

**ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT
INTENTIONAL RADIATOR CERTIFICATION TO
FCC PART 15 SUBPART C REQUIREMENT**

OF

Control System

MODEL No.: DC34

Trade mark: DOOYA

FCC ID: VYY-DC34

REPORT NO: E0712090F

ISSUE DATE: January 23, 2008

Prepared for

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Prepared by

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VERIFICATION OF COMPLIANCE

Applicant:	NINGBO DOOYA MECHANIC & ELECTRONIC TECHNOLOGY CO., LTD. Luotuo Industrial Area, Zhenhai, Ningbo, Zhejiang, P.R.China
Product Description:	Control System
Model Number:	DC34
Serial Number:	DC44, DC48, DC49, DC61, DC35, DC36, DC37, DC38, DC39, DC90, DC91, DC92, DC93, DC94, DC95
File Number:	E0712090F
Date of Test:	December 25, 2007 to January 20, 2007

We hereby certify that:

The above equipment was tested by SHENZHEN EMTEK Co., Ltd. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4 (2003) and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rules Part 15.231.

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

Approved By



David Lee/ Q.A. Manager
SHENZHEN EMTEK Co., Ltd.

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1. GENERAL INFORMATION

1.1 Product Description

The NINGBO DOOYA MECHANIC & ELECTRONIC TECHNOLOGY CO., LTD. Model: DC34 (referred to as the EUT in this report) The EUT is an short range, lower power, Control System designed as an Input Device.

A major technical descriptions of EUT is described as following:

A). Operation Frequency: 433.92 MHz, one channel.

B). Power Supply: DC 12V/23A

1.2 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: VYY-DC34 filing to comply with Section 15.231 of the FCC Part 15, Subpart C Rules. The composite system (receiver) is compliance with Subpart B is authorized under a DoC procedure.

1.3 Test Methodology

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4 (2003). Radiated testing was performed at an antenna to EUT distance 3 meters.

1.4 Special Accessories

Not available for this EUT intended for grant.

1.5 Equipment Modifications

Not available for this EUT intended for grant.

1.6 Test Facility

Site Description
EMC Lab. : Accredited by CNAS, 2005.11.02
The certificate is valid until 2010.11
The Laboratory has been assessed and proved to be in compliance
with CNAS-CL01:2006(identical to ISO/IEC17025:2005)
The Certificate Registration Number is L2291

Accredited by TUV Rheinland Guangzhou, 2005.1
The certificate is valid until 2008.2
The Laboratory has been assessed according to the requirements
ISO/IEC 17025:1999

Accredited by FCC, July 07, 2005
The Certificate Registration Number is 709623.

Accredited by Industry Canada, August 30, 2005
The Certificate Registration Number is 46405-4480

Name of Firm : SHENZHEN EMTEK Co., Ltd.
Site Location : Bldg 69, Majialong Industry Zone,
Nanshan District, Shenzhen, Guangdong, China

2. System Test Configuration

2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.2 EUT Exercise

The Transmitter was operated in the normal operating mode. the Tx frequency was fixed which was for the purpose of the measurements.

2.3 Test Procedure

2.3.1 Conducted Emissions (Not apply in the report)

The EUT is a placed on as turn table which is 0.8 m above ground plane. According to the requirements in Section 13.1.4.1 of ANSI C63.4-2003. Conducted emissions from the EUT measured in the **frequency range between 0.15 MHz and 30MHz** using **CISPR Quasi-Peak and average detector mode**.

2.3.2 Radiated Emissions

The EUT is a placed on as turn table which is 0.8 m above ground plane. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter(EUT) was rotated through three orthogonal axes according to the requirements in Section 13.1.4.1 of ANSI C63.4-2003.

2.4 Limitation

(1) Conducted Emission (Not applicable in this report)

According to section 15.207(a) Conducted Emission Limits is as following.

Frequency range MHz	Limits dB(uV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50
Note		
1.The lower limit shall apply at the transition frequencies		
2.The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.		

(2) Radiated Emission

- a. The field strength of any emission within this band (section 15.231) shall not exceed 10000 micro volts/meter at 3 meters. (80dB μ V at 3m) The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in section 15.35 for limiting peak emissions apply.
- b. The field strength of any emissions which appear outside of this band shall not exceed the general radiated emission limits in section 15.209 and section 15.231(Intentional Radiators general limit). as below.

