TEST REPORT

Report No.	CISRR250812092
Project No.	CISR250812092
FCC ID	2BRNR-TAPHUB
Applicant	Tapcentive, Inc.
Address	307 Santa Ana Ave San Francisco, CA 94127-1952, USA
Manufacturer	Zhuhai Heng Yu New Technology Company Limited
Address	No. 10, Yingyue Road, Yunong Village North, Sanzao Town, Zhuhai, Guangdong, P.R. China
Product Name	TAPHUB
Trademark	N/A
Model/Type reference	TAPHUB-01
Listed Model(s)	N/A
Standard	Part 15 Subpart C Section 15.225
Test date	August 15, 2025 to August 19, 2025
Issue date	August 19, 2025
Test result	**Complied**

Lucas Huang

Prepared by: Lucas Huang

GenryLong

Approved by: Genry Long

The test results relate only to the tested samples.

The test report should not be reproduced except in full without the written approval of Shenzhen Bangce Testing Technology Co., Ltd.

Contents

1. REPORT VERSION

Version No.	Issue date	Description
00	August 19, 2025	Original

2. SUMMARY OF TEST RESULT

Report clause	Test Item	Standard Requirement	Result
5.1	Antenna Requirement	15.203	PASS
5.2	AC Conducted Emission	15.207	N/A
5.3	Field Strength of Fundamental Emissions	15.225 (a) (b) (c)	PASS
5.4	20 dB Bandwidth	15.215	PASS
5.5	Frequency Stability	15.225 (e)	PASS
5.6	Radiated Emissions	15.225 (d)/15.209	PASS

Note:

– The measurement uncertainty is not included in the test result.

– *1: No requirement on standard, only report these test data.

– N/A: Not Applicable.

3. SUMMARY

3.1. Product Description

Main unit information:	
Product Name:	TAPHUB
Trade Mark:	N/A
Model No.:	TAPHUB-01
Listed Model(s):	N/A
Model difference:	N/A
Power supply:	N/A
Hardware version:	N/A
Software version:	N/A
Accessory unit (AU) information:	
Battery information:	N/A

3.2. Radio Specification Description

Technology:	NFC
Modulation:	ASK
Operation frequency:	13.56MHz
Channel number:	1
Antenna type:	PCB Antenna
Antenna gain:	0dBi

3.3. Modification of EUT

No modifications are made to the EUT during all test items.

3.4. Testing Site

Laboratory Name	Shenzhen Bangce Testing Technology Co., Ltd.
Laboratory Location	101, building 10, Yunli Intelligent Park, Shutianpu community, Matian Street, Guangming District, Shenzhen, Guangdong, China
FCC registration number	736346

3.5. Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS (dBuV/m) = RA (dBuV) + AF (dB/m) + CL (dB) – AG (dB)

Where FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
RA = Reading Amplitude	AG = Amplifier Gain
AF = Antenna Factor	

3.6. DISTURBANCE Calculation

The AC mains conducted disturbance is calculated by adding the 10dB Pulse Limiter and Cable Factor and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

CD (dBuV) = RA (dBuV) + PL (dB) + CL (dB)

Where CD = Conducted Disturbance	CL = Cable Attenuation Factor (Cable Loss)
RA = Reading Amplitude	PL = 10 dB Pulse Limiter Factor

4. TEST CONFIGURATION

4.1. Test frequency list

Channel	Frequency (MHz)
1	13.56

4.2. Test mode

For RF test items:	
The system was configured for testing in a continuous transmits condition and change test channels by software provided by applicant.Power setting Default.	
Test Item	Modulation
Conducted test item	ASK
Radiated test item	ASK
Remark: – The EUT in each of three orthogonal axis emissions had been tested, but only the worst case (X axis) data recorded in the report.	

4.3. Support unit used in test configuration and system

The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application.

The following peripheral devices and interface cables were connected during the measurement:

Item	Equipment name	Trade Name	Model No.
1	--	--	--

4.4. Test sample information

Type	sample no.
Engineer sample	CISR250625290-S01
Normal sample	CISR250625290-S02

4.5. Testing environmental condition

Type	Requirement	Actual
Temperature:	15~35°C	25°C
Relative Humidity:	25~75%	50%
Air Pressure:	860~1060mbar	1000mbar

4.6. Statement of the measurement uncertainty

No.	Test Items	Measurement Uncertainty
1	AC Conducted Emission	1.63dB
2	Frequency Stability	20Hz
3	20dB Bandwidth	0.002%
4	Radiated Spurious Emission	3.76dB for 30MHz-1GHz 3.80dB for above 1GHz

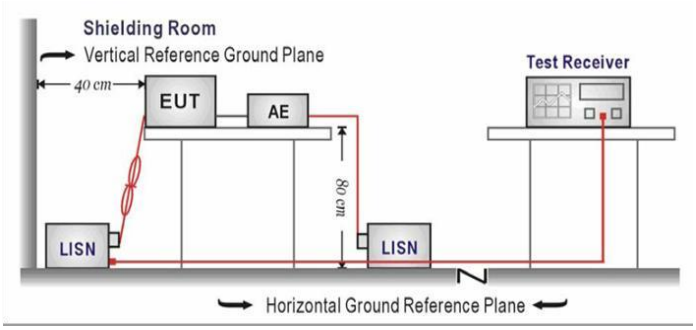
This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=1.96.

4.7. Equipment Used during the Test

Equipment	Manufacture	Model No.	Serial No.	Last cal.	Cal Interval
9*6*6 anechoic chamber	SKET	9.3*6.3*6	N/A	2024.09.01	3Year
Spectrum analyzer	Agilent	N9020A	MY50530263	2025.01.08	1Year
Receiver	ROHDE&SCHWARZ	ESCI	100853	2025.01.08	1Year
Spectrum analyzer	R&S	FSV-40N	/	2025.01.08	1Year
Bilog Antenna	Schwarzbeck	VULB 9163	1463	2025.01.08	2Year
Horn Antenna	SCHWARZBECK	BBHA 9120 D	2487	2025.01.08	2Year
Active Loop Antenna	SCHWARZBECK	FMZB 1519B	/	2025.01.08	2Year
RF Cable	Tonscend	Cable 1	/	2025.01.08	1Year
RF Cable	Tonscend	Cable 2	/	2025.01.08	1Year
RF Cable	SKET	Cable 3	/	2025.01.08	1Year
Pre-amplifier	Tonscend	TAP9K3G32	AP21G806153	2025.01.08	1Year
Pre-amplifier	Tonscend	TAP01018050	AP22E806229	2025.01.08	1Year
L.I.S.N.#1	Schwarzbeck	NSLK8127	/	2025.01.08	1Year
L.I.S.N.#2	ROHDE&SCHWARZ	ENV216	/	2025.01.08	1Year
Horn Antenna	SCHWARZBECK	BBHA9170	1130	2025.01.08	2 Year
Preamplifier	Tonscend	TAP18040048	AP21C806126	2025.01.08	1Year
variable-frequency power source	Pinhong	PH1110	/	2025.01.08	1Year
6dB Attenuator	SKET	DC-6G	/	N/A	N/A
Artificial power network	Schwarzbeck	NSLK8127	8127-01096	2025.01.08	1Year
EMI Test Receiver	Rohde&schwarz	ESCI7	100853	2025.01.08	1Year
8-wire Impedance Stabilization Network	Schwarzbeck	NTFM 8158	8158-00337	2025.01.08	1Year
Artificial power network	Schwarzbeck	ENV216	/	2025.01.08	1Year
Antenna tower	SKET	Bk-4AT-BS	AT2021040101-V1	2025-01-08	1Year

5. TEST CONDITIONS AND RESULTS

5.1. Antenna Requirement

Limit:	**FCC CFR Title 47 Part 15 Subpart C Section 15.203:** An intentional radiator shall be designed to ensure that no antenna other than that furnished by the response-ble 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.
Test configuration:	
Result:	**Passed**
Description	The antenna type is a PCB Antenna(0dBi), Antenna structure please refer to the EUT internal photographs antenna photo.

