



## **STC Test Report**

Date : 2010-04-28

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No. : MH184014

**Applicant (GRI001):**

Grandex International Development Limited  
Unit 2401, Million Fortune Industrial Centre, 34-36 Chai  
Wan Kok Street, Tsuen Wan, N.T., Hong Kong

**Manufacturer:**

Grandex International Development Limited  
Unit 2401, Million Fortune Industrial Centre, 34-36 Chai  
Wan Kok Street, Tsuen Wan, N.T., Hong Kong

**Description of Sample(s):**

Submitted samples(s) said to be  
Product: 1:20 RADIO CONTROL SINGLE  
SPORT RACER  
Brand Name: N/A  
Model Number: 62167  
FCC ID: VC96216727T

**Date Sample(s) Received:**

2010-04-20

**Date Tested:**

2010-4-21

**Investigation Requested:**

Perform ElectroMagnetic Interference measurement in  
accordance with FCC 47CFR [Codes of Federal Regulations]  
Part 15: 2009 and ANSI C63.4:2003 for FCC Certification.

**Conclusion(s):**

The submitted product COMPLIED with the requirements of  
Federal Communications Commission [FCC] Rules and  
Regulations Part 15. The tests were performed in accordance  
with the standards described above and on Section 2.2 in this  
Test Report.

**Remark(s):**

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Dr. LEE Kam Chuen  
Authorized Signatory  
ElectroMagnetic Compatibility Department  
For and on behalf of  
The Hong Kong Standards and Testing Centre Ltd.

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### **1.0 General Details**

#### **1.1 Test Laboratory**

The Hong Kong Standards and Testing Centre Ltd.  
EMC Laboratory  
10 Dai Wang Street, Taipo Industrial Estate  
New Territories, Hong Kong

Telephone: 852 2666 1888  
Fax: 852 2664 4353

#### **1.2 Applicant Details**

##### **Applicant**

Grandex International Development Limited  
Unit 2401, Million Fortune Industrial Centre, 34-36 Chai Wan Kok Street, Tsuen Wan, N.T.,  
Hong Kong

##### **Manufacturer**

Grandex International Development Limited  
Unit 2401, Million Fortune Industrial Centre, 34-36 Chai Wan Kok Street, Tsuen Wan, N.T.,  
Hong Kong

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### **1.3 Equipment Under Test [EUT] Description of Sample(s)**

Product: 1:20 RADIO CONTROL SINGLE SPORT RACER  
Manufacturer: Grandex International Development Limited  
Brand Name: N/A  
Model Number: 62167  
Rating: 9Vd.c("6F22" size battery x 1)

#### **1.3.1 Description of EUT Operation**

The Equipment Under Test (EUT) is a Grandex International Development Limited, 1:20 RADIO CONTROL SINGLE SPORT RACER. The EUT is a transmitter of radio control toy. The transmitter was operating with button, the EUT continues to transmit while one of the button is being pressed, It is pulse transmitter, Modulation by T1,C2,C3, and type is amplitude modulation.

### **1.4 Date of Order**

2010-04-20

### **1.5 Submitted Sample(s):**

1 Sample

### **1.6 Test Duration**

2010-04-21

### **1.7 Country of Origin**

China

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### **2.0 Technical Details**

#### **2.1 Investigations Requested**

Perform ElectroMagnetic Interference measurement in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15: 2009 and ANSI C63.4:2003 for FCC Certification.

#### **2.2 Test Standards and Results Summary Tables**

<b>EMISSION Results Summary</b>						
Test Condition	Test Requirement	Test Method	Class / Severity	Test Result		
				Pass	Failed	N/A
Field Strength of Fundamental Emissions & Spurious Emissions	FCC 47CFR 15.227	ANSI C63.4:2003	N/A	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Radiated Emissions	FCC 47CFR 15.209	ANSI C63.4:2003	N/A	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Note: N/A - Not Applicable

