TEST REPORT

Applicant:	Fujian Youtong Industries Co., Ltd.
Address of Applicant:	North part of 1st 2nd & 3rd floor Building 1 No.18 Majiang Road Mawei Fuzhou Fujian China
Manufacturer:	Fujian Youtong Industries Co., Ltd.
Address of Manufacturer:	North part of 1st 2nd & 3rd floor Building 1 No.18 Majiang Road Mawei Fuzhou Fujian China

Equipment Under Test (EUT)

Product Name:	weather station
Model No.:	YT60234, YT60238, YT60240, LWS234
Trade Mark:	N/A
FCC ID:	2AQBD-60234
Applicable standards:	FCC CFR Title 47 Part 15 Subpart C Section 15.247
Date of sample receipt:	June 20, 2023
Date of Test:	June 25~28, 2023
Date of report issued:	June 28, 2023
Test Result:	PASS *

* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

Robinson Luo
Laboratory Manager

2 Version

Version No.	Date	Description
00	*2023-6-28*	*Original*

Prepared By: ***Date:*** *2023-6-28*

Project Engineer

Check By: ***Date:*** *2023-6-28*

Reviewer

3 Contents

4 Test Summary

Test Item	Section	Result
Antenna requirement	FCC part 15.203/15.247 (c)	Pass
AC Power Line Conducted Emission	FCC part 15.207	Pass
Conducted Peak Output Power	FCC part 15.247 (b)(3)	Pass
Channel Bandwidth & 99% OCB	FCC part 15.247 (a)(2)	Pass
Power Spectral Density	FCC part 15.247 (e)	Pass
Band Edge	FCC part 15.247(d)	Pass
Spurious Emission	FCC part 15.205/15.209	Pass

Remark: Test according to ANSI C63.10:2013

Pass: The EUT complies with the essential requirements in the standard.

Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Radio Frequency	1×10^{-7}
2	Duty cycle	0.37%
3	Occupied Bandwidth	3%
4	RF conducted power	0.75dB
5	RF power density	3dB
6	Conducted Spurious emissions	2.58dB
7	AC Power Line Conducted Emission	3.44dB (0.15MHz ~ 30MHz)
8	Radiated Spurious emission test	3.1dB (9kHz-30MHz)
		3.8039dB (30MHz-200MHz)
		3.9679dB (200MHz-1GHz)
		4.29dB (1GHz-18GHz)
		3.30dB (18GHz-40GHz)
Note (1): The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%.		

5 General Information

5.1 General Description of EUT

	Product Name:	weather station
	Model No.:	YT60234, YT60238, YT60240, LWS234
	Serial No.:	N/A
	Test sample(s) ID:	GTSL2023060506-1
	Sample(s) Status	Engineer sample
	Channel numbers:	802.11b/802.11g /802.11n(HT20): 11
	Channel separation:	5MHz
	Modulation technology:	802.11b: Direct Sequence Spread Spectrum (DSSS) 802.11g/802.11n(H20): Orthogonal Frequency Division Multiplexing (OFDM)
	Antenna Type:	PCB Print Antenna
	Antenna gain:	2.46dBi
	Power supply:	DC 4.5V (Powered by battery) DC 5V (Powered by adapter)
	Adapter Information	Model: XZ0500-1000U Input: 100-240V~, 50/60Hz, 0.4A Output: 5V DC 1000mA 5.0W

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

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Test channel	**Frequency (MHz)**
	802.11b/802.11g/802.11n(HT20)
Lowest channel	2412MHz
Middle channel	2437MHz
Highest channel	2462MHz

5.2 Test mode

Transmitting mode	Keep the EUT in continuously transmitting mode

Remark: During the test, the dutycycle >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.

We have verified the construction and function in typical operation. All the test modes were carried out with the EUT in transmitting operation, which was shown in this test report and defined as follows:

Pre-scan all kind of data rate in lowest channel, and found the follow list which it was worst case.

Mode	802.11b	802.11g	802.11n(HT20)
Data rate	1Mbps	6Mbps	6.5Mbps

5.3 Description of Support Units

None.

5.4 Deviation from Standards

None.

5.5 Abnormalities from Standard Conditions

None.

5.6 Test Facility

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

● **FCC—Registration No.: 381383**

Designation Number: CN5029

Global United Technology Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in files.

● **IC —Registration No.: 9079A**

CAB identifier: CN0091

The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing

● **NVLAP (LAB CODE:600179-0)**

Global United Technology Services Co., Ltd., is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP).

5.7 Test Location

All tests were performed at:

Global United Technology Services Co., Ltd.
Address: No. 123-128, Tower A, Jinyuan Business Building, No.2, Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, Guangdong, China 518102
Tel: 0755-27798480
Fax: 0755-27798960

5.8 Additional Instructions

Test Software	BLDevCube
Power level setup	15

6 Test Instruments list

Radiated Emission:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	3m Semi- Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	GTS250	June 23, 2021	June 22, 2024
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A
3	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	April 14, 2023	April 13, 2024
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9168	GTS640	March 19, 2023	March 18, 2025
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120 D	GTS208	April 17, 2023	April 16, 2025
6	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
7	Coaxial Cable	GTS	N/A	GTS213	April 21, 2023	April 20, 2024
8	Coaxial Cable	GTS	N/A	GTS211	April 21, 2023	April 20, 2024
9	Coaxial cable	GTS	N/A	GTS210	April 21, 2023	April 20, 2024
10	Coaxial Cable	GTS	N/A	GTS212	April 21, 2023	April 20, 2024
11	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	GTS575	April 14, 2023	April 13, 2024
12	Loop Antenna	ZHINAN	ZN30900A	GTS534	Nov. 29, 2022	Nov. 28, 2023
13	Broadband Preamplifier	SCHWARZBECK	BBV9718	GTS535	April 14, 2023	April 13, 2024
14	Amplifier(1GHz-26.5GHz)	HP	8449B	GTS601	April 14, 2023	April 13, 2024
15	Horn Antenna (18-26.5GHz)	/	UG-598A/U	GTS664	Oct. 30, 2022	Oct. 29, 2023
16	Horn Antenna (26.5-40GHz)	A.H Systems	SAS-573	GTS665	Oct. 30, 2022	Oct. 29, 2023
17	FSV·Signal Analyzer (10Hz-40GHz)	Keysight	FSV-40-N	GTS666	March 13, 2023	March 12, 2024
18	Amplifier	/	LNA-1000-30S	GTS650	April 14, 2023	April 13, 2024
19	CDNE M2+M3-16A	HCT	30MHz-300MHz	GTS668	Dec. 20,2022	Dec.19,2023

Conducted Emission						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	Shielding Room	ZhongYu Electron	7.3(L)x3.1(W)x2.9(H)	GTS252	May 14, 2022	May 13, 2025
2	EMI Test Receiver	R&S	ESCI 7	GTS552	April 23, 2023	April 22, 2024
3	Coaxial Switch	ANRITSU CORP	MP59B	GTS225	June 22, 2023	June 21, 2024
4	ENV216 2-L-V-NETZNACHB.DE	ROHDE&SCHWARZ	ENV216	GTS226	April 21, 2023	April 20, 2024
5	Coaxial Cable	GTS	N/A	GTS227	N/A	N/A
6	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
7	Thermo meter	JINCHUANG	GSP-8A	GTS639	April 27, 2023	April 26, 2024
8	Absorbing clamp	Elektronik-Feinmechanik	MDS21	GTS229	April 14, 2023	April 13, 2024
9	ISN	SCHWARZBECK	NTFM 8158	GTS565	April 21, 2023	April 20, 2024
10	High voltage probe	SCHWARZBECK	TK9420	GTS537	April 21, 2023	April 20, 2024

RF Conducted Test:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	MXA Signal Analyzer	Agilent	N9020A	GTS566	April 21, 2023	April 20, 2024
2	EMI Test Receiver	R&S	ESCI 7	GTS552	April 21, 2023	April 20, 2024
3	Spectrum Analyzer	Agilent	E4440A	GTS536	April 21, 2023	April 20, 2024
4	MXG vector Signal Generator	Agilent	N5182A	GTS567	April 21, 2023	April 20, 2024
5	ESG Analog Signal Generator	Agilent	E4428C	GTS568	April 21, 2023	April 20, 2024
6	USB RF Power Sensor	DARE	RPR3006W	GTS569	April 21, 2023	April 20, 2024
7	RF Switch Box	Shongyi	RFSW3003328	GTS571	April 21, 2023	April 20, 2024
8	Programmable Constant Temp & Humi Test Chamber	WEWON	WHTH-150L-40-880	GTS572	April 21, 2023	April 20, 2024

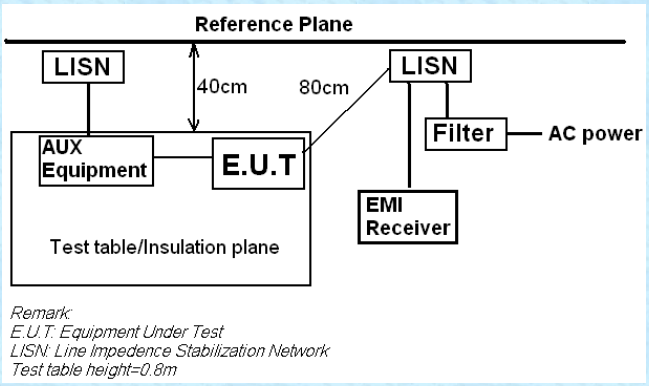
General used equipment:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	Humidity/ Temperature Indicator	KTJ	TA328	GTS243	April 24, 2023	April 23, 2024
2	Barometer	KUMAO	SF132	GTS647	July 26, 2022	July 25, 2023

