ETSI EN 301 489-1 V1.9.2 (2011-09)
ETSI EN 301 489-5 V1.3.1 (2002-08)

TEST REPORT

For

TYT ELECTRONICS CO., LTD

Block 39-1, Optoelectronics-information industry b, Nan’an, Quanzhou, Fujian China

Tested Model: MD-380
Multiple Model: MD-390, MD-368, MD-398

Report Type:	**Product Type:**
Original Report	DMR

Test Engineer: William Li (William Li)

Report Number: RSZ150527001-02

Report Date: 2015-07-02

Reviewed By: Jimmy Xiao (Jimmy Xiao), RF Engineer

Prepared By: Bay Area Compliance Laboratories Corp. (Shenzhen)
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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *TYT ELECTRONICS CO., LTD*'s product, model number: *MD-380* or the "EUT" in this report was a *DMR*, which was measured approximately: 131 mm (L) × 61 mm (W) × 36 mm (H), rated with input voltage: DC 7.4VLi-io rechargeable battery.

Note: This series products model: MD-390, MD-368, MD-398 and MD-380 are identical schematics, the difference among them is just the model number due to marketing purpose, and model MD-380 was selected for fully testing, the detailed information can be referred to the attached declaration letter that stated and guaranteed by the applicant.

** All measurement and test data in this report was gathered from production sample serial number: 1505197 (Assigned by BACL, Shenzhen). The EUT supplied by the applicant was received on 2015-05-27.*

Objective

This test report is prepared on behalf of *TYT ELECTRONICS CO., LTD* in accordance with ETSI EN 301 489-1 V1.9.2 (2011-09) Plus Provisions of ETSI EN 301 489-5 V1.3.1 (2002-08), Electromagnetic compatibility and Radio spectrum Matters (ERM); Electromagnetic Compatibility (EMC) standard for radio equipment and services; Part 5: Specific conditions for Private land Mobile Radio (PMR) and ancillary equipment (speech and non-speech).

The objective of the manufacturer is to determine the compliance of the EUT with ETSI EN 301 489-1 V1.9.2 (2011-09) Plus Provisions of ETSI EN 301 489-5 V1.3.1 (2002-08).

Related Submittal(s)/Grant(s)

No Related Submittal(s).

Test Methodology

All measurements contained in this report were conducted with ETSI EN 301 489-1 V1.9.2 (2011-09).

Test Facility

The test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located on the 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone, ShenZhen, Guangdong 518038, P.R.China.

Test site at Bay Area Compliance Laboratories Corp. (Shenzhen) has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on December 06, 2010. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2009.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 382179. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in a typical fashion (as normally used by a typical user).

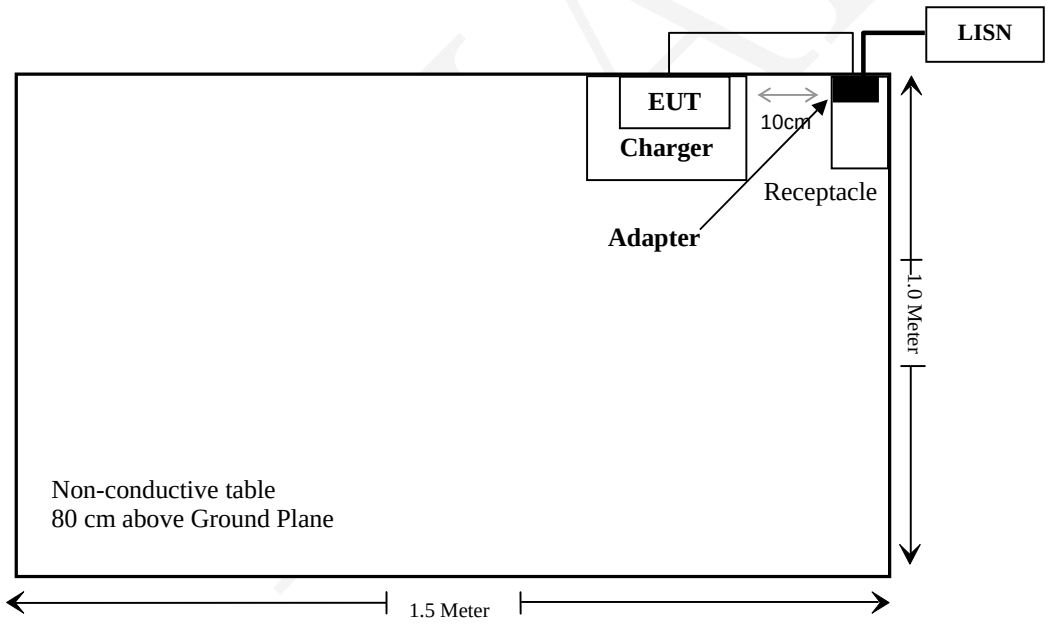
Equipment Modifications

No modification was made to the EUT tested.

External I/O Cable

Cable Description	Length (m)	From/Port	To
Un-shielding Un-detachable DC Power Cable	1.5	Adapter	EUT

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

ETSI EN 301 489-5 V1.3.1 (2002-08)

Rules	Description of Test	Result
§7.1	Reference to clauses EN 301 489-1 §8.4 AC mains power input/output ports	Not Applicable*
§7.1	Reference to clauses EN 301 489-1 §8.3 DC power input/output ports	Not Applicable*
§7.1	Reference to clauses EN 301 489-1 §8.2 Enclosure of ancillary equipment measured on a stand alone basis	Not Applicable*
§7.1	Reference to clauses EN 301 489-1 §8.5 Harmonic current emissions (AC mains input port)	Not Applicable*
§7.1	Reference to clauses EN 301 489-1 §8.6 Voltage fluctuations and flicker (AC mains input port)	Not Applicable*
§7.1	Reference to clauses EN 301 489-1§8.7 Telecommunication ports	Not Applicable*
§7.2	Reference to clauses EN 301 489-1 §9.2 Radio frequency electromagnetic field (80 MHz to 1 000 MHz and 1 400 MHz to 2 700 MHz)(EN 61000-4-3)	Compliance
§7.2	Reference to clauses EN 301 489-1 §9.3 Electrostatic discharge (EN 61000-4-2)	Compliance
§7.2	Reference to clauses EN 301 489-1§9.4 Fast transients, common mode (EN 61000-4-4)	Not Applicable*
§7.2	Reference to clauses EN 301 489-1§9.5 Radio frequency, common mode (EN 61000-4-6)	Not Applicable*
§7.2	Reference to clauses EN 301 489-1 §9.6 Transients and surges in the vehicular environment (ISO 7637-2)	Not Applicable
§7.2	Reference to clauses EN 301 489-1§9.8 Surges (EN 61000-4-5)	Not Applicable*
§7.2	Reference to clauses EN 301 489-1§9.7 Voltage dips and interruptions (EN 61000-4-11)	Not Applicable*

Not Applicable: This equipment will not be used in the vehicular environment.
Not Applicable*: The EUT is used as a portable device.