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### **3.0 Test Results**

#### **3.1 Emission**

##### **3.1.1 Radiated Emissions (30 – 1000MHz)**

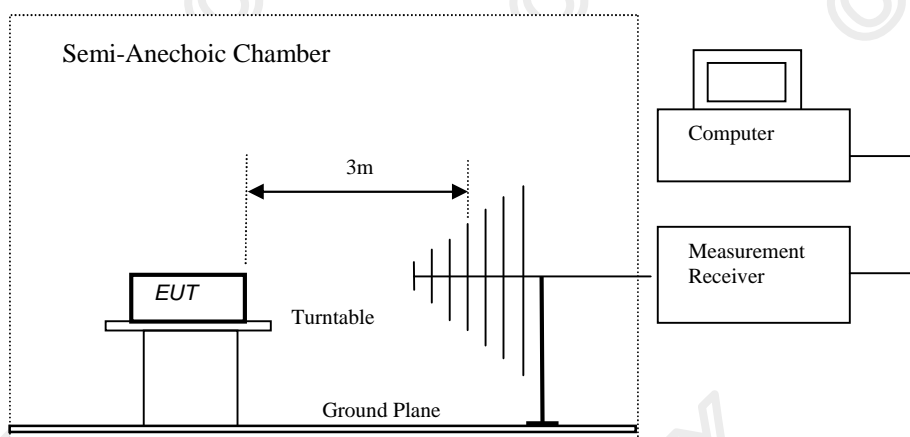
Test Requirement: FCC 47CFR 15.227  
Test Method: ANSI C63.4:2003  
Test Date: 2010-04-21  
Mode of Operation: Tx mode

#### **Test Method:**

The sample was placed 0.8m above the ground plane of semi-anechoic chamber\*. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages.

\*: Semi-anechoic chamber located on the STC (Dongguan) Company Ltd. 68 Fumin Nan Road, Dalang, Dongguan, Guangdong, PRC with a metal ground plane filed with the FCC pursuant to section 2.948 of the FCC rules, with Registration Number: 629686.

#### **Test Setup:**



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### **Limits for Field Strength of Fundamental Emissions [FCC 47CFR 15.227]:**

Frequency Range of Fundamental [MHz]	Field Strength of Fundamental Emission [Peak] [ $\mu\text{V/m}$ ]	Field Strength of Fundamental Emission [Average] [ $\mu\text{V/m}$ ]
26.96-27.28	100,000	10,000

**Results of Tx mode: PASS**

<b>Field Strength of Fundamental Emissions Peak Value</b>						
Frequency MHz	Measured Level @3m dB $\mu\text{V}$	Correction Factor dB/m	Field Strength dB $\mu\text{V/m}$	Field Strength $\mu\text{V/m}$	Limit @3m $\mu\text{V/m}$	E-Field Polarity
27.080	43.60	18.6	62.2	1,288.2	100,000	Vertical

<b>Field Strength of Fundamental Emissions Average Value</b>							
Frequency MHz	Measured Level @3m dB $\mu\text{V}$	Adjusted by Duty Cycle dB	Correction Factor dB/m	Field Strength dB $\mu\text{V/m}$	Field Strength $\mu\text{V/m}$	Limit @3m $\mu\text{V/m}$	E-Field Polarity
27.080	36.0	-7.6	18.6	54.6	537.0	10,000	Vertical

According to FCC 47CFR15.35, the limit on the radio frequency emissions as measured using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit for the frequency being investigated unless a different peak emission limit is otherwise specified in the rules.

Remarks:

Correction Factor includes Antenna Factor and Cable Attenuation.

Calculated measurement uncertainty: 30MHz to 1GHz 5.1dB

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### Limits for Radiated Emissions [FCC 47 CFR 15.209]:

Frequency Range [MHz]	Quasi-Peak Limits [ $\mu\text{V/m}$ ]
30-88	100
88-216	150
216-960	200
Above 960	500

