

FCC PART 15 SUBPART C TEST REPORT
for
Tire Pressure Monitoring System [Voice]
Model No.: TS-2009
FCC ID: YMC-TS2009

of

Applicant: **Mictech Security Co., Ltd.**

Address: **No. 47, Chong-Ching Road, Zuo-Ying District, Kaohsiung,**
Taiwan 81363, R.O.C.

Tested and Prepared

by

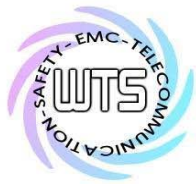
Worldwide Testing Services (Taiwan) Co., Ltd.

FCC Registration No.: 930600

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

A2LA Accredited No.: 2732.01

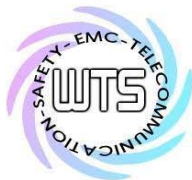
Report No.: W6D21006-10736-C-1



Registration number: W6D21006-10736-C-1
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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 its 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.

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Tester:

July 5, 2010

Danny Sung

Date

WTS-Lab.

Name

Signature

Technical responsibility for area of testing:

July 5, 2010

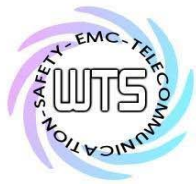
Chang Tse-Ming

Date

WTS

Name

Signature



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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 : 886-2-66068875

1.2.2 Details of accreditation status

Accredited testing laboratory

A2LA accredited number: 2732.01

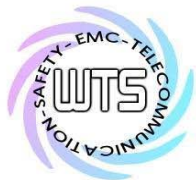
FCC filed test laboratory Reg. No. 930600

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



1.3 Details of approval holder

| | |
|------------|----------------------------------------------|
| Name: | Mictech Security Co., Ltd. |
| Street: | No. 47, Chong-Ching Road, Zuo-Ying District, |
| Town: | Kaohsiung, |
| Country: | Taiwan 81363, R.O.C. |
| Telephone: | +886-7-345699 |
| Fax: | +886-7-345987 |



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1.4 Application details

Date of receipt of test item: July 2, 2010
Date of test: from July 2, 2010 to July 5, 2010

1.5 Test item

Description of test item: Tire Pressure Monitoring System [Voice]

Type identification: TS-2009

Brand name: CruiseTyre

Multi-listing model number: ./.

Transmitting frequency: 433.92 MHz

Operation mode: simplex

Voltage supply: Battery 3.6V

(The device is tested under fresh battery condition.)

Highest clock frequency: 433.92 MHz

Antenna type: PCB antenna

Photos: see Annex

Manufacturer (if applicable)

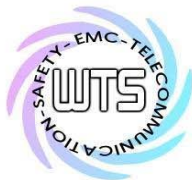
Name: ./.

Street: ./.

Town: ./.

Country: ./.

Additional information: ./.



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1.6 Test standards

Technical standard : FCC RULES PART 15 SUBPART C § 15.231 (e) (2010-9)

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: | Battery 3.6V |

Note: This test report contains only transmitter part. The test result and relevant diagrams of receiver part are listed in the test report number W6D21006-10736-P-15B.

2.3 Test Mode

This EUT is the portable device. So the EUT was tested on three different axes. Please see assessment test results as section 3 of this test report.



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2.4 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-EICHLITUNG 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 | 2009/7/21 | 2010/7/20 |
| 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 Serie 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 |

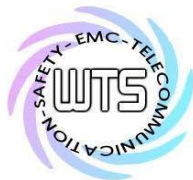


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| | | | | | | |
|-----------------|--------------------------------------|----------------------------------------|----------------|--------------------------|---------------------------------------------|------------|
| ETSTW-RE 053 | Attenuator 3dB | 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 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 | |



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2.5 General Test Procedure

POWER LINE CONDUCTED INTERFERENCE: The procedure used was ANSI STANDARD C63.4-2003 5.2 using a 50 μ H 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 6.4 using a spectrum analyzer. The bandwidth of the spectrum analyzer was 100 kHz with an appropriate sweep speed. The analyzer was calibrated in dB above a microvolt at the output of the antenna. The resolution bandwidth was the 100 kHz and the video bandwidth was 300 kHz.

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 dB μ V) to the antenna correction factor supplied by the antenna manufacturer. The antenna correction factors are stated in terms of dB.

Example:

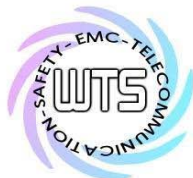
| | |
|------------|------------------------------------------------------------|
| Freq (MHz) | METER READING + ACF + CABLE LOSS (to the receiver) = FS |
| 33 | 20 dB μ V + 10.36 dB/m + 6 dB = 36.36 dB μ V/m @3m |

ANSI STANDARD C63.4-2003 6.2.1 MEASUREMENT PROCEDURES: The UUT was placed on a table 80 cm high and with dimensions of 1m by 1.5m (non metallic table). The UUT was placed in the center of the table. The table used for radiated measurements is capable of continuous rotation. The spectrum was scanned from 30 MHz to 10th harmonic of the fundamental.

Peak readings were taken in three (3) orthogonal planes and the highest readings.

Measurements were made by Taiwan Worldwide Testing Services (Taiwan) Co., Ltd. at the registered open field test site located at. 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.



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3 Test results (enclosure)

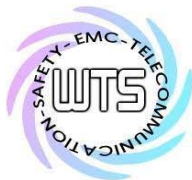
☐ 1st test

☒ test after modification

☐ production test

| TEST CASE | Para. Number | Required | Test passed | Test failed |
|----------------------------------------------|---------------|-------------------------------------|-------------------------------------|--------------------------|
| Transmission Requirements | FCC 15.231(e) | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Radiated Emission | FCC 15.231(e) | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Bandwidth of Emission | FCC 15.231(c) | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Frequency Tolerance | FCC 15.231(d) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Period Alternate Field Strength Requirements | FCC 15.231(e) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Antenna Requirement | FCC 15.203 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Conducted Measurement at (AC) Power Line | FCC 15.207 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

The follows is intended to leave blank.



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3.1 Transmission Requirements

FCC 15.231(e)

3.1.1 Limit of Transmission Time

Devices operated under the provisions of this paragraph shall be provided with a means for automatically limiting operation so that the duration of each transmission shall not be greater than one second and the silent period between transmissions shall be at least 30 times the duration of the transmission but in no case less than 10 seconds.

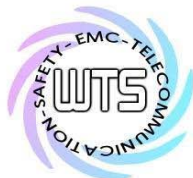
3.1.2 Results for the duration and silent period measurement

☐ This manually operated transmitter employs software to control the duration of each transmission and silent period between transmissions. The real measured result for the duration of each transmission is _____ ms, and the result for silent period between transmissions is _____ second.

☒ This transmitter is operated by automatic activation, and the duration of each transmission and silent period between transmissions will be controlled by software. The real measured result for the duration of each transmission is 320.512821ms, and the result for silent period between transmissions is 10.985577 second.

Explanation: See attached diagrams in appendix.

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



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3.2 Output Power (Field Strength)

Model: TS-2009 Date: 2010/7/2
 Mode: TX mode Temperature: 26 °C Engineer: Danny
 Polarization: Horizontal Humidity: 60 %

| Frequency (MHz) | Reading (dBuV) | | Factor (dB) Corr. | Result @3m (dBuV/m) | | Limit @3m (dBuV/m) | | Margin (dB) | Table Degree (Deg.) | Ant. High (cm) |
|--------------------|-------------------|------|-------------------------|------------------------|------|-----------------------|-------|----------------|---------------------------|----------------------|
| | Peak | Ave. | | Peak | Ave. | Peak | Ave. | | | |
| 433.932 | 25.99 | --- | 18.54 | 44.53 | --- | 92.87 | 72.87 | -28.34 | 230 | 150 |

Polarization: Vertical

| Frequency (MHz) | Reading (dBuV) | | Factor (dB) Corr. | Result @3m (dBuV/m) | | Limit @3m (dBuV/m) | | Margin (dB) | Table Degree (Deg.) | Ant. High (cm) |
|--------------------|-------------------|------|-------------------------|------------------------|------|-----------------------|-------|----------------|---------------------------|----------------------|
| | Peak | Ave. | | Peak | Ave. | Peak | Ave. | | | |
| 433.937 | 17.50 | --- | 18.54 | 36.04 | --- | 92.87 | 72.87 | -36.83 | 208 | 330 |

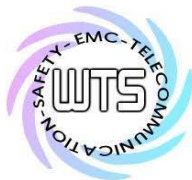
Limit 15.231(e)

| Fundamental Frequency (MHz) | Field strength of fundamental, limit $\mu\text{V/m}$ |
|--------------------------------|-------------------------------------------------------------------------------------|
| 40.66 – 40.70 | 1000 |
| 70 – 130 | 500 |
| 130 – 174 | 500 to 1000** |
| 174 – 260 | 1500 |
| 260 – 470 | 1500 to 5000** (433.92 MHz: 72.87 dB $\mu\text{V/m}$ = 4398.68 $\mu\text{V/m}$) |
| Above 470 | 5000 |

** linear interpolation

Explanation: See attached diagrams in appendix.

Test equipment used: ETSTW-RE 055



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3.3 Out of Band Radiated Emissions

FCC Rule: 15.231(e) , 15.35

For out of band emissions that are close to or that exceed the 20 dB attenuation requirement described in the specification, radiated measurements were performed at a 3 m separation distance to determine whether these emissions complied with the general radiated emission requirement.

Guidance on Measurement of pulsed emission: 15.35(c)

“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.”

Duty Cycle correction = $20 \log (\text{dwell time}/100\text{ms or one period})$

Limits:

For frequencies (Average measurements)

Correction factor conform 15.35 (c) (Average measurements)

Duty cycle correction :

Max. Peak reading – duty cycle correction

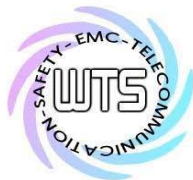
Max permitted average Limits = Max permitted Fundamental limit – 20 dB

For example for 433.92 fundamental carrier:

Max permitted average Limit: $72.87 \text{ dB}\mu\text{V/m} - 20 \text{ dB} = 52.87 \text{ dB}\mu\text{V/m}$

For frequencies above 1GHz (Peak measurements).