Frequency (MHz)	Field strength μ V/m	Distance (m)	Field strength at 3m dB μ V/m
30-88	100	3	40
88-216	150	3	43.5
216-960	200	3	46
Above 960	500	3	54

- Remark:
1. Emission level in dBuV/m=20 log (uV/m)
 2. Measurement was performed at an antenna to the closed point of EUT distance of meters.
 3. Only spurious frequency is permitted to locate within the Restricted Bands specified in provision of ξ 15.205
 4. Emission spurious frequency which appearing within the Restricted Bands specified in provision of ξ 15.205, then the general radiated emission limits in ξ 15.209 apply.

Fundamental Frequency(MHZ)	Field Strength of Fundamental	
	uV/m	dBuV/m
433.92	10996.7	80.83
Harmonics	1100.0	60.83

Remark: (1) Emission level in dBuV/m=20 log (uV/m)
(2) Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.
(3)The emission limit in this paragraph is based on measurement instrumentation employing an average detector. Measurement using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit

2.5 Configuration of Tested System

Fig. 2-1 Configuration of Tested System



3. Summary Of Test Results

FCC Rules	Description Of Test	Result
§ 15.207	Conducted Emission	N/A
§ 15.231 (b)	Radiated Emission	Compliant
§ 15.231 (c)	Bandwidth Test	Compliant
§ 15.231 (a)(1)	Deactivation Testing	Compliant

4. Description of test modes

The EUT (Control System) has been tested under normal operating condition.

The EUT stay in continuous transmitting mode. The Frequency 433.92MHz are chosen for testing.

5. Conducted Emissions Test (Not applicable in this report)

5.1 Measurement Procedure:

1. The EUT was placed on a table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete.

5.2 Test SET-UP (Block Diagram of Configuration)

5.3 Measurement Equipment Used:

Conducted Emission Test Site # 4					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Test Receiver	Rohde & Schwarz	ESCS30	828985/018	05/29/2007	05/29/2008
L.I.S.N	Rohde & Schwarz	ESH2-Z5	834549/005	05/29/2007	05/29/2008
L.I.S.N	Rohde & Schwarz	ESH2-Z5	834549/005	05/29/2007	05/29/2008
50ΩCoaxial Switch	Anritsu	MP59B	M20531	05/29/2007	05/29/2008

5.4 Measurement Result: N/A

5.5 Conducted Measurement Photos: N/A

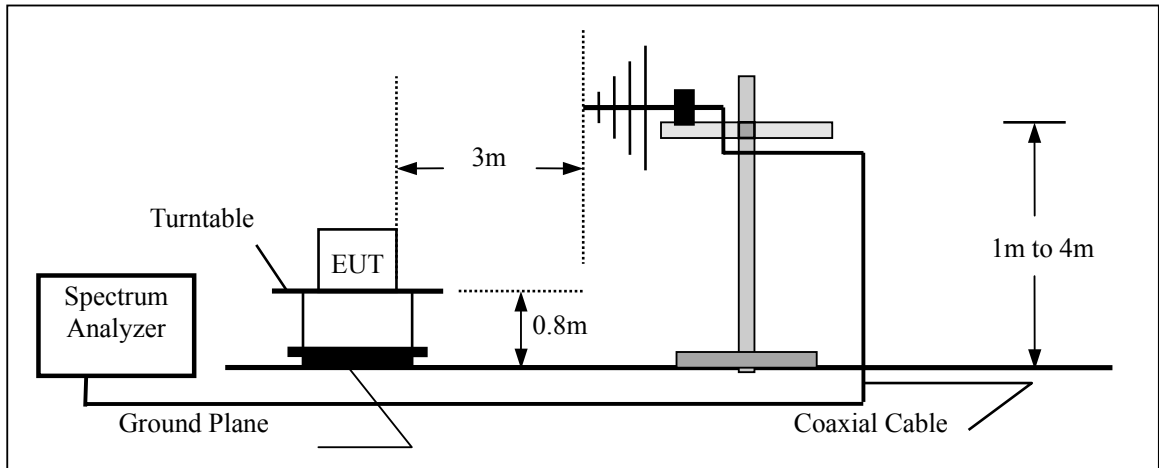
6. Radiated Emission Test

6.1 Measurement Procedure

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measured were complete.

