

FCC TEST REPORT

of

Controller and Transimtter

FCC ID : UZ9HMM433MHZ

Brand Name : N/A

Model No. : HMM-SH

Report No. : FCC07-8018

Date : Apr 24, 2007

Prepared for

HONEST MECHANICAL MANUFACTURING CO.,LTD.

Ting Cun,Duohu Street,Dongmei Industrial Park,Jindong District,Jinhua
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Prepared by

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1 Test Report Certification

Product: Controllor and Transimtter

FCC ID: UZ9HMM433MHZ

Model No.: HMM-SH

Applicant: HONEST MECHANICAL MANUFACTURING CO.,LTD.

Applicant Address: Ting Cun,Duohu Street,Dongmei Industrial Park,Jindong District,Jinhua City,Zhejiang Prov

Manufacturer: HONEST MECHANICAL MANUFACTURING CO.,LTD.

Manufacturer Address: Ting Cun,Duohu Street,Dongmei Industrial Park,Jindong District,Jinhua City,Zhejiang Prov

Test Standards: 47 CFR Part 2
47 CFR Part 15, Subpart C

Test Result: PASS

We, Shenzhen Electronic Product Quality Testing Center, hereby certify that the submitted samples of the above item, as detailed in chapter 2.1 of this report, has been tested in our facility. The test record, data evaluation and test configuration represented herein are true and accurate accounts of measurements of the sample's EMC characteristics under the conditions herein specified.

Tested by: Sheng Yongpan, Date: Apr. 29, 2007
Sheng Yongpan

Checked by: Smart Li, Date: Apr. 29, 2007
Smart Li

Approved by: Wu Li An, Date: Apr. 29, 2007
Wu Li An

2 General Information

2.1 Description of EUT

Description:	Controller and Transimtter
Model No.:	HMM-SH
Type of Antenna:	Integral Antenna
Operation Frequency:	433.93MHz
Power Supply:	DC 12.0V(“AA” size 1.5V battery)
Ports:	NONE

1. Refer to technical document for further information.

2.2 Objective

Perform EMC test according to FCC rules Part 2, Part 15 for FCC ID Certification.

2.3 Test Standards and Results

The EUT has been tested according to 47 CFR

- Part 2 Frequency Allocations and Radio Treaty Matters: General Rules and Regulations (10-1-05 Edition)
- Part 15 Radio Frequency Devices (2006-08-14 Edition)

Test items and the results are as bellow:

?	FCC Rules	Test Type	Result	Test Date
1	§15.231(a)	Transmit time	PASS	2007.03.06
2	§15.231(b)	Radiated Emission	PASS	2007.04.29
3	§15.231(c)	Measured bandwidth	PASS	2007.04.23

2.4 List of Equipments Used

Description	Manufacturer	Model No.	Cal. Due Date	Serial No.
Test Receiver	Rohde & Schwarz	ESIB26	2007.06.05	A0304218
Loop Antenna	Rohde & Schwarz	HFH2-Z2	2007.06.05	A0304220
Ultra Broadband Ant.	Rohde & Schwarz	HL562	2007.06.05	A0304224
Shield Room	Nanbo Tech	Site 1	2008.01.10	A0304188
Anechoic Chamber	Albatross	EMC12.8× 6.8× 6.4m ³	2007.04.10	A0304210

2.5 Test Facility

Shenzhen Electronic Product Quality Testing Center (SET) is a third party testing organization accredited by China National Accreditation Board for Laboratories (CNAL) according to ISO/IEC 17025. The accreditation certificate number is **L1659**.

The EMC chamber site No.1 (EMC12.8× 6.8× 6.4(m)), and the radiated and conducted Emission test equipments of SET are constructed and calibrated to meet the FCC requirements ANSI C63.4:2001 and CISPR 22/EN 55022. The FCC Registration Number is **261302**.

The EMC chamber site No.1 (EMC12.8× 6.8× 6.4(m)) also complies with Canada standard RSS 212, and acceptable to Industry Canada for the performance of radiated measurements. The Industry Canada Registration Number is **IC 5915**.

