

# FCC TEST REPORT

For

**NINGBO DOOYA MECHANIC & ELECTRONIC TECHNOLOGY CO., LTD**

**emitter**

Model No. : DC305, DC104, DC384

FCC ID : VYYDC305

Operating  
Frequency : 433.92MHz

Applicant : NINGBO DOOYA MECHANIC & ELECTRONIC  
TECHNOLOGY CO., LTD  
LOUTOU INDUSTRIAL AREA, ZHENHAI NINGBO,  
ZHEJIANG, CHINA

Regulation : **FCC Part 15 Subpart C Section 15.231**

Prepared by : Shenzhen AOV Testing Technology Co., Ltd.  
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Test Date : June 10-18, 2011

Date of Report : June 19, 2011

# TABLE OF CONTENT

Description	Page
Test Report Declaration	
<b>1. GENERAL INFORMATION</b>	<b>4</b>
1.1 General Information	4
1.2 Test Facility	4
1.3 Test Summary	5
1.4 Test Instrument Used	6
<b>2. TRANSMITTER TIME</b>	<b>7</b>
2.1 Rules Part No.	7
2.2 Limit of transmitter time	7
2.3 Test result	7
<b>3. RADIATION INTERFERENCE</b>	<b>9</b>
3.1 Rules Part No.	9
3.2 Limit of Radiated Disturbances	9
3.3 Test Procedure	9
3.4 Test Result	10
<b>4. BANDWIDTH</b>	<b>11</b>
4.1 Test Standard	11
4.2 Limits	11
4.3 Test Procedure	11
4.4 Test Result	11
<b>5. DUTY CYCLE</b>	<b>13</b>
5.1 Test Standard	13
5.2 Test Procedure	13
5.3 Test Result	13
<b>6. ANTENNA REQUIREMENT</b>	<b>17</b>
<b>7. PHOTOGRAPH OF TEST</b>	<b>18</b>

## TEST REPORT DECLARATION

Applicant : NINGBO DOOYA MECHANIC & ELECTRONIC  
TECHNOLOGY CO., LTD  
Manufacturer : NINGBO DOOYA MECHANIC & ELECTRONIC  
TECHNOLOGY CO., LTD  
EUT Description : emitter

**Test Procedure Used:  
FCC Part 15.231 Subpart C**

The E. U. T. listed below has been completed RF testing by Shenzhen AOV Testing Technology Co., Ltd at the test site of Bontek Compliance Testing Laboratory Ltd. And the Interference emissions can pass FCC Class B limitations.

The test configurations and the facility comply with the radiated and AC line conducted test site criteria in **ANSI C63.4-2009**.

Date of Test: \_\_\_\_\_ June 10-18, 2011 \_\_\_\_\_

Prepared by: \_\_\_\_\_  
  
Project Engineer

Reviewer : \_\_\_\_\_  
  
Project Manager

# 1. GENERAL INFORMATION

## 1.1 General Information

- EUT Description : emitter
- Model No. : DC305, DC104, DC384  
*They are quite same in circuit design and PCB layout, so all tests of this report are perform model DC305.*
- Type of Antenna : Permanent attached
- Applicant : NINGBO DOOYA MECHANIC & ELECTRONIC TECHNOLOGY CO., LTD  
LOUTOU INDUSTRIAL AREA, ZHENHAI NINGBO, ZHEJIANG, CHINA
- Manufacturer : NINGBO DOOYA MECHANIC & ELECTRONIC TECHNOLOGY CO., LTD  
LOUTOU INDUSTRIAL AREA, ZHENHAI NINGBO, ZHEJIANG, CHINA

## 1.2 Test Facility

- Test Firm : Bontek Compliance Testing Laboratory Ltd.  
Certificated by FCC, Registration No.: 338263
- Address : FL.1, Building H-3, Hua Qiao Cheng East Industrial Area  
Qiaocheng East Road, Nanshan, Shenzhen, P.R.China
- Tel : 86-755-86337020
- Fax : 86-755-86337028

### 1.3 Test Summary

For the EUT described above. The standards used were FCC Part 15 Subpart C Section 15.231 for Emissions