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

5.2. AC Conducted Emission

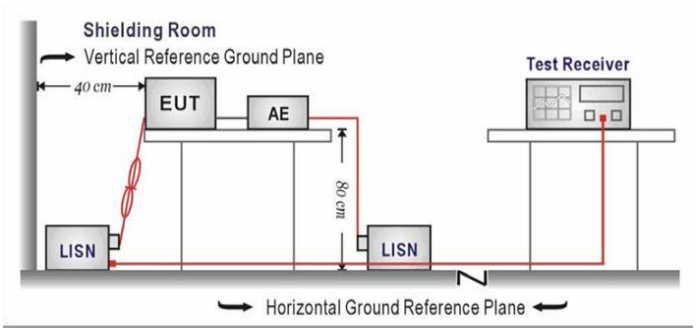
Limit:

FCC CFR Title 47 Part 15 Subpart C Section 15.207

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 configuration:



Test procedure:

1. The EUT was setup according to ANSI C63.10 requirements.
2. The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm from any other grounded conducting surface.
3. The EUT and simulators are connected to the main power through a line impedances stabilization network (LISN). The LISN provides a 50 ohm /50uH coupling impedance for the measuring equipment.
4. The peripheral devices are also connected to the main power through a LISN. (Refer to the block diagram of the test setup and photographs)
5. Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor, was individually connected through a LISN to the input power source.
6. The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length.
7. Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9 kHz.
8. During the above scans, the emissions were maximized by cable manipulation.

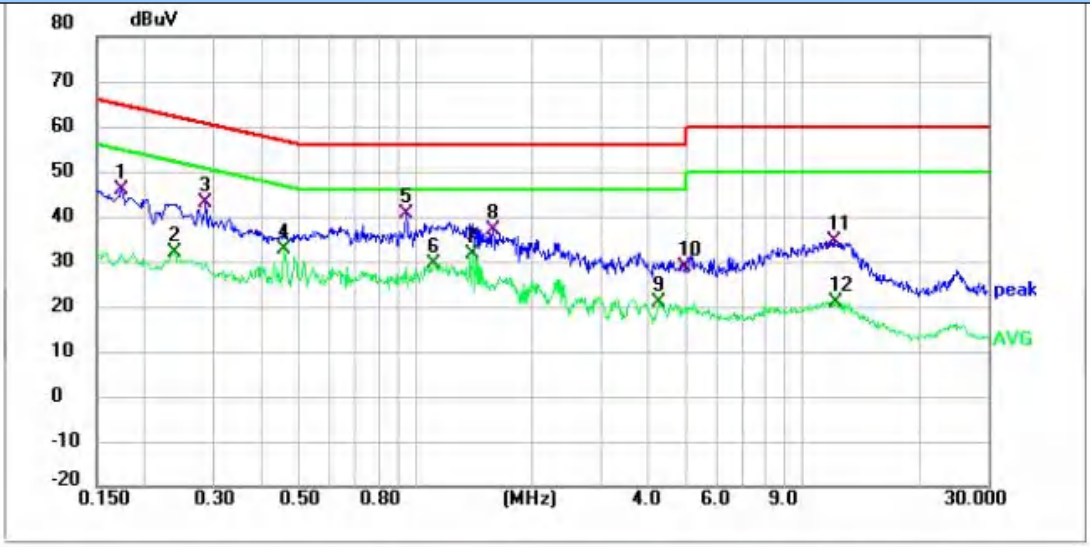
Test mode:

Refer to the clause 4.3

Result:

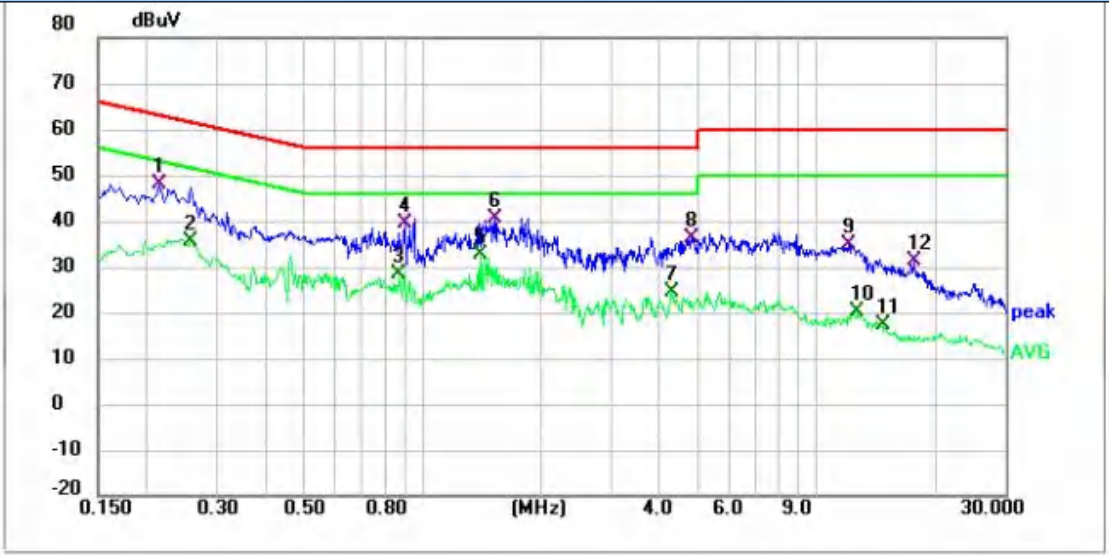
Passed

TM1/ Line: Line



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1740	35.68	10.19	45.87	64.77	18.90	QP
2	0.2380	21.74	10.16	31.90	52.17	20.27	AVG
3	0.2860	32.93	10.15	43.08	60.64	17.56	QP
4 *	0.4580	22.57	10.15	32.72	46.73	14.01	AVG
5	0.9460	30.29	10.19	40.48	56.00	15.52	QP
6	1.1140	19.21	10.20	29.41	46.00	16.59	AVG
7	1.4060	21.44	10.22	31.66	46.00	14.34	AVG
8	1.5900	26.75	10.23	36.98	56.00	19.02	QP
9	4.2500	10.47	10.35	20.82	46.00	25.18	AVG
10	4.9620	18.42	10.38	28.80	56.00	27.20	QP
11	12.0460	24.10	10.46	34.56	60.00	25.44	QP
12	12.2299	10.61	10.46	21.07	50.00	28.93	AVG

TM1/ Line: Neutral



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.2140	37.73	10.14	47.87	63.05	15.18	QP
2	0.2580	25.45	10.15	35.60	51.50	15.90	AVG
3	0.8740	18.19	10.15	28.34	46.00	17.66	AVG
4	0.9060	29.40	10.16	39.56	56.00	16.44	QP
5 *	1.4100	22.50	10.19	32.69	46.00	13.31	AVG
6	1.5220	30.37	10.19	40.56	56.00	15.44	QP
7	4.3140	13.96	10.34	24.30	46.00	21.70	AVG
8	4.8460	25.96	10.37	36.33	56.00	19.67	QP
9	12.0460	24.46	10.44	34.90	60.00	25.10	QP
10	12.6940	9.67	10.46	20.13	50.00	29.87	AVG
11	14.7220	6.93	10.46	17.39	50.00	32.61	AVG
12	17.5780	20.61	10.69	31.30	60.00	28.70	QP

5.3. Field Strength of Fundamental Emissions

Limit:

FCC CFR Title 47 Part 15 Subpart C Section 15.225

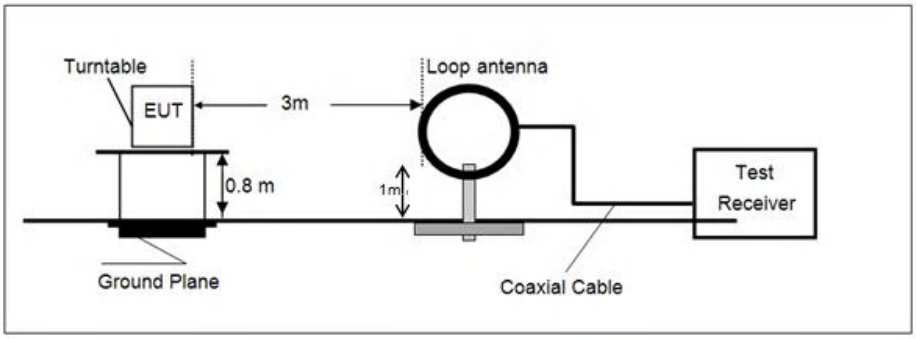
The field strength of any emissions within the band 13.553–13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters.