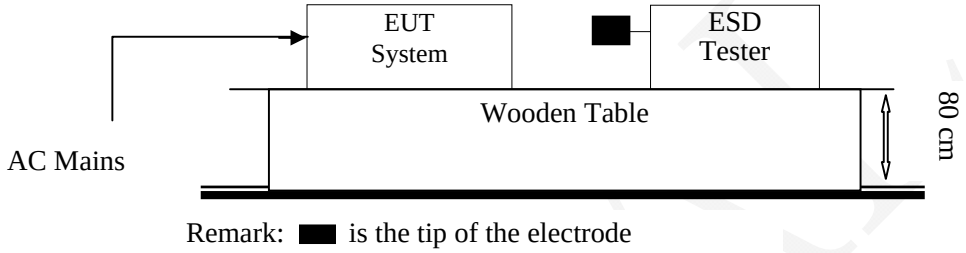
§7.2 - ELECTROSTATIC DISCHARGE

Test Equipment

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
SCHAFFNER	ESD Tester	NSG435	005101	2015-05-19	2016-05-19

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

Test System Setup



Remark: ■ is the tip of the electrode

EN 61000-4-2 specifies that a tabletop EUT shall be placed on a non-conducting table which is 80 centimeters above a ground reference plane and that floor mounted equipment shall be placed on a insulating support approximately 10 centimeters above a ground plane. During the tests, the EUT is positioned over a ground reference plane in conformance with this requirement.

For tabletop equipment, a 1.6 by 0.8-meter metal sheet (HCP) is placed on the table and connected to the ground plane via a metal strap with two 470 k Ohms resistors in series. The EUT and attached cables are isolated from this metal sheet by *0.5-millimeter* thick insulating material. A Vertical Coupling Plane (VCP) grounded on the ground plane through the same configuration as in the HCP is used.

Electrostatic Discharge Test System

A Dito ESD tester is used for testing. It is capable of applying Electrostatic Discharges in both contact discharge modes to 4 kV and air discharge modes to 8 kV in both positive and negative polarities. This is in accordance with EN 61000-4-2 EMC standard.

Electrostatic Discharge Test System Measurement Uncertainty

The measurement uncertainty with a 95 % confidence factor has determined that the applied voltage has a maximum variance of +/- 5% of stated applied value.

Application of Electrostatic Discharges

The test was conducted in the following order: Air Discharge, Direct Contact Discharge, Indirect Contact Horizontal Coupling Plane Discharge, and Indirect Contact Vertical Coupling Plane Discharge. The Electrostatic Discharge test levels were set and discharges for the different test modes were set appropriately. The Electrostatic Discharge is applied to the conductive surface of the computer in which the EUT was enclosed, and along all seams and control surfaces on the computer. When a discharge occurs and an error is caused, the type of error, discharge level and location is recorded.

Test Standard

ETSI EN 301 489-1 V1.9.2 / EN 61000-4-2:2009
Air Discharge at ±2 kV, ±4 kV, ±8 kV
Contact Discharge at ±2 kV, ±4 kV

Test Level

Level	Test Voltage Contact Discharge (±kV)	Test Voltage Air Discharge (±kV)
1.	2	2
2.	4	4
3.	6	8
4.	8	15
X.	Special	Special

Performance criterion: B

Test Procedure

Air Discharge:
This test is done on a non-conductive surface. The round discharge tip of the discharge electrode shall be approached as fast as possible to touch the EUT. After each discharge, the discharge electrode shall be removed from the EUT. The generator is then re-triggered for a new single discharge and repeated 10 times for each pre-selected test point. This procedure shall be repeated until all the air discharge completed.

Contact Discharge:
All the procedure shall be same as Section 8.3.1 of EN 61000-4-2, except that the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.

Indirect discharge for horizontal coupling plane
At least 50 single discharges shall be applied to the horizontal coupling plane, at points on each side of the EUT. The discharge electrode positions vertically at a distance of 0.1m from the EUT and with the discharge electrode touching the coupling plane.

Indirect discharge for vertical coupling plane
At least 50 single discharges shall be applied to the center of one vertical edge of the coupling plane. The coupling plane, of dimensions 0.5m X 0.5m, is placed parallel to, and positioned at a distance of 0.1m from the EUT. Discharges shall be applied to the coupling plane, with this plane in sufficient different positions that the four faces of the EUT are completely illuminated.

Test Data and Setup Photo

Environmental Conditions

Temperature:	29 ℃
Relative Humidity:	46 %
ATM Pressure:	101.5 kPa

The testing was performed by William Li on 2015-06-29.

Test Mode: TX/RX

Table 1: Electrostatic Discharge Immunity (Air Discharge)

EN 61000-4-2 Test Points Location	Test Levels							
	-2 kV	+2 kV	-4 kV	+4 kV	-8 kV	+8 kV	-15 kV	+15 kV
LED Display (5 points）	A	A	A	A	A	A	/	/
Surface （8 points）	A	A	A	A	A	A	/	/
Bottom (5 points)	A	A	A	A	A	A	/	/
Knob (2 points)	A	A	A	A	A	A	/	/
LED Light （1 points）	A	A	A	A	A	A	/	/
Slot(10 points) (10 points)	A	A	A	A	A	A	/	/
Keyboard (16 points)	A	A	A	A	A	A	/	/

Table 2: Electrostatic Discharge Immunity (Direct Contact)

EN 61000-4-2 Test Points Location	Test Levels							
	-2 kV	+2 kV	-4 kV	+4 kV	-6 kV	+6 kV	-8 kV	+8 kV
Screw	A	A	A	A	/	/	/	/
Sheet Metal	A	A	A	A				

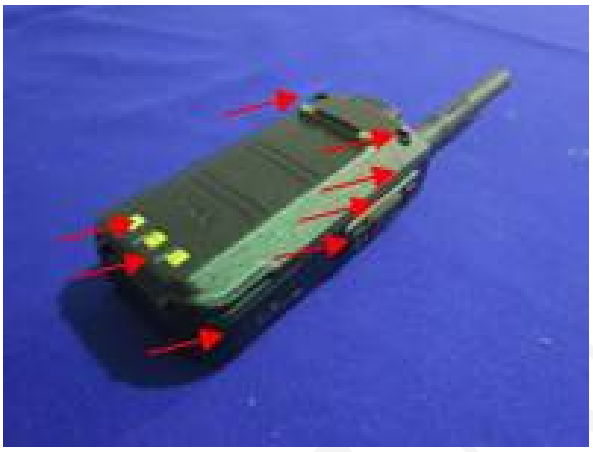
Table 3: Electrostatic Discharge Immunity (Indirect Contact HCP)