Modified Limits for peak conform 15.35 (b) = Max Permitted average Limits + 20dB (because Peak detector is used)



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3.4 Transmitter Radiated Emissions in restricted Bands

FCC Rules: 15.231 (b), 15.205, 15.209, 15.35

Radiated emission measurements were performed from 30 MHz to 8000 MHz.

For radiated emission tests, the analyzer setting was as followings:

RES BW VID BW

Frequency <1 GHz 100 kHz 100 kHz (Peak measurements)

Frequency >1 GHz 1 MHz 1 MHz (Peak measurements)

1 MHz 1 MHz (Average measurements)

Limits:

For frequencies below 1GHz :

| 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 |

For frequencies above 1GHz (Average measurements).

Guidance on Measurement of pulsed emission:

“If the emission is pulsed, modify the unit for continues operation , use the settings shown above, then correct the reading by subtracting the peak-average correction factor, derived from the appropriate duty cycle calculation.

For frequencies above 1GHz (Average measurements).

The correction factor, based on the channel dwell time in a 100 ms period, may be mathematically applied to a measurement made with an average detector, to further reduce the value.

Duty cycle correction = $20 \log (\text{dwell time}/100\text{ms})$

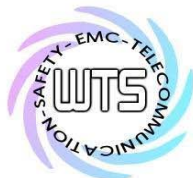
No duty cycle correction was added to the reading

Modified Limits for peak conform 15.35 (b) = Max Permitted average Limits + 20dB (because Peak detector is used)

Above 960 MHz

For mode DSSS CW: $54 \text{ dB}\mu\text{V/m} + 20 \text{ dB} = 74 \text{ dB}\mu\text{V/m}$

Explanation: See attached diagrams.



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3.5 Spurious Emission radiated, Transmitter

Spurious emission was measured with modulation (declared by manufacturer).

The limits on the field strength of the spurious emission in the table § 15.231(e) are based on the fundamental frequency of the intentional radiator. Spurious emission shall be attenuated to the average (or alternatively, CISPR quasi-peak) limits shown in this table or to the general limits shown in § 15.209, whichever limit permits a higher field strength.

In addition, radiated emission which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).

SAMPLE CALCULATION OF LIMIT. All results will be updated by an automatic measuring system in accordance to point 2.3.

Calculation of test results:

Such factors like antenna correction, cable loss, external attenuation etc. are already included in the provided measurement results. This is done by using validated test software and calibrated test system according the accreditation requirements.

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.

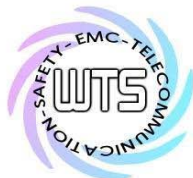
Summary table with radiated data of the test plots

Model: TS-2009 Date: 2010/7/2
Mode: TX mode Temperature: 26 °C Engineer: Danny
Polarization: Horizontal Humidity: 60 %

| Frequency (MHz) | Reading (dBuV) | Detector | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Table Degree (Deg.) | Ant. High (cm) |
|-----------------|----------------|----------|-------------|-----------------|----------------|-------------|---------------------|----------------|
| 868.136 | 24.04 | peak | 25.70 | 49.74 | 72.87 | -23.13 | 229 | 150 |

Polarization: Horizontal

| Frequency (MHz) | Reading (dBuV) | | Factor (dB) Corr. | Result @3m (dBuV/m) | | Limit @3m (dBuV/m) | | Margin (dB) | Table Degree (Deg.) | Ant. High (cm) |
|-----------------|----------------|------|-------------------|---------------------|------|--------------------|-------|-------------|---------------------|----------------|
| | Peak | Ave. | | Peak | Ave. | Peak | Ave. | | | |
| 1300.601 | 53.04 | --- | -12.30 | 40.74 | --- | 74.00 | 54.00 | -13.26 | 210 | 150 |
| 1735.680 | 44.29 | --- | -8.82 | 35.47 | --- | 74.00 | 54.00 | -18.53 | 205 | 150 |
| 2169.600 | 42.32 | --- | -6.17 | 36.15 | --- | 74.00 | 54.00 | -17.85 | 182 | 150 |
| 2603.520 | 42.46 | --- | -4.39 | 38.07 | --- | 74.00 | 54.00 | -15.93 | 211 | 150 |
| 3037.440 | 41.96 | --- | -2.53 | 39.43 | --- | 74.00 | 54.00 | -14.57 | 232 | 150 |
| 3471.360 | 41.80 | --- | -0.76 | 41.04 | --- | 74.00 | 54.00 | -12.96 | 220 | 150 |
| 3905.280 | 41.59 | --- | 0.92 | 42.51 | --- | 74.00 | 54.00 | -11.49 | 241 | 150 |



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Polarization: Vertical

| Frequency (MHz) | Reading (dBuV) | Detector | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Table Degree (Deg.) | Ant. High (cm) |
|-----------------|----------------|----------|-------------|-----------------|----------------|-------------|---------------------|----------------|
| 868.136 | 17.96 | peak | 25.70 | 43.66 | 72.87 | -29.21 | 202 | 330 |

Polarization: Vertical

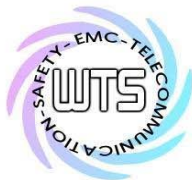
| Frequency (MHz) | Reading (dBuV) | | Factor (dB) Corr. | Result @3m (dBuV/m) | | Limit @3m (dBuV/m) | | Margin (dB) | Table Degree (Deg.) | Ant. High (cm) |
|-----------------|----------------|------|-------------------|---------------------|------|--------------------|-------|-------------|---------------------|----------------|
| | Peak | Ave. | | Peak | Ave. | Peak | Ave. | | | |
| 1300.601 | 43.94 | --- | -12.30 | 31.64 | --- | 74.00 | 54.00 | -22.36 | 230 | 150 |
| 1735.680 | 42.62 | --- | -8.82 | 33.80 | --- | 74.00 | 54.00 | -20.20 | 211 | 150 |
| 2169.600 | 42.50 | --- | -6.17 | 36.33 | --- | 74.00 | 54.00 | -17.67 | 225 | 150 |
| 2603.520 | 42.70 | --- | -4.39 | 38.31 | --- | 74.00 | 54.00 | -15.69 | 233 | 150 |
| 3037.440 | 42.09 | --- | -2.53 | 39.56 | --- | 74.00 | 54.00 | -14.44 | 195 | 150 |
| 3471.360 | 41.61 | --- | -0.76 | 40.85 | --- | 74.00 | 54.00 | -13.15 | 208 | 150 |
| 3905.280 | 41.04 | --- | 0.92 | 41.96 | --- | 74.00 | 54.00 | -12.04 | 219 | 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 attached diagrams.

All other not noted test plots do not contain significant test results in relation to the limits

Test results: The unit meet the FCC requirements.

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



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3.6 Channel Bandwidth

Measurement of Necessary Bandwidth (BN)

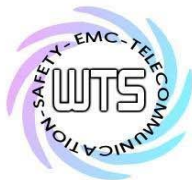
| Used frequency | Bandwidth | Limit |
|----------------|-------------------|------------|
| 433.92 MHz | 242.788461538 kHz | 1.0848 MHz |

Explanation: The bandwidth fulfills the requirements of FCC § 15.231, see attached diagrams.

Limits:

The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

Test equipment used: ETSTW-RE 055



Registration number: W6D21006-10736-C-1

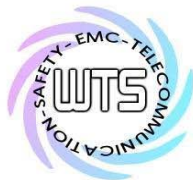
FCC ID: YMC-TS2009

3.7 Antenna requirement

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. 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. This requirement does not apply to carrier current devices or to devices operated under the provisions of Sections 15.211, 15.213, 15.217, 15.219, or 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with Section 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this Part are not exceeded.

Explanation: This PCB antenna is integral antenna which passes antenna requirement.

| | | |
|--------------------------------------|--------------------------------------------|--------------------------------|
| The equipment meets the requirements | yes <input checked="" type="checkbox"/> | no <input type="checkbox"/> |
|--------------------------------------|--------------------------------------------|--------------------------------|



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3.8 Duty Cycle

The correction factor, based on the channel dwell time in a 100ms period, may be mathematically applied to a measurement made with an average detector, to further reduce the measured value.

Average Reading = Peak Reading (dBuV/m) + Duty Cycle Correction

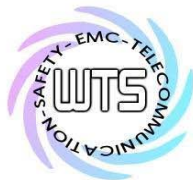
Duty Cycle Correction = $20 \log (\text{Cycle})$

In order to determine the Duty Cycle, the EUT is measured as:

| Testing Mode | T period (ms) | T on (ms) | Duty Cycle | Duty Cycle Correction $20 \cdot \log(\text{Duty Cycle})$ |
|----------------------|------------------|--------------|------------|-------------------------------------------------------------|
| Transmitting mode | -- | -- | -- | -- |

Explanation: This test is not required because the EUT does not belong to phase modulation device.

Test equipment used: ETSTW-RE 055



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3.9 Conducted Measurement at (AC) Power Line

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.

| Frequency | Level | |
|-----------|---------------------------|------------------------|
| | quasi-peak (dB μ V/m) | average (dB μ V/m) |
| -- kHz | -- | -- |

Limits:

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

Explanation: Test is not required because the sample is battery-used.

