# FCC PART 15 SUBPART C TEST REPORT

# for

# FM Transmitter Module &Multiple Cradle

# Model No.: AC-3100

# FCC ID: YEKAC3100

of

Applicant: DIGIDOCK DEVELOPMENT INC.
Address: 6F, No.151, Xinhu 1st Rd., Neihu Dist., Taipei City 11494, Taiwan(R.O.C.)

Tested and Prepared

by

**Worldwide Testing Services (Taiwan) Co., Ltd.**

**FCC Registration No.: 930600**

**Industry Canada filed test laboratory Reg. No. IC 5679A-1**

**A2LA Accredited No.: 2732.01**

**Report No.: W6M21004-10592-P-15**

6F, NO. 58, LANE 188, RUEY-KUANG RD., NEIHU TAIPEI 114, TAIWAN, R.O.C.
TEL: 886-2-66068877 FAX: 886-2-66068879 E-mail: wts@wts-lab.com

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# 1 General Information

## 1.1 Notes

The purpose of conformity testing is to increase the probability of adherence to the essential requirements or conformity specifications, as appropriate.
The complexity of the technical specifications, however, means that full and thorough testing is impractical for both technical and economic reasons.
Furthermore, there is no guarantee that a test sample which has passed all the relevant tests conforms to a specification.
Neither is there any guarantee that such a test sample will interwork with other genuinely open systems.
The existence of the tests nevertheless provides the confidence that the test sample possesses the qualities as maintained and that is performance generally conforms to representative cases of communications equipment.

The test results of this test report relate exclusively to the item tested as specified in 1.5.
The test report may only be reproduced or published in full.
Reproduction or publication of extracts from the report requires the prior written approval of the Worldwide Testing Services(Taiwan) Co., Ltd.

**Tester:**

| Date | WTS-Lab. | Name | Signature |
|---|---|---|---|
| July 27, 2010 | | Rick Chen | Rick Chen. |

**Technical responsibility for area of testing:**

| Date | WTS | Name | Signature |
|---|---|---|---|
| July 27, 2010 | | Chang Tse-Ming | Chang Tse-Ming |

Note:
1. This test report is valid in connection to the model has been tested, any modification to the product which is different from the test model will avoid the certification of the test report.
2. This test report shall always be duplicated in full pages unless the written approval of the testing laboratory is obtained.
3. The X and Y in multi-listing model number are representing different accessories.

Registration number: W6M21004-10592-P-15
FCC ID: YEKAC3100

## 1.2 Testing laboratory

### 1.2.1 Location

OATS
No.5-1, Shuang Sing Village,
LiShuei Rd., Wanli Township,
Taipei County 207, Taiwan (R.O.C.)
Company
Worldwide Testing Services(Taiwan) Co., Ltd.
6F, NO. 58, LANE 188, RUEY-KUANG RD.
NEIHU, TAIPEI 114, TAIWAN R.O.C.
Tel : 886-2-66068877
Fax : 886-2-66068879

### 1.2.2 Details of accreditation status

Accredited testing laboratory

A2LA accredited number: 2732.01

FCC filed test laboratory Reg. No. 930600

Industry Canada filed test laboratory Reg. No. IC 5679A-1



**Test location, where different from Worldwide Testing Services (Taiwan) Co., Ltd. :**

| | |
|---|---|
| Name: | ./. |
| Accredited number: | ./. |
| Street: | ./. |
| Town: | ./. |
| Country: | ./. |
| Telephone: | ./. |
| Fax: | ./. |

## 1.3 Details of approval holder

| | |
|---|---|
| Name: | DIGIDOCK DEVELOPMENT INC. |
| Street: | 6F, No.151, Xinhu 1st Rd., Neihu Dist., |
| Town: | Taipei City 11494, |
| Country: | Taiwan(R.O.C.) |
| Telephone: | 886-2-2790-1089 |
| Fax: | 886-2-2790-2429 |

## 1.4 Application details

| | |
|---|---|
| Date of receipt of test sample: | April 28, 2010 |
| Date of test: | from April 28, 2010 to July 23, 2010 |

## 1.5 General information of Test item

| | |
|---|---|
| Type of test item: | FM Transmitter Module &Multiple Cradle |
| Model Number: | AC-3100 |
| Multi-listing model number: | CR-3XXXFMYYY (XXX=0~9, YYY=A~Z) |
| Transmitting frequency: | 88.3 – 88.9 MHz |
| Operation mode: | simplex |
| Modulation Type: | FM |
| Voltage supply: | DC 12-24 V |
| Channel Numbers: | 4 |
| Frequency of selectable channel: | 88.3 / 88.5 / 88.7 / 88.9 MHz |
| Antenna Type | PCB Antenna |
| Photos: | see Appendix |

**Manufacturer**:(if different from Approval Holder)

| | |
|---|---|
| Name: | ./. |
| Street: | ./. |
| | ./. |
| Town: | ./. |
| Country: | ./. |

## 1.6 Test standards

Technical standard :

FCC RULES PART 15 SUBPART C § 15.203, § 15.209, § 15.239 (2009-10)

# 2 Technical test

## 2.1 Summary of test results

No deviations from the technical specification(s) were ascertained in the course of the tests performed. ☒

or

The deviations as specified in 3 were ascertained in the course of the tests performed. ☐

## 2.2 Test environment

| | |
|---|---|
| Temperature: | 23 °C |
| Relative humidity content: | 20 ... 75 % |
| Air pressure: | 86 ... 103 kPa |
| Details of power supply: | DC 12-24 V |

## 2.3 Test equipment utilized

| No. | Test equipment | Type | Serial No. | Manufacturer | Cal. Date | Next Cal. Date |
|---|---|---|---|---|---|---|
| ETSTW-CE 001 | EMI TEST RECEIVER | ESHS10 | 842121/013 | R&S | 2009/9/10 | 2010/9/9 |
| ETSTW-CE 004 | ZWEILEITER-V-NETZNACHBILDUNG TWO-LINE V-NETWORK | ESH3-Z5 | 840731/011 | R&S | 2010/3/2 | 2011/3/1 |
| ETSTW-CE 005 | Line-Impedance Stabilisation Network | NNBM 8126D | 137 | Schwarzbeck | 2009/9/9 | 2010/9/8 |
| ETSTW-CE 006 | IMPULSBEGRENZER PULSE LIMITER | ESH3-Z2 | 100226 | R&S | 2010/5/8 | 2011/5/7 |
| ETSTW-CE 007 | SPECTRUM ANALYZER 5GHz | FSB | 849670/001 | R&S | Pre-test Use NCR | |
| ETSTW-CE 008 | HF-EICHLEITUNG RF STEP ATTENUATOR 139dB DPSP | 334.6010.02 | 844581/024 | R&S | Function Test | |
| ETSTW-CE 009 | TEMP.&HUMIDITY CHAMBER | GTH-225-40-1P-U | MAA0305-009 | GIANT FORCE | 2010/7/21 | 2011/7/19 |
| ETSTW-CE 015 | CISPR 22 TWO BALANCED TELECOM PAIRS IMPEDANCE STABILIZATION NETWORK | FCC-TLISN-T8-02 | 20307 | FCC | 2009/9/12 | 2010/9/11 |
| ETSTW-CE 016 | TWO-LINE V-NETWORK | ENV216 | 100050 | R&S | 2009/9/9 | 2010/9/8 |
| ETSTW-RE 002 | Function Generator | 33220A | MY43004982 | Agilent | Function Test | |
| ETSTW-RE 003 | EMI TEST RECEIVER | ESI 26 | 831438/001 | R&S | 2009/10/1 | 2010/9/30 |
| ETSTW-RE 004 | EMI TEST RECEIVER | ESI 40 | 832427/004 | R&S | 2009/9/18 | 2010/9/17 |
| ETSTW-RE 005 | EMI TEST RECEIVER | ESVS10 | 843207/020 | R&S | 2009/9/11 | 2010/9/10 |
| ETSTW-RE 006 | Attenuator 10dB | 50HF-010-5N-1 | None | STEP | 2010/3/5 | 2011/3/4 |
| ETSTW-RE 010 | ABSORBING CLAMP | MDS 21 | 3469 | Schwarzbeck | 2009/9/11 | 2010/9/10 |
| ETSTW-RE 012 | TUNABLE BANDREJECT FILTER | D.C 0309 | 146 | K&L | Function Test | |
| ETSTW-RE 013 | TUNABLE BANDREJECT FILTER | D.C 0336 | 397 | K&L | Function Test | |
| ETSTW-RE 018 | MICROWAVE HORN ANTENNA | AT4560 | 27212 | AR | 2009/10/1 | 2010/9/30 |
| ETSTW-RE 020 | MICROWAVE HORN ANTENNA | AT4002A | 306915 | AR | Function Test | |
| ETSTW-RE 021 | SWEEP GENERATOR | SWM05 | 835130/010 | R&S | 2009/8/19 | 2010/8/18 |
| ETSTW-RE 027 | Passive Loop Antenna | 6512 | 00034563 | EMCO | 2009/8/14 | 2011/8/13 |
| ETSTW-RE 028 | Log-Periodic Dipole Array Antenna | 3148 | 34429 | EMCO | 2010/4/14 | 2011/4/13 |
| ETSTW-RE 029 | Biconical Antenna | 3109 | 33524 | EMCO | 2010/4/14 | 2011/4/13 |
| ETSTW-RE 030 | Double-Ridged Guide Horn Antenna | 3117 | 00035224 | EMCO | 2010/3/2 | 2011/3/1 |
| ETSTW-RE 032 | Millivoltmeter | URV 55 | 849086/013 | R&S | 2009/8/23 | 2010/8/22 |
| ETSTW-RE 033 | WaveRunner 6000A Serise Oscilloscope | WAVERUNNER 6100A | LCRY0604P14508 | LeCroy | Function Test | |
| ETSTW-RE 034 | Power Sensor | URV5-Z4 | 839313/006 | R&S | 2009/8/23 | 2010/8/22 |
| ETSTW-RE 042 | Biconical Antenna | HK116 | 100172 | R&S | 2010/1/13 | 2011/1/12 |
| ETSTW-RE 043 | Log-Periodic Dipole Antenna | HL223 | 100166 | R&S | 2010/4/29 | 2011/4/28 |
| ETSTW-RE 044 | Log-Periodic Antenna | HL050 | 100094 | R&S | 2010/5/11 | 2011/5/10 |
| ETSTW-RE 047 | PSA SERIES SPECTRUM ANALYZER | E4445A | MY46181369 | Agilent | Pre-test Use NCR | |
| ETSTW-RE 048 | Triple Loop Antenna | HXYZ 9170 | HXYZ 9170-134 | Schwarzbeck | 2009/8/31 | 2010/8/30 |

