FCC TEST REPORT

For

General Procurement, Inc

Hyundai Koral_7XL

Model No.: Koral_7XL

Prepared For	:	General Procurement, Inc
Address	:	800 E Dyer Road , Santa Ana, California, United States 92705
Prepared By	:	Shenzhen Anbotek Compliance Laboratory Limited
Address	:	1/F, Building D, Sogood Science and Technology Park, Sanwei community, Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China.518102
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Report Number	:	SZAWW181206001-03
Date of Receipt	:	Dec. 06, 2018
Date of Test	:	Dec. 06, 2018~Jan. 10, 2019
Date of Report	:	Jan. 11, 2019

Contents

TEST REPORT

Applicant : General Procurement, Inc

Manufacturer : Shen Zhen Cheng Fong Digital-Tech Limited

Product Name : Hyundai Koral_7XL

Model No. : Koral_7XL

Trade Mark : Hyundai

Rating(s) : Input: DC 5V, 2A(Via adapter Input: AC 100~240V, 50/60Hz, Max: 0.35A; with DC 3.7V, 2500mAh Battery inside)

Test Standard(s) : **FCC Part15 Subpart C 2018, Section 15.247**

Test Method(s) : **ANSI C63.10: 2013, KDB558074 D01 DTS Meas Guidance v05**

The device described above is tested by Shenzhen Anbotek Compliance Laboratory Limited to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The measurement results are contained in this test report and Shenzhen Anbotek Compliance Laboratory Limited is assumed full of responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT (Equipment Under Test) is technically compliant with the FCC Part 15 Subpart C requirements.

This report applies to above tested sample only and shall not be reproduced in part without written approval of Shenzhen Anbotek Compliance Laboratory Limited.

Date of Test   Dec. 06, 2018~Jan. 10, 2019

Prepared by

(Engineer / Oliay Yang)

Reviewer

(Supervisor / Snowy Meng)

Approved & Authorized Signer

(Manager / Sally Zhang)

1. General Information

1.1. Client Information

Applicant	:	General Procurement, Inc
Address	:	800 E Dyer Road , Santa Ana, California, United States 92705
Manufacturer	:	Shen Zhen Cheng Fong Digital-Tech Limited
Address	:	Building A, ChengFong Industrial Area, Huaxing road, Dalang, Longhua, Shen Zhen, China
Factory	:	Shen Zhen Cheng Fong Digital-Tech Limited
Address	:	Building A, ChengFong Industrial Area, Huaxing road, Dalang, Longhua, Shen Zhen, China

1.2. Description of Device (EUT)

Product Name	:	Hyundai Koral_7XL	
Model No.	:	Koral_7XL	
Trade Mark	:	Hyundai	
Test Power Supply	:	AC 240V, 60Hz for adapter/ AC 120V, 60Hz for adapter/ DC 3.7V Battery inside	
Test Sample No.	:	S1(Normal Sample), S2(Engineering Sample)	
Product Description	:	Operation Frequency:	802.11b/ g/ n(HT20) 2412-2462MHz
		Number of Channel:	11 Channels for 802.11b/ g/ n(HT20)
		Modulation Type:	802.11b CCK; 802.11g/n OFDM
		Antenna Type:	PIFA Antenna
		Antenna Gain(Peak):	2.5 dBi

Remark: 1) For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.
2) This report is for Wifi 2.4G module.

1.3. Auxiliary Equipment Used During Test

Adapter	:	Manufacturer: Shenzhen Jihongda Power Co., Ltd.
		M/N: JHD-AP013U-050200BB-B Input: 100-240V~ 50/60Hz, 0.35A Output: DC 5V, 2000mA

1.4. Description of Test Modes

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

RADIATED EMISSION TEST (BELOW 1GHz):

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis and antenna ports (if EUT with antenna diversity architecture).

Following channel(s) was (were) selected for the final test as listed below.

Mode	Available Channel	Test Channel	Modulation Tech.	Modulation Type	Data Rate (Mbps)
802.11b	1 to 11	1	CCK	DBPSK	1.0

For the test results, only the worst case was shown in test report.

RADIATED EMISSION TEST (ABOVE 1GHz):

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis and antenna ports (if EUT with antenna diversity architecture).

Following channel(s) was (were) selected for the final test as listed below.

Mode	Available Channel	Test Channel	Modulation Tech.	Modulation Type	Data Rate (Mbps)
802.11b	1 to 11	1, 6, 11	CCK	DBPSK	1.0
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
802.11n HT20	1 to 11	1, 6, 11	OFDM	BPSK	6.5

POWER LINE CONDUCTED EMISSION TEST:

The EUT was tested with the following mode

EUT configure mode	Test Mode
-	Keeping TX mode

BANDEDGE MEASUREMENT:

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

Following channel(s) was (were) selected for the final test as listed below.

Mode	Available Channel	Test Channel	Modulation Tech.	Modulation Type	Data Rate (Mbps)
802.11b	1 to 11	1, 11	CCK	DBPSK	1.0
802.11g	1 to 11	1, 11	OFDM	BPSK	6.0
802.11n HT20	1 to 11	1, 11	OFDM	BPSK	6.5

ANTENNA PORT CONDUCTED MEASUREMENT:

This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

Following channel(s) was (were) selected for the final test as listed below.

Mode	Available Channel	Test Channel	Modulation Tech.	Modulation Type	Data Rate (Mbps)
802.11b	1 to 11	1, 6, 11	CCK	DBPSK	1.0
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
802.11n HT20	1 to 11	1, 6, 11	OFDM	BPSK	6.5

1.5. List of channels

Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)
01	2412	04	2427	07	2442	10	2457
02	2417	05	2432	08	2447	11	2462
03	2422	06	2437	09	2452		

1.6. Description Of Test Setup

CE

RE
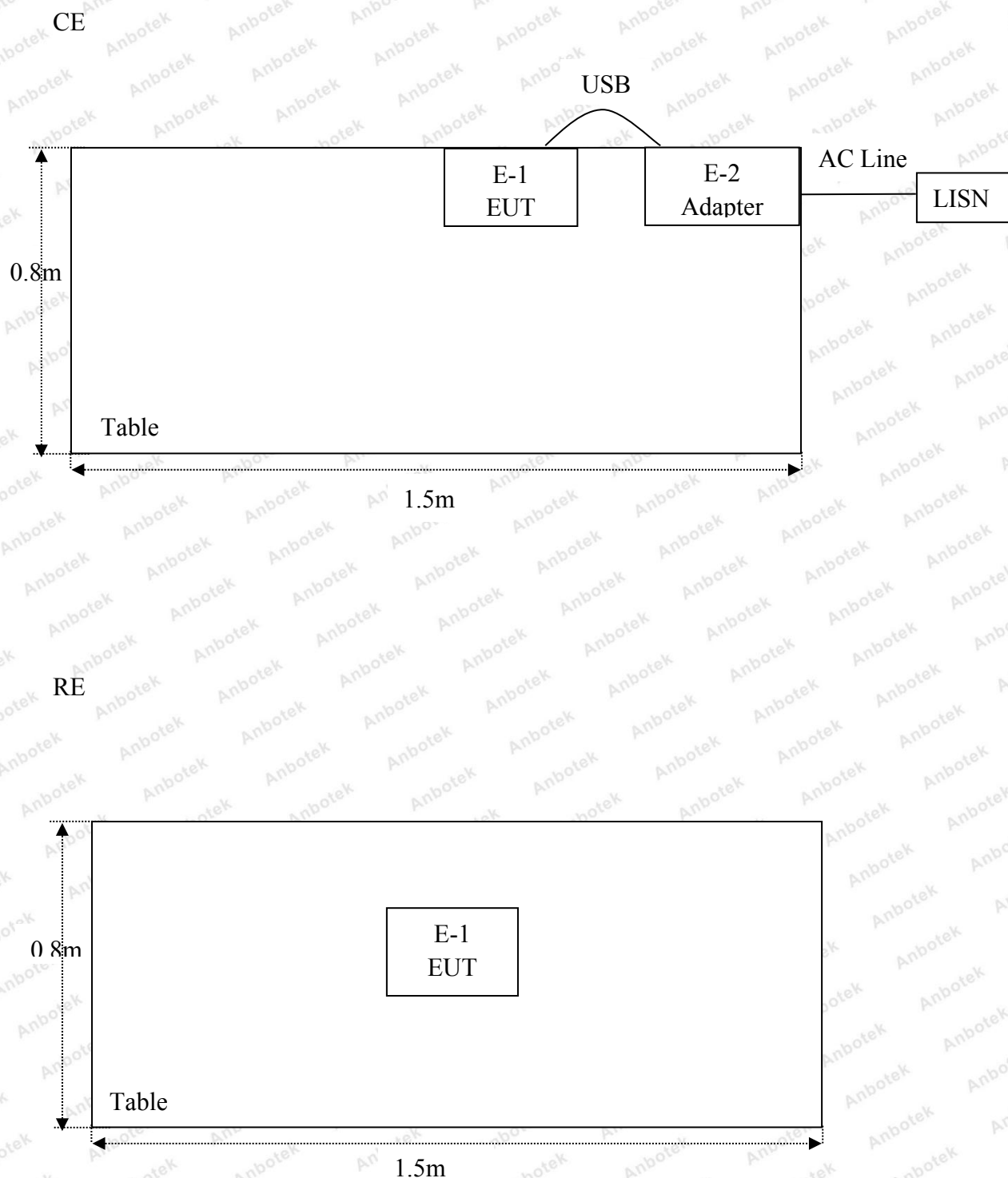
1.7. Test Equipment List

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	L.I.S.N. Artificial Mains Network	Rohde & Schwarz	ENV216	100055	Nov. 05, 2018	1 Year
2.	EMI Test Receiver	Rohde & Schwarz	ESPI3	101604	Nov. 05, 2018	1 Year
3.	RF Switching Unit	Compliance Direction	RSU-M2	38303	Nov. 05, 2018	1 Year
4.	Spectrum Analysis	Agilent	E4407B	US39390582	Nov. 05, 2018	1 Year
5.	MAX Spectrum Analysis	Agilent	N9020A	MY51170037	Nov. 05, 2018	1 Year
6.	Preamplifier	SKET Electronic	BK1G18G30D	KD17503	Nov. 05, 2018	1 Year
7.	Double Ridged Horn Antenna	Instruments corporation	GTH-0118	351600	Nov. 19, 2018	1 Year
8.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	VULB 9163-289	Nov. 19, 2018	1 Year
9.	Loop Antenna	Schwarzbeck	FMZB1519B	00053	Nov. 19, 2018	1 Year
10.	Horn Antenna	A-INFO	LB-180400-KF	J211060628	Nov. 20, 2018	1 Year
11.	Pre-amplifier	SONOMA	310N	186860	Nov. 05, 2018	1 Year
12.	EMI Test Software EZ-EMC	SHURPLE	N/A	N/A	N/A	N/A
13.	RF Test Control System	YIHENG	YH3000	2017430	Nov. 05, 2018	1 Year
14.	Power Sensor	DAER	RPR3006W	15I00041SN045	Nov. 05, 2018	1 Year
15.	Power Sensor	DAER	RPR3006W	15I00041SN046	Nov. 05, 2018	1 Year
16.	MXA Spectrum Analysis	Agilent	N9020A	MY51170037	Nov. 05, 2018	1 Year
17.	MXG RF Vector Signal Generator	Agilent	N5182A	MY48180656	Nov. 05, 2018	1 Year
18.	Signal Generator	Agilent	E4421B	MY41000743	Nov. 05, 2018	1 Year
19.	DC Power Supply	IVYTECH	IV3605	1804D360510	Apr. 02, 2018	1 Year
20.	Constant Temperature Humidity Chamber	ZHONGJIAN	ZJ-KHWS80B	N/A	Nov. 01, 2018	1 Year

1.8. Description of Test Facility

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

FCC-Registration No.: 184111

Shenzhen Anbotek Compliance Laboratory Limited, EMC Laboratory has been registed and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration No. 184111, July 31, 2017.

ISED-Registration No.: 8058A-1

Shenzhen Anbotek Compliance Laboratory Limited, EMC Laboratory has been registered and fully described in a report filed with the (ISED) Innovation, Science and Economic Development Canada. The acceptance letter from the ISED is maintained in our files. Registration 8058A-1, June 13, 2016.

Test Location

Shenzhen Anbotek Compliance Laboratory Limited.
1/F, Building D, Sogood Science and Technology Park, Sanwei community, Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China.518102

2. Summary of Test Results

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.		

3. Conducted Emission Test

3.1. 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.			

3.2. Test Setup
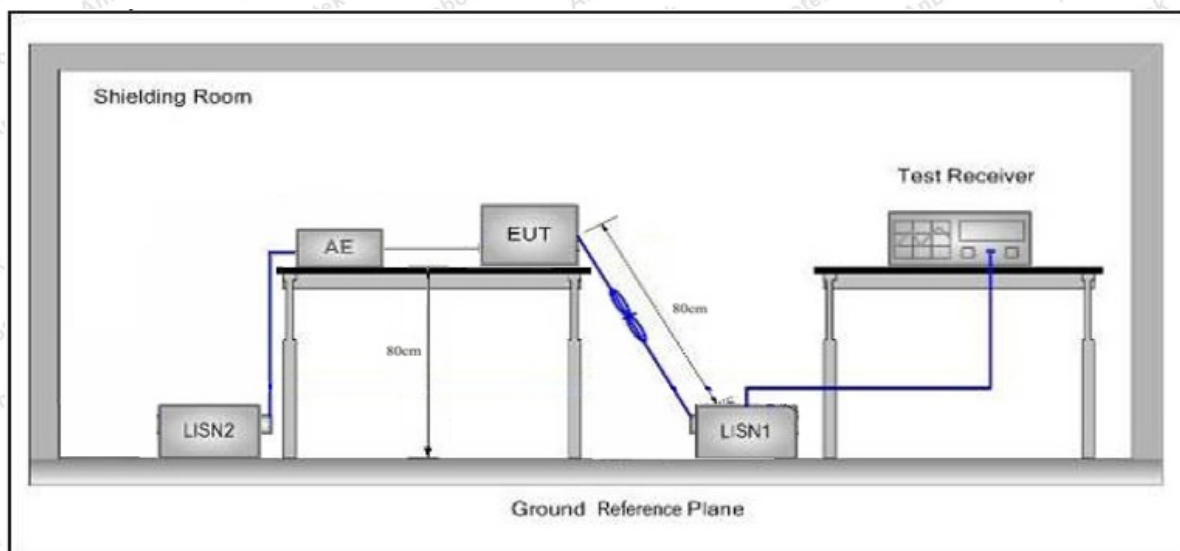
3.3. Test Procedure

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.

3.4. Test Data

Please to see the following pages.