2.6 Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

- Temperature: 15-35°C
- Humidity: 30-60 %
- Atmospheric pressure: 86-106 kPa

3 Radiated Emission Test

3.1 Limits of Radiated Emission

- (a) According to 15.231(b), In addition to the provisions of Section 15.205, the field strength of emissions from intentional radiators operated under this Section shall not exceed the following:

Fundamental Frequency (MHz)	Field Strength of Fundamental (microvolts/meter)	Field Strength of Spurious Emissions (microvolts/meter)
40.66 - 40.70	2,250	225
70 - 130	1,250	125
130 - 174	1,250 to 3,750 **	125 to 375 **
174 - 260	3,750	375
260 - 470	3,750 to 12,500 **	375 to 1,250 **
Above 470	12,500	1,250

** linear interpolations

[Where F is the frequency in MHz, the formulas for calculating the maximum permitted fundamental field strengths are as follows: for the band 130-174 MHz, $\mu\text{V/m}$ at 3 meters = $56.81818(F) - 6136.3636$; for the band 260-470 MHz, $\mu\text{V/m}$ at 3 meters = $41.6667(F) - 7083.3333$. The maximum permitted unwanted emission level is 20 dB below the maximum permitted fundamental level.]

- (b) The formula for calculating the limit of field strength of fundament is $41.6667 \times 433.30 - 7083.3333 = 10970.84 \mu\text{V/m} = 80.8 \text{ dBuV/m}$, the limit of spurious emission is 60.8 dBuV/m (Average)
- (c) Spurious emissions shall be attenuated to the average (or, alternatively, CISPR quasi-peak) limits shown in this table or to the general limits shown in Section 15.209, whichever limit permits a higher field strength.

Frequency of Emission (MHz)	Field Strength ($\mu\text{V/m}$)	Field Strength ($\text{dB}\mu\text{V/m}$)
30 - 88	100	40
88 - 216	150	43.5
216 - 960	200	46
Above 960	500	54

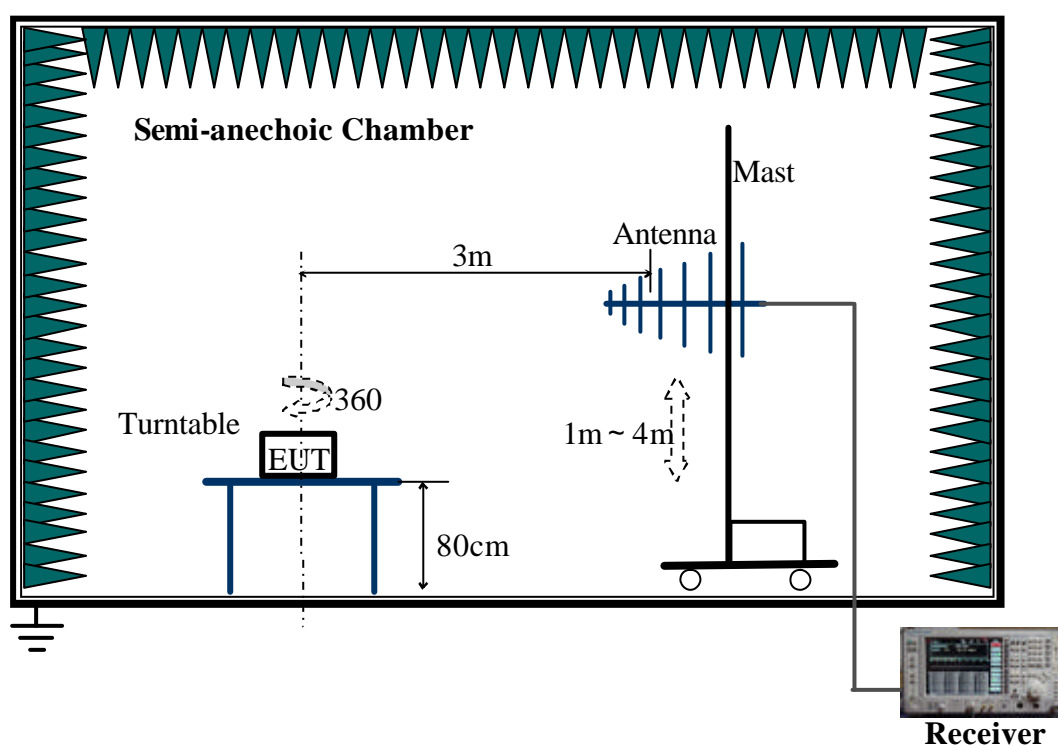
NOTE:

- Field Strength ($\text{dB}\mu\text{V/m}$) = $20 \log$ Field Strength ($\mu\text{V/m}$).
- In the emission tables above, the tighter limit applies at the band edges.

3.2 Test Procedure

- The EUT was placed on the top of a ratable 0.8 meters above the ground at a semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- For the below 1000MHz test, the antenna is a broadband antenna. For the above 1000MHz test, the antenna is a horn antenna, and its height is varied from one meter to four meter above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to the heights from 1 to 4 meters and the ratable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test-receiver system was set to applied detector function and specified bandwidth with Maximum Hold Mode.