| | | | | | | |
|---|---|---|---|---|---|---|
| ETSTW-RE 049 | TRILOG Super Broadband test Antenna | VULB 9160 | 9160-3185 | Schwarzbeck | 2010/4/13 | 2011/4/12 |
| ETSTW-RE 051 | Attenuator 6dB | 50HF-006-1 | None | JFW | 2010/3/5 | 2011/3/4 |
| ETSTW-RE 053 | Attenuator 3dB | 50HF-003-1 | None | JFW | 2010/3/5 | 2011/3/4 |
| ETSTW-RE 055 | SPECTRUM ANALYZER | FSU 26 | 200074 | R&S | 2010/6/3 | 2011/6/2 |
| ETSTW-RE 060 | Attenuator 30dB | 5015-30 | F651012z-01 | ATM | Pre-test Use NCR | |
| ETSTW-RE 061 | Amplifier Module | CHC 1 | None | ETS | 2009/11/12 | 2010/11/11 |
| ETSTW-RE 062 | Amplifier Module | CHC 2 | None | KMIC | 2009/11/12 | 2010/11/11 |
| ETSTW-RE 064 | Bluetooth Test Set | MT8852B-042 | 6K00005709 | Anritsu | Function Test | |
| ETSTW-RE 065 | Amplifier | AMF-6F-18002650-25-10P | 941608 | MITEQ | 2010/4/13 | 2011/4/12 |
| ETSTW-RE 066 | Highpass Filter | H1G013G1 | 206015 | MICROWAVE CIRCUITS, INC. | 2010/3/5 | 2011/3/4 |
| ETSTW-RE 072 | CELL SITE TEST SET | 8921A | 3339A00375 | HP | 2009/10/2 | 2010/10/1 |
| ETSTW-RE 073 | Power Meter | N1911A | MY45100769 | Agilent | 2010/1/7 | 2011/1/6 |
| ETSTW-RE 074 | Power Sensor | N1921A | MY45241198 | Agilent | 2010/1/7 | 2011/1/6 |
| ETSTW-RE 081 | Highpass Filter | H03G13G1 | 4260-02 DC0428 | MICROWAVE CIRCUITS, INC. | 2010/3/5 | 2011/3/4 |
| ETSTW-RE 096 | SIGNAL GENERATOR | SMIQ 03B | 102274 | R&S | 2010/5/31 | 2011/5/30 |
| ETSTW-RE 099 | DC Block | 50DB-007-1 | None | JFW | 2010/3/5 | 2011/3/4 |
| ETSTW-RE 105 | 2.4GHz Notch Filter | NO124411 | 39555 | MICROWAVE CIRCUITS, INC. | 2010/3/25 | 2011/3/24 |
| ETSTW-RE 106 | Humidity Temperature Meter | TES-1366 | 091011113 | TES | 2010/3/25 | 2011/3/24 |
| ETSTW-GSM 002 | Universal Radio Communication Tester | CMU 200 | 109439 | R&S | 2009/9/22 | 2010/9/21 |
| ETSTW-GSM 019 | Band Reject Filter | WRCTF824/849-822/851-40/12+9SS | 3 | WI | Function Test | |
| ETSTW-GSM 020 | Band Reject Filter | WRCD1747/1748-1743/1752-32/5SS | 1 | WI | Function Test | |
| ETSTW-GSM 021 | Band Reject Filter | WRCD1879.5/1880.5-1875.5/1884.5-32/5SS | 3 | WI | Function Test | |
| ETSTW-GSM 022 | Band Reject Filter | WRCT901.9/903.1-904.25-50/8SS | 1 | WI | Function Test | |
| ETSTW-GSM 023 | Power Divider | 4901.19.A | None | SUHNER | 2009/9/21 | 2010/9/20 |
| ETSTW-Cable 002 | Microwave Cable | SUCOFLEX 104（S_Cable 7） | 238093 | HUBER+SUHNER | 2009/9/16 | 2010/9/15 |
| ETSTW-Cable 003 | Microwave Cable | SUCOFLEX 104（S_Cable 11） | 209953 | HUBER+SUHNER | 2009/9/16 | 2010/9/15 |
| ETSTW-Cable 006 | Microwave Cable | SUCOFLEX 104（S_Cable 8） | 238095 | HUBER+SUHNER | 2010/3/5 | 2011/3/4 |
| ETSTW-Cable 010 | BNC Cable | 5 M BNC Cable | None | JYE BAO CO.,LTD. | 2010/3/5 | 2011/3/4 |
| ETSTW-Cable 011 | BNC Cable | BNC Cable 1 | None | JYE BAO CO.,LTD. | 2009/8/20 | 2010/8/19 |
| ETSTW-Cable 012 | BNC Cable | BNC Cable 2 | None | JYE BAO CO.,LTD. | 2009/8/20 | 2010/8/19 |
| ETSTW-Cable 013 | Microwave Cable | SUCOFLEX 104（S_Cable 5） | 232345 | HUBER+SUHNER | 2010/3/5 | 2011/3/4 |
| ETSTW-Cable 022 | N TYPE Cable | OATS Cable 3 | 0002 | JYE BAO CO.,LTD. | 2010/3/5 | 2011/3/4 |
| ETSTW-Cable 039 | Microwave Cable | SUCOFLEX 104（S_Cable 19） | 316739 | HUBER+SUHNER | 2010/3/5 | 2011/3/4 |
| WTSTW-SW 001 | EMI TEST SOFTWARE | Harmonics-1000 | None | EMC PARTNER | HARCS Version 4.16<br>Firmware Version 2.18 | |

| | | | | | |
|---|---|---|---|---|---|
| WTSTW-SW 002 | EMI TEST SOFTWARE | EZ_EMC | None | Farad | Version ETS-03A1 |
| WTSTW-SW 003 | EMS TEST SOFTWARE | i2 | None | AUDIX | Version 3.2007-8-17b |
| WTSTW-SW 005 | GSM Fading Level Correction | GSMFadLevCor | None | R&S | Version 1.66 |

## 2.4 General Test Procedure

**POWER LINE CONDUCTED INTERFERENCE:** The procedure used was ANSI STANDARD C63.4-2003 using a 50µH LISN (if necessary). Both lines were observed. The bandwidth of the spectrum analyzer was 10 kHz with an appropriate sweep speed.

**RADIATION INTERFERENCE:** The test procedure used was according to ANSI STANDARD C63.4-2003 employing a spectrum analyzer. For investigated frequency is equal to or below 1GHz, the RBW and VBW of the spectrum analyzer was 100 kHz and 100kHz respectively with an appropriate sweep speed. For investigated frequency is above 1GHz, both of RBW and VBW of the spectrum analyzer were 1 MHz with an appropriate sweep speed. The analyzer was calibrated in dB above a microvolt at the output of the antenna.

**FORMULA OF CONVERSION FACTORS:** The Field Strength at 3m was established by adding the meter reading of the spectrum analyzer (which is set to read in units of dBµV) to the antenna correction factor supplied by the antenna manufacturer. The antenna correction factors are stated in terms of dB.

Example:

| Freq (MHz) | METER READING + ACF + CABLE LOSS (to the receiver) = FS |
|---|---|
| 33 | 20 dBµV + 10.36 dB + 6 dB = 36.36 dBµV/m @3m |

The EUT was placed on a table 80 cm high and with dimensions of 1m by 1.5m (non metallic table) and arranged according to ANSI C63.4-2003 Section 13.1.2. The table used for radiated measurements is capable of continuous rotation. The spectrum was scanned from 30 MHz to the frequency specified as follows:

(1) If the intentional radiator operates below 10 GHz: to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.
(2) If the intentional radiator operates at or above 10 GHz and below 30 GHz: to the fifth harmonic of the highest fundamental frequency or to 100 GHz, whichever is lower.
(3) If the intentional radiator operates at or above 30 GHz: to the fifth harmonic of the highest fundamental frequency or to 200 GHz, whichever is lower, unless specified otherwise elsewhere in the rules.
(4) If the intentional radiator contains a digital device, regardless of whether this digital device controls the functions of the intentional radiator or the digital device is used for additional control or function purposes other than to enable the operation of the intentional radiator, the frequency range shall be investigated up to the range specified in paragraphs (a)(1)-(a)(3) of this section or the range applicable to the digital device, as shown in paragraph (b)(1) of this Section, whichever is the higher frequency range of investigation.

For hand-held devices, a exploratory test was performed with three (3) orthogonal planes to determine the highest emissions.
Measurements were made by Worldwide Testing Services(Taiwan) Co., Ltd. at the registered open field test site located at No.5-1, Shuang Sing Village, LiShuei Rd., Wanli Township, Taipei County 207, Taiwan (R.O.C.) The Registration Number: **930600**.

When an emission was found, the table was rotated to produce the maximum signal strength. At this point, the antenna was raised and lowered from 1m to 4m. The antenna was placed in both the horizontal and vertical planes.

When the radiated emission limits are expressed in terms of the average value of the emission, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value.

The formula is as follows:
Average = Peak + Duty Factor
Duty Factor = 20 log (dwell time/T)
T = 100ms when the pulse train period is over 100 ms or the period of the pulse train.

Modified Limits for peak according to 15.35 (b) = Max Permitted average Limits + 20dB

## 2.5 Product Description and System Test Configuration

### 2.5.1 Production Description

Insert the Transmitter into the Cigar Lighter of the motor vehicle.
Pull out the adjustable plug to fit into the voice output of i-POD.
Choose one of the frequency from channel 88.3, 88.5, 88.7, 88.9 MHz of the transmitter, and tune the FM receiver to the same frequency, then you'll enjoy the music from the i-POD.

### 2.5.2 System Test Configuration

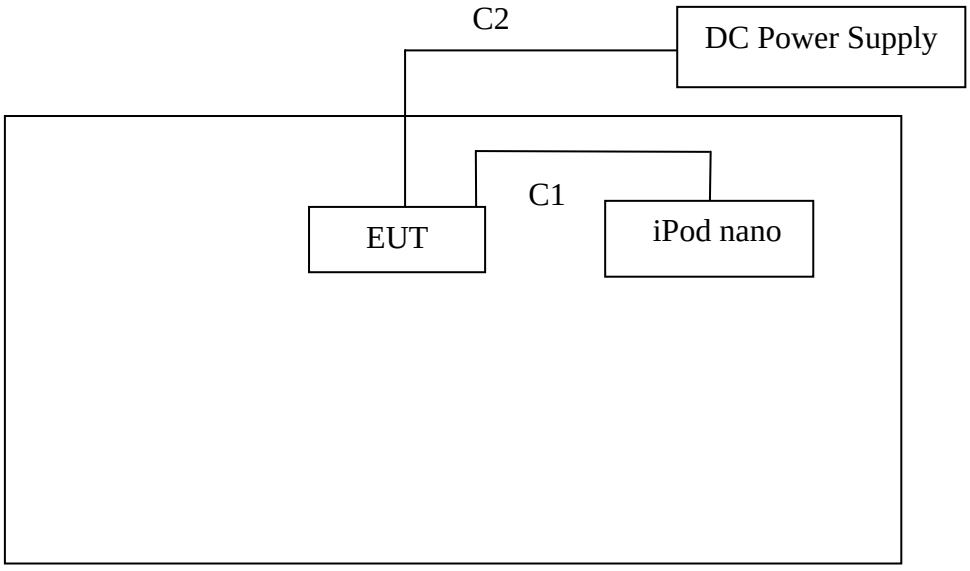
#### 2.5.2.1 Supported Ancillary Equipment

| Item | Name of Equipment | Manufacturer | Model Number | FCC ID | Note |
|---|---|---|---|---|---|
| 1 | DC Power Supply | ABM | 9306D | N/A | N/A |
| 2 | iPod nano | Apple | A1199 | N/A | N/A |

#### 2.5.2.2 The relevant cables of Supported Ancillary Equipment

| Item | Name of Cables | Shielded Used | Ferrite Used | Length | Note |
|---|---|---|---|---|---|
| C1 | Audio Line | Non-Shielded | N/A | 0.5m | Detachable |
| C2 | Power Line | Non-Shielded | N/A | 1.2m | Detachable |

#### 2.5.2.3 Setup Configuration



#### 2.5.2.4 Description of Test Mode

The system was configured for testing in a typical arrangement as the manufacturer's declaration. During the test, the i-POD played program and set the volume to the maximum level. There was no special software to be exercised during the test.

There are four channels on EUT, and the operating frequency range of EUT is from 88.3 MHz to 88.9 MHz. We choose the middle channel (88.7 MHz) for main final test.

## 2.6 The Description of Modification

No modification was made during the all test items been performed.

## 3 Test results (enclosure)

| TEST CASE | Required | Test passed | Test failed |
|---|---|---|---|
| Emission bandwidth 15.239 (a) | ☒ | ☒ | ☐ |
| Band Edge Measurement 15.239 (a) | ☒ | ☒ | ☐ |
| Carrier (Field Strength) 15.239 (b) | ☒ | ☒ | ☐ |
| Spurious Emissions 15.239 (c) | ☒ | ☒ | ☐ |
| Power Line Conducted Emission 15.207 | ☐ | ☐ | ☐ |

***Note: The lowest channel is 88.3 MHz and the highest channel is 88.9 MHz. The tuning control were manually adjusted to verify maximum tuning range.***

(The follows is intended to leave blank.)

## 3.1 Emission Bandwidth

FCC Rule: 15.239(a)

**88.7 MHz:**

| Test condition | | Detector | Bandwidth (kHz) | Limit (kHz) |
|---|---|---|---|---|
| $T_{nom}$= 23°C | $V_{nom}$ = 12 V | Peak | 72.14428858 | 200 |

Limit: 15.239(a)
Emissions from the intentional radiator shall be confined within a band 200 kHz wide centered on the operating frequency. The 200 kHz band shall lie wholly within the frequency range of 88-108 MHz.

Test equipment used: ETSTW-RE 003, ETSTW-RE 004, ETSTW-RE 029, ETSTW-RE 042

Explanation: See attached diagrams as Appendix.

## 3.2 Band Edge Measurement

FCC Rule: 15.239(a)

| Channel | Frequency MHz | Detector | Test Results (dBμV/m) | Limit (dBμV/m) |
|---|---|---|---|---|
| Lower Band-edge | 88.3 | Peak | -- | 40 |

Test equipment used: ETSTW-RE 003, ETSTW-RE 004, ETSTW-RE 029, ETSTW-RE 042

Explanation: Before testing, the tuning control were manually adjusted to verify maximum tuning range. The lowest channel is 88.3 MHz and the highest channel is 88.9 MHz. Band edge Measurement is not required because the emission bandwidth is only 72.1443 kHz.

### 3.3 Carrier ( Field Strength)

FCC Rule: 15.239(b) , 15.35

Model: AC-3100 Date: 2010/7/21
Mode: 12VDC Temperature: 31.4 ˚C Engineer: Rick
Polarization: Horizontal Humidity: 51 %

| Frequency (MHz) | Reading (dBuV) | Detector | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Table Degree (Deg.) | Ant. High (cm) |
|---|---|---|---|---|---|---|---|---|
| 88.6710 | 33.20 | AVG | 9.00 | 42.20 | 47.90 | -5.70 | 0 | 150 |

Polarization: Vertical

| Frequency (MHz) | Reading (dBuV) | Detector | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Table Degree (Deg.) | Ant. High (cm) |
|---|---|---|---|---|---|---|---|---|
| 88.6790 | 36.42 | AVG | 9.00 | 45.42 | 47.90 | -2.48 | 150 | 150 |

Mode: 24VDC
Polarization: Horizontal

| Frequency (MHz) | Reading (dBuV) | Detector | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Table Degree (Deg.) | Ant. High (cm) |
|---|---|---|---|---|---|---|---|---|
| 88.6870 | 27.18 | AVG | 9.00 | 36.18 | 47.90 | -11.72 | 210 | 150 |

Polarization: Vertical

| Frequency (MHz) | Reading (dBuV) | Detector | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Table Degree (Deg.) | Ant. High (cm) |
|---|---|---|---|---|---|---|---|---|
| 88.6890 | 30.10 | AVG | 9.00 | 39.10 | 47.90 | -8.80 | 150 | 150 |

Limit:
15.239(b)
The field strength of any emissions within the permitted 200 kHz band shall not exceed 250 microvolts/meter ( 47.90 dBuV/m ) at 3 meters.