Conducted Emission Test Data

Test Site: 1# Shielded Room
Operating Condition: Keeping TX+ Charging Mode
Test Specification: AC 240V, 60Hz for adapter
Comment: Live Line
                           Tem.: 24.4℃ Hum.: 49%
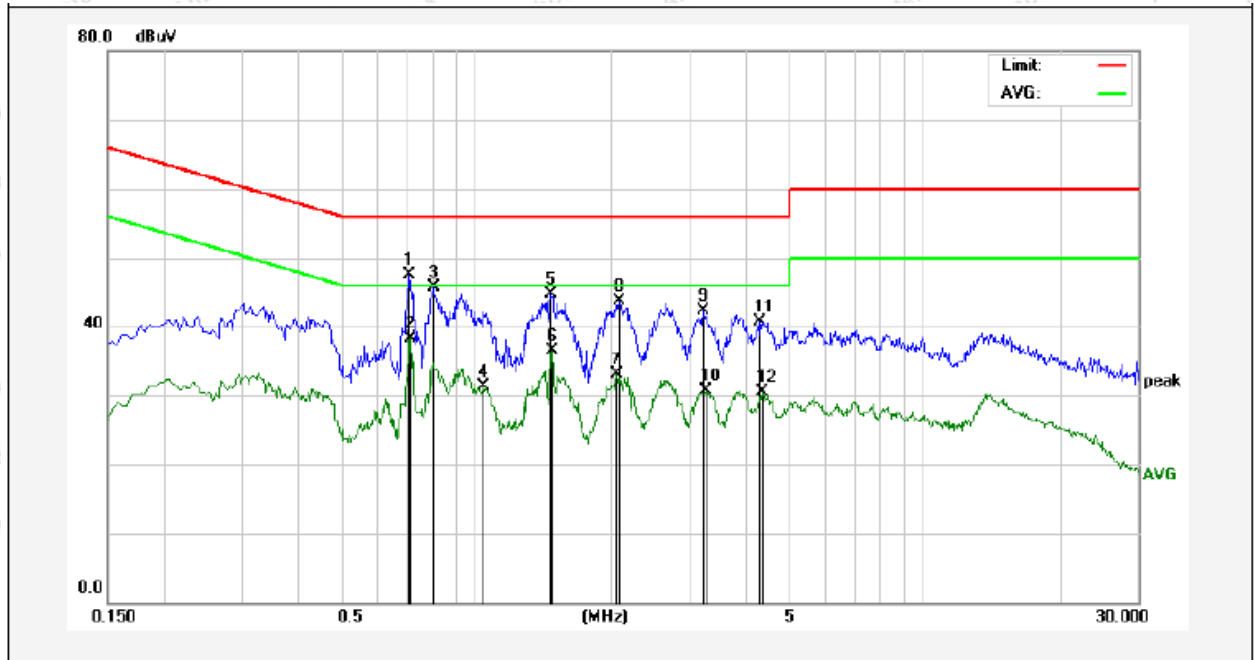
No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Over Limit (dB)	Detector	Remark
1	0.7100	27.44	20.04	47.48	56.00	-8.52	QP	
2	0.7140	18.20	20.04	38.24	46.00	-7.76	AVG	
3	0.8020	25.72	20.07	45.79	56.00	-10.21	QP	
4	1.0380	11.24	20.12	31.36	46.00	-14.64	AVG	
5	1.4700	24.65	20.13	44.78	56.00	-11.22	QP	
6	1.4740	16.43	20.13	36.56	46.00	-9.44	AVG	
7	2.0579	12.94	20.14	33.08	46.00	-12.92	AVG	
8	2.0780	23.53	20.14	43.67	56.00	-12.33	QP	
9	3.2220	22.19	20.16	42.35	56.00	-13.65	QP	
10	3.2500	10.52	20.16	30.68	46.00	-15.32	AVG	
11	4.2900	20.49	20.19	40.68	56.00	-15.32	QP	
12	4.3380	10.24	20.19	30.43	46.00	-15.57	AVG	

Conducted Emission Test Data

Test Site: 1# Shielded Room
Operating Condition: Keeping TX+ Charging Mode
Test Specification: AC 240V, 60Hz for adapter
Comment: Neutral Line
                               Tem.: 24.4℃ Hum.: 49%
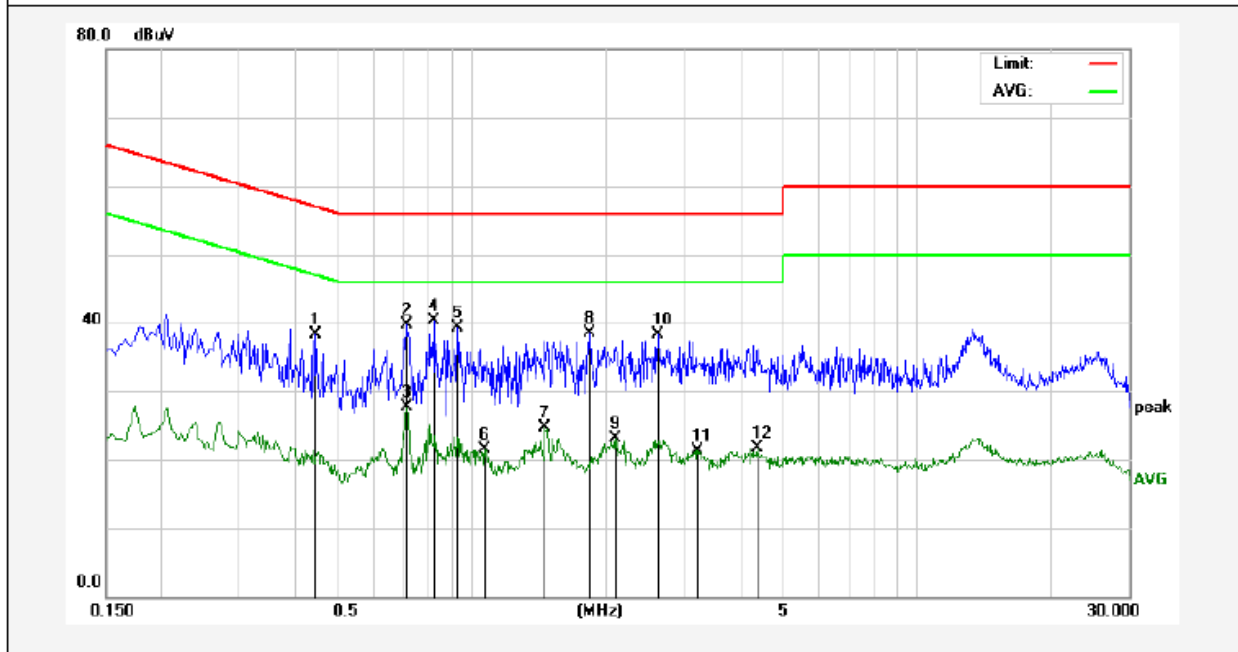
No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Over Limit (dB)	Detector	Remark
1	0.4460	18.37	19.96	38.33	56.95	-18.62	QP	
2	0.7140	19.63	20.04	39.67	56.00	-16.33	QP	
3	0.7140	7.71	20.04	27.75	46.00	-18.25	AVG	
4	0.8260	20.22	20.07	40.29	56.00	-15.71	QP	
5	0.9260	19.11	20.10	39.21	56.00	-16.79	QP	
6	1.0660	1.44	20.12	21.56	46.00	-24.44	AVG	
7	1.4620	4.62	20.13	24.75	46.00	-21.25	AVG	
8	1.8340	18.30	20.14	38.44	56.00	-17.56	QP	
9	2.1099	2.93	20.14	23.07	46.00	-22.93	AVG	
10	2.6220	18.12	20.15	38.27	56.00	-17.73	QP	
11	3.2180	1.20	20.16	21.36	46.00	-24.64	AVG	
12	4.3700	1.45	20.19	21.64	46.00	-24.36	AVG	

Conducted Emission Test Data

Test Site: 1# Shielded Room
Operating Condition: Keeping TX+ Charging Mode
Test Specification: AC 120V, 60Hz for adapter
Comment: Live Line
                         Tem.: 24.4℃ Hum.: 49%

No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Over Limit (dB)	Detector	Remark
1	0.3980	9.02	19.93	28.95	47.89	-18.94	AVG	
2	0.4300	18.06	19.95	38.01	57.25	-19.24	QP	
3	0.7380	23.87	20.05	43.92	56.00	-12.08	QP	
4	0.7380	15.37	20.05	35.42	46.00	-10.58	AVG	
5	1.2020	18.80	20.12	38.92	56.00	-17.08	QP	
6	1.4500	9.71	20.13	29.84	46.00	-16.16	AVG	
7	1.5020	18.27	20.13	38.40	56.00	-17.60	QP	
8	2.5059	18.71	20.15	38.86	56.00	-17.14	QP	
9	2.8100	7.61	20.16	27.77	46.00	-18.23	AVG	
10	3.7900	17.27	20.18	37.45	56.00	-18.55	QP	
11	4.2260	5.95	20.19	26.14	46.00	-19.86	AVG	
12	14.0780	7.60	20.27	27.87	50.00	-22.13	AVG	

Conducted Emission Test Data

Test Site: 1# Shielded Room
Operating Condition: Keeping TX+ Charging Mode
Test Specification: AC 120V, 60Hz for adapter
Comment: Neutral Line
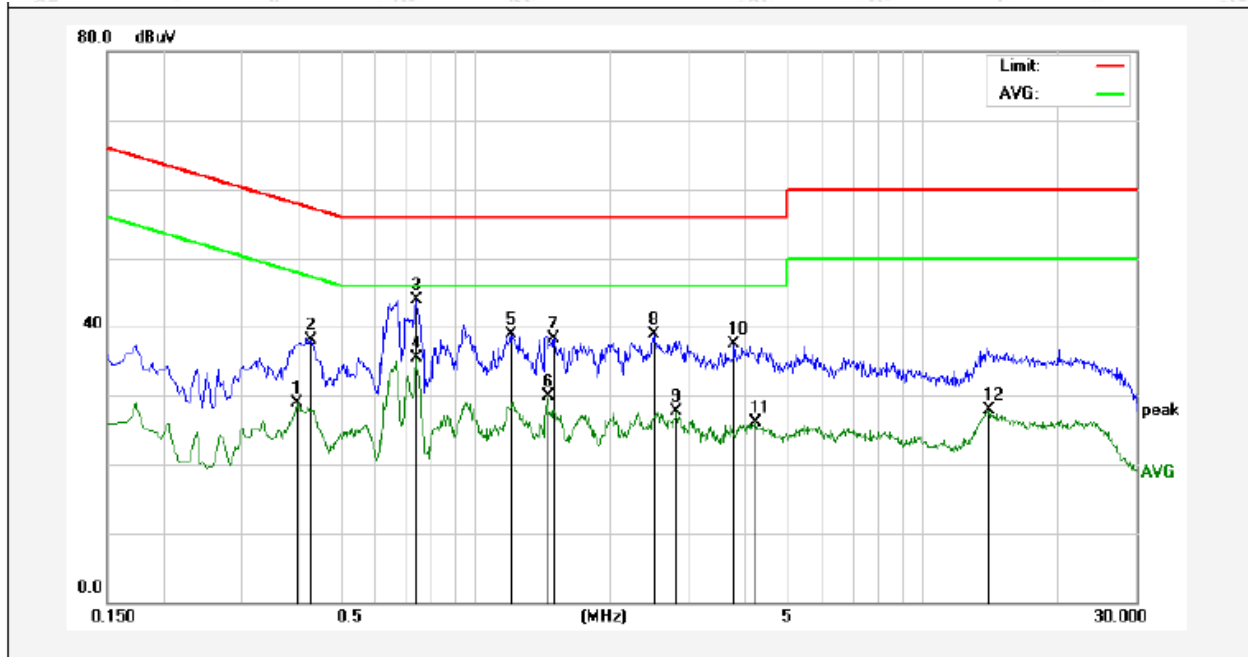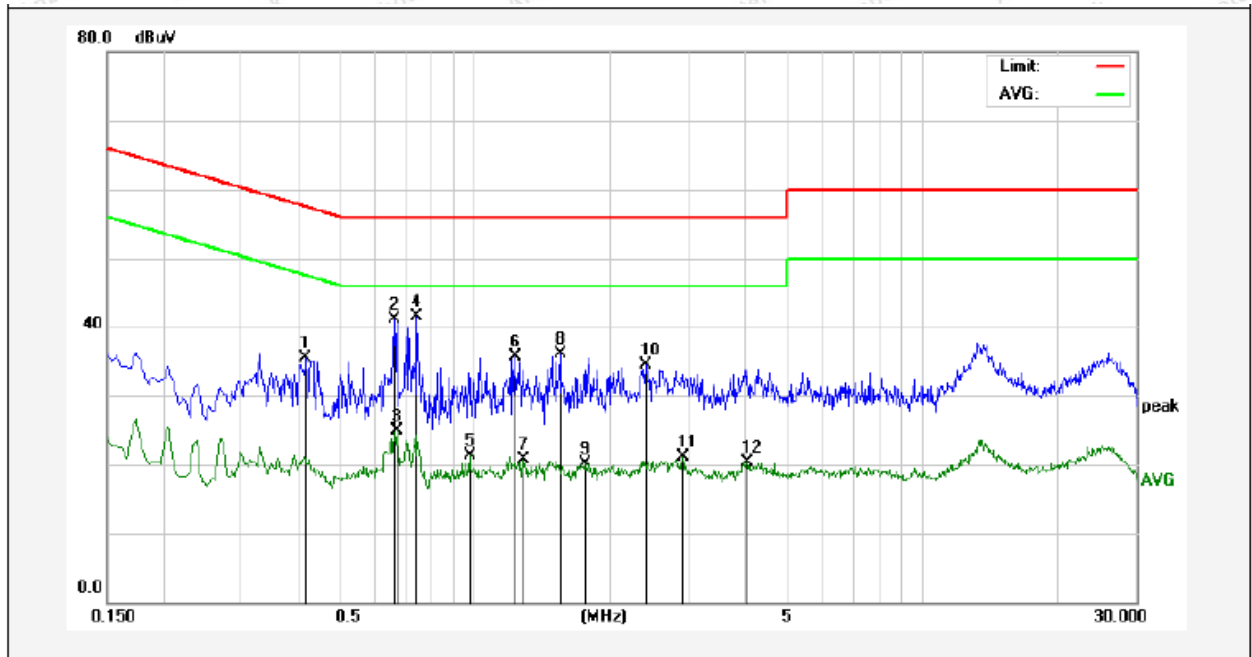   Tem.: 24.4℃ Hum.: 49%

No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Over Limit (dB)	Detector	Remark
1	0.4180	15.61	19.94	35.55	57.49	-21.94	QP	
2	0.6580	21.15	20.03	41.18	56.00	-14.82	QP	
3	0.6700	4.84	20.03	24.87	46.00	-21.13	AVG	
4	0.7420	21.39	20.05	41.44	56.00	-14.56	QP	
5	0.9700	1.15	20.11	21.26	46.00	-24.74	AVG	
6	1.2260	15.63	20.12	35.75	56.00	-20.25	QP	
7	1.2780	0.58	20.13	20.71	46.00	-25.29	AVG	
8	1.5500	16.00	20.13	36.13	56.00	-19.87	QP	
9	1.7540	-0.07	20.14	20.07	46.00	-25.93	AVG	
10	2.4060	14.28	20.15	34.43	56.00	-21.57	QP	
11	2.9060	0.96	20.16	21.12	46.00	-24.88	AVG	
12	4.0580	0.18	20.18	20.36	46.00	-25.64	AVG	

4. Radiation Spurious Emission and Band Edge

4.1. 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.

