

FCC PART 15C TEST REPORT FOR CERTIFICATION
On Behalf of

AAMP of Florida, Inc. dba AAMP Global

1-Din Audio Mechless

Model Number: RM2004

Additional Model: RM2000, RM2001, RM2002, RM2003

FCC ID: XBD-RM2004

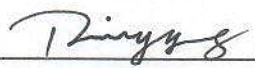
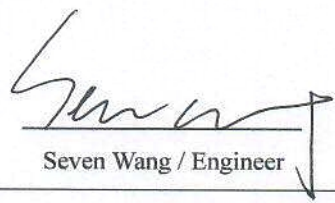
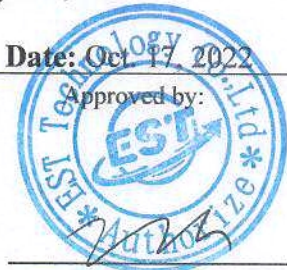
| | |
|--------------|---|
| Applicant : | AAMP of Florida, Inc. dba AAMP Global |
| Address: | 15500 Lightwave Dr., Suite 202, Clearwater, Florida, United States |
| | |
| Prepared By: | EST Technology Co., Ltd. |
| | Chilingxiang, Qishantou, Santun, Houjie, Dongguan, Guangdong, China |
| | Tel: 86-769-83081888-808 |

| | |
|-----------------|-----------------|
| Report Number: | ESTE-R1905020-1 |
| Date of Test: | Oct. 08, 2022 |
| Date of Report: | Oct. 17, 2022 |

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EST Technology Co., Ltd.

| | | | |
|---|---|--|---------------|
| Applicant: | AAMP of Florida, Inc. dba AAMP Global | | |
| Address: | 15500 Lightwave Dr., Suite 202, Clearwater, Florida, United States | | |
| Manufacturer: | AAMP of Florida, Inc. dba AAMP Global | | |
| Address: | 15500 Lightwave Dr., Suite 202, Clearwater, Florida, United States | | |
| E.U.T: | 1-Din Audio Mechless | | |
| Model Number: | RM2004 | | |
| Additional Model: | RM2000, RM2001, RM2002, RM2003 (They are identical except model name only) | | |
| Power Supply: | DC 12V | | |
| Trade Name: | ECHOMASTER | Serial No.: | ----- |
| Date of Receipt: | Sep. 26, 2022 | Date of Test: | Oct. 08, 2022 |
| Test Specification: | FCC Part 15 Subpart C (15.247) ANSI C63.10:2013 FCC KDB 558074 D01 15.247 Meas Guidance v05r02 | | |
| Test Result: | <p>The device described above is tested by EST Technology Co., Ltd. The measurement results were contained in this test report and EST Technology Co., Ltd. was assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT to be technically compliance with the FCC Rules and Regulations Part 15 Subpart C requirements.</p> <p style="text-align: center;">This report applies to above tested sample only and shall not be reproduced in part without written approval of EST Technology Co., Ltd.</p> | | |
| Prepared by: | Reviewed by: | Date: Oct 17 2022 | |
|  Ring Yang / Assistant |  Seven Wang / Engineer |  Iceman Hu / Manager | |
| Other Aspects: | This report base on the previous report with report number: ESTE-R1905020, audio amplifier IC (PT12916) were changed, so just re-tested spurious emissions (30MHz-1GHz), other test item needn't re-tested. | | |
| Abbreviations: OK/P=passed fail/F=failed n.a/N=not applicable E.U.T=equipment under tested | | | |
| This test report is based on a single evaluation of one sample of above mentioned products ,It is not permitted to be duplicated in extracts without written approval of EST Technology Co., Ltd. | | | |

1. GENERAL INFORMATION

1.1. Description of Device (EUT)

| | | |
|---------------------|---|---|
| Product Name | : | 1-Din Audio Mechless |
| Model Number | : | RM2004 |
| Software Version | : | N/A |
| Hardware Version | : | 410-RM2000AA-10 |
| Operation frequency | : | 2402MHz~2480MHz |
| Number of channel | : | 79 |
| Modulation Type | : | BT BDR(1Mbps): GFSK BT EDR(2Mbps): $\pi/4$ -DQPSK BT EDR(3Mbps): 8-DPSK |
| Sample Type | : | Prototype production |

Note:For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.

1.2. Antenna Information

| Ant No. | Brand | Model Name | Antenna Type | Connector | Gain (dBi) |
|---------|-------|------------|--------------|-----------|------------|
| 1 | - | - | Internal | - | 0 |

Note: This information is provided by the applicant.

1.3. Information of RF Cable

| Cable Loss(dB) | Provided by |
|---|---------------------------------------|
| 1.0 | AAMP of Florida, Inc. dba AAMP Global |
| Note: 1. The customer declared the loss value of the RF Cable, and the test results of this report only apply to the sample as received. 2. This information is provided by the applicant. | |

2. SUMMARY OF TEST

2.1. Summary of test result

| No. | Description of Test Item | FCC Standard Section | Results |
|-----|---|-------------------------------|---------|
| 1 | Maximum Peak Output Power | 15.247(a)(1) | N/A |
| 2 | 20dB Bandwidth | 15.247(a)(1) | N/A |
| 3 | Carrier Frequency Separation | 15.247(a)(1) | N/A |
| 4 | Number Of Hopping Channel | 15.247(a)(1)(iii) | N/A |
| 5 | Dwell Time | 15.247(a)(1)(iii) | N/A |
| 6 | Conducted Band Edge | 15.247(d) | N/A |
| 7 | Conducted Spurious Emissions | 15.247(d) | N/A |
| 8 | Radiated Spurious Emissions and Band Edge | 15.205 15.209 15.247(d) | PASS |
| 9 | AC Power Line Conducted Emissions | 15.207 | N/A |
| 10 | Antenna Requirement | 15.203 | N/A |

Note: "N/A" denotes test is not applicable in this test report.

2.2. Test Facilities

EMC Lab : Certificated by CNAS, CHINA
Registration No.: L5288
This Certificate is valid until: November 12, 2023

Certificated by FCC, USA
Designation Number: CN1215
This Certificate is valid until: January 31, 2024

Certificated by A2LA, USA
Registration No.: 4366.01
This Certificate is valid until: January 31, 2024

Certificated by Industry Canada
CAB identifier No.: CN0035
This Certificate is valid until: January 31, 2024

Certificated by VCCI, Japan
Registration No.:C-14103; T-20073; R-13663;
R-20103; G-20097
Date of registration: Apr. 20, 2020
This Certificate is valid until: Apr. 19, 2023

Certificated by TUV Rheinland, Germany
Registration No.: UA 50413872 0001
Date of registration: July 31, 2018

Certificated by Intertek
Registration No.: 2011-RTL-L2-64
Date of registration: November 08, 2018

Name of Firm : EST Technology Co., Ltd.