Test equipment used: ETSTW-RE 003, ETSTW-RE 004, ETSTW-RE 029, ETSTW-RE 042

Explanation: In this case, the average limit is met when using a peak detector, the EUT shall be deemed to meet both limits of peak and average and measurement with the average detector is unnecessary. See attached diagrams as Appendix.

## 3.4 Spurious Emission

FCC Rules: 15.239 (c), 15.209
Radiated emission measurements were performed from 30 MHz to 1000 MHz.
For radiated emission tests, the analyzer setting was as followings:

Frequency ≦ 1 GHz, RBW:100 kHz, VBW: 100 kHz (Peak measurements)
Frequency ＞1 GHz, RBW: 1 MHz, VBW: 1 MHz (Peak measurements)
Frequency ＞1 GHz , RBW:1 MHz , VBW: 10Hz (Average measurements)

The peak and average spurious emission plots was measured with the average limits.
In the Table being listed the critical peak and average value an exhibit the compliance with the above calculated Limits.

**Summary table with radiated data of the test plots**

Model: AC-3100 Date: 2010/7/21
Mode: 12VDC Temperature: 31.4 ˚C Engineer: Rick
Polarization: Horizontal Humidity: 51 %

| Frequency (MHz) | Reading (dBuV) | Detector | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Table Degree (Deg.) | Ant. High (cm) |
|---|---|---|---|---|---|---|---|---|
| 177.7153 | 25.01 | peak | 13.94 | 38.95 | 43.50 | -4.55 | 180 | 150 |
| 266.4530 | 22.58 | peak | 15.07 | 37.65 | 46.00 | -8.35 | 160 | 150 |
| 354.7094 | 24.49 | peak | 17.51 | 42.00 | 46.00 | -4.00 | 100 | 150 |
| 531.4630 | 22.41 | peak | 21.75 | 44.16 | 46.00 | -1.84 | 290 | 150 |
| 709.6191 | 13.58 | peak | 25.01 | 38.59 | 46.00 | -7.41 | 180 | 150 |
| 942.4850 | 7.36 | peak | 28.43 | 35.79 | 46.00 | -10.21 | 190 | 150 |

Polarization: Vertical

| Frequency (MHz) | Reading (dBuV) | Detector | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Table Degree (Deg.) | Ant. High (cm) |
|---|---|---|---|---|---|---|---|---|
| 177.7153 | 24.11 | peak | 13.94 | 38.05 | 43.50 | -5.45 | 130 | 150 |
| 266.4530 | 21.10 | peak | 15.07 | 36.17 | 46.00 | -9.83 | 180 | 150 |
| 354.7094 | 20.33 | peak | 17.51 | 37.84 | 46.00 | -8.16 | 130 | 150 |
| 531.4630 | 13.97 | peak | 21.75 | 35.72 | 46.00 | -10.28 | 140 | 150 |
| 709.6191 | 9.99 | peak | 25.01 | 35.00 | 46.00 | -11.00 | 180 | 150 |
| 907.4148 | 10.40 | peak | 27.78 | 38.18 | 46.00 | -7.82 | 190 | 150 |

Mode: 24VDC

Polarization: Horizontal

| Frequency (MHz) | Reading (dBuV) | Detector | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Table Degree (Deg.) | Ant. High (cm) |
|---|---|---|---|---|---|---|---|---|
| 177.7153 | 27.96 | peak | 13.94 | 41.90 | 43.50 | -1.60 | 180 | 150 |
| 266.4530 | 19.66 | peak | 15.07 | 34.73 | 46.00 | -11.27 | 290 | 150 |
| 354.7094 | 26.77 | peak | 17.51 | 44.28 | 46.00 | -1.72 | 100 | 150 |
| 531.4630 | 19.48 | peak | 21.75 | 41.23 | 46.00 | -4.77 | 260 | 150 |
| 709.6191 | 10.98 | peak | 25.01 | 35.99 | 46.00 | -10.01 | 180 | 150 |
| 812.0240 | 7.31 | peak | 26.57 | 33.88 | 46.00 | -12.12 | 40 | 150 |

Polarization: Vertical

| Frequency (MHz) | Reading (dBuV) | Detector | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Table Degree (Deg.) | Ant. High (cm) |
|---|---|---|---|---|---|---|---|---|
| 177.7153 | 24.29 | peak | 13.94 | 38.23 | 43.50 | -5.27 | 160 | 150 |
| 266.4530 | 17.14 | peak | 15.07 | 32.21 | 46.00 | -13.79 | 120 | 150 |
| 354.7094 | 23.34 | peak | 17.51 | 40.85 | 46.00 | -5.15 | 140 | 150 |
| 531.4628 | 10.30 | peak | 21.75 | 32.05 | 46.00 | -13.95 | 260 | 150 |
| 709.6191 | 9.52 | peak | 25.01 | 34.53 | 46.00 | -11.47 | 130 | 150 |
| 800.8016 | 7.24 | peak | 26.50 | 33.74 | 46.00 | -12.26 | 180 | 150 |

**Note**
1. **Correction Factor = Antenna factor + Cable loss - Preamplifier**
2. **The formula of measured value as: Test Result = Reading + Correction Factor**
3. **Detector function in the form : PK = Peak, QP = Quasi Peak, AV = Average**
4. **All not in the table noted test results are more than 20 dB below the relevant limits.**
5. **See the attached diagram as appendix.**

Limits: 15.209

| Frequency of Emission (MHz) | Field strength (microvolts/meter) | Field Strength (dB microvolts/meter) |
|---|---|---|
| 30 – 88 | 100 | 40.0 |
| 88 – 216 | 150 | 43.5 |
| 216 – 960 | 200 | 46.0 |
| Above 960 | 500 | 54.0 |

Test equipment used: ETSTW-RE 003, ETSTW-RE 004, ETSTW-RE 028, ETSTW-RE 029, ETSTW-RE 030, ETSTW-RE 042, ETSTW-RE 043, ETSTW-RE 044

## 3.5 Power Line Conducted Emission

For an intentional radiator which is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the table bellows with this provision shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminals.

This measurement was transact first with instrumentation using an average and peak detector and a 10 kHz bandwidth. If the peak detector achieves a calculated level, the measurement is repeated by an instrumentation using a quasi-peak detector.

**Limits:**

| Frequency of Emission (MHz) | Conducted Limit (dBuV) | |
|---|---|---|
| | Quasi Peak | Average |
| 0.15-0.5 | 66 to 56 | 56 to 46 |
| 0.5-5 | 56 | 46 |
| 5-30 | 60 | 50 |

Test equipment used: ETSTW-CE 001, ETSTW-CE 003, ETSTW-CE 004, ETSTW-CE 006

Explanation: This test item is not applicable due to the EUT is fed by car power supply.

# Appendix

## A Measurement diagrams

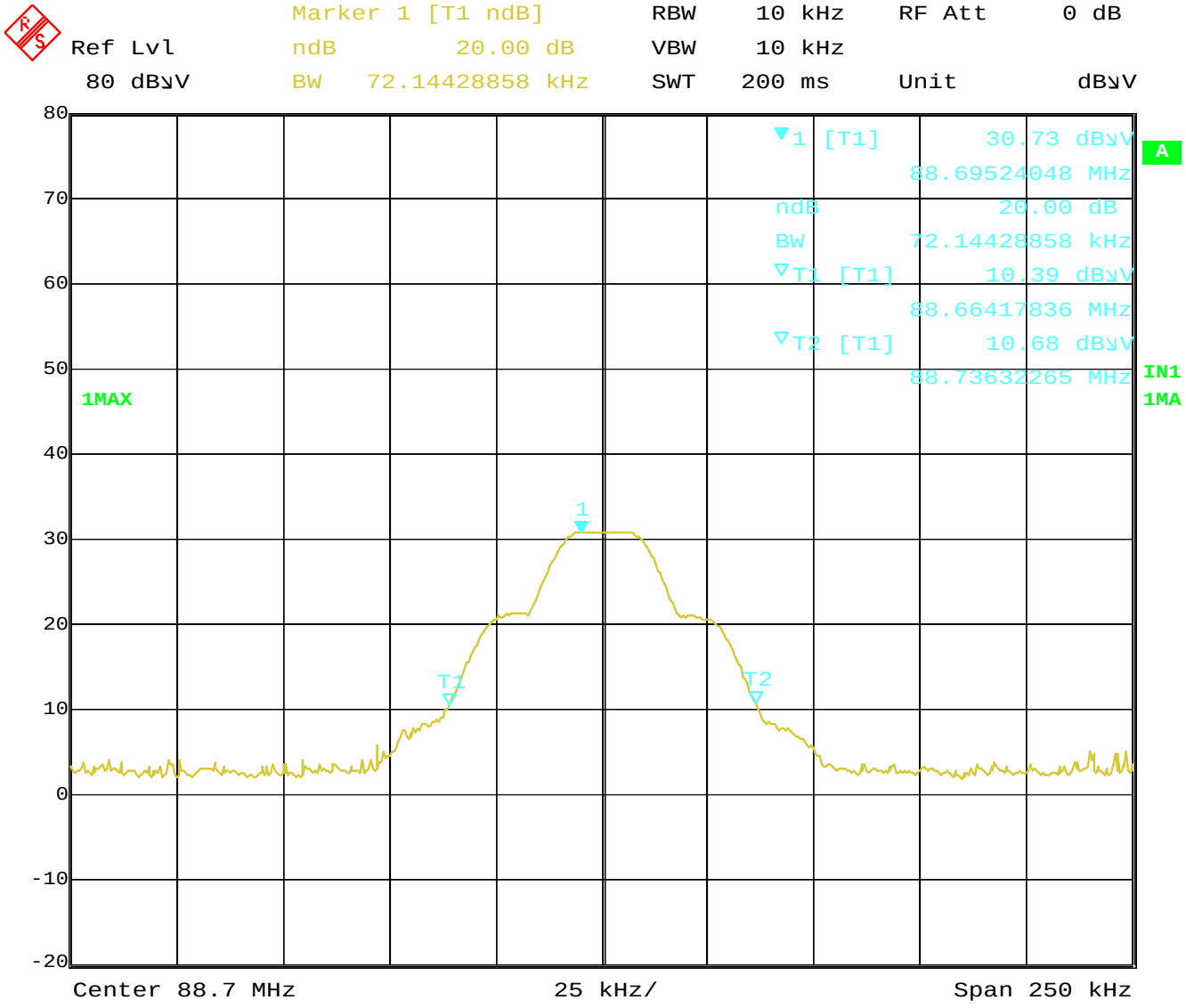
1. Emission Bandwidth
2. Band Edge Measurement
3. Carrier Field Strength
4. Spurious Emissions