6.2 Test SET-UP (Block Diagram of Configuration)

Radiated Emission Test Set-Up



6.3 Measurement Equipment Used:

Open Area Test Site # 3					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	Rohde & Schwarz	FSEM30	849720/019	05/29/2007	05/29/2008
Amplifier	HP	8449B	3008A00277	05/29/2007	05/29/2008
Horn Antenna	Sunol Sciences	DRH-118	A052604	05/29/2007	05/29/2008
EMI Test Receiver	Rohde & Schwarz	ESCI	100028	05/29/2007	05/29/2008
Amplifier	HP	HP8447E	1937A01046	05/29/2007	05/29/2008
Broadband Antenna	Sunol Sciences	JB1	A040904-2	05/29/2007	05/29/2008

6.4 Measurement Result

A. Fundamental Radiated Emission Data

Operation Mode: Transmitting Mode Test Date : December 29, 2007
 Test Item: Fundamental Radiated Emission Data Temperature : 24
 Fundamental Frequency: 433.92MHz Humidity : 52 %
 Test Result: PASS Test By: Andy

Freq. (MHz)	Ant.Pol. H/V	Emission Level (dBuV)	Limit 3m (dBuV/m)	Margin (dB)	Note
433.91	V	65.15	80.83	-15.68	Peak
867.10	V	55.62	60.83	-5.21	Peak
1301.42	V	50.15	60.83	-10.68	Peak
1735.84	V	46.91	60.83	-13.92	Peak
2168.81	V	43.68	60.83	-17.15	Peak
2602.10	V	41.51	60.83	-19.32	Peak
433.69	H	64.68	80.83	-16.15	Peak
867.14	H	54.12	60.83	-6.71	Peak
1301.31	H	51.50	60.83	-9.33	Peak
1735.14	H	46.97	60.83	-13.86	Peak
2168.47	H	42.69	60.83	-18.14	Peak
2602.44	H	40.97	60.83	-19.86	Peak

Other harmonics emissions are lower than 20dB below the allowable limit.

- Note:**
- (1) All Readings are Peak Value.
 - (2) Emission Level= Reading Level+Probe Factor +Cable Loss
 - (3) The average measurement was not performed when the peak measured data under the limit of average detection.

B. General Radiated Emission Data

Operation Mode: Transmitting Mode Test Date : December 25, 2007
 Test Item: General Radiated Emission Data Temperature : 24
 Fundamental Frequency: 433.92 MHz Humidity : 52%
 Test Result: PASS Test By: Andy

Freq. (MHz)	Ant.Pol. H/V	Emission Level (dBuV)	Limit 3m (dBuV/m)	Margin (dB)	Note
38.91	V	28.94	40.00	-11.06	Peak
46.99	V	27.29	40.00	-12.71	Peak
95.97	V	26.97	43.50	-16.53	Peak
156.81	V	31.57	43.50	-11.93	Peak
189.51	V	32.91	43.50	-10.59	Peak
397.42	V	31.54	46.00	-14.46	Peak
59.15	H	27.91	40.00	-12.09	Peak
72.61	H	26.91	43.50	-16.59	Peak
98.64	H	28.67	43.50	-14.83	Peak
167.47	H	30.71	43.50	-12.79	Peak
269.48	H	31.33	46.00	-14.67	Peak
374.98	H	32.97	46.00	-13.03	Peak

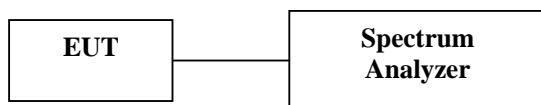
Note: Emission Level= Reading Level+ Probe Factor +Cable Loss

7. DEACTIVATION TESTING

7.1 Requirement

Per 15.231(a) (1), a manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

7.2 Test configuration



7.3 Measurement Equipment Used:

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	HP	8594E	3649A03840	05/29/2007	05/29/2008

7.4 Test Procedure

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the the spectrum analyzer.
3. Set center frequency of spectrum analyzer =operating frequency.
4. Set the spectrum analyzer as RBW=100KHz, VBW=1MHz, Span=0Hz, adjust sweep=500ms.
5. Repeat above procedures until all frequency measured were completed.