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

### Results of Tx mode: PASS

Radiated Emissions						
Quasi-Peak						
Frequency MHz	Measured Level @ 3m dB $\mu\text{V}$	Correction Factor dB/m	Field Strength dB $\mu\text{V/m}$	Field Strength $\mu\text{V/m}$	Limit @ 3m $\mu\text{V/m}$	E-Field Polarity
54.16	28.1	9.3	37.4	74.1	100	Vertical
81.20	6.1	6.9	13.0	4.5	100	Vertical
108.30	4.7	8.5	13.2	4.6	150	Vertical
135.40	7.3	7.7	15.0	5.6	150	Vertical
162.50	7.7	9.8	17.5	7.5	150	Vertical
189.60	4.9	10.2	15.1	5.7	150	Vertical
216.60	4.6	11.1	15.7	6.1	200	Vertical
433.30	23.9	18.5	42.4	131.8	200	Vertical
460.40	24.8	18.7	43.5	149.6	200	Vertical
487.50	22.4	20.7	43.1	142.9	200	Vertical

#### Remarks:

No further spurious emissions found between lowest internal frequency and 30MHz.

Correction Factor includes Antenna Factor and Cable Attenuation.

Calculated measurement uncertainty : 30MHz to 1GHz 5.1dB

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### **3.2 20dB Bandwidth of Fundamental Emission**

Test Requirement: FCC 47 CFR 15.227  
Test Method: ANSI C63.4:2003 (Section 13.1.7)  
Test Date: 2010-04-21  
Mode of Operation: Tx mode

#### **Test Method:**

The bandwidth is measured at an amplitude level reduced from the reference level by a specified ratio. The reference level is the level of the highest amplitude signal observed from the transmitter at the fundamental frequency. Once the reference level is established, the equipment is conditioned with typical modulating signal to produce the worst-case (i.e. the widest) bandwidth.

#### **Test Setup:**

As Test Setup of clause 3.1.1 in this test report.

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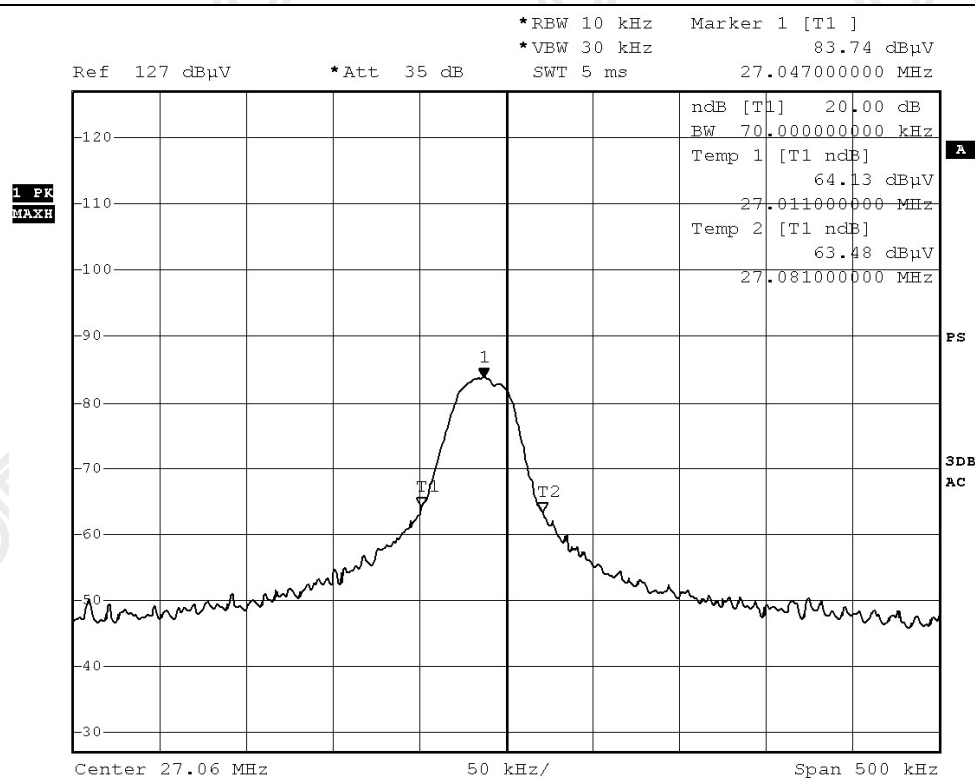
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### Limits for 20dB Bandwidth of Fundamental Emission:

