# FCC Part 15 Rules &RSS-215 Test Report

Report No.: AGC00589131103FE08

| | | |
|---|---|---|
| **FCC ID** | : | PH3DJ-500 |
| **IC** | : | 3070C-DJ500 |
| **TYPE OF AUTHORIZATION** | : | Certification |
| **APPLICATION PURPOSE** | : | Original Equipment |
| **PRODUCT DESIGNATION** | : | VHF/UHF FM HANDHELD TRANSCEIVER |
| **BRAND NAME** | : | ALINCO |
| **TEST MODEL** | : | DJ-500T |
| **CLIENT** | : | Alinco Incorporated, Electronics Division |
| **DATE OF ISSUE** | : | Nov.14, 2013 |
| **STANDARD(S)** | : | FCC Part 15 Rules&RSS-215 |
| **REPORT VERSION** | : | V 1.0 |

***A***ttestation of ***G***lobal ***C***ompliance (Shenzhen) Co., Ltd

**Report Revise Record**

| Report Version | Revise Time | Issued Date | Valid Version | Notes |
|---|---|---|---|---|
| V1.0 | / | Nov.14, 2013 | Valid | Original Report |

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## 1. VERIFICATION OF COMPLIANCE

| | |
|---|---|
| **Applicant** | Alinco Incorporated, Electronics Division |
| **Address** | Yodoyabashi Dai-Bldg 13F, 4-4-9 Koraibashi, Chuo-Ku, Osaka 541-0043, Japan |
| **Manufacturer** | Alinco Incorporated, Electronics Division |
| **Address** | Yodoyabashi Dai-Bldg 13F, 4-4-9 Koraibashi, Chuo-Ku, Osaka 541-0043, Japan |
| **Product Designation** | VHF/UHF FM HANDHELD TRANSCEIVER |
| **Brand name:** | ALINCO |
| **Test Model** | DJ-500T |
| **Hardware Version:** | V1.0 |
| **Software Version:** | V2.02 |
| **Measurement Procedure** | ANSI C63.4: 2003 |
| **Date of test:** | Nov.11, 2013 to Nov.13, 2013 |
| **Deviation:** | None |
| **Condition of Test Sample** | Normal |

The above equipment was tested by Attestation Of Global Compliance (Shenzhen) Co., Ltd. for compliance with the requirements set forth in the FCC Rules and Regulations Part 15, the measurement procedure according to ANSI C63.4:2003. This said equipment in the configuration described in this report shows the maximum emission levels emanating from equipment are within the compliance requirements.

The test results of this report relate only to the tested sample identified in this report.

| | | |
|---|---|---|
| Tested by | Wall Huang | Nov.14, 2013 |
| Checked By | Kidd Yang | Nov.14, 2013 |
| Authorized By | Solger Zhang | Nov.14, 2013 |

## 2. PRODUCT INFORMATION

The EUT is a VHF/UHF FM HANDHELD TRANSCEIVER designed for voice communication. It is designed by way of utilizing the FM modulation achieves the system operating.
A major technical description of EUT is described as following:

| | |
|---|---|
| **Communication Type** | Voice / Tone only |
| **Modulation** | FM |
| **RX Frequency Range** | 144MHz-148MHz&420MHz-450 MHz<br>136MHz-174MHz &400MHz-480MHz |
| **Channel step** | 12.5KHz |
| **Antenna Designation** | Detachable |
| **Power Supply** | DC 7.4V by battery |
| **Adapter Parameter** | Input: 100-240V, 50/60HZ, 0.3A<br>Output: 12V, 0.5A |

**I/O Port Information (☒Applicable ☐Not Applicable)**

| **I/O Port of EUT** | | | |
|---|---|---|---|
| **I/O Port Type** | **Q'TY** | **Cable** | **Tested with** |
| DC Input Port | **1** | 1.5m, Unshielded | |
| Antenna Connect Port | 1 | 0 | 1 |
| Hand-Operated Microphone Connect Port | 1 | 0.5m, Unshielded | 1 |

## 3. TEST FACILITY

| | |
|---|---|
| **Facility** | Attestation of Global Compliance (Shenzhen) Co., Ltd |
| **Location:** | 2/F., Building 2, No.1-No.4, Chaxi Sanwei Technical Industrial Park, Gushu, Xixiang, Bao'an District, Shenzhen, Guangdong, China |
| **Description:** | The test site is constructed and calibrated to meet the FCC requirements in documents ANSI C63.4:2003. |
| **Site Filing:** | The FCC Registration Number is 259865 |
| **Instrument Tolerance:** | All measuring equipment is in accord with ANSI C63.4 requirements that meet industry regulatory agency and accreditation agency requirement. |

## 4. SUPPORT EQUIPMENT LIST

| Device Type | Manufacturer | Model Name | Serial No. | Data Cable | Power Cable |
|---|---|---|---|---|---|
| -- | -- | -- | -- | -- | -- |

## 5. SYSTEM DESCRIPTION

**EUT test procedure:**

1. Connect EUT and peripheral devices.
2. Power on the EUT, the EUT begins to work.
3. Running data transmission and make sure the EUT normal working.

**EMC TEST MODES**

| No. | TEST MODES |
|---|---|
| 1 | Scanning mode + Receiving mode |

**Note:** Only the result of the worst case was recorded in the report.

## 6. SUMMARY OF TEST RESULTS

| FCC Rules | RSS-215 | Description Of Test | Result |
|---|---|---|---|
| §15.107 | RSS-Gen | Conduction Emission | Compliant |
| §15.109 | RSS-Gen | Radiated Emission | Compliant |
| §15.121 | §4.1 | Scanning receivers and frequency converters used with scanning receivers. | Compliant |

# 7. FCC&RSS-215 LINE CONDUCTED EMISSION TEST

## 7.1. TEST EQUIPMENT OF LINE CONDUCTED EMISSION TEST

| Description | Manufacturer | Model | Identifier | Cal. Date | Cal. Due |
|---|---|---|---|---|---|
| Spectrum Analyzer | Agilent | E4440A | US41421290 | 07/17/2013 | 07/16/2014 |
| EMI Test Receiver | Rohde & Schwarz | ESCI | 100694 | 07/17/2013 | 07/16/2014 |
| LISN | Rohde & Schwarz | ESH2-Z5 | 862060/020 | 07/17/2013 | 07/16/2014 |

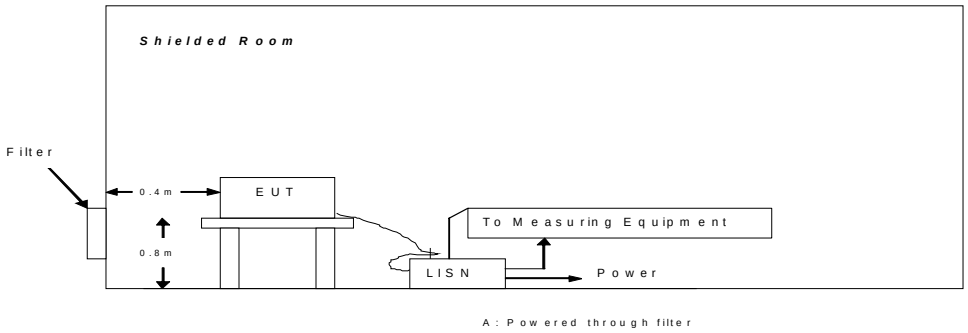
## 7.2 .LIMITS OF LINE CONDUCTED EMISSION TEST

| Frequency | Maximum RF Line Voltage | |
|---|---|---|
| | Q.P.( dBuV) | Average( dBuV) |
| 150kHz~500kHz | 66-56 | 56-46 |
| 500kHz~5MHz | 56 | 46 |
| 5MHz~30MHz | 60 | 50 |

