



FCC Part 15C Test Report

FCC ID: 2A5LD-MD05

Applicant: Shenzhen Mengdou Intelligent Technology Co., Ltd.

Address: 4th floor, building A2, Jiushun Industrial Park, liaokeng, Minsheng 1st Road, Shiyan street, Bao'an District, Shenzhen, China

Manufacturer: Shenzhen Mengdou Intelligent Technology Co., Ltd.

Address: 4th floor, building A2, Jiushun Industrial Park, liaokeng, Minsheng 1st Road, Shiyan street, Bao'an District, Shenzhen, China

EUT: Scan translation pen

Trade Mark: N/A

Model Number: MD05, MD01, MD02, MD03, MD04, MD06, MD07, MD08, MD09, MD10, MD11, MD12, MD13, MD14, MD15, MD16, MD17, MD18, MD19, MD20, MD21, MD22, MD23, MD24, MD25

Date of Receipt: Mar. 02, 2022

Test Date: Mar. 02 2022 - Mar. 11, 2022

Date of Report: Mar. 11, 2022

Prepared By: Shenzhen DL Testing Technology Co., Ltd.

Address: 101-201, Building C, Shuanghuan, No.8, Baoqing Road, Baolong Industrial Zone, Baolong Street, Longgang District, Shenzhen, Guangdong, China

Applicable Standards: FCC PART 15 C 15.247
ANSI C63.10:2013

Test Result: Pass

Report Number: DL-20220308029-1E

Prepared (Test Engineer): Pxing Huang

Reviewer (Supervisor): Jack Bu

Approved (Manager): Jade Yang



This test report is based on a single evaluation of one sample of above mentioned products. It is not permitted to be duplicated in extracts without written approval of Shenzhen DL Testing Technology Co., Ltd.



Table of Contents

Page

1. SUMMARY OF TEST RESULTS.....	5
1.1 MEASUREMENT UNCERTAINTY.....	5
2. GENERAL INFORMATION.....	6
2.1 GENERAL DESCRIPTION OF EUT.....	6
2.2 DESCRIPTION OF TEST MODES.....	7
2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED.....	7
2.4 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE).....	7
2.5 EQUIPMENTS LIST FOR ALL TEST ITEMS.....	8
3. EMC EMISSION TEST.....	9
3.1 CONDUCTED EMISSION MEASUREMENT.....	9
3.2 POWER LINE CONDUCTED EMISSION Limits.....	9
3.3TEST PROCEDURE.....	9
3.4 DEVIATION FROM TEST STANDARD.....	9
3.5 TEST SETUP.....	10
3.6 EUT OPERATING CONDITIONS.....	10
3.7 TEST RESULTS.....	10
4. RADIATED EMISSION MEASUREMENT.....	13
4.1 RADIATED EMISSION LIMITS.....	13
4.2 TEST PROCEDURE.....	14
4.3 DEVIATION FROM TEST STANDARD.....	14
4.4 TEST SETUP.....	14
4.5 EUT OPERATING CONDITIONS.....	15
4.6 TEST RESULTS.....	15
5. RADIATED BAND EMISSION MEASUREMENT.....	19
5.1 TEST REQUIREMENT:.....	19
5.2 TEST PROCEDURE.....	19
5.3 DEVIATION FROM TEST STANDARD.....	19
5.4 TEST SETUP.....	20
5.5 EUT OPERATING CONDITIONS.....	20
5.6 TEST RESULT.....	21



Table of Contents

Page

6. PEAK OUTPUT POWER.....	22
6.1 APPLIED PROCEDURES / LIMIT.....	22
6.2 TEST PROCEDURE.....	22
6.3 DEVIATION FROM STANDARD.....	22
6.4 TEST SETUP.....	22
6.5 EUT OPERATION CONDITIONS.....	22
6.6 TEST RESULTS.....	22
7. POWER SPECTRAL DENSITY TEST.....	23
7.1 APPLIED PROCEDURES / LIMIT.....	23
7.2 TEST PROCEDURE.....	23
7.3 DEVIATION FROM STANDARD.....	23
7.4 TEST SETUP.....	23
7.5 EUT OPERATION CONDITIONS.....	23
7.6 TEST RESULTS.....	24
8. 6DB BANDWIDTH TEST.....	29
8.1 APPLIED PROCEDURES / LIMIT.....	29
8.2 TEST PROCEDURE.....	29
8.3 DEVIATION FROM STANDARD.....	29
8.4 TEST SETUP.....	29
8.5 EUT OPERATION CONDITIONS.....	29
8.6 TEST RESULTS.....	29
9. OUT OF BAND EMISSIONS TEST.....	35
9.1 APPLIED PROCEDURES / LIMIT.....	35
9.2 TEST PROCEDURE.....	35
9.3 DEVIATION FROM STANDARD.....	35
9.4 TEST SETUP.....	35
9.5 EUT OPERATION CONDITIONS.....	35
9.6 TEST RESULTS.....	35
10. SPURIOUS RF CONDUCTED EMISSION.....	39
10.1 APPLIED PROCEDURES / LIMIT.....	39
10.2 TEST PROCEDURE.....	39
10.3 DEVIATION FROM STANDARD.....	39
10.4 TEST SETUP.....	39



Table of Contents	Page
10.5 EUT OPERATION CONDITIONS.....	39
10.6 TEST RESULTS.....	40
11. ANTENNA REQUIREMENT.....	45
11.1 STANDARD REQUIREMENT.....	45
11.2 EUT ANTENNA.....	45
12. TEST SEUUP PHOTO.....	46



1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC Part15 (15.247) , Subpart C			
Standard Section	Test Item	Judgment	Remark
15.207	Conducted Emission	PASS	
15.247(c)	Radiated Spurious Emission	PASS	
15.205	Band Edge Emission	PASS	
15.247(b)(1)	Peak Output Power	PASS	
15.247(a)(2)	6dB Bandwidth	PASS	
15.247(e)	Power Spectral Density	PASS	
15.247(d)	Band edge measurements	PASS	
15.247(d)	Conducted Spurious Emission	PASS	
15.203	Antenna Requirement	PASS	

NOTE:

(1)" N/A" denotes test is not applicable in this Test Report

1.1 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95 %.

No.	Item	Uncertainty
1	Conducted Emission Test	$\pm 2.56\text{dB}$
2	RF power,conducted	$\pm 0.42\text{dB}$
3	Spurious emissions,conducted	$\pm 2.76\text{dB}$
4	All emissions,radiated(<1G)	$\pm 3.65\text{dB}$
5	All emissions,radiated(>1G)	$\pm 4.89\text{dB}$
6	Temperature	$\pm 0.5^{\circ}\text{C}$
7	Humidity	$\pm 2\%$

1.2 TEST FACILITY

Shenzhen DL Testing Technology Co., Ltd.

Add.: 101-201, Building C, Shuanghuan, No.8, Baoqing Road, Baolong Industrial Zone, Baolong Street, Longgang District, Shenzhen, Guangdong, China

FCC Test Firm Registration Number: 854456

Designation Number: CN1307

IC Registered No.: CN0118



2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Product Name:	Scan translation pen
Trademark:	N/A
Model No.:	MD05
Model Difference:	MD01, MD02, MD03, MD04, MD06, MD07, MD08, MD09, MD10, MD11, MD12, MD13, MD14, MD15, MD16, MD17, MD18, MD19, MD20, MD21, MD22, MD23, MD24, MD25 (All models have same circuits diagram, PCB Layout, construction and rated power, only different is the model name.)
Sample No.:	DL-20220308029#
Operation Frequency:	2412~2462 MHz for 802.11b/g/nHT20
Channel Numbers:	11 Channels for 802.11b/g/n(HT20)
Channel Separation:	5MHz
Modulation Type:	DSSS, OFDM
Antenna Type:	Internal Antenna
Antenna Gain:	-0.52dBi
Power Supply:	DC 5V from Adapter, DC 3.7V from Battery

Note:

1.For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

2.The EUT's all information provided by client.

