	11	2462
4	2427	8	2447		

Test Frequency and Channel for 802.11 b/g/n (HT20):

Lowest Frequency		Middle Frequency		Highest Frequency	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2412	6	2437	11	2462

3.3 Test Site

Precise Testing & Certification Co., Ltd.

Building 1, No. 6, Tongxin Road, Dongcheng Street, Dongguan, Guangdong, China

FCC Registration Number: 790290

A2LA Certificate No.: 4408.01

IC Registration Number: 12191A-1

4 Equipment During Test

4.1 Equipments List

RF Conducted Test

Name of Equipment	Manufacturer	Model	Serial No.	Characteristics	Calibration Due
MXG Signal Analyzer	Agilent	N9020A	SER MY5111038	10Hz-30GHz	Aug. 21, 2021
Coaxial Cable	CDS	79254	46107086	10Hz-30GHz	Aug. 21, 2021
Power Meter	Anritsu	ML2495A	0949003	300MHz-40GHz	Aug. 21, 2021
Power Sensor	Anritsu	MA2411B	0917017	300MHz-40GHz	Aug. 21, 2021

Remark: The temporary antenna connector is soldered on the PCB board in order to perform conducted tests and this temporary antenna connector is listed in the equipment list.

Radiated Emissions

Name of Equipment	Manufacturer	Model	Serial No.	Characteristics	Calibration Due
EMI Test Receiver	Rohde&Schwarz	ESCI	101417	9KHz-3GHz	Aug. 21, 2021
Loop Antenna	Schwarzbeck	FMZB 1519	012	9 KHz -30MHz	Aug. 21, 2021
Bilog Antenna	SCHWARZBECK	VULB9160	9160-3355	25MHz-2GHz	Aug. 21, 2021
Preamplifier (low frequency)	SCHWARZBECK	BBV 9475	9745-0013	1MHz-1GHz	Aug. 21, 2021
Cable	Schwarzbeck	PLF-100	549489	9KHz-3GHz	Aug. 21, 2021
Spectrum Analyzer	Agilent	E4407B	MY45109572	9KHz-40GHz	Aug. 21, 2021
Horn Antenna	SCHWARZBECK	9120D	9120D-1246	1GHz-18GHz	Aug. 21, 2021
Power Amplifier	LUNAR EM	LNA1G18-40	J10100000081	1GHz-26.5GHz	Aug. 21, 2021
Horn Antenna	SCHWARZBECK	BBHA 9170	9170-181	14GHz-40GHz	Aug. 21, 2021
Amplifier	SCHWARZBECK	BBV 9721	9721-205	18GHz-40GHz	Aug. 21, 2021
Cable	H+S	CBL-26	N/A	1GHz-26.5GHz	Aug. 21, 2021
RF Cable	R&S	R204	R21X	1GHz-40GHz	Aug. 21, 2021

Conducted Emissions

Name of Equipment	Manufacturer	Model	Serial No.	Characteristics	Calibration Due
EMI Test Receiver	Rohde&Schwarz	ESCI	101417	9KHz-3GHz	Aug. 19, 2021
Artificial Mains Network	Rohde&Schwarz	ENV216	102453	9KHz-300MHz	Aug. 19, 2021
Artificial Mains Network	Rohde&Schwarz	ENV216	101342	9KHz-300MHz	Aug. 19, 2021

4.2 Measurement Uncertainty

Parameter	Uncertainty
RF output power, conducted	±1.0dB
Power Spectral Density, conducted	±2.2dB
Radio Frequency	± 1 x 10^{-6}
Bandwidth	± 1.5 x 10^{-6}
Time	±2%
Duty Cycle	±2%
Temperature	±1°C
Humidity	±5%
DC and low frequency voltages	±3%
Conducted Emissions (150kHz~30MHz)	±3.64dB
Radiated Emission(30MHz~1GHz)	±5.03dB
Radiated Emission(1GHz~25GHz)	±4.74dB

4.3 Description of Support Units

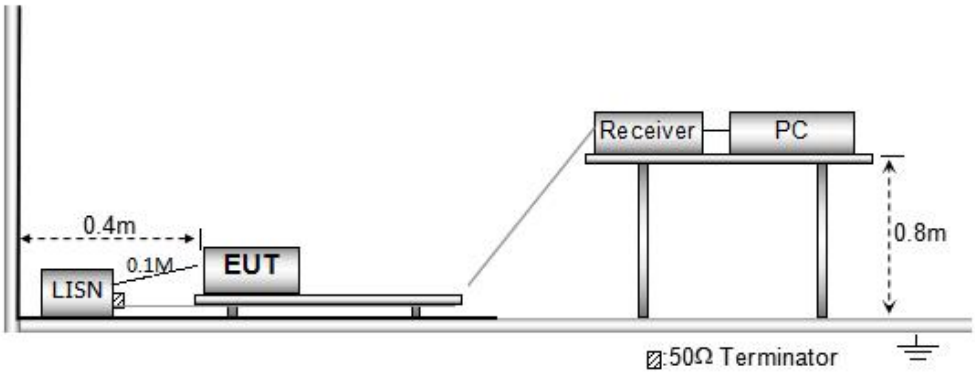
Equipment	Model No.	Series No.
N/A	Input: AC 100-240V, 50-60Hz Output: DC 24V, 1A,	N/A

5 Conducted Emission Test

5.1 Test Standard and Limit

Test Standard	FCC Part15 Section 15.207		
Test Limit	Frequency	Maximum RF Line Voltage (dBuV)	
		Quasi-peak Level	Average Level
	150kHz~500kHz	66 ~ 56 *	56 ~ 46 *
	500kHz~5MHz	56	46
	5MHz~30MHz	60	50
Remark: (1) *Decreasing linearly with logarithm of the frequency. (2) The lower limit shall apply at the transition frequency.			

5.2 Test Setup



5.3 Test Procedure

The EUT system is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm coupling impedance for the EUT system. Please refer the block diagram of the test setup and photographs. Both sides of AC line are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to FCC ANSI C63.10-2013 on Conducted Emission Measurement.

The bandwidth of test receiver (ESCI) set at 9kHz.

The frequency range from 150kHz to 30MHz is checked.

5.4 Test Data

Note:All adapters have been tested,and the worst adapter data in the report:K25V240100U.

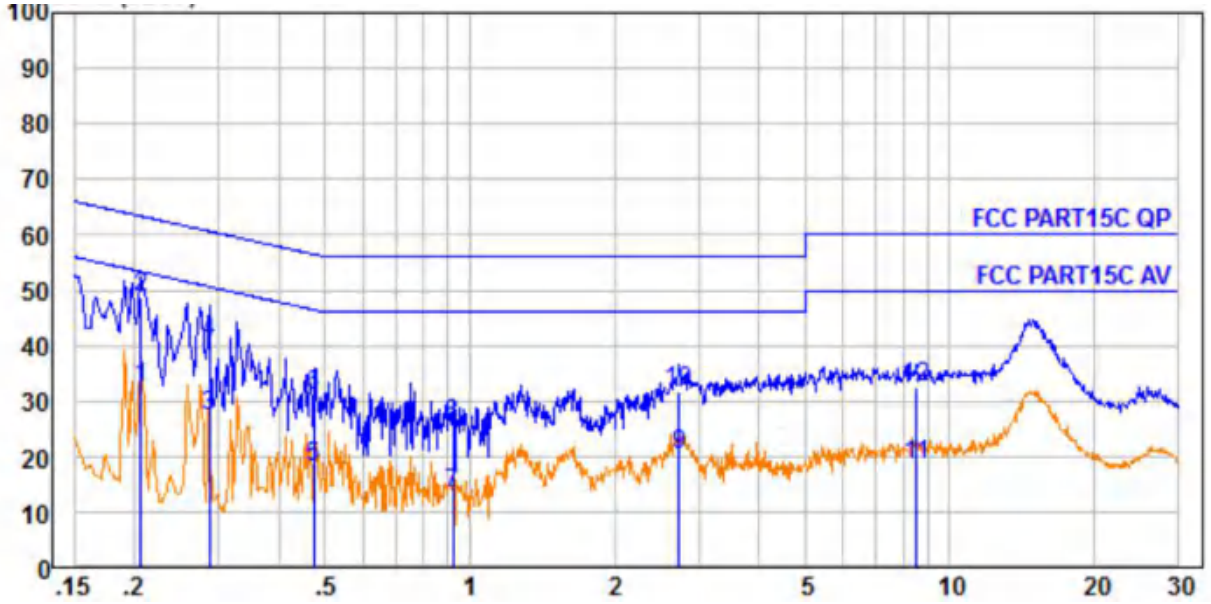
Conducted Emission Test Data

Operating Condition: 802.11b CH01

Test Specification: AC 120V/60Hz

Comment: Live Line

Tem.: 23.1℃ Hum.: 54.6%



No.	Freq MHz	Cable Loss dB	AMN Factor dB	Receiver Reading dBµV	Emission Level dBµV	Limit dBµV	Over Limit dB	Remark
1.	0.206	0.29	9.59	22.62	32.50	53.36	-20.86	Average
2.	0.206	0.29	9.59	38.87	48.75	63.36	-14.61	QP
3.	0.286	0.36	9.60	17.23	27.19	50.63	-23.44	Average
4.	0.286	0.36	9.60	30.59	40.55	60.63	-20.08	QP
5.	0.474	0.42	9.61	7.94	17.97	46.45	-28.48	Average
6.	0.474	0.42	9.61	20.79	30.82	56.45	-25.63	QP
7.	0.923	0.46	9.61	3.25	13.32	46.00	-32.68	Average
8.	0.923	0.46	9.61	15.64	25.71	56.00	-30.29	QP
9.	2.736	0.47	9.62	10.36	20.45	46.00	-25.55	Average
10.	2.736	0.47	9.62	21.74	31.83	56.00	-24.17	QP
11.	8.546	0.56	9.75	8.22	18.53	50.00	-31.47	Average
12.	8.546	0.56	9.75	22.02	32.33	60.00	-27.67	QP

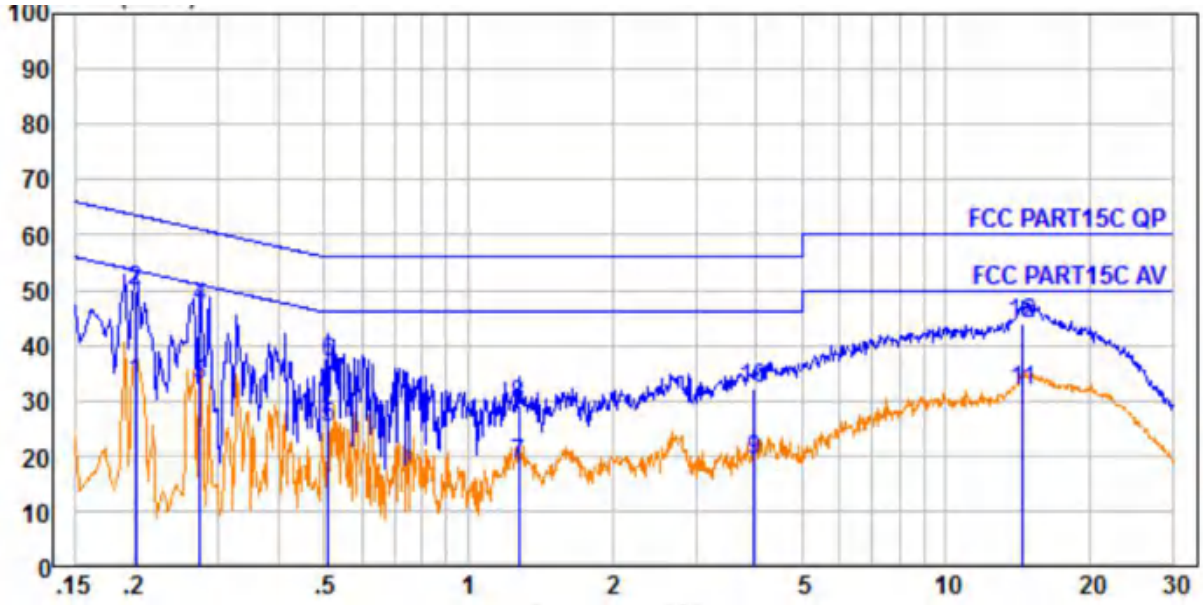
Conducted Emission Test Data

Operating Condition: 802.11b CH01

Test Specification: AC 120V/60Hz

Comment: Neutral Line

Tem.: 23.1℃ Hum.: 54.6%



No.	Freq MHz	Cable Loss dB	AMN Factor dB	Receiver Reading dBμV	Emission Level dBμV	Limit dBμV	Over Limit dB	Remark
1.	0.202	0.28	9.61	23.25	33.14	53.54	-20.40	Average
2.	0.202	0.28	9.61	40.06	49.95	63.54	-13.59	QP
3.	0.274	0.35	9.62	22.79	32.76	50.98	-18.22	Average
4.	0.274	0.35	9.62	36.99	46.96	60.98	-14.02	QP
5.	0.510	0.43	9.63	14.88	24.94	46.00	-21.06	Average
6.	0.510	0.43	9.63	26.84	36.90	56.00	-19.10	QP
7.	1.276	0.46	9.64	8.19	18.29	46.00	-27.71	Average
8.	1.276	0.46	9.64	19.23	29.33	56.00	-26.67	QP
9.	3.964	0.47	9.68	9.01	19.16	46.00	-26.84	Average
10.	3.964	0.47	9.68	22.00	32.15	56.00	-23.85	QP
11.	14.517	0.56	9.84	21.49	31.89	50.00	-18.11	Average
12.	14.517	0.56	9.84	33.64	44.04	60.00	-15.96	QP

6 . Radiation Spurious Emission and Band Edge

6.1 . Test Standard and Limit

Test Standard	FCC Part15 C Section 15.209 and 15.205				
Test Limit	Frequency (MHz)	Field strength (microvolt/meter)	Limit (dBuV/m)	Remark	Measurement distance (m)
	0.009MHz~0.490MHz	2400/F(kHz)	-	-	300
	0.490MHz-1.705MHz	24000/F(kHz)	-	-	30
	1.705MHz-30MHz	30	-	-	30
	30MHz~88MHz	100	40.0	Quasi-peak	3
	88MHz~216MHz	150	43.5	Quasi-peak	3
	216MHz~960MHz	200	46.0	Quasi-peak	3
	960MHz~1000MHz	500	54.0	Quasi-peak	3
	Above 1000MHz	500	54.0	Average	3
		-	74.0	Peak	3

Remark:

(1)The lower limit shall apply at the transition frequency.

(2) 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.

6.2 Test Setup

Figure 1. Below 30MHz

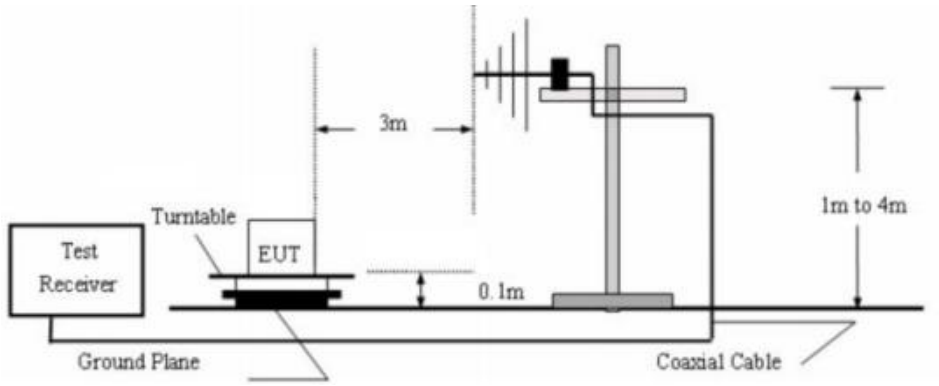
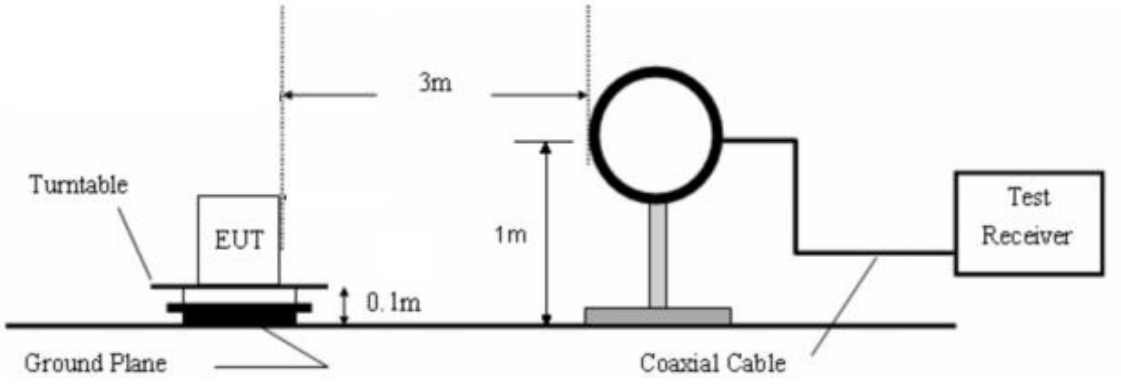


Figure 2. 30MHz to



1GHz

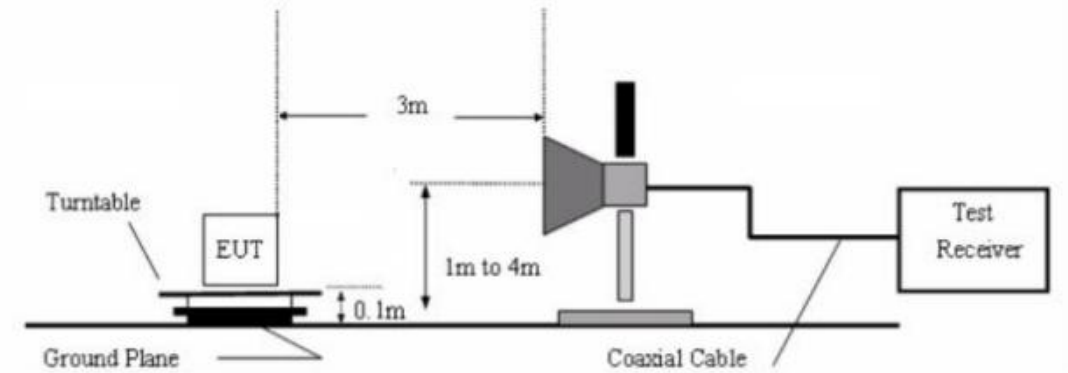


Figure 3. Above 1 GHz

6.3 Test Procedure

For below 1GHz: The EUT is placed on a turntable, which is 0.1m above the ground plane.

For above 1GHz: The EUT is placed on a turntable, which is 0.1m above the ground plane.

The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT is set 3 meters away from the receiving antenna which is mounted on a antenna tower. The antenna can be moved up and down from 1 to 4 meters to find out the maximum emission level. Rotated the EUT through three orthogonal axes to determine the maximum emissions, both horizontal and vertical polarization of the antenna are set on test. The EUT is tested in 9*6*6 Chamber. The device is evaluated in xyz orientation.

For the radiated emission test above 1GHz:

Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.

For 9kHz to 150kHz, Set the spectrum analyzer as:
RBW = 200Hz, VBW =1kHz, Detector= Quasi-Peak, Trace mode= Max hold, Sweep- auto couple.
For 150kHz to 30MHz, Set the spectrum analyzer as:
RBW = 9KHz, VBW =30kHz, Detector= Quasi-Peak, Trace mode= Max hold, Sweep- auto couple.
For 30MHz to 1000MHz, Set the spectrum analyzer as:
RBW = 100kHz, VBW =300kHz, Detector= Quasi-Peak, Trace mode= Max hold, Sweep- auto couple.
For above 1GHz,Set the spectrum analyzer as:
RBW =1MHz, VBW =1MHz, Detector= Peak, Trace mode= Max hold, Sweep- auto couple.
RBW =1MHz, VBW =10Hz, Detector= Average, Trace mode= Max hold, Sweep- auto couple.

6.4 Test Data

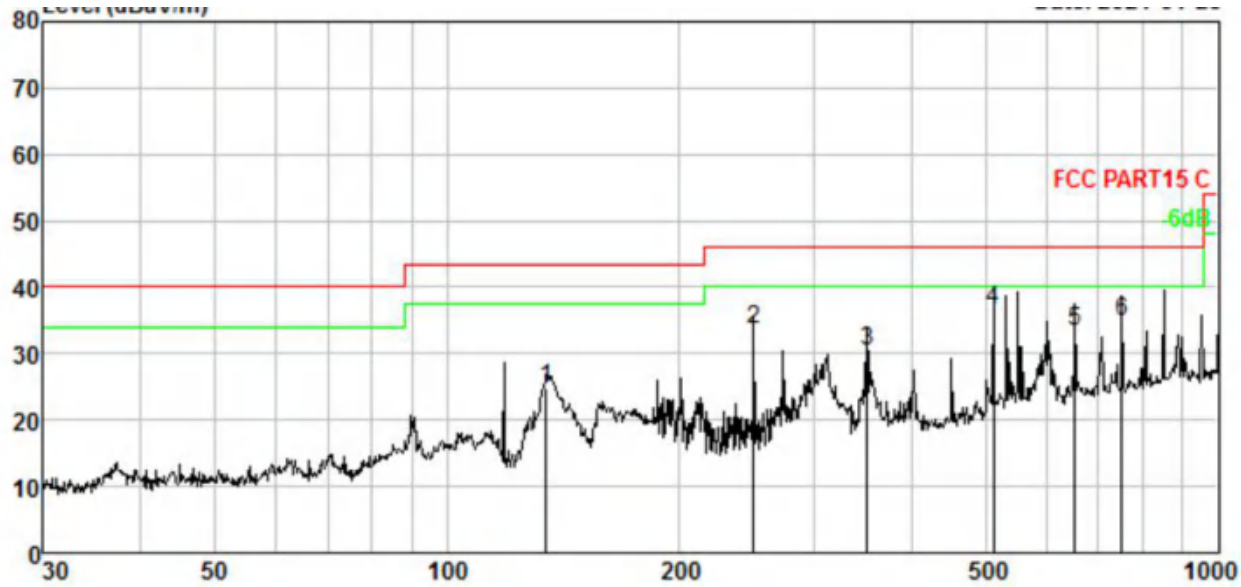
PASS

During the test, Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the X-axis is the worst case.
The test results of 9kHz-30MHz was attenuated more than 20dB below the permissible limits, so the results don't record in the report.
During the test, pre-scan all modes, and found the 802.11b CH01 of ANT A which is the worst case, only the worst case is recorded in the report.

All adapters have been tested,and the worst adapter data in the report:K25V240100U.