Site Location : Chilingxiang, Qishantou, Santun, Houjie, Dongguan,
Guangdong, China

2.3. Measurement uncertainty

| Test Item | Uncertainty |
|---|-----------------------|
| Uncertainty for Conduction emission test | ±3.48dB |
| Uncertainty for spurious emissions test (Below 30MHz) | ±1.62 dB |
| Uncertainty for spurious emissions test (30MHz-1GHz) | ±4.60 dB(Polarize: H) |
| | ±4.68 dB(Polarize: V) |
| Uncertainty for spurious emissions test (1GHz to 25GHz) | ±4.96dB |
| Uncertainty for radio frequency | 7×10^{-8} |
| Uncertainty for conducted RF Power | 1.08dB |
| Uncertainty for Power density test | 0.26dB |

Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

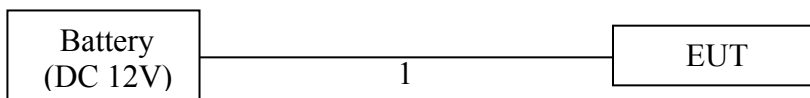
2.4. Assistant equipment used for test

| Item | Equipment | Brand | Model Name/Type No. | FCC ID | Series No. |
|------|-----------|-------|---------------------|--------|------------|
| - | - | - | - | - | - |

| Item | Shielded Type | Ferrite Core | Length | Note |
|------|---------------|--------------|--------|----------|
| 1 | NO | NO | 0.8m | DC Cable |

2.5. Block Diagram

For radiated emissions test: EUT was placed on a turn table, which is 0.8 (or 1.5) meter high above ground. EUT was beset into Bluetooth test mode by software before test.



(EUT: 1-Din Audio Mechless)

2.6. Test mode

Combining all the rates, modulations, and packet types, the Pre-scans had been carried out. The worst case test mode was selected for the final test as listed below.

| Test Item | Modulation Type | Operating Mode | Packet Type | Test Channel |
|---|-----------------|----------------|-------------|-----------------|
| Radiated Spurious Emissions(Below 1GHz) | GFSK&8-DPSK | Non Hopping | DH5 | Low/Middle/High |

Note: In radiated measurement,the EUT had been pre-scan on the positioned of each 3 axis(X,Y,Z), the worst case was found when positioned on **X-plane**.

2.7. Channel List

| Channel No. | Frequency (MHz) | Channel No. | Frequency (MHz) | Channel No. | Frequency (MHz) | Channel No. | Frequency (MHz) |
|-------------|-----------------|-------------|-----------------|-------------|-----------------|-------------|-----------------|
| 0 | 2402 | 1 | 2403 | 2 | 2404 | 3 | 2405 |
| 4 | 2406 | 5 | 2407 | 6 | 2408 | 7 | 2409 |
| 8 | 2410 | 9 | 2411 | 10 | 2412 | 11 | 2413 |
| 12 | 2414 | 13 | 2415 | 14 | 2416 | 15 | 2417 |
| 16 | 2418 | 17 | 2419 | 18 | 2420 | 19 | 2421 |
| 20 | 2422 | 21 | 2423 | 22 | 2424 | 23 | 2425 |
| 24 | 2426 | 25 | 2427 | 26 | 2428 | 27 | 2429 |
| 28 | 2430 | 29 | 2431 | 30 | 2432 | 31 | 2433 |
| 32 | 2434 | 33 | 2435 | 34 | 2436 | 35 | 2437 |
| 36 | 2438 | 37 | 2439 | 38 | 2440 | 39 | 2441 |
| 40 | 2442 | 41 | 2443 | 42 | 2444 | 43 | 2445 |
| 44 | 2446 | 45 | 2447 | 46 | 2448 | 47 | 2449 |
| 48 | 2450 | 49 | 2451 | 50 | 2452 | 51 | 2453 |
| 52 | 2454 | 53 | 2455 | 54 | 2456 | 55 | 2457 |
| 56 | 2458 | 57 | 2459 | 58 | 2460 | 59 | 2461 |
| 60 | 2462 | 61 | 2463 | 62 | 2464 | 63 | 2465 |
| 64 | 2466 | 65 | 2467 | 66 | 2468 | 67 | 2469 |
| 68 | 2470 | 69 | 2471 | 70 | 2472 | 71 | 2473 |
| 72 | 2474 | 73 | 2475 | 74 | 2476 | 75 | 2477 |
| 76 | 2478 | 77 | 2479 | 78 | 2480 | - | - |

2.8. Test Equipment

| For conducted emission test | | | | | | |
|-----------------------------|-----------------|--------------|------------|------------------|------------|-----------|
| Equipment | Manufacturer | Model No. | Serial No. | Calibration Body | Last Cal. | Next Cal. |
| EMI Test Receiver | Rohde & Schwarz | ESHS30 | EST-E001 | LISAI | June 13,22 | 1 Year |
| Artificial Mains Network | Rohde & Schwarz | ENV216 | EST-E002 | LISAI | June 13,22 | 1 Year |
| Pulse Limiter | Rohde & Schwarz | ESH3-Z2 | EST-E078 | LISAI | June 13,22 | 1 Year |
| Test Software | Audix | e3-6.111221a | N/A | N/A | N/A | N/A |

| For radiated emission test(9 kHz-30MHz) | | | | | | |
|---|-----------------|--------------|------------|------------------|------------|-----------|
| Equipment | Manufacturer | Model No. | Serial No. | Calibration Body | Last Cal. | Next Cal. |
| EMI Test Receiver | Rohde & Schwarz | ESR7 | EST-E047 | LISAI | June 13,22 | 1 Year |
| Active Loop Antenna | SCHWABE ECK | FMZB 1519B | EST-E054 | LISAI | June 13,22 | 1 Year |
| Test Software | Audix | e3-6.111221a | N/A | N/A | N/A | N/A |
| 9kHz-30MHz Cable | N/A | EST-001 | N/A | N/A | N/A | N/A |

| For radiated emissions test (30-1000MHz) | | | | | | |
|--|-----------------|--------------|------------|------------------|------------|-----------|
| Equipment | Manufacturer | Model No. | Serial No. | Calibration Body | Last Cal. | Next Cal. |
| EMI Test Receiver | Rohde & Schwarz | ESR7 | EST-E047 | LISAI | June 13,22 | 1 Year |
| Bilog Antenna | Teseq | CBL 6111D | EST-E034 | LISAI | June 13,22 | 1 Year |
| Test Software | Audix | e3-6.111221a | N/A | N/A | N/A | N/A |
| 30-1000MHz Cable | N/A | EST-002 | N/A | N/A | N/A | N/A |

3. RADIATED SPURIOUS EMISSIONS AND BAND EDGE

3.1. Limit

All the emissions appearing within 15.205 restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions shall be at least 20dB below the fundamental emissions, or comply with 15.209 limits.

15.205 Restricted frequency band

| MHz | MHz | MHz | GHz |
|---------------------|-----------------------|-----------------|------------------|
| 0.090 - 0.110 | 16.42 - 16.423 | 399.9 - 410 | 4.5 - 5.15 |
| 0.495 - 0.505 | 16.69475 - 16.69525 | 608 - 614 | 5.35 - 5.46 |
| 2.1735 - 2.1905 | 16.80425 - 16.80475 | 960 - 1240 | 7.25 - 7.75 |
| 4.125 - 4.128 | 25.5 - 25.67 | 1300 - 1427 | 8.025 - 8.5 |
| 4.17725 - 4.17775 | 37.5 - 38.25 | 1435 - 1626.5 | 9.0 - 9.2 |
| 4.20725 - 4.20775 | 73 - 74.6 | 1645.5 - 1646.5 | 9.3 - 9.5 |
| 6.215 - 6.218 | 74.8 - 75.2 | 1660 - 1710 | 10.6 - 12.7 |
| 6.26775 - 6.26825 | 108 - 121.94 | 1718.8 - 1722.2 | 13.25 - 13.4 |
| 6.31175 - 6.31225 | 123 - 138 | 2200 - 2300 | 14.47 - 14.5 |
| 8.291 - 8.294 | 149.9 - 150.05 | 2310 - 2390 | 15.35 - 16.2 |
| 8.362 - 8.366 | 156.52475 - 156.52525 | 2483.5 - 2500 | 17.7 - 21.4 |
| 8.37625 - 8.38675 | 156.7 - 156.9 | 2690 - 2900 | 22.01 - 23.12 |
| 8.41425 - 8.41475 | 162.0125 - 167.17 | 3260 - 3267 | 23.6 - 24.0 |
| 12.29 - 12.293 | 167.72 - 173.2 | 3332 - 3339 | 31.2 - 31.8 |
| 12.51975 - 12.52025 | 240 - 285 | 3345.8 - 3358 | 36.43 - 36.5 |
| 12.57675 - 12.57725 | 322 - 335.4 | 3600 - 4400 | (²) |