4.2. Test Setup
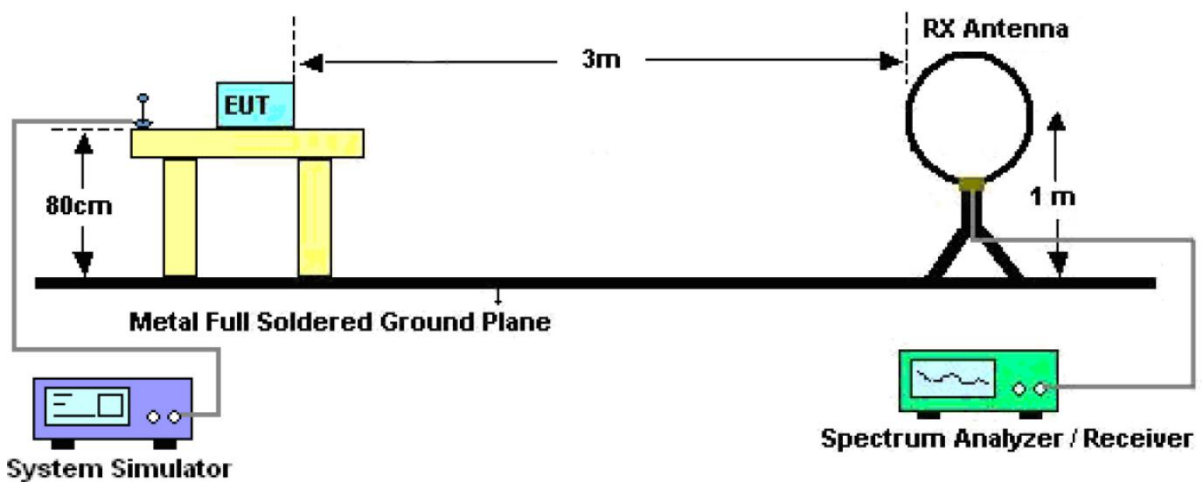
Figure 1. Below 30MHz
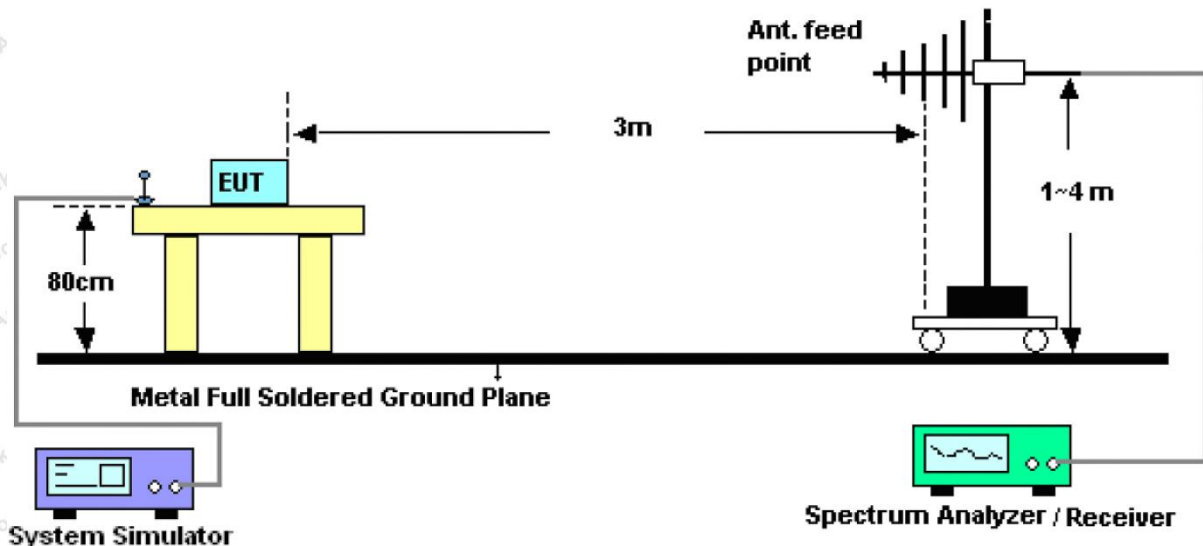
Figure 2. 30MHz to 1GHz
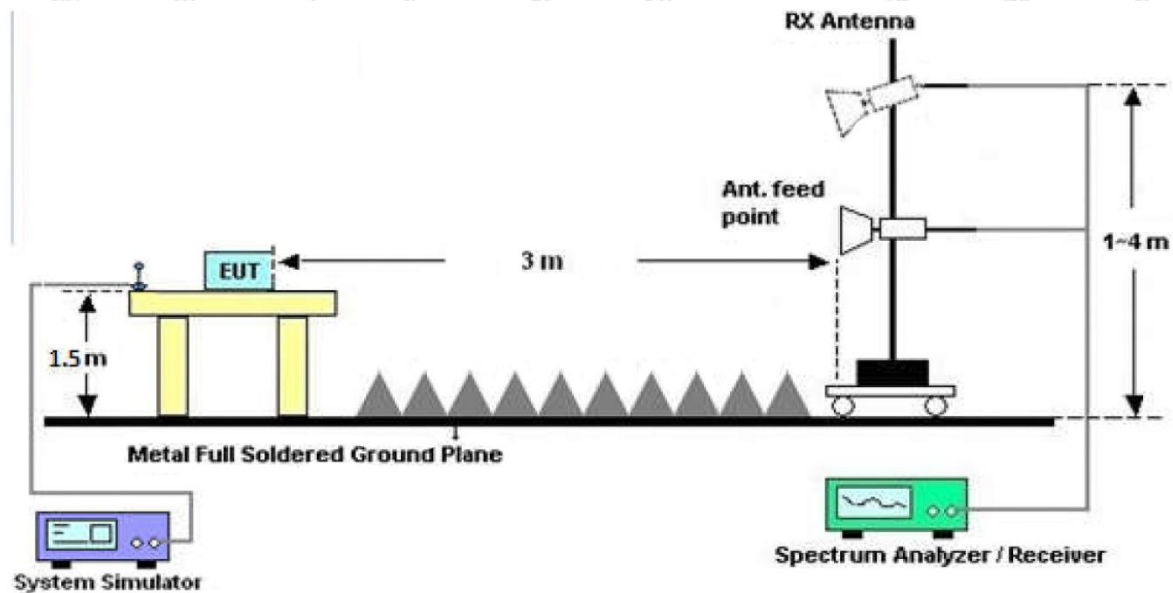
Figure 3. Above 1 GHz

4.3. Test Procedure

For below 1GHz: The EUT is placed on a turntable, which is 0.8m above the ground plane.
For above 1GHz: The EUT is placed on a turntable, which is 1.5m 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.

4.4. 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.

Test Results (30~1000MHz)

Job No.:	SZAWW181206001-01	Temp.(℃)/Hum.(%RH):	25.2℃/52%RH
Standard:	FCC PART 15C	Power Source:	DC 3.7V
Test Mode:	Keeping TX Mode	Polarization:	Horizontal
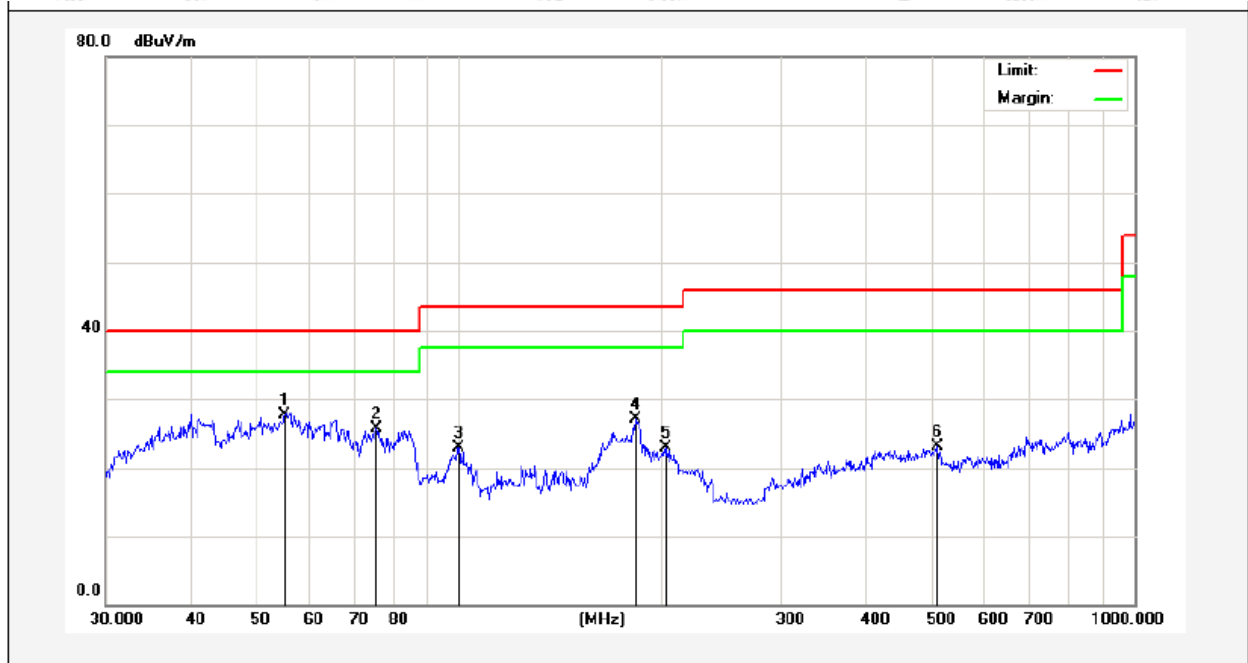
No.	Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	55.2207	45.37	-17.74	27.63	40.00	-12.37	peak			
2	75.4462	48.40	-22.70	25.70	40.00	-14.30	peak			
3	99.8777	44.77	-21.78	22.99	43.50	-20.51	peak			
4	182.5592	47.94	-20.87	27.07	43.50	-16.43	peak			
5	202.8103	42.89	-19.93	22.96	43.50	-20.54	peak			
6	511.8351	34.05	-10.99	23.06	46.00	-22.94	peak			

Test Results (30~1000MHz)

Job No.:	SZAWW181206001-01	Temp.(℃)/Hum.(%RH):	25.2℃/52%RH
Standard:	FCC PART 15C	Power Source:	DC 3.7V
Test Mode:	Keeping TX Mode	Polarization:	Vertical
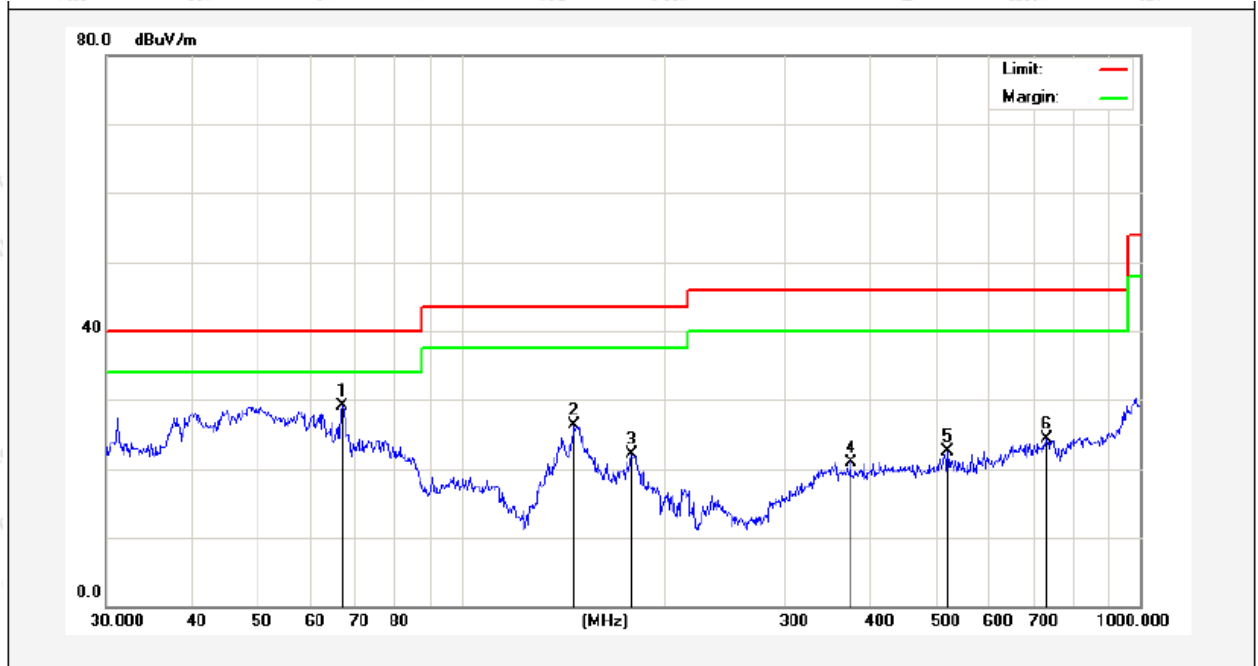
No.	Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	66.9668	48.66	-19.64	29.02	40.00	-10.98	peak			
2	146.8874	44.75	-18.38	26.37	43.50	-17.13	peak			
3	178.1322	39.15	-16.98	22.17	43.50	-21.33	peak			
4	374.6225	33.51	-12.63	20.88	46.00	-25.12	peak			
5	520.8881	33.04	-10.59	22.45	46.00	-23.55	peak			
6	729.3582	31.98	-7.61	24.37	46.00	-21.63	peak			

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	40.01	34.13	6.61	34.09	46.66	74.00	-27.34	V
7236.00	34.04	37.14	7.74	34.51	44.41	74.00	-29.59	V
9648.00	32.59	39.35	9.26	34.80	46.40	74.00	-27.60	V
12060.00	*					74.00		V
14472.00	*					74.00		V
16884.00	*					74.00		V
4824.00	38.72	34.13	6.61	34.09	45.37	74.00	-28.63	H
7236.00	33.81	37.14	7.74	34.51	44.18	74.00	-29.82	H
9648.00	32.17	39.35	9.26	34.80	45.98	74.00	-28.02	H
12060.00	*					74.00		H
14472.00	*					74.00		H
16884.00	*					74.00		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	29.12	34.13	6.61	34.09	35.77	54.00	-18.23	V
7236.00	22.91	37.14	7.74	34.51	33.28	54.00	-20.72	V
9648.00	22.94	39.35	9.26	34.80	36.75	54.00	-17.25	V
12060.00	*					54.00		V
14472.00	*					54.00		V
16884.00	*					54.00		V
4824.00	28.28	34.13	6.61	34.09	34.93	54.00	-19.07	H
7236.00	22.40	37.14	7.74	34.51	32.77	54.00	-21.23	H
9648.00	21.93	39.35	9.26	34.80	35.74	54.00	-18.26	H
12060.00	*					54.00		H
14472.00	*					54.00		H
16884.00	*					54.00		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	39.12	34.35	6.67	34.09	46.05	74.00	-27.95	V
7311.00	34.14	37.21	7.77	34.53	44.59	74.00	-29.41	V
9748.00	33.63	39.45	9.33	34.80	47.61	74.00	-26.39	V
12185.00	*					74.00		V
14622.00	*					74.00		V
17059.00	*					74.00		V
4874.00	39.63	34.35	6.67	34.09	46.56	74.00	-27.44	H
7311.00	32.80	37.21	7.77	34.53	43.25	74.00	-30.75	H
9748.00	33.53	39.45	9.33	34.80	47.51	74.00	-26.49	H
12185.00	*					74.00		H
14622.00	*					74.00		H
17059.00	*					74.00		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	29.99	34.35	6.67	34.09	36.92	54.00	-17.08	V
7311.00	22.46	37.21	7.77	34.53	32.91	54.00	-21.09	V
9748.00	22.88	39.45	9.33	34.80	36.86	54.00	-17.14	V
12185.00	*					54.00		V
14622.00	*					54.00		V
17059.00	*					54.00		V
4874.00	29.76	34.35	6.67	34.09	36.69	54.00	-17.31	H
7311.00	21.89	37.21	7.77	34.53	32.34	54.00	-21.66	H
9748.00	23.24	39.45	9.33	34.80	37.22	54.00	-16.78	H
12185.00	*					54.00		H
14622.00	*					54.00		H
17059.00	*					54.00		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	44.48	34.57	6.74	34.09	51.70	74.00	-22.30	V
7386.00	34.71	37.29	7.80	34.55	45.25	74.00	-28.75	V
9848.00	36.85	39.55	9.41	34.81	51.00	74.00	-23.00	V
12310.00	*					74.00		V
14772.00	*					74.00		V
17234.00	*					74.00		V
4924.00	43.85	34.57	6.74	34.09	51.07	74.00	-22.93	H
7386.00	33.64	37.29	7.80	34.55	44.18	74.00	-29.82	H
9848.00	33.03	39.55	9.41	34.81	47.18	74.00	-26.82	H
12310.00	*					74.00		H
14772.00	*					74.00		H
17234.00	*					74.00		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	35.42	34.57	6.74	34.09	42.64	54.00	-11.36	V
7386.00	24.64	37.29	7.80	34.55	35.18	54.00	-18.82	V
9848.00	25.36	39.55	9.41	34.81	39.51	54.00	-14.49	V
12310.00	*					54.00		V
14772.00	*					54.00		V
17234.00	*					54.00		V
4924.00	34.23	34.57	6.74	34.09	41.45	54.00	-12.55	H
7386.00	23.04	37.29	7.80	34.55	33.58	54.00	-20.42	H
9848.00	22.30	39.55	9.41	34.81	36.45	54.00	-17.55	H
12310.00	*					54.00		H
14772.00	*					54.00		H
17234.00	*					54.00		H

Remark:

1. During the test, pre-scan the 802.11b, g, n(HT20N) mode, and found the 802.11b mode 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	52.15	29.15	3.41	34.01	50.70	74.00	-23.30	H
2400.00	61.33	29.16	3.43	34.01	59.91	74.00	-14.09	H
2390.00	53.87	29.15	3.41	34.01	52.42	74.00	-21.58	V
2400.00	63.26	29.16	3.43	34.01	61.84	74.00	-12.16	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	38.77	29.15	3.41	34.01	37.32	54.00	-16.68	H
2400.00	47.12	29.16	3.43	34.01	45.70	54.00	-8.30	H
2390.00	40.63	29.15	3.41	34.01	39.18	54.00	-14.82	V
2400.00	48.28	29.16	3.43	34.01	46.86	54.00	-7.14	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	53.02	29.28	3.53	34.03	51.80	74.00	-22.20	H
2500.00	48.69	29.30	3.56	34.03	47.52	74.00	-26.48	H
2483.50	55.38	29.28	3.53	34.03	54.16	74.00	-19.84	V
2500.00	51.29	29.30	3.56	34.03	50.12	74.00	-23.88	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	39.21	29.28	3.53	34.03	37.99	54.00	-16.01	H
2500.00	35.21	29.30	3.56	34.03	34.04	54.00	-19.96	H
2483.50	41.20	29.28	3.53	34.03	39.98	54.00	-14.02	V
2500.00	37.12	29.30	3.56	34.03	35.95	54.00	-18.05	V