**Note: 1. The lower limit shall apply at the transition frequency.

2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz

## 7.3. BLOCK DIAGRAM OF LINE CONDUCTED EMISSION TEST



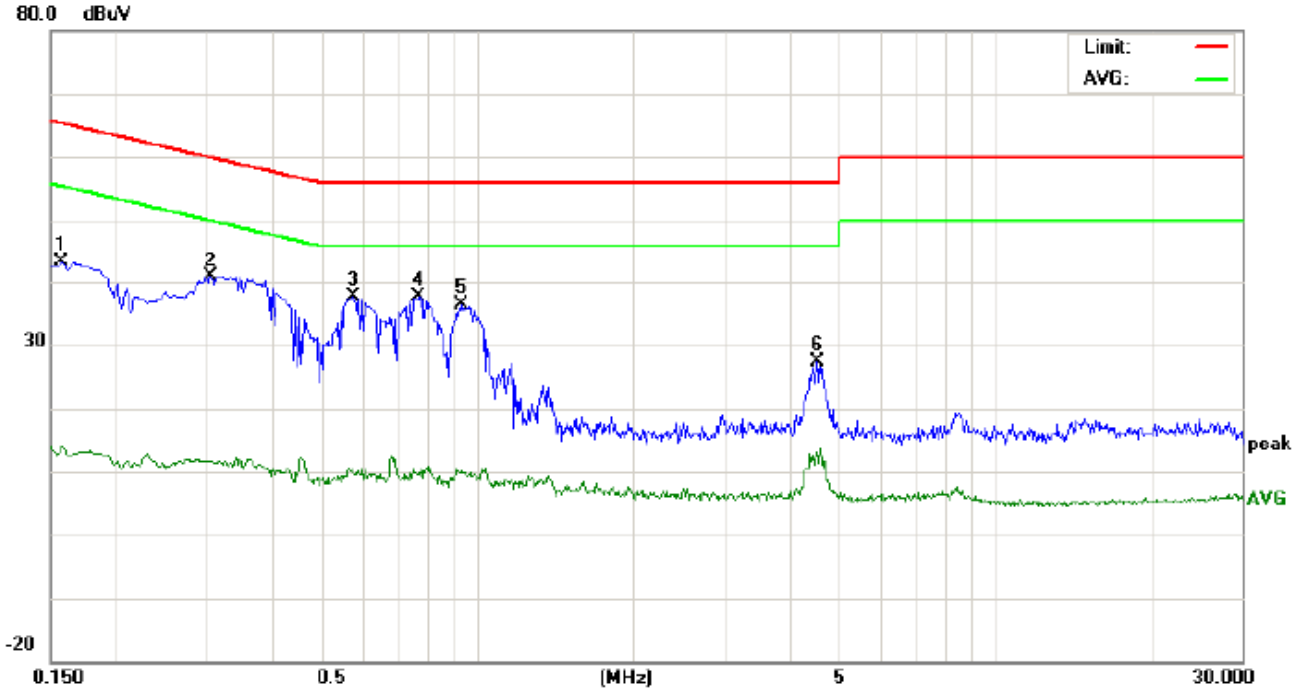
## 7.4. PROCEDURE OF LINE CONDUCTED EMISSION TEST

1) The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.4 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
2) Support equipment, if needed, was placed as per ANSI C63.4.
3) All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.
   The EUT received power through a Line Impedance Stabilization Network (LISN) that was grounded to the protect earth.
4) The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
5) Analyzer / Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.
6) During the above scans, the emissions were maximized by cable manipulation.
7) A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions.
8) Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less –2dB to the A.V. limit in Peak mode, then the emission signal was re-checked using Q.P and Average detector.

   The test data of the worst case condition (mode 1) was reported on the following Data page.

## 7.5 TEST RESULT OF LINE CONDUCTED EMISSION TEST

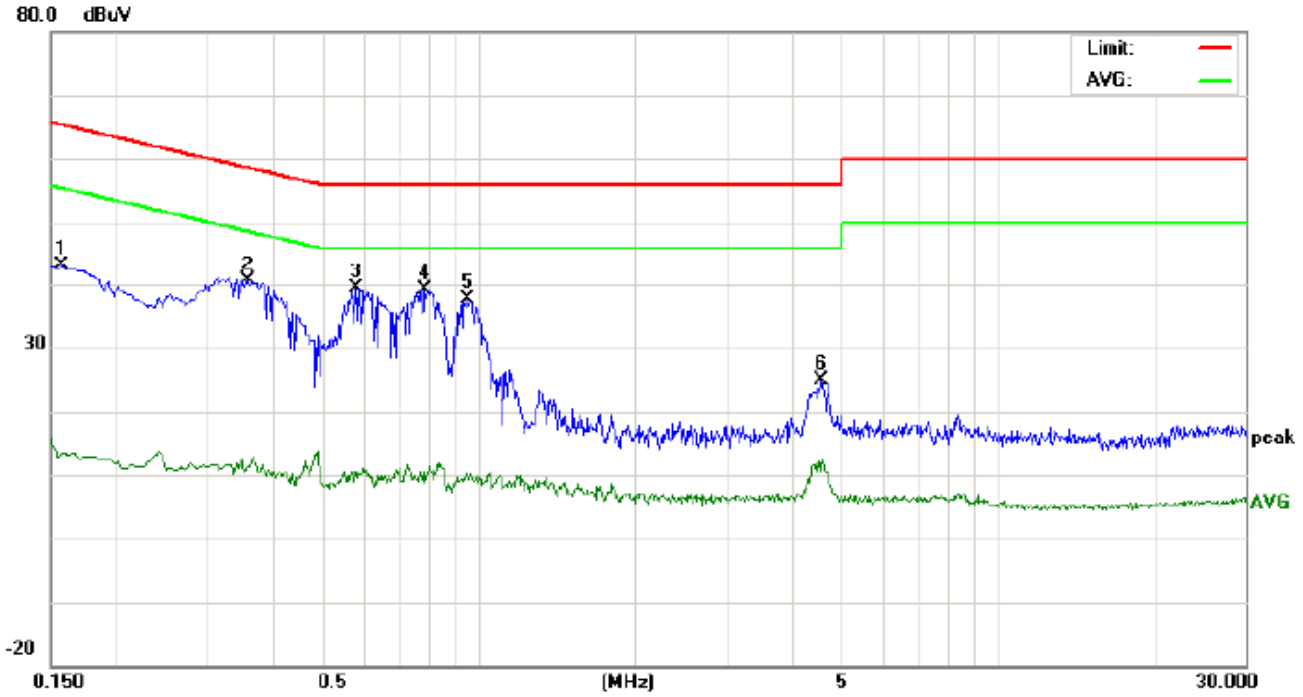
Line Conducted Emission Test Line 1-L




Site: Conduction
Phase: *L1*
Temperature: 26
Limit: FCC Class B Conduction(QP)
Power:
Humidity: 60 %
EUT: VHF/UHF FM HANDHELD TRANSCEIVER
M/N: DJ-500T
Mode: Mode 1
Note:

| No. | Freq. (MHz) | Reading_Level (dBuV) | | | Correct Factor | Measurement (dBuV) | | | Limit (dBuV) | | Margin (dB) | | P/F | Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Peak | QP | AVG | dB | Peak | QP | AVG | QP | AVG | QP | AVG | | |
| 1 | 0.1580 | 33.28 | | 3.77 | 10.17 | 43.45 | | 13.94 | 65.56 | 55.56 | -22.11 | -41.62 | P | |
| 2 | 0.3059 | 30.48 | | 1.39 | 10.29 | 40.77 | | 11.68 | 60.08 | 50.08 | -19.31 | -38.40 | P | |
| 3 | 0.5778 | 27.29 | | -0.43 | 10.33 | 37.62 | | 9.90 | 56.00 | 46.00 | -18.38 | -36.10 | P | |
| 4 | 0.7740 | 27.45 | | -0.41 | 10.30 | 37.75 | | 9.89 | 56.00 | 46.00 | -18.25 | -36.11 | P | |
| 5 | 0.9378 | 25.93 | | -0.37 | 10.39 | 36.32 | | 10.02 | 56.00 | 46.00 | -19.68 | -35.98 | P | |
| 6 | 4.5339 | 17.23 | | 2.98 | 10.21 | 27.44 | | 13.19 | 56.00 | 46.00 | -28.56 | -32.81 | P | |