7.5 Test Data

Environmental Conditions

Temperature:	24 ° C
Relative Humidity:	52%
ATM Pressure:	1032mbar

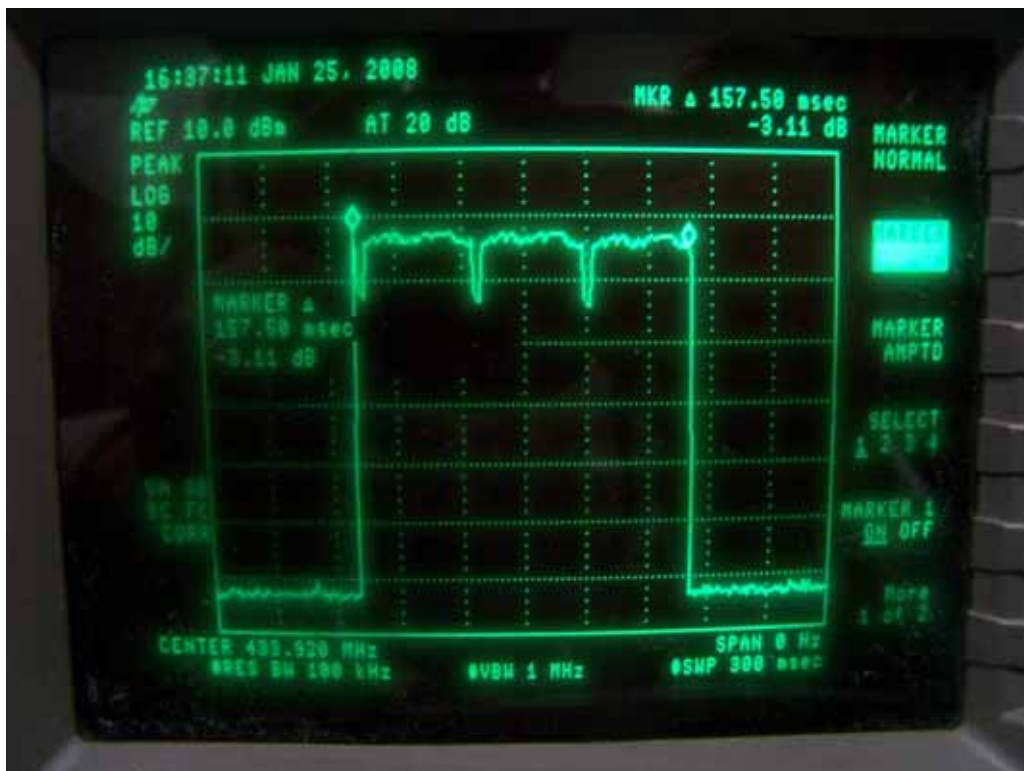
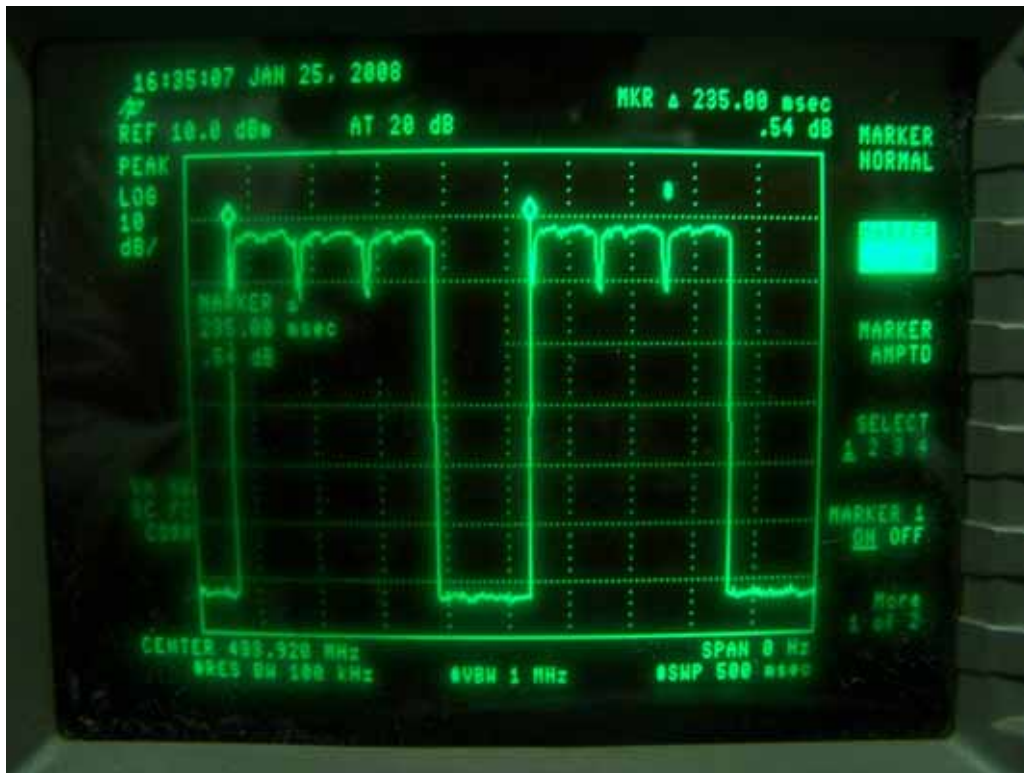
Test Mode: Transmitting