3.Channel List(802.11b/g/nHT20)

Channel	Frequency (GHz)	Channel	Frequency (GHz)
01	2.412	06	2.437
02	2.417	07	2.442
03	2.422	08	2.447
04	2.427	09	2.452
05	2.432	10	2.457
11	2.462		



2.2 DESCRIPTION OF TEST MODES

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

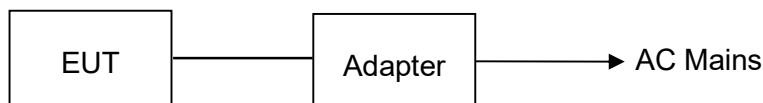
Pretest Mode	Description
	802.11b/g/n (20MHz)
Low Channel	2412MHz
Middle Channel	2437MHz
High Channel	2462MHz

Note: 1. The measurements are performed at the highest, middle, lowest available channels.

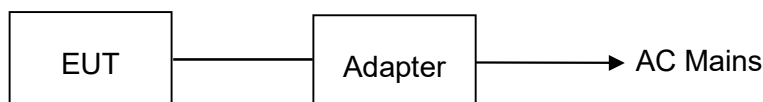
2. During the test, the duty cycle >98%, the test voltage was tuned from 85% to 115% of the nominal rated supply voltage, and found that the worst case was under the nominal rated supply condition. So the report just shows that condition's data.

2.3 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Radiated Spurious Emission Test



Conducted Spurious Emission Test



2.4 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE)

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Model/Type No.	Series No.	Note
1	Notebook	Lenovo G475	GB14477457	AE
2	Adapter	SC-48	N/A	AE

Item	Shielded Type	Ferrite Core	Length	Note

Note:

- (1) For detachable type I/O cable should be specified the length in cm in 『Length』 column.

**2.5 EQUIPMENTS LIST FOR ALL TEST ITEMS**

Radiation test, Band-edge test and 6db bandwidth test equipment

Item	Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	Spectrum Analyzer (9kHz-26.5GHz)	Agilent	E4408B	MY50140780	Dec. 06, 2021	Dec. 05, 2022
2	Test Receiver (9kHz-7GHz)	R&S	ESRP7	101393	Dec. 06, 2021	Dec. 05, 2022
3	Bilog Antenna (30MHz-1GHz)	R&S	VULB9162	00306	Dec. 06, 2021	Dec. 05, 2022
4	Horn Antenna (1GHz-18GHz)	Schwarzbeck	BBHA9120D	02139	Dec. 06, 2021	Dec. 05, 2022
5	Horn Antenna (18GHz-40GHz)	A.H. Systems	SAS-574	588	Dec. 06, 2021	Dec. 05, 2022
6	Amplifier (9KHz-6GHz)	Schwarzbeck	BBV9743B	00153	Dec. 06, 2021	Dec. 05, 2022
7	Amplifier (1GHz-18GHz)	EMEC	EM01G8GA	00270	Dec. 06, 2021	Dec. 05, 2022
8	Amplifier (18GHz-40GHz)	Quanjuda	DLE-161	97	Dec. 06, 2021	Dec. 05, 2022
9	Loop Antenna (9KHz-30MHz)	Schwarzbeck	FMZB1519B	00014	Dec. 06, 2021	Dec. 05, 2022
10	RF cables1 (9kHz-1GHz)	ChengYu	966	004	Dec. 06, 2021	Dec. 05, 2022
11	RF cables2 (1GHz-40GHz)	ChengYu	966	003	Dec. 06, 2021	Dec. 05, 2022
12	Antenna connector	Florida RF Labs	N/A	RF 01#	Dec. 06, 2021	Dec. 05, 2022
13	Power probe	KEYSIGHT	U2021XA	MY55210018	Dec. 06, 2021	Dec. 05, 2022
14	Signal Analyzer 9kHz-26.5GHz	Agilent	N9020A	MY55370280	Dec. 06, 2021	Dec. 05, 2022
15	Test Receiver 20kHz-40GHz	R&S	ESU 40	100376	Dec. 06, 2021	Dec. 05, 2022
16	D.C. Power Supply	LongWei	PS-305D	010964729	Dec. 06, 2021	Dec. 05, 2022

Conduction Test equipment

Item	Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	843 Shielded Room	ChengYu	843 Room	843	Nov. 25, 2019	Nov. 24, 2022
2	EMI Receiver	R&S	ESR	101421	Dec. 06, 2021	Dec. 05, 2022
3	LISN	Schwarzbeck	NNLK 8128	5089	Dec. 06, 2021	Dec. 05, 2022
4	843 Cable 1#	ChengYu	CE Cable	001	Dec. 06, 2021	Dec. 05, 2022

Other

Item	Name	Manufacturer	Model	Software version
1	EMC Conduction Test System	FALA	EZ_EMCC	EMC-CON 3A1.1
2	EMC radiation test system	FALA	EZ_EMCC	FA-03A2
3	RF test system	MAIWEI	MTS8310	2.0.0.0
4	RF communication test system	MAIWEI	MTS8200	2.0.0.0



3. EMC EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

3.2 POWER LINE CONDUCTED EMISSION Limits (Frequency Range 150KHz-30MHz)

FREQUENCY (MHz)	Limit (dBuV)		Standard
	Quasi-peak	Average	
0.15 -0.5	66 - 56 *	56 - 46 *	FCC
0.50 -5.0	56.00	46.00	FCC
5.0 -30.0	60.00	50.00	FCC

Note:

- (1) The tighter limit applies at the band edges.
- (2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

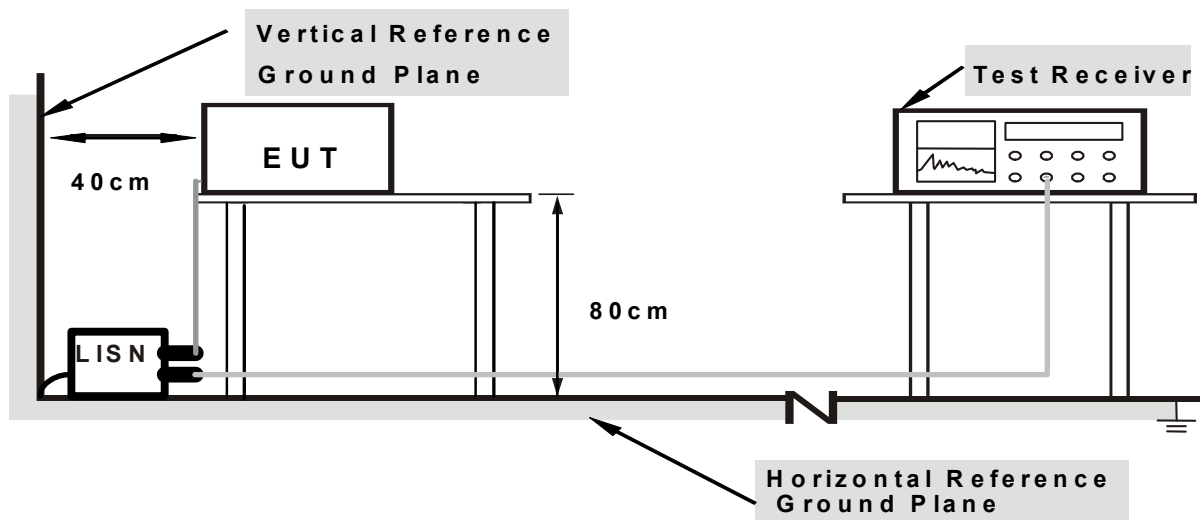
3.3 TEST PROCEDURE

- a. The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- d. LISN at least 80 cm from nearest part of EUT chassis.
- e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.4 DEVIATION FROM TEST STANDARD

No deviation

3.5 TEST SETUP



Note: 1.Support units were connected to second LISN.