Test Results (30~1000MHz)

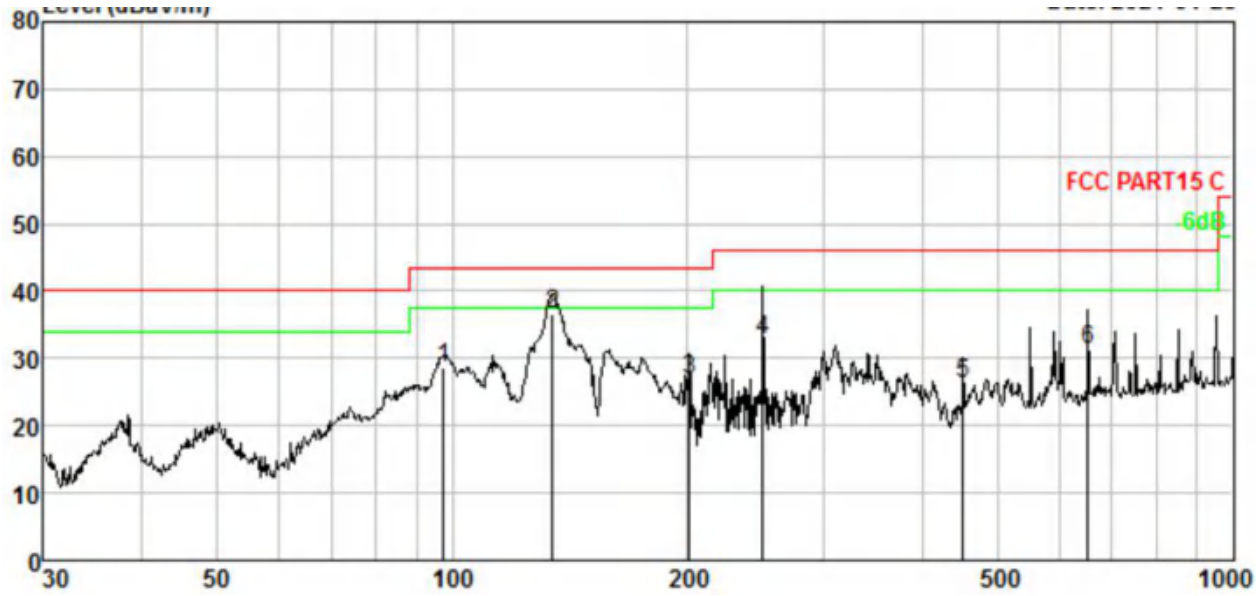
Temp.(℃)/Hum.(%RH):	24.5℃/52%RH	Polarization:	Horizontal
Standard:	FCC PART 15C	Power Source:	AC 120V/60Hz
Test Mode:	802.11b CH01		



No.	Freq MHz	Cable Loss dB	ANT Factor dB/m	Receiver Reading dBuV	Preamp Factor dB	Emission Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark
1.	134.559	3.78	12.97	38.10	30.01	24.84	43.50	-18.66	QP
2.	250.301	4.85	12.50	46.39	30.19	33.55	46.00	-12.45	QP
3.	350.477	5.43	14.40	41.24	30.53	30.54	46.00	-15.46	QP
4.	511.835	6.08	17.44	44.00	30.91	36.61	46.00	-9.39	QP
5.	651.942	6.50	19.62	38.42	31.05	33.49	46.00	-12.51	QP
6.	750.108	6.74	20.70	38.48	31.13	34.79	46.00	-11.21	QP

Test Results (30~1000MHz)

Temp.(℃)/Hum.(%RH):	24.5℃/52%RH	Polarization:	Vertical
Standard:	FCC PART 15C	Power Source:	AC 120V/60Hz
Test Mode:	802.11b CH01		



No.	Freq MHz	Cable Loss dB	ANT Factor dB/m	Receiver Reading dBuV	Preamp Factor dB	Emission Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark
1.	97.456	3.23	9.35	45.93	29.99	28.52	43.50	-14.98	QP
2.	134.559	3.78	12.97	49.87	30.01	36.61	43.50	-6.89	QP
3.	201.393	4.47	11.05	41.25	30.04	26.73	43.50	-16.77	QP
4.	250.301	4.85	12.50	45.58	30.19	32.74	46.00	-13.26	QP
5.	451.135	5.86	15.93	35.20	30.81	26.18	46.00	-19.82	QP
6.	651.942	6.50	19.62	36.10	31.05	31.17	46.00	-14.83	QP

Test Results (Above 1000MHz)

Test Mode: 802.11b Mode					Test channel: Lowest			
Peak Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
4824.00	40.47	32.29	4.10	28.45	48.41	74.00	-25.59	V
7236.00	34.33	35.99	6.22	27.83	48.71	74.00	-25.29	V
9648.00	32.79	38.11	7.83	25.10	53.63	74.00	-20.37	V
4824.00	39.11	32.29	4.10	28.45	47.05	74.00	-26.95	H
7236.00	34.06	35.99	6.22	27.83	48.44	74.00	-25.56	H
9648.00	32.37	38.11	7.83	25.10	53.21	74.00	-20.79	H
Average Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
4824.00	29.54	32.29	4.10	28.45	37.48	54.00	-16.52	V
7236.00	23.19	35.99	6.22	27.83	37.57	54.00	-16.43	V
9648.00	23.14	38.11	7.83	25.10	43.98	54.00	-10.02	V
4824.00	28.64	32.29	4.10	28.45	36.58	54.00	-17.42	H
7236.00	22.64	35.99	6.22	27.83	37.02	54.00	-16.98	H
9648.00	22.11	38.11	7.83	25.10	42.95	54.00	-11.05	H

Test Results (Above 1000MHz)

Test Mode: 802.11b Mode					Test channel: Middle			
Peak Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
4874.00	39.50	32.35	4.12	28.44	47.53	74.00	-26.47	V
7311.00	34.38	36.08	6.30	27.74	49.02	74.00	-24.98	V
9748.00	33.80	38.25	7.91	24.65	55.31	74.00	-18.69	V
4874.00	39.95	32.35	4.12	28.44	47.98	74.00	-26.02	H
7311.00	33.01	36.08	6.30	27.74	47.65	74.00	-26.35	H
9748.00	33.68	38.25	7.91	24.65	55.19	74.00	-18.81	H
Average Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
4874.00	30.34	32.35	4.12	28.44	38.37	54.00	-15.63	V
7311.00	22.69	36.08	6.30	27.74	37.33	54.00	-16.67	V
9748.00	23.05	38.25	7.91	24.65	44.56	54.00	-9.44	V
4874.00	30.06	32.35	4.12	28.44	38.09	54.00	-15.91	H
7311.00	22.10	36.08	6.30	27.74	36.74	54.00	-17.26	H
9748.00	23.40	38.25	7.91	24.65	44.91	54.00	-9.09	H

Test Results (Above 1000MHz)

Test Mode: 802.11b Mode					Test channel: Highest			
Peak Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
4924.00	45.13	32.41	4.14	28.42	53.26	74.00	-20.74	V
7386.00	35.12	36.15	6.36	27.68	49.95	74.00	-24.05	V
9848.00	37.14	38.35	7.97	24.33	59.13	74.00	-14.87	V
4924.00	44.40	32.41	4.14	28.42	52.53	74.00	-21.47	H
7386.00	34.00	36.15	6.36	27.68	48.83	74.00	-25.17	H
9848.00	33.30	38.35	7.97	24.33	55.29	74.00	-18.71	H
Average Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
4924.00	36.03	32.41	4.14	28.42	44.16	54.00	-9.84	V
7386.00	25.03	36.15	6.36	27.68	39.86	54.00	-14.14	V
9848.00	25.64	38.35	7.97	24.33	47.63	54.00	-6.37	V
4924.00	34.75	32.41	4.14	28.42	42.88	54.00	-11.12	H
7386.00	23.39	36.15	6.36	27.68	38.22	54.00	-15.78	H
9848.00	22.56	38.35	7.97	24.33	44.55	54.00	-9.45	H

Test Results (Above 1000MHz)

Test Mode: 802.11G Mode					Test channel: Lowest			
Peak Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
4824.00	41.00	32.29	4.10	28.45	48.94	74.00	-25.06	V
7236.00	34.66	35.99	6.22	27.83	49.04	74.00	-24.96	V
9648.00	33.03	38.11	7.83	25.10	53.87	74.00	-20.13	V
4824.00	39.56	32.29	4.10	28.45	47.50	74.00	-26.50	H
7236.00	34.36	35.99	6.22	27.83	48.74	74.00	-25.26	H
9648.00	32.59	38.11	7.83	25.10	53.43	74.00	-20.57	H
Average Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
4824.00	30.03	32.29	4.10	28.45	37.97	54.00	-16.03	V
7236.00	23.52	35.99	6.22	27.83	37.90	54.00	-16.10	V
9648.00	23.37	38.11	7.83	25.10	44.21	54.00	-9.79	V
4824.00	29.06	32.29	4.10	28.45	37.00	54.00	-17.00	H
7236.00	22.93	35.99	6.22	27.83	37.31	54.00	-16.69	H
9648.00	22.32	38.11	7.83	25.10	43.16	54.00	-10.84	H

Test Results (Above 1000MHz)

Test Mode: 802.11G Mode					Test channel: Middle			
Peak Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
4874.00	39.93	32.35	4.12	28.44	47.96	74.00	-26.04	V
7311.00	34.66	36.08	6.30	27.74	49.30	74.00	-24.70	V
9748.00	34.00	38.25	7.91	24.65	55.51	74.00	-18.49	V
4874.00	40.32	32.35	4.12	28.44	48.35	74.00	-25.65	H
7311.00	33.25	36.08	6.30	27.74	47.89	74.00	-26.11	H
9748.00	33.87	38.25	7.91	24.65	55.38	74.00	-18.62	H
Average Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
4874.00	30.74	32.35	4.12	28.44	38.77	54.00	-15.23	V
7311.00	22.96	36.08	6.30	27.74	37.60	54.00	-16.40	V
9748.00	23.24	38.25	7.91	24.65	44.75	54.00	-9.25	V
4874.00	30.40	32.35	4.12	28.44	38.43	54.00	-15.57	H
7311.00	22.33	36.08	6.30	27.74	36.97	54.00	-17.03	H
9748.00	23.57	38.25	7.91	24.65	45.08	54.00	-8.92	H

Test Results (Above 1000MHz)

Test Mode: 802.11G Mode					Test channel: Highest			
Peak Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
4924.00	45.89	32.41	4.14	28.42	54.02	74.00	-19.98	V
7386.00	35.60	36.15	6.36	27.68	50.43	74.00	-23.57	V
9848.00	37.48	38.35	7.97	24.33	59.47	74.00	-14.53	V
4924.00	45.03	32.41	4.14	28.42	53.16	74.00	-20.84	H
7386.00	34.42	36.15	6.36	27.68	49.25	74.00	-24.75	H
9848.00	33.62	38.35	7.97	24.33	55.61	74.00	-18.39	H
Average Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
4924.00	36.72	32.41	4.14	28.42	44.85	54.00	-9.15	V
7386.00	25.49	36.15	6.36	27.68	40.32	54.00	-13.68	V
9848.00	25.97	38.35	7.97	24.33	47.96	54.00	-6.04	V
4924.00	35.35	32.41	4.14	28.42	43.48	54.00	-10.52	H
7386.00	23.79	36.15	6.36	27.68	38.62	54.00	-15.38	H
9848.00	22.86	38.35	7.97	24.33	44.85	54.00	-9.15	H

Test Results (Above 1000MHz)

Test Mode: 802.11N20 Mode					Test channel: Lowest			
Peak Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
4824.00	41.53	32.29	4.10	28.45	49.47	74.00	-24.53	V
7236.00	35.00	35.99	6.22	27.83	49.38	74.00	-24.62	V
9648.00	33.27	38.11	7.83	25.10	54.11	74.00	-19.89	V
4824.00	40.01	32.29	4.10	28.45	47.95	74.00	-26.05	H
7236.00	34.65	35.99	6.22	27.83	49.03	74.00	-24.97	H
9648.00	32.81	38.11	7.83	25.10	53.65	74.00	-20.35	H
Average Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
4824.00	30.52	32.29	4.10	28.45	38.46	54.00	-15.54	V
7236.00	23.84	35.99	6.22	27.83	38.22	54.00	-15.78	V
9648.00	23.60	38.11	7.83	25.10	44.44	54.00	-9.56	V
4824.00	29.48	32.29	4.10	28.45	37.42	54.00	-16.58	H
7236.00	23.21	35.99	6.22	27.83	37.59	54.00	-16.41	H
9648.00	22.54	38.11	7.83	25.10	43.38	54.00	-10.62	H

Test Results (Above 1000MHz)

Test Mode: 802.N20 Mode					Test channel: Middle			
Peak Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
4874.00	40.37	32.35	4.12	28.44	48.40	74.00	-25.60	V
7311.00	34.94	36.08	6.30	27.74	49.58	74.00	-24.42	V
9748.00	34.19	38.25	7.91	24.65	55.70	74.00	-18.30	V
4874.00	40.69	32.35	4.12	28.44	48.72	74.00	-25.28	H
7311.00	33.50	36.08	6.30	27.74	48.14	74.00	-25.86	H
9748.00	34.05	38.25	7.91	24.65	55.56	74.00	-18.44	H
Average Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
4874.00	31.14	32.35	4.12	28.44	39.17	54.00	-14.83	V
7311.00	23.23	36.08	6.30	27.74	37.87	54.00	-16.13	V
9748.00	23.43	38.25	7.91	24.65	44.94	54.00	-9.06	V
4874.00	30.75	32.35	4.12	28.44	38.78	54.00	-15.22	H
7311.00	22.57	36.08	6.30	27.74	37.21	54.00	-16.79	H
9748.00	23.75	38.25	7.91	24.65	45.26	54.00	-8.74	H

Test Results (Above 1000MHz)

Test Mode: 802.11N20 Mode					Test channel: Highest			
Peak Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
4924.00	46.64	32.41	4.14	28.42	54.77	74.00	-19.23	V
7386.00	36.08	36.15	6.36	27.68	50.91	74.00	-23.09	V
9848.00	37.82	38.35	7.97	24.33	59.81	74.00	-14.19	V
4924.00	45.67	32.41	4.14	28.42	53.80	74.00	-20.20	H
7386.00	34.84	36.15	6.36	27.68	49.67	74.00	-24.33	H
9848.00	33.93	38.35	7.97	24.33	55.92	74.00	-18.08	H
Average Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
4924.00	37.42	32.41	4.14	28.42	45.55	54.00	-8.45	V
7386.00	25.96	36.15	6.36	27.68	40.79	54.00	-13.21	V
9848.00	26.29	38.35	7.97	24.33	48.28	54.00	-5.72	V
4924.00	35.94	32.41	4.14	28.42	44.07	54.00	-9.93	H
7386.00	24.20	36.15	6.36	27.68	39.03	54.00	-14.97	H
9848.00	23.17	38.35	7.97	24.33	45.16	54.00	-8.84	H

Remark:

1. During the test, pre-scan the 802.11b,g,n(HT20) mode, support MIMO, and found the 802.11b mode of ANT A is worse case , the report only record this mode.
2. Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
3. “*”, means this data is the too weak instrument of signal is unable to test.

Radiated Band Edge:

Test Mode: 802.11b Mode					Test channel: Lowest			
Peak Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
2390.00	52.26	27.39	2.77	34.01	48.41	74.00	-25.59	H
2400.00	61.47	27.42	2.78	34.01	57.66	74.00	-16.34	H
2390.00	53.98	27.39	2.77	34.01	50.13	74.00	-23.87	V
2400.00	63.43	27.42	2.78	34.01	59.62	74.00	-14.38	V
Average Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
2390.00	38.84	27.39	2.77	34.01	34.99	54.00	-19.01	H
2400.00	47.20	27.42	2.78	34.01	43.39	54.00	-10.61	H
2390.00	40.71	27.39	2.77	34.01	36.86	54.00	-17.14	V
2400.00	48.37	27.42	2.78	34.01	44.56	54.00	-9.44	V

Test Mode: 802.11b Mode					Test channel: Highest			
Peak Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
2483.50	53.17	27.70	2.84	34.03	49.68	74.00	-24.32	H
2500.00	48.81	27.75	2.86	34.03	45.39	74.00	-28.61	H
2483.50	55.56	27.70	2.84	34.03	52.07	74.00	-21.93	V
2500.00	51.43	27.75	2.86	34.03	48.01	74.00	-25.99	V
Average Value								

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
2483.50	39.30	27.70	2.84	34.03	35.81	54.00	-18.19	H
2500.00	35.29	27.75	2.86	34.03	31.87	54.00	-22.13	H
2483.50	41.30	27.70	2.84	34.03	37.81	54.00	-16.19	V
2500.00	37.19	27.75	2.86	34.03	33.77	54.00	-20.23	V

Remark: 1.Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2.the data provided now is the worst data

Radiated Band Edge:

Test Mode: 802.11g Mode					Test channel: Lowest			
Peak Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
2390.00	51.91	25.77	4.83	33.92	48.59	74.00	-25.41	H
2400.00	61.01	25.80	4.86	29.93	61.74	74.00	-12.26	H
2390.00	53.61	25.77	4.83	33.92	50.29	74.00	-23.71	V
2400.00	62.87	25.80	4.86	29.93	63.60	74.00	-10.40	V
Average Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
2390.00	38.59	25.77	4.83	33.92	35.27	54.00	-18.73	H
2400.00	46.92	25.80	4.86	29.93	47.65	54.00	-6.35	H
2390.00	40.44	25.77	4.83	33.92	37.12	54.00	-16.88	V
2400.00	48.06	25.80	4.86	29.93	48.79	54.00	-5.21	V

Test Mode: 802.11g Mode					Test channel: Highest			
Peak Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
2483.50	52.68	27.70	2.84	34.03	49.19	74.00	-24.81	H
2500.00	48.42	27.75	2.86	34.03	45.00	74.00	-29.00	H
2483.50	54.99	27.70	2.84	34.03	51.50	74.00	-22.50	V
2500.00	50.98	27.75	2.86	34.03	47.56	74.00	-26.44	V
Average Value								

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
2483.50	39.00	27.70	2.84	34.03	35.51	54.00	-18.49	H
2500.00	35.05	27.75	2.86	34.03	31.63	54.00	-22.37	H
2483.50	40.97	27.70	2.84	34.03	37.48	54.00	-16.52	V
2500.00	36.94	27.75	2.86	34.03	33.52	54.00	-20.48	V

Remark: 1.Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2.the data provided now is the worst data

Radiated Band Edge:

Test Mode: 802.11n20 Mode					Test channel: Lowest			
Peak Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
2390.00	51.95	25.77	4.83	33.92	48.63	74.00	-25.37	H
2400.00	61.06	25.80	4.86	29.93	61.79	74.00	-12.21	H
2390.00	53.65	25.77	4.83	33.92	50.33	74.00	-23.67	V
2400.00	62.93	25.80	4.86	29.93	63.66	74.00	-10.34	V
Average Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
2390.00	38.62	25.77	4.83	33.92	35.30	54.00	-18.70	H
2400.00	46.95	25.80	4.86	29.93	47.68	54.00	-6.32	H
2390.00	40.46	25.77	4.83	33.92	37.14	54.00	-16.86	V
2400.00	48.10	25.80	4.86	29.93	48.83	54.00	-5.17	V

Test Mode: 802.11n20 Mode					Test channel: Highest			
Peak Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
2483.50	52.73	27.70	2.84	34.03	49.24	74.00	-24.76	H
2500.00	48.46	27.75	2.86	34.03	45.04	74.00	-28.96	H
2483.50	55.05	27.70	2.84	34.03	51.56	74.00	-22.44	V
2500.00	51.03	27.75	2.86	34.03	47.61	74.00	-26.39	V
Average Value								

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
2483.50	39.03	27.70	2.84	34.03	35.54	54.00	-18.46	H
2500.00	35.08	27.75	2.86	34.03	31.66	54.00	-22.34	H
2483.50	41.00	27.70	2.84	34.03	37.51	54.00	-16.49	V
2500.00	36.97	27.75	2.86	34.03	33.55	54.00	-20.45	V

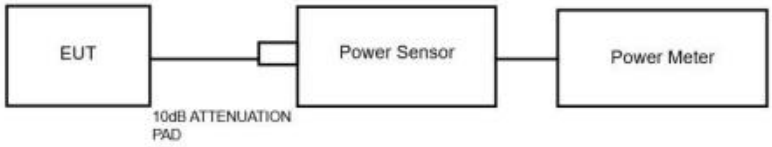
Remark: 1.Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2.the data provided now is the worst data

7 . Maximum Peak Output Power Test

7.1 Test Standard and Limit

Test Standard	FCC Part15 C Section 15.247 (b)(3)
Test Limit	30dBm

7.2 Test Setup



7.3 Test Procedure

1. The Transmitter output (antenna port) was connected to the power meter.
2. Turn on the EUT and power meter and then record the power value.
3. Repeat above procedures on all channels needed to be tested.

Note: The cable loss and attenuator loss were offset into measure device as amplitude offset.

7.4 Test Data

Test Item	:	Max. peak output power	Test Mode	:	CH Low ~ CH High
Test Voltage	:	DC 24V	Temperature	:	24.5℃
Test Result	:	PASS	Humidity	:	52%RH

ANT A:

Test Channel	Frequency (MHz)	Maximum Peak Conducted Output Power（PK） (dBm)	Limit dBm	Results
TX 802.11b Mode				
CH01	2412	15.20	30	PASS
CH06	2437	14.80	30	PASS
CH11	2462	14.11	30	PASS
TX 802.11g Mode				
CH01	2412	13.97	30	PASS
CH06	2437	15.78	30	PASS
CH11	2462	15.26	30	PASS
TX 802.11n(20) Mode				
CH01	2412	14.37	30	PASS
CH06	2437	15.86	30	PASS
CH11	2462	15.16	30	PASS

ANT B:

Test Channel	Frequency (MHz)	Maximum Peak Conducted Output Power（PK） (dBm)	Limit dBm	Results
TX 802.11b Mode				
CH01	2412	15.18	30	PASS
CH06	2437	14.83	30	PASS
CH11	2462	14.09	30	PASS
TX 802.11g Mode				
CH01	2412	14.09	30	PASS
CH06	2437	15.63	30	PASS
CH11	2462	15.22	30	PASS
TX 802.11n(20) Mode				
CH01	2412	13.91	30	PASS
CH06	2437	15.82	30	PASS
CH11	2462	15.15	30	PASS

ANT A+ANT B:

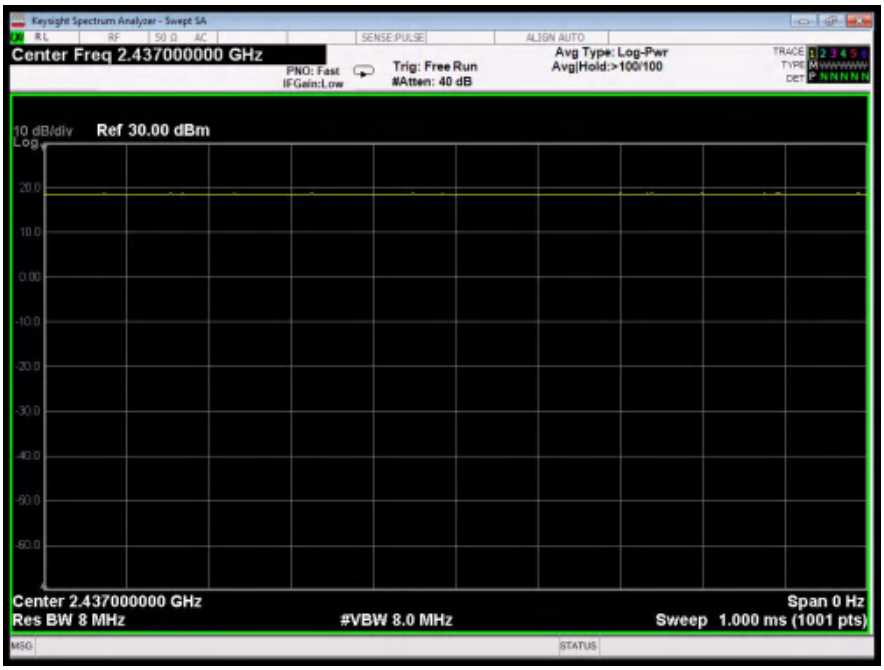
Test Channel	Frequency (MHz)	Maximum Peak Conducted Output Power（PK） (dBm)	Limit dBm	Results
TX 802.11N20 Mode				
CH01	2412	17.156	29.09	PASS
CH06	2437	18.830	29.09	PASS
CH11	2462	18.165	29.09	PASS

Note: For power test the duty cycle is 100% in continuous transmitting mode.