Frequencies (MHz)	Field Strength (microvolts/meter)	Field Strength (dBμV/m) at 10m	Field Strength (dBμV/m) at 3m
13.553 ~ 13.567MHz	15848 at 30m	103.08 (QP)	124 (QP)

Mask Limit:

Frequency (MHz)	Limit (dBuV/m)	Distance (m)
1.705-13.110	69.5	3
13.110-13.410	80.5	3
13.410-13.553	90.5	3
13.553-13.567	124.0	3
13.567-13.710	90.5	3
13.710-14.010	80.5	3
14.010-30.000	69.5	3

Test configuration:



Test procedure:

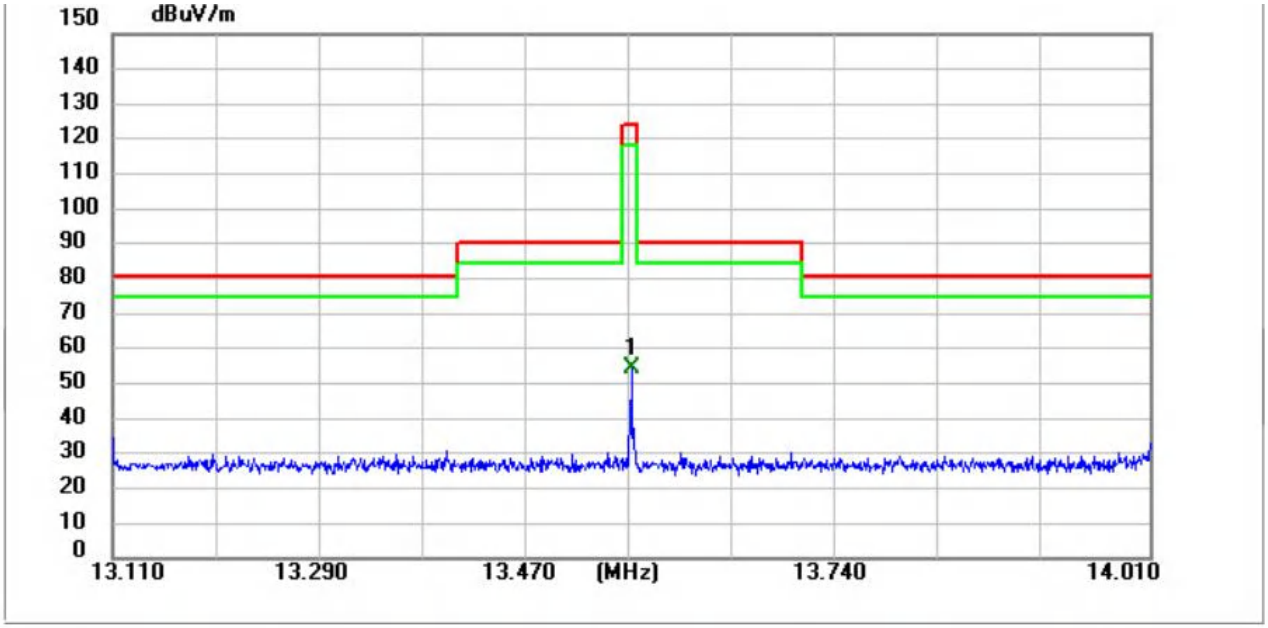
1. The EUT was setup and tested according to ANSI C63.10.
2. The EUT is placed on a turn table which is 0.8 meter above ground for below 1 GHz. The turn table is rotated 360 degrees to determine the position of the maximum emission level.
3. The EUT was set 3 meters from the receiving antenna, which was mounted on the top of a variable height antenna tower.
4. For X axis / Y axis/ Z axis were tested.

Test mode: Refer to the clause 4.3

Test data: Refer to the Appendix B

Result: **Passed**

0°



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1 *	13.5600	76.82	-22.48	54.34	124.00	69.66	QP

*Note: Factor= Antenna Factor + Cable Loss

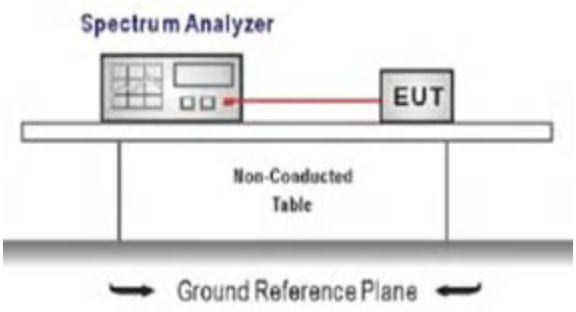
Measured（dBμV/m）= Reading + Factor+51.5, Margin= Measured - Limit

Emission level (dBμV/m) = 20 log Emission level (μV/m).

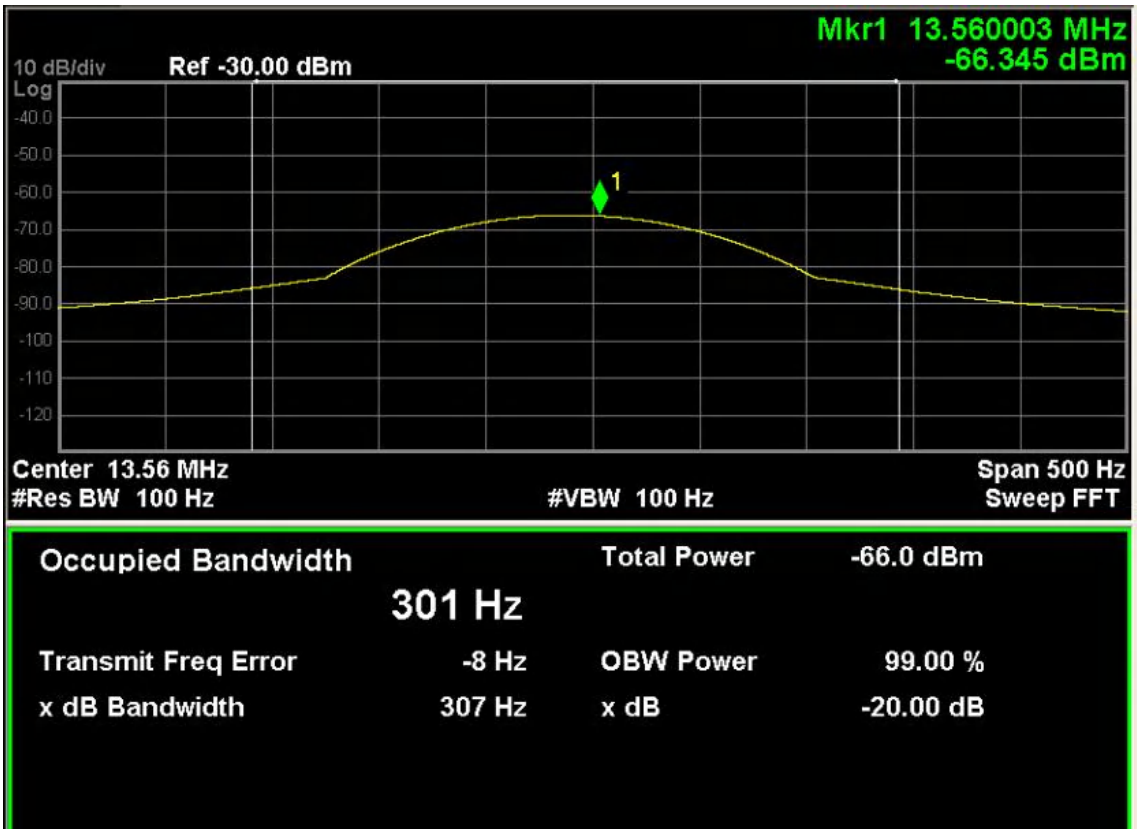
All emissions emit from non-NFC function of digital unintentional emissions. All NFC′ s spurious emissions are below 20dB of limits.