Tests Carried Out Under FCC Part 15 Subpart C

<b>Standard</b>	<b>Test Items</b>	<b>Status</b>
Section 15.207	Conducted Emission	N/A
Part 15 Subpart C Section 15.231	emitter time	Complied
	Radiation Emission	Complied
	20dB Bandwidth	Complied
	Duty Cycle	Complied
Part 15 Subpart C Section 15.203	ANTENNA REQUIREMENT	Complied

Temperature : 22 °C  
 Relative Humidity : 53%  
 Pressure : 1010hPa  
 Test Power : DC 3V

## 1.4 Test Instrument Used

No.	Equipment	Manufacturer	Model No.	S/N	Calibration date
1.	EMI Test Receiver	R&S	ESCI	100687	2010-11-22
2.	Amplifier	HP	8447D	1937A02492	2010-11-22
3.	TRILOG Broadband Test-Antenna	SCHWARZBECK	VULB9163	9163-324	2010-11-22
4.	Horn Antenna	SCHWARZBECK	BBHA9120A	B08000991-0001	2010-11-27
5.	High Field Biconical Antenna	ELECTRO-METRICS	EM-6913	166	2010-11-22
6.	Log Periodic Antenna	ELECTRO-METRICS	EM-6950	811	2010-11-22
7.	Remote Active Vertical Antenna	ELECTRO-METRICS	EM-6892	304	2010-11-22
8.	Teo Line Single Phase Module	SCHWARZBECK	NSLK8128	D-69250	2010-11-22
9.	Positioning Controller	C&C	CC-C-1F	MF7802113	2010-11-27
10.	Triple-Loop Antenna	EVERFINE	LLA-2	607004	2010-11-22
11.	10dB attenuator	SCHWARZBECK	MTAIMP-136	R65.90.0001#06	2010-11-22

## 2. TRANSMITTER TIME

### 2.1.Rules Part No.

FCC Part 15 Subpart C Section 15.231

### 2.2.Limit of transmitter time

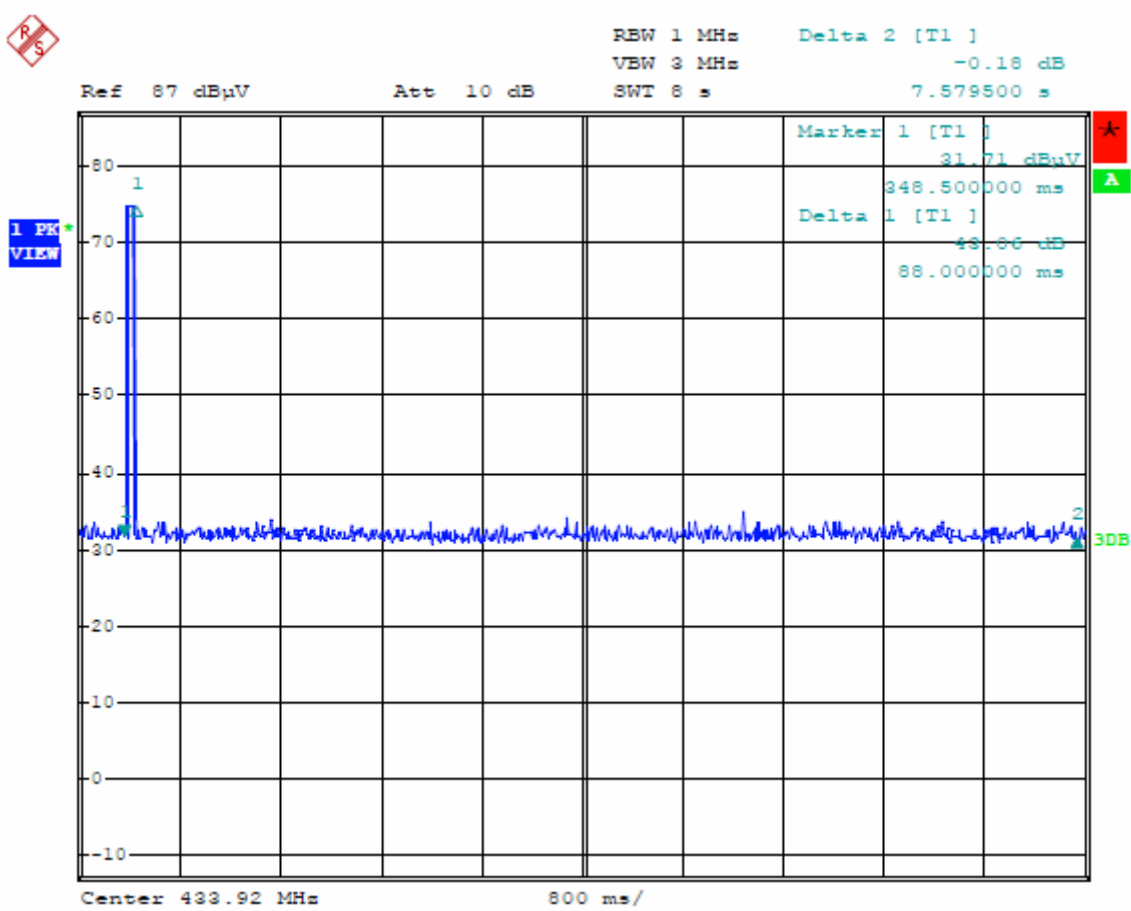
A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