Line Conducted Emission Test Line 2-N




Site: Conduction
Limit: FCC Class B Conduction(QP)
EUT: VHF/UHF FM HANDHELD TRANSCEIVER
M/N: DJ-500T
Mode: Mode 1
Note:

Phase: *N*
Power:

Temperature: 26
Humidity: 60 %

| No. | Freq. (MHz) | Reading_Level (dBuV) | | | Correct Factor | Measurement (dBuV) | | | Limit (dBuV) | | Margin (dB) | | P/F | Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Peak | QP | AVG | dB | Peak | QP | AVG | QP | AVG | QP | AVG | | |
| 1 | 0.1580 | 33.05 | | 3.15 | 10.17 | 43.22 | | 13.32 | 65.56 | 55.56 | -22.34 | -42.24 | P | |
| 2 | 0.3578 | 30.32 | | 1.01 | 10.31 | 40.63 | | 11.32 | 58.78 | 48.78 | -18.15 | -37.46 | P | |
| 3 | 0.5818 | 29.13 | | 0.21 | 10.33 | 39.46 | | 10.54 | 56.00 | 46.00 | -16.54 | -35.46 | P | |
| 4 | 0.7900 | 28.88 | | 0.27 | 10.29 | 39.17 | | 10.56 | 56.00 | 46.00 | -16.83 | -35.44 | P | |
| 5 | 0.9498 | 27.34 | | -0.05 | 10.39 | 37.73 | | 10.34 | 56.00 | 46.00 | -18.27 | -35.66 | P | |
| 6 | 4.5777 | 14.54 | | 1.49 | 10.21 | 24.75 | | 11.70 | 56.00 | 46.00 | -31.25 | -34.30 | P | |

# 8. FCC&RSS-215 RADIATED EMISSION TEST

## 8.1. TEST EQUIPMENT OF RADIATED EMISSION

| Description | Manufacturer | Model | Identifier | Cal. Date | Cal. Due |
|---|---|---|---|---|---|
| PSA SERIES SPECTRUM ANALYZER | AGILENT | E4440A | US41421290 | 07/17/2013 | 07/16/2014 |
| ANTENNA | A.H. | SAS-521-4 | 26 | 07/17/2013 | 07/16/2014 |
| HORN ANTENNA | EM | EM-AH-10180 | 67 | 04/20/2013 | 04/19/2014 |
| AMPLIFIER | EM | EM30180 | 0607030 | 07/18/2013 | 07/17/2014 |
| POSITIONING CONTROLLER | MF | MF-7802 | MF780208147 | 07/17/2013 | 07/16/2014 |

## 8.2. LIMITS OF RADIATED EMISSION TEST

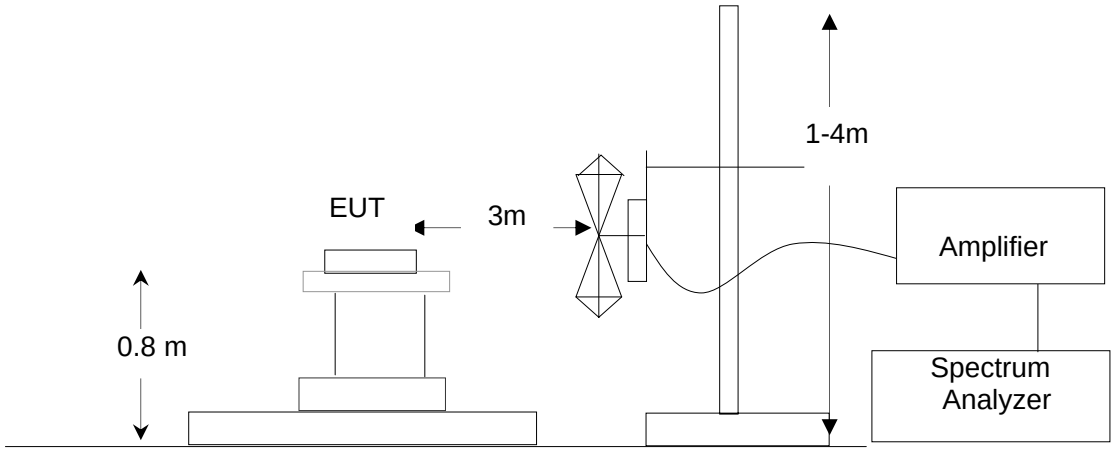
**PROVISIONS APPLICABLE**

FCC Part 15 Subpart B Section 15.109
RSS-215 Section 5.1

| Frequency (MHz) | Distance (m) | Maximum Field Strength Limit (dBuV/m/ Q.P.) |
|---|---|---|
| 30~88 | 3 | 40.0 |
| 88~216 | 3 | 43.5 |
| 216~960 | 3 | 46.0 |
| Above 960 | 3 | 54.0 |

**Note: The lower limit shall apply at the transition frequency.

## 8.3 BLOCK DIAGRAM OF RADIATED EMISSION TEST



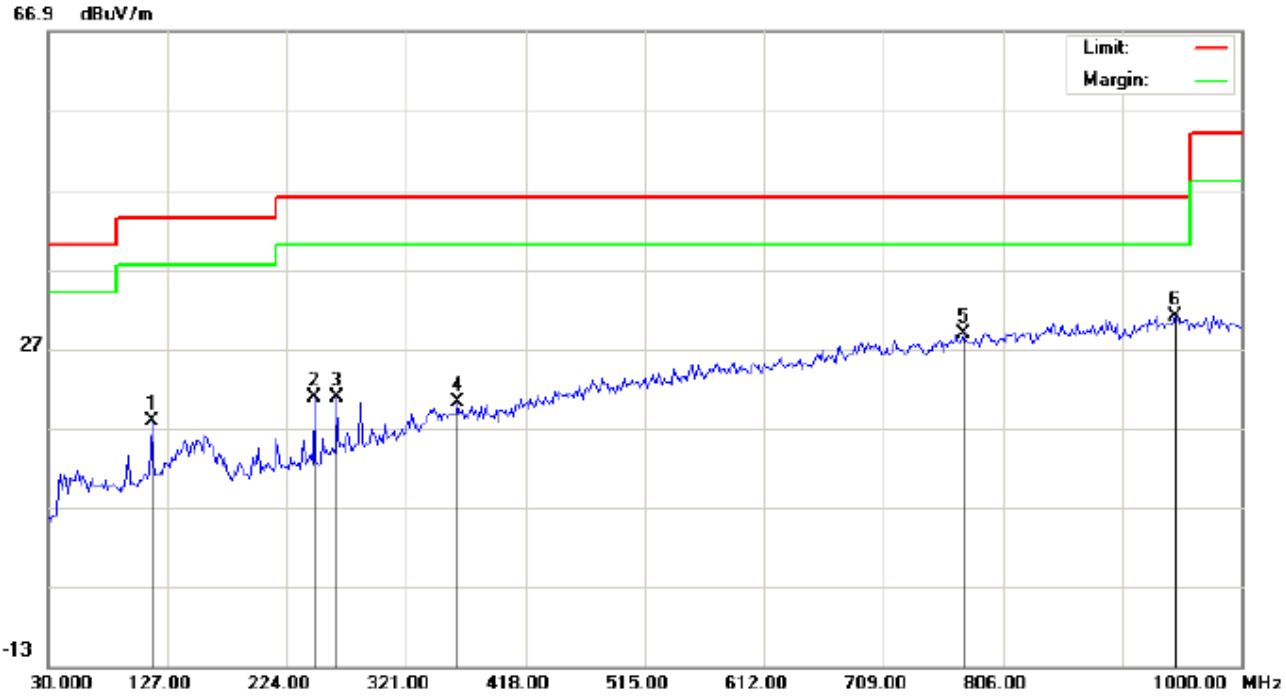
**8.4 PROCEDURE OF RADIATED EMISSION TEST**