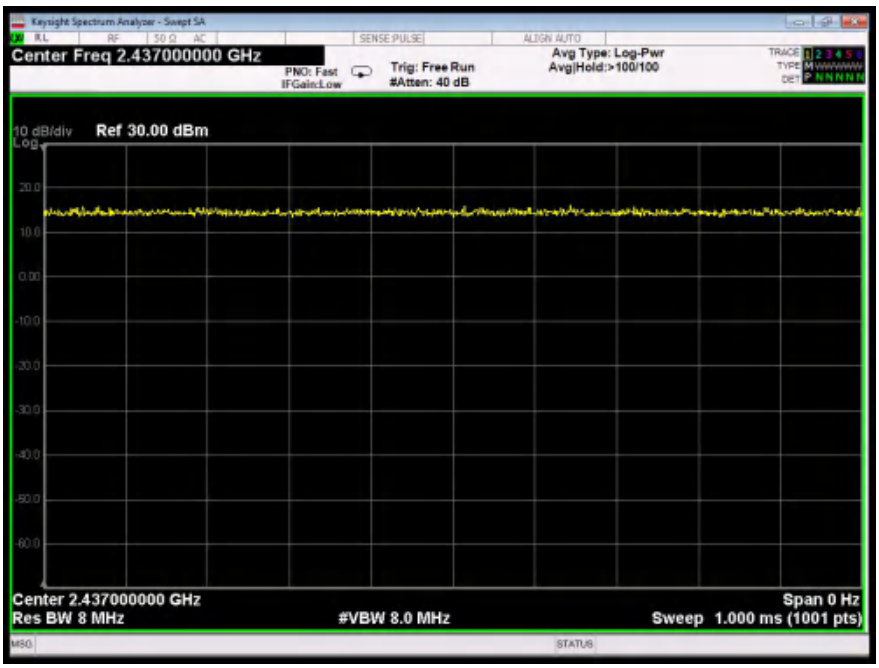
Please see the plot of next page

ANT A:

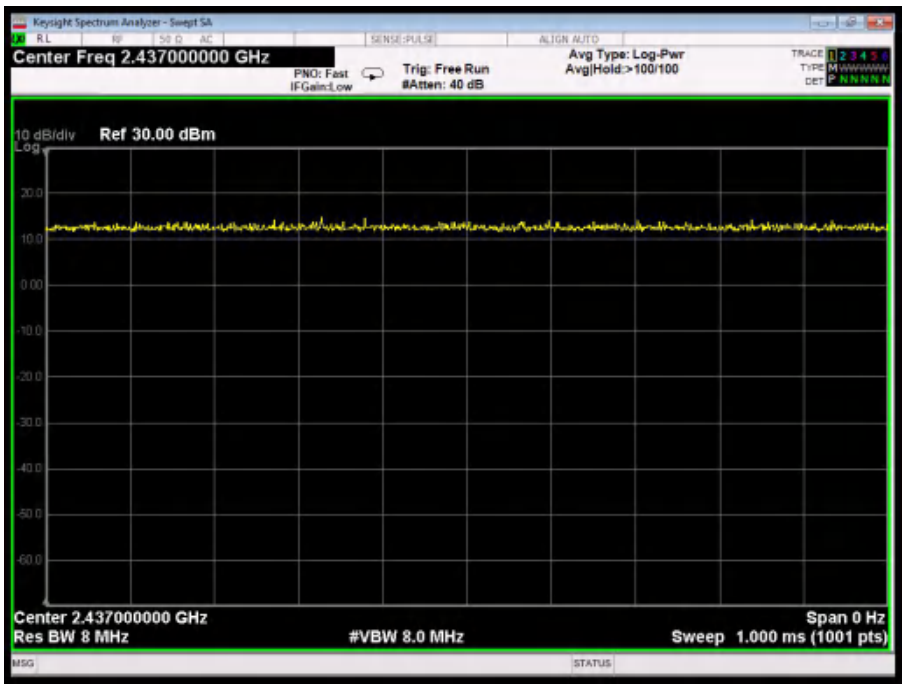
Duty Cycle



802.11b mode



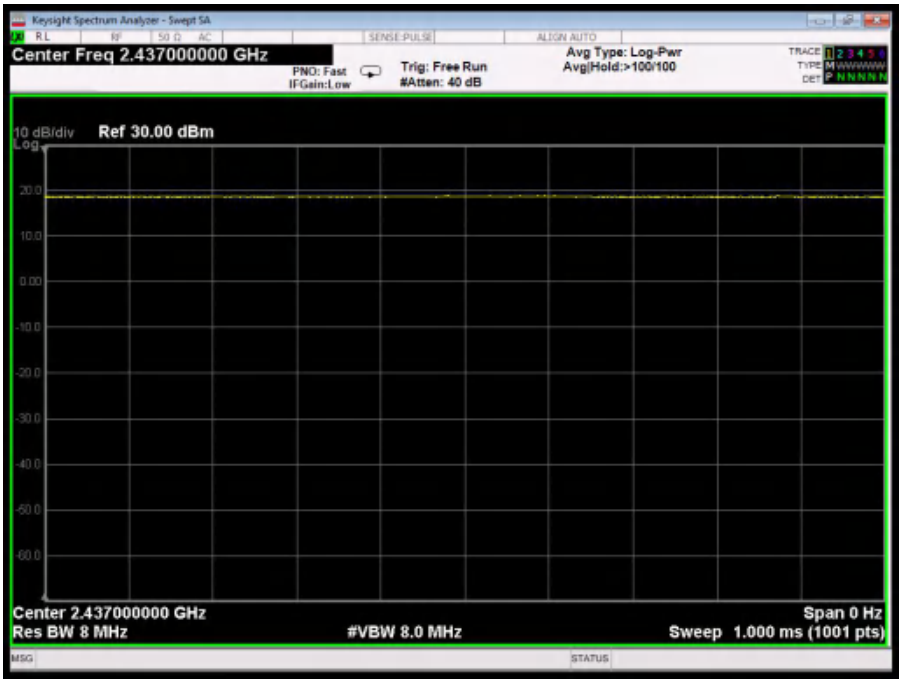
802.11g mode



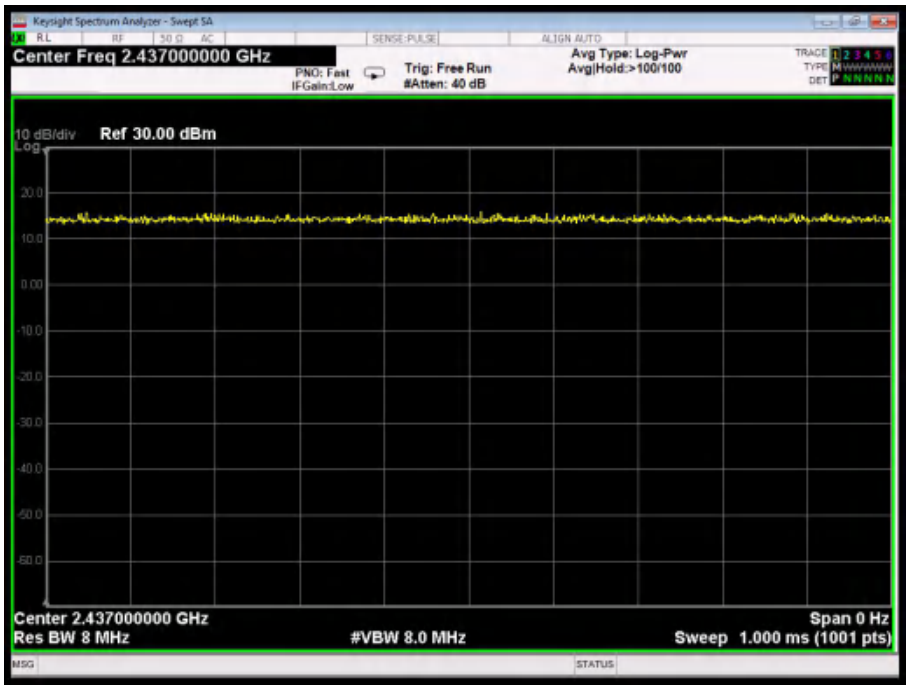
802.11n(HT20) mode

ANT B:

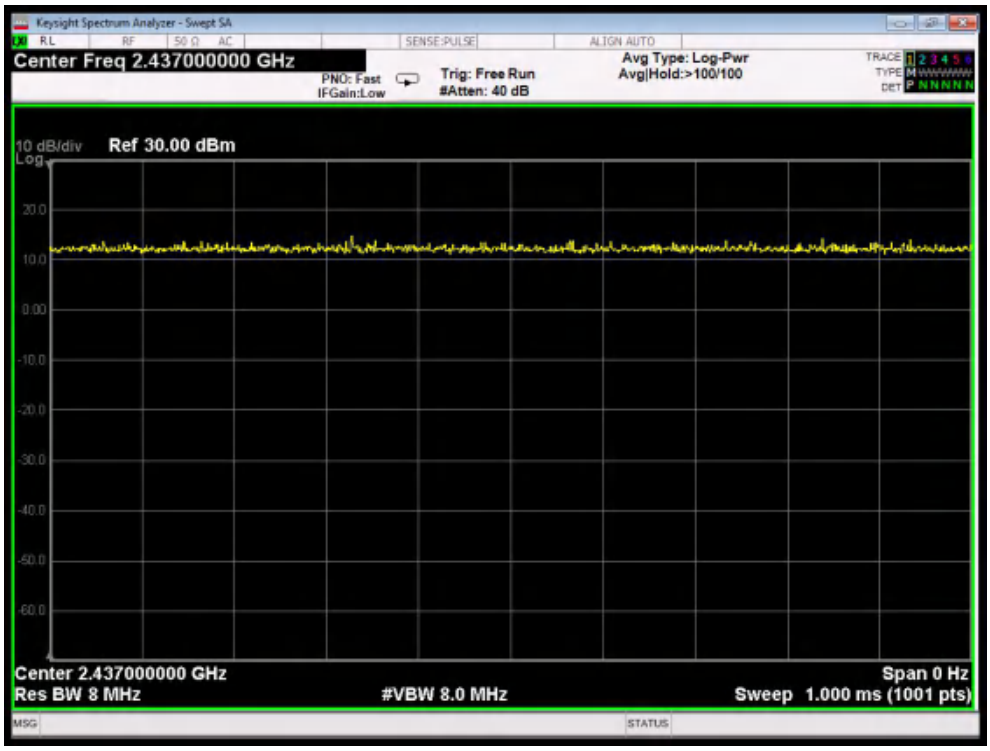
Duty Cycle



802.11b mode



802.11g mode



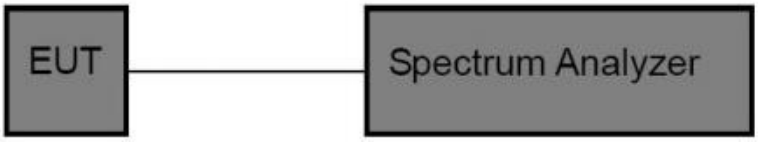
802.11n(HT20) mode

8 6DB Occupy Bandwidth Test

8.1 Test Standard and Limit

Test Standard	FCC Part15 C Section 15.247 (a)(2)
Test Limit	>500kHz

8.2 Test Setup



8.3 Test Procedure

1. Place the EUT on the table and set it in the transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as:
RBW= 100kHz, VBW≥3*RBW =300kHz
Detector= Peak
Trace mode= Max hold.
Sweep- auto couple.
4. Mark the peak frequency and –6dB (upper and lower) frequency.
5. Repeat until all the rest channels are investigated.

8.4 Test Data

Test Item	:	6dB Bandwidth	Test Mode	:	CH Low ~ CH High
Test Voltage	:	DC 24V	Temperature	:	24.5℃
Test Result	:	PASS	Humidity	:	52%RH

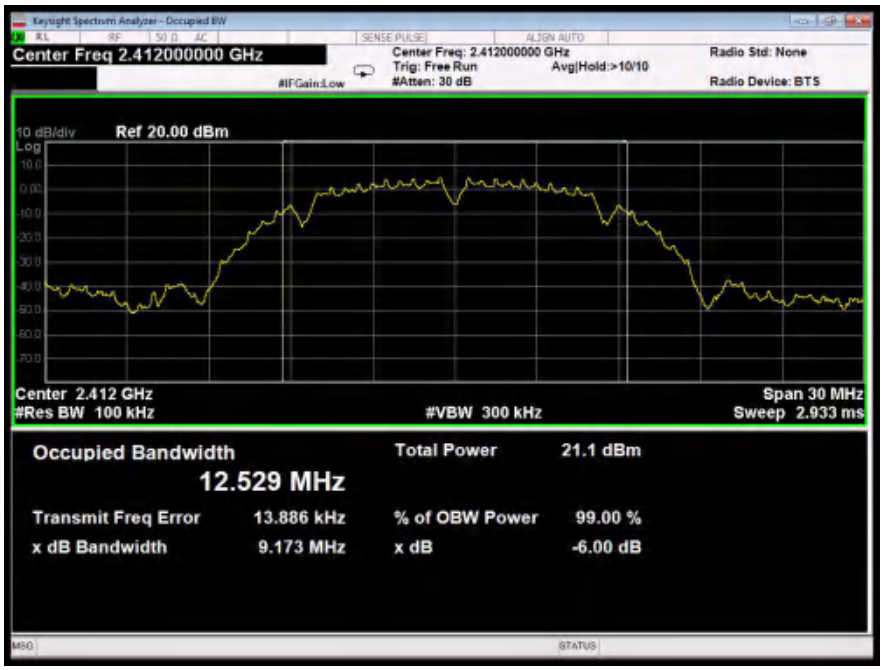
ANT A:

Mode	Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Results
802.11b	Low	2412	9.173	>500	PASS
	Middle	2437	9.153		PASS
	High	2462	9.165		PASS
802.11g	Low	2412	15.15	>500	PASS
	Middle	2437	15.16		PASS
	High	2462	15.12		PASS
802.11n20	Low	2412	15.16	>500	PASS
	Middle	2437	15.13		PASS
	High	2462	15.15		PASS

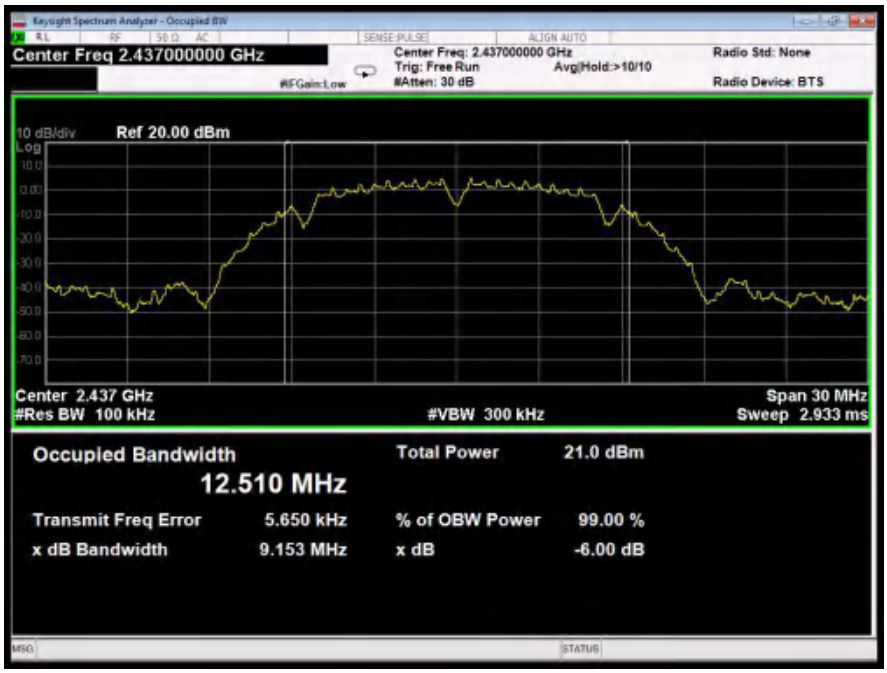
ANT B:

Mode	Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Results
802.11b	Low	2412	9.157	>500	PASS
	Middle	2437	9.150		PASS
	High	2462	9.164		PASS
802.11g	Low	2412	14.98	>500	PASS
	Middle	2437	15.15		PASS
	High	2462	15.12		PASS
802.11n20	Low	2412	15.14	>500	PASS
	Middle	2437	15.13		PASS
	High	2462	15.14		PASS

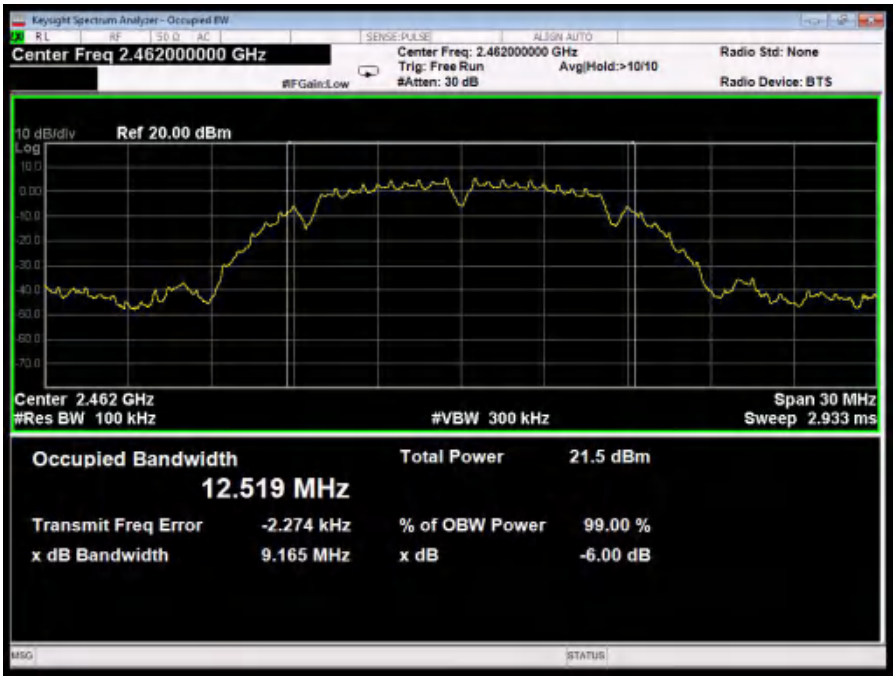
ANT A:



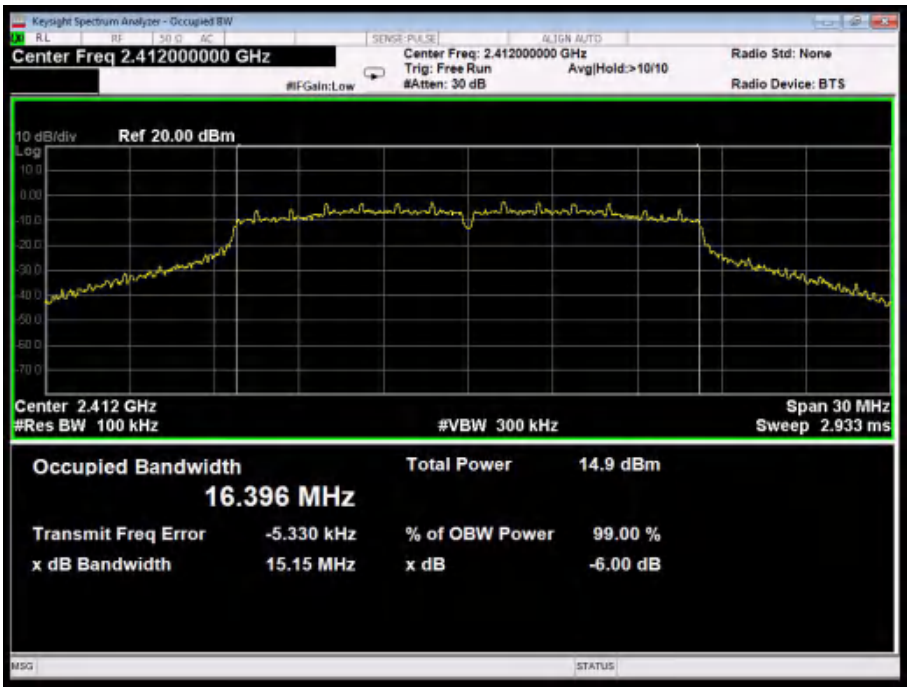
802.11b mode : Lowest



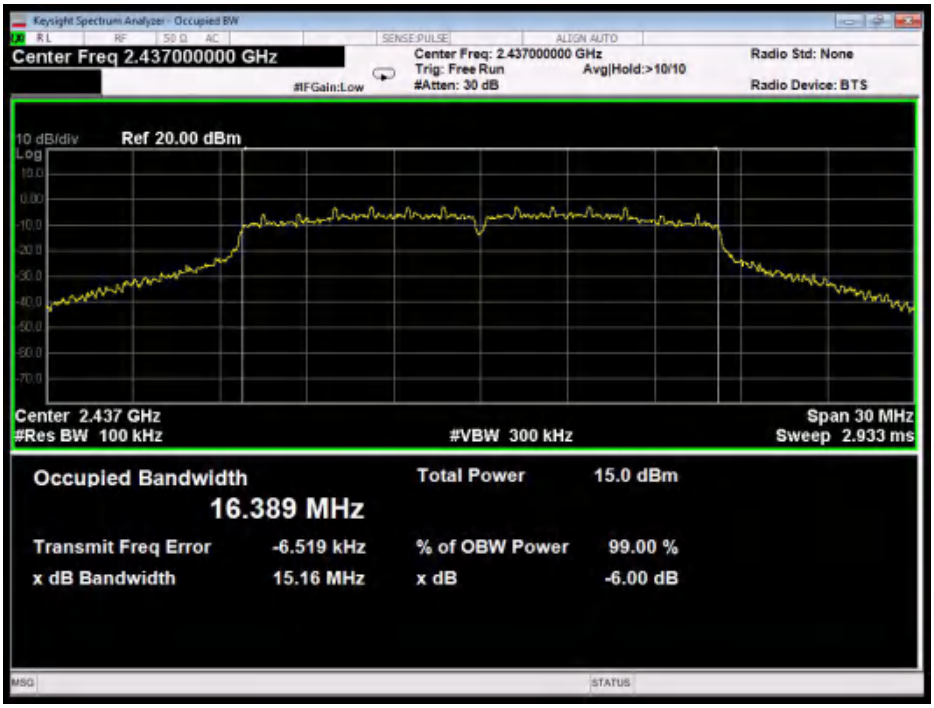
802.11b mode : Middle



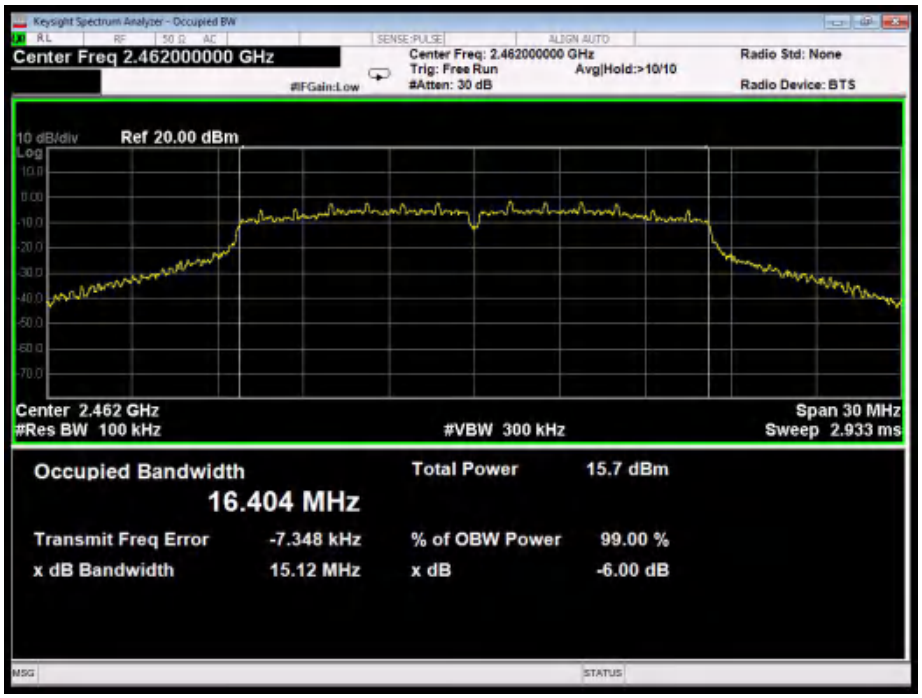
802.11b mode : Highest



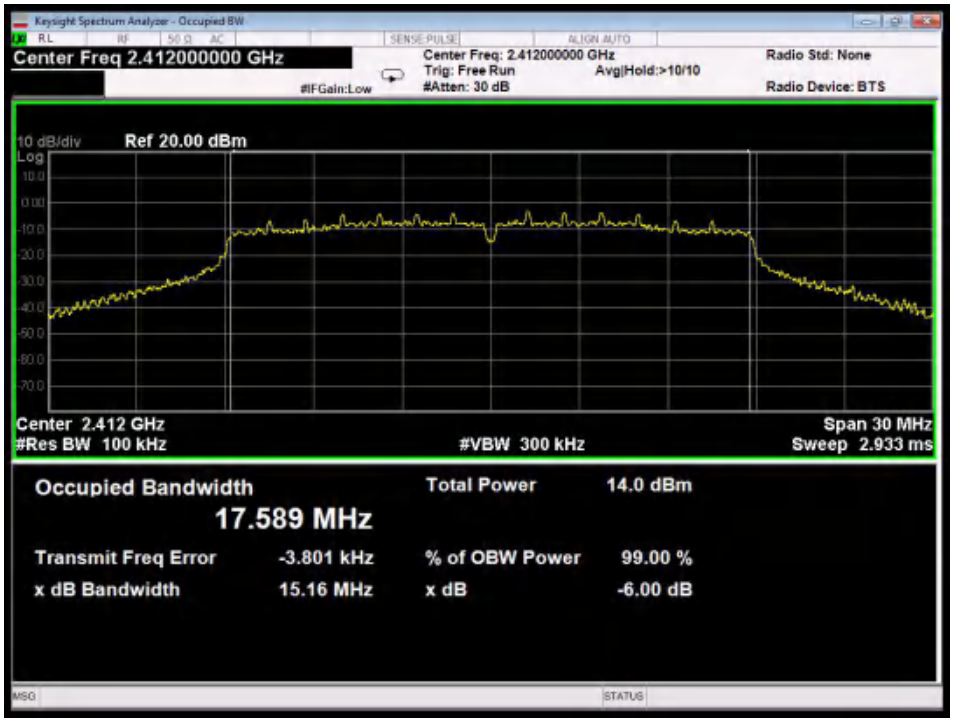
802.11g mode : Lowest



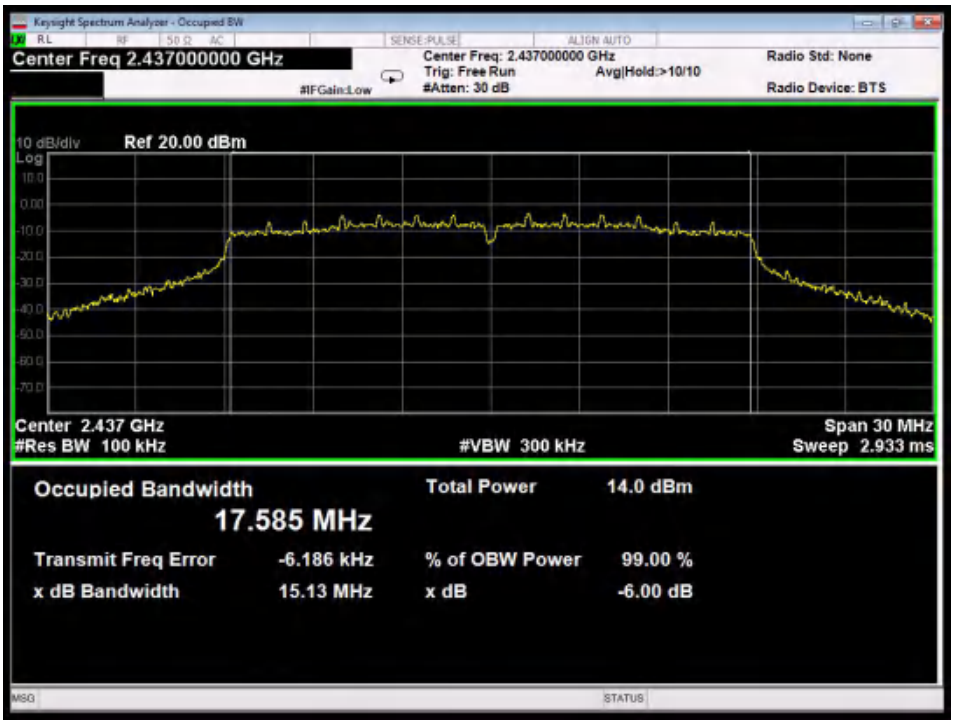
802.11g mode : Middle



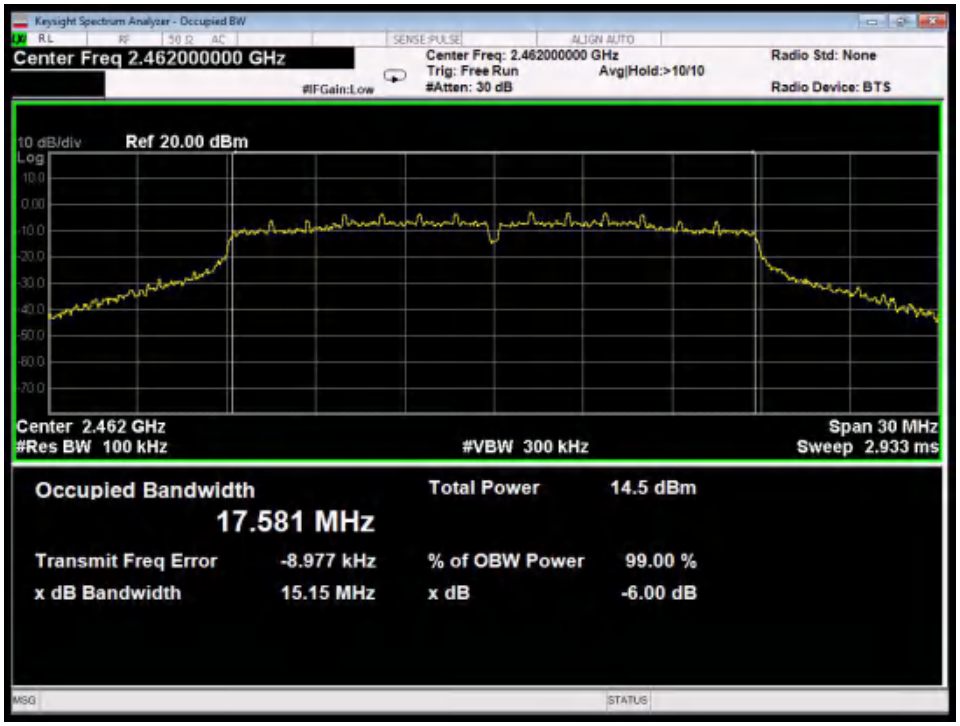
802.11g mode : Highest



802.11n20 mode : Lowest

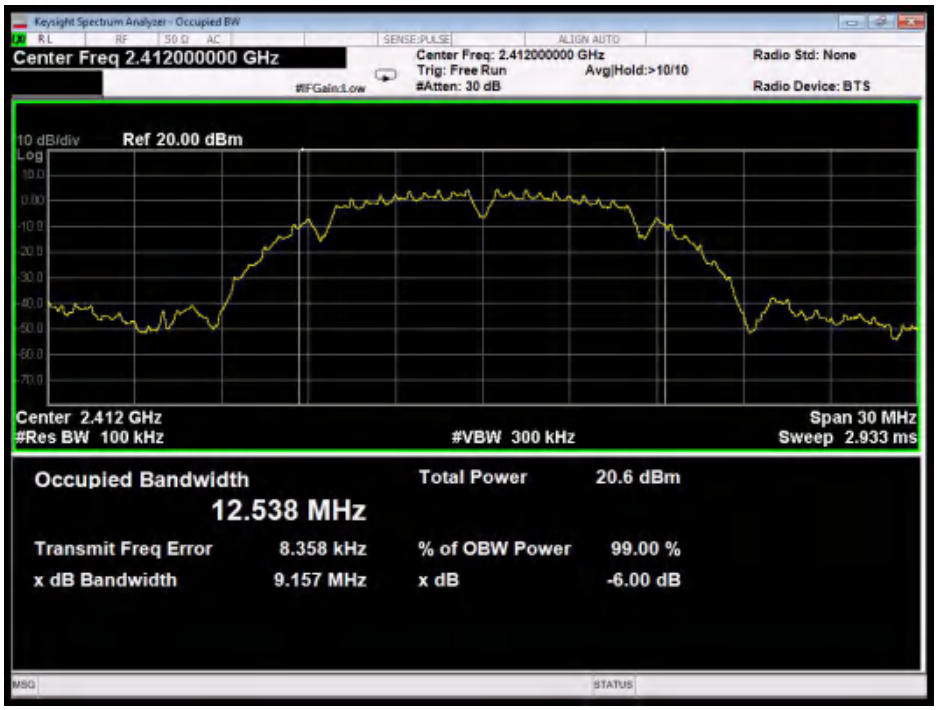


802.11n20 mode : Middle

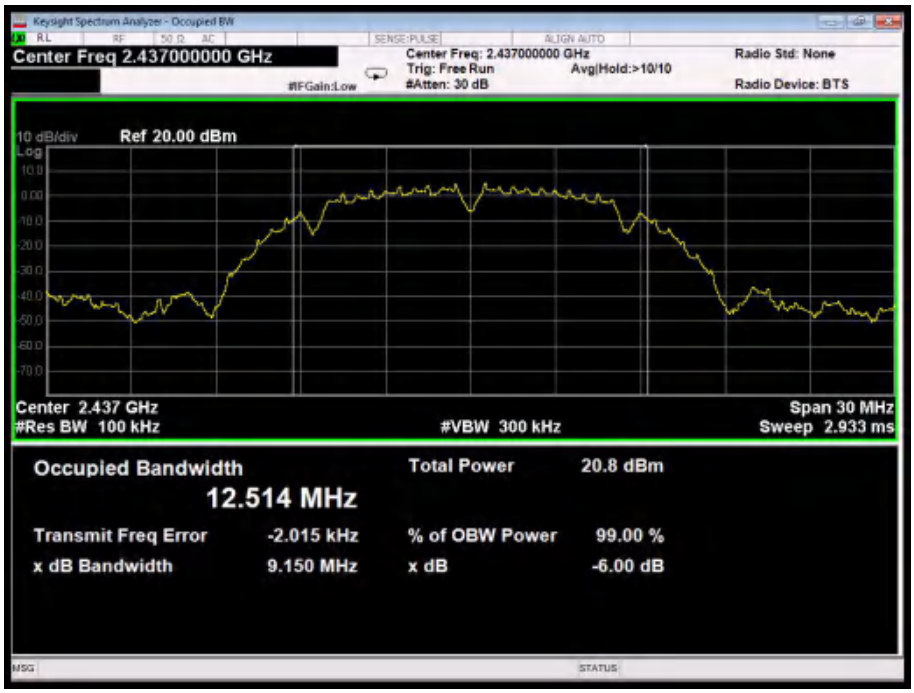


802.11n20 mode : Highest

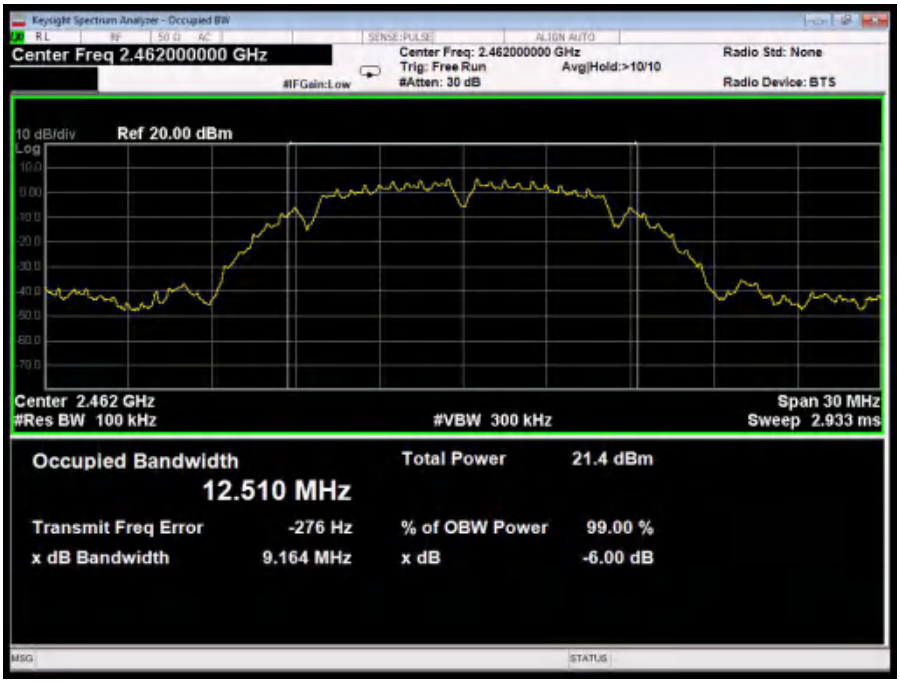
ANT B:



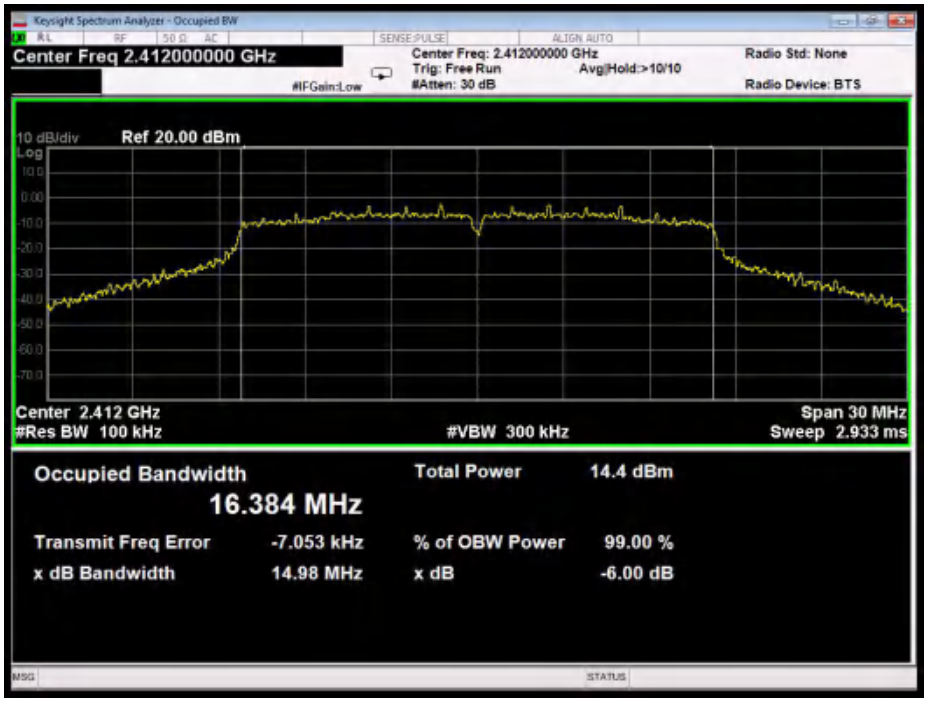
802.11b mode : Lowest



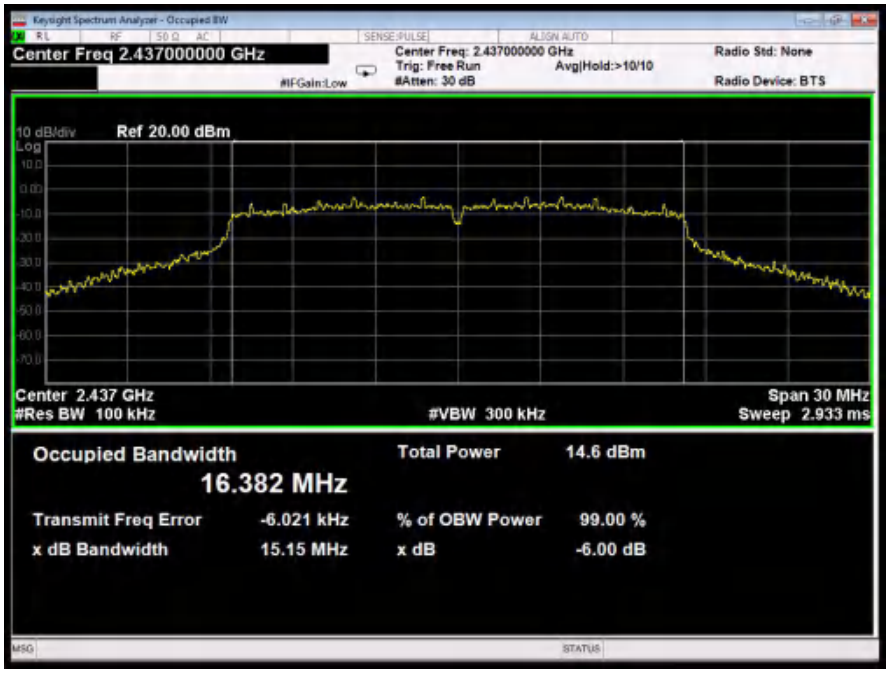
802.11b mode : Middle



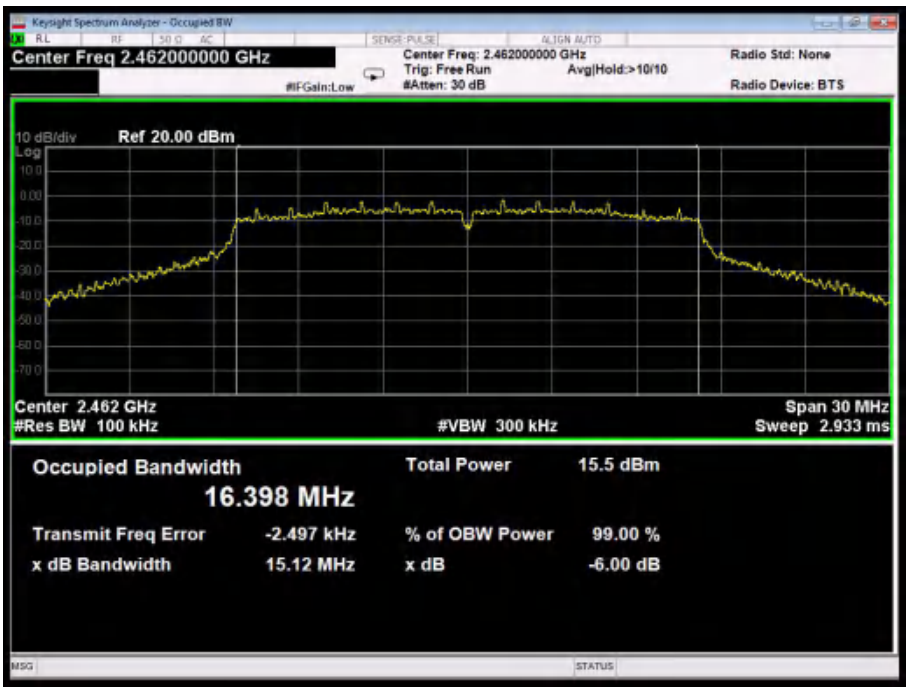
802.11b mode : Highest



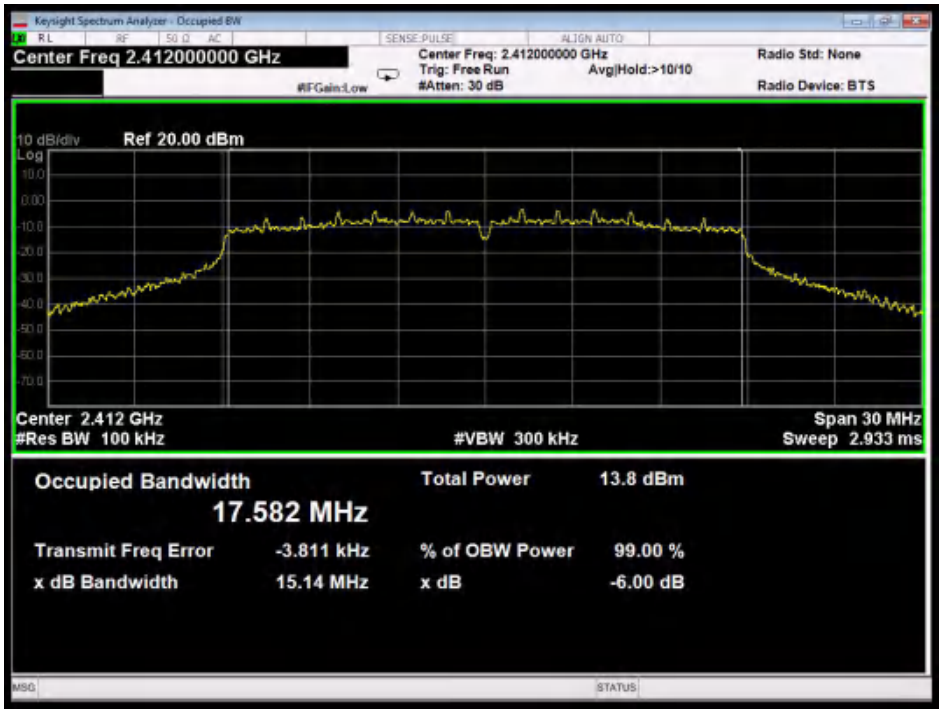
802.11g mode : Lowest



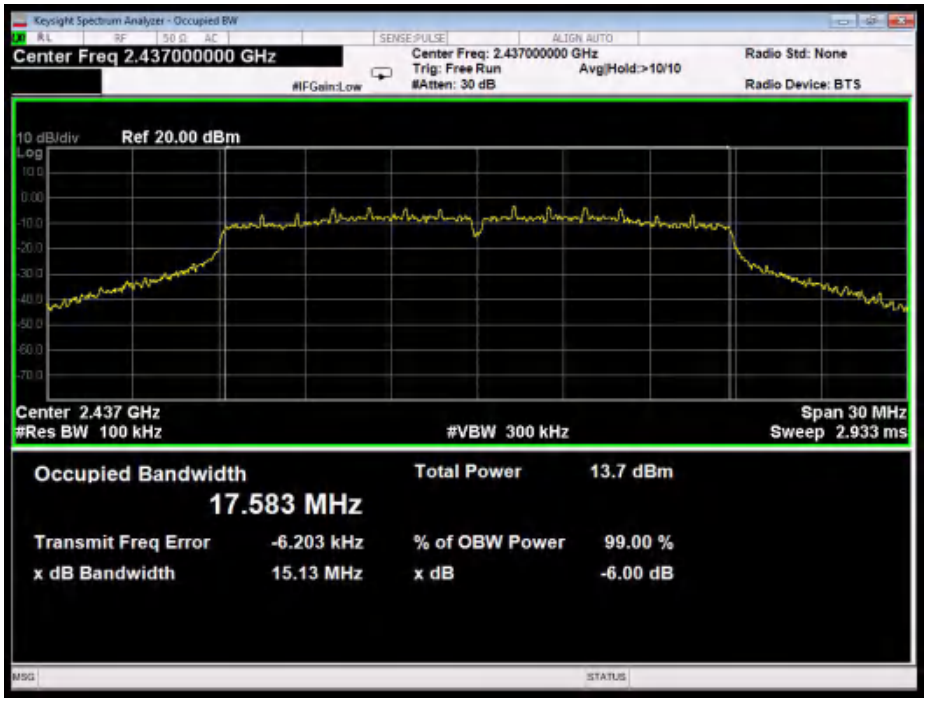
802.11g mode : Middle



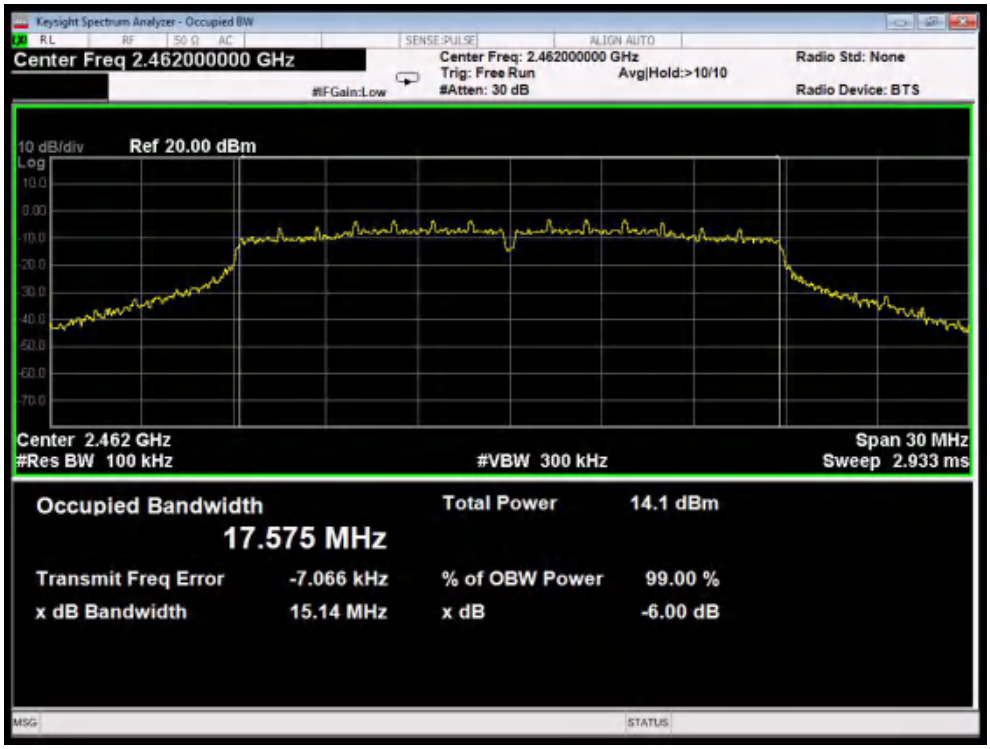
802.11g mode : Highest



802.11n20 mode : Lowest



802.11n20 mode : Middle



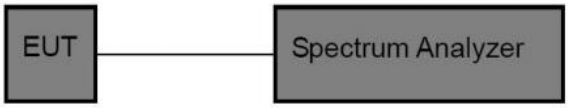
802.11n20 mode : Highest

9 . Power Spectral Density Test

9.1 Test Standard and Limit

Test Standard	FCC Part15 C Section
Test Limit	8dBm/3KHz

9.2 Test Setup



9.3 Test Procedure

1. Place the EUT on the table and set it in transmitting mode. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
2. Set the spectrum analyzer as RBW = 3kHz, VBW = 10kHz, Span = 1.5xDTS BW
3. Record the max. reading.
4. Repeat the above procedure until the measurements for all frequencies are completed.

9.4 Test Data

Test Item	:	Power Spectral Density	Test Mode	:	CH Low ~ CH High
Test Voltage	:	DC 24V	Temperature	:	24.5℃
Test Result	:	PASS	Humidity	:	52%RH

ANT A:

Mode	Channel	Frequency (MHz)	PSD (dBm/3KHz)	Limit (dBm/3KHz)	Results
802.11b	Low	2412	-11.399	8.00	PASS
	Middle	2437	-10.631	8.00	PASS
	High	2462	-10.098	8.00	PASS
802.11g	Low	2412	-17.475	8.00	PASS
	Middle	2437	-17.722	8.00	PASS
	High	2462	-16.995	8.00	PASS
802.11n20	Low	2412	-17.125	8.00	PASS
	Middle	2437	-19.437	8.00	PASS
	High	2462	-18.291	8.00	PASS

ANT B:

Mode	Channel	Frequency (MHz)	PSD (dBm/3KHz)	Limit (dBm/3KHz)	Results
802.11b	Low	2412	-11.474	8.00	PASS
	Middle	2437	-10.909	8.00	PASS
	High	2462	-9.831	8.00	PASS
802.11g	Low	2412	-16.549	8.00	PASS
	Middle	2437	-17.557	8.00	PASS
	High	2462	-16.858	8.00	PASS
802.11n20	Low	2412	-19.222	8.00	PASS

	Middle	2437	-19.658	8.00	PASS
	High	2462	-17.619	8.00	PASS

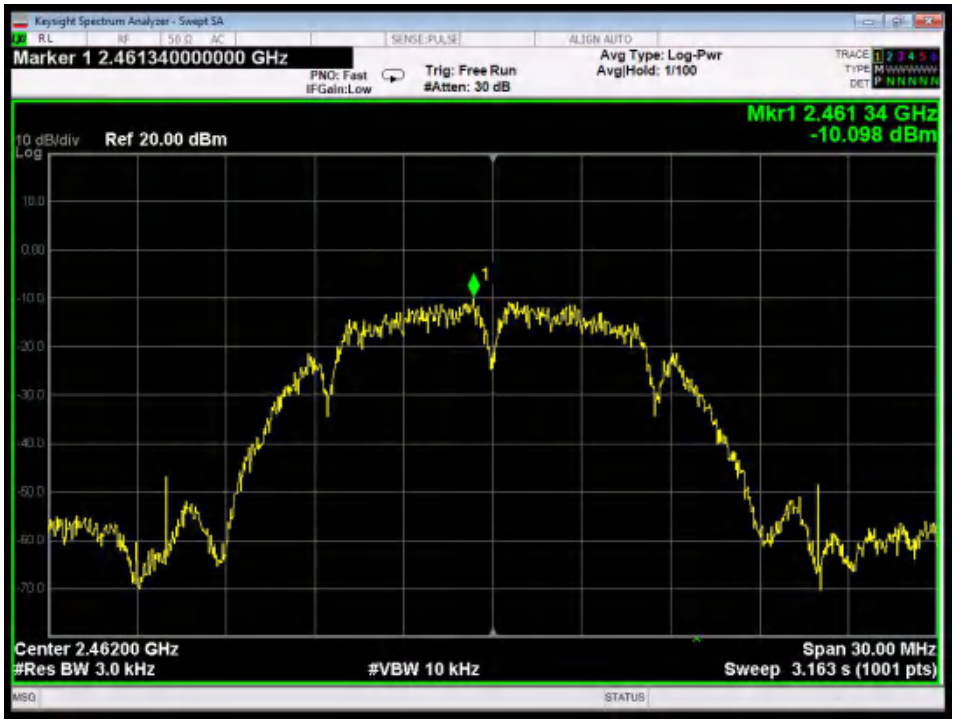
ANT A+ANT B:

Mode	Channel	Frequency (MHz)	PSD (dBm/3KHz)	Limit (dBm/3KHz)	Results
802.11n20	Low	2412	-15.04	7.09	PASS
	Middle	2437	-16.54	7.09	PASS
	High	2462	-14.93	7.09	PASS

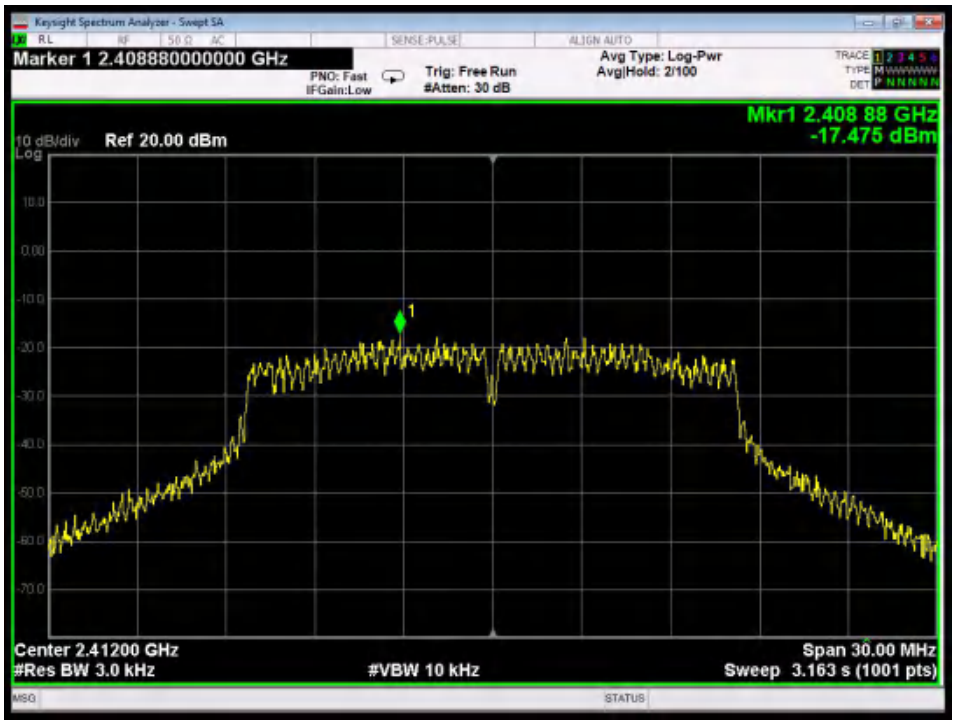
ANT A:

802.11b mode : Lowest

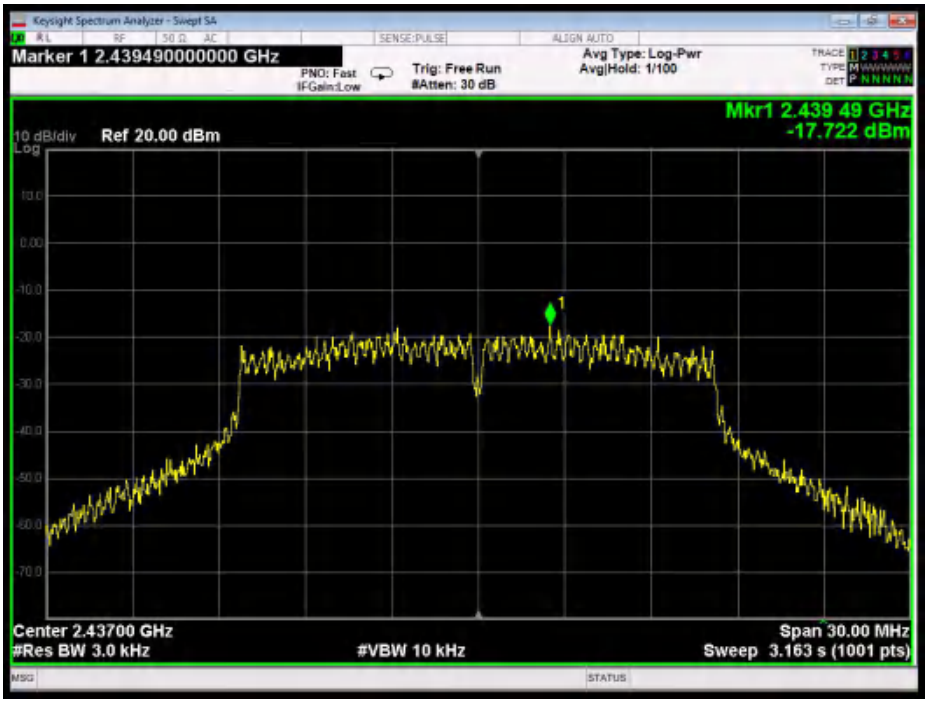
802.11b mode : Middle



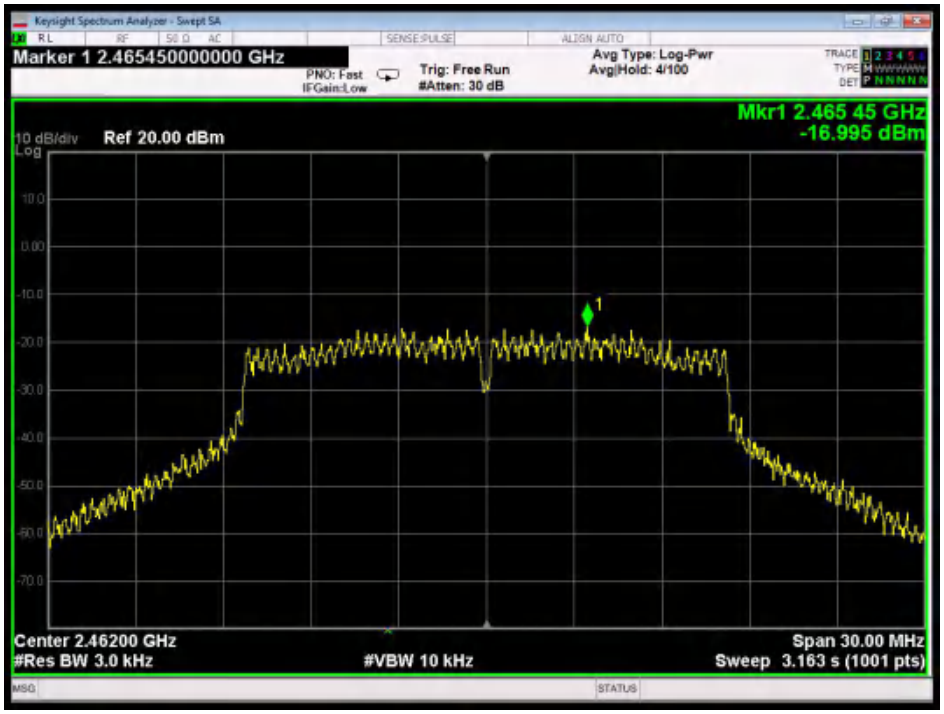
802.11b mode : Highest



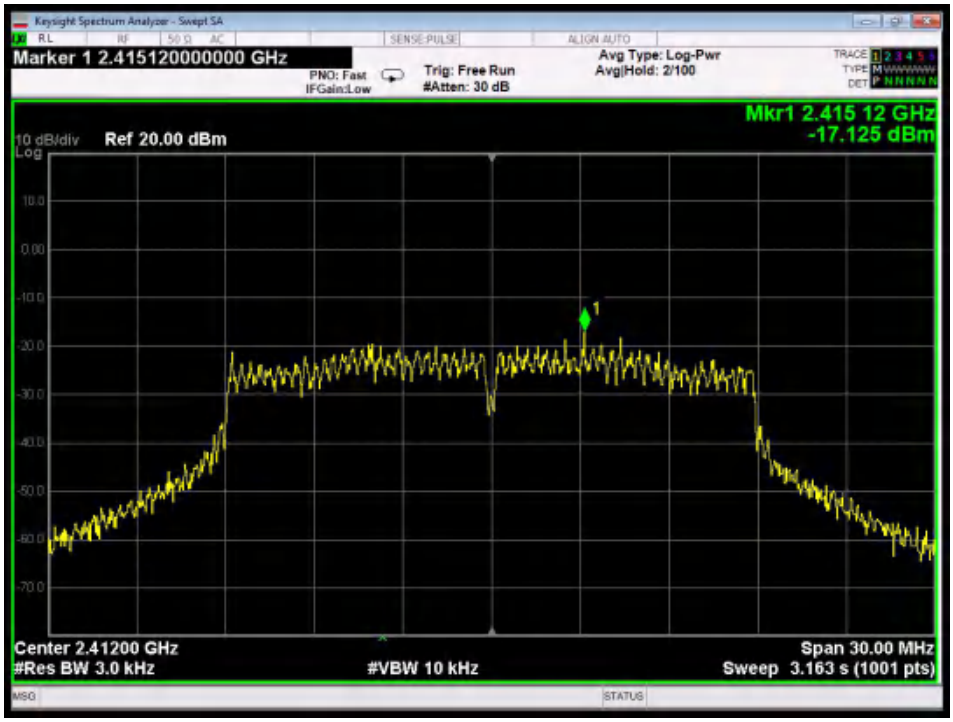
802.11g mode : Lowest



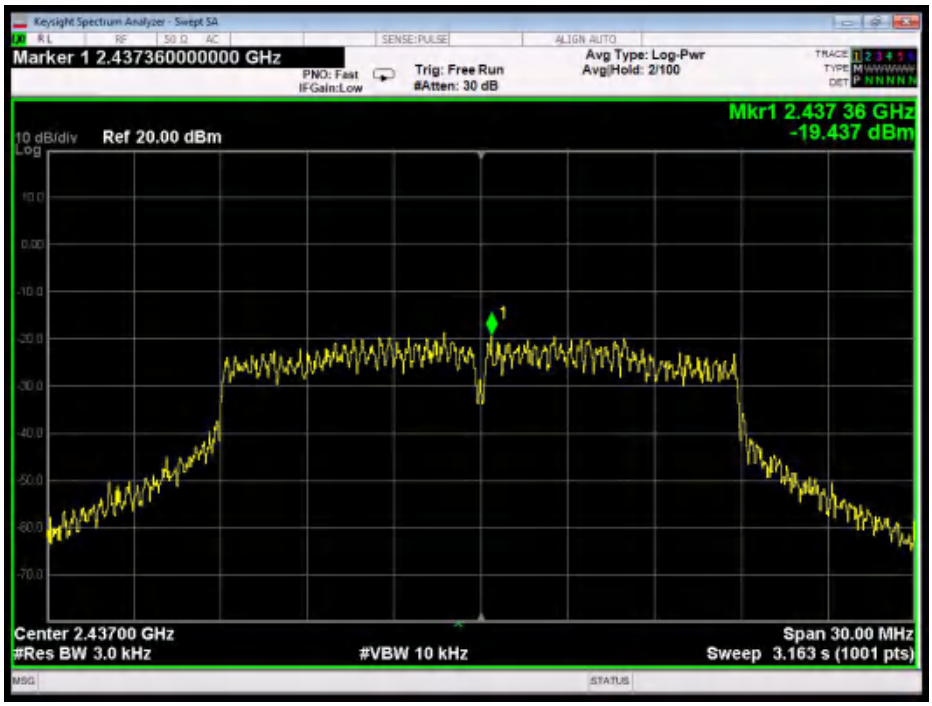
802.11g mode : Middle



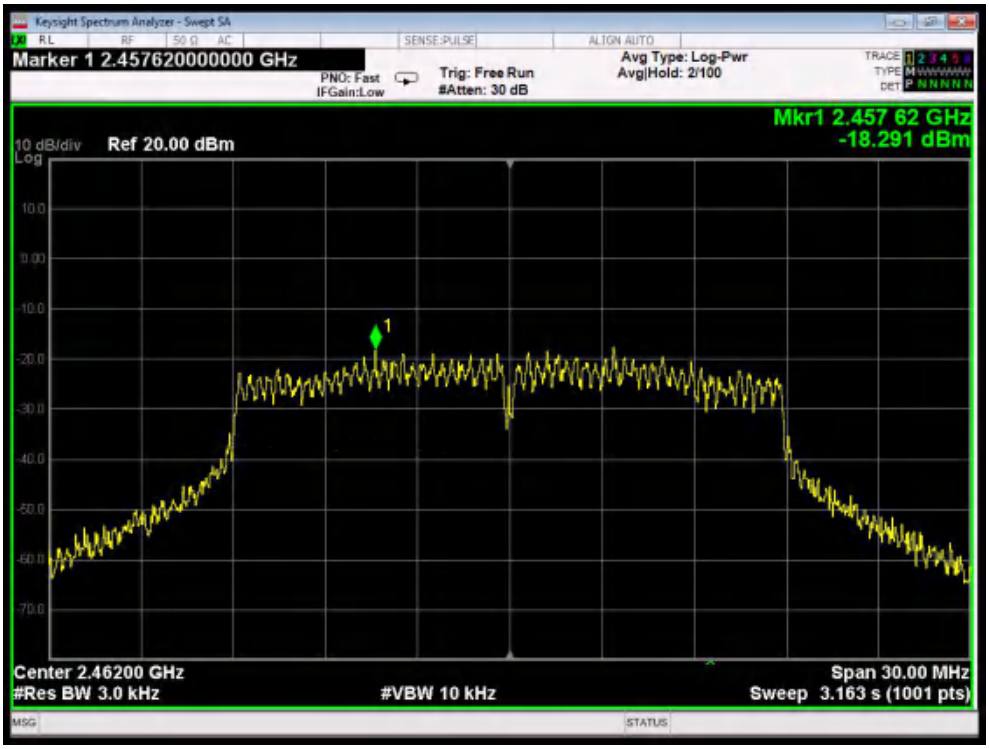
802.11g mode : Highest



802.11n20 mode : Lowest



802.11n20 mode : Middle

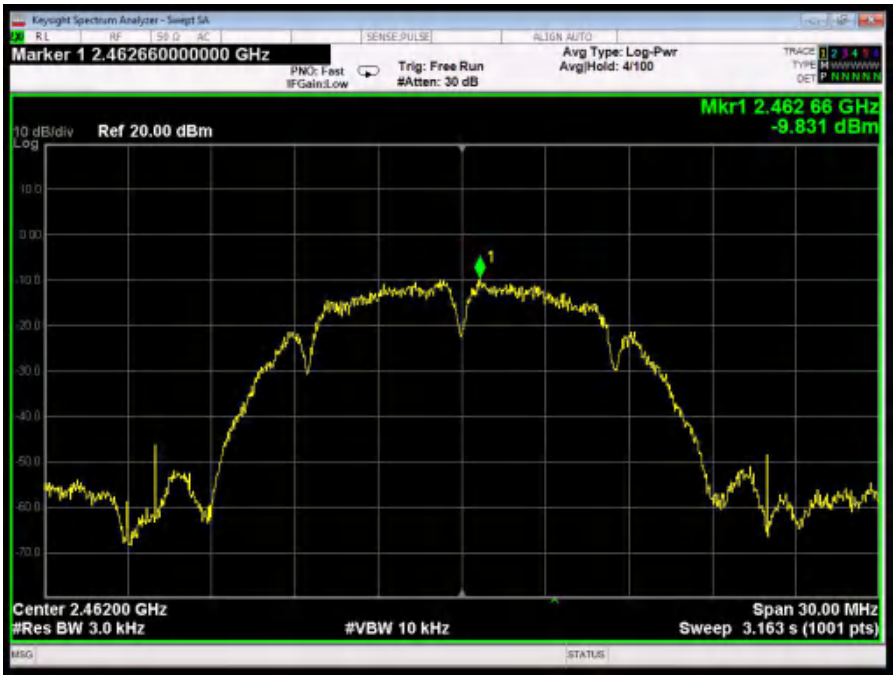


802.11n20 mode : Highest

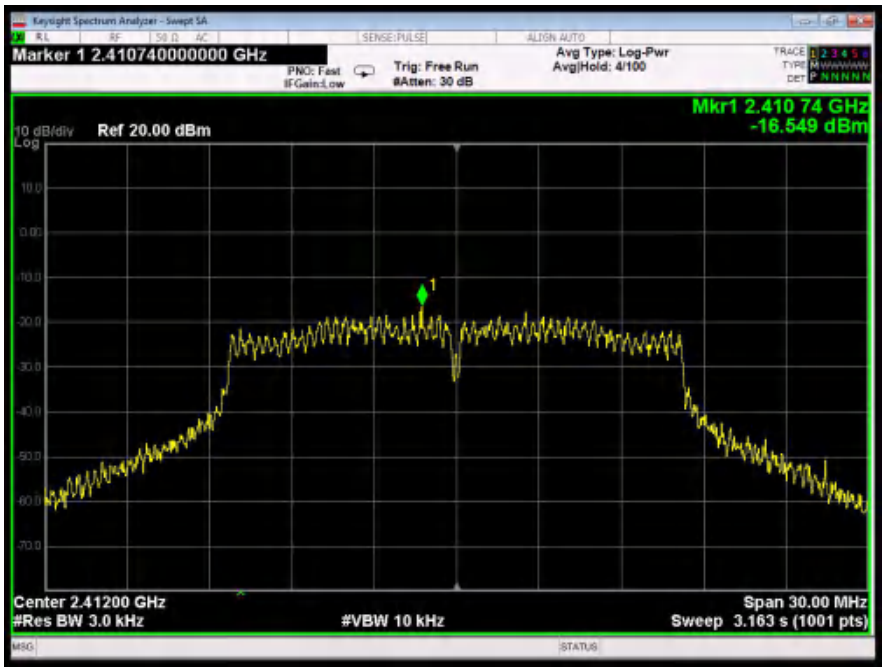
ANT B:

802.11b mode : Lowest

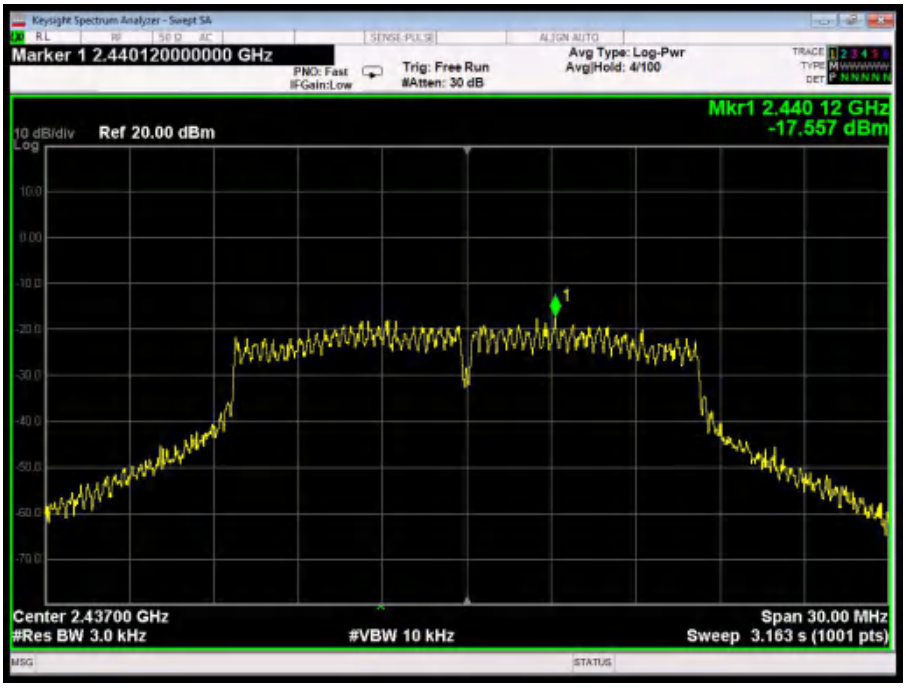
802.11b mode : Middle



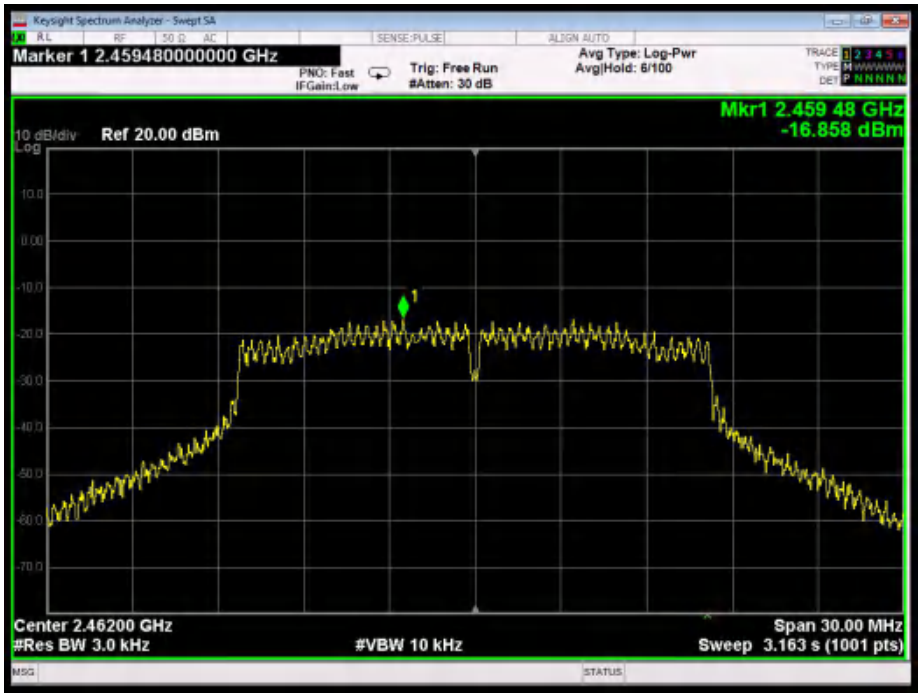
802.11b mode : Highest



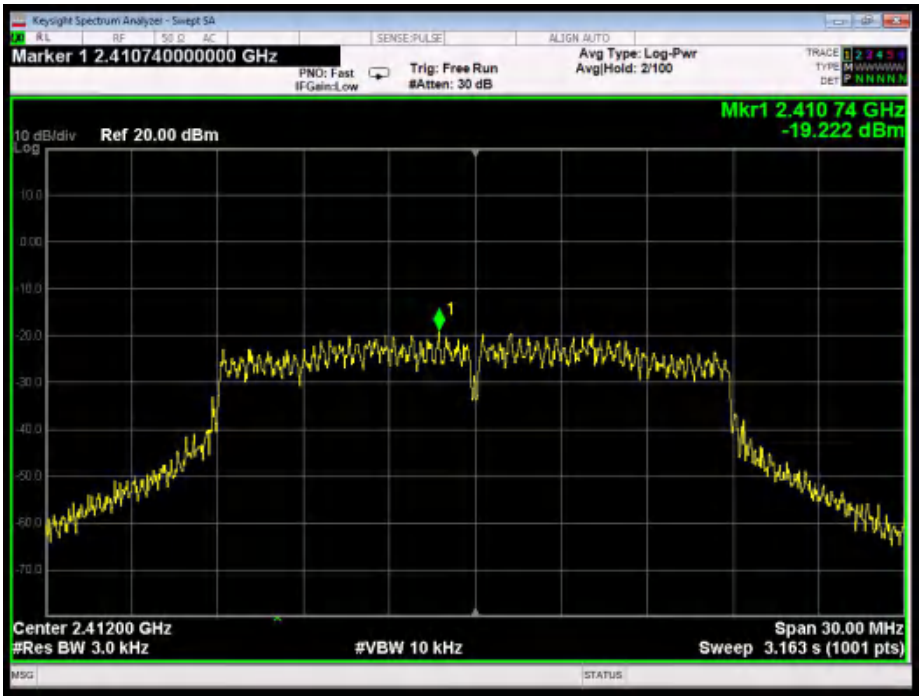
802.11g mode : Lowest



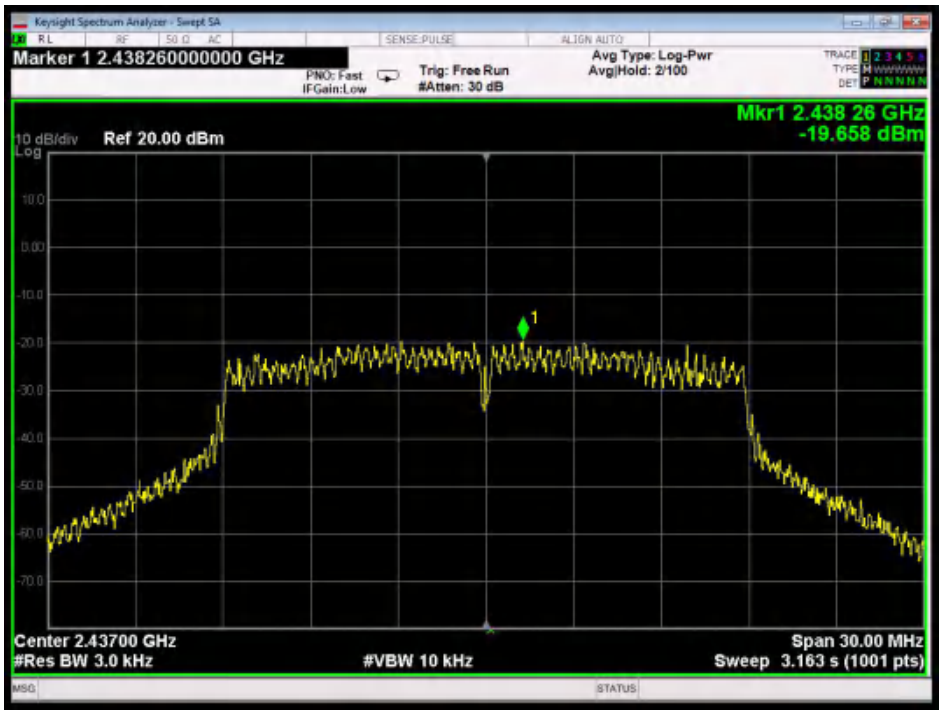
802.11g mode : Middle



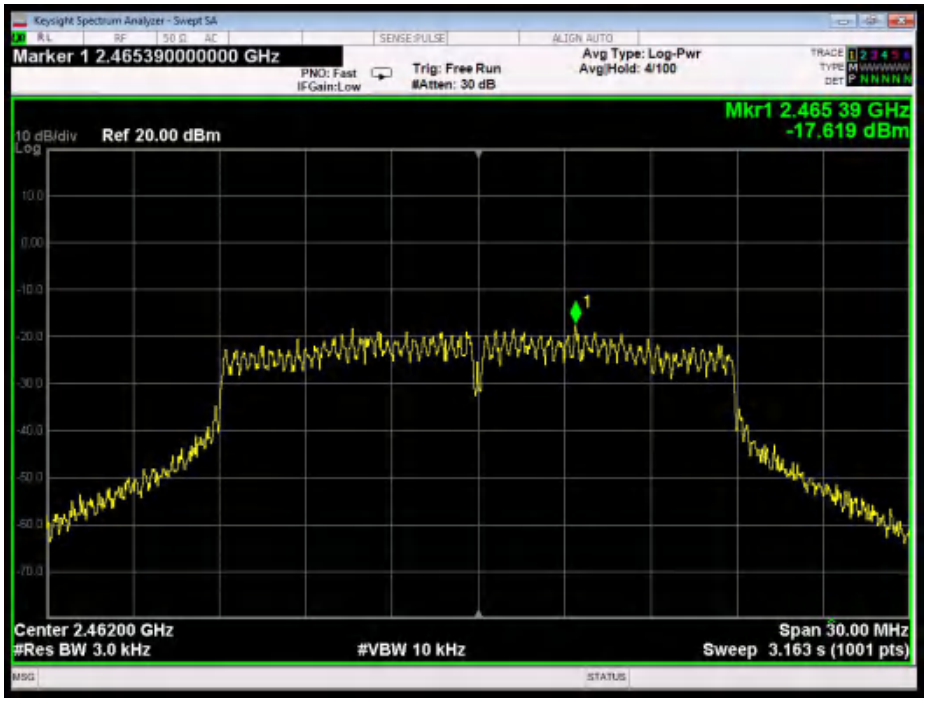
802.11g mode : Highest



802.11n20 mode : Lowest



802.11n20 mode : Middle



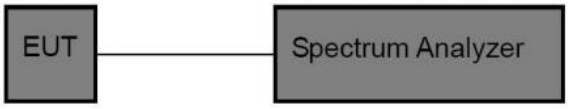
802.11n20 mode : Highest

10 100kHz Bandwidth of Frequency Band Edge Requirement

10.1 Test Standard and Limit

Test Standard	FCC Part15 C Section 15.247 (d)
Test Limit	in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator in operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in15.209(a).

10.2 Test Setup



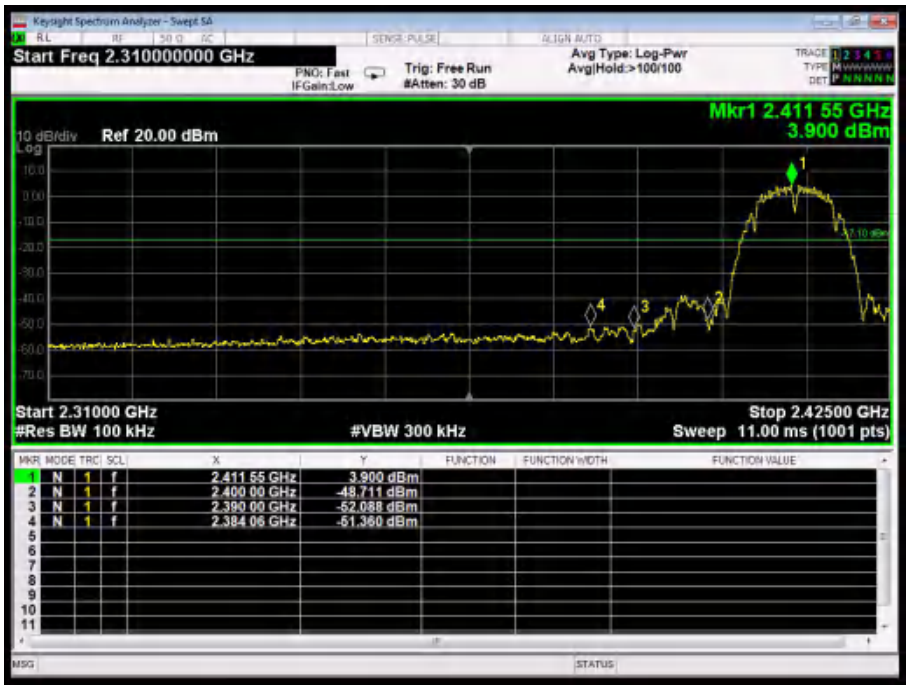
10.3 Test Procedure

Using the following spectrum analyzer setting:
1. Set the RBW = 100KHz.
2. Set the VBW = 300KHz.
3. Sweep time = auto couple.
4. Detector function = peak.
5. Trace mode = max hold.
6. Allow trace to fully stabilize.

10.4 Test Data

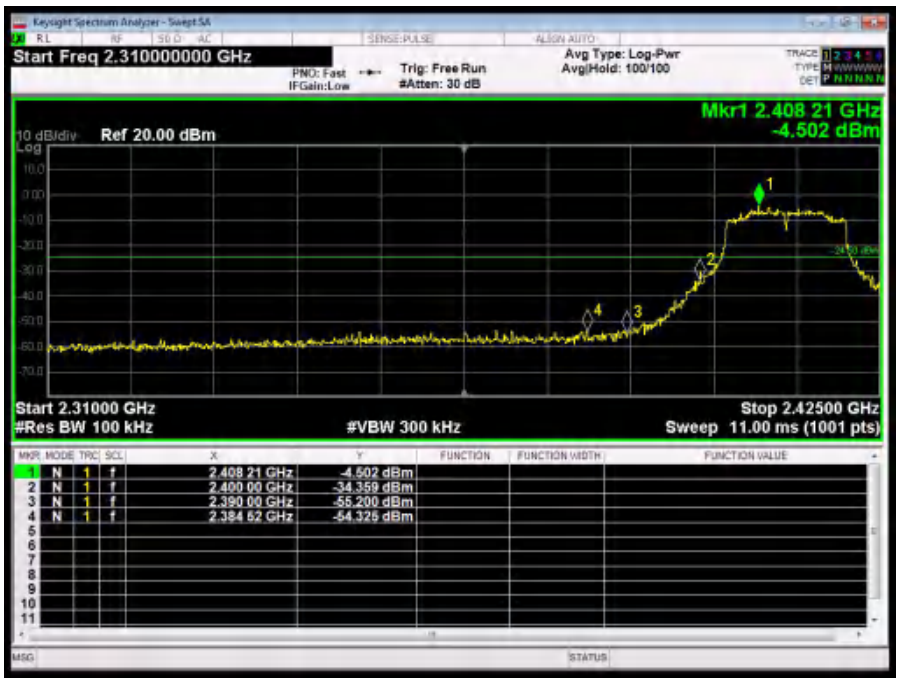
Test Item	:	Band edge	Test Mode	:	CH Low ~ CH High
Test Voltage	:	DC 24V	Temperature	:	24.5℃
Test Result	:	PASS	Humidity	:	52%RH

ANT A:



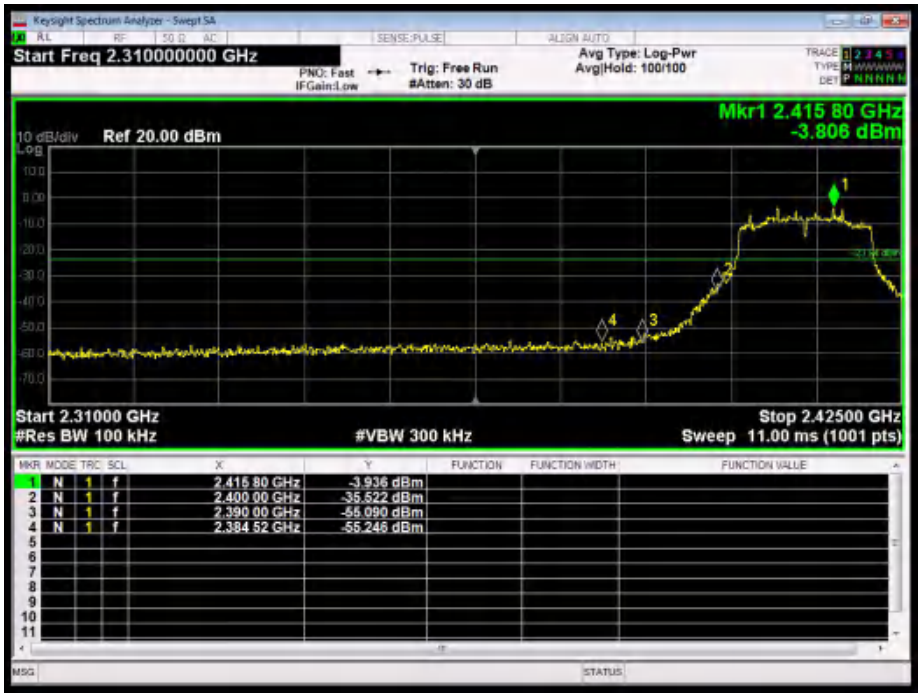
802.11b mode : Lowest

802.11b mode : Highest



802.11g mode : Lowest

802.11g mode : Highest



802.11n20 mode : Lowest

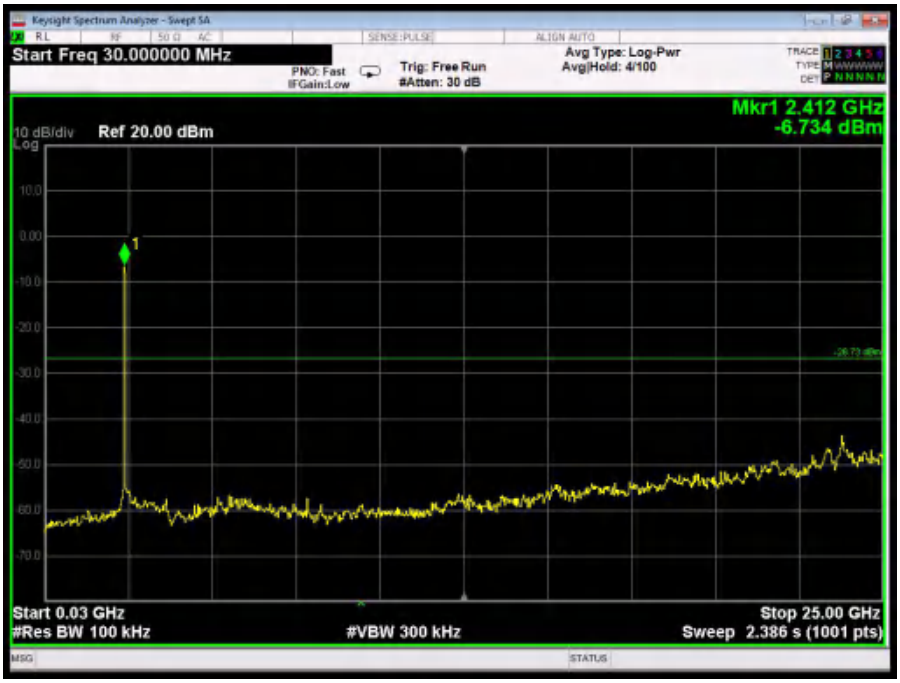
802.11n20 mode : Highest

Conducted Emission Method

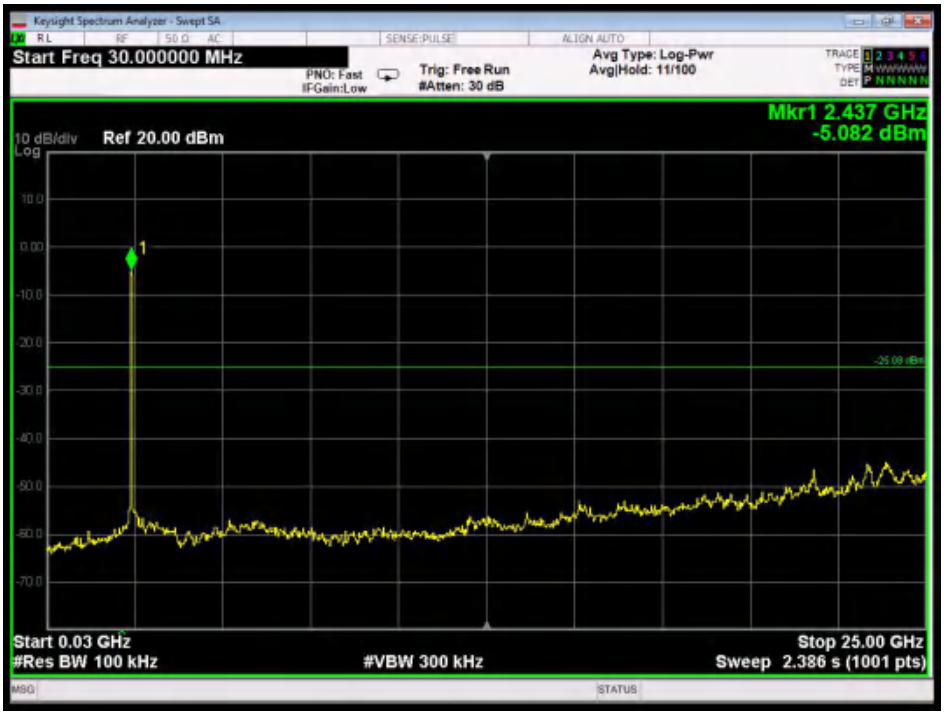
802.11b mode : Lowest

802.11b mode : Middle

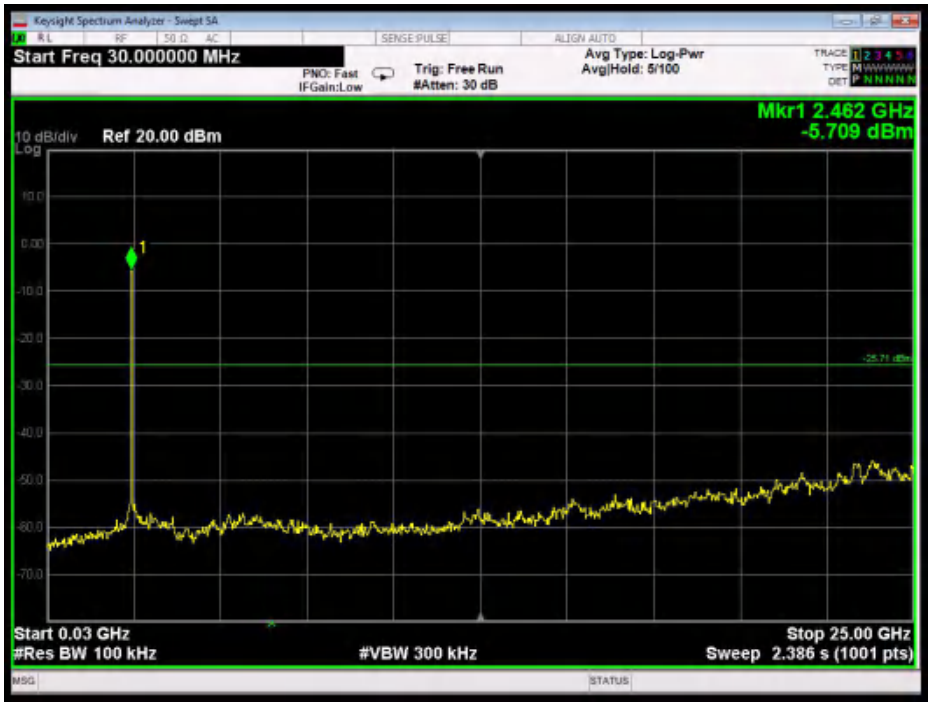
802.11b mode : Highest



802.11g mode : Lowest



802.11g mode : Middle



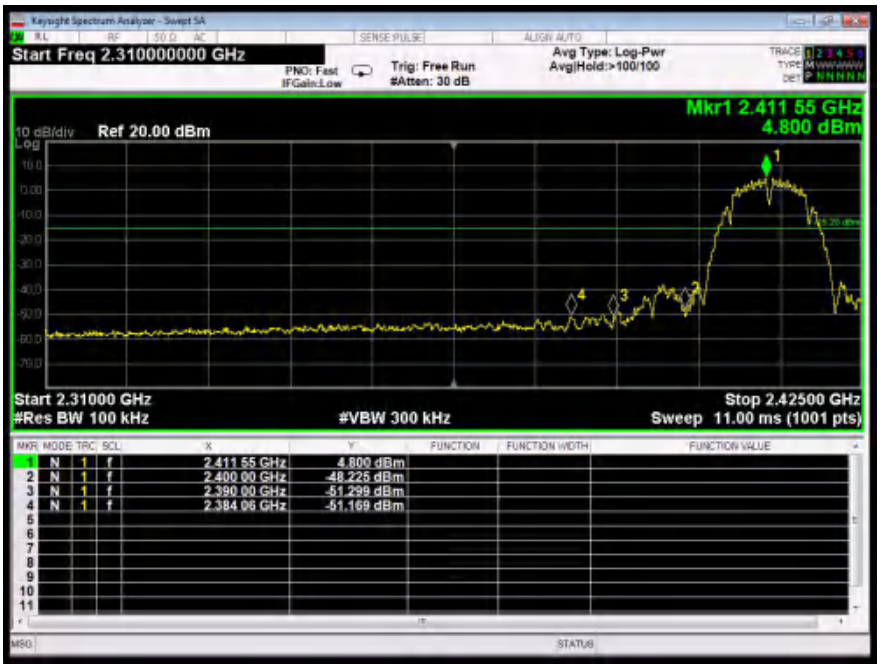
802.11g mode : Highest

802.11n20 mode : Lowest

802.11n20 mode : Middle

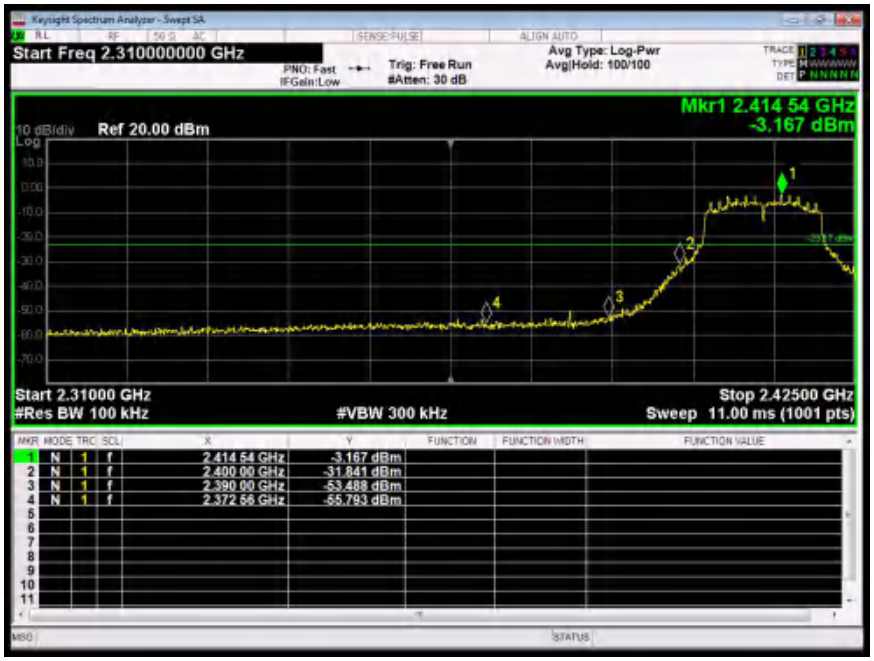
802.11n20 mode : Highest

ANT B:



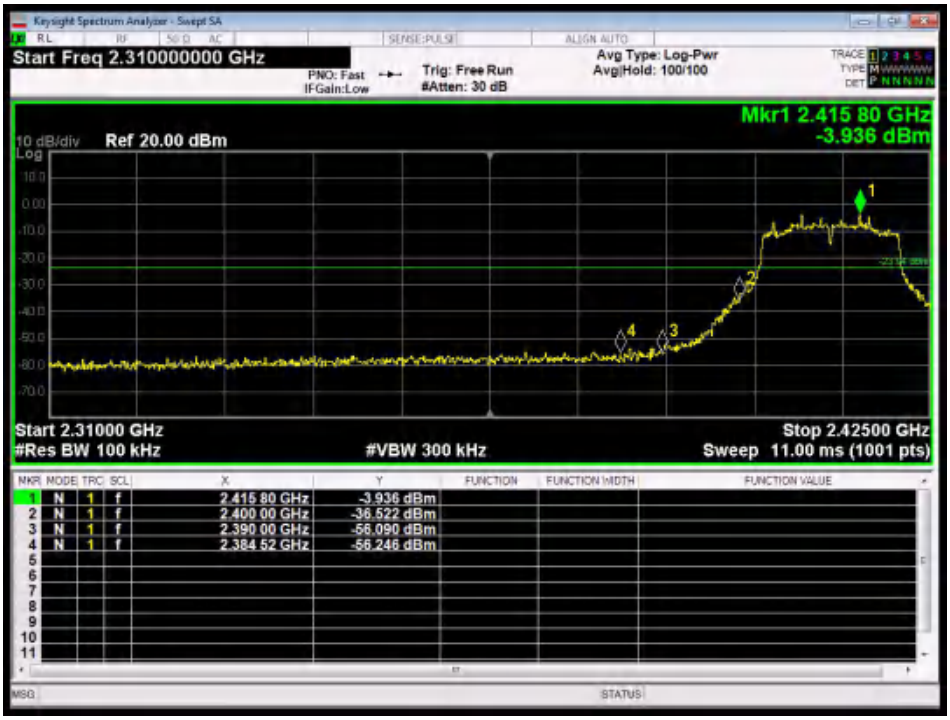
802.11b mode : Lowest

802.11b mode : Highest



802.11g mode : Lowest

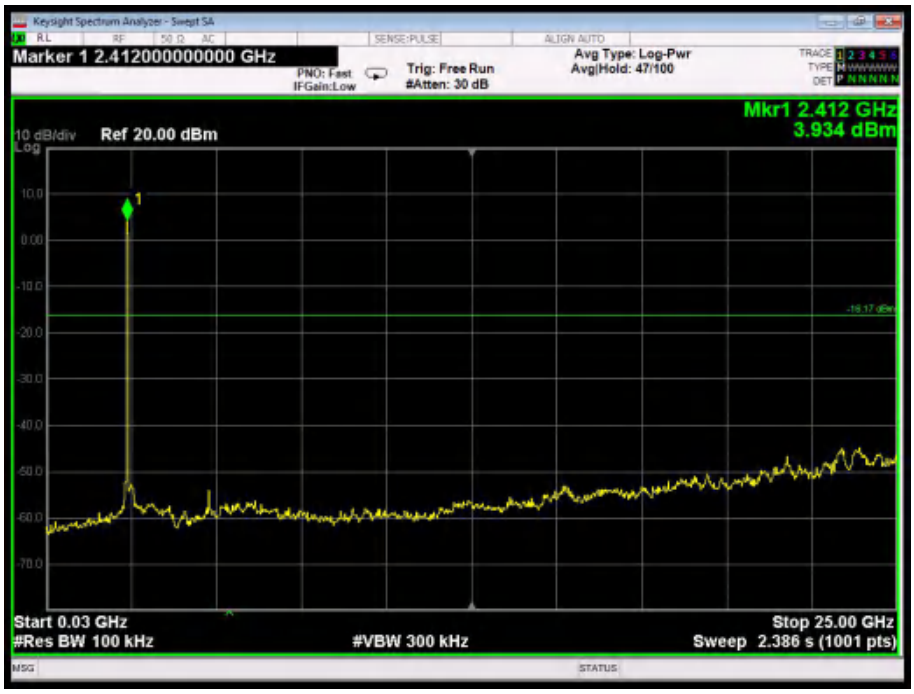
802.11g mode : Highest



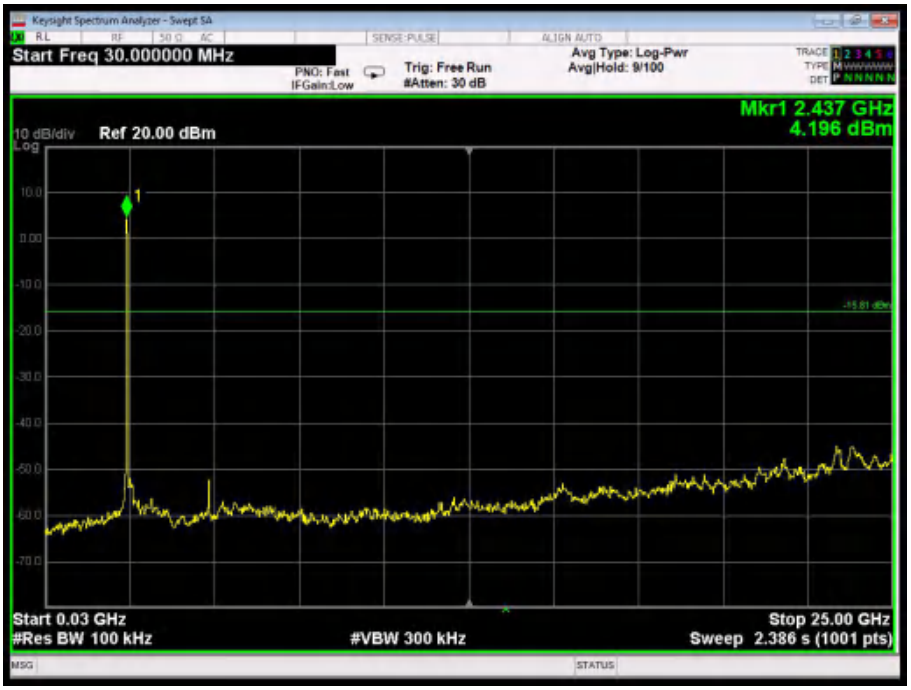
802.11n20 mode : Lowest

802.11n20 mode : Highest

Conducted Emission Method

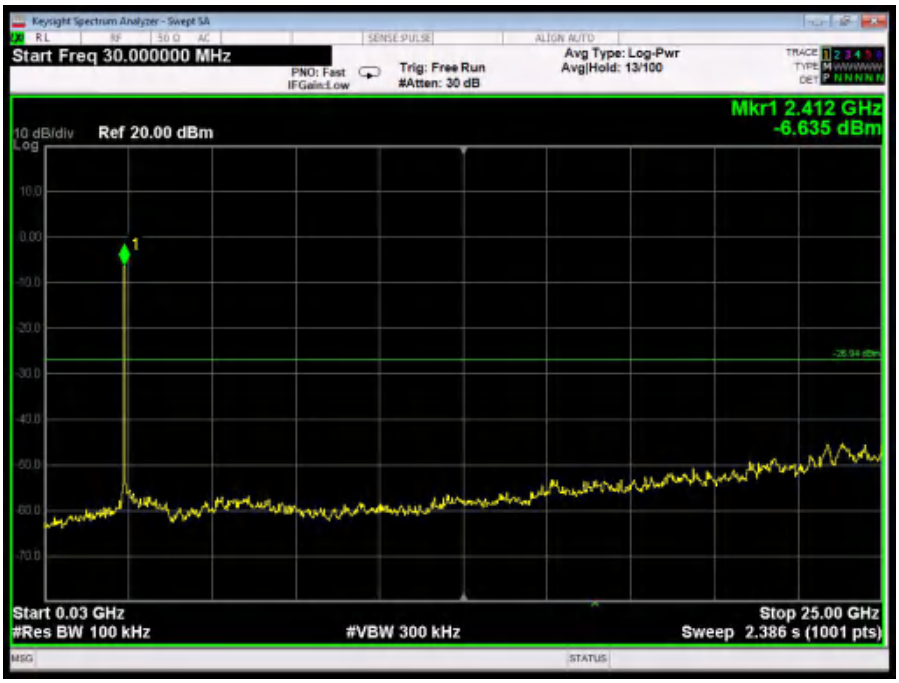


802.11b mode : Lowest

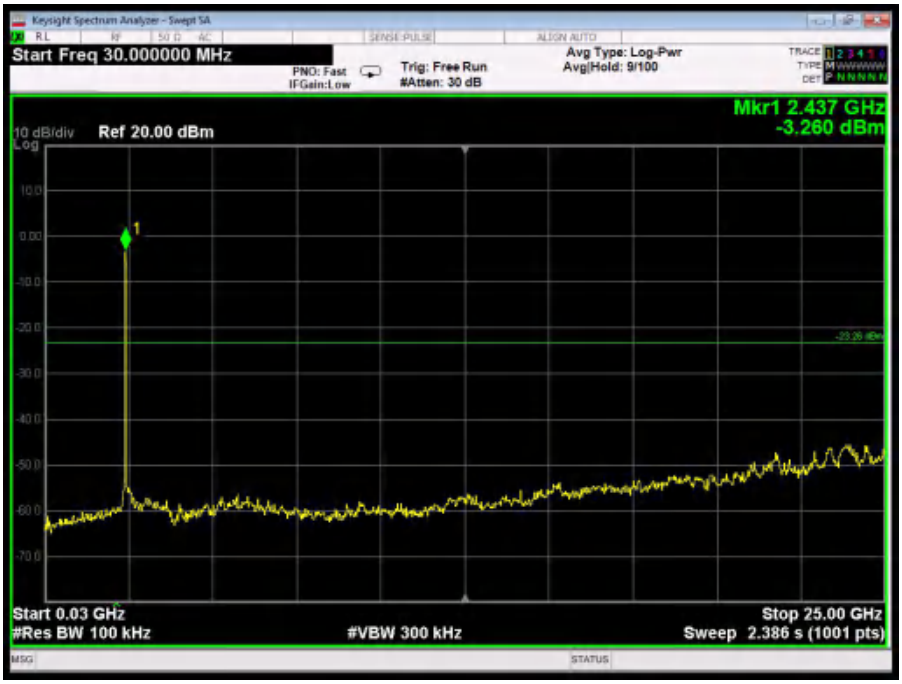


802.11b mode : Middle

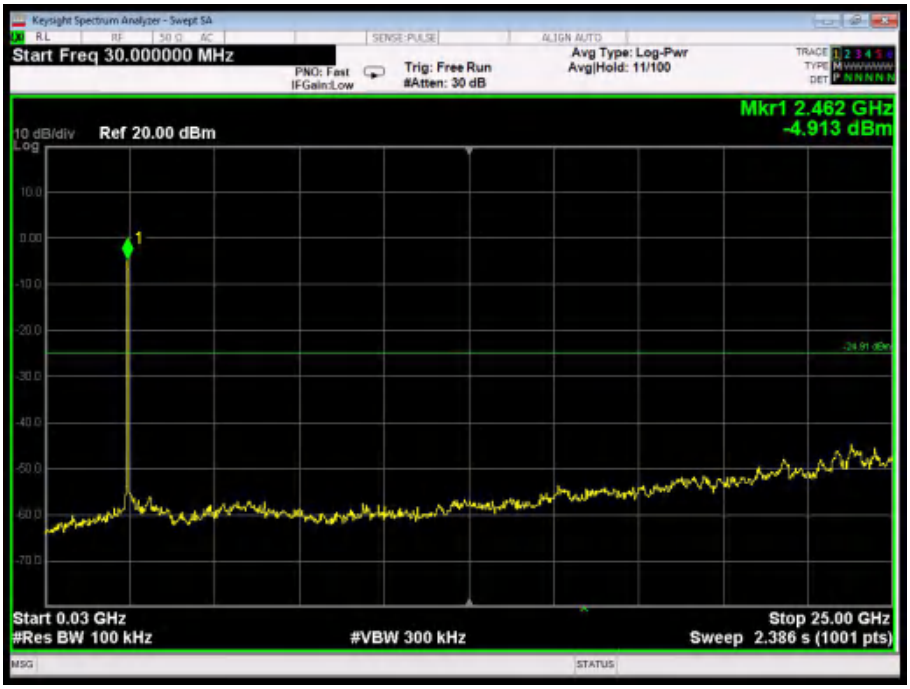
802.11b mode : Highest



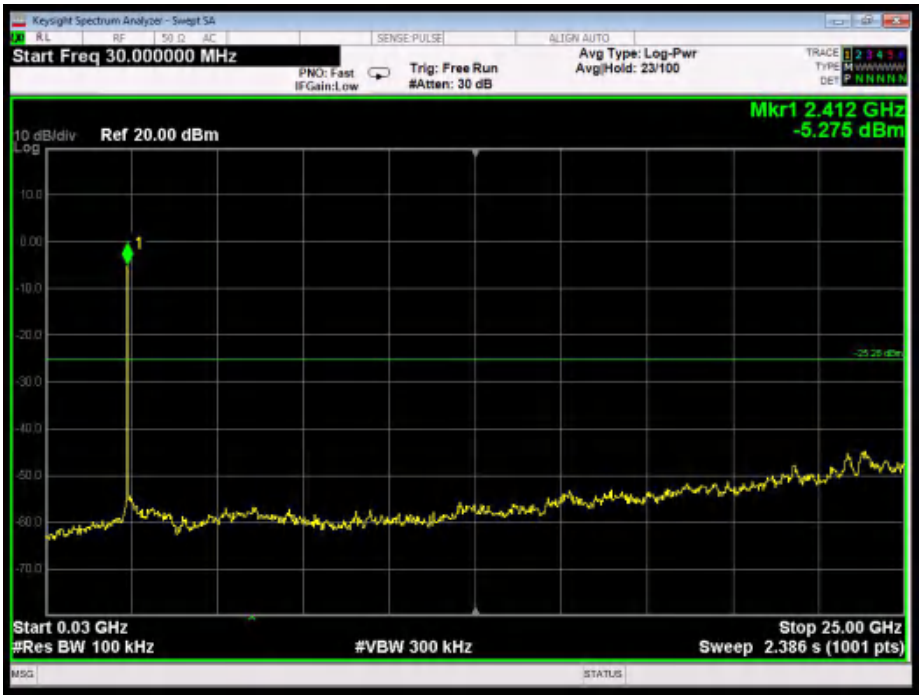
802.11g mode : Lowest



802.11g mode : Middle



802.11g mode : Highest



802.11n20 mode : Lowest

802.11n20 mode : Middle

802.11n20 mode : Highest

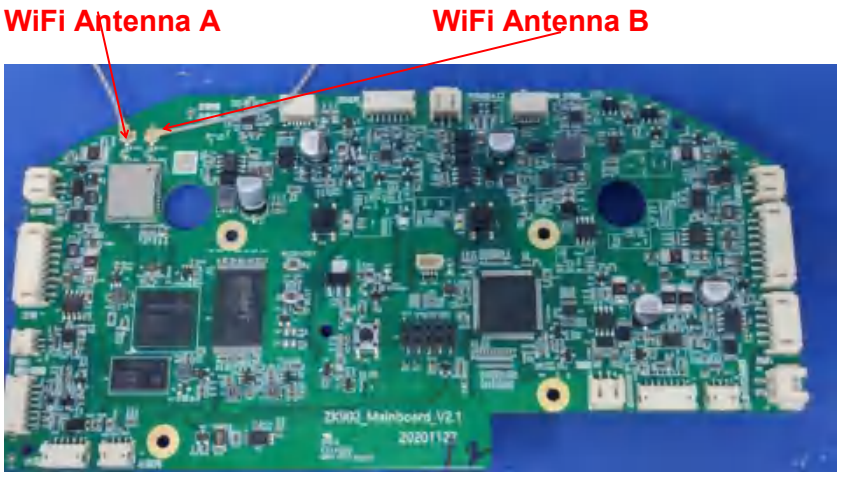
11 . Antenna Requirement

11.1 Test Standard and Requirement

Test Standard	FCC Part15 Section 15.203 /247(c)
Requirement	1) 15.203 requirement: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. 2) 15.247(c) (1)(i) requirement: Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

11.2 Antenna Connected Construction

and the best case gain of the antenna is 3.9 dBi. It complies with the standard requirement.