Remark:

1. Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor

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	51.25	27.53	5.47	33.92	50.33	74.00	-23.67	H	
2400.00	60.13	27.55	5.49	29.93	63.24	74.00	-10.76	H	
2390.00	52.91	27.53	5.47	33.92	51.99	74.00	-22.01	V	
2400.00	61.83	27.55	5.49	29.93	64.94	74.00	-9.06	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	38.13	27.53	5.47	33.92	37.21	54.00	-16.79	H	
2400.00	46.38	27.55	5.49	29.93	49.49	54.00	-4.51	H	
2390.00	39.92	27.53	5.47	33.92	39.00	54.00	-15.00	V	
2400.00	47.48	27.55	5.49	29.93	50.59	54.00	-3.41	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	51.74	29.28	3.53	34.03	50.52	74.00	-23.48	H	
2500.00	47.69	29.30	3.56	34.03	46.52	74.00	-27.48	H	
2483.50	53.92	29.28	3.53	34.03	52.70	74.00	-21.30	V	
2500.00	50.13	29.30	3.56	34.03	48.96	74.00	-25.04	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	38.43	29.28	3.53	34.03	37.21	54.00	-16.79	H	
2500.00	34.61	29.30	3.56	34.03	33.44	54.00	-20.56	H	
2483.50	40.35	29.28	3.53	34.03	39.13	54.00	-14.87	V	
2500.00	36.48	29.30	3.56	34.03	35.31	54.00	-18.69	V	

Remark:

1. Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor

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	50.76	27.53	5.47	33.92	49.84	74.00	-24.16	H
2400.00	59.47	27.55	5.49	29.93	62.58	74.00	-11.42	H
2390.00	52.38	27.53	5.47	33.92	51.46	74.00	-22.54	V
2400.00	61.03	27.55	5.49	29.93	64.14	74.00	-9.86	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	37.78	27.53	5.47	33.92	36.86	54.00	-17.14	H
2400.00	45.97	27.55	5.49	29.93	49.08	54.00	-4.92	H
2390.00	39.53	27.53	5.47	33.92	38.61	54.00	-15.39	V
2400.00	47.03	27.55	5.49	29.93	50.14	54.00	-3.86	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	51.03	29.28	3.53	34.03	49.81	74.00	-24.19	H
2500.00	47.15	29.30	3.56	34.03	45.98	74.00	-28.02	H
2483.50	53.11	29.28	3.53	34.03	51.89	74.00	-22.11	V
2500.00	49.49	29.30	3.56	34.03	48.32	74.00	-25.68	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	38.01	29.28	3.53	34.03	36.79	54.00	-17.21	H
2500.00	34.28	29.30	3.56	34.03	33.11	54.00	-20.89	H
2483.50	39.87	29.28	3.53	34.03	38.65	54.00	-15.35	V
2500.00	36.12	29.30	3.56	34.03	34.95	54.00	-19.05	V

Remark:

1. Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor

5. Maximum Peak Output Power Test

5.1. Test Standard and Limit

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

5.2. Test Setup
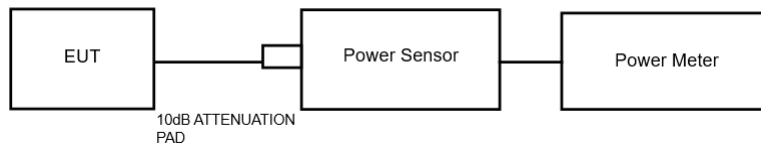
5.3. Test Procedure

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.

5.4. Test Data

Test Item	:	Max. peak output power	Test Mode	:	CH Low ~ CH High
Test Voltage	:	DC 3.7V Battery inside	Temperature	:	24℃
Test Result	:	PASS	Humidity	:	55%RH

Test Channel	Frequency (MHz)	Maximum Peak Conducted Output Power（PK）(dBm)	Limit dBm	Results
TX 802.11b Mode				
CH01	2412	13.53	30	PASS
CH06	2437	11.53	30	PASS
CH11	2462	15.99	30	PASS
TX 802.11g Mode				
CH01	2412	12.50	30	PASS
CH06	2437	12.02	30	PASS
CH11	2462	16.59	30	PASS
TX 802.11n(20) Mode				
CH01	2412	12.15	30	PASS
CH06	2437	12.12	30	PASS
CH11	2462	16.53	30	PASS

**Note: For power test the duty cycle is 100% in continuous transmitting mode.
Please see the plot of next page**

Duty Cycle
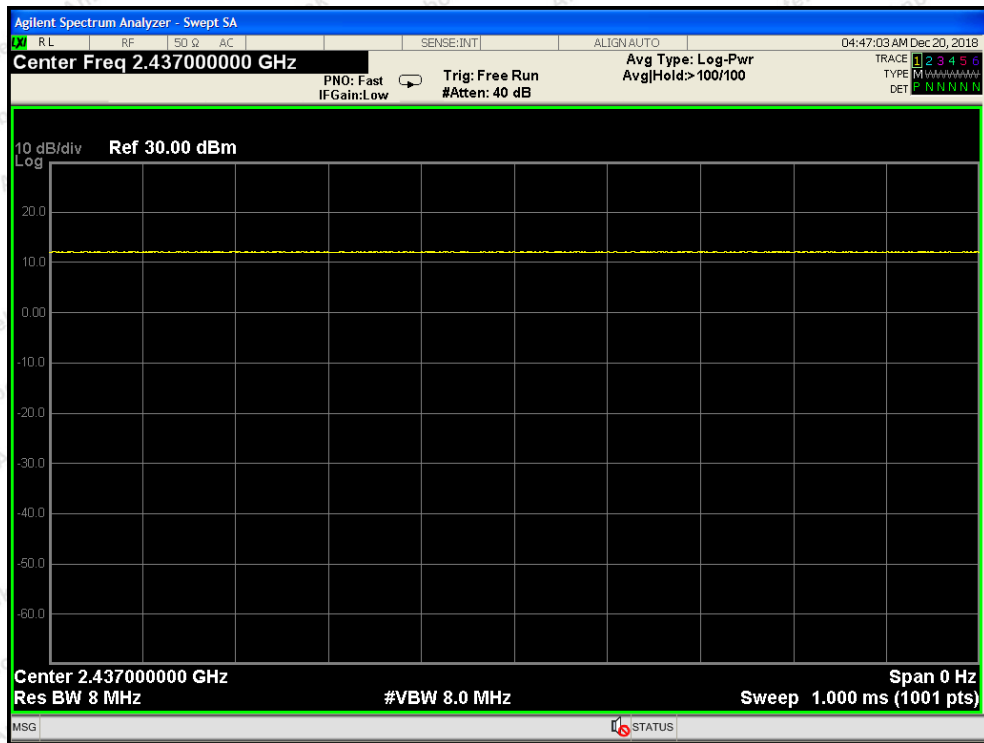
802.11b mode

802.11g mode
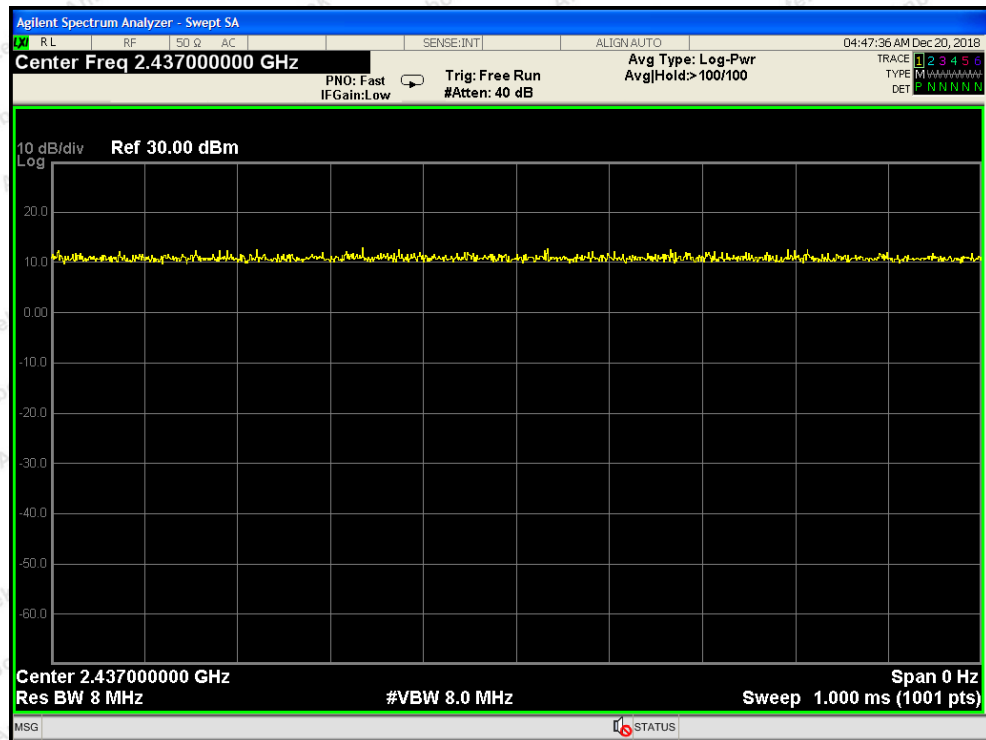
802.11n(HT20) mode

6. 6DB Occupy Bandwidth Test

6.1. Test Standard and Limit

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

6.2. Test Setup
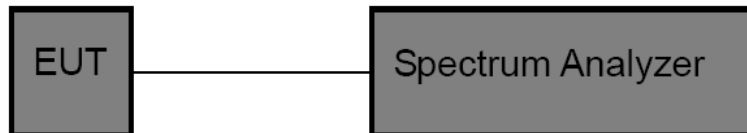
6.3. Test Procedure

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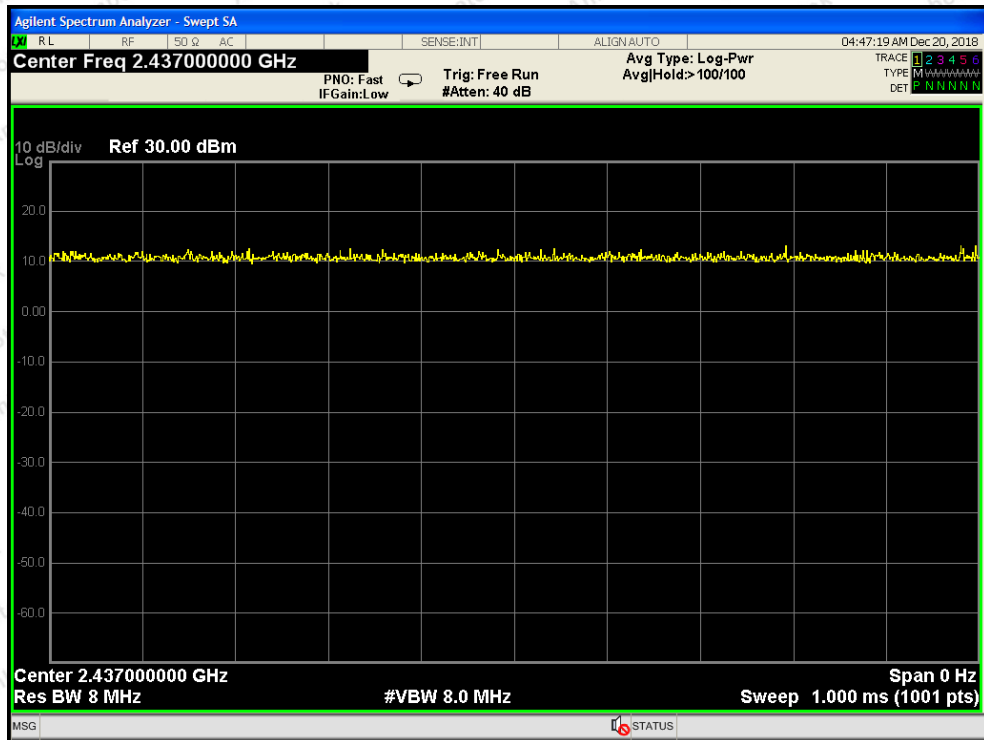2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as:
   RBW= 100kHz, VBW≥3*RBW =300kHz
   Detector= Peak
   Trace mode= Max hold.
   Sweep- auto couple.
4. Mark the peak frequency and –6dB (upper and lower)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

6.4. Test Data

Test Item	:	6dB Bandwidth	Test Mode	:	CH Low ~ CH High
Test Voltage	:	DC 3.7V Battery inside	Temperature	:	24℃
Test Result	:	PASS	Humidity	:	55%RH

Mode	Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Results
802.11b	Low	2412	8.602	>500	PASS
	Middle	2437	9.113		PASS
	High	2462	9.570		PASS
802.11g	Low	2412	13.84	>500	PASS
	Middle	2437	15.71		PASS
	High	2462	15.36		PASS
802.11n20	Low	2412	13.82	>500	PASS
	Middle	2437	16.33		PASS
	High	2462	15.97		PASS

Agilent Spectrum Analyzer - Occupied BW

| RL | RF | 50 Ω | AC | | SENSE:INT | ALIGN AUTO | | 04:35:03 AM Dec 20, 2018 |

Center Freq 2.412000000 GHz

Center Freq: 2.412000000 GHz Radio Std: None
Trig: Free Run Avg|Hold:> 10/10
#IFGain:Low #Atten: 30 dB Radio Device: BTS

10 dB/div **Ref 20.00 dBm**
Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0

Center 2.412 GHz Span 30 MHz
#Res BW 100 kHz #VBW 300 kHz Sweep 2.933 ms

Occupied Bandwidth		Total Power	16.9 dBm
12.343 MHz			
Transmit Freq Error	255.19 kHz	OBW Power	99.00 %
x dB Bandwidth	8.602 MHz	x dB	-6.00 dB

MSG STATUS

802.11b mode : Lowest

Agilent Spectrum Analyzer - Occupied BW

| RL | RF | 50 Ω | AC | | SENSE:INT | ALIGN AUTO | | 04:34:47 AM Dec 20, 2018 |

Center Freq 2.437000000 GHz

Center Freq: 2.437000000 GHz Radio Std: None
Trig: Free Run Avg|Hold:> 10/10
#IFGain:Low #Atten: 30 dB Radio Device: BTS

10 dB/div **Ref 20.00 dBm**
Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0

Center 2.437 GHz Span 30 MHz
#Res BW 100 kHz #VBW 300 kHz Sweep 2.933 ms

Occupied Bandwidth		Total Power	14.9 dBm
15.064 MHz			
Transmit Freq Error	1.3047 MHz	OBW Power	99.00 %
x dB Bandwidth	9.113 MHz	x dB	-6.00 dB

MSG STATUS

802.11b mode : Middle

Agilent Spectrum Analyzer - Occupied BW

| | | SENSE:INT | ALIGN AUTO | 04:34:35 AM Dec 20, 2018 |

Center Freq 2.462000000 GHz

Center Freq: 2.462000000 GHz Radio Std: None
Trig: Free Run Avg|Hold:>10/10
#IFGain:Low #Atten: 30 dB Radio Device: BTS

10 dB/div Ref 20.00 dBm
Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0

Center 2.462 GHz Span 30 MHz
#Res BW 100 kHz #VBW 300 kHz Sweep 2.933 ms

Occupied Bandwidth		Total Power	19.7 dBm
12.570 MHz			
Transmit Freq Error	-928 Hz	OBW Power	99.00 %
x dB Bandwidth	9.570 MHz	x dB	-6.00 dB