15.209 Limit

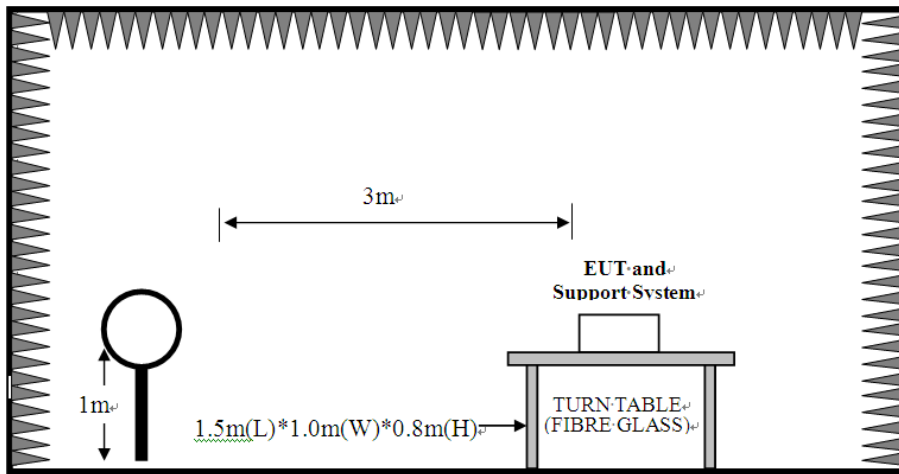
| Frequency (MHz) | Field Strength(μV/m) | Distance(m) |
|-----------------|----------------------|-------------|
| 0.009-0.490 | 2400/F(kHz) | 300 |
| 0.490-1.705 | 24000/F(kHz) | 30 |
| 1.705-30 | 30 | 30 |
| 30-88 | 100 | 3 |
| 88-216 | 150 | 3 |
| 216-960 | 200 | 3 |
| Above 960 | 500 | 3 |

Note:

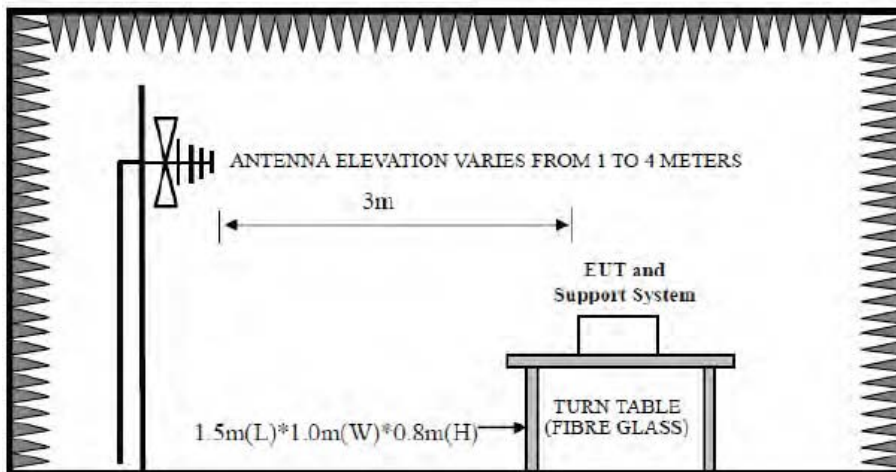
- (1) Emission level dBμV = 20 log Emission level μV/m.
- (2) The smaller limit shall apply at the cross point between two frequency bands.
- (3) Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.

3.2. Test Setup

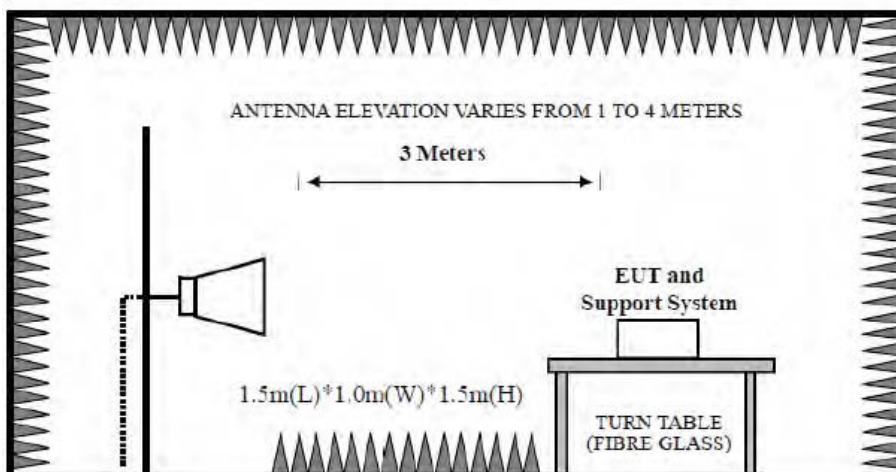
9kHz~30MHz



30~1000MHz



Above 1GHz



3.3. Spectrum Analyzer Setting

For 9KHz-150KHz

| Spectrum Parameters | Setting |
|---------------------|---|
| RBW | 300Hz(for Peak&AVG)/CISPR 200Hz(for QP) |
| VBW | 300Hz(for Peak&AVG)/CISPR 200Hz(for QP) |
| Start frequency | 9KHz |
| Stop frequency | 150KHz |
| Sweep Time | Auto |
| Detector | PEAK/QP/AVG |
| Trace Mode | Max Hold |

For 150KHz-30MHz

| Spectrum Parameters | Setting |
|---------------------|----------|
| RBW | 9KHz |
| VBW | 9KHz |
| Start frequency | 150KHz |
| Stop frequency | 30MHz |
| Sweep Time | Auto |
| Detector | QP |
| Trace Mode | Max Hold |

For 30MHz-1GHz

| Spectrum Parameters | Setting |
|---------------------|----------|
| RBW | 120KHz |
| VBW | 300KHz |
| Start frequency | 30MHz |
| Stop frequency | 1GHz |
| Sweep Time | Auto |
| Detector | QP |
| Trace Mode | Max Hold |

For Above 1GHz

| Spectrum Parameters | Setting |
|---------------------|--------------------------------------|
| RBW | 1MHz |
| VBW | PEAK Measurement |
| | AVG Measurement |
| 3MHz | Duty cycle $\geq 98\%$, VBW=10Hz |
| | Duty cycle $< 98\%$, VBW $\geq 1/T$ |
| Start frequency | 1GHz |
| Stop frequency | 25GHz |
| Sweep Time | Auto |
| Detector | PEAK |
| Trace Mode | Max Hold |

3.4. Test Procedure

- a. EUT was placed on a turn table, which is 0.8 meter high above ground for below 1GHz test, and which is 1.5 meter high above ground for above 1GHz test.
- b. EUT is set 3 meters away from the receiving antenna, which is mounted on a antenna tower.
- c. Set the EUT transmit continuously with maximum output power.
- d. The turn table can rotate 360 degrees to determine the position of the maximum emission level.
- e. The antenna can be moved up and down between 1 meter and 4 meters to find out the maximum emission level. Both horizontal and vertical polarization of the antenna are set on test.
- f. Spectrum analyzer setting parameters in accordance with section 10.3.
- g. Repeat above procedures until all channels and test modes were measured.
- h. Record the results in the test report.