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

Registration number: W6D21006-10736-C-1

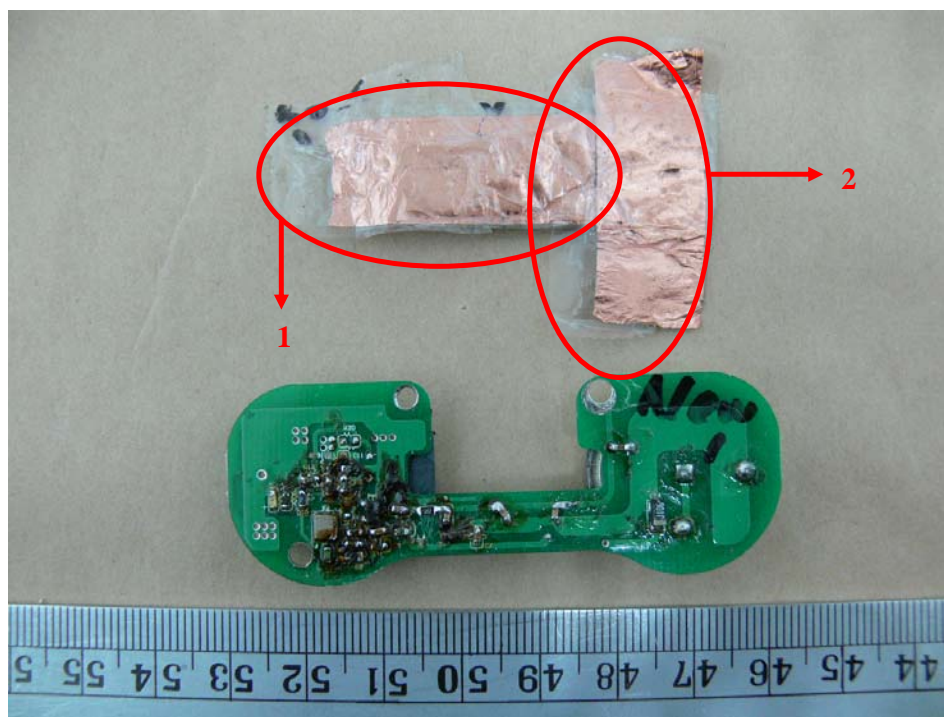
FCC ID: YMC-TS2009

3.10 Equipment Modification

The testing was passed only under the specific modification condition as below:

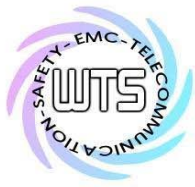
| Item | Component | Quantity | Model No. | Specification | Manufacturer |
|------|-------------|----------|-----------|---------------|------------------------|
| 1 | Copper Foil | 1 | NA | 15*38*0.5(mm) | DINYI PRINTING CO.,LTD |
| 2 | Copper Foil | 1 | NA | 35*15*0.5(mm) | DINYI PRINTING CO.,LTD |

The detail position information of the modified components is referred to below picture.



Any modification made previous to test by Mictech Security Co., Ltd. will be incorporated in each product sold in USA.

No modification was made by Worldwide Testing Services (Taiwan) Co., Ltd..



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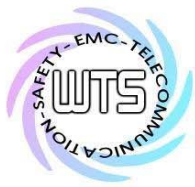
Appendix

A Measurement diagrams

1. Active Time
2. Output Power
3. Spurious Emissions radiated
4. Bandwidth

B Photos

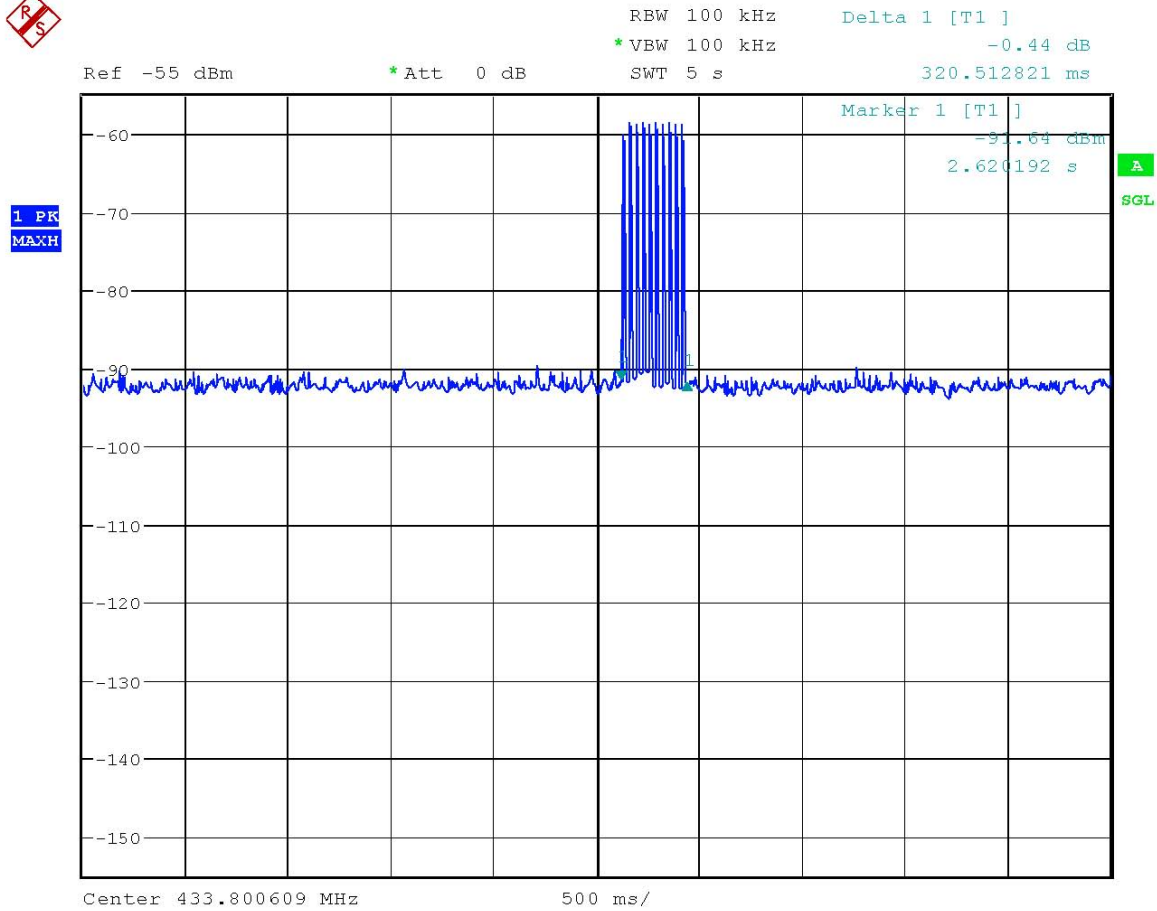
1. External Photos
2. Internal Photos
3. Set Up Photos



Worldwide Testing Services(Taiwan) Co., Ltd.

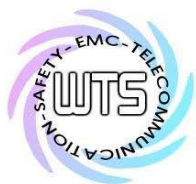
Registration number: W6D21006-10736-C-1
FCC ID: YMC-TS2009

Active Time



Duration Time

Date: 2.JUL.2010 12:31:03



Worldwide Testing Services(Taiwan) Co., Ltd.