## B Photos

1. External Photos
2. Internal Photos
3. Set Up Photo of Radiated Emission

Registration number: W6M21004-10592-P-15
FCC ID: YEKAC3100

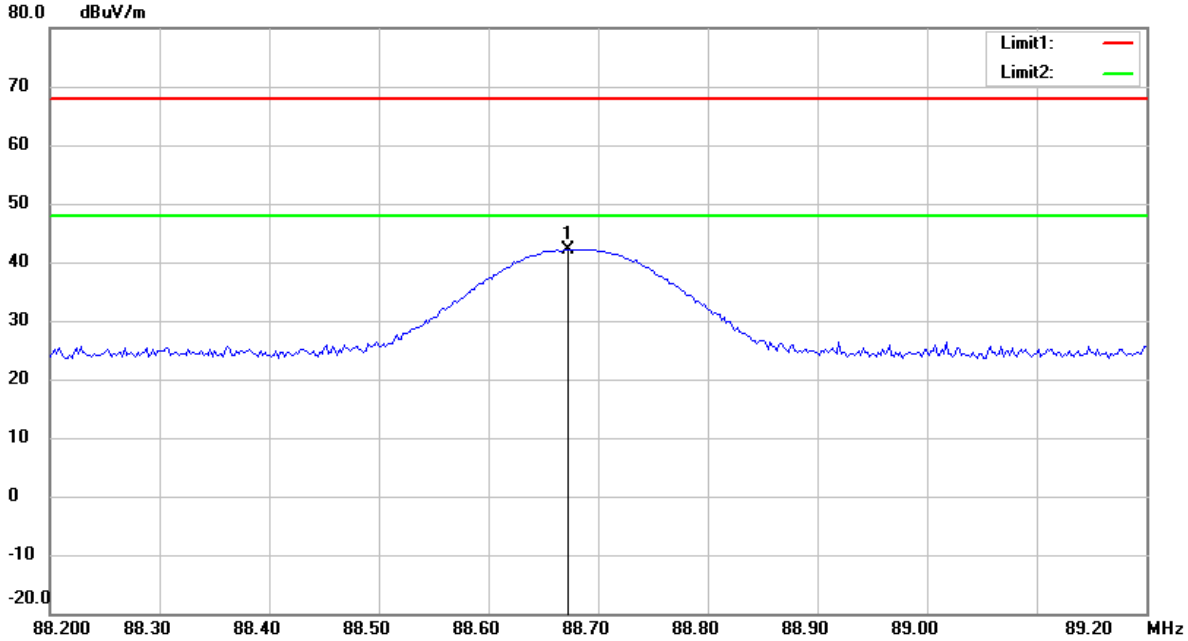
## Emission Bandwidth



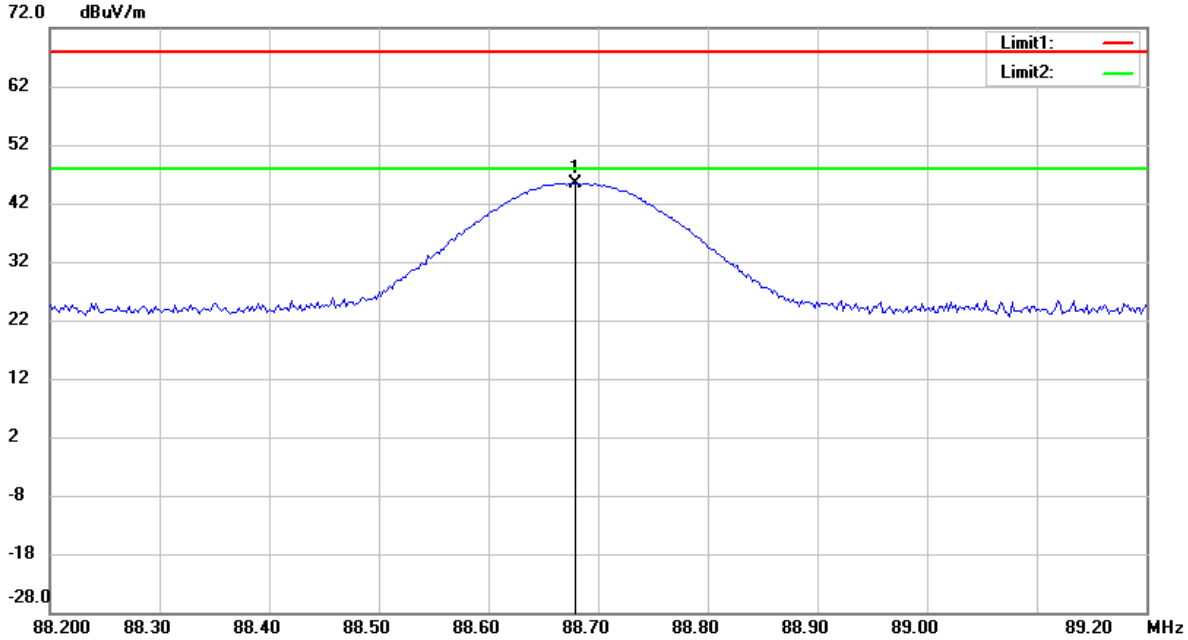

Date: 16.JUL.2010 09:58:05

Registration number: W6M21004-10592-P-15
FCC ID: YEKAC3100

# Carrier Field Strength
## 88.7 MHz_12VDC
## Antenna Polarization H




## Antenna Polarization V

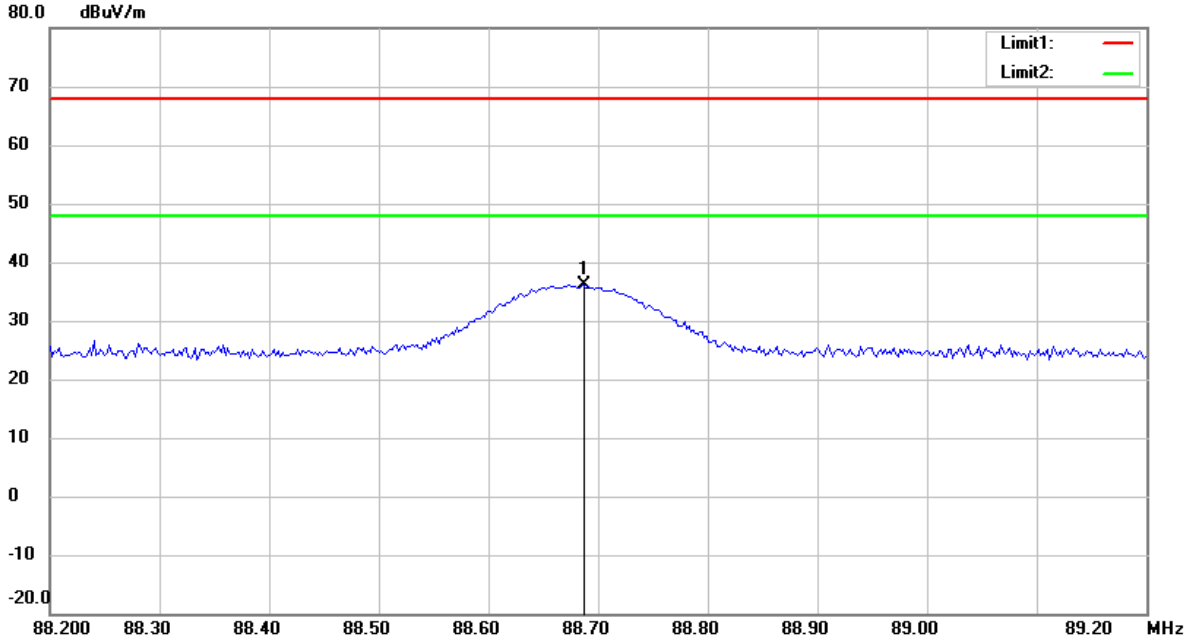



**Up Line: Peak Limit Line**
**Down Line: Ave Limit Line**
**Note:**

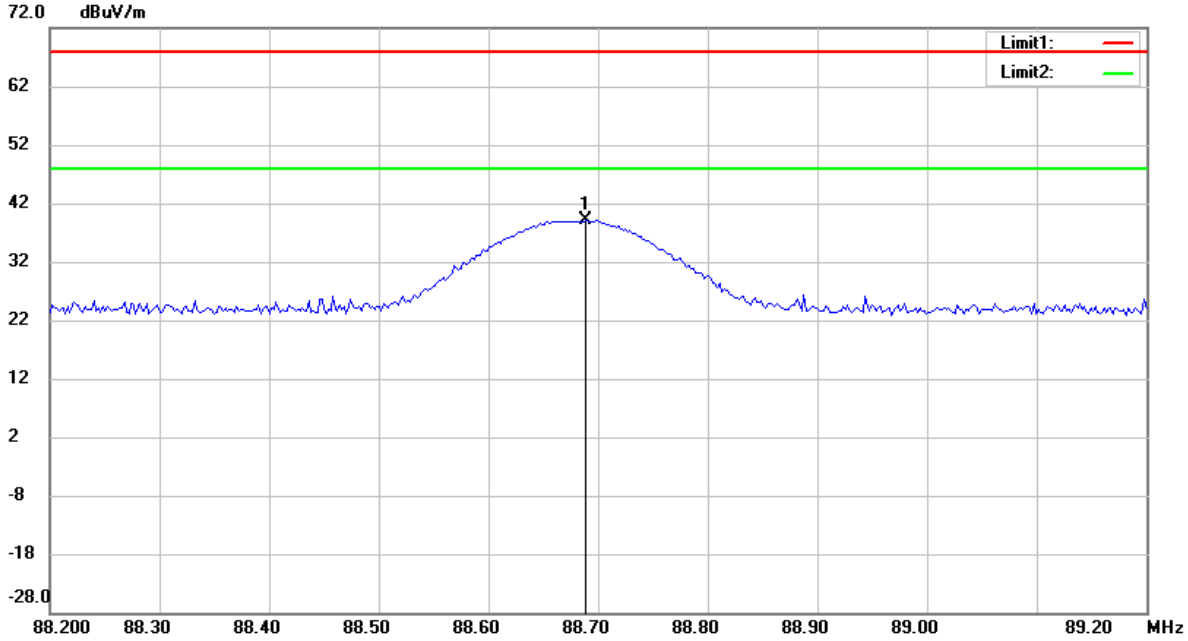
1. **The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.**
2. **The some frequencies may exceed the limit line without the specified detectors, but that cannot present the results are failed to the specification of test standard.**
3. **For corrected test results are listed in the relevant table of Carrier Field Strength test data of this test report.**

88.7 MHz_24VDC

Antenna Polarization H




Antenna Polarization V

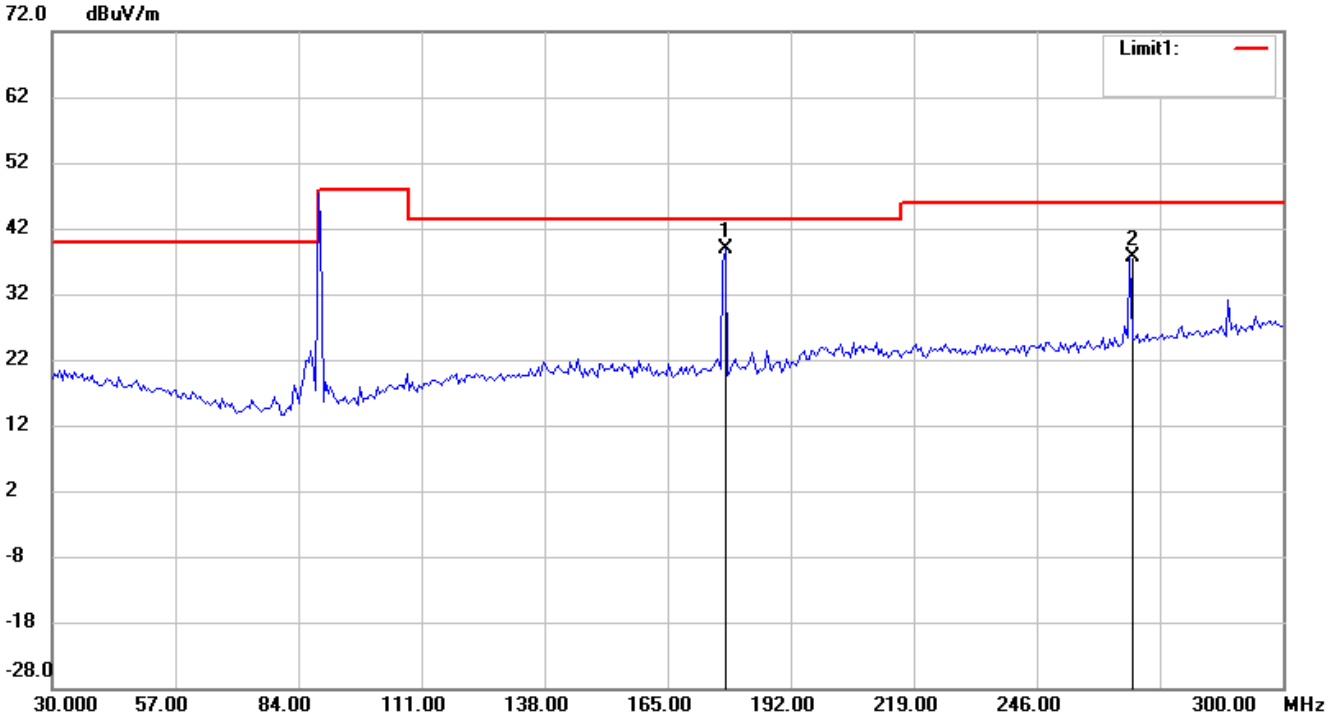


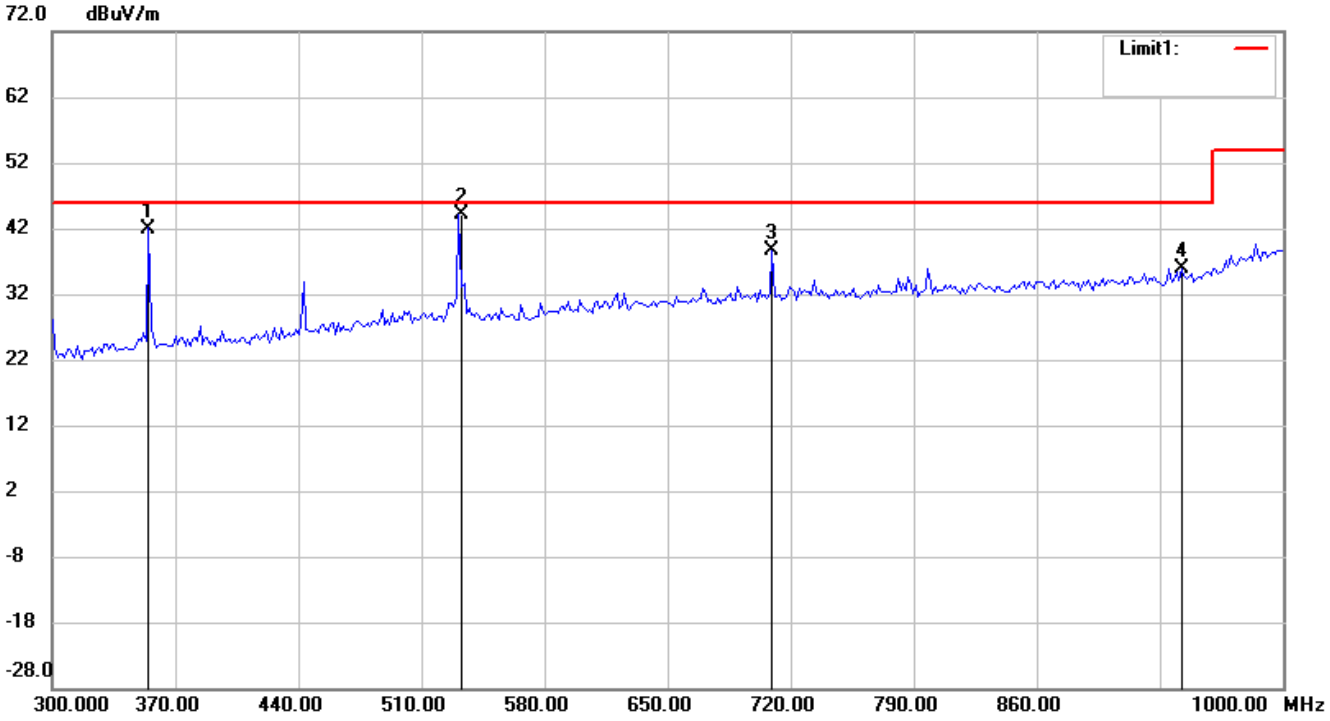

**Up Line: Peak Limit Line**
**Down Line: Ave Limit Line**
**Note:**

1. **The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.**
2. **The some frequencies may exceed the limit line without the specified detectors, but that cannot present the results are failed to the specification of test standard.**
3. **For corrected test results are listed in the relevant table of Carrier Field Strength test data of this test report.**