Note:

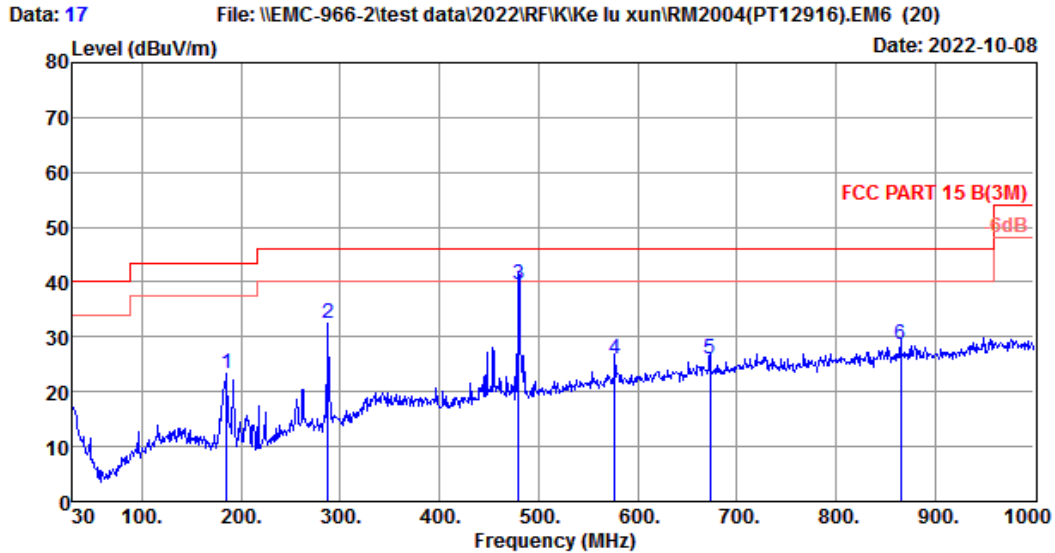
1. For emissions above 1GHz, if peak level comply with average limit, then the average level is deemed to comply with average limit.
2. The frequency 2402MHz ,2441MHz and 2480MHz is fundamental frequency which no limit, the limit on plots is automatically generated by the software, it's not fundamental limit, we can't remove it.

3.5. Test Result

Radiated Emissions Below 1GHz

EST Technology

Chilingxiang, Qishantou, Santun,
Houjie, Dongguan,Guangdong,China
Tel:+86-769-83081888
Fax:+86-769-83081878

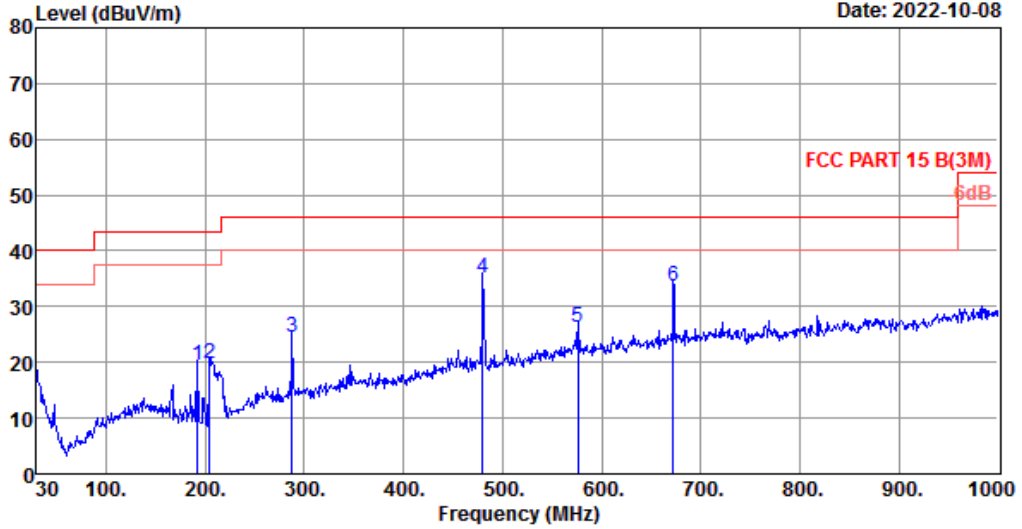


Site no. : 2# 966 chamber Data no. : 17
 Dis. / Ant. : 3m 47018 Ant. pol. : HORIZONTAL
 Limit : FCC PART 15 B(3M)
 Env. / Ins. : Temp:20.9°C;Humi:48.5%;Press:101.50kPa
 Engineer : Frank
 EUT : 1-Din Audio Mechless
 Power : DC 12V From Battery
 M/N : RM2004
 Test Mode : TX Mode
 CW51+PT12916

| | Freq. (MHz) | ANT Factor (dB/m) | Cable Loss (dB) | Reading (dBuV) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|---|----------------|-------------------------|-----------------------|-------------------|-------------------------------|-------------------|----------------|--------|
| 1 | 185.20 | 9.60 | 1.12 | 12.59 | 23.31 | 43.50 | 20.19 | QP |
| 2 | 288.02 | 13.76 | 1.57 | 17.29 | 32.62 | 46.00 | 13.38 | QP |
| 3 | 480.08 | 17.10 | 2.26 | 20.13 | 39.49 | 46.00 | 6.51 | QP |
| 4 | 577.08 | 20.17 | 2.49 | 3.18 | 25.84 | 46.00 | 20.16 | QP |
| 5 | 673.11 | 21.70 | 2.78 | 1.36 | 25.84 | 46.00 | 20.16 | QP |
| 6 | 865.17 | 23.95 | 3.21 | 1.53 | 28.69 | 46.00 | 17.31 | QP |

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
 2. Margin= Limit - Emission Level.
 3. The emission levels that are 20dB below the official limit are not reported.