Frequency Range [MHz]	20dB Bandwidth [kHz]	FCC Limits [MHz]
27.04	70.00	within 26.96-27.28

### 20dB Bandwidth of Fundamental Emission



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### **Appendix A**

#### **List of Measurement Equipment**

##### **Radiated Emission**

<b>EQP NO.</b>	<b>DESCRIPTION</b>	<b>MANUFACTURER</b>	<b>MODEL NO.</b>	<b>SERIAL NO.</b>	<b>LAST CAL</b>	<b>DUE CAL</b>
EM215	MULTIDEVICE CONTROLLER	EMCO	2090	00024676	N/A	N/A
EM216	MINI MAST SYSTEM	EMCO	2075	00026842	N/A	N/A
EM217	ELECTRIC POWERED TURNTABLE	EMCO	2088	00029144	N/A	N/A
EM218	ANECHOIC CHAMBER	ETS-Linggren	FACT-3	--	2008/12/01	2011/12/01
EM083	STCOATS	--	--	--	2008/12/08	2011/12/08
EM174	BICONILOG ANTENNA	EMCO	3142B	1671	2010/01/24	2012/01/24
EM229	EMI Test Receiver	R&S	ESIB40	100248	2009/09/27	2010/09/27
EM022	LOOP ANTENNA	EMCO	6502	1189-2424	2009/07/26	2011/07/26

#### **Remarks:-**

CM Corrective Maintenance

N/A Not Applicable

TBD To Be Determined

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### Appendix B

#### Duty Cycle Correction During 100msec

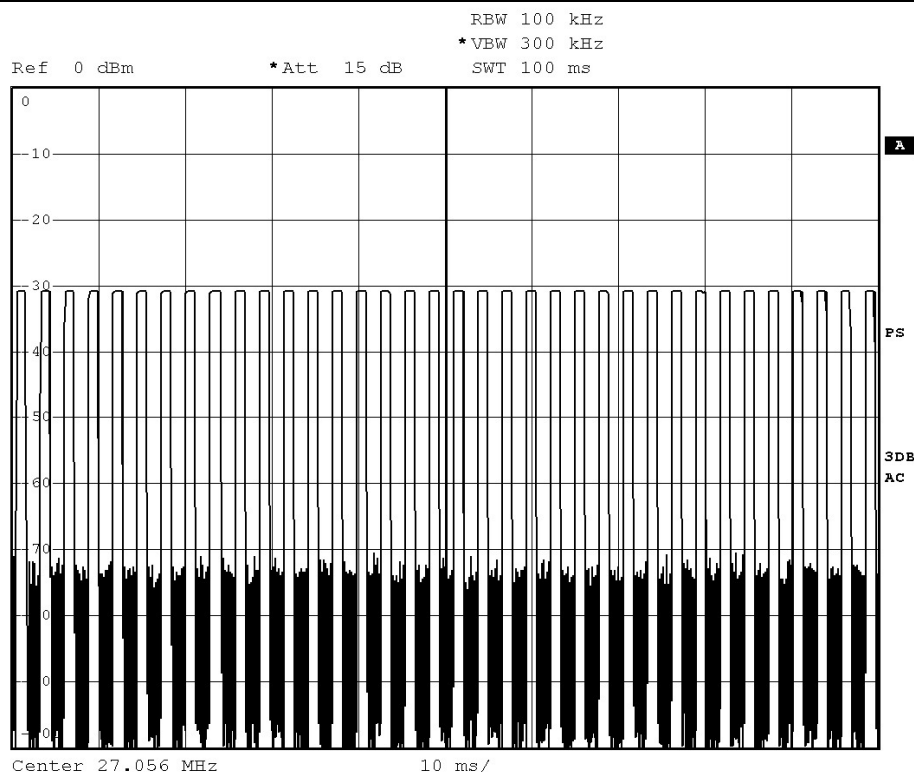
Each function key sends a different series of characters, but each packet period (100msec) never exceeds a series of 36 long pulses (1.16msec). Assuming any combination of short and long pulses may be obtained due to encoding the worst case transmit duty cycle would be considered (36x1.16msec) per 100msec=-7.6dB duty cycle. Figure A through B show the characteristics of the pulse train for one of these functions.

