TEST Report

Applicant:	YEAHER INC.
Address of Applicant:	51 Steel Dr,Unit A, New Castle,Delaware,19720
Manufacturer :	Nimo Direct Inc.
Address of Manufacturer :	51 Steel Dr,Unit A, New Castle,Delaware,19720
Equipment Under Test (EUT)	
Product Name:	Portable Computer
Model No.:	N153S
Series model:	N153B, N153G
Trade Mark:	N/A
FCC ID:	2BEMH-N153S
Applicable standards:	FCC CFR Title 47 Part 15 Subpart C Section 15.247
Date of sample receipt:	Oct. 18, 2024
Date of Test:	Oct. 18, 2024 ~ Oct. 26, 2024
Date of report issued:	Oct. 26, 2024
Test Result :	PASS *

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

1. Version

Version No.	Date	Description
00	*Oct. 26, 2024*	*Original*

Tested/ Prepared By	Heber He ***Project Engineer***	***Date:***	***Oct. 26, 2024***
Check By:	Bruce Zhu ***Reviewer***	***Date:***	***Oct. 26, 2024***
Approved By :	Kevin Yang ***Authorized Signature***	***Date:***	***Oct. 26, 2024***

SHENZHEN HTT TECHNOLOGY CO.,LTD
HTT

2. Contents

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3. Test Summary

Test Item	Section in CFR 47	Result
Antenna requirement	15.203/15.247 (c)	Pass
AC Power Line Conducted Emission	15.207	Pass
Conducted Output Power	15.247 (b)(3)	Pass
Channel Bandwidth	15.247 (a)(2)	Pass
Power Spectral Density	15.247 (e)	Pass
Band Edge	15.247(d)	Pass
Spurious Emission	15.205/15.209	Pass

Remarks:

1. *Pass: The EUT complies with the essential requirements in the standard.*
2. *Test according to ANSI C63.10:2013*

Measurement Uncertainty

Test Item	Frequency Range	Measurement Uncertainty	Notes
Radiated Emission	30~1000MHz	4.37 dB	(1)
Radiated Emission	1~18GHz	5.40 dB	(1)
Radiated Emission	18-40GHz	5.45 dB	(1)
Conducted Disturbance	0.15~30MHz	2.68 dB	(1)
Note (1): The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%.			

4. General Information

4.1. General Description of EUT

Product Name:	Portable Computer
Model No.:	N153S
Series model:	N153B, N153G
Test sample(s) ID:	HTT202410082-1(Engineer sample) HTT202410082-2(Normal sample)
Operation frequency	2402~2480 MHz
Number of Channels	40
Modulation Type	GFSK
Channel separation	2MHz
Antenna Type:	FPC Antenna
Antenna Gain:	4.27 dBi
Power Supply:	DC 11.4V From Battery and DC 20.0V From External Circuit
Adapter Information:	Model: A879-200500C-US1 Input: 100-240V~50/60Hz,2.5A Output: PD 5V3A/9V3A/12V3A/15V3A/20V5A PPS 3.3-21V5A 100W Max

Channel	Frequency(MHz)	Channel	Frequency(MHz)
0	**2402**	20	2442
1	2404	21	2444
2	2406	22	2446
3	2408	23	2448
4	2410	24	2450
5	2412	25	2452
6	2414	26	2454
7	2416	27	2456
8	2418	28	2458
9	2420	29	2460
10	2422	30	2462
11	2424	31	2464
12	2426	32	2466
13	2428	33	2468
14	2430	34	2470
15	2432	35	2472
16	2434	36	2474
17	2436	37	2476
18	2438	38	2478
19	**2440**	**39**	**2480**

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:

Channel	Frequency
The lowest channel	2402MHz
The middle channel	2440MHz
The Highest channel	2480MHz

4.2. Test mode

Transmitting mode	Keep the EUT in continuously transmitting mode.
Remark: During the test, 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.	

4.3. Description of Support Units

None.

4.4. Deviation from Standards

None.

4.5. Abnormalities from Standard Conditions

None.

4.6. Test Facility

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

FCC-Registration No.: 779513 Designation Number: CN1319
Shenzhen HTT Technology Co.,Ltd. has been accredited on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements.

A2LA-Lab Cert. No.: 6435.01
Shenzhen HTT Technology Co.,Ltd. has been listed by American Association for Laboratory Accreditation to perform electromagnetic emission measurement.

The 3m-Semi anechoic test site fulfils CISPR 16-1-4 according to ANSI C63.10 and CISPR 16-1-4:2010.

4.7. Test Location

All tests were performed at:

Shenzhen HTT Technology Co.,Ltd.
1F, Building B, Huafeng International Robotics Industrial Park, Hangcheng Road,Nanchang Community, Xixiang Street, Bao'an District, Shenzhen, Guangdong, China
Tel: 0755-23595200
Fax: 0755-23595201

4.8. Additional Instructions

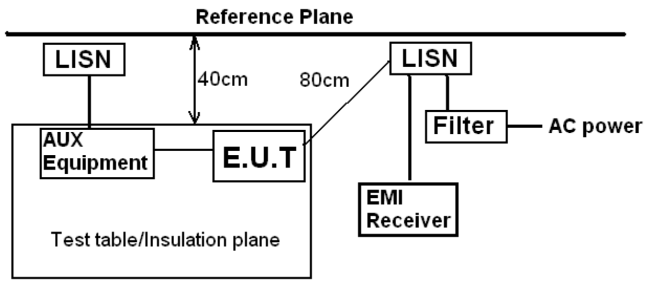
Test Software	Special AT test command provided by manufacturer to Keep the EUT in continuously transmitting mode and hopping mode
Power level setup	Default

5. Test Instruments list

Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	3m Semi- Anechoic Chamber	Shenzhen C.R.T technology co., LTD	9*6*6	HTT-E028	Aug. 10 2024	Aug. 09 2027
2	Control Room	Shenzhen C.R.T technology co., LTD	4.8*3.5*3.0	HTT-E030	Aug. 10 2024	Aug. 09 2027
3	EMI Test Receiver	Rohde&Schwar	ESCI7	HTT-E022	Apr. 26 2024	Apr. 25 2025
4	Spectrum Analyzer	Rohde&Schwar	FSP	HTT-E037	Apr. 26 2024	Apr. 25 2025
5	Coaxial Cable	ZDecl	ZT26-NJ-NJ-0.6M	HTT-E018	Apr. 26 2024	Apr. 25 2025
6	Coaxial Cable	ZDecl	ZT26-NJ-SMAJ-2M	HTT-E019	Apr. 26 2024	Apr. 25 2025
7	Coaxial Cable	ZDecl	ZT26-NJ-SMAJ-0.6M	HTT-E020	Apr. 26 2024	Apr. 25 2025
8	Coaxial Cable	ZDecl	ZT26-NJ-SMAJ-8.5M	HTT-E021	Apr. 26 2024	Apr. 25 2025
9	Composite logarithmic antenna	Schwarzbeck	VULB 9168	HTT-E017	May. 21 2024	May. 20 2025
10	Horn Antenna	Schwarzbeck	BBHA9120D	HTT-E016	May. 20 2024	May. 19 2025
11	Loop Antenna	Zhinan	ZN30900C	HTT-E039	Apr. 26 2024	Apr. 25 2025
12	Horn Antenna	Beijing Hangwei Dayang	OBH100400	HTT-E040	Apr. 26 2024	Apr. 25 2025
13	low frequency Amplifier	Sonoma Instrument	310	HTT-E015	Apr. 26 2024	Apr. 25 2025
14	high-frequency Amplifier	HP	8449B	HTT-E014	Apr. 26 2024	Apr. 25 2025
15	Variable frequency power supply	Shenzhen Anbiao Instrument Co., Ltd	ANB-10VA	HTT-082	Apr. 26 2024	Apr. 25 2025
16	EMI Test Receiver	Rohde & Schwarz	ESCS30	HTT-E004	Apr. 26 2024	Apr. 25 2025
17	Artificial Mains	Rohde & Schwarz	ESH3-Z5	HTT-E006	May. 23 2024	May. 22 2025
18	Artificial Mains	Rohde & Schwarz	ENV-216	HTT-E038	May. 23 2024	May. 22 2025
19	Cable Line	Robinson	Z302S-NJ-BNCJ-1.5M	HTT-E001	Apr. 26 2024	Apr. 25 2025
20	Attenuator	Robinson	6810.17A	HTT-E007	Apr. 26 2024	Apr. 25 2025
21	Variable frequency power supply	Shenzhen Yanghong Electric Co., Ltd	YF-650（5KVA）	HTT-E032	Apr. 26 2024	Apr. 25 2025
22	Control Room	Shenzhen C.R.T technology co., LTD	8*4*3.5	HTT-E029	Aug. 10 2024	Aug. 09 2027
23	DC power supply	Agilent	E3632A	HTT-E023	Apr. 26 2024	Apr. 25 2025
24	EMI Test Receiver	Agilent	N9020A	HTT-E024	Apr. 26 2024	Apr. 25 2025
25	Analog signal generator	Agilent	N5181A	HTT-E025	Apr. 26 2024	Apr. 25 2025
26	Vector signal generator	Agilent	N5182A	HTT-E026	Apr. 26 2024	Apr. 25 2025
27	Power sensor	Keysight	U2021XA	HTT-E027	Apr. 26 2024	Apr. 25 2025
28	Temperature and humidity meter	Shenzhen Anbiao Instrument Co., Ltd	TH10R	HTT-074	Apr. 28 2024	Apr. 27 2025
29	Radiated Emission Test Software	Farad	EZ-EMC	N/A	N/A	N/A
30	Conducted Emission Test Software	Farad	EZ-EMC	N/A	N/A	N/A
31	RF Test Software	panshanrf	TST	N/A	N/A	N/A