7 Test results and Measurement Data

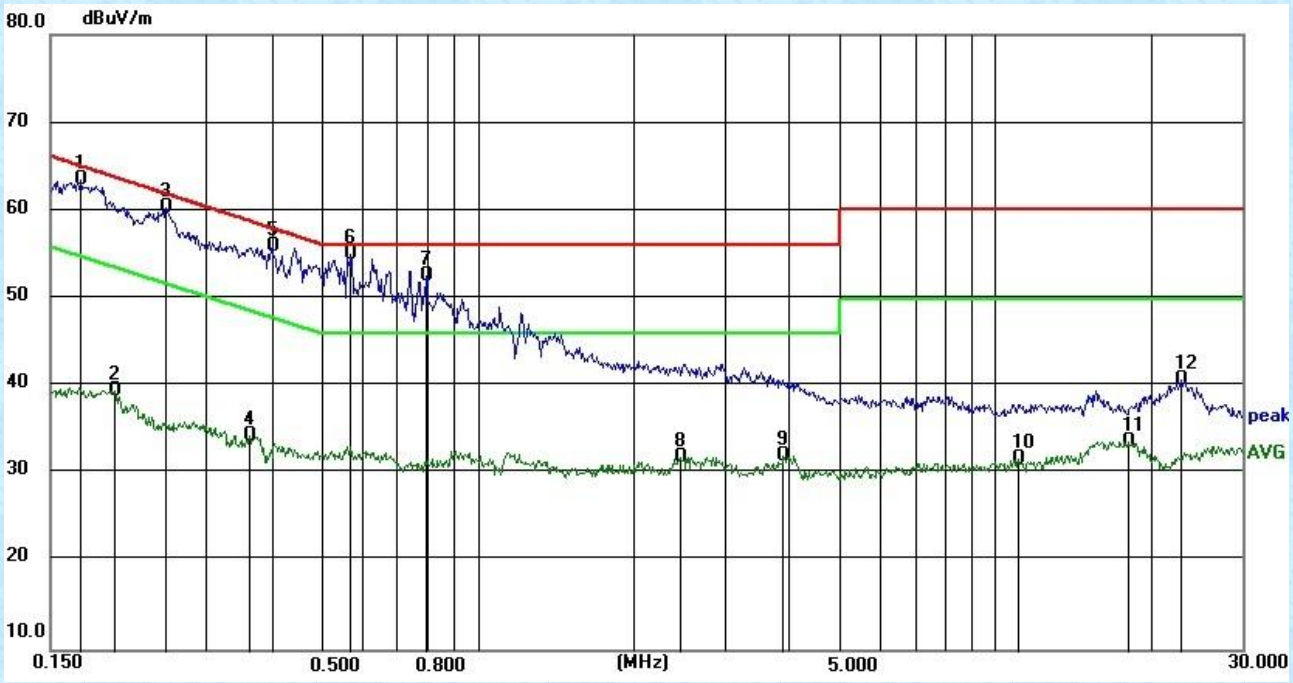
7.1 Antenna requirement

Standard requirement:	FCC Part15 C Section 15.203 /247(c)
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. **15.247(c) (1)(i) requirement:** (i) 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 6dBi.	
EUT Antenna:	
The antennas are PCB Print Antenna, the best case gain of the antennas are 2.46dBi, reference to the appendix II for details	

7.2 Conducted Emissions

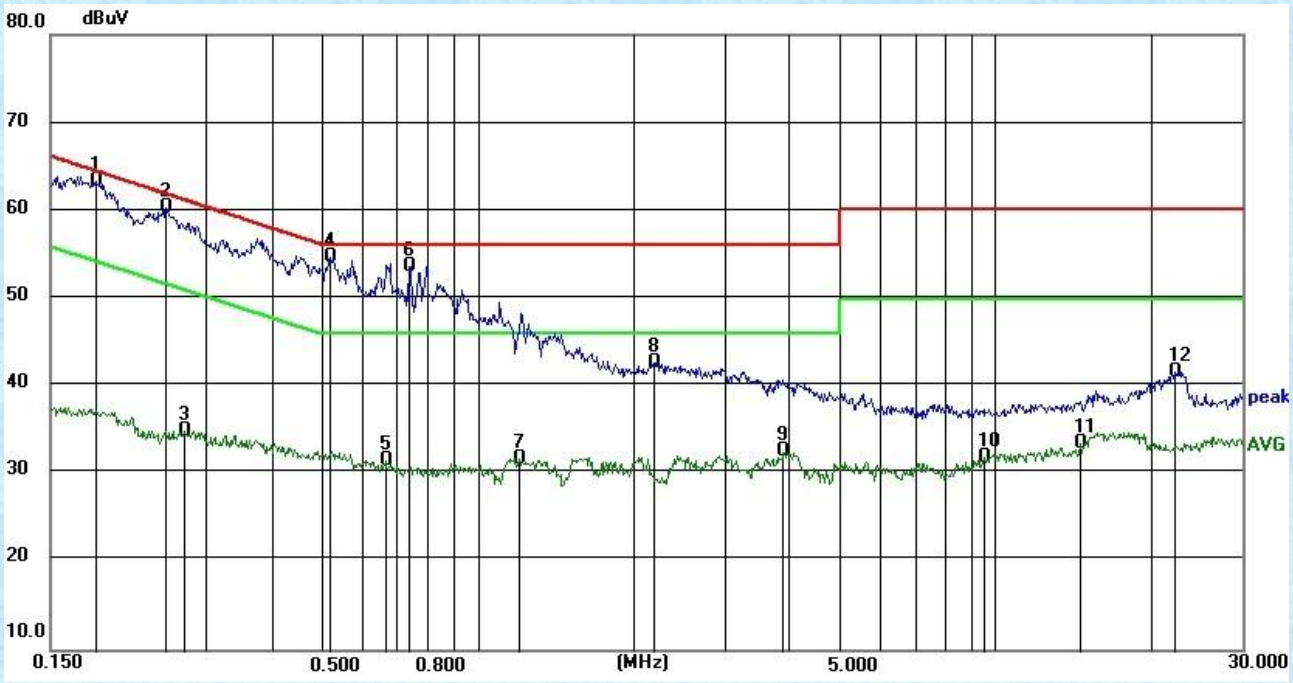
Test Requirement:	FCC Part15 C Section 15.207
Test Method:	ANSI C63.10:2013
Test Frequency Range:	150KHz to 30MHz
Receiver setup:	RBW=9KHz, VBW=30KHz, Sweep time=auto
Limit:	Frequency range (MHz) / Limit (dBuV): Quasi-peak / Average 0.15-0.5: 66 to 56* / 56 to 46* 0.5-5: 56 / 46 5-30: 60 / 50 * Decreases with the logarithm of the frequency.
Test setup:	 *Remark:* *E.U.T: Equipment Under Test* *LISN: Line Impedence Stabilization Network* *Test table height=0.8m*
Test procedure:	1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment. 2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs). 3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10:2013 on conducted measurement.
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test environment:	Temp.: 25 °C / Humid.: 52% / Press.: 1012mbar
Test voltage:	AC 120V, 60Hz
Test results:	Pass

Measurement data
Line:



Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Remark
0.172	53.43	10	63.43	64.86	1.43	QP
0.1995	29.57	10.01	39.58	53.63	14.05	AVG
0.2505	50.27	10.01	60.28	61.74	1.46	QP
0.3633	24.43	10.01	34.44	48.65	14.21	AVG
0.4017	45.96	10.01	55.97	57.82	1.85	QP
0.57	45.04	10.02	55.06	56	0.94	QP
0.796	42.6	10.02	52.62	56	3.38	QP
2.4605	21.84	10.07	31.91	46	14.09	AVG
3.9014	21.95	10.12	32.07	46	13.93	AVG
11.0791	21.42	10.32	31.74	50	18.26	AVG
18.0393	23.36	10.44	33.8	50	16.2	AVG
22.7754	30.17	10.52	40.69	60	19.31	QP

Neutral:

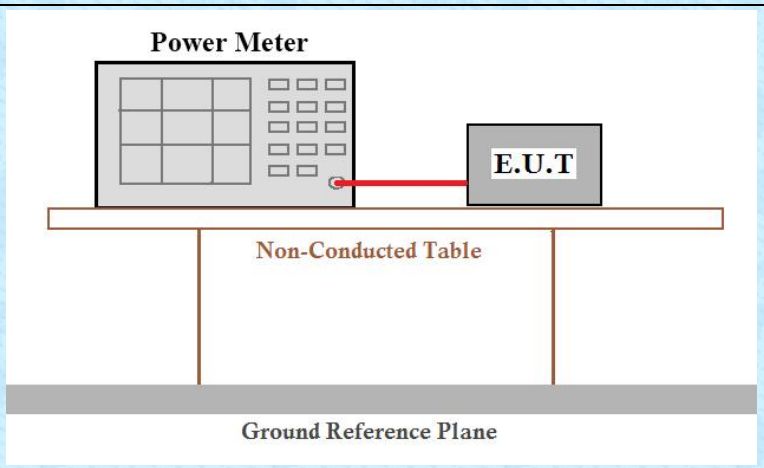


Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Remark
0.1833	53.28	10.01	63.29	64.33	1.04	QP
0.2505	50.27	10.01	60.28	61.74	1.46	QP
0.2726	24.94	10.01	34.95	51.04	16.09	AVG
0.5209	44.66	10.02	54.68	56	1.32	QP
0.6643	21.52	10.02	31.54	46	14.46	AVG
0.7389	43.63	10.02	53.65	56	2.35	QP
1.2033	21.82	10.04	31.86	46	14.14	AVG
2.1897	32.57	10.07	42.64	56	13.36	QP
3.9014	22.45	10.12	32.57	46	13.43	AVG
9.5518	21.58	10.29	31.87	50	18.13	AVG
14.5942	23.14	10.38	33.52	50	16.48	AVG
22.2972	31.15	10.52	41.67	60	18.33	QP

Notes:

1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Final Level =Receiver Read level + LISN Factor + Cable Loss
4. *If the average limit is met when using a quasi-peak detector receiver, the EUT shall be deemed to meet both limits and measurement with the average detector receiver is unnecessary.*

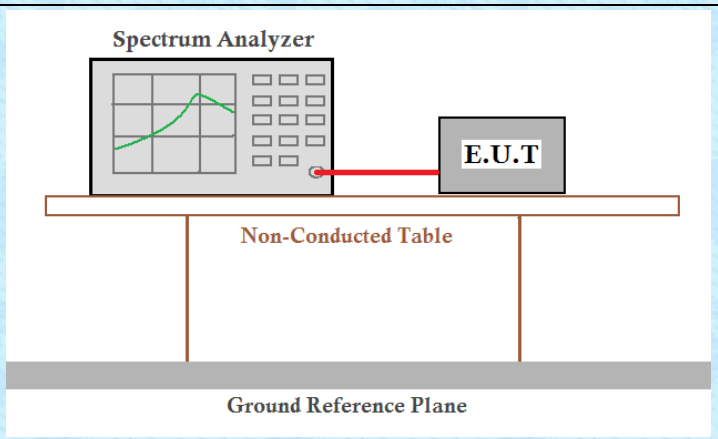
7.3 Conducted Peak Output Power

Test Requirement :	FCC Part15 C Section 15.247 (b)(3)
Test Method :	KDB558074 D01 15.247 Meas Guidance v05r02
Limit:	30dBm
Test setup:	
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement Data

Test CH	Peak Output Power (dBm)			Limit(dBm)	Result
	802.11b	802.11g	802.11n(HT20)		
Lowest	15.19	15.41	15.22	30.00	Pass
Middle	15.16	15.23	15.23		
Highest	16.15	16.13	16		

7.4 Channel Bandwidth & 99% Occupy Bandwidth

Test Requirement :	FCC Part15 C Section 15.247 (a)(2)
Test Method :	KDB558074 D01 15.247 Meas Guidance v05r02
Limit:	>500KHz
Test setup:	
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