3.3 Test Setup



For the actual test configuration, please refer to the related item-Photographs of the Test Configuration.

3.4 EUT Setup and Operating Conditions

The left and forward direction buttons of the EUT were pressed to produce the highest emission.

Since the EUT is considered a portable unit, it was pre-tested on the positioned of each 3 axis. There for only the test data of the worse case- y axis was used for Radiated test.

3.5 Test Results

No.	Frequency (MHz)	Antenna Polarization	Emission Detector	Emission Level (dBmV/m)	Limits (dBmV/m)	Margin (dBmV/m)
1	433.93	H	PK	72.45	100.80	28.35
2	433.93	V	PK	71.68	100.80	29.12
3	433.93	H	AV	69.54	80.80	11.26
4	433.93	V	AV	68.77	80.80	12.03
5	867.86	H	PK	40.67	80.80	40.13
6	867.86	V	PK	40.18	80.80	40.62
7	1301.85	H	PK	45.46	80.80	35.34
8	1301.85	V	PK	42.14	80.80	38.66
9	1735.80	H	PK	43.45	80.80	37.35
10	1735.80	V	PK	42.16	80.80	38.64
11	40	V	QP	21.46	40	18.54
12	100	V	QP	20.82	43.5	22.68
13	400	H	QP	38.45	46	7.55
14	600	H	QP	40.62	46	5.38
15	800	H	QP	40.18	46	5.82

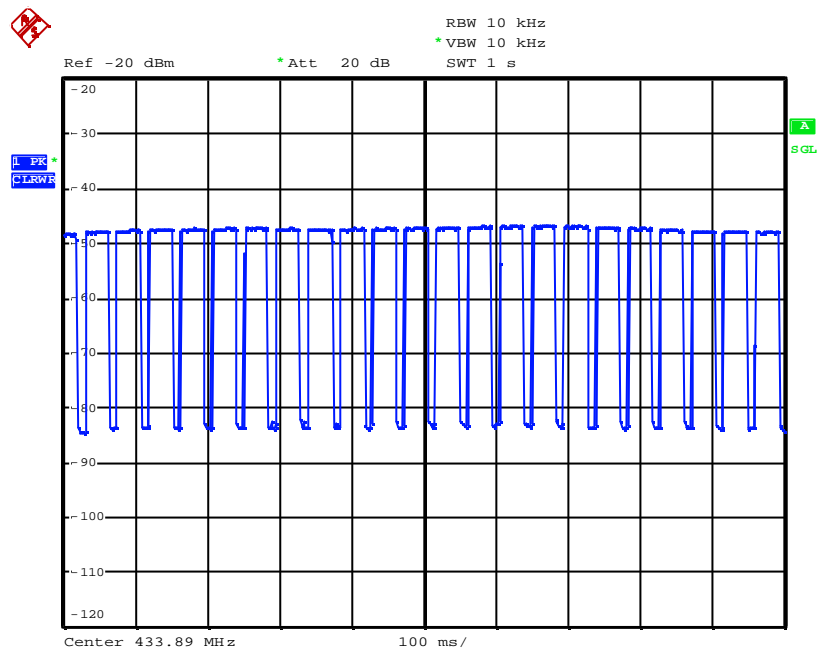
NOTE:

The average value of fundamental frequency is: Average= Peak Value + 20 log(Duty cycle)

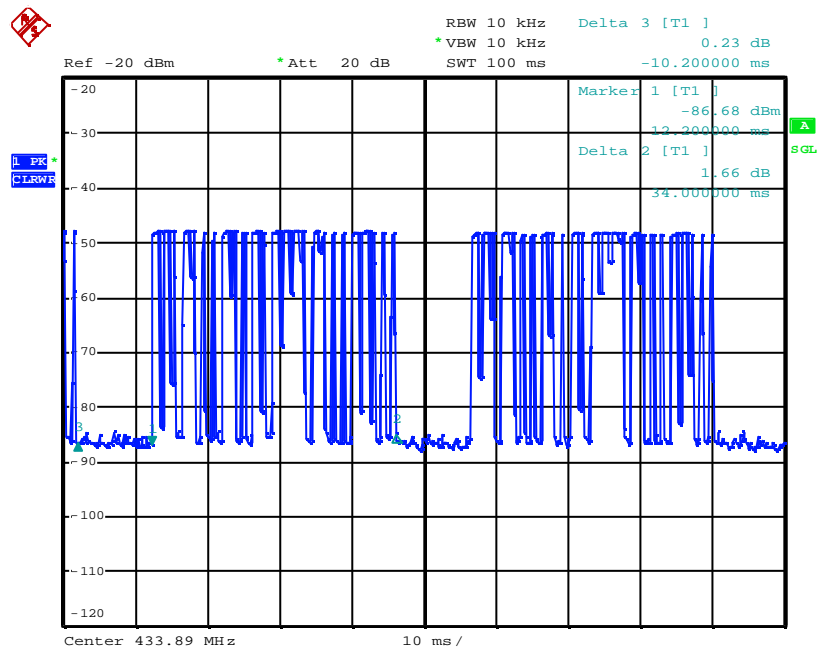
Where the duty factor is calculated from following formula:

$$20\log(\text{Duty cycle}) = 20\log((10 \times 2380 + 15 \times 520) / (10200 + 34000)) = -2.91\text{dB}$$

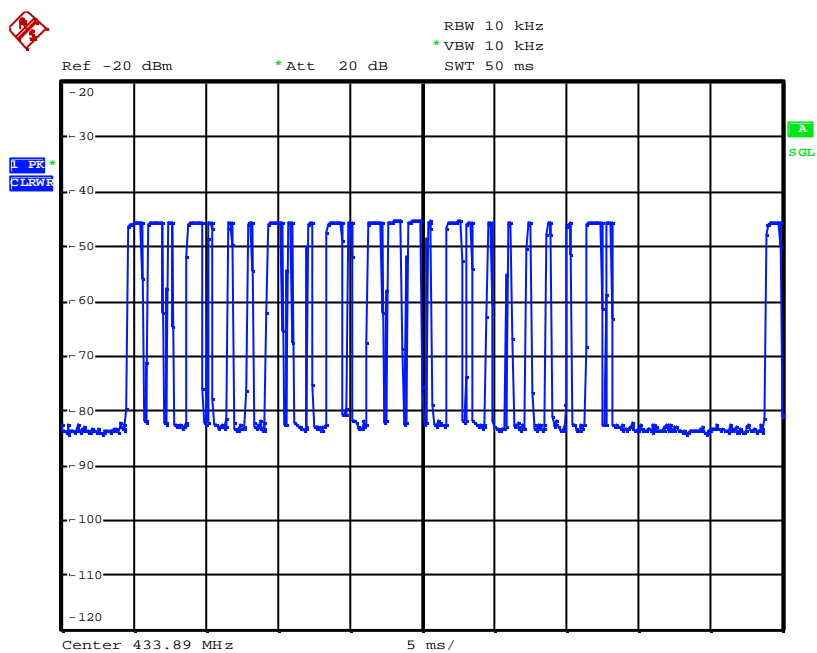
Please see page 9-11 for plotted duty.