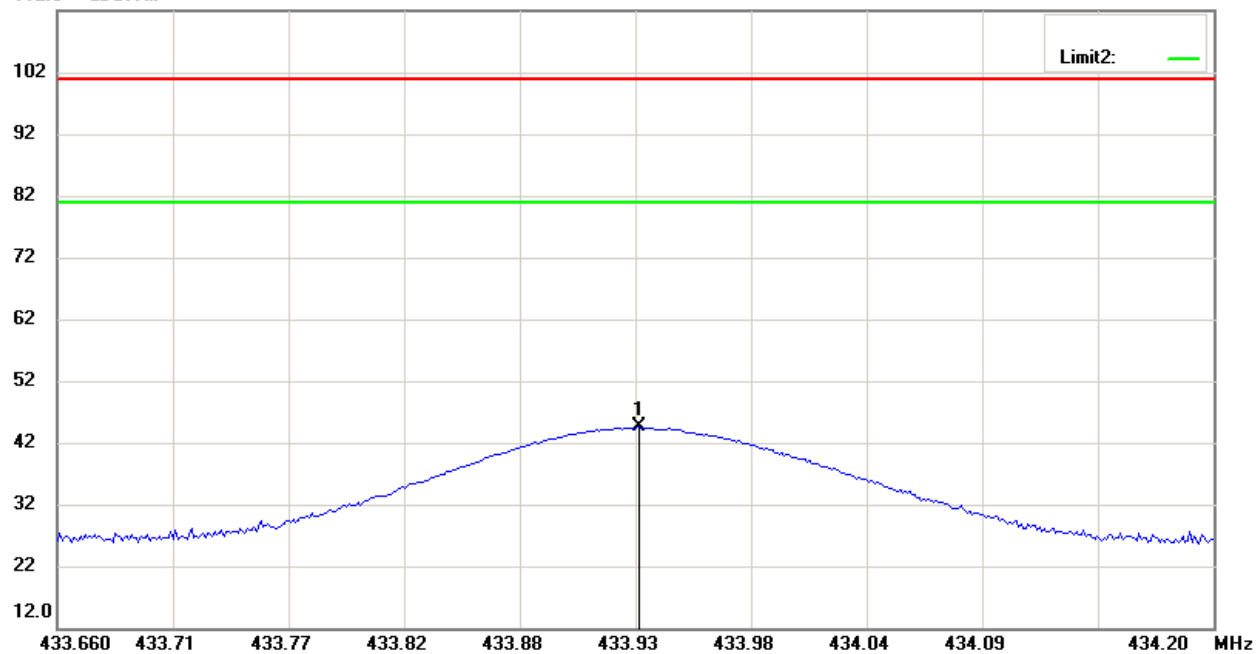
Registration number: W6D21006-10736-C-1

FCC ID: YMC-TS2009

Output Power

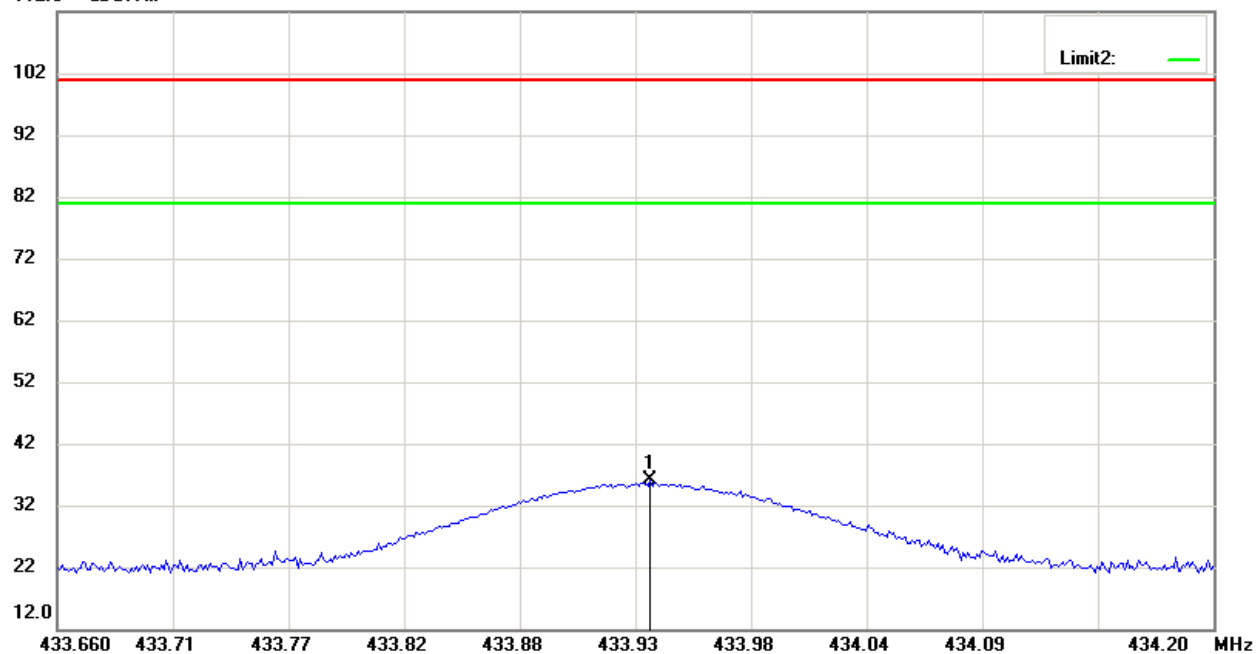
Antenna Polarization H

112.0 dBuV/m



Antenna Polarization V

112.0 dBuV/m





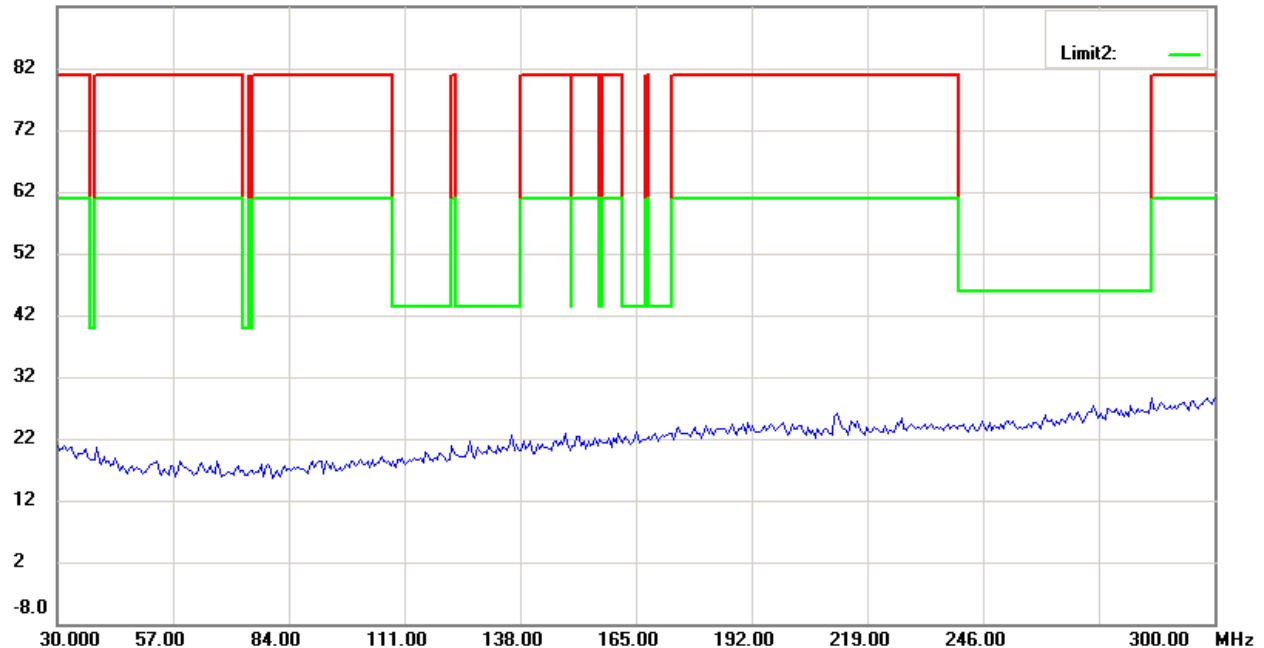
Registration number: W6D21006-10736-C-1

FCC ID: YMC-TS2009

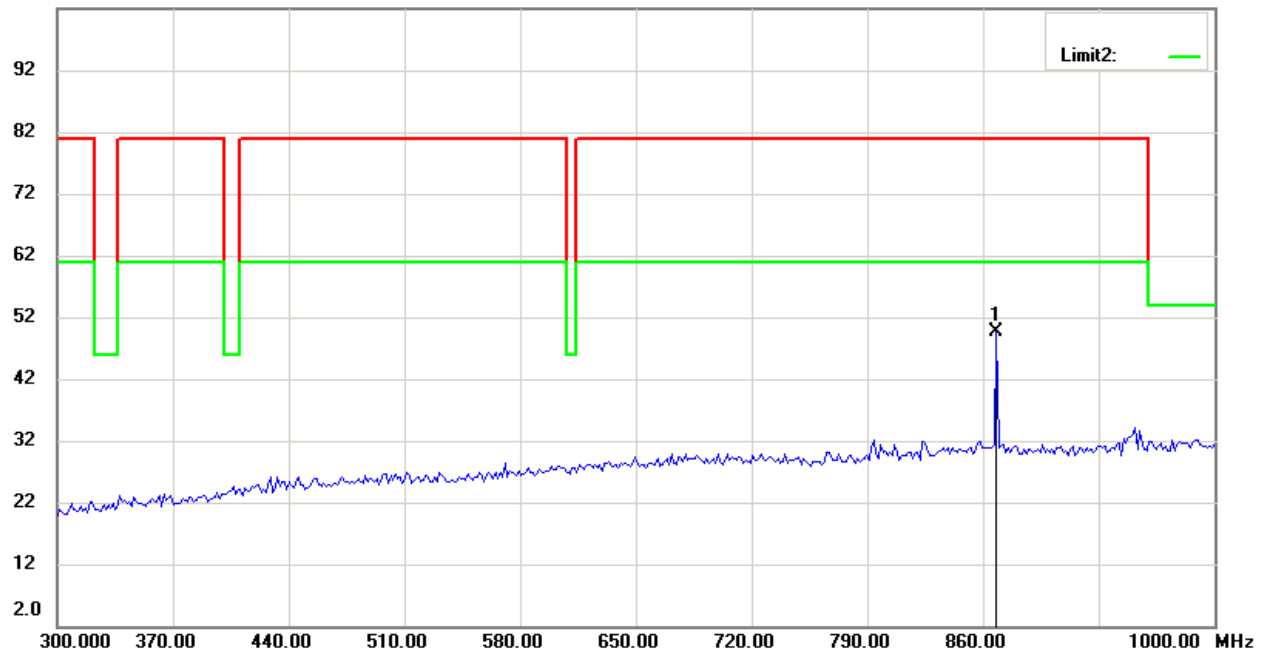
Spurious Emissions radiated

Antenna Polarization H

92.0 dBuV/m



102.0 dBuV/m



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 radiated test data of this test report.

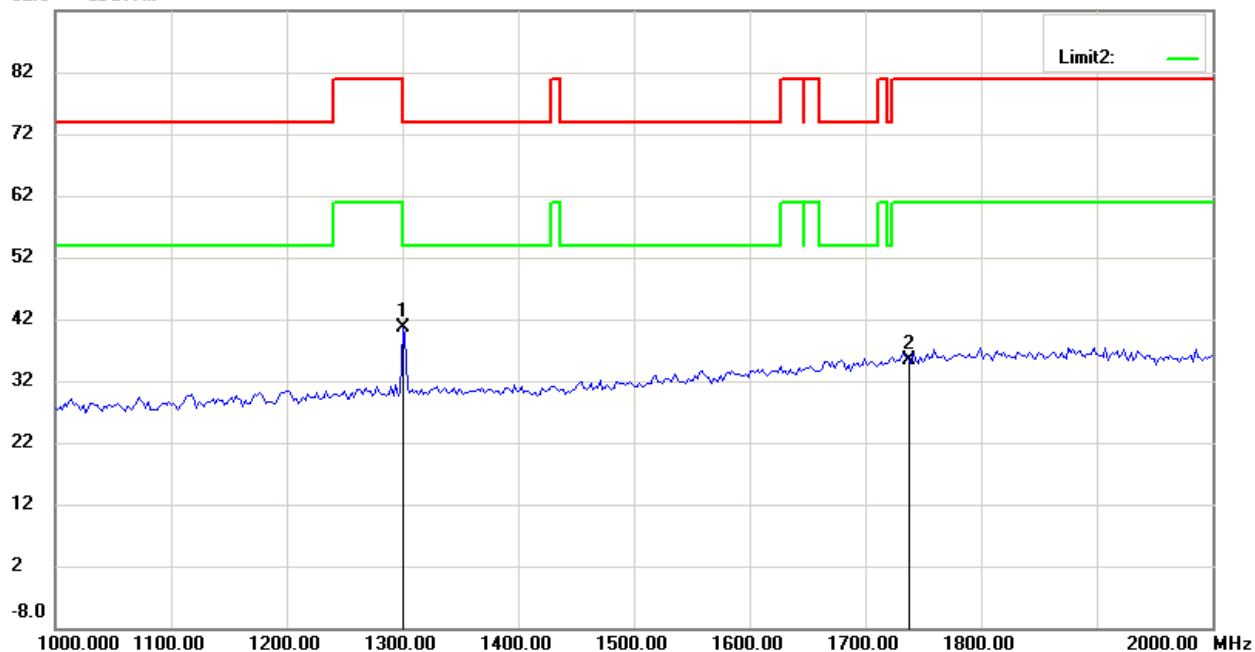


Worldwide Testing Services(Taiwan) Co., Ltd.