Data: 18 File: \\EMC-966-2\test data\2022\RF\K\Ke lu xun\RM2004(PT12916).EM6 (20) Date: 2022-10-08



Site no. : 2# 966 chamber Data no. : 18
 Dis. / Ant. : 3m 47018 Ant. pol. : VERTICAL
 Limit : FCC PART 15 B(3M)
 Env. / Ins. : Temp:20.9°C;Humi:48.5%;Press:101.50kPa
 Engineer : Frank
 EUT : 1-Din Audio Mechless
 Power : DC 12V From Battery
 M/N : RM2004
 Test Mode : TX Mode
 CW51+PT12916

| | Freq. (MHz) | ANT Factor (dB/m) | Cable Loss (dB) | Reading (dBuV) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|---|----------------|-------------------------|-----------------------|-------------------|-------------------------------|-------------------|----------------|--------|
| 1 | 191.99 | 9.16 | 1.09 | 9.10 | 19.35 | 43.50 | 24.15 | QP |
| 2 | 204.60 | 9.00 | 1.13 | 9.67 | 19.80 | 43.50 | 23.70 | QP |
| 3 | 288.02 | 13.76 | 1.57 | 9.22 | 24.55 | 46.00 | 21.45 | QP |
| 4 | 480.08 | 17.10 | 2.26 | 15.78 | 35.14 | 46.00 | 10.86 | QP |
| 5 | 576.11 | 20.16 | 2.49 | 3.61 | 26.26 | 46.00 | 19.74 | QP |
| 6 | 672.14 | 21.70 | 2.79 | 9.24 | 33.73 | 46.00 | 12.27 | QP |

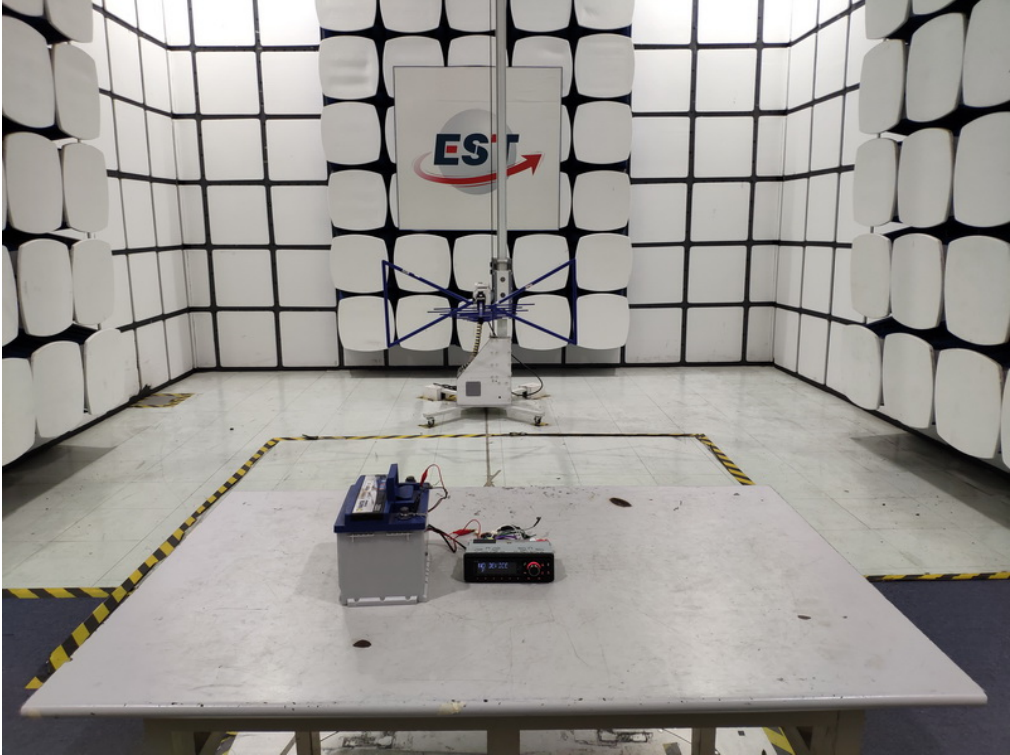
Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
 2. Margin= Limit - Emission Level.
 3. The emission levels that are 20dB below the official limit are not reported.

Note:

1. The amplitude of 9KHz to 30MHz spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be reported.
2. All test mode had been pre-test, only the worst case was reported.

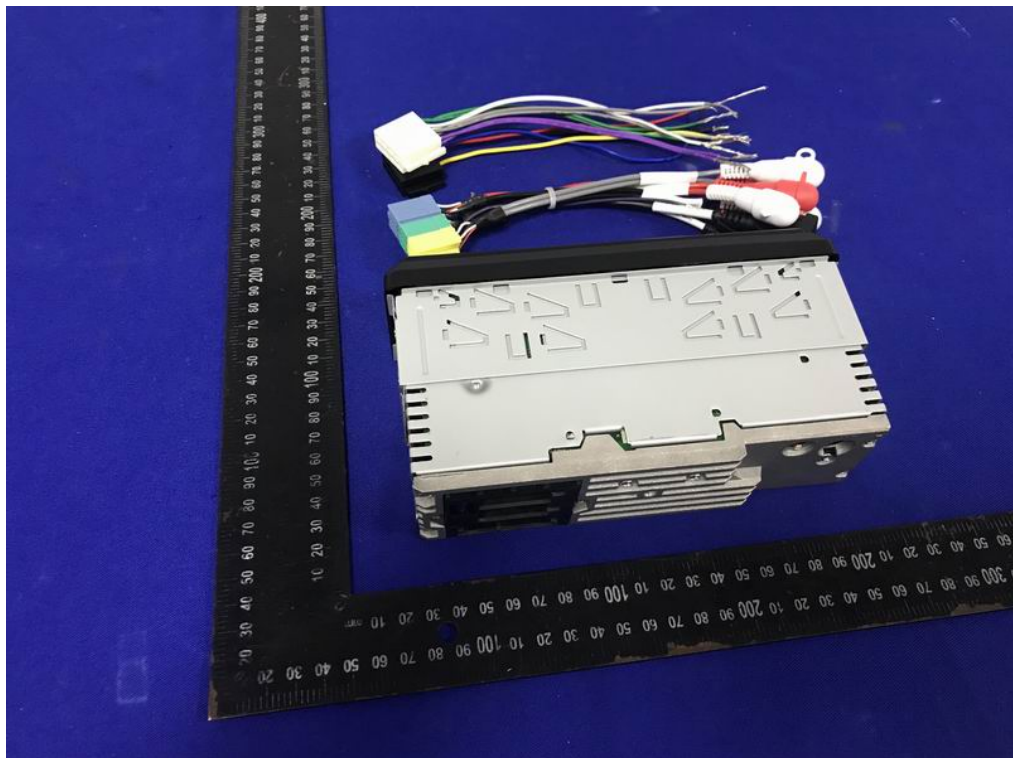
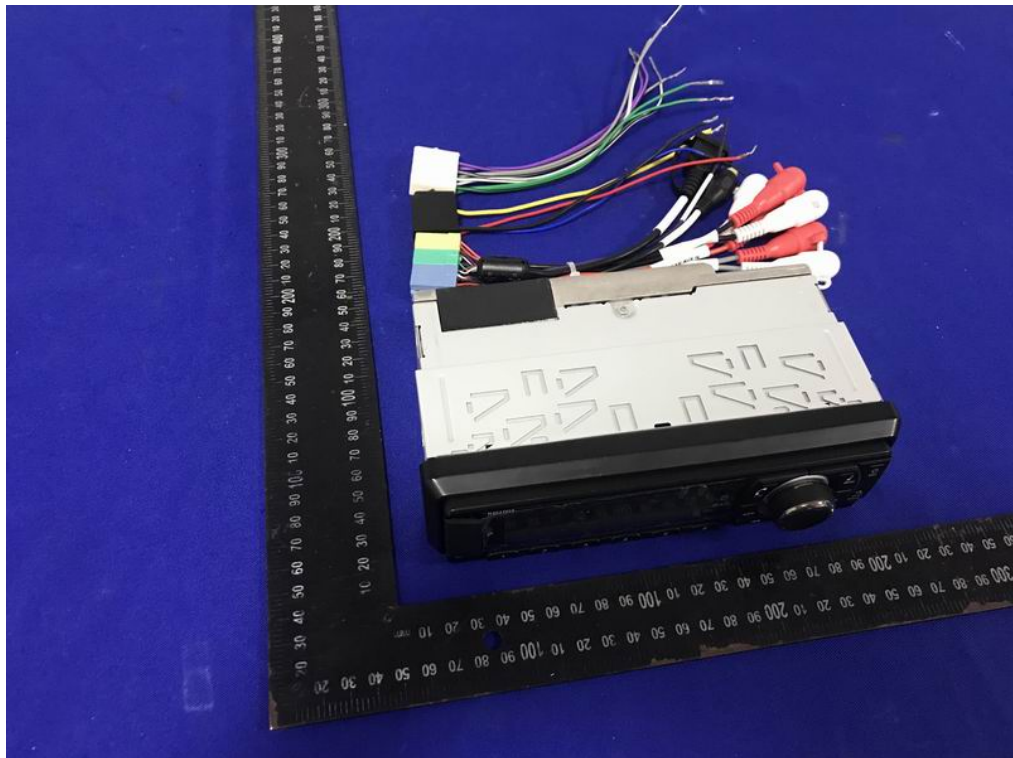
4. TEST SETUP PHOTO