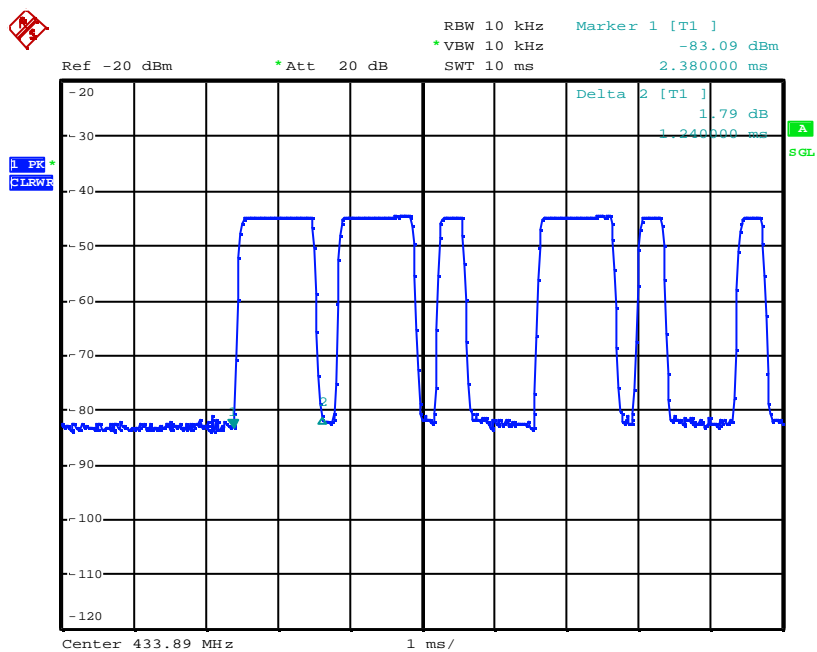
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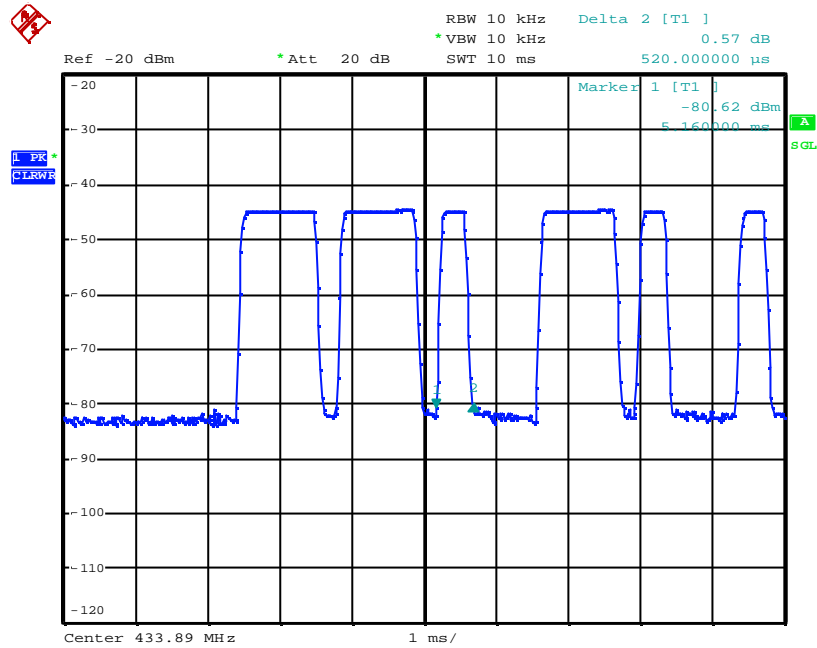
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Date: 28.APR.2007 16:36:40



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4 Occupied Bandwidth Test

4.1 Limits of Occupied Bandwidth

- (a) According to 15.231(c), 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.

4.2 Test Procedure

- (a) The EUT was placed on the top of a ratable 0.8 meters above the ground at a semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- (b) The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- (c) The antenna is a loop antenna. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to the heights from 1 to 4 meters and the ratable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- (d) The test-receiver system was set to Peak Detector Function and Specified Bandwidth with Maximum Hold Mode. RBW= 10kHz. VBW=30kHz
- (e) Measure the 20dB bandwidth and compare with the required limit.