2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

3.6 EUT OPERATING CONDITIONS

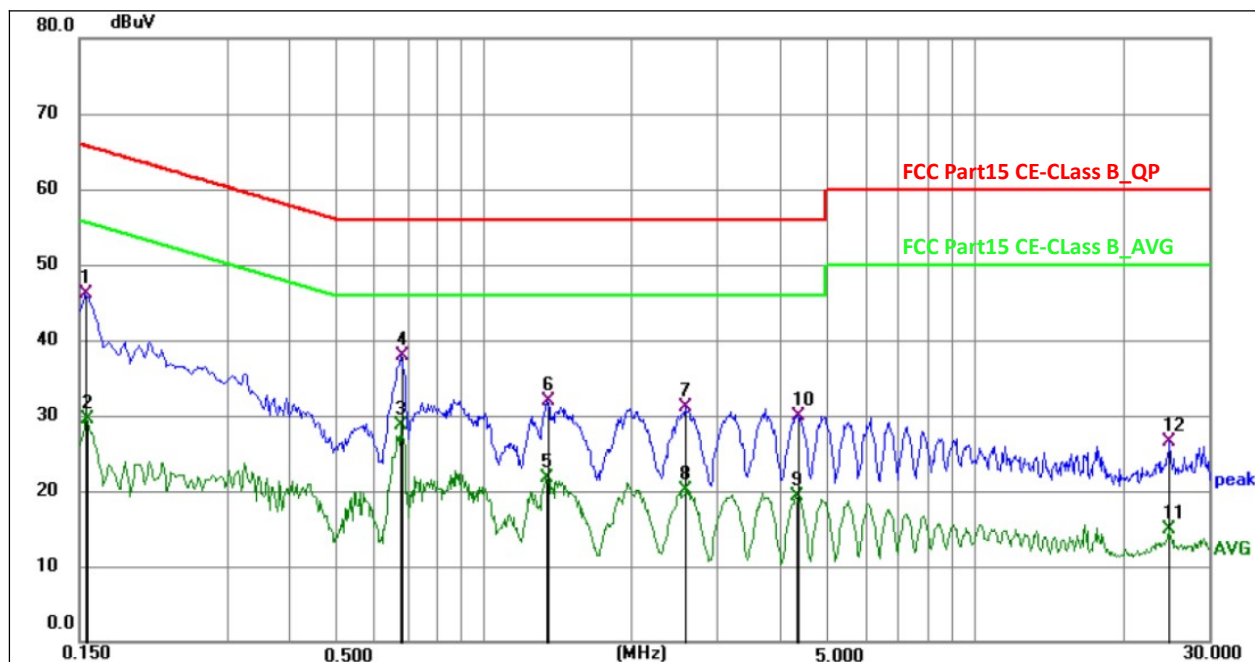
The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

3.7 TEST RESULTS

Note: 1. All modes were tested at AC 120V and 240V, only the worst result of AC 120V was reported.
2. All modes were tested at Low, Middle, and High channel, only the worst result of 802.11b Low Channel was reported.



Temperature:	25 °C	Relative Humidity:	54%
Pressure:	1010hPa	Phase :	L
Test Voltage:	AC 120V/60Hz		
Test Mode:	Transmitting mode of 802.11b 2412MHz		



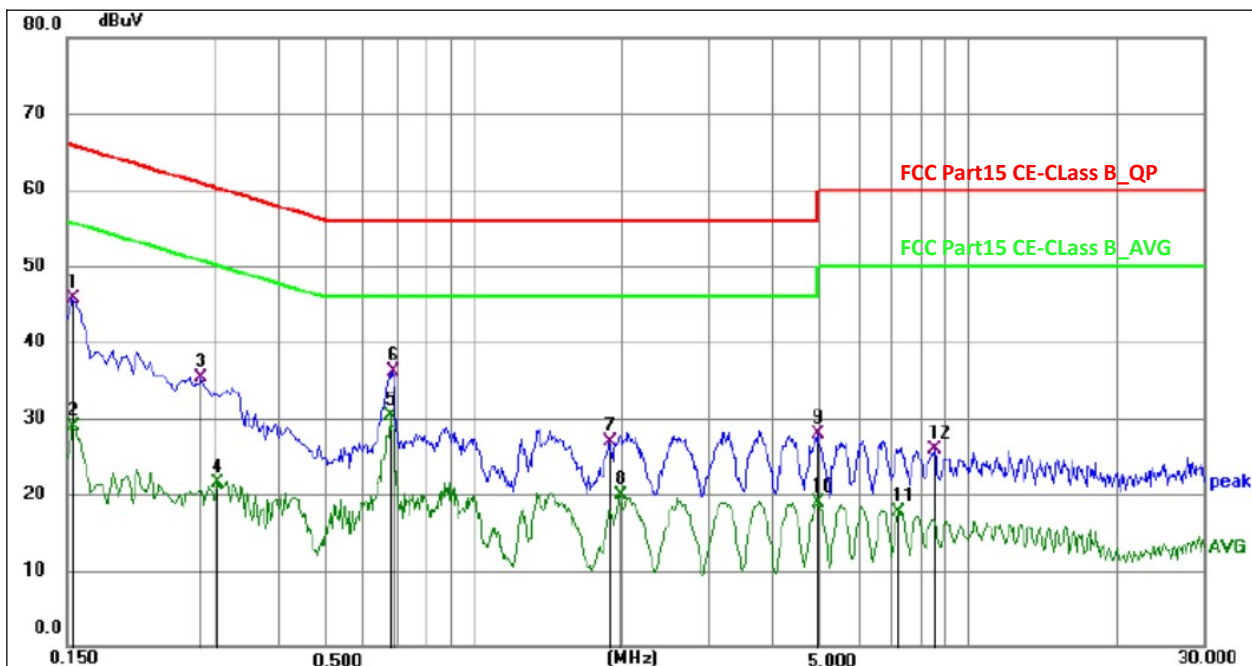
Remark:

Margin = Limit – Level, Correct Factor = Cable lose + LISN insertion loss, Level= Reading + Correct factor

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1545	35.74	10.29	46.03	65.75	-19.72	QP
2	0.1548	19.17	10.29	29.46	55.74	-26.28	AVG
3 *	0.6765	18.30	10.32	28.62	46.00	-17.38	AVG
4	0.6809	27.66	10.32	37.98	56.00	-18.02	QP
5	1.3425	11.35	10.35	21.70	46.00	-24.30	AVG
6	1.3515	21.54	10.35	31.89	56.00	-24.11	QP
7	2.5800	20.63	10.39	31.02	56.00	-24.98	QP
8	2.5935	9.63	10.39	20.02	46.00	-25.98	AVG
9	4.3260	8.93	10.43	19.36	46.00	-26.64	AVG
10	4.3530	19.48	10.43	29.91	56.00	-26.09	QP
11	24.9000	4.22	10.72	14.94	50.00	-35.06	AVG
12	24.9404	15.83	10.72	26.55	60.00	-33.45	QP



Temperature:	25 °C	Relative Humidity:	54%
Pressure:	1010hPa	Phase :	N
Test Voltage:	AC 120V/60Hz		
Test Mode:	Transmitting mode of 802.11b 2412MHz		



Remark:

Margin = Limit – Level, Correct Factor = Cable lose + LISN insertion loss, Level= Reading + Correct factor

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1545	35.45	10.32	45.77	65.75	-19.98	QP
2	0.1545	18.66	10.32	28.98	55.75	-26.77	AVG
3	0.2805	25.01	10.33	35.34	60.80	-25.46	QP
4	0.3030	11.22	10.33	21.55	50.16	-28.61	AVG
5 *	0.6765	20.03	10.34	30.37	46.00	-15.63	AVG
6	0.6855	25.75	10.34	36.09	56.00	-19.91	QP
7	1.8825	16.44	10.39	26.83	56.00	-29.17	QP
8	1.9725	9.54	10.39	19.93	46.00	-26.07	AVG
9	4.9650	17.37	10.47	27.84	56.00	-28.16	QP
10	4.9650	8.46	10.47	18.93	46.00	-27.07	AVG
11	7.2510	7.21	10.52	17.73	50.00	-32.27	AVG
12	8.5470	15.27	10.54	25.81	60.00	-34.19	QP

**4. RADIATED EMISSION MEASUREMENT****4.1 RADIATED EMISSION LIMITS (Frequency Range 9kHz-1000MHz)**

In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

FREQUENCY (MHz)	Limit (dBuV/m) (at 3M)	
	PEAK	AVERAGE
Above 1000	74	54

Notes:

- (1) The limit for radiated test was performed according to FCC PART 15C.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	25GHz
RB / VB (emission in restricted band)	1 MHz / 1 MHz for Peak, 1 MHz / 10Hz for Average

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP



4.2 TEST PROCEDURE

Below 1GHz test procedure as below:

- The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

Above 1GHz test procedure as below:

- Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber and change form table 0.8 metre to 1.5 metre(Above 18GHz the distance is 1 meter and table is 1.5 metre).
- Test the EUT in the lowest channel, the middle channel, the Highest channel

Note:

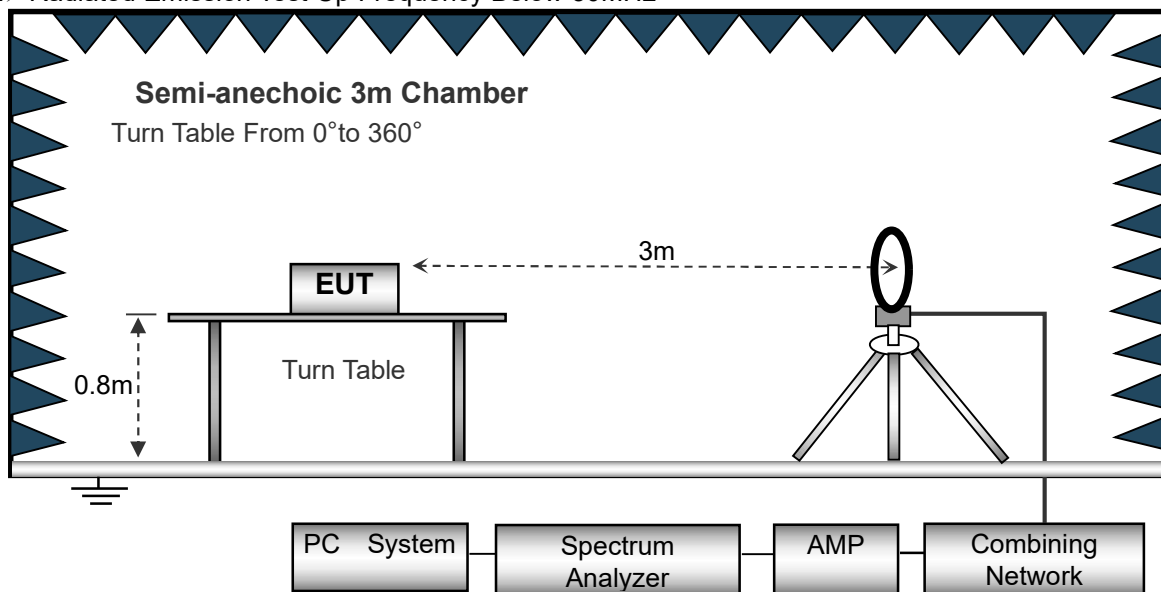
Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported

4.3 DEVIATION FROM TEST STANDARD

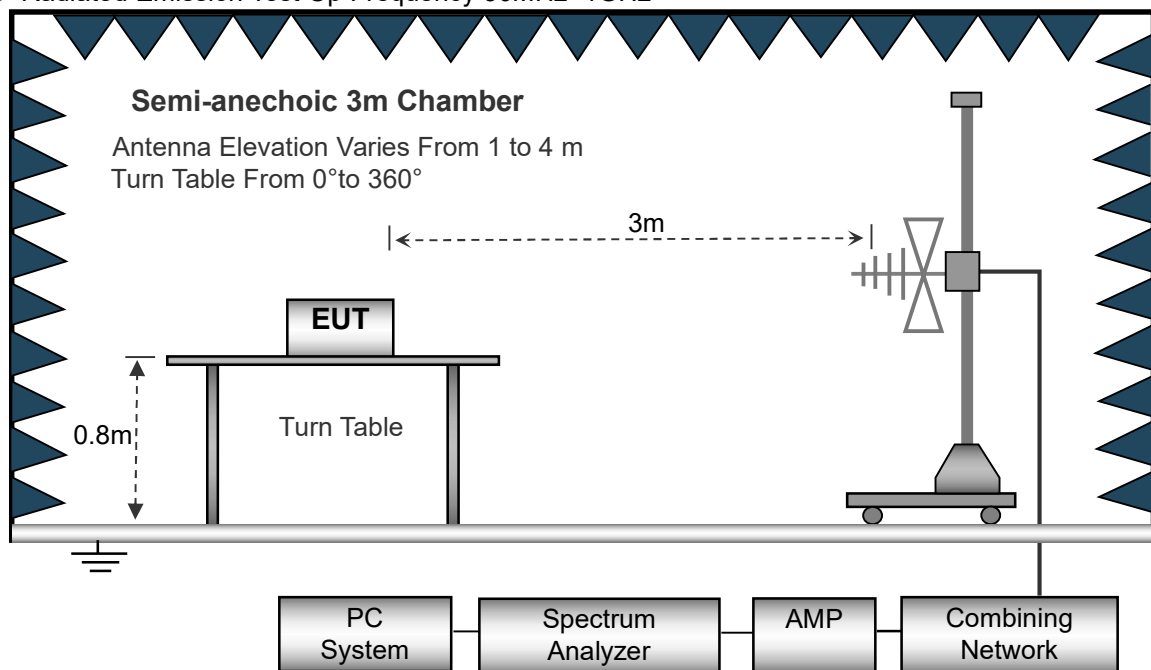
No deviation

4.4 TEST SETUP

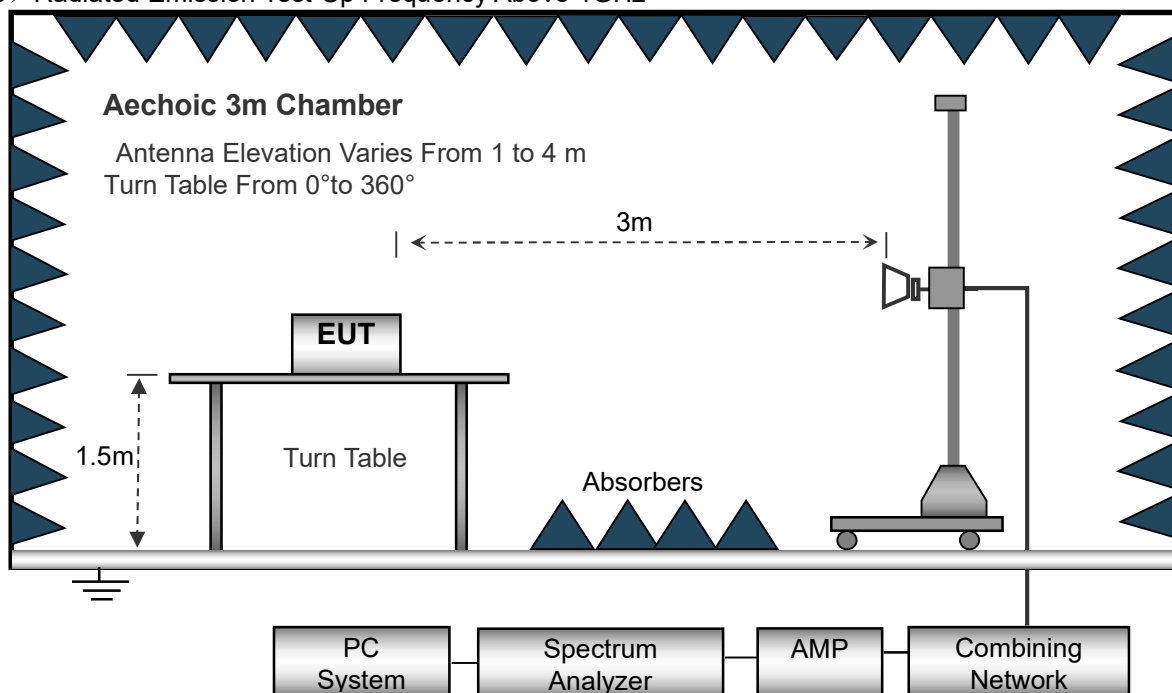
(A) Radiated Emission Test-Up Frequency Below 30MHz