Radiated Test (Below 1GHz)

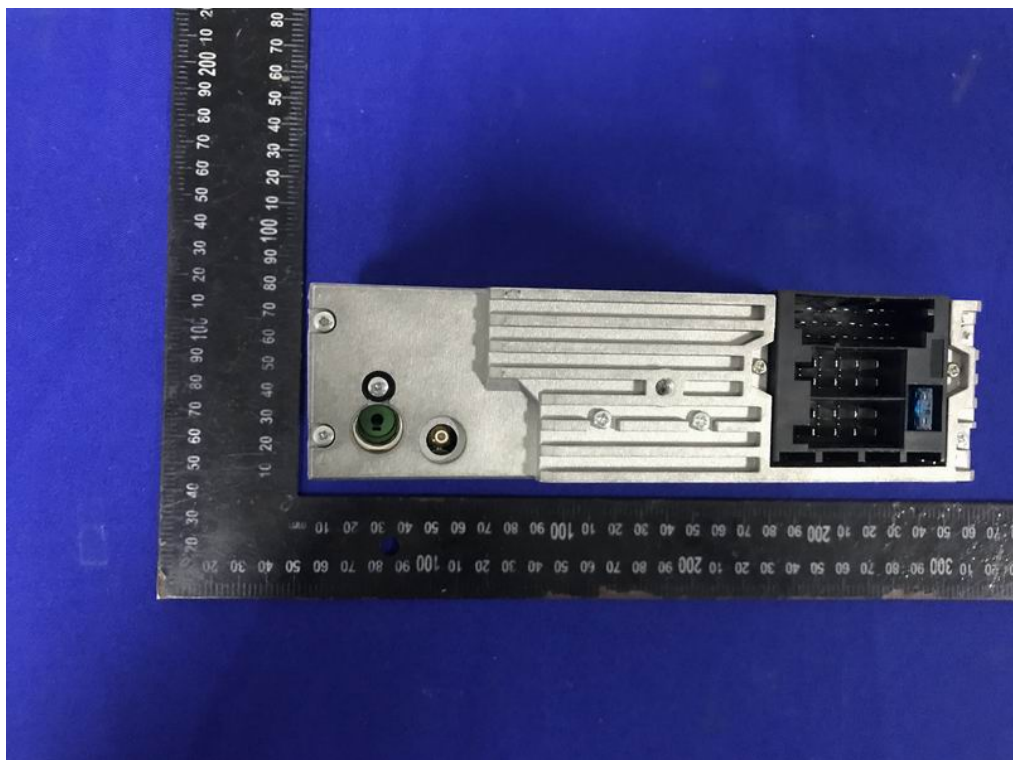


5. EUT PHOTO

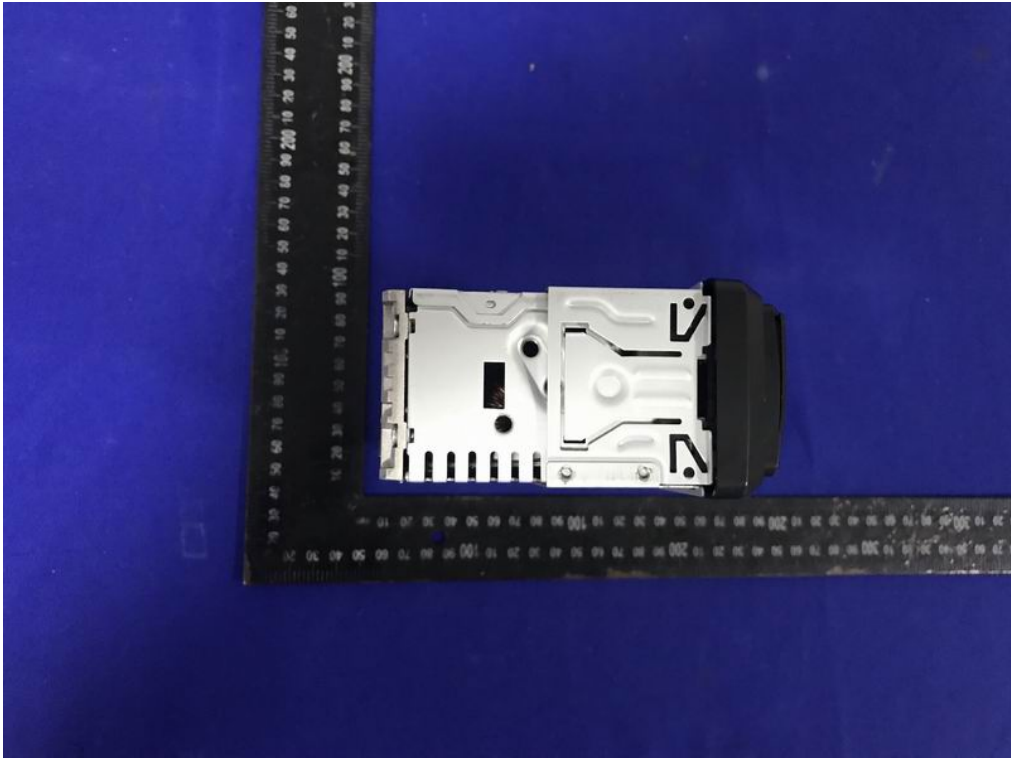
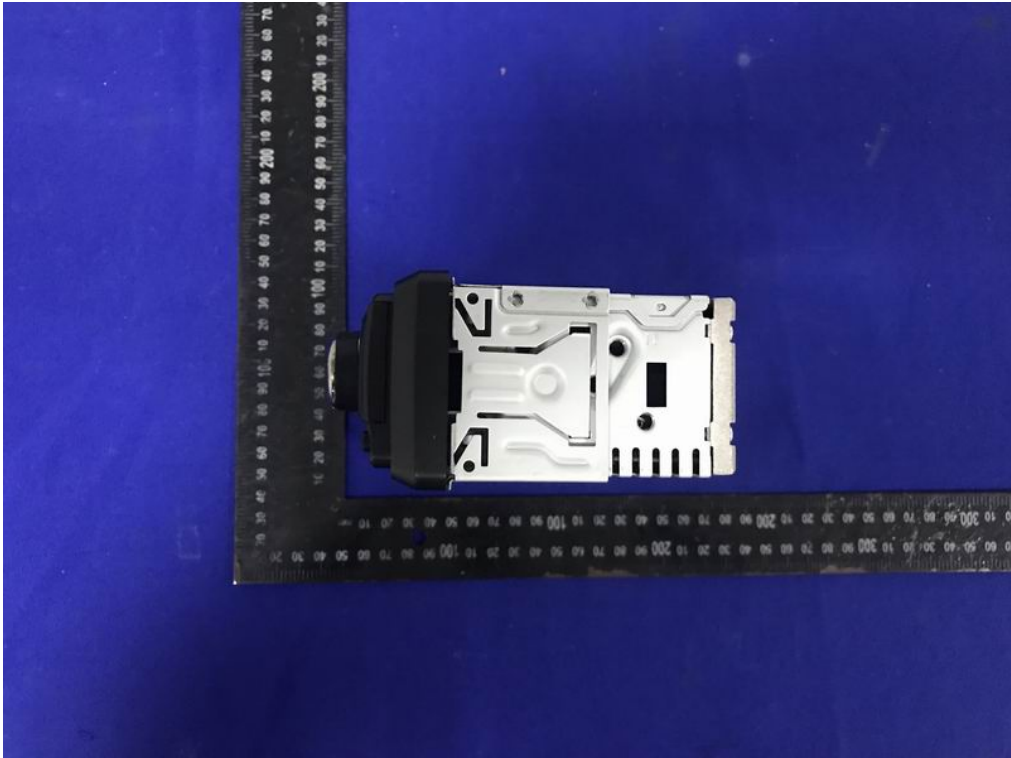
External Photos
M/N: RM2004