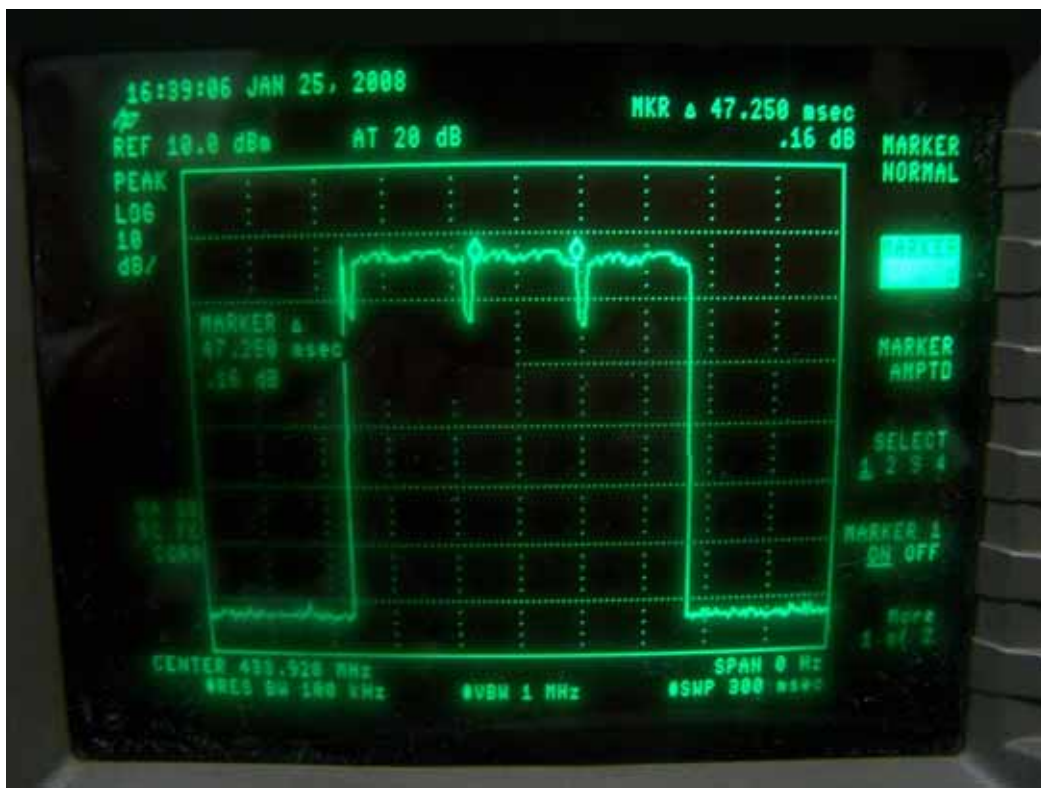
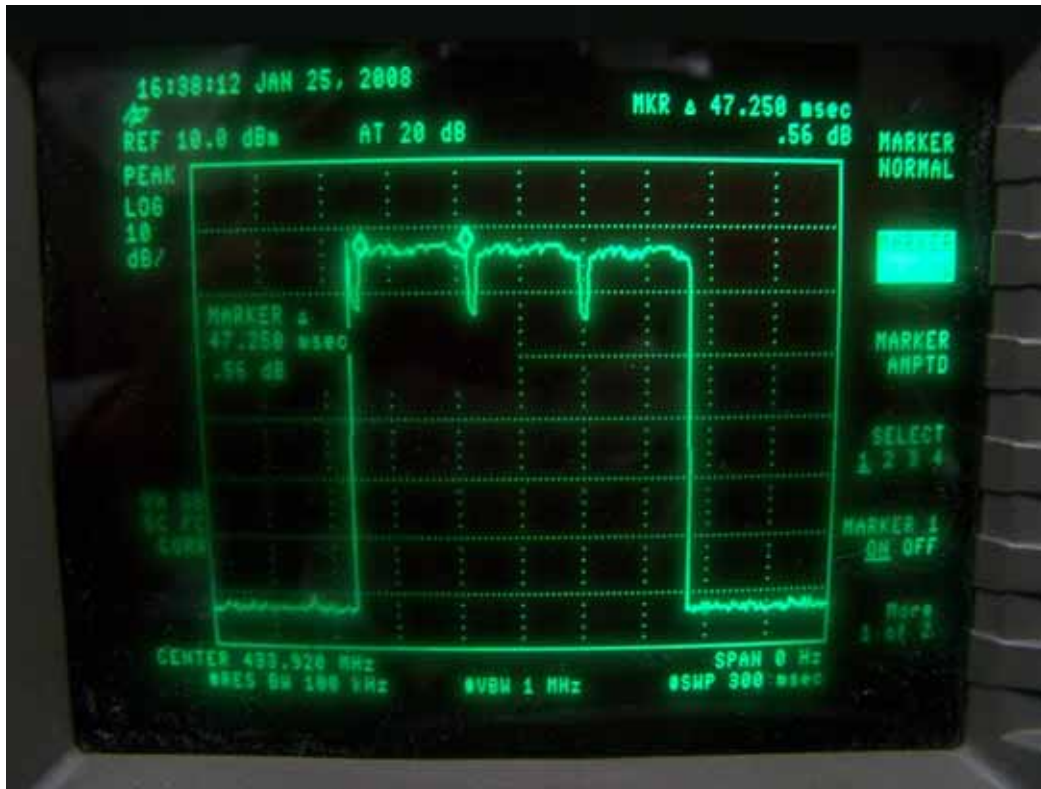
Once press the key, the EUT transmit 433.92MHz signal, and once the key is released the EUT stop transmitting within not more than 5 seconds.