Registration number: W6M21004-10592-P-15
FCC ID: YEKAC3100

Spurious Emissions
88.7 MHz_12VDC
Antenna Polarization H



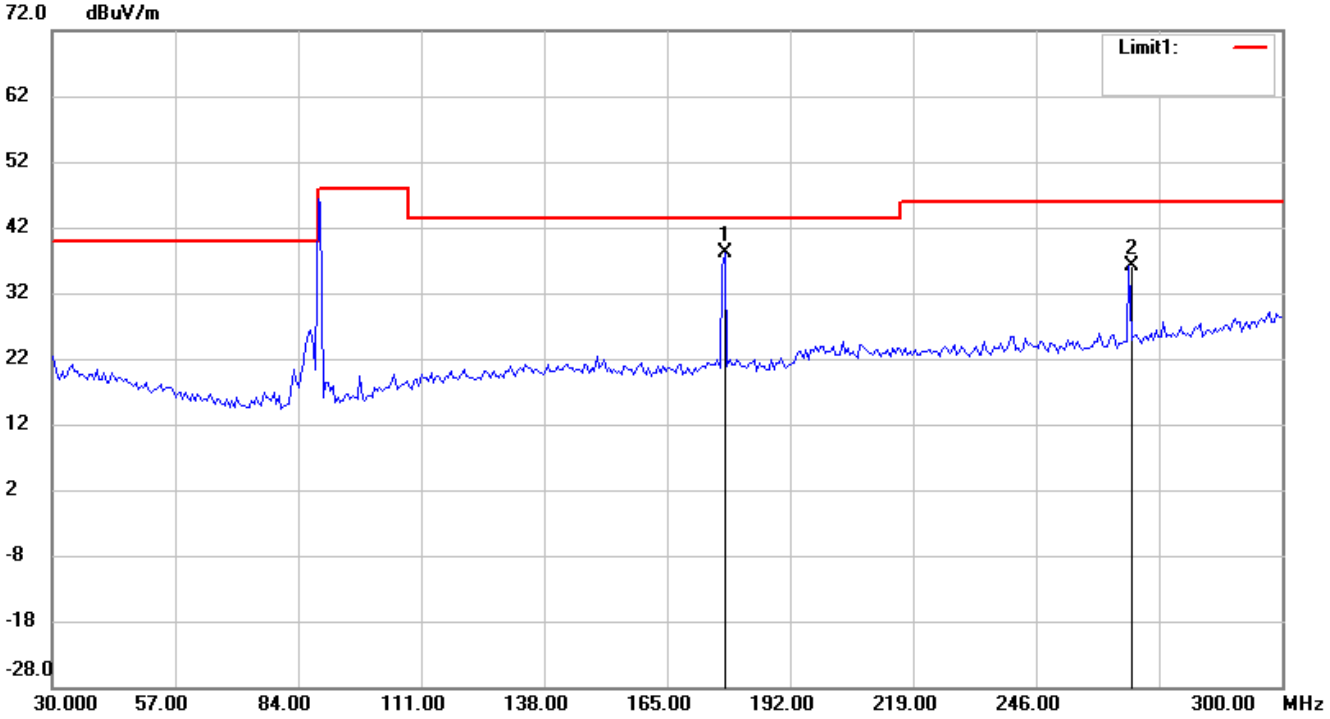



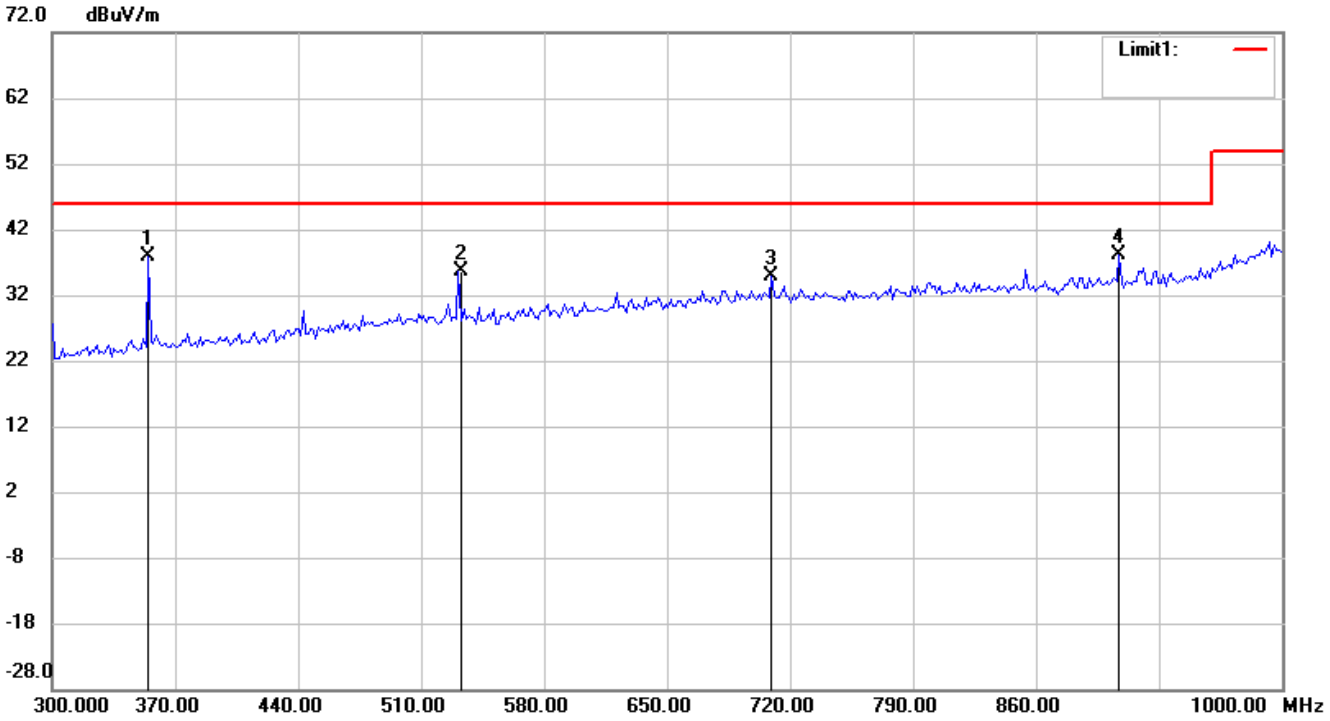

**Note:**

1. **The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.**
2. **The some frequencies may exceed the limit line without the specified detectors, but that cannot present the results are failed to the specification of test standard.**
3. **For corrected test results are listed in the relevant table of radiated test data of this test report.**

Registration number: W6M21004-10592-P-15
FCC ID: YEKAC3100

## Antenna Polarization V



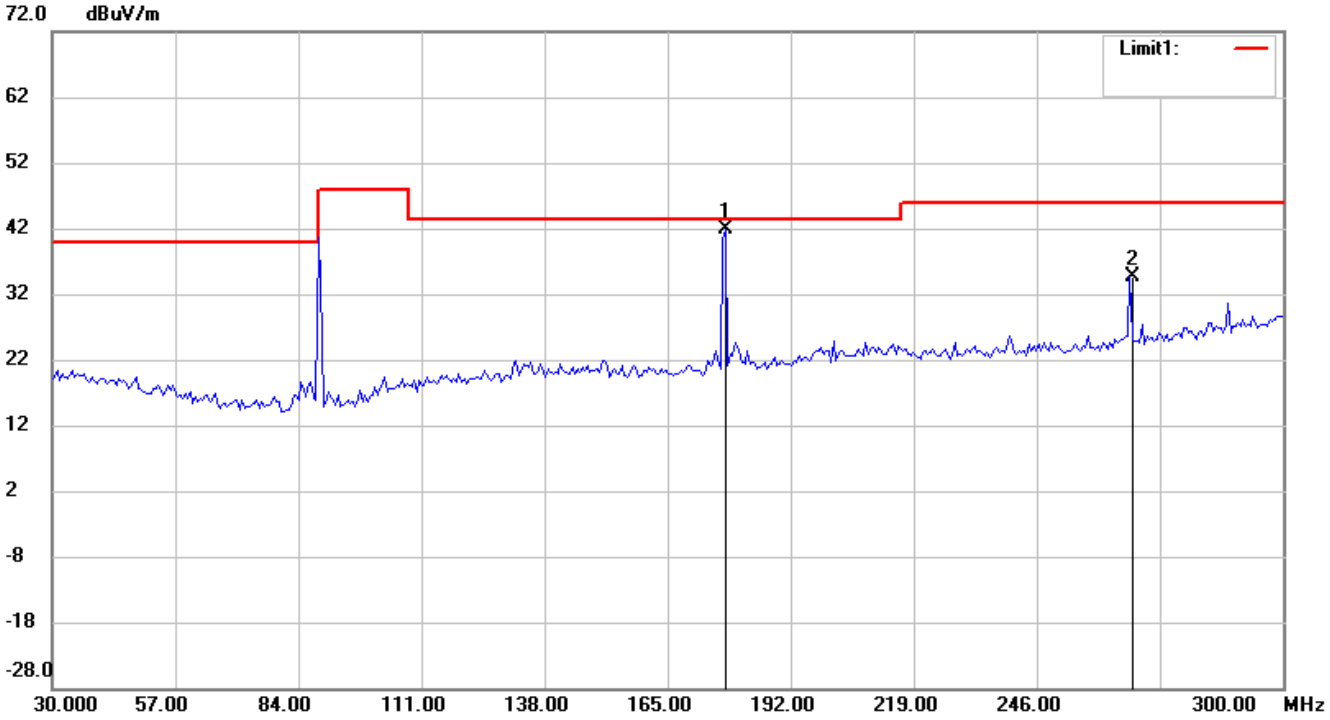



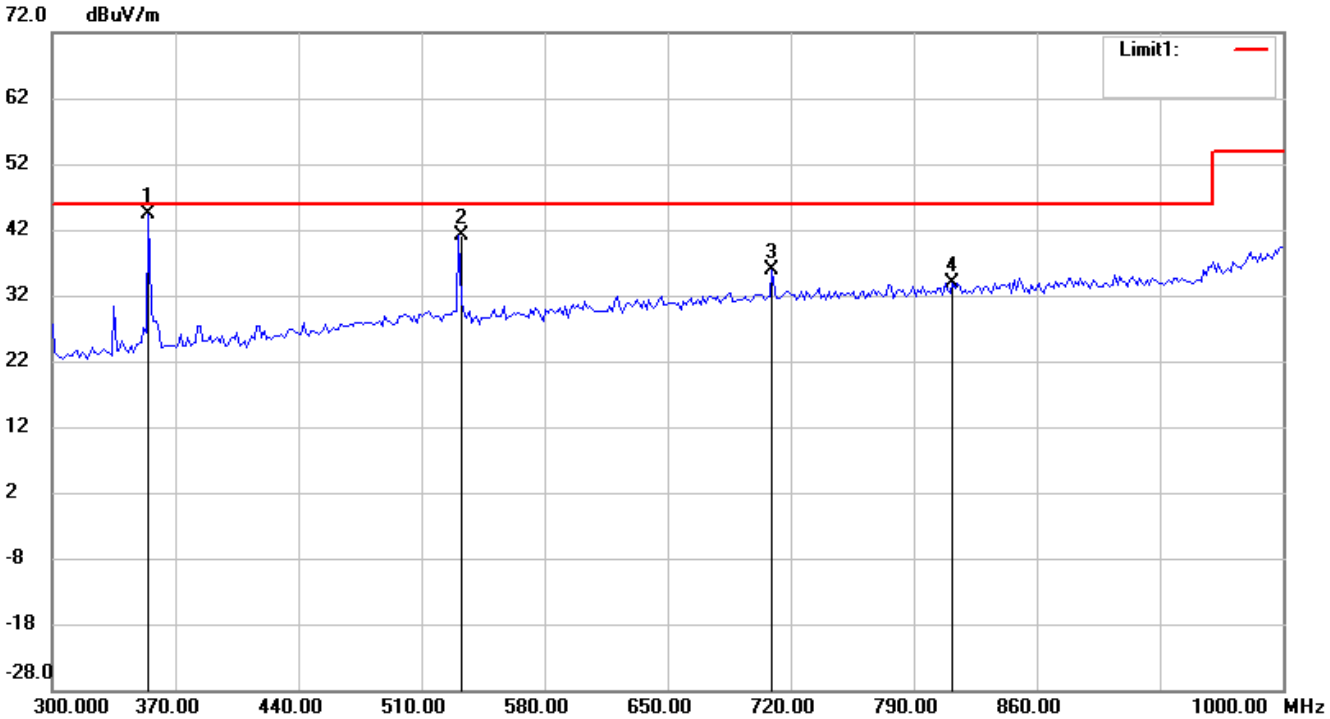

**Note:**

1. **The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.**
2. **The some frequencies may exceed the limit line without the specified detectors, but that cannot present the results are failed to the specification of test standard.**
3. **For corrected test results are listed in the relevant table of radiated test data of this test report.**