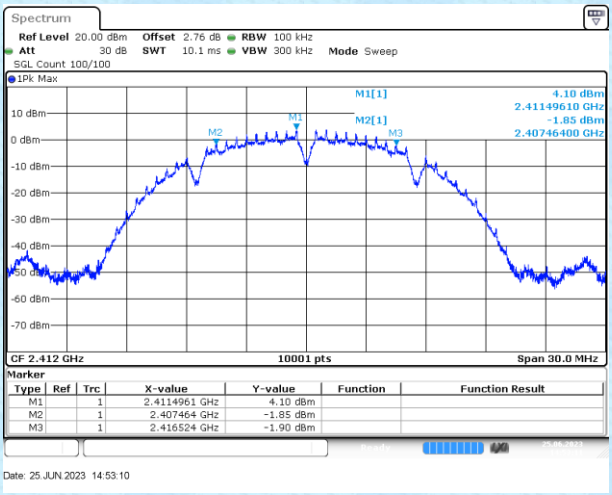
Measurement Data

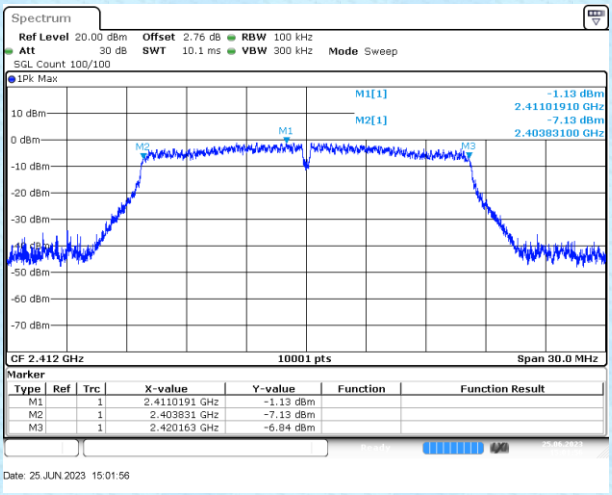
Test CH	Channel Bandwidth (MHz)			Limit(KHz)	Result
	802.11b	802.11g	802.11n(HT20)		
Lowest	9.06	16.332	17.058	>500	Pass
Middle	9.048	16.335	16.302		
Highest	9.552	16.329	17.028		

Test CH	99% Occupy Bandwidth (MHz)			Result
	802.11b	802.11g	802.11n(HT20)	
Lowest	13.358	16.333	17.32	Pass
Middle	13.307	16.33	16.324	
Highest	13.283	16.327	17.308	

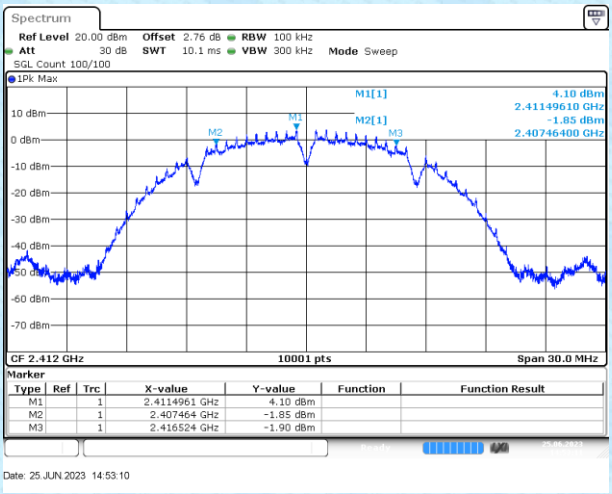
Test plot as follows: -6dB BW

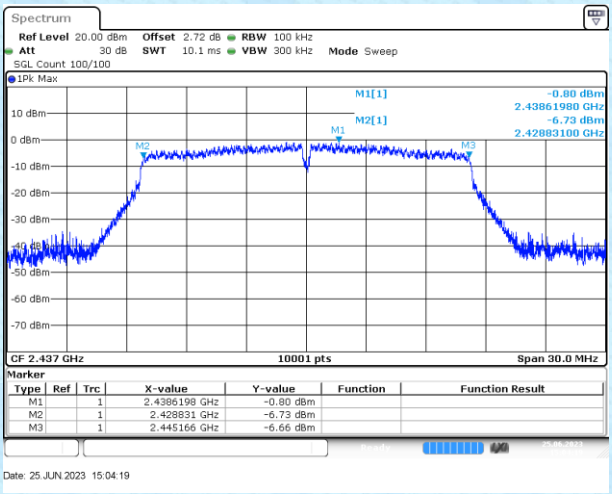
802.11b		802.11g	



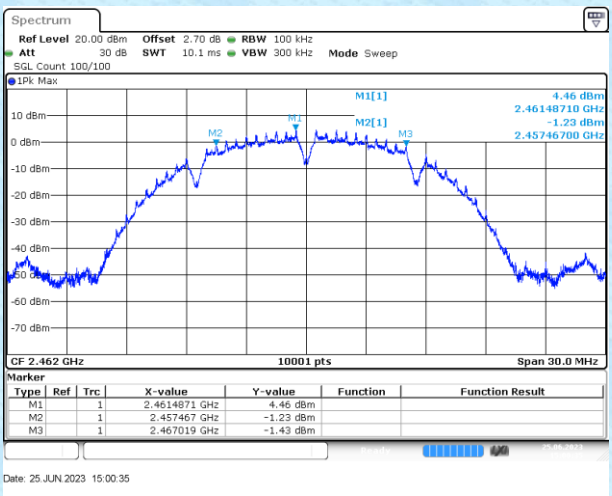


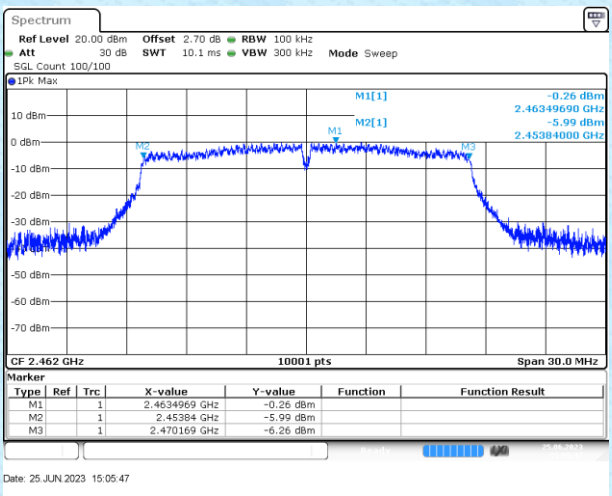
Lowest channel





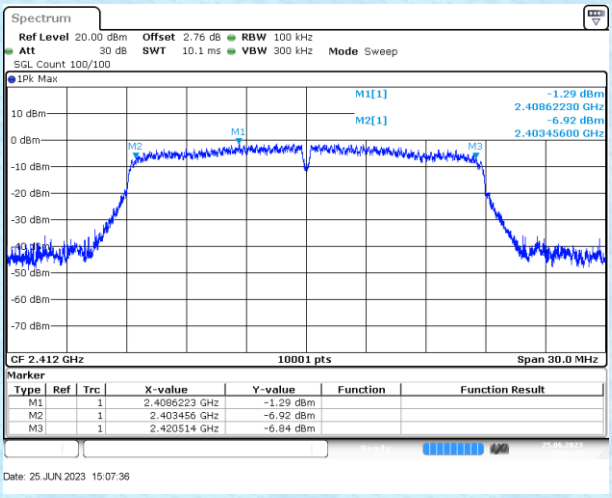
Middle channel



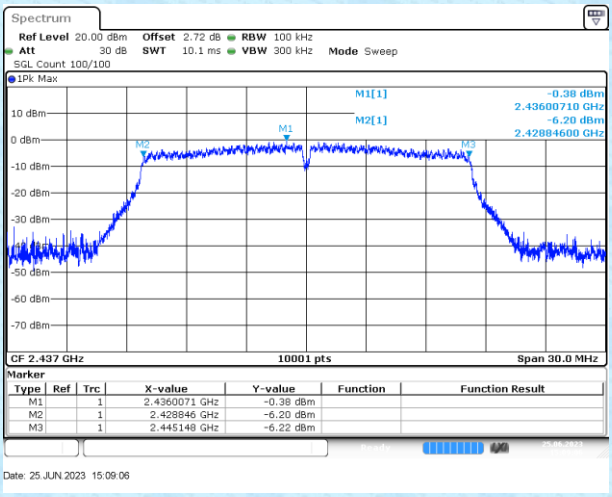


Highest channel

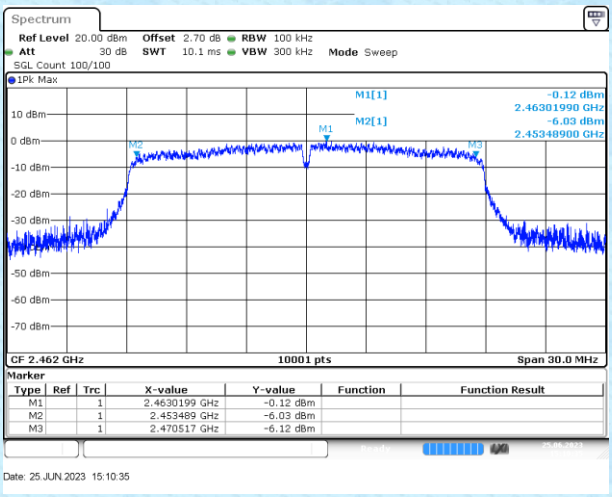
802.11n(HT20)