Remarks:

Duty Cycle Correction = -7.6dB

The following figures [Figure A to Figure B] show the characteristics of the pulse train for one of these functions.

**Figure A [Pulse Train]**



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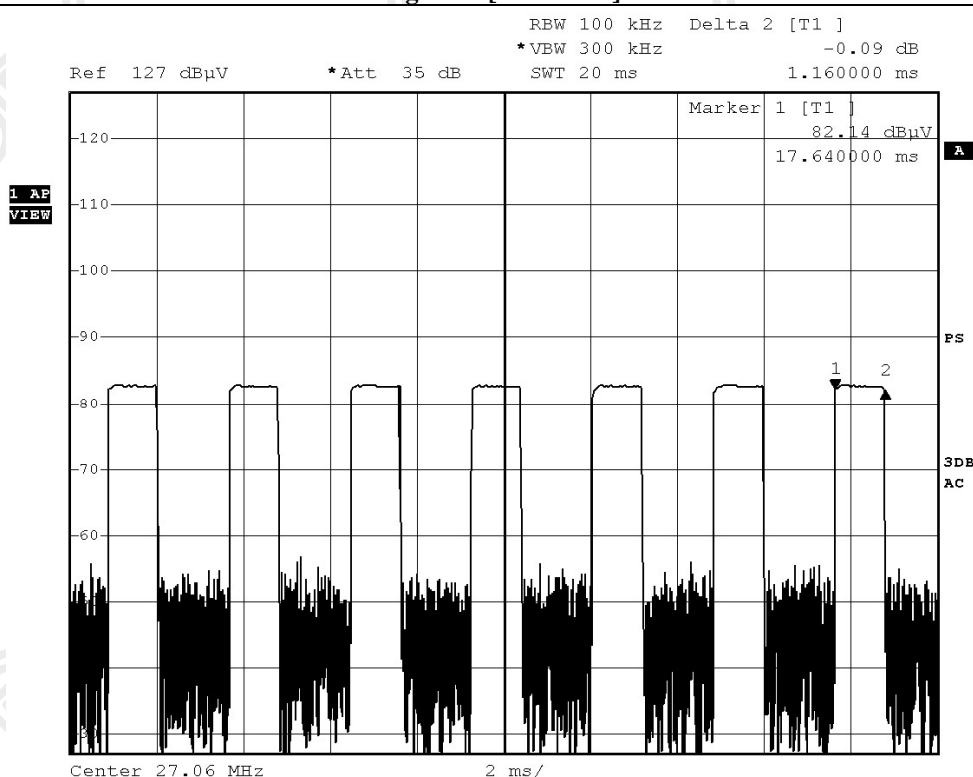
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**Figure B [Sole Pulse]**