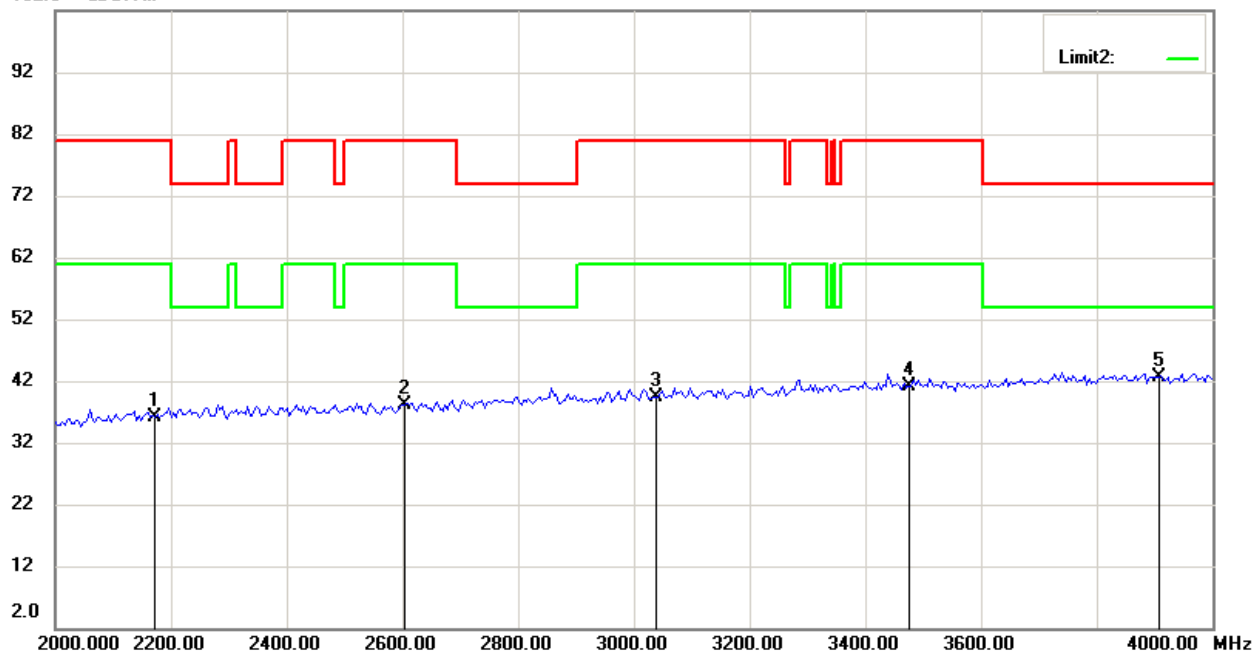
Registration number: W6D21006-10736-C-1

FCC ID: YMC-TS2009

92.0 dBuV/m



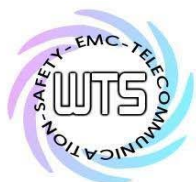
102.0 dBuV/m



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 radiated test data of this test report.

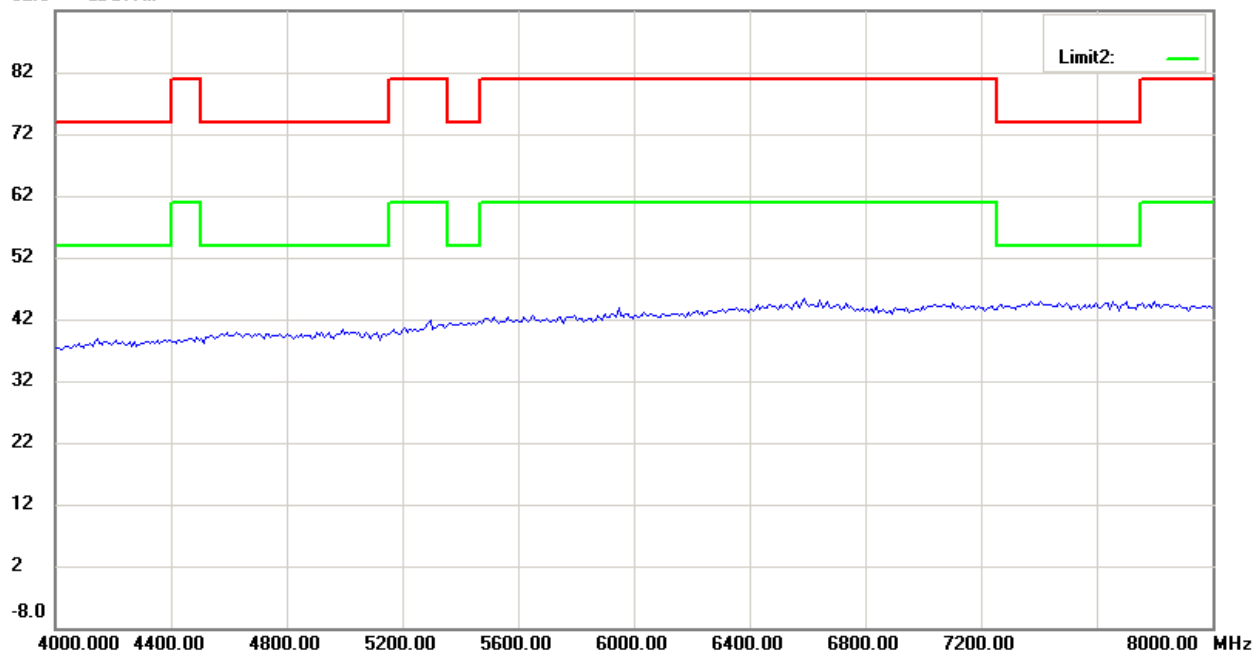


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Registration number: W6D21006-10736-C-1

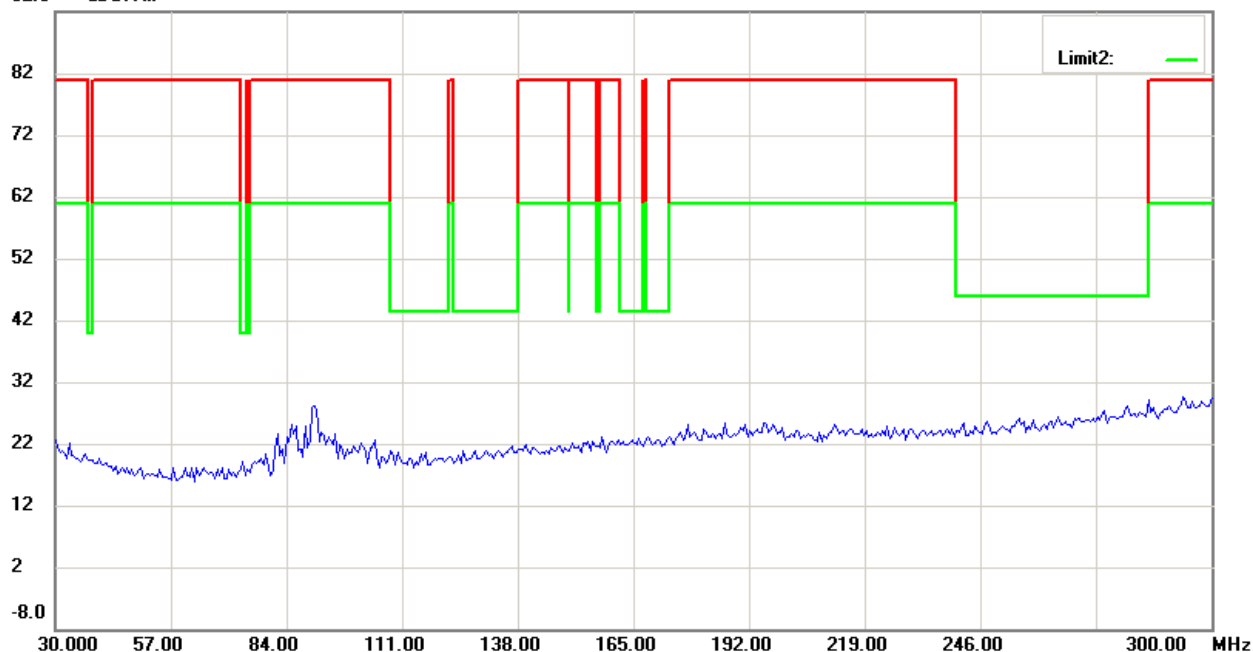
FCC ID: YMC-TS2009

92.0 dBuV/m



Antenna Polarization V

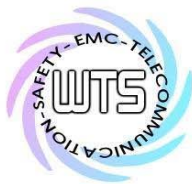
92.0 dBuV/m



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 radiated test data of this test report.