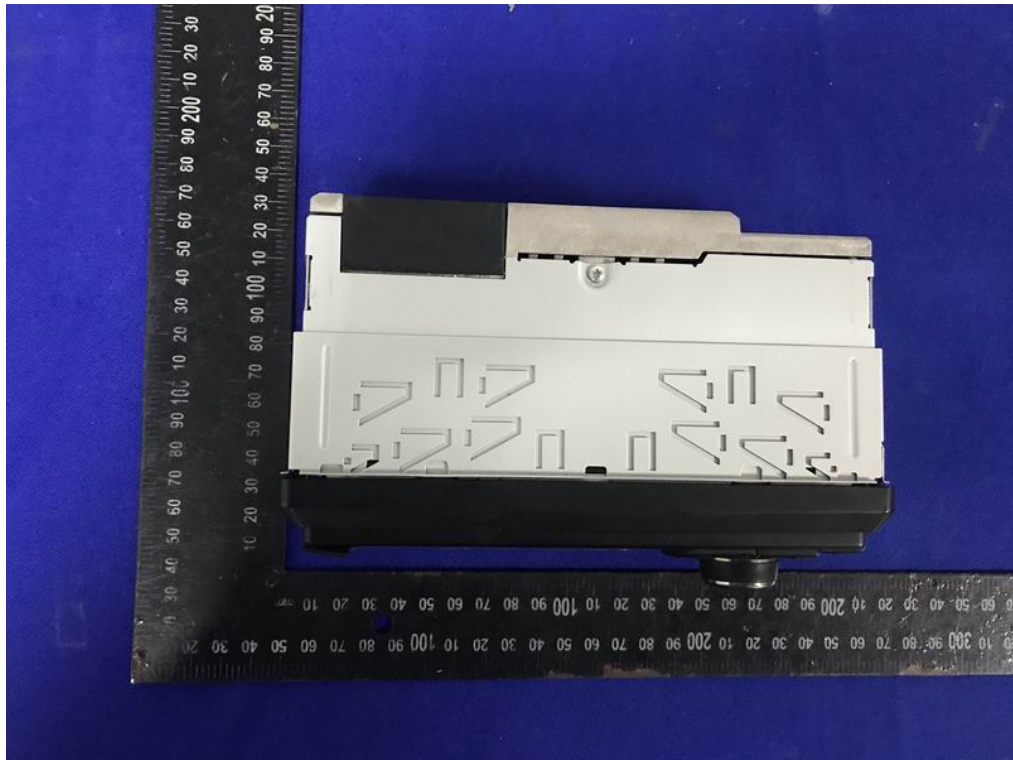
External Photos
M/N: RM2004



External Photos
M/N: RM2004



External Photos
M/N: RM2004



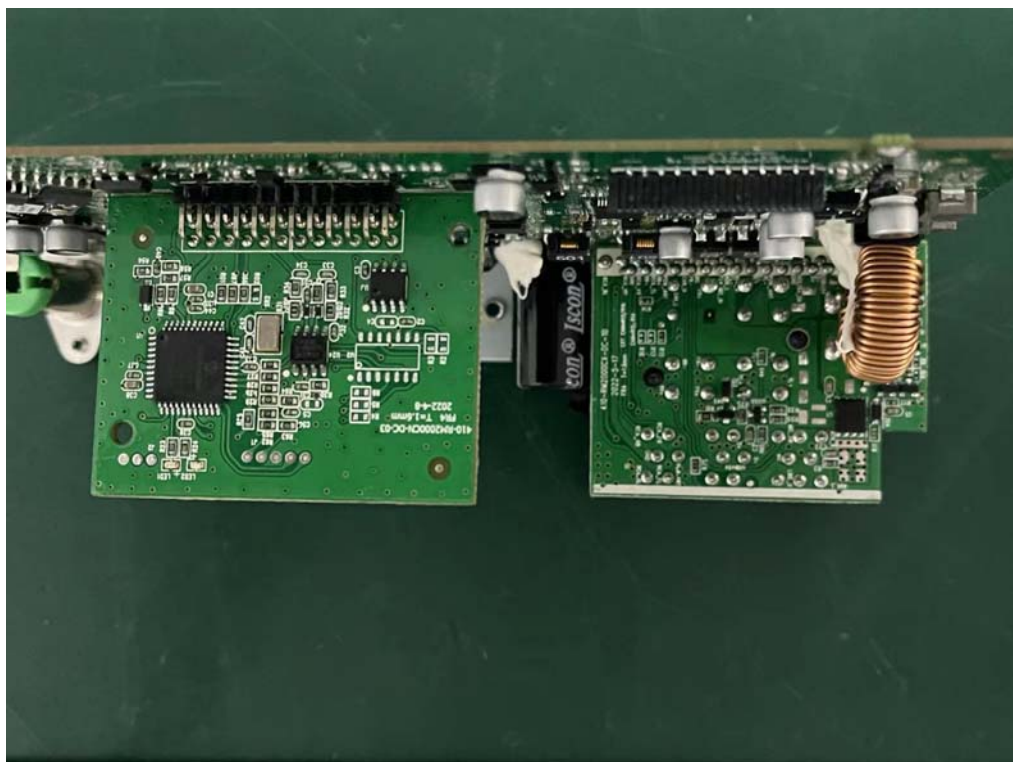
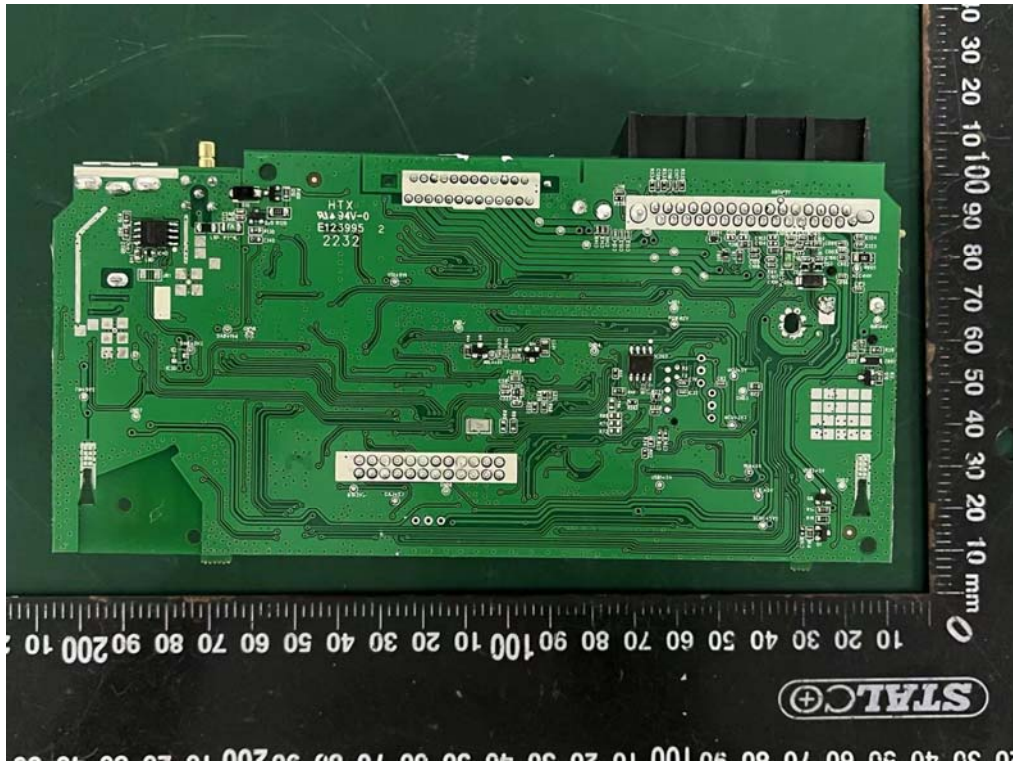
Internal Photos
M/N: RM2004