X axis / Y axis/ Z axis were tested,report only recorded the worst result of X axis.

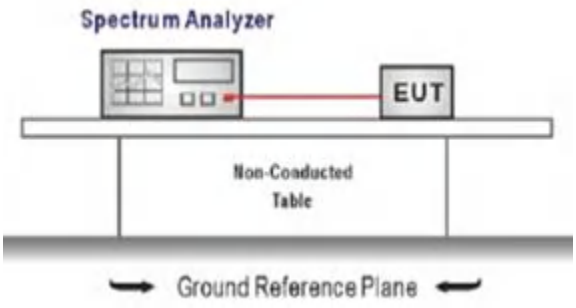
5.4. 20 dB Bandwidth

Limit:	--
Test configuration:	
Test procedure:	1. The transmitter output was connected to the spectrum analyzer through an attenuator, the path loss was compensated to the results for each measurement. 2. Set to the maximum power setting and enable the EUT transmit continuously 3. Use the following spectrum analyzer settings: Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel RBW ≥ 1% of the 20 dB bandwidth, VBW ≥ RBW Sweep = auto, Detector function = peak, Trace = max hold 4. Measure and record the results in the test report.
Test mode:	Refer to the clause 4.3
Result:	**Passed**

20dB Bandwidth



5.5. Frequency Stability

Limit:	The frequency tolerance of the carrier signal shall be maintained within +/- 0.01% (100ppm) of the operating frequency over a temperature variation of -20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a full charged battery.
Test configuration:	
Test mode:	Refer to the clause 4.3
Test data:	Refer to the Appendix B
Result:	**Passed**

Voltage vs. Frequency Stability

Voltage(V)	Measurement Frequency (MHz)	Deviation (KHz)	Deviation (ppm)	Limit (ppm)
VL	13.56036	0.36	26.55	100
VN	13.56022	0.22	16.22	100
VH	13.56034	0.34	25.07	100

Temperature vs. Frequency Stability

Temperature (℃)	Measurement Frequency (MHz)	Deviation (KHz)	Deviation (ppm)	Limit (ppm)
-20	13.56028	0.28	20.68	100
-10	13.56036	0.36	26.53	100
0	13.56037	0.37	27.56	100
10	13.56030	0.30	22.15	100
20	13.56048	0.48	35.51	100
30	13.56029	0.29	21.07	100
40	13.56012	0.12	8.67	100
50	13.56015	0.15	11.15	100

5.6. Radiated Spurious Emission

Limit:

FCC CFR Title 47 Part 15 Subpart C Section 15.209

Frequency	Limit (dBuV/m)	Value
0.009 MHz ~0.49 MHz	2400/F(kHz) @300m	Quasi-peak
0.49 MHz ~ 1.705 MHz	24000/F(kHz) @30m	Quasi-peak
1.705 MHz ~30 MHz	30 @30m	Quasi-peak

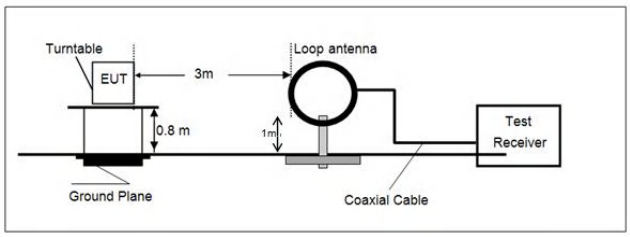
Limit dBuV/m @3m = Limit dBuV/m @300m + 40*log(300/3

Limit dBuV/m @3m = Limit dBuV/m @30m +40*log(30/3)

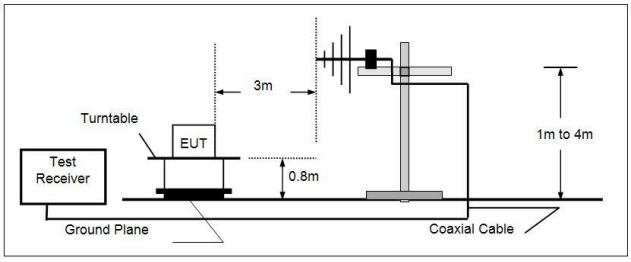
Frequency	Limit (dBuV/m @3m)	Value
30MHz~88MHz	40.00	Quasi-peak
88MHz~216MHz	43.50	Quasi-peak
216MHz~960MHz	46.00	Quasi-peak
960MHz~1GHz	54.00	Quasi-peak
Above 1GHz	54.00	Average
	74.00	Peak

Test configuration:

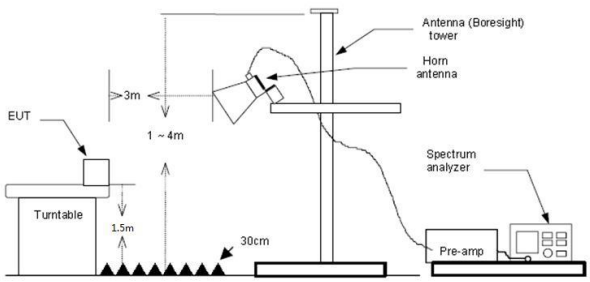
9kHz~30MHz



30 MHz ~ 1 GHz



Above 1 GHz



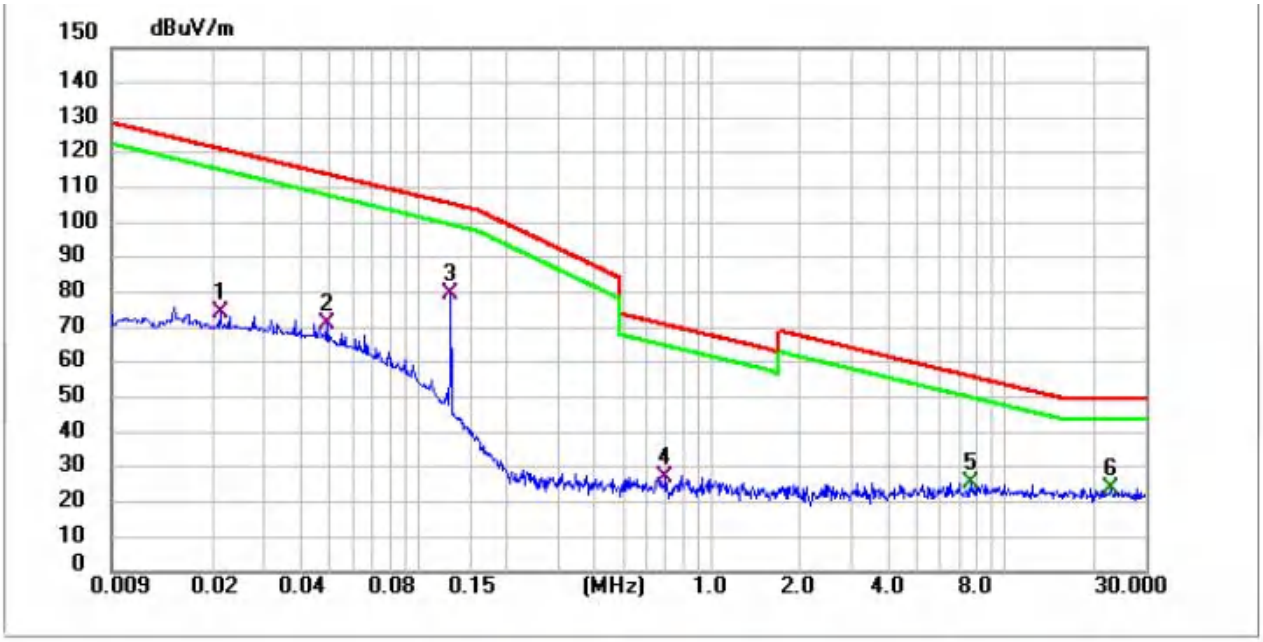
Test procedure:	5. The EUT was setup and tested according to ANSI C63.10. 6. The EUT is placed on a turn table which is 0.8 meter above ground for below 1 GHz, and 1.5 m for above 1 GHz. The turn table is rotated 360 degrees to determine the position of the maximum emission level. 7. The EUT was set 3 meters from the receiving antenna, which was mounted on the top of a variable height antenna tower. 8. For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines. 9. Set to the maximum power setting and enable the EUT transmit continuously. 10. Use the following spectrum analyzer settings a) Span shall wide enough to fully capture the emission being measured; b) Below 1 GHz: RBW=120 kHz, VBW=300 kHz, Sweep=auto, Detector function=peak, Trace=max hold; If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported. c) Set RBW=1MHz, VBW=3MHz for >1GHz, Sweep time=auto, Detector=peak, Trace=max hold for Peak measurement For average measurement: use duty cycle correction factor method (DCCF) Averager level = Peak level + DCCF
Test mode:	Refer to the clause 4.3
Result:	**Passed**