MSG STATUS

802.11b mode : Highest

Agilent Spectrum Analyzer - Occupied BW

| | | SENSE:INT | ALIGN AUTO | 04:35:27 AM Dec 20, 2018 |

Center Freq 2.412000000 GHz

Center Freq: 2.412000000 GHz Radio Std: None
Trig: Free Run Avg|Hold:>10/10
#IFGain:Low #Atten: 30 dB Radio Device: BTS

10 dB/div Ref 20.00 dBm
Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0

Center 2.412 GHz Span 30 MHz
#Res BW 100 kHz #VBW 300 kHz Sweep 2.933 ms

Occupied Bandwidth		Total Power	13.0 dBm
16.329 MHz			
Transmit Freq Error	52.455 kHz	OBW Power	99.00 %
x dB Bandwidth	13.84 MHz	x dB	-6.00 dB

MSG STATUS

802.11g mode : Lowest

Agilent Spectrum Analyzer - Occupied BW

	SENSE:INT	ALIGN AUTO	04:35:46 AM Dec 20, 2018
Center Freq 2.437000000 GHz	Center Freq: 2.437000000 GHz	Radio Std: None
	Trig: Free Run	Avg|Hold:>10/10	
#IFGain:Low	#Atten: 30 dB	Radio Device: BTS

10 dB/div   Ref 20.00 dBm

Center 2.437 GHz
#Res BW 100 kHz   #VBW 300 kHz   Span 30 MHz   Sweep 2.933 ms

Occupied Bandwidth		Total Power	12.0 dBm
21.364 MHz			
Transmit Freq Error	1.8965 MHz	OBW Power	99.00 %
x dB Bandwidth	15.71 MHz	x dB	-6.00 dB

802.11g mode : Middle

Agilent Spectrum Analyzer - Occupied BW

	SENSE:INT	ALIGN AUTO	04:36:02 AM Dec 20, 2018
Center Freq 2.462000000 GHz	Center Freq: 2.462000000 GHz	Radio Std: None
	Trig: Free Run	Avg|Hold:>10/10	
#IFGain:Low	#Atten: 30 dB	Radio Device: BTS

10 dB/div   Ref 20.00 dBm

Center 2.462 GHz
#Res BW 100 kHz   #VBW 300 kHz   Span 30 MHz   Sweep 2.933 ms

Occupied Bandwidth		Total Power	16.9 dBm
16.648 MHz			
Transmit Freq Error	37.142 kHz	OBW Power	99.00 %
x dB Bandwidth	15.36 MHz	x dB	-6.00 dB

802.11g mode : Highest

Agilent Spectrum Analyzer - Occupied BW		
R L RF 50 Ω AC	SENSE:INT ALIGN AUTO	04:36:25 AM Dec 20, 2018
Center Freq 2.412000000 GHz	Center Freq: 2.412000000 GHz	Radio Std: None
	Trig: Free Run Avg|Hold:>10/10	Radio Device: BTS
#IFGain:Low	#Atten: 30 dB	

10 dB/div Ref 20.00 dBm
Log

Center 2.412 GHz Span 30 MHz
#Res BW 100 kHz #VBW 300 kHz Sweep 2.933 ms

Occupied Bandwidth		Total Power	12.4 dBm
17.394 MHz			
Transmit Freq Error	67.867 kHz	OBW Power	99.00 %
x dB Bandwidth	13.82 MHz	x dB	-6.00 dB

802.11n20 mode : Lowest

Agilent Spectrum Analyzer - Occupied BW		
R L RF 50 Ω AC	SENSE:INT ALIGN AUTO	04:36:39 AM Dec 20, 2018
Center Freq 2.437000000 GHz	Center Freq: 2.437000000 GHz	Radio Std: None
	Trig: Free Run Avg|Hold:>10/10	Radio Device: BTS
#IFGain:Low	#Atten: 30 dB	

10 dB/div Ref 20.00 dBm
Log

Center 2.437 GHz Span 30 MHz
#Res BW 100 kHz #VBW 300 kHz Sweep 2.933 ms

Occupied Bandwidth		Total Power	12.2 dBm
21.705 MHz			
Transmit Freq Error	1.9188 MHz	OBW Power	99.00 %
x dB Bandwidth	16.33 MHz	x dB	-6.00 dB

802.11n20 mode : Middle

Agilent Spectrum Analyzer - Occupied BW

R L   RF   50 Ω   AC   SENSE:INT   ALIGN AUTO   04:37:06 AM Dec 20, 2018

Center Freq 2.462000000 GHz   Center Freq: 2.462000000 GHz   Radio Std: None

#IFGain:Low   Trig: Free Run   Avg|Hold:>10/10   Radio Device: BTS

#Atten: 30 dB

10 dB/div   **Ref 20.00 dBm**
Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0

Center 2.462 GHz   Span 30 MHz
#Res BW 100 kHz   #VBW 300 kHz   Sweep 2.933 ms

Occupied Bandwidth		Total Power	17.2 dBm
17.747 MHz			
Transmit Freq Error	22.071 kHz	OBW Power	99.00 %
x dB Bandwidth	15.97 MHz	x dB	-6.00 dB

MSG   STATUS

802.11n20 mode : Highest

7. Power Spectral Density Test

7.1. Test Standard and Limit

Test Standard	FCC Part15 C Section 15.247 (e)
Test Limit	8dBm/3KHz

7.2. Test Setup

```
┌─────────┐              ┌──────────────────┐
│   EUT   │──────────────│ Spectrum Analyzer │
└─────────┘              └──────────────────┘
```
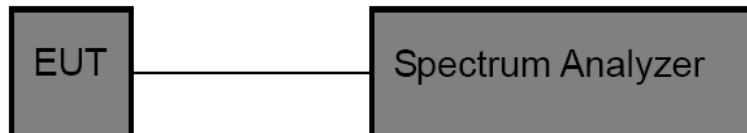
7.3. Test Procedure

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.

7.4. Test Data

Test Item	:	Power Spectral Density	Test Mode	:	CH Low ~ CH High
Test Voltage	:	DC 3.7V Battery inside	Temperature	:	24℃
Test Result	:	PASS	Humidity	:	55%RH

Mode	Channel	Frequency (MHz)	PSD (dBm/3KHz)	Limit (dBm/3KHz)	Results
802.11b	Low	2412	-13.820	8.00	PASS
	Middle	2437	-13.632	8.00	PASS
	High	2462	-8.465	8.00	PASS
802.11g	Low	2412	-18.420	8.00	PASS
	Middle	2437	-19.182	8.00	PASS
	High	2462	-15.408	8.00	PASS
802.11n20	Low	2412	-16.927	8.00	PASS
	Middle	2437	-19.965	8.00	PASS
	High	2462	-15.889	8.00	PASS
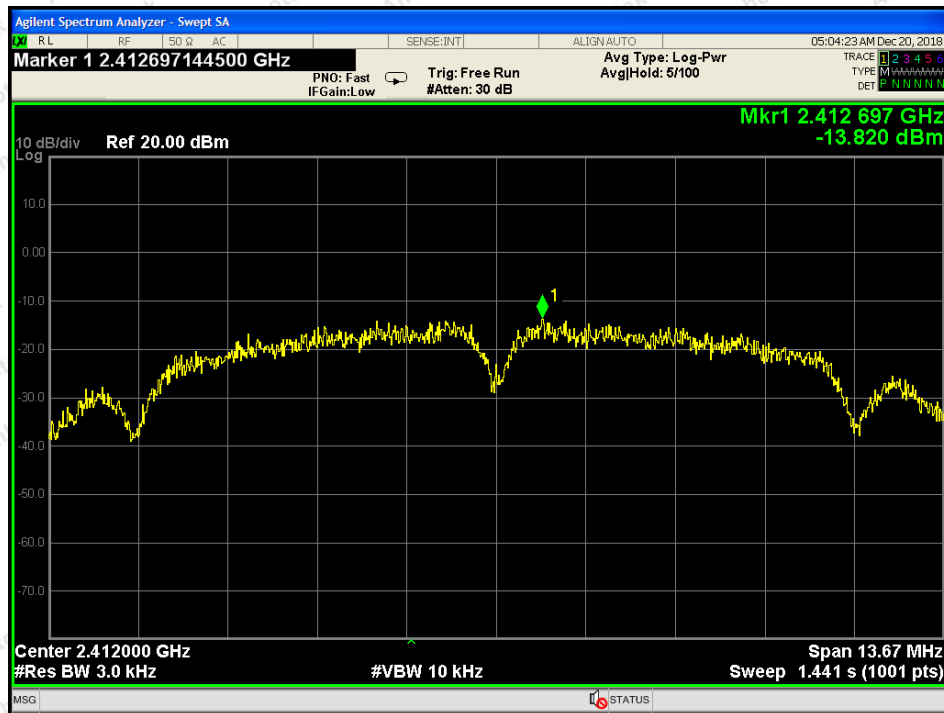
802.11b mode : Lowest
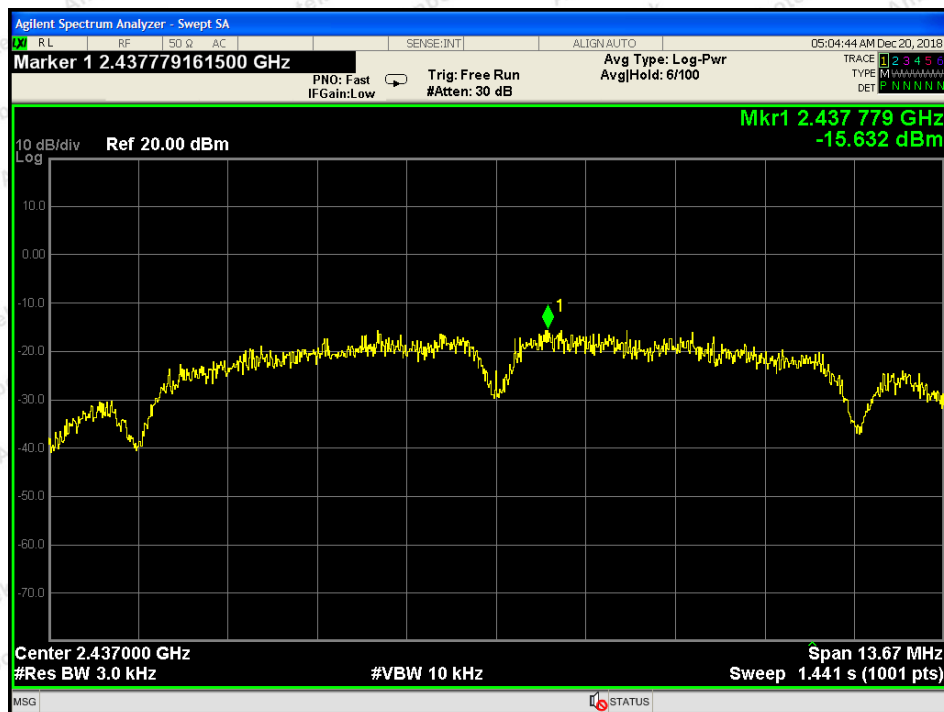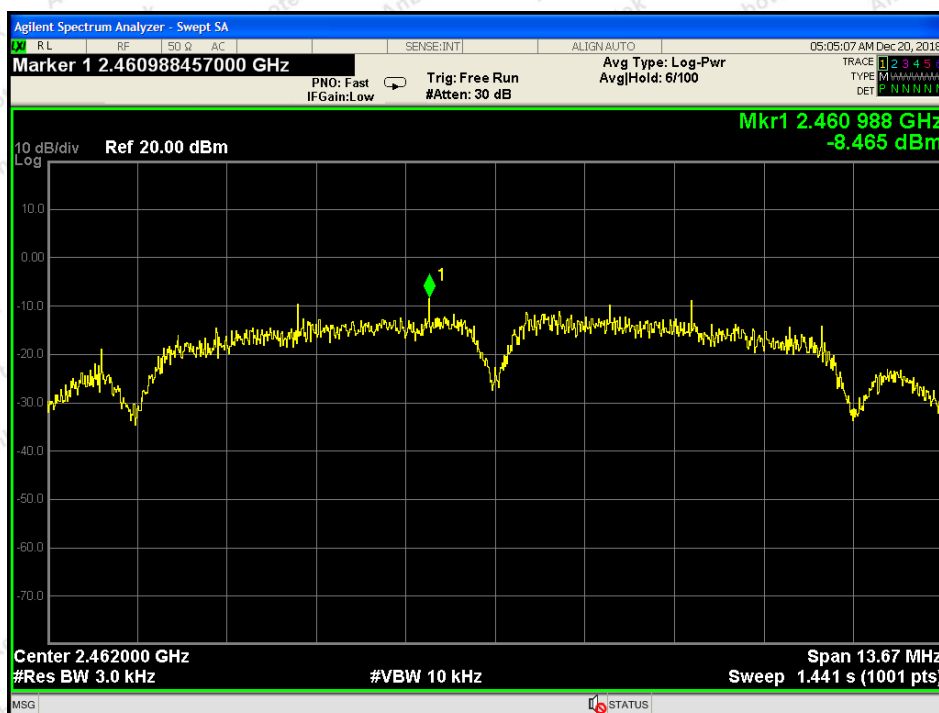
802.11b mode : Middle

802.11b mode : Highest
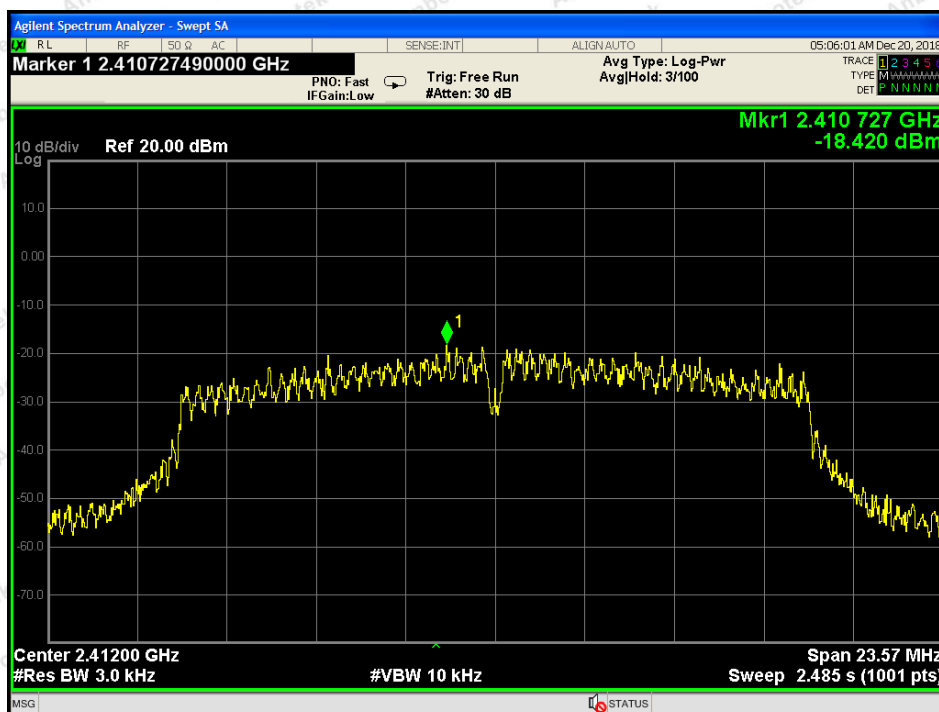
802.11g mode : Lowest