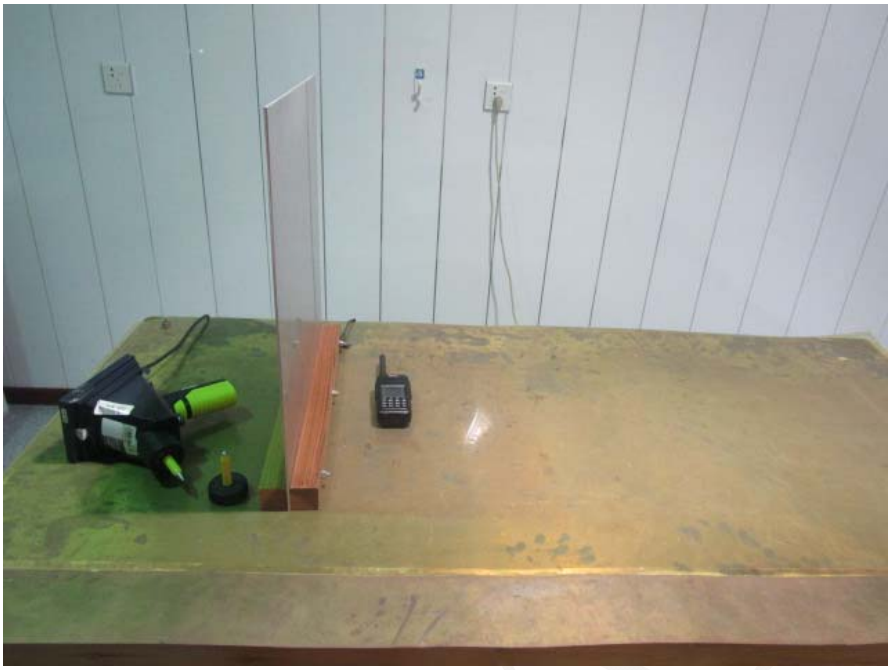
EN 61000-4-2 Test Points Location	Test Levels							
	-2 kV	+2 kV	-4 kV	+4 kV	-6 kV	+6 kV	-8 kV	+8 kV
Front Side	A	A	A	A	/	/	/	/
Back Side	A	A	A	A	/	/	/	/
Left Side	A	A	A	A	/	/	/	/
Right Side	A	A	A	A	/	/	/	/

Table 4: Electrostatic Discharge Immunity (Indirect Contact VCP)

EN 61000-4-2 Test Points Location	Test Levels							
	-2 kV	+2 kV	-4 kV	+4 kV	-6 kV	+6 kV	-8 kV	+8 kV
Front Side	A	A	A	A	/	/	/	/
Back Side	A	A	A	A	/	/	/	/
Left Side	A	A	A	A	/	/	/	/
Right Side	A	A	A	A	/	/	/	/





Test Setup Photo

§7.2 - RF ELECTROMAGNETIC FIELD (80-1000 MHz, 1400- 2700 MHz)

Electromagnetic Field Test System

A signal generator and a power amplifier are used to provide a signal at the appropriate power and frequency to a Broadband antenna to obtain the required electromagnetic field at the position of the EUT in accordance with the EN 61000-4-3 basic EMC publication.

Electromagnetic Field Test System Measurement Uncertainty

Measurement uncertainties are evaluated in accordance with current best practice. Our reported expanded uncertainties are based on standard uncertainties, which are multiplied by an appropriate coverage factor to provide a statistical confidence level of approximately 95%.

Application of Electromagnetic Field

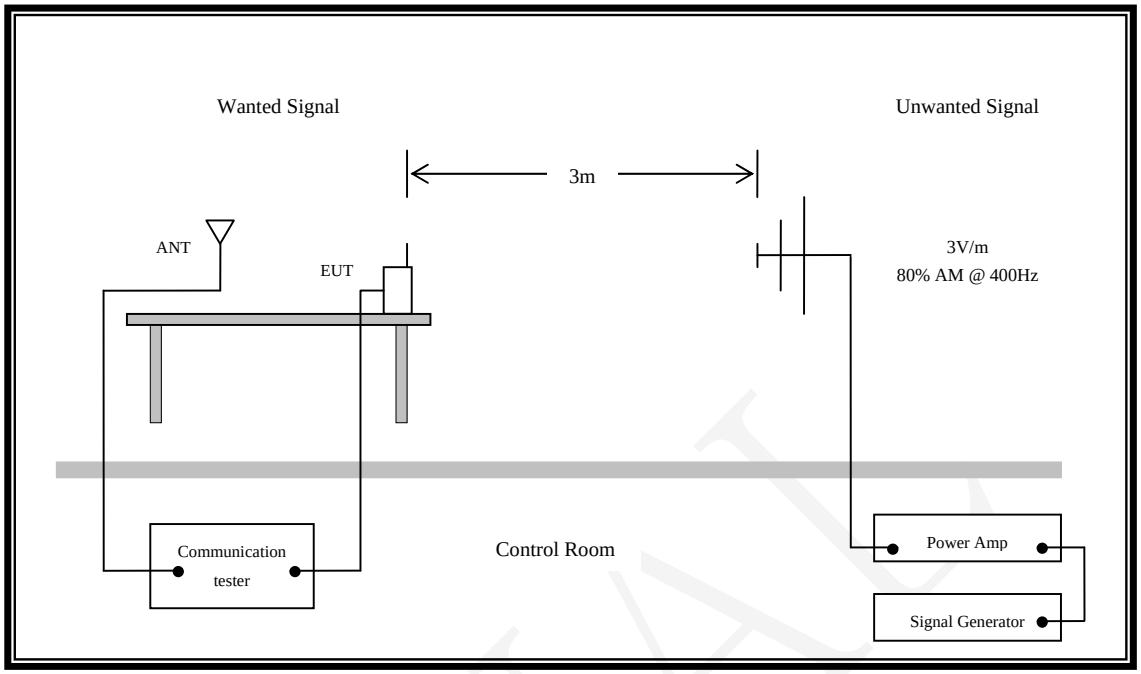
The electromagnetic field is established at the front edge of the EUT. The frequency range is swept from 80 to 1000 MHz and 1400 to 2700 MHz using a power level necessary to obtain a 3 volt/meter, 400Hz AM sine wave modulated at 80% depth, field directed at the EUT. The test is performed with the most susceptible side of the EUT facing the field-generating antenna. If an error is detected, the field is reduced until the error is not repeatable, the field is then manually increased until the error begins to occur. This threshold level, the frequency and the error created are noted before continuing the scan.