Note:

1) Level= Reading + Factor/Transd; Factor/Transd =Antenna Factor+ Cable Loss- Preamp Factor
2) Over Limit = Level– Limit
3) Average measurement was not performed if peak level is lower than average limit(54 dBuV/m) for above 1GHz.

For 9 kHz ~ 30 MHz

0°



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	0.0212	96.25	-22.14	74.11	121.08	46.97	Peak
2	0.0485	93.28	-22.20	71.08	113.89	42.81	Peak
3	0.1287	101.91	-22.57	79.34	105.42	26.08	Peak
4	0.6956	48.78	-21.89	26.89	70.76	43.87	Peak
5	7.6783	47.37	-22.16	25.21	55.87	30.66	Peak
6 *	22.7690	46.19	-22.33	23.86	49.54	25.68	Peak

Note: Only recorded the worst test result.

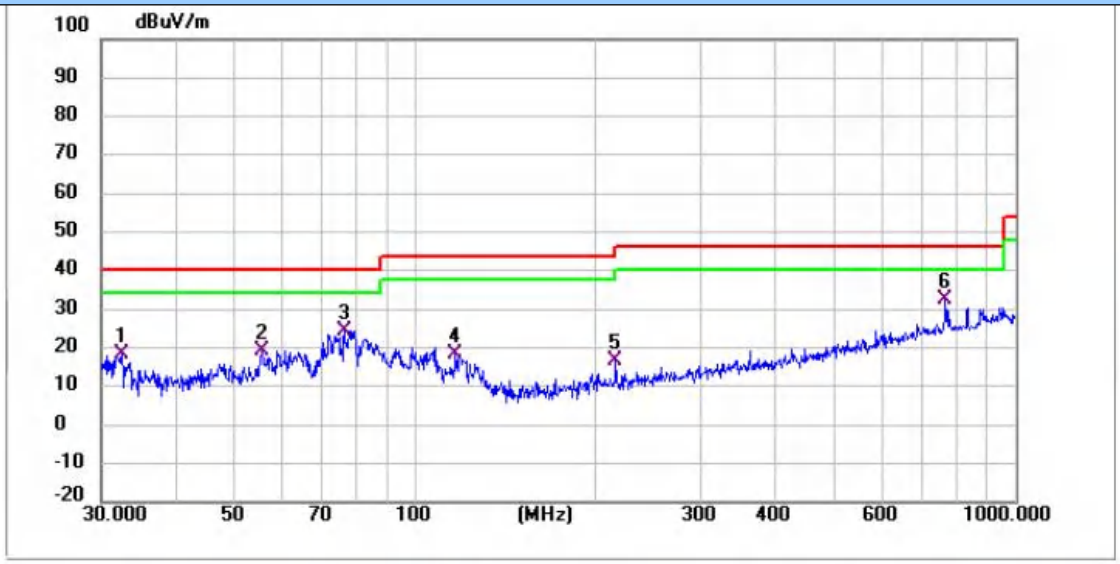
For 30 MHz ~ 1000 MHz

Have pre-scan all test channel, found CH00 which it was worst case, so only show the worst case's data on this report.

TM1/ Polarization: Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	33.0950	45.84	-32.05	13.79	40.00	26.21	QP
2	72.0843	57.85	-33.41	24.44	40.00	15.56	QP
3	86.8067	49.28	-33.73	15.55	40.00	24.45	QP
4	206.3975	45.18	-29.65	15.53	43.50	27.97	QP
5	419.1081	42.81	-24.35	18.46	46.00	27.54	QP
6 *	942.1304	48.98	-14.24	34.74	46.00	11.26	QP

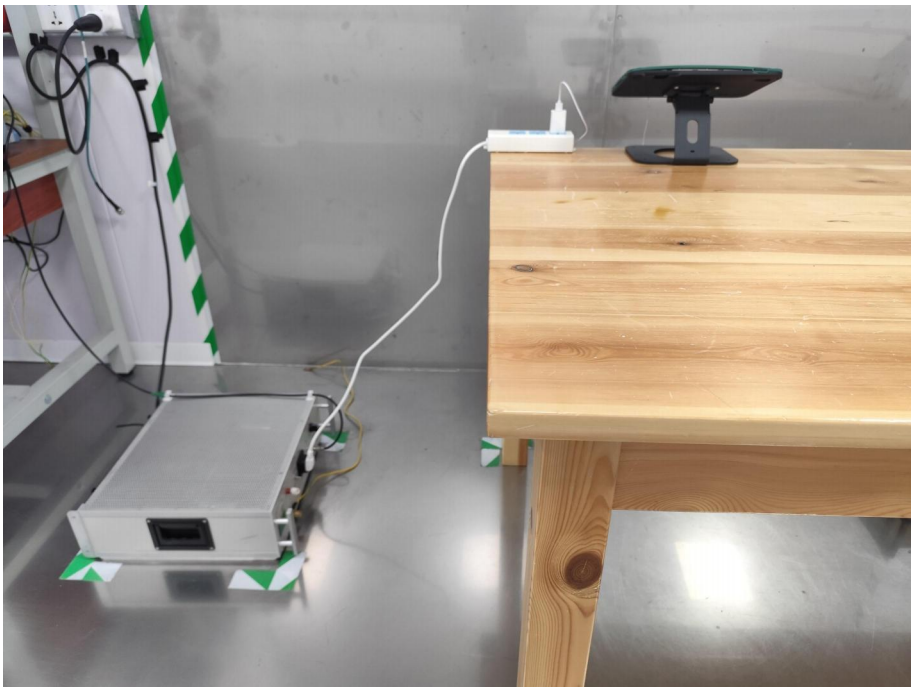
TM1/ Polarization: Vertical



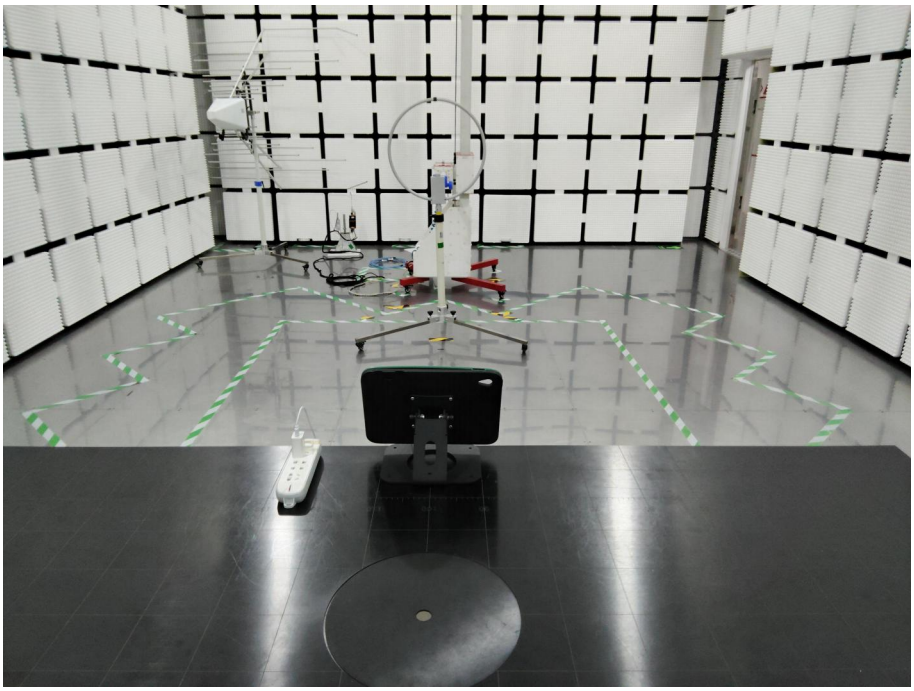
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	32.4060	50.55	-32.06	18.49	40.00	21.51	QP
2	55.6093	49.71	-30.33	19.38	40.00	20.62	QP
3	76.2442	58.45	-34.16	24.29	40.00	15.71	QP
4	116.9494	50.19	-31.75	18.44	43.50	25.06	QP
5	216.0240	46.25	-29.61	16.64	46.00	29.36	QP
6 *	766.0571	49.78	-17.09	32.69	46.00	13.31	QP