4.3 Test Setup

Same as 3.3

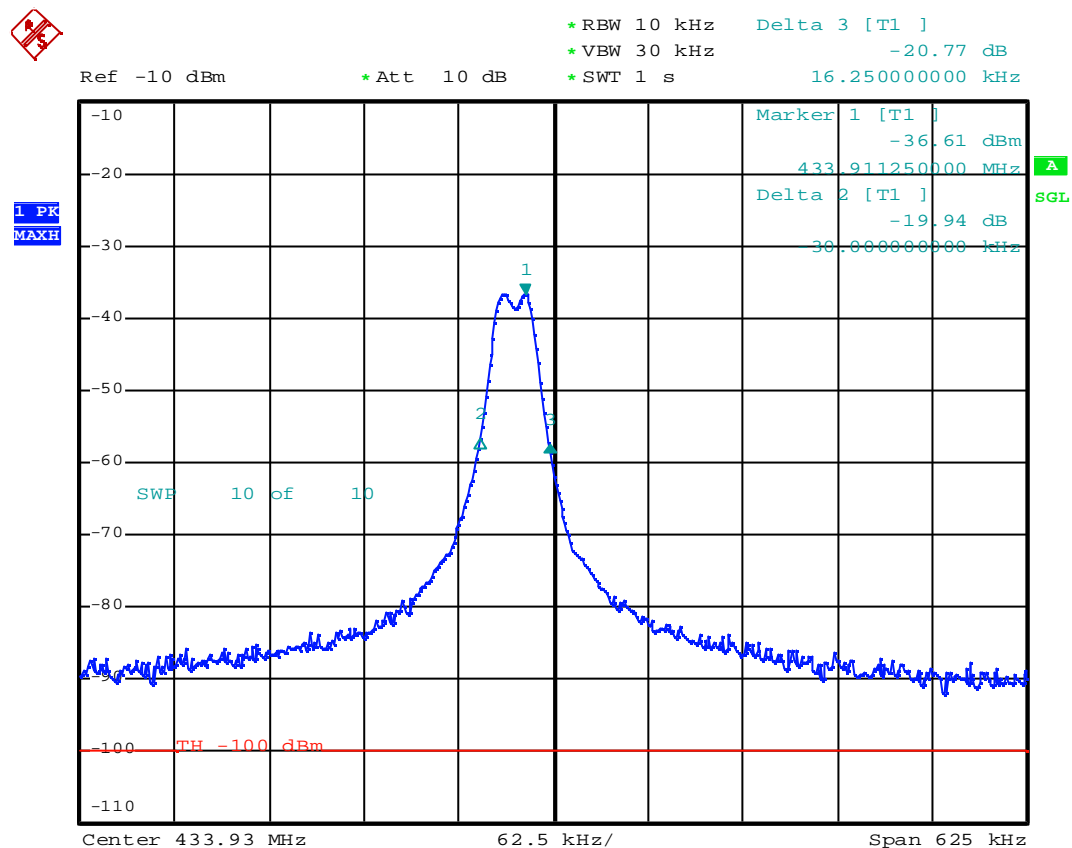
4.4 EUT Setup and Operating Conditions

Same as 3.4

4.5 Test Results

	Test Results (kHz) Center freq. offset	Limit (kHz) Center freq. offset
Lowest Frequency	-16.25	-542.37
Highest Frequency	30.00	+542.37

Test plots of Occupied Bandwidth



Date: 23.APR.2007 12:23:27

5 Dwell Time Test

5.1 Limits of dwell time

According to 15.231(a), A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

5.2 Test Procedure

- (a) The EUT was placed on the top of a ratable 0.8 meters above the ground at a semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- (b) The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- (c) The antenna is a loop antenna. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to the heights from 1 to 4 meters and the ratable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- (d) The test-receiver system was set to Peak Detector Function and Specified Bandwidth with Maximum Hold Mode. RBW= VBW=100kHz
- (e) Measure the 20dB bandwidth and compare with the required limit.