1) The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden turntable with a height of 0.8 meters is used which is placed on the ground plane as per ANSI C63.4 (see Test Facility for the dimensions of the ground plane used). When the EUT is floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
2) Support equipment, if needed, was placed as per ANSI C63.4.
3) All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.
4) The EUT received DC 7.4V by DC source. All support equipments received AC 120V/60Hz power from socket under the turntable, if any.
5) The antenna was placed at 3 meter away from the EUT as stated in FCC Part 15. The antenna connected to the Analyzer via a cable and at times a pre-amplifier would be used.
6) The Analyzer / Receiver quickly scanned from 30MHz to 1000MHz. The EUT test program was started. Emissions were scanned and measured rotating the EUT to 360 degrees and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.
7) The test mode(s) were scanned during the test:
8) Recorded at least the six highest emissions. Emission frequency, amplitude, antenna position, polarization and turntable position were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit and Q.P./Peak reading is presented.

The test data of the worst case condition(mode 1) was reported on the following Data page

## 8.5 TEST RESULT OF RADIATED EMISSION TEST

Radiated Emission Test –Horizontal -3m Below 1G



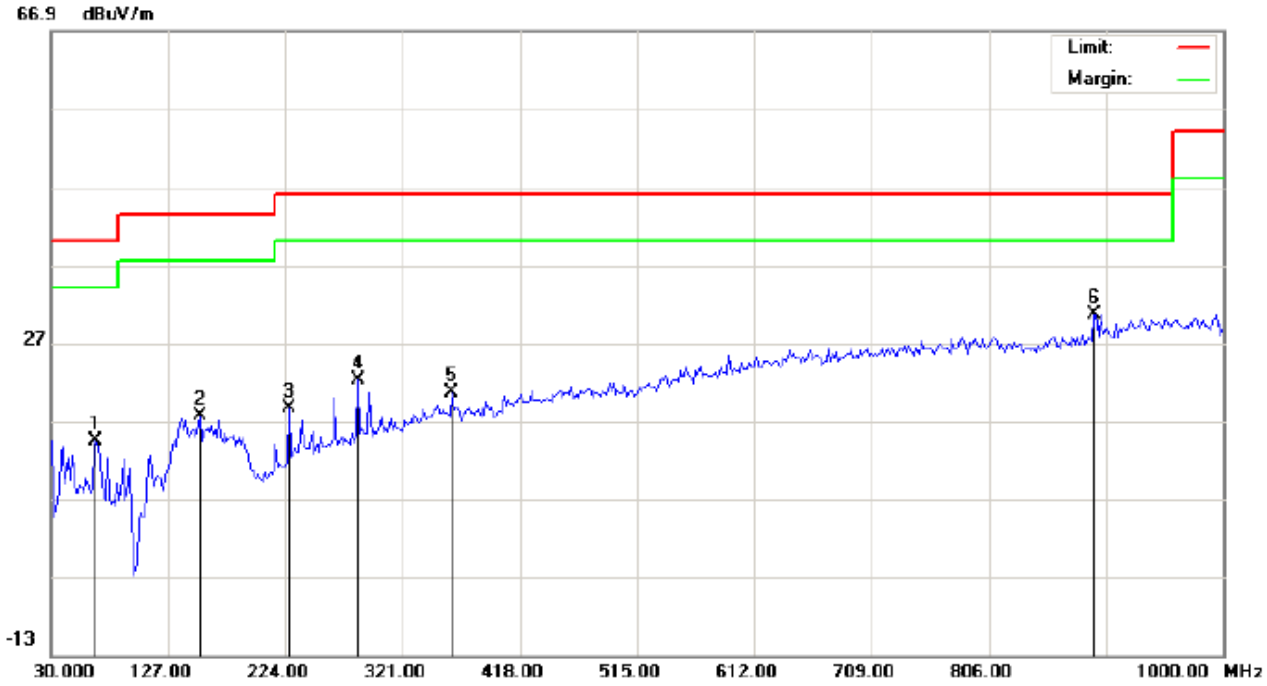

Site: site #1
Limit: FCC Class B 3M Radiation
EUT: VHF/UHF FM HANDHELD TRANSCEIVER
M/N: DJ-500T
Mode: Mode 1
Note:

Polarization: *Horizontal*
Power:
Distance: 3m

Temperature: 26
Humidity: 60 %

| No. | Mk | Freq. | Reading | Factor | Measurement | Limit | Over | Detector | Antenna Height | Table Degree | Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB/m | dBuV/m | dBuV/m | dB | | cm | degree | |
| 1 | | 114.0667 | 6.45 | 11.45 | 17.90 | 43.50 | -25.60 | peak | | | |
| 2 | | 246.6333 | 7.03 | 13.77 | 20.80 | 46.00 | -25.20 | peak | | | |
| 3 | | 264.4167 | 6.53 | 14.34 | 20.87 | 46.00 | -25.13 | peak | | | |
| 4 | | 363.0333 | 1.31 | 18.83 | 20.14 | 46.00 | -25.86 | peak | | | |
| 5 | | 773.6667 | 1.86 | 26.96 | 28.82 | 46.00 | -17.18 | peak | | | |
| 6 | * | 946.6500 | 1.13 | 29.91 | 31.04 | 46.00 | -14.96 | peak | | | |

Radiated Emission Test –Vertical -3m Below 1G



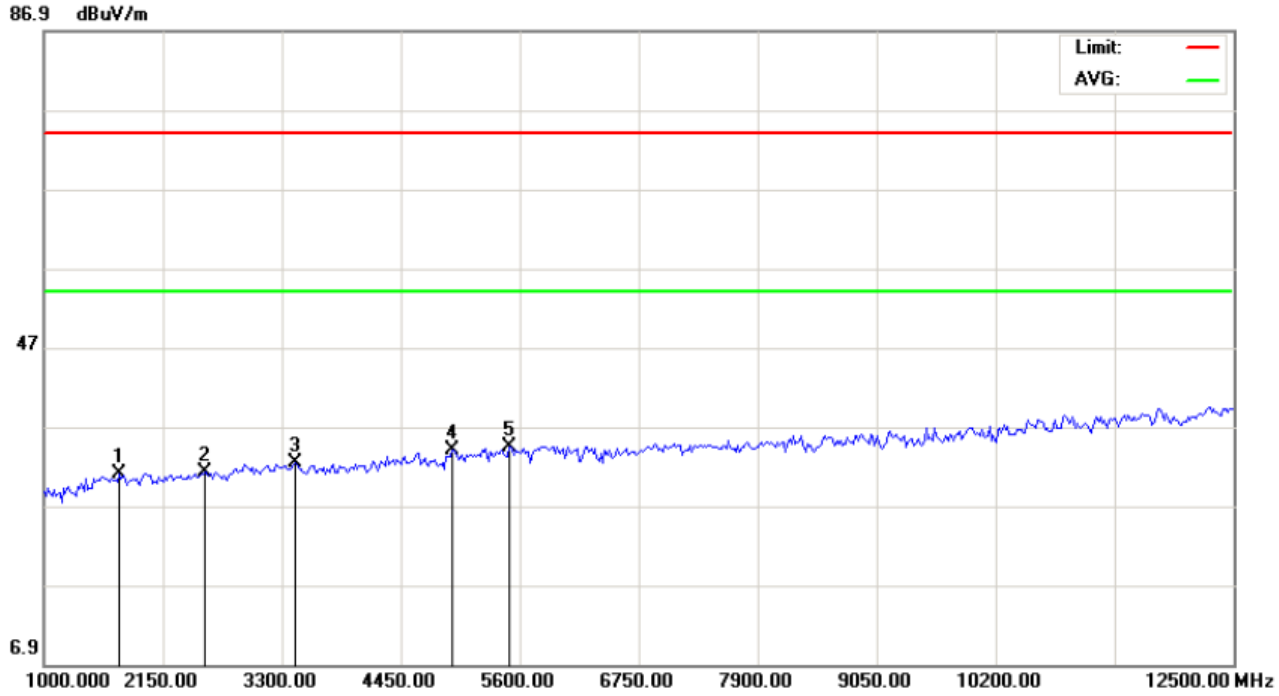

Site: site #1
Limit: FCC Class B 3M Radiation
EUT: VHF/UHF FM HANDHELD TRANSCEIVER
M/N: DJ-500T
Mode: Mode 1
Note:

Polarization: *Vertical*
Power:
Distance: 3m

Temperature: 26
Humidity: 60 %

| No. | Mk | Freq. | Reading | Factor | Measurement | Limit | Over | Detector | Antenna Height | Table Degree | Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB/m | dBuV/m | dBuV/m | dB | | cm | degree | |
| 1 | | 67.1833 | 9.04 | 5.36 | 14.40 | 40.00 | -25.60 | peak | | | |
| 2 | | 152.8667 | 2.29 | 15.28 | 17.57 | 43.50 | -25.93 | peak | | | |
| 3 | | 227.2333 | 6.86 | 11.67 | 18.53 | 46.00 | -27.47 | peak | | | |
| 4 | | 283.8167 | 7.29 | 14.92 | 22.21 | 46.00 | -23.79 | peak | | | |
| 5 | | 361.4167 | 1.86 | 18.82 | 20.68 | 46.00 | -25.32 | peak | | | |
| 6 | * | 893.3000 | 2.25 | 28.44 | 30.69 | 46.00 | -15.31 | peak | | | |

Radiated Emission Test –Horizontal -3m Above 1G



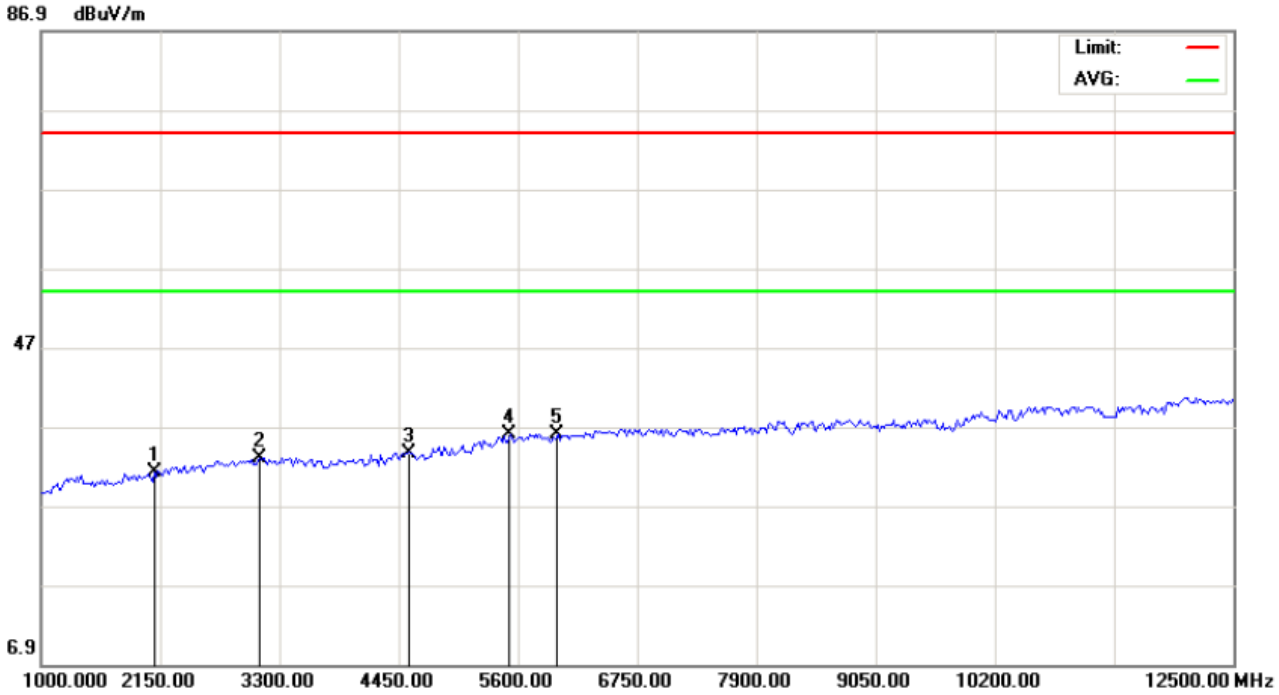

Site: site #1
Limit: FCC Class B 3M Radiation above 1GHZ(PK)
EUT: VHF/UHF FM HANDHELD TRANSCEIVER
M/N: DJ-500T
Mode: Mode 1
Note:

Polarization: ***Horizontal***
Power: DC 7.4V
Distance:

Temperature: 26
Humidity: 60 %

| No. | Mk. | Freq. | Reading | Factor | Measurement | Limit | Over | Detector | Antenna Height | Table Degree | Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB/m | dBuV/m | dBuV/m | dB | | cm | degree | |
| 1 | | 1728.333 | 43.93 | -12.98 | 30.95 | 74.00 | -43.05 | peak | | | |
| 2 | | 2552.500 | 40.71 | -9.44 | 31.27 | 74.00 | -42.73 | peak | | | |
| 3 | | 3434.167 | 40.33 | -7.95 | 32.38 | 74.00 | -41.62 | peak | | | |
| 4 | | 4948.333 | 35.92 | -1.94 | 33.98 | 74.00 | -40.02 | peak | | | |
| 5 | * | 5504.167 | 36.19 | -1.81 | 34.38 | 74.00 | -39.62 | peak | | | |

Radiated Emission Test –Vertical -3m Above 1G




Site: site #1
Limit: FCC Class B 3M Radiation above 1GHZ(PK)
EUT: VHF/UHF FM HANDHELD TRANSCEIVER
M/N: DJ-500T
Mode: Mode 1
Note:

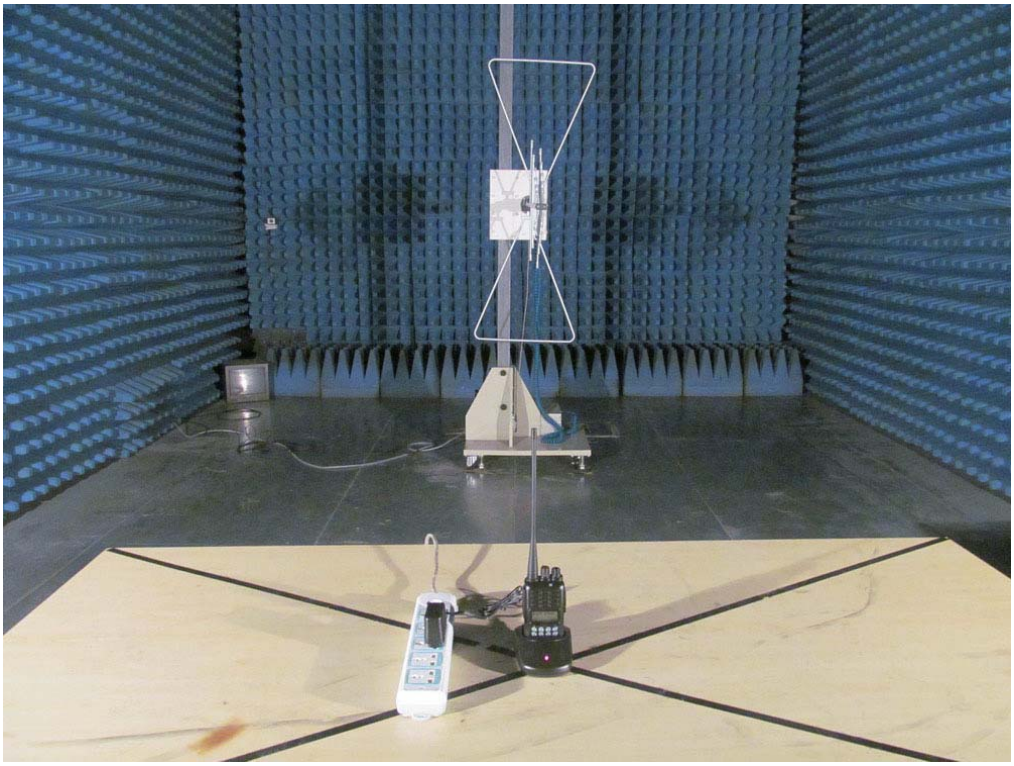
Polarization: ***Vertical***
Power: DC 7.4V
Distance:

Temperature: 26
Humidity: 60 %

| No. | Mk. | Freq. | Reading | Factor | Measurement | Limit | Over | Detector | Antenna Height | Table Degree | Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB/m | dBuV/m | dBuV/m | dB | | cm | degree | |
| 1 | | 2092.500 | 41.25 | -10.02 | 31.23 | 74.00 | -42.77 | peak | | | |
| 2 | | 3108.333 | 41.25 | -8.26 | 32.99 | 74.00 | -41.01 | peak | | | |
| 3 | | 4545.833 | 36.69 | -2.99 | 33.70 | 74.00 | -40.30 | peak | | | |
| 4 | * | 5523.333 | 37.78 | -1.80 | 35.98 | 74.00 | -38.02 | peak | | | |
| 5 | | 5983.333 | 37.57 | -1.59 | 35.98 | 74.00 | -38.02 | peak | | | |

# APPENDIX 1
# PHOTOGRAPHS OF TEST SETUP

RADIATED TEST SETUP



CONDUCTED EMISSION

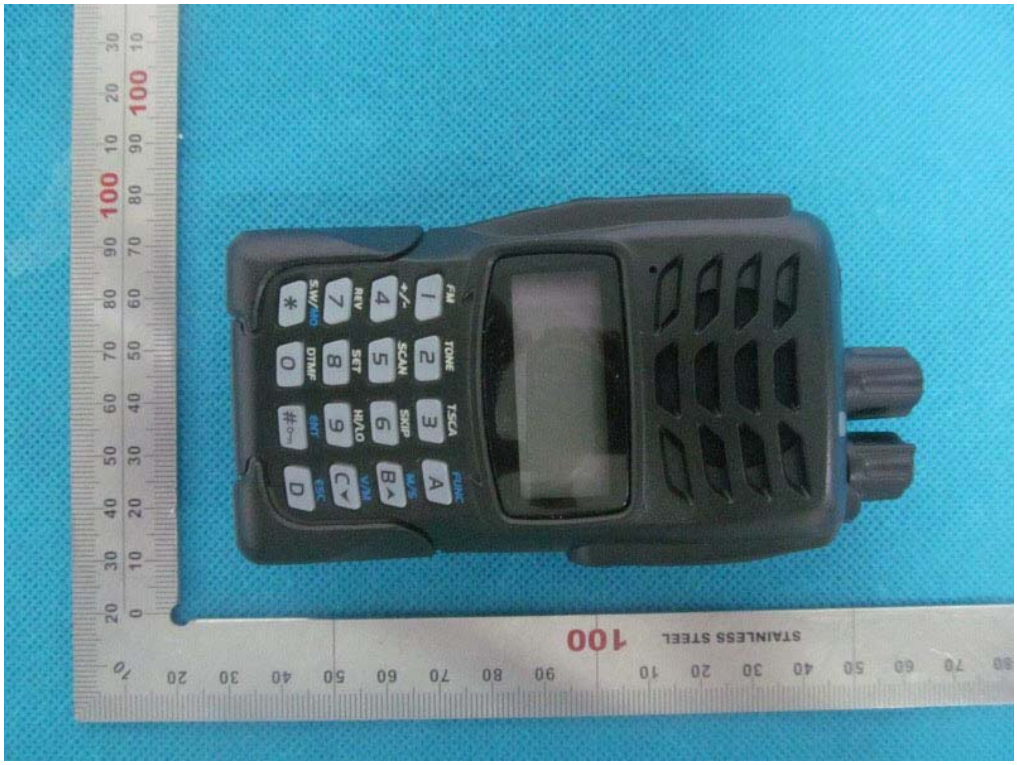
# APPENDIX 2
# PHOTOGRAPHS OF EUT

WHOLE VIEW OF EUT

TOP VIEW OF EUT

BOTTOM VIEW OF EUT

FRONT VIEW OF EUT



BACK VIEW OF EUT

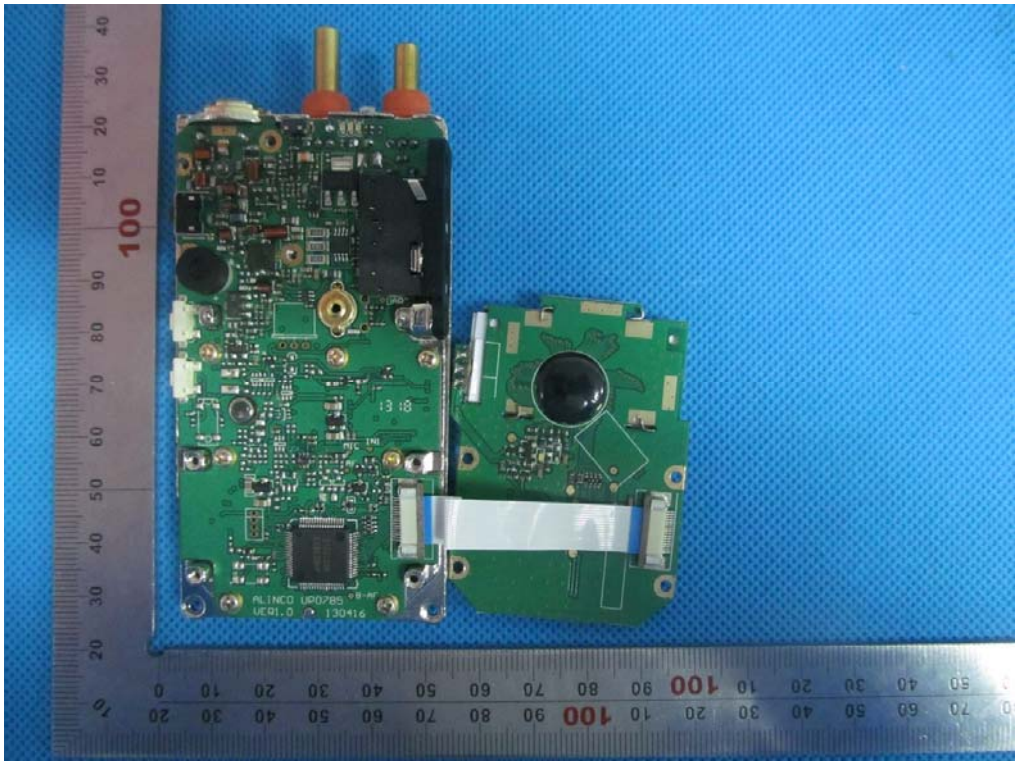
LEFT VIEW OF EUT

RIGHT VIEW OF EUT