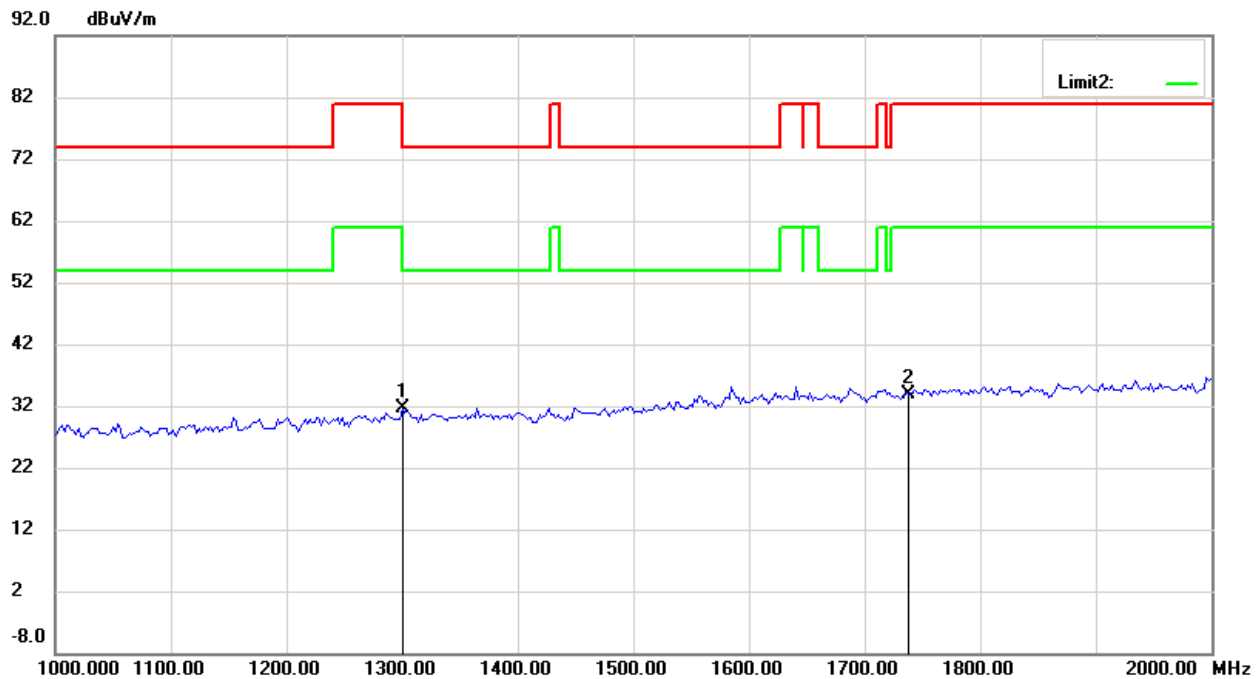
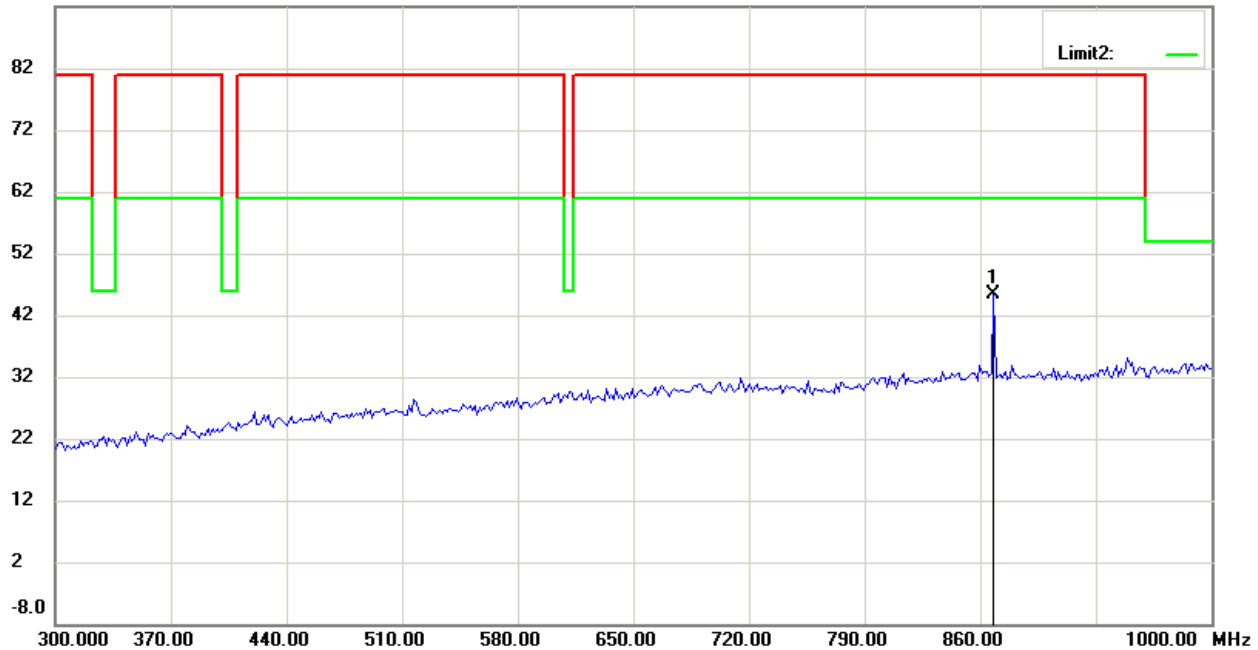


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Registration number: W6D21006-10736-C-1

FCC ID: YMC-TS2009

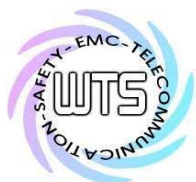
92.0 dBuV/m



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 radiated test data of this test report.

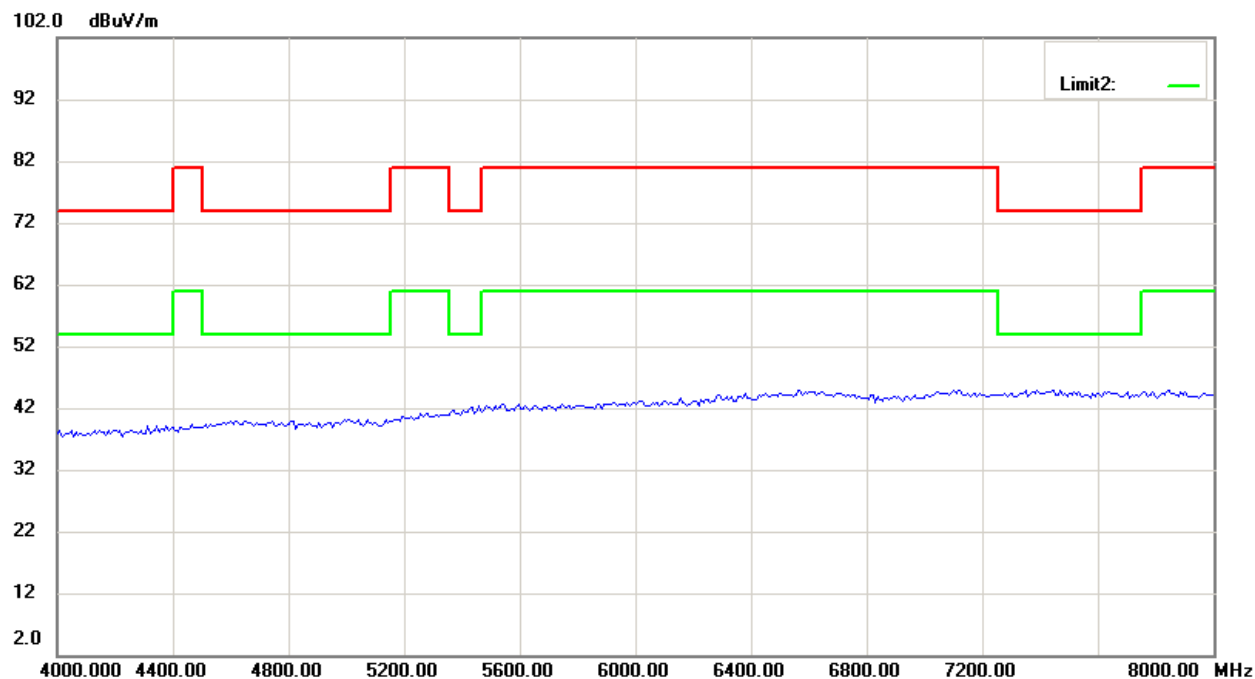
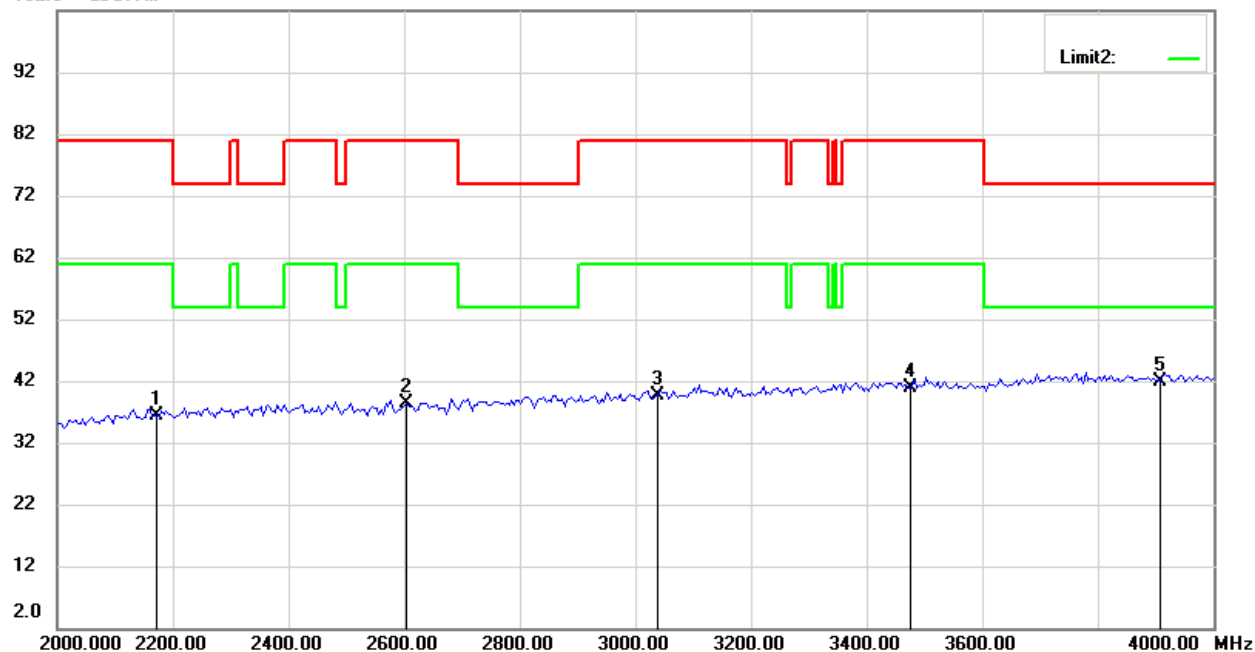


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Registration number: W6D21006-10736-C-1

FCC ID: YMC-TS2009

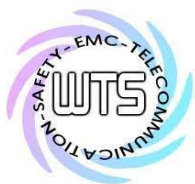
102.0 dBuV/m



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 radiated test data of this test report.