Test Equipment

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Amplifier Research	Power Amplifier	200W1000/M2	H1004497	2014-11-03	2015-11-03
Amplifier Research	Microware Amplifier	5S1G4	71377	NCR	NCR
Amplifier Research	Field Meter	FM5004	302149	2013-01-08	2016-01-08
ETS-LINDGREN	Sensor	HI-6005	00069461	2013-01-08	2016-01-08
HP	Signal Generator	8648C	3426A01345	2015-05-09	2016-05-09
Sunol Sciences	Bi-log Antenna	JB1	A040904-2	2014-12-07	2017-12-06
HP	Synthesized Sweeper	HP 8341B	2624A00116	2015-06-03	2016-06-03
Sunol Sciences	Horn Antenna	DRH-118	A052304	2014-12-29	2017-12-28
HP Agilent	RF Communication Test Set	8920A	3325U00859	2015-06-03	2016-06-03

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

EUT Setup



Test Standard

ETSI EN 301 489-1 V1.9.2 / EN 61000-4-3:2006 + A1:2008 + A2:2010
Test Level 2 at 3V / m
Test Levels and Performance Criterion

Test Level

Level	Field Strength (V/m)
1.	1
2.	3
3.	10
X.	Special

Performance Criterion: A

Test Data and Setup Photo

Environmental Conditions

Temperature:	28 ℃
Relative Humidity:	47 %
ATM Pressure:	101.5 kPa

The testing was performed by William Li on 2015-06-29

Test Mode: TX/RX

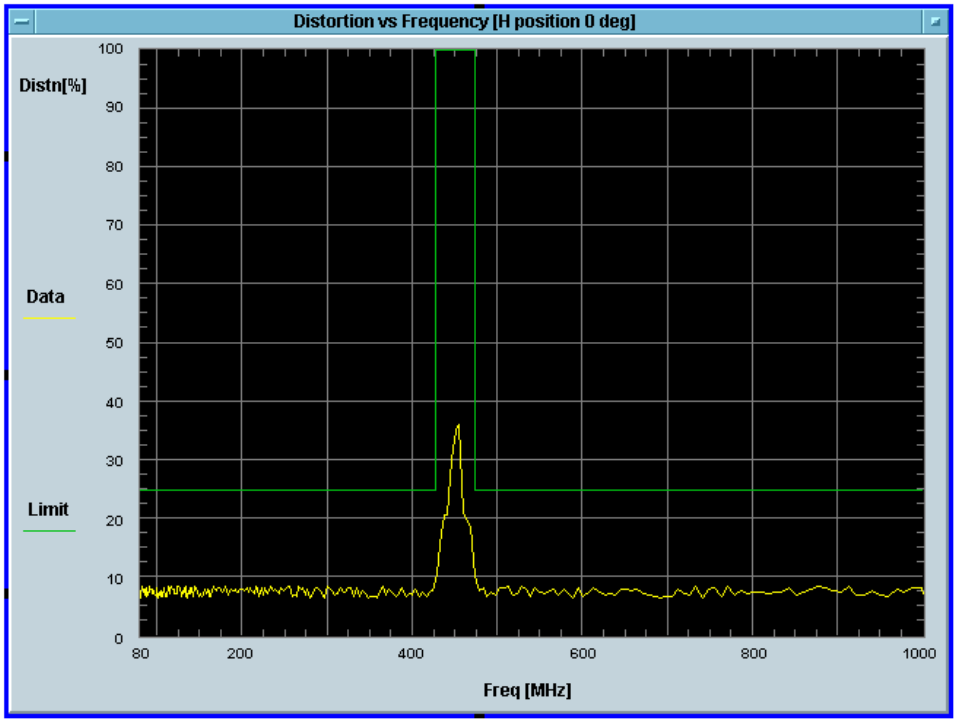
Frequency Range (MHz)	Front (3 V/m)		Rear (3 V/m)		Left Side (3 V/m)		Right Side (3 V/m)	
	VERT	HORI	VERT	HORI	VERT	HORI	VERT	HORI
80-1000	A	A	A	A	A	A	A	A
1400-2700	A	A	A	A	A	A	A	A

NOTE:
－ A: PERFORMANCE CRITERION A
－ A BIT ERROR NOT EXCEED 1 × 10-2
－NO UNINTENTIONAL TRANSMISSION IS FOUND.

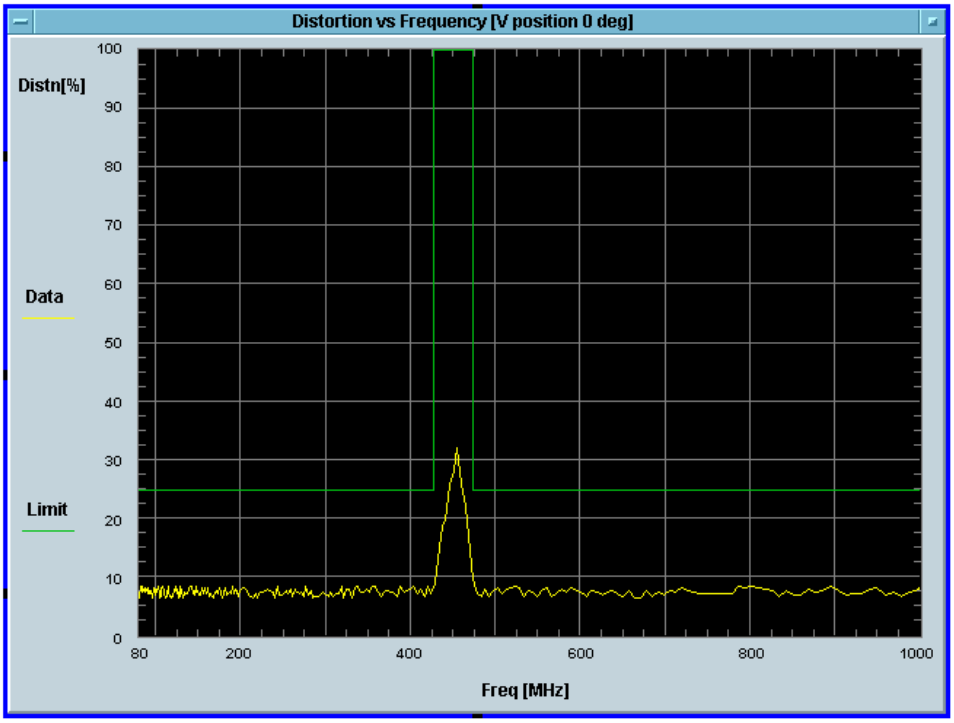
Test Result: Pass

Worst case:

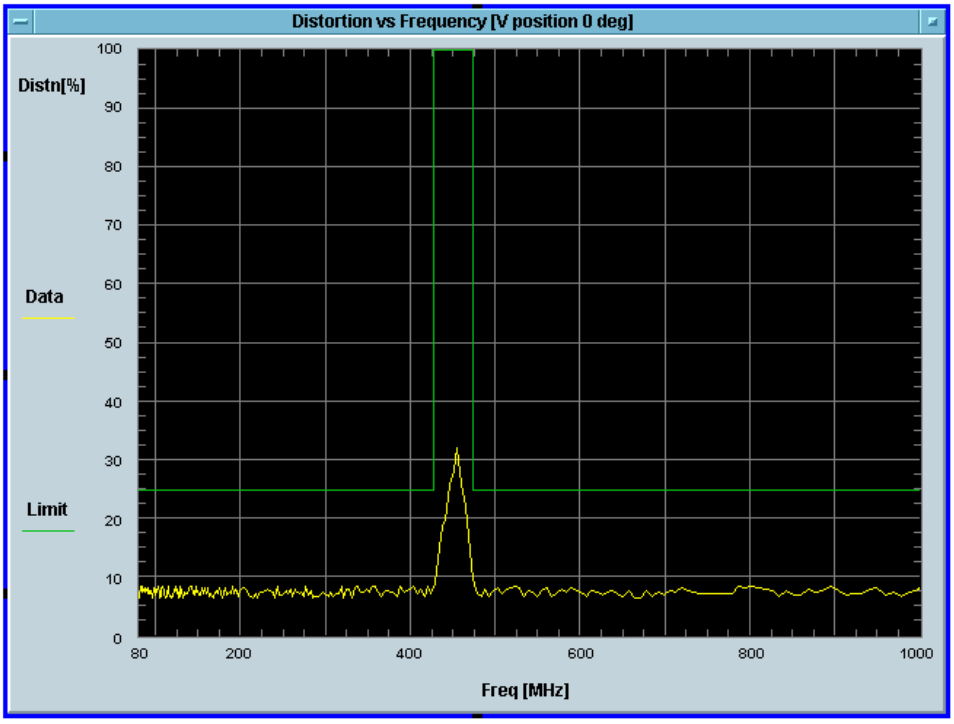
Horizontal, Below 1GHz, Front



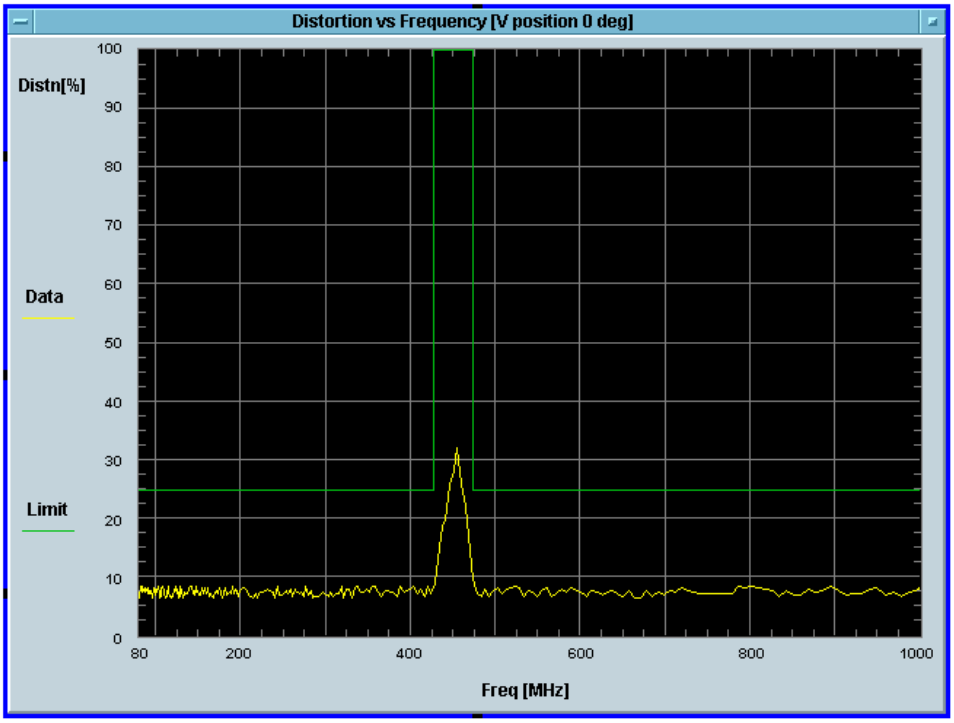
Vertical, Below 1GHz, Front



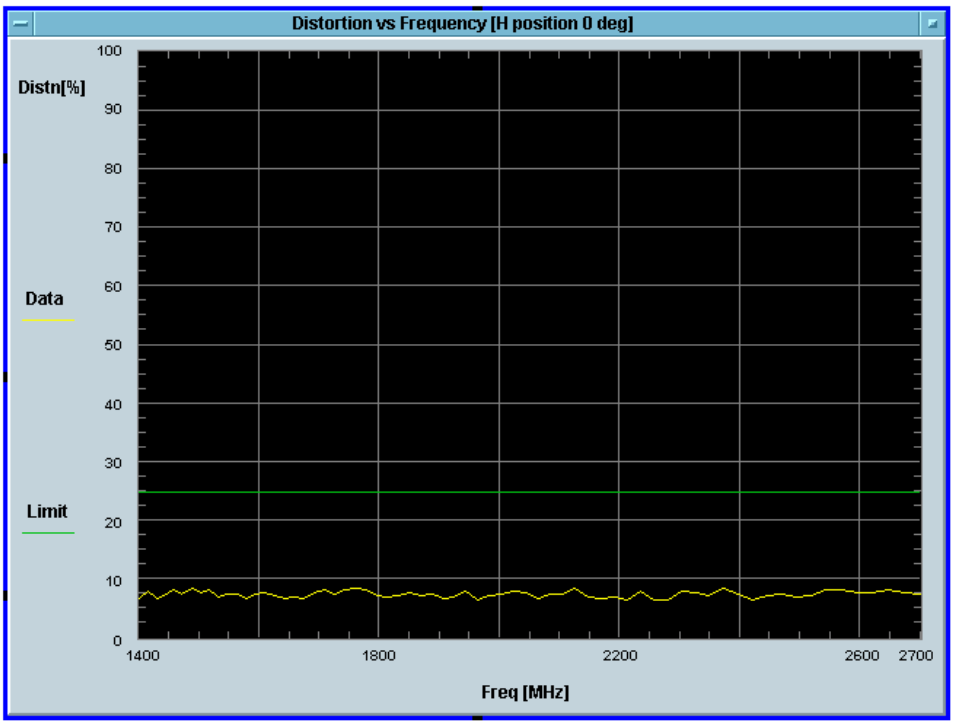
Horizontal, Below 1GHz, Right



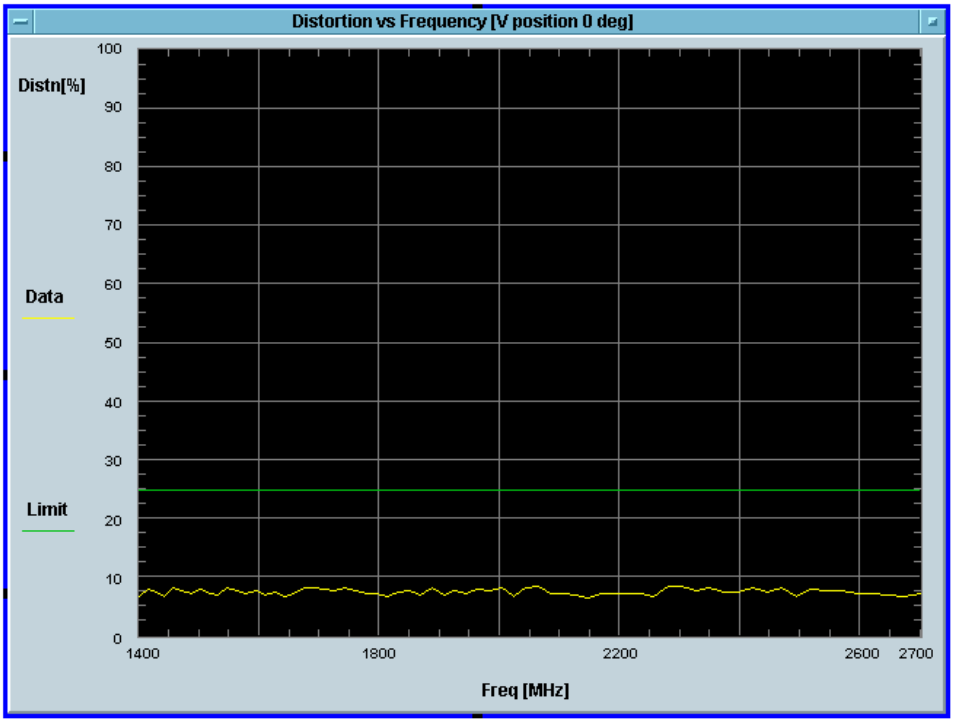
Vertical, Below 1GHz, Right



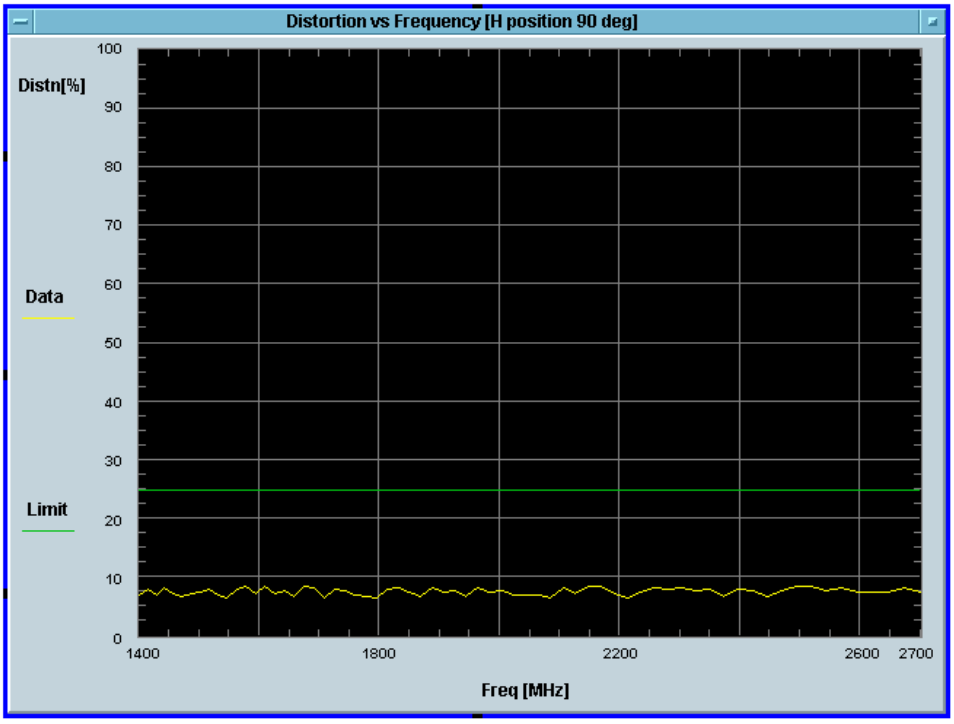
Horizontal, Above 1GHz, Front



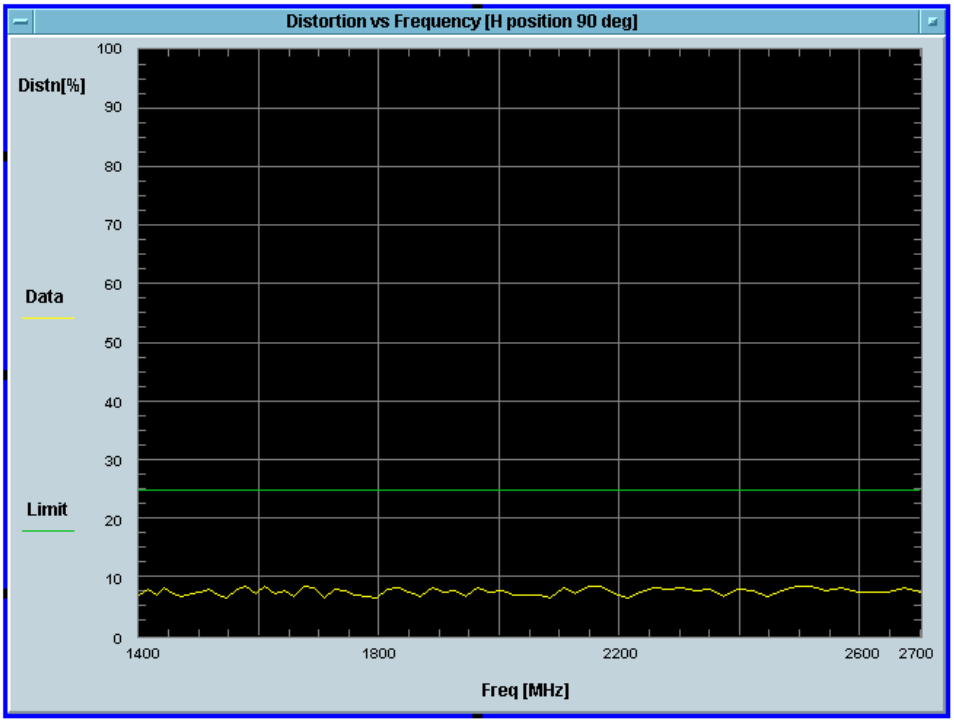
Vertical, Above 1GHz, Front



Horizontal, Above 1GHz, Right



Vertical, Above 1GHz, Right



Test Setup Photos

EXHIBIT A - CE PRODUCT LABELING

CE Label Format

CE 1313 ①

Specifications: The marking set out above must be affixed to the apparatus or to its data plate and have a minimum height of 5 mm. The elements should be easily readable and indelible. They may be placed anywhere on the apparatus case or in its battery compartment. No tool should be needed to view the marking.
1313: 4 digit notified body number