6. TEST SETUP PHOTOS

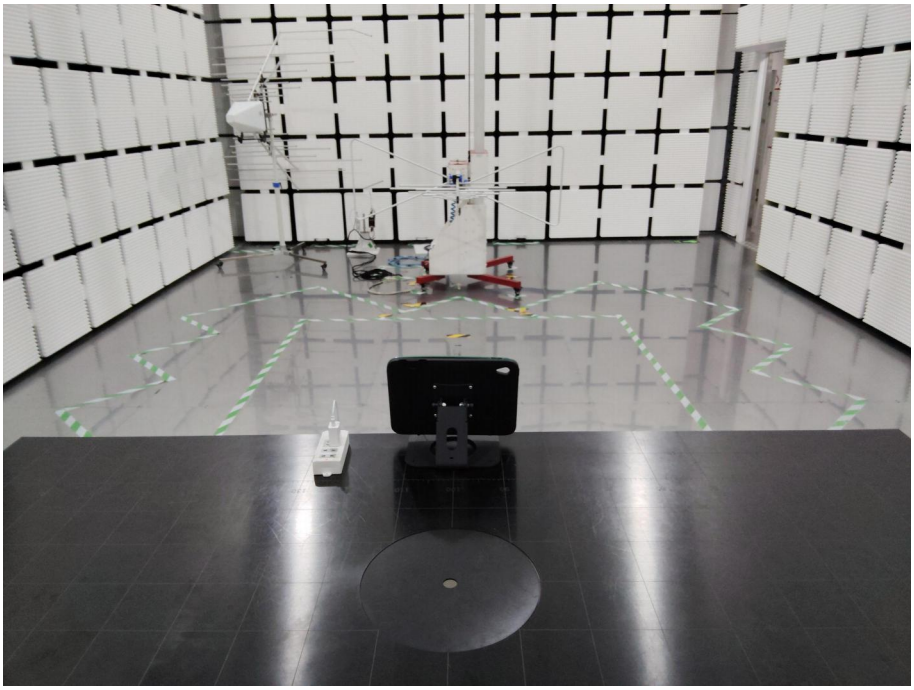
Conducted Emission at AC power line



Emissions in frequency bands (below 30MHz)

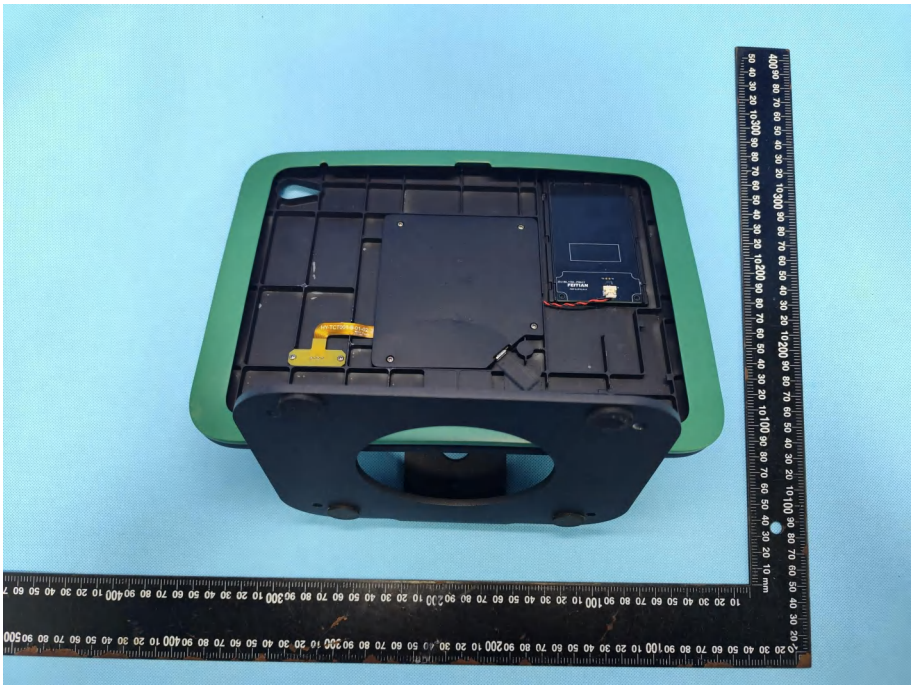


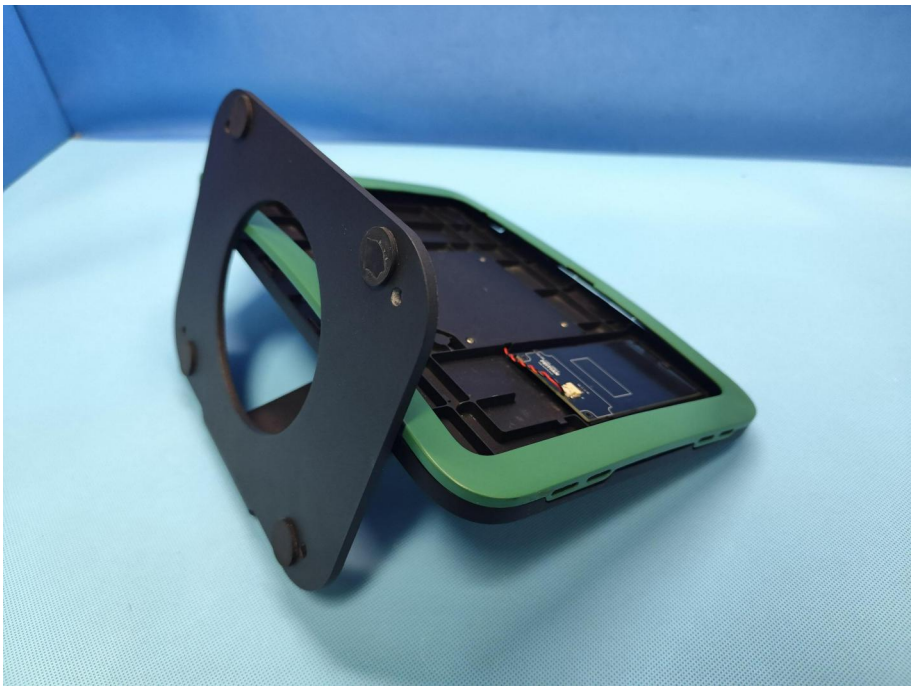
Emissions in frequency bands (30M-1GHz)