Internal Photos
M/N: RM2004



Internal Photos
M/N: RM2004

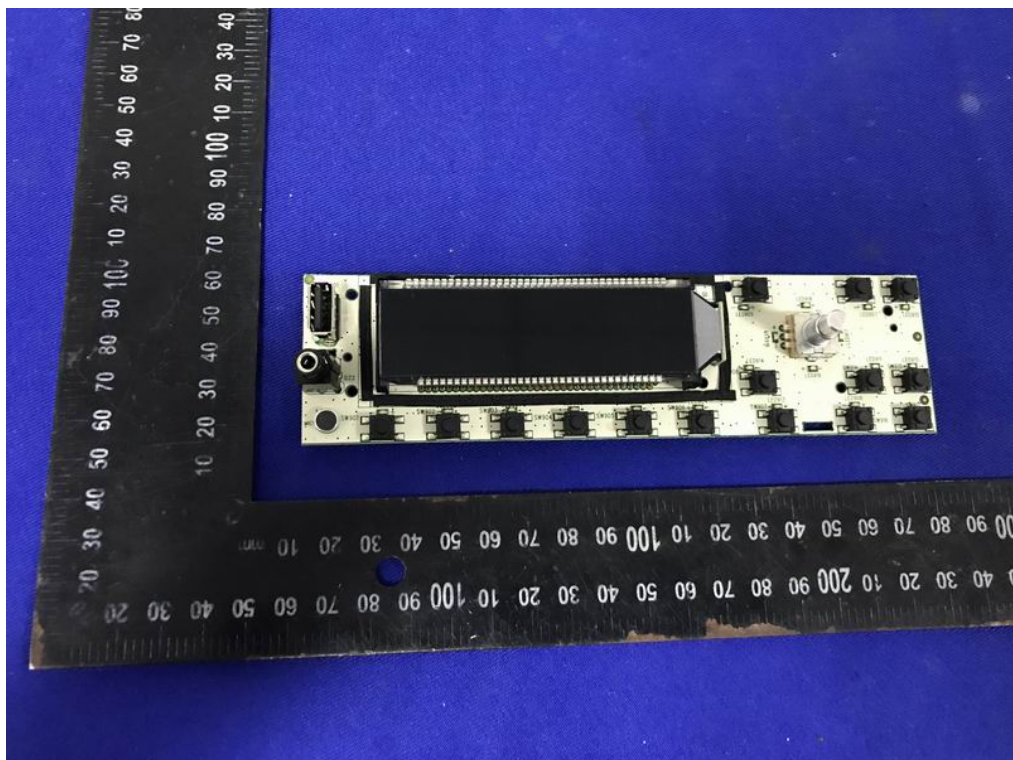
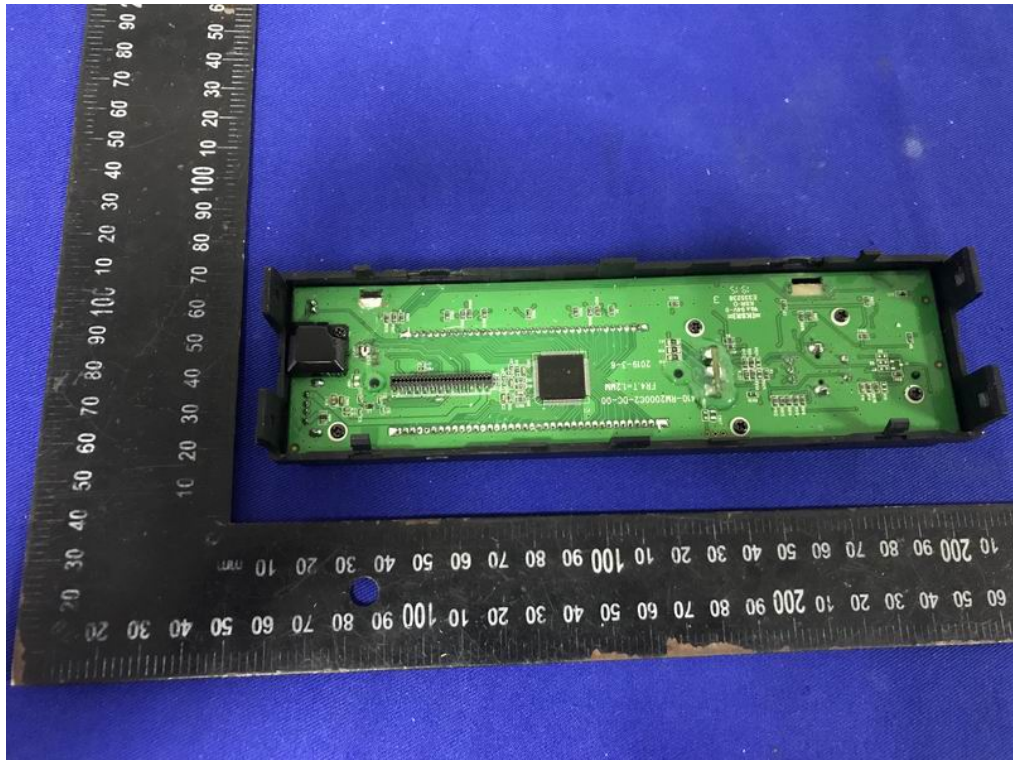


Internal Photos
M/N: RM2004



Bluetooth Antenna

Internal Photos
M/N: RM2004



End of Test Report