5.3 Test Setup

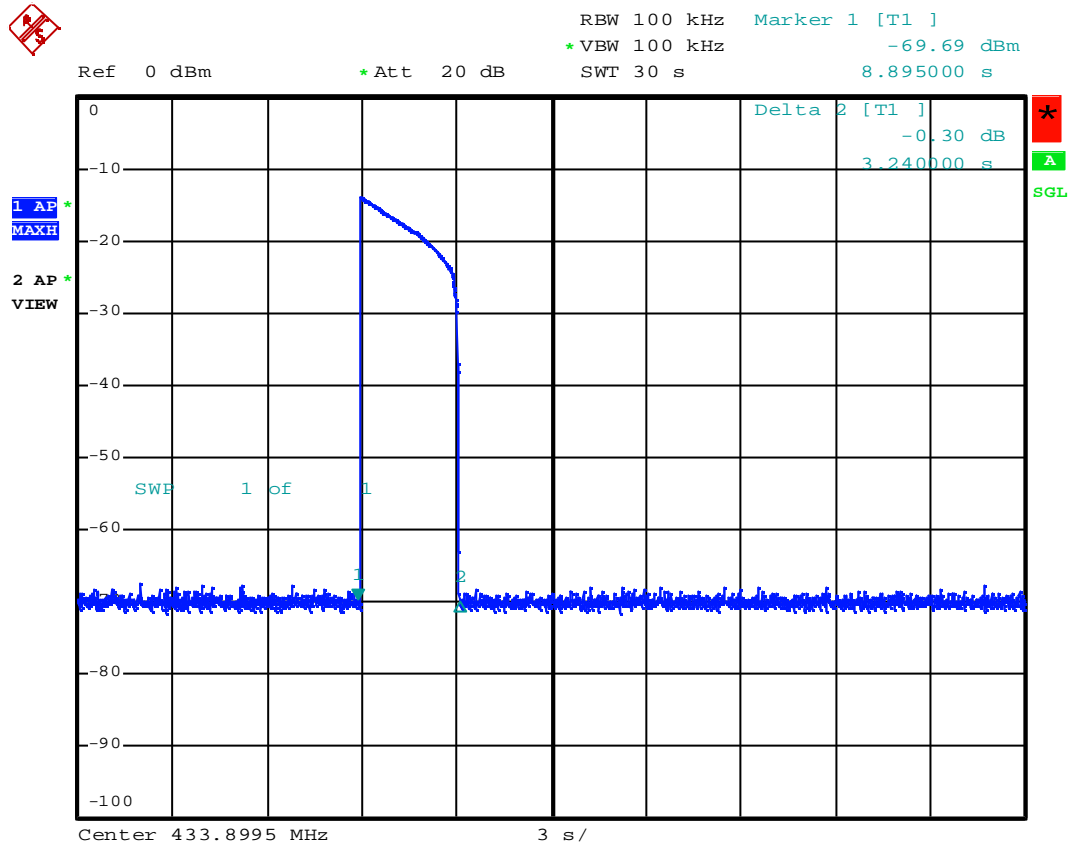
Same as 3.3

5.4 EUT Setup and Operating Conditions

Same as 3.4

5.5 Test Results

Test plots of Occupied Bandwidth



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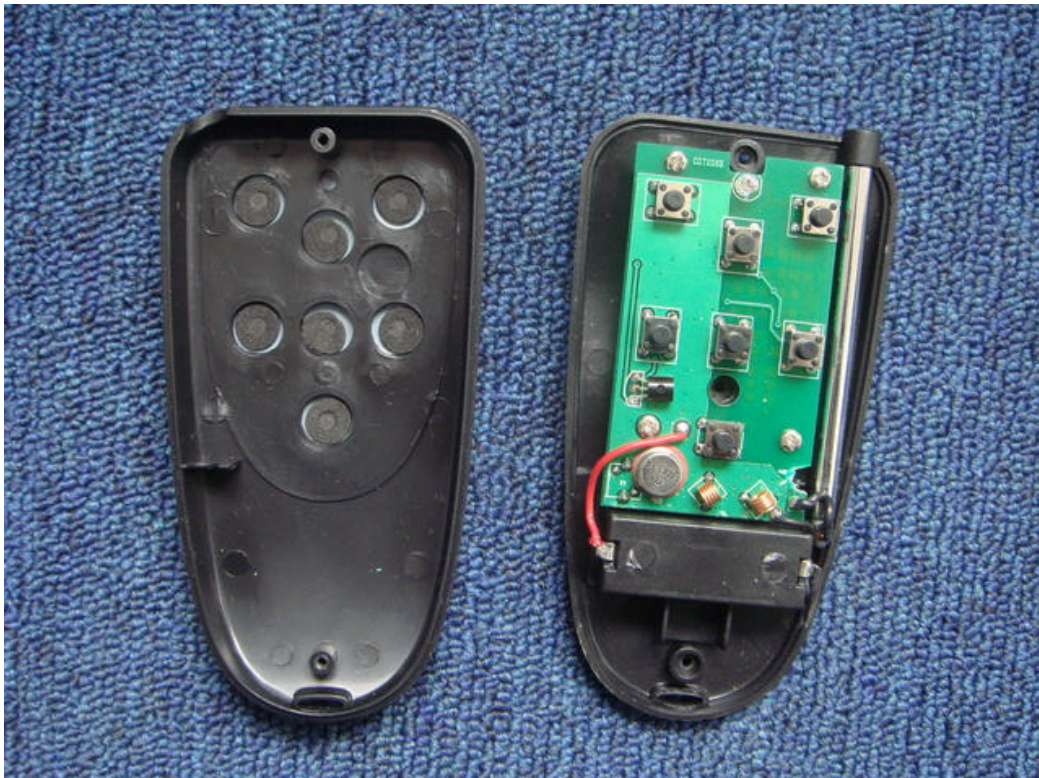
Appendix I : Photographs of the EUT