6. Test results and Measurement Data

6.1. Conducted Emissions

<table>
<tr><td>Test Requirement:</td><td colspan="6">FCC Part15 C Section 15.207</td></tr>
<tr><td>Test Method:</td><td colspan="6">ANSI C63.10:2013</td></tr>
<tr><td>Test Frequency Range:</td><td colspan="6">150KHz to 30MHz</td></tr>
<tr><td>Class / Severity:</td><td colspan="6">Class B</td></tr>
<tr><td>Receiver setup:</td><td colspan="6">RBW=9KHz, VBW=30KHz, Sweep time=auto</td></tr>
<tr><td>Limit:</td><td colspan="6">
<table>
<tr><td rowspan="2">Frequency range (MHz)</td><td colspan="2">Limit (dBuV)</td></tr>
<tr><td>Quasi-peak</td><td>Average</td></tr>
<tr><td>0.15-0.5</td><td>66 to 56*</td><td>56 to 46*</td></tr>
<tr><td>0.5-5</td><td>56</td><td>46</td></tr>
<tr><td>5-30</td><td>60</td><td>50</td></tr>
</table>
* Decreases with the logarithm of the frequency.</td></tr>
<tr><td>Test setup:</td><td colspan="6">

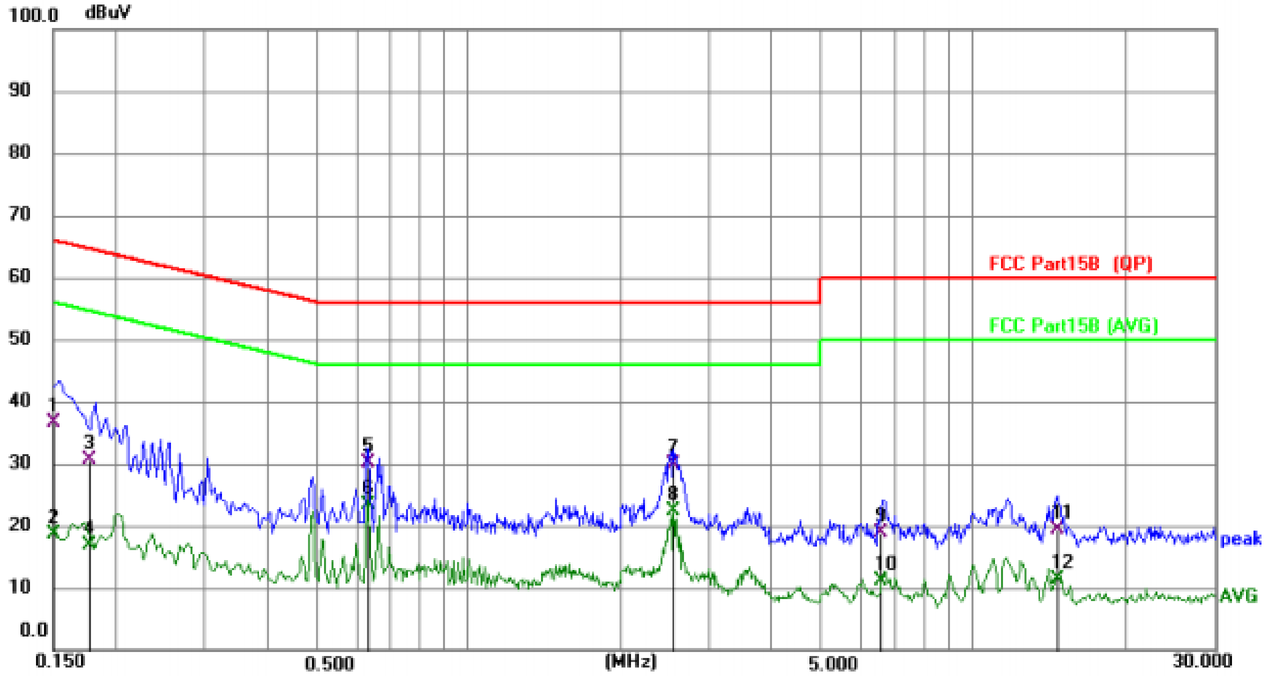
Remark
E.U.T: Equipment Under Test
LISN: Line Impedence Stabilization Network
Test table height=0.8m</td></tr>
<tr><td>Test procedure:</td><td colspan="6">1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH 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.</td></tr>
<tr><td>Test Instruments:</td><td colspan="6">Refer to section 6.0 for details</td></tr>
<tr><td>Test mode:</td><td colspan="6">Refer to section 5.2 for details</td></tr>
<tr><td>Test environment:</td><td>Temp.:</td><td>25 °C</td><td>Humid.:</td><td>52%</td><td>Press.:</td><td>1012mbar</td></tr>
<tr><td>Test voltage:</td><td colspan="6">AC 120V, 60Hz</td></tr>
<tr><td>Test results:</td><td colspan="6">PASS</td></tr>
</table>

Remark: Both high and low voltages have been tested to show only the worst low voltage test data.

Report No.: HTT202410082F03

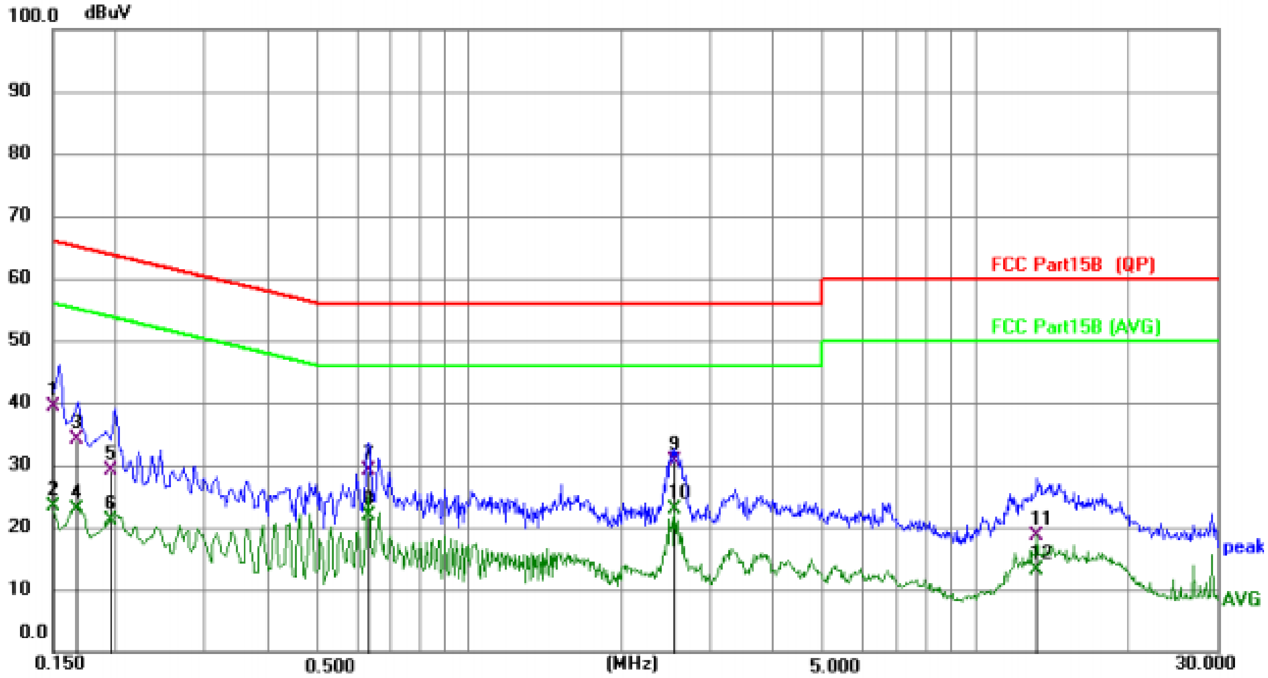
Measurement data:

Line:



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz		dB	dBuV	dBuV	dB	Detector
1		0.1513	26.40	10.16	36.56	65.93	-29.37	QP
2		0.1513	8.53	10.16	18.69	55.93	-37.24	AVG
3		0.1768	20.52	10.19	30.71	64.63	-33.92	QP
4		0.1768	6.81	10.19	17.00	54.63	-37.63	AVG
5		0.6316	19.82	10.32	30.14	56.00	-25.86	QP
6	*	0.6316	13.07	10.32	23.39	46.00	-22.61	AVG
7		2.5500	19.39	10.46	29.85	56.00	-26.15	QP
8		2.5500	11.87	10.46	22.33	46.00	-23.67	AVG
9		6.6209	8.27	10.62	18.89	60.00	-41.11	QP
10		6.6209	0.45	10.62	11.07	50.00	-38.93	AVG
11		14.6525	8.23	11.04	19.27	60.00	-40.73	QP
12		14.6525	0.32	11.04	11.36	50.00	-38.64	AVG

Neutral:

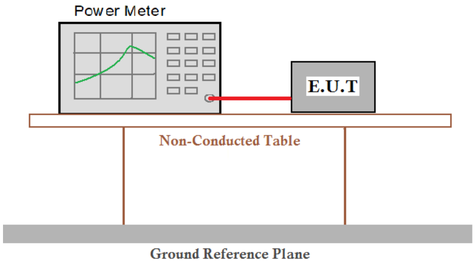


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz		dB	dBuV	dBuV	dB	Detector
1		0.1500	29.22	10.16	39.38	66.00	-26.62	QP
2		0.1500	13.10	10.16	23.26	56.00	-32.74	AVG
3		0.1672	23.98	10.18	34.16	65.10	-30.94	QP
4		0.1672	12.79	10.18	22.97	55.10	-32.13	AVG
5		0.1960	18.87	10.21	29.08	63.78	-34.70	QP
6		0.1960	10.90	10.21	21.11	53.78	-32.67	AVG
7		0.6332	18.81	10.35	29.16	56.00	-26.84	QP
8		0.6332	11.58	10.35	21.93	46.00	-24.07	AVG
9		2.5511	20.08	10.43	30.51	56.00	-25.49	QP
10	*	2.5511	12.37	10.43	22.80	46.00	-23.20	AVG
11		13.2374	7.46	11.06	18.52	60.00	-41.48	QP
12		13.2374	2.05	11.06	13.11	50.00	-36.89	AVG

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 Los

6.2. Conducted Output Power

Test Requirement:	FCC Part15 C Section 15.247 (b)(3)
Test Method:	ANSI C63.10:2013 and KDB558074 D01 DTS 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
Test environment:	Temp.: 25 °C / Humid.: 52% / Press.: 1012mbar

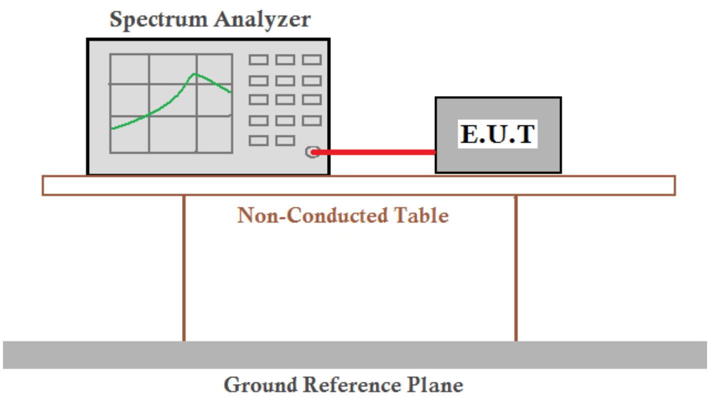
Measurement Data

Mode	TX Type	Frequency (MHz)	Maximum Peak Conducted Output Power (dBm)		Verdict
			ANT1	Limit	
1M	SISO	2402	3.81	<=30	Pass
		2440	3.45	<=30	Pass
		2480	2.89	<=30	Pass
2M	SISO	2402	3.71	<=30	Pass
		2440	3.38	<=30	Pass
		2480	3.11	<=30	Pass

Shenzhen HTT Technology Co.,Ltd. Tel: 0755-23595200 Fax: 0755-23595201
1F, Building B, Huafeng International Robotics Industrial Park, Hangcheng Road,Nanchang Community, Xixiang Street, Bao'an District, Shenzhen, Guangdong, China

Report No.: HTT202410082F03

6.3. Channel Bandwidth

Test Requirement:	FCC Part15 C Section 15.247 (a)(2)				
Test Method:	ANSI C63.10:2013 and KDB558074 D01 DTS 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				
Test environment:	Temp.: 25 °C	Humid.:	52%	Press.:	1012mbar

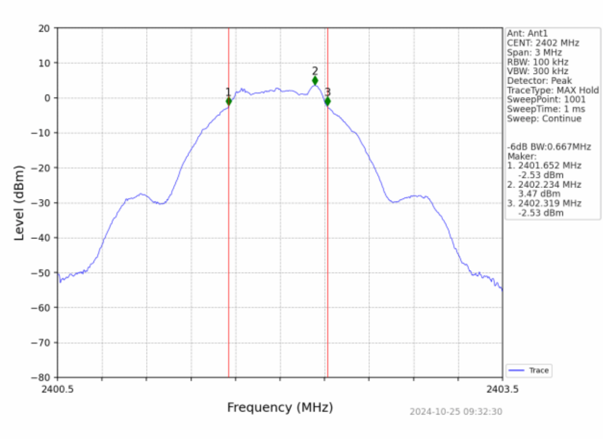
Measurement Data

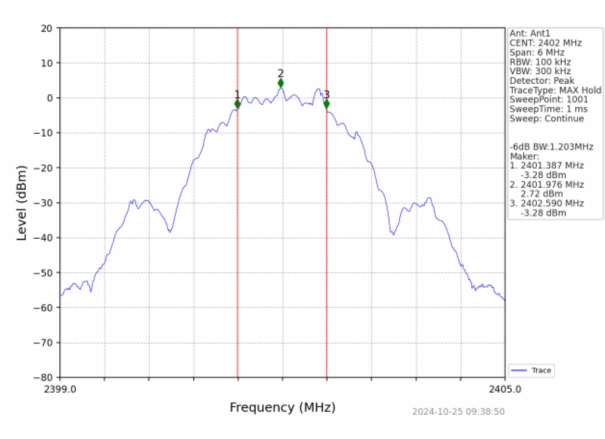
Mode	TX Type	Frequency (MHz)	ANT	6dB Bandwidth (MHz)		Verdict
				Result	Limit	
1M	SISO	2402	1	0.667	>=0.5	Pass
		2440	1	0.665	>=0.5	Pass
		2480	1	0.666	>=0.5	Pass
2M	SISO	2402	1	1.203	>=0.5	Pass
		2440	1	1.204	>=0.5	Pass
		2480	1	1.250	>=0.5	Pass

Test plot as follows:

1M

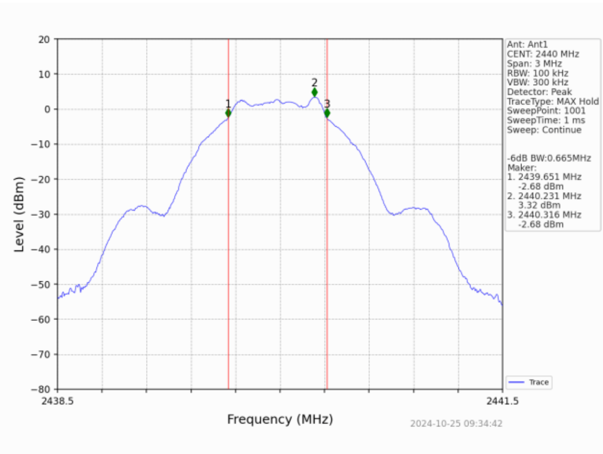
2M

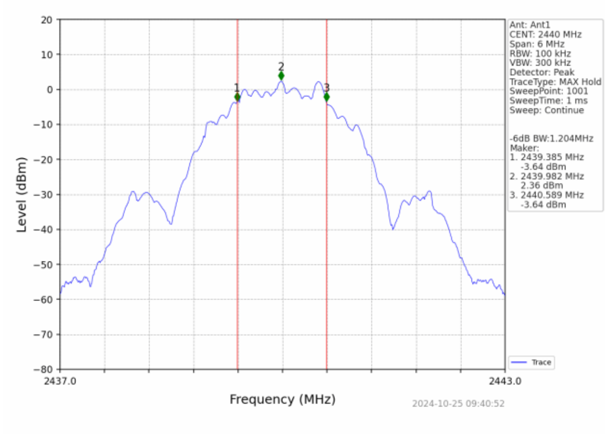




Lowest channel

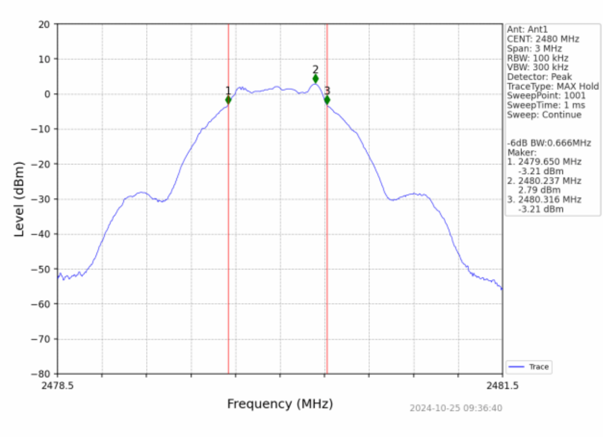
Lowest channel

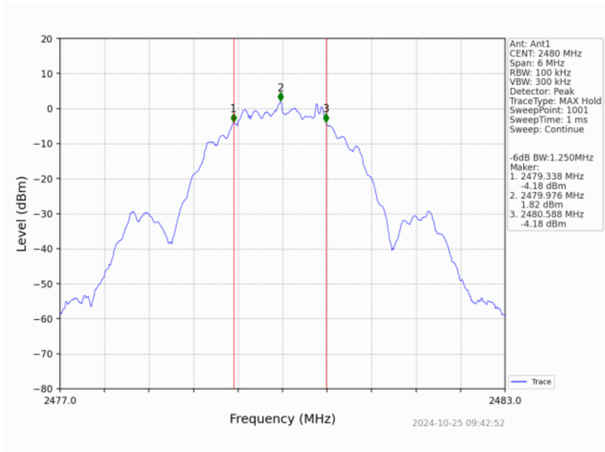




Middle channel

Middle channel

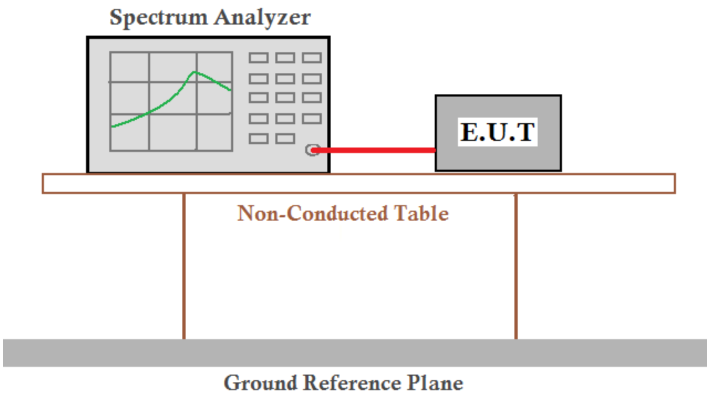




Highest channel

Highest channel

6.4. Power Spectral Density

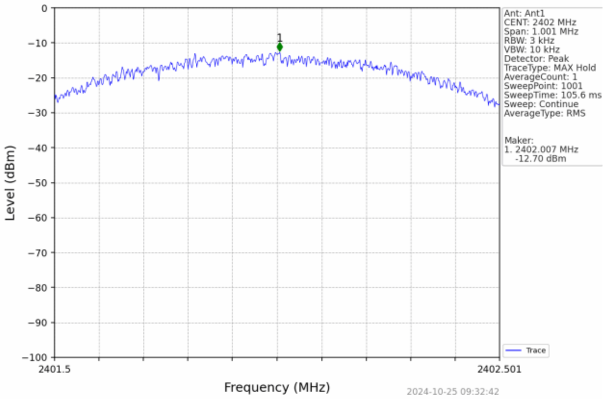
Test Requirement:	FCC Part15 C Section 15.247 (e)				
Test Method:	ANSI C63.10:2013 and KDB558074 D01 DTS Meas Guidance V05r02				
Limit:	8dBm/3kHz				
Test setup:					
Test Instruments:	Refer to section 6.0 for details				
Test mode:	Refer to section 5.2 for details				
Test results:	Pass				
Test environment:	Temp.:	25 °C	Humid.:	52%	Press.:	1012mbar

Measurement Data

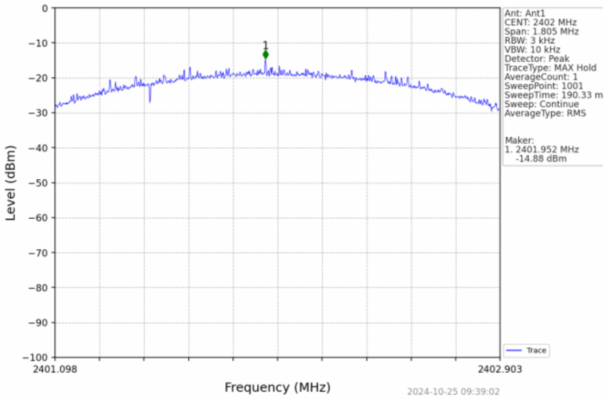
Mode	TX Type	Frequency (MHz)	Maximum PSD (dBm/3kHz)		Verdict
			ANT1	Limit	
1M	SISO	2402	-12.70	<=8	Pass
		2440	-12.69	<=8	Pass
		2480	-13.52	<=8	Pass
2M	SISO	2402	-14.88	<=8	Pass
		2440	-15.19	<=8	Pass
		2480	-16.58	<=8	Pass

Test plot as follows:

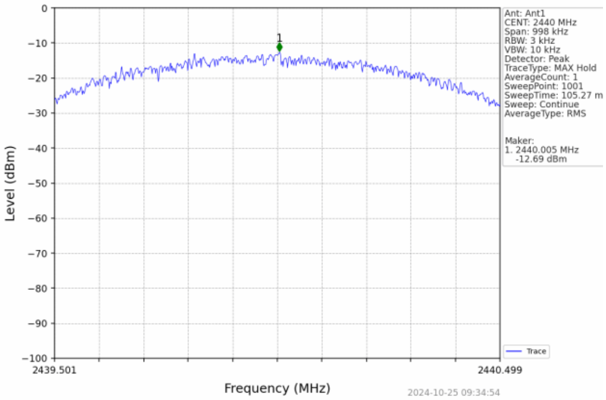
1M	2M



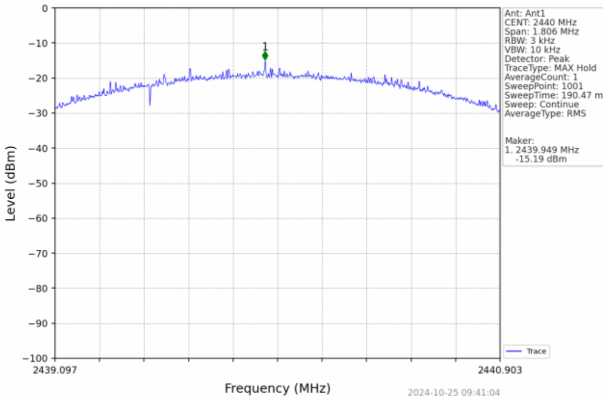
Lowest channel



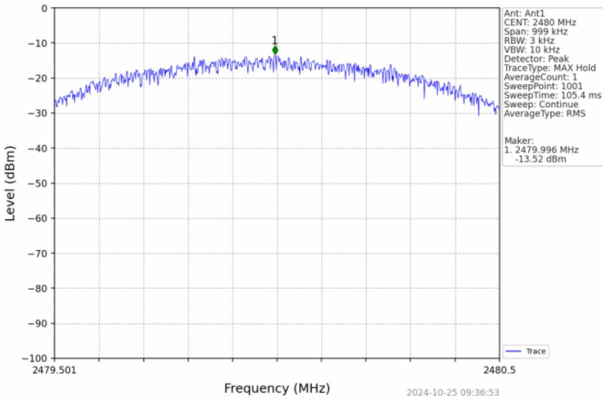
Lowest channel



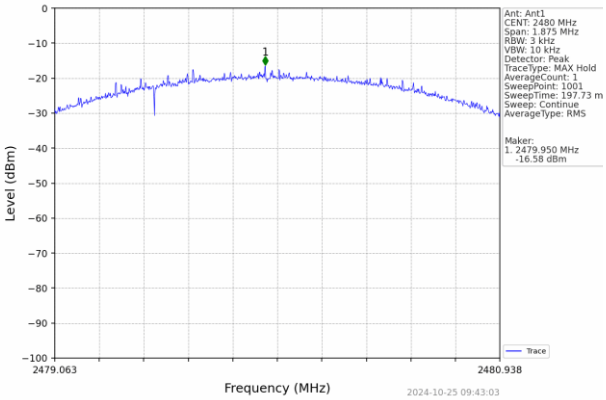
Middle channel



Middle channel



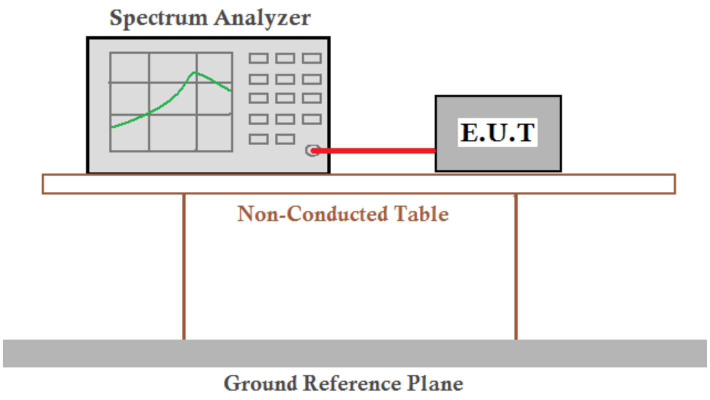
Highest channel



Highest channel

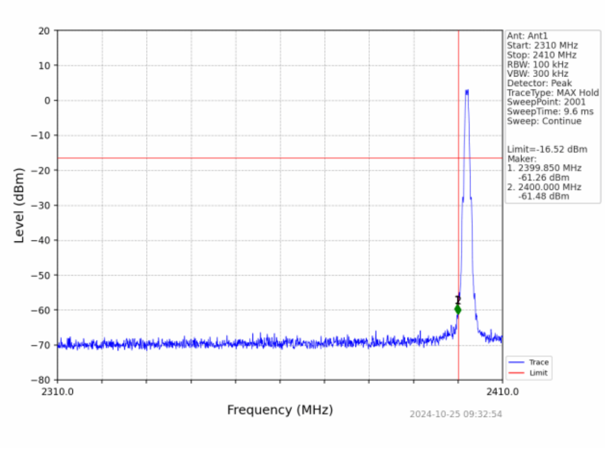
6.5. Band edges

6.5.1 Conducted Emission Method

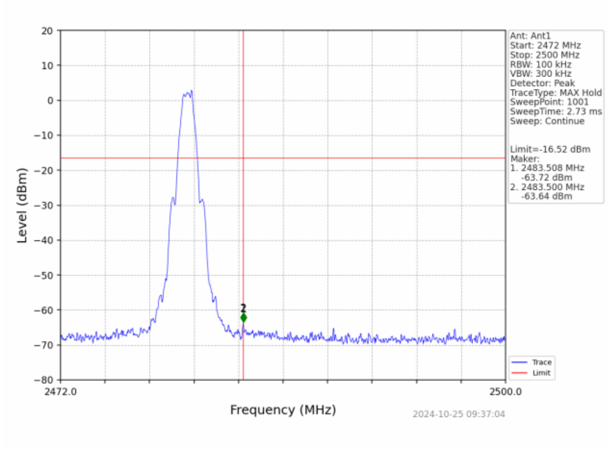
Test Requirement:	FCC Part15 C Section 15.247 (d)					
Test Method:	ANSI C63.10:2013 and KDB558074 D01 DTS Meas Guidance V05r02					
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by 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 environment:	Temp.:	25 °C	Humid.:	52%	Press.:	1012mbar

Test plot as follows:

1M

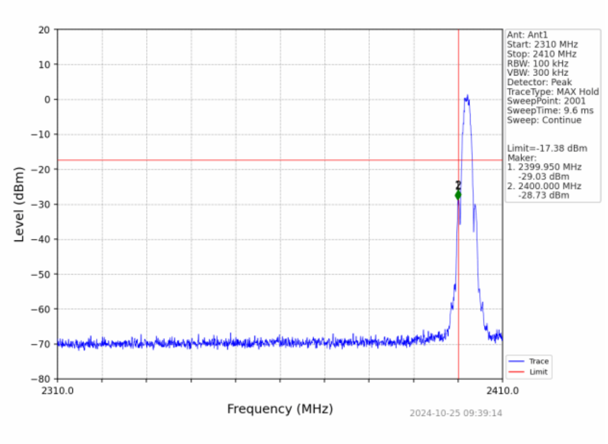


Lowest channel

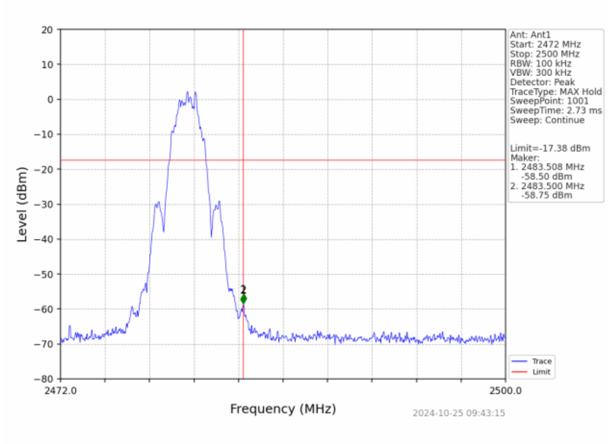


Highest channel

2M

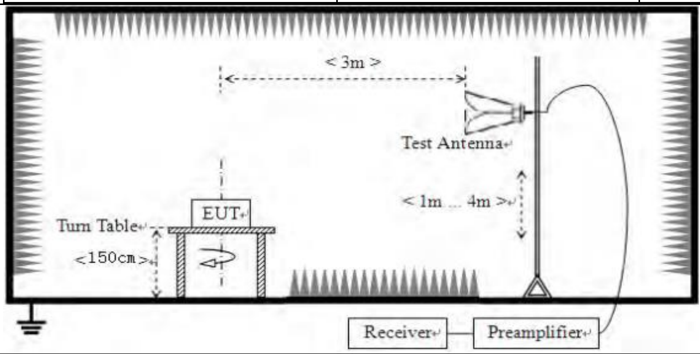


Lowest channel



Highest channel

6.5.2 Radiated Emission Method

<table>
<tr><td>Test Requirement:</td><td colspan="6">FCC Part15 C Section 15.209 and 15.205</td></tr>
<tr><td>Test Method:</td><td colspan="6">ANSI C63.10:2013</td></tr>
<tr><td>Test Frequency Range:</td><td colspan="6">All of the restrict bands were tested, only the worst band’s (2310MHz to 2500MHz) data was showed.</td></tr>
<tr><td>Test site:</td><td colspan="6">Measurement Distance: 3m</td></tr>
<tr><td>Receiver setup:</td><td colspan="6"><table>
<tr><td>Frequency</td><td>Detector</td><td>RBW</td><td>VBW</td><td>Value</td></tr>
<tr><td rowspan="2">Above 1GHz</td><td>Peak</td><td>1MHz</td><td>3MHz</td><td>Peak</td></tr>
<tr><td>RMS</td><td>1MHz</td><td>3MHz</td><td>Average</td></tr>
</table></td></tr>
<tr><td>Limit:</td><td colspan="6"><table>
<tr><td>Frequency</td><td>Limit (dBuV/m @3m)</td><td>Value</td></tr>
<tr><td rowspan="2">Above 1GHz</td><td>54.00</td><td>Average</td></tr>
<tr><td>74.00</td><td>Peak</td></tr>
</table></td></tr>
<tr><td>Test setup:</td><td colspan="6">
</td></tr>
<tr><td>Test Procedure:</td><td colspan="6">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 X axis positioning which it is worse case, only the test worst case mode is recorded in the report.</td></tr>
<tr><td>Test Instruments:</td><td colspan="6">Refer to section 6.0 for details</td></tr>
<tr><td>Test mode:</td><td colspan="6">Refer to section 5.2 for details</td></tr>
<tr><td>Test results:</td><td colspan="6">Pass</td></tr>
<tr><td>Test environment:</td><td>Temp.:</td><td>25 °C</td><td>Humid.:</td><td>52%</td><td>Press.:</td><td>1012mbar</td></tr>
</table>