Registration number: W6M21004-10592-P-15
FCC ID: YEKAC3100

88.7 MHz_24VDC
Antenna Polarization H



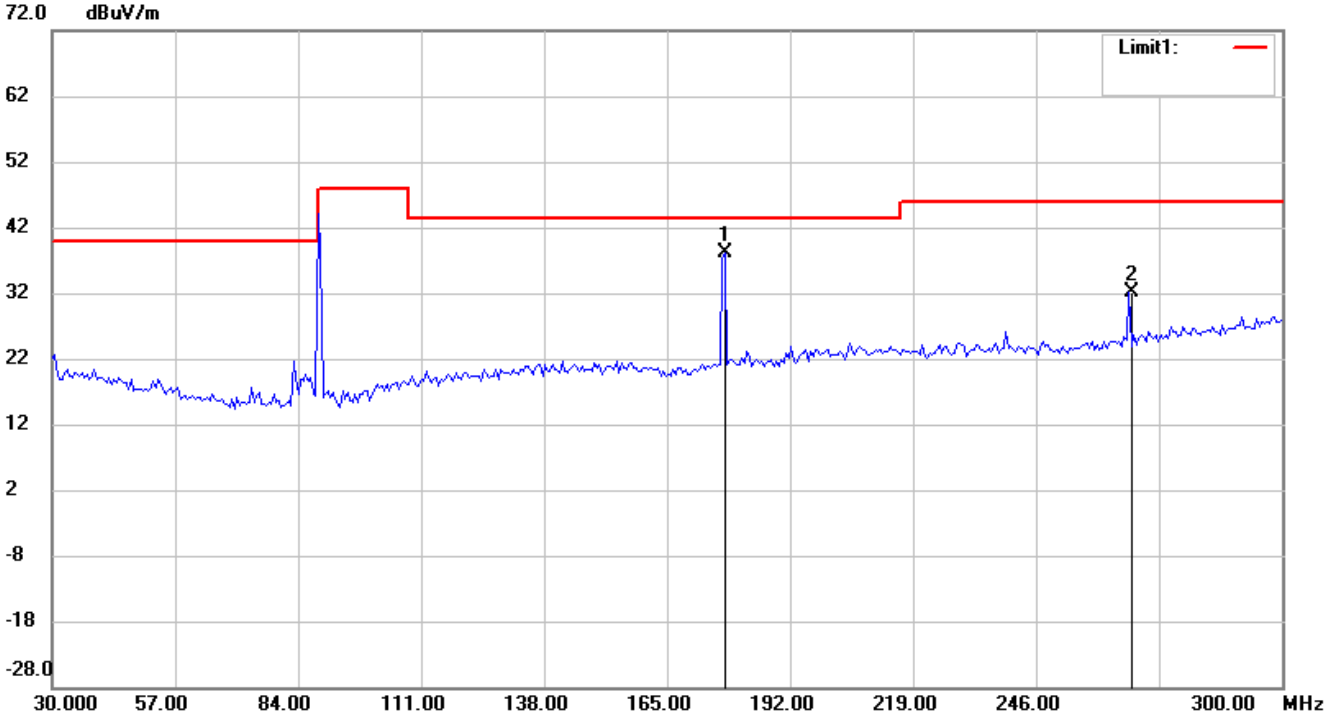



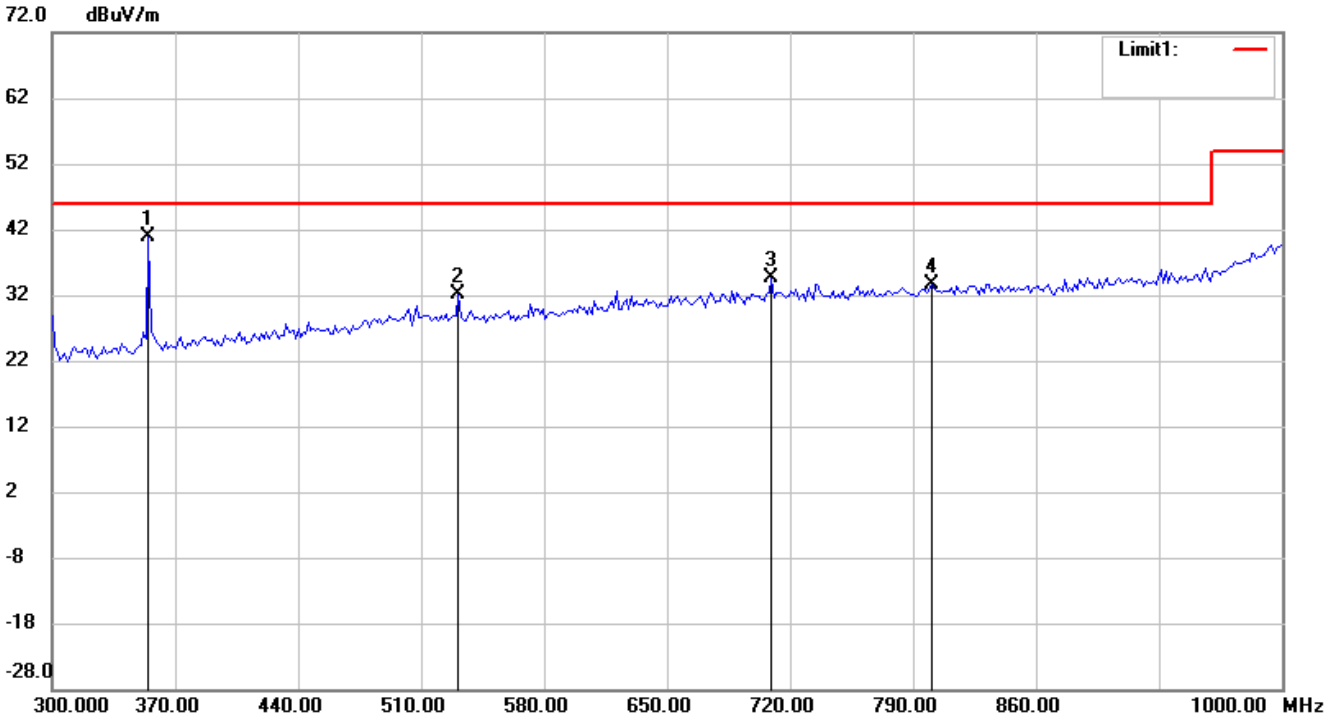

**Note:**

1. **The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.**
2. **The some frequencies may exceed the limit line without the specified detectors, but that cannot present the results are failed to the specification of test standard.**
3. **For corrected test results are listed in the relevant table of radiated test data of this test report.**

Registration number: W6M21004-10592-P-15
FCC ID: YEKAC3100

## Antenna Polarization V




**Note:**

1. **The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.**
2. **The some frequencies may exceed the limit line without the specified detectors, but that cannot present the results are failed to the specification of test standard.**
3. **For corrected test results are listed in the relevant table of radiated test data of this test report.**