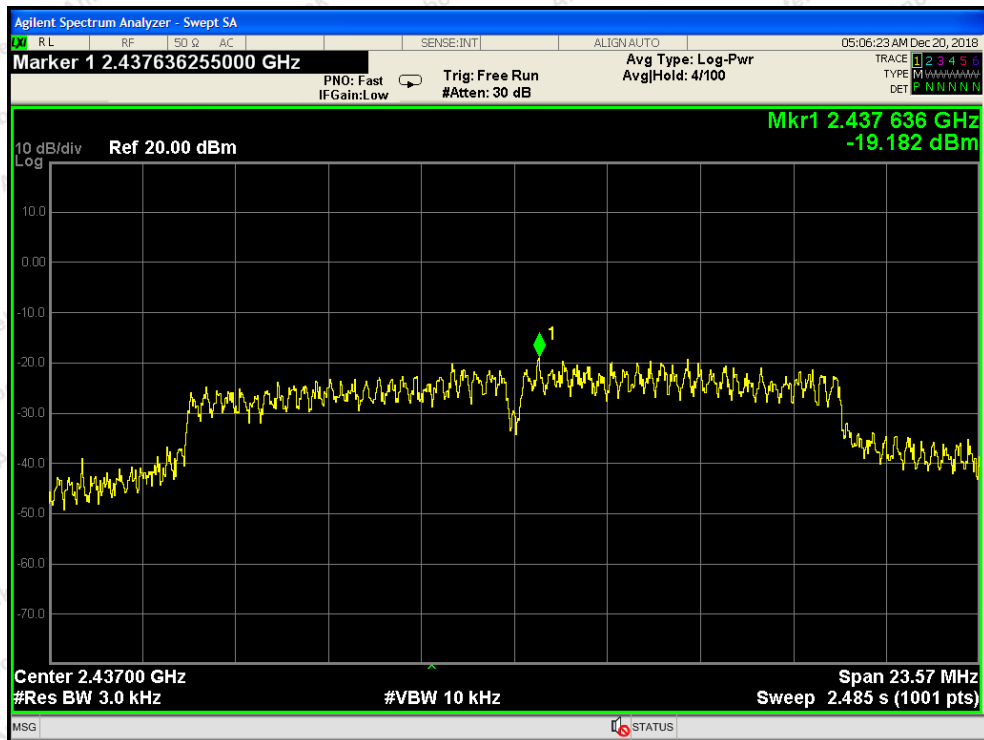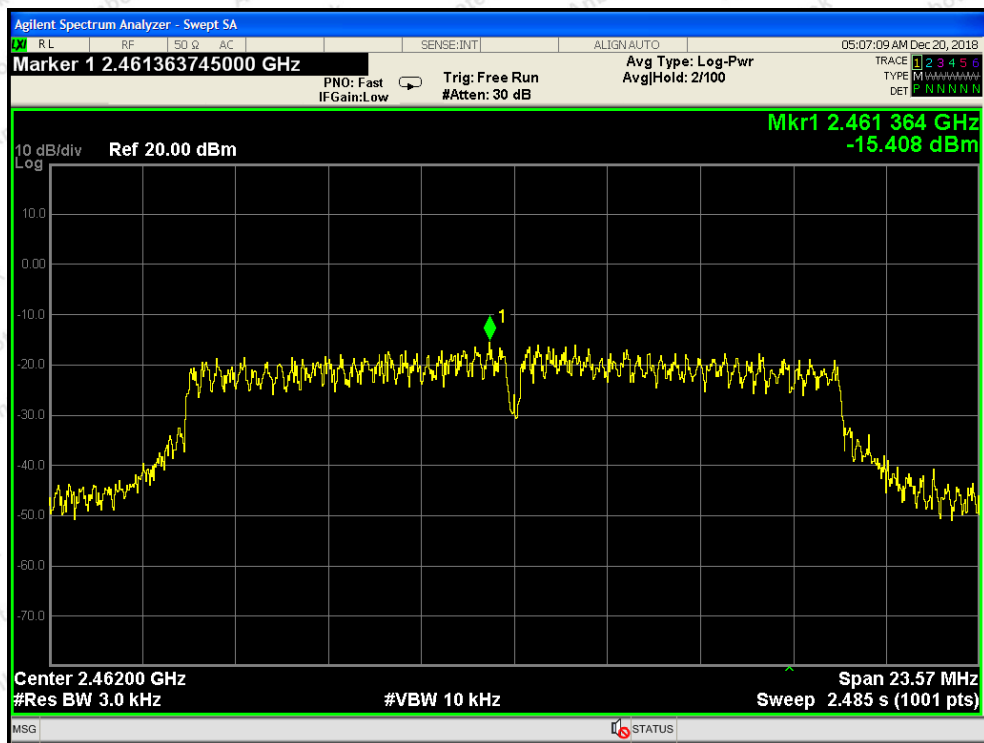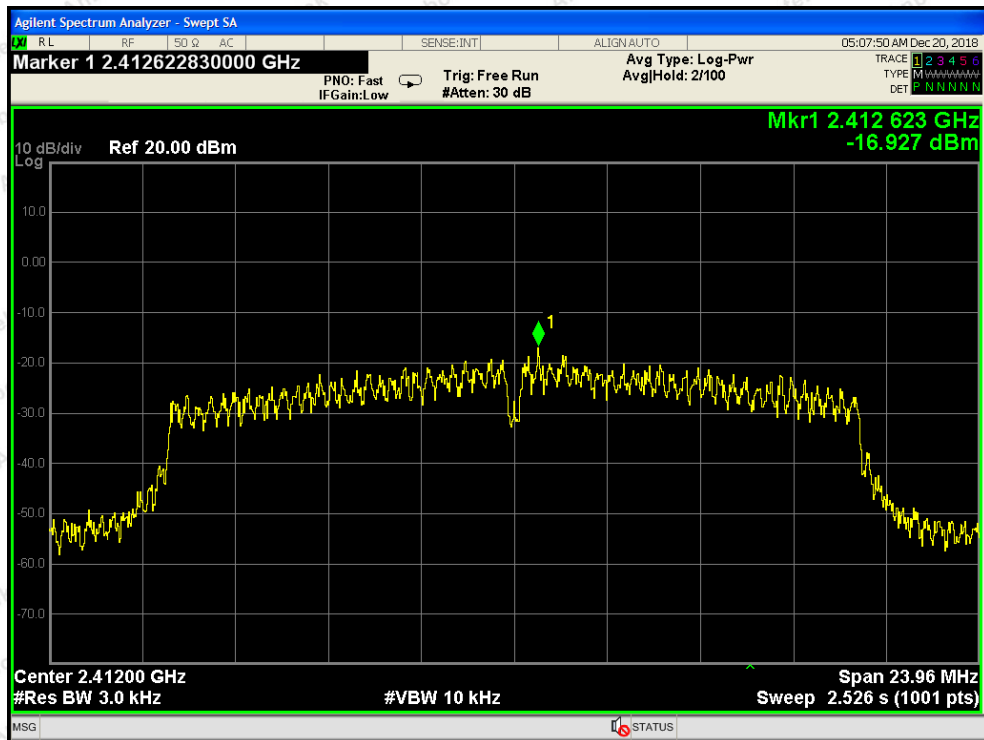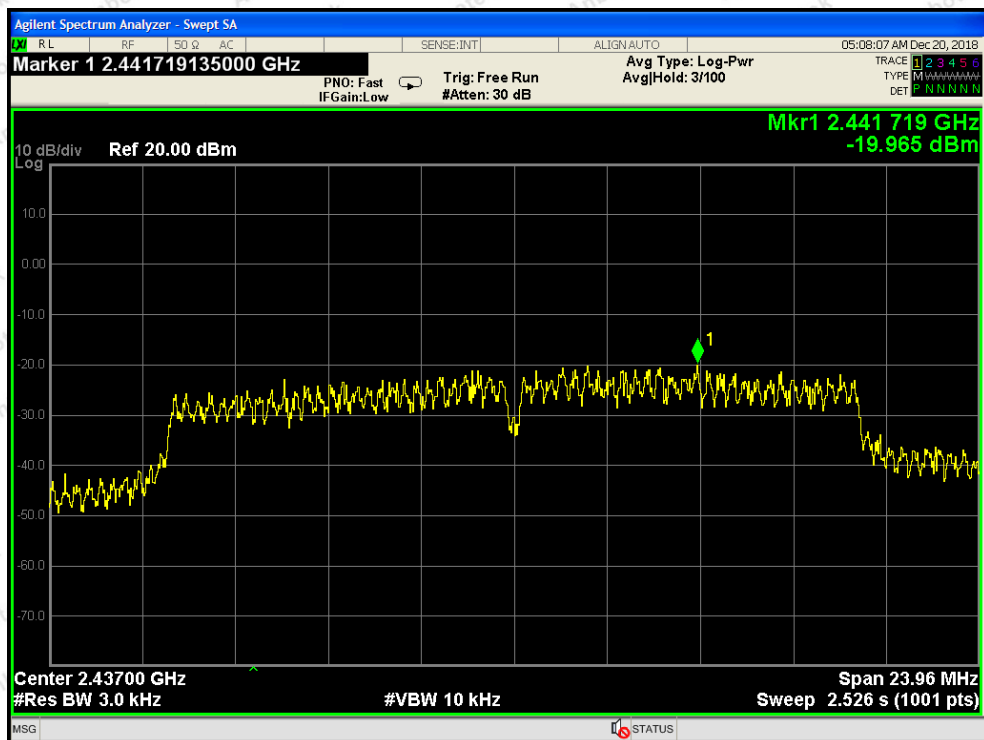**Anbotek**
Product Safety
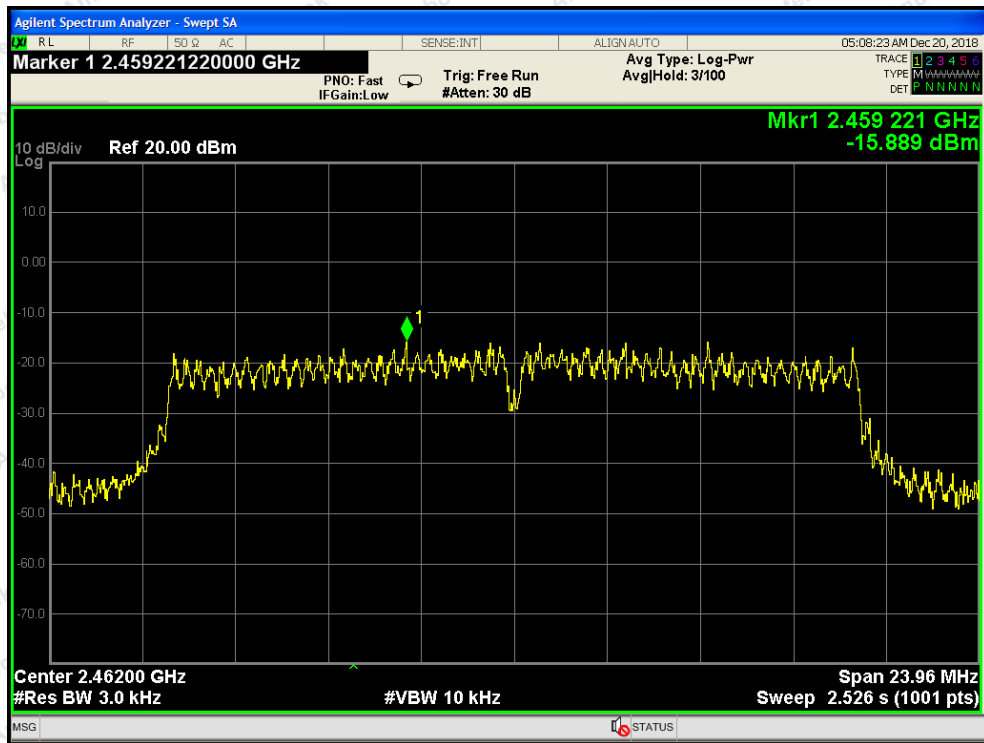

802.11g mode : Middle

802.11g mode : Highest

802.11n20 mode : Lowest

802.11n20 mode : Middle

802.11n20 mode : Highest

8. 100kHz Bandwidth of Frequency Band Edge Requirement

8.1. 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).

8.2. Test Setup

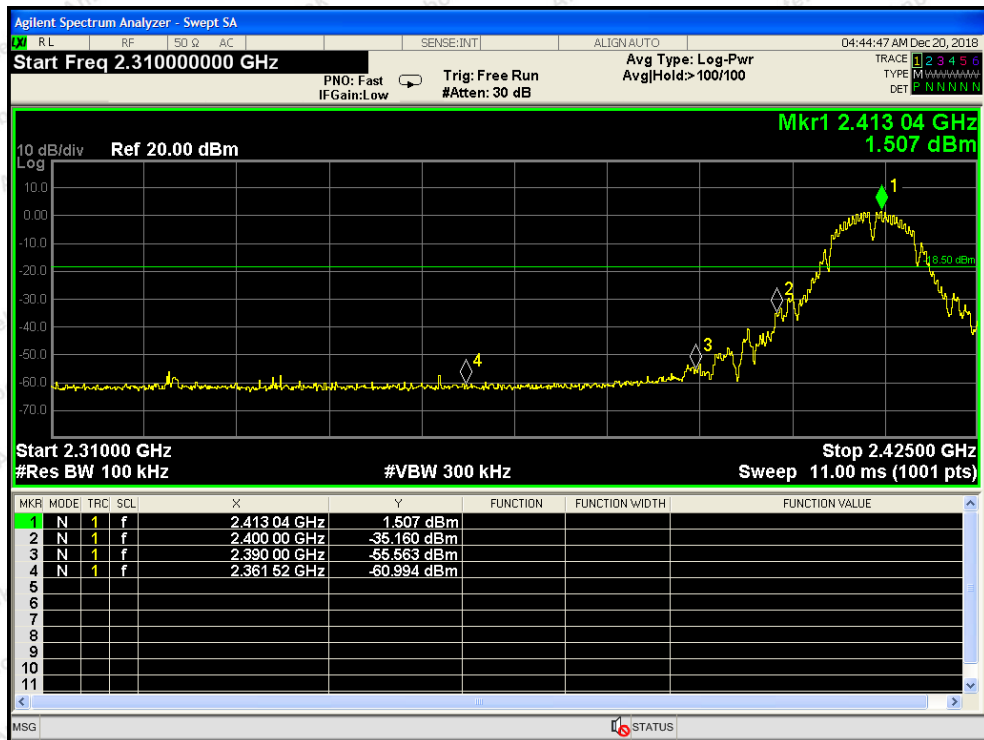EUT —— Spectrum Analyzer
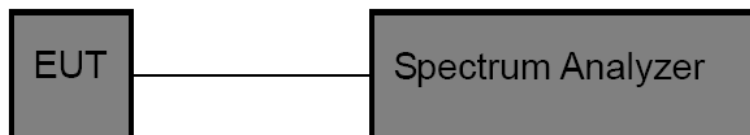
8.3. Test Procedure

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.