Measurement Data

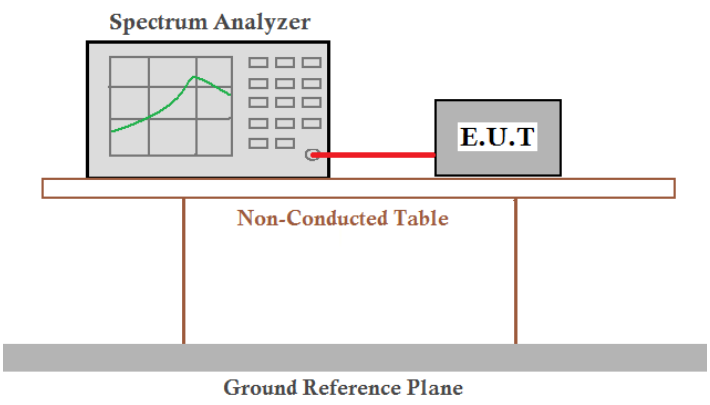
Remark: GFSK(1M), GFSK(2M) all have been tested, only worse case GFSK(1M) is reported.

Operation Mode: GFSK (1M)

Frequency(MHz):			**2402**		**Polarity:**		**HORIZONTAL**		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2390.00	59.29	PK	74	14.71	60.68	27.2	4.31	32.9	-1.39
2390.00	45.04	AV	54	8.96	46.43	27.2	4.31	32.9	-1.39
Frequency(MHz):			**2402**		**Polarity:**		**VERTICAL**		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2390.00	59.45	PK	74	14.55	60.84	27.2	4.31	32.9	-1.39
2390.00	46.04	AV	54	7.96	47.43	27.2	4.31	32.9	-1.39
Frequency(MHz):			**2480**		**P olarity:**		**HORIZONTAL**		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2483.50	55.90	PK	74	18.10	56.83	27.4	4.47	32.8	-0.93
2483.50	44.54	AV	54	9.46	45.47	27.4	4.47	32.8	-0.93
Frequency(MHz):			**2480**		**Polarity:**		**VERTICAL**		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2483.50	54.28	PK	74	19.72	55.21	27.4	4.47	32.8	-0.93
2483.50	43.69	AV	54	10.31	44.62	27.4	4.47	32.8	-0.93

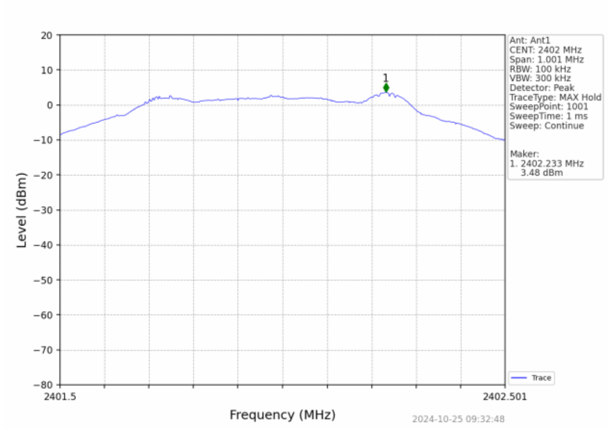
6.6. Spurious Emission

6.6.1 Conducted Emission Method

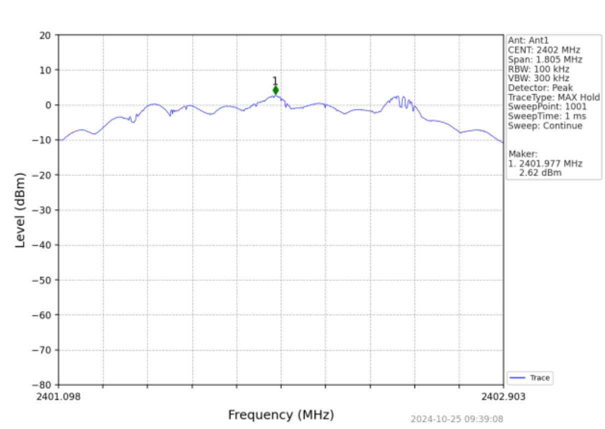
<table>
<tr><td>Test Requirement:</td><td colspan="6">FCC Part15 C Section 15.247 (d)</td></tr>
<tr><td>Test Method:</td><td colspan="6">ANSI C63.10:2013 and KDB558074 D01 DTS Meas Guidance V05r02</td></tr>
<tr><td>Limit:</td><td colspan="6">In any 100 kHz bandwidth outside the frequency band in which 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.</td></tr>
<tr><td>Test setup:</td><td colspan="6">
</td></tr>
<tr><td>Test Instruments:</td><td colspan="6">Refer to section 6.0 for details</td></tr>
<tr><td>Test mode:</td><td colspan="6">Refer to section 5.2 for details</td></tr>
<tr><td>Test results:</td><td colspan="6">Pass</td></tr>
<tr><td>Test environment:</td><td>Temp.:</td><td>25 °C</td><td>Humid.:</td><td>52%</td><td>Press.:</td><td>1012mbar</td></tr>
</table>

Test plot as follows:

GFSK



1M

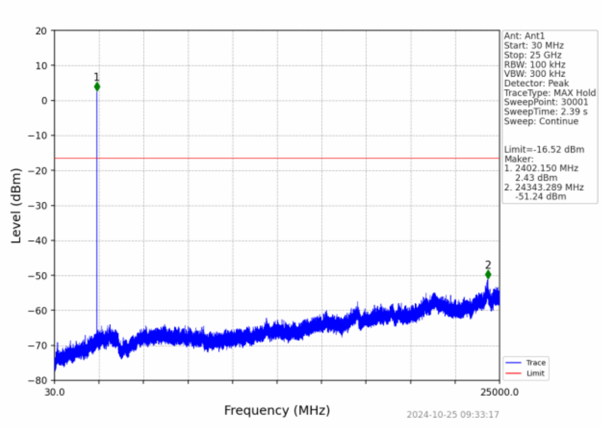


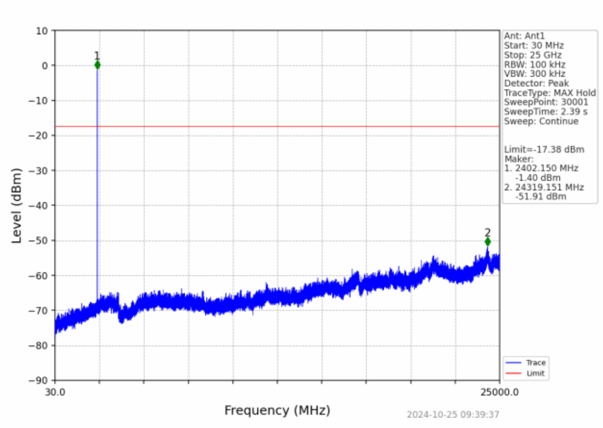
2M

reference

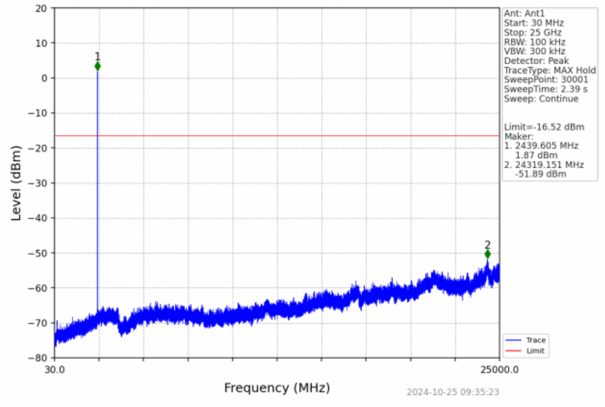
GFSK

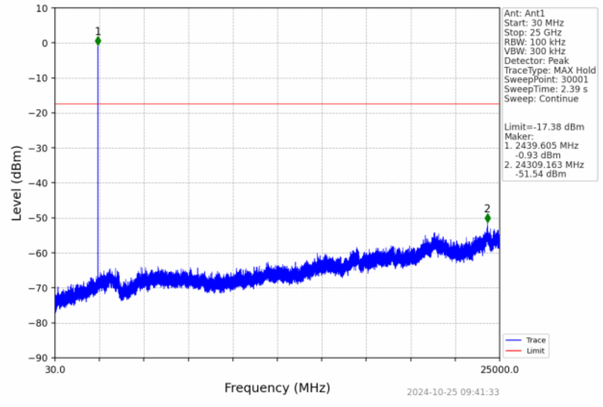
1M	2M



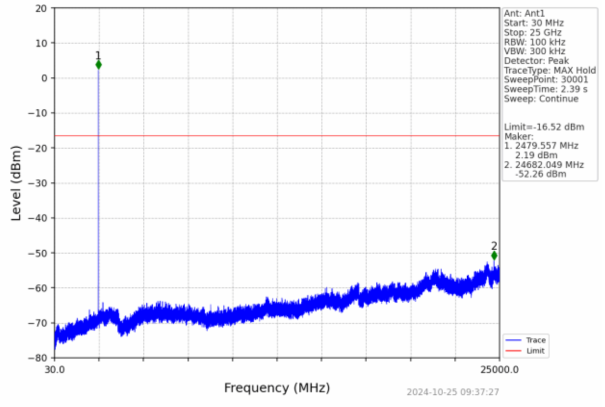


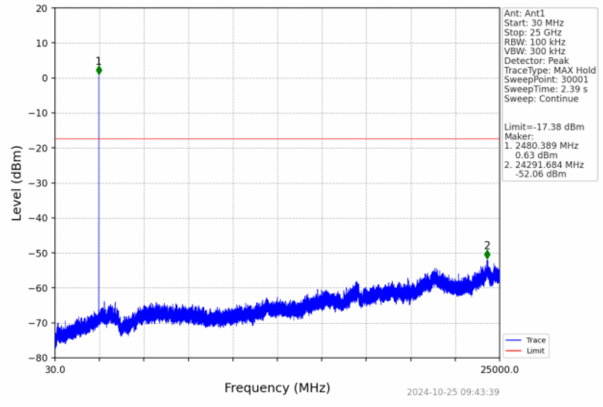
Low Channel ***Low Channel***





Mid Channel ***Mid Channel***





High Channel ***High Channel***

6.6.2 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:

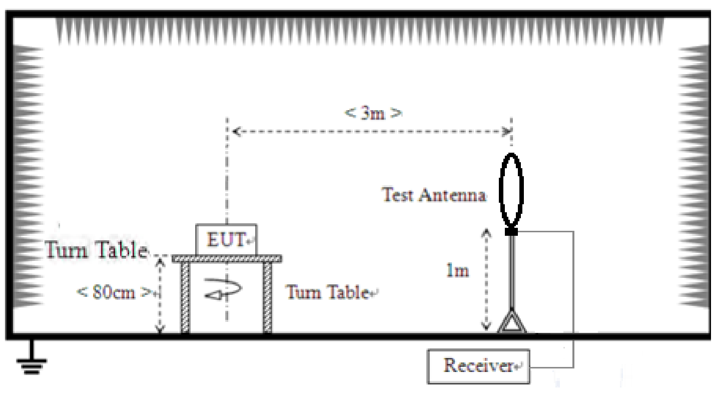
Frequency	Detector	RBW	VBW	Value
9KHz-150KHz	Quasi-peak	200Hz	600Hz	Quasi-peak
150KHz-30MHz	Quasi-peak	9KHz	30KHz	Quasi-peak
30MHz-1GHz	Quasi-peak	120KHz	300KHz	Quasi-peak
Above 1GHz	Peak	1MHz	3MHz	Peak
	Peak	1MHz	10Hz	Average

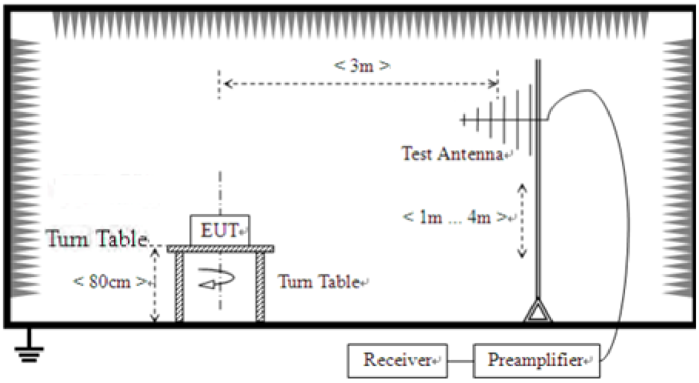
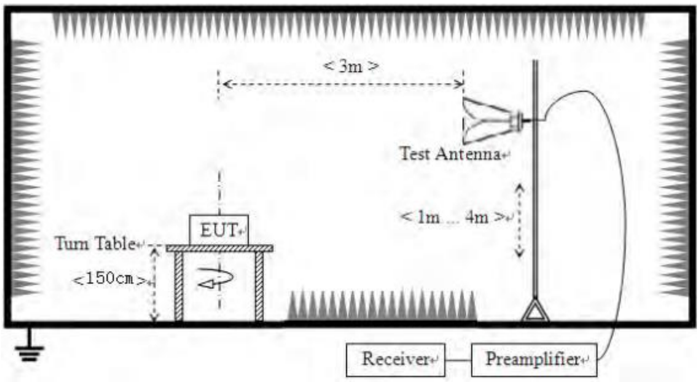
Limit:

Frequency	Limit (uV/m)	Value	Measurement Distance
0.009MHz-0.490MHz	2400/F(KHz)	QP	300m
0.490MHz-1.705MHz	24000/F(KHz)	QP	30m
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					

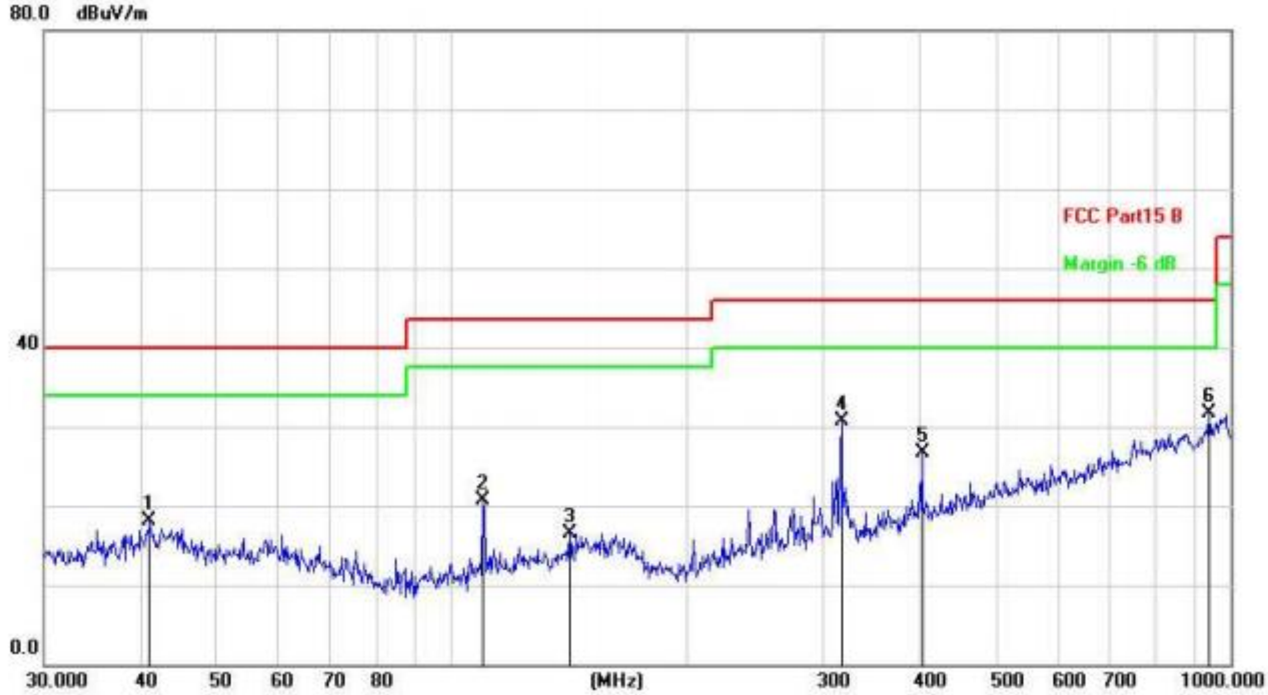
Measurement data:

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.*
2. *Radiated emission test from 9 KHz to 10th harmonic of fundamental was verified, and no emission found except system noise floor in 9 KHz to 30MHz and not recorded in this report.*
3. *Based on all tested data, the EUT complied with theFCC Part 15.207 standard limit for a wireless device, and with the worst case as BLE 1M 2402MHz as below:*

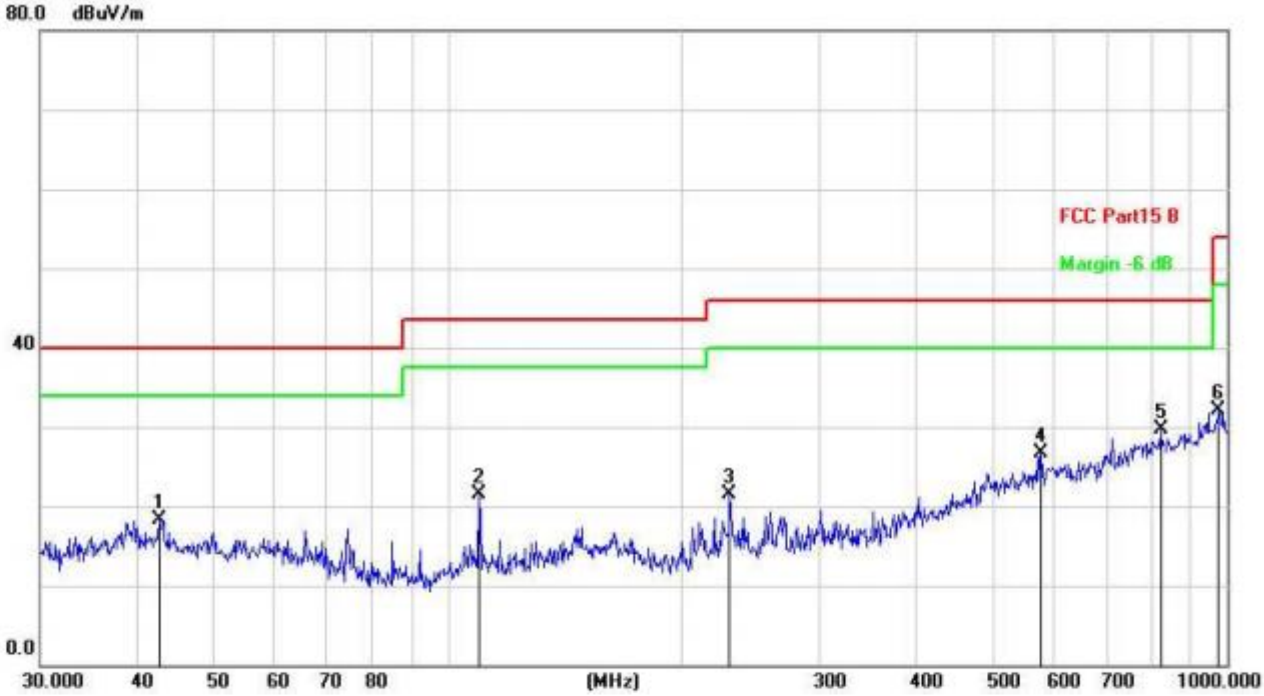
■ **Below 1GHz**

■ Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dB/m	dB	Detector
1		40.9881	28.26	-10.23	18.03	40.00	-21.97	peak
2		109.7960	34.71	-14.09	20.62	43.50	-22.88	peak
3		141.8262	28.22	-11.65	16.57	43.50	-26.93	peak
4		316.5889	41.24	-10.44	30.80	46.00	-15.20	peak
5		401.8385	34.71	-7.98	26.73	46.00	-19.27	peak
6	*	938.8325	28.88	2.76	31.64	46.00	-14.36	peak

Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dB/m	dB	Detector
1		42.6000	28.58	-10.24	18.34	40.00	-21.66	peak
2		109.7960	35.59	-14.09	21.50	43.50	-22.00	peak
3		230.0985	34.00	-12.48	21.52	46.00	-24.48	peak
4		576.6443	30.63	-3.89	26.74	46.00	-19.26	peak
5	*	821.7103	29.06	0.56	29.62	46.00	-16.38	peak
6		975.7528	28.60	3.41	32.01	54.00	-21.99	peak

Final Level =Receiver Read level + Correct Factor

■ **Above 1-25GHz**

Frequency(MHz):			**2402**		**Polarity:**		**HORIZONTAL**		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
4804.00	59.64	PK	74	14.36	53.94	31	6.5	31.8	5.7
4804.00	42.80	AV	54	11.20	37.10	31	6.5	31.8	5.7
7206.00	54.49	PK	74	19.51	41.84	36	8.15	31.5	12.65
7206.00	43.18	AV	54	10.82	30.53	36	8.15	31.5	12.65

Frequency(MHz):			**2402**		**Polarity:**		**VERTICAL**		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
4804.00	58.67	PK	74	15.33	52.97	31	6.5	31.8	5.7
4804.00	43.65	AV	54	10.35	37.95	31	6.5	31.8	5.7
7206.00	52.10	PK	74	21.90	39.45	36	8.15	31.5	12.65
7206.00	43.27	AV	54	10.73	30.62	36	8.15	31.5	12.65

Frequency(MHz):			**2440**		**Polarity:**		**HORIZONTAL**		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
4880.00	60.02	PK	74	13.98	53.86	31.2	6.61	31.65	6.16
4880.00	44.83	AV	54	9.17	38.67	31.2	6.61	31.65	6.16
7320.00	53.01	PK	74	20.99	40.06	36.2	8.23	31.48	12.95
7320.00	44.22	AV	54	9.78	31.27	36.2	8.23	31.48	12.95

Frequency(MHz):			2440		Polarity:		VERTICAL		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
4880.00	61.94	PK	74	12.06	55.78	31.2	6.61	31.65	6.16
4880.00	42.54	AV	54	11.46	36.38	31.2	6.61	31.65	6.16
7320.00	54.20	PK	74	19.80	41.25	36.2	8.23	31.48	12.95
7320.00	44.49	AV	54	9.51	31.54	36.2	8.23	31.48	12.95

Frequency(MHz):			2480		Polarity:		HORIZONTAL		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
4960.00	62.00	PK	74	12.00	55.34	31.4	6.76	31.5	6.66
4960.00	41.49	AV	54	12.51	34.83	31.4	6.76	31.5	6.66
7440.00	53.02	PK	74	20.98	39.72	36.4	8.35	31.45	13.3
7440.00	45.04	AV	54	8.96	31.74	36.4	8.35	31.45	13.3

Frequency(MHz):			2480		Polarity:		VERTICAL		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
4960.00	62.54	PK	74	11.46	55.88	31.4	6.76	31.5	6.66
4960.00	43.15	AV	54	10.85	36.49	31.4	6.76	31.5	6.66
7440.00	54.85	PK	74	19.15	41.55	36.4	8.35	31.45	13.3
7440.00	44.07	AV	54	9.93	30.77	36.4	8.35	31.45	13.3

Remark：
(1) Data of measurement within this frequency range shown “--- ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
(2) When the test results of Peak Detected below the limits of Average Detected, the Average Detected is not need completed.

6.7. Antenna Requirement

Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. 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

FCC CFR Title 47 Part 15 Subpart C Section 15.247(c) (1) (I):

(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.

Antenna Connected Construction

The maximum gain of antenna was 4.27 dBi.

Remark:The antenna gain is provided by the customer , if the data provided by the customer is not accurate, Shenzhen HTT Technology Co.,Ltd. does not assume any responsibility.

7. Test Setup Photo

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

8. EUT Constructional Details

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

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