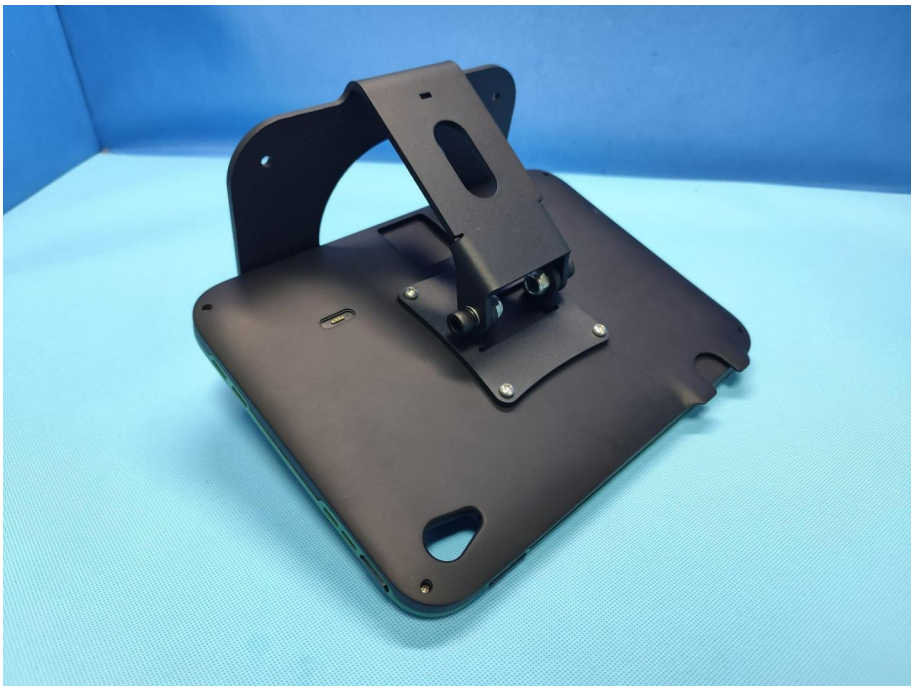


7. EXTERNAL AND INTERNAL PHOTOS

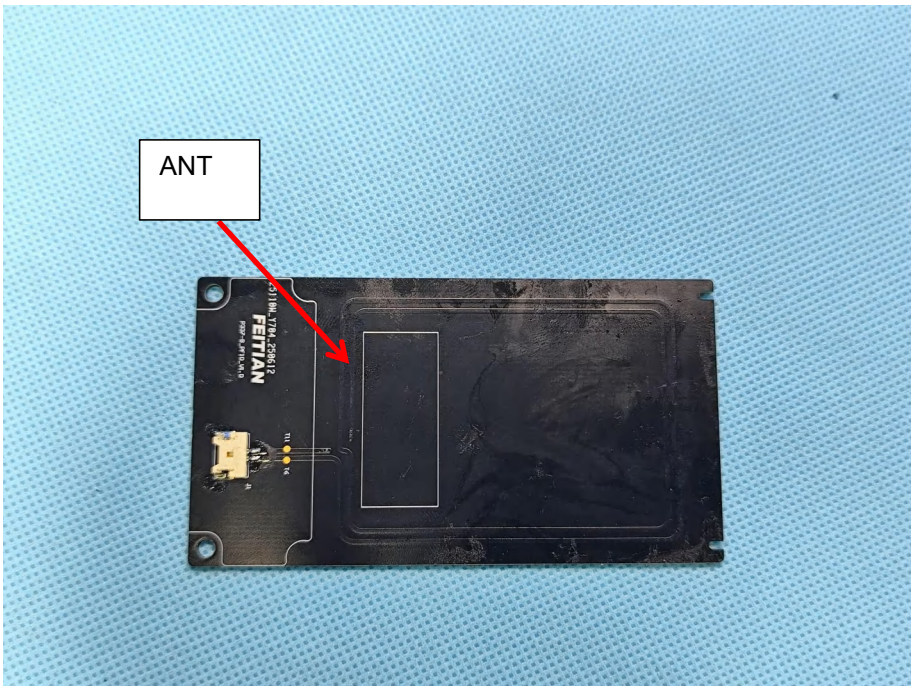
7.1External photos

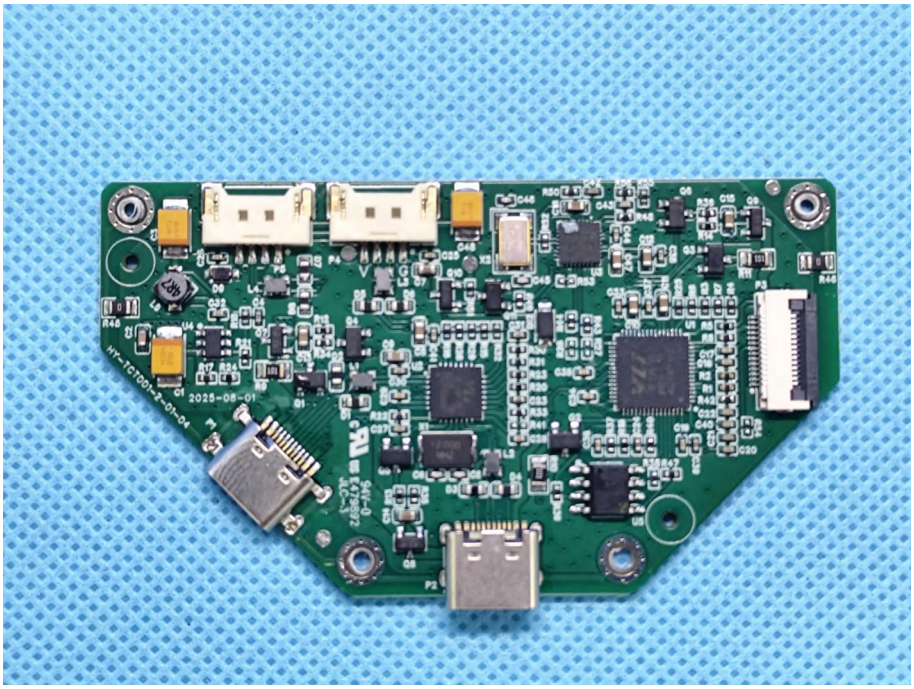


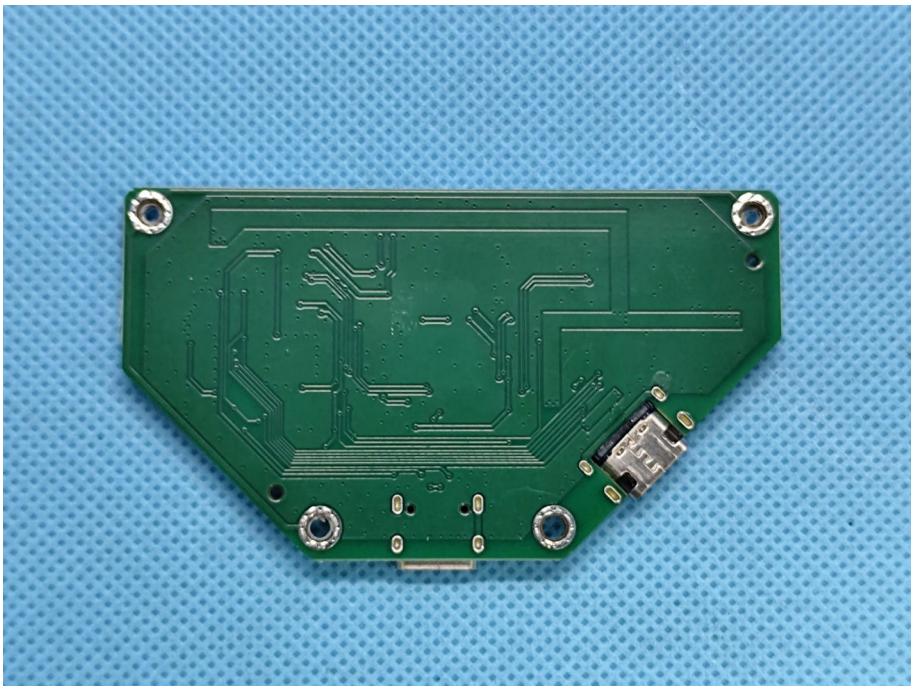




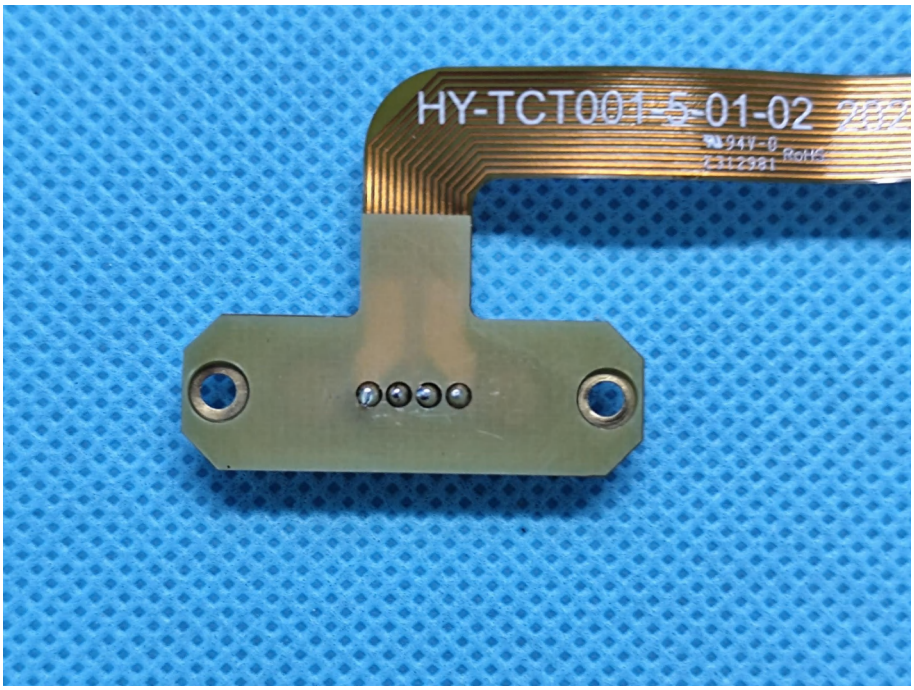