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### **Appendix C**

#### **Photographs of EUT**

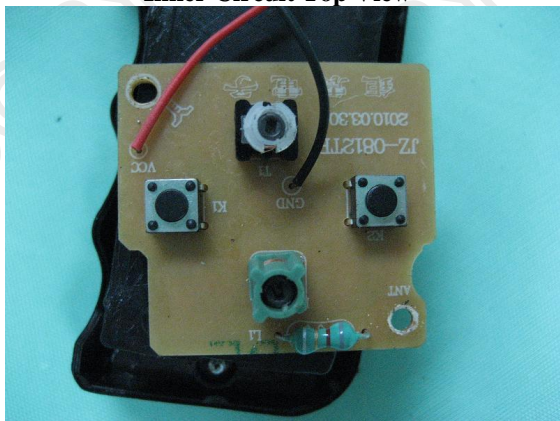
**Front View of the product**



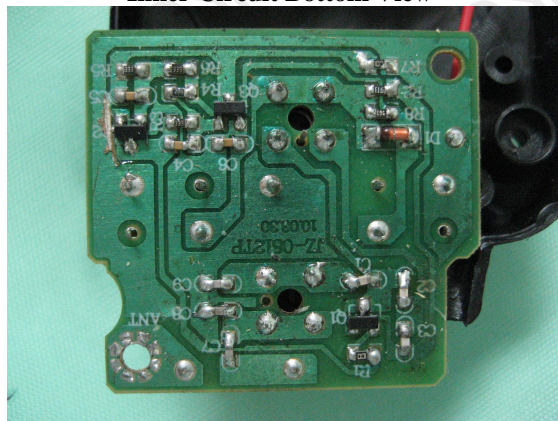
**Rear View of the product**



**Inner Circuit Top View**



**Inner Circuit Bottom View**



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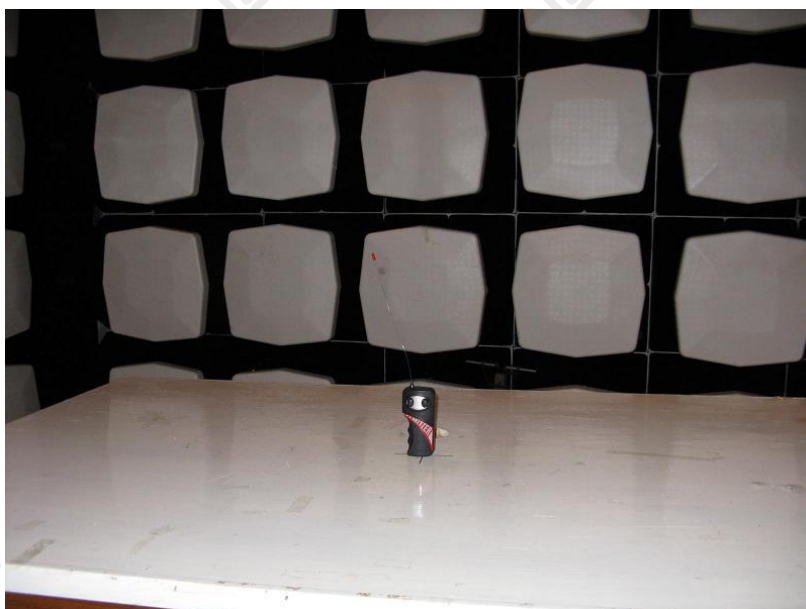
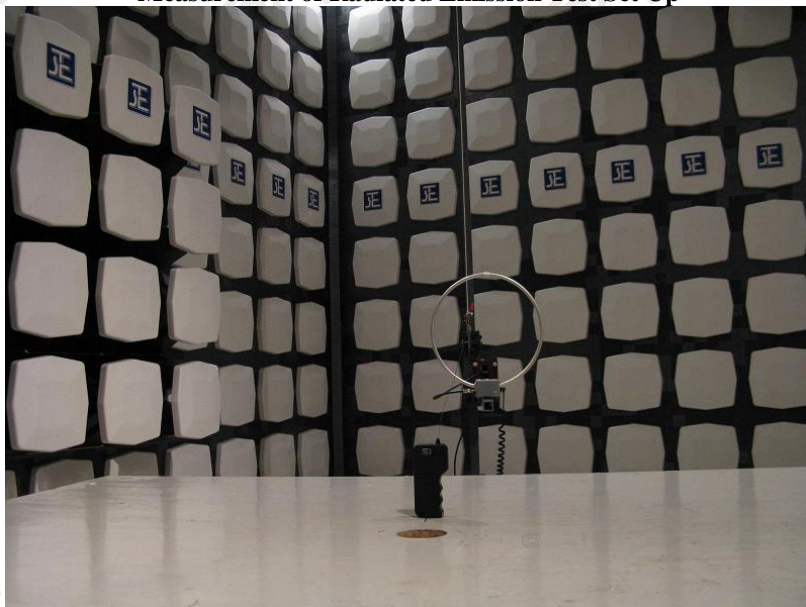
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### **Photographs of EUT**

**Measurement of Radiated Emission Test Set Up**



**\*\*\*\*\* End of Test Report \*\*\*\*\***

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