### 2.3.Test result

**PASS**

Detailed information, Please refer to the following page.

T=260ms <5s





### 3. RADIATION INTERFERENCE

#### 3.1. Rules Part No.

FCC Part 15 Subpart C Section 15.231

#### 3.2. Limit of Radiated Disturbances

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

Remark : (1) Emission level (dB) $\mu$ V = 20 log Emission level  $\mu$ V/m

(2) The smaller limit shall apply at the cross point between two frequency bands.

(3) Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.

#### 3.3. Test Procedure

##### **ANSI STANDARD C63.4-2009 10.1.7 MEASUREMENT PROCEDURES:**

The EUT is placed on a turned table that is 0.8 meter above the ground. The turned table can rotate 360 degrees to determine the position of the maximum emission level. The EUT is set 3 meters away from the receiving antenna that is mounted on the antenna tower. The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level. Broadband antenna (log periodical antenna and horn antenna) is used as receiving antenna. Both horizontal and vertical polarization of the antenna is set on test.

The resolution bandwidth was 100 kHz and the video bandwidth was 300 kHz.

The spectrum was scanned from 30 MHz to 10th harmonic of the fundamental.

## 3.4. Test Result

**PASS**

Field Strength of Fundamental:

Horizontal:

Frequency (MHz)	AV (dBuV/m)	PK (dBuV/m)	Average Limit (dBuV/m)	Peak Limit (dBuV/m)	Average Margin (dBuV/m)	Peak Margin (dBuV/m)
433.92	47.82	55.32	80.83	100.83	33.01	45.51
868.52	43.36	50.86	60.83	80.83	17.47	29.97
2168.80	36.43	43.93	60.83	80.83	24.40	36.90

Vertical:

Frequency (MHz)	AV (dBuV/m)	PK (dBuV/m)	Average Limit (dBuV/m)	Peak Limit (dBuV/m)	Average Margin (dBuV/m)	Peak Margin (dBuV/m)
433.92	47.82	55.32	80.83	100.83	33.01	45.51
868.52	54.24	61.74	60.83	80.83	6.59	19.09
2168.80	37.93	45.43	60.83	80.83	22.90	35.4

Field Strength of Spurious Emission:

Horizontal:

Frequency (MHz)	PK (dBuV/m)	Read Level (dBuV/m)	Limit (dBuV/m)	(PK)Margin (dBuV/m)
125.29	23.13	---	43.5	20.20
353.05	34.96	---	46.0	11.10
383.18	34.23	---	46.0	11.77
440.08	35.84	---	46.0	10.16
586.93	35.34	---	46.0	10.66
592.58	33.58	---	54.0	20.42
630.45	40.60	---	54.0	13.40
755.26	40.55	---	54.0	13.45
945.80	44.50	---	54.0	9.50
1260.58	42.01	---	54.0	11.99
1482.95	40.35	---	54.0	13.65
1575.56	39.52	---	54.0	14.48

Vertical:

Frequency (MHz)	PK (dBuV/m)	Read Level (dBuV/m)	Limit (dBuV/m)	(PK)Margin (dBuV/m)
125.60	21.74	---	43.5	21.76
353.89	30.08	---	46.0	15.92
383.89	30.16	---	46.0	15.84
456.70	33.69	---	46.0	12.31
581.80	34.72	---	46.0	11.28
630.45	44.60	---	54.0	9.40
945.80	45.50	---	54.0	8.50
1260.85	40.52	---	54.0	13.48
1385.50	42.85	---	54.0	11.15
1575.60	41.50	---	54.0	12.50
1785.25	41.58	---	54.0	12.42
1890.85	42.62	---	54.0	11.38

## 4. BANDWIDTH

### 4.1. Test Standard

FCC Part 15 Subpart C Section 15.231

### 4.2. Limits

$(0.0025 * 433.92 \text{MHz} = 1084.8 \text{KHz})$

$72 \text{KHz} < 1084.8 \text{KHz}$

### 4.3. Test Procedure

- (1) Turn on the transmitter, and set it to transmit the pulse train continuously.
- (2) Set Test Receiver into spectrum analyzer mode, Tune the spectrum analyzer to the transmitter carrier frequency, and set the spectrum analyzer resolution bandwidth (RBW) to 100kHz and video bandwidth (VBW) to 100kHz, then select Peak function to scan the channel frequency.
- (3) The 20dB bandwidth was measured and recorded.  
Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

### 4.4. Test Result

**PASS**

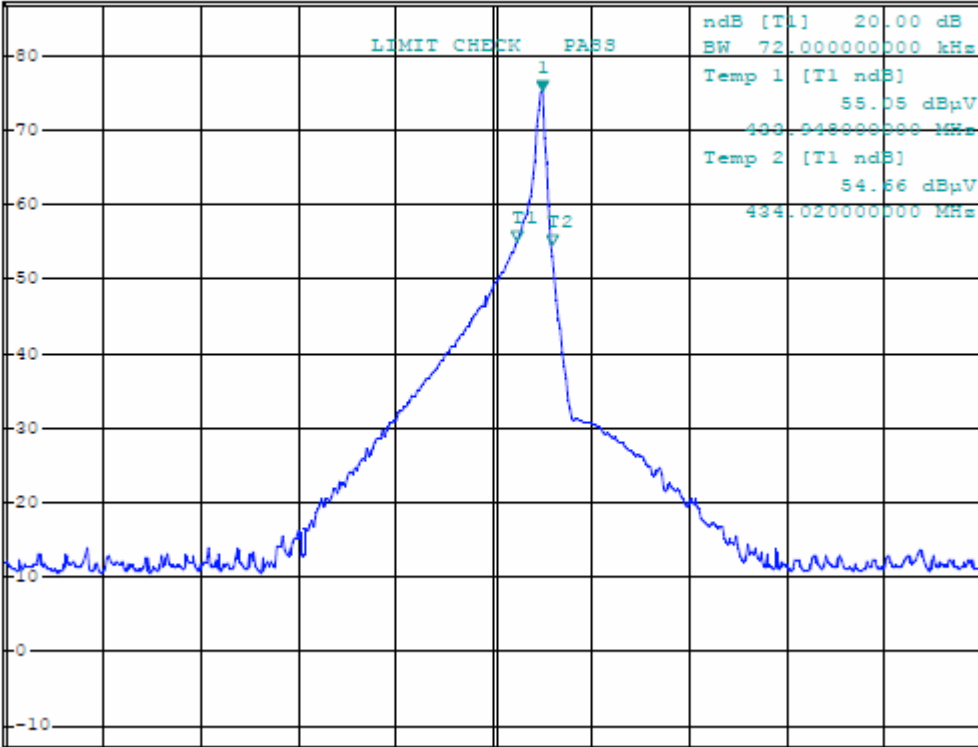
Detailed information, Please refer to the following page.