(B) Radiated Emission Test-Up Frequency 30MHz~1GHz



(C) Radiated Emission Test-Up Frequency Above 1GHz



4.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

4.6 TEST RESULTS

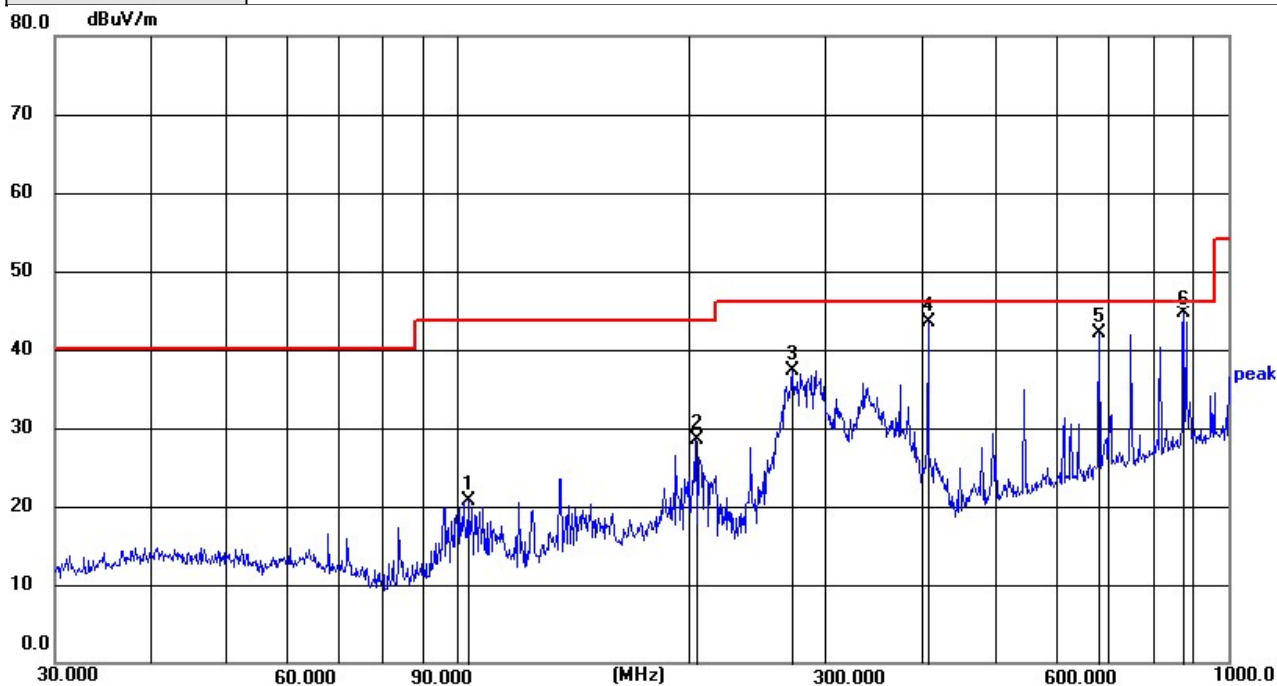
Note: 1. All modes of 802.11b/g/n20 were test at Low, Middle, and High channel, only the worst result of 802.11b Low Channel was reported for below 1GHz test.

2. By preliminary testing and verifying three axis (X, Y and Z) position of EUT transmitted status, it was found that “Z axis” position was the worst, and test data recorded in this report.



Below 1GHz Test Results

Temperature:	26℃	Relative Humidity:	54%
Pressure:	1010 hPa	Polarization :	Horizontal
Test Voltage :	AC 120V/60Hz		
Test Mode :	Transmitting mode of 802.11b 2412MHz		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	103.170	39.41	-18.72	20.69	43.50	22.81	QP
2	204.023	46.34	-17.91	28.43	43.50	15.07	QP
3	271.944	52.10	-14.80	37.30	46.00	8.70	QP
4	408.015	55.33	-11.74	43.59	46.00	2.41	QP
5	680.079	48.53	-6.52	42.01	46.00	3.99	QP
6 *	875.094	49.76	-6.04	43.72	46.00	2.28	QP

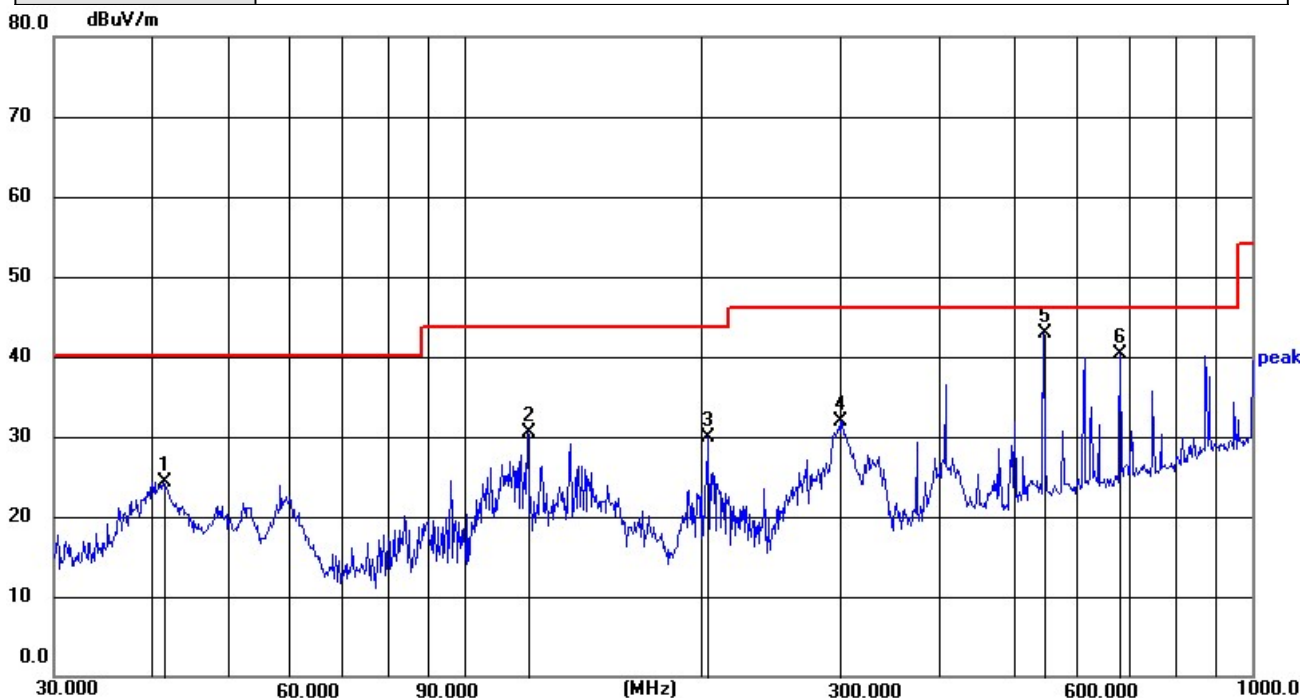
Remark:

Correct Factor = Cable loss + Antenna factor – Preamplifier;

Level = Reading Level + Correct Factor; Margin = Limit – Level;



Temperature:	26℃	Relative Humidity:	54%
Pressure:	1010 hPa	Polarization :	Vertical
Test Voltage :	AC 120V/60Hz		
Test Mode :	Transmitting mode of 802.11b 2412MHz		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	41.284	39.01	-14.63	24.38	40.00	15.62	QP
2	120.024	47.57	-17.00	30.57	43.50	12.93	QP
3	203.987	47.75	-17.91	29.84	43.50	13.66	QP
4	299.736	45.87	-13.97	31.90	46.00	14.10	QP
5 *	544.037	51.91	-9.10	42.81	46.00	3.19	QP
6	680.079	46.76	-6.52	40.24	46.00	5.76	QP

Remark:

Correct Factor = Cable loss + Antenna factor – Preamplifier;

Level = Reading Level + Correct Factor; Margin = Limit – Level;