Lowest channel



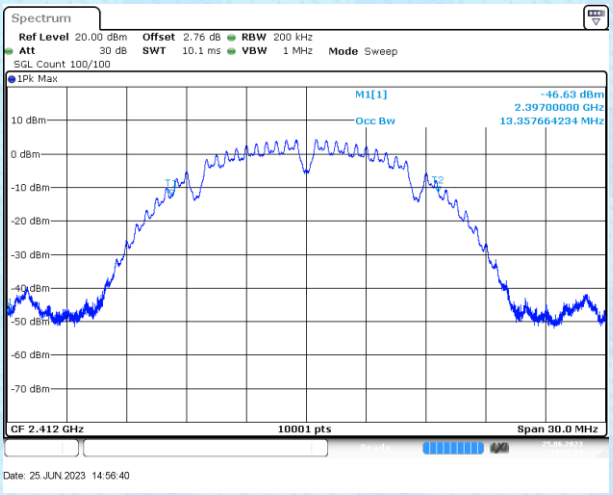
Middle channel

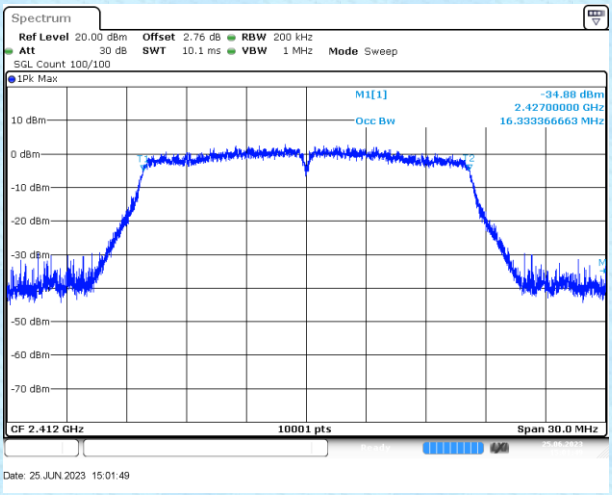


Highest channel

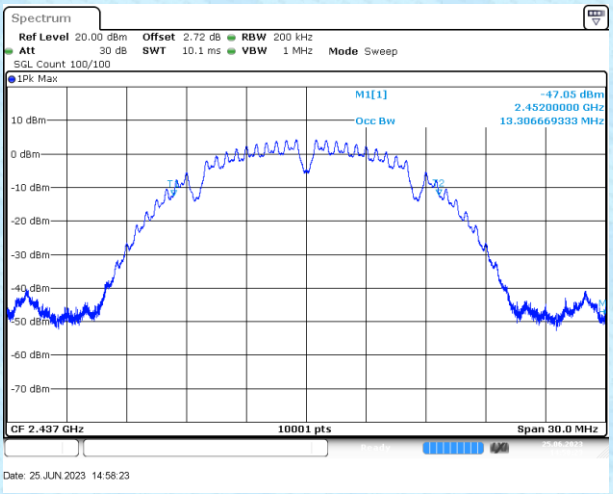
99% BW

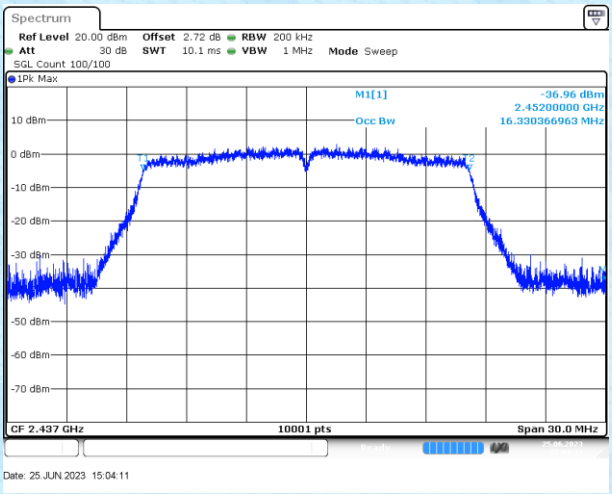
802.11b		802.11g	



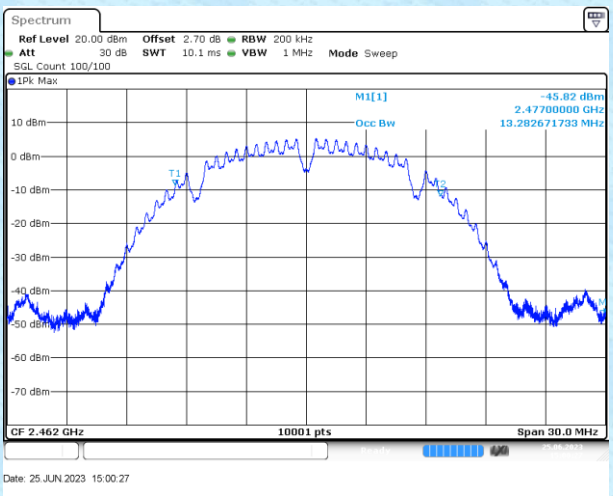


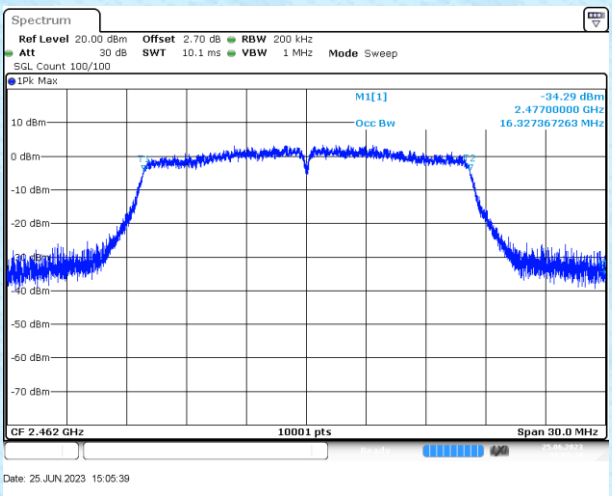
Lowest channel





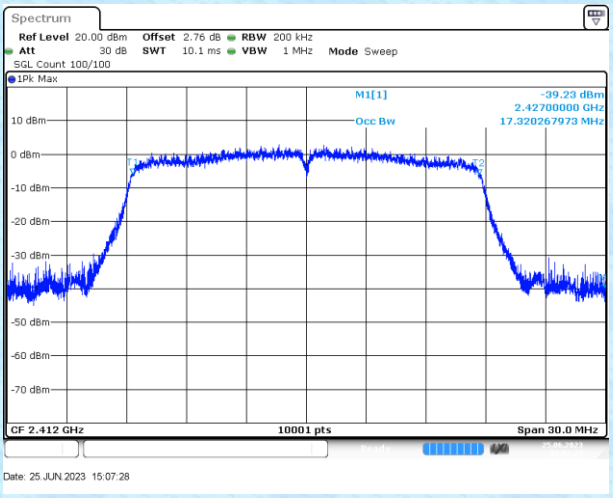
Middle channel



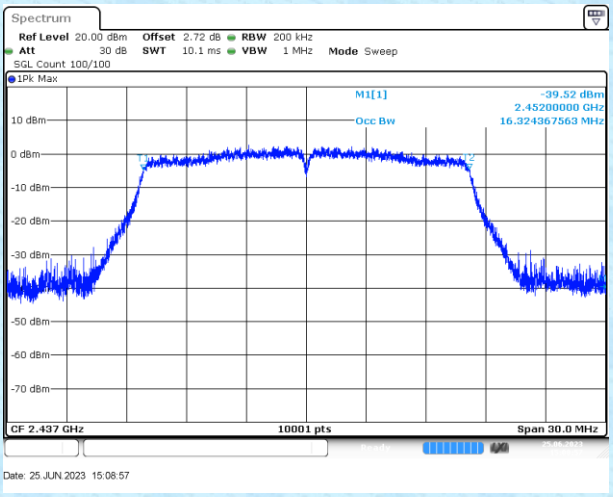


Highest channel

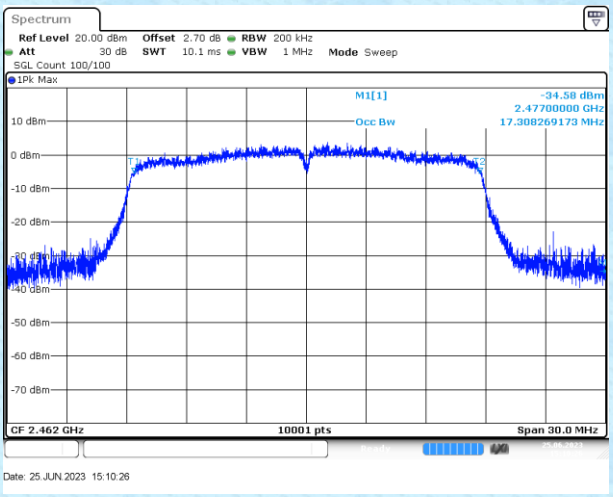
802.11n(HT20)



Lowest channel

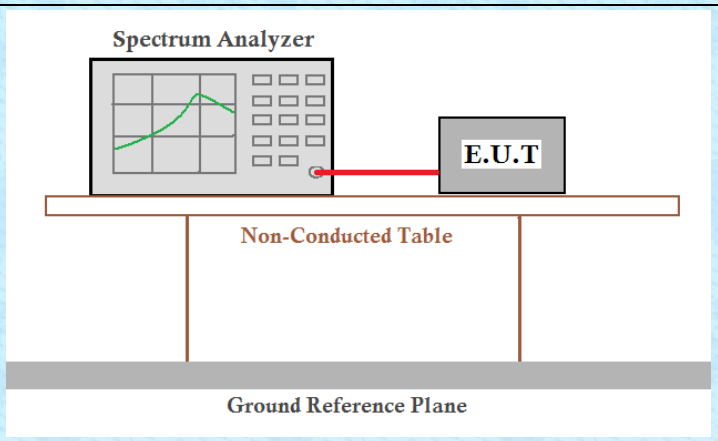


Middle channel



Highest channel

7.5 Power Spectral Density

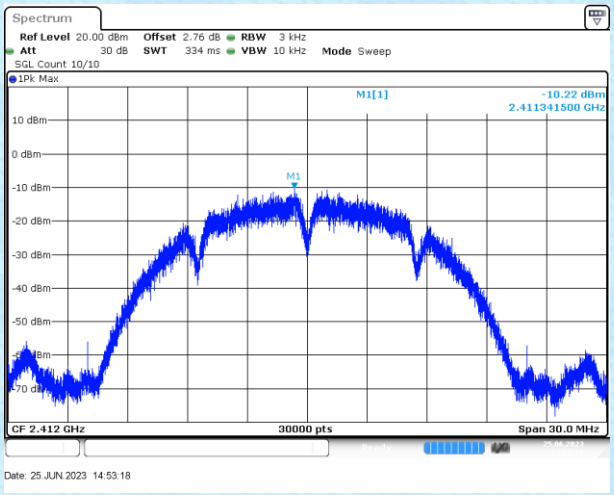
Test Requirement:	FCC Part15 C Section 15.247 (e)
Test Method:	KDB558074 D01 15.247 Meas Guidance v05r02
Limit:	8dBm/3kHz
Test setup:	
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

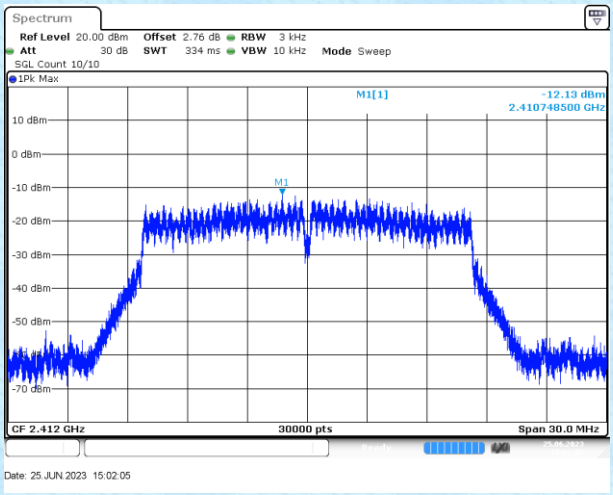
Measurement Data

Test CH	Power Spectral Density (dBm/3kHz)			Limit (dBm/3kHz)	Result
	802.11b	802.11g	802.11n(HT20)		
Lowest	-10.22	-12.13	-12.13	8.00	Pass
Middle	-10.84	-12.7	-12.7		
Highest	-8.9	-12.08	-12.08		

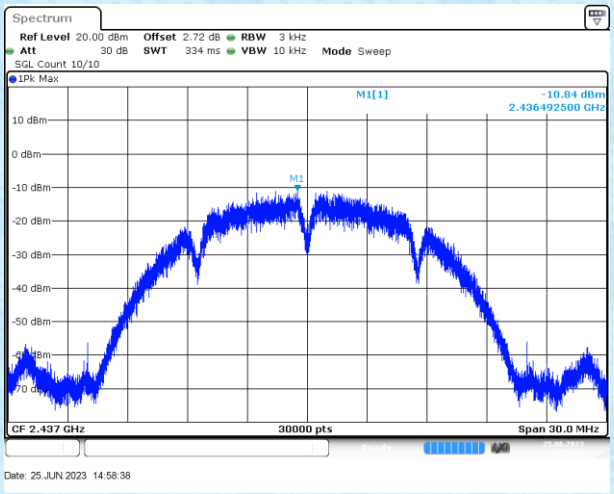
Test plot as follows:

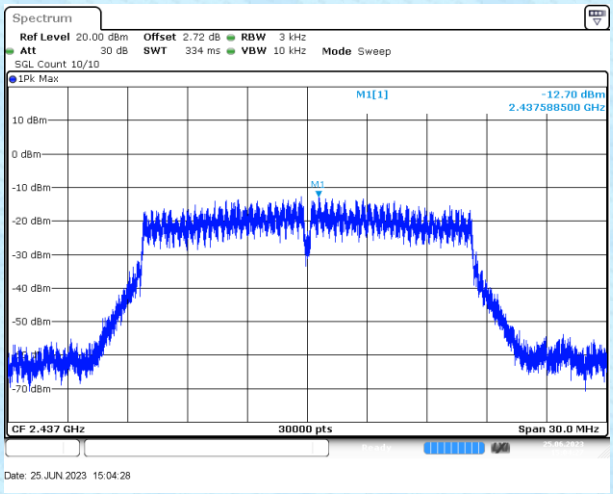
802.11b		802.11g	



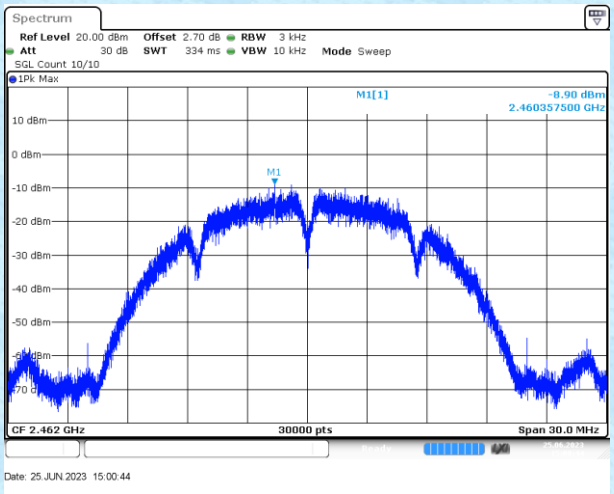


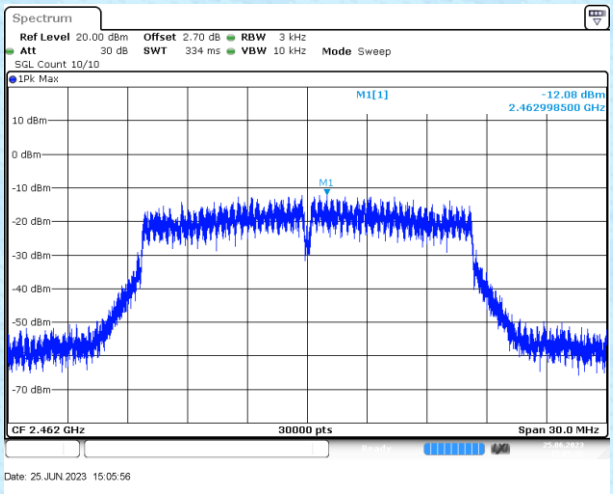
Lowest channel





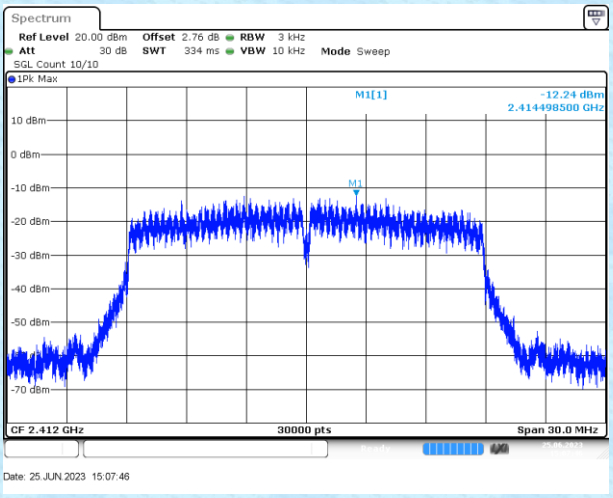
Middle channel



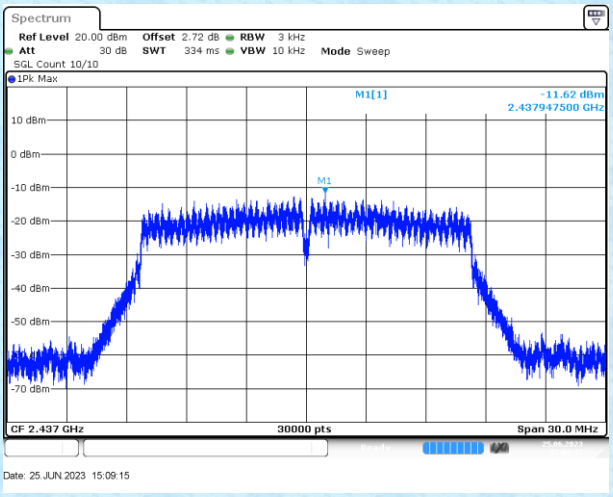


Highest channel

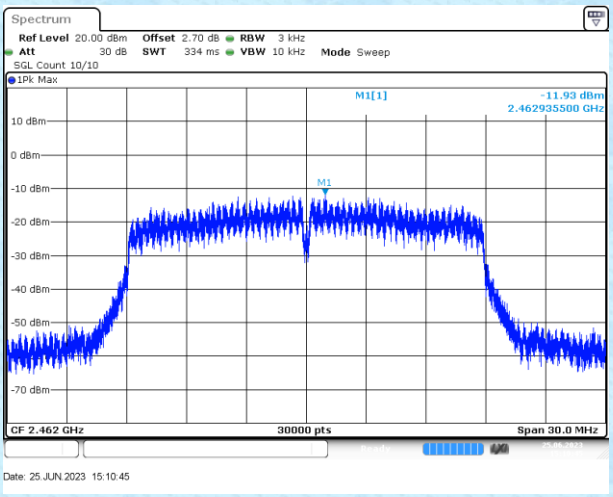
802.11n(HT20)



Lowest channel



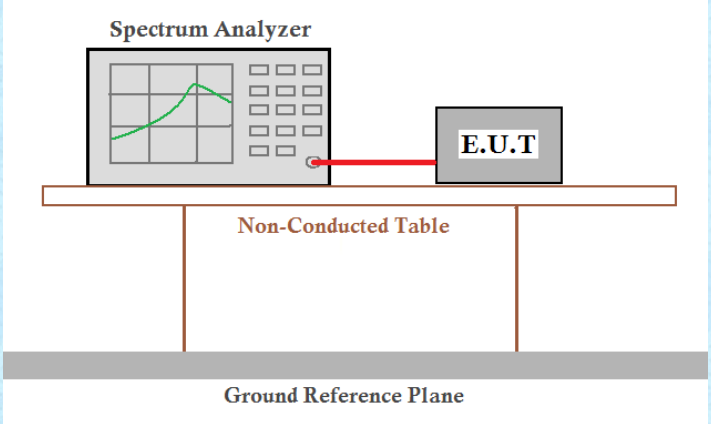
Middle channel



Highest channel

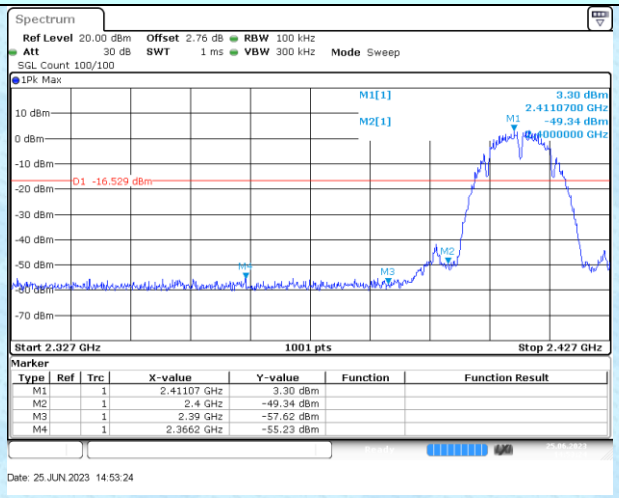
7.6 Band edges

7.6.1 Conducted Emission Method

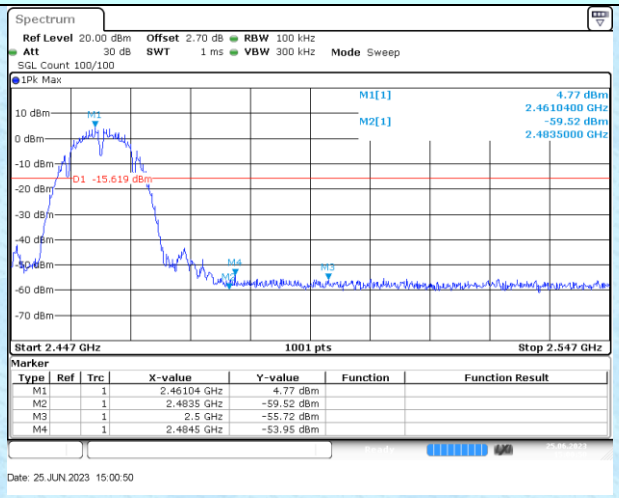
Test Requirement:	FCC Part15 C Section 15.247 (d)
Test Method:	KDB558074 D01 15.247 Meas Guidance v05r02
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.
Test setup:	
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Test plot as follows:

Test mode:	802.11b

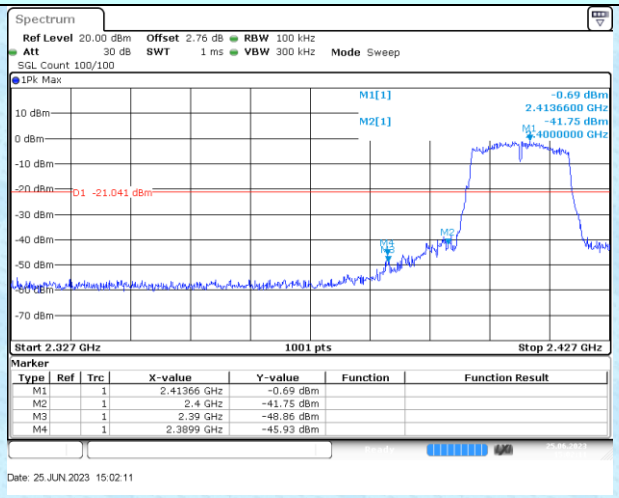


Lowest channel

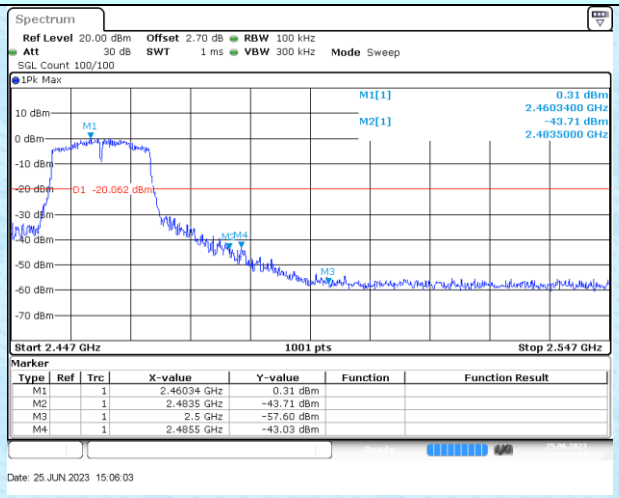


Highest channel

Test mode:	802.11g

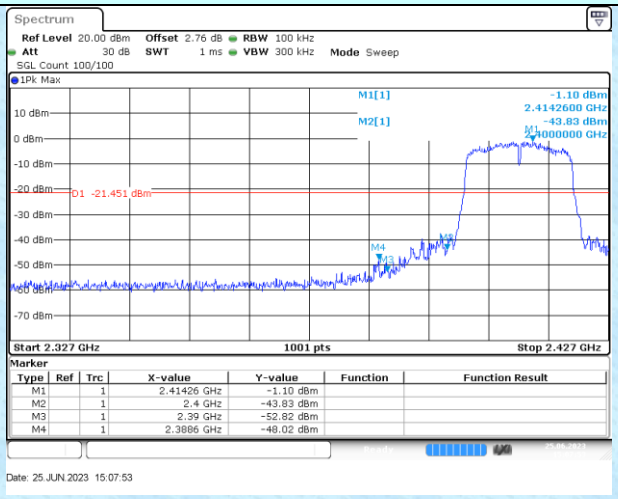


Lowest channel

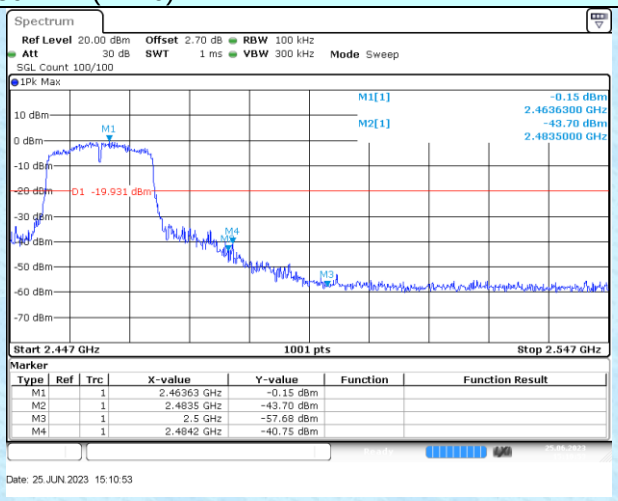


Highest channel

Test mode:	802.11n(HT20)



Lowest channel



Highest channel

7.6.2 Radiated Emission Method

Test Requirement:	FCC Part15 C Section 15.209 and 15.205
Test Method:	ANSI C63.10: 2013
Test Frequency Range:	All of the restrict bands were tested, only the worst band's (2310MHz to 2500MHz) data was showed.
Test site:	Measurement Distance: 3m

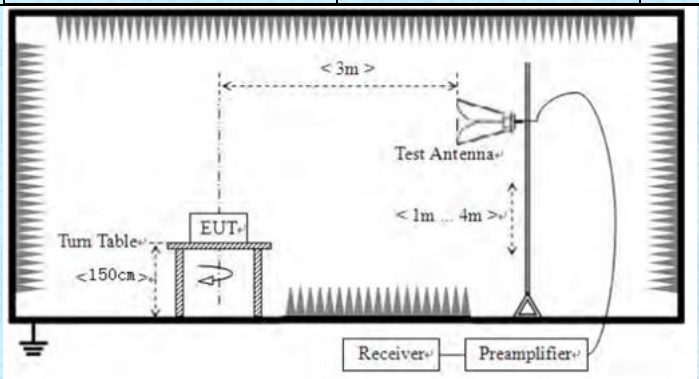
Receiver setup:

Frequency	Detector	RBW	VBW	Value
Above 1GHz	Peak	1MHz	3MHz	Peak
	Average	1MHz	3MHz	Average

Limit:

Frequency	Limit (dBuV/m @3m)	Value
Above 1GHz	54.00	Average
	74.00	Peak

Test setup:



Test Procedure:

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. The radiation measurements are performed in X, Y, Z axis positioning. And found the Y axis positioning which it is worse case, only the test worst case mode is recorded in the report.

Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement data:

Test mode:	802.11b	Test channel:	Lowest

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2310	55.48	27.14	6.19	42.04	46.77	74	-27.23	Horizontal
2390	61.73	27.37	6.31	42.11	53.3	74	-20.7	Horizontal
2310	46.58	27.14	6.19	42.04	37.87	74	-36.13	Vertical
2390	47.85	27.37	6.31	42.11	39.42	74	-34.58	Vertical

Test mode:	802.11b	Test channel:	Highest

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.5	57.86	27.66	6.45	42.01	49.96	74	-24.04	Horizontal
2500	46.48	27.7	6.47	42	38.65	74	-35.35	Horizontal
2483.5	46.05	27.66	6.45	42.01	38.15	74	-35.85	Vertical
2500	46.75	27.7	6.47	42	38.92	74	-35.08	Vertical

Test mode:	802.11g	Test channel:	Lowest

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2310	56.74	27.14	6.19	42.04	48.03	74	-25.97	Horizontal
2390	62.22	27.37	6.31	42.11	53.79	74	-20.21	Horizontal
2310	50.57	27.14	6.19	42.04	41.86	74	-32.14	Vertical
2390	52.06	27.37	6.31	42.11	43.63	74	-30.37	Vertical

Test mode:	802.11g	Test channel:	Highest

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.5	60.75	27.66	6.45	42.01	52.85	74	-21.15	Horizontal
2500	50.55	27.7	6.47	42	42.72	74	-31.28	Horizontal
2483.5	49.78	27.66	6.45	42.01	41.88	74	-32.12	Vertical
2500	47.05	27.7	6.47	42	39.22	74	-34.78	Vertical

Test mode:	802.11n(HT20)	Test channel:	Lowest

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2310	57.44	27.14	6.19	42.04	48.73	74	-25.27	Horizontal
2390	62.41	27.37	6.31	42.11	53.98	74	-20.02	Horizontal
2310	53.73	27.14	6.19	42.04	45.02	74	-28.98	Vertical
2390	52.73	27.37	6.31	42.11	44.3	74	-29.7	Vertical

Test mode:	802.11n(HT20)	Test channel:	Highest

Peak value:

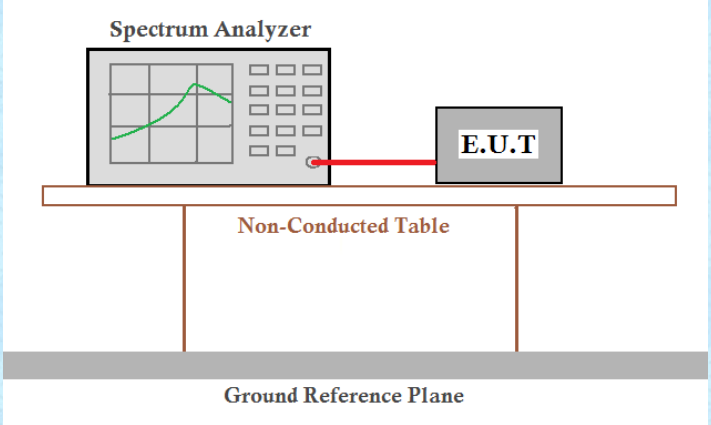
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.5	60.9	27.66	6.45	42.01	53	74	-21	Horizontal
2500	54.44	27.7	6.47	42	46.61	74	-27.39	Horizontal
2483.5	51.66	27.66	6.45	42.01	43.76	74	-30.24	Vertical
2500	50.2	27.7	6.47	42	42.37	74	-31.63	Vertical

Remarks:

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

7.7 Spurious Emission

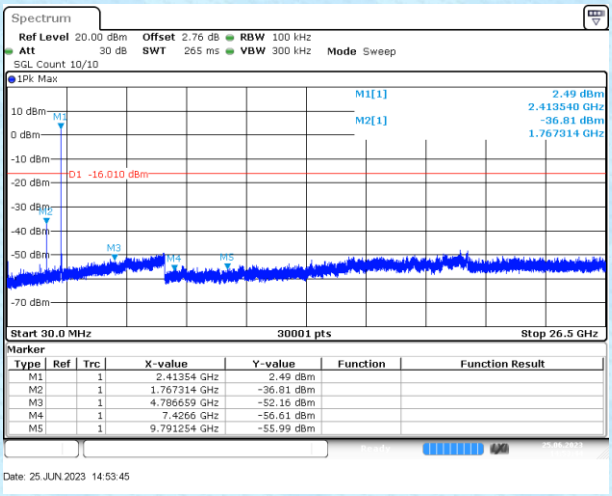
7.7.1 Conducted Emission Method

Test Requirement:	FCC Part15 C Section 15.247 (d)
Test Method:	KDB558074 D01 15.247 Meas Guidance v05r02
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 30 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.
Test setup:	
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Test plot as follows:

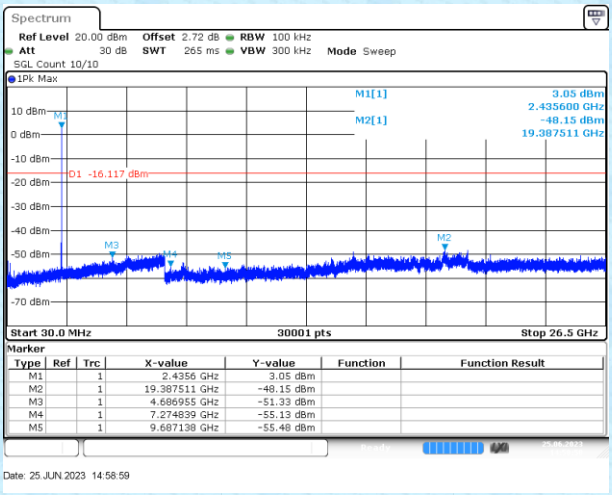
802.11b

Lowest channel



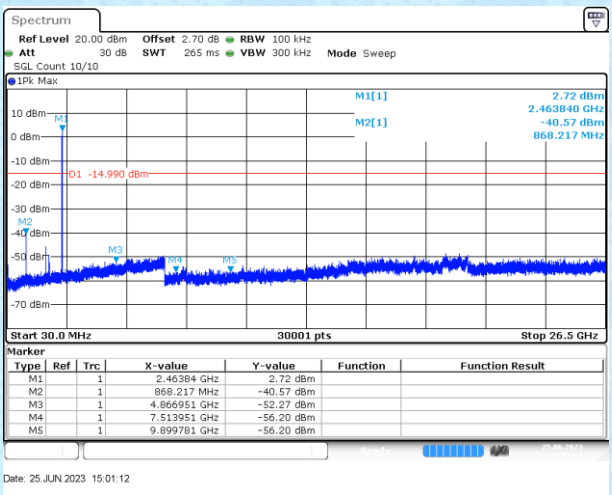
30MHz~25GHz

Middle channel



30MHz~25GHz

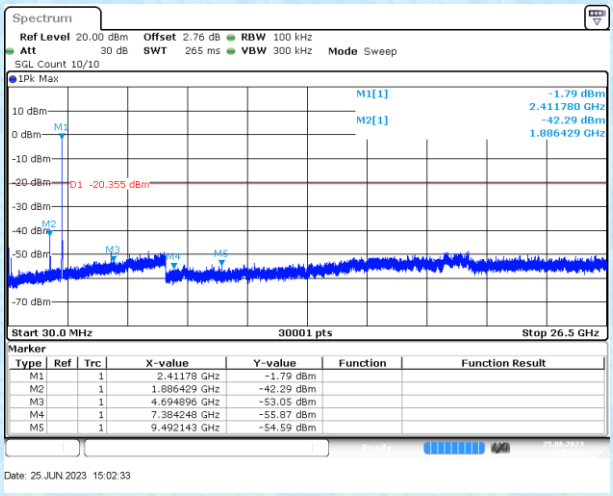
Highest channel



30MHz~25GHz

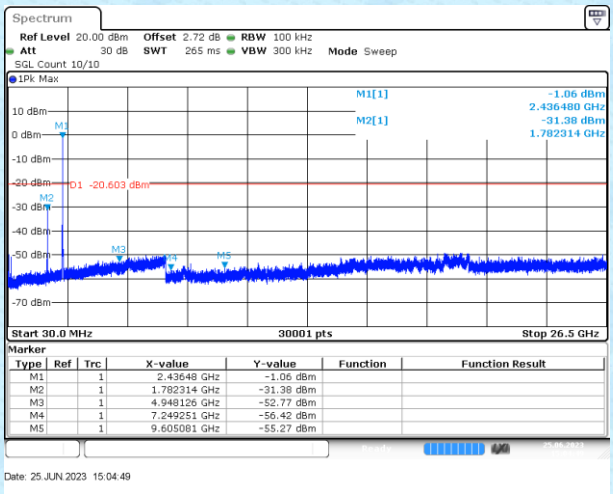
802.11g

Lowest channel



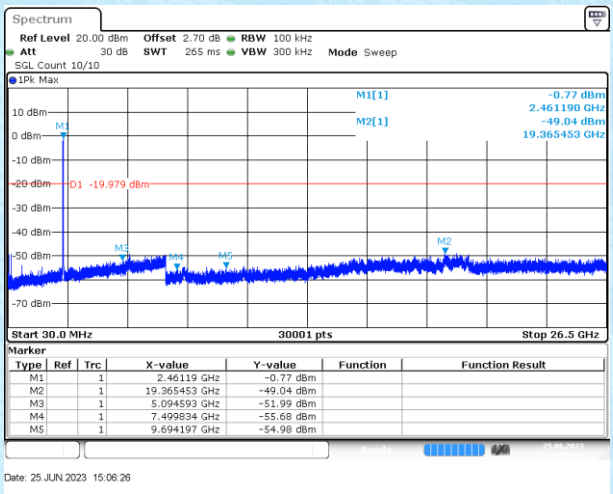
30MHz~25GHz

Middle channel



30MHz~25GHz

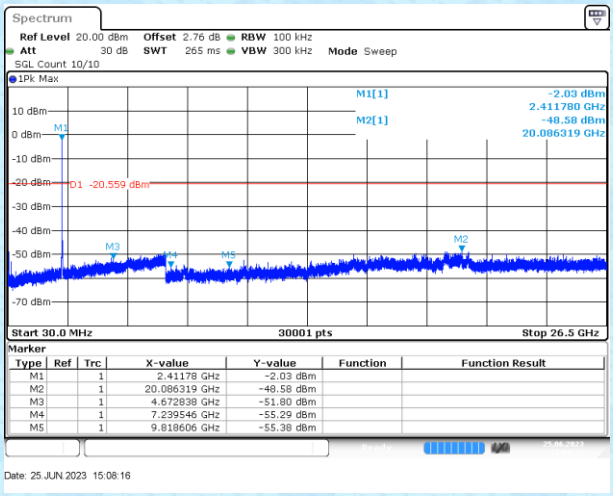
Highest channel



30MHz~25GHz

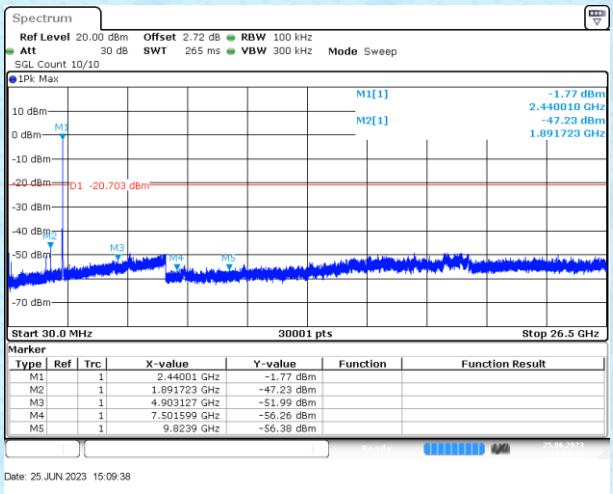
802.11n(HT20)

Lowest channel



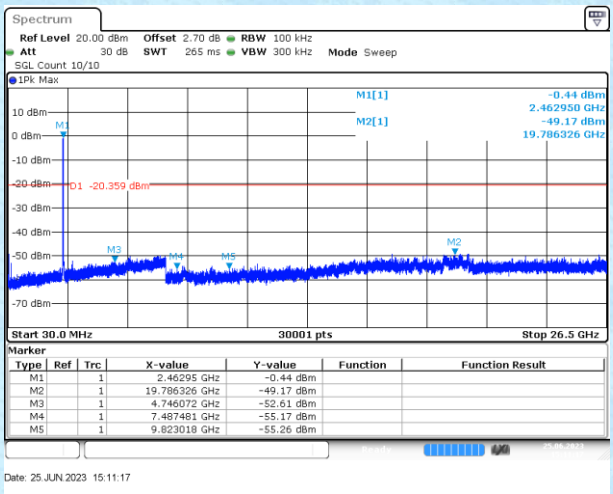
30MHz~25GHz

Middle channel



30MHz~25GHz

Highest channel



30MHz~25GHz

7.7.2 Radiated Emission Method

Test Requirement:	FCC Part15 C Section 15.209
Test Method:	ANSI C63.10: 2013
Test Frequency Range:	9kHz to 25GHz
Test site:	Measurement Distance: 3m

Receiver setup:

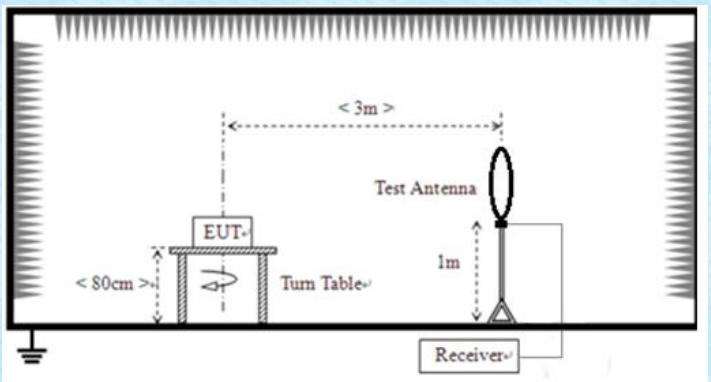
Frequency	Detector	RBW	VBW	Value
9KHz-150KHz	Quasi-peak	200Hz	600Hz	Quasi-peak
150KHz-30MHz	Quasi-peak	9KHz	30KHz	Quasi-peak
30MHz-1GHz	Quasi-peak	120KHz	300KHz	Quasi-peak
Above 1GHz	Peak	1MHz	3MHz	Peak
	Peak	1MHz	10Hz	Average

Limit:

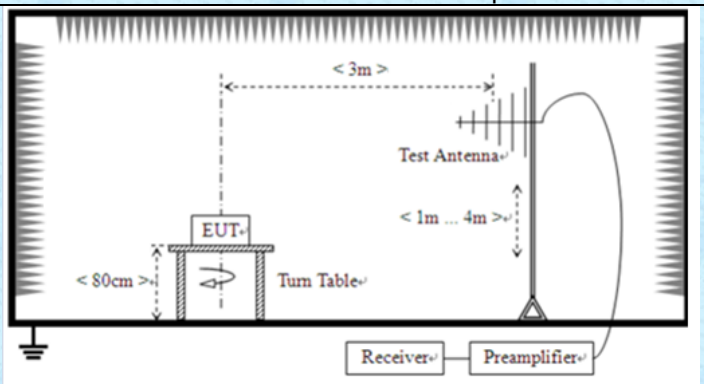
Frequency	Limit (uV/m)	Value	Measurement Distance
0.009MHz-0.490MHz	2400/F(KHz)	QP	300m
0.490MHz-1.705MHz	24000/F(KHz)	QP	300m
1.705MHz-30MHz	30	QP	30m
30MHz-88MHz	100	QP	3m
88MHz-216MHz	150	QP	
216MHz-960MHz	200	QP	
960MHz-1GHz	500	QP	
Above 1GHz	500	Average	
	5000	Peak	

Test setup:

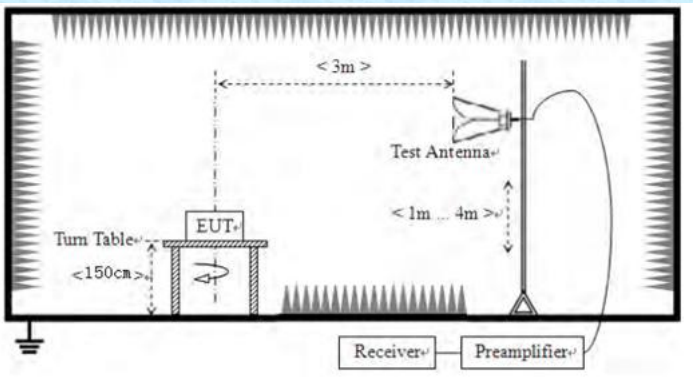
For radiated emissions from 9kHz to 30MHz



For radiated emissions from 30MHz to1GHz



For radiated emissions above 1GHz



Test Procedure:	1. The EUT was placed on the top of a rotating table (0.8m for below 1G and 1.5m for above 1G) 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.
Test Instruments:	Refer to section 6.0 for details

Test mode:	Refer to section 5.2 for details					
Test environment:	Temp.:	25 °C	Humid.:	52%	Press.:	1012mbar
Test voltage:	AC 120V, 60Hz					
Test results:	Pass					

Remarks:

1. Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the Y-axis which it is worse case.