External Photos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48
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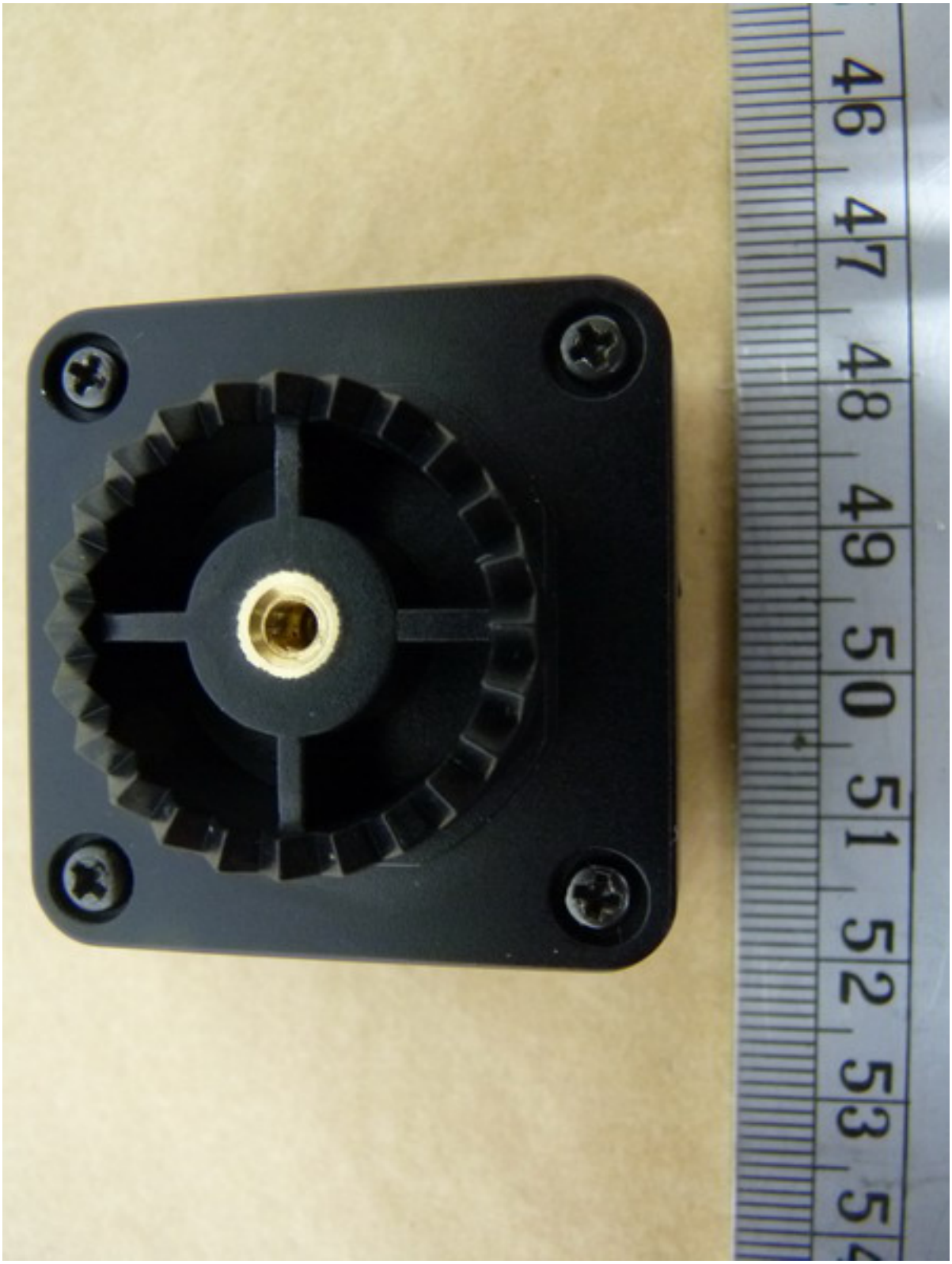
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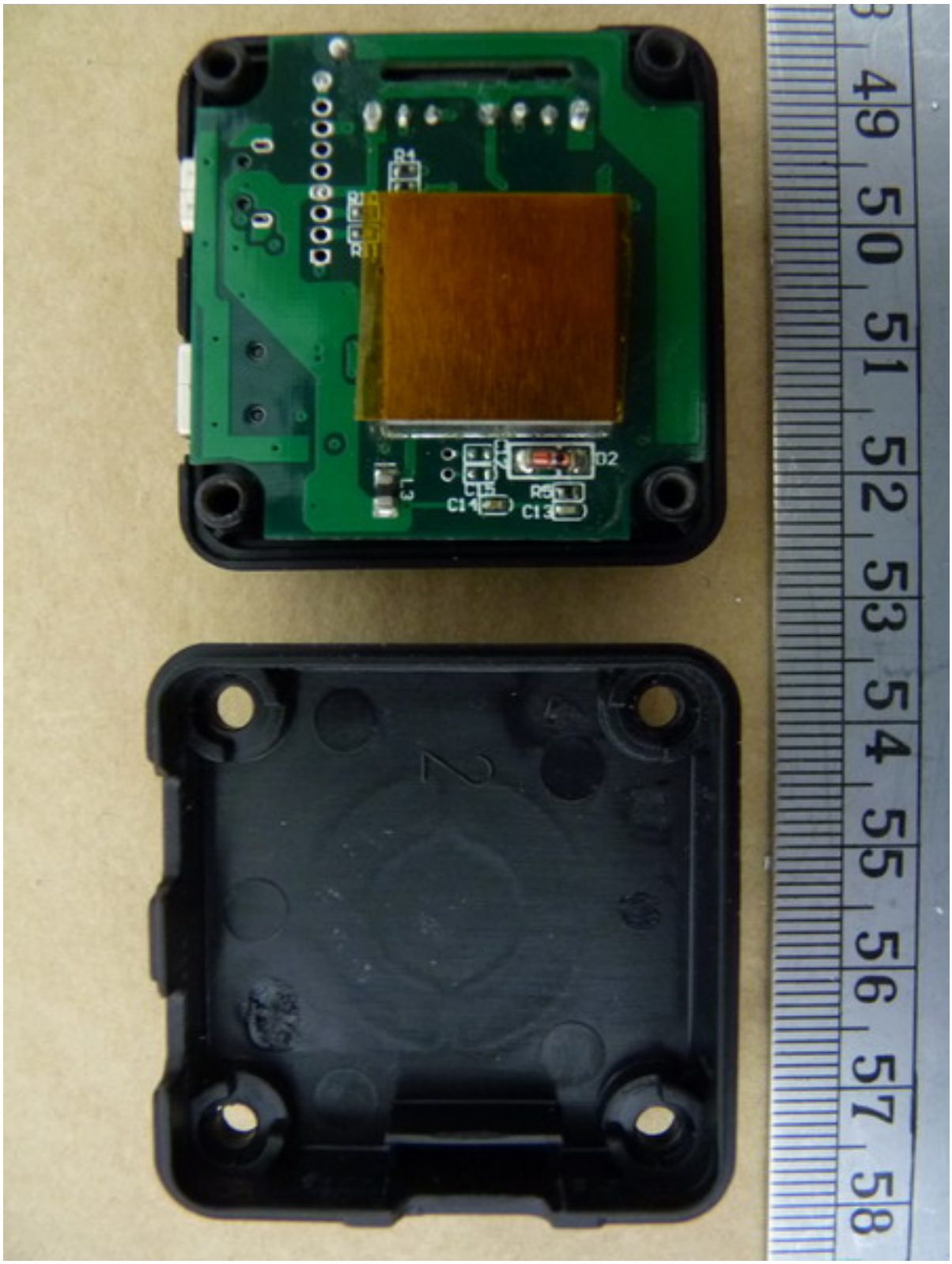
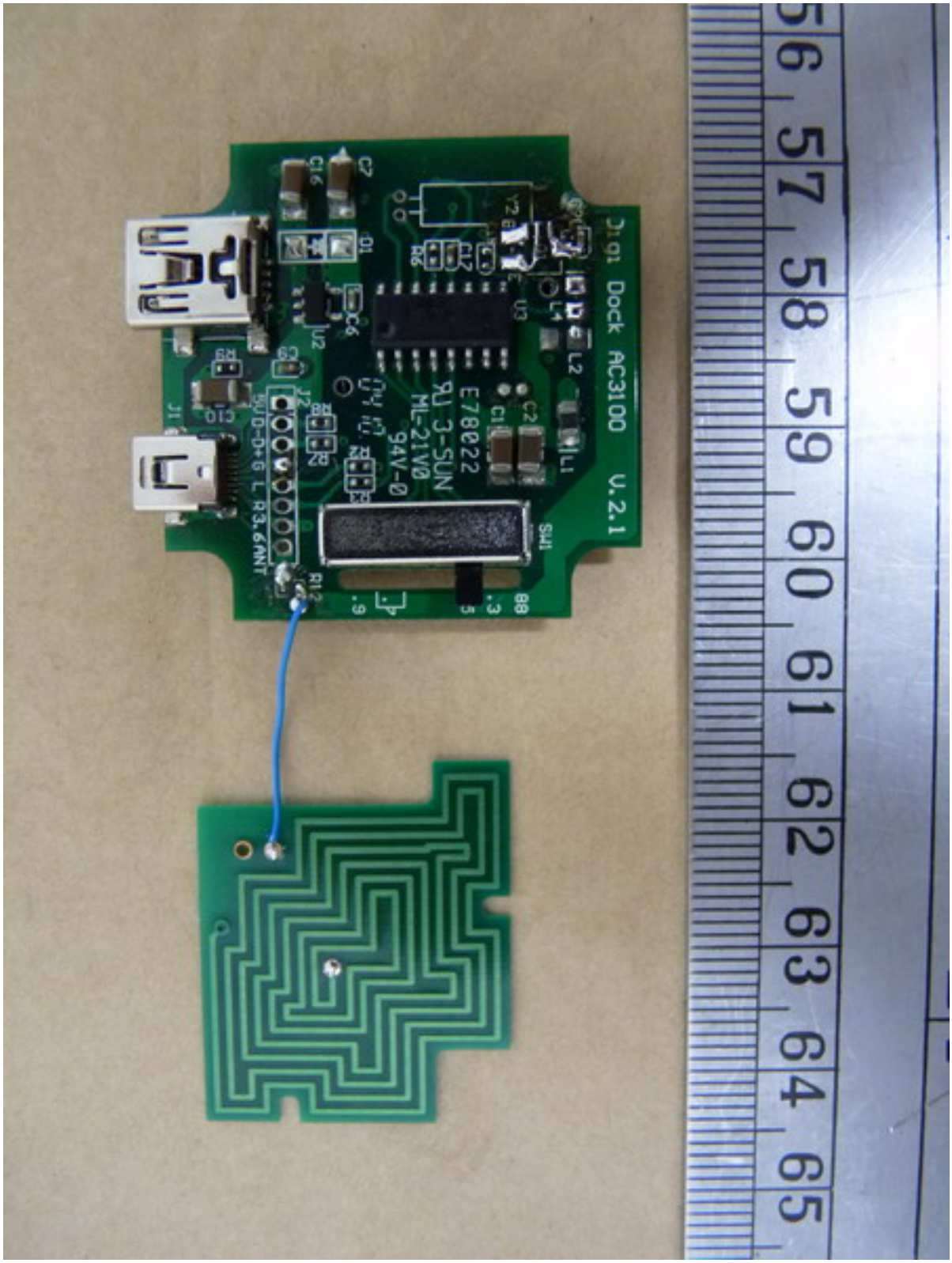
## Internal Photos