\*RBW 10 kHz    Marker 1 [T1 ]  
\*VBW 30 kHz                    75.25 dBμV  
SWT 20 ms                    434.000000000 MHz

Ref 87 dBμV                    \*Att 10 dB

1 PK  
MAXH



ndB [T1] 20.00 dB  
BW 72.000000000 kHz  
Temp 1 [T1 ndB] 55.95 dBμV  
433.948000000 MHz  
Temp 2 [T1 ndB] 54.56 dBμV  
434.020000000 MHz

B

TDF

3DB

Center 433.9 MHz                    200 kHz/                    Span 2 MHz

## 5. DUTY CYCLE

### 5.1. Test Standard

15.231

### 5.2. Test Procedure

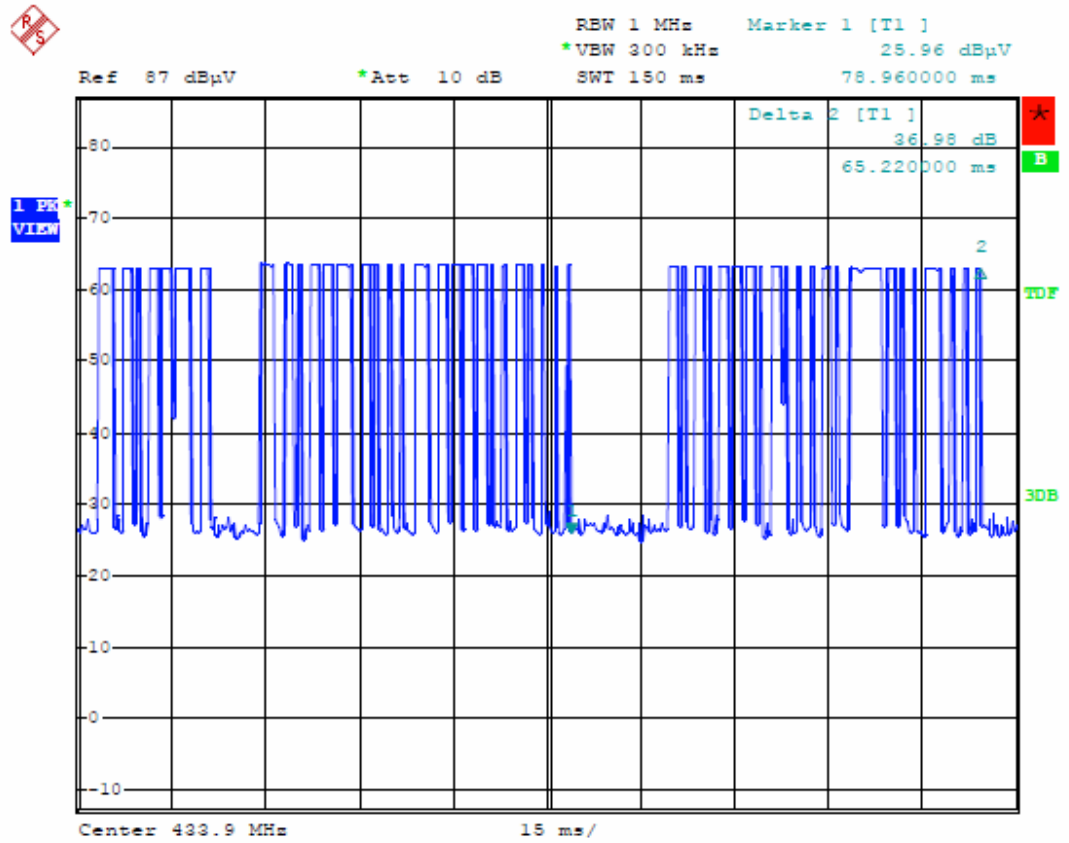
- (1) The EUT was placed on a turntable which is 0.8m above ground plane.
- (2) Set EUT operating in continuous transmitting mode
- (3) Set Test Receiver into spectrum analyzer mode, Tune the spectrum analyzer to the transmitter carrier frequency, and set the spectrum analyzer resolution bandwidth(RBW) to 100kHz and video bandwidth(VBW) to 300kHz, Span was set to 0Hz.
- (4) The Duty Cycle was measured and recorded.