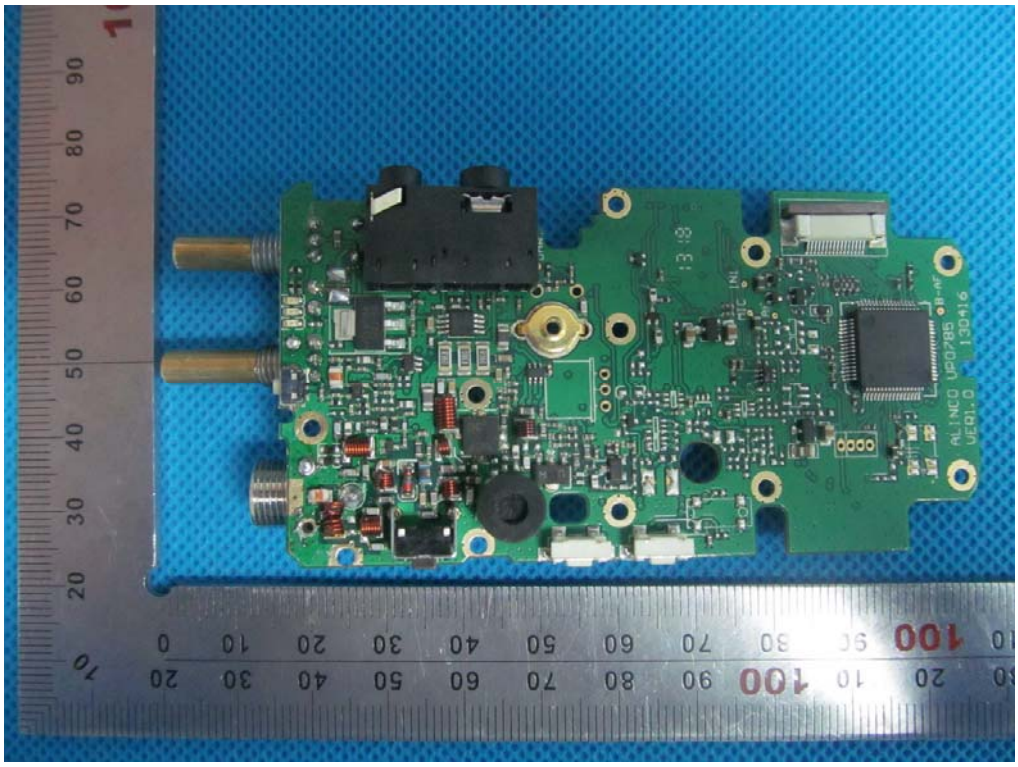
OPEN VIEW-1 OF EUT

OPEN VIEW-2 OF EUT

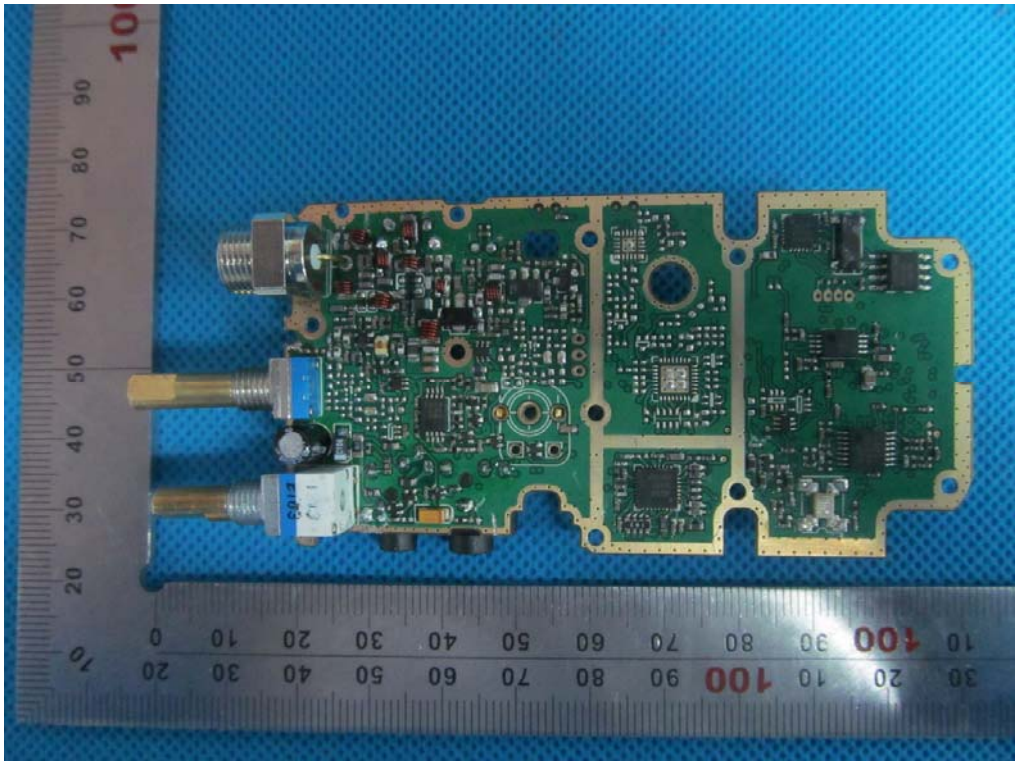
INTERNAL VIEW-1 OF EUT



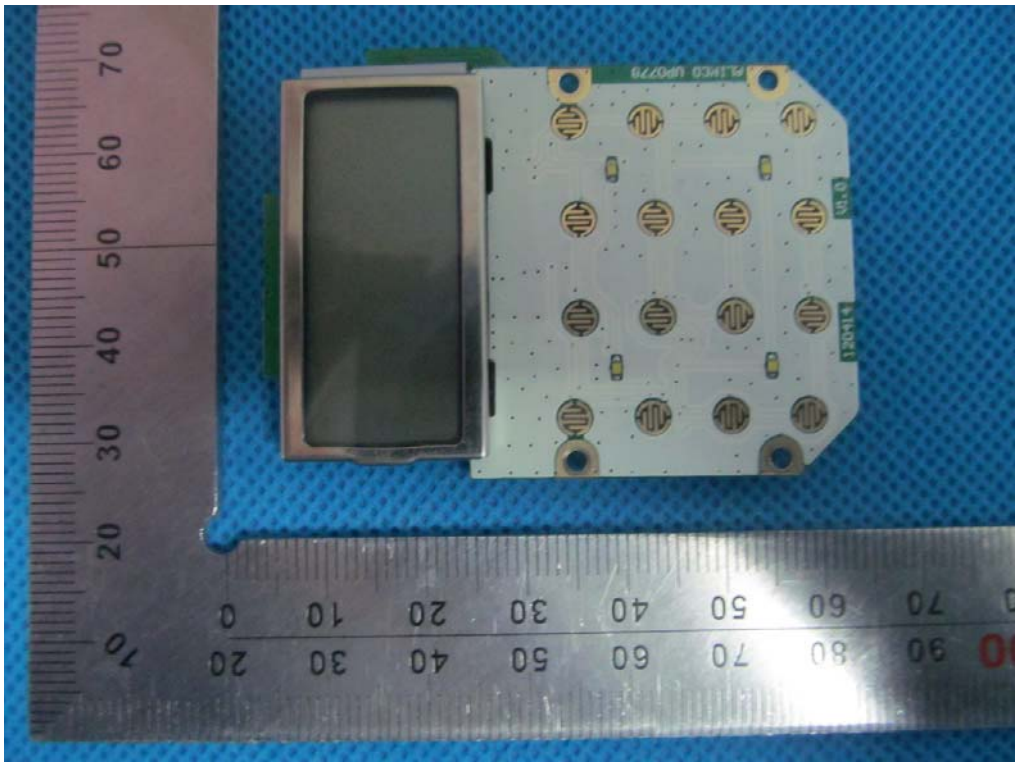
INTERNAL VIEW-2 OF EUT



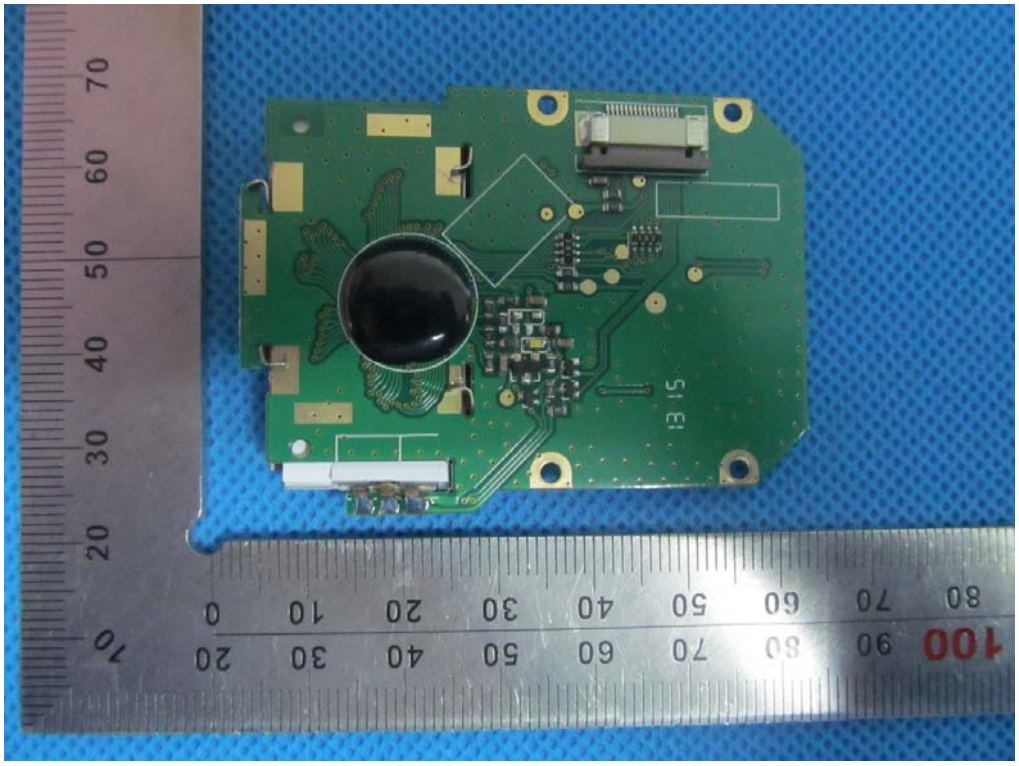
INTERNAL VIEW-3 OF EUT



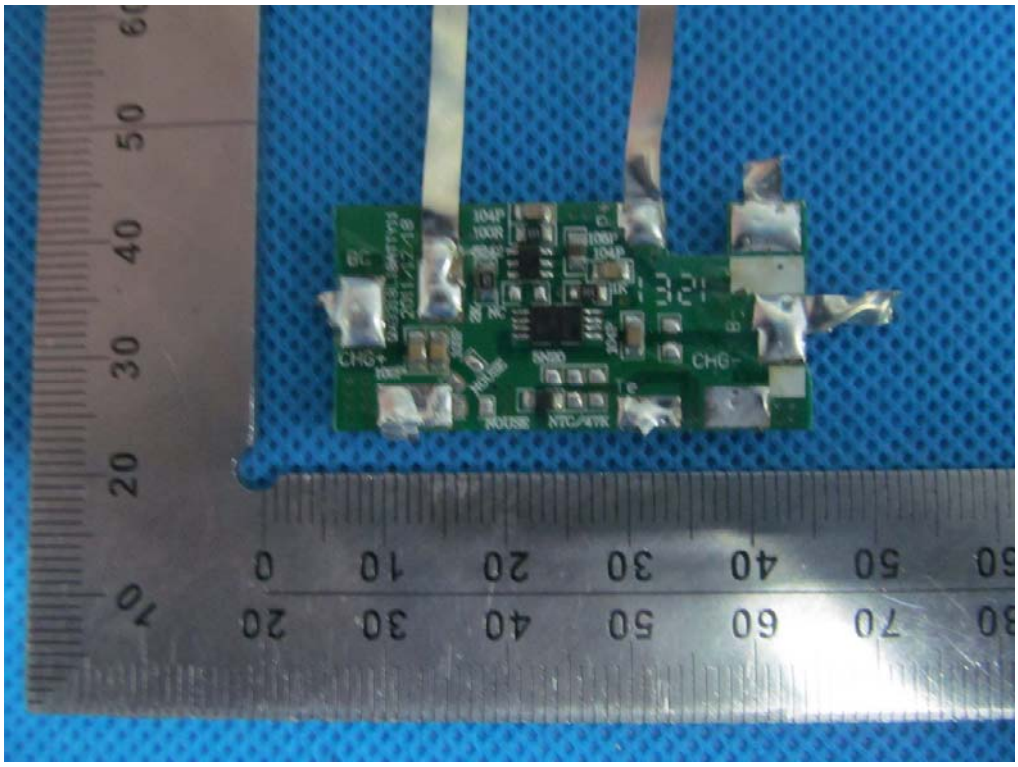
INTERNAL VIEW-4 OF EUT



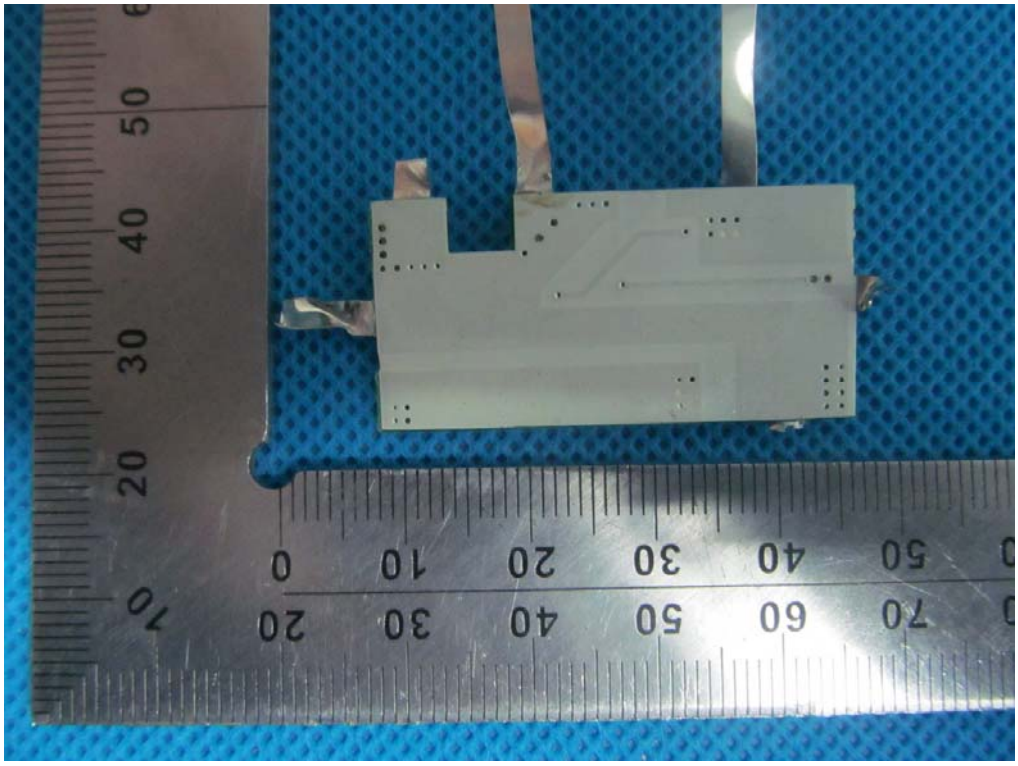
INTERNAL VIEW-5 OF EUT



INTERNAL VIEW-6 OF EUT




INTERNAL VIEW-7 OF EUT



**----END OF REPORT----**