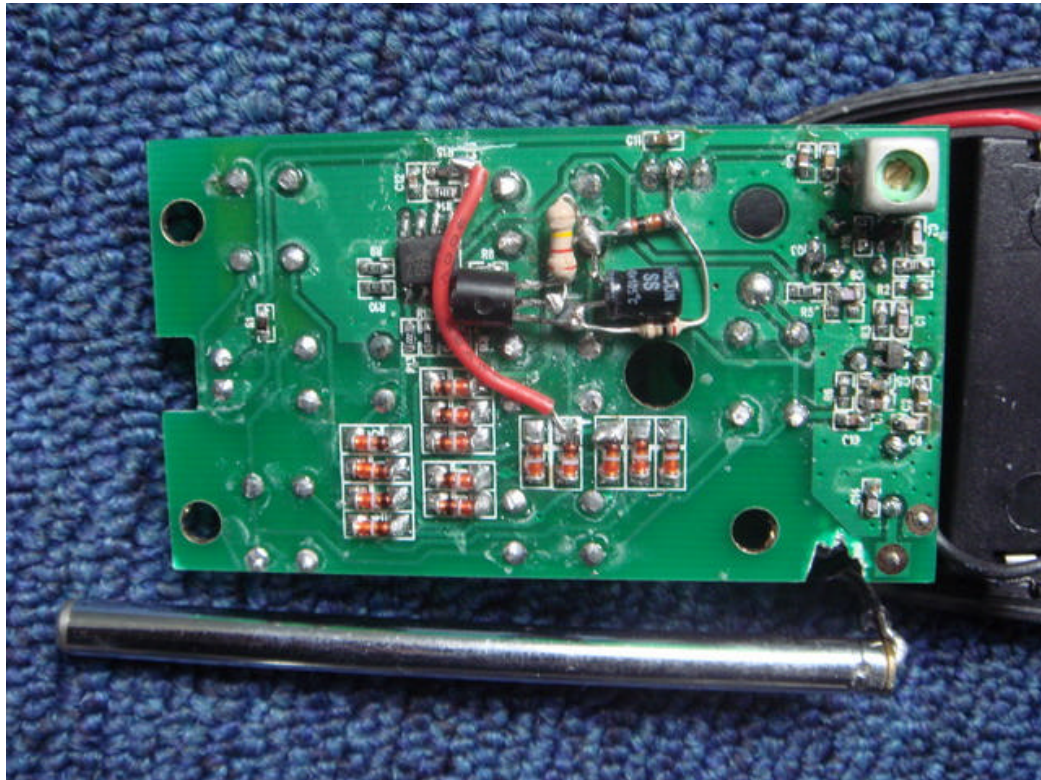
1. Appearance





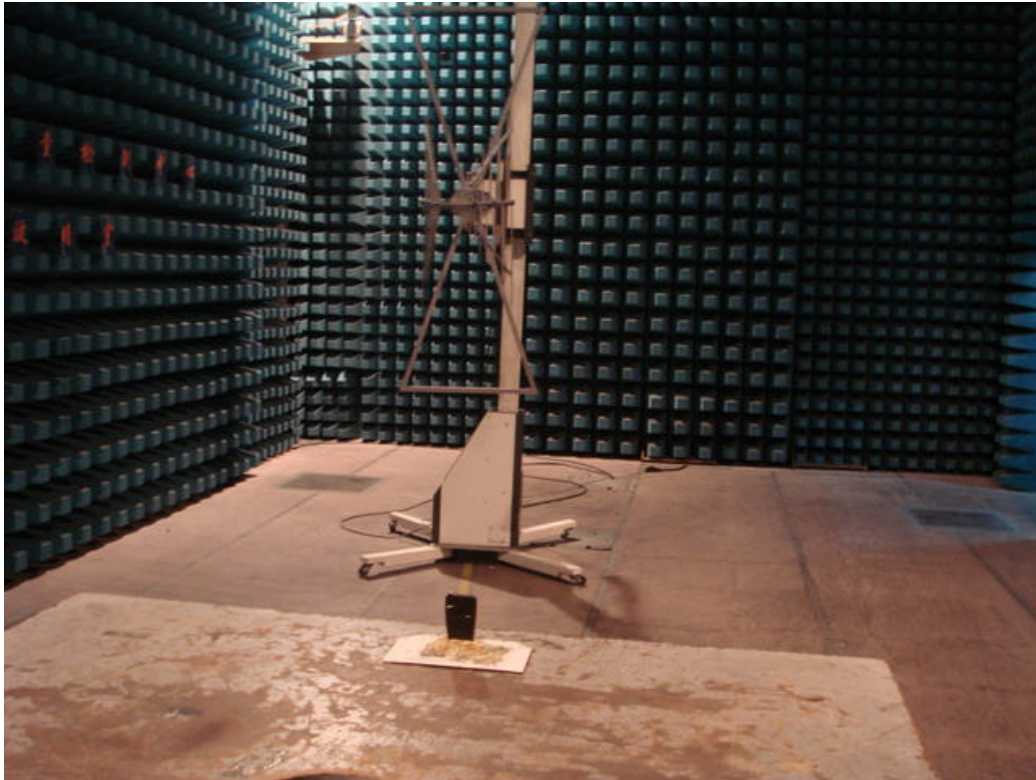
2. Inside





Appendix II : Photographs of the Test Configuration

1. Radiated Emission Test (30MHz~1000MHz)



2. Radiated Emission Test (above 1000MHz)