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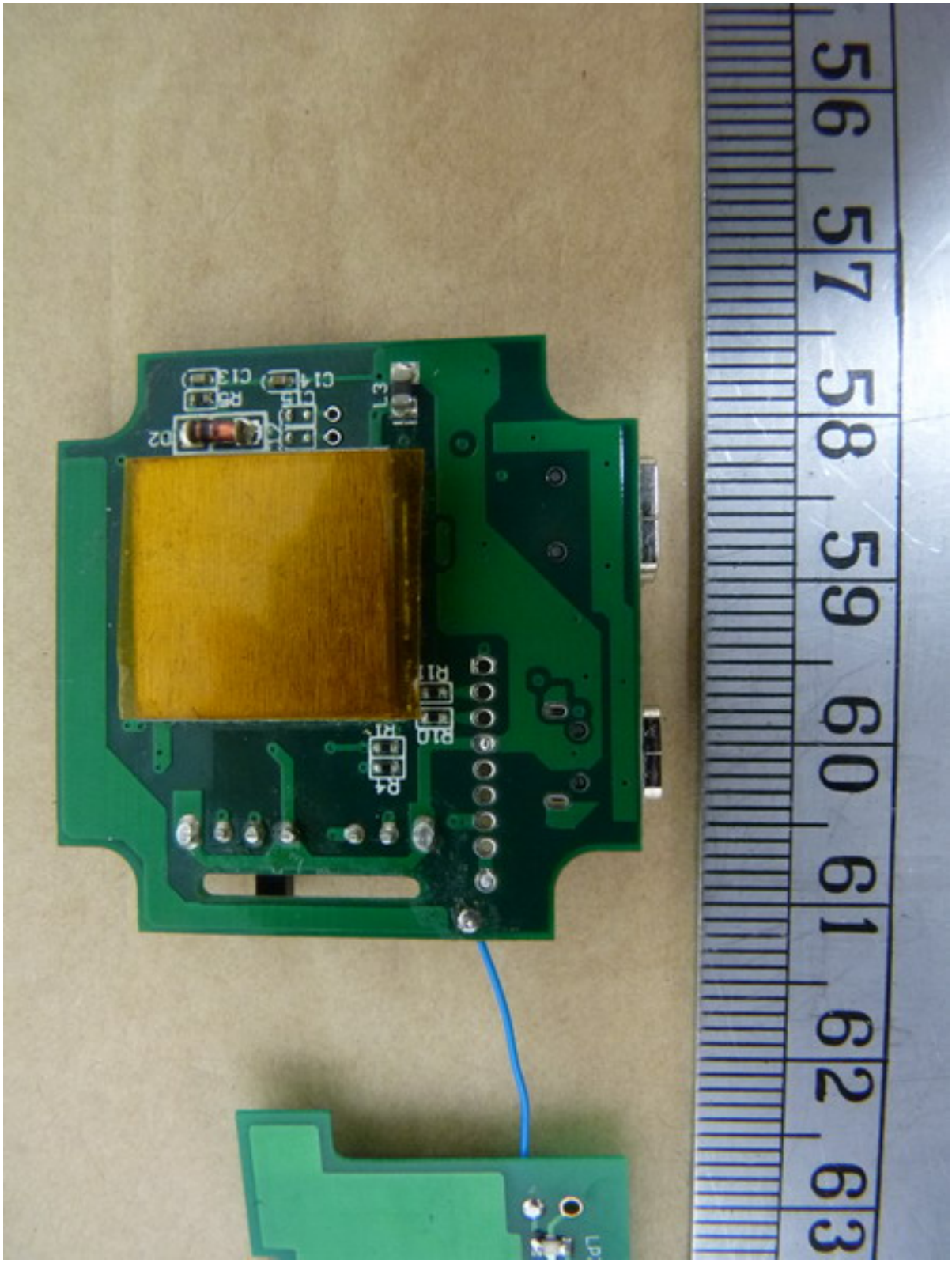
E78022
RU 3-SUN
ML-21V0
94V-0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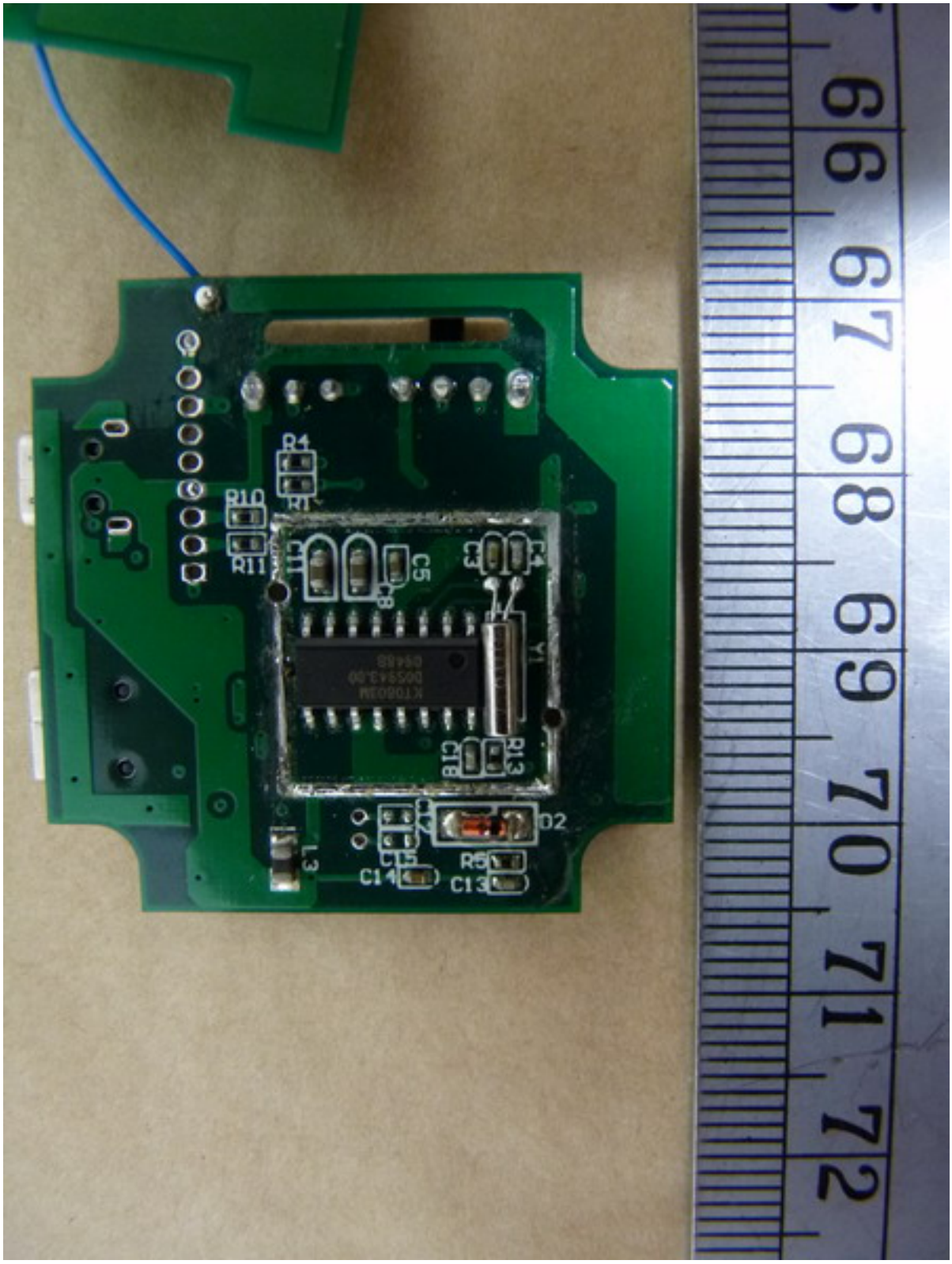
61
62
63
C13
C14
L3
D2
R10
R4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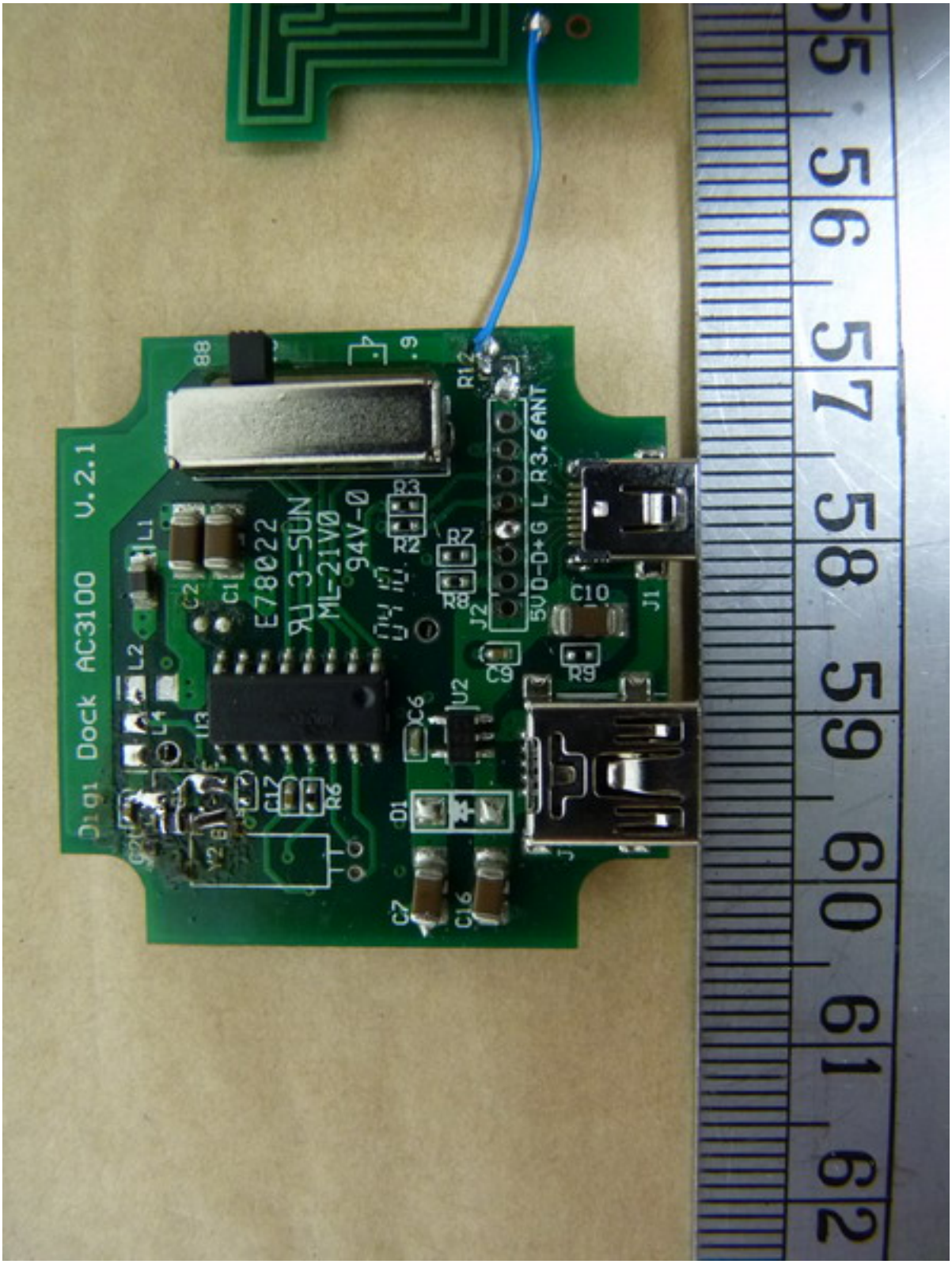
R10
R11
C5
Y1
R12
R13
D2
C14
C13
R5
L3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5V0-D+G L R3.6ANT
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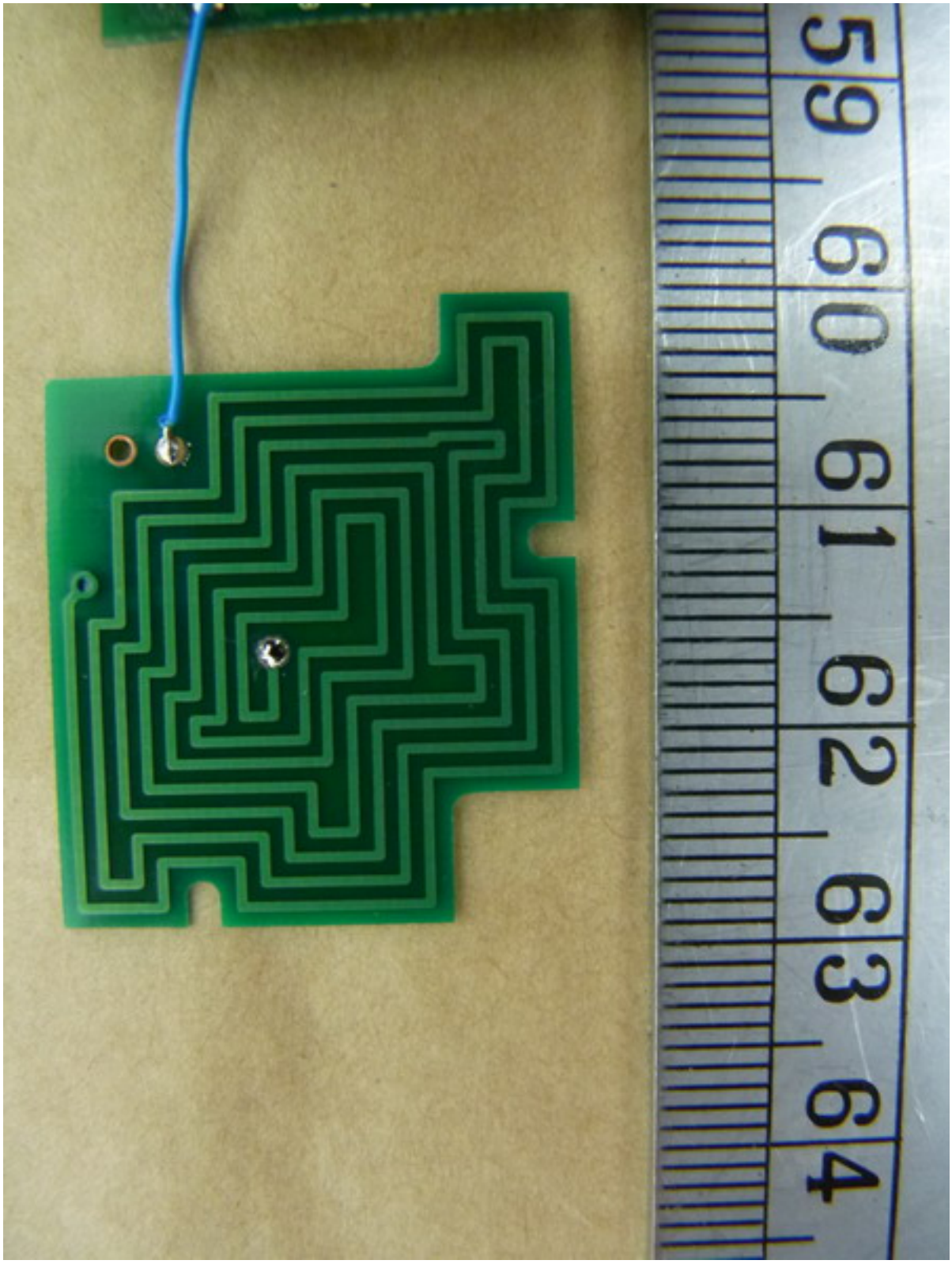
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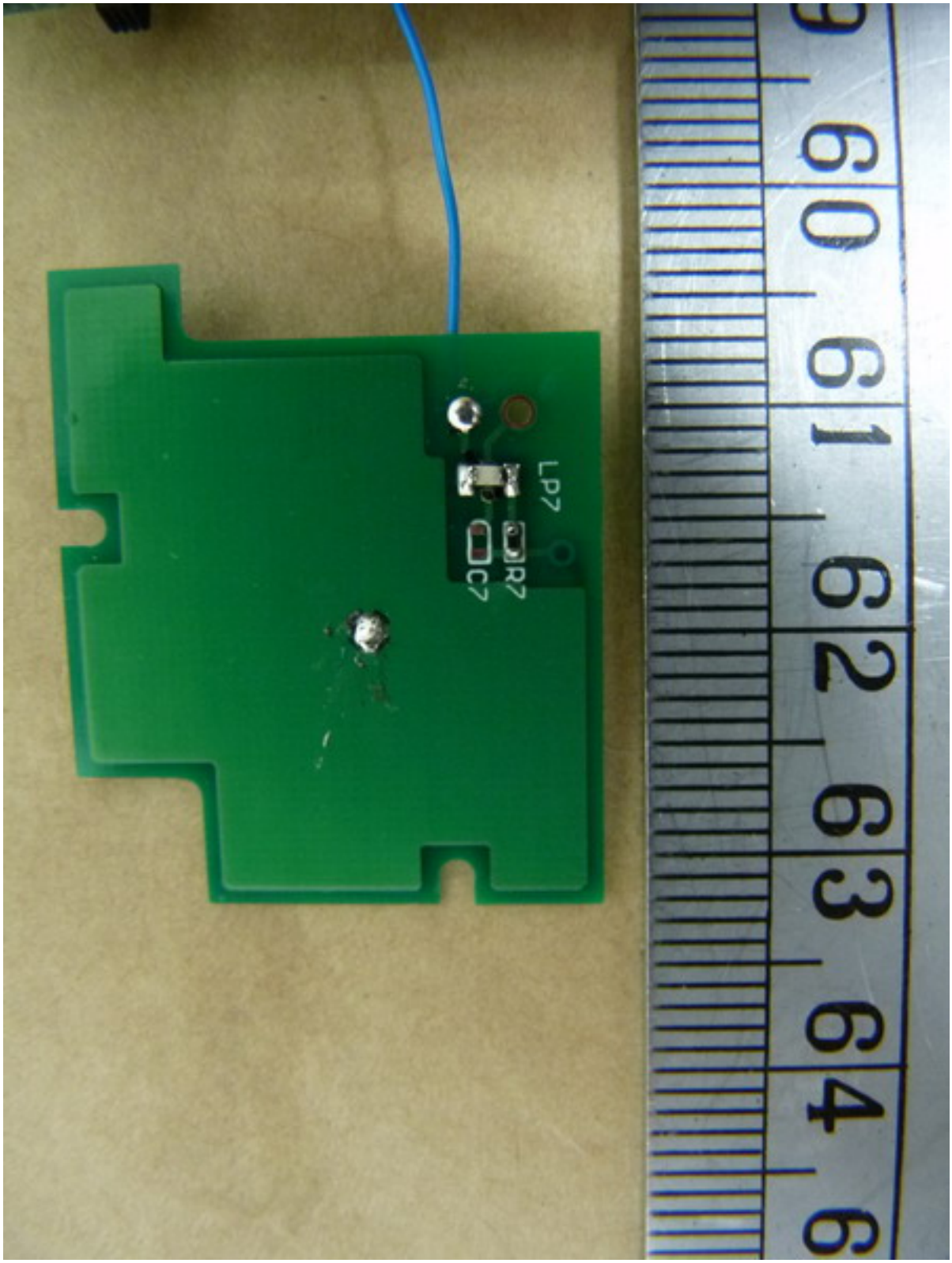
LP7
R7
C7

## Set Up Photo of Radiated Emission