**Above 1GHz Test Results
(802.11b Worst Case)**

Polar (H/V)	Frequency	Meter Reading	Pre- amplifier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
operation frequency:2412									
V	4824.00	67.88	50.65	6.88	31.29	55.4	74.00	-18.6	PK
V	4824.00	56.34	50.65	6.88	31.29	43.86	54.00	-10.14	AV
V	7236.00	67.33	49.98	7.16	36.63	61.14	74.00	-12.86	PK
V	7236.00	51.56	49.98	7.16	36.63	45.37	54.00	-8.63	AV
V	16087.00	48.86	51.53	11.34	41.52	50.19	74.00	-23.81	PK
H	4824.00	66.34	50.65	6.88	31.29	53.86	74.00	-20.14	PK
H	4824.00	55.17	50.65	6.88	31.29	42.69	54.00	-11.31	AV
H	7236.00	69.34	49.98	7.16	36.63	63.15	74.00	-10.85	PK
H	7236.00	51.78	49.98	7.16	36.63	45.59	54.00	-8.41	AV
H	16087.00	49.12	51.53	11.34	41.52	50.45	74.00	-23.55	PK
operation frequency:2437									
V	4874.00	67.45	50.67	6.89	31.38	55.05	74.00	-18.95	PK
V	4874.00	55.47	50.67	6.89	31.38	43.07	54.00	-10.93	AV
V	7311.00	69.47	50.02	7.24	36.63	63.32	74.00	-10.68	PK
V	7311.00	53.44	50.02	7.24	36.63	47.29	54.00	-6.71	AV
V	16087.00	48.08	51.53	11.34	41.52	49.41	74.00	-24.59	PK
H	4874.00	66.35	50.67	6.89	31.38	53.95	74.00	-20.05	PK
H	4874.00	55.24	50.67	6.89	31.38	42.84	54.00	-11.16	AV
H	7311.00	69.67	50.02	7.24	36.63	63.52	74.00	-10.48	PK
H	7311.00	52.12	50.02	7.24	36.63	45.97	54.00	-8.03	AV
H	16087.00	48.26	51.53	11.34	41.52	49.59	74.00	-24.41	PK
operation frequency:2462									
V	4924.00	68.17	50.79	6.83	31.36	55.57	74.00	-18.43	PK
V	4924.00	55.34	50.79	6.83	31.36	42.74	54.00	-11.26	AV
V	7386.00	69.56	50.11	7.25	36.58	63.28	74.00	-10.72	PK
V	7386.00	53.42	50.11	7.25	36.58	47.14	54.00	-6.86	AV
V	16087.00	49.65	51.53	11.34	41.52	50.98	74.00	-23.02	PK
H	4924.00	67.34	50.79	6.83	31.36	54.74	74.00	-19.26	PK
H	4924.00	55.46	50.79	6.83	31.36	42.86	54.00	-11.14	AV
H	7386.00	67.16	50.11	7.25	36.58	60.88	74.00	-13.12	PK
H	7386.00	52.09	50.11	7.25	36.58	45.81	54.00	-8.19	AV
H	16087.00	49.44	51.53	11.34	41.52	50.77	74.00	-23.23	PK
Remark:									
1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-Amplifier, Margin= Emission Level - Limit									
2. If peak below the average limit, the average emission was no test.									
3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.									



5. RADIATED BAND EMISSION MEASUREMENT

5.1 TEST REQUIREMENT:

FCC Part15 C Section 15.209 and 15.205

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

FREQUENCY (MHz)	Limit (dBuV/m) (at 3M)	
	PEAK	AVERAGE
Above 1000	74	54

Notes:

- (1) The limit for radiated test was performed according to FCC PART 15C.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	2300MHz
Stop Frequency	2520MHz
RB / VB (emission in restricted band)	1 MHz / 1 MHz for Peak, 1 MHz / 10Hz for Average

5.2 TEST PROCEDURE

Above 1GHz test procedure as below:

1. The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.
2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
7. Test the EUT in the lowest channel, the Highest channel

Note:

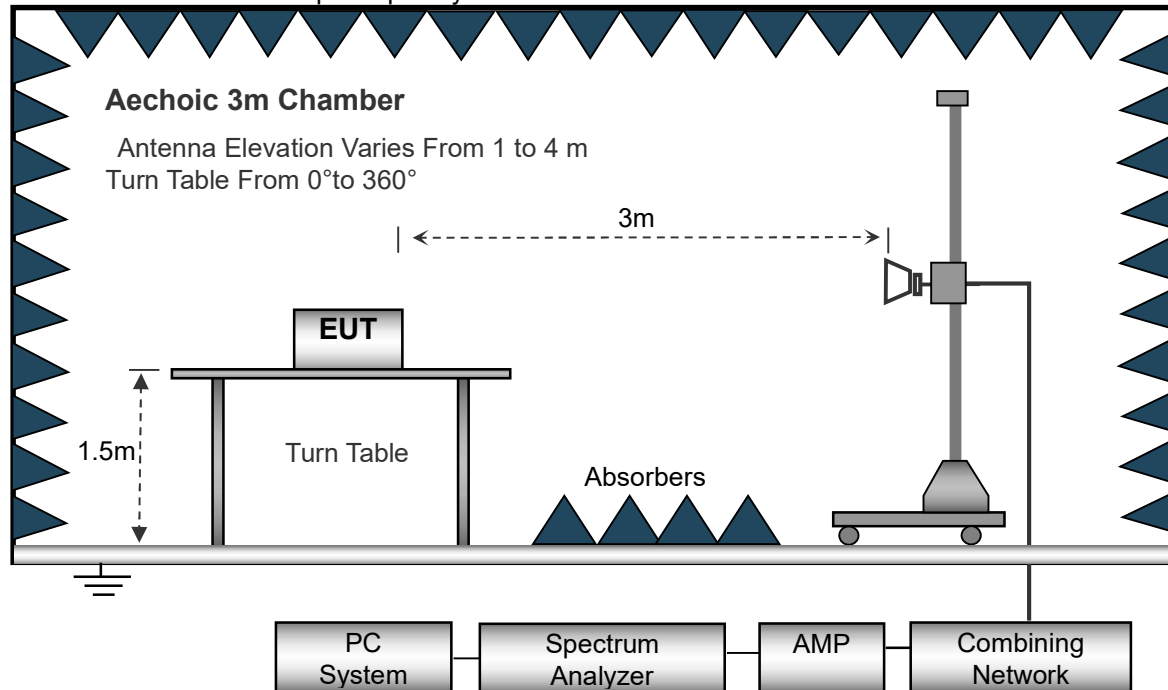
Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported

5.3 DEVIATION FROM TEST STANDARD

No deviation

5.4 TEST SETUP

Radiated Emission Test-Up Frequency Above 1GHz



5.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.



5.6 TEST RESULT

802.11b Worst Case

Polar (H/V)	Frequency	Meter Reading	Pre- amplifier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
operation frequency:2412									
V	2390.00	76.55	52.12	2.73	27.38	54.54	74.00	-19.46	PK
V	2390.00	65.67	52.12	2.73	27.38	43.66	54.00	-10.34	AV
V	2400.00	76.34	52.16	2.78	27.41	54.37	74.00	-19.63	PK
V	2400.00	64.76	52.16	2.78	27.41	42.79	54.00	-11.21	AV
H	2390.00	76.19	52.12	2.73	27.38	54.18	74.00	-19.82	PK
H	2390.00	65.11	52.12	2.73	27.38	43.10	54.00	-10.90	AV
H	2400.00	76.72	52.16	2.78	27.41	54.75	74.00	-19.25	PK
H	2400.00	65.25	52.16	2.78	27.41	43.28	54.00	-10.72	AV

Polar (H/V)	Frequency	Meter Reading	Pre- amplifier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
operation frequency:2462									
V	2483.50	77.05	52.23	2.86	27.44	55.12	74.00	-18.88	PK
V	2483.50	65.04	52.23	2.86	27.44	43.11	54.00	-10.89	AV
V	2500.00	76.15	52.26	2.88	27.49	54.26	74.00	-19.74	PK
V	2500.00	64.09	52.26	2.88	27.49	42.20	54.00	-11.80	AV
H	2483.50	76.12	52.23	2.86	27.44	54.19	74.00	-19.81	PK
H	2483.50	65.46	52.23	2.86	27.44	43.53	54.00	-10.47	AV
H	2500.00	76.64	52.26	2.88	27.49	54.75	74.00	-19.25	PK
H	2500.00	65.06	52.26	2.88	27.49	43.17	54.00	-10.83	AV

Remark:

1. Emission Level = Reading Level+Antenna Factor+Cable loss-Preamplifier Factor.
2. Over Limit= Absolute Level - Limit.
3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has not to be reported.
4. EUT Pre-scan X/Y/Z orientation, only worst case is presented in the report (Z orientation)



6. PEAK OUTPUT POWER

6.1 APPLIED PROCEDURES / LIMIT

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

6.2 TEST PROCEDURE

- a. The EUT was directly connected to the power meter and antenna output port as show in the block diagram below,

6.3 DEVIATION FROM STANDARD

No deviation.