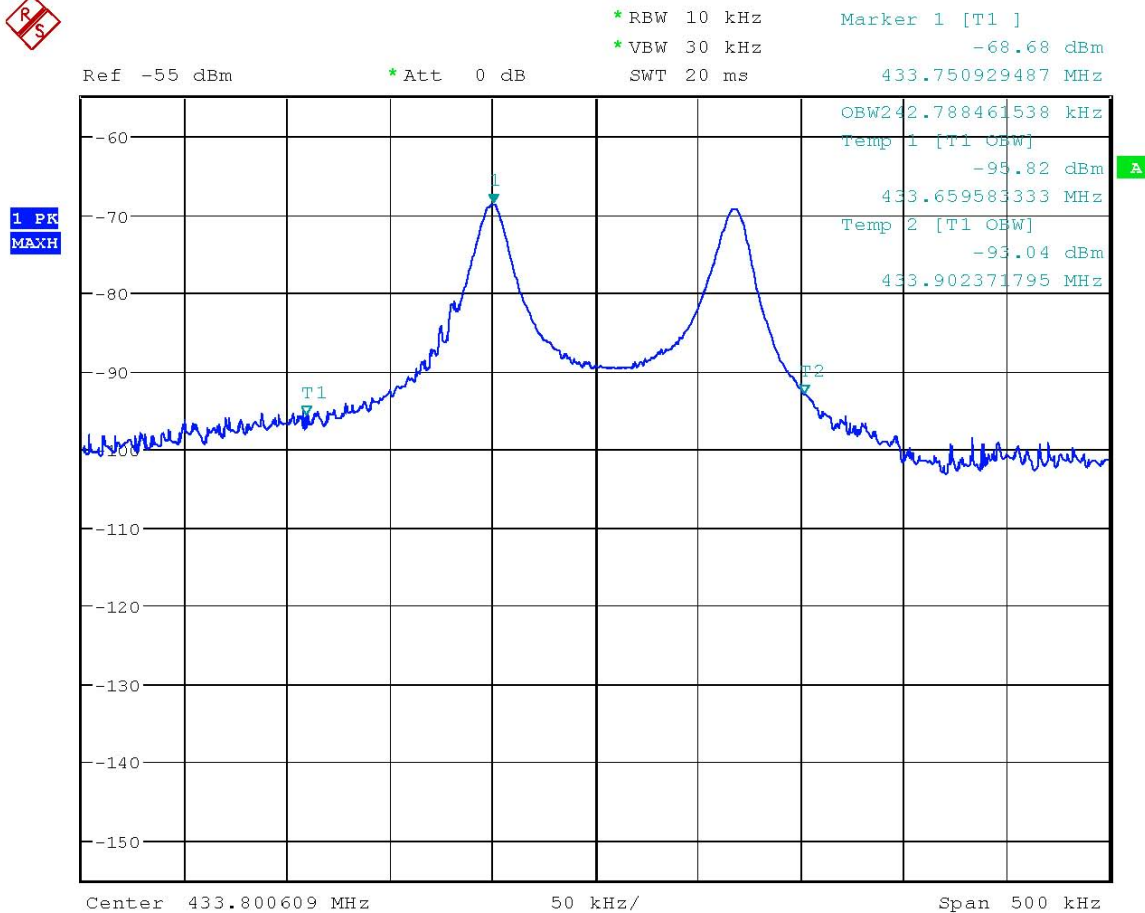


Worldwide Testing Services(Taiwan) Co., Ltd.

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Bandwidth



Occupied Bandwidth

Date: 2.JUL.2010 12:16:53



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Pictures

External Photos

Transmitter and receiver



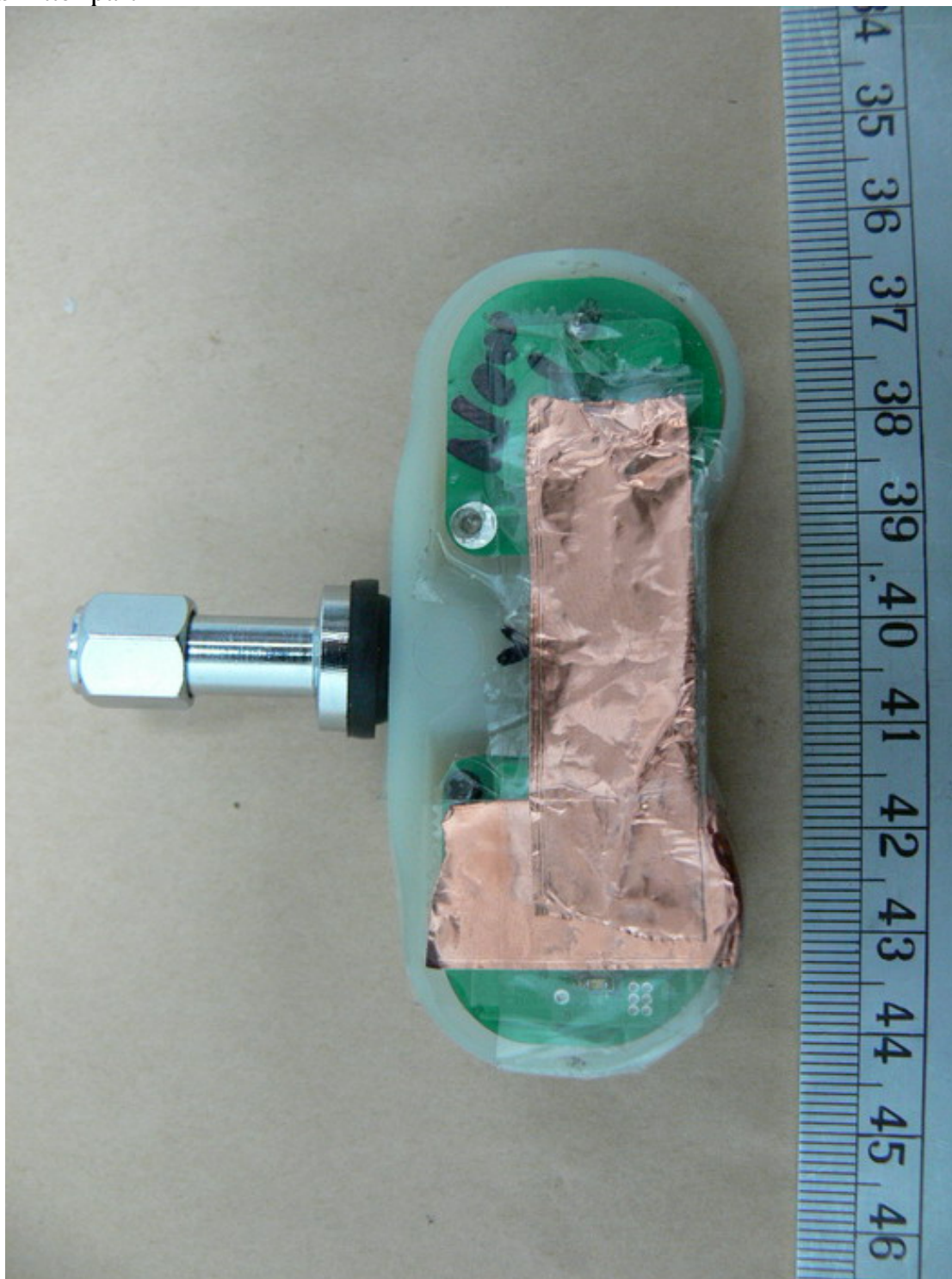


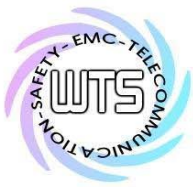
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Registration number: W6D21006-10736-C-1

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Transmitter part





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Registration number: W6D21006-10736-C-1
FCC ID: YMC-TS2009