APPENDIX I -- TEST SETUP PHOTOGRAPH

Photo of Conducted Emission Measurement

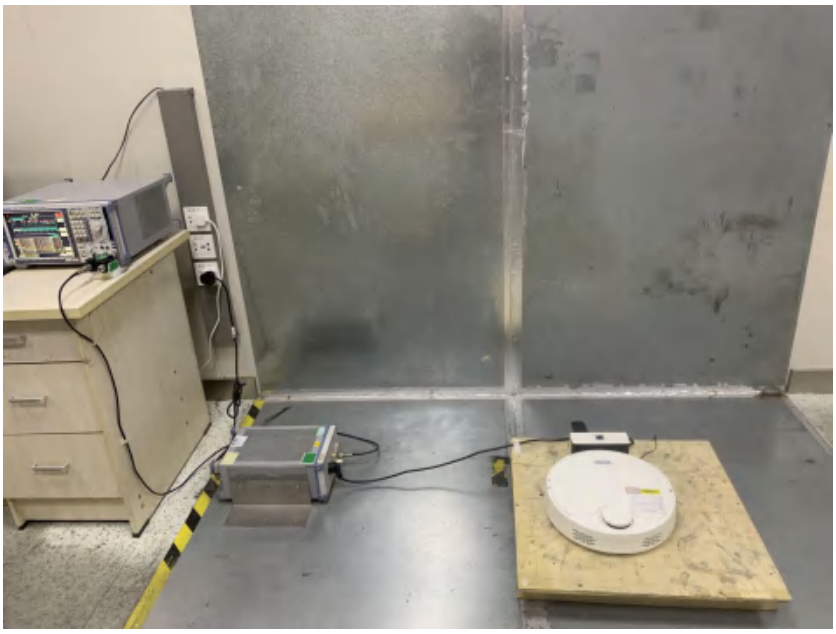
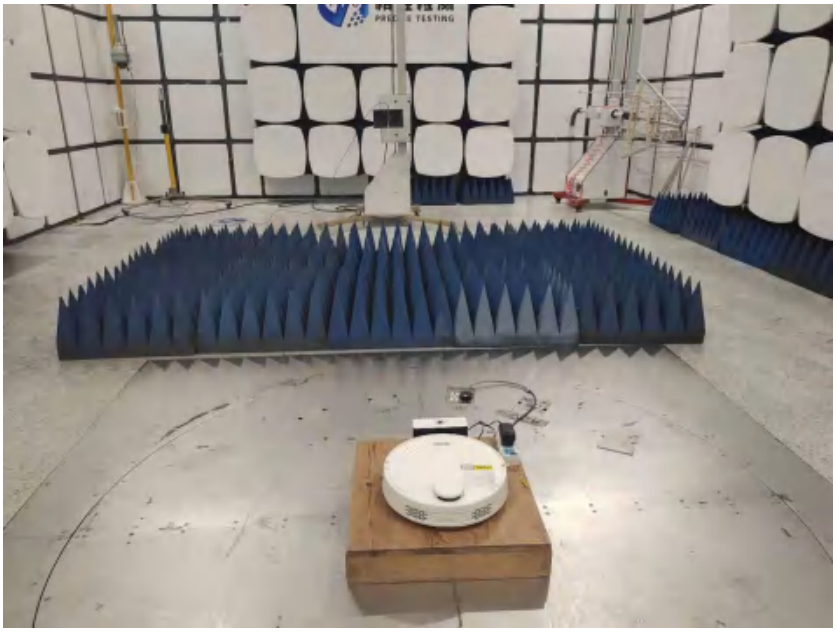


Photo of Radiation Emission Test

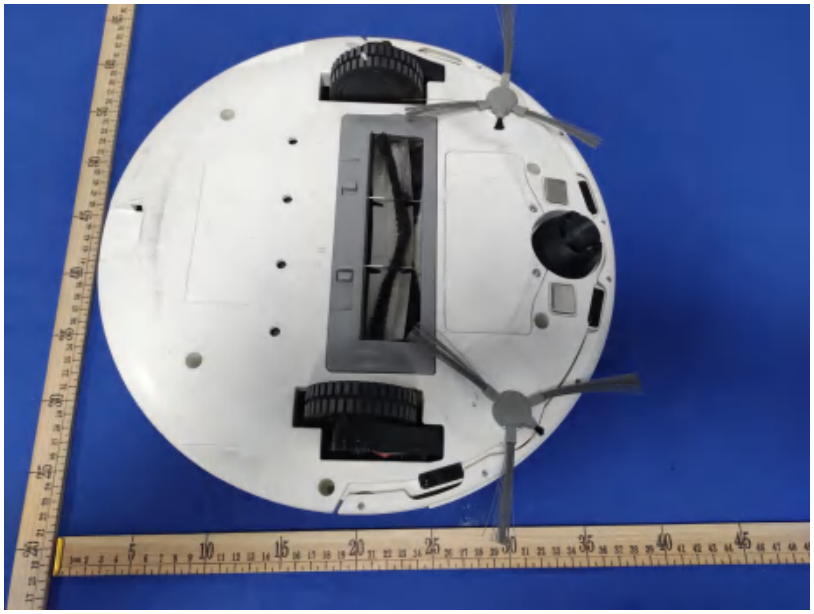
From 30MHz-1000MHz

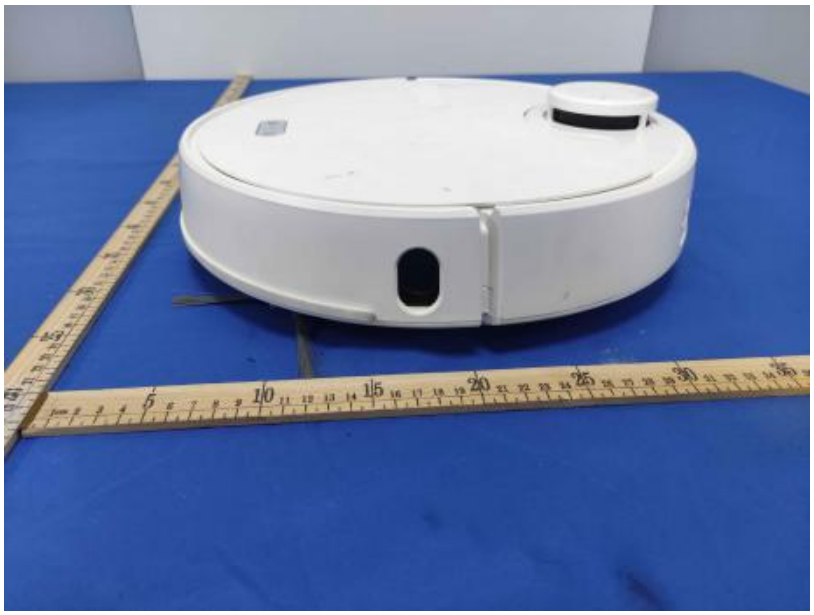
Above 1GHz



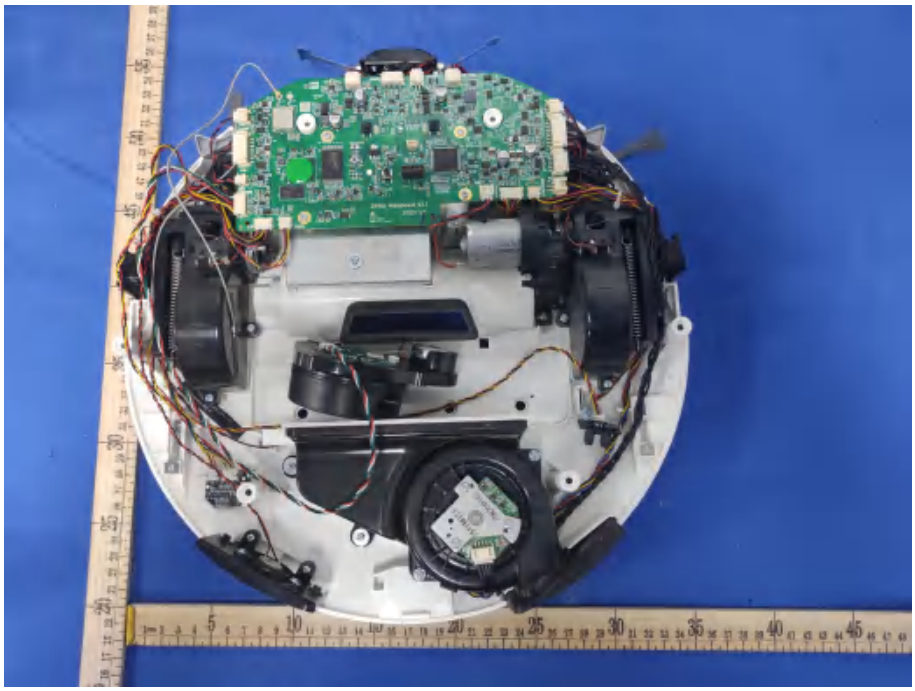
APPENDIX II -- EXTERNAL PHOTOGRAPH

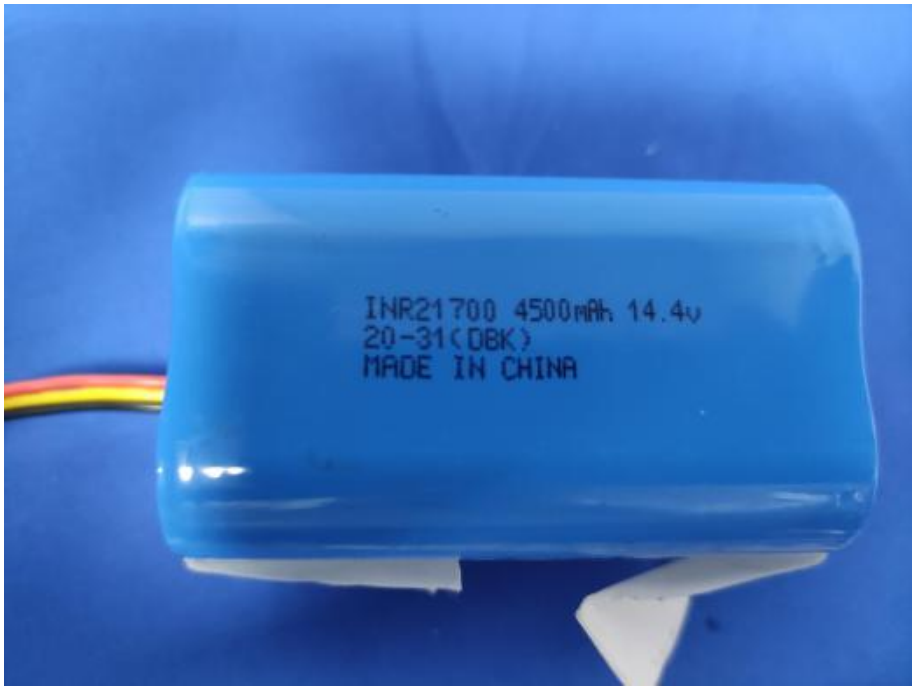
KPTEC AC ADAPTER
MODEL:K25V240100G
INPUT:100-240V~50/60Hz 0.6A
OUTPUT:24.0V ⎓ 1.0A 24.0W
MADE IN CHINA IP20

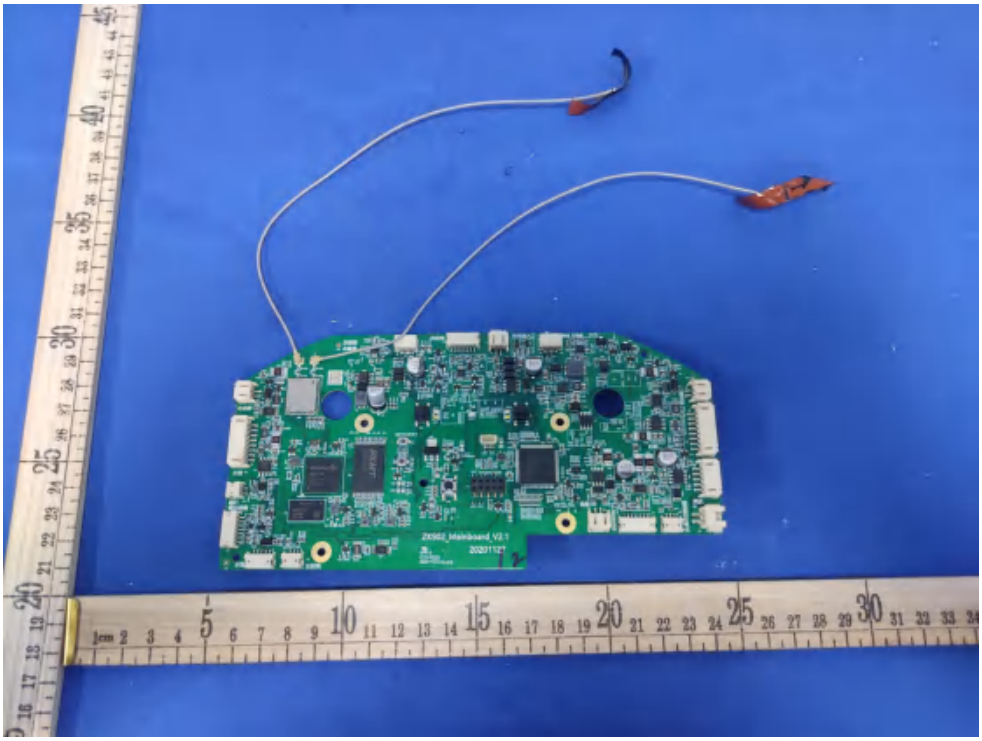


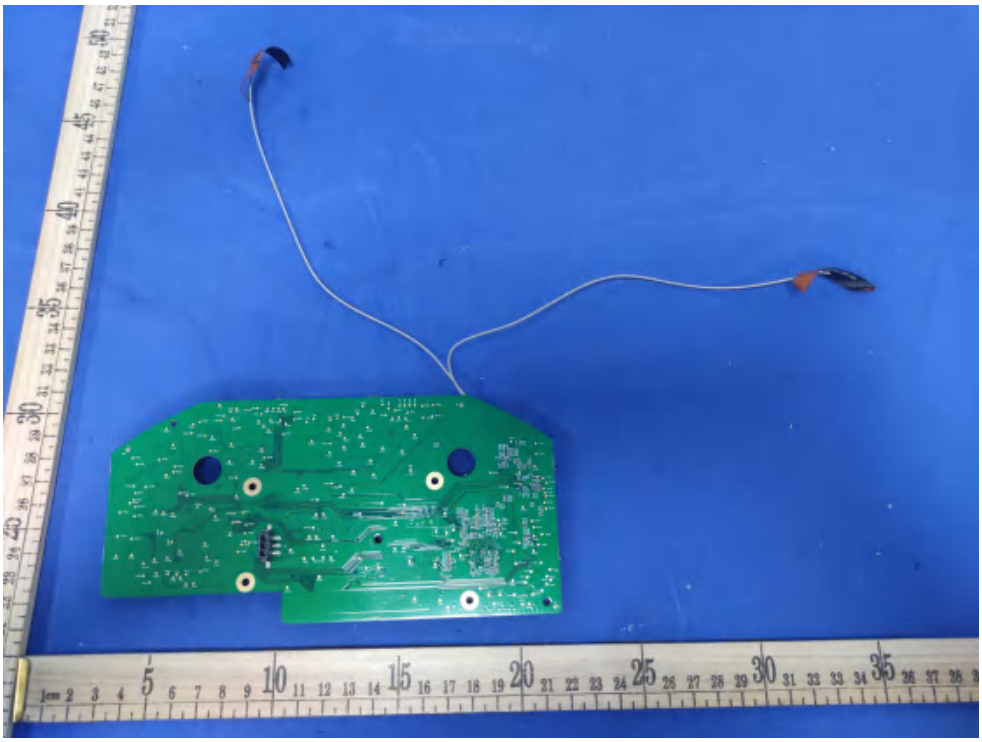


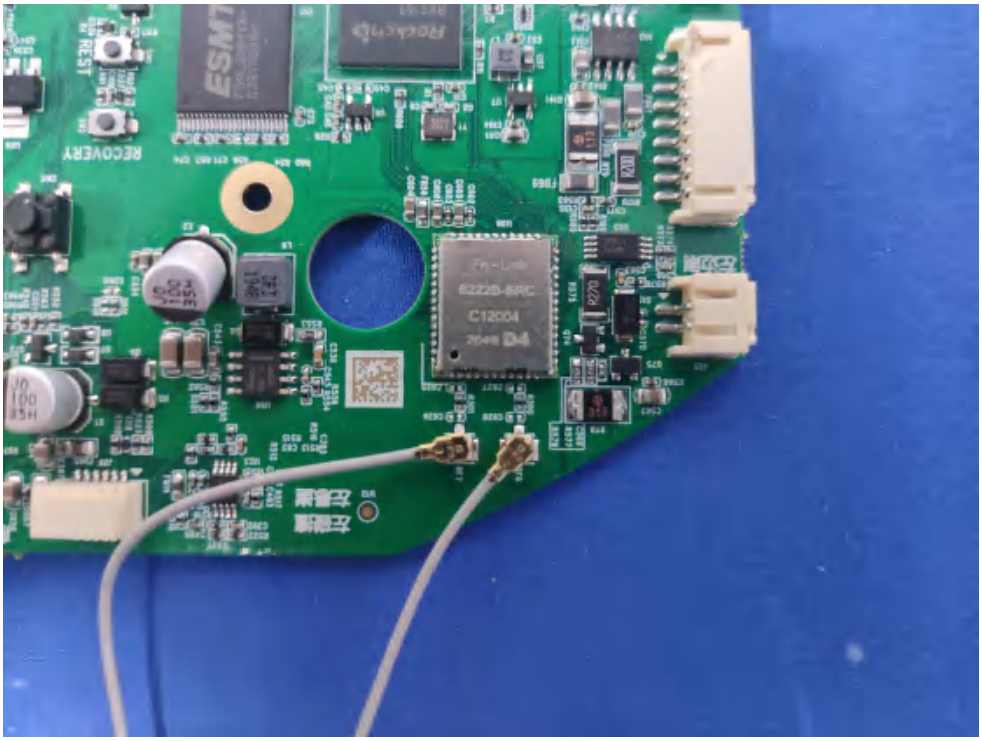
APPENDIX III -- INTERNAL PHOTOGRAPH

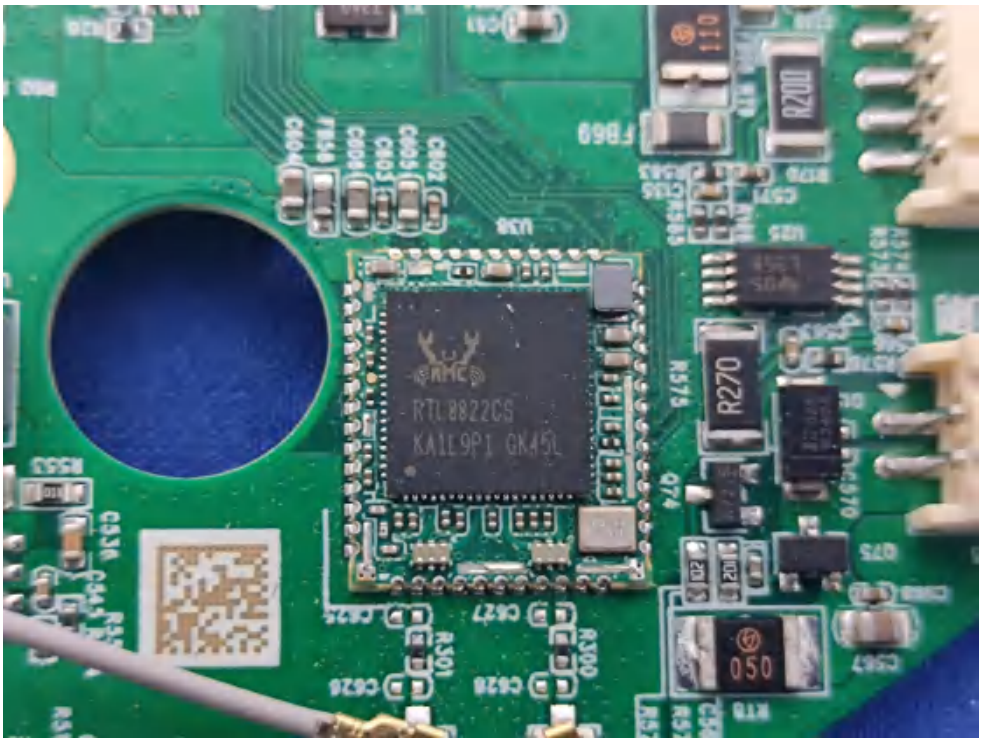












---------- End of Report ----------