6.4 TEST SETUP



6.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

6.6 TEST RESULTS

Test Mode	Channel	Peak Power[dBm]	Conducted Limit[dBm]	Verdict
11B	2412	8.45	≤30	PASS
	2437	8.16	≤30	PASS
	2462	8.34	≤30	PASS
11G	2412	7.99	≤30	PASS
	2437	8.02	≤30	PASS
	2462	8.17	≤30	PASS
11N20SISO	2412	8.21	≤30	PASS
	2437	8.25	≤30	PASS
	2462	7.93	≤30	PASS



7. POWER SPECTRAL DENSITY TEST

7.1 APPLIED PROCEDURES / LIMIT

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

Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	= the frequency band of operation
RB	$RBW \geq 3kHz$
VB	$VBW \geq 3RBW$
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

7.2 TEST PROCEDURE

- a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,

7.3 DEVIATION FROM STANDARD

No deviation.

7.4 TEST SETUP



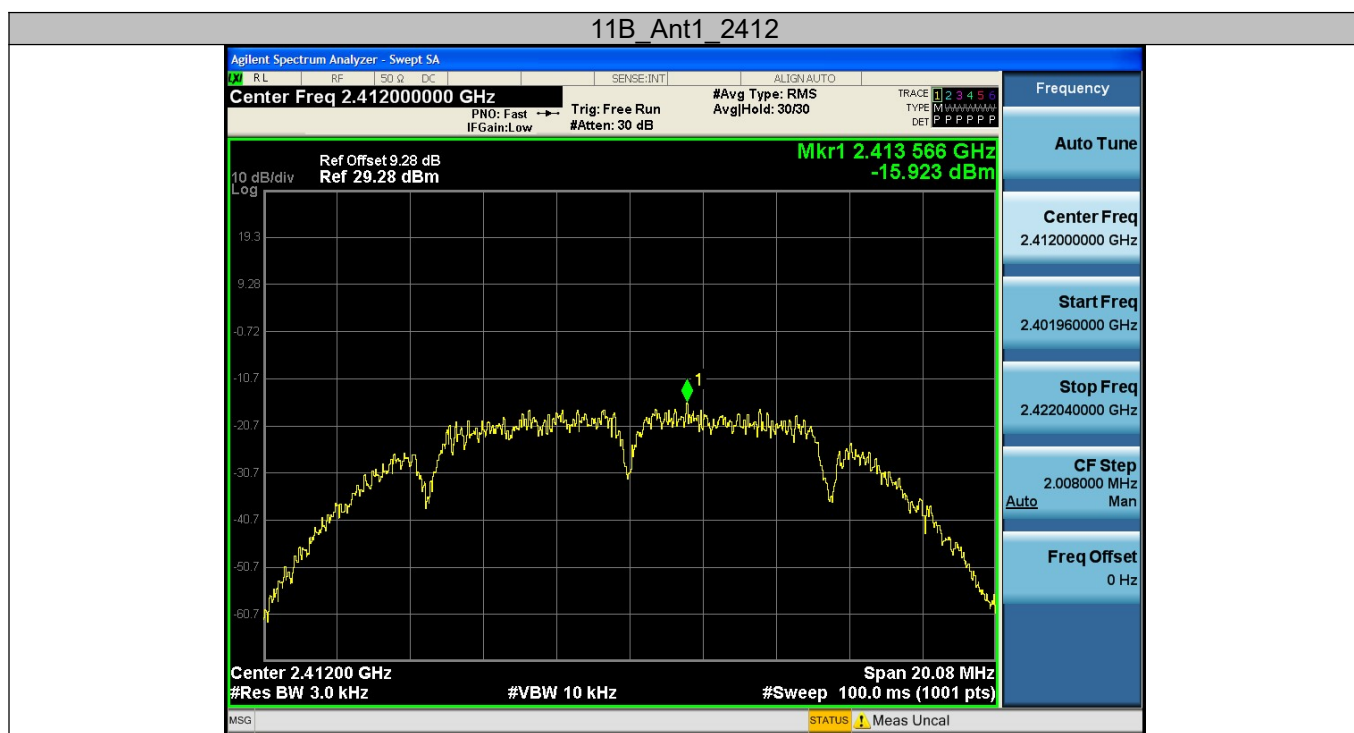
7.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.



7.6 TEST RESULTS

TestMode	Channel	Result[dBm/3-100kHz]	Limit[dBm/3kHz]	Verdict
11B	2412	-15.92	≤8	PASS
	2437	-14.23	≤8	PASS
	2462	-12.65	≤8	PASS
11G	2412	-18.47	≤8	PASS
	2437	-17.45	≤8	PASS
	2462	-15.60	≤8	PASS
11N20SISO	2412	-19.47	≤8	PASS
	2437	-17.90	≤8	PASS
	2462	-18.03	≤8	PASS