7.2 Internal photos

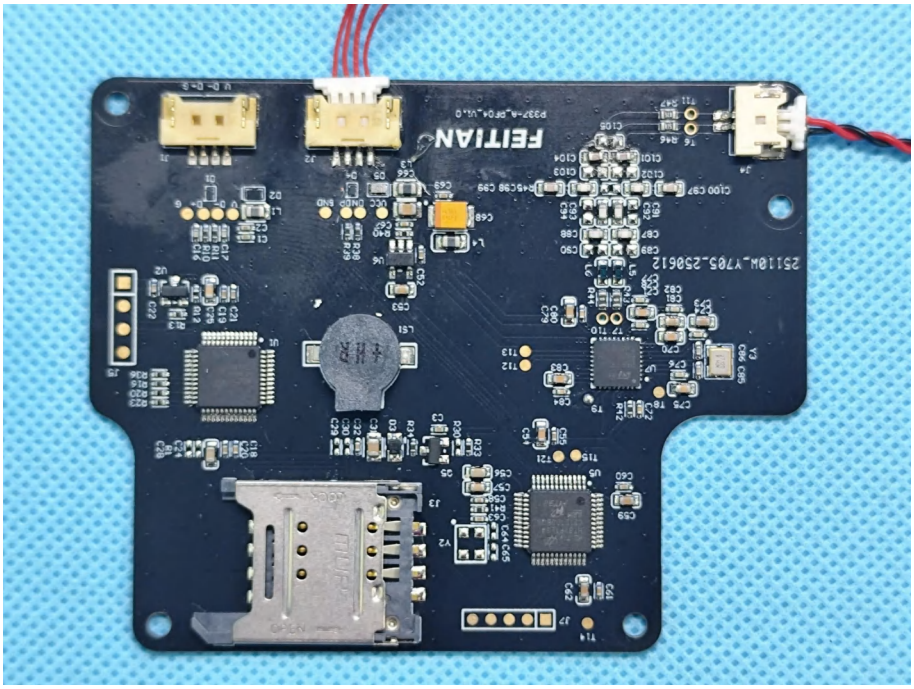

ANT
FEITIAN

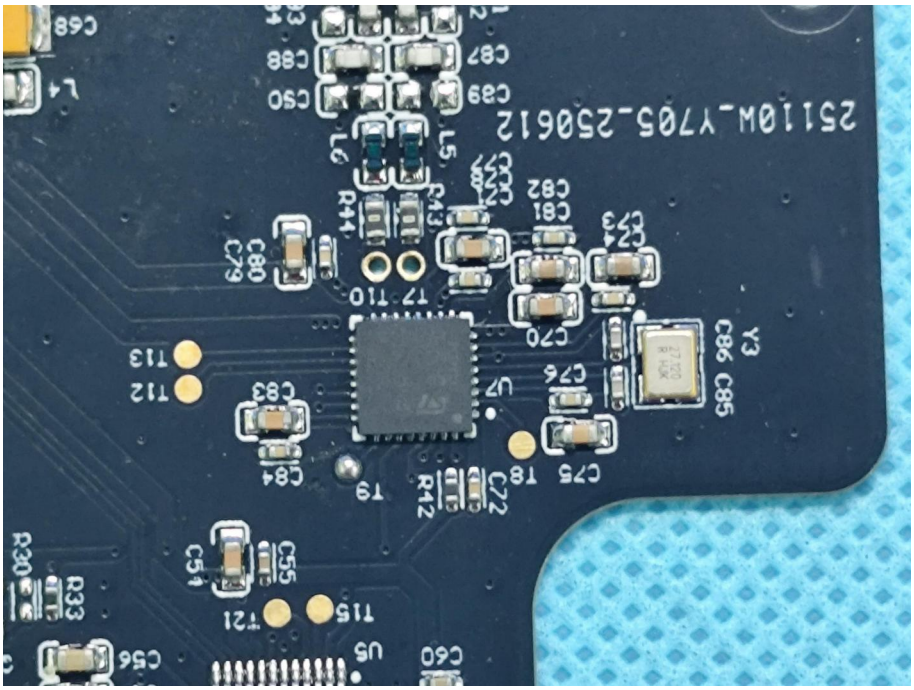


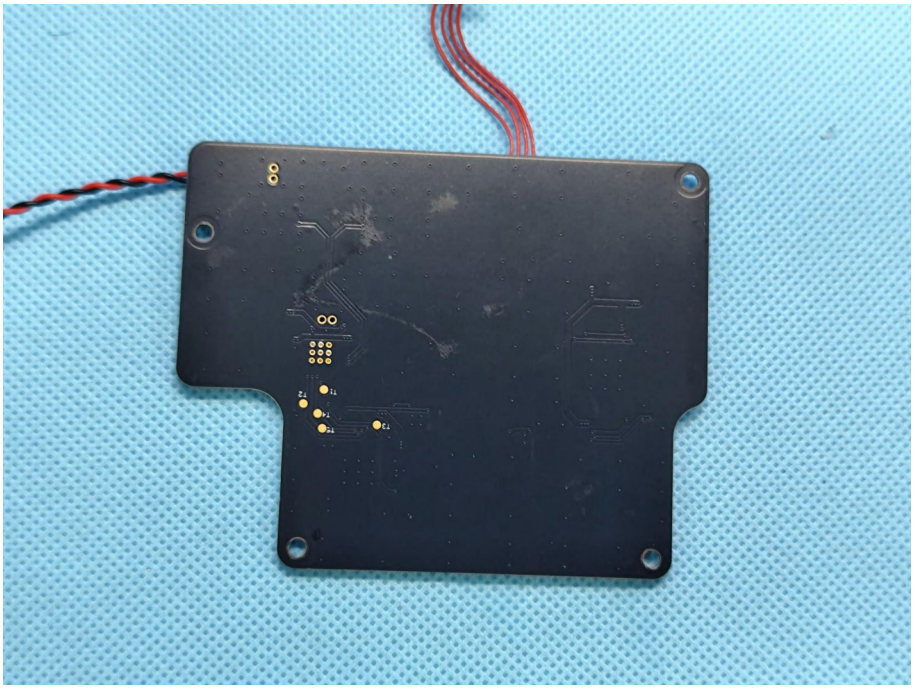



P1


HY-TCT001-5-01-02


FEITIAN





-------End of the report-------