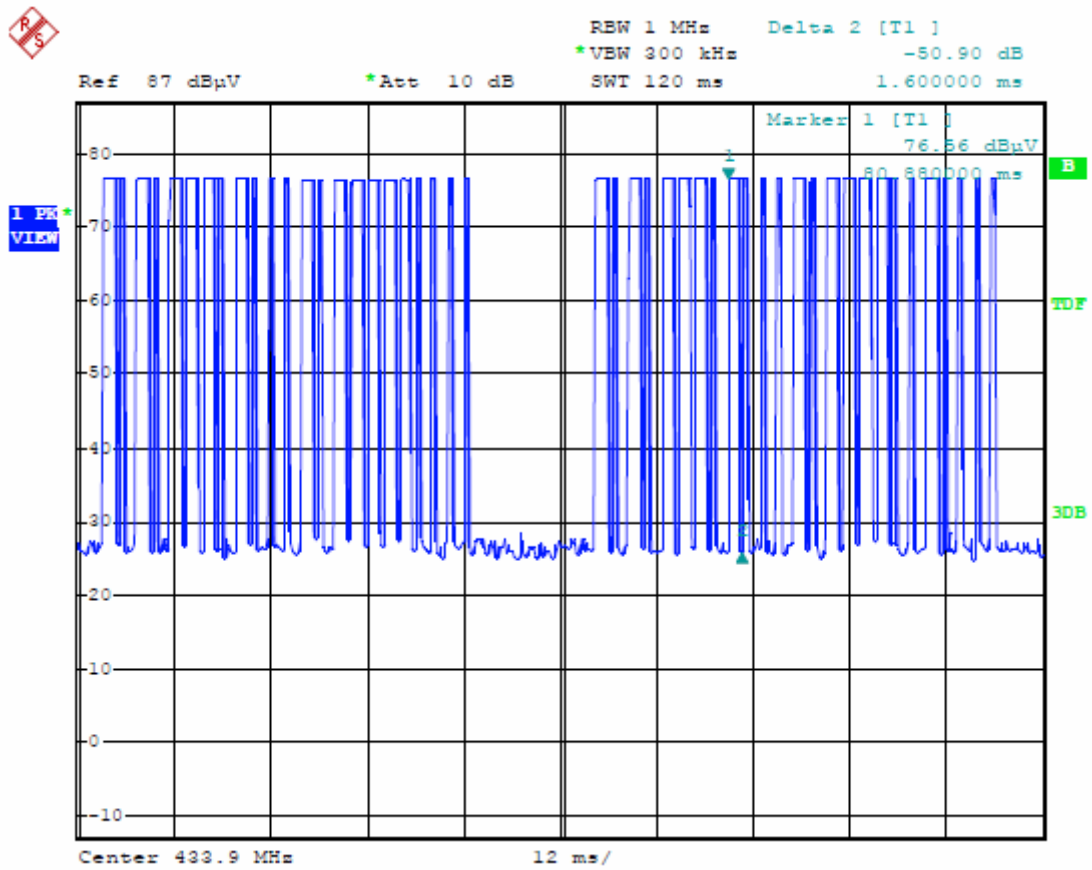
### 5.3. Test Result

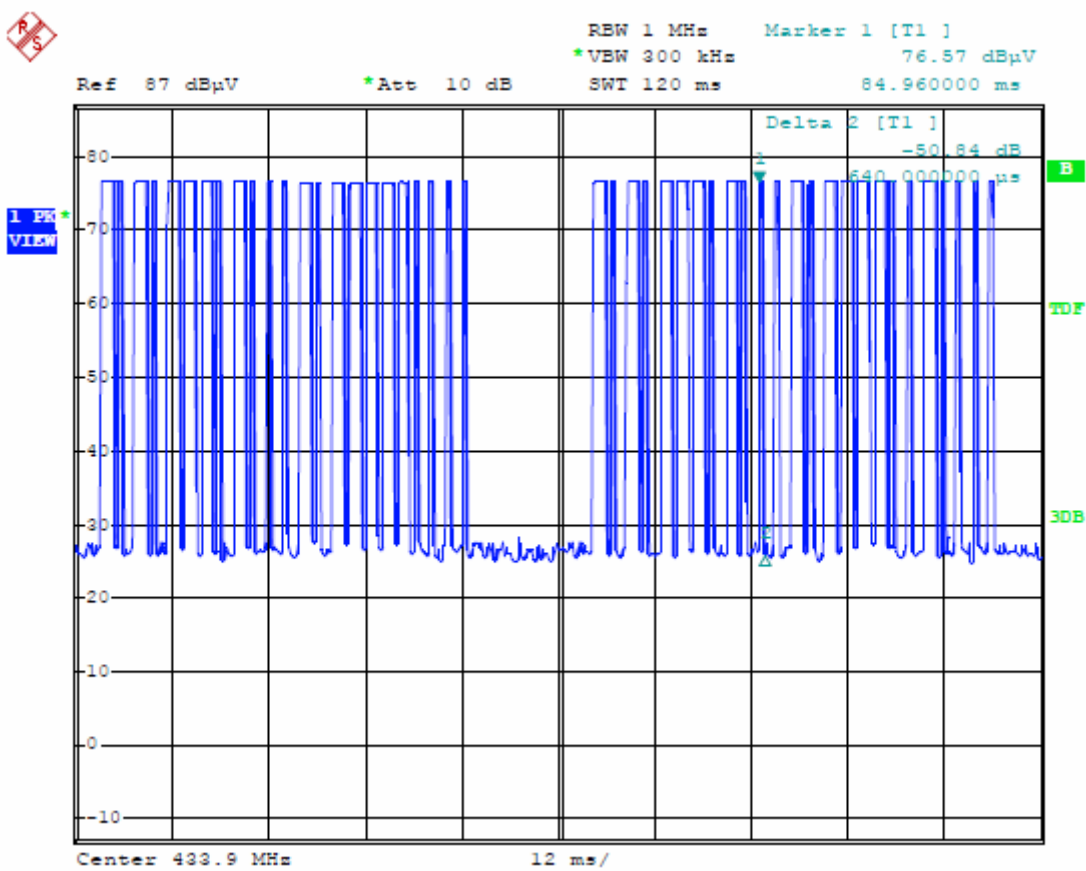
Test plots see following pages

$$20\log(\text{Duty cycle}) = 20\log(12 \times 1.6\text{ms} + 13 \times 0.64\text{ms} / 65.22\text{ms}) = -7.5\text{dB}$$

Note: because the pulse emission bandwidth is less than measuring bandwidth, so the PDCF is not need









## 6. ANTENNA REQUIREMENT

Requirement(s): 47 CFR §15.203

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.

Antenna requirement must meet at least one of the following:

- a) Antenna must be permanently attached to the device.