11B_Ant1_2437

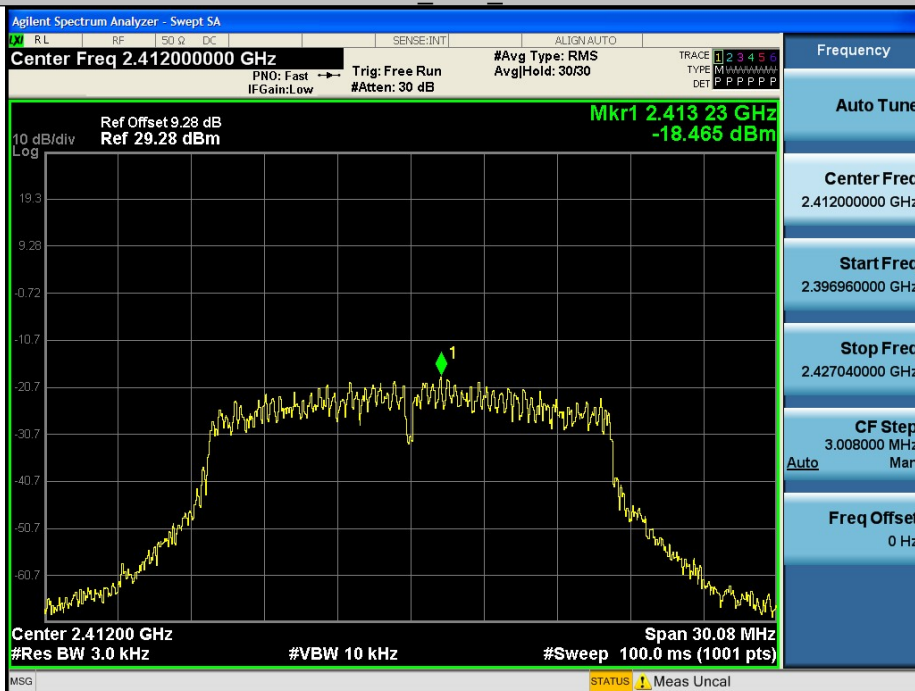


11B_Ant1_2462

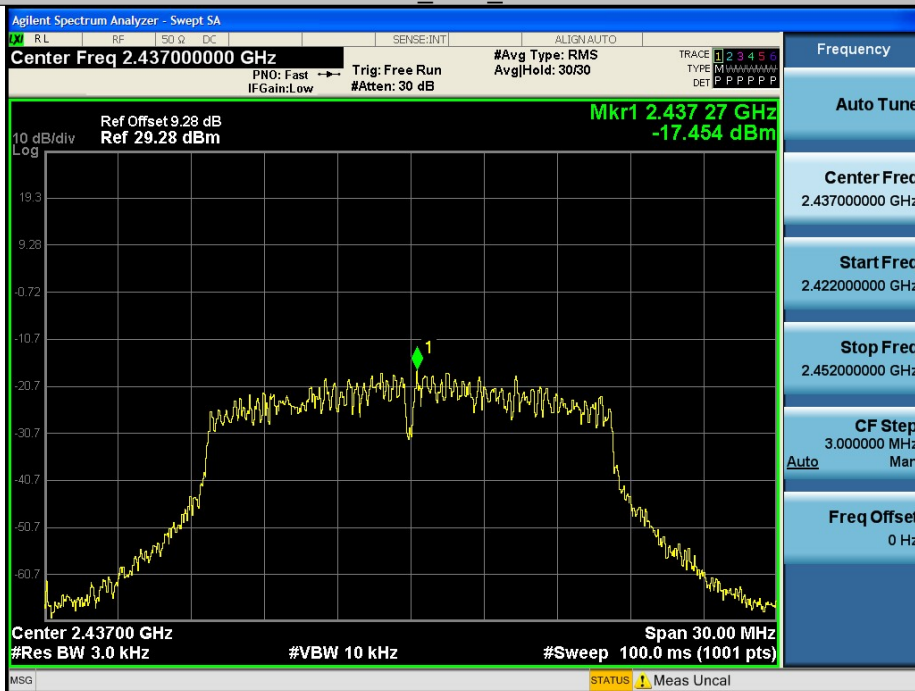




11G_Ant1_2412

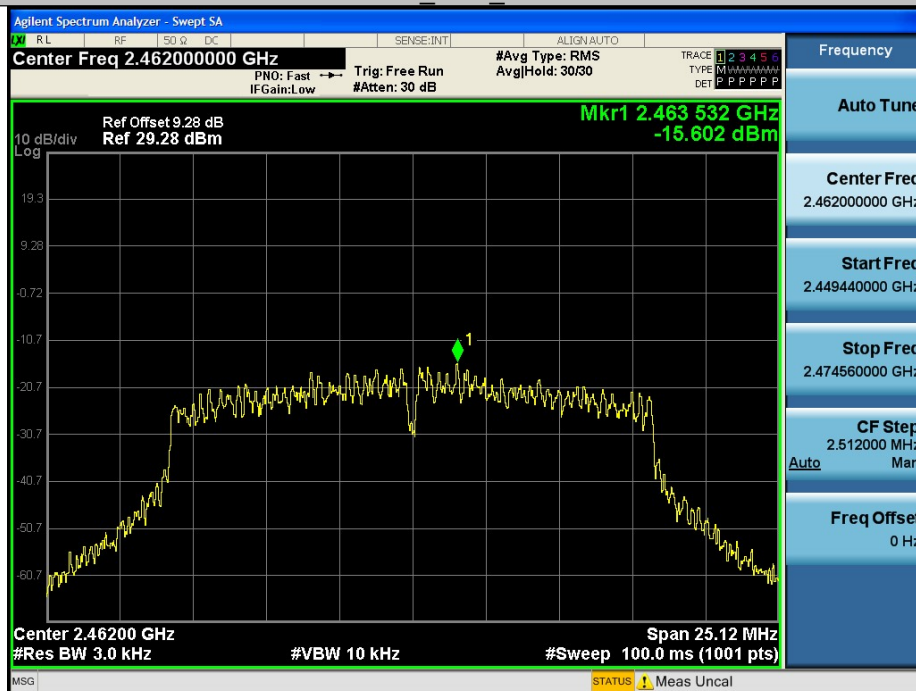


11G_Ant1_2437

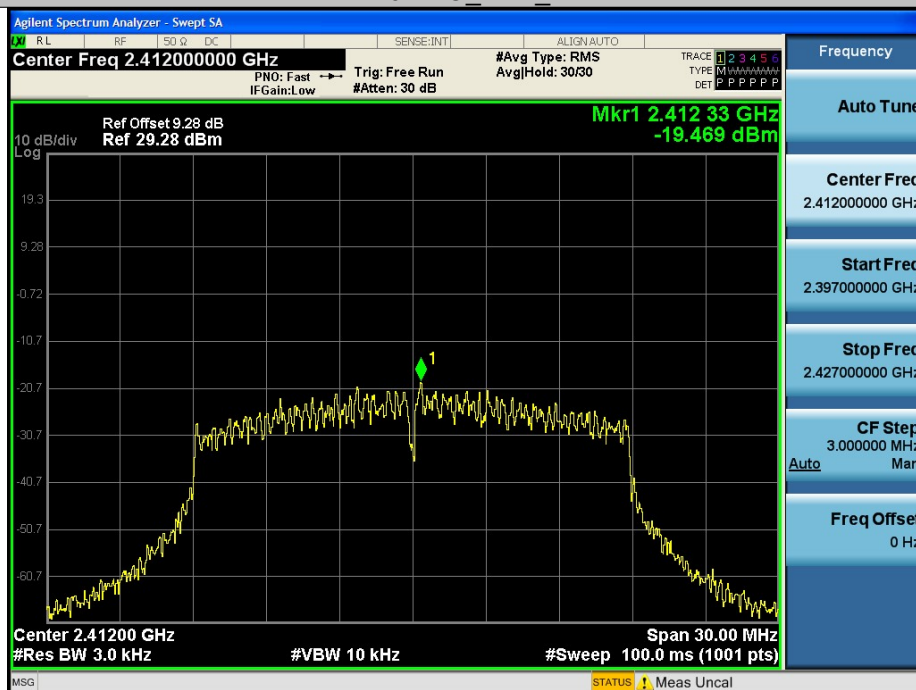




11G_Ant1_2462

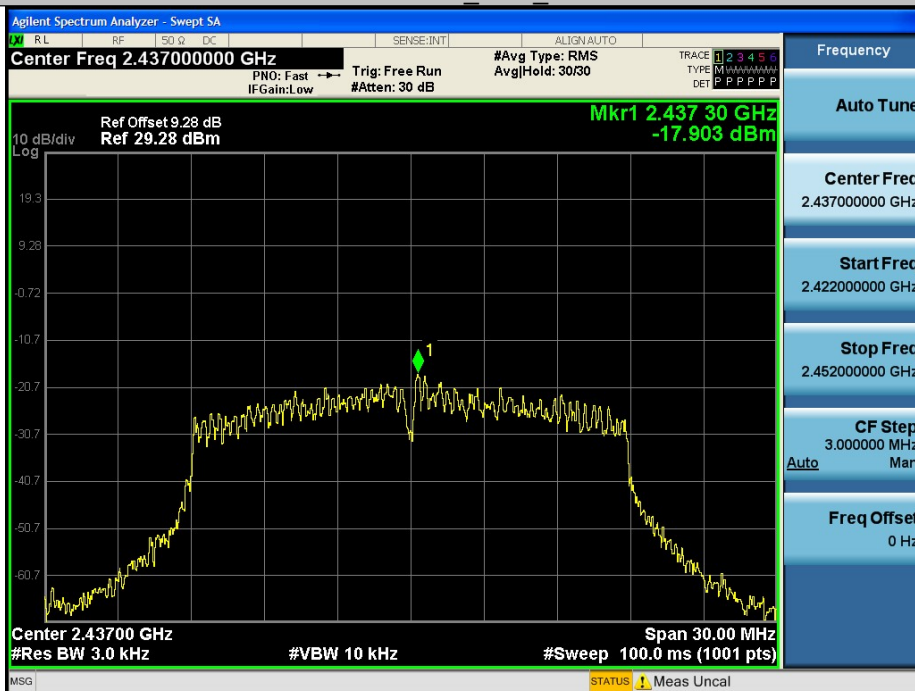


11N20SISO_Ant1_2412





11N20SISO_Ant1_2437



11N20SISO_Ant1_2462