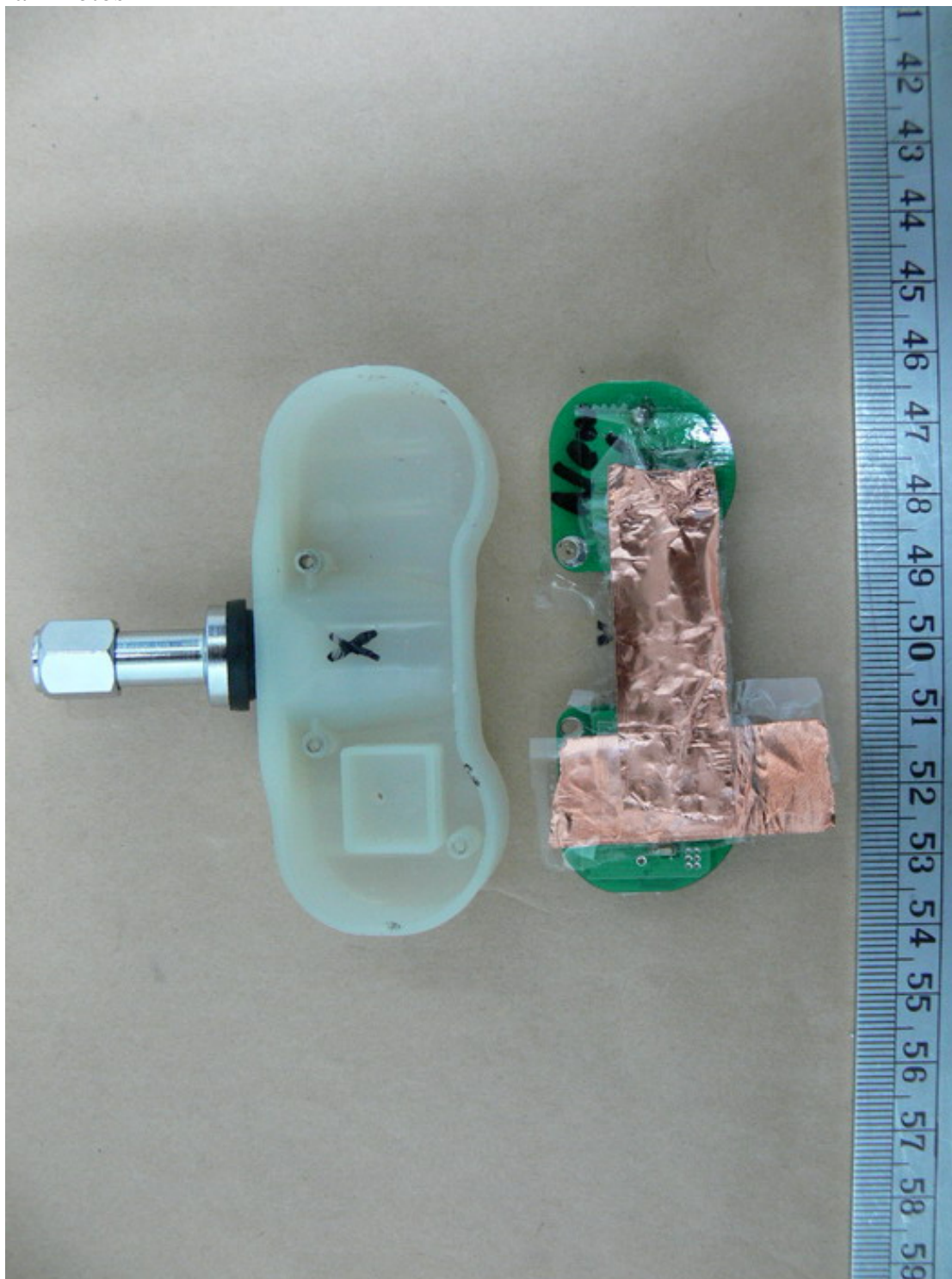


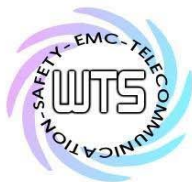
Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6D21006-10736-C-1

FCC ID: YMC-TS2009

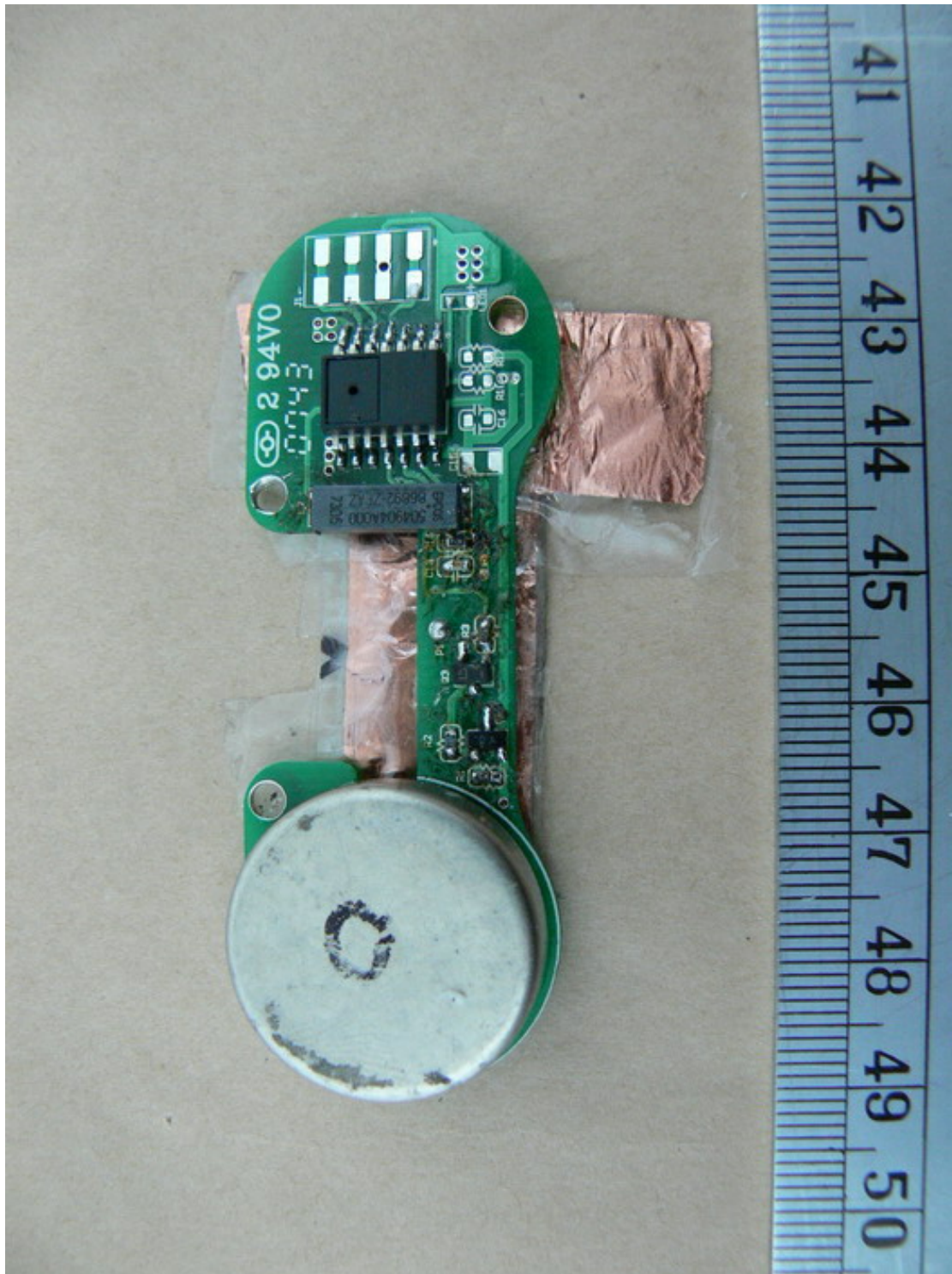
Internal Photos





Worldwide Testing Services(Taiwan) Co., Ltd.

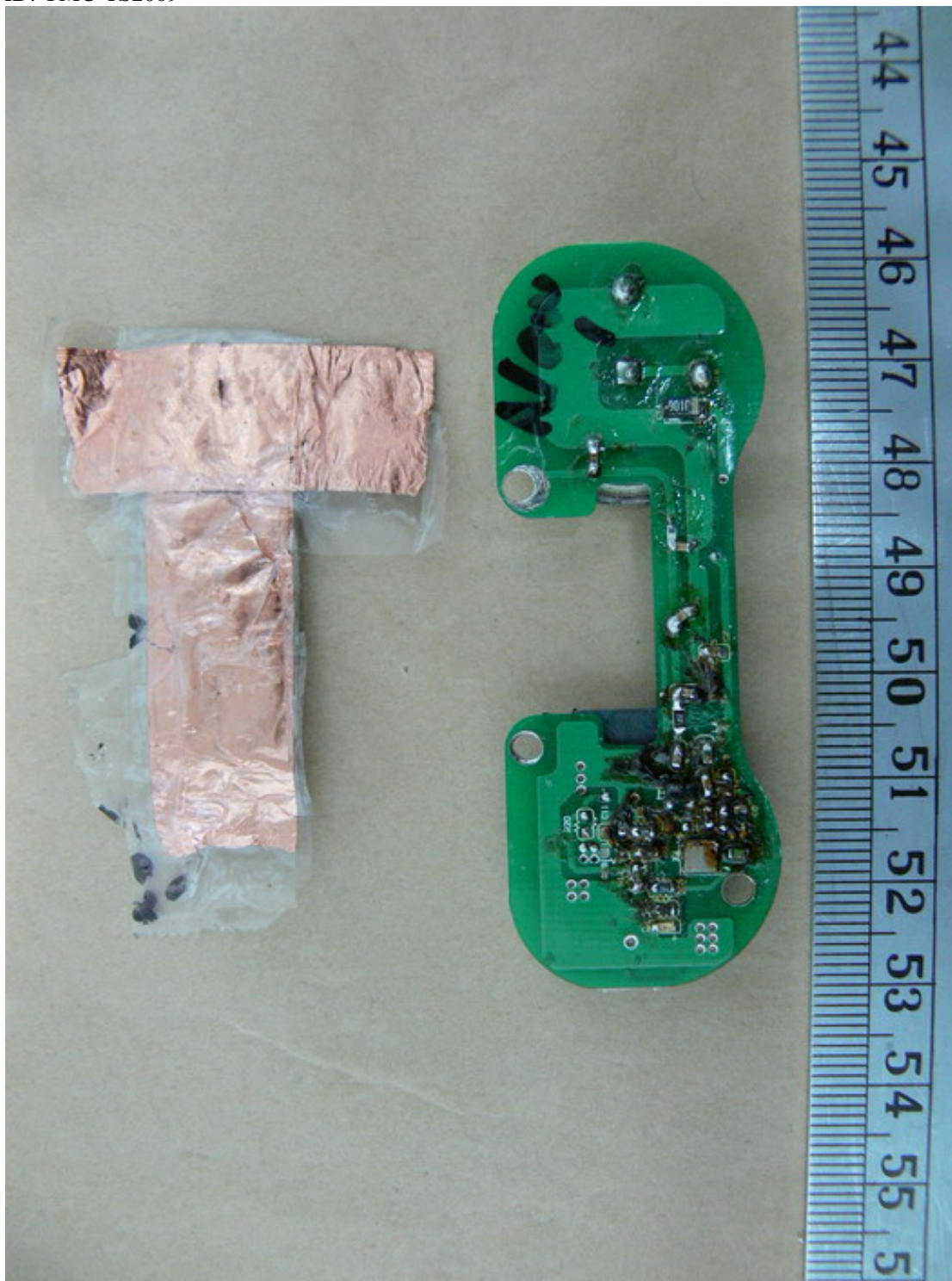
Registration number: W6D21006-10736-C-1
FCC ID: YMC-TS2009





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FCC ID: YMC-TS2009





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FCC ID: YMC-TS2009

Set Up Photos