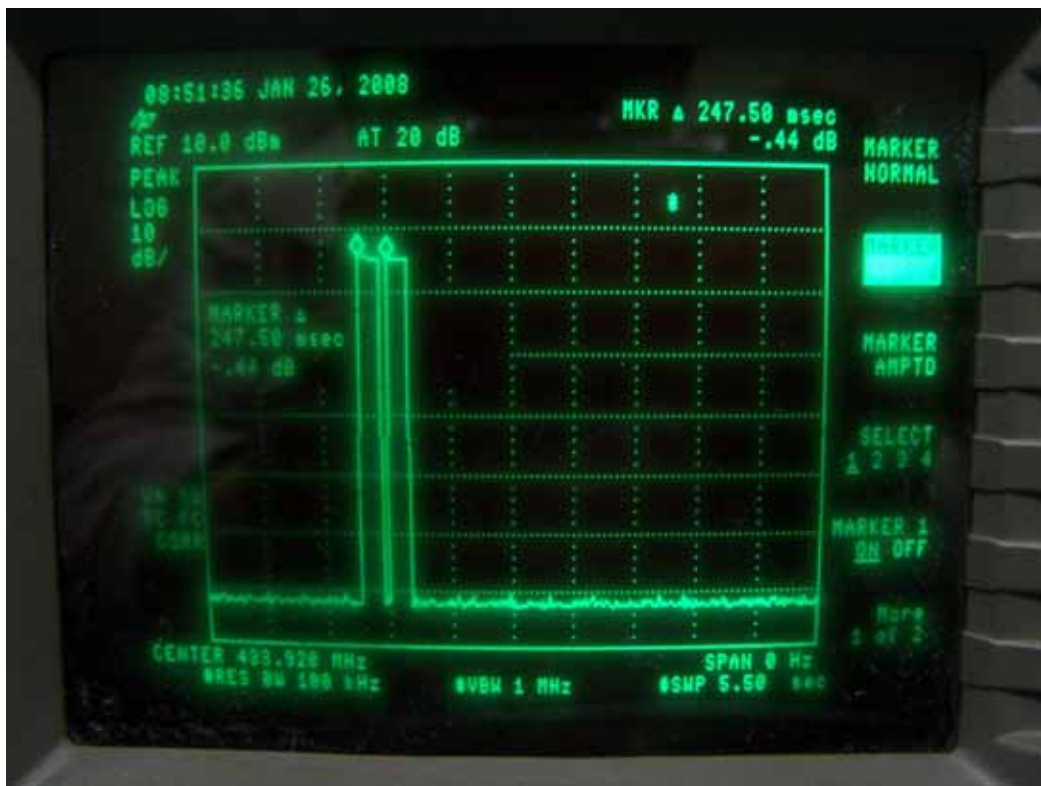
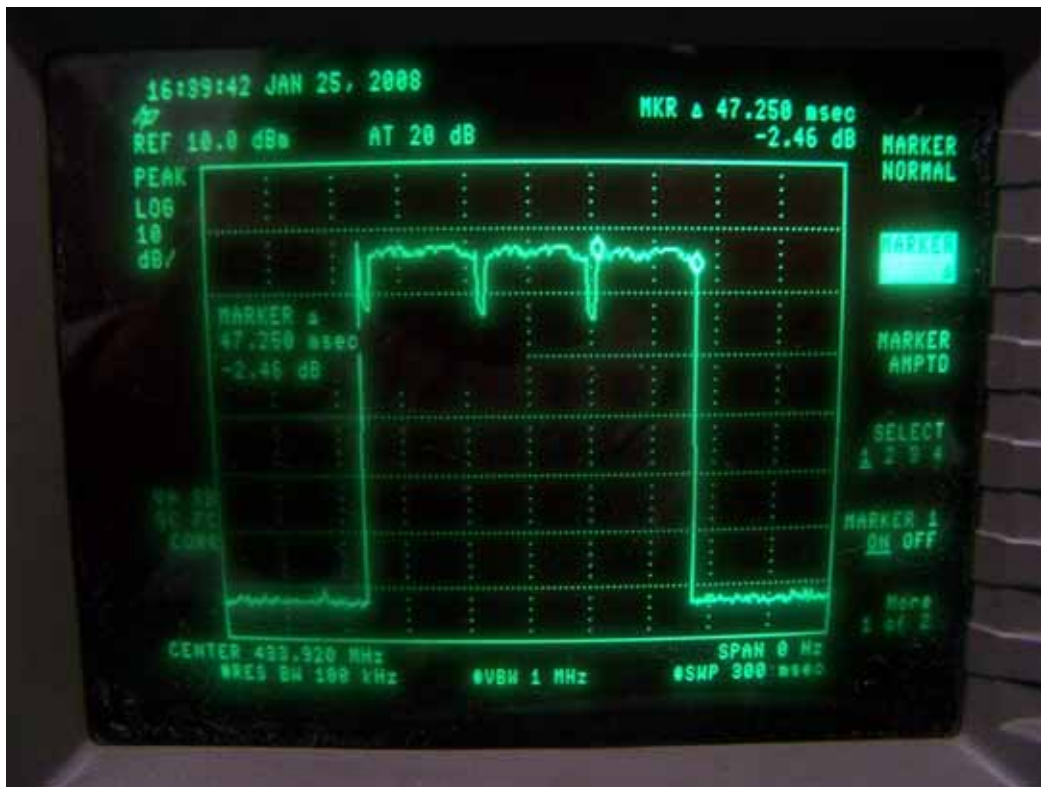
Transmitting time (ms)	Limit (Second)	Result
235	5	PASS

Duty cycle correction factor= $20 \cdot \log(47.25 \cdot 3 / 235) = -4.35\text{dB}$.

Refer to the attached Duty Cycle plot







8. Occupied Bandwidth

8.1 Measurement Procedure

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Set EUT as normal operation
3. Set SPA Center Frequency = fundamental frequency, RBW, VBW= 10KHz
4. Set SPA Max hold. Mark peak.

8.2 Test SET-UP (Block Diagram of Configuration)

Same as 6.2 Radiated Emission Measurement.

8.3 Measurement Equipment Used:

Same as 6.2 Radiated Emission Measurement.

8.4 Measurement Results:

The field strength of any emissions which appear outside of this band shall not exceed the general radiated emission limits in section 15.209.

Refer to attached data chart.

Band Width Test Data



APPENDIX 1

PHOTOGRAPHS OF SET UP

Radiated Emission Setup Photos