8.4. Test Data

Test Item	:	Band edge	Test Mode	:	CH Low ~ CH High
Test Voltage	:	DC 3.7V Battery inside	Temperature	:	24℃
Test Result	:	PASS	Humidity	:	55%RH

Agilent Spectrum Analyzer - Swept SA

R L   RF   50 Ω   AC   SENSE:INT   ALIGN AUTO   04:44:47 AM Dec 20, 2018

Start Freq 2.310000000 GHz
PNO: Fast   Trig: Free Run   Avg Type: Log-Pwr   TRACE 1 2 3 4 5 6
IFGain:Low   #Atten: 30 dB   Avg|Hold:>100/100   TYPE M
DET P N N N N

Mkr1 2.413 04 GHz
1.507 dBm

10 dB/div   Ref 20.00 dBm
Log
10.0
0.0
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0

Start 2.31000 GHz   Stop 2.42500 GHz
#Res BW 100 kHz   #VBW 300 kHz   Sweep 11.00 ms (1001 pts)

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	2.413 04 GHz	1.507 dBm			
2	N	1	f	2.400 00 GHz	-35.160 dBm			
3	N	1	f	2.390 00 GHz	-55.563 dBm			
4	N	1	f	2.361 52 GHz	-60.994 dBm			
5								
6								
7								
8								
9								
10								
11								

MSG   STATUS

802.11b mode : Lowest

Agilent Spectrum Analyzer - Swept SA

R L   RF   50 Ω   AC   SENSE:INT   ALIGN AUTO   04:44:11 AM Dec 20, 2018

Start Freq 2.450000000 GHz
PNO: Fast   Trig: Free Run   Avg Type: Log-Pwr   TRACE 1 2 3 4 5 6
IFGain:Low   #Atten: 30 dB   Avg|Hold:>100/100   TYPE M
DET P N N N N N

Mkr1 2.463 50 GHz
3.503 dBm

10 dB/div   Ref 20.00 dBm
Log
10.0
0.0
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0

Start 2.45000 GHz   Stop 2.50000 GHz
#Res BW 100 kHz   #VBW 300 kHz   Sweep 4.800 ms (1001 pts)

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	2.463 50 GHz	3.503 dBm			
2	N	1	f	2.483 50 GHz	-54.858 dBm			
3	N	1	f	2.492 95 GHz	-58.964 dBm			
4								
5								
6								
7								
8								
9								
10								
11								

MSG   STATUS
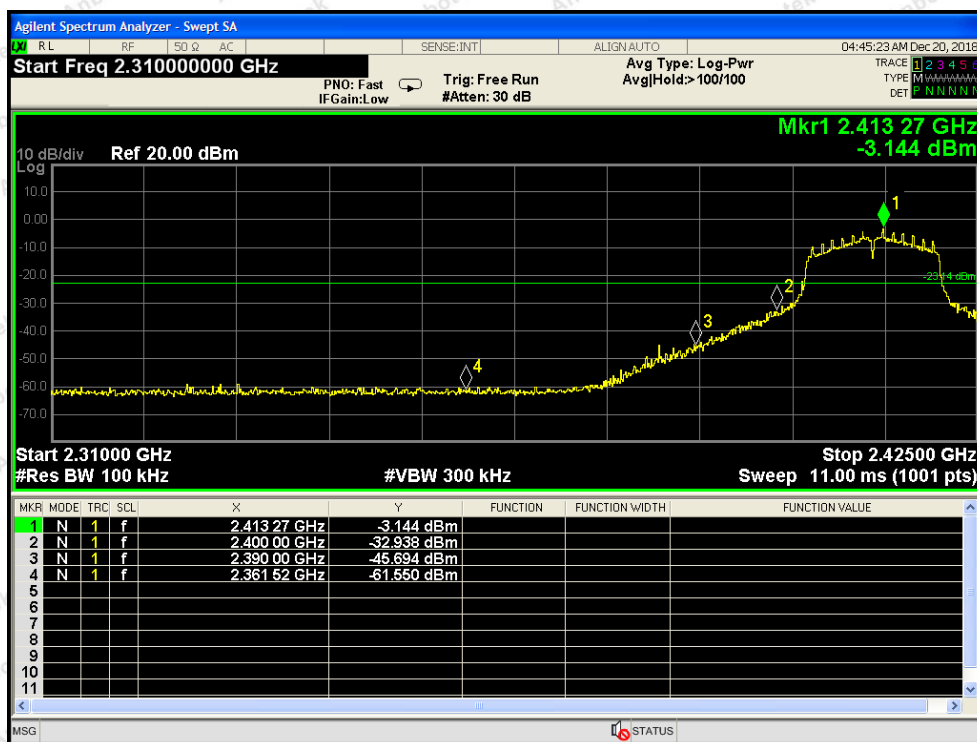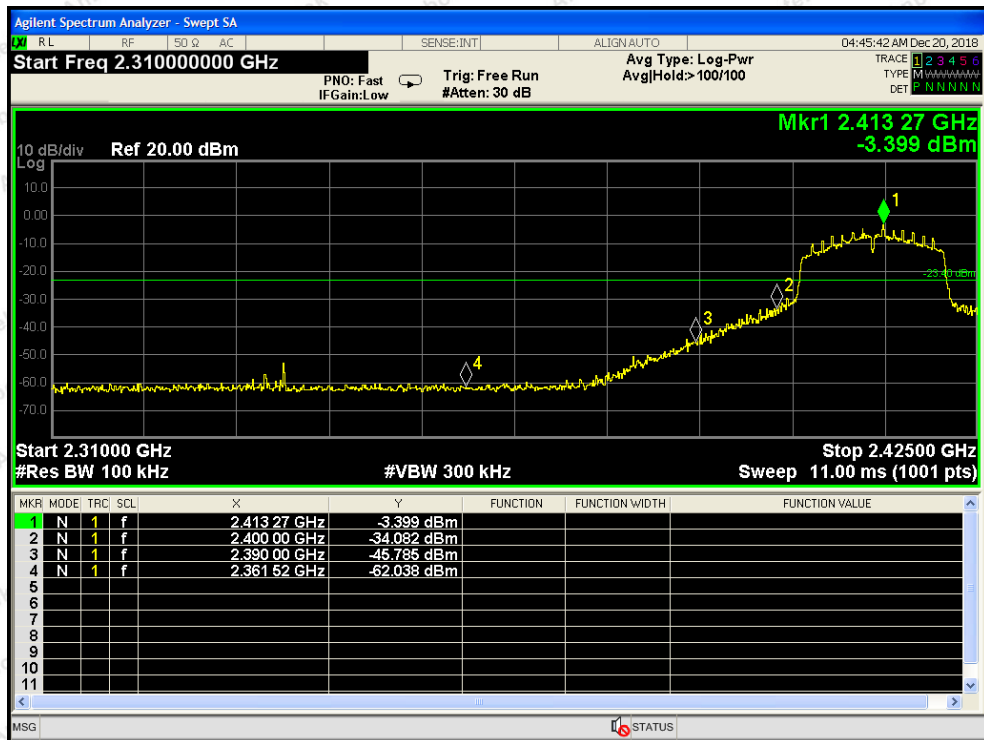
802.11b mode : Highest

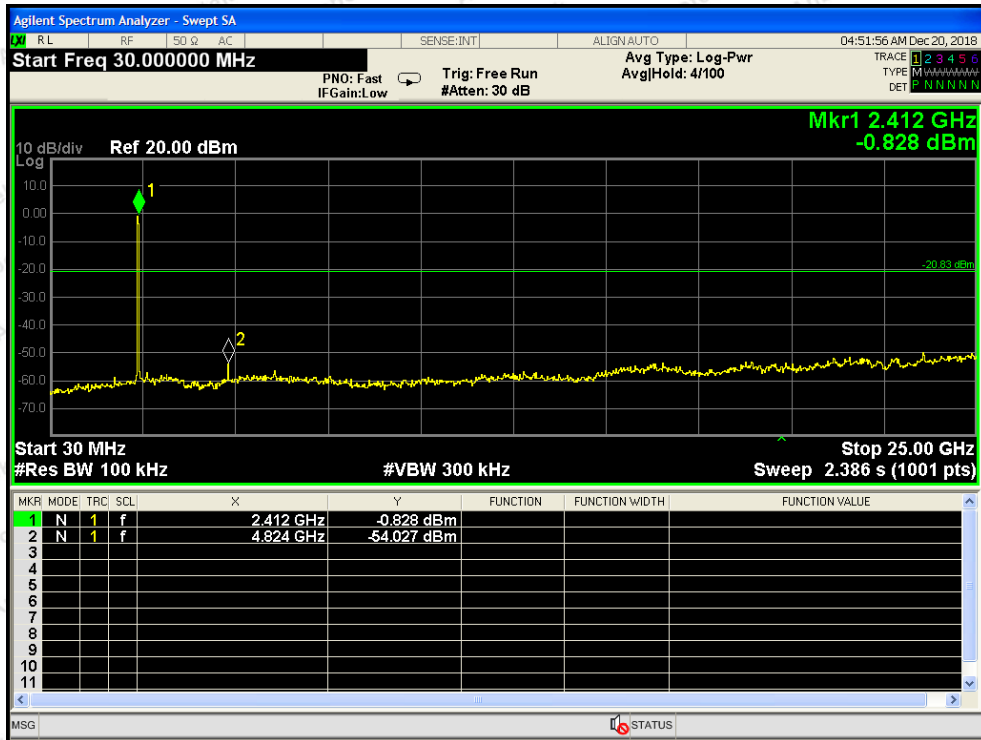802.11g mode : Lowest

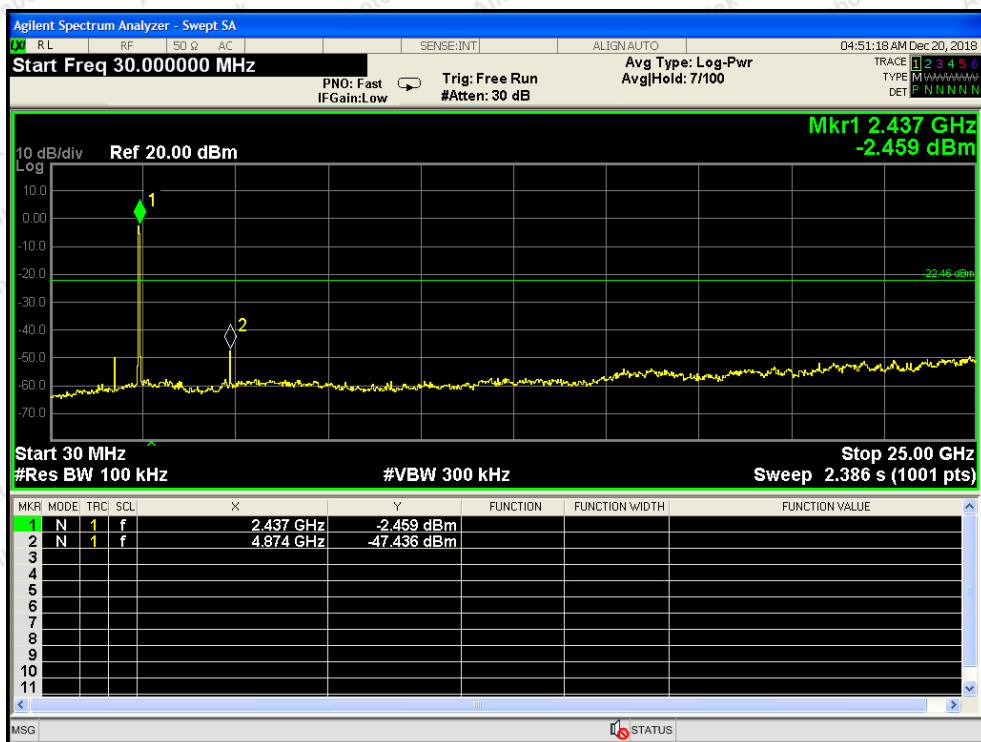802.11g mode : Highest
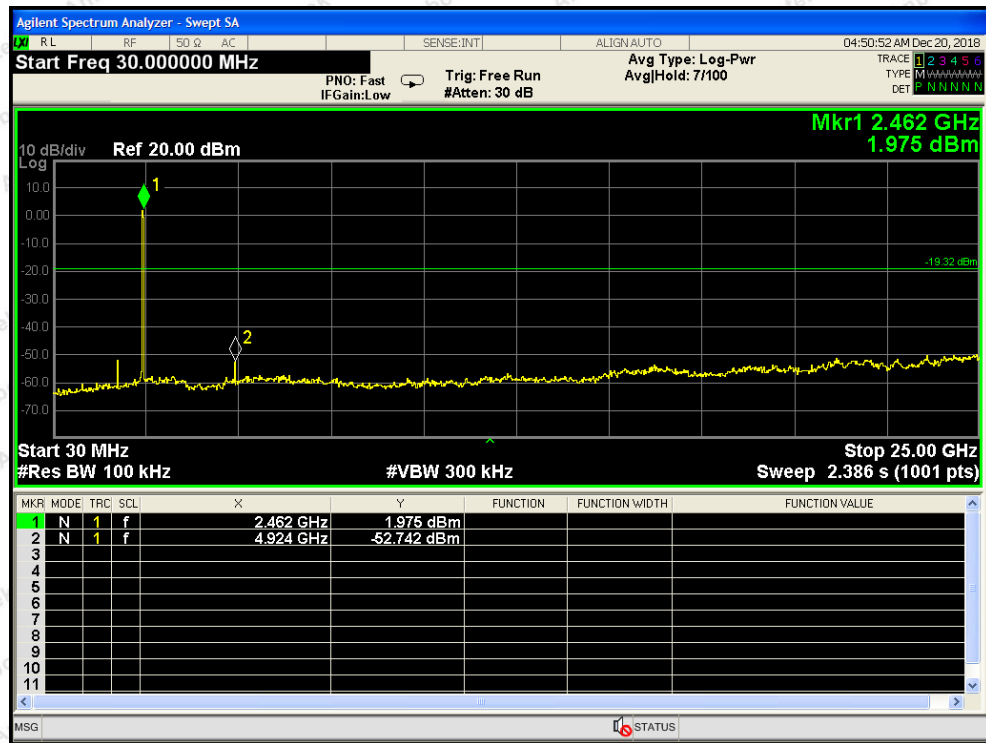
802.11n20 mode : Lowest