Note: The label should contain the below content:

① The name of the manufacturer or the person responsible for placing the apparatus on the market
② Type
③ Batch and/or serial numbers

Proposed Label Location on EUT

Proposed Label Location on EUT

EXHIBIT B - EUT PHOTOGRAPHS

EUT – Front View

EUT – Rear View

EUT – Top View

EUT – Bottom View

EUT – Left View

EUT – Right View

EUT – Cover off View 1

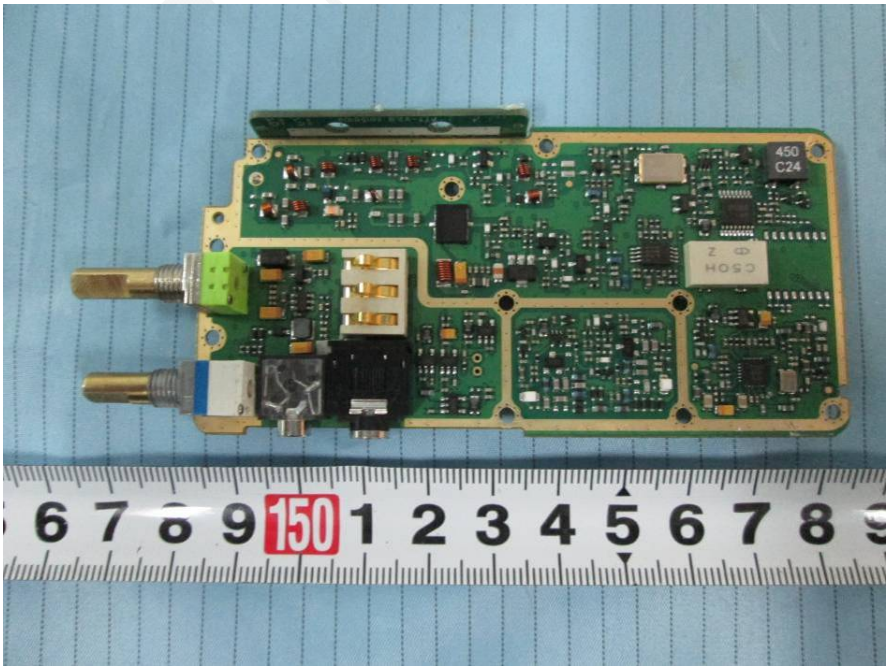
EUT – Cover off View 2

EUT –Cover off View 3

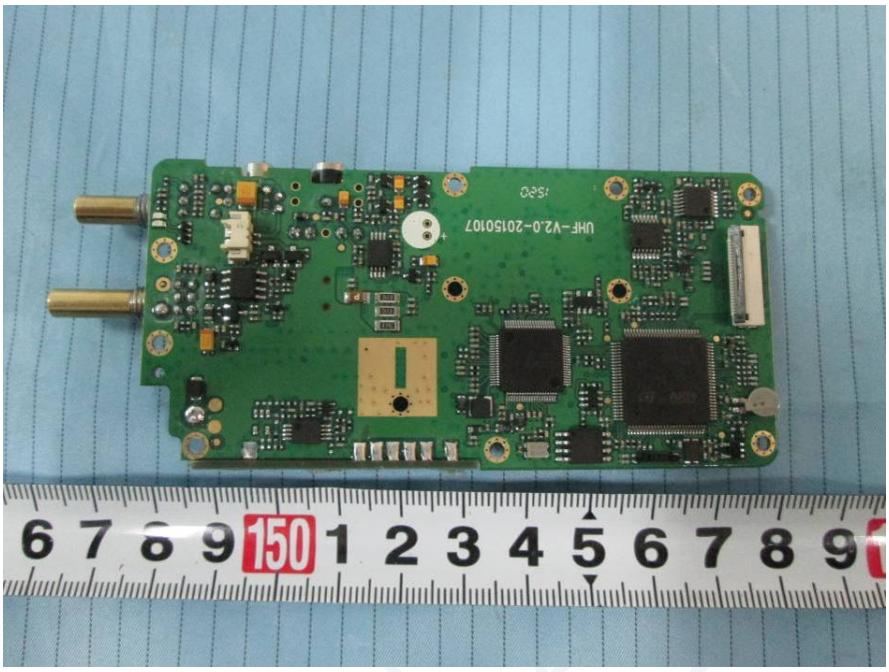
EUT –Cover off View 4

EUT –Cover off View 5

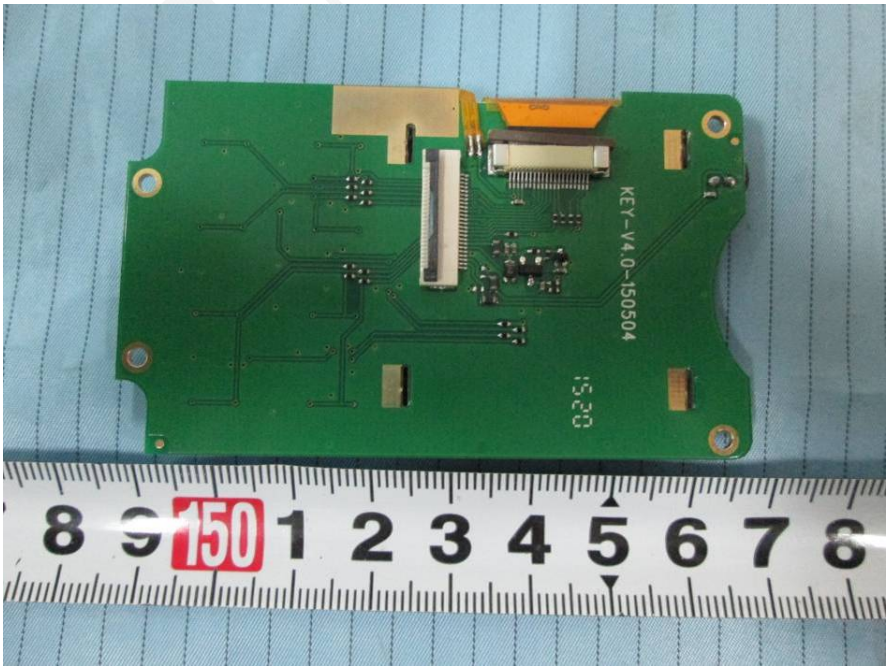
EUT – Main Board 1 View



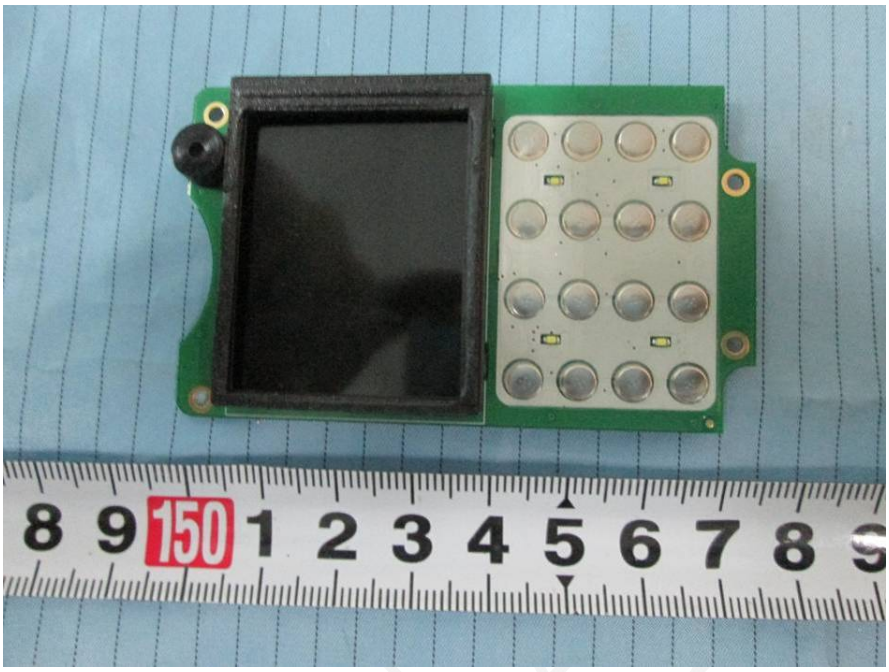
EUT – Main Board 2 View



EUT – Main Board 3 View

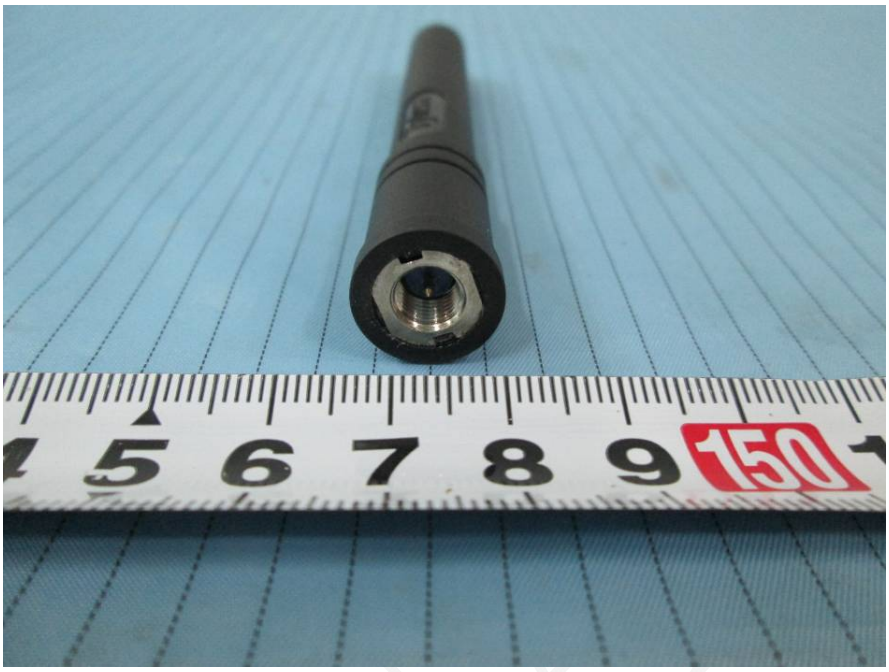


EUT – Main Board 4 View



EUT – Antenna View

EUT – Antenna Port View

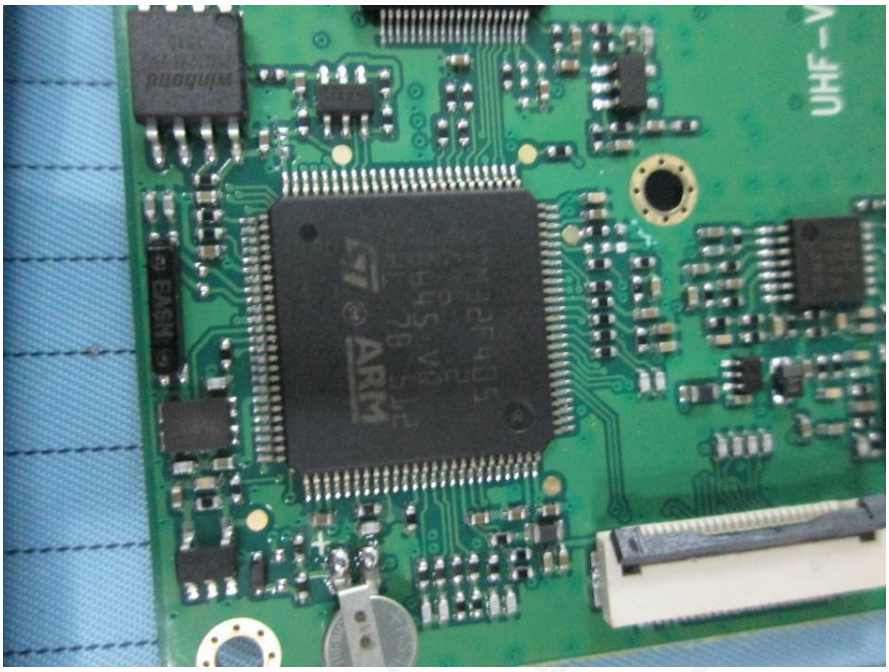


EUT – Battery Front View

EUT – Battery Back View

EUT – Battery Label View

EUT – Chip View



PRODUCT SIMILARITY DECLARATION LETTER

TYT ELECTRONICS CO., LTD
Block 39-1, Optoelectronics-information industry b, Nan'an, quanzhou, Fujian China
Fax: +86 595-27770858 Fax: +86 595-27770857

2015-7-8

Product Similarity Declaration

To Whom It May Concern,

We, TYT ELECTRONICS CO., LTD, hereby declare that we have a product named as DMR (Model number: MD-380) was tested by BACL, meanwhile, for our marketing purpose, we would like to list a series models (MD-390 MD-368 MD-398) on reports and certificate, all the models are identical schematics, just model number is different. No other changes are made to them.
We confirm that all information above is true, and we'll be responsible for all the consequences. Please contact me if you have any question.

Sincerely,

Jiamao Lin

Manager

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