- b) Antenna must use a unique type of connector to attach to the device.
- c) Device must be professionally installed. Installer shall be responsible

for ensuring that the correct antenna is employed with the device.

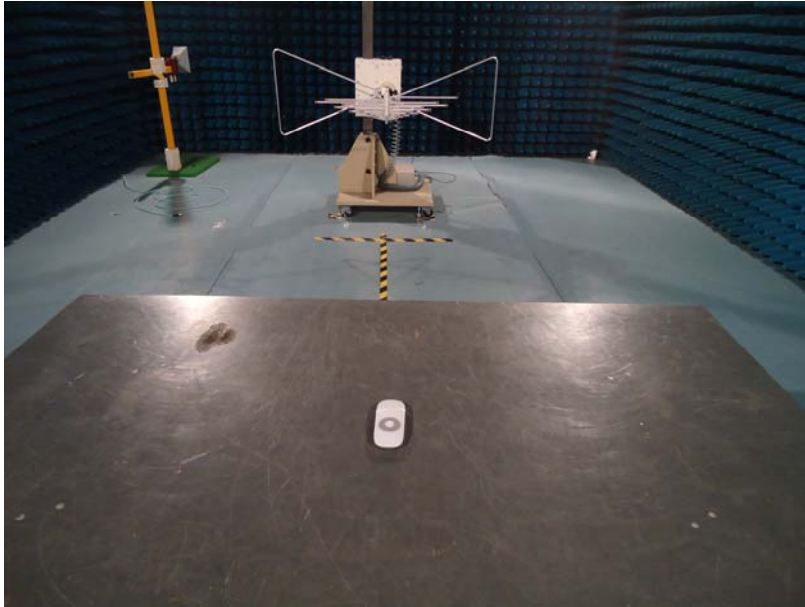
The antenna is integral antenna. Antenna maximum gain is 0dBi.

According to Section 15.203, 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 EUT has no antenna connector for printed antenna. Therefore the EUT complies with Section 15.203 of the FCC rules.

## 7. PHOTOGRAPH OF TEST

Below 1GHz



Above 1GHz