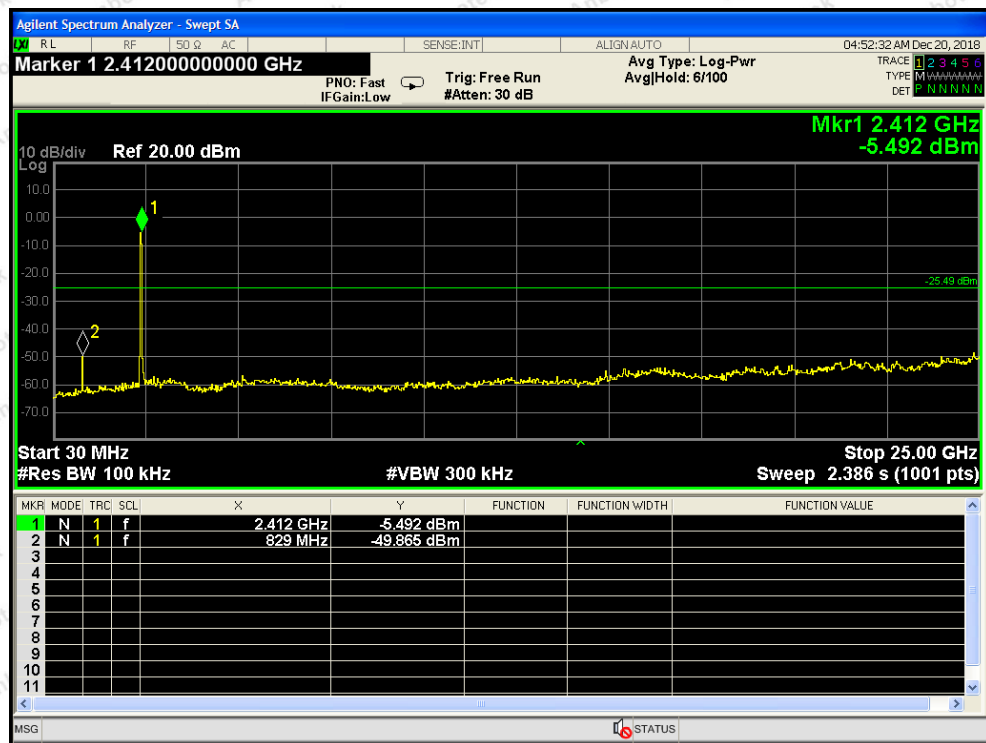802.11n20 mode : Highest

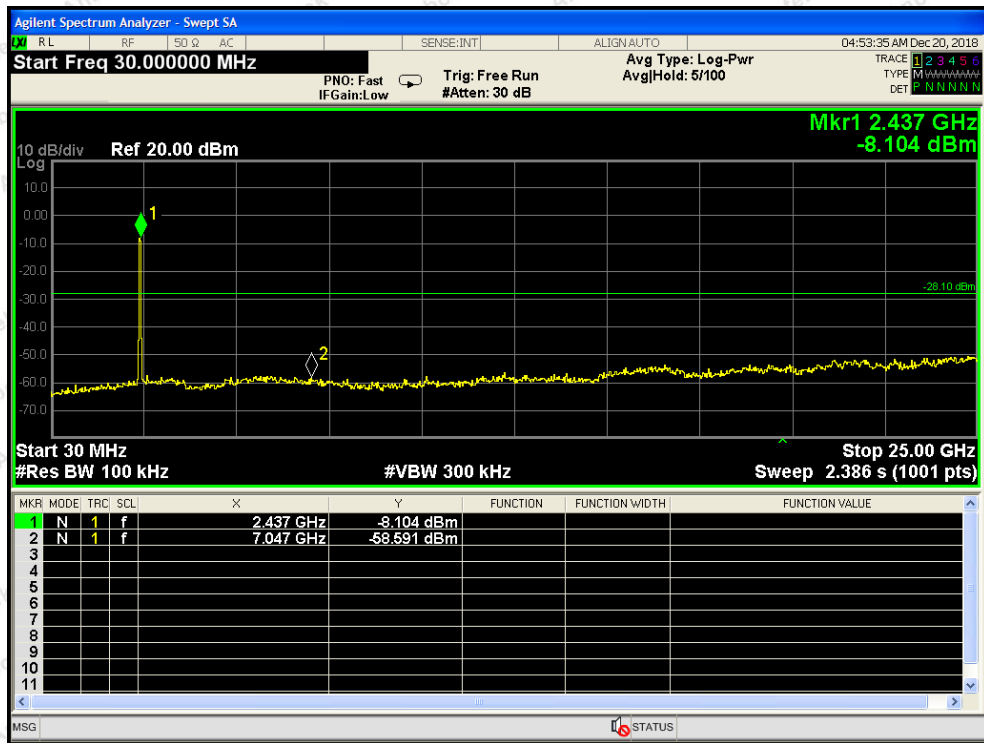## Conducted Emission Method

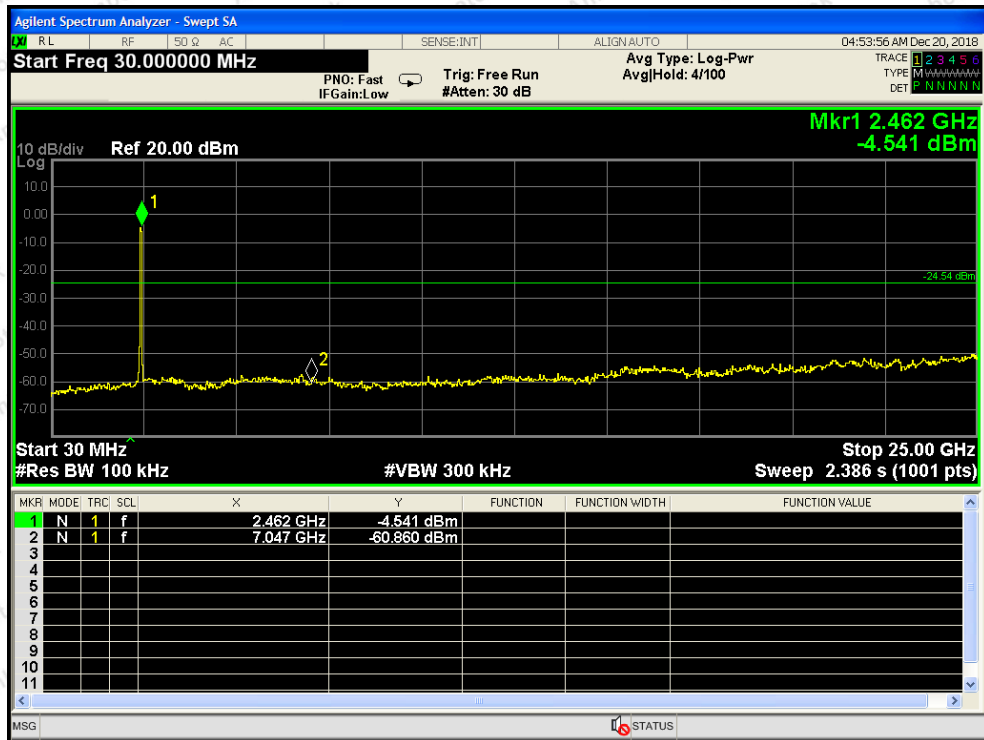802.11b mode : Lowest

802.11b mode : Middle

Anbotek Product Safety

802.11b mode : Highest

802.11g mode : Lowest

802.11g mode : Middle
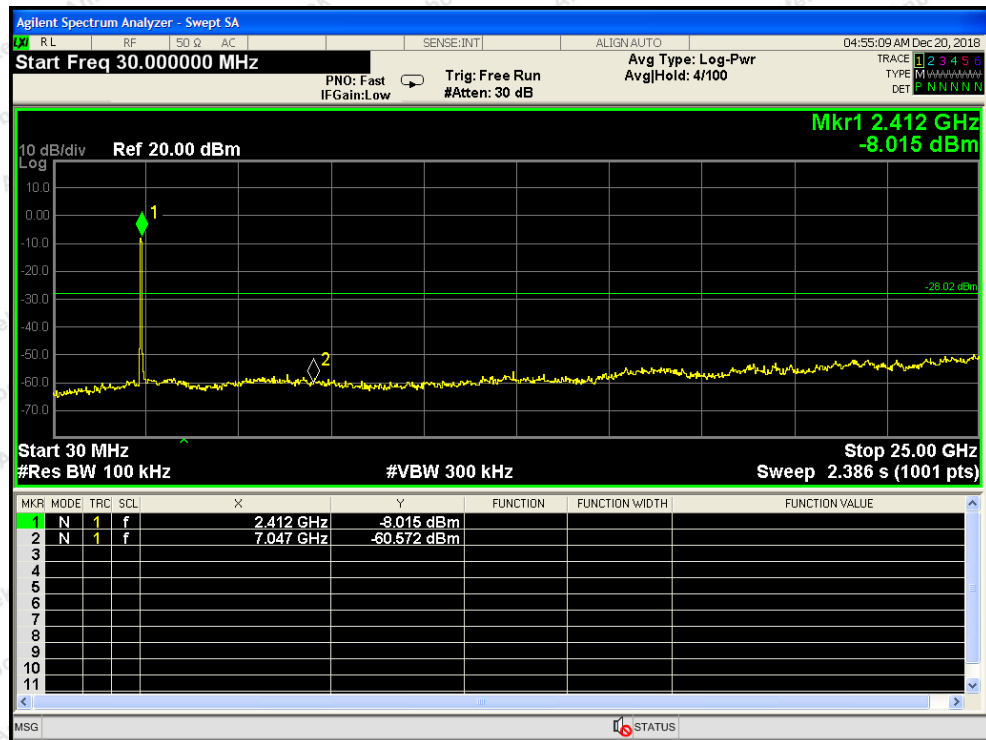

802.11g mode : Highest
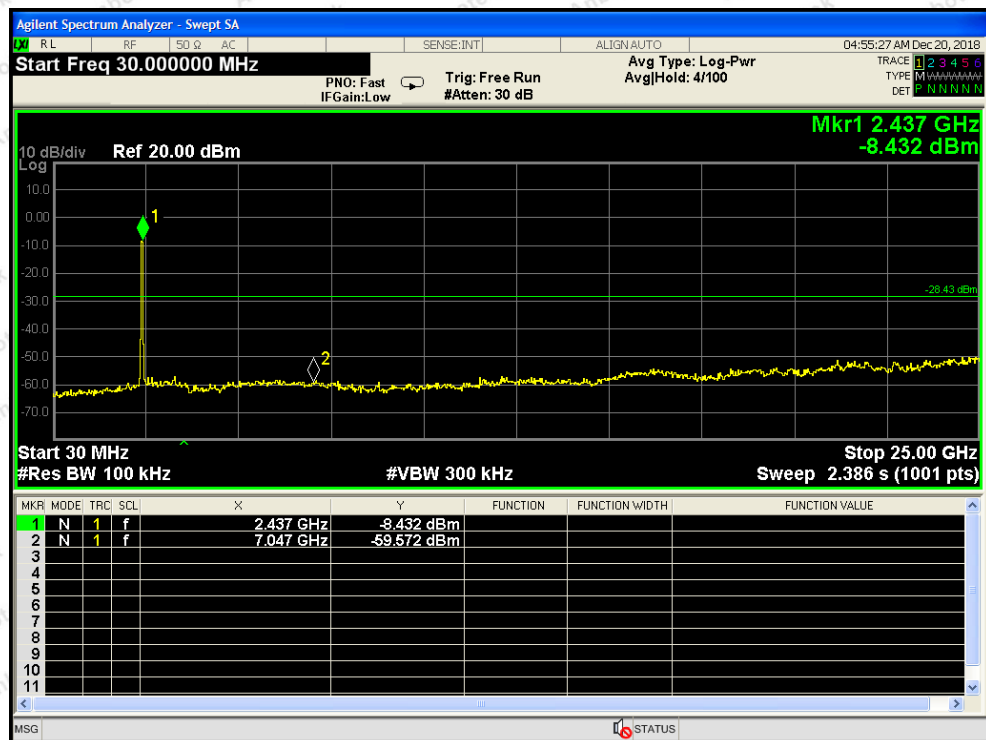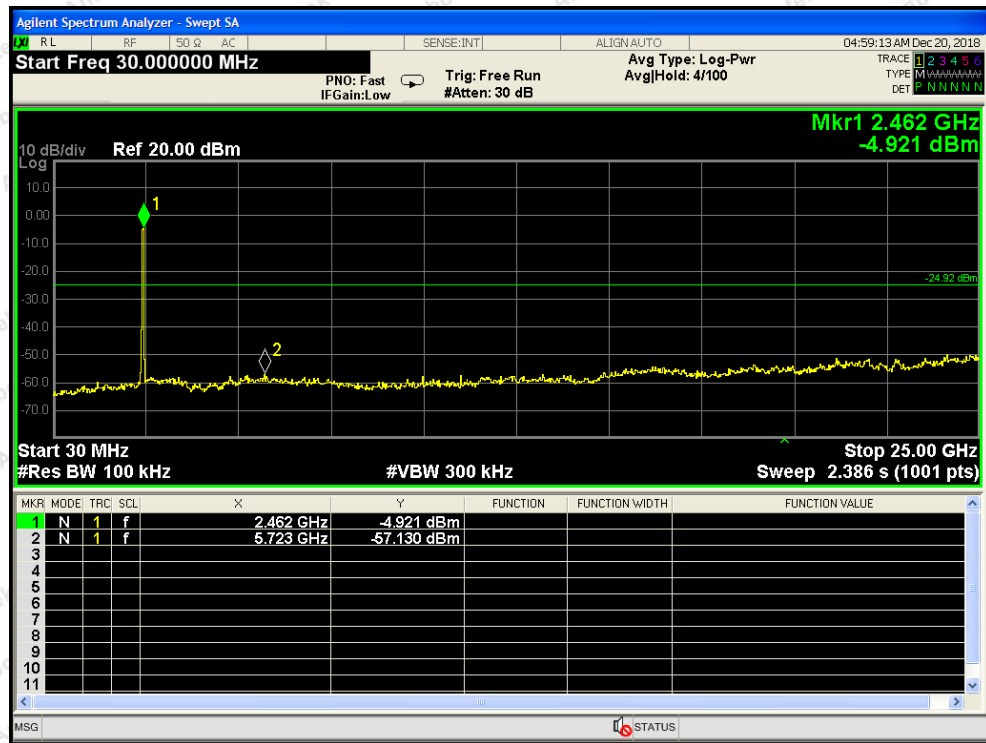
802.11n20 mode : Lowest

802.11n20 mode : Middle

Agilent Spectrum Analyzer - Swept SA					

Start Freq 30.000000 MHz

PNO: Fast   Trig: Free Run
IFGain:Low   #Atten: 30 dB

Avg Type: Log-Pwr
Avg|Hold: 4/100

04:59:13 AM Dec 20, 2018

Mkr1 2.462 GHz
-4.921 dBm

10 dB/div   Ref 20.00 dBm

Start 30 MHz
#Res BW 100 kHz   #VBW 300 kHz

Stop 25.00 GHz
Sweep 2.386 s (1001 pts)

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	2.462 GHz	-4.921 dBm			
2	N	1	f	5.723 GHz	-57.130 dBm			
3								
4								
5								
6								
7								
8								
9								
10								
11								

MSG   STATUS

802.11n20 mode : Highest

9. Antenna Requirement

9.1. 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.

9.2. Antenna Connected Construction

The antenna is a PIFA Antenna which permanently attached, and the best case gain of the antenna is 2.5 dBi It complies with the standard requirement.
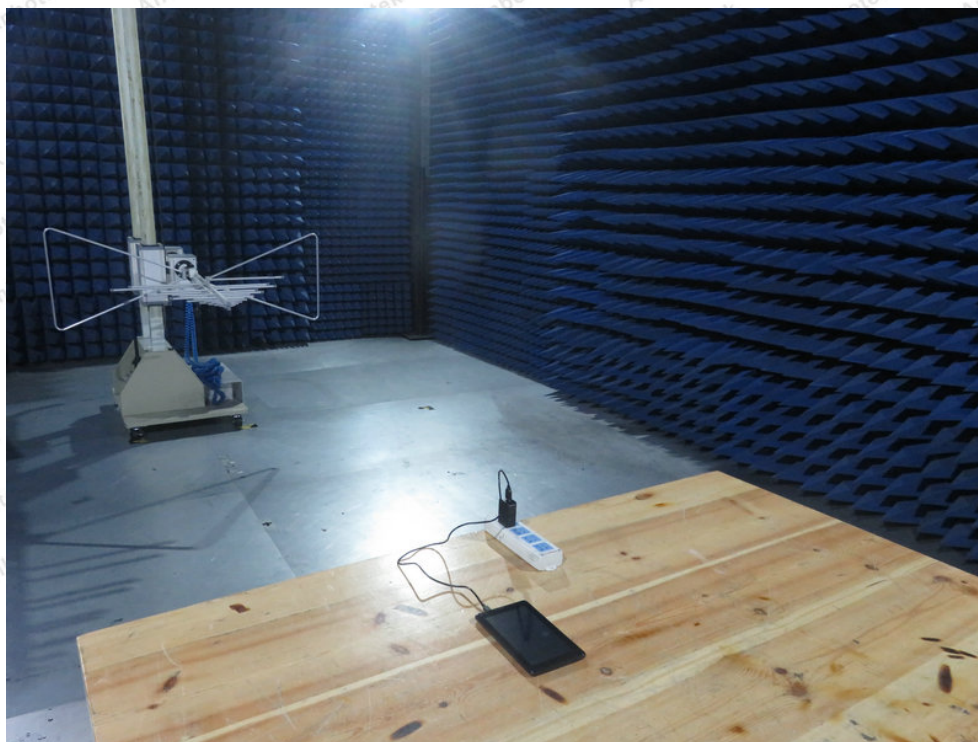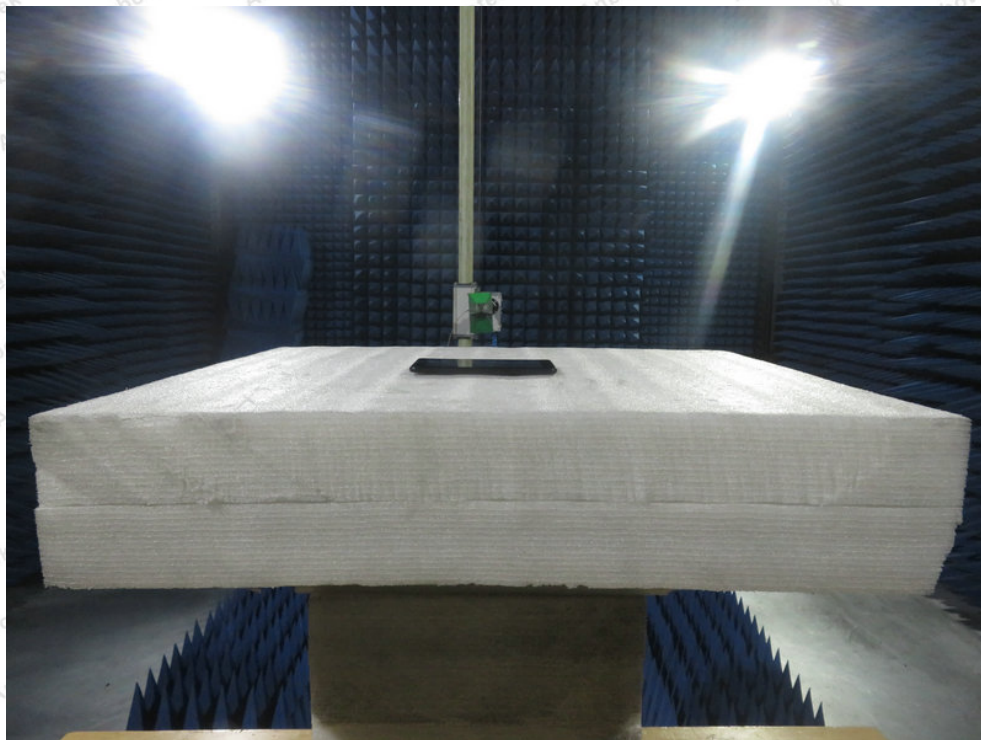

WIFI Antenna

APPENDIX I -- TEST SETUP PHOTOGRAPH

Photo of Conducted Emission Measurement

Photo of Radiation Emission Test

APPENDIX II -- PHOTOGRAPH

Reference to the test report   SZAWW181206001-01

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