Measurement data:

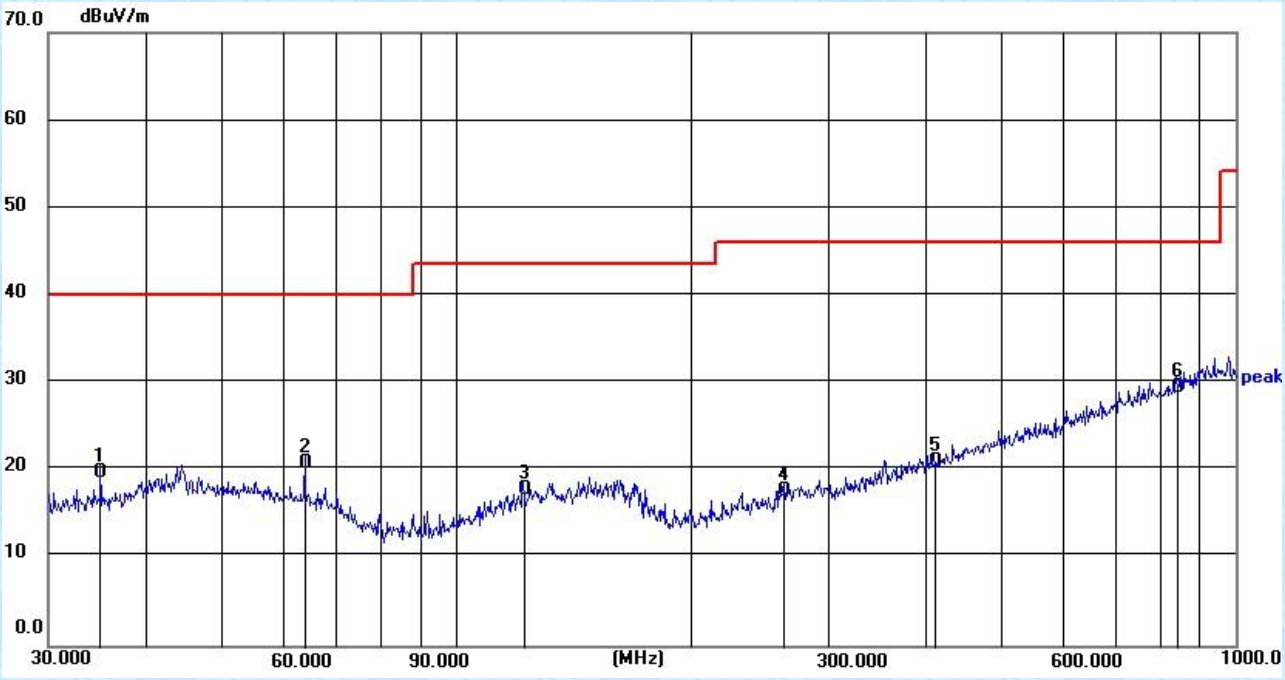
■ **9kHz~30MHz**

The emission from 9 kHz to 30MHz was pre-tested and found the result was 20dB lower than the limit, and according to 15.31(o), the test result no need to reported.

■ **Below 1GHz**

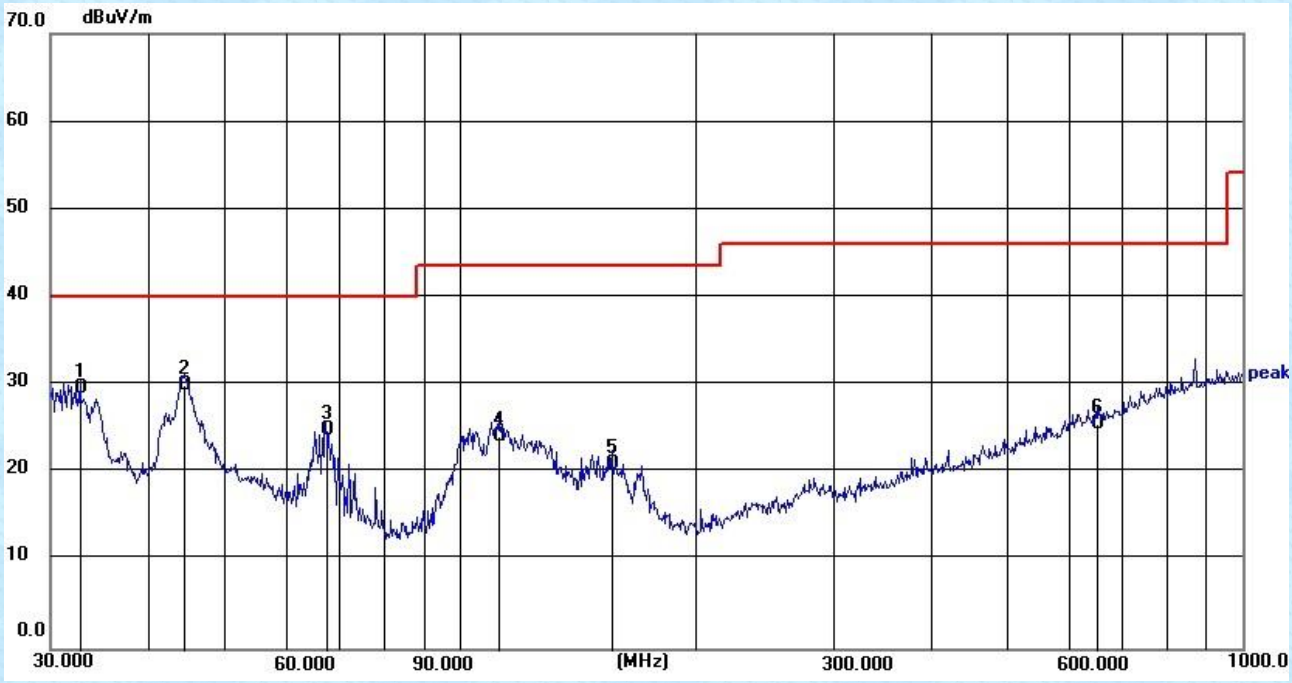
Pre-scan all test modes, found worst case at 802.11b 2462MHz, and so only show the test result of 802.11b 2462MHz

Horizontal:



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	35.0048	6.31	13.61	19.92	40.00	20.08	QP
2	63.9828	7.62	13.27	20.89	40.00	19.11	QP
3	121.9755	4.32	13.60	17.92	43.50	25.58	QP
4	262.8955	4.05	13.68	17.73	46.00	28.27	QP
5	410.3825	2.99	18.04	21.03	46.00	24.97	QP
6	839.1818	4.27	25.27	29.54	46.00	16.46	QP

Vertical:



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	32.7486	16.70	12.97	29.67	40.00	10.33	QP
2	44.4308	15.61	14.53	30.14	40.00	9.86	QP
3	67.4382	12.72	12.30	25.02	40.00	14.98	QP
4	112.1305	11.84	12.39	24.23	43.50	19.27	QP
5	156.4578	6.63	14.40	21.03	43.50	22.47	QP
6	651.9417	3.48	22.09	25.57	46.00	20.43	QP

■ **Above 1GHz**

Test mode:	802.11b	Test channel:	Lowest

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4824	35.13	31.79	8.62	32.1	43.44	74	-30.56	Vertical
7236	32.36	36.19	11.68	31.97	48.26	74	-25.74	Vertical
4824	38.22	31.79	8.62	32.1	46.53	74	-27.47	Horizontal
7236	33.53	36.19	11.68	31.97	49.43	74	-24.57	Horizontal

Test mode:	802.11b	Test channel:	Middle

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4874	36.09	31.85	8.66	32.12	44.48	74	-29.52	Vertical
7311	34.5	36.37	11.71	31.91	50.67	74	-23.33	Vertical
4874	37.03	31.85	8.66	32.12	45.42	74	-28.58	Horizontal
7311	33.92	36.37	11.71	31.91	50.09	74	-23.91	Horizontal

Test mode:	802.11b	Test channel:	Highest

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4924	36.84	31.9	8.7	32.15	45.29	74	-28.71	Vertical
7386	34.26	36.49	11.76	31.83	50.68	74	-23.32	Vertical
4924	38.5	31.9	8.7	32.15	46.95	74	-27.05	Horizontal
7386	34.67	36.49	11.76	31.83	51.09	74	-22.91	Horizontal

Test mode:	802.11g	Test channel:	lowest

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4824	34.27	31.79	8.62	32.1	42.58	74	-31.42	Vertical
7236	32.14	36.19	11.68	31.97	48.04	74	-25.96	Vertical
4824	37.96	31.79	8.62	32.1	46.27	74	-27.73	Horizontal
7236	32.66	36.19	11.68	31.97	48.56	74	-25.44	Horizontal

Test mode:	802.11g	Test channel:	Middle

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4874	36.03	31.85	8.66	32.12	44.42	74	-29.58	Vertical
7311	33.75	36.37	11.71	31.91	49.92	74	-24.08	Vertical
4874	36.77	31.85	8.66	32.12	45.16	74	-28.84	Horizontal
7311	33.8	36.37	11.71	31.91	49.97	74	-24.03	Horizontal

Test mode:	802.11g	Test channel:	Highest

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4924	35.98	31.9	8.7	32.15	44.43	74	-29.57	Vertical
7386	33.77	36.49	11.76	31.83	50.19	74	-23.81	Vertical
4924	37.59	31.9	8.7	32.15	46.04	74	-27.96	Horizontal
7386	34.63	36.49	11.76	31.83	51.05	74	-22.95	Horizontal

Test mode:	802.11n(HT20)	Test channel:	Lowest

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4824	35.26	31.79	8.62	32.1	43.57	74	-30.43	Vertical
7236	32.27	36.19	11.68	31.97	48.17	74	-25.83	Vertical
4824	38.03	31.79	8.62	32.1	46.34	74	-27.66	Horizontal
7236	33.29	36.19	11.68	31.97	49.19	74	-24.81	Horizontal

Test mode:	802.11n(HT20)	Test channel:	Middle

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4874	36.28	31.85	8.66	32.12	44.67	74	-29.33	Vertical
7311	34.12	36.37	11.71	31.91	50.29	74	-23.71	Vertical
4874	36.96	31.85	8.66	32.12	45.35	74	-28.65	Horizontal
7311	33.93	36.37	11.71	31.91	50.1	74	-23.9	Horizontal

Test mode:	802.11n(HT20)	Test channel:	Highest

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4924	36.88	31.9	8.7	32.15	45.33	74	-28.67	Vertical
7386	34.24	36.49	11.76	31.83	50.66	74	-23.34	Vertical
4924	38.31	31.9	8.7	32.15	46.76	74	-27.24	Horizontal
7386	35.29	36.49	11.76	31.83	51.71	74	-22.29	Horizontal

Remark:

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

2 "", means this data is the too weak instrument of signal is unable to test.*

8 Test Setup Photo

Reference to the **appendix I** for details.

9 EUT Constructional Details

Reference to the **appendix II** for details.

------End------